WPD Walpunda Land System

Area: 97 km^2

Landscape: Rocky, NE-SW trending ridges and low undulating rises with deeper calcareous and clayey red soils on lower slopes. Steep hills and rises in the east have razorback ridges. The ridges are curved around the apex of a large structural fold.

Geology: Lithologies are mixed, but calcareous rocks are dominant. Common rocks include calc-siltstones and limestones of the Tapley Hill Formation and Etina Limestone, and non-calcareous Uroonda Siltstone.

Topography: Linear ridges flanked by undulating rises and pediments

Elevation: High point is Weira Hill (649 m asl)

Annual rainfall: 275 - 300 mm average

Soils:

- Shallow stony loams and sandy loams (calcareous and non calcareous) are predominant on ranges.
- Calcareous loams occur on broad undulating plains and rises. These soils are often powdery and easily erodible. Significant areas are scalded and gullied.
- Red clay loamy soils occur extensively on pediments and plains between the ridges.

Main soils:

On basement rock rises and ranges

L1a Shallow stony loam
L1b Shallow stony sandy loam
A2 Shallow calcareous loam to sandy loam

Minor soils:

Rises and ranges

B2 Shallow calcareous sandy loam to loam on calcrete
C2 Gradational loam on rock
D1 Sandy loam to clay loam over clay on rock
D7 Sandy loam to loam over poorly structured clay on rock
L1c Shallow stony loamy sand to sandy loam on quartzite
RR Rock outcrop

Pediments and plains

A3 Deep moderately calcareous sandy loam to loam
A5 Rubbly calcareous clay loam to sandy loam on clay
A6 Gradational calcareous clay loam
C1 Gradational sandy loam
C3 Friable gradational clay loam
C4 Hard gradational clay loam
D2 Sandy loam to clay loam over red clay
D4 Loam to clay loam over pedaric red clay
E2 Red cracking clay
M1 Deep alluvial loam
M3 Stony alluvial loam

Summary: The Walpunda Land System occurs NNE of Belton, east of Cradock, and is named after Walpunda Creek which flows through it. It consists mainly of NW-SE trending rocky ridges and rises on calcareous siltstones and limestones with shallow calcareous loamy soils. Red clay soils occur extensively on plains and pediments between the ridges.

Soil Landscape Unit summary: 48 Soil Landscape Units (SLUs) mapped in the Walpunda Land System

