DEPARTMENT OF MINES
SOUTH AUSTRALIA

REPT. BK. No. 74/195
G.S. No. 5510
D.M. No 364/74

INVESTIGATION FOR ROAD RUBBLE

HDS WALLAROO,KADINA,KULPARA,TICKERA,

COUNTY DALY

District Council of Kadina

by

W.S. McCALLUM
GEOLOGIST
Environmenatal Resources Division.

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ABSTRACT

Reconnaissance mapping in the Kadina District Council area has indicated possible sites for quarrying Ripon calcrete for use in construction and maintenance of unsealed roads. Sub-surface testing by trenching will be necessary to prove the quality and quantity of the reserves.

INTRODUCTION

The Kadina District Council uses approximately sixteen thousand cubic metres of base course material each year for road maintenance and construction. Several quarries are operated throughout the council area but supplies for existing quarries are running low near the townships of Moonta, Kadina, Paskeville and Tickera. The Kadina, Wallaroo and Moonta Town Councils are separate autonomous bodies within the District Council area.

As it is possible that the Town and District councils will merge, the survey also considered potential supplies of road material for use within the townships.

The Council would prefer material which can be quarried by ripping rather than blasting as extraction costs are reduced. However material of suitable quality for base course (ie. hard with small amounts of fines) will usually require blasting. Smaller quantities of poorer quality sub-base material are used in new road construction. Lower quality material is abundant throughout the council area and can be quarried by ripping.

Supply of stone for sealed roads is the responsibility of the Highways Department which is presently operating a large quarry in section 360, Hundred of Kulpara in a hard crystalline Cambrian dolomite (Kulpara Limestone).

The Council requested assistance from the Department of Mines to locate supplies of base course material within the Council area and the author carried out a reconnaissance survey in May 1974.

GEOLOGICAL SETTING

The Council area lies on the Wallaroo 1:63,360 map sheet (Crawford 196.) on the HAYALLA 4 mile area and on the Moonta 1:63,360 map area on the MAITLAND 1:250,000 map sheet. The council area includes the Hundreds of Wallaroo and Kadina and part of the Hundreds of Kulpara and Tickera within County Daly.

Precambrian crystalline basement rocks, Precambrian sediments, and Cambrian dolomite lie at a shallow depth over much of the area. High grade metamorphic rocks, schists, gneisses and jaspellites, (possible Gleve metamorphic equivalents) grading into migmatites and granite, with associated intrusive porphyries occur in the East of the area near Wallaroo, Moonta and Kadina, extending as far North as Tickera. East of Kadina the depth to basement increases and Tertiary and Quaternary limestones, clays, and sands become thicker. Near Paskeville Precambrian sandstones and siltstones of the Pandurra Formation occur near the surface. The Precambrian rocks are overlain in places by a hard dolomite (Kulpara Limestone of Cambrian age) which may be up to 30 metres thick in places.

Most of the area is covered by a mantle of Quaternary sediments,particularly calcrete.Formerly referred to as travertine or Kunkar limestone,this is nodular to massive sheet limestone formed as a B soil horizon. Firman(1969) describes several calcrete horizons,the oldest and usually the thickest being referred to as Ripon Calcrete.

ROAD BUILDING MATERIALS

Calcrete is used extensively throughout the State for road works,the thicker massive sheet material usually requiring blasting but providing a high quality base course,while nodular varieties can be ripped to supply lower quality sub-base course.

Calcrete deposits have been found at various sites in the council area and are located on the accompanying plan and described below.

HUNDRED OF WALLAROO

Locality 1 Section 1761. There is already a council pit in stone reserve 1761 but this appears to be nearly worked out. This should be tested by trenching.In section 1500,1432 and 1541 South of here there is 0.5 metres of topsoil overlying 1 metre of very hard calcrete which in turn overlies a cream coloured calcareous loam. In the extreme South of section 1530 there is abundant calcrete float.

Locality 2 Further East trenches along the South of section 4 expose very hard sheet calcrete at 0.5 metres depth and rubbly calcrete is exposed in the South East of section 5 and the West of sections 8 and 10. East of these sections sandy nodular calcrete overlies Cambrian dolomite at shallow depths.

