

# BRU Brukunga Land System

Rolling low hills in the Brukunga - Dawesley area

**Area:** 37.6 km<sup>2</sup>

**Annual rainfall:** 545 – 820 mm average

**Geology:** The land is underlain by greywackes and phyllites of the Tappanappa Formation of the Kanmantoo Group. The western edge of the System is marked by pyritic and ferruginized metamorphic rocks of the Nairne Pyrite. The rocks outcrop in places, especially on steeper slopes. On lower slopes the rocks are highly weathered, with soft grey silty material extending to depths of several metres. In valley flats, the soils are formed on coarse to medium grained micaceous alluvium, derived from localized erosion and redeposition of hillslope rocks and soils.

**Topography:** The System is dominated by low hills with undulating upper slopes, sometimes with relatively flat summit surfaces, moderately inclined hillslopes and some short steep slopes. Slopes range from 3% on some upper slopes to 50% on steep dissection slopes. Rock and stone are common, being most extensive on the steepest slopes. Drainage depressions are well defined throughout. Watercourses flow either southwards in the Dawesley Creek catchment, or eastwards to the Bremer River.

**Elevation:** 210 - 470 m

**Relief:** Up to 80 m

**Soils:** Most soils have loamy sand to sandy loam surfaces overlying red or brown firm clay subsoils grading to weathering rock within a metre. On lower slopes and valley flats, soils are formed on deeply weathered rock or alluvium. On steeper and / or rocky slopes, shallower profiles without subsoil clays are common.

#### Main soils

##### *Soils on slopes*

**K2** Loam over red clay

**K3a** Sandy loam over red / brown clay

**L1** Shallow stony sandy loam

##### *Soils of flats and drainage depressions*

**F2** Loamy sand over brown or red dispersive clay

##### *Minor soils*

**K1** Gradational sandy loam

**K3b** Sandy loam over red clay (on pyritic rock)

**Main features:** The Brukunga Land System is dominated by undulating to rolling low hills with moderately deep texture contrast soils with sandy to loamy surfaces and clayey subsoils. There are shallow soils associated with rock outcrops on steeper slopes. The soils are moderately fertile but prone to acidification and compaction. Waterlogging and associated saline seepage in places are problems on lower slopes. Due to the prevalence of pyritic rocks in the landscape, acid sulfate soils often occur in these lower lying areas. Most slopes are best suited to pastures because of the erosion potential and surface stone and rock. The flats and drainage depressions have deep texture contrast soils and are potentially arable, if sufficient area is available. Waterlogging, salinity, compaction, acidity and watercourse erosion are the main issues.



