Report On

Refraction Seismic Survey

In

Parkin Township, Ontario

for

Capital Geoconsultants, Toronto

May, 1974.

D. R. Vohra, M.Sc., P.Eng.
Pointe-Gatineau, P.Q.

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Introduction:

A refraction seismic survey was carried out on the property of the Capital Geoconsultants Toronto in Parkin Township of Ontario between 16th of April 1974 and 7th of May 1974.

The field crew consisted of following personnel:-

1.	Mr. D. R. Vohra	Geophysicist
2.	Mr. Raymond Rousselle	Helper
3.	Mr. Paul Lariviere	Helper
4.	Mr. R. G. Stevens	Helper

Property Location and Access

The Capital Geoconsultants property covered by refraction seismic survey consists of the following mining claims:-

359766	396928	396926
359767	396929	396927
359145	396930	397082
359144	358873	~~358731~~ 357731
376868	397084	~~397084~~ 397083
		378869.

This property is located at 7½ miles N.E. of Capreol, Ontario. It is easily accessible by Hwy 545 up to Ross Lake and 1½ miles of gravel road. It also is accessible by railroad, i.e. up to Capreol by C.N.R.

Line Cutting and Grid Preparation:

The first five days in the field were spent in preparation of the grid. The lines were cut, chained and picketed every 100 feet. (For grid see enclosed Location Map)

Profile 1 was the North-South cut line, and was the base line for the survey. Profiles 11, 13 and 14 were the lines cut East-West from the base line. Profiles 2a, 2b, 3, 4, 5 & 6 were the radial lines cut from the southern end of the base line. Profiles 7, 8 & 9 were cut from the previously cut lines namely Profile 1 & 3.

Profile 12 is an isolated line cut across the swamp. (See Location Map)

Instrumentation and Survey Techniques

The instrument used for this survey was FS-3 refraction seismograph. This model was manufactured by Huntec Ltd. of Toronto, Ontario. The read out for this instrument was a moving stylus burning signals into electro sensitive paper; the recorded signals were zero crossings of the positive pulse. Power supply consisted of rechargeable Nicad battery. The DC drive motor was digitably controlled. Five different transistorized circuit boards comprised the circuitry. Two geophones were used since the instrument provided a coincidence circuit to allow the operator to record only those events which arrive simultaneously at both geophones. The travel time accuracy was ±1%, the frequency response was 12-200 cps. Recorder range was 3-340 milliseconds. Energy source for the present survey was dynamite. The weight of the instrument was 27.5 lbs.

Refraction Seismic Method

Elastic waves generated by explosive travel downward in all directions, and, after being reflected and refracted at rock interfaces (at depth), return to the surface of the earth. The interpretation of recorded seismic data consisted of determining the velocity of propagation of these elastic waves and analyzing the refraction and reflection phenomenon at the interfaces or boundaries between rock layers that were characterized by different acoustic properties. The refraction phenomena was of principal interest in this investigation.

In refraction method of seismic prospecting the quantity observed was the time interval between the initiation of the leastic wave by an explosion and the first disturbance of the ground as detected by a seismomity at a known distance from the source of energy.

The proportion of the energy refracted was dependent on the difference in propagation velocities on opposite sides of acoustic boundary. At the critical angle of incidence upon an interface, most of the energy did not penetrate into the underlying layer but traveled along the interface with the velocity of the underlying layer and followed the relations defined in optical theory by Snell's Law.

As the wave advanced along the boundary, energy was refracted back to the surface at the same angle as the critical angle of incidence (after Huygen's Principle). This was the basis of refraction method and its successful application was dependent on an increase in velocity with depth.

In all 150 separate seismometer points were tested.

Consistently good time-distance plots were obtained for locations in the map area.

The velocities observed ranged from 1200 ft/sec. to 25,000 ft/sec. It was suggested that the velocities from 800 - 2000 ft/sec are probably due to the presence of clay and sand or sandy clay where as velocities from 2000 ft/sec to 5000 ft/sec were probably due to the presence of gravels. Velocities from 6000 ft/sec to 25000 ft/sec represented bedrock at various depths.

Summary and Conclusions:

The refraction seismic survey indicated that only at the northend of profile 1 and in profile 11 are present two layers in the overburden. All other profiles indicate only one layer of overburden. (See Refraction seismic Profile Map)

The bedrock depth countour map indicates the presence of three deep channels of bedrock at profile 11, one at profile 8, another one at the junction of profiles 2(b) and 8, and one at the profile 1 at the south end.

Most of these deep channel-points tend to have a NE-SW direction. (See Key Map on Bedrock contour map)

Submitted Respectfully,

May, 1974

Pointe Gatineau, P.Q.

D.R. Vohra, M.Sc., P.Eng.

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Formulae

Formulae used for depth determination:

1. For a two layer case:-

i)

$$Z_o = \frac{Vo\ (Ti\ V_1 - X)}{2\sqrt{(V_1^2 - Vo^2)}}$$

Where Z_o is the depth to the bedrock, Vo and V_1 are the wave velocities of first and second layers respectively.
X is the distance between shot and detector.
Ti is the time required for the wave to traverse the refracted path.

ii) For critical distance

$$Z = \frac{xc}{2}\sqrt{\frac{V_1 - Vo}{V_1 + Vo}}$$

where xc is the critical distance.

iii) For time intercept

$$Z = \frac{ti}{2} \cdot \frac{V_1 Vo}{\sqrt{V_1^2 - Vo^2}}$$

where ti is the intercept time.

Formulae (continued)

2. For 3 layer case:-

$$Z_1 = \left(Ti_2 - \frac{2Zo\sqrt{V_2^2 - Vo^2}}{VoV_2}\right) \cdot \frac{V_1V_2}{2\sqrt{V_2^2 - V_1^2}}$$

Vo, V_1 and V_2 are the velocities of first, second and third layers, respectively.

Zo is the depth to the second layer.

Z_1 is the depth to the third layer.

Ti_2 is the travel time required for the wave to traverse the refracted path.

Personnel

1. D. R. Vohra, Geophysicist.
   55A Rue Bourassa,
   Pointe Gatineau, P. Que.

2. Mr. Raymond Ruseell, Helper.
   97 Maurice Street,
   Hanmer, Ontario.

3. Mr. Paul Lariviere, Helper.
   82 Maurice Street,
   Hanmer, Ontario.

4. Mr. R. G. Stevens, Helper.
   Capreol, Ontario.

5. Mr. M. P. Richer, Draftsman.
   3 Lowrey Street,
   Ottawa, Ontario.

6. Mrs. M. Gervais, Secretarial Services.
   479 Parkdale Avenue,
   Ottawa, Ontario.

Labour Distribution

1. Line Cutting and Grid Preparation- 5 days

   Number of people involved 4

   Total Labour = 4 x 5 = 20 Man days

2. Refraction Seismic Survey

   Field operations 12 days

   Number of people involved in the survey 3

   Total Labour = 12 x 3 = 36 Man days

3. Interpretation and Report presentation

   a) Interpretation 7 Man days

   b) Drafting 5 Man days

   c) Typing, etc. 2 Man days

   Total labour 14 Man days

Total Labour for the survey 70 Man days

CERTIFICATE

I, Dharam Raj Vohra, of Pointe Gatineau, P. Quebec, do hereby certify that:-

1. I have no direct or indirect interest in the Capital Geo-consultants,(Toronto) Claim Group, nor do I anticipate any interest in stocks and shares in this Company

2. I am a Professional Engineer registered in the Province of Ontario and practising my profession for the last 12 years.

3. I am a graduate of the Universities of Poona and Banaras. (B. Sc. and M. Sc.)

4. I am a member of A.P.E.O., S.E.G., C.I.M.M., P. & D. Ass., E.A.E.G., A.A.P.G. and N.A.F.A.G.

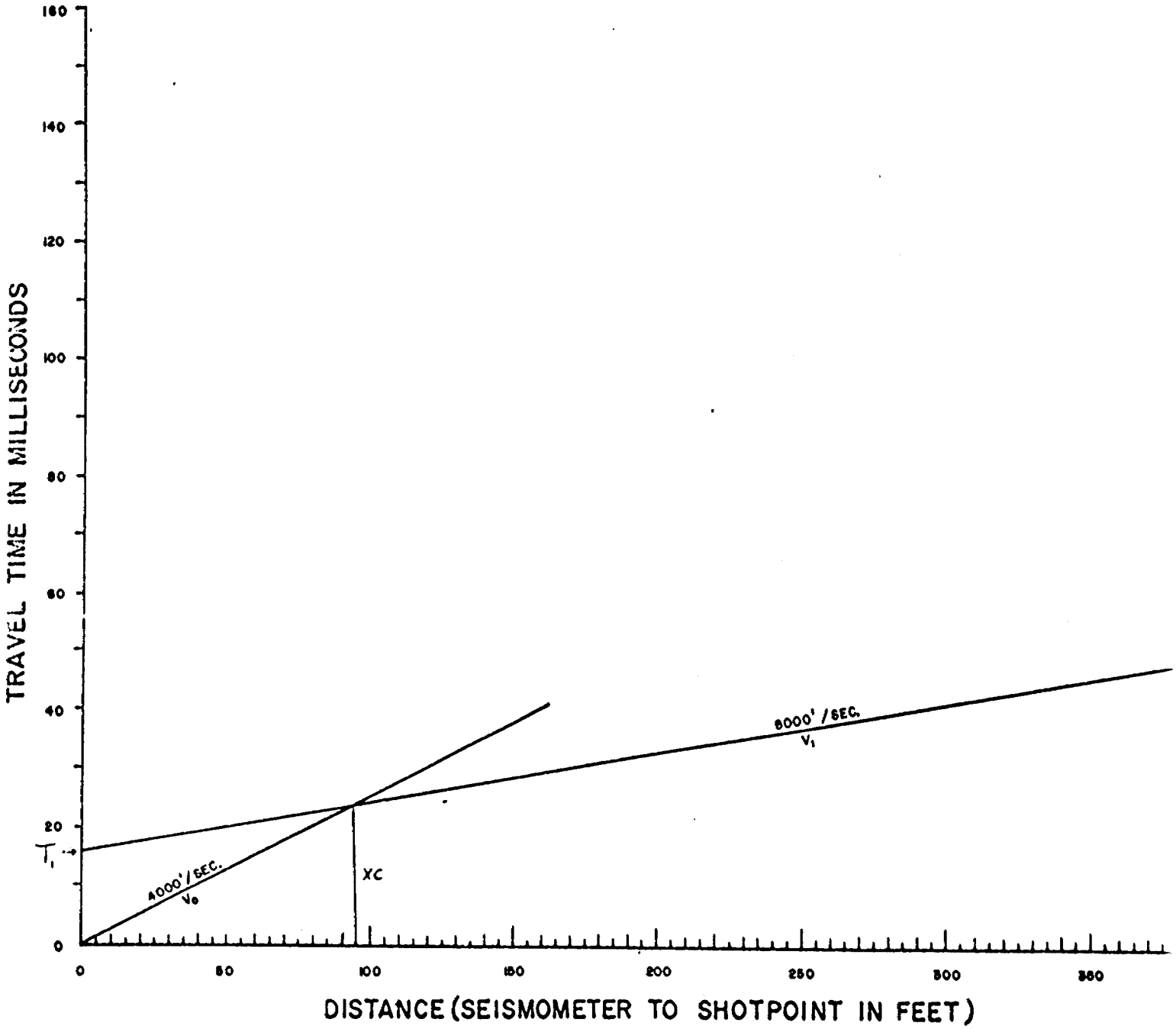
5. This report is based on the results of Refraction seismic survey carried out by me.

