

SUN Sunnyvale Land System

Gently undulating elevated plains, rises and slopes, and some depression areas. This land system forms a northerly extension of the Yorke Peninsula central highlands zone.

Area: 118.7 km²

Landscape: Gently undulating elevated plains, rises and slopes, and some depression areas. Outlying rises of this system are situated on a lower elevation plain to the north. To the east and southeast are slopes running down to lower elevation plains and drainage depressions. To the south are the higher elevation rises and low hills of the Artherton highlands area. To the west is the 'sand over clay' country of the Agery area.

The land system is mostly underlain by Pre-Adelaidean Proterozoic age, mostly fine-grained, metamorphic rocks. Saprolitic materials are found at the base of some soils. Clayey sediments have formed from these rocks. Mostly this clay has formed in situ, however, some transported clay is likely to occur in low lying areas. Many soils are formed in these clayey sediments. Accessions of wind-deposited carbonate dust have infused into profiles. Wind-deposited calcareous loess (Woorinen Formation) overlies the clayey sediments in many places, particularly on the northern outliers and in the west. Some older calcareous loess is calcreted.

Indications of drainage occur over this system: drainage depressions and often vague drainage lows. Calcareous loess has been removed from the majority of these areas, leaving soils formed in clayey sediments.

Annual rainfall: 375 - 445 average

Main soils:

- A4-A5** *(rubbly) calcareous loam*
- D2-C3** *clay loam to loam over red clay*
- A6** *gradational calcareous clay loam*
- D2b** *loam over red clay loam*

Minor soils: **B2** *shallow calcareous loam on calcrete*

Main features: The land system is mostly arable. The most common soils are clay loams overlying clayey subsoil (these soils are particularly fertile), and deep to moderate depth calcareous loams. Many soils with clayey subsoils are imperfectly drained. Numerous areas are prone to waterlogging. Toxic accumulations of boron and sodium can occur in clayey subsoils or substrates. Toxic elements especially occur where a clayey subsoil restricts drainage.

Calcareous soils 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 particularly the case in the highly calcareous deep to moderate depth calcareous loams.

Water erosion is a potential issue on sloping land and land adjacent to slopes, especially along drainage lows. However, the clay loamy to light clayey surface textures in these areas minimises the potential risk.

Saline seepage results in raised subsoil salinity levels on some slopes and in depressions. Where these occur, soils with hard carbonate rubble and/or shallow depth to calcrete have reduced effective waterholding capacities, and hence reduced production potentials. Also surface rubble can interfere with some farming operations.



Soil Landscape Units summary: Sunnyvale Land System (SUN)

SLU	% of area	Main features
HMK HMKg	2.7 1.8	Land dominated by soils formed in clayey sediments. Main soils: often calcareous <i>clay loam over red clay</i> D2-C3 grading to <i>gradational calcareous clay loam</i> A6 . With limited to common areas of <i>calcareous loam</i> A5-A4 . HMK – lower footslopes: gently undulating plains and slight slopes with some relatively low lying areas and vague drainage ways (slopes 0-2%). HMKg – gently undulating plains and slight slopes with drainage ways (slopes 0.5-2%).
HUA HUB HUO HUZ	5.1 3.9 2.5 9.6	Land dominated by soils formed in clayey sediments. Main soils: often calcareous <i>clay loam to loam over red clay</i> D2-C3 , probably with some <i>gradational calcareous clay loam</i> A6 . With limited to extensive areas of <i>calcareous loam</i> A4-A5 , and <i>loam over red clay loam</i> overlying saprolitic material D2b . Minor to limited areas of <i>shallow calcareous loam on calcrete</i> B2 can occur, especially on higher land. HUA – gently undulating plains (slopes 0-1%). HUB – slopes and low rises with some drainage ways (slopes 0-3%) HUO – depression area with drainage ways (slopes 0-1.5%). HUZ – elevated plains/summit surfaces with drainage lows (slopes 0-1%).
IPA IPB	28.4 1.5	Land dominated by calcareous soils formed in clayey sediments. Main soils: <i>gradational calcareous clay loam</i> A6 grading to <i>clay loam over red clay</i> D2-C3 in lows. With limited to common areas of <i>rubbly calcareous loam</i> A5-A4 . With minor to limited <i>shallow calcareous loam on calcrete</i> B2 to <i>shallow calcareous loam over red clay on calcrete</i> B6 . IPA – slightly elevated gently undulating plains with drainage lows (slopes 0-1%). IPB – slopes with vague drainage lows (0.5-2%).
IOA	11.3	Land dominated by calcareous soils formed in clayey sediments and calcareous loess. Main soils: <i>gradational calcareous clay loam</i> A6 grading to <i>clay loam over red clay</i> D2-C3 in lows. And extensive areas of <i>calcareous loam</i> A5-A4 . With minor to limited areas of <i>shallow calcareous loam on calcrete</i> B2 . IOA – rises and slopes with vague drainage lows (slopes 0-2%).
SDB	2.4	Land dominated by soils formed in calcareous loess and clayey sediments. Main soils: <i>calcareous loam</i> A5-A4 , and common to extensive areas of <i>gradational calcareous clay loam</i> A6 grading to <i>clay loam over red clay</i> D2-C3 . SDB – rise (slopes 0-2.5%).
SdB	0.8	Land dominated by soils formed in rubbly calcareous loess. Main soils: <i>rubbly calcareous loam</i> A4-A5 . With limited to common areas of <i>clay loam over red clay</i> D2-C3 grading to <i>gradational calcareous clay loam</i> A6 , and <i>shallow calcareous loam on calcrete</i> B2 grading to <i>shallow calcareous loam over red clay on calcrete</i> B6 and <i>shallow loam on calcrete</i> B3 . SdB – upper slopes with some vague drainage ways (slopes 0.5-2%).
SFK	14.5	Land dominated by calcareous soils formed in non rubbly calcareous loess. Main soils: mostly dark <i>calcareous loam</i> A4-A5 . With some <i>gradational calcareous clay loam</i> A6 grading to <i>calcareous clay loam over red clay</i> D2-C3 , especially in drainage lows. SFK – level to gently undulating plains with drainage lows (slopes 0-1.5%).
SRA SRB	10.8 4.9	Land dominated by soils formed in calcareous loess. Main soils: <i>calcareous loam</i> A4-A5 . With limited to common areas of <i>gradational calcareous clay loam</i> A6 in lows, including a few <i>clay loam over red clay</i> D2-C3 in vague drainage lows; and <i>shallow calcareous loam on calcrete</i> B2 to <i>shallow calcareous loam over red clay on calcrete</i> B6 . SRA – outlying rises (slopes 0-2%). SRB – outlying rises (slopes mostly 0.5-3%, but up to 5%).
QHZ	0.1	Land dominated by calcreted soils. Main soils: probably <i>shallow calcareous loam on calcrete</i> B2 with sandy to loamy textures. QHZ – non arable slightly elevated rise surface: probably a stony relict dune rise (slopes 0-1%).

