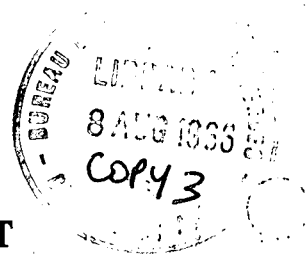


COMMONWEALTH OF AUSTRALIA



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DEPARTMENT OF NATIONAL DEVELOPMENT  
BUREAU OF MINERAL RESOURCES  
GEOLOGY AND GEOPHYSICS

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RECORDS:

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1966/100

REPORT ON PHOTO-INTERPRETATION OF MITCHELL (SOUTHERN HALF), ROMA AND  
CHINCHILLA 1:250,000 SCALE SHEETS, QUEENSLAND

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by

J.C. Rivereau  
Institute Français du Pétrole

The information contained in this report has been obtained by the Department of National Development, as part of the policy of the Commonwealth Government, to assist in the exploration and development of mineral resources. It may not be published in any form or used in a company prospectus without the permission in writing of the Director, Bureau of Mineral Resources, Geology and Geophysics.

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## SUMMARY

The northern part of the studied area includes ?Permian, Triassic, Juriassic and Cretaceous sediments which form the northern border of the Surat Basin. Southward, these sediments are unconformably overlain by Tertiary sandstone and duricrust, by sand (Chinchilla Sand) and by Tertiary basalt. The Precambrian basement crops out in the eastern part of CHINCHILLA. On MITCHELL and ROMA the various units are photogeologically well defined, but on CHINCHILLA the presence of timber cover and of duricrust or Tertiary over the different formations has resulted in a rather homogeneous, confusing photogeological pattern as far as the sedimentary units are concerned.

The area is not strongly folded and dips gently southwards, and is disturbed only by gentle anticlinal ridges generally trending north-north-westward-(e.g. on ROMA). Many lineaments have been found probably controlled by faulting.

## INTRODUCTION

MITCHELL, ROMA and CHINCHILLA 1:250,000 scale Sheets are in the Surat Basin between 26° and 27° south latitude and 147° and 151° 30' east longitude. The photo interpretation of this area has been carried out with the purpose of assisting in the planning and execution of the field work scheduled for the 1966 season. Field mapping of the northern half of Mitchell was completed during 1965 and the map accompanying this report shows the results of field work in the north and of photo-interpretation in the south. The air photographs used were flown in 1966 at a nominal scale of 1:85,000. Detail from the individual photo scale overlays has been reported on overlays of the National Mapping photo scale compilation sheets and then reduced to a scale of 1:250,000.

## MITCHELL

### Physiography

The sheet area can be divided into three physiographic units corresponding to the three main geological formations.

- (1) Roma Formation area: - It is found in most of the north-eastern part of the sheet and along river channels elsewhere, forming low, eroded areas typified by their closely spaced drainage pattern and absence of timber except on sandy patches.
- (2) Duricrust: - It forms flat, scarp-forming areas covered with timber and in many places caps the Roma Formation. It has been much eroded by creeks and now remains as a very indented Tableland.
- (3) Tertiary: - In the southern and western part of the sheet, the duricrust is progressively overlain by Tertiary sand and more or less consolidated sandstone which forms gentle, rounded mounds or flat, soft sandy surfaces.

The Maranoa river, with a fairly wide channel, crosses the sheet area, flowing to the south.

### Stratigraphy (Table I)

In assigning possible geological equivalents to the photogeological units reference has been made to the results of the field work previously completed in the northern half of the Sheet (Exon, Casey and Galloway, 1966).