May, 1974.

D.R. Vohra, M.Sc., P.Eng.

Pointe Gatineau, P. Quebec.

DEPTH CALCULATION



V_0 = 4000 ft./sec.

V_1 = 8000'ft/sec.

XC = 95 ft.

$\therefore$ DEPTH (Z) = $\frac{XC}{2}\sqrt{\frac{V_1 - V_0}{V_1 + V_0}}$

= $\frac{95}{2}\sqrt{\frac{1}{3}}$ = 27·4 FT.

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S A N D E X D E V E L O P M E N T S L I M I T E D

M O N T R E A L

REPORT ON GLACIO-FLUVIAL PLACER GOLD DEPOSIT

MILNET AREA

HUTTON & PARKIN TOWNSHIPS, SUDBURY MINING DISTRICT, ONTARIO

S.k. Singh Msc.Ph.D.
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1. INTRODUCTION

The property, described herein, is a placer gold iron, base metal and nickel prospect in the Milnet area along Vermillion River, Parkin & Hutton Townships, Ontario. During the past several months geological and geophysical surveys (seismic refraction) were carried out under the direction of the author. The geological (research and field) and geophysical work was completed under the guidance of Dr. K. Sethuraman, Capital Geoconsultants Toronto, 164-Golfview, Toronto. Both the author and Dr. K. Sethuraman spent 40 days in forming some of the opinions expressed in this report through field and library investigation.

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2. LOCATION & ACCESS

The property consists of 19 contiguous surveyed and unpatented claims in Hutton & Parkin Townships, Sudbury Mining District, Ontario. These claims cover an area of 720 acres as documented below. (Table 1)

TABLE 1.
Property of Sandex Development Ltd.
Milnet Area, Sudbury, Ontario

Township	Range	Lots	Claims	Area in Acres
	III	1,2	S-358730	40
	III	1,2	S-358729	40
	III	1	S-345584	40
HUTTON	III	1	S-378866	40
	II&III	1	S-378867	40
	II&III	1	S-396925	30
	III	12	S-359766	40
	III	12	S-359767	40
	II	12	S-396928	40
PARKIN	II	12	S-359144	40
	II	12	S-396929	30

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TABLE 1.
Property of Sandex Development Ltd.
Milnet Area, Sudbury, Ontario,
CONT'D

Township	Range	Lots	Claims	Area in Acres
PARKIN	II	11,12	S-396926	40
	II	12	S-359743	40
	II	12	S-396930	40
	II	11,12	S-396927	40
	II	12	S-378868	40
	II	12	S-358731	40
	II	12	S-378869	40
	II	12	S-378870	40

The claim-group is located approximately 10 miles north of the town of Capreol and is easily accessible by Highway 545 abd C.N. Railways (Fig.1). A few dirt roads branching from the Highway 545 make the property accessible by car even during winter. However, several trails provide an easy access to almost all the claims.

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3. EXPLORATION HISTORY & DEVELOPMENT

First panning of gold was carried out in 1898 during the short-lived gold rush and average value of 12 to 15 ¢ / cu yd were reported from most of the area but values as high as 50¢ to $1.00 were also recorded (Gracey 1898, Gold at $20.67/oz) from gravels along Vermillion river-drainage system. Coleman (1901) summarized the occurrence of gold as placer deposit and Ahn (1905-1908) carried out some experimentation to recover it from gravels and sands. The Onwatin Placer Mining Syndicate Limited performed considerable test-pitting and some drilling in the area between 1939-1942 period. This company investigated the area but dropped the claims in 1947. From 1947 to 1948, Brewis & White Limited carried out drilling and obtained encouraging results on 4 drill holes. Prest (1949) described the best panning results from a quarter mile stretch of the channelway immediately east of the road at the north-end

of Ross Lake. Cook (1959) and Prendergast (1959) carried out systematic geological and geophysical surveys respectively for Concor Chibougamau Mines Ltd. A program of surface trenching (40 pits) and drilling (20 churn drill holes) was carried out subsequently. The coded colour counts in six churn drill logs from older channels indicate significant concentrations just above the bedrock lying at depths varying from 20 to 38 feet below the surface.

Assessment work by Queensland Explorations Ltd. (1959) to test the northward extension of known gold bearing channels included a geological survey and surface sampling of 36 test pits. The assays ranged from trace to 0.1 oz of Au per cu.yd. Mackay (1972) sampled on a grid and reported a grade upto 0.20 oz Au per ton with an average value of about $6.50 per ton (Gold at $60.00 /oz). Nelson & Associates (Personal communication, 1974) took 9 grab samples from the 19 claim-group 3 of which assayed 0.06, 0.07 & 0.20 oz/ton of gold.

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4. REGIONAL GEOLOGY
(Surface Deposits)

The solid geological formations (poorly exposed in the area) around the claim group have been described (Prest, 1949) as volcanic lavas and sediments of keewatin and Timiskaming, Algoman intrusions, Cobalt sediments, the Animikean sediments of the Sudbury basin and keweenawan intrusions. A few outcrops of granite, granitic gneisses and gabbro of Precambrian age were seen exposed in the Area. The bedrock is commonly covered by a thin mantle of Pleistocene drift which includes modified ground moraine, silt and talus.

Since Pleistocene times and development of present Vermillian River drainage system, there has been virtually no modification of the glacial deposits.

The Pleistocene deposits of the Capreol-Milnet area can be divided based on the medium of their transport (Prest, 1949) as follows:

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(a)	Glacio-Eolian:	Dune Sands, Silts & Loess
(b)	Glacio-Lacustrine:	Lake bottom silts & clays, shoreline sands & gravels, deltaic deposits
(c)	Glacio-Fluvial:	Boulders, gravels, sands & silts deposited (i) eskers & crevasse fillings, (ii) kame terraces and outwash
(d)	Glacial:	Bouldery, gravelly & sandy till deposited (a) end Moraine (b) lateral Moraine (c)ground Moraine.

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5. LOCAL GEOLOGY

The geological formations of the area may be classified as Precambrian, Pleistocene & Recent. The Precambrian rocks include granites, granitic gneisses and greenstone. The unconsolidated deposits of Pleistocene have been modified very little during Recent time.

The Pleistocene deposits in the claim-group include glacio-eolian, glacic-fluvial and glacial gravels, clays, sands and tills. The glacio-eolian and glacial deposits are found as surface deposits and thin verneer on the rocks of the area. The glacio-fluvial deposits form a greater portion of the Pleistocene formations. These deposits may also include some deposits derived from the glacial till which might have been reworked by post glacial waters.

The type of glacio-fluvial deposits found in the area, indicates a good slope of the land for stream flow such that sudden velocity changes could result into

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deposition of the load. The streams might have at the time been subglacial and at a later time, as the ice retreated, been sub-aerial. Alternatively, it can also be postulated that N-S channelways existed before Pleistocene time and during Pleistocene, these channelways resulted into fluvio-glacial streams. However, the most recent seismic refraction data (Vohra, 1974) indicates that the channelways (except the deeper ones) in the claim group show NE-SW direction and the depth varies from place to place indicating formation of deeper pools as compared to levelled alluvial streams.

The glacio-fluvial deposits consist of boulders (Huronian), gravels, sand, silt and clay. The clay and silt adhere to the larger rock debris, however the clay also occurs as clay balls and clayey layers within the gravels and sands. Sometimes these clay layers are narrow and form lenses in the glacio-fluvial deposits.

The glacial deposits in the claim-group consist of till made up of boulders, clay and other rock fragments plastered on the sides and tops of some of the rock knobs which form low lying hills on the property.

The glacio-eolian deposits conceal much of the detail of the glacio-fluvial and glacial deposits. They consist of dune sands and some loess. These deposits of sand and silt appear elongate in a north - south direction and roughly parallel the glacio-fluvial channelways.

The Recent deposits of silt or mud are found in swamps and the bottom of ponds.

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6. INTERPRETATION OF AERIAL PHOTOGRAPHS

The aerial photograph interpretation is one of the most useful way to locate old and new drainage systems. Therefore, Dr. K. Sethuraman, Capital Geoconsultants, Toronto interpreted the possible old river channels and prepared a map locating each one of them in the claim-group (Fig.2). This analysis also utilized the data collected by previous prospecting companies and individual prospectors. Therefore, it indicates the approximate location of the old channels until established by geophysical (seismic refraction) surveys. To confirm the aerial photograph interpretation for the claim group, a seismic refraction survey was performed which established that the photo interpretation is adequate even for estimating the probable pay streaks within acceptable limits. Therefore, once the amount of recoverable gold per cu.yd. is established, the combination of aerial photograph interpretation and the results from seismic refraction should be very helpful in estimating the probable reserves.

