HSH Horseshoe Land System

Area: 397.7 km^2

Landscape: Arcuate linear quartzite ridges trending south-west to north-east with some pound and basin landforms. Mostly ranges with intervening valleys and rises. Named after The Horseshoe Range, of which Moockra Pound is a prominent feature.

Annual rainfall: 250 – 425 mm average

Geology: Resistant quartzites and siltstones of the Wilpena Group form the ranges, whereas more erodible or softer lithologies underlie calcareous and/or clayey plains and rises.

Topography: Steep rocky quartzite hills forming ranges with associated foothills, rises, pediments and intervening undulating plains west of Carrieton, extending north to west of Cradock.

Elevation: Up to 750 m on the eastern edge of Moockra Pound, but mostly around 600 m on the rim of the pound. North of the pound, elevations are around 350 m where the topography consists of rises.

Relief: Variable, ranging up to 270 m on the very steep eastern side of Moockra Pound, grading to 30 m in the north where rolling rises are more typical.

Typical soils:

- Stony, shallow, calcareous red loam over quartzite (Rudosols) on ridges and upper slopes, occasionally non-calcareous.
- Stony, shallow, loam grading to red clay (Kandosols/Dermosols) on ridges and upper slopes, with or without soft carbonate.
- Loam to clay loam over red clay, with soft carbonate at depth (Chromosols/Dermosols) on pediments and lower slopes.
- Highly erodible calcareous loam to clay loam - (Calcarosols/Tenosols) occur on Tarcowie siltstone, usually on linear valleys, -pediments and low rises around the outer edge of the land system.
- Highly erodible clay loam over prismatic structured red or pale clay with soft carbonate at depth (Sodosols) on Tarcowie siltstone occurs on lower slopes of rises and plains.

Main soils:

L1 (36%) Shallow soil on rock Rocky Rudosol-Tenosol
D1 (19%) Loam over clay on rock Shallow Calcic-Hypercalcic Red Chromosol
RR (11%) Bare rock
D2 (10%) Loam over red clay Calcic-Hypercalcic Red Chromosol-Sodosol

Minor soils:

A2 (8%) Calcareous loam on rock Paralithic Calcarosol
C2 (5%) Gradational loam on rock Shallow Red Dermosol-Kandosol-Calcarosol
D4 (4%) Loam over pedaric red clay Pedaric Red Sodosol-Dermosol

Summary: Range and valley landscape with arcuate ridges and some pound and basin forms. This land system forms a high "spine" of country between the Willochra Plain in the west and the undulating land to the east around Carrieton. Shallow loamy soils are associated with the ranges and deeper red, texture-contrast and gradational soils occur on lower slopes and valley floors. The landscapes exhibit extensive areas affected by gully erosion and scalding, a reflection of the erodible nature of the soils.

Soil Landscape Unit summary: Horseshoe Land System (HSH)

