FAI Fairview Land System

A highland land system consisting of rises and slopes, and a few low hills, plains and depressions

Area: 66.2 km^2

Landscape: A highland land system which is underlain by various types of Cambrian age limestone-dolomite bedrock. The system consists of rises and slopes, and has a few low hills, plains and depressions. A northeast-southwest oriented linear ridge forms the western side of the system, while a 'v-shaped' ridge forms the northern arc of the system. Just south of the apex point of the 'v-shaped' ridge is a prominent low hill which is significantly higher elevation than either of the two ridge areas. In the northeast of the system are some relatively low lying plains enclosed between the two ridges. A number of closed depressions occur in this inter-ridge area – these are sinkhole formations which are characteristic of limestone based landscapes.

The youngest bedrock is dark blue-grey Ramsay Limestone which underlies the rises in the very southern part of the system. Dark blue-grey Parara Limestone underlies the main central part of the system – including the western arm. This is the limestone-dolomite rock quarried for road metal just southwest of Curramulka, and is the bedrock in which the world famous Curramulka caves (Correl Cave) have formed. This rock is lithologically identical to some outcropping rock north of Ardrossan – approximately 40 km to the northeast. The oldest bedrock is the grey to yellow Kulpara Limestone which underlies the northeastern part of the system. The Curramulka town caves have formed in this bedrock, and the rock quarried in the BHP dolomite mine south of Ardrossan is also Kulpara Limestone. (Crawford, A.R., 1965).

Accessions of wind-deposited carbonate dust have infused into profiles in relatively recent geological times. Also, calcareous loess (Woorinen Formation) overlies older sediments in many areas. Calcrete has formed from these carbonate-rich sediments over time. Many soils across the system are underlain by calcrete, and many contain hard carbonate rubble. The surface of near surface limestone-dolomite bedrock has been calcreted by solution and recrystallisation of carbonate. In some places clayey sediments overlie the limestone-dolomite bedrock. These are probably Hindmarsh Clay equivalent deposits. The clayey sediments are often overlain by calcareous loess deposits.

Annual rainfall: 405 – 465 mm average

Main soils:

B2	Shallow calcareous loam on calcrete (around 29% of area)
A4-A5	Calcareous loam (around 29% of area)
B6	Shallow loam over clay on calcrete (around 18% of area)
B3	Shallow loam on calcrete (around 12% of area)

Minor soils:

A6	Gradational calcareous loam (around 6% of area)
D3	Loam over clay (approximately 3% of area)

Main features: The system is mostly arable, however, some areas are too stony and shallow to be cropped, and a few slopes are too steep. The most common soils are various shallow soils overlying calcrete. Calcareous loams are also relatively common. Surfaces soils are mostly loamy, and are often hardsetting. Sandy topsoils occur in a small area in the east of the system where adjacent landscapes are dominated by 'sand over clay' soils. Many soil profiles are shallow and/or contain hard carbonate rubble. These

limit soil moisture holding capacity and hence productive potential. Stones also interfere with many farming practices.

There is potential for water erosion on many slopes, particularly where slopes are long. Care needs to be taken with surface management in these areas to minimise the risk of water erosion. Contour banking has been constructed on some slopes to reduce the potential risk.

Where soils are calcareous, they limit the availability of certain nutrients: deficiencies of the major nutrient phosphorus and the trace element zinc are common, while deficiencies of the trace elements manganese and iron are possible. Temporary trace element deficiencies can occur in cold and wet conditions with susceptible crops. This is especially the case where soils have highly calcareous surfaces.

Saline seepage affects some soils in low lying areas – generally as raised subsoil/substrate salinity levels. Especially in highland areas, raised salinity levels in these layers is likely to be the result of an accumulation of cyclic salt. This is particularly to be expected when the subsoil or substrate layer is clayey, however, clayey subsoils overlying calcrete seem not to be affected. Correspondingly, many subsoils/substrates have accumulations of sodium which are toxic to most crop roots. The status of toxic accumulations of boron in the lower subsoil is not known well, however, upper subsoils, and soils overlying calcrete, usually have no problem, although it is likely that many substrates have high boron levels.

Many soils have hardsetting surfaces, and many subsoils are dispersive. Waterlogging may occur in some low lying areas, particularly when subsoils are dispersive.

