NORTHERN TERRITORY GEOLOGICAL SURVEY REPORT GS79/6

# DIAMOND DRILLING INVESTIGATIONS, 1978
# NORTH RINGWOOD MINES N.T.

by

A.W. NEWTON

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## 1. SUMMARY

Following an application for drilling assistance at the North Ringwood Mine in March, 1978, the Drilling Section, Department of Mines and Energy, drilled four diamond drill holes, totalling 264 metres between August and October, 1978. Diamond drilling located two zones of significant gold mineralisation at depths up to 40 metres below old workings.

Gold mineralisation is confined to discontinuous quartz reefs of limited dimensions. Due to the nature of the reefs further diamond drilling would be of meagre value.

Exploratory mining of reefs where the two significant gold intersections were encountered could indicate reserves sufficient to support a small scale mining operation, although the remoteness of the prospect may limit its viability.

## 2. INTRODUCTION

An application for drilling assistance at GML's 153B and 154B was made by W.J. Fisher on behalf of the leaseholder Secured Loans and Developments Limited in March, 1978. A drilling programme of 200 metres was subsequently approved. Diamond drilling was carried out between August and October, 1978 and consisted of four holes totalling 264 metres.

NOTE: Actual drilling exceeded approved drilling as a consequence of continued vehicle breakdowns. As the drill could not be shifted from the site of D.D.H.2 due to unavailable transport, it was decided that drilling should continue in order to provide stratigraphic information until transport became available.

Prior to the commencement of the drilling programme plane table mapping of abandoned mine workings and environs was undertaken by officers of the Northern Territory Geological Survey.

## 3. LOCATION AND ACCESS

Map : McKINLAY RIVER 100,000 Topographic Survey Sheet 5271

Co-ordinates : Lat. 130°9'50"

Long. 131°37'30"

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Universal Grid Reference : GL 846431

Vehicle access from Darwin is by Stuart and Arnhem Highways to a turn-off 1 kilometre West of the Mary River Bridge. From the turn-off a dirt track leads in a generally southerly direction for approximately 33 kilometres to the mine site. Much of the track passes over black soil plains which are generally impassable between November and April.

## 4. GEOLOGY

The mine lies within sheared sediments of the Lower Proterozoic Burrell Creek Formation. The sediments consist principally of chloritic and micaceous silstones and shales, and have a general north-westerly strike direction and a near vertical dip.

Numerous quartz reefs are found within the sediments. Reefs overall follow the general strike direction of the sediments although some "saddle-type" reefs are aligned in directions almost perpendicular to the strike of the sediments. The reefs vary in width from 0.5 to 4 metres and generally have limited strike dimensions. From old workings some reefs are known to persist to depths of at least 20 metres. Gold mineralisation is associated with some of the quartz reefs although recent surface sampling of many of the reefs has failed to indicate gold associated with any of the reefs.

The North and South Ringwood Mines were worked principally between 1894 and 1897 and up to 1902 and during this time there was a total recorded production of about 2800 ozs. of gold at an approximate average grade of 1 oz. per ton.

## 5. DIAMOND DRILLING RESULTS

Four diamond drill holes totalling 264 metres were completed by the Department's Drilling Section. Core recovery within sections of sediments was effectively 100% but in quartz reef sections recovery was often poor due to the fractured and cavernous nature of the reefs. Complete core loss occurred in D.D.H.3 in the interval 62.85 - 63.60 metres. All drill core was geologically logged and 49 split core samples were forwarded for assay to the East Point Laboratories,

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Department of Transport and Works. The samples were assayed for gold, silver and bismuth.

D.D.H. 1 was inclined at 45° on a bearing of 230° magnetic to test two parallel, shallow surface workings striking 135° over a length of about 60 metres. Interbedded sandstone, silstone and shale were intersected throughout the hole. Several narrow quartz veins less than 0.5 metres thick were intersected between 27.0 and 50.0 metres. A series of narrow quartz veins in chloritic silstone and shale were intersected between 50 and 51 metres. Some of these veins contained pyrite and galena and assay results showed a trace of gold over the interval 50.0 to 50.5 metres. This gold assay was the only sample which gave a value above the detection limit for gold in D.D.H.1.

D.D.H. 2 was inclined 60° on a bearing of 345° magnetic to test for gold mineralisation below collapsed workings. Sulphide mineralisation in the form of arsenopyrite and suspected bismuthinite were noted in dumps adjacent to the workings. Micaceous and chloritic silstone and shale were intersected throughout the hole. Much of the shale or slate was spotted, probably with relict chiastolite. Two quartz breccia zones were intersected between 32.25 and 33.0 metres and between 40.4 and 40.85 metres but showed no significant gold values although an assay of 0.5 gm/tonne gold was recorded over the interval 32.5 - 33.0 metres. A section of vein quartz with associated banded shale material was intersected between 41.6 and 43.6 metres, and this probably represents the depth extension of the gold mineralisation encountered in the collapsed workings. An assay of 60 gm/tonne gold was recorded over the interval 41.6 - 42.1 metres with a value of 0.6 gm/tonne gold over the interval 42.1 - 42.6 metres.

D.D.H. 3 was inclined 50° on a bearing of 65° magnetic to test the continuation of mineralisation below a series of deep pits in close proximity to a water-filled shaft of unknown depth. Siltstone and shale were again the main rock types intersected. A quartz breccia zone with interbands of siltstone was intersected between 37.4 and 41.1 metres. Within this zone low grade mineralisation (3.1 gm/tonne) was outlined over a 2.5 metre interval between 37.1 and 39.6 metres, with a best value of 8.5 gm/tonne between 37.6 and 38.1 metres. Trace gold was also noted between 40.1 and 41.4 metres.

