MNC Minecrow Land System

Flats of the Minecrow watercourse extending from Hundred of Townsend to Hundred of Wells

Area: 743.8 km^2

Annual rainfall: 555 – 635 mm average

Geology: The land system is underlain by sediments of the Pleistocene Padthway Formation, which includes clays and interbedded sands and limestones or dolomites, deposited in coastal lagoons. Miscellaneous swamp floor sediments have subsequently accumulated in lower lying areas. Protruding through the Padthaway sediments are scattered calcreted calcarenite rises, probably islands in the old lagoons. The rises are variably covered by deposits of Molineaux Sand.

Topography: The Minecrow Land System is a NNW-SSE trending flat (inter0dune corridor), bordered by ancient coastal dune ranges on both sides. The corridor has a gradual fall to the north. Drains have been installed to assist the flow of water to a narrow gap in the western range which links the Minecrow and the Ross Systems. There is also a fall to the west causing water to pond against the western range. A network of swamps abuts the range. These are seasonally inundated. There is a saline water table within a metre or so of the surface over most of the flats, so they are characteristically marginally to highly saline. Low rises scattered across the flats are less than 10 m high.

Elevation: 10 – 30 m

Relief: Up to 10 m

Soils: Seasonally wet and saline soils are most common, associated with sand over clay and a range of shallow sandy to loamy soils over calcrete.

Main soils

Sandy soils (dunes, rises and flats)

H3 Deep bleached siliceous sand
G2 Bleached sand grading to sandy clay loam
G3 Thick sand over clay
G4 Sand over poorly structured clay
G5 Sand over acidic clay
I1 Highly leached sand
I2 Wet highly leached sand

Stony soils (rises and flats)

B2 Shallow calcareous loamy sand to loam on calcrete
B3 Shallow loamy sand to sandy loam over sandy clay loam on calcrete
B4 Shallow red loam on calcrete
B5 Shallow dark clay loam on limestone
B6 Shallow loam over red-brown clay on calcrete
B7 Shallow sand over clay on calcrete
B8 Shallow sand on calcrete
B9 Shallow clay loam over brown or dark clay on calcrete
L1 Shallow soil on rock
RR Limestone outcrop

Heavy soils

F2 Sandy loam over poorly structured brown or dark clay
E1 Black cracking clay
E3 Brown or grey cracking clay
M2 Deep friable gradational clay loam
M4 Deep hard gradational sandy loam

Other soils

N1 Peat
N2 Saline soil
N2a Saline clay over sand
N2b Wet highly saline calcareous loam
N3 Wet soil (non to moderately saline)
A7 Calcareous loam to clay loam on marl
A8 Gypseous calcareous loam
C5 Gradational dark clay loam
D2 Loam over red clay
B7/N2 Sand over wet clay on calcrete
N2/G4 Sand over wet saline clay

Main features: The Minecrow Land System is characterised by marginally to highly saline flats which are increasingly affected by rising saline groundwater tables and floodwater. Main soils: moderately deep sandy texture contrast types, but establishment of salt tolerant pasture species is necessary for sustained production. Low rises have either moderately shallow stony soils or highly infertile sands.

Soil Landscape Unit summary: 109 Soil Landscape Units (SLUs) are mapped in the Minecrow Land System:

SLU	% of area	Main features #
A-g	0.15	Isolated granite outcrops. There is extensive rocky outcrop and surface stone. Main soils: shallow soil on rock - **L1** (D). These areas have little agricultural value.
M-B M-C	0.03 0.06	Isolated stony rises formed on calcreted calcarenite of ancient coastal dunes within the NNW-SSE trending flat. There is greater than 50% calcrete within these rises. **M-B** Gently sloping undulating rises **M-C** Undulating rises Main soils: limestone outcrop - **RR** (C), shallow sandy loam on calcrete - **B3** (C), shallow loam over red clay on calcrete - **B6** (C) and shallow sand over clay on calcrete - **B7** (L). The stony soils are very shallow to moderately deep, have moderate fertility and very low to moderate waterholding capacity. The rocky areas are semi-arable with up to 50% exposed outcropping in concentrated areas. These soils are very well drained.
MAA MAB MAC	0.11 0.33 0.08	Isolated stony rises formed on calcreted calcarenite of ancient coastal dunes within the NNW-SSE trending flat. There is greater than 90% shallow soil or calcrete outcrop with greater than 50% bare calcrete. **MAA** Gently undulating plain **MAB** Gently sloping undulating rises **MAC** Undulating rises Main soils: limestone outcrop - **RR** (E), shallow sandy loam on calcrete - **B3** (E) and shallow loam over red-brown clay on calcrete - **B6** (C). This land is non-arable as soils are very shallow and have very low waterholding capacity and fertility.
MEB	0.09	Isolated undulating rises formed on calcreted calcarenite of ancient coastal dunes within the NNW-SSE trending flat. There is less than 10% bare calcrete outcrop. Main soils: shallow sandy loam on calcrete - **B3**, shallow calcareous loam on calcrete - **B2**, limestone outcrop - **RR**, shallow loam over red-brown clay on calcrete - **B6**.

		These soils are semi-arable as they are shallow to very shallow and/or stony, have moderately-low to low waterholding capacity and fertility. They are very well drained. The sandy soils are bleached siliceous sand - **H3**, sand grading to sandy clay loam - **G2** and thick sand over clay - **G3**. These soils are deep with low fertility, moderate waterholding capacity and rapid drainage. Severe water repellence and the susceptibility to wind erosion are limitations.
MHB MHh MHn	0.33 0.05 0.1	Isolated undulating rises formed on calcreted calcarenite of ancient coastal dunes within the NNW-SSE trending flat. These rises are variably covered by deposits of Molineaux Sand. **MHB** Undulating rises **MHh** Undulating rises with 10-50% marginally saline land **MHn** Undulating rises with up to 10 saline land Main soils: bleached siliceous sand - **H3**, sand grading to sandy clay loam - **G2** and thick sand over clay - **G3**. These soils are deep with low to very low fertility, moderate waterholding capacity and rapid drainage. Severe water repellence, soil acidity and the susceptibility to wind erosion are limitations. The shallow rising soils: shallow sandy loam on calcrete - **B3**, shallow red loam on limestone – **B4**, shallow sand over clay on calcrete - **B7**, shallow calcareous loam on calcrete - **B2** and shallow loam over red-brown clay on calcrete - **B6.** This land is semi-arable as these soils are shallow and/or stony and have low waterholding capacity and moderately low fertility. Drainage is rapid. The soils in the flats and swampy areas include sandy loam over poorly structured brown or dark clay - **F2,** wet soil - **N3,** saline soils - **N2** and shallow dark clay loam on limestone - **B5**. These soils are deep, have moderately low fertility, moderate waterholding capacity and are poorly to very poorly drained. There is moderate salinity on the flats but in the swampy areas the salinity is high to very high due to the water table seasonally above the surface.
MJB	0.85	Isolated undulating rises to 10 m high formed on calcreted calcarenite of ancient coastal dunes within the NNW-SSE trending flat. These rises are variably covered by deposits of siliceous Molineaux Sand. There is variable surface calcrete, depending on the presence of sand. 10-20% stone cover is common, with outcropping reefs and heavy stone in places. There are limited saline swamps within the rises. **MJB** Undulating rises Main soils: loamy sand over sandy clay loam on calcrete - **B3** (E), deep bleached sand - **H3** (C), sand grading to sandy clay loam - **G2** (C), sand over friable brown clay on calcrete - **B7** (L) and shallow calcareous loamy sand on calcrete - **B2** (M). Key properties: Drainage: Rapidly to well drained. Fertility: Very low on deep sands to moderately low on stony soils. Physical condition: Surface soils are soft to loose and do not restrict root growth. Where subsoils occur they are friable and not restrictive to root growth. AWHC: Moderate on sandy soils. Very low-to-low on stony soils, due to shallow depth to hard calcrete. Salinity: Low. Erosion potential Water: Low to moderate, depending on slope. Wind: High on sand spreads to moderately low on stony ground. Water repellence: Strong on sand spreads. Low to slight on stony land. Rockiness: Nil on sand spreads. Variable to 50%, usually less than 20%. Other: The higher rises are exposed. Summary: Deep, low fertility, water repellent and erodible sands with shallow, stony soils of marginal fertility.

