

APA Apamurra Land System

Undulating plains and rises in the Apamurra area

Area: 56.1 km²

Annual rainfall: 345 – 425 mm average

Geology: The geology is inferred from ground observation. The western and northern parts are underlain by Tertiary or early Quaternary sediments, including Blanchetown Clay around Apamurra. These sediments are overlain by Woorinen Formation carbonates which are calcreted in places, but which are generally less than a metre thick over the older materials. Along the western side, basement highs of gneiss and quartzite are close to the surface. In the south east, the undulating topography and occasional granitic outcrop suggests that a large granite dome underlies the land. Very gritty deep subsoils support this proposition. Water courses that have cut through the sedimentary cover have deposited alluvial sediments in their valleys. These are generally medium textured but gritty. Sporadic windblown sand overlies the plains and rises. The sand has usually been reworked into low dunes.

Topography: The topography of the system largely reflects the probable geology. Virtually undissected Blanchetown Clay occurs on a high level gently sloping plain around Apamurra. Where the Tertiary cover has been partially dissected, the plains are gently undulating, and are sporadically overlain by low sand hills and sand spreads. The land underlain by granite is undulating with significantly more relief than the rest of the system. These areas have been dissected by water courses, creating alluvial flats and drainage depressions.

Elevation: 90 m in the east at the outfall of the water courses to 180 m in the west

Relief: Up to 40 m

Soils: A range of soils reflects the varied parent materials of the system. Sandy loams with red clayey subsoils are most common, but there are extensive areas of gradational sandy loams, both calcareous and non calcareous. Sandy soils, either deep, or moderately shallow over more clayey subsoils are limited.

Main soils

- D5** Loamy sand over sandy clay on Tertiary sediments
- D3** Sandy loam over red clay on Blanchetown Clay
- D2a** Sandy loam over red clay }
- A4a** Calcareous sandy loam } on deeply weathered granite
- A4/C1** Gradational loamy sand }
- H2** Deep sand on reworked Tertiary sediments

Minor soils

Alluvial flats and depressions

- D2b** Loamy sand over red clay
- A4b** Calcareous sandy loam
- D5/M4** Loamy sand over red sandy clay loam

Stony rises

- B2** Shallow stony calcareous soil on calcrete
- A2** Calcareous sandy loam over granite

Gently undulating plains

- G4** Sand over dispersive clay on Tertiary sediments
- D7** Sandy loam over red clay on rock



Main features: The Apamurra Land System comprises gently undulating plains and undulating rises formed on a variety of geological materials. The soils vary according to the geology, but include mainly moderately deep texture contrast soils and moderately shallow calcareous soils. The former group have sandy to loamy surface soils with consequent variations with regard to fertility and structure, but subsoils usually have at least moderate clay contents to store moisture and retain nutrients. Fertility and sometimes waterholding capacity are the main limitations, with slight limitations due to boron toxicity and erosion potential. The calcareous soils are shallower and with reduced waterholding capacity. They are more likely to suffer lime induced nutrition problems, but are better structured.

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

SLU	% of area	Main features #
EgC	0.7	Rises formed on basement rocks capped by Woorinen Formation carbonates. There is variable surface quartzite and calcrete, usually between 10% and 20%. Main soil: <u>calcareous sandy loam</u> - A2 (D). These soils are moderately deep to shallow. Restricted water holding capacity and excessive stone limit productive potential. These mainly calcareous soils are only moderately fertile.
GCB	1.2	Sandy rises and low dunes. Main soils: <u>sand over dispersive clay</u> - G4 (V), with <u>deep sand</u> - H2 (L) on low dunes. The soils are infertile and prone to water repellence and wind erosion. The dispersive subsoils will perch water after prolonged rain, so profiles with relatively thin surfaces can be affected by waterlogging.
HFA	15.1	Gently undulating high level plain formed on Blanchetown Clay. Slopes are 1-4%. Main soils: <u>sandy loam over red clay</u> - D3 (V) with <u>sandy loam over red clay on rock</u> - D7 (L). These soils are moderately deep and inherently fertile. The main limitations to productivity are sub-optimal soil structure (hard setting surfaces and dispersive clay subsoils) and probable boron toxicity (associated with the impermeable substrate clay).
HHB	33.5	Undulating rises up to 40 m high, with slopes of 2-8%. The land is underlain at depth by granite, which has weathered to a gritty medium textured material underlying the soils. There is minor surface quartzite and calcrete. Main soils: <u>sandy loam over red clay</u> - D2a (E) and <u>calcareous sandy loam</u> - A4a (E), with <u>gradational loamy sand</u> - A4/C1 (C). These soils are moderately deep (except for the calcareous sandy loams) with adequate water holding capacity, and moderate to low fertility caused by either sandy textures or high carbonate contents. Other slight limitations include some potential for wind and water erosion, and subsoil boron toxicity.
HTB	39.3	Gently undulating plain with slopes of 1-3%, underlain by Tertiary sediments capped by soft and occasionally rubbly carbonates. Sand spreads sporadically overlie the landscape. Main soils: <u>loamy sand over sandy clay</u> - D5 (V) and <u>deep sand</u> - H2 (C) on sand spreads. The main soils are moderately deep with moderate to low inherent fertility. Productive potential is fair to good provided that fertility is maintained. Sandier soils are less fertile and prone to water repellence and wind erosion.
JKA JKE JKJ	3.4 3.4 2.5	Flats and drainage depressions formed on medium textured gritty outwash from the ranges to the west. JKA Gently inclined flats with slopes of 1-2%. JKE Drainage depressions with weakly defined water courses. JKJ Drainage depressions with well defined and partly eroded water courses. Main soils: <u>loamy sand over red clay</u> - D2b (E) and <u>calcareous sandy loam</u> - A4b (E), with <u>loamy sand over red sandy clay loam</u> - D5/M4 (L). These soils are deep with moderately low to moderate inherent fertility. The calcareous soils have restricted water holding capacity due to highly calcareous clay layers at moderate depth. The texture contrast soils (D2b) have a tendency to set hard, thereby adversely affecting workability, seedling emergence and runoff. Elevated subsoil boron can be expected where subsoils are clayey. There is some potential for water erosion in drainage depressions.
QMB	0.9	Low stony rises formed on calcrete. There is abundant surface stone. Main soil: <u>shallow stony calcareous soil</u> - B2 (D). These are shallow and stony, with moderate to severe limitations due to low water holding capacity and workability problems.



