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D.M. 795/57

DEPARTMENT OF MINES
SOUTH AUSTRALIA

Report on

BLUE LIMESTONE DEPOSIT

SEC. 1022, HD. YANKALILLA, CO. HINDMARSH

(H. & L. C. DEPT.)

by

L. G. Nixon
Geologist

MINERAL RESOURCES SECTION
GEOLOGICAL SURVEY

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57-212	Blue Limestone Deposit, Sec. 1022, Hd. Yankalilla, Co. Hindmarsh (H. & L. C. Dept.)	1" = 50'.
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D.M. 795/57

M.C. Report No. Refer 45/9

G.S. Report No. Refer 740

18th July, 1957.

MICROFILMED

D.M. 795/57

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Report on

BLUE LIMESTONE DEPOSIT

SEC. 1022, HD. YANKALILLA, CO. HINDMARSH

(H. & L. G. DEPT.)

1. ABSTRACT

Two groups of Cambrian rocks, unconformably overlain by horizontal to sub-horizontal Permian glacials, occur in the area mapped, in the S.W. portion of Sec. 1022. The Cambrian sediments consist of limestones and calcareous slates. Reserves in Areas A & B together are estimated to exceed 350,000 cu. yards. Four diamond drill holes totalling 525' have been recommended to block out reserves in Area B where reserves are estimated to be approximately 50,000 cubic yards in the solid.

2. PREVIOUS LITERATURE

1. Report of Investigations No. 3.
2. "Tillites and Related Glacial Topography of South Australia." Eclogae Geologicae Helvetiae. Vol. 48.

3. INTRODUCTION

On 10/5/57 a geological survey of Sec. 1022, Hd. Yankalilla was completed. This survey was carried out following a request by the Commissioner of Highways to this Department. Approximately 50,000 cu. yards of crushed aggregate are required for use on various roads in the Normanville area. The surveying was done by M.B. Langsford (Surveyor) using a Watts microptic alidade.

4. ACCESS AND TOPOGRAPHY

Section 1022 is situated approximately 50 miles by road south of Adelaide. It is bounded to the north by Carrickalinga Creek, to the east and west by fences and to the south by an unsurfaced road. Access may be gained from the south along a metalled road connecting with the bitumen road just outside Normanville.

Difference in elevation in the area mapped is approximately 120'. The general slope of the country here is to the west the gradient being about 1 in 10.

5. GEOLOGY

Permian

Permian sediments in the area mapped are exposed in the old quarry, and in a pit in the south eastern portion of the section (See Map No. 57-212). They consist of unconsolidated, horizontal to sub-horizontal glacials, fluvioglacials and varved deposits resting unconformably over folded Cambrian strata.

Because of lack of outcrop in these areas, the boundaries of the blanketing Permian overmass have been inferred.

Cambrian

Two groups of sediments of Cambrian age occur in the area mapped, these are the Mottled Limestone and Calcareous Slates, and the Lower Archeocyathinae Limestone.

Mottled Limestone and Calcareous Slates. These sediments conformably overlie the Lower Archeocyathinae Limestone and are referred to on the accompanying map (No. 57-212) as "Bedded blue limestone outcrop with thin interbedded quartzite beds".

Differential weathering has etched the rock, causing the more resistant beds to stand out in relief. Over most of the area individual beds average about 1½ inches in thickness.

The limestone layers are usually a lighter grey blue colour, dense, tough and fine grained, occasionally a limestone bed may exceed 12 inches in thickness.

In the old quarry and immediately to the east of it, these rocks have been deeply weathered and attenuated, and are represented by thinly laminated yellow-brown calcareous shales. A transition zone about 12 feet wide shows various grades of weathering between the weathered calcareous shales and the unweathered rock to the east.

The regional strike of the beds is north easterly, dipping to the south east. However due to minor folding in this group, the strike and dip directions vary considerably (see Map No. 57-212). No fossils were found in these sediments.

Lower Archeocyathinae Limestone. This group conformably underlies the Mottled Limestone and Calcareous Slates, from which it is distinguished by its massive appearance in the field, lack of differential weathering (in marked contrast to the differentially weathered overlying group), the presence of archeocyathinae, its light blue grey colour, fine grain size, denseness, toughness and well developed joint system.