MJn	1.01	**MJn** Complex of calcarenite rises and up to 20% swampy depressions and up to 10% saline land. Main soils: as for **MJB** on rises (V), with sand over poorly structured clay - **G4** (M), sand over wet clay on calcrete - **B7/N2** (M), saline clay over sand - **N2a** (M) and wet highly saline calcareous loam - **N2b** (M) on flats. Key properties: Drainage: Well drained on rises. Poorly drained in depressions. Fertility: Moderately low to low. Physical condition: No limitations to root growth. AWHC: Moderate. Salinity: Moderately low on rises. High to very high in depressions. Erosion potential Water: Low Wind: Moderately low. Water repellence: Moderately low. Rockiness Up to 20% surface calcrete on rises. Where soils, **B3**, **B4**, **B7** and **B2** occur, the land is semi-arable as these soils are shallow and/or stony and have moderately-low to low waterholding capacity and fertility. These soils are rapidly drained. The sandy soils **H3** and **G2** are deep with low fertility, moderate waterholding capacity and rapid drainage. Severe water repellence, soil acidity and the high potential for wind erosion are limitations. Summary: Low fertility (but well drained and non saline soils) on rises are dominant. Flats are being increasingly affected by salinity as water tables rise. Salt tolerant species are required to maintain productivity.
MLB	0.09	Isolated undulating rises formed on calcreted calcarenite of ancient coastal dunes within the NNW-SSE trending flat. Deposits of Molineaux Sand variably cover these rises. There is variable surface calcrete, depending on the presence of sand. There are no swamps. 10-20% stone cover is common, with more in places. Main soils: shallow sandy loam on calcrete - **B3** , limestone outcrop - **RR** , shallow loam over red-brown clay on calcrete - **B6** , and shallow sand over clay on calcrete - **B7** . The land is non-arable as the soils are very shallow and/or stony and have very low waterholding capacity and moderately low fertility. Drainage is rapid. Sandy soils bleached siliceous sand - **H3**, highly leached sand - **I1**, thick sand over clay - **G3** and wet highly leached sand - **I2**. The soils are deep, have low fertility, moderate to high waterholding capacity and are rapidly to slightly imperfectly drained. Water repellence and susceptibility to wind erosion are limitations.
MNB	0.03	Isolated undulating rises formed on calcreted calcarenite of ancient coastal dunes within the NNW-SSE trending flat. These rises are variably covered by deposits of Molineaux Sand. There is variable surface calcrete, depending on the presence of sand. There are no swamps. Main soils: bleached siliceous sand - **H3** (E), shallow loam over red-brown clay on calcrete - **B6** , highly leached sand - **I1** , shallow sandy loam on calcrete - **B3** and limestone outcrop - **RR** . The soils are quite mixed and they range in depth from very shallow to deep. The shallow soils are stony and can be a slight limitation. The fertility varies from moderately low to very low, the waterholding capacity from moderate to low and the drainage is rapid. Water repellence, soil acidity and the susceptibility to wind erosion are limitations.
MVB	0.25	Isolated undulating rises formed on calcreted calcarenite of ancient coastal dunes within the NNW-SSE trending flat. Deposits of Molineaux Sand variably cover these rises. There is variable surface calcrete, depending on the presence of sand. There is between 10-20% outcropping of calcrete. There are no swamps. Main shallow soils: shallow loam over red-brown clay on calcrete - **B6,** shallow calcareous loam on calcrete - **B2**, limestone outcrop - **RR**, shallow sandy loam on calcrete - **B3** and shallow red loam on limestone - **B4**. The shallow soils are shallow; have moderately low-to-low waterholding capacity and fertility. Drainage is rapid. The outcropping areas of calcrete are non-arable as they are very shallow with very low waterholding capacity and moderately low fertility. The presence of surface stones would be a limitation for these soils. Sandy soils: bleached siliceous sand - **H3** and sand grading to sandy clay loam - **G2** (M). These soils are deep, have low fertility, moderate waterholding capacity and rapid drainage. Severe water repellence, soil acidity and the susceptibility to wind erosion are limitations.

MWA	0.48	Very low raised plain to gently sloping that is formed on calcreted calcarenite of ancient coastal dunes. Main soils: shallow sand over clay on calcrete - **B7**, shallow loam over red-brown clay on calcrete - **B6,** shallow sandy loam on calcrete - **B3** and limestone outcrop - **RR**. The shallow soils with moderately low waterholding capacity, moderate fertility and slightly imperfect drainage. The subsoil clay may be a slight limitation to root growth and also the presence of surface stone.
MXA	0.19	Gently undulating plain with minor swamps. Main soils: shallow sandy loam on calcrete - **B3**, shallow sand over clay on calcrete - **B7**, limestone outcrop - **RR** and wet soil - **N3**. These soils are shallow with low to moderately low waterholding capacity and moderate to moderately low fertility. Drainage is imperfect to poor. Subsoil salinity is evident and may affect root growth in low-lying areas.
MwA MwB	0.03 0.02	Undulating plains to gently undulating rises. Main soils: shallow loam over red-brown clay on calcrete - **B6,** shallow red loam on limestone - **B4**, shallow sandy loam on calcrete - **B3** and limestone outcrop - **RR** . These soils are shallow to very shallow with moderate fertility and low to very low waterholding capacity. Drainage is rapid.
NBA NBC NBU NBa NBu	2.52 0.44 0.19 0.23 0.04	Flat plains with occasional swamps formed on calcreted sediments of the Padthaway Formation. There variable areas of swamps, saltpans and stony rises. **NBA** Plains with 0-10% swamps **NBC** Plains with 0-10% swamps and 0-10% stony rises **NBU** Plains with 10-50% swamps and 10-50% stony rises **NBa** Plains with 0-10% saline swamps **NBu** Plains with 10-50% saline swamps and 10-50% stony rises Main soils on plains: shallow dark clay loam on limestone - **B5**, shallow sand over clay on calcrete - **B7**, shallow sandy loam on calcrete - **B3**, shallow sand over clay on calcrete - **B8**, and calcareous clay loam on marl - **A7**. The soils are moderate to shallow, have moderate fertility and moderately low waterholding capacity. Drainage is imperfect. Salinity levels are moderate due to rising groundwater tables. Productive potential of plants may be slightly decreased. Stony rise soils: shallow calcareous loam on calcrete - **B2**, limestone outcrop - **RR** and gypseous calcareous loam - **A8**. These soils are very shallow and stony with moderate fertility and very low waterholding capacity. Drainage is rapid. Swamps and salt pans sols: saline soil - **N2**, wet soil - **N3**, sandy loam over poorly structured brown or dark clay - **F2** and shallow clay loam over brown or dark clay on calcrete - **B9**. These soils are moderate to deep, have moderate to high fertility and waterholding capacity. The swamps are poorly drained with subsoil salinity evident. Slight limitation for root growth due to dispersive subsoil clays. The saltpan is very poorly drained and salinity levels are extreme due to rising groundwater tables.
NJA NJC NJE	0.94 0.29 0.20	Flat plains with occasional swamps formed on calcreted sediments of the Padthaway Formation. There variable areas of swamps, salt pans and stony rises which may only be 1 m high. **NJA** Plain **NJC** Plains with 0-10% stony rises **NJE** Plains with 0-10% mixed rises Plain soils: deep friable gradational clay loam M2, black cracking clay E1, sandy loam over poorly structured brown or dark clay - **F2** and shallow dark clay loam on limestone - **B5**. These soils are deep with high fertility and waterholding capacity. Drainage is poor. There is a slight limitation to root growth due to the dispersive subsoil clays. Drainage is poor and there is evidence of subsoil salinity due to rising groundwater tables. Rises main soils: shallow calcareous loam on calcrete - **B2**, limestone outcrop - **RR** and **B5**. These soils are very shallow and stony and have moderate fertility, moderately low waterholding capacity. Drainage is imperfect and there is evidence of subsoil salinity.
NKL NKM NKc	1.40 3.95 0.35	Flat plains with occasional very low stony rises formed on calcreted sediments of the Padthaway Formation. Groundwater tables are within two metres of the surface. **NKL** Plains with 10-50% swamps & 0-10% mixed rises **NKM** Plains with 0-10% swamps with 10-50% stony rises

