Queensland Department of Primary Industries
Land Resource Bulletin QV83001

Land resources of the Burnett Region Part 1: South Burnett

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Division of Land Utilisation

QUEENSLAND DEPARTMENT OF PRIMARY INDUSTRIES

Queensland Government Technical Report

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LAND RESOURCES OF THE BURNETT REGION

PART 1: SOUTH BURNETT

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Queensland Department of Primary Industries
Brisbane 1983

ISSN 0811-9007

Queensland Department of Primary Industries
GPO Box 46
Brisbane 4001

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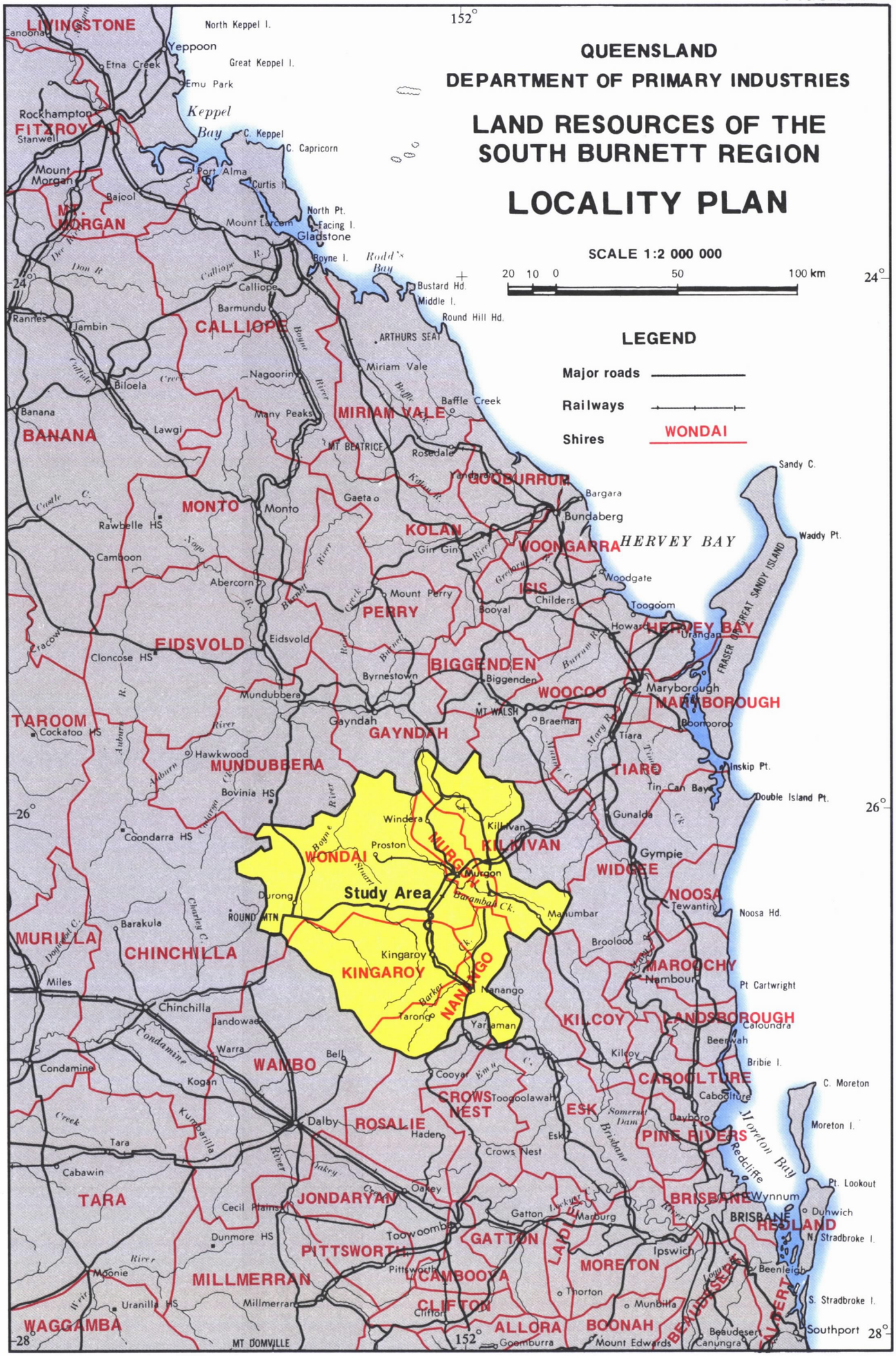

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SUMMARY

The land resources of approximately 1 064 000 ha, comprising the South Burnett portion of the Burnett Region were mapped and described.

Sixty-five mapping units were delineated on the basis of geology, topography, soils and vegetation and their distribution is shown on the accompanying 1:250 000 mapping unit map. Each mapping unit is described in terms of its component land units. The broad management requirements are outlined for each mapping unit.

The resources of the area including climate, geology, landform, drainage, vegetation and soils are discussed.

Present land use is discussed and potential land use examined. A current land use map at a scale of 1:250 000 accompanies the report.

Land degradation is not a major problem. Erosion, salinity, tree and shrub regrowth, pasture degradation and land slips were the main forms identified. Probable causes are discussed and reclamation and/or preventive measures recommended. The extent and location of degradation in the form of salinity, severe erosion and land slip are shown on the accompanying land capability - land suitability map. Gully erosion, pasture degradation and tree or shrub regrowth were the most common forms of degradation in the grazing lands.

Approximately 80% of the cultivation lands requiring soil conservation measures are now protected. Conservation cropping techniques are also gaining acceptance. Current management and land use practices appear to perform satisfactorily on the main cultivation soils.

Attempts to improve the carrying capacity by introducing legumes such as fine-stem stylo to native pastures and establishing a managed grazing system are justified to maintain long term productivity.

1. INTRODUCTION

The Burnett Region of south-east Queensland encompasses a total area of approximately 3 000 000 ha. It is one of the few large areas of the State where land resources are not adequately mapped and described.

In 1977, a programme was initiated to map and describe the resources of this region. The region has been divided into three sub-regions, namely South Burnett, Central Burnett and North Burnett. The South Burnett was the first area to be surveyed and is the subject of this report.

1.1 Objectives

The objectives of the study were to:

(a) prepare a land resource map, compiled at 1:100 000 and published at 1:250 000, and describe the mapping units defined,
(b) prepare a map of current land use,
(c) prepare a land capability - land suitability map,
(d) assess and map existing and potential areas subject to land degradation, and
(e) consider management requirements for the mapping units defined.

1.2 Area features

This study includes the Shires of Kingaroy, Wondai, Murgon, Kilkivan West (i.e. that part of the Shire west of the Coast Range) and Nanango excluding that portion of the Shire covered by the Cooyar Grazing Lands Study (Vandersee, 1978).

The total area involved is assessed as approximately 1 064 000 ha. The extent of the area, selected physical features and the Shire boundaries are presented in figure 1.

The Burnett, D'Aguilar and Bunya Highways provide major road links to and through the area. The majority of secondary roads are bitumen sealed with almost all of the remainder providing all weather access except in times of major floods.

Kingaroy is connected by rail link through Wondai and Murgon to Theebine on the coastal rail link. Proston is connected by rail to Murgon.

A major aerodrome is located at Kingaroy while minor aerodromes are located at Wondai and Nanango.

Electricity is provided by the Wide Bay-Burnett Electricity Board with most properties being connected to the service. Telephone and mail services are provided to most properties.

The total population (adjusted for Kilkivan Shire) of the South Burnett is approximately 20 000 (Australian Bureau of Statistics 1976). Kingaroy is the largest town with an estimated population of 4 500 (Australian Bureau of Statistics, June 1980). Other significant centres of population are Murgon, Wondai, Nanango, Goomeri, Proston, Blackbutt and Kumbia.

A large power station is currently being built at Tarong in the south of the area.

1.3 Methods

Relevant literature and articles were reviewed. This was followed by the data collection phase and recording of resource data in a computer compatible form suitable for retrieval and manipulation.

1.3.1 Data collection and presentation

Following a familiarisation reconnaissance of the area, air photo interpretation using black and white photographs (1:80 000 (approximate scale)) was undertaken.

Initially, geological units as mapped by Murphy *et al.* (1976), Ellis (1968) and Reiser (1971) were recognised and subsequently these were sub-divided into mapping units. Mapping units are defined as discrete areas of land with or without a recurring pattern of soils, vegetation and topography. Land use or potential land use is relatively uniform within each mapping unit. Within each mapping unit the component land units i.e. areas with similar soils, topography and vegetation, were recognised and described but not mapped. One or more land units occur within each mapping unit.

Following delineation of the mapping unit boundaries, the field survey was carried out to verify the mapping and collect detailed land resource information.

Detailed information was collected at 339 sites during the periods from July 1978 to February 1979 and June 1979 to December 1979. The data were recorded in computer compatible form after Dawson (1972). Many more sites were examined in less detail and not recorded as reference sites. A total of 73 profiles were sampled at standard depths for chemical analysis. Bulk surface samples (0-10 cm) were collected from an additional 142 profiles and submitted for selected chemical analysis. Analytical methods used in chemical analysis are presented in Appendix V.

Vegetation was classified into structural formations using a modification of the system proposed by Specht (1970). The structural formation was determined by assessing the predominant stratum which is not necessarily the tallest stratum.

Landform was recorded using the system proposed by Speight (1981) however only the relief-terrain slope table was used (Appendix VII).

Following the data collection phase, land unit descriptions (Appendix II), mapping unit descriptions and the diagrammatic cross sections of each mapping unit (Appendix I) were prepared.

A mapping unit map at a scale of 1:250 000 is enclosed.

Although all of the land resources of the area have been mapped and described, the level of investigation in State Forests, Reserves and very rough inaccessible terrain is very limited. More detailed examination of these areas may be justified to satisfy a specific interest.

2. RESOURCES OF THE SURVEY AREA

2.1 Climate

The area is classed as sub-tropical, long hot summers and mild winters (Bureau of Meteorology 1979).

Rainfall decreases moving away from the main ranges and towards the west and north west. Rainfall is summer-dominant and varies considerably over the years.

Climatic data for Nanango, Kingaroy and Gayndah (north of the area) are presented in table 2.1. Table 2.2 presents monthly and annual median rainfall totals for selected centres (Bureau of Meterology 1979). The median is used in preference to the average as the amount indicated is not disproportionately influenced by either the extremely high or low totals. The median represents the mid-point of each station's rainfall registration, either monthly or annually, and therefore can be easily recognised as the amount which will not be exceeded on half the occasions.

Frosts occur in all low lying parts of the region. June, July and August experience on average between eight and nine frosts per month however frosts may occur as early as May and as late as October. Foley (1945) reported for Nanango that the average date of the first frost ($0^{o}C$) is June 8 and the last frost ($0^{o}C$) is September 15. A slightly later date of the first frost and earlier date for the last frost would be expected for Kingaroy because of its higher elevation.

Droughts are a regular feature of Queensland's environment. Since 1965 State Cabinet has declared the Shires of the South Burnett drought stricken over a number of periods. Table 2.3 lists the Shires and the dates of declaration and revocation of droughts in each Shire since 1965.

2.2 Geology

A full description of the geological formations, including distribution and history, is contained in the reports and accompanying maps of Warner (1964), Ellis (1968), Reiser (1971), Murphy *et al.* (1976) and Geological Survey of Queensland (1979).

2.2.1 Geological history

The Yarraman Block is the main structural feature influencing the area. It comprises the Maronghi Creek Beds and undifferentiated Palaeozoic rocks all of which have been intruded by Permian and Triassic granites and related rocks. The rocks of the Yarraman Block were metamorphosed and folded in the Lower Permian. The Yarraman Block is overlain to the south and south west by sediments of the Tarong and Moreton Basins, and is overlain by and faulted against the Esk Trough to the east (Murphy *et al.* 1976).

TABLE 2.1 CLIMATIC DATA FOR NANANGO, KINGAROY AND GAYNDAH

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Nanango Latitude 26° 41'S. Longitude 152° 0'E. Elevation 345.0 m.													
Mean daily max. temp°C	30.0	28.4	27.8	25.7	22.4	20.1	19.3	21.4	22.9	26.4	29.0	29.5	25.3
Mean daily min. temp°C	17.7	17.3	15.2	10.9	7.1	4.0	2.7	4.5	7.5	11.8	14.2	16.5	10.8
Mean rainfall mm	114	105	90	47	40	46	43	34	41	65	75	105	805
Median rainfall mm	100	86	73	36	34	34	30	25	35	56	65	95	770
Mean no. rain days	10	10	10	7	6	5	5	5	5	7	7	9	86
Kingaroy P.O. Latitude 26° 33'S. Longitude 151° 50'E. Elevation 430.4 m.													
Mean daily max. temp°C	29.2	28.8	27.4	25.2	21.6	19.1	18.2	20.1	23.1	26.0	28.4	29.2	24.7
Mean daily min. temp°C	17.2	17.1	15.2	11.7	7.6	5.2	3.5	4.7	7.7	11.5	14.2	16.2	11.0
Mean rainfall mm	118	97	84	43	35	46	38	28	38	62	77	111	777
Median rainfall mm	103	84	63	29	27	28	27	22	32	55	66	92	752
Mean no. rain days	9	9	8	5	5	5	5	4	5	7	7	9	78
Gayndah P.O. Latitude 25° 38'S. Longitude 151° 37'E. Elevation 103.6 m.													
Mean daily max. temp°C	32.0	31.6	30.5	28.7	25.1	22.5	21.7	23.6	26.5	29.3	31.3	32.0	27.9
Mean daily min. temp°C	20.1	19.9	18.1	14.7	10.3	7.9	5.8	7.3	10.3	14.3	17.2	19.0	13.7
Mean rainfall mm	121	111	80	36	40	44	39	29	37	64	76	109	786
Median rainfall mm	110	82	57	29	29	34	25	22	26	59	65	103	800
Mean no. rain days	9	8	7	5	4	4	4	4	4	6	7	8	70

Source: *Climatic Averages Queensland*, Metric Edition, 1975, Bureau of Meteorology

TABLE 2.2 MONTHLY AND ANNUAL MEDIAN RAINFALL (MILLIMETRES) DATA FOR SELECTED CENTRES

CENTRE	YEARS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.	ANNUAL
Barambah	55	104	72	57	39	37	39	28	23	30	60	70	88	778
Benarkin (Forestry)	50	123	120	124	54	46	38	35	27	34	65	75	98	988
Blackbutt	60	104	107	99	37	38	27	40	27	34	61	68	92	856
Durong Sth (Lanark)	42	81	78	60	18	27	23	23	25	28	61	62	91	674
Goomeri P.O.	58	113	91	59	37	32	28	26	21	29	63	77	107	816
Kingaroy P.O.	65	104	84	60	29	28	26	27	23	33	55	67	91	755
Kumbia	50	108	85	70	36	35	28	34	26	32	64	70	104	788
Murgon P.O.	62	110	98	66	34	35	27	31	21	26	63	68	100	800
Nanango P.O.	85	100	83	72	36	35	33	28	25	36	58	65	95	765
Proston	35	93	101	84	33	34	22	30	22	24	56	62	96	738
Taabinga (Haly Creek)	52	107	84	61	32	28	28	26	21	30	51	76	89	731
Tarong	50	93	75	59	25	25	27	26	23	31	62	62	88	717
Windera Creek	30	98	73	53	39	25	37	21	17	24	50	62	74	665
Wondai P.O.	65	110	87	53	31	28	36	30	21	31	61	75	98	810
Wooroolin P.O.	53	115	80	65	26	31	32	26	19	30	54	83	103	785

Source: Bureau of Meteorology, 1979

2.2.2 Geological units

A summary of the rock units of the South Burnett area in terms of age, lithology, distribution, thickness and mode of formation is given in table 2.4.

2.2.3 Economic geology

Coal. Economic coal seams occur in the Tarong Beds south of Kingaroy. Unsuccessful attempts were made to develop the deposits at Neumgna in 1949. Since 1968, Conzinc Riotinto Australia Exploration Pty Ltd has explored the South Burnett district for coal and carried out an extension drilling programme in the Tarong area. Six major coal seams have been recognised, two of which are between 10 and 30 m in thickness and are potential producers of steaming coal. In 1979 the Queensland Government approved the construction of a power station at Tarong to utilise this coal.

Gold. Although no longer mined in the area, gold has been mined over the years in the Tansey and Nanango districts.

Copper. Copper has previously been mined at Taromeo Copper Mine near Nanango and the Gallangowan area north of Nanango.

Lime and dolomite. On Barambah Creek, 8 km south east of Murgon, numerous small lenses of high grade carboniferous limestone form a north - north-west trending belt 7.3 km long (Martin 1977). Production is on a limited scale from this field at present.

Earthy dolomite is currently quarried from a deposit at Keysland, 20 km west of Murgon and is used locally for agriculture.

Clay deposits. At Brooklands, kaolin derived from decomposed granite in situ has been used in the manufacture of refractories (Murphy *et al.* 1976). Substantial deposits of clay occur in the Goodger area south of Kingaroy. Sandy kaolin is currently mined from this area, for use as a coating clay an an additive in refractories (Geological Survey of Queensland 1979).

Clay for use in brickworks was mined at Wondai and Nanango but both these factories have ceased production although moves have been made to re-open the Nanango brick works in recent times.

Gemstones. Small occurrences are found through out the area. Mining leases are held over garnet deposits at Brigooda and agate at Windera.

2.3 Landform and drainage

2.3.1 Landform

Landforms correlate well to geology despite the complexity of the area. The landforms associated with each of the mapping units are indicated on the map legend as well as in Section 2.4.

TABLE 2.4 ROCK UNITS OF THE SOUTH BURNETT

Age	Rock unit and letter symbol	Lithology	Distribution	Thickness (m)	Depositional environment and/or relationships
Quaternary	Qa	Alluvial gravel, sand, silt and clay.	Mainly along Barker and Barambah Creeks and other major streams.	Up to 30	Fluviatile.
"	Qpc	Clayey residual soils generally forming alluvial plains.	Extending from the Boyne River through Durong to the western boundary of the area.	Up to 50	Fluviatile.
"	Qs	General sand and soil cover.	East of Durong along the Boyne River.	Unknown	Fluviatile.
Cainozoic	Czg	Granite wash; feldspathic sandstone.	In north-west from Brigooda towards Allies Creek.	Up to 23	Sheet erosion of granite with some local transport by streams.
Tertiary	Ts	Poorly consolidated sandstone, conglomerate, siltstone and mudstone.	3 km north of Wondai, 4 km east of Cherbourg, 18 km north of Nanango and 8 km south of Kingaroy.	Less than 50	Fluviatile.
"	Tv	Olivine and pyroxene basalt, trachyte, rhyolite, agglomerate, agglomerate tuff.	Murgon-Windera area.	Up to 250	Continental.
"	Main Range Volcanics. Tm	Vesicular olivine basalt, pyroxene basalt, dolerite, minor lacustrine sediments.	Kumbia through Kingaroy to north of Proston and around Blackbutt.	Up to 700	Continental.
"	Oakdale Sandstone To	Poorly consolidated sandstone, mudstone and conglomerate.	Oakdale - Wooroonden area north of Murgon.	Less than 100	Fluviatile.
Early to Middle Jurassic	Evergreen Formation Jle	Mudstone, siltstone, minor sandstone.	North west of area towards Allies Creek.	150 to 200	Lacustrine and some fluviatile.
"	Marburg Formation Jm or Jlm	Sublabile to labile sandstone, mudstone, siltstone, minor coal seams.	Along the south western boundary from Manneum Creek through Ironpot towards Durong South.	100	Fluviatile with possible brief marine incursion.
Middle to Late Triassic	Tarong Beds Rut	Labile sandstone, mudstone, polymictic conglomerate, coal seams.	Neumga through Tarong to Kunioon West.	Greater than 300	Fluviatile and paludal.
Middle Triassic	Aranbanga Beds Rma or Ra	Andesite, dacite, andesitic and rhyolitic tuff, agglomerate.	North-west of Speedwell to northern boundary.	Unknown	Continental, subaerial.
"	Rlg	Mainly granite.	North west corner of area.	-	Intrusive.
Early to Middle Triassic	Station Creek Adamellite. Rs	Hornblende adamellite, biotite granite, olivine-pyroxene monzonite, biotite-hornblende monzonite.	Small area on eastern edge of area around Gobongo Creek.	-	Intrusive.
"	Esk Formation Re	Sublabile to labile sandstone, mudstone, siltstone, polymictic and local oligomictic conglomerate, trachytic tuff bands.	Narrow north-north west trending belt from near Benarkin to Murgon.	Maximum of 3 000	Fluviatile and lacustrine.
"	Neara Volcanics Rn	Volcanic conglomerate, andesitic agglomerate, flows, and tuff, mudstone, conglomerate, sandstone, acid tuff.	North-north west trending belt 25 km wide extending from Manumbar mill to northern boundary.	Less than 3 000	Continental, fluviatile and subaerial.
Permo-Triassic	Boondooma Igneous Complex P-Rb or Pgy	Granodiorite, granite, diorite, adamellite, gabbro.	Extends from Maidenwell north west through Gordonbrook to the north western boundary.	-	Intrusive.
"	Kinnaham Creek Granodiorite P-Rk	Coarse grained, grey granodiorite.	Eastern portion around Gallangowan and Manumbar.	-	Intrusive.
"	Taromeo Tonalite P-Rt	Hornblende-biotite tonalite, hornblende diorite, adamellite.	South eastern portion from Nanango to Blackbutt.	-	Intrusive.
Upper Permian	Wigton Adamellite Puw	Rapakivi granite, pyroxene gabbro, biotite adamellite, hornblende-biotite diorite.	Northern portion of area from Wooroonden to northern boundary.	-	Intrusive.
Permo-Carboniferous	Biggenden Beds C-Pb	Siltstone, mudstone, andesitic volcanics, minor conglomerate.	Small area on north western boundary or area.	Unknown	Marine.
Palaeozoic	Pz	Mudstone, slate, chert, jasper, phyllite, schist, greenstone, greywacke, limestone, micaschist, meta-quartzite.	Eastern area near Manumbar mill and south west from Manneum Creek to "Burrandowan". Narrow belt from Gordonbrook to Proston.	Several thousand metres.	Deep water marine.
"	Maronghi Creek Beds. Pzm	Mudstone, siltstone, greywacke, chert, slate, phyllite, jasper, basaltic and andesitic agglomerate, minor acid welded tuff.	North west trending belt from near Blackbutt to near Murgon.	Unknown, at least several thousand metres.	Deep water marine.

Five broad categories of relief occur:

(a) mountains and ranges,
(b) plateau areas,
(c) moderate relief,
(d) low relief,
and
(e) plains.

Mountains and ranges. Mountains and ranges occupy approximately 10% of the area. The Bunya Mountains, with an average elevation of 900 m above sea level (a.s.l.), with highest surveyed points of approximately 1 104 m at Mt. Mowbullan and approximately 1 135 m at Mt. Kiangarow form the major feature of the area. The Bunya Mountains are part of the Great Dividing Range formed from basalts of the Main Range Volcanics. The volcanics also form other less elevated areas (450 to 530 m a.s.l.) of the Cooyar and Blackbutt Ranges.

The eastern boundary is formed by the Brisbane and Coast Ranges. These ranges are predominantly formed by Neara Volcanics with some areas of Esk Formation and undifferentiated metamorphics. These ranges average 300 to 400 m (a.s.l.) with many areas up to 450 m (a.s.l.) and north-north west trending strike ridges are a common feature.

Local topography is described as steep hilly to steep mountainous terrain. Smaller areas of Biggenden Beds, Aranbanga Beds, Boondooma Igneous Complex and undifferentiated metamorphics exhibit similar topography although not necessarily associated with the major ranges.

Plateau areas. The main plateau areas occur in the vicinity of Kingaroy with smaller plateau areas in the vicinity of Murgon, Proston and Benarkin. Average elevation is approximately 450 m (a.s.l.) with the local topography defined as undulating low hills to rolling low hills with some steep areas associated with scarps. The plateaus are remnants of lateritised Main Range Volcanics and Tertiary volcanics and occupy approximately 10% of the area.

Moderate relief. Landform of moderate relief dominates the area and accounts for approximately 55% of the area. It is associated with the Boondooma Igneous Complex, Maronghi Creek Beds, Marburg Formation, Evergreen Formation and Tarong Beds. Local topography ranges from undulating low hills to steep hills with average elevations of 350 to 400 m (a.s.l.).

Smaller areas of Wigton Adamellite, Main Range Volcanics, Neara Volcanics and Esk Formation also exhibit a moderate relief.

Low relief. Only an estimated 15% of the area can be classified as having low relief with undulating rises to undulating low hilly topography.

Small areas of the Boondooma Igneous Complex, Taromeo Tonalite, Kingaham Creek Granodiorite, and Tertiary clays and sediments as well as minor areas of the Esk Formation, Maronghi Creek Beds, undifferentiated metamorphics, Wigton Adamellite and granite wash occur as low relief.

Average elevation is approximately 300 to 400 m (a.s.l.).

Plains. Plains are classified locally as level plains to gently undulating plains and occupy approximately 10% of the total area. Average elevations are 300 to 350 m (a.s.l.). The plains are usually associated with Quaternary alluvial deposits of sands, clays and gravels.

2.3.2 Drainage

Two rivers and one major creek system characterise the drainage systems of the area.

The Boyne River catchment occupies the south western and western portion of the area. It flows in a north-westerly and then northerly direction from near the Bunya Mountains to the northern boundary of the area. Major tributaries of the Boyne River include Mannuem, Ironpot, Lawsons Broad and Boondooma Creeks.

The Stuart River catchment occupies the central portion of the area. The river flows in a north-easterly direction from the Bunya Mountains to Kingaroy and then flows north-westerly to join the Boyne River west of Proston. Major tributaries of the Stuart River include Deep, Reedy and Home Creeks.

The Barker-Barambah Creeks systems drain the south-eastern, eastern and north-eastern portions. Barker Creek flows north-easterly from the Bunya Mountains to Nanango and north to Murgon where it joins Barambah Creek. Major tributaries of Barker Creek include Tanduringie, Middle, Meandu, Wheelbarrow and Fricky Creeks.

Barambah Creek flows north-easterly from Mannumbar to Mondure and then flows northwards to the boundary. Major tributaries of Barambah Creek include Boonara, Sunday and Woroon Creeks while Windera, Nangur and Dadamarine Creeks flow into Boonara Creek. Boonara Creek joins Barambah Creek on the northern most boundary.

2.4 Mapping units

Mapping units as defined form the basis for this study. The area has been mapped into sixty-five mapping units on the basis of topography, vegetation, soils and geology. These have subsequently been grouped into nine zones based on geological parent material. A map at a scale of 1:250 000 depicting the extent and distribution of the mapping units is enclosed.

Each mapping unit is composed of a number of land units. Land units are described but not mapped. The description of the mapping units (Appendix I) shows diagrammatically the relationship of the land units within each mapping unit and the average percentage of each land unit occurring. Each individual map unit has subsequently been coded in computer compatible form and the data punched onto card deck.

Due to mapping scale and the fact that land types are generally a continuum, boundaries between many map units are gradual rather than sharp. Where land types are mixed or merge over large distances, they are mapped as a complex. The mapping unit contributing most to the complex is indicated first.

2.4.1 Alluvials

Alluvial derived mapping units comprise approximately 9% of the area. Six mapping units were defined: one on recent alluvia (Qa1), one on old alluvia (Qa2), one as water reservoirs and wet or semi-permanently wet areas (Qa3), two on alluvial clay sheets (Qp1, Qp2) and one as sandy alluvia (Qs1).

The recent alluvia are associated with the present creeks and rivers. Soils are predominantly black earths and are extensively cropped. Originally they carried a grassy open woodland of Queensland blue gum with areas of gum-topped box, poplar box and broad-leaved apple.

Flat to gently undulating plains of old alluvia (Qa2) occur in the vicinity of Mondure. They are extensively cleared and cropped. Soils are predominantly xanthozems and red brown earths supporting narrow-leaved ironbark open woodland to open forest.

Major water reservoirs, lakes and semi-permanent wetlands (Qa3) occur throughout the area. Vegetation is sparse and land use is restricted to limited grazing in dry seasons.

The flat to gently undulating alluvial clay plains, located in the Durong area, have been divided into those areas relatively free of gilgai (Qp1) and those areas exhibiting large gilgai (Qp2). Both areas were predominantly brigalow-belah open forests on grey and brown clays. Unit Qp1 is extensively cleared and cropped while unit Qp2 is extensively cleared and used for cattle grazing. Small areas of red-brown earths, red earths and euchrozems supporting silver-leaved ironbark and narrow-leaved ironbark open forest to woodland communities also occur. These are extensively cleared and cropped.

Sandy alluvial plains (Qs1) occur east of Durong. Soils range from euchrozems and yellow podzolics to siliceous sands. Most areas are extensively cleared with many areas being cropped or used for improved pastures.

2.4.2 Granite wash

Granite wash occurs in the north-west and occupies approximately 2% of the area. These lands have been divided into three mapping units.

Gently undulating terrain on lateritised granite wash (Cz1) occurs in the vicinity of Brigooda. Soils are predominantly krasnozems supporting "softwood scrub" closed scrubs and narrow-leaved ironbark open forests. They are extensively cleared and used for cropping.

Flat to gently undulating terrain on granite wash (Cz2) occurs near Boondooma. Soils are predominantly soloths with small areas of red brown earths. Vegetation is predominantly narrow-leaved ironbark, Queensland blue gum open forests which are extensively cleared and used for grazing with small areas cultivated for cropping.

Steep hilly terrain on granite wash (Cz3) occurs scattered throughout the north-west. Soils are predominantly lithosols and soloths supporting narrow-leaved ironbark shrubby open woodlands. Clearing is limited and only minor areas are grazed.

2.4.3 Laterite

Seven mapping units have been defined in this zone, five associated with the Main Range Volcanics, one with the Tertiary volcanics and one with the Tertiary clays and sediments. These seven mapping units comprise approximately 9% of the area.

The gently undulating to hilly terrain on both the Main Range Volcanics (Lt1), extending from Kumbia through Kingaroy to Tingoora, and the Tertiary volcanics (Lt2), on the Murgon plateau, supports "softwood scrub" closed scrubs on upper slopes and narrow-leaved ironbark open forests to woodlands on lower slopes. Soils are predominantly krasnozems and euchrozems which have been extensively cleared and used for cropping.

Undulating to hilly terrain on the Main Range Volcanics has been subdivided into three mapping units. Unit Lt3 in the vicinity of Stonelands exhibits very snuffy krasnozems and euchrozems supporting tallowwood, pink bloodwood and small-fruited grey gum open forests. Lateritic gravel and rock frequently occur. The area is only partially cleared and is either cropped or planted to Duboisia plantations. Unit Lt4 in the Blackbutt-Benarkin area exhibits krasnozems and euchrozems supporting blackbutt, narrow-leaved ironbark, small-fruited grey gum open forest with some areas of "softwood scrub" species. The area is partially cleared and cropped or retained as State Forests with some areas planted to exotic species. Unit Lt7 extends from Mt. Mc Euen through Proston to Speedwell. Soils are krasnozems and euchrozems, frequently snuffy, supporting spotted gum, small-fruited grey gum open forests or closed scrub of "softwood scrub" species. The unit is extensively cleared, with the exception of scarp areas, and cropped with some areas planted to Duboisia. Portion of this mapping unit occurs as State Forest producing natural grown timber.

Steep hilly terrain and scarps on the Main Range Volcanics (Lt6) occur scattered throughout the central belt of the area. Soils are lithosols and shallow gravelly krasnozems and euchrozems supporting "softwood scrub" closed scrubs and spotted gum, small-fruited grey gum open forests. This mapping unit is moderately cleared with land use ranging from improved pastures, limited cropping, and Duboisia plantations to increasing residential use and horticultural tree crops.

Gently undulating to flat terrain on Tertiary clays and sediments (Lt5) occurs south of Kingaroy. Soils are predominantly xanthozems and krasnozems supporting gum-topped box, narrow-leaved ironbark open forests. Areas of Queensland blue gum, silver-leaved ironbark and "softwood scrub" species also occur. This unit is extensively cleared and used for cropping.

2.4.4 Basalt, rhyolite, trachyte, shale

The seven mapping units recognised within this zone account for approximately 13% of the area. Four units were defined within the Main Range Volcanics and are located from Maidenwell through to the Bunya Mountains in the south. Smaller areas are found from Tingoora through to Mt. Mc Euen.

Mapping unit Tml with gently undulating to hilly terrain exhibits shallow to moderately deep black earths supporting narrow-leaved ironbark woodland to open forests. This unit is extensively cleared and used for cropping. The hilly to steep hilly terrain with similar soils and vegetation (Tm2) is extensively cleared or timber treated and used for grazing of native pastures. Small areas are cultivated and cropped.

The steep, hilly to mountainous terrain exhibits shallow soils classed as lithosols and lithosol-prairie intergrades with minor areas of black earths. Rock and stone outcrops frequently occur. Mapping unit Tm3 is characterised by narrow-leaved ironbark, Queensland blue gum open forests which are extensively cleared or timber treated and used for grazing of native pastures. Unit Tm4 is characterised by "softwood scrub" closed scrubs with small areas of open forest. It is used for National Parks, Reserves and State Forests producing natural grown timber.

Three mapping units were recognised within the Tertiary volcanics and are located in the Cloyna-Windera area. Unit Tvl exhibits undulating to hilly terrain with shallow black earths supporting narrow-leaved ironbark, silver-leaved ironbark, Moreton Bay ash open woodland to open forest. This unit is extensively cleared and used for cropping. Unit Tv2 is characterised by steep hilly to mountainous terrain with shallow black earths and lithosol-prairie intergrades supporting "softwood scrub" closed scrubs. They are extensively cleared and used for grazing of both native and improved pastures.

The steep hilly to hilly terrain of unit Tv3 is partially lateritised and is characterised by lithosols and shallow krasnozems and euchrozems supporting narrow-leaved ironbark, spotted gum, shrubby open forests with some "softwood scrub" areas. This unit is largely undisturbed and used for low intensity grazing and State Forests producing natural grown timber.

2.4.5 Sandstones, siltstones, shales and conglomerate

Eight mapping units have been recognised within this zone and they account for approximately 6% of the area. They are located in the south, south-west and north-west as well as other isolated areas.

Four geological units are included: Tertiary sediments and Oakdale Sandstones, Marburg Formation, Evergreen Formation and Tarong Sandstones. All the mapping units with the exception of Jml of the Marburg Formation are characterised by soils ranging in depth from shallow to moderately deep and classed as soloths, solodics with some solodized solonetz and yellow podzolics. Mapping unit Jml is characterised by brown clays with minor areas of soloths and red brown earths.

The undulating to hilly terrain on Tertiary sediments and Oakdale Sandstones (Tsl) occurring west of Cloyna and north of Nanango support narrow-leaved ironbark, Queensland blue gum woodland to open forest with minor areas of brigalow and black tea-tree. This unit is partially cleared and cropped although it is more suitable for improved pastures. In the vicinity of Iron Pot, the gently undulating to hilly terrain (Jml) of the Marburg Formation supports "softwood scrub", belah, black tea-tree closed scrubs. These are extensively cleared and used for cropping and improved pastures.

The gently undulating (Jm2) and the undulating to hilly (Jm3) terrain of the Marburg Formation supports narrow-leaved ironbark open forests with rusty gum, spotted gum forests on ridge crests. They occur south of Durong and extend towards Iron Pot. Other areas occur west of Mannuem. Portion of the area is cleared or timber treated and used for grazing of native pastures although the majority of the area is designated State Forests which are producing natural grown timber.

Topography of the Evergreen Formation varies from flat to gently undulating (Je1) to undulating to low hilly (Je2) to steep hilly (Je3) terrain. Vegetation is predominantly narrow-leaved ironbark, Queensland blue gum open forests with spotted gum becoming dominant on the steeper areas of Je3. These mapping units are located in the north-west towards Allies Creek and are used as State Forests producing natural grown timber.

Only one mapping unit was recognised on the Tarong Beds (Rul) and this occurred in the Tarong-Neumga area. Topography is undulating to hilly with vegetation ranging from rusty gum, brown bloodwood, Yarraman ironbark open forests to areas of spotted gum, narrow-leaved ironbark open forests to "softwood scrub" species closed scrub. Much of the area has been extensively cleared and used for grazing while parts remain as State Forests producing natural grown timber.

2.4.6 Andesites, volcanic conglomerate and sandstones

Ten mapping units accounting for approximately 21% of the area have been recognised. They are all located in the north and east. Three geological formations are represented: Aranbanga Beds, Esk Formation and Neara Volcanics.

Within the Aranbanga Beds, occurring north-west of Speedwell and north of Double Knob, two mapping units were recognised. The hilly terrain (Rml) is characterised by soloths and solodics supporting narrow-leaved ironbark, Queensland blue gum open woodlands to open forests. It is extensively cleared or timber treated and used for grazing of native pastures. The steep hilly to mountainous terrain (Rm2), characterised by rock outcrops, lithosols and soloths supporting narrow-leaved ironbark open forests, is largely undisturbed and used for restricted grazing or State Forests producing natural grown timber.

Two mapping units were recognised on the Esk Formation in a narrow belt running northwards from near Benarkin to Murgon. Soils vary from solodics and soloths to minor prairie soils and grey-brown podzolics with vegetation dominated by narrow-leaved ironbark, Queensland blue gum and silver-leaved ironbark woodland to open forests. The level to gently undulating terrain (Rel) has been extensively cleared and is cropped or planted to improved pastures while the moderately undulating to hilly terrain (Re2) although extensively cleared or timber treated is used for grazing of native pastures.

Six mapping units were recognised in the Neara Volcanics and these occur in a belt extending from Manumbar to the northern boundary.

The gently undulating to low hilly terrain (Rn1) in the vicinity of Murgon and Cloyna exhibit black earths and brown clays with some solodics and soloths. Vegetation varies from brigalow, belah open forests and "softwood scrub" closed scrubs to narrow-leaved ironbark open forests all of which have been extensively cleared and are used for cropping. The moderately undulating terrain (Rn2), in the vicinity of Tansey, supporting Queensland blue gum, Moreton bay ash woodlands on black earths and brown clays is extensively cleared and cropped.

The gently undulating to hilly terrain (Rn3) and the strongly undulating to steep hilly terrain (Rn4) support narrow-leaved ironbark, Queensland blue gum, Moreton Bay ash open forests with areas of silver-leaved ironbark. Soils vary from lithosols, often rocky, to soloths, solodics and some prairie soils. Both units are extensively cleared or timber treated and are used for grazing of native pastures.

"Softwood scrub" species closed scrubs dominate the moderately undulating to steep hilly terrain (Rn5) found north-east of Murgon from Manyung to Goomeribong. Soils vary from shallow black earths, red and brown clays to solodics and solodized solonetz. Rock outcrops frequently occur. A portion of the unit is cleared and used for grazing of native and improved pastures while the remainder is State Forest and is used for both natural and exotic timber production.

Steep hilly to mountainous terrain (Rn6) occurs south and east of Manumbar. Soils vary from red and yellow podzolics to soloths and lithosols. Vegetation is predominantly narrow-leaved ironbark, small-fruited grey gum, Queensland blue gum layered open forests with areas of "softwood scrub" species. Only limited areas have been cleared and the major portion is used as State Forest producing natural and exotic timbers.

2.4.7 Granites, granodiorites and tonalites

Sixteen mapping units accounting for approximately 28% of the area have been recognised in this zone. They occur in a belt extending from Blackbutt and Maidenwell through to the north-western boundary. A small area also occurs in the vicinity of Manumbar. Six geological units are included in this zone; Boondooma Igneous Complex, Station Creek Adamellite, undifferentiated Triassic intrusions, Kingaham Creek Granodiorite, Taromeo Tonalite and Wigton Adamellite.

Five mapping units were recognised within the Boondooma Igneous Complex. The undulating to hilly terrain (Pb1) in the vicinity of Gordonbrook is characterised by yellow, brown or red podzolics, soloths and solodics supporting narrow-leaved ironbark, Queensland blue gum open forests. The unit is extensively cleared and cultivated both for crops and improved pastures.

The undulating to hilly (Pb2) and the steep hilly to hilly (Pb3) mapping units are characterised by soloths, solodics and solodized solonetz supporting narrow-leaved ironbark, Queensland blue gum open forests. Rock outcrops are common on both units. They are both extensively cleared or timber treated and used for grazing of native pastures.

Lateritised granites (Pb4) of the Boondooma Igneous Complex occur as hilly terrain with rocky scarps. These occur scattered throughout the area. Soils vary from red earths and lithosols to red podzolics and soloths. Vegetation consists of Queensland peppermint, pink bloodwood, small-fruited grey gum open forests. Small areas are cleared and cultivated while the majority is relatively undisturbed and only used for intermittent grazing.

Steep hilly to very steep hilly terrain (Pb5) with frequent rock outcrops occurs in the north-west. Soils are predominantly lithosols, soloths and solodics supporting narrow-leaved ironbark open forest. These areas are only partially cleared and used for limited grazing with portion of the area designated State Forest producing natural grown timber.

Forests producing natural grown timber and planted forests of exotic timber dominate the steep hilly to mountainous terrain on the Station Creek Adamellite (Rs1) north-east of Manumbar. Soils vary from soloths to yellow and brown podzolics supporting narrow-leaved ironbark, white mahogany, small-fruited grey gum, pink bloodwood layered open forests.

The undifferentiated Triassic intrusives occurring north-east of Tansey have been divided into two mapping units. The moderately undulating to steep hilly (Rg1) and the hilly to mountainous (Rg2) terrain. Soils vary from lithosols to soloths and solodics often with rock outcrops. Vegetation is predominantly narrow-leaved ironbark, Queensland blue gum open forests with the more mountainous unit designated as State Forest producing natural grown timber. The less sloping terrain has been partially cleared or timber treated and is used for grazing of native pastures. Two mapping units were recognised within the Kingaham Creek Granodiorites occurring in the vicinity of Manumbar. The gently undulating to low hilly terrain (Pk1) exhibits soloths, solodized solonetz and solodic soils with some gravelly lithosols and supports narrow-leaved ironbark, Queensland blue gum open forests. The unit is extensively cleared or timber treated and used for grazing. The strongly undulating to steep hilly terrain (Pk2) supports "softwood scrub" species on soloths and red and yellow podzolics. This unit is predominantly State Forest reserves used for the production of exotic and natural grown timber.

Three mapping units were recognised within the Taromeo Tonalite. They occur in an area extending from Blackbutt through to Nanango. The undulating to low hilly terrain (Pt1) which is partly lateritised is characterised by red, brown or yellow podzolics and soloths supporting silver-leaved ironbark, Queensland blue gum open forests. Small areas of "softwood scrub" species occur. This unit is partially cleared and cultivated for cropping or improved pastures and partly designated as State Forests of natural grown timber.

Both the undulating to hilly (Pt2) and the steep to very steep hilly (Pt3) terrain are extensively cleared or timber treated and used for grazing of native pastures. Predominant soils are soloths, solodics and lithosols with some rock outcrops. Vegetation is narrow-leaved ironbark, Queensland blue gum, silver-leaved ironbark open forests.

Three mapping units were recognised within the Wigton Adamellite extending from Hivesville through to the northern boundary. Both the gently undulating to hilly (Pu1) and the hilly (Pu2) terrain units are partially cleared or timber treated and used for grazing of native pastures. Soils range from solodics and solodized solonetz to lithosols and vegetation is predominantly narrow-leaved ironbark, Queensland blue gum, pink bloodwood, silver-leaved ironbark woodlands. Mapping unit Pu2 is only used for limited grazing because of the steeper topography.

Black earths and some solodics characterise the undulating terrain of unit (Pu3) occurring at Wooroonden, Kawl Kawl and Kinleymore. Vegetation is "softwood scrub", brigalow, open scrubs to open forests of brigalow, belah. Both communities have been extensively cleared and cropped.

2.4.8 Siltstones and mudstones

Only one mapping unit (Cb1) accounting for approximately 1% of the area has been recognised in this zone. The steep hilly to mountainous terrain on Biggenden Beds located north-east of Tansey is characterised by "softwood scrub" closed scrubs and narrow-leaved ironbark open forests on soloths and yellow and red podzolics. The unit is predominantly used as State Forests producing natural grown timber.

2.4.9 Quartzite, shale, siltstone, greywacke

Seven mapping units accounting for approximately 11% of the area have been recognised in this zone. They are formed on Maronghi Creek Beds and undifferentiated metamorphics and occur in four main areas; extending from west of Mannuem Creek to Chahpingah, from north of Gordonbrook to near Speedwell north of Proston, from near Benarkin to Wondai-Murgon, and in the vicinity of Gallangowan-Manumbar Mill.

The undulating to hilly terrain (Pz1) is characterised by solodics, solodized solonetz and soloths supporting narrow-leaved ironbark open woodland. This mapping unit is extensively cleared and many areas are cultivated for cropping or improved pastures.

The hilly to steep hilly (Pz3) and the very steep hilly to steep hilly (Pz5) mapping units are both characterised by frequent rock and stone outcrops and lithosols, solodics and soloths supporting narrow-leaved ironbark open woodlands. Both these mapping units are moderately cleared or timber treated and used for grazing of native pastures. A large proportion of mapping unit Pz3 and part of Pz5 is designated State Forest and used for producing natural grown timber.

"Softwood scrub" species open to closed scrubs on soloths, solodics and lithosols, often stony, characterise the hilly terrain of mapping unit Pz2. These areas are moderately cleared and used for grazing of improved or native pastures with minor areas of cropping. Portion of the area is designated State Forest used for the production of both natural grown and exotic timber.

The strongly undulating to steep hilly terrain (Pz7) in the vicinity of Manumbar Mill, although mainly on Maronghi Creek Beds and undifferentiated metamorphics includes small areas of serpentinite. Soils are predominantly

soloths, solodics and solodized solonetz with areas of prairie soils (on serpentinites) and black earths. Vegetation is predominantly narrow-leaved ironbark, Queensland blue gum woodland to open forest which is extensively cleared or timber treated and used for grazing of native pastures. Portion of the area is designated State Forest producing natural grown timber.

Lateritised metamorphics occur south of Wondai as gently undulating to flat plains (Pz4). Soils are xanthozems, euchrozems and minor red earths with some soloths and solodics. Vegetation is predominantly narrow-leaved ironbark open forests which are extensively cleared and cultivated for cropping or improved pastures.

"Softwood scrub" species closed scrubs with associated brigalow, belah and gum-topped box characterise the undulating to hilly terrain north of Proston (Pz6). Soils vary from solodics to non-calcic brown soils with areas of grey and brown clays. Rock and stone frequently occur. This unit is extensively cleared and cultivated for cropping or improved pastures.

2.5 Vegetation

There is a lack of published information available on the vegetation communities of the area. Communities in small portions of the area have been recorded by White (1920), Isbell (1962), Ridley (1962), Webb (1964), Reid *et al.* (1979) and McKeown (unpubl.) and in adjacent areas by Tommerup (1934), Durrington (1974) and Vandersee (1978).

The natural vegetation over much of the area has been cleared or partially cleared, either for agriculture or grazing. Approximately 80 000 ha or 7.5% of the area is retained as State Forests and Timber Reserves producing both natural grown and exotic timber. Plant communities not modified in some way by man are now difficult to find. As a result many of the descriptions are based on remnants of the original communities. Only the dominant trees and shrubs have been identified.

The large number of plant communities described have been arranged into four major groups for ease of discussion.

Communities and formations associated with each mapping unit are indicated in Appendix I while the species and formations of each land unit are presented in more detail in Appendix II.

The common names of native plant species recorded in the area are listed in Appendix III.

Communities dominated by eucalyptus species account for approximately 80% of the area while "softwood scrub" species as closed forests and scrubs account for 10%, brigalow and associated communities 6% and miscellaneous communities 4%.

The four major groups recorded were:

(a) eucalypt woodland to open forest,
(b) closed forests and scrubs,
(c) brigalow and associated communities, and
(d) miscellaneous communities.

2.5.1 Eucalypt woodland to open forests

Communities dominated by species of eucalypts account for approximately 80% of the vegetation of the area.

Narrow-leaved ironbark woodland to open forest. Narrow-leaved ironbark *(Eucalyptus crebra)* frequently occurs as pure stands on the mid and upper slope positions of the following mapping units Qa2; Tm1-2; Pb2; Jm2; Pz1; Pz3-5.

This community often grades into one or several of the following eucalypt communities.

Narrow-leaved ironbark, Queensland blue gum open forest. This community occurs throughout the area and is usually associated with lower and mid slope positions. This community or variations of it account for greater than 40% of the vegetation. It has been recorded as significant areas in the following mapping units Lt1; Ts1; Je1-2; Rm1; Re1; Rn3; Rm2-3; Pb1-3; Rg1; Pk1; Pz7; as well as smaller areas in many of the remaining mapping units.

Species commonly associated with this community vary considerably and include the following: silver-leaved ironbark *(E. melanophloia)*, Moreton Bay ash *(E. tessellaris)* and pink bloodwood *(E. intermedia)*. Smaller areas of broad-leaved apple *(Angophora subvelutina)*, gum-topped box *(E. moluccana)*, yellow box *(E. melliodora)* and fuzzy box *(E. conica)* occur on the lower slopes. Spotted gum *(E. maculata)*, rusty gum *(A. costata)* and mountain coolibah *(E. orgadophila)* form scattered communities on the upper slopes and ridge crests.

An understorey frequently occurs and includes one or more of the following: bull oak *(Casuarina luehmannii)*, black she-oak *(C. littoralis)*, forest she-oak *(C. torulosa)*, quinine bush *(Petalostigma pubescens)*, dogwood *(Jacksonia scoparia)*, red ash *(Alphitonia excelsa)* and wild rosemary *(Cassinia laevis)*.

Species which are infrequently associated with this community include: white cypress pine *(Callitris columellaris)*, black cypress pine *(C. endlicheri)*, Yarraman ironbark *(E. melanoleuca)*, white bottle brush *(Callistemon salignus)*, corkwood *(Duboisia leichhardtii)*, coast banksia *(Banksia integrifolia)* and grass trees *(Xanthorrhoea* spp.*)* together with minor areas of "softwood scrub" species.

A wattle *(Acacia* spp.*)* understorey frequently develops following mans disturbance of this community.

