



Mineral Deposit Series Report No. 11

Mineral Deposits and Occurrences in the Schist Lake Area, NTS 63K/12

By G.H. Gale and D.R. Eccles
Winnipeg, 1992

Energy and Mines

Hon. James E. Downey
Minister

Ian Haugh
Deputy Minister

Geological Services

W.D. McRitchie
Director

This publication is available in large print, audiotape or braille on request

TABLE OF CONTENTS

	Page
INTRODUCTION	1
Methodology	1
Format of Mineral Deposit Maps	1
Format of Mineral Deposit Reports	2
Abbreviations	2
Acknowledgments	2
GEOLOGY OF AREA NTS 63K/12	6
SELECTED REFERENCES	7
MINERAL DEPOSITS AND OCCURRENCES: SCHIST LAKE AREA (NTS 63K/12)	9
Location 1 (Schist Lake)	9
Location 2 (Mandy)	15
Location 3 (West Arm)	21
Location 4 (White Lake)	27
Location 5 (Cuprus)	31
Location 6 (Centennial)	37
Location 7 (Sourdough)	45
Location 8 (LeVasseur)	47
Location 9 (Chica)	49
Location 10 (Copper Reef)	53
Location 11 (Hotstone)	57
Location 12 (Burnt Island)	59
Location 13	61
Location 14 (Ironsides)	63
Location 15	67
Location 16 (Iron Horse)	69
Location 17 (Sunbeam)	71
Location 18	75
Location 19 (Now)	77
Location 20	79
Location 21	83
Location 22 (City Deep)	85
Location 23	87
Location 24	89
Location 25	91
Location 26	93
Location 27	95
Location 28	96
Location 29	97
Location 30	99
Location 31	103
Location 32 (Neso)	105
Location 33	109
Location 34	111
Location 35 (Klik)	113
Location 36 (Billy Boy)	115
Location 37 (Tarry)	117
Location 38	121
Location 39	122

	Page
Location 40 (Neso Lake)	123
Location 41	127
Location 42	129
Location 43	130
Location 44	131
Location 45 (Four Mile)	133
Location 46	137
Location 47	139
Location 48	140
Location 49	141
Location 50	143
Location 51	146
Location 52	149
Location 53 (Rossen)	151
Location 54	153
Location 55	155
Location 56	159
Location 57	163
Location 58	165
Location 59	166
Location 60	167
Location 61	169
Location 62	171
Location 63	173
Location 64	175
Location 65	177
Location 66	181
Location 67	183
Location 68	184
Location 69	185
Location 70	187
Location 71	189
Location 72	191
Location 73	193
Location 74	195
Location 75	197
Location 76	199
Location 77	201
Location 78	203
Location 79	207
Location 80	209
Location 81	211
Location 82	213
Location 83	215
Location 84	217
Location 85	219
Location 86	221
Location 87	223
Location 88	225
Location 89	226
Location 90	228

	Page
Location 91	229
Location 92	233

FIGURES

Index Map 1 Mineral Deposits and Occurrences in the Schist Lake Area (NTS 63K/12), Manitoba	4
Figure 1: General geology, distribution of basaltic rock types and major faults in the Flin Flon region (modified after Syme, 1990)	5
Figure 1-1: Geological setting and sample locations at the Schist Lake deposit	8
Figure 1-2: Plan of the 91 m (300 foot) level, Schist Lake Mine	10
Figure 1-3: Longitudinal section, looking N64E, Schist Lake Mine	11
Figure 2-1: Geological setting and sample locations at the Mandy deposit	16
Figure 2-2: Outline of ore lense and longitudinal section of the Mandy Mine	18
Figure 3-1: Geological setting of the West Arm deposit	20
Figure 3-2: Generalized cross section of the West Arm Mine, (looking southeast)	22
Figure 3-3: Geological plan of the 450 metre (1475 foot) level, West Arm Mine	24
Figure 4-1: Geological setting of the White Lake deposit	26
Figure 4-2: Longitudinal section of White Lake Mine	28
Figure 5-1: Geological setting of the Cuprus deposit	30
Figure 5-2: Cross-section A-A' of the Cuprus deposit, (looking north)	33
Figure 5-3: Plan of the 600-foot level, Cuprus Mine	34
Figure 5-4: Longitudinal section of the Cuprus Mine (looking east)	35
Figure 6-1: Geological setting of the Centennial deposit	38
Figure 6-2: Cross section (looking N10E) and longitudinal section (looking N100E) of the Centennial Mine	39
Figure 6-3: Diagrammatic results of geochemical survey at the Centennial deposit	40
Figure 6-4: Generalized distribution of alteration types found in the host rocks to the Centennial deposit	41
Figure 7-1: Geological setting of occurrence 7	44
Figure 8-1: Geological setting of occurrence 8	46
Figure 9-1: Detailed geology, trench and drill hole locations at occurrence 9	48
Figure 9-2: Vertical section through drill holes 9, 11 and 13 at occurrence 9	50
Figure 9-3: Location and cross section of trench 2 (looking south)	51
Figure 10-1: Geological setting of occurrence 10	52
Figure 10-2: Drill hole and trench locations at occurrence 10	54
Figure 11-1: Geological setting of occurrence 11	56
Figure 12-1: Detailed geology and drill hole locations at occurrence 12	58
Figure 13-1: Geological setting of occurrence 13	60
Figure 14-1: Geological setting of occurrence 14	62
Figure 14-2: Trench and sample locations at occurrence 14	64
Figure 15-1: Geological setting of occurrence 15	66
Figure 15-2: Detailed geology at occurrence 15	68
Figure 16-1: Geological setting of occurrence 16	70
Figure 17-1: Geological setting of occurrence 17	72
Figure 17-2: Detailed geology at trenches 1 and 2 occurrence 17	73
Figure 18-1: Geological setting of occurrence 18	74
Figure 18-2: Detailed geology at occurrence 18	76
Figure 19-1: Detailed geology, drill hole and trench locations at occurrence 19	78
Figure 20-1: Geological setting of occurrence 20	80
Figure 20-2: Detailed geology, trench and sample locations at occurrence 20	81
Figure 21-1: Detailed geology, trench and drill hole locations of occurrence 21	82

Figure 22-1: Geological setting of occurrence 22	84
Figure 23-1: Geological setting of occurrence 23	86
Figure 23-2: Detailed geology and trench locations at occurrence 23	88
Figure 24-1: Detailed geology, trench and drill hole locations at occurrence 24	90
Figure 25-1: Geological setting of occurrence 25	92
Figure 26-1: Geological setting of occurrences 26, 27, 28 and 29	94
Figure 29-1: Drill hole and trench locations at occurrence 29	98
Figure 30-1: Geological setting of occurrences 30 and 31	100
Figure 30-2: Detailed geology in the vicinity of occurrence 30	101
Figure 31-1: Detailed geology and trench location at occurrence 31	102
Figure 32-1: Geological setting of occurrence 32	104
Figure 32-2: Geology and location of trenches and shafts at occurrence 32	106
Figure 33-1: Geological setting of occurrence 33	108
Figure 34-1: Geological setting of occurrences 34 and 35	110
Figure 35-1: Detailed geology and sample locations at occurrence 35	112
Figure 36-1: Geological setting of occurrences 36 and 37	114
Figure 36-2: Detailed geology, drill hole and trench locations at occurrence 36	116
Figure 37-1: Detailed geology, drill hole and trench locations at occurrence 37	118
Figure 37-2: Plan and section of trench in schistose felsic rocks at occurrence 37	119
Figure 38-1: Geological setting of occurrences 38 and 39	120
Figure 40-1: Geological setting of occurrence 40	124
Figure 41-1: Geological setting of occurrence 41	126
Figure 42-1: Geological setting of occurrences 42 and 43	128
Figure 44-1: Geological setting of occurrence 44	132
Figure 45-1: Geological setting of occurrence 45	134
Figure 45-2: Trench locations at occurrence 45	135
Figure 46-1: Geological setting of occurrences 46, 47 and 48	136
Figure 49-1: Geological setting of occurrence 49	142
Figure 50-1: Geological setting of occurrence 50	144
Figure 50-2: Detailed geology at occurrence 50	145
Figure 51-1: Geological setting of occurrence 51	147
Figure 52-1: Geological setting of occurrence 52	148
Figure 53-1: Geological setting of occurrence 53	150
Figure 54-1: Geological setting of occurrence 54	152
Figure 54-2: Trench and sample locations at occurrence 54	154
Figure 55-1: Geological setting of occurrence 55	156
Figure 55-2: Detailed geology of occurrence 55	157
Figure 55-3: Detailed geology and sample locations at occurrence 55	158
Figure 56-1: Geological setting of occurrence 56	160
Figure 56-2: Trench locations and geochemical data at occurrence 56	161
Figure 57-1: Geological setting of occurrence 57	162
Figure 58-1: Geological setting of occurrences 58 and 59	164
Figure 60-1: Geological setting of occurrence 60	168
Figure 61-1: Geological setting of occurrence 61	170
Figure 62-1: Detailed geology and drill hole locations at occurrence 62	172
Figure 63-1: Detailed geology, drill hole and trench locations at occurrence 63	174
Figure 64-1: Geological setting of occurrence 64	176
Figure 65-1: Geological setting of occurrences 65, 66, 67 and 68	178
Figure 65-2: Detailed geology at occurrence 65	179
Figure 66-1: Detailed geology at occurrence 66	180

	Page
Figure 67-1: Geological setting of occurrences 67 and 68	182
Figure 69-1: Geological setting of occurrence 69	186
Figure 70-1: Geological setting of occurrence 70	188
Figure 71-1: Geological setting of occurrence 71	190
Figure 72-1: Geological setting of occurrence 72	192
Figure 73-1: Geological setting of occurrence 73	194
Figure 74-1: Geological setting of occurrence 74	196
Figure 75-1: Geological setting of occurrence 75	198
Figure 76-1: Geological setting of occurrence 76	200
Figure 77-1: Geological setting of occurrence 77	202
Figure 78-1: Geological setting of occurrence 78	204
Figure 78-2: Geochemical data and trench locations at occurrence 78 (from A.F. 92888)	205
Figure 79-1: Geological setting of occurrence 79	206
Figure 80-1: Geological setting of occurrences 80 and 81	208
Figure 80-2: Detailed geology, trench and drill hole locations at occurrence 80	210
Figure 81-1: Detailed geology, drill hole and trench locations at occurrence 81	212
Figure 82-1: Geological setting of occurrences 82 and 83	214
Figure 84-1: Geological setting of occurrences 84 and 85	216
Figure 85-1: Detailed geology, trench location and geochemical data at occurrence 85	218
Figure 86-1: Geological setting of occurrence 86	220
Figure 87-1: Geological setting of occurrence 87	222
Figure 88-1: Geological setting of occurrences 88, 89 and 90	224
Figure 91-1: Geological setting of occurrence 91	230
Figure 91-2: Trench locations and detailed geology at Asbestos Island	231
Figure 92-1: Geological setting of occurrence 92	232

TABLES

Table 1: Mineral deposit types	2
Table 1-1: Chemical analyses of rocks from the Schist Lake Mine area	12
Table 2-1: Chemical analyses of rocks from the Mandy Mine area (from Mwanang'Onze, 1978)	17
Table 3-1: Chemical analyses of rocks from the 205 m level, the 450 m level and DDH W-19 near elevation 850 m of the Westarm Mine (from Ko, 1980)	23
Table 5-1: Chemical analyses of rocks from the Cuprus Mine area (from Mwanang'Onze, 1978)	32
Table 14-1: Gold content of grab samples from unlabelled cores at Location 14	63
Table 89-1: Intersections of near solid to solid sulphide \pm graphite in drill cores at Location 89	227

MAP

MDS Map No. 11: Mineral Deposits and occurrences in the Schist Lake Area (NTS
63K/12), Manitoba in pocket

INTRODUCTION

This report and accompanying map are part of a Mineral Deposit Series presenting a uniformly organized and up-to-date collation and analysis of information on mineral occurrences in the Province of Manitoba. The series is intended: (1) to provide explorationists with a geoscientific data base that can be used in mineral exploration; and (2) to provide a technical data base for other government users in resource evaluations, formulation of mineral and land use policies and the initiation of regional development programs.

METHODOLOGY

The documentation program was initiated in the main mining districts of the province under the 1984-1989 Canada-Manitoba Mineral Development Agreement. Under this project mineral deposit geologists of the Geological Services Branch have attempted to inspect and evaluate each known mineral occurrence. These site visits ranged from a preliminary half day or less search of an area for old workings, to extensive geological mapping of selected occurrences for a week or more. In addition, for each occurrence the geologists have attempted to synthesize available data from published and unpublished sources. The Manitoba Mineral Inventory Card Index and the cancelled Assessment Files have been used extensively in the preparation of the report. Mineral occurrence documentations representing only cancelled assessment file compilations are identified as such under the heading 'Name'. Information for all other occurrences was acquired primarily by field examination and are commonly supplemented by cancelled assessment file compilations.

Information has been collated and maps prepared with the assistance of junior staff geologists and summer assistants. Senior mineral deposit geologists have provided the deposit classifications and text for the report.

The locations of all mineral deposits and occurrences are presented in Figure 1.

Deposit versus Occurrence

Throughout this report mineralization is referred to as a deposit if tonnage and grade figures are known; all other mineralization is referred to as an occurrence.

Massive Sulphide versus Solid Sulphide

The use of 'massive sulphide' in the geological literature is confusing in that it is not always clear whether the authors are referring to a 'massive sulphide deposit' (cf. Sangster, 1972) or a section of sulphide-rich rock. In this publication 'massive sulphide' will be used in reference to a deposit type, i.e., a volcanogenic massive sulphide deposit type, rather than the nature of the mineralization. A volcanogenic or sedimentogenic massive sulphide deposit can contain a sulphide lens that locally contains as little as 10% sulphide minerals by volume. The alteration zones that are an integral part

of many massive sulphide deposits rarely contain more than 50% sulphide minerals. Consequently, the use of 'solid sulphide' for 75%-100% and 'near solid sulphide' for 50%-75% sulphide minerals is adopted in place of the commonly used term 'massive' to describe the textural aspects of a sulphide mineralization.

FORMAT OF MINERAL DEPOSIT MAPS

Location:

One of the incentives spurring the mineral deposit documentation was the absence of accurate location maps for known mineral occurrences. Inaccurate land bases have previously resulted in failure to find old workings, surveys carried out in wrong areas, and even cancellation of intended surveys by explorationists. Consequently, considerable field time has been spent in establishing occurrence locations and attempts have been made to display exact locations both on the map and in the accompanying report.

The location number on the map is a unique reference number that will be used both in the report and the geologists' unpublished data base. These numbers are consecutive within each 1:50 000 NTS map sheet (but not within portions of a map sheet such as Map MDS87-1).

Deposit Types:

In order to maintain a mineral deposit classification, which will be useful to both explorationists and metallogeneticists, a simplified descriptive classification was selected. This classification is based on the use of common deposit types for the classification of both deposits and occurrences. The classification of mineralization is based on the premise that the mineral explorationist requires information on metals and types of mineralization in an area as well as on the economic deposits (past, present and future producers).

All deposits and occurrences are classified according to the Deposit Type classification in Table 1.

The deposit type displayed on the map represents mineralization with the greatest economic potential, for example a disseminated narrow chalcopyrite layer is emphasized rather than a much thicker solid pyrite-graphite layer.

Mineralization:

A symbol is used to denote the percentage and/or type of mineralization present. At some localities more than one type of mineralization is present. The type of mineralization displayed in the symbol represents the mineralization with the greatest economic potential as indicated by the deposit type symbol. It should be noted that in the context of this report a "sulphide facies iron formation" is equivalent to a "sulphide stratum". For a discussion of sulphide stratum the reader is referred to Gale *et al.* (1980).

TABLE 1: MINERAL DEPOSIT TYPES**STRATABOUND MASSIVE SULPHIDE TYPE DEPOSITS**

- a) Volcanic rock-associated
- b) Sedimentary rock-associated
- c) Alteration zone associated with a or b

CHEMICAL SEDIMENT TYPE DEPOSITS

- a) Sulphide facies iron formation
- b) Oxide facies iron formation
- c) Carbonate facies iron formation
- d) Silicate facies iron formation
- e) Other chemical sediments

VEIN TYPE DEPOSITS

- a) Single vein
- b) Multiple veins or lenses
- c) Stockwork

MAGMATOGENIC TYPE DEPOSITS ASSOCIATED WITH MAFIC/ULTRAMAFIC ROCKS

- a) Disseminated
- b) Layered
- c) Net textured
- d) Podiform

DEPOSIT WITH PROPHYRY AFFINITIES**PEGMATITE TYPE DEPOSITS****CLASTIC SEDIMENT TYPE DEPOSITS****REPLACEMENT TYPE DEPOSITS****DISSEMINATED MINERALIZATION - NOT CLASSIFIED**

Host Rocks:

In general, this description refers to the immediately underlying and overlying rock types. When a number of rock types are present in an extensive zone of mineralization, the most common rock types are indicated.

Elements:

This description allows for a maximum of three metals present in increasing order of abundance by volume. The precious and base metals are indicated in preference to elements such as iron and carbon.

In some instances it has been more efficient on the map and in the report to make reference to an area of mineralization rather than individual deposits or occurrences. All mineralization in the area delineated by a dotted line on the map is referenced in the report under the location number within that area.

FORMAT OF MINERAL DEPOSIT REPORTS**Location:**

Each deposit or occurrence description will contain the unique deposit reference number, deposit or claim name where applicable, UTM coordinates, general area description, the reference number of the airphoto on which the deposit can be located and a brief description of method(s) of access.

Exploration Summary:

This section provides a summary of the extent of exploration. Information for this section was compiled from Mineral Inventory Cards, cancelled Assessment Files, and maps and files from the Mining Recording Office.

Geological Setting:

In this section the general geology of a deposit or occurrence is described. The information levels of the descriptions vary considerably and depend largely upon the extent of geological mapping during the documentation project. For further details the reader should consult the references cited.

Mineralization:

A detailed description of the mineralization provides the reader with the opportunity to make his own evaluation of the significance of a mineral occurrence or deposit.

Geochemical Data:

In addition to detailed geological mapping around individual mineral occurrences, rock samples were collected from trenches and outcrops in the vicinity of the occurrences. The assay and geochemical data are included in this section. Extensive geochemical data bases are referenced but not reproduced here.

Classification:

In this section the geologist may indicate the reasons for the classification appearing on the Mineral Deposit Map. For those localities containing more than one deposit type, the deposit types not shown on the map are documented here.

References:

These include both published and unpublished sources. For published and assessment report information the reader should obtain desired material directly from the source. The mineral deposit geologists will endeavour to supply copies of unpublished material on a deposit by deposit basis. References listed at the end of each occurrence description may also include sources of additional information not directly cited in the text.

ABBREVIATIONS

The following abbreviations are used throughout the deposit and occurrence descriptions:

A.F.	assessment file
asp	arsenopyrite
CB	claim block
c.g.	coarse grained
cm	centimetre
cp	chalcopyrite
DDH	diamond drill hole(s)
diss.	disseminated
EM	electromagnetic
f.g.	fine grained
g/t	grams per tonne

HBED	Hudson Bay Exploration and Development Company Limited
HBMS	Hudson Bay Mining and Smelting Company Limited
HLEM	horizontal loop electromagnetic
km	kilometre
m	metre
m.g.	medium grained
M.I.Card	Mineral Inventory Card
NSS	near solid sulphide
oz/ton	ounces per ton
po	pyrrhotite
py	pyrite
sp	sphalerite
SS	solid sulphide
t	tonne
tr.	trace
VLEM	vertical loop electromagnetic
VLF-EM	very low frequency electromagnetic

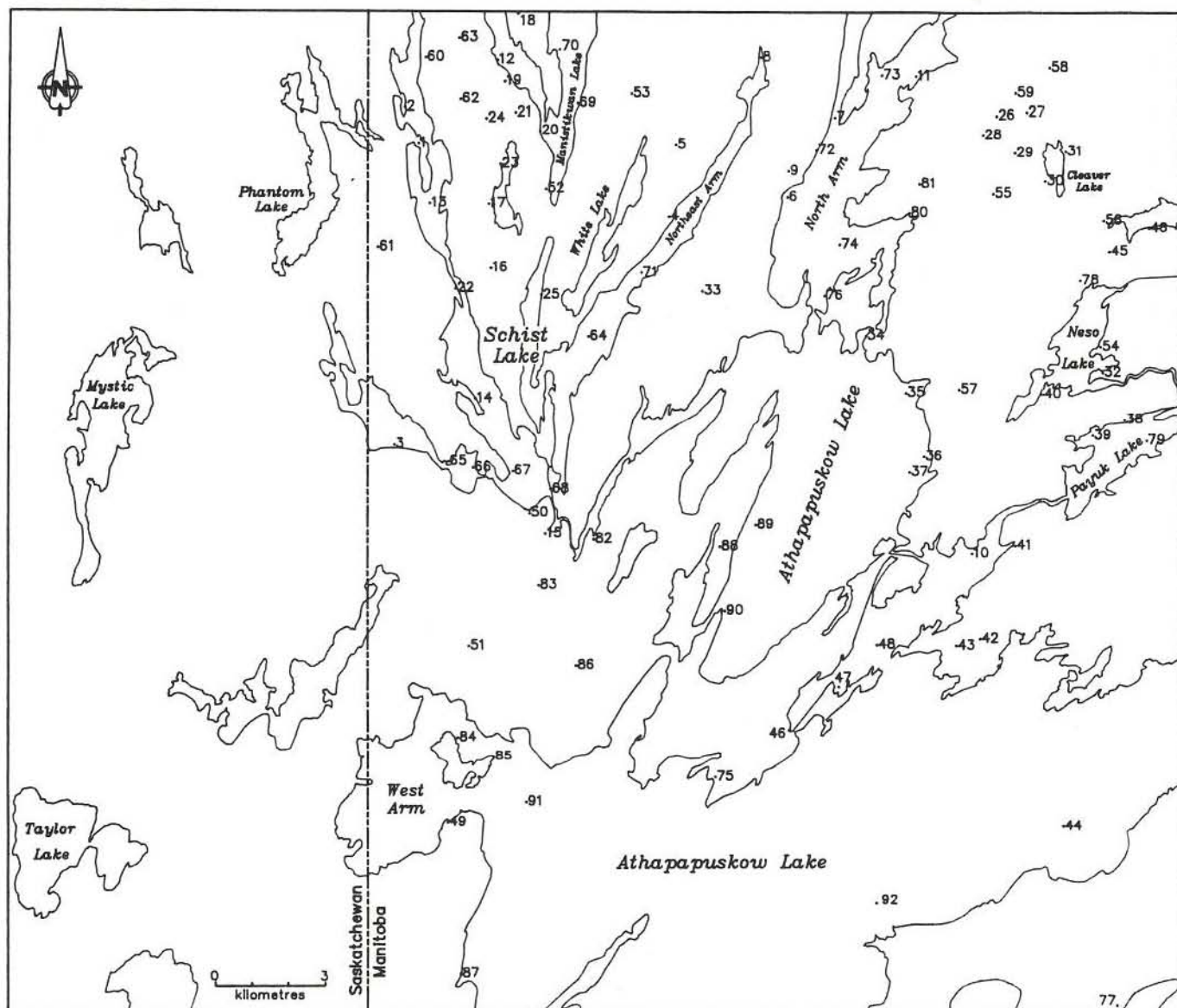
ACKNOWLEDGMENTS

A number of summer assistants have assisted with various facets of the preparation of this report, but Mark

Cooper, Tony Butt, and Rudy Schmidtke were especially helpful during the hunt for old workings. David Parbery assisted in the documentation of mineral deposits during the 1984 field season. Mr. A.L. Parres and Mr. Phillip Bachnick provided valuable information on the locations of old trenches. The manuscript was typed by Shirley Weselak, William Baker and Leah Chudy and reviewed by Karen Ferreira and Mark Fedikow. David Baldwin edited the manuscript.

The base map accompanying this report was prepared by the second author using the computer facilities at the University of Winnipeg and we thank Dr. W.C. Bell for the use of his computer facilities. Eric Su assisted in the preparation of figures using Autocad software.

NOTE: This mineral deposit report and the accompanying map are intended to be active documents that can be updated as new information becomes available. Although revisions of the publication are anticipated, any additional unpublished information may be obtained by contacting the authors or the Director, Geological Services Branch.



Index Map 1: Mineral Deposits and Occurrences in the Schist Lake Area, NTS 63K/12.

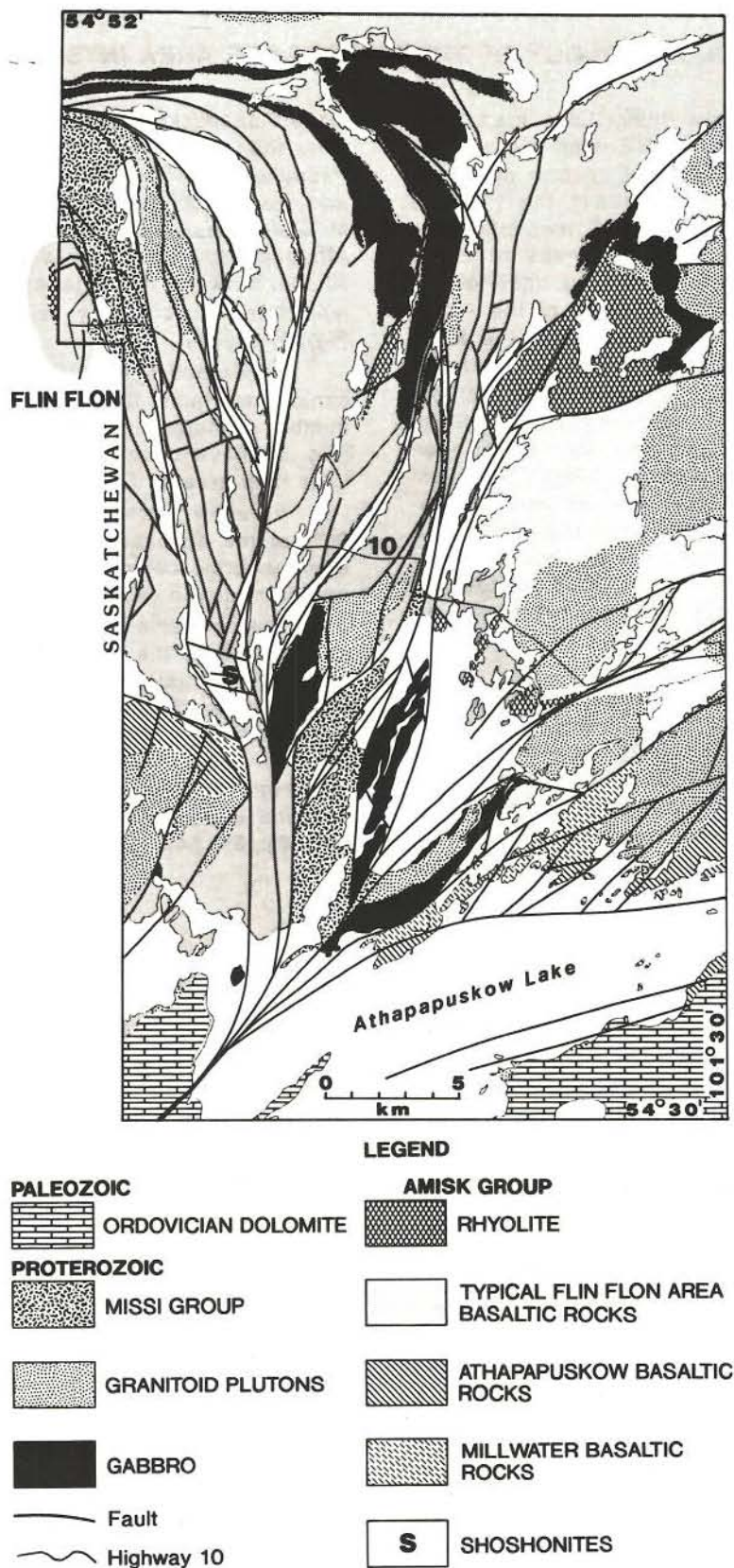


Figure 1: General geology, distribution of basaltic rock types and major faults in the Flin Flon region (modified after Syme, 1990)

GENERAL GEOLOGY OF THE SCHIST LAKE AREA (NTS 63K/12)

The geology base for the Schist Lake area (NTS 63K/12) mineral deposit map (MDS map No. 11, in pocket) is derived from the one inch to one mile map sheets of Buckham (1944), Tanton (1941), the 1:12 000 map of Stockwell (1960), the 1:20 000 map of Bailes and Syme (1987), and the 1:15 840 maps of Syme (1988a, 1988b, 1988c, 1988d). The area is underlain by metavolcanic and metasedimentary rocks of the Amisk Group and clastic metasedimentary rocks of the Missi Group that have been intruded by ultramafic to felsic rocks. The Amisk Group consists predominantly of basalt and basaltic andesite flows, volcanoclastic rocks and felsic rocks of Proterozoic age that have been dated at 1886 ± 2 Ma (Gordon *et al.*, 1990). The Missi Group metasedimentary rocks are fine- to very coarse-grained fluviatile sandstone and conglomerate that were derived, in part from, and deposited unconformably upon, the Amisk Group rocks. Flat-lying Ordovician dolomitic limestone and sandstone unconformably overlie Precambrian rocks in the southern part of the map area.

An island arc tectonic setting was established for tholeiitic volcanic rocks of the Flin Flon area by Stauffer *et al.* (1975). This interpretation was reaffirmed by Bailes and Syme (1989) and Syme (1990) on the basis of detailed studies of the physical volcanology and extensive geochemical studies of the volcanic rocks.

Syme (1988e, 1990) determined that basaltic rocks in the eastern part of the Schist Lake map area,

the 'Athapapuskow basalts', have higher magnesia contents than the typical arc-type basaltic rocks that occur throughout the Flin Flon area (Bailes and Syme, 1989) and were probably erupted in a back arc basin. The Millwater basalts, which occur adjacent to the Athapapuskow basalts, have compositions that are transitional between the Athapapuskow basalts and the arc-type basalts commonly found in the Flin Flon area (Syme, 1988e).

Bailes and Syme (1989) established a detailed volcanic stratigraphy for the Flin Flon area and identified a number of major fault blocks. Many of these fault blocks (Fig. 1) have been traced southwards into the Schist Lake map area by Syme (1985, 1988e).

Intrusive rocks, which constitute approximately 60% of the exposed Precambrian areas, include a layered gabbroic complex, gabbro, quartz diorite, tonalite and granodiorite (Syme, 1986; 1987; 1988).

Volcanogenic massive sulphide type deposits have been mined at the Mandy, Schist Lake, Cuprus, White Lake, Centennial and West Arm deposits (Locations 1-6). A number of subeconomic massive sulphide type deposits are also known (*e.g.* Locations 7,10). Quartz veins have been explored for gold mineralization at several locations, *e.g.* the Neso Lake area where the mineralization is associated with regional shears (*e.g.* Locations 32, 36, 54).

SELECTED REFERENCES

- Bailes, A.H. and Syme, E.C.
1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.
- Bailes, A.H. and Syme, E.C.
1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.
- Buckham, A.F.
1942: Athapapuskow Lake, Manitoba: preliminary map; Geological Survey of Canada, Paper 42-16, 1:31 680.
- Buckham, A.F.
1944: Athapapuskow Lake, Manitoba; Geological Survey of Canada, Map 807A, 1:63 360.
- Gordon, T.M., Hunt, P.A., Loveridge, W.D., Bailes, A.H. and Syme, E.C.
1987: U-Pb zircon ages from the Flin Flon and Kisseynew belts, Manitoba: chronology of early Proterozoic crust formation; In Geological Association of Canada, Mineralogical Association of Canada, 1987 Joint Annual Meeting, Program with Abstracts, v. 12, p. 4.
- Gordon, T.M., Hunt, P.A., Bailes, A.H., and Syme, E.C.
1990: U-Pb ages from the Flin Flon and Kisseynew belts, Manitoba: chronology of crust formation at an Early Proterozoic accretionary margin; in The Early Proterozoic Trans-Hudson Orogen of North America (J.F. Lewry and M.R. Stauffer, eds.) Geological Association of Canada Special Paper 37, p. 177-200.
- Syme, E.C.
1985: Athapapuskow Lake project; in Manitoba Energy and Mines, Report of Field Activities, 1985, p. 44-47.
- Syme, E.C.
1986a: Schist Lake; Manitoba Energy and Mines, Preliminary Geological Map 1986F-1, 1:15 840.
- Syme, E.C.
1986b: Schist Lake area (Athapapuskow project); in Manitoba Energy and Mines, Report of Field Activities, 1986, p. 36-42.
- Syme, E.C.
1987a: Athapapuskow Lake project; in Manitoba Energy and Mines, Report of Field Activities, 1987, p. 30-40.
- Syme, E.C.
1987b: Stratigraphy and geochemistry of two Proterozoic arcs: Lynn Lake and Flin Flon metavolcanic belts, Manitoba; In Geological Association of Canada, Mineralogical Association of Canada, 1987 Joint Annual Meeting, Program with Abstracts, v. 12, p. 94.
- Syme, E.C.
1988a: Schist Lake (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-1, 1:15 840.
- Syme, E.C.
1988b: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.
- Syme, E.C.
1988c: West Arm (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-3, 1:15 840.
- Syme, E.C.
1988d: Millwater (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-4, 1:15 840.
- Syme, E.C.
1988e: Athapapuskow Lake project; in Manitoba Energy and Mines, Report of Field Activities, 1988, p. 20-34.
- Syme, E.C.
1989: Athapapuskow Lake project: status report; in Manitoba Energy and Mines, Report of Field Activities, 1989, p. 38-39.
- Syme, E.C.
1990: Stratigraphy and geochemistry of the Lynn Lake and Flin Flon metavolcanic belts, Manitoba. in The Early Proterozoic Trans-Hudson Orogen of North America (J.F. Lewry and M.R. Stauffer, eds.) Geological Association of Canada Special Paper 37 p. 143-162.
- Syme, E.C., Bailes, A.H., Gordon, T.M. and Hunt, P.A.
1987: U-Pb zircon geochronology in the Flin Flon Belt: age of volcanism; in Manitoba Energy and Mines, Minerals Division, Report of Field Activities, 1987, p. 105-107.

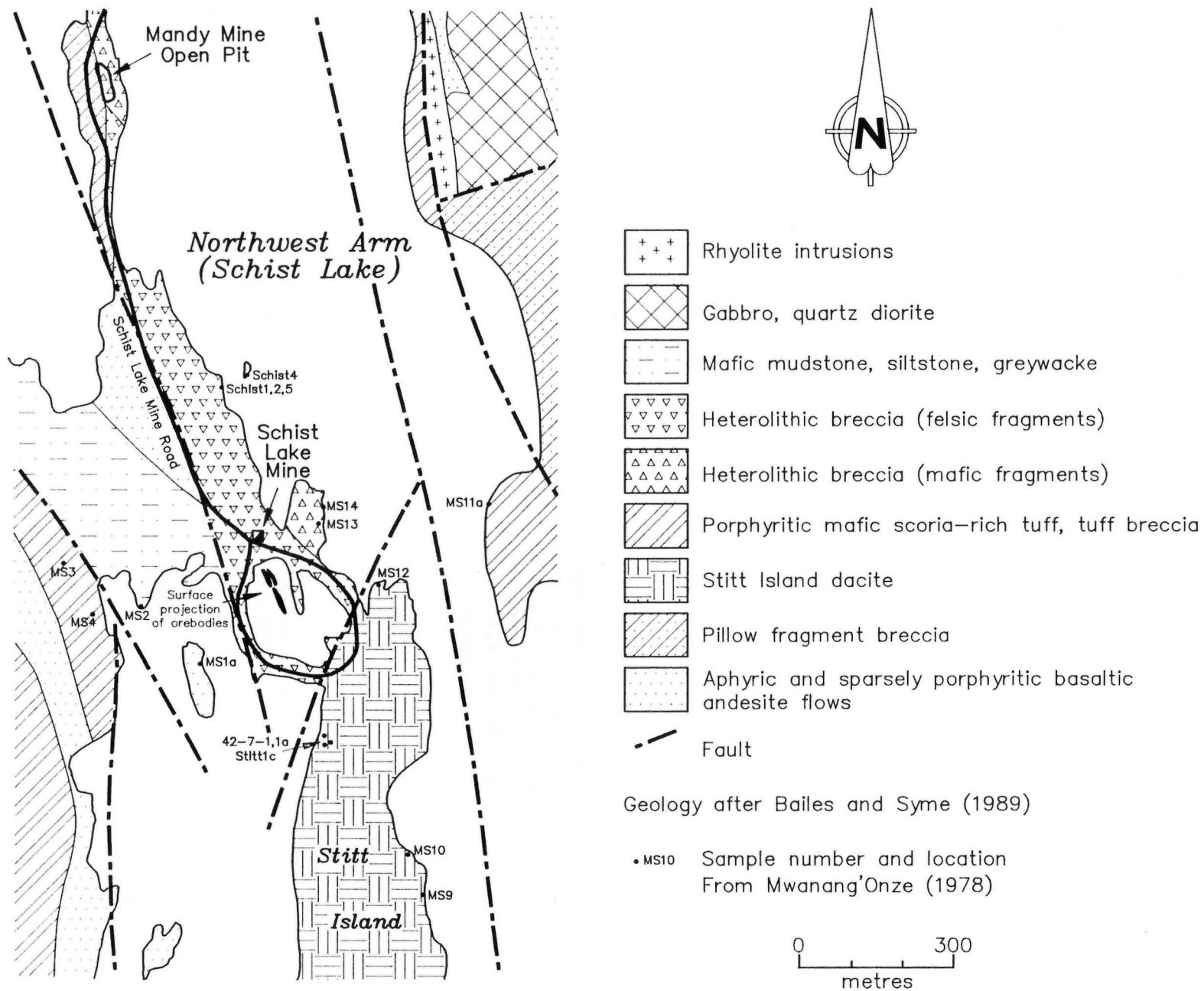


Figure 1-1: Geological setting and sample locations at the Schist Lake deposit.

MINERAL OCCURRENCE DESCRIPTIONS: NTS 63K/12

LOCATION: 1

NAME: Schist Lake Mine

UTM: 6066875N/318003E

ACCESS: Via mine road from Channing

AREA: 5 km south of Flin Flon

AIRPHOTO: A26397-230

EXPLORATION SUMMARY:

The Ryan claim was staked by Isidore Dion in 1915. The property was optioned to Standard Trust Co. in 1917, and trenches were dug prior to 1919 when Lease 19 was issued for the claim. The claim was optioned by both Flin Flon Mines Ltd. and HBMS in 1928 and by Emergency Metals Ltd. in 1940. HBED optioned the claim in 1946 from Jack Wanless.

An orebody of approximately 272 000 t was outlined by diamond drilling in 1947. Shaft sinking began in 1947 and full production began in August 1954. Internal shafts were sunk from the 335 m (1 100 foot) and 655 m (2 150 foot) levels. One zone was developed to the 1 067 m (3 500 foot) level at the south end of the mine. In addition, an exploration drift was driven northward on the 564 m (1 850 foot) level to the Mandy Mine (Location 2). The mine ceased production in March 1976 (M.I. Card NTS 63K/12 Cu 4).

GEOLOGICAL SETTING:

The area has been mapped by Tanton (1941), Stockwell (1960) and Bailes and Syme (1989).

The ore lenses, located beneath Schist Lake (Fig. 1-1), are situated within a unit of carbonatized sericite schist (Davies *et al.*, 1962, p. 73; Geological staff, 1957, p. 258). Locally, in underground workings, these rocks are silicic and/or chloritic and contain rock fragments of mafic composition. A 1 to 2 m thick band of straw-yellow sericitic schist forms a distinct rock unit at the south end of the mine. The sericite-carbonate rock unit, shown in Figure 1-2, is probably the northern extension of the massive carbonate-bearing silicic rock that is exposed on Stitt Island (Fig. 1-1).

Heterolithic volcanic breccia, north of the mine shaft (Fig. 1-1), is composed predominantly of felsic, plagioclase phyric mafic and intermediate volcanic fragments, minor aphyric mafic volcanic fragments, amygdaloidal mafic to intermediate volcanic fragments and several laminated sedimentary rock or tuff fragments (Bailes *et al.*, 1987). These rocks were extensively chloritized, silicified and pyritized.

East and southeast of the Schist Lake Mine shaft (Fig. 1-1), heterolithic volcanic breccia contains angular to rounded fragments of mafic to felsic rocks. These rocks contain abundant plagioclase phenocrysts in both the rock fragments and the matrix (Bailes *et al.*, 1987). Immediately east of the headframe, these rocks contain porphyroblastic carbonate grains, but a small outcrop

southeast of the headframe does not contain visible evidence of hydrothermal alteration.

The large body of carbonatized silicic rocks on Stitt Island (Fig. 1-1) appears to be equivalent to the 'sericite-carbonate rock' found within the mine (Fig. 1-2). These rocks are white to light buff weathering, massive or weakly brecciated and extremely fine grained. Carbonatization of the unit is extensive and varies from fine grained disseminated iron-carbonate to veins of iron-carbonate more than 2 cm wide. The only textural feature observed in these rocks are polygonal columnar joints and 0.1% rounded and embayed quartz phenocrysts 0.5 to 1 mm in diameter (Bailes *et al.*, 1987). This rock has been interpreted as an altered felsic volcanic rock (Bailes *et al.*, 1987) and as a chemical precipitate or sinter type of deposit (Gale and Koo, 1977). The chemical analysis of this rock (Table 1-1) contains up to 7.1% K₂O, which is high for peripheral hydrothermal mineralization in association with massive sulphide type alteration, but is comparable to an analysis of 9.9% K₂O in altered felsic rocks underlying a Kuroko type deposit in Japan (Dudas *et al.*, 1983, analysis KK3, p. 121).

Stratigraphic top determinations in the Schist Lake area are a contentious issue. Syme *et al.* (1982) state that the Schist Lake and Mandy orebodies occur in a west-facing sequence. Gale *et al.* (1976) argue that these deposits have tops to the east; the information used to support this contention is reported below.

MINERALIZATION:

The deposit consisted of a number of steeply east-dipping ore lenses that are referred to as the North and South Zones (Fig. 1-2 and 1-3). The ore lenses strike northwesterly, have vertical to steep eastward dips and plunge 60° SE. The North Zone contained three lenses that had maximum strike lengths of 60 m and lengths along plunge of 300 m. The North Zone lenses occurred between the 40 m and 700 m depths in the mine. The South Zone contained four main lenses, which had strike lengths of 60 to 120 m and lengths of 300 to 700 m along plunge. The South Zone orebody extended from surface to a depth of 1 050 m. The average thickness of the ore lenses was approximately 10 m (Howkins and Martin, 1970a).

Three types of ore were found in the South Zone; namely, (1) solid sphalerite-pyrite; (2) solid chalcopyrite-sphalerite; and (3) disseminated chalcopyrite-pyrite. The eastern (No. 1) ore lense consisted predominantly of

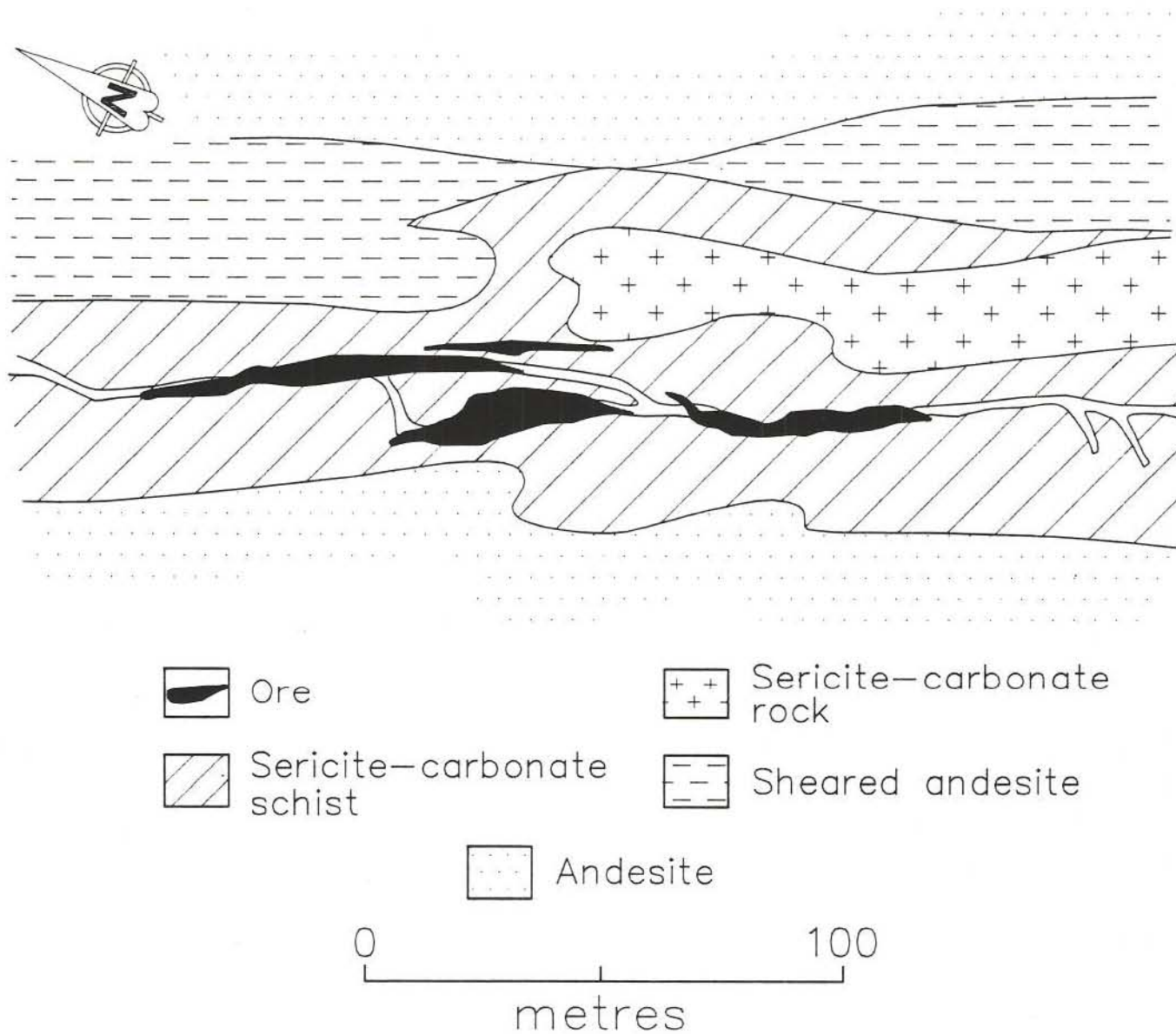


Figure 1-2: Plan of the 91 m (300 foot) level, Schist Lake Mine (after Geological Staff, 1957).

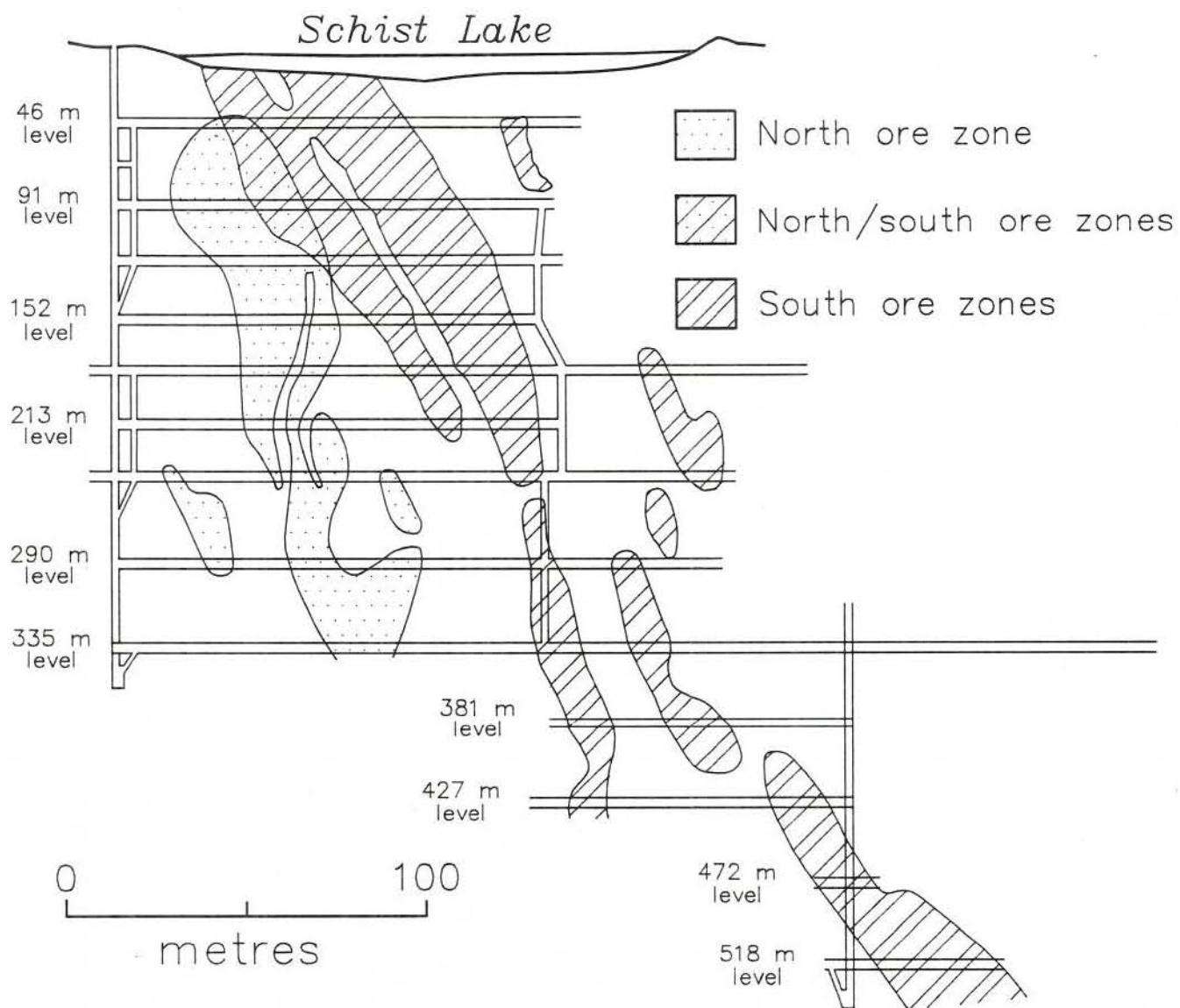


Figure 1-3: Longitudinal section, looking N64°E, Schist Lake Mine (after Geological Staff, 1957).

TABLE 1-1: CHEMICAL ANALYSIS OF ROCKS FROM THE SCHIST LAKE MINE AREA.
ANALYSES 1-7 FROM UNPUBLISHED DATA (G.H.G., 1984) AND 8-17 FROM MWANANG'ONZE (1978).

SAMPLE #	ROCK DESCRIPTION	SiO ₂ (wt.%)	Al ₂ O ₃ (wt.%)	Fe ₂ O ₃ (wt.%)	CaO (wt.%)	MgO (wt.%)	Na ₂ O (wt.%)	K ₂ O (wt.%)	TiO ₂ (wt.%)	P ₂ O ₅ (wt.%)	MnO (wt.%)	Cu (ppm)	Zn (ppm)	Ni (ppm)	Ba (ppm)
1. 42-7-1	Silicic rock from Stitt Island	70.00	10.86	3.38	2.15	1.19	0.13	6.31	0.30	0.12	0.06	-	-	-	-
2. 42-7-1A	Silicic rock from Stitt Island	63.55	10.51	4.05	4.59	2.25	0.12	5.76	0.26	0.12	0.08	-	-	-	-
3. 42-1-Stitt1e	Silicic rock from Stitt Island	62.10	11.30	4.20	2.90	1.70	0.10	7.10	0.30	0.11	0.09	19	62	<2	570
4. 42-1-Schist 1	Altered rock with 'chlorite' veins	24.60	23.60	26.60	0.40	14.50	0.01	0.10	0.80	0.28	0.13	220	251	<2	50
5. 42-Schist 2	Altered rock with 'chlorite' veins	46.60	16.70	15.30	0.20	10.30	0.04	0.50	0.50	0.05	0.09	38	144	<2	170
6. 42-1-Schist 5	Altered rock with 'chlorite' veins	65.00	11.40	10.90	0.20	6.00	0.10	0.60	0.40	0.11	0.08	226	74	<2	140
7. 42-1-Schist 4	Andesite tuff	50.60	18.00	10.10	2.90	6.30	4.30	0.80	0.60	0.06	0.11	100	88	11	160
8. MS1a	Basalt tuff	47.70	15.76	12.53	4.58	5.65	4.75	1.03	0.62	0.33	0.21	114	94	28	-
9. MS2	Basalt porphyritic breccia	49.40	16.81	11.52	6.93	3.63	3.11	1.88	0.74	0.35	0.17	55	88	20	-
10. MS3	Andesite breccia	51.05	15.96	12.10	3.80	5.60	5.16	1.52	0.49	0.18	0.21	87	110	19	-
11. MS4	Basalt porphyritic breccia	44.40	17.96	10.24	17.10	4.13	0.58	0.01	0.32	0.07	0.17	22	56	58	-
12. MS9	Dacite breccia	63.80	11.20	7.11	3.43	2.73	2.20	1.98	0.41	0.31	0.12	18	69	10	-
13. MS10	Dacite (light weathering) intrusion	62.80	14.39	3.52	3.45	2.09	3.34	3.65	0.37	0.26	0.07	10	36	22	-
14. MS11a	Andesite tuff breccia	58.80	15.02	10.08	2.13	3.57	2.30	2.41	0.68	0.12	0.14	97	109	12	-
15. MS12	Porphyritic andesite breccia	51.35	17.19	11.88	5.95	6.15	2.12	0.30	0.62	0.16	0.10	95	86	11	-
16. MS13	Porphyritic andesite breccia	51.60	17.42	10.73	2.75	5.35	3.43	2.03	0.82	0.26	0.09	110	88	18	-
17. MS14	Porphyritic basalt breccia	46.60	17.88	13.31	1.52	13.10	1.55	0.49	0.48	0.11	0.09	200	228	260	-

solid sphalerite-pyrite, whereas the western part of the west ore lense (No. 2) was solid chalcopryite-sphalerite. Disseminations and veinlets of chalcopryite and pyrite form the eastern part and lowermost end of the west (No. 2) lense (Geological staff, 1957). This metal zonation in stacked ore lenses suggests that the lenses young toward the east.

Conflicting evidence is given by Howkins and Martin (1970a), who consider the deposit to occupy the eastern limb of the Burley Lake Syncline. They state that sphalerite banding occurs toward the stratigraphic hanging wall and that chalcopryite is concentrated toward the footwall (east?).

Metallic minerals in the deposit include pyrite, chalcopryite, sphalerite, arsenopyrite, galena, enargite, and gold. Metal zonation is prominent in individual sulphide lenses. One of us (G.H.G.) observed a sulphide lense with a chalcopryite and chlorite footwall zone (50% sulphide) that was directly overlain by solid chalcopryite, sphalerite and pyrite; the abundance of banded sphalerite increased in the solid sulphide lense toward the hanging wall.

Disseminations and stringers of chalcopryite and pyrite in chloritic schist below and between several of the solid sulphide lenses are considered to be metamorphic products of the extensive hydrothermal alteration zone immediately adjacent to this deposit. Magnesian-chlorite bearing veins, up to 10 cm wide, disseminated pyrite and chalcopryite, and local zones of silicification several tens of metres in diameter are well exposed north of the mine shaft (see sample locations Schist 1, 2, 5, Fig. 1-1). This alteration zone is considered to be part of the alteration associated with the Schist Lake and Mandy ore zones (Bailes *et al.*, 1987), but Gale *et al.* (1976) consider it to be part of a younger hydrothermal event.

GEOCHEMICAL DATA:

The deposit produced 1 877 813 t of ore containing 4.21% Cu, 7.00% Zn, 1.4 g/t Au and 37 g/t Ag (M.I. Card NTS 63K/12 Cu4). Data for individual ore lenses are not available.

No systematic geochemical study of the Schist Lake Mine has been undertaken.

Chemical analyses of altered rocks from the alteration zone north of the mine shaft (Table 1-1) are typical of those obtained from other massive sulphide type deposit alteration zones in the Flin Flon area, *i.e.*, low Na₂O, high MgO, FeO and Al₂O₃. Only one of the analyses (MS4) from Mwanang'Onze (1978) has an indication of low Na₂O relative to unaltered rocks in this area.

CLASSIFICATION:

Stratabound massive sulphide type deposit; volcanic rock associated. The deposit consists of stacked and zoned ore lenses and an associated hydrothermal alteration zone. The magnesium-rich vein alteration

north of the mine shaft is considered to represent a stratigraphically higher hydrothermal vent. The nature of the carbonate alteration is not certain, but alteration of the Stitt Island dacite is probably also related to a massive sulphide type hydrothermal event.

REFERENCES:

- Bailes, A.H. and Syme, E.C.
1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.
- Bailes, A.H. and Syme, E.C.
1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.
- Bailes, A.H., Syme, E.C., Galley, A., Price, D.P., Skirrow, R. and Ziehlke, D.J.
1987: Early Proterozoic volcanism, hydrothermal activity, and associated ore deposits at Flin Flon and Snow Lake, Manitoba; Geological Association of Canada, Field Trip Guidebook, Saskatoon, 95p.
- Davies, J.F., Bannatyne, B.B., Barry, G.S. and McCabe, H.R.
1962: Geology and mineral resources of Manitoba; Manitoba Mines and Natural Resources, Mines Branch, 190p.
- Dudas, F.D., Campbell, I.H., and Gorton, M.P.
1983: Geochemistry of Igneous rocks in the Hokuroka District, Northern Japan; In The Kuroko and Related Volcanogenic Sulfide Deposits, (H. Ohmoto and B. Skinner, eds.), Economic Geology Monograph 5, p. 115-133.
- Gale, G.H., Baldwin, D.A., Solkoski, L., Ostry, G. and Fedikow, M.A.F.
1977: Evaluation of massive sulphide environments; In Manitoba Mines, Resources and Environmental Management, Mineral Resources Division, Report of Field Activities, 1977, p. 109-112.
- Gale, G.H. and Koo, J.
1977: Evaluation of massive sulphide environments; In Manitoba Mines, Resources and Environmental Management, Non-Renewable Resource Evaluation Program, Second Annual Report p. 43-62.
- Gale, G.H., Koo, J., Solkoski, L. and Southard, G.
1976: Evaluation of Massive Sulphide Environments; In Manitoba Mines, Resources and Environmental Management, Non-Renewable Resource Evaluation Program, First Annual Report, Open File 77-1, p. 54-61.

Gale, G.H., Somerville, R.C., Chornoby, P.J., Haystead, B., Provins, N., Braun, D., Mundy, D. and Walker, A.

- 1982: Geological setting of the mineral deposits at Ruttan, Thompson, Snow Lake and Flin Flon; Geological Association of Canada and Mineralogical Association of Canada, Joint Annual Meeting, University of Manitoba, Winnipeg, Manitoba, 1982, Field Trip Guidebook No. 14, 59p.

Geological Staff, Hudson Bay Mining and Smelting Co. Ltd.

- 1957: Schist Lake Mine, Manitoba; Structural Geology of Canadian Ore Deposits; Canadian Institute of Mining and Metallurgy, v. 2, p. 258-262.

Heywood, W.W.

- 1966: Ledge Lake area, Manitoba and Saskatchewan; Geological Survey of Canada, Memoir 337, 43p.

Howkins, J.B. and Martin, P.L.

- 1970a: A comparison between the Flin Flon and Snow Lake orebodies of Hudson Bay Mining and Smelting Co. Ltd., unpublished report, Hudson Bay Mining and Smelting Co., Flin Flon, Manitoba, 15p.

Howkins, J.B. and Martin, P.L.

- 1970b: A comparison between the Flin Flon and Snow Lake orebodies of Hudson Bay Mining and Smelting Co. Ltd; Abstract, Canadian Institute of Mining and Metallurgy Annual Meeting, 1970.

Mineral Inventory Card NTS 63K/12 Cu4

Manitoba Energy and Mines, Geological Services Branch

Mwanang'Onze, E.H.B.

- 1978: Stratigraphy and petrochemistry of the host rocks of copper-zinc deposits in the Flin Flon-Snow Lake greenstone belt; University of Manitoba, Ph.D. thesis, (unpublished), 420p.

Stockwell, C.H.

- 1960: Flin Flon-Mandy, Manitoba and Saskatchewan; Geological Survey of Canada, Map 1078A, 1:12 000.

Syme, E.C., Bailes, A.H., Price, D.P. and Ziehlke, D.V.

- 1982: Flin Flon volcanic belt: Geology and ore deposits at Flin Flon and Snow Lake, Manitoba; Geological Association of Canada and Mineralogical Association of Canada, Joint Annual Meeting, University of Manitoba, Winnipeg, Manitoba, 1982, Field Trip Guidebook No. 6, 91p.

Tanton, T.L.

- 1941: Schist Lake, Saskatchewan and Manitoba; Geological Survey of Canada, Map 633A, 1:63 360.

LOCATION: 2

NAME: Mandy Mine

UTM: 6067876N/317666E

ACCESS: Via all weather road to Mandy Mine

AREA: 5 km south of Flin Flon

AIRPHOTO: A26497-228

EXPLORATION SUMMARY:

Prospectors J.J. Reynolds and F.C. Jackson discovered a solid chalcopyrite-sphalerite lense in 1915 and staked the property. Tonopah Canadian Mines Co. was incorporated in 1916 to develop the property. A 23 000 t orebody containing 20% Cu was outlined by mid-1916. The property was assigned to the Mandy Mining Co. and open pit mining commenced in December, 1916. In 1917-18 a shaft was sunk to a depth of 30 m, and in 1918-19 it was deepened to the 61 m (100 foot) level. Mining ceased in 1919.

In 1928-29 the shaft was deepened to 312 m and approximately 2 500 m of drifts were completed. In addition, extensive diamond drilling was completed at the 300 m level (Wright, 1931). Exploration was discontinued in November, 1929. In 1942 HBMS bought control of the property and formed Emergency Metals Ltd., who brought the property into production in April, 1943. Operations ceased in December, 1944. In 1962 drifts were driven from the 330 m (1 100 foot) and 396 m (1 300 foot) levels of the Schist Lake Mine toward the Mandy Mine (Davies *et al.*, 1962). In 1970-72 the area below the Mandy Mine orebody was explored by an exploration drift from the Schist Mine at the 564 m (1 850 foot) level. Extensive drilling from this level discovered only a small ore zone (M.I. Card NTS 63K/12 Cu6).

GEOLOGICAL SETTING:

The area has been mapped by Stockwell (1960), and Bailes and Syme (1989). The Mandy deposit occurs near the contact between felsic and mafic heterolithologic breccia and pillow fragment breccia (Fig. 2-1); it is considered to occur at the same stratigraphic level as the Schist Lake Mine (Howkins and Martin, 1970). No evidence of an alteration zone was detected during field examination of surface exposures in the vicinity of the deposit.

The location of samples Mm5 and Mm21 were shown only on a section by Mwanang-Onze (1978) and are deduced to be from west of the orebody.

MINERALIZATION:

Only sketchy information is available on the nature of this deposit. The chalcopyrite orebody mined by the Mandy Mining Co. had dimensions of 30 x 3.7 x 61 m. This chalcopyrite zone was surrounded by a zone of banded sphalerite, chalcopyrite and pyrite that was surrounded by a zone of pyrite (Hanson, 1920). The banded lense was separated from the footwall schist by a 3 m thick pyrite band, and was overlain by a 3 to 3.5 m thick layer of sphalerite and pyrite and another band

of pyrite (Mandy Mines Ltd., Corporation File). Most of the 102 000 t of ore removed by Emergency Metals Co. was derived from the solid sulphide lense above the 61 m (200 foot) level. The dimensions of the solid sulphide lense are estimated to have been approximately 60 m long by 7 m wide and 70 m in depth (Fig. 2-2). The main minerals identified in the solid sulphide ores were pyrite, chalcopyrite, sphalerite, galena and arsenopyrite.

In the 564 m (1 850 foot) level exploration drift, which was driven from the Schist Lake Mine, there is a 0.5 to 1 m thick zone of chalcopyrite mineralization that consists of irregular veins of chalcopyrite, generally <2 cm thick. These veins appeared to be typical of chalcopyrite mobilize in an incipient fault or shear zone.

GEOCHEMICAL DATA:

In 1916-19 the 23 000 t of chalcopyrite ore mined contained 19.7% Cu, 2.9 g/t Au and 83 g/t Ag. In 1943 and 1944 the 102 000 t of ore mined contained 5.63% Cu, 13.95% Zn, 3.05 g/t Au and 55 g/t Ag. The combined totals yield a deposit of 125 000 t with 8.22% Cu, 11.38% Zn, 3.02 g/t Au and 60.15 g/t Ag; one of the highest grade deposits known in the Flin Flon area.

Chemical analyses of five rock samples collected in the vicinity of the Mandy deposit (Fig. 2-1) are presented in Table 2-1. These analyses do not exhibit a pronounced sodium depletion on either side of the solid sulphide lense. This information tends to support field observations that there does not appear to be a massive sulphide type alteration zone exposed in outcrop adjacent to the deposit.

CLASSIFICATION:

Stratabound massive sulphide type deposit; volcanic rock associated. If an alteration zone exists, it is probably situated directly below the solid sulphide lense. Alternatively, the solid sulphide lense may have been faulted into its present position. (*cf.*, Schist Lake deposit, Location 1).

REFERENCES:

Alcock, F.J.

1923: Flin Flon Map Area, Manitoba and Saskatchewan; Geological Survey of Canada, Summary Report 1922, Part C, p. 26-29.

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

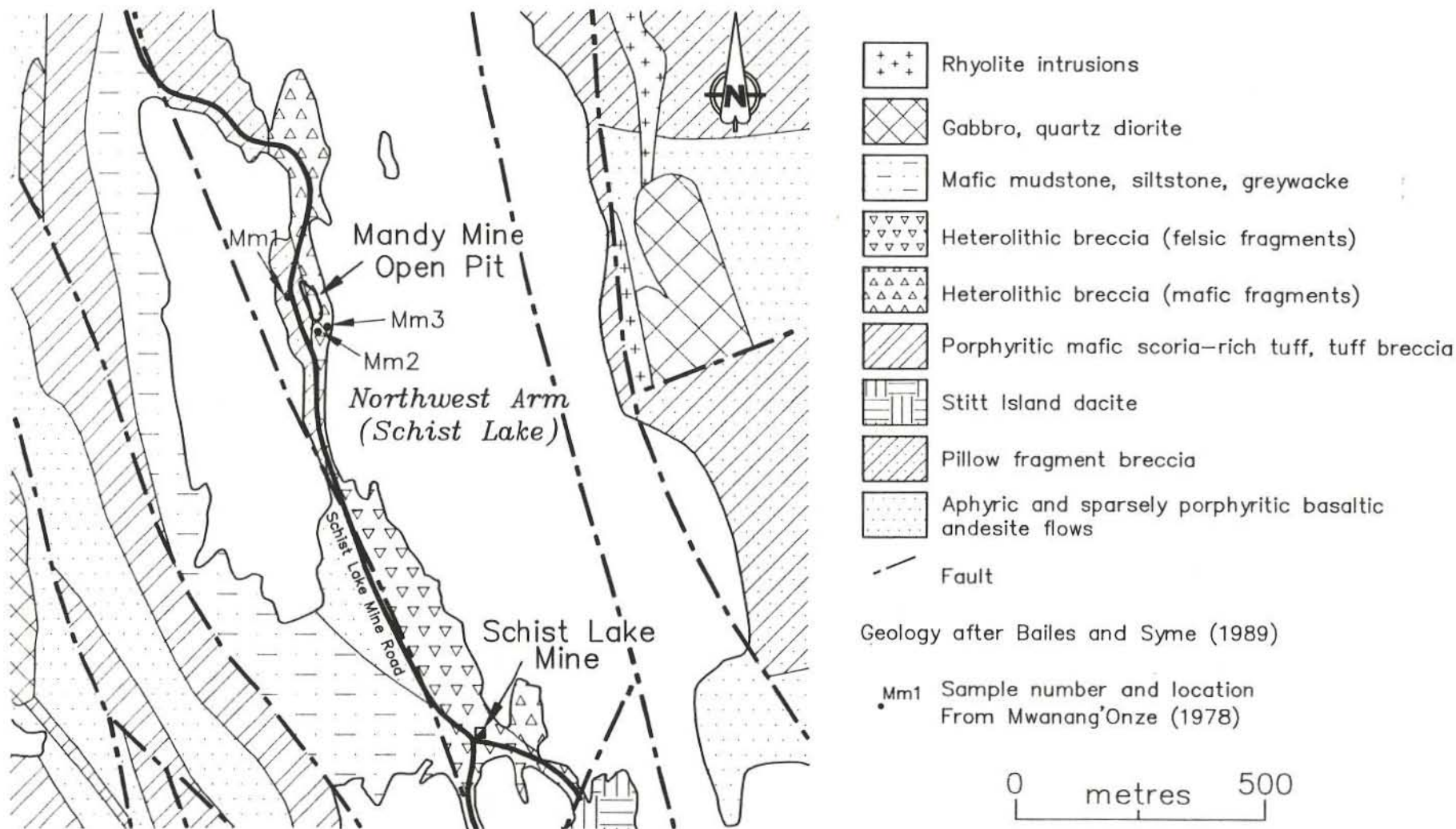


Figure 2-1: Geological setting and sample locations at the Mandy deposit.

TABLE 2-1: CHEMICAL ANALYSES OF ROCKS FROM THE MANDY MINE AREA (FROM MWANANG'ONZE, 1978)

SAMPLE #	ROCK DESCRIPTION	SiO ₂ (wt.%)	Al ₂ O ₃ (wt.%)	Fe ₂ O ₃ (wt.%)	FeO (wt.%)	CaO (wt.%)	MgO (wt.%)	Na ₂ O (wt.%)	K ₂ O (wt.%)	TiO ₂ (wt.%)	P ₂ O ₅ (wt.%)	MnO (wt.%)	Cu (ppm)	Zn (ppm)	Ni (ppm)	Co (ppm)
Mm1	Basalt breccia	48.80	16.50	5.29	5.92	6.20	4.63	5.10	0.26	0.71	0.11	0.21	141	164	40	38
Mm2	Basalt breccia	49.50	18.00	3.55	7.88	4.95	5.00	4.34	0.22	0.82	0.15	0.20	46	80	30	41
Mm3	Basalt breccia	48.50	16.26	3.23	8.52	6.13	4.08	4.29	0.23	0.84	0.26	0.21	20	81	23	39
Mm5	Basalt breccia	51.60	12.59	2.10	6.76	8.20	7.35	2.62	1.08	0.52	0.27	0.21	74	68	62	39
Mm21	Basalt tuff	44.35	15.22	3.30	5.84	12.16	3.65	4.40	1.08	0.43	0.32	0.23	71	50	26	40

The location of samples Mm5 and Mm21 were shown only on a section by Mwanang'Onze (1978) and are deduced to be from west of the orebody.

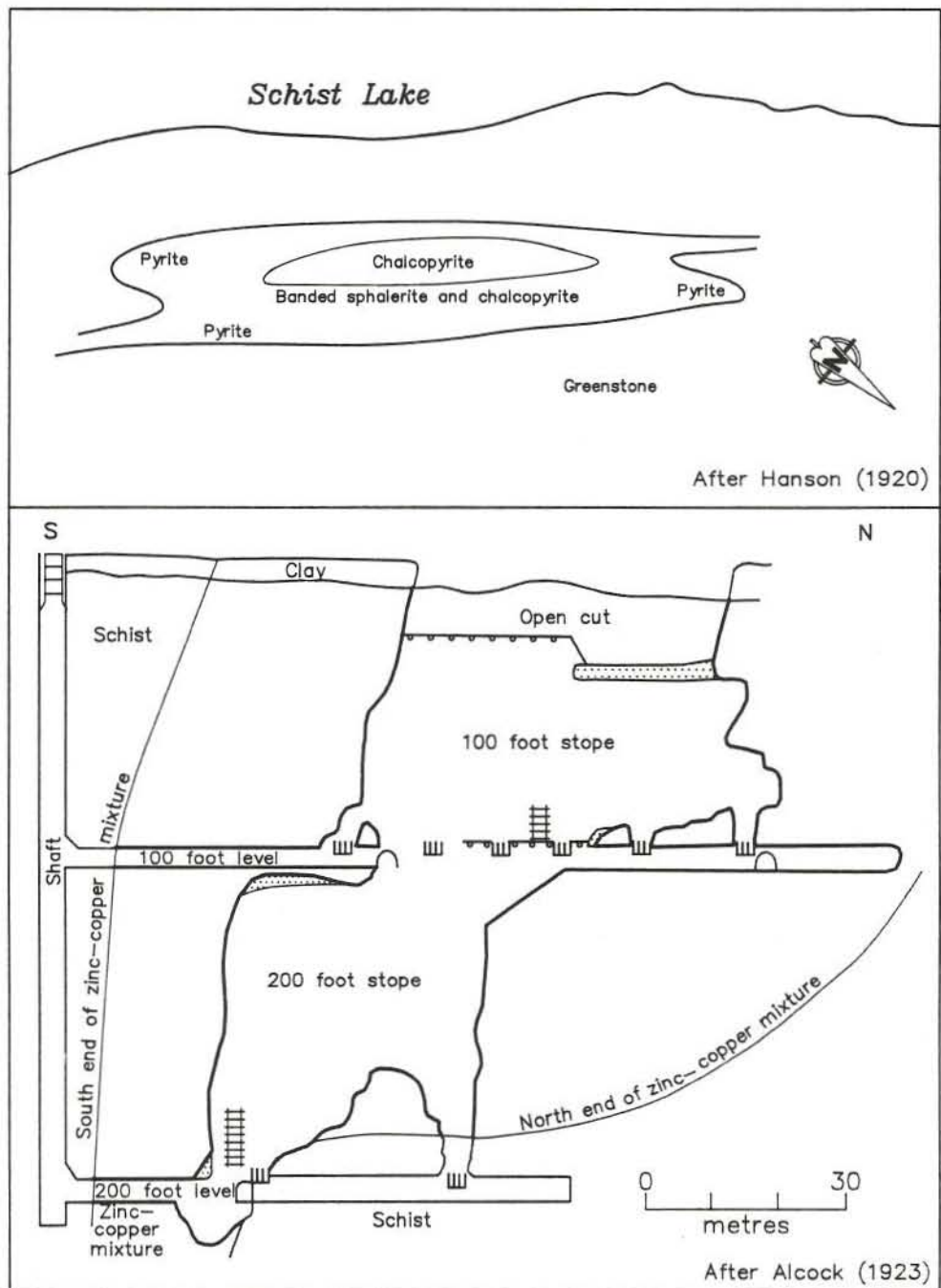


Figure 2-2: Outline of ore lense and longitudinal section of the Mandy Mine.

- Bailes, A.H. and Syme, E.C.
1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.
- Bruce, E.L.
1918: Amisk-Athapapuskow Lake District; Geological Survey of Canada, Memoir 105, p. 72-77.
- Davies, J.F., Bannatyne, B.B., Barry, G.S. and McCabe, H.R.
1962: Geology and mineral resources of Manitoba; Manitoba Mines and Natural Resources, Mines Branch, 190p.
- Gale, G.H., Baldwin, D.A. and Koo, J.
1980: A geological evaluation of Precambrian massive sulphide deposit potential in Manitoba; Manitoba Energy and Mines, Mineral Resources Division, Economic Geology Report ER79-1, 137p.
- Gale, G.H. and Koo, J.
1977: Evaluation of massive sulphide environments; In Manitoba Mines, Resources and Environmental Management, Non-Renewable Resource Evaluation Program, Second Annual Report, p. 43-62.
- Hanson, G.
1920: Some Canadian occurrences of pyritic deposits in metamorphic rocks; Economic Geology, v. 15, p. 574-609.
- Heywood, W.W.
1966: Ledge Lake area, Manitoba and Saskatchewan; Geological Survey of Canada, Memoir 337, 43p.
- Howkins, J.B. and Martin, P.L.
1970: A comparison between the Flin Flon and Snow Lake orebodies of Hudson Bay Mining and Smelting Co. Ltd.; unpublished report, Hudson Bay Mining and Smelting Co., Flin Flon, Manitoba, 15p.
- Mandy Mines Ltd., Corporation File
Manitoba Energy and Mines, Mines Branch, Corporation Files, unpublished.
- Mineral Inventory Card NTS 63K/12 Cu6
Manitoba Energy and Mines, Geological Services Branch
- Mwanang'Onze, E.H.B.
1978: Stratigraphy and petrochemistry of the host rocks of copper-zinc deposits in the Flin Flon-Snow Lake greenstone belt; University of Manitoba, Ph.D. thesis, (unpublished), 420 p.
- Sangster, D.F.
1972: Precambrian volcanogenic massive sulphide deposits in Canada-a review; Geological Survey of Canada, Paper 72-22, 44p.
- Stockwell, C.H.
1960: Flin Flon-Mandy, Manitoba and Saskatchewan; Geological Survey of Canada, Map 1078A, 1:12 000.
- Syme, E.C., Bailes, A.H., Price, D.P. and Ziehlke, D.V.
1982: Flin Flon volcanic belt: Geology and ore deposits at Flin Flon and Snow Lake, Manitoba; Geological Association of Canada and Mineralogical Association of Canada Joint Annual Meeting, University of Manitoba, Manitoba 1982, Field Trip Guidebook No. 6, 91p.
- Wright, J.F.
1931: Geology and mineral deposits of a part of northwest Manitoba; Geological Survey of Canada, Summary Report, 1930, pt. C, p. 1-124.

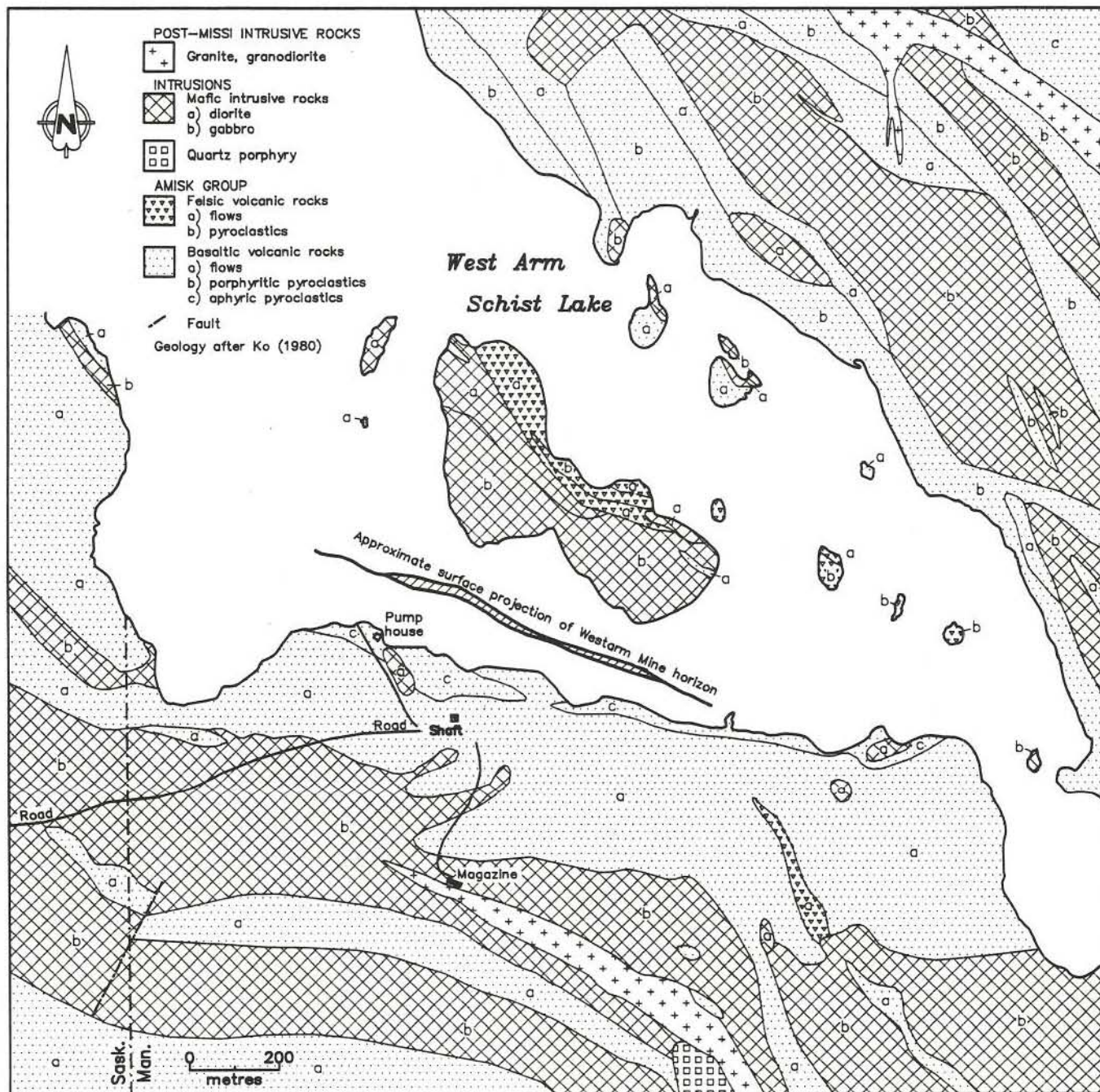


Figure 3-1: Geological setting of the West Arm deposit.

LOCATION: 3

NAME: West Arm Mine

UTM: 6058577N/316982E

ACCESS: Via mine road from South Main Shaft, Flin Flon

AREA: West arm of Schist Lake

AIRPHOTO: A26364-90

EXPLORATION SUMMARY:

The area was staked by N. Thurber in 1949. A magnetometer survey was conducted in 1953. The area was restaked in 1954 by N. Bevans and in 1957 by E. Hopkinson, but the claims were cancelled in 1958. In 1967 R. McIntyre staked the Wan 279 and 282 claims for HBED. EM surveys were conducted during 1964 (airborne), 1968 and 1969 (ground). In 1970 two holes were drilled, and by 1973 a deposit containing 650 000 t of 4.63% Cu and 0.6% Zn to a depth of 420 m had been outlined. A shaft was sunk to a depth of 440 m in 1975 and was deepened to 580 m in 1976. Production ceased in 1985, but underground exploration was underway in January 1990.

GEOLOGICAL SETTING:

The area has been mapped by Heywood (1966) and Syme (1987, 1988). Basaltic flows are exposed along the shoreline and on the hill south of the deposit. Rhyolitic and dacitic volcanoclastic rocks, and mafic intrusive rocks are exposed on small islands north of the deposit (Fig. 3-1). The deposit is located within a unit of dominantly graphitic argillaceous sedimentary rocks that underlie the west arm of Schist Lake. The host rocks and the orebody dip 70° to 85° S. Footwall rocks exposed on islands north of the sulphide lense are fine- to medium-grained gabbro and basalt pillow breccia (Syme, 1987). The southward younging basaltic pillowed flows in the hanging wall of the deposit are separated from the host rocks to the deposit by a fault (Ko, 1980). The immediate host rocks (Fig. 3-2) include dacitic flows and tuff, pyritic-graphitic-argillite and quartz-sericite-carbonate-chlorite schist (Ko, 1980).

MINERALIZATION:

The only description of the deposit, and the source of this summary, is contained in Ko (1980).

The West Arm Cu-Zn orebody was a 140 x 600 x 4.5 m lense of predominantly solid sulphide that had sharp conformable contacts with the enclosing pyritic and graphitic schists. The orebody consists mainly of fine grained pyrite and variable amounts of chalcopyrite and sphalerite. Stringer and disseminated sulphides constitute approximately 10% of the orebody. Minor metallic minerals in the ore are tetrahedrite-tennantite, arsenopyrite, bornite, hematite, pyrrhotite, cobaltite, covellite and argentite. Gangue minerals include quartz, graphite, carbonate, sericite and chlorite. Although

some parts of the sulphide deposit are banded, stratigraphic mineral zonation has not been identified; there is a decrease in the ratio of Cu/(Cu+Zn) from 0.97 in the upper levels to 0.59 below the 510 m level. In addition, the solid sulphide ores were separated into five distinct facies, namely: 1) pyrite-chalcopyrite ore, 2) pyrite-chalcopyrite-sphalerite ore, 3) pyrite-chalcopyrite ore with tetrahedrite-tennantite veinlets, 4) pyritic ore and 5) cherty sulphide ore (Ko, 1980).

Drill data from approximately the 730 m (2 400 foot) level indicate a solid sulphide zone with chert fragments at the hanging wall and a pyrrhotite-bearing disseminated sulphide zone with chalcopyrite stringers at the footwall.

At approximately the 450 m (1 475 foot) level, the main sulphide zone (Fig. 3-3) passes from stringer sulphides at the eastern margin into a near solid pyrite-chalcopyrite lense that is overlain by a pyritic zone with chalcopyrite and sphalerite, which is in turn overlain by a structurally higher pyritic zone with approximately 70% fine- to coarse-grained pyrite, but only minor chalcopyrite. A cherty sulphide zone (30% pyrite, 70% chalcopyrite, minor sphalerite) grades laterally into pyritic cherty dacitic tuff (Ko, 1980).

This relationship invites speculation that this solid sulphide lense represents a mineralogically zoned deposit with its basal portion to the northeast and its stratigraphic top to the southwest. This stratigraphic zoning is consistent with that inferred from surface geology and implies modification of the original layering during regional deformation either by faulting or by rotation during the development of tight to isoclinal folds.

GEOCHEMICAL DATA:

1 137 873 t of ore grading 3.25% Cu, 1.48% Zn, 1.4 g/t Au and 16 g/t Ag. were produced. Known reserves of 504 454 t grading 3.53% Cu, 1.8% Zn, 1.3 g/t Au and 15.0 g/t Ag remain.

Although the deposit is associated with a thin layer of quartz-sericite-carbonate-chlorite schist, there is little geochemical evidence to support the presence of an extensive hydrothermal alteration zone in the immediate vicinity of the deposit (Table 3-1; Ko, 1980). If the deposit has been extensively modified by regional deformation, as suggested above, then an associated alteration zone, as well as more solid sulphide could be present nearby.

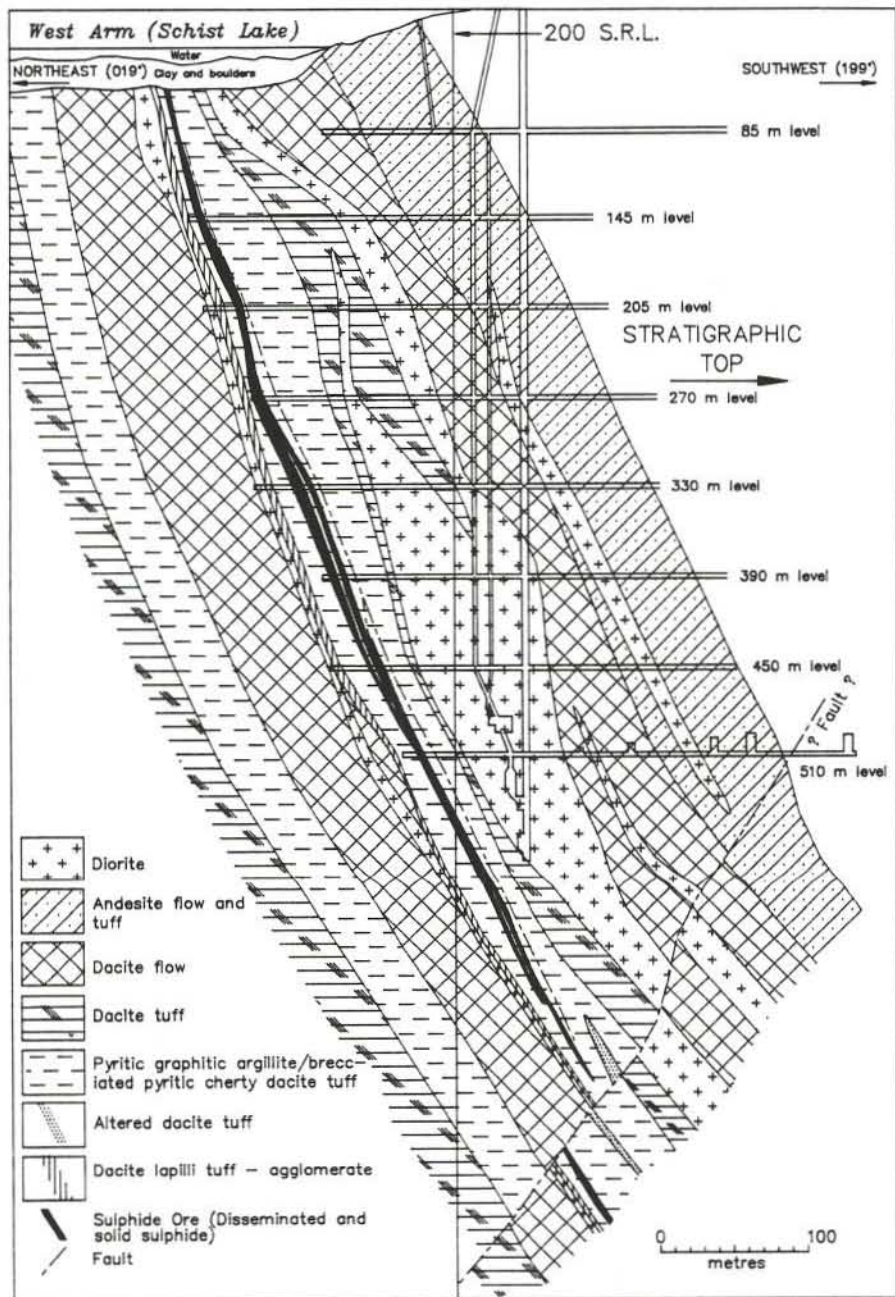


Figure 3-2: Generalized cross section of the West Arm Mine, looking southeast (from Ko, 1980).

TABLE 3-1: CHEMICAL ANALYSES OF ROCKS FROM THE WESTARM MINE (FROM KO, 1980).