		NKc Plains with 0-10% saline swamps and 0-10% stony rises Plain soils: gradational clay loam - **C5** and calcareous clay loam on marl - **A7**. These soils are deep with high fertility and waterholding capacity. Drainage is poor and there may be subsoil salinity. The rising shallow soils are similar to that of the **NBA** soil landscape unit. These soils are shallow to very shallow, have moderate to high fertility, and low to very low waterholding capacity. Drainage is imperfect to well drained. Subsoil salinity, rockiness and dispersive subsoil clays may be a slight limitation.
NMA NMB NMD NMF NMd NMf NMk	4.22 2.97 0.14 0.05 0.78 0.06 0.12	Flat plains with occasional very low sandy rises and up to 50% swamps formed on calcreted sediments of the Padthaway formation. Groundwater tables are within two metres of the surface. **NMA** Level plain with 0-10% swamps **NMB** Stony plains with 0-10% swamps **NMD** Plains with 0-10% swamps and 0-10% sandy rises **NMF** Plains with 10-50% swamps **NMd** Plains with 0-10% saline swamps and 0-10% sandy rises **NMf** Plains with 10-50% saline swamps **NMk** Plains with 10-50% saline swamps with 0-10% sandy rises Main soils: shallow sand over clay on calcrete - **B7**, shallow dark clay loam on limestone - **B5**, deep friable gradational clay loam - **M2**, sand over poorly structured clay - **G4**, saline soil - **N2** and wet soil - **N3**. These soils are shallow to moderately deep, have moderate to moderately low fertility and waterholding capacity. Drainage is imperfect to poor. There is a moderate limitation for root growth due to the dispersive subsoil clays. Salinity levels vary evidence of subsoil salinity to moderately high due to rising saline groundwater tables. Minor sandy rise soils: thick sand over clay - **G3**, bleached siliceous sand - **H3** and sand grading to sandy clay loam - **G2**. These soils are deep with low fertility, moderate waterholding capacity and rapid drainage. Moderate water repellence and the susceptibility to wind erosion are limitations.
NSA NSK	0.12 0.31	Flat deeper sandy surfaces plains with occasional very low sandy rises and up to 30% swamps formed on calcreted sediments of the Padthaway formation. Groundwater tables are often within two metres of the surface. wet soil - **N3** (E) **NSA** Level plain with 0-10% swamps **NSK** Plains with 20-30% swamps with 10-30% sandy rises. Main soils: thick sand over clay - **G3** (E), sand over poorly structured clay - **G4** and shallow dark clay loam on limestone - **B5** (C). These soils are deep, have moderate to moderately low fertility and high to moderate waterholding capacity. Drainage is imperfect. The flats are dominated by soils with sandy surfaces and dispersive subsoil clays that are a slight limitation to root growth. The heavier clay loam surfaces are slightly more fertile however moderately low water-holding capacity. The swamps have similar soils to the plains however there are soils that remain wet for up to 3 months of the year. The sandy rise soils are the same as the **NMK** soil landscape unit. These soils are deep with low fertility, moderate waterholding capacity and rapid drainage. Moderate water repellence and the susceptibility to wind erosion are limitations.
NTJ	0.09	Small flat deeper sandy surfaces plain with 30-50% swamps and 20-30% sandy rises formed on calcreted sediments of the Padthaway Formation. Main soils: thick sand over clay - **G3** (E), sand over poorly structured clay - **G4**, shallow dark clay loam on limestone - **B5** (C), wet soil - **N3** (E) and bleached siliceous sand - **H3**. The plain soils are deep, have moderately low fertility and moderate waterholding capacity. Drainage is imperfect to poor. The plains are dominated by soils with sandy surfaces and dispersive subsoil clays that are a slight limitation to root growth. The sandy rises are deep with low fertility, moderate waterholding capacity and rapid drainage. Moderate water repellence, soil acidity and the susceptibility to wind erosion are limitations.
NUP	0.20	Small flat deeper sandy surfaces plain with 10-20% sandy rises and 0-10% swamps formed on calcreted sediments of the Padthaway Formation. Plain soils: thick sand over clay - **G3** (E), sand over poorly structured clay - **G4**, shallow sand over clay on calcrete - **B7** and shallow red loam on limestone - **B4**. These soils are deep with moderately low fertility, high waterholding capacity and imperfectly drained. Soil acidity and dispersive subsoil clays are a slight limitation to root growth. The swampy soils are wet soil - **N3** (E), deep hard gradational sandy loam - **M4** and sand grading to sandy clay loam - **G2**. These soils are deep with high fertility and waterholding capacity. They are

