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GEOLOGY OF THE ENON CELESTITE MANTO, ENON, CAPE BRETON COUNTY, NOVA SCOTIA

431896

Fredericton, N. B.
December 21, 1967

A. D. Hudgins
Geologist

11F/15A

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SUMMARY

Prospecting procedures and diamond drilling by Lura Corporation Ltd. during the years 1962-1963 delineated a large tabular body of celestite ($Sr SO_4$) in the Enon District of Cape Breton Island, Nova Scotia. There is evidence to suggest that the gently dipping stratiform deposit is 1800 feet long, 1600 feet wide, and 7 1/2 feet in average thickness, containing a possible tonnage of 2,160,000 tons of mineralization averaging 75% $Sr SO_4$. There is concrete evidence that 270,000 tons of probable mineralization averaging 75% $Sr SO_4$ is contained within a block 600 feet long by 600 feet wide, with an average thickness of 7 1/2 feet. This latter body is partially exposed at the surface and it is believed that about 125,000 tons of this high grade $Sr SO_4$ could be recovered by open pit methods down to a maximum depth of 50 feet below the surface of the ground. The remaining 145,000 tons could be easily extracted by trackless underground mining methods utilizing gently inclined stopes and haulage ways from the bottom of the open pit.

It is recommended that a comprehensive market study of the uses for celestite be carried out and if the results of this compilation are promising then it is further recommended that detailed diamond drilling be undertaken to establish the size and grade of the deposit. Detailed concentration and separation tests in respect to the recovery of the celestite should be carried out in the near future.

PURPOSE OF REPORT

It is the writer's purpose to present the salient facts in respect to the geology, size, and extent of the Enon Celestite deposit. The deposit was first discovered in 1962 and, until the latter part of 1966, it did not seem to offer any economic possibilities and, as a consequence, a detailed report was not made pertaining to geology, size etc. Over the past year, Dr. J. H. Morgan, Consulting Geologist of Lura Corporation, and the Nova Scotia Department of Mines have suggested that the deposit could have economic potential. This report therefore presents a picture of the development possibilities of the celestite mineralization in the Enon property.

The writer is currently carrying out geochemical and microscope research work on the celestite deposit and a further report will be submitted giving detailed description of the geology and possible origin of the mineralization.

LOCATION

The Enon district of Cape Breton Island, Nova Scotia, is situated about 9 miles due south of Big Pond, a small community on the south side of East Bay, the eastern arm of the Bras d'Or Lakes.

The property is easily reached from Sydney by travelling 25 miles along Route 4 to Big Pond and thence southerly, for a distance of 9 miles to the head of Lake Enon. From the west, a secondary road turns off Highway 4 at Hay Cove and trends northeasterly for a distance of 15 miles towards the head of Lake Enon.

The property is about 35 miles northeast of the town of St. Peters and 35 miles southwest of the city of Sydney. The celestite showing is only 200-300 feet from the Big Pond - Grand River road and is situated 1/4 mile south west of the Enon Post Office. (Map 1 & 2)

EXTENT OF PROPERTY

The Enon celestite property consists of 7 mining claims (280 acres) and is contained within reference map 11F15A. Three claims are in good standing until June 1968, and four are in good standing until January 1969. The property consists of the following tracts and claims: (Map 2)

TRACT	CLAIMS	EXPIRATORY DATE	REF MAP
46	O,P,Q,	June 1st, 1968	11F15A
47	N	June 11th,1969	11F15A
50	D	" "	"
51	A,B	" "	"

HISTORY

The celestite deposit was found by Lura Corporation Limited in the early spring of 1962. At this time the company was actively engaged in prospecting and geochemical surveys for base metals in the Loch Lomond - Salmon River areas of Cape Breton.

Angular float of what was then thought to be barite was observed in the bed of a small stream 200 feet north of the Big Pond - Grand River road and about 500 - 600 feet south of the south corner of Little Enon Lake. In the summer of 1963 a small pit was sunk a few feet north of the float and, at a depth of 2 feet, solid outcrop of celestite was encountered.

A soil sampling programme was carried out during the summer of 1962 and numerous anomalies for Pb & Zn were found in soils surrounding the celestite mineralization. A drilling programme in the early winter of 1963, with the objective of probing the geochemical anomalies for base metal possibilities delineated a large tabular mass of celestite.

The only work carried out in the property since 1963 was done in November 1967, it consisted of stripping portions of the southerly extension of the deposit to recover material for test purposes.

GENERAL CHARACTER OF PROPERTY

The celestite deposit is situated at the extreme northeast end of the Loch Lomond Basin, a chain of northeasterly trending lakes approximately 7 miles long and one half - two miles wide. The lakes from northeast - southwest are known as Little Enon Lake, Enon Lake, Lake Uist, and Loch Lomond respectively. (Map 1 & 2)

The immediate area surrounding the deposit is very flat with elevations averaging 175 - 200 feet above sea level. The terrain south of Little Enon Lake is heavily wooded with spruce and fir. The area just south of Little Enon Lake, around the northern edge of the deposit, is swampy and covered with scrub spruce.

Drainage from the southeast side of the deposit is northerly towards the south side of Little Enon Lake. The difference in elevation between the south side of the property and the north is only about 25 feet.

The southern portion of the deposit is overlain by glacial till varying from 2-10 feet thick. The central portion and southern edge of the deposit are covered by about 20-50 feet of till and boulder clay.

Outcrops within the property are extremely scarce and angular float is only found along the south side of the lake and in the bed of the small brook draining the deposit.

REGIONAL GEOLOGICAL SETTING

The property occupies the central and narrowest portion of a Carboniferous - age basin that trends northeasterly from the Atlantic Ocean towards Sydney. (Map 1, G. S. C. Map 1026A). It is contained within the northerly limits of the Loch Lomond Basin which is underlain by Devonian granitic rocks, Mississippian sediments, and Pennsylvanian sediments.

The Carboniferous sediments unconformably overlie a Devonian age granitic basement complex consisting essentially of felsite porphyries, granite, syenite, and granodiorites. The competent basement rocks are only slightly faulted and fractured.

The sediments directly above the basement rocks are believed to be upper Windsor in age and are composed of alternating beds of marine limestones, evaporites, conglomerates, and shallow water shales, mudstones, and sandstones. These Mississippian-age rocks are approximately 350 feet thick in the northern portion of the Loch Lomond Basin and over 2000 feet thick in the area surrounding Lake Uist and Loch Lomond towards the south. The Windsor rocks have a regional strike of N45°E, conformable to the trend of the Carboniferous basin, and dip at angles varying from 0° - 15° northwest, towards the center of the basin.

The Windsor sediments are conformably overlain by a thick undivided series of lacustrine and deltaic sediments of Pennsylvanian age consisting of conglomerate, sandstone, shale and minor thin coal seams. The beds have a regional strike of N40°-45°E and dip at low angles towards the northwest.

The Pennsylvanian rocks are in fault contact with the Pre-Carboniferous basement rocks on the northwest side of the basin; they dip at high angles of 60°-85° towards the southeast. It is believed that the northwest side of the Carboniferous-age basin is bordered by a major Post-Carboniferous normal fault that dips at high angles towards the southeast, the Carboniferous sediments within the basin were down dropped relative to the crystalline rocks on the northwest.

The Pennsylvanian sediments are over 2000 feet thick in the central portion of the basin around Loch Lomond, 1000 feet thick in the northern part of the basin, and 200-300 feet thick on the northern side of Little Enon Lake, just north of the celestite deposit.

Approximately 1-1/2 miles southwest of the Enon area there is evidence for a large, or series of large, celestite-barite-galena beds underlying the waters of Loch Lomond and Lake Uist. (Map 3). At Salmon River (Silver Mine), 7 miles towards the northeast on the south side of the basin large tonnages of low-grade galena mineralization are located in basal Pennsylvanian arenites near the Windsor-Pennsylvanian contact about 200-300 stratigraphically above the unconformity between the Windsor sediments and the granitic basement rocks.

At Big Glen, mid way between Salmon River and Enon, basal Windsor limestones and conglomerates are widely mineralized with low-grade galena and sphalerite. These beds are about 100 feet above the unconformity between the Windsor beds and the granitic basement rocks.

A few small showings and abundant float of barite-galena have been found on the north and west sides of the basin at Lochside and Mt. Auburn, 5 and 10 miles respectively from Enon.

The lower Windsor sediments in the Loch Lomond Basin are enriched in trace quantities of Sr, Ba, Pb & Zn. - Abundant floats of ore-grade lead-zinc-silver mineralization replacing limestones, and barite-celestite are common throughout the district. Further exploration surveys for base metals in the region are planned for the summer of 1968.

DETAILED GEOLOGY AND MINERALOGY

The Enon celestite deposit is a large stratiform body partially replacing the lower portion of a sandstone-mudstone bed at the contact with

an underlying, dense, altered limestone bed. It is totally within Windsor age sediments and occurs at an average distance of 150 feet above the unconformity between the Mississipian beds and the granitic basement. It strikes N40°-45°E and dips at angles varying between 8°-10° at its southern extremity. In the northern and central portion of the deposit the dip is essentially horizontal.. (Map 3 and 4)

The stratigraphy of the deposit has been fairly well ascertained by drilling. The southern and central portion of the body is underlain by an altered bed of limestone 30 - 40 feet thick and a bed of ferruginous conglomerate 60 - 80 feet thick, containing pebbles and cobbles of Pre-carboniferous granitic rocks. The deposit is overlain by 100 - 125 feet of varying thicknesses of shales, conglomerates and limestones. The northern part of the deposit below the bed or manto of celestite and the footwall limestone is decidedly different in lithology to that of the central and southern portions. Here, the deposit and the footwall limestone are underlain by about 200 feet of varying thickness of gypsum, anhydrite, gypsiferous sediments, black shales and limestones. The acute angular unconformity represents a pinching-out and onlap of evaporites and gypsiferous sediments over the basal Windsor conglomerate. The pinch-out reflects the southern terminus of evaporite deposition in the Loch Lomond Basin. (Map 4). The northern portion of the deposit is overlain by the same stratigraphic units or beds as those in the southern and central parts of the deposit, i.e. shales, limestones and conglomerates.