PROPORTION codes assigned to soils within Soil Landscape Units (SLU):

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| (D) Dominant in extent (>90% of SLU) | (C) Common in extent (20–30% of SLU) |
| (V) Very extensive in extent (60–90% of SLU) | (L) Limited in extent (10–20% of SLU) |
| (E) Extensive in extent (30–60% of SLU) | (M) Minor in extent (<10% of SLU) |



Detailed soil profile descriptions:**Main soils:**

- A4-A5** *(rubby) calcareous loam* [Regolithic Hypercalcic-Supracalcic-Lithocalcic-Petrocalcic Calcarosol]
Grey brown to brown medium thickness calcareous loamy to clay loamy topsoil grading to light clayey to loamy subsoil with abundant fine carbonate. Profiles range from having minor to abundant carbonate rubble; some are underlain by a weak calcrete layer at moderate depth. Some of these soils are underlain by a clayey substrate within 120 cm of the surface (soil **A5**); profiles can be underlain by silty clay loamy to sandy saprolitic sediments.
- D2-C3** *clay loam to loam over red clay* [Effervescent-Sodic Hypercalcic-Lithocalcic-Petrocalcic Red Chromosol-Dermosol]
Red brown to brown medium thickness to thin clay loam, or sometimes loamy or light clayey topsoil overlying red to red brown clayey subsoil, grading to reddish clayey lower subsoil with abundant fine carbonate. Topsoils are often calcareous. The profile is underlain by clayey substrate (Hindmarsh Clay equivalent), deeply weathered clay loamy to loamy saprolitic sediments, or sometimes calcrete or carbonate rubble at moderate depth. (Soil **B6** occurs when calcrete occurs at shallow depth). Closely related to soil **A6**, but either texture contrast, or gradational with non calcareous to slightly calcareous surfaces. Typically found in drainage depressions and drainage lows.
- A6** *gradational calcareous clay loam* [Pedal Hypercalcic Calcarosol]
Medium thickness to thin calcareous grey brown to brown clay loamy to loamy topsoil grading to a brown, reddish or yellowish clayey subsoil with abundant fine carbonate. This is underlain by a clayey substrate (Hindmarsh Clay equivalent) or silty saprolitic sediments. These soils grade to **D2-C3** soils. Particularly found in slight lows.
- D2b** *loam over red clay loam* [Red-Brown Chromosol]
Red brown medium thickness to thin loamy topsoil over reddish clay loamy subsoil grading to clay loam with abundant fine carbonate. This is underlain by deeply weathered clay loamy to sandy saprolitic sediments. Mostly found in the southeast of the system.

Minor soils:

- B2** *shallow calcareous loam on calcrete* [Petrocalcic Calcarosol]
Grey brown to brown calcareous loams or clay loams overlying calcrete at shallow depth. The calcrete is often only weakly to moderately cemented and relatively thin (typically 15 to 30 cm thick). Profiles typically contain abundant hard carbonate rubble.

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

