52N07SE0019 010

REPORT

ON

THE 1987 GROUND GEOPHYSICAL SURVEYS

SHABUMENI LAKE PROPERTY

ONTARIO

FOR

MARILYN RESOURCES LIMITED

May, 1987
Toronto, Ontario

S.J. Bate, M.Sc.
MPH CONSULTING LIMITED

SUMMARY

During February of 1987 MPH Consulting Limited conducted a limited ground geophysical program on behalf of Marilyn Resources Limited on the latter's Shabumeni Lake Property in northwestern Ontario.

The objective of the program was to locate and document the geophysical signatures of known mineralization, trace these signatures and derive structural and lithologic information if possible. To meet these objectives the geophysical program undertaken consisted of total field magnetic, VLF-EM and Induced Polarization and apparent resistivity surveying.

The property is underlain by Archean intermediate-to-mafic volcanics intruded locally by mafic diorites and gabbros, and felsic quartz- monzonite units. Previous exploration has identified seven auriferous zones, labelled Zones 1 to 7, on the property, six of which are within the current survey area. The better gold values appear to be associated with sulphide-bearing quartz veins (Marilyn Resources, 1987).

The total field magnetic survey defined magnetic units of varying dimensions trending northeast conformably with the geology. These features, primarily in the southern and western sectors of the survey area, were generally interpreted to reflect gabbroic intrusives. Structural features trending north-south and northwest were interpreted from the magnetic contours.

The VLF-EM survey defined conductive features which exhibit a high degree of correlation with topographical features. Two conductors with strike extent in excess of 200 ft are interpreted to reflect an intermediate-to-mafic volcanic/intrusive gabbro contact and a major fault zone, respectively. Neither these features nor any other interpreted VLF conductor correlates with any known mineralized zone.

From interpretation of the IP resistivity survey moderate-to-high resistivities are generally observed semi-coincident with the known mineralized zones. The apparent resistivity survey proved only marginally useful in mapping geology given the obvious topographic responses evident in the dataset.

The induced polarization survey delineated 8 weak-to-moderate short strike length variable amplitude chargeability features interpreted with varying degrees of confidence. These features are characterized by low chargeability amplitudes which range from 1.5 to 4 times background. The IP anomalies are interpreted to reflect variable increases in polarizable material possibly reflecting sulphide mineralization in both the intermediate-to-mafic volcanics and gabbroic intrusives.

Polarizable responses are interpreted coincident or semicoincident with mineralized zones 1, 2, 6 and 7. Zone 3 was not surveyed and no response was recorded over Zones 4 and 5. Zone 6 is coincident with the northern extent, and Zone 7 with the southern extent of Anomaly E. Although this continuity of Anomaly E is somewhat suspect, the responses are interpreted to indicate that Zones 6 and 7 are components of a single mineralized horizon. Accordingly the Induced Polarization technique appears to be an effective exploration technique in this area.

Recommendations for further work based on the results and conclusions to date include:

1. Trenching, if possible, of the IP anomalies unrelated to known mineralized quartz veins.

2. If drilling is to be undertaken on the property, IP anomalies A, E and D and any polarizable features deemed to be of interest from the trenching program should be tested.

3. Detailed IP surveys using a pole-dipole array and dipole spacing "a" of 25 ft should be considered to more confidently define and trace the strike extent of individual mineralized horizons; particularly those reflecting mineralized Zones 1, 4 and 5 and chargeability Anomaly E.

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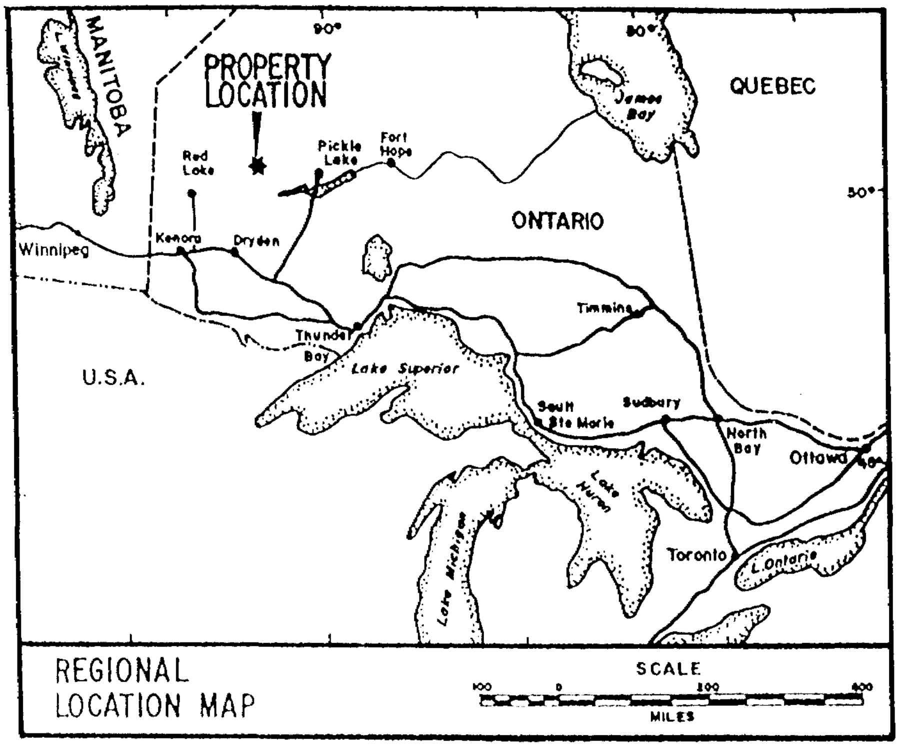
1.0 INTRODUCTION

During February of 1987 MPH Consulting Limited undertook a ground geophysical program on behalf of Marilyn Resources Limited on the latter's Shabumeni Lake Property in northwestern Ontario. The objective of the program was to locate and trace the extent, if possible, of known sulphide bearing quartz veins which are believed to be related to gold mineralization and, if possible, to assist the mapping of lithology in areas of poor exposure. To meet this objective the geophysical program undertaken consisted of total field magnetics, VLF-EM and induced polarization and apparent resistivity surveying.

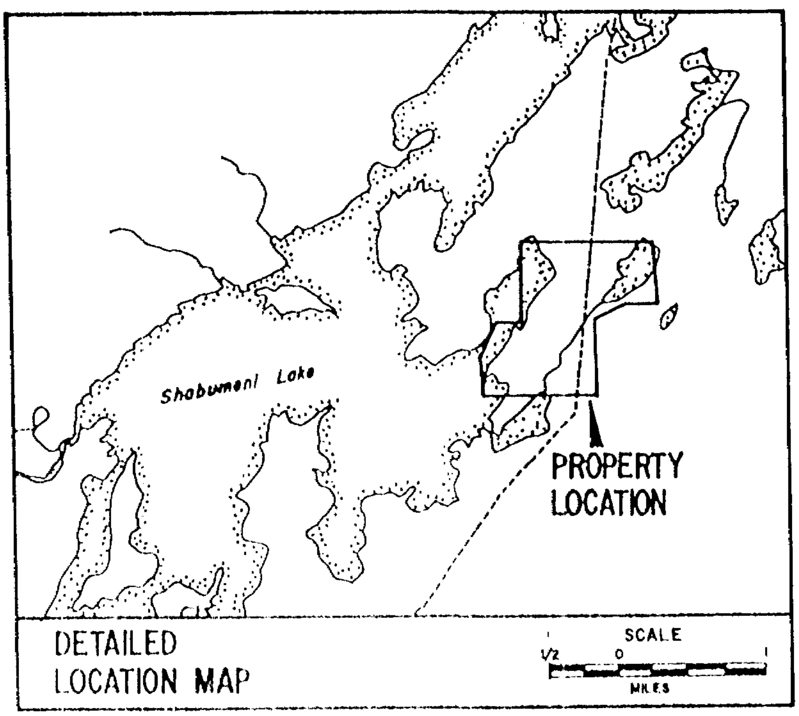
2.0 LOCATION AND ACCESS

The Shabumeni property is located in northwestern Ontario approximately 60 miles east-northeast of Red Lake and 20 miles north of the South Bay mine. The property consists of 14 claims which abut the eastern shore of Shabumeni Lake, approximately 4 miles to the west of Birch Lake (Figure 1).

The property is accessed by float (ski) plane from Red Lake. The winter road which connects Birch Lake and the South Bay mine road passes 1½ miles east of the property and could be used for winter access to the property.



REGIONAL LOCATION MAP



DETAILED LOCATION MAP

MARILYN RESOURCES LTD.

SHABUMENI LAKE PROJECT

LOCATION MAP

Project No. C-970	By: M.Kratochvill, D. Hall
Scale:	Drawn: MPH
Drawing No: Figure 1	Date: February, 1987

MPH Consulting Limited

3.0 GEOLOGY AND MINERALIZATION

The property is underlain by Archean supracrustal rocks with an apparent northeast trend. Intermediate-to-mafic volcanics predominate on the property. Both pillowed and massive flows and pyroclastics have been mapped. The volcanics are locally intruded by mafic diorites and gabbros, and felsic quartz-monzonite units. Structural features on the property are inferred to trend northeast (Marilyn Resources, 1987).

Previous programs of VLF-EM surveying, geological mapping, stripping and channel sampling have identified seven auriferous zones on the property, six of which are within the vicinity of the current survey area. Gold mineralization reportedly occurs within quartz-carbonate veins with varying amounts of pyrite and minor chalcopyrite content. The veins occur within all rock units and range in width from 3 cm to 1 m. Sulphide content is extremely variable ranging from less than 1% to sporadic concentrations of up to 30% pyrite (Marilyn Resources, 1987).

4.0 SURVEY PARAMETERS

4.1 Linecutting

The linecutting on the Shabumeni Lake property was carried out under contract to Marilyn Resources Ltd. An imperial grid was established with the baseline, oriented northeast-southwest, located in the eastern portion of the claim group. For the current survey program, the limits of the baseline are 18+00S and 10+00N. Crosslines were established at 200 ft intervals on lines 0+00 to 18+00S. The lines were extended west of the baseline to the shore of Shabumeni Lake and eastwards for distances varying from 2+00E to 7+00E. Crosslines were also established at 9+00N and 10+00N and extended westwards to 10+00W.

4.2 Magnetic Survey

Total field magnetic surveying on the Shabumeni Lake property was conducted on lines 18+00S to 0+00 and also on lines 9+00N and 10+00N. Approximately 3.73 miles of data was gathered at 50 ft station intervals on these lines.

An EDA PPM 350 total field magnetometer was utilized with an EDA PPM 400 base station magnetometer to record total field amplitudes and correct for diurnal variations. Equipment specifications are presented in Appendix I.

4.3 VLF-EM Survey

The VLF-EM survey was conducted over the same lines as the total field magnetic survey. Approximately 3.73 miles of tilt angle inphase and quadrature data was gathered at 50 foot intervals. Seattle, Washington with a frequency of 24.8 kHz was used as the transmitting source for the surveying. The instrument used was a Geonics EM-16 and its specifications are presented in Appendix I.

4.4 Induced Polarization Survey

Initially lines 2+00S to 6+00S were surveyed utilizing a dipole-dipole array with a dipole (a) spacing of 100 feet and dipole separations of "n" = 1 to 4. High resistivities were observed in the outcrop areas and an apparently thick conductive cover was noted in the swamp areas. Definition of the mineralized zones was poor. Therefore, in order to improve anomaly resolution while maintaining the effective depth of investigation and the required productivity and property coverage, the survey parameters were changed to a pole-dipole array utilizing a dipole "a" spacing of 50 feet and dipole separations of "n" = 1 to 4. The remaining lines and a portion of line 6+00S were surveyed with this array.

Approximately 3.78 miles of data was acquired in total.

The time-domain induced polarization system employed was a 2.5 kw Huntec MK IV. The specifications for the IP instrumentation are presented in Appendix I.

5.0 DATA PRESENTATION

The data for this project is presented as a series of maps at a scale of 1":100' and pseudosections at scales of 1":50' and 1":100'.

The total field magnetic data is presented as magnetic contours superimposed on a map of corrected magnetic values recorded at each station. Contour intervals are chosen to suitably highlight the magnetic texture of the survey area (Map 1).

A structural interpretation of the magnetic data based upon the truncations and deviations of the magnetic contours is presented in Map 1.

The VLF-EM survey data is presented in profile format. The field readings are plotted at a vertical scale of 1":20% for both the dip angle in-phase and quadrature responses (Map 2). In terms of the measurement and plotting, conventions employed proper positive-to-negative crossovers from west to east.

The VLF-EM anomalies, as discussed in Section 6.2, are identified on Map 2.

The results of the Induced Polarization and apparent resistivity surveys are presented in pseudosection format at a scale of 1":100' for the dipole-dipole data (lines 2+00S to 6+00S: Pseudosections P-4, P-5 and P-6) and 1":50' for the pole-dipole data (the remaining lines and a section of line 6+00S: Pseudosections P-1 to P-3, P6a and P-7 to P-12).

In order to assist the interpretation of the apparent resistivity data, an approximated topographic profile is superimposed on the pseudosections.

The interpreted apparent resistivity and total chargeability features are superimposed on the pseudosections.

6.0 INTERPRETATION

6.1 Total Field Magnetic Survey

The contoured total field magnetic data defined northeast-southwest magnetic trends conformable with the regional geology.

The low amplitude, generally bland background magnetic expression is interpreted to reflect predominantly intermediate-to-mafic volcanics. There is insufficient contrast in the magnetic expression of the various volcanic units for identification of individual lithologies.

A number of broad magnetic responses are noted in the southern and western sectors of the survey grid. These features are in excess of 200 feet wide, range in amplitude from several hundred to 3000 nTs above background and extend over two or more lines. These magnetic features are interpreted to reflect mafic intrusives, such as gabbros, with varying degrees of magnetite content. The current geological knowledge of the property confirms this interpretation in part.

Analysis of the truncation and deviation of the magnetic contours has provided interpretation of structural features trending north-south and northwest-southeast.

6.2 VLF-EM Survey

The VLF-EM data defined conductive trends generally conformable with those derived from the magnetic data and regional geology. The anomalous responses are generally moderate-to-weak in amplitude and display strike lengths varying from 200 to 1,200 ft.

Data from several of the lines display noise which is unavoidably due to cultural effects related to the induced polarization surveying which was being carried out at the same time.

Many of the weak short strike length conductive features display a high degree of correlation with topographic features such as swamps and cliff edges. Three interpreted anomalies of strike extent greater than 300 ft, two of which are interpreted to reflect bedrock features, are labelled V1 to V3 on Map 2 and discussed below.

Anomaly V1, located in the southeastern portion of the survey area, extends from line 8+00S, 4+25E to 14+00S, 4+00E. This feature may extend to line 18+00S where a partially surveyed response indicates a conductor of similar response character at 3+00E. In this event the anomaly is open to the north and south where the survey lines were not extended far enough east to cover this feature.

The anomaly is coincident with the Alain Swamp, a topographic feature of average width 400 ft, which trends northeast across the property. The possible extension of Anomaly V1 to line 18+00 is situated on high ground with outcrop recorded in the area.

The response character and width of Anomaly V1 leads to the interpretation of a narrow, conductive bedrock feature such as a fault/ shear zone. No direct support for this interpretation can be derived from the magnetic data due to the limited coverage in this sector of the property. However, Anomaly V1 correlates with weakly anomalous magnetic amplitudes with a sympathetic trend.

Anomaly V2, located in the central portion of the survey area, extends from 0+00, 5+00W to 12+00S, 8+75W where it is truncated by a north-south trending fault as interpreted from the magnetics. A possible extension of Anomaly V2 trends south-southwest from 10+00W on line 14+00S to line 18+00S with a similar response character and amplitudes. Anomaly V2 correlates with low swampy ground and probably reflects conductive overburden.

Anomaly V3 is a short strike length, weak VLF-EM anomaly located in the southwestern portion of the survey area. This feature, which trends northeast, extends from line 8+00S, 9+75W to 12+00S, 11+00W and is located in an area of high ground.

The response profiles indicate a near surface extremely weak conductive source. Anomaly V3 lies on the eastern flank of a strong magnetic feature interpreted to reflect a gabbroic intrusive. Thus, Anomaly V3 may, in part, be reflecting the contact between a gabbroic intrusive to the west and intermediate-to-mafic volcanics to the east.

6.3 Induced Polarization and Resistivity Survey

6.3.1 Resistivity

Apparent resistivity amplitudes recorded range from 100 to in excess of 30,000 ohm-m. Invariably the low resistivity areas of less than 500 ohm-m are coincident with low swampy ground.

Correlation of the resistivity data with the limited geologic information was undertaken to determine whether an empirical resistivity model could be documented to help map areas of poor exposure. However, topographic effects, apparent throughout the datasets, severely encumbered this analysis. They are most pronounced along the ridge which abuts the western edge of the mid swamp area between lines 6+00S and 14+00S. Geometric effects related to topography generally produce resistivity highs flanked by lows along ridges and lows bounded by highs coincident with valleys.

Those areas believed to be underlain by intermediate-to-mafic volcanics display resistivities ranging from 5,000 to 15,000 ohm-m. There is insufficient geologic information and definition in the resistivity data to provide a reliable subdivision of the lithologic units.

A large variation in resistivities, from 3,000 ohm-m to in excess of 20,000 ohm, is noted where gabbroic intrusives are inferred. Given the limited geologic information and the degree of contamination from topographic responses, it is impossible to attempt any meaningful interpretation.

Inspection of the resistivity data in the areas of known mineralization indicates most of the anomalous zones occur within areas displaying resistivities in excess of 15,000 ohm-m.

The notable exception is the main zone (Zone 1) which displays a discrete resistivity low of less than 400 ohm-m. Trenching along this zone indicates concentrations of up to 30% sulphides. Thus, the low resistivity feature may be reflecting local in-situ conductivity related to the sulphides and/or alteration possibly related to a structural feature. However, the absence of a corresponding VLF-EM conductor indicates the sulphides are not electrically continuous.

6.3.2 Induced Polarization Survey

The induced polarization data defined a number of weakly polarizable horizons with various trends. The background total chargeability amplitudes are consistently low, being less than 5 msec. Amplitudes within anomalous responses range from 5 to 21 msec. Although a broad range of apparent resistivities are recorded, there do not appear to be continuously sympathetic responses in the chargeability sections. The uniformly low chargeabilities are interpreted to indicate a generally low polarizable material content throughout the underlying lithologies.

Within the survey area eight short strike length anomalies, labelled A to H, are interpreted and described in detail below. Most of the horizons trend obliquely to magnetic strike and display chargeabilities of less than 10 msec and a strike length of less than 400 feet.

Anomaly A extends from line 0+00, 7+00W to 4+00S, 5+80W where it is truncated by a northwest trending fault interpreted from the magnetics. Chargeability amplitudes range from 8 to 20 msec. The horizon is open to the north and appears to be plunging to the south. The anomaly is semicoincident with, and on the northern flank of, a broad magnetic feature in an area where mafic volcanics have been mapped. No outcrops are indicated in the vicinity, however, of the magnetic feature which is inferred to reflect a gabbroic intrusive.

From the geological compilation map supplied (Marilyn Resources, 1987), it would appear that mineralized Zone 5 is located approximately 150 ft. west of Anomaly A. Zone 5 therefore does not have a recorded chargeability response associated with it, but a discrete low resistivity feature at 8+12W may be reflecting the zone. If Zone 5 is a very narrow feature with minimal sulphides associated with it, it would be necessary to use smaller array parameters to delineate a recognizable response.

Anomaly A, however, is considered a priority target given its fair response character along strike. Anomaly A is interpreted to reflect a narrow horizon of weak sulphide mineralization which may be structurally related to a gabbroic unit.

Anomaly B is a weak 7-10 msec feature extending from approximately line 8+00S, 9+60W to 12+00S, 11+00W. A possible extension of the horizon to line 6+00S is interpreted at 8+50W. Anomaly B is semicoincident with VLF-EM Anomaly V3 and the interpreted contact of a gabbroic intrusive to the west and intermediate-to-mafic volcanics to the east.

Anomaly B is interpreted to be reflecting a marginal increase in polarizable mineral content in the vicinity of gabbroic/volcanic contact.

Anomaly C, situated to the southwest of Anomaly B within a gabbroic intrusive, extends from line 12+00S, 13+30W to 16+00S, 11+70W. Total chargeability amplitudes are variable, ranging from 4 to 15 msecs.

On lines 14+00S and 16+00S, where Anomaly C is best defined, the polarizable horizon is on the southern flank of a magnetic feature of similar strike extent within the gabbroic intrusive. The anomaly is also semi-coincident with zone 2 on these lines (Marilyn Resources, 1987).

Anomaly C is interpreted to be reflecting variable concentrations of sulphide minerals, possibly associated with quartz veining, within a gabbroic body.

Anomaly D extends from line 2+00S, 2+30W to 0+00, 1+00W where it is open to the north. On line 0+00 the anomalous response is broad, of weak amplitude and the causal source is at depth. On line 2+00S, however, the response is narrow, near surface and of amplitudes up to 21 msecs. No correlating VLF-EM or magnetic features are noted.

Anomaly D is interpreted to reflect variable volumes of polarizable mineral content possibly associated with shearing and/or quartz veining in the intermediate-to-mafic volcanics.

Anomaly E extends from 14+00S, 1+10W to line 8+00S, 2+00W and may be open to the north as the probable continuation of the anomaly on line 6+00S is only partially surveyed. A dipole-dipole array with a dipole spacing of 100 ft was used with coverage limited by the eastern extent of the line.

The anomaly is best defined on line 8+00S where a narrow, near-surface feature is interpreted with recorded chargeability amplitudes of up to 18 msecs. Elsewhere, Anomaly E is of weak-to-moderate strength. Anomaly E appears to subdivide on lines 10+00S and 12+00S where Anomaly E1 is interpreted at 3+00W.

The geology map supplied indicates that the northern extent of Anomaly E is semi-coincident with mineralized zone 6 and the southern extent with zone 7 (Marilyn Resources, 1987). Thus, Anomaly E is probably reflecting sulphide mineralization associated with zones 6 and 7. The continuity of Anomaly E, although somewhat suspect, is interpreted to indicate that mineralized zones 6 and 7 are related.

Anomalies E and E1 are interpreted to reflect variable concentrations of polarizable material (sulphides) predominantly within intermediate-to-mafic volcanics.

Anomaly F is a weak, poorly defined chargeability feature with amplitudes ranging from 6 to 10 msec. The anomaly extends from line 14+00S, 5+00W to 18+00S, 3+85W where it is open to the south.

No magnetic or VLF-EM correlation is noted to support the interpretation. However, the polarizable horizon is semi-coincident with a contact, indicated on the geological map, between intermediate-to-mafic volcanics to the east and a narrow intrusive (possibly gabbroic) to the west (Marilyn Resources, 1987).

Anomaly F is therefore interpreted to be reflecting minor sulphide mineralization possibly associated with a geological contact.

Anomaly G is located 200 ft west of Anomaly F on lines 16+00S and 18+00S and is open to the south. Total chargeability amplitudes range from 6 to 9 msec. The resistivities associated with this feature range from 3,000 to 6,000 ohm-m which are low relative to the other polarizably anomalous areas. No coincident magnetic or VLF-EM responses are noted.

Anomaly G is interpreted to be reflecting weak concentrations of polarizable material within intermediate-to-mafic volcanics.

Anomaly H is a weak, poorly resolved chargeability feature extending from 8+00S, 1+85E to 12+00S, 2+20E. The anomaly is open both to the north and south. The total chargeability amplitudes are low, ranging from 6 to 8 msecs, and exhibit a degree of correlation with corresponding apparent resistivity amplitudes leading to a tentative interpretation of Anomaly H only. No correlating magnetic or VLF-EM responses are noted.

If indeed reflecting a discrete polarizable feature, Anomaly H is inferred to reflect a local concentration of sulphide mineralization in intermediate-to-mafic volcanics.

On lines 9+00N and 10+00N several discrete zones of weak-to-moderate chargeability are defined. Due to the limited coverage, the strike of these features cannot be reliably interpreted. Of particular note is the 9 msec chargeability anomaly on line 9+00N coincident with zone 1 at 4+75W. The absence of a corresponding response on line 10+00N, where zone 1 is known to extend, suggests the sulphide concentrations are extremely variable along strike. This fact, together with the narrow widths (3 cm to 1 m) of mineralization encountered to date on the property, suggest that possibly a smaller dipole spacing of 25 ft would be necessary to fully resolve and trace its extent with any confidence.

A number of other poorly defined or short strike length features are interpreted with varying degrees of confidence within the survey area. These features invariably define narrow zones of elevated chargeabilities which are inferred to reflect localized and variable concentrations of polarizable material.

7.0 CONCLUSIONS

The objective of the ground geophysical surveys as outlined in Section 1.0 was met in part, as described below. Conclusions pertinent to the further exploration of the property, drawn from the interpretation of the datasets, are also presented.

The total field magnetic data defined a number of broad magnetic features, in the southern and western portions of the survey area, interpreted to reflect gabbroic intrusives which have been partially mapped. No differentiation could be made between the host intermediate-to-mafic volcanics. Analysis of the truncation and deviation of the magnetic contours led to the interpretation of north and northwest trending structural features.

The VLF-EM data defined predominantly northeast trending conductive features of limited strike extent and a high degree of correlation with topographic features. Two conductors of strike length greater than 200 ft are interpreted to reflect bedrock features. Anomaly V1 may reflect a fault/shear zone within the Alain swamp. Anomaly V3 is interpreted to reflect a contact between a gabbroic intrusive to the west and intermediate-to-mafic volcanics to the east. None of the VLF conductors correlate with a known mineralized zone.

The apparent resistivity data was affected by responses due to topographic features and penetration was limited in areas of thick conductive cover. Analysis of the resistivity data indicates that the known mineralized zones tend to occur in areas where the resistivities are generally greater than 15,000 ohm-m. It was not possible to reliably identify a resistivity signature of individual lithologic units.

The Induced Polarization survey defined low background chargeabilities interpreted to reflect a low polarizable mineral content within the underlying lithologies. Eight discrete zones of strike extent over two lines or more and weak-to-moderate chargeabilities, ranging from 1.5 to 5 times background, are interpreted to reflect variable increases in concentrations of polarizable minerals. The trends of the polarizable horizons are approximately northeast.

The majority of the known mineralized zones which were surveyed appear to have been defined by the induced polarization technique. The correlation of the IP anomalies which are coincident or semi-coincident with the known mineralized zones are summarized below:

Zone 1: Single line anomaly on line 9+00N
Zone 2: Anomaly C
Zone 3: Not surveyed
Zone 4: No distinct response recorded
Zone 5: No distinct response recorded: possible low resistivty response
Zone 6: Anomaly E
Zone 7: Anomaly E

The character of the remaining IP responses is similar to those associated with the known mineralized zones and are thus considered prospective exploration targets. In particular, Anomaly D is considered a priority targets.

Gold mineralization outlined on the property to date is generally associated with sulphide mineralization. However, the widths of the zones, being between 3 cm and 1 m, are narrow with respect to the dipole spacing of 50 ft used in the current survey program. Given the narrow widths and variable sulphide content of the zones, detailed surveying with a dipole spacing of 25 ft is recommended over zones of interest in an attempt to trace the horizons along strike and verify the interpretation of such features as Anomaly E.

Investigation of the fault/shear zone at 3+75E is recommended on lines 16+00S southwards where higher ground should allow adequate penetration and resolution of any anomalous polarizable features.

8.0 RECOMMENDATIONS

On the basis of the preceding conclusions and the prior detailed discussion of the geophysical results it is recommended that further exploration of the Shabumeni Lake property be carried out as follows:

1. All existing geological information should be carefully integrated with the geophysical results.

2. If drilling is to be undertaken then consideration should be given to drill testing anomalies A and E to ascertain the continuity of mineralization along strike.

3. Trenching, if possible, of the IP anomalies unrelated to known mineralized quartz veins should be undertaken.

4. Drilling of anomaly D on line 2+00S and any other anomalies currently unexplained geologically should be considered, particularly if trenching results are encouraging.

5. Induced polarization surveying using a pole-dipole array with an "a" spacing of 25 ft may be required to fully detail anomalous responses and the strike extent of anomalous horizons given the small geometrical parameters reported for the mineralized zones. In particular, the main zone (zone 1) and zone 4 (not recorded by the current survey) warrant further investigation with these survey parameters.

Respectfully submitted,

Q.6451

Simon J. Bate

Toronto, Ontario
May, 1987

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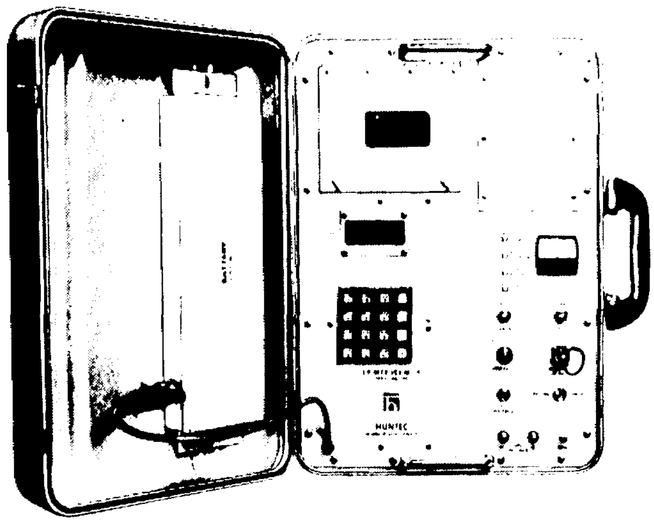
REFERENCES

Marilyn Resources, 1987. A geological map and previous assessment report on the Shabumeni Lake Property supplied by Jack Green.

APPENDIX II

Instrument Specifications

M-4 Induced Polarization Receiver



DESCRIPTION

The Huntec M-4 is a microprocessor based receiver for time and frequency domain IP and complex resistivity measurement. It is

Easy to operate. One switch starts a measurement, of up to 29 quantities simultaneously. The optional Cassette DataLogger records them all in seconds. Calibration, gain setting and SP buckout are all automatic.

Reliable. Using advanced digital signal processing techniques, the M-4 delivers consistently accurate data even in noisy, highly conductive areas. For mechanical reliability it is packaged in a rugged aluminum case for backpack or hand carrying.

Versatile. The operator may adjust delay and integration times, operating frequency and other measurement parameters, to adapt to a wide range of survey conditions and requirements. An independent reference channel facilitates drillhole and underground work, and guarantees transmitter-receiver synchronization in high-noise conditions.

Highly accurate. With a frequency bandwidth of 100 Hz and noise-cancelling digital signal stacking, the M-4 delivers very precise results. The details are summarized in a table overleaf.

