4. DETAILED MAP UNIT DESCRIPTIONS AND CAPABILITY RATINGS

Thirty map units have been identified within the Strathfieldsaye District.

For each group of map units related by geology, there is a broad review of the common land uses, soil types, forms of land degradation, and major constraints to land use. Each individual map unit is described in a two page format which includes a site description, soil profile description and land capability assessment.

Note:

(i) Because soil observation depth did not exceed 1.5 m, the depth to hard rock and depth to seasonal watertable have been generalised where they exceed 1.5 m.

(ii) pH recorded in the soil profile descriptions are field pH results. The pH recorded in the interpretation of laboratory analysis are $CaCl_2$ or field pH as indicated.

(iii) As the tertiary fan area is restricted to a small geographic area, it was considered unnecessary to prepare a review to accompany the map unit descriptions.

(iv) The metamorphic aureole is described within the Ordovician sediments section. The metamorphic aureole is comprised of Ordovician sediments that have been subjected to various levels of metamorphism. The approximate area of the metamorphic aureole is indicated on maps 1A and 1B.

(v) Minor drainage lines have not been mapped as separate map units. Soils of minor drainage lines often have similar soils of greater depth and reduced drainage capacity to those of the surrounding map unit. Minor drainage lines are often indicated as watercourses on maps 1A and 1B.

4.1 Quaternary alluvial map units

There are three alluvial map units in the district. Major creeks including Axe, Sweeneys, Emu, Myrtle and Sheepwash creeks have narrow active floodplains with younger alluvial soils. Axe, Emu and Sweeneys creeks also have gently inclined, older alluvial plains. Other creeks such as Native Gully, Hargreaves, Splitters, Mosquito and Kangaroo Creek have narrow active floodplains flowing through undulating Ordovician terrain.

Significant disturbance has occurred on these alluvial areas due to agricultural uses such as cropping, grazing and irrigated horticulture. Most soils present are considered to be disturbed soils with frequent mixing of topsoils and subsoils due to cultivation.

The soils present on the narrow active floodplains are highly variable. High in the catchment area of streams, course sandy sediments are more prevalent, with finer sediments being deposited lower in the catchment. Major soils types were identified in the lower catchment where soils show less variation. In general, the soils are uniform clays with occasional sandy washes overlying topsoils, and sand lenses present at depth.

Bleached, mottled red duplex soils occur on the older alluvial plain. Variants include unbleached red duplex soils and yellow duplex soils in minor depressions.

Within the alluvial units, moderate levels of salting and stream bank erosion occur. Increased local and regional groundwater recharge, combined with the loss of vegetation cover, continues to cause salting problems. Salting and loss of vegetation has also increased the incidence of sheet erosion in the alluvial units, particularly during flood events.

Land management considerations

The major concerns in these units include flooding risk, site drainage and salinity. Land use is predominantly agriculture, with minor rural residential development encroaching upon floodplain areas.

Flooding risk is of greater importance on the lower active floodplains where flood frequency is high and may cause significant problems for site access, effluent disposal and building foundations. The older alluvial plains have a lower flood frequency and may allow greater development.

Site drainage and permeability is generally poor, and when combined with a high flooding risk poses a high risk for effluent disposal.

Salting has the potential to significantly reduce agricultural production and may cause considerable damage to foundations, plumbing and gardens in residential areas. Where salting occurs in agricultural zones, it will require careful management to minimise loses in production and soil loss through sheet erosion. In residential areas, it may be necessary to consider rezoning options and prohibit further development on land known to be effected by salting. Salting is considered a very high hazard and may require long term remedial action at a catchment wide level, for control to be achieved. Bare soils and the presence of spiny rush are good indicators of salinity.

The alluvial units have the highest quality agricultural land in the district. Although the units are classed as moderate in capability, existing limitations can be overcome by improving the level of land management. With rural residential areas encroaching upon alluvial lands, fragmentation of existing agricultural land also occurs. The value of these agricultural lands to the District should be considered.

SOIL OF QUATERNARY ALLUVIAL ORIGIN

Plate 1 Map unit: Qa1
PPF:Uf
Red Kandosol

Plate 2 Map Unit Qa2
PPF: Dy3.42
Brown Sodosol

Plate3 Map unit: Qap
PPF: Dr3.42
Red Chromosol

MAP UNIT SYMBOL: **Qa1** Area:1500 ha	MAP UNIT: **Quaternary alluvium, floodplain**

A. GENERAL DESCRIPTION

Narrow active floodplains are present along Axe, Emu, Sweeneys, Myrtle and Sheepwash creeks. These soils are highly variable but red uniform clays are common lower in the catchment. Frequent cultivation of these soils has resulted in mixing of topsoils and subsoils.

Rising saline groundwater has resulted in the loss of significant areas of agricultural land. Areas within the township of Strathfieldsaye are also affected. Minor sheet erosion also occurs where ground cover has been lost due to salinity, particularly during seasonal flooding.

SITE CHARACTERISTICS

Parent Material Age:	Quaternary	**Depth to Seas. Watertable:**	> 1.5 m
Parent Material Lithology:	Alluvium	**Flooding Risk:**	Very high
Landform Pattern:	Alluvial plain	**Drainage:**	Well drained
Landform Element:	Channel bench	**Rock Outcrop:**	Nil
Slope a) common:	1%	**Depth to Hard Rock:**	> 1.5 m
Slope b) range:	0-3%		
Potential Recharge to Groundwater:	Low		
Major Native Vegetation Species:	Red River Gum, Yellow Box		
Present Land Use:	Grazing, irrigation		
Length of Growing Season	April - September		

LAND DEGRADATION

Degradation Processes	**Water Erosion sheet/rill gully**		**Wind Erosion**	**Mass Movement**	**Salting**	**Acidification**
Susceptibility	Very low	Moderate	Very low	Very low	High	Low
Incidence	Very low	Low	Very low	Very low	Moderate	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A0 0-5 cm Organic, clear transition to:

A11 5-25 cm Dark brown(10YR4/3) light clay, massive structure, earthy fabric, very firm consistence, pH 5.5. Clear transition to:

A12 25-35 cm Dark brown (7.5YR4/2) light clay, moderate angular blocky structure, peds 5-20 mm, rough fabric, firm consistence, few small subrounded sedimentary pebbles, pH 6.0. Clear transition to:

B2 35-70 cm Reddish brown (5YR4/3) light clay, coarse faint red and orange mottles are common, weak subangular blocky structure, rough fabric, very firm consistence, peds 20-50 mm, pH 6.0. Gradual transition to:

B3 70-115 cm Yellowish red (5YR4/8) sandy clay, many fine faint red mottles, massive structure, earthy fabric, strong consistence, small subrounded sedimentary pebbles are common, pH 6.5. Clear transition to:

2Db 115-150+ cm Yellowish red (5YR5/6) sand, single grain structure, sandy fabric, loose consistence, few medium size subrounded quartz pebbles, pH 7.0.

CLASSIFICATION

Factual Key:	Uf (major)
Australian Soil Classification:	Mottled, Mesotrophic, Red Kandosol, thick, slightly gravely, clayey, very deep.
Unified Soil Group:	CL

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A11	4.4	6	VL	L	D	S	T	H	VL
A12	4.6	9	VL	L	D	D	S	L	M
B2	5.2	17	VL	L	D	D	S	M	M
B3	5.9	3	VL	L	D	D	S	VL	M

VL: Very Low L: Low M: Moderate H: High VH: Very High D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

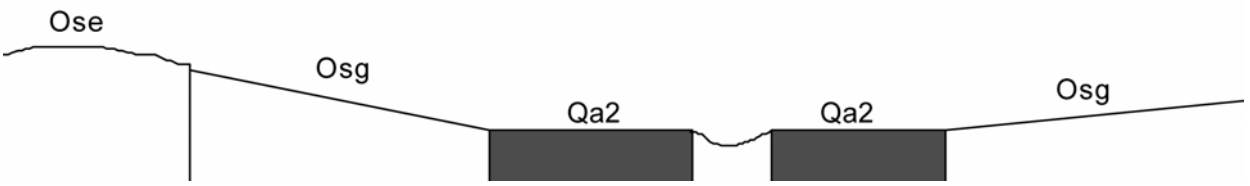
SOIL PROFILE CHARACTERISTICS:

Permeability:	Slow (average 50 mm/day, range 20-100 mm/day)
Available Water Capacity:	High (197 mm H_2O)
Linear Shrinkage (B horizon):	Very low (6%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	$C_3T_1S_3$	Climate, susceptibility to gully erosion, condition of topsoil
Effluent Disposal (septic tanks)	5	Flooding risk, permeability
Farm Dams	3	Permeability
Building Foundations		
slab	5	Flooding risk
stumps/footings	5	Flooding risk
Secondary Roads	5	Flooding risk

MAP UNIT SYMBOL: **Qa2** Area:890 ha	MAP UNIT: **Quaternary alluvium, floodplain**



A. GENERAL DESCRIPTION

Narrow active floodplains occur along minor creeks that flow through undulating Ordovician terrain. These include Hargreaves, Splitters, Native Gully, Mosquito and Kangaroo creeks. Soils are variable higher in the catchment, but bleached and mottled yellow duplex soils are dominant lower in the catchment. An occasional sandy wash may be found overlying the yellow duplex soil where flooding has occurred. Minor salting and severe gully erosion occur.

SITE CHARACTERISTICS

Parent Material Age: Quaternary	**Depth to Seas. Watertable:** > 1.5 m
Parent Material Lithology: Alluvium	**Flooding Risk:** Very high
Landform Pattern: Rises	**Drainage:** Imperfectly drained
Landform Element: Channel bench	**Rock Outcrop:** Nil
Slope a) common: 1%	**Depth to Hard Rock:** > 1.5 m
Slope b) range: 1-3%	
Potential Recharge to Groundwater: Low	
Major Native Vegetation Species: Yellow Box, River Red Gum	
Present Land Use: Grazing	
Length of Growing Season: April - September	

LAND DEGRADATION

Degradation Processes	Water Erosion sheet/rill gully		Wind Erosion	Mass Movement	Salting	Acidification
Susceptibility	Very low	Moderate	Very low	Very low	Moderate	Moderate
Incidence	Very low	Moderate	Very low	Very low	Low	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A11	0-5 cm	Yellowish brown (10YR5/4) coarse sandy loam, weak subangular blocky structure, peds 10-20 mm, rough fabric, very week consistence, small subrounded and angular sedimentary and quartz pebbles are common, pH 6.5. Clear transition to:
A12	5-20 cm	Brown (10RY5/3) clay loam with coarse sand, massive structure, earthy fabric, firm consistence, few small subrounded and angular sedimentary and quartz pebbles, pH 6.5. Gradual transition to:
A2	20-50 cm	Very pale brown (10YR7/4) sandy clay loam with coarse sand, massive structure, earthy fabric, weak consistence, few small subrounded and angular sedimentary and quartz pebbles, pH 7.0. Clear transition to:
B2	50-60 cm	Light yellowish brown (10YR6/4) light clay with sand, many medium distinct orange and pale mottles, weak columnar structure, peds 20-50 mm, rough and smooth fabric, firm consistence, few small subrounded and angular sedimentary and quartz pebbles, pH 7.5. Gradual transition to:
BC	60-115+ cm	Light yellowish brown (10YR6/4) light clay with sand, many medium distinct orange and red mottles, weak columnar structure, peds 100-200 mm, rough and smooth fabric, very firm consistence, few small subrounded and angular sedimentary and quartz pebbles, pH 8.0.

CLASSIFICATION

Factual Key:	Dy 3.42 (major), Dy3.41 (minor)
Australian Soil Classification:	Mesotrophic, Mottled-Hypernatric, Brown Sodosol, thick, slightly gravely, clay loamy, clayey, deep
Unified Soil Group:	CL

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A11	5.7	2	L	L	S	S	S	H	VL
A12	5.6	9	L	L	D	S	S	H	VL
A2	7.0	3	VL	VL	D	S	S	VL	L
B2	7.1	15	M	L	D	S	S	VL	H

VL: Very Low L: Low M: Moderate H: High VH: Very High D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Slow (average 80 mm/day, range 10-180 mm/day)

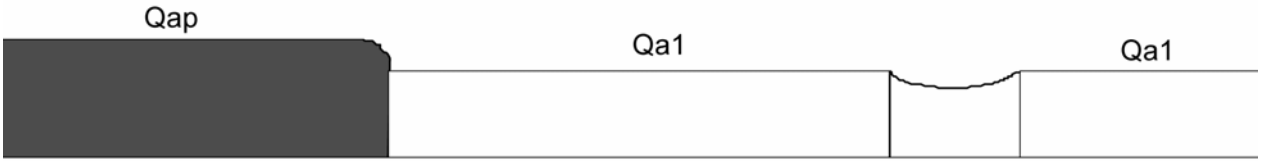
Available Water Capacity: High (159 mm H_2O)

Linear Shrinkage (B horizon): Very low (5%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	$C_3T_1S_3$	Climate, condition of topsoil, depth to seasonal watertable, susceptibility to gully erosion, electrical conductivity
Effluent Disposal (septic tanks)	4	Drainage, flooding risk
Farm Dams	3	Depth to seasonal water table, suitability of subsoil, permeability, dispersibility of subsoil
Building **Foundations slab** **stumps/footings**	 4 4	 Drainage, flooding risk Drainage, flooding risk
Secondary Roads	4	Drainage, flooding risk

MAP UNIT SYMBOL: **Qap** Area:1580 ha	MAP UNIT: **Quaternary alluvium, alluvial plain**



A. GENERAL DESCRIPTION

Small alluvial plain areas are present above the active floodplains of Axe, Sweenies and Sheepwash Creek. Bleached and mottled red duplex soils are common on the plains. Variants include unbleached red duplex soils and yellow duplex soils in minor depressions.

SITE CHARACTERISTICS

Parent Material Age: Quaternary	**Depth to Seas. Watertable:** > 1.5 m
Parent Material Lithology: Alluvium	**Flooding Risk:** High
Landform Pattern: Alluvial plain	**Drainage:** Moderately well drained
Landform Element: Plain	**Rock Outcrop:** Nil
Slope a) common: 1% **Slope b) range:** 0-3%	**Depth to Hard Rock:** > 1.5 m
Potential Recharge to Groundwater: Low	
Major Native Vegetation Species: River Red Gum, Yellow Gum	
Present Land Use: Grazing, dryland and irrigated cropping	
Length of Growing Season April - September	

LAND DEGRADATION

Degradation Processes	**Water Erosion sheet/rill gully**		**Wind Erosion**	**Mass Movement**	**Salting**	**Acidification**
Susceptibility	Very low	Moderate	Low	Very low	Low	Low
Incidence	Very low	Low	Low	Very low	Nil	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A0	0-5 cm	Organic
A1	5-15 cm	Brown (10YR5/3) fine sandy clay loam, massive, earthy fabric, very firm consistence, few small subrounded and subangular sedimentary pebbles, pH 6.0. Clear transition to:
A2	15-25 cm	Light brown (7.5YR6/4), bleached (7.5YR8/2), clay loam, many fine faint red mottles, massive structure, earthy fabric, very firm consistence, few small subrounded sedimentary pebbles, pH 6.5. Gradual transition to:
B2	25-80 cm	Reddish brown (2.5YR4/4) light medium clay, many coarse faint red orange yellow and pale mottles, moderate subangular blocky structure, peds 20-50 mm, smooth fabric, strong consistence, few small subrounded sedimentary pebbles, pH 6.5. Gradual transition to:
B31	80-110 cm	Yellowish brown (5YR5/6) light medium clay, many medium size distinct red and pale mottles, weak platy structure, peds 50-100 mm, very firm consistence, rough fabric, many subrounded and subangular platy sedimentary pebbles, pH 6.5. Gradual transition to:
B32	110-140+ cm	Brown (7.5YR5/4) light medium clay, many coarse faint orange and pale mottles, moderate platy structure, peds 20-50 mm, firm consistence, pH 9.5.

CLASSIFICATION

Factual Key:	Dr 3.42 (major)
Australian Soil Classification:	Bleached-Mottled, Mesotrophic, Red Chromosol, medium non gravely, clay loamy, clayey, very deep.
Unified Soil Group:	CL

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A1	4.0	0	VL	VL	S	S	T	M	VL
A2	4.3	7	VL	VL	D	D	T	VL	H
B2	5.2	33	VL	M	D	S	S	VL	M
B31	6.3	31	VL	L	D	D	S	VL	H

VL: Very Low L: Low M: Moderate H: High VH: Very High D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Low (average 8 mm/day, range 0.5-30 mm/day)

Available Water Capacity: Moderate (123 mm H_20)

Linear Shrinkage (B horizon): Very low (6%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	$C_3T_1S_3$	Climate, condition of topsoil, susceptibility to gully erosion
Effluent Disposal (septic tanks)	4	Flooding risk
Farm Dams	2	Nil
Building **Foundations slab** **stumps/footings**	 4 4	 Flooding risk Flooding risk
Secondary Roads	4	Flooding risk

4.2 Quaternary volcanic map units

There are six Quaternary volcanic map units in the District. The parent material is olivine basalt which is restricted to a narrow corridor that follows the Coliban River through Lake Eppalock and down the Campaspe River to Axedale. The basalt terrain is diverse with elevated basalt plateaus, steep scarps and moderate and gentle slopes. The elevated basalt plateau is occasionally broken by minor drainage lines and Lake Eppalock. Two distinct soil types occur on the basalt map units.

The slightly undulating basalt plateau contains uniform grey cracking clay soils of variable depth. The plateau is divided into areas with a high amount of unconsolidated surface rock, and those free of rock.

At the edge of the basalt plateau, a narrow, steep rocky scarp is usually present. This rocky scarp has not been mapped due to restrictions of scale. Below the scarp are steep to gentle slopes with shallow, red gradational soils. In very shallow situations, red uniform clay loam soils may be found. Surface rock is common on the steep and moderate slopes. The basalt cap is thin or absent at the edge of the plateau and contact with the underlying sedimentary clay may occur where colluvial wash is present.

Land degradation is limited on the basalt terrain. Minor sheet erosion occurs on the steep to moderate slopes.

Land use in the past has been restricted to stock grazing as soil conditions do not advantage cropping practices.

Land management considerations

The major concerns in these units are the steep rocky slopes, shallow depth to hard rock, poor site drainage and impermeable subsoils.

The steeper rocky slopes are not a major component of the basalt terrain, however significant problems with siting for access tracks, building foundations and effluent disposal will occur if housing development is required.