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7. GEOPHYSICAL SURVEYS

The claim-group has been geophysically surveyed by the following techniques:

(a) Airborne magnetic survey (Geological Survey of Canada, 1959) & Ground Dip-needle magnetic surveys (Hutchison, 1959)

(b) Seismic Refraction (Prendergast, 1959 & Vohra, 1974)

(a) Magnetic Surveys

The Airborne magnetic surveys indicate a magnetic anomaly (with NE-SW orientation) in the vicinity of claims S-358729 and S-378866. From the aero-magnetic map it appears that the anomaly has a magnitude around 2200 gammas. Hopkins Mining Consultants Limited (Hutchison, 1959) followed this anomaly on ground with Dip-needle magnetic surveys. Since Queen'sland Explorations Ltd., did not obtain the option for the adjoining claims, Hutchison (1959) mapped the anomaly incompletely. However, he assumed that the anomaly had a magnitude of about

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10,000 gammas on ground, which is below the regional magnetic level. During the above survey Hutchison (Op.cit) noted occurrence of banded magnetite at a distance of 600 feet to the east of the anomaly and at a distance of 200 feet to the north-east of this magnetite point he discovered two copper showings. However, no outcrop was noted in the area of this magnetic anomaly. Later Mackay (1972) checked this anomaly and attributed it to the presence of black-sands in the area.

(b) Seismic Refraction Surveys

The seismic refraction test was first carried out by Sulmac Exploration Services Limited (Prendergast 1959). This test was performed to explore the possible location of the old river channels by determining the configuration of the bedrock. Therefore, the test included i) trial determination of bedrock at locations of known overburden depths, ii) profiling across the expected strike of the hidden channels , iii) profiling along the channel to determine deeper portions.

The initial phase established that the seismic method could give depth estimates within ± 10% error. Thus the method was considered quite adequate. The second phase showed that dynamite blasts were necessary to get good results as the loose sand and gravel absorbed the energy produced by sledge-hammer technique rather quickly and in greater magnitude. The third phase could not be completed due to deterioration in the ground conditions.

In 1974, seismic refraction work (Vohra 1974) was carried under the direction of the Capital Geoconsultants, Toronto for Sandex Development Limited, Montreal. Since the test performed by Cook (1959) was successful, therefore, the survey performed in 1974 included i) a depth estimation test with FS_3 (Huntec seismograph), ii) determination of the bedrock topography, iii) determination of the thickness of various layers based on velocities, iv) determination of the continuity of the layers within the area.

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The first phase of the survey established that the relative error for depth determination was less than ± 5%. The bedrock topography appears to be typical of glaciated areas however some evidence of pre-glacial valleys can also be considered as possibility. Two profiles indicated the presence of two layers of over-burden while most of the surveyed area consisted of single layer surfacial deposit. The bedrock-depth relationship indicated the presence of three deep channels. These deep channels appear to have open V-shaped valleys which tend to indicate that pre-glacial stream valleys with NE-SW orientation existed in the area. The average depth of the layers in two layer case, ranged from 15-20 feet.

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8. ECONOMIC GEOLOGY

The claim-group may be a potential prospect for iron, base metals, nickel and gold as outlined below.

a) Iron, base metal, nickel prospect:

The possibility of massive magnetite and base metals is suggested by the presence of iron ore deposit at a distance of 4 miles to the NW of the magnetic anomaly observed in the claim - group. This possibility is further enhanced by the presence of "Jonsmith Mines" a former nickel-copper producer at a distance of 4 miles to the southeast of the anomaly. Both these occurences are at the contact of granite and greenstone which apparently passes through the property closer to the observed anomaly. Furthermore, the anomaly is negative and small. Therefore, it may indicate concentration of magnetic minerals. It appears to be related to chalcopyrite-pyrrhotite occurrences about 400 feet away from the observed anomalous magnetic area. Mackay (1972) suggests that the anomaly might be caused by concentration of gold associated -

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magnetite bearing black sands. However, the author does not necessarily share Mackay's views because he believes that the anomaly indicates presence of vein or dyke or a mineralized zone in the bedrock.

b) Gold Prospect

The occurrence of Placer Gold in glaciated parts of the Precambrian shield has been considered unlikely(Prest 1949). Therefore, not many companies have ventured to explore such areas. The assays obtained by prospectors and individual companies from Capreol-Milnet section of the glaciated valleys has made the claim-group a viable exploratory target.

Gold content of economic importance has been recovered from the glacio-fluvial channelways. These channelways appear to have followed pre-existing structural or physiographic lineaments, modified by glacial action of the Pleistocene time. Prest (1949) suggested that the gold might have formed in pre-glacial placer concentrations that might not have been completely

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dissipated by glaciation. Alternatively, the possibility of such concentration of gold by torrential glacial streams should not be overruled. Second mechanism of concentration of gold can be further substantiated on the basis of very special conditions existing in this part of the glaciated Precambrian. These conditions include pre-existing north-south valleys which might have marked a pre-glacial river system and might have controlled glacial movements and drainage to a marked degree. Furthermore, Porcupine and Shiningtree lode gold deposits occur not far away to the north of the claim-group.

It is very highly unlikely that any pre-glacial placer deposits could exist without some degree of modification by the overriding glaciers and the consequent glacio-fluvial streams. Locally, where protected by a rock ridge or promontory, a pre-existing concentration might have been covered by till and ice at an early stage of glacial advance, with later ice movements merely overriding this location. During the period of glacial retreat the glacio-fluvial streams

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might not reach such gold concentrations or at the most might redistribute the same locally. Such areas when located should form sure exploration targets.

While considering the possibility of concentration power of the glacio-fluvial streams, the source of the placer might have been concentration due to redistribution of pre-Pleistocene placers or concentration and redistribution of gold sparsely distributed in glacial till.

The exploration results from Queensland Exploration Ltd. and Concor Chibougamau Mines Ltd., indicate that higher concentration of gold is found closer to the bedrock. Therefore, it increases the potential of the present 19-claim group which contains deeper valleys. The placer gold noted in the channel east of Ross Lake, from the glacio-fluvial gravels does point towards the important role played by glacio-fluvial streams in concentrating gold in the Pleistocene deposits of the area.

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i) Nature of Gold

The placer gold reported from the area is mostly "shot" size variety. It can be readily concentrated using gravity separation in medium of water. The gold fragments are free and are not associated with any other mineral or rock fragments. Nuggets are not common although pieces of gold upto 50 milligrams have been reported (Cook 1959, Prest 1949). Two main types of gold particles have been observed. The bright yellow fine fragments occur in the well established fluvio-glacial deposits near the surface or at shallow depths while the red coloured coarser fragments to flakes occur at deeper levels associated with clay lenses. Generally gold occurs in paystreaks of limited lateral extent. These paystreaks are quite common and repetitive within the glacio-fluvial deposit. It is quite likely that the bright yellow fragments are reworked and redistributed by fluvio-glacial streams from the glacial tills while rusty, red variety might have been derived from pre-existing alluvial placer gold.

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ii) Inferred Reserves of Gold

The previous work has been but limited to surface sampling. Deep sample assays are totally lacking. In Dr. Sethuraman's opinion (personal communication, 1974) geologically inferred reserve within 19 claim group is about 7 million cubic yards, of potential pay gravel averaging upto $2.00 per cubic yards. A potential yardage in the contiguous claims owned by Sandex Development Limited, outside the claim-group, if proven, is bound to make this operation highly attractive.

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9. RECOMMENDATIONS

A recent seismic refraction work combined with air-photo interpretation and previously recorded data, outline the extent and nature of channelways and that of the overburden in these glacio-fluvial streams. Further, ideal dredging conditions existing in the claim-group warrant a systematic churn drill sampling at favourably located sites along the older channelways with the objective of testing the pay gravel at depths closer to the bedrock. In the area of magnetic anomaly an electromagnetic survey should be planned to discriminate between magnetite and base metal mineralization.

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10. REFERENCES

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11. ASSESSMENT WORK CREDITS

The work outlined in the report was carried by the author and Dr. Sethuraman under Capital Geoconsultants, Toronto. This work may be credited as follows:

DESCRIPTION	MAN DAYS (8 hrs/ day)	CREDIT FACTOR	NO. OF CREDITS
1. Geological Research at O.D.M., ASSESSMENT FILES, Geol.Surv.Canada and photo-interpretation, by Drs K.Sethuraman & S.K. Singh	(35 ?)	7	245
2. Field investigations in the area carried out by Drs K. Sethuraman and S.k.Singh between May 5, 74 and May 12,74	5	7	35
3. Preparation of report	8	7	56
4. Drafting	4	7	28
5. Typing	2	7	14
		Total credits	378

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Case postale 8888, Montréal 101, Québec

12. CERTIFICATE

I, Sudesh K. Singh, of Science de La Terre, Université du Québec à Montréal, do hereby certify that:

1. The work recorded was carried under my supervision and I participated fully as a member of the Capital Geoconsultants Toronto in carrying out the investigation.

2. I am a Research Scientist at the UQAM in Quarternary Geology and I possess over ten years professional experience in exploration and researches in different disciplines of Geology.

3. I am a graduate (Ph.D. from OTTAWA UNIVERSITY, 1972 and M.Sc. from Punjab Univ. 1964) of Mineral Sciences and Economic Geology.