SAMPLE #	ROCK DESCRIPTION	SiO ₂ (wt.%)	Al ₂ O ₃ (wt.%)	Fe (wt.%)	CaO (wt.%)	MgO (wt.%)	Na ₂ O (wt.%)	K ₂ O (wt.%)	MnO (wt.%)	Au (g/t)	Ag (g/t)	Cu %	Zn %	NI (%)
1	Pyritic graphitic argillite intercalated with brecciated pyritic cherty dacite tuff	52.78	10.98	10.97	4.13	2.12	1.65	3.60	0.11	-	-	-	-	-
2	Pyritic graphitic argillite intercalated with brecciated pyritic cherty dacite tuff	51.16	10.29	14.34	4.59	3.05	0.44	2.15	0.24	Tr	Tr	Tr	Tr	0.006
3	Pyritic graphitic argillite intercalated with brecciated pyritic cherty dacite tuff	41.19	10.98	15.49	3.87	3.55	1.17	0.25	2.87	Tr	Tr	0.17	0.24	0.008
4	Hangingwall dacite tuff	43.93	13.14	7.28	10.00	6.40	2.03	1.13	0.17	Tr	Tr	Tr	Tr	0.010
5	Hangingwall dacite tuff	43.17	12.81	6.86	6.67	5.40	4.32	0.14	1.50	Tr	Tr	0.39	Tr	0.007
6	Hangingwall diorite	45.11	13.01	7.07	13.58	8.54	2.21	0.01	1.56	Tr	Tr	0.08	Tr	0.015

- not analyzed

Tr. trace amounts

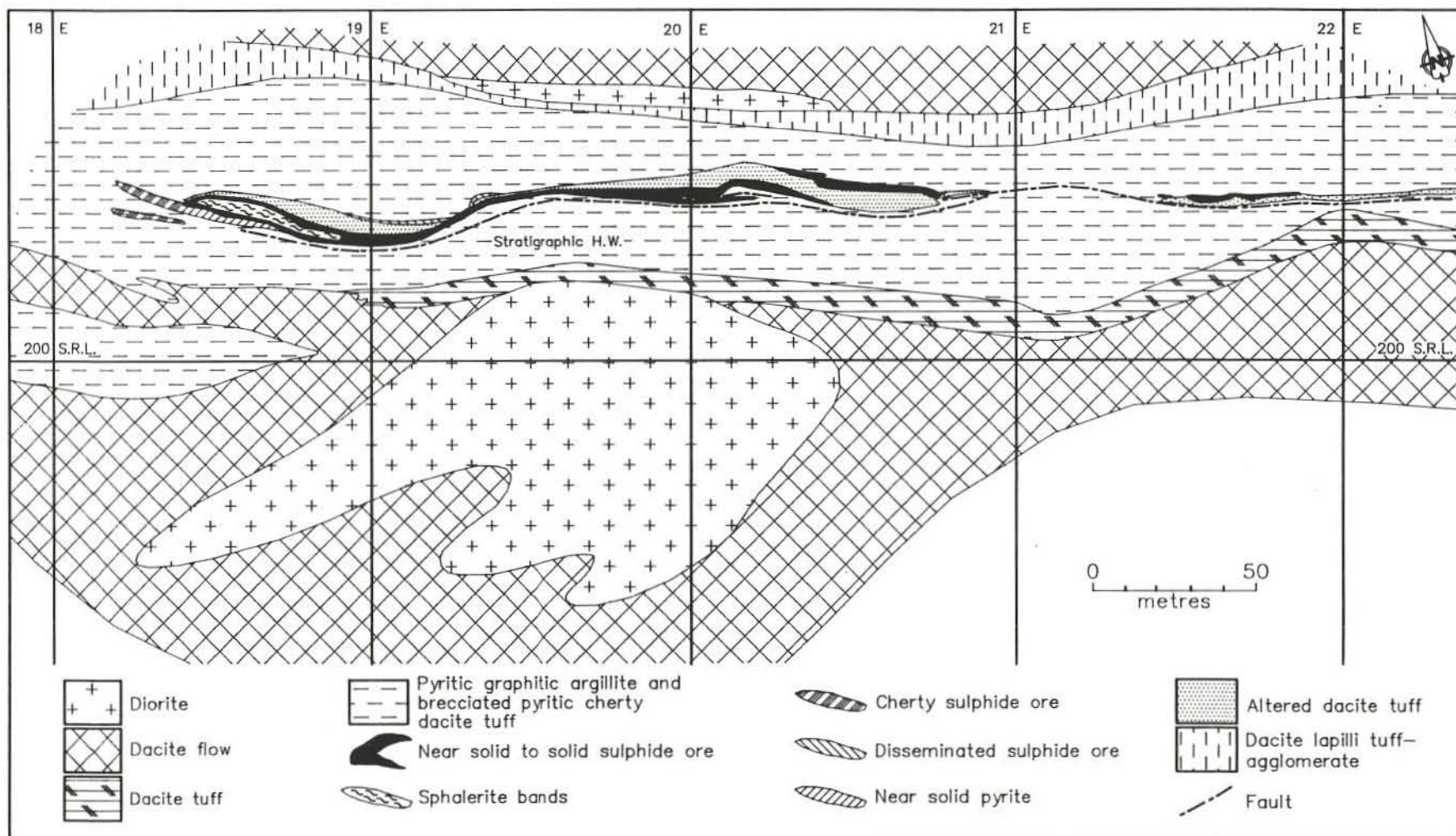


Figure 3-3: Geological plan of the 450 metre (1475 foot) level, West Arm Mine (from Ko, 1980).

CLASSIFICATION:

Stratabound massive sulphide type deposit; volcanic rock associated. Available information suggests that this sulphide deposit was deposited distal to its exhalative vent. This deposit is atypical of Cu-Zn deposits in the Flin Flon district, in that it is enclosed within a thick unit of pyrite-graphite-phyllitic schist.

REFERENCES:

Gale, G.H., Baldwin, D.A., and Koo, J.

- 1980: A geological evaluation of Precambrian massive sulphide deposit potential in Manitoba; Manitoba Energy and Mines, Mineral Resources Division, Economic Geology Report ER79-1, 137p.

Heywood, W.W.

- 1966: Ledge Lake area, Manitoba and Saskatchewan; Geological Survey of Canada, Memoir 337, 43p.

Ko, C.B.

- 1980: Geology of the Westarm copper-zinc sulphide deposit; Hudson Bay Exploration and Development Co. Ltd., Company Report, 25p.

Mineral Inventory Card: NTS 63K/12 Cu10

Manitoba Energy and Mines, Geological Services Branch.

Syme, E.C.

- 1987: Athapapuskow Lake project; In Manitoba Energy and Mines, Minerals Division, Report of Field Activities, 1987, p. 30-40.

Syme, E.C.

- 1988: West Arm (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-3, 1:1:15 840.

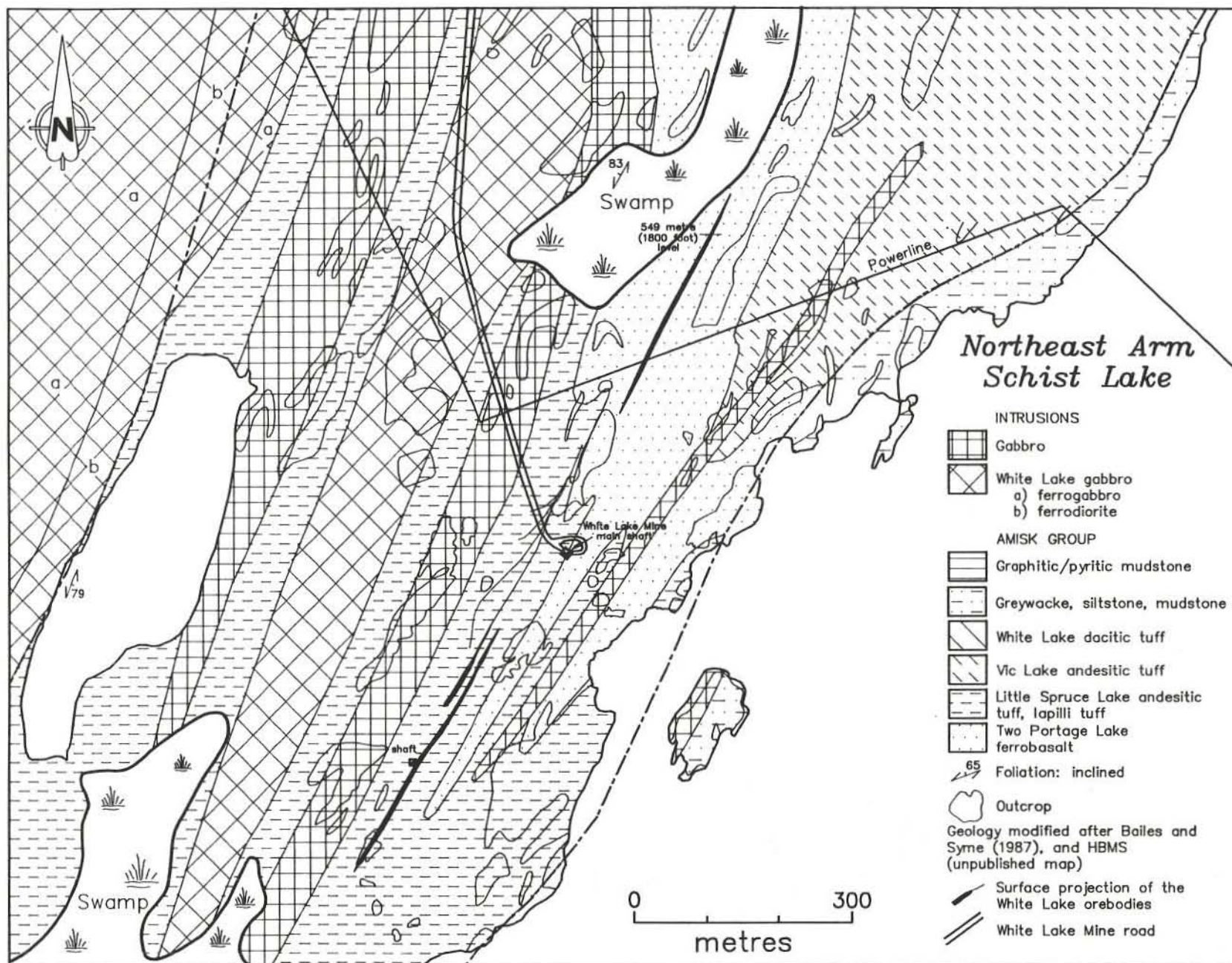


Figure 4-1: Geological setting of the White Lake deposit.

LOCATION: 4

NAME: White Lake Mine

UTM: 6064525N/324741E

ACCESS: Via Provincial Road 10 and mine access road

EXPLORATION SUMMARY:

The area of the deposit was staked by E.A. Mortimer in 1919; the claim was allowed to lapse in 1925. The claim was restaked in 1929, 1939 and again in 1941 when J.G. Thompson staked HBED5 and transferred all interests to HBED. A geophysical survey, and four diamond drill holes totalling 1 381 m, were completed in 1943. The discovery of an orebody was announced in 1963. Shaft sinking commenced in 1970 and the mine was brought into production in 1972 with reserves of 302 000 t of 5.4% Zn and 2.62% Cu. Production ceased in 1982 (M.I. Card NTS 63K/12 Cu4).

GEOLOGICAL SETTING:

The White Lake Mine occurs in a unit of intermediate tuff and lapilli tuff that has been intruded by gabbro and diorite. The intermediate lapilli tuff is overlain by graphitic and pyritic argillite and the Two Portage Lake ferrobasalt (Fig. 4-1; Bailes and Syme, 1987).

MINERALIZATION

The deposit consisted of several lenses of predominantly solid sulphide that dipped 80° to 85°W near the surface and 85°E at depth. The long axis of the orebody plunged 25° to 35°N (Fig. 4-2) and appears to approximate the plunge of a large fold.

Between the 183 m (600 foot) and 244 m (800 foot) levels, two of the solid sulphide lenses that occurred at the same stratigraphic level were separated along plunge by a zone of graphite schist and barren pyrite. The main solid sulphide zone had a strike of N31°E, a plunge of approximately 30°N and a vertical to steeply eastward dip. In general, it was mineralogically zoned with a Cu-rich footwall and a Zn-rich hanging wall. The average thickness of this zone was 1.5 to 2.0 m, but locally the zone was up to 12 m thick. Grain sizes varied from 0.1 to 0.3 mm (Grice, 1976).

Disseminated chalcopryite occurs locally beneath the solid sulphide lenses. A pyrite-graphite zone occurs approximately 200 m east of the ore zone.

On the 366 m (1 200 foot) level, the solid sulphide lense had a thickness of approximately 2 m. This lense consisted from bottom to top of:

1. a 50 cm thick footwall zone of near solid chalcopryite and pyrrhotite as stringers, anastomosing veins and masses enclosing black chlorite-quartz ovoid lenses that ranged in size from less than a centimetre to several tens of metres.

AREA: Northeast arm of Schist Lake

AIRPHOTO: A26397-123

2. this footwall zone was overlain by solid sulphide consisting mainly of banded pyrite, chalcopryite and sphalerite. The sphalerite content increased markedly towards the hanging wall where near solid sphalerite was in sharp contact with the intermediate tuff. Mineralogical zoning, although locally conspicuous, was not always apparent in the solid sulphide lenses. The banded solid sulphide lense locally displayed abundant tight to isoclinal minor folds.

The near solid chalcopryite-pyrrhotite footwall zone is interpreted as a product of metamorphic segregation and mobilization. In addition, there were a number of localities within the mine with 1 to 2 m thick zones of disseminated sulphides in chloritic rocks that resembled metamorphosed alteration zone material. An extensive alteration zone was not observed to stratigraphically underlie this deposit; it is probable that an alteration zone was initially present and was subsequently dissected by folds and faults.

GEOCHEMICAL DATA:

Between 1972 and 1982 this deposit produced 849 598 t of ore grading 1.97% Cu and 4.63% Zn. The orebody commonly contained up to 6.0% Cu at its stratigraphic base and up to 16.0% Zn at its top; average solid sulphides contained approximately 6.0% Zn, 3.0% Cu, 68.57 g/t Ag and 0.69 g/t Au.

CLASSIFICATION:

Stratabound massive sulphide type deposit; volcanic rock associated.

REFERENCES:

- Bailes, A.H. and Syme, E.C.
1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.
- Bailes, A.H. and Syme, E.C.
1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.
- Govett, G.J.S.
1976: Detection of deeply buried and blind sulphide deposits by measurement of H⁺ and conductivity of closely spaced surface soil samples; Journal of Geochemical Exploration, v. 6, no. 3, p. 359-382.

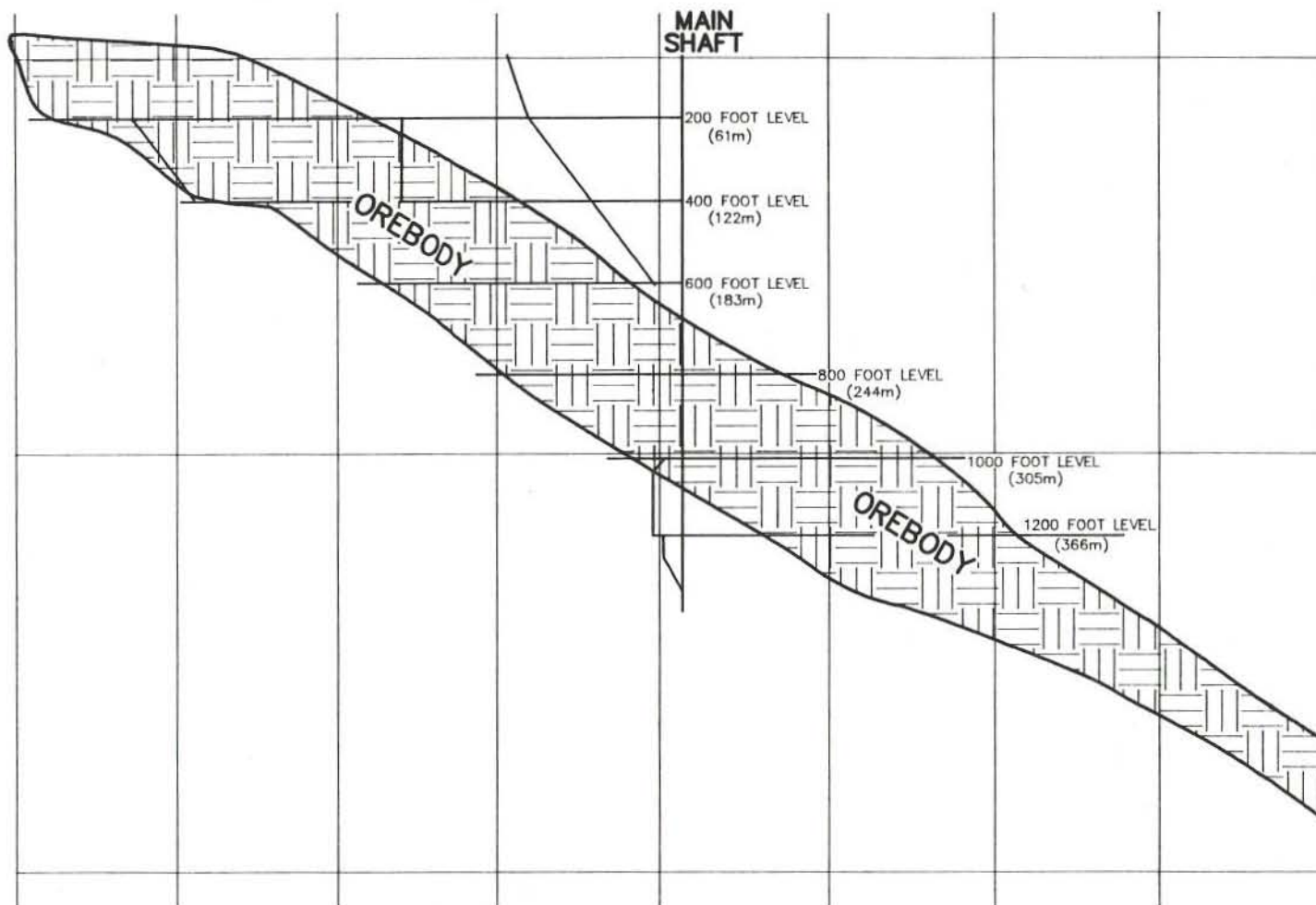


Figure 4-2: Longitudinal section of White Lake Mine.

Grice, J.D.

1976: Ore mineralogy; In Manitoba Mines, Resources and Environmental Management, Non-Renewable Resource Evaluation Program, First Annual Report, Open File 77-1, p. 106-145.

Mineral Inventory Card NTS 63K/12 Cu4

Manitoba Energy and Mines, Geological Services Branch.

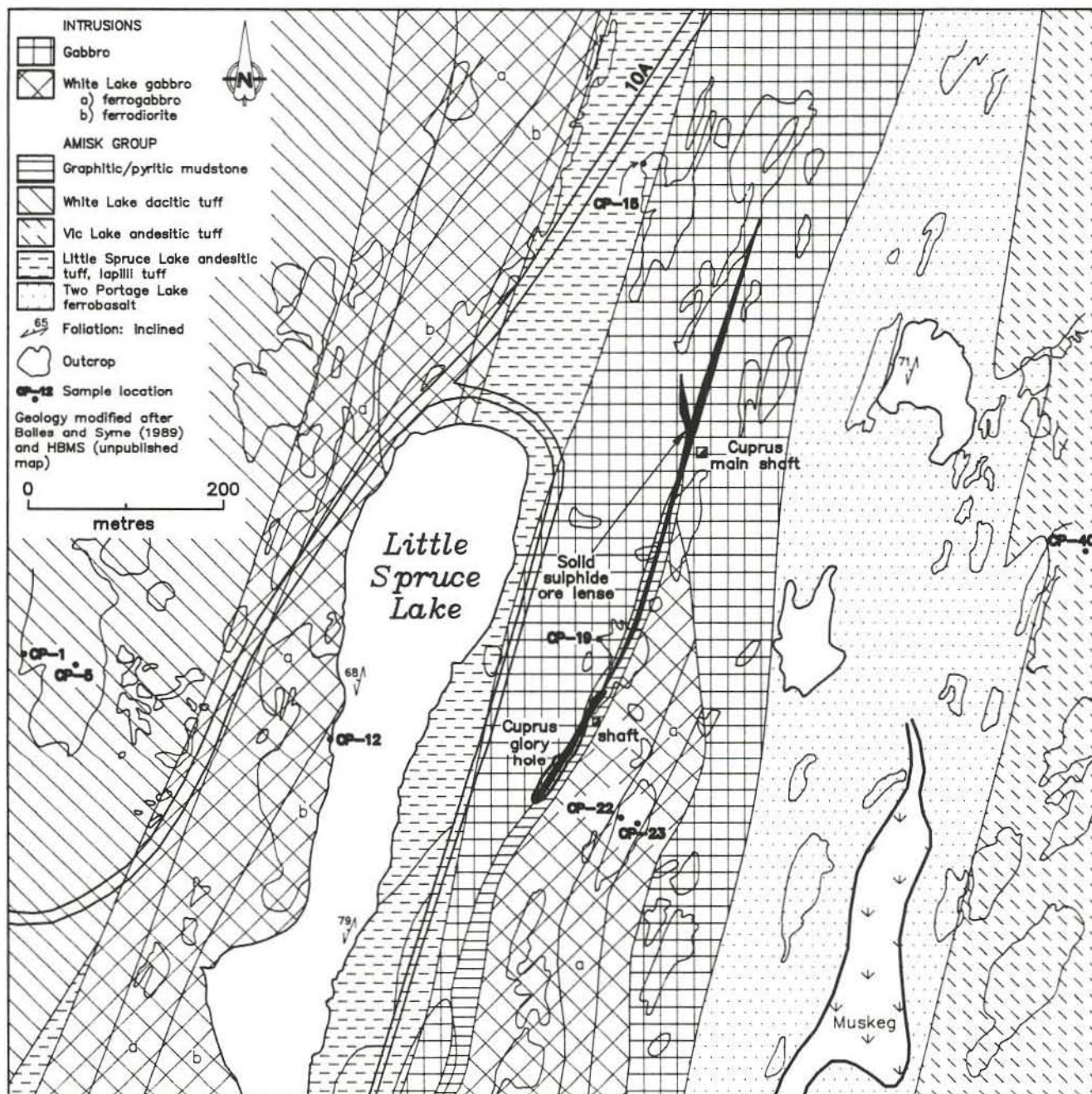


Figure 5-1: Geological setting of the Cuprus deposit.

LOCATION: 5

NAME: Cuprus Mine

UTM: 6066565N/325093E

ACCESS: Via Provincial Road 10A

EXPLORATION SUMMARY:

The Three Nations claim was staked in 1919 by Baptiste LeVasseur, who trenched a chalcopryite occurrence prior to 1926. The claim lapsed in 1926 and was restaked by V. Thompson. J.F. Wright (1931) reported seven water filled trenches and a small shaft at the south end of the deposit; a 1 m section reportedly contained 3.6% Cu. In 1938 a 41 m drill hole intersected chalcopryite. The property was optioned in 1939 by Sherritt Gordon Mines Ltd., Ventura Ltd. and Tonopah Canadian Mines Co. and 12 holes totalling 670 m were drilled at 15 m intervals. This drill program outlined one sulphide lense with dimensions of 46 x 5 x 59 m and intersected an adjacent lense. In 1941, the property was optioned by HBED who drilled over 1 200 m of core in 14 holes. In 1944 Cuprus Mines Ltd. was formed as a subsidiary of HBED and four sulphide lenses were identified by a 10 000 m drill program. A shaft was sunk in 1946. Production began in 1948 and ceased in 1954 (M.I. Card NTS 63K/12 Cu11).

GEOLOGICAL SETTING:

The Cuprus orebodies occurred within the same unit of intermediate volcanoclastic rocks as that containing the White Lake deposit (Location 4; Bailes and Syme, 1987). The graphitic and pyritic argillite that hosted the orebodies were intruded by fine grained gabbroic rocks (Fig. 5-1). These mafic intrusions have separated the volcanoclastic rocks from the overlying Two Portage Lake ferrobalt, and consequently, it can only be surmised that the White Lake and Cuprus orebodies occurred at or close to the same stratigraphic level. The graphitic argillite has been deformed by folding and intrusion of mafic rocks (Fig. 5-2, and 5-3).

The graphitic rocks locally contain slightly calcareous well-banded tuff with abundant chert and minor graphite and chert. Adjacent to the orebodies the argillite has a tuff component, is intercalated with beds of chert, contains less pyrite, but more graphite and pyrrhotite than the same rock farther from the orebodies. At the contact with the orebody the banded rock is a highly sheared schist (Geological Staff, 1957).

MINERALIZATION:

The ruler-shaped solid sulphide ore lenses were mined for approximately 600 m along a plunge of approximately 30° to the NNE (Fig. 5-4). Banding in the sulphide ores was common and conformable with schistosity in the host rocks. The main sulphide minerals, in order of decreasing abundance, were pyrite, pyrrhotite, chalcopryite, sphalerite and galena; minor amounts of

AREA: Northeast arm of Schist Lake

AIRPHOTO: A26497-125

arsenopyrite were also present. Although consisting mostly of solid sulphide, some disseminations and stringers of mobilized(?) were present. An exposed zone of sulphidic and altered(?) rock several metres thick immediately west of the Cuprus Mine glory hole (Fig. 5-1) could be part of an extensive zone of hydrothermal alteration.

GEOCHEMICAL DATA:

462 000 t of ore produced from this mine contained 3.24% Cu, 6.42% Zn, 1.36 g/t Au and 28.0 g/t Ag. Mwanang-Onze (1978) provided major element analyses for five fine grained gabbroic rocks and five pyroclastic rocks from the general vicinity of the deposit; eight of these analyses are presented in Table 5-1. None of these analyses indicate Na depletion or Mg enrichment.

CLASSIFICATION:

Stratabound massive sulphide type deposit; volcanic rock associated. There are insufficient data to determine if this deposit has an associated alteration zone.

REFERENCES:

- Bailes, A.H. and Syme, E.C.
1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.
- Bailes, A.H. and Syme, E.C.
1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.
- Bailes, A.H., Syme, E.C., Galley, A.G., Price, D.P., Skirrow, R. and Ziehlke, D.V.
1987: Early Proterozoic volcanism, hydrothermal activity, and associated ore deposits at Flin Flon and Snow Lake, Manitoba; Geological Association of Canada, Mineralogical Association of Canada, 1987 Joint Annual Meeting, Field Trip Guidebook No. 1, 95p.
- Gale, G.H., Baldwin, D.A., and Koo, J.
1980: A geological evaluation of Precambrian massive sulphide deposit potential in Manitoba; Manitoba Energy and Mines, Mineral Resources Division, Economic Geology Report ER79-1, 137p.

TABLE 5-1: CHEMICAL ANALYSES OF ROCKS FROM THE CUPRUS MINE AREA (FROM MWANANG'ONSE, 1978)

SAMPLE #	ROCK DESCRIPTION	SiO ₂ (wt.%)	Al ₂ O ₃ (wt.%)	Fe ₂ O ₃ (wt.%)	CaO (wt.%)	MgO (wt.%)	Na ₂ O (wt.%)	K ₂ O (wt.%)	TiO ₂ (wt.%)	P ₂ O ₅ (wt.%)	MnO (wt.%)	Cu (ppm)	Zn (ppm)	Ni (ppm)	Co (ppm)
CP-1	Dacite breccia	64.50	13.02	2.94	4.25	1.98	3.30	1.56	0.43	0.31	0.17	38	68	10	28
CP-5	Felsic breccia	68.90	13.04	3.33	3.08	1.23	1.55	1.67	0.45	0.13	0.14	66	68	10	18
CP-12	Mafic breccia	50.00	15.60	3.91	1.68	2.23	4.21	0.62	1.96	0.62	0.11	18	148	10	26
CP-15	Intermediate breccia	62.70	13.16	2.79	3.93	2.65	1.74	1.62	0.44	0.26	0.21	116	62	21	23
CP-19	Gabbro	47.00	16.02	4.54	9.08	6.90	2.46	0.22	1.98	0.27	0.25	77	119	62	56
CP-22	Gabbro	49.50	13.40	3.30	8.08	4.95	3.81	0.25	2.12	0.29	0.21	22	49	49	54
CP-23	Gabbro	48.25	13.36	3.19	8.05	6.20	3.26	0.21	1.94	0.24	0.23	66	72	110	57
CP-40	Intermediate tuff/ breccia	57.40	15.24	3.21	4.93	2.73	3.98	2.88	0.48	0.24	0.17	505	148	26	33

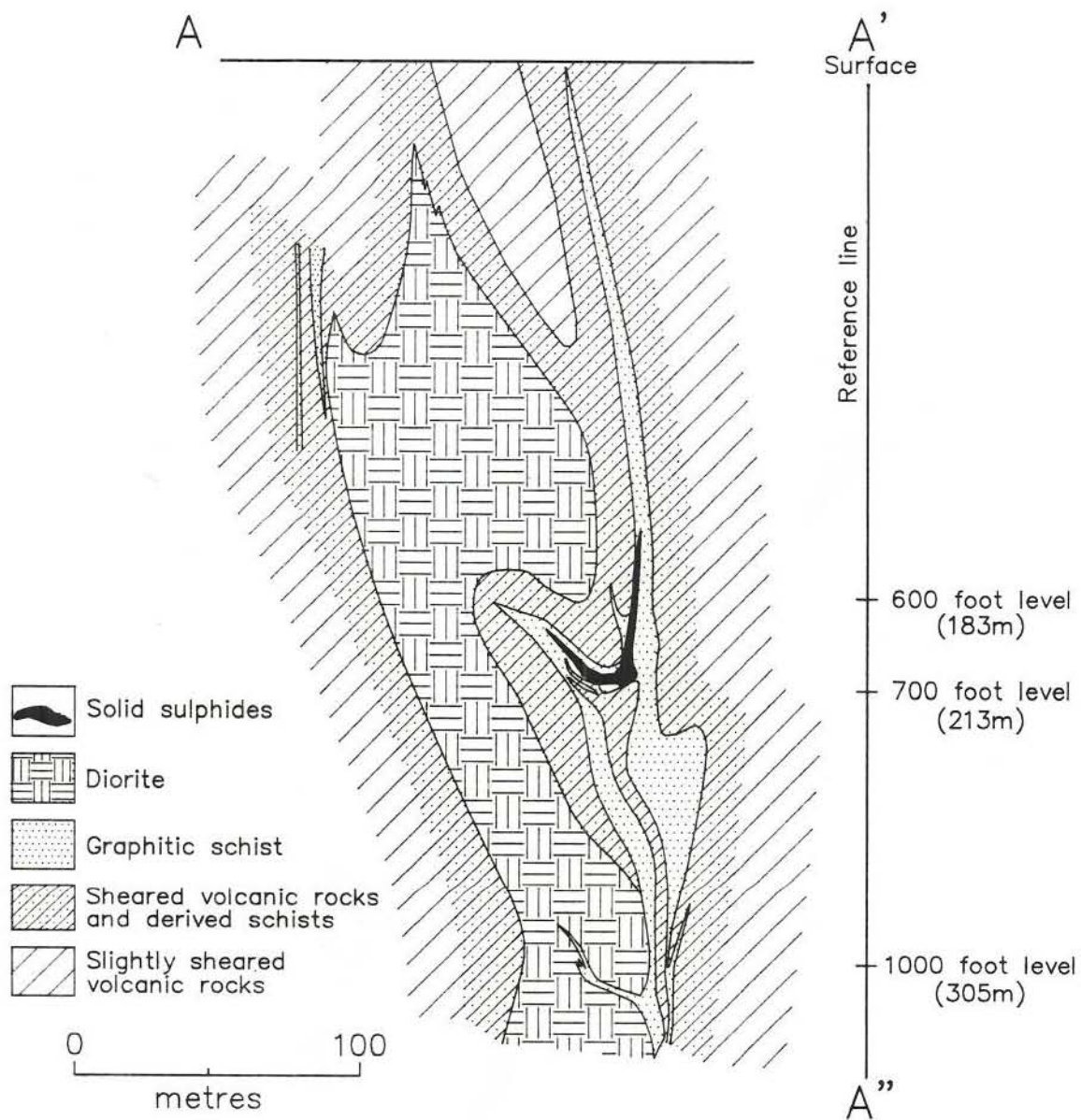


Figure 5-2: Cross-section A-A' of the Cuprus deposit, looking north (after Geological Staff, 1957).

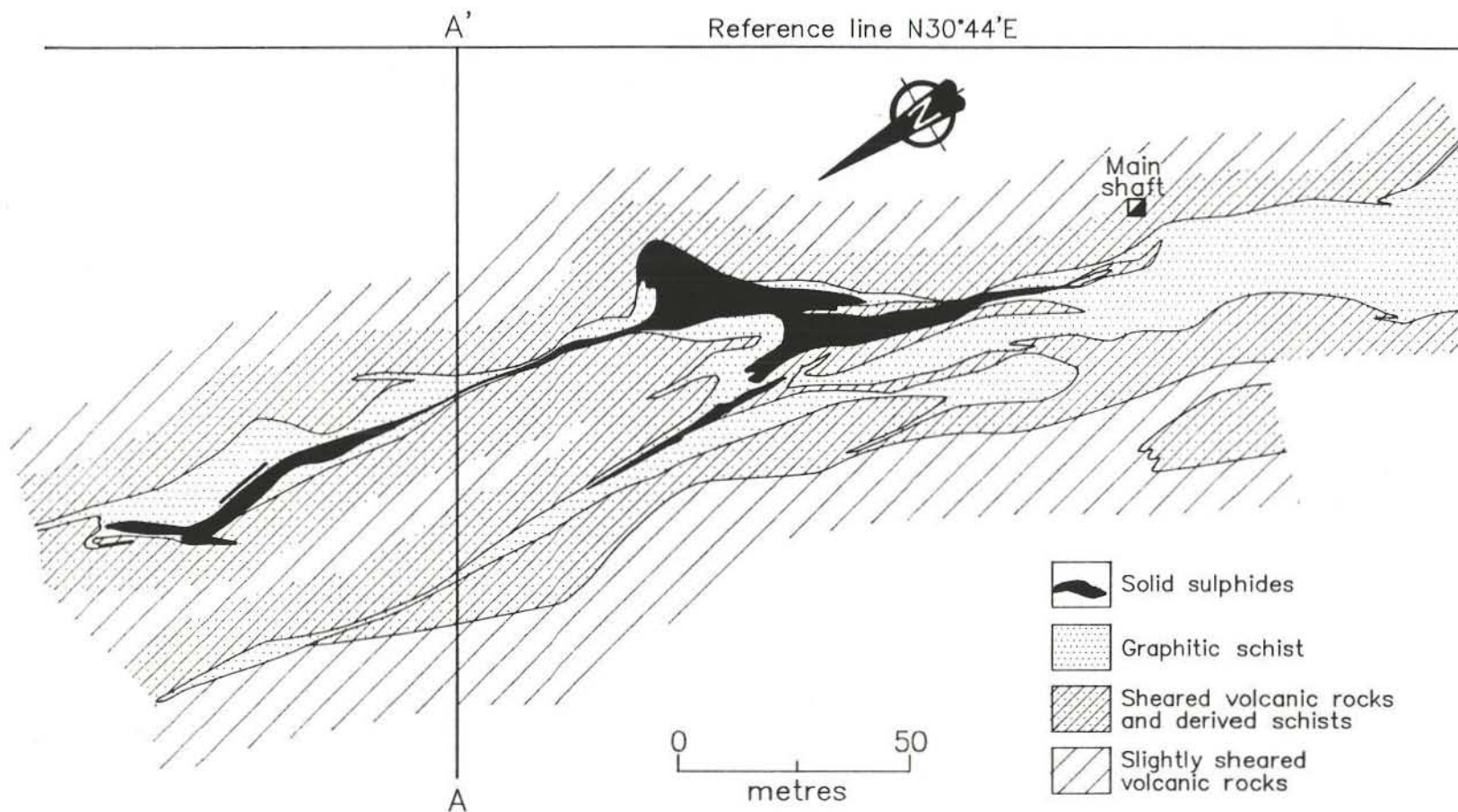


Figure 5-3: Plan of the 600-foot level, Cuprus Mine (after Geological Staff, 1957).

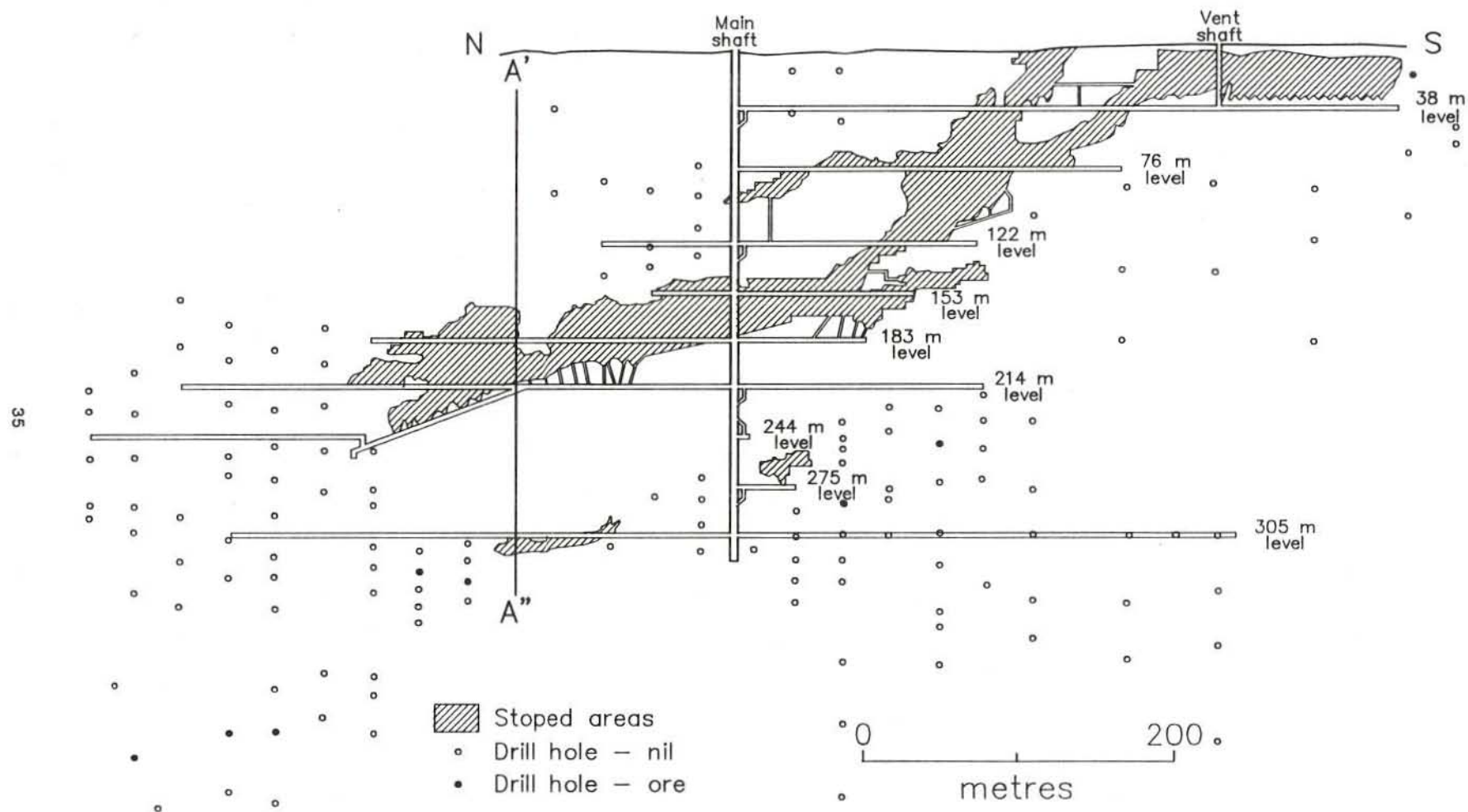


Figure 5-4: Longitudinal section of the Cuprus Mine, looking east.

Geological Staff, Hudson Bay Mining and Smelting Co. Ltd.

- 1957: Cuprus Mine, Manitoba; Structural Geology of Canadian Ore Deposits; Canadian Institute of Mining and Metallurgy, v. 2, p. 253-257.

Mineral Inventory Card NTS 63K/12 Cu11

Manitoba Energy and Mines, Geological Services Branch

Mwanang'Onze, E.H.B.

- 1978: Stratigraphy and petrochemistry of the host rocks of copper-zinc deposits in the Flin Flon-Snow Lake greenstone belt; University of Manitoba, Ph.D. thesis, (unpublished), 420 p.

Syme, E.C., Bailes, A.H., Price, D.P. and Ziehlke, D.V.

- 1982: Flin Flon volcanic belt: Geology and ore deposits at Flin Flon and Snow Lake, Manitoba; Geological Association of Canada and Mineralogical Association of Canada Joint Annual Meeting, University of Manitoba, Manitoba 1982, Field Trip Guidebook No. 6, 91p.

Wallace, R.C.

- 1920: Mining and mineral prospects in northern Manitoba; Office of Commissioner of Northern Manitoba, Northern Manitoba Bulletin, p. 26-27

Wright, J.F.

- 1931: Geology and mineral deposits of a part of northwest Manitoba; Geological Survey of Canada, Summary Report, 1930, pt. C, p. 1-124.

LOCATION: 6

NAME: Centennial

UTM: 6066560N/325100E

ACCESS: Via Provincial Road 10A

AREA: North arm of Athapapuskow Lake

AIRPHOTO: A26328-196

EXPLORATION SUMMARY:

Several claims were staked in the area in 1930, but no work was recorded. In 1947 J.T. Walker staked claims Copper Hill 25 and -26, which were transferred to Transnorthern Nickel and Copper Mines Ltd. in 1949. A magnetometer survey conducted in 1952 did not reveal any anomalies, but a VLEM survey conducted in 1955 indicated a conductor in the general vicinity of the deposit. In 1956, two follow-up drill holes were abandoned in till. These claims were cancelled in 1957.

In 1965 H. Hansen staked claim Ida 22 and in 1969 staked Ida 33 Fr. over the deposit. HBED conducted EM surveys in 1968 and drilled five holes on claim Ida 22 in 1970.

In 1970 HBMS announced the discovery of a deposit containing 1 270 060 t of 2.06% Cu, 2.6% Zn, 1.37 g/t Au and 24.0 g/t Ag above the 366 m (1 200 foot) level. An adit was driven at -13° beneath the lake for 640 m and a vertical winze was sunk 430 m to access the deposit. The mine opened in 1977 with proven reserves of 1 451 500 t containing 1.6% Cu and 2.7% Zn above the 366 m (1 200 foot) mine level. The mine was temporarily closed in 1983 and officially closed in May, 1988 (M.I. Card NTS 63K/12 Cu2).

GEOLOGICAL SETTING:

The deposit subcrops beneath 50 m of water and overburden about 350 m east of the west shore of Athapapuskow Lake (Fig. 6-1). The deposit is described by Price (1977) and Provins (1980); this description is extracted mainly from Provins (1980).

The deposit is situated in a fault block that consists mainly of mafic volcanic rocks and gabbroic intrusions (Bailes and Syme, 1989). Felsic fragmental rocks stratigraphically underlie and felsic pyroclastic rocks stratigraphically overlie the sulphide deposit (Fig. 6-2). Felsic fragmental rocks east of the deposit consist of quartz phyrlic rhyodacitic lapilli and blocks in a chloritic sulphide-bearing matrix. Minor amounts of mafic volcanic rock fragments are also present, and become more abundant toward the east within several hundred metres of the deposit. Drill core from immediately north of the sulphide lense consists predominantly of mafic flow rocks and coarse fragmental rocks; although these rocks are along strike from the felsic fragmental rocks they do not appear to be their stratigraphic equivalents.

Felsic fragmental rocks stratigraphically above the sulphide lense (Fig. 6-2) consist mostly of fine grained tuff with beds defined by variations in fragment size that ranges from 0.5 to 5 cm in diameter.

The felsic pyroclastic rocks are overlain by pyritic graphitic argillite (Fig. 6-2). The base of this unit is a 2 m thick graphitic and pyritic schist that has been traced for several kilometres to the south by geophysical surveys and several drill holes. This basal unit contains thinly bedded earthy pyrite layers, which locally attain thicknesses of 2 m, interbedded with cherty carbonate and graphitic layers. The remainder of this sedimentary unit consists of a 12 to 20 m thick unit of argillitic rocks that contain ash tuff, cherty, graphitic and chloritic layers, and are in turn overlain by 5 to 10 metres of pyritic and graphitic argillite.

The argillitic rocks are overlain to the west by a 50 m thick unit of felsic lapilli tuff and rhyolite-dacite flow breccia. The lapilli tuff is straw yellow when fresh, but develops a reddish-brown colour upon exposure to air due to oxidation of Fe-bearing carbonate.

Mafic volcanic flow rocks overlie the felsic pyroclastic rocks, and are in fault contact with younger Missi Group arkoses and conglomerates. Missi conglomerates exposed in the mine contain distinctive jasper pebbles. The unconformity between the Missi and Amisk Groups is exposed north of the Centennial deposit (Bailes *et al.*, 1987).

Strata are considered to young westward in the mine area, because there is a zone of metamorphosed hydrothermally altered rocks immediately adjacent to the eastern margin of the solid sulphide lense (Fig. 6-2). The ore deposit is, therefore, overturned towards the west (Fig. 6-3).

Although airborne EM conductors suggest that the Centennial deposit may be at the same stratigraphic position as the Sourdough deposit (Location 7), there is only sparse geological evidence to support this interpretation.

MINERALIZATION:

The deposit consisted of a single conformable tabular sheet of near solid sulphide and an underlying zone of chloritic, sericitic and sulphidic alteration that locally contained sufficient chalcopyrite adjacent to the near solid sulphide lense to constitute ore. The orebody had a strike length of approximately 100 m, a thickness of 5 to 40 m and extended from lake bottom to a depth of more than 500 m. Between the 120 m (400 foot) level and the 480 m (1 575 foot) level the deposit contained 2 285 622 t, 1.5% Cu, 2.19% Zn, 21.6 g/t Ag and 1.17 g/t Au (Provins, 1980).

The near solid sulphide lense consisted of 1 to 20 mm thick discontinuous layers. These layers contained both sulphide and gangue minerals; each layer con-

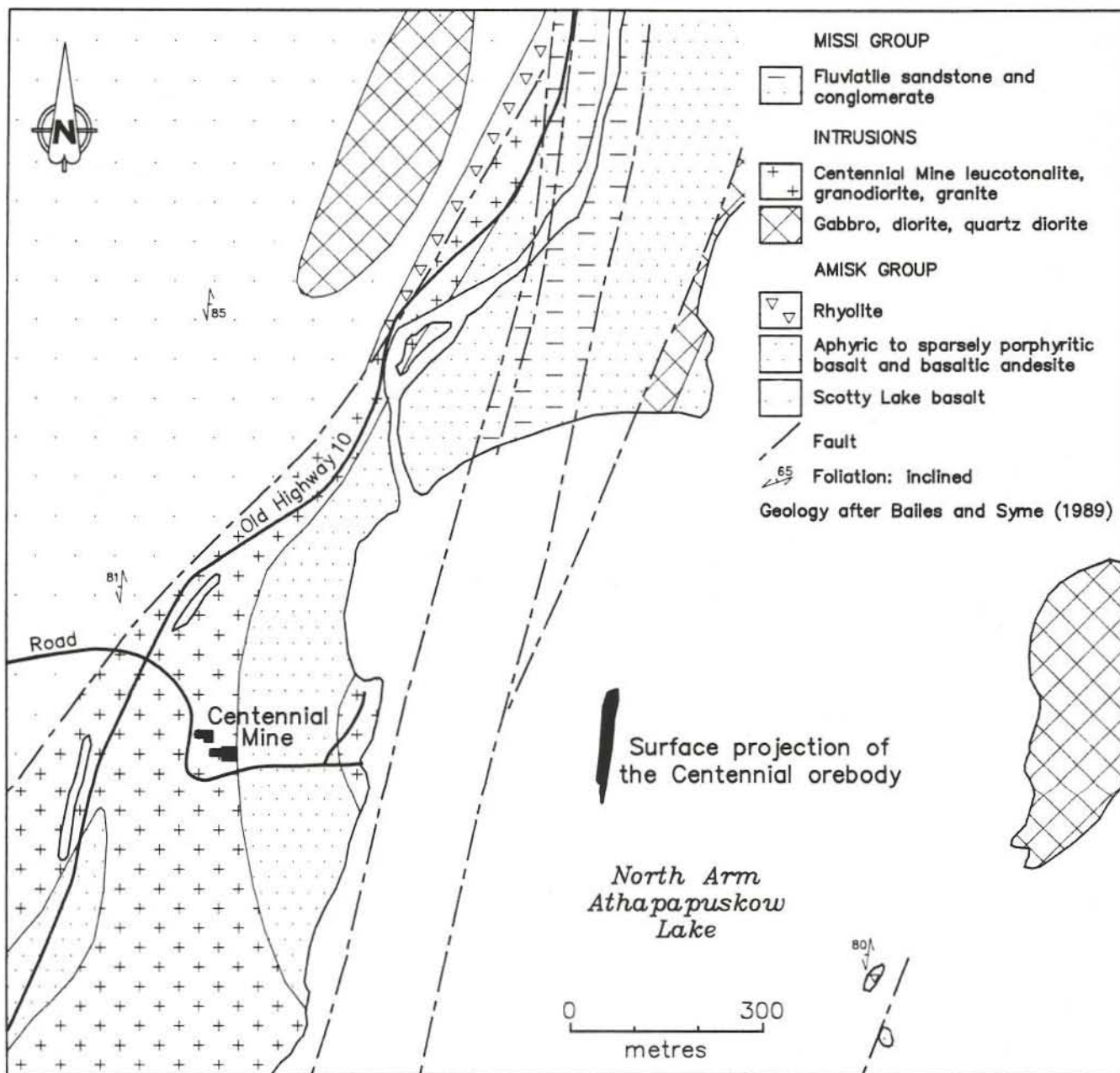


Figure 6-1: Geological setting of the Centennial deposit.

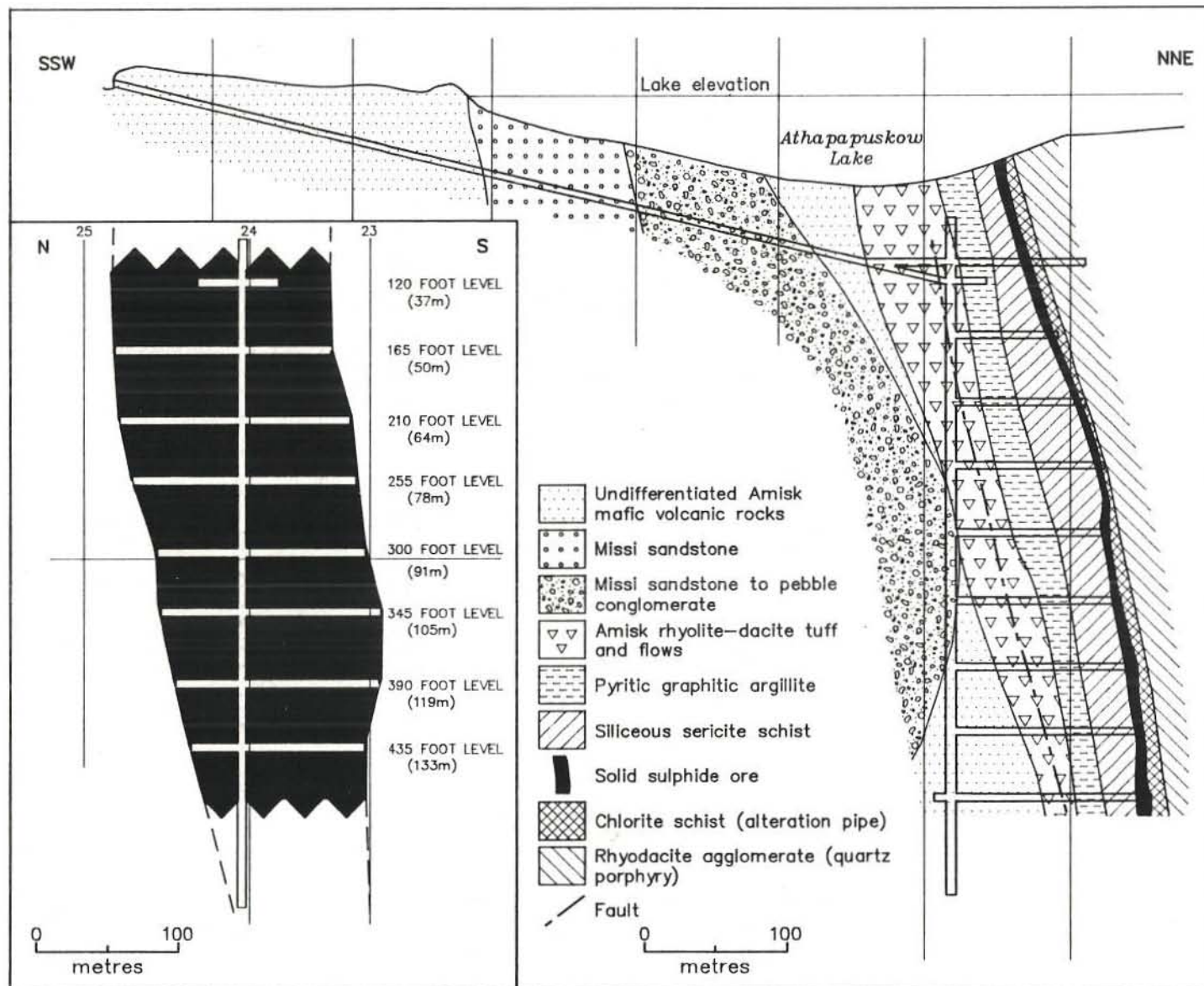


Figure 6-2: Cross section (looking N10°E) and longitudinal section (looking N100°E) of the Centennial Mine (after Provins, 1980).

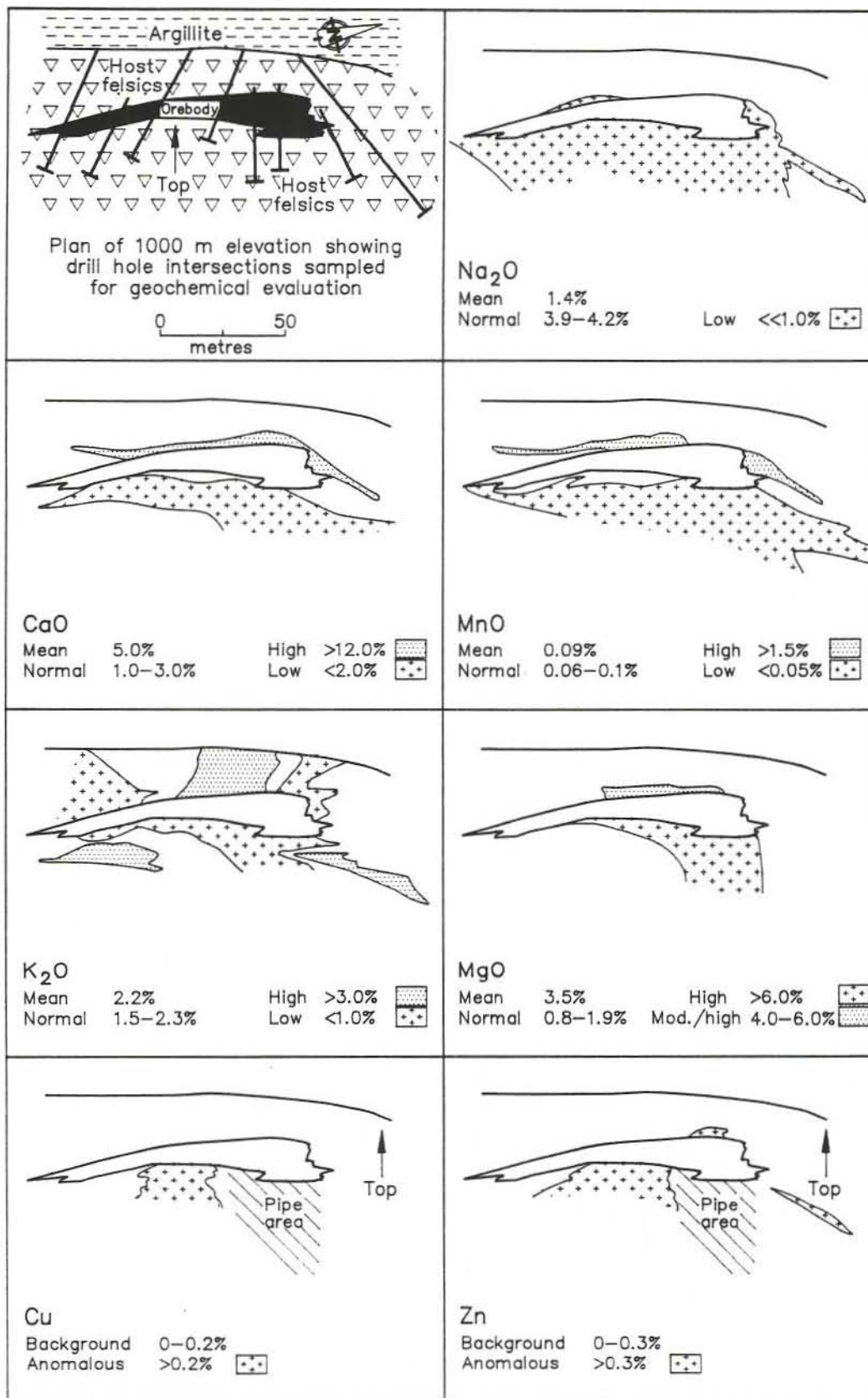


Figure 6-3: Diagrammatic results of geochemical survey at the Centennial deposit (after Provins, 1980).

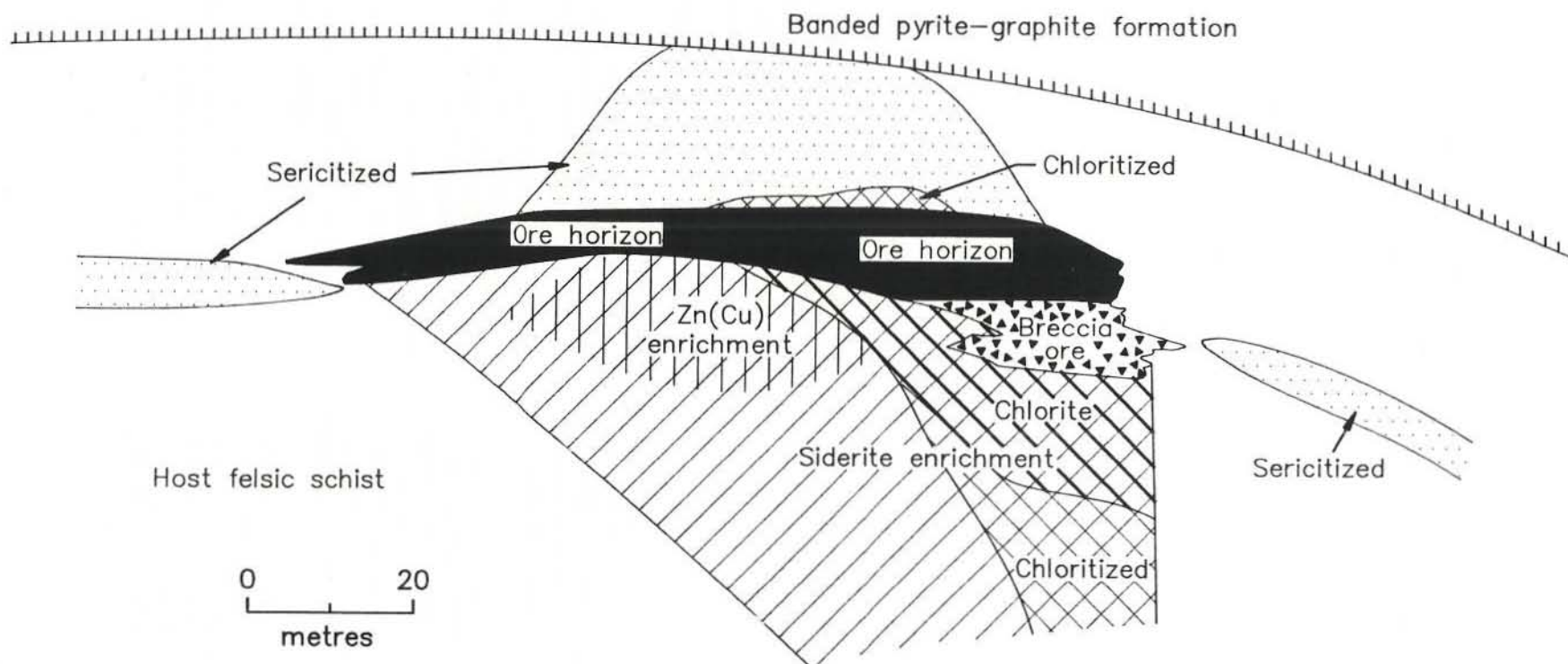


Figure 6-4: Generalized distribution of alteration types found in the host rocks to the Centennial deposit (from Provins, 1980).

tained a band of pyrite, a band of quartz intergrown with very fine grained Fe-dolomite to Fe-magnetite, and bands of chalcopyrite and/or sphalerite.

The orebody exhibited compositional zoning, both along strike with the Zn content increasing to the south, and from stratigraphic base to top with chalcopyrite-rich sections at the base, pyrite-rich sections in the middle and sphalerite-rich sections near the stratigraphic top. At the stratigraphic top of the deposit there was a 1 m thick layer of sulphide that contained significantly higher grades of Cu, Zn, Au and Ag than the average contents of the orebody.

The near solid sulphide zone consisted mainly of 0.05 to 0.2 mm pyrite, sphalerite, chalcopyrite, and quartz with minor magnetite and arsenopyrite. Toward the north end of the orebody, there were local concentrations of tennantite-tetrahedrite (Scott, 1977) in a matrix of grey-white cherty carbonate; this material was probably mobilized produced during deformation and/or metamorphism of the deposit. Minor galena, cobaltite and gold were also present.

A small discontinuous zone that contains near solid chalcopyrite-pyrite, cherty Mg-siderite to dolomite-bearing rocks with small lenses of chalcopyrite and tennantite, and chlorite schist with minor chalcopyrite stringers, occurs between the near solid sulphide lense and a chloritic schist zone near the northeastern extremity of the deposit. This zone is typical of the Cu-rich keel that commonly occurs stratigraphically below solid sulphide lenses in the Flin Flon area, e.g., the Flin Flon deposit (Gale and Eccles, 1988), Schist Lake deposit, and White Lake deposit (Locations 1 and 4, this volume).

GEOCHEMICAL DATA:

1 012 818 t of ore mined between 1977 and 1983 contained 1.42% Cu and 2.31% Zn. 611 732 t of ore mined between 1985 and in 1988 contained 1.36% Cu and 2.79% Zn. The deposit yielded a combined total of 1 624 550 t of 1.41% Cu, 2.48% Zn, 0.046 g/t Au and 0.59 g/t Ag.

Based on whole rock analyses of 130 host rock samples from eight drill holes, Provins (1980) determined that rocks stratigraphically below the orebody were depleted in Na₂O, MnO, CaO and, to some extent, K₂O, whereas MgO, Cu and Zn were enriched in this area. Immediately adjacent to the near solid sulphide lense there was an enrichment in CaO, MnO and MgO (Fig. 6-3).

A hydrothermal alteration zone ('pipe') has been defined stratigraphically below the sulphide lense (Fig. 6-4). At the north end of the orebody Provins (1980) noted that within 10 m of the ore the alteration consists mainly of chlorite schist, whereas 30 m from the orebody, the alteration consists of large felsic quartz porphyry fragments in a groundmass that has only been darkened by minor chloritization.

The chlorite-enriched portion of the alteration zone is virtually devoid of sulphide mineralization. However, a definite chalcopyrite-sphalerite-pyrite enrichment envelope surrounds the chloritic 'core', and a carbonate-enrichment envelope extends south of the orebody. This alteration zone (Fig. 6-4) is atypical of those normally found in the Flin Flon area, in that it appears to be defined by asymmetric geochemical anomalies. The asymmetrical nature of the stratigraphically underlying alteration zone could be the result of deposition adjacent to a growth fault (N. Provins, pers. comm., 1989), variations in permeability and porosity of the host rocks or displacement of the remainder of the alteration zone and associated sulphide lense by a post-depositional fault. The latter interpretation is favoured here because of abrupt changes from altered to unaltered fragmental rocks in closely spaced drill cores in the vicinity of the postulated fault (G.H. Gale, unpublished geochemical data).

CLASSIFICATION:

Stratabound massive sulphide type deposit; volcanic rock associated. A zone of hydrothermal alteration is associated with the deposit.

REFERENCES:

- Bailes, A.H., Syme, E.C., Galley, A.G., Price, D.P., Skirrow, R. and Ziehlke, D.V.
1987: Early Proterozoic volcanism, hydrothermal activity, and associated ore deposits at Flin Flon and Snow Lake, Manitoba; Geological Association of Canada, Mineralogical Association of Canada, 1987 Joint Annual Meeting, Field Trip Guidebook No. 1, 95p.
- Bailes, A.H. and Syme, E.C.
1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.
- Bailes, A.H. and Syme, E.C.
1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.
- Gale, G.H. and Eccles, D.R.
1988: Mineral deposits and occurrences in the Flin Flon Area: Part II, Flin Flon area, (63K/13 SW); Manitoba Energy and Mines, Mineral Deposit Series Report No. 2, 98p.
- Grice, J.D.
1976: Ore mineralogy; In Manitoba Mines, Resources and Environmental Management, Non-Renewable Resource Evaluation Program, First Annual Report, Open File 77-1, p. 106-145.

Mineral Inventory Card NTS 63K/12 Cu2.

Manitoba Energy and Mines, Geological Services Branch.

Hudson Bay Mining and Smelting Ltd.

1977: Flin Flon-Snow Lake Geology; Hudson Bay Mining and Smelting Ltd.; Flin Flon, Manitoba; unpublished report, 55p.

Provins, N.

1980: Geology of the Centennial Copper-Zinc Deposit, Flin Flon, Manitoba, 13p. with 7 figures; Hudson Bay Mining and Smelting Ltd., Flin Flon, Manitoba. Paper presented at Canadian Institute of Mining and Metallurgy, 5th Annual District Four Meeting, September, 1980.

Scott, J.D

1977: Ore Mineralogy; in Manitoba Mines, Resources and Environmental Management, Non-Renewable Resource Evaluation Program, Second Annual Report, p. 71-88.

Syme, E.C., Bailes, A.H., Price, D.P. and Ziehlke, D.V.

1982: Flin Flon volcanic belt: Geology and ore deposits at Flin Flon and Snow Lake, Manitoba; Geological Association of Canada and Mineralogical Association of Canada Joint Annual Meeting, University of Manitoba, Manitoba 1982, Field Trip Guidebook No. 6, 91p.

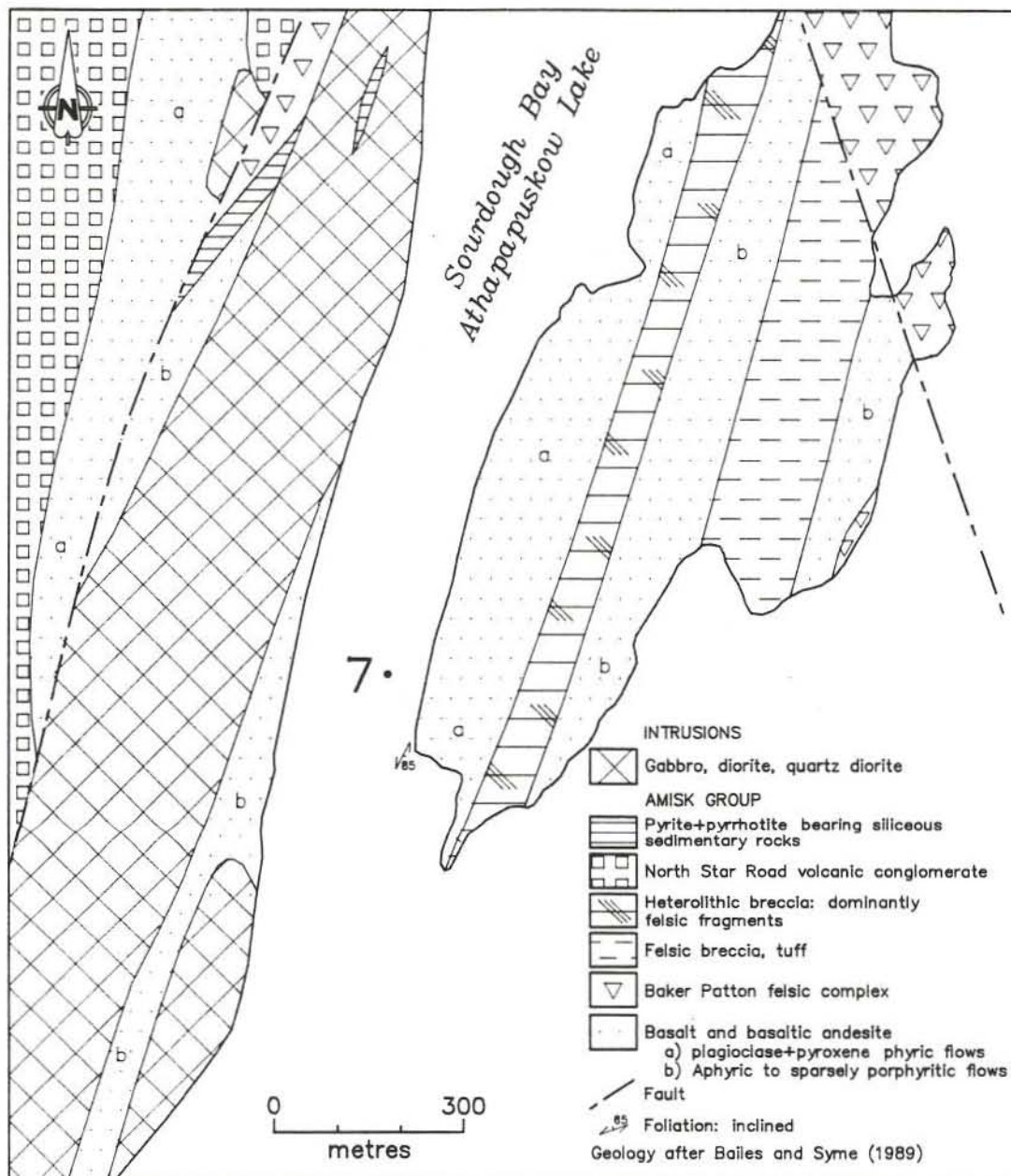


Figure 7-1: Geological setting of occurrence 7.

LOCATION: 7

NAME: Sourdough

UTM: 6067175N/329473E

ACCESS: Via Provincial Road 10A and North Star Mine road

EXPLORATION SUMMARY:

The area was staked by J.C. MacGregor in 1948. Stanmac Ltd. conducted reconnaissance EM surveys in the area and intersected 2.77% Cu over 90 cm core length in one drill hole in 1948. Sherritt Gordon Mines Ltd. optioned the property in 1949 and drilled nine holes in the vicinity of the original discovery. Since 1949 the property has been optioned to various concerns who have undertaken further diamond drilling, and EM and magnetometer surveys. Prior to 1975, approximately 10 000 m of core had been drilled on the property (M.I. Card NTS 63K/12 Cu17). Additional drilling has been done by HBED since 1975.

GEOLOGICAL SETTING:

The Sourdough Bay deposit crops out beneath Athapapuskow Lake (Fig. 7-1). Rocks on the lakeshores comprise pyroxene phyric pillow fragment mafic breccia and aphyric mafic flows that have been intruded by fine- to medium-grained gabbro and quartz diorite (Bailes and Syme, 1989). Unpublished drill data indicate that the sulphide lense occurs along the east margin of a quartz porphyry body. The lense is structurally overlain by a 20 m thick east-dipping unit of siliceous tuff with several discontinuous layers of graphitic tuff. Irregularly shaped dioritic dykes/sills intrude the tuff.

MINERALIZATION:

The deposit has a strike length of approximately 229 m at lake bottom, an average thickness of 4.2 m, and has been drilled to a depth of 244 m. The mineralized zone consists of approximately 30% pyrite, chalcopyrite and sphalerite. Pyrite, the most abundant sulphide mineral, occurs both as fine- to medium-grained granular disseminations, as near solid sulphide sections, and as very fine grained, dense solid sulphide sections. Chalcopyrite occurs as small blebs, veinlets and disseminations throughout pyritic rocks and intergrown with solid pyrite. Sphalerite is generally intergrown and interbanded with pyrite (Keys, 1963). In a number of drill holes, the mineralization consists of two sections of higher grade separated by 30 to 60 cm of

AREA: Sourdough Bay, Athapapuskow Lake

AIRPHOTO: No.?

low grade or barren material. The easterly, or hanging wall section, contains thicker and higher grade mineralization. Keys (1963) calculated that the deposit contained 291 150 t of 1.46% Cu, 1.71% Zn, 1.03 g/t Au and 29.83 g/t Ag.

GEOCHEMICAL DATA:

Keys (1963) noted the presence of an alteration zone consisting of sericitization and silicification. Although associated with the mineralization, this alteration extends only a short distance south of the sulphide zone, but continues beyond the northern limits of the known sulphide zone.

CLASSIFICATION:

Stratabound massive sulphide type deposit; volcanic rock associated.

REFERENCES:

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

Keys, M.R.

1963: Sourdough Bay Mines Ltd., Diamond drilling 1963, unpublished report, Sourdough Mines Ltd., 4p., Manitoba Energy and Mines, Mines Branch.

Mineral Inventory Card, NTS 63K/12 CU 17

Manitoba Energy and Mines, Geological Services Branch

Wright, J.F.

1931: Geology and mineral deposits of a part of northwest Manitoba; Geological Survey of Canada, Summary Report, 1930, pt. C, p. 1-124.

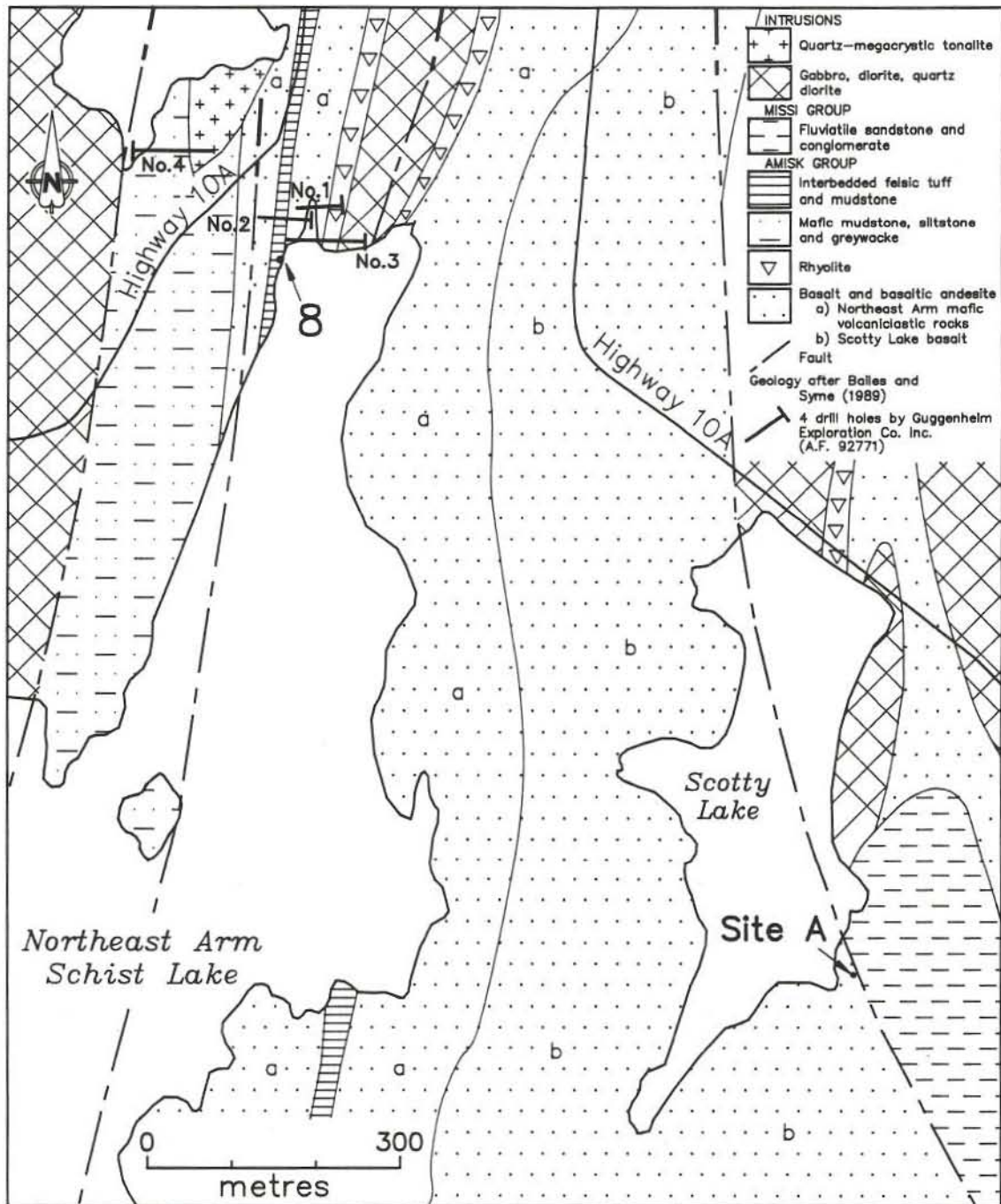


Figure 8-1: Geological setting of occurrence 8.

LOCATION: 8

NAME: LeVasseur

UTM: 6068845N/327523E

ACCESS: Via Provincial Road 10A

AREA: Northeast arm, Schist Lake

AIRPHOTO: A26328-200

EXPLORATION SUMMARY:

The claim was staked in 1919 by J.B. LeVasseur. Wallace (1920) reported that a 2 m deep trench had been sunk on a 2 m wide shear zone. J. Waldron noted a 2 x 2 x 10 m shaft on the claim in 1925 (M.I. Card NTS 63K/12 Cu13). Holloway (1939) noted the old shaft, three old pits along strike to the south of the shaft, and three diamond drill hole collars oriented N80°E/60°E. Four diamond drill holes totalling 230 m were drilled by Guggenheim Exploration Co. Inc. on claim Pic 1 in 1966 (A.F. 92771). Three additional holes were drilled in 1968 (A.L. Parres, written comm., 1976). The old shaft was water filled, but still open in 1976. Sherritt Gordon Mines Ltd. drilled three holes totalling 210 m at Site A (Fig. 8-1), near the southeast corner of Scotty Lake in 1949, but did not intersect any sulphide minerals.

GEOLOGICAL SETTING:

The area is dominantly underlain by the Northeast Arm mafic volcanoclastic rocks that have been intruded by various mafic rocks (Fig. 8-1; Bailes and Syme, 1989). Graphitic argillite was intersected in drill cores. Mineralization is hosted by a thin unit of interbedded felsic tuff and mudstone.

MINERALIZATION:

Wallace (1920) indicated that the shaft had been sunk on two stringers of chalcopyrite and pyrite that were 7.5 and 15 cm thick; at the bottom of the shaft (2 m deep) the vein was 75 cm thick. Rubble adjacent to the shaft contains fine grained solid chalcopyrite and chalcopyrite-pyrite. Mineralization and host rocks have a steep westerly dip of 85°.

Diamond drill holes put down on the Pic 1, claim immediately north of the LeVasseur occurrence intersected minor pyrite, trace chalcopyrite and up to 5 m of graphitic schist (A.F. 92771). Pyrite-bearing schist, 40 to 60 cm thick, occurs near Provincial Road 10A along strike from the shaft.

GEOCHEMICAL DATA:

None

CLASSIFICATION:

Stratabound massive sulphide type deposit; volcanic rock associated. It is not certain from the information available if this occurrence represents a distal massive sulphide type deposit or a vein of sulphide mobilized. There is no obvious alteration in either the rubble around the shaft or in the exposed host rocks. The pyritic and graphitic argillites that extend along strike to the north represent a chemical sediment type deposit; sulphide facies iron formation.

REFERENCES:

- Assessment File: 92771
Manitoba Energy and Mines, Mines Branch.
- Bailes, A.H. and Syme, E.C.
1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.
- Bailes, A.H. and Syme, E.C.
1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.
- Holloway, J.M.
1939: LeVasseur, M.C.; Manitoba Energy and Mines, Mines Branch unpublished report, 2 p.
- Mineral Inventory Card NTS 63K/12 CU 13
Manitoba Energy and Mines, Mines Branch.
- Wallace, R.C.
1920: Mining and mineral prospects in northern Manitoba; Office of Commissioner of Northern Manitoba, Northern Manitoba Bulletin, p. 26-27

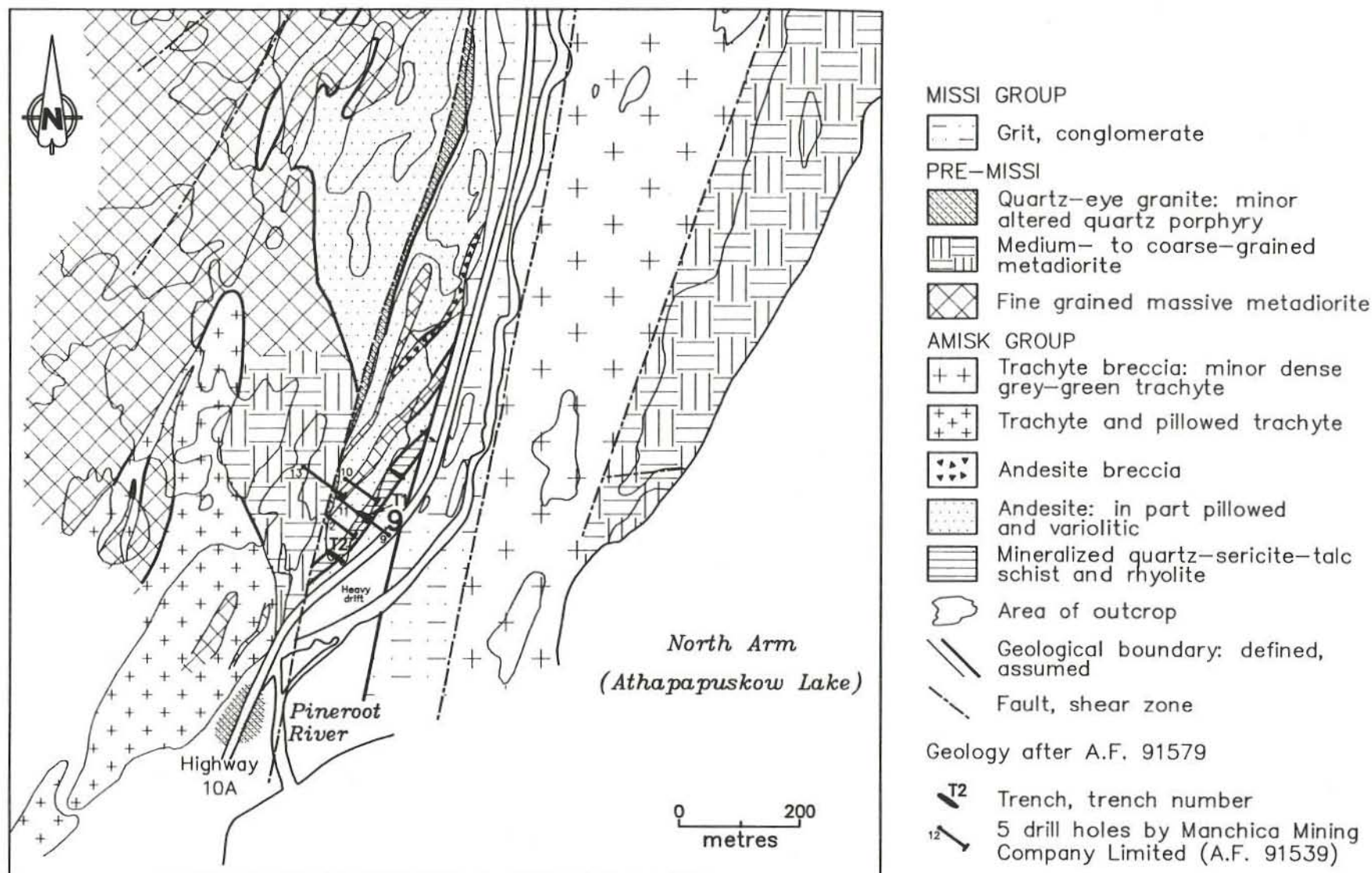


Figure 9-1: Detailed geology, trench and drill hole locations at occurrence 9 (Geology after A.F. 91579).

LOCATION: 9

NAME: Chica

UTM: 6065704N/328130E

ACCESS: Via Provincial Road 10A

EXPLORATION SUMMARY:

The Chica claim was staked in 1914 by Charles Rees, and in 1917 was assigned to C.S. Power who dug a trench on the property. In 1918 the claim was assigned to the Chica Mining Co.; five holes totalling 582 m were drilled in the area before the end of 1919. Other pits and trenches were dug prior to 1921 when the claim was leased for 21 years. A geological survey was conducted in 1951 and five holes (total length of 597 m) were drilled in 1952 by Manchica Mining Co. Ltd. The claim was cancelled in 1976 and was restaked by Pinebay Mines as CB 4287 (M. I. Card NTS 63K/12 CU 13).

Trench 1 (3 x 2.5 x 24 m) and trench 2 (2 x 2 x 20 m) were still open in 1984, but the old pits were filled (Fig. 9-1). In 1981, W.B. Dunlop staked the area as the Suzi claim.

GEOLOGICAL SETTING:

The area is predominantly underlain by mafic volcanic rocks that have been intruded by fine- to medium-grained gabbroic rocks (Fig. 9-1). A quartz porphyry, interpreted to represent rhyolite, has been correlated with similar rocks to the south (Bailes and Syme, 1987). These rocks, which occur west of the Centennial Fault and a thin wedge of Missi Group sedimentary rocks, are considered to be separate and different from the host rocks to the Centennial Mine (Location 6, this volume).

Although it is generally presumed that faults in this area are near vertical (cf. Bailes and Syme, 1989), Figure 9-2 illustrates that there are low angle (approximately 45°), west-dipping faults. Locally, Amisk Group rocks have been thrust over Missi Group rocks.

MINERALIZATION:

Two zones of sericitic schist developed in the quartz porphyritic rhyolite contain approximately 5% pyrite, trace chalcopyrite, and locally, thin bands/veinlets of solid pyrite (Fig. 9-3). Abundant quartz veinlets and stringers occur in rhyolitic rock in some drill core (Manchica Co. Ltd. Corporation File). Less than 5% pyrite is disseminated throughout the more massive quartz porphyritic rhyolite.

In drill core the mineralized zone with the highest sulphide content (percentage not given) occurs adjacent to the contact with Missi conglomerate (Fig. 9-3; Manchica Co. Ltd., Corporation File). This zone of mineralization has a known strike length of approximately 300 m and a maximum vertical extent of approximately 125 m (A.F. 91539).

AREA: 0.8 km northwest of Centennial Mine

AIRPHOTO: A26328-197

GEOCHEMICAL DATA:

Surface samples assayed up to 1.25% Cu, 0.35% Zn, 6.86 g/t Au and 27.43 g/t Ag over 1.5 m (Manchica Co. Ltd., Corporation File). Drill cores contained 0.25% Cu over 40 cm and 2.8% Cu and 0.31% Zn over 15 cm. The maximum Au assay obtained from drill core was 0.41 g/t Au over 80 cm (Manchica Co. Ltd., Corporation File; A.F. 91579).

CLASSIFICATION:

Vein type deposit; multiple veinlets and lenses of pyrite ± chalcopyrite in a quartz porphyritic rhyolite. The sulphide minerals in the shear zones appear to have been mobilized from the enclosing host rocks. If the quartz porphyritic rhyolite is extrusive, it could contain additional Cu-Zn mineralization along strike or down-dip. The extent of movement on the inclined fault will determine if further exploration of the mineralized felsic rock is warranted.

REFERENCES:

- Assessment Files: 91579, 91539, 92249
Manitoba Energy and Mines, Mines Branch.
- Bailes, A.H. and Syme, E.C.
1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.
- Bailes, A.H. and Syme, E.C.
1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.
- Holloway, J.M.
1939: Chica M.C.; Manitoba Energy and Mines, Mines Branch, unpublished report, 3p.
- Manchica Co. Ltd. Corporation File;
Manitoba Energy and Mines, Mines Branch, Corporation Files, unpublished.
- Mineral Inventory Card NTS 63K/12 CU 13
Manitoba Energy and Mines, Geological Services Branch
- Wallace, R.C.
1920: Mining and mineral prospects in northern Manitoba; Office of Commissioner of Northern Manitoba, Northern Manitoba Bulletin, p. 26-27.

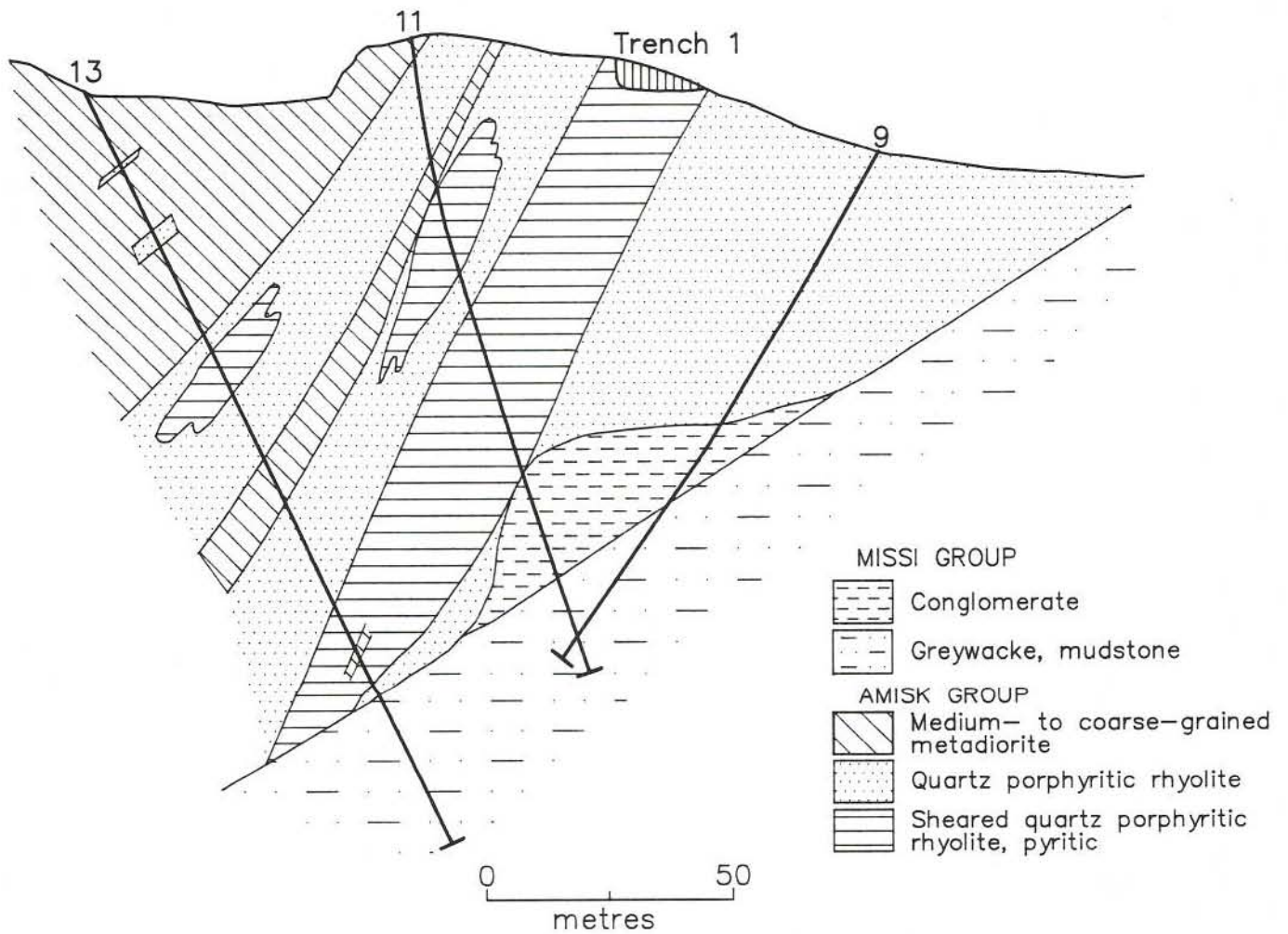
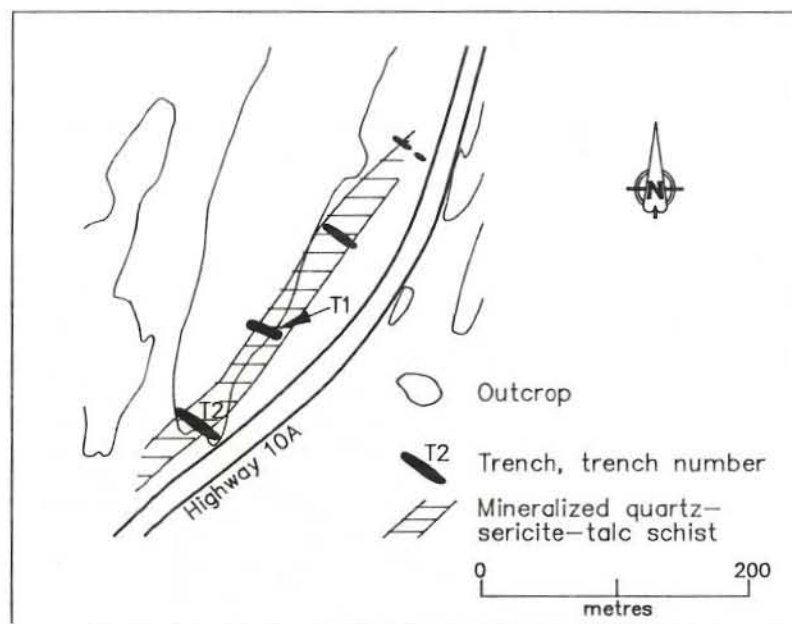


Figure 9-2: Vertical section through drill holes 9, 11 and 13 at occurrence 9 (from A.F. 91539).



