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MINING LANDS BRANCH

OPAP GRANT #OP92-265 FINAL REPORT OF WORK

CAVENDISH VERMICULITE PROJECT

by:

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January 13, 1993

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Summary-

A total of \$9319.65 was spent from July to December 1992; a total of which 85% was spent directly on expenditures.

Initial studies outline a vermiculite-bearing zones with significant values (38 to 48 percent vermiculite by volume lying under the northwest section of leased claim (mining and surface rights) EO38362. Subsequent studies indicated four parallel vermiculite-bearing zones with significant values to the west of this claim, and a block of six claims (1191249 and 1191295) were staked to cover this area.

Studies indicate that there are significant results in all of these zones and that some of them are possibly connected. Drill results also indicated vermiculite values continue with depth and in most cases increase at depth.

Values (percentage of vermiculite by volume), sizes, and grades (pounds of vermiculite per cubic foot) indicate that there are markets for this material and that there is the possibility for a large tonnage with adequate grade for marketing purposes. There are also indications that the zones can be extended and that there are other areas in close proximity which show promise and should be investigated.

Tests have indicated that the vermiculite is of small size but the densities are low enough to meet commercial specifications applicable for insulation, wall-board, and plaster aggregate markets.

Final Report

Cavendish Township, Ontario

Vermiculite Project

Introduction-

This project consisted of exploration of contiguous patented claims EO 35355, EO 35356, and EO 35362 which are held by the author in conjunction with the other grant qualifiers.

Work consisted of:

Linecutting (chaining and flagging and cutting)

Magnetometer survey

VLF Electromagnetic Survey

Prospecting and testing for presence of vermiculite)

Geological mapping

Geochemical Sampling/ soil testing

Drilling / overburden sampling

Laboratory studies (Percentage/grade/sizing/weight category)

In 1976, a vermiculite zone between 1500 feet and 5000 feet in length and over a width of 400 feet was outlined in Cavendish Township. Vermiculite was known to occur on leased claims owned by the author to the west and in line of strike with this deposit, but no work was done until present.

Geochemical sampling and drilling have located a vermiculite-bearing zone on the west side of claim 38362. This zone lies

along the east contact of a metamorphosed limestone (marble) unit, and continues off of the claim group onto crown land to the south west.

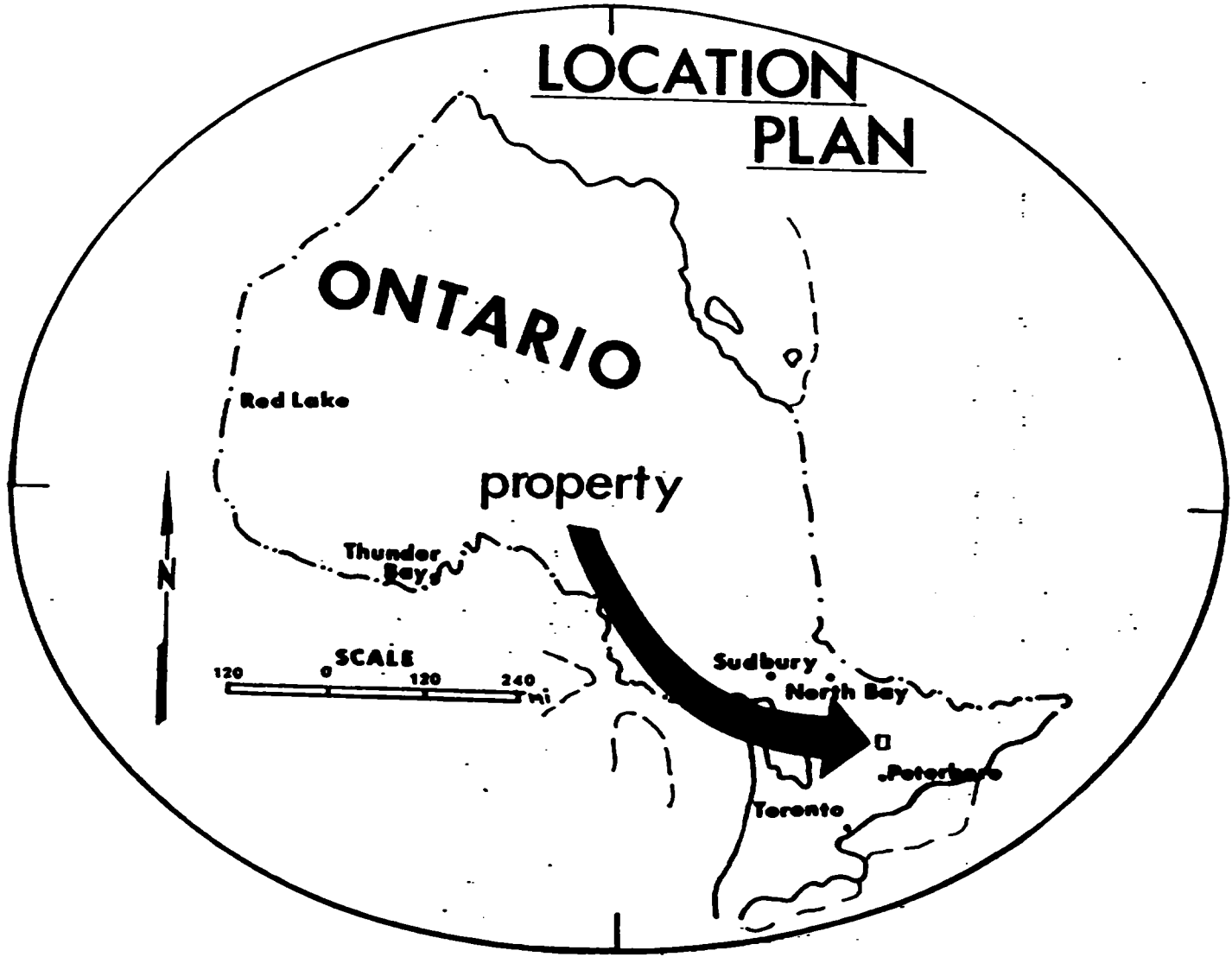
Further work has located four other vermiculite-bearing zones with similar width and lengths as the first zone; all of which appear to be parallel zones. A depression with higher-grade residual material, connecting all of these zones, has been located on the south side of Horseshoe Lake. A block of six claims (claim group 1191249 and 1191295) were picked up to cover the vermiculite-bearing zones although some of the zones do continue southwesterly onto crown land (which is open at present).

All five of these zones have returned significant vermiculite assays. Drilling of these zones suggests that the values continue and increase in value with depth. The zone which is found on claim 38362, although it is high-grade, is a lense type situation which lies at the eastern contact of the marble unit. Three of the other zones lie in the central portions of the marble complex and appear to be wider and have greater depths.

The next phase would be to continue to delineate the zones to the southwest, and to bulk sample/test in detail the higher grade sections of the zones outlined by the present program. A majority of the better grades are in an area of approximately 200 meters by 800 meters. This should be tested by both a grid pattern geochemical and drilling program, and by a backhoe trenching bulk study.

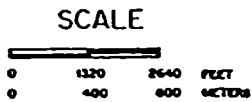
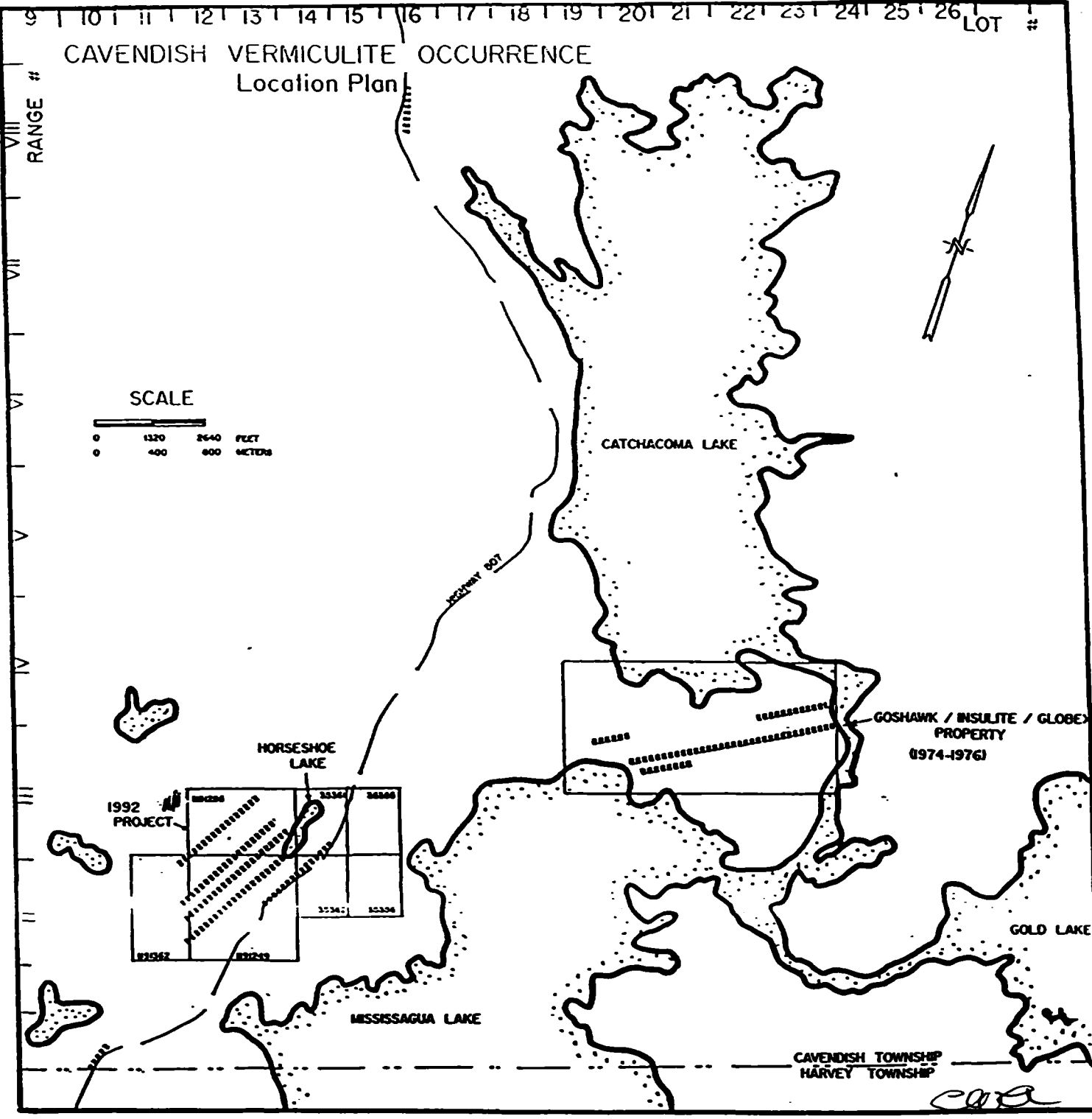
The backhoe can test down to a depth of approximately 6.0 meters. If this second phase returns similar values to the first phase, tonnage estimates and grades can be computed. It is estimated this second phase will cost approximately \$30,000.00.

