

# SIM Simmonston Land System

**Area:** 50.8 km<sup>2</sup>

**Landscape:** Ranges and pediments system at the northern end of the alluvial Willochra plain. The ranges are linear rocky, quartzitic and the pediments which abut them vary from coalesced fans with red clayey soils, to calcareous rises, often on calcareous basement rock. Ironstone gravel occurs in some red soils. Deep weathering profiles exist in some parts of this land system as indicated by the presence of ferruginous layers and mottled, kaolinised zones which have been exposed by erosion in places. Some pediments which are severely scalded and gullied. ABC Range Quartzite occurs in this land system and typically occurs under gentle to moderately undulating pediments and low rises with erodible, red, texture-contrast soils.

**Annual rainfall:** 250 - 275 mm average

**Geology:** ABC Range Quartzite mostly with Pound Quartzite forming ridges. Inclusions of other lithologies, such as Cambrian Hawker Group limestones and calc-silicate rocks also occur.

**Typical soils:** Calcic, red, pedaric Sodosols/Chromosols on pediment slopes and gently undulating summit surfaces; red clayey, pedaric Dermosols and Vertosols often occur in association. Ironstone gravel amounts range from slight to >50% in surface horizons. Gypsum is often present as a few soft segregations in the subsoil, and may form gypcrete horizons in B-C horizons or weathered rock zone. Very shallow loamy to clay-loamy calcic red Rudosols occur on elongate quartzite ridges typical of this land system. All soils may have extensive gravel as a surface lag and/or throughout the profile.

**Main soils:**

<b>D4</b>	(16%)	Loam over pedaric red clay	(Pedaric Red Sodosol-Dermosol)
<b>A5</b>	11%	Rubbly calcareous loam on clay	(Supracalcic-Lithocalcic Calcarosol on clay)
<b>A3</b>	(10%)	Deep moderately calcareous loam	(Calcic Calcarosol)
<b>D2</b>	(10%)	Loam over red clay	(Calcic-Hypercalcic Red Chromosol-Sodosol)

**Minor soils:**

<b>A4</b>	(8%)	Deep (rubbly) calcareous loam	(Hypercalcic-Lithocalcic Calcarosol)
<b>L1</b>	(8%)	Shallow soil on rock	(Rocky Rudosol-Tenosol)
<b>D1</b>	(7%)	Loam over clay on rock	(Shallow Calcic-Hypercalcic Red Chromosol)
<b>A6</b>	(6%)	Gradational calcareous clay loam	(Pedal Hypercalcic-Lithocalcic Calcarosol on clayey subsoil)
<b>A2</b>	(5%)	Calcareous loam on rock	(Paralithic Calcarosol)

**Summary:** Linear rocky range with pediments and fan deposits. Pediments have red clayey texture contrast soils, calcareous soils occur on calcareous colluvia and calc-siltstones and limestones. Tertiary deep weathering profiles and associated ironstone soils occur in places. Scalding and gullying is severe in parts of the land system.