EAST

WEST

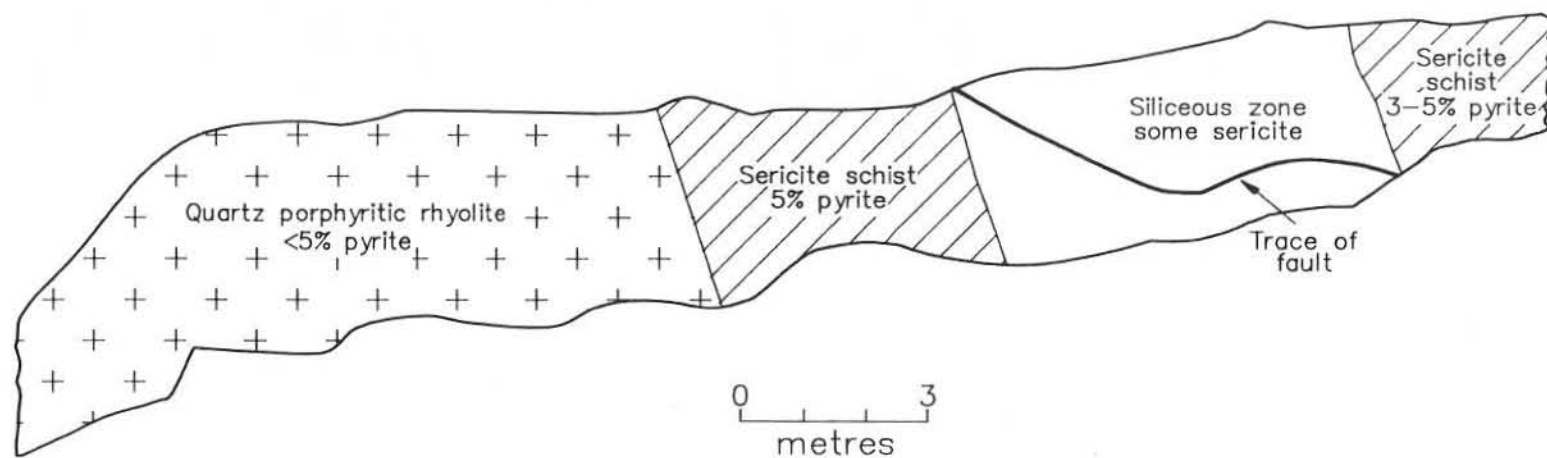


Figure 9-3: Location and cross section of trench 2, looking south, occurrence 9.

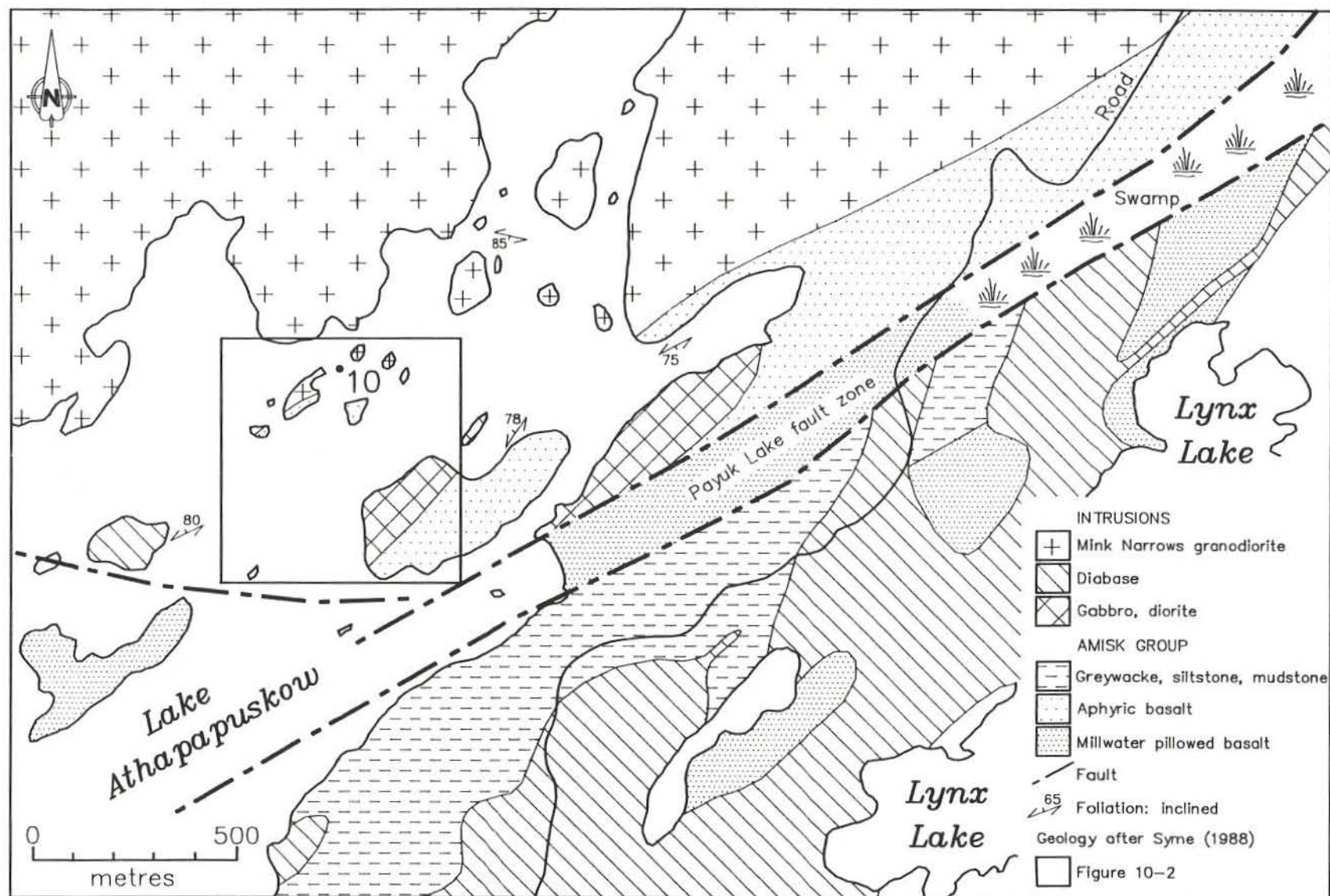


Figure 10-1: Geological setting of occurrence 10.

LOCATION: 10

NAME: Copper Reef

UTM: 6054943N/332775E

ACCESS: Via boat on Athapapuskow Lake

EXPLORATION SUMMARY:

The Ty 2 and Ty 3 claims were staked by A.D. Moodie in 1936. In 1943 Thompson Drilling and Mining Development Co. Ltd. outlined a small, low grade Cu-Zn deposit with nine drill holes. In 1944 the claims were optioned to HBED. A. Talbot staked the Sun 1 claim over the deposit in 1950, drilled one hole in 1951 and optioned the property to HBED in 1952. An EM survey identified a conductor near the old Copper Reef occurrence, and 2 958 m of core was drilled in 1953 and 1954 before the option was given up in 1954 (A.F. 90360). The Sun 1 claim was cancelled in 1959. The Bee 3 claim, staked in 1965, was assigned to Falconbridge Nickel Mines Ltd. in 1968 and then to Copper Reef Mines (1973) Ltd. in 1973 (M.I. Card NTS 63K/12 Pyr2). Several trenches were still visible in 1976. Several trenches found on a reef that was under 30 cm of water probably date from the time of the original discovery.

GEOLOGICAL SETTING:

The deposit occurs in volcanic rocks adjacent to the contact of the Mink Narrows granodiorite pluton (Buckham, 1944; Syme, 1988). The dominantly mafic volcanic rocks are interlayered with greywacke, argillite and graphitic argillite, and have been intruded by sills and dykes of the Mink Narrows pluton and plagioclase pyritic gabbroic rocks (Fig. 10-1). Volcanic rocks in this area have been hornfelsed around the margins of the plutons in an aureole that is approximately 1 km wide. Locally, the regional greenschist facies metamorphism overprints the contact metamorphism (Syme, in prep.).

MINERALIZATION:

Trenches near the shoreline and on the reef contain minor to moderate amounts of pyrite and chalcopyrite as disseminations and stringers in chloritic and silicic rocks that probably represent a metamorphosed alteration zone associated with a massive sulphide type deposit.

Mineralization characteristic of the deposit is known only from drill logs contained in A.F. 90360 (Fig. 10-2), and from information provided by Falconbridge Ltd.; drill core from this deposit has not been viewed by the authors.

Drill core from DDH 16 typifies the sulphide mineralization found in holes 26, 24, 21 etc. DDH 16 intersected approximately 10 m of solid sulphide from 228 m to 240 m. Four additional solid sulphide intersections 15 to 30 cm in length, between 222 m and 226 m may represent either veins of solid sulphide mobilized in an al-

AREA: Mink Narrows, Athapapuskow Lake

AIRPHOTO: A26328-4

teration zone or sulphide layers. Although disseminated sulphides were noted in the drill log it is not clear if this material is typical of massive sulphide type alteration zones.

The solid sulphide layers consist of pyrite, pyrrhotite, chalcopyrite, sphalerite and magnetite. In general, the solid sulphide intersections that are deeper in the drill holes are more Zn rich than shallower intersections, but no consistent metal zonation can be determined from the drill data.

Locally, for example in DDH 25, the deepest intersections of solid sulphide are associated with a 10 to 15 m thick sulphide-rich rhyolitic rock; this mineralization may represent a different stratigraphic level from that intersected closer to the surface.

GEOCHEMICAL DATA:

The deposit contains approximately 500 000 t of 1.5% Cu and 0.5% Zn (Gale *et al.*, 1980).

CLASSIFICATION:

Stratabound massive sulphide type deposit; volcanic rock associated. This southeast dipping deposit was originally drilled from its structural footwall and consequently, the core intersections of solid sulphide are probably much greater than the true thickness of the sulphide layers. The effects of the granitic intrusion on the morphology of the deposit as well as the extent of sulphide mineral mobilization have not been documented.

REFERENCES:

- Assessment Files: 90352, 90353, 90360, 91585;
Manitoba Energy and Mines, Mines Branch.
- Buckham, A.F.
1942: Athapapuskow Lake, Manitoba: preliminary map; Geological Survey of Canada, Paper 42-16, 1:31 680.
- Buckham, A.F.
1944: Athapapuskow Lake, Manitoba; Geological Survey of Canada, Map 807A, 1:63 360.
- Gale, G.H., Baldwin, D.A., and Koo, J.
1980: A geological evaluation of Precambrian massive sulphide deposit potential in Manitoba; Manitoba Energy and Mines, Mineral Resources Division, Economic Geology Report ER79-1, 137p.

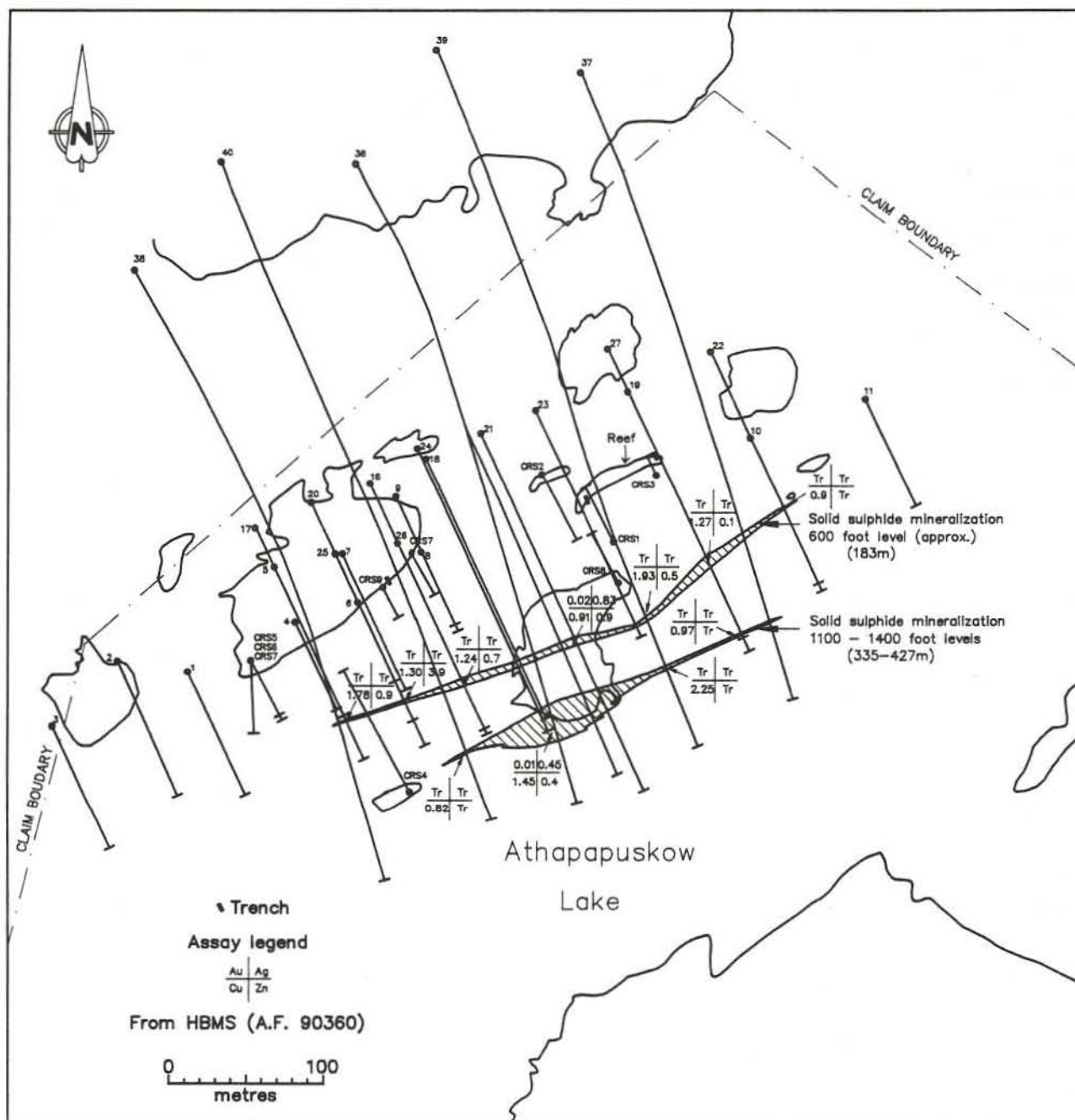


Figure 10-2: Drill hole and trench locations at occurrence 10.

Mineral Inventory Card NTS 63K/12 Pyr2,
Manitoba Energy and Mines, Geological
Services Branch

Syme, E.C.

1988: Bakers Narrows (part of NTS 63K/12); Man-
itoba Energy and Mines, Preliminary Geolo-
gical Map 1988F-2, 1:15 840.

Syme, E.C.

in prep: Geology of the Athapapuskow Lake area;
Manitoba Energy and Mines,

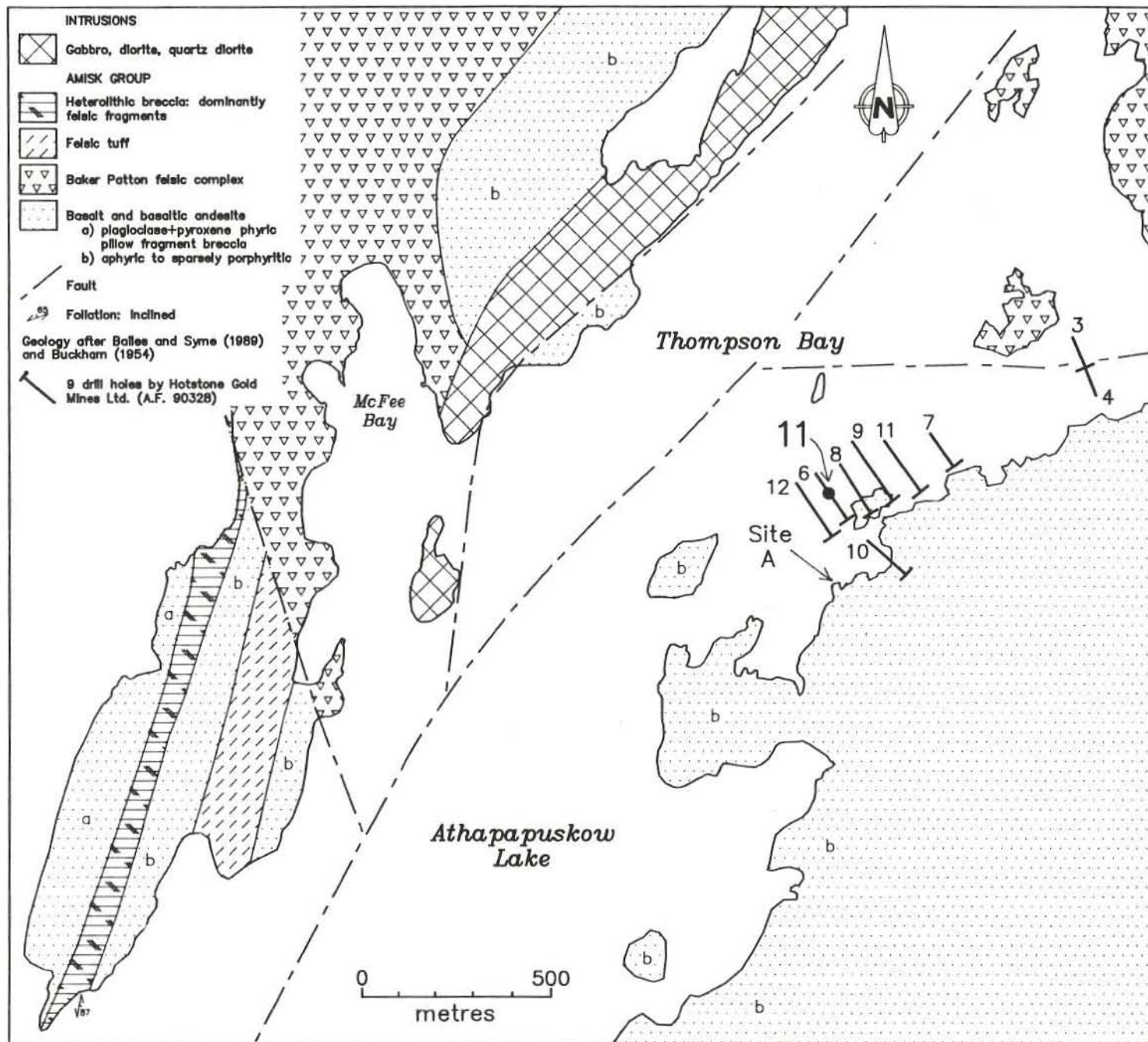


Figure 11-1: Geological setting of occurrence 11.

LOCATION: 11**NAME: Hotstone****UTM: 6068184N/331759E****ACCESS: Via boat to the North Arm of Athapapuskow Lake****AREA: Approximately 5 km northeast of Bakers Narrows****AIRPHOTO: A26328-175****EXPLORATION SUMMARY:**

The property was staked by W.E. Baker as Palma 7 and 8 in 1945. It was restaked as part of the F.H. Group in 1948 by D. Baker and optioned to Hotstone Gold Mines Ltd. in 1951. An EM survey and two drill holes (260 m) were completed in 1951. Seven holes (1 280 m) were drilled in 1952 (A.F. 90328). The claims were cancelled in 1959 and the occurrence was restaked as Our 48 in 1963; an EM survey was conducted by Kerr Addison Mines in 1964 (A.F. 90343). The area was staked as Sour 20 and 23 claims and transferred to Pinebay Mines Ltd. who drilled three holes on Sour 23 in 1976 (M.I. Card NTS 63K/12 Pyr1).

GEOLOGICAL SETTING:

The area is underlain by aphyric to sparsely porphyritic basalt and basaltic andesite flows. An east-trending fault north of the occurrence marks the southern boundary of the Baker Patton felsic complex (Fig. 11-1). The DDH intersected fine- to medium-grained, greyish-green andesite and layers of fragmental rhyolite (A.F. 90328). Pillow outlines indicate stratigraphic tops in the area are apparently toward the west.

MINERALIZATION:

Hotstone Gold Mines Ltd. reported two parallel sulphide zones 100 m apart. The west zone has a strike length of approximately 210 m and contains up to 30 m of 10% Fe-sulphides with trace chalcopyrite. The 30 m interval intersected in DDH 6 contained several 30 cm sections of near solid sulphide mineralization. The east zone, which was intersected by DDH 10, was described as 31 m of "well mineralized rhyolite with black chloritic(?) material". Mineralized rhyolite and/or rhyolite fragmental rocks were also intersected in DDH 6, 8, 9 and 12. Highly siliceous fragments were noted in DDH 11 (Hotstone Gold Mines Ltd., Corporation File; A.F. 90328).

Site A (Fig. 11-1) is an area of visible alteration where an intermediate volcanoclastic rock with fragments up to 70 cm contains 1 to 4 cm wide black chlorite veins with disseminated pyrite (Ostry, 1977).

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Stratabound massive sulphide type deposit; volcanic rock associated. The disseminated and stringer sulphides, together with the chlorite-sulphide vein network, are interpreted as part of an alteration zone typically associated with volcanogenic stratabound massive sulphide type deposits.

REFERENCES:

Assessment Files: 90328, 90343

Manitoba Energy and Mines, Mines Branch.

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

Buckham, A.F.

1942: Athapapuskow Lake, Manitoba: preliminary map; Geological Survey of Canada, Paper 42-16, 1:31 680.

Buckham, A.F.

1944: Athapapuskow Lake, Manitoba; Geological Survey of Canada, Map 807A, 1:63 360.

Hotstone Gold Mines Ltd., Corporation File;

Manitoba Energy and Mines, Mines Branch, Corporation Files, unpublished.

Mineral Inventory Card NTS 63K/12 PYR 1

Manitoba Energy and Mines, Geological Services Branch.

Ostry, G.M.

1977: Field Notes, Geology of the Hotstone property; Energy and Mines, Geological Services Branch, 3 p., unpublished.

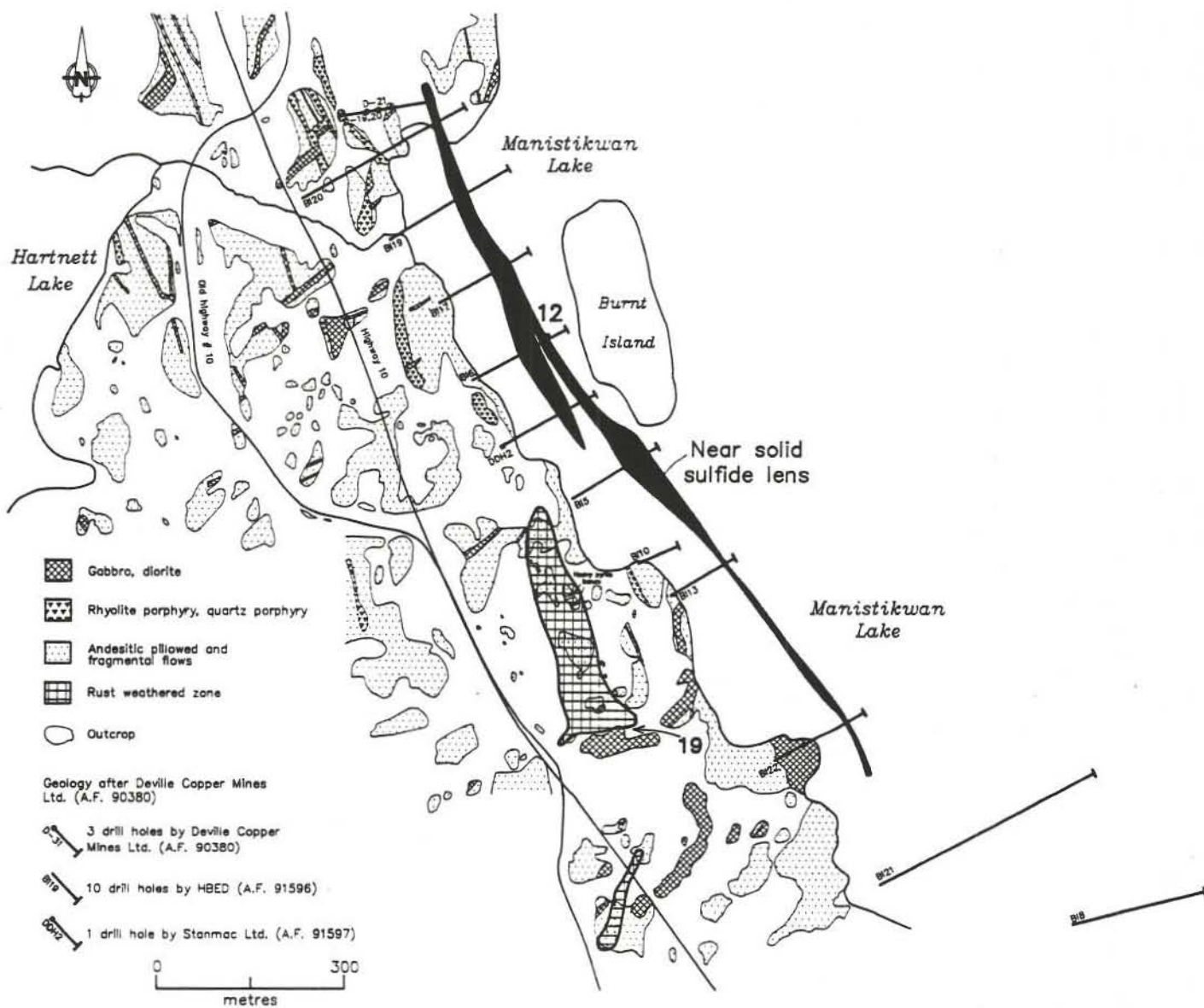


Figure 12-1: Detailed geology and drill hole locations at occurrence 12.

LOCATION 12:

NAME: Burnt Island

UTM: 6069057N/320251E

ACCESS: Via Provincial Road 10

AREA: West shore of Manistikwan Lake

AIRPHOTO: A26364-175

EXPLORATION SUMMARY:

In 1948, Stanmac Ltd. completed an EM survey of the Big Island (Manistikwan Lake) area, and drilled a 217 m hole on a conductor west of Burnt Island (A.F. 91597). HBED optioned the property in 1949 and drilled ten holes totalling 2 238 m (A.F. 91596). The Now 1 and -2 claims were staked in 1955 and optioned to De-Ville Copper Mines Ltd. in 1956. Magnetic, EM and geological surveys were completed in 1956-57 (M.I. Card NTS 63K/12 Zn1). Three holes totalling 221 m were drilled on Now 1 at the north end of the sulphide zone (A.F. 90380).

GEOLOGICAL SETTING:

The area is underlain by aphyric to sparsely plagioclase phyric basalt to basaltic andesite flows and breccia, with thin mafic intrusions and minor rhyolitic rocks (Fig. 12-1; Bailes and Syme, 1987; A.F. 90380). The holes drilled by DeVile Copper Mines Ltd. along strike from the mineralized zone intersected 1 to 15 m sections of sericite schist, dacite, chlorite schist and graphitic schists (A.F. 90380). The HBED drill holes intersected graphitic tuff, as well as greywacke, and fragmental and amygdaloidal andesitic rocks (A.F. 91596).

MINERALIZATION:

DDH 2 (Stanmac Ltd.) intersected two layers of pyrite in slaty and cherty tuff with some graphitic slips (A.F. 91597). The HBED drill holes intersected several bands of graphitic tuff that include sections with minor to near solid pyrite. Eight HBED holes (BI 5,-6,-7,-13,-19,-20,-21 and -22) outline a near solid pyrite lense (Fig. 12-1). DDH BI 5 and -6 contain a total of 51 m and

60 m, respectively, of near solid pyrite with graphite interbedded with siliceous and grey tuff (A.F. 91596).

GEOCHEMICAL DATA:

Most of the solid sulphide sections contained only trace amounts of Au, Ag, Zn and Cu; the highest contents recorded were 0.69 g/t Au, 8.23 g/t Ag and 0.14% Cu over 61 cm in DDH BI 21.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. Some of the sulphide facies iron formation layers are graphitic; others may represent the barren lense of a stratabound massive sulphide type deposit.

REFERENCES:

- Assessment Files 91596, 91597, 90375, 90380
Manitoba Energy and Mines, Mines Branch.
- Bailes, A.H. and Syme, E.C.
1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.
- Bailes, A.H. and Syme, E.C.
1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.
- Mineral Inventory Card NTS 63K/12 Zn1
Manitoba Energy and Mines, Geological Services Branch.

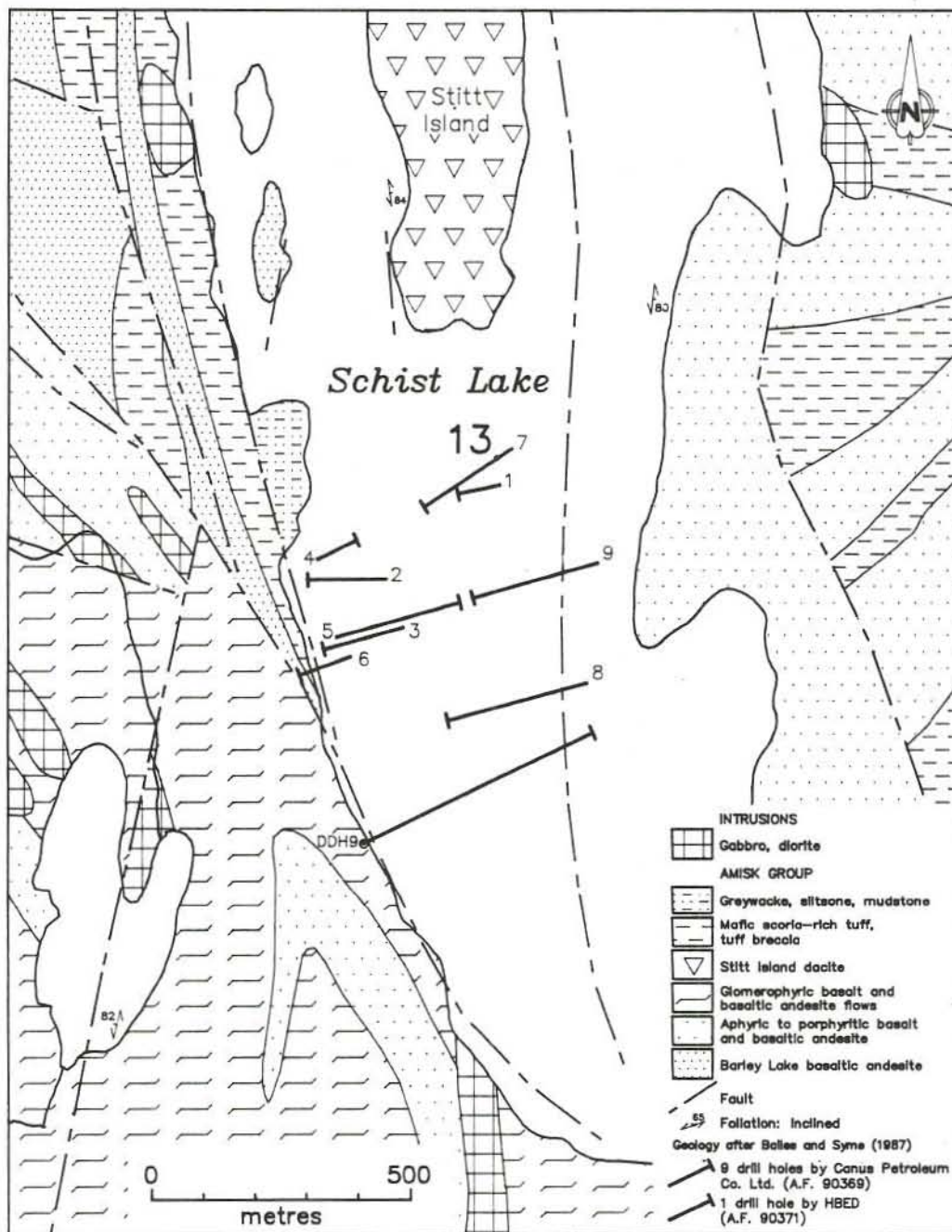


Figure 13-1: Geological setting of occurrence 13.

LOCATION: 13

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6065210N/318241E

ACCESS: Via boat on Schist Lake from Channing

EXPLORATION SUMMARY:

C.R. Parres staked the C.R. claim group in 1946. In 1946-47, the property was mapped at a scale of 1:9 600 by Heywood (1966). In 1949, Canus Petroleum Co. Ltd. drilled two holes on C.R. 8 and seven holes on C.R. 9 for a total of 1 454 m (A.F. 90369). HBED drilled DDH 9 (516 m) on C.R. 10 in 1953 (A.F. 90371).

GEOLOGICAL SETTING:

Rocks exposed on the western shoreline of Schist Lake include basaltic andesite flows and pillow breccia, glomerophytic basalt flows, metasedimentary rocks (greywacke?), and mafic tuff and tuff breccia (Fig 13-1). The area occurs within the same structural block as Stitt Island and the Schist Lake deposit (Location 1; cf. Bailes and Syme, 1989).

Similar rocks were found in drill core (A.F. 90369). In addition DDH 8 and 9 intersected 218 m and 196 m, respectively, of silicic, sericitic and carbonate-rich rock that is similar to rocks found on Stitt Island.

MINERALIZATION:

DDH 2 contained finely disseminated pyrite in 5.5 m of sericitized, silicified felsic intrusive(?) rocks. DDH 3 intersected 1.5 m of similar material. DDH 5 intersected 27 m of a "grey acid flow(?) with considerable fine pyrite". DDH 7 intersected 21 m and 27 m long zones of a grey siliceous rock with considerable pyrite \pm pyrrhotite. The only sulphide intersected in DDH 8 was minor pyrite. DDH 9, intersected abundant sericite-, chlorite-, and carbonate-bearing schist, but only minor pyrite. A 12 cm core intersection from DDH 9 contained trace chalcocopyrite (A.F. 90371).

GEOCHEMICAL DATA:

None.

AREA: South of Stitt Island, Schist Lake

AIRPHOTO: A26397-231

CLASSIFICATION:

Disseminated mineralization - not classified. It is not known if these sulphide-bearing silicic rock cores were analyzed for Au. It is possible that the sulphide mineralization is related to a stratabound massive sulphide type deposit since similar host rocks occur in the hanging wall of the Schist Lake deposit (see Location 1, this volume).

REFERENCES:

- Assessment Files: 90369, 90371, 91848
Manitoba Energy and Mines, Mines Branch.
- Bailes, A.H. and Syme, E.C.
1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.
- Bailes, A.H. and Syme, E.C.
1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.
- Heywood, W.W.
1966: Ledge Lake area, Manitoba and Saskatchewan; Geological Survey of Canada, Memoir 337, 43p.
- Stockwell, C.H.
1960: Flin Flon-Mandy, Manitoba and Saskatchewan; Geological Survey of Canada, Map 1078A, 1:12 000.
- Stockwell, C.H.
1946: Flin Flon-Mandy area, Manitoba and Saskatchewan; Geological Survey of Canada, Paper 46-14, 5p.

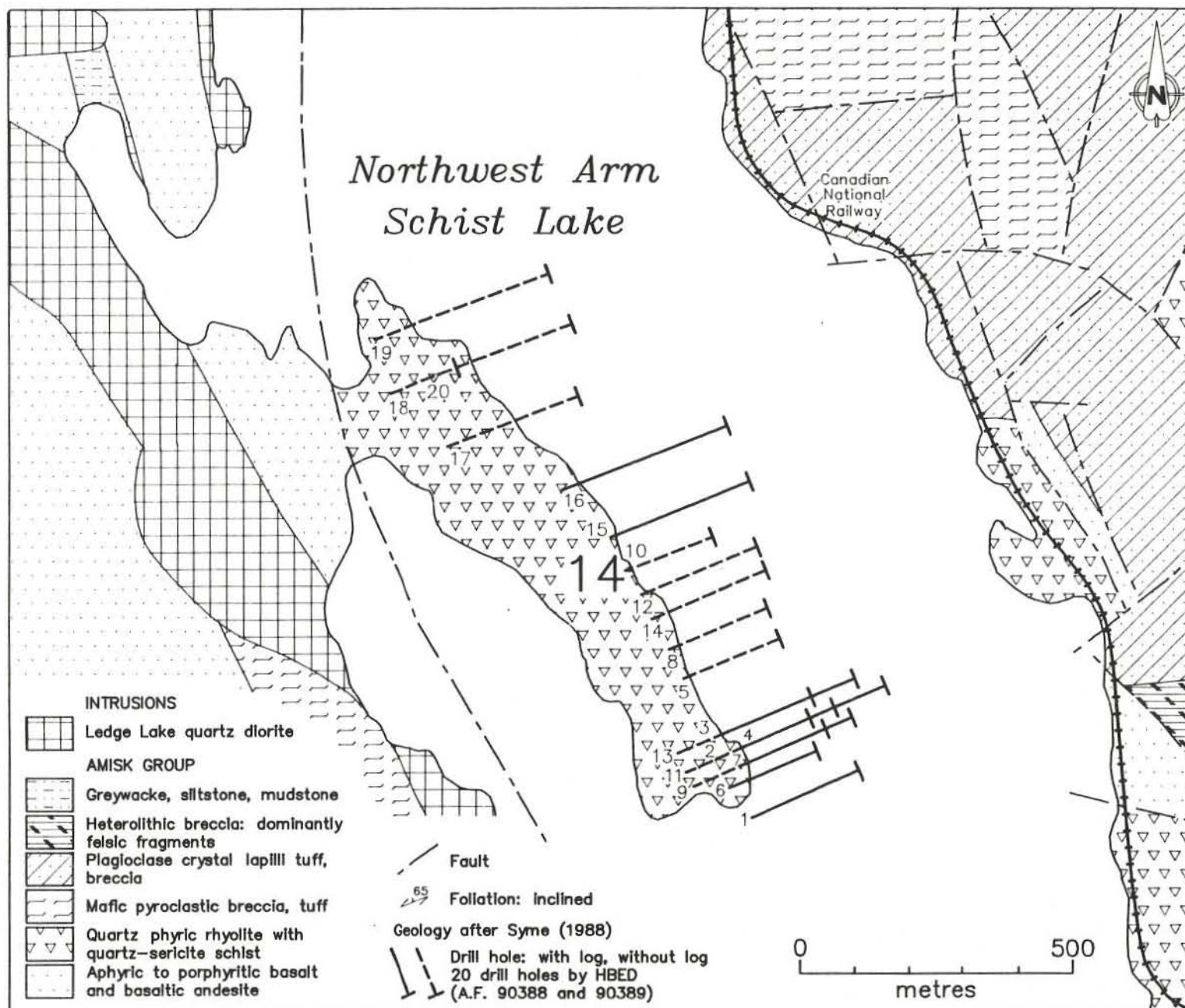


Figure 14-1: Geological setting of occurrence 14.

LOCATION: 14**NAME:** Ironsides**UTM:** 6059784N/319276E**ACCESS:** Via boat on Schist Lake at Channing**AREA:** West shore of Schist Lake**AIRPHOTO:** A26397-234**EXPLORATION SUMMARY:**

In 1948 HBED drilled 19 holes on the Ironsides claim group; drill core logs are available for eight holes totalling 1 968 m (A.F. 90388, 90389). Approximately 1 500 m of unlabelled drill core was located in the swamp at the southwest end of the peninsula. Four small trenches were identified on the peninsula (Fig. 14-1).

GEOLOGICAL SETTING:

The peninsula is underlain by quartz phyric rhyolite and quartz-sericite schist derived partly or wholly from rhyolitic rocks that are separated from the mafic volcanic rocks by a fault (Fig 14-1; Bailes and Syme, 1987). The drill cores were logged as siliceous carbonate rocks and various siliceous, chloritic, sericitic and carbonate-rich schists and/or tuffs. Minor graphite-bearing schist was present in some cores. Rhyolite was noted in DDH 16 (A.F. 90388).

MINERALIZATION:

The trenches were cut in altered silicic rocks along the shoreline of Schist Lake (Fig. 14-2). The schistose rocks are extensively pyritized; most of the drill core contains at least minor pyrite. Drill core, from several metres to tens of metres in length, contains up to 50% pyrite. Approximately 1 m of near solid pyrite was intersected in DDH 3. Trace to minor chalcopyrite was noted sporadically throughout the drill core (A.F. 90388).

GEOCHEMICAL DATA:

Eighty-six grab samples (30-60 cm long) of pyritic rocks from unlabelled and unsplit core were analyzed for Au by fire assay and atomic absorption. The results are presented in Table 14-1.

TABLE 14-1: GOLD CONTENT OF GRAB SAMPLES FROM UNLABELLED CORES AT LOCATION 14

Samples No.	ppb Au	Samples No.	ppb Au	Samples No.	ppb Au
42-4-6A-SL-1	15	42-4-4A-SL-5	<12	42-4-5A-SL-4	41
42-4-6A-SL-2	12	42-4-4B-SL-1	18	42-4-5B-SL-1	29
42-4-6A-SL-3	12	42-4-4B-SL-2 & 3	<12	42-4-5B-SL-2	64
42-4-6A-SL-4	18	42-4-4B-SL-4	12	42-4-5B-SL-3	24
42-4-6A-SL-5	12	42-4-4B-SL-5	12	42-4-5B-SL-4	12
42-4-7B-SL-1	<12	42-4-1B-SL-2	<12	42-4-5B-SL-5	29
42-4-7B-SL-4	12	42-4-1B-SL-3	12	42-4-2A-SL-1	24
42-4-7B-SL-4	12	42-4-1B-SL-4	12	42-4-2A-SL-2	24
42-4-10B-SL-1	<12	42-4-8A-SL-1	12	42-4-2A-SL-3	29
42-4-10B-SL-2	18	42-4-8A-SL-2	29	42-4-2A-SL-4	18
42-4-10B-SL-3	18	42-4-8A-SL-3	122	42-4-2A-SL-5	18
42-4-10B-SL-4	12	42-4-8A-SL-4	47	42-4-9A-SL-1	18
42-4-10B-SL-5	<12	42-4-8A-SL-5	29	42-4-9A-SL-2	24
42-4-6B-SL-1	<12	42-4-8B-SL-1	24	42-4-9A-SL-3	<12
42-4-6B-SL-2	18	42-4-8B-SL-2	24	42-4-9A-SL-4	<12
42-4-6B-SL-3	12	42-4-1A-SL-1	35	42-4-2B-SL-1	<12
42-4-6B-SL-4	18	42-4-1A-SL-2	18	42-4-2B-SL-2	<12
42-4-6B-SL-5	18	42-4-1A-SL-3	18	42-4-2B-SL-3	<12
42-4-10A-SL-3	18	42-4-1A-SL-4	29	42-4-2B-SL-4	12
42-4-4A-SL-1	12	42-4-1A-SL-5	41	42-4-2B-SL-5	12
42-4-4A-SL-2	<12	42-4-5A-SL-1	24	42-4-3B-SL-5	12
42-4-4A-SL-3	<12	42-4-5A-SL-2	29	42-4-93	20
42-4-4A-SL-4	12	42-4-5A-SL-3	18	42-4-94B	20

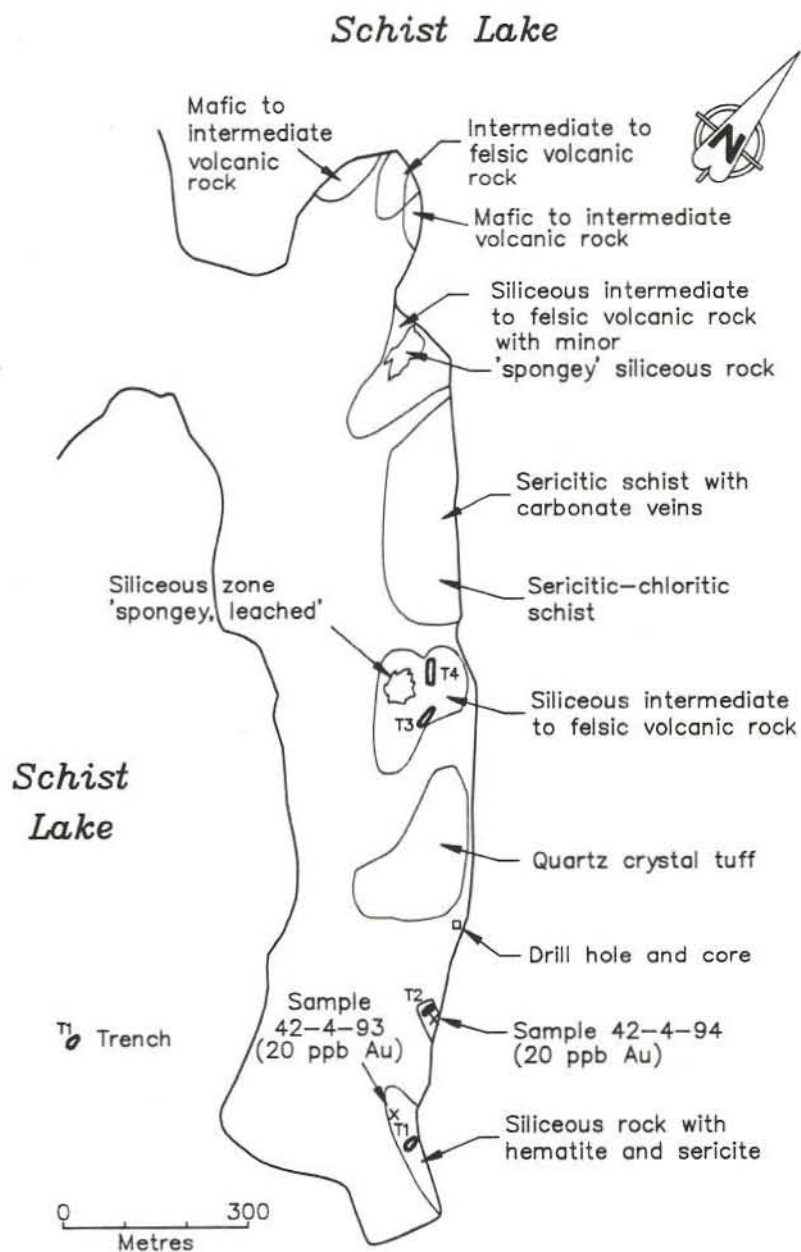


Figure 14-2: Trench and sample locations at occurrence 14.

CLASSIFICATION:

Stratabound massive sulphide type deposit; volcanic rock associated. The pyritic, chloritic and sericitic rocks are similar to some metamorphosed alteration zones associated with massive sulphide type deposits in the Flin Flon area.

REFERENCES:

Assessment Files: 90388,90389

Manitoba Energy and Mines, Mines Branch.

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

Parbery, D. and Gale, G.H.

1984: Mineral deposit investigations in the Flin Flon area; In Manitoba Energy and Mines, Mineral Resources Division, Report of Field Activities 1984, p. 60-66.

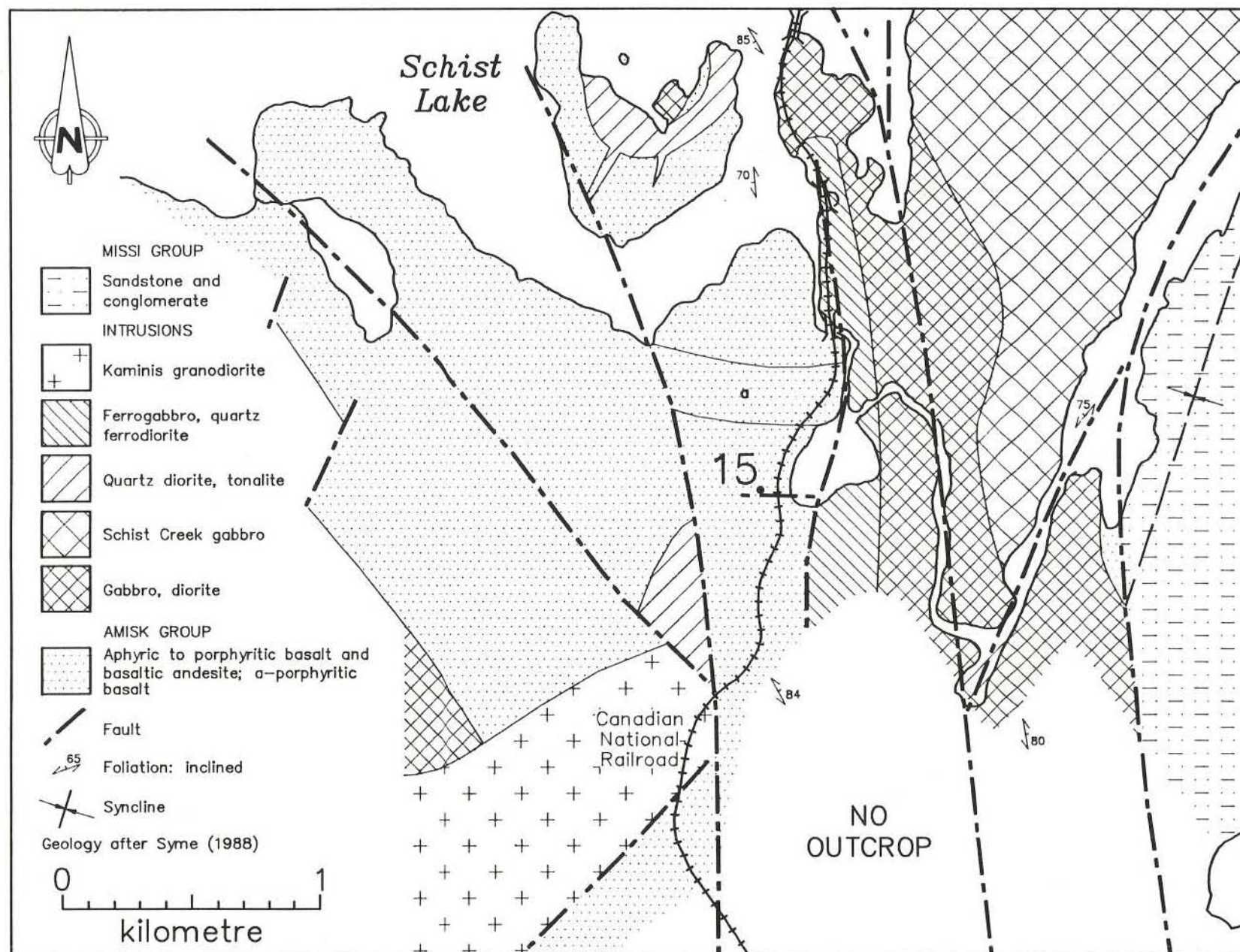


Figure 15-1: Geological setting of occurrence 15.

LOCATION: 15

NAME:

UTM: 6055924N/321048E

ACCESS: Via boat on Schist Creek from Channing or Bakers Narrows; 258 m west of railway

EXPLORATION SUMMARY:

A pyrite occurrence was indicated by Buckham (1944). A 10 x 10 m trench was located in 1984 (Parbery and Gale, 1984).

GEOLOGICAL SETTING:

The area is underlain predominantly by aphyric basalt (Syme, 1988). The mineralization occurs between the Ross Lake Fault to the west and a north-trending fault to the east (Fig. 15-1).

MINERALIZATION:

The sulphide-bearing zones contain chloritic schist and up to 10% pyrite as disseminations along fractures, and as lenses up to 2 cm long (Fig. 15-2). Approximately 40 m east of the trench, the volcanic rocks contain 2 mm veins of white and pink quartz and black chlorite.

GEOCHEMICAL DATA:

None.

AREA: South end of Schist Lake

AIRPHOTO: A26397-262

CLASSIFICATION:

Disseminated mineralization - not classified.

REFERENCES:

Buckham, A.F.

1942: Athapapuskow Lake, Manitoba: preliminary map; Geological Survey of Canada, Paper 42-16, 1:31 680.

Buckham, A.F.

1944: Athapapuskow Lake, Manitoba; Geological Survey of Canada, Map 807A, 1:63 360.

Parbery, D. and Gale, G.H.

1984: Mineral deposit investigations in the Flin Flon area; In Manitoba Energy and Mines, Mineral Resources Division, Report of Field Activities 1984, p. 60-66.

Syme, E.C.

1988: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

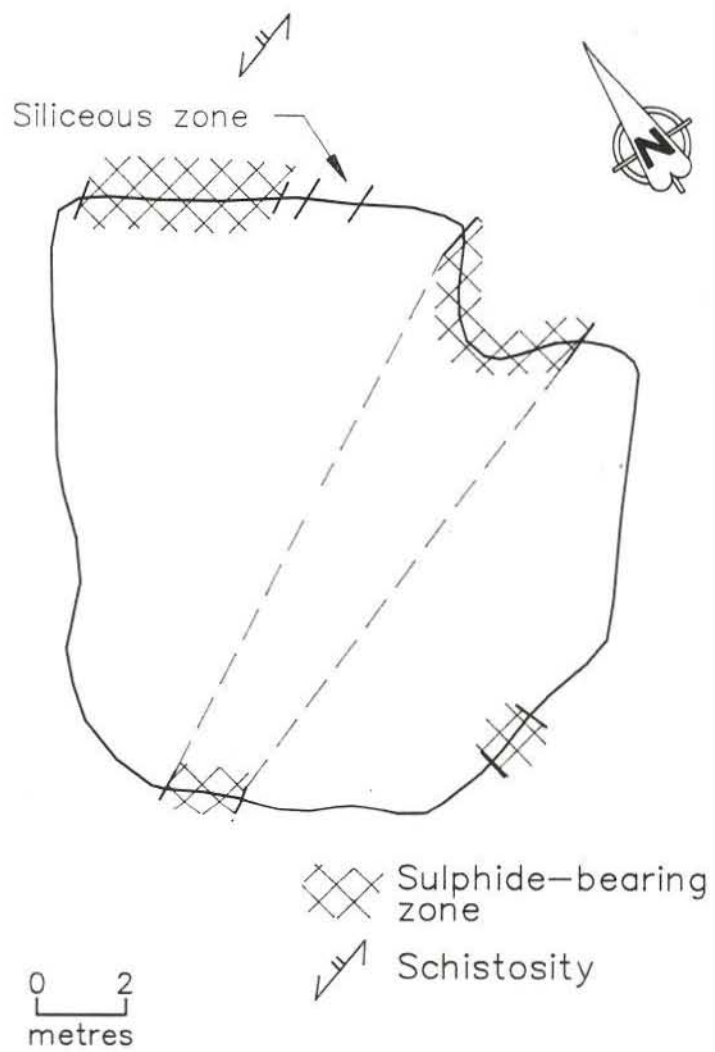


Figure 15-2: Detailed geology at occurrence 15.

LOCATION: 16

NAME: Iron Horse

UTM: 6063353N/319850E

ACCESS: Via boat from Channing and traverse

EXPLORATION SUMMARY:

The Iron Horse claims were staked in 1928 by C.E. Hermann and W.J. Dawson. In 1929 five trenches or 'shafts' from 1.5 to 7.5 m deep were dug, with drifts extending from one shaft. In 1930 Manitoba Flin Flon Mines Ltd. obtained the claims and by the end of that year they reportedly completed six additional 'shafts' up to 15 m deep on Iron Horse 3 and -6. By 1937 more than 11 278 m of surface trenching had been done (M.I. Card NTS 63K/12 Cu16).

In 1947 HBMS obtained the claims at a tax auction. In 1957 Iron Horse 6 was cancelled and a two-year lease was obtained on Iron Horse 3 by HBMS. Granges Exploration AB conducted a geophysical survey and drilled one hole (45 m) in 1978 and another (48 m) in 1981 to test EM anomalies to the north of the Iron Horse claims on CB 7347 (A.F. 92495, 92499).

GEOLOGICAL SETTING:

The area is underlain by mafic volcanoclastic and flow rocks that have been intruded by mafic dykes (Fig 16-1; Bailes and Syme, 1987). A thin unit of felsic tuff and mudstone is present along the western margin of the mineralization (Syme, 1988; Bailes and Syme, 1987). DDH SH-5 intersected quartz porphyry; DDH SH-13 intersected rhyolite and rhyolite tuff (A.F. 92495, 92499).

MINERALIZATION:

A 5 to 6 m thick zone of solid sulphide strikes north for 1 525 m within a sequence of graphitic and siliceous pyritic mudstone and felsic tuff that is mineralized over a thickness of 40 m (M.I. Card NTS 63K/12 Cu16). Sulphide layers include pyrite, pyrrhotite, chalcopyrite, sphalerite and arsenopyrite. Disseminated chalcopyrite and pyrrhotite occur at the north end of the zone.

DDH SH-5 intersected minor pyrite and pyrrhotite disseminations and stringers throughout its length, as well as one 60 cm long intersection with 10 to 15% pyrite-pyrrhotite and a 13 m intersection that contained 60% quartz. DDH SH-13 intersected 10 cm of 10% pyrite and short intersections of minor pyrrhotite.

AREA: Between Inlet Arm and northwest arm of Schist Lake

AIRPHOTO: A26397-231, -255

GEOCHEMICAL DATA:

A grab sample taken in 1928 contained 11.89% Cu, 1.94% Zn, 51.40 g/t Ag and 1.38 g/t Au. Trench assays of 1% Cu, 3.4 g/t Au, 0.51 g/t Ag and trace Ni were reported (M.I. Card NTS 63K/12 Cu16; Manitoba Flin Flon Mines Ltd., Engineering File)

Drill core assays from DDH SH-5 were 6.86 g/t Au and 3.43 g/t Au for sample lengths of 37 cm and 76 cm, respectively (A.F. 92495).

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. The mineralization intersected in DDH SH-13 and SH-5 is not known.

REFERENCES:

Assessment Files: 92495, 92499

Manitoba Energy and Mines, Mines Branch.

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

Manitoba Flin Flon Mines Ltd.

Engineering File, Manitoba Energy and Mines, Mines Branch.

Mineral Inventory Card NTS 63K/12 Cu16.

Manitoba Energy and Mines, Geological Services Branch

Syme, E.C.

1988: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

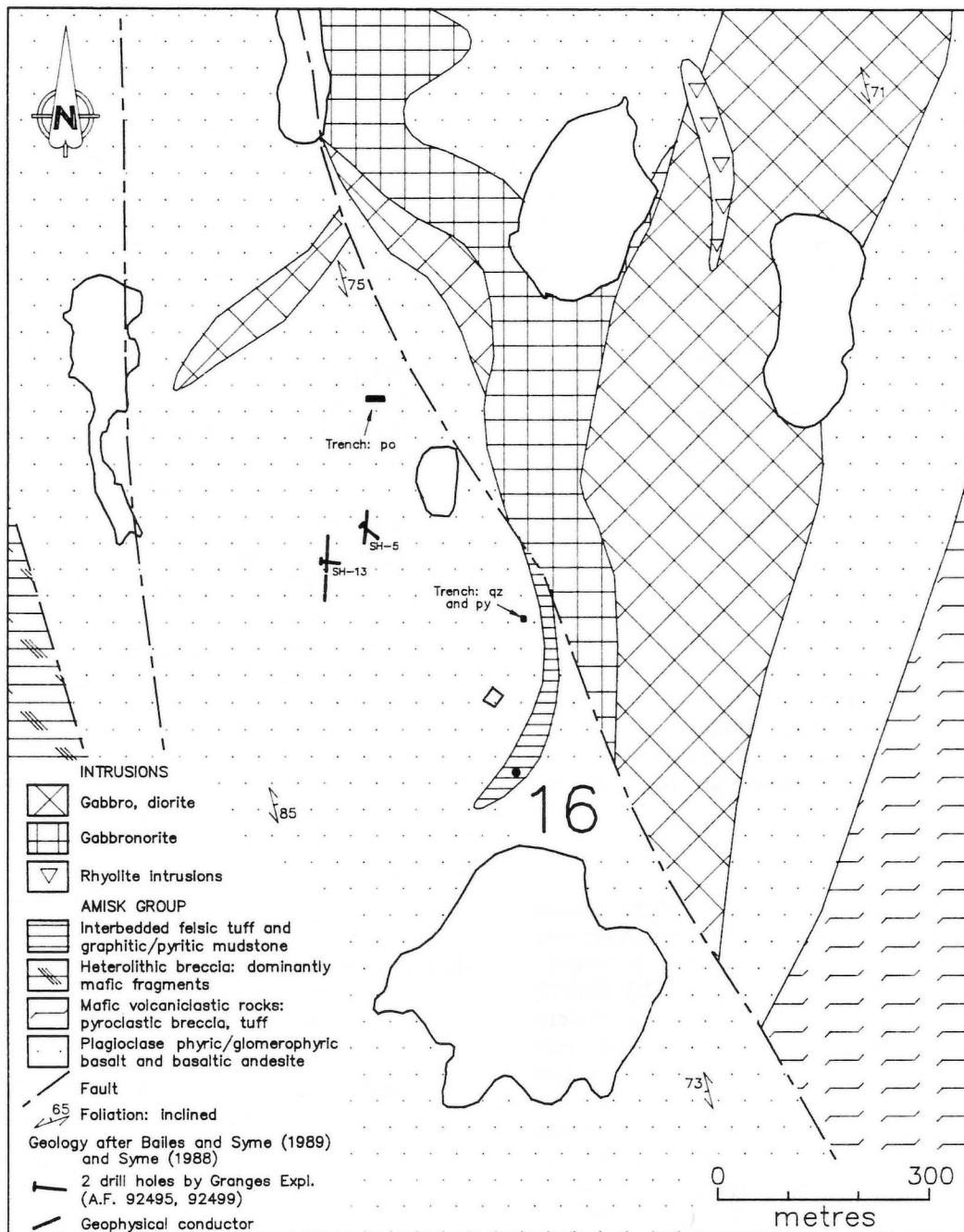


Figure 16-1: Geological setting of occurrence 16.

LOCATION: 17**NAME: Sunbeam****UTM: 6065126N/319854E****ACCESS: Via canoe from Rennie Lake****AREA: West side of Hook Lake****AIRPHOTO: A26397-131****EXPLORATION SUMMARY:**

The Cu occurrence was staked as the Sunbeam claim in 1917 by E. Erikson, the Sunrise claim in 1922 by W.E. Rose and the Polaris claim in 1923 by W.T. Thompson. Some surface work was undertaken in 1924-1927. The area was restaked several times prior to 1940, when claim R 18 was assigned to HBED. A geological survey was undertaken in 1944 and a 46 m hole drilled. Claim R 18 was leased to HBMS in 1944 and the lease was renewed in 1965 (M.I. Card NTS 63K/12 Cu18). Two trenches were found near the southwest end of Hook Lake in 1984 (Parbery and Gale, 1984).

GEOLOGICAL SETTING:

The area is underlain by a sequence of plagioclase phyric basaltic flows and mafic pyroclastic rocks that have been intruded by gabbroic and rhyolitic rocks (Fig. 17-1; Bailes and Syme, 1987). The trenches were cut in a felsic rock, consisting of either rhyolite flows or micrographic leucotonalite (Bailes and Syme, 1989) that is in contact with a unit of mafic volcanic rock or the fine grained margin of a mafic intrusion (Fig. 17-2).

MINERALIZATION:

At trench 1 (Fig. 17-2) the sulphide zone is approximately 3 m wide, but most of the sulphides are concentrated in a 1 m wide rusty weathered and fractured zone that has 25% sulphide minerals and can be traced for approximately 100 m south from the trench. The sulphide zone is hosted by felsic volcanic rocks, orientated 015°/65°SW. Several 1 to 5 cm veins of near solid pyrite ± chalcopyrite with quartz occur in the sulphide-bearing rock. At sample sites 4 and 5, dark grey to greenish-grey, fine grained silicic rock has 1 to 10% pyrite stringers and disseminations (Fig. 17-2). Millimetre wide epidote and carbonate veinlets are present at sample site 3; felsic volcanic rocks west of sample site 3 contain 1% pyrite and/or pyrrhotite (Fig. 17-2). A narrow zone of mafic to intermediate rocks with 1 to 3% pyrite occurs at the east margin of the trench; mafic rocks immediately east of this unit contain less than 1% pyrite.

At trench 2, the mineralized zone is 2 m wide; solid sulphide veins are more abundant than in trench 1, but still occur near the felsic-mafic rock contact (Fig. 17-2).

GEOCHEMICAL DATA:

None

CLASSIFICATION:

Vein type deposit; multiple veins or lenses. This occurrence could represent sulphide mobilizate associated with a chemical sediment type deposit; sulphide facies iron formation. The classification is dependant upon an intrusive or extrusive origin of the felsic host rock.

REFERENCES:

Assessment Files: 92495, 921499

Manitoba Energy and Mines, Mines Branch.

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

Mineral Inventory Card NTS 63K/12 Cu18

Manitoba Energy and Mines, Geological Services Branch

Tanton, T.L.

1941: Schist Lake, Saskatchewan and Manitoba; Geological Survey of Canada, Map 633A, 1:63 360.

Parbery, D. and Gale, G.H.

1984: Mineral deposit investigations in the Flin Flon area; in Manitoba Energy and Mines, Mineral Resources Division, Report of Field Activities 1984, p. 60-66.

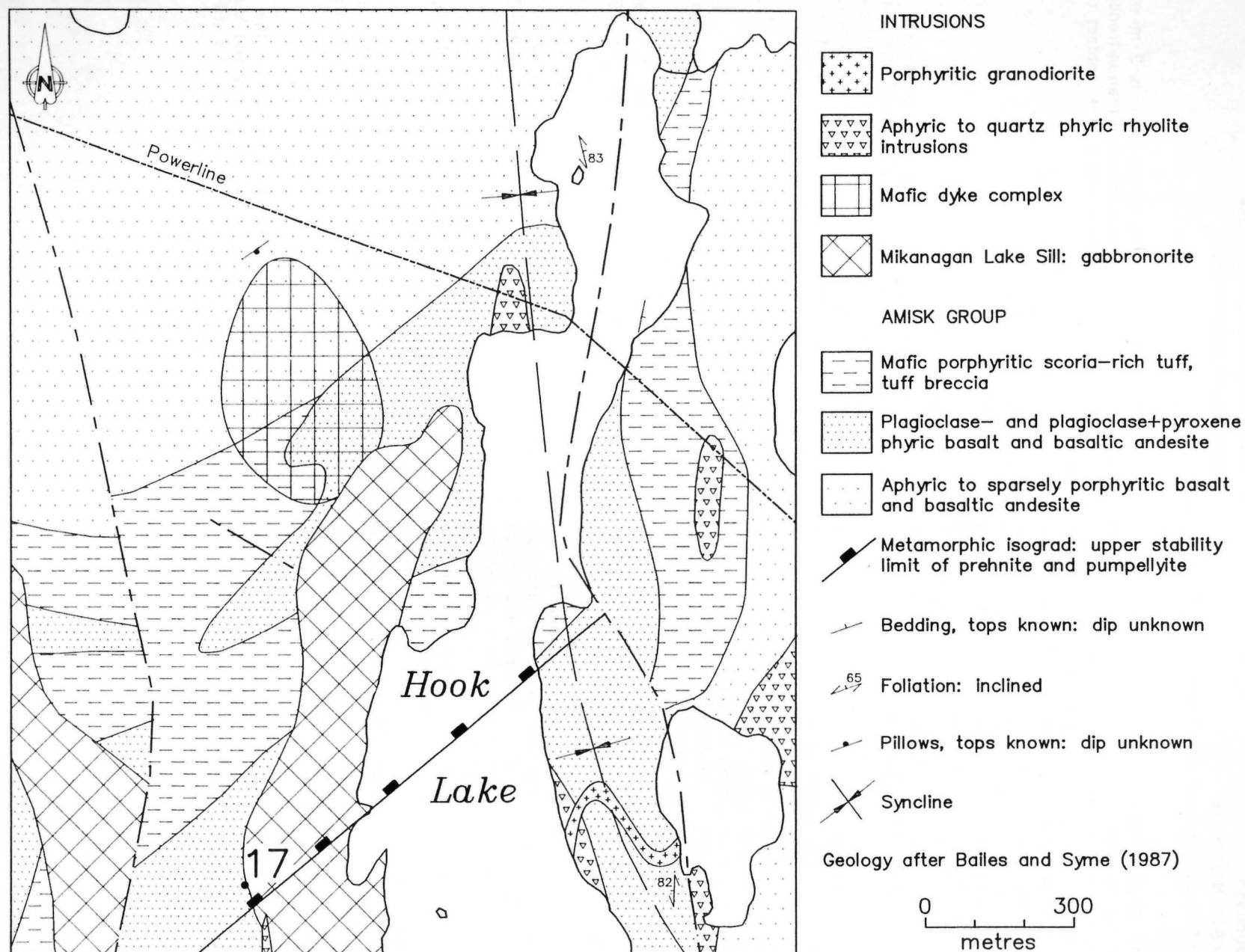


Figure 17-1: Geological setting of occurrence 17.

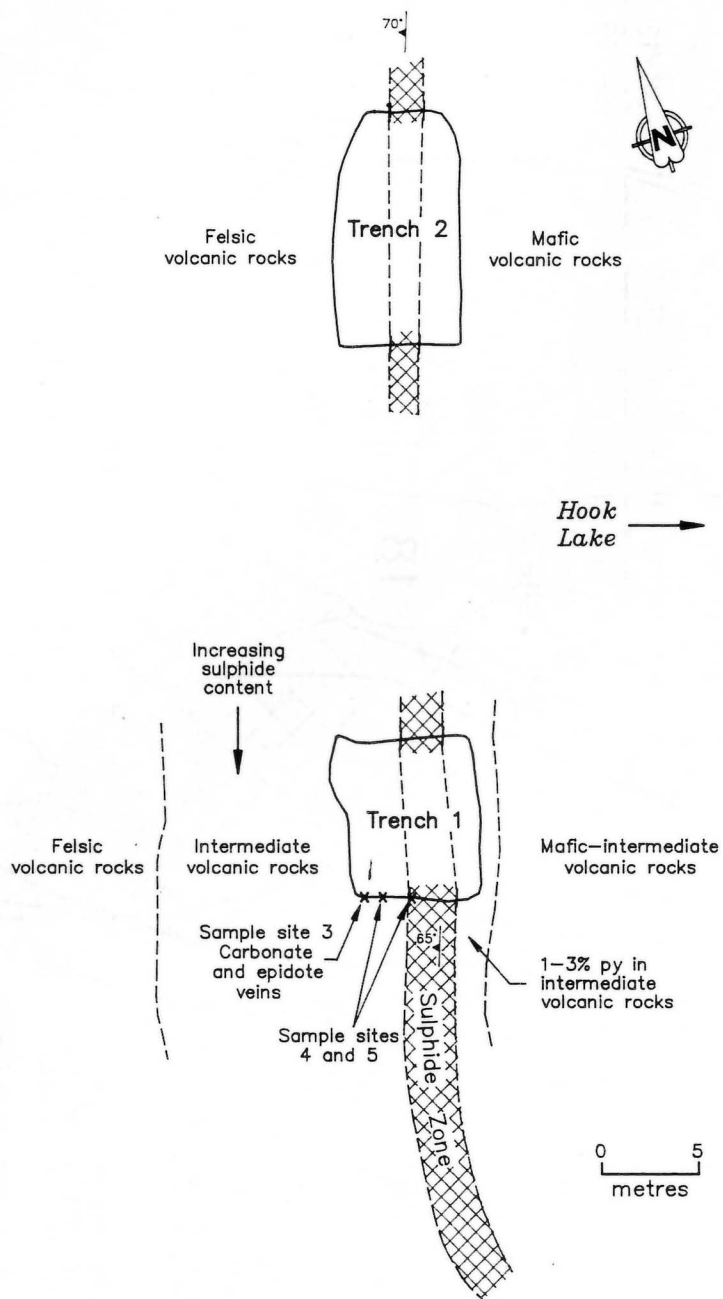


Figure 17-2: Detailed geology at trenches 1 and 2 occurrence 17.

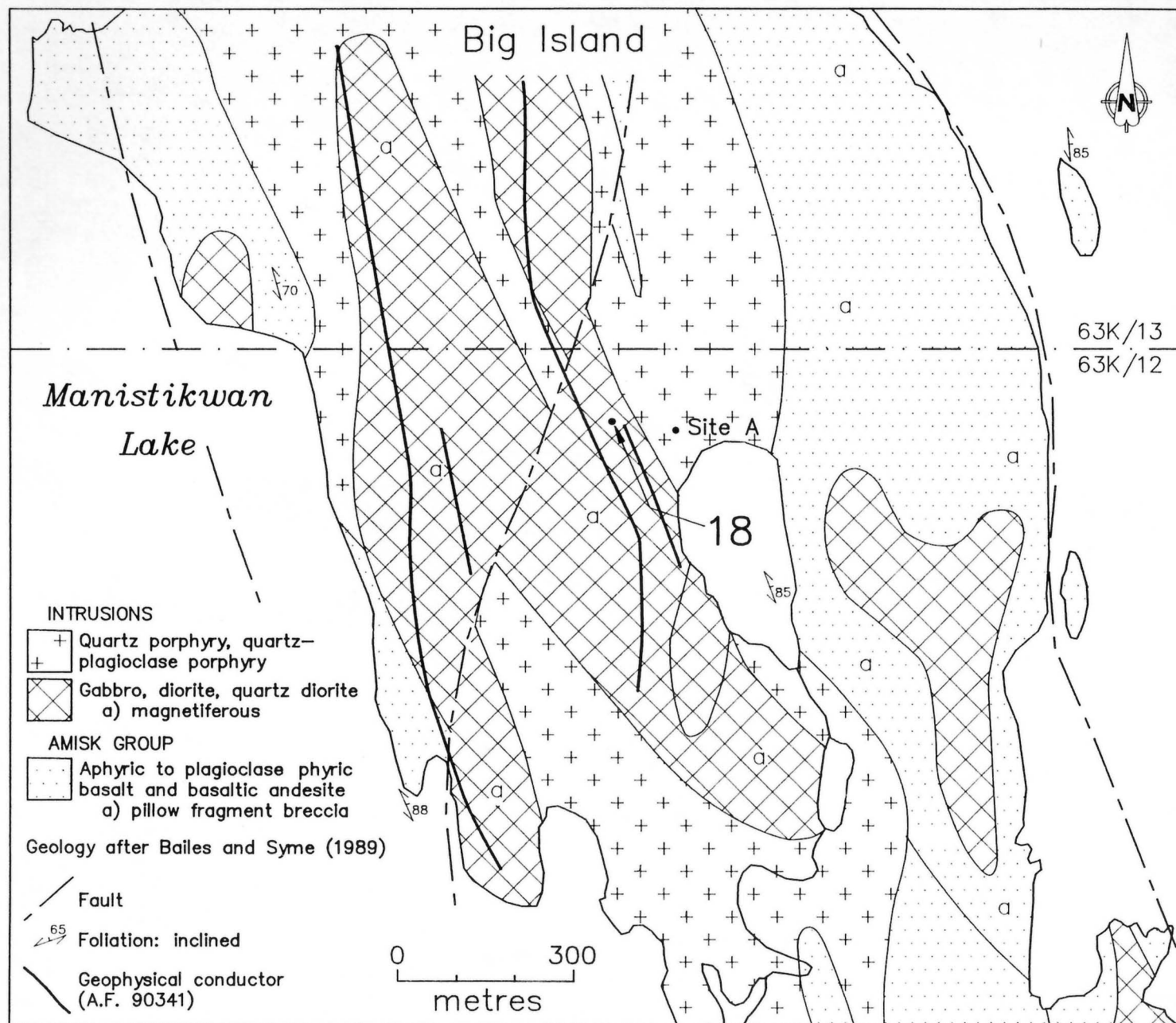


Figure 18-1: Geological setting of occurrence 18.

LOCATION: 18

NAME: Now

UTM: 6070133N/3210223E

ACCESS: Via boat on Manistikwan Lake

AREA: Big Island, Manistikwan Lake

AIRPHOTO: A26364-174

EXPLORATION SUMMARY:

A Cu occurrence was noted by Tanton (1941). In 1952, a magnetic anomaly, immediately west of the occurrence shown by Tanton (1941), was delineated by Big Island Copper Mines Ltd. The area was searched twice during the course of field investigations for this report, but no trenches or mineralization were found.

GEOLOGICAL SETTING:

The vicinity of the mineralization (Site A, Fig. 18-1) indicated by Tanton (1941) is underlain by a quartz porphyry intrusion (Bailes and Syme, 1989) that contains 15 to 20%, 2 to 3 mm quartz crystals. Several exposures of rhyolitic fragments in a fine grained rhyolitic matrix occur west of Site A and adjacent to the contact with the fine grained diorite (Fig. 18-1). The only mineralization noted in this area occurs in association with quartz veins in the diorite.

MINERALIZATION:

Minor disseminated pyrite and trace amounts of arsenopyrite needles occur in diorite (Fig. 18-2). White quartz veins 1 to 1.5 m thick were noted in several places throughout the diorite.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Disseminated mineralization - not classified. Pyrite and arsenopyrite in diorite.

REFERENCES:

Assessment File: 90341

Manitoba Energy and Mines, Mines Branch.

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

Tanton, T.L.

1941: Schist Lake, Saskatchewan and Manitoba; Geological Survey of Canada, Map 633A, 1:63 360.

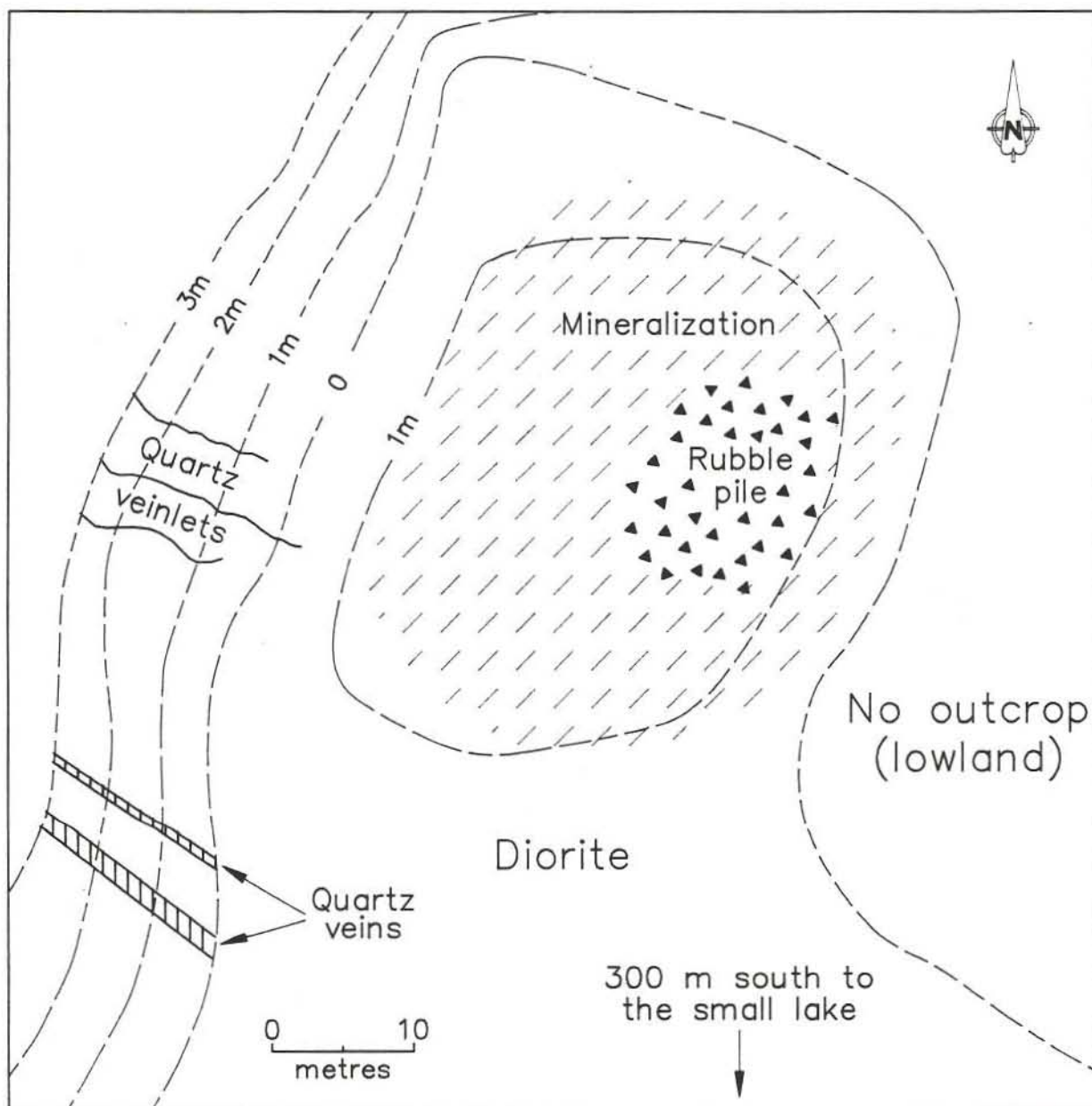


Figure 18-2: Detailed geology at occurrence 18.

LOCATION: 19**NAME: NOW****UTM: 6068476N/320426E****ACCESS: Via Provincial Road 10****EXPLORATION SUMMARY:**

The area was initially staked in 1934 by J. Beaudry and assigned to Manitoba Quebec Mines Ltd. The Now 2 and Now 3 claim fractions were staked by R.L. Vancoughneet in 1951; some trenching was done before the claims were cancelled in 1954. The Now 2 and -3 claims were staked in 1955 by H. Dowhaluk and were optioned to DeVille Copper Mines Ltd. in 1956, who conducted magnetic, EM and geological surveys. Eight holes totalling 973 m were drilled in 1957, but the claims were cancelled in 1959 (A.F. 90380; M.I. Card NTS 63K/12 Zn1).

GEOLOGICAL SETTING:

The area is underlain by aphyric to sparsely plagioclase phyric pillowed basalt flows that have been intruded by a small body of rhyolite (Fig. 19-1; Bailes and Syme, 1989). A detailed geological survey of the area indicated the presence of numerous small rhyolitic, gabbroic and dioritic intrusions (Fig 19-1, A.F. 90380).

MINERALIZATION:

A pyritic zone 30 m wide and 335 m long that is exposed in outcrops and trenches (Fig. 19-1) contains disseminations, veinlets and veins of pyrite and trace pyrrhotite. The zone is hosted by rusty weathered mafic volcanic rocks that also contain veins of chlorite. An 8 x 23 m lense of solid sulphide consisting of up to 75% pyrite, 25% pyrrhotite and minor chalcopyrite has been delineated by drilling at the southern margin of the zone of alteration; the sulphide lense occurs near the contact of a diorite dyke and a carbonatized rhyolite (A.F. 90380).

Pyrite disseminations and veinlets that occur southwest of the solid sulphide zone (Fig. 19-1) repre-

AREA: West shore of Manistikwan Lake**AIRPHOTO: A26364-176**

sent the westward continuation of the zone of alteration that occurs north of the solid sulphide zone.

GEOCHEMICAL DATA:

One 1.5 m section of drill core contained 0.4% Zn, but most drill core samples assayed less than 0.1% Zn and trace Cu (A.F. 90380).

CLASSIFICATION:

Stratabound massive sulphide type deposit; volcanic rock associated. Visually, the alteration zone resembles those associated with massive sulphide type deposits in the Flin Flon area. The solid sulphide lense was probably derived from the mobilization of sulphide minerals from the zone of alteration and deposition at the margin of the younger gabbroic intrusion. A relationship between this occurrence and occurrence 12 is implied, and should be investigated.

REFERENCES:

- Assessment File: 90380,
Manitoba Energy and Mines, Mines Branch.
- Bailes, A.H. and Syme, E.C.
1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.
- Bailes, A.H. and Syme, E.C.
1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.
- Mineral Inventory Card NTS 63K/12 Zn1
Manitoba Energy and Mines, Geological Services Branch

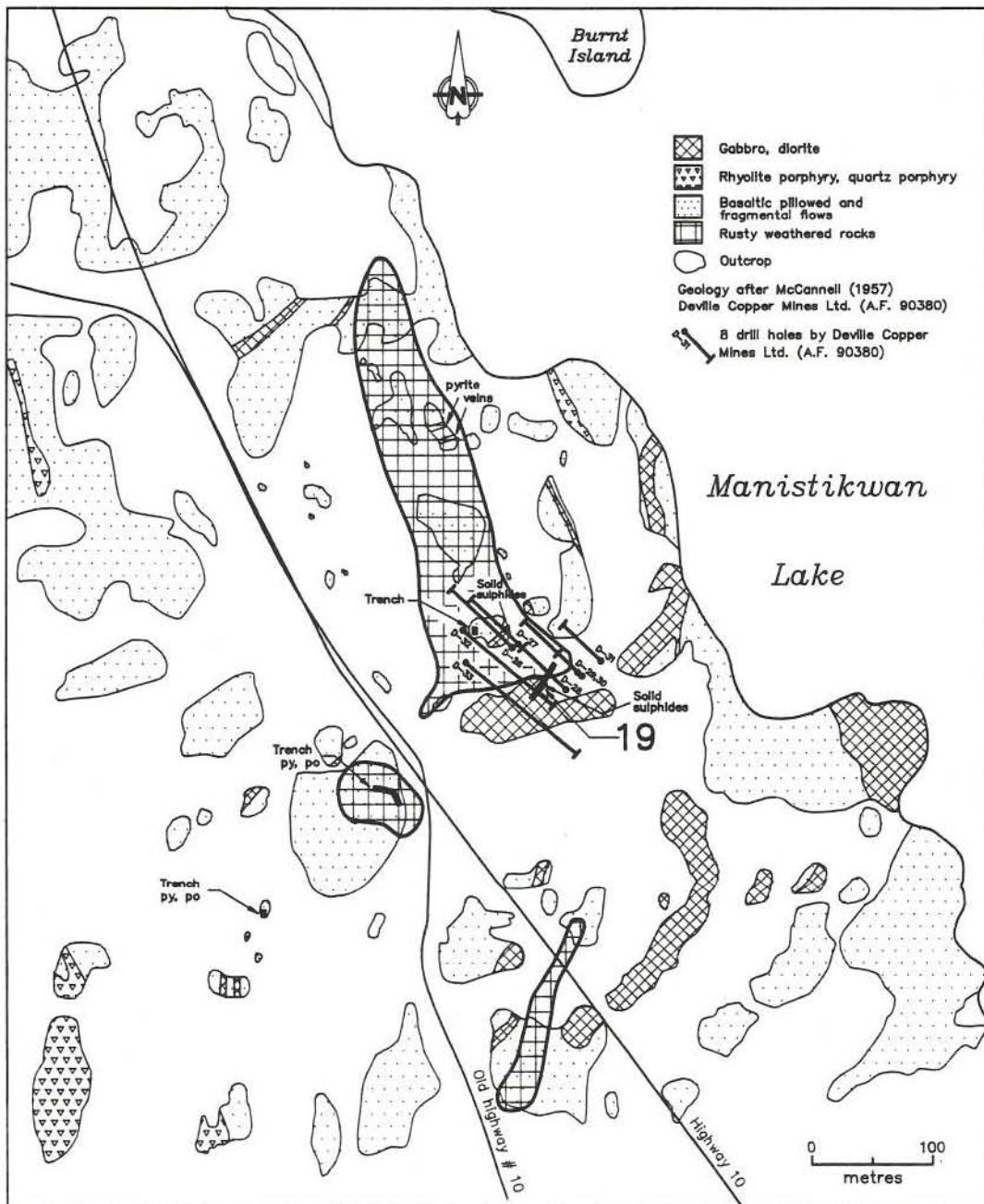


Figure 19-1: Detailed geology, drill hole and trench locations at occurrence 19.

LOCATION: 20

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6067095N/321361E

ACCESS: Via Provincial Road 10 and traverse, or by boat on Manistikwan Lake

EXPLORATION SUMMARY:

In 1949, HBED completed magnetic and EM surveys and tested conductors with three drill holes totaling 708 m on the Big Island claim (A.F. 91596). Stanmac Ltd. drilled a 123 m hole in 1949 (A.F. 91597). A 2 x 2 x 1 m trench was found less than 2 m from the shoreline in 1984.

GEOLOGICAL SETTING:

The area is underlain by aphyric to sparsely porphyritic basalt and andesitic basalt flows (Fig. 20-1; Bailes and Syme, 1989).

MINERALIZATION:

A trench with up to 2% pyrite and trace chalcopyrite was excavated in aphanitic siliceous volcanic rock. The sulphide minerals occur as disseminations and stringers that parallel fractures (cleavage) in the rock at 168°/85°W. The sulphide-bearing silicified rock is exposed intermittently along the shoreline of Manistikwan Lake for 50 m (Fig. 20-2). DDH B.I. 23 drill core contained one 45 cm thick section of chloritic andesite with near solid pyrite and traces of chalcopyrite and pyrrhotite; minor amounts of pyrite occurred in silicified and andesitic rocks uphole from a 25 m thick section of fine grained graphitic rock that contained layers of up to near solid pyrite. DDH B.I. 25 intersected 6 m of very siliceous andesite with sections of near solid pyrite. DDH B.I. 29 intersected near solid and solid sulphide sections interlayered with graphite (A.F. 91596).

AREA: West shore of Manistikwan Lake

AIRPHOTO: A26364-176

GEOCHEMICAL DATA:

One drill core sample from DDH B.I. 29 assayed 0.34 g/t Au and 6.51 g/t Ag over 45 cm (A.F. 91596). Two samples from the trench assayed 52 ppm Cu and 151 ppm Cu; both trench samples contained less than 12 ppb Au (Fig 20-2).

CLASSIFICATION:

Stratabound massive sulphide type deposit; volcanic rock associated. The chloritic and sericitic schist, sulphide stringers and disseminations, and solid sulphide intersections in the uppermost parts of the drill holes are tentatively interpreted as a zone of alteration related to a massive sulphide type deposit. It is not certain from the available data if a solid sulphide lense was intersected in the drill holes. A chemical sediment type deposit, sulphide facies iron formation, which is graphite-bearing, structurally underlies the altered rocks.

REFERENCES:

Assessment Files: 90374, 90380, 91596, 91597

Manitoba Energy and Mines, Mines Branch.

