

YAN Yankalilla Land System

Undulating rises and rolling low hills around Yankalilla

Area: 14.6 km²

Annual rainfall: 525 - 650 mm average

Geology: The landscape is formed on remnant sediments laid down in Permian age glacial valleys. These sediments include clayey sands (mostly indurated to weak sandstones), sandy clays and clays (including some strongly slickensided forms). These sedimentary beds have been substantially eroded, so that underlying basement rock highs protrude through in places. There has been more recent deposition of clays and sandy clays on alluvial flats. About 70% of the landscape is mantled by carbonates which have probably blown in from the west and been leached into the soil and upper parts of the underlying sediments.

Topography: The landscape is undulating to rolling, created by erosion of the ancient glacial valley sediments. Steep south facing slopes, generally affected by landslips and/or gully erosion, are characteristic of the area. The land is drained by the Bungala River and its tributaries which flow in a westerly direction along the floor of the glacial valley. There is a substantial alluvial flat (town of Yankalilla) adjacent to the river as it approaches the sea.

Elevation: 10 m on the lower Bungala River flat to 160 m

Relief: Up to 80 m

Soils: The soils vary according to the nature of the underlying material, and the amount of secondary carbonate remaining in the profile. Texture contrast soils are predominant. These have thick bleached sandy surfaces through to dark clay loams. Subsoils vary from thin sandy clay loams to thick heavy clays. Deep subsoil carbonate accumulations vary from thick soft to semi hard layers, often with a platy structure, through to minor segregations. 30% of soils are non calcareous in the upper 100 cm.

Main soils: *Soils formed on glacial valley sediments*

- F1a** Sandy loam over alkaline - neutral brown clay
- D3** Hard sandy loam over red clay
- F1b** Sandy loam over acid - neutral brown clay
- F2a** Sandy loam over poorly structured brown clay
- G2** Thick bleached sand over sandy clay loam

Minor soils: *Soils formed on glacial valley sediments*

- C5** Dark gradational loam over thick carbonate
- E1** Black cracking clay
- E3** Grey-brown cracking clay
- B4** Red brown loam on hard carbonate

Soils formed on alluvial sediments

- D2** Loam over red clay
- F1c** Loam over brown clay
- F2b** Loamy sand over dispersive brown clay
- M2** Gradational brown loam



Main features: The Yankalilla Land System comprises undulating to rolling rises and low hills with limited areas of both flatter and steeper land. The rising ground has a variety of soils including loamy sand/sandy loam texture contrast profiles, thick bleached sands, hard red texture contrast soils, cracking clays and moderately shallow black loams over lime. These are moderately fertile to infertile, often with imperfect drainage, and variable depth. Productive potential is low (thick sands) to moderate (sandy loams). The black loams are potentially highly productive. The alluvial flats have loamy red or brown texture contrast soils of high fertility, but some drainage problems. The steep hillslopes are fragile areas where conservation management is essential to ensure that the erosion of the past is stabilized.

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

SLU	% of area	Main features #
ANC	0.2	<p>Rolling low hills to precipitous slopes formed on partially calcified schists of the Barossa Complex. There is variable surface stone, up to 50% on steeper slopes.</p> <p>ANC Rolling low hills with relief to 80 m and slopes of 18-30%. Drainage depressions are well defined.</p> <p>These landscapes are characterized by shallow soils over weathering rock, which is variably calcified, resulting in a range of soils including loam over clay profiles, shallow loams over thick carbonate accumulations and shallow stony profiles.</p> <p>Main soils: <u>Shallow stony sandy loam</u> - L1 (V) <u>Acidic sandy loam over red clay</u> - K4 (C) <u>Gradational loam over semi hard carbonate</u> - C2 (L)</p> <p>The combination of shallow stony soils, moderate to steep slopes and coastal exposure limits the potential of this land. The precipitous slopes of ANF are highly susceptible to erosion including land slip, requiring that grazing pressure be minimized.</p>
AeD	0.3	<p>Rolling to very steep low hills and hills formed on schists of the Barossa Complex. Surface rock and stone are variable, with very rocky patches occurring most commonly on steepest slopes.</p> <p>AeD Steep to very steep and very rocky hillslopes with very narrow crests and drainage depressions; relief is up to 175 m and slopes are 30-80%.</p> <p>Most soils have texture contrast profiles with sandy loam surfaces overlying friable clayey subsoils forming in fresh weathering rock. On upper slopes where rocks are deeply weathered and kaolinized, soils are similar but deeper. Shallow stony soils are common on rocky and steep slopes. Deeper texture contrast and stony soils on local alluvium and colluvium occur on lower slopes and drainage depressions.</p> <p>Main soils: <u>Acidic sandy loam over brown clay on schist</u> - K4a (E) on hillslopes <u>Acidic sandy loam over brown clay on kaolinized schist</u> - K4b (L) on upper slopes <u>Shallow stony sandy loam</u> - L1 (E) on steeper rocky slopes <u>Sandy loam over brown or red clay</u> - F1c (L) on deeply weathered rock on lower slopes <u>Sandy loam over brown mottled clay</u> - F1a (M) in drainage depressions <u>Gradational red loamy sand</u> - M1a (M) in drainage depressions</p> <p>Main soils are moderately deep and moderately to well drained. Inherent fertility is relatively low; soils are highly susceptible to acidification. Land is too steep for uses involving regular cultivation, but there is some potential for perennial horticultural and floricultural crops where water is available.</p>
HGC HGD	13.2 52.5	<p>Undulating rises and rolling low hills formed on sandstones and sandy clays of old glacial valleys.</p> <p>HGC Undulating rises to 30 m high with slopes of 3-10%.</p> <p>HGD Gently rolling low hills to 80 m high with slopes of 10-20%.</p> <p>There is a variety of soils with surfaces ranging from thick sands, through soft loamy sands or sandy loams, to firm loams.</p> <p>Main soils: <u>Sandy loam over alkaline - neutral brown clay</u> - F1a (C) } on sandy clays <u>Sandy loam over acid - neutral brown clay</u> - F1b (L) } <u>Hard sandy loam over red clay</u> - D3 (C) } on sandstones <u>Thick bleached sand over sandy clay loam</u> - G2 (C) } <u>Dark gradational loam over thick carbonate</u> - C5 (L) } <u>Red brown loam over hard carbonate</u> - B4 (M) } <u>Loam over brown clay</u> - F1c (M) on narrow flats between the rising ground</p>