Queensland blue gum woodland to open forest. Queensland blue gum *(E. tereticornis)* communities commonly are associated with the alluvial mapping unit Qal and the lower slopes and drainage lines of many of the other mapping units. Broad-leaved apple *(A. subvelutina)* and rough-barked apple *(A. floribunda)* are the most common associated species.

Silver-leaved ironbark woodland to open forest. Small areas of pure stands of silver-leaved ironbark have been recorded in mapping units Qsl, Qpl, Tvl and Pt2. More commonly this community occurs with narrow-leaved ironbark, Moreton Bay ash and Queensland blue gum as associated species.

Minor areas of ironwood *(Acacia excelsa)*, kurrajong *(Brachychiton populneum)* and grass trees may be associated with this community.

Blackbutt, narrow-leaved ironbark, small-fruited grey gum open forests. This community was recorded in mapping units Lt4 and Ptl. Blackbutt *(E. pilularis)* frequently dominates with narrow-leaved ironbark and small-fruited grey gum *(E. propinqua)* commonly occurring. This community occurs on the mid and upper slope positions and frequently has brush box *(Tristania conferta)*, tallowwood *(E. microcorys)*, forest she-oak and "softwood scrub" species associated. Rusty gum becomes more frequent on stony or shallow soils while Sydney blue gum *(E. saligna)* occurs on some lower slope areas.

A wattle understorey frequently occurs where this community has been disturbed.

Tallowwood, bloodwood, narrow-leaved ironbark woodland to open forest. Communities of tallowwood, pink bloodwood, brown bloodwood *(E. trachyphloia)* and narrow-leaved ironbark were recorded in mapping units Lt3-4 and Lt7.

Species frequently associated with this community include small-fruited grey gum, rusty gum, spotted gum and forest she-oak.

A wattle understorey frequently occurs where this community has been disturbed.

Spotted gum, rusty gum open forest. This community commonly occurs on steep upper slopes, ridge crests and rock outcrops in many of the mapping units including Lt6-7; Pb4; Rml-2; Je2-3; Jm2-3; Tsl; Rgl; Pz3.

Pure stands of spotted gum are common although a wattle understorey often occurs. Associated species with this community include small-fruited grey gum, narrow-leaved ironbark, and Yarraman ironbark with black she-oak, forest she-oak, wild rosemary, dogwood and long leaved hovea *(Hovea longifolia)* as understorey species.

Gum-topped box open forest. Gum-topped box frequently occurs as pure stands on the lower slopes and valley floors of many of the mapping units. Although the total area is not large it has been recorded as a significant community in approximately half of the mapping units. These include the following: Ltl; Lt5; Qal; Tv2; Tsl; Jel-2; Jm2-3; Rul; Rml-2; Rsl; Rel; Rnl; Rn5-6; Pkl; Pu3; Pzl-7.

Gum-topped box frequently occurs as an associated species with many of the other communities. Species frequently associated with this community include Queensland blue gum, broad-leaved apple, bull oak, small-fruited grey gum, swamp mahogany *(Tristania suaveolens)*, narrow-leaved ironbark, with occasional areas of coast banksia, "softwood scrub" species, silver-leaved ironbark and a paper barked tea-tree *(Melaleuca decora)*.

An understorey of wattles including Queensland silver wattle *(Acacia podalyriifolia)*, Brisbane wattle *(A. fimbriata)*, early flowering black wattle *(A. leiocalyx)*, a wattle *(A. ixiophylla)*, a wattle *(A. conferta)* and shrubs including sticky hop bush *(Dodonaea viscosa)*, a hop bush *(D. cuneata)*, native cherry *(Exocarpus cupressiformis)* and *(Choretrum candollei)* frequently occur.

Poplar box woodland to open forest. Only very small areas of communities dominated by poplar box *(Eucalyptus populnea)* were recorded in mapping units Tvl, Qal and Jml. Associated species include Queensland blue gum and narrow-leaved ironbark with occasional brigalow *(A. harpophylla)* and belah *(Casuarina cristata)* although pure stands occur.

Queensland peppermint woodland to low open forests. Small areas often associated with rocky or lateritised rock outcrops in mapping units Pb2, Pb4 and Je2 are characterised by Queensland peppermint *(E. exserta)* woodland to low open forest. Species often associated with this community include pink bloodwood, red ash and wattles.

2.5.2 Closed forests and scrubs

These communities tend to occur in higher positions in the landscape and on steeper slopes than the previous communities. They occupy approximately 10% of the area.

Closed forests. This community is associated mainly with mapping unit Tm4. "Softwood scrub" species predominate with bunya pine *(Araucaria bidwillii)*, hoop pine *(A. cunninghamii)* and *Flindersia* spp. frequently occurring. Associated species of Queensland stringybark *(E. phaeotricha)*, small-fruited grey gum, narrow-leaved ironbark and Queensland blue gum occur in varying amounts.

Closed scrubs. This community occurs throughout the region associated with almost all geological formations. It frequently merges with many of the eucalypt communities. Closed scrubs have been recorded in the following mapping units: Czl; Cz3; Ltl-7; Tml-2; Tm4; Tvl-3; Jml; Rul; Rsl; Rnl; Rn5-6; Rg2; Pk2; Ptl; Pt3; Pul; Pu3; Cbl; Pz2; Pz4; Pz6.

Although individual species have not been identified the following are commonly recorded: crow's ash *(Flindersia australis)*, yellowwood *(Flindersia xanthoxyla)*, Queensland cascarilla bark *(Crotin insularis)*, red ash, cumby cumby *(Pittosporum phylliraeoides)* and native olive *(Notelaea microcarpa)*.

Associated species which may occur include narrow-leaved ironbark, Yarraman ironbark, gum-topped box, hoop pine and bottle tree *(Brachychiton rupestre)*.

Lantana *(Lantana camara)* and wattles may occur as understorey species and often predominate following clearing.

2.5.3 Brigalow and associated communities

Although only accounting for an estimated 6% of the area these communities occupy soils which are suitable for cropping. They are extensively cleared and cropped and contribute significantly to the agricultural output of the area.

Brigalow open forest. This community occurs associated with mapping units Jml; Pul; Qpl-2; Rnl and Pzl. Brigalow is the dominant tree species although wilga *(Geijera parviflora)* is commonly associated together with belah, black tea-tree *(Melaleuca bracteata)*, ironwood and gum-topped box.

Brigalow, belah open forest. Mapping units similar to those of the brigalow open forest comprise this community which tends to be associated with those areas free of severe gilgai development. Small areas of pure stands of belah occur throughout these areas.

Associated species include wilga, black tea-tree, gum-topped box, narrow-leaved ironbark, Queensland blue gum, bottle tree and "softwood scrub" species.

Black tea-tree low open forest to open scrub. This community commonly occurs on low sloping positions and often poorly drained areas of similar mapping units to the brigalow open forests. It merges into the brigalow and brigalow, belah communities and often occurs with gum-topped box emergents.

Black tea-tree frequently occurs more prolifically after clearing or disturbance of original stands of this community.

2.5.4 Miscellaneous communities

Miscellaneous communities occur scattered throughout the area and account for an estimated 4% of the area. The more obvious and frequently occurring communities include the following.

Fringing forests. These communities vary structurally from low open, to open to low closed forests. They are common along major water courses throughout the area. Characteristic species include weeping bottle brush *(Callistemon viminalis)* and river she-oak *(Casuarina cunninghamiana)* with associated broad-leaved apple and Queensland blue gum. Small areas of black tea-tree also occur. Dominance of any one species varies with the permanency of the water in the creek.

Grass tree tall open shrublands. Although grass trees occur as understorey species in several of the eucalypt communities it is recorded as pure stands on sandy soils in mapping units Pb2-3; and on some rocky steep areas of Tm3.

Quinine bush tall shrublands. This tree commonly occurs as an understorey species in many of the eucalypt communities. Pure stands occur on deep sands and shallow rocky soils of mapping units Pb2-3; Pul-2 and Cz3.

Paper-barked tea tree low open woodlands. Small communities of paper-barked tea-tree occur in mapping units Jm2; Jel-2 and Rml. Paper-barked tea-tree frequently occurs as an understorey species of several of the eucalypt communities.

Cypress pine low open forests. Small communities of both black and white cypress pine were recorded in mapping units Jm2; Rm2; Pu2; Pz3. In many cases cypress pine occurs as an understorey species of several of the eucalypt communities.

Thready bark she-oak tall shrublands. Thready bark she-oak *(Casuarina inophloia)* occurs as pure stands in mapping unit Jm2. Frequently it grades into the surrounding eucalypt communities and occurs as an understorey species.

2.6 Soils

2.6.1 Introduction

Broad scale mapping of this area was undertaken by Isbell *et al.* (1967) for the *Atlas of Australian Soils* at a scale of 1:2 000 000. More recently, soils have been described for the Byee, Windera and Redgate areas by Wills (1973), Reid *et al.* (1979) and McKeown (unpubl.). A small portion in the west and north west has been described by Isbell (1962) and Isbell and Hubble (1967). Soils formed on the Neara Volcanics to the south east have been described by Murtha (1977). Selected sites have been examined by other workers although very few of these data have been published.

Descriptions of the 339 sites described in detail during this study are presented on microfiche. Analytical data for the 73 representative profiles and 142 bulk surface samples collected are also presented on microfiche.

2.6.2 Soil classification

Soils have been described according to the principal profile forms of Northcote (1979) and the Great Soil Groups of Stace *et al.* (1968). Within each Great Soil Group, soil families have been recognised on the basis of profile depth, texture of the surface horizon, soil reaction trend and colour of the B horizon. Microrelief was also used where its presence influenced the potential use of a soil group.

2.6.3 Relationship between soils and geology

Parent material is the major factor determining the character and distribution of soils. Distribution of soils is related to the lithology and weathering status of the parent rocks and materials and the geomorphic history of the landscape.

A range of soils is formed on alluvial parent materials. Dark cracking clays (black earths and alluvial soils) dominate the recent alluvia of rivers and streams while brown and yellowish brown gradational soils (xanthozems and red brown earths) dominate the older alluvia. The alluvial clay plains

exhibit grey and brown cracking clays (grey and brown clays) with moderate to severe gilgai microrelief while the sandy alluvials exhibit a range of soils including euchrozems, xanthozems and siliceous sands as well as texture contrast soils with yellow clay subsoils (yellow podzolics and soloths).

Granite wash, where lateritised, is dominated by gradational red brown clay loams and clays (krasnozems) while the remaining areas exhibit texture contrast soils with yellowish brown clay subsoils (soloths, solodics).

The lateritised Main Range Volcanics and Tertiary volcanics are dominated by gradational and uniform textured red clay loams and clays (krasnozems, euchrozems and minor xanthozems) while the lateritised Tertiary clays and sediments exhibit yellow gradational soils (xanthozems with areas of krasnozems and solodics).

The non-lateritised Main Range Volcanics and Tertiary volcanics are dominated by shallow to moderately deep, dark, cracking clays (black earths with areas of lithosols and lithosol - prairie intergrades).

Texture contrast soils are a feature of the remaining geological units of the area. The sandstones, siltstones and conglomerates of the Tertiary sediments, Oakdale Sandstone, Marburg Formation, Evergreen Formation and Tarong Beds exhibit texture contrast soils with brown or yellowish brown clay subsoils (soloths, solodics and solodized solonetz). Frequent areas of shallow stony lithosols and minor areas of siliceous sands also occur. Krasnozems and euchrozems occur where these formations have been lateritised and brown clays develop on finer textured parent materials.

The andesites, volcanic conglomerate and sandstones of the Aranbanga Beds, Esk Formation and Neara Volcanics characteristically exhibit texture contrast soils with brown, yellowish brown and reddish brown clay subsoils (soloths, solodics and red, yellow and grey brown podzolics). Smaller areas of grey and brown cracking clays (black earths and brown clays) also occur.

Texture contrast soils with yellow clay subsoils (soloths, solodics and solodized solonetz) are characteristic of the soils formed on granites, granodiorites and tonalite of the Boondooma Igneous Complex, undifferentiated Triassic intrusions, Kingaham Creek Granodiorite, Taromeo Tonalite, Station Creek Adamellite and Wigton Adamellite. Lithosols frequently occur on steep slopes and ridges. Red, yellow and brown podzolics and minor krasnozems and red earths also occur where the parent material has been lateritised.

The siltstones and mudstones of the Biggenden Beds exhibit texture contrast soils with brown and bright yellowish brown clay subsoils (soloths and yellow and red podzolics).

Soils formed on the quartzite, shale, siltstone and greywacke of the Maronghi Creek Beds and undifferentiated metamorphics are also characterised by texture contrast soils with brown and yellowish brown clay subsoils (solodics, solodized solonetz and some soloths). Significant areas of stony lithosols and small areas of brown and grey clays also occur. Small areas of prairie soils and dark clays on serpentinite are also associated with this geological unit.

2.6.4 Soil groupings

The soils recognised have been placed into fifteen Great Soil Groups or nearest equivalent group. Each group has an alphabetical symbol to represent the Great Soil Group e.g. black earths (B). Within each group, soil families have been recognised and these have designated a number for ease of description. Table 2.5 lists the appropriate or nearest equivalent Great Soil Group, the soil family and summary description, principal profile forms and land units in which the soil family dominates.

Alluvial soils. Soils in this group occur on recent alluvial deposits and show a minimum of profile development. They occur near present stream channels. Only one soil family was recognised although small areas of alluvial soils grading into black earths probably exist adjacent to major streams.

Fertility levels are moderate to high and the soils are frequently cultivated and cropped. Undisturbed areas need to be retained adjacent to creek lines to maintain bank stability. A minimum width of 10 m on either side is recommended for small streams while widths of 20-30 m on either side are recommended for larger creeks.

Black earths. These soils have uniform textured profiles, and are dark cracking clays varying in depth, colour and soil reaction trend. Usually these soils are located on mid and lower slope positions and alluvial areas.

Recognition of the two soil families was based mainly on profile depth and soil reaction trend.

Soils in this group are moderately to highly fertile and have a high available soil water storage capacity. As a result many areas have been cleared and cultivated for cropping. Suitability for cultivation and cropping is determined by land slope, soil depth and stoniness.

Moderate to severe erosion can occur on these soils, particularly where cultivated on sloping land and unprotected by soil conservation measures.

Lithosols. These soils are shallow, frequently gravelly or stony, sands, loams and clay loams overlying weathered parent material. They are located on upper slope positions and ridge crests fequently in association with rock outcrops.

Two soil families were recognised based mainly on texture and soil reaction trend.

Soils in this group are characterised by low to very low fertility levels and available soil water storage capacities. Many areas have been cleared or partially cleared for grazing of native pastures although this is not a recommended practice.

Erosion can be a serious problem with these soils because of their shallow nature and steep slopes.

Grey, brown and red clays. Soils in this group have uniform textured profiles and are cracking clays varying in colour and depth. They are usually located on lower slopes and plains.

Five soil families have been recognised, one in the red clays and two in each of the grey and brown clays. Soil families were determined mainly by colour, depth and degree of gilgai development.

These soils are moderately fertile and have a moderate to high available soil water storage capacity. As a result, wherever gilgai development is not a major limitation, these soils have been cleared and cultivated for crops. Areas where gilgai development or slope gradients are excessive are usually cleared and support native or introduced pastures and are used for grazing.

Moderate erosion occurs on these soils particularly where they are cultivated on slopes and unprotected by soil conservation measures.

Red-brown earths. These soils have texture contrast profiles with brown, yellowish brown or reddish brown clay subsoils. Soil reaction trend is neutral to alkaline with soft and nodular calcium carbonate often occurring at depth.

These soils occupy only a small proportion of the area and only one soil family has been recognised.

A moderate soil fertility level enables these soils to be cultivated and cropped although grazing of introduced pastures is a common use.

Erosion may become a problem where these soils are cultivated on sloping land if unprotected by soil conservation measures.

Siliceous sands and earthy sands. These soils have uniform, coarse textured profiles, varying in colour and depth. They are located on low slope gradients usually on mid and lower slope positions.

Only a very small area of these soils occurs. Two soils families were recorded, one a siliceous sand and one an earthy sand. Depth, texture and colour determine the soil family.

Soil fertility levels and available soil water storage capacities are low to very low. Despite this, many areas are cleared or timber treated to encourage native pasture growth. Small areas have been cultivated and cropped and in some cases introduced pasture species established for grazing.

Podzolics. These soils have texture contrast profiles with brown, yellowish brown or reddish brown clay subsoils and an acid soil reaction trend. They are located on mid and lower slope positions.

Four soil families have been recognised based mainly on colour of the B horizon as well as profile depth and type.

Soils within this group are moderately fertile and have a moderate available soil water storage capacity. Most areas have been cleared or timber treated and are used for grazing of native pastures. Significant areas are cultivated for cropping and/or the establishment of introduced pastures.

Earths. These soils have uniform or gradational textured profiles usually with an acid to neutral soil reaction trend. They occur throughout the area, often on upper slopes or plateau areas.

Three soil families were recognised based mainly on colour, texture and profile depth.

The total area of these soils is not large. They are moderately fertile with a moderate available soil water storage capacity. Many areas are cleared or partially cleared and in some cases cultivated for cropping or establishing introduced pastures.

Erosion may present a problem where cultivation is practised on sloping areas unprotected by soil conservation measures.

Non-calcic brown soils. These soils have texture contrast profiles with brown, yellowish brown or reddish brown clay subsoils. They are usually located in mid and lower slope positions.

Two soil families were recognised based mainly on soil depth, surface characteristics and soil reaction trend.

Only small areas of these soils were recorded scattered throughout the area. The soils are moderately fertile with a moderate available soil water storage capacity. They are largely cleared or timber treated and used for grazing of native pastures. Minor areas are cultivated and cropped.

Prairie soils. These soils have texture contrast to uniform profiles with dark brown to yellowish brown clay subsoils. They are usually located on lower slope positions.

Only one soil family was recognised. The total area of this soil is very small. It is moderately fertile with a moderate available soil water storage capacity. Most areas have been cleared or timber treated and are used for grazing of native pastures.

Krasnozems. These soils are red, gradational textured with some uniform fine textured profiles with weak horizon differentiation, weak to moderate structure development and predominantly acid soil reaction trend. They are found in all slope positions on the undulating plateau and plateau remnants.

Three soil familes were recognised based mainly on profile depth and surface characteristics.

These soils, which occupy extensive areas of the main agricultural belt, have a moderate to high fertility level and a moderate available soil water storage capacity. Fertility levels tend to decline under continuous cropping. Most of these soils have been cleared and extensively cultivated and cropped.

Erosion is a problem with cultivation on sloping areas although soil conservation measures and conservation cropping techniques give satisfactory control.

Euchrozems. These soils are essentially red, gradational and uniform fine textured profiles with weak horizon differentiation, moderate structure development and neutral to acid soil reaction trend. They are found in all slope positions but are more frequent on mid and upper slope positions.

Two soil families were recognised based mainly on texture and colour.

Soils within this group have a moderate to high fertility level which tends to decline under cropping. They have a moderate available soil water storage capacity and are extensively cleared and cultivated for cropping. Erosion is a problem with cultivation on sloping areas although this can be controlled satisfactorily.

Xanthozems. These soils are yellow, gradational textured profiles with moderate horizon differentiation, strong structure and neutral soil reaction trend. They are usually found in lower slope positions.

Only one soil family was recognised.

Soils in this group have a moderate fertility level and available soil water storage capacity. They are extensively cleared and cultivated for cropping. Erosion occurs with cultivation on steep slopes unprotected by soil conservation measures.

Soloths. These soils have texture contrast profiles with brown, dark reddish brown and yellowish brown clay subsoils and an acid soil reaction trend. They occupy a significant proportion of the area and are found on almost all slope positions but more commonly on mid and lower slopes.

Four soil families were recorded based mainly on profile depth, colour of the subsoil and surface characteristics including texture, structure and depth.

Soils in this group have a low or occasionally moderate fertility level and a low available soil water storage capacity. They have been extensively cleared or timber treated and are used for the production of native pastures for grazing. Limited areas have been cultivated for cropping or introduced pastures. Those areas with red or dark clay subsoils are more likely to be cultivated.

Gully erosion is common in this group particularly where overgrazing and excessive clearing of steep slopes has occurred.

Solodized solonetz and solodic soils. These soils have texture contrast profiles with brown, yellowish brown or reddish brown clay subsoils and an alkaline soil reaction trend. They occupy an extensive area and are found in almost all slope positions but more commonly on mid and lower slope positions.

Three soil families were recognised based mainly on profile depth, colour of the subsoil and surface characteristics including texture, structure and depth.

TABLE 2.5 GREAT SOIL GROUP OR EQUIVALENT, SOIL FAMILY, SUMMARY DESCRIPTION, PRINCIPAL PROFILE FORMS AND LAND UNITS IN WHICH SOIL FAMILY DOMINATES

GREAT SOIL GROUP OR EQUIVALENT GROUP	FAMILY	SUMMARY SOIL DESCRIPTION	PRINCIPAL PROFILE FORMS	LAND UNITS IN WHICH SOIL FAMILY DOMINATES
Alluvial Soils (A)	A1	Moderately deep to deep soils. Brownish black to greyish yellow brown sand, loamy sands to sandy clay loams grading into bright brown sands and sandy clays. Neutral soil reaction trend.	Um 5.42, Uc 1.21	104
Black Earths (B)	B1	Shallow to moderately deep soils. Brownish black, self-mulching, cracking clays becoming browner with depth. Neutral soil reaction trend.	Ug 5.12, 5.13	1, 3, 7, 8, 9, 10, 13, 15, 16, 19, 74, 75, 77, 78, 79, 145, 146, 216, 223
	B2	Deep soils. Brownish black, self mulching, cracking clays becoming brown or greyish brown with depth. Occasional areas linear gilgai. Alkaline to neutral soil reaction trend.	Ug 5.15, 5.16	2, 4, 21, 22, 210, 215, 221, 222, 224, 228, 234, 273
Lithosols (L)	L1	Very shallow to shallow soils. Frequent rock outcrops and surface stone. Brownish black to very dark brown to reddish brown loams, clay loams and light clays over decomposing rock. Neutral to acid soil reaction trend.	Um 1.13, 1.23, 1.44, 6.12, 6.21	5, 12, 14, 17, 20, 44, 46, 80, 154, 159, 160, 181, 188, 189, 192, 198, 231, 271, 272
	L2	Very shallow to shallow soils. Frequent rock outcrops and surface stone. Brownish black to dark brown loamy sand to sandy loam over decomposing rock. Acid to neutral soil reaction trend.	Uc 1.21, 1.22, 1.23	66, 73, 95, 98, 103, 105, 106, 123, 130, 136, 142, 172, 174, 177, 247, 257
Grey Brown and Red Clays (C) Red Clays	C1	Moderately deep to deep soils. Brownish black to very dark reddish brown light to medium clays grading into dark reddish brown to orange clays. Some lateritic rock and gravel occurs. Neutral soil reaction trend.	Ug 5.32, 5.37, Uf 6.12	6, 11
Grey Clays	C2	Moderately deep to deep soils. Various amounts of rock. Brownish black to dark brown medium clays grading into greyish yellow brown to grey medium to heavy clays. Calcium carbonate occurs at depth. Occasional minor gilgai. Alkaline soil reaction trend. Acid subsoils may occur.	Ug 5.15, 5.23, 5.24	148, 196
	C3	Deep soils. Brownish grey to dark brown medium clays grading into yellowish brown to yellowish grey heavy clays. Moderate to large gilgai. Black clay surface in depression. Calcium carbonate occurs at surface in puff and at depth in depression. Alkaline soil reaction trend. Acid subsoils also frequently occur.	Ug 5.24, 5.31, 5.35	167, 169
Brown Clays	C4	Moderately deep to deep soils. Dark brown to brownish black, self mulching clays becoming brown or olive brown with depth. Minor gilgai development. Calcium carbonate frequently occurs at depth. Alkaline soil reaction trend.	Ug 5.15, 5.32, 5.34	24, 91, 147, 232
	C5	Deep soils. Dark brown to brownish black medium to heavy clays overlying brown or dull yellowish brown medium to heavy clays. Moderate gilgai frequently occur. Calcium carbonate occurs at depth. Alkaline soil reaction trend.	Ug 5.32, 5.34, 5.35	161, 162, 166, 168
Red Brown Earth (R)	R1	Moderately deep to deep texture contrast soils. Very dark brown to dark brown fine sandy clay loams to clay loams, occasional bleached A_2, overlying brown, yellowish brown or reddish brown medium to heavy clays. Calcium carbonate may occur at depth. Neutral to alkaline soil reaction trend.	Db 1.12, 1.13, 1.43, 2.23, 2.43, 3.13, 3.23, Dr 4.22	29, 59, 72, 89, 92, 163, 164, 182
Siliceous Sand and Earthy Sands (S)	S1	Shallow to moderately deep soils. Brown or brownish grey loamy sands to sands grading into brown to dull yellowish brown loamy and gravelly sands. Acid soil reaction trend.	Uc 1.21, 1.23	34, 111
	S2	Deep soils. Reddish brown to dark brown loamy fine sand grading into bright reddish brown or bright yellowish brown loamy fine sands becoming sandy loams at depth. Acid soil reaction trend.	Uc 1.22	96

TABLE 2.5 CONTINUED

GREAT SOIL GROUP OR EQUIVALENT GROUP	FAMILY	SUMMARY SOIL DESCRIPTION	PRINCIPAL PROFILE FORMS	LAND UNITS IN WHICH SOIL FAMILY DOMINATES
Podzolics (P) Grey Brown Podzolics	P1	Moderately deep to deep texture contrast soils. Brownish black to dark brown loamy sands to clay loams, bleached A_2, overlying brown to yellowish brown medium to heavy clays. Acid to neutral soil reaction trend.	Db 1.22, 1.32, 2.31, Dy 3.21	109, 128, 212
Yellow Podzolics	P2	Moderately deep to deep texture contrast soils. Brownish black to very dark brown sandy loam to clay loam, bleached A_2, overlying brown to yellowish brown medium to heavy clays. Acid to occasional neutral soil reaction trend.	Dy 3.22, 3.41, 4.21, 5.21, 5.31, 5.41, 5.22	118, 126, 139, 197, 199, 201, 202, 204, 260, 263, 269
Red Podzolics	P3	Shallow to moderately deep texture contrast soils. Brownish black to very dark reddish brown sandy loam to loam, bleached A_2, overlying reddish brown, dark reddish brown or brown medium to heavy clays. Acid to neutral soil reaction trend.	Dr 2.22, 2.41, 2.42, 3.21, 3.31, 4.22, 4.42	120, 127, 186
Lithosol-Podzolic Intergrade	P4	Shallow to moderately deep soils, some texture contrast. Brownish black, dark brown to yellowish brown fine sandy loams to clay loams over rock or overlying brown, dark reddish brown to yellowish brown medium to heavy clays. Acid soil reaction trend.	Uc 1.21, 2.21, 1.23, Db 3.21, Dy 4.12, 4.21, 5.31, Dr 4.11	90, 100, 107, 240, 251, 270
Earths (E) Yellow Earth	E1	Moderately deep to deep soils. Brownish black to dark brown loam-fine sandy to fine sandy clay loam, occasional sporadic bleached A_2, grading into brown and yellowish brown light to medium clays. Acid to neutral soil reaction trend.	Um 1.22, Gn 2.25, Db 3.23	113, 170
Red Earth	E2	Moderately deep to deep soils. Occasional shallow areas and rock outcrops. Very dark reddish brown to dark reddish brown fine sandy loams to sandy clay loams grading into brown or dark reddish brown light to medium clays. Acid soil reaction trend.	Gn 2.11, 2.12, 3.11, Um 5.22, 1.22	69, 88, 114, 116, 133, 185
	E3	Moderately deep to deep soils. Dark reddish brown clay loams, usually snuffy, grading into dark reddish brown to dark red light to medium clays. Acid soil reaction trend.	Gn 2.11, 2.12	62
Non-Calcic Brown Soils (N)	N1	Moderately deep to deep texture contrast soils. Brownish black to dark brown sandy loam to fine sandy clay loam, occasional bleached A_2, overlying reddish brown to yellowish brown medium to heavy clays. Acid to neutral soil reaction trend.	Db 1.12, 2.11, 2.12, 2.13, 2.31, 2.41	39, 117, 119, 226, 227
	N2	Shallow to moderately deep texture contrast soils. Brownish black to dark brown sandy loam to clay loam overlying brown to yellowish brown medium to heavy clays. Acid soil reaction trend.	Db 3.12, 3.31, 4.31, Dy 4.21	141, 264
Prairie Soils (F)	F1	Shallow to moderately deep texture contrast soils. Brownish black loam to clay loam overlying very dark brown, dark brown or yellowish brown medium to heavy clays. Neutral soil reaction trend.	Db 1.12, 1.13, 3.12, Dy 5.12	200, 241
Krasnozems (K)	K1	Moderately deep to deep soils. Dark reddish brown to very dark reddish brown loams to clay loams grading into reddish brown, dark reddish brown to dark red clays. Some lateritic gravel may occur. Acid soil reaction trend.	Gn 2.11, 3.11, 3.12, Uf 6.12, 6.31	37, 41, 42, 43, 45, 51, 53, 81
	K2	Deep soils. Dark reddish brown clay loams, occasionally gritty, grading into dark reddish brown or dark red, light to medium clays. Ferruginous concretions throughout. Acid soil reaction trend.	Gn 3.11, 3.12	63, 64, 65, 158
	K3	Moderately deep to deep soils. Dark reddish brown to very dark reddish brown loams to clay loams, usually snuffy, grading into dark reddish brown and reddish brown clay loams and clays. Acid soil reaction trend.	Gn 2.11, 2.12, 3.11, Um 1.23, 5.22	40, 47, 48, 49, 50, 61

TABLE 2.5 CONTINUED

GREAT SOIL GROUP OR EQUIVALENT GROUP	FAMILY	SUMMARY SOIL DESCRIPTION	PRINCIPAL PROFILE FORMS	LAND UNITS IN WHICH SOIL FAMILY DOMINATES
Euchrozems (U)	U1	Moderately deep to deep soils. Dark red to very dark reddish brown loams, clay loams to light clays grading into dark red to reddish brown light to medium clays. Neutral to acid soil reaction trend.	Gn 3.11, 3.12, 2.12, 3.22, Uf 6.12, 6.13, 6.31	18, 35, 36, 38, 52, 54, 55, 233
	U2	Moderately deep to deep soils. Brownish black to very dark reddish brown sandy loams to fine sandy clay loams grading into brown, dark reddish brown or reddish brown clays. Neutral to acid soil reaction trend.	Gn 3.12, 2.12, 3.21, Uf 6.31	33, 58, 165, 176
Xanthozems (X)	X1	Moderately deep to deep soils. Very dark reddish brown to dark brown loams and fine sandy clay loams, often gravelly, overlying brown, yellowish brown or reddish brown medium to heavy clays. Neutral soil reaction trend.	Gn 2.65, 3.21, 3.72, Uf 6.12, 6.31, 6.34	26, 27, 30, 31, 56, 57
Soloths (T)	T1	Moderately deep to deep texture contrast soils. Brownish black to dark brown loam to fine sandy clay loam, bleached A_2, overlying brown, dark reddish brown to yellowish brown medium to heavy clays. Acid soil reaction trend.	Db 1.32, 1.41, 1.42, 2.31, 2.41, 3.31	175, 217, 218, 225, 249, 250, 252, 253, 255, 262, 265, 266, 267, 268
	T2	Shallow to moderately deep texture contrast soils. Brownish black, dark brown to greyish brown gravelly sandy loams to clay loams, bleached A_2, overlying dark reddish brown to yellowish brown medium to heavy clays. Acid soil reaction trend.	Dr 3.31, 3.41, 3.42	115, 152, 157
	T3	Moderately deep to deep texture contrast soils. Brownish black, dark brown to greyish brown sandy loam to fine sandy clay loam, bleached A_2, overlying yellowish brown, dull yellow orange or reddish brown medium to heavy clays, often gritty. Acid soil reaction trend.	Dy 2.41, 2.42, 3.21, 3.41, 3.42	67, 68, 70, 71, 84, 108, 112, 125, 150, 178, 180, 195, 208, 209, 238, 239, 242, 254, 258, 259
	T4	Shallow to moderately deep texture contrast soils. Scattered rock outcrops. Brownish black to greyish brown loamy sands, sandy loams to sandy clay loams, bleached A_2, overlying yellowish brown to dark brown medium to heavy clays, often gritty. Acid soil reaction trend.	Dy 5.21, 5.31, 5.41	87, 110, 124, 131, 132, 203, 205, 261
Solodized Solonetz and Solodic Soils (D)	D1	Shallow to moderately deep texture contrast soils. Frequent rock outcrops. Brownish black to dark brown loamy sand to sandy clay loam, bleached A_2, overlying greyish yellow brown, bright brown and reddish brown medium to heavy clays. Alkaline to neutral soil reaction trend.	Dy 4.43, 5.32, 5.42, Db 3.42, Dd 3.43	86, 102, 121, 134, 140, 214
	D2	Moderately deep to deep texture contrast soils. Some shallow or rocky areas occur. Dark brown, dull yellowish brown to brownish black sandy loams to clay loams, bleached A_2, overlying brown to yellowish brown medium to heavy clays. Occasional calcium carbonate concretions. Alkaline to neutral soil reaction trend.	Db 1.32, 1.33, 1.42, 1.43, 2.33, 2.42, 2.43	23, 83, 85, 137, 149, 151, 155, 156, 179, 190, 191, 193, 194, 206, 207, 211, 213, 219, 220, 229, 230, 235, 236, 237, 256
	D3	Moderately deep to deep texture contrast soils. Some shallow or rocky areas occur. Brownish black, dull yellowish brown to greyish brown loamy sands, sandy loams to clay loams, bleached A_2, overlying brown, yellowish brown or reddish brown medium to heavy clays. Alkaline to neutral soil reaction trend.	Dy 2.23, 2.43, 3.32, 3.33, 3.42, 3.43, Dr 2.32	25, 28, 32, 60, 76, 82, 93, 94, 97, 99, 101, 122, 129, 135, 138, 143, 144, 153, 171, 173, 183, 184, 187, 243, 244, 245, 246, 248

Soils in this group have a low and in some cases moderate fertility level and a low available soil water storage capacity. They are extensively cleared and/or timber treated and are used for grazing of native pastures. Small areas are cultivated and used for cropping or establishing introduced pastures. Soils cultivated are usually those with deep surface horizons and/or red or dark subsoils and occurring in low sloping situations.

Gully erosion may be severe in this soil group and commonly occurs where overgrazing and excessive clearing have taken place on sloping areas.

2.6.5 Soil chemical and physical properties

Soil chemical properties. Analytical data for the soil profiles representing the major land units of the mapping units together with the detailed profile descriptions are presented on microfiche. The criteria used for rating the nutrient status are listed in Appendix VI.

The analytical ratings for soils collected from a range of parent materials within each Great Soil Group are presented in table 2.6. Ratings for many of the groups were determined from a limited number of sites so results should be interpreted with caution.

All samples for analysis were collected from undisturbed or relatively undisturbed sites.

Ratings in table 2.6 indicate that black earths formed on all parent materials are very fertile and have a high available soil water capacity. These soils which occur in the Tm and Rn mapping units are used extensively for cropping.

Soils of the grey, brown and red clay Great Soil Group are very fertile and have a high available soil water capacity. Phosphorus may be deficient in some cases, particularly under cropping. These soils which occur in the Qp and to a lesser extent in the Jm, Tm, Pu and Rn mapping units are also cropped extensively.

Soils classed as red earths, red brown earths, krasnozems, euchrozems and non-calcic brown soils are moderately fertile but often low in phosphorus. Available soil water capacity is moderate. They form the dominant soils in the Lt mapping units as well as significant areas in the Qp, Qs, Je, Jm and Rn mapping units. They are extensively cropped, however fertilizer applications are necessary with continuous cropping. Soils within the high fertility group will also respond to fertilizer applications where continuous cropping is carried out.

All other soil groups are classed as low to moderately fertile and are predominantly used for grazing of native pastures. Responses could be expected with the application of fertilizers. However under present conditions the economics of such practices are doubtful.

None of the soil profiles analysed can be classed as saline although some of the soils on the Marburg Formation, the Evergreen Formation and the Tarong Beds almost qualified as having saline subsoils.

TABLE 2.6 SITES ANALYSED AND ANALYTICAL RATINGS FOR VARYING PARENT MATERIALS FOR EACH GREAT SOIL GROUP

Great Soil Group	Parent Material	Profiles Analysed (Site No.)	Bulk Surface Analysed (Site No.)	Analytical Ratings					
				Nitrogen	Phosphorus	Potassium	Soil Sodicity	Soil Salinity	Available Soil Moisture
Alluvial Soils	Tarong Beds.	19		Fair	Very high	High	Non-sodic	Non-saline	Low - medium
	Evergreen Formation.		185		Very low	High			
Black Earths	Main Range Volcanics.	3, 4, 6, 8, 9, 90, 275	2, 7, 10, 51, 58, 64	Very fair	High - very high	High	Non-sodic	Non-saline	Very high
	Neara Volcanics.	116, 279	259, 280, 282, 283, 323	Very fair - high	High - very high	High	Sodic	Non-saline	Very high
	Quaternary alluvia (recent).	14, 333	15, 93	Very fair	High - very high	High	Sodic	Non-saline	Very high
	Wigton Adamellite.	288		Very high	Very high	High	Non-sodic	Non-saline	Very high
	Tertiary volcanics.	117, 332	329	High	Very high	High	Non-sodic	Non-saline	High - very high
Lithosols	Esk Formation.	44		Fair	Very fair	High	Non-sodic	Non-saline	Medium - high
	Maronghi Creek Beds*.	72	43, 62, 71	Low	Very low - fair	Very fair - high	Non-sodic	Non-saline	Low
	Tarong Beds.		17		Very low	Very low			
	Main Range Volcanics.		49		Very high	High			
Siliceous Sands	Boondooma Igneous Complex.	12	25, 47, 132, 156, 157	Very low	Low - very low	Low - fair	Non-sodic	Non-saline	Low - very low
	Tarong Beds.	20		Very low	Very low	Low	Non-sodic	Non-saline	Very low
	Quaternary alluvia (sandy).		140		Very low	Fair			
Grey, Brown and Red Clays	Quaternary alluvia (sandy).	79		Very fair	Fair	High	Strongly sodic	Non-saline	High - very high
	Main Range Volcanics.	91		High	Fair	High	Strongly sodic	Non-saline	Very high
	Marburg Formation.	69		Very high	Fair	High	Sodic	Non-saline	Very high
	Wigton Adamellite.	289		High	High	High	Strongly sodic	Non-saline	Very high
	Quaternary alluvia (clay).	80, 81, 193, 194	137	Very fair - high	Low - fair	High	Strongly sodic	Non-saline	Very high
	Neara Volcanics.		326	Fair	Low	High			
Red Brown Earths	Quaternary alluvia (old).	183	94, 102	Fair	Very low	Fair - very fair	Strongly sodic	Non-saline	High
	Neara Volcanics.	180, 232		High	Very fair - high	High	Sodic	Non-saline	Medium - high
	Tertiary sediments.		174		Very low	Very low			
	Marburg Formation.	67	66	Fair	Low	High	Sodic	Non-saline	High
	Quaternary alluvia (clay).		171		Low	Very fair			
Podzolics	Neara Volcanics.		121, 257		Fair - high	High			
	Oakdale Sandstone.	126		Low	Very low	Fair	Strongly sodic	Non-saline	Low - medium
	Boondooma Igneous Complex.	13, 129	23, 48, 114, 130	Low	Very low - fair	Very low - fair	Sodic	Non-saline	Medium
	Taromeo Tonalite.	33	31, 34	Fair	Very low	High	Non-sodic	Non-saline	Medium
	Wigton Adamellite.		217		Very low	Low			
	Maronghi Creek Beds.		134		Very low	Low			
Lithosol - Podzolic Intergrade	Marburg Formation.	70		High	Fair - low	High	Non-sodic	Non-saline	Medium - high
	Boondooma Igneous Complex.		16	Low	Fair - low	Very low			
	Maronghi Creek Beds.	73		Low	Low	Very fair	Strongly sodic	Non-saline	Low - medium
Yellow Earth	Boondooma Igneous Complex.		149		Very low	High			
	Quaternary alluvia (clay).		195		Very low	High			
Red Earths	Main Range Volcanics.	269	40	High	Very low	High	Non-sodic	Non-saline	Low - medium
	Tertiary sediments.		97		Very low	Fair			
	Granite wash.	153	152	Fair	Very low	High	Non-sodic	Non-saline	Low - medium
	Boondooma Igneous Complex.	133	148	Fair	Very low	Very fair	Non-sodic	Non-saline	Medium
	Taromeo Tonalite.		36		Very low	Very fair			
	Quaternary alluvia (clay).		136, 192		Very low	High			

* Maronghi Creek Beds includes undifferentiated metamorphics

TABLE 2.6 CONTINUED.

Great Soil Group	Parent Material	Profiles Analysed (Site No.)	Bulk Surface Analysed (Site No.)	Analytical Ratings					
				Nitrogen	Phosphorus	Potassium	Soil Sodicity	Soil Salinity	Available Soil Moisture
Non-Calcic Brown Soils	Neara Volcanics.	164	178, 179	Very fair	Fair - high	High	Non-sodic	Non-saline	High
	Tertiary sediments.		173		Very low	Fair			
	Maronghi Creek Beds.	277		Very fair	High	High	Strongly sodic	Non-saline	Medium - high
	Boondooma Igneous Complex.		160		Very low	Very fair			
	Main Range Volcanics.		52		High	High			
Prairie Soils	Neara Volcanics.		226, 228		High - very high	High			
	Main Range Volcanics.		1		High - very high	High			
Krasnozems	Main Range Volcanics	28, 59, 88, 175, 250	41, 105, 197, 225	High	Very low - low	High	Non-sodic	Non-saline	Medium
	Tertiary volcanics	119	122, 123, 234	High	Low, some high	High	Non-sodic	Non-saline	Medium
	Granite wash.	189	190	Very fair	Fair	High	Non-sodic	Non-saline	Medium
	Evergreen Formation.		188		Very low	Very fair			
	Neara Volcanics.		285		High	High			
Euchrozems	Main Range Volcanics.	26, 84, 85	27, 29, 54, 87, 92, 108, 176, 191	Very fair - high	Low - very fair	High	Non-sodic	Non-saline	Medium
	Quaternary alluvia (sandy).	75		Fair	High	High	Non-sodic	Non-saline	Medium
	Quaternary alluvia (clay).		82		Fair	High			
	Taromeo Tonalite.		30		Very low	Very low			
Xanthozems	Quaternary alluvia (old).	100	101	Low	Very low	Low	Non-sodic	Non-saline	Low - medium
	Quaternary alluvia (sandy).		139		Very low	High			
	Main Range Volcanics.		86		Very low	High			
	Tertiary sediments.		109, 110		Very low	Fair			
	Maronghi Creek Beds.		89		Very low	Very fair			
Soloths	Esk Formation.		205, 206, 209		Low	Fair - very fair			
	Neara Volcanics.		166, 227		Fair - high	High			
	Carboniferous sediments.		187		Fair	High			
	Oakdale Sandstone.	125		Fair	Very low	Fair	Strongly sodic	Non-saline	Medium
	Granite wash.		151		Very low	Low			
	Evergreen Formation.		168, 184		Very low	Very fair			
	Aranbanga Beds.	321		Very fair	Low	High	Non-sodic	Non-saline	High
	Boondooma Igneous Complex.	147	150, 240	Fair	Very low - low	Fair - very fair			
	Wigton Adamellite.		221		Very low	Fair			
	Maronghi Creek Beds.		46		Very fair	High			
	Undifferentiated Triassic Intrusions.		262, 263, 265, 266		Low - very low	Fair			
	Kingaham Creek Granodiorite.		295		Very low	Fair			
	Biggenden Beds.		267		Fair - very fair	High			
Solodized Solonetz and Solodic Soils	Maronghi Creek Beds.	39, 63, 78	32, 42, 74, 154, 155	Low - fair	Very low - low	Very fair	Strongly sodic	Non-saline	Medium
	Wigton Adamellite.	221, 214	212, 246, 247, 248	Low	Very low	Low - very fair	Strongly sodic	Non-saline	Low - medium
	Quaternary alluvia (recent).	224		Very fair	High	High	Sodic	Non-saline	Medium - high
	Quaternary alluvia (old).		104		Very low	High			
	Carboniferous Beds.	238		Fair	Very low	Very fair	Strongly sodic	Non-saline	Medium
	Esk Formation.	45, 128	127, 196, 207, 208, 230	Very fair - fair	Low	High	Sodic - strongly sodic	Non-saline	Medium
	Oakdale Sandstone.	328		High	Very low	High	Strongly sodic	Non-saline	Medium
	Neara Volcanics.	290	163, 181	Very fair	High	High	Strongly sodic	Non-saline	Medium - high
	Tertiary volcanics.	330		Very fair	High	High	Sodic	Non-saline	High
	Main Range Volcanics.		95, 98		Low	High			
	Tertiary sediments.		99, 107		Very low	Low - very low			
	Evergreen Formation.		167		Very low	Very low			
	Marburg Formation.	68	60, 76	Very fair - high	Very low - low	Very fair - high	Strongly sodic	Non-saline	Low - medium
	Boondooma Igneous Complex.	159	135, 145, 201	Very low	Very low	Very low - fair	Strongly sodic	Non-saline	Low - medium
	Taromeo Tonalite.	35	37, 38	Very low	Very low	Low - fair	Sodic	Non-saline	Low - medium
	Aranbanga Beds.	243	273	Fair	Low	High	Strongly sodic	Non-saline	Medium
	Tarong Beds.		18, 21, 24		Low	Fair			

A large number of the Great Soil Groups were classed as sodic or strongly sodic indicating that there is a considerable amount of sodium in the exchange complex. Saline outbreaks have been recorded throughout the area and the distribution of these is shown on the land capability - land suitability map.

Soil physical properties. The soil physical properties considered to be important in the soils of this area are: bulk density, dispersible B horizons, hard setting and surface-sealing A horizons, soil cracking, gilgai, snuffy surface condition, soil acidity, alkali soil problems, and available soil water capacity.

Bulk density. High bulk densities which are frequently recorded in the B horizons of many of the texture contrast soils may restrict root and water penetration. Bulk densities of 1.5 to 1.6 g/cc reduce root penetration and 1.8 to 1.9 g/cc exclude root penetration (Veihmeyer and Hendrickson 1948; Zimmerman and Kardos 1961; Stace *et al.* 1968; Vandersee and Mullins 1977). When the bulk density of medium to fine textured subsoils exceeds 1.7 g/cc, hydraulic conductivity values will be so low that drainage difficulties can be anticipated (USDA 1954).

Although no bulk density measurements were made for the soils of this area, field observations indicated that roots did not penetrate the B horizons of many of the solodized solonetz, solodics and soloths. Structure and consistence of these soils recorded during profile descriptions indicated that bulk densities were high. High bulk densities can also occur at varying depths in many of the other soil groups.

Dispersible B horizons. Soils with high exchangeable sodium percentages and high electrical conductivity levels are usually dispersible. This was demonstrated by Vandersee while studying soils on the southern Darling Downs (Vandersee and Mullins 1977).

Texture contrast soils such as the solodized solonetz, solodics and soloths frequently exhibit dispersible B horizons. Within these groups, once the A horizon has been removed, either mechanically or by erosion, the dispersible B horizons erode at accelerated rates.

Analytical data obtained during this study indicate that these soil groups would disperse readily and this was confirmed by field observations.

Hard-setting and surface sealing A horizon. Surface sealing and hard-setting have been defined by Northcote (1979). Both features usually become more pronounced when the vegetation cover has been removed. Surface sealing may reduce the rate of water entry into the soil resulting in higher runoff. Continuous heavy grazing and indiscriminate use of fire will contribute to decreasing the surface cover to levels which allow these conditions to develop.

Soils groups in this area exhibiting these features include the solodized solonetz, solodics, soloths, podzolics, red-brown earths and the earths. Minor areas associated with degraded sites of other soil groups may also occur.

Soils with finer textured surfaces (loams and clay loams) tend to hard set and surface seal whereas those with coarser textured surfaces (loamy sands and sands) do not (Lutz 1952; Vandersee and Mullins 1977).

A naturally compact, hard setting surface soil or thin crust produced by cultivation may hinder seedling emergence. Quick drying of poorly structured soil to form a hard mass may also hamper root development. The poorer the soil condition, the more often and longer will the growth of the plant be affected. Frequently a correlation exists between poor structural condition of the soil and its nutrient status : soils which suffer from unfavourable consistence and structure tend to have unsatisfactory distribution of exchangeable cations and/or lower phosphate and nitrogen status (de Mooy *et al.* 1977). Analytical data obtained during this study support these findings.

Soil cracking. Soil cracking, while having beneficial effects in allowing greater water entry during early summer storms, can present problems with contour bank design.

Soils which crack extensively will require broad based or broad based top side banks to prevent cracks extending through the bank. Soil groups which are likely to crack extensively include black earths and grey, brown and red clays.

Gilgai. Both linear and nuram gilgai forms occur throughout the area.

Linear gilgais are frequently associated with black earths in lower slope situations and because of their magnitude usually are not a constraint to cultivation.

Nuram gilgais are associated mainly with the grey and brown clays and occasionally with the black earths. The magnitude of these gilgais varies greatly from 10 cm to almost 2 m but is frequently of the order of 0.7 m. The banks (puffs or mounds) and depressions vary greatly in spacing and shape but tend to be reasonably uniform over limited areas (Isbell 1962). The magnitude and extreme variation in distribution of these gilgais greatly restrict the potential land use. Soils which would be otherwise suitable for cultivation present major problems even for the establishment of suitable pastures for grazing.

Snuffy surface condition. Soils with A horizons having an extremely friable, snuffy or powdery consistence, low clay contents and low bulk densities occur within the krasnozems. These soils frequently have a very acid soil reaction trend and this together with their poor structural condition greatly restricts their potential use.

Wind erosion may become a problem in these soils when vegetation cover is continually removed by cultivation.

Soil acidity. Soil pH has a significant influence on the availability of plant nutrients and on the range of plants which will grow and produce satisfactorily.

Soils with an extremely low or acid pH occur within the krasnozems. Often this is associated with the snuffy surface condition.

