CONTENTS ENVELOPE 2596 DME 1069/72

TENEMENT: NOT RELATED

TENEMENT HOLDER: DEPARTMENT OF MINES OF SOUTH AUSTRALIA

REPORTS:

SOUTH AUSTRALIAN MINES DEPARTMENT 1975

Interim Report, Golden Grove Quarries Investigation. September 1975 (pgs. 2-20)

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SOUTH AUSTRALIAN MINES DEPARTMENT
GOLDEN GROVE QUARRIES INVESTIGATION

Interim Report

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September 1975

INDEX:

1.0 SETTING AND INTENT OF THE INTERIM REPORT

Tract Consultants in July 1975 were commissioned to conduct a landscape and visual assessment for the restoration of sand and clay quarries in the Golden Grove area.*

The intent of the project is to suggest appropriate uses for the restored areas (includes Phases 1 to 3) and to formulate the most suitable phasing (based on a landscape and visual assessment+) and restoration strategies (Phase 4).

There are many limitations to the scope of the study. They range from a lack of costing for alternate restoration plans, minimal assessment of potential environmental impacts to uncertainty of future use for the area.

The study will consider how the shape and extent of excavation should be controlled so that mining can continue without inconvenience whilst allowing the final quarry sites to be easily adapted to other community uses.

This Interim Report covers only Phase One on the following flow chart.

* The Study Area is that land bounded by Golden Grove Road in the west, Yatala Vale Road in the south, the Rural A boundary to the north and Seaview Road in the east.

\+ The assessment is based on the principles of placing the cuts and fills from earth working in the landscape so that the shape of the landscape is maintained while causing a minimum of visual blight to nearby residents. Further, the recommendations should enable logical construction units and sound quarrying management to be practised.

2.0 PROGRESS TO DATE:

The following flow chart shows the timing and purpose of each Phase

PHASE	PURPOSE	TIME	PRESENT STATE
1	Site Reconnaissance	Week 1 Week 2 Week 3	Complete
	*		
2	Base Data Information	Week 4 Week 5	In Train
	*		
3	Potential Use for Extractive Areas	Week 6 Week 7 Week 8 Week 9	Preliminary Study Commenced
		Week 10	To be Commenced
4	Phasing and Restoration Strategies	Week 11 Week 12 Week 13 Week 14	To be Commenced
	Review	As required	

* Indicates review between S.A. Mines Department and Tract Consultants.

3.0 ASSUMPTIONS:

The study, due to its specific focus (landscape and visual assessment) had to be based on many assumptions. While it is recognised that some assumptions may be impossible to answer at present, it is equally difficult to provide a firm guide on restoration without their resolution. This report, where possible, suggests some ways of overcoming this problem and subjects that need further study.

This is an interim report covering only Phase One of our work. It can form the basis of future talks with Government and private organisations. It is critical to resolve the issue of future use of the quarried areas. Until this position is reached, it is difficult to formulate an overall restoration strategy which will not prejudice future opportunities. We recommend that such a strategy be prepared after the question of land use has been resolved.

Suggestions for future land uses in the restoration areas will be made in Phase Four of the study. The final choices, however, must come from in-depth analysis and discussion between Government and private organisations.

In-depth design, e.g. contouring, planting types and other similar detail matters are not included as part of our Study Brief. They should, however, be important at a later stage (detailed phase) when land uses and the quantity and quality of materials have been determined.

Legal and statutory matters will also need greater study at the detailed phase, when potential uses and phasing have been formulated. e.g. zoning changes, ownership of the restored areas, etc.

4.0 LIMITATIONS OF DATA:

Because this study is primarily a landscape and visual assessment, its potential is limited in covering other topics, such as costs, environmental, social, etc. However, from a landscape point of view, we believe that with wise planning, a logical and satisfactory solution can be obtained.

The importance of a visual assessment in any study of this type should be weighted very heavily in deciding future plans. Particular limitations of data include:

- The ultimate use of the area is unknown. This places extreme limits on any restoration guidelines. In fact, only the immediate concerns can be stated with any certainty, e.g. peripheral screening at Yatala Vale Road or Golden Grove Road.
- There is a lack of known quantities and quality of extractive materials.
- There is no provision for costing of the various phasing options.
- The possible "working out" programmes of individual quarries is unknown. The scattered ownership pattern restricts an easily co-ordinated "working out" scheme. Furthermore, market demands could easily change extraction programmes. Problems would almost certainly arise if certain areas were restricted from extraction - for example, if the southern section was designated for immediate working (assuming of course, Council would agree to zoning changes) with consequent restrictions placed on the northern section. Problems would arise if material unavailable in the south (but available in the north) were to come into demand.
- Natural resource data, e.g. groundwater quality, quantity, reusages, etc. is extremely limited. Wherever possible suggestions will be made for needed future investigations.

Engineering feasibility studies such as stability of slime areas (on slopes and flat) and the potential to regenerate these features are not presently available. These considerations are vital to any restoration programme. For the purpose of this study however, it was assumed some form of regeneration could occur.

