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Noranda Exploration Company Limited

Geological and Self Potential Surveys

of the

Eholt Groups of Mineral Claims

Eholt, 6 miles east

of

Greenwood, B.C.

$49^{\circ} 118^{\circ}$  Southeast

M. M. Menzies, P. Eng.  
May/December - 1956

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Legend

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NORANDA EXPLORATION COMPANY LIMITED

Cost of Geological and Self Potential Surveys

of the

Kholt Groups of Mineral Claims

Greenwood, B.C. - 1957

Professional Engineering:

Supervisory, field, laboratory, drafting

180 days @ \$35.00/day . . . \$ 6,300.00

Technical (Self Potential Operator):

120 days @ \$20.00/day . . . \$ 2,400.00

Labour:

Line cutting, soil sampling, self potential assistants (average of 7 men/day for 120 days)

840 man days @ \$14.00/day . \* 11,760.00

TOTAL COST . . . . . \$ 20,460.00

Cost Proportions:

Group D - (Roy 1-5, 14, 15, 48 Fr.) . . . . . \$ 800.00

Group E - (Roy 13, 16, 18, 19, 24, 25 Fr.  
July, July Fr.) . . . . . \$ 800.00

Group F - (Roy 6, 9-12, 17, 20, 23). . . . . \$ 800.00

Group 474 - (Chemical Fr., Remington Fr.,  
Lakeview Fr., Blue Bell Fr., Lakeview  
No. 2 Fr.) . . . . . \$ 500.00

Group 457 - (Bie Fr., MacArthur Fr.) . . . . . \$ 200.00

Group G - (Hank 1-8) . . . . . \$ 800.00

TOTAL . . . . . \$ 3,900.00

*M. M. McGregor*

Noranda Exploration Company Limited

Geological and Self Potential Report  
of the  
Eholt Groups of Claims

Introduction:

Noranda Exploration Company Limited first became interested in the Eholt area early in 1955 and by the first week of February of that year had staked 41 claims and fractions surrounding 22 crown grants which cover the former producers and prospects of the Summit Camp. All of these crown grants were subsequently acquired by lease or option with the exception of the three comprising the B. C. mining property. Nine additional located claims and fractions were optioned and 42 others staked. Assessment work was done in 1955 and an extensive programme, including geological, self potential, magnetometer, geochemical, and transit surveys, stripping, and diamond drilling, was started in May 1956 and completed by the following December.

Description:

The Eholt property has a maximum relief of 1,000 feet, ranging from 3,000 to 4,000 feet elevation. Drainage in the north half of the area is approximately magnetic north; farther south it is southeasterly. In general, ridges tend to be northeasterly and slopes are commonly steep but not precipitous.

The forest growth, though small and of little commercial value, is very heavy in the valleys where cedar forms nearly impenetrable thickets. It is lighter on the flanks of ridges where tamarac, fir and balsam predominate and some southern slopes are bare.

Precipitation is light in the summer, most creeks and swamps becoming dry by early fall.

The Eholt property is traversed by the No. 3 Provincial Highway, bounded on the north by the Canadian Pacific Railway and cut by a network of abandoned railroad grades, recent logging roads and trails.

Geology:

Geological reports on the Boundary District are:

1. R. W. Brock, "Preliminary Report on the Boundary Creek District",  
Geol. Surv. Can. Summ. Report for 1902.
2. R. A. Daly, "Geology of the North American Cordillera at the Forty-Ninth Parallel", Geol. Surv. Can. Mem. 38, 1912.
3. O. E. LeRoy, "Geology and Ore Deposits of Phoenix, B. C.",  
Geol. Surv. Can. Mem. 21, 1912.
4. D. A. McNaughton, "Greenwood-Phoenix Area", Geol. Surv. Can.  
Paper 45-20, 1945.
5. R. H. Seraphim, "Geology and Copper Deposits of the Boundary District, B.C.", Can. Min. Met. Bull., Vol. 49,  
No. 3, Sept. 1956, P. 684.
6. H. T. Carswell, "M. Sc. Thesis, University of British Columbia",  
1957. (Unpublished).

Although rock outcrops form only from 5 to 10 percent of the area examined in detail during 1956, these exposures did provide a good knowledge of the Eholt geology. Ages of rocks range from Early Palaeozoic to Tertiary. The Early Palaeozoic Knob Hill formation does not outcrop in the Eholt map area but very extensive exposures are found to the west where it completely

encircles the younger rocks of the Phoenix camp. Much of the Kholt property is underlain by chert breccia, limestone breccia, limestone and volcanics of the Brooklyn formation. In the vicinity of the Oro Denore where extensive garnetization has occurred the favourable Brooklyn rocks are cut by diorite and granodiorite of Mesozoic age and here both alteration and mineralization are intimately related to these intrusives. Tertiary flows overlie older formations north of Leon Lake and associated dykes and sills of syenite, pulaskite, and augite porphyry outcrop extensively to the north and south of the B. C. mine.

The production record of the Summit Camp and the intensive work done by Noranda Exploration Company Limited in that area have shown the geology favorable for the economic occurrence of copper mineralization. Basic features common to all commercial Boundary District copper deposits are (1) Brooklyn limestone and (2) extensive and strong alteration of this favorable formation to lime silicates. These requirements are seen to advantage in the Oro Denore, Emma, and B. C. mines where replacement of sharn in varying degrees by magnetite, chalcopyrite, pyrrhotite and minor pyrite has occurred.

Regional structure is not easily deciphered but, in general, the area bears the distinctive characteristics of a broad northeasterly trending marine basin formed in early Palaeozoic times following uplift and the intense folding of the Knob Hill formation. A period of rapid sedimentation, during which material was transported from the mountainous area immediately to the west and deposited as chert breccia, limestone breccia and limestone in the shallow marine trough, was interrupted by erosion and then followed by extensive volcanic activity represented by the basaltic and andesitic flows and pyroclastics

of the Brooklyn formation. Mesozoic intrusions, ranging from diorite to granite, occur along the west boundary of the Summit area and extensive Tertiary flows and related igneous rocks cover the northern portion of the map sheet. Only minor folding or warping occurred in post Knob Hill times and continental conditions prevailed following the uplift which terminated the deposition of the Brooklyn limestone.

The B. C. copper deposit lies along the unconformable contact of the skarnitized Brooklyn limestone and the Palaeozoic volcanics. Strike is northeasterly, the dip vertical to steeply east, with the younger volcanics forming the footwall of the orebody. Swarms of Tertiary pulaskite dykes cut the ore.

The structure of the Emma magnetite - chalcopyrite deposit is similar to that of the B. C. but Mesozoic intrusions form the west boundary of the ore.

The Ore Denore is more complex with irregular replacement copper deposits lying in garnetite along or above a westerly striking granodiorite dyke. The southerly side of the granodiorite dips approximately vertically while the northerly side dips at a flat angle to the north. A sill-like body of diorite underlies the skarn to the south of the granodiorite dyke. The thickness of the diorite is not yet known but it is thought to be post-skarn in age and older than the granodiorite. Diamond drilling to test the existence of the favourable garnetite below the diorite is now under consideration.

Evidence supporting the relationship of the Summit Camp copper deposits to the Mesozoic intrusions is convincing.

Production:

The low grade copper deposits of the Boundary District occur in skarnitized Brooklyn limestone and are associated with granodioritic intrusives in the Deadwood and Summit Camps. The same relationship may exist at depth between the Phoenix deposits and the Mesozoic intrusions.

The total production of the District has been about 22,000,000 tons of ore averaging slightly over 1.5 percent copper, 0.03 ounces per ton in gold and 0.5 ounces per ton in silver.