As soil acidity increases the availability of plant nutrients decreases. High acidity levels are recorded where the normal agricultural crops of the area cannot be grown. Frequently these areas exist as small occurrences in otherwise normal areas. Large areas do occur and increasing the soil pH by one half to one unit will greatly benefit crop performance by increasing the availability of nutrients, both natural and applied.

Alkali soil problems. An alkali soil is defined as a soil that contains sufficient exchangeable sodium to interfere with the growth of most crop plants, either with or without appreciable quantities of soluble salts. Alkali soil conditions are considered to be important when a soil layer contains more than 15% of exchangeable sodium on the exchange complex (USDA 1954). Alkali soils are also usually characterised by a soil pH greater than 8.5. Australian soils with much lower contents of exchangeable sodium - down to about 6% of the cation exchange capacity - have been associated with the poorer than normal physical behaviour characteristic of solodic soils (Emerson 1967).

Soils with high levels of sodium on the cation exchange complex may have enhanced swelling and shrinking and thus a strong tendency for the clay particles to disperse. Its influence is further felt in an increased plasticity and stickiness of the clay when moist to wet and in poorer structural stability. Dominance of sodium and also magnesium on the exchange complex are thought to be largely responsible for the hardness of the dry soil (de Mooy *et al.* 1977).

Many of the texture contrast soils in this area, particularly the solodized solonetz and solodic soils, exhibit alkali soil conditions in their clayey B horizons. Similar conditions may also occur in other soil groups e.g. grey and brown clays. Soils classified as strongly sodic in table 2.6 have an exchangeable sodium percentage greater than 14 while those classified as sodic have values between 6% and 15% exchangeable sodium. Poor physical characteristics of these soils were also observed during field inspections.

Available soil water capacity. The available soil water capacity is defined as the difference between field capacity and permanent wilting point. Available soil water capacity was determined in the laboratory by calculating the difference between moisture held at 0.33 bar and 15 bar. These values are presented with the analytical data for selected profiles on microfiche.

As expected those soil groups with high clay contents exhibit high available soil water capacities. The black earths and grey, brown and red clays have a high available soil water capacity thus enabling cropping to be carried out successfully in normal seasons. The red brown earths, red earths, earths, krasnozems, xanthozems, euchrozems, alluvials and podzolics all exhibit moderate available soil water capacities while the majority of the solodized solonetz, solodics, soloths, siliceous sands, sands and lithosols have low available soil water capacities which greatly restrict their potential use.

Effective soil depth, or depth to which water will penetrate and therefore the depth to which plant roots can penetrate, has a significant effect on the total available soil water capacity of the soil. Effective soil depth is very important in the solodized solonetz, solodics and soloths where the clay B horizons are often impermeable to both plant roots and water penetration.

2.7 Land capability - land suitability

2.7.1 Introduction

A land capability classification has been completed for all land units recorded. The land capability classification for agricultural purposes of Rosser *et al.* (1974) was used. The classification groups land into eight classes and contains three distinct divisions based on the degree of limitation for agricultural purposes. The eight classes are allotted to the three divisions on the following basis:

Division A	Agricultural land	arable	Classes I - IV
Division B	Agricultural land	pastoral	Classes V - VII
Division C	Non-Agricultural land		Class VIII

To determine the land capability class, the fourteen limiting factors (Appendix IV) were assessed for each land unit. The land capability classes and subclasses indicate the degree and kind of limitation to agricultural use of the land units. The land capability class together with the subclasses are presented for each land unit in Appendix II.

2.7.2 Land capability - land suitability

Due to the complex nature of many of the land units described, a range of land capability classes for each land unit is common. To provide an overall view of land capability, those areas exhibiting a range of land capability have been allocated proportionally to the relevant classes.

The land classes, area of land within each class and percentage of the total study area are presented in table 2.7. In addition a land capability - land suitability map at a scale of 1:250 000 accompanies this report. The sixty-five mapping units have been grouped into ten major land use groups. For each major land use group, the predominant land capability class, the land use limitations and land capability subclass as well as production suitability and management needs are indicated.

Table 2.7 Area and percentage of total area of each land capability class

	LAND CAPABILITY CLASS							
	II	III	IV	V	VI	VII	VIII	Total
Area (ha)	94 100	192 600	257 400	900	380 000	131 700	7 300	1 064 000
% of total	8.9	18.0	24.2	0.1	35.7	12.4	0.7	100.0

It is obvious from the figures in table 2.7 that in excess of 70% of the area has been classed as primarily pastoral land (i.e. classes IV to VII). Approximately 27% is classed as land suitable for continuous agriculture (classes II and III). Class IV land has been classified as primarily pastoral land however it is suitable for occasional cropping. No land has been classed as class I as it was considered that those areas likely to fall in this class were affected by occasional overflow flooding or wetness sufficient to place them in class II.

Almost 36% of the land has been classed as class VI land and this together with class IV land occupies 60% of the area. This indicates the large area of predominantly pastoral land capable of being improved using machinery and improved pasture species.

Although only 900 ha, 0.1% of the area, have been classed as class V an additional 22 000 ha of mapping unit Qp2 which have been classed as class IV could be added to class V. This area has moderate to severe gilgai development greatly restricting the use of machinery. On the land capability - land suitability map this mapping unit has been classed as class IV-V because of the combination of wetness and gilgai development. Both these restrictions are removed if sufficient land levelling is carried out.

3. LAND USE

3.1 Present land use

3.1.1 Introduction

A wide variety of rural enterprises are carried out in this area. Approximately 11% of the area of rural holdings or 8% of the total study area is cultivated and cropped to cereal grains, peanut, bean and oil seed crops and horticultural crops. Cattle enterprises occupy almost all of the remaining area with the exception of State Forest, National Park, town and road reserves.

A current land use map, at a scale of 1:250 000, produced from aerial photo interpretation with limited updating by field checking accompanies this report.

The gross value of agricultural production in the five Shires (includes all of Kilkivan Shire) for the year 1977-78 was in excess of $47 million. Agricultural production includes crops, livestock disposals and livestock products.

The total area of each Shire, area of rural holdings, area of crops, area of sown pastures and area other uses for the year 1977-78 are shown in table 3.1.

Table 3.1 Total area, area rural holdings, area crops, area sown pasture and area other uses for each Shire for 1977-78

Shire	Total area ('000 ha)	Area rural holdings ('000 ha)	Area crops ('000 ha)	Area sown pasture ('000 ha)	Other ('000 ha)
Kilkivan	325	244	8.3	12.8	223.3
Kingaroy	242	201	39.1	15.2	146.5
Murgon	70	57	11.5	5.4	40.0
Nanango	174	122	9.8	6.8	105.6
Wondai	357	337	28.5	21.5	287.2

Source: Australian Bureau of Statistics, Queensland Office.

3.1.2 Agriculture

In all Shires with the exception of Kilkivan, gross value of production from crops exceeded that of livestock disposals or livestock products.

The major crops grown include peanuts, grain sorghum, navy beans, soybeans, maize and sunflowers in the summer months and wheat and barley in the winter months.

Table 3.2 Area planted to specific crops over a four year period for each Shire

Shire	Wheat				Barley				Peanuts				Navy beans			
	1975-76 (ha)	76-77 (ha)	77-78 (ha)	78-79 (ha)	1975-76 (ha)	76-77 (ha)	77-78 (ha)	78-79 (ha)	1975-76 (ha)	76-77 (ha)	77-78 (ha)	78-79 (ha)	1975-76 (ha)	76-77 (ha)	77-78 (ha)	78-79 (ha)
Kilkivan	427	659	415	491	2 197	2 404	1 939	2 329	-	-	-	-	267	48	-	-
Kingaroy	1 188	1 465	909	2 021	4 930	4 431	4 392	4 589	12 290	12 278	10 822	13 767	3 618	3 941	5 706	2 577
Murgon	515	589	857	1 127	2 597	2 374	2 533	2 963	1 263	1 416	1 440	2 098	203	210	238	15
Nanango	289	366	209	423	1 838	2 288	1 262	1 635	734	951	572	708	278	339	654	344
Wondai	2 396	2 293	2 020	2 600	3 814	3 089	3 141	3 652	4 810	5 277	5 315	6 704	593	475	531	161

Shire	Soybeans				Sorghum				Maize				Sunflowers			
	1975-76 (ha)	76-77 (ha)	77-78 (ha)	78-79 (ha)	1975-76 (ha)	76-77 (ha)	77-78 (ha)	78-79 (ha)	1975-76 (ha)	76-77 (ha)	77-78 (ha)	78-79 (ha)	1975-76 (ha)	76-77 (ha)	77-78 (ha)	78-79 (ha)
Kilkivan	1 175	1 236	1 247	1 380	2 362	1 647	2 919	2 924	53	63	46	53	499	299	179	243
Kingaroy	1 018	1 358	2 219	2 558	7 086	5 485	6 493	5 788	3 957	5 671	5 099	6 068	450	333	531	583
Murgon	409	1 225	1 660	1 536	1 907	1 763	2 425	2 409	160	146	383	553	917	996	892	1 153
Nanango	1 227	1 718	1 771	1 947	2 421	1 947	2 165	2 428	708	1 023	890	980	438	202	221	255
Wondai	1 749	2 105	2 623	1 904	6 925	7 145	7 956	7 355	1 872	2 380	2 897	3 786	819	642	1 416	782

Source: Australian Bureau of Statistics, Queensland Office

The relative areas of each of the major crops grown over a four year period are shown for each of the Shires in table 3.2. Annual fertilizer applications are required for successful cropping on all soils for continuous cropping. Phosphorus, nitrogen and potassium are the major nutrients required with the amount and type being determined by the crop to be grown and soil analysis data.

Conservation cropping is a new farming technique which is proving successful in the South Burnett (Bateman and Rowlings 1980). It is a system whereby tillage operations are reduced to a minimum and as much crop or residue cover is retained on the soil at all times. It aims to conserve soil moisture, reduce soil erosion risk and production costs while maintaining satisfactory crop performance and returns. Recent developments in machinery capable of operating in stubble conditions and increasing fuel costs have stimulated considerable farmer interest in this technique.

Irrigation is used on approximately 1 700 ha of agricultural crops to supplement natural rainfall particularly along the alluvial flats associated with the major creek lines. Approximately 1 200 ha of lucerne is grown with the aid of irrigation for both hay and forage along the alluvial flats.

3.1.3 Pastoral

Pastoral enterprises occupy approximately 74% of the total area. These are in the form of mixed dairying and cropping enterprises and beef producing enterprises.

Dairying. Although the number of dairy farms has declined over recent years it continues to be a viable industry. During 1979-80 a total of 238 farms in the South Burnett supplied to the Murgon factory or through the Kingaroy and Nanango receival depots. Whole milk production forms the basis for 164 of these suppliers while cream production accounted for seventy four suppliers. The number of cream suppliers is expected to continue to decline rapidly. The approximate location of most of the whole milk suppliers together with some of the cream suppliers is shown on the current land use map.

Many of the dairying enterprises are mixed cropping-dairying systems with the emphasis on the cropping side. Many of the farms are located along the alluvial creek flats where irrigation is frequently used to ensure an adequate feed supply to maintain production. Fodder crops are grown to maintain production. Oats is the main winter crop and forage sorghum the main summer crop while lucerne is frequently grown with or without the aid of irrigation.

Beef cattle. The beef industry contributed in excess of $16 million income through livestock disposals in the year 1978-79. Both breeding and fattening are carried out with at least one major lot feed enterprise currently operating near Murgon.

The approximate distribution of the beef industry can be seen by examining those areas designated as cleared or partially cleared on the current land use map.

Beef production is based primarily on native pastures. However improved pastures such as Rhodes grass *(Chloris gayana)*, green panic *(Panicum maximum* var. *trichoglume)*, kikuyu *(Pennisetum clandestinum)*, lucerne *(Medicago sativa)* and various annual medics *(Medicago* spp.*)* are used throughout the area (Rawson 1967; Wilson *et al.* 1974; Hodge 1979). Other grass species which have been successfully grown include buffel grass *(Cenchrus ciliaris)*, setaria *(Setaria anceps)* and ryegrass *(Lolium* spp.*)* while legumes include lotononis *(Lotononis bainesii)*, siratro *(Macroptilium atropurpureum)* and fine-stem stylo *(Stylosanthes guianensis* var. *intermedia)*.

The area designated as sown pastures and lucerne represents approximately 5% of the total area of rural holdings. Less than one quarter of this exists as well maintained pastures.

Grazing crops, particularly oats and forage sorghums, are also grown. These are used to supplement native pastures particularly during winter and for topping off cattle for market.

Regular cattle sales are held throughout the area with a good attendance of buyers. Abattoirs for the processing of cattle are located at Kingaroy and Murgon.

3.1.4 Forestry

State Forest and Timber Reserves are located throughout the area and amount to more than 80 000 ha (Wilson *et al.* 1974). The State Forests include planted forests of both native conifers and exotic conifers or true pines and native forests.

All of the planted forests are located in the south and east, at the base of the Bunya Mountains, along the Cooyar, Blackbutt and Brisbane Ranges, west of Goomeri and at Archookoora south of Kingaroy. Species planted include the native hoop pine and the exotic species of pine, patula pine *(Pinus patula)* and radiata or monterey pine *(P. radiata)*.

Timber mills are located at Kingaroy, Blackbutt, Benarkin, Taromeo, Murgon, Wondai, Proston, Elgin Vale, Kumbia, Cloyna and Cherbourg. Additional mills are located at Yarraman and Allies Creek just outside the area.

3.1.5 Horticultural and medicinal crops

Horticulture is not a major industry in the area although good quality produce can be grown. An area of approximately 70 ha is planted annually to horticultural crops. The main crops are potatoes, onions, rockmelons, beans, sweet corn, tomatoes and strawberries with pumpkins and watermelons grown periodically by some farmers.

Several growers producing small crops (lettuce, tomatoes, etc.) for local consumption operate in each of the major towns.

Tropical fruits such as pineapples, bananas, mangoes, papaws and avocados are grown mainly on the Murgon Tableland while kiwi fruit, avocados and some litchis are grown successfully at Kingaroy, Kumbia and Memerambi.

Corkwood *(Duboisia leichhardtii)* which grows naturally on many of the red snuffy krasnozems, is now grown in plantations in the Proston, Speedwell, Boondooma and the Murgon plateau areas. The leaves of this shrub contain relatively large amounts of tropane alkaloid drugs. The main drugs produced are nor-hyoscamide, hyoscamide, scopolamine and atropine. Payment is based on the scopolamine content of the dried leaf. Improved varieties and prices have resulted in a moderate expansion in the area of this crop.

Distribution of the major areas of horticulture and medicinal crops is shown on the current land use map.

3.1.6 Pigs and poultry

Poultry enterprises are not a major industry within the area.

Several large intensive piggeries are located in the area, particularly in the vicinity of Kingaroy and Keysland. Pig meats are processed in abattoirs at Kingaroy and Yarraman.

3.1.7 Mining

In the past, mining has not been of great importance. However the decision to construct the Tarong Power Station at Neumgna means that coal mining will be an important industry in the future. Construction work has commenced at the power station site and a limited amount of coal has been mined.

As mentioned in the geology section, other minerals which have been mined include gold, copper and gemstones.

Kaolinitic clay deposits are mined on a small scale at Brooklands and Goodger.

Small areas of limestone are mined on Barambah Creek east of Murgon and earthy dolomite is mined at Keysland, west of Murgon.

Numerous gravel quarries provide road building materials.

3.1.8 National Parks, Reserves and recreation areas

The Bunya Mountains National Park is the only National Park in the area. It has a total area of 11 700 ha including that portion which extends outside the study area. The park provides excellent camping, picnicking, bush walking and scenic facilities.

An area of 8 ha, surrounding Gueena lagoon, west of Murgon is a declared environmental park. In addition a small area of natural "softwood scrub" vegetation on the Murgon Tableland has recently been declared an environmental park.

All State Forests and National Parks are declared fauna sanctuaries as well as twelve other areas listed by the Queensland National Parks and Wildlife Service (1979). These include areas at Proston, Di Di, Taabinga and along parts of Barker and Boonara Creeks.

Other recreation areas include Coomba Falls at Maidenwell, Benarkin Forestry picnic area at Benarkin and Kinbombi Falls at Kinbombi on the eastern boundary of the area.

3.1.9 Water reservoirs and supplies

Gordonbrook Dam on the Stuart River provides the domestic water supply for Kingaroy.

Two major dams are planned for the area. The Boondooma Dam, currently under construction, on the Boyne River will supply water for the Tarong Power Station as well some irrigation downstream. The Bjelke-Petersen Dam, approved in principle, on Barker Creek will supply irrigation water for the Byee and Redgate areas.

A series of weirs provides irrigation or domestic water supplies. The weirs include the Proston weir on the Stuart River, Nanango weir on Barker Creek, Murgon weir on Barambah Creek, Silverleaf weir on Barambah Creek and the McAulay weir on Yarraman Creek.

Rural water supply schemes established by the Queensland Water Resources Commission and operated by rural water supply boards serve the Boondooma, Brigooda, Merlwood and Proston areas (Queensland Water Resources Commission 1979).

3.2 Potential land use

3.2.1 Introduction

Major land use changes are unlikely to occur in the foreseeable future. Agriculture is highly developed and pastoral areas have limited development potential. Moderate expansion is anticipated in horticultural and medicinal crops and mining activities with limited expansion in the pig, poultry and forestry industries.

Significant areas worthy of consideration as nature conservation areas (flora and fauna reserves and environmental parks) have been recognised.

3.2.2 Agriculture

Almost all the productive soils of mapping units Ltl, Tml and Lt5 and the less productive soils of mapping units Jml and Pbl are fully developed for agriculture.

Significant areas of mapping units Qsl and Pzl are considered suitable for agricultural development although the natural fertility is low to moderate and the soils are quite erodible. Both these areas have low sloping terrain which with adequate soil conservation measures is considered suitable for cropping. There is also a limited opportunity for further agricultural expansion on the lower sloping areas of mapping unit Pb2.

Changes may occur in the types of crops grown and the farming systems used. Conservation cropping techniques have proved successful in the South Burnett (Bateman and Rowlings 1980) and adoption of these techniques is expected to increase. The type of crop grown is not expected to change although the proportion of each crop grown is dependent on prospective market prices and seasonal conditions.

Soil conservation measures are applied to approximately 80% of the cropped land in the South Burnett. It is recognised that contour banks alone do not provide a complete erosion control measure. Contour banks combined with some form of conservation cropping is the recommended practice.

3.2.3 Pastoral

Any expansion in the beef industry will depend on increasing the carrying capacity of the existing grazing areas coupled with continued satisfactory market prices. Carrying capacity can be increased by using improved sown pastures or the addition of legumes to native pastures.

Pasture species which have been successfully grown are listed under present land use. Jones and Rees (1972) working with a solodic soil in mapping unit Pt2 report that Rhodes grass, buffel grass, siratro and lucerne yielded and persisted well on a site near Nanango. Bowen (1980) reports that despite low yields of plant material, cattle weight gains have been impressive in trials conducted in the Central Burnett using fine-stem stylo in native pastures.

Fine-stem stylo grows well on light textured soils in the Burnett Region where annual rainfall is between 800 and 1 000 mm. Fine-stem stylo will grow on most soil types but adequate drainage is essential. Soils with any tendency for waterlogging, often recognised by the presence of sedges, should be avoided (Bowen 1980). During this study approximately 15 000 ha of sandy, texture contrast soils in mapping units Pb2, Pu1 and Pu2 were identified as capable of using fine-stem stylo in the native pasture. The largest areas of suitable soils occur in the Boondooma-Proston and Wigton areas.

Many of the soils and slopes of mapping units Jm1, Pb1-2, Re1 and Rn3 as well as many of the mixed mapping units adjacent to the lateritic units are more suited to improved pastures than to continuous cropping.

Selected areas of mapping units Ts1, Jm2, Je1, Pu1, Pt1-2, Pb2, Pz6-7, Tv3, Ru1, Pk1 and Rg1 are suited to the establishment of improved pastures. Limited cultivation is required to ensure satisfactory establishment.

The extent of timber clearing or treatment is shown on the current land use map. There are no areas which justify further clearing of timber on a large scale. Areas currently supporting relatively undisturbed timber are primarily reserves or steeper, stony or rocky areas.

Timber regrowth is a problem in many areas. Selective control of regrowth is essential if pasture productivity is to be maintained.

3.2.4 Horticulture and medicinal crops

Although horticulture is not a major industry at present there appears to be a trend to establish horticultural crops, particularly tree crops, on many of the elevated lateritised areas such as mapping units Lt6 and Lt4. The major restriction to this development is the lack of suitable water supplies.

An increase in the area of vegetable crops grown is expected in the Byee area once water becomes available from the Bjelke-Petersen Dam.

There is a current expansion in the area planted to medicinal crops, predominantly in mapping units Lt3, Lt6 and Lt7. It is not anticipated that there will be any further major expansion in this crop because of the restriction of suitable land. Well drained soils with low soil pH are preferred together with protection from severe winds and frosts. These criteria greatly restrict the potentially suitable areas.

3.2.5 Irrigation

Existing irrigation occurs along both Barker and Barambah Creeks with supplies and water quality being unsatisfactory in dry times. Construction of the Bjelke-Petersen Dam on Barker Creek near Murgon has been approved in principle. This dam will store sufficient water to serve a gross area of 6 180 ha in the Byee-Redgate area of which some 4 725 ha would be irrigated annually (Joint Queensland Department of Primary Industries, Queensland Water Resources Commission Report 1979). The likely cropping rotation will be a barley-soybean rotation with alternatives of wheat for barley and grain sorghum or sunflowers for soybeans (McKeown unpubl.).

No other major irrigation schemes are likely to be developed in this area in the foreseeable future.

3.2.6 Forestry

Any further expansion in the area designated as State Forest Reserves is highly unlikely. Some restricted areas in the current reserves can be expected to be established to planted forests, particularly in the Blackbutt -Benarkin area and scattered along the eastern boundary. No major new areas of planted forests are expected to be developed.

3.2.7 Mining

Construction of the Tarong Power Station will ensure that coal mining becomes a major industry in the future.

Kaolinitic clays have been found in reasonable quantities in the Goodger-Brooklands area. Expansion in the mining of these clays could be anticipated.

3.2.8 Reserves and recreation areas

No further areas suitable for National Parks have been identified. However, a number of areas which contain special features either of scenery, recreational potential or small areas of remnant or otherwise significant vegetation have been identified.

These areas include Boat Mountain north of Murgon, the Barambah Gorge in the north, Wooroolin Swamp, parts of the Parish of Waringa in the north west, part of the Abbeywood area near Abbeywood School, Goodger scrub south east of Goodger and areas of scrub-forest breaks occurring in some of the State Forest areas particularly in the south. Boat Mountain has been examined and recommended for designation as an Environmental Park (James, pers. comm.).

3.2.9 Real estate

There has been a recent upsurge in subdivision for hobby farms and housing in the vicinity of Kingaroy, Yarraman, Nanango and Blackbutt. Such development is of concern where it threatens valuable agricultural land. Valuable agricultural land is a limited resource and alienation of it for housing should be discouraged.

Kingaroy Shire Council has recently engaged a town planning consultant to prepare a whole of shire plan. Indications are that this plan will attempt to preserve valuable agricultural land.

4. LAND DEGRADATION

Various types of land degradation have occurred in varying degrees throughout the area. The most common forms of degradation are erosion, salinity, tree and shrub regrowth and pasture degradation while landslips are also of concern.

4.1 Extent and cause

The location of the major occurrences of gully erosion, tunnel erosion, saline outbreaks and landslips are indicated on the land capability - land suitability map. This attempts to record the present location and to some degree the extent of the current situation.

4.1.1 Erosion

There was probably negligible erosion, other than geological erosion, in this area prior to settlement. Accelerated erosion occurs following settlement due primarily to man's direct and indirect interference with his environment.

Erosion by water is the major form although wind can be a potential cause in some areas. Wind erosion is a potential problem where the very friable snuffy krasnozems occurring in mapping units Lt6 and Lt7 are cultivated and not protected by vegetation cover.

Erosion will occur on continuously cultivated sloping lands if soil conservation measures are not applied. The red soils of mapping units Lt1-5 and Lt7 are all prone to sheet erosion even though they consist largely of highly permeable, well structured krasnozems. Reduced permeability following long term agricultural use is identified as a major factor in the erosion of krasnozems on sloping sites (Briggs 1967). Gully erosion is associated with badly maintained waterways or poorly situated access tracks in these mapping units.

Gully erosion occurs more commonly in the remaining cultivated areas of mapping units Tm1, Rn1, Pb1, Jm1, Pz1 and Pz6. Soils are predominantly black earths with some grey and brown clays, podzolics and soloths.

In the cleared or partially cleared grazing areas, severe gully erosion is associated with the banks and heads of many of the natural minor drainage lines. Areas are recorded in mapping units Pb2, Pz3 and Re2 with areas too small to record at this mapping scale occurring in almost all other mapping units. Faulkner (pers. comm.) in his erosion assessment of the Boyne and Stuart River catchments concluded that there is currently no major erosion problem although there is evidence of previous stream and gully bank erosion. Sheet erosion continues to occur in varying degrees throughout the grazing areas.

The erosion of the sides and gully heads of the natural drainage lines is primarily due to increased runoff following clearing of the catchment including the drainage lines. Stocking rates are frequently high resulting in poor ground cover and hence higher runoff rates.

Sharp *et al.* (1964) reported runoff rates from a heavily grazed watershed to be ten times greater than from a lightly grazed watershed.

Severe gully erosion is associated with roads. This is usually due to the roadway diverting the water and increasing the flow rates. Often the highly erodible B horizon is exposed in the table drains and erodes at an accelerated rate. Waterfall action as a result of cross drainage structures has also caused gullies to form.

Tunnel erosion was recorded north of Proston on steeply sloping, completely cleared, land with soils having highly dispersible B horizons. Although causing problems locally, it is not regarded as a major form of erosion. No other instances of tunnel erosion were recorded although small areas with a potential for tunnel erosion exist.

4.1.2 Salinity

Salinity in this area is classed as water table salting. There is an association of this type of salting with cleared and/or cultivated deep soils on deeply weathered rocks, though not all such areas exhibit salting (Hughes 1979). Jenkin and Irwin (1975) suggest that the main cause of water table salting is excessive clearing of upper slopes which allows more water to reach the saline ground water zone. This raises the water table and results in outbreaks in lower slope positions. Hughes (pers. comm.) also suggests that clearing of the valley floors has also allowed water tables to rise resulting in increased saline outbreaks.

Water table salting is usually associated with particular geological and geomorphological units. A large proportion of the salting in this area is related to the lateritised basalts, the Lt mapping units. Other saline outbreaks have been recorded associated with sandstone or sedimentary mapping units (Jm, Ru, Ts), volcanic mapping units (Rn, Tm) and some metamorphic mapping units (Pz).

Murphy and Easton (1950) noted that ring-barking of timber on the hills to the east of Byee flats in the period 1877 to 1890 caused many springs to develop. Saline seepages are now a feature of many of the valleys of the area.

The area directly affected is in the order of 500 ha although a precise area is difficult to obtain. Areas affected vary according to the wetness of the season and many areas are still contained within or very close to the present water courses.

4.1.3 Tree and shrub regrowth

Regrowth of trees and shrubs occurs throughout the grazing areas. Eucalypt, wattle and shrub regrowth are common following clearing of the natural vegetation. Wattles occur as a component of the natural vegetation, often as suppressed seedlings, and it is only following clearing, disturbance or fire that they become a problem.

Dense wattle regrowth is common on many of the shallower, often stony, soils on ridge lines and steeply sloping areas. These areas should not have been originally cleared as the expense of both clearing and controlling regrowth is unlikely to be recouped in increased productivity.

Eucalypt regrowth commonly occurs on the sloping grazing lands. Regrowth is often aided by heavy stocking rates which eliminates the competition between the grass species and the seedling trees and shrubs. Treatment of regrowth may become very costly where the problem is not recognised at an early stage, or a lack of funds prevent treatment at an opportune time.

A significant area of brigalow and black tea-tree regrowth occurs in the Durong - Boondooma area (mapping unit Qp2). Brigalow produces profuse numbers of suckers if clearing is carried out under unfavourable conditions. Extremely large gilgai and depressed cattle markets have combined to produce both physical and financial constraints on adequate control measures.

4.1.4 Pasture degradation

Although no specific study was carried out to determine the extent of pasture degradation the following features were noted.

Many areas were detected where the native pastures consist of pitted blue grass *(Bothrichloa decipiens)* and wire grasses *(Aristida* spp.*)* both of which are indicators of a degraded pasture.

Pasture degradation is related to excessive grazing pressure, indiscriminate use of fire and decreased soil fertility due to erosion. Soil nutrient status - in particular nitrogen and to a lesser extent phosphorus - is probably the overriding factor limiting pasture production in much of the Burnett Region (Scateni 1967).

Many areas of sown pastures, while initially being very productive, have deteriorated rapidly. This has resulted from the wrong choice of species, early heavy grazing or continuous heavy grazing preventing seedling establishment and lack of an adequate fertilizer maintenance programme.

4.1.5 Landslip

All of the landslips recorded were associated with the Tertiary volcanic or lateritic mapping units (Tm, Tv or Lt). None of the areas detected were large and all were associated with slopes of greater than 20% which have been completely cleared of trees and shrubs. Areas of weakness develop during very wet periods resulting in landslips developing.

4.2 Recommended correction and/or prevention methods

It is possible to rehabilitate or prevent most forms of land degradation. Some of the methods or techniques which would have to be applied to provide complete reclamation or control may not be economically feasible. Local departmental officers, particularly soil conservation and agriculture, should be contacted for advice regarding practices to control degradation in particular areas.

4.2.1 Erosion

All cultivation, other than the alluvial flats associated with the major creeks, requires soil conservation measures to help control erosion by water. Mechanical soil conservation measures are well accepted in the area as indicated by the fact that approximately 80% of the cultivated lands requiring soil conservation measures are currently protected. For more complete control of soil erosion, mechanical measures need to be combined with conservation cropping techniques (Bateman and Rowlings 1980).

Gully erosion which occurs in many of the marginal cropping areas could have been prevented by early recognition that these areas were never really suited to continuous cultivation. To reclaim severely eroded areas, gullies should be filled ensuring that no erodible B horizon is left exposed and an adequate depth of top soil cover is present for plant growth and a permanent pasture established. Fertilizer, particularly nitrogen and in most cases phosphorus, will be required to successfully establish improved pastures in these degraded areas.

In the grazing areas it is usually not economical to fill existing gullies. However steps should be taken to minimise the further development of both existing or new gullies.

Consideration should be given to destocking and fencing badly eroded areas and allowing these to revegetate naturally. Some attempt to establish pasture in the degraded area may be justified. Rocks or old tyres placed in the head of the gully may help trap soil as well as prevent further headwards movement of the gully.

Many gullies, particularly those with unstable sides and heads could have been prevented by maintaining sufficient ground cover in the surrounding catchments to prevent excessive runoff. Stocking rates need to be adjusted so that there is an adequate ground cover present at all times.

Gullies associated with roads may have been prevented by carefully selecting road locations and in providing cross drainage structures. Particular care is required with table drains where the high erodible, dispersible B horizons of texture contrast soils are often exposed. Runoff water should be dispersed as quickly as possible into a stable, well grassed area. Any concentration of runoff water along these sites will rapidly lead to severe erosion which is difficult to reclaim.

Areas currently exhibiting tunnel erosion should be destocked and allowed to revegetate. Some light intermittent grazing may be possible once the area is stabilised.

Vegetation cover should be maintained at all times where wind erosion is suspected of being a problem.

4.2.2 Salinity

Reclamation of areas affected by water table salting may be difficult to justify in economic terms. Drainage, using underground and surface drains, would only be considered where saline areas directly affect personal property or income. Examples of such cases would include outbreaks near farm buildings or where they affect water supplies or outbreaks in mid-slope positions affect productive land further down slope.

Establishment of salt tolerant grasses and shrubs should be encouraged to help lower the water table and prevent spread of the bare areas.

A number of salt tolerant trees have been suggested by Forestry Department (pers. comm.) as worthy of consideration. Exotic species include athel tree *(Tamarix aphylla)*, pepper tree *(Schinus molle)*, chinese elm *(Ulmus parviflora)*, white mulberry *(Morus alba)* and chinese hackberry *(Celtis sinensis)*. Native species include gum topped box *(E. moluccana)*, fuzzy box *(E. conica)*, Queensland blue gum *(E. tereticornis)* and the tea-trees *(Melaleuca linariifolia, M. nodosa* and *M. armillaris)*.

Salt tolerant grasses such as Rhodes grass *(Chloris gayana)*, green couch grass *(Cynodon dactylon)* and makarikari grass *(Panicum coloratum)* have been grown successfully in saline areas in the past.

As one of the major causes appears to be overclearing of trees on the upper slopes and on the valley floors, the problem will most likely remain until these areas are re-established to trees. This is unlikely to occur until the saline areas become large enough to significantly affect agricultural areas.

4.2.3 Tree and shrub regrowth

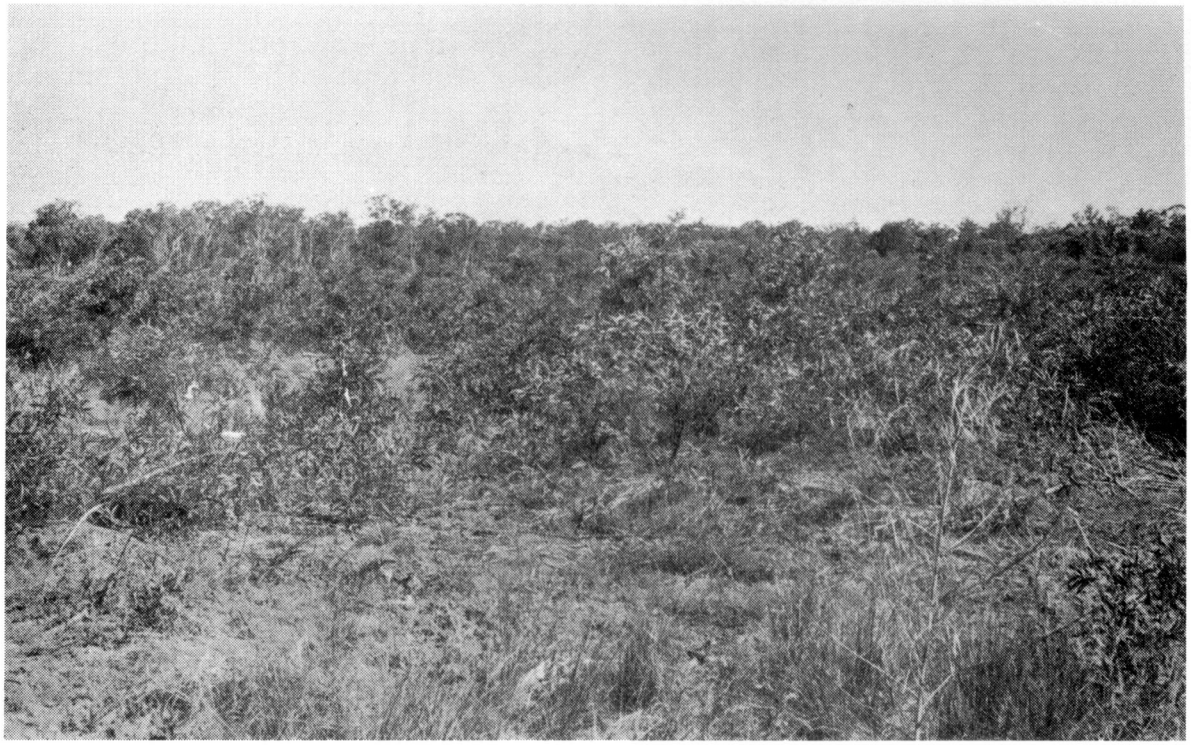
Frequently the areas with excessive tree and shrub regrowth are on shallow unproductive soils on steep slopes. These communities may have been more valuable in reducing runoff and hence erosion downstream. They may also have played an important part in preventing water table salting occurring downstream. Many of these saline areas appeared subsequent to complete clearing of catchments.

When clearing is justified, regrowth should be controlled by mechanical or chemical means before it becomes dense enough to reduce pasture growth and vigour. Continuous overgrazing will reduce pasture vigour and encourage tree and shrub regrowth.

The level of clearing required to produce optimum pasture production and cover is still a subject for debate. A research project, conducted by the Woodland Ecology Unit of CSIRO in consultation with the Department of Primary Industries was carried out near Kingaroy. The aim was to assess varying levels of tree thinning on pasture yield responses. A consequence of this research is that it should be possible to determine the level of regrowth which will not significantly affect pasture productivity. Data from this programme have yet to be evaluated.

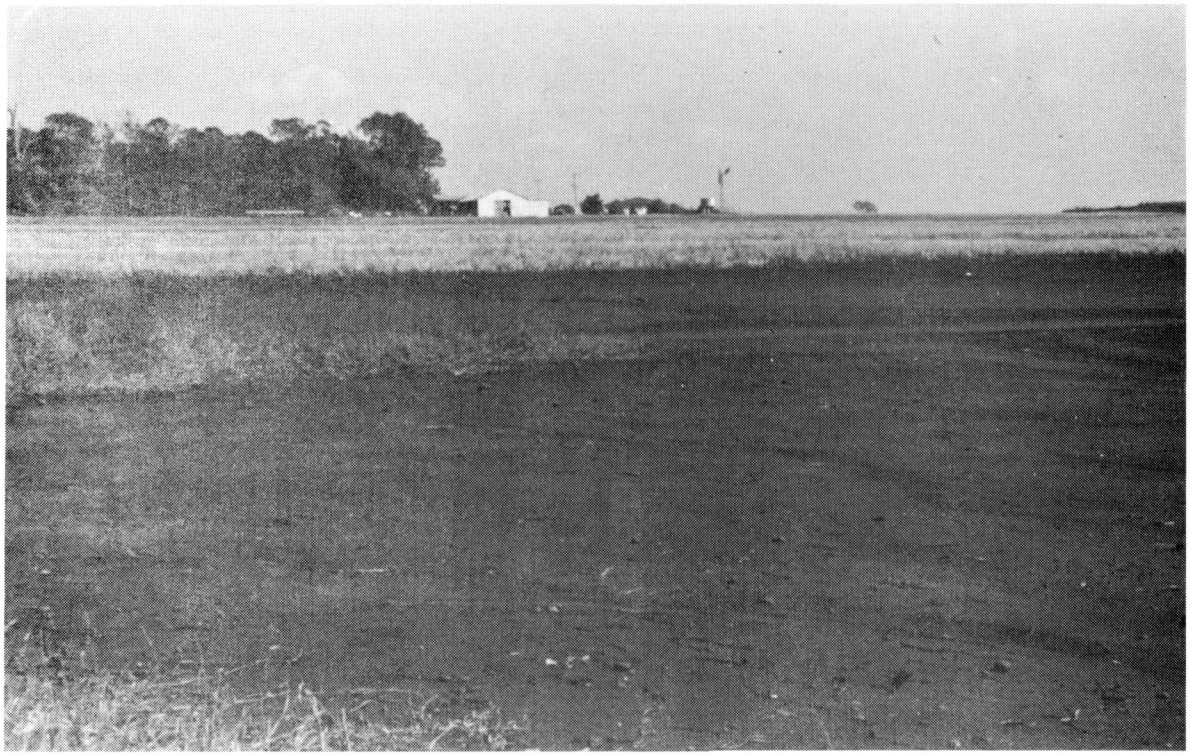
Plate 5. Severe gully erosion, due to excessive clearing, overgrazing or poor siting of roads and watering points, occurs throughout the grazing areas. Only isolated examples as severe as the above photo are recorded.

Plate 6. Numerous examples of severe overgrazing occur throughout the area.



Plates 7 and 8. Regrowth of brigalow suckers is a major problem following clearing in mapping unit Qp2, particularly in the deeply gilgaied areas.

Plates 9 and 10. Water table salting, both along drainage lines (above) and in lower slope positions (below), is a common occurrence in this area, particularly associated with the lateritic mapping units (Lt).



Tothill (1971) suggests that selective use of fire together with a managed grazing system is an effective means of suppressing regrowth in pasture areas.

Johnson (1964, 1968a, 1968b) and Everist (1966, 1968) have demonstrated economical and effective methods of controlling brigalow regrowth by chemical and cultural methods. Cultural methods are difficult with the extremely large gilgai in the area and depressed cattle markets until recently have restricted the use of chemical methods.

4.2.4 Pasture degradation

Adjusting stocking rates to the condition and/or potential of the pastures is an essential factor in maintaining or restoring pasture productivity. Inadequate internal fencing in much of this area results in little or no grazing management.

Overstocking is common and pasture degradation is inevitable. A system of rotational grazing and spelling is necessary to allow pastures to set seed and seedlings establish, if desirable species are to be maintained.

When establishing improved pastures by cultivation, some form of protection from erosion in the highly vulnerable establishment phase is essential. Sypkens (1969) discusses pasture development using alternate contour furrows or contour structures to alleviate this problem.

As a shortage of nitrogen is probably the major factor limiting pasture production in the area (Scateni 1967) the addition of legumes to the native pastures is desirable. Legumes in both sown and native pastures are important as the economics of using nitrogen fertilizer are questionable. Attempts at large scale establishment of fine-stem stylo in native pastures on sandy textured soils is considered justified to maximise productivity of the area. Difficulty in obtaining adequate seed supplies may present problems.

Improved pastures require a high level of management to maintain productivity, quality and persistence of desirable species. Less productive native grass species and weeds will rapidly invade these pastures if they are continually overgrazed or fertility is not maintained.

Fire is a management tool which should not be used indiscriminantly each year in an attempt to obtain fast green growth following spring rains. Prescribed burns may be valuable in the control of tree and shrub regrowth.

4.2.5 Landslip

Landslips in the area have developed following clearing of steep slopes. They are difficult to reclaim and should be allowed to revegetate naturally to establish some form of stability. Further clearing should be avoided on areas considered to be prone to landslip.

5. MANAGEMENT REQUIREMENTS

Broad management requirements have been determined for each mapping unit. Precise requirements and methods for any particular area or situation should be determined in consultation with the appropriate departmental extension officer.

The important management requirements for individual or groups of mapping units when used for cropping and/or grazing or other uses are presented in table 5.1.

The recommended correction and/or prevention methods for the various forms of degradation discussed in section 4 should be considered in conjunction with table 5.1.

Table 5.1 Important management requirements for mapping units

MAPPING UNITS	REQUIREMENTS WHEN USED FOR CROPPING	REQUIREMENTS WHEN USED FOR GRAZING OR OTHER USES
Qa1	Adequate drainage to prevent waterlogging. Nitrogen fertilizer for continuous cropping. Retain crop residue. Leave vegetation on stream banks and adjacent areas undisturbed to minimise erosion.	Nitrogen fertilizer for irrigated pastures. Leave stream banks and adjacent areas well vegetated to minimise erosion.
Qa2, Lt1, Lt2, Lt4, Cz1	Mechanical soil conservation measures on slopes. Well grassed waterways. Conservation cropping desirable. Nitrogen and phosphorus fertilizer with continuous cropping. Lime or dolomite required periodically on isolated extremely acid areas. Establish permanent vegetation on any saline outbreaks adjacent to drainage lines.	Improved pastures established by cultivation need soil conservation measures. Nitrogen and phosphorus fertilizer to maintain productivity. Revegetate any saline outbreaks adjacent to drainage lines.
Qp1	Mechanical soil conservation measures on slopes. Gilgai levelled to prevent waterlogging. Conservation cropping desirable. Phosphorus and in some cases nitrogen fertilizer with continuous cropping.	Improved pastures established by cultivation need soil conservation measures. Control brigalow and tea-tree regrowth by chemical and/or mechanical means. Rotational grazing to maintain improved pastures.
Tm1, Tv1, Rn1, Rn2	Mechanical soil conservation measures on slopes. Well grassed waterways. Nitrogen fertilizer with continuous cropping. Conservation cropping desirable. Fill and stabilize any existing gullies.	Improved pastures established by cultivation need soil conservation measures. Introduce legumes into native pastures where possible. Sulphur fertilizer may be required.
Lt5, Pz4, Qs1	Mechanical soil conservation measures on slopes. Well grassed waterways. Conservation cropping desirable. Nitrogen and phosphorus fertilizer with continuous cropping. Establish permanent vegetation on any saline outbreaks adjacent to drainage lines.	Improved pastures established by cultivation need soil conservation measures. Nitrogen and phosphorus fertilizer to maintain productivity. Rotational grazing. Revegetate any saline outbreaks. Control regrowth in native pastures and adjust stocking rates to maintain adequate vegetation cover at all times.
Lt3, Lt7	Mechanical soil conservation measures on slopes even with medicinal and horticultural crops. Nitrogen and phosphorus fertilizer with continuous cropping. Conservation cropping desirable. Maintain vegetation cover on snuffy soils to control potential wind erosion.	Improved pastures established by cultivation need soil conservation measures. Nitrogen and phosphorus fertilizer to maintain productivity. Rotational grazing. Regrowth control essential. Native pastures unproductive.
Ts1, Jm1, Pu3, Pz6	Mechanical soil conservation measures on slopes. Phosphorus and in some cases nitrogen fertilizer with continuous cropping. Conservation cropping desirable. Any gilgai require levelling to prevent waterlogging. Fill and stabilise any existing gullies.	Improved pastures established by cultivation need soil conservation measures. Phosphorus and nitrogen fertilizer to maintain productivity. Rotational grazing. Stabilise eroded areas and establish pastures. Control regrowth where required.
Pb1, Pz1	Mechanical soil conservation measures on slopes. Well grassed waterways. Nitrogen, phosphorus and in some cases potassium fertilizer with continuous cropping. Conservation cropping desirable. Ensure B horizons not exposed in contour banks, waterways, etc. Fill existing gullies and stabilise with pasture.	Improved pastures established by cultivation need soil conservation measures. Phosphorus and nitrogen fertilizer to maintain productivity. Rotational grazing. Fill and stabilise gullies and other eroded areas. Introduce legumes to native pastures and control excessive regrowth. Adjust stocking rates to maintain adequate vegetation cover at all times. Locate watering points to avoid tracks concentrating runoff water and causing erosion.
Qp2	Generally unsuitable for cropping as levelling of large gilgai is not economical.	Regrowth control by chemical and/or mechanical means essential. Establish improved pastures where possible. Native pasture productivity very low.
Tm2, Tv2, Re1, Rn3	Small areas suitable for cropping - mechanical soil conservation measures required. Nitrogen fertilizer and conservation cropping desirable. Fill existing gullies and convert eroded areas to pasture.	Improved pastures established by cultivation need soil conservation measures. Sulphur fertilizer may be required with legumes in both sown and native pastures. Control regrowth in native pasture areas and adjust stocking rates to maintain adequate vegetation cover at all times.
Pb2, Pk1, Cz2, Pu1, Pt1	Small areas suitable for cropping - mechanical soil conservation measures required. Nitrogen, phosphorus and potassium fertilizer when cropped. Ensure B horizons not exposed in contour banks, waterways, etc. More suitable for planting improved pastures.	Improved pastures established by cultivation need soil conservation measures. Not economical to fertilize. Introduce legumes to improved and native pastures. Adjust stocking rates to maintain adequate vegetation cover at all times. Stabilise existing eroding areas. Control regrowth. Locate watering points and access tracks to avoid tracks concentrating runoff water and causing erosion.
Pb3, Pu2, Pt2, Rg1, Pk2	Not suitable continuous cropping. Convert existing cultivation to improved pastures.	Improved pastures established by cultivation need soil conservation measures. Not economical to fertilize. Introduce legumes to improve native pastures. Adjust stocking rates to maintain adequate vegetation cover at all times. Stabilise existing eroding areas. Control regrowth. Locate watering points and access tracks to avoid tracks concentrating runoff water and causing erosion.
Tm3, Rm1, Re2, Rn4, Rn5, Pz2, Pz3, Pz7		Small areas suitable for establishment of improved pastures by cultivation. Need soil conservation measures. Introduce legumes to native pastures if possible. Control regrowth on lower slopes. Allow trees and shrubs to regenerate on very steep slopes. Adjust stocking rates to maintain adequate vegetation cover at all times. Locate watering points and access tracks to avoid erosion.
Jm2, Je1, Je2, Ru1		Areas suitable for establishment of improved pastures by cultivation need soil conservation measures. Introduce legumes into native pastures where possible. Control regrowth. Allow trees and shrubs to regenerate on steep erodible areas. Adjust stocking rates to maintain adequate vegetation cover at all times. Locate watering points and access tracks to avoid erosion.
Lt6, Cz3, Tv3, Pb4	Minor areas suitable cropping with mechanical soil conservation measures. Nitrogen and phosphorus fertilizer required and conservation cropping desirable.	Small areas suitable improved pastures and medicinal and horticultural crops with soil conservation measures. Retain native vegetation or allow trees and shrubs to regenerate to provide watershed protection.
Pb5, Pz5, Pt3, Rg2, Rm2, Rn6, Jm3, Je3, Tm4, Cb1, Rs1		Restrict clearing and treatment of regrowth. Light grazing possible in favourable growing seasons. Use as watershed protection areas.
Qa3		Maintain vegetation cover on fringes for stability. Consider major areas as flora and fauna reserves.

6. CONCLUSIONS

6.1 Agricultural land

Detailed soils assessment is justified on the agricultural areas to adequately define the soils, their properties and specific management requirements. The current soil survey project by Agricultural Chemistry Branch officers, which includes all of the soils in the main cropping belt from north of Proston, through Kingaroy, to Kumbia will fulfil this need for a major part of the area.

Mechanical soil conservation measures are necessary on almost all the cropped land. Approximately 80% of this area is currently protected.

Conservation cropping techniques are applicable to the area and are currently gaining acceptance by the farming community. A continued extension effort in this field is required.

Regular fertilizer applications are required under continuous cropping with the type and amount being determined by soil analysis.

Very steep or badly eroded cultivation areas should be returned to permanent pasture.

Saline outbreaks in and near drainage lines in cultivation areas should be monitored and where possible a permanent vegetation cover re-established.

A moderate expansion in medicinal and horticultural tree crops is currently occurring. Further expansion in vegetable crops is anticipated once the Bjelke-Petersen Dam is constructed.

