

KAR Karoonda Land System

(Based on the description by A. K. McCord in "A Description of Land in the Southern Mallee of South Australia")

Undulating plains, rises and sandhills between Karoonda and Sandalwood

Area: 473.6 km²

Annual rainfall: 310 – 360 mm average

Geology: The land is underlain by sandy sediments of the Loxton / Parilla Formations. There are sporadic veneers of Blanchetown Clay equivalent overlying the sandy materials. These sediments were evidently capped by calcrete in the past, as remnants of an old calcreted land surface occur occasionally. Highly calcareous windblown deposits of Woorinen Formation blanket about 30% of the area. These are generally medium textured and contain varying amounts of rubbly carbonate. More recent windblown Molineaux Sands cover about 40% of the landscape, overlying Woorinen materials, calcretes and the older Tertiary sediments.

Topography: The topography reflects the geological composition. The underlying Tertiary sediments have a flat to very gently undulating surface, but the remnant calcrete benches, the Woorinen sediments and the Molineaux Sands overlying the plains give rise to an undulating land surface. Some of the calcrete remnants occur as well defined NW-SE trending ridges, while the sandhills have a general east-west orientation.

Elevation: 55 - 85 m

Relief: 5 - 15 m

Soils: Except for deep sands on sandhills, most soils are loamy. Some are calcareous throughout, and others have non calcareous texture contrast profiles.

Main soils

Slopes and rises

A4/C1 Calcareous / gradational loam

Sandhills

H2 Deep sand

Flats

D2 Sandy loam over red clay

Minor soils

Slopes and rises

B2 Rubbly calcareous loam

Main features: The Karoonda Land System includes significant fertile productive flats, but the majority of the land is either rises with calcareous sandy loams or sandhills. The calcareous soils of the rises are generally moderately deep and reasonably fertile with moderately low erosion potential. However, there are minor areas of shallow stony soils. The sandhills are mostly arable although characterized by low fertility sands prone to water repellence and wind erosion. Some larger dunes are semi or non arable due to the high risk of erosion.



Soil Landscape Unit summary: 11 Soil Landscape Units (SLUs) mapped in the Karoonda Land System:

SLU	% of area	Main features #
HkA	0.5	Flats and depressions with less than 10% stony and sandy rises. Main soil: <u>sandy loam over red clay</u> - D2 (D). These soils are relatively deep and fertile, with low erosion potential. They have few limitations for agricultural production. Where underlain by Blanchetown Clay, boron toxicity may be a problem. Presence of this clay downgrades irrigation potential due to restricted deep drainage.
HoA HpA	15.7 19.6	Very gently undulating flats with up to 20% low rubbly rises and up to 30% low sandy rises. HoA Flats with less than 10% sandy rises. HpA Flats with between 10% and 30% sandy rises. Main soils: <u>sandy loam over red clay</u> - D2 (V) on flats, and <u>calcareous / gradational loam</u> - A4/C1 (L-C) on non sandy rises and some flats. In HpA , <u>deep sand</u> - H2 (L-C) occurs on sandhills. The main soils (as for HkA) are deep, fertile and stable with few limitations to agricultural production. The calcareous soils on the rises are also favourable soils, although with somewhat lower natural fertility. The sandy rises are less suitable agricultural soils, with low fertility levels and moderate susceptibility to water repellence and wind erosion. All soils have irrigation potential with the same provisos regarding Blanchetown Clay as indicated above.
QaB	1.7	Complex of calcrete benches (about 50%), slopes and depressions (about 30%) and low sandhills (about 20%). There is extensive surface calcrete on the benches. Main soils: <u>rubbly calcareous loam</u> - B2 (E) on benches, <u>calcareous / gradational loam</u> - A4/C1 (L) on slopes, <u>sandy loam over red clay</u> - D2 (M) in depressions, and <u>deep sand</u> - H2 (L) on sandhills. The main soils are shallow and stony but mostly arable, although moisture holding capacity and stoniness affect productive potential. The soils of the slopes and depressions are relatively deep and fertile with few limitations. The sandhills are infertile and susceptible to wind erosion and water repellence.
SQB	23.2	Complex of rises (about 60%), flats (about 20%) and sandhills (about 20%). Main soils: <u>calcareous / gradational loam</u> - A4/C1 (V) on slopes, <u>sandy loam over red clay</u> - D2 (L) in flats, and <u>deep sand</u> - H2 (L) on sandhills. Most soils are sandy loams with more clayey subsoils to reasonable depth and are potentially productive. The more calcareous types are prone to some fertility problems due to nutrient fixation. The sandy soils have low fertility and are susceptible to wind erosion and water repellence.
SSB	4.1	Rises with up to 10% calcrete and 10-30% superimposed low sandhills. Main soils: <u>calcareous / gradational loam</u> - A4/C1 (V), with <u>deep sand</u> - H2 (L) on sandhills and <u>rubbly calcareous loam</u> - B2 (M) on heavy stone patches. The most common soils are as for SQB , the main difference being the presence of stony areas in SSB. Some of these are non arable.
U-A UBF UBG UBI UBJ	0.7 10.9 3.5 0.6 19.5	Sandhill - swale complexes comprising variable proportions of irregular shaped sandhills overlying the main landscape. U-A Individual high sandhills. UBF 60-90% moderate sandhills. UBG 60-90% low sandhills. UBI 30-60% moderate sandhills. UBJ 30-60% low sandhills. Main soils: <u>deep sand</u> - H2 (E-V) on sandhills, with <u>calcareous / gradational loam</u> - A4/C1 (C) and <u>sandy loam over red clay</u> - D2 (C) on the slopes and flats between the sandhills. The sands are infertile and susceptible to water repellence and wind erosion. The high sandhills are very fragile and need very careful management. They are not arable. The moderate sandhills are semi arable and ideally should be stabilized with perennial vegetation such as lucerne. The low sandhills are arable but sound soil conservation management is required. The calcareous loams and sandy loam over red clay soils between the sandhills are potentially productive soils with few limitations.

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:**Slopes and rises****A4/C1** Calcareous / gradational loam

(Hypercalcic / Supracalcic, Epibasic Calcarosol OR Hypercalcic / Supracalcic, Red Kandosol)

Non calcareous to calcareous sandy loam grading to a red calcareous sandy clay loam over Class III B rubbly carbonate at about 30 cm, becoming less rubbly with depth and grading to Loxton Sand below 100 cm. Extensive on slopes.

B2 Rubbly calcareous loam (Petrocalcic, Lithocalcic Calcarosol)

Calcareous rubbly light sandy clay loam becoming more clayey with depth overlying hard calcrete (sheet or boulder) within 20 cm, becoming softer below 100 cm and overlying Blanchetown Clay. Extensive on stony rises.

Flats**D2** Sandy loam over red clay (Calcic, Red Chromosol / Dermosol)

Medium thickness firm sandy loam overlying a red well structured clay loam to light clay, calcareous from about 60 cm, grading to Loxton Sand below 100 cm.

Sandhills**H2** Deep sand (Calcareous, Arenic, Brown-Orthic Tenosol)

Very thick dark brown loose sand, paler with depth overlying red clayey sand, often as lamellae in a sandier matrix.

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