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

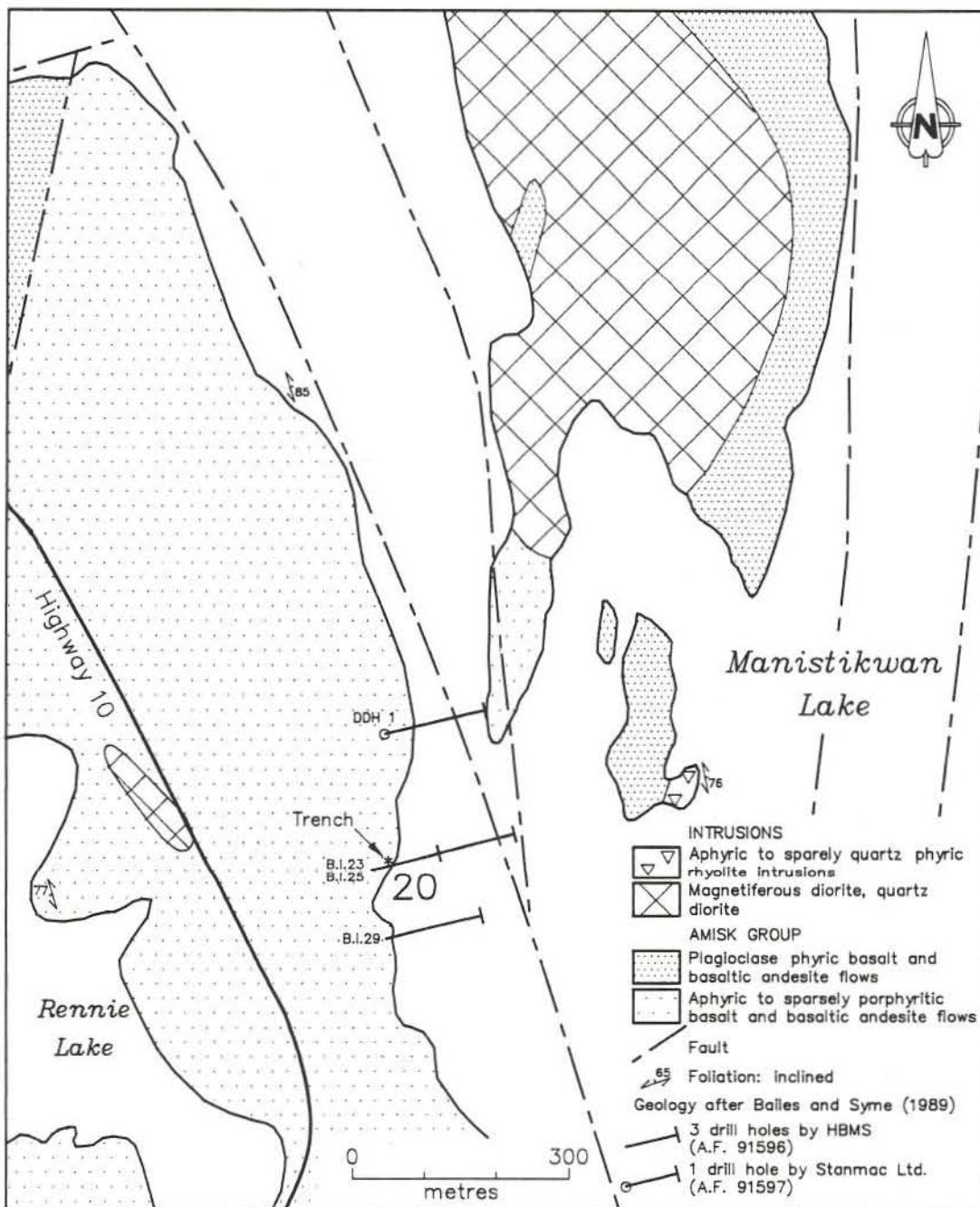


Figure 20-1: Geological setting of occurrence 20.

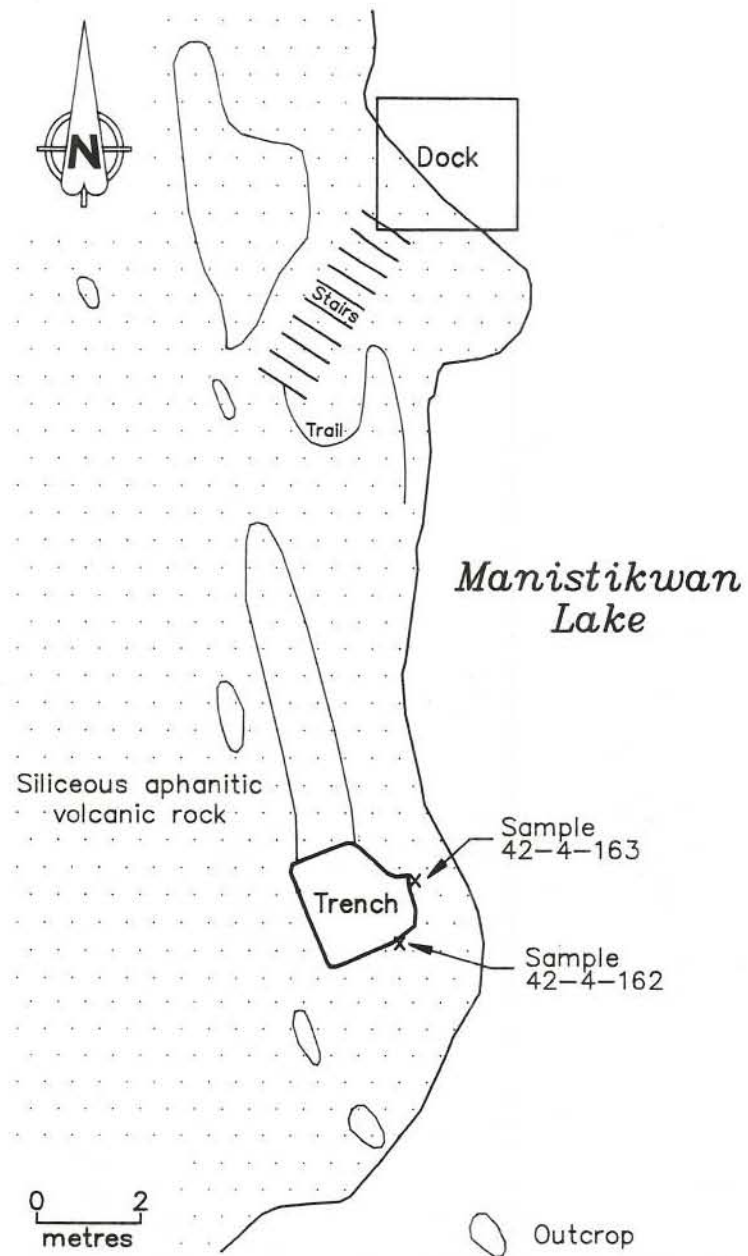


Figure 20-2: Detailed geology, trench and sample locations at occurrence 20.

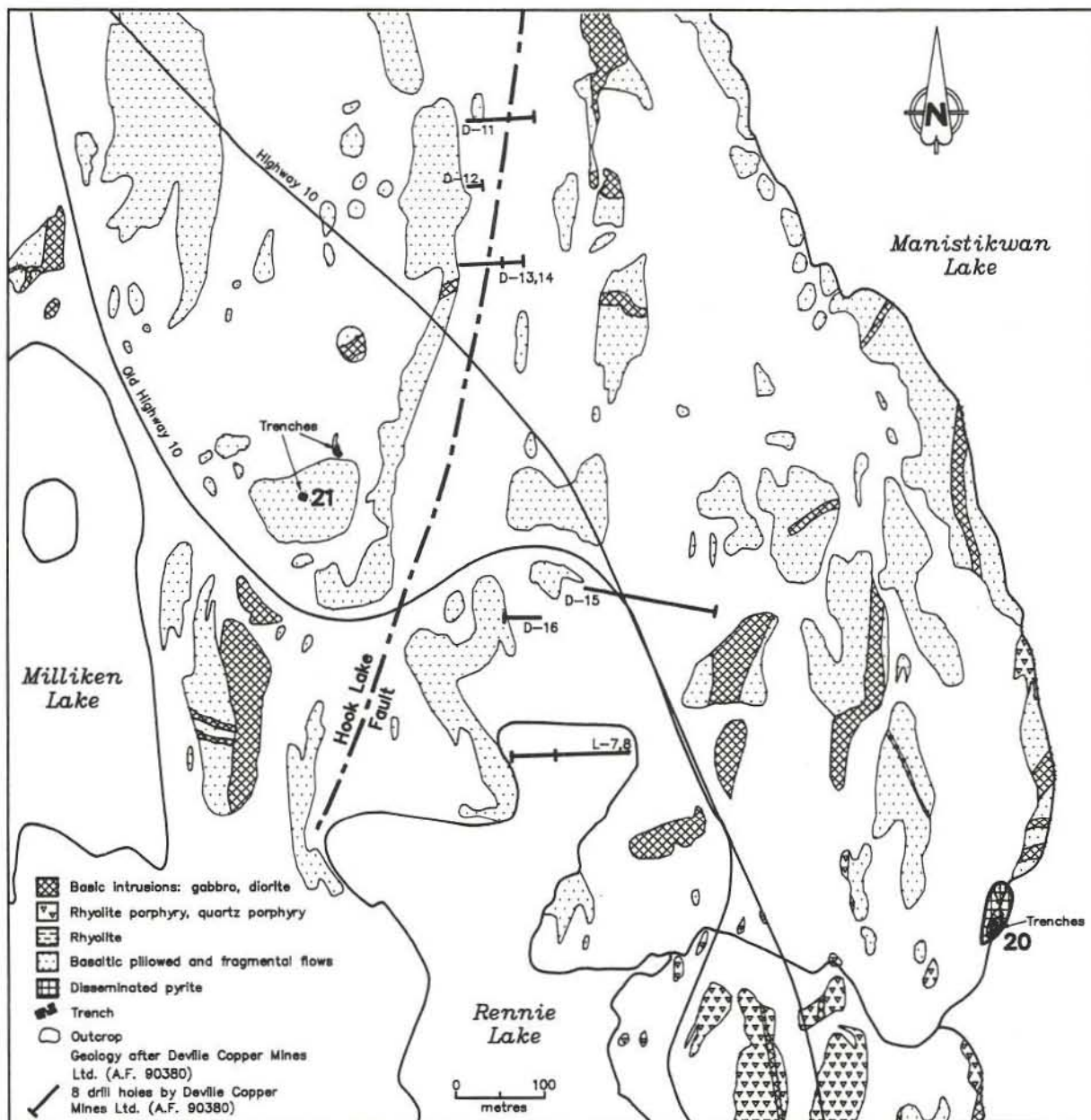


Figure 21-1: Detailed geology, trench and drill hole locations of occurrence 21.

LOCATION: 21

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6067634N/320712E

ACCESS: Via Provincial Road 10

EXPLORATION SUMMARY:

R.G. Crosby mapped the Cu claim group for Le Pas-Flin Flon Mines in 1950. In 1956-57, DeVille Copper Mines mapped the Cu and Now claim groups and drilled eight holes totalling 841 m (A.F. 90374, 90375, 90380).

GEOLOGICAL SETTING:

The area is underlain by basaltic pillowed and fragmental flows (Fig. 21-1). The Hook Lake Fault separates aphyric to sparsely plagioclase porphyritic basalt and basaltic andesite to the southeast from plagioclase- and pyroxene-phyric flows and pillow breccia to the northwest (Bailes and Syme, 1989).

MINERALIZATION:

Four holes drilled under a swampy area by DeVille Copper Mines in 1956 (D-11 to D-14) intersected altered intermediate flows and felsic volcanic rocks with short 'graphitic' sections in silicified volcanic rocks. Drill logs indicate that minor pyrite and traces of malachite were intersected, but up to 20% graphite was noted in both the altered intermediate and the silicified volcanic rocks. Several cherty sections could be products of silicification. Minor hematite and carbonate are also present (A.F. 90375).

The altered intermediate rocks are described in the core logs as soft, greenish grey, chloritic, cherty, massive and containing graphitic 'streaks'. DDH D-15 intersected trace to minor pyrite and pyrrhotite and considerable 'chrome mica', which is disseminated throughout a thick section of schistose felsic to intermediate rocks. DDH L-7 intersected minor pyrite and graphite.

AREA: North end of Rennie Lake

AIRPHOTO: A26364-176

DDH D-16 and L-8 intersected trace amounts of pyrite and pyrrhotite (A.F. 90374, 98375).

CHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. In the Flin Flon region, concentrations of up to 20% graphite are rare, whereas black graphite-pyrite (earthy pyrite) zones are common. In addition, black (magnesian) chlorite and talc concentrations were not always recognized by core loggers in the 1950's. Consequently, the 'graphitic' sections described in these drill logs may represent magnesian 'alteration veins' in an alteration zone of the type commonly associated with massive sulphide type deposits. The presence of graphite in DDH L-7 may indicate the along strike continuation of strata from DDH D-13.

REFERENCES:

Assessment File 90374, 90375, 90380

Manitoba Energy and Mines, Mines Branch.

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

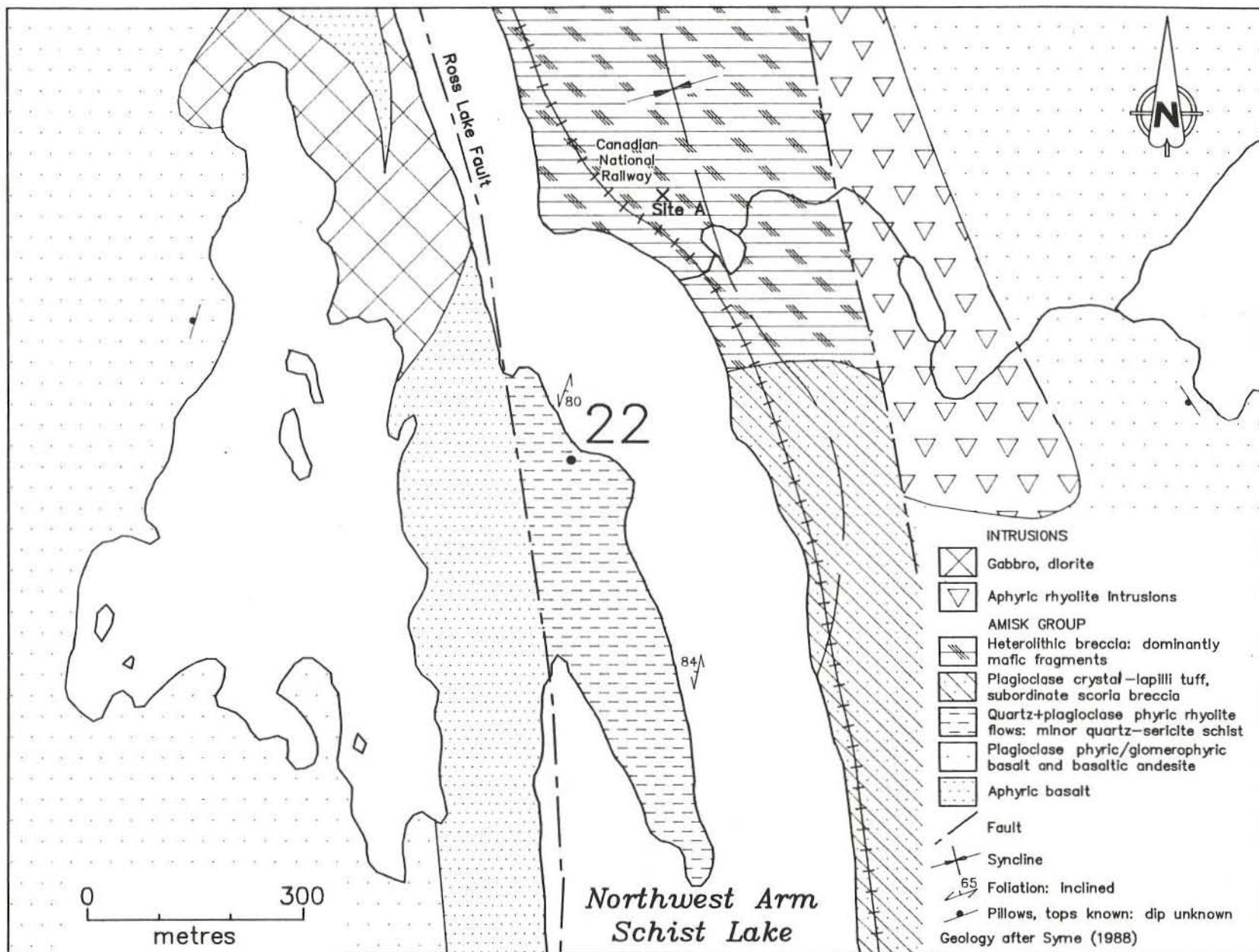


Figure 22-1: Geological setting of occurrence 22.

LOCATION: 22**NAME:** City Deep**UTM:** 6062811N/318906E**ACCESS:** Via boat on Schist Lake**AREA:** South of Stitt Island on the west shore of Schist Lake**AIRPHOTO:** A26397-232**EXPLORATION SUMMARY:**

Manitoba Flin Flon Mines Ltd. discovered gold-bearing quartz veins on the City Deep claim while working on the Iron Horse claim group in the early 1930's (Manitoba Flin Flon Mines Ltd., Corporation File). Tanton (1941) indicates a mineral occurrence at the site.

The area was searched in 1990, but no quartz veins or old trenches were found. An abandoned gravel pit was developed at site A (Fig. 22-1) where Tanton (1941) also indicated a mineral occurrence that would have been within the boundaries of the City Deep claim.

GEOLOGICAL SETTING:

The north-trending Ross Lake Fault separates quartz- and plagioclase-phyric rhyolite and quartz-sericite schist to the east from aphyric to sparsely porphyritic basalt and basaltic andesite flows to the west (Fig. 22-1; Syme, 1988).

MINERALIZATION:

On the City Deep claim, initially examined for gold-bearing quartz veins, there was a zone with an apparent width of 90 m of almost pure silica (up to 90%) that was considered exceptional flux material for the Flin Flon smelter (Manitoba Flin Flon Mines Ltd., Corporation File).

GEOCHEMICAL DATA:

A selective grab sample from the City Deep claim returned an analysis of 150 g/t Au and 350 g/t Ag. An eighteen metre channel sample reportedly contained 63 g/t Au (Manitoba Flin Flon Mines Ltd., Corporation File).

CLASSIFICATION:

Disseminated mineralization - not classified. The gold-bearing quartz vein on the City Deep claim was probably situated at Site A and subsequently covered during operation of the gravel quarry.

REFERENCES:

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

Manitoba Flin Flon Mines Ltd., NTS 63K/12NW

Corporation File, Newspaper clippings, unpublished files; Manitoba Energy and Mines, Mines Branch.

Syme, E.C.

1988: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

Tanton, T.L.

1941: Schist Lake, Saskatchewan and Manitoba; Geological Survey of Canada, Map 633A, 1:63 360.

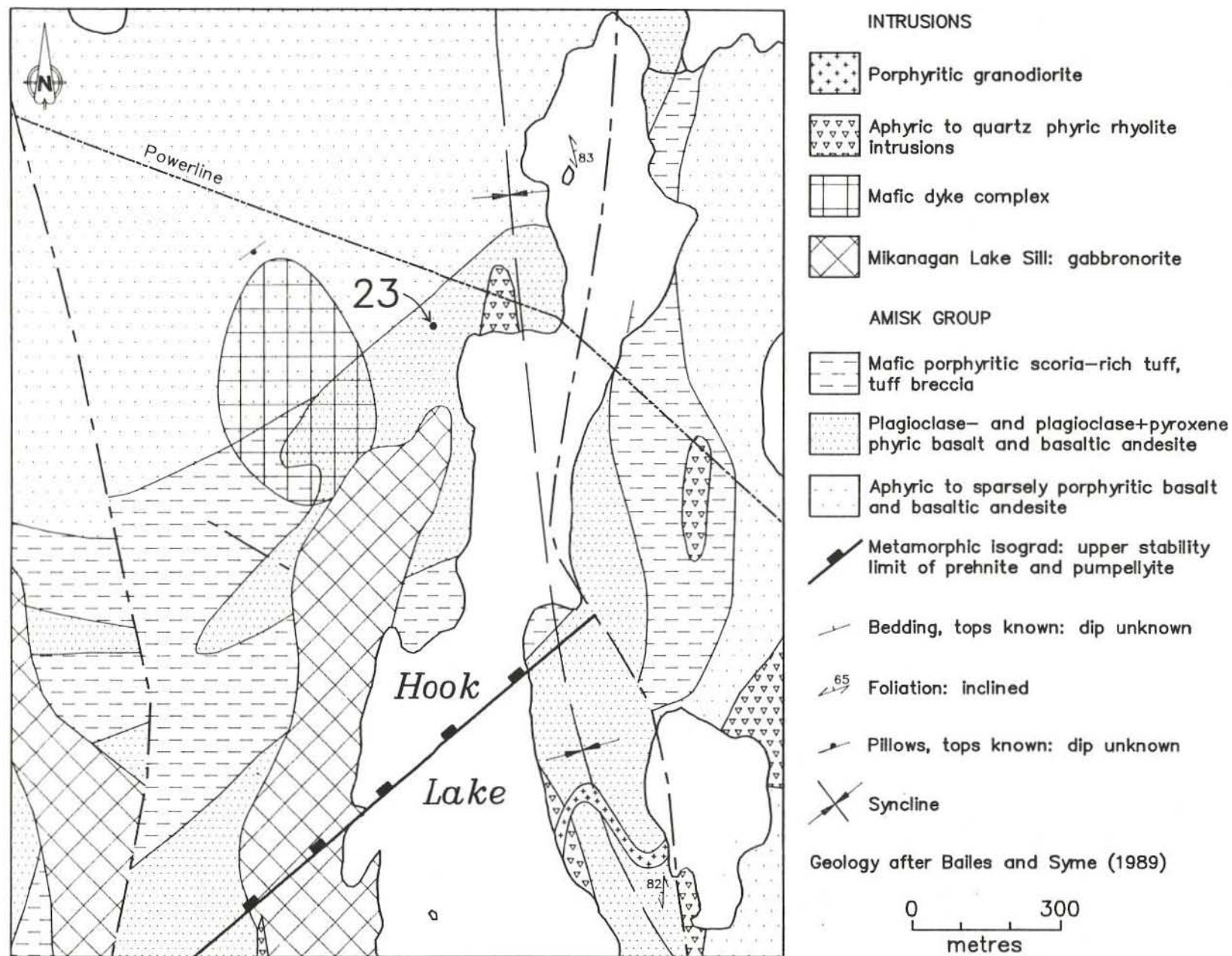


Figure 23-1: Geological setting of occurrence 23.

LOCATION: 23

NAME:

UTM: 6066195N/320216E

ACCESS: Via canoe from Rennie Lake

AREA: Northwest corner of Hook Lake

AIRPHOTO: A26364-178

EXPLORATION SUMMARY:

Tanton (1941) indicated a mineral occurrence in the area. A 2 x 3 x 4 m water-filled trench was located in 1984.

GEOCHEMICAL DATA:

None

GEOLOGICAL SETTING:

The area is underlain by pillowed plagioclase- and pyroxene-phyric basalt and basaltic andesite flows (Fig. 23-1; Bailes and Syme, 1989). The mineralization occurs at the margin of a feldspar porphyry with up to 25% plagioclase phenocrysts (rhyolitic intrusion?) and a mafic to intermediate vesicular brecciated flow (Fig. 23-2).

CLASSIFICATION:

Vein type deposit; multiple veins or lenses.

MINERALIZATION:

A 3 m wide rusty weathered mineralized zone contains two subparallel veins of near solid pyrite that are separated by a dark grey chloritic rock with 1 to 3 mm pyrite veinlets and disseminated chalcopyrite and pyrite. East of the sulphide zone, the volcanic rocks contain only trace pyrite.

REFERENCES:

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

Tanton, T.L.

1941: Schist Lake, Saskatchewan and Manitoba; Geological Survey of Canada, Map 633A, 1:63 360.

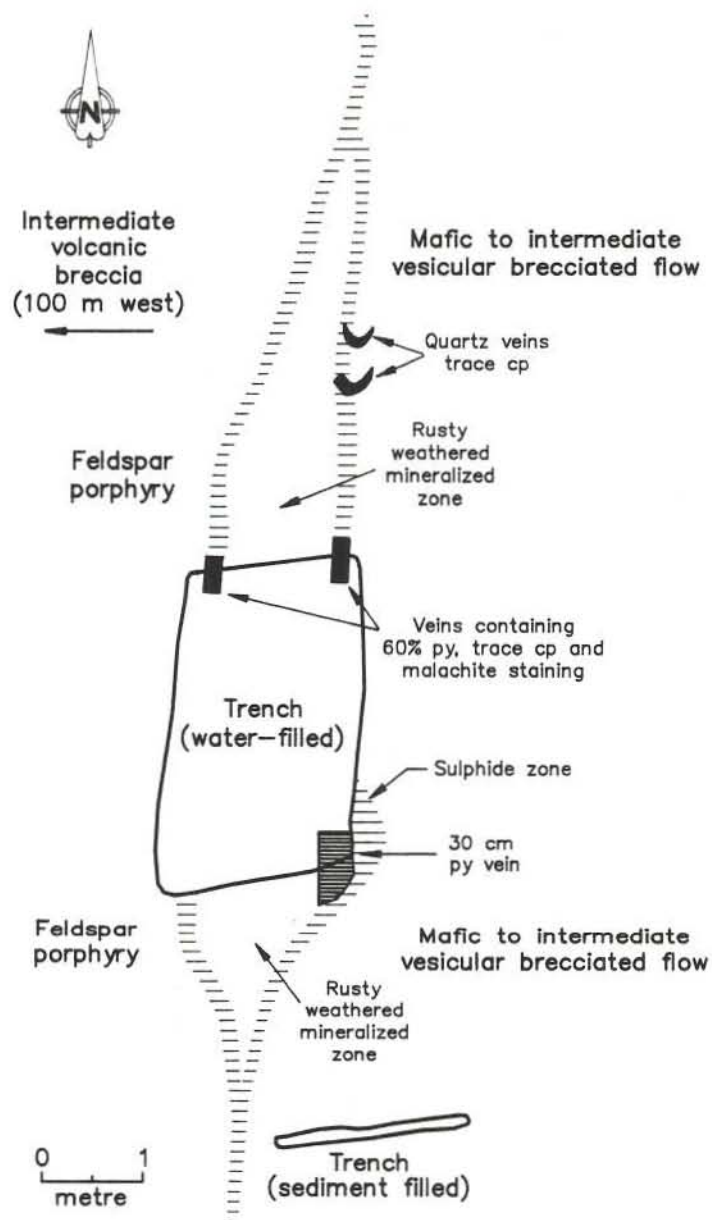


Figure 23-2: Detailed geology and trench locations at occurrence 23.

LOCATION: 24

NAME:

UTM: 6067507N/319900E

ACCESS: Via Provincial Road 10 and traverse

AREA: Milliken Lake

AIRPHOTO: A26364-176

EXPLORATION SUMMARY:

In 1950, Le Pas-Flin Flon Mines completed magnetic and geological surveys on the Cu claims group (A.F. 90374, 90375). In 1956-57, DeVille Copper Mines mapped the Cu and Now claim groups and drilled three holes totalling 457 m (A.F. 90380).

GEOLOGICAL SETTING:

The area is underlain by basaltic pillowed and fragmental flows, and minor rhyolite (Fig. 24-1; A.F. 90374, 90375). Bailes and Syme (1989) described the rocks as aphyric and porphyritic pillow fragment breccia with a mafic dyke complex.

MINERALIZATION:

Chalcopyrite-bearing quartz veinlets in rhyolitic rocks are exposed in outcrop. The quartz veins were intersected in DDH L-5, but did not contain any chalcopyrite. Minor fine grained disseminated pyrite was intersected in basaltic rocks in DDH L-6 and L-4 (A.F. 90374, 90375).

GEOCHEMICAL DATA:

The copper content is referred to as 'fair copper samples' (A.F. 90375).

CLASSIFICATION:

Vein type deposit; multiple veins or lenses.

REFERENCES:

Assessment Files: 90374, 90375, 90380

Manitoba Energy and Mines, Mines Branch.

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

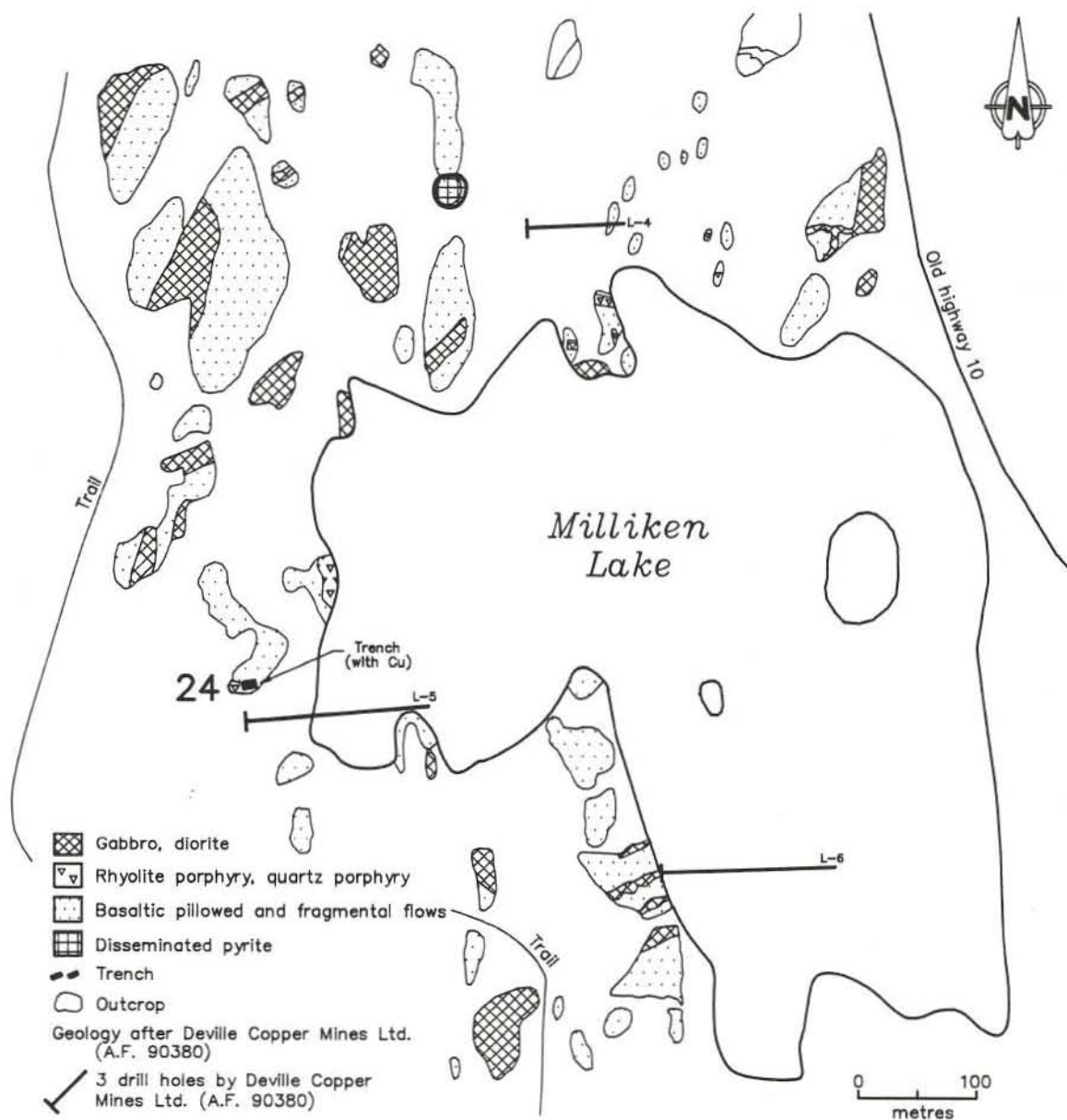


Figure 24-1: Detailed geology, trench and drill hole locations at occurrence 24.

LOCATION: 25

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6062521N/321188E

ACCESS: Via boat on Inlet Arm, Schist Lake

EXPLORATION SUMMARY:

In 1950, HBED completed an EM survey on the Jo claims group and tested conductors with 8 drill holes totalling 1 225 m. DDH 3 and 3A were lost in overburden (A.F. 90334).

GEOLOGICAL SETTING:

The east side of Inlet Arm (Schist Lake) is underlain predominantly by aphyric basaltic andesite whereas the west side is underlain by glomerophytic basalt to basaltic andesite flows, pyroclastic tuff and breccia and crystal lapilli tuff (Fig. 25-1, Bailes and Syme, 1989; Syme, 1988). The Inlet Arm Fault, which separates the Hook Lake and Bear Lake fault blocks, passes through Inlet Arm (Bailes and Syme, 1987). According to available drill logs, Inlet Arm is underlain by layered tuffaceous rocks, graphitic tuff and a variety of graphitic, chloritic and sericitic schists. Small exposures of heterolithic breccia with felsic fragments occur on the shoreline at the north end of Inlet Arm (Bailes and Syme, 1989).

MINERALIZATION:

Drill holes JO-1 and JO-2 intersected several thick layers of graphitic schist. A 75 cm section of minor pyrite in grey tuff was intersected near the bottom of DDH JO-2. DDH Inlet 1 intersected four layers, 0.6 to 4 m thick, of graphitic schist \pm minor pyrite, several sections of altered rhyolite with minor pyrite \pm graphite and numerous sections of sericite or sericite-chlorite schist. DDH Inlet 2, -3 and -4 also intersected considerable sericite and/or chlorite schist and minor rhyolite. Garnet-

AREA: Inlet Arm, Schist Lake

AIRPHOTO: A26397-256

iferous sericite schist in DDH Inlet 2 and -3 may represent a zone of intensely altered rocks (A.F. 90334).

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. Some of the geophysical anomalies are due to sulphide-bearing graphitic strata, but some may also be caused by regional faults. The abundance of chlorite and sericite schist, rhyolite and garnet (in an area that is reportedly at greenschist grade of metamorphism) indicates that the area should be investigated further for massive sulphide type deposits.

REFERENCES:

- Assessment Files: 90334, 90364, 91583 91951
Manitoba Energy and Mines, Mines Branch.
- Bailes, A.H. and Syme, E.C.
1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.
- Bailes, A.H. and Syme, E.C.
1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.
- Syme, E.C.
1988: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

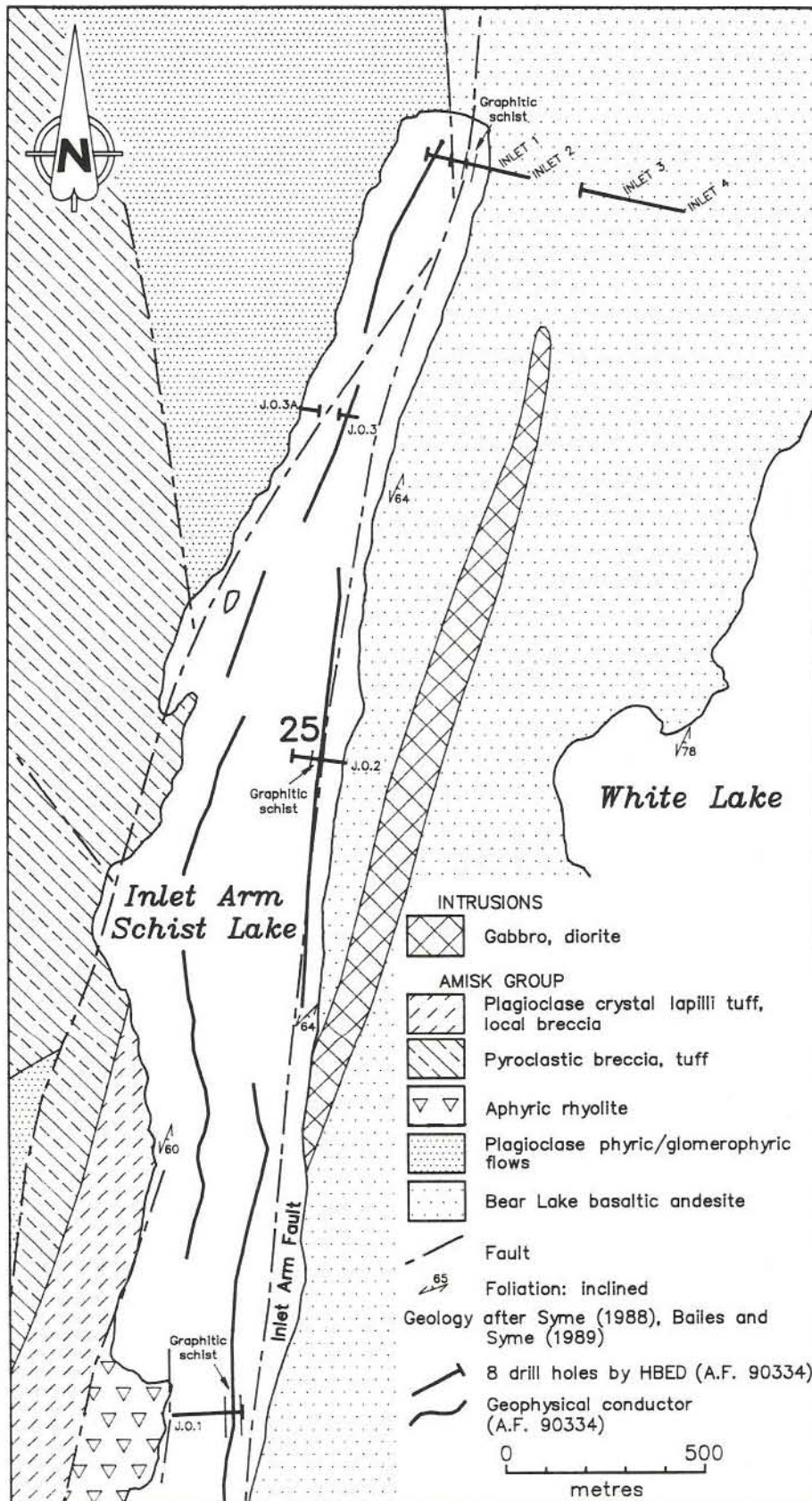


Figure 25-1: Geological setting of occurrence 25.

LOCATION: 26

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6067034N/333930E

ACCESS: Via Kississing Lake road and 2.5 km west on a logging road

AREA: Northwest of Cleaver Lake

AIRPHOTO: A26328-11

EXPLORATION SUMMARY:

In 1949, HBED conducted an EM survey and drilled six holes totalling 626.4 m (A.F. 90320). A trench (1 x 1 x 0.5 m) has been cut on the south side of a 10 x 30 m outcrop.

weathered rhyolitic rocks exposed in the trench contain quartz veinlets with 2% pyrite. Locally, the rhyolitic pyroclastic rocks have a chloritic matrix.

GEOLOGICAL SETTING:

The occurrence is underlain by basalt to basaltic andesite flows that have been intruded by gabbro, diorite, quartz porphyry and granite. Basaltic flows and rhyolitic lapilli tuff outcrop adjacent to the logging road. A large granodiorite and tonalite pluton occurs east of Cleaver Lake (Fig. 26-1; Buckham, 1944). The drill holes intersected abundant silicified andesite and quartz porphyry. The area where the drilling was undertaken is covered by a sand plain.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Stratabound massive sulphide type deposit; volcanic rock associated. The occurrence may represent vein type sulphide mobilizate, but the chloritic rhyolite seen in outcrop and the silicified andesite noted in the drill logs probably represents the alteration zone of a massive sulphide type deposit

MINERALIZATION:

DDH 9 intersected a total of 6.4 m of solid pyrrhotite with minor pyrite and chalcopyrite in three layers within 23.8 m of cherty silicified andesite with minor to moderate sulphide mineralization.

DDH 12 and 13 intersected a total of 1.8 m and 3.2 m, respectively, of near solid to solid pyrrhotite with pyrite in silicified andesite; minor rhyolite and dacite were intersected in these drill holes (A.F. 90320). Rusty

REFERENCES:

Assessment File: 90320

Manitoba Energy and Mines, Mines Branch.

Buckham, A.F.

1942: Athapapuskow Lake, Manitoba: preliminary map; Geological Survey of Canada, Paper 42-16, 1:31 680.

Buckham, A.F.

1944: Athapapuskow Lake, Manitoba; Geological Survey of Canada, Map 807A, 1:63 360.

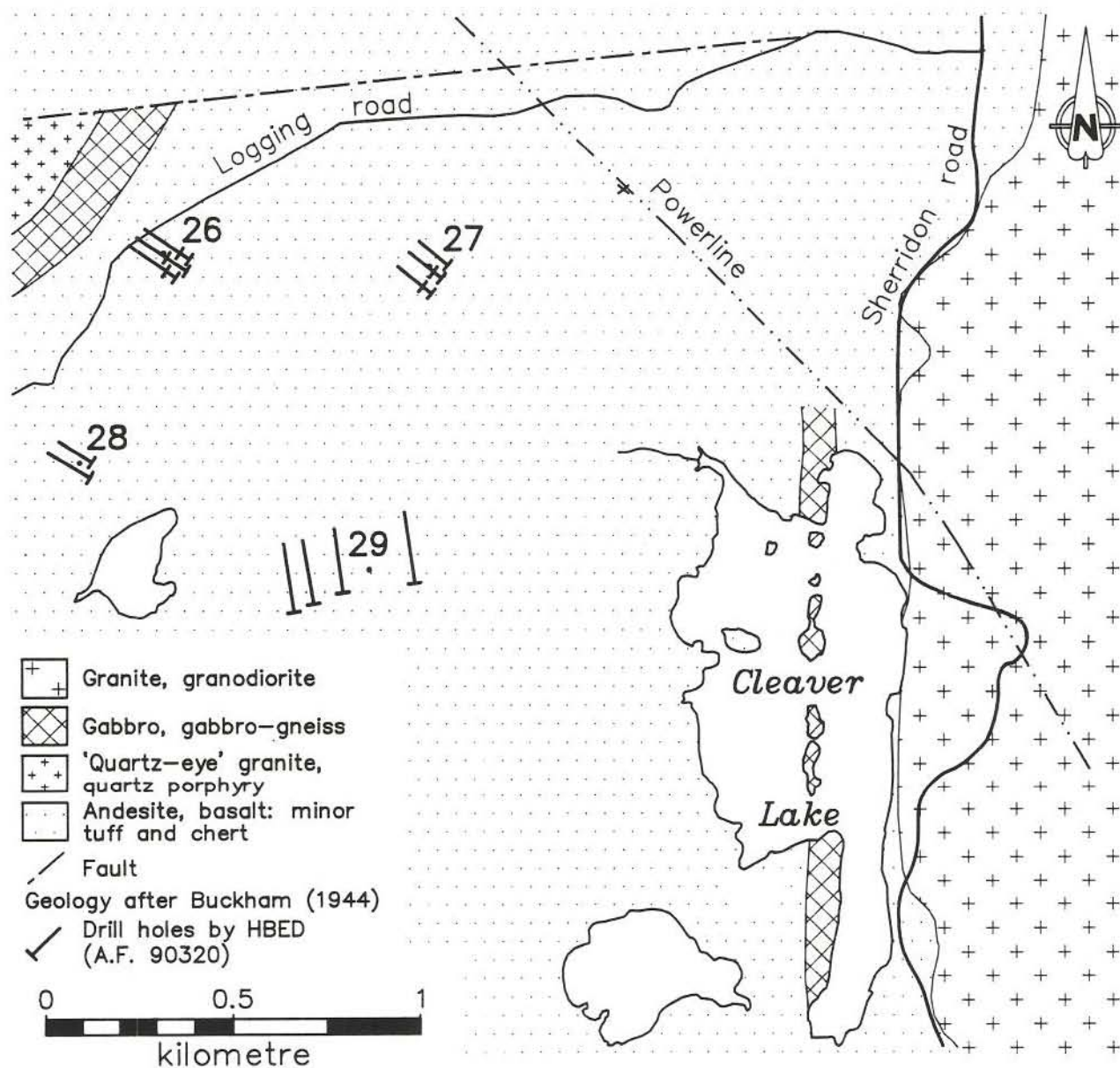


Figure 26-1: Geological setting of occurrences 26, 27, 28 and 29.

LOCATION: 27

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6067091N/334769E

ACCESS: Via Kississing Lake road, approximately 1.6 km west on a logging road and traverse

EXPLORATION SUMMARY:

HBED conducted an EM survey in 1949 and drilled five holes totalling 678 m on claim Amber 2 (A.F. 90320).

GEOLOGICAL SETTING:

The area is underlain by basalt to basaltic andesite flows that have been intruded by gabbro, diorite, quartz porphyry and granite. A large granodiorite and tonalite pluton occurs east of Cleaver Lake (Fig. 26-1; Buckham, 1944). The drill holes intersected considerable dacite with sections of sheared andesite, quartz porphyry and rhyolite. DDH 18 also intersected 16 m of amygdaloidal dacite (A.F. 90320).

MINERALIZATION:

DDH 14 and 15 intersected up to 2 m of near solid pyrite and pyrrhotite in silicified to cherty dacite. DDH 16 intersected minor to 'well mineralized' pyrite and pyrrhotite, and minor chalcopyrite over 27 m of silicified, sheared and partly garnetiferous dacite (A.F. 90320).

AREA: Northwest of Cleaver Lake (Fig. 26-1)

AIRPHOTO: A26398-69

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Stratabound massive sulphide type deposit; volcanic rock associated. The 'silicified dacite' with pyrite and pyrrhotite probably represents a metamorphosed hydrothermal alteration zone of the type commonly associated with massive sulphide type deposits.

REFERENCES:

Assessment File: 90320

Manitoba Energy and Mines, Mines Branch.

Buckham, A.F.

1942: Athapapuskow Lake, Manitoba: preliminary map; Geological Survey of Canada, Paper 42-16, 1:31 680.

Buckham, A.F.

1944: Athapapuskow Lake, Manitoba; Geological Survey of Canada, Map 807A, 1:63 360.

LOCATION: 28

NAME: (A.F. Mineralization intersected in drill core.)

UTM: 6066503N/333535E

ACCESS: Via Kississing Lake road, and 3.3 km west on a logging road

EXPLORATION SUMMARY:

HBED conducted an EM survey in 1949 and drilled two holes totalling 251 m on claim Bond 18 (A.F. 90320).

GEOLOGICAL SETTING:

The area is underlain by basalt to basaltic andesite flows that have been intruded by gabbro, diorite, quartz porphyry and granite (Fig. 26-1; Buckham, 1944). The drill holes intersected mostly dacite, rhyolite and quartz porphyry with sections of sheared chloritic andesite (A.F. 90320). No exposures were found in the area where the drilling was done.

MINERALIZATION:

DDH 19 contained 2.1 m of near solid pyrite and pyrrhotite. DDH 20 intersected 1.7 m of dacite with 'moderate' amounts of pyrrhotite and pyrite and local sections of near solid sulphide (A.F. 90320, 92379). These near solid sulphide sections are structurally underlain by dacite with minor to moderate amounts of pyrrhotite and pyrite that are in turn underlain by chlo-

AREA: Northwest of Cleaver Lake (Fig. 26-1)

AIRPHOTO: A26328-11

ritic dacite, chlorite schist, chloritic andesite and quartz porphyry.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Stratabound massive sulphide type deposit; volcanic rock associated. This appears to be a solid sulphide lense with a structurally underlying zone of alteration in dacitic to rhyolitic rocks.

REFERENCES:

Assessment Files: 90320, 92379

Manitoba Energy and Mines, Mines Branch.

Buckham, A.F.

1942: Athapapuskow Lake, Manitoba: preliminary map; Geological Survey of Canada, Paper 42-16, 1:31 680.

Buckham, A.F.

1944: Athapapuskow Lake, Manitoba; Geological Survey of Canada, Map 807A, 1:63 360.

LOCATION: 29

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6065964N/334403E

ACCESS: Via Kissinging Lake road, and traverse 1.3 km west around the north end of Cleaver Lake

EXPLORATION SUMMARY:

G.W. Jones completed four X-ray drill holes totalling 99 m on the A claims in 1950 (A.F. 90209). In 1951 HBED tested a 150 m long EM anomaly with four drill holes totalling 745 m (A.F. 90315, 90316). The four trenches, which were probably blasted by G.W. Jones, were cleaned out by P. Bachnick in 1976 (Fig. 29-1).

GEOLOGICAL SETTING:

The area is underlain by basalt to basaltic andesite flows that have been intruded by gabbro, diorite, quartz porphyry and granite (Fig. 26-1; Buckham, 1944). Host rocks to the mineralization include silicified chloritic dacite, silicified chloritic andesite and quartz-feldspar phyric rhyolite. The rhyolitic rocks are partly sericitized and cherty (A.F. 90316).

MINERALIZATION:

DDH 3 drilled by HBED (Fig. 29-1) intersected seven sections, 0.3 to 2.5 m thick, of near solid to solid pyrrhotite with minor pyrite and chalcopyrite. DDH 1 intersected 1.4 m and 0.6 m of near solid pyrrhotite with minor pyrite and chalcopyrite. DDH 2 and 4 intersected only minor disseminated sulphide minerals. Chloritic and sericitic sections with minor pyrite and pyrrhotite occur structurally below the solid sulphide sections.

AREA: West of Cleaver Lake (Fig. 26-1)

AIRPHOTO: A26398-60

Four holes drilled by G.W. Jones intersected a 2.3 m quartz vein with moderate amounts of pyrite, as well as pyritic and pyrrhotitic layers, in sedimentary rocks (Fig 29-1, A.F. 90209)

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Stratabound massive sulphide type deposit; volcanic rock associated. The chloritic and sericitic rocks structurally below the solid sulphide section probably represent the distal portion of an alteration zone.

REFERENCES:

Assessment Files: 90209, 90315, 90316

Manitoba Energy and Mines, Mines Branch.

Buckham, A.F.

1942: Athapapuskow Lake, Manitoba: preliminary map; Geological Survey of Canada, Paper 42-16, 1:31 680.

Buckham, A.F.

1944: Athapapuskow Lake, Manitoba; Geological Survey of Canada, Map 807A, 1:63 360.

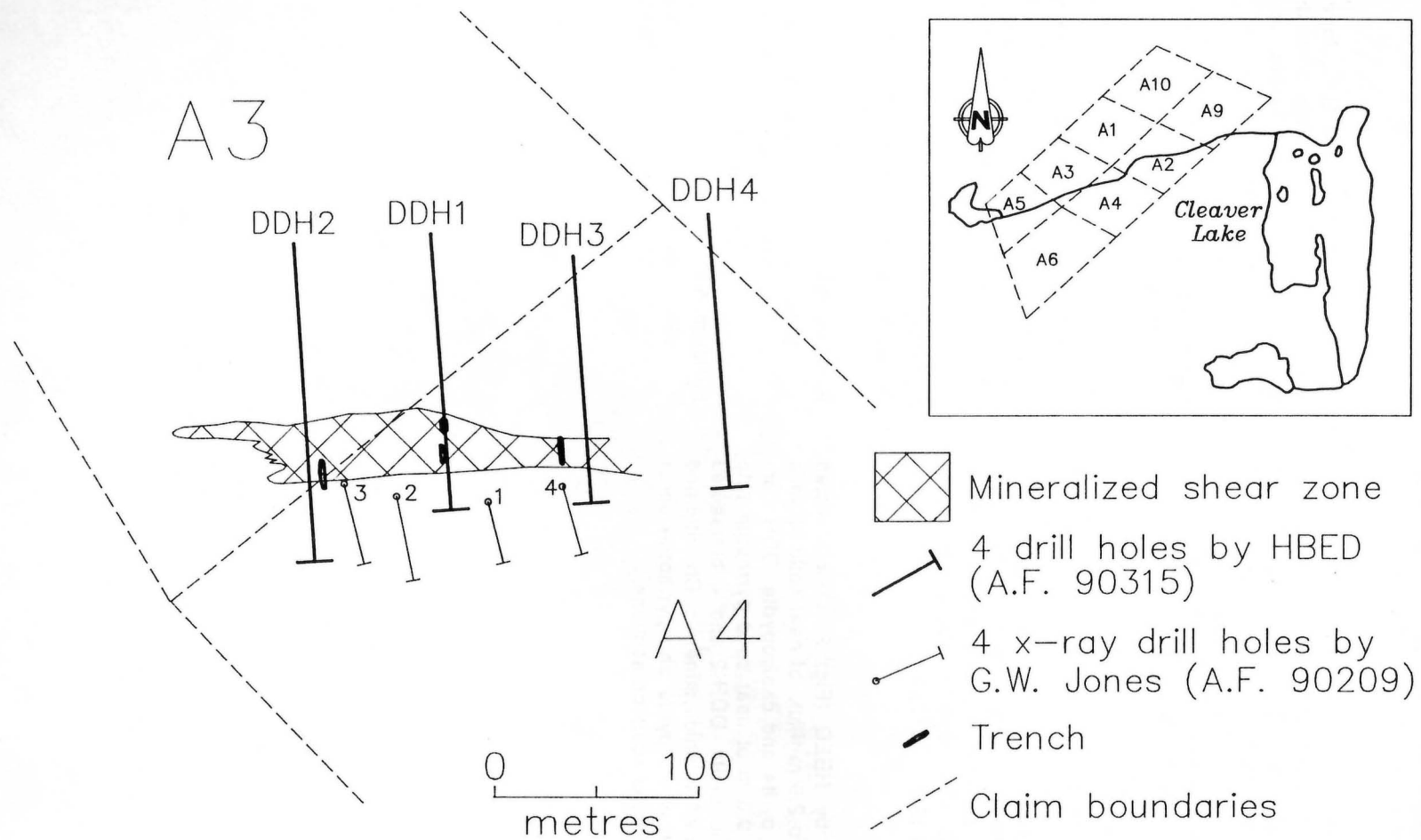


Figure 29-1: Drill hole and trench locations at occurrence 29.

LOCATION: 30

NAME:

UTM: 6065154N/335192E

ACCESS: Via Kississing Lake road and boat on Cleaver Lake

AREA: Cleaver Lake

AIRPHOTO: A26398-69

EXPLORATION SUMMARY:

A Cu occurrence was discovered by P. and S. Bachnick. Four trenches were blasted on the property in 1976. HBED conducted airborne and ground EM and magnetometer surveys over the area in 1980 (A.F. 92563). Sherritt Gordon Mines Ltd. conducted geophysical and geological surveys in the area in 1977-78 and drilled 4 holes totalling 476 m in 1979 (A.F. 93012).

GEOLOGICAL SETTING:

The area is underlain mainly by andesite and basalt (Fig. 30-1). The trenches are cut in felsic tuff(?). The east end of the mineralization is cut off by a mafic dyke. Aphanitic felsic flows that are intruded by mafic dykes structurally overlie the mineralization to the north-east (Fig. 30-2).

MINERALIZATION:

Three of the four trenches expose mineralization along a strike length of 60 m. A near solid pyritic zone, apparently a 15 to 30 cm thick layer, structurally overlies a zone of felsic rocks with minor chalcopyrite and pyrite that occur as disseminations and veinlets. A 25 cm section of chloritic andesite intersected by DDH CL-3 contained up to 30% pyrite and 1 to 5% chalcopyrite, which was the highest sulphide-bearing material intersected in the four DDH (A.F. 93012).

GEOCHEMICAL DATA:

37 samples of drill core were assayed for Cu, Zn \pm (Au and Ag). The highest values obtained were 0.66% Cu over 25 cm and 0.73% Cu over 12 cm (A.F. 93012).

CLASSIFICATION:

Stratabound massive sulphide type deposit; volcanic rock associated. Disseminated sulphides south of the solid sulphide layer resemble a weakly developed alteration zone of the type commonly associated with massive sulphide type deposits.

REFERENCES:

Assessment Files 93012, 93043, 92563

Manitoba Energy and Mines, Mines Branch.

Buckham, A.F.

1942: Athapapuskow Lake, Manitoba: preliminary map; Geological Survey of Canada, Paper 42-16, 1:31 680.

Buckham, A.F.

1944: Athapapuskow Lake, Manitoba; Geological Survey of Canada, Map 807A, 1:63 360.

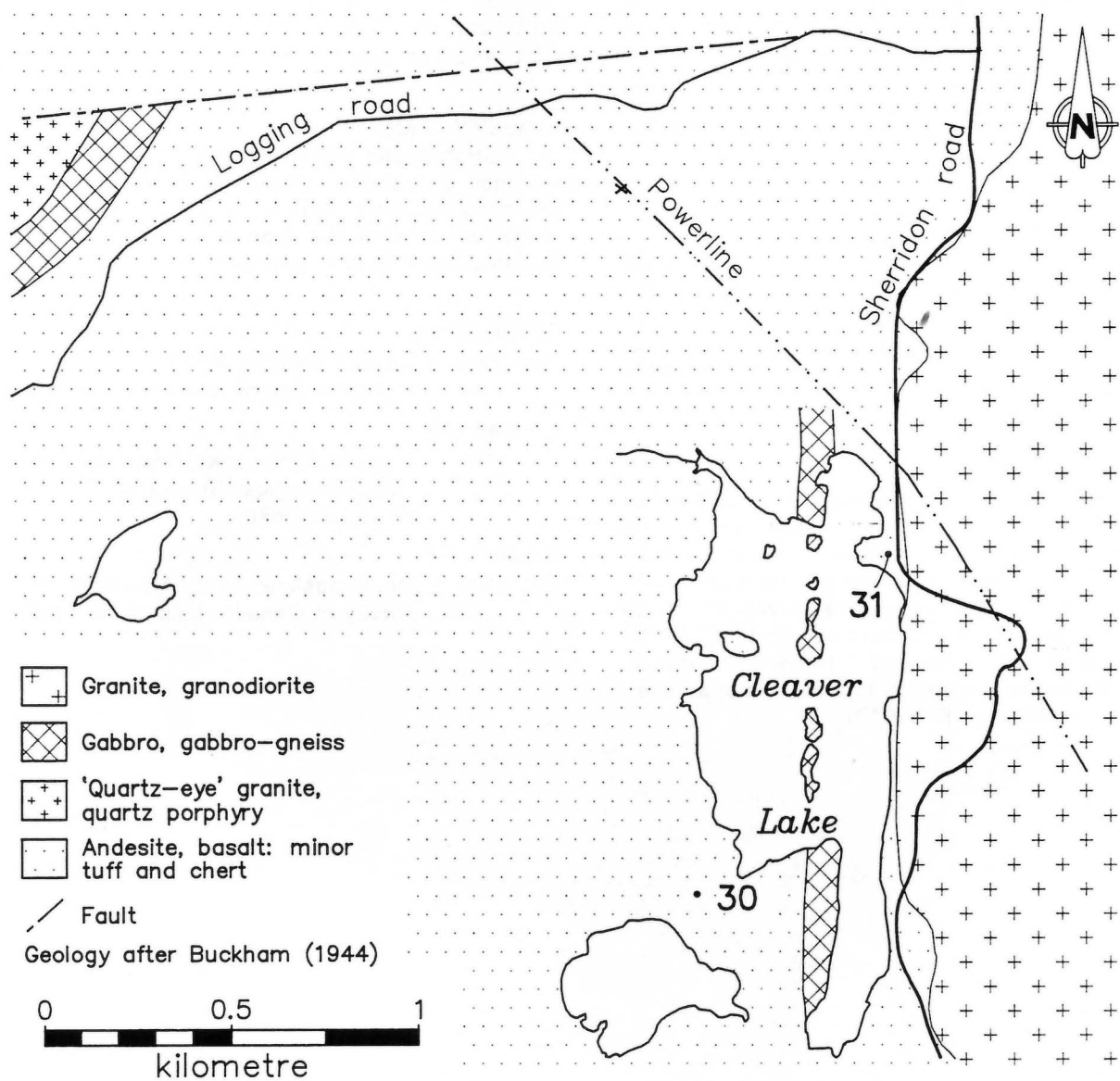


Figure 30-1: Geological setting of occurrences 30 and 31.

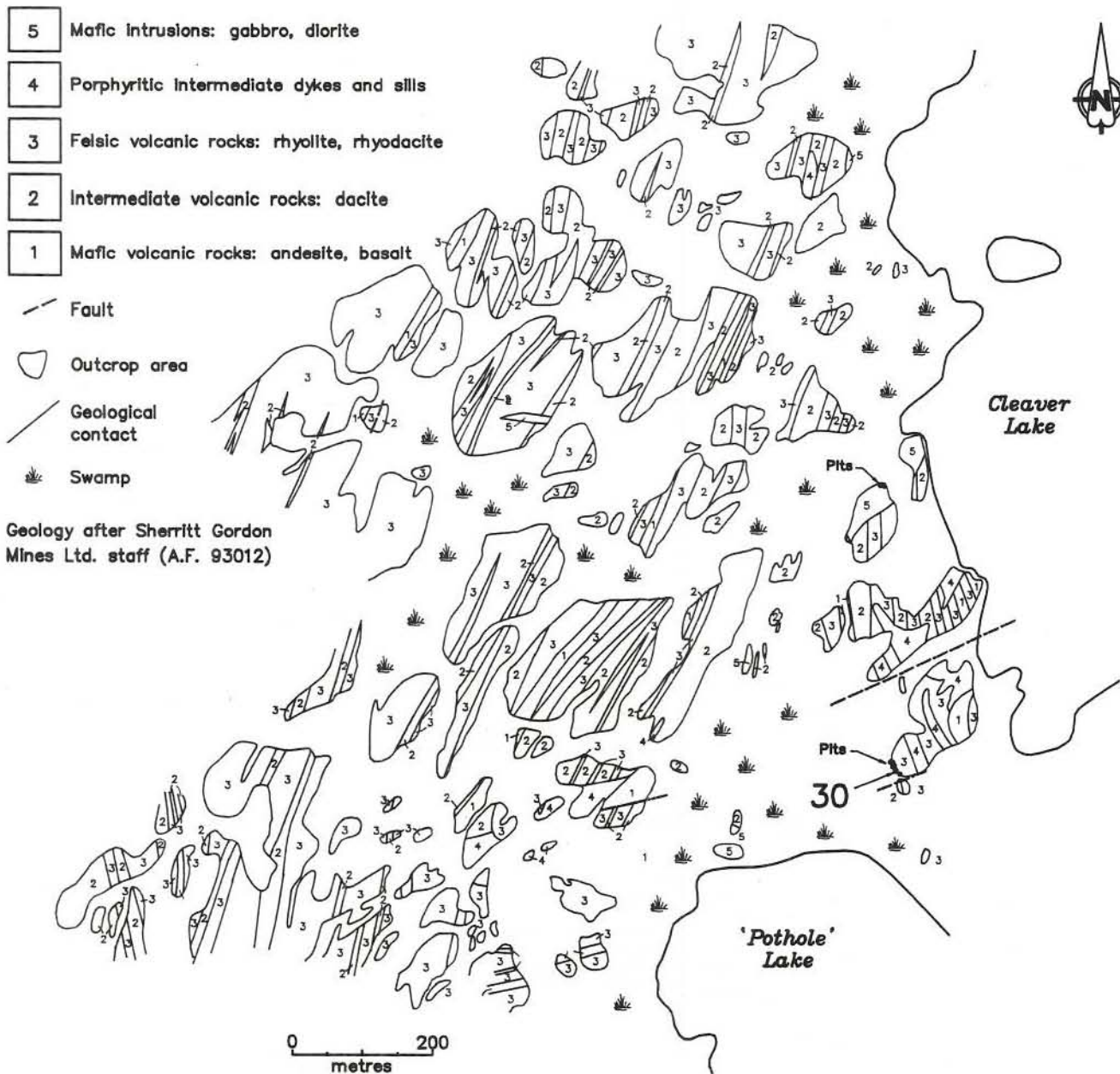


Figure 30-2: Detailed geology in the vicinity of occurrence 30.

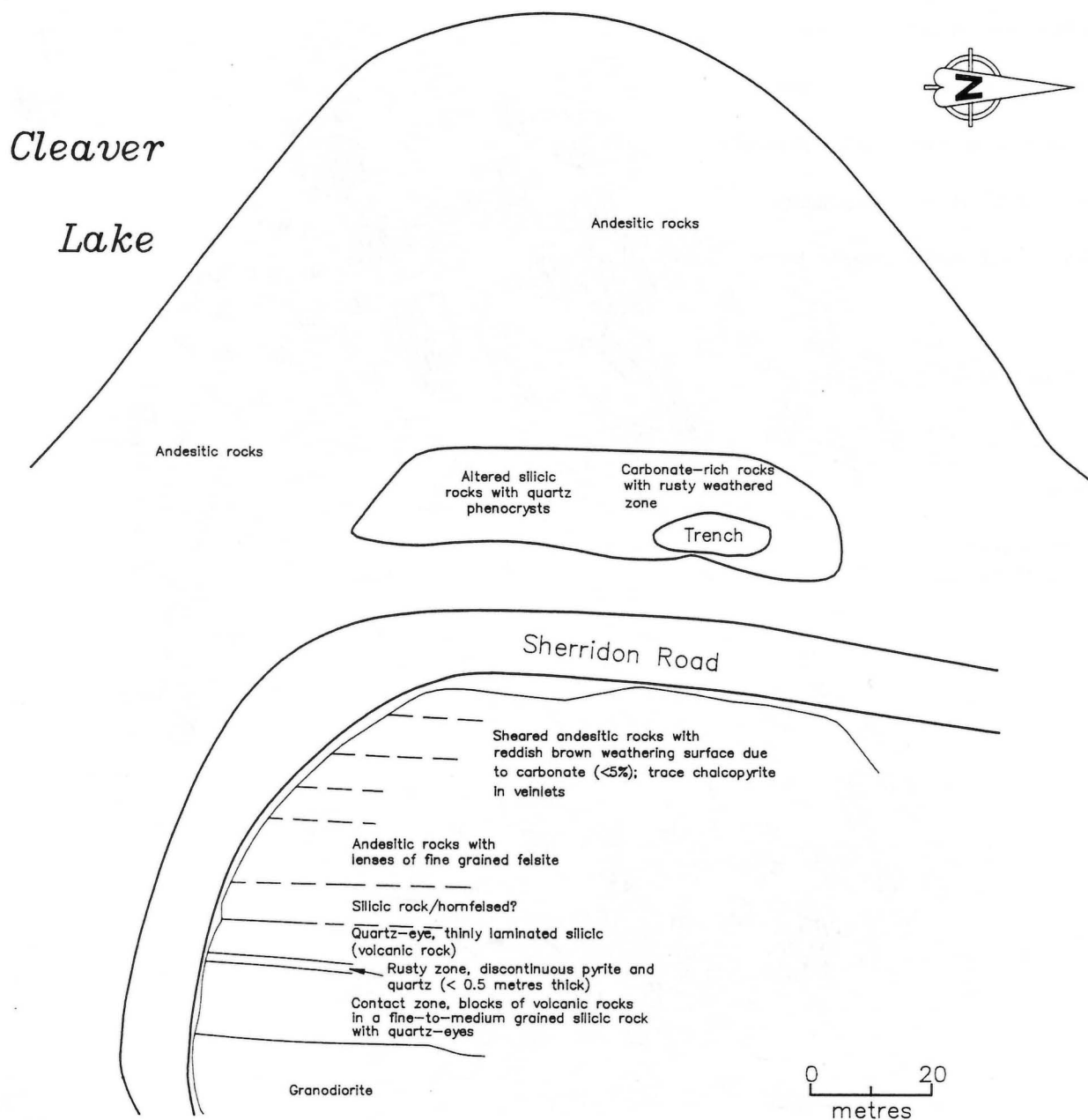


Figure 31-1: Detailed geology and trench location at occurrence 31.

LOCATION: 31**NAME:**

UTM: 6065954N/335768E

ACCESS: Via the Kississing Lake road

AREA: East of Cleaver Lake (Fig. 30-1)

AIRPHOTO: A26398-69

EXPLORATION SUMMARY:

A.L. Parres drilled a 63 m hole on claim CBM 11317 in 1982 (A.F. 92567). The mineralization was exposed during widening of the Sherridon road in the 1970's, but some exploration took place in the area at an earlier date as evidenced by a partly filled trench.

GEOLOGICAL SETTING:

The occurrence is located near the contact between Amisk volcanic rocks and the Nisto Lake granitic pluton (Fig. 30-1; Buckham, 1944). DDH CLE-1 intersected dacitic to rhyodacitic tuff (A.F. 92567). The quartz porphyritic rocks observed in the drill core commonly have blue quartz phenocrysts that are typical of some intrusions in the area.

MINERALIZATION:

In outcrop, trace to minor amounts of chalcopyrite occur in the volcanic rocks (Fig. 31-1). Moderate amounts of pyrite occur throughout the drill core. DDH CLE-1 intersected 6.6 m of 5 to 60% pyrite stringers and near solid pyrite with minor magnetite and hematite, and minor to trace amounts of chalcopyrite, arsenopyrite and sphalerite. Fuchsite, chlorite and carbonate are common constituents of the sulphide-bearing rocks in drill core (A.F. 92567). Carbonatized rocks on the west side of the road may be altered felsic volcanic rocks (Fig. 31-1).

GEOCHEMICAL DATA:

A 34 cm drill core sample with 15 to 25% fine grained pyrite, 2% hematite and traces of chalcopyrite and sphalerite contained 0.11% Cu and 0.2% Zn. Another sample with 55 to 65% fine grained pyrite assayed 0.06% Cu and 0.3% Zn over 12 cm. One sample contained 3 g/t Ag, but none of the samples assayed contained Au (A.F. 92567).

CLASSIFICATION:

Vein type deposit; multiple veins. Sulphide mobilization occurs near the contact zone between volcanic and intrusive rocks.

REFERENCES:

Assessment File: 92567

Manitoba Energy and Mines, Mines Branch.

Buckham, A.F.

1942: Athapapuskow Lake, Manitoba: preliminary map; Geological Survey of Canada, Paper 42-16, 1:31 680.

Buckham, A.F.

1944: Athapapuskow Lake, Manitoba; Geological Survey of Canada, Map 807A, 1:63 360.

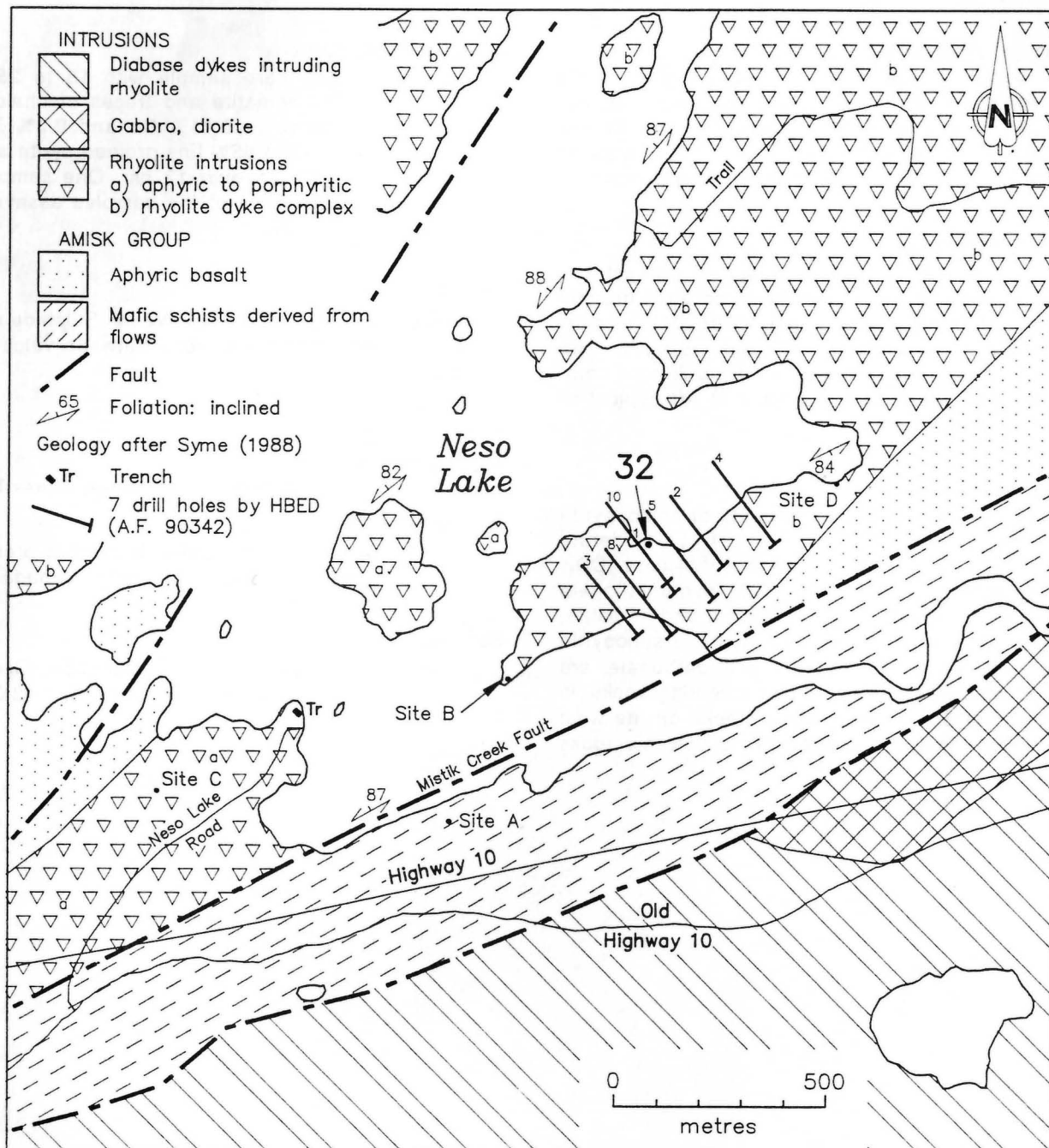


Figure 32-1: Geological setting of occurrence 32.

LOCATION: 32

NAME: Neso

UTM: 6059830N/336479E

ACCESS: Via Provincial Road 10 and boat

EXPLORATION SUMMARY:

The area was staked as the Hobson Choice and Neso claims in the early 1920's. The Eureka claims were staked by Ted Hartnett in 1939. A number of pits and three shafts were blasted on the claims between 1920-1940. In the late 1940's, the area was staked as the Neso claims and later optioned by HBED. Seven drill holes with a total length of 2 078 m were completed by HBED on Neso 1 and 2 in 1951-52 (A.F. 90342).

GEOLOGICAL SETTING:

Parbery (1986) interpreted some of the felsic rocks in the area to be extrusive. However, the area north of the Mistik Creek Fault has been mapped as a complex of rhyolitic intrusions (Fig 32-1, Syme, 1988). A large granodiorite intrusion occurs immediately east of Neso Lake (Buckham, 1944; Syme, 1988).

The large peninsula, where the three shafts are located, is underlain dominantly by altered mafic volcanic rocks (Fig. 32-2). These rocks are separated from the dominantly mafic volcanic rocks to the south by the Mistik Creek Shear Zone (Syme, 1988).

The rocks south of the Mistik Creek Fault in the vicinity of site A (Fig. 32-1) were described in detail by Parbery (1986):

"Rocks at the southeast end of Neso Lake consist of interlayered mafic tuffs, mafic pillowed flows, massive flows, flow breccia and intermediate breccias. Pillow tops are to the south. The units strike between 243° and 258° and dip steeply to the north and south. Rocks to the east of the mafic volcanic rocks consist of a quartz monzonitic-granodioritic intrusion and a mafic intrusive breccia of gabbroic composition.

A felsic dyke with a strike length of 800 m and a width of 25 m cuts the mafic volcanic rocks at the southeast end of Neso Lake. Contacts with the surrounding mafic volcanic rocks are either obscured or are sheared and weathered and trend between 238°-251°, subparallel to the local stratigraphy. The dyke is strongly silicified, mildly feldspathized and is cut by numerous quartz veins.

This altered dyke is aphanitic to fine grained, siliceous and comprises roughly 60% quartz, 30% feldspar and less than 10% chlorite. The chlorite occurs along fractures and foliation planes. The strong foliation and fractures cutting the rock and quartz veinlets produce 1 to 2 mm fragments of quartz and groundmass material. The groundmass is felsic, aphanitic pink cream to light brown-grey, and carries subhedral quartz grains that are 0.5 mm in diameter. Rare blue-grey grains up to 4 mm in length were noted in one outcrop. In some areas

AREA: East Neso Lake

AIRPHOTO: A26398-88

quartz and plagioclase grains are up to 2 mm across; grain sizes change commonly over short distances."

MINERALIZATION:

The mineralization at this occurrence, which is on the original Hobsons Choice claim, consists of disseminated cubes of pyrite up to 5 mm in size with minor chalcopyrite and carbonate in a 3 m wide, weakly foliated, rusty weathered shear zone. Quartz veins up to 20 cm thick with minor tourmaline on fracture surfaces are scattered throughout the shear zone.

At site A, Parbery (1986) describes the mineralization:

"The many crosscutting quartz veins and pods present in the silicified rock are 0.1 to 20 cm thick and 0.1 to 10 m in length. The quartz is normally white and becomes grey where the veins thin to only several millimetres in width. Although most veins trend east to northeast, several veins strike at right angles to the general trend and have a moderate to shallow dip. The north-south veins are offset a few millimetres along foliation planes that trend 242°/85°N. Locally quartz veins composed 20% of the rock. A salmon-pink to orange, weathered feldspar is found within, and adjacent to, many of the quartz veins. Fine grained feldspar forms 5 to 10% of vein material. Quartz veins where present in the adjacent mafic volcanic rocks commonly carry pink-orange feldspars.

Some portions of the altered dyke are grey and siliceous whereas the more intensely altered rock is white due to the greater amount of quartz vein material present. Rusty weathered fractures in the altered rock are randomly oriented and stain approximately 5% of the outcrop surface in some areas."

A small trench (2 x 3 x 3 m) at the western end of the peninsula (site B) was cut in aphanitic grey felsic rock with 1% pyrite and trace chalcopyrite (Fig 32-1).

At site C, 1 to 3 cm thick quartz veins contain trace pyrite and visible gold and are hosted by altered felsic rocks.

The shaft on the original Neso claim (site D) was sunk on a northeast-trending silicified and carbonatized zone that contains chalcopyrite, pyrite and quartz. A trench 30 m west of the shaft exposed similar rocks (Dawson, 1932).

Drill holes by HBED (Fig. 32-1) intersected a large number of chloritic and/or sericitic schist zones less than 50 cm in core length with trace to moderate amounts of pyrite and trace to minor amounts of chalcopyrite that occur as disseminations and veinlets. Quartz

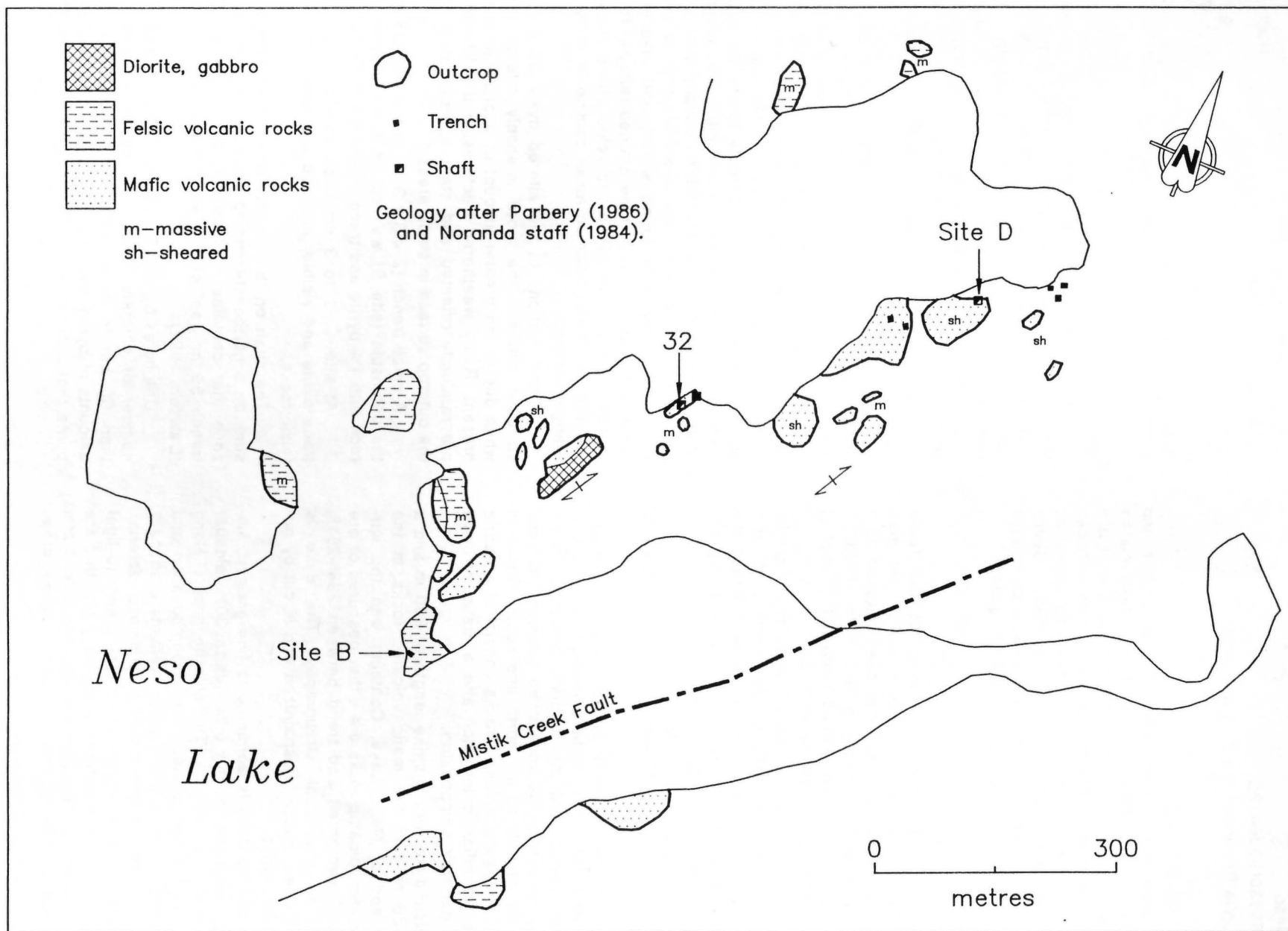


Figure 32-2: Geology and location of trenches and shafts at occurrence 32.

and carbonate veins and stringers contained trace chalcopyrite (A.F. 90342).

GEOCHEMICAL DATA:

P. Bachnick (pers. comm., 1975) noted free gold in a narrow quartz vein at Location 32; samples from this vein contained up to 137 g/t Au.

Morgan (1940) noted up to 34 g/t Au at site B. P. Bachnick (pers. comm., 1976) obtained 3.4 g/t Au from grab samples at site C. Dawson (1932) indicates that the shear zone through the shaft at site D carried 'fair' values of Au.

CLASSIFICATION:

Vein type deposit; multiple veins or lenses. Quartz and carbonate veins in shear zones.

REFERENCES:

Assessment File: 90342

Manitoba Energy and Mines, Mines Branch.

Bachnick, P.

1975: (Personal communication, Flin Flon, 1975)

Buckham, A.F.

1942: Athapapuskow Lake, Manitoba: preliminary map; Geological Survey of Canada, Paper 42-16, 1:31 680.

Buckham, A.F.

1944: Athapapuskow Lake, Manitoba; Geological Survey of Canada, Map 807A, 1:63 360.

Dawson, A.F.

1932: 1:6000 scale plan of the Neso and Dixie Claims; unpublished map.

Morgan,

1940: Report on the Eureka Claims, Neso Lake. Manitoba Energy and Mines, unpublished file, 2p.

Noranda Staff

1984: Geology of the Twin Lakes area, 10 000 scale map. Provided by Mr. A.L. Parres, Flin Flon.

Parbery, D.

1986: Mineral occurrence studies - Flin Flon area; in Manitoba Energy and Mines, Minerals Division, Report of Field Activities, 1986, p. 49-55.

Syme, E.C.

1987: Athapapuskow Lake project; in Manitoba Energy and Mines, Minerals Division, Report of Field Activities, 1987, p. 30-40.

Syme, E.C.

1988: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

Tanton, T.L.

1941: Schist Lake, Saskatchewan and Manitoba; Geological Survey of Canada, Map 633A, 1:63 360.

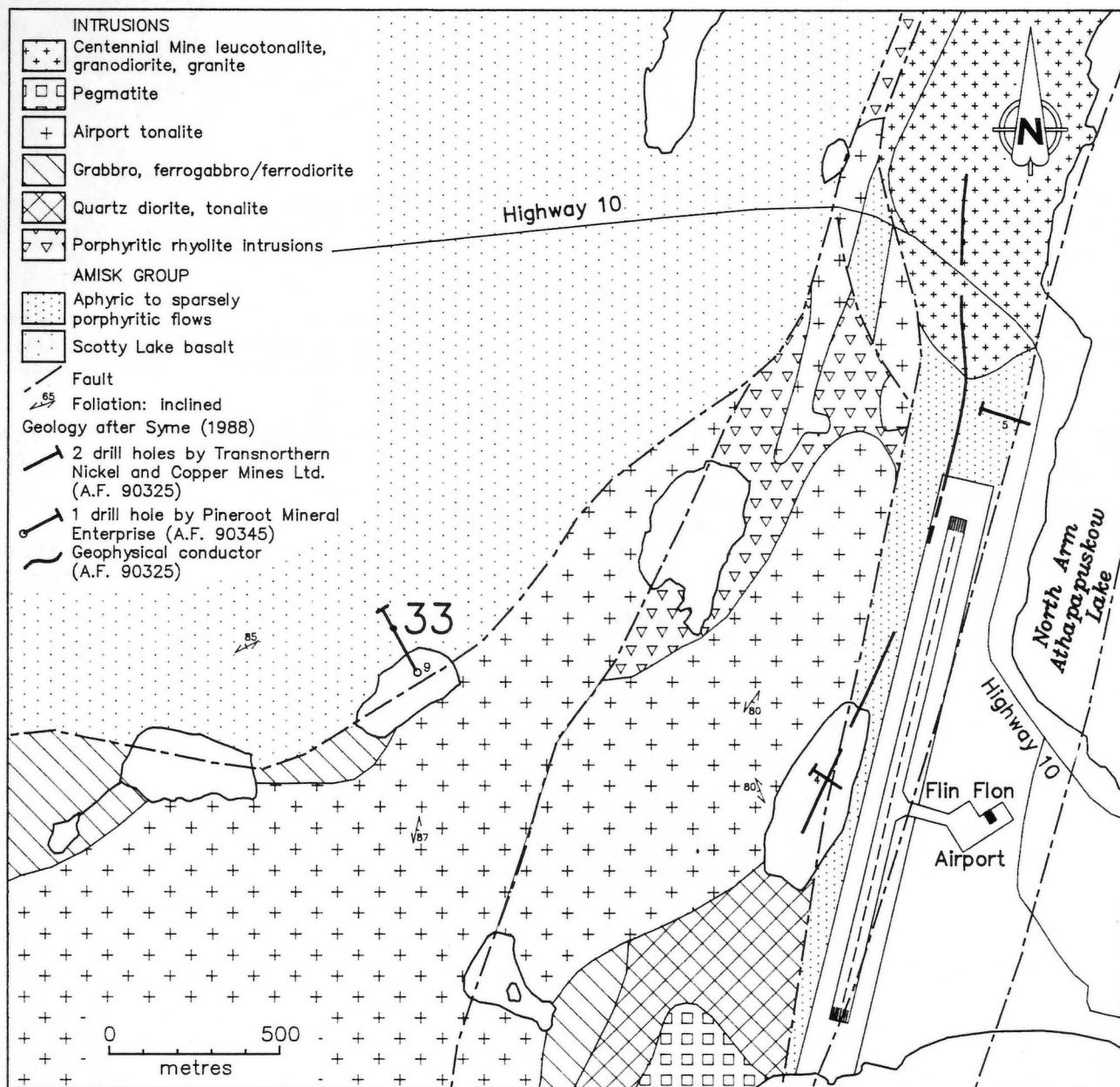


Figure 33-1: Geological setting of occurrence 33.

LOCATION: 33

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6062487N/325642E

ACCESS: Traverse along a trail from the north end of the Flin Flon airfield

EXPLORATION SUMMARY:

In 1956, Transnorthern Nickel and Copper Mines Ltd. tested EM anomalies with 2 drill holes totalling 216 m on claims Copper Hill 34 and -44 (A.F. 90325). A 206 m hole was drilled on the claim Tip Top 8 by Pineroot Mineral Enterprises in 1968 (A.F. 90345).

GEOLOGICAL SETTING:

The area (Fig. 33-1) is underlain by the Scotty Lake basalt, which consists predominantly of flows and synvolcanic dykes and sills (Bailes and Syme, 1989). The airport tonalite consists of a quartz megacrystic tonalite with small mafic xenoliths; it is separated from the basaltic rocks by a fault zone (Syme, 1988).

MINERALIZATION:

DDH 9 core contained a 19 m intersection of approximately 50% sulphide minerals that included: (1) 0.5 m of solid pyrrhotite; (2) 0.9 m of solid, fine grained pyrite with pyrrhotite; (3) 1.4 m of solid pyrite with veinlets of pyrite, pyrrhotite, quartz, and traces of chalcopyrite and graphite; and (4) three sections of 0.9 to 1.5 m, with 30 to 60% pyrite and pyrrhotite and trace chalcopyrite. The host rocks are dacitic and rhyolitic in composition (A.F. 90345). DDH 9 was collared on the lake; no mineralization was found in outcrop. DDH 4, and 5 did not intersect any sulphide mineralization, but carbonate was noted in the drill log for DDH 5 (A.F. 90325).

AREA: West of the airfield at Baker's Narrows

AIRPHOTO: A26397-128

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment type deposit, sulphide facies iron formation. The presence of trace amounts of graphite in these sulphide-bearing rocks, and intersections of chert, rhyolite, dacite, veins of sulphide and solid sulphide also suggest a massive sulphide type deposit with sulphide minerals mobilized into late veins.

REFERENCES:

Assessment Files: 90325,90345

Manitoba Energy and Mines, Mines Branch.

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

Syme, E.C.

1988: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

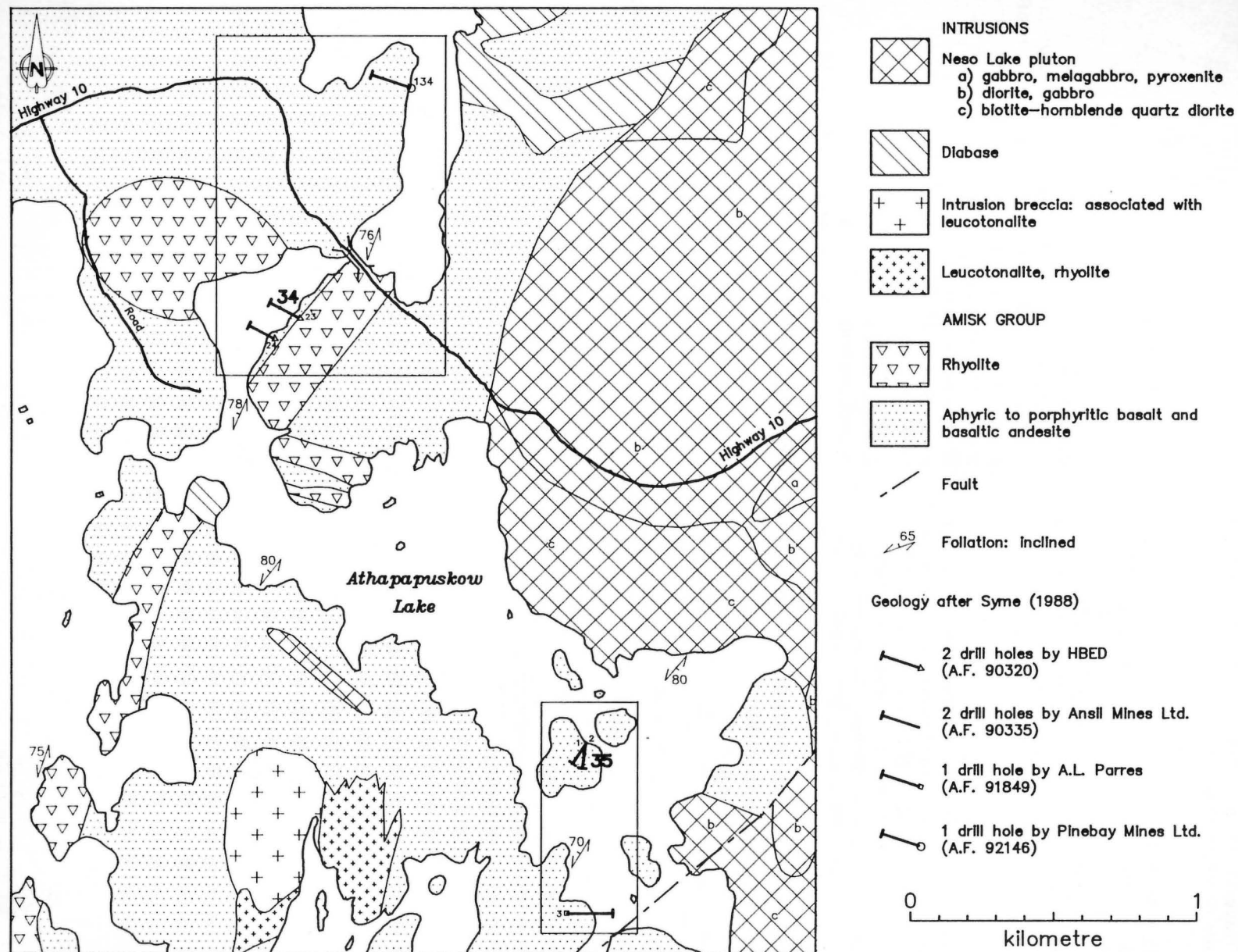


Figure 34-1: Geological setting of occurrences 34 and 35.