LOCATION PLAN



ewd

CAVENDISH VERMICULITE OCCURRENCE
Location Plan



1992 PROJECT

HORSESHOE LAKE

CATCHACOMA LAKE

MISSISSAGUA LAKE

GOSHAWK / INSULITE / GLOBEX
PROPERTY
(1974-1976)

GOLD LAKE

CAVENDISH TOWNSHIP
HARVEY TOWNSHIP

CWA

Property-

The property initially consisted of leased claims (Mining and surface rights) 35355, 35356, and 35362 totalling some 120 acres. These claims are controlled by C.W. Archibald, the author of this report. During the initial phases of the exploration program, it was found that the eastern boundary of a large vermiculite-bearing complex crossed the northwest section of claim 35362, and continued off of the southwest boundary. Consequently, another two claim blocks , claims 1191249 and 1191295 were picked up in August and November of 1992 to cover the remaining areas of vermiculite-bearing materials. A total of approximately 320 acres was covered by these two new claims; with a total of approximately 400 acres covering the total area. All of these claims are contiguous.

Location & Access-

This property lies approximately 200 kilometers northeast of Toronto, and 24 kilometers north of Buckhorn, and 56 kilometers north of Peterboro. It lies in the southern section of Cavendish Township in Southern Ontario.

Access is by paved Highway # 507 (open year-round) which cuts through the eastern section of this claim group. This highway can be accessed from Gooderham in the north and from a highway which joins Lindsay/Bobcaygeon to Peterboro in the south.

The property is bordered immediately to the east by Mississagua Lake.

Resources-

The area is well wooded with hardwood maple and oak, with some pine on the ridges and spruce/cedar in the lower-swamp areas.

Road access is readily available to the property year-round.

Power lines supplying hydro electricity passes through the eastern section of the claim group.

History-

The showings were first staked in 1950.

Considerable test-pitting and stripping has been done from time to time in a haphazard manner; mainly over the area some 1,200 meters to the east between Catchacoma and Mississagua Lakes (see Location Plan).

In 1973, Globex minerals Inc. leased the ground, prospected part of two claims to the east of the present exploration area using diamond and auger drilling.

In 1975, Goshawk Mines Limited purchased 100 percent interest in the claims south of Catchacoma Lake. An east-west base-line was cut, lines were marked at two-hundred foot intervals, and stations were located every one-hundred feet on lines. Test-pitting was started at the stations in November of 1975 and samples taken for analyses. Since May of 1976, augering, using a four inch auger, has been done at every station between lines whenever vermiculite had been found. Samples have been taken in the humus layer and at varying depths to bedrock with those samples showing a vermiculite content being sent for laboratory analysis.

A report by the author in 1977 had outlined some 54,000 tons of commercial grade vermiculite within the topsoil materials (+5% vermiculite by volume); over a strike length of 1,500 meters; located on the Insulite/Goshawk property. A cutoff of fourteen pounds per cubic foot was used.

In 1981, the property consisting of claims 463848-463849, 460128, 38132-38133, and 38139-38142 was transferred to Insulite Development Corporation which in turn surveyed the property and brought the claims to lease. This new group was put under Plan 45R-4525. This lease was granted by the Ministry of Natural Resources for the purpose of development for mining purposes of the vermiculite potential underlying the claims, after a meeting with the cottage owners in the area. Development

within 150 feet of the roads or any existing developments, and 300 to 400 feet of the shorelines was part of this approval. Consequently, a large portion of the higher-grade vermiculite showing was withdrawn from development. For this reason, this project was put on hold until another zone in the area could be established.

No work on vermiculite exploration or development has been done in the area ~~until~~ since 1976. It has been known that vermiculite has existed on claims 35361 and 35362 (southeast of Horseshoe Lake), as initially located by Harvey Greene, but no further exploration was every carried out.

Geology-

The claim group is mainly underlain by Grenville limestone which has been altered to marble, dolomite, and diopside. Areas can be seen in this marble with disseminated flakes of amber mica (Phlogopite and biotite) which has been altered to vermiculite. The higher grade vermiculite flakes are of a green colour.

In some areas, the mica is heavily concentrated in a mica schist, or an amphibolite schist unit. These units locally strike east-west in the area between Catchacoma and Mississagua Lakes, and northeast-southwest in the areas to the west around highway #507.

To the east and southeast of the claim group is the Anstruther granite batholith; in the form of granite gneiss. Bordering this mass is a band of dark paragneiss which has been altered to biotite schist and amphibolite.

Narrow lenses of amphibolite are also found within the marble unit.

The limestones occur as a series of northeast to east trending ridges with steep north faces and gentle south dipping slopes. Bedding varies from 30 degrees to flat south dipping to the east of the claim group, to 60 to 85 degrees steeply dipping to the southwest in areas underlying the claim group.

In areas of vermiculite-rich limestone, the tops of the ridges generally appear to be capped by a harder, vermiculite-poor limestone which has protected the softer vermiculite-rich limestone from erosion. A few localized outcrops show an estimated ten to thirty percent vermiculite by volume.

Vermiculite is prevalent in the top soil over large areas and these areas are in many places underlain by vermiculitized limestones.

Amber, green-black, and silver mica when exfoliated becomes a light cream colour. Flakes of mica to one-quarter inch are uncommon with the main flake size under one-eighth of an inch. Some of the mica is only partially vermiculitized and will not fully exfoliate.

As vermiculite is light and tends to float , a secondary concentration of this material should be found in low or swampy areas.

There are several swampy areas or low-ground conditions underlying the claim group and survey area near known vermiculite-rich sections which may have concentrations of vermiculite. These areas could be of economic interest.

Markets-

The vermiculite market, at least in Toronto and Montreal, would be available to this source if sufficient supply could be located. Freight rates from the two present sources of Libby, Montana, and Africa make it prohibitive to land and supply vermiculite to these markets at competitive prices. Of the five known world producers, four have dwindling reserves which are now being mined within narrow-lense deposits. The fifth has problems of talc/serpentinite contamination within the vermiculite bearing materials. The only other known Canadian vermiculite areas, located around Perth, Ontario and Sudbury, Ontario have also had talc/asbestos contamination problems within the vermiculite-bearing materials.

Dependent upon sieve size and bulk density of the expanded vermiculite product, vermiculite is used for insulation fill, hot ingot transportation, light-weight concrete aggregate, agricultural use, plaster or wall-board aggregate or fillers, and paint extenders.

So far, on this property and the surrounding properties, the average bulk density of the material has been high and the grain size small which would limit its use to fillers with plaster, wall-board, and industrial uses. The grain sizes of the exfoliated material has so far been larger in the field than has been produced in the laboratory so it could be a temperature control that is lacking.

Small test samples also show it does not absorb water which could make it unusable for agricultural use. Due to the fact that it does not absorb water, it would make a better additive for wall-board, insulation and similar uses which is the largest part of the present market. For the characteristics of the Cavendish Township vermiculite, see attached sieve range-bulk density sheets.

Exploration-

Exploration since 1975 has been systematic surface testing of the areas to attempt to delineate an area or areas with a tonnage of loose vermiculite contained within the residual limestone sand of a grade which would be marketable.

