DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL SURVEY
NON-METALLIC RESOURCES

# INVESTIGATION FOR ROAD RUBBLE HUNDREDS OF TICKERA, WILTUNGA, NINNES, KULPARA. COUNTY DALY. DISTRICT COUNCIL OF BUTE.

by

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EXTRACTIVE MINERALS SECTION

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Rept. Bk. No. 76/118
G.S. 5790
D.M. 108/76

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DEPARTMENT OF MINES
SOUTH AUSTRALIA

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# INVESTIGATION FOR ROAD RUBBLE HUNDREDS OF TICKERA, WILTUNGA, NINNES, KULPARA COUNTRY DALY. DISTRICT COUNCIL OF BUTE.

## ABSTRACT

Reconnaissance in the Bute District Council area has located potential sites where Ripon Calcrete may be obtained for use in the construction and maintanance of unsealed roads. Trenching will be necessary to determine the quality and thickness of the deposits.

## INTRODUCTION

Present sources of limestone road rubble in the hundreds of Wiltunga and Ninnes and those parts of the hundreds of Tickera and Kulpara within the District Council of Bute were reported by the council to be nearing exhaustion. A reconnaissance survey was carried out in June, 1976 following a request from the council for assistance in locating additional deposits.

Roadmaking operations are confined to construction and maintenance of unsealed roads. Ripon Calcrete has been used exclusively for these purposes because of its widespread availability and ease of extraction, and it is often possible to minimise costs by siting the pits between the verges of the roads and adjacent fences. The calcrete is won by

ripping and fed to a small, mobile crusher. The resultant product is laid at a rate of about 1 cubic metre per metre length of new road, providing a thickness of about 110 mm of surfacing, and the operation is completed by compaction with a roller.

Sealed roads are the responsibility of the Highways Department, which obtains hard Cambrian dolomite from the Kulpara Limestone at a quarry on section 360, hundred of Kulpara.

## GEOLOGICAL SETTING

Geological coverage of the council area at 1;250 000 scale is provided by the published ADELAIDE, BURRA and MAITLAND sheets and by the WHYALLA sheet which is presently in preparation. 1 - mile coverage is limited to Wakefield and Wallaroo.

Precambrian basement rocks and Cambrian dolomitic limestones occur at shallow depth over much of the area. Schists, gneisses and jaspilites which grade into migmatites and granite occur in the hundred of Tickera in the west. Tertiary clastics and limestones occur overlying these older rocks in the western and southern parts of the area.

A mantle of Quaternary sediments, including sands, clays and calcrete blankets most of the council area. The calcrete is formed as a B soil horizon and varies from a nodular rubble to sheets of hard cemented limestone, underlain in some places by calcareous silt. Firman (1973) mentions a number of calcrete horizons, the oldest, thickest and most extensive of these being the Ripon Calcrete of Middle Pleistocene age.

## ROAD BUILDING MATERIALS

Exposures of the material within this council area are restricted to road cuttings, existing road rubble pits and temporary excavations for the installation of public utilities. The calcrete deposits are invariably covered by soil and sand spread, the only surface indications being the presence of calcrete float.

The localities visited by the author are shown on Plan 76-728 and are described below.

### HUNDRED OF TICKERA

Locality 4. Section 568. Abundant calcrete float occurs in paddocks along the council's western boundary road, and deposits are likely to occur within the council area to the north and east. Large fragments of hard calcrete up to 0.3 m in diameter were found on the roadside.

Locality 5. Sections 9 and 40. Hard nodular calcrete, 0.5 m thick and overlain by thin sand spread was observed in an E. & W.S. trench over a distance of approximately 0.6 km. The trench digger broke the calcrete into fragments up to about 0.3 m in diameter.

Locality 6. Section 28. Calcrete float with fragments up to 0.2 mm diameter was evident in paddocks to the south of the road over a distance at least 1 km.

Locality 7. Section 58. Sandy, nodular calcrete underlain by sheet calcrete was found in a road cutting. The calcrete is approximately 0.3 m thick and is overlain by orange-brown sand. The deposit is underlain by pink calcarenite and hardness decreases with depth. Similar material exists at locality 7A.

Locality 8. Section 141. Calcrete stockpiles were

noticed in adjacent paddocks. Deposits may exist in interdune areas beneath thin sand spread, but are likely to be less than 0.3 m in thickness.

Locality 9. Sections 120 and 117. This area is covered by sand spread with little observable calcrete.

Localities 10 and 11. Sections 114and 116. Hard calcrete float was noted to the south of the council's northern boundary road.

Localities 12 and 12A. Section 112 and 174. Calcrete float was visible to the east in section 235, hundred of Wiltunga and evidence of previous working was seen on the eastern side of the road.