The total recorded production of the Summit Camp, as reported in Index No. 3, B. C. Department of Mines, Table I, is 11,672 ounces of gold, 326,988 ounces of silver and 17,980,390 pounds of copper nearly all of which came from the B. C., Oro Denore, and Emma mines. Of these three properties the Oro Denore offers the best chance for finding and developing economic extensions to the mixed-out ore bodies.

Reasons for Geological and Self Potential Survey:

The past production record of the Boundary District, the similarity of Eheit geology to that of the Phoenix Camp, the ease of access and suitability of the area to the grid method of survey, the adequate percentage of rock outcrops, and the rising price of copper were all influencing factors. The soil mantle was found comparatively shallow over much of the area, a necessary requirement for effective use of the self potential. It was thought that any outcropping copper deposit of economic size and grade would give definite anomalous readings and the past season's work seems to confirm the accuracy of the supposition.

Method of Attack:

Five parallel base lines, bearing north 21 degrees east, were spaced at 3,000 feet intervals and totalled some 50,000 feet. These were chained at 100 foot intervals and permanently marked by punched metal tags. Section lines, at right angles to the base lines, were spaced 400 feet apart, chained at 100 foot intervals, and marked by metal tags every 500 feet. Two hundred foot spacings of section lines were used over a combined area of about one square mile and at the Ore Denoro a section line spacing of 100 feet was required for detailed self potential work, mapping, and diamond drill control. In all, over 100 miles of line were cut.

A transit survey was run from the B. C. mine 4,000 feet southerly and thence 6,000 feet westerly to the Ore Denoro. The old mine workings were then surveyed and mapped at a scale of 30 feet to the inch.

For convenience the Eholt area was divided into 6 areas, each 6,000 feet square. Two-hundred scale geological and self potential maps (30 inches square) were made of each of these areas. An index map showing this arrangement is included in the attached map folio.

Details of Geological Survey:

H. T. Carswell of Vancouver, B. C., and a University of British Columbia M. Sc. student did most of the geological mapping of the Eholt property. He was assisted briefly by H. Veerman, A. Burton and K. Olien. Supervision of the Ore Denoro diamond drilling programme, compilation of a detailed set of plans and sections, and the interpretation of results was assumed by the writer.

Over 40 miles of line was mapped at 200 scale and the remainder of the Eholt area was covered by 1,000 scale air photo traverses. Old mine workings

were mapped by plane table at 50 scale.

H. T. Carswell is presently engaged in writing his M. Sc. thesis on the Economic Geology of the Summit Camp and has made up a large number of thin and polished sections to assist in this study.

Details of Self Potential Survey:

The self potential survey was conducted under the direct supervision and to the complete satisfaction of the author by his brother, M. W. Menzies of Vancouver, B. C. The instrument used is Model E-7473B Geophysical Potentiometer manufactured by the Canadian Research Institute, 46 St. George Street, Toronto 5, Ontario.

The technique employed was as follows:

- (1) Base lines were quickly surveyed at 50 foot intervals and all readings checked and corrected immediately to avoid errors in the survey due to low frequency A.C. currents normally associated with magnetic storms and sun spots.
- (2) Section lines were run 1,000 feet on each side of the base lines, thus strips, 2,000 feet in width, were surveyed along each base line.
- (3) Gaps 1,000 feet in width were then surveyed between these strips. Traverses, 8,000 feet in length, were formed in this manner and closures of less than 10 millivolts normally obtained. Where larger closure errors occurred traverses were re-surveyed and readings corrected.
- (4) In the Khelt area fluctuations of less than 50 millivolts were not considered significant and generally disregarded.

Several major self potential anomalies of moderate to high intensity were discovered during the season's work. A number of small, weak anomalies were also outlined. Of the former, two covered the Oro Denoro and Emma mines

and a third picked up the mineralized Mountain Rose shear zone. A very large and strong anomaly on the Erwin Crown Grant was shown by diamond drilling to have resulted from a very black, graphitic limestone, in part very weakly mineralized by pyrite. Anomalies on both the Roy 42 and Roy 44 were investigated by bulldozer and these too were caused by weakly mineralized graphitic limestone. While some high readings were obtained around the old B. C. mine an anomaly was not obtained. This is readily explained by the small size of the original sulphide outcrops and the thoroughness with which the deposit was mined. While a large area of intrusives were encountered immediately north of the B. C., it was hoped that a sulphide deposit could be picked up in the favourable formation to the south and on strike of the former high grade mine. This hope was not realized.

From our investigations of the Ehelt geology and the self potential results none of the smaller, low intensity anomalies, with the possible exception of that on the Blue Bell Crown Grant, would seem to justify additional work.

Results:

Results of the programme as outlined in this report may be summarized as follows:

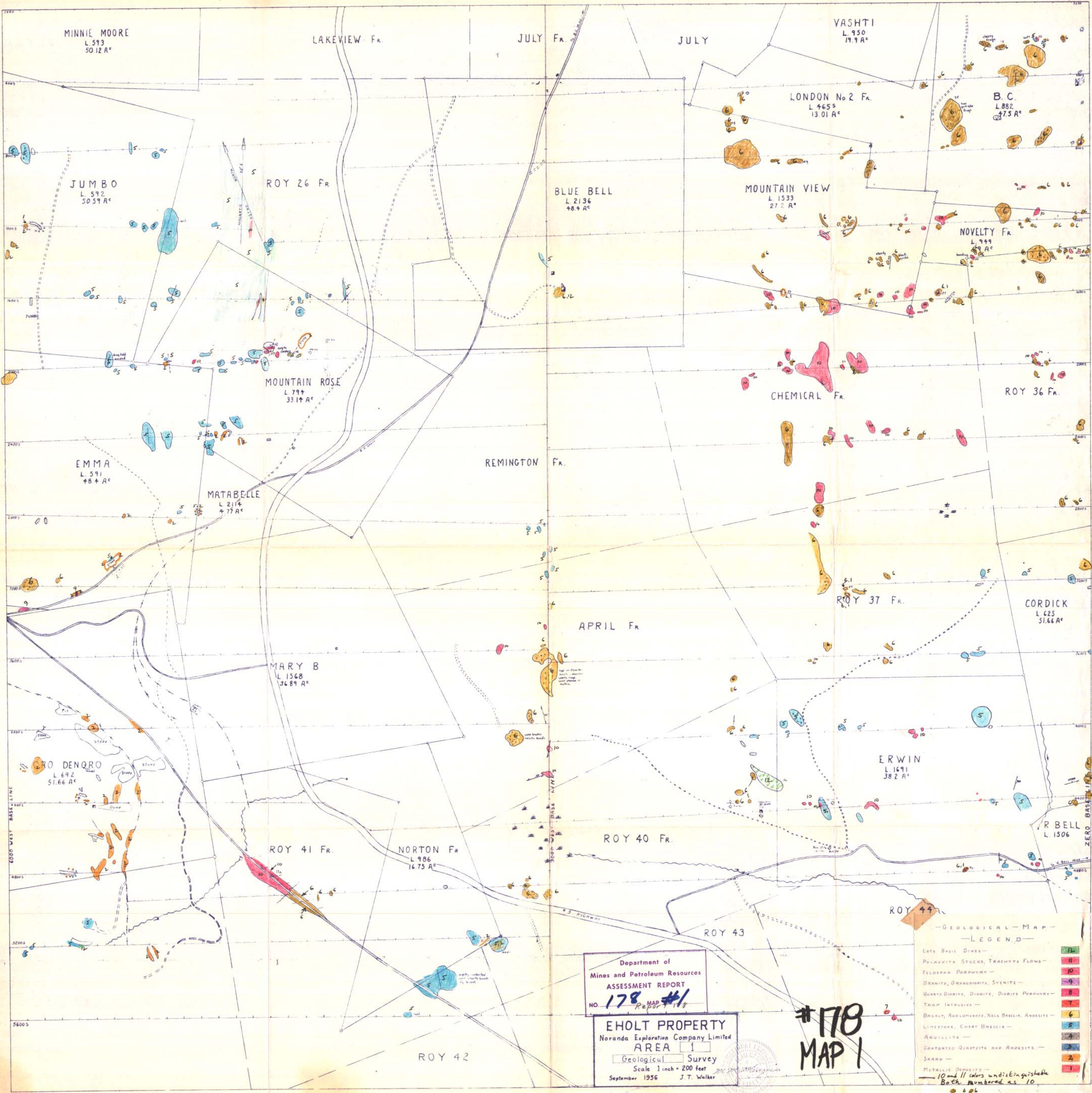
1. No new copper deposits have yet been discovered on the Ehelt property.
2. With the exception of the small, mined-out B. C. ore body, known copper sulphide deposits were readily detected by the self potential method.
3. Very weakly mineralized graphitic limestone gave strong anomalous self potential readings.
4. Diamond drilling and surface work on the larger self potential anomalies suggest that weak anomalies have been caused by very slight pyrite mineralization.