Locality 3. In a closed road at the North of section 1045 there are calcrete pits which could probably be extended to the West. The Calcrete float extends to the South of section 1040.

Locality 4. North of Moonta rubbly calcrete is visibly in sections 1234, 1268 and in a small pit in the South-West of section 320.

Locality 5. North East of Moonta there is abundant float of large calcrete boulders in the North of section 1748 and quarryable calcrete may extend to the South and South-East. Other possible sites are the North-East of section 1753, the North of section 2025 and the East of section 397.

Locality 6. Along the North-South road separating the Hundreds of Wallaroo and Kadina there is abundant calcrete float between Kadina and Cunliffe, especially in section 480, and 721 Hundred of Kadina and 140, 137 and 1980 Hundred of Wallaroo.

Locality 7. In section 931, North of Wallaroo township there is a private quarry containing clacrete of high quality which is being sold to Kadina District Council and Wallaroo Town Council. Reserves in this section are estimated at 20,000 tons and quarrying could be extended to the East or into section 919 to the North.

Locality 8. North-West of Kadina there is a pit in hard sheet calcrete in the North-East of section 620 which could probably be extended to the South West into 626 or near the junction of section 622,623 and 624. The topography slopes away to the North and North West, and the Calcrete becomes rubbly West and East of these sections.

Locality 9. Thick hard calcrete is exposed in the road next to swamp flats in section 896 and extends for 1 kilometre to the south along the road, and to the South-East and East of section 896. One kilometre North of the flats the calcrete is very thin and rubbly.

HUNDRED OF KADINA

Locality 10. There is extensive ripon calcrete in the South near Cunliffe. There is an existing rubble pit in park lands 0.5 kilometres East of Cunliffe town centre and a pit on the Western edge of section 250 Hundred of Kadina. This latter pit could be extended several hundred metres South, or alternative quarries could be started in sections 84, 86, especially in sections 85, 90 and 504 (Western half) to the South East.

Locality 11. North of Cunliffe the calcrete rapidly becomes rubbly and probably unusable. However in section 256 a quarry yields large quantities of high quality stone, with possible extensions to the South-West for 100 metres. From here North along the road to Kadina there is extensive calcrete float, but near section 480 the terrain dips to the East and there are no further possible sites within the Hundred of Kadina in this area.

Locality 12. East of Cunliffe there is not suitable material until section 494 which contains abundant calcrete which could be quarried. Neighbouring sections 272E, 1018 and 275 (Southern part) could yield further supplies. An existing pit in rubbly calcrete in section 49/ just to the North could be extended in any direction, and calcrete also occurs in the West of section 1017 and along the road North-West from here for 1 kilometre. There are no further possible quarry sites West of here within the Hundred of Kadina.

Locality 13. Five kilometres North-West of Paskeville there is a large area of calcrete float. A quarry is being worked in the North-West of section 173, hundred of Kadina, exposing thick hard limestone. This quarry can be extended to the South or West, or other pits could be started any where within section 173.

Locality 14. There are further minor patches of calcrete in sections 626, 629, 236, 237 between Thrington and Kadina.

Locality 15. East of Kadina township there are isolated possible quarry sites in the North of section 233, the South-East of section 234 and the centre of the Western edge of section 233, with several minor patches of calcrete in the South-East of 108, the South West of 131, the North-West of 231 and near section 156.

Locality 16. Further North West towards Bute there are small patches of calcrete in the South of 702, the North West of 586, the South West of 584 and very extensive calcrete throughout section 139 with minor patches extending to the North West of section 138. North and North East of here there are extensive inland sand dunes, and to the North West there is thin calcrete in sections 118 and 119, while further west there is extensive calcrete float near the road intersection at the North East of section 98.

HUNDRED OF KULPARA

Locality 17. South and South East of Paskeville Precambrian basement sandstones (Pandurra Formation) outcrop or are present at shallow depth under topsoil and calcrete does not occur. North of Paskeville within the Hundred of Kulpara, pits on a disused road between sections 86 and 87 could be extended along the road to North into section 86.