. . 28

Université du Québec à Montréal
Case postale 8888, Montréal 101, Québec

4. I am a member of P.D. Association, N.P.A., C.I.M.M. & Min.Soc.Amer.

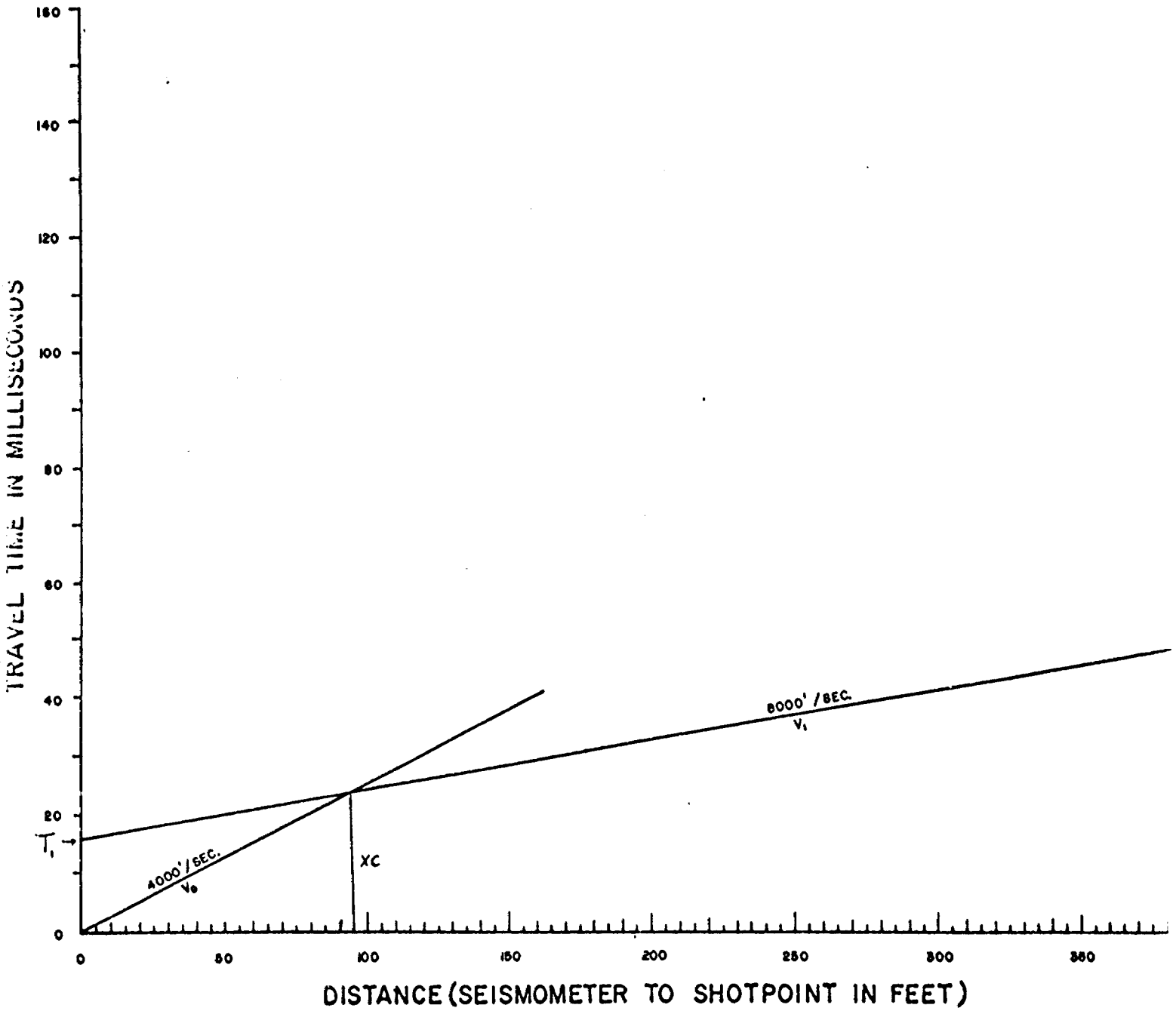
5. I fully share the responsibility as to the accuracy & validity of opinions expressed in this report.

July, 1974.

S.K. Singh

S.K. Singh M.Sc.Ph.D.

DEPTH CALCULATION



V_0 = 4000 ft./sec.

V_1 = 8000 ft/sec.

XC = 95 ft.

$\therefore$ DEPTH (Z) = $\frac{XC}{2}\sqrt{\frac{V_1 - V_0}{V_1 + V_0}}$

= $\frac{95}{2}\sqrt{\frac{1}{3}}$ = 27.4 FT.

SANDEX DEVELOPMENTS LTD.

LOCATION MAP OF THE PROPERTY IN HUTTON TOWNSHIP, ONTARIO

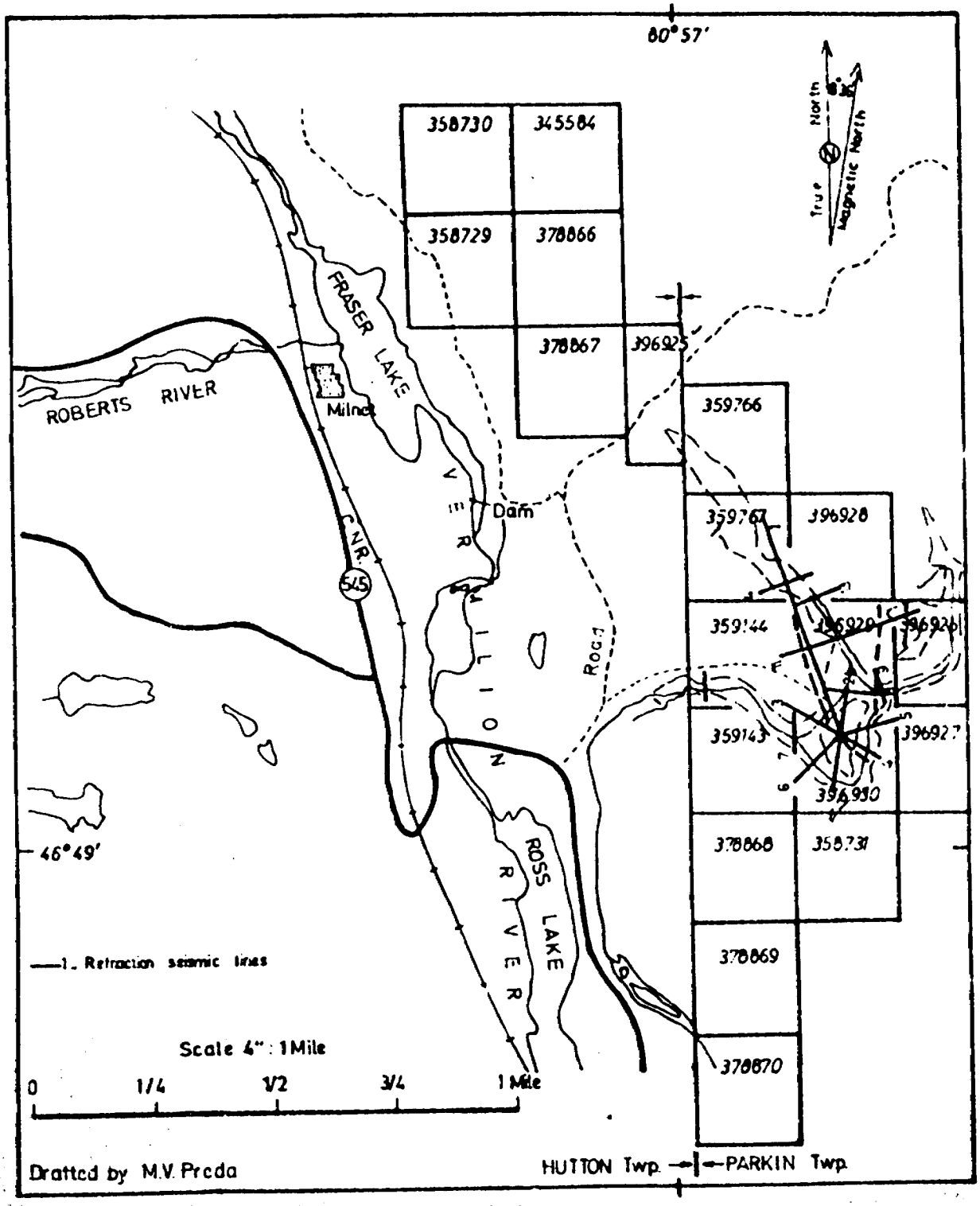
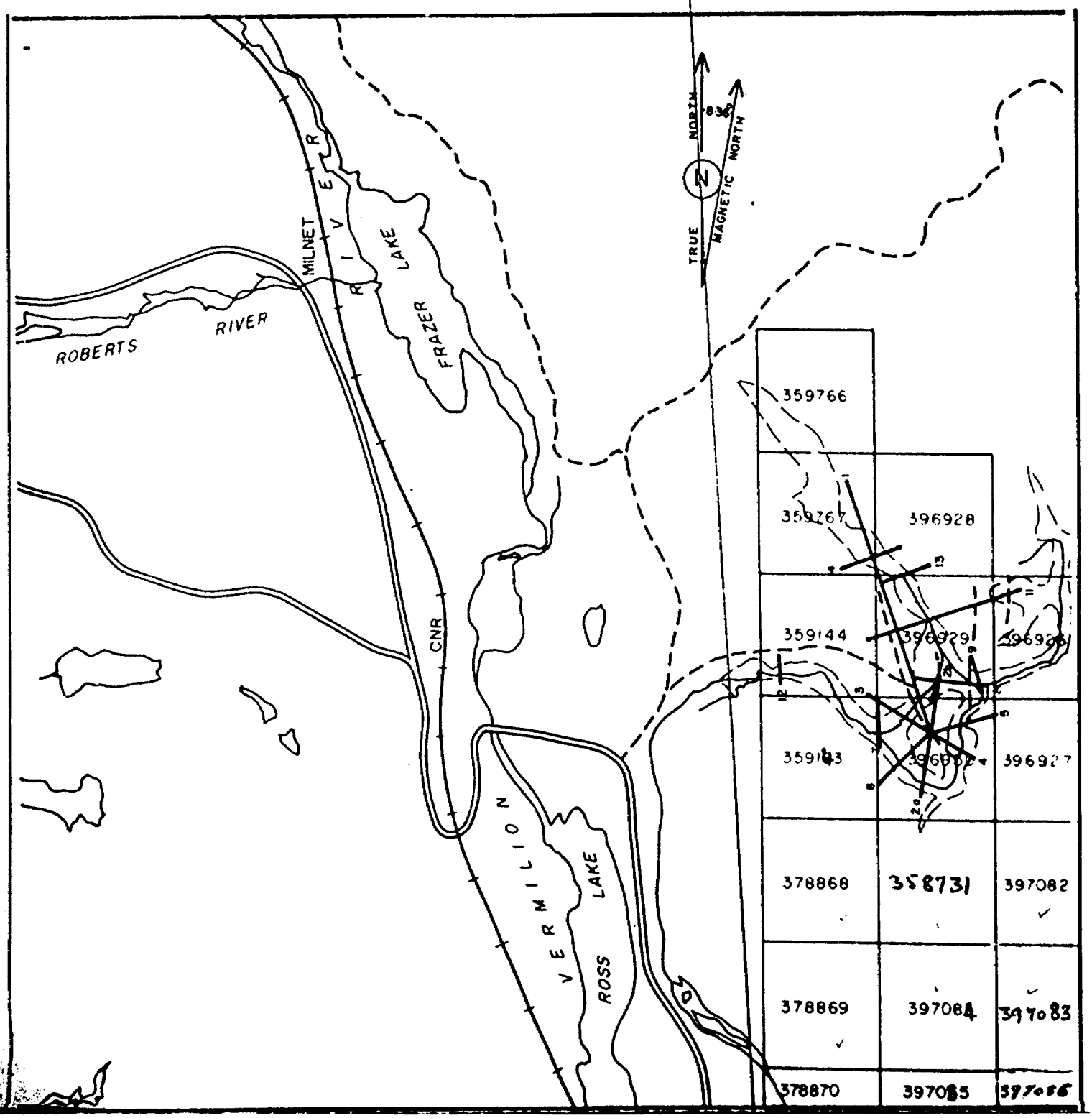


