DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL SURVEY
NON-METALLIC RESOURCES DIVISION

GLEN OSMOND SHALE QUARRY
SEC. 1079, HD. ADELAIDE

(P.M. 58 - P.G.H. Industries Pty. Ltd.)

by

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GEOLOGIST
EXTRACTIVE MINERALS SECTION

Rept.Bk.No. 77/30
G.S. No. 5858
D.M. No. 917/71

10th March, 1977.

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DEPARTMENT OF MINES
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ABSTRACT

At the Glen Osmond quarry, 140,000 tonnes of weathered shale and 50,000 tonnes of Quaternary clay suitable for brick making purposes remain in that part of the quarry presently in operation.

INTRODUCTION

Between the 7th and 9th August 1974 a geological survey was completed over the quarry area to determine reserves of brick shale and brick clay. Field data was transferred onto an overlay of Department of Lands orthophoto sheet No. 6628-49-g at a scale of 1 to 2 500.

The area is used mainly for crushing and stockpiling of brick shale from quarries in the Adelaide Hills before transportation to the nearby P.G.H. Industries Brick works, 0.8 km away on Glen Osmond Road (section 270, Hd. Adelaide). Small amounts of clay and weathered shale are being removed from the lower levels of the quarry for mixing with other brick making materials.

TENURE AND LOCATION

The Glen Osmond shale quarry is operated by P.G.H. Industries Pty. Ltd. in section 1079, Hd. Adelaide. Private Mine 58 was declared over the area on 7.3.73.

The quarry is on the western edge of the Hills Face Zone, adjacent to the South East Freeway overlooking the city of Adelaide. Recent subdivisions extend up to the north western boundary of the area, while to the south and east of the quarry the topography is rugged and tree covered.

A disused quartzite quarry within the Private Mine is being used as a rifle range.

QUARRYING ACTIVITY

The quarry has been in operation since very early in the State's history and both quartzite and shale have been quarried. Initially, comparatively fresh shale and slate was removed for building stone from the northern part of the quarry. Large amounts of quartzite were later quarried from several workings in the Mitcham Quartzite for use as aggregate and road metal. This work exposed the weathered shale below the quartzite. It has since been quarried extensively for brick making, as has the Quaternary deposit in the north-west of the quarry.

Several small disused quarries have been worked in the upper shale unit (Mintaro Shale equivalent) in the south-west of the Private Mine area.

PREVIOUS INVESTIGATIONS

A.T. Armstrong reported the existence of 1 900 000 tonnes of weathered shale overlain by 400 000 tonnes of overburden consisting of waste from the quartzite quarry which was then in operation.

Valentine (1972) reports the existence of over 5 million m^3 of shale (Mintaro Shale equivalent) overlying the quartzite in the south-west of the Private Mine, but there has not yet been any quarrying of these reserves. No drilling or testing of these reserves (e.g. suitability for brickmaking) has yet been carried out.

SITE GEOLOGY

I. BASEMENT GEOLOGY

The quarry is located in Adelaidean sediments. Three basement rock units belonging to the Burra Group are recognised in the quarry area. The uppermost unit is a shale which outcrops to the south of the main area (Mintaro Shale equivalent). It overlies a massive quartzite (The Mitcham Quartzite) which in turn overlies a lower shale unit (Saddleworth Formation equivalent) in the north of P.M. 58.

Description of basement units

a. The lower shale unit (Saddleworth Formation equivalent) consists of grey laminated shales with a well developed cleavage inclined to the bedding. The laminations are wavy and contorted, and the shale is jointed and dendritic. Quartz veins, up to 12 cm thick, and parallel to the bedding are visible in the south of the major northern quarry. The shale weathers progressively from grey to brown then to reddish brown near ground level. Where it underlies the Quaternary deposit in the north-west of the Private Mine it has weathered to a very soft red material. The weathered material from higher in the profile is more suitable for brick manufacture than the comparatively fresh grey rock outcropping in the floor of the lowest quarry.

