GEOLOGICAL REPORT

of the

MASSEY BLACK GRANITE

ALGOMA DISTRICT

for

SUDBURY CANADIAN GRANITE INC.

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MASSEY BLACK GRANITE

INTRODUCTION

A geologic study of a metagabbroic intrusive (referred to here afterwards as black granite) was undertaken by Bedrock Consulting of Sudbury, Ontario on behalf of Sudbury Canadian Granite Inc. of Sudbury, Ontario.

This report is the result of a series of field visits and observations undertaken from November 1986 to November 1987 of a large metagabbroic intrusive north of the town of Massey. A portion of this intrusive was mapped into recognizable units with the objective of locating a possible quarry site. Initial development work on a proposed quarry site was also undertaken and a preliminary study of the fractures encountered is included.

Location and Access

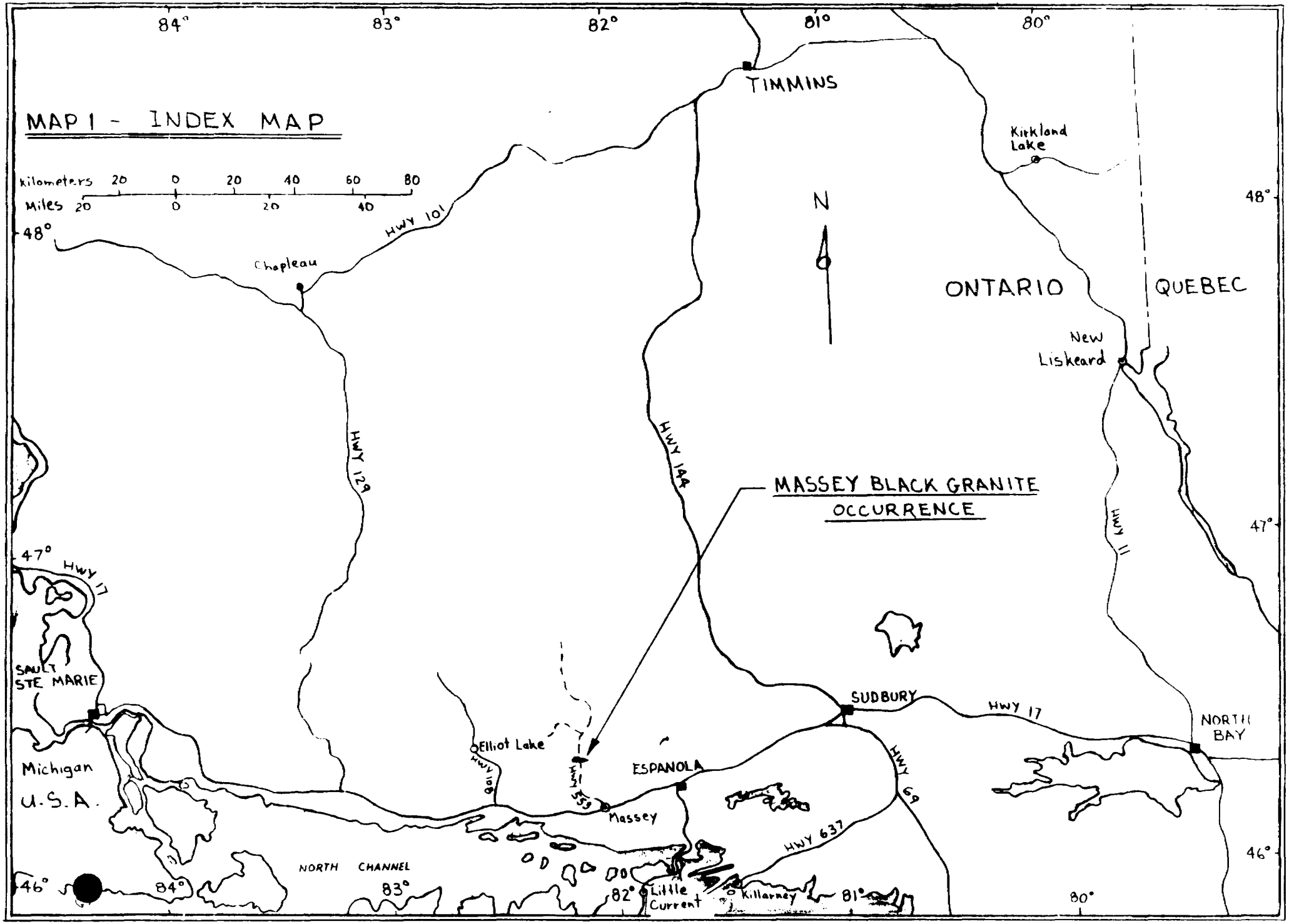
The Massey black granite is found in the northeastern part of Cadeau and the northwestern part of Tennyson Township of the Algoma District of Ontario. Geographically it is located at a latitude of 46° 21' and a longitude of 82° 10' or in reference to the N.T.S. system near the centre of 41 J/8.

Access to the deposit is obtained by the well maintained gravel highway #533. The deposit is found about 22 kilometres north on this highway from the intersection of highway #533 and highway #17 located in Massey.

The general area of the occurrence is shown on Map #1 and Map #3 while the location of the quarry workings and access roads are shown on Map #2.

Previous Geological Work

Evidence of previous claim posts have been observed in the area but no record of work has been found on these claims. Minor reference to this black granite exists in old reports found in the Massey library.


MAP 1 - INDEX MAP
Kilometers 20 0 20 40 60 80
Miles 20 0 20 40
84°
83°
82°
81°
80°
48°
47°
46°
TIMMINS
Kirkland Lake
Chapleau
HWY 101
HWY 129
HWY 144
HWY 11
N
ONTARIO
QUEBEC
New Liskeard
MASSEY BLACK GRANITE OCCURRENCE
HWY 17
SAULT STE MARIE
Michigan U.S.A.
Elliot Lake
HWY 108
HWY 556
Massey
ESPANOLA
SUDBURY
HWY 17
NORTH BAY
HWY 69
HWY 637
NORTH CHANNEL
Little Current
Killarney

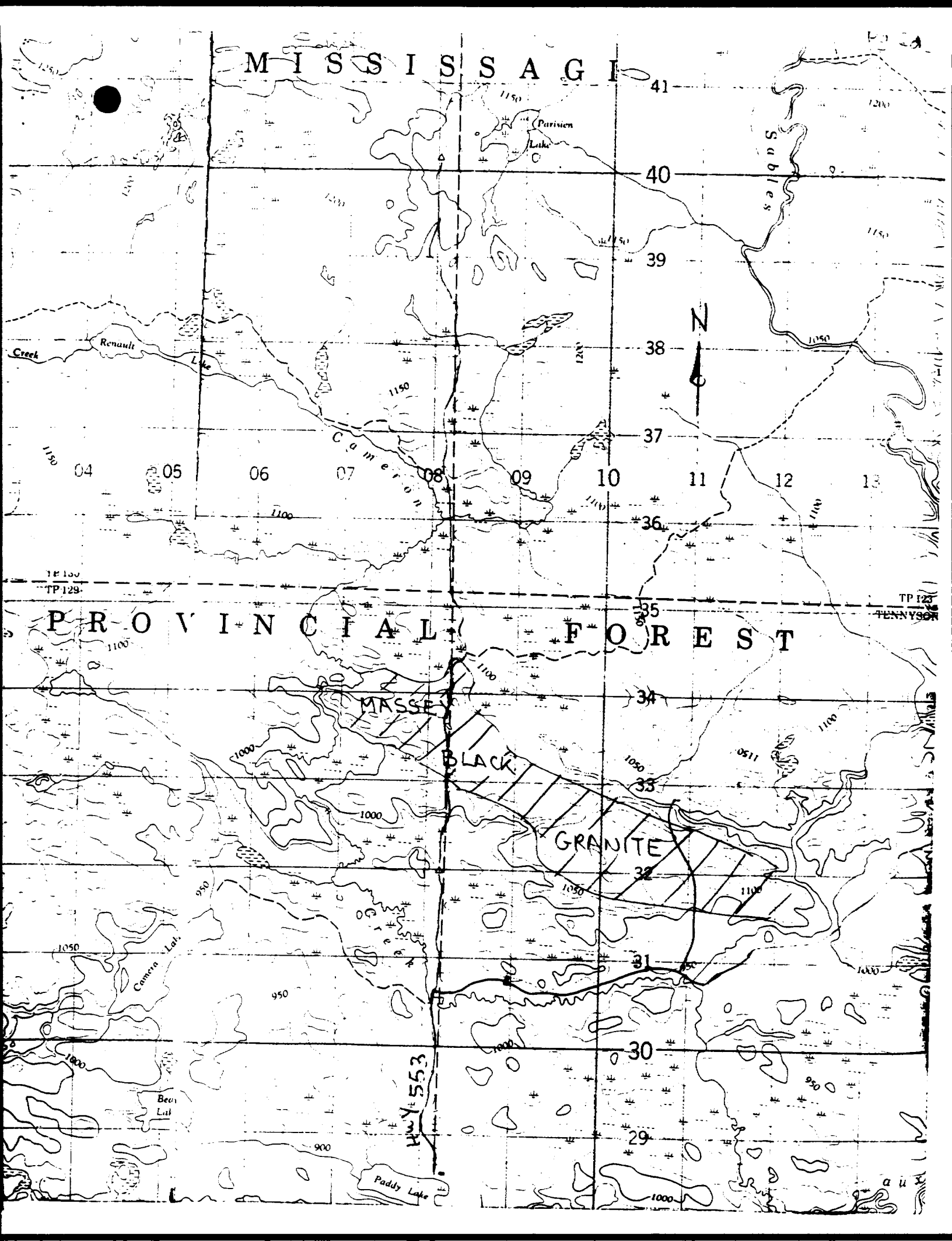
NORTHWAY SURVEY CORPORATION LIMITED
NORTHWAY SURVEY CORP
NORTHWAY SURVEY CORPORATION LIMITED

Topography and Vegetation

The area of the Massey black granite consists of a NW - SE trending 100 - 150 ft. high broad hummocky ridge. Drainage to the north and south is carried by Cameron Creek into the River aux Sables which flows southward into the Spanish River to the north shore of Lake Huron.