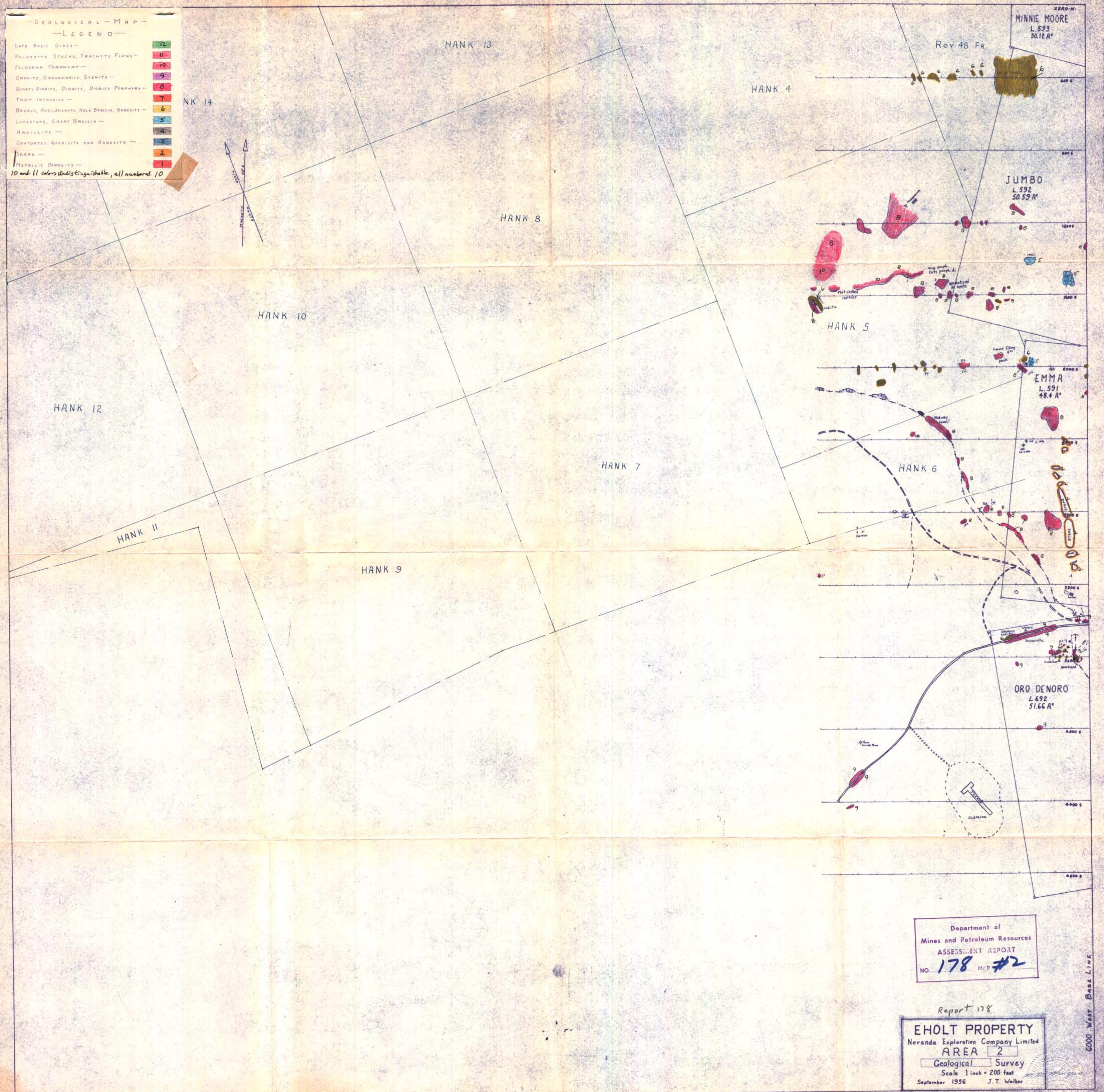
5. It is unlikely that any commercial ore deposits would be missed by this survey unless they were deep seated or buried under lava flows.
6. The Emma - Ore Denoro area is considered worthy of a detailed diamond drilling and mapping programme.

