

# SCC Stone Chimney Creek Land System

Outwash fans associated with the headwaters of Stone Chimney and Baldina Creeks east of the Burra Hills

**Area:** 139.7 km<sup>2</sup>

**Annual rainfall:** 275 – 400 mm average

**Geology:** The land system is underlain by Appila Tillite and finer grained rocks of the Tapley Hill Formation, and these outcrop over about a quarter of the area. Most of the system is covered by sediments of the Pooraka Formation, washed out of the hills to the west. These sediments range from sandy clay loams to clays, with grit and gravel layers. Most of the sediments and rocks are mantled by soft fine grained aeolian carbonates.

**Topography:** The land system includes the headwaters of the Baldina and Stone Chimney Creeks. It comprises a gently inclined outwash fan abutting the eastern edge of the Burra Hills, and basement rock rises, mainly in the north. These two main components occur in a ratio of about 3:1. The fans gradually level off in an easterly direction, with slopes of about 10% adjacent to the hills, grading to 2% in the east. The even grades are interrupted occasionally by low rises of basement rock protruding through the sedimentary cover. Water courses originating in the hills flow across the fans in a general easterly direction. The rising ground includes dissected low hills in the north – the headwaters of Baldina Creek, and discrete rises projecting through the sedimentary cover of the outwash fans. Water course erosion is significant throughout. Most water courses have been eroded in the past, and some are still actively eroding. Scalding is common in places.

**Elevation:** 550 m on the upper fan to 290 m where the two main water courses leave the system.

**Relief:** Up to 70 m in the dissected low hills in the north. Elsewhere, basement rock highs rise a maximum of 40 m above the fan surface.

**Soils:** The soils are mostly either sandy loam to loam over red clay, or calcareous loam. These may be either shallow over rock, or deep over alluvium.

**Main soils:**

*Soils formed on alluvium*

**D3** Loam over dispersive red clay

**A6** Deep calcareous loam over clay

**D2** Loam over red clay

**D4** Loam over friable red clay

*Soils formed on basement rock*

**A2** Shallow calcareous loam on rock

**Minor soils:**

*Soils formed on alluvium*

**A3** Deep calcareous loam

**C3** Gradational clay loam

*Soils formed on basement rock*

**D1** Loam over red clay on rock

**L1** Shallow stony loam

**C2** Shallow gradational loam on rock



**Main features:** The Stone Chimney Creek Land System comprises outwash fans and basement rock rises. The fans are gently sloping with deep, inherently fertile soils. However, past gully erosion and scalding have severely degraded the physical and chemical fertility of the soils, so that they are now highly susceptible to further damage. Soils on the rises and low hills on basement rock are shallow soils and there is extensive rock outcrop. Scalding and gully erosion are common in these areas as well. Maintenance of surface cover, control of runoff water and protection of water courses are crucial for minimization of erosion. Marginal and unreliable rainfall make cropping risky, but overgrazing can equally lead to both water and wind erosion.

