

# CNW Canowie Land System

Series of low hills extending from Belalie North southwards to the Broughton River, and including the Bluff Range near Canowie.

**Area:** 235.4 km<sup>2</sup>

**Annual rainfall:** 405 – 555 mm average

**Geology:** Siltstones of the Saddleworth Formation and Appila Tillite with interbedded quartzites are the main rock types. The latter outcrop in linear reefs over much of the steeper more strongly dissected land. The rocks are mantled by a veneer of fine aeolian carbonates which have leached 20 to 50 cm below the ground surface.

**Topography:** The Land System is one of the main north - south ranges which characterize the Northern Agricultural Districts. It extends for over 50 km, forming the eastern side of Browns Hill Range, as mainly gently rolling to moderately steep low hills with occasional steeper slopes, interspersed with gently inclined slopes and outwash fans. Slopes are generally in the range 5 - 20%, but reach 50% in places. The Bluff Range is included, although it differs in that its topography is controlled by two quartzite ridges.

**Elevation:** 730 m north of Browns Hill to 340 m at the southern end

**Relief:** Maximum local relief is 100 m, but 20 - 50 m is more usual. Overall relief from east to west across the range is 100 - 150 m

**Soils:** Most soils are shallow and loamy over basement rock, although there are also loamy surfaced soils with red clayey sub soils on slopes. Deeper texture contrast soils are predominant on lower lying land.

## Main soils

### *Rises and hills*

- A2** Shallow calcareous loam
- D1** Hard loam over red clay on rock
- L1** Shallow stony loam - rocky areas
- C2** Gradational loam on rock

## Minor soils

### *Outwash fans and flats*

- D2** Hard loam over red clay
- D3** Hard loam over dispersive red clay
- C3** Gradational loam

**Main features:** The Land System comprises a mixture of land types:

- a) Steep, rocky non arable land suitable for pastures;
- b) Semi arable land characterized by mainly shallow although quite productive soils where erosion control is a major issue;
- c) Undulating rises with good production potential limited by poor surface structure (texture contrast soils) and shallow stony profiles. Surface management to control erosion and improve soil structure is the main consideration;
- d) Gently inclined lower slopes and drainage depressions with deep and fertile, but poorly structured soils. These areas are particularly susceptible to erosion because of the run on water they receive, fragile water courses and low infiltration rate soils.