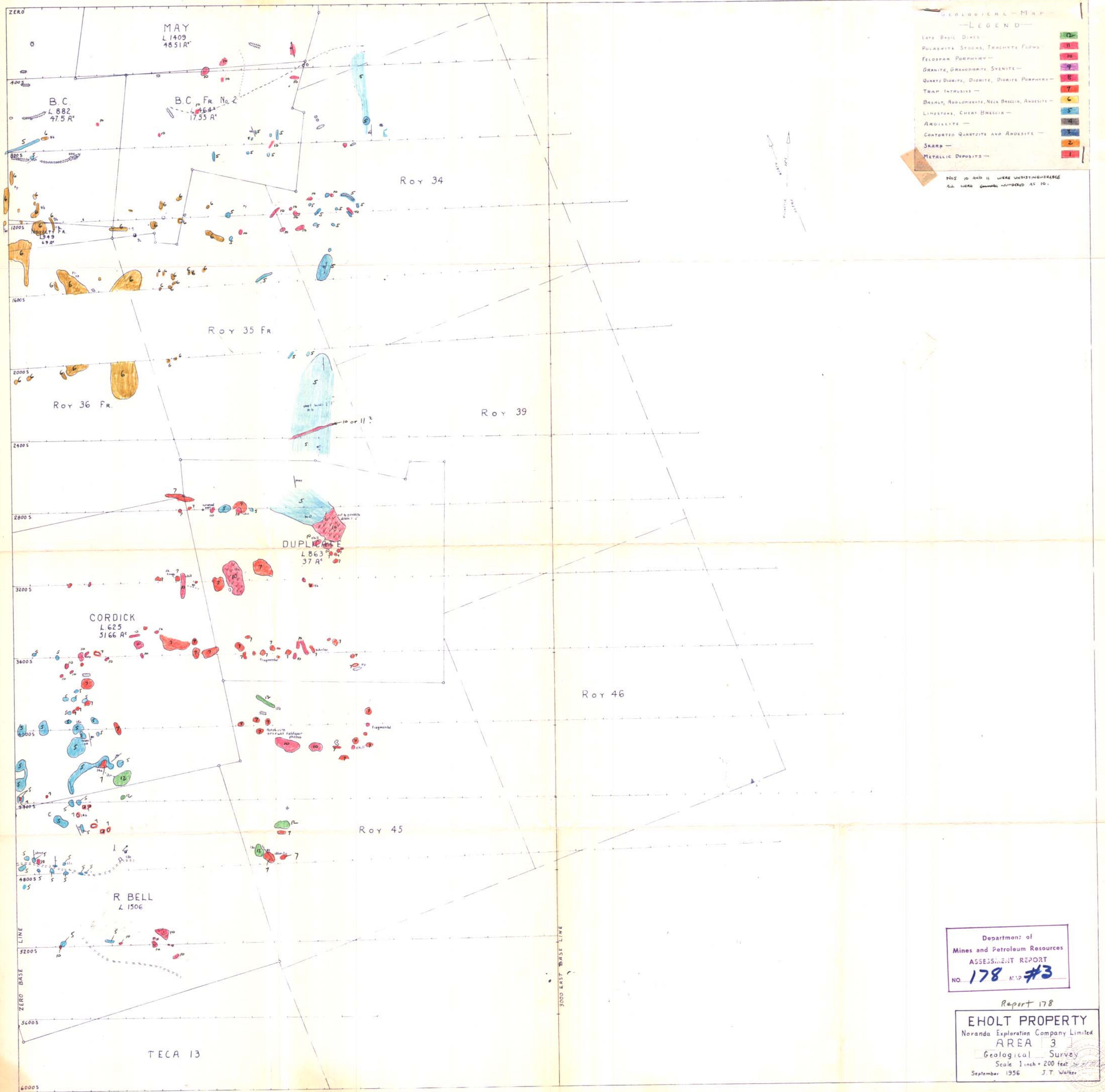
Respectfully submitted



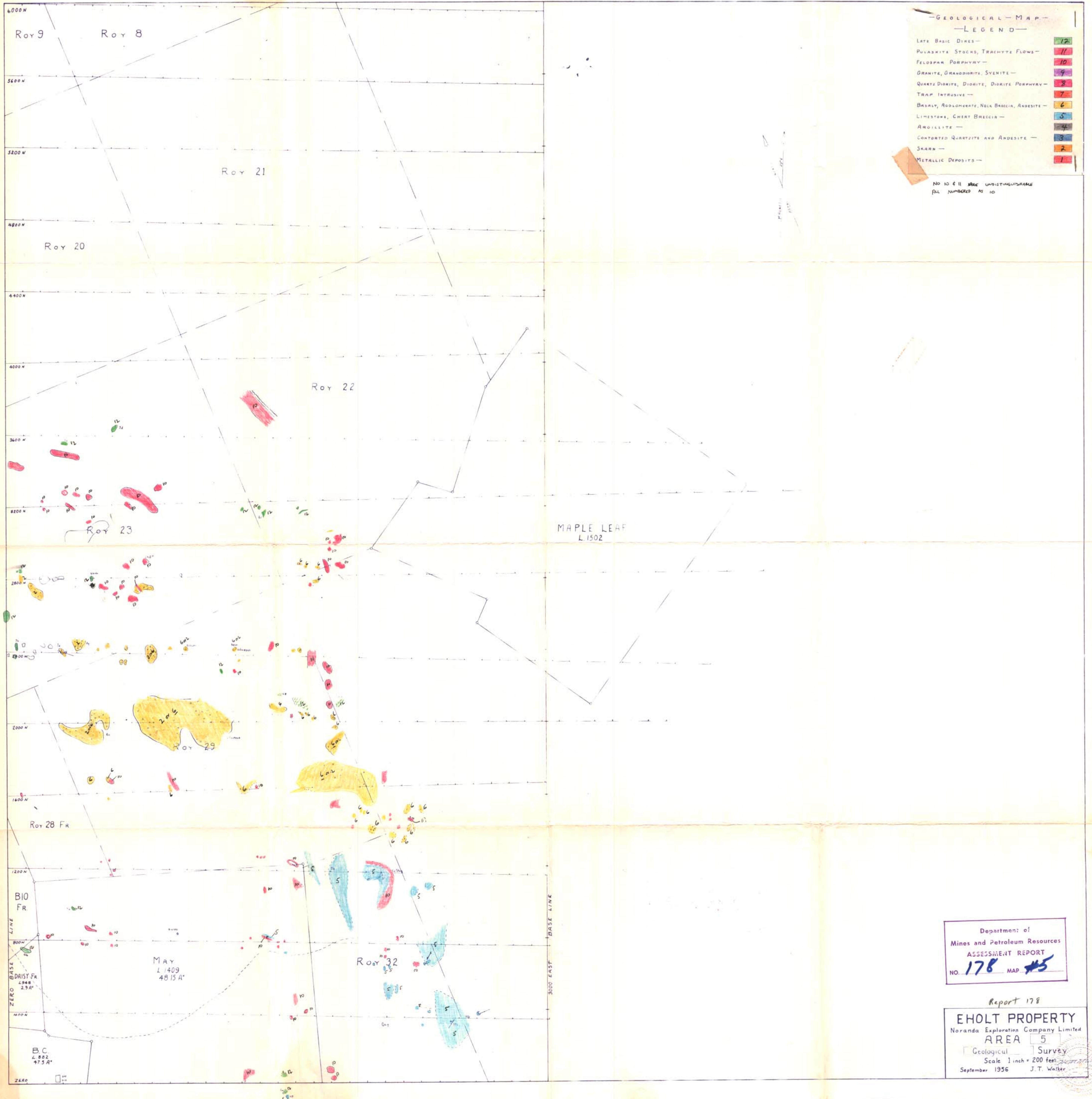
Morris M. Menzies, P. Eng.











— GEOLOGICAL MAP —	
— LEGEND —	
LATE BASIC DIKES	12
PULASKITE STOCKS, TRACHYTE FLOWS	11
FELDSPAR PORPHYRY	10
GRANITE, GRANODIORITE, SYENITE	9
QUARTZ DIORITE, DIORITE, DIORITE PORPHYRY	8
TRAP. INTRUSIVE	7
BASALT, AGGLOMERATE, NECK BRECCIA, ANDESITE	6
LIMESTONE, CHERT BRECCIA	5
AROILLITE	4
CONTORTED QUARTZITE AND ANDESITE	3
SKARN	2
METALLIC DEPOSITS	1

