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REPORT
on a
GEOLOGIC SURVEY
of
FOUR MINING CLAIMS
on
HOTHAM ISLAND
North Channel, Lake Huron, Ontario
for
TOUGH-ROCK QUARRIES LIMITED
and
POLY ORES MINING COMPANY LIMITED

by

Albert Hopkins
B.A.Sc., M.C.I.M., F.G.A.C., M.E.I.C.
of
HOPKINS MINING CONSULTANTS LIMITED

Toronto, Canada.

8 December 1960.

63A.390

REPORT ON GEOLOGIC SURVEY

FOUR CLAIMS ON HOTHAM ISLAND

(N. Channel, L. Huron, Ont.)

TOUGH-ROCK QUARRIES LIMITED

(Poly Ores Mining Company Limited)

by

Albert Hopkins

Introduction

Hotham Island has never been geologically mapped, not having been covered by Leopold Reinecke in 1914 nor by W.H. Collins in 1925. The writer several years ago recognized the Island as being partly underlain by potentially valuable Trap Rock, so staked the favourable (east) end of it for your company. The present survey was performed to locate the outline of "Quarry A" adjacent to your proposed Dock and Plant Areas, the survey to be filed as assessment work in conjunction with concurrent diamond drilling and an early Ontario Land Survey of the claims. Thus your mining claims may be patented and a quarry permit obtained very soon, so plant construction may start in 1961 and mining operations in the spring of 1962.

Property

This consists of 18 contiguous unpatented mining claims Nos. S.108674 to S.108691 inclusive, being the east end of Hotham Island. The High Water Mark of Hotham Island shoreline forms the outside boundary of the claims where they touch Lake Huron. This geologic report has to do with only the four westernmost contiguous mining claims of the group, however, being nos. S.108688, -89, -90, and -91. These four claims comprise a total area of approximately 100 acres. All 18 claims are in good standing until 13 February 1961, when two years' assessment work must be filed.

Location

This whole property comprises the eastern half of Hotham Island, being half a mile north of Fox Island, one mile northeast of Frechette Island, two miles west of McBean Harbour, five miles due south of Walford (C.P.R.) Station, nine air miles southwest of Massey, ten miles SSE of Spanish, and ten miles north of Manitoulin Island. This is in the North Channel of Lake Huron, Sudbury Mining Division, Algoma District, Ontario. The four claims geologically surveyed lie about one-third of the island's length from its East end.

Access

The Island may be reached from:-

- (a) Massey, 12 miles southwest by road to McBean Harbour, and thence 2 miles west by water.
- (b) Spanish, 10 miles southeast by water via Little Detroit.
- (c) Massey, 14 miles southwest by road to Fred Bob's house at Long Bay, and thence 1 mile south by water.
- (d) Little Current 15 miles northwest by boat or aircraft.
- (e) Gore Bay, 18 miles northeast by boat.
- (f) Lake Lauzon, near Blind River, 30 miles ESE. by commercial aircraft.
- (g) Parry Sound, 120 miles WNW by commercial aircraft.
- (h) Toronto Island airport, 220 miles northwest by float aircraft.

Topography (see topographic survey map)

The relief of Hotham Island is moderate, the hilltops rising to about 680 feet above sea level (a maximum of about 100 feet above Lake Huron which is 578.5 feet above Mean Sea Level.) There are few abrupt high cliffs. Overburden is also scarce, especially on the hilltops. Timber is sparse, except for the valleys, where white pine, hemlock, poplar, birch, oak, jackpine, and maples are sometimes thick. Good construction or structural timber is scarce, and should be imported if needed. Firewood and driftwood are plentiful. Lake Huron offers an unlimited supply of cold pure water.

General Geology

The basement rocks consist of an Archaean (early pre-Cambrian) Keewatin greenstone schist complex (schistified and recrystallized volcanics and iron formation). Intruded into this complex are Archaean batholithic intrusives, probably of Algoman age, consisting of granites and syenites and their derivatives. After a long period of mountain building and subsequent erosion, the Proterozoic (Huronian) sediments were deposited horizontally on the remains of the above-mentioned Archaean rocks, the lowest member of which is the Mississagi Quartzite.