TABLE I

	<u>MITCHELL</u>		
Photogeological character:	Reference		Possible Geological equivalent
	Qa - alluvium	} - Quaternary	}
	Qa1 - old alluvium		
	Qs - sand, residual soil		
Dark tone, flat, scarp forming.	Czd - duricrust	Undifferentiated	} - CAINOZOIC
Medium grey tone, soft formation covered with timber, bedded, scarp-forming, with white patches in places.	T - Lateritised sand-stone, sand, silt-stone, conglomerate	} - Tertiary	
Dark tone, high relief, hard appearance.	Tb - Basalt		
Light grey tone, with white spots, very soft.	Klr - siltstone, mudstone, claystone.	ROMA FORMATION Lower Cretaceous	} - MESOZOIC



Klr - Roma Formation - Cretaceous.

It is a fairly soft and impermeable formation which consists of mudstone, siltstone and claystone, and is characterized by a closely spaced drainage pattern and a light tone. It is covered, in places, by more or less large patches of sand. The surface of outcropping area gently dips to the south but no particular dip has been recorded. This formation is particularly well shown in the eastern and north-eastern part of the studied area. Elsewhere it occurs along the river valleys but is generally concealed by sand or scree crumbling from the duricrust.

Tb - Tertiary basalt.

On Run 5, 5015, two flat lying, scarp forming outcrops, very similar in air photo-character to the duricrust, are regarded as a continuation of the Tertiary basalt flows on the northern half of the sheet.

Czd - Duricrust.

It consists of a flat, scarp forming, very indented tableland capping the Roma Formation in places and strongly eroded by creeks. The thickness is not constant and the duricrust can occur at several levels. It is well distributed throughout the sheet area and probably mantled the whole area at one stage.

T - Tertiary sand and sandstone.

It usually lies over the duricrust but also directly over the Roma Formation. Unlike the duricrust the actual limit of the outcrops is probably the limit of deposition. It is composed of more or less consolidated sandstone, sand, siltstone and conglomerate covered by timber and forms a less uniform surface than the duricrust surface, with some gentle, rounded mounds. Flat, sandy areas such as the one which lies in the south-western corner of the sheet may be younger.

Generally the boundaries of this rather soft formation are gradational and the thickness is variable, ranging from a thin coat to a thick, bedded formation (Western area).

Structure

The anticlinal axes coming from the northern half of the sheet cannot be continued on the southern half because of the Tertiary cover. Nevertheless some supposed axes, suggested by the drainage pattern and a few topographic features have been drawn.

ROMA

Physiography:

The Tertiary and the duricrust form a tableland in the southern part of the sheet. This Tableland is crossed by rivers draining southwards and is covered by timber.

The Cretaceous and Jurassic which crop out in the northern half of the sheet form the second physiographic unit. This part bears few timber areas and is mainly cultivated. The drainage is northward.

North of Roma, the basalt of the Grafton Range forms some peaks.

Stratigraphy (Table 2)

In assigning possible geological equivalents to the photogeological units, reference has been made to the northern half of MITCHELL (Exon, Casey and Galloway, 1966) and to previous work by Reeves (1947), Day (1964) and Forbes (1967).

TABLE 2

ROMA

## Photogeological Character:

## Reference:

## Possible Geological Equivalent

	Qa - Alluvium		} - Quaternary	} - CAINOZOIC
	Qa1 - Old alluvium			
	Qs - Sand, residual sand			
Dark toned, flat, scarp forming.	Czd - Duricrust		Undifferentiated	
Medium grey toned, fairly soft formation covered with timber, bedded, scarp forming, with white patches in places.	T -	} - Lateritised sandstone, sand siltstone, conglomerate	} - Tertiary	
Bedded, scarp forming, with white patches.	T1 -			
Dark toned, high relief, hard appearance	Tb - Basalt			
Light grey toned, white spots, very soft	Klr - Siltstone, mudstone, claystone	ROMA FORMATION		
Medium grey toned, medium to soft, hummocky surface, bedded in places	Kli - Sandstone	KINGULL FORMATION	} - Lower Cretaceous	
Medium grey toned, medium to soft, hummocky surface, bedded in places	Kln - Sandstone	NULLAWURT FORMATION		
Grey toned, well bedded, scarp forming in places, rather hard	Klx - Sandstone, siltstone, shale	MOOGA SANDSTONE		
Light grey toned, medium to soft, hummocky surface	Juo - Sandstone, shale	ORALLO FORMATION	} - Upper Jurassic	} - MESOZOIC
Light grey toned with white patches, medium to soft, hummocky surface	Jug - Sandstone	GUBBERAMUNDA FORMATION		
Light grey to grey toned, fairly soft	Jmi			
	Jmi3			
	Jmi2 - Sandstone, siltstone, shale	INJUNE CREEK GROUP	Middle Jurassic	
Dark toned, well bedded, medium to hard	Jlh - Sandstone	HUTTON SANDSTONE	Lower Jurassic	

