TIL Tilkilki Land System

Area: 318 km^2

Landscape: Pediments and valley floors between ranges. Soils are mostly calcareous and the landscape is moderately dissected with some severe erosion in places. Occasional hard rock rises with shallow soils protrude through the pediment slopes.

Annual rainfall: 225 - 275 mm average range, but over 90% receives 250 - 275mm annual average

Geology: The land is largely underlain by Proterozoic Age Umberatana Group tillites, sandstones and siltstones of the Adelaide Geosyncline, with pediments and plains covered by colluvial/alluvial deposits of Pleistocene and Holocene ages.

Main soils:	**A4** (21%) Deep (rubbly) calcareous loam **D4** (19%) Loam over pedaric red clay	Hypercalcic-Lithocalcic Calcarosol Pedaric Red Sodosol-Dermosol
	A3 (15%) Deep moderately calcareous loam	Calcic Calcarosol
	A2 (13%) Calcareous loam on rock	Paralithic Calcarosol
	M4 (12%) Deep hard gradational sandy loam	Hard Brown-Dark Kandosol- Dermosol
Minor soils:	**A5** (7%) Rubbly calcareous loam on clay	Supracalcic-Lithocalcic Calcarosol on clay
	L1 (4%) Shallow soil on rock	Rocky Rudosol-Tenosol
	C2 (4%) Gradational loam on rock	Shallow Red Dermosol-Kandosol-Calcarosol

Summary: The Tilkilki Land System consists of broad pediments and valley floors between ranges with occasional hard rock rises mainly Umberatana Group tillites, siltstones and sandstones. Soils are mostly gradational and calcareous, but pedaric red duplex soils are common. as are non calcareous gradational soils.

Soil Landscape Unit summary: Tilkilki Land System (TIL)

SLU	% of area	Component	Main soils	Prop#	Notes
AAD	0.4	Steep peak	L1A2	D	Dissected, rocky, steep low hills on limestone and calc-siltstone with very shallow loamy soils. Relief is 30-90m, slopes are 30-50%. Main soils: Shallow stony soils on rock **- L1** and Calcareous loam on rock – **A2**.
ADA	1.2	Rise	A2L1	V	Non-arable rocky rises with thin soil cover formed on limestone and calc-siltstone with very shallow loamy soils. **ADA** Undulating rises with very shallow stony calcareous soils formed on Skillagollee Dolomite and calcareous fine-grained rock. Fans occur in association. Relief is less than 30m, slopes are 3-10%. **ADB** Rolling rises and fans. Relief is 9-30m, slopes are 10-30%. Main soils:
		Fan	A3M1	C	
ADB	0.3	Rise	A2L1	D	