Sensitive. The same features that make the M-4 accurate allow detection of very weak signals. The Huntec receiver requires lower transmitter power than any other, for a given set of operating conditions. Automatic correction for drifts in self-potential and gain allow long stacking times for significant signal-to-noise improvements.

Intelligent. Under the control of a powerful 16-bit microprocessor, the M-4 calibrates and tests itself between measurements. Coded error messages, flashed onto the display, inform the operator of any malfunction.

The M-4 Receiver is complemented by Huntec's new M-4 transmitters, which offer precisely timed constant-current output and both time and frequency domain waveforms, compatible with the receiver's accuracy and multi-mode measurement capabilities. The RL-2 Reference Isolator connects any IP transmitter to the receiver's reference channel. The GeoDataBase field computer reads, stores and processes data from M-4 cassettes.

Contact Huntec for more information on the benefits offered by the M-4 product line.

FEATURES

- Time and Frequency domain IP and Complex Resistivity operation
- Simultaneous Time domain and Complex Resistivity measurement
- Automatic calibration
  - gain setting
  - SP cancellation
  - fault diagnosis
  - filter tuning
- Independent reference channel for drillhole and underground work
- 33 quantities, displayable on large 3½ digit low-temperature liquid-crystal readout
- Analogue meter for source resistance measurement
- 10^9 ohms differential input resistance
- 8 hours continuous operation with replaceable, rechargeable nickel-cadmium battery pack (2 supplied)
- Optional Cassette DataLogger fits inside case, has read-after-write error checking. Up to 350 stations per tape.
- Conveniently packaged for backpacking or hand carrying
- 100 Hz bandwidth, fine time-resolution
- Advanced digital signal stacking
- Delivers reliable, accurate data in noisy, highly conductive areas.

huntec
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SPECIFICATIONS

Inputs

Signal Channel

Ran[illegible]	5×10^{-5} to 10 volts. Automatic ranging. Overload indication
Resistance:	Greater than 10^9 ohms differential
Bandwidth:	100 Hz
SP Cancellation:	−5 to +5 volts (automatic)
Protection:	Low-leakage diode clamps, gas discharge surge arrestors, replaceable fuses.

Reference Channel

Level:	500 mV minimum, 10 volts peak maximum, overload indication
Resistance:	2×10^5 ohms differential

Controls and Functions

Operating Controls

Keypad:	16 keys, calculator format, function associated with each key.
Reference Registers:	Keypad may be used to store up to ten 3½ digit numeric values with floating decimal point, to represent station number, line number, operator, time, date, weather, transmitter current, etc. for recording on cassette.

Programming Controls

Sub-panel:	All programming controls are on a covered sub-panel, not accessible during normal operation.
Thumbwheel Switches:	Select delay time t_D in milliseconds, chargeability window t_p in milliseconds; operating frequency; PFE frequency ratio.

Displayable Quantities

Time domain:	Primary voltage; self-potential; chargeability (total or each of 10 windows of equal width); phases of odd harmonics 3 to 15; amplitudes of odd harmonics 1 to 15; cycle count; repeating display of polarization potential and total chargeability.
Freq.domain:	Primary amplitude; Percent Frequency Effect; self-potential; cycle count.
Complex Resistivity:	Phases of odd harmonics 3 to 15; amplitudes of odd harmonics 1 to 15; fundamental phase (with ref. input); cycle count.
Any mode:	Battery voltage, Frequency error.

Outputs

Displays

Digital Display:	3½ digit, low-temperature liquid crystal display. Indicates measurement results and diagnostic error messages.
Analogue Meter:	Ohms scale for source resistance; also gives qualitative indication of signal-to-noise ratio.

Cassette DataLogger (Optional)

Description:	Accommodated within M-4 chassis. If not acquired with receiver, may be retrofitted by user at any time. Two recording modes:
Partial:	All sub-panel settings, measurement results, and contents of reference registers are recorded (2 seconds recording time).
Full:	As in partial mode, but also recorded is one cycle of averaged signal waveform (28 seconds recording time). If external reference is used, one cycle of reference waveform is also recorded (60 seconds recording time). Extra memory and software available to average and store the reference waveform for advanced offline resistivity computation.
Format:	ANSI/ECMA/ISO standard for saturation recording: 80 bytes/record, all data recorded in ASCII code.
Verification:	Read-after-write data verification (automatic)

Mechanical

M-4 Receiver with battery pack:	45 cm x 33 cm x 14 cm, 10.0 kg
M-4 Receiver with battery pack and Cassette DataLogger:	Dimensions as above, 11.0 kg
Replaceable Battery pack:	33 cm x 11 cm x 4.5 cm, 3 kg

Environmental

Temperature:	Operation: −20°C to +55°C Storage: −40°C to +70°C
Humidity:	Moisture-proof, operable in light drizzle.
Altitude:	−1,525 m to +4,775 m
Shock,Vibration:	Suitable for transport in bush vehicles.

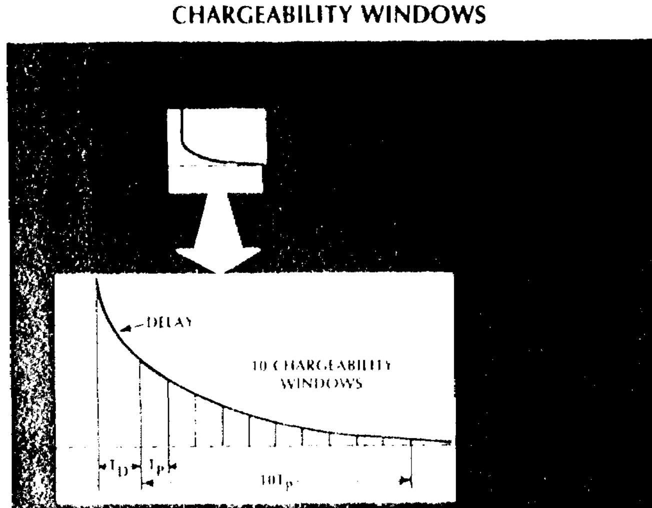
OUTPUT ACCURACY AND SENSITIVITY

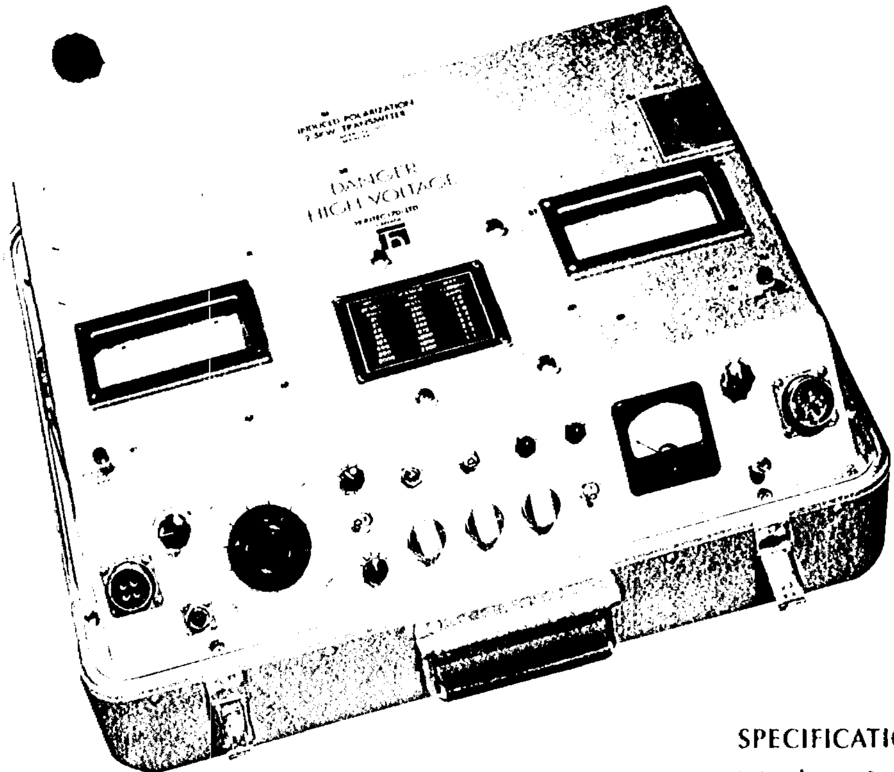
[redacted]	[redacted]					
[redacted]	milliradians	volts	volts	volts	seconds	%
[redacted]	2 milliradians(1)	1% 40Hz 2% to 80Hz	±1%	±1%	0.1%(2)	0.1%(3) full scale
[redacted]	0.01 milliradians	10^{-6} volts	10^{-6} volts	10^{-3} volts	10^{-3} seconds	0.001% full scale

1) Frequency domain mode: at harmonic frequencies up to 15 Hz, increases to not more than 5 milliradians at 80 Hz.
   Time domain mode: at harmonic frequencies up to 7.5 Hz, increases to not more than 5 milliradians at 30 Hz.
2) of total OFF time
3) Full scale defined as 100% PFE.

Cassette Data: recorded in ASCII, 9 digits with decimal point fixed for four decimal digits.
Display Data: 3½ digits, floating decimal point
Resolution of averaged waveform limited by A/D converter to one part or 4096 x (square root of cycle count).
Resolution of reference waveform (not averaged) limited by available memory to one part in 256. Additional memory and averaging software available as option.

CHARGEABILITY WINDOWS





M-4 SERIES

Induced Polarization/ Resistivity 2.5 kW Transmitter

DESCRIPTION

The HUNTEC M-4 2.5 kW Induced Polarization transmitter is designed for time domain, frequency domain (PFE) and complex resistivity applications. The unit converts primary 400 Hz ac power from an engine-alternator set to a regulated dc output current, set by the operator. Current regulation eliminates output waveform distortion due to electrode polarization effects. It is achieved in the transmitter by varying the alternator field currents. The transmitter is equipped with dummy loads to smooth out generator load variations.

FEATURES

- Solid-state switching for long life and precise timing.
- Open circuit during the "off" time ensures no counter current flow.
- Resistance measurement for load matching.
- Precision crystal controlled timing.
- Failsafe operation protects against short-circuit and overvoltage.
- Automatic regulation of output current eliminates errors due to changing polarization potential and load resistance.

SPECIFICATIONS

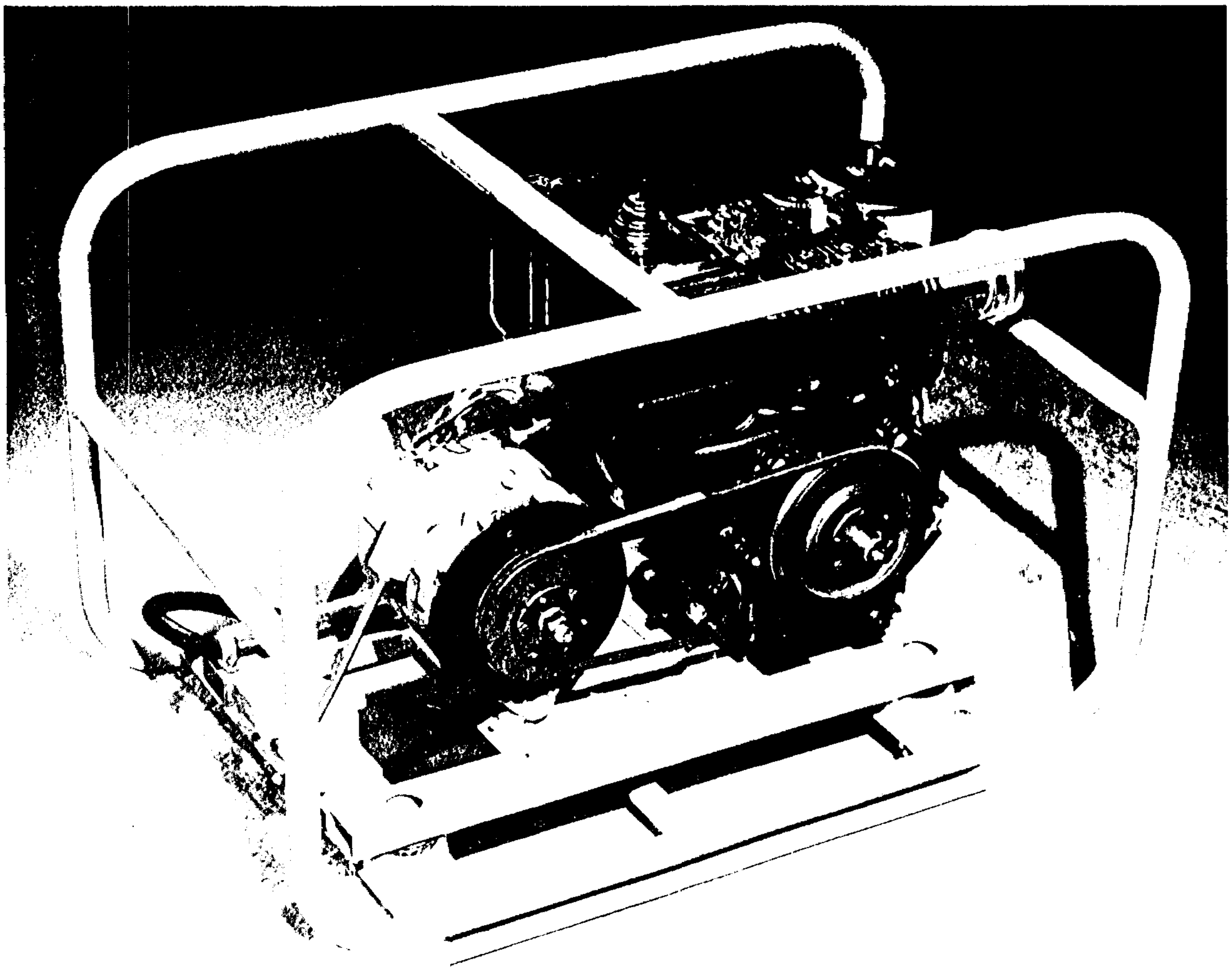
Mark-4 2.5 kW Transmitter

A) Power input:	96 — 144 V line to line 3 phase 400 Hz (from Huntec generator set)
B) Output:	Voltage: 150 — 2200 V dc in 8 steps Current: 0.2 — 7 A regulated**
C) Current regulation:	Less than ±0.1% change for ±10% load change
D) Output frequency:	0.0625 Hz to 1 Hz (time domain, complex resistivity) 0.0625 Hz to 4 Hz (frequency domain) selectable from front panel An additional range of frequencies between 0.78 and 5.0 Hz is available and can be selected by an internal switch.
E) Frequency accuracy:	±50 ppm −30°C to + 60°C
F) Output duty cycle: $T_{on}/(T_{on}+T_{off})$	0.5 to 0.9375 in increments of 0.0625 (time domain) 0.9375 (complex resistivity) 0.75 (frequency domain)
G) Output current meter:	Two ranges: 0-5 A and 0-10 A
H) Ground resistance meter:	Two ranges: 0-10 kΩ and 0-100 kΩ
I) Input voltage meter:	0-150 V
J) Dummy load:	Two levels: 500 W and 1.75 kW
K) Temperature range:	−34°C to + 50°C
L) Size:	53 cm x 43 cm x 29 cm
M) Weight:	26 kg

**Smaller currents are obtainable, but outside the current regulation range the transmitter voltage is regulated, not the current.

huntec (70) LIMITED

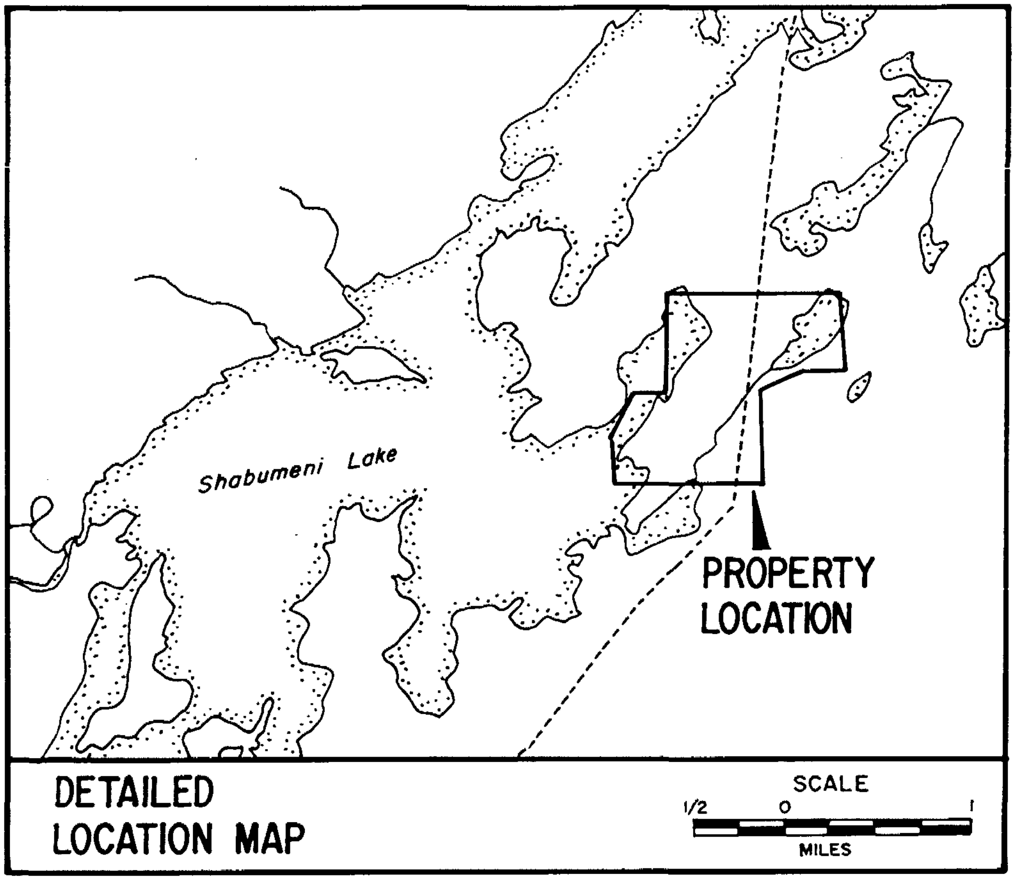
25 HOWDEN ROAD,
SCARBOROUGH,
ONTARIO, CANADA
M1R 5A6
PHONE (416) 751-8055
TELEX 06-963640
CABLE: HUNTOR, TORONTO



SPECIFICATIONS

M-4 2.5 kW Engine Driven Alternator

Output:	120 V ac 400 Hz 3.5 kVA maximum
Engine:	6 kW air cooled, single cylinder four cycle piston engine with manual start
Fuel:	Regular grade gasoline, tank capacity 3.8 L to give 4 h duration
Alternator:	Delta connected heavy duty automobile type, belt driven, air cooled
Construction:	Tubular protective carrying frame with resiliently mounted engine and alternator
Size:	51 cm x 48 cm x 76 cm
Weight (dry):	61 kg

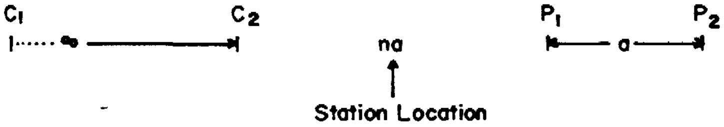


LEGEND

TRANSMITTER — *Huntec 2.5 kw.*

RECEIVER — *Huntec Mk IV*

POLE DIPOLE ARRAY



a = 100' n=1,2,3,4

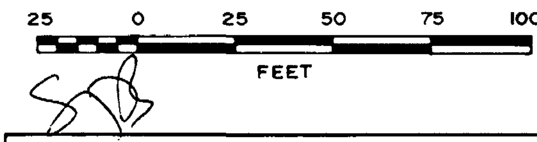
CHARGEABILITY HIGH

Very Strong — Strong — Mod. — Weak

IP Anomaly at Surface

IP Anomaly at Depth

Estimated Depth (ft.) Z ~ 10



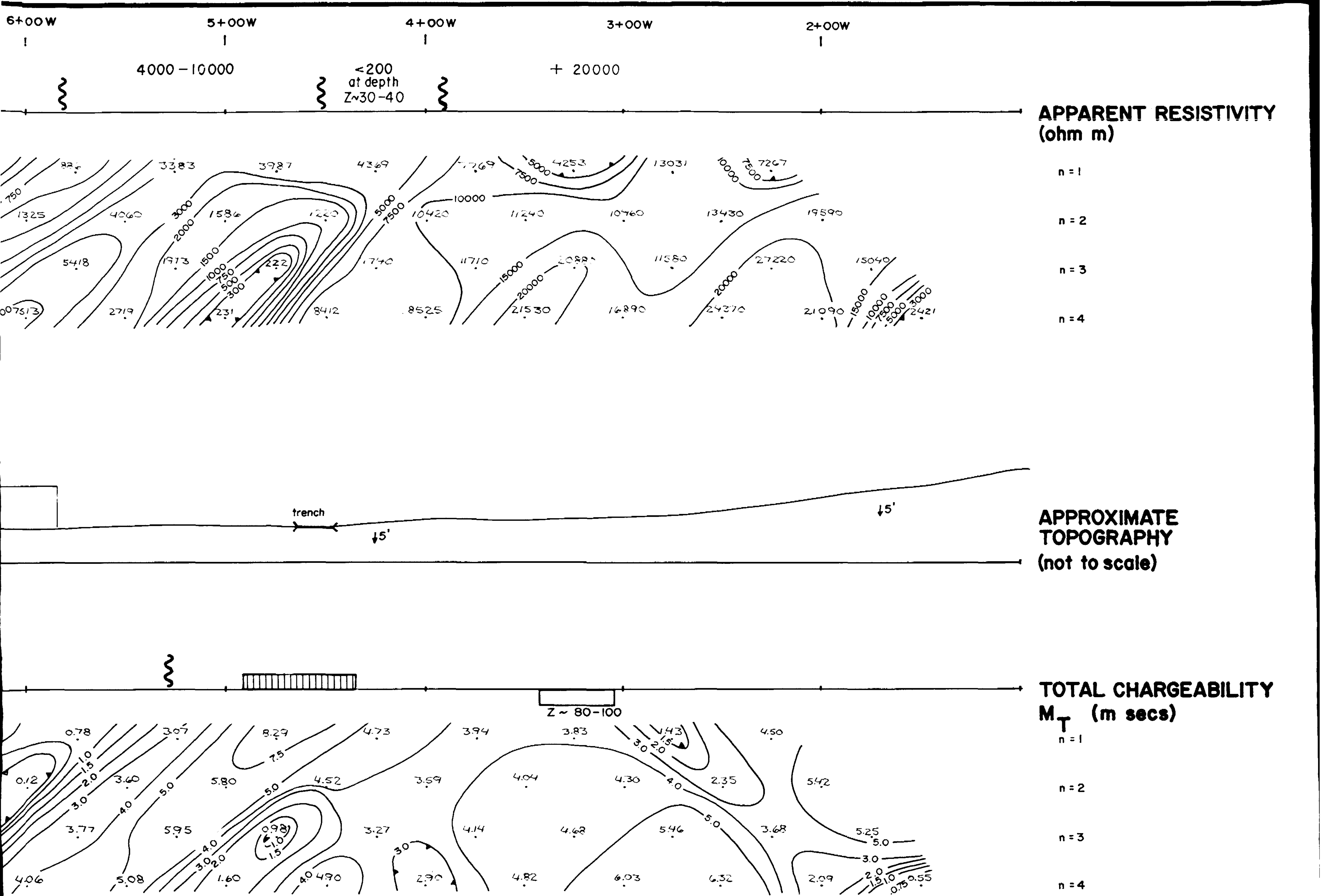
MARILYN RESOURCES LTD.

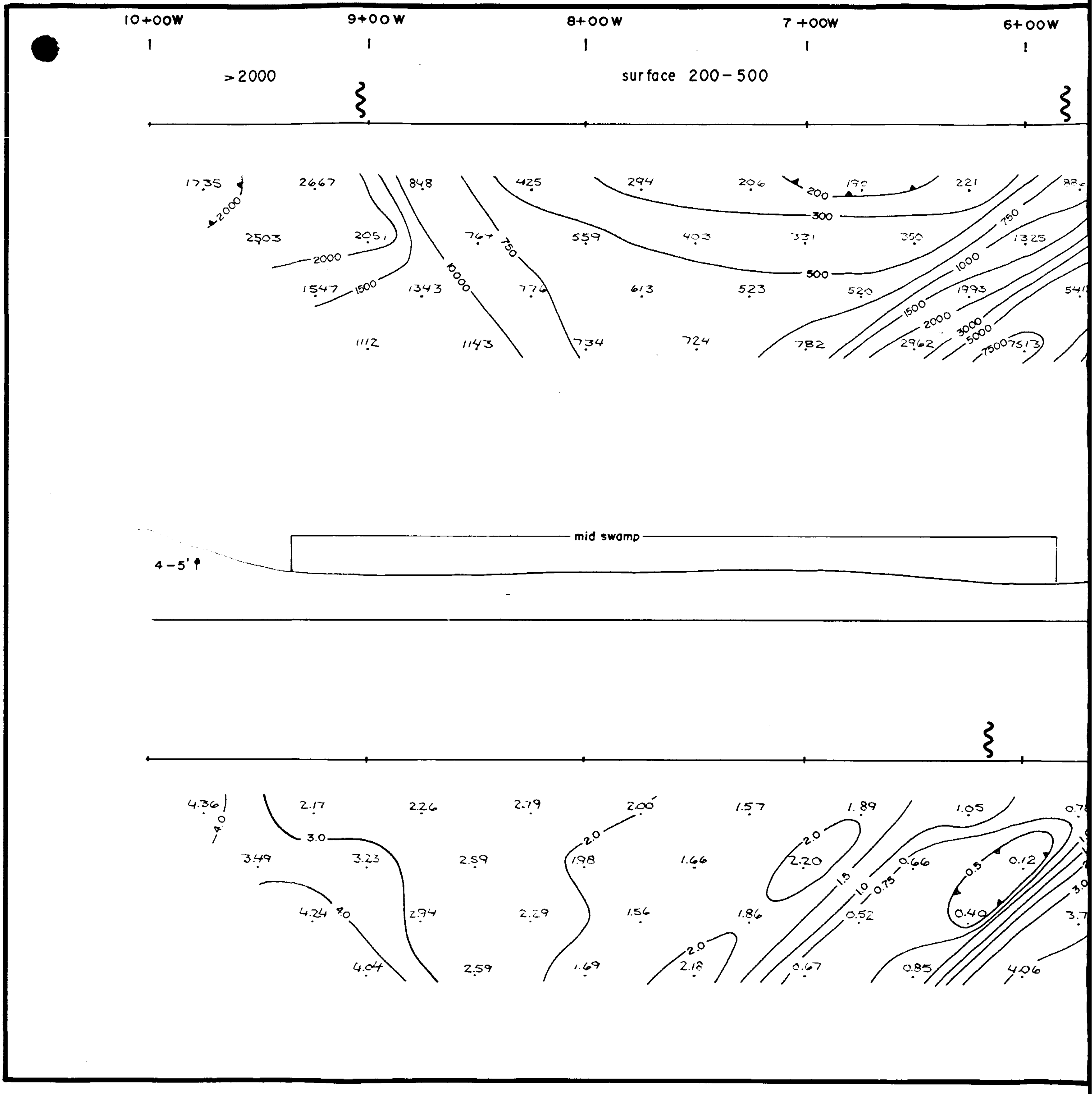
SHABUMENI LAKE PROJECT
INDUCED POLARIZATION SURVEY
PSEUDOSECTION

LINE 9+00 NORTH

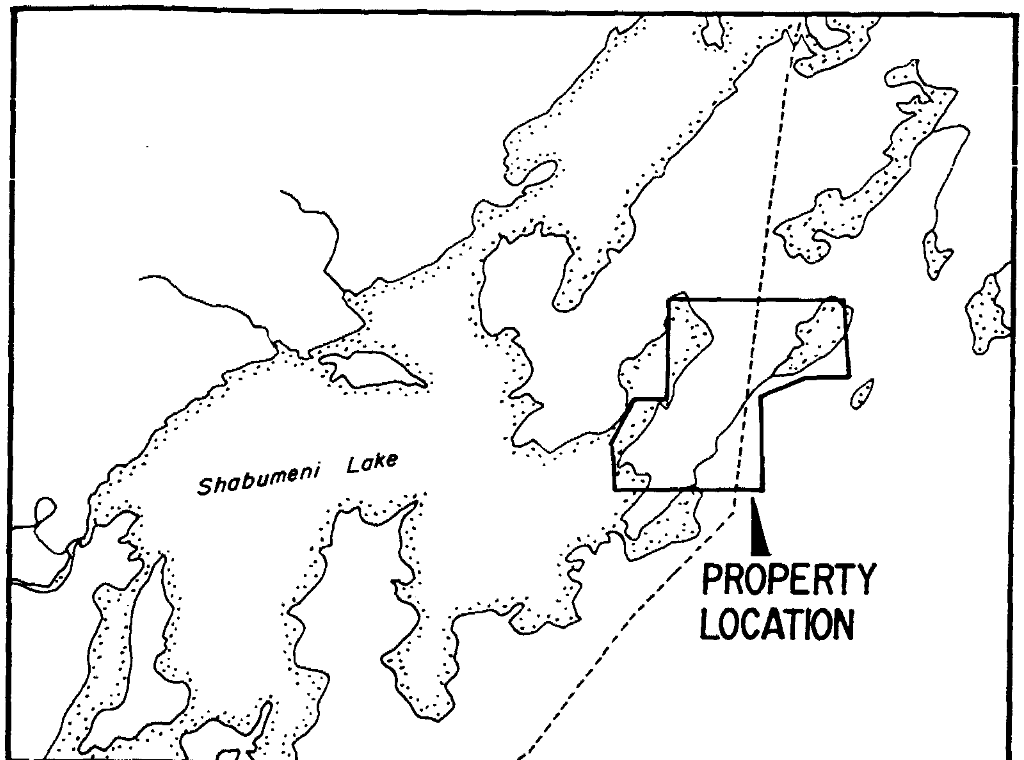
Project No. C-970	By: D.Hall
Scale: 1: 600	Drawn: MPH
Drawing No. Figure P-2	Date: February, 1987

MPH Consulting Limited


6+00W
5+00W
4+00W
3+00W
2+00W
4000 – 10000
<200 at depth Z~30-40
+ 20000
APPARENT RESISTIVITY (ohm m)
n = 1
n = 2
n = 3
n = 4
trench
5'
5'
APPROXIMATE TOPOGRAPHY (not to scale)
Z ~ 80-100
TOTAL CHARGEABILITY M_T (m secs)
n = 1
n = 2
n = 3
n = 4


