ELECTRO-MAGNETIC SURVEY

PALSTON MINING AND DEVELOPMENT COMPANY LIMITED

McNISH TOWNSHIP, ONTARIO.

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PURPOSE OF SURVEY

A ground E.M. survey was conducted over the area to detect electrically-conductive zones. As metallic mineralisation was known to occur on the property it was reasonable to expect that some at least of the conductors located by the survey would prove to be due to the presence of metallic conductors rather than the uneconomic occurrence of graphite or ionized solution-filled fault or shear zones.

AREA OF SURVEY

The survey was conducted over two separate grids, each however being tied in by a common N-S base line. The first area known as the "Beaver Pond" area lies in the northwestern corner of the claim group and covers the ground which contains showings 3, 4, 5 and 6 as described in the writer's previous report. The survey here was conducted over lines 12N to 36N running west of the Base Line.

The second surveyed area is known as the South-East zone and includes Lines 12N to 28S running east from the common Base Line.

CONDUCT OF SURVEY

Stations were read at 100' intervals along east-west lines spaced 200 feet apart. A vertical loop, supplied by an electrical current of 1200 cycles per second, was used to create the electro-magnetic field. Dip angles were measured by the detecting coil at each station.

BASIS OF ELECTRO-MAGNETIC METHOD

The method involves the transmission of an alternating electro-magnetic wave of a given frequency, which permeates the ground in the vicinity of a transmitting coil. This wave or field induces an electric current in any conductor on which it is incident. The flow of an alternating current in a conductor sets up its own, or secondary, radiating electro-magnetic field. These two fields form a resultant whose configuration depends on the following characteristics of the subsurface conductors:-(1) size, (2) shape, (3) electrical conductivity, (4) magnetic permeability, and (5) frequency of the transmitted wave. To a lesser extent the resultant is also dependent on material adjacent to conductor, topography, and surface conductivity. The direction of the resultant vector is measured by a small receiving coil tuned to the frequency of the transmitted wave.

GEOLOGY OF AREA

As a detailed description of the geology and mineral occurrences of the area was discussed previously in another report by the writer little need be said here.

Suffice it to say that the area covered by the E.M. survey is underlain by Upper Huronian sediments known as the Cobalt Series. The Cobalt Series consists of an assemblage of conglomerates, quartzites, argillites and greywackes locally intruded by later diabase dykes. The general strike in the area appears to be roughly N-S although 90° variations from this are quite common. Most of the known sulphide occurrences appear to be associated with shear zones occurring usually within the greywacke and argillites.

As the grid coordinates of the mineral occurrences and other geological features in the area are unknown by the writer it is impossible in the present dissertation to tie the geophysical results in with the known geology. Obviously a final interpretation to the geophysical results can not be attained until all known facts are compiled together. Such will be the case, however, in the near future when geological grid map results are in.

INTERPRETATION

As was stated previously, the electro-magnetic method is capable of detecting buried conductors. Conductors so located may be caused by a number of geological conditions, namely, (1) graphitic slate, (2) massive bands of metallic sulphides etc., (3) interlocked grains of sulphides and oxides, and (4) ionized solution-filled fault zones. It is important therefore, from the interpretation standpoint, that as much be known about the geological environment as possible if a proper interpretation is to be given to the results.

Higher frequencies are capable of locating less conductive zones, indicative of sparse, disseminated mineralization while the lower frequencies are able to locate only the more conductive materials such as massive sulphide deposits. Moreover, as the frequency of the transmitted wave increases, the penetration falls off rapidly. Because of this fact it appears that the optimum frequency range is from 500 to 1500 cycles.

This survey, utilizing a frequency of 1200 cycles, should be capable of locating massive sulphide zones as well as the more heavily-enriched disseminated occurrences.

(a) Beaver Pond Area

The E. M. results in this area are shown on the E.M. plan map accompanying this report.

Conductors A, A', and B appear to be the most interesting. Conductor A lies close to two showings which contain minor amounts of lead, silver, copper and nickel. Conductor A' lies on strike with A and was confirmed by later detailing. This conductor is at least 800 feet long and appears to end in the vicinity of Line 26N. A conductor, on strike with A' and crossing line 28N, however, suggests a renewed continuation of the A' conductor.

The B conductor occurs in the area adjacent to a nickel-copper showing and is most probably due to metallic mineralization similar to that found in the showing. The conductors occurring on L 26N at station 18+50W was confirmed in detailing and is possibly the most massive part of the zone.

Conductor B' lies of strike with B and is one of the best conductors located in the area.

(b) South-East Zone.

Two E.M. maps are submitted on this area, one showing the results of the preliminary E.M. survey conducted in the area, the other being the final E.M. map showing the results of both the preliminary and detail E.M. surveys.

The exact nature of the strike of many of the conductive zones in this area is unknown and for this reason the strike directions in many cases are noted as being questionable. The large number of conductors located brings in to play a number of alternative strikes to the zones, the true nature of which can best be solved by subsequent field examination.

Many of the conductors such as L, M, and K appear to strike in a direction parallel to the diabase dykes in the area. Conduction is likely to be, in such cases, along the diabase contacts arising either from ionized shears or from snare to heavy mineralization along these contact zones.

Many of the other conductors, however, such as N, I, J, and P strike to the northeast and are most likely caused by metallic mineralization.

The E.M. results suggest also the presence of a conductive fault striking E-W between Lines 16S and 18S but since it is parallel to the lines it is difficult to pinpoint.

At 9+50E and Line 22S conductors appear to change in strike to a SE direction. It may be that conductors E, G, and H, or F, G, and I are actually the same conductive zones and turn in a horseshoe fashion because of a marked deflection in the strike of underlying geology. Structurally it may be that the change in strike of the conductors is caused by either an anticline plunging to the west or a synclinal sedimentary structure plunging to the east.

A third and quite probable explanation for this 'nosing' effect of the conductors is the fact that any igneous intrusion intruding into these sediments from a south- south-west direction would likely cause heavy shearing in the sediments in a direction at right angles to the direction of compression or intrusion.

In the northeast survey corner of the area a very definite conductor has been located near a copper-gold showing. Four samples from this averaged 1,81% copper and .04 oz of gold per ton. This conductor (B) is at least 1600 feet long. No attempt was made to trace its southern extension due to the proximity of the nearby Sturgeon River. Two hundred feet east of this conductor lies another conductive zone (A) which strikes parallel to B and whose north and south extensions have not as yet been traced. Conductor B appears to be the most interesting conductor on the property.

CONCLUSIONS AND RECOMMENDATIONS

The survey reveals a large number of electrical conductors. Many of these conductors are coincident with known base-metal occurrences which were found previously on the property.

Since a large number of similar shows are known to exist, some of which were found to contain interesting quantities of base metals as well as precious metals, it is most likely that many of these conductors are coincident and result from similar type mineralization.

Further work is definitely recommended in the form of surface geological examination followed by test diamond drilling of those conductors known or believed to be due to sulphides.

It is the writer's understanding that Mr. Stone, chief geologist for Falconbridge Mining and Development Company Limited is presently conducting a detailed surface examination of these conductors. Drilling therefore should begin at the conclusion of this survey.

Respectfully submitted,

Radar Exploration Company,

J. Wm. Pemberton

(J. W. Pemberton.)

Toronto, Ontario,

October 17, 1955.

Revised November 15, 1955.

I, ROGER HOWELL PEMBERTON, of 224 St. George Street, Toronto, Ontario, DO HEREBY CERTIFY:

1. THAT I am a duly qualified geologist and geophysicist.

2. THAT I obtained my B.Sc. in geology in 1953 from the University of Western Ontario and my M. Sc. in geophysics in 1954 from the University of Wisconsin.

3. THAT I have no direct or indirect interest, nor do I expect to receive any direct or indirect interest in the property or securities of Palston Mining and Development Company Limited.

4. THAT my report is based on an electromagnetic survey conducted on the property in August and September, 1956 under my supervision.

DATED at Toronto, this 15th day of November 1956.

R. H. Pemberton

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ACKNOWLEDGMENT

Some of the information contained in this report has been obtained from Mr. C. Stone, geologist for Palston Mining and Development Company, who accompanied the writer during his investigation of the McNish Township property.

All exploration on the property was carried out under Mr. Stone's supervision during the months of February to May 1956.

PROPERTY AND LOCATION

The property of Palston Mining and Development Company consists of thirty-four contiguous mining claims of about 40 acres each located in the north-west corner of McNish Township and covering parts of lots 9, 10, 11 and 12, Concessions V and VI. At the time of the writer's visit to the property four of the claims had just recently been staked and were not as yet recorded. The other 30 claims are numbered as follows: 91913-27 inclusive; 93072-74 inclusive; 93336-42 inclusive; 94033-34 and 94096-98 inclusive.

These claims are known as the McNish Group of Palston Mining and Development Company.

ACCESSIBILITY

The nearest rail point to the claim group is Chudleigh on the Canadian National Railway Capreol route about 9 miles to the south.

