SUG Sugarloaf Land System

Rises, pediments and associated drainage lines formed on limestones and calc-siltstones. Named from Watt Sugarloaf, a prominent hill in the adjacent Black Jack Range southwest of Hawker.

Area: 126 km²

Rainfall: 250 - 325 mm annual average (mostly 275 - 300 mm)

Geology: Predominantly calcareous rocks including limestones, calc-siltstones and calcareous shales

of the Hawker Group of the northern Flinders Ranges. Included are occurrences of calc-

siltstones typical of the Tapley Hill Formation.

Elevation: Over 550 m asl on hills in the northeast, grading to 240m on valley floors in the southwest.

Most of the land system has elevations in the 250-350m range.

Relief: Mostly around 10 - 20 m, with the exception of hills in the northeast where relief is up to 70

m.

Soils: Shallow rocky soils and calcareous loamy soils on rock occupy three quarters of the land

system, with rubbly calcareous gradational soils typical on gentle rises and pediment slopes.

Main soils: L1a Shallow stony loam (on rock)

A2 Calcareous loam to sandy loam (on rock)

A5 Rubbly calcareous loam to sandy loam on clay (on outwash)

Minor soils: On rock

B2 Shallow calcareous loam on calcrete

C2 Gradational sandy loam to clay loam on rock

D1 Loam to clay loam over clay on rock

D7 Loam over poorly structured clay on rock

G1 Moderately deep sand
L1b Shallow stony sandy loam
L1c Shallow stony loamy sand
L1d Shallow stony clay loam

L1e Shallow drift sand RR Rock outcrop

On outwash or reworked deposits

A3 Deep moderately calcareous sandy loam to loam

Deep (rubbly) calcareous sandy loam

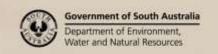
A6 Gradational calcareous clay loam

C1 Gradational sandy loamC3 Friable gradational clay loamD4 Clay loam over pedaric red clay

D5 Hard loamy sand over red clay

E2 Red cracking clay

M3 Deep gravelly sandy loam





Summary:

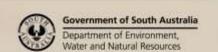
Limestones and calc-siltstones underlie the rolling to undulating landscape. Shallow calcareous gradational soils are common on the rises, with deeper calcareous soils formed on pediments and outwash sediments.

Soil Landscape Unit summary: 45 Soil Landscape Units (SLUs) mapped in the Sugarloaf Land System

SLU	% of area	Component	Main soils	Prop#	Notes	
AAD	2.9	Steep low hills	L1	D	Dissected rocky steep rises to steep low hills formed on limestone and calc-siltstone with very shallow sandy loam to loam soils.	
AAS	5.4	Rolling rises	L1	D	AAD Steep low hills. Relief is 30-90m, slopes are 30-50%.	
AAV	1.2	Steep rises	L1	D	AAS Dissected rolling rises. Scalding & sheet erosion are common. Soils are mostly shallow, but occasionally, moderately deep in drainage lines. Relief is 9-30m, slopes are 10-30%. AAV Steep rises forming a low west-facing scarp. Extensive rock outcrop. Relief is 9-30m, slopes are 30-56%. Main soils: shallow calcareous loam - A2.	
ADB	12.6	Rolling rises	L1	D	Rocky rises with thin soil cover formed on limestone and calc-	
ADg	0.1	Gently undulating rises	L1	D	siltstone with very shallow loamy soils. ADB Rolling rises formed on calcareous fine-grained Wonoka Formation siltstone, shale and limestone. Relief is 9-30m, slopes	
ADJ	2.3	Steep rises	L1C2 A2	D	are 10-30%. ADg Dissected and gullied gently undulating rises on calcareous Wonoka Formation. Slopes are 1-3%, relief is less than 30m. ADJ Steep rises on Cambrian Hawker Group limestone. Relief is 9-30m, slopes are 30-56%. Main soils: shallow stony loam - L1a, with gradational loam on rock - C2, shallow calcareous loam - A2 and loam over clay on rock - D1.	
AQA	0.3	Undulating rises	L1	D	Rises and low hills formed on Pound Quartzite with very shallow rocky soils and rocky outcrops.	
AQC	0.4	Rolling low hills	L1	D	AQA Undulating low foothills. Relief < 30m, slopes are 3-10%. AQC Rolling low hills. Relief is 30-90m, slopes are 3-10%. Main soils: shallow stony loamy sand - L1c, with gradational sandy loam on rock - C2.	
DMH	1.6	Lower slopes and rises	D1D7 M3	D	Undulating lower slopes and rises adjacent to Kanyaka Hill. Soils overlie Hawker Group calcareous shales and limestone. Gullying affects 10-20% of the land. Soils are generally saline, especially subsoils. Relief is less than 30m, slopes are 3-10%. Main soils: clay loam over (pedaric) clay on rock - D1, loam over poorly structured clay on rock - D7 and deep gravelly sandy loam - M3, with shallow stony loam - L1a.	
DOG	0.2	Plateau	E2C3 D4	D	Gently undulating crest or plateau remnant on Hawker Group calcareous fine grained rocks. Relief is less than 9m, slopes < 3%. Main soils: red cracking clay - E2, friable gradational clay loam - C3 and clay loam over pedaric red clay - D4.	
DSm	2.8	Undulating rises Rock outcrops	D1C2 D7 L1RR	V C	Undulating rises with shallow clay loamy surfaced soils over rock with >20% outcropping rock. Relief < 30m, slopes 3-10%. Main soils: *Rises*: clay loam over (pedaric) clay on rock - D1, gradational clay loam on rock - C2 and loam over poorly structured clay on rock -	
					D7 Rocky areas: shallow stony loam - L1a and rock outcrop - RR.	