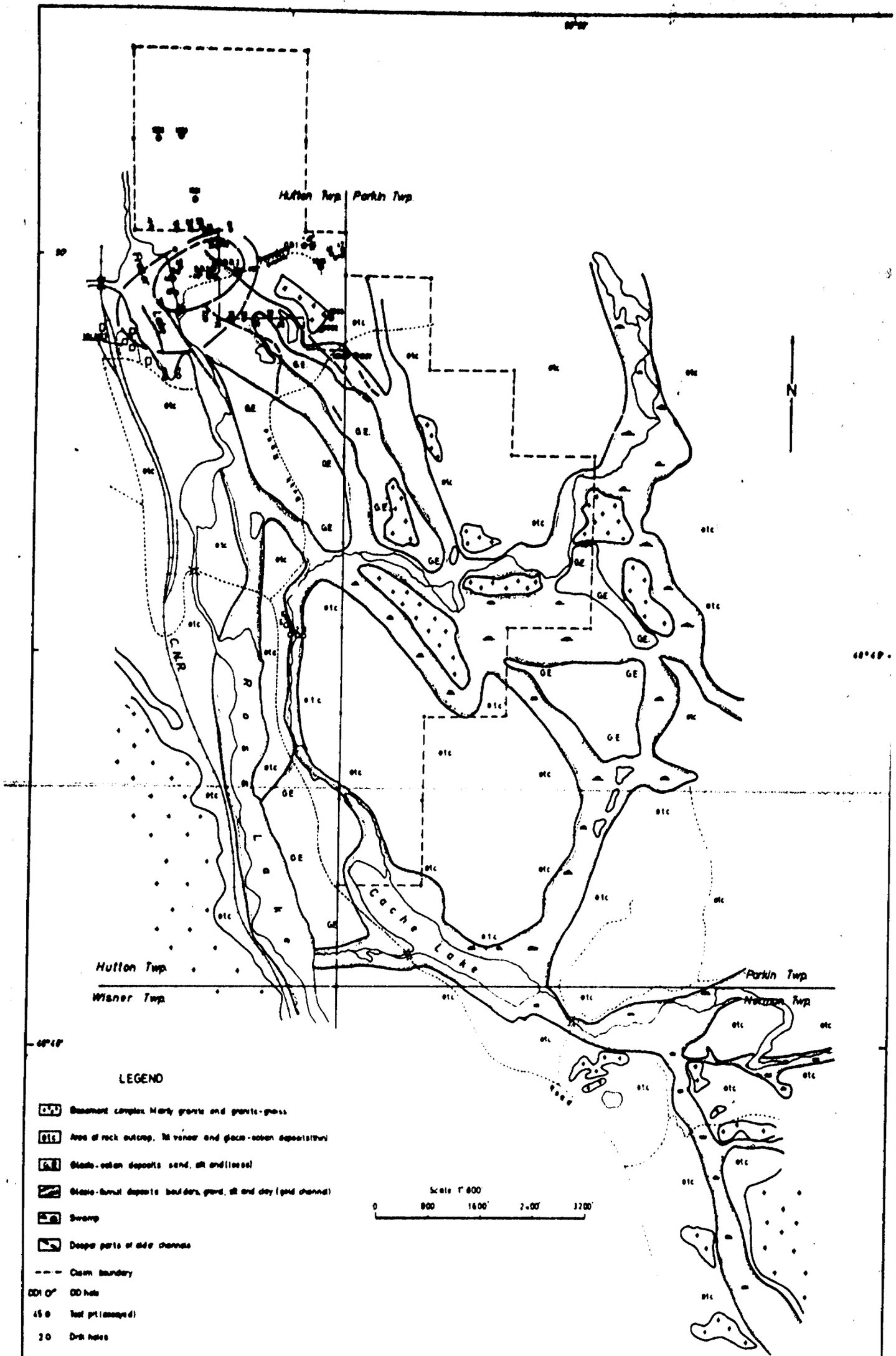
FIG. 1

LOCATION MAP
OF THE PROPERTY
PARKIN IN
~~HUTTON~~ TOWNSHIP, ONT.

1/4 mile = 1 inch

SCALE 4 INCHES = 1 MILE




Hutton Twp.
Parkin Twp.
N
C.N.R.
Cache Lake
Hutton Twp.
Wisner Twp.
Parkin Twp.
Nairn Twp.
LEGEND
Basement complex, Mainly granite and granite-gneiss
Area of rock outcrop, Till veneer and glaco-eolian deposits(thin)
Glacio-eolian deposits sand, silt and lacustrine
Glacio-fluvial deposits boulders, gravel, silt and clay (and channels)
Swamp
Deeper parts of glacial channels
Claim boundary
DDH
Test pit (assayed)
Drill holes
DDH assayed samples
Magnetic anomaly from survey performed by Geological Survey of Canada 1958-60 Map 1922 G - Milnet - Ontario
Geology compiled by Capital GeoConsultants of Toronto
Scale 1" 800
0 800 1600' 2400' 3200'
PLACER GOLD PROPERTY
MILNET AREA
ONTARIO
SANDEX DEVELOPMENTS LTD