		These soils are each substantially different from one another. The F1 soils are marginally fertile, prone to acidification, and susceptible to waterlogging due to perching of water on the clayey subsoil. The D3 soils are poorly structured, although moderately fertile. Profiles are relatively shallow, so available water holding capacity is likely to be limiting. They are highly erodible by water. The deep sandy soils (G2) are infertile although well drained. They are susceptible to acidification, water repellence and wind erosion. The dark loams are naturally fertile, although somewhat shallow. All are suitable for irrigation, but there is a moderate to high risk of drainage problems on the sandy loams.
HYC HYLL	3.2 15.2	<p>Slopes formed on sandy clays and clays of Permian glacial valleys. Landslips and/or gully erosion are significant features.</p> <p>HYC Lower slopes of less than 10% slope, with minor gully erosion and no land slip.</p> <p>HYLL Hillslopes up to 80 metres high with gradients of 20% to 30% (but up to 60% in places), affected by landslips in the past and/or with high potential for future mass movement. Watercourses are usually gullied.</p> <p>There is a mixture of sand to loam over yellow and brown mottled clays, and cracking clay soils.</p> <p>Main soils: <u>Sandy loam over poorly structured brown clay</u> - F2a (E) <u>Sandy loam over alkaline - neutral brown clay</u> - F1a (E-L) <u>Black cracking clay</u> - E1 (M-C) <u>Grey-brown cracking clay</u> - E3 (M-C)</p> <p>Although these soils are generally inherently fertile and deep (although prone to waterlogging), the fragility of the land restricts land use options. Even once stabilized, the severely damaged areas are always vulnerable to renewed erosion.</p>
JRE	11.2	<p>Alluvial flats of the Bungala River. The soils are deep and predominantly texture contrast.</p> <p>Main soils: <u>Loam over red clay</u> - D2 (E) <u>Loam over brown clay</u> - F1c (C) <u>Loamy sand over dispersive brown clay</u> - F2b (C)</p> <p>These soils are mostly inherently fertile, moderately well drained and with high water holding capacities. They have high production potential, although much of the land is occupied by the town of Yankalilla. The F2b soils with dispersive subsoil are less favourable, being marginally fertile and prone to waterlogging.</p>
LNO	1.0	<p>Drainage depressions associated with larger water courses. Underlying materials are medium to fine grained alluvial sediments.</p> <p>LNO Drainage depressions with up to 10% saline seepages.</p> <p>The soils are typically variable, but fall into two main groups:</p> <ul style="list-style-type: none"> - loam over clay soils <u>sandy loam over brown clay</u> - F2b (C) <u>clay loam over brown clay</u> - F1b (C) - gradational soils <u>deep black clay loam</u> - M2 (E) <u>deep sandy loam</u> - M1 (L) <p>These soils are deep but frequently imperfectly drained due to their clayey subsoils. However, thick surface soils reduce the severity of this problem. The M2 soils are highly fertile, and the F1 and M1 soils are moderately fertile. Salinity, waterlogging, stream bank erosion and occasional flooding are common problems. The land has moderately high pasture production potential, but limited scope for horticulture.</p>
LoE	3.2	<p>Gently inclined alluvial fans formed on clayey outwash sediments derived from fine grained basement rocks. Slopes are up to 4%. The soils are deep with loamy surfaces and thick clayey subsoils.</p> <p>Main soils: <u>Gradational brown loam</u> - M2 (E) <u>Loam over brown clay</u> - F1c (E)</p> <p>These soils are deep, fertile and moderately well drained. Although there are waterlogged areas, the land overall is potentially highly productive, with a range of grazing and horticultural land use options.</p>