Locality 13. Section 83. Abundant calcrete float with fragments up to 80 mm diameter exists in the ploughed paddock to the west.

Locality 14. Sections 51, 81 and 169. Further evidence of road rubble deposits in the area to the east of Alford is provided by the abundance of float material in paddocks on both sides of the east-west road which passes between sections 51 and 81. Locality 15 is a sand pit on section 81.

Localities 16, 16A, 17 and 18. To the south of Alford, along the north-south road passing between sections 54 and 55, large stock piles of nodular calcrete have been accumulated. Future supplies would probably be obtainable from adjacent paddocks and from unworked roadside deposits.

Locality 19. Section 118 and 14W. Calcrete float fragments, generally 50-80 mm in diameter, are abundant in ploughed paddocks to the east and west of the road. Hard nodular calcrete fragments mixed with brown soil were located on the roadside. Trenching

will be required to determine the workability of the deposits.

Locality 21. Section 50N. Calcrete float was observed in a paddock to the west of this site.

HUNDRED OF WILTUNGA

Locality 20. Section 272. Calcrete float fragments up to 60 mm in diameter were observed in paddocks to the south. To the east of locality 20 however, along the northern council boundary, dune sand predominates and no indications of possible calcrete deposits were found. Exploratory trenching in topographically low areas would be necessary to expose any deposits which may exist in the area.

Locality 22. Section 149W. A small rubbish pit which contains calcrete fragments was located in a paddock, but this material may have been derived from cultivation and hence may not be in situ.

Locality 23. Section 149E. Fragments of calcrete were found covering the base of a shallow pit.

Locality 24. Section 150. The large pile of calcrete boulders found at this locality were probably obtained locally and exploratory trenching nearby may locate the source material.

Locality 25. Section 137. Calcrete float was evident in ploughed paddocks to the south of the road.

Locality 1. Section 71. An outcrop of grey to white, bedded, conglomeratic, coarse weathered sandstone was located in an old calcrete pit, about 2.5 km north-west of Bute. The exposure is typical of the Pandurra Formation, and the weathered material is too friable for use as road rubble. The calcrete is thin, but probably usable.

Locality 2. Section 121. Orange-brown and white nodular calcrete with abundant calcareous silt was found near the Snowtown road, about 2.4 km north-northeast of Bute. The calcrete is hard and cemented, and is reported by the council to be too hard for the mobile crusher. The deposit probably extends beneath the paddock to the south.

Localities 26 to 31. Numerous sand dunes traverse the road to the north of Bute between Bute and Wokurna. Many disused calcrete pits are located on the lower flanks of these dunes or in the interdunal areas where sand overburden is thinnest. Further supplies of road rubble could be obtained by extension of existing workings or by trenching in unworked interdunal areas. The deposits are typically hard and nodular in the upper part, with underlying sheet calcrete and pink calcareous silt. Localities 30 and 31 are disused pits, situated outside of the council area, between Wokurna and the northern council boundary. Locality 31 is situated 0.4 km south of Wokurna, in part section 31, hundred of Wokurna, and does not appear on Plan 76-728.

HUNDRED OF NINNES

Locality 32. Sections 226 and 227. Abundant fragments of nodular and partly dark coloured calcrete float occurs on both sides of the road. Abundant calcrete stockpiles were noted at locality 32A (section 225).

Locality 33. Section 58. Calcrete is generally widespread in this locality and is visible on both sides of the road, and in the paddock to the south.

Locality 34. Section 62. Quarry in Sturt Tillite and calcrete with vertical faces approximately 10 m in height. The tillite contains rounded to subangular

fragments, up to 0.6 m in diameter, of granite, gneiss, jaspilite, quartzite and shale in a patchy grey and red-brown siltstone matrix, and is overlain by approximately 3 m of rubbly calcrete. Exploration trenches in the area should disclose suitable calcrete but the tillite would require blasting and crushing.

Locality 35. Sections 68 and 69. Extensive calcrete deposits exist along this section of road. Paddocks in the area contain abundant float material, which has been piled near fences.

Localities 36 and 37. Sections 12 and 19. Ferruginous weathered sandstone float of the Pandurra Formation was located at these sites. The material may be overlain by calcrete, which would be exposed by shallow trenching, but is too friable for use as road rubble.

Locality 39. Section 30. Stockpiles of calcrete rubble were found to the east of the road. Sheets of cemented nodular calcrete were noted in an existing pit at locality 39A and are probably widespread.

HUNDRED OF KULPARA

Localities 40, 41 and 42. Sections 101, 103E, 104, 374, 403 and 404. Extensive deposits of calcrete occur to the north of Melton for a distance of about 6.5 km. Hard material predominates and exploratory trenching to assess workability would be required in areas not previously exploited for road rubble.