		poorly drained and have dispersive subsoil clays. Sandy rise soils: bleached siliceous sand - **H3** and highly leached sand - **I1**. These soils are deep with low fertility, moderate waterholding capacity and rapid drainage. Moderate water repellence, soil acidity and the susceptibility to wind erosion are limitations.
NYA NYD NYI NYk	3.96 2.86 0.09 1.27	Flat plains with less than 10% low sandy rises and up to 30% swamps formed on calcreted sediments of the Padthaway formation. Groundwater tables are within two metres of the surface. **NYA** Level plain with 0-10% swamps **NYD** Plains with 0-10% swamps and 0-10% sandy rises **NYI** Stony plains with 20-30% swamps **NYk** Plains with 20-30% saline swamps with 0-10% sandy rises Main plain soils: shallow dark clay loam on limestone - **B5**, shallow sand on calcrete - **B8**, shallow calcareous loam on calcrete - **B2**, limestone outcrop - **RR** and deep friable gradational clay loam - **M2**. These soils are generally shallow with high fertility, moderately low to very low waterholding capacity. The stony plains have a slight limitation with rockiness. Drainage is imperfect. Subsoil salinity is evident. Swampy soils: sandy loam over poorly structured brown or dark clay - **F2**, grey cracking clay - **E3**, wet soil N3, **B5** and **M2**. These soils are deep with high fertility and high to moderately low waterholding capacity. Drainage is poor to very poor. Salinity levels are nil to moderately high, which is due to rising groundwater tables. Sandy soils: thick sand over clay - **G3** and shallow sand over clay on calcrete - **B7**. These soils are moderately deep with moderately low fertility and waterholding capacity. Drainage is imperfect. Water repellence and the susceptibility to wind erosion are limitations.
NZA NZG NZP NZd Nze NZk NZl NZp NZr NZs	0.36 1.20 0.29 1.13 1.73 1.36 0.09 3.61 0.95 0.06	Flat plains with occasional very low stony and sandy rises and swamps formed on calcreted sediments of the Padthaway formation. Groundwater tables are within two metres of the surface. **NZA** Level plain with 0-10% sandy rises **NZG** Drainage depression **NZP** Plains with 20-30% swamps and 0-10% sandy rises **NZd** Plains with 0-10% saline swamps and 0-10% sandy rises **NZe** Plains with 0-10% saline swamps and 0-10% mixed rises **NZk** Plains with 10-50% saline swamps with 0-10% sandy rises **NZl** Plains with 20-30% saline swamps, 20-30% stony rises and 0-10% sandy rises **NZp** Plains with 20-30% sandy rises and 0-10% saline swamps **NZr** Plains with 20-30% saline swamps, 20-30% stony rises and 0-10% sandy rises **NZs** Plains with 20-30% saline swamps and 0-10% sandy rises Main soils: sand over poorly structured clay - **G4** (M), thick sand over clay - **G3** (M), sand over shallow dark clay loam on limestone - **B5**, deep friable gradational clay loam - **M2** and saline soil - **N2** (D). These soils are of moderate to shallow depth, moderately low to moderate fertility and moderate to moderately low waterholding capacity. There is a slight to high limitation to root growth due to the dispersive subsoil clays. Drainage is imperfect to very poor, and the watertable can be above the surface for up to 3 months. Salinity levels vary from slight (subsoil) to moderately high due to rising saline groundwater tables. These flats have low productive potential unless sown to salt and waterlogging tolerant pasture species. Swampy soils: deep hard gradational sandy loam - **M4**, sandy loam over poorly structured brown or dark clay - **F2**, grey cracking clay - **E3** and saline soil - **N2**. These soils are deep with moderate to moderately low fertility and high waterholding capacity. There is a high to severe limitation to root growth due to the dispersive subsoil clays. Drainage is poor to very poor. Salinity levels vary from slight (subsoil) to moderately high due to rising groundwater tables. Sandy soils on the rising ground: bleached siliceous sand - **H3** (L), sand grading to sandy clay loam - **G2** (L), thick sand over clay - **G3** (M), sand over acidic clay - **G5** and wet highly leached sand - **I2**. These soils are deep with low fertility, moderate waterholding capacity and imperfectly drained. Moderate water repellence and the susceptibility to wind erosion are limitations. Stony soils on rising ground: shallow calcareous loam on calcrete - **B2**, shallow red loam on limestone - **B4** and **B5**. These rises are shallow to very shallow with moderate fertility and low waterholding capacity. Drainage is imperfect.

Nad	2.52	Flat shallow plain with less than 10% low sandy rises. Main soils: calcareous clay loam on marl - **A7**, shallow dark clay loam on limestone - **B5** and shallow calcareous loam on calcrete - **B2**. These soils are deep to moderately deep with moderate fertility and high waterholding capacity. Drainage is imperfect and salinity levels are moderately-high to high due to rising groundwater tables. Surface rockiness may be a slight limitation. Sandy rise soils: shallow sand on calcrete - **B8** (M) and limestone outcrop - **RR** (M). These rises are very shallow with moderately low fertility and very low waterholding capacity. Drainage is rapid and surface rockiness is a limitation.
NkD	0.46	Flat plains with 20-30% swamps and 10-20% sandy rises formed on calcreted sediments of the Padthaway formation. Main plain soils: shallow sand over clay on calcrete - **B7** and sand over poorly structured clay - **G4**. Soils are shallow with moderate to moderately low fertility and waterholding capacity. Drainage is imperfect and there is a moderate limitation to root growth due to the dispersive subsoil clays. Swampy soils: shallow dark clay loam on limestone - **B5**, deep friable gradational clay loam - **M2**, wet soil - **N3** (D) and **G4**. Soils moderately deep with high fertility and moderate waterholding capacity. Drainage is poor and there is a slight limitation to root growth due to the dispersive subsoil clays. Sandy soils: thick sand over clay - **G3**, highly leached sand - **I1**, bleached siliceous sand - **H3**, wet highly leached sand - **I2** and shallow sand over clay on calcrete - **B7**. These soils are deep with moderately low to low fertility, moderate waterholding capacity and are well drained. There is a nil to slight limitation to root growth due to the dispersive subsoil clays. Water repellence, soil acidity and the susceptibility to wind erosion are limitations.
NlA NlB NlG NlM Nlf	5.61 0.15 01.0 2.34 1.19	Plains with 20-30% stony rises and depressions. **NlA** Level plain **NlB** Stony plains **NlG** Drainage depression **NlM** Plain with 20-30% stony rises **Nlf** Plains with 20-30% swamps Main plain soils: grey cracking clay - **E3**, black cracking clay - **E1**, shallow dark clay loam on limestone - **B5** (E), gradational dark clay loam - **C5**, calcareous clay loam on marl - **A7**, limestone outcrop - **RR** and wet soil - **N3**. These soils are shallow to deep, have high fertility and high to low waterholding capacity depending on the depth of the soil. Surface rockiness will be a management limitation on the stony plains. Drainage is imperfect and poor in the depressions. Salinity levels are slight (subsoil) to moderately high. Stony rise soils: shallow calcareous loam on calcrete - **B2** and shallow dark clay loam on limestone - **B5**. These soils are very shallow, have moderate fertility, very low waterholding capacity and are well drained. Surface rockiness will be a management problem.
NmK Nme	0.30 0.07	Plains with occasional swamps and saline swamps and minor mixed low rises **NmK** Plains with 10% swamps and 0-10% sandy rises **Nme** Plains with 20-30% saline swamps and 0-10% mixed rises Plain soils: shallow sand over clay on calcrete - **B7**, shallow dark clay loam on limestone - **B5** (E) and saline soil - **N2**. The soils are shallow to moderately deep with moderately low fertility and moderate to moderately low waterholding capacity. Drainage is imperfect to poor. There is a high limitation to root growth due to the dispersive subsoil clays. Salinity levels vary from moderate to high due to rising groundwater tables. Stony soils on the rising ground: shallow calcareous loam on calcrete - **B2**, shallow red loam on limestone - **B4** and shallow dark clay loam on limestone - **B5**. These rises are shallow to very shallow with moderate fertility and low waterholding capacity. Drainage is imperfect. Sandy soils on the rising ground: bleached siliceous sand - **H3** (L), sand grading to sandy clay loam - **G2** (L), thick sand over clay - **G3** (M) and sand over poorly structured clay – **G4**. These soils are deep with moderately low fertility, moderate waterholding capacity and imperfectly drained. Moderate water repellence, soil acidity and the susceptibility to wind erosion are limitations.
NnA NnD NnG NnV	1.59 0.61 0.83 0.87	Flat plains with 20-30% swamps, 30-60% stony rises and 0-10% sandy rises formed on calcreted sediments of the Padthaway formation. **NnA** Level plain **NnD** Plains with 0-10% sandy rises

