

# LAF Laffer Land System

Flat to very gently undulating plains in the Hundred of Stirling and the eastern part of the Hundred of Laffer

**Area:** 335.3 km<sup>2</sup>

**Annual rainfall:** 480 – 525 mm average

**Geology:** The Land System is formed on sediments of the Padthaway Formation, laid down probably as lagoon floor sediments, following the retreat of the sea. They are mainly sandy clays, but range from clayey sands to clays, with interbedded limestones. These sediments are capped by hard, semi-hard, or less commonly, soft carbonate, derived from the solution and recrystallization of the underlying limestones. Remnant calcarenites of old coastal dunes occur sporadically in the east, and deposits of recent windblown sand occur in the north and west. In the south are several granite outcrops.

**Topography:** The Laffer Land System is a flat to very gently undulating plain between ranges of old coastal dunes. Most of the land was originally well drained, but with the continual rise of ground water tables following widespread clearance of native vegetation in the region, increasing waterlogging and salinization may be expected in places in future. Scattered across the plain are rises of three types:

- Chains of low stony rises which are the exposed crests of old buried coastal dunes.
- Low sandy rises.
- Granite outcrops and low hills, notably Mt. Monster.

**Elevation:** 20 - 30 m overall but up to 80 m on granite outcrops.

**Relief:** Less than 5 m generally but up to 55 m on isolated granite outcrops.

**Soils:** The characteristic soils have sandy surfaces, thin clayey subsoils and are shallow over calcrete. Shallow calcareous sandy loams are sub-dominant. Non calcareous sandy loams occur on some flats and deep sands on some rises.

## Main soils

### *Flats*

- B7a** Sand over brown clay on calcrete
- B3a** Shallow stony loamy sand over calcrete
- B2** Calcareous loam over calcrete
- G4** Sand over dispersive brown clay

## Minor soils

### *Flats*

- B6** Gradational sandy loam
- D2** Loam over friable red clay
- B7b** Sand over grey clay on calcrete
- B8** Bleached sand over calcrete

### *Stony rises*

- B3b** Shallow stony loamy sand over calcrete
- L1** Gritty loamy sand over granite

### *Sandy rises*

- G2** Sand grading to sandy clay loam
- H3** Deep bleached sand



**Vegetation:** Heath, mallee heath, pink gum and blue gum, with minor stringybark.

**Main features:** The Laffer Land System is a flat to very gently undulating plain characterized by shallow sandy surfaced soils over calcrete. The soils have moderately low fertility and water holding capacities, but are generally well drained. However, if water tables continue to rise, at least some parts of the land are at risk of increased waterlogging and salinization. There are minor calcrete and sand rises scattered across the plain. Granite outcrops in the south are spectacular, but their main influence is probably on groundwater movement.

**Soil Landscape Unit summary:** 8 Soil Landscape Units (SLUs) mapped in the Laffer Land System:

SLU	% of area	Main features #
A-g	0.9	Low hills and rises up to 55 m high where granite intrusions protrude above ground surface. There is extensive rocky outcrop and surface stone. Main soil: <u>gritty red loamy sand</u> - <b>L1</b> (D). These areas have little agricultural value and are mostly reserved for recreational and conservation uses.
MJA	0.6	Low stony rises projecting from the plain. They are formed on calcarenite. Main soil: <u>shallow stony loamy sand over calcrete</u> - <b>B3b</b> (D).  Key properties: Drainage: Rapidly to moderately well drained due to permeable soils and elevated position. Fertility: Moderately low to moderate, due to the predominantly sandy surfaces. Physical condition: Good. Most soils have firm to soft surface soils with friable subsoils. AWHC: Low to moderately low. Salinity: Low. Erosion potential: Water: Moderately low to moderate. Wind: Low to moderately low. Water repellence: Nil to slight. Rockiness: Minor. Up to 10% surface calcrete and sheet rock.  <u>Summary:</u> Well drained shallow stony soils with marginal fertility.
NAA	60.6	Flat plains with occasional very low stony or sandy rises formed on calcreted sediments of the Padthaway Formation. Main soils: <u>sand over brown clay on calcrete</u> - <b>B7a</b> (E) and <u>shallow stony loamy sand over calcrete</u> - <b>B3a</b> (C) with <u>sand over dispersive brown clay</u> - <b>G4</b> (L), <u>bleached sand over calcrete</u> - <b>B8</b> (L), <u>gradational sandy loam</u> - <b>B6</b> (L) and <u>loam over friable red clay</u> - <b>D2</b> (L).  Key properties: Drainage: Well to moderately well drained. Fertility: Moderately low to moderate (red soils). Physical condition: There are no surface or subsurface soil structure impediments to root growth. AWHC: Moderately low. Salinity: Moderately low to moderate in subsoil. This land is at risk of salinization if watertables continue to rise. Erosion potential: Water: Low. Wind: Low to moderately low. Water repellence: Slight to moderate. Rockiness: Up to 5% surface calcrete stone with heavier patches.  <u>Summary:</u> Flats dominated by soils with sandy surfaces and thin clayey subsoils over calcrete. Drainage is moderate, fertility is moderately low.



