BRK Brinkley Land System

Gently undulating dunefields extending in an arc south from Murray Bridge, then west towards Langhorne Creek.

Area: 230.1 km^2

Annual rainfall: 400 – 500 mm average

Geology: The land is underlain by old alluvial sediments with textures ranging from clayey sands to sandy clays. There are remnants of early Quaternary lake floor clays (Blanchetown Clay equivalent) in places. Sediments are generally covered by highly calcareous deposits of the Woorinen Formation. These have variable rubble content and have hardened to calcretes in places. There is a general tendency for higher rubble and calcrete concentrations in an easterly direction. The calcareous deposits are in turn overlain by more recent sands which have been reworked into distinctive parallel dunes.

Topography: The dominant feature of the Brinkley Land System is the pattern of moderate parallel sand dunes with a marked almost east - west orientation. These are superimposed over a gently undulating landscape of stony rises and pronounced benches with intervening flats and swales.

Elevation: 10 m in the south east to 47 m in the north west

Relief: Less than 10 m

Soils: The soils fall into three broad categories, viz. shallow stony sandy loams over calcrete or highly calcareous materials, deep loamy texture contrast soils, and sandy soils (either deep sand or sandy texture contrast types).

Main soils

Stony rises

B2 Shallow stony calcareous sandy loam
B3 Shallow stony non calcareous sandy loam
A4a Rubbly calcareous sandy loam
A4b Calcareous sandy loam

Minor soils

Stony rises

B7a Shallow sand over sandy clay

Flats, swales and depressions

D2 Sandy loam over red clay
D3 Sandy loam over dispersive red clay
A4c Rubbly calcareous sandy loam
F2 Sandy loam over dispersive brown clay
G1 Sand over red sandy clay
A5 Calcareous sandy loam on clay
A6 Calcareous clay loam

Sandhills

G3/G4 Sand over dispersive clay
G2 Sand over light sandy clay loam
H3 Deep sand
B7b Shallow sand over sandy clay

Main features: The Brinkley Land System is characterized by a pattern of discrete sandhills, stony benches and rises, and swales and flats. The soils of the sandhills are mixed deep sands and sands over more clayey subsoils. They are infertile and prone to water repellence and wind erosion. The soils of the rises contain variable amounts of calcrete rubble. These range from shallow non arable sandy loams over sheet calcrete on the benches, through arable rubbly forms, to deeper calcareous sandy loams with little rubble. Variable waterholding capacity and moderately low fertility are the main limitations of these soils. The flats and swales have deeper soils including sandy loams over red clays and a range of calcareous types. These mostly have good productive potential.

Soil Landscape Unit summary: 7 Soil Landscape Units (SLUs) mapped in the Brinkley Land System:

SLU	% of area	Main features #
HuE	6.1	Swales, flats and depressions formed over clayey sand to sandy clay sediments, with low calcreted rises. Main soils: sandy loam over red clay - **D2** (E), rubbly calcareous sandy loam - **A4c** (C), calcareous clay loam - **A6** (L), sandy loam over dispersive brown clay - **F2** (L) and calcareous sandy loam on clay - **A5** (L), with shallow stony calcareous sandy loam - **B2** (L) on rises. The D2 soils are deep and moderately fertile, with no significant limitations to productivity. The A4c and B2 soils are less fertile and, depending on rubble content, have lower water holding capacities. The F2 and A6 soils can be expected to have restricted drainage due to dispersive clayey subsoils. The stony rises have shallow stony soils with severe water holding limitations.
O-B ODg	18.8 0.9	Sand dunes and spreads. Many of the sand dunes are uncleared, and many of the cleared dunes have eroded in the past, especially those which have been partially cleared. **O-B** Parallel east - west oriented moderate sand dunes. **ODg** Sand spreads on low rises. Main soils: deep sand - **H3** (E), sand over light sandy clay loam - **G2** (E) and sand over dispersive clay - **G3/G4** (C), with shallow sand over sandy clay on calcrete - **B7b** (L), where sand has blown off. Soils as listed under "*Stony rises*" also occur between the sand spreads of **ODg** and on eroded sections of **O-B**. The sandy soils are infertile and prone to water repellence and wind erosion. Productivity potential is low. Wind erosion control is a priority on unstable dunes. Most of the cleared dunes are arable, but conservation management using crops such as cereal rye are needed to maintain stability.
QcB	9.5	Gently undulating rises formed on rubbly calcrete, with 20-30% low sandhills and sand spreads. There is 20% or more surface calcrete and occasional rocky reefs. Main soils: shallow soils over calcrete - **B3/B2** (E) and rubbly calcareous sandy loam - **A4a** (E), with sand over dispersive clay - **G3/G4** (L) and deep sand - **H3** (L) on sandy areas. This land is mostly arable but the shallow stony soils restrict moisture holding capacity. Lime induced nutrient deficiencies can be expected on the mainly calcareous soils. The sandy soils are infertile and prone to water repellence and wind erosion.
QzZ	7.3	Low benches formed on sheet calcrete. There is extensive surface calcrete and near surface rocky reefs. Main soils: shallow stony non calcareous sandy loam - **B3** (E) and shallow stony calcareous sandy loam - **B2** (E). These soils are shallow, stony and generally non arable.
SdA	57.0	Very gently undulating land underlain by alluvial silty sands to sandy clays (about 75%) and heavy clays (about 25%). The landscape comprises very low rises (50%), swales and flats (20%), low stony benches (20%) and low sandhills (10%). Main soils: Rises: rubbly calcareous sandy loam - **A4a** (C), calcareous sandy loam - **A4b** (L), shallow stony sandy loam over calcrete - **B3/B2** (C) and shallow sand over sandy clay on calcrete - **B7a** (L). Flats: Soils as for **HuE** (V) with sand over dispersive clay - **G3/G4** (L) and sand over red sandy clay - **G1** (M). Benches: shallow stony sandy loam over calcrete - **B3/B2** (D). Sandhills: sand over dispersive clay - **G3/G4** (E), sand over light sandy clay loam - **G2** (E),

