LGC Log Crossing Land System

Inter-dune corridor between the Cantara Road and Alf Flat

Area: 90.1 km^2

Annual rainfall: 535 – 560 mm average

Geology: The System is a complex of calcreted calcarenites of the Bridgewater Formation (on rises) and clayey / limestone sediments of the Padthaway Formation and associated Recent swamp sediments (on flats). The calcarenites are partially covered by windblown Molineaux Sands.

Topography: The Log Crossing Land System is a complex depression linking the broader flats of the Wells corridor to the south with the Messent discharge flats to the north. The continuity of the corridor is interrupted in this system by extensive calcarenite rises within the depression. These rises break the system up into a string of swamps and shallow lakes separated by low narrow ridges. Drains have been cut through these low ridges to facilitate the northward flow of water.

Elevation: 15 - 50 m

Relief: Maximum relief is 30 m

Soils: There is a range of wet saline soils on swampy depressions, and sandy texture contrast soils on better drained flats. Shallow stony and deep sandy soils, all well drained, characterize rising ground. Over 25% of the land surface is more or less permanently inundated.

Main soils

Swampy flats

N2a Sand over yellow and grey wet saline clay
N2b Saline clay over sand
N2c Wet saline calcareous loam

Minor soils

Imperfectly drained flats

B7/N2 Sand over moderately saline clay on calcrete
N2/G4 Sand over moderately saline clay

Well drained flats

B7a Sand over brown clay on calcrete
G3/G4 Sand over brown sodic clay

Rises

B3 Shallow stony loamy sand over calcrete
B7b Sand over brown clay on calcrete
B8 Shallow bleached sand over calcrete
G2a Loamy sand over sandy clay loam
G2b Sand over light sandy clay loam
H3 Deep bleached sand

Main features: The Log Crossing Land System comprises a series of flats which are either seasonally or permanently inundated, separated by sandy or stony rises which are well drained and non saline, but are characterized by either infertile water repellent sands or shallow stony soils. Productive potential of the flats is being progressively diminished by increasing salinity and flooding.

Soil Landscape Unit summary: 6 Soil Landscape Units (SLUs) mapped in the Log Crossing Land System:

SLU	% of area	Main features #
MHB	21.6	Stony rises up to 30 m high (usually less than 20 m) formed on calcreted calcarenite and partially overlain by windblown Molineaux Sands. There is variable surface calcrete stone depending on the depth of sand. Main soils: deep bleached sand - **H3** (C) and loamy sand to sand over sandy clay loam - **G2a/G2b** (C) on sandy areas, and shallow stony loamy sand over calcrete - **B3** (L) and shallow bleached sand over calcrete - **B8** (L) with sand over brown clay on calcrete - **B7b** (M) on stony areas. Key properties: Drainage: Rapidly to well drained. Fertility: Low to moderately low. Physical condition: No restrictions to root growth above the calcrete. AWHC: Very low to moderate, depending on depth to calcrete and stone content of soil. Salinity: Low to moderately low. Erosion potential: Water: Low to moderately low. Wind: Low to moderately low. Water repellence: Low to moderate (sandy soils) Rockiness: Up to 20% surface calcrete and outcropping rock. Summary: The rises are well drained and not saline, but have variable depth and often very shallow soils of moderately low fertility.
MJn	13.1	Complex of low sandy and stony rises, with 10-20% swampy depressions. Main soils: deep bleached sand - **H3** (C) and loamy sand to sand over sandy clay loam - **G2a/G2b** (L) on sandy rises, and shallow stony loamy sand over calcrete - **B3** (L), shallow bleached sand over calcrete - **B8** (L) with sand over brown clay on calcrete - **B7b** (M) on stony rises, and various wet saline soils - **N2a/N2b/N2c** (L) in swampy depressions. Key properties: Drainage: Well drained (poorly drained in depressions). Fertility: Low. Physical condition: No physical limitations. AWHC: Moderately low. Salinity: Low (high in depressions). Erosion potential: Water: Low. Wind: Low to moderate. Water repellence: Moderate. Rockiness: Up to 20% surface stone and outcropping calcrete. Summary: Most of the land is well drained and at no risk of salinization. However, soils are either low fertility sands prone to water repellence and erosion, or shallow and stony.
NGp	7.4	Gently undulating land comprising roughly equal proportions of moderately well drained flats and sandy or stony rises, with up to 20% swampy depressions. Main soils: sand over brown clay on calcrete - **B7b** (C) and sand over brown sodic clay - **G3/G4** (L) on better drained flats, sand over moderately saline clay (on calcrete) - **B7/N2** and **N2/G4** (L) on imperfectly drained flats, soils as for MHB on rises (C), and wet saline soils - **N2a/N2b/N2c** (L) in swampy areas.