SLU	% of area	Component	Main soils	Prop#	Notes
AAA	0.1	Undulating rises	L1RRA2	D	Rises and hills with shallow rocky calcareous soils formed on fine-grained rocks. Rock outcrops are common. **AAA** Undulating rises. Relief: < 30m, slopes: 3-10%. **AAH** Rolling rises with eroded watercourses; up to 20% of land affected by gullying. Relief is 9-30m, slopes are 10-30%. **AAI** Rolling low hills with eroded watercourses; over 20% of land affected by gullying. Relief is 30-90m, slopes are 3-10%. **AAJ** Steep low hills with eroded watercourses; over 20% affected by gullying. Relief is 30-90m, slopes are 30-50%. Main soils: Shallow stony soils on rock **- L1** and Calcareous loam on rock – **A2**. Rock outcrop - **RR** is common.
AAH	2.2	Rolling rises	L1RRA2	D	
AAI	0.6	Rolling low hills	L1RRA2	D	
AAJ	1.0	Steep low hills	L1RRA2	D	
ABB	0.1	Rolling rises	L1RR	D	Hills and rises with linear rocky quartzite outcrops and shallow rocky soils on interbedded fine-grained rocks. **ABB** Rolling rises. Relief: 9-30m, slope: 10-30%. **ABC** Rolling low hills. Relief: 30-90m, slopes: 10-30%. **ABD** Steep low hills. Relief: 30-90m, slopes: 30-50%. **ABI** Rolling low hills with eroded watercourses. Relief: 30-90m, slopes: 3-10%. **ABK** Steep hills with eroded watercourses. Relief is 90-300m, slopes are 30-50%. Main soils: Shallow stony soils on rock **- L1**. Rock outcrop - **RR** is common.
ABC	3.9	Rolling low hills	L1RR	D	
ABD	0.7	Steep low hills	L1RR	D	
ABI	5.4	Rolling low hills	L1RR	D	
ABK	0.9	Steep hills	L1RR	D	
ACA	1.4	Undulating rises	D1L1	D	Hills and rises with shallow red texture contrast and clay loamy gradational soils formed on limestone. **ACA** Undulating rises. Relief: < 30m, slopes: 3-10%. **ACB** Rolling rises. Relief is 9-30m, slopes are 10-30%. **ACC** Rolling low hills. Relief: 30-90m, slopes: 10-30%. **ACE** Steep hills; soils are shallow and rocky, with rock outcrop common. Relief: 90-300m, slopes: 30-50%. **ACG** Undulating rises with gullying affecting more than 20% of land. Relief is less than 30m, slopes are 3-10%. **ACH** Rolling rises with eroded watercourses. Relief is 9-30m, slopes are 10-30%. **ACI** Rolling low hills with gullying affecting more than 20% of land. Relief is 30-90m, slopes are 10-30%. **ACJ** Steep low hills with gullying affecting more than 20% of land. Soils are shallow and rocky, with rock outcrop common. Relief: 30-90m, slopes: 30-50%. **ACg** Undulating rises with gullying affecting more than 20% of land and scalding affecting 5-10%. Relief is less than 30m, slopes are 3-10%. **ACh** Rolling rises with gullying affecting 10-20% of land and scalding affecting 0-5%. Relief is 9-30m, slopes are 10-30%. Main soils: Clay loam over pedaric red clay on rock - **D1** and Shallow stony soils on rock **- L1**. Rock outcrop - **RR** is common on steeper landscapes.
ACB	0.2	Rolling rises	D1L1	D	
ACC	10.4	Rolling low hills	D1L1	D	
ACE	0.6	Steep hills	D1L1RR	D	
ACG	0.5	Undulating rises	D1L1	D	
ACH	1.2	Rolling rises	D1L1	D	
ACI	4.6	Rolling low hills	D1L1	D	
ACJ	3.5	Steep low hills	D1L1RR	D	
ACg	1.7	Undulating rises	D1L1	D	
ACh	1.9	Rolling rises	D1L1	D	
ADB	0.1	Rolling rises	L1	D	Rises with very shallow stony calcareous soils formed on Skillagollee Dolomite and calcareous fine-grained rock. **ADB** Rolling rises. Relief: < 30m, slopes: 10-30%. **ADI** Rolling low hills with gullying affecting more than 20% of land and scalding affecting 0-5%. Relief is greater than 30m, slope steepness is 10-30%. Non-arable. **ADK** Steep hills with gullying affecting more than 20% of land and scalding affecting 0-5%.
ADI	0.9	Rolling low hills	L1	D	
ADK	0.6	Steep hills	L1RR	D	