					Rises: Calcareous loam on rock – **A2** and Shallow stony soils on rock **- L1**. ***Fans:*** Deep moderately calcareous loam - **A3** and Deep alluvial loam - **M1**.
AEA	0.2	Rise	L1	D	Non-arable rocky rises formed on mostly fine-grained rocks. Soils are very shallow and more than 20% are petrocalcic (contain a calcrete layer). **AEA** Gently sloping rises with mostly very shallow loam on fine grained rock or bare rock, not or slightly calcareous. Relief is less than 30m, slopes are 1-3%. **AEB** Rolling rises. Relief is 9-30m, slopes are 10-30%. Main soils: Shallow stony soils on rock **- L1**.
AEB	0.8	Ridge	L1	D	
AUA	0.5	Rise	L1A2	D	Non-arable, gently sloping rocky rises formed mainly on quartzite, but the soils are mostly calcareous. Relief is less than 30m, slopes are 3-10%. Main soils: Shallow stony soils on rock **- L1** and Calcareous loam on rock – **A2**.
AYA	0.3	Rise	A2L1	D	Hills and rises on fine-grained rocks, especially siltstones of the Tapley Hill Formation. More than 20% of soils contain secondary carbonate. **AYA** Undulating rises. Relief is less than 30m, slopes are 3-10%. **AYI** Rolling rises with eroded watercourses; 10-20% of land is gullied. Relief is 30-90m, slopes are 10-30%. **AYM** Undulating rises. Scalded. Relief is less than 30m, slopes are 3-10%. **AYT** Rolling rises with scree slopes. Relief is 9-30m, slopes are 10-30%. Main soils: Calcareous loam on rock – **A2** and Shallow stony soils on rock - **L1**.
AYI	0.7	Rise	A2L1	D	
AYM	1.1	Rise	A2L1	D	
AYT	0.1	Rise	A2L1	D	
AZB	1.7	Rise	A2L1	V	Non-arable, bare, rocky rolling rises formed on Ulupa Siltstone Formation siltstones and shales. Pediments and outwash fans and valley infill form in complex with the basement rises. 10-20% pediments with texture contrast loam over red clay. Watercourses are eroded, 10-20% of land on the pediments is gullied. Relief is 30-90m, slopes are 10-30%. Main soils: ***Rises:*** Calcareous loam on rock – **A2** and Shallow stony soils on rock **- L1**. ***Fans:*** Gradational loamy sand - **M4** and Friable gradational clay loam - **C3**.
		Fan	M4C3	C	
EaV	0.4	Rise	A2A4	D	Gently undulating rises formed over basement rock / saprolite within one metre of the surface. Soils are not texture contrast and are calcareous in some part of the profile. Less than 90% of soils are Calcarosols. Most soils are formed on quartzites. Less than 20% are Chromosols or Dermosols. More than 20% are Dermosols or Sodosols on kaolinised rock. Ironstone gravels may be present. Moderately scalded (5-10%). Slopes are 1-3%, relief is less than 30m. Main soils: Calcareous loam on rock – **A2** and Deep (rubbly) calcareous sandy loam **-A4**.

EEV	0.3	Rise	A2	D	Gently undulating rises with mostly gradational calcareous soils, containing carbonate concretions or hard calcrete fragments. Moderately scalded. Slopes are 1-3%, relief is less than 30m. Main soils: Calcareous loam on rock – **A2**.
EFB	0.9	Rise	A2	D	Gently undulating rises with moderately shallow soils overlying hard calcareous rocks, typically siltstones and limestones. Minor scalding may be present. Slopes are 1-3%, relief is less than 30m. Main soils: Calcareous loam on rock – **A2**.
EGB	1.9	Rise	A2	V	Gently undulating rises and fans formed over basement rock / saprolite within one metre of the surface. Soils are not texture contrast and are calcareous in some part of the profile. 20-50% of soils are Calcarosols. Slopes are 1-3%, relief is less than 30m. Main soils: ***Rises:*** Calcareous loam on rock – **A2**. ***Fans:*** Deep moderately calcareous loam - **A3** and Gradational loamy sand - **M4**.
		Fan	A3M4	C	
EHB	2.0	Rise	A2	E	Rises and fans on calcareous siltstones and limestones such as those of the ABC Range Quartzite Formation of the Wilpena Group. **EHB** Gently sloping rises and fans Slopes are 1-3%, relief is 9-30m. **EHG** Gently sloping rises and fans. Drainage lines are incised and gullying is common. Relief is 9-30m, slopes are 1-3%. Main soils: ***Rises:*** Calcareous loam on rock – **A2**. ***Fans:*** Deep moderately calcareous loam - **A3** and Gradational loamy sand - **M4**.
		Fan	A3M4	E	
EHG	2.2	Rise	A2	E	
		Fan	A3M4	E	
EJB	0.1	Rise	A2A4	D	Gently undulating rises and fans formed over basement rock / saprolite within one metre of the surface. Soils are not texture contrast and are calcareous in some part of the profile. Less than 50% of soils are Calcarosols. Slopes are 1-3%, relief is less than 30m. Main soils: Calcareous loam on rock – **A2** and Deep (rubbly) calcareous sandy loam **-A4**.
EVB	0.9	Rise	A2L1	D	Gently undulating rises with rock outcrops and shallow calcareous soils formed on fine-grained calcareous rocks. Slopes are 1-3%, relief is less than 30m. Main soils: Calcareous loam on rock – **A2** and Shallow stony soils on rock **- L1**.
EZB	1.5	Rise	A2	V	Rises with mostly shallow calcareous soils on weathered siltstones of the Tapley Hill Formation and the Tarcowie Siltstone. Fans are associated landforms. **EZB** Gently undulating rises with rocky outcrops. Up to 5% of land is gullied and/or scalded. Subsoils are moderately saline. Slopes are 1-3%, relief is less than 30m. **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. **EZl** Gently undulating rises with rocky outcrops, severely scalded
		Fan	A3A4	C	
EZH	0.3	Rise	A2	V	
		Fan	A3A4	C	
EZV	0.4	Rise	A2	V	
		Fan	A3A4	C	
EZl	4.2	Rise	A2	E	
		Fan	A3A4	E	
EZm	1.8	Rise	A2	E	
		Fan	A3A4	E	