Jlh - Hutton Sandstone

This unit crops out in a small area of the northern part of the sheet along the Eurombah Creek in a probably anticlinal position, surrounded by younger units. It is a fairly hard, well bedded sandstone.

Jmi - Injune Creek Group

This second unit covers the northern part of the sheet area. It is a fairly soft unit of sandstone, siltstone and shale but the character is not particularly specific. In the western part, this unit has been divided into three sub units Jmi<sub>1</sub>, Jmi<sub>2</sub>, and Jmi<sub>3</sub> on the basis of harder beds but these sub-divisions fade away towards the east.

Jug, Juo - Gubberamunda and Orallo Formations

The differentiation between these units can be made only in the middle part of the sheet. Jug generally forms a scarp or a marker bed overlying the Middle Jurassic - the bottom of this scarp has been chosen as the boundary between Middle and Upper Jurassic.

Klx - Mooga Sandstone

In the western part of the sheet it is one of the distinctive units. It consists of well bedded sandstone or siltstone at the base which conformably overlies Jug, Juo. In the eastern part of the sheet the boundary is less obvious in some places. Part of the outcrop is concealed at Mount Combabula by Tertiary sandstone or duricrust.

Kln, Kli - Nullawart and Kingull Formations

On the air photographs, the division between these formations can be made from the western border of the sheet as far as the Pickanjinnee area, but is lost eastward where these units are, for the most part, masked by Tertiary tableland.

Klr - Roma Formation (See MITCHELL)

It consists of mudstone, claystone and siltstone, and is observed mainly in the Roma area, conformably overlying Kln - Kli. Eastward and southward it is overlain by duricrust and Tertiary sandstone, but areas of outcrop are found south of Wallumbilla and around Yuleba, Dulacca and Drillham.

Tb. - Basalt.

It forms a line of peaks north-east of Roma (Mount Bassett and Grafton Range) and Mount Eumamurrin. In the Grafton Range area it has protected the Nullawart Formation from weathering.

T.T<sub>1</sub> - Tertiary. Czd - Duricrust.

The Tertiary rocks are similar, in the western part, to those found on Mitchell but some bedding appears within the formation and eastward, particularly along the Yuleba and Tcharning Creek the bedding is obvious. Possibly, however, it corresponds only to several levels of lateritisation, therefore the relationship between this Tertiary sand and sandstone and the duricrust is not so clear as on Mitchell, where the sand and sandstone usually overlies the duricrust.

T<sub>1</sub> - differentiates only the lowest level of T.

Czd has been kept for areas of flat, scarp-forming tableland.