NAB	3.1	<p>Flat to gently undulating plains with very low stony rises formed on calcreted sediments of the Padthaway Formation.</p> <p>Main soils: <u>shallow stony loamy sand over calcrete</u> - <b>B3a</b> / <b>B3b</b> (E) and <u>sand over brown clay on calcrete</u> - <b>B7a</b> (E), with <u>bleached sand over calcrete</u> - <b>B8</b> (L).</p> <p>Key properties:</p> <p>Drainage: Moderately well drained.</p> <p>Fertility: Low to moderately low.</p> <p>Physical condition: No soil structure impediments to root growth.</p> <p>AWHC: Low.</p> <p>Salinity: Moderately low. This land is at risk of salinization if water tables continue to rise.</p> <p>Erosion potential: Water: Low. Wind: Low.</p> <p>Water repellence: Slight to nil.</p> <p>Rockiness: Up to 10% surface calcrete stones. On flats, up to 20% on rises.</p> <p><u>Summary:</u> Plain with shallow stony soils having low water holding capacity and moderately low fertility. This is a stonier variant of <b>NAA</b>.</p>
NAa	16.8	<p>Flat plains formed on calcreted sediments of the Padthaway Formation.</p> <p>Main soils: <u>sand over grey clay on calcrete</u> - <b>B7b</b> (C), <u>sand over brown clay on calcrete</u> - <b>B7a</b> (C), <u>sand over dispersive brown clay</u> - <b>G4</b> (E), <u>shallow stony loamy sand over calcrete</u> - <b>B3a</b> (L), and <u>bleached sand over calcrete</u> - <b>B8</b> (L).</p> <p>Key properties:</p> <p>Drainage: Moderately well to imperfectly drained.</p> <p>Fertility: Moderately low.</p> <p>Physical condition: No surface soil structure impediments to root growth. Subsoil clays of B7b are slightly limiting.</p> <p>AWHC: Moderate.</p> <p>Salinity: Moderately low to moderate in subsoil. This land is at risk of salinization if water tables continue to rise.</p> <p>Erosion potential: Water: Low. Wind: Low to moderately low.</p> <p>Water repellence: Slight.</p> <p>Rockiness: Up to 2% surface calcrete stone.</p> <p><u>Summary:</u> Flats dominated by soils with sandy surfaces and clayey subsoils over calcrete. Drainage is moderate to imperfect, fertility is moderately low. This is a less well drained variant of <b>NAA</b>.</p>
NBA	15.4	<p>Flat to very gently undulating plains formed on calcreted sediments of the Padthaway Formation.</p> <p>Main soil is <u>calcareous loam over calcrete</u> - <b>B2</b> (D).</p> <p>Key properties:</p> <p>Drainage: Well drained.</p> <p>Fertility: Moderate.</p> <p>Physical condition: Surface soils generally friable, but can set hard. Subsoil is well structured but thin and mixed with calcrete rubble.</p> <p>AWHC: Low to moderately low, due to shallow depth to sheet or rubbly calcrete.</p> <p>Salinity: Moderately low to moderate in highly calcareous subsoil materials.</p> <p>Erosion potential: Water: Low. Wind: Low.</p> <p>Water repellence: Nil.</p> <p>Rockiness: Up to 10% surface calcrete stone, occasional sheet rock to surface.</p> <p><u>Summary:</u> Well drained shallow calcareous soils over rubbly calcrete.</p>



