BRW Brentwood Land System

The system is dominated by plains, most of which have numerous low stony rises, and includes a number of marginally saline low lying stony plains, many saline depressions, and one ancient salt lake in the very south of the system.

Area: 77.8 km^2

Landscape: The system is dominated by plains, most of which have numerous low stony rises. There are a number of marginally saline low lying stony plains, a number of saline depressions, and one ancient salt lake in the very south of the system. Most of the system was formerly blanketed by coastal carbonate sand deposits. This sand has largely been removed by wind action in very recent geological times, but remnant dune cores in the form of jumbled low stony rises remain. There are a few coastal backplains situated directly behind coastal dunes which have very slight parallel ridge lines evident, indicating that these are relict coastal dunes. And there are some low coastal sand dunes.

The vast majority of soils are shallow or very shallow and overlie calcrete. There is a general trend of decreasing fine carbonate content from the north of the system to the south. Shallow carbonate sands occur on coastal backplains, and on a few low stony rises, especially in the northern part of the system. The most common soils are shallow carbonate-rich loamy sands to fine sandy loams which occur on low stony rises, and on flats, especially in the north and centre of the system. Shallow calcareous loams mostly occur on flats in the centre of the system, but are extensive on plains in the south of the system. Shallow non calcareous loams occur on a few flats in the centre of the system, but are relatively common on slightly low lying areas in the south of the system. Some deeper soils occur, especially in the north and centre of the system.
The northern part of the system is underlain at depth by Permian age sediments associated with glacial activity, while the southern part is underlain at depth by Tertiary age sandy limestones (Crawford, A.R., 1965). These are everywhere overlain by younger Quaternary age sediments. Calcreted carbonate-rich sediments form the top sedimentary layer.

Annual rainfall: 395 - 415 mm average

Main soils:
B2 Shallow calcareous loam on calcrete (around 38% of area)
B1b Shallow highly calcareous loamy sand on calcrete (around 35% of area)

Minor soils:
B3 Shallow loam on calcrete (around 12% of area)
B1a Shallow carbonate sand on calcrete (around 7% of area)
A1 Highly calcareous loamy sand (approximately 4% of area)

Main features: Surface textures range from loamy to sandy. Most soils have calcrete at shallow to very shallow depth. Such soils have restricted water holding capacities which limits productive potential. Surface stone and calcrete outcrops can interfere with many farming practices.

Some soils are dominantly composed of fine carbonate sand, while many loamy sands to fine sandy loams are composed of a mixture of carbonate and quartz particles. Such highly calcareous soils have low fertility. The high carbonate content of these soils leads to the restricted availability of a number of nutrients. The availability of phosphorus, manganese, zinc and iron is restricted. Higher than normal amounts of phosphorus fertilizer are often needed for adequate crop production, and regular manganese

applications are necessary. Copper and cobalt are also normally deficient on such soils.

As fine carbonate content decreases in surface soils, the extent of restricted nutrient availabilities diminishes. For example, calcareous loams, which have surfaces dominated by quartz particles, usually do not need regular supplements of manganese.

Saline seepage affects the depression areas in this system to the extent that they are highly to marginally saline. Many subsoils have raised salinity levels. Correspondingly, sodium levels are high in many soils.

The potential for wind erosion is moderate to moderately high on many soils. This is exacerbated by the water repellent nature of the more sandy soils. Careful surface management is needed to protect such soils.

Soil Landscape Unit summary: Brentwood Land System (BRW)

SLU	% of area	Main features #
QnK	1.4	Land dominated by shallow soil on calcrete. Main soils: *shallow calcareous loam on calcrete* **B2** grading to *shallow loam on calcrete* **B3**. **QnK** stony plains (slopes 0-1%, 4-5r).
QRK QRKk QRT	24.5 7.6 1.5	Land dominated by shallow calcareous soil on calcrete. Main soils: *shallow calcareous loam on calcrete* **B2** grading to *shallow loam on calcrete* **B3** on flats, and grading to minor areas of *shallow highly calcareous loamy sand on calcrete* **B1b** on some low rises. **QRK** stony plains with many low stony rises (slopes 0-1.5%, 4-5r). **QRKk** gently undulating plain (slopes 0-1%, 3-4r). **QRT** marginally saline low lying stony plains (slopes <1%, 4s).
QSK	22.9	Land dominated by shallow calcareous soil on calcrete. Main soils: *shallow calcareous loam on calcrete* **B2** grading to *shallow highly calcareous loamy sand on calcrete* **B1b**, with some *shallow loam on calcrete* **B3** on flats. With minor areas of *calcareous loam* **A4** grading to *highly calcareous loamy sand* **A1**. **QRK** relatively low lying stony plains with very many low stony rises (slopes 0-1.5%, 4-5r).
YaU YaW YaX	3.6 1.9 0.4	Land dominated by shallow carbonate sand on calcrete. Main soils: *shallow carbonate sand on calcrete* **B1a**. Possibly with some moderate depth *carbonate sand* **H1**. **YaU** slightly elevated coastal backplains, situated directly behind coastal dunes (slopes <1%): there are very slight ridge lines parallel to the coast, which indicate that these areas are composed of a series of relict coastal dunes. **YaW** relatively low lying coastal backplains, situated directly behind coastal dunes (slopes <1%): there are slight ridge lines, which indicate that these areas are composed of a series of relict coastal dunes. **YaX** marginally saline depression (slopes <1%, 4s°).
YbU YbX	10.1 0.6	Land dominated by shallow carbonate-rich soil on calcrete. Main soils: *shallow highly calcareous loamy sand on calcrete* **B1b** possibly grading to a few *shallow carbonate sand on calcrete* **B1a** on low rise surfaces, and probably grading to a few *shallow calcareous loam on calcrete* **B2** in stony flats. **YbU** gently undulating to undulating plain with very many low rises (slopes 0-2.5%). **YbX** marginally saline low lying stony plain (slopes <1%, 4s).
YcU YcX	20.1 0.7	Land dominated by shallow carbonate-rich soil on calcrete. Main soils: *shallow highly calcareous loamy sand on calcrete* **B1b** grading to a few *shallow carbonate sand on calcrete* **B1a** on low rise surfaces, and grading to *shallow calcareous loam on calcrete* **B2** in flats. With some *highly calcareous loamy sand* **A1** possibly grading to some *calcareous loam* **A4**, on low rises and flats. **YcU** gently undulating to undulating plains with very many low rises, most of which are stony (slopes 0-2.5%). **YcX** marginally saline depressions with a few highly saline patches (slopes <1%, 4s°).