		NnG Drainage depression **NnV** Plain with 30-60% stony rises, 20-30% sandy rises and 20-30% swamps Main soils on plains and non-swampy depressions: shallow dark clay loam on limestone - **B5**, thick sand over clay - **G3**, gradational dark clay loam - **C5** and shallow clay loam over brown or dark clay on calcrete - **B9**. Main soils of sandy rises: thick sand over clay - **G3** and wet highly leached sand - **I2**. Stony rises: shallow dark clay loam on limestone - **B5**, shallow loam over red-brown clay on calcrete - **B6** and shallow red loam on limestone - **B4**. Swamps soils: wet soil - **N3** (M), grey cracking clay - **E3** and deep hard gradational sandy loam - **M4**. These soils are shallow, have high fertility and moderately low waterholding capacity. Drainage on the plains is imperfect and very poor in the swamps. Salinity levels are slight (subsoil) to moderate due to the rising groundwater tables.
Nsa	0.03	Low lying saline area. Main soils: thick sand over clay - **G3**, wet soil - **N3** , saline soil - **N2** , wet highly leached sand - **I2** and shallow dark clay loam on limestone - **B5**. These soils are deep with moderately low fertility and high waterholding capacity. Drainage is poor to well drained. Salinity is moderately high. There is a slight limitation to root growth due to the dispersive subsoil clays.
NxA NxF NxU	2.17 8.04 0.32	Shallow plains that are formed on calcreted sediments of the Padthaway Formation. There is a mixture of plains with and without surface stone, up to 40 % stony rises and up to 25% swamps. **NxA** Level plain **NxF** Plains with 20-30% swamps **NxU** Plains with 20-30% swamps and 20-30% stony rises. Main soils: shallow calcareous loam on calcrete - **B2** (V), shallow dark clay loam on limestone - **B5** (E), calcareous clay loam on marl - **A7**, limestone outcrop - **RR**, shallow sand over clay on calcrete - **B7**, shallow clay loam over brown or dark clay on calcrete - **B9** and wet soil - **N3** (M). These soils are shallow, have high fertility and moderately low waterholding capacity. Drainage on the plains is imperfect and very poor in the swamps. Salinity levels are slight (subsoil) to moderate due to the rising groundwater tables. Lunettes are shallow stony rises: shallow sandy loam on calcrete - **B3** and shallow loam over red-brown clay on calcrete - **B6**. There is moderate fertility and low waterholding capacity. Drainage is rapid.
Nyk	0.25	Flat plains with 10-50% saline swamps and 0-10% sandy rises formed on calcreted sediments of the Padthaway formation. Main soils: shallow dark clay loam on limestone - **B5**, wet soil - **N3**, grey cracking clay – **E3**, thick sand over clay - **G3**, bleached siliceous sand - **H3** and sand over poorly structured clay – **G4**. These plain and swamp soils are moderately deep, have high fertility and moderate waterholding capacity and are imperfectly to poorly drained. There is a slight to moderate limitation to root growth due to the dispersive subsoil clays. Salinity levels vary from nil to moderately high due to rising groundwater tables. The minor sandy rises are deep with moderately low fertility, moderate waterholding capacity and slightly imperfectly drained. Moderate water repellence and the susceptibility to wind erosion are limitations.
NzF	1.82	Plain with minor swamps. Main soils: thick sand over clay - **G3**, shallow dark clay loam on limestone - **B5**, wet soil - **N3**, deep hard gradational sandy loam - **M4** and grey cracking clay - **E3**. These soils are moderately deep to deep with high fertility and moderate to high waterholding capacity. Drainage is imperfect and the swamps are very poorly drained (water filled for greater than 3-10 months). There is a slight limitation to root growth due to the dispersive subsoil clays.

OFC OFD OFS	0.01 0.17 0.04	Isolated dune rises formed on calcreted calcarenite of ancient coastal dunes within the interdunal corridor. **OFC** Dunes with greater than 90% sand dune coverage **OFD** Low dunes with greater than 90% sand dune coverage **OFS** Dunes with 60-90% sand dune coverage and 10-20% saline swales Main soils: highly leached sand - **I1**, wet highly leached sand - **I2**, bleached siliceous sand - **H3**, sand grading to sandy clay loam - **G2** (L), thick sand over clay - **G3**, sand over acidic clay - **G5**, shallow sand over clay on calcrete - **B7** (M), shallow sand on calcrete - **B8** (M), shallow sandy loam on calcrete - **B3** (M), wet soil - **N3** (M), and saline soil - **N2** (M). The sandy soils are deep with low fertility, moderate waterholding capacity and rapid drainage. Severe water repellence, soil acidity and the susceptibility to wind erosion are limitations. The swale soils are deep with moderate fertility, high waterholding capacity and poor drainage. There is a slight limitation to root growth due to the poorly structured subsoil clays. Salinity levels are moderately high to high. Productivity potential is reduced on this land as salt tolerant species are evident. The stony soils are very shallow and/or stony and have moderately low to low waterholding capacity and fertility.
OHC	0.05	Isolated dune rises formed on calcreted calcarenite of ancient coastal dunes within the interdunal corridor. There are minor stony rises within the dunes with over 90% sand dune coverage. Main soils: highly leached sand - **I1** (E), bleached siliceous sand - **H3** , shallow loam over red-brown clay on calcrete - **B6** , shallow sandy loam on calcrete - **B3** (M) and limestone outcrop - **RR** . The sandy soils are deep with low fertility, moderate waterholding capacity and rapid drainage. Severe water repellence and the susceptibility to wind erosion are limitations. The stony soils are shallow and stony, with moderately low fertility and very low waterholding capacity. Drainage is rapid. Rockiness is a slight limitation.
Xl-	0.21	Fresh water lakes
Xq- XqC XqD	0.06 0.01 0.04	Fresh to marginally saline swamps, at least seasonally inundated. **Xq-** Seasonally inundated swamp **XqC** Swamp **XqD** Marginally saline swamp Main soils: peat - **N1**, wet soil - **N3**, deep friable gradational clay loam - **M2**, and thick sand over clay - **G3**. Soils are deep with low fertility and high waterholding capacity. Drainage is poor. Swamps are underwater for greater than 3 months. The saline swamps have moderately high to high salinity.
XuF XuX Xuf Xul	0.20 0.51 0.04 0.10	Non-saline wet swamps. **XuF** Marginally saline swamp **XuX** Swampy and marginally saline drainage depression **Xuf** Swamp with 20-30% stony rises **Xul** Marginally saline swamp with 20-30% stony rises Main soils: wet soil - **N3** (V), peat - **N1** and saline soil - **N2**. These soils are deep, have high fertility and high waterholding capacity. Drainage is very poor. The swamps are underwater for greater than 3 months. Some swamps have moderate to moderately high salinity. Shallow stony soils: shallow calcareous loam on calcrete - **B2** (M), shallow sandy loam on calcrete - **B3** (M) and shallow dark clay loam on limestone - **B5** (M). These soils are semi-arable as they are very shallow and very stony. They have moderately low fertility, very low waterholding capacity and they are well drained. They have very little elevation.
XwC Xwl	0.17 0.07	Wetland of variable salinity **XwC** Swamp **Xwl** Marginally saline swamp with 20-30% stony rises Main soils: wet soil - **N3** (V), saline soil - **N2** and sand grading to sandy clay loam - **G2**. These soils are deep, have high fertility and high waterholding capacity. Drainage is very poor. The swamps are underwater for greater than 3 months. Shallow stony soils: shallow calcareous loam on calcrete - **B2** (M), shallow sandy loam on calcrete - **B3** (M) and shallow dark clay loam on limestone - **B5** (M). These soils are semi-arable as they are very shallow and very stony. They have moderately low fertility, very low waterholding capacity and they are well drained. They have very little elevation.