Eventually Nipissing (quartz) and/or (olivine-) Keweenawian (both Proterozoic) basic igneous rocks intruded the above-mentioned rocks, whether as sills or dykes or both, and the whole mass has been tilted and folded by later dynamic metamorphism and tectonics. These basic intrusives consist of quartz-dabase and related diabasic rocks, olivine diabase, diorite, dolerite, andesite, basalt, and amphibolite. Cooling cracks in these basic intrusives were sometimes filled by quartz veins, with some calcite, chlorite, zoisite, pyrite, and rarely chalcopyrite and gold.

Local Geology (see attached geologic survey map)

The four claims in question were mapped by traversing picket lines 100 feet apart over most of the map area (8 line-files) and by pace and compass traverses at 200-foot intervals

over the unpacketed balance (about 2.63 line-miles).

The four claims are underlain by Mississagi impure quartzites intruded by Nipissing (quartz-) and Keweenaw (olivine-) diabbases, dolerites, diorites, and andesitic basalt. The intrusives trend WSW to ENK across the centre of the four-claim block.

The sedimentary bedding planes trend east-west, with actual strikes noted from 70° to 110° astronomic. (Magnetic North at Hotham Island this year is approximately 6.5° west of True North). Dips are mainly steep to the north, with actual readings from 45°N. to 83°N. noted. The quartzite is definitely impure, and its varieties are well interbedded. The three main types are:-

- (f) Pink, impure, felspathic quartzite (the youngest)
- (d) Grey, impure, argillaceous, thick-bedded quartzite.
- (e) Yellow-cream, impure, thin-bedded quartzite (the oldest).

Often the contacts between the quartzites and the intrusive basic rocks form topographic features, and are obscured by talus slopes or overburden. These intrusive contacts vary from 65° to 115° in strike, and from 67°S to 53°N. in dip. The "Plant Area" is the extensive quartzite area on the south side of the four-claim map-area.

The intrusive rocks include:-

- (a) Coarse-grained hologrystalling to porphyritic dark-grey diorite with white or pink feldspars.
- (b) Medium-grained ophitic altered dark-grey quartz-diabase or altered dolerite.
- (c) Fine-grained trap dykes, andesitic in texture.

A sample of somewhat similar medium-grained "trap rock" from a drill hole on nearby Frechette Island was examined by Dr. Peach, mineralogist and petrologist of the University of Toronto, and he describes the core sample as follows:-

"In hand specimen:-

Dark greenish grey, medium grain, compact- to even-grained texture, small whitish stringers, no sulphides visible.

In thin section:-

The rock is composed entirely of secondary minerals and consists mainly of a felted aggregate of blades of a pale-green secondary amphibole (nearly actinolite in composition) in a fine-grained matrix of secondary albite, zoisite, and chlorite. Scattered through the matrix are remnants of albitized plagioclase. A small stringer is composed of chlorite, quartz, ~~pyrite~~ and carbonate. A very small amount of rutile, partly altered to leucoxene, is randomly disseminated through the silicates. The rock is peppered with a small amount of fine-grained pyrite.

The rock is now an amphibolite or "greenstone", the result of metamorphism of a diabase or coarse basaltic flow. No primary structures persist.

Minerals present:-

	Approximate percentage
Actinolite amphibole	70 - 80%
Chlorite	less than 10%
Albite	10 - 15%
Zoisite	
Carbonate	
Quartz	
Pyrite	
Rutile and leucoxene	

Macroscopically the writer has noted gradations in the trap rock from typical ophitic diabase through holocrystalline diorite to coarse-grained or porphyritic andesitic basalt, and all their metamorphosed facies. Mineralogically, of course, these basic intrusives are not "trap", but we use the loose trade term "Trap Rock" to include them all.

The maximum horizontal width of the intrusive on these four claims (in "Quarry A") is 750 feet, and the greatest depth proven to date (by vertical hole no. A-4) is 905 feet. If the demarcation between a dyke and a sill is a 45° incline, then the intrusives may be classified as dykes. If they were originally insinuated between the flat Huronian sedimentary beds, and later the whole complex was folded and tilted, then they may originally have been sills.