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The mineralisation is probably a continuation of that worked in the surface pits although it is displaced a little to the west. A quartz vein and another quartz breccia zone were intersected between 54.3 and 55.0 metres and between 57.8 and 62.85 metres respectively but no gold mineralisation was detected in either zone.

D.D.H. 4. was inclined 50° on a bearing of 245° magnetic, and was located on the same site as D.D.H. 3. In conjunction with D.D.H. 3 it was designed to provide a composite section across the ridge on which most of the old workings were sited. Siltstone was the principle rock type intersected. Basalt was intersected in the Burrell Creek Formation between 16.7 and 18.5 metres. A broken quartz vein with limonitic boxworks was noted between 22.2 and 22.45 metres and this assayed 8.0 gm/tonne gold over the interval 22.0 to 22.5 metres. Other quartz-veined sections were noted between 36.8 and 38.1 metres and between 38.9 and 39.5 metres but apart from a trace of gold in the latter intersection no significant mineralisation was noted.

## 6. CONCLUSIONS AND RECOMMENDATIONS

Diamond drilling has located two zones of significant gold mineralisation in D.D.H. 2, 60 gm/tonne between 41.6 and 42.1 metres and in D.D.H. 3, 3.1 gm/tonne between 37.1 and 39.6 metres. The results confirm that gold mineralisation in surface workings continues to depths of at least 40 metres.

The gold-bearing quartz reefs in the mine area are essentially discontinuous pods of limited dimensions and consequently any further drilling of individual reefs would be of little help towards establishing a viable mining operation on a limited scale. Any further exploration of the quartz reefs should take the form of exploratory mining to determine bulk grades of the quartz reefs, as diamond drilling simply provides an indication that the quartz reefs persist at depth without providing a reliable indication of the grade of gold mineralisation.

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## 7. REFERENCES

Walpole, B.P., Crohn, P.W., Dunn, P.R., and Randal, M.A. 1968 Geology of the Katherine - Darwin Region, Northern Territory. Bur.Min. Resour. Aust. Bull 82

# APPENDIX I

## Diamond Drill Hole Assays

## North Ringwood Mines, N.T.

D.D.H.'s 1 - 4

Split core samples were analysed using the Atomic Absorption Spectrophotometer at the East Point Laboratory of the Department of Transport and Works. The results for gold and silver are given in grams/tonne, and those for bismuth in micrograms/gram.

Detection limits are as follows:

| | | |
|---|---|---|
| Au | 0.2 | gm/tonne |
| Ag | 2 | gm/tonne |
| Bi | 10 | ug/g |

A minus sign (-) preceding a number denotes the value is less than the detection limit.

| HOLE | INTERVAL (Metres) | Au | Ag | Bi |
|---|---|---|---|---|
| D.D.H. 1 | 49.5 - 50.0 | - 0.2 | - 2 | 14 |
| | 50.0 - 50.5 | 0.4 | - 2 | 30 |
| | 50.5 - 51.0 | - 0.2 | - 2 | 18 |
| | 57.0 - 57.5 | - 0.2 | - 2 | 25 |
| | 57.5 - 58.0 | - 0.2 | - 2 | 18 |
| | 58.0 - 58.5 | - 0.2 | - 2 | 30 |
| | 58.5 - 59.0 | - 0.2 | - 2 | 24 |
| D.D.H. 2 | 22.3 - 22.8 | - 0.2 | - 2 | 80 |
| | 24.6 - 25.1 | - 0.2 | - 2 | 60 |
| | 29.6 - 30.1 | - 0.2 | - 2 | 25 |
| | 32.0 - 32.5 | - 0.2 | 2 | 100 |
| | 32.5 - 33.0 | 0.5 | 2 | 80 |
| | 33.0 - 33.5 | - 0.2 | - 2 | 150 |
| | 40.4 - 40.9 | - 0.2 | 2 | 210 |
| | 41.6 - 42.1 | 60.0 | 12 | 180 |
| | 42.1 - 42.6 | 0.6 | 4 | 240 |
| | 42.6 - 43.1 | - 0.2 | - 2 | 90 |
| | 43.1 - 43.6 | - 0.2 | 2 | 30 |
| | 45.0 - 45.5 | - 0.2 | 4 | 25 |
| | 81.5 - 82.0 | 0.4 | 4 | 40 |
| D.D.H. 3 | 13.5 - 14.0 | 0.4 | - 2 | 16 |
| | 19.6 - 20.1 | 0.4 | 10 | 45 |
| | 29.3 - 29.8 | - 0.2 | - 2 | 35 |
| | 37.1 - 37.6 | 0.4 | 4 | 40 |
| | 37.6 - 38.1 | 8.5 | - 2 | 70 |
| | 38.1 - 38.6 | 0.4 | 2 | 20 |
| | 38.6 - 39.1 | 5.5 | 4 | 35 |
| | 39.1 - 39.6 | 0.8 | - 2 | 30 |
| | 39.6 - 40.1 | - 0.2 | - 2 | 100 |
| | 40.1 - 40.6 | 0.4 | - 2 | 60 |
| | 40.6 - 41.1 | 0.4 | - 2 | 50 |
| | 54.3 - 55.0 | - 0.2 | - 2 | 45 |