10+00W
9+00W
8+00W
7+00W
6+00W
>2000
surface 200-500
mid swamp
4-5'

TIVITY



DETAILED LOCATION MAP

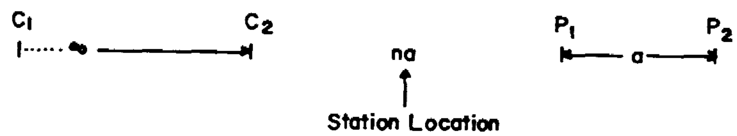
SCALE
1/2 0 1
MILES

L E G E N D

TRANSMITTER *Huntec 2.5 kw.*

RECEIVER *Huntec Mk IV*

POLE DIPOLE ARRAY



a=50' n=1,2,3,4

CHARGEABILITY HIGH

Very Strong | Strong | Mod. | Weak

IP Anomaly at Surface

IP Anomaly at Depth

Estimated Depth (ft.) Z ~ 10

ILITY

SCALE
25 0 25 50 75 100
FEET

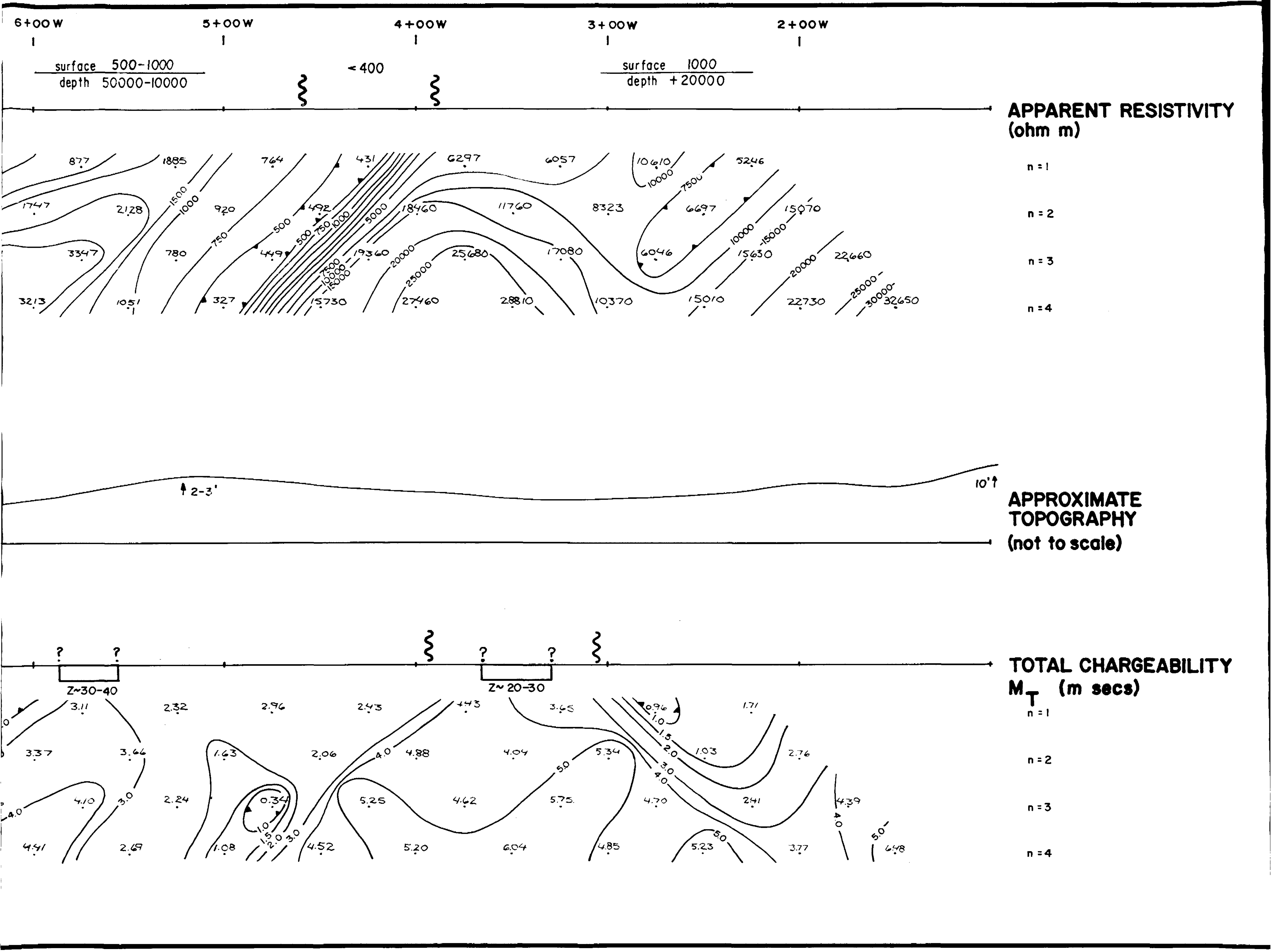
MARILYN RESOURCES LTD.

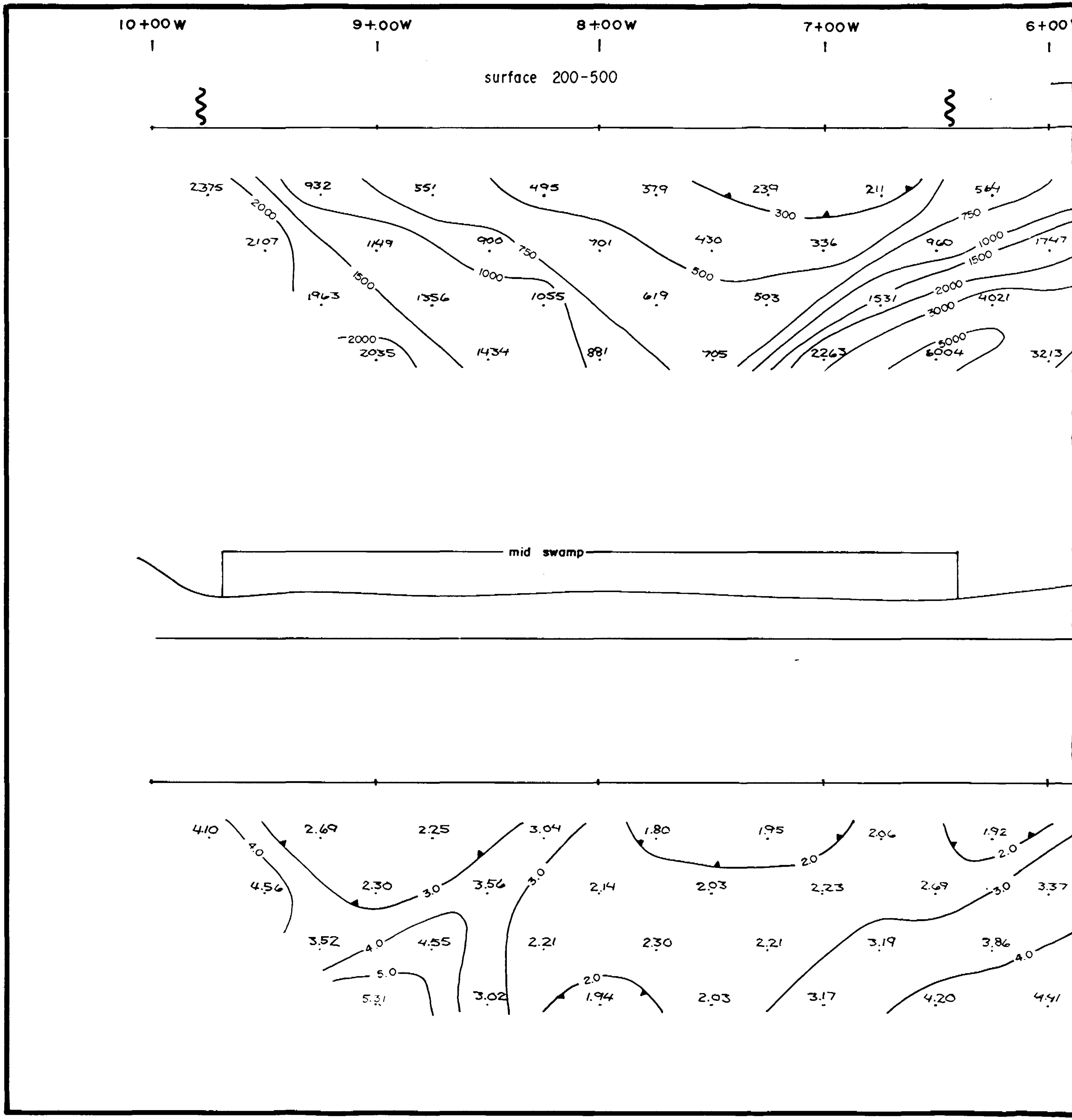
SHABUMENI LAKE PROJECT
INDUCED POLARIZATION SURVEY
PSEUDOSECTION

LINE 10+00 NORTH

Project No. C-970	By: D. Hall
Scale: 1:600	Drawn: MPH
Drawing No. Figure P-1	Date: February, 1987

MPH Consulting Limited


6+00W
5+00W
4+00W
3+00W
2+00W
surface 500-1000
depth 50000-10000
<400
surface 1000
depth +20000
APPARENT RESISTIVITY
(ohm m)
n = 1
n = 2
n = 3
n = 4
877
1885
764
431
6297
6057
10610
5246
1747
2128
920
492
18460
11760
8323
6697
15070
3347
780
449
19360
25680
17080
6046
15630
22660
3213
1051
327
15730
27460
28810
10370
15010
22730
32650
2-3'
10'
APPROXIMATE
TOPOGRAPHY
(not to scale)
Z~30-40
Z~20-30
TOTAL CHARGEABILITY
M T (m secs)
3.11
2.32
2.96
2.43
4.43
3.65
0.96
1.71
3.37
3.66
1.63
2.06
4.88
4.04
5.34
1.03
2.76
4.10
2.24
0.34
5.25
4.62
5.75
4.70
2.41
4.39
4.41
2.69
1.08
4.52
5.20
6.04
4.85
5.23
3.77
6.48



10+00W
9+00W
8+00W
7+00W
6+00
surface 200-500
2375 932 551 495 379 239 211 564
300
2000 750
2107 1149 900 701 430 336 960 1747
750 500 1000 1500
1000
1963 1356 1055 619 503 1531 4021
1500 2000 3000
2000 2035 1434 881 705 2263 5000 6004 3213
mid swamp
4.10 2.69 2.25 3.04 1.80 1.95 2.06 1.92
4.0 2.0 2.0
4.56 2.30 3.56 2.14 2.03 2.23 2.69 3.37
3.0 3.0 3.0
3.52 4.55 2.21 2.30 2.21 3.19 3.86
4.0 5.0 2.0 4.0
5.31 3.02 1.94 2.03 3.17 4.20 4.41

APPARENT RESISTIVITY
(ohm m)

n = 1

n = 2

n = 3

n = 4

APPROXIMATE TOPOGRAPHY
(not to scale)

TOTAL CHARGEABILITY
M_T (m secs)

n = 1

n = 2

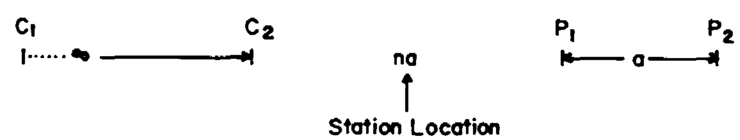
n = 3

n = 4

L E G E N D

TRANSMITTER	*Huntec 2.5 kw.*
RECEIVER	*Huntec Mk IV*

POLE DIPOLE ARRAY



a = 50'   n = 1,2,3,4

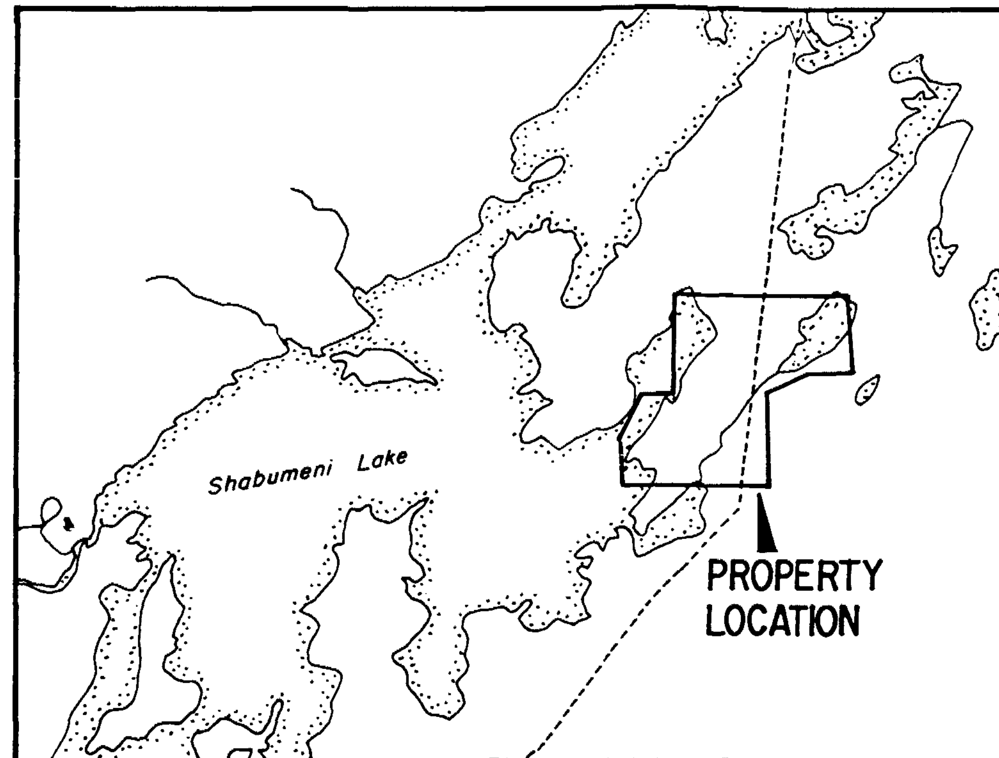
CHARGEABILITY HIGH

Very Strong | Strong | Mod. | Weak

IP Anomaly at Surface

IP Anomaly at Depth

Estimated Depth (ft.) Z ~ 10



DETAILED LOCATION MAP

SCALE
1/2 0 1
MILES

S C A L E
25 0 25 50 75 100
FEET

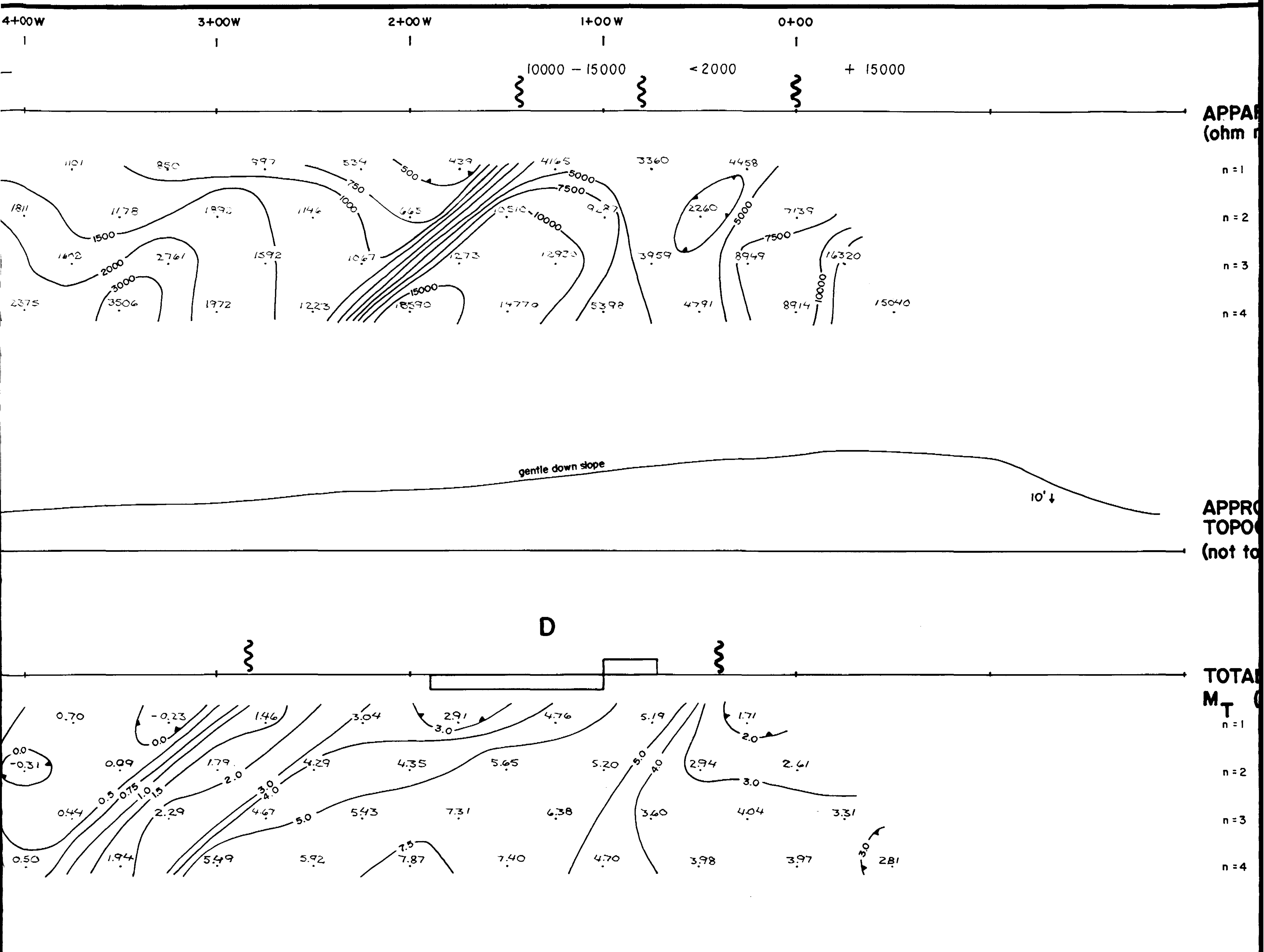
MARILYN RESOURCES LTD.

SHABUMENI LAKE PROJECT
INDUCED POLARIZATION SURVEY
PSEUDOSECTION

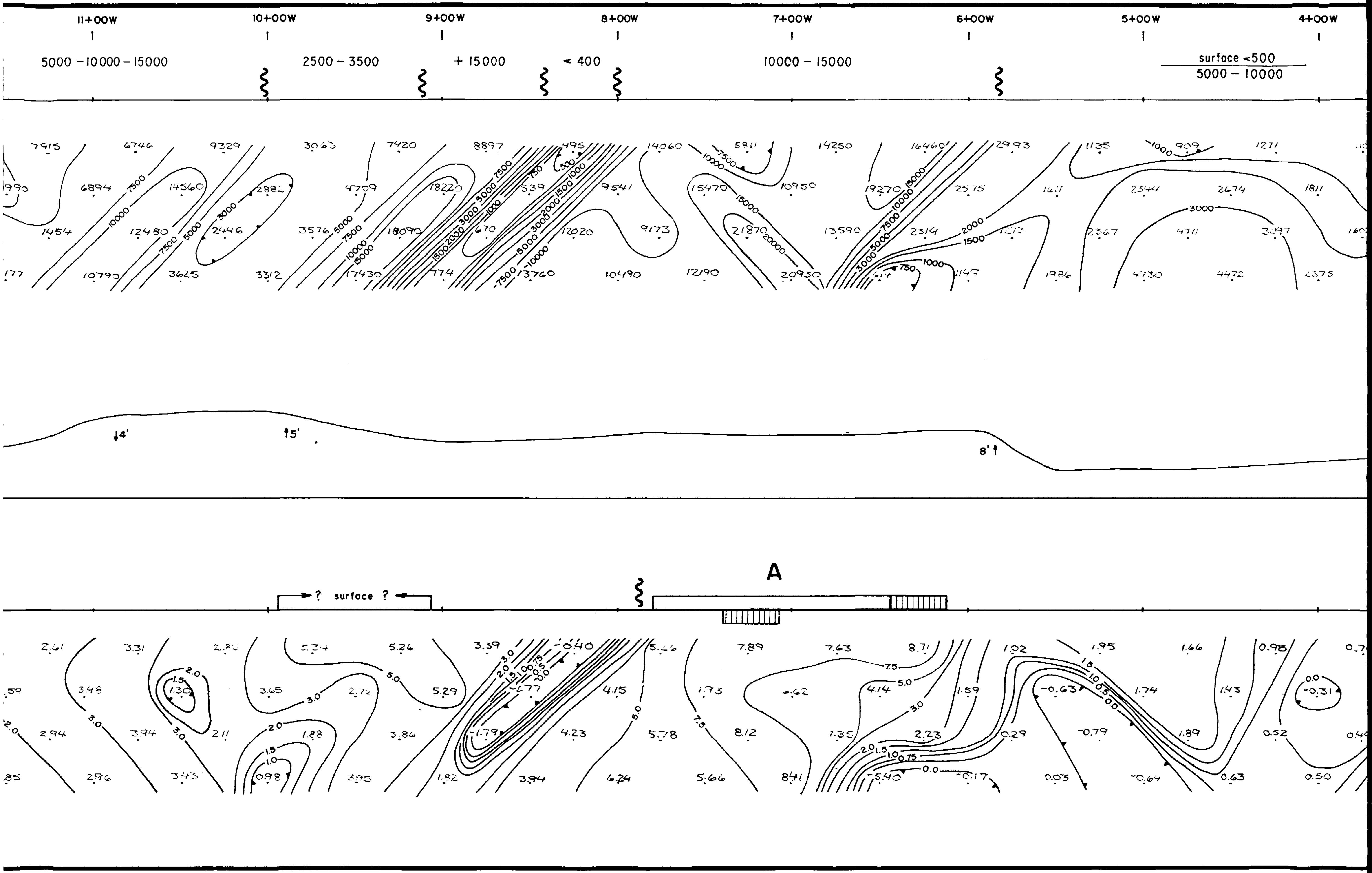
LINE 0+00

Project No. C-970	By: D. Hall
Scale: 1: 600	Drawn: MPH
Drawing No. Figure P-3	Date: February, 1987

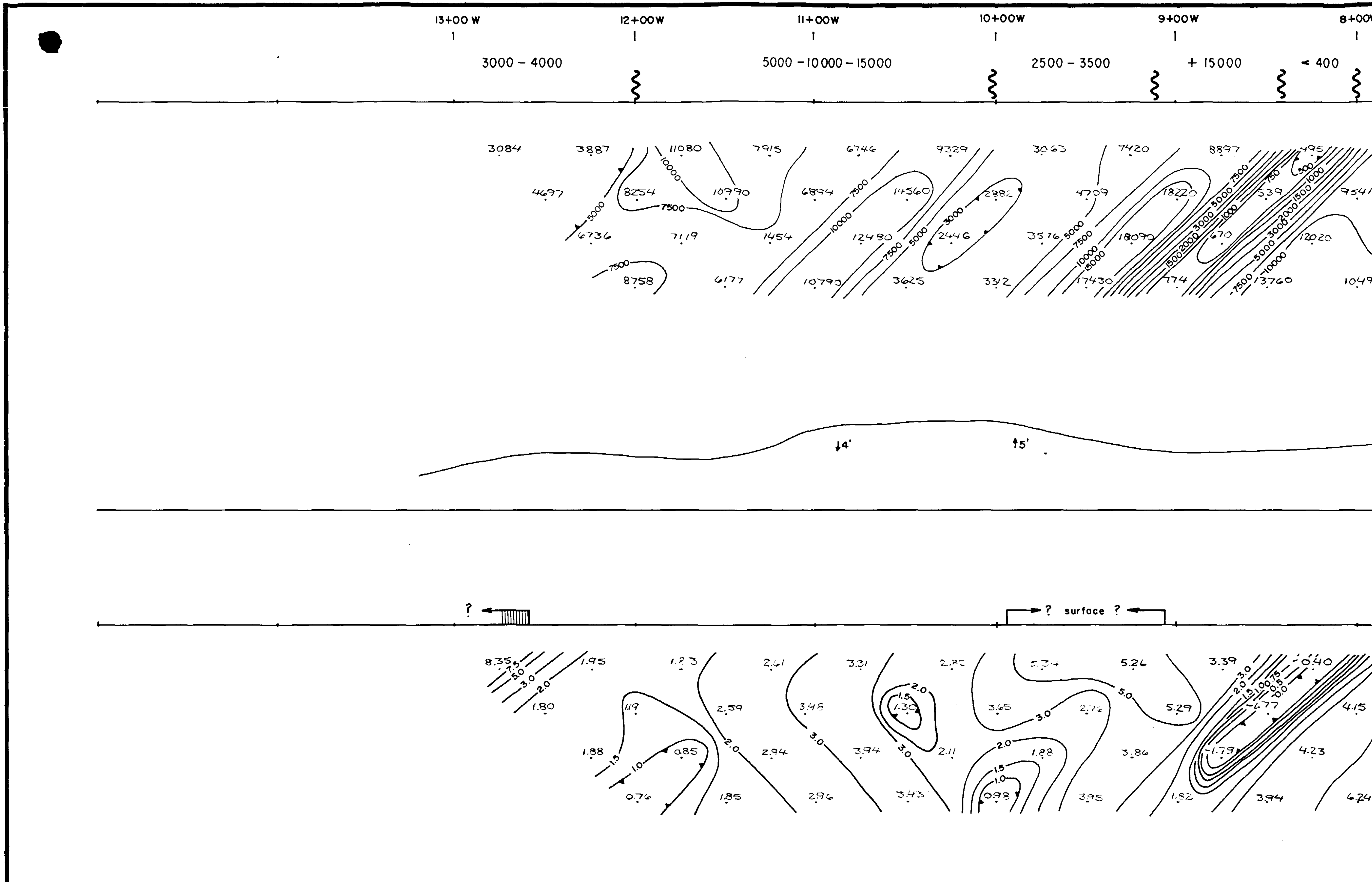
MPH Consulting Limited



4+00W
3+00W
2+00W
1+00W
0+00
10000 – 15000
<2000
+ 15000
APPAR
(ohm
n = 1
n = 2
n = 3
n = 4
gentle down slope
10'
APPRO
TOPO
(not to
D
TOTAL
M
T
n = 1
n = 2
n = 3
n = 4



11+00W
10+00W
9+00W
8+00W
7+00W
6+00W
5+00W
4+00W
5000 – 10000 – 15000
2500 – 3500
+ 15000
< 400
10000 – 15000
surface <500
5000 – 10000
4'
5'
8'
A
? surface ?


13+00 W
12+00W
11+00W
10+00W
9+00W
8+00W
3000 – 4000
5000 – 10000 – 15000
2500 – 3500
+ 15000
< 400
4'
5'
?
? surface ?

APPARENT RESISTIVITY
(ohm m)

n = 1

n = 2

n = 3

n = 4

APPROXIMATE
TOPOGRAPHY
(not to scale)

TOTAL CHARGEABILITY
M_T (m secs)

n = 1

n = 2

n = 3

n = 4

L E G E N D

TRANSMITTER	*Huntec 2.5 kw.*
RECEIVER	*Huntec Mk IV*

DOUBLE DIPOLE ARRAY

C_1 —— a —— C_2 na P_1 —— a —— P_2

Station Location

a = 100' n = 1,2,3,4

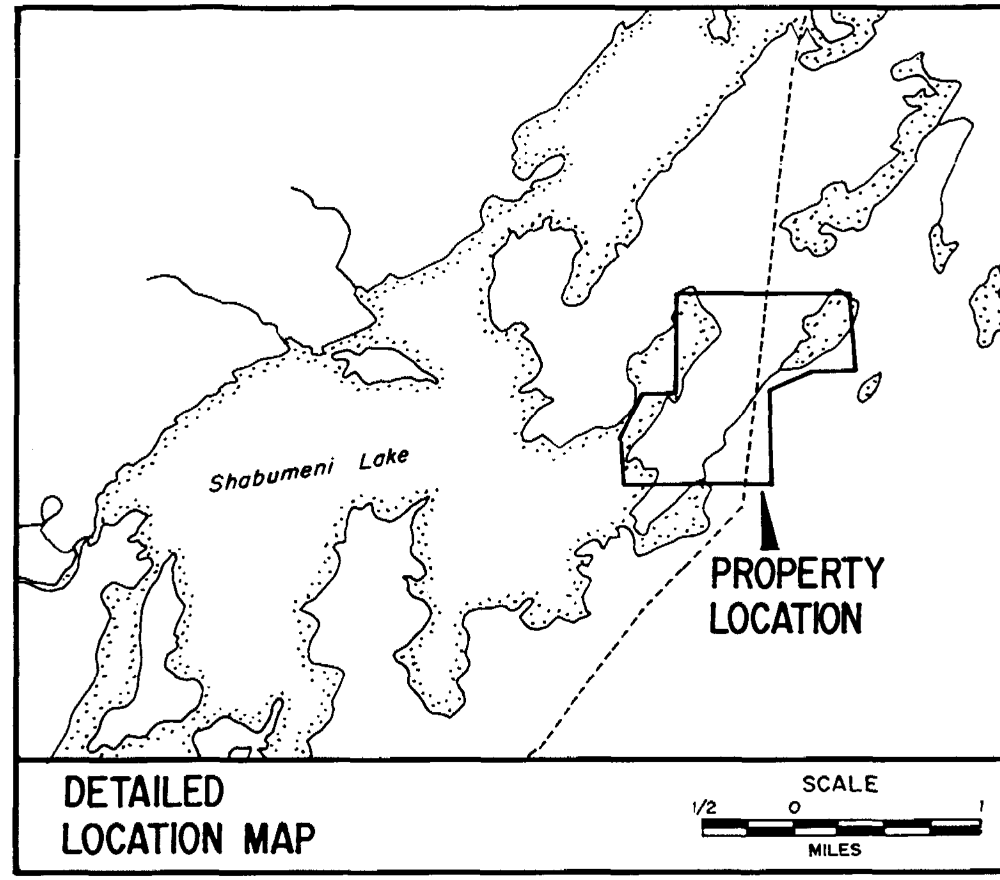
CHARGEABILITY HIGH

Very Strong Strong Mod. Weak

IP Anomaly at Surface

IP Anomaly at Depth

Estimated Depth (ft.) Z ~ 10



S C A L E

50 0 50 100 200

FEET

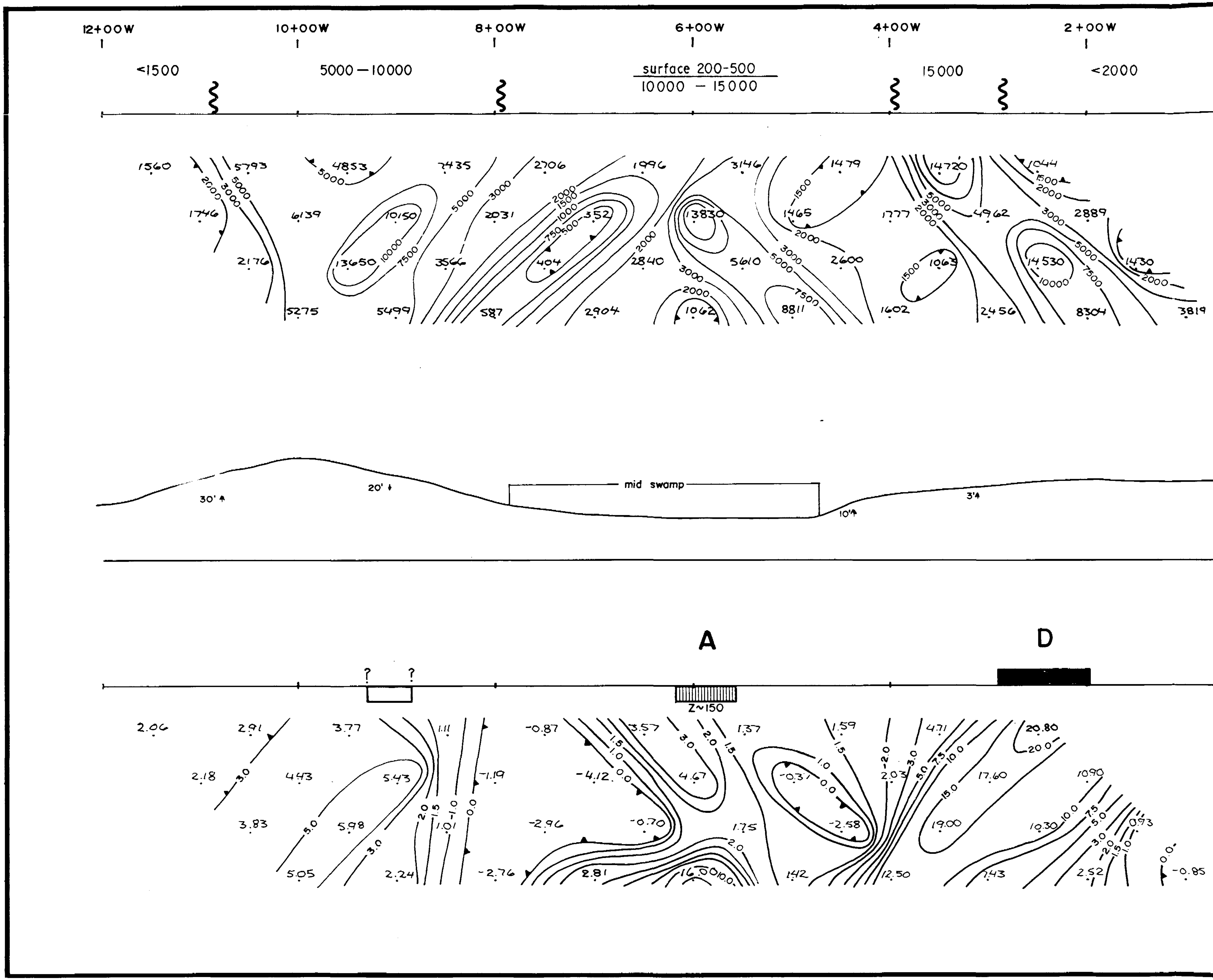
MARILYN RESOURCES LTD.