It is conveniently reached by a road which meets the C.N.R. at Glen Afton and which heads due north up to Brightwater Lake, swings west into MacBeth Township and thence south to the Sturgeon River near the northeast corner of the claim group. The group is easily reached by air by plane landings on Ozhway Lake which is straddled by the claim group.

HISTORY OF AREA

First attention was paid to the area by prospector George Waltenbury who staked 42 claims around a nickel-cobalt-copper showing which occured in the quartzite formations at the northeast end of Beaver Pond. With the financial assistance of a partnership group he undertook extensive exploration and development work and erected a small mining camp consisting of five buildings which included a stable and a well developed blacksmith shop. From his first shaft which went down approximately 16 feet he removed a considerable amount of rock and ore. It was reported that Mr. Waltenbury shipped a small amount of ore (approx. 1 ton) to the Temiskaming Testing Laboratories in the year 1934-5. The writer was unable to verify this because the Laboratories' records were burned in a fire in 1939 and no records before October 1939 are available.

Elsewhere on the property considerable trenching and shaft sinking was done by Mr. Waltenbury on sulphide-bearing quartz veins which occurred mainly within the greywacke formations.

In 1938-39 Mr. Waltenbury discovered Zincblende-bearing float immediately to the northwest of Ozhway Lake and he proceeded to sink a small shaft through the overburden. Fortunately he was able to locate lead-zinc mineralization in place and removed

approximately 5 tons of ore to a stock-pile. From time to time various amounts of this stock-piled ore were removed for assaying and the results showed extremely high values in lead and zinc as well as appreciable quantities of copper and silver.

About the end of 1939 financial difficulties forced Mr. Waltenbury to abandon all further exploratory efforts in the area.

In 1944 the property was restaked by his son Wilfred who was drowned shortly after in the nearby Sturgeon River. The claims were allowed to lapse until 1956 when prospecting by Mr. Norman Saville resulted in the staking of 18 claims in January of 1956. These 18 claims were later sold to Mr. C. Stone and during the period from February to May an additional 16 claims were staked thus bringing the number of claims in the group to 34 in number.

The whole region in the vicinity of Palston Mining and Development Company's claim group has recently experienced tremendous activity due mainly to the great success which Timagami Mining Company has had in locating extremely high-grade copper ore in the Lake Timagami area. Drilling is presently in progress on a 114 claim group located 1½ miles west of Palston's claim group. Pickel Crow Goldfields is carrying on an exploration programme on a large group 3½ miles to the east of Palston's group. In Clement Township, 4 miles to the northeast Noranda Mines is also actively engaged in exploration and development work in the vicinity of a fine showing of massive chalcopyrite and pyrrhotite occurring within the sediments.

Besides these companies there are numerous other ones which are at present actively engaged in exploration and development work.

GEOLOGY OF THE AREA

The geology of McNish Township has been previously described by E.L. Bruce in Vol.XLI, Part IV, 1932, O.D.M. Reports.

The formations underlying the area presently designated as Palston's claim group are believed to belong to the Cobalt Series which were laid down in Upper Huronian times. The rocks in the area, except for a few intrusions of diabase are all sedimentary in origin and are found to be either conglomerates, quartzites, greywackes, or argillites. Transitional phases from one type to another are common and in some cases it is extremely difficult, if not impossible, to place such rock facies in any one of the aforementioned categories.

The youngest sedimentary rock appears to be the Gowganda Conglomerate which occurs above the underlying quartzite and greywackes. In some places this conglomerate appears to lie unconformably upon the older rocks and in others it appears conformable. The Gowganda formation contains a large variety of pebbles, among which granite is conspicuous.

The quartzites, argillites and greywackes are older than the Gowganda formation but the stratigraphic relationship between the various sedimentary facies is most difficult to ascertain. Because of the absence of stratification within most of these rocks, it is difficult to obtain a true strike and dip and consequently the structural conditions of the area are difficult to interpret. The writer observed however, that at least two different beds of quartzite occur in the stratigraphic sequence. These two zones are separated by a silicious argillite which in places appears to be conglomeritic in nature. The best exposures of this sequence occur along the west

side of Beaver Pond and in the vicinity of the north-east corner of the property.

Immediately north of Ozhway Lake and at the site of the lead-zinc showing there are two rock facies which were not found elsewhere on the property. One is a dark-grey, slaty, argillate which occurs as the hanging-wall formation of the mineralized zone, the other is a cherty conglomerate into which the ore-forming solutions have intruded.

The whole assemblage of sedimentary rocks is folded into gently to modiumly dipping anticlines and synclines whose axes strike generally in a northerly direction. Later diabase dykes are found in some places to have intruded all the older rocks. There is the possibility that some diabasic intrusions occurred immediately before the Gowganda formation was laid down since in one exposure the diabase was observed to intrude the greywacke but to end abruptly when it reached the contact between the greywacke and the Gowganda conglomerate.

Numerous quartz veins were observed cutting through all the formations in the area. Many of these veins are associated with sulphide mineralization and may possibly be associated with sulphide ore bodies of sufficient size and grade as to be mined economically. Shearing within the greywacke and agillites as well as occasionally within the conglomerate is quite common. Some of these shear zones are mineralized to a considerable degree and are the most common host for the mineralization found in many of the showings on the property.

Fifteen separate mineralized showings were examined by the writer; Each of these showings was associated with either copper,

nickel, cobalt, silver, lead, or zinc mineralization. In many cases a combination of two or three of these elements was found in a single showing.

Because of this widespread mineralization and the presence of suitable host rocks within the area the writer believes it quite possible that sufficient concentrations of suitable grade ore underlie the area and may be found if further exploration is continued on the property.

DEVELOPMENT WORK

A large amount of surface work in the form of trenching was carried out by Mr. Stone during the months of February to May 1956. Much of his efforts consisted of cleaning out and enlarging many of the trenches and old shafts previously blasted out by Mr. Waltenbury in the 1930's.

The discovery of many of the showings on the property must, however, be credited to the perseverance and engineering of Mr. Stone who, while working under severe winter conditions, was fortunate enough to discover a number of mineralized occurrences which add much to the economic possibilities of the claim group.

Fifteen separate showings were examined by the writer, the most significant of which is No.8, the showing of high grade lead and zinc containing appreciable quantities of silver and copper as well.

Fifty-nine assays from twenty-three mineralized specimens forwarded to Dr. D.A. Moddle, Provincial Assayer, have been obtained by the writer. In addition twenty-four separate assays were run by Bell-White Laboratories on samples forwarded to them previously by

Mr. Stone.

For the purpose of simplification the following is a breakdown of the various showings examined, the location of which is identified by the corresponding numbers on the accompanying geological map.

SHOWING NO. 1

Mineralization here is associated with a quartz dyke 6" wide striking N.E. through a light-grey quartzite.

A large trench 40 feet long, 6 feet wide and up to 8 feet deep was previously dug to expose this vein. In March 1956, Mr. Stone re-opened the trench and blasted out about 3 tons of fresh rock to expose the zone.

Mineralization consists of massive galena, sphalerite and pyrite. Although massive in character it appears to be restricted to the quartz vein itself as no mineralization was visually seen on either of the vein in the quartzite.

SHOWING NO. 2

This showing is similar to showing No.1 but the mineralization is far less spectacular being only minor chalcopyrite and pyrite and consequently does not appear to warrant further development at this time.

SHOWING NO. 3

The mineralization in this showing strikes through the quartzite N. 50 degrees W and dips 50 degrees to the northwest. Mineralization at the surface appears to be restricted to about a

6" width composed of narrow sulphide stringers localized along fracture planes in the quartzite. Sulphide minerals present are massive pyrrhotite, some chalcopyrite, sparse galena and pyrite. The main gangue mineral is a carbonate.

This showing is the site at which Mr. Waltenbury spent most of his efforts. The old shaft he sunk went down approximately 15 feet and apparently showed that the main vein widened somewhat at depth. The old winch and cable he used to haul out the rock can still be seen today. Approximately 30 tons of rock was removed from the shaft. Mr. Waltenbury removed apparently about one ton of ore to the Temiskaming Testing Laboratories for assay in 1934-5. Unfortunately all the company's records of that time were destroyed in a later fire.

Along side the shaft is a small stock-pile of ore consisting of the aforementioned minerals plus the presence of what appeared to be cobaltiferous and nickeliferous pyrite.

A number of samples were assayed, the results of which are as follows:-

Sample No.	Oz.Au./Ton	Oz.Ag./Ton	% Co.	% Ni.
7 MCN	trace	.26	.042	.10
8 MCN	trace	.18	.030	.06
3 A				.12
3 E		Nil	.04	.07
3 H		trace	.045	.14
3 J				.10

These results do not show a grade sufficiently high to be mined even if large tonnages were found. However they do indicate the presence of interesting mineralization which might be connected with higher grade zones at depth or along strike.