Exploration has consisted of test-pitting or power augering, and diamond drilling to greater depths. Recent exploration using the OPAP grant for 1992 has consisted of testing a new area some distance from cottages or major lakes. This area has been tested by overburden drilling techniques using the Pionjar system. This system is new and has only been used in the last few years. Flow-through sampling bits of 1.3 inch diameter were used to obtain samples from on top of the bedrock and/or within the weathered surface bedrock.

Initial studies by OPAP grants were used to delineate five vermiculite-anomalous trends; all appearing to trend in a northeasterly direction which is parallel to the geological strike in the area. This was done by digging samples down to 1.0 meter from surface and testing using a propane torch to indicate if vermiculite was present. The drilling was based over areas where vermiculite was indicated by preliminary studies.

This preliminary study has shown the presence of at least five anomalous trends; all of which have high-grade areas.

Vermiculite of a good-quality and grade has been indicated in the areas southeast, south, and southwest of Horseshoe Lake. Although there is a northeast trend indicated by the studies, the high grade areas can be possibly linked together in an east-west direction. Drilling has also indicated that in some of the areas and areas underlying swamps, that the vermiculite is found at depth and has large-tonnage situation possibilities.

Three vermiculite bearing zone were outlined on the Insulite property (to the east of the presently explored area). These zones are 463 meters length X 123 meters width, 617 meters length X 93 meters width, and the third continues off the property towards the west and the new area of exploration (see Location Plan).

No attempt has been made to explore the bedrock but some road-cuts along highway # 507 have shown the vermiculite to be exposed in lenses or shear-controlled fractures.

The vermiculite-rich limestone is friable enough to be ripped using a bulldozer. Due to the fact that the bedrock crumbles easily, it is deduced that the weathering processes have carried the vermiculite material into areas of lower ground and into swamp areas.

To more accurately appraise the grade, tonnage and extent of the vermiculite-bearing zones, trenching by backhoe or bulldozer will be necessary to expose these areas.

Basal Till Sampling Technique-

In much of northern and southern Ontario, there is a varying depth of glacial till consisting of unconsolidated clay, sand, gravel, and boulders, or a mixture of these overlying bedrock. The layer immediately above the bedrock, or the basal till, generally consists of coarse sand or gravel and at times portions of weathered or decomposed rock.

Where the basal till contains pieces of weathered bedrock, a sample of this material will give indication of the mineral content, and assists in correlating the geology.

Assays of basal till samples cannot be taken as representative of the immediate bedrock as this till layer can be contaminated by the flow of groundwater and mixing of material from above. Where this condition occurs, a grid of holes is necessary to trace the mineral content by following stronger indications of the source.

In this survey, attempts were made to sample the weathered bedrock immediately below the basal till layer, or in the case of deep swamp overburden the basal layer above bedrock was sampled. This program is used in conjunction with the geochemical sampling program (OP92-264) and attempt was made to sample under the geochemical samples to delineate any vermiculite-bearing zones to depth, or vermiculite zones which are in place and not residual.

In deep overburden, such as in the swamp area south of Horseshoe Lake, only clay overburden was observed. Depths of up to 10.0 meters were encountered in some of the swamp areas. In some cases hard-unweathered bedrock was encountered and could not be penetrated. In these areas the rock was generally free of vermiculite as it was in an unweathered state.

The drilling was conducted in October and November of 1992. There was partial snow-cover on the ground but ground conditions were unfrozen. The drill will not penetrate granite boulders or granite bedrock, but

will penetrate into the marble or metasediment units as they are friable and partially weathered near-surface. A total of approximately eight days was used to take some 134 samples. Depths ranged from 1.0 meter to 10.0 meters in depth; or a total of 2.4 meters on average. A total of 317 meters was drilled during the program.

The drilling was located as follows:

11 holes on claim 35361

22 holes on claim 35362

41 holes on claim 1191295

60 holes on claim 1191249

A total of approximately 92% of the drill holes were drilled on areas covered by claims controlled by the author or the other two applicants of the OPAP grants for this area.

Locations and sample descriptions are appended to this report along with sample characteristics such as: percentage vermiculite by volume, water volumes (water absorbancy of the material), sizing of vermiculite by volume, density of vermiculite by volume. These results are located on Plate 1 and within charts within the appendix. The results have been done by an independent laboratory which has been set up for exfoliation of vermiculite samples. These results are also compared to the results from OPAP grant OP92-264 which was completed before this program was completed. Although the sampling was done in October and November of 1992, the final analyses were not obtained until mid-January of 1993.

This sampling method utilizes carbide-tipped samplers with serrated edges for rock penetration, and flow-through bits to bypass overlying sands and clays. The samples were either collected in lexan-tubing

liners or extruded by forcing the sample out of the tube.

The drilling was done using a Pionjar drill with flow-through bits of 1.3 inch diameter. These bits are capable of penetrating through weathered/unconsolidated rock formations. This drill, along with one operator, was rented on contract.

Analyses-

To date, testing has been mainly to test for percentage of vermiculite in the different soil horizons (percentage by weight of the sample). Only those samples showing over 5% by weight of contained vermiculite through visual testing have been sent to a laboratory for further analysis.

The laboratory samples are first weighed wet, dried, and then weighed dry to determine the water capacity/porosity of the material. The samples are dried at low heats of less than 150 degrees F. as it has been found that high heats create a chemical bond in which the vermiculite crystals wont expand. These samples are then pulverized by hand to make sure that the rock fragments are broken up to expose the vermiculite flakes/mica flakes without breaking up the crystal units.

The samples are then exfoliated in heats ranging from 1,350 to 1,700 degrees F. The proven optimum temperature from previous testing by Lakefield Laboratories and Zonolite Canada is approximately 1,650 degrees F.

An optimum temperature and retention period are needed for increasing the grain size and lowering the overall unit weight. This would ultimately show an increase in the tonnage of loose exfolisable vermiculite and also an increase in the coarser or higher marketable materials. These samples are stirred and left to exfoliate for up to one hour; although most of the material exfoliates instantaneously within the first few minutes. It has been found that the vermiculite expands to a larger size in the laboratories as compared to field exfoliation techniques and environments.

After exfoliation, the samples are weighed to obtain a percentage of the total vermiculite as compared to the total volume of material.

The samples are then sieved using four screen sizes: +8 mesh, -8 and 14 mesh, -14 and 28 mesh, and -28 and 48 mesh., and each portion run for bulk density determination (pounds per cubic foot).

Spot analyses have also been made for watability. Those samples tested show the exfoliated vermiculite ~~vermiculite~~ does not absorb water which would make it unusable for greenhouse uses or planting additives but would make it more valuable for insulation, building materials, paint additives, or in heat treating.

Those samples showing upwards of ten percent contained vermiculite in the soil could be commercial as costs would be comparable to open-pit mining of sand material. There are numerous gravel-pit operations and limestone quarry operations in the area which are presently active; thus there appear to be no problems for mining in relation to the by-laws of the township and surrounding areas. Any problems related to the mining in this area were presented during a meeting between the previous Ministry of Natural Resources and the local cottagers in the late 1970's and early 1980's; and the outcome was that the majority welcomed this mining activity to the area.

Results of Drill Program-

Of the one hundred and thirty-four drillholes, some 68.7 percent returned significant vermiculite assays.

Initially, some forty-nine holes were drilled on the anomaly which crosses the northwest corner of claim EO38362. The values appear to be greater on the north part of this anomaly; decreasing to the south. The average value is 1.35% vermiculite by volume in the northern section of this anomaly, over a length of 450 meters. This anomaly lies on the eastern contact of the metamorphosed sediment (marble) unit. This anomaly, called Anomaly E by F.T. Archibald, is at least 600 meters in length and extends into the swamp area west of Highway # 507. There is a possibility there is some secondary vermiculite enrichment in the swamp area with significant vermiculite values.

Conclusions-

Significant vermiculite results were obtained from the overburden drilling program. Five vermiculite-bearing zones have been outlined and indications are that values continue with depth. In the case of all of the zones, values appear to increase with depth.

Values as high as 85.2 percent vermiculite by volume were observed by this program.

The overburden drilling program indicates a greater degree of weathered material under the swamps; in particular in the central portions of the marble/metamorphosed limestone complex. This suggests that there is a possible "bowl" effect caused from secondary transport and accumulation of the vermiculite which occurs due to the fact that the platy texture of the vermiculite allows it to be carried to a lower depression by fluid movement.

Drilling has also suggested that the origin of the vermiculite is from metamorphosed limestone, and that the vermiculite is contained within this complex or in close proximity to it.

Vermiculite percentages appear to be higher when exfoliating by furnace as compared to exfoliation by propane ignition methods. This is observed by a comparison between geochemical samples which were exfoliated by propane and the overburden drill samples which were exfoliated by furnace. The furnaces provide a higher and more constant heat. It was also observed that exfoliation in the furnace occurred within 2.3 to 4.5 seconds.

Size distributions indicate that over fifty percent of the vermiculite is contained within the -24 to +48 mesh size range. A breakdown of size is as follows:

- +14 mesh size- averages less than 4% of total vermiculite
- 14 to +28 mesh- averages 12% to 30% of total vermiculite
- 28 to +48 mesh- averages 34% to 43% of total vermiculite

Erratic densities from assay results were observed. It is believed from field studies that -14 to +48 mesh sizes average between 9.7 and 14.0 pounds per cubic foot. Sample reject are available and are presently being reassayed. Unfortunately these results will not be available for this report, and will have to be appended at a later date.