					Relief is 90-300m, slopes are 30-50%. Main soils: Shallow stony soils on rock **- L1**. Rock outcrop - **RR** is common on steeper landscapes. Minor soils: gradational red clay-loamy over clay (Red clayey pedaric Dermosols - **C2)**, and Calcareous loam on rock – **A2**.
AFB	0.4	Rolling rises	L1A2	D	Rises and hills with shallow soils on fine grained basement rocks. 20-50% of soils have calcreted layers. **AFB** Rolling rises. Relief is 9-30m, slopes are 10-30%. **AFC** Rolling low hills. Relief: 30-90m, slopes: 10-30%. **AFK** Steep hills with eroded watercourses; more than 20% affected by gullying, non arable. Relief is 90-300m, slopes are 30-50%. Main soils: Shallow stony soils on rock **- L1** and Calcareous loam on rock – **A2**.
AFC	0.4	Rolling low hills	L1A2	D	
AFK	0.2	Steep hills	L1A2	D	
AKB	0.7	Rolling rises	L1	D	Hills and rises with very shallow rocky calcareous soils formed on coarse-grained rocks of the Pre-Cambrian Burra Group including the Rhynie Sandstone and Skillagollee Dolomite. **AKB** Rolling rises. Relief is 9-30m, slopes are 10-30%. **AKE** Very Steep Hills. Relief is greater than 90m, slope steepness is greater than 60%. **AKI** Rolling low hills with eroded watercourses Relief is 30-90m, slopes are 10-30%. **AKM** Undulating rises with scalding and sheet erosion. Relief is less than 30m, slopes are 3-10%. **AKi** Rolling low hills with eroded watercourses and scalding. Relief is 30-90m, slopes are 10-30%. **AKj** Steep low hills with eroded watercourses and scalding. Relief is 30-90m, slopes are 30-50%. Main soils: Shallow stony soils on rock **- L1**.
AKE	10.8	Very Steep Hills	L1	D	
AKI	1.0	Rolling low hills	L1	D	
AKM	0.4	Undulating rises	L1	D	
AKi	0.9	Rolling low hills	L1	D	
AKj	4.1	Steep low hills	L1	D	
APH	0.5	Rolling rises	L1D1	D	Hills and rises on coarse-grained basement rocks particularly Appilla Tillite Formation. **APH** Rolling rises with eroded watercourses. Gullying affects 10-20% of land. Relief: 9-30m, slopes: 10-30%. **API** Rolling low hills with eroded watercourses. Gullying affects more than 20% of land. Non arable. Relief is 30-90m, slopes are 10-30%. **APK** Steep hills with eroded watercourses. Gullying affects more than 20% of land. Non arable. Relief is 90-300m, slopes are 30-50%. Main soils: Shallow stony soils on rock **- L1** and Loam over pedaric red clay on rock - **D1**.
API	0.4	Rolling low hills	L1D1	D	
APK	2.2	Steep Hills	L1	D	
AQC	0.2	Rolling Low Hills	L1	D	Non-arable low hills formed on quartzite (Pound Quartzite Formation) with very shallow rocky soils and bare rocky outcrops. **AQC** Rolling low hills. Relief is 30-90m, slopes are 3-10%. **AQE** Steep hills. Relief is 90-300m, slopes are 30-50%. **AQJ** Steep low hills with gullying affecting more than 20% of land. Non arable. Relief: 30-90m, slopes: 30-50%. **AQi** Rolling low hills with eroded watercourses/gullying affecting more than 20% of land and scalding affecting 10-50%. Relief is 30-90m, slopes are 10-30%. Main soils: sandy, Shallow stony soils on rock **- L1** and Bare rock - **RR**.
AQE	3.6	Steep Hills	L1	D	
AQJ	0.8	Steep Low Hills	L1	D	
AQi	0.1	Rolling Low Hills	L1	D	
DAD	0.1	Rolling rises	D1C2	D	Rolling rises with duplex soils over basement rocks, typically siltstones of the Saddleworth Formation. Calcareous subsoils. Relief is 9-30m, slopes are 10-30%. Main soils: Clay loam over pedaric red clay on rock - **D1** and Gradational loam on rock -**C2**.
DEI	1.0	Rolling rises	D1C2 A2	D	Rolling rises with duplex soils over basement rocks, typically Bunyeroo Formation shale. Calcareous subsoils. 5-10% of land is gullied.