LOCATION: 34

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6061052N/330066E

ACCESS: Via Provincial Road 10 and boat

EXPLORATION SUMMARY:

HBED drilled two holes totalling 351 m on the Campo 4 claim in 1950 (A.F. 90320). Pinebay Mines Ltd. tested a ground EM conductor on CB 5628 with a 182 m drill hole in 1976 that intersected mostly andesitic rocks (A.F. 92146).

GEOLOGICAL SETTING:

The area is underlain by aphyric to sparsely porphyritic basalt and basaltic andesite with small areas of aphyric rhyolite and rhyolite dykes (Fig. 34-1; Syme, 1988). Drill holes on Campo 4 claim intersected mostly dacite and rhyolite (A.F. 90320).

MINERALIZATION:

Up to 2% pyrite, pyrrhotite and chalcopyrite were noted at several places throughout the drill cores in dark grey to greenish-grey, fine- to medium-grained andesite. Some of the andesite is chloritized, has abun-

AREA: Southeast of Bakers Narrows, Athapapuskow Lake

AIRPHOTO: A26328-179

dant calcite stringers and contains minor talc schist (A.F. 92146, 90320).

GEOCHEMICAL DATA:

Eight drill core samples assayed up to 0.34 g/t Au, 0.3% Cu and 0.03% Zn (A.F. 92146).

CLASSIFICATION:

Disseminated mineralization - not classified.

REFERENCES:

Assessment Files: 90320, 92146

Manitoba Energy and Mines, Mines Branch.

Syme, E.C.

1988: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

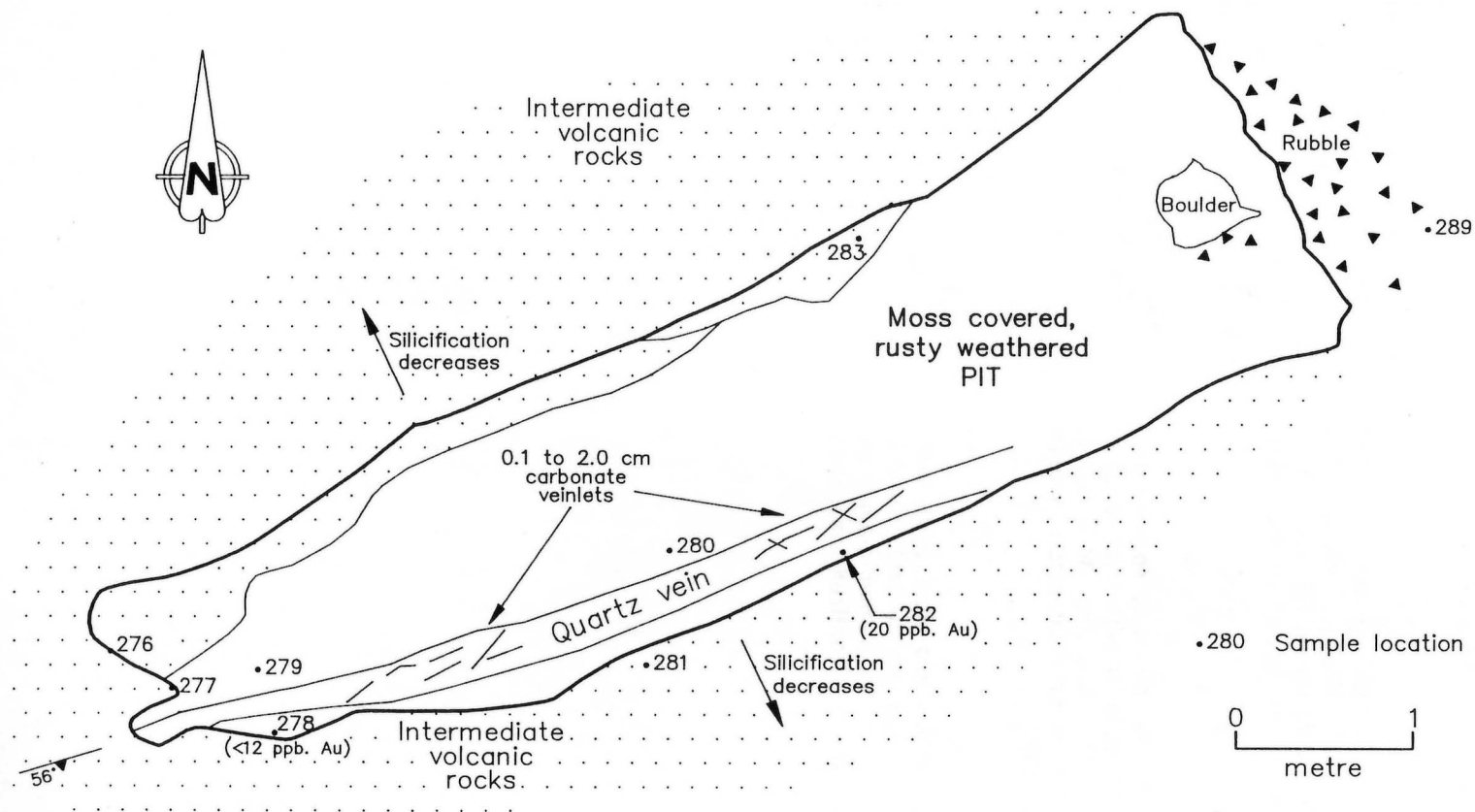


Figure 35-1: Detailed geology and sample locations at occurrence 35.

LOCATION: 35

NAME: Klik

UTM: 6059486N/331130E

ACCESS: Via Provincial Road 10 and boat

EXPLORATION SUMMARY:

Ansil Mines drilled two holes totalling 135 m on claim Klik 3 in 1965 (A.F. 90335). In 1970 A.L. Parres completed an EM survey and drilled a 199 m hole to test a 2 km long EM conductor on Klik 5 (A.F. 91849). Three trenches were located near the west shore of the island, and another boulder filled trench (4 x 1 x 1 m) was found 50 m to the south (Parbery and Gale, 1984).

GEOLOGICAL SETTING:

The area is underlain by aphyric to sparsely porphyritic basalt and basaltic andesite with small areas of rhyolite and rhyolite dykes (Fig. 34-1; Syme, 1988). The Neso Lake diorite to quartz diorite pluton occurs to the east and north of the occurrence. Drill core contained alternating layers of andesite and rhyolite (A.F. 90335, 91849).

MINERALIZATION:

A 6 x 2 x 2 m trench (Fig. 35-1) follows a 20 to 45 cm thick quartz vein (255°/56°S) that is cut by randomly oriented, 0.1 to 2.0 cm thick, carbonate veinlets. Silicified intermediate volcanic rocks with quartz and carbonate veinlets host the quartz vein. The quartz vein and adjacent wall rock contain 1% pyrite and chalcopyrite.

The two smaller trenches (2.5 x 1.5 x 0.15 m and 1 x 0.75 x ? m) on the west shore of the island expose feldspar aphyric silicified volcanic rock and silicified carbonatized volcanic rock.

DDH 1 and 2 intersected 1 cm quartz and quartz-carbonate veins and a 40 cm quartz vein with minor disseminations and veins of pyrite.

AREA: Southeast of Bakers Narrows (Fig. 34-1)

AIRPHOTO: A26328-180

DDH 3 intersected fine grained disseminated pyrite and chalcopyrite and veinlets of pyrite associated with quartz and quartz-carbonate veins (A.F. 91849).

GEOCHEMICAL DATA:

Two grab samples of the silicified intermediate volcanic rock adjacent to the quartz vein assayed 12 ppb and 20 ppb Au; sample locations are shown on Figure 35-1.

Drill core assays from DDH 1 and 2 reported nil Au (A.F. 90335).

CLASSIFICATION:

Vein type deposit; single vein. Disseminated pyrite intersected in DDH 3 may represent a pyritic stratum.

REFERENCES:

Assessment File: 90335, 91849

Manitoba Energy and Mines, Mines Branch.

Parbery, D. and Gale, G.H.

1984: Mineral deposit investigations in the Flin Flon area; In Manitoba Energy and Mines, Mineral Resources Division, Report of Field Activities 1984, p. 60-66.

Syme, E.C.

1988: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

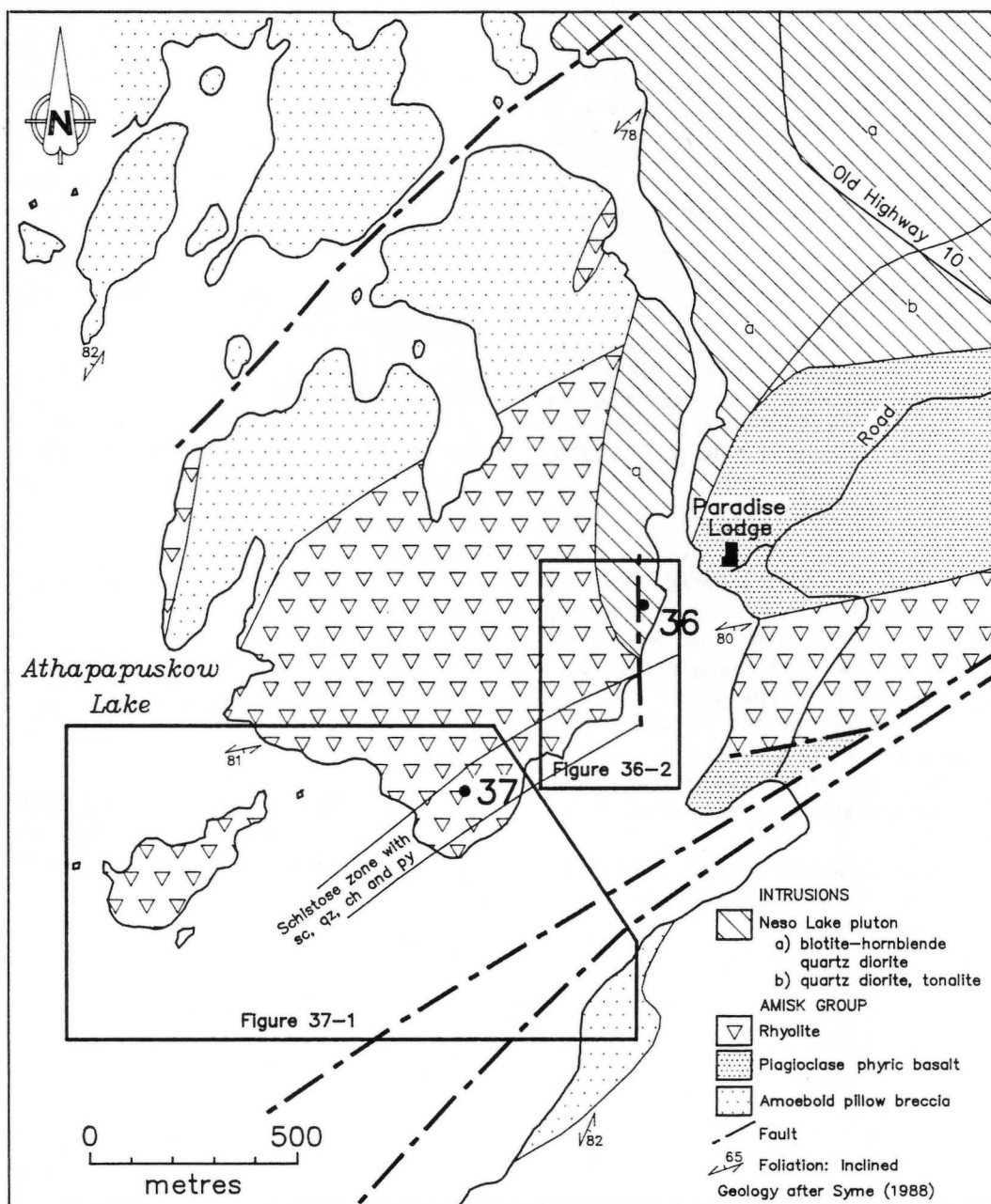


Figure 36-1: Geological setting of occurrences 36 and 37.

LOCATION: 36**NAME: Billy Boy****UTM: 6057690N/331549E****ACCESS: Via Provincial Road 10 to Athapapuskow Lake and by boat****EXPLORATION SUMMARY:**

The Billy Boy Au deposit was discovered by Manitoba Basin Mining Co. in 1929 (Wright, 1938), approximately 450 m northeast of their original Cu prospect (see Location 37). Several trenches were blasted and 381 m of diamond drilling was reported in 1931 (Billy Boy, File 8778).

In 1935 the Billy Boy claim was assigned to W. Cowan. Churchill Basin Mines Ltd. optioned the property in 1937, and installed a 5 ton/day mill in 1938. Ore was obtained from a V-shaped open pit about 21 m long with a maximum depth of 5 m (Morgan, 1940).

In 1965, Jack Murray excavated a 12 x 2 x 1 m trench and drilled a 84 m hole (A.F. 92614). An HLEM survey was conducted for Granges Exploration AB in 1976 (A.F. 90331; M.I. Card NTS 63K/12 Au1).

GEOLOGICAL SETTING:

The area is underlain by biotite-hornblende quartz diorite that is the southwestern extension of the Neso Lake Pluton. A north-trending fault occurs west of the occurrence. Aphyric rhyolite is exposed west of the quartz diorite and on the eastern side of the lake channel (Fig 36-1; Syme, 1988).

MINERALIZATION:

In the open pit at site A (Fig. 36-2), the quartz diorite was cut by 6 to 20 cm thick veins of quartz and brown weathered carbonate that contained pyrite, chalcopyrite, arsenopyrite and some galena. The veins were orientated N10°E/45°E and N10°W/45°W. Gold occurred as tiny blebs and smears in the quartz filled joints, and associated with pyrite and galena (M.I. Card NTS 63K/12 Au1). The dioritic wall rocks contain disseminated pyrite, arsenopyrite, and chalcopyrite.

In the trench at site B (Fig. 36-2), siliceous sericitic schist with sections of grey, aphanitic siliceous rock up to 1 cm thick contain 30 to 35% solid pyrite veinlets. The sulphide-rich sericitic schists (Fig. 36-2) contain a 2 m thick section of sericite schist in the centre of the trench.

GEOCHEMICAL DATA:

Three bulk samples smelted in 1937 contained: (1) 7.3 tonnes - 197.3 g/t; (2) 20.9 tonnes - 70 g/t; and (3) 30 tonnes - 162.6 g/t. In 1939, 77.3 tonnes were milled;

AREA: Southeast of Bakers Narrows, Athapapuskow Lake**AIRPHOTO: A26328-6, -182**

45.5 tonnes yielded 435.4 grams Au amalgam, and 31.8 tonnes yielded 777 or 808 grams Au and 280 grams Ag (M.I. Card NTS 63K/12 Au1). This deposit is estimated to have yielded 135 tonnes grading 70.87 g/t Au.

Two grab samples from the 12 x 2 x 1 m trench contained 20 ppb and 60 ppb Au.

CLASSIFICATION:

Vein type deposit; multiple veins or lenses. Au-bearing quartz-carbonate veins in a diorite intrusion.

REFERENCES:

Assessment Files: 92614, 90331

Manitoba Energy and Mines, Mines Branch.

Billy Boy, File 8778

Mining Recording Files, Manitoba Energy and Mines, Mines Branch.

Buckham, A.F.

1942: Athapapuskow Lake, Manitoba: preliminary map; Geological Survey of Canada, Paper 42-16, 1:31 680.

Buckham, A.F.

1944: Athapapuskow Lake, Manitoba; Geological Survey of Canada, Map 807A, 1:63 360. Churchill Basin Mines Ltd., NTS 63K/12 NE; Corporation File, Manitoba Energy and Mines, Mines Branch.

Mineral Inventory Card NTS 63K/12 Au1

Manitoba Energy and Mines, Geological Services Branch.

Morgan, J.H.

1940: Billy Boy and Eureka Claims, NTS 63K/12NE; unpublished Information File, Manitoba Energy and Mines, Mines Branch.

Syme, E.C.

1988: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

Wright, J.F.

1938: Geology and Mineral Deposits of a part of Northwest Manitoba; Geological Survey of Canada Report, 1930, Part C, p. 53-54.

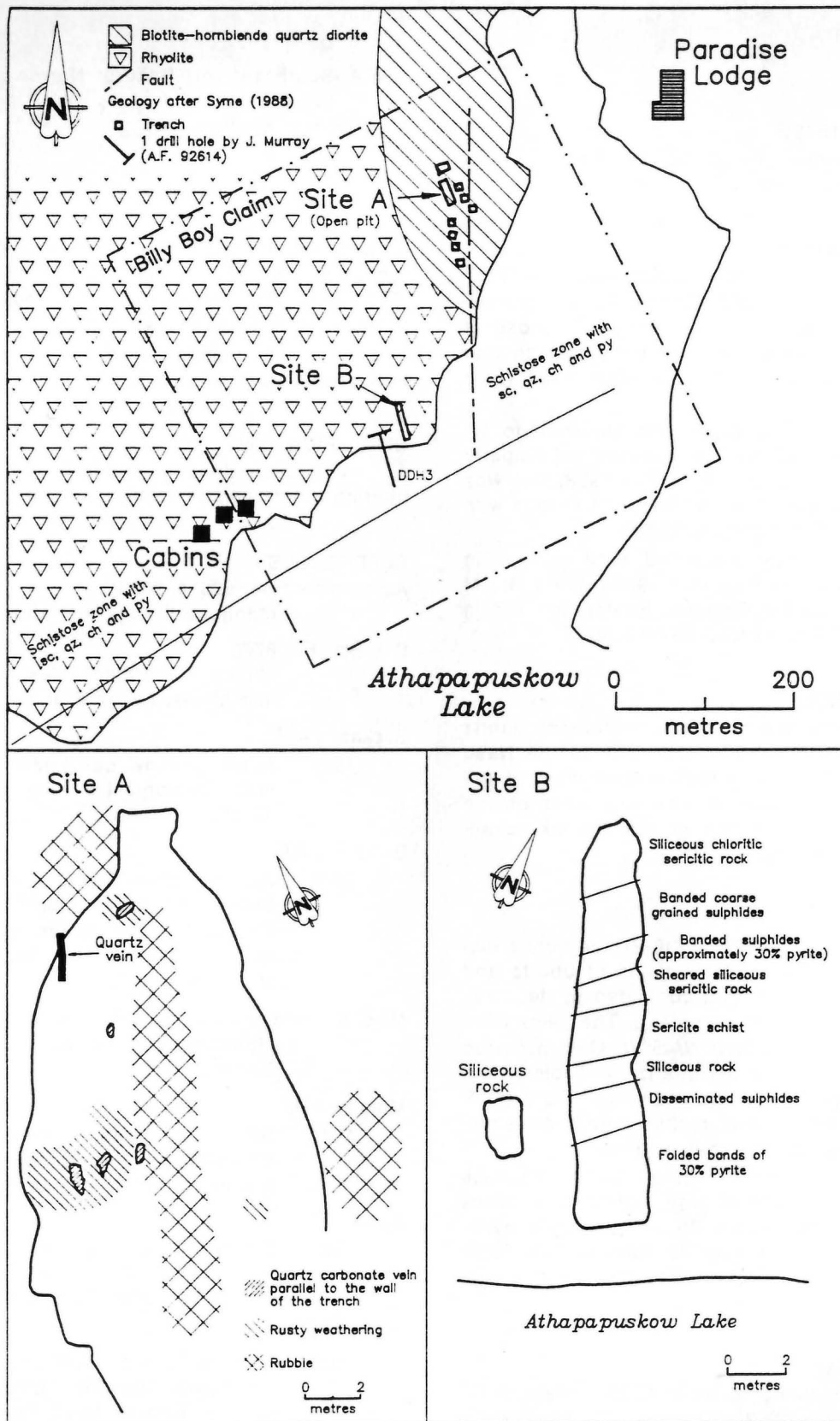


Figure 36-2: Detailed geology, drill hole and trench locations at occurrence 36.

LOCATION: 37**NAME: Tarry****UTM: 6057256N/331140E****ACCESS: Via Provincial Road 10 to Athapapuskow Lake and boat****AREA: Southeast of Bakers Narrows, Athapapuskow Lake (Fig. 36-1)****AIRPHOTO: A26328-182****EXPLORATION SUMMARY:**

This occurrence was staked as the Billy Boy claim in 1925 by T.R. Webb. It was assigned to W.E. Baker the following year and trenches were blasted over the next three years. Manitoba Basin Mines Co. Ltd. optioned the property in 1929. Wright (1931) indicates that 21 pits and trenches exposed the mineralization. Early claim maps show the property was renamed the Tarry claim between 1931 and 1933. At least three holes have been drilled on the Tarry claim (A.F. 90329). Four holes were drilled to test EM anomalies along strike from the Tarry occurrence and one hole tested an EM anomaly to the south (Fig. 37-1; A.F. 90317, 90318).

HBED completed a 167 m drill hole on the Metal 1 claim in 1954 (A.F. 90339). An EM survey was carried out on the Aur and Metal claims by HBED in 1956 (A.F. 90329). Auric Mining Explorations Ltd. tested these conductors with two holes totalling 347 m on Aur 2 and Metal 1 in 1956 (A.F. 90318). Between 1967 and 1970, two holes totalling 640 m were drilled on Asarco 19 claim by Asarco Exploration Co. of Canada Ltd (A.F. 90317; Mineral Inventory Card NTS 63K/12 Au1).

GEOLOGICAL SETTING:

The mineralization occurs in a zone of quartz sericite schist that is at least 30 m wide. Aphyric rhyolite occurs north of the schistose zone (Fig. 36-1; Syme, 1988). The schistose zone appears to be part of the Neso Lake Shear Zone (Parbery and Gale, 1984). It is exposed on a small ridge at site A and has been traced northeast along strike (Fig. 37-1).

MINERALIZATION:

The quartz-sericite schist contains several narrow (<2 m) schistose sulphide-bearing zones that are separated by blocks of silicic, sericitic and less schistose felsic rock (Fig. 37-2). Pyrite and chalcopyrite vary from trace to <10% by volume. Malachite stains are common in the rusty weathered zones exposed in the old trenches.

In the quartz-sericite schist unit, 1 to 3 cm quartz and pyrite veinlets crosscut malachite-stained, carbonate-bearing schist. Although solid sulphides were observed in adjacent rubble piles, the exposed sericite schist contains only minor disseminated sulphides, but considerable rusty weathered areas.

At site A, the fine grained basaltic or gabbroic rocks contain quartz-carbonate veinlets and veins, 10 to 30 cm thick, with trace amounts of pyrite and chalcopy-

rite. The mafic host rocks obliquely crosscut schistose felsic rocks; sulphide veins and veinlets fill late fractures.

Holes drilled southwest of the trenches (Fig. 37-1) intersected several sections of 1 to 10% pyrite in intermediate and felsic volcanic rocks. Asarco holes DDH 1 and 2 intersected a 7.6 cm quartz vein with 40% chalcopyrite and veinlets of pyrite with chalcopyrite (A.F. 90317).

Wright, (1931) indicated that outcrops of sulphide-bearing schist with up to 2% Cu had been trenched on the Var claims at a location southeast of the Billy Boy claim group; this mineralization was not located during this study.

GEOCHEMICAL DATA:

A drill core sample of quartz veins with 40% chalcopyrite returned 0.41% Cu over 3 m (A.F. 90317).

CLASSIFICATION:

Vein type deposit; multiple veins or lenses. Anastomosing pyrite and chalcopyrite veins occur in a zone of sheared quartz-sericite schist that is part of the Neso Lake Shear Zone.

REFERENCES:

- Assessment Files: 90317, 90318, 90329, 90339
Manitoba Energy and Mines, Mines Branch.
- Mineral Inventory Card NTS 63K/12 Au1
Manitoba Energy and Mines, Geological Services Branch.
- Parbery, D. and Gale, G.H.
1984: Mineral deposit investigations in the Flin Flon area; in Manitoba Energy and Mines, Mineral Resources Division, Report of Field Activities 1984, p. 60-66.
- Syme, E.C.
1988: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.
- Wright, J.F.
1931: Geology and mineral deposits of a part of northwest Manitoba; Geological Survey of Canada, Summary Report, 1930, pt. C, p. 1-124.

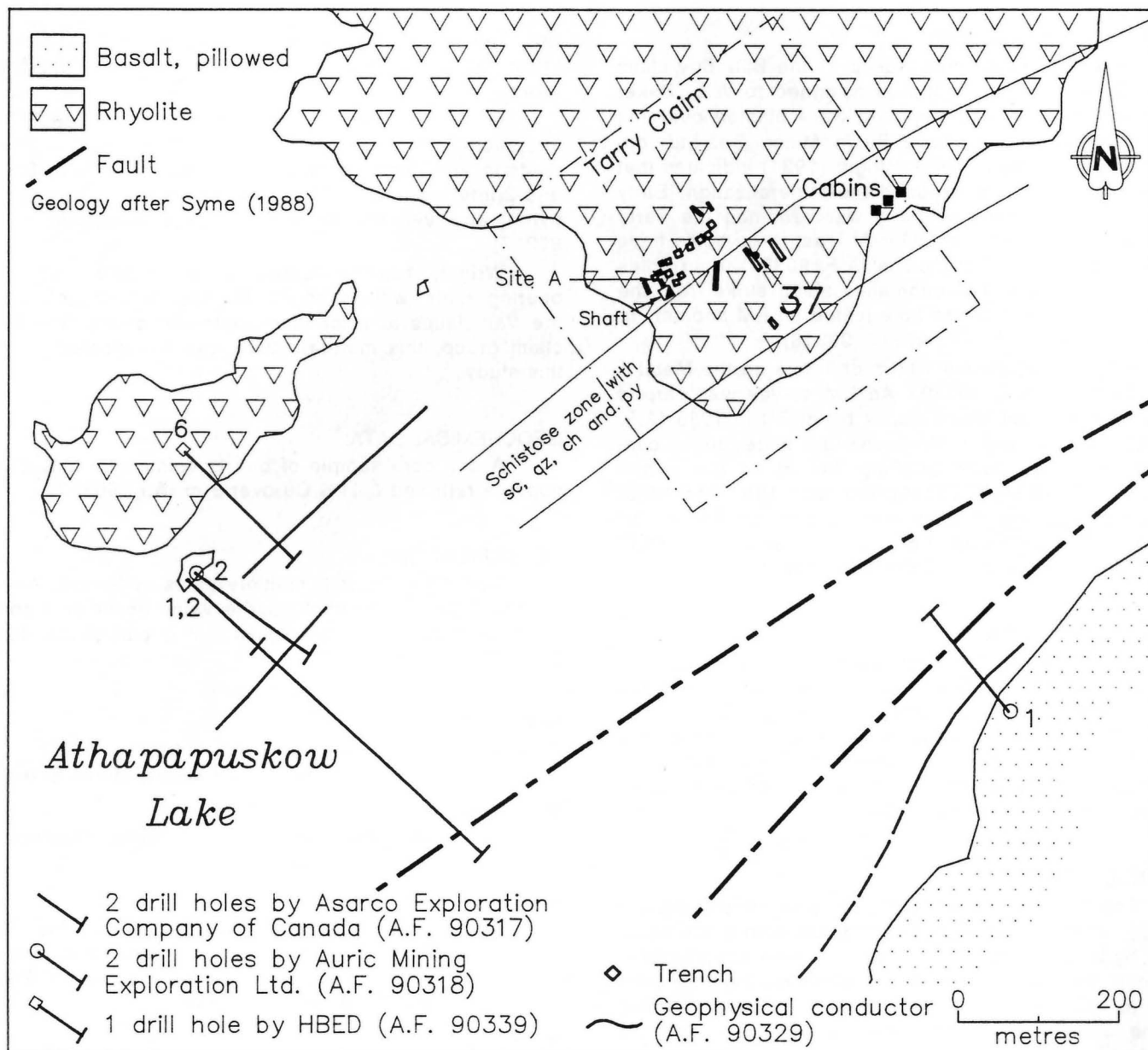


Figure 37-1: Detailed geology, drill hole and trench locations at occurrence 37.

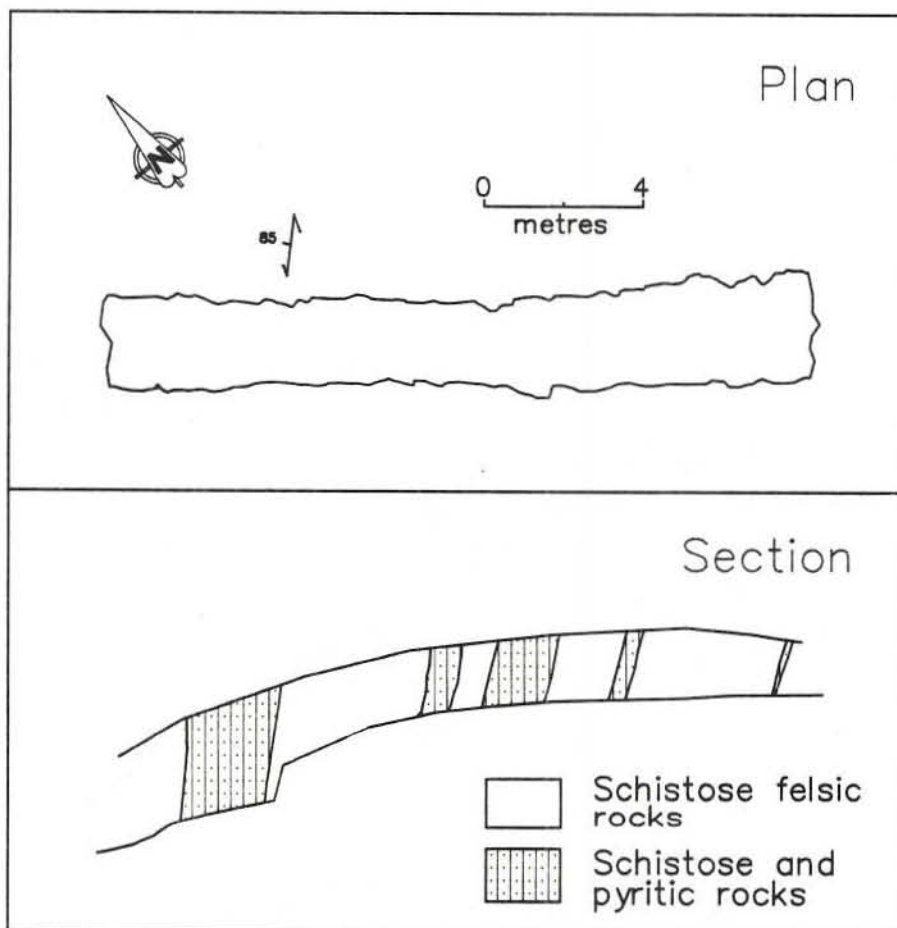


Figure 37-2: Plan and section of trench in schistose felsic rocks at occurrence 37.

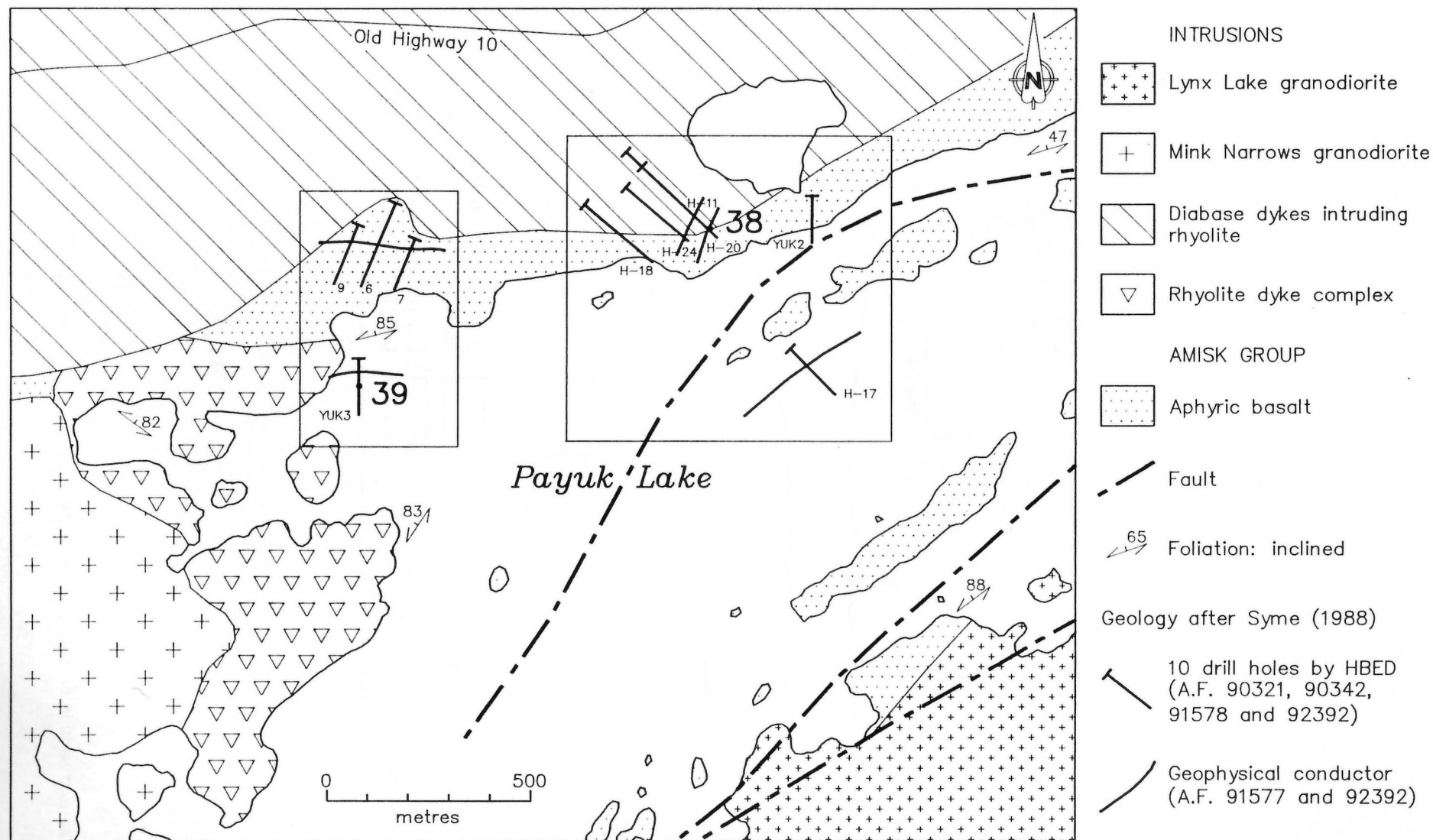


Figure 38-1: Geological setting of occurrences 38 and 39.

LOCATION: 38

NAME: (A.F. - Mineralization intersected in drill core)
UTM: 6058515N/337110E
ACCESS: Via Provincial Road 10 and boat on Payuk Lake

AREA: Payuk Lake
AIRPHOTO: A26398-87

EXPLORATION SUMMARY:

HBED completed an EM survey on the Bus claims in 1951 and tested conductors with three drill holes (698 m) in 1952 (A.F. 90321). HBED drilled two holes totaling 383 m on the P claims in 1956 (A.F. 91578). In 1982, HBED completed an EM survey on CB 10503 and drilled a 117 m hole (A.F. 92392).

GEOLOGICAL SETTING:

The area is underlain by aphyric basalt and fine- to medium-grained diabase dykes intruded into rhyolite. A rhyolite intrusion with abundant diabase dykes is exposed to the west (Fig. 38-1; Syme, 1988).

DDH H-11, H-18, H-20 and H-24 intersected mostly basaltic rocks with minor dioritic, gabbroic and rhyodacitic rocks. DDH H-17 intersected mostly sheared basalt with quartz and carbonate stringers, but also contained three intersections of graphitic schist with pyrite, carbonate and quartz (A.F. 90321, 91578).

DDH Yuk-2 intersected andesite flows, and diorite and granodiorite dykes with abundant carbonate and chlorite veins (A.F. 92392).

MINERALIZATION:

DDH H-11, H-18, H-20 and H-24 cores contained many intersections with disseminations and veinlets of minor to moderate pyrite and pyrrhotite, and trace chalcopyrite and sphalerite. DDH H-11 and H-20 intersected 1.5 m and 3.0 m of solid sulphides. Although some chloritic alteration is present, it does not resemble the type of alteration normally associated with volcanogenic massive sulphide type deposits.

DDH Yuk-2 core contained a 15 m long intersection with abundant carbonate veinlets, up to 10% pyrrhotite, 1% sphalerite and less than 1% chalcopyrite. A 70 m long section consists of a nonfoliated, brecciated,

carbonate/chlorite veined dacitic to andesitic flow with two extensively carbonatized sections, 60 cm and 6 m in length; 1 to 6% pyrrhotite and trace to 1% chalcopyrite were also present in short (30 cm) sections. Although this drill hole apparently did not intersect the major shear zone (Syme, 1988), the zone could occur immediately south of the collar of this drill hole.

DDH 17 core contained only trace amounts of pyrite in several short sections.

GEOCHEMICAL DATA:

Samples of DDH Yuk-2 core contained only trace amounts of Au, Ag, Cu and Zn (A.F. 92392).

CLASSIFICATION:

Vein type deposit; multiple veins or lenses. The solid sulphide sections in DDH 11 and 20 are in close proximity to gabbro dykes and probably represent mobilization of sulphides into fractures. The discontinuous nature of the solid sulphide section precludes a sulphide facies iron formation designation. The graphitic schist intersected in DDH 17 does not appear to contain sufficient sulphides to warrant classification as a sulphide facies iron formation. In the drill logs there is no evidence that the type of alteration is typical of that associated with massive sulphide type deposits.

REFERENCES:

- Assessment Files: 90321, 91577, 91578, 92392
Manitoba Energy and Mines, Mines Branch.
Syme, E.C.
1988: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

LOCATION: 39

NAME: (A.F. - Mineralization intersected in drill core)
UTM: 6058095N/336212E
ACCESS: Via Provincial Road 10 and boat on Payuk Lake

EXPLORATION SUMMARY:

HBED completed an EM survey on the Bus claims and tested an anomaly with three drill holes totalling 515 m in 1952 (A.F. 90342). In 1982, HBED drilled one 117 m hole on CB 10503 (A.F. 92392).

GEOLOGICAL SETTING:

The area is underlain by aphyric basalt intruded by fine- to medium-grained diabase and rhyolite (Fig. 38-1; Syme, 1988). The drill cores from DDH 6, 7 and 9 were logged mostly as basaltic rocks (A.F. 90342). DDH Yuk-3 intersected andesite and diorite (A.F. 92392).

MINERALIZATION:

DDH 7 intersected a 8.1 m long shear zone that contained near solid pyrite and pyrrhotite with trace chalcopyrite in sections up to 0.5 m long. Trace pyrrhotite was disseminated locally throughout the basalt.

DDH 9 intersected 4.6 m of 'well mineralized' pyrrhotite and pyrite at the margin of a fine grained gabbro. DDH Yuk-3 contained multiple bands of 6% pyrite and pyrrhotite that locally contained 1 to 2% sphalerite and/or chalcopyrite (A.F. 90342).

AREA: Payuk Lake (Fig. 38-1)
AIRPHOTO: A26398-74

GEOCHEMICAL DATA:

The highest assay returned from DDH Yuk-3 core samples was 0.26% Cu and 0.8% Zn (A.F. 92392).

CLASSIFICATION:

Vein type deposit; multiple veins or lenses. The solid sulphide sections probably represent sulphide mobilized into fractures from the disseminated sulphide sections. The disseminations and veinlets of sulphide minerals may be the distal portion of an alteration zone of a massive sulphide type deposit; exploration for this type of deposit would be warranted if detailed mapping reveals that lithologies are locally discordant to the EM anomalies.

REFERENCES:

- Assessment Files: 90342, 91577, 92392
Manitoba Energy and Mines, Mines Branch.
- Syme, E.C.
1988: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

LOCATION: 40

NAME: Neso Lake

UTM: 6059300N/334898E

ACCESS: Via Provincial Road 10 and boat

AREA: Neso Lake

AIRPHOTO: A26398-73

EXPLORATION SUMMARY:

HBED drilled a 22 m hole on the Turk claim in 1965 (A.F. 90346). M. Little completed a 23 m drill hole in 1966 (A.F. 90386). M. Little and G.F. Thompson drilled four holes totalling 291 m in 1968 on claim Zorro (A.F. 91534). Golden World Resources mapped the geology of the Klick 1 and 2 claims in 1982. During the 1980's gold exploration programs have been undertaken in the area by both Noranda Exploration Co. Ltd. and Homestake Mining Co. (P. Bachnick, pers. comm., 1989). Several trenches were located on the southeast side of the island and at site A along strike to the north on the mainland (Fig. 40-1).

GEOLOGICAL SETTING:

The area is underlain by porphyritic basalt to basaltic andesite flows and aphyric to porphyritic rhyolite intrusions. The dioritic to quartz dioritic Neso Lake Pluton occurs to the northwest (Fig. 40-1; Syme, 1988). Altered and sheared rocks that are exposed along highway 10 south of Neso Lake are probably part of the Neso Lake Shear Zone that extends southward to the Tarry occurrence (Location 37) and northeastward through Neso Lake (Parbery and Gale, 1984). The rocks were described by Parbery (1986, p. 49) as:

"Rhyodacitic to dacitic volcanic rocks occur at the south-southwest end of Neso Lake and extend north-eastwards as far as the Kississing Lake road. Portions of these rocks exposed along Provincial Road 10 are silicified and carbonatized.

Rhyodacitic rocks weather buff-white, are aphanitic to very fine grained and contain quartz and plagioclase phenocrysts. Subhedral quartz phenocrysts. Subhedral quartz phenocrysts average 1.5 mm in diameter and make up 1 to 10% of the rock. Anhedral plagioclase phenocrysts, 1 to 1.5 mm in diameter, make up 5% of the rock. Some outcrops have up to 5% small chlorite blebs that are probably remnants of mafic phenocrysts. Dacitic rocks are differentiated from the rhyodacitic rocks by their coarser grain size, a darker coloured weathered surface and only trace amounts of quartz phenocrysts. Most of the rocks termed dacitic are feldspar phyric, with 1 mm anhedral white plagioclase phenocrysts comprising approximately 5% of the rock.

The felsic to intermediate rocks are vesicular, tuffaceous and contain mafic fragments. However, most of the outcrop in this area consists of white to light tan, weathered massive rhyodacite to dacitic flows. These rocks are aphanitic to very fine grained and contain plagioclase and/or quartz phenocrysts. Changes in pheno-

cryst content may occur over several metres but only a few contacts were observed between different units. These rocks strike between 222° and 253° and most dip steeply to the northwest.

Volcanic and volcanoclastic rocks of intermediate composition are intercalated with the felsic volcanic rocks. These rocks consist of plagioclase crystal tuffs, monolithic breccias and rare felsic fragmental rocks. Several intermediate plagioclase ± hornblende phyric dykes intrude the rocks of this area." (Parbery, 1986, p. 49). Syme (1988) indicates that these rocks form part of an extensive rhyolitic dyke complex.

MINERALIZATION:

Trace to minor pyrite and trace chalcopryrite were intersected in rhyolitic rocks in DDH 1 (A.F. 90346). DDH 2 intersected several silicified sections and abundant quartz veinlets and stringers, but only trace amounts of disseminated pyrite; chalcopryrite was noted on fracture surfaces at 40 m. DDH 6 intersected quartz veinlets with minor pyrite disseminations and veinlets, but DDH 4 intersected stringers and irregular masses of pyrite and arsenopyrite throughout a 78 m interval of felsic volcanic(?) rock.

DDH 3 and 5 intersected several quartz veins and abundant veinlets, but only a few of these contained minor, if any, pyrite (A.F. 91534). The trench at site A exposes 1 to 2% pyrite disseminations and blebs (2 mm) within rusty weathered, fine grained 'greenstone'.

At site B, a 15 cm thick quartz vein with 10 to 30% arsenopyrite was exposed in a carbonatized rock by a road cut (Fig. 40-1). Several roadside exposures of a rhyodacitic-dacitic rock east of site B are also silicified(?) and carbonatized. The altered rocks are aphanitic, red brown on weathered surfaces and waxy brown green on fresh surfaces; locally, they contain 2 to 20 cm thick white quartz veins. Late-stage quartz-carbonate veins, 3 to 5 cm wide and up to 20 m long, are common in the altered rocks. The red brown weathered altered rocks are interspersed with pale green to white coloured rocks in exposures along Provincial Road 10 in this area. Trace amounts of pyrite and chalcopryrite occur within both altered and unaltered rocks; most of the sulphides occur on fracture surfaces and as rare 1 to 5 cm veinlets that parallel late-stage quartz-carbonate veins (Parbery, 1986).

GEOCHEMICAL DATA:

None

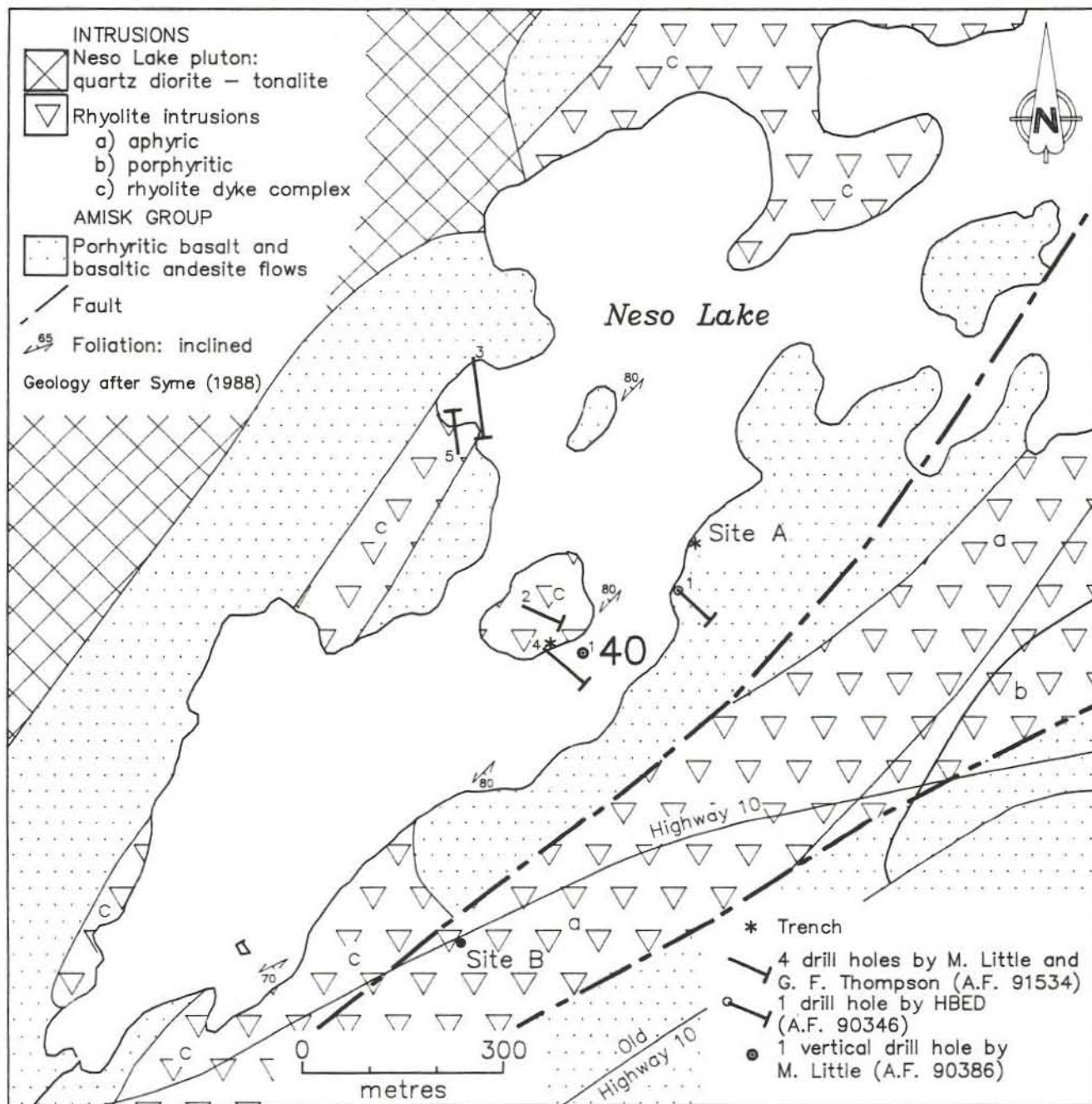


Figure 40-1: Geological setting of occurrence 40.

CLASSIFICATION:

Vein type deposit; multiple veins or lenses. The altered, schistose, pyritic rocks are similar to those associated with the Neso Lake Shear Zone.

REFERENCES:

Assessment Files: 90346, 90386, 91534, 91535, 92546

Manitoba Energy and Mines, Mines Branch.

Parbery, D. and Gale, G.H.

1984: Mineral deposit investigations in the Flin Flon area; in Manitoba Energy and Mines, Mineral Resources Division, Report of Field Activities 1984, p. 60-66.

Parbery, D.

1986: Mineral occurrence studies - Flin Flon area; in Manitoba Energy and Mines, Minerals Division, Report of Field Activities, 1986, p. 49-55.

Syme, E.C.

1988: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

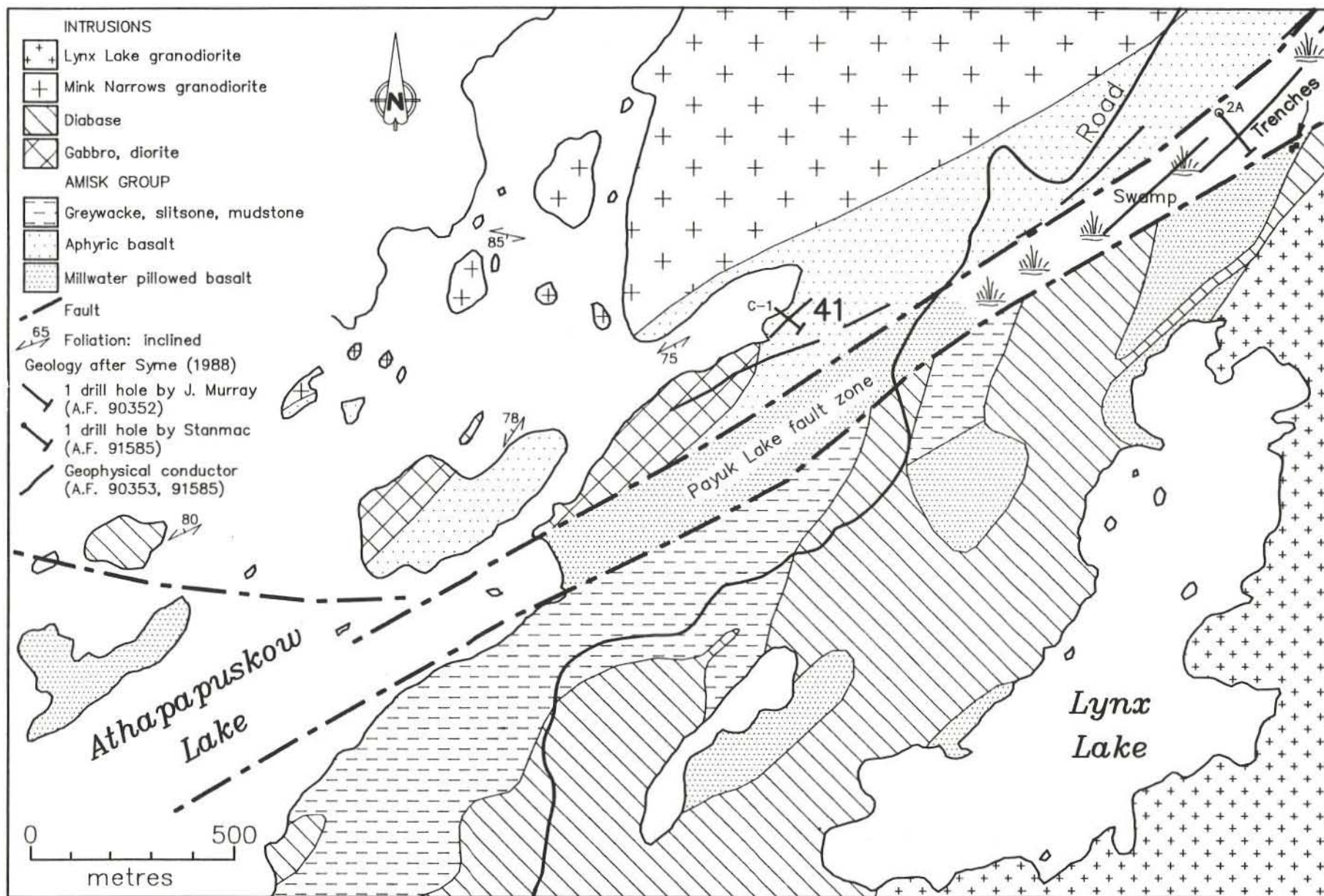


Figure 41-1: Geological setting of occurrence 41.

LOCATION: 41

NAME:

UTM: 6055105N/333981E

ACCESS: Via Millwater quarry road and traverse

AREA: Southwest of Payuk Lake

AIRPHOTO: A26398-76, -77

EXPLORATION SUMMARY:

Stanmac completed an EM survey of the C.R. and Payuk claim groups in 1949. They blasted three trenches on claim P1 and drilled a 159 m hole on claim C.R. 52 (A.F. 91585). J. Murray drilled a 56 m hole southwest of Stanmac's trenches on claim C.R. 18 in 1960 (A.F. 90352).

GEOLOGICAL SETTING:

The area encompasses the Payuk Lake Fault Zone and is underlain by aphyric to sparsely porphyritic basalt flows, gabbro, diorite and diabase. The Mink Narrows granodiorite pluton occurs to the northwest and the Lynx Lake granodiorite pluton occurs to the southwest (Fig. 41-1; Syme, 1988). The drill core consisted mainly of medium grained, fragmental andesite. The Stanmac pits were blasted at the contact between basalt and schistose dacite with minor diorite dykes (A.F. 91585).

MINERALIZATION:

Disseminated pyrite was found in the trenches and minor chalcopyrite was observed in the rubble adjacent to the trenches. Drill hole 2A intersected 8 m of graphitic tuff with several layers of pyrite (A.F. 91585). Drill hole C-1 intersected 30 cm of solid pyrite with graphite-filled fractures (A.F. 90352).

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. The rocks in this area are probably stratigraphically equivalent to those hosting the Copper Reef deposit (Location 10).

REFERENCES:

Assessment Files: 90352, 91585

Manitoba Energy and Mines, Mines Branch.

Syme, E.C.

1988: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

Syme, E.C.

1987: Athapapuskow Lake project; In Manitoba Energy and Mines, Minerals Division, Report of Field Activities, 1987, p. 30-40.

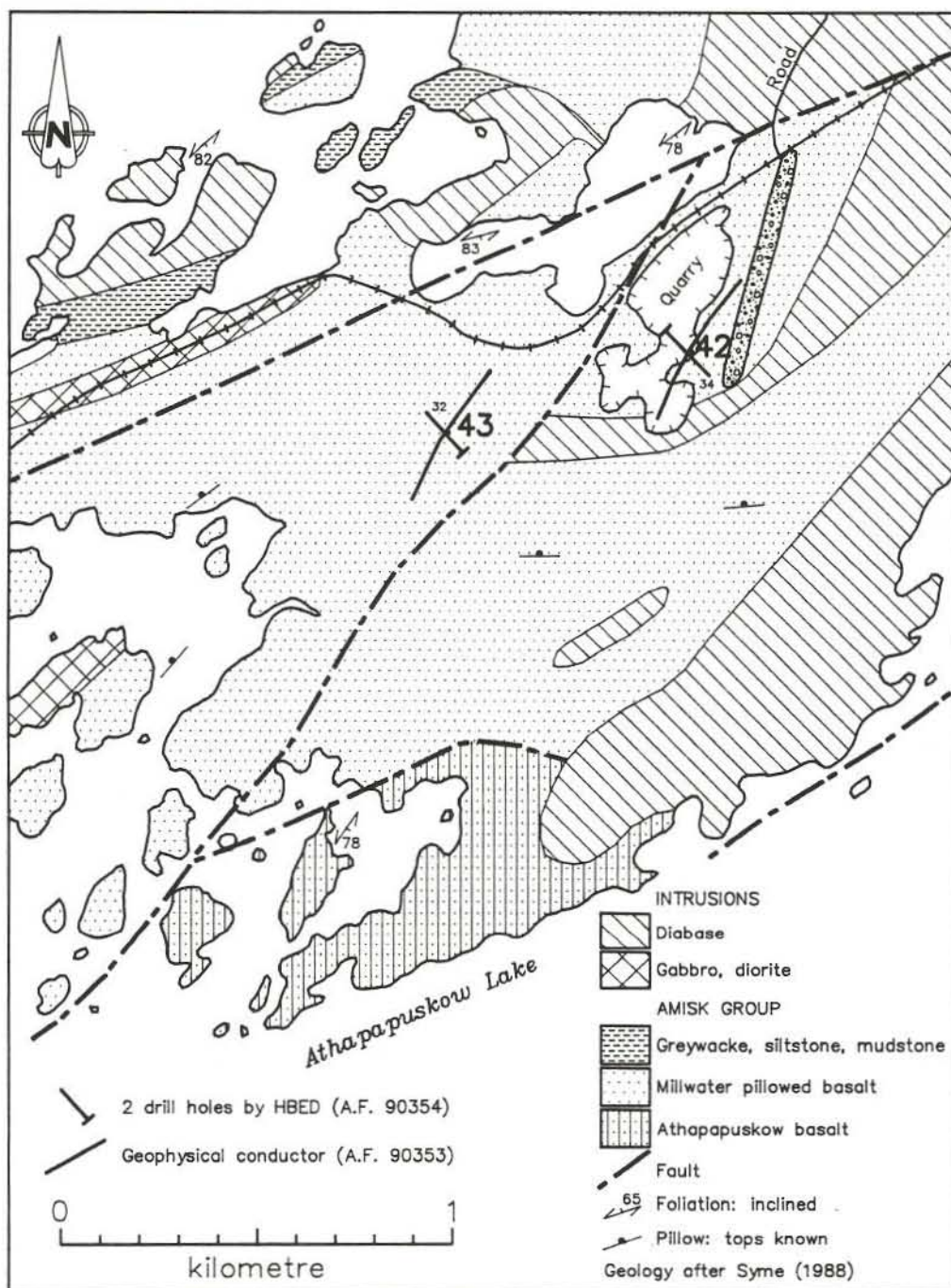


Figure 42-1: Geological setting of occurrences 42 and 43.

LOCATION: 42

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6052588N/332907E

ACCESS: Via Millwater quarry road

AREA: 2 km east of Millwater

AIRPHOTO: A26063-242

EXPLORATION SUMMARY:

HBED completed an EM survey on the Joy claims in 1952 and drilled DDH 34 (116 m) on claim Joy 51 in 1953. HBED completed a second EM survey on the Hap claims in 1980 (A.F. 90353, 90354). The area was staked in 1980-81 after pyrite and chalcopryrite were found in the Canadian National Railway crushed stone quarry.

GEOLOGICAL SETTING:

The occurrence is located south of the Millwater Fault in pillowed basalt intruded by fine- to medium-grained diabase dykes (Fig. 42-1; Syme, 1988a). An assemblage of rhyolite and diorite were intersected in drill cores. These rocks occur in the contact metamorphic aureole of a granodiorite (Syme, 1988b).

MINERALIZATION:

In DDH 34 disseminated pyrite and pyrrhotite were intersected between 104.5 m and 115 m in andesite, rhyolite and graphitic tuff. Pyrite stringers and specks of chalcopryrite occur in sheared carbonatized andesite at 105 m and 106 m (A.F. 90354). A lense (vein?) of solid

pyrite with minor chalcopryrite was exposed on the margins of the quarry (E.C. Syme, Pers. Comm. 1989).

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Vein type deposit; multiple veins or lenses.

REFERENCES:

Assessment Files: 90353, 90354, 92587

Manitoba Energy and Mines, Mines Branch.

Syme, E.C.

1988a: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

Syme, E.C.

1988b: Athapapuskow Lake project; In Manitoba Energy and Mines, Minerals Division, Report of Field Activities, 1988, p. 20-34.

LOCATION: 43

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6052412N/332246E

ACCESS: Via Millwater quarry road and traverse

AREA: West of Millwater (Fig. 42-1)

AIRPHOTO: A26063-242

EXPLORATION SUMMARY:

HBED completed a ground EM survey on the Joy claims in 1952 and drilled a 106 m hole on claim Joy 50 in 1953. A second EM survey by HBED was completed on the Hap claims in 1980 (A.F. 90353, 90354).

GEOLOGICAL SETTING:

The area is underlain by Millwater pillow basalt (Fig. 42-1; Syme, 1988). Drill core intersected inter-layered andesitic rocks and graphitic schist with quartz, as well as several sections of altered diorite (A.F. 90354).

MINERALIZATION:

DDH 32 intersected disseminations and stringers of pyrite. A 1.2 m section of andesite and siliceous brecciated schist contained minor disseminated pyrite; seven intersections of quartz-graphite schist contained veinlets of pyrite (A.F. 90354).

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Vein type deposit; multiple veins or lenses. The pyrite veinlets probably resulted from mobilization of sulphides from the pyritic graphitic sedimentary layers into fractures within the same strata.

REFERENCES:

Assessment Files: 90353, 90354, 92587

Manitoba Energy and Mines, Mines Branch.

Syme, E.C.

1988: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

LOCATION: 44

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6047205N/334971E

ACCESS: Via Provincial Road 10 and boat on Athapapuskow Lake

EXPLORATION SUMMARY:

The area was staked by R. Drake and D.C. Walker in 1950 and was restaked by J. Bell in 1955. In 1955, Cyprus Exploration Corporation Ltd. completed an EM survey on the Mopa claims group. J. Bell blasted a trench (43 x 2 x 2.5 m) and drilled three X-ray holes totalling 67 m on claim Mopa 25 in 1955 (A.F. 90357, 90358). C. Kuryliw completed a geological map in 1971 and magnetometer and EM surveys in 1972-73 on CB 3919 through CB 3948; a 208 m hole was drilled on CB 3930 in 1973 (A.F. 91172). Pronto Explorations Ltd. prepared a geological map of the area in 1973 and undertook magnetometer and EM surveys in 1975 (A.F. 92574).

GEOLOGICAL SETTING:

The island that contains the mineralization (Fig. 44-1) is underlain predominantly by massive basalt flows; aphyric rhyolite flows crop out on the northern tip of the island. Islands to the north are underlain by an assemblage of gabbro, diorite, peridotite and pyroxenite. Ordovician dolomites crop out along the lakeshore immediately south of the island (Fig. 44-1; Syme, 1988).

MINERALIZATION:

C. Kuryliw recorded 4.6 m of disseminated chalcopyrite in rhyolitic and dacitic tuff (Pronto Explorations Ltd., Corporation File; A.F. 91172). Scattered grains and blebs of pyrite and chalcopyrite were found in all three X-ray drill cores (A.F. 90358).

AREA: Islands near southeastern shore of Athapapuskow Lake

AIRPHOTO: A26061-213

GEOCHEMICAL DATA:

A drill core sample of chalcopyrite-bearing rhyolite and dacite assayed 1.06% Cu over 4.6 m (M.I. Card NTS 63K/12 Cu 5).

CLASSIFICATION:

Disseminated mineralization - not classified.

REFERENCES:

- Assessment File 90357, 90358, 91172, 92016, 92574
Manitoba Energy and Mines, Mines Branch.
- Mineral Inventory Card NTS 63K/12 Cu5
Manitoba Energy and Mines, Geological Services Branch.
- Pronto Exploration Ltd., NTS 63K/12 SE
Corporation File, Manitoba Energy and Mines, Mines Branch.
- Syme, E.C.
1988: Millwater (part of NTS NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-4. 1:15840

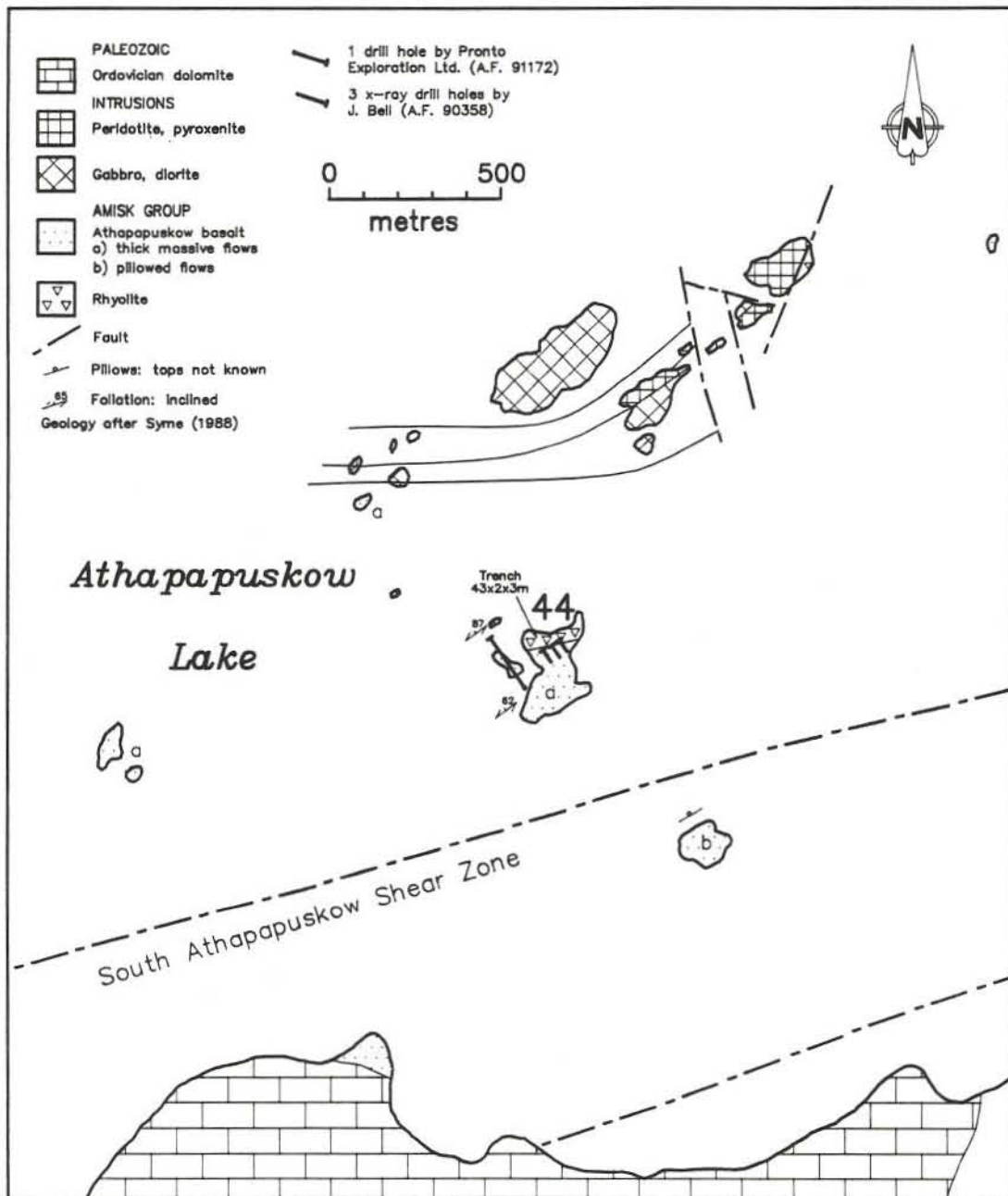


Figure 44-1: Geological setting of occurrence 44.

LOCATION: 45**NAME:** Four Mile**UTM:** 6063338N/336909E**ACCESS:** Via Provincial Road 10 and Kississing Lake road**AREA:** Nisto Lake**AIRPHOTO:** A26398-90**EXPLORATION SUMMARY:**

HBED completed a ground EM survey on the Bus claims in 1952 (A.F. 91577). S. Bachnick staked CB 3094 in 1970 and restaked it as CB 4935 in 1972 (M.I. Card NTS 63K/12 Cu7). HBED, Sherritt Gordon Mines Ltd. and Falconbridge Nickel Mines Ltd. completed airborne EM and magnetic surveys over the area in 1973-74 (A.F. 91700, 92020, 91564). Falconbridge Nickel Mines Ltd. completed a geological map in 1975 (A.F. 92688). Between 1974 and 1987, trenches were blasted on sulphide occurrences southwest of Nisto Lake.

GEOLOGICAL SETTING:

The area is underlain by very fine grained massive intermediate flows and rhyolite with up to 20%, 3 mm quartz and/or feldspar phenocrysts. The volcanic rocks are intruded by fine grained and porphyritic mafic dykes and sills (Fig. 45-1; A.F. 92688).

MINERALIZATION:

Pyrite and chalcopyrite occur in fractures and veins in various lithologies throughout the area. Several trenches were blasted in highly fractured and jointed rocks over an area of 100 x 100 m with abundant malachite stains. A 16 m long trench (T5; Fig. 45-2), exposed a small chalcopyrite and pyrite lense with minor molybdenite and disseminated pyrite in an epidotized quartz-rich sericite schist with staurolite. Other trenches in the area expose veinlets of chalcopyrite, pyrite, pyrrhotite and minor molybdenite.

Chalcopyrite veinlets and disseminations occur in malachite-stained sericite schist with minor pyrite and epidote over a large area southwest of Nisto Lake that is underlain mainly by rhyodacitic rocks.

GEOCHEMICAL DATA:

Grab samples from the chalcopyrite, pyrite and molybdenite lense in trench T5 assayed up to 4.16% Cu (A.F. 92688). Assays of chalcopyrite-bearing rock from several other trenches are shown on Figure 45-2.

CLASSIFICATION:

Vein type deposit; multiple veins. The mineralization occurs in numerous veinlets and fractures that probably represent mobilization during a late thermal event or porphyry type mineralization. Geochemical studies have not been conducted to test for porphyry type alteration.

REFERENCES:

Assessment Files: 91577, 91564, 91700, 92020, 92479, 92620, 92688, 92689

Manitoba Energy and Mines, Mines Branch.

Mineral Inventory Card NTS 63K/12, Cu7

Manitoba Energy and Mines, Geological Services Branch.

Syme, E.C.

1988: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

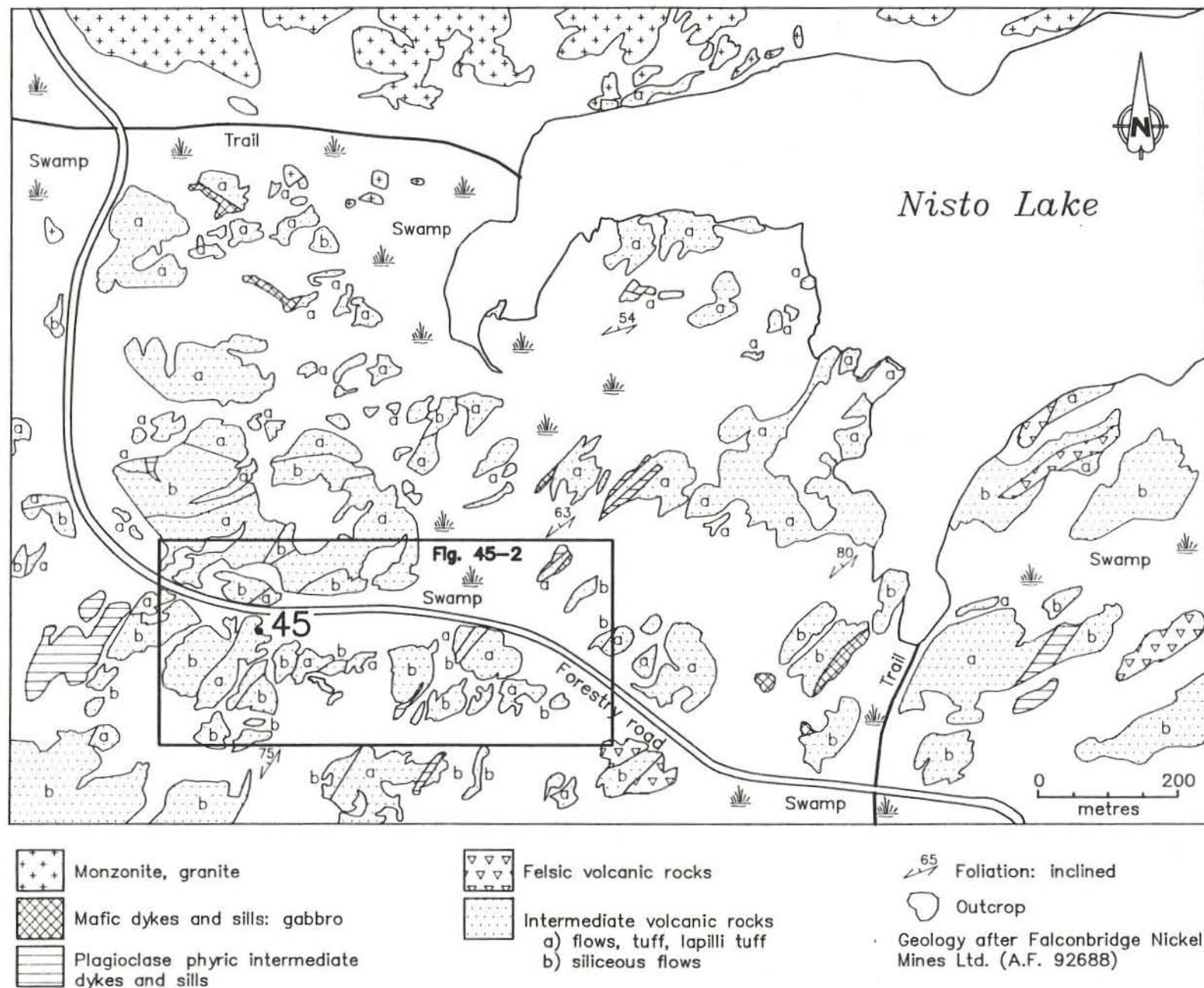
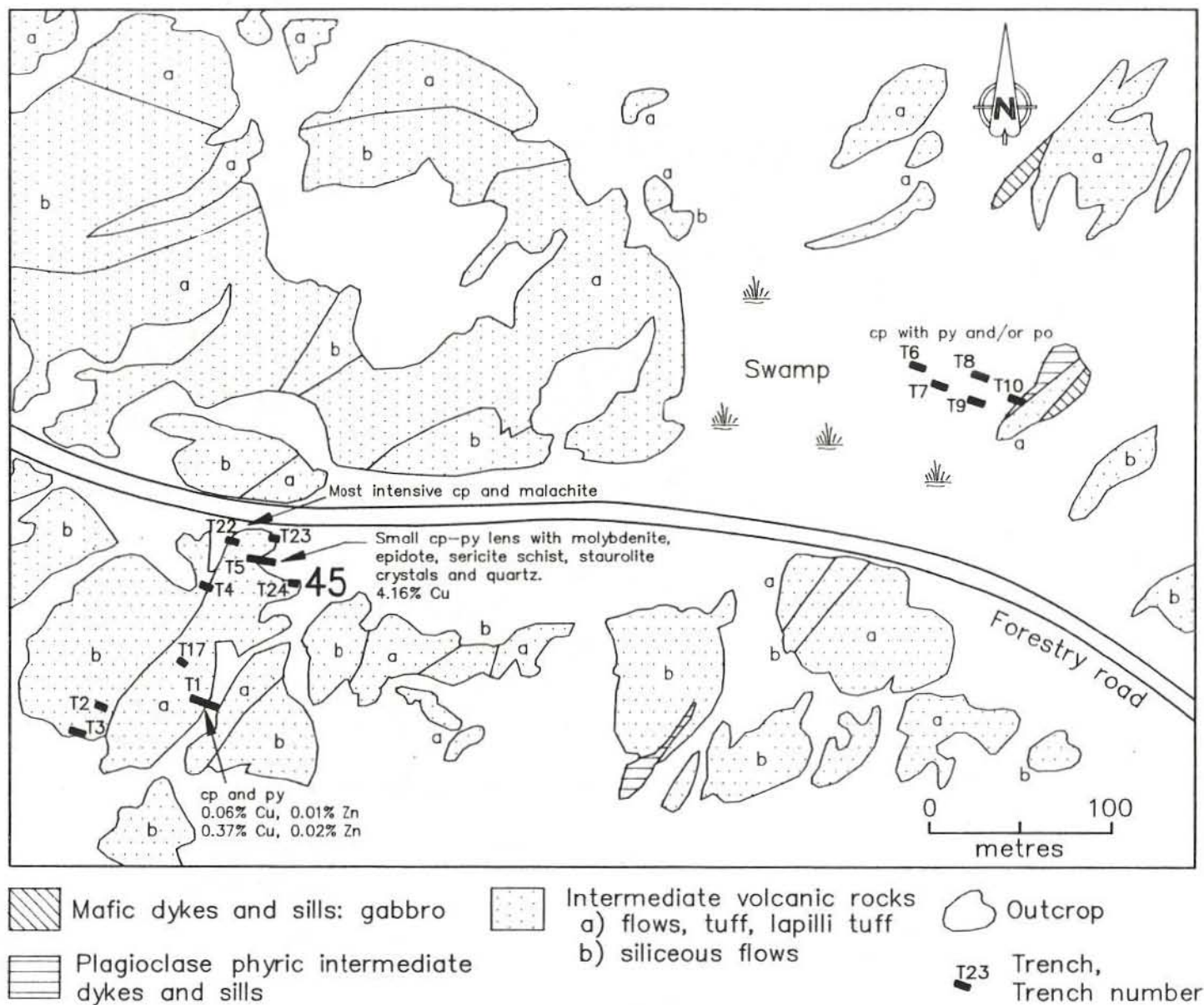


Figure 45-1: Geological setting of occurrence 45.



Geology after Falconbridge Nickel
Mines Ltd. (A.F. 92688)

Figure 45-2: Trench locations at occurrence 45.

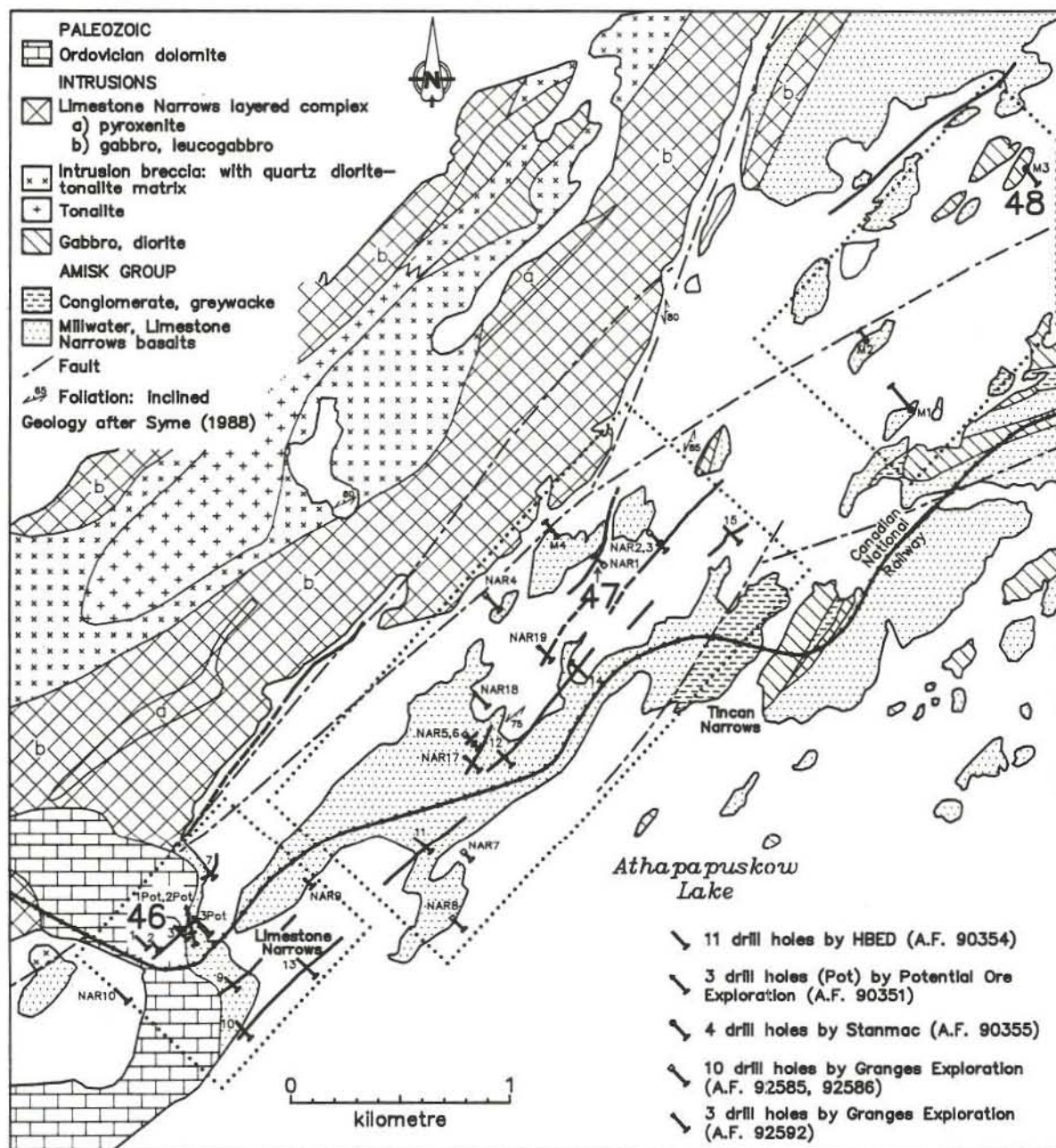


Figure 46-1: Geological setting of occurrences 46, 47 and 48.

LOCATION: 46

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6050289N/327527E

ACCESS: Via boat from Cranberry Portage

EXPLORATION SUMMARY:

In 1952 HBED completed an EM survey on the Joy claims and defined an anomalous zone that extends intermittently for 3 km northeast of Limestone Narrows (A.F. 90353). HBED tested the conductors with 7 holes totalling 557 m in 1953 (A.F. 90354). In 1972 Potential Ore Exploration Co. Ltd. drilled three holes totalling 397.6 m (A.F. 90351). Granges Exploration AB drilled two holes totalling 89 m on CB 7764 and CB 8526 in 1977 (A.F. 92586).

GEOLOGICAL SETTING:

The Payuk Lake Fault separates Millwater pillowed basalt to the southeast from the Limestone Narrows layered complex to the northwest (Fig. 46-1; Syme, 1988a). Along the northwest shoreline of Athapapuskow Lake the layered complex consists dominantly of gabbro and leucogabbro. Ordovician limestone and sandstone underlie parts of the area west of Limestone Narrows.

Graphitic argillite, dacite and rhyolite were the dominant rock types intersected by the drill holes. Rock exposures consist of basaltic tuff, buff weathered pillowed flows (Millwater basalt), and a mafic volcanoclastic rock unit that ranges from mudstone-siltstone-greywacke to heterolithic breccia that contains <2 cm rounded to angular fragments (Syme, 1987). The Millwater basalts chemically resemble oceanic rift basalts (Syme, 1988b) unlike the remainder of Amisk Group rocks in the Flin Flon area, which resemble island arc type rocks (Bailes and Syme, 1989).

MINERALIZATION:

Trace pyrite occurs in association with graphitic schist in most of the drill cores. Hematite veinlets, probably resulting from groundwater action, occur in sheared dacite (A.F. 90354). Several graphitic schist sections contain layers of near solid pyrite and graphite or 'earthy pyrite' strata that constitute regional EM conductors.

From north to south the EM anomalies are characterized by:

DDH 7 intersected 2.4 m, 4.8 m and 10.0 m of graphitic schist ;

DDH 1 (HBED) intersected 22.8 m of graphitic schist with minor pyrite ;

DDH 3 (HBED) intersected 24.9 m of graphitic schist with trace pyrite;

DDH 1 Pot intersected two layers, 4.8 m and 5.7 m, of graphitic schist with trace pyrite;

AREA: Limestone Narrows, Athapapuskow Lake

AIRPHOTO: A26062-173

DDH 2 Pot intersected 7.3 m, 15.5 m, 15.0 m and 80.8 m sections of graphitic schist with interlayered 'earthy pyrite' layers;

DDH 3 Pot contained abundant layers of graphitic schist with interlayers of 'earthy pyrite';

DDH Nar10 intersected 2.1 m of graphitic schist with dacite fragments and 15.5 m of dacite .

DDH Nar9 intersected a 2.1 m graphitic zone with minor pyrite;

DDH 9 (HBED) intersected 46 cm of graphitic schist and approximately 91.4 m of sheared and sericitic dacite;

DDH 10 (HBED) intersected 21.3 m of graphitic schist and approximately 91.4 m of rhyolite with several intersections of graphite schist, 0.3 to 3 m in length; and,

DDH 13 (HBED) core consisted of a mixture of graphitic schist and dacite.

GEOCHEMICAL DATA:

Three drill core samples from DDH Nar9 and Nar10 contained only trace amounts of Cu, Zn, Ag and Au (A.F. 92586).

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. The sulphide facies iron formations are graphite-bearing. In addition, graphite-bearing strata with trace to moderate amounts of pyrite are common.

REFERENCES:

Assessment Files: 90353 90354, 90351, 92586

Manitoba Energy and Mines, Mines Branch.

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

Syme, E.C.

1987: Athapapuskow Lake project; In Manitoba Energy and Mines, Minerals Division, Report of Field Activities, 1987, p. 30-40.

Syme, E.C.

1988a: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

Syme, E.C.

1988b: Athapapuskow Lake project; In Manitoba Energy and Mines, Minerals Division, Report of Field Activities, 1988, p. 20-34.

LOCATION: 47

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6051403N/328955E

ACCESS: Via boat on Athapapuskow Lake

EXPLORATION SUMMARY:

In 1952 HBED completed an EM survey on the Joy claims and defined anomalous zones that extend intermittently for 3 km northeast of Limestone Narrows (A.F. 90353). In 1953 the conductors were tested with DDH 11, 12, 14 and 15 totalling 437.1 m (A.F. 90354). In 1958, Stanmac Ltd. drilled a 103 m hole (DDH M4) on claim Mill 22 (A.F. 90355). Granges Exploration AB drilled 8 holes (520 m) on CB 7754 and CB 7763 in 1979, and 3 holes (183 m) on CB 7764 in 1982 (A.F. 92585, 92586, 92592).

GEOLOGICAL SETTING:

The Payuk Lake Fault separates pillowed basalt to the southeast from the Limestone Narrows layered complex to the northwest. Along the northwest shoreline of Athapapuskow Lake the layered complex consists dominantly of gabbro and leucogabbro. Ordovician limestone and sandstone underlie parts of the area west of Limestone Narrows (Fig. 46-1; Syme, 1988a).

Graphitic argillite, dacite and rhyolite were the dominant rock types intersected by the drill holes. DDH Nar17, Nar5, Nar6, Nar19, Nar1, Nar2, Nar3 intersected abundant dacitic, rhyodacitic, and rhyolitic rocks. Rock exposures in this area consist of brown weathering basaltic tuff, buff weathered pillowed flows (the Millwater basalt) and mafic volcanoclastic rocks that range from mudstone-siltstone-greywacke to heterolithic breccia that contains <2 cm rounded, subangular to angular fragments (Syme, 1987). The Millwater basaltic rocks are chemically different from the island arc type rocks of the Flin Flon area (Bailes and Syme, 1989) in that they resemble oceanic rift basalts (Syme, 1988b).

MINERALIZATION:

DDH M4 intersected trace pyrite in minor graphitic schist; sericitic and talcose schists in the felsic rocks in this core are probably related to shears. A 3.3 m intersection with 50% quartz and a 2.1 m length of white quartz vein were also intersected by this drill hole (A.F. 90355). DDH Nar4 intersected 6.3 m of graphitic schist with minor pyrite within dacitic and mafic volcanic rocks.

DDH Nar1 intersected 3.0 m of graphitic schist and 'earthy pyrite' within dacitic rocks. DDH Nar18 intersected 1.8 m and 16.2 m of dacitic to rhyolitic rocks with quartz veinlets that contain trace pyrite. DDH Nar19 intersected short sections of graphitic schist with minor pyrite.

AREA: Northeast of Limestone Narrows, Athapapuskow Lake (Fig. 46-1)

AIRPHOTO: A26328-186, -188

Graphitic argillite was noted in DDH Nar3, Nar18 and Nar6. Breccia was recorded in DDH Nar2 and Nar4;

In DDH Nar2, a 3 m long core intersection contained stringers of pyrite. 'Earthy pyrite' layers were noted in a 3 m intersection of DDH Nar17 (A.F. 92585, 92586, 92592).

DDH 11, 12, 14 and 15 intersected graphitic schist layers and minor pyrite within dacitic to rhyolitic rocks. DDH 15 appears to have intersected considerably more graphitic schist than DDH 11, 12 and 14 (A.F. 90354).

GEOCHEMICAL DATA:

Assays of drill core samples from the Nar DDH indicate trace amounts of Cu, Zn, Au and Ag (A.F. 92585, 92586).

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation.

REFERENCES:

Assessment Files: 90353, 90354, 92585, 92586, 92592, 90355; Manitoba Energy and Mines, Mines Branch.

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

Syme, E.C.

1987: Athapapuskow Lake project; in Manitoba Energy and Mines, Minerals Division, Report of Field Activities, 1987, p. 30-40.

Syme, E.C.

1988a: Millwater (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-4, 1:15 840.

Syme, E.C.

1988b: Athapapuskow Lake project; in Manitoba Energy and Mines, Minerals Division, Report of Field Activities, 1988, p. 20-34.

LOCATION: 48**NAME:** (A.F. - Mineralization intersected in drill core)**UTM:** 6052527N/330056E**ACCESS:** Via boat on Athapapuskow Lake**EXPLORATION SUMMARY:**

Stanmac Ltd. drilled three holes totalling 364.8 m in 1940 (A.F. 90355). An EM survey of the Joy claims by HBED in 1952 covered parts of the area of Figure 46-1 (A.F. 90353).