Ontario Ministry of Natural Resources

Lands Administration Branch

Projects Unit

Technical Assessment Work Credits

File 2.1547

41115SW0165 0020 HUTTON

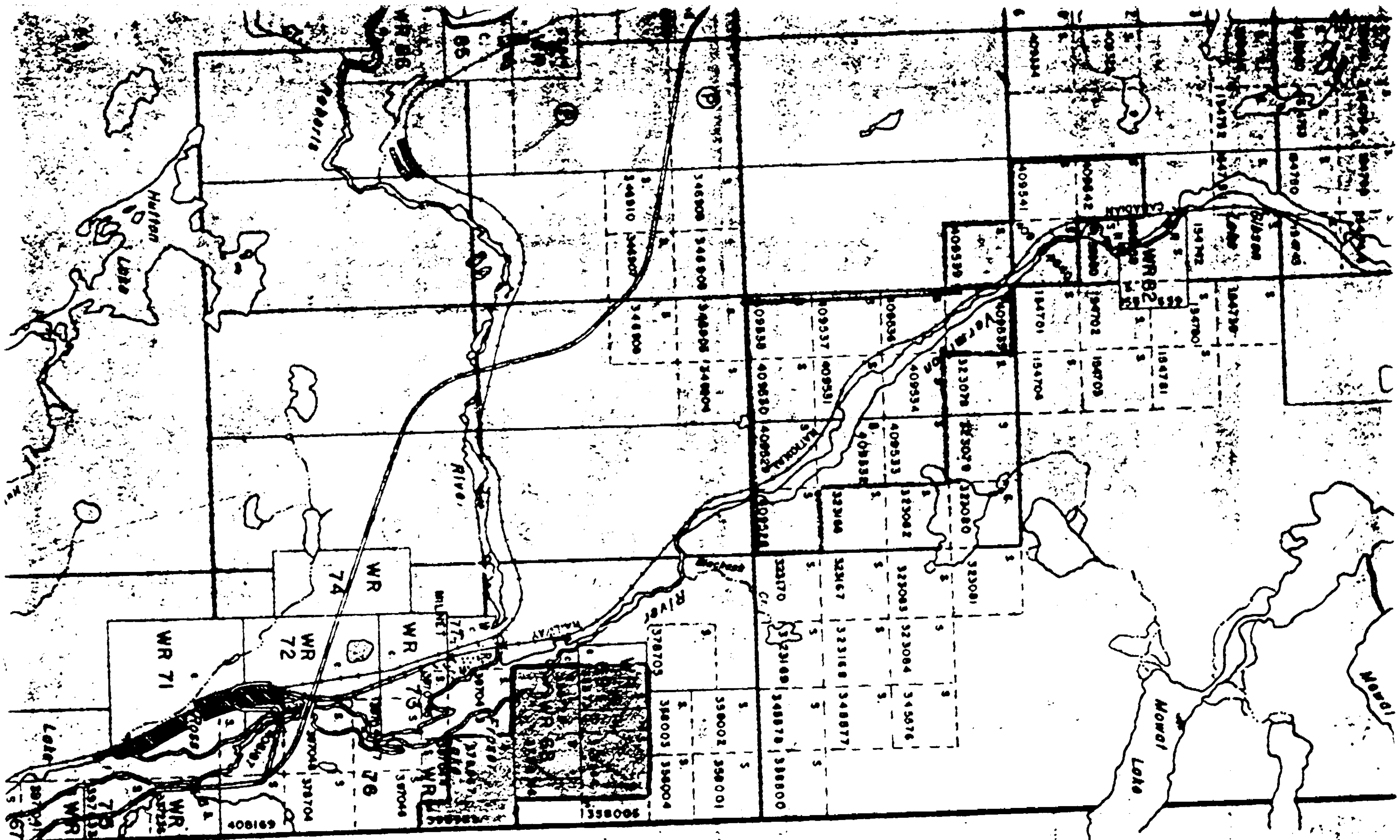
900

Recorded Holder: Sandex Developments Limited

Township or Area: Hutton and Parkin Townships

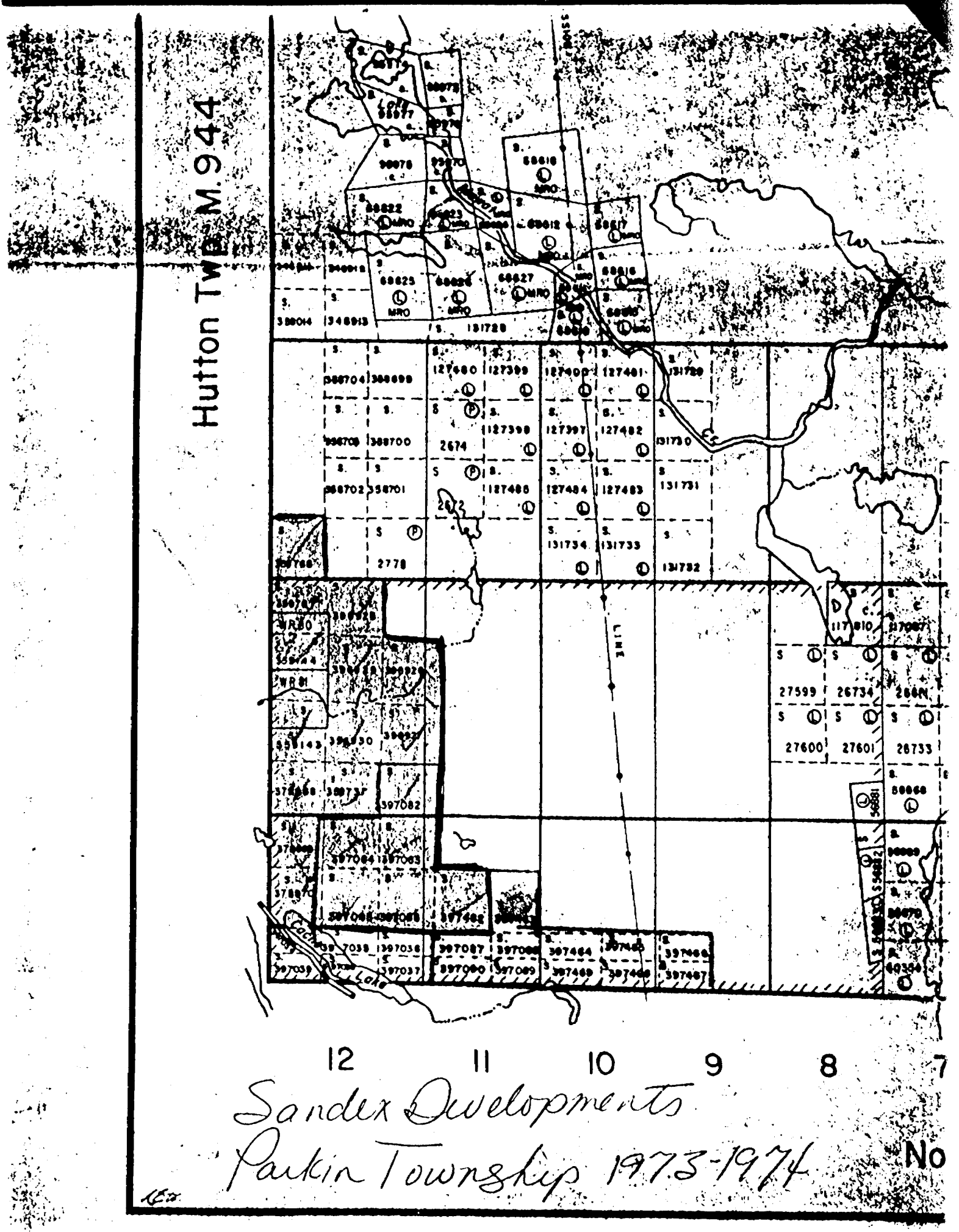
Type of survey and number of Assessment days credit per claim	Mining Claims
Geophysical	S. 358729
Electromagnetic _____ days	358731
Magnetometer _____ days	359143 - 44
Radiometric _____ days	359766 - 67
Induced polarization _____ days	378867 to 70 inclusive
Section 86 (18) 19 & 20) see across days	396925 to 30 "
Geological _____ days	397082 to 86 "
Geochemical _____ days	
Man days ☐ Airborne ☒	Amount spent on programme (Aerial Photogeology interpretation and Seismic Refraction survey) = $10,000.00
Special provision ☐ Ground ☒	
Notice of Intent to be issued:	Total assessment days credit allowed = 666.7
☐ Credits have been reduced because of partial coverage of claims.	The assessment work credits of 666.7 days must be recorded equally on the above Mining Claims as 31.75 days for each of these twenty-one claims.
☐ Credits have been reduced because of corrections to work dates and figures of applicant.	
☒ No credits have been allowed for the following mining claims as they were not sufficiently covered by the survey:	
S. 345584	
358730	
378866	

The Mining Recorder may reduce the above credits if necessary in order that the total number of approved assessment days recorded on each claim does not exceed the maximum allowed as follows: Geophysical — 80; Geological — 40; Geochemical — 40;



Sandox Developments Ltd
Hutton Twp
1973-1974

PARKIN TWP. M.1049


Hutton Twp. M.944
12
11
10
9
8
7
Sandex Developments
Parkin Township 1973-1974
No

Parkin Twp.

VI

V

IV

Wisher Twp.

NORMAN TWP.
SCALE 1" = 40 CH.

INDIAN RESERVE NO. 11

Boss Lake

Lake Wanapitei

Rathbun Twp.