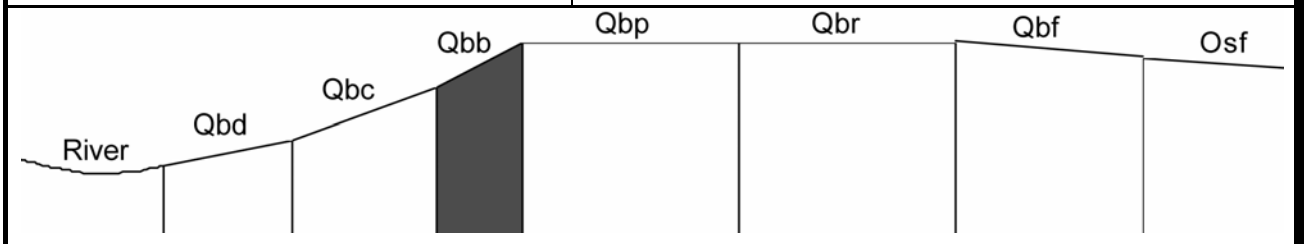
Due to poor site drainage and impermeable subsoils, the gently undulating basalt plain is unlikely to be suited to septic tanks, and other forms of effluent disposal may be more appropriate.

SOIL OF VOLCANIC ORIGIN

Plate 4 Map Units: Qbb, Qbc, Qbd, Qbf
PPF: Gn3.12
Red Ferrosol

Plate 5 Map Unit: Qbr
PPF: Ug5.2
Brown Vertosol

MAP UNIT SYMBOL: **Qbb** Area:32 ha	MAP UNIT: **Quaternary basalt, steep slope**



A. GENERAL DESCRIPTION

These steep basalt slopes occur on the edge of the basalt plateau below a narrow rocky escarpment. Surface stone and boulders are abundant and soils are shallow. Red gradational soils are common, while variants include uniform clay loams in shallow situations. The basalt cap is shallow and is underlain by sedimentary clays.

SITE CHARACTERISTICS

Parent Material Age: Quaternary	**Depth to Seas. Watertable:** > 1.5 m
Parent Material Lithology: Basalt	**Flooding Risk:** Nil
Landform Pattern: Plateau	**Drainage:** Well drained
Landform Element: Hillslope	**Rock Outcrop:** < 50%
Slope a) common: 35%	**Depth to Hard Rock:** 0.2 m
Slope b) range: 33-60%	
Potential Recharge to Groundwater: High	
Major Native Vegetation Species: River Red Gum, Yellow Gum	
Present Land Use: Grazing	
Length of Growing Season April - September	

LAND DEGRADATION

Degradation Processes	**Water Erosion sheet/rill gully**		**Wind Erosion**	**Mass Movement**	**Salting**	**Acidification**
Susceptibility	Very high	Low	Very low	Low	Very low	Moderate
Incidence	Low	Very low	Very low	Very low	Nil	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A1	0-10 cm	Dark reddish grey (5YR4/2) clay loam, strong subangular blocky structure, peds 2-5mm, smooth and rough fabric, very firm consistence, many small subrounded basaltic pebbles, pH 5.5. Gradual transition to:
B2	10-20 cm	Very dark grey (5YR3/1) light clay, strong subangular blocky structure, peds 2-5mm, smooth fabric, firm consistence, small subangular and subrounded basaltic pebbles are abundant, pH 6.0. Gradual transition to:
R	20-80 cm	Basalt rock.
2Db	80-120+ cm	Buried sedimentary soil.

CLASSIFICATION

Factual Key:	Gn 3.12 (major) Um (minor)
Australian Soil Classification:	Haplic, Eutrophic, Red Ferrosol, thin, slightly gravely, clay loamy, clayey, very shallow
Unified Soil Group:	ML

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A1	4.8	10	VL	H	D	S	S	H	VL
B2	5.5	61	VL	H	D	S	S	H	M

VL: Very Low L: Low M: Moderate H: High VH: Very High D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Rapid (average 520 mm/day, range 130-1150 mm/day)

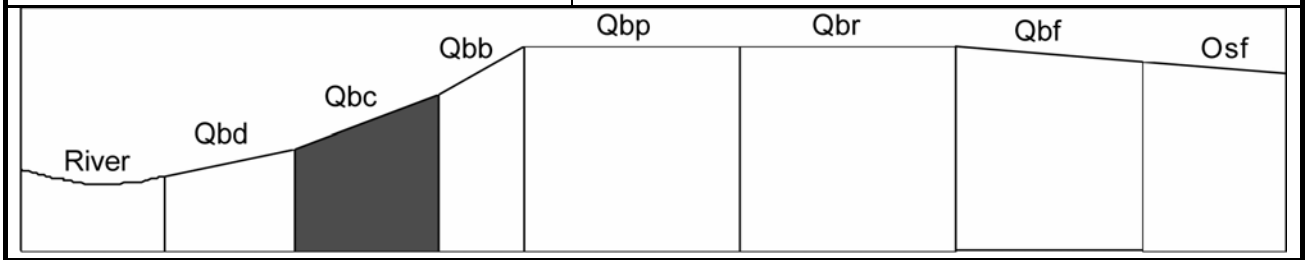
Available Water Capacity: Very low (30 mm H_20)

Linear Shrinkage (B horizon): Moderate (13%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	$C_3T_5S_5$	Slope, depth to hard rock, available water capacity, susceptibility to sheet erosion
Effluent Disposal (septic tanks)	5	Slope
Farm Dams	5	Slope, suitability of subsoil, depth to hard rock
Building Foundations slab stumps/footings	 5 5	 Slope, depth to hard rock Depth to hard rock
Secondary Roads	5	Slope, depth to hard rock

MAP UNIT SYMBOL: **Qbc** Area:32 ha	MAP UNIT: **Quaternary basalt, moderately steep slope**



A. GENERAL DESCRIPTION

The moderately steep basalt slopes occur on the edge of the basalt plateau below a narrow rocky escarpment. Surface stone and boulders are abundant and soils are shallow. Red gradational soils are common, while variants include uniform clay loams in shallow situations. The basalt cap is also shallow and is underlain by sedimentary clays.

SITE CHARACTERISTICS

Parent Material Age: Quaternary
Parent Material Lithology: Basalt
Landform Pattern: Plateau
Landform Element: Hillslope
Slope a) common: 25%
Slope b) range: 21-32%

Depth to Seas. Watertable:> 1.2 m
Flooding Risk: Nil
Drainage: Well drained
Rock Outcrop: < 50%
Depth to Hard Rock: 0.2 m

Potential Recharge to Groundwater: High
Major Native Vegetation Species: River Red Gum, Yellow Gum
Present Land Use: Grazing
Length of Growing Season April - September

LAND DEGRADATION

Degradation Processes	Water Erosion sheet/rill gully		Wind Erosion	Mass Movement	Salting	Acidification
Susceptibility	Very high	Low	Very low	Low	Very low	Moderate
Incidence	Low	Very low	Very low	Very low	Nil	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A1 0-10 cm Dark reddish grey (5YR4/2) clay loam, strong subangular blocky structure, peds 2-5 mm, smooth and rough fabric, very firm consistence, many small subrounded basaltic pebbles, pH 5.5. Gradual transition to:

B2 10-20 cm Very dark grey (5YR3/1) light clay, strong subangular blocky structure, peds 2-5 mm, smooth fabric, firm consistence, small subangular and subrounded basaltic pebbles are abundant, pH 6.0. Gradual transition to:

R 20-90 cm Basalt rock.

2Db 90-130 cm Buried sedimentary soil.

CLASSIFICATION

Factual Key:	Gn 3.12(major) Um (minor)
Australian Soil Classification:	Haplic, Eutrophic, Red Ferrosol, thin, slightly gravely, clay loamy, clayey, very shallow
Unified Soil Group:	ML

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A1	4.8	10	VL	H	D	S	S	H	VL
B2	5.5	61	VL	H	D	S	S	H	M

VL: Very Low L: Low M: Moderate H: High VH: Very High D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Rapid (average 520 mm/day, range 130-1150 mm/day)

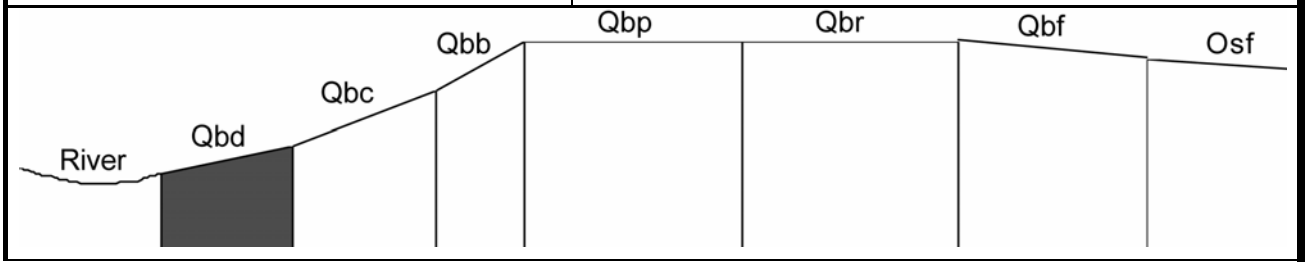
Available Water Capacity: Very low (30 mm H_2O)

Linear Shrinkage (B horizon): Moderate (13%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	$C_3T_4S_5$	Depth to hard rock, available water capacity, susceptibility to sheet erosion
Effluent Disposal (septic tanks)	4	Slope
Farm Dams	5	Slope, suitability of subsoil, depth to hard rock
Building **Foundations slab** **stumps/footings**	 5 5	 Depth to hard rock Depth to hard rock
Secondary Roads	5	Depth to hard rock

MAP UNIT SYMBOL: **Qbd** Area:127 ha	MAP UNIT: **Quaternary basalt, moderate slope**



A. GENERAL DESCRIPTION

Shallow red gradational soils are common on moderate slopes that occur on the edge of the basalt plateau. Variants include a shallow uniform clay loam overlying yellow sedimentary clays on lower slopes. Surface stone and boulders are common. In some areas, only red colluvial wash overlies the sedimentary clays.

SITE CHARACTERISTICS

Parent Material Age: Quaternary **Parent Material Lithology:** Basalt **Landform Pattern:** Plateau **Landform Element:** Hillslope **Slope a) common:** 14% **Slope b) range:** 11-20%	**Depth to Seas. Watertable:**> 1.5 m **Flooding Risk:** Nil **Drainage:** Well drained **Rock Outcrop:** < 20% **Depth to Hard Rock:** 0.8 m
Potential Recharge to Groundwater: High **Major Native Vegetation Species:** River Red Gum, Yellow Gum **Present Land Use:** Grazing **Length of Growing Season** April - September	

LAND DEGRADATION

Degradation Processes	**Water Erosion sheet/rill gully**		**Wind Erosion**	**Mass Movement**	**Salting**	**Acidification**
Susceptibility	High	Low	Very low	Moderate	Very low	Moderate
Incidence	Low	Very low	Very low	Very low	Very low	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A1	0-10 cm	Dark reddish grey (5YR4/2) clay loam, strong subangular blocky structure, peds 2-5 mm, smooth and rough fabric, very firm consistence, many small subrounded basaltic pebbles, pH 5.5. Gradual transition to:
B2	10-80 cm	Very dark grey (5YR3/1) light clay, strong subangular blocky structure, peds 2-5 mm, smooth fabric, firm consistence, small subangular and subrounded basaltic pebbles are abundant, pH 6.0. Gradual transition to:
R	80-120 cm	Basalt rock.
2Db	120+ cm	Buried sedimentary soil.

CLASSIFICATION

Factual Key:	Gn 3.12(major) Um (minor)
Australian Soil Classification:	Haplic, Eutrophic, Red Ferrosol, thin, slightly gravely, clay loamy, clayey, very shallow
Unified Soil Group:	ML

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A1	4.8	10	VL	H	D	S	S	H	VL
B2	5.5	61	VL	H	D	S	S	H	M

VL: Very Low L: Low M: Moderate H: High VH: Very High D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Rapid (average 520 mm/day, range 130-1150 mm/day)

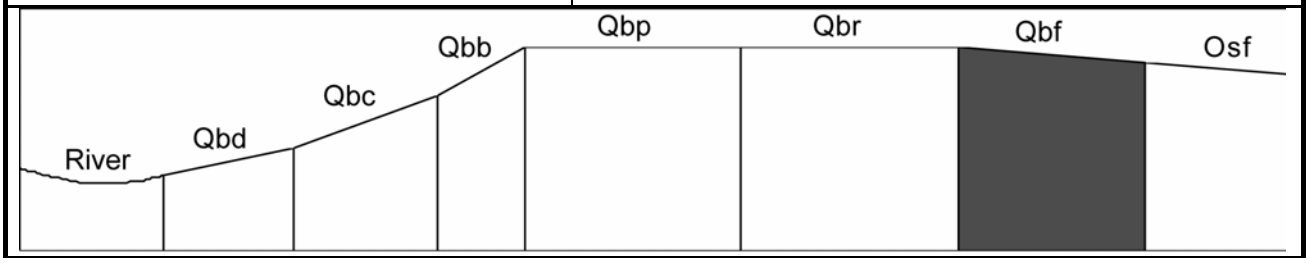
Available Water Capacity: Very low (30 mm H_2O)

Linear Shrinkage (B horizon): Moderate (13%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	C3T4S4	Slope, depth of topsoil, depth to hard rock, susceptibility to sheet erosion
Effluent Disposal (septic tanks)	3	Slope, depth to impermeable layer
Farm Dams	5	Suitability of subsoil, depth to hard rock
Building Foundations slab stumps/footings	 4 4	 Slope, depth to hard rock Depth to hard rock
Secondary Roads	4	Slope, depth to hard rock, USG subsoil

MAP UNIT SYMBOL: **Qbf** Area:183 ha	MAP UNIT: **Quaternary basalt, gentle slope**



A. GENERAL DESCRIPTION

Shallow red gradational soils are common on gentle slopes on the edge of the basalt plateau. Variants include a red shallow uniform clay loam overlying yellow sedimentary clays on lower slopes. Surface stone and boulders are common. In some areas, only red colluvial wash overlies the sedimentary clays.

SITE CHARACTERISTICS

Parent Material Age: Quaternary
Parent Material Lithology: Basalt
Landform Pattern: Plateau
Landform Element: Hillslope
Slope a) common: 7%
Slope b) range: 4-10%
Depth to Seas. Watertable:> 1.5 m
Flooding Risk: Nil
Drainage: Well drained
Rock Outcrop: < 10%
Depth to Hard Rock: 0.8 m

Potential Recharge to Groundwater: Moderate
Major Native Vegetation Species: River Red Gum, Yellow Gum
Present Land Use: Grazing
Length of Growing Season April - September

LAND DEGRADATION

Degradation Processes	Water Erosion sheet/rill gully		Wind Erosion	Mass Movement	Salting	Acidification
Susceptibility	Moderate	Low	Very low	Very low	Very low	Very low
Incidence	Low	Very low	Very low	Very low	Very low	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A1	0-10 cm	Dark reddish grey (5YR4/2) clay loam, strong subangular blocky structure, peds 2-5 mm, smooth and rough fabric, very firm consistence, many small subrounded basaltic pebbles, pH 5.5. Gradual transition to:
B2	10-80 cm	Very dark grey (5YR3/1) light clay, strong subangular blocky structure, peds 2-5 mm, smooth fabric, firm consistence, small subangular and subrounded basaltic pebbles are abundant, pH 6.0. Gradual transition to:
R	80-120 cm	Basalt rock.
2Db	120+ cm	Buried sedimentary soil.

CLASSIFICATION

Factual Key:	Gn 3.12(major) Um (minor)
Australian Soil Classification:	Haplic, Eutrophic, Red Ferrosol, thin, slightly gravely, clay loamy, clayey, very shallow
Unified Soil Group:	ML

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A1	4.8	10	VL	H	D	S	S	H	VL
B2	5.5	61	VL	H	D	S	S	H	M

VL: Very Low L: Low M: Moderate H: High VH: Very High D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Rapid (average 520 mm/day, range 130-1150 mm/day)

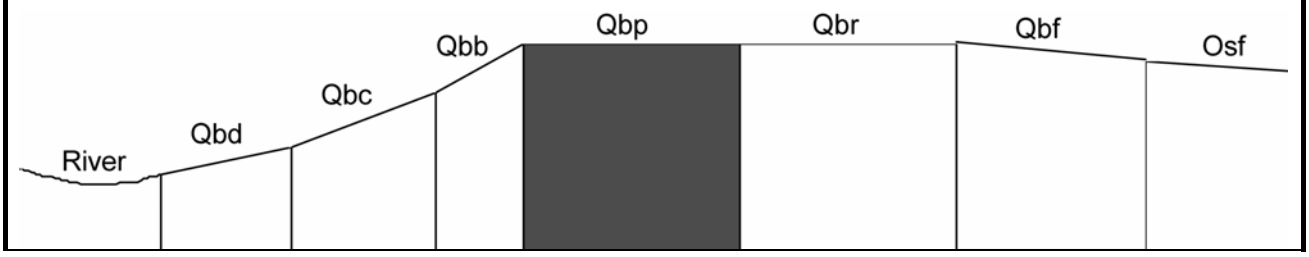
Available Water Capacity: Very low (30 mm H_20)

Linear Shrinkage (B horizon): Moderate (13%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	C3T3S4	Depth of topsoil, depth to hard rock
Effluent Disposal (septic tanks)	2	Nil
Farm Dams	5	Suitability of subsoil, depth to hard rock
Building Foundations slab stumps/footings	3 3	Slope, depth to hard rock, linear shrinkage Depth to hard rock, linear shrinkage
Secondary Roads	4	USG subsoil, slope

MAP UNIT SYMBOL: **Qbp** Area:127 ha	MAP UNIT: **Quaternary basalt, plain**



A. GENERAL DESCRIPTION

This quaternary basalt plain is mostly free of surface stone. The plains are very gently undulating with a uniform dark grey cracking clay soil. Deeper soil profiles may be mottled and carbonate concretions may be present. Minor variations include a uniform brown cracking clay. Surface water ponding is common in wet months of the year, while surface cracking is common in dry months.