Localities 3, 43 and 44. Sections 292 and 485, and section 527, hundred of Cameron. The calcrete appears to be thin or absent over wide areas in the South Hummocks region. Indications of calcrete deposits were found in the eastern part of the Hundred of Kulpara.

Calcrete float occurs to the north, west and east of locality 3, where hard fragments up to 0.2 m in diameter were observed. At locality 44, a ploughed paddock to the south of an old calcrete pit also contains float. Soft friable sandstone was located at locality 44, and although it extends to the south into the council area, this material would be too friable for good quality road rubble.

Locality 45. Section99. Calcrete deposits were located at this site overlying good quality Tertiary concrete sand. The sand is being extracted by Ready-mix Concrete Pty. Ltd.

Locality 46. Road reserve, adjacent Section 229. Moderately hard grey dolomitic limestone (Kulpara Limestone) extends for approximately 3 km to the north and south of this site, located about 1.5 km southeast of Kulpara. Road base material from the same formation is obtained by the Highways Department from a quarry about 3 km northwest of Melton.

## SUMMARY AND RECOMMENDATIONS

Exposures of material suitable for road rubble are almost totally absent in areas not previously exploited by the council. The only indications of the existence of near surface deposits in such areas are provided by occurrences of float, and the suitability of the rock for road construction can only by determined by exploratory trenching.

Calcrete is extensive in the council area, and is the only material which meets with the council's preference for deposits which combine case of extraction with widespread availability. The older formations contain higher quality road base material, but

deposits are not as widespread, and blasting and crushing would be necessary to provide a useable product.

The following localities are those where exploratory trenching by the council would be most likely to yield calcrete.

HUNDRED OF TICKERA

| | | |
|---|---|---|
| Locality 4, | Section 568 | (south of Tickera) |
| Locality 5, | Sections 9 & 40 | (south of Tickera) |
| Locality 6, | Section 28 | (near Tickera) |
| Locality 10, | Section 116 | (north of Alford) |
| Locality 12, 12A | Section 112, 174 | (northeast of Alford) |
| Locality 13, | Section 83 | (northeast of Alford) |
| Locality 14, | Sections 51,81,169 | (east of Alford) |
| Localities 16,16A 17,18 | " 21,14E, Sections 46,47,20 15 | (South of Alford) |
| Locality 19 | Sections 14W,118 | (south of Alford) |
| Locality 21 | Section 272 | (south-southeast of Alford) |

HUNDRED OF WILTUNGA

| | | |
|---|---|---|
| Locality 20, | Section 272 | (northeast of Alford) |
| Locality 23, | Section 144 | (south-southeast of Alford) |
| Locality 24, | Section 150 | (northwest of Bute) |
| Loclaity 25, | Section 137 | (northwest of Bute) |
| Localities 26 to 29, | Bute-Wokurna road | (north of Bute) |

HUNDRED OF NINNES

| | | |
|---|---|---|
| Localities 32,32A | Sections 226,227,225 | (west of Mona) |
| Locality 33, | Section 58 | (south-southwest of Bute) |
| Locality 34, | Section 62 | (southwest of Bute) |
| Locality 35, | Sections 68,69 | (southwest of Mona) |
| Localities 39,39A, | Sections 30,24 | (northwest of Kulpara) |

HUNDRED OF KULPARA

| | | |
|---|---|---|
| Locality 40, | Sections 101,103E,104 | (northwest of Melton) |
| Locality 41, | Section 374 | (west of Melton) |
| Locality 42, | Section 403,404 | (northwest of Melton) |
| Locality 3, | Section 292 | (east of Kulpara) |
| Locality 44, | Section 485 | (northeast of Kulpara) |
| Locality 45, | Section 99 | (northwest of Kulpara) |

Should additional calcrete road rubble deposits be required in areas not covered by this investigation, it is suggested that evaluation be carried out by the council using the methods indicated in this report. Favourable sites are those where the float is most abundant, and areas covered by dunes could be explored by trenching in the interdunal corridors where the thickness of overburden is likely to be least. Trenching by public authorities such as the E. & W. S. and P.M.G. Departments provides a valuable aid in assessing untested areas, and liason with these organisations is strongly recommended.

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21/9/76

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# LOCATION PLAN
## ROAD RUBBLE INVESTIGATION
## DISTRICT COUNCIL OF BUTE

**REFERENCE**

Section Number _____ 227

Sample Locations _____ •35 / 26

Tickera

HD TICKERA

Alford

HD WILTUNGA

HD KADINA

HD NINNES

HD KULPARA

BUTE

Paskeville

Kulpara

Melton

Road

Railway

N

SCALE

0 5 10

KILOMETRES

**LOCALITY MAP**

Port Augusta

Whyalla

Port Pirie

BUTE

AREA OF INVESTIGATION

SPENCER GULF

GULF ST. VINCENT

K.I.