SHOWING NO. 4

Mineralization here occurs within at least three quarts veins varying in width from 3 to 6 inches and striking N 28° E through greywacke. A 5 foot wide diabase dyke strikes N 60° W across the mineralized zone. Ore mineralization is sparse and consists of galena, pyrite, pyrrhotite and chalcopyrite. Both the greywacke and mineralized quartz veins appear to have undergone later disturbance induced by strong N-S shearing.

SHOWING NO. 5

Pyrite, pyrrhotite, minor chalcopyrite, argentiferous galena, and sphalerite occur here in a sheared greywacke. Five trenches, one of which is at least 10 feet deep, have exposed this mineralization at various places. The shear zone strikes N 75° W and is at least 100 feet wide. Mineralization is associated with quartz veins occurring within the zone and also along the more heavily developed shears. Evidence of intensive movement is shown by much slickenside development within this zone.

Occurrences of phyllite and the presence of well-devloped crystals of actinolite indicate that mineralization was at least mesothermal and possibly hypothermal although the presence of galena and sphalerite would tend to rule out the latter.

Samples sent in for assays gave the following results:

Sample No.	Oz.Au./Ton	Oz/Ag./Ton	% Pb.
5 A	trace	trace	
5 B		2.70	3.25

SHOWING NO. 6

This showing occurs on the side of a rise, the Whole of

which is heavily iron-stained. Massive pyrrhotite with sparse chalcopyrite occurs within a greywacke. Olivine appears to be closely associated with the pyrrhotite as well as with well developed pyrite crystals. Mr. Waltenbury blasted out a trench 10 feet wide by 35 feet long but because of the heavy iron-staining along all sides of the trench it was impossible to establish clearly the attitude of the mineralized zone.

Assays of two samples from this showing give:

Sample No.	Oz. Au./Ton	Oz. Ag./Ton	% Ni.	% Cu.
6 A	trace	trace	trace	
6 B			.08	.12

SHOWING NO. 7

Chalcopyrite occurring as ¼" blebs in quartz is associated with a series of quartz veins each about 4" - 6" wide. The quartz veins occur in stockwork fashion in a greywacke. There is some evidence of cross-faulting and displacement of quartz veins. The main chalcopyrite veins strike approximately N 20° E and dip 60° W and although the trench examined showed only minor mineralization it could be that they widen with depth or are only the visible expression of greater concentrations elsewhere.

SHOWING NO. 8

This showing located in the west-central portion of Claim No. 91914 is the most spectacular and interesting occurrence on the property. Six grab samples from this showing gave an average gross value per ton of $65.56 at present metal prices.

Lead, zinc, silver, copper and cadmium metals occur

together, visual mineralization being in the form of massive sphalerite, galena and chalcopyrite with minor pyrrhotite and pyrite. Silver most probably occurs in the form of argentiferous galena since the silver assay values show a definite percentage relationship to those of the lead values.

No outcrop occurs in the immediate vicinity of the showing.

A large angular erratic boulder containing heavily disseminated to massive zinc-blende, galena, chalcophyrite and pyrrhotite lies on surface about 130 feet SE of the main showing. Mr. Waltenbury put down his first shaft atop a small rise east of Showing No. 8 in the hope of locating the source from which the boulder came. After his first effort failed he moved about 50 feet west and fortunately found it in place. During the past winter Mr. Stone cleaned out this shaft and examined the zone. It was found that mineralization occurred within a cherty pebble conglomerate which was overlain by a dark-grey slaty argillite. These beds strike N 10° E and dip 30° E. The total depth of this shaft was 11 feet, 10 feet of it being overburden, the last foot being in bedrock and ore. The second shaft was put down about 20 feet west of the first and across what is believed to be the width of the ore zone. This shaft penetrated 17.5 feet of overburden and about .5 feet of ore. A small 2.5 feet drift was blasted in the north face of the shaft and about 1 ton of ore was removed from it.

Four attempts were made to test the zone with a packsack drill but because of the thick overburden it was impossible to penetrate it. Besides this a trench was dug about 130 feet west

of the showing but because of a rapid inflow of water and caving it had to be abandoned before it reached bedrock.

Mineralization appears to be localized within the cherty pebble conglomerate where it occurs in massive character. Only sparsely disseminated pyrite and pyrrhotite appear to occur in the overlying slaty argillite. This slaty argillite appears to have acted as a barrier to rising ore-bearing solutions and as a result deposition from solution became localized in the underlying cherty member.

The writer has found no intrusive rocks which might have been the source of the mineralization, other than the occurrences of diabase lying NW of the showing. But due to the fact that most of the area contains little outcrop it is entirely possible that a granitic or dioritic intrusive underlies the present topography.

About 3.5 tons of ore presently lies on a stockpile just south of the shaft. About 200 lbs. were removed previously from the property by Mr. Stone.

The writer picked six random grab samples from the stockpile and submitted them for assay.

These samples averaged $65.56 combined P6, Zn., Cu., and Ag.

Sample No.	% Cu.	% P6.	% Zn.	Oz.Ag./Ton	Gross Value	Remarks
8A	3.88	4.83	6.40	1.55	$68.57	Silver 90¢/oz.
8B	trace	6.71	14.06	trace	$58.76	Copper 45¢/lb.
8C	trace	2.03	15.60	1.05	$51.39	Lead 15.5¢/lb.
8D	trace	11.86	15.03	2.50	$79.13	Zinc 13.5¢/lb.
8E	0.64	1.06	8.03	1.10	$31.72	
8F	trace	14.25	22.01	2.03	$105.52	
Average	0.75	6.79	13.53	1.37		
Gross Value	$6.75	$21.05	$36.53	$1.23	$65.56	

In addition one assay was run for cadmium and showed it to contain .005% Cd.

SHOWING NO. 9

This is the occurrence of the large erratic which was heavily mineralized. It has no economic significance other than the fact that its discovery led to the finding of Showing No. 8.

SHOWING NO. 10

This occurrence consists of chalcopyrite, pyrrhotite and pyrite mineralization within an olivine diabase dyke cutting through a quartzite phase of the greywacke. Two samples taken from a 10' x 6' trench assayed 0.48% and 0.35% copper respectively. The whole outcrop here is heavily iron-stained and extent of mineralization was not able to be assessed.

SHOWING NO. 11

Mineralization here consists of minor chalcopyrite and pyrrhotite occurring within about a 4 foot wide zone in the Gowganda conglomerate. The mineralized zone strikes N 35° E and is exposed along the face of a shallow 10' x 10' trench. Sulphides are associated with 1" to 2" wide quartz veins which occur in stockwork-like fashion in the conglomerate. A sample of the pyrrhotite was assayed for nickel but showed only a trace nickel. A second sample assayed for copper ran 0.17% Cu.

About 200 feet north of Showing No. 11 there is an interesting 3 foot wide garnetiferous zone lying along the contact between a diabase dyke and a phyllite. This zone strikes north and

dips 65° W and has associated with it pyrrhotite and minor chalcopyrite. This mineralized zone is quite probably part of the same zone exposed at Showing No. 11 and indicates that mineralization persists along strike for at least 200 feet. This phyllite moreover would be an extremely fine host to sulphide mineralization and could possibly contain greater concentrations of ore-minerals than is exposed here.

SHOWING NO. 12

The mineralized zone is exposed along the south face of a 10 foot deep shaft sunk previously by Mr. Waltenbury. Mineralization occurs over about a 12 inch width and occupying the zone between a diabase dyke on the west and sediments on the east. Sulphides are massive pyrrhotite and minor chalcopyrite. The associated rock or gangue is gabbroic in nature and consists of quartz, plagioclase, augite and olivine. The attitude and structure of both the mineralized zone and host rocks is very confusing and it is quite probable that the south face of the shaft shows a cross-sectional view of a major fault since the upper part of the mineralized zone stops suddenly against a highly sheared and deeply weathered chloritic zone. Only one sample was submitted for assay and ran 0.43% copper and a trace nickel.

SHOWING NO. 13

Finely disseminated chalcopyrite and pyrrhotite occur associated with quartz veins within the conglomerate. It is impossible to tell at this time the extent of mineralization since it occurs on a small isolated outcrop.

SHOWING NO. 14

Trenching here exposed copper-gold mineralisation over a 20 foot width in a grey-coloured argillite. The mineralized zone is associated with at least five parallel highly sheared chloritic zones which contain appreciable quantities of copper sulphides and some gold. These shear zones strike N 15° E and dip vertically. The whole zone is deeply weathered and altered to limonitic material. Most of the argillite is agglomeritic in nature consisting of fragments 1/16" to 3/4" in diameter. It is difficult to tell whether it is of sedimentary or volcanic origin since it could easily be either or both.

Four samples sent in for assay gave the following returns for copper and gold:-

Sample No.	% Cu.	Oz.Au./Ton	Gross Value	Remarks
14B	1.69	0.01	$15.56	Gold $35.00/oz.
14C	0.44	0.01	$ 4.31	Copper 45¢/lb.
14E	3.54	0.13	$36.41	
14F	1.59	0.01	$14.66	
Average	1.81	0.04		
Gross Value	16.29	1.40	$17.69	

This showing is particularly interesting. Values are sufficiently high and the host rock is particularly favourable to sulphide mineralization. Moreover the existence of known copper sulphide mineralization at Showing No. 14B shows the mineralization to be persistent along strike and also over a very considerable width.