SITE CHARACTERISTICS

Parent Material Age: Quaternary
Parent Material Lithology: Basalt
Landform Pattern: Plateau
Landform Element: Plain
Slope a) common: 2%
Slope b) range: 0-5%

Depth to Seas. Watertable:> 1.5 m
Flooding Risk: Nil
Drainage: Very poor
Rock Outcrop: Nil
Depth to Hard Rock: 1.5 m

Potential Recharge to Groundwater: Low
Major Native Vegetation Species: River Red Gum, Yellow Box
Present Land Use: Grazing
Length of Growing Season April - September

LAND DEGRADATION

Degradation Processes	Water Erosion sheet/rill	gully	Wind Erosion	Mass Movement	Salting	Acidification
Susceptibility	Very low	Very low	Very low	Very low	Low	Low
Incidence	Very low	Low	Low	Nil	Nil	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A1 0-10 cm — Dark grey (10YR4/1) light medium clay, strong subangular blocky structure, peds 5-10 mm, rough fabric, strong consistence, small subrounded basalt pebbles are common, pH 6.0. Clear transition to:

B21 10-50 cm — Greyish brown (10YR5/2) heavy clay, weak angular blocky structure, smooth fabric, rigid consistence, pH 8.0. Gradual transition to:

B22 50-150+ cm — Greyish brown (10YR5/2) heavy clay, weak angular blocky structure, smooth fabric, rigid consistence, pH 8.5.

CLASSIFICATION

Factual Key:	Ug 5.2 (major)
Australian Soil Classification:	Haplic, Brown Vertosol, gravely, fine, very fine , deep
Unified Soil Group:	CH

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A1	5.5	12	VL	H	D	S	S	H	VL
B2	6.7	45	VL	VH	D	S	S	VL	M

VL: Very Low L: Low M: Moderate H: High VH: Very High D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Slow (average 15 mm/day, range 0-40 mm/day)

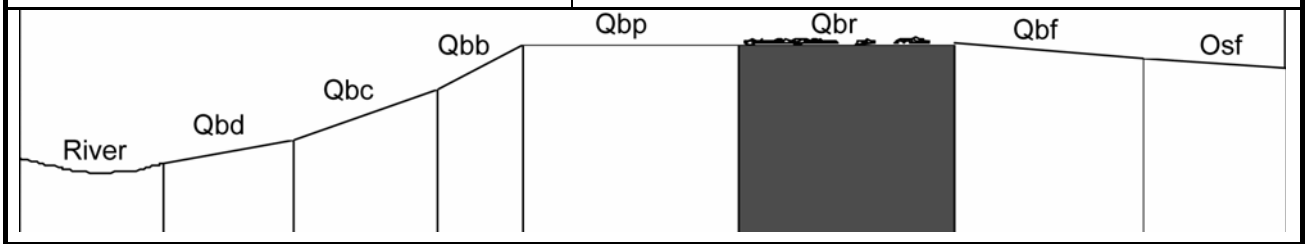
Available Water Capacity: High (195 mm H_2O)

Linear Shrinkage (B horizon): Low (10%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	$C_3T_1S_4$	Depth of topsoil
Effluent Disposal (septic tanks)	5	Drainage
Farm Dams	4	Depth to hard rock
Building **Foundations slab** **stumps/footings**	 5 5	 Drainage Drainage
Secondary Roads	5	Drainage

MAP UNIT SYMBOL: **Qbr** Area:343 ha	MAP UNIT: **Quaternary basalt, rocky plain**



A. GENERAL DESCRIPTION

The rocky basalt plains are very gently undulating with a shallow uniform dark grey cracking clay soil. Large amounts of surface stone always occur in this unit. Deeper soil profiles may be mottled and carbonate concretions may be present. Minor variations include a uniform brown cracking clay. Surface water ponding is common in wet months of the year while surface cracking is common in dry months

SITE CHARACTERISTICS

Parent Material Age: Quaternary
Parent Material Lithology: Basalt
Landform Pattern: Plateau
Landform Element: Plain
Slope a) common: 2%
Slope b) range: 0-5%

Depth to Seas. Watertable: > 1.5 m
Flooding Risk: Nil
Drainage: Very poor
Rock Outcrop: > 25%
Depth to Hard Rock: 0.5 m

Potential Recharge to Groundwater: Low
Major Native Vegetation Species: River Red Gum, Yellow Box **P**
resent Land Use: Grazing
Length of Growing Season April - September

LAND DEGRADATION

Degradation Processes	Water Erosion sheet/rill gully		Wind Erosion	Mass Movement	Salting	Acidification
Susceptibility	Very low	Very low	Very low	Very low	Low	Low
Incidence	Very low	Low	Low	Nil	Nil	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A1 0-10 cm Dark grey (10YR4/1) light medium clay, strong subangular blocky structure, peds 5-10 mm, rough fabric, strong consistence, small subrounded basalt pebbles are common, pH 6.0. Clear transition to:

B2 10-50 cm Greyish brown (10YR5/2) heavy clay, weak angular blocky structure, smooth fabric, rigid consistence, pH 8.0. Gradual transition to:

R 50+ cm Basalt rock.

CLASSIFICATION

Factual Key:	Ug 5.2 (major)
Australian Soil Classification:	Haplic, Brown Vertosol, gravely, fine, very fine, deep
Unified Soil Group:	CH

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A1	5.5	12	VL	H	D	S	S	H	VL
B2	6.7	45	VL	VH	D	S	S	VL	M

VL: Very Low L: Low M: Moderate H: High VH: Very High D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Slow (average 10 mm/day, range 0-40 mm/day)

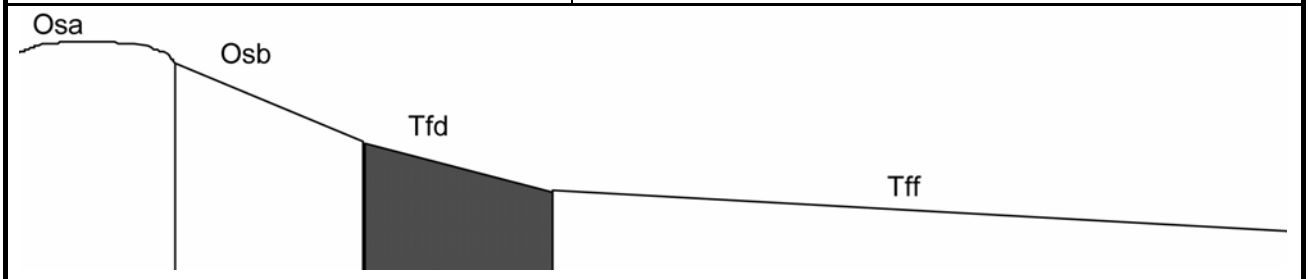
Available Water Capacity: Low (66 mm H_2O)

Linear Shrinkage (B horizon): Low (10%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	$C_3T_1S_4$	Depth of topsoil, depth to hard rock, gravel/stone/boulder content
Effluent Disposal (septic tanks)	5	Drainage
Farm Dams	5	Slope, suitability of subsoil, depth to hard rock
Building Foundations slab stumps/footings	5 5	Drainage, depth to hard rock Drainage, depth to hard rock
Secondary Roads	5	Drainage, depth to hard rock, proportion of stone and boulder

MAP UNIT SYMBOL: **Tfd** Area:90 ha	MAP UNIT: **Tertiary fan, moderate slope**



A. GENERAL DESCRIPTION

Colluvial fans developed on the southern slopes of the metamorphic aureole ridge overlying granodiorite. The soils are dominantly yellow duplex with fine sandy loam topsoil, bleached, A_2 horizons and extremely mottled clay subsoils. Many quartz and metamorphosed sedimentary fragments occur on the soil surface and throughout the profile. In the subsoil, the combination of clay and gravel has produced a compact layer. Variations include fewer coarse fragments within the profile, particularly on the lower slopes. Minor drainage lines within this unit often expose granodiorite boulders.

SITE CHARACTERISTICS

Parent Material Age: Tertiary **Parent Material Lithology:** Sedimentary **Landform Pattern:** Rolling hills **Landform Element:** Footslope **Slope a) common:** 14% **Slope b) range:** 11-20%	**Depth to Seas. Watertable:** > 1.5 m **Flooding Risk:** Nil **Drainage:** Well drained **Rock Outcrop:** Nil **Depth to Hard Rock:** > 1.5 m
Potential Recharge to Groundwater: Moderate **Major Native Vegetation Species:** Red Gum, Yellow Box, Red Stringybark, Golden Wattle, Lightwood, Hedge Wattle, Spreading Wattle **Present Land Use:** Grazing **Length of Growing Season** April - September	

LAND DEGRADATION

Degradation Processes	Water Erosion sheet/rill	gully	Wind Erosion	Mass Movement	Salting	Acidification
Susceptibility	Very high	High	High	High	Low	High
Incidence	Moderate	Moderate	High	Low	Nil	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A1 0-15 cm — Brownish black (10YR3/2) fine sandy loam, weak subangular blocky structure, peds 510 mm, rough fabric, moderately weak consistence, many medium sized subangular metamorphic and quartz gravel fragments, moderate organic matter, pH 6.2. Clear transition to:

A2 15-45 cm — Dull yellowish brown (10YR5/4) fine sandy loam, bleached (10YR7/4) when dry, massive structure, earthy fabric, moderately weak consistence, a few medium sized subangular metamorphic and quartz gravel fragments, pH 5.4. Abrupt transition to:

B 45-115+ cm — Dull yellow orange (10YR7/6) medium clay, abundant medium sized distinct grey, orange, red and pale mottles, moderate subangular blocky structure, peds 5-10 mm, rough fabric, moderately firm consistence, many course angular metamorphic and quartz fragments, pH

CLASSIFICATION

Factual Key:	Dy 3.41 (major)
Australian Soil Classification:	Bleached-Mottled, Yellow, Kurosol; deep, thick, loamy, moderately gravely.
Unified Soil Group:	CL

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A1	6.2	44	VL	L	S	S	S	M	H
A2	5.3	19	VL	L	S	S	S	L	H
B	4.6	34	L	L	S	S	S	VL	L

VL: Very Low L: Low M: Moderate H: High VH: Very High D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Rapid (average 500 mm/day, range 330-650 mm/day, estimated))

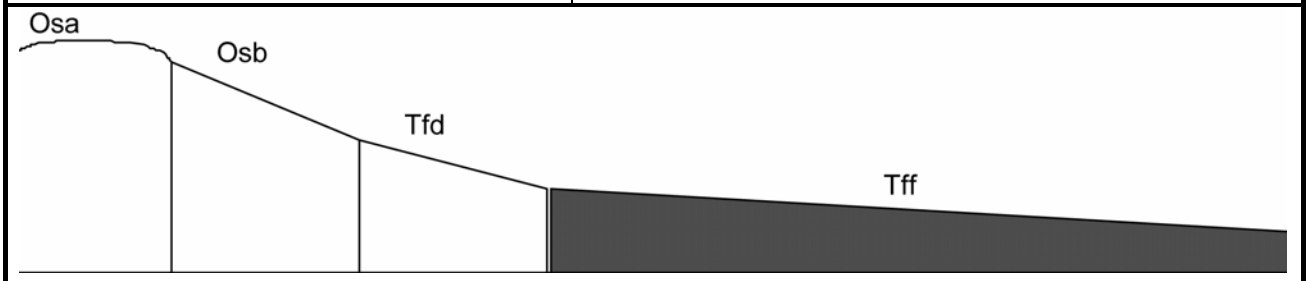
Available Water Capacity: Very high (287 mm H_2O)

Linear Shrinkage (B horizon): Low (12.4%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	C_3 T_4 S_5	Susceptibility to sheet/rill erosion.
Effluent Disposal (septic tanks)	3	Slope
Farm Dams	4	Slope, suitability of subsoil, rapid permeability, high susceptibility to slope failure
Building Foundations slab stumps/footings	4 4	High risk of slope failure, moderate slope High risk of slope failure
Secondary Roads	4	Slope, high risk of slope failure

MAP UNIT SYMBOL: **Tff** Area:82 ha	MAP UNIT: **Tertiary fan, gentle slope**



A. GENERAL DESCRIPTION

Colluvial fans developed on the southern slopes of the metamorphic aureole ridge overlying granodiorite. The soils are dominantly yellow duplex with fine sandy loam topsoil, bleached, A_2 horizons and extremely mottled clay subsoils. Many quartz and metamorphosed sedimentary fragments occur on the soil surface and throughout the profile. In the subsoil, the combination of clay and gravel has produced a compact layer. Variations include fewer coarse fragments within the profile, particularly on the lower slopes. Minor drainage lines within this unit often expose granodiorite boulders.

SITE CHARACTERISTICS

Parent Material Age: Tertiary **Parent Material Lithology:** Sedimentary **Landform Pattern:** Undulating hills **Landform Element:** Footslope **Slope a) common:** 9% **Slope b) range:** 4-10%	**Depth to Seas. Watertable:** > 5 m **Flooding Risk:** Nil **Drainage:** Well drained **Rock Outcrop:** Nil **Depth to Hard Rock:** > 1.5 m
Potential Recharge to Groundwater: Moderate **Major Native Vegetation Species:** Red Gum, Yellow Box, Red Stringybark, Golden Wattle, Lightwood, Hedge Wattle, Spreading Wattle **Present Land Use:** Grazing **Length of Growing Season** April - September	

LAND DEGRADATION

Degradation Processes	Water Erosion sheet/rill	gully	Wind Erosion	Mass Movement	Salting	Acidification
Susceptibility	Very high	Moderate	High	Low	Moderate	High
Incidence	Moderate	High	High	Low	Very how	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A1 0-15 cm Brownish black (10YR3/2) fine sandy loam, weak subangular blocky structure, peds 510 mm, rough fabric, moderately weak consistence, many medium sized subangular metamorphic and quartz gravel fragments, moderate organic matter, pH 6.2. Clear transition to:

A2 15-45 cm Dull yellowish brown (10YR5/4) fine sandy loam, bleached (10YR7/4) when dry, massive structure, earthy fabric, moderately weak consistence, few medium sized subangular metamorphic and quartz gravel fragments, pH 5.4. Abrupt transition to:

B 45-130+ cm Dull yellow orange (10YR6/7) medium clay, abundant medium sized distinct grey, orange red and pale mottles, moderate subangular blocky structure, peds 5-10 mm, rough fabric, moderately firm consistence, many course angular metamorphic and quartz fragments pH

CLASSIFICATION

Factual Key: Dy 3.41

Australian Soil Classification: Bleached-Mottled, Yellow, Kurosol; deep, thick, loamy, moderately gravely

Unified Soil Group: CL

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A1	6.2	44	VL	L	S	S	S	M	H
A2	5.3	19	VL	L	S	S	S	L	H
B	4.6	34	L	L	S	S	S	VL	L

VL: Very Low L: Low M: Moderate H: High VH: Very High D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Rapid (average 500 mm/day, range 330-650 mm/day)

Available Water Capacity: Very high (> 200 mm H_2O)

Linear Shrinkage (B horizon): Low (12.4%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	C_3 T_3 S_5	Susceptible to sheet/rill erosion
Effluent Disposal (septic tanks)	2	Nil
Farm Dams	4	Suitability of subsoil, permeability
Building Foundations slab stumps/footings	3 2	Slope, Nil
Secondary Roads	3	Slope, USG

4.3 Tertiary alluvial sedimentary map units

The remnants of an early Tertiary floodplain, the alluvial sediments have been extensively eroded over time. The remnant alluvial sediments are found on gentle crests and adjacent slopes between Bendigo and Axedale. The alluvial sediments contain course quartz gravels, sands, clays and conglomerate. These hilltop gravel deposits have been extensively strip mined throughout the district.

Soils of the alluvial sediments vary considerably due to the impact of strip mining. Areas in which strip mining has occurred will require site inspection to determine varying site conditions.
The soils present in undisturbed areas are bleached, mottled yellow duplex soils. Soil depth is generally shallow, but depth increases downslope. Occasional drainage depressions contain similar soils. Conglomerate (cemented rounded gravels) often underlie subsoils.

Soil erosion is not considered to be a major problem in the Tertiary alluvial sediments, however disturbed surface soils resulting from strip mining are susceptible to sheet and gully erosion .

Heathlands containing an unusual abundance of indigenous wildflowers and orchids can be found in some undisturbed areas. These areas have high conservation significance.

Land management considerations

The Tertiary sediments cover only a small proportion of the district and much of this is now being developed for rural residential land use.

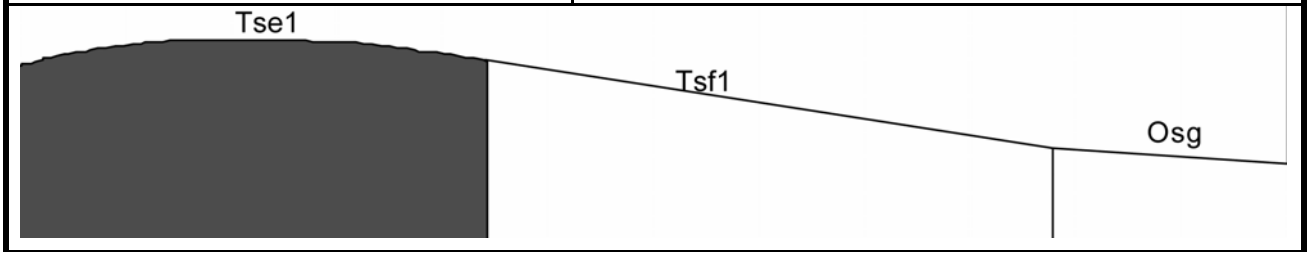
The shallow depth to hard rock and impermeable and dispersible subsoils, are the major constraints to land use.

Siting of access tracks and effluent disposal fields will require special consideration, while dam construction will be limited by shallow, dispersible subsoils and small catchment areas. Alternative effluent disposal systems may be required.

Improved land management is required to protect drought prone crests from overgrazing.

Plate 6 Map Units: Tse, Tsf
PPF: Dy3.41
Grey Chromosol

MAP UNIT SYMBOL: **Tse1** Area:25 ha	MAP UNIT: **Tertiary alluvial sediments, gentle crest**



A. GENERAL DESCRIPTION

Isolated tertiary sedimentary crests are found overlying Ordovician sediments in the north of the District. Mining of the alluvial gravel deposits has left few undisturbed sites and remnant soils show little resemblance to the original soil. Undisturbed sites contain a bleached and mottled yellow duplex soil, often overlying cemented quartz gravels. Sheet erosion is common on disturbed sites. Site inspections are required when developing areas previously used for gravel extraction.