SHABUMENI LAKE PROJECT
INDUCED POLARIZATION SURVEY
PSEUDOSECTION

LINE 2+00 SOUTH

Project No. C-970	By: D. Hall
Scale: 1:1200	Drawn: MPH
Drawing No: Figure P-4	Date: February, 1987

MPH Consulting Limited



12+00W
10+00W
8+00W
6+00W
4+00W
2+00W
<1500
5000 — 10000
surface 200-500
10000 — 15000
15000
<2000
mid swamp
30'
20'
10'
3'
A
D
Z~150

APPARENT RESISTIVITY (ohm m)

n = 1

n = 2

n = 3

n = 4

APPROXIMATE TOPOGRAPHY (not to scale)

TOTAL CHARGEABILITY M_T (m secs)

n = 1

n = 2

n = 3

n = 4

L E G E N D

TRANSMITTER	*Huntec 2.5 kw.*
RECEIVER	*Huntec Mk IV*

DOUBLE DIPOLE ARRAY

C_1 — a — C_2 na P_1 — a — P_2

Station Location

a = 100' n = 1,2,3,4

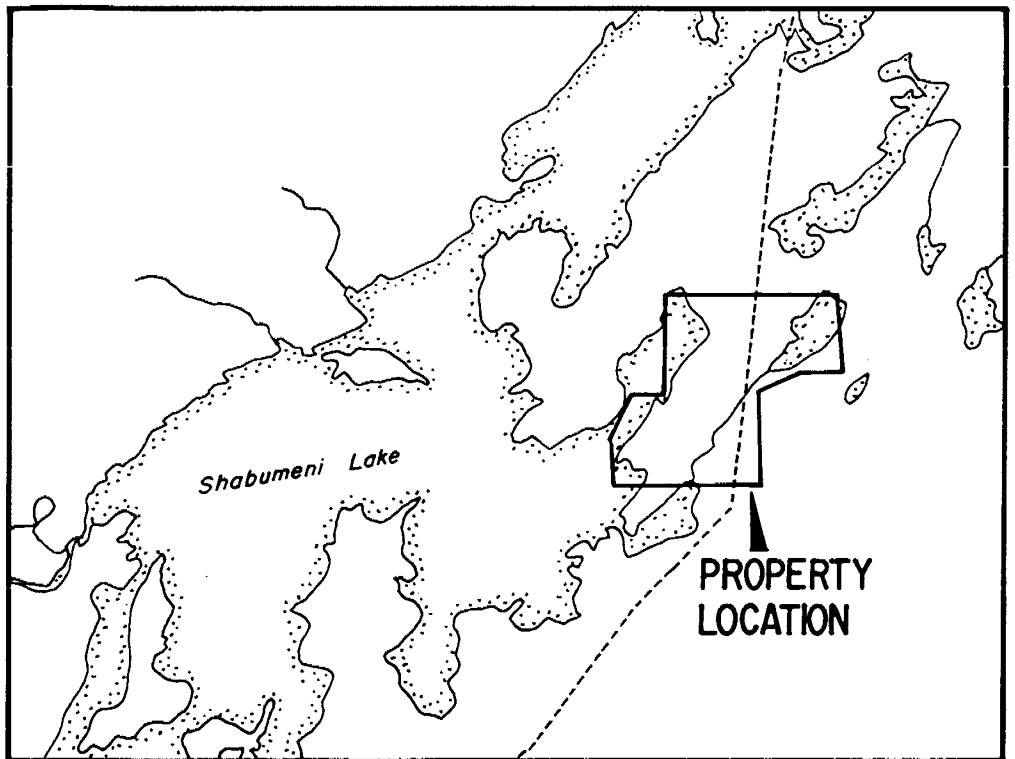
CHARGEABILITY HIGH

Very Strong Strong Mod. Weak

IP Anomaly at Surface

IP Anomaly at Depth

Estimated Depth (ft.) Z ~ 10



DETAILED LOCATION MAP

SCALE
1/2 0 1
MILES

S C A L E
50 0 50 100 200
FEET

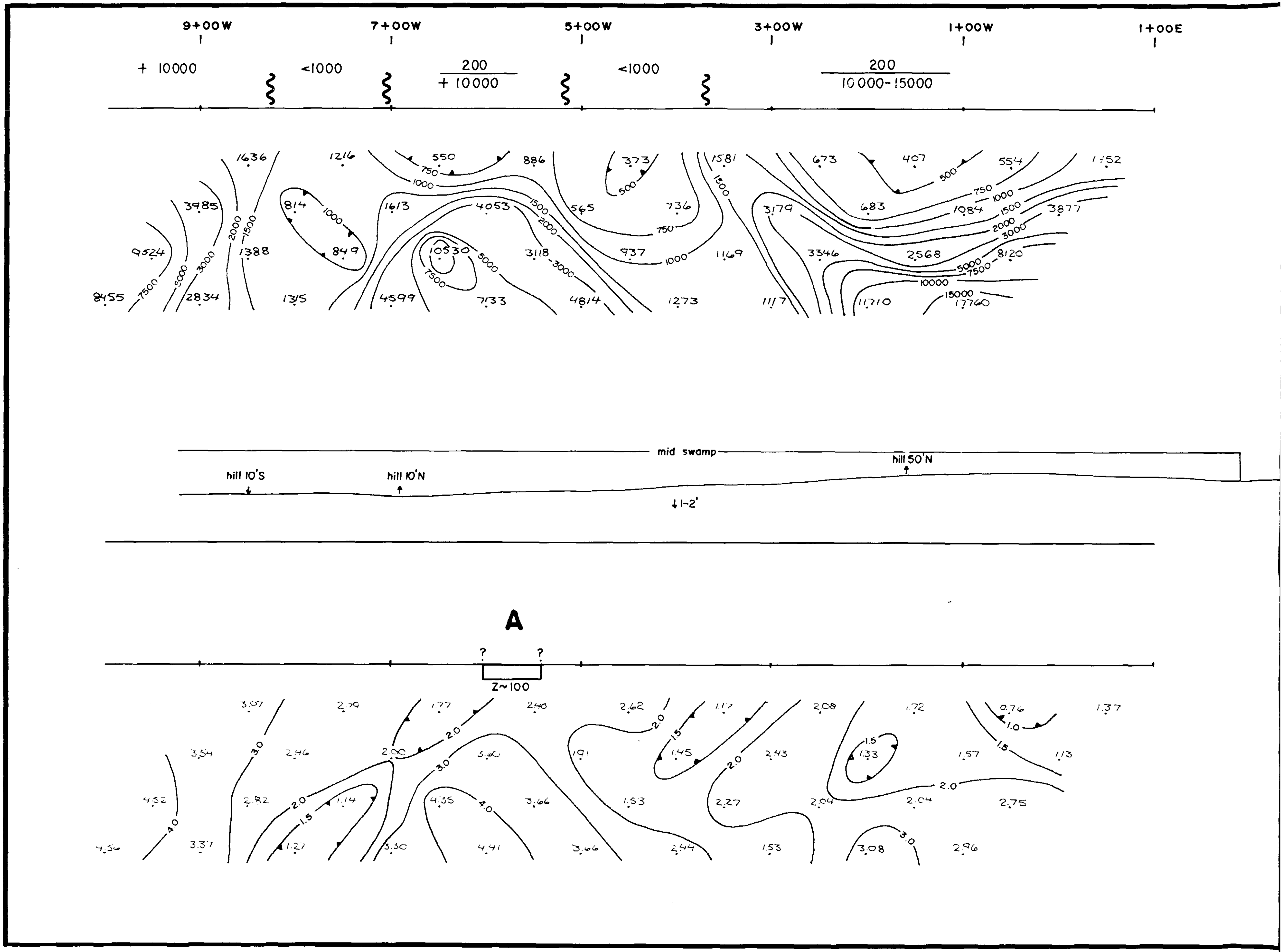
MARILYN RESOURCES LTD.

SHABUMENI LAKE PROJECT
INDUCED POLARIZATION SURVEY
PSEUDOSECTION

LINE 4+00 SOUTH

Project No. C-970	By: D. Hall
Scale: 1:1200	Drawn: MPH
Drawing No. Figure P-5	Date: February, 1987

MPH Consulting Limited


9+00W
7+00W
5+00W
3+00W
1+00W
1+00E
+ 10000
<1000
200
+ 10000
<1000
200
10000-15000
mid swamp
hill 10'S
hill 10'N
hill 50'N
1-2'
A
Z~100

RESISTIVITY

E
Y

RGEABILITY
s)

L E G E N D

TRANSMITTER	*Huntec 2.5 kw.*
RECEIVER	*Huntec Mk IV*

POLE DIPOLE ARRAY

C_1 ······ ∞ ——— C_2 na P_1 —— a —— P_2

↑ Station Location

a=50'   n=1,2,3,4

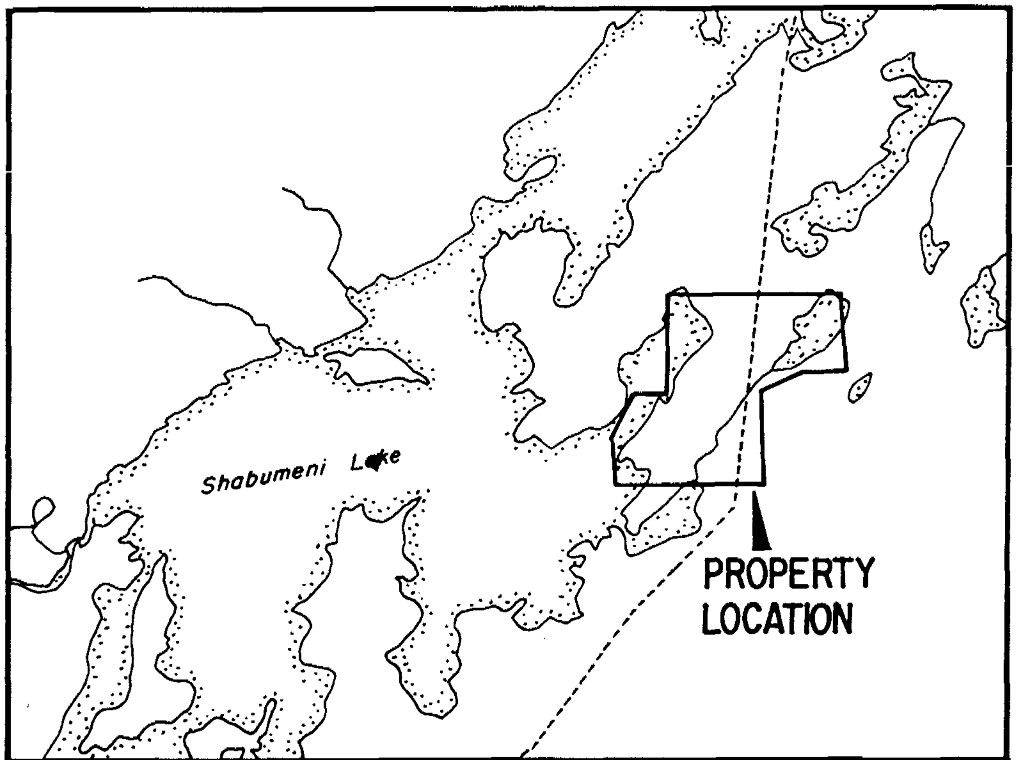
CHARGEABILITY HIGH

Very Strong | Strong | Mod. | Weak

IP Anomaly at Surface

IP Anomaly at Depth

Estimated Depth (ft.) Z ~ 10



DETAILED LOCATION MAP

SCALE 1/2 0 1 MILES

S C A L E

25 0 25 50 75 100

FEET

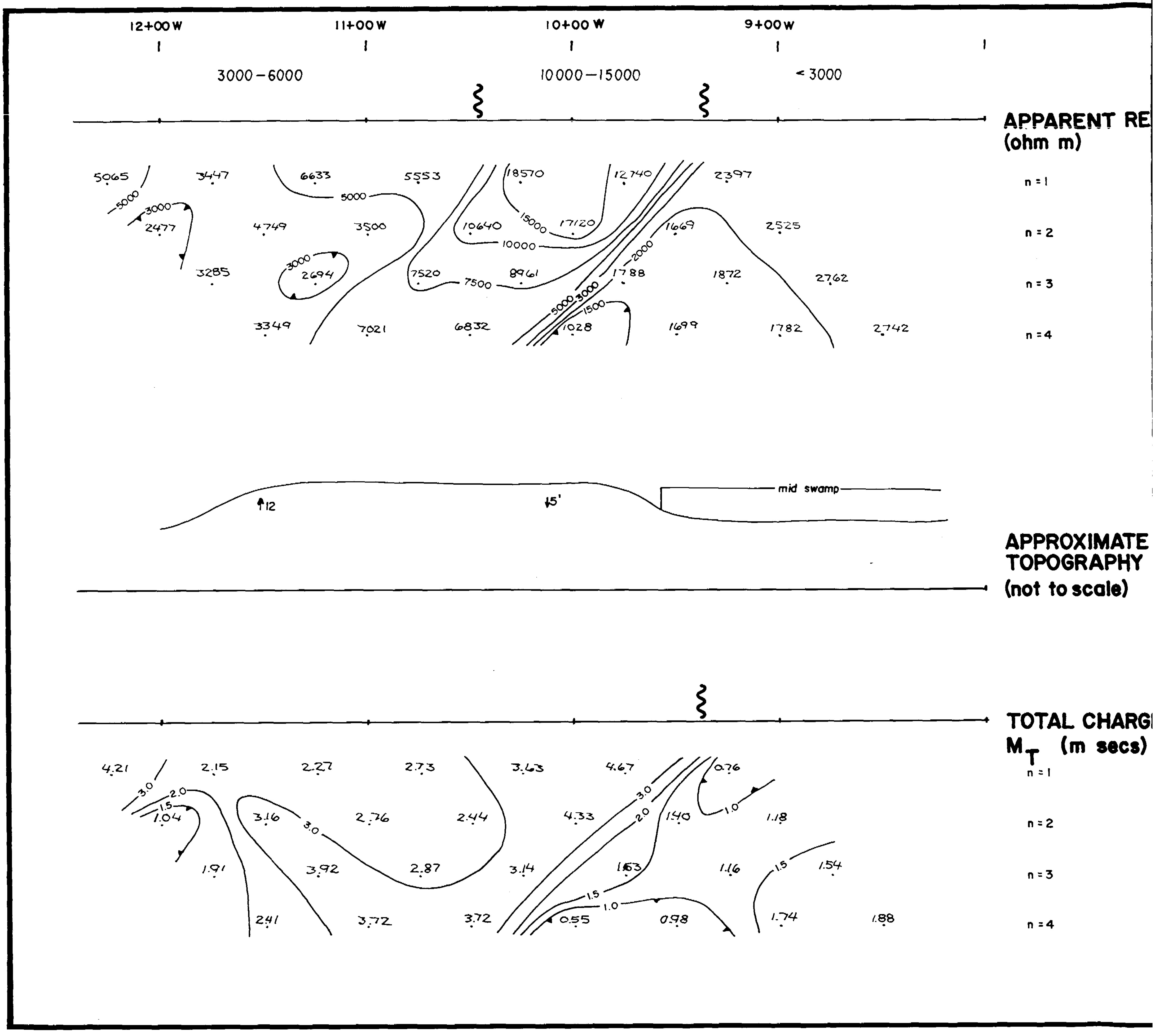
MARILYN RESOURCES LTD.

SHABUMENI LAKE PROJECT
INDUCED POLARIZATION SURVEY
PSEUDOSECTION

LINE 6+00 SOUTH

Project No. C-970	By: D. Hall
Scale: 1:600	Drawn: MPH
Drawing No. Figure P-6a	Date: February, 1987

MPH Consulting Limited


12+00W
11+00W
10+00W
9+00W
3000-6000
10000-15000
<3000
APPARENT RE
(ohm m)
n=1
n=2
n=3
n=4
5065
3447
6633
5553
18570
12740
2397
2477
4749
3500
10640
17120
1669
2525
3285
2694
7520
8961
1788
1872
2762
3349
7021
6832
1028
1699
1782
2742
mid swamp
12
5'
APPROXIMATE
TOPOGRAPHY
(not to scale)
TOTAL CHARG
M_T (m secs)
4.21
2.15
2.27
2.73
3.63
4.67
0.76
1.04
3.16
2.76
2.44
4.33
1.40
1.18
1.91
3.92
2.87
3.14
1.63
1.16
1.54
2.41
3.72
3.72
0.55
0.98
1.74
1.88

APPARENT RESISTIVITY
(ohm m)

n = 1

n = 2

n = 3

n = 4

5'

APPROXIMATE
TOPOGRAPHY
(not to scale)

TOTAL CHARGEABILITY
M_T (m secs)

n = 1

n = 2

n = 3

n = 4

LEGEND

TRANSMITTER	*Huntec 2.5 kw.*
RECEIVER	*Huntec Mk IV*

DOUBLE DIPOLE ARRAY

C_1 — a — C_2 na P_1 — a — P_2

Station Location

a = 100' n = 1,2,3,4

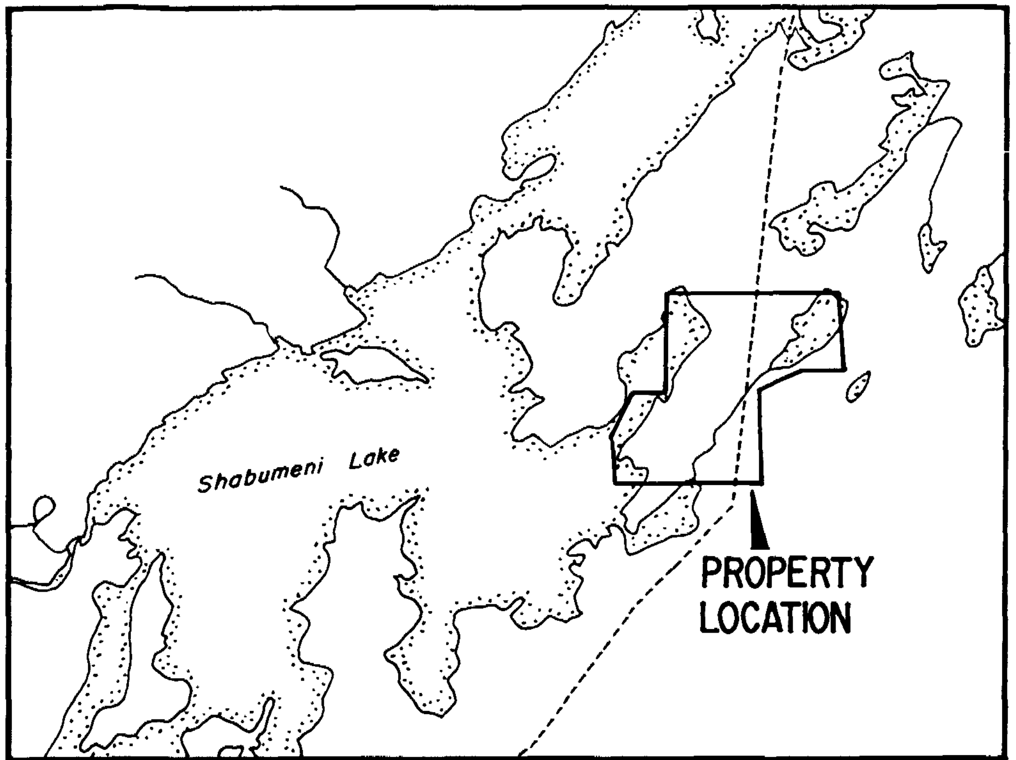
CHARGEABILITY HIGH

Very Strong | Strong | Mod. | Weak

IP Anomaly at Surface

IP Anomaly at Depth

Estimated Depth (ft.) Z ~ 10



DETAILED
LOCATION MAP

SCALE
1/2 0 1
MILES

SCALE
50 0 50 100 200
FEET

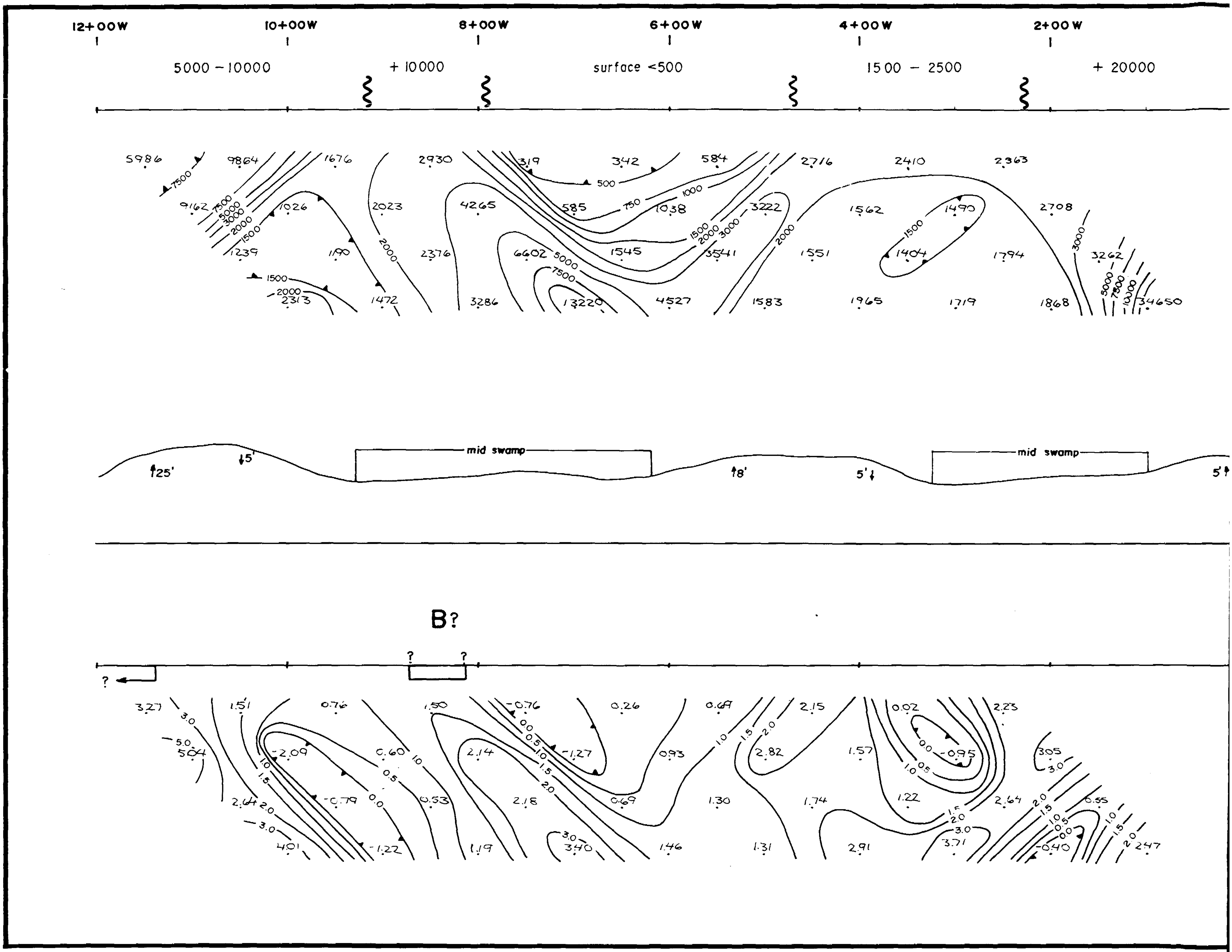
MARILYN RESOURCES LTD.

SHABUMENI LAKE PROJECT
INDUCED POLARIZATION SURVEY
PSEUDOSECTION

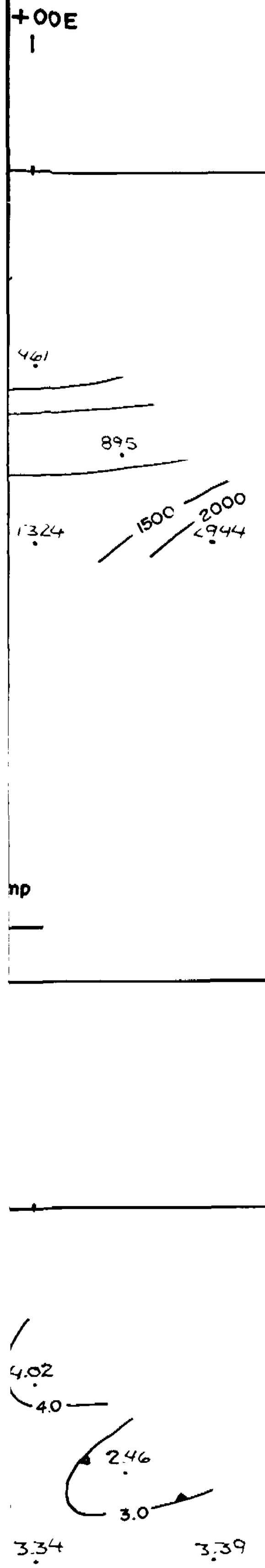
LINE 6+00 SOUTH

Project No. C-970	By: D. Hall
Scale: 1:1200	Drawn: MPH
Drawing No: Figure P-6 b	Date: February, 1987

MPH Consulting Limited



12+00W
10+00W
8+00W
6+00W
4+00W
2+00W
5000 - 10000
+ 10000
surface <500
1500 - 2500
+ 20000
mid swamp
mid swamp
25'
5'
8'
5'
5'
B?