		deep sand - **H3** (L) and shallow sand over sandy clay on calcrete - **B7b** (M) where sand has blown off. This complex landscape includes rises with rubbly and non rubbly calcareous sandy loams, with an unmappable mosaic of facets as listed above (ie flats and swales as for **HuE**, stony rises and benches as for **QcB** and **QzZ**, and sandhills as for **O-B**). The rises are mostly arable, although there are limited areas where calcrete reefs, excessive stone or shallow soils effectively prevent cultivated agriculture. Restricted water holding capacity is a limitation to some extent throughout, except on the flats and swales.
ZA-	0.4	Moderately to highly saline depressions. Some are well suited to the establishment of salt tolerant grasses, while others are too wet and saline. Soils are saline variants of **HuE**.

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:

Stony rises

B2 Shallow stony calcareous sandy loam (Petrocalcic Calcarosol)
Medium thickness calcareous sandy loam over Class III C carbonate rubble.

B3 Shallow stony non calcareous sandy loam (Petrocalcic, Leptic Rudosol)
Medium thickness loamy sand to sandy loam over calcrete.

A4a Rubbly calcareous sandy loam (Supracalcic / Lithocalcic Calcarosol)
Calcareous sandy loam to loamy sand with increasing carbonate nodules with depth.

A4b Calcareous sandy loam (Hypercalcic Calcarosol)
Calcareous sandy loam becoming more clayey and calcareous with depth over very highly calcareous Class III A carbonate with up to 20% nodules, from about 40 cm, grading to clayey material deeper than 100 cm.

B7a Shallow sand over sandy clay (Petrocalcic / Lithocalcic, Brown Chromosol)
Medium thickness sand to loamy sand, usually with a bleached A2 layer, over a brown massive sandy clay loam to clay on rubbly or sheet calcrete within 50 cm.

Flats, swales and depressions

D2 Sandy loam over red clay (Hypercalcic, Red Chromosol)
Thin to medium thickness soft sandy loam, overlying a red sandy clay to clay, very highly calcareous with limited hard nodules and some gypsum from 40 cm. Brown, red and grey clayey sand to sandy clay underlies the soil from 85 cm.

D3 Sandy loam over dispersive red clay (Calcic, Red Sodosol)
Thin to medium thickness hard sandy loam to loam over a coarsely structured dispersive red clay, calcareous from about 35 cm, grading to clayey alluvium.

A4c Rubbly calcareous sandy loam (Supracalcic / Lithocalcic Calcarosol)
Medium thickness calcareous loamy sand to light sandy clay loam, overlying Class III B or III C carbonate rubble from 40 cm. Brown, red and grey clayey sand to sandy clay underlies the soil from 70 cm.

F2 Sandy loam over dispersive brown clay (Hypercalcic, Brown Sodosol)
Thin sandy loam sharply overlying a dispersive brown clay, highly calcareous from about 30 cm, grading to grey and red clay from about 50 cm.

G1 Sand over red sandy clay (Hypercalcic, Red Chromosol)
Medium thickness sand to loamy sand over a weakly structured friable red sandy clay loam to sandy clay, with fine or rubbly carbonate from about 35 cm, grading to alluvium.

A5 Calcareous sandy loam on clay (Regolithic, Hypercalcic / Supracalcic Calcarosol)
Calcareous sandy loam grading to a very highly calcareous light sandy clay loam with variable rubble, abruptly overlying red coarsely structured clay within 120 cm.

A6 Calcareous clay loam (Epihypersodic, Regolithic / Pedal, Hypercalcic Calcarosol)
Calcareous sandy clay loam to light clay, becoming more clayey and calcareous with depth, grading to heavy clay within 120 cm. More clayey types tend to have less carbonate and well developed subsoil structure.

Sandhills

G3/G4 Sand over dispersive clay (Calcic, Brown Sodosol)
Thick loose sand with a bleached A2 layer sharply overlying a brown columnar sandy clay with some soft carbonate from about 80 cm, continuing below 100 cm.

G2 Sand over light sandy clay loam (Brown Kandosol)
Loose grey sand with a bleached A2 layer grading to a yellow sand over a brownish light sandy clay loam from about 75 cm, with variable carbonate, becoming sandier with depth with clayey bands.

H3 Deep sand (Arenic, Bleached-Orthic Tenosol)
Very thick sand with a bleached A2 layer, becoming yellow with depth, continuing below 150 cm.

B7b Shallow sand over clay on calcrete (Petrocalcic / Lithocalcic, Brown Chromosol)
As above under "Stony rises".

Further information: DEWNR Soil and Land Program