WGE WGEa WGU	1.1 0.3 0.2	Coastal landscapes. Main soils: *carbonate sand* **H1** grading to *shallow carbonate sand on calcrete* **B1a**, especially on very low dunes and flats. **WGE** very low coastal dunes (5a). **WGEa** low coastal dunes (7-5a). **WGU** marginally saline coastal flats with some very low dunes (4a, 4s).
WU-	2.0	**WU-** – sandy and rocky subtidal to intertidal flats/reefs.
ZA- ZD-	0.9 0.3	*Saline depressions and a salt lake.* **ZA-** highly saline depressions (5-4s): often including some marginally saline flats. Main soils: mostly saline variants of *shallow highly calcareous loamy sand on calcrete* **B1b** grading to some *shallow calcareous loam on calcrete* **B2**, and some *highly calcareous loamy sand* **A1** grading to some *calcareous loam* **A4**. **ZD-** ancient salt lake (8s): a relatively deep depression which is bare of vegetation. The area includes some highly saline lake margin areas. Main soils: *saline soil* **N2**: a typical profile has calcareous sandy loam to light clay overlying green-grey to olive-brown non calcareous clay. There is a thin surface salt crust, and the underlying sediments are rich in salt crystals and 'fluffy' gypsum.

Classes in the 'Soil Landscape Unit summary' table (eg. 2-1e, 3w, 2y, etc) describe the predominant soil and land conditions, and their range, found in Soil Landscape Units. The number '1' reflects minimal limitation, while increasing numbers reflect increasing limitation. Letters correspond to the type of attribute:

a - wind erosion	e - water erosion	f - flooding	g - gullying
r - surface rockiness	s - salinity	w - waterlogging	y - exposure

Detailed soil profile descriptions:

Main soils:

B2 *Shallow calcareous loam on calcrete* [Petrocalcic Calcarosol]
Grey brown to brown calcareous loam with calcrete at shallow to very shallow depth. Some sandy loams may occur. The surface layer is dominated by quartz particles. Subsoil textures can be a heavy as clay loam. Profiles often contain abundant hard carbonate rubble. Mostly found on flats and some slight rises.

B1b *Shallow highly calcareous loamy sand on calcrete* [Supravescent Petrocalcic Calcarosol]
Shallow to very shallow grey loamy sand to fine sandy loam on calcrete. The soil is a mixture of carbonate and quartz particles. Profiles are often water repellent. Found on low stony rises and in some flats.

Minor soils:

B3 *Shallow loam on calcrete* [Petrocalcic Tenosol]
Red brown loam with calcrete at shallow to very shallow depth. Profiles may be slightly calcareous. Surfaces are usually hardsetting. Subsoil textures can be a heavy as clay loam. Profiles often contain abundant hard carbonate rubble. Mostly found on flats.

B1a *Shallow carbonate sand on calcrete* [Petrocalcic Shelly Calcarosol]
Shallow to very shallow grey fine carbonate sand on calcrete. The soil is dominantly composed of carbonate particles. Profiles are typically water repellent. Found on coastal backplains and on areas of very low coastal dunes.

A1 *Highly calcareous loamy sand* [Supravescent Calcarosol]
Moderate depth to deep grey loamy sand to fine sandy loam. The soil is a mixture of carbonate and quartz particles. Profiles often contain abundant hard carbonate rubble in subsoil layers, and are often underlain by calcrete at moderate depth. Topsoil layers are often water repellent. Subsoil layers may be as heavily textured as clay loam in depression areas.

References: Crawford, A. R. (1965). `The Geology of Yorke Peninsula'. *Bull. geol. Surv. S. Aust., 39*.

Further information: DEWNR Soil and Land Program