The sedimentary horizons pinch out laterally along strike as well as down dip. (Map 5)

The Pre-Carboniferous basement rocks generally have an even and smooth surface but towards the west slight undulations of low relief are evident. It is pertinent to mention that the celestite body thickens appreciably over a structural high of small relief towards the west in the vicinity of hole No. 18.

Pennsylvanian sediments comprised of calcareous-ferruginous conglomerate are believed to be located under the overburden just north of the south side of Little Enon Lake as abundant angular float of this material occurs in this area.

The Windsor sediments are very free of appreciable deformational features. The only beds that exhibit noticeable fracturing are the competent limestone horizons. The footwall limestone bed exhibits the most fractures of any rock type and even these are very sporadic and small.

The celestite body is a partial replacement of the lower portion of a ferruginous, glauconitic, and calcareous mudstone-sandstone member that varies from 20 to 40 feet in thickness. Conglomeratic phases are

frequent in this bed as well as shaly or argillaceous sandstones. The bed is unfractured and unaltered throughout.

The mineralization consists of coarse grained, massive and submassive celestite ($SrSO_4$) that is generally a bluish white or greyish white in colour. Numerous large blebs of a reddish brown celestite are frequent throughout. The celestite is generally euhedral and exhibits large 3mm-5mm tabular, rhombic prisms. Large rosettes of elongated prismatic crystals up to 1" in diameter are common as well as radiating, colloform crystal forms and growths, especially in the southern portion of the deposit.

Spherical vugs up to 1" in diameter are partially lined with amorphous manganiferous-petroliferous material. These small cavities are commonly speckled or lined with extremely minute crystals of sphalerite and galena.

Recent microscope work on the mineralization has found evidence for sporadic, minute, crystals of realgar, orpiment and native sulfur occuring in thin seams and associated with galena, sphalerite and chalcopyrite. Small lenses and blebs of red ochre (hematite) and manganite were observed in the celestite. The estimated average combined Fe-Mn content of the deposit would be well below 1.5%. The bulk of the deposit is relatively free from any visible impurity (excepting blebs of unreplaced rock). A sample from a trench in the southern part of the deposit was assayed and yielded the following:

SrO - 55% (95% $SrSO_4$)
BaO - 1.16% (1.78% $BaSO_4$)
SiO2 - 4.67%
CaO - 0.32% (0.77% $CaSO_4$)

The average grade of the deposit intersected in holes 15-18 is about 75% $SrSO_4$ with minor impurities of Fe_2O_3, $CaSO_4$, $BaSO_4$, and SiO_2.

It is possible that an appreciable portion of the celestite deposit may consist of strontianite ($SrCO_3$). Recent microscope work has shown that stout pseudo-hexagonal crystals of strontianite are intimately intermixed with the celestite. It is possible that the bulk of the strontianite has been replaced by celestite and the crystals are actually pseudomorphs.

The footwall limestone bed is moderately altered and contains frequent, thin wide spread seams (1-1/8 inches) of extremely fine grained galena, sphalerite and chalcopyrite. The carbonate horizon is generally a

dark grey to buff colour and contains sporadic fragments of crinoid stems, algal growths and bryozoans. Portions of the limestone in direct contact with the celestite have been bleached, dolomitized, and silicified. Small spherical and ovoid - like concentrations of bluish white celestite and thin fractures of clear celestite are common in the upper 5-10 feet of the bed. The limestone is exposed in the bed of the small brook just south of hole No. 15, assays of this bed have yielded up to 4% Zn, 2% Pb and 1 oz of Ag/ton. The numerous soil anomalies along the southern edge of the celestite deposit reflect the presence of Pb-Zn mineralization within the footwall horizon.

The northern and central portions of the deposit are fairly well confined to the bottom 5 feet of the sandstone-mudstone number. The deposit is around 15 feet thick at its southern extremity where it crops out, it apparently pinches to 3 - 5 feet thick at the northern edge. The deposit thickens out appreciably towards the southwest, west of a line joining holes 15, 16 and 17, and pinches out between holes 18 and 19. The body in the vicinity of hole No. 18 is about 27 feet thick, but only 5 - 7 feet of this mineralization could be classed as ore grade material. The mineralization apparently extends towards the northeast and southwest because angular float of massive celestite has been found along the McVicar Road and the southeastern corner of Little Enon Lake.

SUMMARY OF DRILL HOLES

Five vertical holes totalling 1158 feet were drilled on the property in 1963. The locations and sections of these holes are shown on maps Nos 4 - 10. Four holes, Nos 15 - 18, intersected the celestite deposit. Hole No. 19 did not intersect any appreciable mineralization; numerous long sections of core were lost due to poor ground conditions. It is possible, however, that appreciable celestite mineralization occurs in the vicinity of hole No. 19 as frequent bluish white crystals of celestite were observed in sludges from lost core sections.

Hole No. 15: cored 11.2 feet of possible massive celestite. From 0.0 - 4.1 broken fragments and pieces of celestite embedded in a reddish clay or till were encountered. From 4.1 - 11.2 massive celestite averaging 85% $SrSO_4$ was cored in a nearly continous section. The deposit in this area is probably over 15 feet thick.

Hole No. 16: 550 feet north of No. 15 intersected 5 feet of massive celestite grading 75% $SrSO_4$ at a vertical depth of 95.5 feet. The sediments above and below this intersection do not contain any appreciable concentrations of celestite.

Hole No. 17: 800 feet north of No. 16 intersected 1-1/2 feet of massive celestite (90 - 100% $SrSO_4$ by visual estimation) at a vertical depth of 75 feet. The deposit here could be much more than the thickness noted above as 95% of the core was lost between 63.5 and 73 feet. Sludges from a drill-run at around 60-65 feet contained appreciable crystals of greyish and reddish brown lath-shaped crystals of celestite.

Hole No. 18: 600 feet west of Hole No. 16 encountered widespread celestite mineralization from 147 to 174 feet. From 147-152 feet a sandstone - conglomerate facies averages about 25% $SrSO_4$ (visual estimation), 152-162.8 feet has massive blebs of celestite in a sandstone-mudstone sequence and contains about 30-35% $SrSO_4$. From 162.8-167.8 feet, a 7.0 feet length yielded 52% $SrSO_4$, the last 5 feet of this sample would average 70-75% $SrSO_4$ (visual estimation). Between 167.8 and 174 feet numerous high grade lenses and blebs of celestite were intersected, and at 172-173 feet a one foot bed of 100% celestite (visual estimation) was cored.

Hole No. 19: 600 feet west of hole No. 18 intersected the favorable sandstone - shale bed at a depth of 215 feet and passed into the footwall limestone bed at 240 feet. The sandstone horizon does not contain any visible concentrations of strontium mineralization. As mentioned previously, a large percentage of the cores were lost above 200 feet and frequent grains of celestite were noted in sludges. These sludges are not available for assaying.

SIZE AND EXTENT OF DEPOSIT

There is evidence to suggest that the stratiform celestite deposit is persistent both laterally along strike and down dip. If it is assumed that the celestite deposit persists between the outcrop and drill intersections, it could occupy an area of 1800 feet in an east-west direction by 1600 feet north-south. It is possible that the bed could have much larger dimentions because float of celestite has been found outside the limits given above. It is believed that the body has an average thickness of 7 1/2 feet of ore grade material (over 70% $SrSO_4$).

The estimated tonnage factor for 75% $SrSO_4$ and 25% sandstone-mudstone would be about 10 cu. ft. per ton = 1. This is based on the assumption that the massive celestite has a specific gravity of 3.9 and the sediments an average specific gravity of 2.3.

A block 1800 ft x 1600 ft x 7.5 ft would contain over 2,000,000 tons of "possible ore" averaging 75% $SrSO_4$.

A block of probable mineralization outlined by holes 15, 16, 18 and the trenches would be 600 feet long by 600 feet wide, with an average

thickness of 7 1/2 feet. It would contain about 270,000 tons averaging over 75% $SrSO_4$. About 50% of this block could be mined by open cuts or pits down to a vertical depth of 50 feet below the surface and the remainder could be developed by cheap, trackless mining methods utilizing gently inclined stopes and haulage ways from the bottom of the pit or open-cut.

A block of possible mineralization 1800 feet by 1000 feet by 7 1/2 feet contained by holes 15, 16 and 18 and the projected easterly extension of the deposit could contain around 1,350,000 tons of mineralization averaging 75% $SrSO_4$.

CONCLUSIONS AND RECOMMENDATIONS

The Enon celestite body contains 270,000 tons of probable celestite mineralization averaging 75% $SrSO_4$. The deposit contains a possible tonnage of 2,160,000 tons of high grade strontium mineralization averaging 75% $SrSO_4$.

The deposit is believed to be hydrothermal (telethermal) in origin and was found by ascending thermal waters rich in strontium, replacing a porous sandstone-mudstone bed in direct contact with a relatively impermeable, underlying dense limestone bed. It is suggested that the thermal waters were intermixed with deep circulating meteoric water and that the strontium salts were derived from the leaching of evaporite members below the celestite deposit. The solutions may have migrated up dip and part may have travelled vertically.

The mineralization is definitely epigenetic (later than the enclosing rocks). The lead-zinc mineralization in the footwall limestone was later than the celestite mineralization in the sandstone-mudstone member.

The Enon celestite body is believed to be the largest single source of celestite so far reported. It is suggested that a comprehensive market study be carried out in respect to the demand and use for the type of mineralization found at Enon. It is suggested that the mineralization could have uses other than for a source of chemical-grade strontium salts. The celestite could be a source of filler-grade material and possibly may be utilized in oil-drilling muds.

If market studies, coupled with research into recovery, concentration, and conversion of celestite into other strontium salts are promising, it is recommended that diamond drilling be done sufficient to indicate that 3 to 5 years supply is readily available for open pit mining.

