BGO Bendigo Land System

Area: 118.0 km^2

Landscape: Rolling rises and pediments. The rises which form the "spines" of these low ranges, have shallow soils and outcropping hard rock especially on the steeper parts. The pediments which surround the rises have both calcareous and non-calcareous soils (red soils or Kandosols).

Annual rainfall: 210 – 250 mm average

Geology: Proterozoic tillites, siltstones, dolomites and quartzites of the Umberatana Group and Burra Group siltstones and shales of the Adelaide Geosyncline form the ridges. Pleistocene sediments occur on the pediments surrounding the hard rock areas.

Main soils:

A4	Deep (rubbly) calcareous sandy loam to loam
A2	Shallow calcareous loam
L1	Shallow stony soil over rock
L1a	Shallow stony loam
L1b	Shallow stony sandy loam
A3	Deep moderately calcareous sandy loam to loam
D4	Sandy loam to clay loam over pedaric red clay

Minor soils:

A5	Rubbly calcareous sandy loam to clay loam on clay
C1	Gradational sandy loam
C2	Gradational loam on rock
C3	Friable gradational (sandy) clay loam
M4	Hard gradational sandy clay loam
RR	Rock outcrop

Summary: The Bendigo Land System consists of rolling rises with mostly shallow calcareous and non-calcareous soils, and pediments with deeper soils which include gradational and texture-contrast profiles.

Soil Landscape Unit summary: 28 Soil Landscape Units (SLUs) mapped in the Bendigo Land System:

SLU	% of area	Component	Main soils	Prop#	Notes
AAB	1.8	Ridges	L1A2	D	Rolling rises on limestone and calc-siltstone with very shallow loamy soils. Relief is less than 30m, slopes are 10-30%. Main soils: shallow stony loam **- L1a** and shallow calcareous loam - **A2**, with rock outcrop - **RR**.
ABB	1.0	Ridges	L1	D	Rolling rises with linear rocky quartzite outcrops and shallow rocky soils on interbedded fine-grained rocks. Relief is 9-30m, slopes are 10-30%. Main soils: shallow stony sandy loam **- L1b**, with rock outcrop - **RR** and shallow calcareous loam - **A2**.
AEB	0.5	Rises	L1	D	Non-arable rocky, rolling rises formed on mostly fine-grained rocks. Soils are very shallow. Relief is 9-30m, slopes are 10-30%. Main soils: shallow stony loam - **L1a**, with shallow calcareous loam - **A2**.
AKH	3.1	Ridges	L1	D	Ridges of rolling rises with very shallow rocky soils formed on coarse-grained rocks. Watercourses are eroded. Relief is 9-30m, slopes are 10-30%. Main soils: shallow stony sandy loam **- L1b**, with rock outcrop -