TABLE 3

## CHINCHILLA

Photogeological character	Reference	Possible Geological equivalent :
	Qa - Alluvium	} }
	Qs - Sand, residual soil	} }
Flat, cultivated area, soft appearance	Qco - Sand, conglomerate - CHINCHILLA SAND	} -Quaternary
Same as Qco with slightly different soil pattern	Qco1- Sand, conglomerate - CHINCHILLA SAND	} }
Dark tone, flat, scarp forming	Czd - Duricrust	Undifferentiated
Medium grey tone, fairly soft formation covered with timber; bedded, scarp forming, with white patches in places	T - Lateritised sandstone, sand, siltstone, conglomerate.	} } -CAINOZOIC
Light grey tone to white, showing flow pattern mainly cultivated.	Tb1 - )	} -Tertiary
Same as Tb1 but at a higher level	Tb2 - ) -Volcanics mainly basalt	} }
Light grey tone, with white spots, very soft appearance	Klr - Siltstone, mudstone, claystone. - ROMA FORMATION - Lower Cretaceous	} -Cretaceous
	K - Undifferentiated	} }
Light grey tone, medium to soft, hummocky surface	Juo - Sandstone, Shale - ORALLO FORMATION - Upper Jurassic	} }
Light grey tone with white patches, medium to soft, hummocky surface	Jug - Sandstone - GUBBERAMUNDA FORMATION - Upper Jurassic	} }
Light grey to grey tone, fairly soft	Jmi - Sandstone, silt-stone shale - INJUNE CREEK FORMATION - Middle Jurassic	} -MESOZOIC
Dark tone, medium to hard appearance, timber cover, duricrust or Tertiary capping in places	Jlh - Sandstone - HUTTON SANDSTONE - Lower Jurassic	} -Jurassic
White to light grey tone, soft to medium appearance, bedded in places, mainly cultivated	Jle - Argillite, mudstone, fine sandstone - EVERGREEN FORMATION - Lower Jurassic	} }
Hard appearance, timber cover, duricrust or Tertiary capping in places, dendritic drainage pattern	Jlp - Sandstone, silt-stone, argillite - PRECIPICE SANDSTONE - Lower Jurassic (May include Triassic sediments)	} }
	J - Undifferentiated	} }
High relief, hard appearance	Rh - Rhyolite, dacite	} -Triassic to Carboniferous
Well bedded outcrop, steeply dipping	?C -	}
Hard appearance, trend lines	gn - Metamorphic rock	}
Medium grey tone, hard appearance, jointed	gr <sub>1</sub> - Granite	-PRECAMBRIAN
Similar to gr, but lighter tone, no timber, dendritic drainage pattern.	gr <sub>2</sub> - Granite	}

### Structure

Several lineaments, probably controlled by faulting, have been shown on the map. A north-northwest anticlinal axis extends from the outcrop area of Hutton Sandstone to the Muggleton area and may continue along the Yuleba Creek. West of this axis, a fault, with the same strike, controls the shape of the boundaries between Klx and Jug - Juo, and between Jug and Jmi<sub>3</sub> and Jmi<sub>3</sub> and Jmi<sub>1-2</sub>.

### CHINCHILLA

### Physiography

The sheet area can be divided into five physiographic units:-

- 1) The granite and basalt area in the eastern part of the sheet forms high lands. The area of basalt flows is cultivated.
- 2) A flat area of low, cultivated lands in the central southern and central south-eastern part of the sheet, drained by Burraburri and Charley's Creeks and the Condamine River corresponds to the Chinchilla Sand.
- 3) The Triassic and Lower Jurassic Formations, partly covered by Tertiary, form middle lands continuing the tableland of Tertiary; they are covered by timber.
- 4) The Tertiary forms tablelands covered with timber, in the north-western part of the sheet.
- 5) The outcrop area of Middle Jurassic, most of which is cultivated, forms a separate middle land unit in the north-western corner of the sheet area.

### Stratigraphy (Table 3)

Dense timber which covers most parts of the sheet area and the occurrence of duricrust or lateritised Tertiary sandstone which caps part of the outcrops, added to the lack of photogeological markers and specific character within the sedimentary formations, have made the geological interpretation of the sediments of this sheet particularly difficult.

### gr<sub>1</sub>, gr<sub>2</sub> - Granite

It occurs only in the north-eastern and eastern parts of the sheet; in the north it shows a well developed joint pattern (gr<sub>1</sub>) and to the south it has a specific pattern of numerous rounded ridges associated with a closely spaced dendritic drainage network (gr<sub>2</sub>).