**Soil Landscape Unit summary:** Simmonston Land System (SIM)

SLU	% of area	Component	Main soils	Prop#	Notes
AMO	2.3	Rolling low hills	L1C2	D	Linear ridge trending northwest to southeast of rolling low hills formed on ABC Range Quartzite. Slopes are 10-30%, relief is 30-90m. Shallow lithosols dominate the ridges and upper slopes, deeper gradational soils occur on mid to lower slopes. Main soils: <u>Shallow stony soils on rock</u> - <b>L1</b> and red gradational soils, <u>Red clayey pedaric Dermosols</u> - <b>C2</b> .
AQC	1.1	Rolling low hills	L1	D	Hills with shallow rocky soils formed on quartzite, such as ABC Range Quartzite.
AQD	4.6	Steep low hills	L1	D	<b>AQC</b> Rolling low hills. Relief is greater than 30m, slopes are 10-30%. Main soils: <u>Shallow stony soils on rock</u> - <b>L1</b> . Minor <u>Gradational loam on rock</u> - <b>C2</b> , soils also occur. Mostly non-arable. <b>AQD</b> Steep low hills as above, with extensive rock outcrop. Relief is less than 90m, slopes are 30-60%. Main soils: <u>Shallow stony soils on rock</u> - <b>L1</b> and <u>Bare rock</u> - <b>RR</b> . Non-arable.
DNW	1.6	Undulating rises	D1	D	Rises with red texture soils formed over basement rock. The soils have clay loam and clay surface textures. <b>DNW</b> Undulating rises with 5-50% of the land affected by scalding. Relief is less than 30m, slopes are less than 10%. Main soils: <u>Loam over red clay</u> - <b>D2</b> and <u>Loam over clay on rock</u> - <b>D1</b> .
EUm	1.7	Undulating Rises	L1C2 A2	D	Undulating rises with a complex of red clay-loamy soils and shallow calcareous soils and red gradational-textured soils. Gullyng affects up to 10% of land and up to 50% is scalded. Relief is less than 30m, slopes are 3-10%. Main soils: <u>Shallow stony soils on rock</u> - <b>L1</b> , <u>Gradational loam on rock</u> - <b>C2</b> and <u>Calcareous loam on rock</u> - <b>A2</b> .
EVm	3.8	Undulating rises	A2	V	Undulating rises with rocky outcrops. Shallow calcareous loamy soils formed on Cambrian hawker Group limestones and calc-siltstones. Relief is less than 30m, slopes are 3-10%. Main soils: <u>Calcareous loam on rock</u> - <b>A2</b> and <u>Bare rock</u> - <b>RR</b> .
		Rocky outcrops	RR	C	
FHV	1.3	Gently undulating plains	J1D4	D	<b>FHV</b> Gently undulating plains and plateau remnants on deeply weathered kaolinized rocks. Soils contain ironstone gravelly layers and surface lag. Nearly 50% of the land is scalded, moderate salinity subsoil occurs. Slopes are 1-3%, relief is less than 9m. Main soils: <u>Ironstone soil with calcareous lower subsoil</u> - <b>J1</b> and <u>Loam over pedaric red clay</u> - <b>D4</b> .
FHm	4.2	Undulating plains	J1D4	D	<b>FHm</b> Undulating plains, nearly 20% of land is affected by gullyng, and up to 50% is scalded.. Slopes are 3-10%, relief is less than 9m. Main soils: <u>Ironstone soil with calcareous lower subsoil</u> - <b>J1</b> and <u>Loam over pedaric red clay</u> - <b>D4</b> . <b>FHv</b> Gently undulating plains, nearly 20% of land is affected by gullyng, and more than 50% is scalded. Slopes are 1-3%, relief is less than 9m. Main soils: <u>Ironstone soil with calcareous lower subsoil</u> - <b>J1</b> and <u>Loam over pedaric red clay</u> - <b>D4</b> .
FHv	3.9	Gently undulating plains	J1D4	D	



JIV	4.3	Gently sloping plain	D4D1 A5	D	<b>JIV</b> Gently undulating plain with some shallow stony rises, scalding affects 10-50%. Slopes are 1-3%, relief is less than 9m. Main soils: <u>Loam over pedaric red clay - D4</u> , <u>Loam over clay on rock- D1</u> , <u>Rubbly calcareous loam on clay - A5</u> .
JMV	4.6	Gently sloping plain	D2D4 A6	D	Plains with stony texture-contrast soils, which often have pedaric clay subsoils. <b>JMV</b> Gently sloping plain, scalding affects 10-50%. Slopes are 1-3%, relief is less than 9m. <b>JMk</b> Level plains, up to 20% is gullied, around 50% is scalded. Slopes are less than 1%. <b>JMI</b> Gently sloping plains. Up to 20% is gullied, around 20-50% is scalded. Slopes are 1-3%, relief is less than 9m. <b>JMv</b> Gently sloping plains. Up to 20% is gullied, over 50% is scalded. Slopes are 1-3%, relief is less than 9m. Main soils: <u>Loam over red clay - D2</u> , <u>Loam over pedaric red clay - D4</u> and <u>Gradational calcareous clay loam - A6</u> . Red clay soils are minor components. Soils fertile, but suffer erosion of thin surface layers, leaving scalds.
JMk	1.3	Plains	D2D4 A6	D	
JMI	11.2	Gently sloping plain	D2D4 A6	D	
JMv	1.7	Gently sloping plain	D2D4 A6	D	
JNV	0.7	Gently sloping pediments	D4D2 A5	D	Pediments with non-stony pedaric, texture contrast soils with calcareous subsoils. Surface textures are clay loamy mostly. <b>JNV</b> Gently sloping pediments. Scalding affects 10-50% of land. Slopes are 1-3%, relief is less than 9m. <b>JNn</b> Rolling pediments. Gullyng affects 20% of the land, scalding affects up to 10%. Slopes are 10-30%, relief is < 9m. Main soils: <u>Loam over red clay - D2</u> , <u>Loam over pedaric red clay - D4</u> and <u>Rubbly calcareous loam on clay - A5</u> . Red clay soils occur in minor association.
JNn	4.4	Rolling pediments	D4D2 A5	D	
JZG	0.7	Gently undulating pediment	D4A5	V	Pediment-basement rock complex with red texture contrast soils on pediments and 20-30% rocky rises with shallow texture contrast soils. <b>JZG</b> Gently undulating pediment-basement rises complex, gullyng affects 10-20% of land.
		Rocky outcrops	RR	C	
JZII	2.1	Rolling pediment	D4A5	V	<b>Pediments:</b> Slopes are 1-3%, relief is under 9m. Main soils: <u>Loam over pedaric red clay - D4</u> , <u>Loam over clay on rock- D1</u> and <u>Loam over red clay - D2</u> with minor <u>Rubbly calcareous loam on clay - A5</u> .
		Rocky outcrops	RR	C	
JZk	7.1	Plains	D4D1 D2	V	<b>Rocky rises:</b> Mainly <u>Bare rock - RR</u> . <b>JZII</b> Rolling pediment- basement rises. <b>Pediments:</b> Gullyng affects >50% of land. Slopes are 10-30%, relief is less than 9m. <b>Rocky outcrops:</b> Mainly <u>Bare rock - RR</u> . <b>JZk</b> Plains-basement rises complex, with very gentle slopes of less than 1%. Nevertheless, gullyng affects more than 20% of the pediments and 10-20% of the rises. Scalding affects more than 50% of the pediments and 5% of the rises.
		Rocky rises	D1	C	
JZI	2.2	Gently undulating pediments	D4D1 D2	V	<b>Plains:</b> Main soils: <u>Loam over pedaric red clay - D4</u> , <u>Loam over clay on rock- D1</u> and <u>Loam over red clay - D2</u> with minor <u>Rubbly calcareous loam on clay - A5</u> . <b>Rocky rises:</b> Main soil: <u>Loam over clay on rock- D1</u> <b>JZI</b> Pediment-basement rises complex, similar in soils and rocky rise occurrence to <b>JZB</b> above. Pediments have gentle slopes of 1-3%. Gullyng affects more than 20% of the pediments and 10-20% of the rises. Scalding affects more than 50% of the pediments and less than 5% of the rises. <b>Pediments:</b> Slopes are 1-3%, relief is under 9m.
		Rocky rises	D1	C	



