

CEH Central Highlands Land System

Low hills, rises, slopes and drainage depressions. A highlands area to the east of Maitland. This system forms the main part of the central section of the Yorke Peninsula central highlands zone.

Area: 43.3 km²

Landscape: Low hills, rises, slopes and drainage depressions. This highlands area is mostly underlain by resistant Pre-Adelaidean Proterozoic age metamorphosed bedrock (eg gneissic rock). In an area in the western part of the system, this older bedrock is overlain by younger Adelaide System 'shield Proterozoic' (eg red sandstone) (Crawford, A.R., 1965). The system is situated to the east of Maitland – on the opposite side of the upper Yorke Valley depression. Soils are formed on saprolitic sediments, weathered rock, hard rock, or clayey sediments in some lower lying areas. Most soils have red clayey subsoils. Weathered rock and rock fragments are found in and on many soils. Accessions of wind-deposited carbonate dust have infused into profiles. Hard carbonate rubble is found in many soils, and calcrete also occurs.

Annual rainfall: 415 – 485 mm average

Main soils:

D7-C4-D3	Loam to clay loam over red clay (around 62% of area)
A2-C2	Calcareous loam on saprolitic sediments or rock (around 19% of area)
A6	Gradational calcareous clay loam (around 4% of area)
B2	Shallow calcareous loam to clay loam on calcrete (around 4% of area)

Minor soils: **E3-E2** Brown-red cracking clays (less than 1% of area)

Main features: The system is mostly arable, however, a few slopes are too steep, and few soils too shallow and rocky to be cropped. The most common soils are loams or clay loams overlying clayey subsoil. Many soils contain hard carbonate fragments, and some rock fragments. Hard fragments reduce effective water holding capacities. Also, surface stones can interfere with some farming operations.

Soils on sloping land, adjacent lower lying areas, and in drainage depressions have potential for water erosion. This is particularly the case in sloping drainage lines and drainage ways where overland water-flow can concentrate. Texture contrast profiles are particularly prone to water erosion – many of such topsoils are gritty (including numerous fine quartz fragments). There is evidence of significant topsoil erosion in many areas; which has occurred since clearing and settlement. The first catchment scheme in South Australia was instigated in this area in the 1950s due to the extent of water erosion problems.

Flooding can occur in parts of drainage depressions. Saline seepage affects some soils in low lying areas, mostly as raised subsoil salinity levels.

Toxic accumulations of boron and sodium were not found to be a significant issue. However, lower subsoils of some profiles have high sodium levels.

Where they occur, calcareous soils 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 the case for soils with highly calcareous surfaces.



Soil Landscape Unit summary: Central Highlands Land System (CEH)

SLU	% of area	Main features
AAC	1.9	Non arable rocky land. Main soils: shallow to very shallow <i>loam to clay loam over red clay</i> D7 . With limited to common areas of <i>calcareous loam on rock</i> A2-C2 , and <i>shallow loam on rock</i> L1 . AAC – non arable crests and slopes (slopes 2-25%, relief >30m).
DGB DGC DGCb DGCc DGCe DGCj DGCco DGD DGDc DGDde DGDdo DGZ	2.0 12.1 1.1 3.3 11.9 0.9 1.0 2.8 2.2 7.5 11.9 1.8	Land dominated by texture contrast soils formed on rock. Main soils: <i>loam to clay loam over red clay</i> D7-C4 . With minor to limited areas of <i>shallow calcareous loam on calcrete</i> B2 grading to <i>shallow loam on calcrete</i> B3 , and <i>calcareous loam on saprolitic sediments</i> A2-C2 . DGB – mid level crests (slopes 0-3.5%). DGC – crests and slopes with drainage lows (slopes 1-6%). DGCb – mid to lower slopes with ill-defined drainage lows (slopes 1-3.5%). DGCc – slopes and crests with ill-defined drainage lows and contour banks (slopes 1-6%). DGCe – slopes and crests with ill-defined drainage ways and signs of sheet erosion (slopes 1-8%). Includes non arable outcrops. DGCj – lower slopes with drainage lows and signs of sheet erosion (slopes 1-3.5%). DGCco – slopes with ill-defined drainage ways, signs of sheet erosion, and contour banks (slopes 1-4%). DGD – slopes and crests with drainage lows (slopes 3-8%). DGDc – low hills: slopes and crests with drainage ways and contour banks (slopes 1-12%). DGDde – slopes and crests with drainage ways and signs of sheet erosion (slopes 1-12%). Includes non arable patches. DGDdo – slopes and crests with drainage ways, signs of sheet erosion, and contour banks (slopes 2-15%). Includes non arable patches. DGZ – crests (slopes 0-2%).
HMB HMC HMH	1.1 11.7 1.4	Land dominated by soils formed on clayey to saprolitic sediments. Main soils: <i>clay loam to loam over red clay</i> D3-C4-D7 grading to <i>gradational calcareous clay loam</i> A6 , often over saprolitic sediments, which grade to <i>calcareous clay loam on saprolitic sediments</i> A2 . Possibly with some <i>shallow loam over red clay on calcrete</i> B6 . HMB – lower slopes (1-2%). HMC – lower slopes with drainage lows/drainage ways (slopes 1-4%). With contour banking in a few areas. HMH – lower slopes with drainage ways and a few drainage lines, and signs of some erosion (slopes 1-3%).
HVB HVC HVCc HVCe HVCco HVZ	0.7 6.8 2.1 5.8 3.7 2.1	Land dominated by soils formed on saprolitic to clayey sediments. Main soils: <i>loam to clay loam over red clay</i> D3-C4-D7 , usually over saprolitic sediments. With areas of <i>shallow calcareous loam on calcrete</i> B2 grading to <i>shallow loam on calcrete</i> B3 , and <i>calcareous loam on saprolitic sediments</i> A2-C2 . HVB – lower slopes (slopes 1-2.5%). HVC – slopes and lower slopes with drainage ways (slopes 1-7%). HVCc – slopes with vague drainage ways and contour banks (slopes 1-6%). HVCe – slopes and drainage areas with drainage ways and some drainage lines, and signs of sheet erosion (1-10%). HVCco – slopes with drainage ways and signs of sheet erosion: contour banked (slopes 2-8%). HVZ – crests and upper slopes (slopes 0-2%).
KaJ	3.7	Drainage depressions dominated by soils formed in clayey sediments. Main soils: <i>clay loam to loam over red clay</i> D3-C4 . KaJ – drainage depressions with central drainage lines, some signs of erosion, and a few signs of salinity (slopes 0-2.5%).
KKC	0.6	Land dominated by calcareous soils formed in clayey outwash sediments. Main soils: <i>gradational calcareous clay loam</i> A6 with vertic (reactive) subsoils, grading to <i>brown-red cracking clay</i> E3-E2 . With minor to limited areas of <i>clay loam over red clay</i> C4 with vertic (reactive) subsoil. KKC – upper drainage depression with gilgai microrelief (slopes 1-2.5%).