Tests have been made that show the material can be readily concentrated and densities of the exfoliated material are low enough to meet commercial specifications. Most of the material found to date is of small grain size and would be most applicable to insulation, wall-board, and plaster aggregates. It also makes ideal insulation material due to the fact it is the non-absorbant variety. Since it does not hold moisture, it is not useful for agricultural uses.

Recommendations-

The present program has indicated five zones with significant vermiculite values. Although they are terminated to the north, they all continue to the southwest and should be tested using geochemical sampling and overburden drilling. The overburden drilling is more useful in the swamp areas and areas of deeper overburden cover.

The areas with swamp/low-lying ground in close proximity to the anomalous areas should be further evaluated. In particular, there is an area of approximately 200 meters by 800 meters at the south side of Horseshoe Lake which should be tested by detail. In this area there appears to be a large basin of vermiculite-bearing material which has accumulated from secondary weathering and movement processes.

Extensions of the present zone to the southwest can be done by using drill fences at 100 meters between fences and 25 meters between holes. Detailed work over the basin area can be done by using a square-grid pattern of 50 meter square grids (totalling 300 holes over an area of 200m. x 800m.).

Error can be eliminated by purchasing a furnace capable of 2000 degrees F. to exfoliate the samples. One can be purchased for approximately \$650.00.

It appears that the grades, sizes and densities of the vermiculite are sufficient for present market needs, and it is therefore recommended that exploration be continued to increase the tonnages of the vermiculite deposits.

January 13, 1992.

Toronto, Ontario.



Charles W. Archibald

Sample Statistics & Descriptions

<u>Sample #</u>	<u>Sample Location</u>	<u>Description</u>	<u>Depth(m.)</u>
0	L18-700S	@ road marble,green mica	1.0
1	L18-675S	marble/dolomite	1.0
3	L18-625S	marble,green mica	1.0
4	L18-600S	marble,green mica	1.0
5	L18-575S	marble,green mica	1.0
6	L18-550S	marble,green mica	1.0
8	L18-500S	marble	1.0
9	L18-475S	marble,green mica	1.0
10	L18-450S	marble	1.0
11	L18-425S	marble	1.0
12	L18-400S	marble	1.0
13	L18-375S	marble,green mica	1.0
15	L18-325S	marble,green mica	1.0
16	L18-300S	marble,green mica	1.0
17	L18-275S	marble,green mica	1.0
18	L18-250S	marble	1.0
19	L18-225S	marble,green mica	1.0
20	L18-200S	marble	1.0
21	L18-175S	marble	2.0
22	L18-150S	marble	1.5
23	L18-125S	marble,green mica	1.5
24	L18-100S	marble	2.0
25	L18-0+75S	marble,green mica	1.5
26	L18-0+50S	marble	1.5
27	L18-0+25S	marble	1.5
28	L18-00@ 50m	S.road marble	1.5
29	L18-725S	marble	2.0
30	L18-750S	marble	2.5
31	L18-775S	marble	2.5
32	L18-800S	marble	2.5
33	L18-825S	marble	1.5
34	L18-850S	marble	1.0
35	L18-875S	marble	1.0
36	L18-900S	marble	1.0
37	L18-925S	marble	1.0
38	L18-950S	marble	1.0
39	L18-975S	marble,green mica	1.0
40	L18-1000S	marble	1.0

41	L18-1025S	marble	1.0
42	L18-1050S	marble	1.0
43	L18-1075S	marble	1.0
44	L18-1100S	marble	1.0
45	L18-1125S	marble	1.0
46	L18-1150S	marble	1.0
47	L18-1175S	marble	1.0
48	L18-1200S	marble	1.0
49	L18-1225S	marble,green mica	2.0
50	L18-1250S	marble	2.0
51	L18-1275S	marble	2.5
52	L18-1300S	marble	3.0
53	L5-050S-	amphibolite	2.5
54	L7S-600W	marble	4.5
55	L7S-650W	marble	2.5
56	L7S-775W	marble	2.0
57	L7S-825W	marble	2.5
58	L7S-850W	marble	2.0
59	L7S-925W	marble	3.0
60	L7S-0+50W	marble	3.0
61	L7S-0+75W	marble	4.0
62	L7S-100W	marble	4.0
63	L7S-125W	marble	4.5
64	L7S-150W	marble	5.0
65	L7S-200W	marble	6.0
66	L8S-225W	marble	2.0
67	L8S-475W	marble	3.5
68	L8S-500W	marble	2.5
69	L8S-525W	marble	2.5
70	L8S-550W	marble	3.0
71	L8S-575W	marble	4.5
72	L8S-775W	marble	2.5
73	L8S-825W	marble	3.0
74	L8S-900W	marble,green mica	4.0
75	L8S-950W	marble	4.0
76	L9S-175W	marble	2.0
77	L9S-200W	clay with mica	7.0
78	L9S-225W	clay (green)	9.0
79	L9S-725W	marble	2.5
80	L9S-750W	marble	2.5
81	L9S-775W	marble	2.0

82	L9S-800W	marble,green mica	2.5
83	L9S-825W	marble	3.0
84	L9S-850W	marble	2.5
85	L9S-875W	marble	2.0
86	L9S-900W	marble	2.0
87	L9S-925W	marble	2.5
88	L10S-200W	marble	2.5
89	L10S-225W	marble	2.5
90	L10S-250W	marble,+pegmatite	4.5
91	L10S-275W	marble	3.5
92	L10S-550W	marble	2.5
93	L10S-575W	marble,green mica	3.0
94	L10S-925W	marble	2.5
95	L11S-250W	marble	2.0
96	L11S-275W	marble	2.0
97	L11S-300W	marble,+pegmatite	2.5
98	L11S-325W	marble	3.0
99	L11S-350W	marble	3.0
100	L12S-250W	marble	1.0
101	L12S-275W	marble	2.0
102	L12S-300W	marble	2.5
103	L12S-325W	marble,green mica	3.5
104	L13S-325W	marble	3.5
105	L14S-500W	marble,mica rich	2.0
106	L14S-525W	marble	2.0
107	L14S-550W	marble	2.5
108	L15S-600W	marble	2.5
109	L15S-625W	marble	2.0
110	L15S-650W	marble	2.0
111	L16S-650W	marble,mica rich	1.0
112	L17S-650W	marble,green mica	2.0
113	L15S-675W	marble	2.5
114	L11S-225W	marble	1.0
115	L8S-875W	marble	4.5
117	L10S-800W	marble	4.5
118	L14S-225W	marble	3.5
119	L10S-175W	marble	1.0
120	L9S-250W	clay, grey	10.0
121	L8S-800W	marble	2.5
122	L8S-850W	marble	3.0
123	L8S-925W	marble	3.5

124	L10S-950W	marble	2.0
125	L7S-900W	marble	2.5
126	L7S-875W	marble	2.0
127	L7S-800S	marble	2.0

128	L7S-625W	marble	4.0
129	L8S-175W	marble	2.0
130	L9S-650W	marble	3.0
131	L9S-675W	marble	3.0
132	L10S-650W	marble	3.0
133	L11S-700W	marble	3.0
134	L11S-725W	marble	3.0

* 5 samples lost- results left out

Daily Report (OPAP # OP92-265)

<u>Date</u>	<u>Area</u>	<u>Work Performed</u>
July 15	prospecting claims 38140 et al (Goshawk/Insulite) and along Beaver Lake Rd.	sampling along road with F.T.Archibald
July 16	prospecting claim 35362, 35361, sampling Greene showing, sampling HWY #507(north & south)	sampling along road to Harvey Twp. with F.T. Archibald
Sept.2	prospecting claim 35361	sampling (bulk sample)
Sept.3	prospecting claim 35361 & 35362	sampling, % vermiculite determination.
Dec.15	report prep	maps
Dec.16	report prep.	Introduction/Access/Geology
Dec.17	report prep.	History/Location/Sampling
Dec.18	sample prep./sorting	Initial sample study(visual)
Dec.19	work procedure/report	Assay lab to determine work procedure on samples
Dec. 20	report prep.	initial results
Dec. 21	report prep.	initial results
Jan. 11	report compilation	results catagorization
Jan.12	report compilation	results catagorization
Jan.13	report finalization	conclusions & recommendations

Expenses (OPAP #OP92-265)

<u>Date (1992)</u>	<u>Description</u>	<u>Cost</u>
June 30	hardware (Home Hardware)	\$ 16.40
July 15	Trappers Inn -meal	13.91
Aug.17	xerox/copy(Paragon)	13.80
Aug.13	xerox(Paragon)	65.03
Sept.2	meals	29.15
Sept. 2	motel (Rockland)	53.76
Sept.2	meals	20.27
Sept.2	groceries (Westside)	7.57
Sept.3	Trappers Inn -meal	16.16
Sept.3	groceries(#05898)	9.30
Sept.8	casual labour	214.00
	Assaying charges (Assayers Ltd.)	2,247.00
	Drill Rental/with Operator (Lillex Ind.)	4,708.00
	1351 km. (field & lab) @ 30 cents per km.	<u>405.30</u>
	TOTAL EXPENDITURES-----	<u>\$ 7819.65</u>

Drilling Report (SRI 247 - 07927-286)

Date	Area	work performed
July 15	prospecting claim 35360 et al (Gosnowik) mesquite, and along Beaver Lake Rd	sampling along road with P.T. Archibald
July 16	prospecting claim 35362, 35361, sampling Greene showing sampling near #507 north to south	sampling along road to Jarvey Twp. with P.T. Archibald
Sept. 2	prospecting claim 35361	sampling (bulk sample)
Sept. 3	prospecting claim 35361 & 35362	sampling, & vermiculite determination.
Dec. 15	report prep	maps
Dec. 16	report prep.	Intro/Access/Geology
Dec. 17	report prep.	History/Location/Sampling
Dec. 18	sample prep./sorting	initial sample study (visual)
Dec. 19	work procedure/report	Assay lab to determine work procedure on samples
Dec. 20	report prep.	initial results
Dec. 21	report prep.	initial results
Jan. 11	report compilation	results categorization
Jan. 12	report compilation	results categorization
Jan. 13	report finalization	conclusions & recommend.



