

LOP Long Plains Land System

Very gently undulating plains between Pinery and Dublin

Area: 172.6 km²

Annual rainfall: 365 – 385 mm average

Geology: The Land System is underlain by silty to clayey alluvium deposited on an ancient flood plain. A veneer of highly calcareous Woorinen Formation material overlies the alluvium. This varies in form from finely divided soft masses of carbonate in a clay loam or clay matrix, to rubbly Class III B forms, depending on degree of exposure. Thickest accumulations of Woorinen materials are on low rises where they are often accompanied by abundant surface stone. There are also small areas of Molineaux Sand deposits, occurring as low sand hills. These overlie the Woorinen carbonates.

Topography: The Long Plains Land System is a very gently undulating plain with an overall gradient to the south west of less than 0.5%. Most of the land is a mosaic of about 75% flats and depressions and 25% very low rises, with up to 10% stone cover. In the Long Plains area is a depression, probably an old river flat. There are minor small dunefields of very low relief scattered across the plains. There is no surface drainage.

Elevation: 50 m in the north east to 10 m in the south west

Relief: Less than 5 m

Soils: Deep calcareous loams to sandy loams are characteristic. Deep red texture contrast and gradational loams are sub-dominant, with limited areas of sandy soils.

Main soils

A6 Calcareous loam - extensive (plains)

A4 Rubbly calcareous sandy loam - common (low rises and flats)

Minor soils

A5 Calcareous sandy loam over clay - flats

D2 Hard loam over red clay - low lying flats near Long Plains

D3 Hard loam over dispersive red clay

G1 Loamy sandy over red sandy clay - rises

H2 Deep / moderately deep sand - sand hills

C3 Gradational loam - flats

B2 Shallow calcareous sandy loam on calcrete - stony rises

Main features: The Long Plains Land System is flat to very gently undulating and fully arable. The soils are predominantly calcareous throughout, variations being mainly due to the nature of subsurface carbonate layers which are either soft or rubbly. Moisture holding capacity is a limitation on the rubbly soils. Otherwise, lime induced nutrient deficiencies, and restricted crop options are the main consequences of the high soil carbonate status. The non calcareous texture contrast soils in the Long Plains area are more fertile, but less well structured. Very high pH and high levels of boron and sodium in the carbonate layers impact on productivity, particularly in drier seasons. There are small areas of sand hills with associated fertility and wind erosion problems. Increasing subsoil salinity in the lower (western parts) of the System affects crop yields.



Soil Landscape Unit summary: 5 Soil Landscape Units (SLUs) mapped in the Long Plains Land System:

SLU	% of area	Main features #
JDA	2.1	Alluvial plains formed on silty to clayey sediments with slopes of less than 1%. Main soils: <u>hard loam over (dispersive) red clay</u> - D2/D3 (V), with <u>gradational loam</u> - C3 (L) and <u>calcareous loam</u> - A6 (L). These soils are deep, fertile and moderately well drained, although the D3 soils, with dispersive clay subsoils are prone to sub surface waterlogging in wet seasons. Many of the sandier surfaced profiles are hard setting, which affects water infiltration, workability and seedling emergence / early crop growth. However, use of gypsum and modified surface management practices can overcome this condition, and productive potential is high.
KVA KVP	76.0 18.8	Very gently undulating plains formed on clayey sediments with slopes of less than 1%. The landscape comprises about 75% flats and depressions and about 25% very low rises which have variable amounts of surface calcrete stone up to 10%. There are minor sandy rises. KVA Flats above the 15 m contour. KVP Marginally saline flats below the 15 m contour. Main soils: Flats (KVA) <u>Calcareous loam</u> - A6 (V), with <u>rubbly calcareous sandy loam</u> - A4 (L), <u>calcareous sandy loam over clay</u> - A5 (L), <u>hard loam over (dispersive) red clay</u> - D2/D3 (L) and <u>gradational loam</u> - C3 (M). Flats (KVP) <u>Calcareous loam</u> - A6 (V) and <u>rubbly calcareous sandy loam</u> - A4 (E). Rises <u>Rubbly calcareous sandy loam</u> - A4 (V), <u>calcareous loam</u> - A6 (L) and <u>loamy sand over red sandy clay</u> - G1 (L) with <u>shallow calcareous sandy loam on calcrete</u> - B2 (M), and <u>deep / moderately deep sand</u> - H2 (M). These soils are fully arable, although some, mainly on the low rises, are rubbly with restricted waterholding capacity. Virtually all soils are calcareous throughout with consequent implications for nutrient fixation and crop options; but soil structural problems are unlikely. Boron and sodium levels are likely to be high within potential root zone depths. The subsoil carbonate layer is highly alkaline. Erosion potential is low, although the lighter soils will blow if excessively worked or grazed. Subsoil salinity levels are moderate in KVP as the land is increasingly under the influence of relict marine salinity. Reductions in yields of all but tolerant crops can be expected.
U-D UFJ	0.8 2.3	Dune-swale systems with 30-60% dune coverage. The dunes overlie the older KVA flats. U-D Isolated single low dunes or sand spreads without a swale component. UFJ Dunefields with fully arable low dunes. Main soils: Dunes: <u>deep / moderately deep sand</u> - H2 (V), with <u>loamy sand over red sandy clay</u> - G1 (L). Swales: <u>calcareous loam</u> - A6 and <u>rubbly calcareous sandy loam</u> - A4 (D). The dunes, although mostly arable, are nevertheless difficult to manage due to the low fertility status of the soils and the constant risk of wind erosion. Some have been eroded in the past (down to the underlying calcrete in places). The soils of the swales are potentially more productive, but the rubbly forms are subject to moisture deficit in spring. The main difficulty lies in managing the system as a whole, a problem made more difficult because property and paddock boundaries generally are not parallel to dune systems.

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

- | | |
|--|---------------------------------------|
| (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:

- A4** Rubbly calcareous sandy loam (Regolithic, Supracalcic Calcarosol)
10 - 25 cm calcareous sandy loam to loam grading to a rubbly Class III B carbonate layer at 25 cm, over a less rubbly sandy clay loam with depth with substrate alluvium deeper than 100 cm.
- A5** Calcareous sandy loam over clay (Regolithic, Supracalcic Calcarosol)
20 - 25 cm calcareous sandy loam over rubbly Class III B carbonate grading to a very highly calcareous sandy clay loam with clayey alluvium from about 110 cm.
- A6** Calcareous loam (Regolithic / Pedal, Hypercalcic Calcarosol)
10 - 20 cm calcareous sandy loam to clay loam grading to a very highly calcareous sandy clay loam to clay loam over a clay loamy to clayey Class III A /I carbonate layer from 35 cm with substrate alluvium at 90 cm.
- B2** Shallow calcareous sandy loam on calcrete (Petrocalcic, Lithocalcic Calcarosol)
20 cm calcareous sandy loam over rubbly Class III C carbonate on calcrete at about 40 cm.
- C3** Gradational loam (Hypercalcic, Red Dermosol)
10 - 30 cm loam to clay loam grading to a well structured red clay with abundant soft carbonate from about 40 cm, over substrate alluvium from 80 cm.
- D2** Hard loam over red clay (Hypercalcic, Red Chromosol)
10 - 30 cm hard fine sandy loam to loam abruptly overlying a red well structured and friable light clay with abundant soft carbonate from about 40 cm, grading to a medium clay by 100 cm.
- D3** Hard loam over red clay (Hypercalcic, Red Sodosol)
10 - 30 cm hard fine sandy loam to loam abruptly overlying a coarsely structured and dispersive red light clay with abundant soft carbonate from about 40 cm, grading to a medium clay by 100 cm.
- G1** Loamy sandy over red sandy clay (Calcic, Red Chromosol)
10 - 15 cm soft loamy sand abruptly overlying a red sandy clay loam, calcareous from 30 cm grading to red substrate clay from about 100 cm.
- H2** Deep / moderately deep sand (Calcic Calcarosol / Calcareous, Arenic, Red-Orthic Tenosol)
Up to 75 cm calcareous or non calcareous loose sand overlying either a red clayey sand, calcareous with depth, a truncated loamy A4/A5/A6/D2/D3 soil (as for the flats), or rubbly/sheet calcrete.

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