Soil Landscape Unit summary: Fairview Land System (FAI)

SLU	% of area	Main features
GKB	3.6	Land dominated by sandy texture contrast soil. Main soils: *sand over clay* **G4** grading to some *loam over clay* **D3**. Possibly with some *thick sand over clay* **G3**, especially on low sandy rises. Also with common to extensive areas of *shallow sand over clay on calcrete* **B7** grading to *shallow loam over clay on calcrete* **B6**, and possibly some *calcareous loam* **A4**-**A5**. **GKB** – undulating rises with drainage lows (slopes 0-3.5%): this unit includes a few very low sandy rises which are remnant dune ridges.
IYB IYC IYL IYO IYZ IYZw	3.3 5.7 3.0 2.2 0.4 0.3	Land dominated by calcareous soils formed in clayey sediments. Main soils: *gradational calcareous loam* **A6** grading to *loam over clay* **D3**. With common to extensive areas of rubbly *calcareous loam* **A5**-**A4**. Also with some *shallow loam over clay on calcrete* **B6** grading to *shallow calcareous loam on calcrete* **B2**. **IYB** – gently undulating rise with a few vague drainage lows (slopes 0-3%). **IYC** – rise/low hill slopes (slopes 1-4%). **IYL** – lower slopes and drainage lows (slopes 0-2%). **IYO** – gently undulating closed depression (slopes 0-1%): probably sinkhole formations in the underlying limestone-dolomite. **IYZ** – rise/low hill surface (slopes 0-1%). **IYZw** – slight drainage low in rise surface (slopes 0-1%).
QKZ	0.3	Land dominated by shallow calcareous soil on calcrete. Main soils: *shallow calcareous loam on calcrete* **B2**. With limited to common areas of *calcareous loam* **A4**-**A5**. **QKZ** – rise surface (slopes 0-1.5%).
QRB	3.6	Land dominated by shallow calcareous soil on calcrete. Main soils: *shallow calcareous loam on calcrete* **B2**, with limited to common areas of *shallow loam on calcrete* **B3**. There can be minor areas of *gradational calcareous loam* **A6** (in lows), and *calcareous loam* **A5**. **QRB** – stony slopes (slopes 1-3.5%): up to 30% non arable stony land.
QTA	3.8	Land dominated by shallow soil on calcrete.

QTB QTC QTCc QTCx QTDc QTZ	5.1 4.1 0.9 2.9 0.7 0.6	Main soils: *shallow calcareous loam on calcrete* **B2**, with limited to common areas of *shallow loam on calcrete* **B3** grading to *shallow loam over clay on calcrete* **B6**. With limited to common areas of *calcareous loam* **A4**-**A5**. There may be minor areas of *gradational calcareous loam* **A6** in lows. **QTA** – gently undulating rise surface with a few vague drainage lows (slopes 0-1.5%). **QTB** – undulating rises with vague drainage lows and a few rocky outcrop areas (slopes 0-3.5%). **QTC** – slopes and rises with a few rocky outcrop areas (slopes 1-6%): includes limestone-dolomite quarry on lower slope just southwest of Curramulka. **QTCc** – slopes with contour banking (slopes 2-6%). **QTCx** – rise and slopes with a few non arable stony areas (slopes 0.5-4%). **QTDc** – slopes with contour banks (slopes 5-20%, mostly 5-10%). **QTZ** – rise/low hill surface (slopes 0-1%).
QhA	11.9	Land dominated by shallow soil on calcrete. Main soils: *shallow calcareous loam on calcrete* **B2** grading to *shallow loam on calcrete* **B3**, with extensive areas of *shallow loam over clay on calcrete* **B6**. With limited areas of *gradational calcareous loam* **A6** grading to *loam over clay* **D3** (in lows), and *calcareous loam* **A5**-**A4**. **QhA** – level to gently undulating plains and low rises (slopes 0-1.5%)
QnA1 QnC1	1.1 1.1	Land dominated by shallow soil on calcrete. Main soils: *shallow calcareous loam on calcrete* **B2**, and common to extensive areas of *shallow loam on calcrete* **B3**. Minor areas of *shallow loam over clay on calcrete* **B6** grading to *hard red loam* **C4**b-**D3**b may occur in lows. **QnA1** – gently undulating very stony plain with a few drainage lows (slopes 0-1.5%): approximately 80% non arable stony land. **QnC1** – gently undulating very stony slopes (slopes 0.5-8%): approximately 80% non arable stony low rises and 20% arable flats.
QsA	3.9	Land dominated by shallow soil on calcrete. Main soils: *shallow calcareous loam on calcrete* **B2**, common to extensive areas of *shallow loam on calcrete* **B3**, and some *shallow loam over clay on calcrete* **B6** in lows. There can be minor areas of *gradational calcareous loam* **A6** grading to *loam over clay* **D3** (in lows), and *calcareous loam* **A5**. **QsA** – gently undulating stony plains and low rises with some drainage lows (slopes 0-1.5%): up to 30% non arable stony land.
RCB RCC RCCj RCD RCZ	1.1 0.7 1.8 0.5 0.6	Land dominated by shallow calcareous soil on calcrete. Main soils: *shallow loam on calcrete* **B3**, with limited to common areas of *shallow calcareous loam on calcrete* **B2**. Minor areas of *hard red loam* **C4**b-**D3**b may occur in drainage lows. **RCB** – rise surface and upper slopes (slopes 0.5-2.5%). **RCC** – slopes with a few drainage lows (slopes 0.5-8%). **RCCj** – lower slopes with some drainage lows (slopes 2-6%). **RCD** – slopes (slopes 5-20%). **RCZ** – rise surface (slopes 0-1%).
ROA ROB	5.3 0.9	Land dominated by shallow calcareous soil on calcrete. Main soils: *shallow loam over clay on calcrete* **B6**. **ROA** – somewhat elevated gently undulating plain with some vague drainage lows (slopes 0-1%). **ROB** – slopes (slopes 0.5-2%).
SPB SPC SPHc SPZ	21.8 3.9 1.9 2.7	Land dominated by soils formed in calcareous loess. Main soils: *calcareous loam* **A4**-**A5**. With limited to common areas of *shallow calcareous loam on calcrete* **B2** probably grading to *shallow loam over clay on calcrete* **B6** and *shallow loam on calcrete* **B3**. And with minor to limited areas of *gradational calcareous loam* **A6** grading to *loam over clay* **D3** in lows. **SPB** – undulating rises and slopes with vague drainage lows (slopes 0-3.5%). **SPC** – slopes (slopes 1-4%). **SPHc** – slopes with few drainage lines with minor gullying and contour banking (slopes 1-4%). **SPZ** – rise surface and upper slopes (slopes 0-1.5%).
ZA-	9.1	Salinised land Main soils: probably *sand over clay* **G4** grading to some *loam over clay* **D3**. **ZA-** – saline depression (5-4s).