### gn - Metamorphic rocks

Two outcrops in the north of the sheet, (Run 1, Photos 5018, 5042) with trends of schistosity are thought to be of metamorphic rocks.

### ?C. - Carboniferous

This interpretation is doubtful and this outcrop (R1-5034) may be metamorphic rock.

### Rh - Rhyolite - Dacite

They form some scattered peaks in the northern part of the sheet.

## J - Undifferentiated Jurassic

Several areas of outcrops, within the Tertiary area, have been labelled as undifferentiated Jurassic more because of their geographical position than of their own photogeological character which is not distinctive. Unlike ROMA where some marker beds or scarps allow boundaries to be followed, on CHINCHILLA the more or less scattered nature of inliers within the Tertiary area prevents any correlations being made between them.

### Jlp - Precipice Sandstone

It is observed in the eastern part of the sheet, along the granite. To the south, it is capped by Tertiary basalt flows. This unit may include Triassic formations which have not been differentiated; it is usually covered by timber.

### Jle - Evergreen Formation

Except in the northern part of the sheet where it forms a fairly large area of outcrop this unit is poorly exposed. It occurs on the west side of the Boyne River (Run 3) but due to its soft character it forms depressions and is generally concealed by sand. It probably occupies a large area beneath the eastern part of the Chinchilla Sand.

### Jlh - Hutton Sandstone

It occupies a large area in the middle of the sheet. It has a hard appearance, is covered by timber and is capped by a more or less continuous mantle of duricrust of Tertiary sandstone. Because of the cover the boundaries between this unit and Jmi or Jle are not clear, and Jlh may also include part of Jle or Jlp.

### Jmi - Injune Creek Group (See ROMA)

This unit crops out in the north-western corner of the sheet.

### Jug-Juo - Gubberamunda and Orallo Formations (See ROMA)

It is observed only in a small area in the west of the sheet, between the Tertiary and the Injune Creek Group.

## K. - Undifferentiated Cretaceous

This symbol has been applied to scattered outcrops within the Tertiary in the south west of the sheet.

### Klr - Roma Formation (See MITCHELL and ROMA)

It is concealed by Tertiary and occurs only in the southern corner along the creek channels, in the vicinity of Miles and east of Condamine.

### Tb1 Tb2 - Tertiary Basalt

It is found principally in the south-eastern corner of the sheet where it forms large basalt flows over the eastern border of the Condamine plain. Further east a second higher series of flow has been labelled Tb2.

Other basalt flows occur within the granite (R1, 5030) or the sedimentary rock (R2 5158 - 5162). The basalt is generally distinctive because it is cultivated.

### T. Czd - Tertiary Sandstone - duricrust (See MITCHELL and ROMA)

It is observed mainly in the western part of the Sheet but also is spread throughout the Sheet area capping any formation with scattered or more or less continuous outcrops, principally on Jlh, masking the photo-character of the underlying units.