In the southwest corner of claim no. S.108689 by the "Dock Area" is an oval-shaped crater or depression which we call the "Ennis Crater". It is covered with swamp and vegetation, and forms a wet flat oval about 60 feet by 80 feet, the centre lying about 10 feet below its rim and the surrounding rock surface. The crater is the focus of three diabase or diorite dykes, and is surrounded by quartzite. It has probably been formed as a result of one of the following:-

- (a) A very old man-made pit blasted or chipped out of trap rock and loaded into sailing ships on the adjacent deep-water shoreline. Trees up to 12 inches at the butt are now growing in the crater.
- (b) The neck of a volcano of Nipissing or Keweenaw time, which was one of the channels up through which the "Trap Rock" of the island moved. The present depression of the crater may have been caused by differential erosion of the Recent Ice Age.
- (c) A small meteorite which crashed here in the last 30,000 years or so and disintegrated upon impact.

Structural Geology (see attached geologic map)

Apart from the obvious folding and intrusions, there is another possible tectonic feature. There are four possible faults causing displacement in the four-claim block.

The oldest transverse fault Z-- Z - Z appears to displace the quartzite - trap rock contact, and also is suggested by the topography. This fault in turn is displaced by later strike-fault Y - Y and oblique fault X - X. Finally, transverse fault W - W appears to displace the eastern extension of "Quarry A" trap rock, and causes a topographical feature (a low sandy area) between "Quarry A" and "Quarry B" to the northeast.

Economic Geology

Several grab samples of surface quartz, as well as two diamond drill hole quartz vein intersections, gave nil to trace values in gold and silver. Quartz stringers and veins are numerous, and up to 15 feet thick, but in the opinion of the writer, are of no more economic value than are the untold millions of tons of impure quartzite on and adjacent to your Hotham Island property.

In the opinion of the writer, however, the tens of millions of tons of trap rock on the Island are of economic value, due to their quality and to their proximity to a deep-water dock area on the Great Lake waterways. The 905-foot depth of core from drill hole no. A-4 in "Quarry A" is to be tested by the Ontario

Department of Highways for Trap Rock aggregate classification. Here is their classification of a bulk sample of drill hole cores of similar-looking material on near-by Frechette Island:-

	<u>Composite Sample A</u>	<u>Composite Sample B</u>
MAGNESIUM SULPHATE	unable to test, as this part of their laboratory was inoperative at the time.	
LOS ANGELES ABRASION	8.4	9.6
WATER ABSORPTION	0.19%	0.23%
Specific Gravity	2.90	2.91

These results were received from the D.H.O. (Downsview) by the writer by telephone on 9 April 1959. They reported that these results compare favourably with the Marmora trap rock, and would come under H.L.1 specifications.

A grab surface sample from Hotham Island was also tested by the Materials and Research Section of the Ont. Dept. of Highways, and their engineers, F.C. Brownbridge, Frank Gill, and Mr. Gibson reported on 22 Nov. 1956 as follows:-

Lab. No.	Location	Petrographic No.	Los Angeles Abrasion	Magnes. Sulphate Test	Absorption
56-S-20132	Hotham Island	90.2	7.1	4.6-4.7	0.10

They said that the sample compares favourably with their HL 1 specifications.

"Quarry A" is 2500 feet long, a maximum width of 750 feet, and an average width of 500 feet, so it has an area of 1,250,000 square feet. Having a specific gravity of 2.9 - 3.0, approximately 10 cubic feet of trap rock weigh 1 short ton. Thus "Quarry A" contains about 125,000 tons per vertical foot. The average height of the trap rock surface of Quarry A above datum (Lake Huron) is about 30 feet. Therefore there should be about 3,750,000 tons above datum and a further 7,500,000 tons below datum to a 60-foot cut or face level. Successive vertical cuts necessarily become smaller, so the second cut would probably be about 2400 feet by 400 feet, or an area of 960,000 square feet, or contain 96,000 tons per vertical foot. Thus down to the 120-foot level below Lake Huron in Quarry A alone there are approximately:-

above datum	3,750,000 tons
first cut below datum	7,500,000 "
second cut below datum	5,750,000 "
Total	17,000,000 tons.

Quarry sites B and C, east of this four-claim block, are each larger than Quarry A.

References

Trap Deposits on the North Shore of Lake Huron by Leopold Reinecke, 1914, G.S.C. Memoir 85 and map no. 170A.

Ont. Dept. of Mines Annual Report, 1915, Part 1.

North Shore of Lake Huron by W.H. Collins, 1925, G.S.C. Memoir 143 and "Blind River" map (publication no. 1970).