ROY 2

4800  
4400  
4000  
3600  
3200  
2800  
2400  
2000  
1600  
1200  
800  
400  
ZERO

ROY 1

HANK 1

ROY 14

HANK 2

ROY 16

HANK 15

ROY 15

HANK 16

HANK 3

WEST BASE LINE

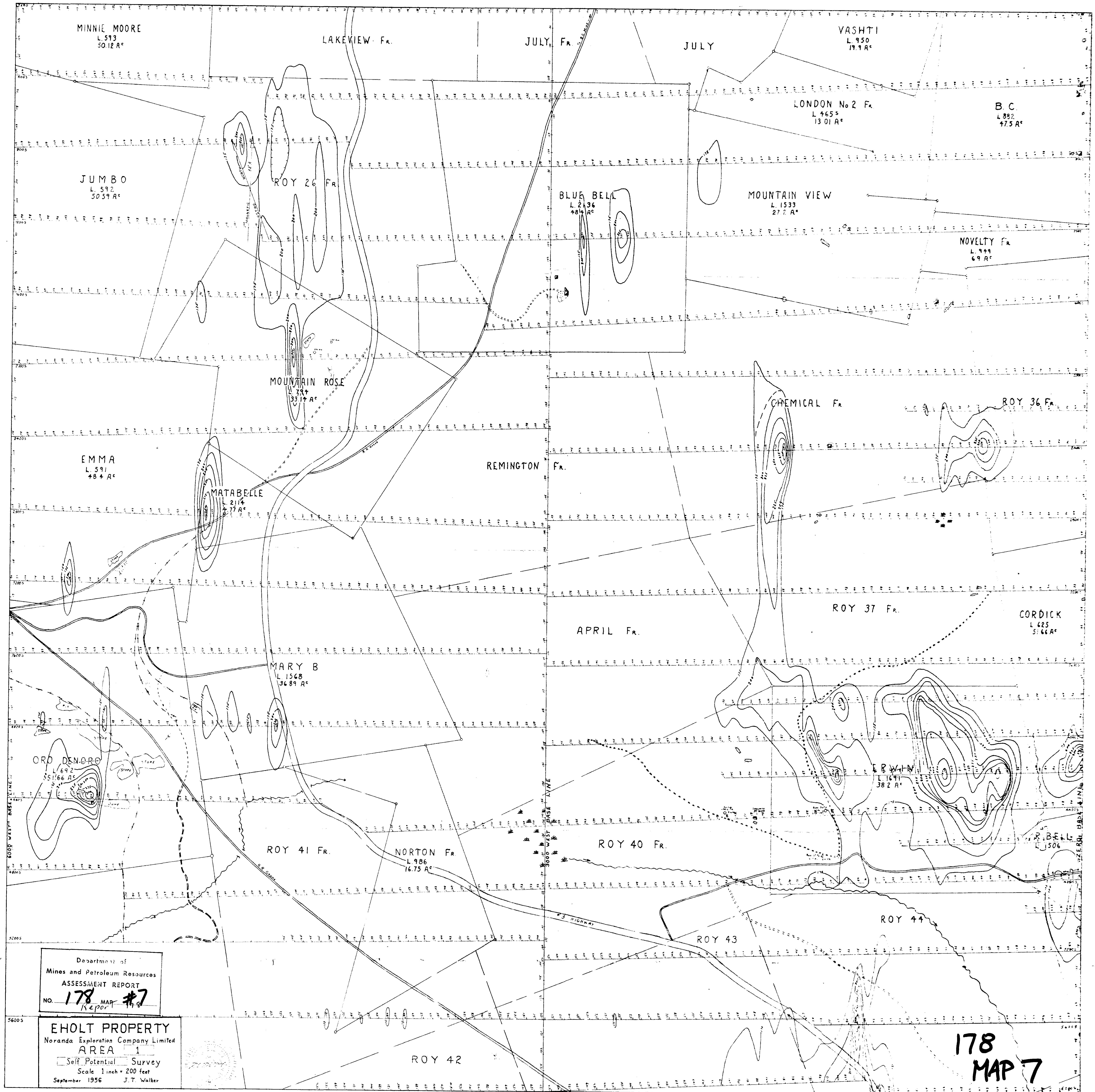
Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 178 MAP #6

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EHOLT PROPERTY
Noranda Exploration Company Limited
AREA [ ]
Geological Survey
Scale 1 inch = 200 feet
September 1956 J.T. Walker