5.0 MINING BOUNDARIES:

Based on visual assessment it can be stated that mining should be excluded west of Golden Grove Road. The eastern boundary should be limited (if possible) to the lower slopes on the eastern side. This would avoid considerable visual blight, particularly if the area or those nearby are to be used for residential or recreation purposes. This recommendation was strongly suggested in the Interim Report (January 1975) for the South Australian Land Commission by Hannaford & Partners and Tract Consultants Pty.Ltd.

Continued mining anywhere in the area will pose special problems (of noise, unsightliness, and traffic). Every effort should be made to minimise these problems. In particular, a screening area should be set aside along Golden Grove Road between the road and the mines, and between other areas and the mines. These screening zones should be heavily planted. Planting should take place as soon as possible.

The southern boundary is difficult to define - based on visual analysis it would appear wisest to work most of the southern area. This would enable maximum utilization of resources. Further, it would pose little or no problem to the restoration attempts.

The northern area would appear to be limited by the watershed regulations. The best procedure here would be to restrict mining to presently quarried areas.

6.0 DESCRIPTION OF THE AREA: (Refer to Appendix 1 for a description of the area).

7.0 LANDSCAPE PRINCIPLES:

The need to harmonize with surrounding landscape form, maintain existing vegetation (where practical), follow natural drainage courses as potential division lines and minimise impacts on the natural systems are some of the main principles.

The site presently is not considered to have a high potential to visually absorb development. The openness of the country and the elevated areas around the quarries means that the area has a high potential visual impact. The landscape form however, can be turned into a positive factor by restoring the site in a manner that makes it a visual highlight. The use of water in this landscape for example, could provide an enjoyable contrast (an recreation amenity) to the Hills Face area.

8.0 INTERIM RECOMMENDATIONS:

Firm recommendations on solutions for land uses, suitable phasing and restoration strategy will require additional data to be made available to us. Tentative suggestions for suitable land use can however, be made in conjunction with recommended landscape treatment.

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Irrespective of the future land uses, an immediate action plan can be devised. The main objective would be to heavily screen Golden Grove Road. The southern boundary (Yatala Vale Road) should also be carefully treated with planting. The mounding of earth along these roads is not considered essential. In fact, the present practice of several quarry operators, e.g. Monier along Golden Grove Road of piling material near the road is not only aesthetically displeasing, it is potentially very dangerous.

could be

The following page indicates a very brief list of possible land uses and actions and impacts that they may cause by them.

8.1 POSSIBLE LAND USE MATRIX:

Actions Required	Pollution Potential	Cutting and Filling	Planting (Trees and Grass Cover)	Stabilizing Critical Areas	Restricting Use in Certain Areas	Changing Zoning	Daming Water	Dewatering	Developing on Restored Surface
1. Passive Recreation (Picnic, Parks etc)	Mn	Ma	Ma	Ma	Ma	Mn	Mn	Ma	Mn
2. Active Recreation (Football fields, playfields, etc.)	Mn	Ma	Ma	Ma	Ma	Mn	Mn	Ma	Ma
3. Residential Development	Mn	Ma	Ma	Ma	Ma	Ma	Ma	Ma	Ma
4. Industrial Development	Ma	Ma	Ma	Ma	Mn	Ma	Na	Ma	Ma
5. Water & Sports Complex	Mn	Ma	Ma	Ma	Mn	Mn	Mn	Mn	Mn
6. Waste Disposal	Ma	Mn	Ma	Ma	Mn	Ma	Na	Ma	Ma
7. Agriculture - Pasture	Mn	Ma	Ma	Ma	Mn	Mn	Mn	Ma	Na
8. Agriculture - Cropping	Mn	Ma	Ma	Ma	Mn	Mn	Mn	Ma	Na

The actual selection of uses is outside the scope of this study. Our knowledge of the area suggests however, the uses mentioned above could be suitable to the area under review.

Likely Implications: = Ma = Major effort required - likely to be expensive
Mn = Minor effort required - unlikely to be expensive
Na = Not applicable

8.2 RECREATION POTENTIAL

Surveys[+] of surrounding areas do suggest that there are unsatisfied recreational needs in the neighbouring areas. i.e. Modbury-Golden Grove Area. These needs, to the extent that they cannot be satisfied within the surrounding areas themselves, will be better catered for by sensitive development in the restored quarries area than they would be if the land was put to another purpose.

+ Some are presented in the Interim Report to S.A.L.C. January 1975 by Hannaford & Partners and Tract Consultants Pty.Ltd. Another source is the Tea Tree Gully Council which has conducted various surveys.

8.3 MANAGEMENT AND METHODS OF RESTORATION GUIDELINES

- Timing : yet to be resolved
- Area covered : yet to be resolved
- Workable units for restoration (one unit, two units, eight units, etc.) : yet to be resolved
- Slime stands and fine waste material : this is an extremely complex problem. There are several potential ways of handing the situation including disposal at the bottom of a waterbody or spreading to a depth of 15" to 18" and allowing to dry then remove (this would take up a tremedous area - far greater than is presently available).