In the old quarry this group is completely weathered to a massive yellow brown rock, quite soft, similar to a soft mudstone. Between a dozer cut extending northerly from the old quarry and the mapped outcrop of Lower Archaeocyathinae Limestone further north, a mantle of soil obscures the nature of the underlying rock.

Structure

Folding. The regional structure consists of tightly folded sediments overturned to the west. (Ref. Rep. of Investigations No. 3). The area mapped is considered to be part of the western limb of a syncline, whose axis is overturned to the west.

In the mottled limestones and calcareous slates there is, in some places, considerable development of minor structures. It is thought that most of these structures are diastrophic, although in rocks of this type non-diastrophic structures can be expected.

Faulting. Faulting has been inferred from the fractured state of the rock near the contact of the two Cambrian groups in the old quarry, and the attenuation of the Mottled Limestone and Calcareous Slate beds in this area. It is probable that some of the drag folding in the sediments is related to this inferred fault.

6. RESERVES

Area A. Reserves are estimated to exceed 300,000 cu. yards in the solid.

Area B. Reserves are estimated at approximately 50,000 cu. yards in the solid allowing for a 60° batter on the quarry face.

Large reserves of limestone exist outside the mapped area.

7. DRILLING

Most of the stone in the shaded areas are considered to be suitable for use as aggregate for road construction purposes. It is recommended that some diamond drilling be carried out to test the quality of the stone in area B and block out the reserves.

Four diamond drill holes are suggested. These have been located on the plan and their details are set out below.

DDH No. 1 depressed 25° bearing 307°M depth 170 ft.
DDH No. 2 " 25° " 307°M " 150 ft.
DDH No. 3 " 30° " 321°M " 125 ft.
DDH No. 4 " 30° " 321°M " 80 ft.

An alternative to the above recommendation is to have two holes only. One located at DDH No. 1, depressed 25°, bearing 307°M, depth 320 ft., and the other located at DDH No. 3, depressed 30°, depth 205 ft. The disadvantages of this alternative scheme are (i) Longer time for pulling core from the hole at depth (ii) Over 60% of the core would be from below the area of probable quarry operations. (See Sec. A-B & C-D. Map Ref. No. 57-212).

8. CONCLUSIONS AND RECOMMENDATIONS

Sediments of Permian age unconformably overly Cambrian strata in the area mapped. Due to lack of outcrop the extent of the Permian overmass is not known.

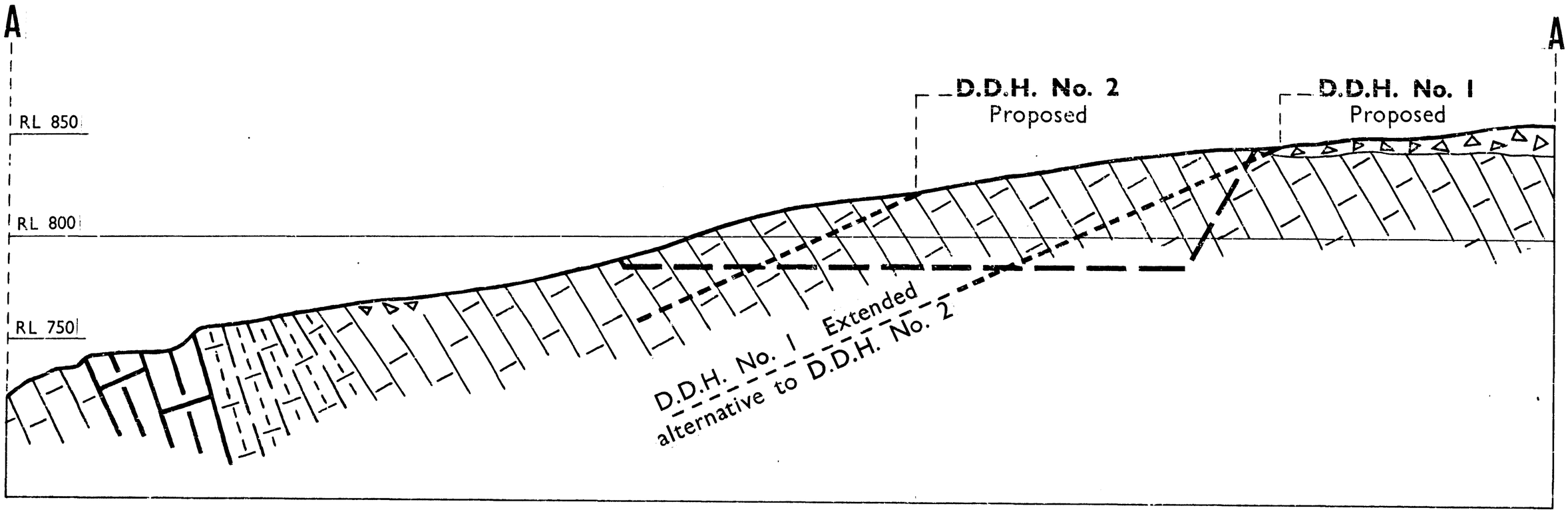
The Cambrian strata have been mapped as two distinct groups. The lower group being the Lower Archeocyathinae Limestone conformably overlain by the Mottled Limestone and Calcareous Slate group. Archeocyathina fossils were observed in the lower group, the Location of these have been marked on the map.