APPARENT RESISTIVITY
(ohm m)

n = 1

n = 2

n = 3

n = 4

APPROXIMATE TOPOGRAPHY
(not to scale)

TOTAL CHARGEABILITY
M_T (m secs)

n = 1

n = 2

n = 3

n = 4

L E G E N D

TRANSMITTER	*Huntec 2.5 kw.*
RECEIVER	*Huntec Mk IV*

POLE DIPOLE ARRAY

C_1 ······ ∞ ——— C_2 na ↑ Station Location P_1 — a — P_2

a = 50' n = 1,2,3,4

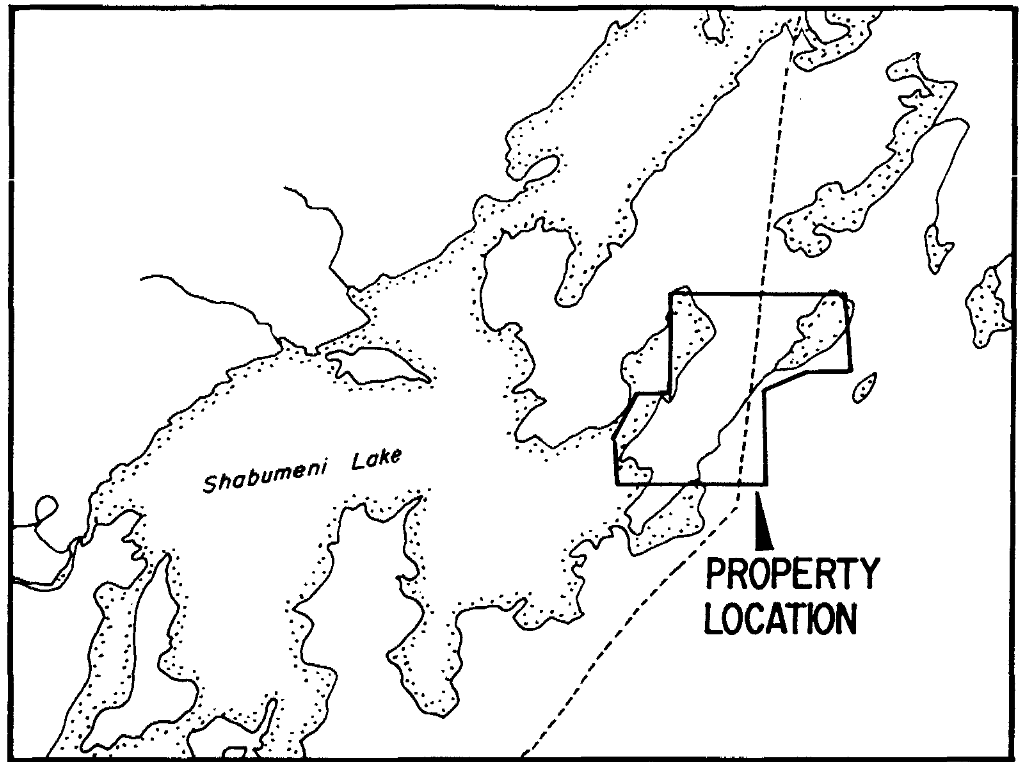
CHARGEABILITY HIGH

Very Strong | Strong | Mod. | Weak

IP Anomaly at Surface

IP Anomaly at Depth

Estimated Depth (ft.) Z ~ 10



DETAILED LOCATION MAP

SCALE
1/2 0 1
MILES

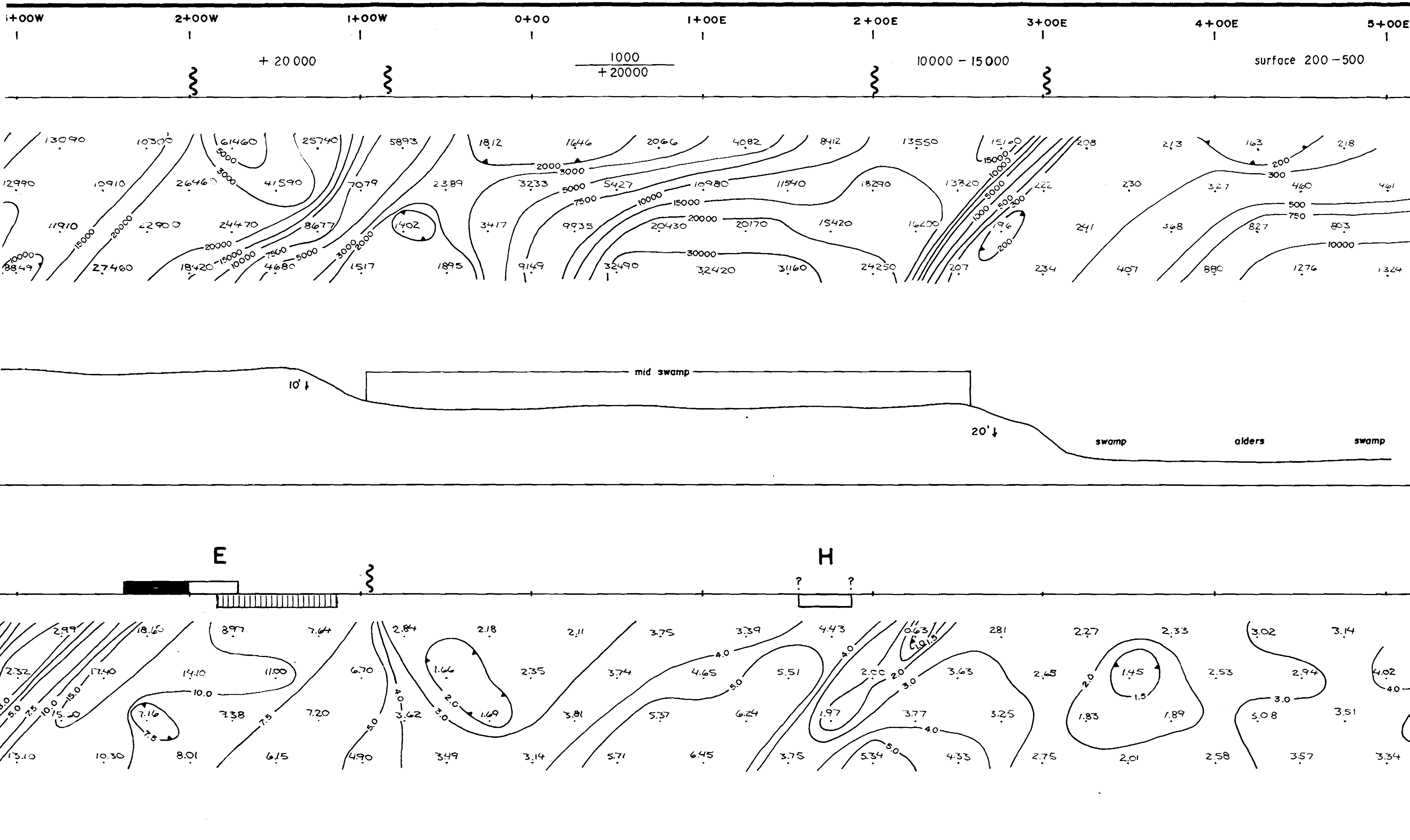
S C A L E
25 0 25 50 75 100
FEET

MARILYN RESOURCES LTD.

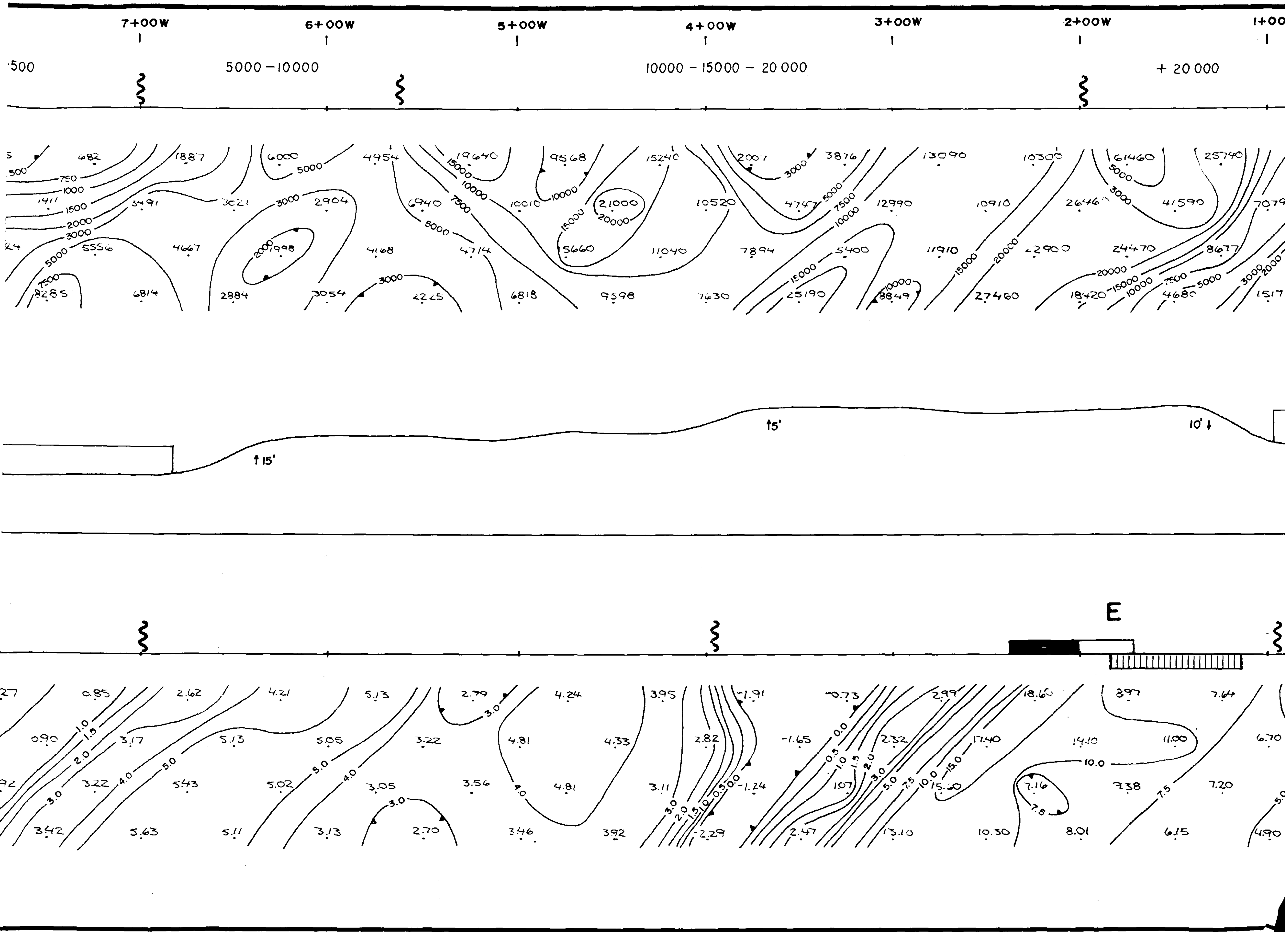
SHABUMENI LAKE PROJECT
INDUCED POLARIZATION SURVEY
PSEUDOSECTION
LINE 8+00 SOUTH

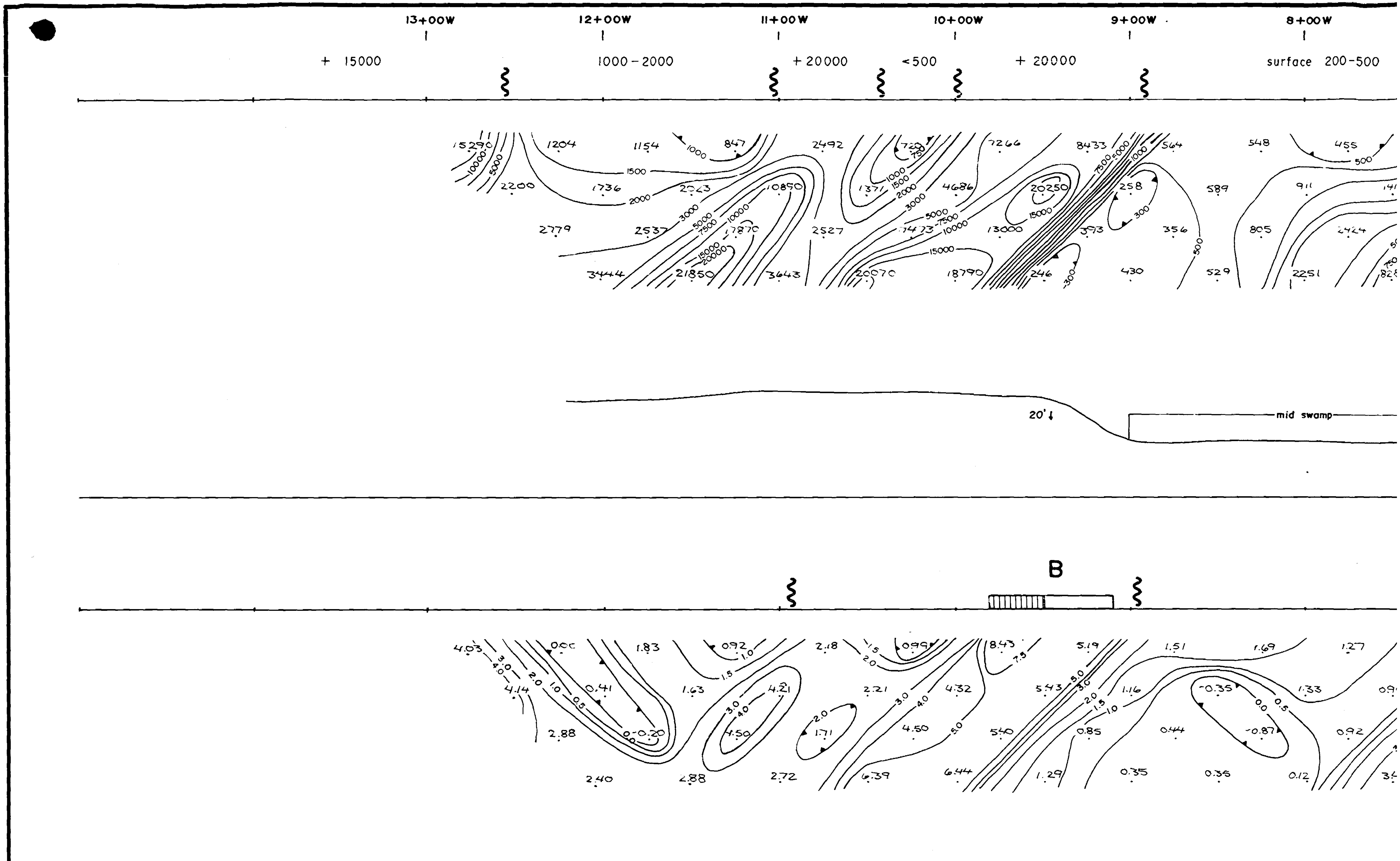
Project No. C-970	By: D. Hall
Scale: 1:600	Drawn: MPH
Drawing No. Figure P-7	Date: February, 1987

MPH Consulting Limited

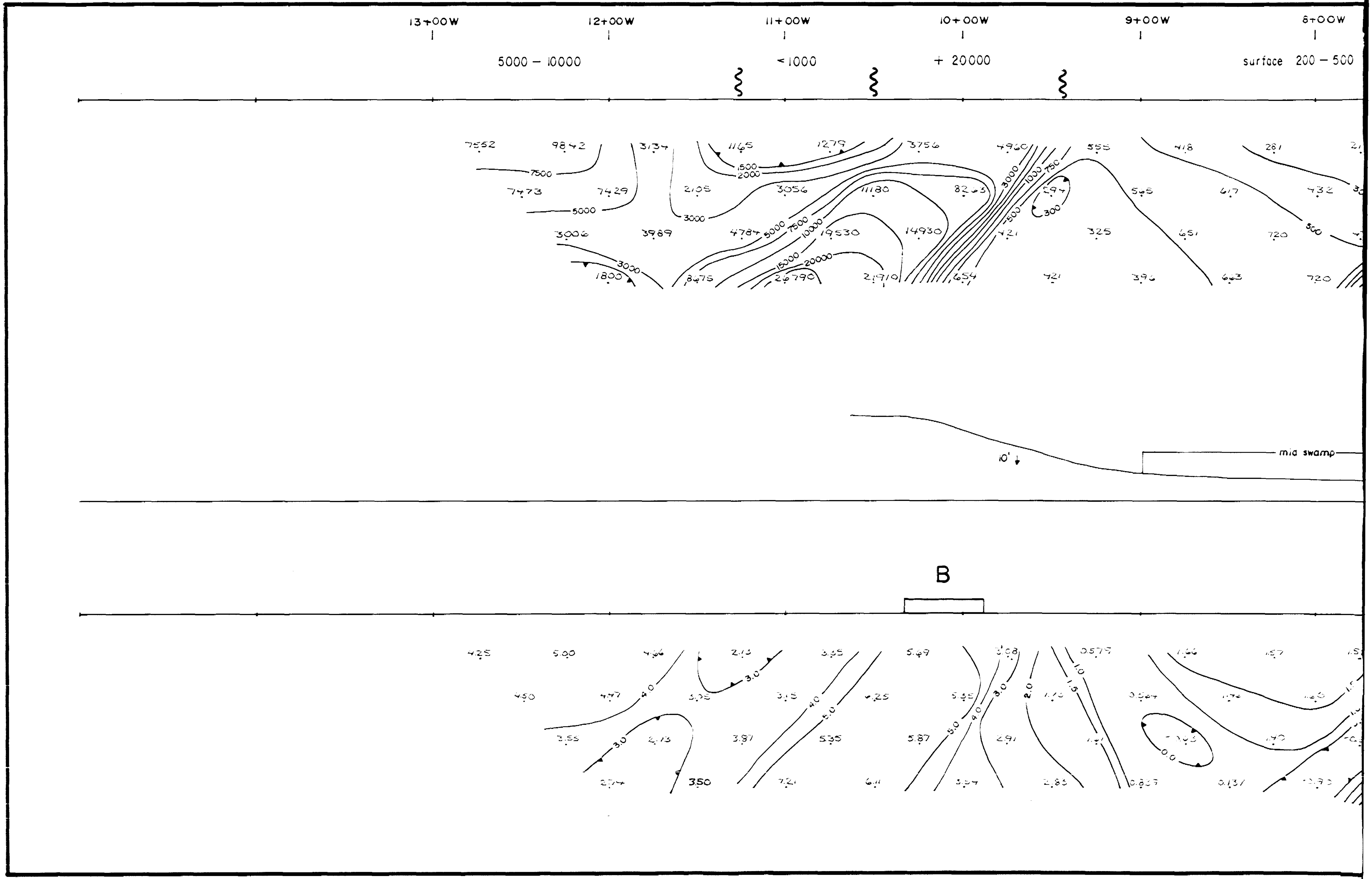


2+00W
1+00W
0+00
1+00E
2+00E
3+00E
4+00E
5+00E
+ 20 000
1000
+ 20000
10000 – 15 000
surface 200 – 500
mid swamp
10'
20'
swamp
alders
swamp
E
H
?
?

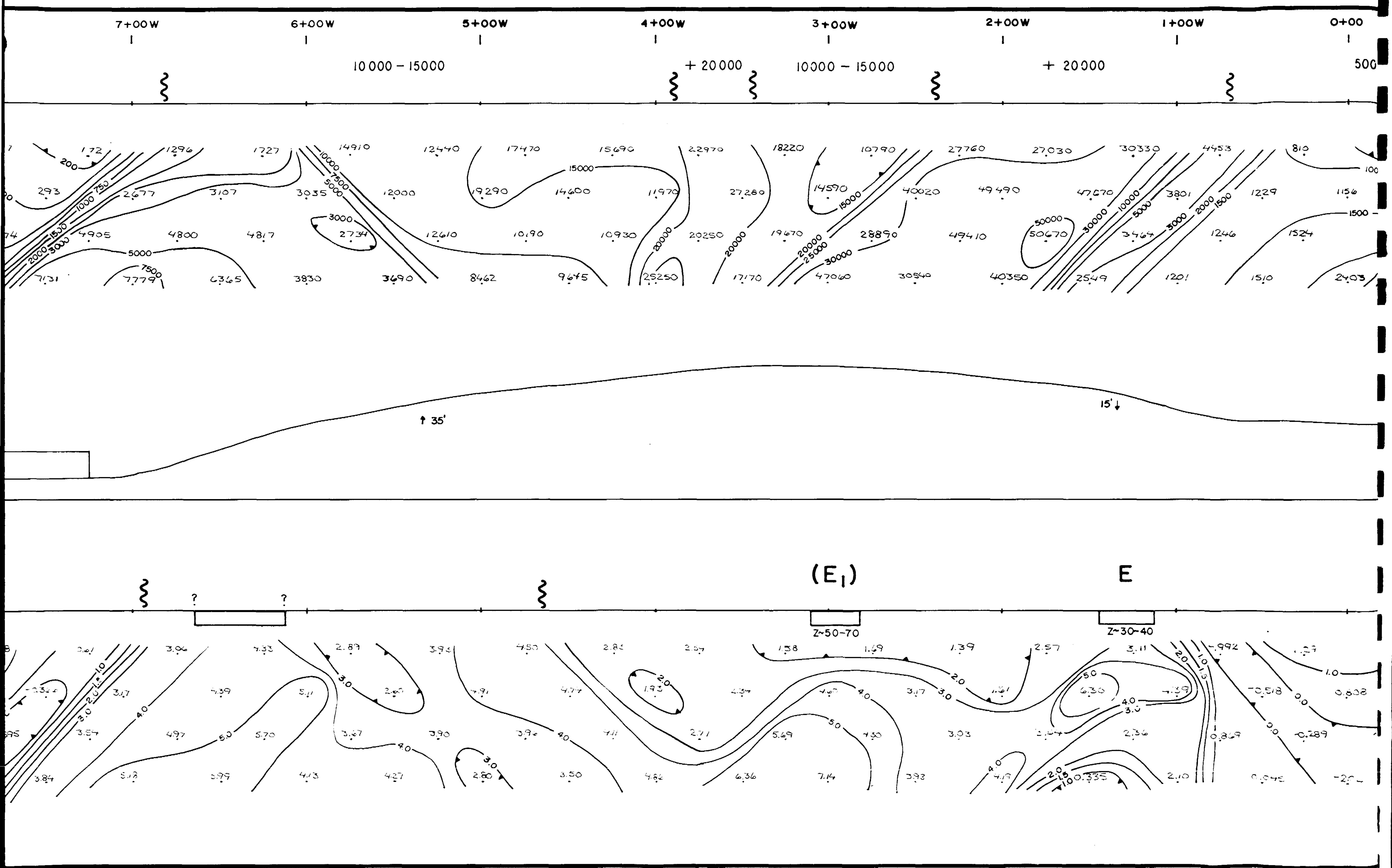

7+00W
6+00W
5+00W
4+00W
3+00W
2+00W
1+00
500
5000 – 10000
10000 – 15000 – 20 000
+ 20 000
15'
15'
10'
E



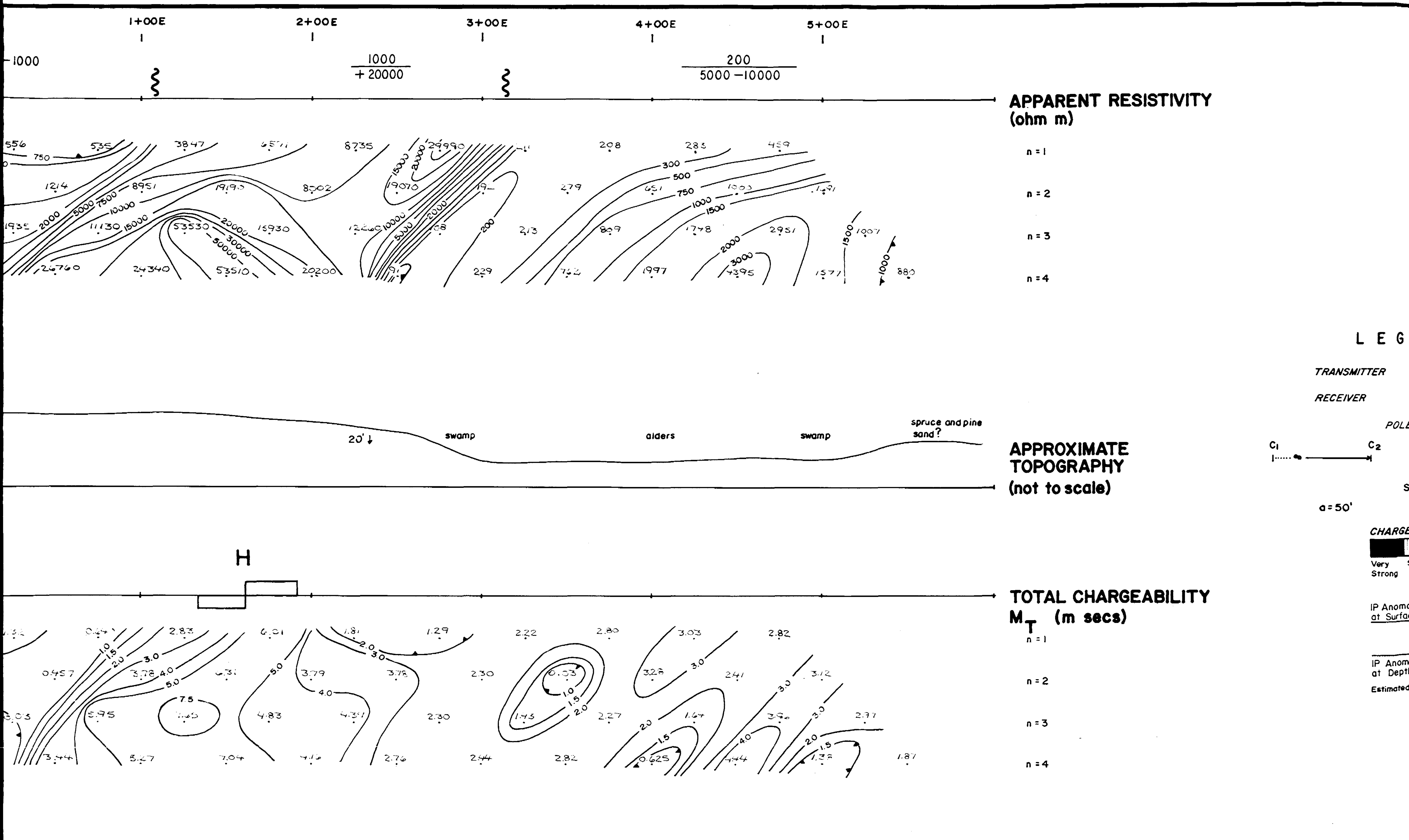
13+00W
12+00W
11+00W
10+00W
9+00W
8+00W
+ 15000
1000 - 2000
+ 20000
<500
+ 20000
surface 200-500
20'
mid swamp
B



13+00W
12+00W
11+00W
10+00W
9+00W
8+00W
5000 – 10000
<1000
+ 20000
surface 200 – 500
mid swamp
10'
B



7+00W
6+00W
5+00W
4+00W
3+00W
2+00W
1+00W
0+00
10000 – 15000
+ 20000
10000 – 15000
+ 20000
500
15'
35'
(E1)
E
Z~50-70
Z~30-40



1+00E
2+00E
3+00E
4+00E
5+00E
1000
1000
+ 20000
200
5000 – 10000
APPARENT RESISTIVITY
(ohm m)
n = 1
n = 2
n = 3
n = 4
20' ↓
swamp
alders
swamp
spruce and pine
sand?
APPROXIMATE
TOPOGRAPHY
(not to scale)
H
TOTAL CHARGEABILITY
M_T (m secs)
n = 1
n = 2
n = 3
n = 4
L E G
TRANSMITTER
RECEIVER
POLE
C1
C2
a = 50'
CHARGEA
Very
Strong
IP Anomaly
at Surface
IP Anomaly
at Depth
Estimated

APPARENT RESISTIVITY (ohm m)

n = 1

n = 2

n = 3

n = 4

spruce and pine
sand?

APPROXIMATE TOPOGRAPHY (not to scale)

TOTAL CHARGEABILITY M_T (m secs)

n = 1

n = 2

n = 3

n = 4

L E G E N D

TRANSMITTER	*Huntec 2.5 kw.*
RECEIVER	*Huntec Mk IV*

POLE DIPOLE ARRAY

C_1 C_2 na P_1 a P_2

Station Location

a = 50'   n = 1,2,3,4

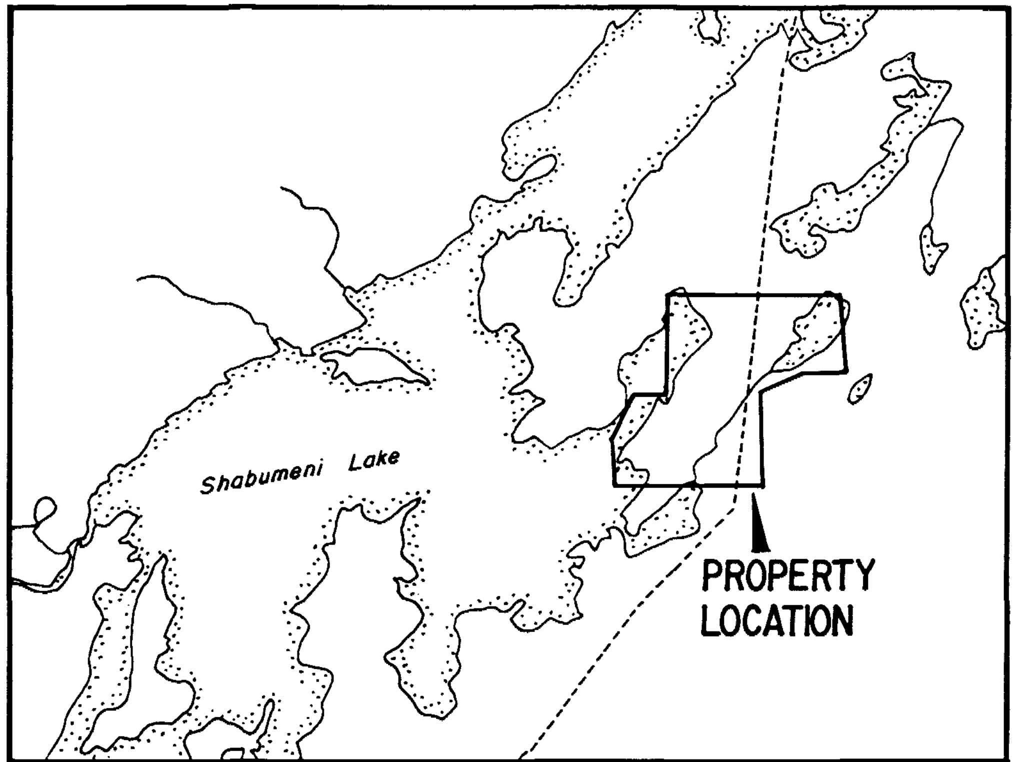
CHARGEABILITY HIGH

Very Strong   Strong   Mod.   Weak

IP Anomaly at Surface

IP Anomaly at Depth

Estimated Depth (ft.) Z ~ 10



DETAILED LOCATION MAP

SCALE
1/2 0 1
MILES

S C A L E
25 0 25 50 75 100
FEET

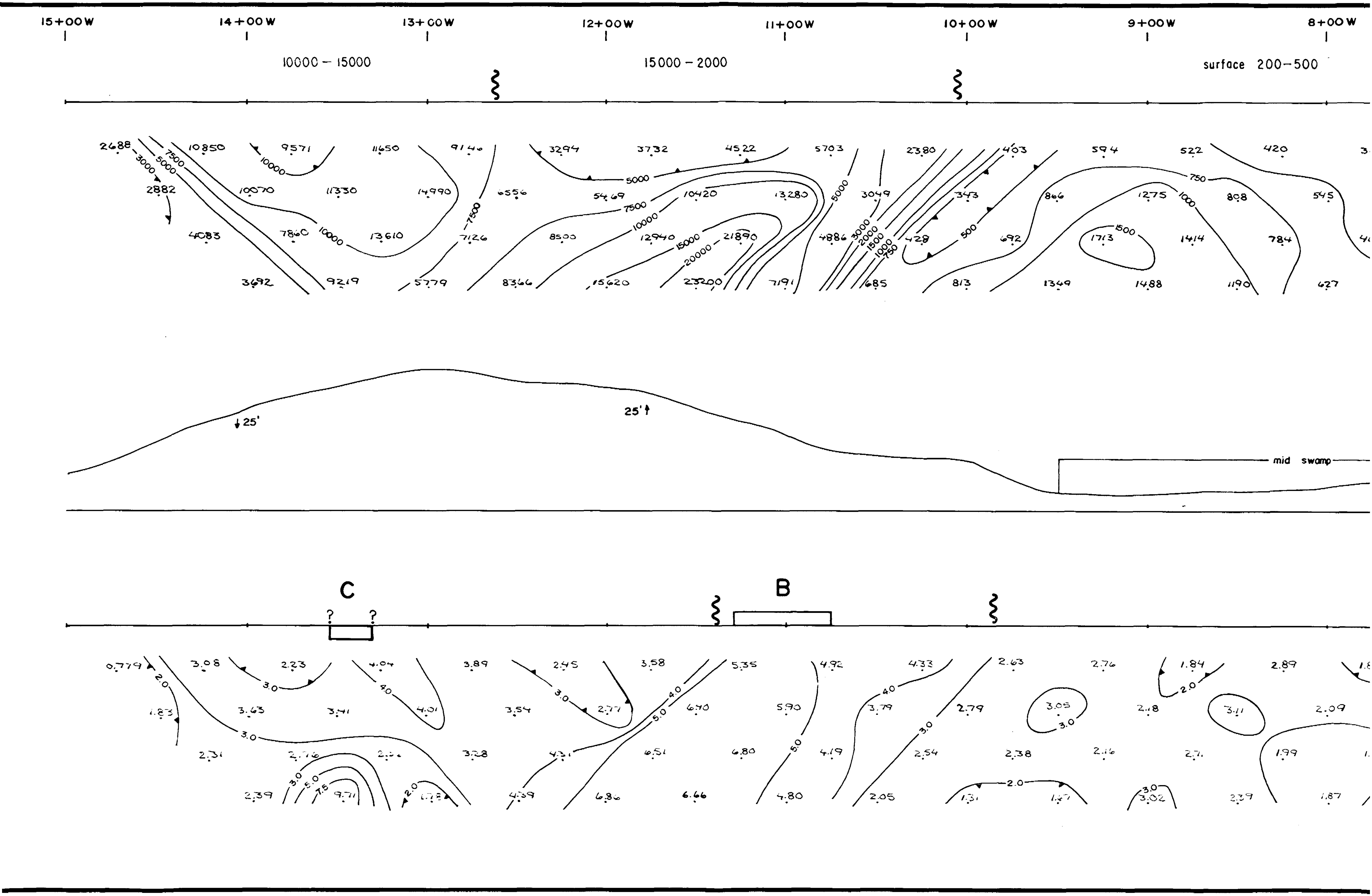
MARILYN RESOURCES LTD.