Ont. Dept. of Lands & Forests - Forest Inventory Map no. 462821. (lat. N.46°07'30" to N.46°15'00", long. 82°00' - 82°15'W.)

Ont. Dept. of Lands & Forests vertical air photo series no. 1-49-4601.

Can. Hydrographic Service Map No. 2287, "Clapperton Is. to Meldrum Bay".

Ont. Dept. of Mines claim whiteprint "Frechette Island" no. M.1257.

National Topo. Map "Chapleau-Sudbury" sheet 41 NE.

National Topo. Map "Spanish E." sheet no. 41 J/1 East.

Conclusions

1. The 4-claim section of your Hotham Island property contains about 17 million tons of mineable trap rock of commercial grade (Quarry A).
2. This is adjacent to the good-sized Plant Area underlain by quartzite, and a deep-water dock area on Lake Huron.
3. The occasional quartz veins in the Trap Rock contain little or no precious or base metals, and are of no economic value.
4. The quartzite is very impure, and of no known economic value.

Recommendations

It is recommended by the writer that:-

The balance of your Hotham Island property (14 claims) be surveyed geologically and topographically, to ascertain exact boundaries and tonnages of trap rock in Quarries B and C.

Respectfully submitted,

Albert Hopkins

Albert Hopkins.

B.A.Sc., M.C.I.M., F.G.A.C., M.E.I.C.
HOPKINS MINING CONSULTANTS LIMITED.

Toronto, Canada.
8 December 1960.

Appendices

- A. Geologic Survey Map
- B. Topographic Survey Map.
- C. Sounding Chart of Dock Area.
- D. Summary of Diamond Drilling.
- E. Breakdown of Assessment Work man-days.

A Summary of 1960 Vertical Diamond Core Drilling

Hotham Island, North Channel, Lake Huron

Tough-Rock Quarries Limited

(Poly Ores Mining Company Limited)

<u>Hole No.</u>	<u>Depth (ft.)</u>	<u>Collar feet N.</u>	<u>Co-ordinates feet E.</u>	<u>on claim no.</u>	<u>Depth of Trap rock</u>	<u>Remarks</u>
A-1	486	160	1040	S.108691	486 x	On Plant Site near dock area.
A-2	1152	1150	2800	S.108686	143	Between Quarries A and B on south shoreline.
A-3	313	--	--	S.108679	285	On south shoreline south of Quarry B.
A-4	905	1200	2200	S.108688	905 x	In Quarry A.
A-5	140	--	--	S.108675	120	On southeast shoreline near Quarry
A-6	171	--	--	S.108674	162	On east shoreline near Quarry C.
z A-7	617	--	--	S.108679	z 617 x	In Quarry B.

Total 2784 feet.

x means still in trap rock at the bottom of the hole.

z means this hole in the process of being drilled.

A. Hopkins, Mining Engineer.

Hopkins Mining Consultants Limited.

**A Breakdown of Assessment Work
re Geological Survey
on 4 Mining Claims nos. S.108688 - 91 incl.
for Poly Ores Mining Company Limited
on Motham Island, North Channel, Lake Huron
Sudbury Mining Division, Ont.**

Picket lines out and chained : 5.37 miles
Pace and Compass traverses : 2.63 miles
Total 8.0 miles.

	<u>claimed Man-days</u>
GEOLOGIST Albert Hopkins, 25 Melinda St., Toronto 1 9 - 12 November 1960	4
HELPER Norman Beaudry, Massey, Ontario. 9 - 12 November 1960	4
LINE-CUTTERS Jock Morgan, 83 St. Clare Ave. W., Toronto. 1 - 9 November 1960 Eugene Ritchie, Massey, Ontario 1 - 9 November 1960 Donat Poirier, Massey, Ontario 1 - 9 November 1960	4 4 4
DRAFTSMAN Frank Lloyd, 25 Melinda St., Toronto 1. 6 - 8 December 1960	2
WRITING REPORT and TYPING Albert Hopkins, 25 Melinda St., Toronto 1 6 - 8 December 1960	2
Total	24 man-days

24 X allowable 4 is 96 man-days.

96 / 4 claims is 24 man-days per claim.

Certified correct:-

Albert Hopkins
Albert Hopkins, B.A.Sc.
Consulting Geologist.

Toronto, Canada
8 December 1960.