Respectfully submitted,

A. D. Hudgins

A. D. Hudgins

Fredericton, N. B.
December 18th, 1967

SUMMARY

CELESTITE DEPOSITS OF ENON-LOCH LOMOND DISTRICTS, CAPE BRETON, NOVA SCOTIA

By A. D. Hudgins

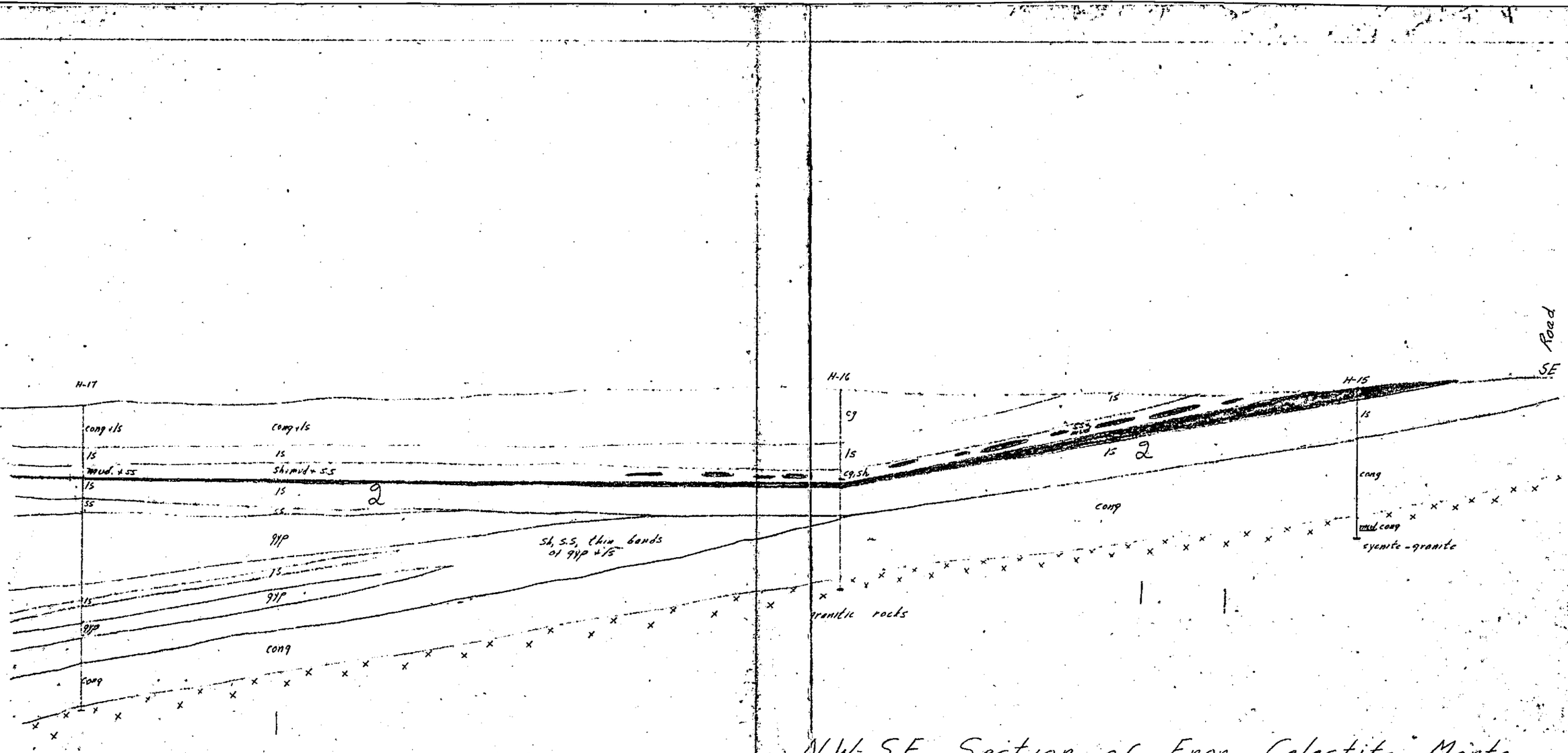
Geological work and diamond drilling by Lura Corporation in the Enon district, Cape Breton County, Nova Scotia have delineated a large stratifrom deposit of celestite replacing sandstones of Upper Windsor age just above a major unconformity separating Carboniferous sediments from Precarboniferous crystalline rocks.

The blanket-like deposit, containing an average grade of over 75% $SrSO_4$ dips at angles of 2° - 10°, has an average thickness of 7' - 8' and is located at depths varying from 0' - 170' below the surface of the ground. There is evidence to suggest that the mineralization is of great areal extent, it is over 2400 feet long and 1400 feet wide. The deposit is open along strike and down the dip.

It is believed that the eastern shores of Lake Uist and Loch Lomond, just south of the Enon area, are also underlain by very large deposits of high grade celestite, some of which contain significant lead-zinc concentrations.

The celestite will be utilized by Cape Chemicals Corporation Limited at Point Edward where some of it will be converted to other strontium salts desired in the chemical industry.

It is the purpose of this talk to discuss the geology of the Enon celestite deposit and the Loch Lomond area. It is expected that a complete text of this paper will be published at a later date.



NW-SE Section of Enon Celestite Manto Enon, Cape Breton, Nova Scotia

Scale: one inch equals one hundred feet

GYP celestite

2	Mississippian – Windsor Group Shales, conglomerate, limestones, mudstone gypsum + anhydrite
1	Devonian – Granites, rhyolites & allied rocks.

Drawn by: A O Hudgins, Nov 19th, 1967

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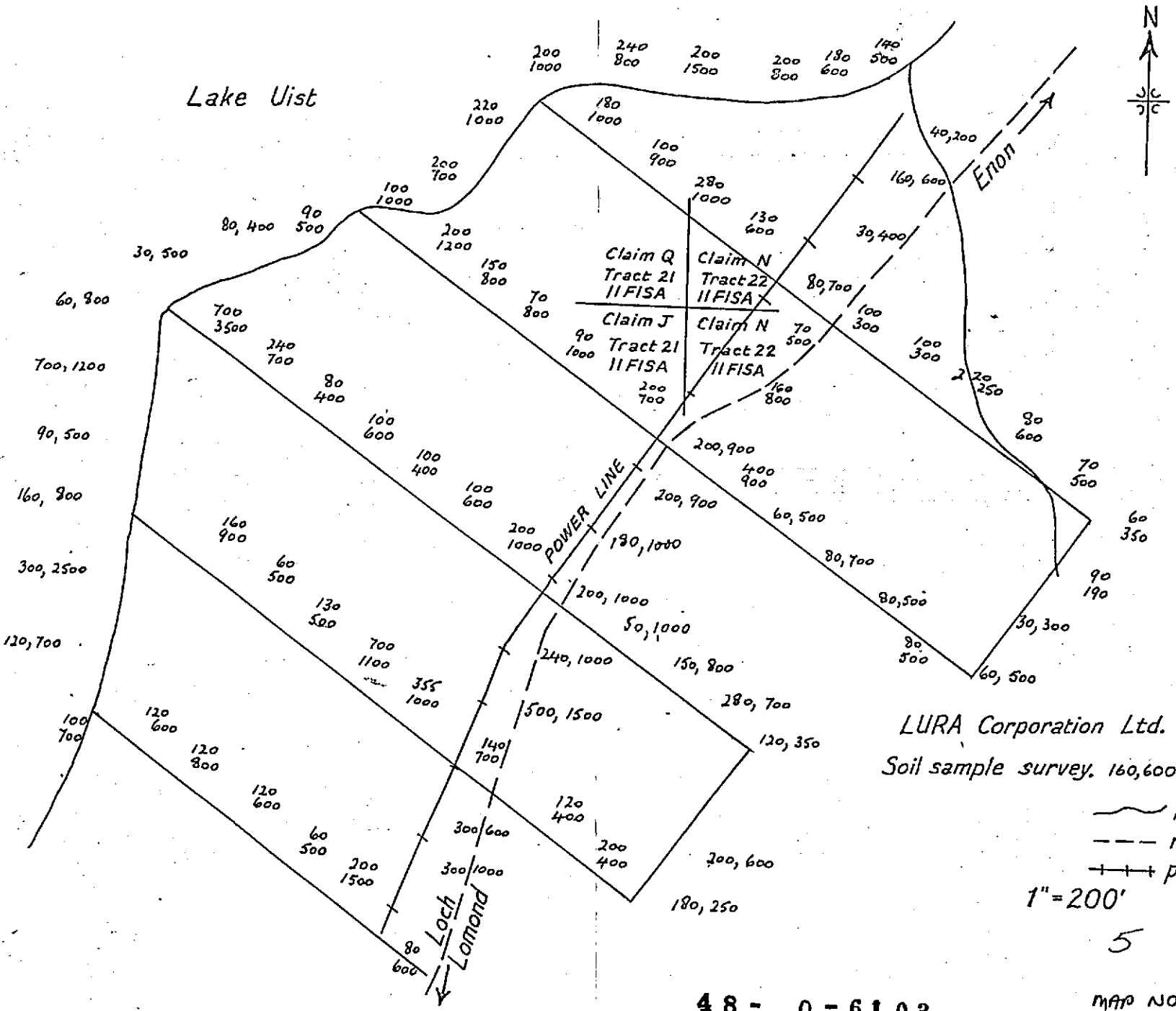
MAP NO 4