Area B lies entirely within the Mottled Limestone and Calcareous Slates. Reserves of stone in this area are estimated to be about 50,000 cu. yards in the solid, and are expected to meet the H. & L.G. Department's requirements of approximately 50,000 cu. yds. of crushed aggregate.

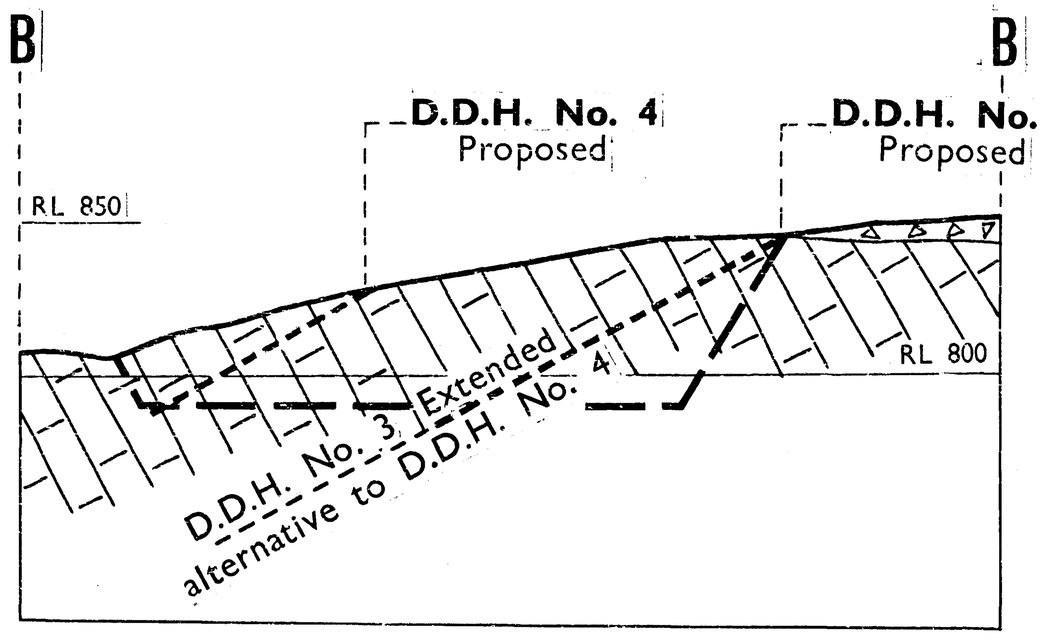
It is recommended that four diamond drill holes be drilled, as discussed under Drilling. to block out reserves and test the quality of the stone, within area B.