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:

Gently undulating plains formed on Woorinen Formation over Tertiary sediments and partly overlain by sand

- D5** Loamy sand over sandy clay (Hypercalcic / Supracalcic, Red / Brown Chromosol)
Medium to thick loamy sand to sandy loam abruptly overlying a red or brown sandy clay loam to sandy clay with abundant soft to nodular Class III A carbonate from about 60 cm, grading to clayey Tertiary sediments below 100 cm.
- H2** Deep sand (Arenic, Red-Orthic Tenosol)
Very thick loamy sand over a red clayey sand at depths ranging from 65 cm to more than 100 cm.
- G4** Sand over dispersive clay (Hypercalcic, Brown Sodosol)
Thick to very thick grey brown loose sand with a bleached A2 layer, sharply overlying a brown or red mottled dispersive sandy clay loam to sandy clay becoming more clayey with depth and with abundant soft carbonate from about 60 cm. Tertiary clay underlies the soil below 100 cm.

High level plains formed on Blanchetown Clay

- D3** Sandy loam over red clay (Calcic, Red Sodosol)
Thick hard sandy loam abruptly overlying a strongly structured dispersive red clay, with soft Class I carbonate from about 70 cm, grading to Blanchetown Clay within 100 cm.

Undulating rises formed on deeply weathered granite

- A4a** Calcareous sandy loam (Hypercalcic / Lithocalcic Calcarosol)
Calcareous sandy loam grading to highly calcareous sandy clay loam over Class III carbonate with variable rubble content from about 40 cm, continuing very highly calcareous below 100 cm.
- A4/C1** Gradational loamy sand (Epibasic, Hypercalcic/Supracalcic Calcarosol OR Hypercalcic, Red Kandosol)
Thick loamy sand grading to calcareous sandy loam over red massive sandy clay loam with abundant soft Class III A carbonate from about 60 cm, continuing below 100 cm.
- D2a** Sandy loam over red clay (Hypercalcic, Red Chromosol)
Medium thickness sandy loam over a red well structured light clay with soft Class III A carbonate from about 50 cm, decreasing with depth to gritty sandy clay loam below 100 cm.

Alluvial flats and depressions

- D2b** Loamy sand over red clay (Hypocalcic, Red Chromosol)
Thick loamy sand to sandy loam, overlying red sandy clay to clay with moderate blocky structure, weakly calcareous from about 65 cm and grading to sandy clay loam to sandy clay continuing below 100 cm.



- A4b** Calcareous sandy loam (Hypercalcic Calcarosol)
Calcareous sandy loam grading to highly calcareous light brown sandy clay loam over a Class III A carbonate layer from about 55 cm, with calcareous clay loam to light clay continuing below 100 cm.
- D5/M4** Loamy sand over red sandy clay loam (Eutrophic / Calcic, Red Chromosol / Kandosol)
Thick loamy sand grading to sandy loam over a red massive sandy clay loam, calcareous from about 60 cm in a third of profiles over red or brown sandy clay loam to sandy clay continuing below 100 cm.

Stony rises

- B2** Shallow stony calcareous soil on calcrete (Petrocalcic Calcarosol)
Medium thickness calcareous sandy loam with variable carbonate rubble over calcrete within 30 cm.
- A2** Calcareous sandy loam over granite (Paralithic, Calcic / Supracalcic Calcarosol)
Medium thickness calcareous sandy loam grading to rubbly or non rubbly Class III carbonate from about 30 cm merging with weathering granite at depths ranging from 50 cm to 100 cm.
- D7** Sandy loam over red clay on rock (Calcic, Red Sodosol)
Medium thickness hard sandy loam to clay loam over a coarsely structured dispersive red heavy clay, calcareous with depth, overlying gneiss or quartzite with 100 cm.

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