					RR and shallow calcareous loam - **A2**.
A-t	9.6	Ridges	L1	D	Steep low hilly ridges on tillites with extensive rock outcrop. Relief is 30-90m, slopes are 30-50%. Main soils: shallow stony sandy loam **- L1b**, with rock outcrop - **RR** and shallow calcareous loam - **A2**.
AWB	3.7	Rises	L1	D	Undulating rises with shallow rocky soils formed on quartzites with more than 50% interbedded calcareous rocks. Relief is 9-30m, slopes are 3-10%. Main soils: shallow stony sandy loam **- L1b**, with shallow calcareous loam- **A2** and rock outcrop- **RR**.
AYB	1.1	Rises	A2	D	Rolling rises on fine grained rocks, especially siltstones of the Tapley Hill Formation. Relief is less than 30m, slopes are 10-30%. Main soils: shallow calcareous loam - **A2**, with shallow stony loam - **L1a**.
EFB	0.3	Rises	A2	D	Gently undulating rises with moderately shallow soils overlying hard calcareous rocks, typically siltstones and limestones. Minor scalding. Slopes are 1-3%, relief is less than 30m. Main soils: shallow calcareous loam - **A2**, with shallow stony loam - **L1a** and deep (rubbly) calcareous loam - **A4**.
EIRz	11.2	Slopes	A4A2	D	Gently sloping fans on outwash and undulating rises formed over basement rock or saprolite within one metre of the surface. Relief is 9-30m, slopes are 3-10%. Slightly to moderately saline, 10-50% scalded and 5-10% gullied. Main soils: deep (rubbly) calcareous sandy loam **-A4** and shallow calcareous loam - **A2**, with deep moderately calcareous sandy loam - **A3** and gradational sandy loam - **C1**.
EOg	4.8	Rises	A2	V	Complex of rises with mostly calcareous soils over pulverulent weathered rock, and fans formed on medium grained outwash sediments. **EOg** Gently undulating rises and fans with eroded waterways and moderate salinity. Slopes are 1-3%, relief is less than 30m. **EOh** undulating rises and fans with eroded waterways and moderate salinity. Slopes are 3-10%, relief is less than 30m. Main soils: ***Rises:*** Shallow calcareous loam - **A2**, with shallow stony loam - **L1a** and gradational loam on rock - **C2**. ***Fans:*** deep moderately calcareous loam - **A3** and deep (rubbly) calcareous sandy loam **- A4**, with gradational sandy loam - **C1**, friable gradational sandy clay loam - **C3** and sandy clay loam over pedaric red clay - **D4**.
		Fans	A3A4	C	
EOh	1.5	Rises	A2	V	
		Fans	A3A4	L	
EPB	2.5	Rises	A2	D	Gently undulating rises and drainage depressions on dissected remnants of calcareous pediments and basement rocks with predominantly calcareous gradational soils. Relief is less than 30m, slopes are 1-3%. Main soils: ***Rises:*** shallow calcareous loam - **A2** with shallow stony loam - **L1a**. ***Drainage Depressions:*** deep moderately calcareous loam - **A3** and deep (rubbly) calcareous sandy loam **- A4**, with gradational sandy loam - **C1**, friable gradational sandy clay loam - **C3** and sandy clay loam over pedaric red clay - **D4**.
		Drainage depressions	A3A4	M	
EUB	3.7	Rises	A2L1	V	Complex of gently undulating rises on fine grained rock and fans on alluvium. Relief is 9-30m, slopes are 1-3%. Main soils: ***Rises:*** Shallow calcareous loam - **A2** and shallow stony loam **- L1a**. ***Fans:*** deep moderately calcareous loam - **A3** and deep (rubbly) calcareous sandy loam **- A4**, with gradational sandy loam - **C1**, friable gradational sandy clay loam - **C3** and sandy clay loam over pedaric red clay - **D4**.
		Fans	A3A4	L	