8.4 FURTHER RESEARCH

- Designate the most suitable uses for restored areas
- Best methods of handling slime and overburden (problems of movement)
- Cost of various phasing operations
- Techniques to involve concerned groups discussing restoration
- Suitable plant species (including chemistry of overburden and spoil-soil mixtures, soil and water characteristics, effect of fertilizer, etc.)
- Groundwater recharge and pollution (particularly implication on Dry and Cobbler Creeks system if the area were made into some type of lake)
- Negotiation with quarry owners to formulate a feasible working programme.

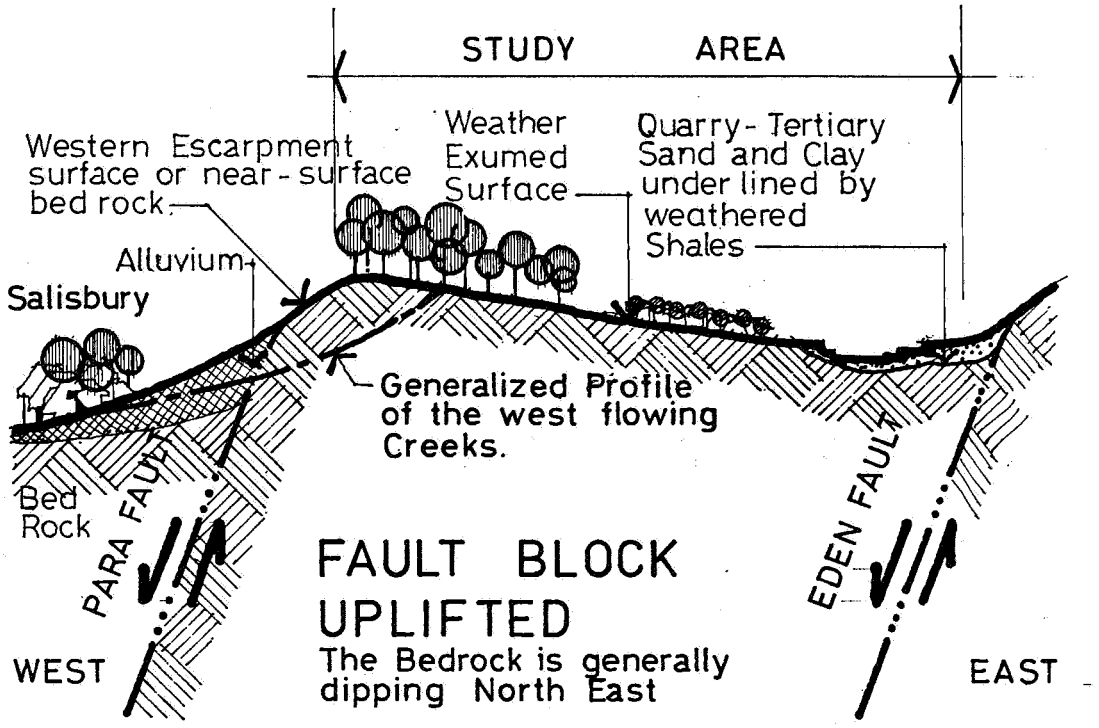
APPENDIX 1:

DESCRIPTION OF THE AREA: adapted from the Interim Report (January 1975) for the South Australian Land Commission by Hannaford & Partners and Tract Consultants Pty.Ltd.

3.2 Physical Landscape

3.2.1 Geology (Map 4)

The landscape is a result of weathering on a fault block, as illustrated on the diagram below:



SCHEMATIC DIAGRAM OF THE SITE'S GEOLOGY
Not to Vertical or Horizontal Scale

The whole area is an uplifted fault block formed during the late Cainozoic times. The basement rocks in this area are north-easterly trending phyllites, shales, dolomites and quartzites of the Torrensial Series of Proterozoic Age. Tertiary sands were deposited on this uplifted block and form an extensive thin cover over the basement, east of the Golden Grove Road. In general, the higher the elevation the stronger is the bedrock.

3.2.2 Depth to Bedrock

(see Map 5)

The depth of bedrock varies throughout the site. In general, the western boundary, the higher points and parts of the quartzite area (near Golden Grove Road) have near-surface bedrock (ranging from 0 - 5'). Bedrock in these areas could cause extra construction costs[1], especially for the installation of services.[2]

The Cobbler Creek Gully has many areas of exposed bedrock which are unstable and would be prohibitvely expensive to build upon. The flatter areas of the site tend to have 0 - 7' of soil cover. Development in this area should extend foundations to the bedrock where possible.

3.2.3 Slopes

(see Map 6)

The site has two distinct slope breakdowns. The steep slopes, result of incising of the creeks (often over 25 percent), tend to be quite unstable. The flatter fault block, has little to moderate slope. Map 6 indicates these areas and the likely construction costs which would apply to them. Slopes in the Planning Area will not involve higher construction costs than would apply in other areas of Adelaide, provided that development is kept to the areas of less than 15 percent slope.

[1]John A. Woodburn, "Modbury-Golden Grove Development Preliminary Site Investigation", Report No.A.195/1., November 1974.

[2]For a detailed analysis, see Maps 6 and 9.

3.2.4 Vegetation and Wildlife
(see Map 7)

Description of Vegetation

There are several basic vegetation communities in the site:

a. dominantly E. leucoxylon - E. camaldulensis with associated understorey;

b. E. porosa with associated understorey;

c. a combination of all three Eucalypt species with associated understorey;

d. vineyards; and

e. open field agriculture.

