

# DER D'Estree Land System

Gently undulating rises – oriented approximately north-south. The rises are mostly remnant plateau areas underlain by basement rock, except for the area adjacent to White Lagoon which is a remnant lunette. The system is surrounded by plains with lagoons on three sides; and by an uncleared relict calcreted dune area directly to the south. D'Estree is the name of a homestead overlooking D'Estrees Bay, situated on the southern part of the main rise of this system.

**Area:** 13.8 km<sup>2</sup>

**Annual rainfall:** 525 – 560 mm average

**Geology:** Most of the area is underlain by early Cambrian age Kanmantoo Group rocks, including Middleton meta-sandstone, Petrel Cove Formation sandstone, siltstone and mudstone, and undifferentiated Kanmantoo Group meta-sandstone. These rocks are usually overlain by deeply weathered Pliocene-Quaternary age clayey sediments which are derived from the underlying rocks. The deeply weathered clay is often capped by ironstone gravel. Recent sand deposits, derived from adjacent plains and lagoonal floors, have been deposited on many of the system's rises, forming hummocky sand dune areas, and producing sandy soils overlying clay. The deep sand and sand over clay area directly east of the White Lagoon area is a true lunette. Some minor areas occur with calcrete or calcrete rubble (Pleistocene age Bridgewater Formation). There have been some accessions of fine carbonate, as some soils have an accumulation of fine carbonate in their lower subsoils.

**Topography:** Gently undulating rises and lunette areas, with very gentle and gentle slopes (1.5 - 4%), sloping down to adjacent plains and lagoons: and with gently undulating plateau or summit areas. Hummocky sand dune and sand spread areas are common.

**Elevation:** From about 20 m to just over 40 m

**Relief:** Typically 10 m or less, but reaches 20 m on some slopes

**Main Soils:**

<b>I1-H3</b>	Very thick sands
<b>G4-G3</b>	Sand over sodic clay
<b>J2-J1</b>	Ironstone soil

**Main Features:** Arable to semi-arable rises. Topsoils are mostly sandy, while some are loamy. The main soils are sandy over brown sodic clay. Sandy soils, which are often thick or very thick, are infertile and pose a wind erosion risk when cleared. Clayey subsoils are usually sodic, and their dispersive nature and related poor structure leads to limited root development and low infiltration rates, leading to poor drainage and increased runoff. Soils with ironstone gravel have reduced fertility due to the 'fixing' of phosphorus. The steeper slopes have some water erosion potential. Fine carbonate occurs in the lower subsoil of many soils.