O-B	0.1	Low rises formed on Molineaux Sand.
O-D	2.5	<p><b>O-B</b> Moderate sand dunes.</p> <p><b>O-D</b> Low sand dunes and sand spreads.</p> <p>Main soils: <u>sand grading to sandy clay loam</u> - <b>G2</b> (E) and <u>deep bleached sand</u> - <b>H3</b> (E).</p> <p>Key properties:</p> <p>Drainage: Rapidly to well drained.</p> <p>Fertility: Low to very low.</p> <p>Physical condition: There are no impediments to root growth.</p> <p>AWHC: Moderately low to moderate.</p> <p>Salinity: Low.</p> <p>Erosion potential: Water: Low. Wind: Moderate to high.</p> <p>Water repellence: High.</p> <p>Rockiness: Nil.</p> <p><u>Summary</u>: Isolated low sandy rises with very low fertility, well drained soils prone to water repellence and erosion.</p>

# 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:

#### Main soils

##### *Flats*

- B7a** Sand over brown clay on calcrete (Petrocalcic, Brown Chromosol)  
Medium thickness sand overlying yellow brown firm clay on limestone or calcreted sandy clay within 50 cm.
- B3a** Shallow stony loamy sand over calcrete (Petrocalcic, Leptic Tenosol)  
Medium thickness loamy sand to sandy loam overlying a layer of mixed calcrete rubble and pockets of brown sandy clay grading to calcreted lagoonal sediments.
- B2** Calcareous loam over calcrete (Petrocalcic, Lithocalcic Calcarosol)  
Medium thickness calcareous stony loam to clay loam overlying Class III C carbonate grading to calcreted lagoonal sediments.
- G4** Sand over dispersive brown clay (Calcic, Brown Sodosol)  
Medium thickness loose sand with a bleached A2 layer, abruptly overlying a brown and grey mottled sandy clay to clay with coarse columnar structure, calcareous with depth.

#### Minor soils

##### *Flats*

- D2** Loam over friable red clay (Hypercalcic, Red Chromosol)  
Medium thickness red brown loam abruptly overlying a red brown well structured clay grading to soft carbonate or calcarenite at 50 - 100 cm.



- B6** Gradational sandy loam (Petrocalcic, Red Kandosol)  
Medium thickness sandy loam grading to a weakly structured red sandy clay loam over calcreted lagoonal sediment within 50 cm.
- B7b** Sand over grey clay on calcrete (Petrocalcic, Grey Chromosol)  
Medium thickness loamy sand abruptly overlying a grey brown firm clay with calcreted lagoonal sediments within 50 cm.
- B8** Bleached sand over calcrete (Petrocalcic, Bleached-Leptic Tenosol / Bleached, Petrocalcic, Brown Kandosol)  
Medium to thick bleached sand with an organically darkened surface, sometimes with a thin, brown more clayey subsoil, over calcreted lagoonal sediments within 50 cm.

*Stony rises*

- B3b** Shallow stony loamy sand over calcrete (Petrocalcic, Leptic Tenosol)  
Loamy sand to loam with variable rubble and slight clay increase with depth overlying calcreted calcarenite shallower than 50 cm.
- L1** Gritty loamy sand over granite (Red Kandosol)  
Variable thickness gritty red loamy sand to sandy loam, becoming more clayey with depth over weathering granite.

*Sandy rises*

- G2** Sand grading to sandy clay loam (Mesotrophic, Yellow Kandosol)  
Thick bleached sand, organically darkened at surface, over a yellow and red friable massive sandy clay loam.
- H3** Deep bleached sand (Basic, Arenic, Bleached-Orthic Tenosol)  
Thick to very thick bleached sand, organically darkened at the surface over yellow sand continuing below 100 cm.

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