Vegetation in the area consists of birch, poplar and maples with occasional spruce in the lower areas. On the black granite ridge, soil cover is generally poor and vegetation growth is sparse and frequently stunted.

Travel through the area is general easy going, impeded by occasional small swampy areas and rocky hummocky ridges.


MISSISSAGI
PROVINCIAL FOREST
Parisien Lake
Sables
Renault Lake
Creek
Cameron
N
04
05
06
07
08
09
10
11
12
13
35
36
37
38
39
40
41
TP 129
TP 123
TENNYSON
MASSEY
BLACK
GRANITE
HWY 553
Paddy Lake
Camera Lak
1150
1100
1050
1000
950
900

GEOLOGY

Good exposure of rocks exist within the study area although overburden becomes prominent towards the east. Especially good exposures are found along numerous northwest - southeast trending hummocks. Generally these are free of vegetation and are arranged en echelon. Between these hummocks are overburden covered areas with frequent scrub brush and occasional wet to swampy areas.

There are basically two major rocks types in the area. These are an early pink granite and a later greenish black metagabbroic intrusive termed as the black granite.

The black granite is further broken into a coarse crystalline variety, and two varieties of a fine crystalline variety. A hybrid rock transitional between the black and pink granite also exits.

Pink Granite

Pink granite is the host rock for the black granite intrusive. It is the predominent rock in the surrounding area. Generally the pink granite is of a massive medium crystalline mixture of orthoclase minor plagioclose, quartz and occasionally biotite and minor amphibole.

Irregular pink granite breccia fragments have been observed along the southern contact of the black - pink granite contact. These fragments frequently show evidence of remelting and digestion in the more hotter mafic gabbro.

Hybrid Rock

Adjacent to the intrusive 'black granite' a hybrid rock may develop. This rock consists of a gradational change in mineralogy from a pink granite to a metagabbroic and probably represents a mixture of the molten gabbroic magma with the remelted peripheral pink granite. On a fresh break this rock appears dark coloured with numerous 1/16" diameter specks of plagoclase and quartz. The occurrence of this rock is shown in Map #2.

Black Granite - Field Observations

The outcrop expression of the black granite metagabbroic intrusive consists of a NW-SE elongated body in excess of 4 miles in length and about $^1/_2$ mile wide.

An interesting feature of this intrusive is the presence of irregular ridges running along the length of the body. These ridges generally have steep faces along the south side and moderate slope along the north side. Between these ridges are occasionally found highly fractured fine grained black granite along overburden covered depressions. Along one of these depressions adjacent to the east side of Hwy *533 near the 22km marker is found xenoliths of pink granite. See Map 2. This information along with the observation of 'beds' while quarrying suggest the possibility of multiple intrusive layers currently dipping 5 - 20° to the north.

In order the delineate the black granite further it was decided to map relative to crystal size and mineralogy of the black granite. Accordingly, the following varieties have been designated: a fine crystalline contact black granite and a fine crystalline internal black granite, a coarse crystalline black granite, a coarse crystalline plagioclase rich black granite.

Fine Crystalline Black Granite

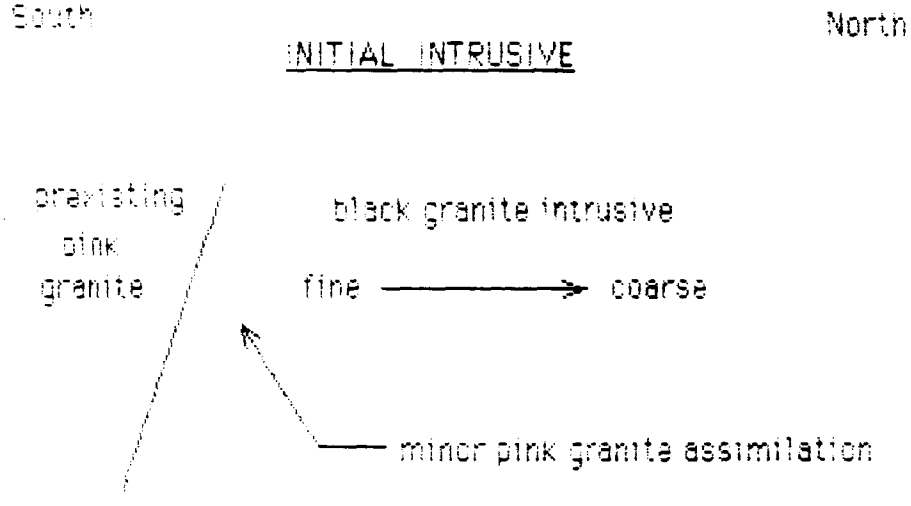
This rock occupies less than 20% of the intrusive and tends to be found in discrete areas. It is typically a homogenous very dark gray and consists of fine to microcrystalline crystals. A slightly higher felsic content is perhaps due to incorporation of the melting of surrounding granitic rocks. This fine crystalline metagabbro tends to occur in two varieties.

Fine Crystalline Contact Black Granite (varieties 1 & 2)

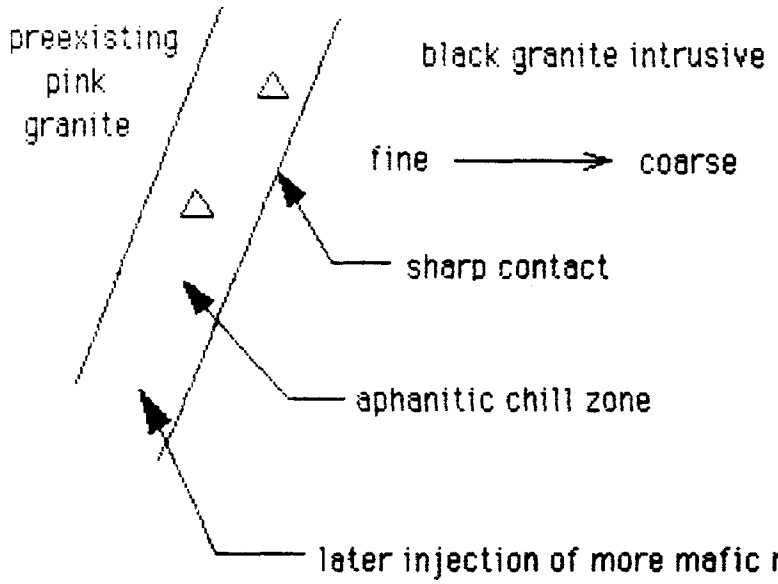
The first and most abundant variety occurs adjacent to the earlier pink granite host rock and appears to represent a contact zone approximately 50m adjacent to the granite. This contact zone is in turn composed of three subzones. These are described proceeding from the pink granite northwards towards the centre of the intrusive. The first chilled proximal zone adjacent to the pink granite is frequently a breccia consisting of an aphanitic metagabbro (variety #1) with local floating semi-digested granite xenoliths. The middle zone, often along a sharp abrupt contact with the former chilled zone, consists of a more or less homogenous dense aphanitic to occasionally finely crystalline metagabbro (variety #2). The innermost zone adjacent to the coarsely crystalline metagabbro consists of a mixture of the middle variety as irregular veins, swirls, or fracture fillings in the coarser crystalline metagabbro and vice versa.

The following sketches suggest a possible model for this arrangement.

Figure 2



LATER INTRUSIVE EVENT



Fine Crystalline Internal Black Granite

Another variety of fine crystalline black granite is less pervasive and appears along particular shear zones away from the pink granite contact. Its recessive weathering on surface exposures frequently forms low lying troughs parallel to adjacent ridges. It tends to form in 1 - 10 cm parallel bands along the shear planes. The fine crystalline mafic rocks found in these zones differs from the former of variety by lacking a near conchoidal fracture and exhibiting a micaeous fissility from probable pressure orientated minerals (acicular amphiboles and chlorite) formed along the parallel shear planes.

Three shear zones have been located as shown on the Map #2 and more may exist, especially in areas of lower topography. These shear zones and their associated fine crystalline metagabbro appear to be a possible later structural feature. More detailed mapping is required to further delineate these zones.