Lake Uist
Claim Q
Tract 21
II FISA
Claim N
Tract 22
II FISA
Claim J
Tract 21
II FISA
Claim N
Tract 22
II FISA
POWER LINE
Loch Lomond
Enon
N
200 1000
240 800
200 1500
200 800
180 600
140 500
220 1000
180 1000
100 900
200 700
100 1000
280 1000
130 600
90 500
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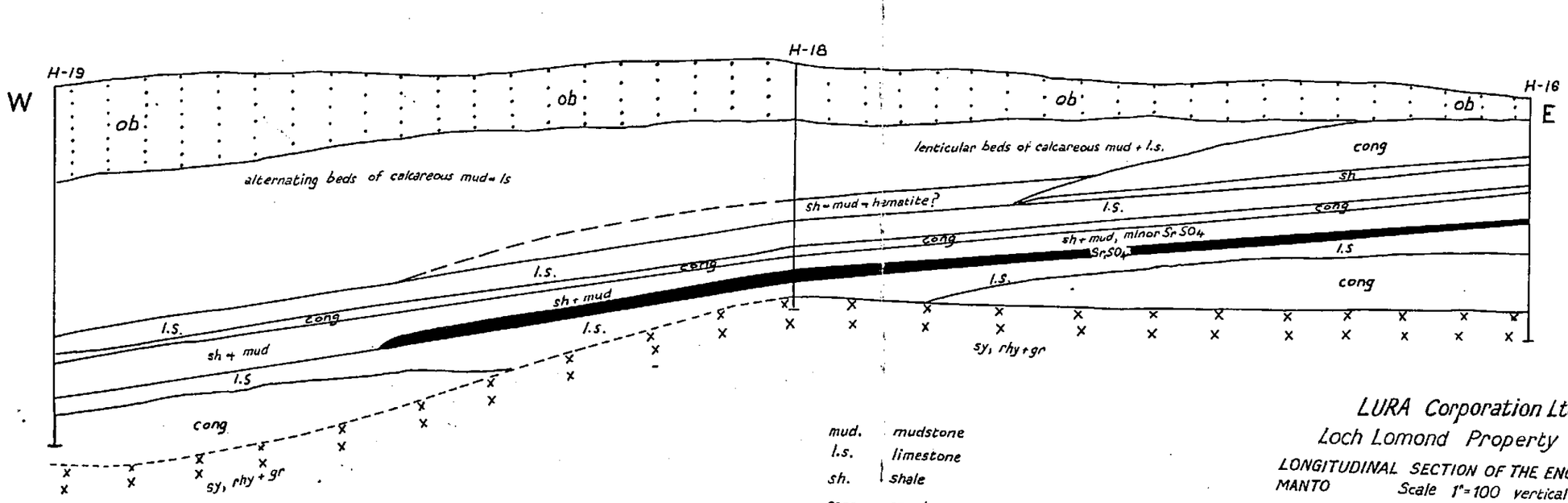
80, 700
60, 500
200, 900
400 900
160 800
80 600
70 500
100 300
100 300
220 250
40, 200
160, 600
30, 400
80, 700
60 350
90 190
30, 300
80 500
LURA Corporation Ltd.
Soil sample survey. 160,600 ppm Pb+Zn
lake shore
road
power line
1" = 200'
5
MAP NO 5
48 - 0 - 6103
43189G
14w



mud.	mudstone
l.s.	limestone
sh.	shale
cong.	conglomerate
$SrSO_4$	celestite
rhy.	rhyolite
gr.	granite
ob.	overburden

LURA Corporation Ltd.

Loch Lomond Property N.S.

LONGITUDINAL SECTION OF THE ENON CELESTITE MANTO Scale 1"=100 vertical + horizontal.

DRAWN by A.D. Hudgins Nov. 28 1963
TRACED by J.M. Dawson Dec 9 1967

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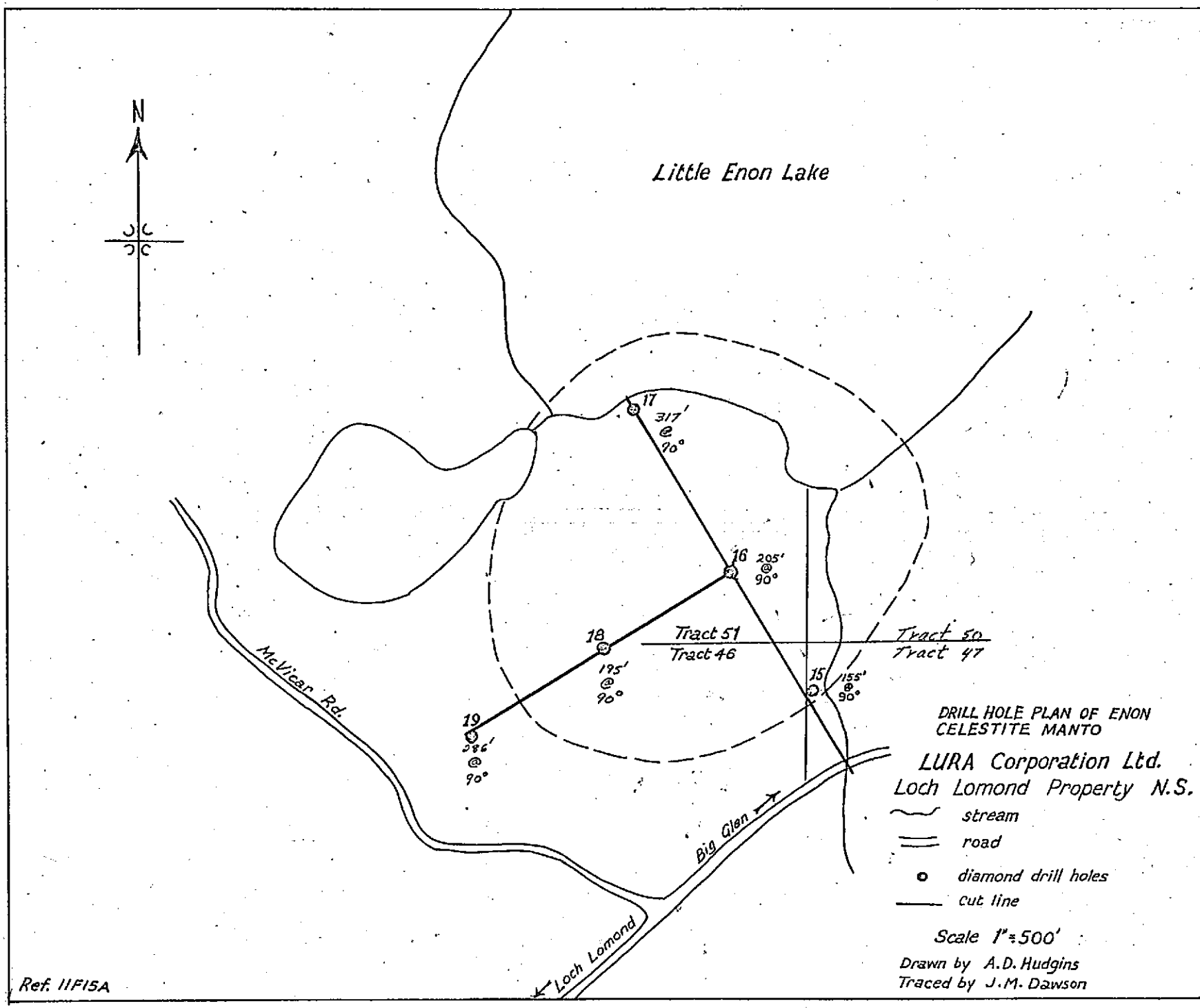
MAP NO 5



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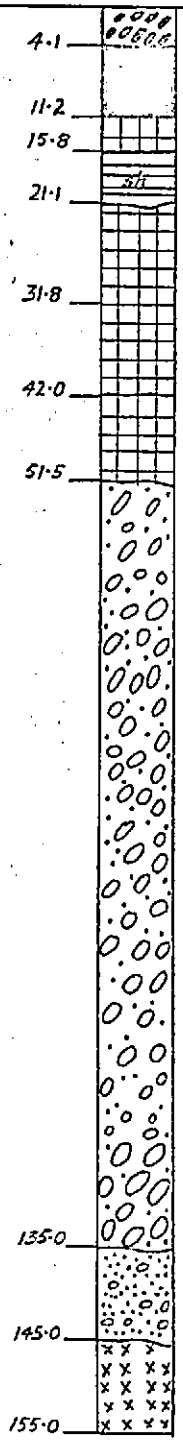
MAP NO 6

ELEV. 205'



4·1'- mixture of till and $SrSO_4$

7'- 85% $SrSO_4$, 15% brown-green calcareous S.S.

Greyish brown, silicified l.s, 5-10% $SrSO_4$ (?)

Greenish grey, glauconitic, calcareous shale.

Buff and grey porcelain like, fossiliferous l.s silicified, slightly dolomitized ?

Highly fossil, grey silicified l.s - frequently Öolitic, odd blob of bluish celestite. Few small stringers of PbS and ZnS

Grey-greyish brown slightly petroliferous and earthy fossil l.s

Grantmire-type cong. Many large cobbles and boulders of Precarboniferous igneous rocks. Matrix is a light green glauconitic sandstone and grit

Maroon and brick red, non calcareous mudstone. Odd pebble of Precarboniferous igneous rocks

Pink rhyolite porphyry

Section of Hole No. 15
SCALE 1" = 20'

Drawn by A. D. HUDGINS
Traced by J. M. DAWSON
Dec. 1967

MAP NO 7

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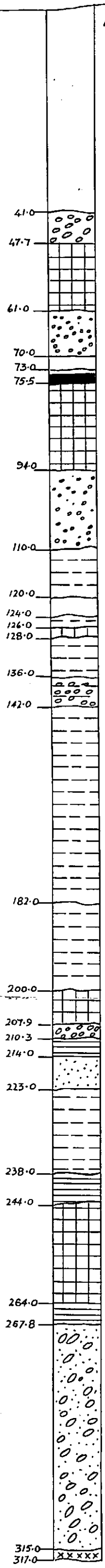
MAP NO 8

ELEV. 185'



Overburden

41·0 — 47·7 Limestone conglomerate

47·7 — 61·0 Limestone

61·0 — 70·0 Brick red mudstone and fine grained sandstone
Lost core - 63·5 - 67·7
67·7 - 70 pebbles of ss - mostly lost core

70·0 — 73·0 lost core (70-73)