ZD-	0.26	Salt lakes that are seasonally or usually filled formed on calcareous clays and marls. Main soil: saline soil - **N2** (D) which is deep, poor fertility and high waterholding capacity. Salinity levels are very high and the watertable is at the surface for 3-10 months. The swamps are too saline for any production other than opportunistic light grazing, but protection of halophytic vegetation must be considered. Occasional low lunettes with soils: gradational calcareous clay loam - **A6** (M), shallow calcareous loam on calcrete - **B2** (M) and shallow dark clay loam on limestone - **B5** (M). This soil is very shallow to moderately deep, have moderate fertility and low waterholding capacity. The soils are calcareous throughout and rockiness may be a restriction with up to 50% rock. Salinity may pose problems on really low rises with levels up to moderately high.
ZK- ZnL ZnP Znj Znl	1.2 5.6 5.2 2.6 0.3	Flats formed on Padthaway Formation sediments, with shallow saline ground water tables. There are varying proportions of swampy depressions and low calcarenite rises. **ZK-** Complex of seasonally inundated swamps, better drained flats and low stony rises in approximately equal proportions. Up to 50% lunettes Main soils: saline soil - **N2** (L), wet soil - **N3** (L), deep hard gradational sandy loam - **M4** (L) and calcareous clay loam on marl - **A7** (M). The flats and swamps are moderate to deep, have moderately low fertility, moderate to high waterholding capacity and are poor to very poorly drained. There is a moderate limitation to root growth due to dispersive subsoil clays. Salinity is high due to the water table seasonally above the surface for over 3 months. Salt tolerant species is evident and production from the swamps is only from opportunistic light grazing. Lunette soils: shallow sand on calcrete - **B8** (L), shallow clay loam over brown or dark clay on calcrete - **B9** (L), shallow calcareous loam on calcrete - **B2** (M) and shallow sandy loam on calcrete - **B3** (M). The soils are shallow to very shallow, have moderately low to low waterholding capacity, moderate fertility and are well drained. There is a slight to moderate limitation due to rockiness in some areas and the possibility of water repellence on the sandy surfaces. **ZnL** Complex of wet flats (40%), better drained flats (40%) and stony rises (20%). **ZnP** Highly saline wet flats, with minor better drained areas. **Znj** Marginally saline flats with about 20% swamps. **Znl** Flats with about 35% low stony rises and about 25% extensive swamps. Main soils: sand over poorly structured clay - **G4**, sand over wet clay on calcrete - **B7/N2** and calcareous loam - **A7** on better drained and marginally saline flats, with saline clay over sand - **N2a**, wet highly saline calcareous loam - **N2b** and sand over wet saline clay - **N2/G4** in swampy depressions. Loamy sand over sandy clay loam on calcrete - **B3** and shallow calcareous loamy sand on calcrete - **B2** occur on stony rises. Key properties: Drainage: Imperfect to very poor (except stony rises). Fertility: Moderately low. Physical condition: No surface limitations, but some subsoils are dispersive and restrict root growth. AWHC: Moderate. Salinity: Moderately high to very high. Erosion potential Water: Low. Wind: Moderately low to low. Water repellence: Low. Rockiness: Nil (except on stony rises). Summary: These flats have low productive potential unless sown to salt and waterlogging tolerant pasture species. Most of the land is too saline for conventional grasses and clovers.
ZO-	0.06	Swamp that is slightly saline and the water table is seasonally above the surface for over 3 months. Main soils: shallow dark clay loam on limestone - **B5** (E), shallow clay loam over brown or dark clay on calcrete - **B9** (E) and shallow sand over clay on calcrete - **B7** (L). These soils are shallow with moderately low to low fertility, high waterholding capacity and are very poorly drained. Salinity levels are high to very high due to rising groundwater tables.
ZQ- ZQC	0.20 0.05	Marginally saline swamps formed on calcareous clays and marls. Main soils: wet soil - **N3** (E), saline soil - **N2** (E) and calcareous clay loam on marl - **A7** (E). These soils are deep, have moderately low fertility, high waterholding capacity and poor to very poor drainage. There is a slight to moderate limitation to root growth due to the dispersive subsoil clays. Salinity is high due to the water table seasonally above the surface for over 3 months. Salt tolerant species is evident and production from the swamps is only from opportunistic light grazing,

ZR-	0.13	Lagoonal depression that is saline. Main soils: saline soil - **N2** (E), calcareous clay loam on marl - **A7** (E) and shallow dark clay loam on limestone - **B5** (L). These soils are moderately deep to deep, have very low fertility and high waterholding capacity. Drainage is very poor. There is a high limitation to root growth due to the dispersive subsoil clays. Salinity is high to very high due to the water table seasonally above the surface for over 3 months. Salt tolerant species is evident and production from the swamps is only from opportunistic light grazing,
ZS-	1.42	Saline swamps formed on calcareous clays and marls. Main soils: saline soil - **N2** (D). These soils are very poorly drained with high to extreme salinity and are seasonally inundated. These are natural features, representing the lowest points in the local landscape. They are seasonally inundated. Vegetation is commonly a reflection of the level of salinity. Cutting grass is common on moderately saline land, tea tree and samphire on highly saline land, while extremely saline land is usually bare. The swamps are too saline for any production other than opportunistic light grazing, but protection of halophytic vegetation must be considered.
ZnL ZnP Znj Znl	5.65 5.23 2.57 0.27	Flat plains with up to 10% low stony and sandy rises formed on clayey and limestone sediments of the Padthaway Formation. The low-lying ground tends to be swampy and is seasonally waterlogged and affected by saline groundwater tables. **Znj** and **Znl** is land where salinity is higher and which is subject to inundation in wet years. **ZnL** Plains with 10-50% swamps and 0-10% mixed rises (stony and sandy) **ZnP** Plains with 0-10% swamps and 10-30% sandy rises **Znj** Plains with 10-50% saline swamps and 0-10% stony rises **Znl** Plains with 10-50% saline swamps and 0-10% mixed rises (stony and sandy). Main soils: sand over clay - **G4** (E), saline soil - **N2** (E), shallow sandy loam on calcrete - **B3** (L), shallow sand over clay on calcrete - **B7** (L), bleached siliceous sand - **H3** (M), sand grading to sandy clay loam - **G2** (M) and thick sand over clay - **G3** (M). These flats are deep, have moderate to high waterholding capacity and have moderately low to very low fertility. Drainage is imperfect to poor. There is a moderate to high limitation to root growth due to the dispersive subsoil clays. Salinity levels are high to very high due to rising groundwater tables. The flats require salt tolerant species for productive pasture growth (ie clovers and conventional perennial grasses will not persist on most of this land). The rising ground is not affected by salt. The stony rise soils are shallow and stony, have moderately low fertility and waterholding capacity and are well drained. The sandy rise soils are deep with low fertility, moderate waterholding capacity and rapid drainage. Severe water repellence and the susceptibility to wind erosion are limitations for pasture and crop growth.
Zpd Zpe Zpf Zpk Zpl	0.15 0.63 0.61 0.79 0.41	Flats formed on Padthaway Formation sediments, generally affected by groundwater tables. Groundwater tables are often within two metres of the surface. There are varying proportions of swampy depressions and low sandy and calcarenite rises. **Zpa** Plains with 0-10% swamps **Zpd** Plains with 0-10% saline swamps with 0-10% sandy rises **Zpe** Plains with 0-10% saline swamps and 0-10% mixed rises **Zpf** Plains with 10-50% saline swamps **Zpk** Plains with 10-50% saline swamps and 0-10% sandy rises **Zpl** Plains with 10-50% saline swamps and 0-10% mixed rises Main soils: sand over poorly structured clay - **G4** (E) and saline soil - **N2** (E). These soils are deep, moderate to high waterholding capacity and have moderately low to very low fertility. Drainage is imperfect to very poorly drained. There is a moderate to high limitation to root growth due to the dispersive subsoil clays. Salinity levels are high to very high due to rising groundwater tables. Minor deep sandy soils: bleached siliceous sand - **H3** (M); sand grading to sandy clay loam - **G2** (M). These soils are deep with low fertility, moderate waterholding capacity and rapid drainage. Severe water repellence and the susceptibility to wind erosion are limitations for pasture and crop growth. Minor stony soils: shallow sandy loam on calcrete - **B3** (M); shallow sand over clay on calcrete - **B7** (M). Soils are shallow and stony, have moderately low fertility and waterholding capacity and are well drained.