SITE CHARACTERISTICS

Parent Material Age: Tertiary	**Depth to Seas. Watertable:** > 0.8 m
Parent Material Lithology: Sedimentary	**Flooding Risk:** Nil
Landform Pattern: Rises	**Drainage:** Moderately well drained
Landform Element: Hillcrest	**Rock Outcrop:** Nil
Slope a) common: 3%	**Depth to Hard Rock:** > 0.8 m
Slope b) range: 3-7%	
Potential Recharge to Groundwater: Moderate	
Major Native Vegetation Species: Red Box, Grey Box	
Present Land Use: Grazing, gravel extraction, rural residential	
Length of Growing Season April - September	

LAND DEGRADATION

Degradation Processes	**Water Erosion sheet/rill gully**		**Wind Erosion**	**Mass Movement**	**Salting**	**Acidification**
Susceptibility	Moderate	Moderate	Low	Very low	Very low	Moderate
Incidence	Low	Low	Low	Nil	Nil	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A1	0-20 cm	Dark brown (7.5YR4/2) sandy loam, single grained sandy, very weak consistence, small, medium and large sedimentary and quartz pebbles of mixed shape are abundant, pH 6.5. Clear transition to:
A2	20-30 cm	Light yellowish brown (10YR6/4) light clay with coarse sand, many coarse prominent red mottles, weak subangular blocky structure, peds 5-10 mm, rough fabric, firm consistence, small, medium and large mixed sedimentary and quartz pebbles are abundant, pH 6.0. Clear transition to:
B22	45-65 cm	Light gray (10YR7/2) light medium clay, many coarse prominent red and pale mottles, strong platy structure, peds 2-5 mm, smooth fabric, weak consistence, many medium sized angular sedimentary and quartz pebbles, pH 6.0. Clear transition to:
B21	30-45 cm	Brownish yellow (10YR6/6) light medium clay, many medium prominent red mottles, strong platy structure, peds 2-5 mm, smooth fabric, weak consistence, many small angular sedimentary and quartz pebbles, pH 6.0. Clear transition to:
	65-80+ cm	Weathered sedimentary rock.

CLASSIFICATION

Factual Key:	Dy 3.41
Australian Soil Classification:	Mottled, Eutrophic, Grey Chromosol, medium, non gravely, loamy, clayey, moderate
Unified Soil Group:	ML

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH (H_2O)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A1	5.4	4.9	VL	L	D	S	T	H	L
A2	5.4	9.3	M	L	D	D	T	L	M
B21	5.8	11.1	L	L	D	S	T	L	VH
B22	8.0	9.5	M	M	D	S	S	VL	VH

VL: Very Low L: Low M: Moderate H: High VH: Very High D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Slow (average 30 mm/day, range 10-70 mm/day)

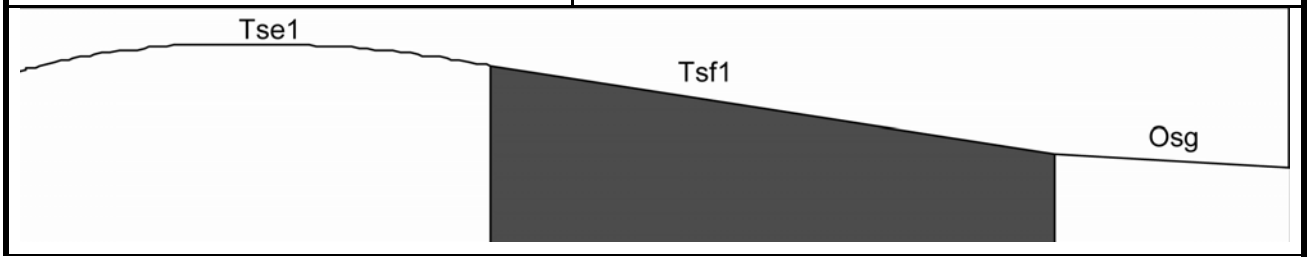
Available Water Capacity: Moderate (115 mm H_2O)

Linear Shrinkage (B horizon): Low (10%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	$C_3T_3S_4$	Depth to hard rock, condition of topsoil, gravel/stone/boulder content
Effluent Disposal (septic tanks)	4	Permeability
Farm Dams	5	Suitability of subsoil, depth to hard rock, dispersibility of subsoil
Building Foundations slab stumps/footings	3 3	Drainage Drainage
Secondary Roads	5	Dispersibility of subsoil

MAP UNIT SYMBOL: **Tsf1** Area:390 ha	MAP UNIT: **Tertiary alluvial sediments, gentle slope**



A. GENERAL DESCRIPTION

Isolated gentle slopes are found overlying Ordovician sediments in the north of the District. Mining of gravel deposits in this unit is less extensive than within the tertiary crests. Undisturbed sites are more common. Undisturbed sites contain a bleached and mottled yellow duplex soil, often overlying cemented quartz gravels. Sheet erosion is common on disturbed sites. Site inspections are required when developing areas previously used for gravel extraction.

SITE CHARACTERISTICS

Parent Material Age: Tertiary
Parent Material Lithology: Sedimentary
Landform Pattern: Rises
Landform Element: Hillcrest
Slope a) common: 5%
Slope b) range: 4-7%

Depth to Seas. Watertable: > 1.0 m
Flooding Risk: Nil
Drainage: Moderately well drained
Rock Outcrop: Nil
Depth to Hard Rock: > 0.8 m

Potential Recharge to Groundwater: Low
Major Native Vegetation Species: Red Box, Grey Box
Present Land Use: Grazing, gravel extraction, rural residential
Length of Growing Season April - September

LAND DEGRADATION

Degradation Processes	Water Erosion sheet/rill gully		Wind Erosion	Mass Movement	Salting	Acidification
Susceptibility	Moderate	Moderate	Low	Very low	Low	Moderate
Incidence	Low	Low	Low	Nil	Very low	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A1 0-20 cm Dark brown (7.5YR4/2) sandy loam, single grained sandy, very weak consistence, small, medium and large sedimentary and quartz pebbles of mixed shape are abundant, pH 6.5. Clear transition to:

A2 20-35 cm Light yellowish brown (10YR6/4) light clay with coarse sand, many coarse prominent red mottles, weak subangular blocky structure, peds 5-10 mm, rough fabric, firm consistence, small, medium and large mixed sedimentary and quartz pebbles are abundant, pH 6.0. Clear transition to:

B21 35-55 cm Brownish yellow (10YR6/6) light medium clay, many medium prominent red mottles, strong platy structure, peds 2-5 mm, smooth fabric, weak consistence, many small angular sedimentary and quartz pebbles, pH 6.0. Clear transition to:

B22 55-70 cm Light grey (10YR7/2) light medium clay, many coarse prominent red and pale mottles, strong platy structure, peds 2-5 mm, smooth fabric, weak consistence, many medium sized angular sedimentary and quartz pebbles, pH 6.0. Clear transition to:

70-90+ cm Weathered sedimentary rock.

CLASSIFICATION

Factual Key: Dy 3.41

Australian Soil Classification: Mottled, Eutrophic, Grey Chromosol, medium, non gravely, loamy, clayey, moderate

Unified Soil Group: ML

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH (H_2O)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A1	5.4	4.9	VL	L	D	S	T	H	L
A2	5.4	9.3	M	L	D	D	T	L	M
B21	5.8	11.1	L	L	D	S	T	L	VH
B22	8.0	9.5	M	M	D	S	S	VL	VH

VL: Very Low L: Low M: Moderate H: High VH: Very High D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Slow (average 30 mm/day, range 10-70 mm/day)

Available Water Capacity: Moderate (115 mm H_2O)

Linear Shrinkage (B horizon): Low (10%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	$C_3T_3S_4$	Depth to hard rock, condition of topsoil (A2), gravel/stone/boulder content
Effluent Disposal (septic tanks)	4	Permeability
Farm Dams	5	Suitability of subsoil, depth to hard rock, dispersibility of subsoil
Building Foundations slab stumps/footings	3 3	Slope, drainage, depth to seasonal watertable Drainage, depth to seasonal watertable
Secondary Roads	5	Dispersibility of subsoil

4.4 Devonian granitic map units

Devonian granodiorite has intruded into Ordovician sediments to form what is commonly referred to as the Harcourt Granite. The granodiorite extends from the southern side of the Big Hill Range near Bendigo, through to North Harcourt and Sutton Grange. The granitic terrain is diverse, with elevated undulating plateaus, very steep to gentle slopes, and broad drainage lines.

The granitic soils show variation where changes in the landscape occur. The granitic terrain is extremely prone to soil erosion and current land use has exacerbated this problem.

The undulating plateau contains rounded, occasionally rock free crests, gentle slopes and minor drainage lines. Soils present upon crests and upper slopes are commonly shallow uniform sands with a distinctive deep weathered horizon overlying hard rock. Occasional yellow duplex soils occur where soil depth increases. Minor drainage lines were not sampled due to limitations with the mapping scale.

At the edge of the plateau, rocky crests, steep and moderate rocky slopes also contain shallow uniform sands. On many steep slopes, erosion has removed the normally present shallow dark topsoil.

Below steep slopes, moderate to gentle colluvial slopes contain bleached and mottled yellow duplex soils. Rock outcrop is limited and soil depth may exceed one metre.

In broad drainage depressions, deep uniform loamy soils are present. Often these soils contain sand lenses at depth. Occasionally bleached, mottled yellow duplex soils may be found in elevated situations.

Sheet and gully erosion are serious problems in the granitic terrain due to sandy topsoils, steep slopes and poor vegetative cover. Mass movement is also active on very steep slopes.

Significant local and regional groundwater recharge occurs in the granitic terrain due to large areas of outcropping rock.

Salting also occurs in isolated drainage depressions where springs and dams result in restricted drainage and waterlogging.

Land use in the granitic terrain was previously restricted to grazing, however due to outstanding views and close proximity to Bendigo, the plateau areas are now popular for rural residential development.

Land management considerations

Strong development guidelines are required in the granitic areas to stop serious soil erosion problems associated with recent rural residential development. Steep slopes, shallow depth to hard rock, dispersible and impermeable subsoils, and significant sheet and gully erosion are important limitations in the granitic units.

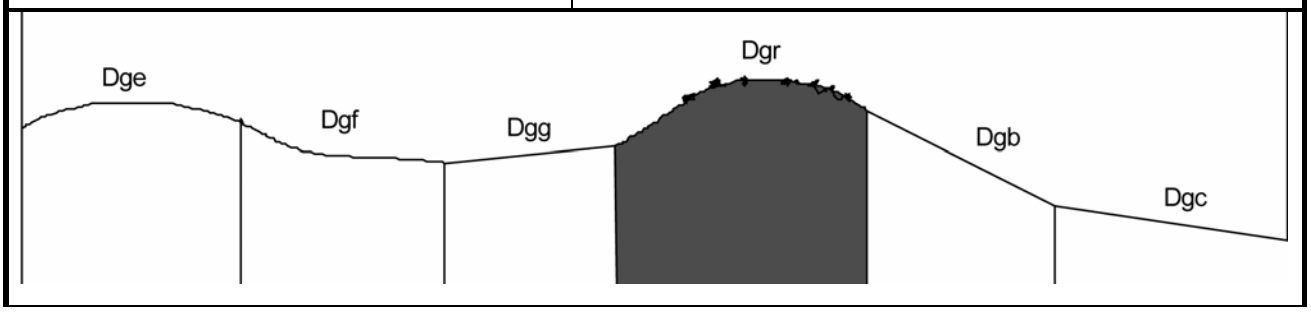
The shallow depth to hard rock, dispersible subsoils and steep slopes make siting of access roads extremely difficult. In most cases roads may require surfacing with bitumen, while table drains and culverts will need regular maintenance.

Allotment size and siting of houses will also require careful consideration due to shallow depth of rock and difficulties with effluent disposal. Soil conservation measures during and following site construction will be required to minimise erosion.
.

Frequent dam failure occurs in the granite units due to the dispersive nature of the subsoil and erosion of dam banks. Difficulty in locating dam sites may also occur in areas with shallow depth to hard rock.

Improved management of steep slopes and drought prone crests are required to ensure minimal land degradation in grazing areas.

MAP UNIT SYMBOL: **Dgr** Area:255 ha	MAP UNIT: **Devonian granodiorite, rocky crest**



A. GENERAL DESCRIPTION

The rocky granodiorite areas occur in a variety of locations extending from steep crests and slopes to gentle crests. Soils are uniform coarse sands and are shallow in depth. Surface boulder and stone comprise greater than 50% of the unit. Occasionally yellow duplex soils are found where deeper soil profiles occur.

SITE CHARACTERISTICS

Parent Material Age: Devonian	**Depth to Seas. Watertable:** > 1.5 m
Parent Material Lithology: Granodiorite	**Flooding Risk:** Nil
Landform Pattern: Plateau/low hills	**Drainage:** Rapidly drained
Landform Element: Hillcrest	**Rock Outcrop:** > 50%
Slope a) common: 15%	**Depth to Hard Rock:** < 0.5 m
Slope b) range: 5-60%	

Potential Recharge to Groundwater: Very high
Major Native Vegetation Species: Grey Box
Present Land Use: Grazing, rural residential
Length of Growing Season April-September

LAND DEGRADATION

Degradation Processes	**Water Erosion sheet/rill gully**		**Wind Erosion**	**Mass Movement**	**Salting**	**Acidification**
Susceptibility	Moderate	Low	High	Very low	Very low	High
Incidence	Low	Very low	Low	Nil	Nil	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A11 0-15 cm Dark brown (7.5YR 3/2) coarse sandy loam, weak subangular blocky structure, peds 10-20 mm, rough fabric, weak consistence, many small subrounded granitic pebbles, pH 5.0. Clear transition to:

A12 15-50 cm Dark brown (7.5YR4/4) coarse sandy loam, weak subangular blocky structure, peds 10-20 mm, rough fabric, weak consistence, many small subrounded granitic pebbles, pH 5.5. Abrupt transition to**:**

50-140+ cm Weathered granodiorite.

CLASSIFICATION

Factual Key:	Uc 1.12 (major) Dy 2.11 (minor)
Australian Soil Classification:	Arenic, Rudosol, non gravely, loamy, shallow
Unified Soil Group:	SM/SC

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	**pH ($CaCl_2$)**	**% Gravel**	**EC (salts)**	**Nutrient Status**	**P**	**K**	**Al**	**Organic Matter**	**Dispersibility**
A11	5.0	20	VL	L	S	S	S	H	VL
A12	4.2	42	VL	VL	D	S	T	M	L

VL: Very low L: Low M: Moderate H: High VH: Very high D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Very rapid (average 2300 mm/day, range 1600-3700 mm/day)

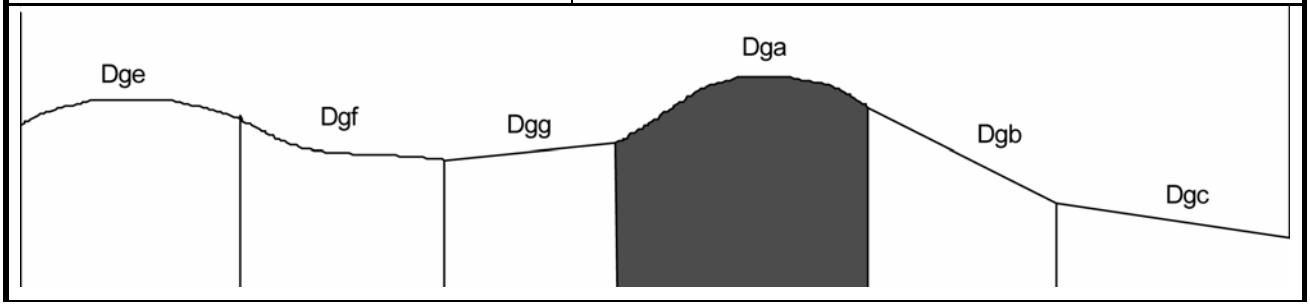
Available Water Capacity: Low (51mm H_2O)

Linear Shrinkage (B horizon): Very low (4%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	$C_3T_5S_5$	Slope, depth to hard rock, gravel/stone/boulder content
Effluent Disposal (septic tanks)	5	Slope, depth to hard rock/impermeable layer
Farm Dams	5	Slope, suitability of subsoil, depth to hard rock, permeability
Building Foundations slab stumps/footings	5 5	Slope, gravel/stone/boulder content, depth to hard rock Slope, gravel/stone/boulder content, depth to hard rock
Secondary Roads	5	Slope, gravel/stone/boulder content, depth to hard rock

MAP UNIT SYMBOL: **Dga** Area:134 ha	MAP UNIT: **Devonian granodiorite, steep crest**



A. GENERAL DESCRIPTION

The steep crests appear on the edge of the granodiorite plateau and lead into very steep slopes. Soils are similar to the rocky outcrops with uniform coarse sands present. Soil depth reaches 0.5 m with a substantial zone of weathered rock. Yellow duplex soils are present where soil depth increases.

This unit is drought prone and severe sheet and rill erosion occurs where vegetation cover is lost. Improved management of these crests is required to limit soil erosion.