Coarse Crystalline Black Granite (varieties 3 & 4)

This is the predominent rock type in the area. It generally is a homogeneous very dark bluish gray colour (variety #3), very heavy and massive with crystal sizes ranging from 3mm. to 6mm. It consists of, on the basis of a cursory examination, 50% of a dark blue gray amphibole, approximately 25% of a dark green transluscent amphibole, occasional 15% plagioclase and 10% quartz forming a hard interlocking matrix. The larger outcrops of this rock tend to form hummocky ridges trending along the strike of major fracturing (110° and occasionally at right angles to this.)

Coarse Crystalline Mottled Black Granite

A gradational variety of greenish coarsely crystalline black granite (designated as variety #4) occurs with plagioclase common up to 30%. This variety, although not as common, is apparent on weathered surfaces but was not distinguished in the mapping.

Occasionally on weathered surfaces recessively weathered curved grooves appear (indicated as C.B. on the map) perhaps indicating differential crystal growth due to thermal convection currents in the crystallizing magma. Some fracturing occurs along these grooves (see fracturing page 10.)

QUARRY SITE DETAILED STUDY

A more detailed study was undertaken to the south of claim 895176. This area was selected as a possible initial quarry site due the variety of relatively sound stone available in the immediate area and the potential ease of quarrying into a steep southern face.

Due to the very irregular weathered surface texture, discoloration and lichen growth, designation of rock types and location of minor fractures was a time consuming process.

To better examine the more sound outcrops in this area, a cut off saw with a dry diamond stone blade was used to cut sample slices into the rock of prospective quarry sites and so obtain an inventory of the quarriable stone available in this area.

A description of these samples are discussed below. The location of the cuts are shown on Map #2. The actual cut samples are stored at Ed Rose's residence Sudbury, Ontario. The standard sample varieties 1, 2, 3 and 4 are in possession of Gaetan Lavallee of Boucherville, Quebec.

SAMPLE CUT A1 & A2

These samples were cut along the same outcrop and were of a #2 variety.

SAMPLE CUT B1 & B2

These samples were cut along the same outcrop and were of a #3 variety.

SAMPLE CUT C (#3 variety)

SAMPLE CUT D (#2 variety)

SAMPLE CUT E (#3 to 4 variety)

SAMPLE CUT F (#2 variety with minor felsic (light coloured material) blebs polishes well and is quite decorative.)

PRELIMINARY TEST QUARRY SITES

An initial quarry site was attempted in the fall of 1986. This is shown as site #1 on Map #2. This site was abandoned as the black granite was too coarse and fractures were too abundant..

Site 2 was then selected and a block of fine crystalline black granite was produced from this site. Proximity to the highway and significant waste led to the selection of Site 3.

Site 3 actually consists of three separate quarry sites 3a, 3b, and 3c, all close to each other. Site 3a was the first area to be quarried in site 3. This site was at the contact of both the fine and coarse grained black granite. Unfortunately fragmentation after blasting was extensive and this site was abandoned without any blocks being produced. Minor veinlets of the early pink granite also extended into the quarry area.

Site 3b is located at the base of the ridge close to the contact of the pink granite. Here, as saw cut sample D indicated, is a finely crystalline black granite. Unfortunately this material fragmented easily upon blasting due to hairline veinlets and an inherent brittleness. Only two small irregular blocks were procured from this site. On quarrying, an underlying horizontal bed (separated by a horizontal fracture) was encountered. This lower bed appeared to exhibit less fracturing and may produce a better block to waste ratio.

Site 3c was the last area to be quarried late in the fall of 1987. It is a coarse crystalline black granite as shown by sample B1 & B2. It was also one of the least fractured areas observed. Difficulty was obtained in initiating a slot to start quarrying due to a lack of fractures. As quarrying was started a pervasive aplite vein, about 1/2 - 2" wide, cut diagonally across the face and disrupted the acquisition of suitable blocks. Furthermore, blasting resulted in excessive fragmentation along the hairline veinlets (see fractures section). Use of the plug and feather (short feathers used) method was tried but produced no significant differences other than being more time consuming.

Reducing the blast hole spacing to 6" from 10" resulted in the production of some irregular sized blocks but these contained some open hairline fractures produced along the hairline veinlets.

The blocks produced from these operations were sent to Carrier Granithem in Ville Marie Quebec for sawing into slabs. These slabs were then sent to Imperial Granite for polishing. The final prepared panels are currently stored at Gaetan Lavallee's residence in Boucherville Quebec.

FRACTURES

Fractures are prominent throughout the map area and will have a significant affect on the size of sound blocks capable of being produced from this property. In most cases fracture density ranged from 20 per 10 m^2 to 1 per 10 m^2. In some cases these fractures appeared to be a surface effect.

Three types of fracturing occur in the map area.

The first consists of two sets of jointing. These are generally a prominent jointing plane with a less prominent irregular near perpendicular jointing. In some areas the prominence of jointing changes and the less prominent jointing becomes the more prominent. In nearly all cases, the strike of this jointing varies around 110° with another set around 40°. The dip is around 80° to near vertical. Generally, the fracture face tends to exhibit a rather undulatory surface.

The second variety of fracturing consists of parallel jointing occurring along micaceous shear zone planes along the contact of the fine and coarse crystalline metagabbro. This jointing regularly parallels the first sets of jointing although variations do exist. Frequently these shear zones are along low lying areas and may have contributed to their erosion.

The third variety of fractures is a surface condition related to a differential weathering texture resulting in curvilinear grooves on the surface of the outcrop, which over time, may result in surficial fractures.

This third variety of fractures initially seemed harmless as they did not extend very deep; however, they are pervasive throughout this intrusive and were a major problem in the production of sound blocks from the test quarry sites. Closer examination of these haphazard curvilinear hairline fractures revealed them to be formed from hairline veinlets of an acicular recessivly weathered mineral. Because of their very thin dimensions and their colour matching the surrounding black granite surface, they are very difficult to detect. This is important for their presence leads to a surface of weakness compared to the interlocking near equant crystals of the surrounding metagabbro. This resulted in fragmentation when blasting at holes 10" apart and fracturing with holes 6" apart. It also explains the reason for the blocky weathering of the steeper slopes of this black granite.

In order to assess the structual integrity of possible saw cut blocks, examination of these hairline veinlets in the saw cut samples were studied in thin section.

Thin Section Analysis of Hairline Veinlets

The previosly mentioned saw cut samples were examined and those exhibiting fractures or potential avenues of fracturing were sent to Janwill Petrographics for the preparation of thin sections. The thin sections were prepared so as to intersect these thin veinlets and potential incipient fractures.

The examination and photography of these thin sections were undertaken by Richard James professor of petrography at Laurentian University. His observations and comments of the rock composition are in agreement with previous work carried out by McGill University. The McGill description of these samples is found in appendix #1.

In studying the thin sections the following order of genesis is apparent. It appears that the rock was originally emplaced as a pyroxene plagioclase gabbro. Subsequent regional amphibolite metamorphism altered the pyroxene to amphiboles. Following the formation of the amphiboles the intrusive was subjected to a hydrothermal alteration which resulted in more siliceous volatiles being injected along irregular random curvilinear surfaces resulting in irregular veinlets of differing mineralogical composition.

The mineralogical composition of these veinlets differs from the hosting metagabbro in consisting of low temperature hydrothermal minerals (such as quartz, chlorite, acicular amphiboles and epidote) in addition the grain size is smaller and exhibits a more 'felt-like' texture

As a result of the smaller grain size and more 'felty' porous texture of these tiny veinlets, preferential weathering results. On surface exposures this leads to the production of open fractures and eventually to the broken blocky character of the steeper outcrops.

When blasting the blocks, near the surface, the rock preferentially breaks along the open fractures. In deeper and more sound rock, breakage occurs along the veinlets. The observation that this breakage along the veinlets is minimized by less stressful closer hole spacing would suggest that sawing of blocks would reduce the production of open fractures even further.

CONCLUSION & RECOMMENDATIONS

From the samples cut in the detailed map area it appears that significant amounts of fine crystalline black granite exist in this area adjacent to the pink granite and abundant coarse crystalline black granite is found thoughout a $^1/_2$ mile by 4 mile area.

It is suggested that the contact of the surrounding earlier granite be mapped out in detail should more fine crystalline material be required. This will allow for an expectation of where the adjacent finer crystalline black granite will occur and a better understanding of the nature of the whole metagabbroic intrusion (ie. whether it is a dyke, sill, lopolith, batholith etc.)

Only very minor sulphides (predominantly chalcopyrite) were noted, however, should significant sulphides be encountered it is suggested to assay these for platinum group elements as similar affiliations with this type of rock type have been noted in the lower zones of the Sudbury Irruptive.

Although substantial quantities of coarse black granite exist in the area, should quarrying be contemplated a large amount of smaller sized 'waste' material would be produced and a use of this material should be considered.

An important factor in the success of future quarrying in this area will depend upon the ability of the hairline veinlets found throughout this rock to maintain structural integrity from extraction to in site use.