HUNDRED OF TICKERA

The road stone available within the Hundred of Tickera is generally poor quality (thin with high sand and clay content) and if often overlain by thick topsoil and sand dunes.

Locality 18. A possible site indicated by calcrete float is the area including the North of section 549, the West of sections

569.570 and the South of section 39. There are small patches of calcrete in the Centre West of section 563, the East of section 8, the West of section 66, and the North-West of section 559. Close to the coast the calcrete is often eroded away or overlain by sand dunes.

Locality 19 In the North near Tickera township there is an existing pit near the roadside in section 71,exposing thin sandy rubble which is probably typical of the quality of road-stone within the Hundred of Tickera. This calcrete extends to the South-East and to the West.Thick hard sheet calcrete is exposed in a creek on the roadside at the North of section 91 and if quarried may yield better quality stone than the pit in section 71.

The reserves available at each locality can only be proved by test drilling and trenching.The calcrete is rarely more than 1 metre thick and varies in lithology from a hard thick limestone to a thin sandy rubble. Once general areas of calcrete have been located,selection of the actual quarry site is often a matter of trial and error, or can be governed by non geological factors such as the proximity of fences,houses or uncleared scrub. It is likely that any good quality supplies with low content of sand and fines will need to be blasted.

Altough supplies of calcrete are extensive the council could investigate the possibility of using alternative rock types.

East of Moonta and East of Wallaroo the calcrete overlies Cambrian Kulpara Limestone or Carpentarian Cleve Metamorphics at shallow depth. These materials will be hard and will need blasting but at an advantage may lie in the reduction in agricultural land destroyed by quarrying. Present practice

is probably destroying 1600 square metres of land each year. However East of Cunliffe the underlying Pandurra Formation is too soft for road metal, and North and East of Kadina calcrete overlies thick Quaternary Hindmarsh clays and sandy Pooraka Formation.

SUMMARY AND CONCLUSIONS

Sites which have the best possibility of yielding suitable quality and quantity of Ripon calcrete for road base material are listed below.

Hundred of Wallaroo

Locality	1	section 1432, 1500 or 1541 (near Moonta)
Locality	1	extreme South of section 1530 (near Moonta)
Locality	2	South of section 4 (near Moonta)
Locality	3	North of section 1045 (near Cunliffe)
Locality	5	section 1748 (North-East of Moonta)
Locality	6	section 140, 137, 1980 (South of Kadina)
Locality	7	section 931 (near Wallaroo)
Locality	8	North-West of section 620 (North-West of Kadina)
Locality	9	section 896 (North of Kadina)

Hundred of Kadina

Locality	10	rubble pit in parklands East of Cunliffe
Locality	10	sections 250, 85, 90, 504 (near Cunliffe)
Locality	11	section 256 (North of Cunliffe; existing pit)
Locality	12	section 494 (West of Cunliffe)
Locality	12	section 491 (West of Cunliffe; existing pit)
Locality	13	section 173 (North-West of Paskeville; existing pi
Locality	15	sections 233, 234 (East of Kadina)
Locality	16	section 139 (North-East of Kadina)

Hundred of Kulpara

Locality 17 sections 86, 87 (North-East of Kadina)

Hundred of Tickera

Locality 18 sections 549, 569, 570, 39.

Locality 19 section 91 (near Tickera).

The area available to Kadina District Council for quarrying is extensive and there are numerous possible quarry sites. Blasting will probably be required to win material of sufficient hardness for base course. Reserves of calcrete in operating quarries near Wallaroo, Cunliffe, North of Paskeville and South of Kadina are extensive. However the underlying Cleve metamorphies and Cambrian dolomites should be considered as a source of base course to increase reserves and confine the limits of workings.

W S McCallum

W.S. McCallum

Geologist
Environment and Resources Division.