SITE CHARACTERISTICS

Parent Material Age: Devonian **Parent Material Lithology:** Granodiorite **Landform Pattern:** Plateau/low hills **Landform Element:** Hillcrest **Slope a) common:** 15% **Slope b) range:** 3-25%	**Depth to Seas. Watertable:** > 1.5 m **Flooding Risk:** Nil **Drainage:** Rapidly drained **Rock Outcrop:** < 50% **Depth to Hard Rock:** 0.5-1.0 m
Potential Recharge to Groundwater: Very high **Major Native Vegetation Species:** Grey Box **Present Land Use:** Grazing, rural residential **Length of Growing Season** April - September	

LAND DEGRADATION

Degradation Processes	**Water Erosion sheet/rill gully**		**Wind Erosion**	**Mass Movement**	**Salting**	**Acidification**
Susceptibility	High	High	High	Moderate	Very low	High
Incidence	High	Very low	Moderate	Very low	Nil	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A11 0-15 cm Dark brown (7.5YR 3/2) coarse sandy loam, weak subangular blocky structure, peds 10-20 mm, rough fabric, weak consistence, many small subrounded granitic pebbles, pH 5.0. Clear transition to:

A12 15-50 cm Dark brown (7.5YR4/4) coarse sandy loam, weak subangular blocky structure, peds 10-20 mm, rough fabric, weak consistence, many small subrounded granitic pebbles, pH 5.5. Abrupt transition to:

50-140+ cm Weathered granodiorite

CLASSIFICATION

Factual Key: Uc 1.12 (major) Dy 2.11 (minor)

Australian Soil Classification: Arenic, Rudosol, non gravely, loamy, shallow

Unified Soil Group: SM/SC

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A11	5.0	20	VL	L	S	S	S	H	VL
A12	4.2	42	VL	VL	D	S	T	M	L

VL: Very low L: Low M: Moderate H: High VH: Very high D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Very rapid (average 2300 mm/day, range 1600-3700 mm/day)

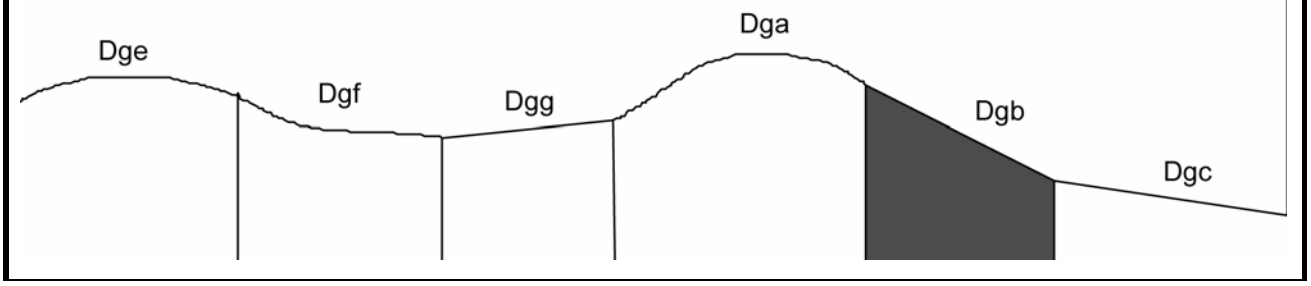
Available Water Capacity: Low (51 mm H_2O)

Linear Shrinkage (B horizon): Very low (4%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	C3T5S5	Slope, depth to hard rock/pan
Effluent Disposal (septic tanks)	5	Slope
Farm Dams	5	Slope, suitability of subsoil, depth to hard rock, permeability
Building Foundations slab stumps/footings	 5 5	 Slope Slope
Secondary Roads	5	Slope

MAP UNIT SYMBOL: **Dgb** Area:333 ha	MAP UNIT: **Devonian granodiorite, steep slope**



A. GENERAL DESCRIPTION

Very steep slopes are present on the edge of the granodiorite plateaus. Slopes may often exceed 50% and have shallow uniform coarse sandy soils. In many cases the shallow dark sandy loam topsoil may have been lost through sheet erosion. In deeper soil profiles yellow duplex soils may be found.

This unit is highly susceptible to sheet, rill and gully erosion, while slumping is also present. A Very high level of management is required to stop severe land degradation from occurring.

SITE CHARACTERISTICS

Parent Material Age: Devonian **Parent Material Lithology:** Granodiorite **Landform Pattern:** Low hills **Landform Element:** Hillslope **Slope a) common:** 38% **Slope b) range:** >33%	**Depth to Seas. Watertable:** > 1.5 m **Flooding Risk:** Nil **Drainage:** Rapidly drained **Rock Outcrop:** < 50% **Depth to Hard Rock:** 0.5-1.0 m
Potential Recharge to Groundwater: Very high **Major Native Vegetation Species:** Grey Box **Present Land Use:** Grazing **Length of Growing Season** April - September	

LAND DEGRADATION

Degradation Processes	**Water Erosion sheet/rill gully**		**Wind Erosion**	**Mass Movement**	**Salting**	**Acidification**
Susceptibility	High	High	High	Moderate	Very low	High
Incidence	High	Moderate	Moderate	Low	Nil	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A11 0-15 cm Dark brown (7.5YR 3/2) coarse sandy loam, weak subangular blocky structure, peds 10-20 mm, rough fabric, weak consistence, many small subrounded granitic pebbles, pH 5.0. Clear transition to:

A12 15-50 cm Dark brown (7.5YR4/4) coarse sandy loam, weak subangular blocky structure, peds 10-20 mm, rough fabric, weak consistence, many small subrounded granitic pebbles, pH 5.5. Abrupt transition to:

50-140+ cm Weathered granodiorite.

CLASSIFICATION

Factual Key: Uc 1.12 (major) Dy 2.11 (minor)

Australian Soil Classification: Arenic, Rudosol, non gravely, loamy, shallow

Unified Soil Group: SM/sc

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A11	5.0	20	VL	L	S	S	S	H	VL
A12	4.2	42	VL	VL	D	S	T	M	L

VL: Very low L: Low M: Moderate H: High VH: Very high D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Very rapid (average 2300 mm/day, range 1600-3700 mm/day)

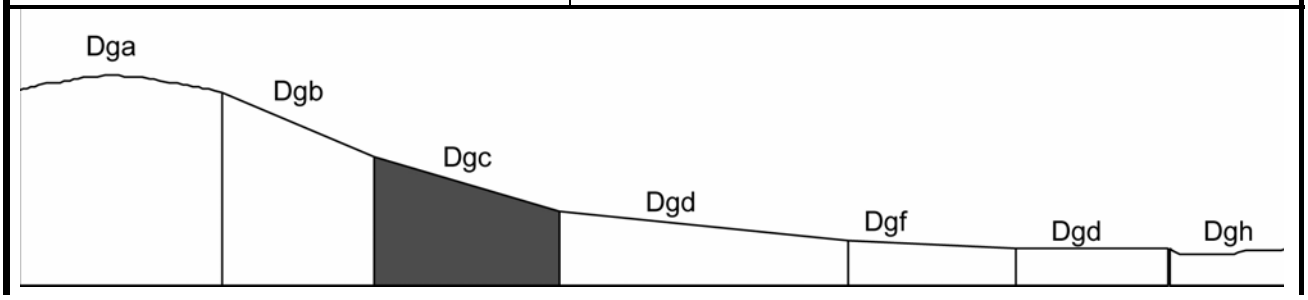
Available Water Capacity: Low (51 mm H_2O)

Linear Shrinkage (B horizon): Very low (4%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	$C_3T_5S_5$	Slope, depth to hard rock
Effluent Disposal (septic tanks)	5	Slope
Farm Dams	5	Slope, suitability of subsoil, depth to hard rock, permeability
Building Foundations slab stumps/footings	5 5	Slope Slope
Secondary Roads	5	Slope

MAP UNIT SYMBOL: **Dgc** Area:369 ha	MAP UNIT: **Devonian granodiorite, moderately steep slope**



A GENERAL DESCRIPTION

These moderately steep slopes have similar shallow uniform coarse sandy soils similar to those of the steep and rocky granitic units. The moderately steep slopes show a more developed and deeper A horizon, while yellow duplex soils become more common closer to the break of slope.

Severe sheet and gully erosion occurs.

SITE CHARACTERISTICS

Parent Material Age: Devonian	**Depth to Seas. Watertable:** > 1.5 m
Parent Material Lithology: Granodiorite	**Flooding Risk:** Nil
Landform Pattern: Low hills	Rapidly drained
Drainage: Landform Element: Hillslope	**Rock Outcrop:** < 50%
Slope a) common: 25%	**Depth to Hard Rock:** 0.5-1.0 m
Slope b) range: 21-32%	

Potential Recharge to Groundwater: Very high
Major Native Vegetation Species: Grey Box
Present Land Use: Grazing, rural residential
Length of Growing Season April - September

LAND DEGRADATION

Degradation Processes	**Water Erosion sheet/rill gully**		**Wind Erosion**	**Mass Movement**	**Salting**	**Acidification**
Susceptibility	Moderate	Moderate	High	Moderate	Very low	High
Incidence	Moderate	Moderate	Moderate	Low	Nil	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A11	0-15 cm	Dark brown (7.5YR 3/2) coarse sandy loam, weak subangular blocky structure, peds 10-20 mm, rough fabric, weak consistence, many small subrounded granitic pebbles, pH 5.0. Clear transition to:
A12	15-50 cm	Dark brown (7.5YR4/4) coarse sandy loam, weak subangular blocky structure, peds 10-20 mm, rough fabric, weak consistence, many small subrounded granitic pebbles, pH 5.5. Abrupt transition to:
	50-140+ cm	Weathered granodiorite.

CLASSIFICATION

Factual Key: Uc 1.12 (major) Dy 2.11 (minor)

Australian Soil Classification: Arenic, Rudosol, non gravely, loamy, shallow

Unified Soil Group: SM/SC

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A11	5.0	20	VL	L	S	S	S	H	VL
A12	4.2	42	VL	VL	D	S	T	M	L

VL: Very low L: Low M: Moderate H: High VH: Very high D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Very rapid (average 2300 mm/day range 1600-3700 mm/day)

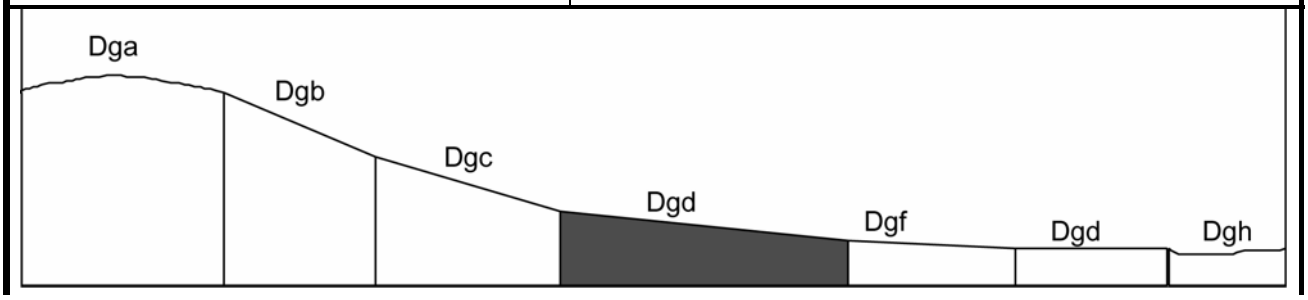
Available Water Capacity: Low (51 mm H_2O)

Linear Shrinkage (B horizon): Very low (4%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	$C_3T_4S_5$	Depth to hard rock
Effluent Disposal (septic tanks)	4	Slope, depth to hard rock/impermeable layer
Farm Dams	5	Slope, suitability of subsoil, depth to hard rock, permeability
Building Foundations slab stumps/footings	4 3	Slope Slope, depth to hard rock, susceptibility to slope failure, gravel/stone/boulder content
Secondary Roads	4	Slope

MAP UNIT SYMBOL: **Dgd** Area:1794 ha	MAP UNIT: **Devonian granodiorite, moderate slope**



A. GENERAL DESCRIPTION

These moderate slopes usually mark the change from steep slopes to gentle slopes and colluvial wash is present. Soils are significantly changed from those upslope. A bleached and mottled yellow duplex soil with a heavy clay subsoil is common. Soil depth increases to 1.0 m while weathered rock continues below the B horizon. Springs often occur in this area.

This unit is subject to sheet and gully erosion, minor salting occurs below springs.

SITE CHARACTERISTICS

Parent Material Age: Devonian	**Depth to Seas. Watertable:** 0.5 m
Parent Material Lithology: Granodiorite	**Flooding Risk:** Nil
Landform Pattern: Low hills	**Drainage:** Imperfectly drained
Landform Element: Footslope	**Rock Outcrop:** 5-20%
Slope a) common: 12%	**Depth to Hard Rock:** > 1.5 m
Slope b) range: 11-21%	

Potential Recharge to Groundwater: High
Major Native Vegetation Species: Grey Box, River Red Gum, Yellow Box
Present Land Use: Grazing, rural residential
Length of Growing Season April - September

LAND DEGRADATION

Degradation Processes	**Water Erosion sheet/rill gully**		**Wind Erosion**	**Mass Movement**	**Salting**	**Acidification**
Susceptibility	High	Moderate	Very low	Moderate	Very low	Moderate
Incidence	Moderate	Low	Low	Low	Very low	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A1 0-15 cm Very dark greyish brown (10YR3/2) clay loam, moderate subangular blocky structure, peds 20-50 mm, rough fabric, firm consistence, small subrounded granitic and quartz pebbles are common, pH 6.0. Clear transition to:

A2 15-65 cm Yellowish brown (10YR5/4) sandy clay loam, massive structure, firm consistence, many small subrounded granitic and quartz pebbles, pH 6.5. Gradual transition to:

B2 65-100 cm Brown (10YR5/3) heavy clay, many coarse prominent red orange and yellow mottles, weak subangular blocky structure, peds 20-50 mm, rough fabric, firm consistence, pH 6.0.

BC 100+ cm Weathered granodiorite, heavy clay.

CLASSIFICATION

Factual Key: Dy 3.41 (major), Dy 2.11 (minor)

Australian Soil Classification: Mesotrophic, Mottled Mesotrophic, Brown Sodosol, thick, non gravely, loamy, clayey, moderate

Unified Soil Group: CH

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A1	4.7	13	VL	L	D	D	S	H	VL
A2	5.2	40	VL	VL	D	D	S	VL	L
B2	4.5	53	VL	L	D	D	S	VL	H

VL: Very low L: Low M: Moderate H: High VH: Very high D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Moderate (average 230 mm/day, range 150-350 mm/day)

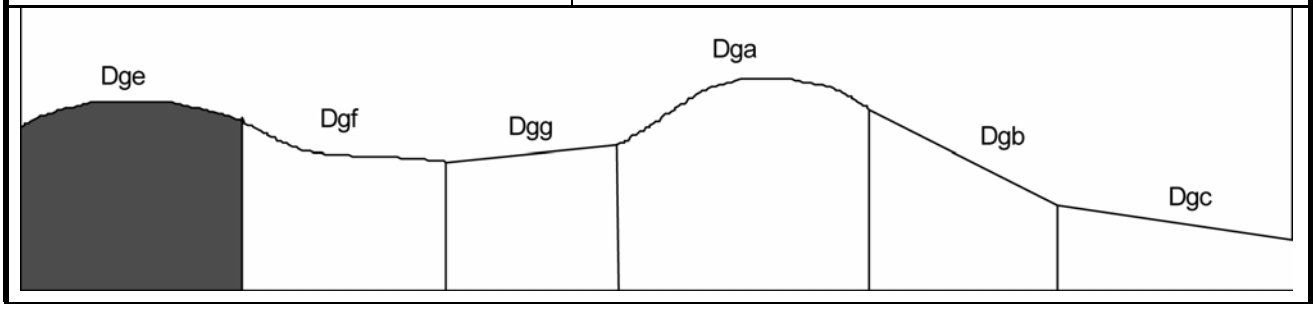
Available Water Capacity: High (154 mm H_2O)

Linear Shrinkage (B horizon): Moderate (14%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	$C_3T_4S_5$	Depth to seasonal watertable
Effluent Disposal (septic tanks)	4	Drainage, depth to seasonal watertable
Farm Dams	5	Depth to seasonal watertable
Building **Foundations slab** **stumps/footings**	 4 4	 Slope, drainage, depth to seasonal watertable Drainage, depth to seasonal watertable
Secondary Roads	4	Slope, drainage, depth to seasonal watertable

MAP UNIT SYMBOL: **Dge** Area:273 ha	MAP UNIT: **Devonian granodiorite, gentle crest**



A. GENERAL DESCRIPTION

The rounded gentle crests have similar soils to the steep crests (Dga). Gentle crests occur on the plateaus and lower undulating terrain. Soils are uniform coarse sands with minor yellow duplex soils present on lower slopes.

SITE CHARACTERISTICS

Parent Material Age: Devonian	**Depth to Seas. Watertable:** > 1.5 m
Parent Material Lithology: Granodiorite	**Flooding Risk:** Nil
Landform Pattern: Plateau/low hills	**Drainage:** Rapidly drained
Landform Element: Hillcrest	**Rock Outcrop:** < 50%
Slope a) common: 6%	**Depth to Hard Rock:** 0.5-1.0 m
Slope b) range: 4-10%	

Potential Recharge to Groundwater: Very high
Major Native Vegetation Species: Grey Box
Present Land Use: Grazing, rural residential
Length of Growing Season April - September

LAND DEGRADATION

Degradation Processes	**Water Erosion sheet/rill gully**		**Wind Erosion**	**Mass Movement**	**Salting**	**Acidification**
Susceptibility	Moderate	Moderate	High	Very low	Very low	High
Incidence	Low	Very low	Moderate	Nil	Nil	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A11 0-15 cm — Dark brown (7.5YR 3/2) coarse sandy loam, weak subangular blocky structure, peds 10-20 mm, rough fabric, weak consistence, many small subrounded granitic pebbles, pH 5.0. Clear transition to:

A12 15-50 cm — Dark brown (7.5YR4/4) coarse sandy loam, weak subangular blocky structure, peds 10-20 mm, rough fabric, weak consistence, many small subrounded granitic pebbles, pH 5.5. Abrupt transition to:

50-140+ cm — Weathered granodiorite.

CLASSIFICATION

Factual Key:	Uc 1.21 (major), Dy 2.11 (minor)
Australian Soil Classification:	Arenic, Rudosol, non gravely, loamy, shallow
Unified Soil Group:	SM/SG

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A11	5.0	20	VL	L	S	S	S	H	VL
A12	4.2	42	VL	VL	D	S	T	M	L

VL: Very low L: Low M: Moderate H: High VH: Very high D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Very rapid (average 2300 mm/day range 1600-3700 mm/day)

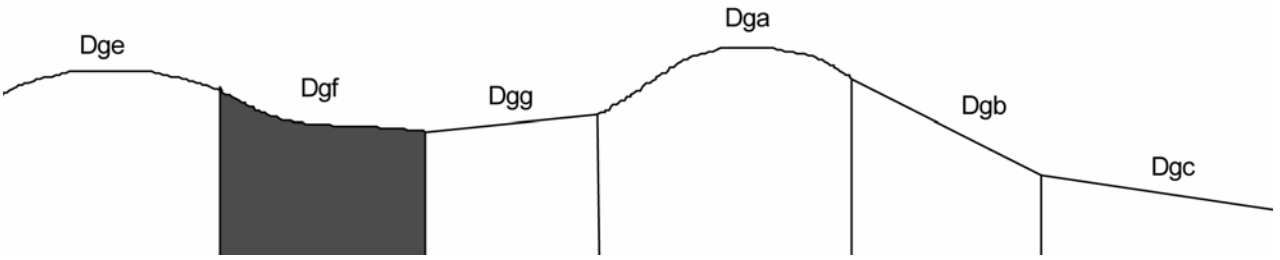
Available Water Capacity: Low (51 mm H_2O)

Linear Shrinkage (B horizon): Very low (4%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	$C_3T_3S_5$	Depth to hard rock/pan
Effluent Disposal (septic tanks)	4	Depth to hard rock/impermeable layer
Farm Dams	5	Suitability of subsoil, depth to hard rock, permeability
Building **Foundations slab** **stumps/footings**	 3 3	 Slope, depth to hard rock, gravel/stone/boulder content Depth to hard rock, gravel/stone/boulder content
Secondary Roads	3	Slope, depth to hard rock, gravel/stone/boulder content

MAP UNIT SYMBOL: **Dgf** Area:1523 ha	MAP UNIT: **Devonian granodiorite, gentle slope**



A. GENERAL DESCRIPTION

The gentle granodiorite slopes are found on the elevated plateaus and undulating hills. These slopes may contain colluvial wash where they adjoin steep slopes. Soils are commonly bleached and mottled yellow duplex soils, the depth of the bleached horizon may vary considerably. In higher situations bleached horizons may be absent.