					(40-50% of land affected) and gullied (20% of land affected). Slopes are 1-3%, relief is less than 30m. **EZm** Undulating rises with rocky outcrops. Gullying affects around 20% of land and scalding affects around 15%. Slopes are 3-10%, relief is less than 30m. Main soils: ***Rises:*** Calcareous loam on rock – **A2**. ***Fans:*** Deep moderately calcareous loam - **A3** and Deep (rubbly) calcareous sandy loam **-A4**.
JIl	2.2	Fan	D4	D	Gently sloping alluvial fan with red texture-contrast soils. Gullying affects 5-50% of land. Scalding affects nearly 50% of land. Slopes are 1-3%, relief is less than 9m. Main soils: Loam over pedaric red clay - **D4**.
JLo	1.3	Drainage depression	D4	D	Plains and pediments with more than 20% pedaric, texture contrast (loam over crumbly red clay) soils, but less than 20% calcareous gradational soils. **JLo** Creek flat. Moderately gullied (10-20%) and scalded (10-50%). Moderately saline subsoils. **JLU** Plains. Moderately scalded (10-50%). Subsoils are moderately saline. **JLu** Flat, severely scalded (>50%). Main soils: Clay loam over pedaric red clay - **D4** and Loam over pedaric red clay on rock - **D1**, with minor occurrences of Deep moderately calcareous loam - **A3**.
JLU	0.1	Flat	D4A3	D	
JLu	0.2	Flat	D4A3	D	
JMU	1.5	Flat	D4D3	D	Plains with stony, pedaric, red, texture contrast soils with quartz gravel on the surface. **JMU** Moderately scalded (5-10%) plains. **JMy** Severely scalded (0ver 50%) plains. Moderately saline. Main soils: quartz gravelly variants of Clay loam over pedaric red clay - **D4** and Loam over poorly structured red clay - **D3**.
JMy	0.8	Flat	D4D3	D	
JPE	1.1	Drainage depression	D4	D	Pediments and plains with texture contrast soils formed on outwash sediments derived from basement rocks. Calcareous in some part of the profile. More than 20% of soils are pedaric (fine crumbly structure in subsoils). **JPE** Drainage depression. **JPG** Gently sloping fan. Moderately gullied, slightly saline and scalded. Slopes are 1-3%, relief is less than 9m. **JPk** Plains. Moderately gullied (10-20%) and scalded (5-10%). **JPo** Creek flats. Moderately gullied (10-20%) and scalded (10-50%). **JPp** Level plains. Severely scalded (over 50%). **JPPz** Plains. Moderately gullied (10-20%) and saline (saline throughout soil profiles), severely scalded (over 50%). **JPq** Gently sloping plains. Severely scalded (over 50%). Slopes are 1-3%, relief is less than 9m. **JPv** Gently sloping fan, moderately gullied (10-20%) and severely scalded (more than 50%). Subsoils are saline. Slopes are 1-3%, relief is less than 9m **JPyy** Drainage depression. Severely gullied (over 20%) and scalded (over 50%). Main soils: Clay loam over pedaric red clay - **D4**.
JPG	0.5	Fan	D4	D	
JPk	0.3	Flat	D4	D	
JPo	1.5	Drainage depression	D4	D	
JPp	0.6	Flat	D4	D	
JPpz	0.9	Flat	D4	D	
JPq	1.9	Fan	D4	D	
JPv	0.9	Fan	D4	D	
JPyy	1.7	Drainage depression	D4	D	