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| HOLE | INTERVAL (Metres) | Au | Ag | Bi |
|---|---|---|---|---|
| D.D.H.3 | 57.8 - 58.5 | - 0.2 | - 2 | 30 |
| | 58.5 - 59.0 | - 0.2 | - 2 | 35 |
| | 60.0 - 60.5 | - 0.2 | - 2 | 20 |
| | 60.5 - 61.0 | - 0.2 | - 2 | 210 |
| | 61.0 - 61.6 | - 0.2 | - 2 | 70 |
| | 61.6 - 62.05 | - 0.2 | - 2 | 20 |
| | 62.05- 62.85 | - 0.2 | - 2 | 60 |
| | 68.95-69.35 | - 0.2 | - 2 | 30 |
| D.D.H. 4 | 22.0 - 22.5 | 8.0 | 8 | 40 |
| | 35.0 - 35.5 | - 0.2 | 4 | 35 |
| | 35.5 - 36.0 | - 0.2 | 2 | 30 |
| | 36.0 - 36.5 | - 0.2 | - 2 | 30 |
| | 36.5 - 37.0 | - 0.2 | - 2 | 80 |
| | 37.0 - 37.5 | - 0.2 | - 2 | 20 |
| | 37.5 - 38.0 | - 0.2 | - 2 | 25 |
| | 38.9 - 39.4 | - 0.2 | 4 | 14 |
| | 39.4 - 39.9 | 0.4 | - 2 | 20 |

# APPENDIX II

## Geological Drill Log Summaries

## North Ringwood Mines, N.T.

## D.D.H.'s 1 - 4

INTERVAL (metres)

## MT. RINGWOOD D.D.H. 1.

| | |
|---|---|
| 0 - 3.70 | No core recovery. |
| 3.70 - 6.3 | Fawn, leached and oxidised siltstone/shale, highly broken and friable.<br>Minor broken quartz material at 4.3m. |
| 6.3 - 7.9 | Mid brown oxidised siltstone. |
| 7.9 - 9.70 | Fawn-light brown, leached and oxidised siltstone/shale, highly broken and friable.<br>8.75-8.85m. Quartz vein with limonite. |
| 9.7 - 12.7 | Light pink-brown oxidised sandstone and siltstone. |
| 12.7 - 21.85 | Interbedded, oxidised siltstone and shale, varies in colour from mid-red brown to light grey-green |
| 21.85 - 60.4 | Grey-green interbedded sandstone, siltstone and shale. Partially oxidised with less oxidation with depth. Several minor quartz veins less than 5cm. wide.<br>27.7-27.8m. Quartz vein with limonite, boxworks.<br>33.5-33.65m. " " " " "<br>40-40.15m. Quartz vein with dark green chloritic material and some galena.<br>40.85-40.95m. Quartz vein with dark green chloritic material.<br>47.55-47,7m. Quartz vein with green chloritic material and minor pyrite.<br>49.55-50.0m. Mainly quartz veining with green chlorite.<br>50.0-51.0m. Series of several narrow quartz veins up to 1cm. thick. Some containing pyrite and galena, in green-grey chloritic siltstone and shale.<br><br>Quartz veining more common below 52m. particularly in the intervals 57.2-57.8m. and 58.1 to 58.9m.<br><br>Note: Bedding in the sediments ran at about $60^{\circ} \pm 10^{\circ}$ to drill hole direction over the length of the hole. |

MT. RINGWOOD D.D.H. 2 (40.25m) D.D.H. 2A (40.25 - 92.20m)

| INTERVAL (metres) | |
|---|---|
| 0-3 | No core recovery. |
| 3-4.1 | Very broken, oxidised siltstone, minor quartz rubble with boxworks. |
| 4.1-20.4 | Interbedded micaceous siltstones and spotted slate (chiastolite?)<br>Mainly light grey-green in colour but some fawn and some red-brown sections. Moderate fracturing in sections.<br>16.4 - 16.55m. Quartz vein with iron and clay material.<br>20 - 20.15m. Quartz vein with dark green chlorite material. |
| 20.4-30.25 | Light grey interbedded siltstones and spotted slates, chloritic and micaceous.<br>21.1 - 21.15m. Minor quartz vein, minor boxworks.<br>22.35 - 22.8m. Quartz vein material with limonitic boxworks.<br>24.8 - 25.1m. Quartz vein, minor boxworks, some dark green chlorite.<br>26.6 - 26.75m. Quartz vein, some dark green chlorite, minor pyrite.<br>29.7 - 29.82. As above.<br>30 - 30.05. As above. |
| 32.25-33.0 | Quartz breccia zone, no obvious mineralisation. Slate and siltstone fragments. |
| 33.0-40.4 | Mid grey interbedded spotted slate and siltstone, chloritic and micaceous.<br>36.65 - 36.8m. Quartz vein, some green chlorite. |
| 40.4-40.85 | Quartz breccia, slate fragments, some pyrite. |
| 40.85-41.6 | Light green spotted slate, with minor quartz vein at 41.2 - 41.25m. |
| 41.6-43.6 | Quartz with banded shale material, some pyrite. |
| 43.6-86.3 | Mid green spotted siltstone and shale, noticeably less spotted material below 50m. Principally a monotonous, grey-green chloritic slate below 50m.<br>45.15 - 45.35m. Quartz vein with veins of dark green chlorite.<br>73.35 - 73.5m. Two minor quartz veins each about 5cm. thick.<br>74.95 - 75.25m. Some quartz veining.<br>78.40 - 80.8m. Spotted siltstone section.<br>81.7 - 81.75m. Vein of massive sulphides, pyrite and arsenopyrite with further narrow quartz veinlets with chalcopyrite and galena to 81.9m.<br>83.8 - 84.0m. Barren qtz. veins.<br>84.7 - 85.1m. Barren qtz. veins. |

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86.3 - 88.5 Barren quartz vein material with yellow and green chlorite, mixed with chloritic siltstone. Vein appears to run near parallel to drill direction.

88.5 - 92.2 Grey-green chloritic siltstone and slate. Narrow sulphide vein 2cm. thick at 90.1m.

Note: Bedding at $20^{\circ} \pm 5^{\circ}$ to drill hole direction throughout hole.