Although the frequency of fractures appears to diminish with depth, to qualify the degree with which this occurs it is suggested that large diameter boreholes be drilled (100 ft. depth maximum) and the number of fractures counted over regular intervals drilled. In addition sound unweathered core intervals **with veinlets** could be cut into 2 inch cubes and subjected to A.S.T.M. tests and the results compared to previous tests. Only if suitable requirements are met should a saw cutting operation may be initiated.

CERTIFICATE

I, Robert G. Komarechka, of the City of Sudbury, in the Province of Ontario hereby certify as follows:

1. That I am a consulting geologist currently residing in Sudbury.

2. That I am a graduate, BSc. Geology major, of Laurentian University of Sudbury, Ontario, a registered professional geologist in the Province of Alberta afiliated with the Canadian Council of Professional Engineers, and that I have been practicing my profession for seven years.

3. That I have no interest direct or indirect, and do not expect to receive any interest in the properties, or in the security of anyone or company involved with this property.

4. That this report is based on a personal examination of the property in the fall of 1986 and the spring, summer and fall of 1987 and the spring of 1988. Preparation of the report continued on until March 1989.

Robert G. Komarechka

Dated at Sudbury, Ontario, this 27th day of April 1989.

RGK. RGK RGK

APPENDIX 1

PETROGRAPHIC DESCRIPTIONS

McGill University

Department of Mining & Metallurgical Engineering
McConnell Engineering Building Telephone: (514) 392-5427 Telex: 05-268-510

GENERAL PETROGRAPHIC DESCRIPTION OF SPECIMENS DERIVED FROM THE TENNYSON TOWNSHIP, ONTARIO

PROFESSOR F.P. HASSANI
MR. V. MLAKAR
DEPARTMENT OF MINING ENGINEERING
MCGILL UNIVERSITY

3480 UNIVERSITY STREET
MONTREAL, QUEBEC, CANADA
H3A 2A7

F. P. Hassani

MARCH 17, 1987

GENERAL INTRODUCTION -

The analysis is based four thin sections prepared to examine the general petrofabric and mineralogical composition from samples derived near the Tennyson Township, West of Sudbury.

The basic rock type is a meta-gabbro derived from a dike cross-cutting late PreCambrian felsic igneous rocks. The original (relict) igneous texture is well preserved, but close examination of mineral components and texture gives evidence that they were regionally metamorphosed to a low grade metamorphic rock.

HAND SAMPLE DESCRIPTION -

A freshly cut planar surface displays a uniformly mottled black with a hue of dark lusterous green color, with occasional milky white to greyish white specks.

The sample is holocrystalline, inequigranular, coarse grained to medium grained and porphyroblastic. Ninety percent (90%) of the specimen consists of idioblastic to subidioblastic tabular to prismatic to acicular grains of lusterous green amphibole (actinolite). They range in size from 1.00mm to 4.00mm long and display a random intergrown network, thus forming a dessicute texture.

The interstitial space is composed of subidioblastic to xenoblastic plagioclase feldspar. Occasional xenoblastic irregular black specks (oxides) are scattered throughout this assemblage. The specimens observed have retained their relict igneous crystalline fabric extensively.

This rock is a Porphyroblastic Actinolite-Plagioclase bearing Meta-Gabbro. The rock was derived from a melanocratic gabbro and has been metamorphosed to the Greenschist Facies.

TEXTURE AND STRUCTURE -

The specimens are holocrystalline, inequigranular, poikioblastic/porphyritic and uniformly medium to fine grained. Eigthy-five percent (85%) of the sample components are developed by porphyroblastic (usually poikioblastic) tabular grains forming an interlocking dessicate fabric, with fifteen percent (15%) interstitial matrix. The matrix varies in mineral composition, size and shape from; poikioblastic subhedral laths to slender needle-shaped clusters and anhedral polycrystalline mosaic patches. Some areas show mortar type fabric, developing with the plagioclase feldspar laths surrounded by polycrystalline masses.

Eighty to eighty-five percent (80%-85%) of the specimen consist of three types of amphiboles distinguished by optical character (predominantly pleochroism), shape and position with respect to texture. The dominant type are composed of long slender prismatic to columnar/tabular, idioblastic to subidioblastic porphyroblasts of actinolite, with frequent imperfectly terminated splintery ends. They are uniquely zoned (easily identified by different shades of green pleochriosm). Three out of the four thin sections examined show up to 80% of the central-core portions of these grains replaced by a fine grained fibrous aggregate of tremolitic amphibole. The aggregates occur as radial clusters, sub-parallel growth patterns and as anhedral microcrystalline patches. The exterior portions and within the outer zones of these grains, are sub-parallel sets of sub-idioblastic prismatic to slender prismatic idioblastic grains of actinolite. They are terminally intergrown within eachother and from similar grains originating from other grain surfaces. This variety varies in size from medium grained prismatic shapes to euhedral fine grained blades to acicular very-fine grained slender needle-shaped grains, which usually project away (diagonally to perpendicular), from the large acicular Actinolite grains, into the interstitial matrix.

Five percent (5%) of the sample appears as prismatic idioblastic to subidioblastic horneblende. This variety display well developed prismatic cleavage. Frequent zoning is apparent similar patterns as seen in the large actinolite grains. The third variety are hosted within the plagioclase feldspar. They form fine slender needle-shaped grains occuring in sub-parallel clusters and as randomly intergrown grains.

The matrix is composed of small medium to fine grained subidioblastic, porphyroblastic-poikioblastic of plagioclase

feldspar. They occur as tabular laths and xenoblastic recrystallized polycrystalline granoblastic mosaic patches.

Among the minor constituents present are rounded droplike or spindle-shaped grains and granular clusters of sphene, subidioblastic to xenoblastic epidote and ilmenite. Brownish biotite occurs adjacent to both amphibole and within polycrystalline mosaic patches.

Late stage micro-fracturing with some evidence of shearing is observed. The fractures are continuous and irregular. They are identified by dusty dark brown inclusions (hematitic or leucoxene or both) outlining structure. Criteria for shearing exists due to the presence of recrystallized polycrystalline patches located adjacent to the fracture, bent, strained and fractured grains. Several grains are also displaced by fractures observed in cross-polarized light, by dislocated twin lamellea sets and replacement by tremolitic masses occuring within the width of the fracture transecting the grains.

MINERALOGICAL COMPONENTS & PERCENTAGES -

Mineral Name	Size Range (mm)	Amount (%)
Amphibole (3 var.)		
a) Actinolite (large)*	0.10-4.15mm	61% to 71%
b) Horneblende	1.85mm (ave.)	3% to 8%
c) Acicular Actinolite (small var.)	½ 0.5-1.15mm	12% to 15%
Biotite **	0.75mm (ave.)	3% to 8%
Plagioclase Feldspar (An 52, Labradorite)	(bimodal)-0.15mm -2.11mm	5% to 10%
Epidote	0.55mm (ave.)	3%
Opaques (Ilmenite)	0.50mm (ave.)	1% to 3%
Leucoxene (after Ilmenite)	½ 0.10mm	1%
Chlorite	½ 0.10mm	trace
Sphene	0.30-0.10mm	trace

note... * 80% out of the 61% total are replaced by tremolitic amphibole fibers, in the interior of the grain.

** the amount shown is not for a uniform distribution, but is variable due to clustering.

SUPPLEMENTARY MINERALOGICAL & OPTICAL DATA -

1) Plagioclase Feldspar (An 52, Labradorite): An content was determined using the Michel-Levy extinction angle method. Colorless, non-pleochroic; low positive relief; Interference colors are first order grey; polysynthetic twinning. Grains appear as anhedral polycrystalline aggregates and subhedral tabular laths; Biaxial +ve, 2V=85

2) AMPHIBOLES:
a) Actinolite (various): deep green to deep blue green to dark grass green pleochroism (x=green, z=deep blue green); moderate positive relief; prismatic cleavage intersecting at 56 & 124 degrees; Interference colors are middle second order yellow to red to violet. Normal twinning on (100) both as simple & repeated; inclined extinction c Z=-15, a X=-2, extinction angles also taken from elongated fragments on (110) cleavage, is approximetly 12 degrees. Grains are tabular, columnar and acicular,; commonly zoned and cores contain parallel & radiating growths of fibrous tremolite, exterior rims show graded growths of prismatic actinolite and horneblende. Biaxial -ve, 2V=65 to 72.

b) Horneblende: Green to dark green pleochroism (x=green, z=dark green); moderate positive relief; prismatic cleavage intersecting at 56 & 124 degrees; first order to low second order interference colors; inclined extinction c Z=20; prismatic grains; Biaxial -ve, 2V=70 to 75.

c) Tremolite (after Actinolite): light green to deep green pleochroism; slender microcrystalline fibrous masses within large Actinolite; high second order to low third order interference colors.

3) Biotite: deep green to dark brown pleochroism; moderate positive relief; third order anomalous interference colors, mottled extinction; parallel extinction; Biaxial -ve, 2V=3 to 5.

4) Epidote: light brown to pale green color; low positive relief; first order dull greens and yellow interference colors; inclined extinction, c Z=5-10; Biaxial -ve, 2V=75-80; distinguished from Hb by pleochroic formula, and color.