HANK 14

HANK 4

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MAP 6

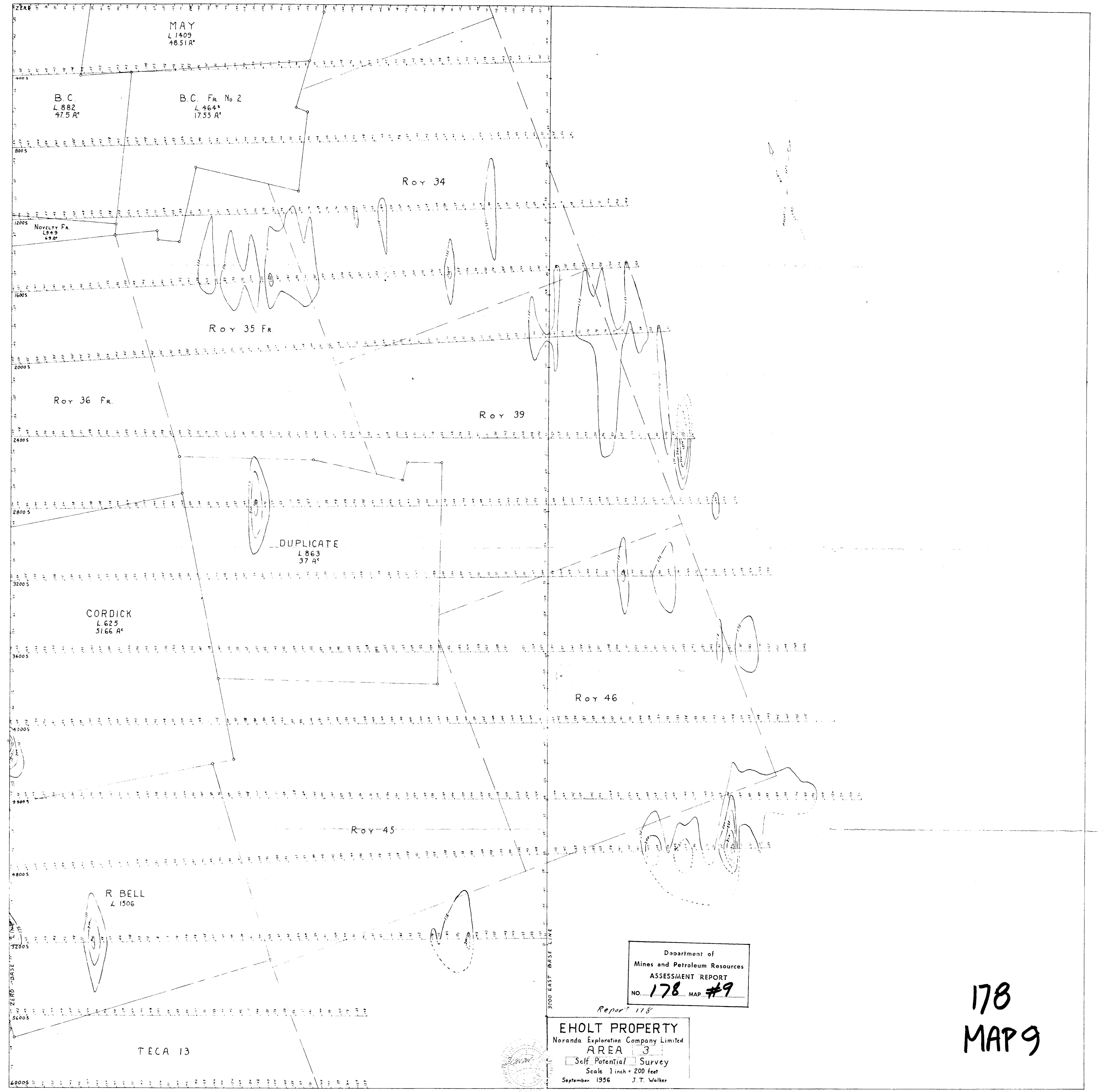


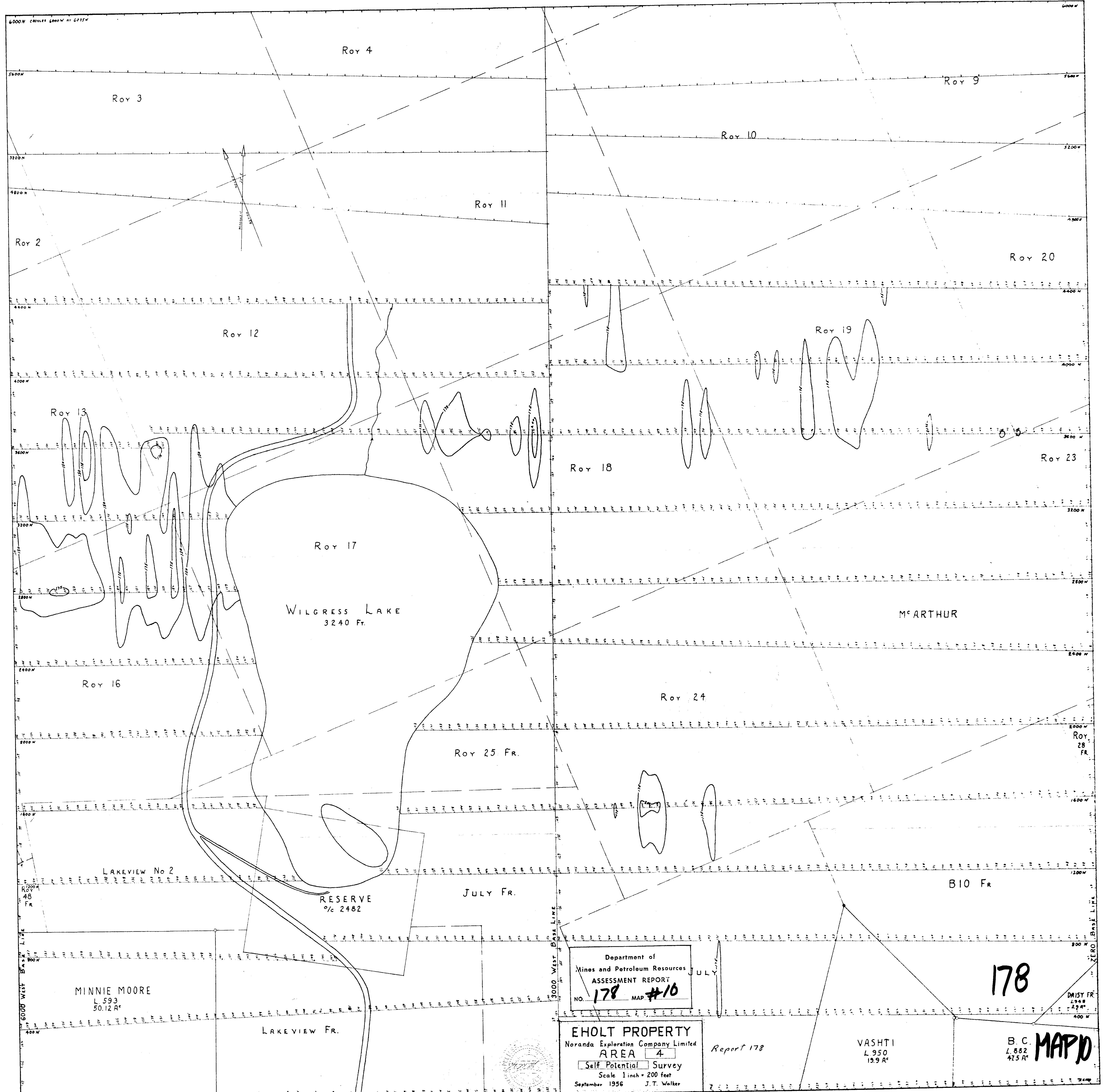


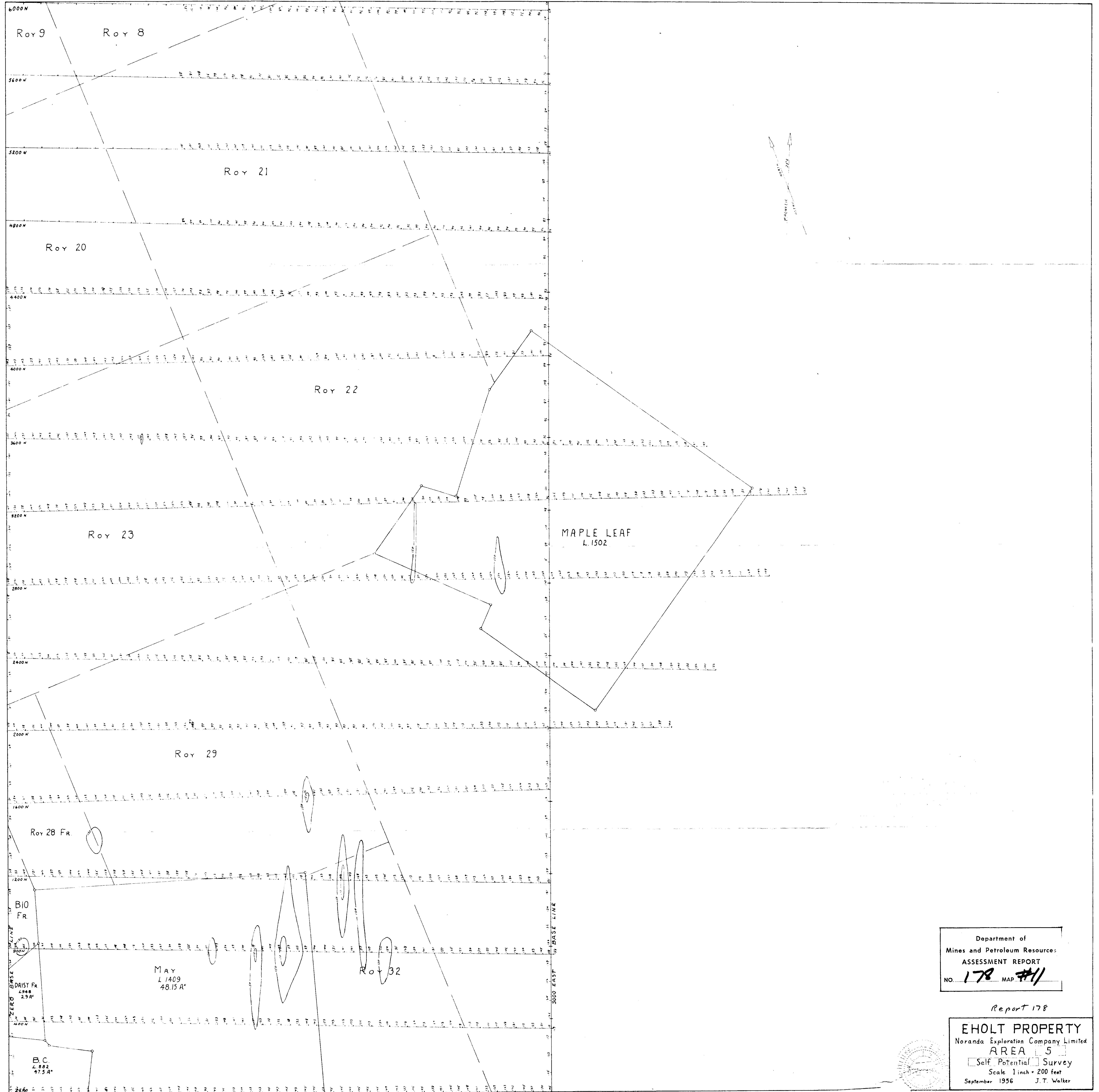
Department of  
 Mines and Petroleum Resources  
 ASSESSMENT REPORT  
 NO. 178 MAP #8