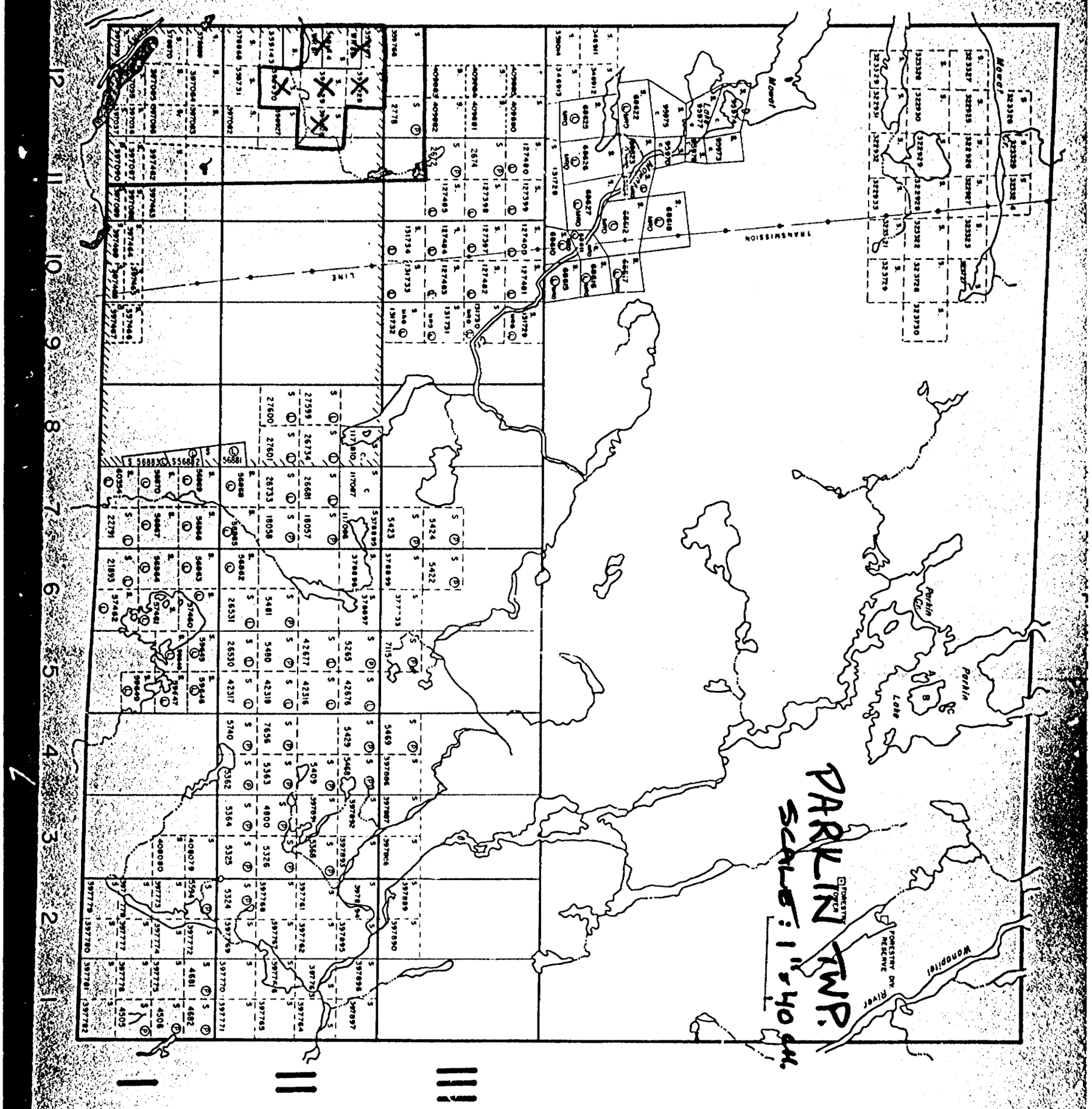
West Bay

Capreol

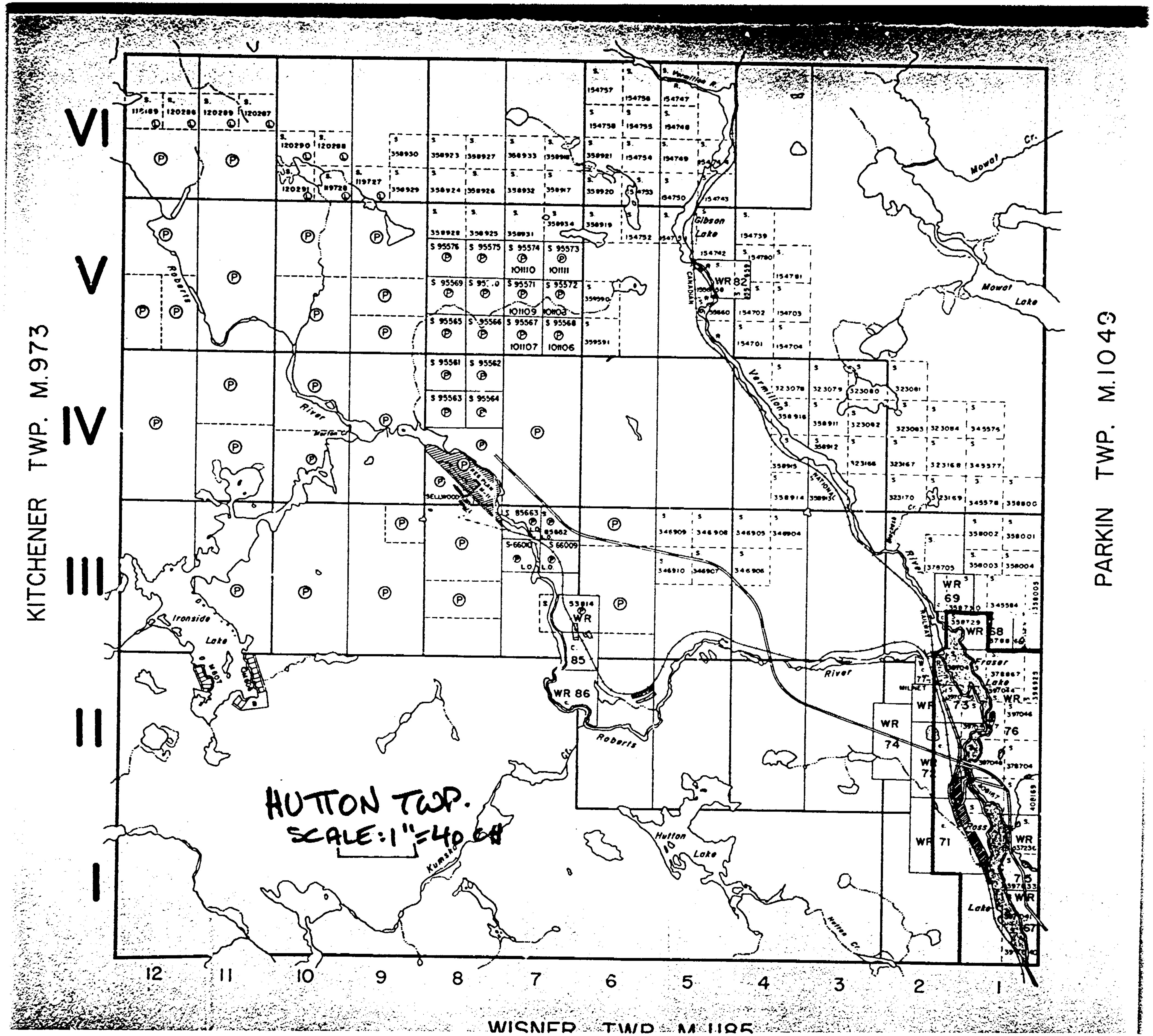
TOWN OF CAPREOL

12 11 10 9 8 7 6 5 4 3 2 1

Hutton Twp. M.944



Aylmer Twp. M.641


HUTTON TWP.
SCALE: 1" = 40 CH
KITCHENER TWP. M.973
PARKIN TWP. M.1043
WISNER TWP. M.1185
VI
V
IV
III
II
I
12
11
10
9
8
7
6
5
4
3
2
1
Ironside Lake
Hutton Lake
Gibson Lake
Mowat Lake
Fraser Lake
Ross Lake
Vermillion River
Roberts River
Mowat Cr.
Kumska Cr.

80°56'

50'

Hutton Twp. | Parkin Twp.

1006 1000 1001 1005 1003 1002 1004 1007

D.D.1 D.D.2 D.D.2 Vert. 186' 1015'

Greenstone Granite

Fraser Lake

MILNET

Bush Road

C.N.R.

ROSS LAKE

Cache Lake

A A' B B' C C' D D' E E'

otc G.E.

N

Hutton Twp.

Wisner Twp.

Parkin Twp.

Norman Twp.

48°49'

46°48'

LEGEND

- Basement complex. Mainly granite and granite-gneiss.
- otc — Area of rock outcrop, Till veneer and glacio-eolian deposits(thin)
- G.E — Glacio-eolian deposits. sand, silt and(loess)
- Glacio-fluvial deposits. boulders, gravel, silt and clay (gold channel)
- Swamp
- Deeper parts of older channels
- A ——— A' Geological traverse
- DD1 — DD hole
- 45 — Test pit(assayed)
- 2 O — Drill holes
- 1005 — ODM assayed samples
- Magnetic anomaly (from survey performed by Geological Survey of Canada 1959-60 Map 1512 G - Milnet - Ontario)

Geology compiled by Capital GeoConsultants of Toronto. Survey 1973 - 1974.

Scale 1":800'

0 800' 1600' 2400' 3200'

GEOLOGICAL MAP OF

PLACER GOLD PROPERTY
MILNET AREA
ONTARIO

SANDEX DEVELOPMENTS LTD.

HUTTON - 0020, #1

80°57' 55'

FIG. 2

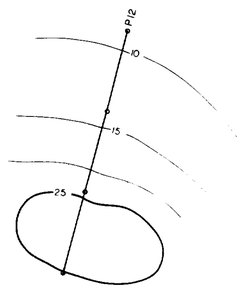
Drafted by M.V. Preda

2.1547

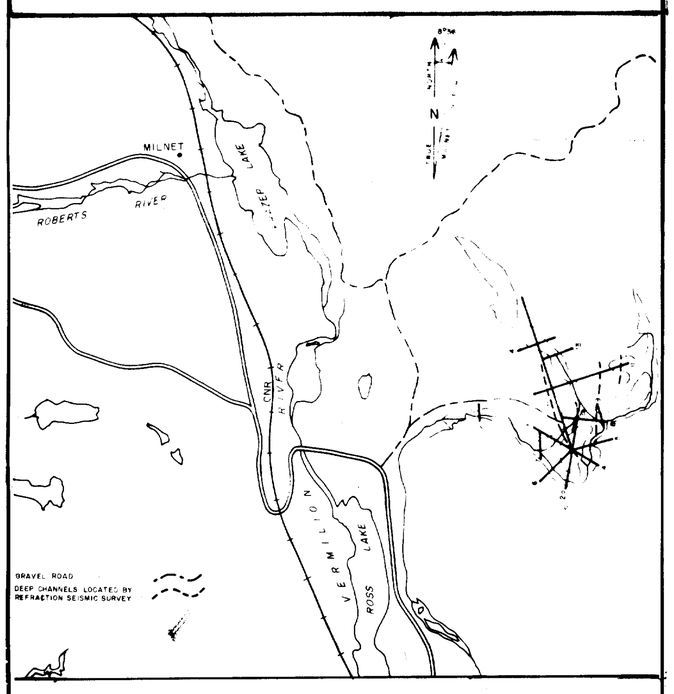
41I15SW0165 0020 HUTTON

1

200



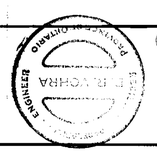
KEY MAP
SCALE
4 INCHES = 1 MILE



REFRACTION SEISMIC SURVEY
FOR
CAPITAL GEOCONSULTANTS
TORONTO, ONT.

TITLE :

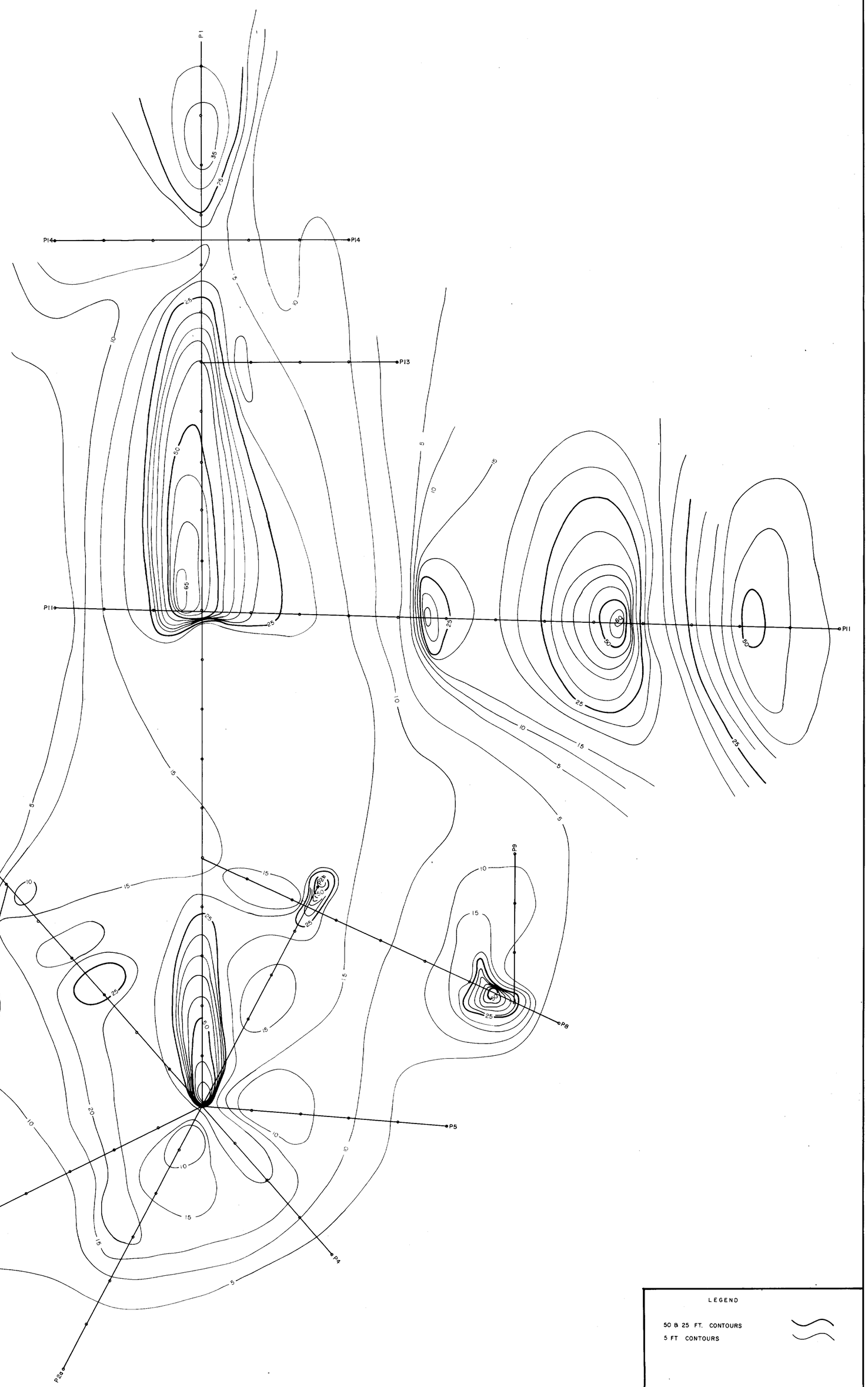
BEDROCK DEPTH CONTOURS
BASED ON THE INTERPRETATION
OF REFRACTION SEISMIC SURVEY



210

BY
D. R. VOHRA, M. Sc, P. Eng.
POINTE GATINEAU, P. QUE.