MT. RINGWOOD D.D.H. 3

| INTERVAL (metres) | |
|---|---|
| 0-24.3 | Interbedded spotted siltstone and slate, fawn, brown, pale green, oxidised, highly fractured. Darker brown section in first 3m.<br>13.6 - 14.0m. Quartz vein with cavities filled with hematite, limonite and brown clay.<br>19.7 - 20.05m. Quartz vein as above.<br>21.4 - 21.5m. Quartz vein as above. |
| 24.3-37.4 | Interbedded spotted siltstone and slate, grey-green, partially oxidised with reduction in oxidation with depth. Some narrow bands of greywacke; the greywacke contains disseminated blebs of pyrite.<br>38.4m 1cm. band of galena.<br>36m. some narrow quartz veins less than 10 cm. thick. |
| 37.4-41.1 | Zone of quartz breccia with bands of siltstone<br>37.4 - 38.0m. Quartz breccia, sediment fragments with some pyrite and arsenopyrite.<br>38.6 - 38.85m. As above.<br>40.4 - 40.7m. As above.<br>40.9 - 41.1m. As above. |
| 41.1-54-3 | Grey green interbedded siltstone and slate, a few narrow quartz veins less than 10cm. thick. |
| 54.3-55.0 | Barren quartz vein, some coarse crystalline quartz. |
| 55.0-57.8 | Grey green siltstone and shale with several narrow quartz veins up to 10cm. thick. |
| 57.8-62.85 | Zone of brecciated quartz veins with interbands of siltstone or shale.<br>57.8 - 61.0m. (2.2m) Cavities noted by drillers below 58m.<br>61.0 - 61.6m. (0.3m.) 61.6 - 62.05 (0.25m)<br>62.05 - 62.55 (0.04m.) 62.55 - 62.85 (0.10m)<br>57.8 - 58.15m. Quartz veining with some chlorite.<br>58.6 - 58.8m. As above.<br>60.1 - 60.25m. As above with minor pyrite.<br>60.5 - 62.85m. Quartz breccia zone with chlorite and minor pyrite. |
| 62.85-63.6 | NO CORE RECOVERY. |
| 63.6-68.95 | Light grey spotted siltstone and shale. |
| 68.95-69.35 | Quartz veining with chlorite (Recovery 0.22m.)<br>Note: Bedding at $50^{\circ} \pm 10^{\circ}$ to drill direction throughout drill hole. |

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# MT. RINGWOOD D.D.H. 4

| INTERVAL (metres) | |
|---|---|
| 0-16.7 | Fawn, pale grey-green, spotted siltstone and slate, oxidised, strongly fractured, with some highly broken and friable sections. Bedding approximately 30° to drill hole direction. |
| 16.7-18.5 | Partially oxidised mid-grey green spotted siltstone, micaceous. |
| 18.5-21.6 | Highly altered basalt with coarse 5mm. cavities, micaceous. |
| 21.6-22.2 | Grey green siltstone, partially oxidised, 1cm. inclusion of pyrite and arsenopyrite at 22.1m. |
| 22.2-22.45 | Broken quartz vein with limonitic boxworks. |
| 22.45-33.30 | Grey-green partially oxidised siltstone, and fawn oxidised spotted siltstone, moderately fractured. Some broken quartz at 30.4m, 32.9m. |
| 33.30-36.8 | Mid-grey green spotted siltstone/slate and greywacke siltstone Sediments contain numerous blebs and veinlets of sulphide material.<br>34.3 - 34.4m. Quartz vein, some chlorite.<br>35.3 - 35.5m. Quartz vein with chlorite and some arsenopyrite.<br>36.3 - 36.4m. As above. |
| 36.8 - 38.1 | Quartz vein section, as follows.<br>36.8 - 37.6m. Quartz vein with chlorite, minor pyrite.<br>37.6 - 37.9m. Siltstone with sulphide blebs and veinlets.<br>37.9 - 38.1m. Quartz vein with chlorite. |
| 38.1 - 38.9 | Mid grey-green siltstone. |
| 38.9 - 39.5 | Quartz vein with chlorite, minor pyrite with sulphide rich sedimentary sections between 39.3 and 39.4m. |
| 39.5 - 39.8 | Siltstone with quartz veins with abundant pyrite, arsenopyrite and some sphalerite. |
| 39.8 - 41.9 | Mid grey-green siltstone. |

# APPENDIX III.

## PETROGRAPHIC DESCRIPTION

(AMDEL)

Mount Ringwood D.D.H. 4 - 20.8m.

Rock Name:
Altered basalt or andesite

Hand Specimen:
An essentially aphanitic, pale to medium greenish-grey coloured rock. Microchemical tests failed to detect the presence of any potash feldspar.

Thin Section:
This rock is comprised mainly of finely divided sericite-clay pseudomorphic after plagioclase laths, intergrown with minor granular quartz and finely divided opaque to translucent iron oxides or iron-titanium oxides. The original rock obviously consisted mainly of feldspar laths generally below 0.2 mm in size through which larger feldspar phenocrysts were disseminated.

All of the feldspar has been completely replaced by finely divided sericite-clay which has a felted, interlocking texture, but the original igneous texture is still retained and locally is very well preserved.

The granular quartz generally forms small disseminated grains below 0.1 mm in size or finely granular aggregates and appears to be a secondary product produced during alteration. Highly degraded biotite flakes are also disseminated through the rock and generally have a translucent, brown, weakly pleochroic colour. The biotite flakes also have fibrous, degraded textures and contain translucent iron oxides along cleavage traces. A finely divided acicular mineral occurs within some disseminated quartz grains and could represent amphibole, although positive identification could not be made due to its very fine character.

This is a feldspar-rich igneous rock with andesitic to basaltic affinities which has suffered extensive alteration to produce abundant, finely divided sericite-clay.