Superfund 101 (1971-82-265)

June 30	hardware (home items)	16.40
July 15	Trappers Inn - meals	17.91
Aug 17	xerox (Paragon)	13.80
Aug 18	xerox (Paragon)	65.03
Sept 2	meals	29.15
Sept 2	motel (Pockland)	53.76
Sept 2	meals	20.27
Sept 2	groceries (Westside)	7.57
Sept 3	Trappers Inn - meals	16.16
Sept 7	groceries (#05895)	9.30
Sept 8	casual labour	214.00
	Assaying charges (Assagers Ltd) ✓	2247.60
	Unit Rental with Operator (Luflex Ind)	4706.00
	1351 km (field & lab) @ 30 cents per km.	<u>405.30</u>

TOTAL EXPENDITURES-----\$7619.65

C.W. ARCHIBALD		AR 203E									
SAMPLE#		41	42	43	44	45	46	47	48	49	50
WEIGHT NET		119.3	344.2	193.2	193.3	130.4	114.7	201.4	214.3	351.1	308.7
WEIGHT DRY		119.2	331.9	190.2	192.8	127.6	111.6	200.7	213.6	349.6	304
% VERMICULITE		11.8	3.2	16.5	18	20.9	21	20.8	24.6	66.7	20.1
% VOLUME											
1 +B		1.4	3	2.7	-	-	-	-	-	34.9	1.1
2 -B+14		2.3	3.1	2.8	3.3	2.4	2.2	0.7	0.6	8.9	9.1
3 -14+28		20.8	25.5	19.4	16.7	16.9	15.9	16.5	12.3	32.3	32.6
4 -28+48		36.5	36.7	33.3	33.3	32.2	35.6	44.3	55.5	15.8	31.1
5 -48		38.9	31.6	41.7	46.7	48.4	46.2	38.3	31.4	8	24.1
BULK DENSITY											
LB8/FT3											
1		41.6	43.6	40.5	-	-	-	-	-	22.9	43.1
2		59.9	52	34.3	49.9	47.8	35.3	49.9	-	28.3	27.
3		39.6	41.6	39.2	39.9	41.9	41.3	42.2	-	31.4	43.
4		50.5	47.7	55.1	35.2	54.6	55.4	53.4	50.9	48.5	47.
5		55.7	65.4	61.5	54.7	49.1	47.7	47.9	56.4	58	50.

103
170

C. W. ARCHIBALD AR 203B

SAMPLE#	68	69	70	71	72	73	73A	74	75	76
WEIGHT NET	304.4	94.4	74.3	164.3	70.9	168.4	167	193.1	210.4	293.0
WEIGHT DRY	282.1	78.5	73.7	153.5	62.5	144.7	138.5	167.6	175	260
% VERMICULITE	58.9	75.8	14.6	21.4	85.2	35.8	26.7	70.6	20.9	66.0
% VOLUME										
1 +8	9.5	1.1	1.9	-	0.4	0.8	5.1	0.2	5.4	0.0
2 -8+14	4.8	1.6	6.8	2.1	1.2	2.1	5.6	1.1	7.4	2.0
3 -14+28	39.9	9.9	38.8	26	6.2	12	25.5	4.5	27	25.0
4 -28+48	33.5	34	33	35.9	24.2	39.4	37.7	28.9	30.4	35.0
5 -48	12.1	53.3	19.4	35.2	67.8	45.9	26	65.1	29.7	35.0
BULK DENSITY										
LBS/FT3										
1	28	-	24.9	18.7	16.2	49.9	18.7	23.4		
2	28.5	54	18.7	19.9	18.1	24.9	24.9	30.5		
3	50.7	46	61.2	44.3	41	53	40.2	33		
4	47.9	46.4	72.9	46.1	44.1	59.4	42.1	52.3		
5	40.8	50.7	83.8	51.1	54.3	63.8	49.4	57.9	58	50.0

C. W. ARCHIBALD AR 203 H

SAMPLE#	Ø0	Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8
WEIGHT WET	585.1	263.5	598.4	195.6	229.9	239	270.8	325.4	17.9
WEIGHT DRY	569.4	246.4	569.9	137.9	176.8	201	237.1	300.2	16
% VERMICULITE	27	27.5	29.4	15.2	21	26.6	14	12.1	5.7
% VOLUME									
1 +8	2.2	--	4.7	0.8	0.7	0.5	1	2.4	--
2 --8+14	2.2	0.5	0.4	0.8	0.8	0.6	1	3.7	--
3 --14+28	16.2	10.5	9.4	16.6	12.4	8.7	15.3	19.7	12.5
4 --28+48	40.2	41.4	37.7	39.1	31.7	38	40.8	35.8	28
5 --48	39.1	47.5	47.6	42.5	54.2	52	41.8	38.2	62.5
BULK DENSITY LBS/FT3									
1	45.2	--	28.1	37.4	12.4	18.7	18.7	31.2	--
2	39	68.6	37.4	62.4	43.6	31.2	43.6	35.3	--
3	43	40.4	38	31.2	35.5	34.5	38.2	37	12.4
4	43.9	46.1	42	34.9	48.5	43.4	41.3	44.7	37.4
5	52.6	51.5	47.1	46.7	53.7	50.5	45.3	50.5	57.4

LILEX INDUSTRIES LTD.

116 VICEROY ROAD, UNIT 13
 CONCORD, ONTARIO L4K 2M3
 TEL./FAX (416) 738-1968

INVOICE № 0379

Date: DEC 31 / 92

Shipping Date: _____

Shipped Via: _____

Customer Order No. _____

TERMS: NET 30 DAYS

Sold To: C. W. ARCHIBALD

Address: 100 ADELAIDE ST WEST

SUITE 702 TORONTO ONT

MSH 153

ORDER DATE	OUR G.S.T. NUMBER	PROV. SALES TAX NUMBER	REFERENCE NUMBER	
	R103330833			
QUANTITY	DESCRIPTION		UNIT PRICE	AMOUNT
	OVER BURDEN DRILL RENTAL WITH OPERATOR, IN CAVENDISH TOWNSHIP PROPERTY.			
	EIGHT DAYS RENTAL		550	4,400
	MINING CLAIM NO: 1191249			

What 8 days
 or who was the operator

Received by: Who was the operator

NET TOTAL	4,400
G.S.T. TAX	308
PROV. SALES TAX	
TOTAL	4,708



Ontario

Ministry of
Northern Development
and Mines

Ministère du
Développement du Nord
et des Mines

Geoscience Approvals Office
933 Ramsey Lake Road
6th Floor
Sudbury, Ontario
P3E 6B5

November 7, 1994

Our File: 2.15557
Transaction #: W9490.00049

Telephone: (705) 670-5853
Fax: (705) 670-5863

Mining Recorder
Ministry of Northern Development
and Mines
MacDonald Block, Room M2-17
900 Bay Street
Toronto, Ontario
M7A 1C3

Dear Sir/Madam:

**Subject: APPROVAL OF ASSESSMENT WORK CREDITS ON MINING CLAIMS
SO.1191249 & 1191295 IN CAVENDISH TOWNSHIP**

The deficiencies in the original submission have been rectified.

Assessment work credits have been approved as outlined on the report of work form for the submission. The credits have been approved under Section 13, Geochemical, Mining Act Regulations.

The approval date is November 1, 1994.

If you have any questions regarding this correspondence, please contact Lucille Jerome at (705) 670-5861.

ORIGINAL SIGNED BY:

Ron C. Gashinski
Senior Manager, Mining Lands Section
Mining and Land Management Branch
Mines and Minerals Division

LJ/jl
Enclosures:

cc: Resident Geologist
Tweed, Ontario

Assessment Files Library
Sudbury, Ontario



Report of Work Conducted After Recording Claim

Mining Act

Rec. No. *Tweed*
Transaction Number
W9490.00049
2.15557

Personal information collected on this form is obtained under the authority of the Mining Act. This information will be used for correspondence. Questions about this collection should be directed to the Provincial Manager, Mining Lands, Ministry of Northern Development and Mines, 100 Adelaide St. East, Toronto, Ontario, P3E 6A9; Telephone (705) 670-7284.