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

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| (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:*Soils formed on glacial valley sediments*

- B4** Red brown loam over hard carbonate (Petrocalcic, Red Dermosol)
Medium thickness well structured red brown loam to clay loam over highly calcareous material, calcreted at the top, grading to sandstone or sandy clay.
- C5** Dark gradational loam over thick carbonate (Hypercalcic, Black Dermosol)
Black strongly granular loam becoming more clayey with depth abruptly overlying semi hard platy to massive carbonate at depths of between 30 and 40 cm, continuing below 100 cm with increasing sandstone fragments.
- D3** Hard sandy loam over red clay (Hypercalcic, Red Sodosol)
20 - 40 cm hard sandy loam with a paler coloured massive A2 layer, abruptly overlying a coarsely structured red clay with massive soft to semi hard carbonate from about 50 cm, grading to sandstone or sandy clay.
- E1** Black cracking clay (Endohypersodic-Endocalcareous, Self-mulching, Black Vertosol)
Medium thickness black clay with strong granular structure and a self-mulching, cracking surface, overlying a black to dark grey heavy clay with strong blocky structure and variable amounts of fine calcareous segregations. The soil is formed over a grey strongly slickensided clay (Hindmarsh Clay equivalent), usually deeper than 100 cm.
- E3** Grey-brown cracking clay (Episodic-Endocalcareous, Epipedal, Brown Vertosol)
Medium thickness grey clay with coarse subangular blocky structure and surface cracks, overlying a grey to brown heavy clay with strong coarse prismatic structure. Carbonate is usually absent, but minor segregations may occur at depth. The soil is formed on a grey heavy clay with well developed slickensides (Hindmarsh Clay equivalent), usually shallower than 100 cm.
- F1a** Sandy loam over alkaline - neutral brown clay (Calcic, Brown Chromosol)
20 - 50 cm soft to firm loamy sand to sandy loam with a bleached A2 layer, abruptly overlying a dark brown, yellowish brown and red clay with strong blocky structure and fine carbonate from about 70 cm.
- F1b** Sandy loam over acid - neutral brown clay (Eutrophic, Brown Chromosol)
25 - 75 cm soft to firm loamy sand to sandy loam with a bleached A2 layer, abruptly overlying a dark brown, yellowish brown and red clay with strong blocky structure and no carbonates.
- F2a** Sandy loam over poorly structured brown clay (Hypocalcic, Subnatric, Brown Sodosol)
Medium thickness dark brown sand to sandy clay loam with a bleached and hard A2 horizon, overlying a dark grey brown and yellow brown mottled heavy clay with strong prismatic structure, grading to a light grey, yellow and red massive sandy clay to clay with minor fine carbonate segregations from 85 cm.
- G2** Thick bleached sand over sandy clay loam (Bleached, Hypercalcic / Eutrophic, Red Chromosol)
55 - 90 cm grey brown sand with a thick bleached A2 layer, over a red massive sandy clay loam to sandy clay. There is abundant fine carbonate as shallow as 70 cm, but deeper than 100 cm in 50% of profiles. Weak sandstone underlies the soil below 100 cm.

Soils formed on alluvial sediments

- D2** Loam over red clay (Calcic, Red Chromosol)
Thick hard loam over a well structured red clay with fine carbonate from 60 cm, grading to alluvial clay.
- F1c** Loam over brown clay (Bleached-Mottled, Hypocalcic, Brown Chromosol)
Medium to thick hard grey brown loam to clay loam with a pale grey to bleached A2 layer, over a dark brown, grey brown and yellow brown mottled clay with minor fine carbonate at depth.



F2b Loamy sand over dispersive brown clay (Calcic, Brown Sodosol)

Medium thickness hard loamy sand with a bleached A2 layer, abruptly overlying a yellowish brown, red and grey mottled dispersive heavy clay with fine carbonate segregations from about 65 cm.

M2 Gradational brown loam (Eutrophic, Brown Dermosol)

Thick to very thick dark brown loam to clay loam, becoming more clayey with depth, grading to a brown or red well structured clay, continuing below 100 cm.

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