**Soil Landscape Unit summary:** 27 Soil Landscape Units (SLUs) mapped in the Canowie Land System:

| SLU                      | % of area                 | Main features #  |
|--------------------------|---------------------------|--|
| AAC<br>AAD<br>AAI<br>AAJ | 11.6<br>2.0<br>3.4<br>1.2 | <p>Non arable strongly dissected low hills and ridges with relief of up to 90 m, formed on mainly siltstones with some interbedded quartzites and tillites.</p> <p><b>AAC</b> Slopes of 10-30%.<br/> <b>AAD</b> Slopes of 20-50%.<br/> <b>AAI</b> Slopes of 10-30% and significant erosion of water courses.<br/> <b>AAJ</b> Slopes of 30-50% and significant erosion of water courses.</p> <p>Main soils: <u>shallow stony loam - L1</u> (E) and <u>shallow calcareous loam - A2</u> (E), with <u>hard loam over red clay on rock - D1</u> (L). This land is largely inaccessible, due to steep slopes and rockiness. Pasture productivity is limited mainly by shallow soils and the difficulty in undertaking improvements (sowing, fertilizing etc). There is considerable potential for erosion and landslip. Watercourses are generally stable although there are sporadic occurrences of gully erosion.</p>   |
| ABB<br>ABC<br>ABD        | 0.3<br>0.9<br>2.2         | <p>Rocky ridges with quartzite spines, flanked by softer rocks.</p> <p><b>ABB</b> Low linear ridges less than 20 m high and with slopes of 10-20%.<br/> <b>ABC</b> Moderate linear ridges to 40 m high with slopes of 10-25%<br/> <b>ABD</b> Steep linear ridges 50-100 m high with slopes of 25-50%</p> <p>Main soils: <u>shallow stony loam - L1</u> (E) with <u>shallow calcareous loam - A2</u> (C), <u>hard loam over red clay on rock - D1</u> (L) and <u>gradational loam on rock - C2</u> (L). The hills are non arable due to the roughness of the terrain, moderate slopes and shallow stony soils. Rocky outcrops limit accessibility in places. Runoff is rapid and exposure is high, so a significant proportion of rainfall does not infiltrate the soil. Watercourses are particularly susceptible to erosion. However, areas of deeper soils are potentially productive for grazing.</p>   |
| DCB<br>DCC               | 1.0<br>17.3               | <p>Very gently to gently undulating rises and low hills between 10 and 50 m high, formed on siltstone basement rock.</p> <p><b>DCB</b> Slopes up to 4%.<br/> <b>DCC</b> Slopes of 3-12%.</p> <p>Main soils: <u>hard loam over red clay on rock - D1</u> (E) with <u>shallow calcareous loam - A2</u> (C) and <u>gradational loam on rock - C2</u> (L), generally overlying weathering rock within 100 cm. <u>Shallow stony loam - L1</u> (L) occurs where rock strata are hard. The soils are moderately fertile, well drained and have moderately high water holding capacities. The slopes are mostly arable (except for minor rocky outcrops and dissected areas). Gradients are moderate with a consequent potential for water erosion. This is exacerbated by the predominant hard setting, poorly structured soil type which tends to seal over and shed water. Other limitations caused by poor structure are difficulty in working and patchy emergence.</p> |
| DSC<br>DSD               | 0.4<br>1.5                | <p>Undulating rises formed on interbedded siltstones and quartzites. Rocky outcrops are common, usually in reefs.</p> <p><b>DSC</b> Rises up to 40 m high (usually less than 30 m) with slopes of 3-10%.<br/> <b>DSD</b> Rises with slopes of 5-20%.</p> <p>Main soils: <u>shallow hard loam over red clay on rock - D1</u> (E) and <u>shallow stony loam - L1</u> (E). These rises are semi-arable due to their slopes and potential for erosion. Rocky reefs and frequent watercourses also limit cropping potential.</p>  |
| EFC<br>EFD               | 1.0<br>2.1                | <p>Undulating rises formed on calcareous basement rocks. Rocky outcrops are common.</p> <p><b>EFC</b> Rises to 30 m high with slopes of 5-12%.<br/> <b>EFD</b> Rolling low hills up to 50 m high and moderately steep upper slopes of 10-20%.</p> <p>Main soils: <u>shallow calcareous loam - A2</u> (E) and <u>shallow stony loam - L1</u> (E). The soils are well drained and well structured, but are shallow and only moderately fertile due to their relatively low clay content.</p>   |
| EGC<br>EGD<br>EGI        | 13.3<br>5.0<br>0.6        | <p>Undulating rises formed on siltstones with minor interbedded more quartzitic rocks.</p> <p><b>EGC</b> Rises with slopes of 5-12% and relief to 50 m.<br/> <b>EGD</b> Rolling low hills with up to 50 m relief and slopes of 10-20%.<br/> <b>EGI</b> Rolling low hills with up to 50 m relief, slopes of 10-20% and eroded water courses.</p> <p>Main soils: <u>shallow calcareous loam - A2</u> (V), with <u>hard loam over red clay on rock - D1</u> (L) and <u>gradational loam on rock - C2</u> (L). The land is mostly arable (except for minor outcrop and occasional short steep slopes), but because most of the soils are relatively shallow, moisture shortages may limit crops in dry finishes. Reduction of water loss and</p>   |