**Soil Landscape Unit summary:** D'Estree Land System (DER)

SLU	% of area	Main features #
OZK OZn	11.4 11.8	<p>Semi-arable sand deposits on rise summits and slopes, as well as a lunette area. Recent quartz sand deposits, deposited as sand spreads, hummocky sand areas or very low jumbled dunes (&lt;2m). The sand is derived from adjacent surface soils and dry lagoonal surfaces. The northern areas are probably lunettes, while the central and southern areas are sand deposits on pre-existing rises.</p> <p>Main soils: bleached <u>very thick sands</u> <b>I1-H3</b> (<i>Podosol-Tenosol</i>).</p> <p><b>OZK</b> – sand spreads and hummocky low dune areas  <b>OZn</b> – sand spreads and hummocky low dune areas, on gentle slopes with &lt;10% saline seepage (slopes 3-10%, 2s). These slopes and lower slopes are somewhat affected by waterlogging and saline seepage.</p> <p>Summary: the main issues are very low fertility, high wind erosion risk, strong water repellence and low water holding capacity due to the sandy nature of these soils.</p>
PaA PaB PaZ	3.5 0.5 2.4	<p>Mostly arable thick sandy deposits on rises, slopes and summits.</p> <p>Main soils: thick <u>sand over sodic clay</u> <b>G3</b> (<i>Brown Sodosol</i>).</p> <p><b>PaA</b> – rises with level to very gentle slopes (0-2%, 1e). Probably an old lunette.  <b>PaB</b> – very gentle to gentle slopes (2-4%, 2e)  <b>PaZ</b> – summit surface with level to very gentle slopes (1e)</p> <p>Summary: the main issues are infertility, wind erosion risk, and strong water repellence due to the sandy nature of these topsoils; also subsoils are sodic.</p>
PbBk PbZk PbA PbB PbE PbZ	4.6 8.7 10.7 1.1 1.5 0.8	<p>Arable thick to medium thickness sandy deposits on rises, slopes and summits.</p> <p>Main soils: thick to medium thickness <u>sand over sodic clay</u> <b>G3-G4</b> (<i>Brown Sodosol</i>).</p> <p><i>Mostly thick sandy topsoils:</i>  <b>PbBk</b> – very gentle to gentle slopes (2-4%, 2e)  <b>PbZk</b> – summit surface with level to very gentle slopes (1e)</p> <p><i>Mostly medium thickness sandy topsoils:</i>  <b>PbA</b> – rise with level to very gentle slopes (1e)  <b>PbB</b> – very gentle slopes with mostly (1.5-3%, 2e)  <b>PbE</b> – depression  <b>PbZ</b> – summit surface with level to very gentle slopes (1e)</p> <p>Summary: the main issues are infertility, wind erosion risk, and strong water repellence due to the sandy nature of these topsoils; while subsoil physical condition is poor due to sodicity, and waterlogging is an issue in the depression.</p>
PIA	0.4	<p>Mostly arable medium thickness sandy deposits, often with hard carbonate rubble, on rises.</p> <p>Main soils: medium thickness sandy soil, often with hard carbonate rubble, over sodic clay with abundant fine carbonate <b>G4b</b> (<i>Hypercalcic-Lithocalcic Brown Sodosol</i>).</p> <p><b>PIA</b> – rise with level to very gentle slopes (1e)</p> <p>Summary: the main issues are infertility, and some water repellence and wind erosion risk due to the sandy nature of these topsoils; also subsoils are sodic, and some surface fragments occur.</p>
FGB FGBk FGZk	10.2 7.0 12.4	<p>Mostly arable summit surfaces and slopes, with medium thickness and some thick sandy soil, usually with ironstone gravel, over sodic clay.</p> <p>Main soils: <u>ironstone soil</u> - medium thickness and some thick sandy soil with ironstone gravel, over sodic clay <b>J2-J1</b> (<i>Ferric Brown Sodosol</i>). With 0-10% soils over calcrete, or calcrete rubble <b>B7-G4b</b> (<i>Petrocalcic-Lithocalcic Brown Sodosol</i>).</p> <p><i>Medium thickness sandy topsoils:</i>  <b>FGB</b> – low-lying very gentle slopes (1.5-3%, 2e)</p> <p><i>Medium thickness and some thick sandy topsoils:</i>  <b>FGBk</b> – very gentle slopes (1.5-3%, 2e)</p>