Waterlogging of the bleached horizon is common. Springs also occur and may be associated with minor salting. The presence of tussock grass can indicate the presence of waterlogging or a spring.

SITE CHARACTERISTICS

Parent Material Age: Devonian	**Depth to Seas. Watertable:** 0.5 m
Parent Material Lithology: Granodiorite	**Flooding Risk:** Nil
Landform Pattern: Low hills	**Drainage:** Imperfectly drained
Landform Element: Footslope	**Rock Outcrop:** 0-10%
Slope a) common: 6%	**Depth to Hard Rock:** > 1.5 m
Slope b) range: 4-10%	

Potential Recharge to Groundwater: Moderate
Major Native Vegetation Species: Grey Box, Yellow Box, River Red Gum
Present Land Use: Grazing, rural residential
Length of Growing Season April - September

LAND DEGRADATION

Degradation Processes	**Water Erosion sheet/rill gully**		**Wind Erosion**	**Mass Movement**	**Salting**	**Acidification**
Susceptibility	Moderate	Moderate	Very low	Very low	Very low	Moderate
Incidence	Moderate	Low	Low	Very low	Very low	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A1 0-20 cm — Very dark greyish brown (10YR3/2) clay loam, moderate subangular blocky structure, peds 20-50 mm, rough fabric, firm consistence, small subrounded granitic and quartz pebbles are common, pH 6.0. Clear transition to:

A2 20-65 cm — Yellowish brown (10YR5/4) sandy clay loam, massive structure, firm consistence, many small subrounded granitic and quartz pebbles, pH 6.5. Gradual transition to:

B2 65-100 cm — Brown (10YR5/3) heavy clay, many coarse prominent red orange and yellow mottles, weak subangular blocky structure, peds 20-50 mm, rough fabric, firm consistence, pH 6.0.

BC 100+ cm — Weathered granodiorite, heavy clay.

CLASSIFICATION

Factual Key:	Dy 3.41
Australian Soil Classification:	Mesotrophic, Mottled Mesonatric, Brown Sodosol, thick, non gravely, loamy, clayey, moderate
Unified Soil Group:	CH

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A1	4.7	13	VL	L	D	D	S	H	VL
A2	5.2	40	VL	VL	D	D	S	VL	L
B2	4.5	53	VL	L	D	D	S	VL	H

VL: Very low L: Low M: Moderate H: High VH: Very high D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Moderate (average 230 mm/day, range 150-350 mm/day)

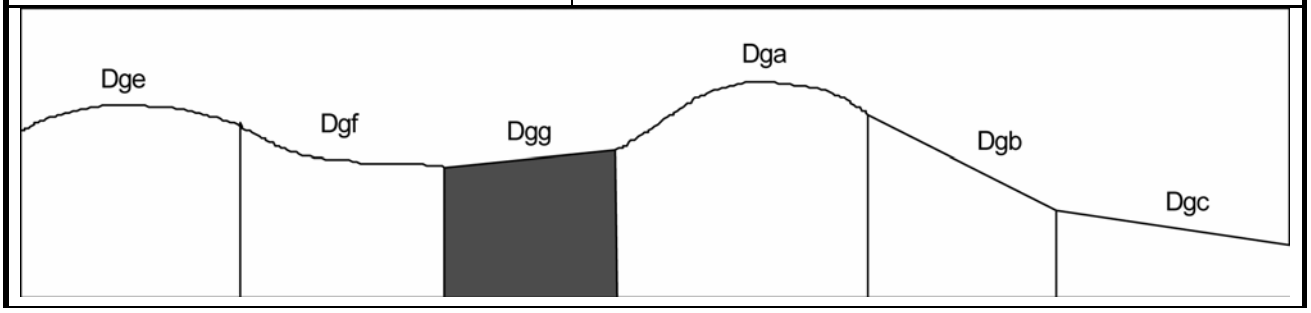
Available Water Capacity: High (154 mm H_2O)

Linear Shrinkage (B horizon): Moderate (14%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	$C_3T_3S_5$	Depth to seasonal watertable
Effluent Disposal (septic tanks)	4	Drainage, depth to seasonal watertable
Farm Dams	5	Depth to seasonal watertable
Building Foundations slab stumps/footings	4 4	Depth to seasonal watertable, drainage Depth to seasonal watertable, drainage
Secondary Roads	4	Depth to seasonal watertable, drainage

MAP UNIT SYMBOL: **Dgg** Area:12 ha	MAP UNIT: **Devonian granodiorite, very gentle slope**



A. GENERAL DESCRIPTION

Very gentle granodiorite slopes are rare in the district. In some instances, very gentle slopes may be mapped as part of gentle slopes or broad drainage depressions. Soils are bleached and mottled yellow duplex soils. Soil depth may reach 1.5 m.

Waterlogging occurs in winter months and the soils are prone to gully erosion.

SITE CHARACTERISTICS

Parent Material Age: Devonian	**Depth to Seas. Watertable:** 0.5 m
Parent Material Lithology: Granodiorite	**Flooding Risk:** Nil
Landform Pattern: Low hills	**Drainage:** Imperfectly drained
Landform Element: Footslope	**Rock Outcrop:** 0-10%
Slope a) common: 3%	**Depth to Hard Rock:** > 1.5 m
Slope b) range: 1-3%	

Potential Recharge to Groundwater: Moderate
Major Native Vegetation Species: Grey Box, Yellow Box, River Red Gum
Present Land Use: Grazing
Length of Growing Season April - September

LAND DEGRADATION

Degradation Processes	Water Erosion sheet/rill gully		Wind Erosion	Mass Movement	Salting	Acidification
Susceptibility	Moderate	Moderate	Very low	Very low	Very low	Moderate
Incidence	Low	Low	Low	Very low	Very low	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A1	0-20 cm	Very dark greyish brown (10YR3/2) clay loam, moderate subangular blocky structure, peds 20-50 mm, rough fabric, firm consistence, small subrounded granitic and quartz pebbles are common, pH 6.0. Clear transition to:
A2	20-70 cm	Yellowish brown (10YR5/4) sandy clay loam, massive structure, firm consistence, many small subrounded granitic and quartz pebbles, pH 6.5. Gradual transition to:
B2	70-110 cm	Brown (10YR5/3) heavy clay, many coarse prominent red orange and yellow mottles, weak subangular blocky structure, peds 20-50 mm, rough fabric, firm consistence, pH 6.0.
BC	110+ cm	Weathered granodiorite, heavy clay.

CLASSIFICATION

Factual Key:	Dy 3.41
Australian Soil Classification:	Mesotrophic, Mottled Mesonatric, Brown Sodosol, thick, non gravely, loamy, clayey, moderate
Unified Soil Group:	CH

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A1	4.7	13	VL	L	D	D	S	H	VL
A2	5.2	40	VL	VL	D	D	S	VL	L
B2	4.5	53	VL	L	D	D	S	VL	H

VL: Very low L: Low M: Moderate H: High VH: Very high D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Moderate (average 230 mm/day, range 150-350 mm/day)

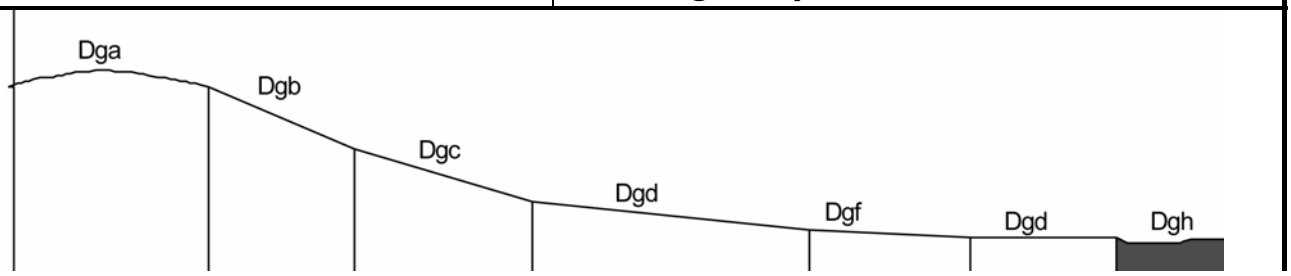
Available Water Capacity: High (154 mm H_2O)

Linear Shrinkage (B horizon): Moderate (14%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	$C_3T_2S_5$	Depth to seasonal watertable
Effluent Disposal (septic tanks)	4	Drainage, depth to seasonal watertable
Farm Dams	5	Depth to seasonal watertable
Building Foundations slab stumps/footings	4 4	Drainage, depth to seasonal watertable Drainage, depth to seasonal watertable
Secondary Roads	4	Drainage, depth to seasonal watertable

MAP UNIT SYMBOL: **Dgh** Area:413 ha	MAP UNIT: **Devonian granodiorite, drainage depression**



A. GENERAL DESCRIPTION

Drainage depressions vary from broad open drainage depressions on the plateau, to narrow drainage corridors that connect major drainage lines and incipient floodplains at low elevations. A uniform clay loam is common in the lower more defined drainage lines. Variants occur higher in the landscape and include dark duplex soils. In both the above soils, a buried, uniform course sandy soil may be found at depth.

These soils may be prone to waterlogging in winter months, especially in drainage depressions upon the plateau where the occurrence of tussock grass indicates the presence of springs.

SITE CHARACTERISTICS

Parent Material Age: Devonian	**Depth to Seas. Watertable:** > 1.7 m
Parent Material Lithology: Granodiorite	**Flooding Risk:** Moderate
Landform Pattern: Plateau/low hills	**Drainage:** Moderately well drained
Landform Element: Valley flat	**Rock Outcrop:** Nil
Slope a) common: 3%	**Depth to Hard Rock:** > 1.7 m
Slope b) range: 1-35%	

Potential Recharge to Groundwater: Moderate
Major Native Vegetation Species: Grey Box, Yellow Box, River Red Gum
Present Land Use: Grazing
Length of Growing Season April - September

LAND DEGRADATION

Degradation	Water Erosion		Wind Erosion	Mass	Salting	Acidification
Processes	**sheet/rill**	**gully**		**Movement**		
Susceptibility	Moderate	High	Moderate	Low	Very low	Low
Incidence	Very low	Low	Very low	Low	Very low	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A1	0-10 cm	Very dark greyish brown (10YR3/2) loam, moderate subangular blocky structure, peds 10-20 mm, rough fabric, firm consistence, few small subrounded quartz gravel pebbles , pH 6.0. Clear transition to:
B1	10-30 cm	Dark brown (10YR3/3) clay loam, massive structure, sandy fabric, very firm consistence, few medium subrounded quartz gravel pebbles, pH 6.0. Clear transition to:
B21	30-40 cm	Dark yellowish brown (10YR4/4) clay loam, massive structure, sandy fabric, very firm consistence, many small rounded quartz gravel pebbles, pH7.0. Clear transition to:
B22	40-70 cm	Dark brown (7.5YR4/4) clay loam, massive structure, sandy fabric, very firm consistence, many small subangular granitic and quartz pebbles, pH6.0. Gradual transition to:
2A1b	70-115 cm	Brown (7.5YR5/4) sandy clay loam, massive structure, sandy fabric, firm consistence, many small rounded granitic and quartz pebbles, pH 6.0. Gradual transition to:
2B2b	115-170+ cm	Brown (7.5YR5/4) sandy clay loam, weak subangular blocky structure, peds 20-50 mm, rough fabric, firm consistence, abundant small subangular granitic and quartz pebbles, pH6.0.

CLASSIFICATION

Factual Key:	Um 5.22(major), Dy 3.41 (minor)
Australian Soil Classification:	Arenic, Stratic, Rudosol, non gravely, clay loamy, very deep
Unified Soil Group:	SM/SC

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A1	5.0	1	VL	L	D	S	S	H	VL
B1	5.0	4	VL	L	D	D	S	M	VL
B21	5.0	35	VL	VL	D	D	S	L	L

VL: Very low L: Low M: Moderate H: High VH: Very high D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Rapid (average 540 mm/day, range 400-800 mm/day)

Available Water Capacity: Very high (291 mm H_2O)

Linear Shrinkage (B horizon): Very low (5%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	$C_3T_2S_4$	Susceptibility to gully erosion
Effluent Disposal (septic tanks)	3	Drainage, flooding risk, depth to seasonal watertable
Farm Dams	4	Permeability
Building Foundations slab stumps/footings	3 3	Drainage, depth to seasonal watertable, flooding risk Drainage, depth to seasonal watertable, flooding risk
Secondary Roads	3	Drainage, depth to seasonal watertable, flooding risk

4.5 Ordovician sedimentary map units

Ordovician sediments containing mudstone, siltstone and sandstone are present throughout the district of Strathfieldsaye. In the south, adjacent to the metamorphic aureole, Ordovician sediments are tightly folded, faulted and uplifted. Ordovician sediments may display various levels of metamorphism, especially the steep crests and slopes delineating the aureole from the granodiorite terrain. Away from the aureole, narrow, often rocky crests and highly dissected steep slopes become less common and give way to low, undulating hills with gentle crests and broad drainage depressions.

Soils vary considerably due to marked changes in land use, topography and climate.

Much of the Ordovician landscape is currently reserved as State Forest. However significant harvesting of timber and clearing of woodland for grazing, dairying and cropping has taken place since early European settlement. Loss of vegetation cover, combined with periods of high grazing and cultivation pressure have modified the soils present. In many cases, erosion has removed much or all of the original topsoil, while cultivation has resulted in mixing of topsoils and subsoils. Many soil types present are considered to be modified soils and are likely to differ from undisturbed soils in their natural state.

Soils depth varies markedly in the south due to the steep terrain and tightly folded and faulted sediments. It is a common occurrence to find shallow soils of 20 cm or less, immediately adjacent to soils approaching a depth of 1.2 m. Therefore it is important to note the minor soil types listed for steep Ordovician map units. These map units also include the more erosion resistant metamorphosed sediments of the aureole which produce similar landform and soil types. In general, shallow and stony uniform clay loams are common where rocky crests and steep rocky slopes occur. Weak stony gradational soils and yellow duplex soils predominate where soil depth increases, especially when moderate slopes are encountered. Occasionally red duplex and red gradational soils occur in areas of good drainage. Surface stone is common on all crests and steep to moderate slopes.

Soils of the low, undulating hills show less variation and soil depth regularly exceeds 1.5 m in drainage lines. Soils present on gentle crests are mostly yellow duplex with uniform or gradational soils present where soils are shallow or rock outcrops. Bleached, mottled yellow duplex soils dominate the gentle slopes and broad drainage depressions of the low, undulating hills. The presence of significant surface stone is restricted to isolated rocky crests and areas of remnant vegetation.

The steeper terrain to the south receives annual rainfall approaching 700 mm per year, approximately 200 mm greater than the low, undulating hills north of the McIvor Highway. In areas of lower rainfall, mottled red duplex soils become common due to the changed rainfall and drainage pattern.

Various land degradation problems exist within the Ordovician landscape. In the steeper terrain, sheet erosion and gully erosion are common where vegetation cover is sparse. The presence of highly fractured rock outcrop and shallow stony soils also contributes to local and regional groundwater recharge. The sodic subsoils present in the low, undulating terrain have contributed to significant gully erosion. Waterlogging and salting are common along drainage lines and below leaking dams. In these situations, Spiny Rush is a good indicator of waterlogging and possibly salinity.

Land management considerations

The steep Ordovician terrain, including the metamorphic aureole, has obvious hazards for all proposed land uses. The major limitations are steep slopes, depth to hard rock and shallow soil depth. The steep terrain is highly susceptible to sheet and gully erosion, especially where vegetation cover is poor.

The siting of access tracks, building foundations, septic tanks and dams is made extremely difficult by steep slopes, depth to rock and shallow soils. Soil conservation measures will be required to minimise erosion during house construction.

Improved management of steep slopes and drought prone crests are required to ensure minimal land degradation occurs in grazing areas.

The low undulating hills are more suited to a range of land uses. The major concerns include subsoil permeability and dispersibility. Shallow depth to hard rock may be a problem on gentle crests.

With rural residential development rapidly increasing in these areas, careful design of effluent disposal fields, farm dams and secondary roading is required. Alternative effluent disposal systems may need to be investigated. Consideration must also be given to dam construction and the impact upon environmental streamflows.

Soil conditions do not favour cropping on these map units, however limited cropping may be possible with improved land management. Limitations on grazing are less severe and can be overcome with appropriate stocking rates and correct conservation practices of summer pasture.

SOILS OF ORDOVICIAN SEDIMENTARY ORIGIN

Plate 10 Map Units: Osa, Osb, Osc, Osd, Ose
PPF: Dy2.11
Brown Kurosol

Plate 11 Map Units: Osf, Osg
PPF: Dy3.42
Yellow Sodosol

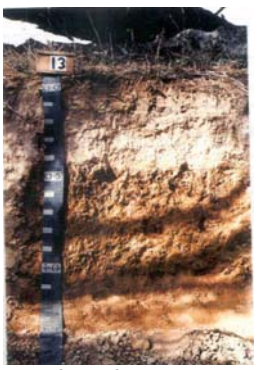
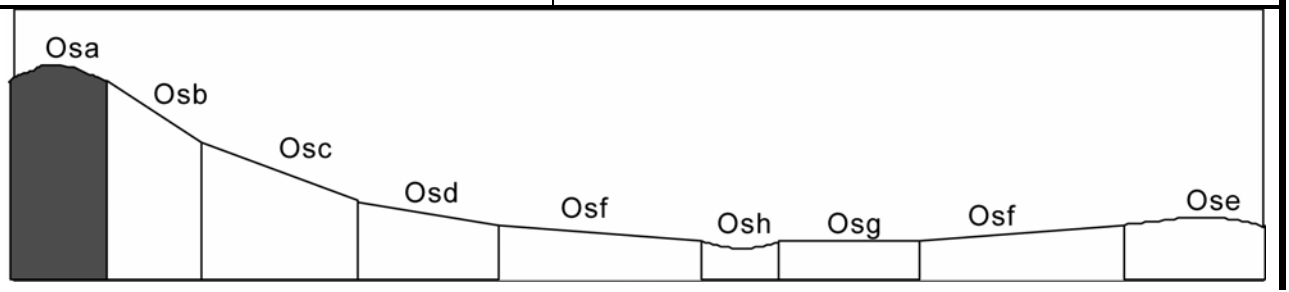


Plate 12 Map Unit: Osh
PPF: Dy3.42
Yellow Sodosol

MAP UNIT SYMBOL: **Osa** Area:738 ha	MAP UNIT: **Ordovician sediments, steep crest**



A. GENERAL DESCRIPTION

Steep sedimentary crests occur in the south of the district adjacent to the granitic terrain. These crests also include the metamorphosed sediments of the metamorphic aureole. Much of this area is set aside as state forest. A stony, shallow yellow duplex soil is common. Uniform coarse sands may also be found in very shallow soils where rock outcrop is common. Soil depth varies from 10 - 100 cm in this unit. Metamorphosed sediments display similar stony, shallow soils, however the parent material is more erosion resistant.