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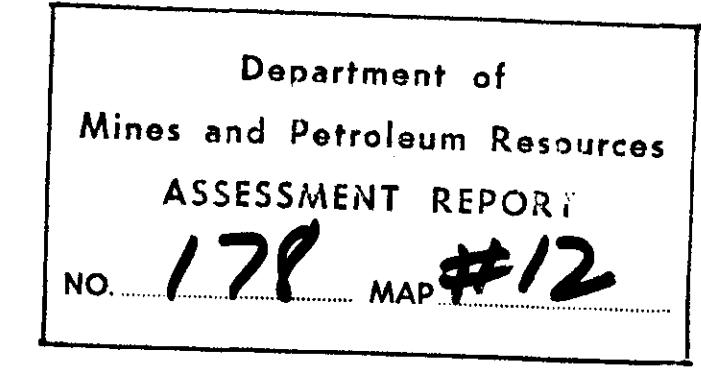
EHOLT PROPERTY  
 Noranda Exploration Company Limited  
 AREA 2  
 Self Potential Survey  
 Scale 1 inch = 200 feet  
 September 1956 J. T. Walker







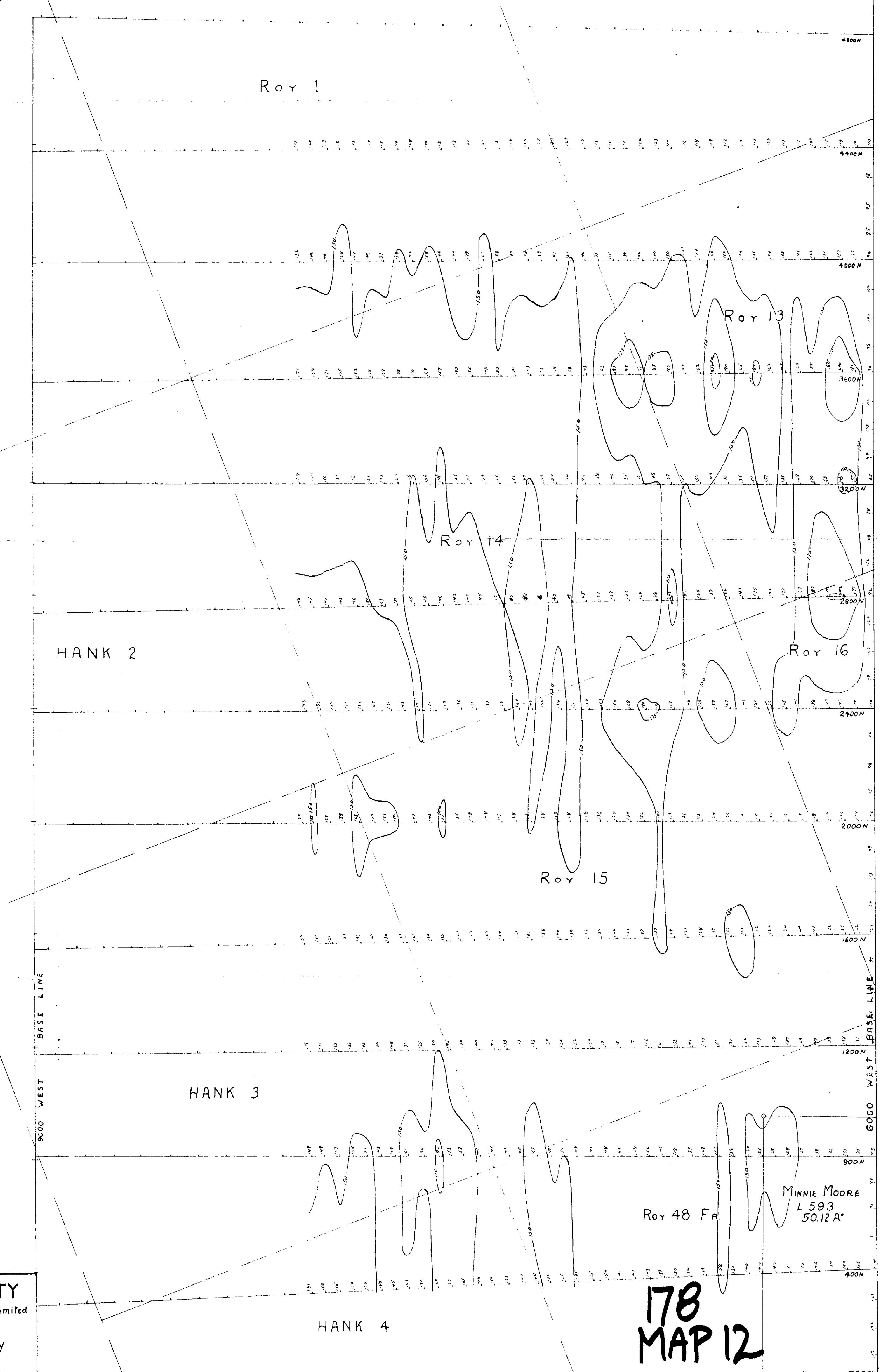
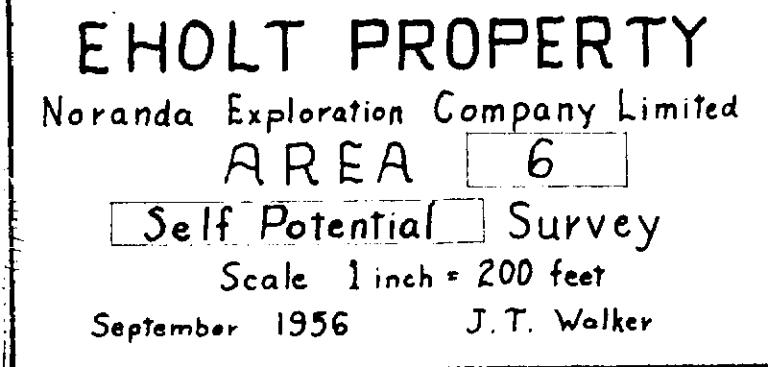
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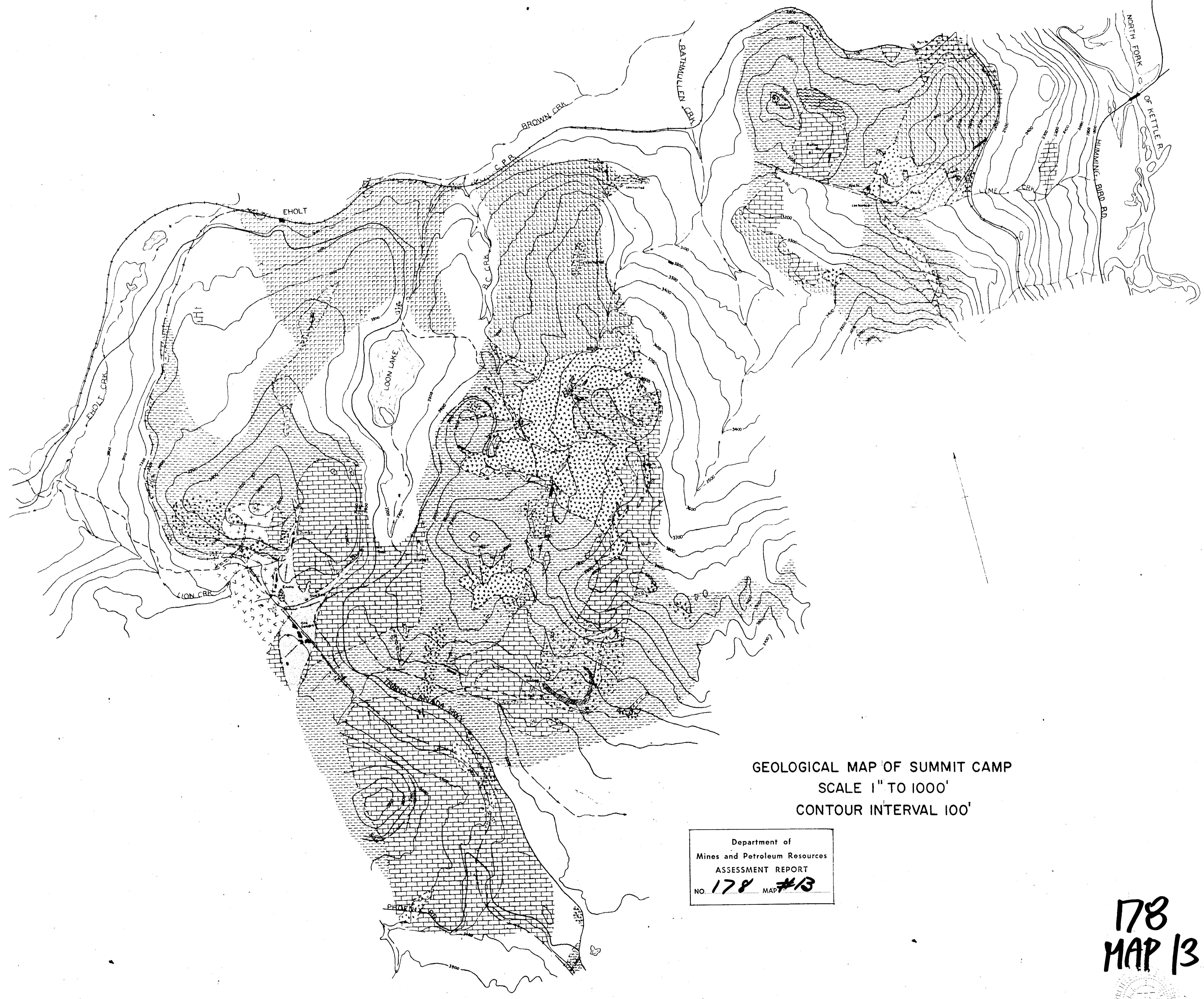
HANK 14