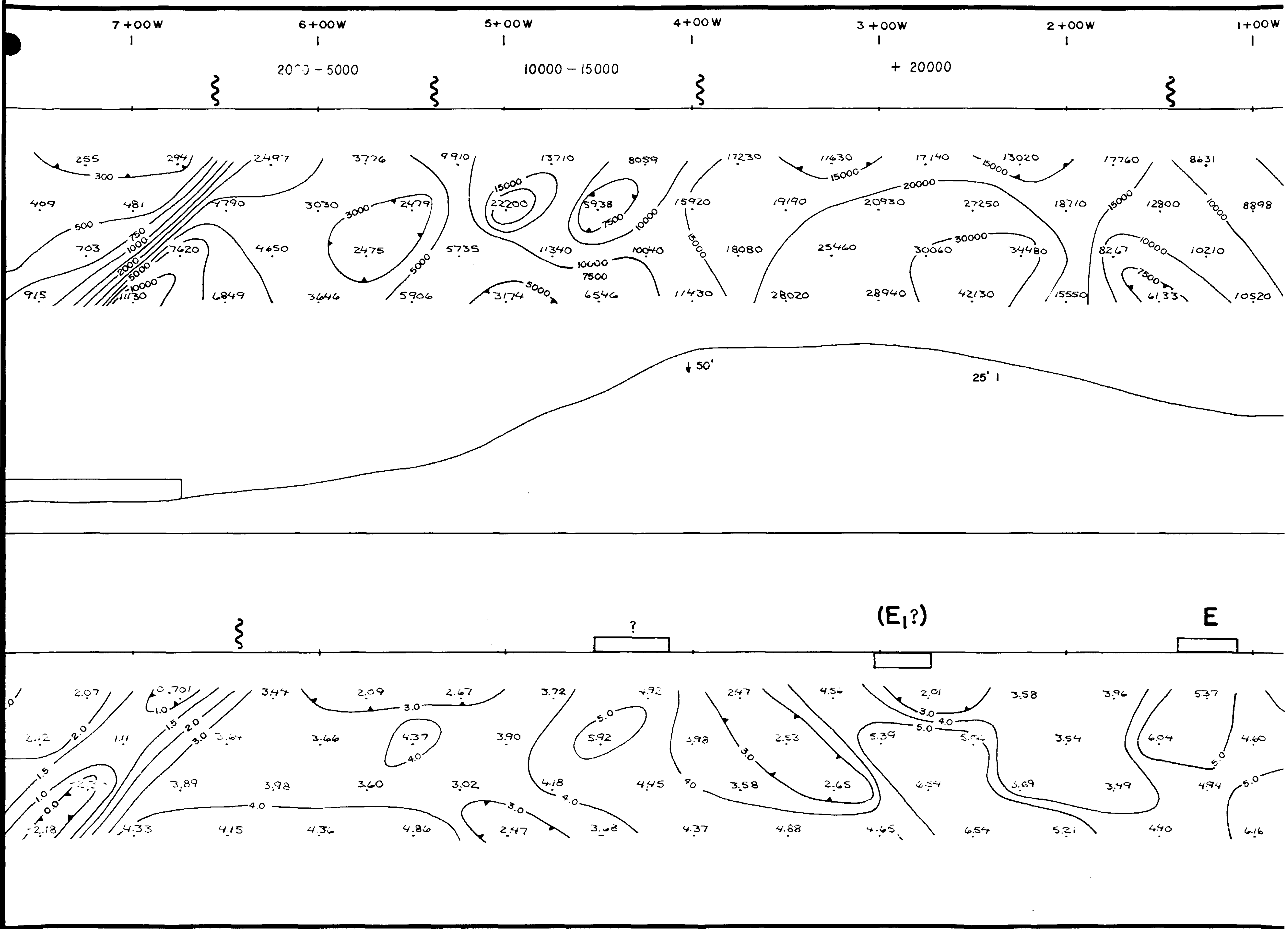
SHABUMENI LAKE PROJECT
INDUCED POLARIZATION SURVEY
PSEUDOSECTION

LINE 10+00 SOUTH

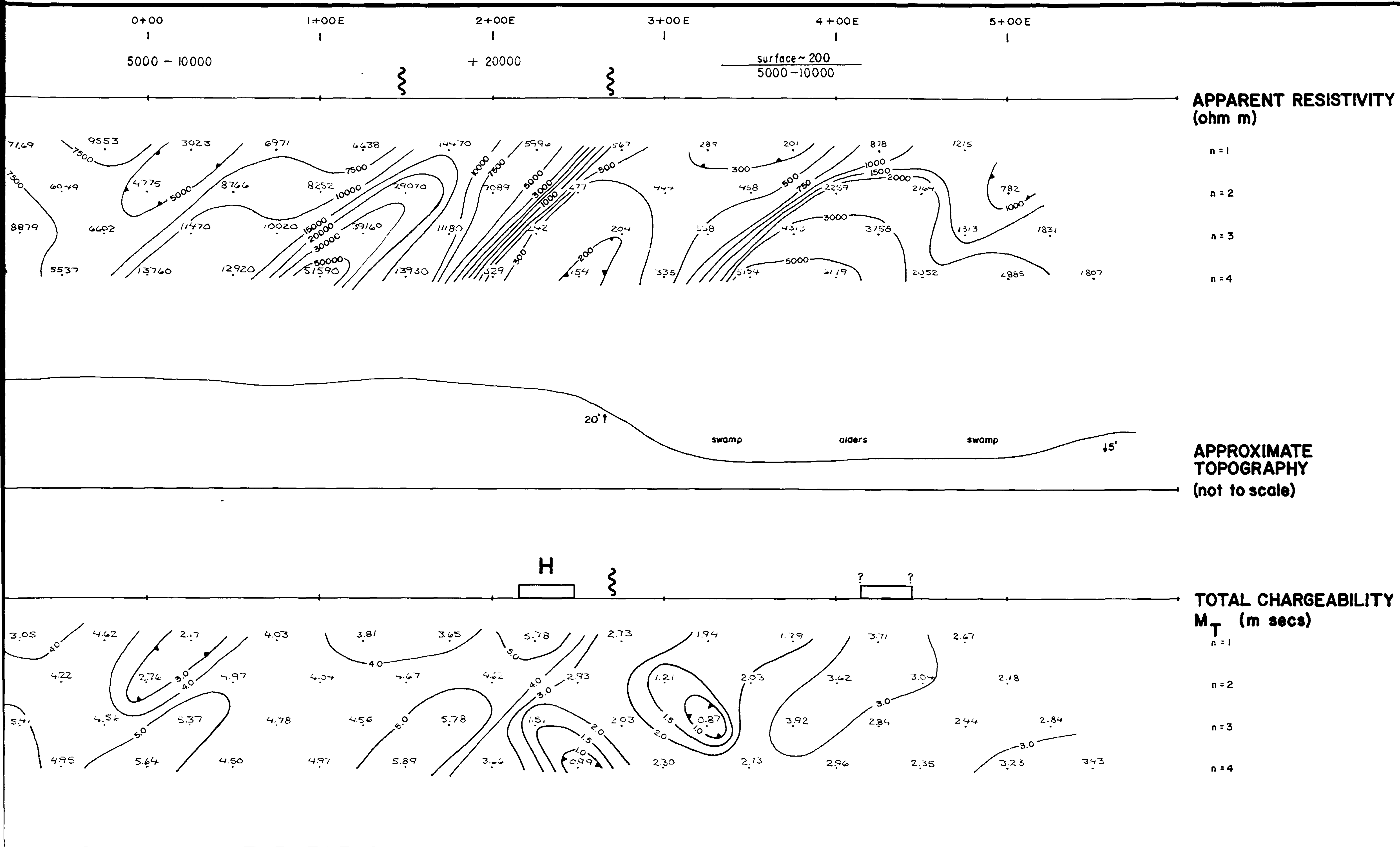
Project No. C-970	By: D.Hall
Scale: 1:600	Drawn: MPH
Drawing No. Figure P-8	Date: February, 1987

MPH Consulting Limited


15+00W
14+00W
13+00W
12+00W
11+00W
10+00W
9+00W
8+00W
10000 – 15000
15000 – 2000
surface 200–500
25'
25'
mid swamp
C
B



7+00W
6+00W
5+00W
4+00W
3+00W
2+00W
1+00W
10000 – 15000
+ 20000
50'
25'
?
(E1?)
E


0+00
1+00E
2+00E
3+00E
4+00E
5+00E
5000 – 10000
+ 20000
surface ~ 200
5000 – 10000
APPARENT RESISTIVITY
(ohm m)
n = 1
n = 2
n = 3
n = 4
20'
swamp
alders
swamp
5'
APPROXIMATE
TOPOGRAPHY
(not to scale)
H
?
?
TOTAL CHARGEABILITY
M_T (m secs)
n = 1
n = 2
n = 3
n = 4

1831

1807

APPARENT RESISTIVITY (ohm m)

n = 1

n = 2

n = 3

n = 4

15'

APPROXIMATE TOPOGRAPHY (not to scale)

TOTAL CHARGEABILITY M_T (m secs)

n = 1

n = 2

n = 3

n = 4

2.84

3.43

L E G E N D

TRANSMITTER — *Huntec 2.5 kw.*

RECEIVER — *Huntec Mk IV*

POLE DIPOLE ARRAY

C_1 ······ ∞ ——— C_2 — na (Station Location) — P_1 ——— a ——— P_2

a = 50' n=1,2,3,4

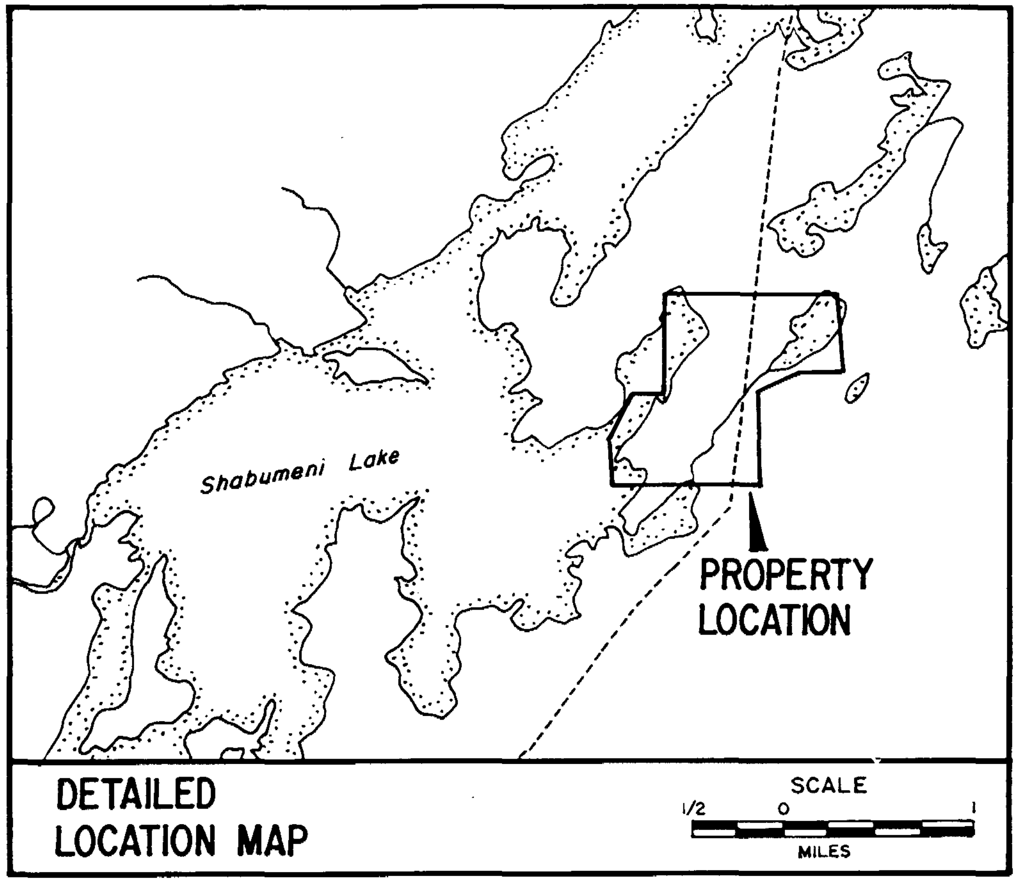
CHARGEABILITY HIGH

Very Strong | Strong | Mod. | Weak

IP Anomaly at Surface

IP Anomaly at Depth

Estimated Depth (ft.) Z ~ 10



SCALE

25 0 25 50 75 100

FEET

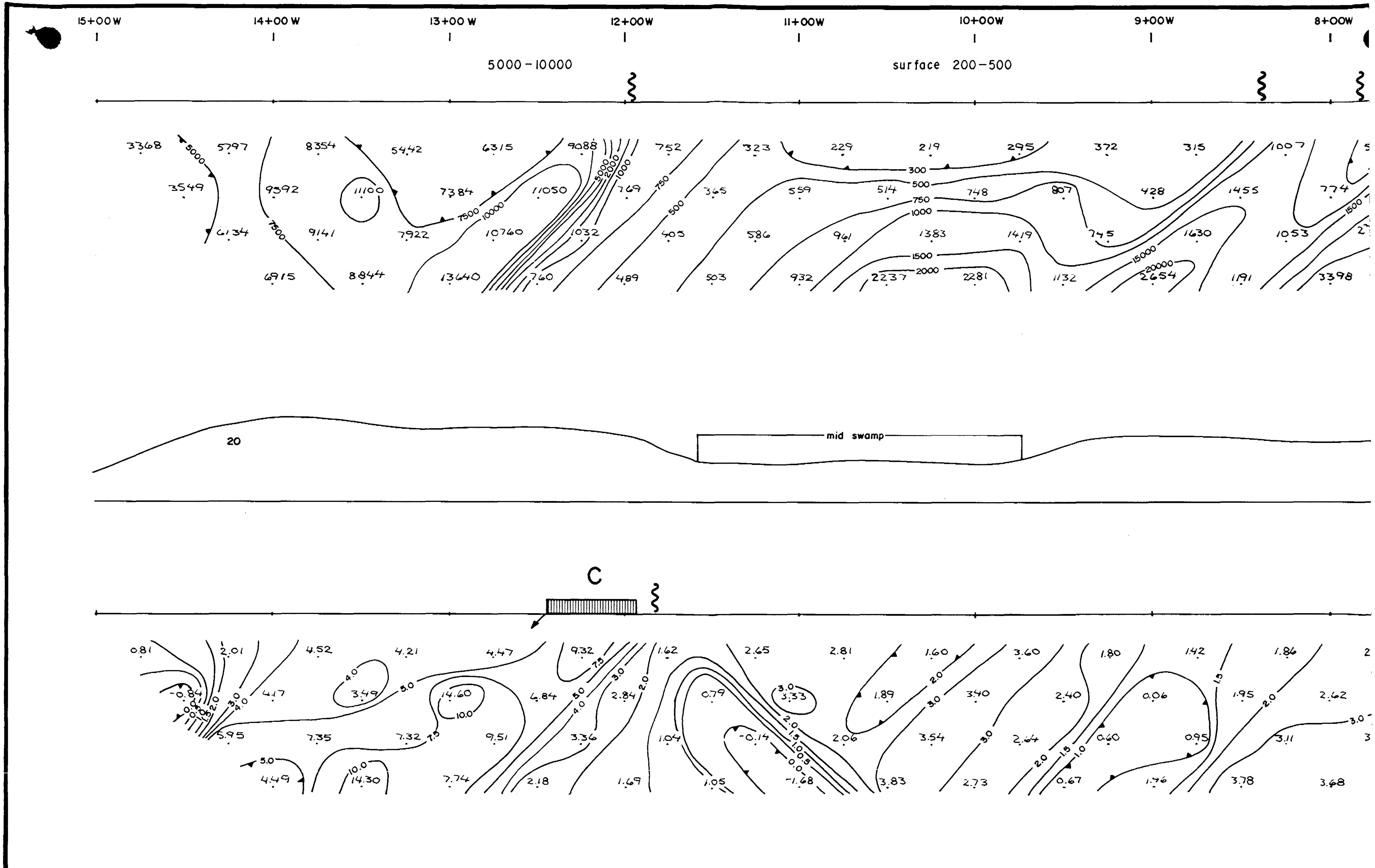
MARILYN RESOURCES LTD.

SHABUMENI LAKE PROJECT
INDUCED POLARIZATION SURVEY
PSEUDOSECTION

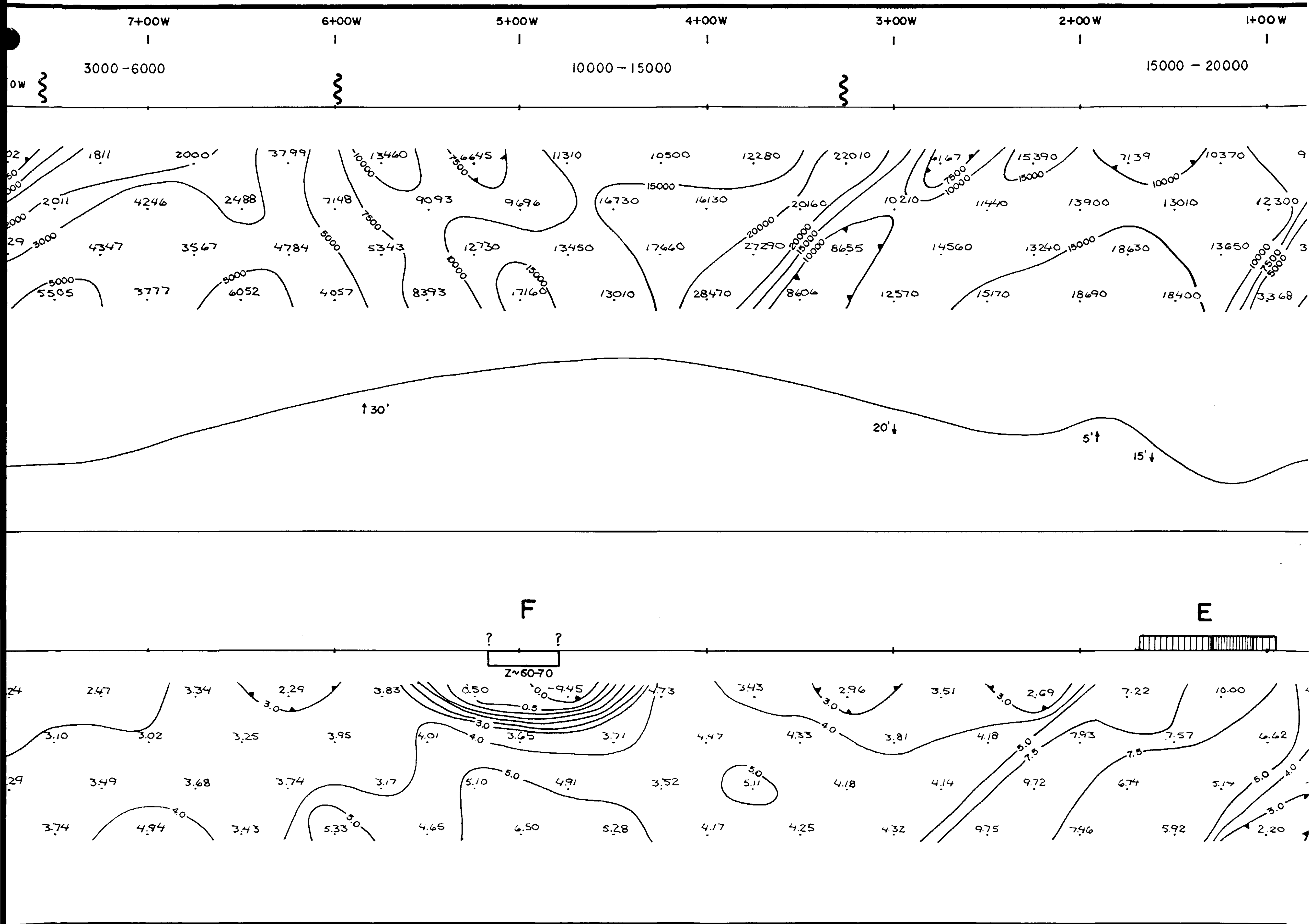
LINE 12+00 SOUTH

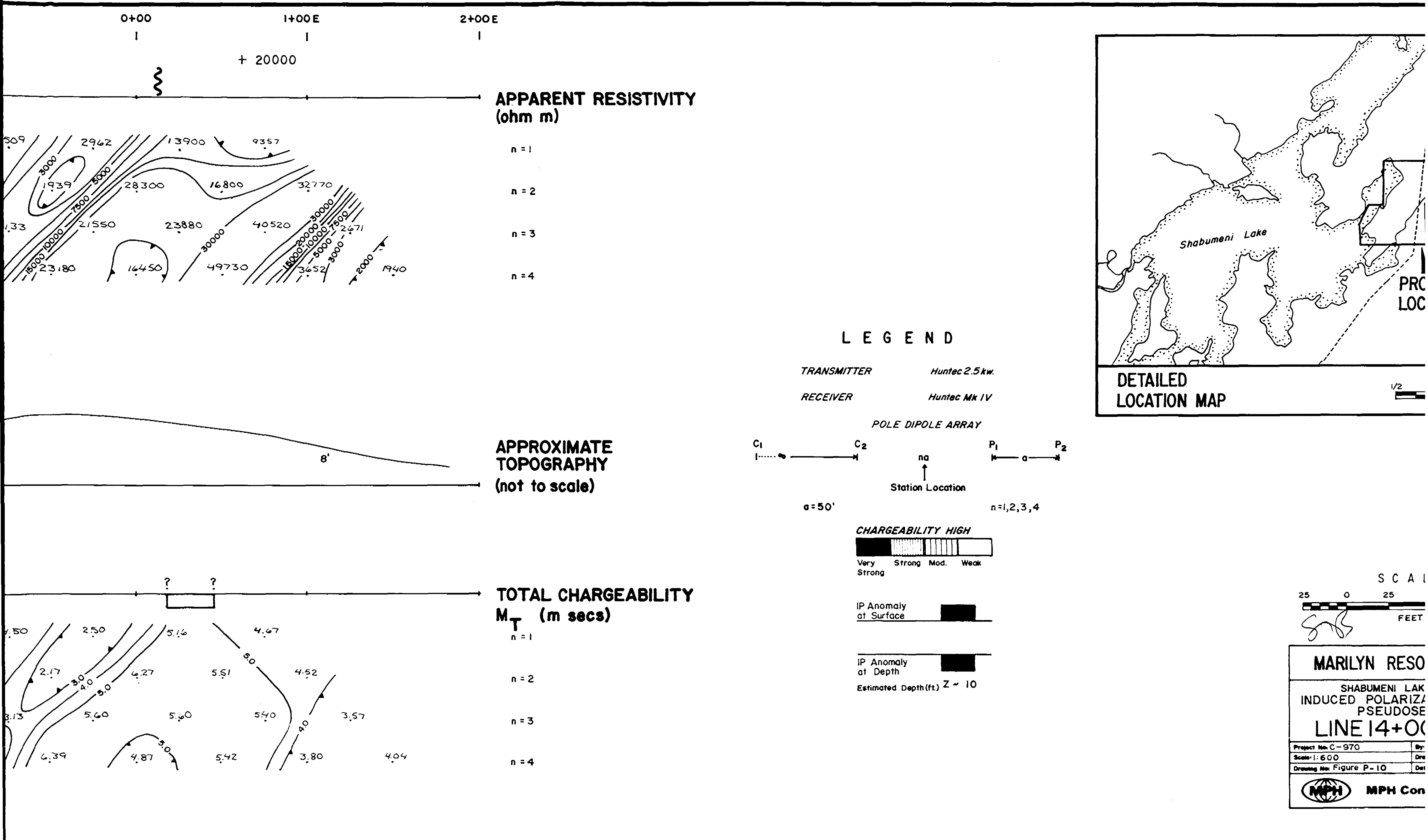
Project No. C-970	By: D. Hall
Scale: 1:600	Drawn: MPH
Drawing No. Figure P-9	Date: February, 1987

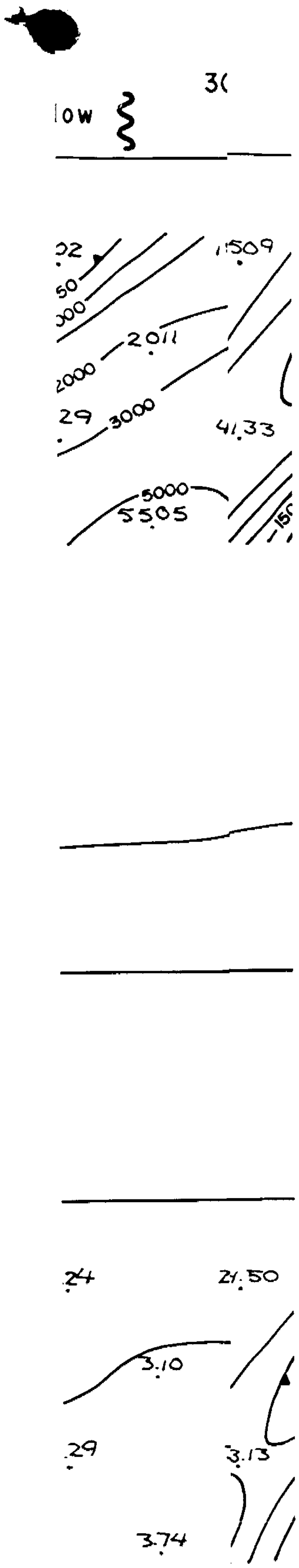
MPH Consulting Limited

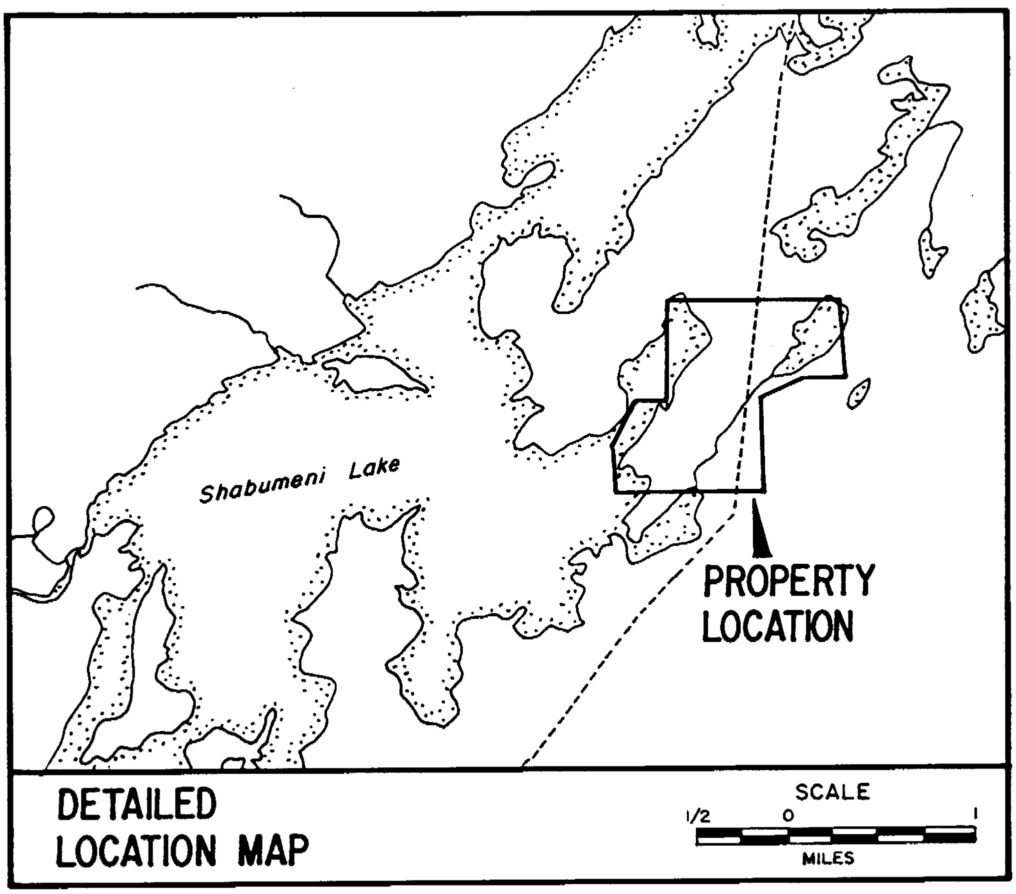


15+00W
14+00W
13+00W
12+00W
11+00W
10+00W
9+00W
8+00W
5000 - 10000
surface 200-500
20
mid swamp
C


