

HOY Hoyleton Land System

Outwash fans, rises and flats in the Hoyleton area

Area: 124.3 km²

Annual rainfall: 390 – 515 mm average

Geology: Sandstones of the River Wakefield Subgroup underlie the Land System, and although outcrops are rare, they form the topographic highs. Between the rises are extensive deposits of Quaternary clayey sediments, some of which appear to be of Tertiary or early Pleistocene age (Hindmarsh Clay). Elsewhere, and particularly on modern alluvial fans and flats, the sediments are more recent Pooraka Formation materials. Geological evolution appears to have involved the dissection of the basement rock by streams from the escarpment to the east, and the subsequent burial of the dissected landscape by Hindmarsh Clay. This in turn has been partially eroded, with Pooraka Formation sediments being deposited around the remnant rises. Simultaneously, there has been aeolian deposition of fine carbonates (now evident as soft or rubbly subsoil accumulations), and sand. Most of the sand has been washed or blown away, but a small dune system remains in the north-west.

Topography: The land system consists of undulating rises (on basement sandstones and Hindmarsh Clay remnants) surrounded by gently inclined outwash fans with a westerly aspect, grading to narrow creek flats and broader alluvial plains. Slopes are always less than 10% and usually less than 5%. Drainage systems arising on the escarpment to the east and rises in the north, converge towards the south west where they dissipate in the sand dune country of the Bowillia Land System.

Elevation: 330 m at the top of the fan in the north east to 120 m in the west

Relief: Maximum relief is 40 m

Soils: Except for the minor sand dune landscape, most soils are loamy to clayey and deep over alluvium or relict clay deposits.

Main soils

A6 Calcareous loam
D2 Loam over red clay
C3 Gradational loam

Minor soils

E2 Red cracking clay
A4 Rubbly calcareous loam
G1 Sand over sandy clay loam
H2 Deep sand

Main features: The Hoyleton Land System is characterized by deep, fertile generally well drained soils. Poorly structured surfaces on some of the loam over clay soils represent the main limitation, although high subsoil boron may restrict rooting depth in places. The land is subject to considerable run on water from the east and in the past this has caused, in places, serious watercourse erosion. Management plans need to include measures to protect streams and control erosion generally.



Soil Landscape Unit summary: 11 Soil Landscape Units (SLUs) mapped in the Hoyleton Land System:

SLU	% of area	Main features #
IWB	5.5	Very gently undulating rises with slopes of 2-4% formed on mixed sandy and clayey sediments. Main soils: <u>calcareous loam</u> - A6 (V), with <u>sand over sandy clay loam</u> - G1 (C), and <u>rubbly calcareous loam</u> - A4 (L). The rises are fully arable but the mixture of soils has a variety of slight limitations including moderately low fertility and wind erosion potential (sandy soils), induced nutrient deficiencies and possible boron toxicity (calcareous soils).
IZA IZB IZC	1.5 29.5 12.5	Rises formed on a complex of alluvial clay remnants, clay derived from the deep weathering of basement rocks and (in places), fresh weathering rock. IZA Very gently inclined slopes of 1% or less. IZB Low rises and very gentle slopes of 1-3% IZC Undulating slopes and rises with slopes of 3-8% Main soils: <u>calcareous loam</u> - A6 (E) and <u>gradational loam</u> - C3 (E), with <u>loam over red clay</u> - D2 (L). 20% of soils have weathering basement sandstone within 100 cm of the surface. The land is fully arable, although steeper slopes (IZC) require contour banking to control water erosion. Drainage is usually good. The main soil limitations are moderate to high levels of subsoil boron and salt, sometimes at moderately shallow depth. Natural fertility is moderately high due to the surface clay content, but induced deficiencies caused by surface alkalinity / carbonate may occur.
KHB KHG KHH	3.0 13.1 13.0	Outwash fans formed on clayey alluvium. KHB Fans with slopes of 2-4%. KHG Fans with slopes of 2-4% and some water course erosion. KHH Fans with slopes of 4-10% and eroded water courses. Main soils: <u>loam over red clay</u> - D2 (E), <u>calcareous loam</u> - A6 (E) and <u>gradational loam</u> - C3 (C). These soils are deep, well drained and with moderate to high natural fertility. They are generally well structured, except for the surfaces of the D2 soils which tend to set hard and seal over. This can result in excessive runoff and erosion and problems with establishment and early growth. Otherwise, the main management issue is control of water erosion, especially on the higher slopes of KHH , and in water courses, where large runoff volumes from the ranges to the east have caused significant damage in the past.
KUA KUE	10.7 8.8	Plains, creek flats and drainage depressions formed on clayey alluvium. KUA Very gently undulating plains with slopes of about 1%, and limited low rises. KUE Creek flats and drainage depressions with slopes of 1-3%. Main soils: <u>loam over red clay</u> - D2 (E), <u>gradational loam</u> - C3 (C), <u>red cracking clay</u> - E2 (C). <u>Calcareous loam</u> - A6 (L) occurs on low rises. Up to half a metre of loamy to clayey sediment overlies these soils near water courses. Soils are inherently fertile with medium to fine textured surfaces, and deep profiles. Except for tendency for the loam over clay soils to set hard, the soils are well structured, although some waterlogging will occur in wet seasons. Moderate levels of subsoil salinity in places but not watertable associated.
SWB	0.4	Rises with slopes of 2-4% formed on soft and rubbly medium textured carbonates of the Woorinen Formation. Main soils: <u>rubbly calcareous loam</u> - A4 (E), <u>sand over sandy clay loam</u> - G1 (E) and <u>calcareous loam</u> - A6 (C). Soils are mostly alkaline to the surface (except G1 soils), with moderate fertility and in the case of the rubbly soils, variable and often low waterholding capacity. All soils, and particularly the sandy G1 soils, are prone to wind erosion, and must be kept covered.
UEI	2.0	Dunefields: 30-60% coverage of dunes 5-10 m high superimposed on undulating landscape. Main soils: <u>calcareous loam</u> - A6 (C), <u>rubbly calcareous loam</u> - A4 (L) and <u>gradational loam</u> - C3 (L) in the swales, with <u>deep sand</u> - H2 (C) and <u>sand over sandy clay loam</u> - G1 (C) on dunes. This is typical dune-swale country with the inherent problem of frequent changes in soil types across the landscape. Control of wind erosion is the main concern on the sandy rises, along with fertility maintenance and the need to encourage deep rooting to maximize water use efficiency. On the more clayey swales, there is a range of minor limitations mainly associated with the underlying Hindmarsh Clay. These include boron toxicity, waterlogging, poor soil structure and salinity.

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

- (D) Dominant in extent (>90% of SLU)
(V) Very extensive in extent (60–90% of SLU)
(E) Extensive in extent (30–60% of SLU)

- (C) Common in extent (20–30% of SLU)
(L) Limited in extent (10–20% of SLU)
(M) Minor in extent (<10% of SLU)



Detailed soil profile descriptions:

- A4** Rubbly calcareous loam (Regolithic, Supracalcic / Lithocalcic Calcarosol)
Calcareous sandy loam to clay loam over rubbly Class III B/C carbonate at moderately shallow depth. The soil becomes less rubbly and more clayey with depth.
- A6** Calcareous loam (Regolithic / Pedal, Hypercalcic Calcarosol)
Medium thickness calcareous loam to clay loam becoming more clayey and calcareous with depth over soft clayey carbonate at 50 cm (35 cm on rises).
- C3** Gradational loam (Hypercalcic, Red Dermosol)
Medium thickness clay loam to light clay grading to a well structured red clay over clayey carbonate at 60 cm (45 cm on rises).
- D2** Loam over red clay (Hypercalcic, Red Chromosol)
Medium thickness hard loam abruptly overlying a well structured red clay with clayey carbonate at 60 cm (45 cm on rises).
- E2** Red cracking clay (Red Vertosol)
Red to dark well structured clay becoming more clayey, coarser structured and calcareous with depth.
- G1** Sand over sandy clay loam (Hypercalcic, Red Chromosol)
Medium thickness loamy sand over a red massive sandy clay loam grading to soft or semi-hard carbonate within 50 cm.
- H2** Deep sand (Calcic Calcarosol / Calcareous, Arenic, Red-Orthic Tenosol)
Thick calcareous or non calcareous sand, becoming slightly clayey and more calcareous with depth.

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

