SPF Spicer Flat Land System

A shallow mostly stony valley or drainage area

Area: 79.0 km^2

Landscape: A shallow valley or drainage area which can be considered in two parts. The northern part is a relatively narrow valley consisting of stony lower slopes, low stony rises, low lying plains/drainage areas, and drainage depressions. Drainage in this northern part moves northward into the Yorke Valley, and mostly arises in the higher 'sand over clay' country to the southeast. However, a few patches of the surface expression of saline seepage occur on western lower slopes. The southern part of the system is a broad stony valley with a few depressions (sinkhole like formations), a drainage area and drainage depression in the very southeast, and a few low rises and somewhat elevated land especially in the south east of the system. Drainage moves southward, eventually into the drainage depression adjacent to the very southwest of the system. This drainage depression then passes through a gap to the west.

The land system is underlain at depth by Proterozoic to Permian age sediments (Crawford, A.R., 1965). However, most of the system consists of shallow to very shallow soils underlain by calcrete. The only significant areas without calcrete are drainage depressions and other low lying drainage areas, where the calcrete has been 'dissolved', and soils overlie clayey sediments. A few areas in the northeast of the system are dominated by 'sand over clay' soils. It is possible that most of the area was once covered by 'sand over clay' dunes, and that the calcrete present today is remnant dune core material. Some lower slopes in the northwest of the system are dominated by soils formed in calcareous loess.

Annual rainfall: 405 - 445 mm average

Main soils:

B3 *shallow loam on calcrete*
B2 *shallow calcareous loam on calcrete*
B6 *shallow loam over clay on calcrete*
D3 *loam over clay*

Minor soils:

B7 *shallow sand over clay on calcrete*
G4 *sand over clay*
A5-**A4** *calcareous loam*
A6 *gradational calcareous clay loam*

Main features: This land system ranges from arable to non arable. There are a number of areas with very shallow stony soils that are unable to be cropped. Many other areas have shallow stony soils which are only marginal for cropping. Depressions and some lower slopes are affected by saline seepage, usually resulting in raised subsoil salinity levels, but also with a few patches of wet saline land on some lower slopes. Some low lying areas are at risk of flooding. The presence of calcrete at shallow depth, and the hard carbonate rubble in many soils, limit profile water holding capacity and hence productive potential. Surface stones also interfere with many farming practices.

Most soils have hardsetting surfaces, and hard subsoils which are often dispersive. Hard dispersive soils limit potential root exploration, and increase runoff. Dispersive and hard subsoils limit potential root exploration, increase runoff, and lead to restricted internal drainage which can result in seasonal waterlogging in low lying areas. Soils on slopes have some potential for water erosion.

Where calcareous soils occur, they restrict 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 particularly true for soils with highly calcareous surfaces.

Sandy topsoils are particularly prone to wind erosion. Care needs to be taken with surface management in these areas to minimise the risk of wind erosion.

Soil Landscape Unit summary: Spicer Flat Land System (SPF)