Qco-Qco1 - Chinchilla Sand

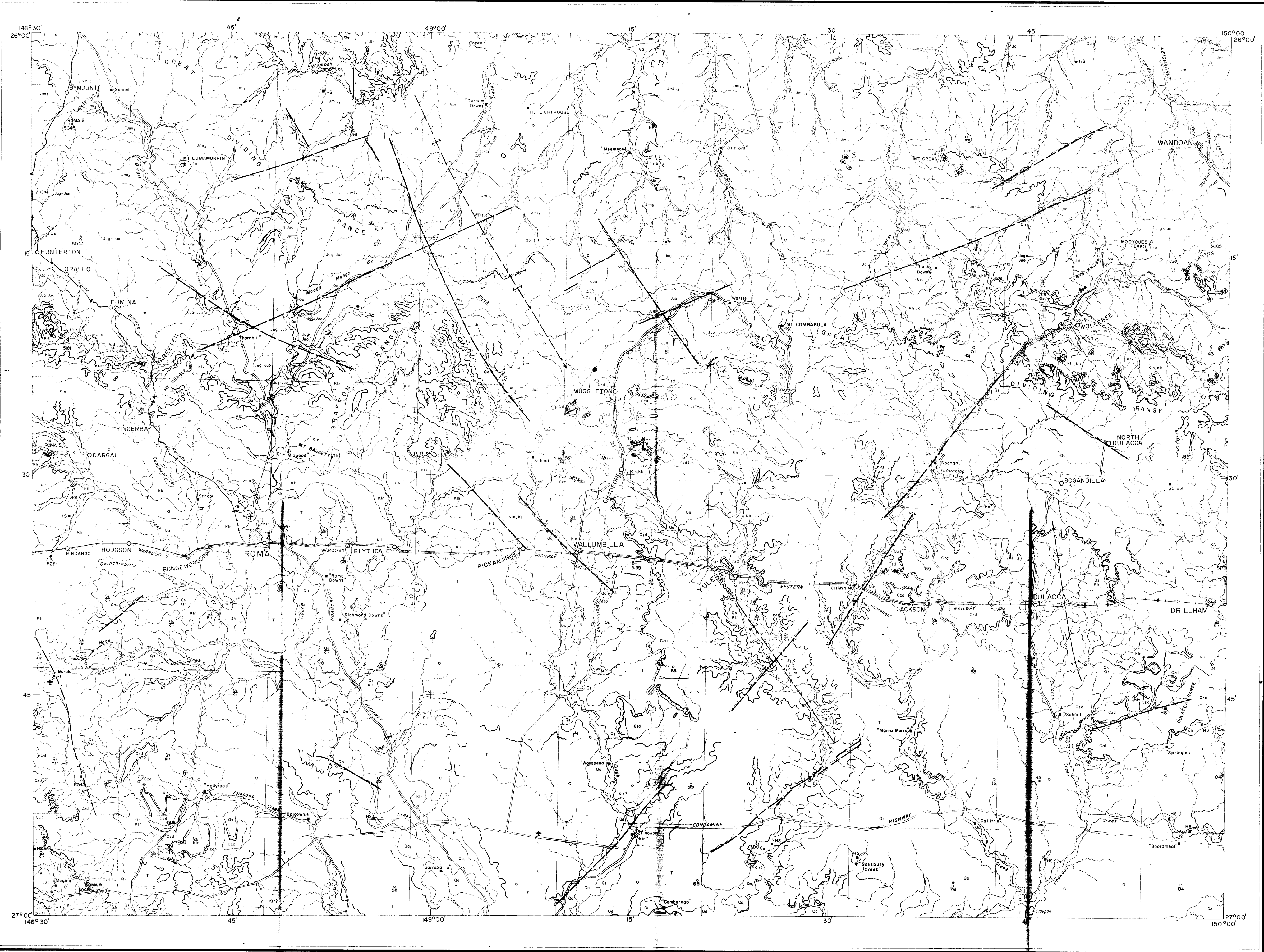
This sand has received a particular symbol because of its continuity and homogeneity. It forms a remarkably flat large plain along the Condamine River and Burraburri and Charley's Creeks. It has a distinctive dark tone in the southern most part and becomes lighter to the north and the west (more sandy?) and is entirely covered with cultivation.

Qco1 has been chosen for a slightly different soil pattern probably due to superficial volcanic colluvium.