Zr-	0.04	Saline flat that includes shallow heavy soils over calcrete and deeper swampy soils. Groundwater tables are often within two metres of the surface. Main soils: saline soil - **N2** (V), shallow dark clay loam on limestone - **B5** (L) and wet soil - **N3** (L). These soils are moderately deep to deep, have moderate to high fertility and high waterholding capacity. Drainage is very poor. Salinity levels are very high due to rising groundwater tables.
Zsk Zss Zsv	1.91 0.03 4.53	Closed depression within the undulating rises to rolling hills formed on calcreted calcarenite. Groundwater tables are often within two metres of the surface. There are varying proportions of swampy depressions **Zsf** Plains with 10-50% saline swamps **Zsk** Plains with 10-50% saline swamps and 0-10% sandy rises **Zsv** Plains with 10-50% swamps and greater than 10% mixed rises Main soils: sand over poorly structured clay - **G4** (E) and saline soil - **N2** (E). These soils are deep, have moderate to high waterholding capacity and moderately low to low fertility. Drainage is imperfect to very poorly drained. There is a moderate to high limitation to root growth due to the dispersive subsoil clays. Salinity levels are high to very high due to rising groundwater tables. Minor deep sandy soils: bleached siliceous sand - **H3** (M), sand grading to sandy clay loam - **G2** (M) and thick sand over clay - **G3** (M). These soils are deep with low fertility, moderate waterholding capacity and rapid drainage. Severe water repellence and the susceptibility to wind erosion are limitations for pasture and crop growth. Minor stony soils: shallow sandy loam on calcrete - **B3** (M) and shallow sand over clay on calcrete - **B7** (M). These soils are shallow and stony, have moderately low fertility and waterholding capacity and are well drained.
Zy-	0.15	Complex of peaty swamps, samphire flats, salt pans and lunettes. Main swampy soils: saline soil **- N2**, wet soil - **N3**, deep hard gradational sandy loam - **M4** and calcareous clay loam on marl - **A7**. These soils are deep, have high fertility and waterholding capacity. Drainage is very poor. Salinity levels are high due to rising groundwater tables. There is a slight limitation to root growth due to the dispersive subsoil clays. Lunette soils: shallow dark clay loam on limestone - **B5** (M), shallow clay loam over brown or dark clay on calcrete B9, shallow calcareous loam on calcrete - **B2** (M) and shallow sandy loam on calcrete - **B3** (M). These soils are non-arable as they are very shallow and/or stony. They have moderately low to moderate fertility, low waterholding capacity and have very little elevation. Low lowing areas within these lunettes may be affected by rising groundwater tables.

PROPORTION codes assigned to Soil Landscape Unit (SLU) components:

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:

(In alphabetic order)

A7 Calcareous loam (Calcarosol over Sodosol)
Medium thickness black calcareous loam to clay loam (often shelly), overlying a bleached sand abruptly overlying a grey and brown mottled sandy clay loam to clay within 100 cm.

A8 Gypseous calcareous loam (Gypseous Calcarosol)
Calcareous soil with a Gypsic horizon) (>20% visual gypsum in a horizon which is at least 10cm thick). Found on lunettes, flats, etc.

B2 Shallow calcareous loamy sand on calcrete (Petrocalcic Calcarosol)
Medium thickness calcareous loamy sand with variable rubble overlying calcreted calcarenite within 50 cm.

B3 Loamy sand over sandy clay loam on calcrete (Petrocalcic, Brown Kandosol / Petrocalcic, Leptic Tenosol)
Medium to thick loamy sand with a bleached A2 layer, sometimes with a thin brown friable light sandy clay loam subsoil, over calcreted calcarenite.

B4 Red sandy loam over calcrete (Petrocalcic, Red Dermosol)
Medium thickness red sandy loam grading to friable red clay loam over calcreted calcarenite within 50 cm - rises.

B5 Shallow dark clay loam on limestone (Petrocalcic, Black Dermosol)
Black clay loam to light clay over calcreted limestone at shallow depth, grading to highly calcareous clay - flats.

B6 Shallow sandy loam over red-brown clay on calcrete (Petrocalcic, Red Kandosol)
Medium thickness sandy loam with slight ironstone gravel overlying a weakly structured reddish brown sandy clay on calcarenite within 50 cm - rises.

B7 Sand over friable brown clay on calcrete (Petrocalcic, Brown Chromosol)
Medium thickness sand overlying brownish friable clay on limestone or calcreted sandy clay within 50 cm.

B7/N2 Sand over wet clay on calcrete (Petrocalcic, Brown Sodosol / 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 moderately saline water table at depth.

B8 Shallow sand on calcrete (Petrocalcic, Bleached-Leptic Tenosol)
Thick bleached sand over calcreted calcarenite within 50 cm - rises.

B9 Shallow clay loam over brown or dark clay on calcrete (Clay loamy Petrocalcic Sodosol)

C5 Gradational dark clay loam (Calcic-Hypercalcic Brown-Grey-Black Dermosol-Calcarosol)
Dark clay loam over abundant 'soft lime'. >10% carbonate is the cut off between this and M2 soils.

E1 Black cracking clay (Black Vertosol)

E3 Brown or grey cracking clay (Brown-Grey Vertosol)

F2 Sandy loam over poorly structured brown or dark clay (Brown-Dark Sodosol-Chromosol)
Topsoil <30 cm over a poorly structured subsoil. Loamy, often sandy loam, to clay loamy texture contrast soil with a sodic/dispersive/poorly structured brown clayey subsoil. Often sandy loam, usually with a bleached horizon, and thin topsoil over a poorly structured B.

G2 Sand grading to sandy clay loam (Mesotrophic, Yellow Kandosol)
Grey sand with a thick bleached A2 layer, over a yellow and red friable massive sandy clay loam.

G3 Thick sand over clay (Hypercalcic, Brown Sodosol/ Chromosol)
Thick bleached sand with an organically darkened surface abruptly overlying a massive to coarsely structured brown to reddish yellow sandy clay to clay, calcareous with depth - rises.