Approximately 30 metres of this shale unit are exposed in the southern face of the northern quarry where it has been extensively quarried. Ellerton (1951) indicates that these shales are suitable for extruded bricks.

b. The Mitcham Quartzite

This unit is a thickly bedded to massive, hard white quartzite grading to quartz rich sandstone, with some conglomerate interbeds. Both quartzite and sandstone are medium grained with heavy mineral banding and some thin silty or shaly interbeds, with rare quartz veins parallel to bedding. The bedding shows large scale broad folds, and is occasionally contorted.

Approximately 50 metres of Mitcham quartzite are exposed overlying the lower shale unit.

c. Upper Shale unit (Mintaro shale equivalent)

Several metres of shale are exposed in the top of the southern quarry faces overlying the Mitcham quartzite and in two abandoned quarry pits 200 metres to the south west. The shale needs fine grinding before being suitable for brick manufacture.

The sequence of Adelaidean rocks is broadly folded about an axis plunging shallowly to the south. A broad synclinal structure is visible on the southern face of the quartzite quarry, with anticlinal structures east and west of the quarry.

Two cleavage sets were measured dipping at 20° towards 95° and 30° towards 65°, (i.e. cleavage is not parallel to the axial plane and is not generally parallel to the bedding plane). Prominent joint sets were nearly vertical, striking approximately 210°, and 70° to 85°.

Several minor faults were seen within the lower shale unit exposed on the quarry face.

II. QUATERNARY GEOLOGY

In the northwest of P.M. 58, a Quaternary alluvial deposit (up to 10 or 15 metres thick) overlies a shallow depression in the lower shale unit.

The contact at the base of the Quaternary slopes to the east, and the unit is an erosional deposit resulting from uplift on the Eden Fault.

The deposit consists of water worn pebbles and angular quartzite and shale fragments in a red clay-silt matrix. The rock type is suitable for brick manufacture when screened and mixed with other shales and clays.

This clay and the underlying Saddleworth Formation shale are the only materials currently being quarried.

RESERVES

1. P.G.H. Industries are removing material from an area in the north-west of P.M. 58. Within this area approximately 190,000 tonnes of material are left, of which 50,000 tonnes is Quaternary clay and 140,000 tonnes is weathered shale (see Appendix I).

2. Additional reserves of weathered "lower" shale existing in the north-east of the Private Mine are estimated at 100,000 tonnes. The disused quarry faces in this area are steep and in a state of disrepair while the lower faces are covered by stock-piles and overburden. Thus these additional reserves may be difficult to extract.

3. There are no other reserves of the lower weathered shale which could be obtained without removal of extensive quantities of the overlying Mitcham Quartzite.

CONCLUSION

In the north west of the quarry, reserves of weathered shale of the Saddleworth Formation approximate 140,000 tonnes. A further 50,000 tonnes of red Quaternary clay is available adjacent to and overlying the weathered shale. Both materials are blended for brick making purposes.

The remainder of the Saddleworth Formation shales in P.M. 58 are overlain by thick Mitcham Quartzite which has been extensively quarried for aggregate. Reserves of weathered shale (Mintaro Shale) are available in the south of the Private Mine. However this part of P.M. 58 is within view of the City of Adelaide (in the Hills Face Zone), and environmental considerations may preclude extension of the quarry to the south.

W S McCallum

WSM:JS
10th March, 1977.

WAYNE S. McCALLUM
GEOLOGIST

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APPENDIX I

RESERVES OF CLAY AND SHALE IN THE N.W. OF P.M. 58

The reserves were calculated from cross sections A, B and C (Fig. 2). The distance between cross section B and C is 18.75 metres, and between A and B is 56.25 metres. Thus the reserve area on Fig. 1 can be divided into 6 sub areas, each 18.75 metres wide between cross section A and C and extending 18.75 metres north and south of cross sections A and C respectively.

The cross section of reserves on A = 1170 sq. metres
B = 890 "
C = 515 "

The volume in each of the 6 sub areas (proceeding from north to south) is estimated at:-

½ (A + O) x 18.75 cu.m.
½ (A + A) x 18.75 cu.m.
½ (A + A) x 18.75 cu.m.
½ (A + B) x 18.75 cu.m.
½ (B + C) x 18.75 cu.m.
½ (C + C/2) x 18.75 cu.m.

This yields a total of

$$(3A + B + \frac{5C}{4}) \times 18.75 \text{ cu. m.}$$

= (3510 + 890 + 644) x 18.75 cu.m.