					Relief is 9-30m, slopes are 10-30%. Main soils: Clay loam over pedaric red clay on rock - **D1**, Gradational loam on rock -**C2** and Calcareous clay loam on rock – **A2**.
DHn	0.7	Rolling Rises	D7L1	D	Rises with texture contrast soils formed over sandy weathering rock. Calcareous subsoils. More than 20% is gullied and 10-50% is scalded. Relief is 9-30m, slopes are 10-30%. Main soils: *Rolling Rises:* Loam over poorly structured clay on rock -**D7** and Shallow stony soils on rock **- L1**. *Drainage Lines:* Loam over poorly structured red clay - **D3** and Loam over pedaric red clay - **D4**.
		Drainage Lines	D3D4	M	
DMW	0.4	Pediment	D1D7 M3	V	Pediment and rocky rises complex with texture contrast soils formed on fine-grained rock. Main soils: *Pediment:* Clay loam over pedaric red clay on rock - **D1** and Loam over poorly structured clay on rock - **D7**.Undulating pediment; 5-10% of land is scalded and gullied. Slopes are 3-10%, relief is less than 9m. *Rocky Rises:* Shallow stony soils on rock **- L1**. Relief is less than 30m, slopes are 3-10%.
		Rocky Rises	L1	L	
DNl	0.2	Rolling rises	D2D1	D	Rises with shallow texture contrast soils formed on fine-grained rocks, typically Brachina Shale Formation. The soils have clay loam surface textures. **DNl** Rolling rises. Gullying affects 5-20% of land. Relief is 9-30m, slopes are 10-30%. **DNW** Undulating rises; 5-10% of land is scalded and gullied. Relief is 9-30m, slopes are 3-10%. **DNl** Gently undulating rises. Gullying affects up to 20% of land and scalding occurs on 5-50%. Slopes are 1-3%, relief is less than 30m. **DNn** Rolling rises. Gullying affects up to 20% of land and scalding occurs on 5-50%. Relief: 9-30m, slopes: 10-30%. Main soils: Loam over red clay - **D2** and Clay loam over pedaric red clay on rock - **D1**.
DNW	0.1	Undulating rises	D2D1	D	
DNl	0.2	Gently undulating rises	D2D1	D	
DNn	0.7	Rolling rises	D2D1	D	
DOZ	0.1	Plateau	E2C3 D4	D	Plateau remnant with clayey and texture contrast soils. Weathered rock occurs within 1m depth. Surface gravels are abundant. 10-50% of land is scalded; 10-20% is gullied. Main soils: Red cracking clay **E2**, Friable gradational clay loam - **C3** and Loam over pedaric red clay - **D4**.
DXH	0.3	Undulating rises	D1L1	V	Landscapes with red duplex soils over basement rock or saprolite within one metre of the surface. More than 20% of soils are formed on outwash sediments. Soils formed on basement rock in complex with soils formed in outwash materials. Surface textures are loamy. **DXH** Undulating rises and pediment slopes with gullies affecting 10-20% of land. Relief: 9-30m, slopes: 3-10%. **DXI** Rolling rises and pediment slopes with gullies affecting 10-20% of land. Main soils: *Rises:* Clay loam over pedaric red clay on rock - **D1** and Shallow stony soils on rock - **L1**. Rocky rises have shallow red duplex soils on rock. *Pediments:* Loam over red clay - **D2**, Loam over pedaric red clay - **D4** and Friable gradational clay loam - **C3**. Pediment slopes have red duplex and gradational soils.
		Pediments	D2D4 C3	C	
DXI	1.1	Rolling rises	D1L1	V	
		Pediments	D2D4 C3	C	
DYH	0.3	Undulating pediments	D2D1	V	Landscapes with red duplex soils over basement rock or saprolite within one metre of the surface. More than 20% of soils are formed on outwash sediments. Soils formed on basement rock in complex with soils formed in outwash materials. Surface textures are clay loamy or clay.
		Undulating rises	D1	C	
DYI	0.1	Rolling rises	D1	V	
		Pediments	D2D1	C	