The site does not have a large amount of mature vegetation, and the areas that do have vegetation tend to be either seasonally wet, steep or generally unsuitable for residential development (for example, high bedrock, unstable geology). Vegetation should be protected wherever possible. The health and vigor of the vegetation is variable throughout the site.

Vegetation Problems

"Leaf skelton" disease is a major problem. This attacks the E. camaldulensis (River Red Gum) in particular. If these trees are killed it will mean a loss of scenic features, wildlife habitat. There may also be erosion problems. The trees are usually found along streams and they tend to stabilize the banks. In many parts of the site these water courses are being eroded (incised). The western vegetation is generally mature and in good condition.

Description of Wildlife

The wildlife in the area is very limited because of competition from domestic animals and the removal of much of the native vegetation. There are no know native animals in the planning area. The clearing of vegetation has also limited the birdlife. Loss of habitat and food source has reduced the possibility of insectivorous and fructivorous birds using the area. The remaining birds tend to be carnivorous (black-backed magpie, crown hawk and white goshawk).

3.2.5 Aquifer Recharge and Ground Water Potential
(see Map 8)

Description

In planning development, there are two areas to be considered: The areas of best recharge potential and the areas of good quality groundwater. During the winter most of the water feeding the streams comes from surface run-off. In the summer months water is fed into the streams from ground water sources.

The quality of the groundwater is high (below 1,000 ml. of salt from a sample taken from the east of Golden Grove Road). The main aquifer is east of Golden Grove Road. Dumping of garbage or stormwater into.this area could pollute the ground water in the planning area.

Water quality is reduced during heavy rains and flooding (and will be further reduced when development occurs). Only the disposal of dissolved solids is improved by increased run off.

The quantity of groundwater varies throughout the Golden Grove area. The section east of Golden Grove Road has given 27,280 litres/hour at 60-80 metres. By contrast, the western section has low amounts, with recharging occuring in the drainage lines and geologic anomalies (approximately 4,550 litres/hour potential supply).

3.2.7 Micro-Climate
(see Map 10)

Description

The micro-climates vary in this landscape because of undulating topography, orientation and slopes. The northern facing slopes, for example, are warmer and drier than the cooler and more shaded southern slopes.

The rainfall tends to decrease to the north. The prevailing winds drive the rains from the south west and west, causing northern slopes to be slightly drier than the southern ones.

The winds are greatly increased at the western side of the site. The occasional hot steady summer breeze from the north will burn off vegetation (particularly exotics) and make living slightly uncomfortable for those residents in its direct path.

The gullies will tend to have warm winds ascending during the mid-day and late afternoon, and cold breezes descending during the late evening and before sunrise. This could cause fog problems in the gullies and the plains area. The Salisbury area presently experiences fogs caused by the warmer moist air masses meeting the colder descending air from the fault block.

Problems

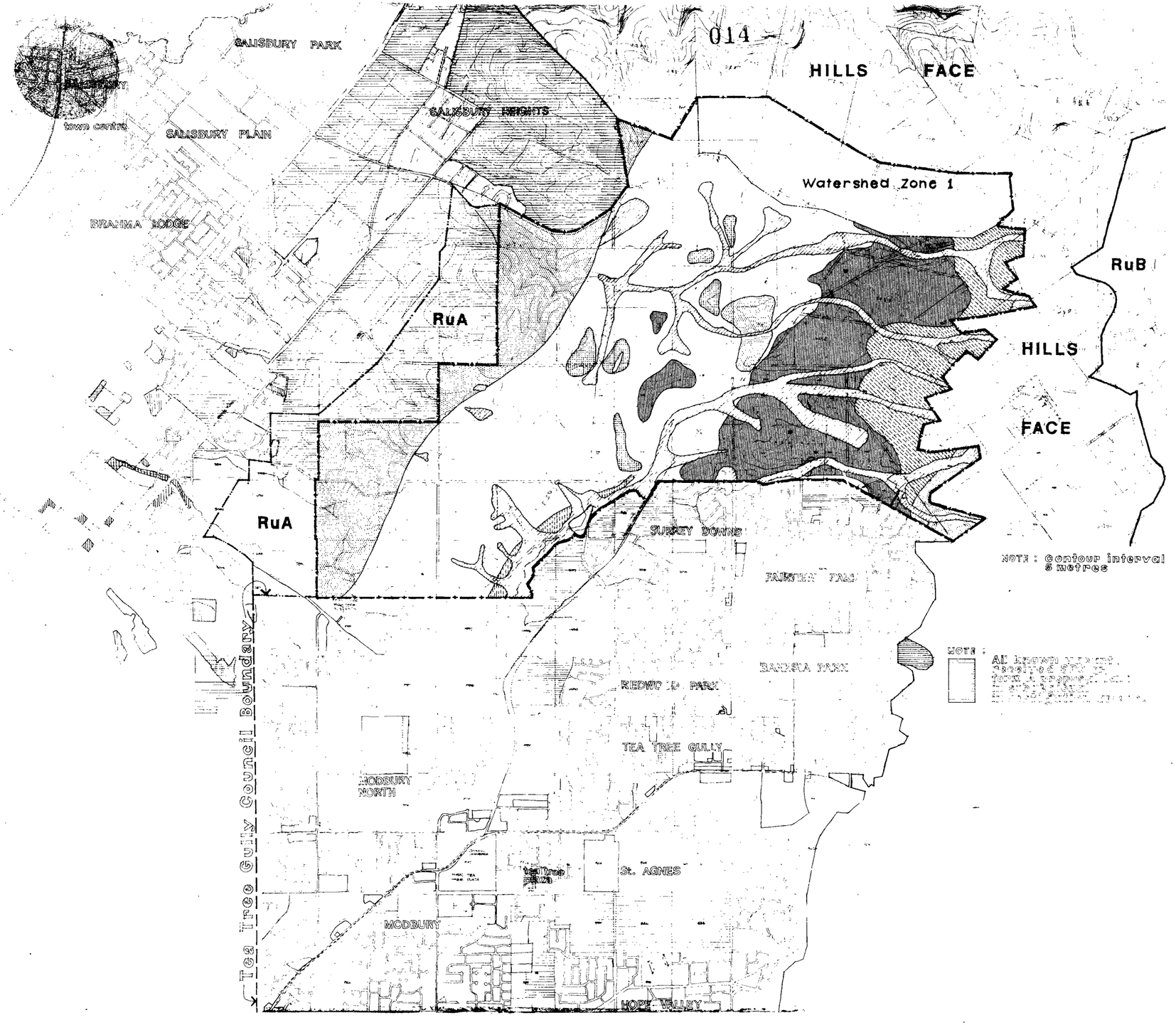
In general, the site has the following micro-climate problems:

- Potential for fog pockets exists in the low points (particularly the south and west facing gullies and in the Salisbury Plain areas).

Strong winds blow from the south west and uncomfortable hot winds from the north.

The seasonal wet areas in the south facing slopes could cause problems. These could be particularly critical in some of the flat-lying areas (both at high and low levels).

2596-1



LEGEND

- ALLUVIAL RED BROWN CLAY AND SILTS ✱ VARIOUS
- 10 CM LIGHT GREY YELLOW SAND 80 CM YELLOW GREY AND ORANGE MOTTLED CLAY ✱ SANDS
- 15 CM DARK BROWN CLAYEY SILT 15 CM CALCRETE ✱ QUARTZITE & SANDSTONE
- 20 CM DARK BROWN SILT 80 CM RED BROWN CLAY ✱ SHALES & PHYLLITES
- 10 CM DARK BROWN SILTY CLAY 10 CM CALCRETE ✱ SHALEY DOLEMITES
- 25 CM DARK RED BROWN CLAY 15CM CALCRETE ✱ PHYLLITES & SHALES
- 80 CM DARK RED BROWN OR CHOCOLATE BROWN SILT CLAY 40CM CALCAREOUS HORIZON ✱ PHYLLITES & SHALES

NOTE : ✱ DENOTES PROMINENT BEDROCK TYPE

MAP ADAPTED FROM DEPARTMENT OF MINES S.A. INVESTIGATIONS OCT. 1974

NORTH

500 0 500 1000 metres

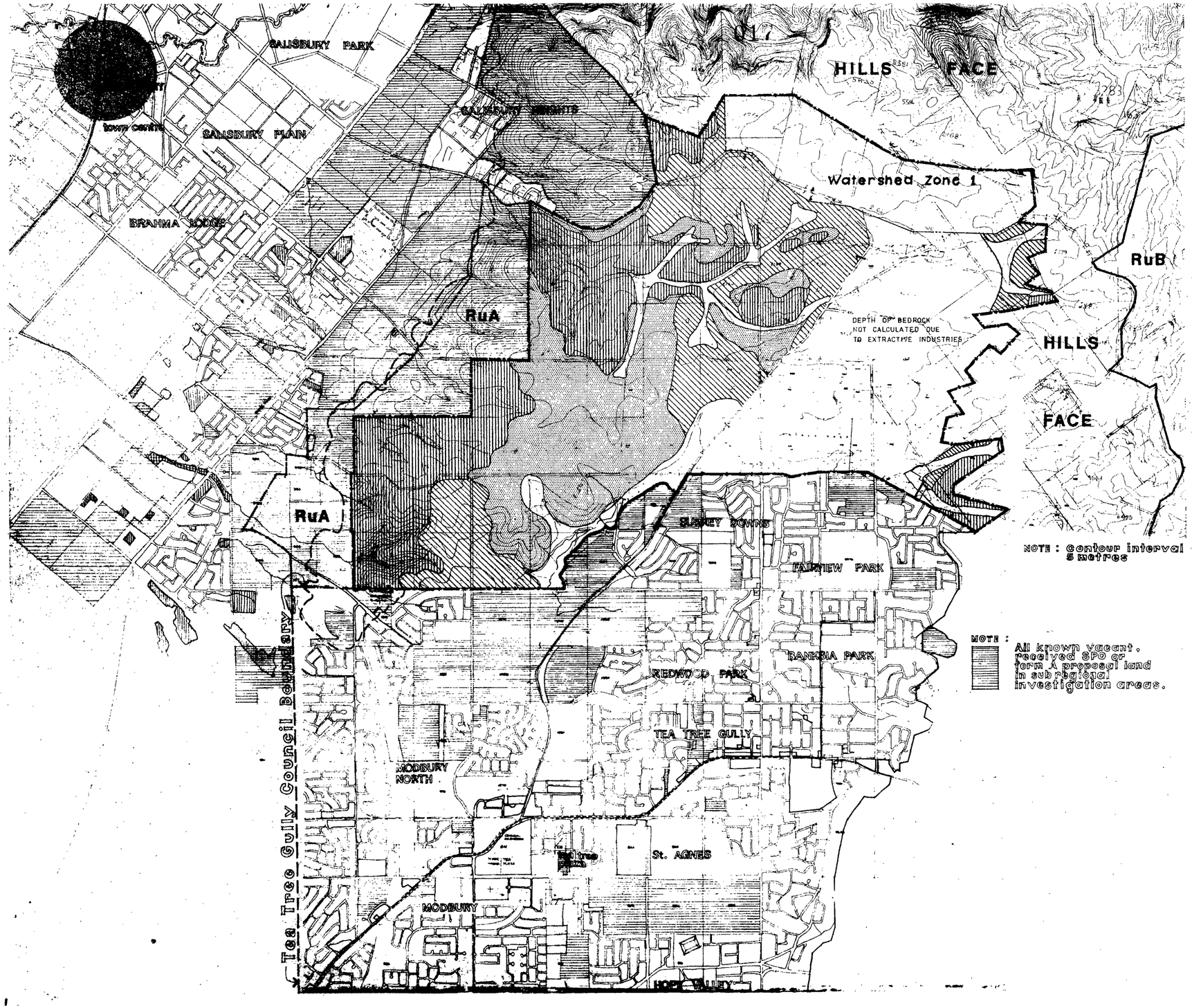
MAP 4

GEOLOGY

HANNAFORD & PARTNERS PTY. LTD.
TRACT PTY. LTD.

January 1975.

2596-2



LEGEND

- 0 – 2 FEET
- 0 – 5 FEET
- 3 – 7 FEET
- > 7 FEET
- 0 – 5 FEET BEDROCK FROM THIS POINT TO THE TEA TREE GULLY BOUNDARY DEPTH TO THE BEDROCK INCREASES TO THE WEST.