L.G. Nixon
GEOLOGIST
MINERAL RESOURCES SECTION

LGN:AGK
12/7/57



SECTION A-A



SECTION B-B

SCALE

FEET 50 0 50 100 150 200 250 FEET

LEGEND

PERMIAN

Permian Tillite (inferred)

CAMBRIAN

Inferred extent of bedded blue limestone with thin quartzite beds

Bedded blue limestone weathered to yellow brown

Massive pale blue limestone weathered to yellow brown

Proposed quarry sections

57-245

Geology by L. G. Nixon

S.A. Dept. of Mines

AREA A

AREA B

Drag fold

1022

QUARRY

Fence

Pit

D.D.H. No. 4 Proposed Depressed 30°

D.D.H. No. 3 Proposed Depressed 30°

D.D.H. No. 2 Proposed Depressed 25°

D.D.H. No. 1 Proposed

Gate

ROAD

1019

1017

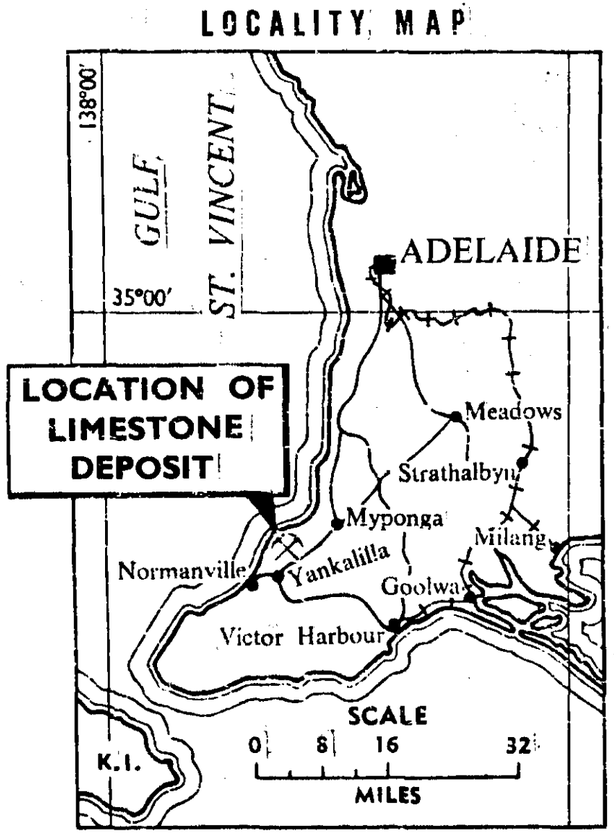
1031

MN

SCALE

FEET 50 0 50 100 150 200 250 300 350 FEET

LOCALITY MAP



LOCATION OF LIMESTONE DEPOSIT

LEGEND

PERMIAN

Permian Tillite (Observed)

Permian Tillite (Inferred)

CAMBRIAN

Bedded Blue limestone outcrops with interbedded (thin) quartzite beds

Bedded Blue limestone weathered to yellow brown

Inferred extent of Bedded Blue limestone with thin quartzite beds (No outcrops)

Inferred extent Bedded Blue limestone weathered to yellow-brown (No outcrops)

Massive pale blue (in parts) siliceous limestone containing Archeocyathinæ remains

Massive pale blue limestone weathered to yellow-brown

Inferred extent of Massive pale blue siliceous limestone (in parts) (No outcrops)

Inferred extent of Massive pale blue limestone weathered to yellow brown

Breccia

Unconformity

Unconformity (Position inferred)