SHOWING NO. 14(B)

This showing lies approximately 55 feet NE of No. 14 and

is similar to it. It lies also at least 30 feet east of the projected strike of the known mineralization in Showing No. 14 and strongly suggests that the mineralized zone is at least 50 feet wide.

CONCLUSIONS

The combination of such marketable metals as gold, silver, lead, zinc, copper and nickel occurring in many cases in strong shear zones and other favourable host rocks is too favourable an indication not to follow up with further work with the object of obtaining more conclusive results.

Showings No. 8 and No. 14 are both extremely interesting and their occurrences are similar in many ways to some of the continent's major base-metal producing mines.

RECOMMENDATIONS

In order to guide future exploration on the property it is recommended that geophysical surveys be commenced immediately to outline anomalous areas to be tested later by the drill.

Because of the large amount of glacial cover it is recommended that "A" core be used in order to insure necessary core recovery.

Respectfully submitted.

Radar Exploration Company

R.H. Pemberton

(R.H. Pemberton)

Toronto, Ontario.
June 19, 1956

DECLARATION

"I, Roger H. Pemberton, residing at 224 St. George Street, in the City of Toronto, and presently employed by Radar Exploration Company, Toronto, do certify that I am a qualified geologist reciving both a B.Sc. and a M.Sc. in geology from the University of Western Ontario and the University of Wisconsin respectively.

I did from May 21st to May 25th, 1956, personally examine Palston Mining and Development's property in McNish Township of Ontario, the results of which appear in my report of June 19, 1956.

I have no interest, direct or indirect, or expect to have at this time, in the property or securities of the company."

Respectfully submitted.

Vera Penny
(Witness)

R.H. Pemberton
(R.H.Pemberton)

June 19, 1956

63-819

030

PALSTON MINING AND DEVELOPMENT COMPANY

GRAVITY SURVEY

A gravity survey was conducted by Radar Exploration Company, Toronto, for Palston Mining and Development Company during the month of September 1956 on their McNish Township property in the Sudbury Mining Division of Ontario.

The survey was conducted for a dual purpose; 1) to check electrical conductors previously located by ground E.M. survey, and 2) to outline the area around the known mineralized zones previously located on the property.

At the termination of the survey the results were compiled and drafted. It was self evident from these results that some additional gravity work had to be done before a final gravity report could be written.

Three subsequent attempts were made to get back into the property to complete the survey but due to freeze-up conditions and severe weather each attempt ended in frustration, as a result the final report is still to be written. However, it is expected that the survey crew will be able to regain entry into the property very shortly.

The following attached Assessment Work Declaration is an account of the number ofdays spent surveying the property and the time required drafting the results.

ASSESSMENT WORK DECLARATION

A gravity survey was conducted by Radar Exploration Company, Toronto, for Palston Mining and Development Company on their McNish Township claim group located in the Sudbury Mining Division of Ontario.

The gravity survey covered parts of thirty contiguous mining claims, thirty of which were recorded at the time the survey was conducted and number as follows: 91913 - 27 inclusive; 93072 - 74 inclusive; 93336 - 42 inclusive; 94033 -34 inclusive and 94096 - 98 inclusive.

A station interval of 100', and in some areas 25', was used on a grid system with a line separation of 200 feet. A Worden Gravity meter #8, sensitivity .10062 milligals per scale division, was used.

A survey crew, consisting of three men, (1) surveyor and party chief, (2) meter operator, and (3) rodman, was employed through out the survey.

The office work consisted of (a) computation of field results, (b) computation of latitude and terrain corrections, (c) drafting, and (d) interpretation. This required the labour of 3 people, (1) geophysicist, (2) computer, and (3) draftsman.

Following is a man days field work weekly breakdown whic does not include travelling time:-

Week	Days x No. of men		Man days field work
Sept. 9.-15.	5 x 3	-	15
" 16.-22.	7 x 3	-	21
" 23.-29.	4 x 3	-	12
Total man days field work		-	58
Man days office work		-	29
Total man days		-	87

This does not include line cutting which was supplied by Palston Mining and Development Company.

The survey was on a contract basis at a rate of [redacted] per month. The cost of this survey was [redacted]

Radar Exploration Company,

per... R.H. Pemberton
R.H. Pemberton

Toronto, Ontario.

January 18th, 1957.

GRAVITY SURVEY REPORT

PALSTON MINING AND DEVELOPMENT COMPANY

McNISH TOWNSHIP, ONTARIO.

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orig + 2 copies each plan

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GRAVITY SURVEY REPORT

PALSTON MINING AND DEVELOPMENT COMPANY

McNISH TOWNSHIP, ONTARIO

THE SURVEY

Like all geophysical methods the gravity meter detects a physical property of rock. In this case the property measured is weight. The complete survey is thus a map of the underlying weight distributions.

It is to be noted that a heavy subsurface body is not only detected but actually weighed, that is, the excess mass of the body is measured. This excess mass determination is independent of any assumptions and it can be translated to an actual tonnage estimate by assuming the average densities of the ore and host rock.

The gravity meter itself has been rapidly developed over the last four years. It is an amazing instrument measuring to one part in 100,000,000 of the earth's field yet is more rugged and can be used with the same speed as a magnetometer.

A survey measuring to such an accuracy is affected by causes other than subsurface masses. These causes can however be accurately corrected for resulting in a "total gravity reading" which represents only what is below the ground. The corrections necessary are (1) elevation - due to change in distance from centre of earth; (2) instrument drift due to affect of temperature and changes in position of the sun and moon; (3) latitude - due to change of shape of earth with latitude; (4) terrain - due to pull of large hills.

LOCATION OF AREA SURVEYED.

The area surveyed, with the exception of two short lines, covers part of the 'southeast' zone lying between lines 0+00S and 32+00S from the base line on the west eastward to station 21+00 east. This southeast zone is part of Palston Mining and Development's McNish township property in Ontario.

PURPOSE OF SURVEY.

The purpose of conducting the gravity survey was twofold: 1) to check the E.M. conductors previously located in the area covered by the E.M. survey and 2) to cover the area in the vicinity of showing No.8 which contained massive lead - zinc - copper mineralization. The co - existence of electrical and gravity anomalies would infer that the subsurface material is a good conductor with a high density. This would increase the probability of it being a massive sulphide deposit.

GEOLOGICAL SKETCH OF AREA.

Formations consisting of conglomerate, quartzite and greywackes belonging to the Cobalts Series underlie the area. These formations were found to strike generally N20E and to dip gently either to the southeast or to the west. Shearing of these sediments is generally in a N.W. direction. Diabase dykes generally striking approximately N30° W are quite numerous and cut all the sediments except the Gowganda conglomerate, the latest member of the sedimentary series.

A large number of mineralized showings have been found in the area, most of which showed disseminated chalcopyrite localized along shear zones in the greywacke.

A good showing of lead - zinc - copper mineralization was located about 600 feet north of Ozhway Lake at grid coordinates 19+30S and 6+50E.

Structurally the central part of the area appears to occupy the crest of an anticline which plunges towards the south-west. Dips along both limbs of the anticline are very gentle, usually being about 25 degrees.

RESULTS OF SURVEY

The gravity results are plotted in profile form along with elevation profiles for each line. The locations of all the electro - magnetic conductors located previously by the E.M. survey have been superimposed on the gravity profiles. These conductors appear as small diamond - shaped figures immediately above the gravity profiles. All the known geology is also presented and appears on the elevation profiles for each line. Residual gravity anomalies are shown as vertically striped areas along the gravity profiles.

The survey does not indicate that any of the E.M. conductors are related to any large massive sulphide deposits. However, some of the conductors are coincident with small to very small gravity 'highs' some of which might be due to fairly heavily mineralized zones.

Those conductors which are coincident with any sort of gravity features are listed below.

Location of Conductor	Quality	Comments
Line 24S-sta.14+50E	poor	-coincident with broad .14 mg. anomaly. Further work definitely recommended.
Line 22S-sta. 9+50E	fair	-coincident with .05 mg. anomaly centred at 10+00E.
Line 20S-sta. 9+50E	fair	-lies immediately west of small gravity high centred at 10+00E. This and the preceeding conductor appear to represent one continuous zone.
Line 18S-sta. 8+60E	fair	-coincident with small (.06mg) and broad gravity high.
Line 14S-sta. 4+50E	good	- situated along east side of .07 mg. gravity high centred at 4+00E.
Line 10S-sta. 7+50E	poor	-lies along west side of .10 mg. gravity high centred at 8+00E.
Line 6S-sta. 8+50E	fair	-coincident with .13 mg. gravity high.