SLU	% of area	Component	Main soils	Prop#	Notes
AAH	3.9	Rolling rises	L1	D	Hills and rises with very shallow soils on rocky slopes.
AAK	9.4	Steep Hills	L1	D	**AAH** Rolling rises with much rock outcrop. Slopes are 10-30%, relief is less than 30 m. Watercourses are eroded and incised. **AAK** Steep rocky hills with significant water course erosion. Slopes are 30-50%, relief up to 100 m. Main soils: shallow stony loam **- L1a**, with shallow calcareous loam - **A2** and gradational loam on rock - **C2**. Non-arable.
ADA	0.6	Undulating rises	C2L1 A2	D	Non arable rocky rises formed on limestones and calc-siltstones, mainly of the Skillogalee Dolomite Formation, with very shallow loamy soils. **ADA** Undulating rises. Relief is less than 30m, slopes are 3-10%. **ADC** Rolling low hills. Relief is 30-90m, slopes are 3-10%. **ADD** Steep low hills as above. Relief is 30-90m, slopes are 30-50%. **ADG** Undulating rises with eroded watercourses. Relief is less than 30m, slopes are 3-10%. **ADH** Rolling rises with eroded watercourses. Relief is 9-30m, slopes are 10-30%. **ADI** Rolling low hills with eroded watercourses. Relief is 30-90m, slopes are 3-10%. **ADJ** Steep low hills with eroded watercourses. Relief is 30-90m, slopes are 30-50%. **ADL** Very steep hills with eroded watercourses. Relief is 90-300m, slopes are 50-100%. **ADg** Undulating rises with eroded watercourses and scalding. Relief is less than 30m, slopes are 3-10%. **ADh** Rolling rises as above with eroded watercourses and scalding. Relief is 9-30m, slopes are 10-30%. Main soils: gradational loam on rock - **C2** (on gentler slopes), shallow stony loam - **L1a** and shallow calcareous loam - **A2**, with rock outcrop - **RR**.
ADC	1.4	Rolling low hills	L1	D	
ADD	0.6	Steep low hills	L1RR	D	
ADG	1.6	Undulating rises	C2L1 A2	D	
ADH	10.9	Rolling rises	L1	D	
ADI	2.1	Rolling low hills	L1	D	
ADJ	1.2	Steep low hills	L1RR	D	
ADL	0.6	Very steep hills	L1RR	D	
ADg	0.5	Undulating rises	C2L1 A2	D	
ADh	8.2	Rolling rises	L1	D	
AHB	7.2	Rolling rises	L1	D	Rolling rises with quartzite ridges and interbedded valleys on fine-grained rocks, typically Uroonda siltstone member of Tarcowie Siltstone. Relief is 30-90m, slopes are 3-10%. Main soils: shallow stony sandy loam **- L1b**, with rock outcrop – **RR** and shallow calcareous loam - **A2**.
APA	0.3	Undulating rises	L1D1	D	Hills and rises on coarse-grained basement rocks particularly Appila Tillite Formation. **APA** Undulating rises. Relief is less than 30m, slopes are 3-10%. **APH** Rolling rises with eroded watercourses. Gullying affects more than 20% of land. Non arable. Relief is 9-30m, slopes are 10-30%. Main soils: shallow stony sandy loam **- L1b** and sandy loam over (pedaric) clay on rock - **D1**.
APH	0.6	Rolling rises	L1D1	D	
AQB	0.8	Rolling rises	L1	D	Rises formed on quartzites (mostly on the Cradock Quartzite Member of the Burra Group) with shallow rocky soils. **AQB** Rolling rises. Relief is less than 30m, slopes are 10-30%. **AQD** Steep low hills with extensive rock outcrop. Relief is 30-90m, slopes are 30-60%. **AQE** Steep hills. Relief is 90-300m, slopes are 30-50%. Main soils: shallow stony loamy sand **- L1c**, with rock outcrop - **RR** and
AQD	0.6	Steep low hills	L1	D	
AQE	1.6	Steep hills	L1	D	