Subdivisional activity has increased in the vicinity of Kingaroy, Nanango and Blackbutt as well as Yarraman just outside the area. Such development should be viewed with concern where it threatens valuable agricultural land. Valuable agricultural land is a limited resource and alienation of it for housing or hobby farms should be discouraged.

6.2 Pastoral land

Expansion in the beef industry depends largely on increasing the carrying capacity of the pastoral areas.

Improved pastures should be established wherever possible. Species which have proved suitable include Rhodes grass, green panic, kikuyu, lucerne, annual medics, buffel grass, setaria, ryegrass, lotononis, siratro and fine-stem stylo.

Fine-stem stylo should be introduced to the native pastures, as soon as practicable, on the well drained sandy surfaced, texture contrast soils of mapping units Pb2, Pu1, Pu2. Some 15 000 ha have been assessed as suitable for this purpose.

Overgrazing or excessive grazing pressures should be reduced by adjusting stocking rates where practicable. This will help maintain the long term productivity of the pasture as well as maintaining sufficient levels of vegetation cover to prevent erosion.

Severely eroded gullies should be filled where practicable and permanent vegetation cover established. With most gullies this is impractical; however, these will generally stabilize once grazing pressures are reduced.

Regrowth of trees and shrubs should be controlled on those areas considered suitable for clearing. Neglect may lead to pasture degradation which may be expensive in terms of lost productivity and subsequent treatment costs.

Further clearing is not warranted in most of the area. Many areas are in fact overcleared.

Trees and shrubs should be allowed to revegetate on many of the steeply sloping areas and/or shallow stony soils to aid in watershed protection. Pasture production from these areas is minimal.

Saline outbreaks in or adjacent to drainage lines should be monitored and where possible a permanent vegetative cover established.

Indiscriminate use of fire should be discouraged. However, prescribed burns may be a useful tool in the control of tree and shrub regrowth as well as maintaining pasture productivity.

6.3 National Parks, State Forests, Reserves

No additional areas which warrant consideration for declaration as State Forest or National Park Reserves were recognised.

Preservation of areas of natural vegetation which currently exist in State Forest Reserves is encouraged as future scientific and aesthetic reference areas.

Some steeply sloping and/or rocky areas with shallow stony soils may warrant re-afforestation. Re-afforestation or allowing natural vegetation to regenerate may help prevent further landslips, as well as reducing runoff and hence erosion. Such development may also be beneficial in controlling the spread of saline outbreaks in or near many of the drainage lines.

Areas have been identified for preservation as scenic or recreational areas or because they contain other special features such as remnant or otherwise significant vegetation. These areas include Boat Mountain, Barambah Gorge, Wooroolin Swamp, part of the Parish of Waringa, part of Abbeywood district and Goodger scrub.

Construction of the Boondooma Dam and the Bjelke-Petersen Dam should provide additional recreational facilities.

6.4 Mining

Coal mining will become a significant industry in the Neumgna district following construction of the Tarong Power Station.

Expansion in mining of the kaolinitic clay deposits in the Brooklands - Goodger area could be anticipated in the future.

A continued requirement for lime or earthy dolomite for agricultural purposes is anticipated. Mining of deposits in the Keysland - Kawl Kawl area should continue providing prices remain competitive.

ACKNOWLEDGEMENTS

Thanks are due to:

Mr. K.K. Hughes for his assistance in interpretation of the geology of the area.

Mr. R.S. Cormack and Mr. K.M. Rosenthal provided the computer analysis and presentation of data.

Production of the final maps was undertaken by Miss S.F. Crofts under the guidance of Mr. C.M. Ellis.

Agricultural Chemistry Branch provided the analytical data.

Botanical specimens were identified by the Queensland Herbarium.

Thanks are also due to all other officers who contributed in any way to the production and presentation of this report.

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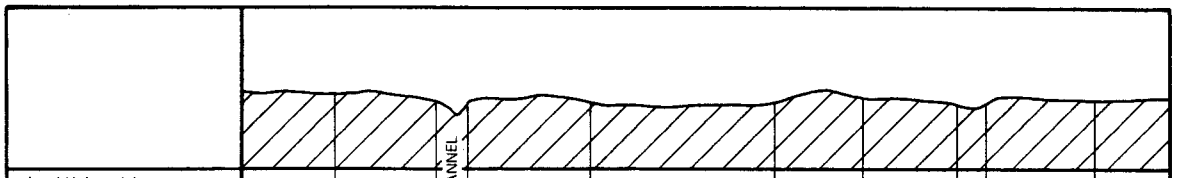
APPENDIX I
MAPPING UNITS

Qa 1 (44 580 ha)



Land Unit and / or Associated Mapping Units	25	22		22	21	23	21	273	24	25
Sites				93	14, 15, 333	224				303
Est. % of Mapping Unit				20	65	5		<1	6	<2

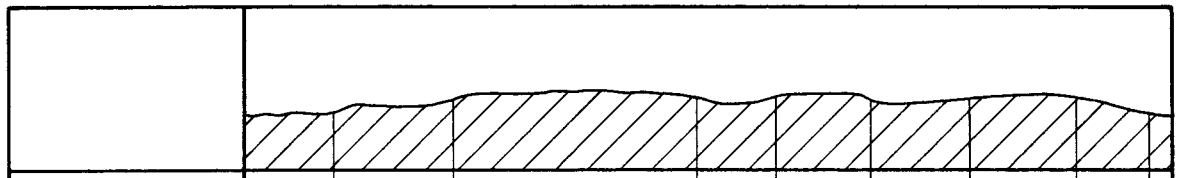
LANDFORM: Flat to slightly undulating plains.

GEOLOGY: Quaternary alluvia (recent). Qa.

SOILS: Deep to very deep, self mulching, dark cracking clays (black earths and alluvial soils). Minor areas of texture contrast soils with brown or yellowish brown clay subsoils (solodics and solodized solonetz).

VEGETATION: Queensland blue gum, broad-leaved apple grassy open woodland with isolated areas of gum-topped box or poplar box open woodland. Weeping bottle brush and river she-oak frequently fringe channels.

Qa 2 (5 140 ha)



Land Unit and / or Associated Mapping Units	Qa 1	30	26	28	26	28	27	29	Qa 1
Sites			101, 106	103, 104			100	102	
Est. % of Mapping Unit		5	45	10			30	10	

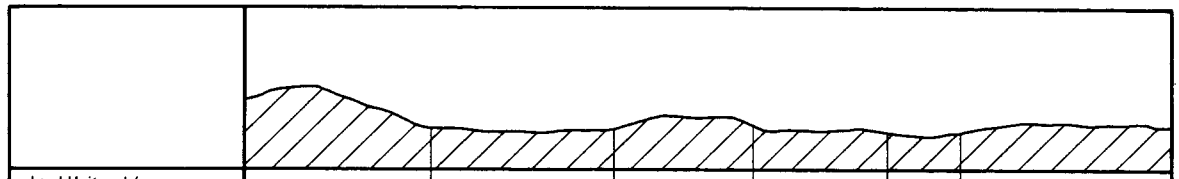
LANDFORM: Flat to gently undulating plains.

GEOLOGY: Quaternary alluvia (old). Qa.

SOILS: Moderately deep to deep soils with dark brown to reddish brown loams, clay loams and light clays grading into light to medium yellowish brown and reddish brown clays (xanthozems). Minor areas of texture contrast soils with yellowish brown clay subsoils (red brown earths and solodics) frequently occur.

VEGETATION: Narrow-leaved ironbark */ Queensland blue gum open woodland to open forest with scattered areas of open woodland to open forest of Queensland blue gum or Moreton Bay ash or gum-topped box.

Qa 3 (560 ha)



Land Unit and / or Associated Mapping Units	Lt 1	273	Lt 1	Qa 1	273	Qa 1
Sites						
Est. % of Mapping Unit		>95				

LANDFORM: Low lying areas of major lakes, reservoirs and semi-permanent wetlands.

GEOLOGY: Frequently recent Quaternary alluvia. Reservoirs determined by location. Qa.

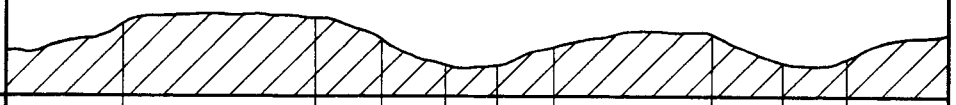
SOILS: Vary considerably. Deep, dark cracking clays (black earths) and minor areas gradational soils (euchrozems). Shallow skeletal and texture contrast soils with reservoirs.

VEGETATION: Queensland blue gum / broad-leaved apple woodland to open forest or broad-leaved apple woodland on margins of unit. Usually sparse vegetation often dominated by grasses tolerant of water logging.

Footnotes: Diagrammatic cross sections present relationships of land units and / or mapping units to each other and are not drawn to scale.
* / means with or without.

APPENDIX I CONTINUED

Qp 1 (9 770 ha)



Land Unit and / or Associated Mapping Units	162	161	164	163	166	162	165	162	166	165
Sites	79	304	171	172			82, 136, 192			
Est. % of Mapping Unit	30	30	<5	20	5		10			

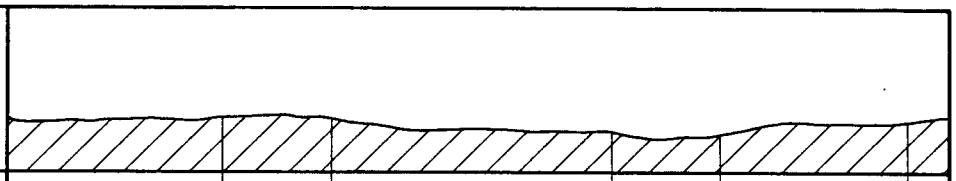
LANDFORM: Flat to gently undulating plains.

GEOLOGY: Quaternary alluvia (clay sheet). Qpc.

SOILS: Deep, grey and brown cracking clays (grey and brown clays) with gilgai micro-relief varying from slight to moderate. Small areas of moderately deep soils with dark reddish brown fine sandy loam to clay loam surface grading into red, dark red or brown clays (red brown earths, euchrozems).

VEGETATION: Brigalow, belah / wilga open forest with moderate to small areas of silver-leaved ironbark, narrow-leaved ironbark, kurrajong, ironwood, wilga open forest to woodland and isolated areas of gum-topped box, rusty gum, wilga, woodland to open forest.

Qp 2 (24 240 ha)



Land Unit and / or Associated Mapping Units	168	170	167	169	168	Qp 1
Sites	137, 138	195	80, 81	193, 194		
Est. % of Mapping Unit	35	<5	45	15		

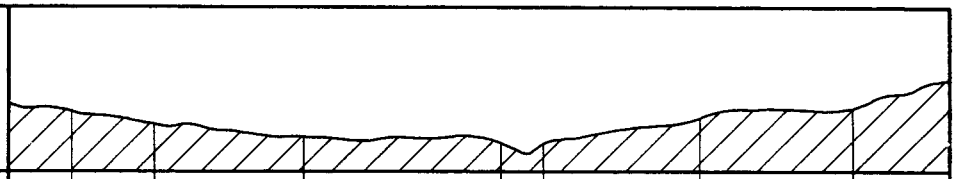
LANDFORM: Flat to gently undulating plains.

GEOLOGY: Quaternary alluvia (clay sheet). Qpc.

SOILS: Deep to very deep, grey or brown cracking clays (grey and brown clays) with moderate to severe gilgai micro-relief. Isolated areas of yellow and red gradational textured soils (yellow earths and red brown earths).

VEGETATION: Predominantly brigalow or brigalow, belah / black tea-tree open forests with scattered areas of gum-topped box, narrow-leaved ironbark, Queensland blue gum and wattle woodland to open forest.

Qs 1 (6 050 ha)



Land Unit and / or Associated Mapping Units	Qp 1	33	31	32	LINE	34	31	Pb 2 or Pz 3
Sites		75	139		CREEK	140		
Est. % of Mapping Unit		<10	50	30		<10		

LANDFORM: Flat to gently undulating plains.

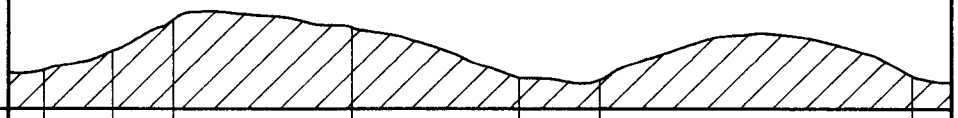
GEOLOGY: Quaternary alluvia (sandy). Qs.

SOILS: Moderately deep to deep soils with dark brown loam and fine sandy clay loam, often gravelly, surfaces grading into brown and yellowish brown mottled clays (xanthozems). Red gradational soils (euchrozems) and texture contrast soils with dark brown loamy sand to sandy loam surfaces overlying brown and yellowish brown mottled clays (yellow podzolics and soloths) also occur.

VEGETATION: Silver-leaved ironbark or narrow-leaved ironbark woodland to open forest with large areas of silver-leaved ironbark, narrow-leaved ironbark, Moreton Bay ash, Queensland blue gum woodland to open forest. Small areas of rusty gum open forests also occur.

APPENDIX I CONTINUED

Cz 1 (2330 ha)



Land Unit and / or Associated Mapping Units	Pb 2	67	66	63	65	7	64	Pb 2
Sites		151		189		58, 275	190	
Est. % of Mapping Unit		<2	8	40	20	5	25	

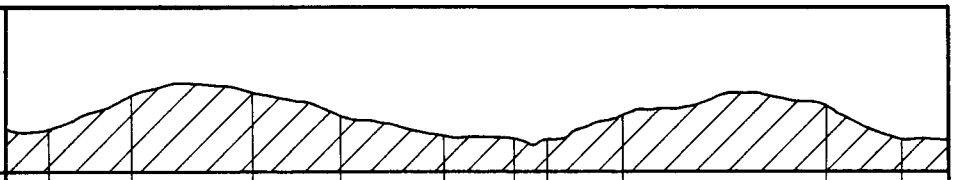
LANDFORM: Gently undulating to hilly terrain. Some steep scarps and drop offs.

GEOLOGY: Lateritised granite wash. Czg.

SOILS: Moderately deep to deep soils with very dark reddish brown clay loams grading into dark reddish brown light to medium clays (krasnozems). Areas of texture contrast soils with brownish black to dull yellow orange loamy sand surfaces overlying dull yellowish brown clays (solodics). Shallow loamy lithosols occur on rock outcrops and scarps.

VEGETATION: "Softwood scrub" species closed scrub with open woodland to open forest of narrow-leaved ironbark, Queensland blue gum, pink bloodwood, wattles / Moreton Bay ash / silver-leaved ironbark on sloping areas. Queensland peppermint, narrow-leaved ironbark woodland may occur on rocky areas.

Cz 2 (12210 ha)



Land Unit and / or Associated Mapping Units	Pb 2	67	69	71	70	72	LINE	70	67	68	Pb 2
Sites			152, 153	241	239	183	CREEK		151		
Est. % of Mapping Unit			10	5	20	5			40	20	

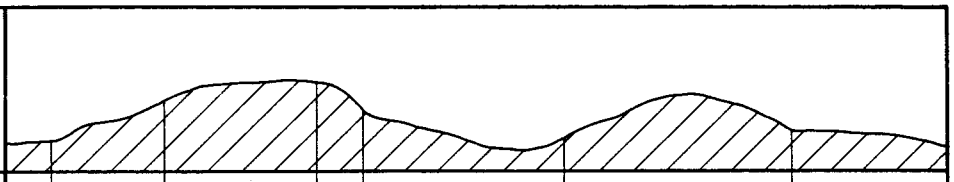
LANDFORM: Flat to gently undulating terrain.

GEOLOGY: Granite wash. Czg.

SOILS: Shallow to moderately deep texture contrast soils with brownish black to dark brown loamy sands to sands overlying dull yellow orange or dull yellowish brown clays (soloths, solodics). Uniform textured sands and loams also occur as well as shallow, loamy or sandy lithosols on ridge crests and rock outcrops.

VEGETATION: Narrow-leaved ironbark, Queensland blue gum, pink bloodwood / bull oak woodland to open forest with occasional woodland to open forest of Moreton Bay ash or Queensland peppermint or silver-leaved ironbark / wattles. Open forests of Queensland blue gum, narrow-leaved ironbark on lower slopes and sandy soils.

Cz 3 (8790 ha)



Land Unit and / or Associated Mapping Units	Pb 2	67	73	66	67	71	Pb 2 or Cz 2
Sites					151	241	
Est. % of Mapping Unit			50	10	20	20	

LANDFORM: Steep hilly terrain, some scarp areas.

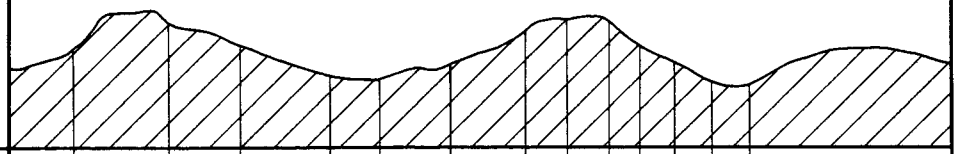
GEOLOGY: Granite wash, often rock outcrop. Czg.

SOILS: Shallow, often stony or rocky, loamy lithosols with areas of moderately deep uniform coarse textured sands. Moderately deep to deep texture contrast soils with dark brown loamy sand to sandy loam surfaces overlying brown, reddish brown or yellowish brown medium to heavy clays (soloths) occur on lower sloping areas.

VEGETATION: Narrow-leaved ironbark, pink bloodwood shrubby open woodland with frequent open woodland to shrubby open woodland of narrow-leaved ironbark / Queensland peppermint / cypress pine / wattle / "softwood scrub" species. "Softwood scrub" species closed scrub or spotted gum open forest occur on some ridge crests.

APPENDIX I CONTINUED

Lt 1 (39 450 ha)



Land Unit and / or Associated Mapping Units	37	Lt 6	36	37	38	37	36	35	Lt 6	36	40	37	39	37
Sites			84, 88, 197	40, 86, 87, 111, 198	85			59, 54, 191			175		120, 173, 203	
Est. % of Mapping Unit			35	30	10			20			<5		<2	

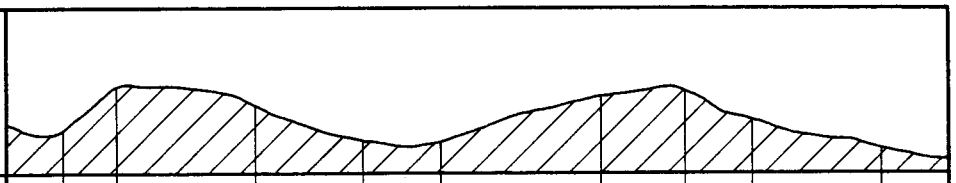
LANDFORM: Gently undulating to hilly terrain.

GEOLOGY: Lateritised Main Range Volcanics. Tm.

SOILS: Moderately deep to deep soils with dark red to very dark reddish brown loams, clay loams and light clays grading into dark red to dark reddish brown medium to heavy clays (krasnozems and euchrozems). Small areas with snuffy surfaces occur.

VEGETATION: "Softwood scrub" species open to closed scrubs on upper slopes and ridges with open forests to woodlands of narrow-leaved ironbark / Queensland blue gum / silver-leaved ironbark on mid slopes. Narrow-leaved ironbark, Queensland blue gum / rough-barked apple / broad-leaved apple / dogwood woodland to open forest occurs on lower slopes. Occasional gum-topped box or fuzzy box woodland on lower slopes and drainage lines.

Lt 2 (6 350 ha)



Land Unit and / or Associated Mapping Units	Tv 2	44	41	42	39	41	45	46	43	Rn 1
Sites		55, 83	119, 122	123	120, 173, 203		213, 244, 287		124, 234	
Est. % of Mapping Unit		10	25	20	<3		9	<3	30	

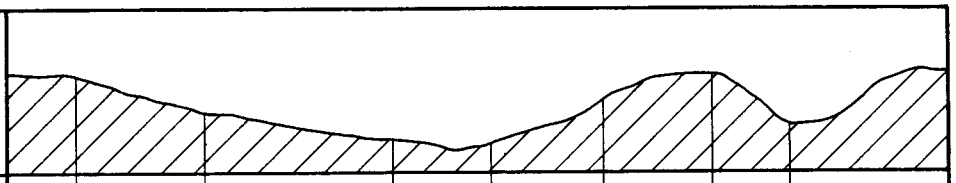
LANDFORM: Undulating to hilly tablelands. Some steep scarps.

GEOLOGY: Lateritised Tertiary volcanics. Tv.

SOILS: Moderately deep to deep soils with dark red to very dark reddish brown loams and clay loams grading into dark red to dark reddish brown light, medium or heavy clays (krasnozems and euchrozems). Shallow, gravelly or stony, lithosols occur with scarps and rock outcrops.

VEGETATION: "Softwood scrub" species closed scrub on upper slopes and ridges, Open forest to woodland of narrow-leaved ironbark, small-fruited grey gum / "softwood scrub" species on slopes to areas of spotted gum, small-fruited grey gum / wattle open forests often associated with scarps.

Lt 3 (9 170 ha)



Land Unit and / or Associated Mapping Units	50	47	48	49	48	45	46	Pu or Rn
Sites	222, 274	250	254	255, 268		213, 244, 287		
Est. % of Mapping Unit	15	30	20	20		10	5	

LANDFORM: Undulating to hilly terrain. Some areas of steep scarps or rocky outcrops.

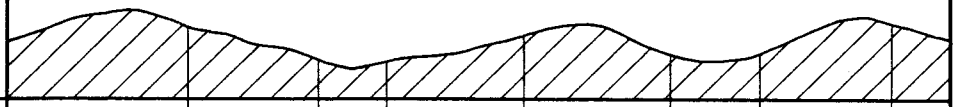
GEOLOGY: Lateritised Main Range Volcanics. Tm.

SOILS: Deep soils with dark reddish brown loams, usually snuffy, grading into dark reddish brown and reddish brown clay loams and light to medium clays (krasnozems and euchrozems). Shallow to moderately deep loams and clay loams, usually gravelly, occur on ridge crests and rocky areas.

VEGETATION: Tallowwood, pink bloodwood, small-fruited grey gum open forest with frequent areas of spotted gum, forest she-oak, Yarraman ironbark, wattle open forest on ridge crests. Occasional areas of "softwood scrub" species / Yarraman ironbark closed scrubs occur throughout.

APPENDIX I CONTINUED

Lt 4 (5 860 ha)



Land Unit and / or Associated Mapping Units	55	53	54	53	52	54	51	Pt 1
Sites	26		27	28	29		30, 41	
Est. % of Mapping Unit	20		5	25	30		20	

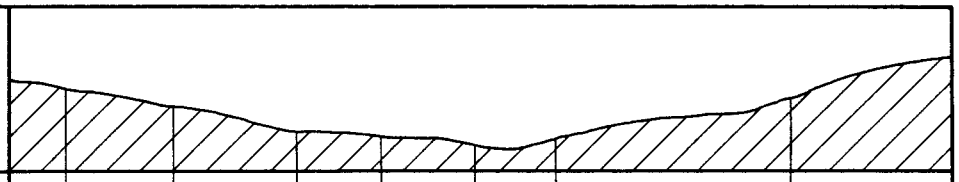
LANDFORM: Undulating to hilly terrain.

GEOLOGY: Lateritised Main Range Volcanics. Tm.

SOILS: Moderately deep to deep soils with very dark reddish brown to reddish brown clay loams to light clays grading into dark red to dark reddish brown medium to heavy clays (euchrozems and krasnozems). Some shallow loamy lithosols occur on ridge crests and rocky areas.

VEGETATION: Blackbutt, narrow-leaved ironbark, small-fruited grey gum open forests on broad ridges with open forests of tallowwood, brush box, rusty gum / Sydney blue gum / forest she-oak / small-fruited grey gum / narrow-leaved ironbark on lower slopes. Closed forests to closed scrubs of "softwood scrub" species occur on ridge crests and upper slopes.

Lt 5 (7 700 ha)



Land Unit and / or Associated Mapping Units	Lt 1	57	58	60	59	39	56	Lt 1
Sites		109	108	107	174	120, 173, 203	110, 176	
Est. % of Mapping Unit		20	20	15	10	<5	30	

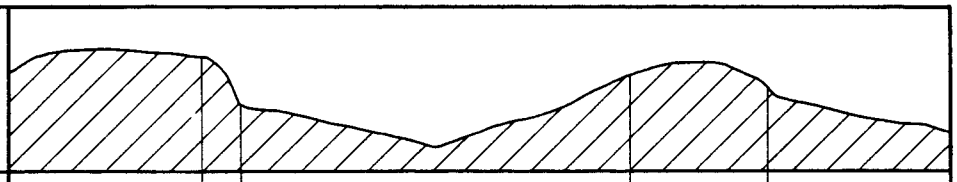
LANDFORM: Gently undulating to flat plains.

GEOLOGY: Lateritised Tertiary clays and sediments. Ts.

SOILS: Moderately deep to deep soils with dark brown to very dark reddish brown sandy loams to clay loams grading into brown, bright yellowish brown or reddish brown medium to heavy clays (xanthozems and krasnozems). Small areas of texture contrast soils with brown and yellowish brown clay subsoils (solodics) also occur.

VEGETATION: Gum-topped box or narrow-leaved ironbark open forest to woodland with frequent areas of Queensland blue gum / narrow-leaved ironbark / silver-leaved ironbark / rusty gum open forests. "Softwood scrub" species closed scrub occurs on higher areas and small-fruited grey gum, swamp mahogany / gum-topped box / wattle / Queensland blue gum open forest in low lying areas.

Lt 6 (15 960 ha)



Land Unit and / or Associated Mapping Units	45	46	Lt 1	44	Lt 1
Sites	213, 244, 287			55, 83	
Est. % of Mapping Unit	15	20		65	

LANDFORM: Steep hilly terrain with frequent scarps and rock outcrops.

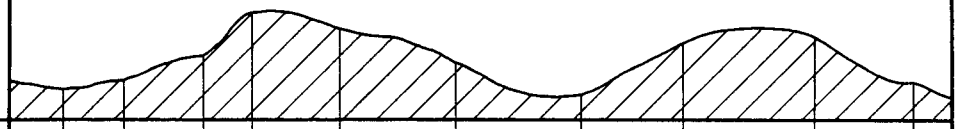
GEOLOGY: Lateritised Main Range Volcanics. Tm.

SOILS: Predominantly shallow, dark reddish brown, loamy lithosols. Frequent rock outcrops and lateritic gravel. Moderately deep, dark reddish brown loams grading into clay loams and light clays also occur (krasnozems and euchrozems).

VEGETATION: "Softwood scrub" species closed scrub on ridge crests with open forests to layered open forest of spotted gum, small-fruited grey gum/narrow-leaved ironbark / Queensland blue gum / rusty gum / black she-oak / wild rosemary / wattle on steep scarps and slopes and occasionally on ridge crests.

APPENDIX I CONTINUED

Lt 7 (14 100 ha)



Land Unit and / or Associated Mapping Units	Pz 6	7	62	46	45	61	37	62	50	62	7
Sites		52, 275	269		213, 244, 287	105	40, 86, 87, 111, 198		222, 274		
Est. % of Mapping Unit		<3	15	<7	15	20	15		25		

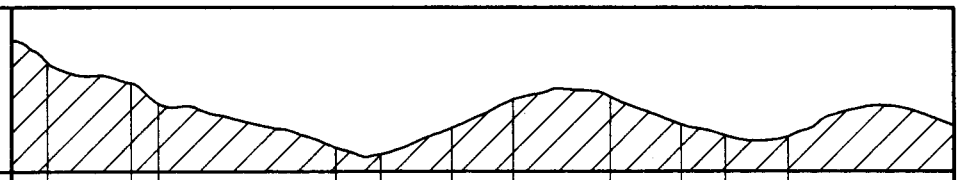
LANDFORM: Undulating to hilly terrain with occasional scarp areas.

GEOLOGY: Lateritised Main Range Volcanics. Tm.

SOILS: Moderately deep to deep soils with dark reddish brown loams, often snuffy, grading into dark reddish brown to dark red medium to heavy clays (krasnozems, euchrozems). Areas of shallow, often rocky, loamy lithosols occur on scarps and steep slopes.

VEGETATION: Spotted gum, small-fruited grey gum open forest on scarps and shallow soils to open forest of narrow-leaved ironbark, Yarraman ironbark, pink bloodwood, brown bloodwood / spotted gum / small-fruited grey gum on slopes and deeper soils. Frequent areas of closed scrub of "softwood scrub" species on upper slopes and ridge crests.

Tm 1 (22 230 ha)



Land Unit and / or Associated Mapping Units	Tm 2	1	5	2	4	3	6	1	3	7	4	1
Sites				3, 4, 9			5	6, 8	7, 90	58, 275		
Est. % of Mapping Unit			<3	15	5		<2	20	45	10		

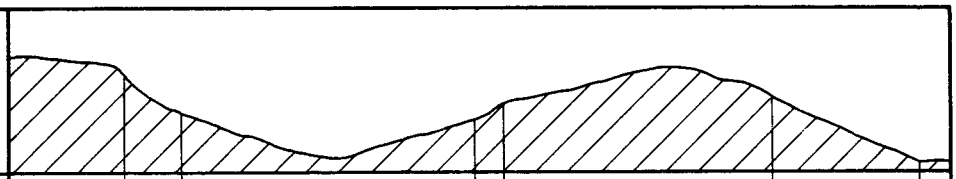
LANDFORM: Gently undulating to hilly terrain. Minor areas of stony drop-offs.

GEOLOGY: Main Range Volcanics. Tm.

SOILS: Shallow to moderately deep, dark, cracking clay soils (black earths). Some areas of linear gilgai occur on lower slopes. Small areas of shallow reddish brown and red clay loams and clays (euchrozems) also occur.

VEGETATION: Narrow-leaved ironbark or silver-leaved ironbark / Moreton Bay ash / Queensland blue gum woodland to open forest on sloping areas. Isolated "softwood scrub" species / narrow-leaved ironbark closed scrubs occur on some ridge crests. Queensland blue gum and rough-barked apple fringe drainage lines.

Tm 2 (28 290 ha)



Land Unit and / or Associated Mapping Units	8	11	9	5	10	9	4
Sites	1, 2, 10, 57	11			64		
Est. % of Mapping Unit	15	<1	35	10	35		<5

LANDFORM: Hilly to some steep hilly terrain. Some rock outcrops and stony areas.

GEOLOGY: Main Range Volcanics. Tm.

SOILS: Shallow to moderately deep, dark, cracking clays (black earths) on slopes with small areas of shallow stony lithosols. Occasional areas of moderately deep, red to reddish brown loams, clay loams and light clays (euchrozems) also occur.

VEGETATION: Narrow-leaved ironbark or silver-leaved ironbark or mountain coolibah / Queensland blue gum / Moreton Bay ash woodland to open forest occur on slopes. Occasional "softwood scrub" species closed scrub on steep slopes or scarps and Queensland blue gum, rough-barked apple, weeping bottle brush and river she-oak fringe drainage lines.

APPENDIX I CONTINUED

Tm 3 (50 430 ha)

Land Unit and / or Associated Mapping Units	11	5	12	5	13	11	15	14	13	5	12	13	15	8	13
Sites	11		49, 52					53						1, 2, 10, 57	
Est. % of Mapping Unit	<3	5	20		35		30	<3						5	

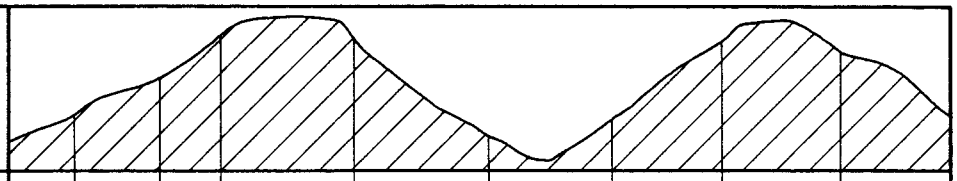
LANDFORM: Steep hilly to mountainous terrain. Frequent rock outcrops and stony areas, some very steep scree slopes.

GEOLOGY: Main Range Volcanics. Tm.

SOILS: Shallow, stony, loam and clay loam lithosols on steep slopes to shallow dark, cracking clays (black earths) on lower slopes.

VEGETATION: Narrow-leaved ironbark woodland to open forest to narrow-leaved ironbark, Queensland blue gum and small-fruited grey gum / silver-leaved ironbark / Moreton Bay ash / mountain coolibah woodland to open forest. Grass trees and rough-barked apple occur on scree slopes.

Tm 4 (11 400 ha)



Land Unit and / or Associated Mapping Units	19	18	20	16	17	19	17	18	19
Sites			50	51					
Est. % of Mapping Unit		8	<2	15	55	20			

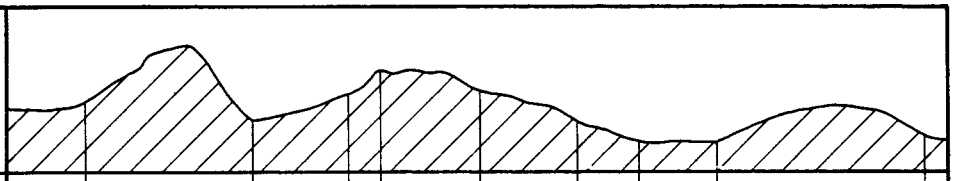
LANDFORM: Steep hilly to mountainous terrain with areas of rock outcrops and scarps.

GEOLOGY: Main Range Volcanics. Tm.

SOILS: Predominantly shallow, stony, loams and clay loams grading into shallow dark, cracking clays (lithosol-prairie intergrades, black earths). Small areas of shallow to moderately deep, reddish brown loams and clay loams grading into light to medium clays (krasnozems) on some upper slopes.

VEGETATION: Predominantly "softwood scrub" species / bunya pine / hoop pine closed forest with Queensland blue gum, Queensland stringybark, small-fruited grey gum, narrow-leaved ironbark open forests scattered throughout. Minor areas of open grassland also occur.

Tv 1 (7 330 ha)



Land Unit and / or Associated Mapping Units	Tv 3 or Rn	13	74	13	8	74	76	75	74	Qa 1
Sites					1, 2, 10, 57	331, 332		329, 330		
Est. % of Mapping Unit		30			20	30	<10	10		

LANDFORM: Undulating to hilly terrain.

GEOLOGY: Tertiary volcanics. Tv.

SOILS: Shallow to moderately deep, dark cracking clays (black earths) with some areas of linear gilgai on sloping areas. Shallow, stony lithosols on steeper slopes and ridges. Texture contrast soils with brown or yellowish brown clay subsoils (solodics) occur on some lower slopes.

VEGETATION: Narrow-leaved ironbark or silver-leaved ironbark / Moreton Bay ash / pink bloodwood open woodland to open forest on slopes with occasional poplar box woodland to open woodland on lower slopes. Isolated areas of "softwood scrub" species closed scrub occur on ridge crests.

APPENDIX I CONTINUED

Tv 2 (12 500 ha)

Land Unit and / or Associated Mapping Units	77	41	45	44	78	77	80	77	79	77	78	41	77	Tv 1
Sites		119, 122	213, 244, 287	55, 83		117	229							
Est. % of Mapping Unit		<5	<5	5	25	35	20		<5					

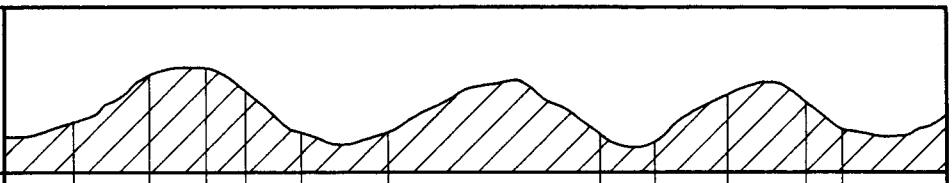
LANDFORM: Steep hilly to mountainous terrain. Some rock outcrops and scarps.

GEOLOGY: Tertiary volcanics. Tv.

SOILS: Shallow to moderately deep, dark cracking clays (black earths) on slopes with shallow, dark loams, clay loams and light clays (lithosol - prairie intergrades), frequently stony, on ridge crests and steep upper slopes. Small areas of shallow reddish brown loams and clay loams grading into clays (euchrozems, krasnozems) occur on some ridge crests and steep slopes.

VEGETATION: Predominantly "softwood scrub" species closed scrubs with occasional narrow-leaved ironbark, spotted gum and gum-topped box / "softwood scrub" species woodland to open forest scattered throughout. Spotted gum, small-fruited grey gum, pink bloodwood open forest occurs on some lateritised ridge crests.

Tv 3 (5 160 ha)



Land Unit and / or Associated Mapping Units	Pu 1	13	45	46	44	39	81	39	13	81	82	Tv 1
Sites			213, 244, 287		55, 83	120, 173, 203					95, 328	
Est. % of Mapping Unit		5	35	15	10	<5	30				<1	

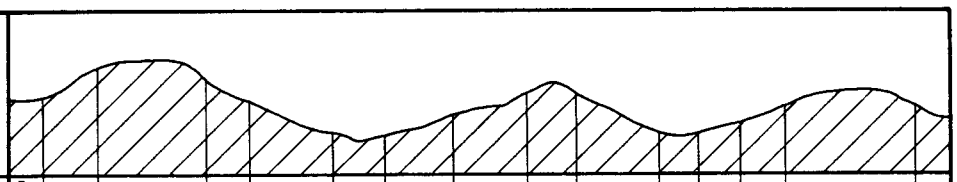
LANDFORM: Hilly to steep hilly terrain. Some steep scarp areas.

GEOLOGY: Lateritised Tertiary volcanics. Tv.

SOILS: Shallow to moderately deep, often rocky or stony loamy lithosols. Moderate areas of dark brown to very dark reddish brown loams, clay loams and light clays grading into reddish brown light to medium clays (krasnozems and euchrozems). Small areas of texture contrast soils with red clay subsoils (soloths) also occur.

VEGETATION: Narrow-leaved ironbark, spotted gum / pink bloodwood / small-fruited grey gum / wattle shrubby open forest with scattered areas of "softwood scrub" species closed scrub throughout. Gum-topped box or silver-leaved ironbark / Queensland blue gum open forest occurs on lower slopes and drainage lines.

Ts 1 (11 120 ha)



Land Unit and / or Associated Mapping Units	Pu, Tv or Lt	88	87	86	82	85	84	86	87	84	85	83	85	83	86
Sites		97, 325	322	338	95, 328	98, 118, 324				125, 126				99	
Est. % of Mapping Unit		<3	15	10	15	7				10				40	

LANDFORM: Undulating to hilly terrain.

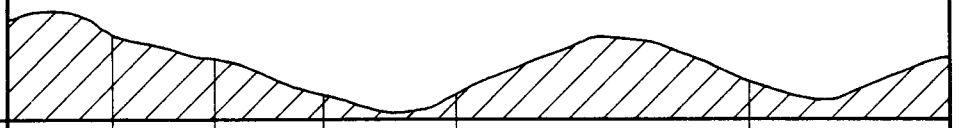
GEOLOGY: Tertiary sediments and Oakdale Sandstones. Ts / To.

SOILS: Predominantly moderately deep to deep texture contrast soils with dark brown to dull yellowish brown sandy loam surfaces overlying yellowish brown, brown or reddish brown medium to heavy clay subsoils (soloths, solodics, yellow podzolics). Small areas of shallow rocky coarse textured lithosols and moderately deep sands (siliceous sands) occur throughout. Occasional areas of reddish brown and dark reddish brown loam and clay loam gradational textured soils also occur.

VEGETATION: Narrow-leaved ironbark, Queensland blue gum woodland to open forest on slopes with frequent areas of narrow-leaved ironbark / rusty gum / Moreton Bay ash / spotted gum / Yarraman ironbark open forest on rock or shallow soils. Minor areas of brigalow / black tea-tree open forests on slopes and gum-topped box, broad-leaved apple open woodland to open forest associated with drainage lines.

APPENDIX I CONTINUED

Jm 1 (4 870 ha)



Land Unit and / or Associated Mapping Units	Jm 3	91	90	92	89	Pz 1 or Pz 2
Sites		69	70	66, 68	67	
Est. % of Mapping Unit		15	25	25	35	

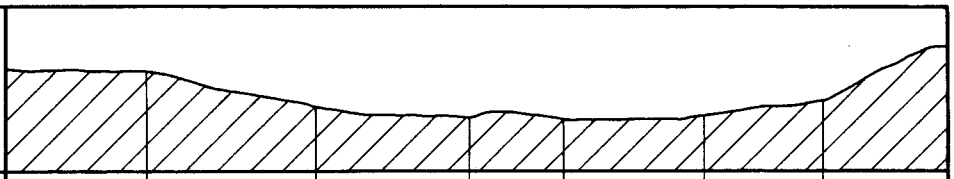
LANDFORM: Gently undulating to some hilly terrain.

GEOLOGY: Marburg Formation. Jm, Jlm.

SOILS: Shallow to moderately deep, brown cracking clays (brown clays) with areas of texture contrast soils with dark brown sandy clay loam to clay loam - sandy surfaces overlying brown, reddish brown or yellowish brown clay subsoils (red brown earths and solodics).

VEGETATION: Predominantly "Softwood scrub" species, belah, black tea - tree and wilga closed scrub on upper slopes and ridges with brigalow, poplar box, narrow - leaved ironbark / Queensland blue gum / wilga open forest on lower slopes.

Jm 2 (3 380 ha)



Land Unit and / or Associated Mapping Units	95	93	94	96	94	93	Jm 3
Sites	61	60	76	77			
Est. % of Mapping Unit	17	45	35	3			

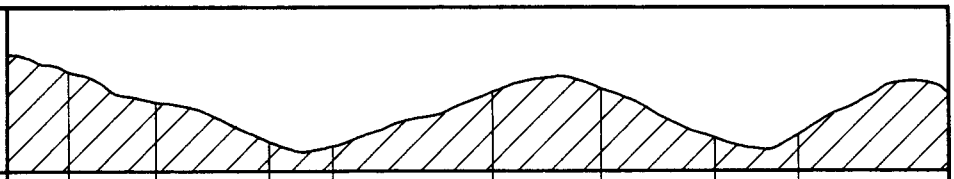
LANDFORM: Gently undulating to flat plains.

GEOLOGY: Marburg Formation. Jm, Jlm.

SOILS: Moderately deep to deep texture contrast soils with brownish black to dark brown sandy loam to sandy clay loam surfaces overlying mottled greyish yellow brown to dull yellowish brown medium to heavy clays (solodics and solodized solonetz). Moderate areas of deep, uniform coarse sands (siliceous sands) also occur as well as minor areas of shallow sandy lithosols.

VEGETATION: Narrow - leaved ironbark or gum - topped box or Queensland blue gum open forests with considerable areas of narrow - leaved ironbark / rusty gum / pink bloodwood / spotted gum / bull oak / paper bark tea - tree / wattle open forest to layered open forest. Occasional open forests of rusty gum, white cypress pine, thready bark she - oak, small - fruited grey gum, dogwood and wattle occur on sandy areas.

Jm 3 (15 620 ha)



Land Unit and / or Associated Mapping Units	Tm	93	97	99	93	95	97	99	98
Sites		60				61			65
Est. % of Mapping Unit		25	20	5		20			30

LANDFORM: Undulating to hilly terrain.

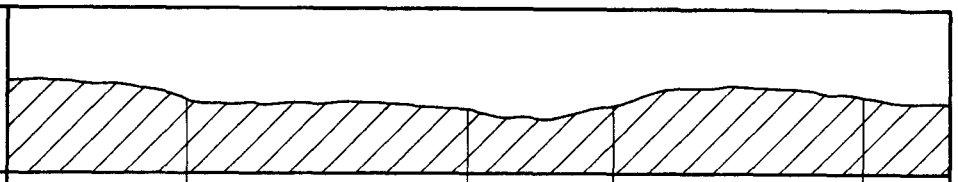
GEOLOGY: Marburg Formation. Jm, Jlm.

SOILS: Moderately deep to deep texture contrast soils with brownish black to dark brown sandy loam to sandy clay loam surfaces overlying mottled dull yellowish brown or dull reddish brown medium to heavy clay subsoils (solodics and solodized solonetz). Shallow, rocky or stony, sandy or sandy loam lithosols occur on ridge crests.

VEGETATION: Narrow - leaved ironbark open forest with frequent areas of open forest of gum - topped box or Queensland blue gum / narrow - leaved ironbark / dogwood / wattle. Rusty gum, pink bloodwood, spotted gum, narrow - leaved ironbark, wattle open forest frequently occurs on ridges.

APPENDIX I CONTINUED

Je 1 (7 000 ha)



Land Unit and / or Associated Mapping Units	152	151	150	151	153
Sites	169, 184	167	168		187, 237, 238
Est. % of Mapping Unit	15	45	20		20

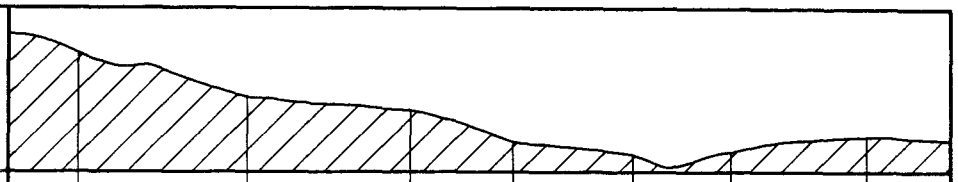
LANDFORM: Flat to gently undulating terrain.

GEOLOGY: Evergreen Formation with small areas of Carboniferous sediments. Jle / C.

SOILS: Moderately deep to deep texture contrast soils with dark brown to greyish brown gravelly sandy loams and loams overlying yellowish brown and dull reddish brown medium to heavy clay subsoils (soloths, some solodics). Small areas of shallow, sandy lithosols also occur.

VEGETATION: Narrow-leaved ironbark, Queensland blue gum / bull oak / paper bark tea-tree woodland to open forest. Gum-topped box open forest on lower slopes and spotted gum, narrow-leaved ironbark, rusty gum, wattle open forests on higher areas or shallow soils.

Je 2 (4 650 ha)



Land Unit and / or Associated Mapping Units	Je 3	154	152	155	151	156	151	Je 1
Sites			169, 184	170	167	185		
Est. % of Mapping Unit		30	30	10	25	<5		

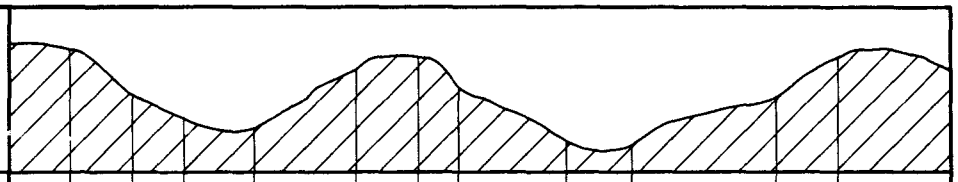
LANDFORM: Undulating to low hilly terrain. Occasional areas rock outcrop.

GEOLOGY: Evergreen Formation. Jle.

SOILS: Shallow to moderately deep texture contrast soils with dark brown or greyish brown loam and clay loam surfaces overlying brown or reddish brown medium to heavy clays (soloths, solodics). Areas of shallow, coarse textured, often rocky or stony lithosols occur as well as scattered areas of moderately deep sands.

VEGETATION: Predominantly narrow-leaved ironbark, Queensland blue gum / bull oak / paper bark tea-tree / dogwood / wattle, woodland to layered open forest with open forest of rusty gum, spotted gum, wattle on ridges and gum-topped box open forests on lower slopes.

Je 3 (9 690 ha)



Land Unit and / or Associated Mapping Units	160	159	157	158	157	160	159	157	156	158	159	160
Sites								186	185	188		
Est. % of Mapping Unit						12		15	<3	30	40	

LANDFORM: Steep hilly terrain. Some rock outcrops and scarp areas.

GEOLOGY: Evergreen Formation, some areas lateritised. Jle.

SOILS: Shallow, sandy or loamy lithosols associated with rock outcrops, scarps and upper slopes. Shallow to moderately deep texture contrast soils with dark brown or greyish brown, often gravelly or stony, sandy loam and loam surfaces overlying brown, yellowish brown or red clay subsoils (soloths, solodics). Small areas of deep, red loams and clay loams (krasnozems) occur.

VEGETATION: Spotted gum, rusty gum, narrow-leaved ironbark, wattle, dogwood open forest to layered open forest on upper slopes and ridge crests. Woodland to open forest of swamp mahogany, rough-barked apple and Queensland blue gum occurs on lower slopes and drainage lines.

APPENDIX I CONTINUED

Ru 1 (4 560 ha)

Land Unit and / or Associated Mapping Units	Tm or Lt	100	105	101	104	101	103	102	Pb
Sites		56		18	19, 20		17	21, 24	
Est. % of Mapping Unit		10	<5	50	<5		20	10	

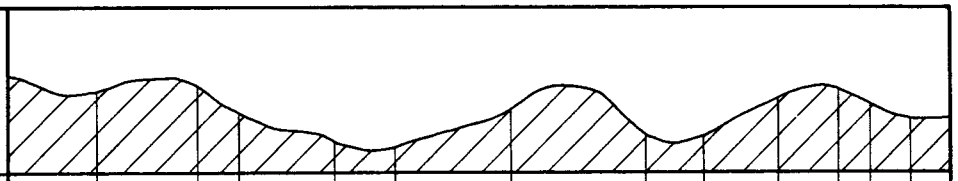
LANDFORM: Undulating to steep hilly terrain with frequent rock outcrops and scarps.

GEOLOGY: Tarong Beds. Rut.

SOILS: Shallow, stony, sandy or loamy lithosols on upper slopes, rock outcrops and scarps. Shallow to moderately deep soils with brownish black to dark brown loamy sand to sandy loam surfaces overlying dull yellowish brown mottled clay subsoils (solodics and solodized solonetz). Areas of moderately deep loamy coarse sands (siliceous sands) also occur.