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

G5 Sand over acidic clay (Sandy Brown Kurosol)
Sandy texture contrast soil with a friable brown strongly acidic clayey to clay loamy subsoil. Very acidic soil; incipient Bh horizons; moderate depth topsoils. Some with ironstone.

H3 Deep bleached sand (Basic, Arenic, Bleached-Orthic Tenosol)
Grey sand with a thick to very thick bleached A2 layer, over yellow sand continuing below 100 cm.

I1 Highly leached sand (Fragic, Pipey, Aeric Podosol)
Grey sand with a very thick bleached A2 layer, over dark brown and yellow massive soft to semi-hard clayey sand (coffee rock), grading to softer yellow and brown sand to sandy clay loam from about 80 cm.

I2 Wet highly leached sand (Fragic, Humic, Aquic Podosol)
Grey sand with a thick bleached A2 horizon, overlying a thin to thick layer of coffee rock, grading to pale brown sand sharply overlying a grey, brown and yellow mottled sandy clay loam to light clay.

L1 Shallow stony loam (Paralithic, Leptic Tenosol)
Shallow stony loam, often calcareous throughout or with depth, overlying weathering rock shallower than 50 cm.

M2 Deep friable gradational clay loam (Red-Brown-Grey- Black Dermosol)
Deep well structured red clay loamy soil.

M4 Deep hard gradational sandy loam (Hard Brown-Dark Kandosol- Dermosol)
Deep dark brown loamy to clay loamy soil grading to clay at depth. Hardsetting surface often with prismatic structures in the subsoil.

N1 Peat (Organosol)
Peaty soil.

N2a Wet highly saline grey clay (Dermosolic, Hypersalic Hydrosol)
Medium thickness dark grey to black clay loam to clay grading to a well structured dark grey clay with minor carbonates and a water table within 100 cm.

N2b Wet highly saline calcareous loam (Calcarosolic, Hypersalic Hydrosol)
Grey very highly calcareous loam grading to a pale grey clay loam over a white very highly calcareous silty clay loam by about 30 cm, with a water table within 100 cm.

N2/G4 Sand over wet saline clay (Sodosolic, Hypersalic Hydrosol)
Medium thickness loamy sand abruptly overlying a grey and yellow brown mottled clay (seasonally saturated), with massive to rubbly carbonate at depth and a saline water table within 100 cm.

N3 Seasonally waterlogged, non to marginally saline equivalents of soils listed above, viz.:
N3c Wet **G3**
N3d Wet **B5**
N3e Wet **B7**

RR Bare rock.

WW Water.

(Grouped on landscape position)

Sandy soils (dunes, rises and flats)

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

G2 Bleached sand grading to sandy clay loam (Sandy 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

G3 Thick sand over clay (Mesotrophic, Mesonatric, Brown Chromosol/Sodosol)
Thick to very thick sand with a pale sand layer directly overlying a brownish clay

G4 Sand over poorly structured clay (Mesonatric, Brown/Grey Sodosol)
Thick organically stained sandy surface overlying a pale sand layer overlying a brown poorly structured clay on limestone or calcrete usually within 100 cm.

G5 Sand over acidic clay (Sandy Brown Kurosol)
Sandy texture contrast soil with a friable brown strongly acidic clayey to clay loamy subsoil. Very acidic soil; incipient Bh horizons; moderate depth topsoils. Some with ironstone.

I1 Highly leached sand (Humeosesquic Aeric Podosol)
Organically darkened sand to loamy sand grading to greyish sand overlying dark sands with organic-aluminium compounds.

I2 Wet highly leached sand (Fragic, Humic, Aquic Podosol)
Grey sand with a thick bleached A2 horizon, overlying a thin to thick layer of coffee rock, grading to pale brown sand sharply overlying a grey, brown and yellow mottled sandy clay loam to light clay.

Stony soils (rises and plains)

B2 Shallow calcareous loamy sand on calcrete (Petrocalcic Calcarosol)
Medium thickness calcareous loamy sand with variable rubble overlying calcreted calcarenite within 50 cm.

B3 Shallow sandy loam on calcrete (Petrocalcic, Orthic Tenosol)
Loamy sand to loam with variable rubble and slight clay increase with depth overlying calcreted calcarenite shallower than 50 cm. Extensive on stony rises.

B4 Red sandy loam over calcrete (Petrocalcic, Red Dermosol)
Medium thickness red sandy loam grading to friable red clay loam over calcreted calcarenite within 50 cm - rises.

B5 Shallow dark clay loam on limestone (Petrocalcic, Black Dermosol)
Black clay loam to light clay over calcreted limestone at shallow depth, grading to highly calcareous clay - flats.

B6 Shallow sandy loam over red-brown clay on calcrete (Petrocalcic, Red Kandosol)
Medium thickness sandy loam with slight ironstone gravel overlying a weakly structured reddish brown sandy clay on calcarenite within 50 cm - rises.

B7 Shallow sand over clay on calcrete (Petrocalcic, Yellow/Brown Chromosol)
Medium thickness sand overlying yellow friable clay on limestone or calcreted sandy clay within 50 cm.

B8 Shallow sand on calcrete (Bleached-Leptic Tenosol)
Thick bleached sand over calcarenite.

B9 Shallow clay loam over brown or dark clay on calcrete. Clay loamy Petrocalcic Sodosol.

L1 Shallow soil on rock (Gritty Red Kandosol)
Variable thickness gritty red loamy sand to sandy loam, becoming more clayey with depth over weathering rock.

RR Limestone outcrop

Heavy soils

E1 Black cracking clay (Black Vertosol)

E3 Brown or grey cracking clay (Brown-Grey Vertosol)

F2 Sandy loam over poorly structured brown or dark clay (Brown-Dark Sodosol-Chromosol)
Topsoil <30 cm over a poorly structured subsoil. Loamy, often sandy loam, to clay loamy texture contrast soil with a sodic/dispersive/poorly structured brown clayey subsoil. Often sandy loam, usually with a bleached horizon, and thin topsoil over a poorly structured B.

M2 Deep friable gradational clay loam (Red-Brown-Grey- Black Dermosol)
Deep well structured red clay loamy soil.

M4 Deep hard gradational sandy loam (Hard Brown-Dark Kandosol- Dermosol)
Deep dark brown loamy to clay loamy soil grading to clay at depth. Hardsetting surface often with prismatic structures in the subsoil.

Other soils

N1 Peat (Organosol)
Peaty soil.

N2 Saline soil (Calcarosolic, Hypersalic Hydrosol)
Grey very highly calcareous loam grading to a pale grey clay loam over a white very highly calcareous silty clay loam by about 30 cm, with a water table within 100 cm.

N3 Seasonally waterlogged, non to marginally saline equivalents of soils listed above, viz.:

- **N3c** Wet **G3**
- **N3d** Wet **B5**
- **N3e** Wet **B7**

A7 Calcareous loam (Calcarosol over Sodosol)
Medium thickness black calcareous loam to clay loam (often shelly), overlying a bleached sand abruptly overlying a grey and brown mottled sandy clay loam to clay within 100 cm.

A8 Gypseous calcareous loam (Gypseous Calcarosol)
Calcareous soil with a Gypsic horizon) (>20% visual gypsum in a horizon which is at least 10cm thick). Found on lunettes, flats, etc.

C5 Gradational dark clay loam (Calcic-Hypercalcic Brown-Grey-Black Dermosol-Calcarosol)
Dark clay loam over abundant 'soft lime'. >10% carbonate is the cut off between this and M2 soils.

Further information: DEWNR Soil and Land Program