73·0 — 75·5 74-75·5 - massive celestite

75·5 — 94·0 Porcelain like l.s - footwall of celestite bed in holes 15,16, and 18

94·0 — 110·0 Grey massive sandstone

110·0 — 120·0 Gypsum and anhydrite

120·0 — 124·0 Lost core

124·0 — 126·0 Gypsum and anhydrite

126·0 — 128·0 Limestone

128·0 — 136·0 Gypsum and anhydrite

136·0 — 142·0 Pebbles of green s.s granite and rhyolite in gypsum
Few whisps of flat galena in gypsum

142·0 — 182·0 Greyish white sugary gypsum and anhydrite
Numerous brown petroliferous blobs
Few thin fractures and fine blebs of native sulfur

182·0 — 200·0 Impure gypsiferous sediments
Thin beds of petroliferous limestone, pink gypsum, dark brown slightly bituminous shales

200·0 — 207·9 Petroliferous limestone, thin bituminous and graphitic beds

207·9 — 210·3 Sharpstone conglomerate

210·3 — 214·0 Calcareous shale

214·0 — 223·0 Brick red and grey mudstone

223·0 — 238·0 Gypsum - Anhydrite breccia

238·0 — 244·0 Calcareous shale

244·0 — 264·0 Porcelain like limestone and öolitic l.s

264·0 — 267·8 Calcareous shale

267·8 — 315·0 Sharpstone conglomerate few thin sandstone beds

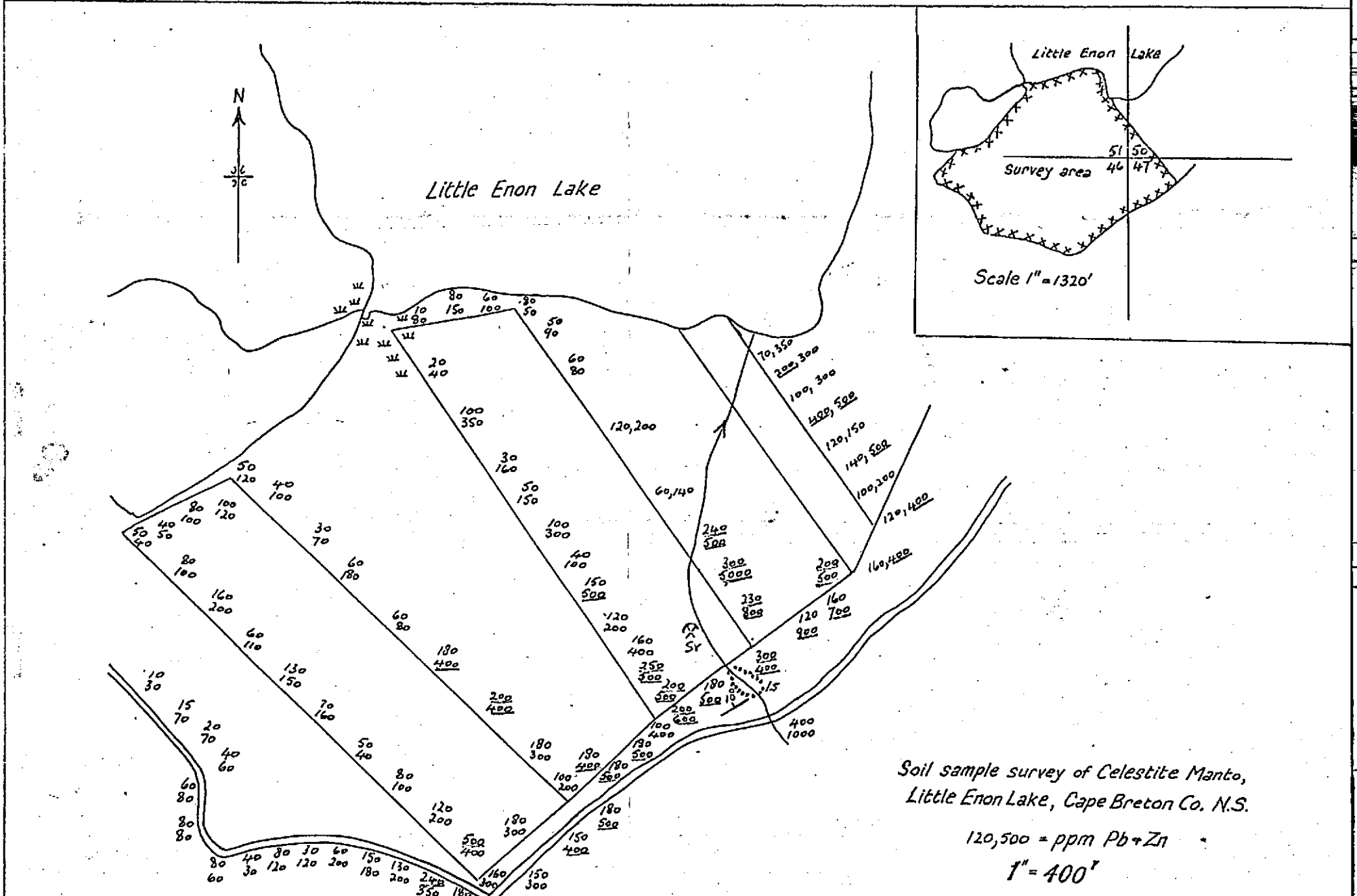
315·0 — 317·0 Red brown felsite

Section of Hole No 17
SCALE 1" = 20'

Drawn by A.D. HUDGINS
Traced by J. M. DAWSON
Dec. 1967

MAP NO 9

48 - 0 - 6101

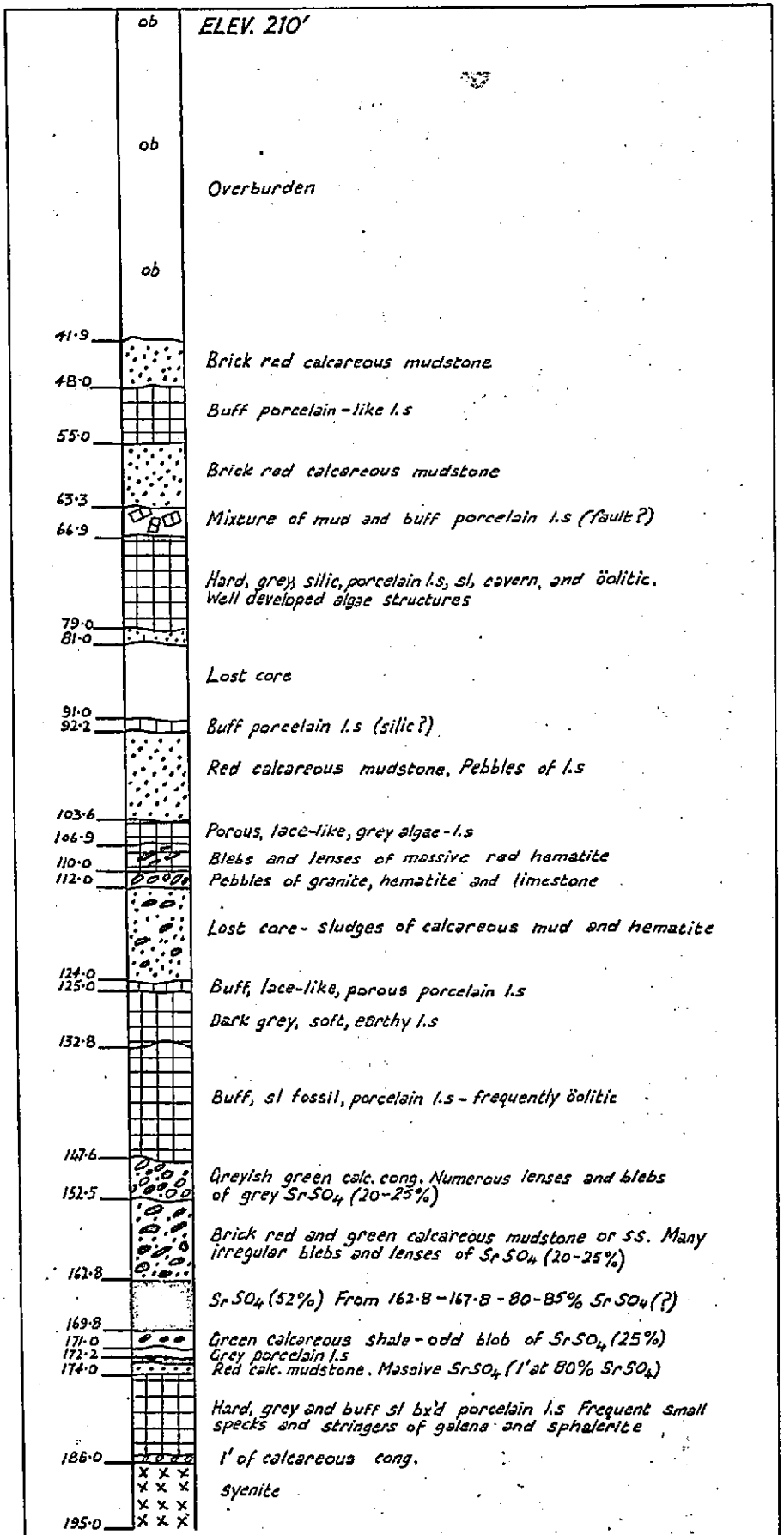


431896

48 - 0 - 6103

MAP NO 10

lw.