		<p><b>FGZk</b> – summit surface with level to very gentle slopes (1e)</p> <p>Summary: the main issues are infertility due to sandy topsoils and phosphorous fixation by ironstone gravel, and some wind erosion risk and water repellence due to the sandy nature of topsoils; while subsoils are sodic.</p>
FHB	3.3	<p>Mostly arable lower slopes of remnant plateau area, with medium thickness to thick loamy soil, usually with ironstone gravel, over sodic clay. Remnant plateau area underlain at depth by Middleton Formation meta-sandstone. The subsoil is probably only sodic at top of clay B horizon.</p> <p>Main soils: <u>ironstone soil</u> - medium thickness to thick sandy loam with ironstone gravel over sodic clay <b>J2-J1</b> (<i>Ferric Brown Sodosol</i>). With 0-10% soils over calcrete, or calcrete rubble <b>B7-G4b</b> (Petrocalcic-Lithocalcic Brown Sodosol).</p> <p><b>FHB</b> – very gentle slopes (1.5-3%, 2e)</p> <p>Summary: the main issues are reduced fertility due to phosphorous fixation by ironstone gravel, and the sodic nature of subsoils.</p>
FFA FFB	2.3 3.7	<p>Mostly arable low rise, probably a remnant plateau area, with medium thickness loamy, with sandy soil, usually with ironstone gravel, over sodic clay. Low rise or remnant plateau area underlain by Petrel Cove Formation sandstone, siltstone and mudstone. The subsoil is probably only sodic at top of clay B horizon.</p> <p>Main soils: medium thickness light sandy loam, with some sandy, with a sub-surface layer of light sandy loam to sandy soil, and with ironstone gravel, over sodic clay <b>J2-J1</b> (<i>Ferric Brown Sodosol</i>).</p> <p><b>FFA</b> – level to very gentle slopes (1e) <b>FFB</b> – very gentle slopes (1.5-3%, 2e)</p> <p>Summary: the main issues are reduced fertility due to phosphorous fixation by ironstone gravel, and the sodic nature of subsoils.</p>
FMB FMZ	1.9 0.7	<p>Mostly arable remnant plateau area, with medium thickness, and some thick sandy soil usually with ironstone gravel, over sodic clay; and with shallow soils over calcrete, or calcrete rubble. A remnant plateau area which has been overlain with sandy deposits. The area is underlain at depth by undifferentiated Kanmantoo Group meta-sandstones. The subsoil is probably only sodic at top of clay B horizon.</p> <p>Main soils: medium thickness, with some thick, sandy soil with ironstone gravel over sodic clay <b>J2-J1</b> (<i>Ferric Brown Sodosol</i>). With 10-30% shallow sandy soils over calcrete or calcrete rubble <b>B7-G4b</b> (Petrocalcic-Lithocalcic Brown Sodosol).</p> <p><b>FMB</b> – very gentle slopes (1.5-3%, 1e) <b>FMZ</b> – summit surface with level to very gentle slopes (1e)</p> <p>Summary: the main issues are infertility due to sandy topsoils and phosphorous fixation by ironstone gravel, and some wind erosion risk and water repellence due to the sandy nature of topsoils; while subsoils are sodic, and some surface fragments occur.</p>
FPZ	1.1	<p>Mostly arable remnant plateau area, with medium thickness to thick loamy soil, usually with ironstone gravel, over non-sodic clay. Remnant plateau area underlain at depth by undifferentiated Kanmantoo Group meta-sandstones. The absence of narrow leaf mallee is an indicator of a non-sodic clay B horizon.</p> <p>Main soils: medium thickness to thick light sandy loam, with a sub-surface layer of light sandy loam to loamy sand, with ironstone gravel, over yellow-brown non-sodic mottled clay <b>G3b</b> (<i>Ferric Brown Chromosol</i>). With 0-10% soil over calcrete, or calcrete rubble <b>B7-G4b</b> (Petrocalcic-Lithocalcic Brown Sodosol).</p> <p><b>FPZ</b> – summit surface with level to very gentle slopes (1e)</p> <p>Summary: the main issue is reduced fertility due to phosphorous fixation by ironstone gravel.</p>

# Classes in the 'Soil Landscape Unit summary' table (eg. 2-1e, 3w, 2y, etc) describe the predominant soil and land conditions, and their range, found in Soil Landscape Units. The number '1' reflects minimal limitation, while increasing numbers reflect increasing limitation. Letters correspond to the type of attribute:

a - wind erosion  
r - surface rockiness

e - water erosion  
s - salinity

f - flooding  
w - waterlogging

g - gullyng  
y - exposure



**Detailed soil profile descriptions:****Main Soils:**

- I1-H3** Very thick sands (*Podosol-Tenosol*). Very thick bleached sands. Neutral to acid loamy sand over bleached sand; on sand usually including some accumulations of iron and organic compounds. Sodic clayey substrate exists somewhere below 60cm; or occasionally the sand overlies calcrete. Found on hummocky low dunes, sand spreads and lunette area.
- G4-G3** Sand over sodic clay (*Brown Sodosol*). Moderate thickness to thick sandy soil over sodic clay. Usually loamy sand over a bleached sand layer, sometimes with ironstone nodules; over yellow-brown to olive-brown sodic clay with some grey, olive and/or red mottles, and often with fine carbonate in the lower subsoil. Found on rise summits and slopes.
- J2-J1** Ironstone soil (*Ferric Brown Sodosol*). Medium thickness, with some thick, sandy loam to loamy sand, with a sub-surface layer of light sandy loam to loamy sand which is sometimes bleached, and usually includes ironstone gravel; over yellow-brown to olive-brown sodic, or occasionally non-sodic, clay with some red and grey mottles, and sometimes with fine carbonate in lower subsoil. Often only the top of the clayey subsoil horizon is sodic. Found on rise summits and some slopes.

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