VEGETATION: Rusty gum, brown bloodwood, Yarraman ironbark, dogwood, wattle open forest to layered open forest occurs on steep slopes and ridge crests. Gum-topped box or spotted gum or narrow-leaved ironbark / broad-leaved apple / swamp mahogany / coast banksia woodland to open forest occurs on lower slopes and drainage lines. "Softwood scrub" species / narrow-leaved ironbark closed scrub occur on some upper slopes

Rm 1 (10 980 ha)



Land Unit and / or Associated Mapping Units	Rm 2	174	172	173	175	173	172	175	171	174	176	175	Pu 1
Sites		271		242, 243	321				273		253		
Est. % of Mapping Unit		12		32	10		30		15		<1		

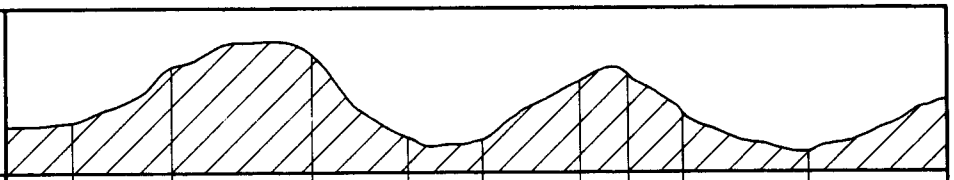
LANDFORM: Hilly terrain.

GEOLOGY: Aranbanga Beds. Rma, Ra.

SOILS: Shallow to moderately deep texture contrast soils with sandy loam to clay loam surfaces overlying yellowish brown or reddish brown clay subsoils (solodics and soloths). Lithosols occur on upper slopes and rocky ridge crests.

VEGETATION: Narrow-leaved ironbark, Queensland blue gum open woodland to open forest with spotted gum, rusty gum, wattle open forest on ridges and gum-topped box or silver-leaved ironbark or narrow-leaved ironbark / bull oak / Queensland blue gum woodland to open forest on lower slopes and valley floors.

Rm 2 (26 460 ha)



Land Unit and / or Associated Mapping Units	Rm 1	178	174	177	175	178	172	177	175	Pu 2 or Rn 4
Sites		270	271						321	
Est. % of Mapping Unit		30	20	30			15		<5	

LANDFORM: Steep hilly to mountainous terrain.

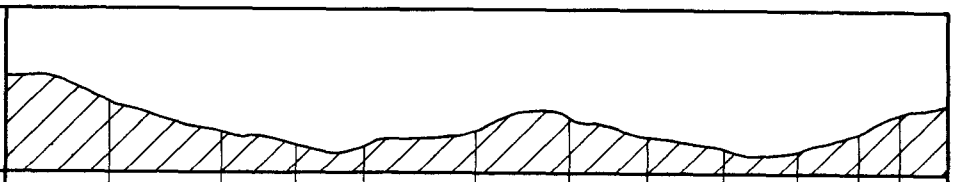
GEOLOGY: Aranbanga Beds. Rma, Ra.

SOILS: Coarse textured lithosols with frequent areas rock outcrops. Moderate areas texture contrast soils with loamy sands to sandy loam surfaces overlying yellowish brown clay subsoils on lower slopes (soloths).

VEGETATION: Narrow-leaved ironbark open forest with narrow-leaved ironbark / pink bloodwood / Queensland blue gum / cypress pine / forest she-oak / Moreton Bay ash open forest with spotted gum open forests on ridge crests and gum-topped box or Queensland blue gum, broad-leaved apple on lower slopes and drainage lines.

APPENDIX I CONTINUED

Re 1 (15 270 ha)



Land Unit and / or Associated Mapping Units	Tv 2	206	209	210	208	207	209	206	210	206	211	207
Sites			196, 206, 230		205, 209	127				128, 207, 231	45, 142, 208	
Est. % of Mapping Unit			15		6	25			5	45	4	

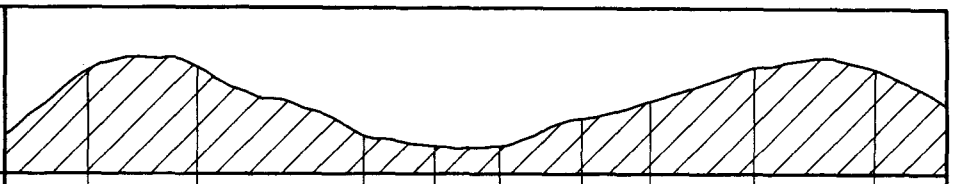
LANDFORM: Level to gently undulating terrain.

GOELOGY: Esk Formation and areas of andesitic volcanics. Re.

SOILS: Moderately deep texture contrast soils with sandy loam to clay loam surfaces overlying dark brown to yellowish brown clay subsoils (solodics and soloths). Dark cracking clays (black earths) occur on valley floors.

VEGETATION: Narrow-leaved ironbark, Queensland blue gum grassy woodland to open forest with gum-topped box woodland to open forest mainly on lower slopes. Queensland blue gum, broad-leaved apple woodlands on valley floors.

Re 2 (10 290 ha)



Land Unit and / or Associated Mapping Units	272	212	211	213	210	211	213	211	214	271
Sites		44, 204	45, 142, 208						141	
Est. % of Mapping Unit	10	25	45		5		10		2	3

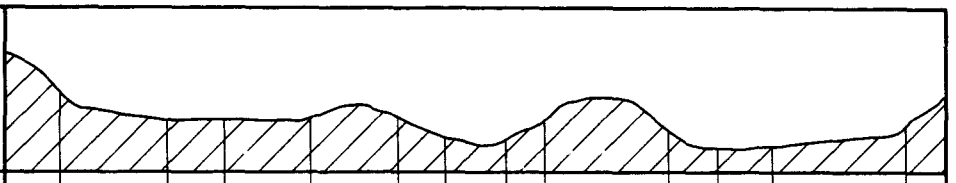
LANDFORM: Undulating to hilly terrain.

GEOLOGY: Esk Formation and minor andesitic volcanics. Re.

SOILS: Moderately deep texture contrast soils with dark clay loam surfaces overlying dark brown to yellowish brown clay subsoils (solodics and grey brown podzolics). Shallow lithosols and loams occur on stony ridge crests and on steeper slopes. Rock outcrops are scattered.

VEGETATION: Narrow-leaved ironbark, Queensland blue gum and silver-leaved ironbark grassy woodland to open forest with gum-topped box woodland to open forest on lower slopes and some ridges. Small areas of "softwood scrub" species closed scrub. Queensland blue gum, broad-leaved apple woodland on valley floors.

Rn 1 (8 800 ha)



Land Unit and / or Associated Mapping Units	Tv 2	216	215	218	217	219	220	219	Lt 2	215	221	215	Lt 2
Sites		116		121	235	236						232, 233	
Est. % of Mapping Unit		25		5	5	5	5				10	45	

LANDFORM: Gently undulating plains and low hills.

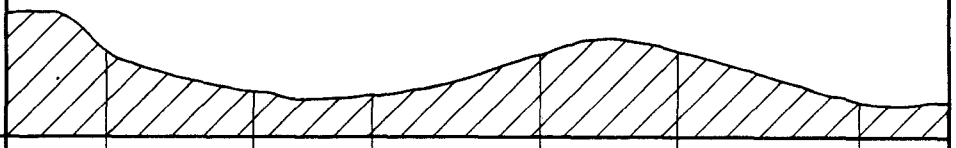
GEOLOGY: Neara Volcanics and minor sandstones. Rn.

SOILS: Moderately deep to deep, dark and brown cracking clays (black earths and brown clays) with small areas of texture contrast soils with loam to sandy clay loam surfaces overlying brown clay subsoils (solodics and soloths) on more hilly terrain. Minor stony ridges.

VEGETATION: Brigalow, belah / black tea-tree open forest with "softwood scrub" species closed scrub on upper slopes. Rusty gum, narrow-leaved ironbark open forest on stony ridges. Gum-topped box, narrow-leaved ironbark and Queensland blue gum open forest on valley floors.

APPENDIX I CONTINUED

Rn 2 (2270 ha)



Land Unit and / or Associated Mapping Units	Rn 4	222	224	222	223	222	Qa 1
Sites			282	278, 279, 281	259, 280		
Est. % of Mapping Unit			5	80	15		

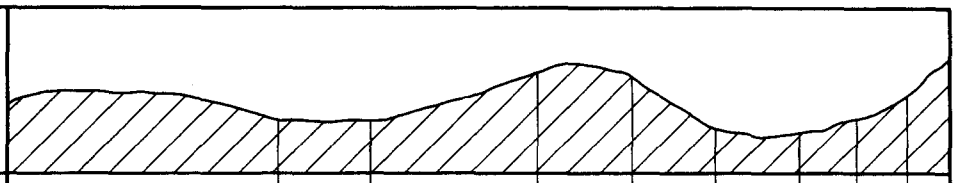
LANDFORM: Moderately undulating terrain and lower slopes of adjoining hills.

GEOLOGY: Neara Volcanics. Rn.

SOILS: Moderately deep to deep, dark brown cracking clays (black earths and brown clays) with minor texture contrast soils.

VEGETATION: Queensland blue gum, Moreton Bay ash / narrow-leaved ironbark grassy woodland.

Rn 3 (19390 ha)



Land Unit and / or Associated Mapping Units	227	228	225	226	229	228	227	225	Rn 4
Sites	164, 166	165, 283, 323	177, 182, 227, 228, 257, 258, 285, 290, 297, 327	178, 284	144, 163, 180, 181, 226, 292				
Est. % of Mapping Unit	13	7	45	25	10				

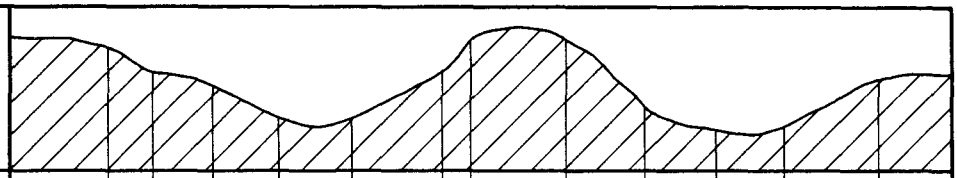
LANDFORM: Gently undulating to hilly terrain.

GEOLOGY: Neara Volcanics. Rn.

SOILS: Moderately deep texture contrast soils with dark clay loam surfaces overlying dark brown to dark reddish brown clay subsoils (soloths, solodics and non-calcic brown soils). Minor loamy lithosols on ridges and dark cracking clays (black earths) on valley floors.

VEGETATION: Narrow-leaved ironbark, Queensland blue gum grassy woodland with areas of silver-leaved ironbark woodland. Queensland blue gum, broad-leaved apple woodland on valley floors

Rn 4 (111900 ha)



Land Unit and / or Associated Mapping Units	230	229	225	229	228	229	231	230	231	225	228	229	Rn 3
Sites					165, 283, 323	144, 163, 180, 181, 226, 292		179, 210, 225, 260	143	177, 182, 227, 228, 257, 258, 285, 290, 297, 327			
Est. % of Mapping Unit					<3	40		30	25	<3			

LANDFORM: Strongly undulating to steep hilly terrain with deeply dissected areas.

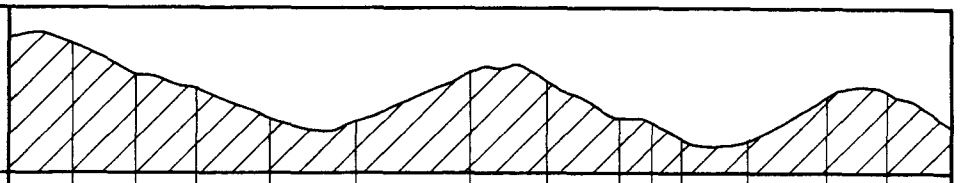
GEOLOGY: Neara Volcanics. Rn.

SOILS: Shallow to moderately deep, gravelly, texture contrast soils with loam to clay loam surfaces overlying dark brown to yellowish brown clay subsoils (soloths, solodics and grey brown podzolics). Shallow stony lithosols on ridges and steeper slopes. Areas of rock outcrop and scattered surface stone.

VEGETATION: Narrow-leaved ironbark, silver-leaved ironbark / scattered pink bloodwood / Queensland blue gum grassy woodland to open forest. Queensland blue gum, broad-leaved apple woodland and fringing forest occur on valley floors and minor drainage lines.

APPENDIX I CONTINUED

Rn 5 (3880 ha)



Land Unit and / or Associated Mapping Units	233	232	235	232	237	235	233	232	233	232	234	236	233	Rn 4
Sites				326			291							
Est. % of Mapping Unit				50	2	10	28				5	5		

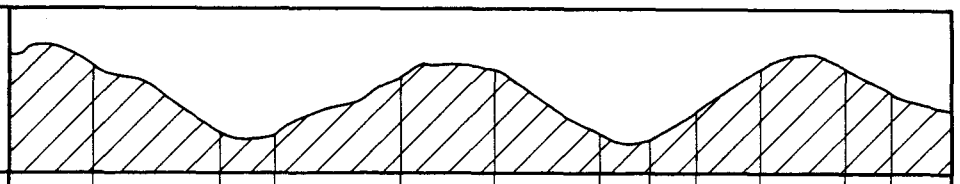
LANDFORM: Moderately undulating to steep hilly terrain.

GEOLOGY: Neara Volcanics with minor areas of Oakdale Sandstone and Tertiary volcanics. Rn / To, Tv.

SOILS: Moderately deep, dark, brown and red clays (black earths and brown and red clays) with shallower texture contrast soils with yellowish brown clay subsoils on more hilly areas (solodics and solodized solonetz). Minor shallow stony lithosols and red and brown gradational soils on some upper slopes and ridges. Occasional rock outcrop.

VEGETATION: "Softwood scrub" species closed scrub and areas of Queensland blue gum, gum-topped box woodland to open forest on lower slopes. Gum-topped box, small-fruited grey gum, narrow-leaved ironbark shrubby open forest in hilly areas.

Rn 6 (9450 ha)



Land Unit and / or Associated Mapping Units	239	240	241	238	242	240	241	240	238	239	238	Rn 3
Sites				316	307					315		
Est. % of Mapping Unit			7	25	8	40				20		

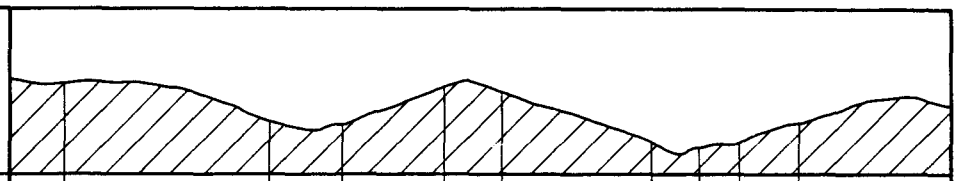
LANDFORM: Steep hilly to mountainous terrain, deeply dissected in parts.

GEOLOGY: Neara Volcanics. Rn.

SOILS: Shallow to moderately deep texture contrast soils with dark loam to clay loam surfaces overlying dark reddish brown to orange clay subsoils (red and yellow podzolics, soloths). Areas of shallow, stony lithosols with some rock outcrop.

VEGETATION: Narrow-leaved ironbark, small-fruited grey gum, Queensland blue gum / brush box / "softwood scrub" species layered open forest. Areas of "softwood scrub" species closed scrub throughout with small areas of gum topped box shrubby woodland on ridges.

Pb 1 (22600 ha)



Land Unit and / or Associated Mapping Units	Pb 2	119	121	118	115	118	121	122	118	120
Sites		115	199, 200	114, 145, 202, 337				201		129, 130
Est. % of Mapping Unit		20	10	30	10			5		25

LANDFORM: Undulating to hilly terrain.

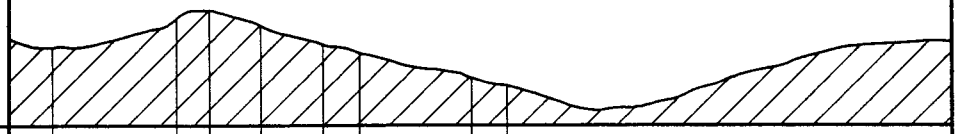
GEOLOGY: Boondooma Igneous Complex. P-Rb, Pgy.

SOILS: Shallow to moderately deep texture contrast soils with sandy loam to clay loam surfaces overlying reddish brown, brown or yellowish brown clay subsoils (yellow, brown or red podzolics and soloths). Small areas of shallow lithosols on ridge crests and brown clays on valley floors.

VEGETATION: Narrow-leaved ironbark, Queensland blue gum, Moreton Bay ash / silver-leaved ironbark / broad-leaved apple woodland to open forest with spotted gum, rusty gum, wattle open forests on ridge crests and Queensland blue gum, broad-leaved apple woodland on valley floors.

APPENDIX I CONTINUED

Pb 2 (116 190 ha)



Land Unit and / or Associated Mapping Units	Pb 1	110	115	106	110	111	110	111	112
Sites			150, 161, 162, 240	25, 146, 339			13	12, 132, 156	112, 131, 147, 157, 158, 159
Est. % of Mapping Unit			<5	15			25	20	35

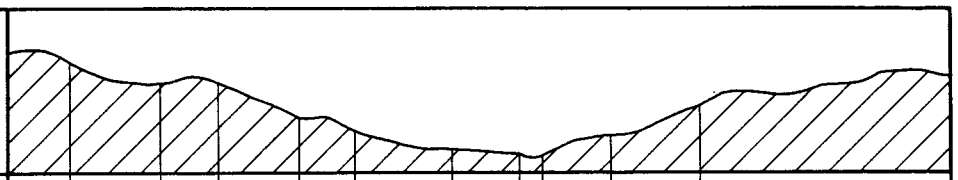
LANDFORM: Undulating to hilly terrain.

GEOLOGY: Boondooma Igneous Complex. P-Rb, Pgy.

SOILS: Moderately deep to deep texture contrast soils with loamy sand to sandy loam surfaces overlying yellowish brown clay subsoils, usually mottled (soloths, solodics, solodized solonetz). Rock outcrops and sandy lithosols occur on ridge crests throughout.

VEGETATION: Narrow-leaved ironbark or Queensland blue gum woodland to open forest with narrow-leaved ironbark, Queensland blue gum, pink bloodwood / quinine / bull oak / Moreton Bay ash / rusty gum, woodland to open forest with understorey species of dogwood and wattle frequently occurring.

Pb 3 (33 870 ha)



Land Unit and / or Associated Mapping Units	106	107	106	107	106	109	108	4	106	107	106
Sites				16		22, 23, 47			25, 146, 339		
Est. % of Mapping Unit				35		19	10	<1	35		

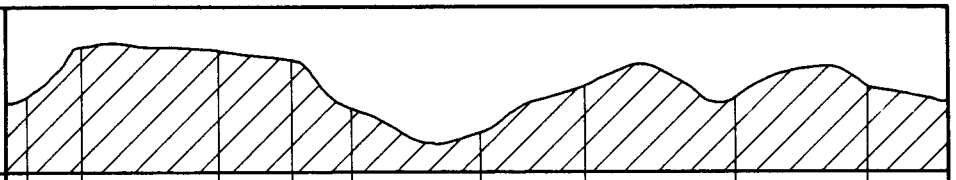
LANDFORM: Hilly to steep hilly terrain with numerous rock outcrops.

GEOLOGY: Boondooma Igneous Complex. P-Rb, Pgy.

SOILS: Shallow loamy sands and coarse textured lithosols on ridge crests and associated with rock outcrops. Moderately deep texture contrast soils with loamy sand to sandy loam surfaces overlying yellowish brown clay subsoils, usually mottled (soloths, solodized solonetz), on sloping areas. Minor areas of moderately deep coarse sands (siliceous sands).

VEGETATION: Narrow-leaved ironbark, Queensland blue gum open forests with narrow-leaved ironbark, Queensland blue gum / silver-leaved ironbark / Moreton Bay ash / pink bloodwood open forests often with quinine or bull oak or wattles as an understorey. Isolated areas of grass tree, rusty gum open shrublands on sandy areas.

Pb 4 (26 380 ha)



Land Unit and / or Associated Mapping Units	Pb 2	116	113	114	115	112	117	115	116	Pb 2
Sites			149	133	150, 161, 162, 240	112, 131, 147, 157, 158, 159	48, 113, 160		148	
Est. % of Mapping Unit			15	8	35	6	16		20	

LANDFORM: Hilly terrain often with rocky scarps and drop offs.

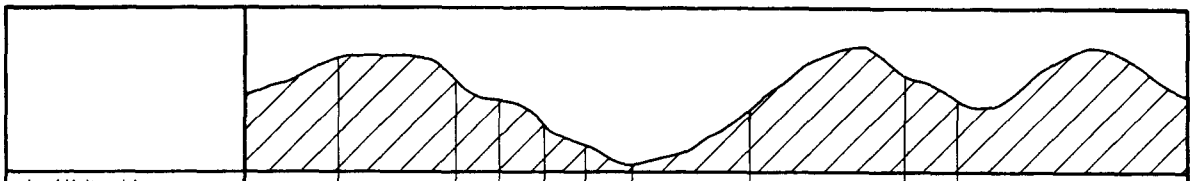
GEOLOGY: Lateritised Boondooma Igneous Complex. P-Rb, Pgy.

SOILS: Shallow, reddish brown loamy lithosols and rock outcrops to moderately deep to deep soils with dark reddish brown loams and clay loams grading into red and reddish brown light clays (red earths). Areas of moderately deep texture contrast soils with reddish brown to brownish black clay loams overlying red and yellowish red clay subsoils (red podzolics, soloths and solodics) also occur on slopes.

VEGETATION: Queensland peppermint, pink bloodwood, small-fruited grey gum, black she-oak open forest with spotted gum, rusty gum / dogwood, open forest on rocky scarps and narrow-leaved ironbark, Queensland blue gum, Moreton Bay ash / wattle / dogwood / red ash woodland to layered open forest on slopes.

APPENDIX I CONTINUED

Pb 5 (15 180 ha)



Land Unit and / or Associated Mapping Units	Pb 3	123	124	123	125	112	108	123	124	123
Sites						112, 131, 147, 157 158, 159				
Est. % of Mapping Unit		30	40		15	10	5			

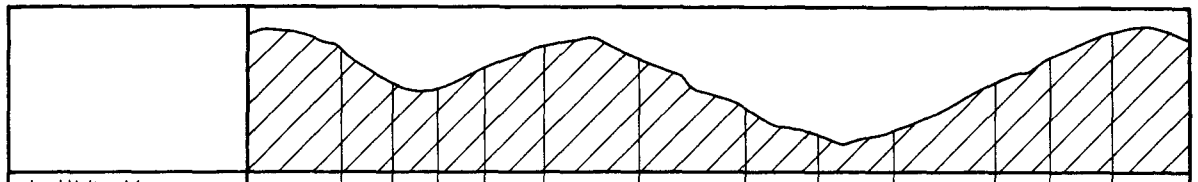
LANDFORM: Steep hilly to very steep hilly terrain.

GEOLOGY: Boondooma Igneous Complex. P-Rb, Pgy.

SOILS: Frequent rock outcrops and shallow coarse textured lithosols on ridges and steep slopes. Shallow to moderately deep texture contrast soils with loamy sand surfaces overlying yellowish brown and brown clay subsoils (soloths and solodics) on slopes and valley floors.

VEGETATION: Narrow-leaved ironbark open forests with frequent areas of narrow-leaved ironbark, Queensland blue gum, pink bloodwood layered open forests and spotted gum / quinine / rusty gum / grass trees / wattle layered open forests on ridge crests or rocky areas.

Rs 1 (1 040 ha)



Land Unit and / or Associated Mapping Units	202	201	205	204	201	202	201	203	205	201	204	201	202
Sites							320						
Est. % of Mapping Unit				20		25	40	10	5				

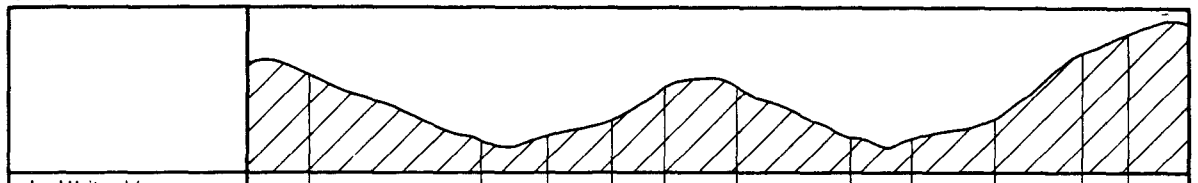
LANDFORM: Steep hilly to mountainous terrain.

GEOLOGY: Station Creek Adamellite. Rs.

SOILS: Shallow to moderately deep sandy texture contrast soils with sandy loam surfaces overlying brown to yellowish brown clay subsoils (soloths, yellow and brown podzolics). Small areas of shallow sandy lithosols on ridges.

VEGETATION: Narrow-leaved ironbark, white mahogany, small-fruited grey gum, pink bloodwood layered open forest with narrow-leaved ironbark, gum-topped box woodland to open forest on lower slopes and valley floors. Areas of "softwood scrub" species closed scrub occur throughout.

Rg 1 (5 060 ha)



Land Unit and / or Associated Mapping Units	244	243	248	243	245	244	243	248	243	245	247	246
Sites						334	335					
Est. % of Mapping Unit						20	35	5		20	7	13

LANDFORM: Moderately undulating to steep hilly terrain.

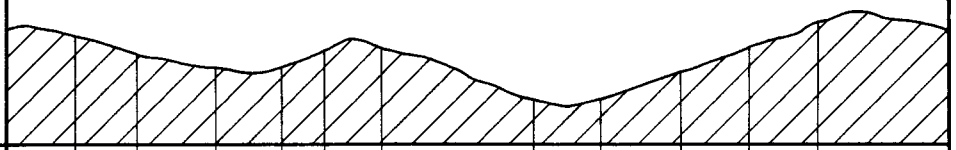
GEOLOGY: Granites of undifferentiated Triassic intrusions. Rlg.

SOILS: Shallow to moderately deep bleached texture contrast soils with brown sandy loam surfaces overlying reddish brown to orange clay subsoils (solodics and solodized solonetz). Minor shallow siliceous sands and gravelly sandy lithosols on ridge crests and steeper slopes with rock outcrop.

VEGETATION: Narrow-leaved ironbark, Queensland blue gum / silver-leaved ironbark / pink bloodwood grassy woodland to open forest. Spotted gum, narrow-leaved ironbark open forest on steeper slopes and ridges and Queensland blue gum, broad-leaved apple woodland on narrow valley floors.

APPENDIX I CONTINUED

Rg 2 (3390 ha)



Land Unit and / or Associated Mapping Units	251	250	249	253	250	251	252	248	249	252	249	250
Sites		262	265	266		261, 263	264					
Est. % of Mapping Unit		20	30	4		20	25	1				

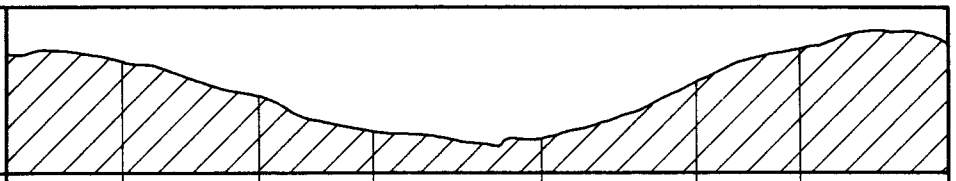
LAND FORM: Hilly to mountainous terrain, deeply dissected in places.

GEOLOGY: Granites of undifferentiated Triassic intrusions. Rlg.

SOILS: Shallow to moderately deep texture contrast soils with brownish black to brown loamy sand to sandy loam surface overlying brown to dull yellowish brown clay subsoils (soloths and podzolics). Shallow, stony, sandy lithosols and minor siliceous sands occur on stony ridges and with areas of rock outcrop.

VEGETATION: Narrow-leaved ironbark, pink bloodwood, small-fruited grey gum / forest she-oak / "softwood scrub" species / wattles layered open forest. Areas of "softwood scrub" species closed scrub throughout and gum-topped box open forest on lower slopes.

Pk 1 (5420 ha)



Land Unit and / or Associated Mapping Units	257	254	258	256	254	257	255
Sites			299	305, 306	295	293, 298	294
Est. % of Mapping Unit			5	10	45	10	30

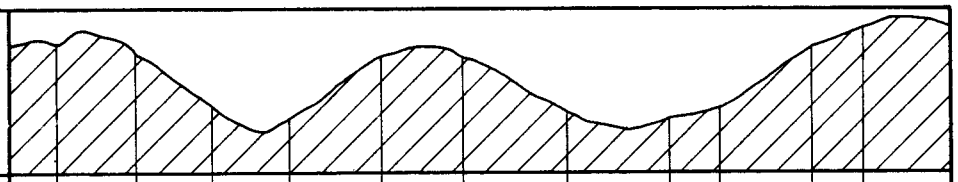
LANDFORM: Gently undulating to low hilly terrain.

GEOLOGY: Kingaham Creek Granodiorite. P-Rk.

SOILS: Moderately deep texture contrast soils with loamy coarse sand to sandy clay loam surfaces overlying dark brown to orange clay subsoils (soloths, solodics and solodized solonetz) with small areas of shallow, stony, sandy lithosols. Silcrete surface stone and rock outcrop in places.

VEGETATION: Narrow-leaved ironbark, Queensland blue gum / rusty gum / pink bloodwood grassy open forest and areas of rusty gum open forest on broad ridges. Gum-topped box open forest and broad-leaved apple, Queensland blue gum woodland occur on lower slopes and valley floors.

Pk 2 (2040 ha)



Land Unit and / or Associated Mapping Units	Pz 2	262	261	263	259	260	259	263	258	261	260	262
Sites						308, 312	311		299			313, 314
Est. % of Mapping Unit			15	<5		20	40		5			15

LANDFORM: Strongly undulating to steep hilly terrain.

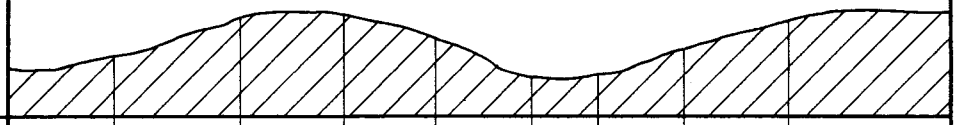
GEOLOGY: Kingaham Creek Granodiorite with some Gallangowan Granodiorite. P-Rk / Cug.

SOILS: Shallow to moderately deep texture contrast soils with dark sandy loam to sandy clay loam surfaces overlying reddish brown to bright yellowish brown clay subsoils (soloths, red and yellow podzolics). Small areas of shallow, gravelly lithosols and minor gradational textured soils. Minor areas of rock outcrop on steeper slopes and ridges.

VEGETATION: "Softwood scrub" species closed scrub and small-fruited grey gum, narrow-leaved ironbark, pink bloodwood, Queensland blue gum / brush box / wattle / "softwood scrub" species layered open forest.

APPENDIX I CONTINUED

Pt 1 (3780 ha)



Land Unit and / or Associated Mapping Units	128	127	51	126	127	129	128	126	51
Sites			30, 41	33	34	38, 336	31		
Est. % of Mapping Unit			10	35	35	5	15		

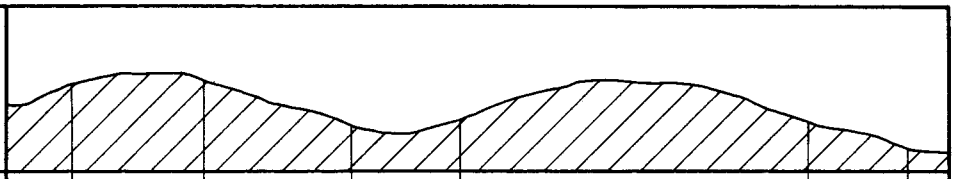
LANDFORM: Undulating to low hilly terrain.

GEOLOGY: Taromeo Tonalite. Some lateritised areas. P-Rt.

SOILS: Moderately deep to deep texture contrast soils with dark reddish brown to brownish black loams and fine sandy loams overlying yellowish brown and reddish brown clay subsoils (red, yellow or brown podzolics, soloths). Small areas of shallow red gradational soils (euchrozems) occur on ridge crests.

VEGETATION: Silver-leaved ironbark, Queensland blue gum open forest with open forest of narrow-leaved ironbark, forest she-oak, rusty gum, pink bloodwood on ridges. Small areas of blackbutt, brush box and "softwood scrub" species layered open forest are common throughout.

Pt 2 (6860 ha)



Land Unit and / or Associated Mapping Units	132	130	131	129	132	133	Qa 1
Sites			37	38, 336	35	36	
Est. % of Mapping Unit		12	37	15	35	<1	

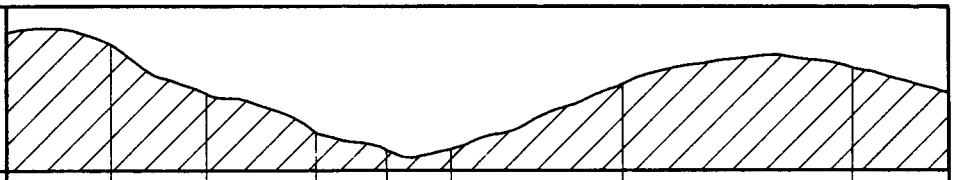
LANDFORM: Undulating to hilly terrain.

GEOLOGY: Taromeo Tonalite. P-Rt.

SOILS: Shallow sandy lithosols with frequent rock outcrops on ridges and upper slopes. Moderately deep texture contrast soils with brown and brownish black loamy sand and sandy loam surfaces overlying yellowish brown clay subsoils (soloths, solodics).

VEGETATION: Narrow-leaved ironbark, silver-leaved ironbark, Queensland blue gum / Moreton Bay ash / wattle open forest with layered open forest of rusty gum, black she-oak, narrow-leaved ironbark, Queensland blue gum and wattles on ridge crests and upper slopes.

Pt 3 (4670 ha)



Land Unit and / or Associated Mapping Units	130	134	130	134	129	131	132	Pt. 2
Sites					38, 336	37	35	
Est. % of Mapping Unit		45	40		<2	8	5	

LANDFORM: Steep to very steep hilly terrain.

GEOLOGY: Taromeo Tonalite. P-Rt.

SOILS: Shallow, often stony, sandy textured lithosols with areas of shallow to moderately deep texture contrast soils with brown or greyish brown loamy sands to sandy loams overlying yellowish brown clay subsoils (soloths).

VEGETATION: Narrow-leaved ironbark, Queensland blue gum open forest with layered open forests of narrow-leaved ironbark, Queensland blue gum, wattles and "softwood scrub" species on ridges and silver-leaved ironbark, broad-leaved apple, Moreton Bay ash woodland to open forest on lower slopes and valley floors.

APPENDIX I CONTINUED

Pu 1 (24 710 ha)

Land Unit and / or Associated Mapping Units	135	137	140	138	136	137	140	139	136	141	Lt 3
Sites	212, 251	211		214, 248	215, 216, 221, 249, 272		252, 246	217		256	
Est. % of Mapping Unit	30	20		10	15		8	15		<2	

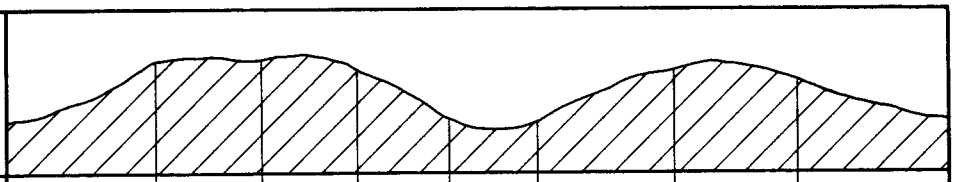
LANDFORM: Gently undulating to hilly terrain.

GEOLOGY: Wigton Adamellite. Puw, Pgw.

SOILS: Shallow to moderately deep texture contrast soils with brownish black to dull yellowish brown loamy sand to sandy loam, often gravelly, surfaces overlying brown or yellowish brown clay subsoils (solodics and solodized solonetz). Areas of rocky or stony shallow sandy lithosols on ridge crests.

VEGETATION: Queensland blue gum, narrow-leaved ironbark, pink bloodwood, silver-leaved ironbark woodland with closed scrub of "softwood scrub" species or open forest of spotted gum and rusty gum on ridges.

Pu 2 (26 410 ha)



Land Unit and / or Associated Mapping Units	Pu 1	142	136	143	140	144	136	143
Sites		245	215, 216, 221, 249, 272		252, 246			247
Est. % of Mapping Unit		12	15		8	30		35

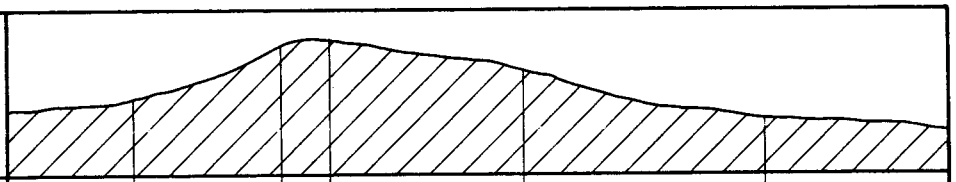
LANDFORM: Hilly terrain.

GEOLOGY: Wigton Adamellite. Puw, Pgw.

SOILS: Shallow to moderately deep texture contrast soils with dark brown to brownish black sandy loams to loamy fine sandy surfaces overlying brown or yellowish brown clay subsoils (solodics and solodized solonetz). Areas of shallow, often stony or gravelly, sandy textured lithosols occur on upper slopes and ridge crests.

VEGETATION: Narrow-leaved ironbark, Queensland blue gum woodland to open forest on slopes with areas of narrow-leaved ironbark, Queensland blue gum / pink bloodwood / bull oak / silver-leaved ironbark / Moreton Bay ash / quinine woodland to layered open forest commonly occurring. Spotted gum, cypress pine, wattle open forest occurs on ridge crests.

Pu 3 (4 830 ha)



Land Unit and / or Associated Mapping Units	149	148	81	146	145	147
Sites	286	223		219	218, 288	91, 220, 289
Est. % of Mapping Unit	12	12	<1	25	40	10

LANDFORM: Undulating terrain.

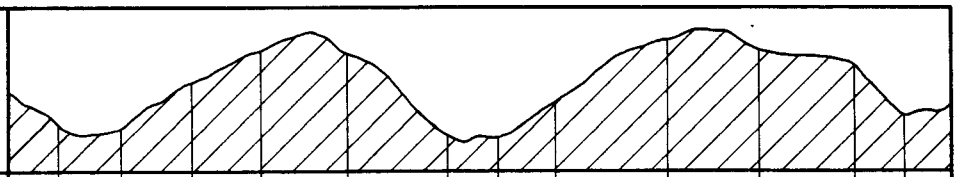
GEOLOGY: Wigton Adamellite, silcrete outcrops and minor sediments. Puw, Pgw.

SOILS: Moderately deep, dark, cracking clays (black earths) with areas of moderately deep to deep texture contrast soils with yellowish brown clay subsoils (solodics). Moderate gilgai occur with the clay soils.

VEGETATION: "Softwood scrub" species, brigalow, belah open scrub to open forest with frequent black tea-tree open scrub and gum-topped box open forest on lower slopes and drainage lines.

APPENDIX I CONTINUED

Cb 1 (9910 ha)



Land Unit and / or Associated Mapping Units	Rn 4	268	266	264	265	264	268	264	266	265	267	266	Rg 1
Sites					267								
Est. % of Mapping Unit					18	30	5		30		17		

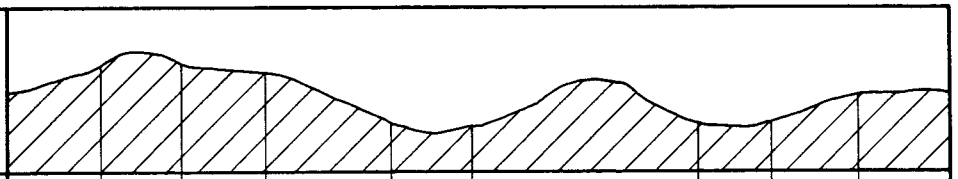
LANDFORM: Steep hilly to mountainous terrain, deeply dissected in parts.

GEOLOGY: Biggenden Beds. C-Pb/Plb.

SOILS: Shallow to moderately deep texture contrast soils with dark brown to brownish black sandy loam to clay loam surfaces overlying dark brown to bright yellowish brown clay subsoils (soloths, yellow and red podzolics). Shallow loamy lithosols on ridges. Scattered surface stone and small areas of rock outcrop on ridges.

VEGETATION: "Softwood scrub" species closed scrub and narrow-leaved ironbark, Queensland blue gum, pink bloodwood grassy open forest with areas of "softwood scrub" species understorey. Queensland blue gum, broad-leaved apple open forest to woodland occurs adjacent to drainage lines.

Pz 1 (24730 ha)



Land Unit and / or Associated Mapping Units	181	185	179	180	184	181	184	183	182
Sites		302	78	96, 309, 318		62, 310	39, 42, 46, 300, 301	135	134, 277
Est. % of Mapping Unit		<5	15	25		30	13	7	<5

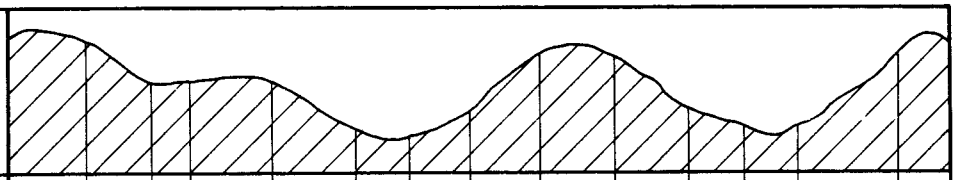
LANDFORM: Undulating to low hilly terrain.

GEOLOGY: Maronghi Creek Beds and undifferentiated metamorphics. Pzm, Pz.

SOILS: Shallow to moderately deep texture contrast soils with brownish black to dark brown loam to clay loam surfaces overlying dull yellowish brown to yellowish brown clay subsoils (solodics and solodized solonetz). Shallow, stony lithosols on ridges. Small areas of moderately deep to deep grey and brown cracking clays also occur.

VEGETATION: Narrow-leaved ironbark/Moreton Bay ash woodland to open woodland with frequent areas of gum-topped box woodland and scattered areas of poplar box or silver-leaved ironbark open forest and isolated open forests of brigalow, belah/wilga.

Pz 2 (18660 ha)



Land Unit and / or Associated Mapping Units	197	269	199	198	270	199	270	269	197	269	180	199	269	197
Sites					43				319		96, 309, 318			
Est. % of Mapping Unit				22	40	<2		16	10		10			

LANDFORM: Hilly terrain with areas of very steep hills.

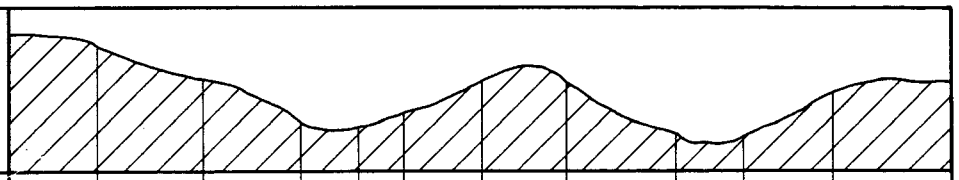
GEOLOGY: Maronghi Creek Beds and undifferentiated metamorphics. Pzm, Pz.

SOILS: Shallow to moderately deep, gravelly texture contrast soils with brownish black to dark reddish brown, gritty, fine sandy loam to clay loam surfaces overlying brown to yellowish brown clay subsoils (soloths, solodics). Areas of shallow, stony, lithosols and minor gradational soils (euchrozems) on ridge crests. Occasional rocky areas on steeper slopes.

VEGETATION: "Softwood scrub" species open to closed scrub with frequent areas of narrow-leaved ironbark, gum-topped box, silver-leaved ironbark/Yarraman ironbark open forest. Small-fruited grey gum, narrow-leaved ironbark, brush box layered open forest occurs on some ridge crests with gum-topped box or Queensland blue gum/swamp mahogany/"softwood scrub" species woodland to layered open forest on lower slopes and drainage lines.

APPENDIX I CONTINUED

Pz 3 (53 980 ha)



Land Unit and / or Associated Mapping Units	189	186	187	190	188	186	181	187	190	186	181
Sites	72		73, 74	32, 63	71		62, 310			317	
Est. % of Mapping Unit	<5		30	10	13		20			22	

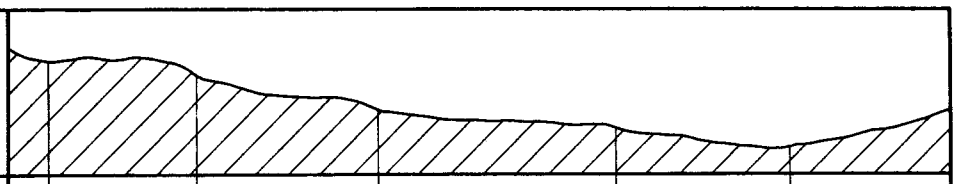
LANDFORM: Hilly to steep hilly terrain.

GEOLOGY: Maronghi Creek Beds and undifferentiated metamorphics. Frequent rock outcrops. Pzm, Pz.

SOILS: Shallow, often rocky, loamy lithosols on ridge crests, minor areas lateritised. Shallow to moderately deep texture contrast soils with brownish black to dull yellowish brown gritty or gravelly loams to clay loams overlying brown or yellowish brown medium to heavy clays (lithosol - podzolic intergrades, soloths, solodics).

VEGETATION: Narrow - leaved ironbark open woodland to open forest with open forest areas of Queensland blue gum, Moreton Bay ash, silver - leaved ironbark / bull oak / white cypress pine / wattle. Small areas of spotted gum, rusty gum, pink bloodwood open forest on ridges and woodlands of gum - topped box / broad - leaved apple in valley floors.

Pz 4 (6 000 ha)



Land Unit and / or Associated Mapping Units	Tm or Lt	198	191	30	184	Pz 3
Sites				89, 92, 94	39, 42, 46, 300, 301	
Est. % of Mapping Unit		6	9	60	25	

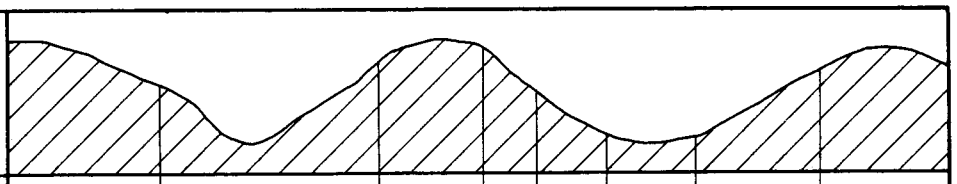
LANDFORM: Gently undulating to relatively flat plains.

GEOLOGY: Lateritised Maronghi Creek Beds and undifferentiated metamorphics. Pzm, Pz.

SOILS: Moderately deep to deep soils with very dark reddish brown to reddish brown loams and clay loams grading into dark reddish brown light to medium clays (xanthozems euchrozems). Areas of texture contrast soils with brown and yellowish brown clay subsoils (soloths, solodics). Small areas of shallow stony or rocky lithosols on ridges.

VEGETATION: Narrow - leaved ironbark woodland to open forest with frequent open forest areas of narrow - leaved ironbark, Queensland blue gum / gum-topped box, and isolated open scrubs of belah, black tea - tree and "softwood scrub" species.

Pz 5 (11 680 ha)



Land Unit and / or Associated Mapping Units	181	192	181	192	193	194	192	181
Sites			62, 310		154, 155			
Est. % of Mapping Unit			15		30	10	45	

LANDFORM: Very steep hilly to steep hilly terrain. Frequent rock outcrops.

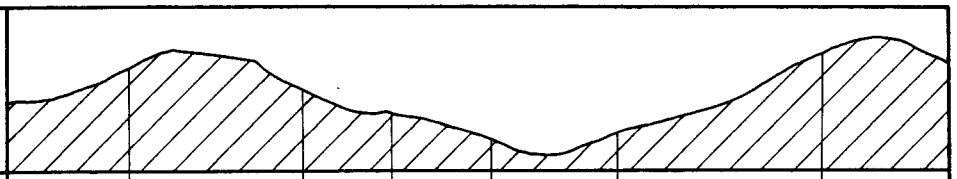
GEOLOGY: Maronghi Creek Beds and undifferentiated metamorphics. Pzm, Pz.

SOILS: Shallow, stony or rocky loamy sand lithosols on ridge crests and upper slopes and shallow to moderately deep texture contrast soils with brownish black to greyish brown loamy sand to sandy loam surfaces overlying dull yellowish brown subsoils (solodics) on lower slopes and valley floors.

VEGETATION: Narrow - leaved ironbark open forest with narrow - leaved ironbark / silver - leaved ironbark / rusty gum / gum - topped box / grass trees / Queensland blue gum / wattle open forest on slopes and rough - barked apple, Queensland blue gum, silver - leaved ironbark open forest on lower slopes and drainage lines.

APPENDIX I CONTINUED

Pz 6 (2 830 ha)



Land Unit and / or Associated Mapping Units	180	Lt or Tv	180	182	196	195	198
Sites	96, 309, 318			134, 277		276	
Est. % of Mapping Unit	10			40	15	25	10

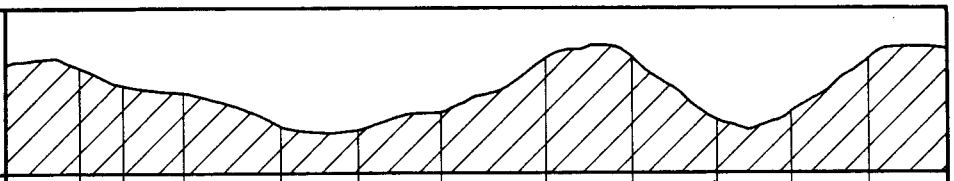
LANDFORM: Undulating to hilly terrain.

GEOLOGY: Maronghi Creek Beds and undifferentiated metamorphics. Pzm, Pz.

SOILS: Moderately deep texture contrast soils with dark brown to brownish black clay loam surfaces overlying brown or dark brown clay subsoils (solodics). Areas of shallow to moderately deep, red gradational soils (euchrozems) on some ridge crests and moderately deep to deep, dark cracking clays (grey and brown clays) on lower slopes.

VEGETATION: "Softwood scrub" species open scrub with areas of open scrub of "softwood scrub" species / brigalow / belah / gum-topped box with open forest of gum-topped box / belah / black tea-tree on lower slopes and drainage lines.