GEOLOGICAL SETTING:

The Payuk Lake Fault separates pillowed basalt to the southeast from the Limestone Narrows layered complex to the northwest. Along the northwest shoreline of Athapapuskow Lake the layered complex consists dominantly of gabbro and leucogabbro (Fig. 46-1; Syme, 1988a).

Rock exposures in this area consist of buff-brown weathering basaltic tuff, buff weathered pillowed flows (the Millwater basalt) and a mafic volcanoclastic rock that ranges from mudstone-siltstone-greywacke to heterolithic breccia that contains <2 cm rounded, sub-angular to angular fragments (Syme, 1987). The Millwater basaltic rocks are chemically different than the island arc type rocks of the Flin Flon area (Bailes and Syme, 1989) in that they resemble oceanic rift basalts (Syme, 1988b).

Graphitic argillite, dacite and rhyolite were the dominant rock types intersected in the drill holes. Dacitic to rhyodacitic rocks were noted in DDH M2 and M3 drill logs; graphitic schist (argillite?) was noted in the drill logs for DDH M1 and M3 (A.F. 90355).

MINERALIZATION:

DDH M3 intersected 15 cm of solid pyrite associated with 45 cm of graphitic schist (A.F. 90355).

AREA: Northeast of Limestone Narrows, Athapapuskow Lake (Fig. 46-1)**AIRPHOTO:** A26328-185**GEOCHEMICAL DATA:**

None.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation.

REFERENCES:

- Assessment Files: 90353, 90355, 92592
Manitoba Energy and Mines, Mines Branch.
- Bailes, A.H. and Syme, E.C.
1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.
- Bailes, A.H. and Syme, E.C.
1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.
- Syme, E.C.
1987: Athapapuskow Lake project; In Manitoba Energy and Mines, Minerals Division, Report of Field Activities, 1987, p. 30-40.
- Syme, E.C.
1988a: Millwater (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-4. 1:15840
- Syme, E.C.
1988b: Athapapuskow Lake project; In Manitoba Energy and Mines, Minerals Division, Report of Field Activities, 1988, p. 20-34.

LOCATION: 49

NAME:

UTM: 6047961N/318028

ACCESS: Via boat on Athapapuskow Lake

AREA: West arm of Athapapuskow Lake

AIRPHOTO: A26062-246

EXPLORATION SUMMARY:

Falconbridge Nickel Mines Ltd. completed a magnetometer survey in 1971 and a geological map in 1974 on CB 3495-3497 and CB 3510-3511 (A.F. 91385, 91583).

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Disseminated mineralization - not classified.

GEOLOGICAL SETTING:

The south shore of the west arm of Athapapuskow Lake is underlain by a rhyolite dyke complex that is intruded by fine grained mafic dykes, fine- to medium-grained diabase, and granodiorite. Ordovician limestone crops out south of the mineral occurrence (Fig. 49-1; Syme, 1988).

REFERENCES:

Assessment Files: 91385, 91583

Manitoba Energy and Mines, Mines Branch.

Syme, E.C.

1988: West Arm (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-3, 1:1:15 840.

MINERALIZATION:

Trace pyrite and carbonate are present in the host rocks (A.F. 91583). Nonmineralized quartz veins range from a few centimetres to 28 cm in width.

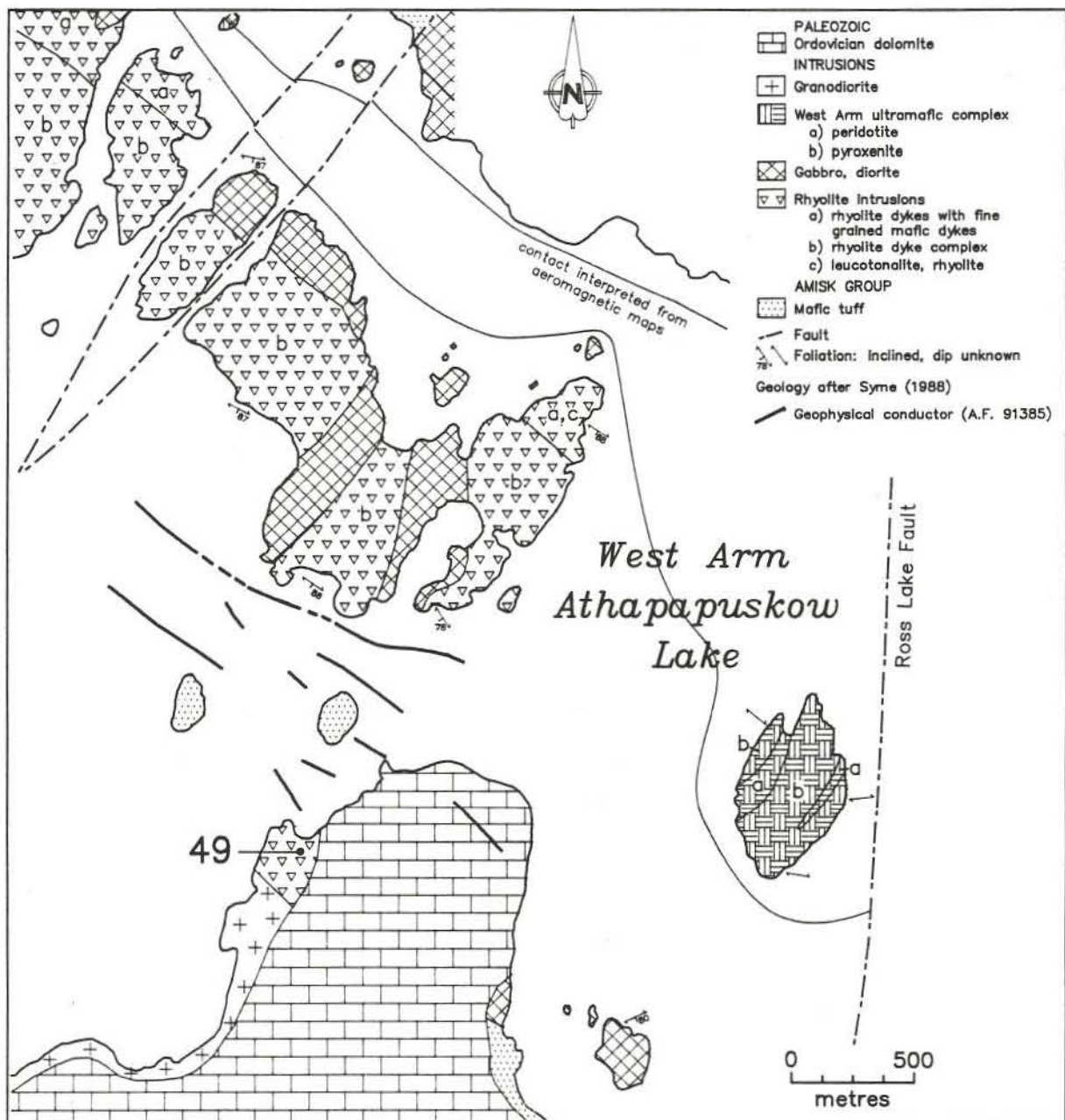


Figure 49-1: Geological setting of occurrence 49.

LOCATION: 50

NAME:

UTM: 6056513N/320633E

ACCESS: Via boat on Schist Lake

EXPLORATION SUMMARY:

In 1948, International Mining Co. completed a geological mapping project on the Tiny and L.F. groups (A.F. 90385). Cyprus Exploration completed DDH 1 (82 m) on claim Tiny 4 in 1955 (A.F. 90382).

GEOLOGICAL SETTING:

The area is underlain by aphyric to porphyritic basalt and basaltic andesite (Fig. 50-1; Syme, 1988). Detailed mapping (1:6500) by International Mining Co. indicated that the occurrence is underlain by highly altered andesitic flows and fragmental rocks. Altered diorite occurs immediately west of the occurrence (Fig. 50-2; A.F. 90385).

MINERALIZATION:

30 to 40% pyrite occurs as distinct sulphide bands in quartz veins, in oxidized and silicified andesite. The quartz veins cannot be traced more than a few metres

AREA: South Schist Lake, near Schist Creek

AIRPHOTO: A26397-262

on the surface. DDH 1 intersected 1.5 m of banded pyrite in 'rusty residual country rock' that contained 10% pyrite (A.F. 90382).

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Vein type deposit; multiple veins or lenses.

REFERENCES:

Assessment Files: 90382, 90385

Manitoba Energy and Mines, Mines Branch.

Syme, E.C.

1988: Schist Lake (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-1, 1:15 840.

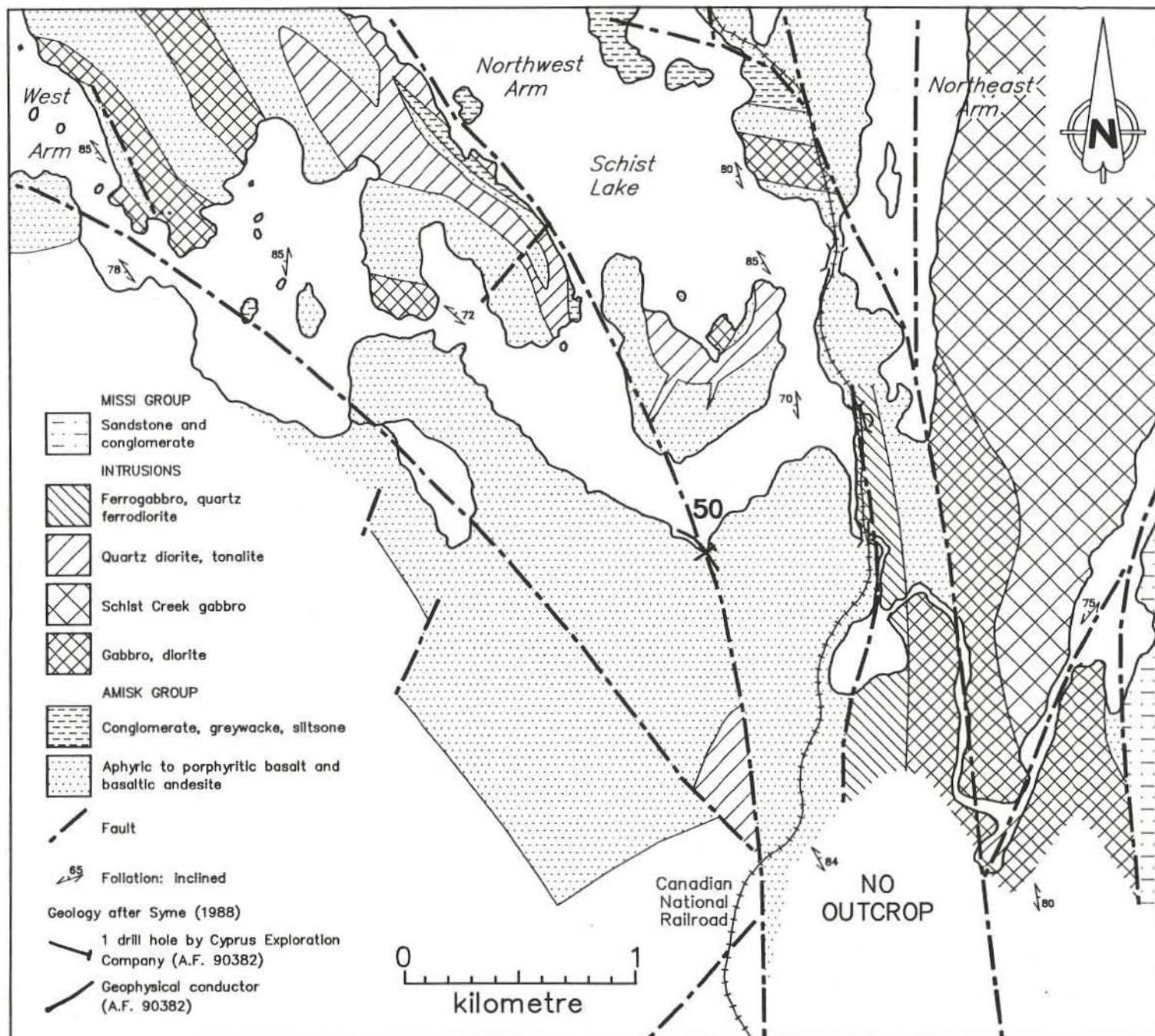


Figure 50-1: Geological setting of occurrence 50.

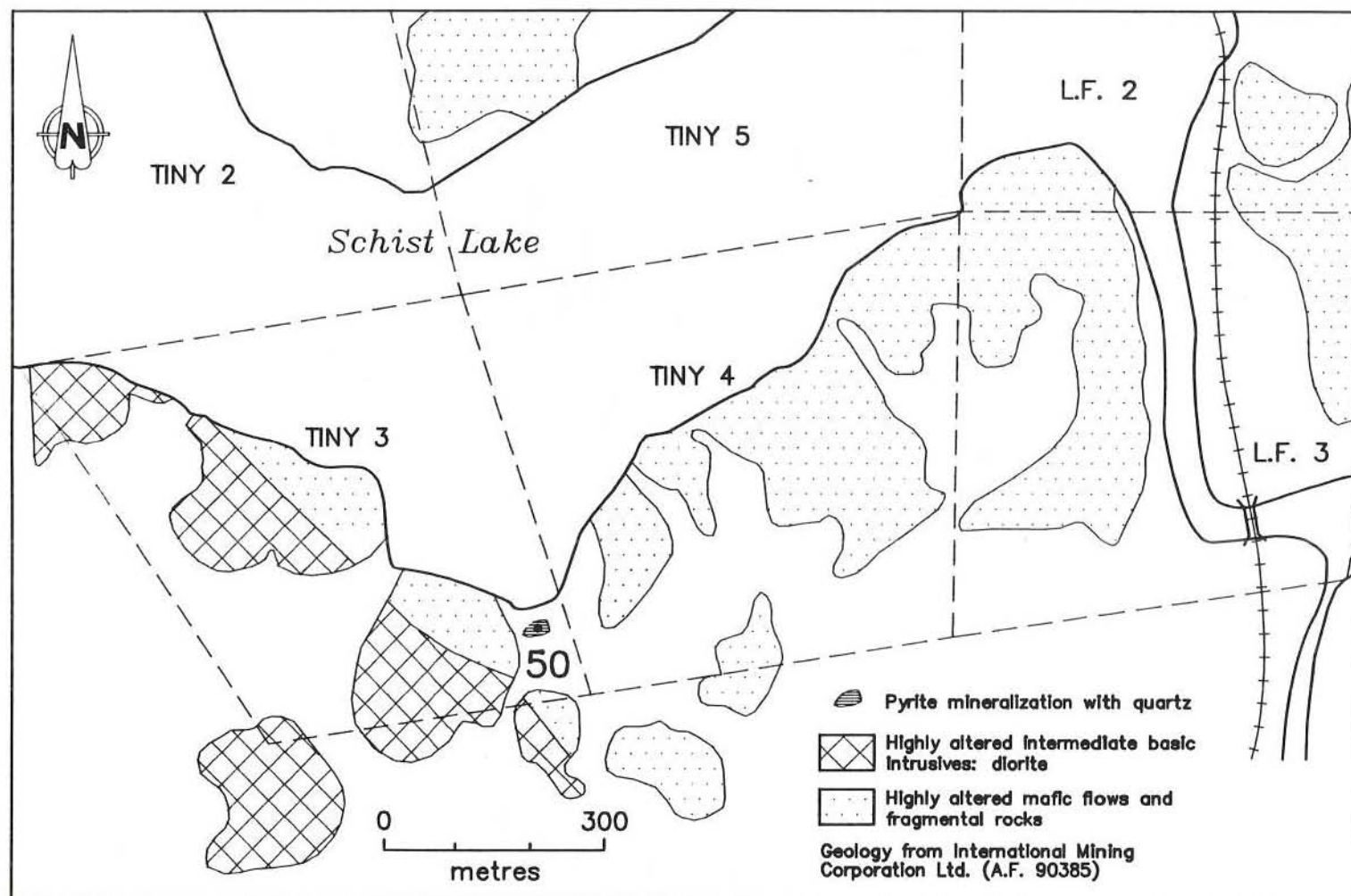


Figure 50-2: Detailed geology at occurrence 50.

LOCATION: 51

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6052706N/318296E

ACCESS: Via boat on Athapapuskow Lake and traverse

AREA: North of west arm of Athapapuskow Lake

AIRPHOTO: A26397-239

EXPLORATION SUMMARY:

J. Pallanik staked claim Sam 7 in 1954 and conducted some surface work (M.I. Card NTS 63K/12 Cu15). In 1964, A. Olesen staked Ant 25 Fr. and assigned it to HBED, who completed an EM survey and drilled 13 holes totalling 1 190 m in 1965 (A.F. 92085). CB 5348 was staked by H. Guymer in 1973 and HBED completed an HLEM survey in 1976 (M.I. Card NTS 63K/12 Cu15).

GEOLOGICAL SETTING:

The area is underlain by mafic tuff and aphyric basalt flows that have been intruded by small plugs of melanocratic gabbro and minor diabase dykes (Fig 51-1; Syme, 1988). The drill holes intersected narrow sections of dacitic and rhyolitic rocks.

MINERALIZATION:

DDH Ant 9 (Fig. 51-1) intersected 1.5 m of near solid sulphide in a 32 m long sulphide-bearing section that contained up to 35% pyrrhotite, 15% pyrite, minor chalcopyrite and sphalerite, and trace galena. DDH Ant 5 and -8 intersected up to 30 cm of 30% pyrrhotite, minor pyrite, chalcopyrite and sphalerite and trace galena. DDH Ant 6 and -7 intersected up to 35% pyrrhotite and trace to minor chalcopyrite. Trace amounts of graphite were noted in DDH 8 (A.F. 92085).

DDH M1 through M8 (Fig. 51-1) intersected variable amounts, generally less than 50%, of pyrrhotite

and pyrite. In DDH M4, a 2.4 m intersection of partly silicified andesite contained 35% pyrite and 40% pyrrhotite. Trace amounts of graphite occurred in DDH M1, M3, M5, M6, M7 and M8 (A.F. 92085).

GEOCHEMICAL DATA:

In DDH Ant 7, a 3.4 m drill core sample of 0 to 35% pyrrhotite, minor pyrite and chalcopyrite contained 0.78% Cu (A.F. 92085).

CLASSIFICATION:

Stratabound massive sulphide type deposit; volcanic rock associated. It is possible that the mineralization intersected represents the distal portion of a massive sulphide type deposit. Mineralization intersected in DDH M1 through M8 is probably a chemical sediment type deposit; sulphide facies iron formation.

REFERENCES:

Assessment File: 92085

Manitoba Energy and Mines, Mines Branch.

Mineral Inventory Card NTS 63K/12 Cu 15

Manitoba Energy and Mines, Geological Services Branch.

Syme, E.C.

1988: Schist Lake (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-1, 1:15 840.

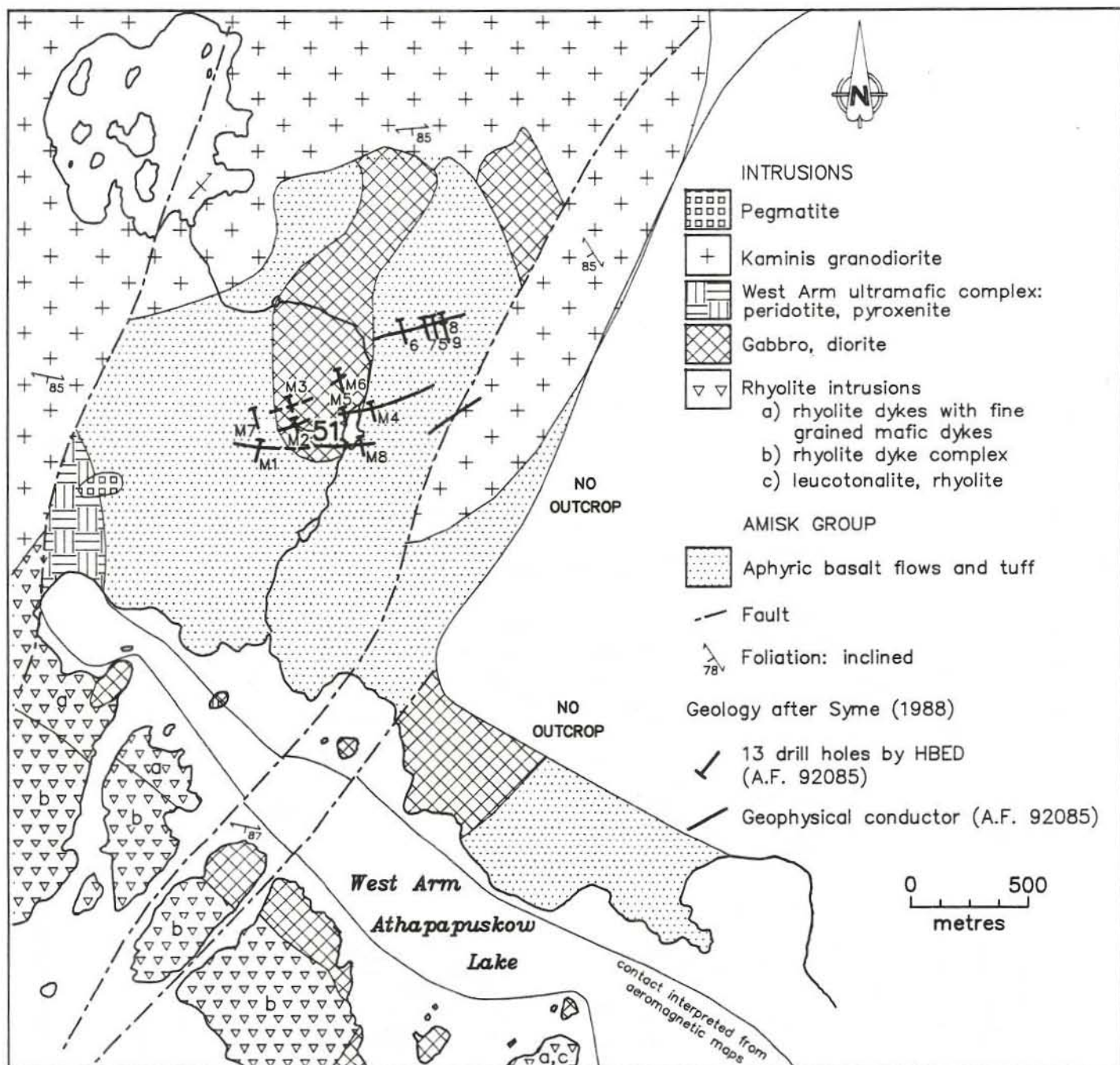


Figure 51-1: Geological setting of occurrence 51.

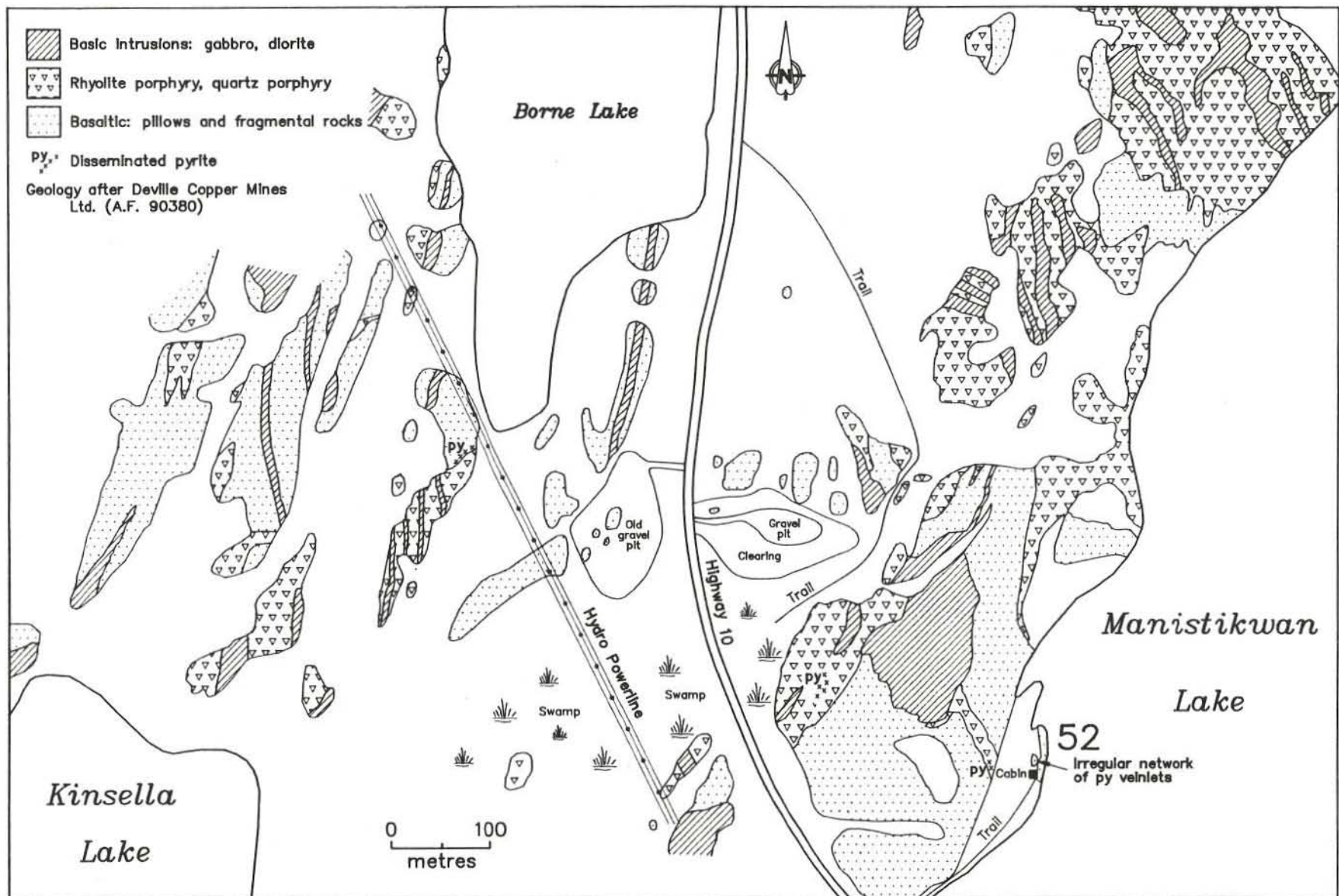


Figure 52-1: Geological setting of occurrence 52.

LOCATION: 52

NAME:

UTM: 6065428N/321540E

ACCESS: Via Provincial Road 10

AREA: South end of Manistikwan Lake

AIRPHOTO: A26364-177, -178

EXPLORATION SUMMARY:

In 1950, Le Pas-Flin Flon Mines completed magnetometer and geological surveys on the Cu claims. De-Ville Copper Mines prepared a geological map of the Now claim group in 1957 (A.F. 90380).

GEOCHEMICAL DATA:

None.

GEOLOGICAL SETTING:

The area is underlain predominantly by basaltic pillowed flows and pyroclastic rocks, gabbroic to dioritic intrusions and rhyolitic intrusions (Fig. 52-1).

CLASSIFICATION:

Vein type deposit; multiple veins or lenses.

MINERALIZATION:

A fine grained, massive rhyolitic rock exposed along the shoreline of Manistikwan Lake contains an irregular network of pyrite veinlets over an area of 20 x 30 m. This small rhyolitic body is probably related to other sulphide-bearing rhyolitic intrusions northeast of Kinsella Lake (Fig. 52-1).

REFERENCES:

Assessment Files: 90374,90380

Manitoba Energy and Mines, Mines Branch.

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

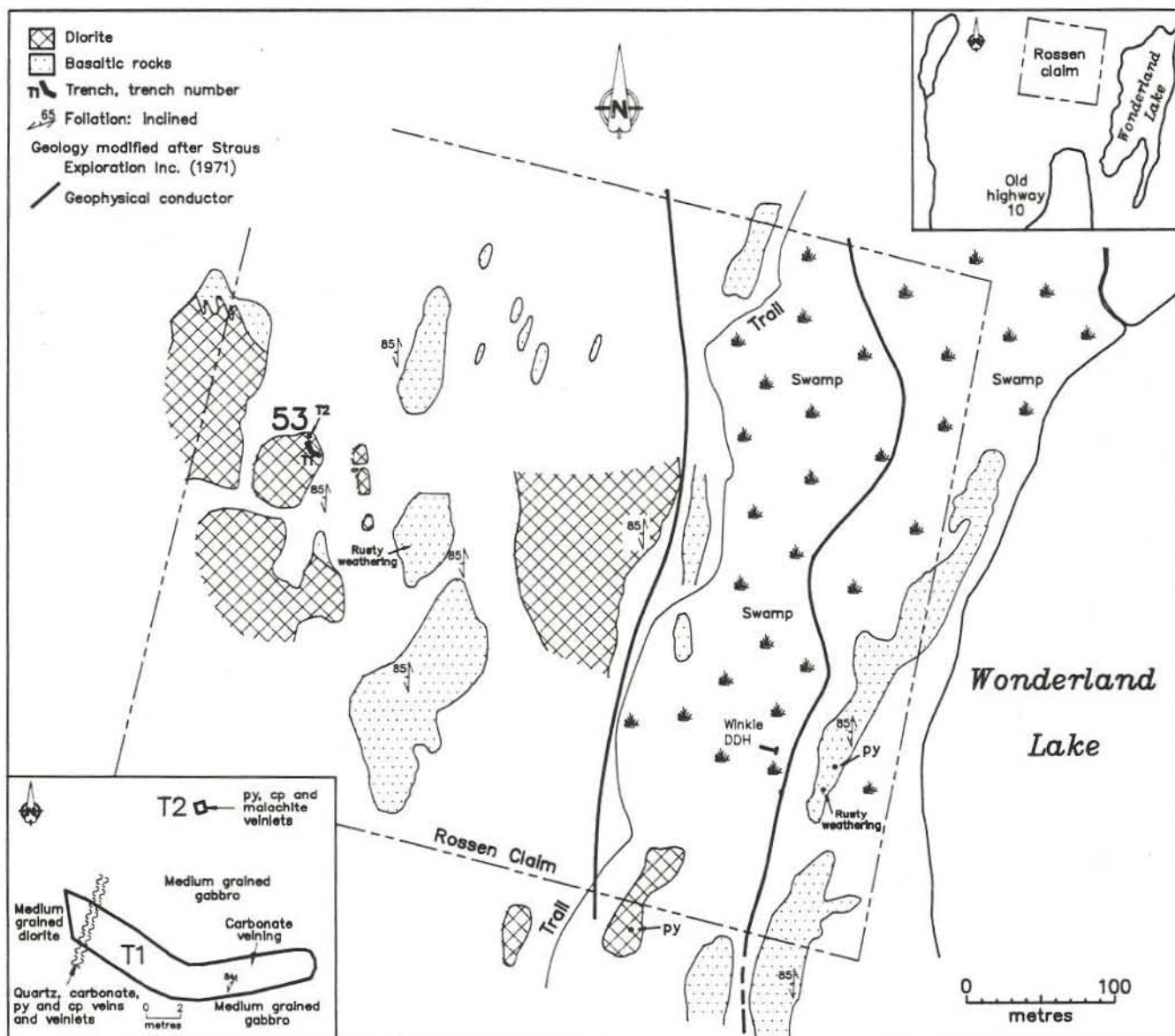


Figure 53-1: Geological setting of occurrence 53.

LOCATION: 53

NAME: Rossen

UTM: 6068006N/323919E

ACCESS: Via Provincial Road 10A

AREA: Wonderland Lake

AIRPHOTO: A26397-148

EXPLORATION SUMMARY:

Straus Exploration Inc. conducted geological and ground EM surveys in 1971 and tested the strongest EM anomaly with a Winkie drill. A partly overgrown trench, 1.5 x 8 x 15 m, was located in 1976.

GEOLOGICAL SETTING:

The area is underlain predominantly by Bear Lake basaltic andesite aphyric flows that have been intruded by a small plug of medium grained gabbroic/dioritic rocks (Fig. 53-1; Bailes and Syme, 1989).

MINERALIZATION:

Minor amounts of chalcopyrite and malachite occur at the west end of the trench in a 1 to 2 m wide shear zone that developed at the sheared/faulted margin of the dioritic intrusion. Several small zones of rusty weathered rock contain trace amounts of pyrite (Fig. 53-1). Chalcopyrite occurs as veins and veinlets in chlorite schist and appears to be late fracture fillings within the zones of deformation.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Vein type deposit; multiple veins or lenses. This mineralization is interpreted to represent mobilization of sulphide minerals into a zone of deformation at the contact between a dioritic intrusion and mafic volcanic rocks.

REFERENCES:

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

Straus Exploration Inc.

1971: Geological map of the Rossan claim, 1:1 200 scale (unpublished map, provided by A.L. Parres, Flin Flon).

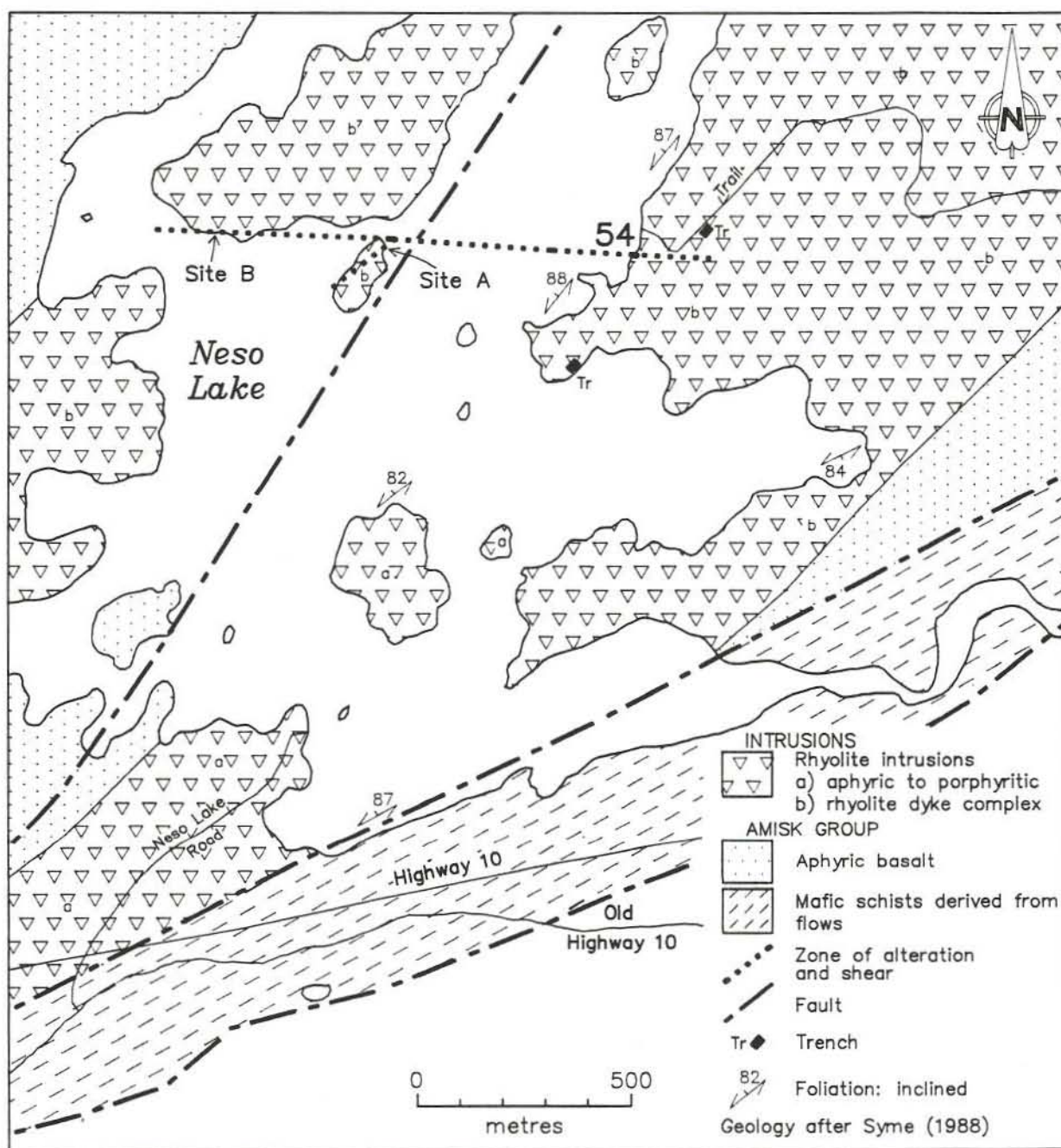


Figure 54-1: Geological setting of occurrence 54.

LOCATION: 54**NAME:**

UTM: 6060522N/336533E

ACCESS: Via Highway 10 to Neso Lake and boat

AREA: East shore of Neso Lake

AIRPHOTO: A26398-89

EXPLORATION SUMMARY:

Several trenches had been completed on a quartz vein when the property was evaluated by Dawson (1932). The Thompson's drilled two holes totalling 40 m on claim Key 9 in 1962 (A.F. 91589). A trench was bulldozed on the mineralized zone in 1975 (P. Bachnick, pers. comm. 1989). Twelve trenches were located on the east shoreline in 1984.

GEOLOGICAL SETTING:

The area is underlain by a rhyolite dyke complex (Fig. 54-1; Syme 1988). The drill holes intersected abundant 'andesite' with siliceous and chloritic sections (A.F. 91509). The immediate vicinity of the occurrence is underlain by minor intermediate volcanic rocks that are intercalated with a thick sequence of massive rhyodacitic rocks (Parbery, 1986). He considered the felsic rocks to consist of dacitic tuff, vesicular quartz-and plagioclase-phyric flows, massive flows and lithic tuff and the intermediate rocks to consist dominantly of crystal tuff(?) and minor fragmental and massive rocks. A quartz vein is hosted by aphanitic to very fine grained, grey-green weathered, massive, mafic to intermediate rock.

MINERALIZATION:

A quartz-carbonate vein, 0.3 to 0.5 m wide, has a strike length of at least 70 m with an attitude of 285°/70°N (Fig. 54-2). The vein, which has sharply defined contacts, locally contains 1 to 3 cm yellow-brown Fe-carbonate pods and veinlets that parallel the strike of the vein. Minor pyrite and chalcopyrite are present in the quartz-carbonate vein and the host rocks. Free gold was reported from this vein (P. Bachnick, pers. comm., 1986).

A 2 m wide silicified zone with fuchsite-bearing fragments and crosscutting quartz-carbonate veins

occur in a zone of intense foliation/shear at site A. At site B a 0.3 m wide zone of intensely sheared rock with fuchsite cuts a light green rock with 5%, 0.5 mm plagioclase phenocrysts in an aphanitic matrix. Rocks adjacent to this shear are silicified and veined by Fe-carbonate. These two zones of silicification and carbonatization are probably a continuation of the quartz-carbonate vein (Parbery, 1986).

GEOCHEMICAL DATA:

Analyzed channel samples of the mineralized quartz vein contained up to 34.29 g/t Au; grab samples assayed 68.57 g/t and 205.71 g/t Au (Dawson, 1932).

CLASSIFICATION:

Vein type deposit; single vein.

REFERENCES:

- Assessment File: 91589
Manitoba Energy and Mines, Mines Branch.
- Dawson, A.S.
1932: 1:6000 scale plan of the Neso and Dixie claims; unpublished, provided by A.L. Parres, Flin Flon, Manitoba
- Parbery, D.
1986: Mineral occurrence studies - Flin Flon area; in Manitoba Energy and Mines, Minerals Division, Report of Field Activities, 1986, p. 49-55.
- Syme, E.C.
1988: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

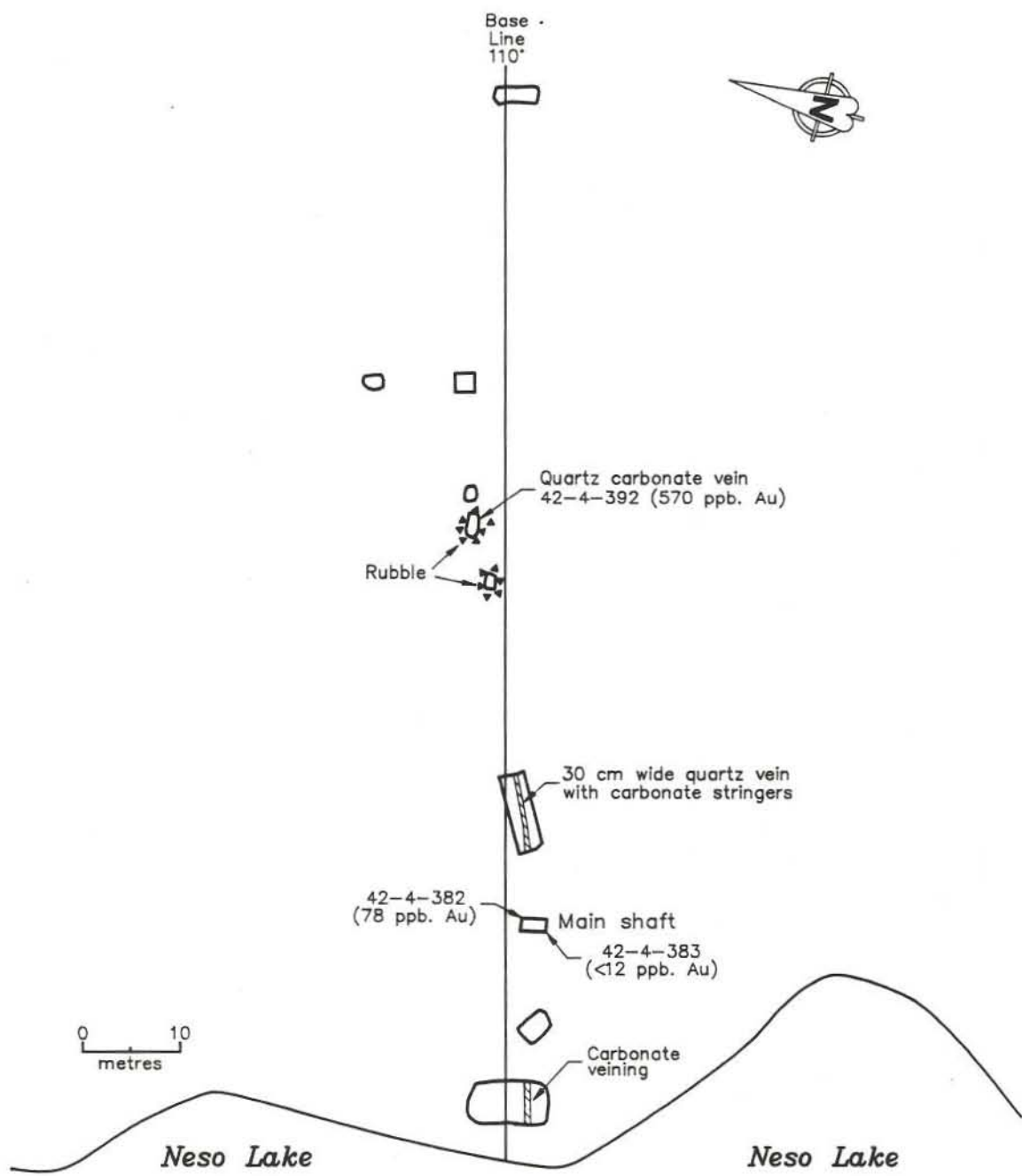


Figure 54-2: Trench and sample locations at occurrence 54.

LOCATION: 55

NAME:

UTM: 6064876N/333744E

ACCESS: Via Kississing Lake Road and old logging trail that starts at a gravel quarry north of Cleaver Lake

EXPLORATION SUMMARY:

HBED completed an EM survey on the A and Amber claims in 1951 (A.F. 90316). CB 5692 was staked in 1972 by S. and P. Bachnick. Falconbridge optioned the property and completed ground EM and magnetic surveys and geological mapping, and sampled several trenches (A.F. 92688). Granges Exploration AB drilled two holes (127 m) to test EM anomalies in 1979 (A.F. 92379; *N.B.* these holes are not accurately located on Fig. 55-1).

GEOLOGICAL SETTING:

The area is underlain by intermediate (basaltic?) volcanic flows that are locally siliceous and have epidote and chlorite alteration. The flows are intruded by fine grained mafic dykes and sills and gabbro (Fig. 55-1). DDH SL-8 intersected dacite, quartz porphyry and andesite (A.F. 92379).

MINERALIZATION:

On the east side of an old logging road, two old trenches expose minor pyrite and some disseminated chalcopyrite in siliceous intermediate volcanic rocks. On the adjacent outcrop to the north, a 3.5 m thick pyritic shear zone contains boudinaged quartz veins. The fractured, grey, siliceous volcanic host rocks contain blebs of chalcopyrite (Fig. 55-2). One hundred metres to the northwest on the west side of the trail, a siliceous pyritic zone and two quartz veins with pyritic walls occur in siliceous intermediate volcanic rocks with chloritic zones and rusty weathered areas (Fig. 55-3). DDH SL-9 intersected 1 m of near solid fine grained pyrrhotite with

AREA: West of the south bay of Cleaver Lake

AIRPHOTO: A26398-69

minor pyrite and sparse chalcopyrite in a 7 m wide zone of chloritic andesite with 5 to 15% pyrite and pyrrhotite and a 1.5 m zone of near solid pyrrhotite with minor chalcopyrite. DDH SL-8 intersected a 3 m section of 60% pyrrhotite with minor pyrite, chalcopyrite and sphalerite, 2.2 m of 40% pyrrhotite with minor chalcopyrite and sphalerite, a 30 cm section of 75% pyrrhotite and a 1.5 m section with 50% pyrrhotite (A.F. 92379).

GEOCHEMICAL DATA:

The locations of several surface samples analyzed by Falconbridge are shown on Figure 55-3. Drill core assays averaged 0.05 g/t Au, 0.5 g/t Ag, 0.07% Cu and 0.12% Zn, with maximum values of 0.31% Cu over 61 cm and 0.36% Zn over 1 m (A.F. 92379).

CLASSIFICATION:

Stratabound massive sulphide type deposit; volcanic rock associated.

REFERENCES:

- Assessment Files: 90316, 92688, 92379
Manitoba Energy and Mines, Mines Branch.
- Buckham, A.F.
1942: Athapapuskow Lake, Manitoba: preliminary map; Geological Survey of Canada, Paper 42-16, 1:31 680.
- Buckham, A.F.
1944: Athapapuskow Lake, Manitoba; Geological Survey of Canada, Map 807A, 1:63 360.

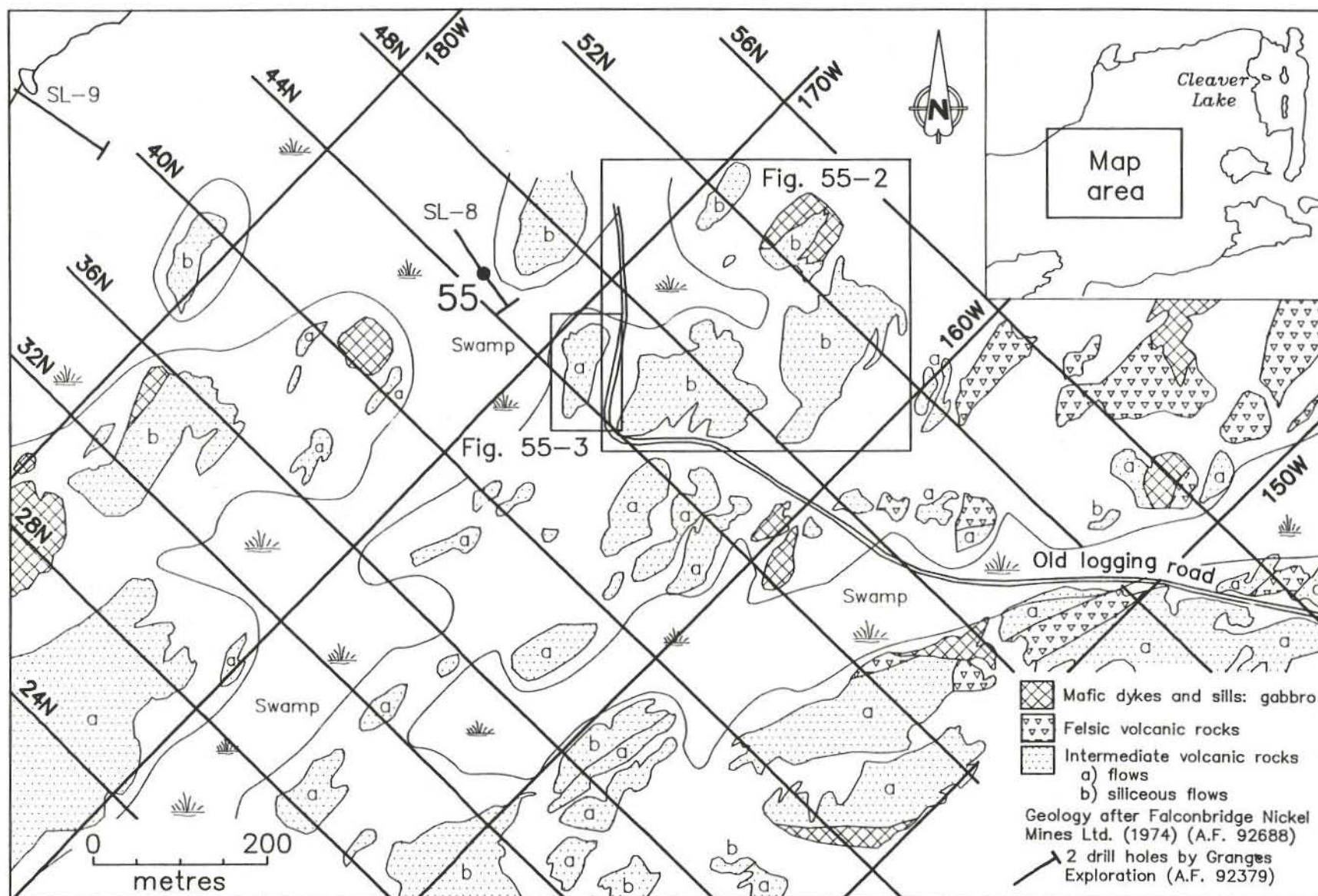


Figure 55-1: Geological setting of occurrence 55.

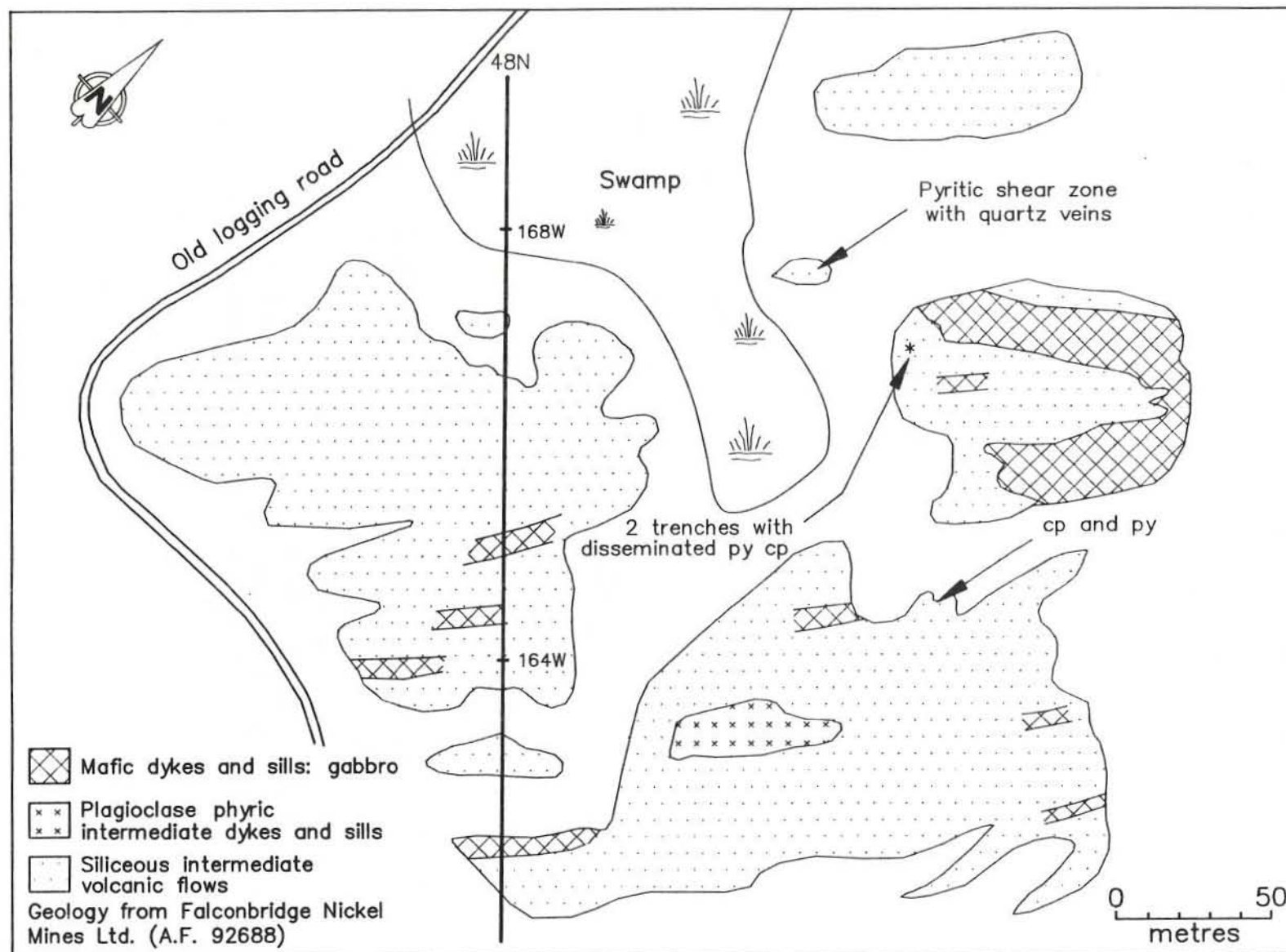


Figure 55-2: Detailed geology of occurrence 55.

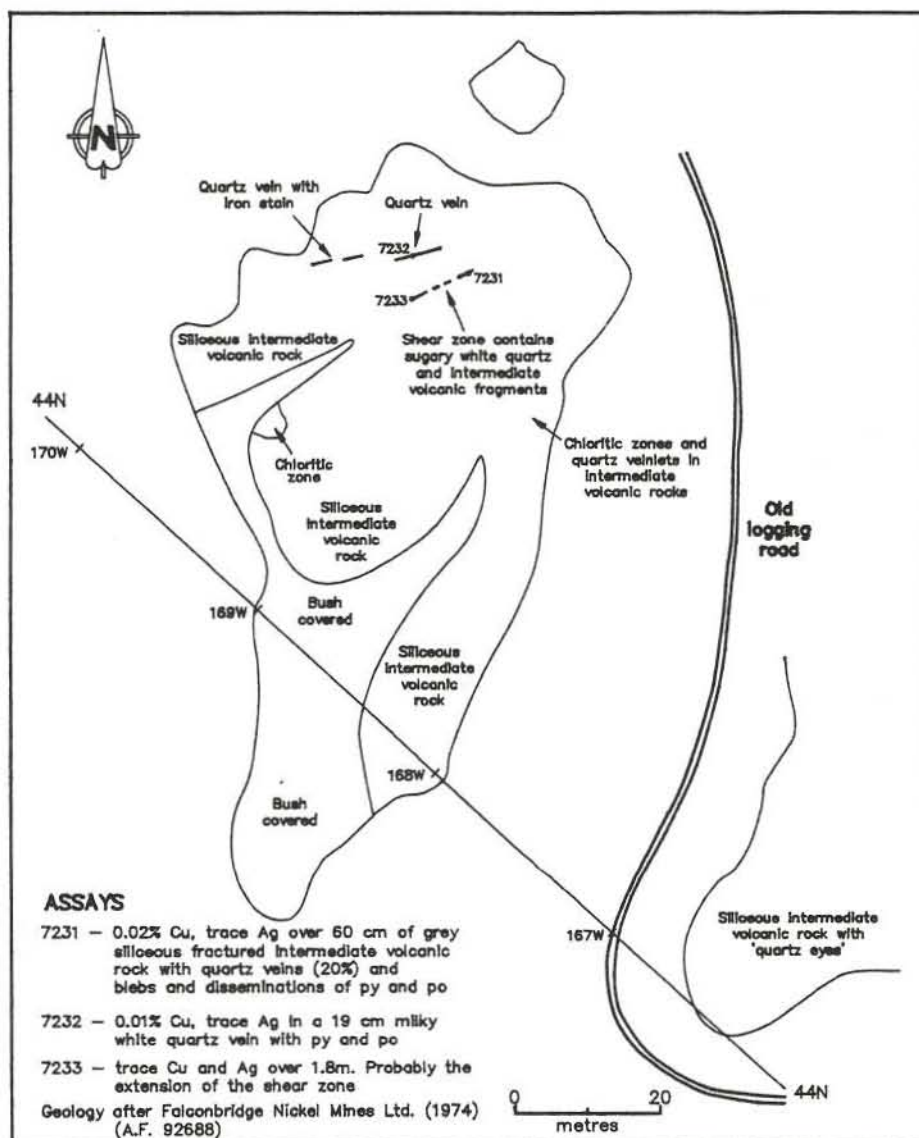


Figure 55-3: Detailed geology and sample locations at occurrence 55.

LOCATION: 56

NAME:

UTM: 6064025N/336750E

ACCESS: Via canoe on Mistik Creek, or by trail from the Kississing Lake road near Cleaver Lake

EXPLORATION SUMMARY:

Several trenches were blasted in the area by Mr. Hobson and Mr. Smith prior to 1932. The area was optioned to Falconbridge Nickel Mines, who completed a geological map of the area. P. and S. Bachnick blasted four additional trenches (A.F. 92688).

GEOLOGICAL SETTING:

The area is underlain by intermediate (basaltic?) and felsic volcanic rocks that have been intruded by a large monzonite-granite body (Fig. 56-1; A.F. 92688). A quartz vein at site A occurs less than 10 m from the margin of the large intrusion, but within layered mafic tuffaceous(?) rocks.

MINERALIZATION:

Disseminated and stringer chalcopryite and minor pyrite and pyrrhotite occur in a 12 m wide shear zone approximately 300 m west of Nisto Lake (Fig. 56-2). The zone may be wider, but its north boundary is under a swamp; six trenches were blasted in this area (A.F. 92688).

At site A (Fig. 56-1), a 30 cm thick quartz-magnetite-chlorite vein contains 2 to 3% pyrite and traces of malachite and chalcopryite (Wadien and Gale, 1984). Approximately 5% pyrite occurs within the layered tuffaceous(?) rocks.

GEOCHEMICAL DATA:

Grab samples from the shear zone contained up to 0.96% Cu and 0.12% Zn (Fig. 56-2). A Hg geochemical anomaly was found in the vicinity of the Cu mineralization (A.F. 92688).

AREA: West of Nisto Lake

AIRPHOTO: A26398-91

CLASSIFICATION:

Vein type deposit; multiple veins or lenses.

REFERENCES:

Assessment Files: 92688, 92689

Manitoba Energy and Mines, Mines Branch.

Buckham, A.F.

1942: Athapapuskow Lake, Manitoba: preliminary map; Geological Survey of Canada, Paper 42-16, 1:31 680.

Buckham, A.F.

1944: Athapapuskow Lake, Manitoba; Geological Survey of Canada, Map 807A, 1:63 360.

Wadien, R.S. and Gale, G.H.

1984: Geochemistry of felsic intrusive and extrusive rocks in the Nisto-Lucille Lake areas, Flin Flon, Manitoba; in Manitoba Energy and Mines, Mineral Resources, Report of Field Activities, 1984, p. 67-68.

Syme, E.C.

1988: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

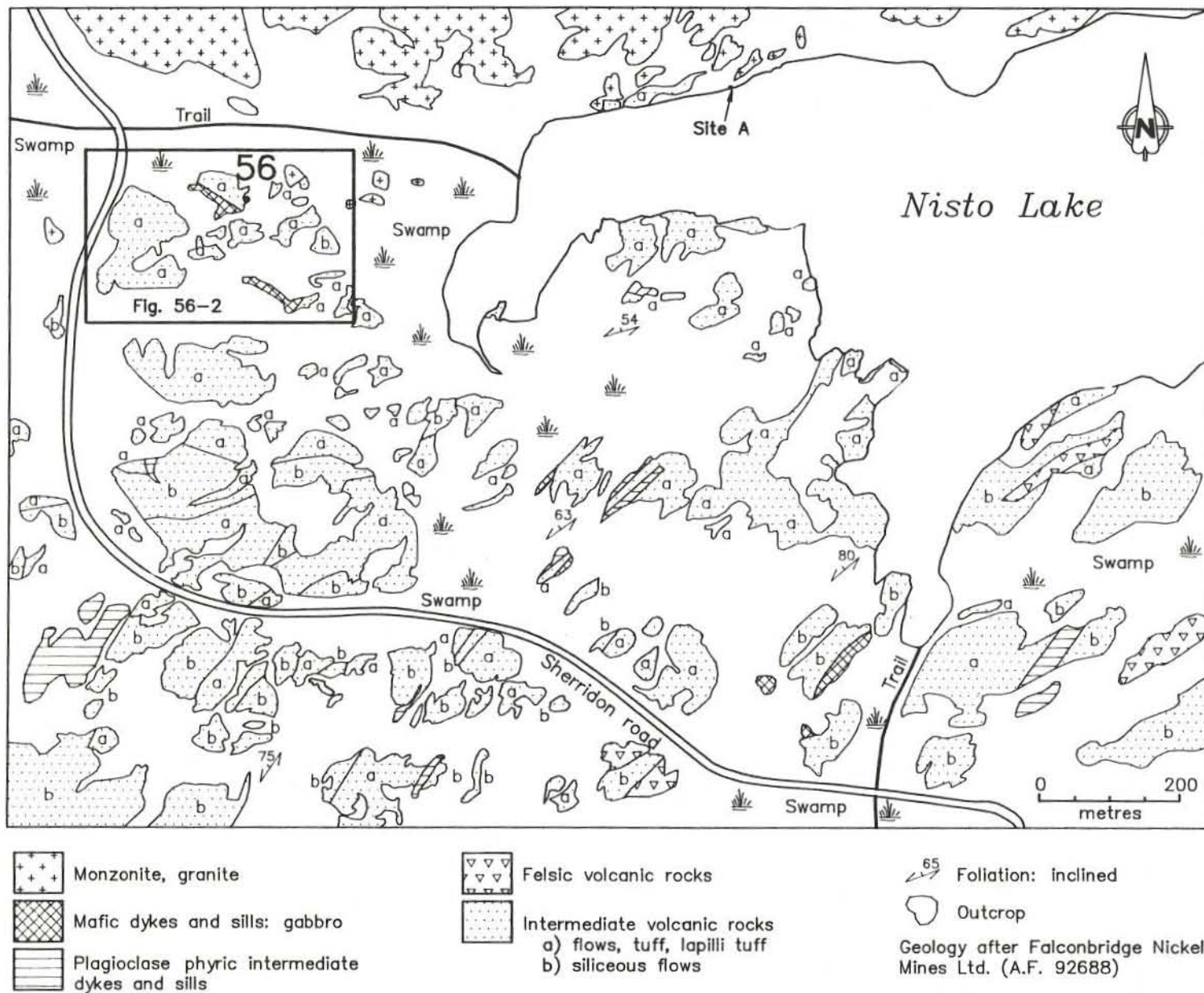
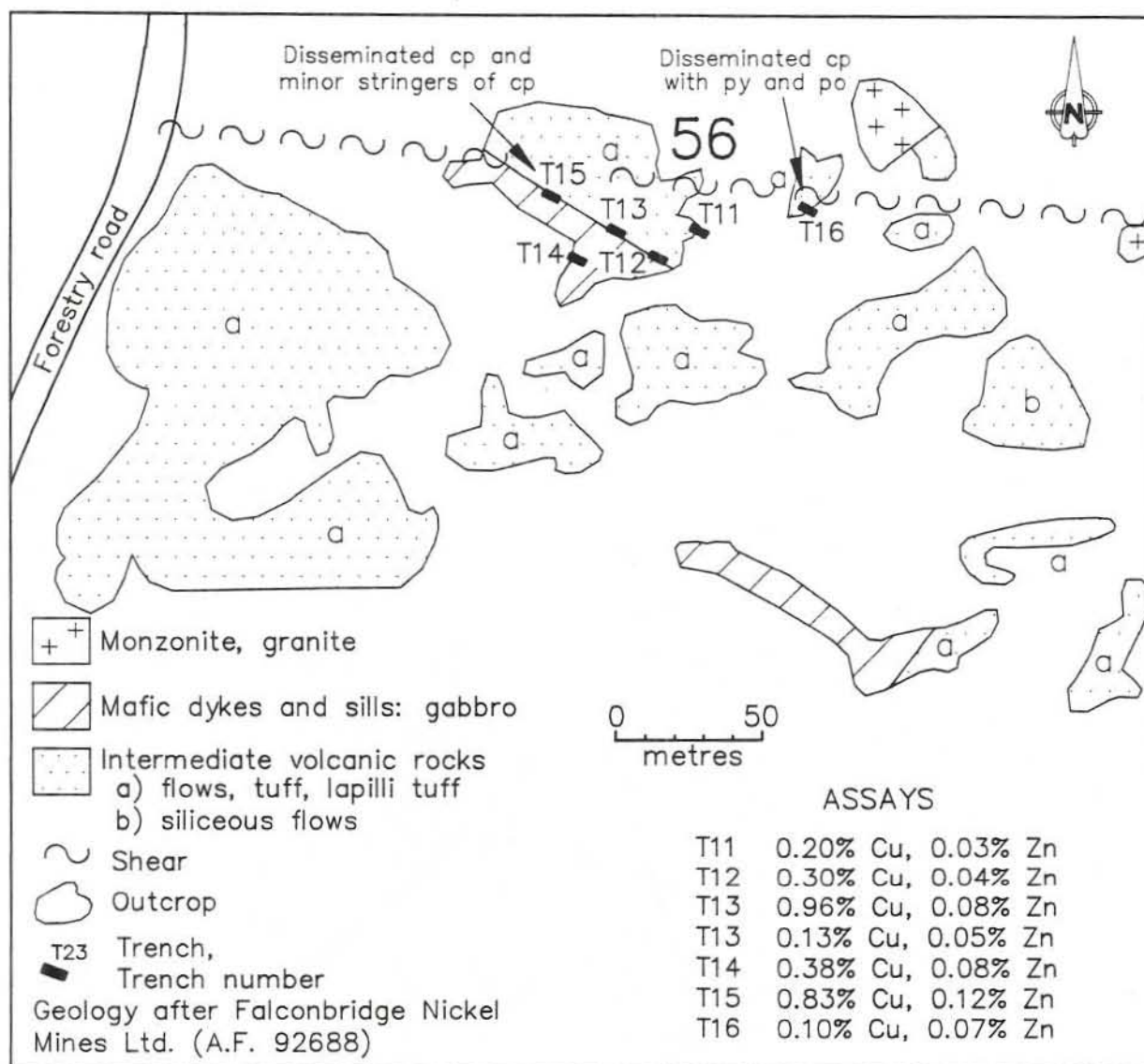


Figure 56-1: Geological setting of occurrence 56.



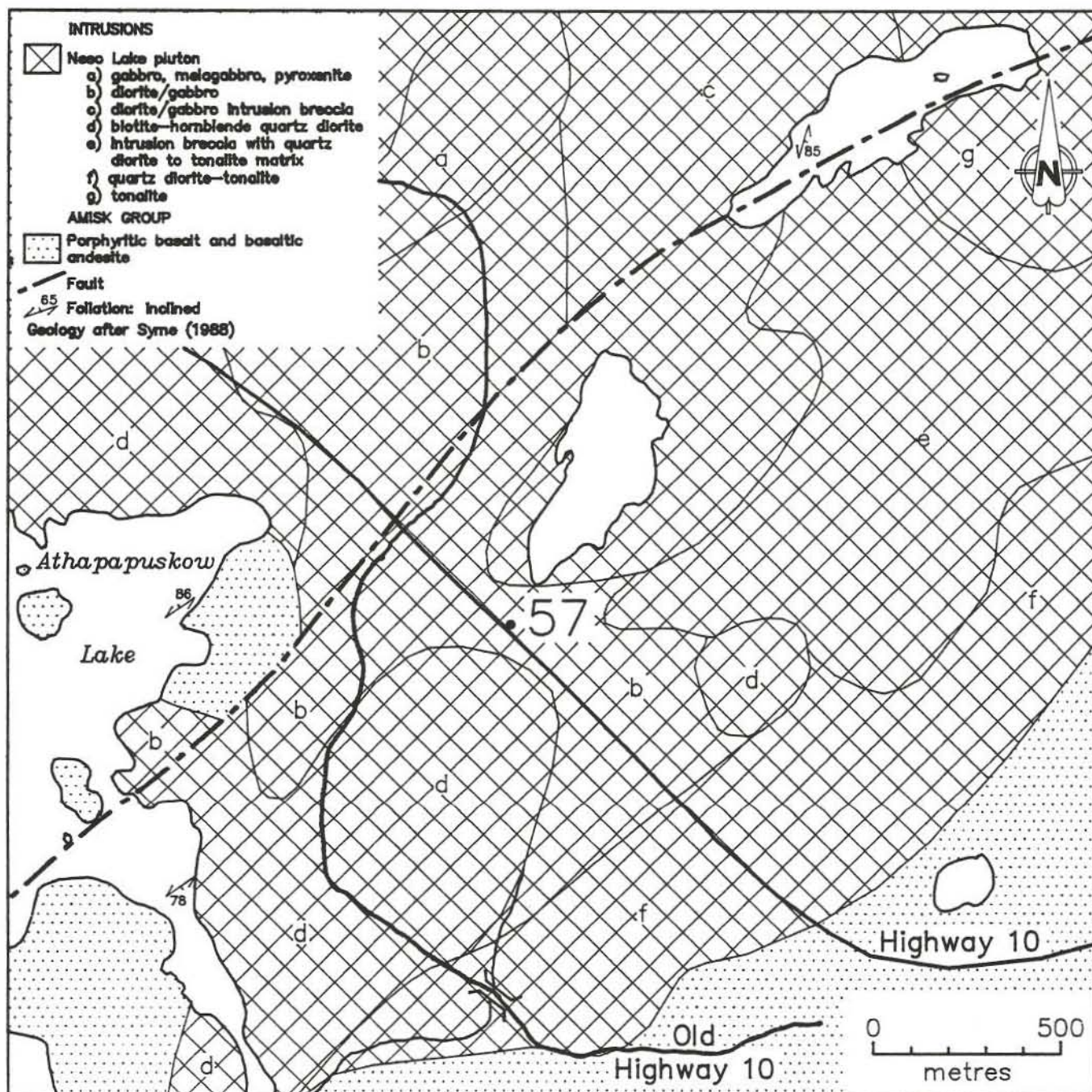


Figure 57-1: Geological setting of occurrence 57.

LOCATION: 57

NAME:

UTM: 6059511N/332587E

ACCESS: Via Highway 10

AREA: West of Neso Lake

AIRPHOTO: A26328-7

EXPLORATION SUMMARY:

Exposure created during construction of Highway 10.

GEOCHEMICAL DATA:

None.

GEOLOGICAL SETTING:

The area is underlain by a medium- to coarse-grained gabbroic intrusion that is part of the Neso Lake Pluton (Fig. 57-1; Syme, 1988).

CLASSIFICATION:

Vein type deposit; single vein.

MINERALIZATION:

A 1 to 2 cm wide quartz vein contains grains and blebs of coarse grained molybdenite.

REFERENCES:

Syme, E.C.

1988: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

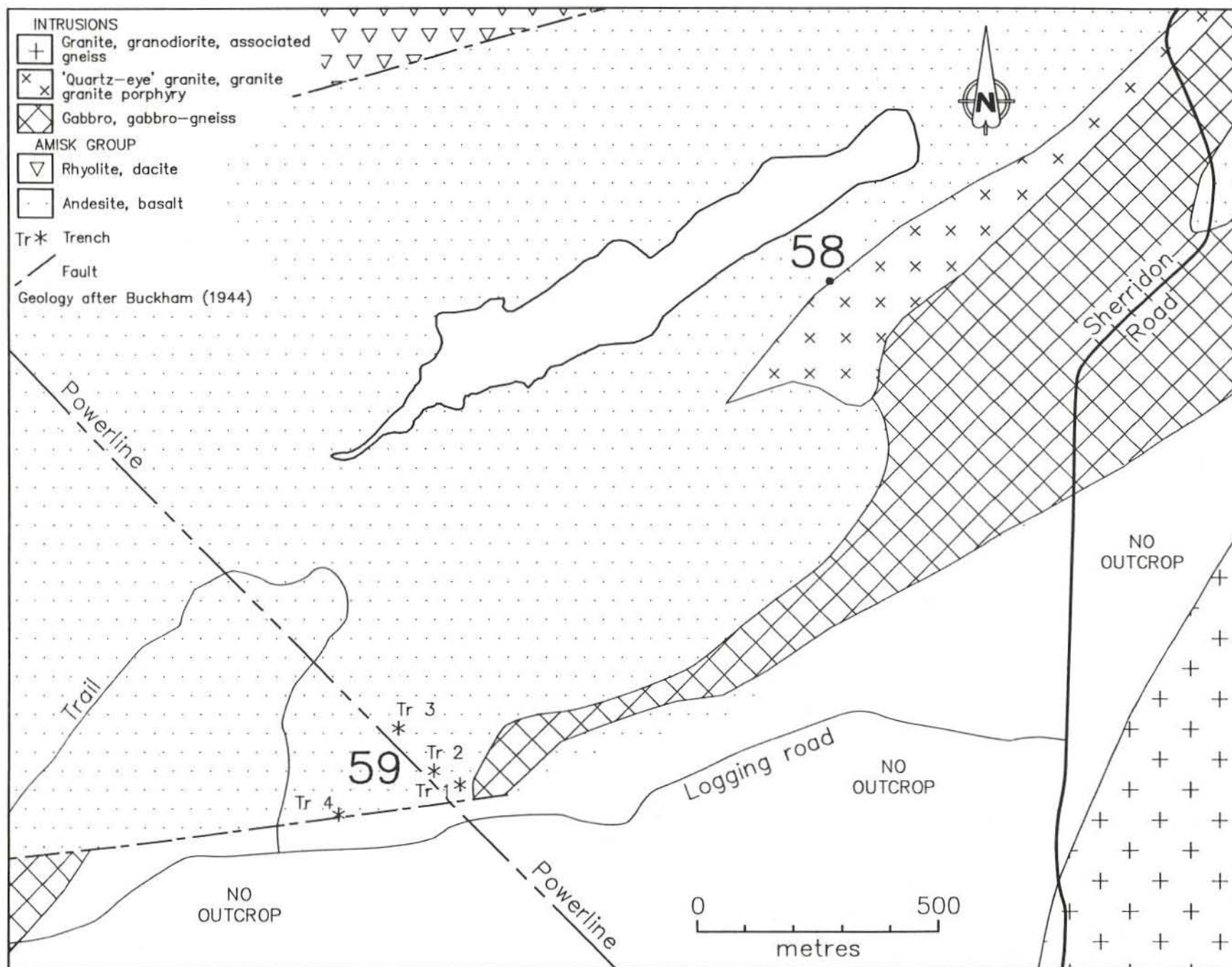


Figure 58-1: Geological setting of occurrences 58 and 59.

LOCATION: 58

NAME:

UTM: 6068231N/335551E

ACCESS: Via Sherridon Road and traverse along bush trail

EXPLORATION SUMMARY:

P. and S. Bachnick prospected the area and staked the Clove claims in 1971. They blasted a trench 2 x 1 x 1 m on the north side of an outcrop at the edge of a swamp.

GEOLOGICAL SETTING:

The area is underlain by massive porphyry with blue quartz phenocrysts, which intrudes mafic and intermediate volcanic rocks (Fig. 58-1).

MINERALIZATION:

The trench exposes pyrite, pyrrhotite, chalcopyrite and sphalerite stringers and blebs that are hosted by quartz porphyry. Elsewhere within this intrusion, there are widely scattered, small areas (30-50 cm) of rusty weathered rock that probably represent mineralization similar to that exposed in the trench.

GEOCHEMICAL DATA:

One sample returned 6.0 g/t Au (P. Bachnick, pers. comm., 1984).

AREA: West of Pothook Lake

AIRPHOTO: A26398-67

CLASSIFICATION:

Vein type deposit; multiple veins or lenses.

REFERENCES:

Buckham, A.F.

1942: Athapapuskow Lake, Manitoba: preliminary map; Geological Survey of Canada, Paper 42-16, 1:31 680.

Buckham, A.F.

1944: Athapapuskow Lake, Manitoba; Geological Survey of Canada, Map 807A, 1:63 360.

Wadien, R.S. and Gale, G.H.

1984: Geochemistry of felsic intrusive and extrusive rocks in the Nisto-Lucille Lake areas, Flin Flon, Manitoba; In Manitoba Energy and Mines, Mineral Resources, Report of Field Activities, 1984, p. 67-68.

LOCATION: 59

NAME:

UTM: 6067220N/334613E

ACCESS: Via Kississing Lake Road, old logging road
and traverse

EXPLORATION SUMMARY:

The area was included in a regional airborne EM survey conducted by HBED during 1951 (A.F. 90409). S. Bachnick blasted five trenches in four small areas of rusty weathered rocks on the Clove claim group in 1971-84.

GEOLOGICAL SETTING:

The area is underlain by basaltic and rhyolitic rocks with minor quartz feldspar porphyry and granite dykes (Fig. 58-1).

MINERALIZATION:

Trenches 1 and 2 contain pyrite veins with up to 4% chalcopyrite in locally pillowed, fine grained basaltic rocks. Pits 3 and 4 contain pyrite veins with trace chalcopyrite. Near solid chalcopyrite and pyrite veins up to 10 cm thick occur in a trench located beneath the powerline. One trench was blasted in a quartz porphyry dyke that contains minor pyrite and some chalcopyrite.

AREA: Northwest of Cleaver Lake (Fig. 58-1)

AIRPHOTO: A26348-69

GEOCHEMICAL DATA:

Sample 3, taken from trench 1 assayed 2.74 g/t Au, 10.29 g/t Ag and 4% Cu. Sample 1, taken from trench 4, assayed 2.06 g/t Au, 3.43 g/t Ag and 1.5% Cu. Three other samples from these trenches assayed 6.17 g/t, 2.06 g/t and 1.37 g/t Au respectively (A.F. 92750).

CLASSIFICATION:

Vein type deposit; multiple veins.

REFERENCES:

Assessment Files: 92620, 90409, 92750

Manitoba Energy and Mines, Mines Branch.

Buckham, A.F.

1942: Athapapuskow Lake, Manitoba: preliminary map; Geological Survey of Canada, Paper 42-16, 1:31 680.

Buckham, A.F.

1944: Athapapuskow Lake, Manitoba; Geological Survey of Canada, Map 807A, 1:63 360.

LOCATION: 60

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6069212N/318285E

ACCESS: Via boat on Schist Lake or along the rail line from Channing

AREA: 1 km south of Channing

AIRPHOTO: A26397-228

EXPLORATION SUMMARY:

Le Pas-Flin Flon Mines Ltd. completed a magnetometer survey and a geological map of the C.U. claims in 1950, and drilled three holes totalling 433 m in 1952 (A.F. 90374). DeVillie Copper Mines Ltd. completed a geology map on the Cu and Now claims and drilled two holes totalling 471 m on Cu 9 in 1957 (A.F. 90380).

were intersected near the end of DDH D-23 (A.F. 90380).

GEOCHEMICAL DATA:

None.

GEOLOGICAL SETTING:

The area is underlain by basaltic porphyritic pillow breccia and plagioclase pyritic flows that are intruded by fine- to medium-grained gabbro and rhyolite (Fig. 60-1). The Cliff Lake Fault occurs to the west along the Schist Lake shoreline (Bailes and Syme, 1989).

CLASSIFICATION:

Disseminated mineralization - not classified.

MINERALIZATION:

The geological maps of DeVillie Copper Mines Ltd. indicate that disseminated pyrrhotite and some pyrite are common in mafic to intermediate volcanic rocks. DDH L-2 intersected 36 m of sheared porphyritic 'andesite' with traces of chalcopyrite and pyrite. DDH L-1 intersected 3.5 m of minor disseminated pyrite (A.F. 90374). White to buff sericite and carbonate-rich schist

REFERENCES:

Assessment Files: 90374, 90380

Manitoba Energy and Mines, Mines Branch.

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

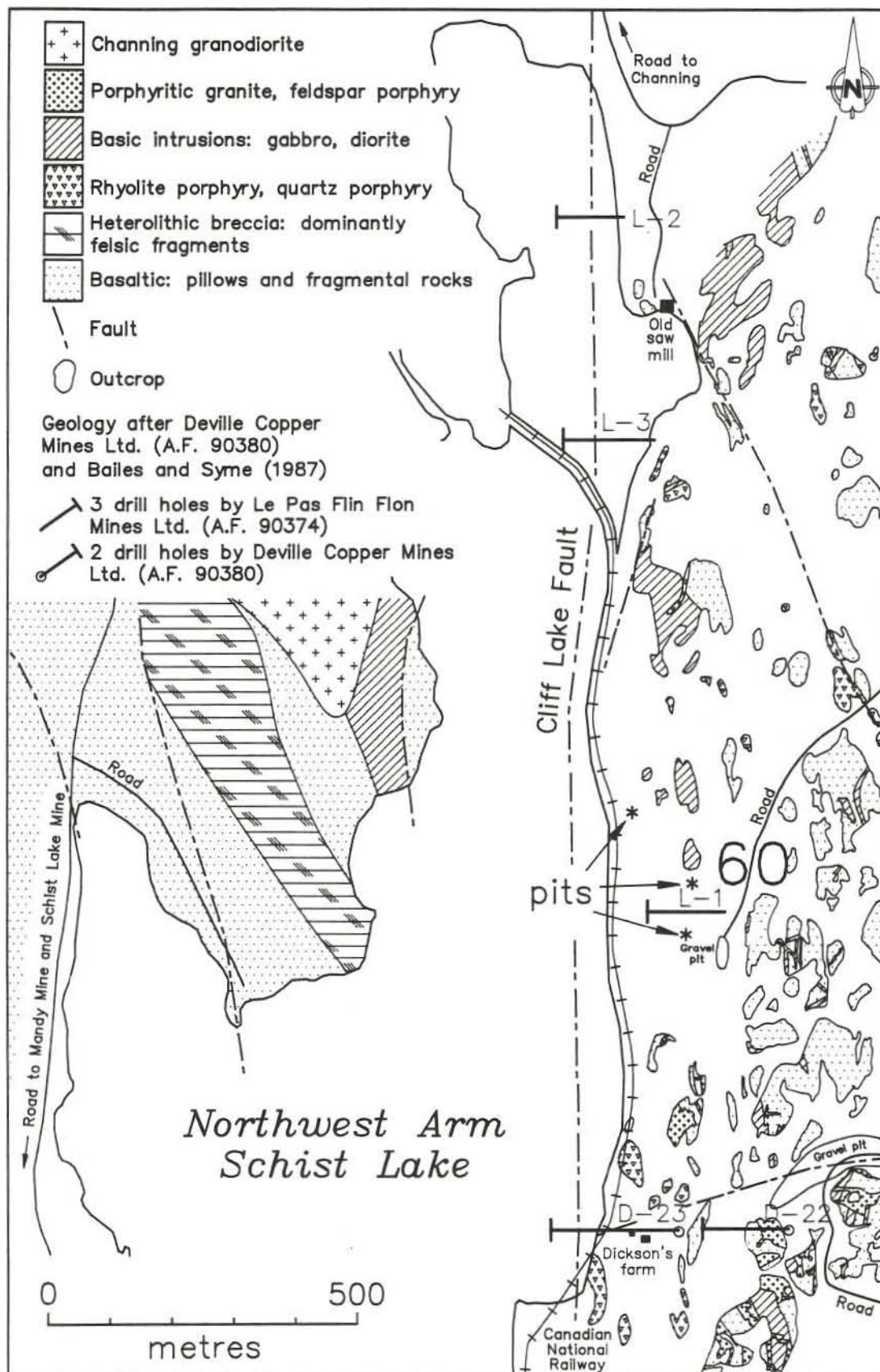


Figure 60-1: Geological setting of occurrence 60.

LOCATION: 61

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6064065N/316780E

ACCESS: Via boat on Schist Lake and traverse

EXPLORATION SUMMARY:

The C.R. claim group was staked by C.R. Parres in 1946. J.C. Parres completed a geology map and report of the claims in 1947 (A.F. 91848). In 1954, HBED drilled two holes totalling 687 m on C.R. 14 and C.R. 20 (A.F. 90370).

GEOLOGICAL SETTING:

The area is underlain by dark greyish-green, aphyric to massive, sparsely porphyritic basalt flows (Bailes and Syme, 1987). A north-trending fault west of Schist Lake separates the mafic volcanic rocks from plagioclase- and quartz-phyric rhyolite (Fig. 61-1). Rhyolitic intrusive rocks occur on the northeast and northwest shores of the lake. J.C. Parres noted that the occurrence is in close proximity to a folded quartz porphyry dyke (A.F. 91848).

MINERALIZATION:

DDH 10 intersected several mineralized sections including: (1) 25 m of "well mineralized" pyrite and pyrrhotite with very slight chalcopyrite in massive andesite; (2) 55 m of "mineralized" pyrite and pyrrhotite with slight chalcopyrite and arsenopyrite in partly siliceous and sericitic dacite to rhyolite; and (3) 20 m of 'partially mineralized' pyrite and pyrrhotite in andesite with bands of dacite. Near site A (Fig. 61-1), a 0.60 x 1.2 x 1.2 m block of near solid sulphide consisting of pyrrhotite, pyrite, chalcopyrite and hematite in sericite schist was un-

AREA: West of the north end of Ledge Lake

AIRPHOTO: A26397-228

covered during prospecting along a fault (A.F. 91848). It is not certain if the near solid sulphide material represents material that is *in situ* or glacial float.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Disseminated mineralization - not classified.

REFERENCES:

Assessment Files: 90370, 91848

Manitoba Energy and Mines, Mines Branch.

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Services, Geological Report GR87-1, 313p.

Syme, E.C.

1988: Schist Lake (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-1, 1:15 840.

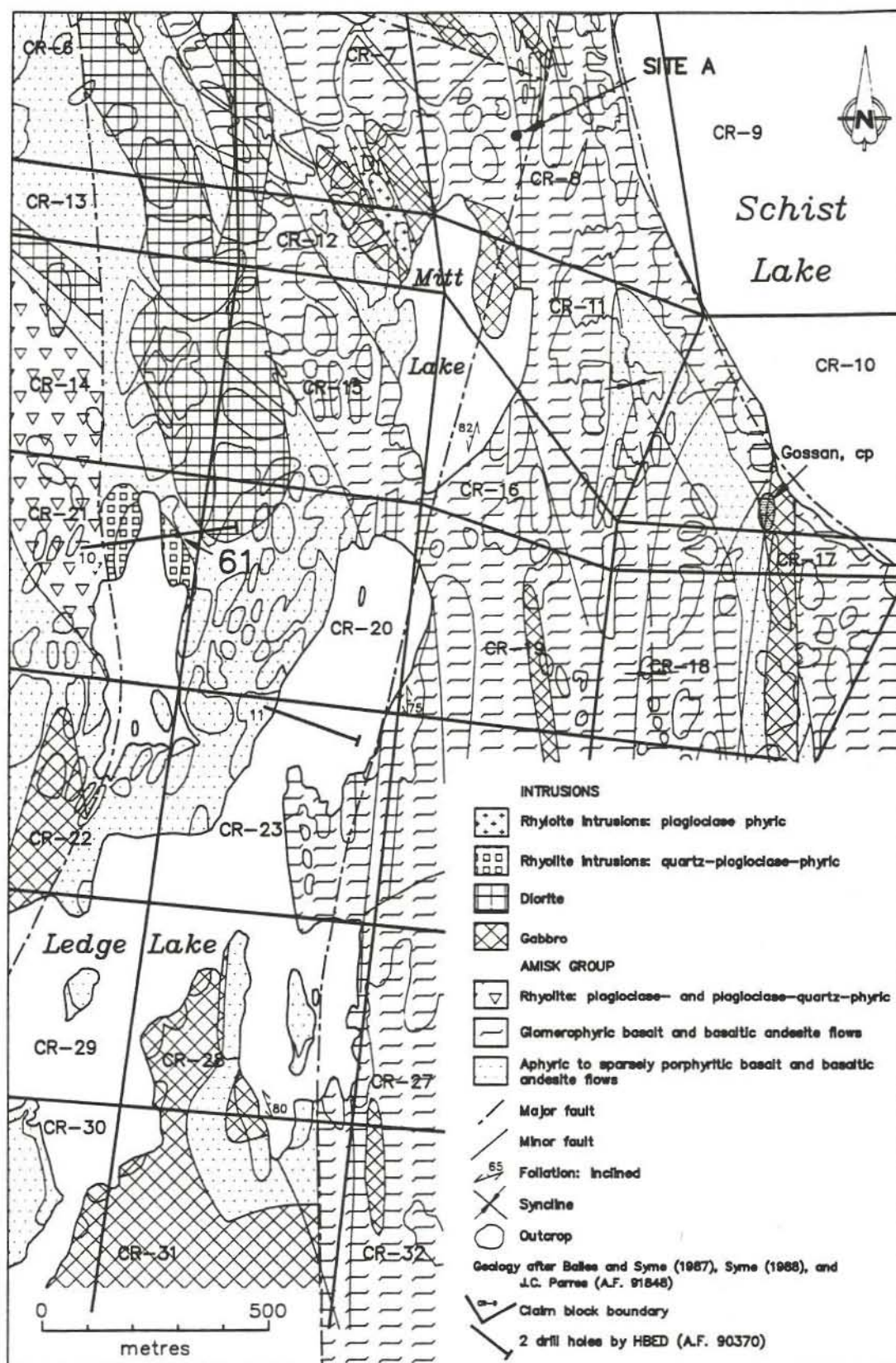


Figure 61-1: Geological setting of occurrence 61.

LOCATION: 62

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6068051N/319215E

ACCESS: Via Provincial Road 10 and traverse

EXPLORATION SUMMARY:

DeVillie Copper Mines Ltd. completed a geological map of the C.U. claims in 1950 and drilled six holes totalling 1 093 m on claims C.U. 11, -14, -15 and -18 in 1955-56 (A.F. 90380).

GEOLOGICAL SETTING:

The area is underlain by equigranular tonalite, which occurs adjacent to the north-trending Insole Fault (Bailes and Syme, 1987). Mafic to intermediate porphyritic pillow breccia and plagioclase- and pyroxene-phyric flows form a syncline to the east of Insole Lake. Small, fine- to medium-grained, equigranular and ophitic to subophitic gabbro and diorite dykes intrude the other rocks (Bailes and Syme, 1987). A detailed map of the area (Fig. 62-1) indicates the presence of rhyolitic and basaltic volcanic rocks, as well as rhyolitic intrusions in the immediate vicinity of the mineralization (A.F. 90380).

MINERALIZATION:

DDH D-7 intersected 60 cm of cherty and silicified intermediate volcanic rocks with minor pyrite and trace chalcopryite that included a 10 cm thick quartz vein with 65% pyrite. A 50 cm intersection with 85% quartz contained scattered stringers of pyrite, pyrrhotite and some

AREA: Between northwest arm of Schist lake and Manistikwan Lake

AIRPHOTO: A26397-228

chalcopryite. The drill core is chloritized and sericitized. DDH D-6 contained 1.2 m and 1.5 m intersections of white quartz with trace pyrite. DDH D-9 intersected 24.6 m of white quartz and 3.6 m of quartz-carbonate rock with moderate amounts of pyrite and arsenopyrite.