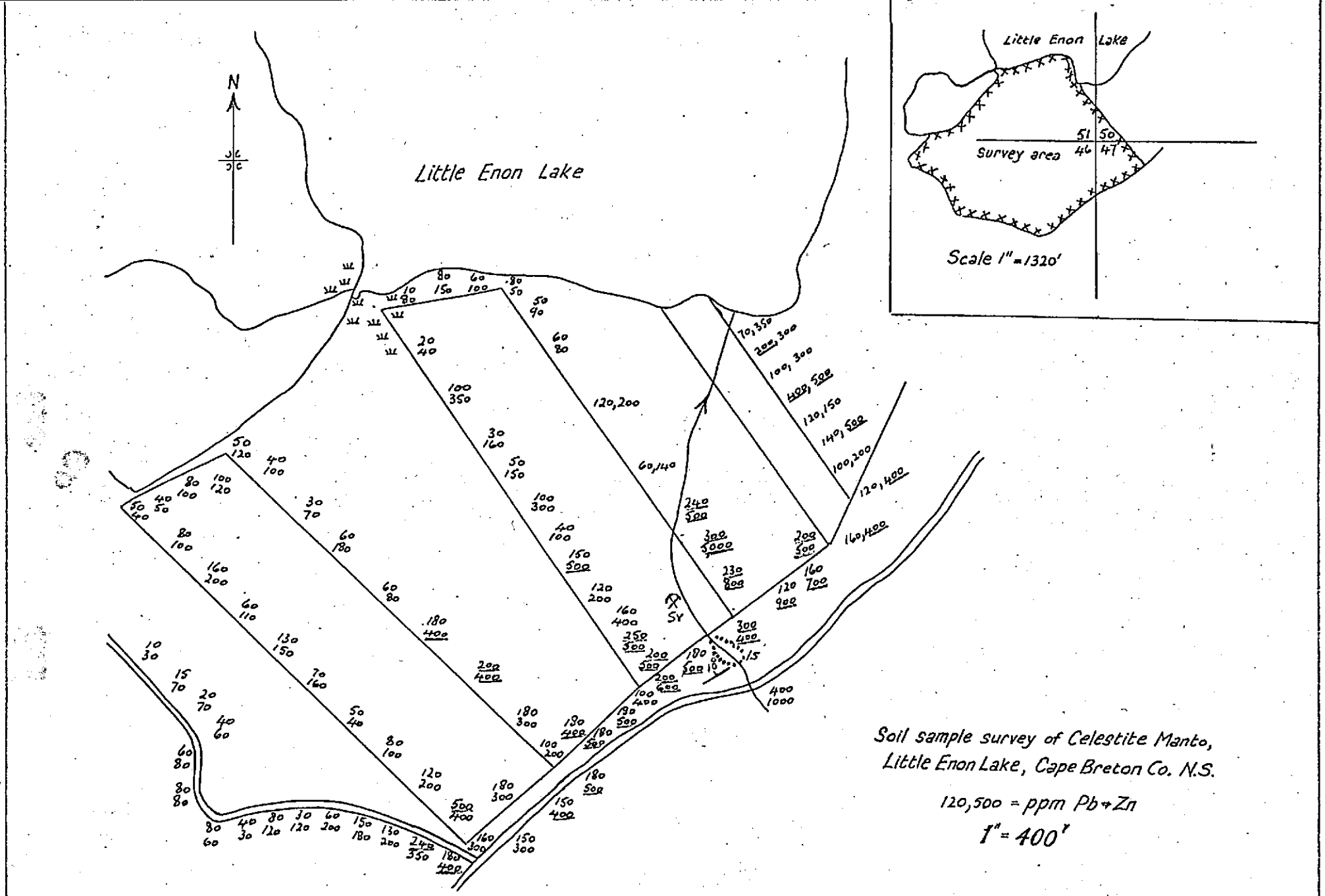
Section of Hole No.18

SCALE 1"=20'

Drawn by A.D.HUDGINS } Dec.1967
Traced by J.M.DAWSON }

48 - 0 - 6101

MAP NO 10



48 - 0 - 6101

MAP NO 11

lw.

TRUE NORTH

LAKE ENON

12

2

1

7

LOCH LOMOND RD.

3

4

Pb, Zn

MAC VICAR RD.

103 99

102

Sr

LAKE UIST
PENINSULA AREA

105

111

117

112

108

PASSAGE BRIDGE

116

LOCH LOMOND

114

KAISER CELESTITE MINING LTD.

Drill Hole Location Map.
Loch Lomond, Rich Co. NS.

●99 *Drill hole*
××Sr *Angular Float*
— — *Road*
—.— *Eastern Limit of Celestite Manto*
Fault
o *proposed holes*

Scale: 1" = 1000'

48 - 0 - 6103

MAP NO 11

CANADA
DEPARTMENT
OF
MINES AND TECHNICAL SURVEYS
GEOLOGICAL SURVEY OF CANADA

MAP 1026A

SOUTHEASTERN CAPE BRETON ISLAND

NOVA SCOTIA

Scale: One Inch to Two Miles = 1/126,720

Miles 2 1½ 1 ½ 0 2 4 6

INDEX MAP

LEGEND

PALAEOZOIC

PENNSYLVANIAN

17 — *Sandstone, shale, conglomerate;* **17a**, *Riversdale group: siltstone, sandstone, shale;* **17b**, *Morien group: sandstone, shale, conglomerate, coal*

MISSISSIPPIAN (?)

16 — *Gabbro, diabasic gabbro*

MISSISSIPPIAN

WINDSOR GROUP (14, 15)

15 — *Marginal basin beds: conglomerate, limestone, sandstone, gypsum, shale; includes undifferentiated Grantmire formation;* **15a**, *Grantmire formation: conglomerate, sandstone*

14 — *Central basin beds: limestone, siltstone, sandstone, shale, gypsum*

HORTON GROUP

13 — *Conglomerate, sandstone, siltstone, shale*

DEVONIAN

12 — *Diorite, quartz diorite, andesite;* **12a**, *andesite, basalt, diabasic gabbro, gabbro*

11 — *Undivided granitic rocks;* **11a**, *rhyolite;* **11b**, *granitized sedimentary rocks;* **11c**, *granite, with inclusions of George River group (1)*

SILURIAN OR DEVONIAN (?)

MIDDLE RIVER GROUP

10 — *Conglomerate, arkosic sandstone, quartzite*

CAMBRIAN

UPPER CAMBRIAN

9 — *MacNEIL FORMATION: shale, minor limestone*

MIDDLE CAMBRIAN

5 — *TROUT BROOK AND MacLEAN BROOK FORMATIONS: shale, siltstone*

LOWER CAMBRIAN

4 — *MacCODRUM AND CANOE BROOK FORMATIONS: shale, claystone*

3 — *MORRISON RIVER FORMATION: red sandstone, conglomerate; minor white quartzite and grey shale*

PROTEROZOIC

FOURCHU GROUP

2 — *Volcanic breccia, tuff, lavas; sandstone, shale; chlorite schist;* **2a**, *sedimentary rocks, chlorite schist; possibly equivalent to 1*

ARCHÆAN

GEORGE RIVER GROUP

1 — *Hornfelsic shale, paragneiss, crystalline limestone; minor greywacke and volcanic rocks*

CAMBRIAN
MIDDLE CAMBRIAN

7, 8 — **7**, *MacMULLIN FORMATION: quartzite, shale, conglomerate* **8**, *KELVIN GLEN GROUP: siltstone, shale, sandstone, conglomeratic sandstone*

BOURINOT GROUP

6A, 6B — **6A**, *Volcanic tuff, breccia; lavas; sandstone, shale; minor greywacke* **6B**, *Greywacke, volcanic tuff, breccia; lavas*

Bedding (horizontal, inclined, vertical, overturned)
Schistosity (inclined, vertical, dip unknown)
Fault (defined, approximate, assumed)
Anticlinal axis (approximate)
Synclinal axis (defined, approximate)
Mine, quarry (lead-zinc; coal, abandoned; gypsum) ⚒ Pb,Zn, Coal, Gyp

Geology by L.J. Weeks, 1944–45; L.J. Weeks and H.L. Cameron, 1947; geology of Scatari Island from Map 362A by E.A. Goranson, 1930, 1931; geology of North Mountain from Map 223A, by T.O. Guernsey, 1928

Main highway
Road well travelled
Road not well travelled
Trail
Post Office
County boundary
Triangulation station
Lighthouse
Marsh
Sand, gravel
Contours (interval 100 feet)

Cartography by the Geological Cartography Division, 1953

Approximate magnetic declination, 25°43' West

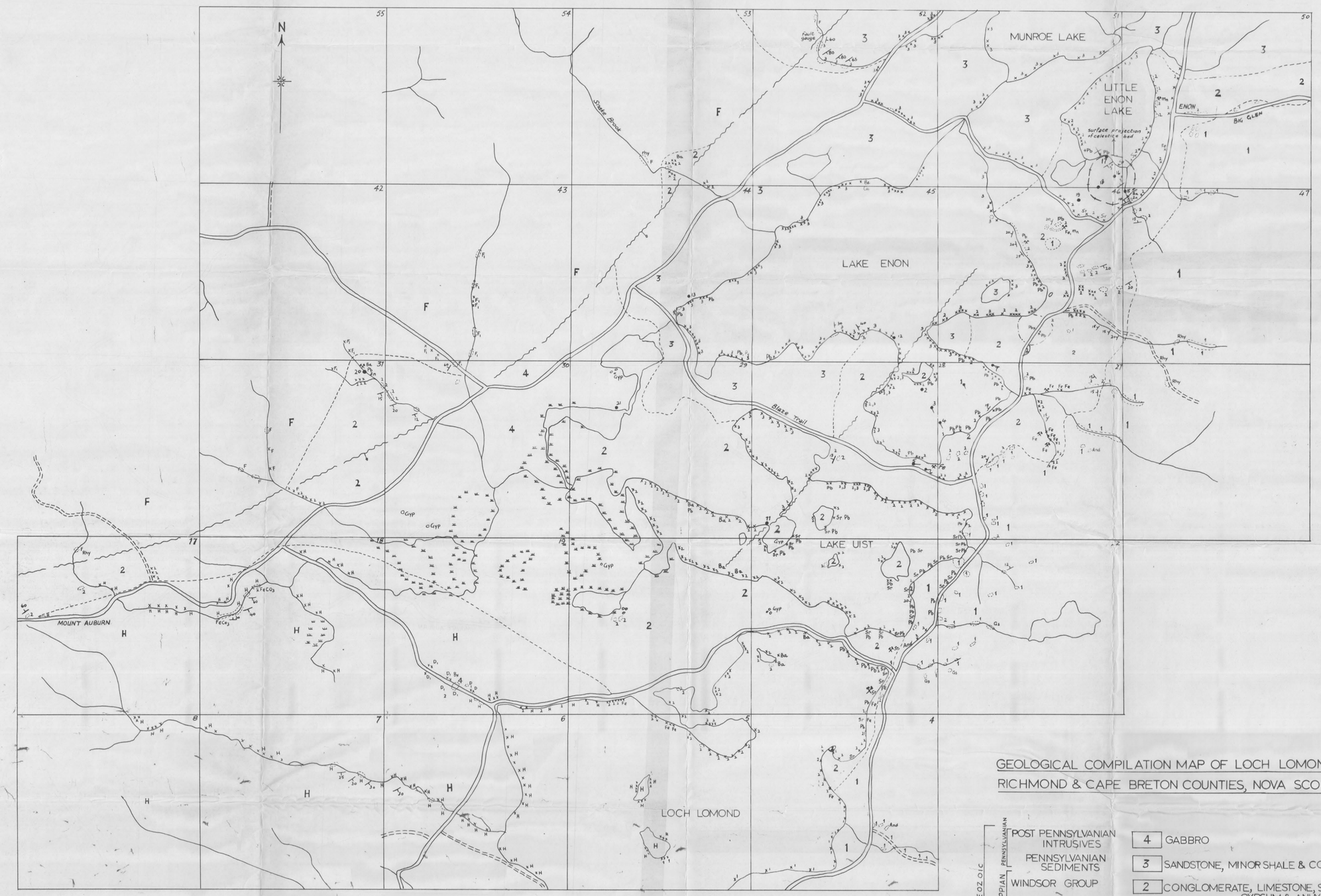
Air photographs covering this map-area may be obtained through the National Air Photographic Library, Topographical Survey, Ottawa, Ontario