= 94,600 cu.m.

This is the total reserve of Quaternary clay and lower shale in the north west of the Private Mine.

The Quaternary clay occurs in the northern four sub areas (i.e. between cross sections A and B, and north of section A), and may constitute up to one half of the reserves in these sub areas.

Thus the volume of Quaternary deposits is:-

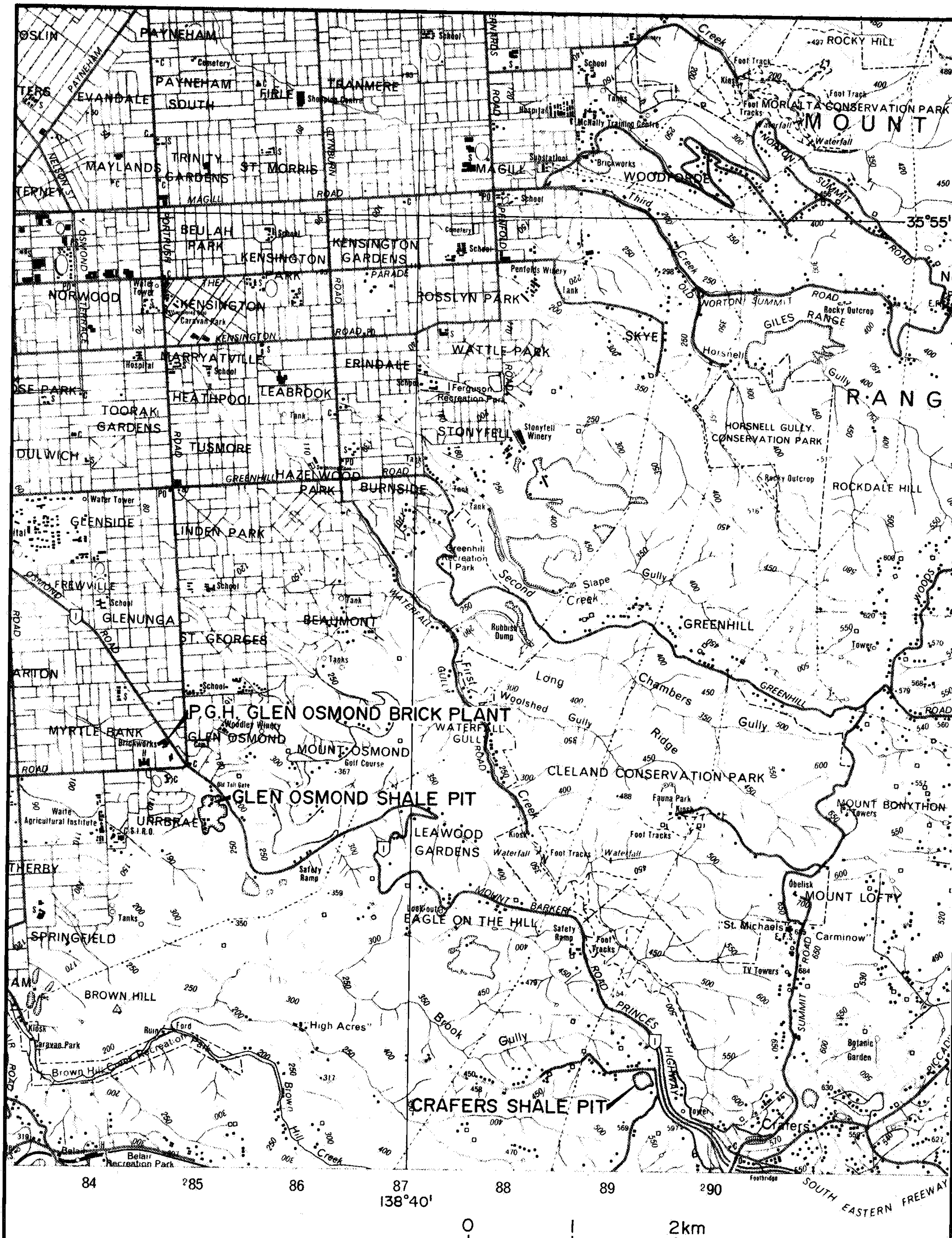
½(½(A + O) + ½(A + A) + ½(A + A) + ½(A + B) x 18.75 cu.m.