					gradational loam on rock - **C2**. Suitable for limited grazing land use only, scenic value is high.
DNG	0.1	Gently undulating rises	D1	D	Gently undulating rises. 10-20% gullied and 0-5% scalded. Moderate subsoil salinity. Slopes are 1-3%, relief is less than 30m. Main soils: sandy clay loam over clay on rock - **D1**, with loam over red clay - **D2** and red cracking clay - **E2**.
EFD	0.3	Rolling rises	D7L1	D	Rises and plains with moderately shallow soils overlying hard calcareous rocks, typically Hawker Group siltstones and limestones. **EFD** Rolling rises with minor scalding. Relief: 9-30m, slopes: 10-30%. **EFH** Undulating rises. Relief is less than 30m, slopes are 3-10%. **EFm** Undulating rises with 25% scalding and 10% affected by gullying. Relief is less than 30m, slopes are 3-10%. Main soils: shallow calcareous loam - **A2**, loam over poorly structured clay on rock - **D7** and shallow stony loam to sandy loam - **L1a,b**,
EFH	11.3	Undulating rises	A2D7 L1	D	
EFm	0.4	Undulating rises	A2D7 L1	D	
EHH	0.2	Undulating pediments	A2	V	Gently undulating rises and pediments on calcareous siltstones and limestones such as those of the Wonoka Formation and the ABC Range Quartzite of the Wilpena Group. **EHH** Undulating rises and pediments. Relief is less than 30m, slopes are 3-10%. Gullying affects up to 20% of land, 0-5% is scalded and subsoils are moderately saline. **EHl** Gently undulating rises, 1-3% slope. Severely scalded (10-50% of land affected) and gullied (20% of land affected). Main soils: shallow calcareous loam - **A2**, sandy loam over poorly structured clay on rock - **D7** and shallow stony loam to sandy loam **- L1a,b**, with shallow calcareous sandy loam on calcrete - **B2** and rock outcrop - **RR**.
EHl	3.3	Rocky outcrops	RR	L	
		Gently undulating rises	A2D7 L1	D	
EVW	3.0	Undulating rises	A2	V	Undulating rises with rock outcrops and shallow calcareous soils formed on fine grained calcareous rocks. 5-10% of land is scalded. Slopes are 3-10%, relief is less than 9-30m**.** Main soils: shallow calcareous loam - **A2**, with rock outcrop - **RR**, rubbly calcareous loam on clay - **A5**, shallow calcareous loam on calcrete - **B2** and shallow stony loam - **L1a**.
		Rocky outcrops	RR	C	
EZH	0.5	Undulating rises	A2A5 B2	V	Rises with mostly shallow calcareous soils on weathered siltstones of the Tapley Hill Formation and the Tarcowie Siltstone. **EZH** Undulating rises with rocky outcrops. Gullying affects 10-20% of land, scalding affects around 5%. Slopes are 3-10%, relief is less than 30m. **EZV** Gently undulating rises and pediments with rocky outcrops. Slopes are 1-3%, relief is less than 30m. **EZm** Undulating rise-pediment complex. 10-50% scalded, 5-10% gullied. Relief is 9-30m, slopes are 3-10%. Main soils: ***Rises***: shallow calcareous sandy loam on rock - **A2**, rubbly calcareous sandy loam on clay - **A5** and shallow calcareous sandy loam on calcrete - **B2**. ***Rocky outcrops***: rock outcrop - **RR**, with shallow stony sandy loam - **L1b**, and shallow calcareous sandy loam on calcrete - **B2**.
		Rocky outcrops	RR	C	
EZV	0.6	Gently und. rises	A2A5 B2	V	
		Rocky outcrops	RR	C	
EZm	6.1	Undulating rises	A2A5 B2	V	
		Rocky outcrops	RR	C	
JLV	2.1	Pediments	D4	D	Gently sloping pediments with loamy surfaced soils formed on outwash sediments. 10-50% scalded. Slopes: 1-3%, relief: <9m. Main soils: loam over pedaric red clay - **D4**, with deep moderately calcareous loam - **A3**.
JNH	0.5	Undulating pediments	D4D2 A5	D	Pediments with non-stony clay loamy soils formed on fine grained outwash sediments.