JZp	1.2	Flat	D4	D	Pediment-basement rock complex with gently sloping pediments with red texture contrast soils and 20-30% rocky rises with shallow texture contrast soils. **JZp** Flat or plain with over 50% affected by scalding. **JZq** Gently sloping fan and rocky rises, severely scalded (over 50%). Slopes are 1-3%, relief is less than 9m. **JZyy** Drainage depression with rocky rises. Severely gullied (over 20%) and scalded (over 50%). Main soils: ***Fans and plains:*** Clay loam over pedaric red clay - **D4**. ***Rises***: Calcareous loam on rock **– A2**
JZq	1.4	Fan	D4	V	
		Rise	A2	L	
JZyy	1.8	Drainage depression	D4	V	
		Rise	A2	L	
KcB	5.5	Fan	A4	D	Fans with mostly gradational calcareous soils, but with more than 20% non-calcareous gradational soils (Kandosols). **KcB** Gently sloping fans. Slopes are 1-3%, relief is less than 9m. **KcH** Undulating fans. Moderately gullied (10-20%). Slopes are 3-10%, relief is less than 9m. **Kcl** Gently sloping plain with 10-20% land gullied and 5-10% scalded. Relief is less than 9m, slopes are 1-3%. **KcV** Gently undulating pediment. Gullying affects up to 5% of land and scalding affects 5-10%. Slopes are 1-3%, relief is less than 9m. Main soils: Deep (rubbly) calcareous sandy loam **-A4**.
KcH	2.3	Fan	A4	D	
Kcl	1.4	Fan	A4	D	
KcV	2.2	Fan	A4	D	
KFB	4.5	Fan	A5A4	E	Pediments and plains with calcareous gradational soils and more than 20% red pedaric texture-contrast soils. **KFB** Gently sloping fan. Slopes are 1-3%, relief is less than 9m. **KFG** Gently undulating fan with 10-20% of land gullied and 0-5% is scalded. Subsoils are moderately saline. Slopes are 1-3%, relief is less than 9m. **KFQz** Gently sloping fan. Severely scalded(over 50%), moderately saline and gullied Slopes are 1-3%, relief is less than 9m. **KFV** Gently sloping fan. 5-10% scalded Slopes are 1-3%, relief is less than 9m. **KFl** Gently sloping pediments as above. Moderately gullied (10-20%) and scalded (10-50%). Slopes are 1-3%, relief is less than 9m. **KFv** Gently sloping fan. Moderately scalded (20-50%), gullied and saline. Slopes are 1-3%, relief is less than 9m. Main soils: ***Fans:*** Rubbly calcareous loam on clay - **A5**, Deep (rubbly) calcareous sandy loam **-A4**. ***Rises***: Calcareous loam on rock **– A2** and Deep (rubbly) calcareous sandy loam **-A4**.
		Rise	A2A4	E	
KFG	1.7	Fan	A5A4	V	
		Rise	A2A4	C	
KFQz	0.3	Fan	A5A4	D	
KFV	4.8	Fan	A5A4	E	
		Rise	A2A4	E	
KFl	2.5	Fan	A5A4	V	
		Rise	A2A4	C	
KFv	0.6	Fan	A5A4	E	
		Rise	A2A4	E	
KgV	0.3	Fan	A3M3	D	Gently undulating fans with over 50% gradational calcareous soils of which most have more than 20%gravel or stone (non-pedogenic). Moderately scalded (10-50%). Slopes: 1-3%, relief is less than 9m. Main soils: Deep moderately calcareous loamy sand - **A3** and Deep gravelly soil -**M3**.
KLB	6.2	Fan	A5A4	V	Fans and rises with clay loamy calcareous soils. Subsoils are moderately saline.
		Rise	A2A4	C	
KLC	0.1	Rise	A2	E	