|                                 |                                 |  |
|---------------------------------|---------------------------------|--|
|                                 |                                 | erosion through runoff is the main management issue, together with fertility maintenance. "Lime-induced" nutrient deficiencies are possible on calcareous soils.   |
| ESC<br>ESD<br>ESI               | 1.6<br>12.9<br>4.3              | Rocky hillslopes, ridges and crests with maximum relief of 60 m and 10-20% rocky outcrops, formed on mixed siltstones, quartzites and tillites.<br><b>ESC</b> Slopes of 5-12%.<br><b>ESD</b> Slopes of 10-20%.<br><b>ESI</b> Slopes of 10-20% with water course erosion.<br>Main soils: shallow <u>gradational loam on rock</u> - <b>C2</b> (E) and <u>shallow calcareous loam</u> - <b>A2</b> (E) formed over siltstone basement rock and containing variable amounts of soft and rubbly carbonate. <u>Shallow stony loam</u> - <b>L1</b> (C) occurs in rocky areas on harder rocks. Rocky reefs, shallow stony soils and sometimes moderate slopes limit cropping of these areas. The arable land is generally confined to strips between the reefs of rock. Water erosion is a potential problem because of the high runoff from the shallow soils and rocky areas.   |
| EZW                             | 0.4                             | Complex of low rises formed on siltstone basement rock and fans formed on alluvium. Slopes are 3-8%. There is sporadic scalding.<br>Main soils: <u>shallow calcareous loam</u> - <b>A2</b> (E) and <u>shallow stony loam</u> - <b>L1</b> (C) on rises, and <u>hard loam over red clay</u> - <b>D2</b> (E) on fans. This land has a higher proportion of deeper soils than surrounding hill country and is potentially arable, but historic erosion may have damaged soil structure causing problems such as low infiltration rates, impeded root growth and increased erosion potential.   |
| JEB<br>JEC<br>JEE<br>JEH<br>JEJ | 2.2<br>5.7<br>2.9<br>0.6<br>0.9 | Flats and outwash fans formed on alluvial sediments.<br><b>JEB</b> Fans with slopes of 2-4% and well defined stable watercourses.<br><b>JEC</b> Fans with slopes of 3-10% and well defined stable watercourses.<br><b>JEE</b> Drainage depressions with mostly stable water courses. Slopes are 3-10%.<br><b>JEH</b> Fans with slopes of 3-10% and eroded watercourses.<br><b>JEJ</b> Drainage depressions with eroded watercourses. Slopes are 3-10%.<br>Main soils: <u>hard loam over red clay</u> - <b>D2</b> (E) and <u>hard loam over dispersive red clay</u> - <b>D3</b> (E) with <u>gradational loam</u> - <b>C3</b> (C) all formed over alluvium. The soils are deep, inherently fertile and generally moderately well drained. The main limitations are poor surface (and subsurface in places) structure. Poor surface structure causes reduced water infiltration resulting in increased erosion potential and surface waterlogging, working difficulty and seedling emergence problems. Dispersive subsoils in the D3 soils cause more prolonged waterlogging. Watercourse erosion is significant in <b>JEH</b> and <b>JEJ</b> . Saline seepage is minor, but it is likely that subsoil salinity levels are moderate and that saline water tables occur in places. |
| JXC<br>JXH                      | 3.4<br>1.3                      | Outwash fans formed on a complex of locally derived alluvium and rises formed on basement rock.<br><b>JXC</b> Slopes of 3-12%, steepest slopes being on the upper margins of the fans adjacent higher ground.<br><b>JXH</b> As for <b>JXC</b> but with eroded water courses.<br>Main soils: <u>hard loam over red clay</u> - <b>D2</b> (E) and <u>hard loam over dispersive red clay</u> - <b>D3</b> (E) on fans and <u>hard loam over red clay on rock</u> - <b>D1</b> (L) and <u>shallow calcareous loam</u> - <b>A2</b> (L) on rises. The fans are similar to JEC and the rises similar to <b>DCC</b> .   |

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

- (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 (Paralithic, Calcic / Lithocalcic Calcarosol)  
Medium thickness calcareous loam over soft to rubbly carbonate grading to weathering siltstone within 100 cm. Rises and hills.
- C2** Gradational loam on rock (Hypercalcic / Supracalcic, Red Dermosol)  
Medium thickness loam to clay loam grading to a well structured red clay with soft (occasionally rubbly) carbonate at depth overlying weathering rock within 100 cm. Rises and hills.
- C3** Gradational loam (Hypercalcic / Supracalcic, Red Dermosol)  
Medium thickness loam to clay loam grading to a well structured red clay with soft (occasionally rubbly) carbonate at depth overlying alluvium, continuing below 100 cm. Fans and flats.
- D1** Hard loam over red clay on rock (Calcic, Red Chromosol)  
Medium thickness hard massive sandy loam to clay loam abruptly overlying a well structured red clay grading to soft carbonate merging with weathering basement rock within 100 cm. Rising ground.
- D2** Hard loam over red clay (Calcic, Red Chromosol)  
Medium thickness hard massive sandy loam to clay loam abruptly overlying a well structured red clay with fine carbonate at depth, grading to alluvium continuing below 100 cm. Fans and flats.
- D3** Hard loam over dispersive red clay (Calcic, Red Sodosol)  
Medium thickness hard sandy loam to clay loam sharply overlying a poorly structured dispersive red clay, calcareous with depth, grading to alluvium continuing below 100 cm. Fans.
- L1** Shallow stony loam (Lithic, Leptic Tenosol / Rudosol)  
Shallow stony loam grading to hard basement rock within 50 cm. Soft carbonate commonly occurs in rock fissures. Rocky rising ground.

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