**Soil Landscape Unit summary:** 29 Soil Landscape Units (SLUs) mapped in Stone Chimney Creek Land System

SLU	% of area	Main features #
ADM ADg ADh ADj	1.7 6.0 1.2 5.6	<p>Rising ground formed on fine grained basement rocks. Landscapes vary from strongly dissected low hills to undulating rises. Rocky outcrop and surface stone are extensive throughout.</p> <p><b>ADM</b> Rise, 30 m high, with slopes of 5-10% and sporadic scalding.</p> <p><b>ADg</b> Complex of dissected rises, 30 m high with slopes of 5-15%, and outwash fans with severely eroded watercourses and extensive scalding.</p> <p><b>ADh</b> Complex of moderate slopes (10-20%) and outwash fans (5-10% slope). Watercourses are severely eroded and scalding is extensive.</p> <p><b>ADj</b> Low hills strongly dissected by Baldina Creek. Slopes are up to 50% and relief is up to 70 m. Scalding and water course erosion are extensive.</p> <p>Main soils on rises: <u>shallow calcareous loam</u> - <b>A2</b> (E) and <u>shallow stony loam</u> - <b>L1</b> (C) with <u>shallow gradational loam on rock</u> - <b>C2</b> (L) and <u>loam over red clay on rock</u> - <b>D1</b> (L). Main soils on fans: <u>deep calcareous loam</u> - <b>A3</b> (M), with <u>loam over hard red clay</u> - <b>D3</b> (M) and <u>loam over friable red clay</u> - <b>D4</b> (M). This land is non arable due to a combination of shallow stony soils, moderate to steep slopes, low and unreliable rainfall and degraded land surfaces. Conservative grazing management is required to prevent further erosion.</p>
DBB DBw	1.8 5.0	<p>Pediments comprising a complex of low basement rock rises and intervening outwash fans in a ratio of about 3:1.</p> <p><b>DBB</b> Gently undulating rises with slopes of less than 2% and sporadic scalding.</p> <p><b>DBw</b> Pediments abutting the steep slopes of the Burra Hills, with low spurs of basement rock rises separated by fans with severely eroded water courses. Slopes are 3-10%. There is sporadic scalding throughout.</p> <p>Main soils: <u>loam over red clay on rock</u> - <b>D1</b> (E) and <u>shallow calcareous loam on rock</u> - <b>A2</b> (E) on rises, with <u>deep calcareous loam</u> - <b>A3</b> (L), <u>loam over dispersive red clay</u> - <b>D3</b> (M) and <u>loam over friable red clay</u> - <b>D4</b> (M) on fans. The soils are moderately shallow to deep and inherently fertile, but unreliable rainfall and the risk of erosion restrict cropping.</p>
DXm	2.7	<p>Outwash fans formed on a complex of fine grained Tapley Hill Formation rocks and locally derived alluvium. Slopes are 3-10%, water courses are eroded and 5-10% of the land is scalded.</p> <p>Main soils: <u>loam over red clay on rock</u> - <b>D1</b> (E) and <u>shallow calcareous loam on rock</u> - <b>A2</b> (C) on basement rock rises, and <u>loam over dispersive red clay</u> - <b>D3</b> (C) and <u>deep calcareous loam</u> - <b>A3</b> (L) on alluvium. Soils are inherently productive but historic erosion has degraded their structure. Soils consequently prone to excessive runoff and further erosion and emergence / root growth problems. Protection of eroded watercourses and scalded areas where still active is a key management issue.</p>
EHC EHb EHh	0.6 1.1 1.1	<p>Complex of basement rock rises and outwash fans in approximately equal proportions.</p> <p><b>EHC</b> Gently inclined footslopes (3-5%)</p> <p><b>EHb</b> Low rises with slopes of less than 3%, and eroded water courses on fans.</p> <p><b>EHh</b> Outwash fans with residual basement rises. Slopes are 2-4%. There is some water course erosion and extensive scalding.</p> <p>Main soils: <u>shallow calcareous loam on rock</u> - <b>A2</b> (E) and <u>shallow stony loam</u> - <b>L1</b> (C) on rises, with <u>deep calcareous loam</u> - <b>A3</b> (C), <u>loam over dispersive red clay</u> - <b>D3</b> (M) and <u>loam over friable red clay</u> - <b>D4</b> (M) on fans. Shallow soils on rises and scalds and erosion gullies on fans are the main limitations.</p>