The above listed locations definitely warrant further attention. The gravity results in the vicinity of the lead - zinc showing are interesting but cause a fair amount of ambiguity in interpretation due to the existence of a large 2 milligal anomaly which occurs between lines 20S and 26S and stations 3+00E and 18+00E. This large anomaly is nearly circular in plan and reaches a maximum value of 2 milligals on line 26S at station 12+00E. This anomaly is most likely caused by a basic mass such as a small gabbro plug which has intruded into the overlying Cobalt sediments but which has not as yet been uncovered by erosive and weathering agents.

Theoretical calculations based on the observed gravity results place the centre of this heavier mass at a depth of 6+50 feet below the present surface.

On the supposition that the area is underlain by this basic intrusive, the lead - zinc showing appears to be located along the north-west contact between this plug and the Cobalt sediments. As can be seen on the accompanying profile sheets, the projected strike (N10°E) through showing No.8 is fairly closely coincident with a line of small gravity highs which are localized along the western limb of the regional gravity 'high' directly over a line which would be coincident with the gabbro - sediment contact. No. E.M. conductors were located directly over the centres of any of these gravity 'highs' (anomalies A,B,C,D and E). This can be explained by the fact that most of the known mineralized zones consisted of the mineral sphalerite, which is a non - conductor. Metallic mineralization such as the galena and chalcopyrite occured in scattered blebs and patches, a condition which would not enable the zone as a whole, to be detected by the electro-magnetic method except at very high frequencies.

Cross sections along the elevation profiles for lines 18S to 24S have been drawn up showing the projected section of the mineralized zone and the proposed diamond drill holes recommended to test this area.

The following is a list of the four holes recommended to test the area in the vicinity of showing No.8. All holes are to be drilled at 45° in a direction N80°W.

D.D.H.No.	Location	Depth	Depth to top of projected mineralized zone	Comments
1	Line 22S sta. 7+50E	340'	70'	to test gravity anomaly D
2	Line 24 sta. 7+00E	250'	68'	to test gravity anomaly E
3	Line 20S sta. 8+00E	275'	75'	to test gravity anomaly C
4	Line 18S sta. 8+00E	460'	54'	to test gravity anomaly A & B
		1325'		

Should drilling at the above locations give encouraging results, then the drilling of other gravity highs both on and off strike would be in order.

There is one further possible, but somewhat remote, explanation concerning the cause of the large 2 milligals gravity anomaly previously explained by the presence of a subsurface gabbroic intrusive. An identical anomalous picture could be produced by a flat lying, tabular, mantos - type body of massive sulphides. This latter explanation can best be proved or disproved by the drill. If upon drilling any of the four holes large sections of intrusive gabbro are cut, then the anomaly is undoubtedly caused by the suggested gabbro plug. If, however, some of the holes cut ~~are~~ massive sulphides and sediments only, then the second theory should be given more weight.

Respectfully submitted,

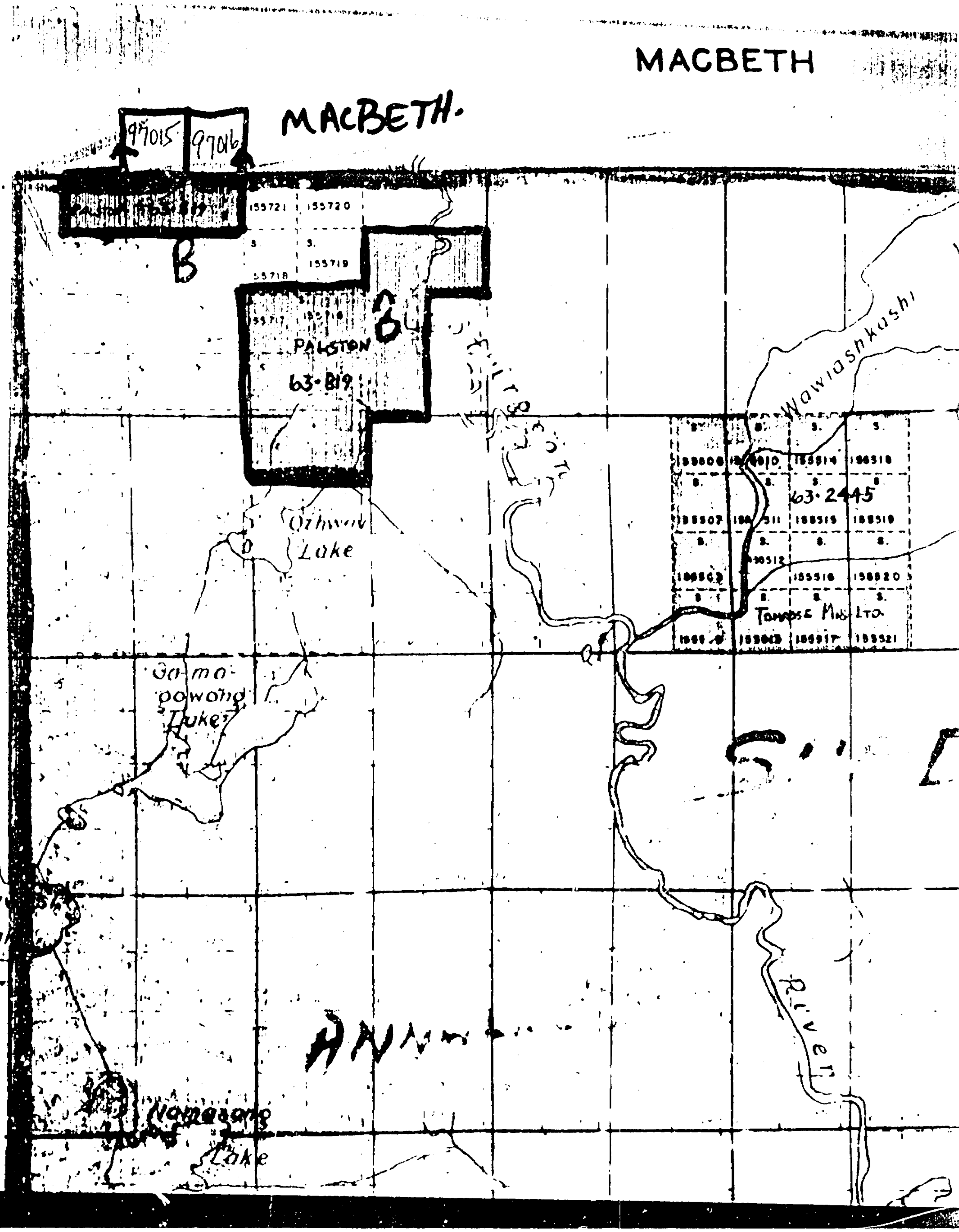
Radar Exploration Company,

R.H. Pemberton.

Toronto, Ontario.

February 22, 1957.

Approved.....


MACBETH
MACBETH.
97015
97016
155721
155720
155719
155718
B
PALSTON
63-819
Wawiashkashi
155514
155518
63-2445
155515
155519
155516
155520
155517
155521
Lake
Ga-ma-powong Lake
River
Lake

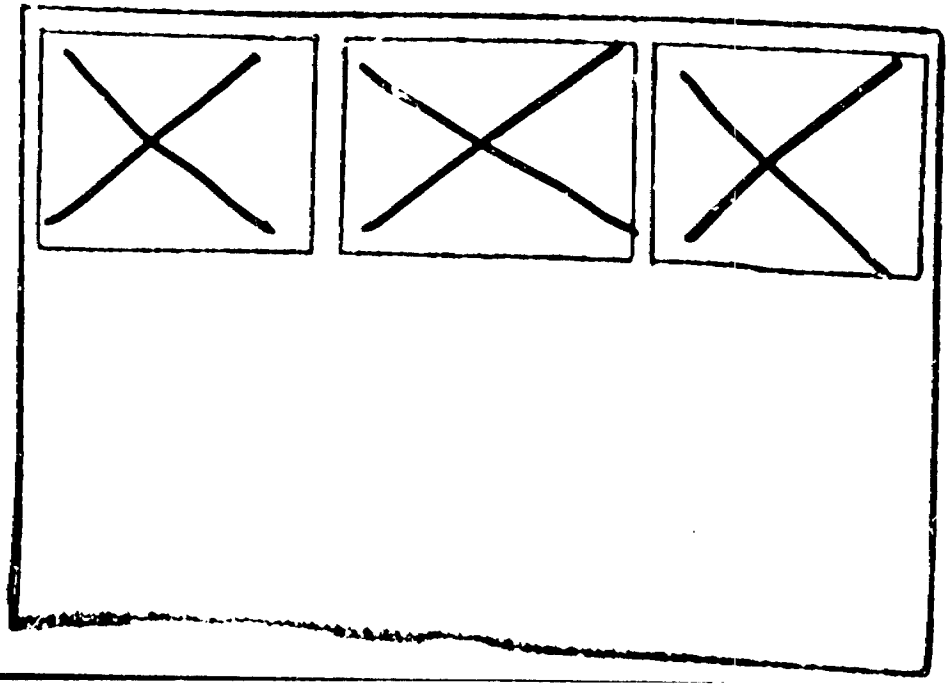
SEE ACCOMPANYING MAP(S) IDENTIFIED AS

MACBETH-0012-A1.#1

#2

#3

LOCATED IN THE MAP CHANNEL IN THE FOLLOWING SEQUENCE (X)