JNI	0.3	Rolling pediments	D4D2 A5	D	**JNH** Undulating pediments with 10-20% of land affected by gullying. Slopes are 3-10%, relief is less than 9m. **JNI** Rolling pediments with more than 20% of land affected by gullying and 0-5% scalded. Slopes are 10-30%, relief is less than 9m. **JNl** Gently sloping pediment plain; gullying affects up to 50% of land, most severe along watercourses. Scalding affects nearly 50% of land. Slopes are 1-3%, relief is less than 9m. Main soils: clay loam over pedaric red clay - **D4**, clay loam over red clay - **D2** and rubbly calcareous loam on clay - **A5** with red cracking clay - **E2**.
JNl	0.8	Gently sloping pediments	D4D2 A5	D	
JXE	1.4	Valley lower slopes	D2	V	Valley lower slopes and pediments with clay loamy soils formed on fine grained sediments and weathering rocks. Slopes are less than 1% Main soils: ***Lower slopes:*** clay loam over red clay - **D2**, with clay loam over clay on rock - **D1** ***Rises:*** clay loam over clay on rock - **D1**, with rock outcrop - **RR**.
		Rocky rises	D1	C	
JYH	1.1	Undulating pediments	D4D1	D	Undulating pediments with mostly clay loamy soils formed on fine grained sediments and weathering rocks. Gullying affects 5-10% of land. Slopes are 3-10%, relief is less than 9 metres. Main soils: clay loam over pedaric red clay - **D4** and clay loam over clay on rock - **D1**, with rubbly calcareous loam on clay - **A5** and gradational loam on rock - **C2**.
JZl	3.4	Gently und. pediments	D4D1 D2	V	Complex of pediments formed on fine grained outwash and weathering rocks, and 20-30% rocky rises. **JZl** Gently undulating pediments and rocky rises. Pediments have between 10-50% of gullied land, with 20-75% scalded. Rises are not affected. Slopes are 1-3% on pediments and 3-10% on rises. **JZm** Undulating pediments and rocky rises. Scalding affects nearly 50% and gullying affects more than 20% of pediments. Rises have less than 5% scalding and around 15% gullying. Slopes are 3-10%, relief is less than 9m on pediments and 9-30m on rises. Main soils: ***Pediments:*** clay loam over pedaric red clay - **D4**, clay loam over clay on rock - **D1** and clay loam over red clay - **D2**, with rubbly calcareous loam on clay - **A5**. ***Rocky rises:*** clay loam over clay on rock - **D1**, with rock outcrop - **RR**.
		Rocky rises	D1	C	
JZm	0.2	Undulating pediments	D4D1 D2	V	
		Rocky rises	D1	C	
KFH	0.5	Pediments	A5	D	Undulating pediments formed on fine grained outwash. 10-20% of land is gullied. Slopes are 3-10%, relief is less than 9m. Main soils: rubbly calcareous clay loam on clay - **A5**, with clay loam over pedaric red clay - **D4**.
KIB	0.3	Pediments	C1A2	V	Complex of pediments and rises. **KIB** Gently sloping pediments with undulating basement rises. KIH Undulating pediments and rises with relief of 10-30m. Slopes are 3-10%. 10-50% of pediments are scalded. **KIm** Moderately sloping pediments and rises. Gullying affects more than 20% of land and scalding affects 5-10%. Slopes are 3-10%. Main soils: ***Pediments:*** gradational sandy loam - **C1**, shallow calcareous loam - **A2** and loam over poorly structured red clay - **D3**, with loam over pedaric red clay - **D4.** ***Rises:*** shallow stony loam **- L1a**, shallow calcareous loam - **A2** and loam over clay on rock - **D1**, with loam over poorly structured clay on rock - **D7**.
		Gently und. rises	L1C1 A2	L	
KIH	1.1	Pediments	C1A2 D3	V	
		Undulating rises	L1A2 D1	L	
KIm	1.1	Pediment	C1A2 D3	V	
		Undulating rises	L1A2 D1	L	

KJB	1.2	Gently und. pediments	C4C3 A6	D	Pediments with clay loamy soils formed on fine grained outwash. **KJB** Gently undulating pediments. Slopes are 1-3%, relief is less than 9m. **KJG** Gently undulating pediments with up to 20% gullying. Slopes are 1-3%, relief is less than 9m. **KJH** Undulating pediments with up to 20% gullying. Slopes are 3-10%, relief is less than 9m. **KJI** Rolling pediments with up to 20% gullying. Slopes are 10-30%, relief is less than 9m. Main soils: hard gradational clay loam - **C4**, friable gradational clay loam - **C3** and gradational calcareous clay loam - **A6**, with rubbly calcareous clay loam on clay - **A5** and clay loam over pedaric red clay - **D4**.
KJG	1.0	Gently und. pediments	C4C3 A6	D	
KJH	2.8	Undulating pediments	C4C3 A6	D	
KJI	0.7	Rolling pediments	C4C3 A6	D	
KLG	0.8	Pediments	A5	D	Gently undulating pediments with predominantly calcareous gradational soils. 10-20% of land is gullied and less than 5% scalded. Slopes are 1-3%, relief is less than 9m. Main soils: rubbly calcareous loam on clay - **A5**, with shallow calcareous loam - **A2**, gradational loam on rock - **C2** and shallow calcareous loam on calcrete - **B2**.
KQV	1.5	Pediments	A5	V	Gently undulating pediments on outwash and low basement rock rises. Up to 10% of pediment land is scalded, and around 5% is gullied. Rises are generally not gullied and scalding occurs on less than 5%. Slopes are 1-3%, relief is less than 9m. Main soils: rubbly calcareous loam on clay - **A5**, with loam over pedaric red clay - **D4** on pediments, and shallow calcareous loam - **A2**, with shallow calcareous loam on calcrete - **B2** and rock outcrop - **RR** on rises.
		Low rises	A2	C	
KRJ	1.0	Valley floors	A3E2 C3	D	Valley floor formed on fine grained alluvium with clay loamy soils. 5-10% of land is gullied and up to 5% is scalded. Main soils: deep moderately calcareous loam - **A3**, red cracking clay - **E2** and friable gradational clay loam - **C3**
XAJ	0.3	Creek flats	M1 M3D4	D	Creek flats formed on variable alluvium. Main soils: deep alluvial loam - **M1**, stony alluvial loam - **M3** and loam over pedaric red clay - **D4**.