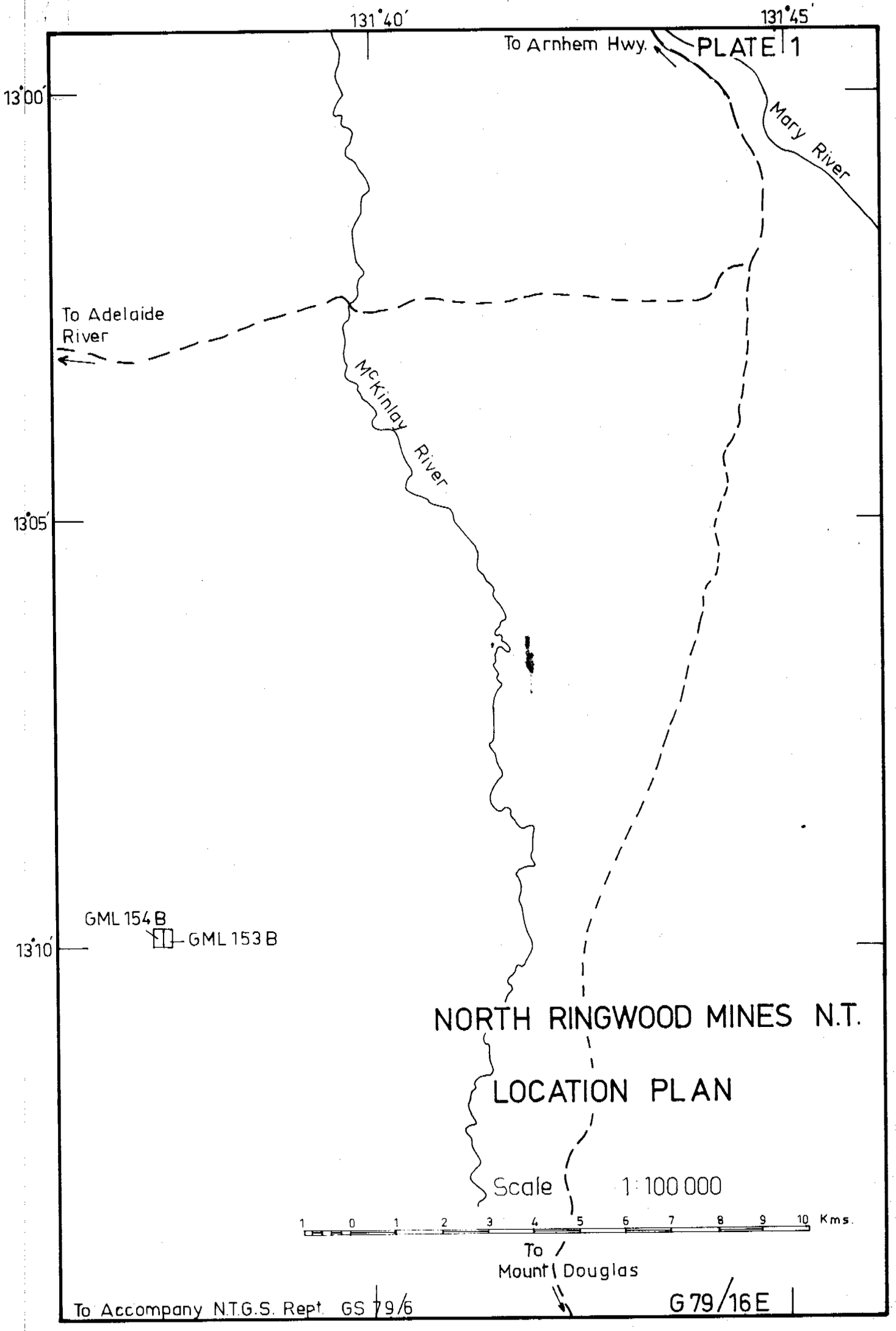
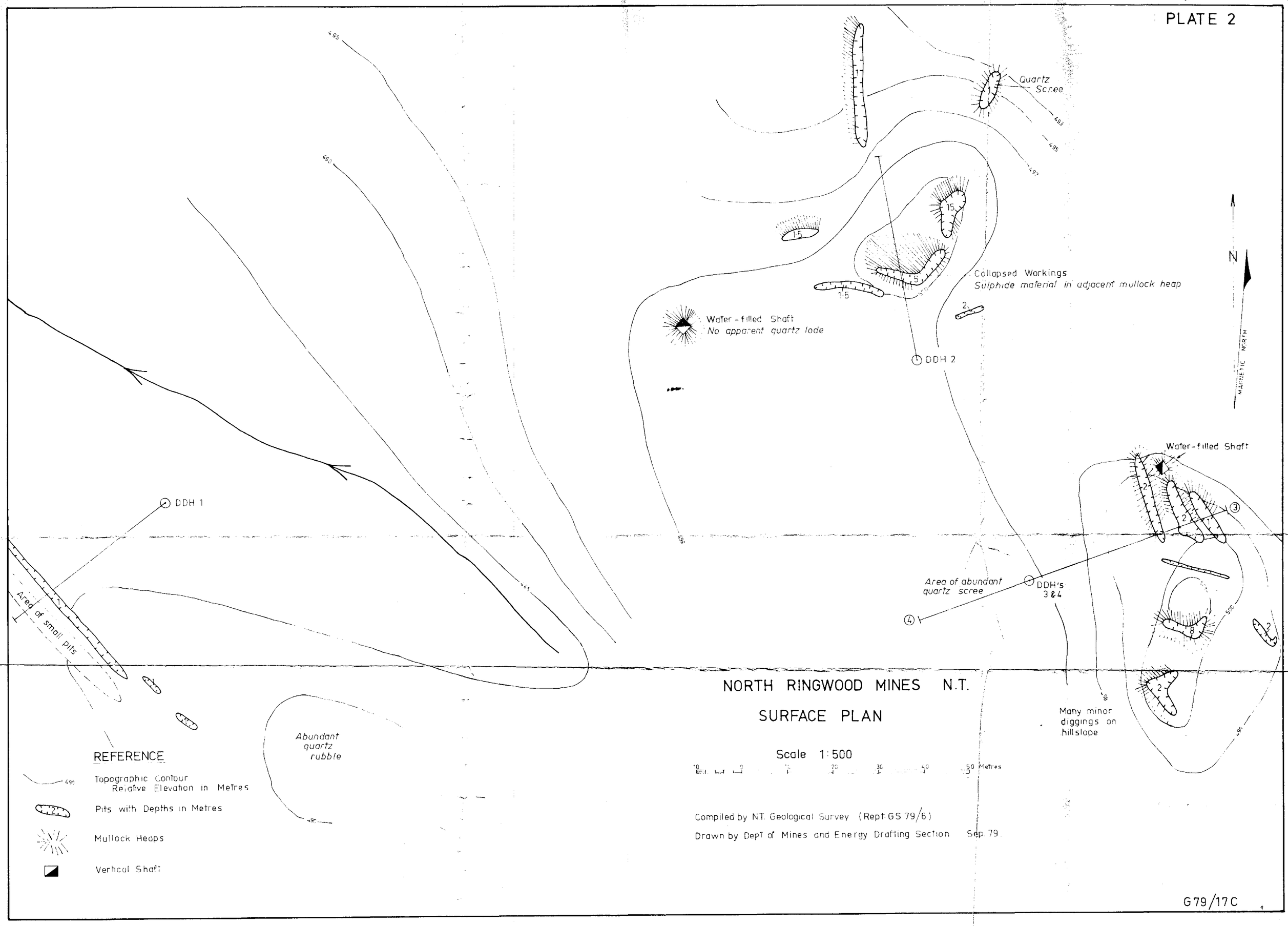