Structure-section along line A-B

PUBLISHED, 1954

48- 0-6108

2020-0-84



GEOLOGICAL COMPILATION MAP OF LOCH LOMOND BASIN, RICHMOND & CAPE BRETON COUNTIES, NOVA SCOTIA.

PALAEOZOIC

- MISSISSIPPIAN
  - POST PENNSYLVANIAN INTRUSIVES
  - PENNSYLVANIAN SEDIMENTS
  - WINDSOR GROUP
  - HORTON GROUP
- DEVONIAN ROCKS
- FOURCHU GROUP

4	GABBRO
3	SANDSTONE, MINOR SHALE & CONGLOMERATE
2	CONGLOMERATE, LIMESTONE, SANDSTONE, SHALE, GYPSUM & ANHYDRITE
H	SANDSTONE, QUARTZITE, SHALE & SILTSTONE
1	GRANITE, GREENSTONE & RHYOLITE
F	GRANITE & RHYOLITE

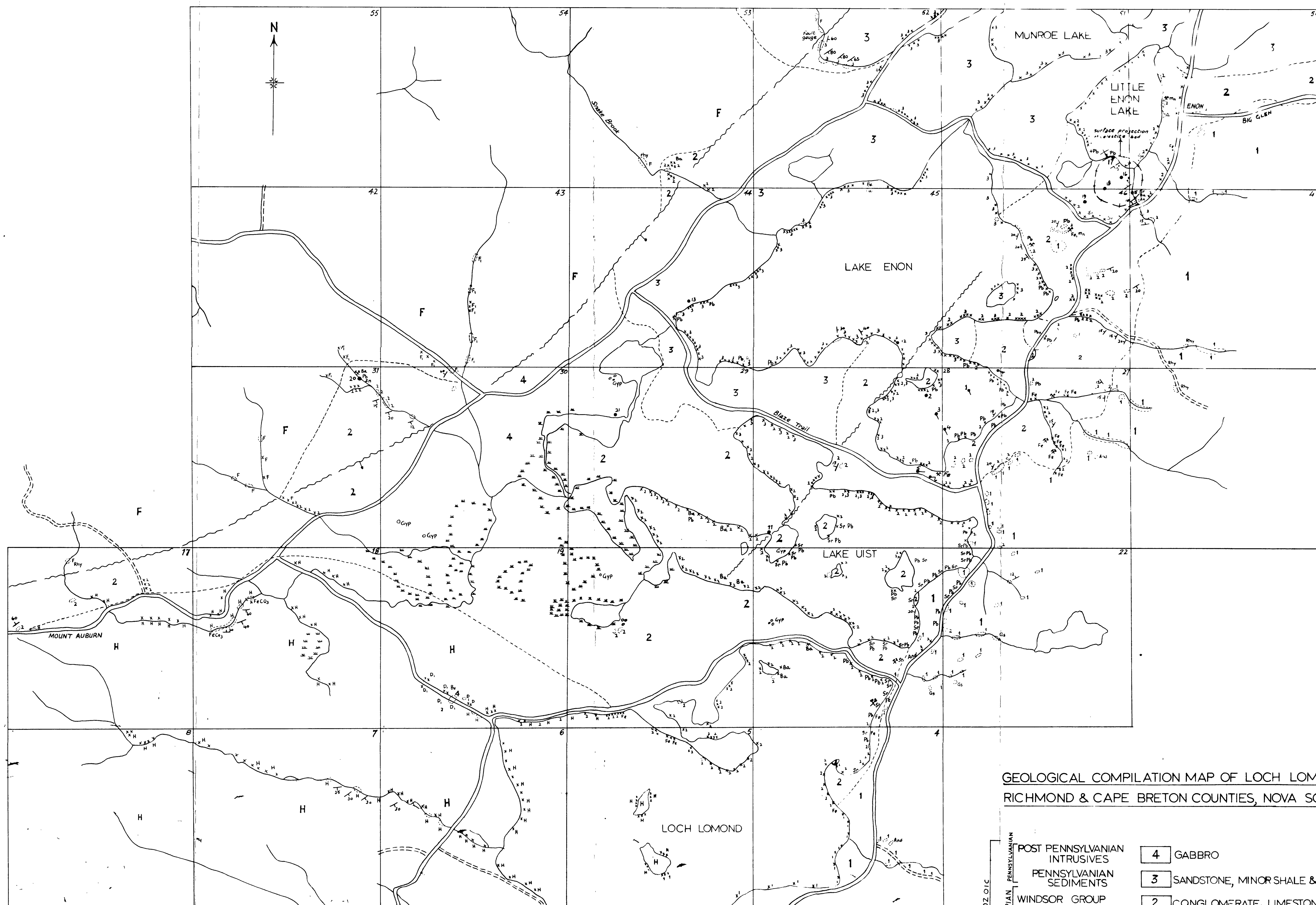
- Outcrop
- xx Angular float
- Rhy Rhyolite
- Di Dionite
- Prospect
- Pb Lead
- Sr Celestite
- Ba Barite
- Fe Iron
- Mn Manganese
- ---- Geological contact (approximate)
- Fault (assumed)
- Trail
- Road
- Stream
- Swamp
- Attitude of beds

SCALE 4" = 1 MILE
REFERENCE MAP 11F15A

48 - 0 - 6103

Drawn by - A.D. HUDGINS. Nov.1963
Traced by - J.M. DAWSON. Dec.1967

MAP NO 3



GEOLOGICAL COMPILATION MAP OF LOCH LOMOND BASIN, RICHMOND & CAPE BRETON COUNTIES, NOVA SCOTIA.

PALAEOZOIC — PENNSYLVANIAN	POST PENNSYLVANIAN INTRUSIVES	4	GABBRO
	PENNSYLVANIAN SEDIMENTS	3	SANDSTONE, MINOR SHALE & CONGLOMERATE
MISSISSIPPIAN	WINDSOR GROUP	2	CONGLOMERATE, LIMESTONE, SANDSTONE, SHALE, GYPSUM & ANHYDRITE
	HORTON GROUP.	H	SANDSTONE, QUARTZITE, SHALE & SILTSTONE
	DEVONIAN ROCKS	1	GRANITE, GREENSTONE & RHYOLITE
	FOURCHU GROUP	F	GRANITE & RHYOLITE

◌	Outcrop	Mn	Manganese
x x	Angular float	----	Geological contact (approximate)
Rhy	Rhyolite	~~	Fault (assumed)
Di	Diorite	===	Trail
⚒	Prospect	═	Road
Pb	Lead	~	Stream
Sr	Celestite	⺌	Swamp
Ba	Barite	20	Attitude of beds
Fe	Iron		

SCALE 4" = 1 MILE
REFERENCE MAP 11F15A

Drawn by - A.D. HUDGINS. Nov.1963
Traced by - J.M. DAWSON. Dec.1967

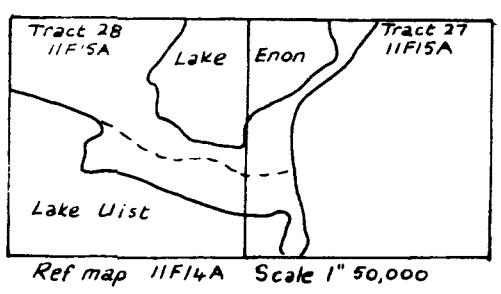
MAP NO. 3 48- 0-6I01

N

LAKE ENON

Enon

Loch Lomond



Ref map 11F14A Scale 1" 50,000

LURA Corporation Ltd.

Loch Lomond Property Richmond Co. N.S.