					Main soils: <u>Loam over pedaric red clay - D4</u> , <u>Loam over clay on rock- D1</u> and <u>Loam over red clay - D2</u> with minor <u>Rubbly calcareous loam on clay - A5</u> . <b>Rocky rises:</b> Main soil: <u>Loam over clay on rock- D1</u> .
KTV	1.3	Pediment	E2C3 D4	D	Gently undulating pediment with non-calcareous and calcareous gradational soils. Slopes are 10-30%. Main soils: <u>Red cracking clay - E2</u> , <u>Friable gradational clay loam - C3</u> and <u>Loam over pedaric red clay - D4</u> . Soils are generally inherently fertile.
KLV	11.3	Gently undulating pediment	A5	D	Gently undulating pediment with clay loamy calcareous soils. Scalding affects 5-10% of the land in the map unit. Slopes are 1-3%, relief is less than 9m. Main soils: <u>Rubbly calcareous clay loam on clay - A5</u> . Minor soils: <u>Calcareous clay loam on rock - A2</u> , <u>Gradational red-brown clay loam over rock-C2</u> and <u>Shallow calcareous loam on calcrete - B2</u> .
KPI	18.2	Gent sloping pediment	A3A4	D	Gently Sloping pediment with sandy surface-textured, gradational, calcareous soils. Scalding affects 10-50% of land and up to 5% is gullied. Slopes are 1-3%, relief is less than 9m. Main soils: <u>Deep moderately calcareous sandy loam - A3</u> and <u>Deep (rubbly) calcareous sandy loam -A4</u> .
XAZ	4.5	Flood plain	M1M3 D4	D	Flood plain with mixed alluvium. Soil surfaces are scalded with up to 50% of land affected. Main soils: <u>Deep alluvial loam - M1</u> , <u>Deep gravelly soil -M3</u> and <u>Loam over pedaric red clay - D4</u> . Prone to flooding.

# 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, Hypercalic / Lithocalic Calcarosol)(A2) OR Shallow stony loam (Calcareous, Paralithic, Leptic Tenosol)(L1)

Shallow stony loam, calcareous throughout or with depth, overlying weathering rock shallower than 50 cm.

**A3** Deep moderately calcareous (sandy) loam (Calcic Calcarosol)

Calcareous (sandy) loam topsoil grading into loamy-clay loamy subsoil without a significant CO<sub>3</sub> buildup in the subsoil (<20% CO<sub>3</sub> in subsoil). Pediment type Calcarosols.

**A4** Deep (rubbly) calcareous loam (Hypercalic-Lithocalic Calcarosol)

Calcareous sandy-clay loamy topsoil grading into loamy-clay loamy subsoil with a significant CO<sub>3</sub> buildup in the subsoil. Often rubbly. Soil usually >120 cm in depth

**A5** Rubbly calcareous loamy sand on clay (Supracalcic-Lithocalic 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 Hypercalic-Lithocalic 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.
- 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.
- 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.
- 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.
- J1** Ironstone soil with calcareous lower subsoil (Ferric Calcic Brown Sodosol-Chromosol-Dermosol)  
Ironstone gravelly soil with a brown alkaline clayey subsoil with a calcareous layer within the profile. Usually clay-loam topsoil with a bleached subsurface layer.
- 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](#)