					DYH Undulating pediment slopes and rises with gullies affecting 10-20% of land. *Pediments:* Pediment slopes with red duplex and gradational soils. Slopes are 3-10%. *Undulating Rises:* Rocky rises with shallow red duplex soils on rock. Relief is 9-30m, slopes are 3-10%. **DYI** Rolling rises and pediment slopes with gullies affecting 10-20% of land. *Rolling Rises:* Rocky rises with shallow red duplex soils on rock. Relief is 9-30m, slopes are10-30%. *Pediment:* Pediment slopes with red duplex and gradational soils. Slopes are 3-10%. Main soils: Loam over red clay - **D2** and Clay loam over pedaric red clay on rock - **D1**.
EHm	0.1	Undulating rises	L1	D	Undulating rises with shallow calcareous soils on calc-siltstone and limestone such as those of the Tapley Hill Formation, Wonoka Formation and the ABC Range Quartzite of the Wilpena Group. Gullying affects up to 20% of land and scalding occurs on 5-50%. Slopes are 3-10%, relief is 9-30m. Main soils: Shallow stony soils on rock **- L1**.
ELH	0.3	Undulating rises	L1C2B2	D	Undulating rises with shallow soils formed on Appila Tillite Formation and alluvium. Gullying affects 5-10% of land, scalding affects around 5%. Slopes: 3-10%, relief: 9-30m. Main soils: Shallow stony soils on rock **- L1**, gradational red clay-loam over clay (Red clayey pedaric Dermosols **- C2**) and Shallow calcareous loam on calcrete - **B2**.
EUH	0.1	Undulating rises	L1C2 A2	D	Rises with a complex of red clayey soils and shallow calcareous soils and red texture contrast soils with calcareous subsoils. **EUH** Undulating rises; gullying affects > 20% of land and scalding affects 0-5%. Slopes are 3-10%, relief is 9-30m. **EUI** Rolling rises; gullying affects10-20% of land and scalding affects 0-5%. Relief: 9-30m, slopes: 10-30%. **EUW** Undulating rises gullying affects 5-10% of land and scalding affects 10-50%. Slopes are 3-10%, relief is 9-30m. **EUm** Undulating rises. Slopes: 3-10%, relief: 9-30m. **EUx** Rolling rises. Relief is 9-30m, slopes are10-30%. Main soils: Shallow stony soils on rock **- L1**, Gradational loam on rock -**C2** and Calcareous loam on rock – **A2**.
EUI	0.2	Rolling rises	L1C2 A2	D	
EUW	0.2	Undulating rises	L1C2 A2	D	
EUm	0.2	Undulating rises	L1C2 A2	D	
EUx	0.2	Rolling rises	L1C2 A2	D	
HOV	0.2	Gently undulating rises	D4E2 A5	D	Thin surfaced texture contrast or red clay soils with strong surface structure with calcareous and/or gypsiferous subsoils. Surface gravels are common. Minor scalding occurs. Some drainage lines are weakly incised. This soil-landscape unit is related to the Coonatto association of Blackburn & Baker (1953). Gypsum is commonly found in the deep subsoil. Calcareous rises form a minor component of this soil landscape. **HOV** Gently undulating rises with 10% scalded land. Main soils: Loam over pedaric red clay - **D4**, Red cracking clay - **E2** and Rubbly calcareous loam on clay - **A5**.
JAE	0.5	Creek line	D2D4 M3	D	Pediments with clay loam surface textures on texture contrast and gradational soils. Red clays are also common. **JAE** Creek line. **JAI** Dissected pediments as rolling rises More than 20% of land is gullied. Non arable. Scalding affects less than 5%. Relief is 9-30m, slopes are10-30%. Main soils: Loam over red clay - **D2**, Deep gravelly soil -**M3**, Loam over pedaric red clay - **D4**, Red cracking clay - **E2** and Friable gradational clay loam - **C3**. **D4** and **C3** soils have surfaces which are highly susceptible to water erosion.
JAI	0.2	Rolling rises	D1E2 C3	D	