5) Chlorite: pale green color; low positive relief; anomalous blue & green interference colors; occur as anhedral and fibrous masses between plagioclase feldspar grains.

6) Sphene: Colorless to yellowish brown; third order interference colors; Biaxial ?; occurs as irregular anhedral

shapes.

7) Ilmeninte: (reflected light mode); light to dark brown color; light to dark brown bireflectance, strong anisotropism shown by various shades of greys; occurs as anhedral irregular shaped grains within Amphibole cores associated with the tremolite masses and larger grains associated with the feldspar.

8) Leucoxene: appears as an aggregate of very fine grained minerals; appear isotropic; high positive relief; occurs as clusters and trails adjacent to or within Amphibole & Feldspar.

Figure 1. General sketch displaying the textural and grain relationships.Large idioblastic to subidioblastic, columnar to acicular Actinolite grains, which exhibit replacemnent by tremolitic masses located in the central portions of the grains. Biotite (stippled) occurs adjacent to the amphiboles within the interstitial matrix. Also thin slender actinolite overprinting the large columnar grains. The interstitial areas are composed of plagioclase laths and inequigranular polycrystalline granoblastic mosaic patches.

APPENDIX 2

REPORTS OF WORK & CLAIM OWNERSHIP

Ministry of Northern Development and Mines
Ontario

Report of Work
(Geophysical, Geological, Geochemical and Expenditures)

Mining Act

DOCUMENT W8907-033

41I08SW0001 2.12418 TENNYSON

900

Type of Survey(s): GEOLOGICAL	Township or Area: TENNYSON
Claim Holder(s): MORRIS SANFTENBERG 2.12418	Prospector's Licence No. C 36277
Address: ~~MORRIS SANFTENBERG~~ Walford, Ontario. P0P 2E0.	
Survey Company: Bedrock Consulting	Date of Survey (from & to): 17 4 88 – 14 3 89 (Day Mo. Yr.)
Total Miles of line Cut: 20	
Name and Address of Author (of Geo-Technical report): Robert G. Komarechka	

Credits Requested per Each Claim in Columns at right

Special Provisions		Days per Claim
For first survey: Enter 40 days. (This includes line cutting)	Geophysical	
	- Electromagnetic	
	- Magnetometer	
For each additional survey: using the same grid: Enter 20 days (for each)	- Radiometric	
	- Other	
	Geological	40
	Geochemical	
Man Days	Geophysical	
Complete reverse side and enter total(s) here	- Electromagnetic	
	- Magnetometer	
	- Radiometric	
	- Other	
	Geological	
	Geochemical	
Airborne Credits		
Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	
	Magnetometer	
	Radiometric	

RECEIVED MAR 20 1989 MINING LANDS SECTION

Mining Claims Traversed (List in numerical sequence)

Prefix	Number	Expend. Days Cr.
S	895374	40
	895323	40

ONTARIO GEOLOGICAL SURVEY ASSESSMENT FILES OFFICE AUG 1 1989 RECEIVED

SUDBURY MINING DIV. RECEIVED MAR 14 1989 A.M. P.M. 7 8 9 10 11 12 1 2 3 4 5 6

Expenditures (excludes power stripping)

Type of Work Performed: GEOLOGICAL MAPPING

Performed on Claim(s): 895374 ; 895373

Calculation of Expenditure Days Credits

Total Expenditures				Total Days Credits
$	÷	15	=	

Instructions
Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

Total number of mining claims covered by this report of work: 2

For Office Use Only		
Total Days Cr. Recorded: 80	Date Recorded: MARCH 15/89	Mining Recorder: [signature]
	Date Approved as Recorded: 12 July 89 R.M.	Branch Director: [signature]

Date: MARCH 14/89 — Recorded Holder or Agent (Signature): [signature]

Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in the Report of Work annexed hereto, having performed the work or witnessed same during and/or after its completion and the annexed report is true.

Name and Postal Address of Person Certifying: Robert G. Komarechka APT #1 396 EVA AVE SUDBURY ONTARIO P3C 4N3 - ph (705) 673-0873

Date Certified: MARCH 14/89 — Certified by (Signature): [signature]

May 4

Ministry of Northern Development and Mines
Ontario

Report of Work
(Geophysical, Geological, Geochemical and Expenditures)

DOCUMENT No. W8907-034

Mining Act

Instructions: – Please type or print.
– If number of mining claims traversed exceeds space on this form, attach a list.
Note: – Only days credits calculated in the "Expenditures" section may be entered in the "Expend. Days Cr." columns.
– Do not use shaded areas below.

Type of Survey(s): GEOLOGICAL	Township or Area: CADEAU
Claim Holder(s): ~~MORRIS SANFTENBERG~~ MORRIS SANFTENBERG 2.12418	Prospector's Licence No.: C 36277
Address: Walford, Ontario . P0P 2E0	
Survey Company: BEDROCK CONSULTING	Date of Survey (from & to): Day 17 Mo. 9 Yr. 89 — Day 19 Mo. 3 Yr. 89
Name and Address of Author (of Geo-Technical report): ROBERT G. KOMARECHKA	Total Miles of line Cut: 20

Credits Requested per Each Claim in Columns at right

		Days per Claim
Special Provisions: For first survey: Enter 40 days. (This includes line cutting) For each additional survey: using the same grid: Enter 20 days (for each)	Geophysical	
	· Electromagnetic	
	· Magnetometer	
	· Radiometric	
	· Other	
	Geological	40
	Geochemical	
Man Days: Complete reverse side and enter total(s) here	Geophysical	Days per Claim
	· Electromagnetic	
	· Magnetometer	
	· Radiometric	
	· Other	
	Geological	
	Geochemical	
Airborne Credits: Note: Special provisions credits do not apply to Airborne Surveys.		Days per Claim
	Electromagnetic	
	Magnetometer	
	Radiometric	

RECEIVED
MAR 20 1989
MINING LANDS SECTION

Mining Claims Traversed (List in numerical sequence)

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.
S	895375	40
	895376	40
	895378	40
	895379	40
	895380	40
	895381	40
	895377	40

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.

SUDBURY MINING DIV. RECEIVED
MAR 14 1989
A.M. 7 8 9 10 11 12 1 2 3 4 5 6 P.M.

Total number of mining claims covered by this report of work: 7

Expenditures (excludes power stripping)

Type of Work Performed: GEOLOGICAL MAPPING

Performed on Claim(s): 895375, 895376, 895377, 895378, 895379, 895380, 895381

Calculation of Expenditure Days Credits
Total Expenditures: $ ÷ 15 = Total Days Credits

Instructions: Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

For Office Use Only		
Total Days Cr. Recorded: 280	Date Recorded: MARCH 15/89	Mining Recorder: D.C. Mills
	Date Approved as Recorded: 12 July 89 R.M.	Branch Director:

Date: MARCH 14/89 — Recorded Holder or Agent (Signature): Robert G. Komarechka

Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in the Report of Work annexed hereto, having performed the work or witnessed same during and/or after its completion and the annexed report is true.

Name and Postal Address of Person Certifying: Robert G. Komarechka APT #1 396 EVA AVE SUDBURY ONTARIO P3C 4N3 – ph (705) 673-0873

Date Certified: MARCH 14/89 — Certified by (Signature): Robert G. Komarechka

Ministry of Northern Development and Mines
Ontario

Report of Work
(Geophysical, Geological, Geochemical and Expenditures)

DOCUMENT No. W8907-072

Mining Act 2.12418

Instructions: – Please type or print.
– If number of mining claims traversed exceeds space on this form, attach a list.
Note: – Only days credits calculated in the "Expenditures" section may be entered in the "Expend. Days Cr." columns.
– Do not use shaded areas below.

Type of Survey(s)	Township or Area
GEOLOGICAL	CADEAU

Claim Holder(s)	Prospector's Licence No.
SUDBURY CANADIAN GRANITE INC	T4779

Address: 2008 LASALLE BLVD SUDBURY ONTARIO P3A 2A5

Survey Company	Date of Survey (from & to)	Total Miles of line Cut
BEDROCK CONSULTING	17 4 88 (Day Mo. Yr.) 14 3 89 (Day Mo. Yr.)	20

Name and Address of Author (of Geo-Technical report): ROBERT G. KOMARECHKA APT #1 396 EVA AVE SUDBURY ONTARIO P3C4N3

Credits Requested per Each Claim in Columns at right

		Days per Claim
Special Provisions For first survey: Enter 40 days. (This includes line cutting) For each additional survey: using the same grid: Enter 20 days (for each)	Geophysical - Electromagnetic	
	Geophysical - Magnetometer	
	Geophysical - Radiometric	
	Geophysical - Other	
	Geological	40
	Geochemical	
Man Days Complete reverse side and enter total(s) here	Geophysical	Days per Claim
	Geophysical - Electromagnetic	
	Geophysical - Magnetometer	
	Geophysical - Radiometric	
	Geophysical - Other	
	Geological	
	Geochemical	
Airborne Credits Note: Special provisions credits do not apply to Airborne Surveys.		Days per Claim
	Electromagnetic	
	Magnetometer	
	Radiometric	

Mining Claims Traversed (List in numerical sequence)

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.
S	895174	40
	895175	40

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.