NORTH

500 0 500 1000 metres

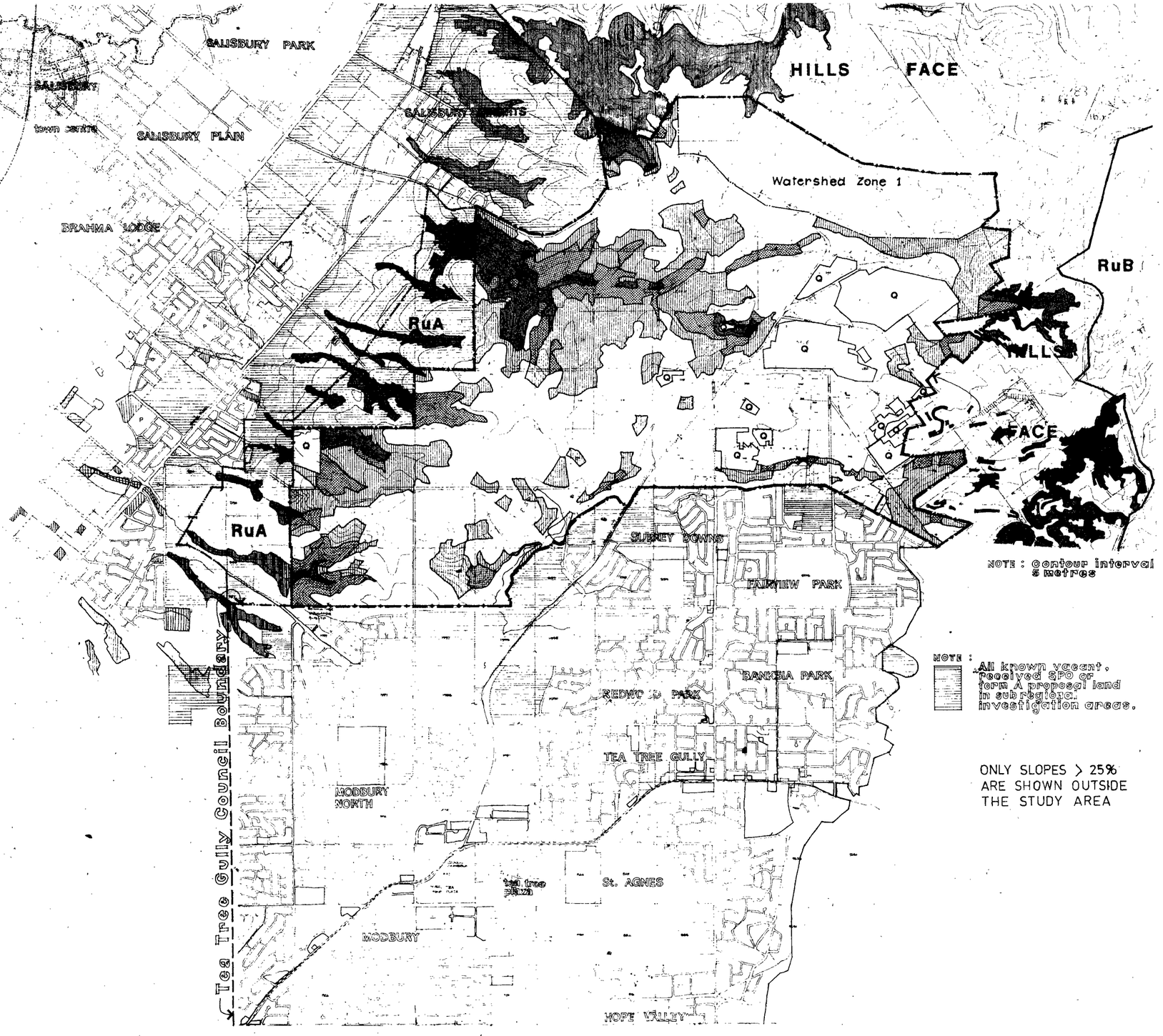
MAP 5

DEPTH TO BEDROCK

HANNAFORD & PARTNERS PTY LTD
TRACT PTY LTD

January 1975

2596-3



LEGEND

- 0-8% SLOPE
- 8-15% SLOPE
- 15-25% SLOPE
- >25% SLOPE
- Q — QUARRY LOCATION INTERPRETED FROM AIR PHOTOS

GRADE	GENERAL SLOPE RANGE	COST $/M² BRICK BUILD UP	COST $/M² BENCHING
GENTLE	0°- 8°	0 - 3.7	0 - 1.7
MODERATE	8°- 15°	3.7 - 7.3	1.7 - 2.5
INTERMED - IATE	15°- 25°	7.3 - 11.3	2.5 - 3.8
STEEP	> 25°	NO BUILD AREA	