JFB	1.0	Gently undulating pediments	D2D4 C1	D	Pediments with mostly red texture contrast soils with clay loam surfaces, calcareous soils occupy more than 20% and other gradational soils occupy more than 10%. **JFB** Gently undulating pediments Slopes are 1-3%, relief is less than 9m. **JFH** Undulating pediments with gullying affecting 10-20% of land, scalding affects 0-5%. Slopes are 3-10%, relief is less than 9m. Main soils: Loam over red clay - D2, Loam over pedaric red clay - D4 and Gradational sandy loam - C1.
JFH	0.6	Undulating pediments	D2D4 C1	D	
JMG	0.4	Gently sloping plain	D2D4 A6	D	Pediments and plains with stony, pedaric, red, texture contrast soils with quartz gravel on the surface. **JMG** Gently sloping pediment plain. Gullying affects 10-20% of the land. Slopes: 1-3%, relief: less than 9m. **JMH** Moderately sloping pediment plain. Slopes are 3-10%, relief is less than 9m. Gullying affects 10-20% of land. **JMI** Rolling pediments. Gullying affects 10-20% of land. Slopes are10-30%, relief is less than 9m. **JMl** Gently sloping pediment plain. Gullying affects more than 20% of the land and over 50% is scalded. Slopes are 1-3%, relief is less than 9m. Main soils: quartz gravelly variants of Loam over red clay - **D2**, with subdominant (10-30%) Loam over pedaric red clay - **D4** and Gradational calcareous clay - **A6**.
JMH	0.8	Undulating pediments	D2D4 A6	D	
JMI	0.1	Rolling pediments	D2D4 A6	D	
JMl	0.1	Gently sloping plain	D2D4 A6	D	
JNB	0.2	Gently sloping pediments	D4D2 A5	D	Pediments with non-stony pedaric, texture contrast soils with calcareous subsoils. Surface textures are clay loamy most commonly. **JNB** Gently sloping pediments. Slopes are 1-3%, relief is less than 9m. **JNH** Undulating pediments with 10-20% of land affected by gullying. Slopes: 3-10%, relief: < 9m. **JNY** Drainage line with eroded banks, stable now. **JNk** Plain; 10-20% affected by gullying and 40-50% scalded. Scalding may be more than 50% locally. Main soils: Loam over red clay - **D2**, Loam over pedaric red clay - **D4** and Rubbly calcareous loam on clay - **A5**. Red clay soils occur in minor association.
JNH	0.4	Undulating pediments	D4D2 A5	D	
JNY	0.4	Drainage line	D4D2 A5	D	
JNk	0.1	Plains	D4D2 A5	D	
JXG	1.2	Gently undulating pediments	D2	V	Pediments with texture contrast soils in complex with rocky rises. Most soils have clay loam surfaces. **JXG** Gently undulating pediments in complex with rocky rises. Gullying affects 10-20% of land. Slopes are 1-3%. **JXH** Undulating pediments in complex with rocky rises. Slopes: 3-10%. Gullying affects 10-20% of land. **JXI** Rolling pediments and rocky rises in complex, with soils as above. Slopes are 10-30%, relief is up to 30m. Gullying is severe and affects more than 20% of land on pediments, but less than 10% on rocky rises. **JXl** Gently undulating pediments in complex with rocky rises. Gullying affects 10-20% of land on pediments, and less than 5% on rises. Scalding affects around 10% of pediments and up to 50% in places. Rocky rises have less than 5% scalded land. Slopes are 1-3%. **JXm** Gently undulating pediments in complex with rocky rises. Gullying affects over 20% of land on pediments, and 5-10% on rises. Scalding affects around 10% of pediments and up to 50% in places. Rocky rises have less than 5% scalded land. Slopes are 3-10%. **JXo** Creek line with rocky rises in complex. Unstable gullies affect more than 20% of the land along the watercourse. Up to 10% of watercourse land is scalded. Rocky rises are not gullied or scalded.
		Rocky rises	D1	C	
JXH	2.4	Undulating pediments	D2	V	
		Rocky rises	D1	C	
JXI	1.6	Rolling pediments	D2	V	
		Rocky rises	D1	C	
JXl	1.0	Gently undulating pediments	D2	V	
		Rocky rises	D1	C	
JXm	4.0	Undulating pediments	D2	V	
		Rocky rises	D1	C	
JXo	0.1	Creek line	D2	V	
		Rocky rises	D1	C	