Pz 7 (4 920 ha)



Land Unit and / or Associated Mapping Units	181	179	180	179	184	180	200	181	179	184	186	181
Sites				78	39, 42, 46, 300, 301	96, 309, 318	296	62, 310			317	
Est. % of Mapping Unit				20	5	10	10	25			30	

LANDFORM: Strongly undulating to steep hilly terrain.

GEOLOGY: Maronghi Creek Beds and undifferentiated metamorphics. Small areas of serpentinite. Pzm, Pz / Pze.

SOILS: Shallow to moderately deep, gravelly texture contrast soils with dark clay loam surfaces over very dark brown to yellowish brown medium to heavy clay subsoils (soloths, solodics, solodized solonetz). Minor shallow loamy lithosols on ridge crests and deep, dark clays (black earths and brown clays) on some valley floors. Scattered rock outcrop.

VEGETATION: Narrow-leaved ironbark, Queensland blue gum / Moreton Bay ash / silver-leaved ironbark woodland to open forest and areas of gum-topped box open forest. Queensland blue gum, broad-leaved apple woodland occurs on lower slopes and valley floors.

Appendix II Land units

LAND UNIT	SOILS	VEGETATION	LANDFORM	GEOLOGY	LAND CAPABILITY CLASS
1.	Shallow to moderately deep soils. Brownish black, self mulching cracking clays often becoming browner with depth. Occasional basalt stone in profile. Ug5.13. Neutral to alkaline soil reaction trend.	Narrow-leaved ironbark open forest.	Upper slopes position and ridge crests. 1-4% slope.	Main Range Volcanics.	III m_2,d_3,e_3
2.	Deep soils. Brownish black, self mulching, cracking clays becoming brown or dark brown with depth. Calcium carbonate occurs with depth. Frequent linear gilgai. Ug5.15, 5.34. Alkaline soil reaction trend.	Narrow-leaved ironbark/ Moreton Bay ash open forest	Mid and lower slope positions. 4-8% slope.	Main Range Volcanics.	III e_3
3.	Shallow to moderately deep soils. Brownish black, self mulching, cracking clays becoming browner with depth. Ug5.13. Neutral to alkaline soil reaction trend.	Narrow-leaved ironbark/ silver-leaved ironbark/ Moreton Bay ash open forest.	Lower slope positions. 4-8% slope.	Main Range Volcanics.	III d_2,e_3
4.	Very deep soils. Brownish black, self mulching cracking clays frequently becoming browner with depth. Calcium carbonate may occur at depth. Ug5.15. Alkaline soil reaction trend.	Queensland blue gum, broad-leaved apple open woodland.	Valley floors and minor drainage lines. 0-2% slope.	Main Range Volcanics.	II e_2
5.	Shallow to very shallow soils. Brownish black to dark brown clays and light clays overlying decomposing basalt. Frequent stone on surface. Um6.21, 6.22. Neutral soil reaction trend.	Narrow-leaved ironbark, Moreton Bay ash open forest.	Steep upper slopes and rocky scarps. 25-45% slope.	Main Range Volcanics.	VII m_6,d_6,t_7,r_5,e_6
6.	Moderately deep to deep soils. Brownish black clays grading into dark reddish brown to orange clays. Some lateritic gravel and rock outcrop occurs. Ug5.37, 5.32, Uf6.12. Neutral soil reaction trend.	Narrow-leaved ironbark/ Moreton Bay ash open forest.	Mid slope positions often at base of steep slopes. 8-10% slope.	Bole layers and lateritised Main Range Volcanics.	III e_3
7.	Shallow to moderately deep soils. Brownish black, self mulching, cracking clays over decomposing parent material. Ug5.13. Occasional brown texture contrast soil. Db. Neutral soil reaction trend.	"Softwood scrub" species, belah shrubby open forest to closed scrub.	Mid and lower slope positions. 5-8% slope.	Main Range Volcanics and minor sediments.	III d_3,e_3
8.	Shallow to very shallow soils. Brownish black clay loams and light clays over decomposing parent material. Stone frequently occurs. Ug5.13, 5.12,Um1.21. Neutral soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum open forest.	Ridge crests often flat topped. 2-6% slope.	Main Range Volcanics.	IV-VI m_4,d_4,r_3,e_3
9.	Moderately deep soils. Brownish black self mulching cracking clays becoming browner with depth. Minor areas linear gilgai. Ug5.13,5.15. Neutral to alkaline soil reaction trend.	Narrow-leaved ironbark, Moreton Bay ash woodland to open forest.	Lower slope positions. 8-12% slope.	Main Range Volcanics.	IV d_3,e_4
10.	Shallow to moderately deep soils. Brownish black self mulching cracking clays over decomposing parent material. Minor areas of stone. Ug5.13,5.12. Neutral to alkaline soil reaction trend.	Narrow-leaved ironbark open forest with scattered areas of mountain coolibah or Moreton Bay ash or silver-leaved ironbark open forest.	Upper slopes and ridge crests. 4-8% slope.	Main Range Volcanics.	III-IV m_3,d_3,e_3
11.	Moderately deep soils. Very dark reddish brown light clay grading into dark reddish brown clays. Lateritic rock on surface. Uf6.12. Neutral soil reaction trend.	Narrow-leaved ironbark/ Moreton Bay ash open forest.	Upper slope positions. 10-15% slope. Minor areas up to 35% slope.	Bole layers and lateritised Main Range Volcanics.	VI-VIII m_2,d_3,t_6,r_5,e_6
12.	Very shallow soils. Brownish black to dark brown loams, clay loams, and light clays over decomposing parent material. Frequent stone. Um1.23, 6.21. Neutral soil reaction trend.	Narrow-leaved ironbark/ Queensland blue gum/ grey gum/"softwood scrub" species open forest to layered open forest.	Ridge crests often fairly flat topped. 3-6% slope.	Main Range Volcanics.	VI m_6,d_6,r_5,e_3
13.	Shallow to moderately deep soils. Brownish black to dark brown clays over decomposing parent material. Scattered stone and rock outcrops. Ug5.12, Um1.22, 1.23. Neutral soil reaction trend.	Narrow-leaved ironbark/ silver-leaved ironbark open forest.	Mid and lower slope positions. 15-25% slope.	Main Range Volcanics and some Tertiary volcanics.	VI-VII m_6,d_6,t_6,r_3,e_6
14.	Minor areas very shallow loams. Majority rock outcrops and scree slopes.	Majority devoid of trees and shrubs. Minor areas grass tree/broad-leaved apple open scrub.	Steep scree slopes and rock outcrops. 40-99% slope. Minor areas as vertical rock cliffs.	Main Range Volcanics.	VIII d_6,t_8,r_5
15.	Moderately deep soils. Brownish black self mulching cracking clays becoming browner with depth. Scattered surface stone. Ug5.13. Neutral to alkaline soil reaction trend.	Narrow-leaved ironbark/ grey gum/Queensland blue gum open forest.	Steep mid and upper slope positions. 10-15% slope .	Main Range Volcanics.	VI d_3,t_4,r_2,e_6
16.	Shallow to moderately deep soils. Complex of brownish black to dark reddish brown clay loams to clays over decomposing parent material or becoming browner or reddish brown with depth. Some surface stone and rock outcrops. Ug5.13, 5.12, Um6.12, 6.13, 6.22, 6.24. Neutral soil reaction trend.	"Softwood scrub" species, hoop pine, bunya pine closed forests.	Upper slopes and ridge crests. 4-8% slope. Scattered areas up to 15% slope.	Main Range Volcanics.	VI d_3,r_2,e_6
17.	Shallow to moderately deep soils. Complex of brownish black to dark reddish brown clay loams to clays over decomposing parent material. Frequent surface stone and rock outcrop. Um6.12, 6.13, 6.22,Ug5.12, 5.13. Neutral soil reaction trend.	"Softwood scrub" species, hoop pine, bunya pine closed forest.	Steep upper slope positions. 25-35% slope. Minor areas up to 45% slope.	Main Range Volcanics.	VIII d_6,t_7,r_5,e_8

Appendix II (continued)

LAND UNIT	SOILS	VEGETATION	LANDFORM	GEOLOGY	LAND CAPABILITY CLASS
18.	Shallow to moderately deep soils. Dark reddish brown loams, clay loams and light clays grading into reddish brown clays. Uf6.12, Gn2.11, 2.12, Ug5.37. Some Lateritic rock. Neutral to acid soil reaction trend.	"Softwood scrub" species, Queensland blue gum, white stringbark closed forest.	Mid and upper slope positions. 10-25% slope.	Main Range Volcanics.	VII d_2,t_6,e_7
19.	Shallow to moderately deep soils. Brownish black to dark brown clay loams to clays over decomposing parent material. Stone occurs on and in profile. Ug5.13, 5.12, Um6.12, 6.13. Neutral soil reaction trend.	"Softwood scrub" species, bunya pine, hoop pine closed forest.	Mid and upper slope positions. 15-25% slope with some lower sloping areas.	Main Range Volcanics.	VII d_4,t_7,r_5,e_7
20.	Shallow to moderately deep soils. Brownish black to dark brown loams and clay loams over decomposing parent material. Stone and rock outcrops commonly occur. Um1.13, 6.12, Ug5.12. Neutral soil reaction trend.	Open grassland with scattered emergents of narrow-leaved ironbark, kurrajong and Queensland blue gum.	Mid and upper slope positions. 30-50% slope. Slopes as low as 10% and as steep as 100% also occur.	Main Range Volcanics.	VIII m_6,t_8,r_5,e_8
21.	Deep to very deep soils. Brownish black, self mulching cracking clays becoming browner with depth. Calcium carbonate may occur at depth. Scattered small gilgai. Ug5.15. Alkaline soil reaction trend.	Queensland blue gum grassy open woodland.	Plain, valley floor. 0-2% slope.	Recent alluvia.	II w_2,e_2,f_2
22.	Deep to very deep soils. Brownish black, self mulching cracking clays becoming browner with depth. Calcium carbonate may occur at depth Ug5.34, 5.15. Alkaline soil reaction trend.	Queensland blue gum, broad-leaved apple grassy open woodland.	Plain, slightly elevated, valley floor. 0-2% slope.	Recent alluvia.	II e_2,f_2
23.	Deep to very deep texture contrast soils. Brownish black to dull yellowish brown clay loam to fine sandy clay loam, bleached A_2, overlying brown or dark brown clays. Some gravel on surface. Db1.43, 2.43. Occasional brown cracking clays occur. Ug5.34. Alkaline soil reaction trend.	Poplar box, Queensland blue gum grassy woodland to open woodland.	Plain, slightly higher terraces. 0-3% slope.	Recent alluvia.	II e_2
24.	Deep to very deep soils. Dark brown to brownish black self mulching clays becoming brown or olive brown with depth. Calcium carbonate may occur at depth. Ug5.34, 5.24. Occasional brown texture contrast soil. Db1.43. Alkaline soil reaction trend.	Gum-topped box open forest with scattered belah, poplar box, Queensland blue gum and silver-leaved ironbark frequently present.	Plain, valley floor. 0-2% slope.	Recent alluvia.	II e_2
25.	Deep to very deep texture contrast soils. Brownish black to dark brown sandy loam to sandy clay loam, bleached A_2, over yellowish brown or dark brown clays. Dy3.43, 3.33, Db1.22, Dr3.33. Alkaline soil reaction trend.	Poplar box, silver-leaved ironbark, Moreton Bay ash grassy woodland with scattered narrow-leaved ironbark, Queensland blue gum, broad-leaved apple and rough-barked apple frequently present.	Plain, valley floor to slight slopes. 0-3% slope.	Recent alluvia.	II e_2
26.	Moderately deep to deep soils. Brownish black to very dark brown clay loams and gravelly clay loams grading into brown clays. Iron and manganese concretions frequently occur. Gn3.21, 3.26, Uf6.31. Acid to neutral soil reaction trend.	Narrow-leaved ironbark open woodland.	Plains. 0-3% slope.	Old alluvia.	II m_2,e_2
27.	Moderately deep to deep soils. Dark brown gravelly clay loams and light clays grading into brown and yellowish brown mottled clays. Iron and manganese concretions occur. Gn3.72, Uf6.34. Neutral soil reaction trend.	Queensland blue gum, narrow-leaved ironbark open forest.	Plains. Slightly elevated. 0-2% slope.	Old alluvia.	II m_2,e_2
28.	Moderately deep to deep texture contrast soils. Brownish black to dark brown gravelly fine sandy loams to clay loams, bleached A_2, overlying yellowish brown clays, often gravelly. Iron and manganese concretions occur throughout. Dy2.43, Dy2.42. Neutral to alkaline soil reaction trend.	Gum-topped box with scattered Queensland blue gum woodland to open forest.	Plains, minor drainage areas and lower areas. 0-2% slope.	Old alluvia.	II m_2,d_2,p_2,e_2
29.	Moderately deep to deep texture contrast soils. Dark brown light sandy clay loams to sandy loams, often gravelly, overlying brown and yellowish brown clays. Iron and manganese concretions occur. Db1.12, Dy2.12, 2.33. Neutral to alkaline soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum/Moreton Bay ash grassy woodland.	Plains, gently sloping. 1-3% slope.	Old alluvia.	II m_2,d_2,e_2
30.	Deep soils. Very dark reddish brown to reddish brown loams to clay loams grading into dark reddish brown clays. Gn3.72, 3.12, 2.42, 3.22, Db4.32, 1.13. Neutral to alkaline soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum/gum-topped box grassy woodland.	Plains and lower slope positions. 1-3% slope.	Old alluvia and lateritised metamorphics.	II e_2

Appendix II (continued)

LAND UNIT	SOILS	VEGETATION	LANDFORM	GEOLOGY	LAND CAPABILITY CLASS
31.	Deep soils. Dark brown loam to fine sandy clay loam, often gravelly, grading into brown and yellowish brown mottled clays. Iron and manganese concretions. Gn3.72, Dy3.12. Neutral to alkaline soil reaction trend.	Narrow-leaved ironbark, Moreton Bay ash grassy open forest with scattered Queensland blue gum, rusty gum and wattle frequently present.	Gently sloping plains. 1-3% slope.	Sandy alluvia.	II m_2,e_2
32.	Deep texture contrast soils. Brownish black to dark brown loamy sands to sandy clay loams, bleached A_2 horizon, overlying brown and yellowish brown clays. Dy3.42, 5.42. Occasional Dr3.42. Neutral soil reaction trend.	Narrow-leaved ironbark, Moreton Bay ash, Queensland blue gum, rusty gum grassy open woodland to open forest.	Lower slopes and relatively flat areas. 0-3% slope.	Sandy alluvia.	III m_3,d_2,e_2
33.	Deep soils. Very dark reddish brown clay loams grading into dark reddish brown, reddish brown or brown clays. Some ferruginous gravel at depth. Gn3.12, 2.12. Neutral to alkaline soil reaction trend.	Silver-leaved ironbark grassy open woodland with scattered Queensland blue gum and narrow-leaved ironbark frequently present.	Broad ridges and upper slopes. 1-3% slope.	Sandy alluvia.	II e_2
34.	Shallow to moderately deep soils. Brown or dark brown loamy sand grading into brown or greyish yellow brown gravelly sands. Uc1.23. Occasional yellow texture contrast soils. Dy5.21, 5.22. Neutral soil reaction trend.	Narrow-leaved ironbark, silver-leaved ironbark, broad-leave apple/Queensland blue gum grassy woodland.	Lower slopes and adjacent drainage lines. 2-5% slope.	Sandy alluvia	VI m_6,d_2,e_2
35.	Moderately deep to deep soils. Very dark reddish brown loams to light clays grading into dark reddish brown to dark red clays. Some ferruginous concretions. Uf6.31, 6.13, Gn2.12. Acid soil reaction trend.	"Softwood scrub" species closed scrub.	Upper slopes and ridge crests. 1-3% slope.	Lateritised Main Range Volcanics.	II e_2
36.	Moderately deep to deep soils. Dark red to very dark reddish brown loams to clay loams grading into dark red to reddish brown clays. Lateritic gravel may occur at depth. Gn2.12, 2.11, 3.11. Acid soil reaction trend.	"Softwood scrub" species closed scrub.	Upper slopes. 5-12% slope. Minor areas up to 25% slope.	Lateritised Main Range Volcanics.	III m_2,e_3
37.	Deep soils. Brownish black to very dark reddish brown loam to clay loam grading into reddish brown to dark reddish brown clays. Some lateritic gravel and ferruginous concretions. Gn3.12, 3.11, 2.12, Uf6.31, 6.12. Acid soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum open forest with scattered silver-leaved ironbark, Yarraman ironbark, rusty gum; dogwood and wattle frequently present.	Lower slopes and broad low ridges. 1-4% slope. Minor areas up to 10% slope.	Lateritised Main Range Volcanics.	III e_3
38.	Deep soils. Very dark reddish brown loams to light clays grading into dark red to dark reddish brown clays. Uf6.31, 6.12, Gn3.11. Acid soil reaction trend.	Silver-leaved ironbark, broad-leaved apple, Queensland blue gum open forest with scattered rough-barked apple, narrow-leaved ironbark, fuzzy box and dogwood frequently present.	Lower slopes and drainage lines. 0-2% slope.	Lateritised Main Range Volcanics.	II e_2
39.	Deep texture contrast soils. Dark brown to very dark reddish brown sandy clay loams to clay loams overlying brown or yellowish brown clays. Iron and manganese concretions frequently occur. Db2.41, 2.31, 2.11, 2.43, 4.11. Occasional gradational soils. Gn3.71. Acid to neutral soil reaction trend.	Gum-topped box open forest with scattered silver-leaved ironbark, Queensland blue gum and broad-leaved apple frequently present.	Drainage lines and associated flats. 1-2% slope.	Lateritised Main Range Volcanics and Tertiary sediments.	II d_2,e_2
40.	Deep soils. Brownish black to very dark reddish brown, snuffy, fine sandy loam to loam grading into dark reddish brown clay. Gn2.12, 2.11, 3.11. Acid soil reaction trend.	Small-fruited grey gum, brown bloodwood shrubby open forest with scattered wild rosemary, forest she-oak, white bottle brush, narrow-leaved ironbark and "softwood scrub" species frequently present.	Mid and upper slopes. 1-4% slope.	Lateritised Main Range Volcanics.	III m_2,k_2,e_3,a_2
41.	Deep soils. Dark reddish brown loams and clay loams grading into dark red gravelly clay loams Gn2.11, Um1.23. Acid soil reaction trend.	"Softwood scrub" species closed scrub.	Mid and upper slopes. 4-10% slope.	Lateritised. Tertiary volcanics.	III e_3
42.	Moderately deep to deep soils. Dark reddish brown clay loams grading into dark red to dark reddish brown clays. Gn2.11, 3.11, 3.12. Acid soil reaction trend.	Narrow-leaved ironbark, small-fruited grey gum, "softwood scrub" species open forest.	Mid and lower slopes. 5-10% slopes.	Lateritised. Tertiary volcanics.	III e_3
43.	Deep soils. Dark reddish brown clay loams grading into dark red clays. Uf6.31, Gn2.12. Occasional red or brown texture contrast soils. Dr, Db. Acid soil reaction trend.	"Softwood scrub" species closed scrub with scattered narrow-leaved ironbark emergents frequently present.	Lower slopes and broad low ridges. 1-5% slope.	Lateritised. Tertiary volcanics.	II e_2
44.	Shallow to moderately deep soils. Very dark reddish brown to brownish black gravelly loams grading into dark reddish brown gravelly loams and clays. Lateritic gravel is common throughout. Um1.23, Uf6.31. Occasional reddish brown gradational soils. Gn. Neutral to acid soil reaction trend.	"Softwood scrub" species closed scrub.	Ridge crests and steeper upper slopes. 4-10% slope. Minor areas as steep as 20% slope.	Lateritised Main Range Volcanics and Tertiary volcanics.	VI m_6,d_4,r_3,e_6

Appendix II (continued)

LAND UNIT	SOILS	VEGETATION	LANDFORM	GEOLOGY	LAND CAPABILITY CLASS
45.	Shallow, moderately deep to occasional deep soils. Very dark reddish brown loams and gravelly loams grading into dark reddish brown to dark red gravelly clays. Some lateritic rock outcrops. Gn3.12, 3.11, Uf6.31, Um1.23. Acid soil reaction trend.	Spotted gum, small-fruited grey gum, narrow-leaved ironbark, pink bloodwood, forest she-oak, red ash, wattle open forest to shrubby open forest.	Ridge crests and steeper upper slopes. 1-5% slope with some areas as steep as 15% slope.	Lateritised Main Range Volcanics and Tertiary volcanics.	III-IV $m_3.d_3.r_2.e_3$
46.	Very shallow soils and rock scarps. Very dark reddish brown gravelly and stony loams grading into lateritised rock. Um1.23 and rock. Neutral to acid soil reaction trend.	Spotted gum/narrow-leaved ironbark open forest or "softwood scrub" species closed scrub.	Steep scarps and drop-offs. 15-40% slope with some areas as steep as 100% slope.	Lateritised Main Range Volcanics and Tertiary volcanics.	VII-VIII $m_6.d_8.t_7.r_5.e_7$
47.	Deep soils. Dark reddish brown, snuffy, loams grading into dark reddish brown clay loams and clays. Um5.22, Gn2.11. Acid soil reaction trend.	Tallowwood, pink bloodwood open forest with scattered forest she-oak, small-fruited grey gum and wattle, frequently present.	Upper slope positions. 3-6% slope.	Lateritised Main Range Volcanics.	III $m_2.k_2.e_3.a_3$
48.	Deep soils. Dark reddish brown loams, frequently snuffy, grading into dark reddish brown and reddish brown clay loams and clays. Sometimes gravelly. Gn2.12, 2.11. Acid soil reaction trend.	Small-fruited grey gum, spotted gum open forest with scattered narrow-leaved ironbark, pink bloodwood, forest she-oak, red ash and wattle frequently present.	Mid and lower slope positions. 3-6% slope.	Lateritised Main Range Volcanics.	III $m_2.k_2.e_3.a_2$
49.	Deep soils. Very dark reddish brown loams, frequently snuffy, grading into dark reddish brown and reddish brown loams and clays. Gn3.11, 2.11, Um5.22. Acid soil reaction trend.	Tallowwood, small-fruited grey gum, brown bloodwood/ narrow-leaved ironbark open forest.	Lower slope positions and broad drainage lines. 1-3% slope.	Lateritised Main Range Volcanics.	III $m_2.k_2.e_3.a_2$
50.	Moderately deep to deep soils. Dark reddish brown loams to clay loams, often snuffy, grading into dark reddish brown clays. Some lateritic gravel occurs. Gn2.11, Um1.23. Acid soil reaction trend.	Yarraman ironbark, "softwood scrub" species shrubby open forest to closed scrub of "softwood scrub" species.	Upper slope positions and broad ridge crests. 1-5% slope.	Lateritised Main Range Volcanics.	III $m_2.k_2.e_3.e_2$
51.	Deep soils. Very dark reddish brown to dark reddish brown loam fine sandy to clay loams grading into dark reddish brown to dark red light to medium clays. Gn3.11, 2.11, 2.12. Acid soil reaction trend.	Blackbutt, narrow-leaved ironbark grassy open forest with scattered pink bloodwood, rusty gum, forest she-oak, brush box and wattle frequently present.	Broad ridge crests and upper slopes. 1-4% slope.	Lateritised Main Range Volcanics.	III e_3
52.	Moderately deep to deep soils. Very dark reddish brown clay loams to light clays, some ferruginous concretions, grading into dark red to dark reddish brown medium to heavy clays over decomposing parent material. Gn3.12, 2.12. Neutral to acid soil reaction trend.	Narrow-leaved ironbark, pink bloodwood grassy open forest with scattered forest she-oak and wattle frequently present.	Upper slopes and ridge crests. 3-5% slope.	Lateritised Main Range Volcanics.	III $m_2.e_3$
53.	Deep soils. Very dark reddish brown clay loams grading into dark red light to medium clays. Gn3.11, 2.11. Acid soil reaction trend.	Pink bloodwood, swamp mahogany grassy open forest with scattered tallowwood, small-fruited grey gum, forest she-oak and wattle frequently present.	Mid slope and lower slope positions. 3-6% slope.	Lateritised Main Range Volcanics.	III e_3
54.	Deep soils. Very dark reddish brown to dark reddish brown clay loams grading into dark red medium to heavy clays. Often ferruginous concretions throughout Gn3.12, 2.12. Acid soil reaction trend.	Pink bloodwood, tallowwood, small-fruited grey gum, broad-leaved apple/Sydney blue gum shrubby open forest.	Drainage lines and lower slopes. 1-4% slope.	Lateritised Main Range Volcanics.	II e_2
55.	Shallow to moderately deep soils. Dark reddish brown to very dark reddish brown loams to clay loams grading into decomposing lateritic rock or dark red to dark reddish brown light to medium clays. Often ferruginous concretions throughout Gn2.12, Um1.23. Neutral to acid soil reaction trend.	"Softwood scrub" species/ hoop pine closed forest to closed scrub.	Ridge crests, upper slopes and some scarp areas. 1-4% slope.	Lateritised Main Range Volcanics.	III $m_2.e_3$
56.	Deep soils. Very dark reddish brown to brownish black clay loam to light clay, sometimes with limonite nodules, grading into brown, bright yellowish brown or reddish brown medium to heavy clays. Uf6.12, 6.31, Gn3.71, 3.75, 4.12, 2.65. Neutral soil reaction trend.	Queensland blue gum, narrow-leaved ironbark, dogwood grassy woodland with scattered silver-leaved ironbark, rusty gum and wattle frequently present.	Lower slopes. 1-4% slope.	Lateritised Tertiary clays and sediments.	III e_3
57.	Moderately deep to deep soils. Dark brown to brown loamy sand to fine sandy clay loams grading into brown or bright yellowish brown light to medium gravelly clays. Limonite nodules frequently occur throughout. Gn2.65, 3.71, 3.75, Dy3.22. Neutral soil reaction trend.	Queensland blue gum, rusty gum open forest with scattered narrow-leaved ironbark, wattle and "softwood scrub" species frequently present.	Mid and upper slopes. 3-5% slope.	Lateritised Tertiary clays and sediments.	III $m_2.d_2.e_3$
58.	Moderately deep to deep soils. Brownish black to very dark reddish brown sandy loam to fine sandy clay loam grading into dark brown to brown to bright brown light to medium clays. Ferruginous concretions frequently occur throughout. Gn3.21. Acid soil reaction trend.	Narrow-leaved ironbark, silver-leaved ironbark/ Queensland blue gum grassy woodland.	Mid slope positions. 1-4% slope.	Lateritised Tertiary clays and sediments.	III $d_2.e_3$

Appendix II (continued)

LAND UNIT	SOILS	VEGETATION	LANDFORM	GEOLOGY	LAND CAPABILITY CLASS
59.	Deep texture contrast soils. Brownish black to dark reddish brown sandy loam to clay loam overlying brown, dark reddish brown to dark red light to medium clays. Dr4.22. Occasional red gradational soils. Gn2.12. Neutral soil reaction trend.	Small-fruited grey gum, swamp mahogany, dogwood, rusty gum, narrow-leaved ironbark shrubby open forest with scattered gum-topped box and forest she-oak frequently present.	Lower slopes and flats adjacent to drainage lines. 1-3% slope.	Lateritised Tertiary clays and sediments.	III $m_2.k_2.e_3$
60.	Shallow to moderately deep texture contrast soils. Dark brown to brownish black loamy sands to loams frequently gravelly, bleached A_2, overlying yellowish brown clays often mottled. Dy3.42. Neutral to alkaline soil reaction trend.	Silver-leaved ironbark, Queensland blue gum grassy woodland with scattered narrow-leaved ironbark and gum-topped box frequently present.	Lower slope positions. 2-5% slope.	Lateritised Tertiary clays and sediments.	III $m_3.d_3.p_2.e_3$
61.	Moderately deep to deep soils. Dark reddish brown loams, often snuffy, grading into dark reddish brown medium to heavy clays. Laterite occurs at depth. Gn2.11. Acid soil reaction trend.	Narrow-leaved ironbark, Yarraman ironbark, brown bloodwood/wattle/"softwood scrub" species open forest to shrubby open forest.	Upper slopes. 3-6% slope with minor areas as steep as 15% slope.	Lateritised Main Range Volcanics.	III $m_3.d_3.p_2.k_2.e_3.a_2$
62.	Deep soils. Dark reddish brown clay loams, often snuffy, grading into dark reddish brown to dark red light to medium clays. Lateritic gravel occurs at depth. Gn2.11. Acid soil reaction trend.	"Softwood scrub" species closed scrub.	Mid and upper slopes. 6-10% slope with minor areas as steep as 25% slope.	Lateritised Main Range Volcanics.	IV $m_3.d_3.p_3.k_2.e_4.a_2$
63.	Deep soils. Dark reddish brown clay loams grading into dark reddish brown and dark red light to medium clays. Ferruginous concretions occur throughout. Gn3.11. Acid soil reaction trend.	"Softwood scrub" species open to closed scrub.	Upper slope positions. 3-6% slope.	Lateritised granite wash.	III e_3
64.	Deep soils. Very dark reddish brown clay loams overlying dark reddish brown light to medium clays. Ferruginous concretions occur throughout. Gn3.12, 3.11. Acid to neutral soil reaction trend.	Narrow-leaved ironbark, "softwood scrub" species grassy to shrubby open woodland.	Broad ridges and lower slopes. 3-6% slope.	Lateritised granite wash.	III e_3
65.	Deep soils. Dark reddish brown clay loams grading into dark reddish brown and dark red light to medium clays. Ferruginous concretions occur throughout. Gn3.11. Acid soil reaction trend.	"Softwood scrub" species open to closed scrub.	Mid and lower slope positions. 6-10% slope.	Lateritised granite wash.	III e_3
66.	Rock outcrops and very shallow soils. Rock and stony dark brown to dull brown loamy sands and sandy loams over decomposing parent material. Uc1.23, 1.22, Um1.22. Neutral soil reaction trend.	Narrow-leaved ironbark, pink bloodwood/Queensland peppermint/"softwood scrub" species shrubby open woodland.	Steep scarps and rock outcrops. 10-30% slope with minor areas as steep as 80% slope.	Granite wash.	VII $m_6.d_6.t_7.r_5.e_7$
67.	Deep texture contrast soils. Brownish black to dull yellow orange loamy sands, bleached A_2, overlying dull yellow orange to dull yellowish brown sandy or gritty clays. Dy2.42, 2.41. Neutral to acid soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum, pink bloodwood/wattle/silver-leaved ironbark open forest to woodland.	Broad ridge crests and mid and upper slopes. 3-6% slope with minor areas as steep as 15% slope.	Granite wash.	IV $m_2.d_3.p_2.k_2.e_4$
68.	Moderately deep to deep texture contrast soils. Brownish black to dark brown loamy sand to sandy loams, bleached A_2, overlying mottled dull yellowish brown medium to heavy clays. Dy3.42, 3.43. Occasional uniform coarse sand. Uc1.22, 1.23. Neutral to alkaline soil reaction trend.	Bull oak, narrow-leaved ironbark, Queensland blue gum, rusty gum layered open woodland to woodland.	Lower slope positions. 1-3% slope.	Granite wash.	III $m_2.d_3.p_2.e_3$
69.	Moderately deep to deep soils. Very dark reddish brown to dark reddish brown loam to fine sandy clay loam grading into brown, bright reddish brown to dark red fine sandy loam to loam-fine sandy. Um1.22, 1.23. Acid soil reaction trend.	Moreton Bay ash, narrow-leaved ironbark open forest.	Broad ridge crests. 1-3% slope.	Granite wash.	III e_3
70.	Shallow to moderately deep texture contrast soils. Occasional rock outcrop. Dark brown to dull brown loamy sands to sands overlying decomposing rock or bleached A_2 overlying dull yellow orange medium to heavy clays, sometimes gravelly. Dy3.41. Occasional uniform coarse sands. Uc1.22. Acid soil reaction trend.	Queensland blue gum, narrow-leaved ironbark grassy open forest.	Lower slopes. 3-5% slope.	Granite wash.	III $m_3.d_3.p_2.r_2.e_3$
71.	Shallow to moderately deep texture contrast soils. Frequent rock outcrops. Dark brown and greyish yellow brown gritty and gravelly sandy loams grading into decomposing rock or bleached A_2, overlying brown, dull yellowish brown or dark reddish brown medium to heavy clays. Dy3.41, Dr3.31. Occasional uniform coarse sand. Uc. Acid soil reaction trend.	Spotted gum, narrow-leaved ironbark, black she-oak, wattle/ Queensland peppermint open forest.	Ridge crests and upper slopes. 5-10% slope with minor areas as steep as 20% slope.	Granite wash.	VI $m_6.d_3.p_2.k_2.r_4.e_6$
72.	Moderately deep to deep texture contrast soils. Brownish black to dull yellowish brown fine sandy clay loams, often gritty, bleached A_2, overlying brown medium to heavy clays often mottled. Db2.43. Alkaline soil reaction trend.	Poplar box grassy woodland with scattered narrow-leaved ironbark and Queensland blue gum frequently present.	Lower slopes, adjacent drainage lines. 1-3% slope.	Granite wash.	III $m_2.p_2.e_3$

Appendix II (continued)

LAND UNIT	SOILS	VEGETATION	LANDFORM	GEOLOGY	LAND CAPABILITY CLASS
73.	Shallow to moderately deep soils. Some rock outcrops. Dark brown to dull brown loamy sands over decomposing rock or overlying brown, dark reddish brown or yellowish brown medium to heavy clays, frequently gravelly. Uc1.23, 1.22, Um1.22, Dy3.32. Neutral soil reaction trend.	Narrow-leaved ironbark, pink bloodwood woodland with scattered Queensland peppermint, white cypress pine, quinine, ironwood, wattle and "softwood scrub" species frequently present.	Ridge crests and upper slopes. 3-6% slope.	Granite wash.	VI $m_6.d_4.p_2.r_3.e_6$
74.	Moderately deep soils. Brownish black to black self mulching clays becoming brownish black to dull yellowish brown with depth, sometimes gravelly over decomposing parent material. Ug5.12. Neutral soil reaction trend.	Silver-leaved ironbark/ narrow-leaved ironbark/ Moreton Bay ash grassy open woodland.	Mid to upper slopes and broad ridge crests. 4-8% slope.	Tertiary volcanics.	III $m_2.d_2.e_3$
75.	Moderately deep to deep soils. Brownish black loams to medium clays overlying brownish black to dark brown medium to heavy clays over decomposing parent material. Ug5.12, Db1.43. Alkaline soil reaction trend.	Narrow-leaved ironbark, poplar box grassy woodland with scattered silver-leaved ironbark and Moreton Bay ash frequently present.	Lower slopes and valley floors. 3-6% slope.	Tertiary volcanics.	II $m_2.d_2.e_2$
76.	Shallow to moderately deep texture contrast soils. Dark brown to dull yellowish brown sandy loams to clay loams, often bleached A_2, overlying brown or yellowish brown medium to heavy clays. Dy3.42, Db2.42, 2.43. Neutral to alkaline soil reaction trend.	Poplar box, narrow-leaved ironbark/Moreton Bay ash grassy woodland.	Lower slopes and isolated other areas. 2-4% slope.	Tertiary volcanics.	III $m_2.d_2.p_2.e_3$
77.	Shallow to moderately deep soils. Frequently stone on surface. Brownish black to very brown loam, clay loams and light clays over decomposing rock or grading into brown, very dark brown or reddish brown clays. Ug5.12, 5.13, Um1.23, 1.22, 6.32. Neutral soil reaction trend.	"Softwood scrub" species/ narrow-leaved ironbark closed scrub.	Steep mid and upper slopes. 10-25% slope with minor areas as steep as 45% slope.	Tertiary volcanics.	VI-VII $m_3.d_2.t_6.r_5.e_6$
78.	Moderately deep to deep soils. Brownish black to black self mulching clays becoming yellowish brown with depth. Ug5.12, 5.13. Neutral soil reaction trend.	"Softwood scrub" species/ narrow-leaved ironbark closed scrub.	Elevated, low sloping areas. 5-10% slope.	Tertiary volcanics.	IV $m_3.d_3.e_4$
79.	Moderately deep to deep soils. Brownish black to black self mulching clays becoming brown or dull yellowish brown with depth. Ug5.13, 5.15. Neutral to alkaline soil reaction trend.	Queensland blue gum open forest with scattered narrow-leaved ironbark, broad-leaved apple and "softwood scrub" species frequently present.	Lower slopes and valley floors. 3-6% slope.	Tertiary volcanics.	III $d_2.e_3$
80.	Shallow to moderately deep soils. Frequently stony and rock outcrops. Brownish black to very dark brown to reddish brown loam and clay loams to light clays over decomposing rock. Um1.22, 1.23, Dr3.31. Acid soil reaction trend.	"Softwood scrub" species closed scrub with narrow-leaved ironbark, gum-topped box and spotted gum frequently present.	Ridge crests and upper slopes. 5-10% slope with minor areas as steep as 20% slope.	Tertiary volcanics.	VI $m_6.d_3.e_6$
81.	Shallow to moderately deep soils. Some areas rock outcrop. Dark brown to very dark reddish brown loams, clay loams and light clays grading into dark reddish brown to reddish brown clay loams and light clays. Uf6.31, Um1.23, Gn2.11, 3.11. Acid soil reaction trend.	Narrow-leaved ironbark, spotted gum open forest with scattered pink bloodwood, wattle and "softwood scrub" species frequently present.	Steep mid and upper slopes and ridge crests. 10-20% slope with minor areas as steep as 35% slope.	Lateritised Tertiary volcanics.	IV-VI $m_3.d_3.e_4$
82.	Moderately deep to deep texture contrast soils. Brownish black to dark brown loam fine sandy to sandy clay loam, bleached A_2, overlying greyish yellow brown to bright brown medium to heavy clays. Dy3.33, 3.43. Occasional dark cracking clay, Ug. Alkaline soil reaction trend.	Brigalow, black tea-tree/ gum-topped box/narrow-leaved ironbark grassy open woodland.	Mid and lower slope positions. 3-6% slope.	Tertiary sediments and Oakdale Sandstones.	III $m_2.d_2.e_3$
83.	Deep texture contrast soils. Dark brown to dull yellowish brown sandy loams, bleached A_2, overlying yellowish brown to brown medium to heavy clays. Soft calcium carbonate at depth. Db1.43, 1.42, Dy2.43. Alkaline soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum grassy woodland with scattered Moreton Bay ash, bull oak and silver-leaved ironbark frequently present.	Broad ridges and associated slopes. 2-5% slope.	Tertiary sediments and Oakdale Sandstones.	III $m_2.e_3$
84.	Moderately deep to deep texture contrast soils. Brownish black to dull yellowish brown fine sandy loam to gravelly loam, often ferruginous concretions, bleached A_2, overlying yellowish brown to dull yellowish brown medium to heavy clays. Dy3.41, 3.42. Occasional yellow gradational soils. Gn3.71. Acid to neutral soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum grassy woodland with scattered Moreton Bay ash, rusty gum, bull oak and gum-topped box frequently present.	Mid slopes and relatively flat areas. 1-4% slope.	Tertiary sediments and Oakdale Sandstones.	III $m_2.d_2.e_3$
85.	Deep texture contrast soils. Dark brown to dull yellowish brown, some light grey, sandy clay loam to clay loam, bleached A_2, overlying dull yellowish brown, yellowish brown or reddish brown medium to heavy clays. Dy3.41, 3.42, 2.13, 2.33, Db1.13, 2.41. Neutral to alkaline soil reaction trend.	Gum-topped box grassy open forest to woodland with scattered ironbark and broad-leaved apple frequently present.	Elevated flat areas, lower slopes and valley floors. 0-3% slope.	Tertiary sediments and Oakdale Sandstones.	III $m_2.p_2.e_3$

Appendix II (continued)

LAND UNIT	SOILS	VEGETATION	LANDFORM	GEOLOGY	LAND CAPABILITY CLASS
86.	Moderately deep to deep texture contrast soils. Minor rock outcrops. Brownish black to dark brown sandy loam to sandy clay loam overlying bright reddish brown to greyish yellow brown medium clays, often mottled. Dy5.41, 3.41, 5.42. Occasional brown texture contrast soil. Db. Acid to neutral soil reaction trend.	Rusty gum, small-fruited grey gum, narrow-leaved ironbark grassy open forest with scattered pink bloodwood, Queensland blue gum, gum-topped box, silver-leaved ironbark, dogwood, swamp mahogany and forest she-oak frequently present.	Mid slope positions. 4-15% slope.	Tertiary sediments and Oakdale Sandstones.	IV $m_2.d_3.e_4$
87.	Moderately deep texture contrast soils. Some rock outcrops. Dark brown to greyish brown sandy loams, sandy clay loams to clay loams, often bleached A_2, overlying yellowish brown, reddish brown to dark reddish brown medium to heavy clays. Dy5.21, 3.41, Dr5.21. Occasional uniform or gradational soils. Uf or Gn. Acid soil reaction trend.	Rusty gum, narrow-leaved ironbark, small-fruited grey gum open forest with scattered pink bloodwood, forest she-oak, Yarraman ironbark, spotted gum, wattle and "softwood scrub" species frequently present.	Rocky ridge crests with minor rocky steep scarps. 0-6% slope with minor areas as steep as 40% slope.	Tertiary sediments and Oakdale Sandstones.	IV $d_3.r_4.e_3$
88.	Moderately deep to deep soils. Some rock outcrops. Brownish black to dark brown loam to gravelly clay loam, ferruginous nodules, grading into reddish brown to dark reddish brown clay loams and medium to heavy clays. Gn2.11, 2.41, 3.11, Dr2.11. Acid soil reaction trend.	Rusty gum, small-fruited grey gum grassy open forest with scattered narrow-leaved ironbark, pink bloodwood, Yarraman ironbark, brush box, black she-oak, Moreton Bay ash and wattle frequently present.	Upper slopes often just below scarps. 0-6% slope.	Tertiary sediments and Oakdale Sandstones.	IV $r_4.e_3$
89.	Moderately deep to deep texture contrast soils. Dark brown sandy clay loam to clay loam - sandy overlying mottled brown or yellowish brown medium to heavy clays. Calcium carbonate at depth. Db2.23. Alkaline soil reaction trend.	Belah, black tea-tree/ brigalow shrubby woodland to open forest.	Mid and upper slopes to ridge crests. 6-10% slope.	Marburg Formation.	IV $m_2.d_2.e_4$
90.	Shallow to moderately deep texture contrast soils. Dark brown loam fine sandy to clay loam sandy overlying brown and bright yellowish brown medium to heavy clays grading into decomposing rock. Dy4.12. Neutral soil reaction trend.	"Softwood scrub" species/ belah closed scrub.	Mid and upper slope positions. 4-8% slope.	Marburg Formation.	IV $m_3.d_3.e_4$
91.	Shallow to moderately deep soils. Brownish black light to medium clays becoming browner with depth grading into decomposing parent material. Ug5.32. Occasional yellow or brown texture contrast soils may occur. Dy, Db. Alkaline soil reaction trend.	"Softwood scrub" species/ belah closed scrub.	Upper slope positions. 4-8% slope.	Marburg Formation.	III $m_2.d_2.e_3$
92.	Moderately deep to deep texture contrast soils. Brownish black fine sandy loam to loam fine sandy, bleached A_2, overlying brown medium to heavy clays. Calcium carbonate occurs at depth. Db1.43, 2.42. Alkaline soil reaction trend.	Belah open forest with scattered brigalow, wilga, poplar box, Queensland blue gum and narrow-leaved ironbark frequently present.	Lower slopes and valley floors. 1-4% slope.	Marburg Formation.	III e_3
93.	Moderately deep texture contrast soils. Brownish black to dark brown sandy loam to sandy clay loam, bleached A_2, overlying mottled dull yellowish brown, dull reddish brown to dull yellow orange medium to heavy clays over decomposing rock. Dy3.32, 3.43, some Dr3.32, 3.42. Neutral to alkaline soil reaction trend.	Narrow-leaved ironbark grassy open forest with scattered gum-topped box, Queensland blue gum, dogwood and wattle frequently present.	Mid and lower slopes. 3-6% with minor areas as steep as 12% slope.	Marburg Formation.	IV $m_2.d_4.p_2.e_4$
94.	Deep texture contrast soils. Brownish black to dark brown loamy fine sand to sandy loam, bleached A_2, overlying greyish yellow brown to dull yellowish brown, often mottled, columnar medium to heavy clays. Dy3.43. Alkaline soil reaction trend.	Spotted gum grassy open forest with scattered rusty gum, bull oak, narrow-leaved ironbark, gum-topped box and paper bark tea-tree frequently present.	Lower slopes. 1-3% slope.	Marburg Formation.	IV $m_3.d_4.p_2.e_3$
95.	Shallow to very shallow soils. Frequently stony or rock outcrops. Brownish black to dark brown loamy sand to loamy coarse sand over rock or overlying dull yellowish brown to dull yellow orange medium to heavy clays over decomposing rock. Uc1.21, Dy3.42, 5.42. Neutral soil reaction trend.	Narrow-leaved ironbark, pink bloodwood, Moreton Bay ash grassy open forest with scattered rusty gum and Queensland blue gum frequently present.	Upper slopes. 0-20% slope, varying greatly.	Marburg Formation.	VI-VII $m_6.d_4.r_5.e_6$
96.	Deep soils. Reddish brown to dark brown loamy fine sand grading into bright reddish brown or bright yellowish brown loamy fine sands becoming sandy loams at depth. Uc1.22. Acid soil reaction trend.	Rusty gum, white cypress pine, thready bark she-oak, dogwood/small-fruited grey gum/wattle grassy open forest to open woodland.	Lower slopes and flat areas. 0-3% slope.	Marburg Formation.	IV $m_4.k_2.e_2$

Appendix II (continued)

LAND UNIT	SOILS	VEGETATION	LANDFORM	GEOLOGY	LAND CAPABILITY CLASS
97.	Moderately deep to deep texture contrast soils. Some rock outcrops occur. Brownish black to dark brown sandy loam to sandy clay loam, bleached A_2, overlying mottled dull yellowish brown or dull reddish brown medium to heavy clays over decomposing rock. Dy3.32, 3.42, 3.43, Dr3.32, 3.42. Neutral to alkaline soil reaction trend.	Gum-topped box grassy open forest with scattered narrow-leaved ironbark, Queensland blue gum and wattle frequently present.	Lower slopes. 3-6% slope.	Marburg Formation.	IV $m_3.d_3.k_2.e_4$
98.	Shallow to very shallow soils. Frequent rock outcrops. Brownish black gravelly fine sandy loams over decomposing rock. Uc1.23. Occasional yellow or red texture contrast soils. Dy, Dr. Acid soil reaction trend.	Spotted gum, narrow-leaved ironbark, rusty gum, dogwood, wattle shrubby open forest.	Steep rocky scarps and upper slopes. 20-60% slope. Minor areas as steep as 90% slope.	Marburg Formation.	VII-VIII $m_6.d_6.t_7.r_5.e_7$
99.	Moderately deep to deep texture contrast soils. Brownish black to dark brown sandy loam to sandy clay loams overlying dull yellowish brown to greyish yellow brown, often mottled, medium to heavy clays. Dy3.43. Alkaline soil reaction trend.	Narrow-leaved ironbark open forest with scattered gum-topped box, Queensland blue gum and broad-leaved apple frequently present.	Valley floors and drainage lines. 0-4% slope.	Marburg Formation.	III $m_2.d_3.e_3$
100.	Shallow to very shallow soils. Frequently stony. Brownish black to brown fine sandy loams overlying decomposing rock. Uc1.23, 1.21, Um1.21. Acid soil reaction trend.	Brown bloodwood, rusty gum open forest with scattered Yarraman ironbark, "softwood scrub" species and wattle frequently present.	Upper slopes and rocky ridge crests. 1-5% slope.	Tarong Beds.	VI $m_6.d_4.r_4.e_6$
101.	Shallow to moderately deep texture contrast soils. Frequent surface stone. Brownish black to greyish yellow brown loamy sand overlying dull yellowish brown gritty clays. Dy2.22. Occasional uniform coarse textured soils. Uc. Acid soil reaction trend.	Narrow-leaved ironbark, rusty gum grassy open forest with scattered Queensland blue gum, dogwood and wattle frequently present.	Mid and upper slope positions. 6-12% slope.	Tarong Beds.	VI $m_6.d_4.r_3.e_6$
102.	Moderately deep to deep texture contrast soils. Brownish black to dark brown loamy sand, bleached A_2, overlying brownish grey to dull yellow orange medium to heavy clay, often gravelly. Dy5.32, 3.42. Neutral soil reaction trend.	Narrow-leaved ironbark, rusty gum, dogwood, bull oak, wattle grassy open forest.	Mid and lower slopes. 3-6% slope.	Tarong Beds.	VI $m_4.d_2.e_6$
103.	Shallow to moderately deep soils. Some rock outcrops and surface stone. Brownish black to dark brown loamy coarse sands becoming yellower with depth over decomposing rock. Uc1.21. Acid soil reaction trend.	Narrow-leaved ironbark, dogwood layered open forest with scattered Yarraman ironbark, brown bloodwood, rusty gum and pink bloodwood frequently present.	Upper slopes and ridge crests. 2-4% slope.	Tarong Beds.	VI $m_6.d_3.r_4.e_6$
104.	Moderately deep to deep soils. Brownish black to greyish yellow brown sand, loamy sand to sandy clay loam grading into dull yellow orange to bright brown sands and sandy clays. Um5.42, Uc1.21, some Dy and Db. Neutral soil reaction trend.	Queensland blue gum, rough-barked apple grassy open forest with scattered narrow-leaved ironbark, wattles, coast banksia and river she-oak frequently present.	Creek lines and valley floors. 0-3% slope.	Tarong Beds.	III $m_3.e_2$
105.	Very shallow soils. Steep rocky scarps and drop offs. Brownish black to dark brown loamy sands, often gravelly over decomposing rock. Uc1.21, Um1.21. Neutral to acid soil reaction trend.	Yarraman ironbark, "softwood scrub" species, narrow-leaved ironbark, wattle shrubby open forest.	Upper slopes and steep scarps. 20-45% slope. Minor areas as steep as 80% slope.	Tarong Beds.	VII-VIII $m_6.d_6.t_7.r_5.e_7$
106.	Shallow to moderately deep soils. Frequent granite tors and boulders. Brownish black to dark brown loamy sand often gravelly becoming yellowish brown clay loam-sandy with depth over decomposing rock. Uc1.22. Acid soil reaction trend.	Queensland blue gum, narrow-leaved ironbark shrubby open forest with scattered quinine, rusty gum, dogwood, grass trees and wattle frequently present..	Upper slopes and rocky ridge crests. 10-20% slope. Minor areas as steep as 50% slope.	Boondooma Igneous Complex.	VI $m_6.d_4.t_6.r_5.e_6$
107.	Shallow to moderately deep texture contrast soils. Some rock outcrops. Brownish black to dull yellowish brown loamy sand over decomposing rock or bleached A_2, overlying dull yellowish brown gritty clays. Dy5.31. Occasional uniform coarse textured soils. Uc1.22. Acid soil reaction trend.	Narrow-leaved ironbark, grass trees, Queensland blue gum, wattle shrubby open forest.	Mid and upper slope positions. 8-15% slope.	Boondooma Igneous Complex.	IV $m_3.d_3.r_2.e_4$
108.	Moderately deep to deep texture contrast soils. Brownish black to greyish brown sandy loam to loamy sands, often bleached A_2, overlying yellowish brown and brown medium to heavy clays. Dy3.21, 3.41. Occasional uniform coarse textured soils. Uc1.22. Acid soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum, broad-leaved apple, bull oak/silver-leaved ironbark grassy open forest.	Lower slopes and valley floors. 3-6% slope. Minor areas as steep as 12% slope.	Boondooma Igneous Complex.	III $m_3.d_2.e_3$