Fossils

Areas for which volumes have been calculated

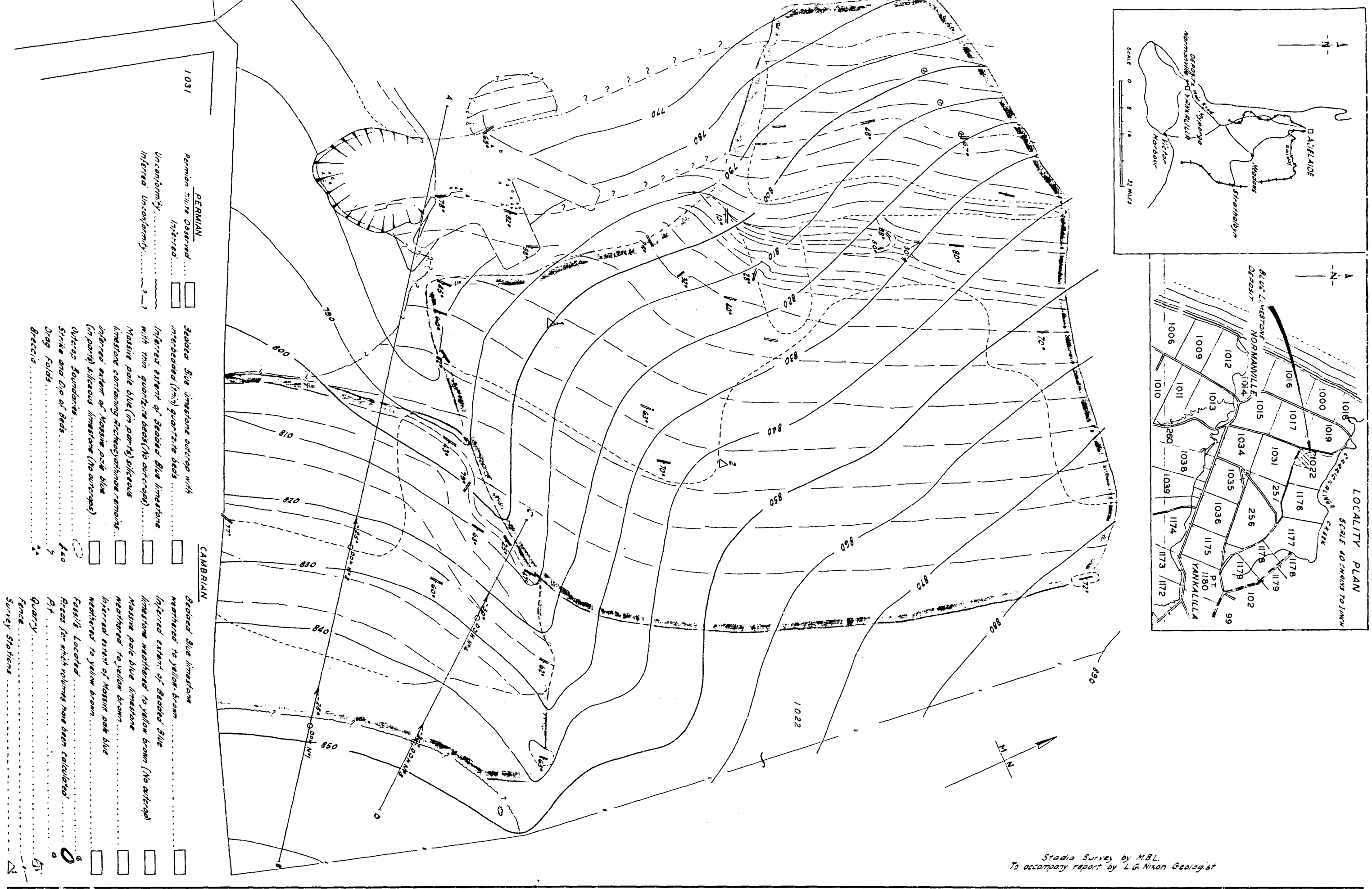
Strike and dip of bedding

57-212

Stadia survey by M. B. Langsford

Geology by L. G. Nixon

S.A. Dept. of Mines



Stadia Survey by M.B.L.
To accompany report by L.G. Nixon Geologist

S.A. DEPARTMENT OF MINES

YANKALILLA BLUE LIMESTONE DEPOSIT SECTIONS 57-295	Req. No.	BLUE LIMESTONE DEPOSIT	Approved	Passed	Scale: 50 FEET TO 1 INCH
	D.M.	HD. YANKALILLA SEC. 1022			57-212
	Compiled from	GEOLOGICAL PLAN			Hc 7
Associated Drawing / No.	No. / Amendment / Exd. / Date		Director of Mines	Exd.	Drn. L.G.N. Tcd. A.J.W. Ckd. K.R. Date 7-6-57