7+00W
6+00W
5+00W
4+00W
3+00W
2+00W
1+00W
3000-6000
10000-15000
15000 - 20000
↑30'
20'↓
5'↑
15'↓
F
E
Z~60-70


0+00
1+00 E
2+00 E
+ 20000
APPARENT RESISTIVITY
(ohm m)
n = 1
n = 2
n = 3
n = 4
APPROXIMATE
TOPOGRAPHY
(not to scale)
8'
TOTAL CHARGEABILITY
M_T (m secs)
n = 1
n = 2
n = 3
n = 4
L E G E N D
TRANSMITTER Huntec 2.5 kw.
RECEIVER Huntec Mk IV
POLE DIPOLE ARRAY
C1 C2 na P1 a P2
Station Location
a = 50'
n = 1,2,3,4
CHARGEABILITY HIGH
Very Strong
Strong
Mod.
Weak
IP Anomaly at Surface
IP Anomaly at Depth
Estimated Depth (ft.) Z ~ 10
Shabumeni Lake
DETAILED LOCATION MAP
SCAL
FEET
MARILYN RESO
SHABUMENI LAK
INDUCED POLARIZA
PSEUDOSE
LINE 14+0
Project No. C-970
Scale: 1:600
Drawing No. Figure P-10
MPH Con





SCALE

25 0 25 50 75 100

FEET

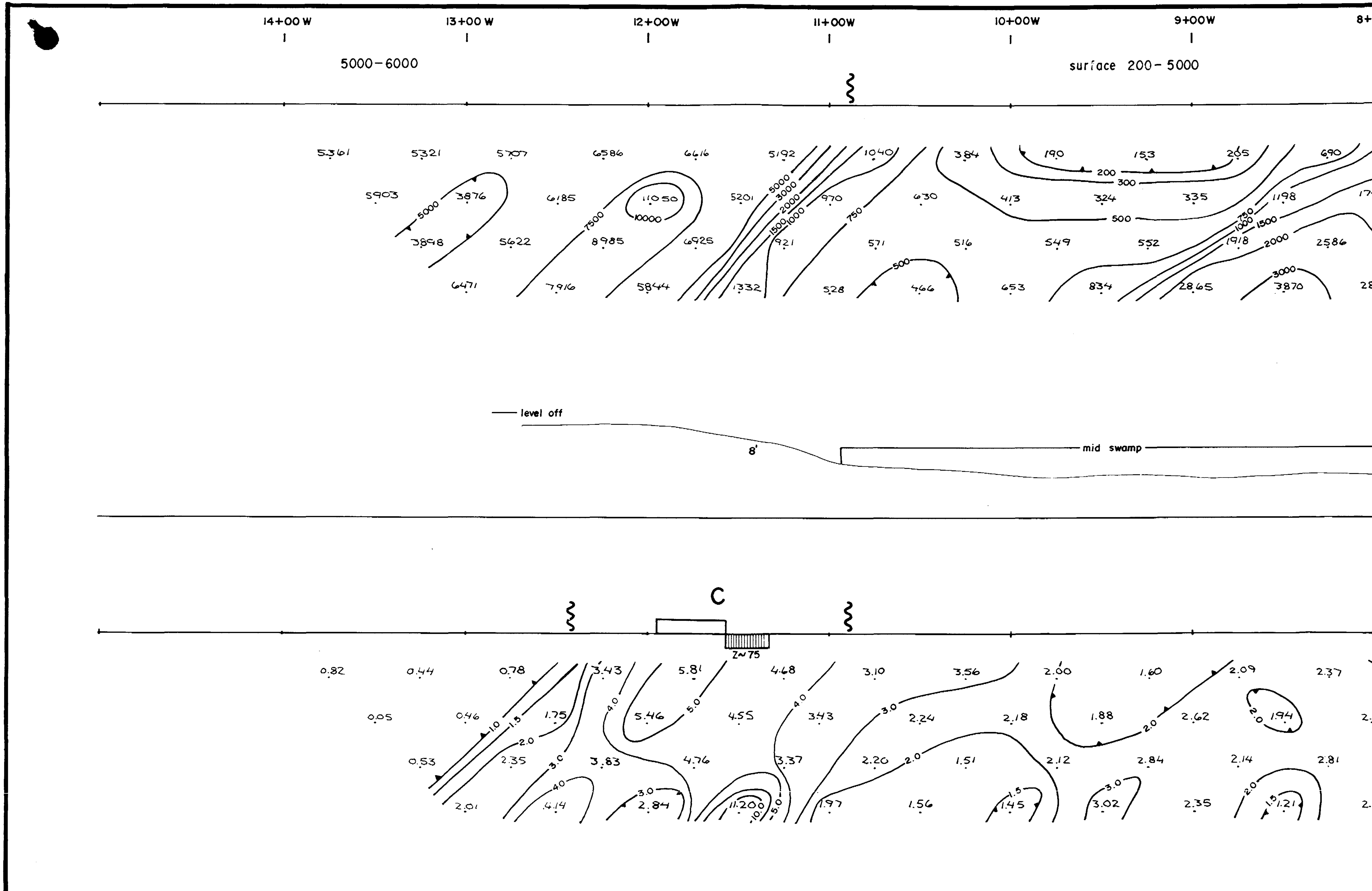
MARILYN RESOURCES LTD.

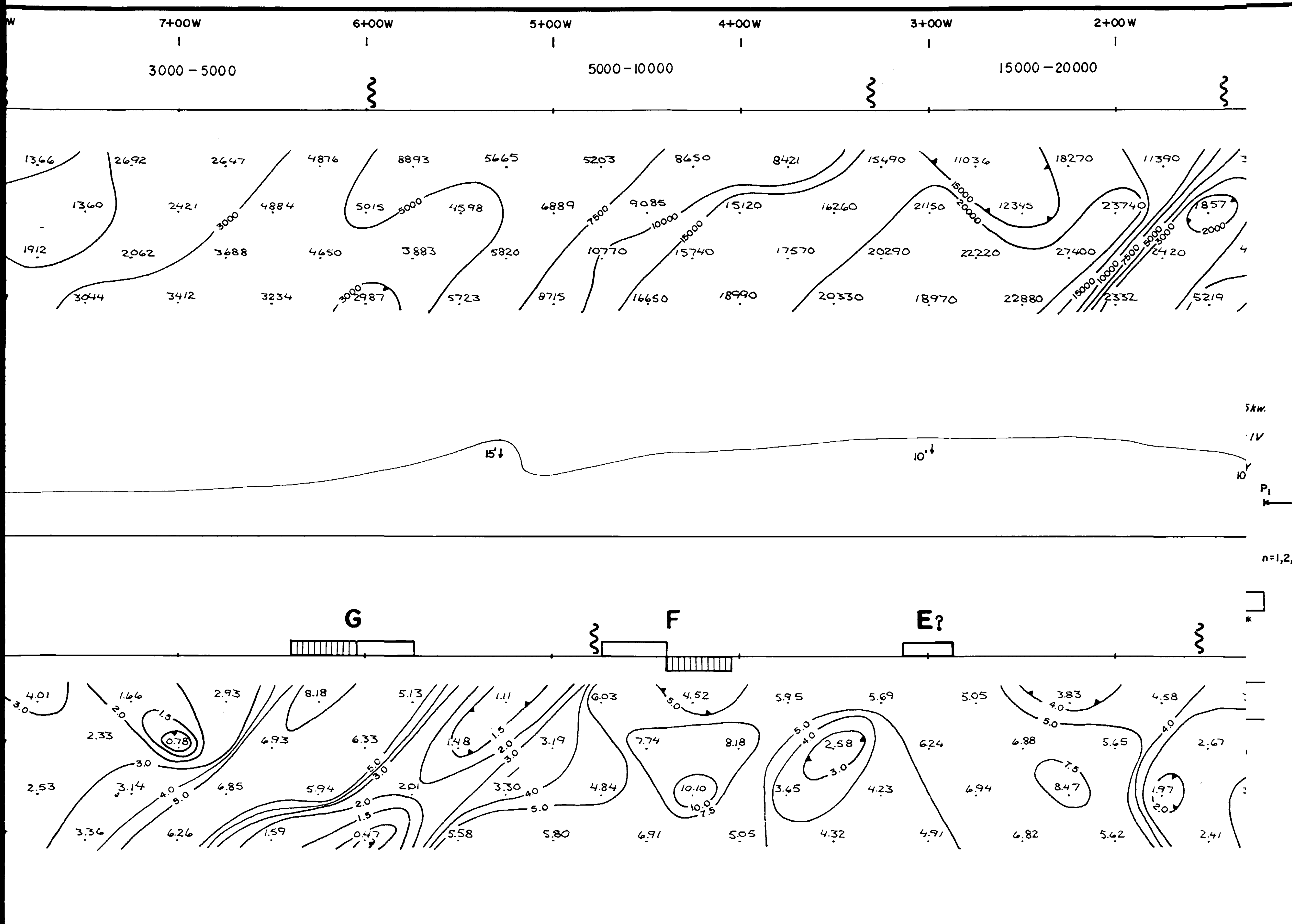
SHABUMENI LAKE PROJECT
INDUCED POLARIZATION SURVEY
PSEUDOSECTION

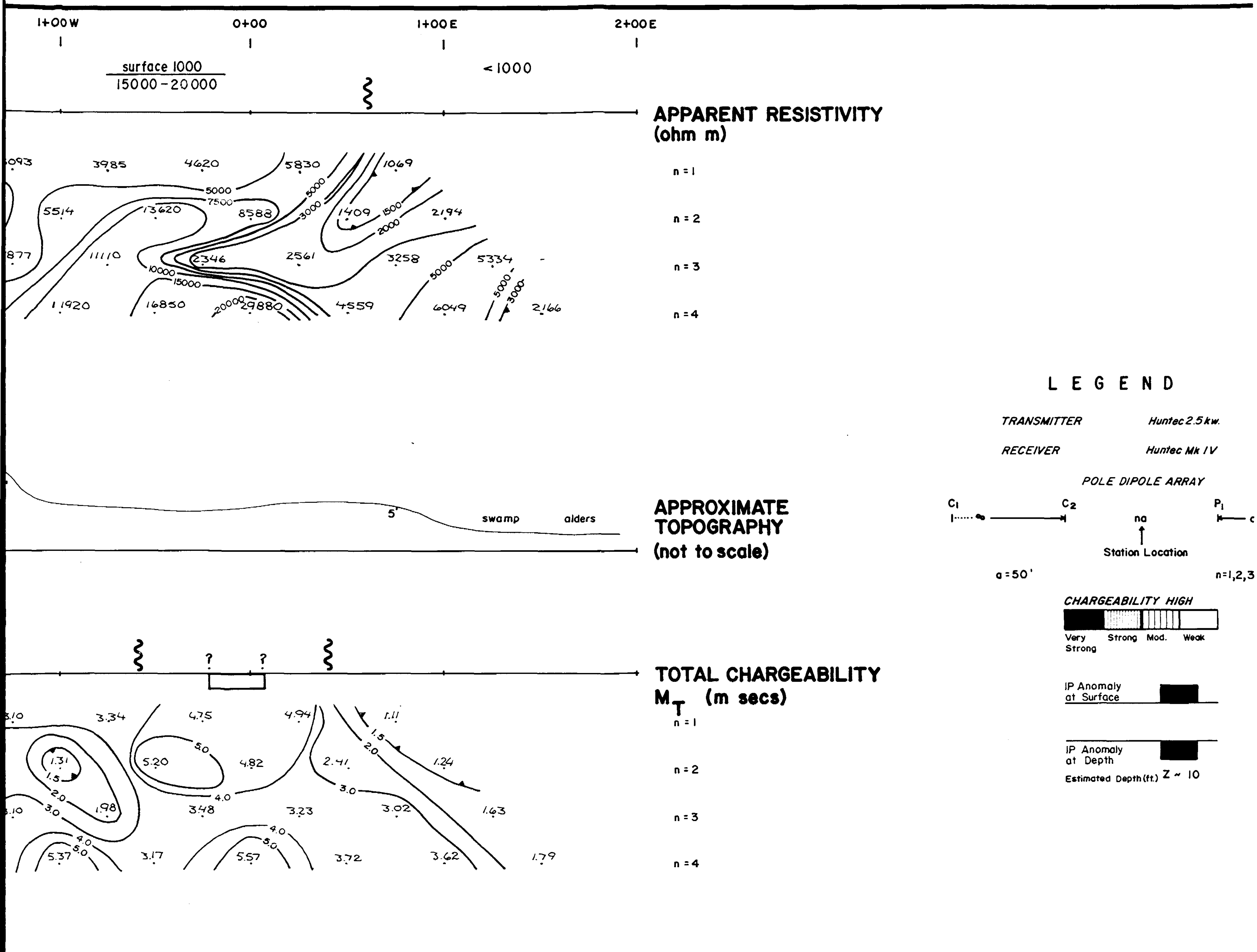
LINE 14+00 SOUTH

Project No. C – 970	By: D. Hall
Scale: 1:600	Drawn: MPH
Drawing No. Figure P-10	Date: February, 1987

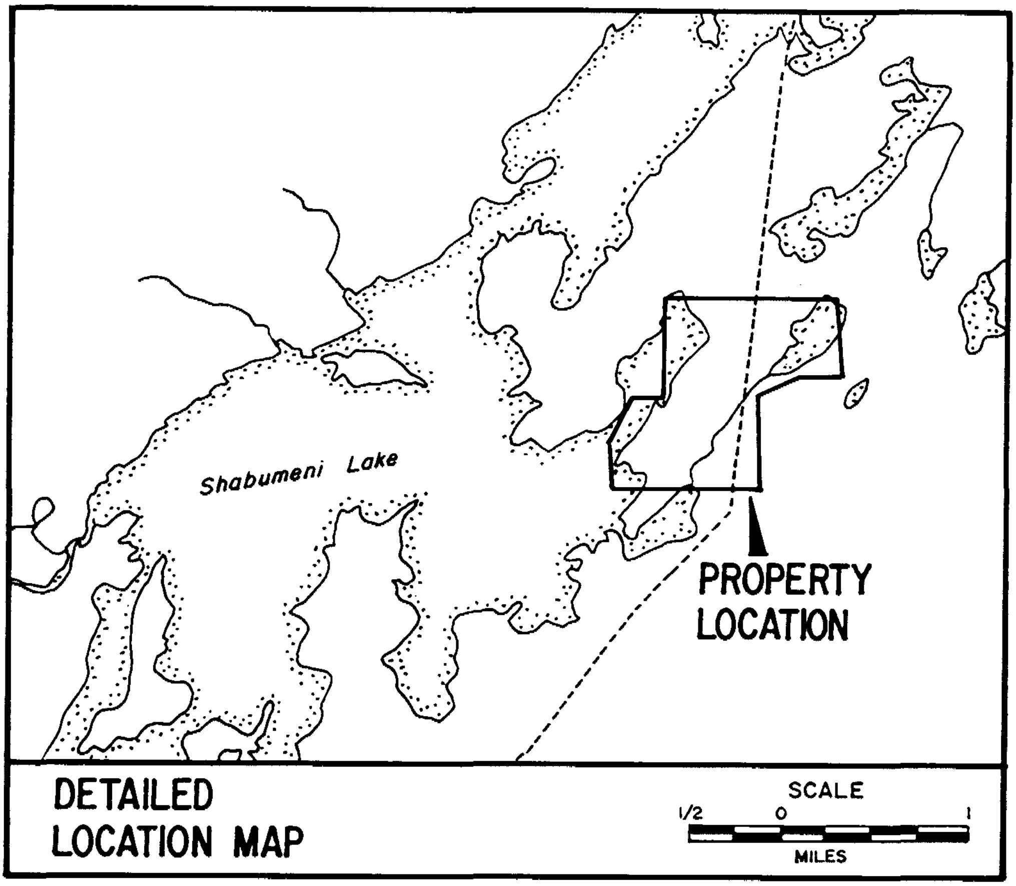
MPH Consulting Limited


14+00 W
13+00 W
12+00W
11+00W
10+00W
9+00W
8+00
5000-6000
surface 200-5000
level off
8'
mid swamp
C
Z~75


7+00W
6+00W
5+00W
4+00W
3+00W
2+00W
3000 – 5000
5000 – 10000
15000 – 20000
15'
10'
5kw.
P1
n=1,2,3
G
F
E?



1+00W
0+00
1+00E
2+00E
surface 1000
15000 - 20000
<1000
APPARENT RESISTIVITY (ohm m)
n = 1
n = 2
n = 3
n = 4
APPROXIMATE TOPOGRAPHY (not to scale)
5'
swamp
alders
TOTAL CHARGEABILITY M_T (m secs)
n = 1
n = 2
n = 3
n = 4
LEGEND
TRANSMITTER Huntec 2.5 kw.
RECEIVER Huntec Mk IV
POLE DIPOLE ARRAY
C_1
C_2
P_1
na
Station Location
a = 50'
n = 1,2,3
CHARGEABILITY HIGH
Very Strong
Strong
Mod.
Weak
IP Anomaly at Surface
IP Anomaly at Depth
Estimated Depth (ft.) Z ~ 10



P2

4

SCALE

25 0 25 50 75 100

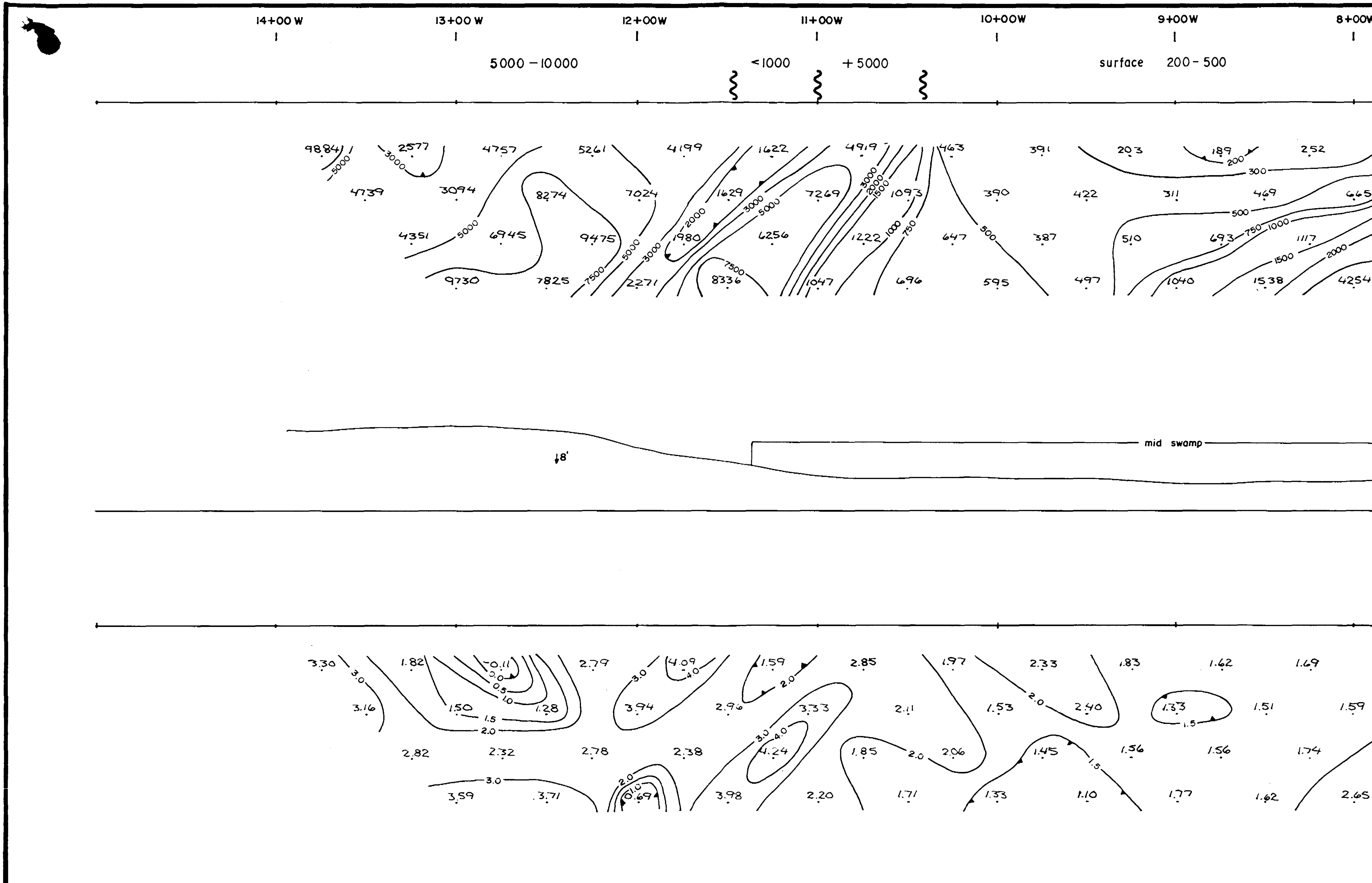
FEET

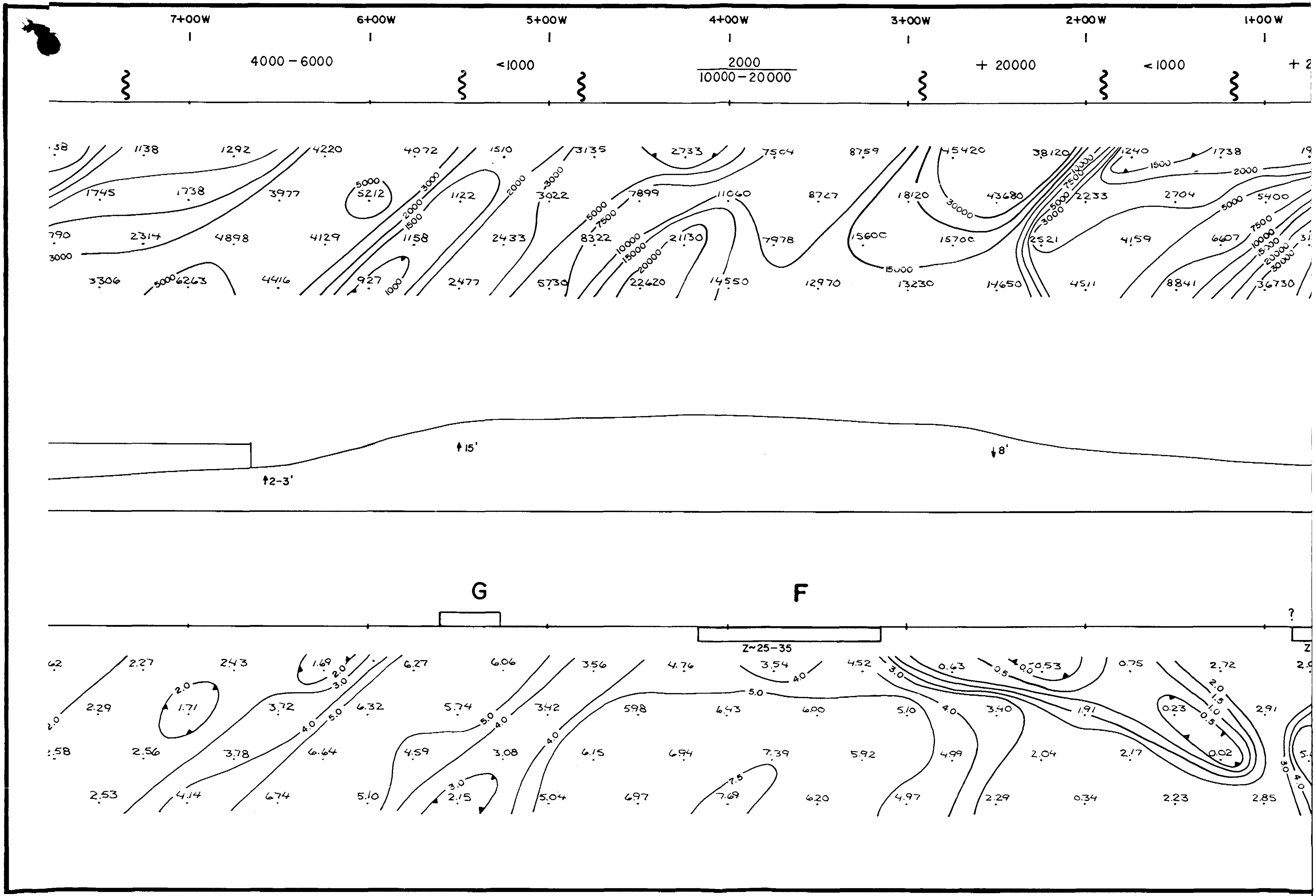
MARILYN RESOURCES LTD.

SHABUMENI LAKE PROJECT
INDUCED POLARIZATION SURVEY
PSEUDOSECTION
LINE 16+00 SOUTH

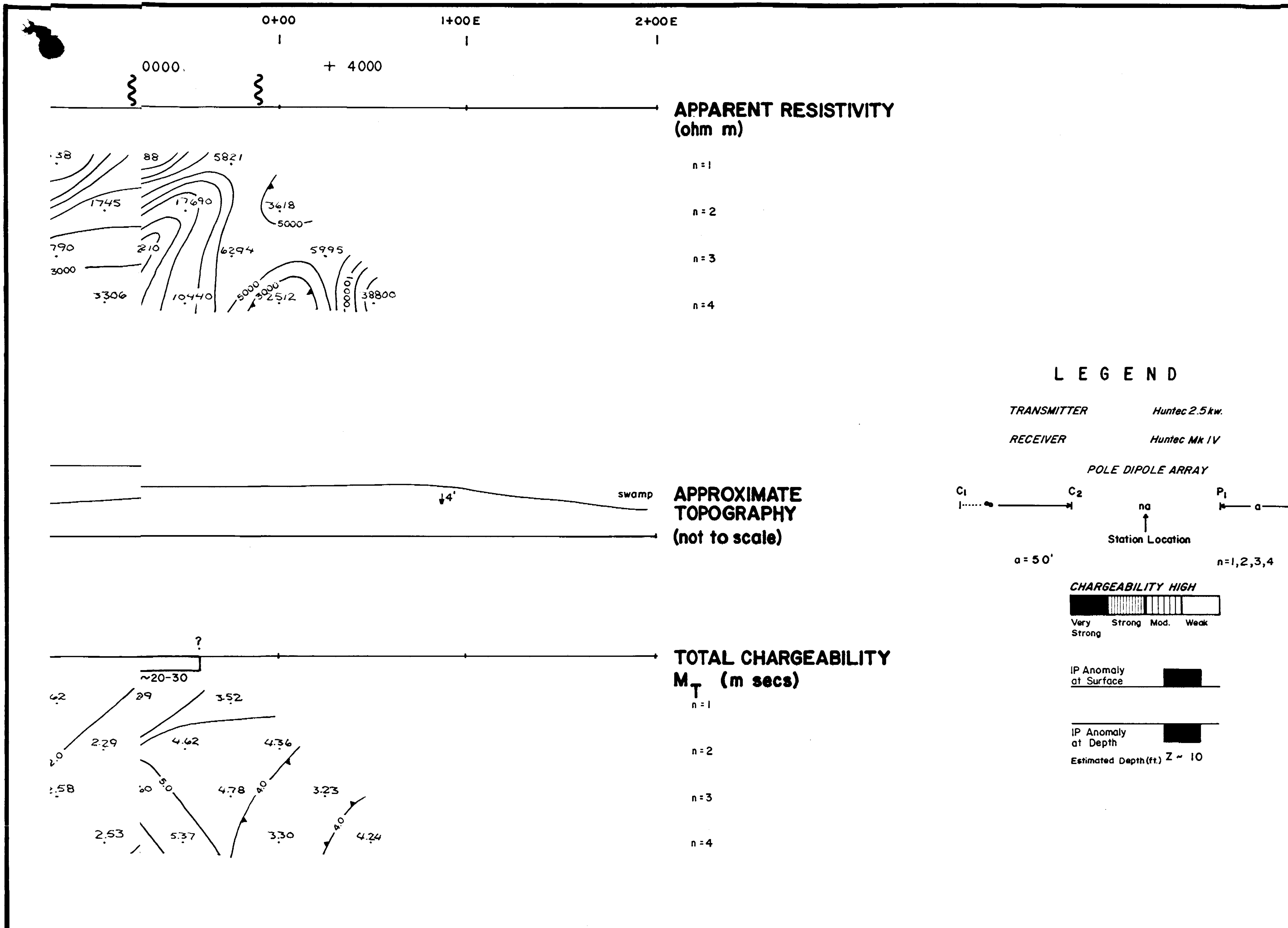
Project No. C-970	By: D. Hall
Scale: 1: 600	Drawn: MPH
Drawing No. Figure P-11	Date: February, 1987

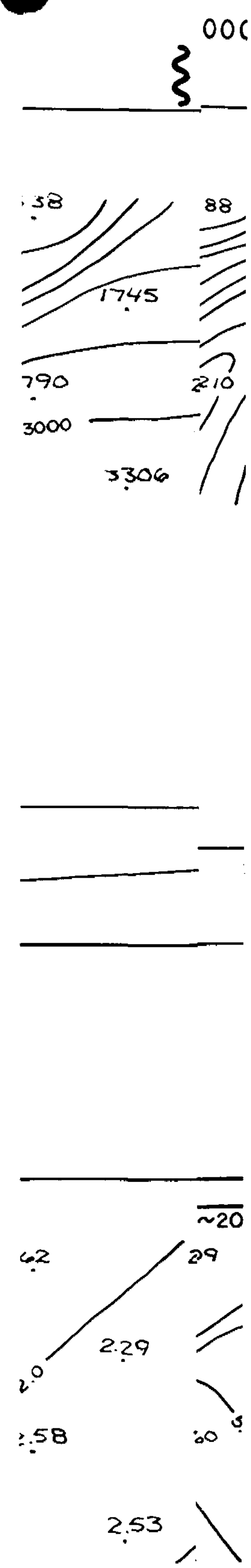
MPH Consulting Limited

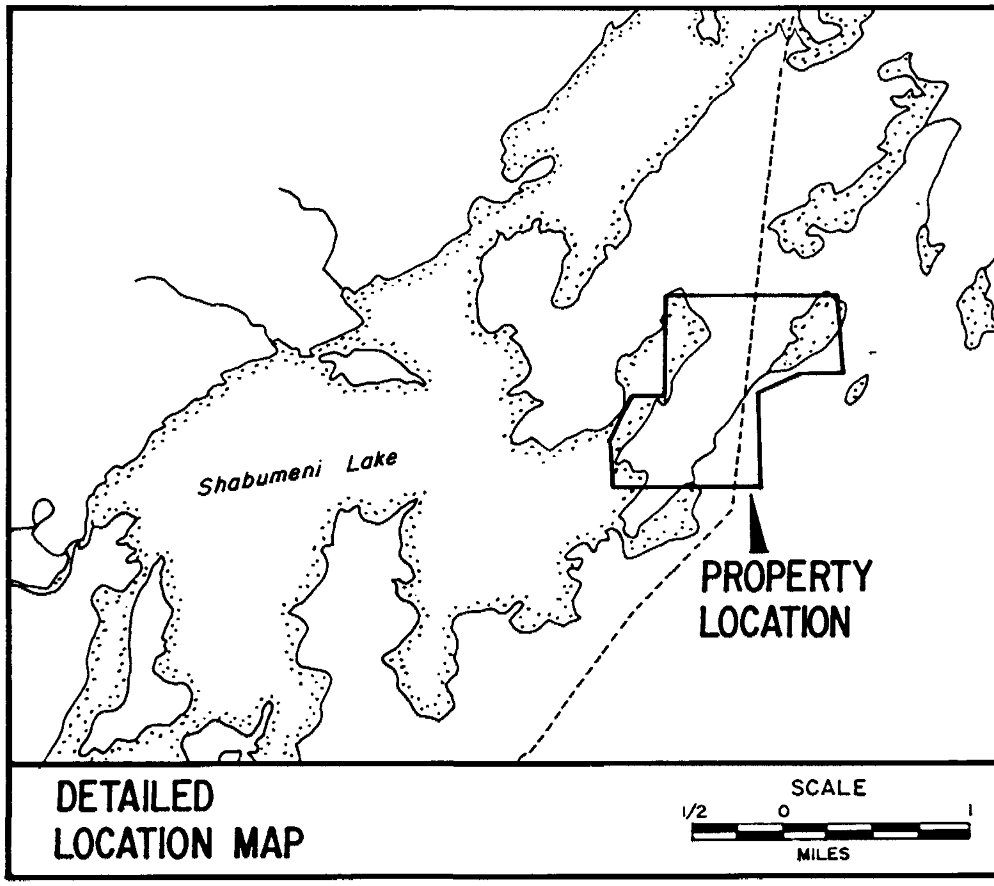

14+00 W
13+00 W
12+00W
11+00W
10+00W
9+00W
8+00W
5000 – 10000
<1000
+5000
surface
200 - 500
8'
mid swamp



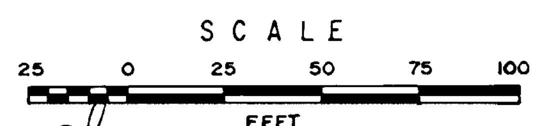
7+00W
6+00W
5+00W
4+00W
3+00W
2+00W
1+00W
4000 – 6000
<1000
2000
10000 – 20000
+ 20000
<1000
15'
8'
2-3'
G
F
Z~25-35
?