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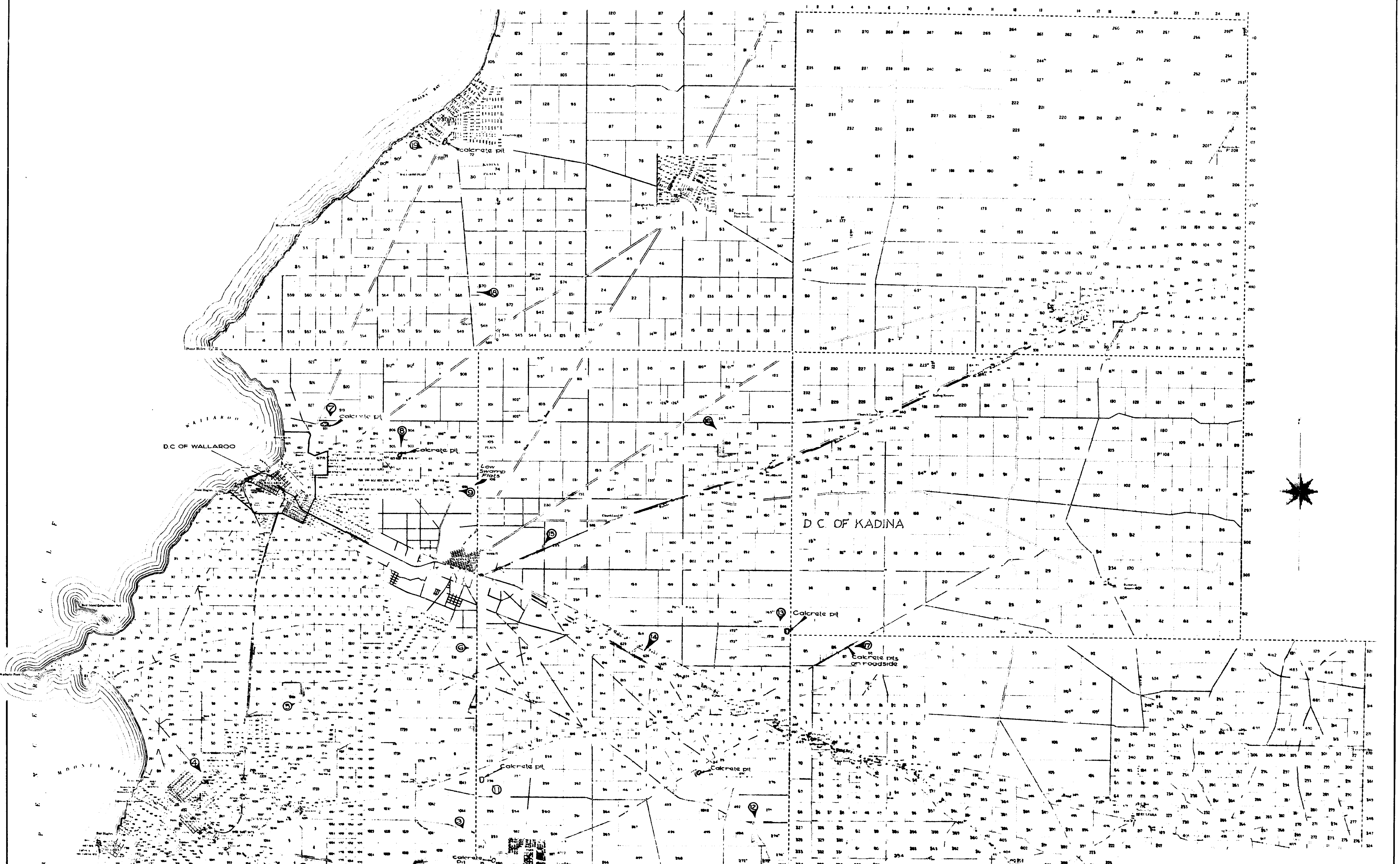

DEPARTMENT OF MINES — SOUTH AUSTRALIA

DISTRICT COUNCIL OF KADINA
INVESTIGATION FOR ROAD RUBBLE
LOCATION PLAN

ENVIRONMENT & RESOURCE SECTION	GEOLOGIST	Drn. W.M.	SCALE 1" = 80 Chains
		Tcd. R.B.	74-757
		Ckd. A.F.	Gc 5/8+10+13
Director of Mines		Exd	DATE 13th Sept 1974