Appendix II (continued)

LAND UNIT	SOILS	VEGETATION	LANDFORM	GEOLOGY	LAND CAPABILITY CLASS
109.	Moderately deep to deep texture contrast soils. Brownish black loamy sands to sands, overlying yellowish brown gritty and gravelly clays. Dy3.21. Occasional uniform coarse textured soils. Uc1.21, 1.22. Acid soil reaction trend.	Queensland blue gum, Moreton Bay ash, silver-leaved ironbark, narrow-leaved ironbark/coast banksia grassy open forest.	Lower slopes. 8-12% slope.	Boodooma Igneous Complex.	VI m_3,d_2,e_6
110.	Moderately deep to deep texture contrast soils. Dark brown to dull yellowish brown loamy sands to sand , often bleached A_2, overlying greyish yellow brown medium to heavy clays. Dy5.31, 3.41. Acid soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum, rusty gum, pink bloodwood, bull oak, dogwood grassy open forest.	Mid and upper slopes. 5-8% slope.	Boondooma Igneous Complex.	IV m_3,d_2,e_4
111.	Shallow to moderately deep soils. Frequent rock outcrops. Brownish black to brownish grey loamy sands to sands grading into dull yellowish brown loamy sands and clayey sands over decomposing rock. Uc1.21, 1.23. Acid soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum, quinine, pink bloodwood, dogwood/ grass trees/Moreton Bay ash grassy open forest.	Mid slope positions. 4-8% slope.	Boondooma Igneous Complex.	VI m_6,d_3,r_5,e_6
112.	Moderately deep to deep texture contrast soils. Scattered areas of rock outcrop. Brownish black to dark brown loamy sand, bleached A_2, overlying dull yellowish brown to yellowish brown medium to heavy clay. Dy3.41, 5.41, 5.42, 2.43. Occasional uniform coarse textured soil. Uc. Acid to neutral soil reaction trend.	Narrow-leaved ironbark, rusty gum grassy open forest with scattered Queensland blue gum, silver-leaved ironbark frequently present.	Lower slopes and broad ridges. 4-8% slope.	Boondooma Igneous Complex.	IV m_4,d_3,p_2,e_4
113.	Moderately deep to deep soils. Some areas rock outcrop. Brownish black to dark brown fine sandy clay loam grading into yellowish brown fine sandy clay loam to light clays, often gravelly, over decomposing rock. Um1.22. Acid soil reaction trend.	Queensland peppermint, pink bloodwood, dogwood, long-fruited bloodwood shrubby low woodland.	Ridge crests, fairly flat. 1-3% slope.	Lateritised Boondooma Igneous Complex.	VI m_6,d_4,r_5,e_6
114.	Moderately deep to deep soils. Very dark reddish brown sandy clay loam grading into dark red loams. Um5.22, Gn2.11. Acid soil reaction trend.	Narrow-leaved ironbark, pink bloodwood, red ash, Queensland peppermint, wattle shrubby woodland.	Ridge crests, fairly flat. 1-3% slope.	Lateritised Boondooma Igneous Complex.	III e_3
115.	Shallow to moderately deep texture contrast soils. Small areas rock outcrops. Brownish black to dark brown sandy loams to gravelly sandy loams, bleached A_2, overlying dark reddish brown to dull yellowish brown medium to heavy clays. Dr3.31, 2.31, 3.41, Dy3.41. Acid soil reaction trend.	Narrow-leaved ironbark, Queensland peppermint, rusty gum shrubby open forest with scattered spotted gum, black she-oak and wattle frequently present.	Upper slopes and ridge crests. 4-10% slope. Minor areas as steep as 20% slope.	Lateritised Boondooma Igneous Complex.	VI m_4,d_2,r_4,e_6
116.	Rock outcrops, scarps and shallow soils. Very dark reddish brown to dark reddish brown fine sandy loams, often stony, grading into dark reddish brown light clays over decomposing rock. Gn2.11. Acid soil reaction trend.	Spotted gum, narrow-leaved ironbark, small-fruited grey gum, pink bloodwood shrubby open forest with scattered Queensland peppermint, dogwood, black she-oak, wattle, rusty gum and "softwood scrub" species frequently present.	Scarps and steep rocky ridges and rock outcrops. 10-30% slope. Minor areas as steep as 70% slope.	Lateritised Boondooma Igneous Complex.	VII-VIII m_6,d_4,t_7,r_5,e_7
117.	Moderately deep texture contrast soils Dark brown to very dark brown fine sandy loam to fine sandy clay loam, occasional bleached A_2, overlying reddish brown to bright brown medium to heavy clays. Db2.12, Dy3.31. Occasional gradational soil. Gn. Neutral soil reaction trend.	Narrow-leaved ironbark, Moreton Bay ash, Queensland blue gum shrubby woodland with scattered silver-leaved ironbark and rough-barked apple frequently present.	Mid and lower slope positions. 5-15% slope. Minor areas as steep as 25% slope.	Lateritised Boondooma Igneous Complex.	VI m_4,d_2,r_4,e_6
118.	Moderately deep to deep texture contrast soils. Brownish black to dark brown loamy sand to sandy loam bleached A_2, overlying yellowish brown, often mottled, heavy clays, Dy3.41, 3.42. Occasional brown texture contrast soil, Db. Acid soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum, woodland to open forest.	Mid and lower slopes. 4-8% slope.	Boondooma Igneous Complex.	III m_2,d_2,p_2,e_3
119.	Shallow to moderately deep texture contrast soils. Very dark brown to brownish black loamy sands and sandy loams, occasional bleached A_2, overlying reddish brown to yellowish brown medium to heavy clays. Dy2.13, 2.12. Occasional brown texture contrast soil. Db. Neutral to alkaline soil reaction trend.	Silver-leaved ironbark, Moreton Bay ash grassy woodland with scattered narrow-leaved ironbark, Queensland blue gum and broad-leaved apple frequently present.	Upper slopes and broad ridges. 5-10% slope. Minor areas as steep as 20% slope.	Boondooma Igneous Complex.	IV-VI m_2,d_2,p_2,e_4
120.	Shallow to moderately deep texture contrast soils. Brownish black to very dark brown sandy loam to loam, bleached A_2, overlying dark reddish brown to brown medium to heavy clays. Iron and manganese concretions frequently occur. Dr3.31, Db1.42. Occasional gradational textured soil. Gn. Acid soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum/ Moreton Bay ash grassy open woodland.	Upper slopes and ridge crests. 4-8% slope.	Boondooma Igneous Complex.	III m_2,p_2,e_3

Appendix II (continued)

LAND UNIT	SOILS	VEGETATION	LANDFORM	GEOLOGY	LAND CAPABILITY CLASS
121.	Deep texture contrast soils. Brownish black to greyish yellow brown fine sandy loams to clay loams, bleached A_2, overlying brown and dull yellowish brown medium clays. Dy4.43, Db2.43. Occasional uniform cracking clays. Ug. Alkaline soil reaction trend.	Queensland blue gum, rough-barked apple/ silver-leaved ironbark, grassy woodland to open forest.	Drainage lines and associated lower slopes. 1-5% slope.	Boondooma Igneous Complex.	II e_2
122.	Moderately deep to deep texture contrast soils. Brownish black to dull yellowish brown fine sandy clay loam to silty clay loam, occasional bleached A_2, overlying yellowish brown and dull yellowish brown medium to heavy clays. Dy2.23, 2.32, 2.33, 4.43. Alkaline soil reaction trend.	Gum-topped box grassy open forest.	Lower slopes adjacent drainage lines. 0-4% slope.	Boondooma Igneous Complex.	II d_2,p_2,e_2
123.	Shallow soils. Frequent rock and boulders. Brownish black to greyish brown loamy sand to sand overlying decomposing rock. Uc1.21, 1.22. Occasional uniform medium textured soils. Um. Acid soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum shrubby open forest with scattered pink bloodwood, grass trees, rusty gum, quinine and wattle frequently present.	Ridge crests and steep upper slopes. 20-40% slope. Minor areas as steep as 60% slope.	Boondooma Igneous Complex.	VII-VIII m_6,d_4,t_7,r_5,e_7
124.	Shallow to moderately deep texture contrast soils. Scattered rock outcrops. Brownish black to greyish brown loamy sands to sands, bleached A_2, overlying yellowish brown medium to heavy clays. Dy5.31, 3.41. Acid soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum, rusty gum, pink bloodwood layered open forest with scattered quinine, black she-oak and wattle frequently present.	Mid and upper slope positions. 10-20% slope.	Boondooma Igneous Complex.	VI-VII m_6,d_4,t_6,e_6
125.	Shallow to moderately deep texture contrast soils. Brownish black to greyish brown loamy sands to sandy loams, bleached A_2, overlying yellowish brown and brown medium to heavy clays over decomposing rock. Dy3.41, 3.42, 5.31. Occasional uniform medium or uniform coarse textured soils. Um, Uc. Acid soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum, rusty gum layered open forest with scattered black she-oak and wattle frequently present.	Valley floors and lower slopes. 15-20% slope.	Boondooma Igneous Complex.	VI-VII m_6,d_4,t_6,e_6
126.	Moderately deep texture contrast soils. Scattered rock outcrops. Brownish black to dark brown fine sandy loam overlying yellowish brown medium to heavy clays. Dy5.22. Neutral soil reaction trend.	Silver-leaved ironbark, Queensland blue gum grassy open forest.	Mid and upper slopes. 6-10% slope.	Taromeo Tonalite.	IV m_2,d_2,e_4
127.	Moderately deep to deep texture contrast soils. Scattered rock outcrops. Very dark reddish brown loams, occasional bleached A_2, overlying dark reddish brown to brown medium clays. Dr4.22, 4.42, 2.22, 2.42. Neutral soil reaction trend.	Queensland blue gum, silver-leaved ironbark grassy woodland.	Mid and lower slope positions. 8-12% slope.	Taromeo Tonalite.	VI m_2,d_2,e_6
128.	Deep texture contrast soils. Brownish black to dark brown loam-fine sandy to clay loam, bleached A_2, overlying brown and bright yellowish brown medium to heavy clays. Db2.31. Acid soil reaction trend.	Gum-topped box grassy open forest.	Lower slopes and valley floors. 5-8% slope.	Taromeo Tonalite.	IV m_2,d_2,p_2,e_4
129.	Moderately deep to deep texture contrast soils. Brownish black to greyish brown loamy sands to loams, often bleached A_2, overlying yellowish brown mottled medium to heavy clays. Dy3.42, 5.42, 5.12, 2.12. Neutral soil reaction trend.	Queensland blue gum, broad-leaved apple grassy woodland to open forest with scattered silver-leaved ironbark, Moreton Bay ash and narrow-leaved ironbark frequently present.	Valley floors and drainage lines. 0-4% slope.	Taromeo Tonalite.	III d_2,p_2,e_3
130.	Shallow soils. Scattered areas rock outcrop. Brownish black to dark brown loamy sands over decomposing rock or overlying reddish brown to brown medium clays. Uc1.23, 1.22, Dr2.12. Occasional Um. Neutral soil reaction trend.	Rusty gum, narrow-leaved ironbark shrubby open forest with scattered silver-leaved ironbark, Moreton Bay ash, black she-oak, dogwood and wattle frequently present.	Ridge crests and upper slopes. 4-12% slope. Minor areas as steep as 20% slope.	Taromeo Tonalite often lateritised.	VI m_6,d_4,r_5,e_6
131.	Shallow to moderately deep texture contrast soils. Brown to dull yellowish brown loamy sands, bleached A_2, overlying mottled dull yellowish brown medium to heavy clays. Dy5.41, 5.42. Acid to neutral soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum grassy open forest.	Mid and lower slopes. 4-8% slope.	Taromeo Tonalite.	IV m_4,d_2,e_4
132.	Shallow to moderately deep texture contrast soils. Scattered areas rock outcrop. Brown to greyish brown loamy sands, bleached A_2, overlying bright brown or yellowish brown medium to heavy clays. Dy5.41, 5.42. Acid to neutral soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum, silver-leaved ironbark grassy open forest.	Upper slopes and broad ridges. 3-6% slope.	Taromeo Tonalite.	IV m_4,d_2,e_4
133.	Deep soils. Dark reddish brown fine sandy loam grading through loam fine sandy to dark reddish brown light clays. Gn2.12. Neutral soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum grassy open forest with scattered Moreton Bay ash and silver-leaved ironbark frequently present.	Lower slope positions. 3-6% slope.	Taromeo Tonalite.	III e_3

Appendix II (continued)

LAND UNIT	SOILS	VEGETATION	LANDFORM	GEOLOGY	LAND CAPABILITY CLASS
134.	Shallow to moderately deep texture contrast soils. Scattered areas rock outcrop. Brownish black to dark brown loamy sand to sandy clay loams, bleached A_2, overlying greyish yellow brown and bright brown medium to heavy clays. Dy5.32, 5.12. Occasional brown texture contrast soil. Db. Neutral soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum grassy open forest with scattered Moreton Bay ash and broad-leaved apple frequently present.	Mid and upper slopes. 8-20% slope. Minor areas as steep as 35% slope.	Taromeo Tonalite.	VI m_6,d_4,t_6,r_4,e_6
135.	Shallow to moderately deep texture contrast soils. Brownish black to dull yellowish brown sands to sandy loams, bleached A_2, overlying dull yellow orange, mottled, medium to heavy clay. Dy3.43. Alkaline soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum grassy woodland with scattered Moreton Bay ash and pink bloodwood frequently present.	Broad ridge crests and upper slopes. 5-10% slope.	Wigton Adamellite	IV m_4,d_3,p_2,e_4
136.	Shallow soils. Scattered areas rock outcrop and stone. Greyish yellow brown loamy sands often gravelly or stony over decomposing rock. Uc1.21, 1.23. Occasional yellow texture contrast soil. Dy. Acid soil reaction trend.	Narrow-leaved ironbark, spotted gum, rusty gum, pink bloodwood, Queensland blue gum, Queensland peppermint, cypress pine grassy open forest.	Upper slopes and rocky ridge crests. 6-15% slope. Minor areas as steep as 40% slope.	Wigton Adamellite.	VI m_6,d_4,t_6,r_5,e_6
137.	Shallow to moderately deep texture contrast soils. Brownish black to dull yellowish brown loamy sand to sandy loam, often gravelly, bleached A_2, overlying yellowish brown gritty or sandy medium clays. Db2.43. Alkaline soil reaction trend.	Silver-leaved ironbark, Queensland blue gum/ narrow-leaved ironbark, grassy woodland.	Upper slope positions. 3-6% slope.	Wigton Adamellite.	VI m_4,d_3,p_2,e_4
138.	Deep texture contrast soils. Dull yellowish brown loam - fine sandy bleached A_2, overlying dull yellowish brown to brown, gritty, medium to heavy clays. Dy3.43, 3.42. Alkaline soil reaction trend.	Queensland blue gum, bull oak grassy woodland with scattered narrow-leaved ironbark and Moreton Bay ash frequently present.	Mid and lower slopes. 3-5% slope.	Wigton Adamellite.	VI m_6,d_4,p_2,e_6
139.	Moderately deep to deep texture contrast soils. Brownish black to dull yellowish brown loamy sand to gravelly loamy sand overlying bright yellowish brown to bright reddish brown medium to heavy clays. Dy3.22. Occasional red texture contrast soil. Dr. Neutral soil reaction trend.	Silver-leaved ironbark, narrow-leaved ironbark grassy woodland.	Mid slope positions. 4-8% slope.	Wigton Adamellite.	VI m_4,d_3,p_2,e_6
140.	Deep texture contrast soils. Brownish black clay loams to fine sandy clay loams, bleached A_2, overlying dark greyish brown to yellowish brown medium to heavy clays. Some calcium carbonate at depth. Dd3.43, 1.43, Dy4.43, 2.43. Alkaline soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum grassy woodland with scattered Moreton Bay ash, quinine, rusty gum and pink bloodwood frequently present.	Lower slopes and drainage lines. 2-4% slope.	Wigton Adamellite.	IV m_4,d_2,e_4
141.	Shallow to moderately deep texture contrast soils. Small areas rock outcrop. Dark brown sandy clay loams to clay loams overlying brown medium to heavy clays. Db3.12. Neutral soil reaction trend.	"Softwood scrub" species, bottle tree/narrow-leaved ironbark closed scrub.	Upper slopes. 4-10% slope. Minor areas as steep as 20% slope.	Wigton Adamellite.	VI m_3,d_2,e_6
142.	Shallow soils. Occasional rock outcrops. Brownish black loamy coarse sands, frequently gravelly, grading into greyish yellow brown loamy coarse sands over decomposing rock. Uc1.21. Acid soil reaction trend.	Narrow-leaved ironbark, pink bloodwood, quinine grassy woodland.	Ridge crests. 2-6% slope.	Wigton Adamellite.	VI m_6,d_4,e_6
143.	Shallow to moderately deep texture contrast soils. Dark brown to brownish black sandy loams to loams-fine sandy, bleached A_2, overlying yellowish brown medium to heavy clays usually columnar. Dy2.43. Alkaline soil reaction trend.	Bull oak, spotted gum, narrow-leaved ironbark grassy woodland.	Mid and upper slope positions. 6-12% slope. Minor areas as steep as 20% slope.	Wigton Adamellite.	VI m_4,d_3,p_2,e_6
144.	Shallow to moderately deep texture contrast soils. Brownish black to dull yellowish brown loamy sand to sandy loam, bleached A_2, overlying brown and yellowish brown medium to heavy clays. Db2.43, Dy3.43. Alkaline soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum grassy woodland with scattered silver-leaved ironbark, pink bloodwood and Moreton Bay ash frequently present.	Mid slope positions. 4-8% slope.	Wigton Adamellite.	IV m_4,d_2,p_2,e_4
145.	Shallow to moderately deep soils. Frequent rock outcrops. Very dark greyish brown light to medium clays becoming dark brown to brown medium to heavy clays over decomposing rock. Ug5.13, 5.32. Alkaline soil reaction trend.	"Softwood scrub" species, brigalow, belah/black tea-tree, open scrub.	Mid and upper slopes. 4-8% slope.	Wigton Adamellite.	III d_2,r_2,e_3
146.	Moderately deep to deep soils. Dark greyish brown to greyish brown medium to heavy clays becoming yellowish brown with depth. Calcium carbonate concretions frequently occur at depth. Commonly gilgaied. Ug5.22, 5.24, 5.13. Alkaline soil reaction trend.	"Softwood scrub" species, brigalow shrubby open forest with scattered belah, black tea-tree and gum-topped box frequently present.	Upper slopes. 1-4% slope.	Wigton Adamellite	III d_2,g_2,e_3

Appendix II (continued)

LAND UNIT	SOILS	VEGETATION	LANDFORM	GEOLOGY	LAND CAPABILITY CLASS
147.	Deep soils. Brownish black medium to heavy clays becoming dark brown or olive brown with depth. Occasional gilgai development. Calcium carbonate concretions frequently occur at depth. Ug5.15, Ug5.34. Occasional yellow or brown texture contrast soil. Dy, Db. Alkaline soil reaction trend.	Brigalow open forest with scattered gum-topped box, belah, black tea-tree, wilga and "softwood scrub" species frequently present.	Lower slopes and adjacent drainage lines. 1-3% slope.	Wigton Adamellite.	II e_2
148.	Moderately deep to deep soils. Varying amounts of silcrete rock in and on surface. Brownish black medium clay grading into greyish yellow brown to grey medium to heavy clays. Calcium carbonate occurs at depth. Ug5.23, 5.34. Alkaline soil reaction trend.	Brigalow, "softwood scrub" species/belah shrubby open forest.	Mid slopes. 4-10% slope.	Wigton Adamellite.	IV r_2,e_4
149.	Deep texture contrast soils. Brownish black fine sandy clay loam, occasional bleached A_2, overlying olive brown or yellowish brown medium to heavy clays. Calcium carbonate occurs at depth. Db1.13, 1.33, Dy2.13, 2.33. Alkaline soil reaction trend.	Gum-topped box, "softwood scrub" species shrubby woodland with scattered brigalow, belah and narrow-leaved ironbark frequently present.	Lower slopes. 1-3% slope. Minor areas as steep as 8% slope.	Wigton Adamellite.	III m_2,p_2,e_3
150.	Deep texture contrast soils. Greyish yellow brown to greyish brown loam or loam-fine sandy, bleached A_2, overlying greyish yellow brown medium to heavy clays. Dy2.41. Acid soil reaction trend.	Rusty gum, narrow-leaved ironbark, Queensland blue gum grassy woodland.	Drainage lines and flat low areas. 0-2% slope.	Evergreen Formation.	IV m_4,d_2,p_2,e_3
151.	Deep texture contrast soils. Greyish brown fine sandy loams, bleached A_2, overlying brown and dull yellowish brown medium to heavy clays. Db2.43, 2.42, Dy3.43. Occasional uniform coarse textured soils Uc1.21. Alkaline soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum woodland with scattered bull oak, paper-barked tea-tree and gum-topped box frequently present.	Slight rises, relatively flat areas. 1-3% slope.	Evergreen Formation.	III m_3,d_2,p_2,e_3
152.	Moderately deep to deep texture contrast soils. Dark brown to greyish brown gravelly sandy loam to loams, bleached A_2, overlying dull reddish brown and yellowish brown medium to heavy clays. Dr3.41, Dy3.41, 3.21, 3.42. Acid soil reaction trend.	Spotted gum, narrow-leaved ironbark woodland to open forest with scattered gum-topped box, dogwood and wattle frequently present.	Lower slopes. 3-6% slope.	Evergreen Formation.	VI m_4,d_3,p_2,e_6
153.	Deep texture contrast soils. Brownish black to dark brown loam to clay loams, frequently bleached A_2, overlying brown medium to heavy clays. Dy3.43, 3.32, 2.32, 2.42. Neutral to alkaline soil reaction trend.	Gum-topped box, bull oak grassy open forest with scattered narrow-leaved ironbark, Queensland blue gum and black tea-tree frequently present.	Lower slopes and drainage lines. 0-2% slope.	Evergreen Formation.	IV m_4,d_3,p_2,e_4
154.	Shallow to moderately deep soils. Some lateritised rock outcrops. Shallow to moderately deep very dark brown to greyish brown loams and clay loams over rock or bleached A_2, overlying dark brown or reddish brown medium to heavy clays. Um1.23, 2.12, Dr3.42, Dy3.42. Neutral soil reaction trend.	Rusty gum, narrow-leaved ironbark shrubby open forest with scattered gum-topped box, Queensland peppermint, dogwood, wattle and paper-bark tea-tree frequently present.	Mid and upper slopes. 4-8% slope. Minor areas as steep as 15% slope.	Evergreen Formation.	VI m_6,d_4,r_5,e_6
155.	Shallow texture contrast soils. Dark brown and greyish brown, frequently gravelly and stony, sandy loams and loams, bleached A_2, over rock or overlying brown and yellowish brown medium to heavy clays. Db1.42, Dy2.43, 2.42. Occasional uniform medium textured soils. Um1.23, 2.12. Neutral to alkaline soil reaction trend.	Narrow-leaved ironbark, bull oak open woodland with scattered rusty gum and spotted gum frequently present.	Mid slopes and minor jump ups. 6-10% slope.	Evergreen Formation.	VI m_6,d_4,p_2,r_5,e_6
156.	Deep texture contrast soils. Brown or dark brown loamy sands and fine sandy loams overlying brown or yellowish brown medium to heavy clays. Dy3.43, 3.42, Db2.43. Occasional uniform medium and uniform coarse textured soils. Um1.23, Uc1.23. Alkaline soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum with scattered rough-barked apple, swamp mahogany and wattle frequently present.	Lower slopes, drainage lines, creek bank levees. 0-3% slope.	Evergreen Formation.	III m_3,d_3,p_2,e_3
157.	Shallow to moderately deep texture contrast soils. Very dark brown to brown loams and clay loams, often gravelly or stony, bleached A_2, overlying rock or dark reddish brown to brown medium to heavy clays. Dr3.42, 3.41, Db2.42, 2.41. Occasional uniform medium textured soils. Um1.23, 1.22. Acid to neutral soil reaction trend.	Spotted gum, narrow-leaved ironbark, wattle grassy open forest.	Mid and upper slopes. 10-25% slope. Minor areas as steep as 40% slope.	Evergreen Formation.	VII m_6,d_4,p_2,r_5,e_7
158.	Moderately deep soils. Very dark reddish brown loams, clay loams and light clays grading into dark reddish brown light to medium clays. Lateritic gravel frequently occurs. Gn3.11, 3.12, Uf6.21. Acid soil reaction trend.	Spotted gum, narrow-leaved ironbark, dogwood, wattle shrubby open forest.	Mid and lower slopes, 4-8% slope.	Evergreen Formation.	III e_3

Appendix II (continued)

LAND UNIT	SOILS	VEGETATION	LANDFORM	GEOLOGY	LAND CAPABILITY CLASS
159.	Very shallow soils. Rock outcrops and scarps. Very dark reddish brown to reddish brown loams and clay loams over rock. Um1.23, Dr3.42. Neutral soil reaction trend.	Spotted gum, narrow-leaved ironbark, wattle, dogwood, rusty gum shrubby open forest.	Upper slopes and scarps. 15-35% slope. Minor areas as steep as 70% slope.	Evergreen Formation.	VII m_6,d_4,r_5,e_7
160.	Shallow soils. Frequent rock outcrops. Dark reddish brown to greyish brown loams and clay loams, often stony or gravelly over rock or overlying dark reddish brown to yellowish brown clays. Um1.23, Dr3.42. Neutral soil reaction trend.	Spotted gum, narrow-leaved ironbark, wattle, dogwood, rusty gum shrubby open forest.	Ridge crests, 2-6% slope. Minor areas as steep as 10% slope.	Evergreen Formation.	VI m_6,d_4,r_5,e_6
161.	Deep soils, Dark brown light clays grading into dark brown to brown medium to heavy clays. Small areas of moderate gilgai. Calcium carbonate may occur at depth. Ug5.34, 5.32. Alkaline soil reaction trend.	Brigalow, belah open forest.	Ridge crests. 0-1% slope.	Old alluvia.	II g_2,e_2
162.	Deep soils. Dark brown to brownish black light to medium clays grading into dark brown to dull yellowish brown medium to heavy clays. Areas of moderate gilgai occur. Calcium carbonate at depth. Ug5.32, 5.35. Alkaline soil reaction trend.	Brigalow, belah/ wilga open forest.	Mid slopes. 3-5% slope. Minor areas as flat as 0.5% slope.	Old alluvia.	II g_2,k_2,e_2
163.	Deep texture contrast soils. Very dark brown fine sandy clay loam to clay loams overlying brown or reddish brown medium to heavy clays. Calcium carbonate occurs at depth. Db3.13. Alkaline soil reaction trend.	Belah open forest with scattered wilga, brigalow and "softwood scrub" species frequently present.	Lower slopes. 4-6% slope.	Old alluvia.	III e_3
164.	Deep texture contrast soils. Dark brown clay loams, sporadic bleached A_2, overlying brown or yellowish brown medium to heavy clays. Calcium carbonate occurs at depth. Db3.23. Occasional gradational soil. Gn2.25. Alkaline soil reaction trend.	Gum-topped box shrubby open forest with scattered wilga, "softwood scrub" species, rusty gum, wattle and narrow-leaved ironbark frequently present.	Mid and upper slopes. 0-2% slope.	Old alluvia.	II e_2
165.	Deep soils. Very dark reddish brown fine sandy loam grading through fine sandy clay loam to dark red or brown light to medium clays. Gn2.12, 2.11. Acid soil reaction trend.	Silver-leaved ironbark, narrow-leaved ironbark, kurrajong, wilga, ironwood, "softwood scrub" species grassy woodland to open woodland.	Upper slopes and elevated areas. 0-3% slope.	Old alluvia.	II e_2
166.	Deep soils. Brown to very dark brown clay loams and light to medium clays grading into reddish brown, brown or yellowish brown clays. Ug5.32, 5.35, Db3.23, 3.13. Alkaline soil reaction trend.	Brigalow, belah, wilga shrubby open forest with scattered poplar box, Queensland blue gum and black tea-tree frequently present.	Lower slopes and drainage lines. 1-3% slope.	Old alluvia.	II e_2
167.	Deep soils. Large gilgais occur. Dark brown light to medium clays grading into brown and yellowish brown medium to heavy clays, black clay surface in depression. Calcium carbonate occurs throughout puff. Ug5.24, 5.31, 5.35. Alkaline reaction trend in puff and acid in depression.	Brigalow, black tea-tree/ belah shrubby open forest.	Plains. 0-2% slope.	Old alluvia.	IV g_4,w_4,e_2
168.	Deep soils. Small to moderate gilgais occur. Brownish black medium to heavy clays overlying brown and dull yellowish brown medium to heavy clays. Calcium carbonate occurs at surface in puff and at depth in depression. Ug5.35, 5.34. Alkaline soil reaction trend.	Brigalow, belah/black tea-tree open forest.	Plains. 0-2% slope.	Old alluvia.	IV g_4,w_4,e_2
169.	Deep soils. Small to moderate gilgais occur. Brownish grey medium to heavy clay overlying brownish grey and yellowish grey heavy clays. Calcium carbonate occurs at depth in depression and surface in puff. Ug5.24. Alkaline soil reaction trend.	Black tea-tree/brigalow grassy open scrub.	Plains, slightly lower, drainage lines. 0-2% slope.	Old alluvia.	IV g_4,w_4,e_2
170.	Deep soils. Brownish black to dark brown loam-fine sandy to clay loam, occasional sporadic bleached A_2, grading into brown and yellowish brown light to medium clays. Gn2.25, Db3.23. Alkaline soil reaction trend.	Gum-topped box, narrow-leaved ironbark open forest to woodland with scattered rusty gum, wattle and Queensland blue gum frequently present.	Plains, slightly elevated. 0-2% slope.	Old alluvia.	II e_2

Appendix II (continued)

LAND UNIT	SOILS	VEGETATION	LANDFORM	GEOLOGY	LAND CAPABILITY CLASS
171.	Shallow to moderately deep texture contrast soils. Dark brown sandy loams to fine sandy loams, bleached A_2, overlying greyish yellow brown and yellowish brown sandy clays to medium to heavy clays. Dy2.43, 3.43. Alkaline soil reaction trend.	Bull oak, spotted gum, narrow-leaved ironbark, Queensland blue gum open forest to low open forest with scattered paper-bark tea-tree, pink bloodwood and wattle frequently present.	Mid slopes, 4-8% slope with some steep rocky scarps, 15-30% slope.	Aranbanga Beds.	VI m_6,d_3,p_2,r_3,e_6
172.	Shallow soils. Often rock outcrops. Dark brown gravelly and stony loams and loamy sands overlying rocks. Uc1.23, 1.22, Um1.23, 1.22. Neutral soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum, wattle layered open forest with scattered rusty gum, spotted gum and pink bloodwood frequently present.	Upper slopes and ridge crests. 10-20% slope. Minor areas as steep as 35% slope.	Aranbanga Beds.	VII m_6,d_4,t_6,r_4,e_7
173.	Shallow to moderately deep texture contrast soils. Brownish black to dull yellowish brown fine sandy loam to sandy clay loam, frequently gravelly, bleached A_2, overlying dull yellowish brown and greyish yellow brown medium to heavy clays. Dy3.42, 3.43, Db1.43. Neutral to alkaline soil reaction trend.	Narrow-leaved ironbark, rusty gum, Moreton Bay ash shrubby woodland with scattered bull oak, silver-leaved ironbark and wattle frequently present.	Mid and lower slopes. 5-10% slope.	Aranbanga Beds.	VI m_6,d_3,p_2,e_6
174.	Shallow soils. Frequent stone and rock outcrops. Dull brown sandy loams, often gravelly, grading into decomposing rock or bleached A_2, overlying bright reddish brown medium clays. Uc1.22, 1.21, Dy2.41, Dr2.41. Acid soil reaction trend.	Spotted gum, forest she-oak shrubby open forest with scattered rusty gum, narrow-leaved ironbark and wattle frequently present.	Ridge crests and rocky areas. 1-5% slope. Minor areas as steep as 12% slope.	Aranbanga Beds.	VII m_6,d_4,r_5,e_7
175.	Shallow to moderately deep texture contrast soils. Brownish black to dark brown loams and gravelly loams, bleached A_2, overlying brown and yellowish brown medium clays. Db1.42, Dy2.42, 3.42. Neutral soil reaction trend.	Gum-topped box, bull oak grassy open forest with scattered narrow-leaved ironbark, silver-leaved ironbark, Moreton Bay ash and broad-leaved apple frequently present.	Lower slopes and drainage lines. 4-8% slope.	Aranbanga Beds.	VI m_4,d_3,p_2,r_4,e_5
176.	Shallow to moderately deep soils. Dark reddish brown clay loams and light clays grading into dark reddish brown to dark red light to medium clays. Gn3.12, Uf6.31. Acid soil reaction trend.	Spotted gum, narrow-leaved ironbark open forest with scattered gum-topped box and wattle frequently present.	Mid slopes often below rock outcrop. 6-10% slope.	Aranbanga Beds.	III m_3,d_2,p_2,e_3
177.	Shallow to moderately deep soils. Rock outcrop and surface stone frequently occur. Brownish black to dull yellowish brown loamy sands to sandy clay loams over rock or overlying dull yellowish brown to greyish yellow brown clays. Uc1.22, 1.23, Um1.23, Dy3.42, Db1.43. Neutral to alkaline soil reaction trend.	Narrow-leaved ironbark open forest with scattered pink bloodwood, Queensland blue gum, black cypress pine, forest she-oak, Moreton Bay ash and spotted gum frequently present.	Steep slopes in all positions. 15-30% slope. Minor areas as steep as 50% slope.	Aranbanga Beds.	VII-VIII m_6,d_4,t_7,r_5,e_7
178.	Shallow to moderately deep texture contrast soils. Frequent rock outcrops occur. Dark brown loamy sands to gravelly or stony loamy sands over rock or overlying dull yellowish brown sandy clays. Dy2.41. Occasional uniform coarse textured soils. Uc1.22, 1.23. Acid soil reaction trend.	Narrow-leaved ironbark open forest with scattered pink bloodwood, forest she-oak and wattle frequently present.	All slope positions. 8-15% slope. Minor areas as steep as 25% slope.	Aranbanga Beds.	VI m_6,d_4,r_5,e_6
179.	Deep texture contrast soils. Dark brown to brownish black fine sandy clay loam to clay loam, occasional bleached A_2, overlying dark brown to brown medium to heavy clays. Calcium carbonate may occur at depth. Db2.42, 1.13, 1.33, Dy3.42. Neutral to alkaline soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum grassy woodland with scattered Moreton Bay ash, poplar box, gum-topped box and silver-leaved ironbark frequently present.	Upper slopes and flat areas. 3-6% slope.	Maronghi Creek Beds and undifferentiated metamorphics.	IV m_2,d_2,p_2,e_4
180.	Shallow to moderately deep texture contrast soils. Brownish black to dull brown clay loams, bleached A_2, overlying dull yellowish brown to yellowish brown, gravelly, medium to heavy clays. Dy2.42, 2.41, 2.32, 3.41. Neutral to acid soil reaction trend.	Gum-topped box open forest with scattered narrow-leaved ironbark, Queensland blue gum and wattle frequently present.	Mid and lower slopes. 4-10% slope.	Maronghi Creek Beds and undifferentiated metamorphics.	IV m_2,d_2,p_2,e_4
181.	Shallow to moderately deep soils. Frequent rock outcrops. Brownish black loamy sands to fine sandy clay loams overlying rock or overlying brown and reddish brown medium to heavy clays. Uc1.23, Db1.22, 1.23, Dr2.41. Neutral to acid soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum, Moreton Bay ash open woodland to open forest with scattered gum-topped box, silver-leaved ironbark and "softwood scrub" species frequently present.	Upper slopes and ridges. 3-8% slope.	Maronghi Creek Beds and undifferentiated metamorphics.	VI m_6,d_4,r_5,e_6
182.	Moderately deep to deep texture contrast soils. Dark brown sandy clay loams, frequently bleached A_2, overlying brown gritty or gravelly medium to heavy clays. Calcium carbonate occurs at depth. Areas of moderate gilgai development. Db1.33, 3.23, Ug5.35, 5.32, 5.24, 5.25. Alkaline soil reaction trend.	Narrow-leaved ironbark, brigalow, Queensland blue gum open forest to open woodland with scattered wilga, belah and "softwood scrub" species frequently present.	Small elevated flat areas. 1-4% slope.	Maronghi Creek Beds and undifferentiated metamorphics.	III p_2,e_3

Appendix II (continued)

LAND UNIT	SOILS	VEGETATION	LANDFORM	GEOLOGY	LAND CAPABILITY CLASS
183.	Moderately deep to deep texture contrast soils. Brownish black sandy clay loam, bleached A_2, overlying dull yellowish brown sandy clays or medium to heavy clays. Dy3.43, Db2.43. Alkaline soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum grassy woodland with scattered silver-leaved ironbark, poplar box, brigalow and wilga frequently present.	Mid and upper slopes. 1-5% slope.	Maronghi Creek Beds and undifferentiated metamorphics.	IV $m_3.d_3,p_2,e_4$
184.	Moderately deep to deep texture contrast soils. Brownish black to greyish yellow brown loam to sandy clay loam, bleached A_2, overlying brown and yellowish brown medium to heavy clays. Dy2.42, 3.42, Db2.42, 1.33. Occasional uniform fine textured soils. Ug. Neutral to alkaline soil reaction trend.	Queensland blue gum, gum-topped box grassy woodland to open forest with scattered narrow-leaved ironbark, silver-leaved ironbark, broad-leaved apple and yellow box frequently present.	Lower slopes and valley floors. 1-5% slope.	Maronghi Creek Beds and undifferentiated metamorphics.	III m_3,d_3,p_2,e_3
185.	Moderately deep soils. Very dark reddish brown sandy clay loam grading into brown or dark reddish brown medium to heavy clays. Um5.22, Db1.22, Dr2.22. Occasional gradational textured soil. Gn. Neutral to acid soil reaction trend.	Narrow-leaved ironbark, Moreton Bay ash grassy woodland with scattered pink bloodwood, rusty gum, spotted gum and wattle frequently present.	Ridge crests and upper slopes. 3-6% slope.	Maronghi Creek Beds and undifferentiated metamorphics, frequently lateritised.	III m_2,d_2,p_2,e_3
186.	Shallow to moderately deep texture contrast soils. Areas of rock outcrop. Brownish black to dull yellowish brown sandy loams to clay loams, bleached A_2, overlying reddish brown to bright brown, medium to heavy clays. Dr3.21, Db1.32, 1.41, Dy2.41. Occasional uniform coarse textured soil. Uc1.23. Neutral to acid soil reaction trend.	Narrow-leaved ironbark grassy open forest with scattered Queensland blue gum, Moreton Bay ash, white cypress pine and wattle frequently present.	Mid to upper slopes. 10-35% slope. Minor areas as steep as 50% slope.	Maronghi Creek Beds and undifferentiated metamorphics.	VII-VIII m_3,d_2,t_7,r_5,e_7
187.	Shallow texture contrast soils. Brownish black to dull yellowish brown loamy fine sand often gravelly, frequently bleached A_2, overlying brown and yellowish brown medium to heavy clays. Dy3.32, Db2.22, 2.42. Neutral soil reaction trend.	Narrow-leaved ironbark, bull oak grassy open woodland with scattered Moreton Bay ash, silver-leaved ironbark and wattle, frequently present.	Mid slopes. 4-10% slope.	Maronghi Creek Beds and undifferentiated metamorphics.	VI m_4,d_4,p_2,e_6
188.	Shallow soils. Frequently stony. Brownish black to dull yellowish brown gritty and gravelly loams to clay loams over rock. Um1.44. Occasional brown texture contrast soil. Db. Acid soil reaction trend.	Narrow-leaved ironbark, silver-leaved ironbark, Queensland blue gum grassy open forest.	Mid and lower slopes. 8-15% slope.	Maronghi Creek Beds and undifferentiated metamorphics.	VI m_6,d_6,r_5,e_7
189.	Shallow soils. Frequent rock outcrops. Brown or dark reddish brown gravelly loamy sand to sandy loam over rock. Uc1.23, Um5.22, Db2.42, Dr3.42. Neutral soil reaction trend.	Spotted gum, rusty gum, narrow-leaved ironbark, wattle/"softwood scrub" species shrubby open forest.	Ridge crests and some scarps. 0-4% slope with scarps of 15-30% slope.	Maronghi Creek Beds and undifferentiated metamorphics often lateritised.	VI m_6,d_4,r_5,e_6
190.	Moderately deep to deep texture contrast soils. Brownish black to greyish yellow brown loamy coarse sands to sandy loams, bleached A_2, overlying dull yellowish brown gritty medium to heavy clays. Db2.33, Dy3.42. Occasional uniform coarse textured soil. Uc1.23. Alkaline to neutral soil reaction trend.	Queensland blue gum, gum-topped box, narrow-leaved ironbark grassy open forest with scattered Moreton Bay ash, grass trees and kurrajong frequently present.	Valley floors and lower slopes. 1-4% slope.	Maronghi Creek Beds and undifferentiated metamorphics.	IV m_3,d_2,p_2,e_4
191.	Moderately deep to deep texture contrast soils. Dark brown, brownish black to reddish brown light sandy clay loam to clay loam, bleached A_2, overlying brown, reddish brown or yellowish brown medium to heavy clays. Db2.42, Dy3.32, Dr3.42. Occasional uniform medium textured soil. Um1.23. Neutral soil reaction trend.	Gum-topped box open forest with scattered belah, black tea-tree and "softwood scrub" species frequently present.	Upper slopes. 4-8% slope.	Maronghi Creek Beds and undifferentiated metamorphics.	VI m_2,d_2,p_2,e_6
192.	Shallow to moderately deep soils. Frequently stony or rock outcrop. Dull yellowish brown sandy loams and loamy sands grading into decomposing rock or overlying bright brown light to medium clays. Uc1.23, Db2.42, 3.42. Occasional uniform medium textured soils. Um. Neutral soil reaction trend.	Narrow-leaved ironbark open forest with scattered rusty gum, Queensland blue gum, Moreton Bay ash, grass trees, pink bloodwood and wattle frequently present.	Mid and upper slopes and some scarps. 15-40% slope.	Maronghi Creek Beds and undifferentiated metamorphics.	VII m_6,d_4,r_5,e_7
193.	Shallow to moderately deep texture contrast soils. Scattered rock outcrop. Brownish black to dull greyish yellow silt loam to fine sandy clay loam, bleached A_2, overlying dull brown or dull yellowish brown light to medium clays. Db2.43, 1.13. Alkaline soil reaction trend.	Silver-leaved ironbark, rough-barked apple/ narrow-leaved ironbark grassy woodland.	Lower slopes. 6-12% slope.	Maronghi Creek Beds and undifferentiated metamorphics.	VI m_3,d_3,p_2,r_3,e_6
194.	Moderately deep to deep texture contrast soils. Brownish black to greyish yellow brown loamy sand to sandy loam, bleached A_2, overlying dull yellowish brown medium to heavy clays. Db2.33, 2.43. Alkaline soil reaction trend.	Silver-leaved ironbark, narrow-leaved ironbark, Queensland blue gum, rough-barked apple grassy woodland to open forest with scattered gum-topped box and Moreton Bay ash frequently present.	Lower slopes and valley floors. 2-6% slope.	Maronghi Creek Beds and undifferentiated metamorphics.	IV m_3,d_2,p_2,e_4

Appendix II (continued)

LAND UNIT	SOILS	VEGETATION	LANDFORM	GEOLOGY	LAND CAPABILITY CLASS
195.	Moderately deep to deep texture contrast soils. Dark brown to brownish black loams to clay loams, bleached A_2, overlying brown, dark brown or grey medium to heavy clays, often gravelly. Dy2.42, 2.41, Db1.32. Acid to neutral soil reaction trend.	Brigalow, gum-topped box, narrow-leaved ironbark/"softwood scrub" species shrubby open forest.	Mid and lower slopes. 2-5% slope.	Maronghi Creek Beds and undifferentiated metamorphics.	IV $m_3.d_2.p_2.e_4$
196.	Moderately deep to deep soils. Dark brown to brownish black clay loams and clays, occasional bleached A_2, over dark brown or grey medium to heavy clays. Ug5.14, 5.24, 5.15, Db1.33, 2.42. Neutral to alkaline soil reaction trend.	Brigalow, belah shrubby open forest with scattered black tea-tree, narrow-leaved ironbark, gum-topped box and "softwood scrub" species frequently present.	Lower slopes and valley floors. 1-4% slope.	Maronghi Creek Beds and undifferentiated metamorphics.	III e_3
197.	Shallow to moderately deep texture contrast soils. Some rock outcrops. Brownish black to dark brown loam-fine sandy to fine sandy clay loam overlying dark brown to yellowish brown medium to heavy clays, often gravelly. Dy5.21, Db3.41, Dr3.21. Occasional shallow uniform loams. Um5.41. Acid soil reaction trend.	Narrow-leaved ironbark, brush box, small-fruited grey gum, Queensland blue gum layered open forest with scattered gum-topped box, pink bloodwood, "softwood scrub" species and wattle frequently present.	Upper slopes and ridge crests. 4-8% slope.	Maronghi Creek Beds and undifferentiated metamorphics.	VI $m_3.d_3.r_3.e_6$
198.	Shallow to moderately deep soils. Some rock outcrops and stony areas. Brownish black and dark reddish brown sandy loam to clay loam grading into reddish brown and yellowish brown gravelly loams and medium clays. Areas of weak lateritisation. Um1.23, 5.42, Dy4.21 areas Gn3.12. Acid to neutral soil reaction trend.	"Softwood scrub" species/ hoop pine/narrow-leaved ironbark closed scrub.	Upper slopes and ridge crests, minor drop offs. 3-10% slope.	Maronghi Creek Beds and undifferentiated metamorphics.	VI $m_6.d_3.r_4.e_6$
199.	Moderately deep to deep texture contrast soils. Brownish black clay loam, occasional bleached A_2, overlying brown to orange medium to heavy clays. Dy4.21, 3.41, Dr3.21. Acid soil reaction trend.	"Softwood scrub" species/ Queensland blue gum/swamp mahogany closed scrub.	Lower slopes and drainage lines. 2-6% slopes.	Maronghi Creek Beds and undifferentiated metamorphics.	IV e_4
200.	Shallow to moderately deep texture contrast soils. Brownish black clay loam overlying very dark brown to dark brown medium to heavy clays. Db1.13, 1.12. Occasional dark cracking clays. Ug5.13. Neutral to alkaline soil reaction trend.	Narrow-leaved ironbark, Moreton Bay ash/Queensland blue gum/"softwood scrub" species woodland to open forest.	Mid to lower slopes. 5-15% slope.	Serpentinite.	IV $m_3.d_3.e_4$
201.	Shallow to moderately deep texture contrast soils. Occasional rock outcrop. Greyish brown loamy sand to clayey coarse sand, commonly bleached A_2, overlying gravelly mottled yellowish brown or brown sandy clay. Dy5.41, 5.21, Db4.21. Acid soil reaction trend.	Narrow-leaved ironbark, white mahogany, pink bloodwood, small-fruited grey gum layered open forest with scattered brush box, forest she-oak and "softwood scrub" species frequently present.	Mid and lower slope positions. 8-30% slope.	Station Creek Adamellite.	VII $d_2.t_7.e_7$
202.	Shallow to moderately deep texture contrast soils. Brownish black sandy loam overlying brown to yellowish brown clays. Dy5.31, Db2.41. Occasional uniform loams and sands. Um1.23, Uc1.2 . Acid soil reaction trend.	Narrow-leaved ironbark, small-fruited grey gum, white mahogany, pink bloodwood layered open forest with scattered brush box and "softwood scrub" species frequently present.	Upper slope positions and broad ridge crests. 2-8% slope.	Station Creek Adamellite.	IV-VI $m_3.d_2.e_4$
203.	Moderately deep texture contrast soils. Brownish black to dark grevish brown sandy loam or sandy clay loam overlying brown or yellowish brown clays. Dy5.41, 3.21, Db3.21. Acid soil reaction trend.	Narrow-leaved ironbark,gum-topped box, Queensland blue gum, pink bloodwood layered open forest with occasional brush box, white mahogany and "softwood scrub" species frequently present.	Lower slope positions. 3-8% slope.	Station Creek Adamellite.	IV $m_4.d_3.e_4$
204.	Shallow to moderately deep texture contrast soils. Brownish black sandy loam to clay loam overlying yellowish brown or brown clays. Dy5.21, 4.21. Acid soil reaction trend.	"Softwood scrub" species closed scrub with scattered hoop pine emergents frequently present.	Mid and lower slope positions. 4-15% slope.	Station Creek Adamellite.	VI $d_3.t_6.e_6$
205.	Moderately deep to deep texture contrast soils. Brownish black or dark brown sandy clay loam overlying dark brown to yellowish brown clays. Dy5.41, 3.41, Db2.31. Acid soil reaction trend.	Narrow-leaved ironbark, gum-topped box, Queensland blue gum, brush box/white mahogany open forest.	Lower slope positions and adjacent drainage lines. 2-6% slope.	Station Creek Adamellite.	IV $m_3.d_3.e_4$
206.	Moderately deep to deep texture contrast soils. Some rock outcrops. Brownish black to brown fine sandy clay loam to clay loam overlying brown or yellowish brown medium clays. Db1.33, 1.13, 2.43, Dy2.43. Minor dark cracking clays. Ug5.12. Alkaline soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum grassy woodland with scattered Moreton Bay ash and silver-leaved ironbark frequently present. Minor areas of silver-leaved ironbark woodland.	Mid and lower slope positions. 3-8% slope.	Esk Formation and some Neara Volcanics.	III $m_3.d_2.e_3$
207.	Shallow to moderately deep texture contrast soils. Some rock outcrops. Brownish black sandy clay loam to clay loam, commonly bleached A_2, overlying brown to yellowish brown medium clays. Db1.43, 1.33, 2.43 minor Dr2.23. Alkaline soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum, Moreton Bay ash/silver-leaved ironbark woodland.	Upper slope positions and broad ridge crests. 2-4% slope.	Esk Formation and some Neara Volcanics.	IV $m_4.d_3.r_2$