GEOCHEMICAL DATA:

A 40 cm sample from DDH D-7 assayed 0.20% Cu (A.F. 90380).

CLASSIFICATION:

Vein type deposit; single vein.

REFERENCES:

Assessment Files: 90375,90380

Manitoba Energy and Mines, Mines Branch.

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

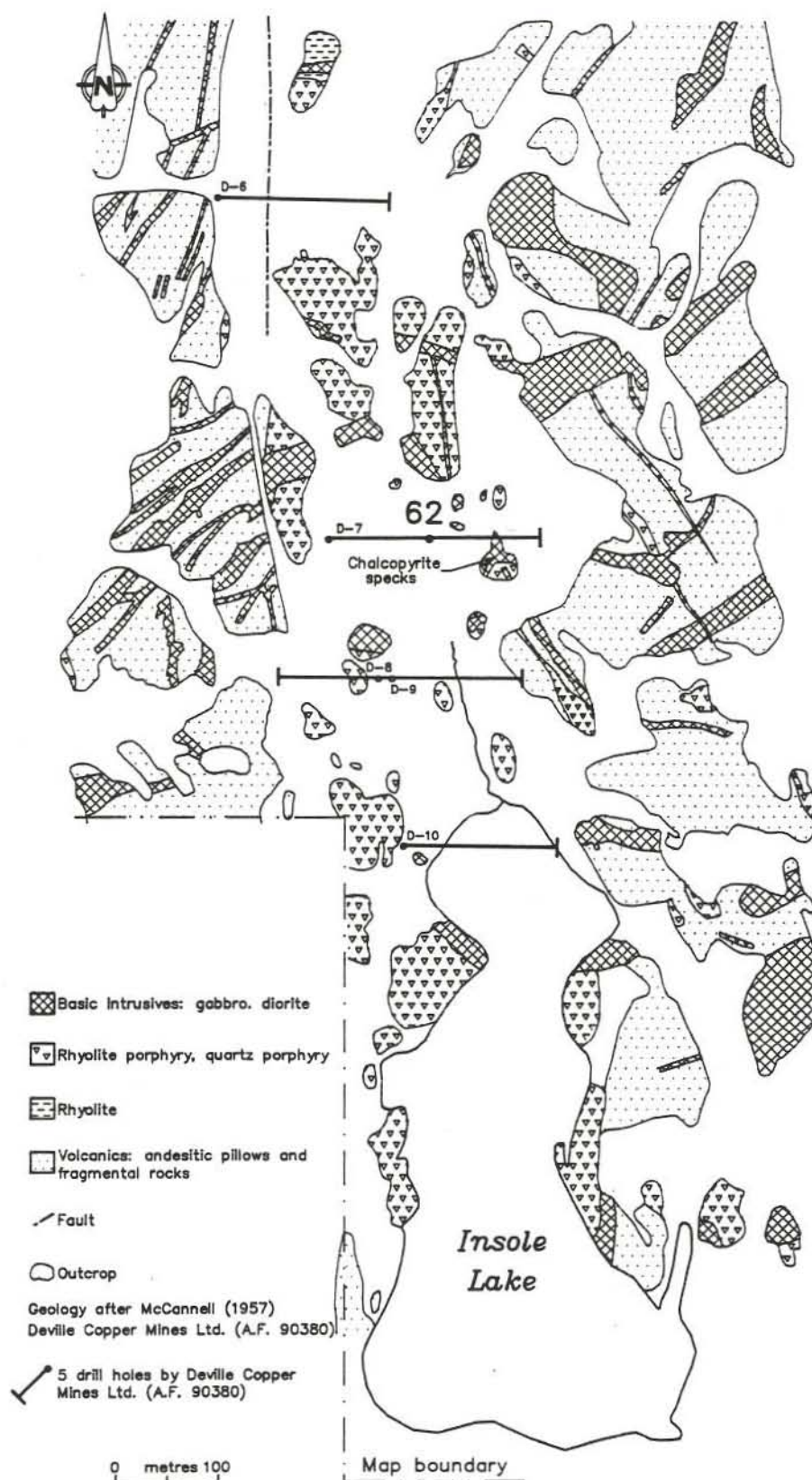


Figure 62-1: Detailed geology and drill hole locations at occurrence 62.

LOCATION: 63

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6069690N/319225E

ACCESS: Via traverse from Provincial Road 10

EXPLORATION SUMMARY:

In 1955, DeVillie Copper Mines Ltd. drilled five holes totalling 580 m on the C.U. 3, -7 and -31 claims. A geology map produced by DeVillie Copper Mines Ltd. shows the locations of several trenches (Fig. 62-1; A.F. 90380).

GEOLOGICAL SETTING:

The area is underlain by aphyric to sparsely porphyritic basalt and basaltic andesite flows (Bailes and Syme, 1987). Small bodies of rhyolitic rocks were delineated on a detailed map of the area (Fig. 63-1). Carbonatized and sheared rhyolitic rocks are present in areas of mineralization (A.F. 90380).

MINERALIZATION:

A zone of rusty weathered rocks extends for approximately 400 m from the north shore of Hartnett Lake northwest to the west side of a small unnamed lake. Four trenches and three drill holes intersected this mineralized zone. The drill holes intersected 'greenstone' with quartz-carbonate alteration and minor stringers and disseminations of pyrrhotite and pyrite. DDH D-2 contained 6.4 m of near solid to solid, fine grained, disseminated pyrite at the contact between altered 'greenstone' and rhyolite. DDH D-3 intersected 18 cm of solid pyrite and pyrrhotite in cherty rhyolite. DDH D-1 intersected only trace amounts of sulphides.

Seven trenches and DDH D-4 tested a shear zone west of Hartnett Lake (Fig. 63-1). DDH D-4 intersected

AREA: North of Hartnett Lake (Fig. 62-1)

AIRPHOTO: A26397-228

a 35 cm quartz-carbonate lense with chloritic veins and moderate amounts of disseminated pyrite and pyrrhotite in a porphyritic 'greenstone'. DDH D-5 and DDH D-6 did not intersect sulphide mineralization (A.F. 90380).

GEOCHEMICAL DATA:

Drill core samples assayed traces of Au and Ag. A 1 m intersection of 'well altered greenstone' with disseminated pyrrhotite and pyrite from DDH D-1 assayed 0.06% Cu (A.F. 90380).

CLASSIFICATION:

Stratabound massive sulphide type deposit; volcanic rock associated. This occurrence probably represents the distal portions of a massive sulphide type deposit.

REFERENCES:

Assessment Files: 90375, 90380

Manitoba Energy and Mines, Mines Branch.

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

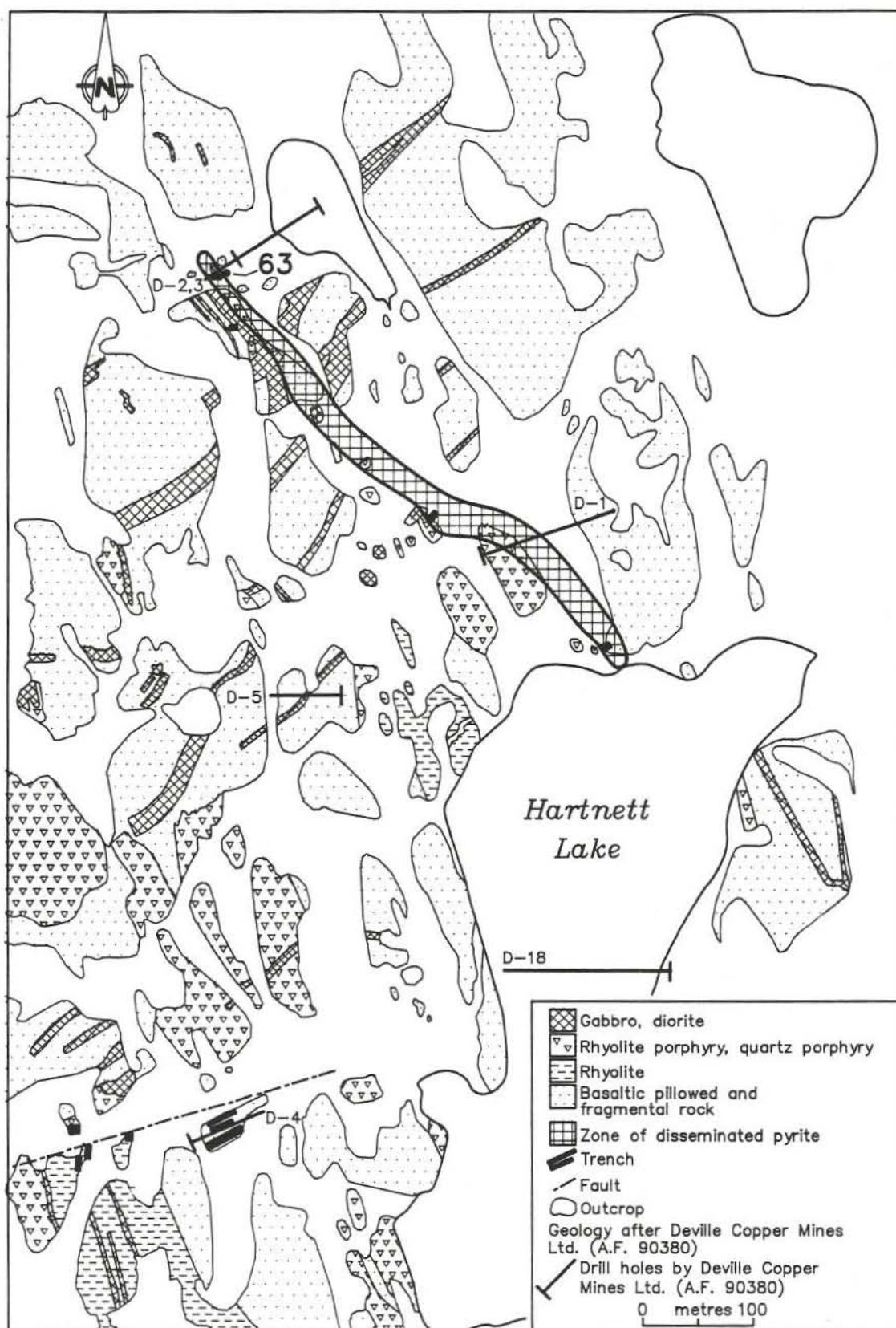


Figure 63-1: Detailed geology, drill hole and trench locations at occurrence 63.

LOCATION: 64

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6061336N/322442E

ACCESS: Via boat on Schist Lake

AREA: Northeast arm of Schist Lake

AIRPHOTO: A26397-257

EXPLORATION SUMMARY:

Stanmac Ltd. drilled a 152 m hole on the Duke claim in 1948 (A.F. 90327). Two additional holes, with a total length of 380 m, drilled on the Stanmac option were probably drilled for HBED (A.F. 90338).

GEOLOGICAL SETTING:

The area is underlain by strongly deformed mafic flows, tuff and fine grained sedimentary rocks that are intruded by abundant dykes of fine grained leucotonalite, tonalite-granodiorite and pegmatite (Fig. 64-1). The northwest tip of the island is underlain by pyroxenite, gabbro and equigranular tonalite. The shoreline to the south is underlain by the Schist Lake Gabbro Pluton (Bailes and Syme, 1987).

MINERALIZATION:

Traces of pyrite and pyrrhotite in dark green, fine grained schistose andesite were intersected by DDH J.O.5 and J.O.6. Trace chalcopyrite was noted in a 3 cm intersection of DDH J.O.6 (A.F. 90327).

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Disseminated mineralization - not classified.

REFERENCES:

Assessment Files: 90327, 90334, 90338

Manitoba Energy and Mines, Mines Branch.

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

Syme, E.C.

1988: Schist Lake (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-1.

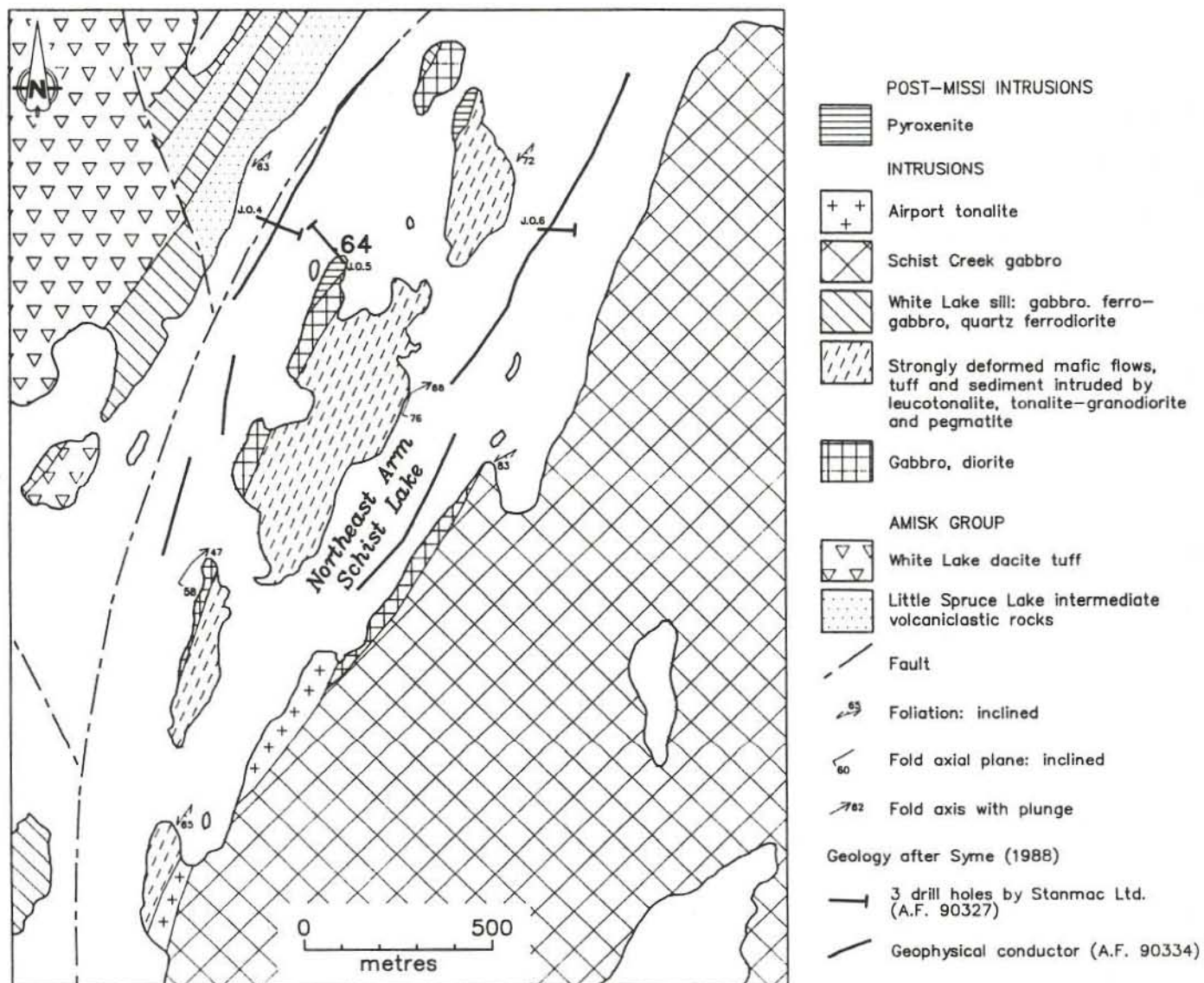


Figure 64-1: Geological setting of occurrence 64.

LOCATION: 65

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6058040N/318447E

ACCESS: Via boat on Schist Lake

AREA: West arm of Schist Lake

AIRPHOTO: A26397-235

EXPLORATION SUMMARY:

A.L. Parres drilled three holes totalling 343 m on ALP 7 in 1950-52 (A.F. 90365). In 1953 HBED drilled two holes totalling 366 m on claim H.W. 38 and completed a geology map of the H.W. claim group (A.F. 90371).

altered diorite and banded iron formation that consisted of alternating bands of quartz and hematite (A.F. 90365, 90371).

GEOCHEMICAL DATA:

None.

GEOLOGICAL SETTING:

The area is underlain by gabbro (Fig. 65-1; Syme, 1988) that has intruded basaltic flows and pyroclastic rocks (Fig. 65-2). The drill holes intersected intermediate (basaltic?) volcanic rocks, diorite, banded iron formation, carbonate schist, graphite schist and rhyolite (A.F. 90365, 90371).

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation.

REFERENCES:

Assessment Files: 90365, 90371, 90377, 90384, 90534, 90382, 90383

Manitoba Energy and Mines, Mines Branch.

Syme, E.C.

1988: Schist Lake (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-1.

MINERALIZATION:

DDH 19 intersected 40 cm of near solid pyrite within 23 m of graphitic schist with bands of very siliceous rock and stringers of hematite and pyrite (A.F. 90371). Minor pyrite was present in several intersections of graphite schist, altered and sheared andesite,

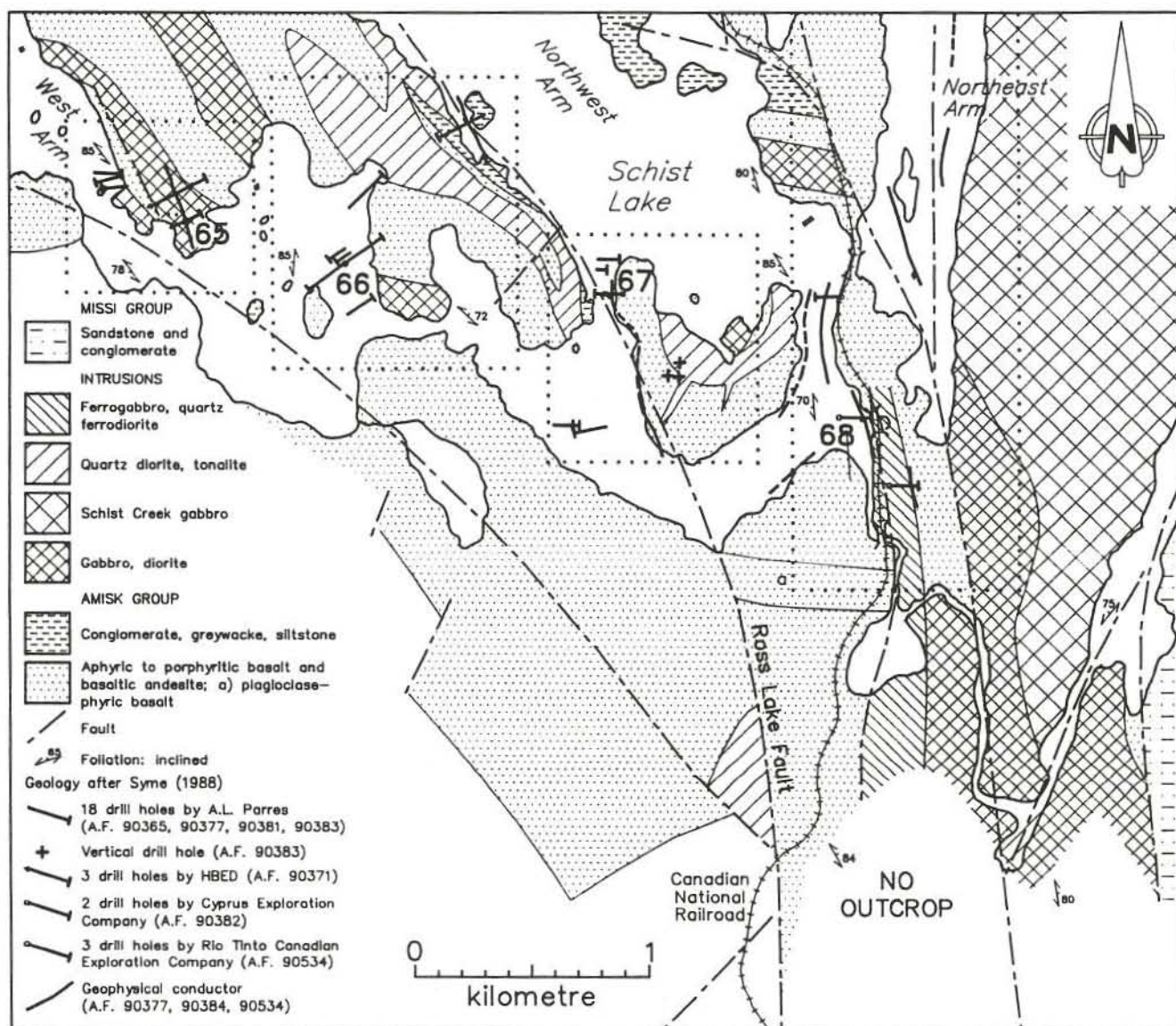


Figure 65-1: Geological setting of occurrences 65, 66, 67 and 68.

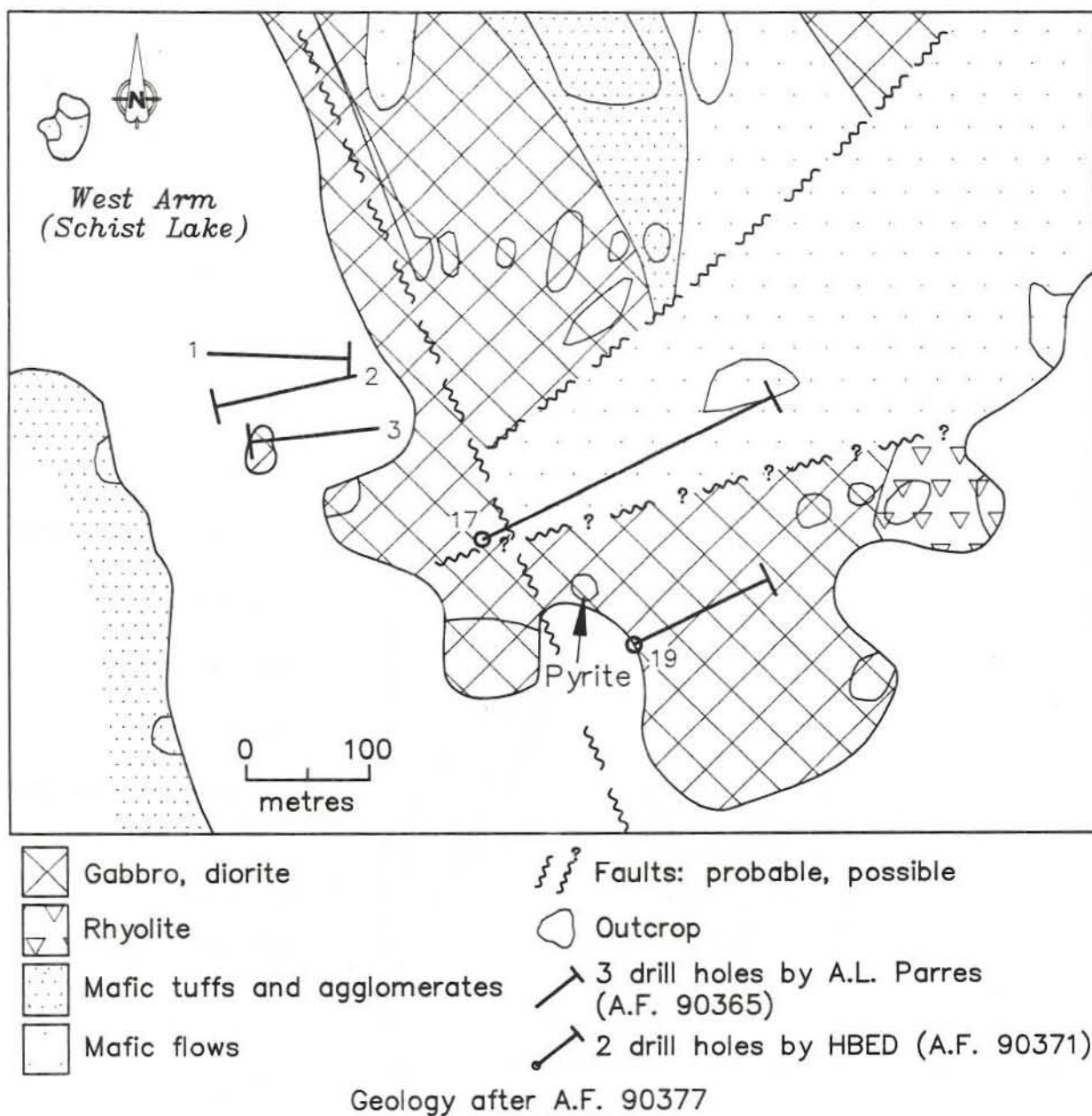


Figure 65-2: Detailed geology at occurrence 65.

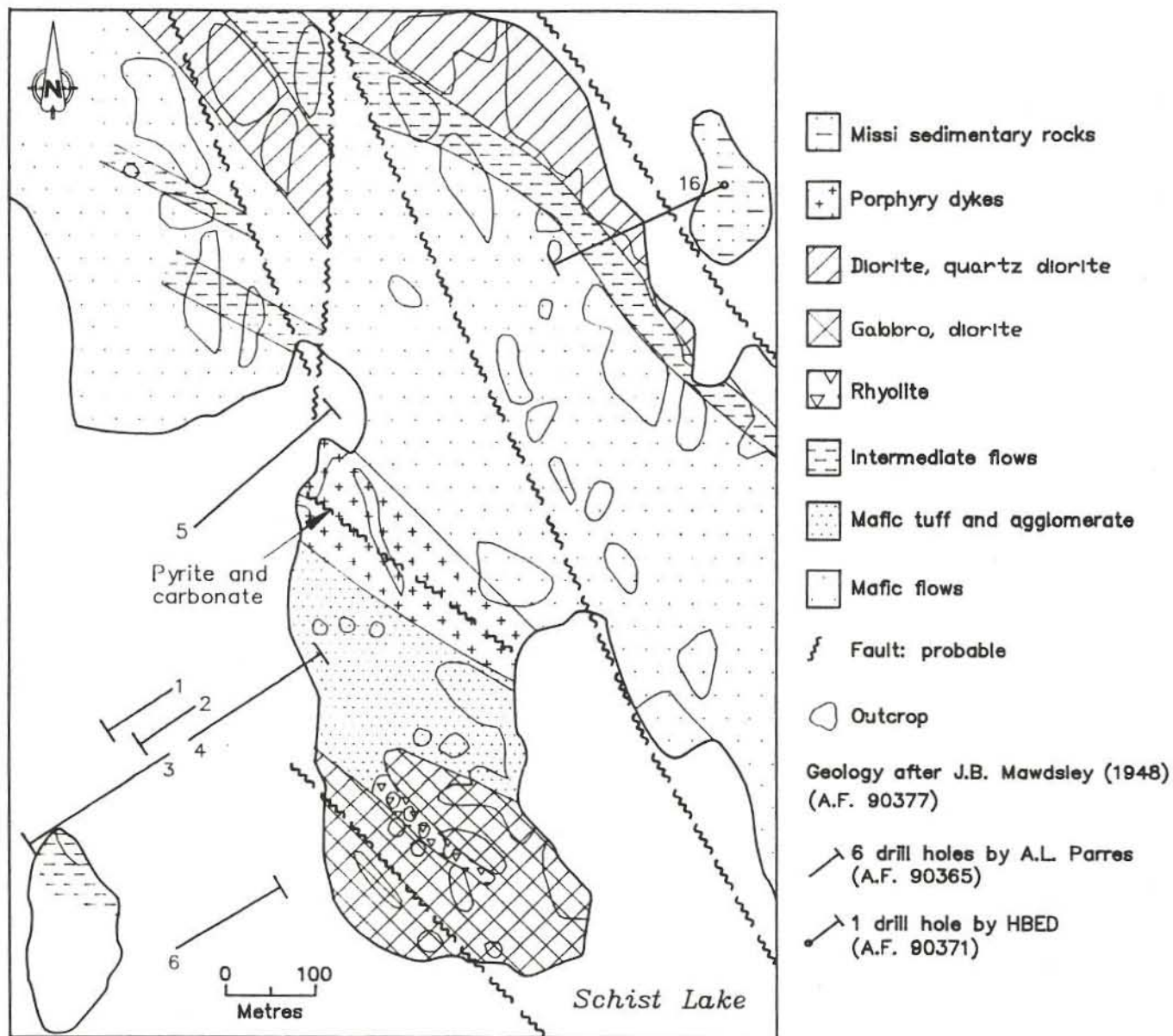


Figure 66-1: Detailed geology at occurrence 66.

LOCATION: 66

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6057841N/319118E

ACCESS: Via boat on Schist Lake

AREA: West arm of Schist Lake (Fig. 65-1)

AIRPHOTO: A26397-235, -260

EXPLORATION SUMMARY:

In 1947, A.L. Parres staked the H.W. claim group, completed a geological report in 1948 and drilled six holes totalling 952 m in 1950 (A.F. 90365, 90377). HBED drilled a 207 m hole on claim H.W. 31 in 1953 (A.F. 90371).

intersection of rhyolitic tuff containing black chlorite and a 5 m intersection of 'hybrid mottled rocks' (A.F. 90365).

GEOCHEMICAL DATA:

None.

GEOLOGICAL SETTING:

The area is underlain by aphyric basaltic flows that are intruded by fine grained equigranular gabbro and diorite (Fig. 65-1). Missi Group clastic sedimentary rocks are exposed on a small island (A.F. 90377; Fig. 66-1). In addition, rhyolite and graphitic schists were intersected in the drill holes.

CLASSIFICATION:

Chemical sediment type deposit, sulphide facies iron formation. The pyritized, chloritized and 'altered' rocks in DDH 3 and 4 could be part of a massive sulphide type deposit alteration zone. The rhyolitic tuff and graphitic schist at this locality may be stratigraphically equivalent to rocks at the West Arm deposit (Location 3, this volume).

MINERALIZATION:

A 4 m long section of graphitic schist containing 'much sulphide' was intersected near the bottom of DDH 4. Similar material was intersected at the bottom of DDH 5.

DDH 3 intersected minor pyrite and trace chalcopyrite in a sequence of rhyolitic tuff, 'andesite', rhyolitic fragmental rocks, and 'altered breccia' with graphitic bands. The rhyolitic tuff layers contain minor pyrite disseminations and/or veinlets. In addition there is a 1.5 m

REFERENCES:

Assessment Files: 90365, 90371, 90377

Manitoba Energy and Mines, Mines Branch.

Syme, E.C.

1988: Schist Lake (part of NTS 63K/12), Manitoba Energy and Mines, Preliminary Geological Map 1988F-1.

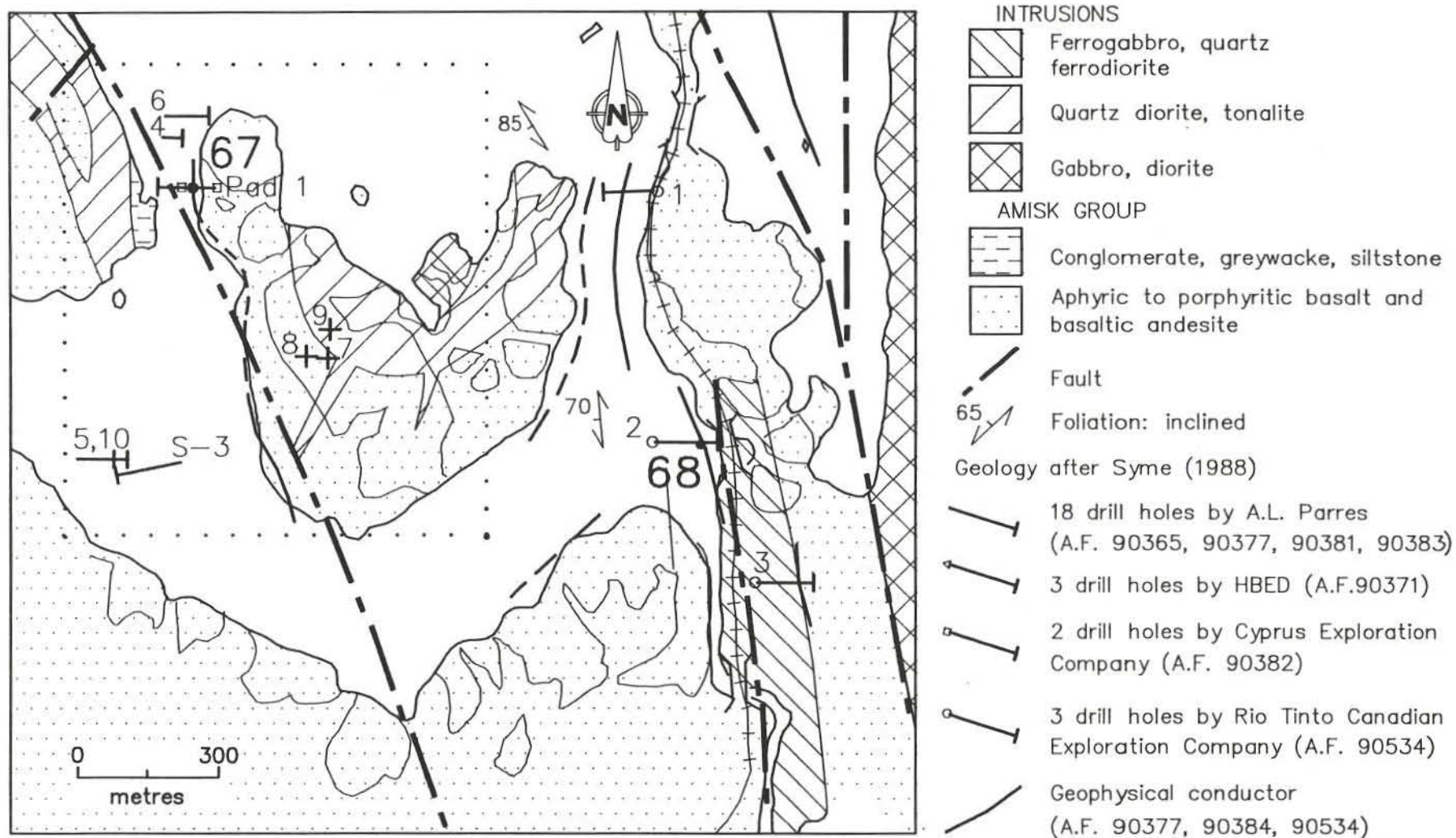


Figure 67-1: Geological setting of occurrences 67 and 68.

LOCATION: 67

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6057714N/320228E

ACCESS: Via boat on Schist Lake

EXPLORATION SUMMARY:

In 1948, International Mining Corporation completed a geological mapping project on the Ring and L.F. groups. A.L. Parres drilled three holes totalling 219 m in 1949 and seven holes totalling 929 m in 1950 on the Tiny claims; two of these holes did not reach bedrock (A.F. 90383). In 1955, Cyprus Exploration Ltd. completed a ground EM survey and drilled one hole (81 m) on the Ting claims (A.F. 90382). A.L. Parres drilled a 123 m hole on claim Pad 9 in 1967 (A.F. 90381).

GEOLOGICAL SETTING:

The area is underlain by aphyric basalt and fine- to medium-grained, equigranular quartz diorite (Fig. 65-1). A regional fault, the Ross Lake fault (Syme, 1988), occurs along the west side of a large island (Fig. 65-1). In addition, graphitic schist and rhyolite were intersected by the drill holes.

MINERALIZATION:

DDH Pad 1 (Fig. 67-1) intersected 6 m of 'graphitic zone with up to 90% graphite' (A.F. 90381); this is probably a graphite-bearing sulphide stratum (Gale *et al.*, 1980)

AREA: Intersection of the northwest and west arms of Schist Lake (Fig. 65-1)

AIRPHOTO: A26397-260

DDH 5 and 10 intersected 21.2 m and 27.3 m respectively, of 'banded massive pyrite' with 'considerable graphite' (A.F. 90383).

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation.

REFERENCES:

- Assessment Files: 90381, 90382, 90383, 90384, 90385
Manitoba Energy and Mines, Mines Branch.
- Gale, G.H., Baldwin, D.A., and Koo, J.
1980: A geological evaluation of Precambrian massive sulphide deposit potential in Manitoba; Manitoba Energy and Mines, Economic Geology Report ER79-1, 137p.
- Syme, E.C.
1988: Schist Lake (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-1.

LOCATION: 68

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6057167N/321255E

ACCESS: Via boat on Schist Lake

EXPLORATION SUMMARY:

In 1948, International Mining Corporation completed a geological map of the Tiny and L.F. claims (A.F. 90385). Rio Tinto Canadian Exploration completed ground magnetometer and EM surveys on the Try and Tiny claims in 1962; the conductors were tested with three holes totalling 353 m (A.F. 90534).

GEOLOGICAL SETTING:

The area is underlain by aphyric basalt and fine grained, equigranular quartz diorite. The Schist Creek Gabbro is exposed north and east of the occurrence (Fig. 65-1; Syme, 1988).

MINERALIZATION:

DDH 1 and 2 (Fig. 67-1) intersected 'greenstones' and several sections of graphitic schist with minor pyrite in a 10 to 20 m section of altered sedimentary rocks or tuff; there is no indication in the drill core that these rocks contain graphite-bearing sulphide facies iron formation. DDH 3 intersected 16.4 m of carbonate-bearing sericitic schist with minor blebs (less than 1 cm) of pyrite and trace chalcopyrite. This rock grades into 6 m of

AREA: South end of Northwest Arm of Schist Lake (Fig. 65-1)

AIRPHOTO: A26397-261

chloritic schist with abundant carbonate, but only trace amounts of pyrite and pyrrhotite (A.F. 90534).

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Disseminated mineralization - not classified. Disseminated mineralization in graphitic sedimentary strata (DDH 1 and 2) and in a fault zone (DDH 3).

REFERENCES:

- Assessment Files: 90385, 90534, 91584
Manitoba Energy and Mines, Mines Branch.
- Gale, G.H., Baldwin, D.A., and Koo, J.
1980: A geological evaluation of Precambrian massive sulphide deposit potential in Manitoba; Manitoba Energy and Mines, Economic Geology Report ER79-1, 137p.
- Syme, E.C.
1988: Schist Lake (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-1.

LOCATION: 69

NAME: (A.F. - Mineralization intersected in drill core)
UTM: 6067807N/322440E
ACCESS: Via Provincial Road 10 to Manistikwan Lake

AREA: Manistikwan Lake
AIRPHOTO: A26364-176

EXPLORATION SUMMARY:

In 1971, A.L. Parres drilled a 303 m hole on CB 2869 to test an EM anomaly (A.F. 90373).

GEOCHEMICAL DATA:

Two samples of drill core were assayed, but contained only traces of Au, Ag, Cu and Zn (A.F. 90373).

GEOLOGICAL SETTING:

The area is underlain by Bear Lake aphyric basaltic andesite flows. The Inlet Arm Fault strikes parallel to the shoreline of Manistikwan Lake (Fig. 69-1; Bailes and Syme, 1987). The drill core did not contain any positive evidence of the Inlet Arm Fault, but there was a 3 m section of lost core at 51.0 m (A.F. 90373).

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation.

MINERALIZATION:

DDH 4 intersected 50 cm of near solid, very fine grained 'earthy pyrite' in 15 m of graphitic tuff. A 27 m intersection of 'andesite' (?) near the end of DDH 4 contained narrow stringers of pyrrhotite and pyrite and trace chalcopryite, as well as a 5 m section of 'heavy pyrite and pyrrhotite mineralization' with traces of chalcopryite and graphite (A.F. 90373).

REFERENCES:

- Assessment File: 90373
Manitoba Energy and Mines, Mines Branch.
- Bailes, A.H. and Syme, E.C.
1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.
- Bailes, A.H. and Syme, E.C.
1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

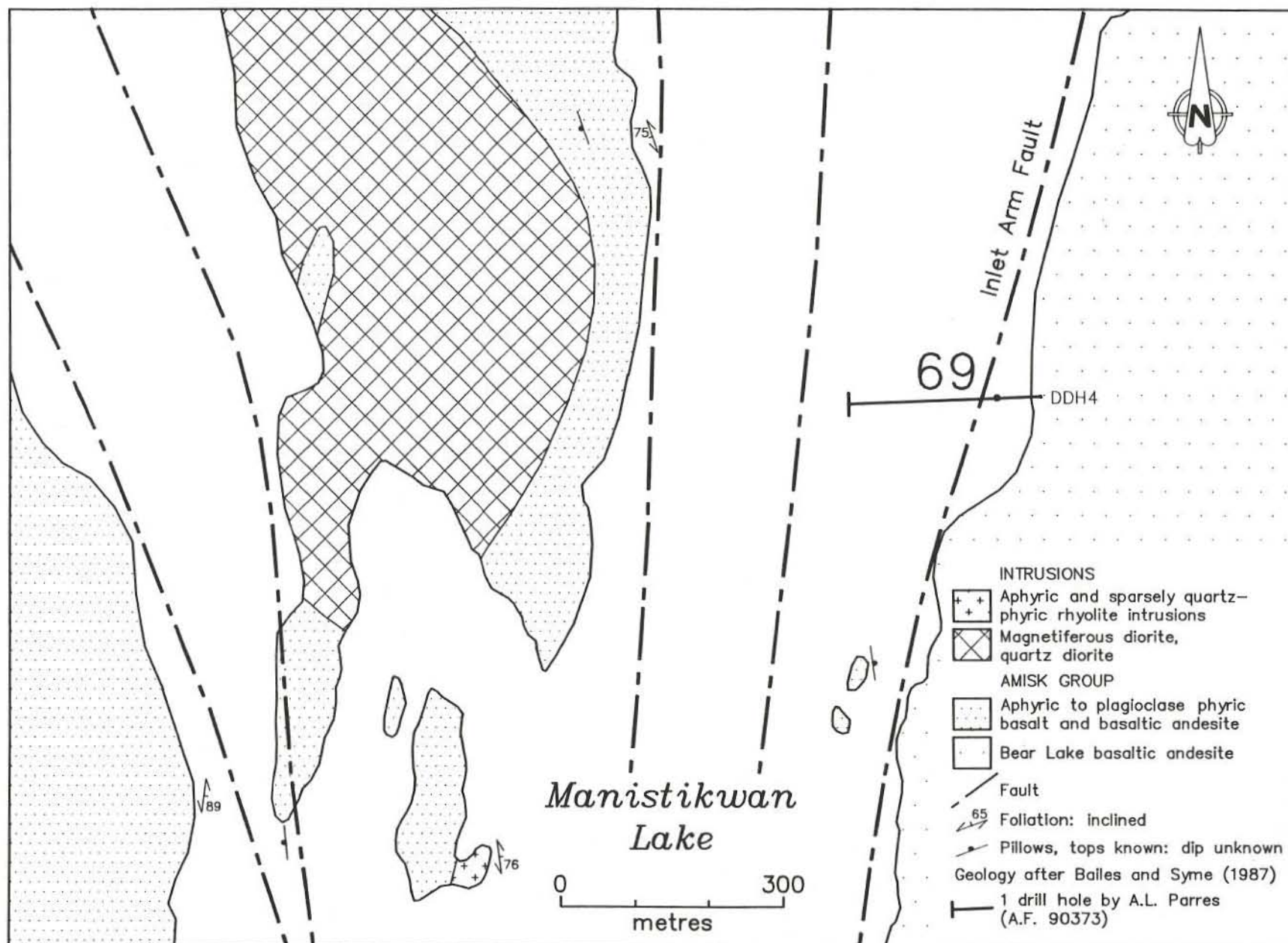


Figure 69-1: Geological setting of occurrence 69.

LOCATION: 70

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6069268N/321990E

ACCESS: Via boat on Manistikwan Lake

EXPLORATION SUMMARY:

In 1949 Stanmac completed an EM survey and drilled a 140 m hole (A.F. 91597). HBED optioned the property and drilled two holes totalling 880 m on the Big Island claims in 1949 (A.F. 91596). Straus Exploration Inc. drilled two holes totalling 250 m on CB 2847 in 1972 (A.F. 90372).

GEOLOGICAL SETTING:

Big Island is underlain by plagioclase phyric basaltic pillowed flows and pillow fragment breccia that have been intruded by gabbro, diorite and quartz diorite (Fig. 70-1). A quartz-rich felsic intrusion occupies the central portion of the island (Bailes and Syme, 1989), but only small intrusions of sparsely quartz phyric rhyolite are exposed on the east shore of Big Island. Several north-trending fault zones parallel the shoreline of Manistikwan Lake (Bailes and Syme, 1989). Drill core contained abundant silicified tuff, siliceous fragmental rocks, bedded tuff, graphitic tuff, sericite schist, grey-wacke and minor siliceous andesite (A.F. 91596).

MINERALIZATION:

DDH B.I. 26 and 27 intersected a number of layers of graphitic tuff with minor pyrite and several layers of near solid to solid pyrite \pm pyrrhotite and graphite. DDH

AREA: East side of the Big Island, Manistikwan Lake

AIRPHOTO: A26364-175

B.I. 26 intersected 60 cm, 140 cm and 30 cm long intervals of near solid sulphide and graphite (A.F. 91596). DDH 1 and 2 also intersected near solid pyrite and graphite layers (A.F. 90372).

GEOCHEMICAL DATA:

Drill core samples contained traces of Cu and Zn (A.F. 90372, 91596).

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation.

REFERENCES:

- Assessment Files: 90372, 91596, 91597
Manitoba Energy and Mines, Mines Branch.
- Bailes, A.H. and Syme, E.C.
1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.
- Bailes, A.H. and Syme, E.C.
1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

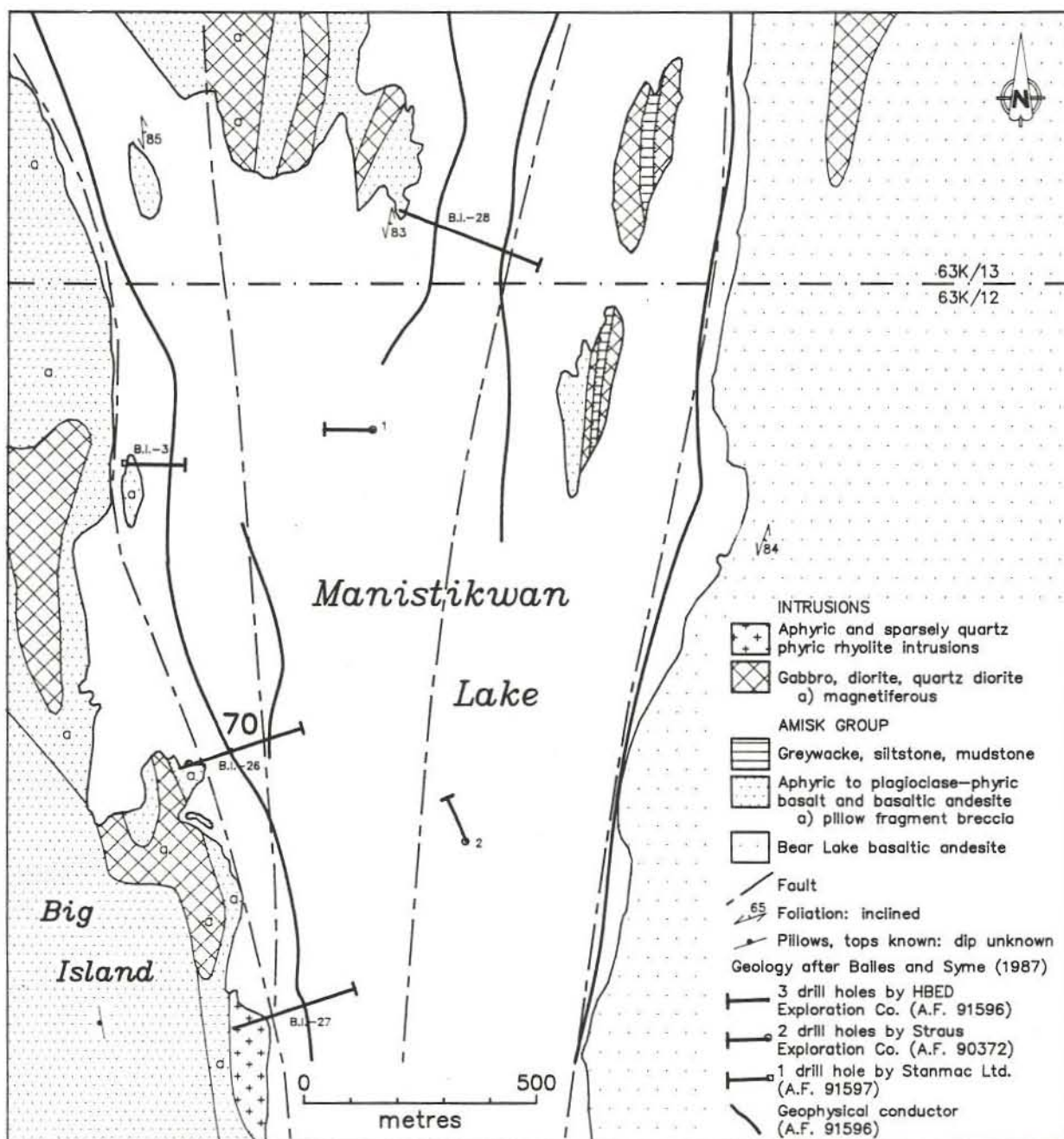


Figure 70-1: Geological setting of occurrence 70.

LOCATION: 71

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6063065N/323987E

ACCESS: Via Provincial Road 10

EXPLORATION SUMMARY:

Transnorthern Nickel and Copper Mines Ltd. completed a ground magnetometer survey in 1952 and a ground EM survey in 1955. The conductors were tested with three drill holes totalling 499 m (A.F. 90325). J. O'Neill drilled a 185 m hole southwest of the Copper Hill claims on claim APG (A.F. 90338). In 1979, Granges Exploration AB drilled a 97 m hole on claim Pat 1FR (A.F. 92402).

GEOLOGICAL SETTING:

The west shore of Schist lake is dominated by the Little Spruce Lake Formation, which comprises andesitic lapilli tuff, tuff breccia and fine grained sedimentary rocks (Fig. 71-1). The Airport Tonalite underlies the east shore of Northeast Arm, Schist Lake (Bailes and Syme, 1987; Syme, 1988). The conductors drilled were located under Schist Lake southeast of the White Lake deposit (Location 4, this volume) and parallel the Northeast Arm Fault (Fig. 71-1).

MINERALIZATION:

Trenches (location unknown) blasted on claim Copper Hill 3 contained minor Fe-sulphide mineralization with a small amount of malachite, but drill tested EM anomalies did not yield any significant amounts of mineralization (A.F. 90325). DDH 1 (Copper Hill 2) intersected 3 cm of disseminated sulphide minerals with trace chalcopyrite in andesite schist. DDH 2 intersected approximately 10 m of graphitic schist with traces of py-

rite and pyrrhotite (A.F. 90325). DDH Bay1 intersected minor disseminated pyrite and trace pyrrhotite associated with abundant quartz stringers in 64 m of chloritized and sericitized andesite schist (A.F. 92402).

AIRPHOTO: A26397-127, -144

GEOCHEMICAL DATA:

A drill core sample from DDH Bay1 assayed 0.05 g/t Au, 2.0 g/t Ag, 0.01% Cu and 0.01% Zn over 1.8 m (A.F. 92402).

CLASSIFICATION:

Disseminated mineralization - not classified.

REFERENCES:

- Assessment Files: 90325, 90338, 92402
Manitoba Energy and Mines, Mines Branch.
- Bailes, A.H. and Syme, E.C.
1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.
- Bailes, A.H. and Syme, E.C.
1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.
- Syme, E.C.
1988: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

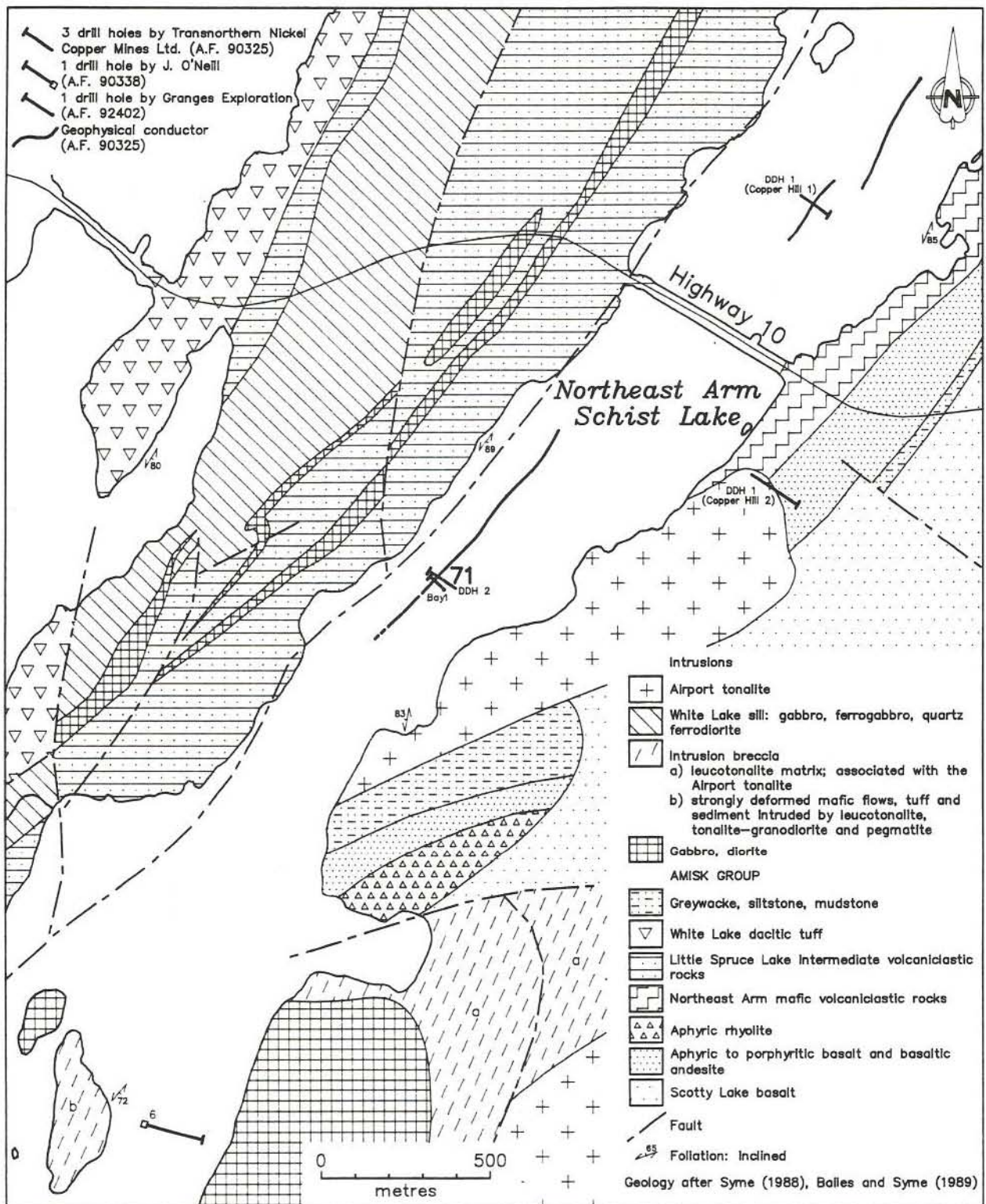


Figure 71-1: Geological setting of occurrence 71.

LOCATION: 72

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6066249N/328940E

ACCESS: Via Provincial Road 10 and boat

EXPLORATION SUMMARY:

Wallace (1920) indicated that work was done on claims in this area. An adit (2 x 1 x 3 m) was cut near the top of a cliff to explore a pyrite-bearing outcrop (date unknown). N.H.C. Fraser drilled two holes totalling 62 m on Rex 1 in 1950 (A.F. 90344). Pineroot Mineral Enterprises Ltd. drilled a 117 m hole on the Eppa 2 claim in 1967 (A.F. 92249).

GEOLOGICAL SETTING:

The area is underlain by gabbro, diorite and quartz diorite with some basalt and basaltic andesite flows (Fig. 72-1). A fault separates these intrusive and volcanic rocks from the North Star Road volcanic conglomerate (Bailes and Syme, 1989).

MINERALIZATION:

DDH 1 (N.H.C. Fraser), intersected 3 m of altered 'cherty tuff' containing small lenses of pyrrhotite that included a 30 cm section of 'considerable pyrite and pyrrhotite with minor amounts of chalcopyrite' (A.F. 90344). DDH 1 (Pineroot Mineral Enterprises), intersected several 2 to 10 cm sulphide bands containing 1 to 20% pyrite and pyrrhotite with trace chalcopyrite in very fine grained dioritic to andesitic rock with siliceous sections. A 5 m section within a 7.9 m zone of breccia contained 2 to 60% pyrite (A.F. 92249). Adjacent to the gabbroic intrusion at the end of the adit there are 30 to 40% pyrite and pyrrhotite with trace chalcopyrite in veins over a length of 50 cm.

AREA: North of Bakers Narrows, Athapapuskow Lake

AIRPHOTO: A26328-176, -198

GEOCHEMICAL DATA:

Three drill core samples from DDH 1 assayed 0.26% Cu over 55 cm, 0.06% Cu over 24 cm and 0.19% Cu over 2 m (A.F. 92249).

CLASSIFICATION:

Vein type deposit; multiple veins or lenses. Pyrite, pyrrhotite and quartz observed in the wall rock exposed in the adit have been mobilized into fractures along the margin of the mafic intrusion. In part the sulphide zone resembles a graphite-bearing sulphide facies iron formation.

REFERENCES:

Assessment Files: 90344, 92249

Manitoba Energy and Mines, Mines Branch.

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

Wallace, R.C.

1920: Mining and mineral prospects in northern Manitoba; Office of Commissioner of Northern Manitoba, Northern Manitoba Bulletin, p. 26-27

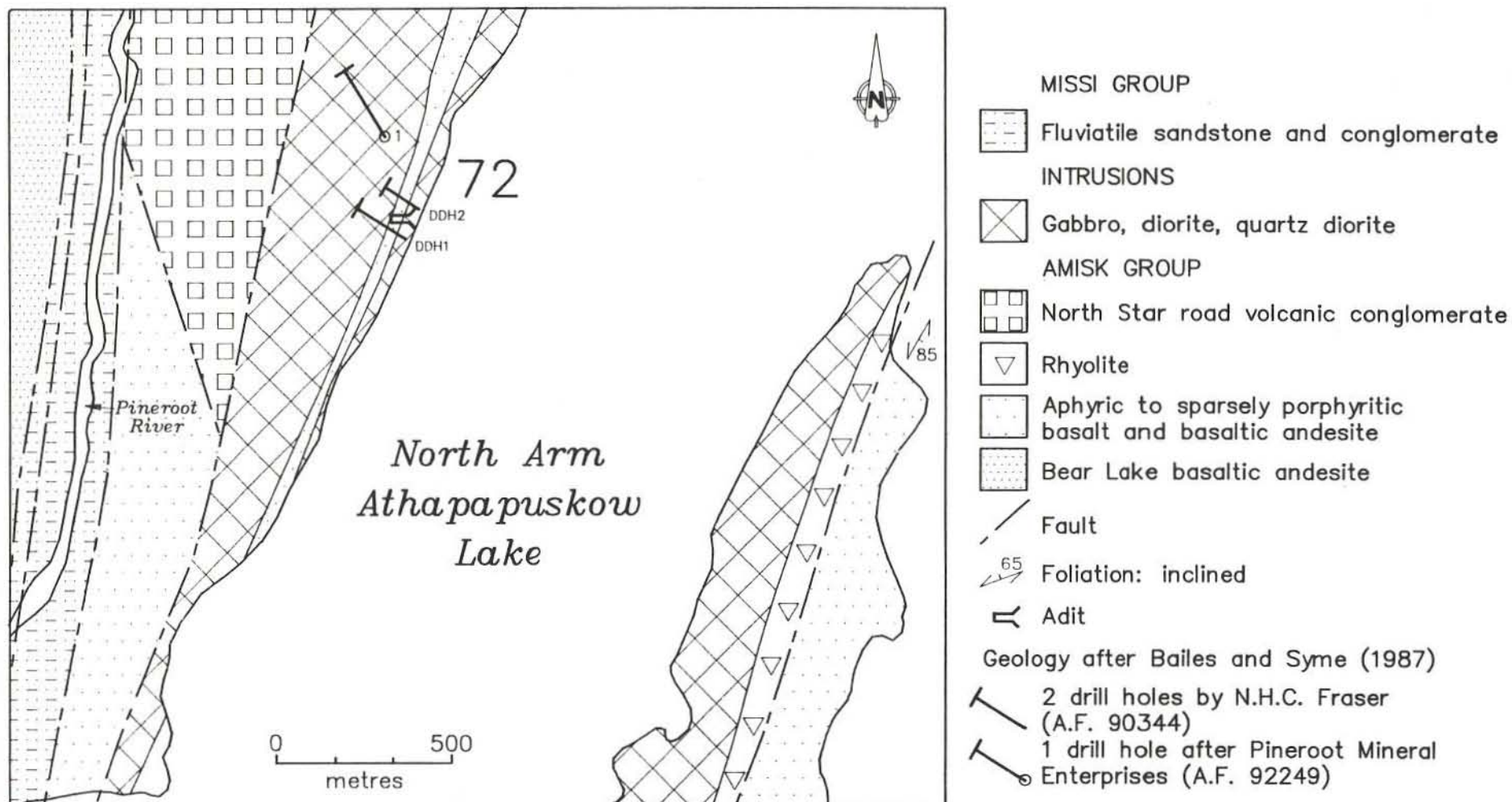


Figure 72-1: Geological setting of occurrence 72.

LOCATION: 73

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6068246N/330816E

ACCESS: Via Provincial Road 10 and boat

EXPLORATION SUMMARY:

Hotstone Gold Mines Ltd. drilled three holes totaling 424 m on claims F.H. 3 and F.H. 4 in 1951-52 (A.F. 90328).

GEOLOGICAL SETTING:

The area is underlain by fine- to medium-grained, equigranular gabbro that intrudes the Baker Patton felsic volcanic complex and minor basalt and basaltic andesite (Fig. 73-1). The gabbro extends north to Murray Lake and has been mapped as far as Flintoba Lake (Gale and Eccles, 1988). The drill core was logged as dominantly andesite with minor sericite schist and rhyolite (A.F. 90328).

MINERALIZATION:

Minor pyrite occurs as disseminations and veinlets in sheared andesite and sericite schist. DDH 2 intersected a 13 m long section of barren quartz (A.F. 90328).

GEOLOGICAL DATA:

None.

CLASSIFICATION:

Disseminated mineralization - not classified. The quartz vein does not appear to contain any sulphide minerals and does not appear to have been assayed for Au.

AREA: North of Bakers Narrows, Athapapuskow Lake

AIRPHOTO: A26328-175

REFERENCES:

Assessment File: 90328

Manitoba Energy and Mines, Mines Branch.

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

Buckham, A.F.

1942: Athapapuskow Lake, Manitoba: preliminary map; Geological Survey of Canada, Paper 42-16, 1:31 680.

Buckham, A.F.

1944: Athapapuskow Lake, Manitoba; Geological Survey of Canada, Map 807A, 1:63 360.

Gale, G.H. and Eccles, D.R.

1988: Mineral deposits and occurrences in the Flin Flon area NTS 63K/13: Part 1, Mikanagan Lake area (63K/13SE); Manitoba Energy and Mines, Mineral Deposit Series Report No. 1, 133p.

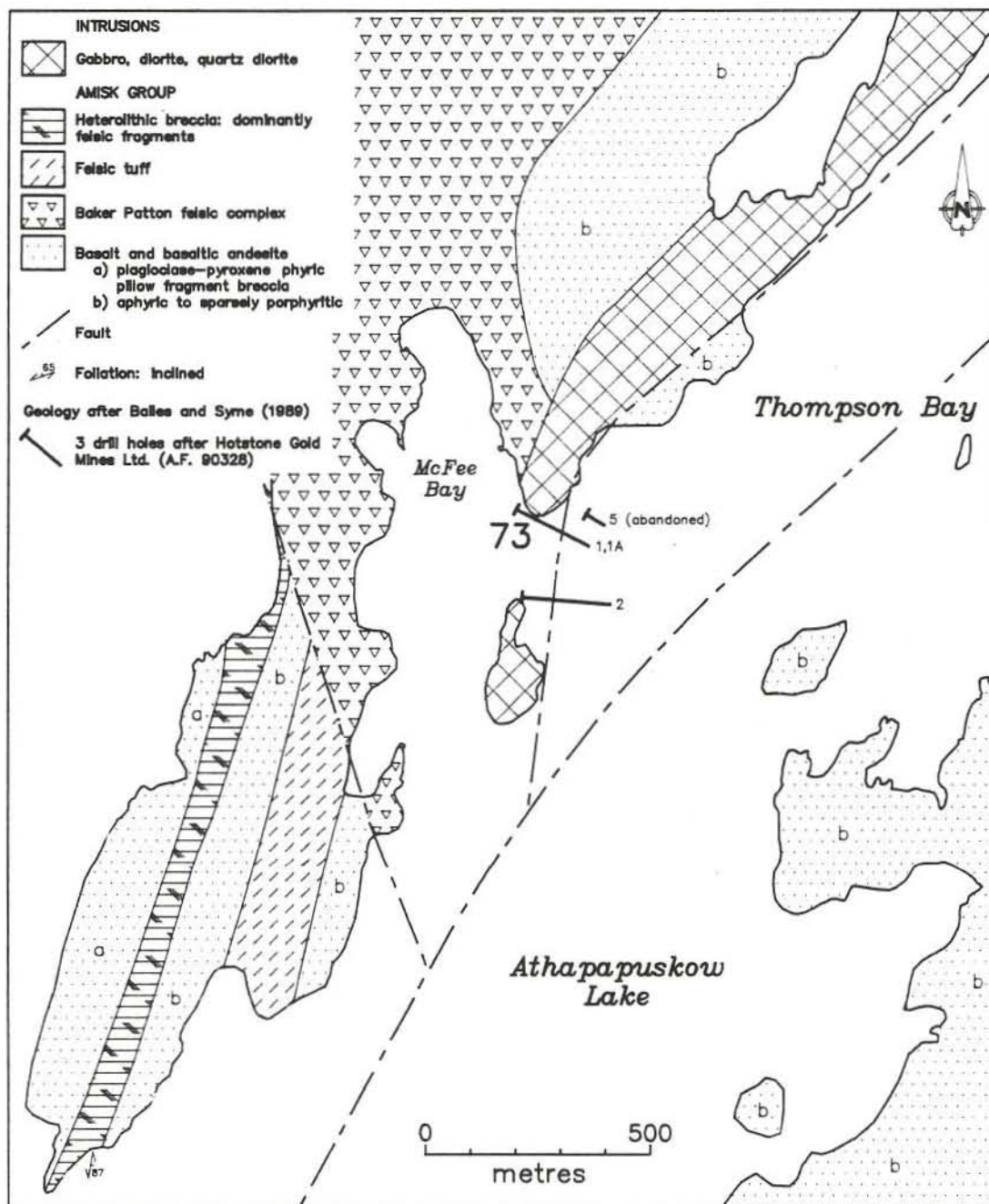


Figure 73-1: Geological setting of occurrence 73.

LOCATION: 74

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6063633N/329456E

ACCESS: Via boat

EXPLORATION SUMMARY:

HBED drilled three holes totalling 536 m on the Key 4 claim in 1974 (A.F. 92254).

GEOLOGICAL SETTING:

The north shore of Sharpe Bay, Athapapuskow Lake is underlain by aphyric rhyolite and aphyric to sparsely porphyritic basalt and basaltic andesite flows (Fig. 74-1). The south shore is underlain by basalt and basaltic andesite flows and minor aphyric rhyolite and rhyolite dykes (Bailes and Syme, 1989). The drill cores were logged mostly as 'andesitic rocks'; a 15 m section of dacitic rocks was intersected in DDH Kay 1 (A.F. 92254).

MINERALIZATION:

DDH Kay 1 intersected 19 m of greenish-grey, very fine grained, well foliated, chlorite-talc schist with small sections of 'andesite' and rhyolite that contain 3 to 60% pyrite. The schist is cut by quartz and pegmatite stringers and contains trace graphite. Minor pyrite and graphite were intersected in DDH Kay 2 and Kay 3 (A.F. 92254). The mode of occurrence of sulphide in DDH Kay 1 was not indicated in the drill logs.

AREA: Northeast of Bakers Narrows, Athapapuskow Lake

AIRPHOTO: A26328-178

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. It is postulated that the 3 m thick zones of 20 to 60% pyrite and graphite represents interlayered near solid pyrite and silicate rock layers.

REFERENCES:

Assessment File: 92254

Manitoba Energy and Mines, Mines Branch.

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

Syme, E.C.

1988: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

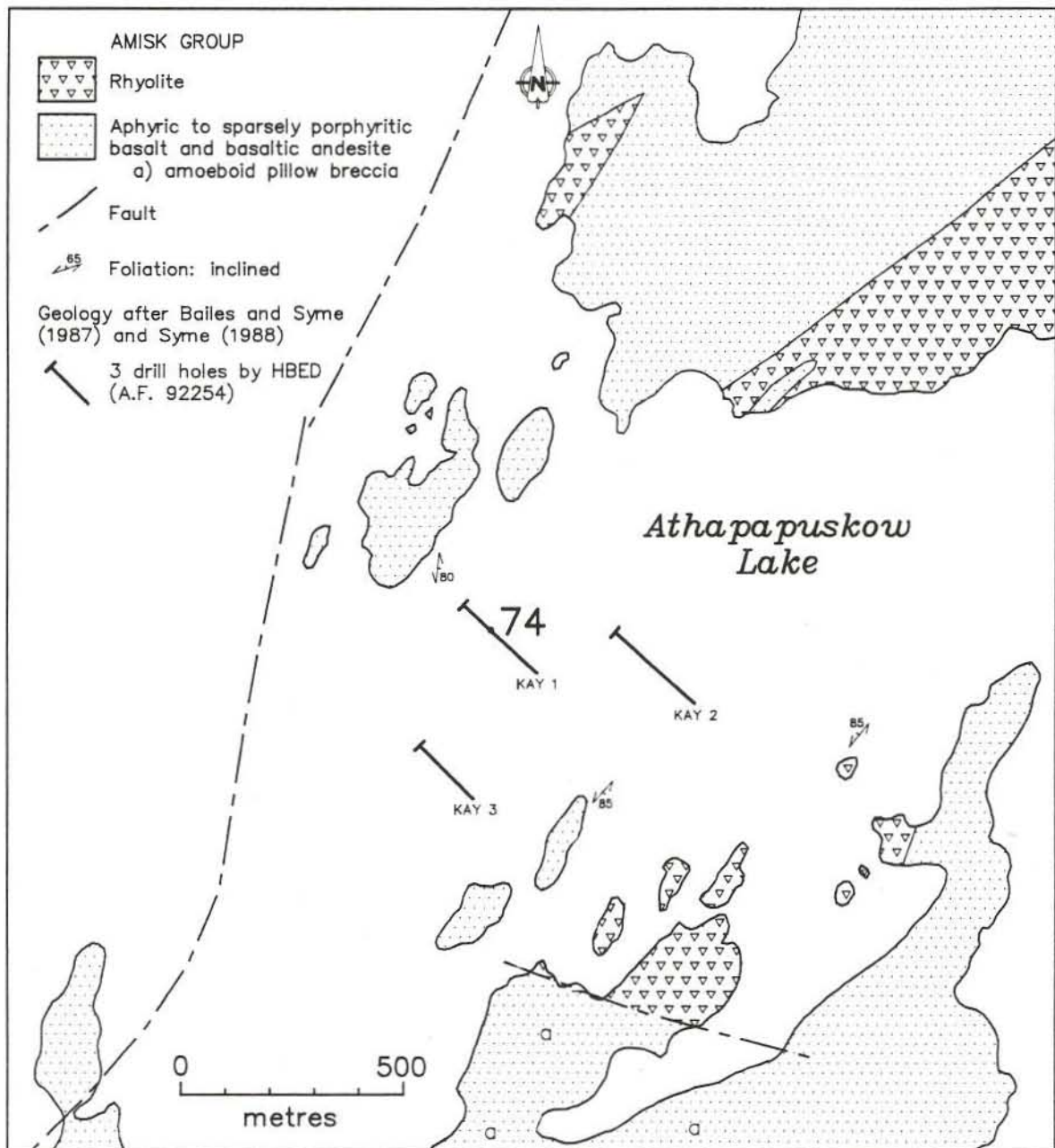


Figure 74-1: Geological setting of occurrence 74.

LOCATION: 75

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6048959N/325441E

ACCESS: Via boat on Athapapuskow Lake

AREA: Limestone Narrows, Athapapuskow Lake

AIRPHOTO: A26397-136

EXPLORATION SUMMARY:

In 1952, HBED completed an EM survey on the Joy claims and drilled four holes totalling 349 m on claims Joy 157, -161 and -162 in 1953 (A.F. 90353, 90354). In 1979, Granges Exploration AB drilled three holes totalling 172.0 m to test EM conductors on CB 7751 (A.F. 92586).

GEOLOGICAL SETTING:

The islands and shorelines of Athapapuskow Lake between the Payuk Lake Fault to the north and the North Athapapuskow Lake Fault to the south (Fig. 75-1) are underlain by the Millwater pillowed basalt (Syme, 1988a). Ordovician dolomite covers the Proterozoic rocks further inland. Most of the drill core consisted of sheared and altered (chloritic, sericitic and hematitic) 'andesite'. In addition to 'andesite', the drill holes intersected minor rhyolite, fragmental rhyolite, rhyolite porphyry and graphitic schist (A.F. 90354).

MINERALIZATION:

DDH Nar11 intersected 10.6 m of 'earthy pyrite' interbedded with graphitic argillite and felsic tuff(?) (A.F. 92586). Minor disseminations and stringers of pyrite

were present in graphite schist in DDH 5 and 8 (A.F. 90354).

GEOCHEMICAL DATA:

Eleven samples from DDH Nar11, Nar12 and Nar13 assayed for Granges Exploration AB contained only trace amounts of Cu, Zn, Au and Ag (A.F. 92586).

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation.

REFERENCES:

- Assessment Files: 90353, 90354, 92454, 92586
Manitoba Energy and Mines, Mines Branch.
- Syme, E.C.
1988a: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.
- Syme, E.C.
1988b: Athapapuskow Lake project; In Manitoba Energy and Mines, Minerals Division, Report of Field Activities, 1988, p. 20-34.

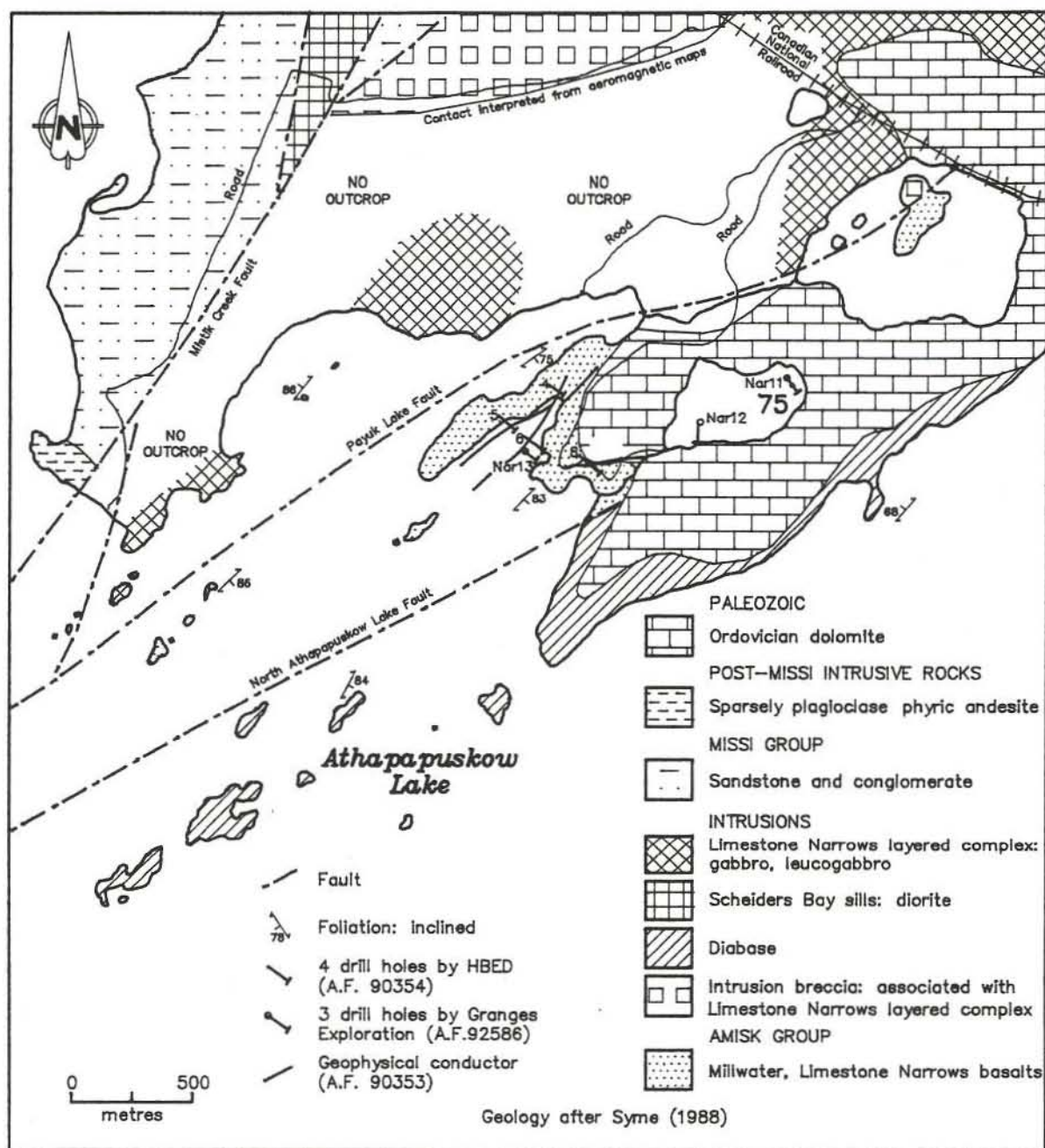


Figure 75-1: Geological setting of occurrence 75.

LOCATION: 76

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6062200N/328979E

ACCESS: Via Highway 10 to Bakers Narrows

AREA: 500 m north of Bakers Narrows, Athapapuskow Lake

AIRPHOTO: A26328-194

EXPLORATION SUMMARY:

In 1972, Straus Exploration Inc. completed a Turam ground EM survey on Reservation of Mineral Rights No. 7 (RMR 007) that outlined three anomalous zones, and tested one anomaly with a 310 m hole (A.F. 92322, 92323). Pinebay Mines Ltd. conducted a HLEM survey on RMR 007 in 1978 (A.F. 92321).

occurs in a 1 cm thick pyrite vein at 236 m (A.F. 92323).

GEOCHEMICAL DATA:

None.

GEOLOGICAL SETTING:

The area is underlain by aphyric to porphyritic basalt and basaltic andesite flows and mafic amoeboid pillow breccia (Fig. 76-1; Syme, 1988). Chloritic 'andesite' and sericite schist were the dominant rock types intersected in drill core (A.F. 92323).

CLASSIFICATION:

Vein type deposit; multiple veins or lenses.

MINERALIZATION:

Narrow lenses, stringers and disseminations of pyrite were intersected in light green, slightly chloritic 'andesite' from 236 m to 310 m in DDH 1A. Chalcopyrite

REFERENCES:

- Assessment Files: 92321, 92322, 92323
Manitoba Energy and Mines, Mines Branch.
- Syme, E.C.
1988: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

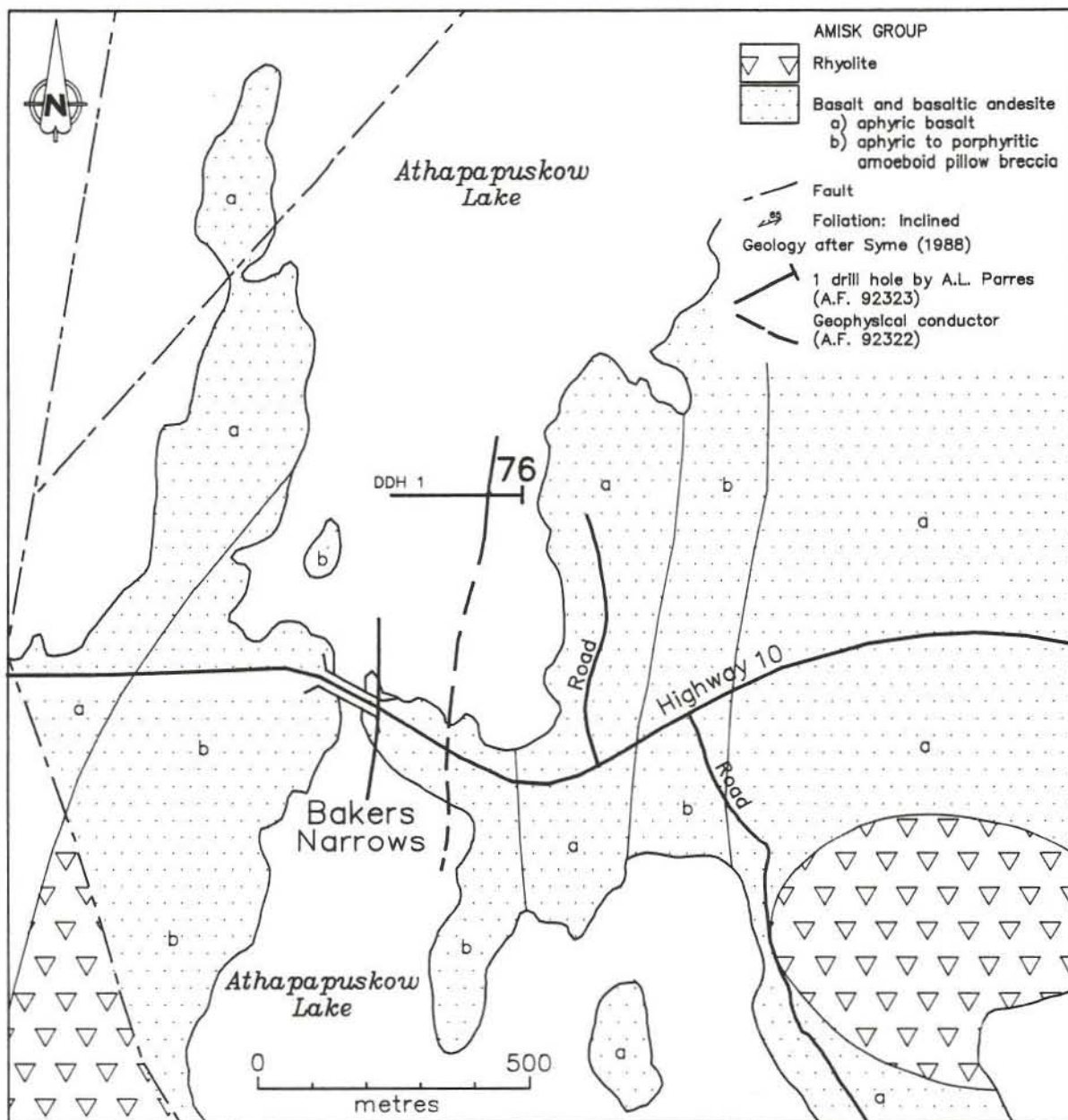


Figure 76-1: Geological setting of occurrence 76.

LOCATION: 77

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6042050N/336247E

ACCESS: Via gravel road from Highway 10 and along old logging trails

AREA: Southeast of Athapapuskow Lake

AIRPHOTO: A26051-71

EXPLORATION SUMMARY:

Pronto Explorations completed EM surveys in 1971 and 1975, and a magnetometer survey in 1973 on Reservation of Mineral Rights 118 (A.F. 92577). HBED drilled two holes totalling 235 m on CB 10623 in 1981 (A.F. 92448).

GEOLOGICAL SETTING:

The area is underlain by Ordovician dolomite that is approximately 20 m thick (Fig. 77-1; A.F. 92448). Andesitic and dacitic tuff with minor granodiorite intrusions underlie the Paleozoic dolomite. The volcanic rocks are locally sheared, chloritic and garnetiferous (A.F. 92448).

MINERALIZATION:

DDH Res-12 intersected 60 cm of minor pyrite and chalcopyrite and possibly visible gold in fine- to medium-grained porphyritic andesitic tuff. DDH Res-12 also intersected 1.2 m with 60 to 70% graphite and 5 to 10% pyrite. Several other sections contained up to 10% pyrite \pm pyrrhotite, minor chalcopyrite, magnetite and graphite in andesite tuff (A.F. 92448).

GEOCHEMICAL DATA:

A sample (DDH Res-12) of chloritic andesite tuff that contained 5 to 6% pyrite stringers and abundant carbonate stringers assayed 0.12% Cu and 0.1% Zn over 50 cm (A.F. 92448).

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. The pyrite stringers probably represent veins of sulphide mobilized from strata containing disseminated sulphide minerals, 'earthy pyrite' and graphite.

REFERENCES:

Assessment Files: 92448, 92577

Manitoba Energy and Mines, Mines Branch.

Syme, E.C.

1988: Millwater (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-4, 1:15840

Syme, E.C.

1988: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

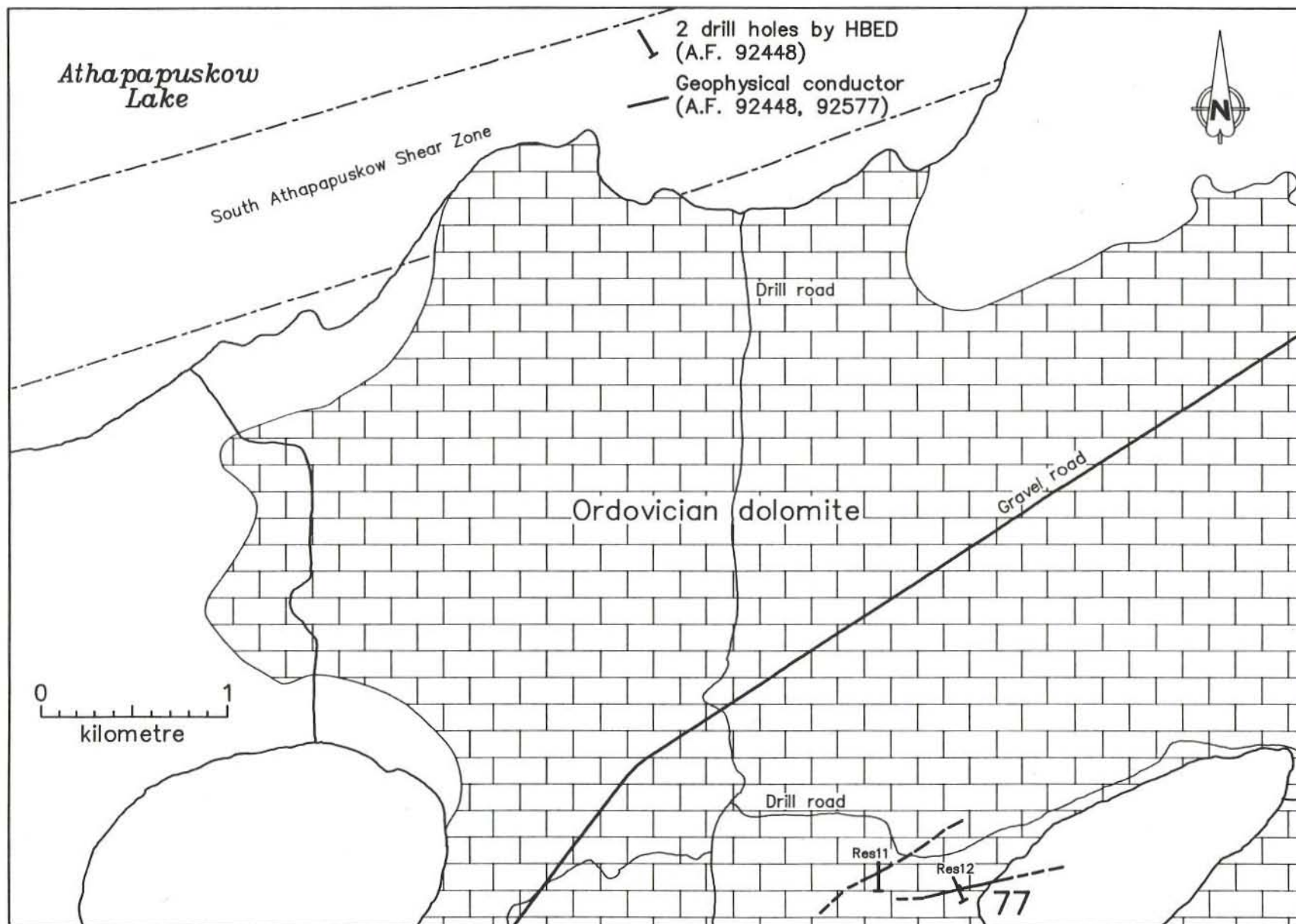


Figure 77-1: Geological setting of occurrence 77.

LOCATION: 78

NAME:

UTM: 6062372N/336047E

ACCESS: Via boat on Neso Lake and traverse

AREA: Northwest Neso Lake

AIRPHOTO: A26398-73

EXPLORATION SUMMARY:

The area was staked as the Mistik claim group in 1949 by W. Jansen. HBED completed an EM survey in 1952 and drilled a 155 m hole south of the Mistik claims (A.F. 90321). W. Jansen restaked the area for Denrow Mines Ltd. as claims Rock 1 to 4 in 1958. W. Wallenhaupt staked claims Gly 1 through 4 in 1963 and blasted several trenches in 1964 (M.I. Card NTS 63K/12 Cu8). In 1972, P. Bachnick staked CB 4149 and blasted 11 trenches in 1973. The claim block was assigned to Falconbridge Nickel Mines Ltd. in 1973, who completed geological, magnetic and EM surveys (A.F. 92688).

GEOLOGICAL SETTING:

The area is underlain by aphyric basalt and a felsic dyke complex with mafic dykes that contain plagioclase \pm pyroxene phenocrysts (Fig. 78-1; E.C. Syme, pers. comm., 1988; A.F. 92688).

MINERALIZATION:

Several of the trenches, which vary in size from 1 x 1 x 0.3 m to 4 x 2 x 1 m, were blasted on an irregular 0.5 to 1.5 m wide quartz-carbonate vein that strikes 145°. This vein cuts green altered mafic volcanic rocks that are locally silicified. At trench 4, the quartz vein contains up to 50% pyrite (Fig. 78-2). Trench 5 contains 20% pyrite with radiating acicular arsenopyrite.

Trenches 4, 6 and 8 to 11 contain disseminations and stringers of chalcopyrite along fractures. Outcrops to the east and south of the trenches commonly have occasional stains of malachite and blebs of chalcopyrite and pyrrhotite that are similar to those in the trenches (A.F. 92688).

GEOCHEMICAL DATA:

Samples from six trenches were assayed for Au, Ag and Cu (Fig. 78-2; A.F. 92688). Grab samples contained up to 30 g/t Au; one 90 cm channel sample contained 4 g/t Au.

CLASSIFICATION:

Vein type deposit; multiple veins or lenses. Disseminations and veinlets of sulphides and gold in felsic and mafic volcanic and intrusive rocks; possible porphyry type mineralization.

REFERENCES:

Assessment Files: 90321, 92688, 92689

Manitoba Energy and Mines, Mines Branch.

Mineral Inventory Card NTS 63K/12 Cu8

Manitoba Energy and Mines, Geological Services Branch.