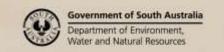


EFC4.4 RisesA2L1 Dcalcareous rocks, typiEFD1.0 RisesA2L1 DEFB Gently undulatin	moderately shallow soils overlying hard
EFD 1.0 Rises A2L1 D EFB Gently undulating	ically Hawker Group siltstones and limestones.
	ng rises with minor scalding. Slopes are 1-3%,
I LI	
	s with minor scalding. Relief is less than 30m,
7.22 2	with minor scalaring. Neller is less than 50m,
11 d 0.5 25W 1365 7.222 V	h minor scalding. Relief is 9-30m, slopes are
L1 10-30%.	
	s with 25% scalding and 10% affected by
ILLET V I U.4 I LOW HSES I AZLI I V I S 7 S	s than 30m, slopes are 3-10%.
I I FIGURE I AZIZZ II I I	h 25% scalding and 10% affected by gullying.
EFW 5.2 Rises A2L1 D Relief is less than 30n	'
FFX 0.2 Rises A2L1 D EFu Low rises and for	otslope plains with severe (60%) scalding and by gullying. Rises have slopes of 1-3% and
	n. Slopes on plains are less than 1%.
	· · · · · · · · · · · · · · · · · · ·
	ng rises with up to 50% scalding on lower ommon between scalded areas. Slopes are 1-
3%, relief is less than	· · · · · · · · · · · · · · · · · · ·
	ains with gullying and extreme levels of
	ises are 1-3%, relief is less than 30m. Slopes
on plains are less that	
	ting rises on calc-siltstone, with moderately
	ief is less than 30m, slopes are 3-10%.
	calc-siltstone, with moderately scalded
	0m, slopes are 10-30%.
Main soils:	·
Rises: shallow calcare	eous loam - A2 and shallow stony loam - L1a
Plains: shallow calcar	reous loam - A2, loam over poorly structured
<u>clay on rock</u> - D7 and	d <u>shallow stony loam</u> - L1a .
	on calcareous siltstones and limestones such
	oka Formation and the ABC Range Quartzite
slopes of the Wilpena Group	
	ow rocky rises with 20-30% pediment slopes.
	ely scalded (more than 50% of land affected)
	and affected). Slopes are 1-3%.
EIII 0.0 14363 74221 B	g rises, scalded (10-50% of land affected) and
	affected). Slopes are 1-3%; relief is less than
pediment 30m.	days (th. 20, 2007)
Siopes	rises with 20-30% lower slopes which are
Complex	led and 20% gullied. Relief is less than 30m,
slopes are 3-10%.	g rises on Hawker Group limestone & calc-
	'
	s of shallow red clay soils occur on crests (She- iated with these). Minor scalding and gullying.
	s and pediment complex with severe scalding
	lopes (more than 50% of land affected). Both
	soils are highly dispersible with moderate to
	uently scalding, sheet-erosion and gullying
	is less than 30m, slopes are 3-10%.
	alcareous loam - A2 and shallow stony loam -
	careous loam on calcrete - B2 , rock outcrop -
==a, with shallow calc	y clay loam - L1d (crests of EHn).
RR and shallow stony	nallow loamy surface soils on calcareous
ESD 0.2 Rises L1A2 D Hills and rises with sh	nallow loamy surface soils on calcareous es of the Wonoka Formation.
ESD 0.2 Rises L1A2 D Hills and rises with sh shales and limestones ESI 4.6 Rises A2A5 D ESD Rolling rises. Roc	