Railway

MURRAY RIVER

ADELAIDE

Murray Bridge

VIC.

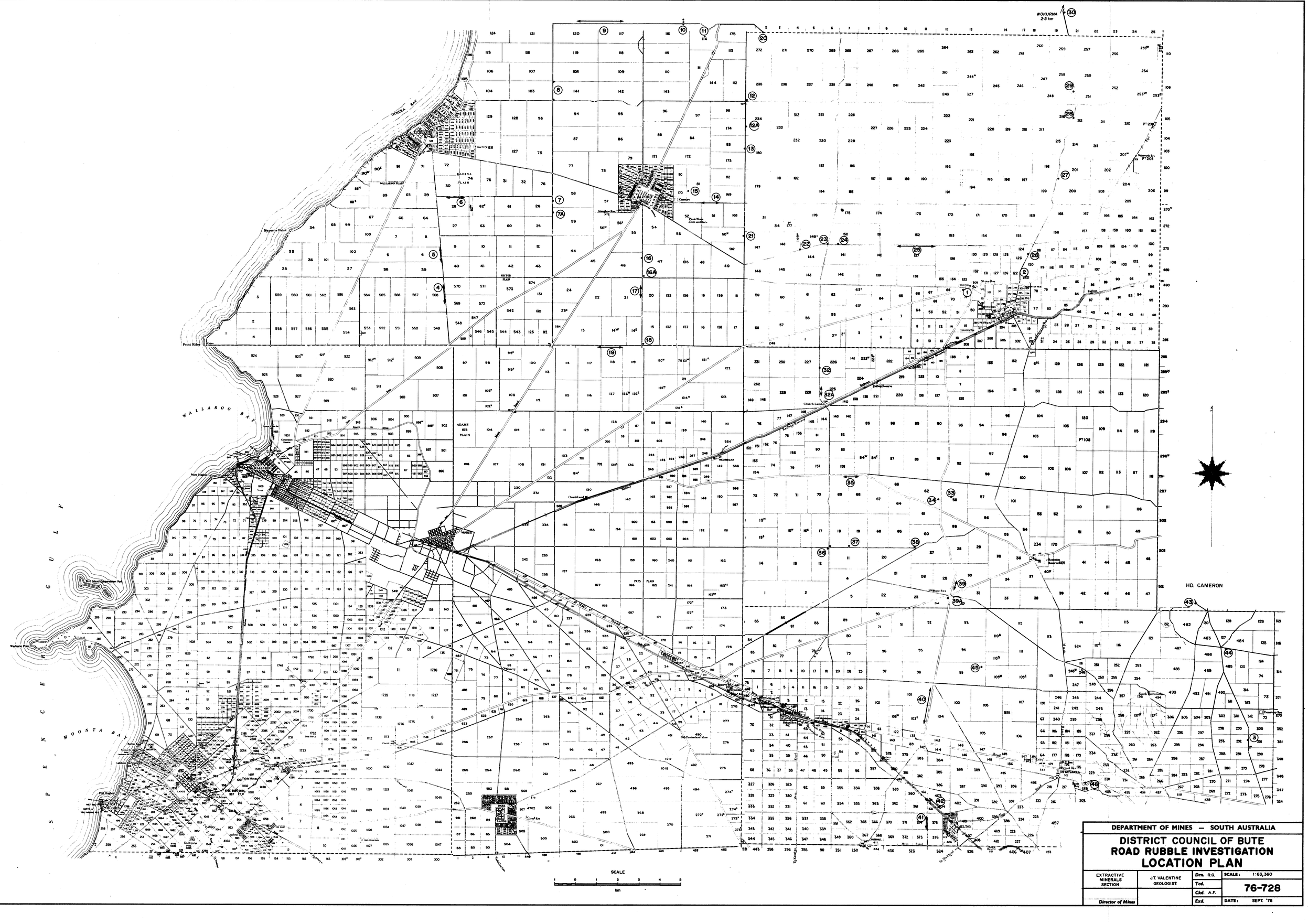
136°00' 137°00' 138°00' 139°00' 140°00'

33°00' 34°00' 35°00' 36°00'

0 50 100

KILOMETRES

MRR 145 J.T. Valentine Geologist 76–728 S.A. Department of Mines




DEPARTMENT OF MINES — SOUTH AUSTRALIA

# DISTRICT COUNCIL OF BUTE
# ROAD RUBBLE INVESTIGATION
# LOCATION PLAN

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| EXTRACTIVE MINERALS SECTION | J.T. VALENTINE GEOLOGIST | Drn. R.G. | SCALE : 1:63,360 |
| | | Tcd. | 76-728 |
| Director of Mines | | Chd. A.F. | |
| | | Exd. | DATE : SEPT. '76 |