= ¼(6A + B) x 18.75 cu.m.

= 37,000 cu.m.

Assuming a Specific Gravity of 1.4, for a dry, slightly gravelly clay, Reserves = 51,800 tonnes.

This leaves 57,600 cu.m. of underlying grey shale. Assuming a Specific Gravity of 2.5, Reserves = 144,000 tonnes.



Part of ADELAIDE 1:50 000 Topographical sheet.

Fig. 1

EXTRACTIVE MINERALS SECTION	**DEPARTMENT OF MINES–SOUTH AUSTRALIA**	SCALE. 1:50 000
COMPILED: W.S.McC.	**GLEN OSMOND AND CRAFERS SHALE PITS LOCALITY MAP**	DATE: 2·3·77
DRN: A.F. / CKD.		PLAN NUMBER: **S12605**

LEGEND

TORRENSIAN STUTTIAN QUATERNARY

Poorly sorted red Quaternary gravel and clay

BURRA GROUP — BELAIR SUB GROUP

Green and grey laminated dendritic slates with occasional quartzite bands. Mintaro Shale equivalent.

Massive white, fine to medium grained quartz sandstones, with minor silty bands and quartzite interbeds. Mitcham Quartzite

Grey or brown weathered shales and slates with minor quartzite interbeds

Bedding dip and strike W. Mc Callum 1974

Bedding dip and strike J Valentine 1972

Quarry face

Geological boundary

Fault.