Soil sample survey 160,800 ppm Pb•Zn

Scale 1"= 400'

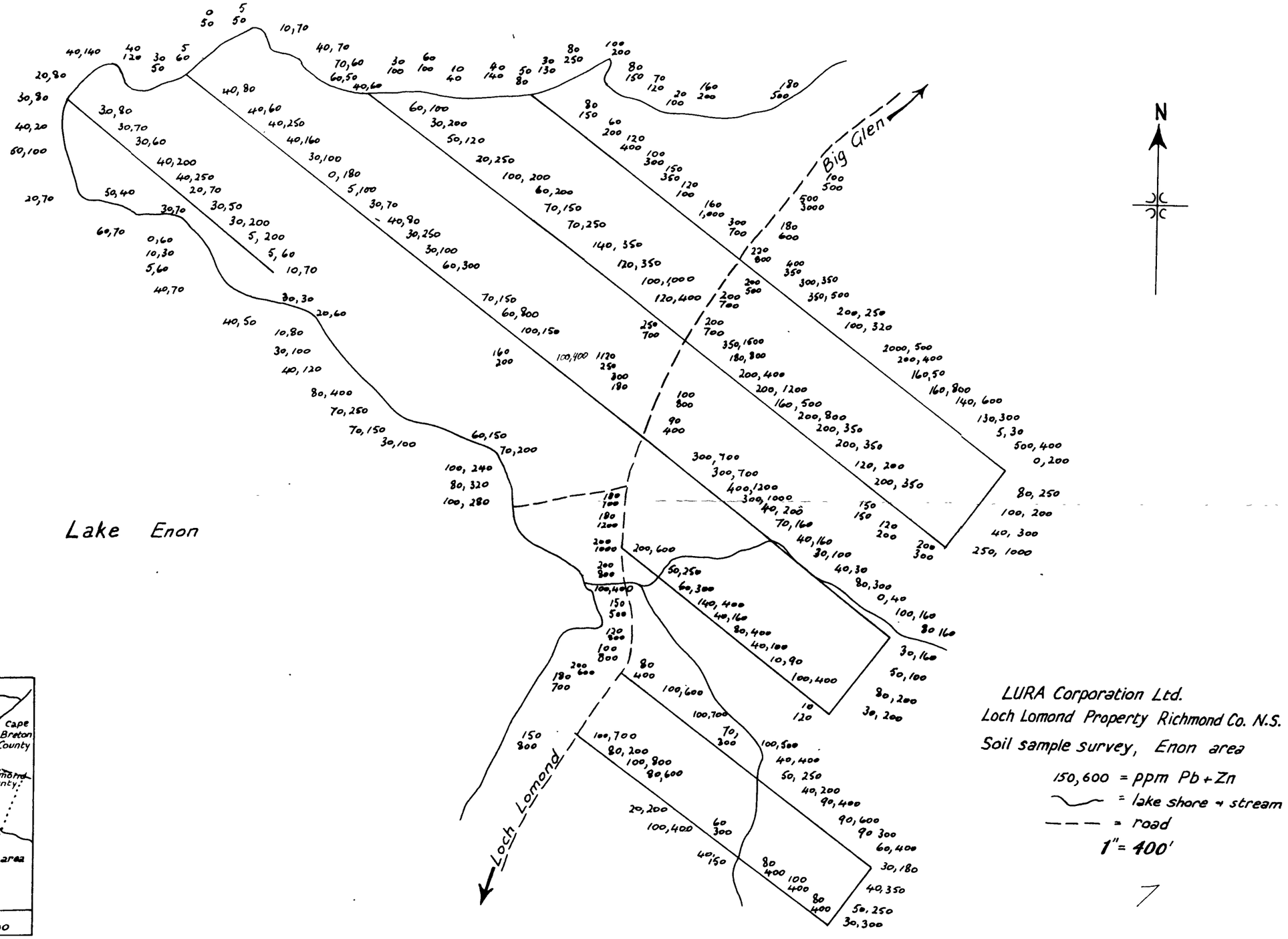
6

MAP NO 6

48 - 0 - 6103

431896

Lake Enon



LURA Corporation Ltd.
Loch Lomond Property Richmond Co. N.S.
Soil sample survey, Enon area

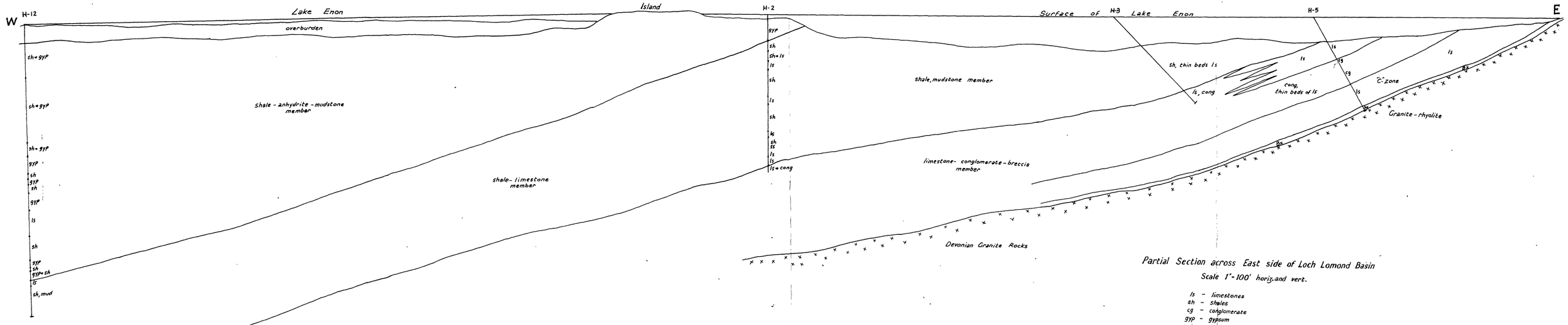
150,600 = ppm Pb + Zn
~ = lake shore + stream
— — — = road
1" = 400'

MAP NO 7

48 - 0 - 6103

1½ ins.

43896



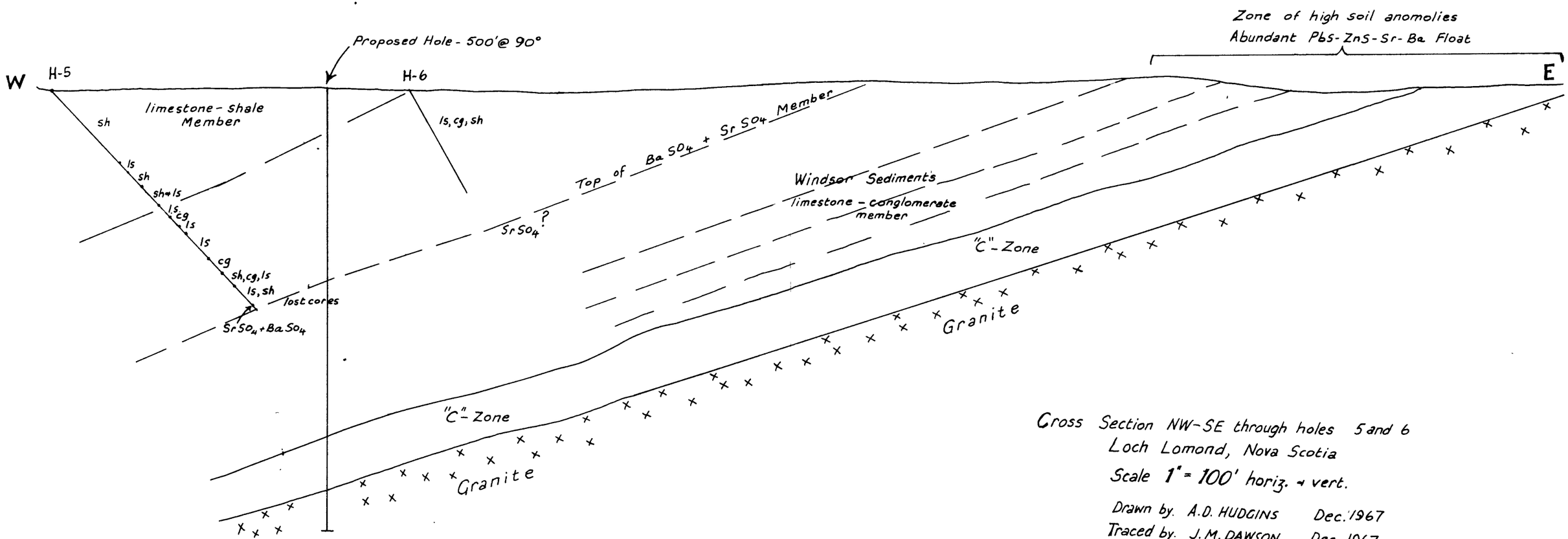
Partial Section across East side of Loch Lomond Basin

Scale 1"=100' horiz. and vert.

ls - limestones
sh - Shales
cg - conglomerate
gyp - gypsum
anhyd - anhydrite
mud - mudstone
ss - sandstone

48 - 0-6103

MAP NO 8



Cross Section NW-SE through holes 5 and 6
Loch Lomond, Nova Scotia
Scale 1" = 100' horiz. + vert.

Drawn by. A.D. HUDGINS Dec. 1967
Traced by. J.M. DAWSON Dec. 1967

48 - 0 - 6103

MAP NO 9

NOVA SCOTIA

Department of Mines

HALIFAX, N. S.

Hon. E. A. Manson, Minister

J. P. Nowlan, Ph. D., Deputy Minister

LOCH LOMOND

SHEET No. 11-F-15-A

60° 45' 40' 35' 60° 30'

Joins Sheet No. 11-F-15-D

50'

45° 45'

Joins Sheet No. 11-F-15-B

Joins Sheet No. 11-F-16-B

Joins Sheet No. 11-F-10-D

UNIVERSAL TRANSVERSE MERCATOR PROJECTION

48 - 0 - 6103

NOTE:—Prepared and draughted by Nova Scotia Department of Mines, Halifax, Nova Scotia, from tracings reflexed by the Department from the original manuscripts plotted on a scale of one inch to one-half mile from aerial photographs and field control surveys by the Surveys and Mapping Branch, Department of Mines and Technical Surveys, Ottawa, Canada.

Alignments of highways and place names checked by Department of Highways and Public Works. Location of county lines, names of lakes and streams, checked by Department of Lands and Forests.

TOPOGRAPHICAL MAP

PROVINCE OF NOVA SCOTIA

1961

Scale : 1/31,680 or 2 Inches to 1 Mile

1 0 1 2

12