HUTTON-0020 #2



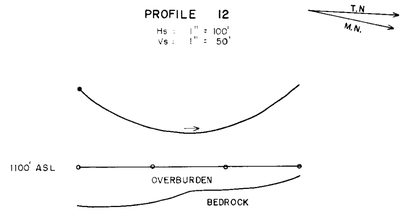
LEGEND

50 & 25 FT. CONTOURS

5 FT CONTOURS

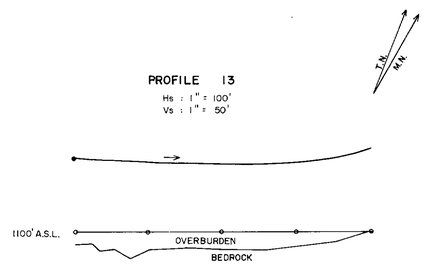
PROFILE 12

Hs : 1" = 100'
Vs : 1" = 50'



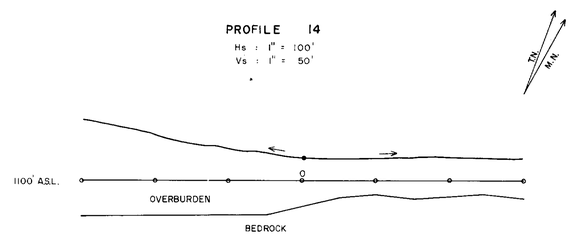
PROFILE 13

Hs : 1" = 100'
Vs : 1" = 50'



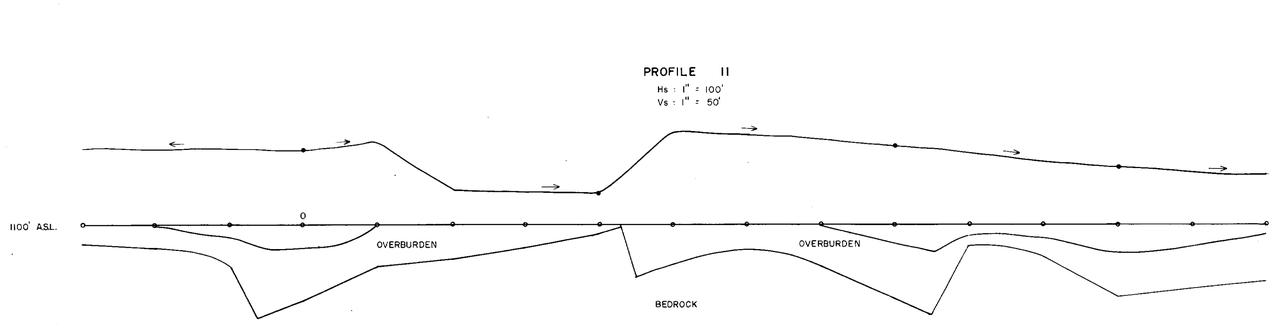
PROFILE 14

Hs : 1" = 100'
Vs : 1" = 50'



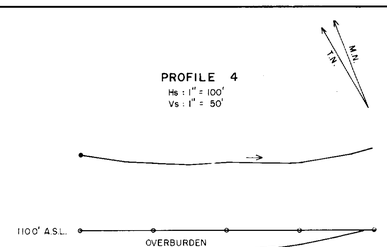
PROFILE 11

Hs : 1" = 100'
Vs : 1" = 50'



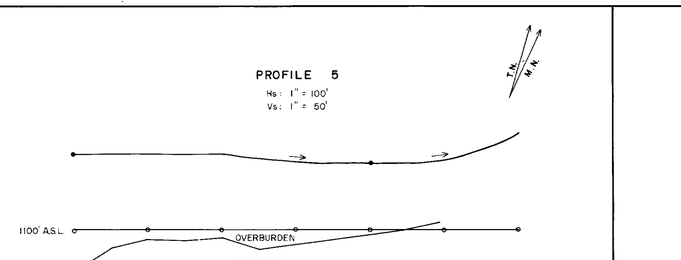
PROFILE 7

Hs : 1" = 100'
Vs : 1" = 50'



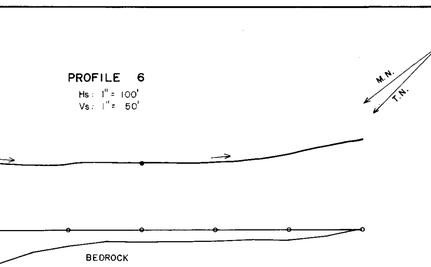
PROFILE 8

Hs : 1" = 100'
Vs : 1" = 50'



PROFILE 9

Hs : 1" = 100'
Vs : 1" = 50'



PROFILE 4

Hs : 1" = 100'
Vs : 1" = 50'

PROFILE 5

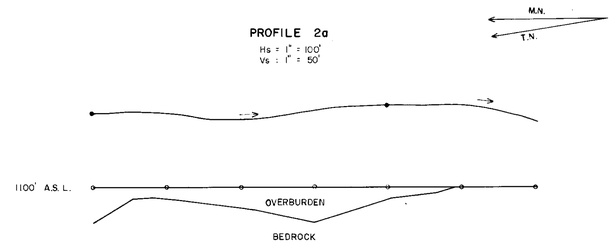
Hs : 1" = 100'
Vs : 1" = 50'

PROFILE 6

Hs : 1" = 100'
Vs : 1" = 50'

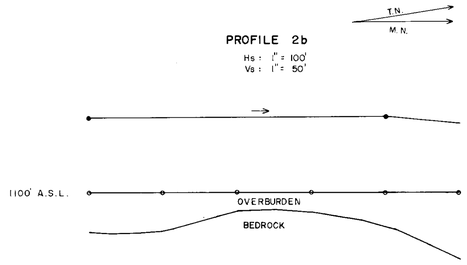
PROFILE 2a

Hs = 1" = 100'
Vs : 1" = 50'



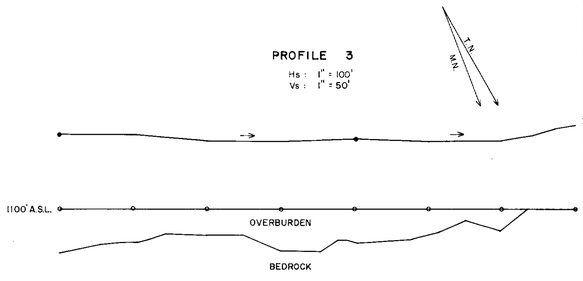
PROFILE 2b

Hs : 1" = 100'
Vs : 1" = 50'



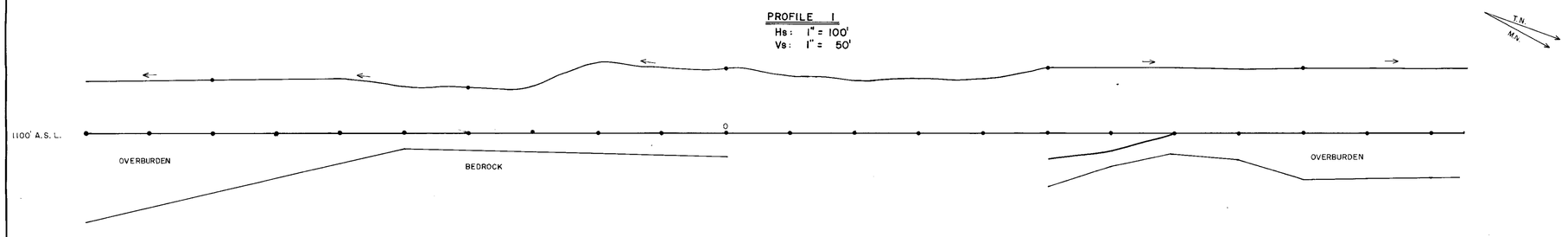
PROFILE 3

Hs : 1" = 100'
Vs : 1" = 50'



PROFILE 1

Hs : 1" = 100'
Vs : 1" = 50'



LEGEND

SURFACE ELEVATION

A.S.L. = ABOVE SEA LEVEL — 1100 A.S.L.

OVERBURDEN

BEDROCK

PROFILE DIRECTION

GEOPHONE SETTING

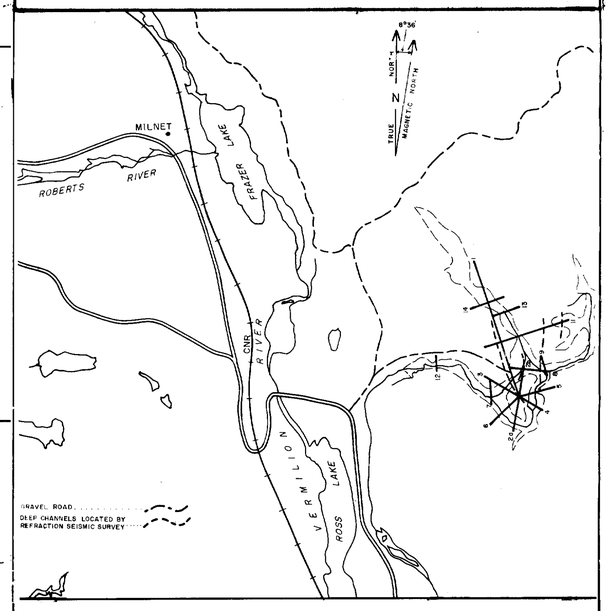
Hs = HORIZONTAL SCALE

Vs = VERTICAL SCALE

T.N. = TRUE NORTH
M.N. = MAGNETIC NORTH
MAGNETIC DECLINATION 8° 36' (APPLIES TO PROFILES)

KEY MAP

4 INCHES = 1 MILE



REFRACTION SEISMIC SURVEY
FOR
CAPITAL GEOCONSULTANTS
TORONTO, ONT.

TITLE :

REFRACTION SEISMIC PROFILES
OF
BEDROCK DETERMINATIONS

BY
D. R. VOHRA, M. Sc., P. Eng.
POINTE GATINEAU, P. QUE.

REGISTERED PROFESSIONAL ENGINEER
D. R. VOHRA
PROVINCE OF ONTARIO

HUTTON-0020 #3