131°40'
131°45'
PLATE 1
To Arnhem Hwy.
13°00'
Mary River
To Adelaide River
McKinlay River
13°05'
GML 154 B
GML 153 B
13°10'
NORTH RINGWOOD MINES N.T.
LOCATION PLAN
Scale 1:100 000
1 0 1 2 3 4 5 6 7 8 9 10 Kms.
To Mount Douglas
To Accompany N.T.G.S. Rept. GS 79/6
G 79/16 E

PLATE 2




REFERENCE

- Topographic Contour, Relative Elevation in Metres
- Pits with Depths in Metres
- Mullock Heaps
- Vertical Shaft

# NORTH RINGWOOD MINES N.T.

## SURFACE PLAN

Scale 1:500

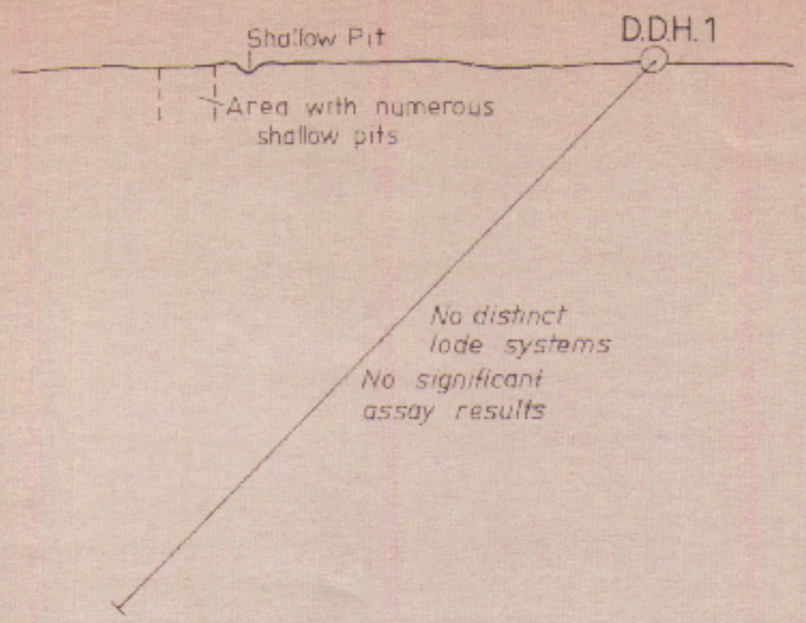
0 10 20 30 40 50 Metres

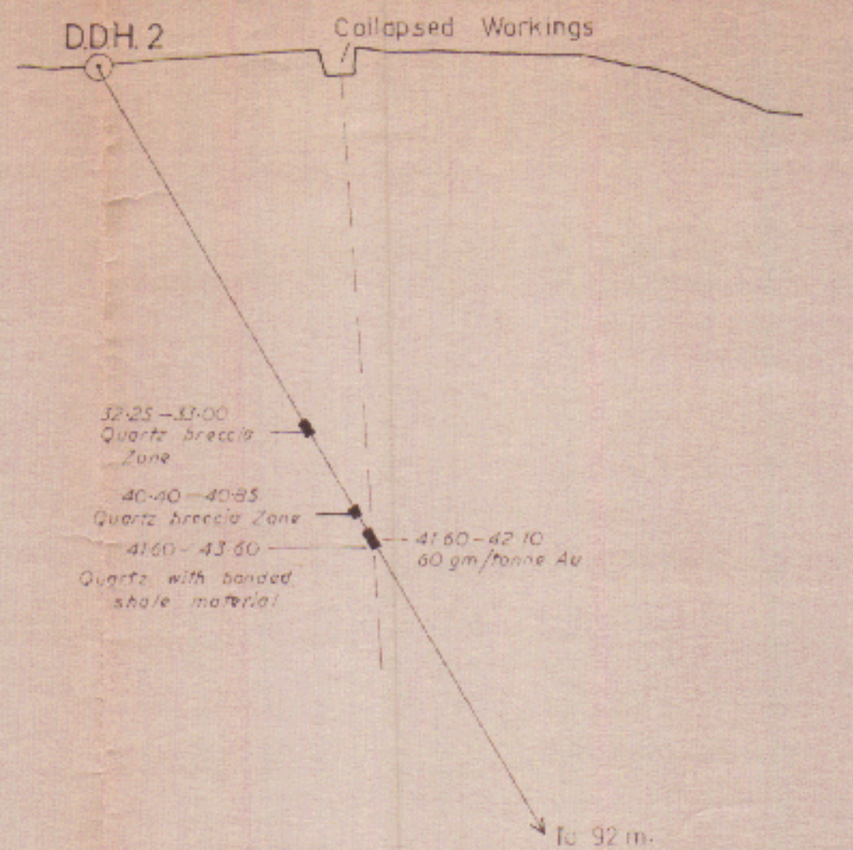
Compiled by N.T. Geological Survey (Rept: GS 79/6)