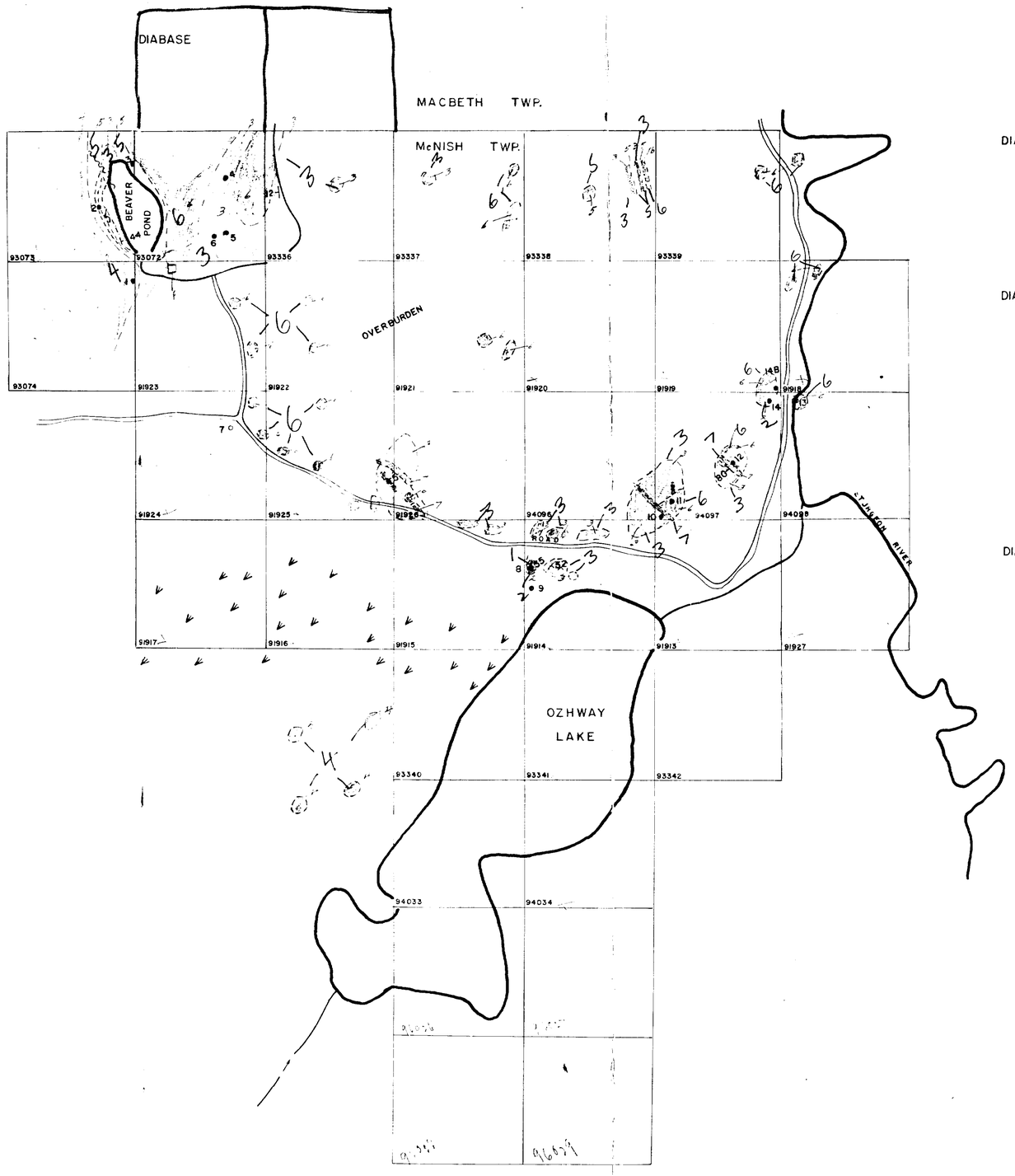


FOR ADDITIONAL

INFORMATION

SEE MAPS:

MACBETH-0012-A1 # 4-8



N

PALSTON MINING & DEVELOPMENT
McNISH TWP. ONT.
GEOLOGICAL PLAN MAP
SHOWING LOCATION OF MINING CLAIMS

SCALE 1 INCH = 10 CHAINS = 660 FEET

LEGEND

⊦	STRIKE AND DIP OF FORMATION
7	DIABASE DYKES.
6	GOWGANDA CONGLOMERATE
5	QUARTZITE
4	ARGILLITE
3	GREYWACKE
2	SILICIOUS ARGILLITE (SLATY)
1	CHERTY CONGLOMERATE
●	MINERALIZED SHOWING

63-819

MACBETH-0012-A1-#1

MACBETH

MCNISH

BEAVER POND

CAMP

L-36 N

L-32 N

L-28 N

L-26 N

L-24 N

L-22 N

L-20 N

L-18 N

L-16 N

L-14 N

L-12 N

25 24 22 20 18 16 14 12 10 8 6 4 2 WEST 0

97015

97016

93-73

93072

93336

LEGEND

S.U.1 — TRANSMITTER SET UP 1

LINES RUN FROM ⚠1

DIP ANGLE PROFILE FROM SET UP 1

POOR FAIR GOOD — CROSSOVERS INDICATING CONDUCTORS

EXTENSION OF CONDUCTIVE ZONES

WEST READINGS ABOVE LINE

EAST " BELOW "

N

PALSTON MINING & DEVELOPMENT
ELECTRO-MAGNETIC SURVEY
McNISH TWP. ONT.