AREA CODE — 416
TELEPHONE — 365-6139



*Rec. in
Sudbury
Res. Geol. office
Dec. 18/70*

90.2

WHITNEY BLOCK.
QUEEN'S PARK.
TORONTO 152. ONT

DEPARTMENT OF MINES AND NORTHERN AFFAIRS
MINING LANDS BRANCH



900

December 11, 1970

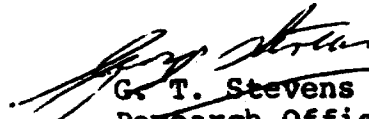
Resident Geologist's Office
1349 La Salle Blvd.
Sudbury, Ontario

Gentlemen:

Enclosed please find duplicate copies
of our file 63A.390.

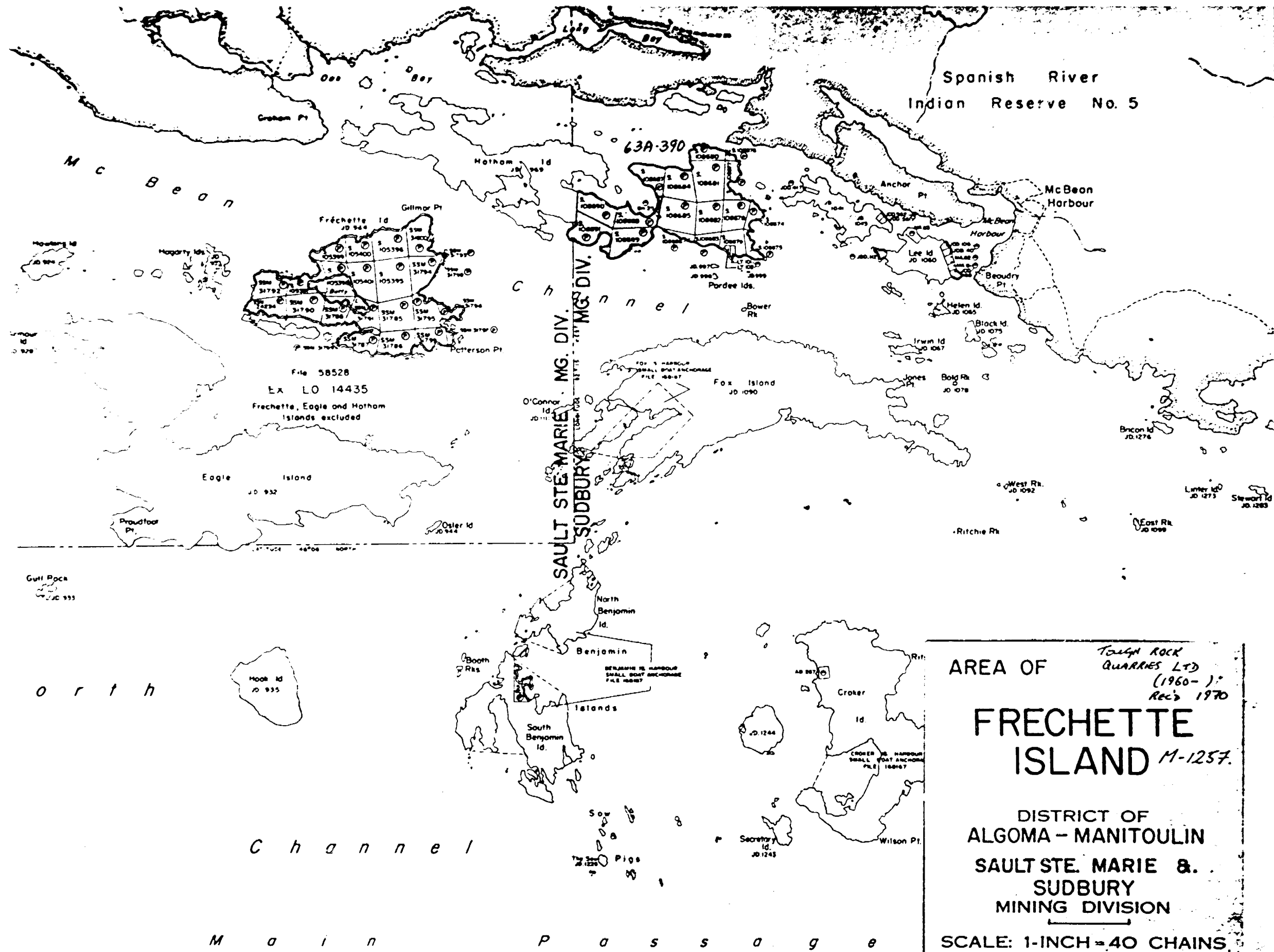
Please add these to your file.