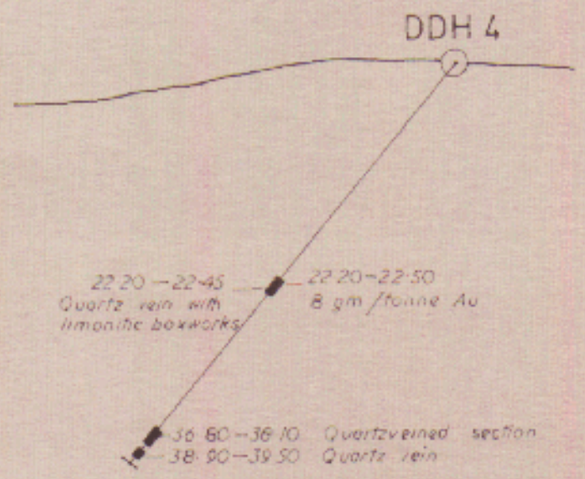
Drawn by Dept of Mines and Energy Drafting Section Sep 79

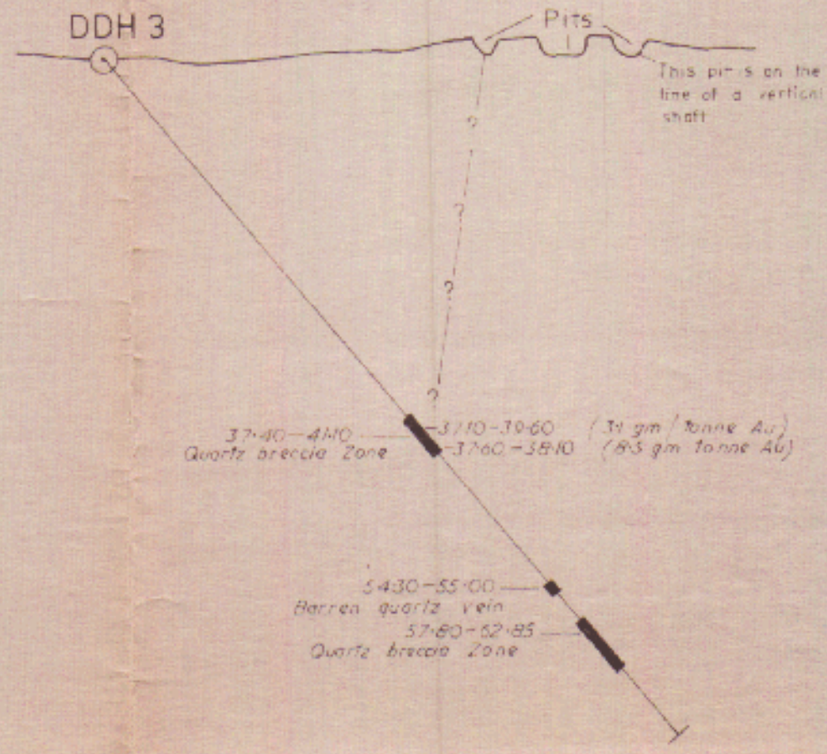
G79/17C

PLATE 3




# NORTH RINGWOOD MINES N.T.

## DRILL SECTIONS

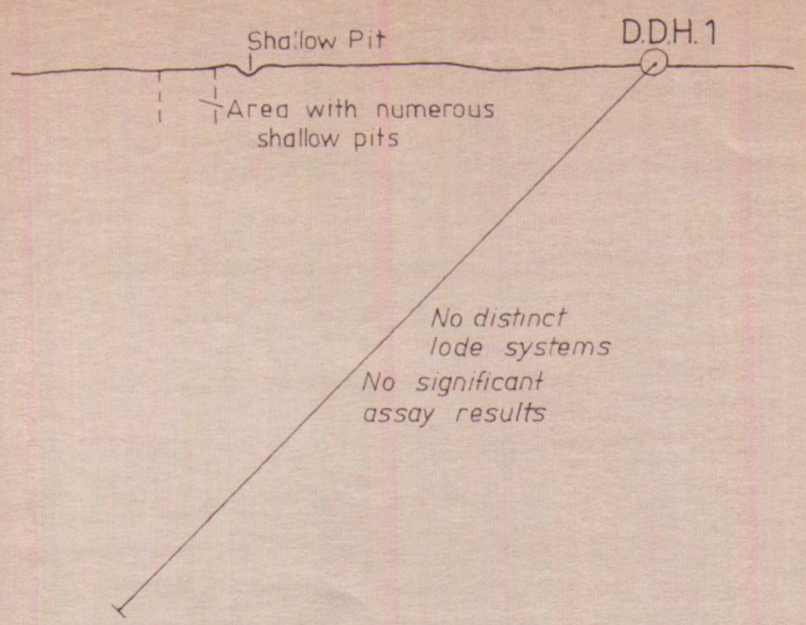
Scale 1 500

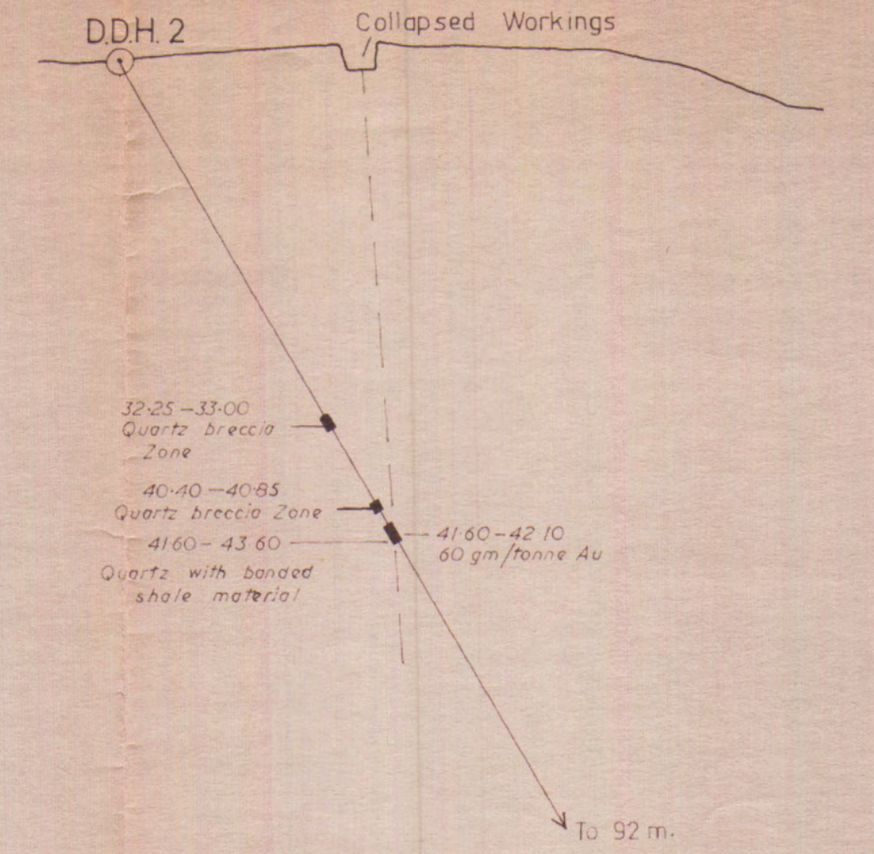