- Instructions:
- Please type or print and submit in duplicate.
 - Refer to the Mining Act and Regulations for requirements of the Recorder.
 - A separate copy of this form must be completed for each Work Group.
 - Technical reports and maps must accompany this form in duplicate.
 - A sketch, showing the claims the work is assigned to, must accompany this form.



900

Recorded Holder ALAN A. ARCHIBALD	Client No. A51431
Address 74 Conley St. Thornhill, Ontario L4J 2X5	Telephone No. 905-660-1554
Mining Division Southeastern Ontario	Township/Area Cavendish
Date Work Performed From: September 18, 1992 To: December 31, 1992	M or G Plan No. M-72

Work Performed (Check One Work Group Only)

Work Group	Type
Geotechnical Survey	
Physical Work, Including Drilling	Drilling (basal till and bedrock)
Rehabilitation	
Other Authorized Work	SECTION 18 ONLY
Assays	
Assignment from Reserve	

RECEIVED
SEP 16 1994
MINING LANDS BRANCH

Total Assessment Work Claimed on the Attached Statement of Costs \$ **10,019.05**

Note: The Minister may reject for assessment work credit all or part of the assessment work submitted if the recorded holder cannot verify expenditures claimed in the statement of costs within 30 days of a request for verification.

Persons and Survey Company Who Performed the Work (Give Name and Address of Author of Report)

Name	Address
C.W. Archibald	702-100 Adelaide St. West Toronto, Ontario M5H 1S3

(Attach a schedule if necessary)

Verification of Beneficial Interest - See Note No. 1 on reverse side

I certify that at the time the work was performed, the claims covered in this work report were recorded in the current holder's name or held under a beneficial interest in the current recorded holder.

Date	Recorded Holder or Agent (Signature)
June 30, 1994	<i>C.W. Archibald</i>

Verification of Work Report

I certify that I have a personal knowledge of the facts set forth in this Work report, having performed the work or witnessed same during and/or after completion and unassisted report is true.

Name and Address of Person Certifying
C.W. Archibald

Telephone No. 6-3635054	Date June 30, 1994	Certified By (Signature) <i>C.W. Archibald</i>
-----------------------------------	------------------------------	---

Office Use Only

Assessment Value Cr. Recorded 10,019	Date Recorded July 7/94	Mining Recorder <i>[Signature]</i>	Recorded Holder or Agent (Signature) <i>[Signature]</i>
	Deemed Approval Date Oct 5/94	Deer Approved <i>[Signature]</i>	

Date Notice for Amendments Sent

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JUL 7 1994

Work Report Number for Applying Reserve	Claim Number (see Note 2)	Number of Claim Units
2.15557	1191249	4
	1191295 <i>REB QA</i>	2
Total Number of Claims		2

Value of Assessment Work Done on the Claim	Value Applied to this Claim
4675 6693 <i>QA</i>	6679
2327 3340 <i>QA</i>	3340
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> RECEIVED SEP 06 1994 MINING </div>	
Total Value Work Done	
7002 10,033	10,019

Value Assigned from this Claim	Reserve: Work to be Claimed at a Future Date
-----	114
-----	-----
Total Assigned From	
-----	114
Total Reserve	

Credits you are claiming in this report may be cut back. In order to minimize the adverse effects of such deletions, please indicate from which claims you wish to prioritize the deletion of credits. Please mark (✓) one of the following:

1. Credits are to be cut back starting with the claim listed last, working backwards.
2. Credits are to be cut back equally over all claims contained in this report of work.
3. Credits are to be cut back as prioritized on the attached appendix.

In the event that you have not specified your choice of priority, option one will be implemented.

Note 1: Examples of beneficial interest are unrecorded transfers, option agreements, memorandum of agreements, etc., with respect to the mining claims.

Note 2: If work has been performed on patented or leased land, please complete the following:

I certify that the recorded holder had a beneficial interest in the patented or leased land at the time the work was performed.	Signature <i>Ch. A. Hilward</i>	Date JUNE 30/94
---	---------------------------------	------------------------



Statement of Costs for Assessment Credit

État des coûts aux fins du crédit d'évaluation

Mining Act/Loi sur les mines

Transaction No./N° de transaction

2. 153 56 4949.00249

July 8 to December 31, 1992

Personal information collected on this form is obtained under the authority of the Mining Act. This information will be used to maintain a record and ongoing status of the mining claim(s). Questions about this collection should be directed to the Provincial Manager, Minings Lands, Ministry of Northern Development and Mines, 4th Floor, 159 Cedar Street, Sudbury, Ontario P3E 6A5, telephone (705) 670-7264.

Les renseignements personnels contenus dans la présente formule sont recueillis en vertu de la Loi sur les mines et serviront à tenir à jour un registre des concessions minières. Adresser toute question sur la collecte de ces renseignements au chef provincial des terrains miniers, ministère du Développement du Nord et des Mines, 159, rue Cedar, 4^e étage, Sudbury (Ontario) P3E 6A5, téléphone (705) 670-7264.

1. Direct Costs/Coûts directs

Type	Description	Amount Montant	Totals Total global
Wages Salaires 6 day	Labour Main-d'oeuvre	214.00	214.00
	Field Supervision Supervision sur le terrain	900.00	1114.00
Contractor's and Consultant's Fees Droits de l'entrepreneur et de l'expert-conseil	Type 8 day office	1200.00	1200.00
	Assaying	2247.00	2247.00
			3447.00 3347.00
Supplies Used Fournitures utilisées	Type office	78.83	78.83
	hardware	16.40	16.40
			95.23 80.23
Equipment Rental Location de matériel	Type drill-operat.	4708.00	4708.00
			4708.00
Total Direct Costs Total des coûts directs			9364.23

2. Indirect Costs/Coûts indirects

Note: When claiming Rehabilitation work indirect costs are not allowable as assessment work. Pour le remboursement des travaux de réhabilitation, les coûts indirects ne sont pas admissibles en tant que travaux d'évaluation.

Type	Description	Amount Montant	Totals Total global
Transportation Transport			
RECEIVED SEP 06 1994 MINING LANDS BRANCH			
Food and Lodging Nourriture et hébergement	room & board	364.12	364.12
Mobilization and Demobilization Mobilisation et démoblisation	1351km. X 30¢	405.30	405.30
Sub Total of Indirect Costs Total partiel des coûts indirects			769.42
Amount Allowable (not greater than 20% of Direct Costs) Montant admissible (n'excedant pas 20 % des coûts directs)			769.42
Total Value of Assessment Credit (Total of Direct and Allowable indirect costs)			10,133.65 10,010.65

Note: The recorded holder will be required to verify expenditures claimed in this statement of costs within 30 days of a request for verification. If verification is not made, the Minister may reject for assessment work all or part of the assessment work submitted.

Note: Le titulaire enregistré sera tenu de vérifier les dépenses demandées dans le présent état des coûts dans les 30 jours suivant une demande à cet effet. Si la vérification n'est pas effectuée, le ministre peut rejeter tout ou une partie des travaux d'évaluation présentés.

Filing Discounts

- Work filed within two years of completion is claimed at 100% of the above Total Value of Assessment Credit.
- Work filed three, four or five years after completion is claimed at 50% of the above Total Value of Assessment Credit. See calculations below:

Total Value of Assessment Credit	Total Assessment Claimed
x 0.50 =	100%

Remises pour dépôt

- Les travaux déposés dans les deux ans suivant leur achèvement sont remboursés à 100 % de la valeur totale susmentionnée du crédit d'évaluation.
- Les travaux déposés trois, quatre ou cinq ans après leur achèvement sont remboursés à 50 % de la valeur totale du crédit d'évaluation susmentionné. Voir les calculs ci-dessous.

Valeur totale du crédit d'évaluation	Evaluation totale demandée
x 0,50 =	

Certification Verifying Statement of Costs

I hereby certify: that the amounts shown are as accurate as possible and these costs were incurred while conducting assessment work on the lands shown on the accompanying Report of Work form.

that as agent / part owner I am authorized (Recorded Holder, Agent, Position in Company)

to make this certification

Attestation de l'état des coûts

J'atteste par la présente: que les montants indiqués sont le plus exact possible et que ces dépenses ont été engagées pour effectuer les travaux d'évaluation sur les terrains indiqués dans la formule de rapport de travail ci-joint.

Et qu'à titre de je suis autorisé (titulaire enregistré, représentant, poste occupé dans la compagnie)

à faire cette attestation.