EVB	1.7	Rises Drainage depressions	A2A4 A3A4	D M	Gently undulating rises with rock outcrops formed on fine grained rocks, and minor drainage depressions. Slopes are 1-3%, relief is less than 30m. Main soils: ***Rises:*** shallow calcareous loam - **A2** and deep (rubbly) calcareous sandy loam **- A4**, with shallow stony loam - **L1a**. ***Drainage Depressions:*** deep moderately calcareous loam - **A3** and deep (rubbly) calcareous sandy loam **- A4**, with gradational sandy loam - **C1**, friable gradational sandy clay loam - **C3** and sandy clay loam over pedaric red clay - **D4**.
JLyy	1.1	Drainage depressions	D4A3	D	Drainage depressions and creek flats with moderately saline subsoils. Severe gullying (over 20%) and scalding (over 50%) of land affected. Main soils: sandy clay loam over pedaric red clay - **D4** and deep moderately calcareous loam - **A3**, with hard gradational sandy clay loam - **M4** and rubbly calcareous sandy clay loam on clay - **A5**.
JOl	5.4	Fans Rises	D4A4 A2A4	V C	Complex of gently undulating fans on alluvium and rises on medium grained basement rock. 10-50% scalding and 10-20% gullying. Slopes are 1-3%, relief is less than 30m. Main soils: ***Fans:*** clay loam over pedaric red clay - **D4** and deep (rubbly) calcareous sandy loam **- A4**, with deep moderately calcareous loam - **A3** and gradational sandy loam - **C1**. ***Rises****:* shallow calcareous loam - **A2** and deep (rubbly) calcareous sandy loam **- A4**, with shallow stony sandy loam - **L1b**.
JPl	2.4	Fans	D4	D	Fans formed on outwash sediments derived from basement rocks. **JPl** Gently sloping fans with 10-20% land gullied and 5-10% scalded. Relief is less than 9m, slopes are 1-3%. **JPq** Gently sloping fans. Severely scalded (over 50%). Slopes are 1-3%, relief is less than 9m. **JPyy** Drainage depressions. Severely gullied (over 20%) and scalded (over 50%). Main soils: sandy loam over pedaric red clay - **D4** with deep moderately calcareous sandy loam - **A3**, deep (rubbly) calcareous sandy loam **- A4** and hard gradational sandy clay loam - **M4**.
JPq	1.8	Fans	D4	D	
JPyy	0.3	Drainage depressions	D4	D	
JYG	9.4	Fans Rises	D4 A2A4	E E	Complex of gently sloping fans on alluvium and rises on medium grained basement rock. Moderately gullied (10-20%). Slopes are 1-3%, relief is less than 9m. Main soils: ***Fans:*** loam over pedaric red clay - **D4** with deep moderately calcareous loam - **A3**, deep (rubbly) calcareous sandy loam - **A4** and hard gradational sandy clay loam - **M4**. ***Rises****:* shallow calcareous loam - **A2** and deep (rubbly) calcareous sandy loam - **A4**, with shallow stony sandy loam - **L1b**.
KcB	2.5	Fans	A4C1	D	Fans formed on medium grained outwash. **KcB** Gently sloping fans. Slopes are 1-3%. **KcG** Gently sloping fans. Gullying affects 10-20% of land. Slopes are 1-3%. **Kcg** Gently undulating fans with eroded waterways and moderate salinity. Slopes are 1-3%. Main soils: deep (rubbly) calcareous sandy loam - **A4** and gradational sandy loam - **C1**, with deep moderately calcareous sandy loam - **A3** and sandy loam over pedaric red clay - **D4**.
KcG	0.6	Fans	A4C1	D	
Kcg	0.5	Fans	A4C1	D	
KFb	16.5	Fans	A4A3	V	Complex of fans on outwash sediments and rises on medium

		Rises	A2A4	C	grained rocks. **KFb** Gently sloping fans and rises. Slopes are 1-3%, relief is less than 9m. Fans are moderately scalded (10-50%) and saline, rises less so. **KFV** Severely scalded (over 50%) gently sloping fans and rises which are only slightly scalded (0-5%). Slopes are 1-3%, relief is less than 9m. Main soils: ***Fans:*** deep (rubbly) calcareous sandy loam **- A4** and deep moderately calcareous sandy loam - **A3**, with sandy loam over pedaric red clay - **D4**, gradational sandy loam - **C1** and hard gradational sandy clay loam - **M4**. ***Rises:*** shallow calcareous loam - **A2** and deep (rubbly) calcareous sandy loam **- A4**, with shallow stony sandy loam - **L1b**.
KFV	3.5	Fans	A4A3	V	
		Rises	A2A4	C	
KIB	1.7	Fans	C1A3	V	Complex of gently undulating fans on alluvium and rises on medium grained rock. Main soils: ***Fans:*** gradational sandy loam - **C1** and deep moderately calcareous sandy loam - **A3**, with sandy loam over pedaric red clay - **D4** and deep (rubbly) calcareous sandy loam **- A4**. ***Rises:*** shallow calcareous loam on rock **- A2** and deep (rubbly) calcareous sandy loam **- A4**, with shallow stony sandy loam - **L1b**.
		Rises	A2A4	C	
KLB	6.5	Fans	A4A3	V	Gently sloping fans and rises formed on outwash sediments. Slopes are 1-3%, relief is less than 9m. Main soils: ***Fans:*** deep (rubbly) calcareous sandy loam **- A4** and deep moderately calcareous sandy loam - **A3**. ***Rises:*** deep (rubbly) calcareous sandy loam **- A4**.
		Rises	A4	C	
KQl	1.3	Fans	A3A4	V	Complex of gently sloping fans and basement rock rises. Moderately saline subsoils. 10-20% of land is gullied. Slopes are 1-3%, relief is less than 9m. Main soils: ***Fans:*** deep moderately calcareous sandy loam - **A3** and deep (rubbly) calcareous sandy loam **- A4** with hard gradational sandy clay loam - **M4** and sandy loam over pedaric red clay - **D4**. ***Rises:*** deep (rubbly) calcareous sandy loam **- A4** with shallow calcareous loam - **A2**.
		Rises	A4	L	