SCALE 1 INCH = 200 FEET

DIP ANGLE VERTICAL SCALE 1 INCH = 20°

◇ = LOCATION OF DETAIL E.M. CROSS-OVERS

—— = E.M DETAIL LINES

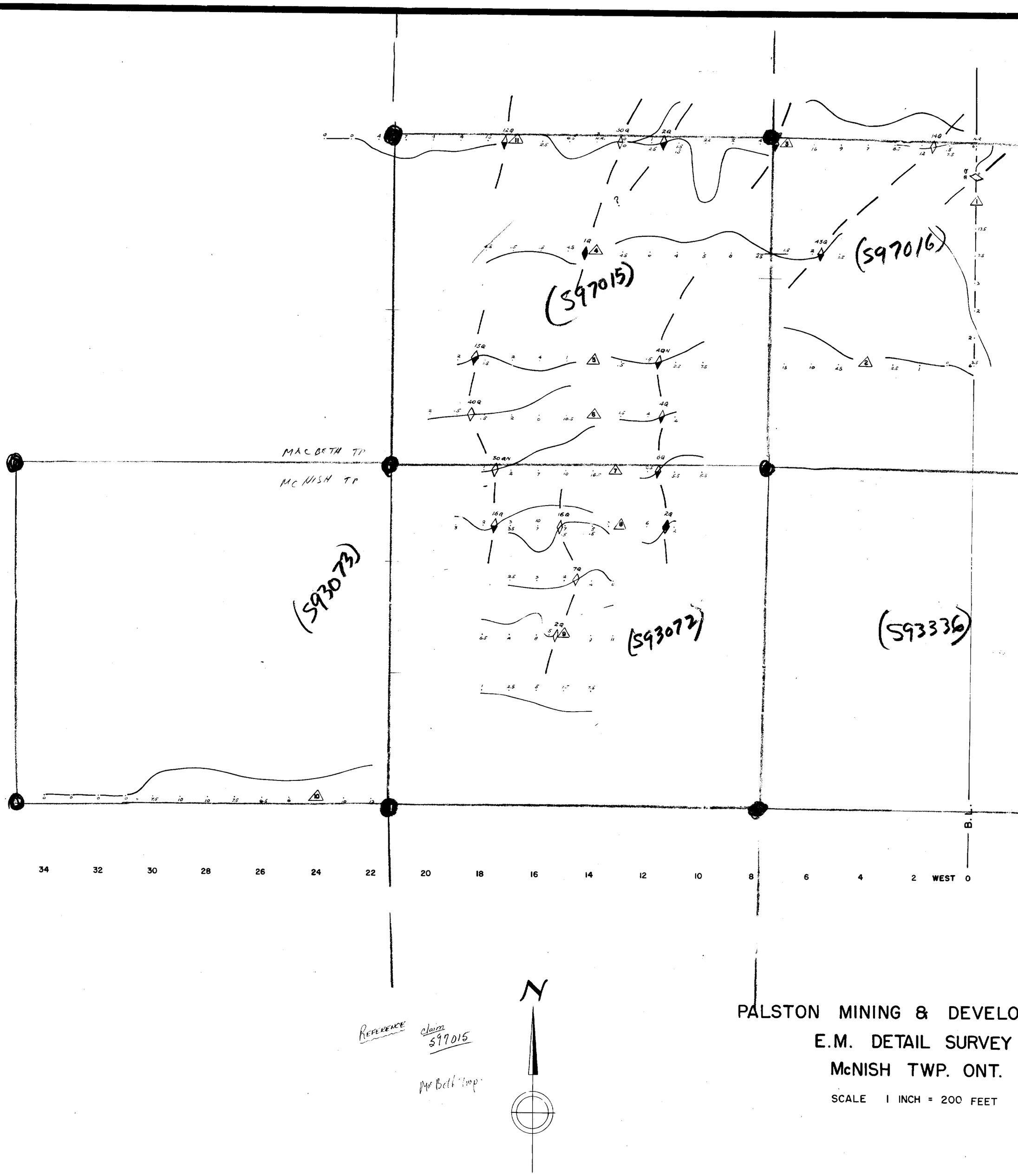
— — = CONFIRMED CONDUCTIVE ZONE

R. Hawkesbury
November 1956

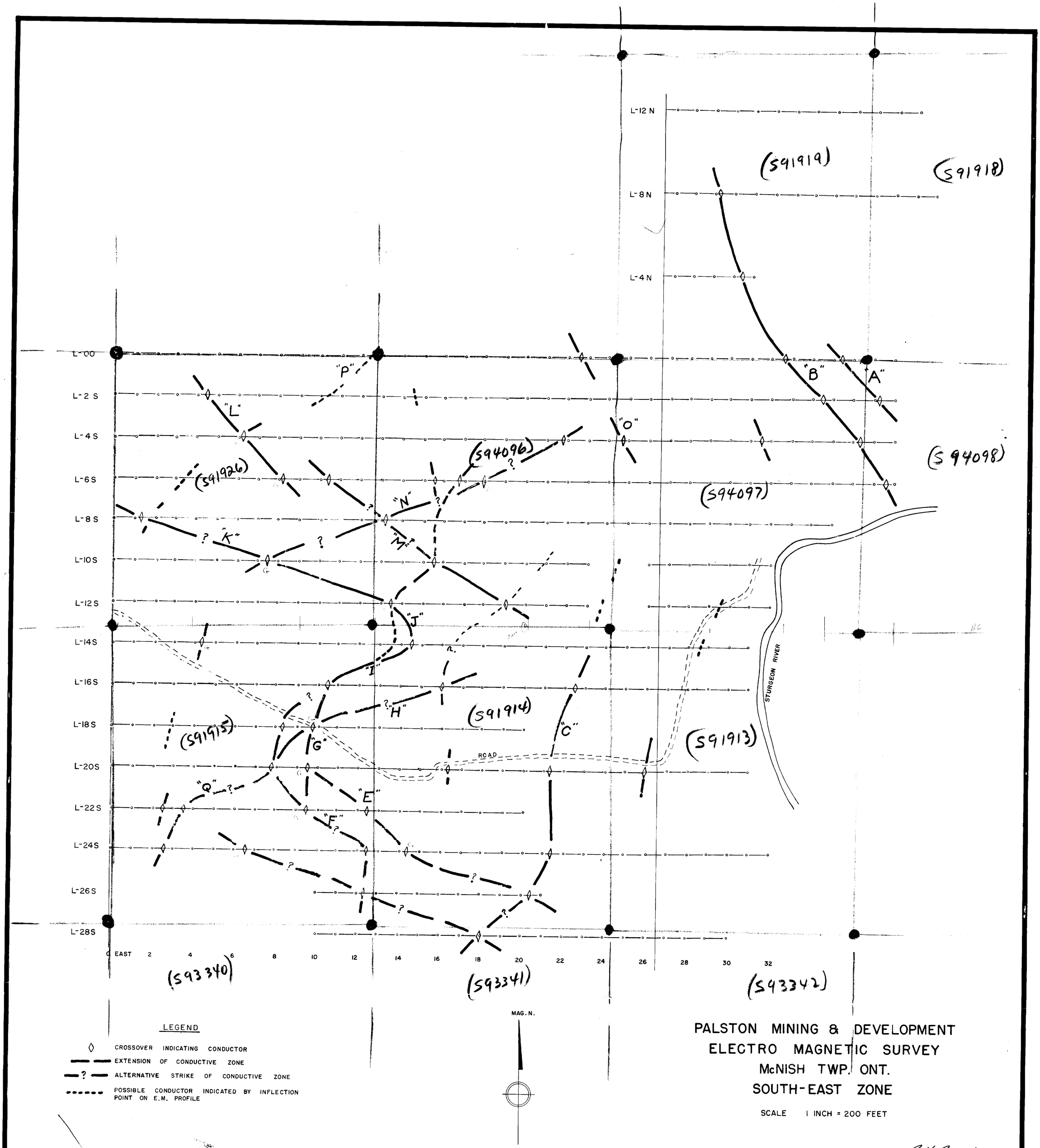
41116SW0022 0012A1 MACBETH

210

MACBETH-0012-A1 #2



MACBETH-0012-



LEGEND

◊ CROSSOVER INDICATING CONDUCTOR

EXTENSION OF CONDUCTIVE ZONE

ALTERNATIVE STRIKE OF CONDUCTIVE ZONE

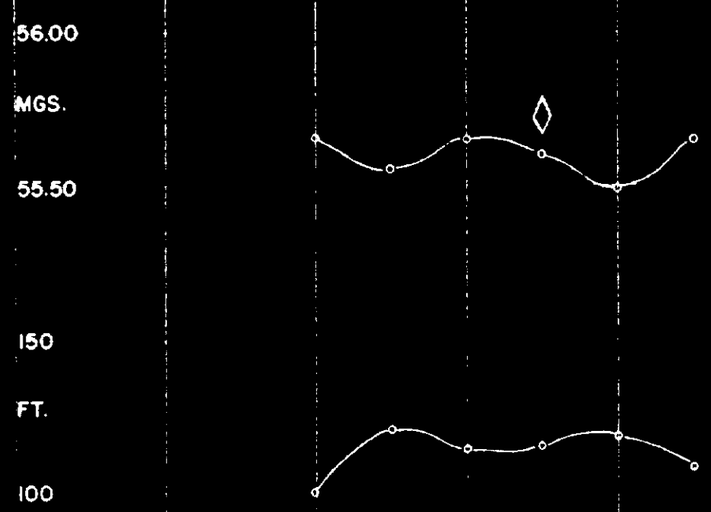
POSSIBLE CONDUCTOR INDICATED BY INFLECTION POINT ON E.M. PROFILE

PALSTON MINING & DEVELOPMENT
ELECTRO MAGNETIC SURVEY
McNISH TWP. ONT.
SOUTH-EAST ZONE