ECN	0.1	D:	A2A5	1,7	TSI Carthough lating gives with our to 200/ of land million and 10
ESN	9.1	Rises Lower slopes	A2A5 A2A5	V L	ESI Gently undulating rises, with up to 20% of land gullied and 10-50% scalded. Relief is 9-30m, slopes are 1-3%.
ESn	6.3	Rises	A2A5 A2A5	D	ESm Undulating rises. Minor scalding and gullying. Relief is 9-30m,
					slopes are 3-10%
					ESN Rolling rises and lower slopes with salinity patches affecting
					10-50% of land. 5-10% of lower slopes are scalded and more than
					20% gullied. Relief is 9-30m, slopes are 10-20%.
					ESn Dissected rolling rises. Minor scalding and gullying. Relief is
					30-90m; slopes are 10-30%.
					Main soils: shallow calcareous loam - A2 and rubbly calcareous
EEE	0.4	1 1 11	4214		loam on clay - A5 , with shallow stony loam - L1a .
ETD	0.4	Low hills	A2L1	D	Rolling low hills with very shallow soils and more than 20%
			RR		outcrop on ABC Range Quartzite Formation (includes siltstones
					and quartzites). Main soils: shallow calcareous loam - A2, shallow stony sandy
					loam - L1b and rock outcrop - RR.
EUC	0.2	Undulating	L1C2	D	Undulating rises formed on fine grained rocks. Relief is less than
Loc	0.2	rises	A2		30m, slopes are 3-10%.
					Main soils: shallow stony loam - L1a, gradational clay loam on rock
					- C2 and shallow calcareous loam - A2.
EYB	4.4	Rises	A2L1	D	Rises formed on Hawker Group (Eh) limestones and sandstones on
EYC	0.2	Rises	A2	D	which occur low red sand dunes and sand sheets. The sand may be
EYm	1.1	Rises	A2	D	locally derived and reworked or it may be an outlier of the
					dunefields to the west of the Flinders Ranges in the Lake Torrens
					area.
					EYB Gently undulating rises with shallow red sand on limestones and
					calcareous shales. Relief is 9-30m, slopes are 1-3%.
					EYC Undulating rises. Relief is 9-30m, slopes are 3-10%.
					EYm Undulating rises. Up to 20% of land is gullied and 10-50%
					scalded. Relief is 9-30m, slopes are 3-10%.
					Main soils:
					Rises : shallow calcareous sandy loam - A2 and shallow stony sandy loam - L1b, with rubbly calcareous sandy loam on clay - A5.
					Sand spreads: shallow sand - L1e and moderately deep sand - G1.
JBo	0.9	Drainage	D5	D	Drainage depressions and pediments formed on outwash
350	0.5	depressions			sediments.
JBv	0.6	Pediment and	D5	D	JBo Drainage depressions with up to 20% of land gullied and 10-
		rises			50% scalded.
					JBv Gently sloping pediments with up to 20% of land gullied and
					minor scalding.
					Main soil: <u>hard loamy sand over red clay</u> - D5 .
JII	0.9	Pediments	D4D1	D	Pediments and plains formed on fine grained rocks and outwash
			A5		deposits.
JII	2.5	Plain	D4D1	D	JII Rolling pediments adjacent to Black Jack Range with some low
			A6		stony rises. Slopes are 10-30%, relief is less than 9m.
					Main soils: <u>loam over pedaric red clay</u> - D4 , <u>loam over clay on rock</u>
					- D1 , <u>rubbly calcareous loam on clay</u> - A5 , with <u>deep moderately</u>
					<u>calcareous loam</u> - A3 and <u>shallow calcareous loam on calcrete</u> -
					B2.
					JII Plain adjacent to and including creeks at the confluence of Kanyaka, Crows Nest and Wirreanda Creeks. Slopes are 1-3%, relief
					is less than 9m.
					Main soils: <u>loam over pedaric red clay</u> - D4, <u>loam over clay on</u>
					rock- D1 and gradational calcareous clay loam - A6 , with deep
					moderately calcareous loam - A3 and deep gravelly sandy loam -
					M3.
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KAJ	0.9	Drainage depressions	C1A2	D	Drainage depressions and plains formed on medium to fine grained outwash sediments. Moderate gullying (20% affected) and minor scalding (5% affected.) Main soils: gradational sandy loam - C1 and shallow calcareous
KDH	0.2	Undulating pediments	C3A5	D	loam - A2. Undulating pediments with some landslips, adjacent to, and derived from, a range of Pound Quartzite formation rocks. Slopes are 3-10%. Main soils: friable gradational clay loam - C3 and rubbly calcareous loam on clay - A5, with clay loam over pedaric red clay - D4 and loam over clay on rock - D1.
KPC	0.4	Pediments and rises	A3A4	D	Dissected undulating pediment adjacent to range southwest of Kanyaka, with calcareous sandy loam soils. Slopes are 3-10%. Main soils: deep moderately calcareous sandy loam - A3 and deep (rubbly) calcareous sandy loam - A4
КТН	1.9	Pediments	E2C3 D4	D	Moderately sloping pediments, often with coarse surface stone cover. Gullying affects 10-20%. Soils are generally saline and gypseous, especially subsoils. Relief < 10m, slopes 3-10%. Main soils: red cracking clay - E2, friable gradational clay loam - C3 and clay loam over pedaric red clay - D4, with deep moderately calcareous loam - A3.
KZB	0.3	Drainage depressions	A5C1	D	Drainage depression with gravelly calcareous soils. Main soils: rubbly calcareous sandy loam on clay - A5 and gradational sandy loam - C1, with deep moderately calcareous sandy loam - A3.