10 0 10 20 30 m

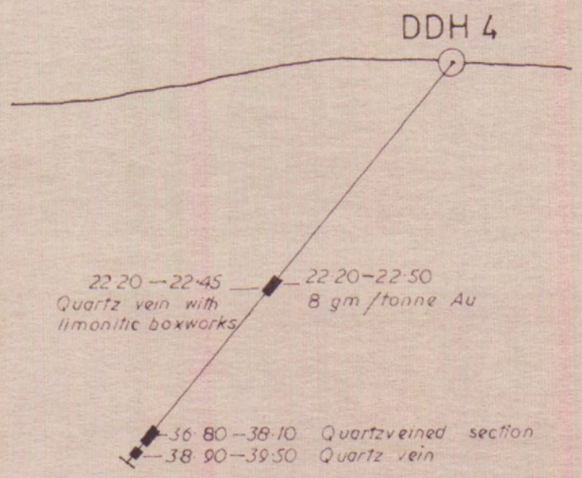
G 79/18D

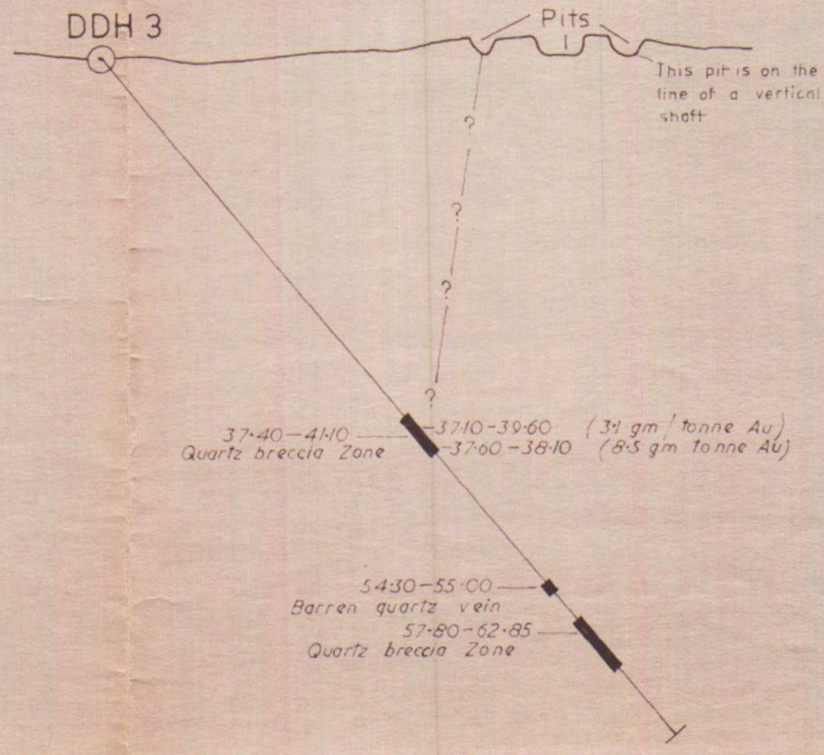
To Accompany NTGS Rept GS 79/6

PLATE 3




# NORTH RINGWOOD MINES N.T.

## DRILL SECTIONS

Scale 1:500

10 0 10 20 30 m

G 79/18D

To Accompany NTGS Rept GS 79/6