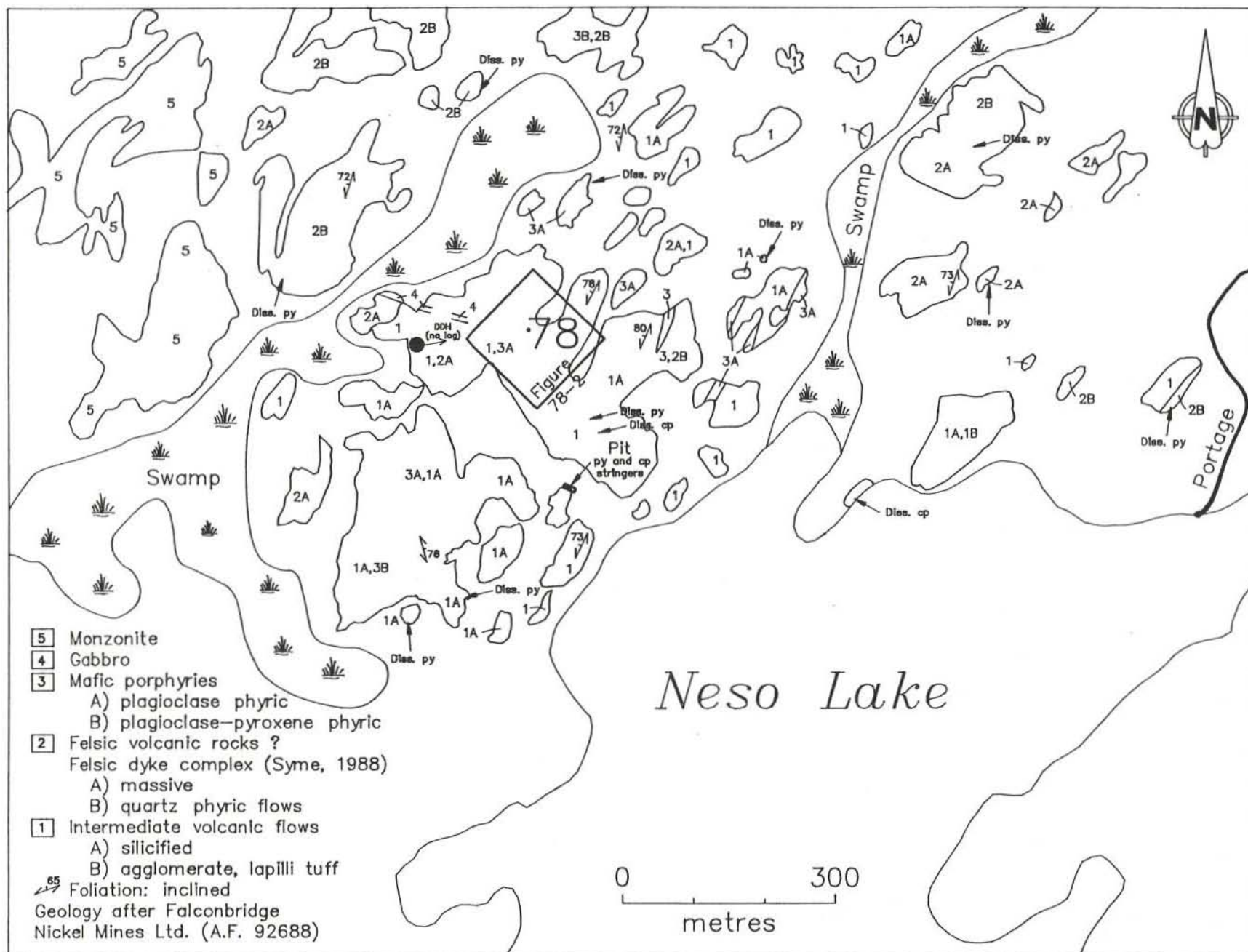


Figure 78-1: Geological setting of occurrence 78.

○ Tr 1



Tr 2 Assays

Au (g/t)	Ag (g/t)
0.3	—
2.4	—
4.9	—
2.4	0.18
4.0	1.2

Tr 3 Assays

Au (g/t)	Ag (g/t)
10.2	4.6
1.5	8.0

Tr 4 Assays

Au (g/t)	Ag (g/t)
30.0	6.8
8.2	2.4
9.0	5.2
15.0	5.2
9.2	7.4

Tr 5 Assays

Au (g/t)	Cu (%)
9.2	6.05
1.2	2.35

Au (g/t)	Cu (%)
3.4	—
4.6	—
0.3	0.12

Tr 6 Assays

Au (g/t)	Cu (%)
1.2	0.12

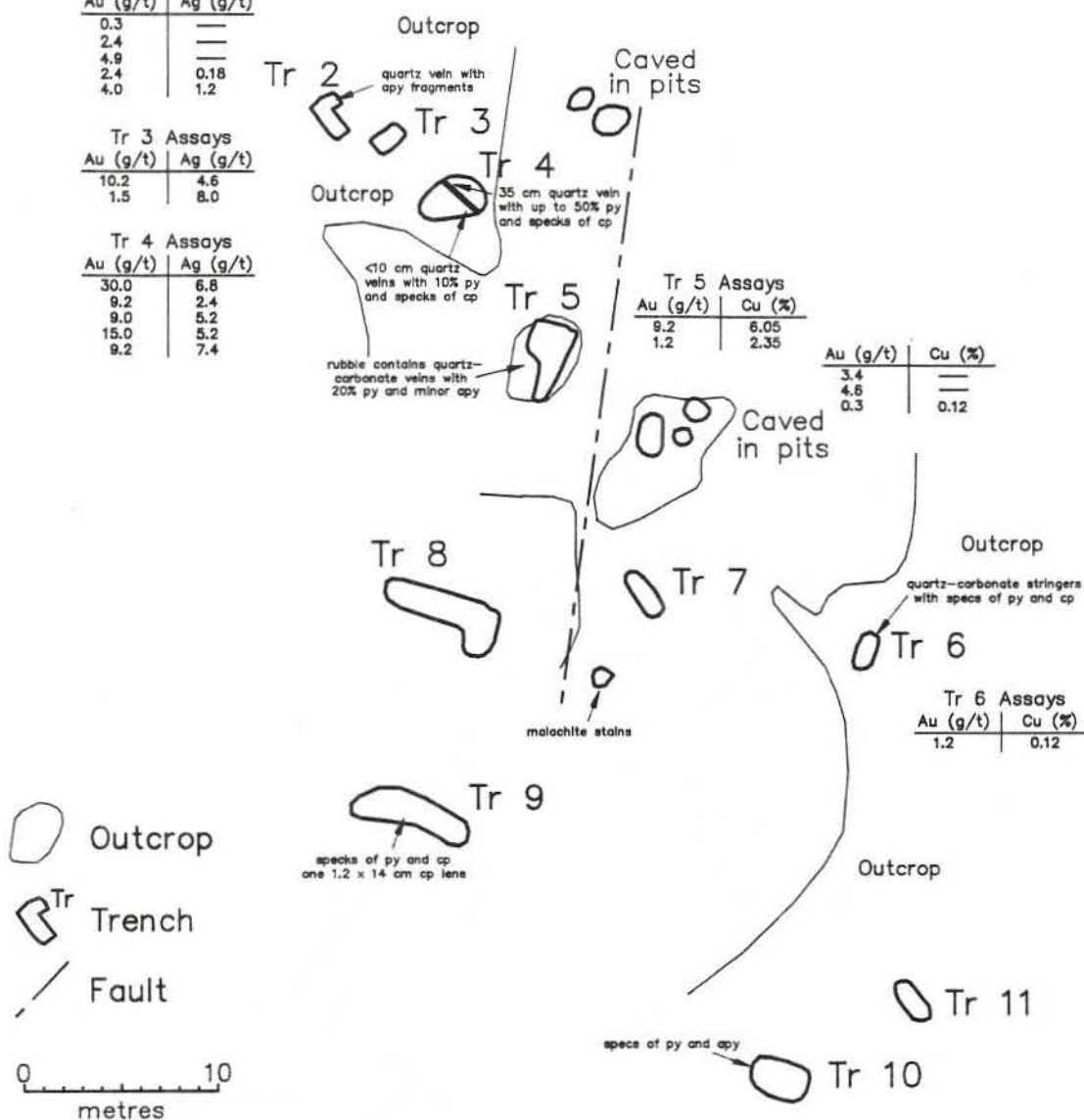


Figure 78-2: Geochemical data and trench locations from at occurrence 78 (A.F. 92888).

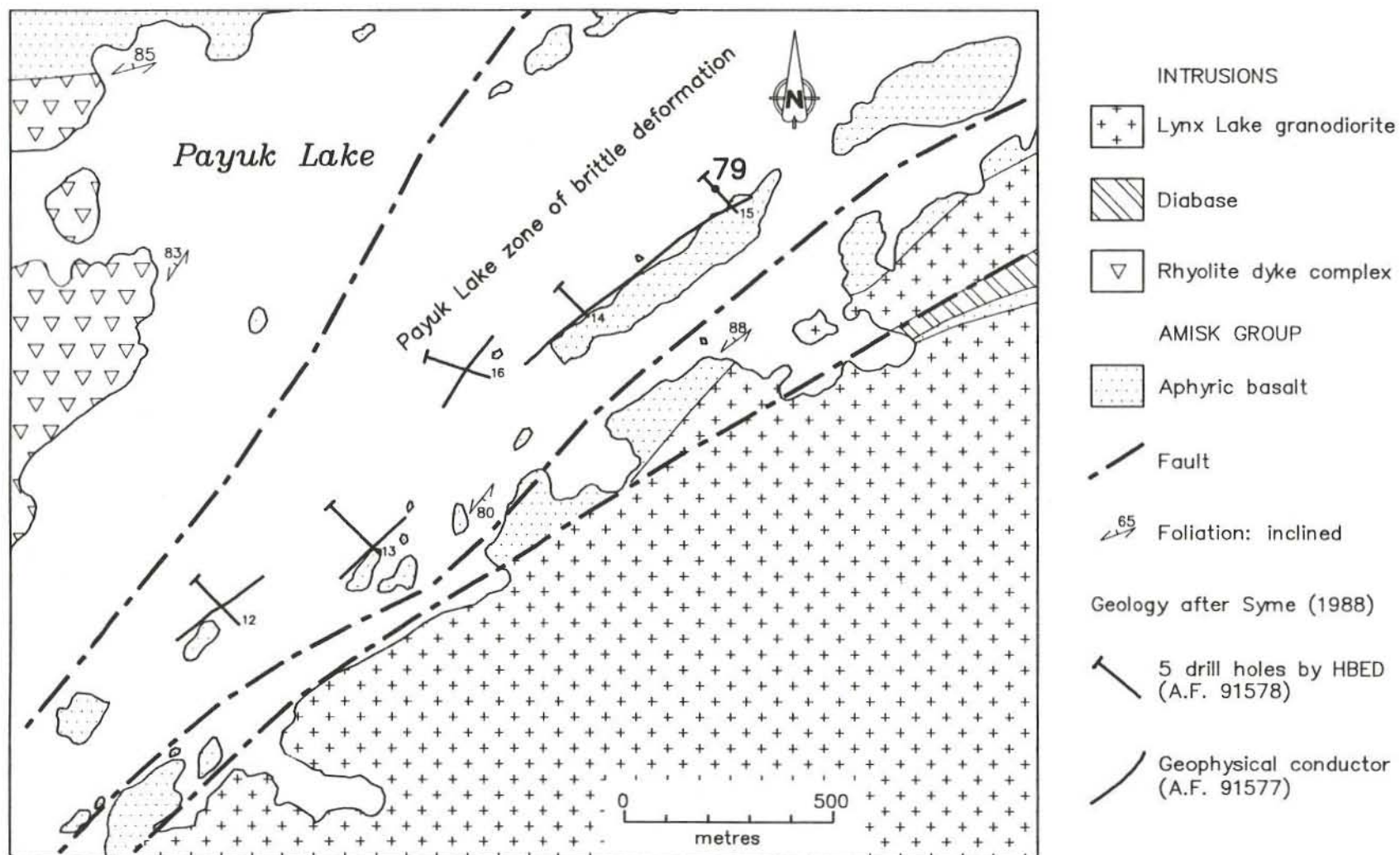


Figure 79-1: Geological setting of occurrence 79.

LOCATION: 79

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6057898N/337683E

ACCESS: Via boat on Payuk Lake

AREA: Islands in Payuk Lake

AIRPHOTO: A26398-86

EXPLORATION SUMMARY:

HBED completed an EM survey on the P and Bus claims in 1951 and drilled five holes totalling 976 m on the P claims in 1956 (A.F. 91577, 91578).

sected 13 m of sheared graphite with quartz fragments and moderate pyrite (A.F. 91578).

GEOCHEMICAL DATA:

None.

GEOLOGICAL SETTING:

The area, which is underlain predominantly by aphyric basalt that has been intruded by diabase dykes, occupies a zone of brittle deformation associated with the Payuk Lake Fault Zone (Fig. 79-1; Syme, 1988). The Lynx Lake Granodiorite Pluton occurs to the south. DDH 12 intersected three sections of fault breccia with a total core length of over 100 m (A.F. 91578).

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation.

REFERENCES:

Assessment Files: 91578, 91577

Manitoba Energy and Mines, Mines Branch.

MINERALIZATION:

Four of the five drill holes intersected pyrite-rich graphite schist with occasional stringers of carbonate and slight chalcopyrite. DDH 15 also intersected 50 cm of andesite with 'well mineralized' pyrite. DDH 16 inter-

Syme, E.C.

1988: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

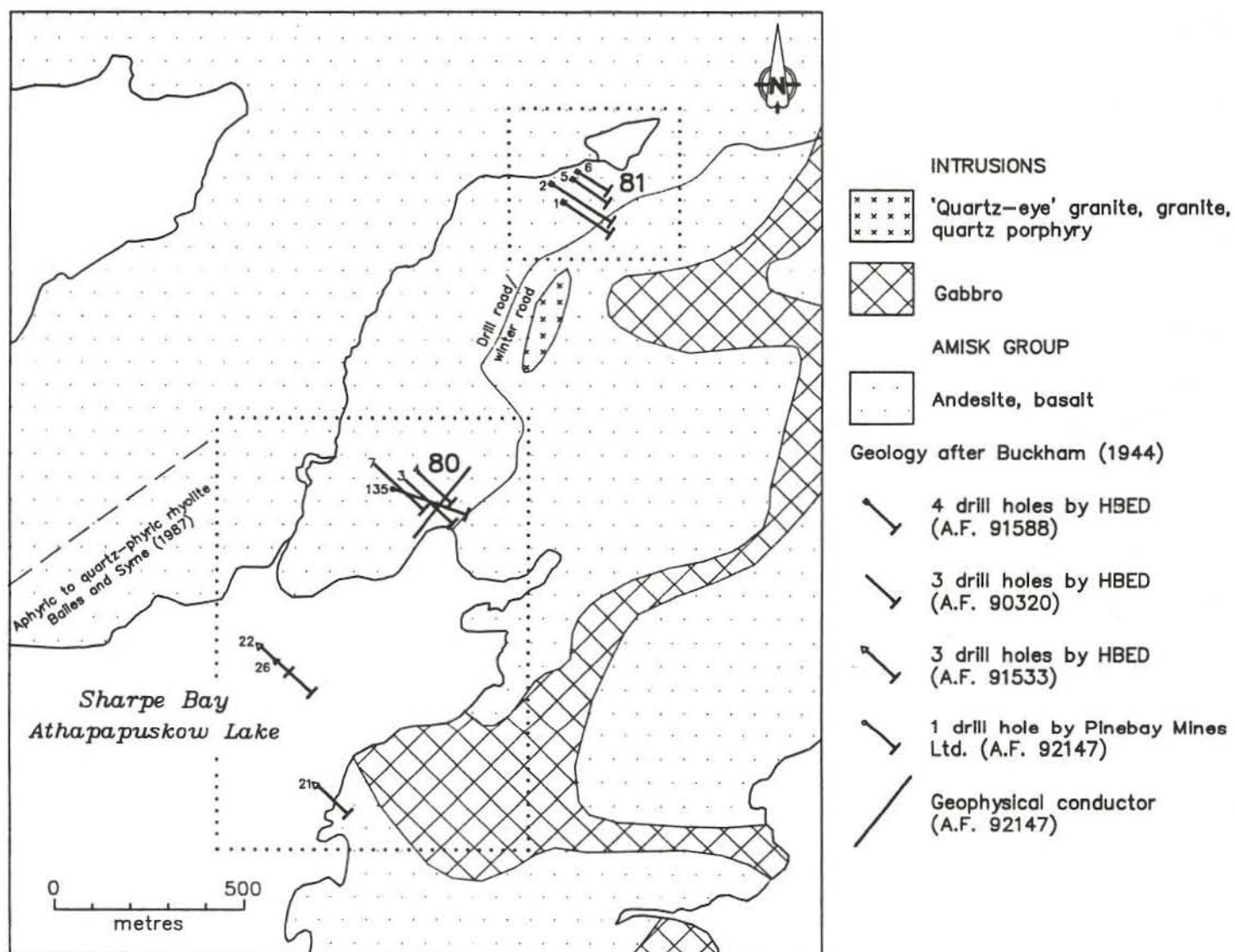


Figure 80-1: Geological setting of occurrences 80 and 81.

LOCATION: 80

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6064428N/331419E

ACCESS: Via Provincial Road 10 to Bakers Narrows
and by boat on Athapapuskow Lake

EXPLORATION SUMMARY:

HBED blasted three trenches and drilled three holes totalling 578 m on the New York claim in 1949. Three trenches had been made on the property at an earlier date (A.F. 91533). In 1950, HBED completed three drill holes totalling 370 m (A.F. 90320). A magnetometer survey was conducted on claim Way 31 in 1974. Pinebay Mines Ltd. tested an EM anomaly on CB 5657 with a 164 m drill hole in 1976 (A.F. 92147).

GEOLOGICAL SETTING:

The area is underlain by a thick sequence of basalt to andesite (Buckham, 1944). The geological map by Bailes and Syme (1987) indicates that the north shore of Sharpe Bay, Athapapuskow Lake, is underlain by aphyric and quartz phyric rhyolite that occurs south of a thick assemblage of aphyric to sparsely plagioclase phyric basalt and basaltic andesite flows (Fig. 80-1; Bailes and Syme, 1989). Trenches have been blasted in rusty weathered rhyolite and dacite (Fig. 80-2; A.F. 91533). DDH 21 and 22 intersected thick sections of quartz phyric felsic rocks. In addition, DDH 26 intersected chloritic and sericite schists (A.F. 91533). Rhyodacitic flows and breccias are exposed immediately west of the trenches (Fig. 80-2).

MINERALIZATION:

DDH 3 intersected 2.1 m of solid pyrite and pyrrhotite and several 'well mineralized' sections in sheared rhyolite and chloritic dacite (A.F. 90320). DDH 135 intersected 40 m of dark green to black, chloritic, intermediate fragmental volcanic rock with 5 to 70% sulphide minerals. The fragments are carbonatized, epidotized and slightly sericitized. Pyrrhotite, pyrite, magnetite and chalcopryrite occur in variable amounts. Gold, covellite and sphalerite grains and blebs were also present (A.F. 92147). The presence of only minor concentrations of sulphide minerals in DDH 4 and 7

AREA: North Arm, Athapapuskow Lake

AIRPHOTO: A26328-178

suggests either that the mineralization is of limited lateral extent or that DDH 3 was drilled along a zone (pipe?) of alteration (A.F. 90320).

GEOCHEMICAL DATA:

Thirty-four drill core samples were assayed; values ranged from nil to 0.69 g/t Au, nil to 3.09 g/t Ag, 0.01% to 0.11% Cu and trace to 0.07% Zn (A.F. 92147).

CLASSIFICATION:

Stratabound massive sulphide type deposit; volcanic rock associated. This occurrence consists of a solid sulphide lense and a zone of extensive chloritization and sulphidization that represents hydrothermal alteration. The stratigraphic top of the alteration system may not have been intersected by the drill holes.

REFERENCES:

- Assessment Files: 90320, 91533, 91842, 92147
Manitoba Energy and Mines, Mines Branch.
- Bailes, A.H. and Syme, E.C.
1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.
- Bailes, A.H. and Syme, E.C.
1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.
- Buckham, A.F.
1942: Athapapuskow Lake, Manitoba: preliminary map; Geological Survey of Canada, Paper 42-16, 1:31 680.
- Buckham, A.F.
1944: Athapapuskow Lake, Manitoba; Geological Survey of Canada, Map 807A, 1:63 360.

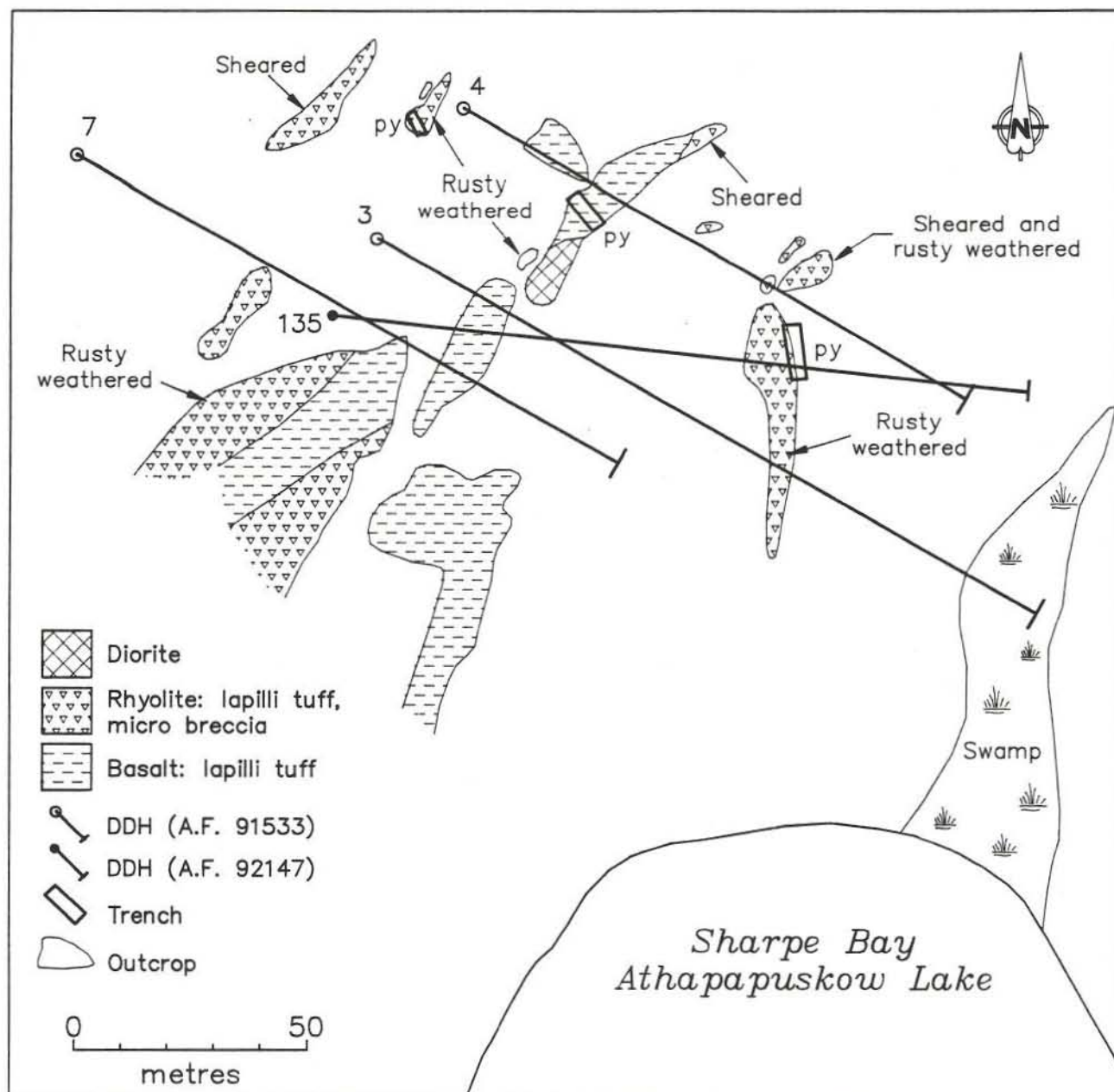


Figure 80-2: Detailed geology, trench and drill hole locations at occurrence 80.

LOCATION: 81

NAME:

UTM: 6065217N/331737E

ACCESS: Via boat from Bakers Narrows to Sharpe Bay on Athapapuskow Lake and traverse approximately 1 km east

EXPLORATION SUMMARY

Three trenches were blasted into a rusty zone prior to 1949 when HBED drilled four holes totalling 656 m on the Rome claim (A.F. 91588).

GEOLOGICAL SETTING:

The area is underlain by a thick sequence of basalt to andesite (Fig. 80-1; Buckham, 1944). Most of the rocks intersected in the drill holes were of rhyolitic and dacitic composition (A.F. 91588).

MINERALIZATION:

The trenches were blasted in sheared, rusty weathered rhyolite that contains fine grained pyrrhotite with some malachite stains (Fig. 81-1). Sulphide mineralization occurred throughout DDH 1 core; this drill hole intersected 5.4 m of 'well mineralized' pyrite and pyrrhotite with scattered chalcopyrite and 1.1 m of near solid pyrite and pyrrhotite within sheared, chloritized and partly silicified dacite. Both DDH 1 and 2 intersected approximately 40 m of chloritic schist, schistose rhyodacite and sulphide-rich rock. DDH 6 intersected 0.5 m of near solid pyrite and pyrrhotite over a core length of 1.1 m (A.F. 91588).

AREA: Northeast of Sharpe Bay, Athapapuskow Lake (Fig. 80-1)

AIRPHOTO: A26328-178

GEOCHEMICAL DATA:

None.

CLASSIFICATION

Stratabound massive sulphide type deposit; volcanic rock associated. The chloritized rocks with sulphide veinlets and disseminations probably represent a zone of hydrothermal alteration. The data are insufficient to determine if the near solid to solid sulphide intersections in DDH 1 and 6 represent the same, or different, sulphide lenses.

REFERENCES:

Assessment File 91588, 91842

Manitoba Energy and Mines, Mines Branch.

Buckham, A.F.

1942: Athapapuskow Lake, Manitoba: preliminary map; Geological Survey of Canada, Paper 42-16, 1:31 680.

Buckham, A.F.

1944: Athapapuskow Lake, Manitoba; Geological Survey of Canada, Map 807A, 1:63 360.

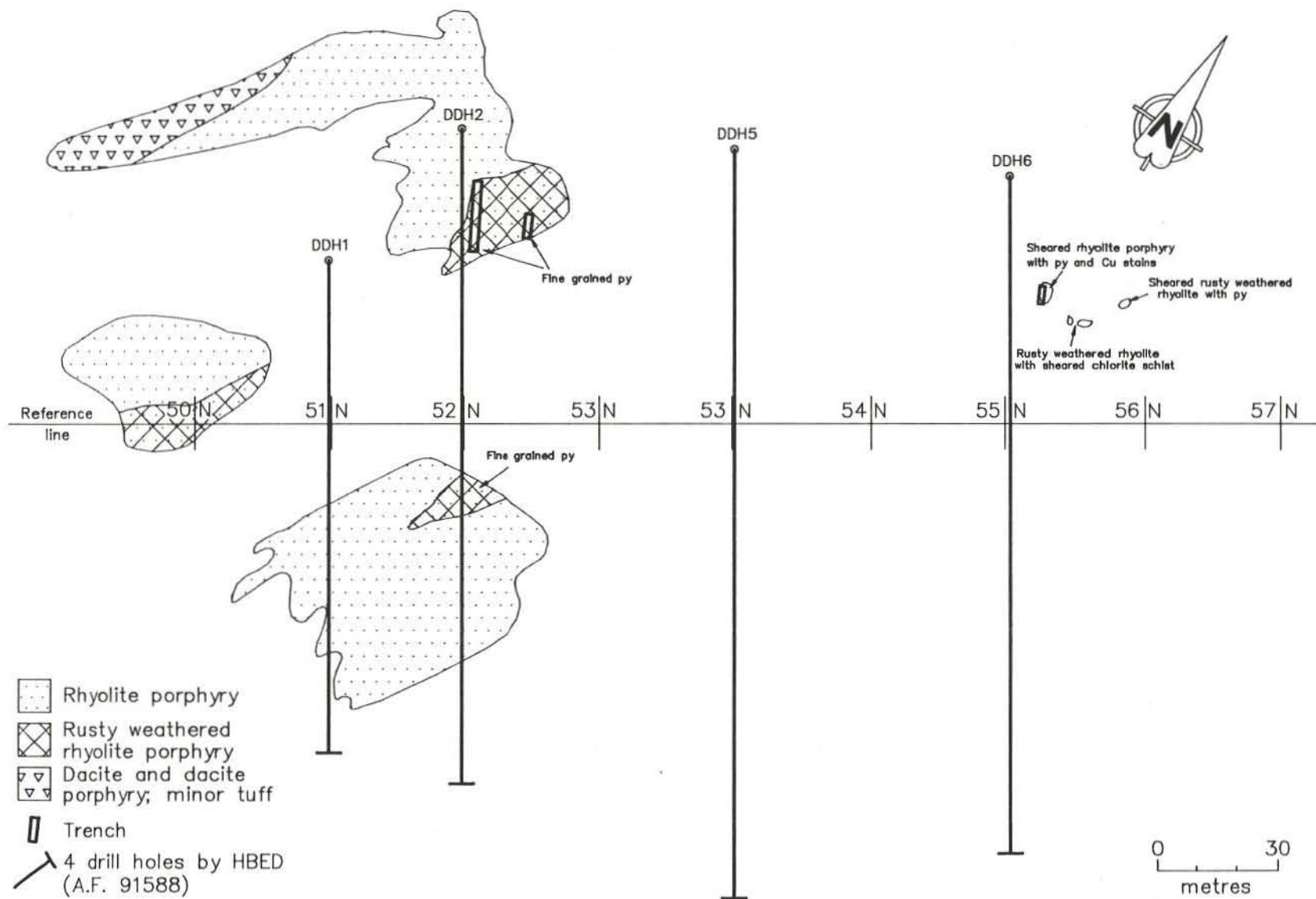


Figure 81-1: Detailed geology, drill hole and trench locations at occurrence 81.

LOCATION: 82

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6055722N/322385E

ACCESS: Via boat on Schist or Athapapuskow lakes

AREA: Southeast Schist Creek

AIRPHOTO: A26397-263

EXPLORATION SUMMARY:

HBED completed an EM survey on the Wan claim group in 1962 and tested a conductor on claim Wan 113 with a 90 m drill hole in 1963 (A.F. 91584).

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation.

GEOLOGICAL SETTING:

The occurrence is located within a wedge of aphyric basalt along the west boundary of the Centennial Fault (Fig. 82-1; Syme, 1988). The fault zone separates Missi Group sandstone and pebble conglomerate to the east from the fine grained equigranular Schist Creek gabbro and diorite to the west.

REFERENCES:

Assessment File 91584

Manitoba Energy and Mines, Mines Branch.

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

Gale, G.H., Baldwin, D.A., and Koo, J.

1980: A geological evaluation of Precambrian massive sulphide deposit potential in Manitoba; Manitoba Energy and Mines, Economic Geology Report ER79-1, 137p.

MINERALIZATION:

An 11 m long core section of sericite-graphite schist reportedly contained 7.5 m of near solid graphite with slight pyrrhotite and pyrite (A.F. 91584). Intersections of this type in the Flin Flon area have been found to be sulphide-graphite strata that consist mainly of sulphide minerals (Gale *et al.*, 1980).

Syme, E.C.

1988: Schist Lake (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-1, 1:15 840.

GEOCHEMICAL DATA:

None.

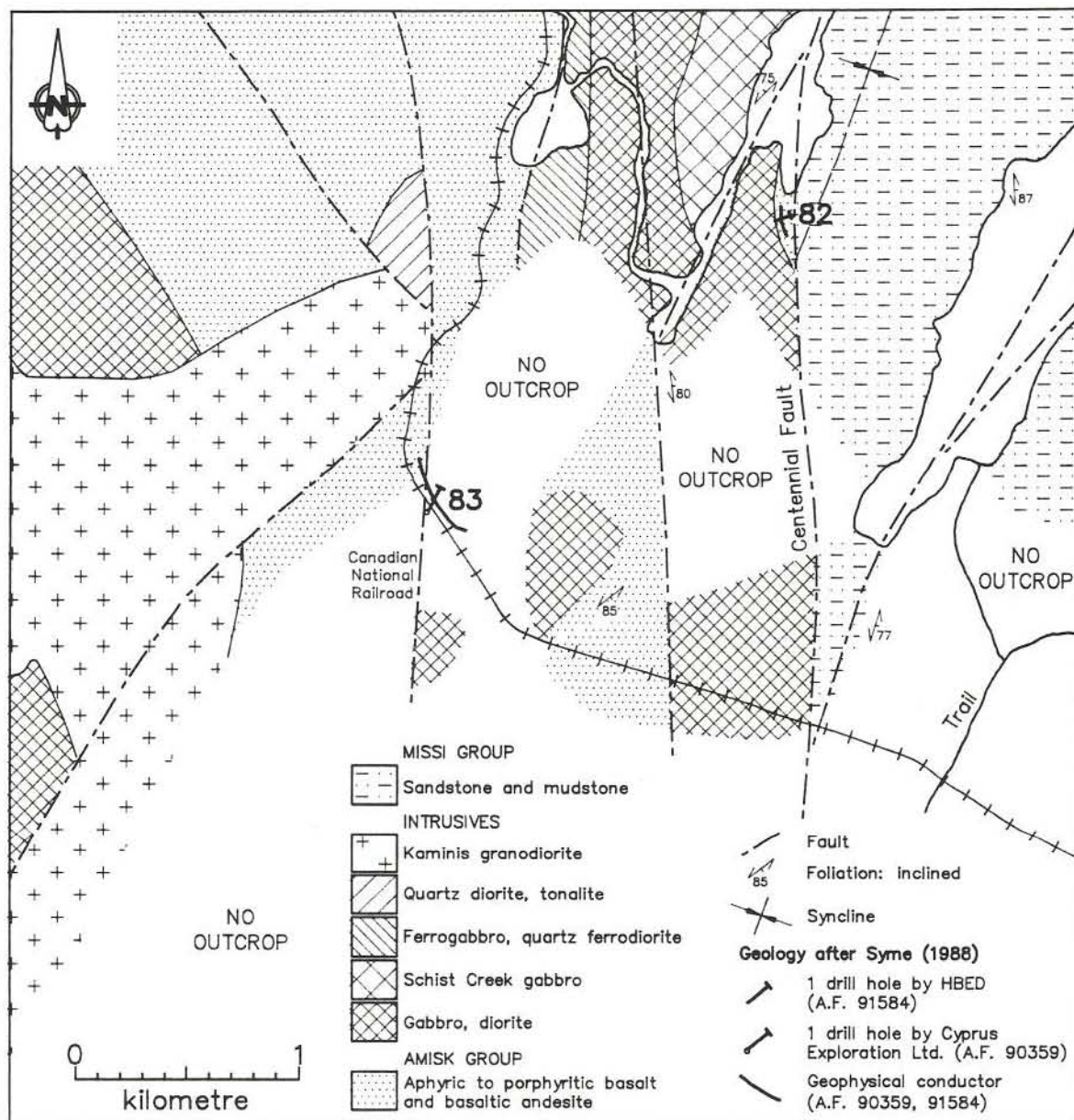


Figure 82-1: Geological setting of occurrences 82 and 83.

LOCATION: 83

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6054527N/320808E

ACCESS: Via traverse along a winter access road from the south end of Schist Lake, or via railroad

EXPLORATION SUMMARY:

Cyprus Exploration Ltd. completed an EM survey on the Sam claims and drilled a 125 m long hole on claim Sam 30 in 1955 (A.F. 90359).

GEOLOGICAL SETTING:

This poorly exposed area is underlain by basaltic rocks and granodiorite (Fig. 82-1; Syme, 1988). The drill hole intersected altered andesite, andesitic tuff, dacitic rocks and graphitic schist (A.F. 90359).

MINERALIZATION:

The drill hole intersected 9 m of graphite-pyrite schist with a number of quartz and feldspar stringers adjacent to highly altered and silicified 'andesite' (A.F. 90359). The 'graphite-pyrite' intersection is interpreted to be sulphide-graphite strata as described by Gale *et al.* (1980).

GEOCHEMICAL DATA:

None.

AREA: Southwest of Schist Lake (Fig. 82-1)

AIRPHOTO: A26397-262

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation.

REFERENCES:

Assessment File 90359

Manitoba Energy and Mines, Mines Branch.

Gale, G.H., Baldwin, D.A., and Koo, J.

1980: A geological evaluation of Precambrian massive sulphide deposit potential in Manitoba; Manitoba Energy and Mines, Economic Geology Report ER79-1, 137p.

Syme, E.C.

1988: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

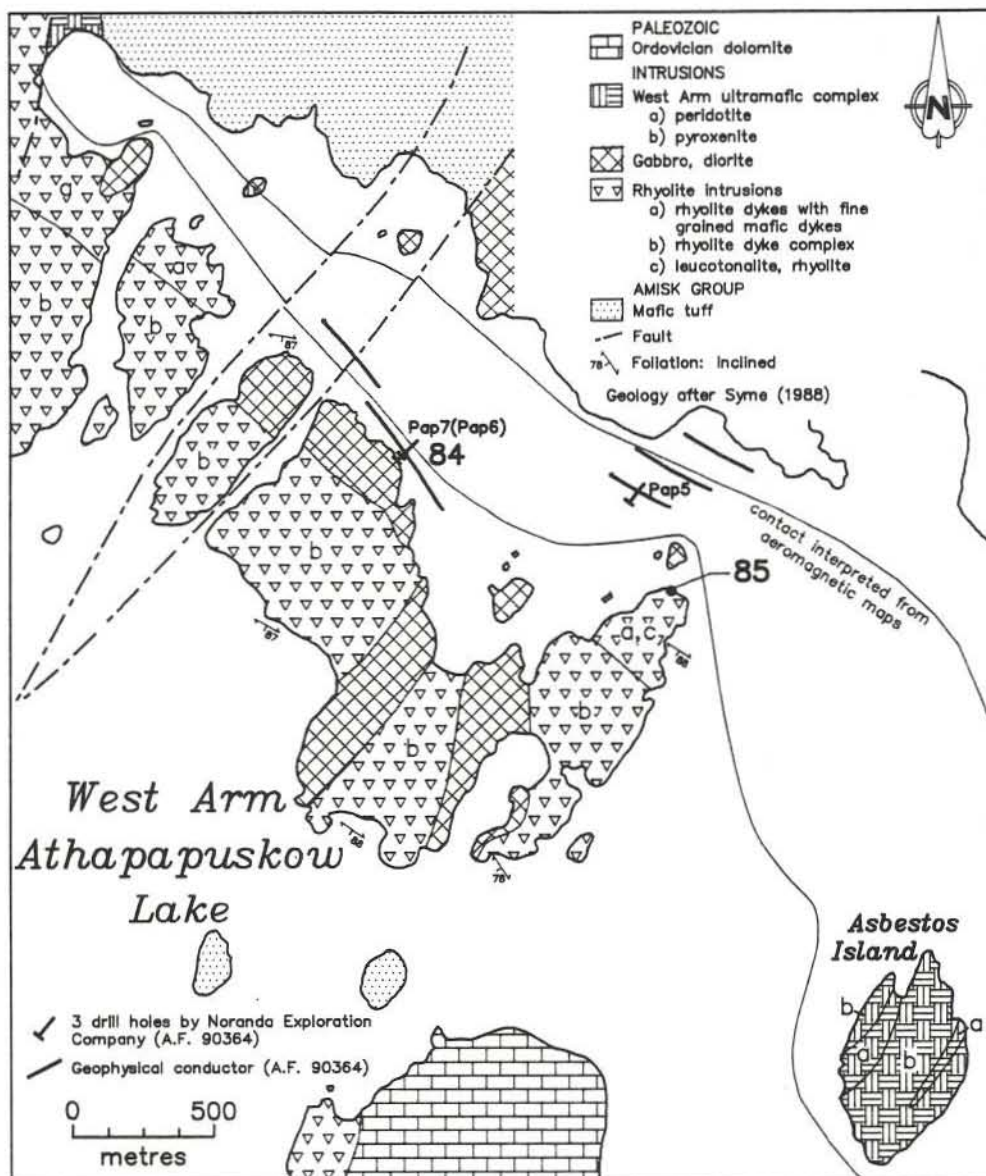


Figure 84-1: Geological setting of occurrences 84 and 85.

LOCATION: 84

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6050422N/318403E

ACCESS: Via boat on Athapapuskow Lake

AREA: West arm of Athapapuskow Lake

AIRPHOTO: A26397-240, -241

EXPLORATION SUMMARY:

Noranda Exploration Co. Ltd. completed an EM survey on the Pap claims in 1966 and drilled a 77 m hole on claim Pap 24 in 1967 (A.F. 90364). Falconbridge Nickel Mines Ltd. conducted a magnetometer survey in 1974 on CB 3495 through 3497 and CB 3510 through 3511 (A.F. 91385).

ated magnetite, hematite, and siderite. Pyrrhotite and pyrite occur as fracture fillings throughout this section of drill core (A.F. 90364).

GEOCHEMICAL DATA:

None.

GEOLOGICAL SETTING:

The interior of the island, which occurs south of DDH Pap 7, consists predominantly of rhyolite dykes that have been intruded by fine grained mafic dykes (Fig. 84-1; Syme, 1988). DDH Pap 7 intersected volcanic rocks, serpentinite, peridotite and quartz diorite (A.F. 90364); the West Arm Ultramafic Complex probably extends north of Asbestos island beneath Athapapuskow Lake (Syme, 1988).

CLASSIFICATION:

Vein type deposit; multiple veins or lenses. Fe-sulphide filled fractures in ultramafic rock.

REFERENCES:

Assessment Files: 90364, 91385, 91583, 91951

Manitoba Energy and Mines, Mines Branch.

Syme, E.C.

1988: West Arm (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-3, 1:1:15 840.

MINERALIZATION:

DDH Pap 7 intersected 22 m of altered volcanic rocks with short sections of serpentinite and dissemin-

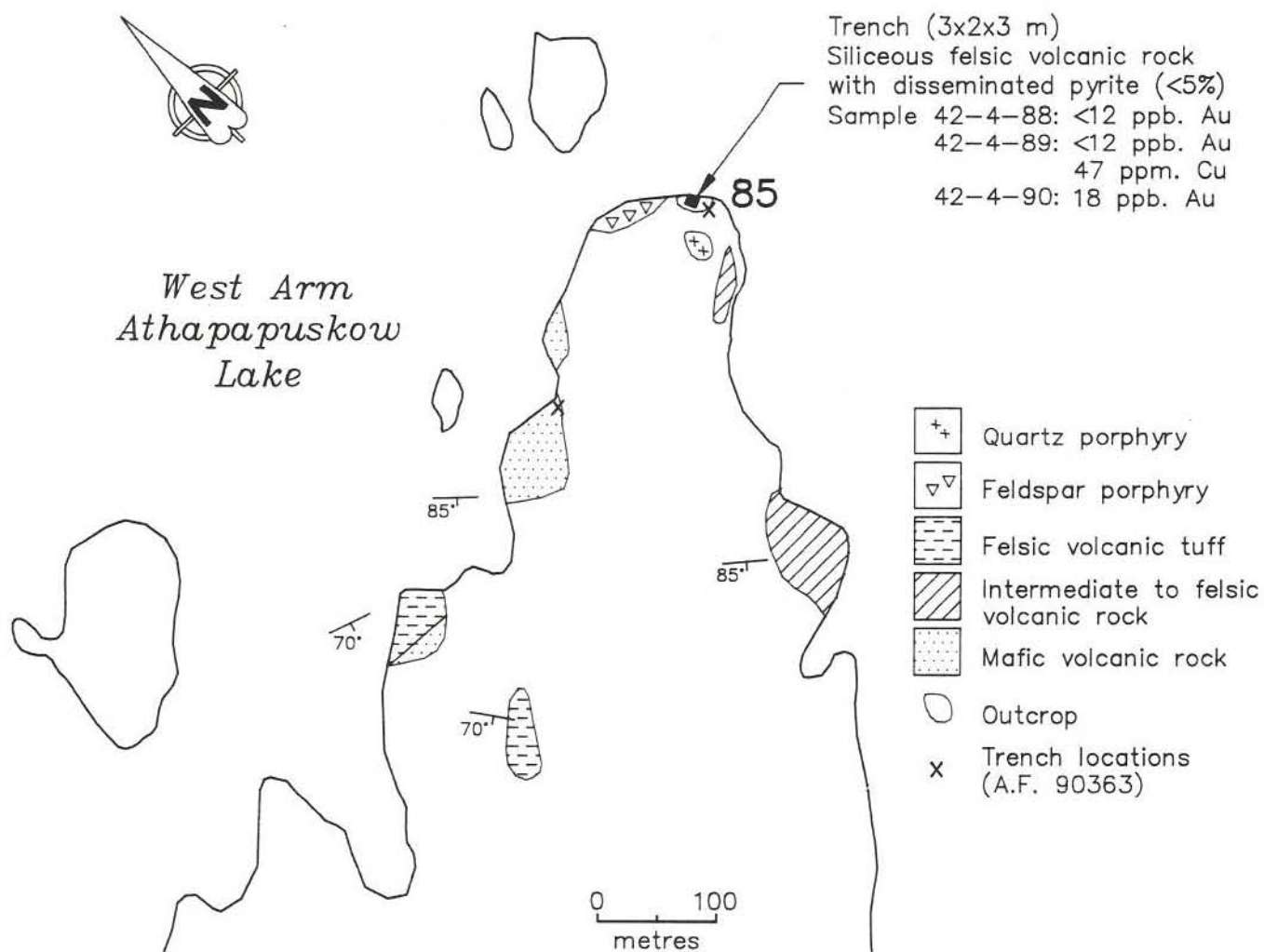


Figure 85-1: Detailed geology, trench location and geochemical data at occurrence 85.

LOCATION: 85

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6049837N/319369E

ACCESS: Via boat on Athapapuskow Lake

AREA: West arm of Athapapuskow Lake (Fig. 84-1)

AIRPHOTO: A26062-178, -246

EXPLORATION SUMMARY:

V.D. Colcleugh completed ground magnetometer and EM surveys on the E.Z. claims in 1950 and blasted two trenches on the northeast tip of a small island (A.F. 90363). Noranda Exploration Co. Ltd. completed an EM survey on the Pap and Hap claims in 1966 and drilled a 73 m hole on claim Pap 31 in 1967 (A.F. 90364). Falconbridge Nickel Mines Ltd. completed a magnetometer survey in 1971 and a geological map of claims CB 3495 through 3497 and CB 510 and 511 in 1974 (A.F. 91385).

GEOLOGICAL SETTING:

The north shore of West Arm, Athapapuskow Lake, is underlain by aphyric basalt and fine- to medium-grained gabbro. The eastern part of the largest island (Fig. 84-1) is underlain by rhyolite dykes that are intruded by fine grained mafic dykes and diorite (Syme, 1988). In general, there are more felsic volcanic rocks on the eastern part of the largest island than on the western part.

MINERALIZATION:

DDH Pap 5 intersected 38 m of serpentinite with short sections of peridotite. Trace to minor magnetite

and calcite stringers are scattered throughout the drill core (A.F. 90364). Traces of pyrite and pyrrhotite occur in fractures. Pyrite disseminations and fracture coatings are common in the fine grained felsic volcanic rocks. Chlorite often accompanies pyrite in the felsic rocks.

GEOCHEMICAL DATA:

A serpentinite sample from DDH Pap 5 assayed 0.02% Ni (A.F. 90364). Several samples from the trench area were analyzed for Au and Cu (Fig. 85-1).

CLASSIFICATION:

Vein type deposit; multiple veins or lenses. The disseminated mineralization in the felsic volcanic rocks has not been classified.

REFERENCES:

- Assessment Files: 90363, 90364, 91385, 91583, 91951
Manitoba Energy and Mines, Mines Branch.
- Syme, E.C.
1988: West Arm (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-3, 1:115 840.

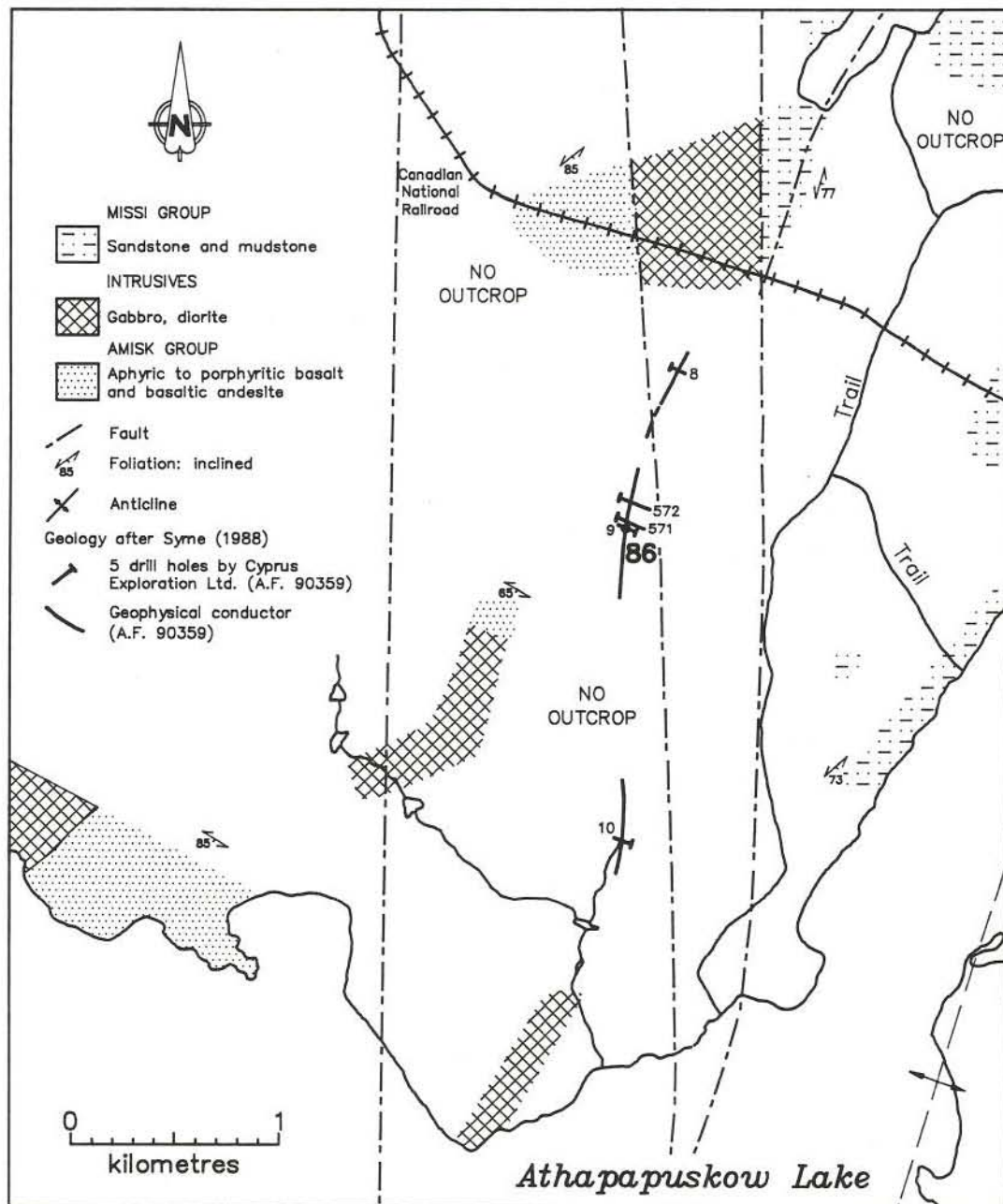


Figure 86-1: Geological setting of occurrence 86.

LOCATION: 86

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6052276N/321753E

ACCESS:

Via boat on Athapapuskow Lake and traverse.

EXPLORATION SUMMARY:

The S.M. claim was staked by M. O'Neill in 1948. The area was restaked as the Sam 55 claim by R.E. Burkett in 1954. Cyprus Exploration Corporation Ltd. completed an EM survey and drilled three holes for a total of 177 m on claims Sam 39, -55 and -68 in 1955. A strong conductor on claim Sam 55 was also tested with two holes with a total length of 279 m in 1977 (A.F. 90359).

GEOLOGICAL SETTING:

The area is underlain by aphyric to sparsely porphyritic basalt flows and gabbro dykes (Fig. 86-1; Syme, 1988).

MINERALIZATION:

DDH 9 intersected 2.6 m of near solid pyrite and pyrrhotite that is structurally underlain by 2.9 m of near solid pyrite and graphite. DDH 572 intersected six zones with more than 50% pyrite and pyrrhotite. Several of the near solid sections contain minor graphite, and one intersection contained chalcopyrite stringers over a core length of 1.2 m. Several breccia and conglomerate layers contain trace to minor pyrite \pm pyrrhotite \pm chalcopyrite (A.F. 90359).

DDH 571 intersected five near solid to solid sulphide layers; most of these contain trace to minor graphite. One narrow intersection near the bottom of this hole reportedly contains sphalerite. The bottom 30 cm contains quartz with increased pyrite and trace chalcopyrite. DDH 8 intersected minor graphite and pyrite in tuff and sedimentary rock layers (A.F. 90359).

AREA: North of the west arm of Athapapuskow Lake

AIRPHOTO: A26062-177

GEOCHEMICAL DATA:

A drill core sample from DDH 572, which was a 90 cm section with 80% sulphide minerals, contained 0.84% Cu and 0.02% Ni (A.F. 90359).

CLASSIFICATION:

Stratabound massive sulphide type deposit; volcanic rock associated. The most westerly sulphide layer intersected in DDH 9 is probably a stratabound massive sulphide type deposit. The graphite-bearing near solid sulphide intersections that occur east of the above appear to be graphite-bearing sulphide facies iron formations.

REFERENCES:

Assessment File: 90359

Manitoba Energy and Mines, Mines Branch.

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

Gale, G.H., Baldwin, D.A., and Koo, J.

1980: A geological evaluation of Precambrian massive sulphide deposit potential in Manitoba; Manitoba Energy and Mines, Economic Geology Report ER79-1, 137p.

Syme, E.C.

1988: Bakers Narrows (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-2, 1:15 840.

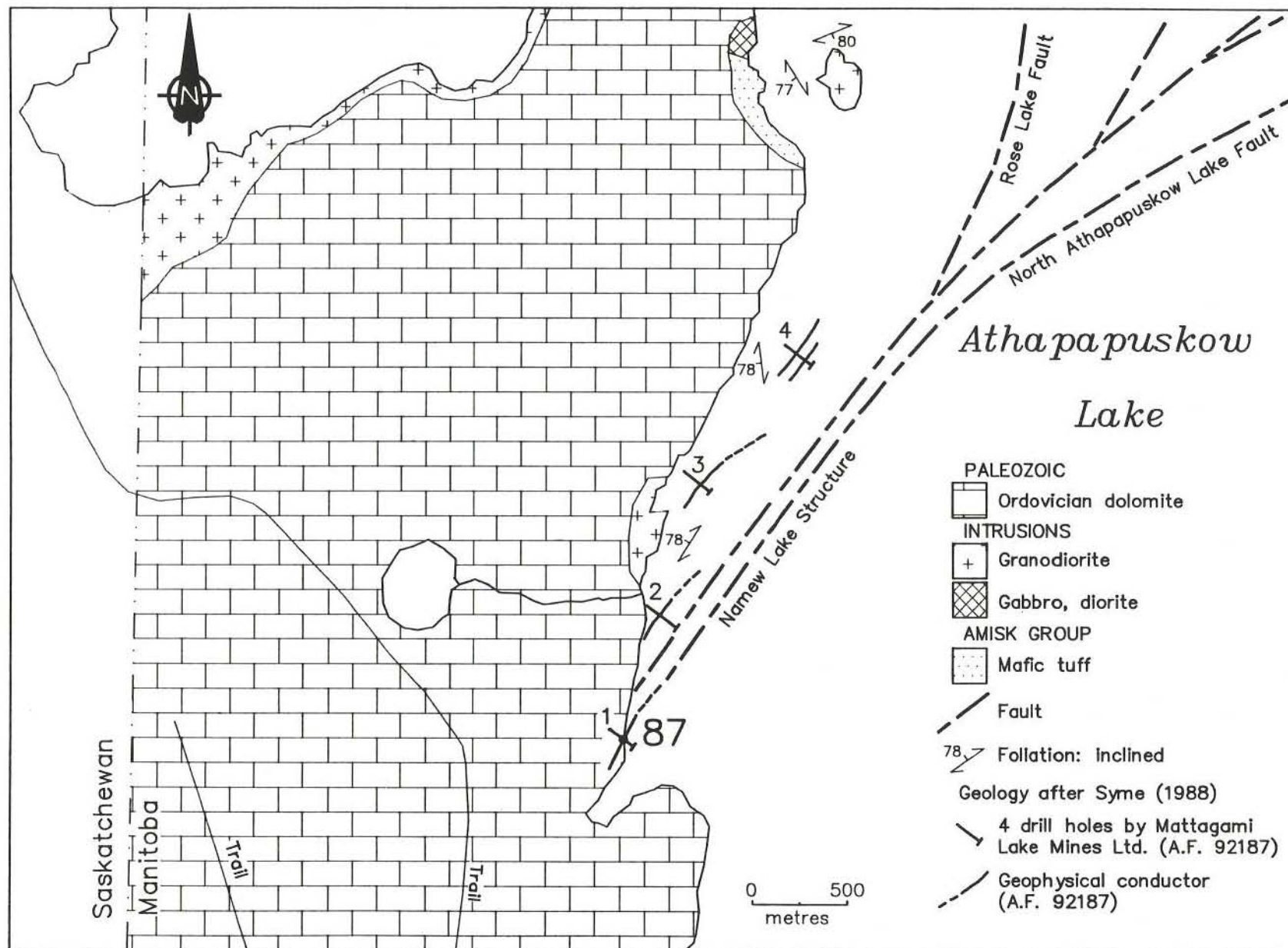


Figure 87-1: Geological setting of occurrence 87.

LOCATION: 87

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6043672N/318205E

ACCESS: Via boat on Athapapuskow Lake

AREA: South of the west arm of Athapapuskow Lake

AIRPHOTO: A26062-243

EXPLORATION SUMMARY:

The Parmlee Syndicate conducted airborne and ground geophysical surveys and drilled one or more holes in the area in the late 1950's (A.F. 92187). Mattagami Lake Mines Ltd. completed a geological map in 1972 and EM and magnetometer surveys on CB 4719 through 4721 in 1973. Four holes totalling 766 m were drilled to test several conductors in 1973 (A.F. 92187).

GEOLOGICAL SETTING:

The area (Fig. 87-1) is covered largely by Ordovician limestone, which varies between 0 and 35 m in depth to the Precambrian bedrock. Shoreline outcrops include basalt, diabase, gabbro, diorite and minor peridotite and pyroxenite (Syme, 1988). DDH 1 and 2 intersected andesitic, rhyodacitic and rhyolitic tuff, graphitic schist and tuffite, and minor chert. DDH 3 intersected rocks similar to those found in DDH 1, as well as medium grained granite and diorite (A.F. 92187).

MINERALIZATION:

DDH 1 intersected four sections, from 60 cm to 5.5 m in length, that consist of near solid to solid sulphide within a section of graphitic tuff(?) 71.7 m long. DDH 2 and 3 contained two intersections and one intersection, respectively, of near solid to solid sulphide. The sulphide sections are described as fine grained and 'earthy', and probably represent sulphide-graphite strata (A.F. 92187).

GEOCHEMICAL DATA:

A number of the massive sulphide sections were assayed. A 35 cm section from DDH 1 assayed 0.1 g/t Au, 1.71 g/t Ag, 0.13% Zn, 0.08% Cu and a 1.4 m sample from DDH 2 assayed 0.1 g/t Au, 3.77 g/t Ag, 0.01% Zn and 0.12% Cu (A.F. 92187).

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation.

REFERENCES:

Assessment File: 92187

Manitoba Energy and Mines, Mines Branch.

Bailes, A.H. and Syme, E.C.

1987: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Map GR87-1-1, 1:20 000.

Bailes, A.H. and Syme, E.C.

1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Report GR87-1, 313p.

Gale, G.H., Baldwin, D.A., and Koo, J.

1980: A geological evaluation of Precambrian massive sulphide deposit potential in Manitoba; Manitoba Energy and Mines, Economic Geology Report ER79-1, 137p.

Syme, E.C.

1988: West Arm (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-3, 1:1:15 840.

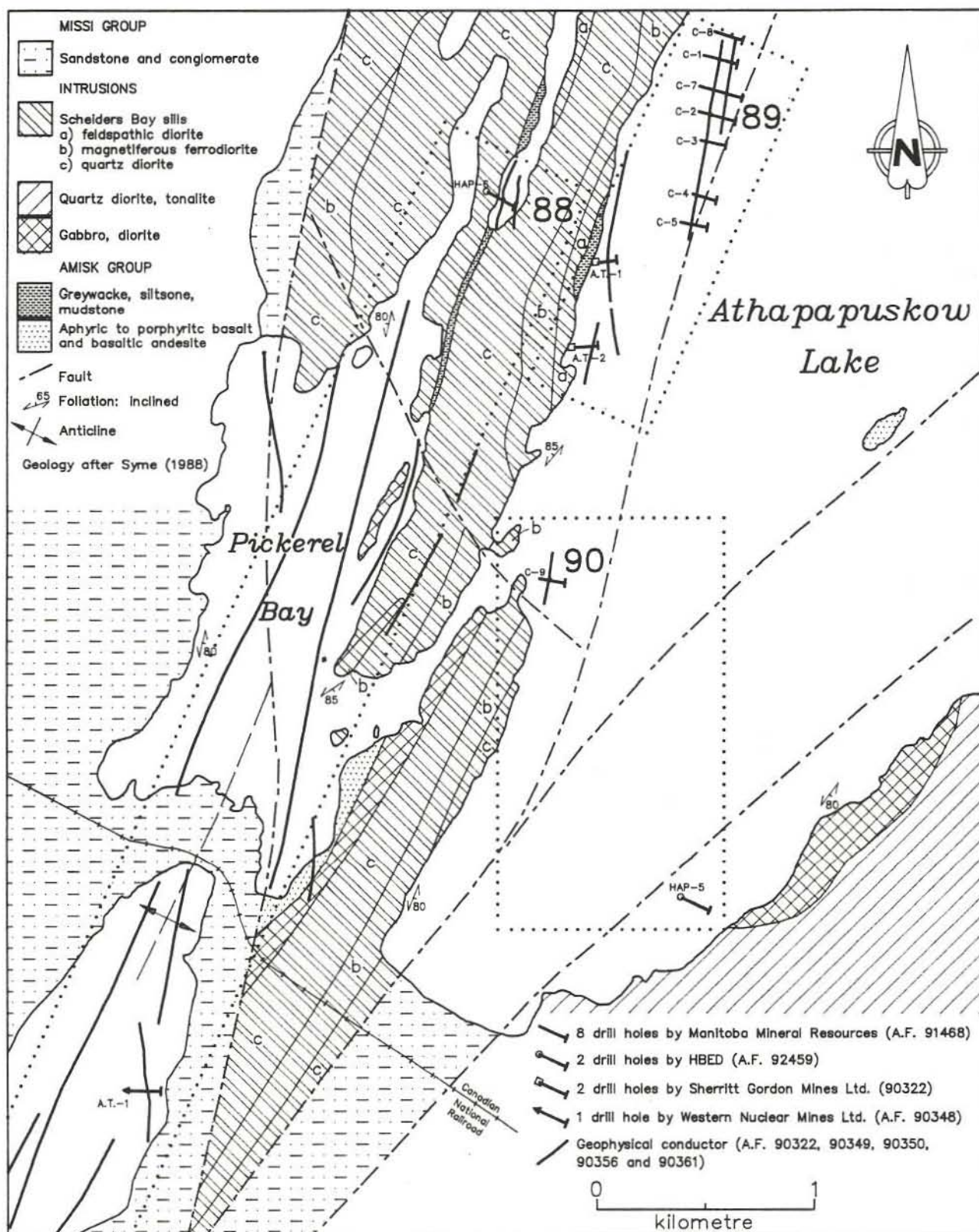


Figure 88-1: Geological setting of occurrences 88, 89 and 90.

LOCATION: 88

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6055393N/325836E

ACCESS: Via boat on Athapapuskow Lake

AREA: North of Athapap Beach, Athapapuskow Lake

AIRPHOTO: A26015-163, -165

EXPLORATION SUMMARY:

In 1948, Stanmac Ltd. completed an EM survey on the Mite claims (A.F. 90356). Western Nuclear Mines completed a ground EM survey on the Atho claims in 1967 and drilled a 138 m hole (Fig. 88-1), but no mineralization was intersected (A.F. 90348). In 1962 HBED completed an EM survey on the Wan claims. HBED drilled a 112 m hole on CB 6096 in 1976 (A.F. 92459, 90361).

GEOLOGICAL SETTING:

The area is underlain by an assemblage of feldspathic diorite, magnetiferous ferrodiorite and fine- to coarse-grained quartz diorite known as the Schneiders Bay Sills (Fig. 88-1; Syme, 1988). Some aphyric basalt, greywacke and siltstone occur throughout the sills. The Schneiders Bay Sills are bound by faults to the east and to the west. Missi Group pebble sandstone and pebble-cobble conglomerate occur west of the Schneiders Bay sills (Fig. 88-1). DDH Hap-6 intersected mostly greywacke and argillite \pm graphite, and minor 'andesite', rhyolite, rhyodacite and diorite (A.F. 92459).

MINERALIZATION:

DDH Hap-6 intersected several sections of graphitic argillite with minor to moderate pyrite. One 20.3 m thick intersection of graphitic argillite contains 3.3 m, 0.5 m, and 1.1 m with 45 to 65% pyrite and graphite. This argillitic unit occurs adjacent to brecciated rhyolite

with minor pyrite and graphite. A 5 m thick amygdaloidal dacite contains minor stringers of pyrite and black chlorite(?) in amygdules.

GEOCHEMICAL DATA

Forty-four samples were assayed; the Au, Ag, Cu and Zn contents were below analytical detection limits.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. The geological setting of this occurrence is somewhat similar to that of the Trout Lake deposit (Gale and Eccles, 1988).

REFERENCES:

- Assessment Files: 90348, 90349, 90356, 90361, 92459
Manitoba Energy and Mines, Mines Branch.
- Gale, G.H. and Eccles, D.R.
1988: Mineral deposits and occurrences in the Flin Flon area NTS 63K/13: Part 1, Mikanagan Lake area (63K/13SE); Manitoba Energy and Mines, Mineral Deposit Series Report No. 1, 1:20 000. 133p.
- Syme, E.C.
1988: Schist Lake (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-1.

LOCATION: 89**NAME:** (A.F. - Mineralization intersected in drill core)**UTM:** 6055955N/326838E**ACCESS:** Via boat on Athapapuskow Lake**AREA:** 6 km south of Baker Narrows, Athapapuskow Lake (Fig. 88-1)**AIRPHOTO:** A26397-132, A26328-191**EXPLORATION SUMMARY:**

In 1949 Sherritt Gordon Mines Ltd. completed an EM survey and drilled two holes totalling 238 m on claims Cat 23 and Cat 29 (A.F. 90322). Manitoba Mineral Resources drilled seven holes totalling 1 173 m on CB 4504 in 1973 (A.F. 91468).

GEOLOGICAL SETTING:

The large peninsula (Fig. 88-1) is underlain by an assemblage of feldspathic diorite, magnetiferous ferrodiorite and fine- to coarse-grained quartz diorite known as the Schneiders Bay Sills (Syme, 1988). Greywacke and siltstone are exposed along the shoreline of Athapapuskow Lake (Fig. 88-1).

DDH A.T.-1 intersected mostly graphitic schists (argillite?) and conglomerate(?); DDH A.T.-2 intersected mostly agglomeratic pyroclastic rocks, some of which are rhyolitic; some of the rhyolite fragments were up to 10 cm in diameter (A.F. 90322). DDH C-1 to C-8 intersected predominantly rhyolitic pyroclastic rocks. Drill logs record numerous rounded rhyolitic fragments that are generally less than 1 cm in diameter, but are over 2.5 cm in diameter in DDH C-5. These drill holes were stopped in rhyolite (A.F. 91468).

MINERALIZATION:

DDH A.T.-1 intersected several layers of near solid to solid pyrite with graphite, as well as short sections of solid pyrite that do not contain graphite. DDH A.T.-2 intersected narrow quartz stringers and Fe-stained fragmental rocks (A.F. 90322).

DDH C-1, C-2 and C-7, intersected several sections of near solid to solid pyrite downhole from the py-

rite-graphite layers (Table 89-1). There are no positive indications of stratigraphic tops in the drill logs, but it is argued that some, if not all, of the C-1 to C-8 drill holes were stopped short and did not adequately test the massive sulphide potential of the rhyolitic unit.

GEOCHEMICAL DATA:

A 2 m intersection of graphitic schist with interlaminate fine grained pyrite and 30% massive pyrite from DDH A.T.-1 assayed 0.12% Cu, trace Ni, and trace Au (A.F. 90322). A 1.5 m sample with 90% pyrite from DDH C-2 contained 0.07 g/t Au, 0.06% Cu and 0.05% Zn (A.F. 91468).

CLASSIFICATION:

Stratabound massive sulphide type deposit; volcanic rock associated. The extensive chloritization, disseminated and stringer pyrite, the extensive rhyolitic tuff host rocks, and the fact that the drill holes did not extend through the rhyolitic rock units indicate that this area has the potential to contain massive sulphide type deposits. The graphitic near solid sulphide layers represent graphite-bearing sulphide facies iron formation.

REFERENCES:

Assessment Files: 90322, 91468

Manitoba Energy and Mines, Mines Branch.

Syme, E.C.

1988: Schist Lake (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-1.

Table 89-1: INTERSECTION OF NEAR SOLID TO SOLID SULPHIDE GRAPHITE IN DRILL HOLES C-1 TO C-8

DDH	Interval (m)	Width (m)	Mineralization (m)	DDH	Interval (m)	Width	Mineralization
C-5	72.1 - 77.7	5.6	30% py	C-7	87.9 - 88.5	0.6	80% py, 20% gf
	87.2 - 88.2	1.0	60% py, 40% gf		100.9 - 104.5	3.6	75% py, 10% gf
	90.0 - 92.0	2.0	60% py, 40% gf		106.0 - 109.7	3.7	65% py, 15% gf
	92.5 - 93.0	0.5	80% gf		111.6 - 112.8	1.2	50% py, 20% gf
					115.0 - 115.5	0.5	25% py, 20% gf
C-4	57.0 - 58.4	1.4	75% py, 30% gf		131.7 - 156.1	24.4	90% py, 5% gf
	63.0 - 63.9	0.9	90% py		163.4 - 165.5	2.1	80% py
	68.2 - 78.1	9.9	85% py, 15% gf				
	81.7 - 92.7	11.0	85% py, 15% gf	C-1	55.9 - 57.9	2.0	75% py
					62.9 - 70.9	8.0	65% py
					100.1 - 101.2	1.1	70% py, 15% gf
C-3	19.5 - 24.1	4.6	75% py, 5% gf		143.9 - 144.8	0.9	50% py
	44.5 - 64.8	20.3	85% py, 15% gf		168.9 - 170.8	1.9	60% py, 5% gf
					199.3 - 200.9	1.6	75% py
C-2	25.3 - 26.5	1.2	70% py, 5% gf		201.5 - 202.7	1.2	50% py
	28.3 - 30.3	2.0	75% py, 5% gf				
	82.0 - 95.1	13.1	90% py, 5% gf	C-8	53.9 - 64.6	10.7	60% py, 10% gf
	116.7 - 118.0	1.3	70% py, 10% gf		71.3 - 76.8	5.5	50% py, 5% gf
	121.2 - 123.4	2.2	65% py, 10% gf		199.6 - 203.6	4.0	70% py, 10% gf
	125.1 - 126.2	1.1	60% py				
	128.0 - 128.3	0.3	70% py				
	135.0 - 135.6	0.6	85% py				
	136.0 - 136.3	0.3	80% py				
	138.1 - 138.4	0.3	80% py				
	139.3 - 140.0	0.7	50% py, 20% gf				
	144.5 - 147.5	3.0	60% py				
	150.0 - 152.4	2.4	55% py				
C-7	52.6 - 53.0	0.4	70% py, 30% gf				
	80.3 - 80.6	0.3	80% py				
	83.5 - 83.7	0.2	80% py				

LOCATION: 90

NAME: (A.F. - Mineralization intersected in drill core)

UTM: 6053620N/325911E

ACCESS: Via boat on Athapapuskow Lake.

EXPLORATION SUMMARY:

In 1949, Sherritt Gordon Mines Ltd. completed a ground EM survey on the Cat claims (A.F. 90322). Cerro Mining Co. of Canada Ltd. completed an airborne EM survey of the area in 1971 (A.F. 90350). Manitoba Mineral Resources drilled a 122 m hole on CB 3607 in 1973 (A.F. 91468). In 1979, HBED drilled a 111 m hole on CB 6474 (A.F. 92459).

GEOLOGICAL SETTING:

The area around the narrows to Pickerel Bay (Fig. 88-1) is underlain by an assemblage of feldspathic diorite, magnetiferous ferrodiorite and fine- to coarse-grained quartz diorite known as the Schneiders Bay Sills (Fig. 88-1; Syme, 1988). Aphyric basalt, greywacke and siltstone occur between and throughout the sills. A northwest-trending fault occurs to the south.

DDH C-9 intersected predominantly massive and fragmental rhyolitic and dacitic rocks and minor andesite in the uppermost 85 m, and graphitic schist in the lowermost 40 m (A.F. 91468). DDH Hap-5 was drilled near the Mistik Creek Fault Zone, which separates Missi conglomerate to the northwest from intrusion breccia to the southeast. These breccias, which are associated with the Limestone Narrows gabbroic intrusion, have a quartz diorite-tonalite matrix that in part has a pegmatoid texture (Syme, 1988). DDH Hap-5 intersected 'andesite' flows and one rhyodacite flow (A.F. 92459).

AREA: Athapap Beach, Athapapuskow Lake (Fig. 88-1).

AIRPHOTO: A26015-166

MINERALIZATION:

A 21 m section of core near the bottom of DDH C-9 had thin layers of pyrite; overall, this section contained 30% pyrite and 15% graphite (A.F. 91468).

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. Since there are abundant rhyolitic fragmental rocks in this area, DDH C-9 was stopped in rhyolite, and the geological setting of this mineralization resembles both the West Arm and Centennial deposits (Locations 3 and 6, this volume). This area is considered to have the potential to contain massive sulphide type deposits.

REFERENCES:

Assessment Files: 90322, 90350, 91468, 92459

Manitoba Energy and Mines, Mines Branch.

Syme, E.C.

1988: Schist Lake (part of NTS 63K/12): Manitoba Energy and Mines, Preliminary Geological Map 1988F-1.

LOCATION: 91

NAME:

UTM: 6048470N/320214E

ACCESS: Via boat on Athapapuskow Lake

AREA: West arm of Athapapuskow Lake

AIRPHOTO: A26062-180

EXPLORATION SUMMARY:

In 1930, W. Winterton staked claims Ineeda 2 and -3, blasted several trenches and optioned the claims to Burley Mines Ltd. In 1965, claims Pap 1, -2, -5 and -6 were staked by J. Dunlop (M.I. Card NTS 63K/12 Asb1). Noranda Exploration Co. Ltd. optioned the property in 1966 from W.B. Dunlop and completed a ground EM survey (A.F. 91951). In 1967, Noranda tested conductors off the north and northeast shores of Athapapuskow Lake with three drill holes totalling 215 m (A.F. 90364). Falconbridge Nickel Mines Ltd. completed a magnetometer survey in 1971, and a geological map of claim blocks CBM 3510, 3511, 3522, 3523, and 3495 to 3497 immediately west of Asbestos Island in 1974 (A.F. 91583). A number of old trenches were located in 1984.

GEOLOGICAL SETTING:

Asbestos Island is underlain by pyroxenite, peridotite and serpentinite (Fig. 91-1, 91-2; Syme, 1988).

MINERALIZATION:

Serpentinite occurs with carbonate as veins and veinlets along joints and fractures in fine- to medium-grained, dark grey to black peridotite. A 3 to 25 cm thick serpentine vein that strikes due north occurs in trench 1 and a vein up to 1 m thick that strikes 238° was observed in trench 4 (Fig. 91-2). Soapstone veins up to 1 m thick occur throughout the ultramafic body.

Drill holes intersected several sections of altered, brecciated, serpentinized peridotite that is commonly fine grained, carbonatized, generally soft and friable,

talcoose and slightly- to strongly-magnetic. Trace to minor pyrite and pyrrhotite occur throughout the serpentinite (A.F. 90364). Coarse tremolite (25 cm) was found in one trench and a 1 cm thick chromite layer was also noted (A.F. 91583).

GEOCHEMICAL DATA:

Fourteen samples were assayed for Cu and Ni; they contained less than 50 ppm Cu and 70 to 1400 ppm Ni (A.F. 91583).

CLASSIFICATION:

Magmatogenic type deposit associated with mafic-ultramafic rocks; disseminated.

REFERENCES:

- Assessment Files: 90364, 90364, 91583 91951
Manitoba Energy and Mines, Mines Branch.
- Burley Mines Ltd.
SW 12-63K, Corporation File; Manitoba Energy and Mines, Mines Branch.
- Mineral Inventory Card NTS 63K/12 Asb1
Manitoba Energy and Mines, Geological Services Branch
- Syme, E.C.
1988: West Arm (part of NTS 63K/12); Manitoba Energy and Mines, Preliminary Geological Map 1988F-3, 1:15 840.

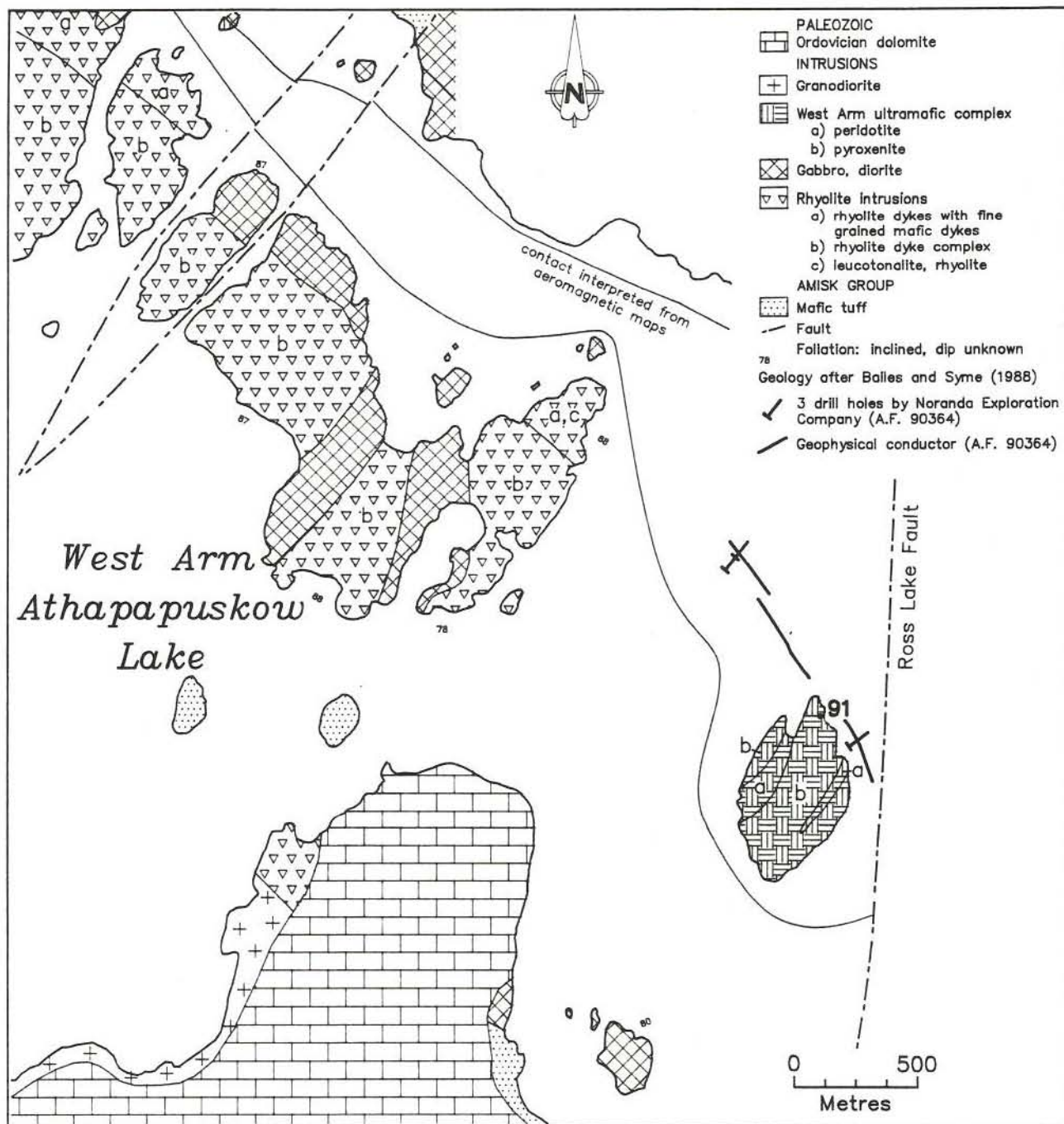


Figure 91-1: Geological setting of occurrence 91.

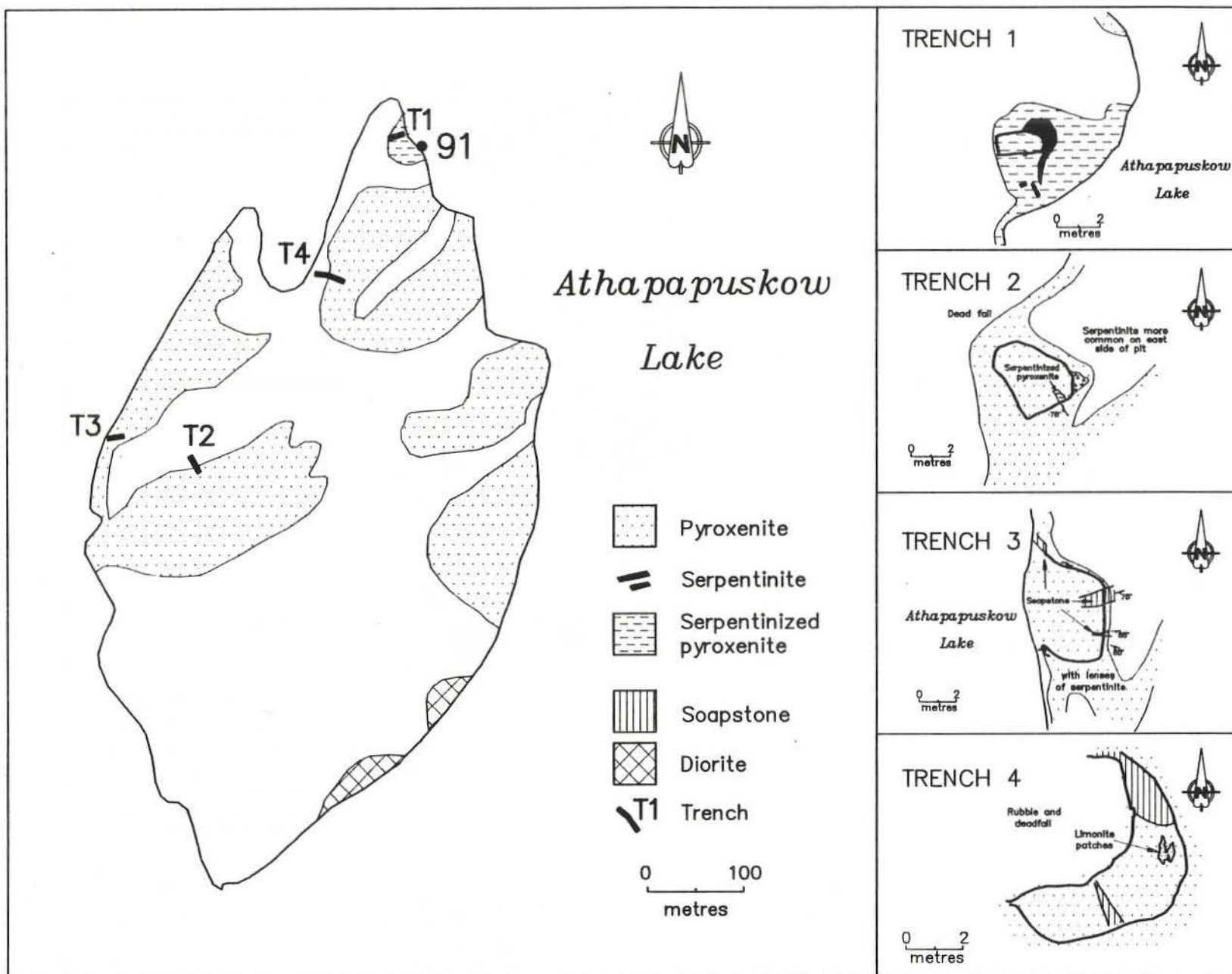


Figure 91-2: Trench locations and detailed geology at Asbestos Island.

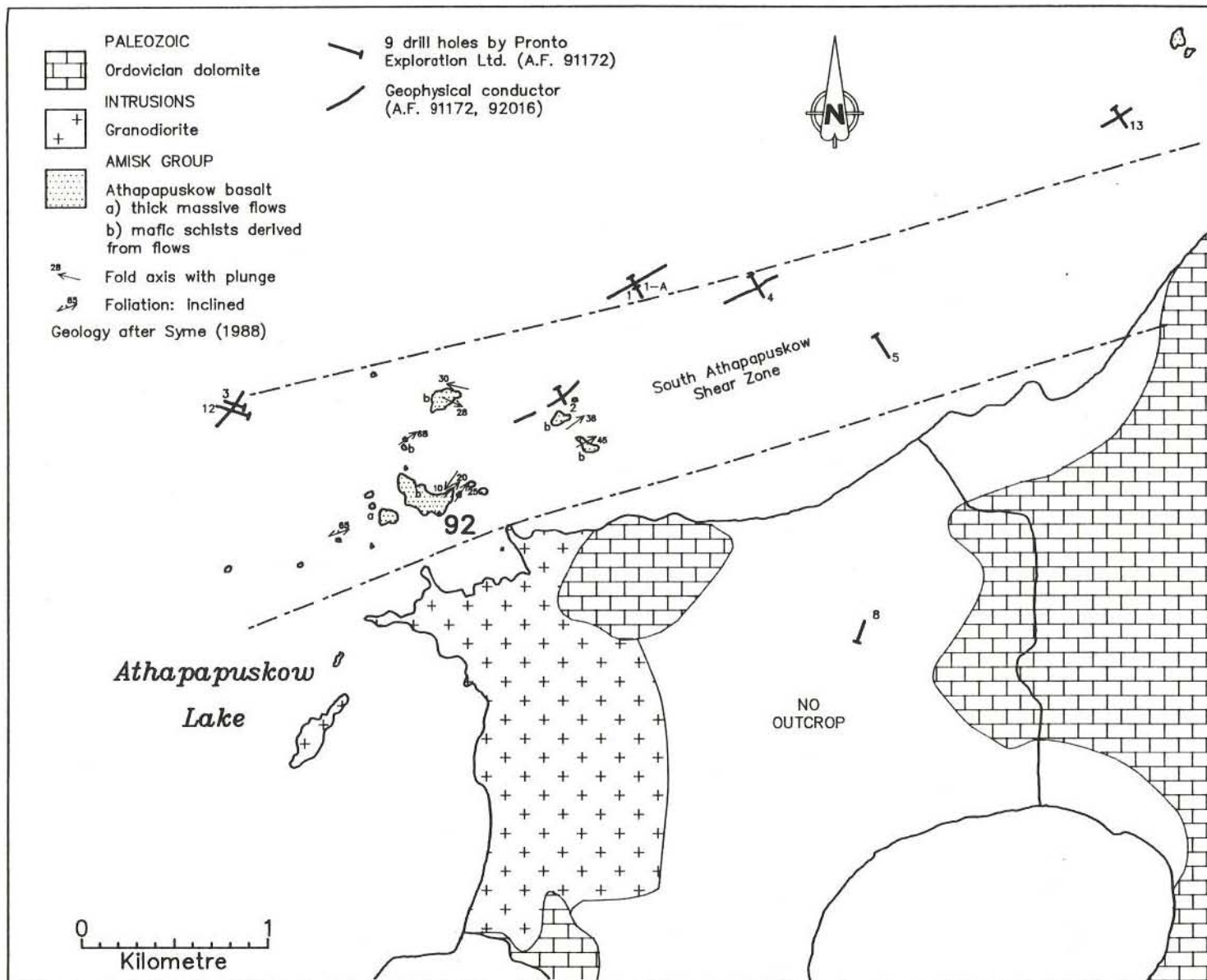


Figure 92-1: Geological setting of occurrence 92.

LOCATION: 92**NAME:**

UTM: 6045212N/329718E

ACCESS: Via Provincial Road 10 and boat on
Athapapuskow Lake

AREA: South end of Athapapuskow Lake

AIRPHOTO: A26062-6

EXPLORATION SUMMARY:

In 1971, C. Kuryliw discovered a Cu occurrence on CB 3939. Magnetic and EM surveys were completed in 1972. In 1972, Pronto Explorations Ltd. drilled nine holes totalling 1 025 m in the vicinity of the occurrence; they undertook magnetometer and EM surveys again in 1975 (A.F. 91172, 92016).

GEOCHEMICAL DATA:

The 15 cm thick zone of disseminated chalcopyrite contained 0.45% Cu (A.F. 92016). Drill core samples from DDH 3 assayed 0.25% Cu, trace Zn, 0.7 g/t Ag over 1.2 m and 0.25% Cu, 0.03% Zn and 1.4 g/t Ag, over 2.3 m. A 2 m intersection from DDH 1-A intersected 0.18% Cu and 0.7 g/t Ag (A.F. 91172).

GEOLOGICAL SETTING:

The occurrence is underlain by mafic schists derived from basalt flows and is located within the South Athapapuskow Shear Zone (Fig. 92-1; Syme, 1988). Granodiorite and Ordovician dolomite are exposed along the shoreline of Athapapuskow Lake near South Bay.

CLASSIFICATION:

Disseminated mineralization - not classified.

MINERALIZATION:

A 15 cm thick zone of disseminated chalcopyrite occurs adjacent to a basalt contact on the north shore of the island (A.F. 92016). DDH 3 intersected 4.25 m (including a 0.7 m lamprophyre dyke) of disseminated chalcopyrite with minor bornite and sparse pyrite and pyrrhotite in andesite tuff adjacent to a gabbro intrusion. Chalcopyrite also occurs as thin platy sheets along tuff beds or shear planes. DDH 1-A intersected minor disseminated pyrite with sparse chalcopyrite in graphitic layers within rhyolite tuff (A.F. 91172).

REFERENCES:

Assessment Files: 90353, 91172, 92016, 92574

Manitoba Energy and Mines, Mines Branch.

Mineral Inventory Card NTS 63K/12 Cu3

Manitoba Energy and Mines, Geological
Services Branch.

Pronto Exploration Ltd.

NTS 63K/12 SE, Corporation File; Manitoba
Energy and Mines, Mines Branch.

Syme, E.C.

1988: Millwater (part of NTS 63K/12); Manitoba
Energy and Mines, Preliminary Geological
Map 1988F-4. 1:15840