Yours very truly,


G. T. Stevens
Research Officer

MPH:ldc

Att.



File 58528
 Ex LO 14435
 Frechette, Eagle and Hotham
 Islands excluded

AREA OF *Tough Rock Quarries Ltd (1960-)*
 Rec'd 1970
FRECHETTE ISLAND M-1257.
 DISTRICT OF ALGOMA - MANITOULIN
 SAULT STE. MARIE & SUDBURY
 MINING DIVISION
 SCALE: 1-INCH = 40 CHAINS.

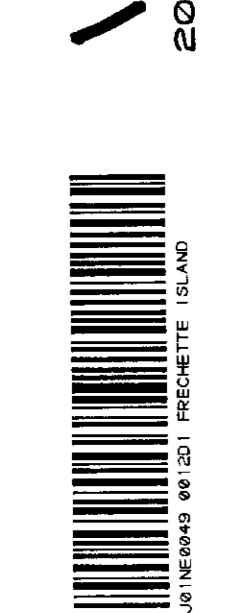
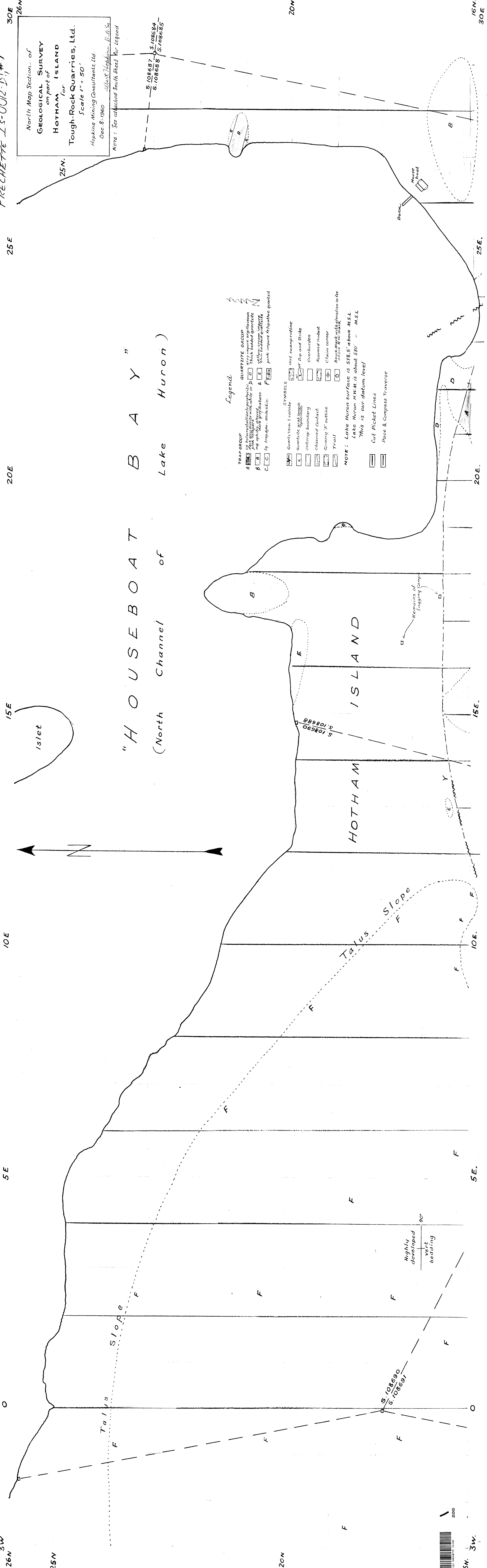
FOR ADDITIONAL
INFORMATION

SEE MAPS:

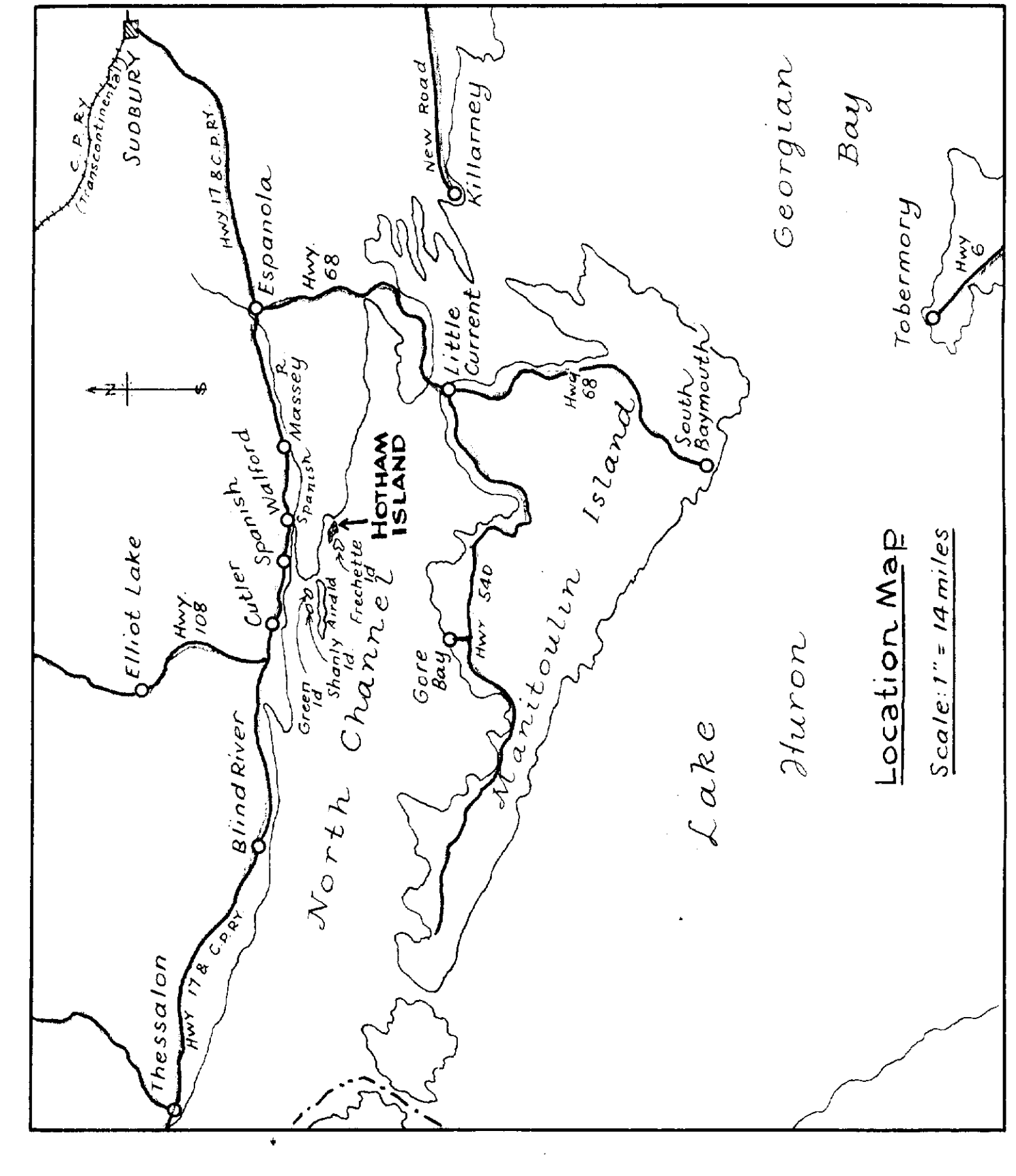
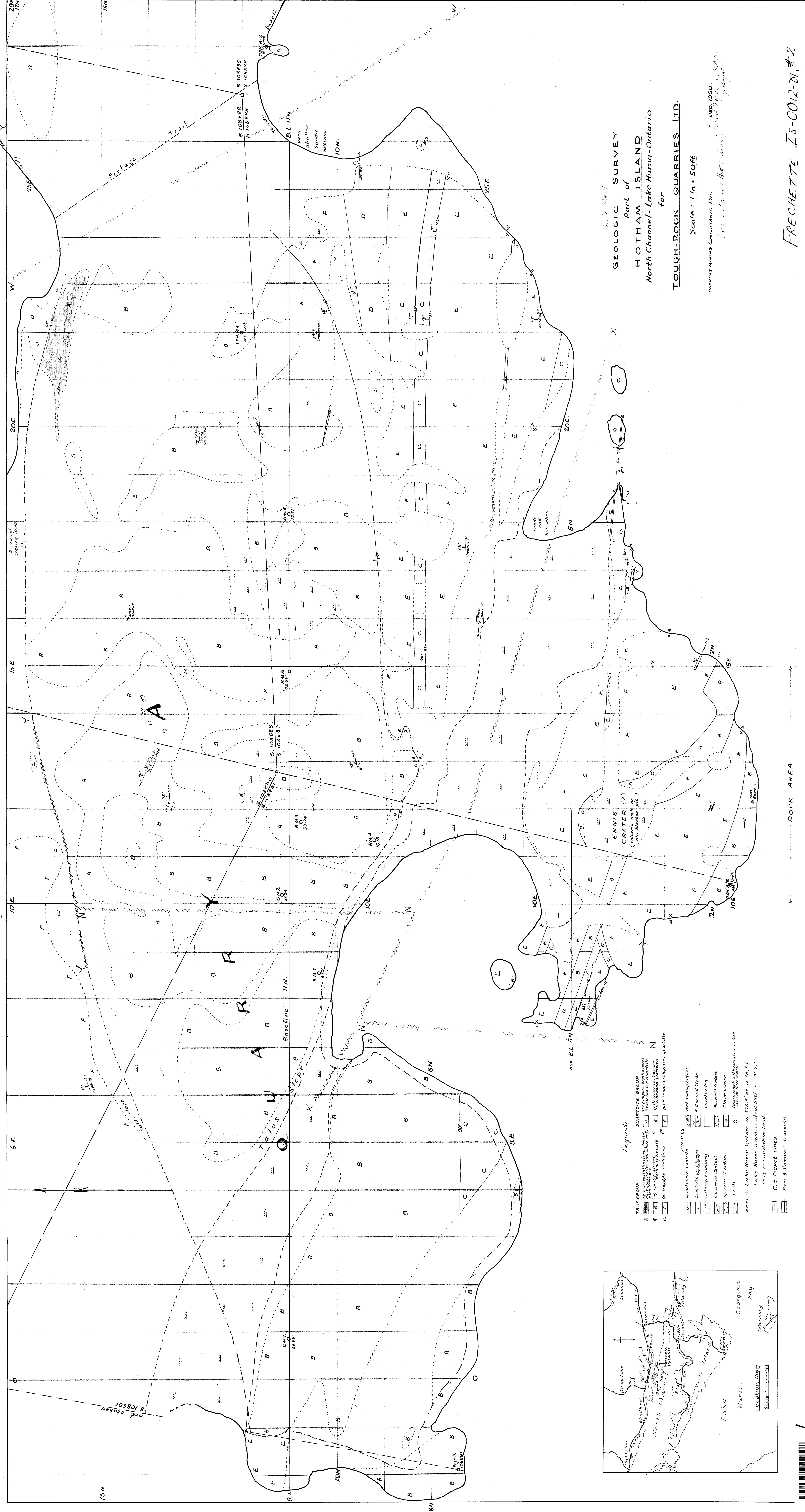
FRECHETTE IS-0012-D1 #1, #2

FRECHETTE IS-0012-D1, #1

FRECHETTE IS-0012-D1, #1



2000
16N. 3W.



GEOLOGIC SURVEY
Part of
HO THAM ISLAND
North Channel - Lake Huron - Ontario
for
TOUGH-ROCK QUARRIES LTD.

Scale: 1 in = 50 ft.

HARRIS MINING CONSULTANTS LTD.
 DEC 1960
 (see attached North sheet)

Legend

- TRAP GROUP**
- A thin bedded quartzite
 - B yellow sandy quartzite
 - C pink impure lithophane quartzite
- QUARTZITE GROUP**
- D thin bedded quartzite
 - E thick bedded quartzite
- SYMBOLS**
- wet swampy ridge
 - quartz vein
 - quartzite dyke
 - quartzite boundary
 - overburden
 - assumed sinked
 - quarry 'A' outline
 - trail
 - spot height with elevation in feet
- NOTE 1:** Lake Huron surface is 578.5 above M.S.L.
 Lake Huron M.W.M. is about 530' - M.S.L.
 This is our datum level.
- Legend**
- cut picket lines
 - pace & compass traverse