C.W.Archibald

Signature Date
June 30, 1992

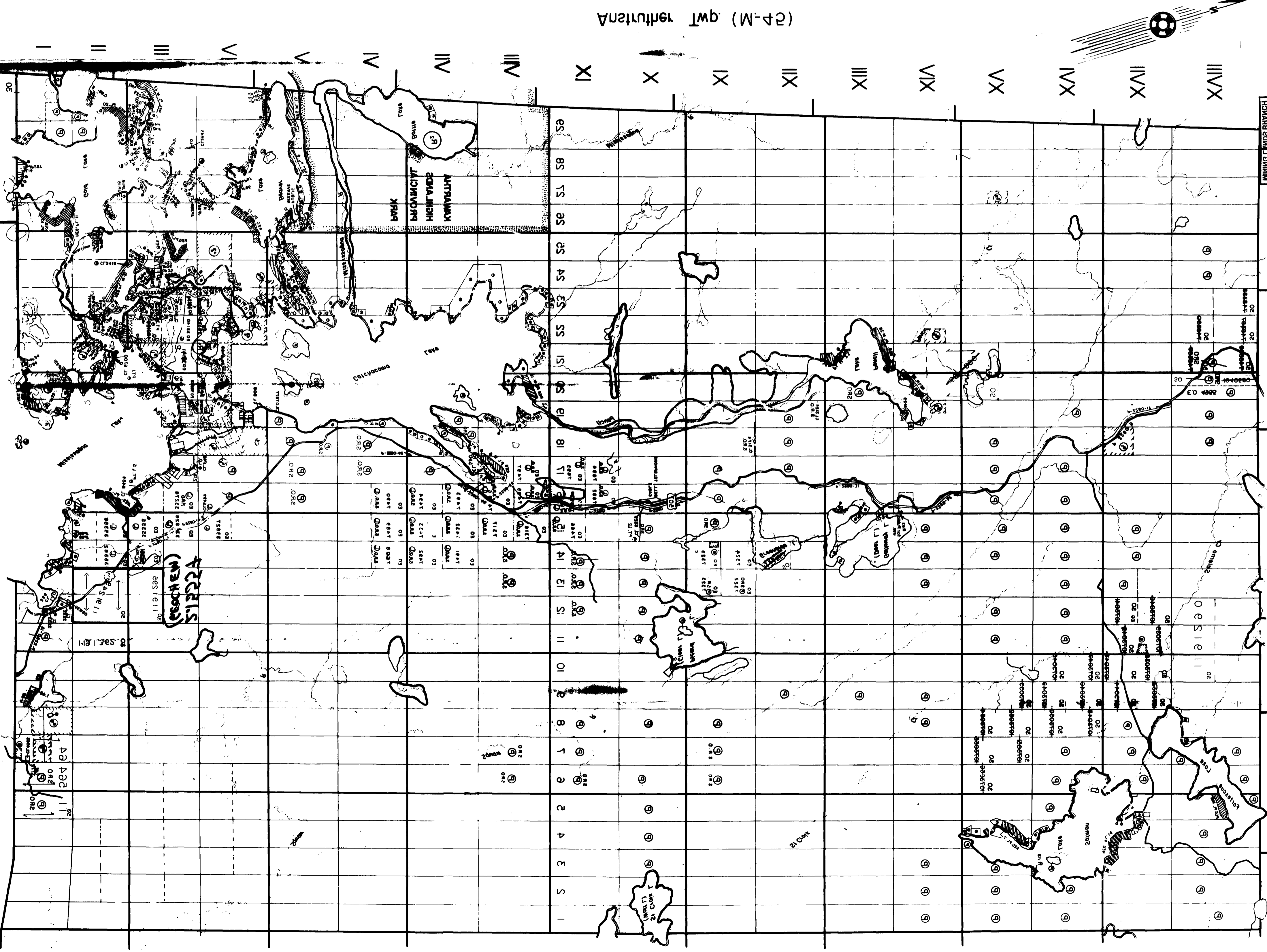
Halvey TWP (W-101)

Bulch TWP (W-ES)

(PE-M) qwt ywld

Сіагомадіа Тwp (W-ES)

RECEIVED
APR 20 0 02 PM '52
MINISTRE DES DEFENSES



(24-M) qwt rehtutnA

ON THE BASIS OF THE INFORMATION RECEIVED FROM THE RECORDS OF THE MINISTRY OF DEFENSE AND THE INFORMATION RECEIVED FROM THE RECORDS OF THE MINISTRY OF DEFENSE, IT IS CONCLUDED THAT THE INFORMATION HAS BEEN OBTAINED FROM THE RECORDS OF THE MINISTRY OF DEFENSE.

MINISTRE DES DEFENSES
DATE OF ISSUE

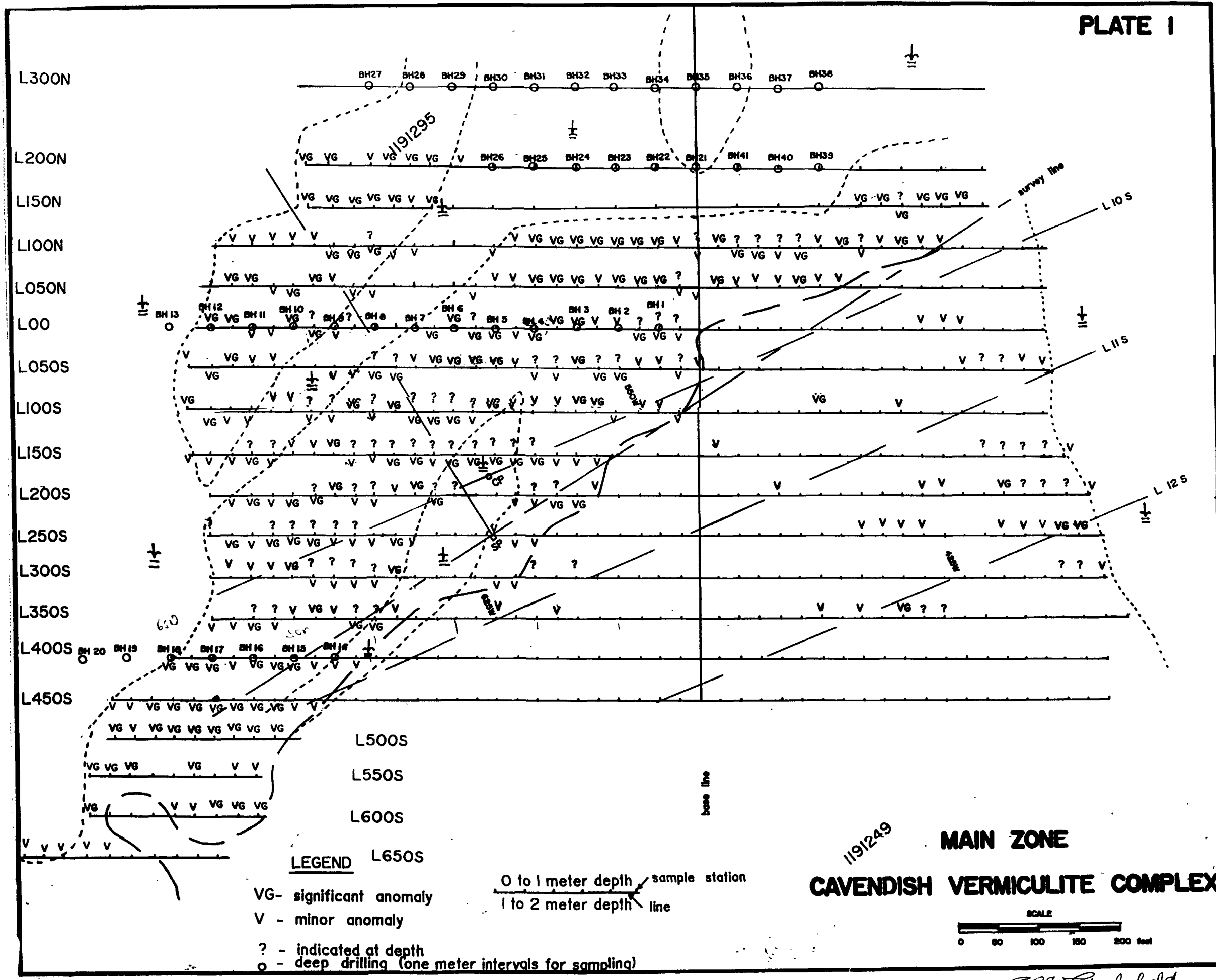
DISPOSITION
DATE
BY
REASON
CLASSIFICATION
CONTROL

NOTES
1. This map is based on the information received from the records of the Ministry of Defense and the information received from the records of the Ministry of Defense.

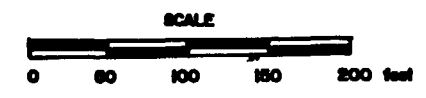
NOTES
1. This map is based on the information received from the records of the Ministry of Defense and the information received from the records of the Ministry of Defense.