SLU	% of area	Main features
GIK	2.8	Land dominated by sandy texture contrast soil. Main soils: *sand over clay* **G4** grading to a few *loam over clay* in lows, and with some *shallow sand over clay on calcrete* **B7**. And extensive areas of sandy rises with *thick sand over clay* **G3**. **GIK** – drainage area: relatively low lying gently undulating plain with some sandy rises and a few drainage lows (slopes 0-1.5%).
GJO	1.0	Land dominated by sandy texture contrast soil. Main soils: *sand over clay* **G4** grading to *loam over clay* **D3** in lows. Probably with limited areas of *shallow sand over clay on calcrete* **B7** grading to *shallow loam over clay on calcrete* **B6**. **GJO** – drainage area: low lying plains with drainage lows/drainage depressions (slopes 0-1%).
HMO HMT	1.2 0.5	Land dominated by loamy texture contrast soils formed in clayey sediments. Main soils: *loam over clay* **D3**, grading to some *shallow loam over clay on calcrete* **B6**, and some *gradational calcareous clay loam* **A6**. **HMO** – closed depression (slopes <1%). **HMT** – closed depression with patches of surface expression of saline seepage (slopes 0-1%).
HVO	2.7	Land dominated by loamy texture contrast soils formed in clayey sediments. Main soils: *loam over clay* **D3** grading to *shallow loam over clay on calcrete* **B6**. With some *gradational calcareous clay loam* **A6**, and some *shallow loam over clay* **B3** grading to *shallow calcareous loam on calcrete* **B2**. **HVO** – low lying plain/drainage depression (slopes <1%).
HXO	3.8	Land dominated by loamy texture contrast soils formed in clayey sediments. Main soils: *loam over clay* **D3** with some *shallow loam over clay on calcrete* **B6**. **HXO** – drainage depression (slopes <1%).
QjA	1.4	Land dominated by shallow soil on calcrete. Main soils: *shallow loam over clay on calcrete* **B6** grading to *shallow sand over clay on calcrete* **B7**. And extensive areas *shallow calcareous loam on calcrete* **B2** with some *shallow loam on calcrete* **B3**. Also minor areas of deeper soils any occur in lows: *loam over clay* **D3** grading to *sand over clay* **G4**. **QjA** – low stony rises (slopes 0-1.5%).
QKK QKP	1.1 0.3	Land dominated by shallow calcareous soil on calcrete. Main soils: *shallow calcareous loam on calcrete* **B2**, possibly with some *calcareous loam* **A5**-**A4**. **QKK** – low stony rise (slopes 0-1.5%). **QKP** – slightly concave low stony rise with patches of surface expression of saline seepage (slopes 0-1%).
QML	1.7	Land dominated by shallow calcareous soil on calcrete. Main soils: *shallow calcareous loam on calcrete* **B2**, with some rubbly *calcareous loam* **A5**-**A4**. **QML** – stony lower slopes (slopes 0.5-3%).

QnA1	14.2	Land dominated by shallow soil on calcrete. Main soils: *shallow calcareous loam on calcrete* **B2** and *shallow loam on calcrete* **B3**. **QnA1** – mostly non arable gently undulating very stony plains, with some low rises, and with a few drainage lows which are often arable (slopes 0-1.5%).
QsA	56.0	Land dominated by shallow soil on calcrete. Main soils: *shallow calcareous loam on calcrete* **B2** and *shallow loam on calcrete* **B3**. With some *shallow loam over clay on calcrete* **B6**. QsA – broad valley area: gently undulating generally low lying stony plains, somewhat elevated in the southeast, with some low rises and some drainage lows (slopes 0-1.5%).
QVLg	2.5	Land dominated by shallow soil on calcrete. Main soils: *shallow loam on calcrete* **B3** and *shallow calcareous loam on calcrete* **B2**. Also with some rubbly *calcareous loam* **A5**-**A4**. **QVLg** – stony lower slopes and low rises with a few drainage lines (slopes 0-3.5%): approximately 30-40% non arable stony land.
RTK	5.4	Land dominated by shallow soil on calcrete. Main soils: *sand over clay on calcrete* **B7** grading to *shallow loam over clay on calcrete* **B6**. And areas of *loam over clay* **D3** grading to *shallow* grading to *sand over clay* **G4**. Sandy soils especially occur on low sandy/stony rises. **RTK** – low lying plains and lower slopes with drainage lows (slopes 0-1.5%).
SdL	2.1	Land dominated by loamy soils formed in rubbly calcareous loess. Main soils: rubbly *calcareous loam* **A5**-**A4**, grading to *calcareous clay loam* **A6** and probably some *loam over clay* **D3**. Also with *shallow loam over clay on calcrete* **B6** grading to *shallow loam on calcrete* **B3** and *shallow calcareous loam on calcrete* **B2**. **SdL** – lower slopes (slopes 0.5-2%).
ShL	2.1	Land dominated by loamy soils formed in calcareous loess. Main soils: *calcareous loam* **A5**-**A4** grading to *shallow calcareous loam on calcrete* **B2**. **ShL** – lower slopes (slopes 1-3.5%).
SRK	1.1	Land dominated by loamy soils formed in calcareous loess. Main soils: *calcareous loam* **A5**-**A4**, with some *gradational calcareous clay loam* **A6**. Also with some *shallow calcareous loam on calcrete* **B2**. **SRK** – lower slight slopes with a patch of surface expression of saline seepage (slopes 0-1%).