SITE CHARACTERISTICS

Parent Material Age: Ordovician	**Depth to Seas. Watertable:** > 1.3 m
Parent Material Lithology: Sedimentary	**Flooding Risk:** Nil
Landform Pattern: Rolling hills	**Drainage:** Rapidly drained
Landform Element: Crest	**Rock Outcrop:** < 50%
Slope a) common: 7% **Slope b) range:** 3-25%	**Depth to Hard Rock:** 0.5-1.3 m (variable)

Potential Recharge to Groundwater: High
Major Native Vegetation Species: Grey Box
Present Land Use: Grazing
Length of Growing Season April-Sept

LAND DEGRADATION

Degradation Processes	**Water Erosion sheet/rill gully**		**Wind Erosion**	**Mass Movement**	**Salting**	**Acidification**
Susceptibility	Very high	High	Moderate	Moderate	Very low	Moderate
Incidence	Low	Very low	Low	Very low	Nil	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A1	0-10 cm	Dark brown (7.5YR4/2) loam, fine sandy, weak subangular blocky structure, peds 20-50 mm, rough fabric, very firm consistence, small rounded sedimentary pebbles are common, pH 5.5. Clear transition to:
B2	10-25 cm	Brown (7.5YR5/4) light clay, massive structure, earthy fabric, very firm consistence, many small rounded sedimentary pebbles, pH 5.5. Gradual transition to:
B3	25-35 cm	Light brown (7.5YR6/4) light clay, moderate subangular blocky structure, peds 5-10 mm, rough fabric, very firm consistence, medium rounded sedimentary pebbles are abundant, pH 6.0. Gradual transition to:
C	35-70 cm	Weathered sedimentary rock.
R	70-130+ cm	Sedimentary rock.

CLASSIFICATION

Factual Key: Dy2.11 (major) Uc6.1, Gn 3 (minor)

Australian Soil Classification: Bleached, Natric, Brown Kurosol, medium, moderately gravely, loamy, clayey, moderate

Unified Soil Group: CL

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A1	4.3	21	L	L	D	S	T	H	VL
B2	4.5	36	L	VL	D	D	T	L	M
B3	4.7	55	L	L	D	D	S	L	H

VL: Very low L: Low M: Moderate H: High VH: Very high D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Rapid (average 620 mm/day, range 200-1550 mm/day)

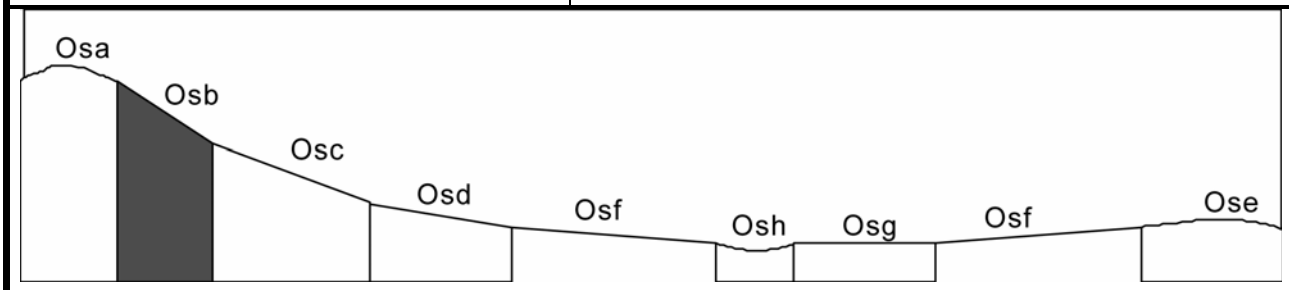
Available Water Capacity: Very low (49 mm H_2O)

Linear Shrinkage (B horizon): Very low (5%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	$C_3T_5S_5$	Slope, depth to hard rock/pan, available water capacity, susceptibility to sheet erosion
Effluent Disposal (septic tanks)	5	Slope
Farm Dams	5	Slope, suitability of subsoil, depth to hard rock
Building **Foundations slab** **stumps/footings**	 5 5	 Slope Slope
Secondary Roads	5	Slope

MAP UNIT SYMBOL: **Osb** Area:205 ha	MAP UNIT: **Ordovician sediments, steep slope**



A. GENERAL DESCRIPTION

Steep sedimentary slopes, including the metamorphosed sediments of the metamorphic aureole are present adjacent to the granitic terrain in the south of the district. Soils are similar to those of the crests above them with predominantly stony, yellow duplex soils with occasional red duplex and yellow gradational soils present. Soil depth may vary from 10 -100 cm in this unit. These slopes are prone to sheet erosion.

SITE CHARACTERISTICS

Parent Material Age: Ordovician
Parent Material Lithology: Sedimentary
Landform Pattern: Rolling hills
Landform Element: Hillslope
Slope a) common: 35%
Slope b) range: > 33%

Depth to Seas. Watertable: > 1.3 m
Flooding Risk: Nil
Drainage: Rapidly drained
Rock Outcrop: < 50%
Depth to Hard Rock: 0.5-1.3 m

Potential Recharge to Groundwater: High
Major Native Vegetation Species: Red Stringybark, Grey Box
Present Land Use: Grazing
Length of Growing Season April-September

LAND DEGRADATION

Degradation Processes	Water Erosion sheet/rill gully		Wind Erosion	Mass Movement	Salting	Acidification
Susceptibility	Very high	High	Moderate	Moderate	Very low	Moderate
Incidence	Moderate	Very low	Low	Very low	Nil	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A1	0-10 cm	Dark brown (7.5YR4/2) loam, fine sandy, weak subangular blocky structure, peds 20-50 mm, rough fabric, very firm consistence, small rounded sedimentary pebbles are common, pH 5.5. Clear transition to:
B2	10-25 cm	Brown (7.5YR5/4) light clay, massive structure, earthy fabric, very firm consistence, many small rounded sedimentary pebbles, pH 5.5. Gradual transition to:
B3	25-35 cm	Light brown (7.5YR6/4) light clay, moderate subangular blocky structure, peds 5-10 mm, rough fabric, very firm consistence, medium rounded sedimentary pebbles are abundant, pH 6.0. Gradual transition to:
C	35-70 cm	Weathered sedimentary rock.
R	70-130+ cm	Sedimentary rock.

CLASSIFICATION

Factual Key: Dy 2.11 (major) Uc 6.1, Dr 2.33, Gn3 (minor)
Australian Soil Classification: Bleached, Natric, Brown Kurosol, medium, moderately gravely, loamy, clayey, moderate
Unified Soil Group: CL

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A1	4.3	21	L	L	D	S	T	H	VL
B2	4.5	36	L	VL	D	D	T	L	M
B3	4.7	55	L	L	D	D	S	L	H

VL: Very low L: Low M: Moderate H: High VH: Very high D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Rapid (average 620 mm/day, range 200-1550 mm/day)

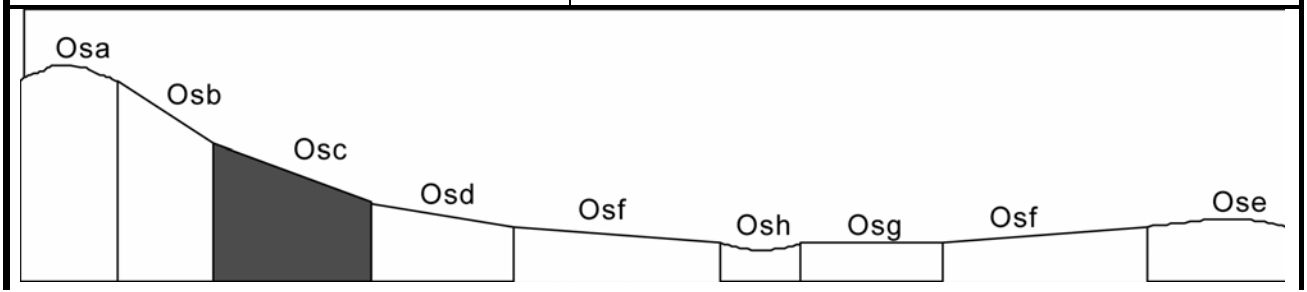
Available Water Capacity: Very low (49 mm H_2O)

Linear Shrinkage (B horizon): Very low (5%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	$C_3T_5S_5$	Slope, available water capacity, susceptibility to sheet erosion
Effluent Disposal (septic tanks)	5	Slope
Farm Dams	5	Slope, suitability of subsoil, depth to hard rock
Building **Foundations slab** **stumps/footings**	 5 5	 Slope Slope
Secondary Roads	5	Slope

MAP UNIT SYMBOL: **Osc** Area:662 ha	MAP UNIT: **Ordovician sediments, moderately steep slope**



A. GENERAL DESCRIPTION

Moderately steep slopes are found mostly in the south of the district near the metamorphic aureole. Much of this area is State Forest. Stony yellow duplex soils are common with occasionally red duplex and yellow gradational soils also present. Soil depth may reach 100 cm. Slightly metamorphosed sediments may be present adjacent to the aureole. These slopes are prone to sheet erosion.

SITE CHARACTERISTICS

Parent Material Age: Ordovician
Parent Material Lithology: Sedimentary
Landform Pattern: Rolling hills
Landform Element: Hillslope
Slope a) common: 25%
Slope b) range: 21-32%

Depth to Seas. Watertable: > 1.3 m
Flooding Risk: Nil
Drainage: Rapidly drained
Rock Outcrop: 10-30%
Depth to Hard Rock: 0.5-1.3 m

Potential Recharge to Groundwater: High
Major Native Vegetation Species: Grey Box, Red Stringybark
Present Land Use: Grazing
Length of Growing Season April-September

LAND DEGRADATION

Degradation Processes	Water Erosion sheet/rill	gully	Wind Erosion	Mass Movement	Salting	Acidification
Susceptibility	High	High	Moderate	Moderate	Very low	Moderate
Incidence	Moderate	Low	Low	Very low	Nil	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A1	0-10 cm	Dark brown (7.5YR4/2) loam, fine sandy, weak subangular blocky structure, peds 20-50 mm, rough fabric, very firm consistence, small rounded sedimentary pebbles are common, pH 5.5. Clear transition to:
B2	10-30 cm	Brown (7.5YR5/4) light clay, massive structure, earthy fabric, very firm consistence, many small rounded sedimentary pebbles, pH 5.5. Gradual transition to:
B3	30-40 cm	Light brown (7.5YR6/4) light clay, moderate subangular blocky structure, peds 5-10 mm, rough fabric, very firm consistence, medium rounded sedimentary pebbles are abundant, pH 6.0. Gradual transition to:
C	40-75 cm	Weathered sedimentary rock.
R	75-130+ cm	Sedimentary rock.

CLASSIFICATION

Factual Key:	Dy 2.11 (major) Dr 2.33, Gn3 (minor)
Australian Soil Classification:	Bleached, Natric, Brown Kurosol, medium, moderately gravely, loamy, clayey, moderate
Unified Soil Group:	CL

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A1	4.3	21	L	L	D	S	T	H	VL
B2	4.5	36	L	VL	D	D	T	L	M
B3	4.7	55	L	L	D	D	S	L	H

VL: Very low L: Low M: Moderate H: High VH: Very high D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Rapid (average 620 mm/day, range 200-1550 mm/day)

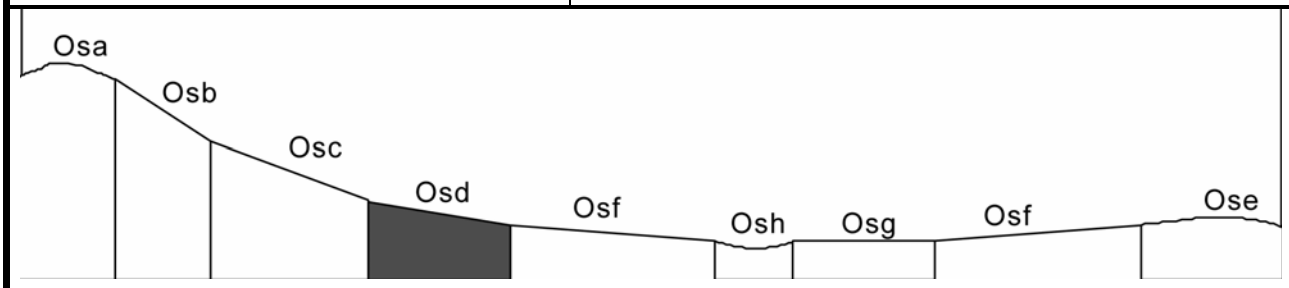
Available Water Capacity: Very low (49 mm H_2O)

Linear Shrinkage (B horizon): Very low (5%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	$C_3T_4S_5$	Available water capacity,
Effluent Disposal (septic tanks)	4	Slope, depth to hard rock / impermeable layer
Farm Dams	5	Slope, suitability of subsoil, depth to hard rock
Building Foundations slab stumps/footings	4 3	Slope Slope, gravel/stone/boulder content, depth to hard rock, susceptibility to slope failure
Secondary Roads	4	Slope

MAP UNIT SYMBOL: **Osd** Area:3008 ha	MAP UNIT: **Ordovician sediments, moderate slope**



A. GENERAL DESCRIPTION

Soils are diverse in this unit due to the noticeable break of slope between steep and gentle slopes. These moderate slopes are found throughout the District. The dominant soil type is a stony yellow duplex soil, however yellow gradational soils and mottled yellow duplex soils are not uncommon. Minor drainage lines in this unit may suffer from gully erosion. Soil depth may reach 120 cm.

SITE CHARACTERISTICS

Parent Material Age: Ordovician
Parent Material Lithology: Sedimentary
Landform Pattern: Rolling hills
Landform Element: Hillslope
Slope a) common: 14% **Slope b) range:** 11-20%

Depth to Seas. Watertable: > 1.3 m
Flooding Risk: Nil
Drainage: Well drained
Rock Outcrop: 10-20%
Depth to Hard Rock: 0.5-1.3 m

Potential Recharge to Groundwater: High
Major Native Vegetation Species: Red Stringybark, Grey Box
Present Land Use: Grazing
Length of Growing Season April-September

LAND DEGRADATION

Degradation Processes	**Water Erosion sheet/rill**	**gully**	**Wind Erosion**	**Mass Movement**	**Salting**	**Acidification**
Susceptibility	High	High	Moderate	Moderate	Very low	Moderate
Incidence	Moderate	Low	Low	Very low	Very low	Low

B. SOIL PROFILE

PROFILE DESCRIPTION

A1	0-10 cm	Dark brown (7.5YR4/2) loam, fine sandy, weak subangular blocky structure, peds 20-50 mm, rough fabric, very firm consistence, small rounded sedimentary pebbles are common, pH 5.5. Clear transition to:
B2	10-30 cm	Brown (7.5YR5/4) light clay, massive structure, earthy fabric, very firm consistence, many small rounded sedimentary pebbles, pH 5.5. Gradual transition to:
B3	30-45 cm	Light brown (7.5YR6/4) light clay, moderate subangular blocky structure, peds 5-10 mm, rough fabric, very firm consistence, medium rounded sedimentary pebbles are abundant, pH 6.0. Gradual transition to:
C	45-85 cm	Weathered sedimentary rock.
R	85-130+ cm	Sedimentary rock.

CLASSIFICATION

Factual Key:	Dy 2.11 (major) Dy 3.11, Dy 3.42, Gn3 (minor)
Australian Soil Classification:	Bleached, Natric, Brown Kurosol, medium, moderately gravely, loamy, clayey, moderate
Unified Soil Group:	CL

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A1	4.3	21	L	L	D	S	T	H	VL
B2	4.5	36	L	VL	D	D	T	L	M
B3	4.7	55	L	L	D	D	S	L	H

VL: Very low L: Low M: Moderate H: High VH: Very high D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Rapid (average 620 mm/day, range 200-1550 mm/day)

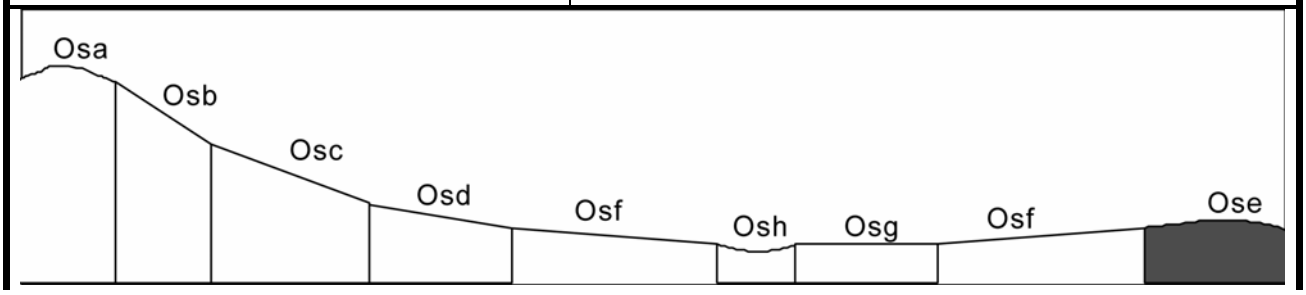
Available Water Capacity: Very low (49 mm H_2O)

Linear Shrinkage (B horizon): Very low (5%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	$C_3T_4S_5$	Available water capacity
Effluent Disposal (septic tanks)	3	Slope, depth to hard rock / impermeable layer
Farm Dams	5	Suitability of subsoil, depth to hard rock
Building Foundations slab stumps/footings	4 3	Slope Slope, gravel/stone/boulder content, depth to hard rock, susceptibility to slope failure
Secondary Roads	4	Slope

MAP UNIT SYMBOL: **Ose** Area:1201 ha	MAP UNIT: **Ordovician sediments, gentle crest**



A. GENERAL DESCRIPTION

Gentle Ordovician sedimentary crests are common throughout the District. Soils are shallow in this unit with surface rock common in some areas. Stony, yellow duplex soils are dominant and may occasionally contain a faint to distinct bleached horizon with mottles.