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REFERENCE

Photogeological Character	Possible Geological Equivalent	
<i>Dark-toned, flat, scarp forming</i>	Qa Alluvium	QUATERNARY
	Qa <sub>1</sub> Old alluvium	
	Qs Sand, residual sand	
<i>Dark-toned, flat, scarp forming</i>	Cd <sub>1</sub> Duricrust	UNDIFFERENTIATED CAINOZOIC
<i>Medium grey-toned, fairly soft formation covered with timber, bedded, scarp forming, with white patches in places</i>	T	TERTIARY
<i>Bedded, scarp forming, with white patches</i>	T <sub>1</sub>	
<i>Dark-toned, high relief, hard appearance</i>	Tb Basalt	
<i>Light grey-toned, with white spots, very soft</i>	K11 Siltstone, mudstone, claystone	Roma Formation
<i>Medium grey-toned, medium to soft, hummocky surface, bedded in places</i>	K12 Sandstone	Kingull Formation
	K13 Sandstone	Nullawurt Formation
<i>Grey-toned, well bedded, scarp forming in places, rather hard</i>	K14 Sandstone, siltstone, shale	Mooga Sandstone
<i>Light grey-toned, medium to soft, hummocky surface</i>	Ju <sub>1</sub> Sandstone, shale	Orallo Formation
<i>Light grey-toned, with white patches, medium to soft, hummocky surface</i>	Ju <sub>2</sub> Sandstone	Gubberamunda Formation
<i>Light grey to grey-toned, fairly soft</i>	Jm <sub>1</sub>	MESOZOIC
	Jm <sub>2</sub> Sandstone, siltstone, shale	Injune Creek Group
	Jm <sub>3</sub>	MIDDLE JURASSIC
	Jm <sub>4</sub>	
<i>Dark-toned, well bedded, medium to hard</i>	Jh Sandstone	Hutton Sandstone
		LOWER JURASSIC

- Lithological boundary

Probable lithological boundary

Anticlinal axis

Synclinal axis

Fault

Probable fault

Lineament

Edge of bed

Probable edge of bed

Edge of bed expressed as scarp

Estimated dips

Horizontal

Very low

Low

Medium

Steep

Vertical

Trend line

Joint pattern

Topographic scarp
- Principal road

Minor roads and tracks

Railway line

Telephone line

Fence

State boundary

Mine

Homestead

Yard

Windpump

Airport or Airfield, Landing ground

Bore

Tank

Well

Spring

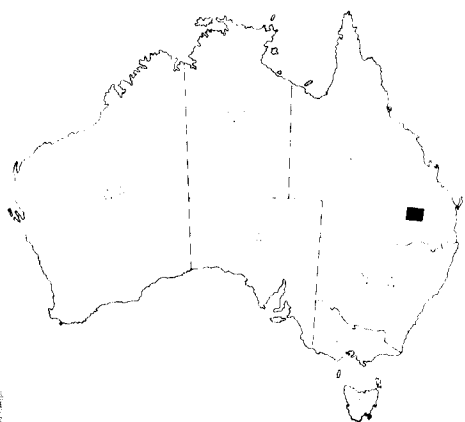
Waterhole

Dam

Photo-centre points

Photo-centre points-adjoint sheet

Compiled by the Bureau of Mineral Resources, Geology and Geophysics.  
Detail adjusted to photoscale compilation prepared by the Division of  
National Mapping, Department of National Development  
Aerial photography by Adasta Airways Pty Ltd., complete vertical  
coverage at 1:85,000 scale. Transverse Mercator Projection.