		Fan	A5A4	E	**KLB** Gently undulating fans and rises. Subsoils have moderate salinity. Slopes are 1-3%, relief is less than 9m. **KLC** Undulating rises and fans with 0-5% scalded and gullied land. Subsoils have moderate salinity. Slopes are 3-10%, relief is less than 9m. **KLU** Level plains with 5-10% scalding. **KLV** Gently undulating fans with 0-5% gullying and 5-10% scalding. Slopes are 1-3%, relief is less than 9m. Main soils: ***Fans:*** Rubbly calcareous loam on clay - **A5** and Deep (rubbly) calcareous sandy loam **-A4**. *Rises:* Calcareous loam on rock **– A2** and Deep (rubbly) calcareous sandy loam **-A4**.
KLU	0.2	Flat	A5A4	D	
KLV	0.2	Fan	A5A4	D	
KOB	4.9	Fan	A4A5	V	Gently sloping fans and rises with calcareous soils occupying more than 80% of land. Slopes are 1-3%, relief is less than 9m. Main soils: ***Fans:*** Deep (rubbly) calcareous sandy loam -**A4** and Rubbly calcareous loam on clay - **A5**. ***Rises***: Deep (rubbly) calcareous sandy loam **-A4**.
		Rise	A4	C	
KQLz	0.2	Rise	A4	D	Gently sloping pediment and basement-rise complexes with mostly calcareous gradational soils. High salinity throughout soils and 10-50% scalded. Slopes are 1-3%, relief is less than 9m. Main soils: Deep (rubbly) calcareous sandy loam **-A4**.
KVA	0.9	Flat	A4A3	D	Pediments and plains formed on calcareous outwash sediments derived from basement rock. More than 90% of soils are calcareous throughout (Calcarosols). Moderately saline soils throughout. **KVA** Flats **KVB** Gently sloping plains. Slopes are 1-3%, relief is less than 9m. **KVE** Flats, moderately scalded (10-50%) **KVU** Level plains, moderately scalded (10-50%). **KVy** Drainage depression, severely scalded (over 50%) and moderately gullied (10-20%). Main soils: Deep (rubbly) calcareous sandy loam **-A4** and Deep moderately calcareous loamy sand - **A3**.
KVB	0.5	Fan	A4A3	D	
KVE	1.1	Flat	A4A3	D	
KVU	0.3	Flat	A4A3	D	
KVy	0.9	Drainage depression	A4A3	D	
KXB	3.5	Fan	M4A3	D	Fans and flats with non texture-contrast soils formed on outwash sediments, calcareous in some part of the profile. More than 50% are Tenosols, Kandosols or Rudosols. Less than 50% have more than 20% gravel or stone, excluding pedogenic carbonate. **KXB** Gently sloping pediments. Slopes are 1-3%, relief is less than 9m. **KXF** Flat. Moderately gullied (10-20%). **KXG** Gently sloping pediments. Moderately gullied (10-20%). Slopes are 1-3%, relief is less than 9m. **KXU** Flat, Moderately scalded (5-10%). Main soils: Gradational loamy sand - **M4** and Deep moderately calcareous loamy sand - **A3**.
KXF	3.4	Flat	M4A3	D	
KXG	6.5	Fan	M4A3	D	
KXU	0.7	Flat	M4A3	D	

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/L1 Shallow calcareous loam (Paralithic, Hypercalcic / Lithocalcic Calcarosol)(**A2**)
Gradational calcareous sandy loam over clay loam on weathered rock.
OR Shallow stony loam (Calcareous, Paralithic, Leptic Tenosol)(**L1**)
Shallow calcareous sandy loam on rock.

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

A4 Deep (rubbly) calcareous loam (Hypercalcic-Lithocalcic Calcarosol)
Calcareous sandy-clay loamy topsoil grading into loamy-clay loamy subsoil with a significant CO_3 buildup in the subsoil. Often rubbly. Soil usually >120 cm in depth

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.

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.

D3 Loam over poorly structured red clay (Calcic-Hypercalcic Red Sodosol-Chromosol)
Topsoil <30 cm over poorly structured subsoil. Hard-setting loamy to clay loamy texture-contrast soil with a prismatic/poorly structured red alkaline clayey subsoil. Often with a thin topsoil. Can have slightly to moderately calcareous surface soil.

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.

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.

M4 Gradational loamy sand (Hypocalcic, Red / Brown Kandosol)
Medium to thick massive (often powdery) loamy sand to sandy loam grading to a red or brown sandy clay loam becoming more clayey and weakly calcareous with depth.

Further information: DEWNR Soil and Land Program