NOTE : TABLE ADAPTED FROM JOHN A. WOODBURN ENGINEERS REPORT NO. A 195/1 NOV. '74

NORTH

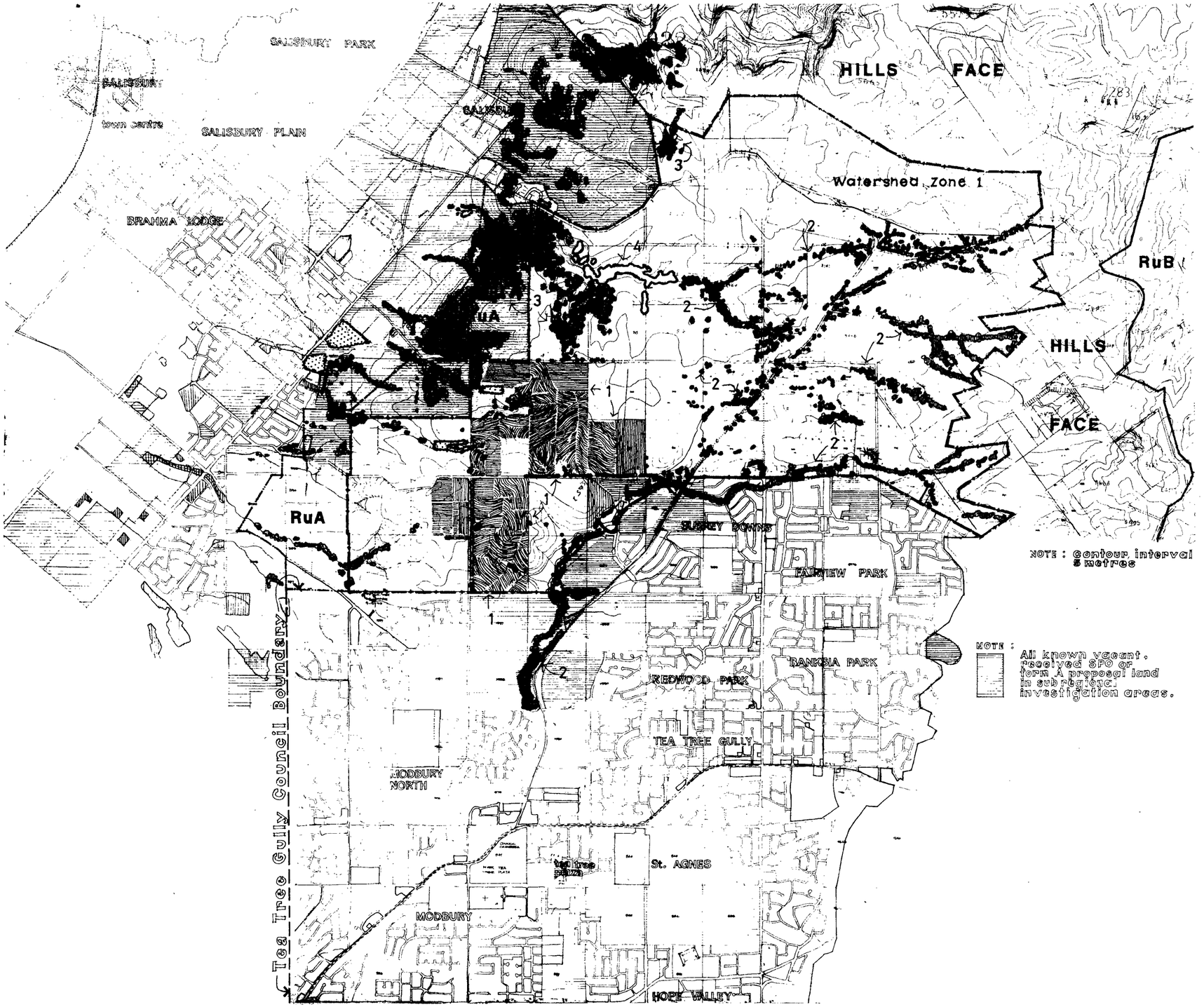
500 0 500 1000 metres

MAP 6 - SLOPES

HANNAFORD & PARTNERS PTY LTD
TRACT PTY LTD

January 1975

2596-4



LEGEND

- VINEYARDS
- DOMINANTLY EUCALYPTUS LEUCOXYLON (BLUE GUM) E. CAMALDULENSIS,(RIVER RED GUM).
- DOMINANTLY E.POROSA
- SCATTERING OF 2 AND 3
- ORCHARD

NORTH

500 0 500 1000 metres

MAP 7

VEGETATION

HANNAFORD & PARTNERS PTY LTD
TRACT PTY LTD

January 1975

026

2596-5

SALISBURY PARK

SALISBURY

town centre

SALISBURY PLAIN

SALISBURY HEIGHTS

HILLS FACE

Watershed Zone 1

BRAHMA LODGE

RuA

RuB

HILLS

FACE

RuA

SURREY DOWNS

FAIRVIEW PARK

BANKSIA PARK

REDWOOD PARK

TEA TREE GULLY

MODBURY NORTH

St. AGNES

MODBURY

HOPE VALLEY

Tea Tree Gully Council Boundary

NOTE : Contour interval 5 metres

NOTE : All known vacant, resolved SPO or form A proposal land in sub-leglous investigation areas.

LEGEND

AREA OF RECHARGE POTENTIAL
4,550 LITRES/HOUR at 30-45 METRES)

AREA OF GOOD QUALITY GROUND WATER
27,280 LITRES/HOUR at 60-80 METRES OF BELOW 1000 mg/l OF SALT)

A COMBINATION OF AQUIFER RECHARGE AND GOOD QUALITY GROUNDWATER

NOTE : PART OF THIS INFORMATION WAS OBTAINED FROM THE DEPT. of MINES, SOUTH AUSTRALIA OCTOBER 1974

NORTH

500 0 500 1000 metres

MAP 8

AQUIFIER RECHARGE

HANNAFORD & PARTNERS PTY LTD