LEGEND
RAILROAD
POWER LINES
IMPROVED ROADS
ROADS
UNIMPROVED ROADS
LOCAL LAND
LICENSE OF OCCUPATION
LOCAL LAND
UNIMPROVED LAND

SCALE 1 INCH = 40 KILOMETERS
DIVISION
PETERBOROUGH
OFFICE OF THE
CANNADA
TO THE TOWNSHIP



1191249
MAIN ZONE
CAVENDISH VERMICULITE COMPLEX



C.W. Arnsfeldt

3 EТАП

ГЕОЛОГИЧЕСКАЯ
СЕТЬ

• ПЛОТНОСТЬ ПОСРЕДСТВЕННО
ОТ ПЛОТНОСТИ ПОСРЕДСТВЕННО
ОТ ПЛОТНОСТИ ПОСРЕДСТВЕННО
ОТ ПЛОТНОСТИ ПОСРЕДСТВЕННО

ГЕОЛОГИЧЕСКАЯ СЕТЬ

(Geological)

СЕТЬ

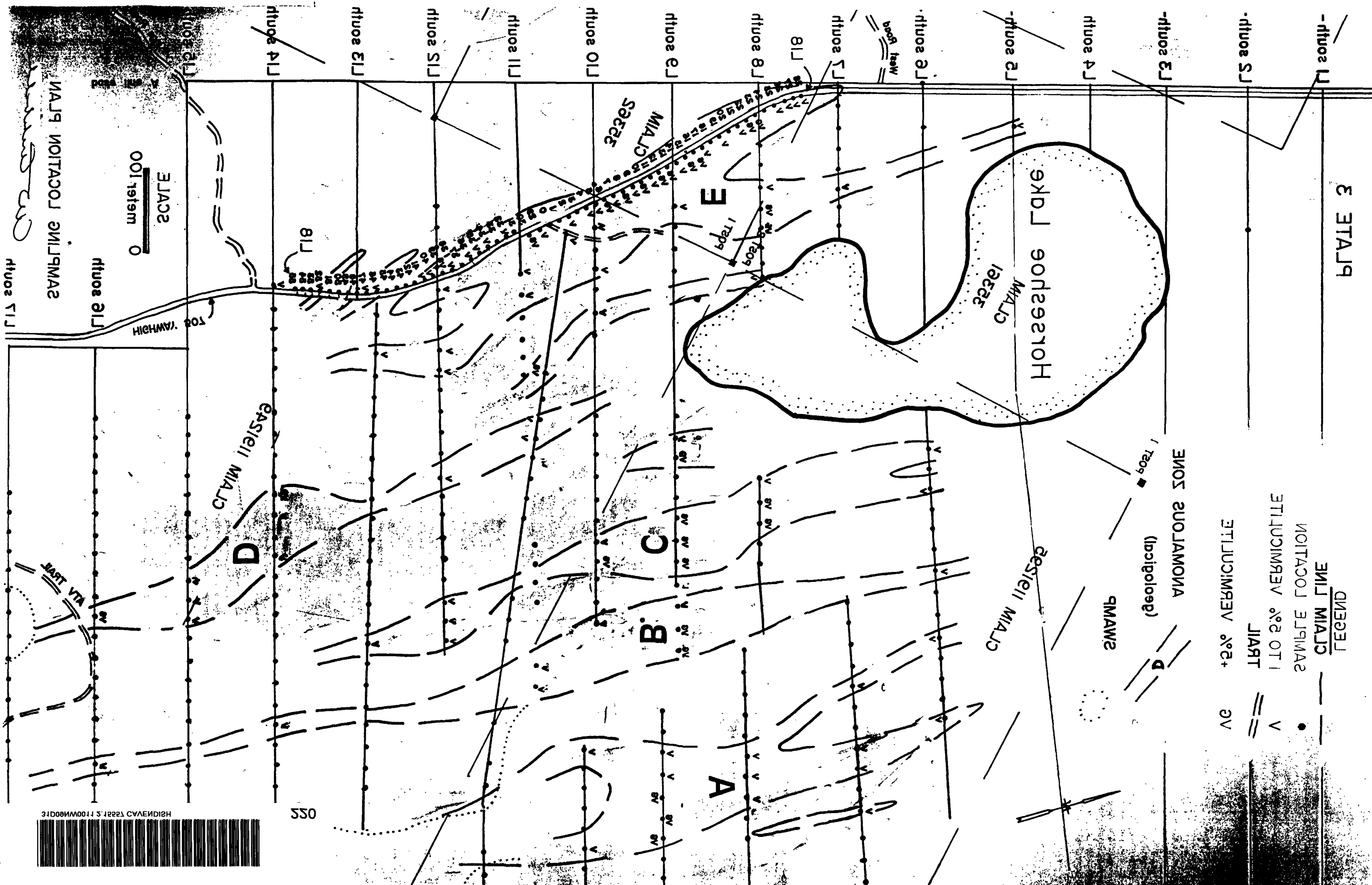
ГЕОЛОГИЧЕСКАЯ СЕТЬ

ОЗЕРО

ОЗЕРО

ОЗЕРО

ОЗЕРО



SCALE
0 100 meters

TRAIL

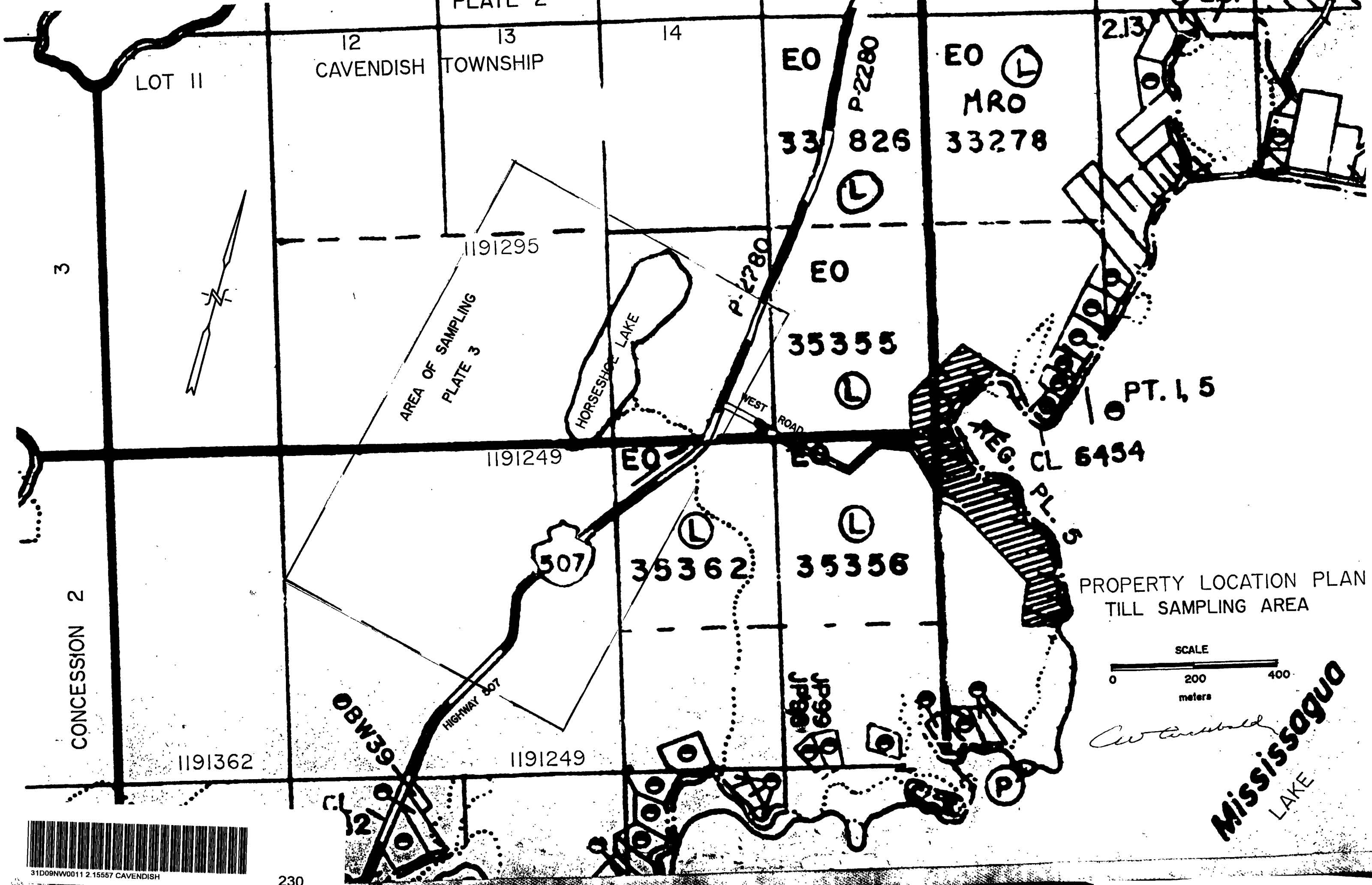
ОЗЕРО

ОЗЕРО

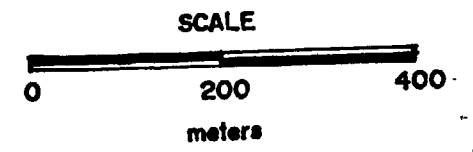
ГЕОЛОГИЧЕСКАЯ СЕТЬ



550



PROPERTY LOCATION PLAN
TILL SAMPLING AREA



C. W. ...

MISSISSAQUA
LAKE



8
7
6
5
4
3
2
1
CONCESSION

LOT

1 2 3 4 5 6 8 10 12 30

SCALE

00 800
eters

TO BUCKINGHAM / BUCKINGHAM 10
C. W. Archibald

PROPERTY LOCATION PLAN

Harvey Twp. (M-101)

Burleigh Twp. (M-102)



31D09NW0011 2 15557 CAVENDISH