**Soil Landscape Unit summary:** 9 Soil Landscape Units (SLUs) mapped in the Brukunga Land System:

SLU	% of area	Main features #
AhC AhD AhY	41.8 11.0 12.3	<p>Rolling low hills formed on metagreywackes and phyllites. There is 10-20% surface stone and rock outcrop, more on occasional steeper slopes.</p> <p>Rolling low hills with relief of 40 to 80 m and slopes of 18-30%.</p> <p><b>AhD</b> Steep short hillslopes with relief to 80 m and slopes of 30-50%.</p> <p>Summit surfaces with slopes up to 15% on margins.</p> <p>Main soils: <u>Loam over red clay</u> - <b>K2</b> (E) in <b>AhC</b> and <b>AhY</b>; (L) in <b>AhD</b>  <u>Sandy loam over red / brown clay</u> - <b>K3a</b> (E) in <b>AhC</b> and <b>AhY</b>; (L) in <b>AhD</b>  <u>Shallow stony sandy loam</u> - <b>L1</b> (C) in <b>AhC</b> and <b>AhY</b>; (V) in <b>AhD</b></p> <p>The land is non arable due to the slopes and/or the extent of outcrop and surface stone. The soils are mostly moderately deep with satisfactory moisture holding capacities and natural fertility. Exceptions are the shallower stony sandy loams, which usually are more common on steeper slopes. The main soil limitations are hard setting, compact surfaces, and somewhat impeded drainage caused by the perching of water on the clayey subsoils. The soils are highly erodible. There is minor saline seepage, usually on lower slopes.</p>
ApC ApD	6.0 4.8	<p>Low discontinuous ridges up to 20 m high formed on pyritic rocks. Slopes are variable up to 40%. There is up to 25% ferruginized sandstone on the surface.</p> <p><b>ApC</b> Ridges to 30 m high with slopes of up to 25%.</p> <p><b>ApD</b> Ridges 60-100 m high with slopes of 25-40%, with occasional landslips.</p> <p>Main soils: <u>Sandy loam over red clay</u> - <b>K3b</b> (E)  <u>Shallow stony sandy loam</u> - <b>L1</b> (E)</p> <p>These small areas are non arable but have good grazing potential. The pyritic rocks are significant as they are a source of sulfides which are associated with the development of acid sulfate soils in waterlogged areas of adjacent land.</p>
CMD	10.8	<p>Gently rolling low hills with relief to 30 m and slopes of 8-18% formed on phyllites and metagreywackes. There is minor surface stone and rock outcrop.</p> <p>Main soils: <u>Loam over red clay</u> - <b>K2</b> (E)  <u>Sandy loam over red / brown clay</u> - <b>K3a</b> (C)  <u>Gradational sandy loam</u> - <b>K1</b> (L)  <u>Shallow stony sandy loam</u> - <b>L1</b> (L)</p> <p>These slopes are semi arable, but land use is restricted largely to grazing by high soil erodibility and rockiness. Pasture productivity is potentially high, as the soils are generally moderately deep and fertile, although prone to waterlogging, compaction and acidification. There are minor saline seepages on lower slopes. These may develop acid sulfate conditions if drained.</p>
LTE LTJ LTa	2.0 4.2 3.5	<p>Flats and drainage depressions underlain by locally derived coarse to medium grained micaceous alluvium or deeply weathered basement schist or metagreywacke.</p> <p><b>LTE</b> Drainage depressions  <b>LTJ</b> Drainage depressions with eroded water courses  <b>LTa</b> Flats with minor saline seepages and eroded water courses</p> <p>Main soil: <u>Loamy sand over brown or red dispersive clay</u> - <b>F2</b>.</p> <p>These soils are deep and moderately fertile, although prone to surface acidification. The fine sandy surfaces are susceptible to compaction, and dispersive clay subsoils cause waterlogging by restricting percolation of water. The soils are highly erodible, so even gentle slopes are at risk of erosion. Water courses are especially vulnerable. Saline seepages are caused by rising water tables bringing salts from the rocks to the surface. Acid sulfate conditions may develop in seepage areas if they are drained. Management systems to increase catchment water use are needed to ameliorate the problem.</p>
-Q-	3.6	Brukunga pyrite quarry.

# 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:**

- F2** Loamy sand over brown or red dispersive clay (Eutrophic, Brown / Red Sodosol)  
Medium to thick loamy sand to fine sandy loam with a bleached A2 layer, abruptly overlying a poorly structured dispersive brown or red mottled sandy clay to light clay grading to highly micaceous sandy alluvium or soft silty deeply weathered rock below 100 cm.
- K1** Gradational sandy loam (Bleached, Mesotrophic, Brown Dermosol)  
Medium to thick hard sandy loam to sandy clay loam with a bleached and gravelly A2 layer, grading to a brown mottled clay loam to clay with strong coarse prismatic structure, over soft weathering rock below 100 cm.
- K2** Loam over red clay (Eutrophic, Red Chromosol)  
Medium thickness hard setting reddish brown sandy loam to clay loam, with a paler coloured and gravelly A2 horizon, overlying a red strongly polyhedral structured clay grading to weathering schist or micaceous sandstone before 100 cm.
- K3a** Sandy loam over red / brown clay (Bleached, Eutrophic, Red / Brown Chromosol)  
Medium thickness brown loamy sand to loam with a bleached and gravelly A2 horizon, overlying a reddish brown and brown mottled firm sandy to heavy clay grading to weathering metagreywacke by 100 cm.
- K3b** Sandy loam over red clay (Eutrophic, Red Chromosol)  
Medium thickness reddish brown fine sandy loam with a paler coloured A2 horizon, sometimes with ironstone gravel, overlying a red clay up to a metre thick, with blocky structure and ferruginous rock fragments throughout. Formed on pyritic rocks.
- L1** Shallow stony sandy loam (Lithic, Leptic Tenosol)  
Thick stony brown sandy loam to light clay loam with up to 50% quartzite and metasandstone gravel and stone throughout, overlying hard rock by 50 cm.

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