					Main soils on pediments: Loam over red clay - **D2**. Loam over clay on rock - **D1** soils are associated with rocky rises.
JYl	0.2	Pediments	D4D1 D7	D	Gently sloping pediments with mostly clay loam surfaced texture contrast soils and more than 10% soils which are calcareous throughout. Gullying affects over 20% of land and scalding affects 10-50%. Slopes are 1-3% Main soils: Loam over pedaric red clay - **D4** and Loam over clay on rock- **D1**. Significant minor soils include Rubbly calcareous loam on clay - **A5** and Gradational loam on rock - **C2**.
JZH	1.1	Undulating pediments	D4D1 D2	V	Pediment-basement rock complex with pediments with red texture contrast soils and 20-30% rocky rises with shallow texture contrast soils. **JZH** Undulating pediments and rocky rise complex. The rises have 20% gullied land and 5% scalding, the pediments show around 5% gullying and no scalding. Slopes are 3-10%, relief is less than 9m on pediments and 9-30m on rises. **JZl** Gently undulating pediments and rocky rise complex. The pediments have between 10-50% of gullied land, with 20-75% scalded. Rises are not affected. Slopes: 1-3% on pediments; 3-10% on rises. **JZm** Undulating pediments and rocky rise complex. 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. **JZo** Creek flat with rocky outcrops. Over 20% of the creek banks have unstable gullies and more than 50% of the banks are scalded. The rocky outcrops are not scalded or gullied. Main soils: *Pediments and plains:* Loam over pedaric red clay - **D4**, Loam over clay on rock- **D1** and Loam over red clay - **D2** with minor Rubbly calcareous loam on clay - **A5**. *Rocky rises:* Loam over clay on rock- **D1** with 10-30% bare rock.
		Rocky rises	D1	C	
JZl	1.1	Gently undulating pediments	D4D1 D2	V	
		Rocky rises	D1	C	
JZm	2.1	Undulating pediments	D4D1 D2	V	
		Rocky rises	D1	C	
JZo	1.2	Creek flat	D4A5	D	
		Rocky outcrops	RR	C	
KCE	0.2	Creek line	C3A3 M3	D	Plains and pediments of outwash sediments with gradational soils with sandy clay loam surface textures. Soils are mostly not calcareous throughout. **KCE** Creek line. **KCH** Undulating pediments, with 10-20% gullied and minor scalding, up to 5%. Slopes are 1-3%. **KCl** Gently undulating pediments, 10% is gullied and up to 50% is scalded. Slopes: 1-3%, relief: < 9m. Main soils: Friable gradational sandy clay loam - **C3** and Deep moderately calcareous sandy loam - **A3**. Additionally, Deep gravelly soil - **M3** is found associated with creek flats.
KCH	0.4	Undulating pediments	C3A3	D	
KCl	0.1	Gently undulating pediments	C3A3	D	
KIl	0.6	Pediment	C1A2	V	Pediment-basement rock complex. Calcareous soils are common but not dominant. **KIl** Gently sloping pediment-basement complex. *Pediment:* Slope is 1-3%. Main soils on pediment: Gradational sandy loam - **C1** and Calcareous loam on rock – **A2**. *Rises:* Gently undulating basement rises with shallow rocky soils. Relief is 9-30m, slope is 1-3%. Gullying affects 5-20% of land and 5-50% is scalded. Main soils: Shallow stony soils on rock **- L1**, Gradational sandy loam - **C1** and Calcareous loam on rock – **A2**. **KIm** Moderately sloping pediment-basement rise complex. Gullying affects more than 20% of land and
		Gently undulating rises	L1C1 A2	L	
KIm	0.9	Pediment	C1A2 D3	V	
		Undulating rises	L1A2D1	L	