RECEIVED
JUL 13 1989
MINING LANDS SECTION

SUDBURY MINING DIV.
RECEIVED
APR 26 1989
A.M. 7 8 9 10 11 12 1 2 3 4 5 6 P.M.
11:05 AM

Total number of mining claims covered by this report of work: 2

Expenditures (excludes power stripping)

Type of Work Performed: GEOLOGICAL MAPPING

Performed on Claim(s): S 895174 ; S895175

Calculation of Expenditure Days Credits

Total Expenditures $ + 15 = Total Days Credits

Instructions: Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

For Office Use Only

Total Days Cr. Recorded	Date Recorded	Mining Recorder
80	July 6, 1989	D.C. Miller
	Date Approved as Recorded: 14 July 89	Branch Director

Date: APRIL 25/89 Recorded Holder or Agent (Signature): Robert G. Komarechka

Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in the Report of Work annexed hereto, having performed the work or witnessed same during and/or after its completion and the annexed report is true.

Name and Postal Address of Person Certifying: Robert G. Komarechka APT #1 396 EVA AVE SUDBURY ONTARIO P3C 4N3 ph (705) 673-0873

Date Certified: APRIL 26 1989

Certified by (Signature): Robert G. Komarechka

1382 (85/12)

Ministry of Northern Development and Mines
Ontario

Report of Work
(Geophysical, Geological, Geochemical and Expenditures)

DOCUMENT No. W8907-073

Mining Act 2.12418

Instructions: – Please type or print.
– If number of mining claims traversed exceeds space on this form, attach a list.
Note: – Only days credits calculated in the "Expenditures" section may be entered in the "Expend. Days Cr." columns.
– Do not use shaded areas below.

Type of Survey(s)	Township or Area
GEOLOGICAL	TENNYSON

Claim Holder(s)	Prospector's Licence No.
SUDBURY CANADIAN GRANITE INC.	T4779

Address: 2008 LASALLE BLUD SUDBURY ONTARIO P3A 2A5

Survey Company	Date of Survey (from & to)	Total Miles of line Cut
BEDROCK CONSULTING	17 4 88 (Day / Mo. / Yr.) to 14 3 89 (Day / Mo. / Yr.)	20

Name and Address of Author (of Geo-Technical report): ROBERT G. KOMARECHKA APT #1 396 EVA AVE SUDBURY ONTARIO P3C4N3

Credits Requested per Each Claim in Columns at right

		Days per Claim
Special Provisions: For first survey: Enter 40 days. (This includes line cutting) For each additional survey: using the same grid: Enter 20 days (for each)	Geophysical	
	- Electromagnetic	
	- Magnetometer	
	- Radiometric	
	- Other	
	Geological	40
	Geochemical	
Man Days: Complete reverse side and enter total(s) here	Geophysical	Days per Claim
	- Electromagnetic	
	- Magnetometer	
	- Radiometric	
	- Other	
	Geological	
	Geochemical	
Airborne Credits: Note: Special provisions credits do not apply to Airborne Surveys.		Days per Claim
	Electromagnetic	
	Magnetometer	
	Radiometric	

Mining Claims Traversed (List in numerical sequence)

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.	Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.
S	895176	40			

RECEIVED
JUL 13 1989
MINING LANDS SECTION

SUDBURY MINING DIV.
RECEIVED
APR 25 1989
A.M. 7 8 9 10 11 12 1 2 3 4 5 6 P.M.
11:05 AM

Total number of mining claims covered by this report of work: 1

Expenditures (excludes power stripping)

Type of Work Performed: GEOLOGICAL MAPPING

Performed on Claim(s): S 895176

Calculation of Expenditure Days Credits: Total Expenditures $ ÷ 15 = Total Days Credits

Instructions: Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

Date	Recorded Holder or Agent (Signature)
APRIL 25	Robert G. Komarechka

For Office Use Only

Total Days Cr. Recorded	Date Recorded	Mining Recorder
40	July 6, 1989	D.C. Hadden
	Date Approved as Recorded: 14 July 89 RM	Branch Director

Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in the Report of Work annexed hereto, having performed the work or witnessed same during and/or after its completion and the annexed report is true.

Name and Postal Address of Person Certifying	Date Certified	Certified by (Signature)
Robert G. Komarechka APT #1 396 EVA AVE SUDBURY ONTARIO P3C 4N3 - ph (705) 673-0873	APRIL 26 1989	Robert G. Komarechka

1362 (85/12)

Ministry of Northern Development and Mines

Ontario

Report of Work

(Geophysical, Geological, Geochemical and Expenditures)

Mining Act

DOCUMENT No. W8907- 104

Instructions: – Please type or print.
– If number of mining claims traversed exceeds space on this form, attach a list.
Note: – Only days credits calculated in the "Expenditures" section may be entered in the "Expend. Days Cr." columns.
– Do not use shaded areas below.

Type of Survey(s): GEOLOGICAL 2.12418	Township or Area: TENNYSON
Claim Holder(s): La Societé De Gestion Maskours Inc	Prospector's Licence No.: T5171
Address: 150 de Brullon Boucherville Quebec, J4B 2J2	
Survey Company: Bedrock Consulting	Date of Survey (from & to): 17 4 88 (Day | Mo. | Yr.) 14 3 89 (Day | Mo. | Yr.)
Total Miles of line Cut: 20	
Name and Address of Author (of Geo-Technical report)	

Credits Requested per Each Claim in Columns at right

		Days per Claim
Special Provisions For first survey: Enter 40 days. (This includes line cutting) For each additional survey: using the same grid: Enter 20 days (for each)	Geophysical	
	- Electromagnetic	
	- Magnetometer	
	- Radiometric	
	- Other	
	Geological	40
	Geochemical	
Man Days Complete reverse side and enter total(s) here	Geophysical	Days per Claim
	- Electromagnetic	
	- Magnetometer	
	- Radiometric	
	- Other	
	Geological	
	Geochemical	
Airborne Credits Note: Special provisions credits do not apply to Airborne Surveys.		Days per Claim
	Electromagnetic	
	Magnetometer	
	Radiometric	

Mining Claims Traversed (List in numerical sequence)

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.
S	~~895385~~	~~40~~ RBK
	~~994524~~	~~40~~ RBK
	~~895384~~	~~40~~ RBK
	994554	40
	~~994521~~	~~40~~ RBK
	~~994523~~	~~40~~ RBK

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.

RECEIVED
SEP 2 1989
MINING LANDS SECTION

SUDBURY MINING DIV
RECEIVED
MAR 14 1989
A.M. P.M.
7 8 9 10 11 12 1 2 3 4 5 6

Total number of mining claims covered by this report of work: ~~RBK~~ 1 S

Expenditures (excludes power stripping)

Type of Work Performed: GEOLOGICAL MAPPING

Performed on Claim(s): 895385, 994524, 895384
994554, 994521, 994523

Calculation of Expenditure Days Credits

Total Expenditures: $ ÷ 15 = Total Days Credits

Instructions
Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

For Office Use Only

Total Days Cr. Recorded	Date Recorded	Mining Recorder
40	Sept. 26, 1989	J. C. Wallen
	Date Approved as Recorded: 29 Sept 89 FS	Branch Director:

Date: MARCH 14 /89

Recorded Holder or Agent (Signature): Robert G. Komarechka

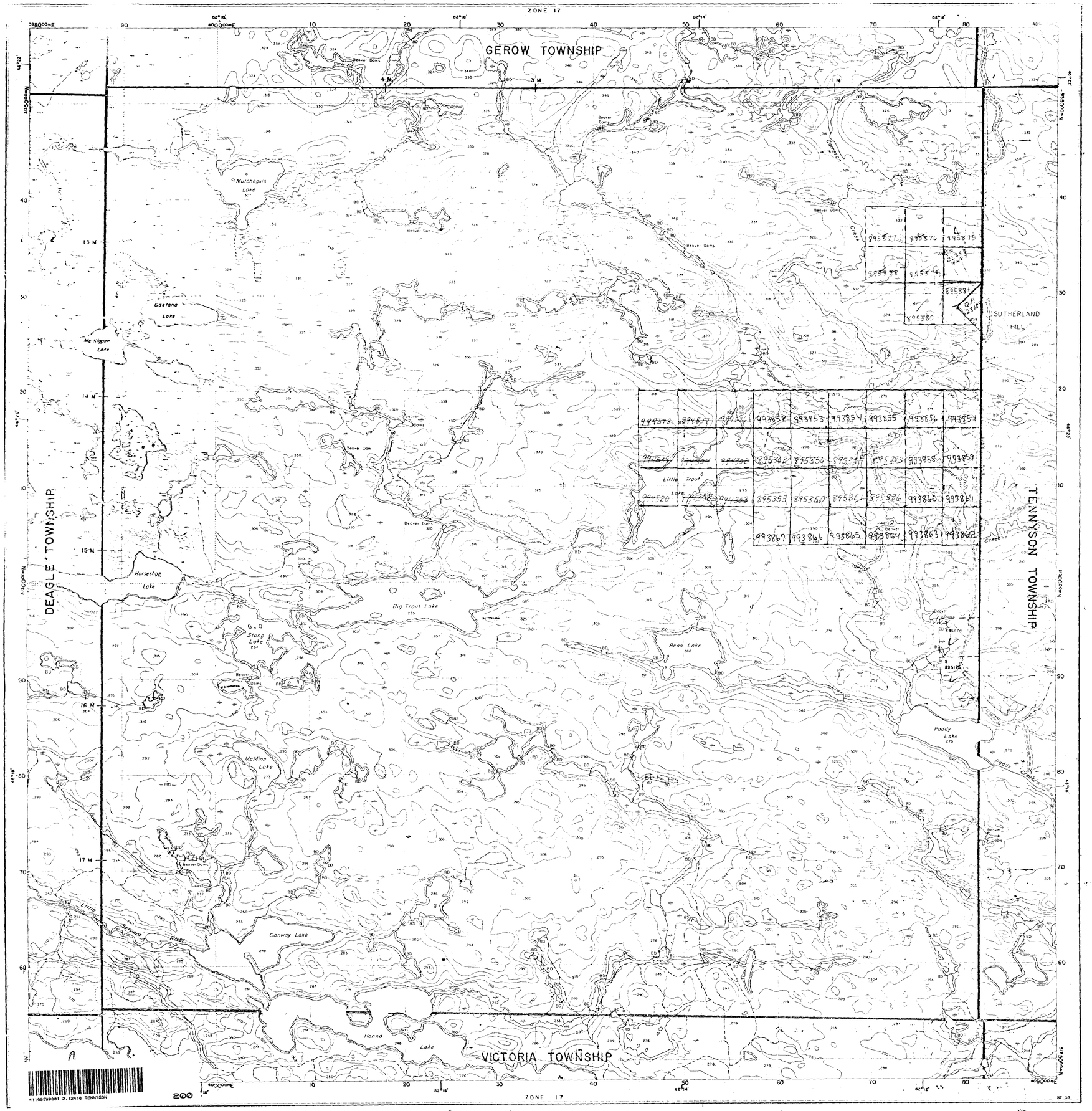
Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in the Report of Work annexed hereto, having performed the work or witnessed same during and/or after its completion and the annexed report is true.

Name and Postal Address of Person Certifying: Robert G. Komarechka APT #1 346 EVA AVE SUDBURY ONTARIO

Date Certified:

Certified by (Signature):



Ministry of Northern Development and Mines

Ontario

In Service: April 5, 1988

INDEX TO LAND DISPOSITION

PLAN

G-2950

TOWNSHIP

CADEAU

M.N.R. ADMINISTRATIVE DISTRICT

ESPANOLA

MINING DIVISION

SUDBURY

LAND TITLES/REGISTRY DIVISION

ALGOMA

Scale 1:20 000

1000 Metres 0 1000 2000 Metres

1000 Feet 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 Feet

Contour Interval 10 Metres

AREAS WITHDRAWN FROM DISPOSITION

MRO - Mining Rights Only
SRO - Surface Rights Only
M + S - Mining and Surface Rights

Description	Order No.	Date	Disposition	File

SYMBOLS

Boundary
- Township, Meridian, Baseline
- Road allowance: surveyed
- shoreline
- Lot/Concession, surveyed
- unsurveyed
- Parcel: surveyed
- unsurveyed
- Right-of-way: road
- railway
- utility
- Reservation
- Cliff, Pit, Pile
- Contour
- Interpolated
- Approximate
- Depression
- Control point (horizontal)
- Flooded land
- Mine head frame
- Pipeline (above ground)
- Railway: single track
- double track
- abandoned
- Road, highway, county, township
- access
- trail, bush
- Shoreline (original)
- Transmission line
- Wooded area

DISPOSITION OF CROWN LANDS

- Patent
  - Surface & Mining Rights
  - Surface Rights Only
  - Mining Rights Only
- Lease
  - Surface & Mining Rights
  - Surface Rights Only
  - Mining Rights Only
- Licence of Occupation
- Order-in-Council
- Cancelled
- Reservation
- Sand & Gravel

DATE OF ISSUE
MAR 0 2 1988
SUDBURY
MINING RECORDING OFFICE

Map base and land disposition drafting by Surveys and Mapping Branch, Ministry of Natural Resources.

The disposition of land, location of lot fabric and parcel boundaries on this index was compiled for administrative purposes only.

200

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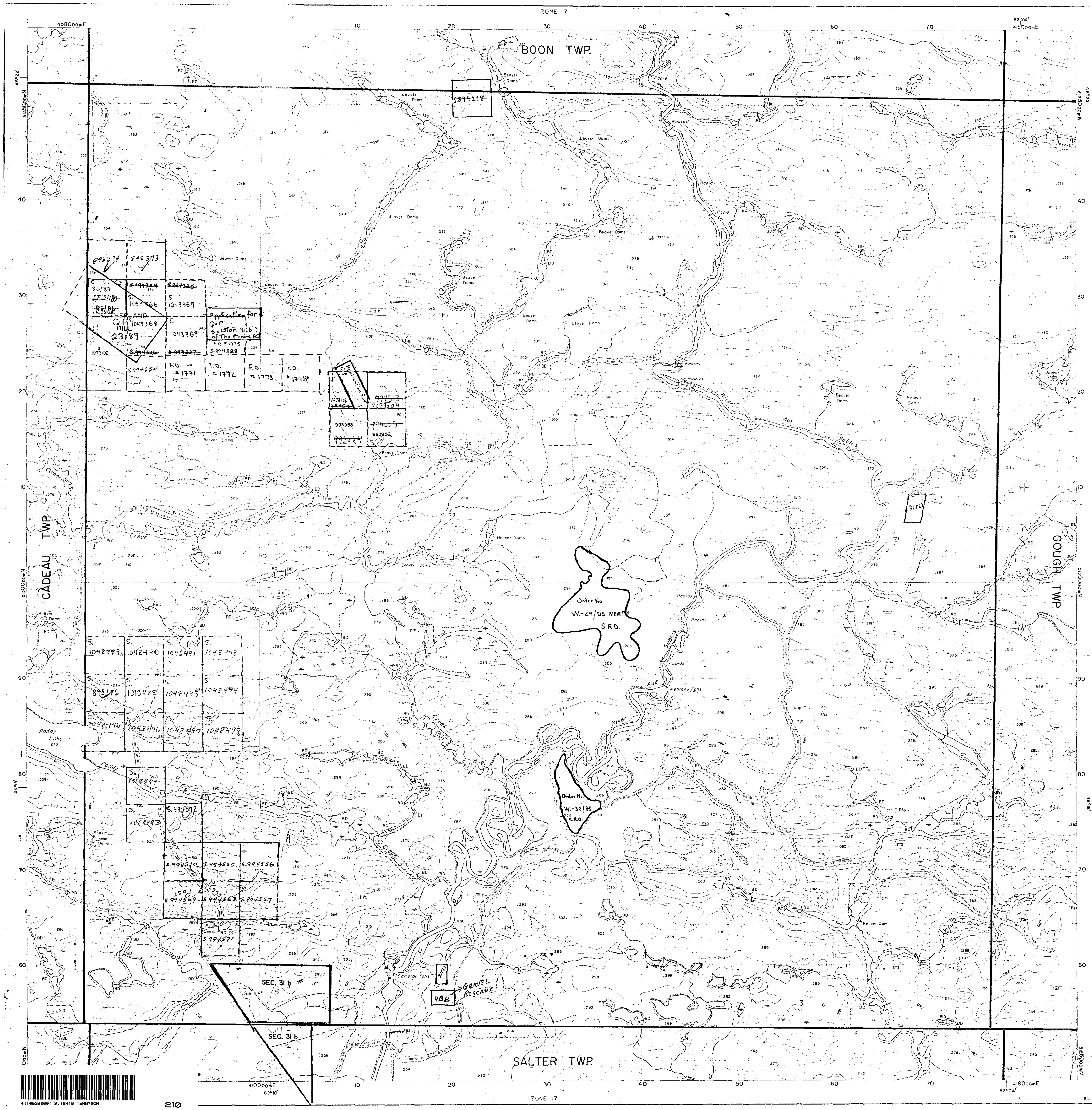


Ministry of Natural Resources
Ministry of Northern Affairs and Mines
Ontario

INDEX TO LAND DISPOSITION

PLAN

G-2895

TOWNSHIP

TENNYSON

M.N.R. ADMINISTRATIVE DISTRICT

ESPANOLA

MINING DIVISION

SUDBURY

LAND TITLES/REGISTRY DIVISION

ALGOMA

Scale 1:20 000

Contour Interval 10 Metres

AREAS WITHDRAWN FROM DISPOSITION

MRO - Mining Rights Only
SRO - Surface Rights Only
M + S - Mining and Surface Rights