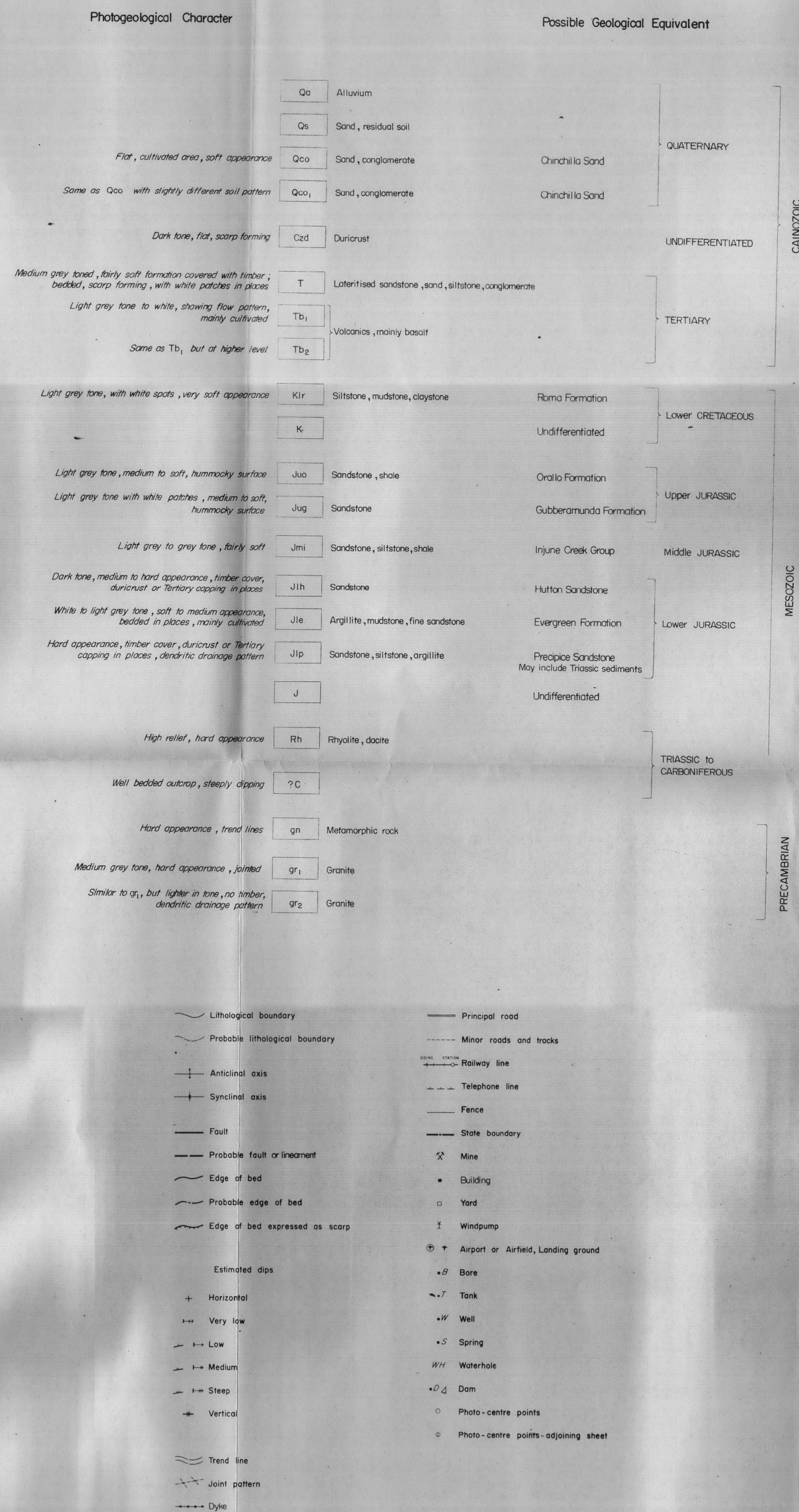
SCALE 1:250,000



INDEX TO ADJOINING SHEETS		
EDDYSTONE	TAROOM	MUNDUBER
MITCHELL	ROMA	CHINCHILLA
HOMEBOIN	SURAT	DALBY

Photo-interpretation by the Photogeological Group,  
Bureau of Mineral Resources, Geology and Geophysics 1966  
Interpreted by J.C.Riviereau, Institut Français du Pétrole.





SCALE 1 : 250,000

Photo - interpretation by the Photogeological Group,  
Bureau of Mineral Resources, Geology and Geophysics 1966  
Interpreted by: J.C.Rivereau, Institut Français du Pétrole.

TAROOM	MUNDUBBERA	MARYBOROUGH
ROMA	CHINCHILLA	GYMPIE
SURAT	DALBY	IPSWICH