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:

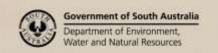
- A2 Shallow calcareous loam to sandy loam (Paralithic, Hypercalcic / Lithocalcic Calcarosol)

 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.
- A4 Deep (rubbly) calcareous sandy loam (Regolithic, Hypercalcic / Lithocalcic Calcarosol)

 Calcareous sandy loam grading to a very highly calcareous sandy clay loam to light clay with variable rubble, continuing below 120 cm.
- A5 Rubbly calcareous loam to sandy loam on clay (Regolithic, Supracalcic / Hypercalcic Calcarosol)

 Calcareous loam to sandy 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.
- Shallow calcareous 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 sandy loam to clay loam on rock (Calcic / Hypercalcic Red Dermosol)

Sandy 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)

Clay loam grading to a friable red clay with abundant soft Class I carbonate within 50 cm, overlying alluvium within 100 cm.

D1 Loam to clay loam over clay on rock (Hypercalcic / Calcic, Red Chromosol)

Medium thickness hard gravelly loam to clay loam over a friable and finely structured red clay, calcareous with depth, grading to weathering basement rock within 100 cm.

D4 <u>Clay loam over red friable clay (Calcic, Pedaric, Red Sodosol)</u>

Thin to medium thickness clay loam over a finely structured friable red clay, calcareous from about 50 cm, grading to fine or medium grained alluvium.

D5 Hard loamy sand over red clay (Calcic / Hypercalcic Red Chromosol / Sodosol)

Hard setting loamy sand to light sandy loam with a poorly structured red alkaline clayey to clay loamy subsoil.

D7 Loam over poorly structured clay on rock (Calcic / Hypercalcic, Red Sodosol)

Medium to thick hard 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 contain gypsum segregations in subsoil.

G1 Moderately deep sand (Hypercalcic, Red Sodosol)

Thick reddish brown sand to loamy sand, over a thin reddish brown massive sandy clay loam, highly calcareous at the base, overlying weathering rock at about 100 cm.

L1a Shallow stony loam (Paralithic, Leptic Tenosol)

Shallow stony loam, often calcareous with depth, overlying weathering fine grained rock shallower than 50 cm.

L1b Shallow stony sandy loam (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 (Paralithic, Leptic Tenosol)

Shallow stony loamy sand, often calcareous with depth, overlying quartzite or coarse grained rock shallower than 50 cm.

L1d Shallow stony clay loam (Paralithic, Leptic Tenosol)

Shallow stony clay loam to light clay, often calcareous with depth, overlying weathering very fine grained rock shallower than 50 cm.

L1e Shallow drift sand (Basic, Paralithic, Leptic Tenosol)

Medium thickness loose reddish sand overlying rock or buried shallow rocky soil.

M3 Deep gravelly sandy 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 stony alluvium.

RR Rock outcrop.

Further information: <u>DEWNR Soil and Land Program</u>