ETB ETC ETD	0.4 3.5 0.7	Low rises up to 30 m high with some higher knobs formed on coarse grained tillites. Rock outcrop is extensive, and rocky areas can occupy up to 50% of the land surface. <b>ETB</b> Low rise, 10 m high, with slopes of less than 4%. <b>ETC</b> Rises to 30 m high with slopes of 5-12% and 20-50% rock outcrop. <b>ETD</b> Rises and abrupt crests to 40 m high with slopes of 8-20% and extensive rock outcrop. Main soil: <u>shallow calcareous loam on rock</u> - <b>A2</b> (V), with <u>shallow stony loam</u> - <b>L1</b> (L) on steeper slopes. These isolated rises with shallow stony soils have little productive potential.
JBA	0.1	Alluvial flat. Main soils: <u>clay loam over dispersive red clay</u> - <b>D3</b> (E), <u>loam over friable red clay</u> - <b>D4</b> (E) and <u>deep calcareous loam</u> - <b>A3</b> (C). These soils are deep and potentially productive.
JLA	0.7	Alluvial flat. Main soils: <u>loam over dispersive red clay</u> - <b>D3</b> (E) and <u>loam over friable red clay</u> - <b>D4</b> (E). These soils are deep and potentially productive.
JPB JPI JPM JPO JPVW JPW	3.2 20.1 9.7 6.6 8.4 1.0	Outwash fans formed on sandy clay loam to clay alluvium with gravelly layers. Most watercourses are eroded and 5-10% of land has been scalded. There is variable surface quartzite stone up to 10%. <b>JPB</b> Fans with slopes of 1-4%. <b>JPI</b> Fans with slopes of 2-3%, eroded water courses and minor scalding. <b>JPM</b> Upper fans with slopes of 3-10%, eroded water courses and minor scalding. <b>JPO</b> Drainage depressions dominated by severely eroded watercourses. <b>JPVW</b> Fans with slopes of 2-10%, dominated by severe water course erosion and scalding. <b>JPW</b> Fans with slopes of 3-5%, severe scalding and some water course erosion. Main soils: <u>loam over dispersive red clay</u> - <b>D3</b> (E) and <u>loam over red clay</u> - <b>D2</b> (E) with <u>deep calcareous loam over clay</u> - <b>A6</b> (L), <u>loam over friable red clay</u> - <b>D4</b> (L) and <u>deep calcareous loam</u> - <b>A3</b> (L). These soils are deep and inherently fertile, but have been severely degraded in the past. This has caused loss of surface structure, leading to an increased potential for runoff and further erosion. The land is potentially arable, but marginal and unreliable rainfall creates a high erosion risk during soil preparation and crop establishment. There is also a high risk of both wind and water erosion if the land is over-grazed.
KFE	1.6	Drainage depression comprising creek flats and a weakly defined watercourse. Main soils: <u>deep calcareous loam</u> - <b>A3</b> (V) with <u>loam over dispersive red clay</u> - <b>D3</b> (L) and <u>loam over friable red clay</u> - <b>D4</b> (L). These soils are deep and inherently fertile. The main limitation to plant growth is poor structure.
KHG G	11.8	Outwash fan with slopes of 2-5% and sporadic watercourse erosion. Main soils: <u>deep calcareous loam over clay</u> - <b>A6</b> (E) and <u>loam over friable red clay</u> - <b>D4</b> (E), with <u>deep calcareous loam</u> - <b>A3</b> (L) and <u>loam over dispersive red clay</u> - <b>D3</b> (L). These soils are deep and inherently fertile, with poor structure in the D3 soils, and marginal subsoil salinity in all soils being the main limitations. Although rainfall is unreliable, some of this land is cropped.
KLB KLI	0.6 0.5	Very low rises on outwash fans. Slopes are 1-2%. <b>KLB</b> Low rises with negligible scalding. <b>KLI</b> Low rises with significant scalding. Main soils: <u>deep calcareous loam over clay</u> - <b>A6</b> (E) and <u>deep calcareous loam</u> - <b>A3</b> (E). These soils are deep, although alkaline throughout, and are moderately saline in the subsoil.
KVB	0.7	Outwash fan with slopes of 2-5%. Main soils: <u>deep calcareous loam</u> - <b>A3</b> (E) and <u>deep calcareous loam over clay</u> - <b>A6</b> (E). These soils are deep, although alkaline throughout, and are moderately saline in the subsoil.
KbH	2.7	Outwash fan with slopes of 3-10% and minor watercourse erosion. Main soils: <u>deep calcareous loam over clay</u> - <b>A6</b> (E) and <u>gradational clay loam</u> - <b>C3</b> (E), with <u>loam over dispersive red clay</u> - <b>D3</b> (L) and <u>loam over friable red clay</u> - <b>D4</b> (L). These soils are deep and inherently fertile, and although some are poorly structured, productive potential is good. As the land abuts the Burra Hills range, rainfall is probably somewhat higher than elsewhere in the system, so opportunistic cropping is possible. However, erosion risk is high.
XAT XAZ	0.7 0.2	Drainage depressions. <b>XAT</b> Terraces and bed of Burra Creek. The water course is well defined, eroded in places with occasional lateral gullies. <b>XAZ</b> Eroded and scalded creek flat. Main soil: <u>deep calcareous loam</u> - <b>A3</b> (D). These landscapes are dominated by fragile water courses. Erosion risk is high, and there is potential for flooding.



# PROPORTION codes assigned to soils within Soil Landscape Units (SLU):

(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** Shallow calcareous loam on rock (Paralithic, Calcic Calcarosol)  
Calcareous stony sandy loam to loam, grading to a highly calcareous silty to light sandy clay loam with rock fragments, over weathering rock within 50 cm.
- A3** Deep calcareous loam (Regolithic, Hypercalcic Calcarosol)  
Calcareous loam to clay loam becoming more clayey and calcareous with depth.
- A6** Deep calcareous loam over clay (Regolithic, Hypercalcic Calcarosol)  
5 - 10 cm calcareous loam becoming more clayey and calcareous at depth with a Class I carbonate layer from 35 cm grading to clayey alluvium at 80 cm.
- C2** Shallow gradational loam on rock (Calcic, Red Dermosol)  
Loam to clay loam grading to a well structured red clay with soft carbonate at depth, over weathering siltstone within 100 cm.
- C3** Gradational clay loam (Calcic, Red Dermosol)  
10 - 40 cm clay loam to loam grading to a well structured red to brown light clay with soft or occasionally rubbly carbonate from 50 cm.
- D1** Loam over red clay on rock (Calcic, Red Chromosol)  
Medium thickness gravelly sandy loam to loam over a red well structured clay, calcareous with depth, grading to weathering rock within 50 cm.
- D2** Loam over red clay (Calcic, Red Chromosol)  
Hard loam, often stony, abruptly overlying a well structured red clay, with soft carbonate at depth over alluvium.
- D3** Loam over dispersive red clay (Calcic, Red Sodosol)  
Medium to thick hard gravelly sandy loam to clay loam abruptly overlying a dispersive red clay, calcareous with depth, over alluvium.
- D4** Loam over friable red 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 (Lithic, Leptic Tenosol / Rudosol)  
Shallow stony loam, sometimes calcareous with depth, overlying basement rock within 50 cm.

**Further information:** [DEWNR Soil and Land Program](#)