Detailed soil profile descriptions:

Main soils:

B2 *shallow calcareous loam on calcrete* [Petrocalcic Calcarosol]
Grey brown to red brown calcareous loam topsoil overlying loam to clay loam subsoil, with calcrete at shallow to very shallow depth. Surfaces are often hardsetting. Profiles often contain abundant hard carbonate rubble.
These soils grade to minor areas of *hard red loam* **C4**b-**D3**b in the flats between very stony low rises on slopes near Curramulka: they have red brown hardsetting loam to clay loam topsoils overlying red light clayey dispersive subsoils, which overlie calcrete at moderate depth.

A4-A5 *calcareous loam* [Regolithic Hypercalcic-Lithocalcic Calcarosol]
Grey brown to brown medium thickness calcareous loamy topsoil (typically loam) grading to loamy or clay loamy subsoil with abundant fine carbonate. Surfaces are often hardsetting. Profiles often contain abundant hard carbonate rubble. Profiles are underlain by calcareous loess, clayey sediments (soil **A5**), or sometimes calcrete at moderate depth. Subsoils are typically strongly alkaline, and are often dispersive.

B6 *shallow loam over clay on calcrete* [Petrocalcic Red Chromosol-Sodosol-Dermosol]
Medium thickness to thin loamy topsoil (typically loam) overlying red to red brown clayey subsoil. This is underlain by calcrete at shallow depth. Surfaces are hardsetting, and subsoils are typically dispersive. The soil layer directly overlying the calcrete often contains abundant hard carbonate rubble. Some profiles may be calcareous throughout. Often found in relatively low lying areas, including drainage lows. Similar soils with sandy topsoils occur in an area in the east of the system: *shallow sand over clay on calcrete* **B7**.

B3 *shallow loam on calcrete* [Petrocalcic Tenosol]
Red to red brown loam topsoil overlying loam to clay loam subsoil, with calcrete at shallow to very shallow depth. Surfaces are hardsetting, and subsoils can be dispersive. Profiles often contain abundant hard carbonate rubble.

Minor soils:

A6 *gradational calcareous loam* [Pedal Hypercalcic-Lithocalcic Calcarosol]
Calcareous grey brown to brown medium thickness to thick loamy topsoil grading to clayey subsoil with abundant fine carbonate. Fine carbonate content increases with depth. Subsoils are typically dispersive. Profiles can contain hard carbonate rubble.

D3 *loam over clay* [Hypercalcic-Lithocalcic Red Sodosol-Chromosol-Dermosol]
Medium thickness to thin loamy topsoil overlying red to red brown clayey subsoil, which grades to a lower subsoil with abundant fine carbonate, or may be underlain by calcrete at moderate depth. Surfaces are hardsetting, and subsoils are typically dispersive. Profiles can contain hard carbonate rubble. Often found in drainage lows. Similar soils with sandy topsoils occur in an area in the east of the system: *sand over clay* **G4** and possibly some *thick sand over clay* **G3**.

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

Further information: DEWNR Soil and Land Program