PROPORTION codes assigned to 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 to sandy loam (Paralithic, Hypercalcic / Lithocalcic Calcarosol)
Calcareous stony loam to sandy 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.

A5 Rubbly calcareous clay loam to sandy loam on clay (Regolithic, Supracalcic / Hypercalcic 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.

A6 Gradational calcareous clay loam (Pedal, Hypercalcic / Supracalcic Calcarosol)
Calcareous clay loam grading to a well structured very highly calcareous (sometimes rubbly) clay, over a red clayey substrate within 120 cm.

B2 Shallow calcareous sandy loam to loam on calcrete (Petrocalcic, Calcic / Lithocalcic Calcarosol)
Stony calcareous loam, often with a very highly calcareous more clayey subsoil, over sheet calcrete within 50 cm. This grades to rubbly carbonate over weathering basement rock within 150 cm.

C1 Gradational sandy loam (Hypercalcic, Red Kandosol)
Friable sandy to loamy topsoil grading to massive red-brown alkaline loamy to clay loamy 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 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.

C4 Hard gradational clay loam (Sodic, Hypercalcic, Red Dermosol)
Hard setting loam to clay loam grading to a coarsely structured dispersive red clay, highly calcareous with depth, over clayey alluvium. Includes eroded former texture contrast soils.

D1 Sandy loam to clay loam over clay on rock (Hypercalcic / Calcic, Red Chromosol)
Medium thickness hard gravelly sandy loam to clay loam over a friable and finely structured red clay, calcareous with depth, grading to weathering basement rock within 100 cm.

D2 Sandy loam to clay loam over red clay (Calcic / Hypercalcic, Red Chromosol)
Hard setting sandy loam to clay loam (with variable quartzite stones) abruptly overlying a well structured red clay with soft Class I carbonate at depth.

D3 Loam over poorly structured red clay (Calcic, Red Sodosol)
Medium thickness hard loam with up to 50% quartzite stones over a coarsely prismatic dispersive red clay, calcareous with depth over stony and clayey alluvium.

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

D7 Sandy loam to loam over poorly structured clay on rock (Calcic / Hypercalcic, Red Sodosol)
Medium to thick hard sandy loam to loam sharply overlying a coarsely structured dispersive red clay, calcareous with depth, grading to highly weathered kaolinized siltstone or quartzite.

E2 Red cracking clay (Epicalcareous, Epipedal, Red Vertosol)
Dark strongly structured clay grading to a well structured red calcareous medium to heavy clay continuing below 100 cm. Often containing gypsum segregations in subsoil.

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.

L1c Shallow stony loamy sand to sandy loam on quartzite (Paralithic, Leptic Tenosol)
Shallow stony loamy sand to sandy loam, often calcareous with depth, overlying quartzite shallower than 50 cm.

M1 Deep alluvial loam (Calcareous, Regolithic, Brown-Orthic Tenosol)
Very thick brown sandy loam to loam, usually calcareous with depth, continuing below 100 cm.

M3 Stony alluvial loam (Basic, Fluvic, Clastic Rudosol OR Basic, Regolithic, Red-Orthic Tenosol)
Thick to very thick loam to sandy loam with more than 50% quartzite stones overlying boulder beds.

RR Rock outcrop

Further information: DEWNR Soil and Land Program