		Key properties: Drainage: Moderately well to well drained on flats and rises. Poorly drained on swampy flats. Fertility: Moderately low. Physical condition: No significant physical limitations. AWHC: Moderate to low. Salinity: Low on rises, moderately low on flats, high in swampy depressions. Erosion potential: Water: Low Wind: Moderate to low. Water repellence: Moderate. Rockiness Nil to minor (rises). Summary: Most land is well drained and non saline, although fertility is low. Rising watertables may cause increased salinization over time.
Xw-	27.0	Swamps which are regularly inundated and where an increasing area is permanently inundated.
Znf	28.0	Flats formed on clays and limestones of the Padthaway Formation, and calcareous clays and marls of swamp floors. The flats are seasonally inundated. Saline water tables are within a metre of the surface over most of the area. Main soils: sand over yellow and grey wet saline clay - **N2a** (E), saline clay over sand - **N2b** (E) and wet saline calcareous loam - **N2c** (E). Key properties: Drainage: Poor to very poor due to shallow water table. Fertility: Moderate. Physical condition: No restrictions in surface soils. Dispersive subsoils restrict root growth. AWHC: Moderate. Salinity: High to very high. Erosion potential: Water: Low. Wind: Low. Water repellence: Low. Rockiness: Nil. Summary: The flats are highly saline and subject to frequent inundation. Conventional pasture species will not persist over most of the area.
ZpO	2.9	Isolated closed depressions with seasonally waterlogged and saline land occupying more than half of the area. Main soils: sand over moderately saline clay - **N2/G4** (C) and sand over yellow and grey wet saline clay - **N2a** (C), saline clay over sand - **N2b** (C) and wet saline calcareous loam - **N2c** (C). Key properties: Drainage: Imperfectly to poorly drained. Fertility: Low. Physical condition: No soil physical impediments to root growth. AWHC: Moderately low to low. Salinity: Moderately high to very high. Erosion potential: Water: Low. Wind: Low. Water repellence: Low. Rockiness: Nil to minor on flats. Summary: Impeded drainage and increasing salinity limit the productivity of these areas. Improvements can be achieved through the establishment of salt tolerant pastures.

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:

Swampy flats

N2a Sand over yellow and grey wet saline clay (Sodosolic, Hypersalic Hydrosol)
Medium thickness loamy sand abruptly overlying a grey and yellow brown mottled clay (seasonally saturated), with rubbly to soft carbonate at depth.

N2b Saline clay over sand (Petrocalcic, Calcarosolic, Salic Hydrosol)
Thin highly calcareous dark clay over a very highly calcareous pale mottled clayey sand with sporadic weak calcrete pans and watertable within 100 cm.

N2c Wet saline calcareous loam (Calcarosolic, Hypersalic Hydrosol)
Grey very highly calcareous loam grading to a pale grey clay loam over either rubbly calcrete or a white very highly calcareous silty clay loam by about 30 cm, with a watertable within 100 cm.

Imperfectly drained flats

B7/N2 Sand over moderately saline clay on calcrete (Petrocalcic, Sodosolic, Salic Hydrosol)
Bleached sand overlying a coarsely structured mottled grey sandy clay loam to clay, with a calcrete pan within 50 cm and a saline watertable at depth.

N2/G4 Sand over moderately saline clay (Hypercalcic / Lithocalcic, Grey Sodosol **OR** Sodosolic, Hypersalic Hydrosol)
Medium thickness loamy sand abruptly overlying a grey and yellow brown mottled clay (seasonally saturated), with rubbly to soft carbonate at depth.

Well drained flats

B7a Sand over brown clay on calcrete (Petrocalcic, Brown Chromosol)
Medium thickness sand overlying yellowish brown firm to friable clay on limestone or calcreted sandy clay within 50 cm.

G3/G4 Sand over brown sodic clay (Lithocalcic, Brown / Grey Sodosol)
Medium to thick sand abruptly overlying a brown and grey mottled columnar sandy clay loam to sandy clay, with rubbly carbonate at depth.

Rises

B3 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.

B7b Loamy sand over sandy clay loam on calcrete (Petrocalcic, Brown Chromosol / Kandosol)
Medium to thick sand with a bleached A2 layer abruptly overlying a brownish friable light sandy clay loam to sandy clay over calcreted calcarenite.

B8 Shallow bleached sand over calcrete (Petrocalcic, Bleached-Leptic Tenosol)
Grey loamy sand with a bleached A2 layer over calcrete at about 40 cm.

G2a Loamy sand over sandy clay loam (Petrocalcic, Brown Chromosol)
Medium to thick brown sand with a bleached A2 layer abruptly overlying a brownish weakly structured friable sandy clay loam to sandy clay over calcreted calcarenite.

G2b Sand over light sandy clay loam (Petrocalcic, Yellow Kandosol)
Thick sand with a bleached A2 layer overlying a yellow light sandy clay loam with calcrete at variable depth.

H3 Deep bleached sand (Basic, Arenic, Bleached-Orthic Tenosol)
Thick to very thick bleached sand, organically darkened surface over yellow sand continuing below 100 cm.

Further information: DEWNR Soil and Land Program