PROPORTION codes assigned Soil Landscape Unit (SLU) components:

- D Dominant in extent (>90% of SLU)
- V Very extensive in extent (60–90% of SLU)
- E Extensive in extent (30–60% of SLU)
- C Common in extent (20–30% of SLU)
- L Limited in extent (10–20% of SLU)
- M Minor in extent (<10% of SLU)

Detailed soil profile descriptions:

A2 Shallow calcareous loam (Paralithic, Hypercalcic / Lithocalcic Calcarosol)
Calcareous stony loam grading to soft or rubbly carbonate over weathering dolomite or calc-siltstone within 50 cm.

A3 Deep moderately calcareous sandy loam to loam (Regolithic, Calcic Calcarosol)
Calcareous loam to sandy loam grading to a loamy to clayey subsoil without a significant carbonate accumulation in the subsoil, grading to medium to fine grained alluvium.

A4 Deep (rubbly) calcareous sandy loam to loam (Regolithic, Hypercalcic / Lithocalcic Calcarosol)
Calcareous sandy loam to loam grading to a very highly calcareous sandy clay loam to light clay with variable rubble, continuing below 120 cm.

A5 Rubbly calcareous sandy loam to clay loam on clay (Regolithic, Hypercalcic / Lithocalcic Calcarosol)
Calcareous sandy loam to clay loam grading to a very highly calcareous rubbly sandy clay loam to light clay, over a clayey substrate deeper than 60 cm, but within 120 cm.

C1 Gradational sandy loam (Hypercalcic, Red Kandosol)
Friable sandy loam grading to massive red-brown alkaline light sandy loam to clay loam subsoil, highly calcareous with depth, over alluvium.

C2 Gradational loam on rock (Calcic / Hypercalcic Red Dermosol)
Loam to clay loam grading to a friable red clay with soft Class I carbonate within 50 cm, grading to weathering rock within 100 cm.

C3 Friable gradational (sandy) clay loam (Calcic / Hypercalcic Red Dermosol)
Loam to clay loam grading to a friable red clay with abundant soft Class I carbonate within 50 cm, overlying alluvium within 100 cm.

D4 Sandy loam to clay loam over pedaric red clay (Calcic, Pedaric, Red Sodosol)
Thin to medium thickness fine sandy loam to clay loam over a finely structured friable (pedaric) red clay, calcareous from about 50 cm, grading to fine or medium grained alluvium.

L1a Shallow stony loam on fine grained rock (Paralithic, Leptic Tenosol)
Shallow stony loam, often calcareous with depth, overlying weathering fine grained rock shallower than 50 cm.

L1b Shallow stony sandy loam on medium grained rock (Paralithic, Leptic Tenosol)
Shallow stony sandy loam, often calcareous with depth, overlying weathering fine to medium grained sandstone or tillite shallower than 50 cm.

M4 Hard gradational sandy clay loam (Calcic, Brown / Red Dermosol / Kandosol)
Hard setting sandy loam to sandy clay loam grading to a poorly structured to massive hard red or brown sandy clay to clay, weakly to moderately calcareous with depth, over alluvial sediments.

RR Rock outcrop

Further information: DEWNR Soil and Land Program