SITE CHARACTERISTICS

Parent Material Age: Ordovician
Parent Material Lithology: Sedimentary
Landform Pattern: Low hills
Landform Element: Crest
Slope a) common: 4%
Slope b) range: 2-7%

Depth to Seas. Watertable:> 1.3 m
Flooding Risk: Nil
Drainage: Well drained
Rock Outcrop: 0-30%
Depth to Hard Rock: 0.5-1.5 m

Potential Recharge to Groundwater: Moderate
Major Native Vegetation Species: Grey Box, Red Stringybark
Present Land Use: Grazing
Length of Growing Season April-September

LAND DEGRADATION

Degradation Processes	**Water Erosion sheet/rill**	**gully**	**Wind Erosion**	**Mass Movement**	**Salting**	**Acidification**
Susceptibility	Moderate	Moderate	Moderate	Very low	Very low	Moderate
Incidence	Low	Very low	Low	Very low	Nil	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A1	0-10 cm	Dark brown (7.5YR4/2) loam, fine sandy, weak subangular blocky structure, peds 20-50 mm, rough fabric, very firm consistence, small rounded sedimentary pebbles are common, pH 5.5. Clear transition to:
B2	10-30 cm	Brown (7.5YR5/4) light clay, massive structure, earthy fabric, very firm consistence, many small rounded sedimentary pebbles, pH 5.5. Gradual transition to:
B3	30-40 cm	Light brown (7.5YR6/4) light clay, moderate subangular blocky structure, peds 5-10 mm, rough fabric, very firm consistence, medium rounded sedimentary pebbles are abundant, pH 6.0. Gradual transition to:
C	40-65 cm	Weathered sedimentary rock.
R	65-130+ cm	Sedimentary rock.

CLASSIFICATION

Factual Key: Dy 2.11 (major) Dy 3.42, (minor)

Australian Soil Classification: Bleached, Natric, Brown Kurosol, medium, moderately gravely, loamy, clayey, moderate

Unified Soil Group: CL

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A1	4.3	21	L	L	D	S	T	H	VL
B2	4.5	36	L	VL	D	D	T	L	M
B3	4.7	55	L	L	D	D	S	L	H

VL: Very low L: Low M: Moderate H: High VH: Very high D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Rapid (average 620 mm/day, range 200-1550 mm/day)

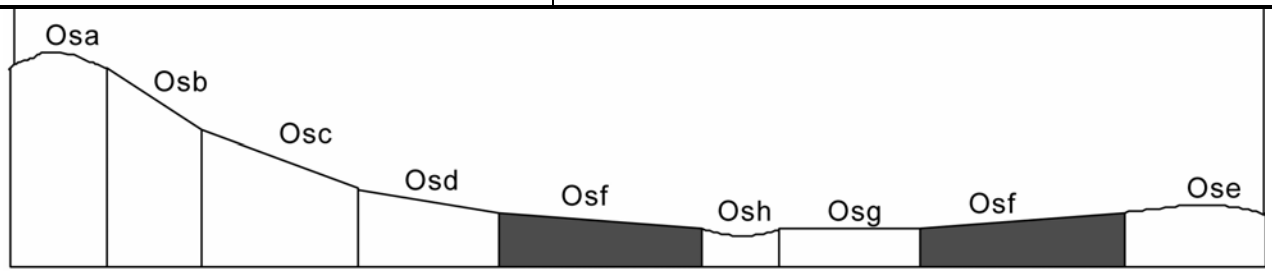
Available Water Capacity: Very low (49 mm H_2O)

Linear Shrinkage (B horizon): Very low (5%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	$C_3T_3S_5$	Available water capacity
Effluent Disposal (septic tanks)	4	Depth to hard rock/impermeable layer
Farm Dams	5	Suitability of subsoil, depth to hard rock
Building **Foundations slab** **stumps/footings**	 3 3	 Slope, depth to hard rock, gravel/stone/boulder content Depth to hard rock, gravel/stone/boulder content

MAP UNIT SYMBOL: **Osf** Area:16220 ha	MAP UNIT: **Ordovician sediments, gentle slope**



A. GENERAL DESCRIPTION

The gentle sedimentary slopes are common throughout the District. The dominant soil type is a bleached and mottled yellow duplex soil. In the north these soils may become bleached and mottled red duplex soils. Minor variations will include unbleached, mottled yellow duplex soils and yellow gradational soils. Soils depth may reach 150 cm.

SITE CHARACTERISTICS

Parent Material Age: Ordovician
Parent Material Lithology: Sedimentary
Landform Pattern: Low hills
Landform Element: Gentle slope
Slope a) common: 7%
Slope b) range: 4-10%

Depth to Seas. Watertable: > 1.5 m
Flooding Risk: Very low
Drainage: Imperfectly drained
Rock Outcrop: 0-10%
Depth to Hard Rock: 1.5 m

Potential Recharge to Groundwater: Moderate
Major Native Vegetation Species: Grey Box, Red Stringybark
Present Land Use: Rural residential, grazing
Length of Growing Season April-September

LAND DEGRADATION

Degradation Processes	Water Erosion sheet/rill gully		Wind Erosion	Mass Movement	Salting	Acidification
Susceptibility	Moderate	High	High	Very low	Low	Low
Incidence	Low	Low	Low	Very low	Low	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A1	0-10 cm	Dark grey (10YR4/1)coarse sandy loam, weak subangular and granular structure, peds 2-5 mm and 20-50 mm, rough fabric, very weak consistence, very few small angular sedimentary and quartz pebbles, pH 6.0. Clear transition to:
A2	10-20 cm	Light grey (10YR7/2) coarse sandy loam, massive structure, earthy fabric, weak consistence, very few small angular sedimentary and quartz pebbles, pH 6.5. Abrupt transition to:
B2	20-70 cm	Light yellowish brown (10YR6/4) medium clay, many medium prominent red and orange mottles, weak columnar structure, peds 50-100 mm, smooth fabric, very firm consistence, pH 8.0. Gradual transition to:
B3	70-90 cm	Dark red (2.5YR3/6) light medium clay, fine distinct orange mottles are common, weak columnar structure, smooth fabric, very firm consistence, pH 7.5. Gradual transition to:
BC	90-130 cm	Brownish yellow (10YR6/6) light medium clay, many medium prominent red orange and pale mottles, weak columnar structure, peds 50-100 mm, smooth fabric, firm consistence, pH 8.0. Clear transition to:
C	130-150 cm	Weathered sedimentary rock.

CLASSIFICATION

Factual Key:	Dy 3.42 (major) Dy 3.12, Gn 4.51 (minor)
Australian Soil Classification:	Eutrophic, Mottled - Mesonatric, Yellow Sodosol medium, slightly gravely, loamy clayey, deep
Unified Soil Group:	CH

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A1	4.6	3	L	VL	S	S	S	M	VL
A2	4.8	13	L	VL	S	D	S	VL	L
B2	7.1	20	VL	M	S	S	S	VL	VH

VL: Very low L: Low M: Moderate H: High VH: Very high D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Slow (average 50 mm/day, range 10-150 mm/day)

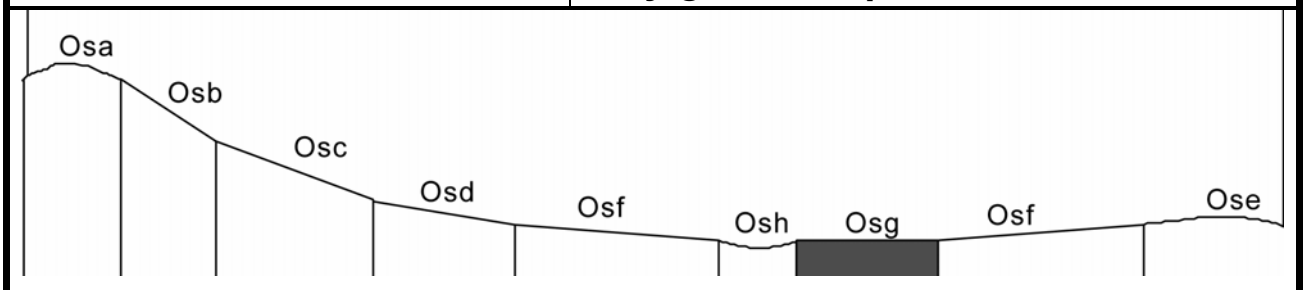
Available Water Capacity: High (162 mm H_2O)

Linear Shrinkage (B horizon): Moderate (16%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	$C_3T_3S_4$	Susceptibility to wind erosion, topsoil condition (A2)
Effluent Disposal (septic tanks)	4	Permeability, drainage
Farm Dams	5	Dispersibility of subsoil
Building Foundations **slab** **stumps/footings**	 4 4	 Drainage Drainage
Secondary Roads	5	Dispersibility of subsoil

MAP UNIT SYMBOL: **Osg** Area:2380 ha	MAP UNIT: **Ordovician sediments, very gentle slope**



A. GENERAL DESCRIPTION

The very gentle sedimentary slopes contain similar soils to gentle slopes. Bleached and mottled yellow duplex soils are common with occasionally unbleached and mottled yellow duplex soils present. To the north of the district, red duplex soils may be encountered. Soil depth may reach 150 cm. Gully erosion is present.

SITE CHARACTERISTICS

Parent Material Age: Ordovician
Parent Material Lithology: Sedimentary
Landform Pattern: Low hills
Landform Element: Very gentle slope
Slope a) common: 2% **Slope b) range:** 1-3%

Depth to Seas. Watertable: > 1.5 m
Flooding Risk: Low
Drainage: Imperfectly drained
Rock Outcrop: 0-10%
Depth to Hard Rock: 1.5 m

Potential Recharge to Groundwater: Low
Major Native Vegetation Species: Grey Box, Red Stringybark, Yellow Box
Present Land Use: Rural residential, grazing **Length of Growing Season** April - September

LAND DEGRADATION

Degradation Processes	**Water Erosion sheet/rill gully**		**Wind Erosion**	**Mass Movement**	**Salting**	**Acidification**
Susceptibility	Low	Moderate	High	Very low	Low	Low
Incidence	Low	Low	Low	Very low	Low	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A1	0-10 cm	Dark grey (10YR4/1)coarse sandy loam, weak subangular and granular structure, peds 2-5 mm and 20-50 mm, rough fabric, very weak consistence, very few small angular sedimentary and quartz pebbles, pH 6.0. Clear transition to:
A2	10-20 cm	Light grey (10YR7/2) coarse sandy loam, massive structure, earthy fabric, weak consistence, very few small angular sedimentary and quartz pebbles, pH 6.5. Abrupt transition to:
B2	20-70 cm	Light yellowish brown (10YR6/4) medium clay, many medium prominent red and orange mottles, weak columnar structure, peds 50-100 mm, smooth fabric, very firm consistence, pH 8.0. Gradual transition to:
B3	70-90 cm	Dark red (2.5YR3/6) light medium clay, fine distinct orange mottles are common, weak columnar structure, smooth fabric, very firm consistence, pH 7.5. Gradual transition to:
BC	90-130 cm	Brownish yellow (10YR6/6) light medium clay, many medium prominent red orange and pale mottles, weak columnar structure, peds 50-100 mm, smooth fabric, firm consistence, pH 8.0. Clear transition to:
C	130-150 cm	Weathered sedimentary rock.

CLASSIFICATION

Factual Key:	Dy3.42 (major) Dy3.12, Gn4.51 (minor)
Australian Soil Classification:	Eutrophic, Mottled - Mesonatric, Yellow Sodosol medium, slightly gravely, loamy clayey, deep
Unified Soil Group:	CH

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A1	4.6	3	L	VL	S	S	S	M	VL
A2	4.8	13	L	VL	S	D	S	VL	L
B2	7.1	20	VL	M	S	S	S	VL	VH

VL: Very low L: Low M: Moderate H: High VH: Very high D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Slow (average 50 mm/day, range 10-150 mm/day)

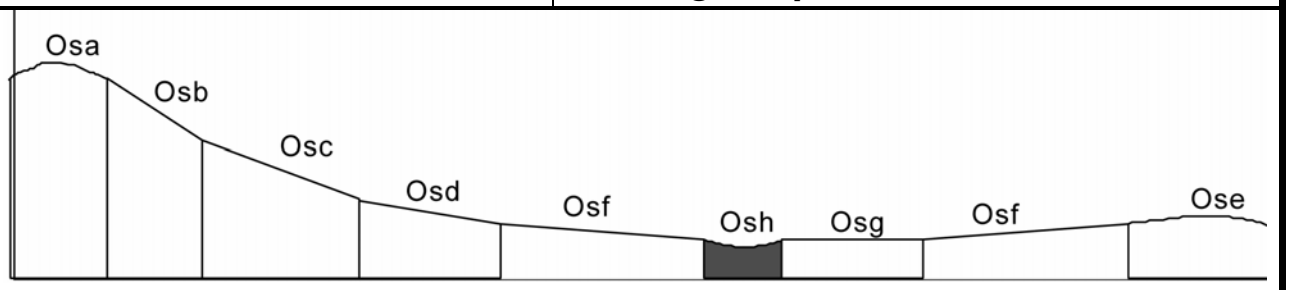
Available Water Capacity: High (162 mm H_2O)

Linear Shrinkage (B horizon): Moderate (16%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	$C_3T_2S_4$	Topsoil condition (A2), susceptibility to wind erosion
Effluent Disposal (septic tanks)	4	Drainage, permeability
Farm Dams	5	Dispersibility of subsoil
Building Foundations **slab** **stumps/footings**	 4 4	 Drainage Drainage
Secondary Roads	4	Drainage

MAP UNIT SYMBOL: **Osh** Area:1982 ha	MAP UNIT: **Ordovician sediments, drainage depression**



A. GENERAL DESCRIPTION

Drainage lines that run through Ordovician units are generally wide and contain soil profiles reaching 200 cm in depth. In many situations minor drainage lines may not have been mapped due to restrictions of scale, especially in steeper units. Bleached and mottled yellow duplex soils are dominant while uniform yellow clays may be found adjacent to floodplain areas. Salting and gully erosion occur in this unit. Seasonal flooding is common.

SITE CHARACTERISTICS

Parent Material Age: Ordovician
Parent Material Lithology: Sedimentary
Landform Pattern: Low hills
Landform Element: Drainage depression
Slope a) common: 3%
Slope b) range: 0-7%

Depth to Seas. Watertable: > 1.5 m
Flooding Risk: Moderate
Drainage: Imperfectly drained
Rock Outcrop: 0-5%
Depth to Hard Rock: > 1.5 m

Potential Recharge to Groundwater: Low
Major Native Vegetation Species: Grey Box, Yellow Box
Present Land Use: Rural residential, grazing
Length of Growing Season April-September

LAND DEGRADATION

Degradation Processes	Water Erosion sheet/rill gully		Wind Erosion	Mass Movement	Salting	Acidification
Susceptibility	Very low	Moderate	Very low	Very low	Moderate	Low
Incidence	Very low	Low	Very low	Very low	Low	Not available

B. SOIL PROFILE

PROFILE DESCRIPTION

A11	0-10 cm	Yellowish brown (10YR5/4) coarse sandy loam, weak subangular blocky structure, peds 1020 mm, rough fabric, very weak consistence, small subrounded and angular sedimentary and quartz pebbles are common, pH 6.5. Clear transition to:
A12	10-20 cm	Brown (10YR5/3) clay loam coarse sandy, massive structure, earthy fabric, firm consistence, few small subrounded and angular sedimentary and quartz pebbles, pH 6.5. Gradual transition to:
A22	0-50 cm	Very pale brown, (10YR7/4) sandy clay loam coarse sandy, massive structure, earthy fabric, weak consistence, few small subrounded and angular sedimentary and quartz pebbles, pH 7.0. Clear transition to:
B2	50-60 cm	Light yellowish brown (10YR6/4) light clay sandy, many medium distinct orange and pale mottles, weak columnar structure, peds 50-100 mm, rough and smooth fabric, firm consistence, few small subrounded and angular sedimentary and quartz pebbles, pH 7.5. Gradual transition to:
BC	60-115 cm	Light yellowish brown (10YR6/4) light clay sandy, many medium distinct orange and red mottles, weak columnar structure, peds 100-200 mm, rough and smooth fabric, very firm consistence, few small subrounded and angular sedimentary and quartz pebbles, pH 8.0. Gradual transition to:
R	115-150 cm	Sedimentary rock.

CLASSIFICATION

Factual Key:	Dy 3.42 (major), Dy 3.41, Uf (minor)
Australian Soil Classification:	Mesotrophic, Mottled - Hypernatric, Yellow Sodosol medium, slightly gravely, clay loamy, clayey, very deep
Unified Soil Group:	CL

INTERPRETATION OF LABORATORY ANALYSIS*

Horizon	pH ($CaCl_2$)	% Gravel	EC (salts)	Nutrient Status	P	K	Al	Organic Matter	Dispersibility
A11	5.7	2	VL	L	S	S	S	H	VL
A12	5.6	9	L	L	D	S	S	L	VL
A2	7.0	3	VL	VL	D	S	S	VL	L
B2	7.1	15	M	L	D	S	S	VL	H

VL: Very low L: Low M: Moderate H: High VH: Very high D: Deficient S: Satisfactory
T: Potentially Toxic NA: Not Available * see Appendix D for analytical results ** Strongly Acidic

SOIL PROFILE CHARACTERISTICS:

Permeability: Slow (average 90 mm/day, range 10-190 mm/day)
Available Water Capacity: High (159 mm H_2O)
Linear Shrinkage (B horizon): Very low (5%)

C. LAND CAPABILITY ASSESSMENT

Land Use	Class	Major Limiting Feature(s)/Land Use
Agriculture	$C_3T_2S_3$	Climate, condition of topsoil, depth to seasonal watertable, available water capacity, electrical conductivity, susceptibility to gully erosion
Effluent Disposal (septic tanks)	4	Drainage
Farm Dams	4	Depth to hard rock
Building **Foundations slab** **stumps/footings**	 4 4	 Drainage Drainage
Secondary Roads	4	Drainage