Description	Order No.	Date	Disposition	File

~~Q.P. No. 21180 (1985/86)~~
G.R. 486
W-29/85 - NER S.R.O.
W-30/85 - NER S.R.O.
Q.P. 22353 - 86/87

SYMBOLS

Boundary
- Township, Meridian, Baseline
- Road allowance; surveyed
- shoreline
- Lot/Concession; surveyed
- unsurveyed
- Parcel; surveyed
- unsurveyed
- Right-of-way; road
- railway
- utility
- Reservation
- Cliff, Pit, Pile
- Contour
- Interpolated
- Approximate
- Depression
- Control point (horizontal)
- Flooded land
- Mine head frame
- Pipeline (above ground)
- Railway; single track
- double track
- abandoned
- Road; highway, county, township
- access
- trail, bush
- Shoreline (original)
- Transmission line
- Wooded area

DATE OF ISSUE
SUDBURY MINING RECORDER'S OFFICE

DISPOSITION OF CROWN LANDS

Patent
- Surface & Mining Rights
- Surface Rights Only
- Mining Rights Only

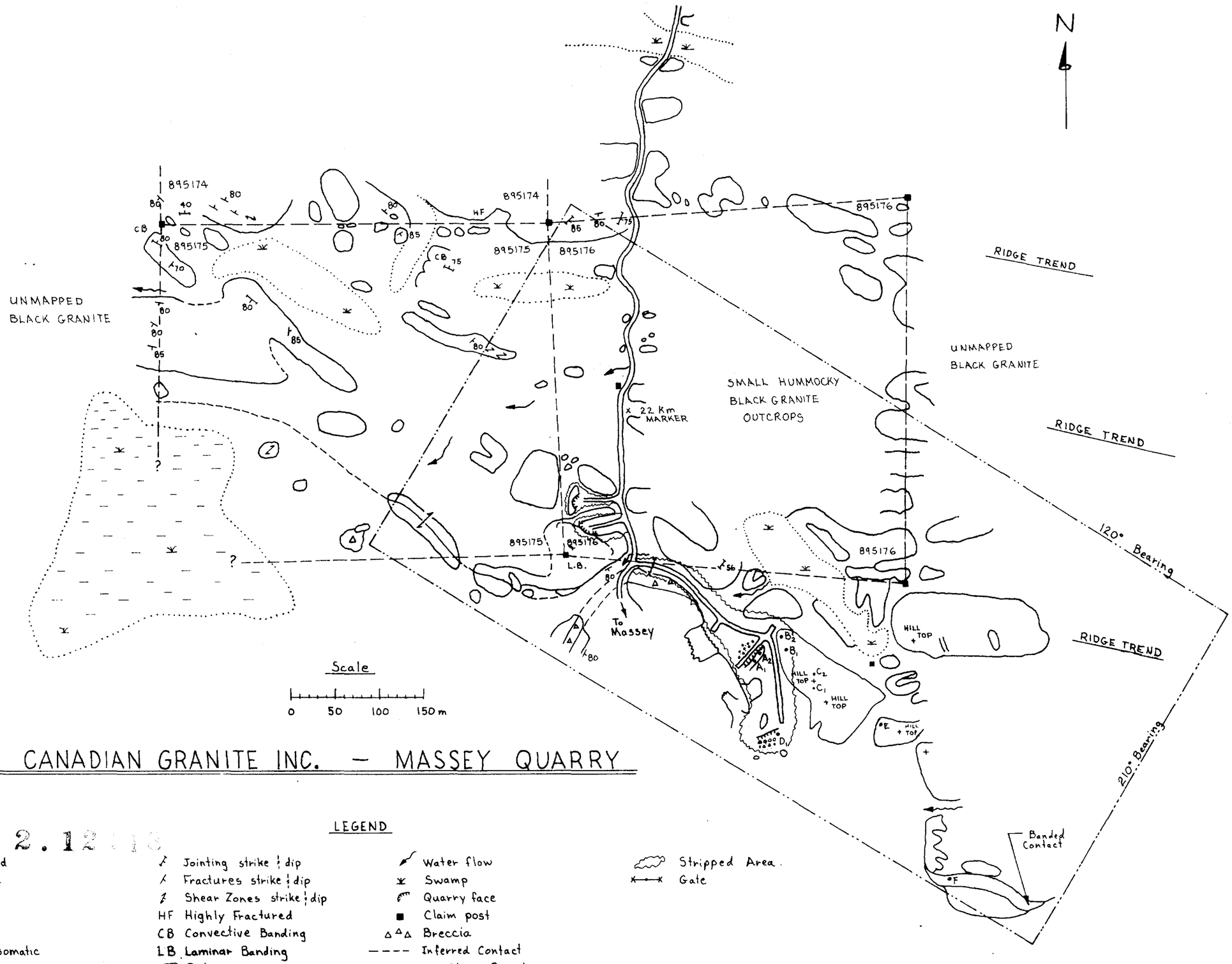
Lease
- Surface & Mining Rights
- Surface Rights Only
- Mining Rights Only

- Licence of Occupation
- Order-in-Council — OC
- Cancelled
- Reservation
- Sand & Gravel

TENNYSON

Map base and land disposition drafting by Surveys and Mapping Branch, Ministry of Natural Resources.

The disposition of land, location of lot fabric and parcel boundaries on this index was compiled for administrative purposes only.



MAP 2

Scale

0 50 100 150 m

SUDBURY CANADIAN GRANITE INC. – MASSEY QUARRY

LITHOLOGY

- Coarse Grained Black Granite
- Fine Grained Black Granite
- Hybrid Metasomatic Gray Granite
- Earlier Pink Granite

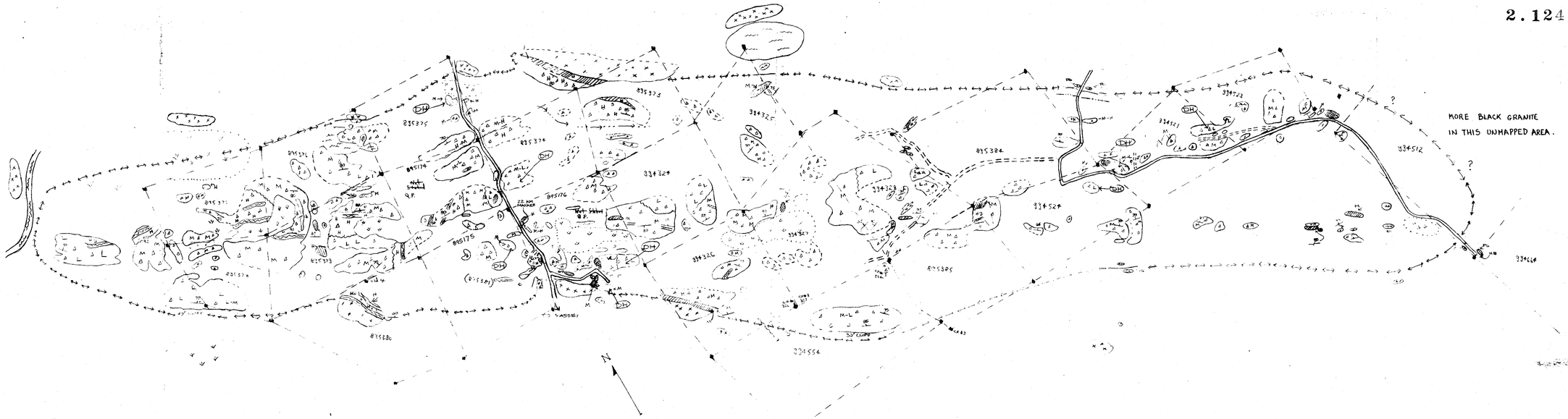
LEGEND

- Jointing strike ¦ dip
- Fractures strike ¦ dip
- Shear Zones strike ¦ dip
- HF Highly Fractured
- CB Convective Banding
- LB Laminar Banding
- Outcrop
- •A, Sample Location
- Water flow
- Swamp
- Quarry face
- Claim post
- Breccia
- Inferred Contact
- Claim Boundary
- Quarry Permit Boundary
- Stripped Area
- Gate

Geological Interpretation by
Bedrock Consulting

Geologist: Robert G. Komarechka P. Geol. August 28, 1987

2.12418



MAP #5 - MASSEY BLACK GRANITE OCCURRENCE, TENNYSON-CADEAU TOWNSHIP

LITHOLOGY

- COARSE GRAINED BLACK GRANITE
- PINK GRANITE
- FINE GRAINED BLACK GRANITE
- FINE GRAINED BLACK GRANITE WITH MINOR AMOUNTS OF PINK GRANITE AS SWARMS IN SHEAR ZONES

LEGEND

- OUTCROP (HIGHLY FRACTURED, 1/4 M AVERAGE FRACTURE SPACING)
- MODERATELY FRACTURED, 1 M x 3/4 M BLOCKS
- JOINTED OR FRACTURE 2 x 1/2 M BLOCKS
- SWAMP
- SUGGESTED DRILL HOLE SIGHT
- CHURCH
- GRAVEL PIT
- RIVER
- DRAINAGE
- ALL WEATHER ROAD
- SECONDARY ROAD
- PROVINCIAL BOUNDARY
- TOWNSHIP BOUNDARY
- SURVEYED LOT LINE

BEDROCK CONSULTING

GEOLOGIST: MEG DUNCAN APRIL 29, 1988