TRACT PTY LTD
January 1975

2596-6

050

ELECTRICITY POWER LINES

FUTURE DAM SITES (UNDER CONSTRUCTION)

HILLS FACE

SALISBURY PARK

SALISBURY

town centre

SALISBURY HEIGHTS

SALISBURY PLAIN

OCCASIONAL HOT STEADY SUMMER WINDS WILL TEND TO SCORCH VEGETATION.

WINTER

Watershed Zone 1

BRAHMA LODGE

WINTER

RuA

RuB

HILLS FACE

WINTER

RuA

SURREY DOWNS

FAIRVIEW PARK

SUMMER

RANDELL PARK

REDWOOD PARK

TEA TREE GULLY

MODBURY NORTH

MODBURY

Tea Tree Gully Council Boundary

NOTE : contour interval 5 metres

NOTE: 1 THE RAINFALL DECEASES TOWARDS THE NORTH, THE PREVAILING WINDS AFFECT THE MICROCLIMATES BY DRIVING RAINS FROM THE SOUTH WEST CAUSING THE NORTHERN SLOPES TO BE SLIGHTLY DRIER THAN THE SOUTHERN ONES

2 RAINFALL VARIES ACROSS THE SITE.

GOLDEN GROVE 23.57" P.A.
TEA TREE GULLY 27.30" P.A.

LEGEND

- NORTH SUNNY EXPOSURES GENERALLY WARMER AND DRIER THAN THE SOUTH SLOPES
- POTENTIAL FOG POCKETS
- SOUTH EXPOSURE TENDING TO BE SEASONALLY COLD & WET
- WARM AIR MASSING MOVE UP THE VALLEY BY MID MORNING & COLD MASSES MOVE DOWN IN LATE EVENING AND EARLY MORNING
- COLD AIR MASSES
- KEY VIEWING AREA
- MAJOR WIND DIRECTIONS
- WIND FREQUENCY & VELOCITY INCREASES AT THE HIGHER POINTS PARTICULARLY ON THE WESTERN ESCARPMENT

NORTH

500 0 500 1000 metres

MAP 10

MICROCLIMATE & SCENIC AMENITY

HANNAFORD & PARTNERS PTY LTD
TRACT PTY LTD

January 1975