Road

Track

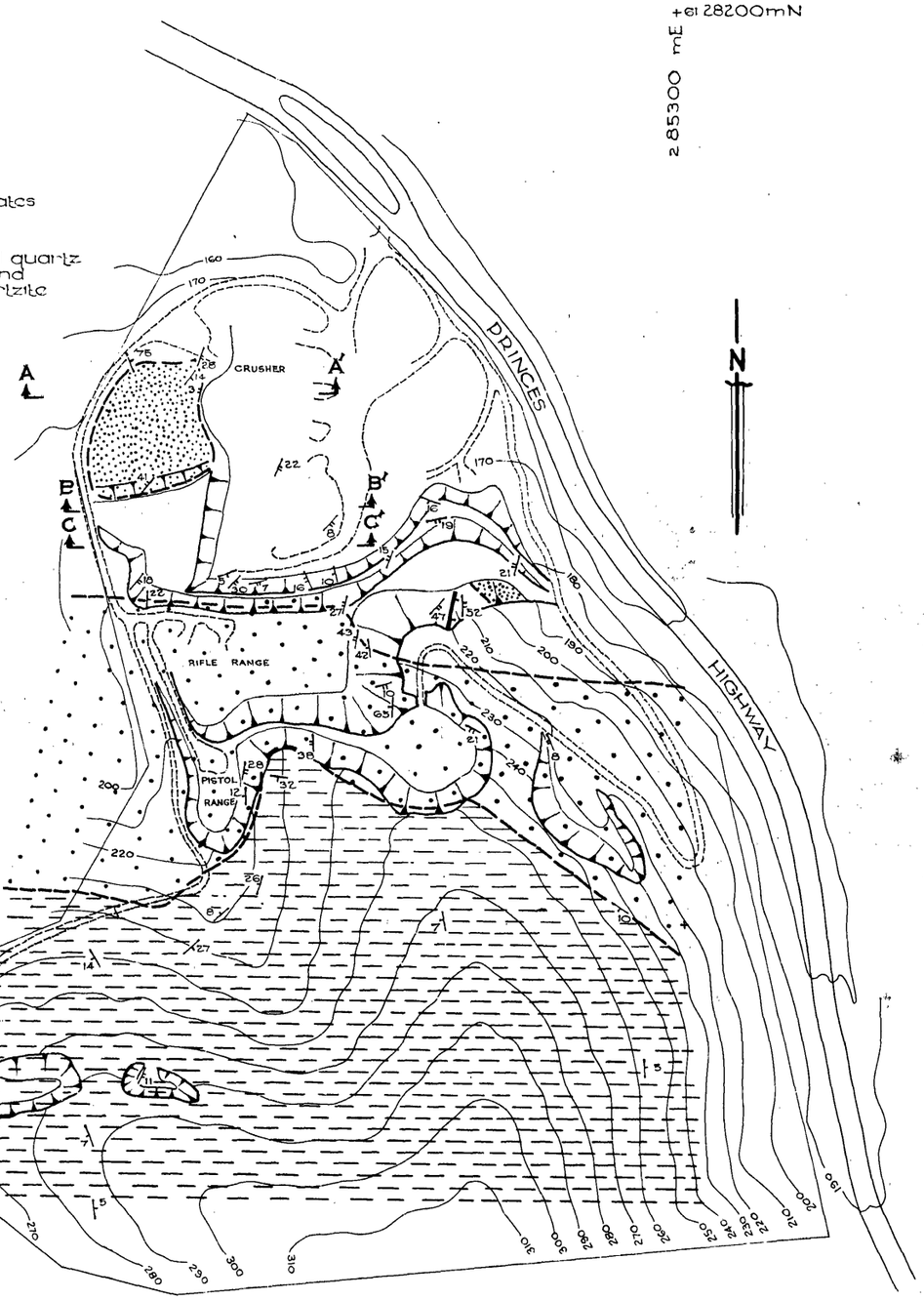
A — A' Cross Section

Section boundary

220 Topogaphic contour (metres)

+61 28200mN

285300 mE

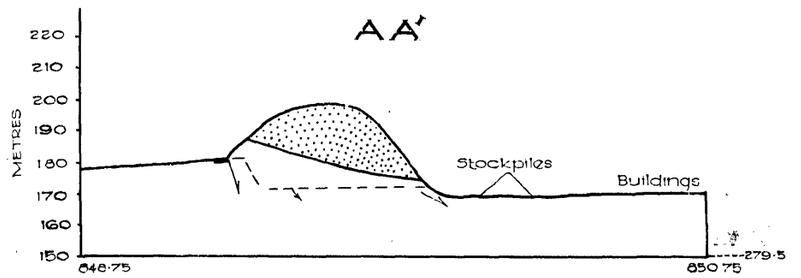


+61 276 00mN

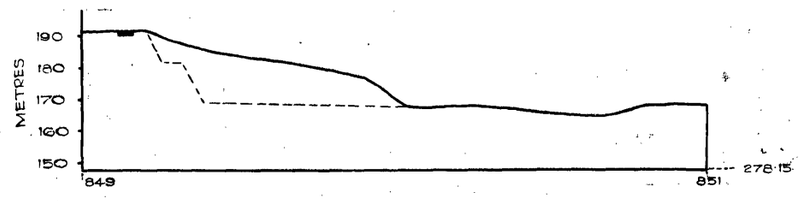
284800mE

CROSS SECTIONS

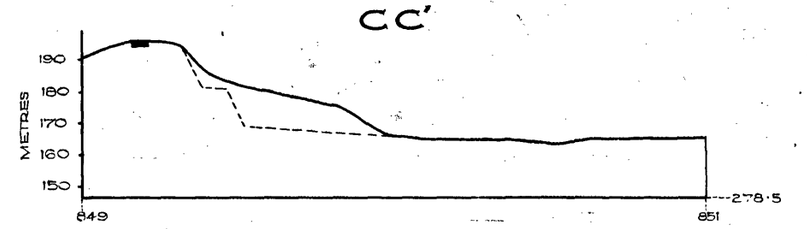
AA'



BB'



CC'



LEGEND

TORRENSIAN TERTIARY

Red gravel and clay

BURRA GROUP

Grey or brown weathered shales with minor quartzite interbeds

LEGEND

0 50 100

METRES

LEGEND

0 100 200

METRES

DEPARTMENT OF MINES — SOUTH AUSTRALIA

GLEN OSMOND SLATE QUARRY
SEC. 1079 HD. ADELAIDE
GEOLOGICAL PLAN & SECTIONS

METALLIC MINERALS SECTION	W.S McCallum GEOLOGIST	Drn. WMC.	SCALE: 1 2500
		Tcd. RB	75–84
Director of Mines		Ckd.	
		Exd.	DATE: 31st. JAN 1975

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