Detailed soil profile descriptions:

Main soils:

B3 *shallow loam on calcrete* [Petrocalcic Tenosol]
Red to red brown loam to clay loam, with calcrete at very shallow to shallow depth. Surfaces are hardsetting, and subsoils are often dispersive. Profiles often contain abundant hard carbonate rubble. These soils are often very shallow and non arable. Found in flats, depressions, and on low rises.

B2 *shallow calcareous loam on calcrete* [Petrocalcic Calcarosol]
Grey brown to brown calcareous loam to clay loam, with calcrete at very shallow to shallow depth. Surfaces are hardsetting, and subsoils can be dispersive. Profiles often contain abundant hard carbonate rubble. These soils are often very shallow and non arable. Found on low rises and flats.

B6 *shallow loam over clay on calcrete* [Petrocalcic Red-Brown Sodosol]
Medium thickness to thin loam to clay loam overlying red to brown clayey subsoil. This is underlain by calcrete at shallow depth. Profiles often contain abundant hard carbonate rubble. Surfaces are hardsetting, and subsoils are dispersive. Profiles can be calcareous throughout. Mostly found in depressions and flats.

D3 *loam over clay* [Sodic-Effervescent Hypercalcic-Lithocalcic Red Sodosol]
Medium thickness to thin loam to clay loam overlying red to red brown clayey subsoil which grades to highly calcareous clay. Surfaces are hardsetting. Profiles can be calcareous throughout, and can contain

hard carbonate rubble. Subsoils are dispersive, and are occasionally somewhat reactive (such soils often crack to the surface). These soils are usually underlain by clayey sediments, but can be underlain by calcrete at moderate depth. Typically found in depressions.

Minor soils:

B7 *shallow sand over clay on calcrete* [Petrocalcic Red-Brown Sodosol]
Medium thickness to thin sandy topsoil overlying red to brown clayey subsoil, which is underlain by calcrete at shallow depth. Profiles often contain hard carbonate rubble. Subsoils are dispersive. The sandy topsoils are typically water repellent.

G4 *sand over clay* [Hypercalcic-Lithocalcic Red-Brown Sodosol]
Medium thickness sandy topsoil overlying red to brown clayey subsoil which grades to highly calcareous clay. Profiles can contain hard carbonate rubble, and are sometimes underlain by calcrete at moderate depth. Subsoils can be coarsely structured, and are dispersive. The sandy topsoils are typically water repellent. These soils grade to similar soils with thick to very thick loose sandy topsoils which are found on sandy rises: *thick sand over clay* **G3**.

A5-**A4** *calcareous loam* [Regolithic Hypercalcic-Lithocalcic Calcarosol]
Grey brown medium thickness calcareous loam to clay loam grading to loamy to light clayey subsoil with abundant fine carbonate. Profiles often contain hard carbonate rubble, and are often underlain by clayey sediments (soil **A5**). Subsoils are usually strongly alkaline, and are dispersive. Mostly found on lower slopes.

A6 *gradational calcareous clay loam* [Pedal Hypercalcic-Lithocalcic Calcarosol]
Calcareous grey brown to brown medium thickness clay loam to loam grading to clayey subsoil with abundant fine carbonate. Fine carbonate content increases with depth. Subsoils are dispersive. Profiles can include hard carbonate rubble. Typically found in depressions. They grade to **D3** soils.

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

Further information: DEWNR Soil and Land Program