HANK 13

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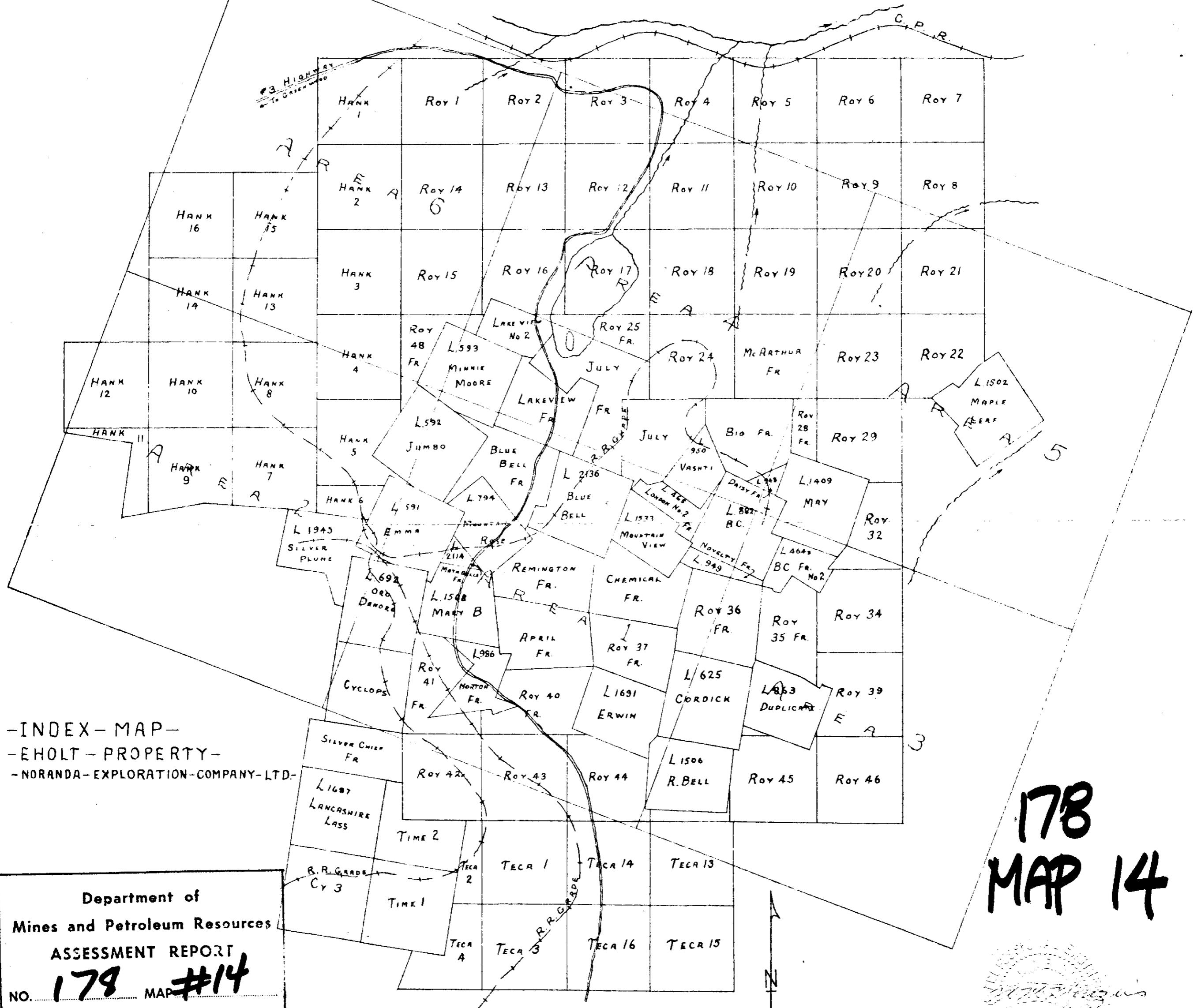
178  
MAP 12



GEOLOGICAL MAP OF SUMMIT CAMP  
SCALE 1" TO 1000'  
CONTOUR INTERVAL 100'

Department of  
Mines and Petroleum Resources  
ASSESSMENT REPORT  
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MAP 13



SCALE: 1 INCH = 1500 FEET

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## INDEX MAP

OF 50 SCALE MINE MAPS  
1000' TO 1 INCH

LEGEND TO GEOLOGICAL MAPS	
MESOZOIC	UNDIFFERENTIATED DIKES
	TRACHYTE FLOWS
	PULASKITE DIKES, SILLS, AND PLUGS
	PHONOLITE DIKES
	GRANODIORITE, GRANITE, SYENITE
	QUARTZ DIORITE, DIORITE
	BROOKLYN FORMATION —
	VOLCANICS —
	UNDIFFERENTIATED GREENSTONE, BASALT, ANDESITE, AND PYROCLASTICS
PALEOZOIC	TUFF
	AGGLOMERATE AND WATER-LAI'D AGGLOMERATE
	BRECCIA AND TUFF PIPES
	LIMESTONE
	LIMESTONE BRECCIA
	CHERT BRECCIA
	KNOB HILL FORMATION — CONTORTED CHERT
	SKARN
	MINERAL DEPOSITS
	BEDDING
	FAULT
	POSSIBLE FAULT
	SHEAR
	SCHISTOSITY
	FOLIATION
	JOINTS
	GEOLOGICAL CONTACT
	GENERALIZED GEOLOGICAL CONTACT