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

- D7-C4-D3** *Loam to clay loam over red clay* [Haplic-Sodic-Effervescent Hypercalcic-Lithocalcic Red Chromosol-Dermosol]
Shallow to deep soils: most are moderate depth. Red brown to brown thin to medium thickness loamy, clay loamy or light clayey topsoil overlying red clayey subsoil, grading to clay with abundant fine carbonate. This is underlain by loamy to clay loamy saprolitic sediments, weathered rock or hard rock, or clayey sediments. Profiles often including some hard carbonate fragments and rock fragments. Many loamy topsoils are gritty – including numerous fine quartz fragments. Topsoils can be slightly calcareous when the profile is gradational (grading to soil **A6**), and slightly to highly calcareous when the profile is texture contrast. Texture contrast soils with loamy topsoils are typically highly erodible. Many gradational soils with hardsetting clay loamy to clayey topsoils in drainage areas, are probably the result of topsoil loss due to past erosion events. A few profiles with clayey subsoils are underlain by calcrete at shallow depth (soil **B6**).
- A2-C2** *Calcareous loam on saprolitic sediments or rock* [Paralithic Hypercalcic-Lithocalcic Calcarosol-Dermosol]
Brown to red brown thin to medium thickness calcareous clay loamy to loamy topsoil grading to clay loamy to light clayey subsoil with abundant fine carbonate. Profiles typically contain hard carbonate fragments. Profiles are underlain by substrates of highly calcareous saprolitic sediments or weathered rock with abundant fine carbonate. Soils are either calcareous throughout (soil **A2**), or have non calcareous surfaces (soil **C2**).
- A6** *Gradational calcareous clay loam* [Pedal Hypercalcic-Lithocalcic Calcarosol]
Calcareous grey brown to brown medium thickness to thin light clayey to loamy topsoil overlying red to brown clayey subsoil with abundant fine carbonate. Fine carbonate content increases with depth. This is underlain by loamy to clay loamy saprolitic sediments, or clayey sediments. Profiles can include some hard carbonate fragments, and sometimes some rock fragments.
- B2** *Shallow calcareous loam to clay loam on calcrete* [Petrocalcic Calcarosol]
Grey brown to red brown calcareous loams or clay loams overlying calcrete at shallow depth. Subsoils can be as heavily textured as light clay. Profiles typically contain some hard carbonate fragments. The calcrete layer is typically relatively thin (20-30cm), and is underlain by highly calcareous sandy to loamy saprolitic sediments. These soils can grade to **B3** soils, which have non calcareous surfaces.

Minor soils:

- E3-E2** *Brown-red cracking clays* [Red-Brown Vertosol]
Cracking and probably calcareous brown to red brown light clayey surface soil grading to brown to red brown clayey subsoils with abundant fine carbonate which shrink on drying and swell on wetting. The main occurrence is in an upper drainage depression area. These soils are associated with gilgai microrelief – mounds, flats, and crabholes – are formed in clayey outwash sediments, and grade to **A6** soils.

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

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