Appendix II (continued)

LAND UNIT	SOILS	VEGETATION	LANDFORM	GEOLOGY	LAND CAPABILITY CLASS
208.	Moderately deep to deep texture contrast soils. Brownish black sandy loam to sandy clay loam, bleached A_2, overlying mottled reddish brown or yellowish brown sandy clay to medium clay. Iron and manganese concretions frequently occur through the profile. Dy3.41, 5.31. Acid soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum, rusty gum/silver-leaved ironbark/gum-topped box grassy woodland to open forest.	Lower slope positions and flat areas. 0-4% slope.	Esk Formation.	IV m_4,d_3,p_3,e_3
209.	Moderately deep to deep texture contrast soils. Brownish black to dark brown sandy loam to clay loam, bleached A_2, overlying mottled dark reddish brown to yellowish brown medium to heavy clay. Iron and manganese concretions commonly occur. Dy3.41, Db2.41, 2.11 minor Dr3.43. Acid to neutral soil reaction trend.	Gum-topped box, Queensland blue gum/narrow-leaved ironbark grassy open forest.	Mid and lower slope positions and valley floors. 0-5% slope.	Esk Formation.	III-IV m_3,d_3,p_2,e_3
210.	Deep soils. Brownish black clay loam to light clay grading into dark brown clays. Ug5.15, 5.32. Occasional brown texture contrast soils. Db1.13, 1.33. Neutral to alkaline soil reaction trend.	Queensland blue gum, broad-leaved apple/ gum-topped box/silver-leaved ironbark grassy woodland.	Lower slope positions and adjacent drainage lines. 0-4% slope.	Esk Formation and Neara Volcanics.	II m_2,d_2,e_2
211.	Moderately deep texture contrast soils. Occasional rock outcrop. Brownish black to dark brown sandy loam to clay loam, frequently bleached A_2, overlying frequently mottled dark brown or reddish brown clays. Db2.33, Dr2.33, Dy3.33. Alkaline soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum grassy woodland with scattered silver-leaved ironbark, Moreton Bay ash and gum-topped box frequently present. Minor areas of silver-leaved ironbark woodland.	Mid and lower slope positions. 8-20% slope. Minor areas up to 30% slope.	Esk Formation and some Neara Volcanics.	IV m_3,d_2,t_4,e_4
212.	Shallow texture contrast soils. Occasional rock outcrop. Brownish black to dark brown loam or clay loam overlying brown to yellowish brown clays. Frequently gravelly. Db1.22, 1.32. Occasional uniform loamy soils. Um1.23. Neutral soil reaction trend.	Narrow-leaved ironbark, silver-leaved ironbark, woodland to open forest with scattered Queensland blue gum and Moreton Bay ash frequently present.	Upper slope positions and broad ridge crests. 1-5% slope.	Esk Formation and some Neara Volcanics.	IV-VI m_4,d_3,r_3,e_4
213.	Moderately deep texture contrast soils. Brownish black to dark brown fine sandy loam or clay loam, frequently bleached A_2, overlying mottled brown or yellowish brown clays. Db2.43, Dy3.43. Alkaline soil reaction trend.	Gum-topped box/narrow-leaved ironbark/ Queensland blue gum grassy open forest.	Lower and mid slope positions. 4-10% slope.	Esk Formation.	IV m_3,d_3,p_2,e_4
214.	Shallow to moderately deep texture contrast soils. Brownish black loam-fine sandy to clay loam, frequently bleached A_2, overlying reddish brown to yellowish brown medium clays. Db3.42, Dy3.42. Alkaline soil reaction trend.	Gum-topped box, Queensland blue gum/narrow-leaved ironbark grassy woodland.	Upper slopes and broad ridge crests. 1-5% slope.	Esk Formation.	IV m_3,d_3,e_4
215.	Moderately deep to deep soils. Black to brownish black self mulching clays grading into yellowish brown clays. Minor areas shallow gilgai. Ug5.15, 5.13, 5.32. Occasional gradational soils. Gn3.23. Neutral soil reaction trend.	Brigalow, belah/"Softwood scrub" species shrubby open forest. Small areas black tea-tree.	Gentle mid and lower slope positions and flat-topped ridges. 1-4% slope.	Neara Volcanics.	III m_2,d_2,e_3
216.	Shallow to moderately deep soils. Black to brownish black self-mulching clays grading to brown or olive brown clay. Some gravel occurs. Ug5.12, 5.13 minor Db1.13. Neutral to alkaline soil reaction trend.	"Softwood scrub" species/ bottle tree open to closed scrub and occasional Queensland blue gum, narrow-leaved ironbark open forest.	Broad ridge crests and upper slope positions. 1-5% slope.	Neara Volcanics.	III m_3,d_3,e_3
217.	Shallow to moderately deep texture contrast soils. Occasional rock outcrop. Brownish black to dark brown sandy clay loam, frequently bleached A_2, overlying mottled brown to reddish brown medium to heavy clays. Db2.41, 1.41, Dy3.41, Dr3.41. Acid soil reaction trend.	Rust gum, narrow-leaved ironbark grassy open forest with scattered Queensland blue gum, gum-topped box, wattle and dogwood frequently present.	Upper slope positions and stony ridge crests. 6-10% slope.	Neara Volcanics and minor Oakdale Sandstones.	VI-VII m_3,d_3,t_4,r_3,e_6
218.	Moderately deep to deep texture contrast soils. Brownish black or dark brown loam to clay loam overlying mottled brown to dark reddish brown medium to heavy clays. Iron and manganese concretions frequently occur. Db2.31, Dy3.31, minor Dr2.31. Occasional gradational soils. Gn3.51. Acid soil reaction trend.	Gum-topped box, narrow-leaved ironbark, Queensland blue gum/ rusty gum/belah grassy open forest.	Mid to upper slope positions and flat-topped ridges. 1-4% slope.	Neara Volcanics.	III m_3,d_2,p_2,e_3
219.	Moderately deep texture contrast soils. Brownish black fine sandy clay loam, bleached A_2, overlying brown to yellowish brown medium to heavy clays. Db1.43, 2.43, Dy2.43. Alkaline soil reaction trend.	Narrow-leaved ironbark, gum-topped box, Queensland blue gum/silver-leaved ironbark grassy open forest.	Mid to lower slope positions. 4-8% slope.	Neara Volcanics.	IV m_2,d_3,p_2,e_4

Appendix II (continued)

LAND UNIT	SOILS	VEGETATION	LANDFORM	GEOLOGY	LAND CAPABILITY CLASS
220.	Moderately deep to deep texture contrast soils. Brownish black fine sandy clay loam to light clay overlying dark brown medium to heavy clays. Db1.33, Dy3.43. Occasional dark cracking clays occur. Ug5.15. Alkaline soil reaction trend.	Queensland blue gum, gum-topped box, broad-leaved apple/ narrow-leaved ironbark grassy open forest.	Lower slope positions and minor drainage lines. 0-3% slope.	Neara Volcanics.	III m_3,d_3,p_2,e_3
221.	Deep soils. Black to brownish black clays grading into dark brown clays. Ug5.15, 5.13. Occasional brown texture contrast soils. Db. Neutral soil reaction trend.	Brigalow, belah open forest with scattered black tea-tree, Queensland blue gum and gum-topped box frequently present.	Lower slope positions and valley floors. 0-3% slope.	Neara Volcanics.	II m_2,d_2,k_2,e_2
222.	Deep soils. Brownish black self mulching cracking clays becoming browner with depth. Ug5.15, 5.13, 5.32 minor Gn3.43. Alkaline soil reaction trend.	Queensland blue gum, Moreton Bay ash/ narrow-leaved ironbark grassy woodland.	Mid to lower slope positions. 2-9% slope. Scattered areas up to 15% slope.	Neara Volcanics.	III m_2,d_2,e_3
223.	Moderately deep soils. Black to brownish black self mulching clays grading into brown medium to heavy clays. Calcium carbonate occurs at depth. Ug5.13, 5.32, minor Gn3.43. Alkaline soil reaction trend.	Queensland blue gum, Moreton Bay ash/ silver-leaved ironbark grassy woodland.	Upper slope positions and hill crests. 2-4% slope.	Neara Volcanics.	III m_2,d_2,e_3
224.	Deep soils. Brownish black clays grading into dark grey to dark brown medium clays. Calcium carbonate occurs at depth. Ug5.16, 5.15. Alkaline soil reaction trend.	Queensland blue gum/ silver-leaved ironbark grassy woodland.	Lower slope positions and alluvial valley floors. 0-3% slope.	Neara Volcanics.	II m_2,d_2,e_2
225.	Moderately deep to deep texture contrast soils. Brownish black fine sandy clay loam to clay loam, occasional bleached A_2, overlying yellowish brown to dark brown medium to heavy clays. Frequently gravelly. Db1.43, 1.13, 1.22, Dy1.43, Dr2.42. Occasional brown cracking clays and gradational soils. Ug5.32, Gn3.11. Neutral to alkaline soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum grassy woodland to open forest with scattered silver-leaved ironbark and Moreton Bay ash frequently present.	Mid to lower slope positions. 5-10% slope.	Neara Volcanics.	IV m_3,d_2,p_2,e_4
226.	Shallow to moderately deep texture contrast soils. Occasional rock outcrop. Brownish black to dark brown clay loam overlying dark brown to reddish brown light to medium clays. Db1.12, 3.12, 1.42, Dy2.42, Dr2.22. Neutral to acid soil reaction trend.	Narrow-leaved ironbark, silver-leaved ironbark grassy woodland with scattered pink bloodwood, Moreton Bay ash and Queensland blue gum frequently present.	Upper slope positions and ridge crests. 2-5% slope.	Neara Volcanics.	IV m_2,d_3,r_2,e_4
227.	Moderately deep texture contrast soils. Brownish black to dark brown clay loam, occasional bleached A_2, overlying dark brown to yellowish brown medium to heavy clays. Db1.12, 3.12, 2.41, Dy2.12, minor Dr3.41. Occasional dark cracking clays. Ug5.13. Acid to neutral soil reaction trend.	Queensland blue gum, narrow-leaved ironbark/ broad-leaved apple/ silver-leaved ironbark grassy woodland.	Lower slope positions. 2-5% slope.	Neara Volcanics.	III m_2,d_2,p_2,e_3
228.	Deep soils. Brownish black self mulching light clay or clay loam grading into brown or dark brown clays. Ug5.15, 5.13, 5.17, areas of Db1.13. Alkaline soil reaction trend.	Queensland blue gum, broad-leaved apple/Moreton Bay ash/yellow box grassy woodland. River she-oak, black tea-tree and weeping bottlebrush fringe water courses.	Lower slope positions and valley floors. 0-4% slope.	Neara Volcanics.	II e_2
229.	Shallow to moderately deep texture contrast soils. Occasional rock outcrop. Brownish black to very dark reddish brown loam-fine sandy to clay loam, occasional bleached A_2, overlying dark reddish brown to yellowish brown medium to heavy clays. Gravelly in some areas. Db1.42, 1.43, 1.13, 1.33, Dr2.13, 3.43, Dy2.43. Occasional areas of uniform loams. Um1.23. Alkaline to neutral soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum, Moreton Bay ash, silver-leaved ironbark/pink bloodwood/brush box grassy woodland to open forest.	Mid to upper slope positions. 10-20% slope.	Neara Volcanics.	VI-VII m_3,d_2,p_2,e_6
230.	Shallow texture contrast soils. Occasional rock outcrop. Brownish black to very dark reddish brown loam to clay loam, occasional bleached A_2, overlying yellowish brown to brown medium to heavy clays. Generally gravelly with surface stone in places. Db1.42, 1.22, Dy2.43, Dr2.12. Occasional areas of gradational soils and stony loams. Gn3.22, Um1.23. Neutral to alkaline soil reaction trend.	Narrow-leaved ironbark, silver-leaved ironbark, pink bloodwood/Queensland blue gum/Moreton Bay ash/ spotted gum grassy woodland.	Upper slope positions and ridge crests. 2-3% slope.	Neara Volcanics.	VI m_3,d_3,p_3,r_3,e_3
231.	Shallow soils. Some rock outcrops. Brownish black loam to clay loam grading into very dark brown to yellowish brown clay loam to medium clays. Frequently gravelly. Um1.23, Dy3.43. Neutral to alkaline soil reaction trend.	Narrow-leaved ironbark, silver-leaved ironbark/ pink bloodwood/kurrajong woodland.	Steeper mid slope positions. 20-40% slope. Minor areas up to 65% slope.	Neara Volcanics.	VII m_6,d_6,t_6,r_4,e_6

Appendix II (continued)

LAND UNIT	SOILS	VEGETATION	LANDFORM	GEOLOGY	LAND CAPABILITY CLASS
232.	Moderately deep to deep soils. Brownish black to dark brown clay loam to medium clay grading into yellowish brown or dark reddish brown medium to heavy clays. Ug5.37, 5.32, Uf6.21, areas of Gn3.22, Db1.42. Neutral to alkaline soil reaction trend.	"Softwood scrub" species/ bottle tree/hoop pine closed scrub.	Mid to lower slope positons. 3-15% slope. Minor areas as steep as 30% slope.	Neara Volcanics.	IV-VI m_2,d_2,t_4,e_4
233.	Shallow soils with rock outcrops common. Brownish black to dark reddish brown loam to clay loams grading into dark brown and reddish brown clays. Gn3.22, 3.12, Um1.43. Neutral soil reaction trend.	"Softwood scrub" species closed scrub.	Upper slope positions and ridge crests. 4-10% slope with minor areas up to 20% slope.	Neara Volcanics and some Tertiary volcanics.	VI-VII m_6,d_4,r_4,e_6
234.	Deep soils. Black and brownish black cracking clays becoming browner with depth. Ug5.13, 5.15, 5.34. Neutral to alkaline soil reaction trend.	Queensland blue gum, gum-topped box grassy woodland to open forest with scattered Moreton Bay ash and broad-leaved apple frequently present.	Valley floors and adjacent drainage lines. 0-4% slope.	Neara Volcanics.	III e_3
235.	Shallow to moderately deep texture contrast soils. Dark brown fine sandy loam to clay loam, occasional bleached A_2, overlying brown to yellowish brown medium to heavy clay. Db1.42, 1.33, Dy2.32. Neutral to alkaline soil reaction trend.	Gum-topped box, small-fruited grey gum shrubby open forest with scattered brush box, narrow-leaved ironbark, "softwood scrub" species and dogwood frequently present.	Mid and lower slope positions. 6-10% slope.	Neara Volcanics.	IV m_3,d_3,p_3,r_4,e_4
236.	Shallow to moderately deep texture contrast soils. Some rock outcrops. Brownish black to brown fine sandy clay loam overlying dark brown to yellowish brown medium clays. Db1.22, 1.42. Occasional areas of brown cracking clays. Ug5.32. Neutral soil reaction trend.	Silver-leaved ironbark, narrow-leaved ironbark grassy woodland with scattered Queensland blue gum, Moreton Bay ash and broad-leaved apple frequently present.	Lower slopes and some broad low ridges. 4-10% slope.	Neara Volcanics.	VI m_4,d_3,p_3,r_4,e_4
237.	Moderately deep texture contrast soils. Some rock outcrops. Brownish black to greyish brown loam to clay loam, frequently bleached A_2, overlying brown to yellowish brown medium to heavy clays. Db2.43, 1.33, Dy3.43. Alkaline soil reaction trend.	Gum-topped box, narrow-leaved ironbark open forest with scattered Queensland blue gum, broad-leaved apple and swamp mahogany frequently present.	Lower slope positions and valley floors. 4-8% slope.	Neara Volcanics.	IV-VI m_4,d_3,p_3,e_4
238.	Shallow to moderately deep texture contrast soils. Brownish black to dark brown clay loam to fine sandy clay loam, occasional bleached A_2, overlying frequently mottled reddish brown to greyish yellow brown medium to heavy clays. Dy3.41, 2.31, Db2.41, Dr3.31. Acid soil reaction trend.	Narrow-leaved ironbark, small-fruited grey gum, Queensland blue gum, brush box shrubby open forest to layered tall open forest with scattered forest she-oak, black she-oak, broad-leaved apple and "softwood scrub" species frequently present.	Mid to upper slope positions. 10-40% slope. Minor areas un to 60% slope.	Neara Volcanics.	VII m_3,d_3,p_2,t_7,e_6
239.	Shallow to moderately deep texture contrast soils. Some rock outcrops. Brownish black loam to clay loam, occasional bleached A_2, overlying dark reddish brown to yellowish brown medium to heavy clays. Dy2.41, Dr2.21, Db3.21. Minor uniform loam soils. Um1.23. Acid soil reaction trend.	Small-fruited grey gum, narrow-leaved ironbark, Queensland blue gum, gum-topped box shrubby open forest with scattered black she-oak, pink bloodwood, broad-leaved apple and "softwood scrub" species frequently present.	Upper slopes and ridge crests. 3-6% slope.	Neara Volcanics.	VI m_4,d_3,p_3,r_4,e_6
240.	Shallow to moderately deep texture contrast soils. Some rock outcrop. Brownish black clay loam overlying dark reddish brown to orange clays. Db3.21, Dr4.11, Dy4.21. Minor uniform loam soils. Um1.23. Acid soil reaction trend.	"Softwood scrub" species/ hoop pine/brush box closed scrub.	Steep mid to lower slope positions. 15-35% slope.	Neara Volcanics.	VII m_3,d_3,t_6,r_3,e_7
241.	Moderately deep texture contrast soils. Brownish black loam to clay loam overlying dark brown to yellowish brown light to medium clay. Db3.12, Dy5.12. Acid to neutral soil reaction trend.	"Softwood scrub" species/ swamp mahogany/brush box closed scrub.	Lower slopes and narrow drainage lines. 0-6% slope.	Neara Volcanics.	III e_3
242.	Shallow to moderately deep texture contrast soils. Brownish black to brown fine sandy clay loam, frequently bleached A_2, overlying mottled brown to yellowish brown medium to heavy clay. Dy3.41, Db2.31. Acid soil reaction trend.	Gum-topped box shrubby open forest with scattered "softwood scrub" species, wattle, Queensland blue gum and small-fruited grey gum frequently present.	Upper slope positions and ridge crests. 1-5% slope.	Neara Volcanics.	VI m_4,d_3,p_3,e_6
243.	Moderately deep texture contrast soils. Brownish black to brown sandy loam to sandy clay loam, bleached A_2, overlying mottled reddish brown to dull yellowish brown sandy clay to heavy clay. Dy3.43, 3.42, Dr.3.43 areas Dr2.42. Neutral to alkaline soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum grassy woodland to open forest with scattered silver-leaved ironbark, Moreton Bay ash, broad-leaved apple and pink bloodwood frequently present.	Mid to lower slope positions. 4-15% slope.	Granites of undifferentiated Triassic intrusions.	VI m_4,d_3,p_3,t_4,e_6
244.	Shallow to moderately deep texture contrast soils. Some rock outcrops. Brownish black sandy loam, bleached A_2, overlying reddish brown to bright yellowish brown medium to heavy clay and sandy clays. Dy2.42, 3.32, Dr2.42. Occasional areas of coarse sands. Uc1.22. Neutral soil reaction trend.	Narrow-leaved ironbark, pink bloodwood open forest with scattered Moreton Bay ash, Queensland blue gum and silver-leaved ironbark frequently present.	Upper slope positions and ridge crests. 2-6% slope.	Granites of undifferentiated Triassic intrusions.	VI m_4,d_3,p_3,r_3,e_6

Appendix II (continued)

LAND UNIT	SOILS	VEGETATION	LANDFORM	GEOLOGY	LAND CAPABILITY CLASS
245.	Shallow to moderately deep texture contrast soils. Some rock outcrop. Brownish black sandy loams, frequently bleached A_2, overlying reddish brown to orange medium to heavy clays and sandy clays. Dy3.43, 2.33, Dr2.43. Neutral to alkaline soil reaction trend.	Narrow-leaved ironbark, silver-leaved ironbark open forest to woodland with scattered spotted gum, Queensland blue gum and forest she-oak frequently present.	Mid to upper slopes. 15-30% slope. Minor areas up to 40% slope.	Granites of undifferentiated Triassic intrusions.	VII m_6,d_4,p_3,t_7,r_3,e_7
246.	Shallow texture contrast soils. Occasional rock outcrop. Brownish black to brown loamy sand to sandy loam, occasional bleached A_2, overlying reddish brown to orange medium clays. Dr2.32, Dy2.41. Occasional areas of coarse sands. Uc1.23. Acid to neutral soil reaction trend.	Spotted gum, narrow-leaved ironbark, silver-leaved ironbark/Queensland blue gum grassy open forest.	Ridge crests and upper slopes. 4-10% slope.	Granites of undifferentiated Triassic intrusions.	VI m_6,d_4,p_3,r_5,e_6
247.	Very shallow to shallow sandy soils. Brownish black loamy sand to sandy loam grading to yellowish brown, gravelly coarse sandy loams. Uc1.21, 1.23, minor Dy2.32. Acid to neutral soil reaction trend.	Spotted gum, narrow-leaved ironbark/silver-leaved ironbark woodland.	Upper slopes with rock outcrop. 15-30% slope.	Granites of undifferentiated Triassic intrusions.	VII-VIII m_6,d_6,p_3,t_7,r_5,e_7
248.	Moderately deep to deep texture contrast soils. Brownish black sandy loam to fine sandy clay loam, frequently bleached A_2, overlying brown to yellowish brown medium to heavy clays. Dy3.43, Db2.43. Alkaline soil reaction trend.	Queensland blue gum, broad-leaved apple, narrow-leaved ironbark grassy woodland to open forest with scattered silver-leaved ironbark and swamp mahogany frequently present.	Lower slopes and adjacent drainage lines. 3-6% slope.	Granites of undifferentiated Triassic intrusions.	III m_3,d_3,p_3,e_3
249.	Moderately deep to deep texture contrast soils. Brownish black to dark brown loamy coarse sand to sandy loam, frequently bleached A_2, overlying dark brown to yellowish brown sandy clays. Db1.41, 2.41, Dy2.21, 2.41. Occasional areas of coarse sands. Uc1.23. Acid soil reaction trend.	Narrow-leaved ironbark, pink bloodwood, small-fruited grey gum, white mahogany layered open forest with scattered Queensland blue gum, forest she-oak and "softwood scrub" species frequently present.	Mid to lower slope positions. 5-10% slope. Minor areas up to 20% slope.	Granites of undifferentiated Triassic intrusions.	VI m_3,d_2,p_3,t_4,e_6
250.	Shallow to moderately deep texture contrast soils. Brownish black sandy loam, frequently bleached A_2, overlying dark brown to yellowish brown medium clays. Db1.41, 1.21, Dy2.41. Minor areas of coarse sands. Uc1.21. Acid soil reaction trend.	Narrow-leaved ironbark, pink bloodwood shrubby open forest with scattered forest she-oak, swamp mahogany and broad-leaved apple frequently present.	Mid to upper slopes. 10-20% slope. Minor areas up to 30% slope.	Granites of undifferentiated Triassic intrusions.	VI m_4,d_3,p_3,t_6,e_6
251.	Shallow soils. Surface stone and rock outcrop common. Brownish black to brown loamy sand to sandy loam, frequently bleached A_2, over brown to dull yellowish brown sandy clay loam to heavy clays. Uc2.21, Db1.41. Acid to neutral soil reaction trend.	Narrow-leaved ironbark/pink bloodwood/wattle grassy open forest.	Upper slopes and ridge crests with low stony rises. 1-5% slope.	Granites of undifferentiated Triassic intrusions.	VI-VII m_6,d_3,r_5,e_6
252.	Moderately deep texture contrast soils. Brownish black to brown sandy loam to sandy clay loam, occasional bleached A_2, overlying brown to bright yellowish brown sandy clays to medium clays. Db3.31, 3.41, Dy4.31. Occasional areas of coarse sands. Uc1.43. Acid soil reaction trend.	"Softwood scrub" species/hoop pine/small-fruited grey gum/brush box closed scrub.	Mid to lower slopes. 8-20% slope, occasionally as steep as 30% slope.	Granites of undifferentiated Triassic intrusions.	VI m_2,d_2,t_6,e_6
253.	Moderately deep texture contrast soils. Brownish black to brown clay loam, frequently bleached A_2, overlying mottled brown to bright brown medium to heavy clays. Db2.41, Dy3.41. Acid soil reaction trend.	Gum-topped box/swamp mahogany grassy open forest.	Lower slopes and minor drainage lines. 3-9% slope.	Granites of undifferentiated Triassic intrusions.	IV m_3,d_3,p_2,e_4
254.	Moderately deep texture contrast soils. Occasional rock outcrops. Brownish black to dark brown coarse sandy loam, frequently bleached A_2, overlying mottled bright brown to reddish brown medium to heavy clays, often gravelly. Dy3.42, Dr3.42, 2.22. Neutral soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum open forest with scattered rusty gum, Moreton Bay ash, pink bloodwood and silver-leaved ironbark frequently present.	Mid and lower slopes. 3-12% slope.	Kingaham Creek Granodiorite.	IV m_4,d_3,p_2,e_3
255.	Shallow to moderately deep texture contrast soils. Some rock outcrops. Brownish black to brown loamy coarse sand to coarse sandy loam, frequently bleached A_2, overlying brown to orange medium clays. Quartz gravel is common. Db1.41, Dy2.41, Dr2.41. Minor areas of uniform sands. Uc1.23. Acid soil reaction trend.	Narrow-leaved ironbark grassy open forest with scattered Queensland blue gum, rusty gum and pink bloodwood frequently present.	Upper slopes and ridge crests. 2-6% slope.	Kingaham Creek Granodiorite.	VI m_4,d_3,e_6
256.	Moderately deep to deep texture contrast soils. Brownish black to brown fine sandy clay loam to light clay, occasional bleached A_2, overlying mottled dark brown to yellowish brown medium to heavy clays. Db2.43, Dy3.43. Minor dark cracking clays. Ug5.13. Neutral to alkaline soil reaction trend.	Broad-leaved apple, Queensland blue gum grassy woodland to open forest.	Valley floors and lower slopes. 0-3% slope.	Kingaham Creek Granodiorite.	III m_3,d_3,p_2,e_2

Appendix II (continued)

LAND UNIT	SOILS	VEGETATION	LANDFORM	GEOLOGY	LAND CAPABILITY CLASS
257.	Shallow to moderately deep soils. Brownish black to brown coarse sandy loam to sandy clay loam, occasional bleached A_2, overlying yellowish brown to dark brown sandy clay loam or heavy clays. Silcrete stone frequently occurs. Uc1.23, Dy3.41, Db1.41. Acid soil reaction trend.	Rusty gum, narrow-leaved ironbark open forest with scattered Queensland blue gum, wattle and dogwood frequently present.	Upper slopes and low ridge crests. 1-4% slope.	Kingaham Creek Granodiorite.	VI m_6,r_2,e_6
258.	Moderately deep to deep texture contrast soils. Dark brown sandy clay loam to fine sandy clay loam, frequently bleached A_2, overlying mottled yellowish brown medium to heavy clays. Iron and manganese concretions frequently occur at top of clay layer. Dy3.41, Db2.41. Acid soil reaction trend.	Gum-topped box, Queensland blue gum/ broad-leaved apple grassy open forest.	Lower slope positions. 1-6% slope.	Kingaham Creek Granodiorite.	IV m_4,d_4,p_3,e_4
259.	Moderately deep texture contrast soils. Scattered rock outcrops. Brownish black to brown sandy clay loam, frequently bleached A_2, overlying reddish brown to bright yellowish brown medium clays. Db3.41, 3.21, Dy4.41, Dr4.21. Minor areas of uniform loams. Um1.42. Acid soil reaction trend.	"Softwood scrub" species/ hoop pine closed scrub.	Mid to lower slopes. 6-20% slope. Minor areas up to 30% slope.	Kingaham Creek Granodiorite.	VI t_6,e_6
260.	Shallow texture contrast soils. Scattered rock outcrops. Brownish black to dark reddish brown sandy loam or sandy clay loam overlying brown to bright yellowish brown medium clays. Dr4.21, Db3.41, Dy3.21. Occasional uniform loams. Um1.23. Acid soil reaction trend.	"Softwood scrub" species/hoop pine/ lantana closed scrub.	Upper slopes and ridge crests. 2-6% slope.	Kingaham Creek Granodiorite.	VI m_4,d_3,e_6
261.	Moderately deep texture contrast soils. Minor rock outcrop. Brownish black deep sandy loam to clay loam overlying dark brown to yellowish brown medium to heavy clays. Quartz gravel common. Dy5.31, 4.21, Db4.21, Dr5.21. Acid soil reaction trend.	Small-fruited grey gum, narrow-leaved ironbark layered open forest with scattered Queensland blue gum, pink bloodwood, brush box, forest she-oak, white stringybark, gum-topped box and "softwood scrub" species frequently present.	Mid to upper slopes. 10-25% slope.	Kingaham Creek Granodiorite.	VI m_3,d_2,t_6,e_6
262.	Shallow to moderately deep texture contrast soils. Some rock outcrop. Brownish black to brown sandy loam to sandy clay loam, frequently bleached A_2, overlying brown to yellowish brown medium to heavy clays. Gravelly in places. Dy3.41, 4.21, Db2.41, Dr4.21. Occasional areas of gradational soils and uniform sands. Gn3.34, Uc1.42. Acid soil reaction trend.	Small-fruited grey gum, narrow-leaved ironbark, pink bloodwood layered open forest with scattered Queensland blue gum, brush box, broad-leaved apple, forest she-oak, white stringybark, wattle and "softwood scrub" species frequently present.	Upper slopes and ridge crests. 2-6% slope.	Kingaham Creek Granodiorite.	VI m_3,d_2,e_6
263.	Moderately deep to deep texture contrast soils. Brownish black to dark brown clay loam to fine sandy clay loam overlying brown to bright brown medium to heavy clays. Dy5.21, 5.41, Db4.21. Acid soil reaction trend.	"Softwood scrub" species closed scrub with scattered hoop pine, Queensland blue gum and swamp mahogany frequently present.	Lower slopes and adjacent drainage lines. 2-5% slope.	Kingaham Creek Granodiorite.	III e_3
264.	Moderately deep texture contrast soils. Brownish black sandy loam to clay loam overlying dark brown to yellowish brown clay loams to heavy clays. Db3.31, 4.31, Dy4.21. Minor areas of uniform loams. Um1.43. Acid soil reaction trend.	"Softwood scrub" species/ hoop pine/brush box closed scrub.	Steep mid and upper slopes. 8-30% slope with some areas as steep as 45% slope.	Biggenden Beds.	VII t_6,e_7
265.	Shallow to moderately deep texture contrast soils. Some rock outcrops. Brownish black to dark brown sandy loam to clay loam overlying brown to yellowish brown medium to heavy clays. Db3.31, Dy4.21. Occasional areas of uniform loams. Um1.23. Acid soil reaction trend.	"Softwood scrub" species/ hoop pine closed scrub.	Uppper slopes and ridge crest. 0-8% slope.	Biggenden Beds.	VI m_3,d_2,r_4,e_6
266.	Shallow to moderately deep texture contrast soils. Some rock outcrops. Brownish black loam to fine sandy clay loam, occasional bleached A_2, overlying brown to bright yellowish brown medium to heavy clays. Db2.31, 2.41, Dy3.31. Occasional uniform loams. Um1.23. Acid soil reaction trend.	Narrow-leaved ironbark, Queensland blue gum grassy open forest with scattered Moreton Bay ash, pink bloodwood and silver-leaved ironbark frequently present.	Mid to upper slopes. 15-40% slope with some areas up to 60% slope.	Biggenden Beds.	VII m_3,t_7,r_4,e_7
267.	Shallow to moderately deep texture contrast soils. Brownish black loam to fine sandy clay loam, occasional bleached A_2, overlying brown to bright yellowish brown medium to heavy clays. Small areas surface stone. Db1.41, 2.21, Dy3.41. Acid soil reaction trend.	Narrow-leaved ironbark, pink bloodwood grassy open forest with scattered Queensland blue gum, forest she-oak, small-fruited grey gum, brush box and "softwood scrub" species frequently present.	Upper slopes and ridge crests. 4-10% slope.	Biggenden Beds.	IV m_3,d_3,r_3,e_4
268.	Moderately deep to deep texture contrast soils. Brownish black clay loam overlying dark brown to yellowish brown medium to heavy clays. Db1.32. Neutral to acid soil reaction trend.	Queensland blue gum, broad-leaved apple, Moreton Bay ash grassy open forest.	Lower slopes and adjacent drainage lines. 3-6% slope.	Biggenden Beds.	IV e_4

Appendix II (continued)

LAND UNIT	SOILS	VEGETATION	LANDFORM	GEOLOGY	LAND CAPABILITY CLASS
269.	Shallow to moderately deep texture contrast soils. Scattered stone and rock outcrops. Brownish black to dark brown gritty loam to clay loam, occasional bleached A_2, overlying reddish brown to yellowish brown medium to heavy clays. Dy4.21, 3.32, Db2.42. Occasional gradational soils and uniform loams. Gn3.21, Um1.23. Acid to neutral soil reaction trend.	Small-fruited grey gum, narrow-leaved ironbark, silver-leaved ironbark layered open forest with scattered brush box, Queensland blue gum, forest she-oak, gum-topped box, "softwood scrub" species and wattle frequently present.	Mid to lower slopes. 10-25% slope with minor areas as steep as 50%.	Maronghi Creek Beds and undifferentiated metamorphics.	VII-VIII m_3,d_2,t_6,e_7
270.	Shallow to moderately deep texture contrast soils. Brownish black gritty fine sandy loam to clay loam, occasional bleached A_2, overlying brown to yellowish brown light to medium clays. Minor areas surface stone. Dy4.21, Db2.42. Occasional stony uniform loams. Um1.23. Acid to neutral soil reaction trend.	"Softwood scrub" species closed scrub with scattered hoop pine, small-fruited grey gum, gum-topped box, Yarraman ironbark and wattles frequently present.	Steep mid to upper slope positions. 8-30% slope.	Maronghi Creek Beds and undifferentiated metamorphics.	VI m_3,d_2,t_6,r_3,e_6
271.	Shallow soils. Brownish black loam to sandy clay loam grading into brown and yellowish brown clay loams. Frequently gravelly with some stone. Um1.23, 1.43. Occasional brown texture contrast soils Db3.11. Acid soil reaction trend.	"Softwood scrub" species/ small-fruited grey gum closed scrub.	Mid to upper slopes. 10-20% slope. Minor areas as steep as 35% slope.	Esk Formation.	VI m_6,d_4,t_6,r_3,e_6
272.	Shallow stony soils. Occasional rock outcrops. Brownish black to brown sandy loams and loams grading into yellowish brown sandy clay loams and medium clays. Um1.23, Db2.42. Acid soil reaction trend.	Narrow-leaved ironbark grassy open forest with scattered rusty gum, Queensland blue gum, Moreton Bay ash and wattle frequently present.	Steep slopes and drop offs. 20-35% slope with minor areas as steep as 60% slope.	Esk Formation.	VII m_6,d_6,t_7,r_5,e_7
273.	Deep soils. Black to dark grey clays over mottled grey clays. Areas of dark brown clay loam to light clay grading into brown to reddish brown medium to heavy clays Ug5.24, 5.5 , Uf6.31, Gn3.13. Neutral soil reaction trend.	Queensland blue gum/ broad-leaved apple grassy woodland to open forest. Bullrushes occur on wet areas.	Permanent lakes and semi-permanent wetlands. Includes drainage depressions, old watercourses. 0-1% slope.	Recent alluvia.	V w_5,f_5

APPENDIX III Common names of native plant species

Botanical Name	Common Name
Acacia amblygona	A wattle
A. bancroftii	A wattle
A. conferta	A wattle
A. excelsa	Ironwood
A. fimbriata	Brisbane wattle
A. harpophylla	Brigalow
A. ixiophylla	A wattle
A. leiocalyx	Early flowering black wattle
A. podalyriifolia	Queensland silver wattle
A. spp.	Wattles
Alphitonia excelsa	Red ash
Angophora costata	Rusty gum
A. floribunda	Rough-barked apple
A. subvelutina	Broad-leaved apple
Araucaria bidwillii	Bunya pine
A. cunninghamii	Hoop pine
Backhousia angustifolia	-
Banksia integrifolia	Coast banksia
Brachychiton populneum	Kurrajong
B. rupestre	Bottle tree
Bursaria incana	Prickly pine or mock orange
Callitris columellaris	White cypress pine
C. endlicheri	Black cypress pine
Callistemon salignus	White bottle brush
C. viminalis	Weeping bottle brush
Cassinia laevis	Wild rosemary, or cough bush
Casuarina cristata	Belah
C. cunninghamiana	River she-oak
C. inophloia	Thready bark she-oak
C. littoralis	Black she-oak
C. luehmannii	Bull oak
C. torulosa	Forest she-oak
Choretrum candollei	-
Crotin insularis	Queensland cascarilla bark
Dodonaea cuneata	A hop bush
D. viscosa var. *viscosa*	Sticky hop bush
Duboisia leichhardtii	Corkwood
Eucalyptus acmenoides	White mahogany
E. conica	Fuzzy box
E. crebra	Narrow-leaved ironbark
E. exserta	Queensland peppermint
E. intermedia	Pink bloodwood
E. maculata	Spotted gum
E. melanoleuca	Yarraman ironbark
E. melanophloia	Silver-leaved ironbark
E. melliodora	Yellow box
E. microcorys	Tallowwood
E. moluccana	Gum-topped box

APPENDIX III Continued

Botanical Name	Common Name
Eucalyptus orgadophila	Mountain coolibah
E. phaeotricha	Queensland stringybark
E. pilularis	Blackbutt
E. polycarpa	Long-fruited bloodwood
E. populnea	Poplar box
E. propinqua	Small-fruited grey gum
E. punctata	Grey gum
E. saligna	Sydney blue gum
E. tereticornis	Queensland blue gum
E. tessellaris	Moreton Bay ash
E. trachyphloia	Brown bloodwood
Exocarpus cupressiformis	Native cherry
Flindersia australis	Crow's ash
F. xanthoxyla	Yellow wood
Geijera parviflora	Wilga
Hovea longifolia	Long-leaved hovea
Jacksonia scoparia	Dogwood
Jagera pseudorhus	Foam bark tree
Maytenus cunninghamii	-
Melaleuca bracteata	Black tea-tree
M. decora	Paper barked tea-tree
Notelaea microcarpa	Native olive
Petalostigma pubescens	Quinine bush
Pittosporum phylliraeoides	Cumby cumby or cattle bush
Tristania conferta	Brush box
T. suaveolens	Swamp mahogany
Xanthorrhoea spp.	Grass tree

APPENDIX IV LAND CAPABILITY CLASSIFICATION FOR AGRICULTURE

TYPE OF LIMITATION	LIMITING FACTOR	DEGREE OF LIMITATION		SUB-CLASS
FACTORS LIMITING CHOICE OF CROPS OR CROP PRODUCTIVITY	Climatic limitation other than rainfall "c"	Slight restriction to choice of crops or slightly restricted production potential.		c2
		Moderate restriction to choice of crops or moderately restricted production potential.		c3
		Severely restricted choice of crops and severely reduced production potential.		c4
		Climatic limitation too severe to allow cropping.		c6
	Moisture availability for crop growth "m"	Occasional limitation to crop production; 7-8 crops possible in 10 years.		m2
		Regular limitation to crop production; 5-7 crops possible in 10 years.		m3
		Occasional cropping possible. Less than 5 crops possible in 10 years.		m4
		Water availability too unreliable to allow cropping.		m6
	Effective soil depth "d"	Effective soil depth 60-100 cm		d2
		Effective soil depth 45-60 cm		d3
		Effective soil depth 25-45 cm		d4
		Effective soil depth < 25 cm		d6
	Soil physical factors affecting crop growth "p"	Degree of limitation imposed on crop production from soil physical factors affecting the growth of crop plants e.g. surface crusting, hard pans, cementation etc.	Slight restriction.	p2
			Moderate restriction.	p3
			Severe restriction.	p4
	Soil nutrient fertility "n"	Moderate deficiencies which may be economically corrected with careful management.		n2
		Severe deficiencies, difficult to correct and which require special management practices.		n3
		Very low fertility; continuous cultivation precluded be structural decline.		n4
	Soil salinity of sodicity "s"	Soil water availability slightly restricted or slight structure decay affecting crop production.		s2
		Soil water availability moderately restricted or moderate structural decay with some toxic effect on crops.		s3
		Soil water availability severely restricted or severe structural decay with moderate to severe toxicity.		s4
		Salinity or alkalinity too severe for crops. Tolerant improved species available.		s6
		Salinity or alkalinity too severe for pasture improvement; tolerant herbage available.		s7
		Bare salt pan; not practical to vegetate.		s8
	Topography "t"	Severe relief or major gullies preclude contour cultivation. Occasional cropping possible.		t4
		Slopes 15-20% or severe relief or gullying preventing cultivation.		t6
		Slopes 20-45% or extreme gullying but accessible to grazing animals.		t7
		Slopes on topography too severe for grazing animals.		t8
FACTORS LIMITING THE USE OF AGRICULTURAL MACHINERY	Soil workability "k"	Soil properties affecting machinery and thus reducing average production potential e.g. stiff clay, columnar structure, compaction, narrow moisture range for working.	Slight restriction.	k2
			Moderate restriction.	k3
			Severe restriction.	k4
	Rockiness or stoniness "r"	Tillage restricted with some types of machinery.		r2
		Tillage restricted with most types of machinery.		r3
		Tillage difficult with all machinery; occasional use possible.		r4
		Use of all machinery for cropping impractical.		r5
	Surface microrefief gilgai and gullying "g"	Tillage restricted with some types of machinery.		g2
		Tillage restricted with most types of machinery.		g3
		Tillage difficult with all machinery; occasional use possible.		g4
		Use of all machinery for cropping impractical.		g5
	Wetness "w"	Use of implements delayed occasionally and slightly reduced production potential.		w2
		Use of implements delayed regularly and moderately reduced production potential.		w3
		Use of implements very difficult and occasional crops only possible.		w4
		Permanently wet; use for cultivation impractical.		w5
FACTORS CONTROLLING LAND DETERIORATION	Susceptibility to water erosion "e"	Simple practices required to reduce water erosion under cultivation to the acceptable level.		e2
		Intensive practices required to reduce water erosion under cultivation to the acceptable level.		e3
		Requires inclusion of a pasture phase to reduce average water erosion losses to the acceptable level.		e4
		Continuous pasture required to reduce water erosion losses to the acceptable level.		e6
		Special practices or grazing restrictions required to reduce water erosion losses to the acceptable level.		e7
		Under grazing water erosion losses are in excess of the acceptable level.		e8
	Susceptibility to flooding "f"	Subject to occasional overflow flooding.		f2
		Subject to regular overflow flooding.		f3
		Subject to severe overflow flooding; permanent cultivation not possible.		f4
		Flood frequency and/or severity precludes any cropping.		f5
	Susceptibility to wind erosion "a"	Slightly susceptible to wind erosion.		a2
		Moderately susceptible to wind erosion.		a3
		Severely susceptible to wind erosion.		a4
		Potential for wind erosion too severe to allow cropping.		a6-8

APPENDIX V Analytical methods

(a) Soil pH - 1:5 soil water suspension after 24 hours, with a glass electrode.

(b) Chloride - 1:5 soil water suspension with a specific ion electrode.

(c) Total Nitrogen - Kjeldahl digest.

(d) Available Phosphorus - acid extractable (N/100 H_2SO_4).

(e) Bicarbonate Extractable Phosphorus - Colwell (1963).

(f) Organic Carbon - Walkley and Black method.

(g) Particle Size Analysis - based on the international system of textural categories, with the Bouyoucos hydrometer.

(h) Replaceable Potassium - N/20 KCL extract.

(i) Cation Exchange Capacity - determination of NH^+_4 in the NH_4 saturated sample after leaching with NH_4CL at pH 7.

(j) Exchangeable Cations

(i) Soils with a pH > 7.5 - extraction with alcoholic ammonium chloride (pH 8.4) after pre-washing with 60% ethanol.

(ii) Soils with a pH < 7.5 - extraction with aqueous, neutral ammonium chloride (exchangeable sodium figure corrected for soluble sodium by subtracting an amount equivalent to the soil chloride).

(I) Ca, Mg - atomic absorption spectrometer.

(II) Na, K - flame photometer.

(k) Total Soluble Salts - Electrical conductivity by 0.336 from 1:5 soil water suspension.

(l) Sodium Chloride - chlorine values by 1.65.

APPENDIX VI Soil chemical ratings

I Nitrogen categories

	Total nitrogen (%) (Kjeldahl)
Very low	< 0.05
Low	0.05 - 0.09
Fair	0.10 - 0.14
Very fair	0.15 - 0.24
High	0.25 - 0.49
Very high	> 0.50

Source: Agricultural Chemistry Branch, Queensland Department of Primary Industries.

II Extractable phosphorus

Acid extractable P (ppm)		Bicarbonate extractable P (ppm)	
Very low	< 10	Very low	< 10
Low	10 - 20	Low	10 - 20
Fair	20 - 35	Fair	20 - 30
Very fair	35 - 45	Very fair	30 - 40
High	45 - 100	High	> 40
Very high	> 100		

Source: Agricultural Chemistry Branch, Queensland Department of Primary Industries.

III Potassium ratings

m equiv. per 100 g	Rating
< 0.15	Very low
0.15 - 0.20	Low
0.20 - 0.30	Fair
0.30 - 0.50	Very fair
> 0.50	High

Crack and Isbell (1970) use the value of 0.2 m equiv. per 100 g of exchangeable potassium as the critical deficiency level.

APPENDIX VI Continued

IV Soil salinity categories (after Northcote and Skene 1972)

Category 0 - Non-saline; no chloride salinity in either the surface soil or subsoil as defined for categories 1 and 2.

Category 1 - Surface salinity; soils containing in their A horizons, or in the surface 20 cm if either the A and B horizons are undifferentiated or the A horizon is less then 10 cm thick, more than 0.1% sodium chloride in loams and coarse soils and more then 0.2% in clay loams and clays.

Category 2 - Subsoil salinity; soils lacking surface salinity but containing more than 0.3% sodium chloride in the B horizon, or below 20 cm if the A and B horizons are undifferentiated.

V Soil sodicity categories (after Northcote and Skene 1972) for the top metre of soil

Category 0 - Non-sodic : ESP < 6

Category 1 - Sodic : ESP 6 - 14

Category 2 - Strongly Sodic : ESP > 14

VI Available water rating

Available water %	Rating
> 15	Very high
12.1 - 15	High
8.1 - 12	Medium
5.1 - 8	Low
< 5	Very low

APPENDIX VII Landform

Relief	Terrain Slope						
	Flat < 1% (About 1:300)	Very Gently 1% - 3% (About 2%)	Gentle 3% - 10% (About 6%)	Moderate 10% - 30% (About 20%)	Steep 30% - 56% (About 40%)	Very Steep 56% - 100% (About 70%)	Precipitous > 100% (About 150%)
Very High > 300 m (About 500 m)	-	-	-	Rolling Mountains	Steep Mountains	Very Steep Mountains	Precipitous Mountains
High 90 m - 300 m (About 150 m)	-	-	Undulating Hills	Rolling Hills	Steep Hills	Very Steep Hills	Precipitous Hills
Low 30 m - 90 m (About 50 m)	-	-	Undulating Low Hills	Rolling Low Hills	Steep Low Hills	Very Steep Low Hills	Badlands
Very Low 9 m - 30 m (About 15 m)	-	Gently Undulating Rises	Undulating Rises	Rolling Rises	Steep Rises	Badlands	Badlands
(Ultra-Low) < 9 m (About 5 m)	Level Plains	Gently Undulating Plains	Undulating Plains	Rolling Plains	Badlands	Badlands	Badlands

APPENDIX VIII Data recorded for each map unit and land unit

(A) Map Units

- Zone - Australian 1:250 000 Zone Number.
- Australian Map Grid Reference - central location of each map unit.
- Land Units present and percentage of map unit area.
- Landform.
- Water Balance Zone.
- Slope Range - most common slope range.
- Present Land Use.
- Recommended Land Use.
- Land Capability Class - dominant class.
- Clearing - approximate level of clearing.
- Existing Landslip.
- Potential Landslip.
- Water Erosion - type and percentage of map unit affected.
- Map Unit Code.
- Shires - shire and percentage of map unit in each.
- Map Unit Number - identifying number for each map unit.
- Survey Code.

(B) Land Units

- Sites - number of each site recorded within land unit.
- Principal Profile Form - dominant soil.
- Great Soil Group.
- Nitrogen Rating.
- Phosphorus Rating.
- Potassium Rating.
- Water Holding Capacity.
- Soil Physical Restrictions.
- Position in Landscape.
- Geology.
- Slope - most common range.
- Vegetation - dominant species and formation.
- Recommended Land Use.
- Land Capability Sub-Classes.
- Land Unit Number.
- Survey Code.