					scalding affects 5-10%. *Pediment:* Slope is 3-10%. Main soils on pediment: Gradational sandy loam - **C1**, Calcareous loam on rock – **A2** and Loam over poorly structured red clay - **D3**. *Rises:* Gently undulating basement rises with shallow rocky, mostly calcareous soils. Relief is 9-30m, slope is 1-3%. Gullying affects 5-20% of land and 5-50% is scalded. Main soils: Shallow stony soils on rock **- L1**, Calcareous loam on rock - **A2** and Loam over clay on rock - **D1**.
KRb	0.3	Gently sloping plains	E2D2	D	Gently sloping plains with gradational or uniform textured soils. Textures are clayey. 5-10% of land is gullied and scalded. Slopes are 1-3%. Main soils on pediments: Red cracking clay - **E2** and Loam over red clay - **D2** with 10-30% of Loam over pedaric red clay - **D4**.
XGT	0.1	Watercourse	M3M1	D	Drainage depressions and watercourses with gravelly loamy alluvial soils. **XGT** Watercourse with eroded, unstable banks. Main soils: Deep gravelly soil -**M3**, Deep alluvial loam - **M1**.
XHS	0.3	Drainage line	M1C1 C3	D	Drainage line with mostly coarse textured soils. Stable banks predominantly. Main soils: Deep alluvial loam - **M1**, Gradational sandy loam - **C1** and Friable gradational sandy clay loam - **C3**.

PROPORTION codes assigned to Soil Landscape Unit (SLU) components:

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

Detailed soil profile descriptions:

A2/L1 Shallow calcareous loam (Paralithic, Hypercalcic / Lithocalcic Calcarosol)(A2) **OR** Shallow stony loam (Calcareous, Paralithic, Leptic Tenosol)(L1)

A3 Deep moderately calcareous (sandy) loam (Calcic Calcarosol)
Calcareous (sandy) loam topsoil grading into loamy-clay loamy subsoil without a significant CO_3 build-up in the subsoil (<20% CO_3 in subsoil). Pediment type Calcarosols.

A5 Rubbly calcareous loamy sand on clay (Supracalcic-Lithocalcic Calcarosol on clay)
Calcareous loamy sand topsoil grading into loamy-clay loamy subsoil on a clayey substrate. Usually rubbly. Clayey substrate occurs at >60 cm and <120 cm.

A6 Gradational calcareous clay loam (Pedal Hypercalcic-Lithocalcic Calcarosol on clayey subsoil)
Calcareous loams to clay loams grading into brown-red clay. Often rubbly.

B2 Shallow calcareous loam on calcrete (Petrocalcic Calcarosol-Rudosol)
Shallow, grey to reddish calcareous sandy to clay loamy soil on calcrete. This includes calcareous Petrocalcic Rudosols.

C1 Gradational sandy loam (Calcic-Hypercalcic Kandosol-Calcarosol)
Friable sandy to loamy topsoil grading into massive red-brown alkaline loamy to clay loamy subsoil.

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

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

D2 Hard 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 Hard clay loam over dispersive red clay (Calcic, Red Sodosol / Sodic, Calcic, Red Chromosol)
Medium thickness hard clay loam with up to 50% quartzite stones over a coarsely prismatic dispersive red clay, calcareous with depth over stony and clayey alluvium.

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

D7 Loam over red clay on rock (Hypercalcic / Calcic, Red Chromosol / Sodosol)
Medium thickness hard gravelly loam over a red clay, friable and finely structured (D1), to hard, coarsely structured and dispersive (D7), calcareous with depth, grading to weathering basement rock within 100 cm.

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.

L1 Shallow stony loam (Paralithic, Leptic Tenosol)
Shallow stony loam often calcareous throughout or with depth, overlying weathering rock shallower than 50 cm.

M1 Alluvial loam (Orthic Tenosol)
Very thick loam with variable gritty or more-clayey lenses, formed over recent alluvium.

M3 Deep gravelly soil (Gravelly Kandosol-Tenosol)
Deep uniform loamy alluvial soils with at least 50% gravel in the major part of the profile.

RR Bare rock

Further information: DEWNR Soil and Land Program