0+00
1+00 E
2+00 E
0000.
+ 4000
APPARENT RESISTIVITY
(ohm m)
n = 1
n = 2
n = 3
n = 4
APPROXIMATE
TOPOGRAPHY
(not to scale)
swamp
↓4'
TOTAL CHARGEABILITY
M_T (m secs)
~20-30
?
L E G E N D
TRANSMITTER Huntec 2.5 kw.
RECEIVER Huntec Mk IV
POLE DIPOLE ARRAY
C1
C2
P1
P2
na
a
Station Location
a = 50'
n=1,2,3,4
CHARGEABILITY HIGH
Very Strong
Strong
Mod.
Weak
IP Anomaly at Surface
IP Anomaly at Depth
Estimated Depth (ft.) Z ~ 10





DETAILED LOCATION MAP



MARILYN RESOURCES LTD.

SHABUMENI LAKE PROJECT
INDUCED POLARIZATION SURVEY
PSEUDOSECTION

LINE 18+00 SOUTH

Project No. C-970	By: D. Hall
Scale: 1: 600	Drawn: MPH
Drawing No. Figure P-12	Date: February, 1987

MPH Consulting Limited

52N07SE0019

900

December 9, 1987

Your File: 70-87
Our File: 2.10445

Mining Recorder
Ministry of Northern Development and Mines
P.O. Box 324
Red Lake, Ontario
POV 2MO

ONTARIO GEOLOGICAL SURVEY
ASSESSMENT FILES
RESEARCH OFFICE
DEC 17 1987
RECEIVED

Dear Madam:

RE: Notice of Intent dated November 24, 1987
Geophysical (Electromagnetic and Magnetometer) Survey
on Mining Claims KRL 870344 et al in Shabumeni Lake Area

The assessment work credits, as listed with the above-mentioned Notice of Intent, have been approved as of the above date.

Please inform the recorded holder of these mining claims and so indicate on your records.

Yours sincerely,

W.R. Cowan, Manager
Mining Lands Section
Mines and Minerals Division

Whitney Block, Room 6610
Queen's Park
Toronto, Ontario
M7A 1W3

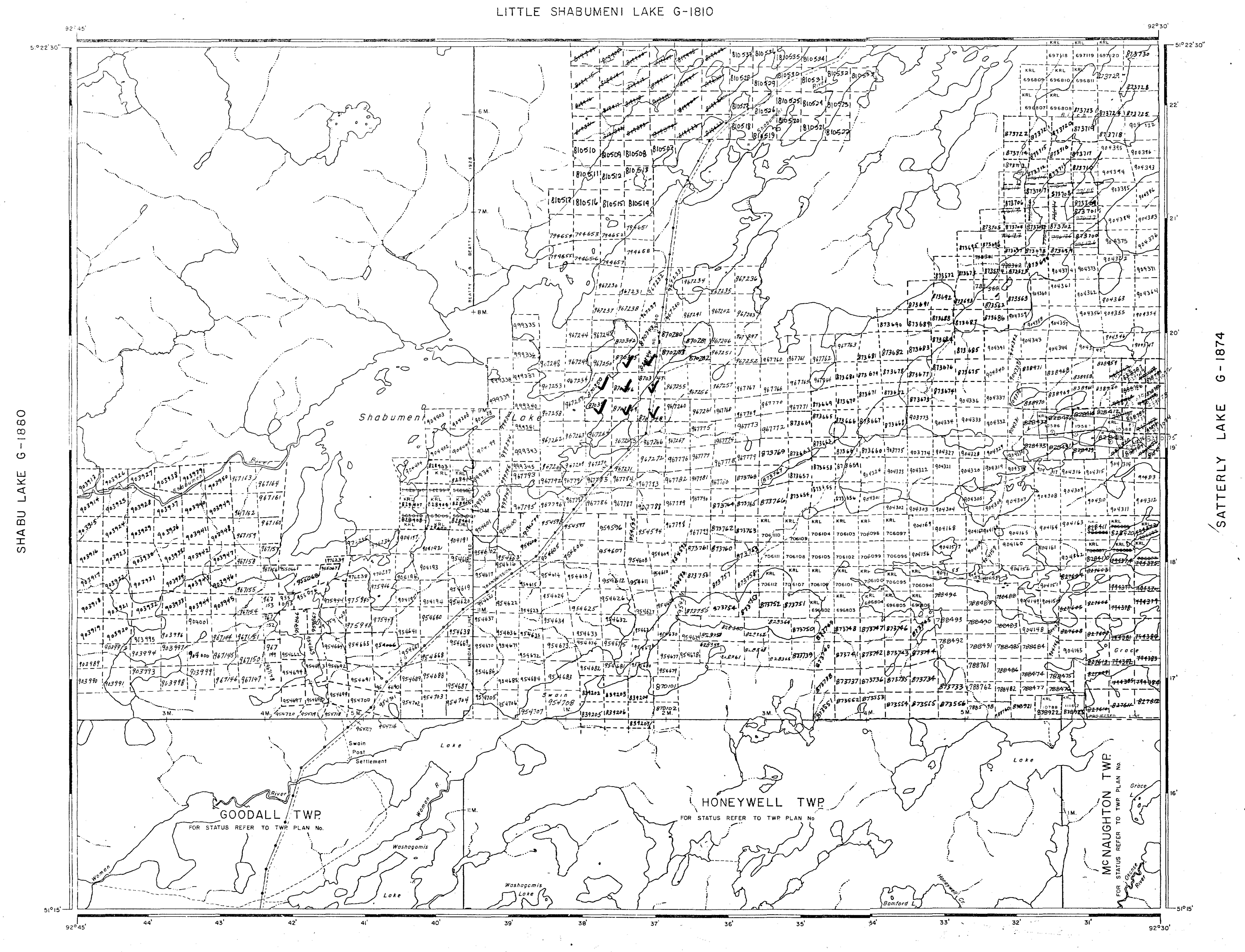
Telephone: (416) 965-4888

SH:pl
Enclosure: Technical Assessment Work Credits

cc: Mr. G.H. Ferguson
Mining & Lands Commissioner
Toronto, Ontario

Resident Geologist
Red Lake, Ontario

Mr. Andrew Hager
Box 236
Red Lake, Ontario
POV 2MO



REFERENCES

AREAS WITHDRAWN FROM DISPOSITION

M.R.O. – MINING RIGHTS ONLY
S.R.O. – SURFACE RIGHTS ONLY
M.+ S. – MINING AND SURFACE RIGHTS

Description	Order No.	Date	Disposition	File

RED LAKE MINING DIVISION
NOV 18 1987
RED LAKE, ONTARIO

RED LAKE MINING DIV.
RECEIVED
JAN 23 1984
A.M. P.M.
7 8 9 10 11 12 1 2 3 4 5 6

52N07SE0019

200

LEGEND

- HIGHWAY AND ROUTE No.
- OTHER ROADS
- TRAILS
- SURVEYED LINES:
  - TOWNSHIPS, BASE LINES, ETC.
  - LOTS, MINING CLAIMS, PARCELS, ETC.
- UNSURVEYED LINES:
  - LOT LINES
  - PARCEL BOUNDARY
  - MINING CLAIMS ETC.
- RAILWAY AND RIGHT OF WAY
- UTILITY LINES
- NON-PERENNIAL STREAM
- FLOODING OR FLOODING RIGHTS
- SUBDIVISION OR COMPOSITE PLAN
- RESERVATIONS
- ORIGINAL SHORELINE
- MARSH OR MUSKEG
- MINES
- TRAVERSE MONUMENT

DISPOSITION OF CROWN LANDS

TYPE OF DOCUMENT	SYMBOL
PATENT, SURFACE & MINING RIGHTS	●
" , SURFACE RIGHTS ONLY	◓
" , MINING RIGHTS ONLY	◒
LEASE, SURFACE & MINING RIGHTS	■
" , SURFACE RIGHTS ONLY	⬒
" , MINING RIGHTS ONLY	⬓
LICENCE OF OCCUPATION	▼
ORDER-IN-COUNCIL	OC
RESERVATION	Ⓡ
CANCELLED	⊗
SAND & GRAVEL	Ⓢ

NOTE: MINING RIGHTS IN PARCELS PATENTED PRIOR TO MAY 6, 1913, VESTED IN ORIGINAL PATENTEE BY THE PUBLIC LANDS ACT, R.S.O. 1970, CHAP. 380, SEC. 63, SUBSEC 1.

SCALE: 1 INCH = 40 CHAINS

FEET 0 1000 2000 4000 6000 8000

METRES 0 200 1000 (1 KM) 2000 (2 KM)

AREA

SHABUMENI LAKE

M.N.R. ADMINISTRATIVE DISTRICT

RED LAKE

MINING DIVISION

RED LAKE

LAND TITLES / REGISTRY DIVISION

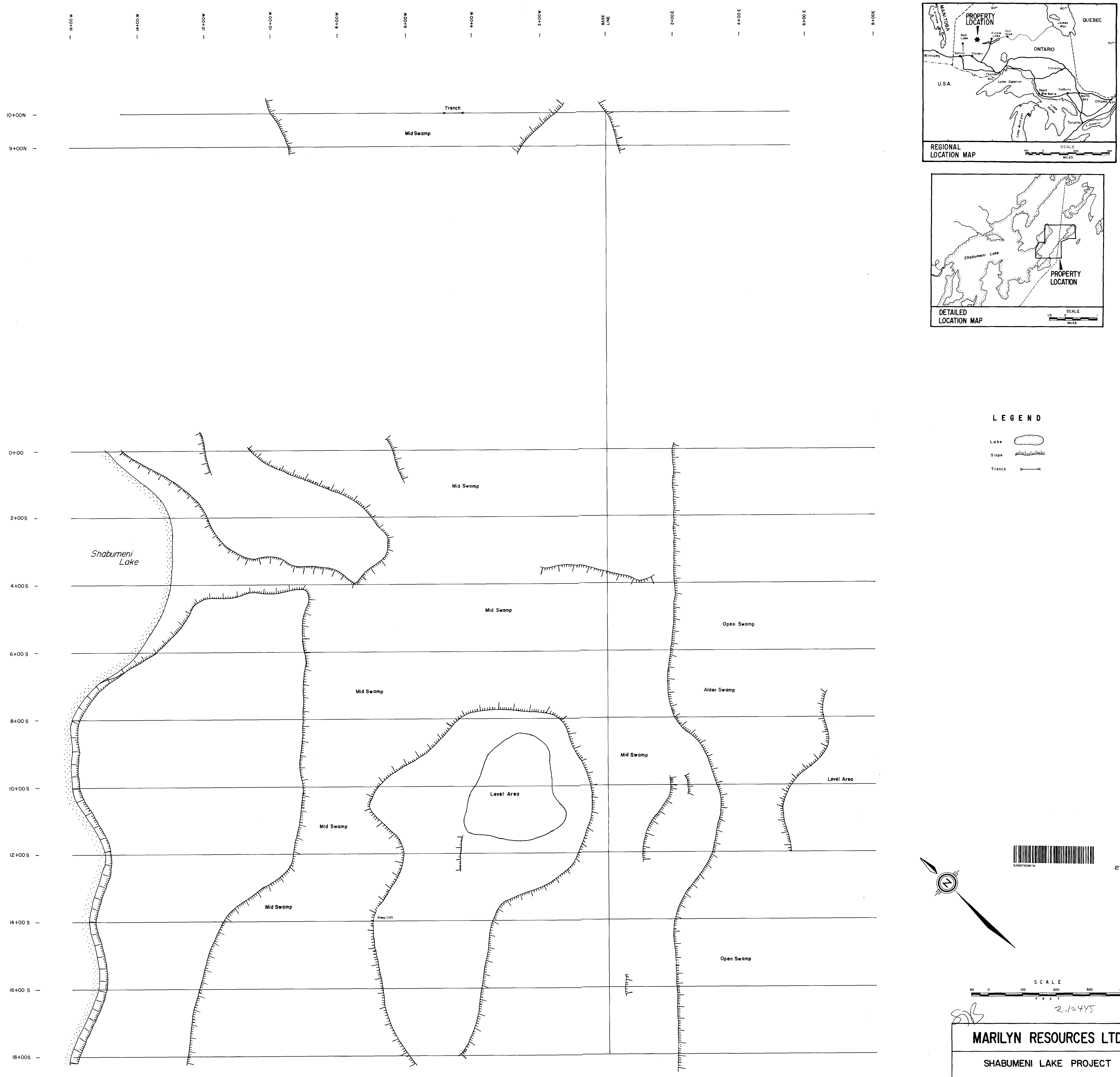
KENORA / PATRICIA

Ontario Ministry of Natural Resources — Land Management Branch

Date FEB. 1983

Number G-1881

513923



2,10445

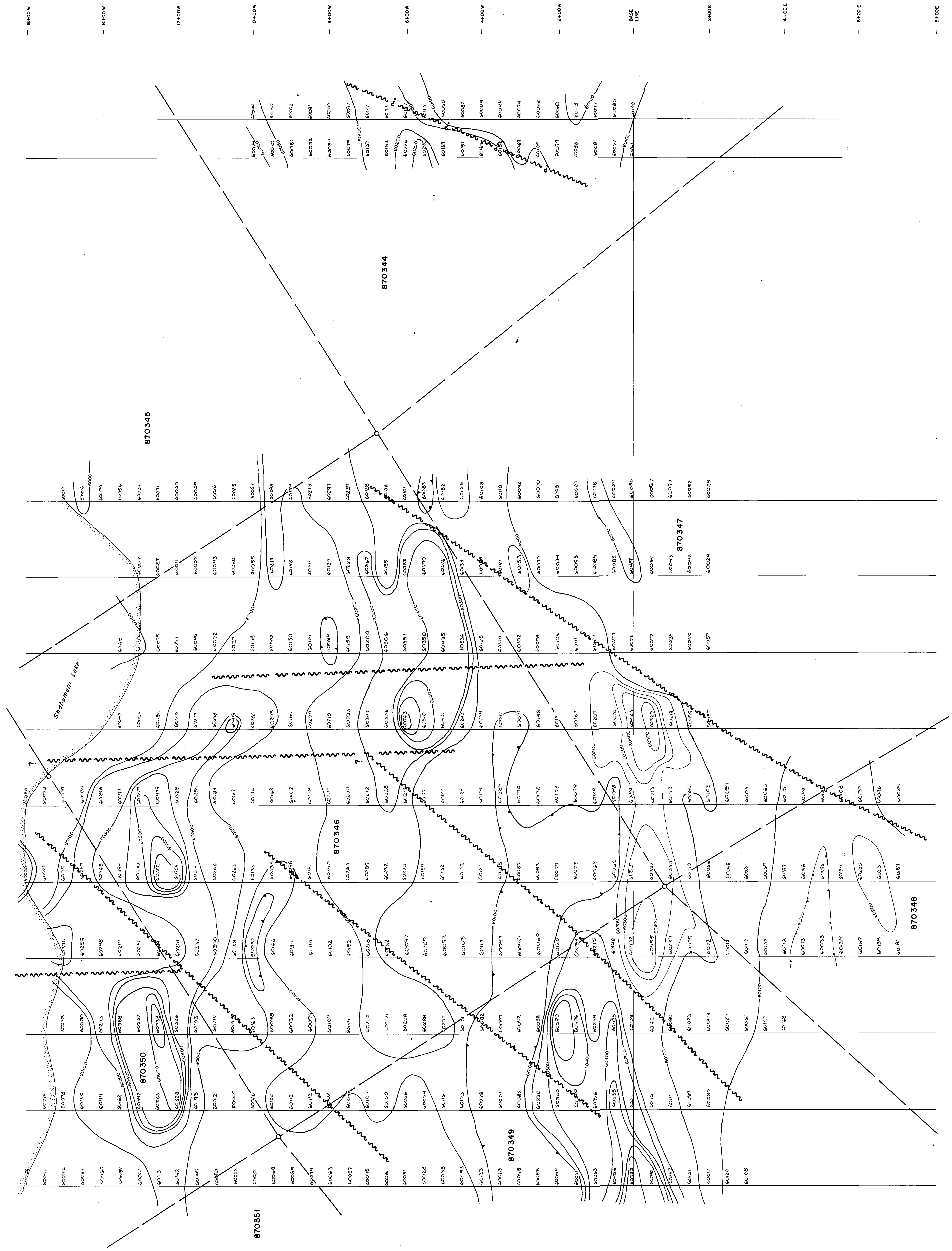
MARILYN RESOURCES LTD.

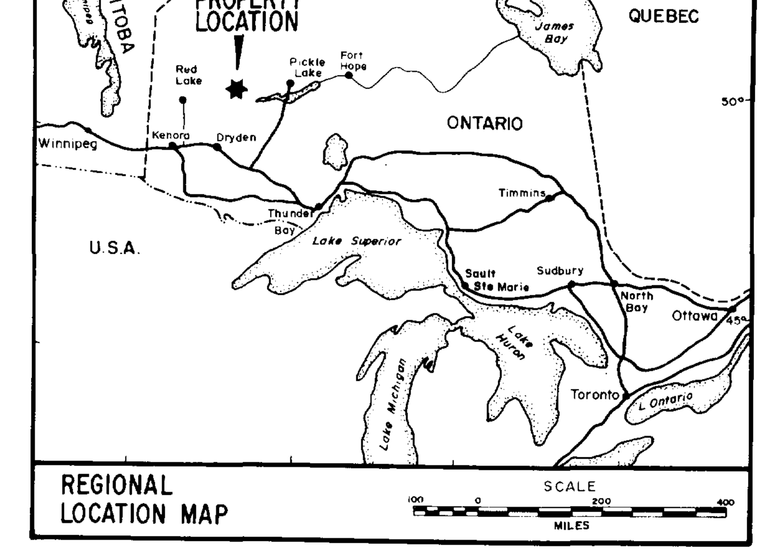
SHABUMENI LAKE PROJECT

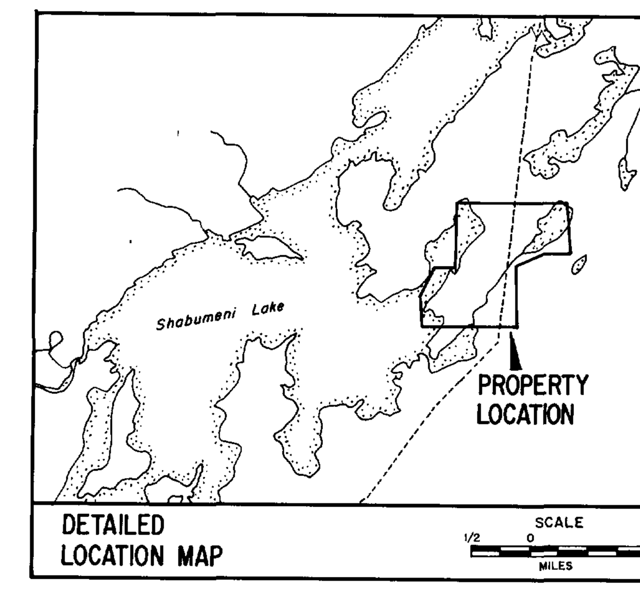
TOPOGRAPHY MAP

Project No: C-970	By: M. Kratochvil
Scale: 1:1200	Drawn: MPH
Drawing No: Map 3	Date: February, 1987

MPH Consulting Limited







LEGEND

INSTRUMENT	EDA Model PPM 350
BASE STATION RECORDER	EDA Model PPM 400
58916	Magnetic Value
	Magnetic Contour
	Magnetic Depression
Contour Interval	
	100 nTs
INTERPETATION	
Fault	

220

SCALE

50 0 100 200 300 400

FEET

MARILYN RESOURCES LTD.

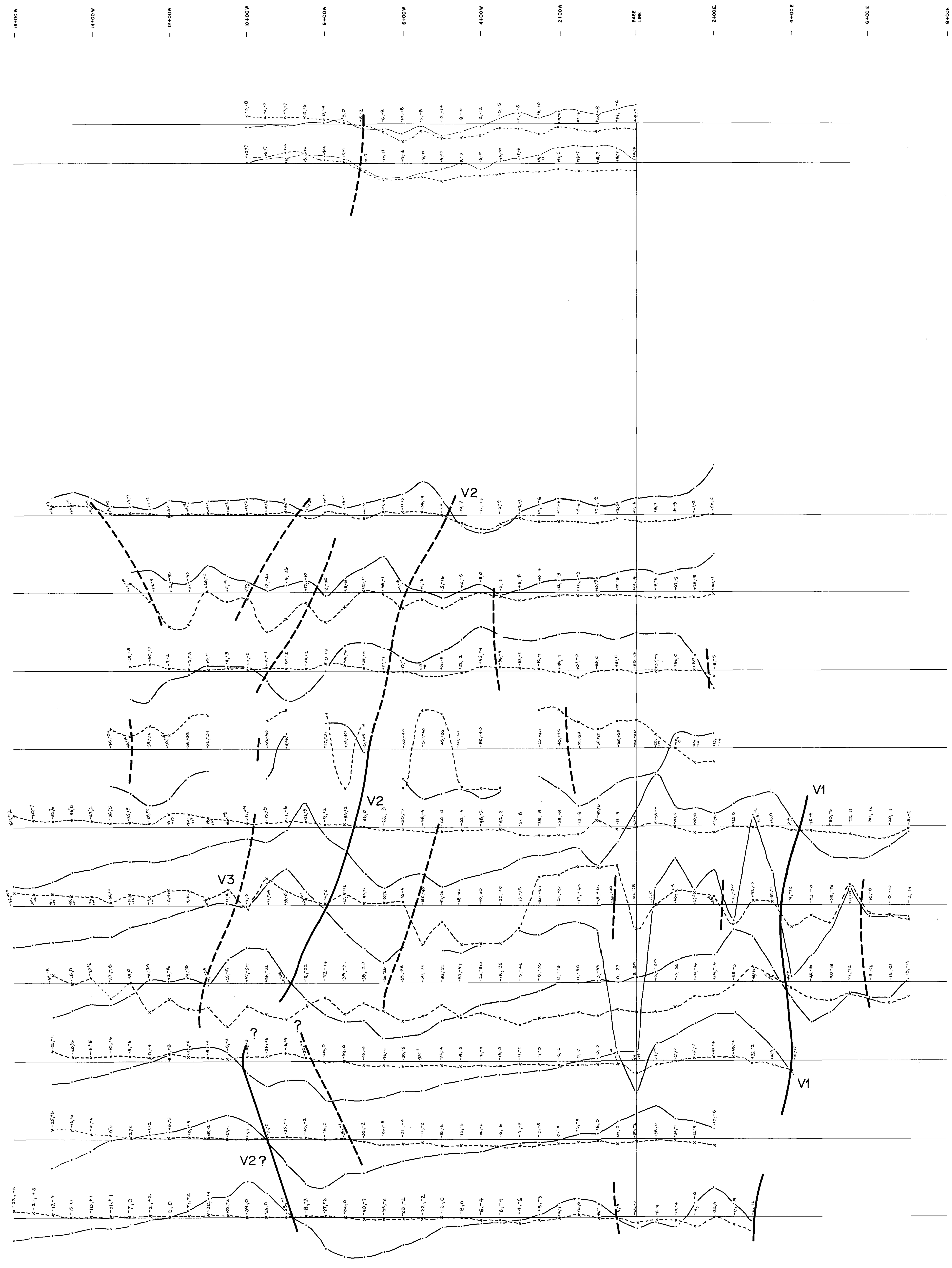
SHABUMENI LAKE PROJECT

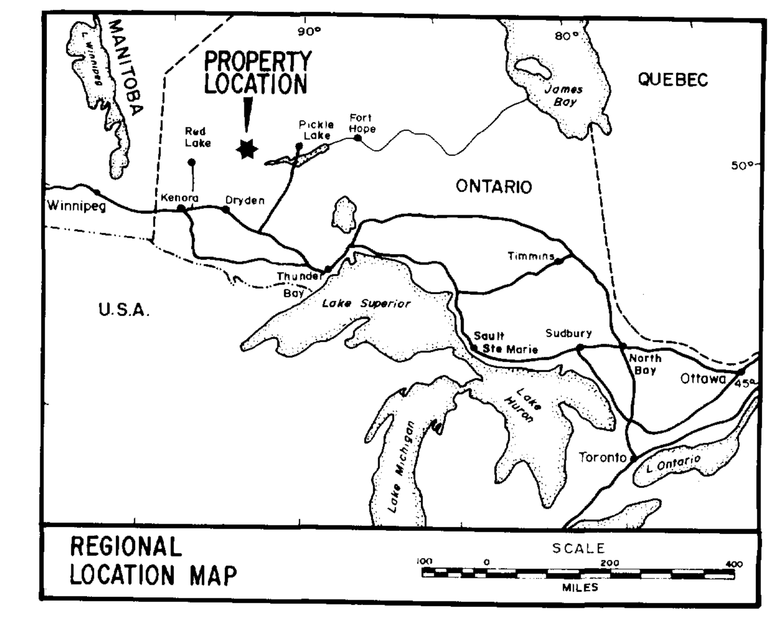
TOTAL FIELD MAGNETICS

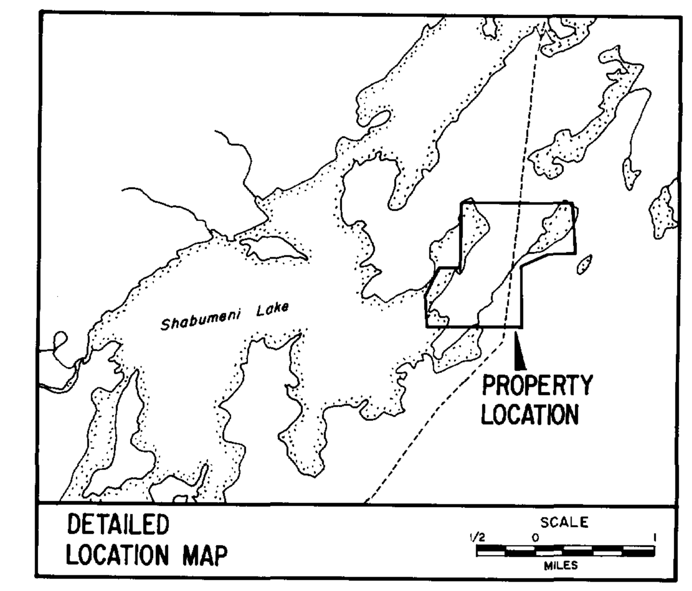
Project No: C-970	By: M. Kratochvil
Scale: 1:1200	Drawn: MPH
Drawing No: Map I	Date: February, 1987

MPH Consulting Limited

210445



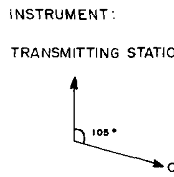




L E G E N D

INSTRUMENT: Geonics EM-16

TRANSMITTING STATION: Cutler, Maine



Inphase Profile

Quadrature Profile

Plotting Designation

Profile Scale: 1" = 40 %

INTERPRETATION

VLF Conductor Axis

Intermediate

Weak

SCALE

50 0 100 200 300 400

FEET

2,10445

MARILYN RESOURCES LTD.

SHABUMENI LAKE PROJECT

VLF-EM PROFILES

Project No: C-970	By: M. Kratochvil
Scale: 1:1200	Drawn: MPH
Drawing No: Map 2	Date: February, 1987

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