SCALE 1 INCH = 200 FEET

R. H. Pemberton
Oct. 1956

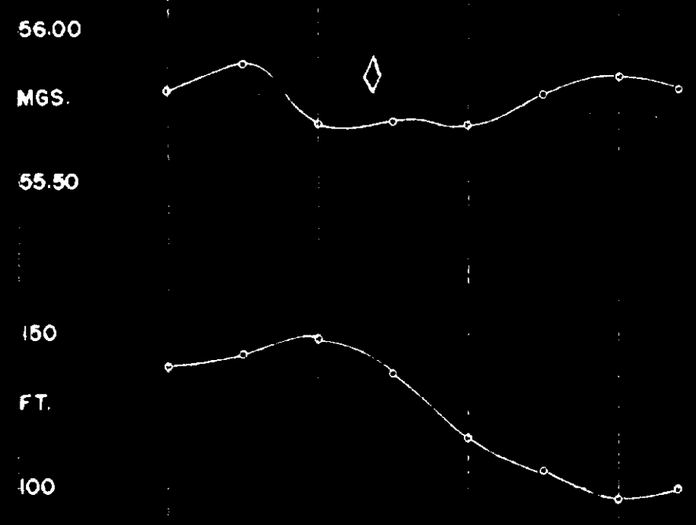
RADAR EXPLORATION



GRAVITY

LINE 20 N

ELEVATION



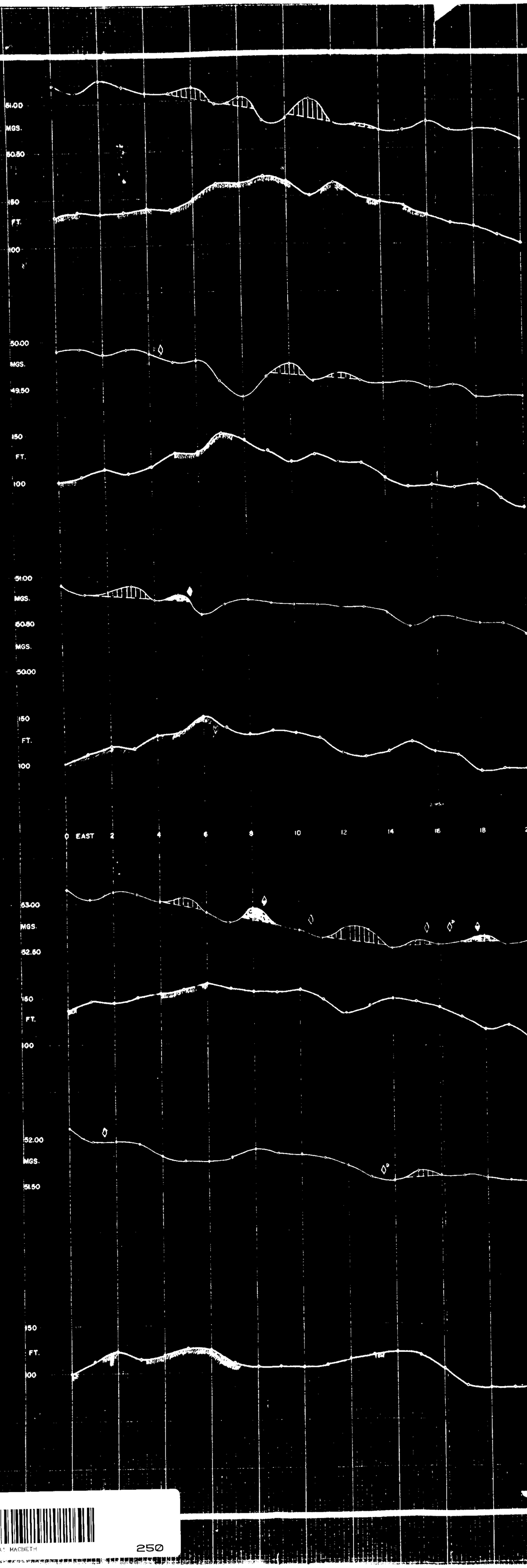
GRAVITY

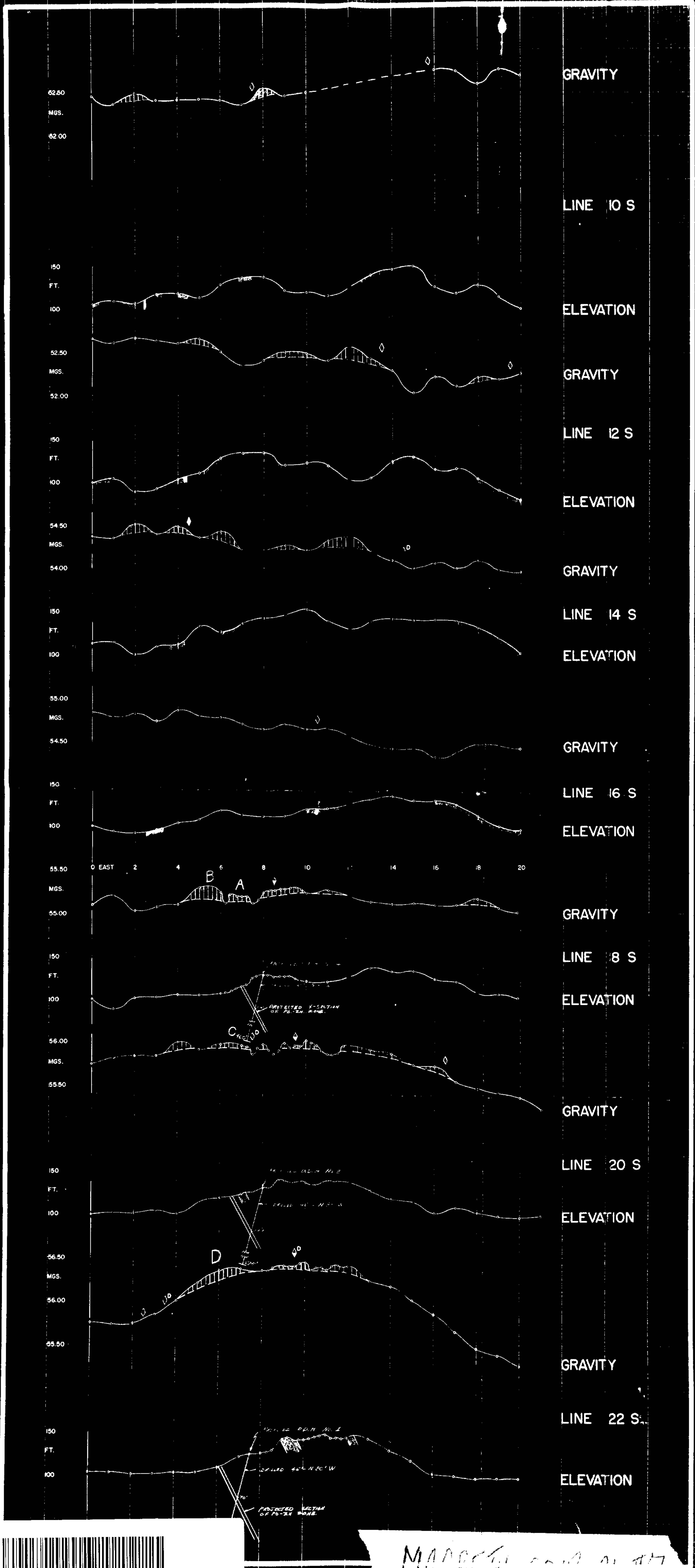
LINE 14 N

ELEVATION

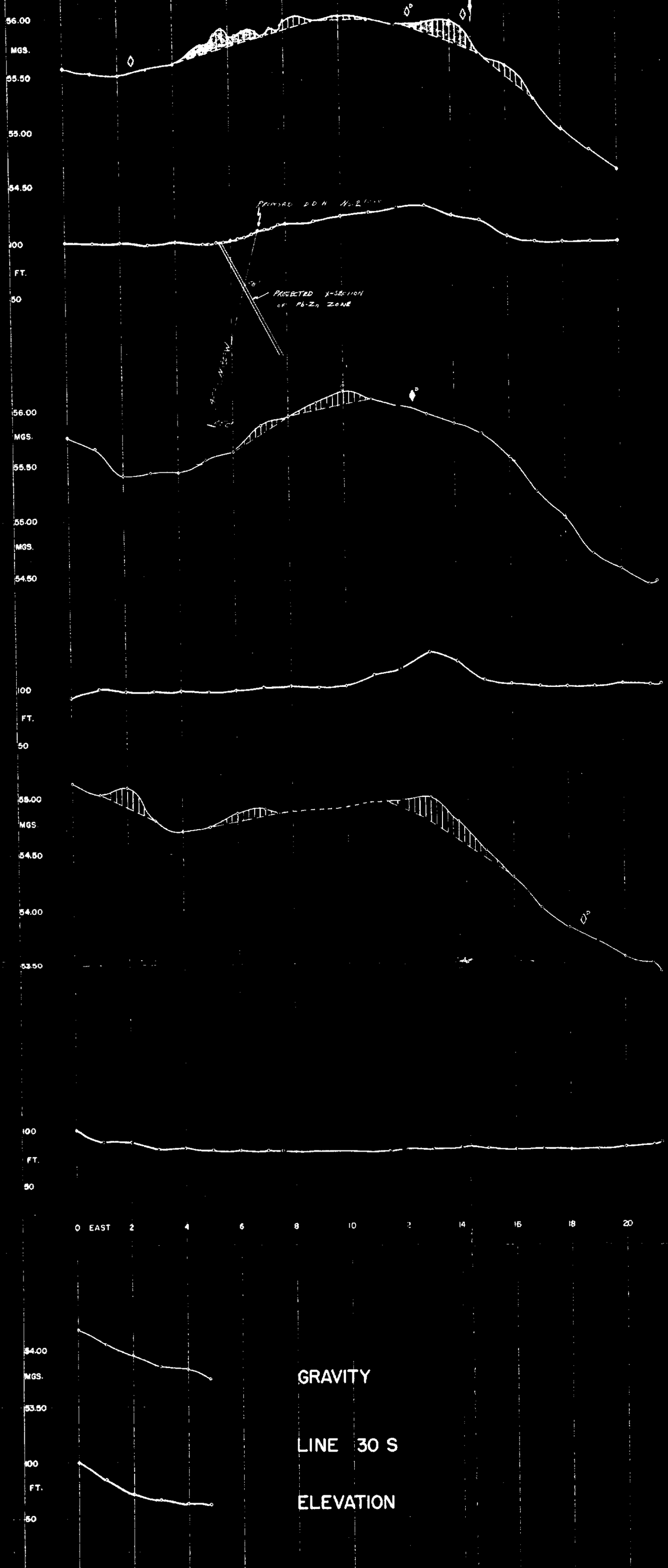
20 18 16 14 12 10 8 6 4 2 WEST 0

B.L.





MACBETH COR 91-7



GRAVITY

LINE 24 S

ELEVATION

GRAVITY

LINE 26 S

ELEVATION

GRAVITY

LINE 28 S

ELEVATION

GRAVITY

LINE 30 S

ELEVATION

GRAVITY

LINE 32 S

ELEVATION

PALSTON MINING & DEVELOPMENT
GRAVITY & ELEVATION PROFILES
McNISH TWP. ONT.

HORIZONTAL SCALE 1 INCH = 200 FEET
VERTICAL GRAVITY SCALE 1 INCH = 50 MGS.