BRA Bradbury Land System

Moderately steep to steep rough hills in the Mylor - Ironbank - Mount Bold area

Area: 64.1 km^2

Annual rainfall: 740 – 1,050 mm average

Geology: The land is formed on massive coarse to medium grained Aldgate Sandstone, with interbedded siltstones. There are minor outcrops of Balhannah Shale. There are occasional lateritic remnants, but most of the deep weathering mantle which at one time blanketed these rocks has been largely eroded away. Deposits of locally derived coarse grained alluvium are minor in overall extent.

Topography: The Bradbury Land System encompasses a massive outcrop of Aldgate Sandstone which has been strongly dissected by the Onkaparinga River and its tributaries to form a landscape of rounded low hills and hills with moderately steep to steep slopes dropping into narrow gullies. In the east the landscape is more subdued, with a greater proportion of rolling low hills and valley flats (largely associated with the Onkaparinga), but west of Mylor the landscape is dominated by steeper and higher hills.

Elevation: 250 m at Mount Bold Reservoir in the south to 500 m in the north-west

Relief: Up to 140 m but usually less than 100 m

Soils: The predominant soils are shallow to moderately deep gritty sandy loams, often with sandy clay subsoils, and moderately to very stony. There is a range of minor soils, mostly sandy to sandy loam soils formed on alluvium of lower slopes and valley flats. There are very minor loamy and ironstone soils on hillslopes.

Main soils

Soils formed on weathering basement rock

K4 Acidic sandy loam over brown clay
K5a Acidic gradational loamy sand
L1a Shallow sandy loam

Minor soils

Soils formed on weathering basement rock

K1 Acidic gradational brown loam
K5b Acidic gradational sandy loam
L1b Shallow stony loamy sand

Ironstone soils

J2 Deep acidic sandy loam ironstone soil

Soils formed on alluvium or deeply weathered rock

F1a Sandy loam over brown sandy clay loam on sandy alluvium
F1b Sandy loam over brown sandy clay on clayey alluvium
F1c Sandy loam over brown sandy clay on deeply weathered rock
M1a Deep sandy loam
M1b Deep gradational sandy loam
H3 Bleached siliceous sand

Main features: The Bradbury Land System is characterized by moderately steep to steep rounded hills with shallow to moderately deep sandy and stony soils. Over half of the land is too steep for any form of agriculture or horticulture. About 40% is undulating to moderately steep, and although the soils are commonly shallow, infertile and acidic, they are well drained and well structured, so there is potential for a range of horticultural and floricultural crops. This potential is enhanced by the good quality groundwater typical of the Aldgate Sandstone aquifers. The soils are highly erodible, so any developments must entail high levels of soil conservation management.

Soil Landscape Unit summary: 14 Soil Landscape Units (SLUs) mapped in the Bradbury Land System:

SLU	% of area	Main features #
AbC	0.8	Moderately steep to very steep hills formed on shales, siltstones, fine sandstones and minor quartzites and dolomites. Slopes range from 18% to 90%, but are usually less than 75%. Relief varies from about 30 metres on some low hills to 200 metres. Crests and drainage depressions are narrow in the steeper country, but are broader where the slopes and relief are more subdued. **AbC** Rolling low hills and moderate hillslopes with relief to 80 m and slopes of 18-30%. The soils are predominantly loamy with brown to yellow subsoil clays forming in weathering rock. On steeper slopes, soils are shallow on rock, while on lower slopes, clay subsoils are thick with rock deeper than a metre. Main soils: Acidic gradational brown loam - **K1a** (E-C) Acidic loam over red clay - **K2a** (L) Shallow stony loam - **L1a** (L-C) on steeper slopes Acidic gradational brown loam on kaolinized rock - **K1c** (L) on upper slopes Loam over brown clay - **F1a** (L) on highly weathered rock on lower slopes This land is all non arable, but the less steep slopes of **AbC**, with moderately deep, well drained and reasonably fertile soils, are ideal for perennial horticulture. The main limitations are potential for erosion during establishment and soil acidity.
AuC AuD AuU AuZ	29.6 51.9 0.2 4.7	Rolling to steep low hills, upper slopes and broad rounded crests formed on medium to coarse grained sandstones, with minor siltstones, and associated lower slope and valley floor sediments derived from localized erosion and re-deposition. Gradients are mostly in the range 15% to 40%, but on broader crests, slopes are as low as 8%, and can reach 60% on some steeper hills. Relief is up to 140 metres, but typically in the range of 50 to 80 metres. Rock outcrop is limited to steeper slopes where there is up to 20% coverage. Overall, there is less than 2% outcropping rock. Surface stone coverage of quartz and sandstone is commonly up to 20%, and more in places. Water courses are well defined in narrow, unmappable drainage depressions. **AuC** Rolling slightly rocky low hills with relief of up to 80 m and slopes of 16-30%. Drainage depressions are narrow with well defined watercourses. **AuD** Steep rocky low hills and steep single slopes with relief to 140 m, although generally less than 100 m and slopes of 30-60%. Drainage depressions are narrow and well defined. **AuU** Scree slopes of 10-25%. **AuZ** Broad rounded crests with slopes of 8-12%. The soils are generally shallow to moderately deep over bedrock, with grey sand to sandy loam surfaces and abundant gravel, overlying yellowish subsoils varying from clayey sands to clays in texture, depending on the nature of the parent rock. Very shallow to shallow stony soils directly overlying rock are common on steeper and / or rocky slopes. Loamy soils over orange clays occur on strata of fine grained rocks. Deep sandy loam over sandy clay loam soils occur on the limited lower slopes. Main soils: Acidic sandy loam over brown clay on rock - **K4** (E) on finer grained sandstones Acidic gradational loamy sand on rock - **K5a** (C) on coarser grained sandstones Shallow sandy loam - **L1a** (C) in steeper rocky areas Shallow stony loamy sand - **L1b** (L) on coarser grained sandstones Acidic gradational brown loam - **K1** (M) on fine grained rocks Sandy loam over brown sandy clay loam - **F1a** (M) on lower slope alluvium

		Deep gradational sandy loam - **M1b** (M) on lower slope alluvium. This land is mostly non arable due to the steep terrain and often shallow stony soils. The soils are infertile and acidic, but moderately well to rapidly drained. They are highly erodible, so virtually all of the land is susceptible to severe erosion if exposed. The gentler slopes of AuC are generally suitable for perennial horticultural and floricultural crops (if soil management is of a high standard), but the rest has limited agricultural production potential.
AvC	0.5	Rolling low hills formed on interbedded sandstones and siltstones of the Aldgate Sandstone Formation. Relief is up to 50 m. Slopes are 18-30%, and up to 40% on some short slopes. Water courses are well defined in drainage depressions up to 100 m wide. Soils are mostly moderately deep over bedrock. Surface soils are generally sandy loams to loams, with some sandier types on limited strata of coarse grained rocks. Subsoils are invariably friable yellow, brown or orange clays, but gravelly and sandier subsoils occur on coarser grained rocks. Deep sandy to loamy soils with sandy clay loam to clay subsoils are predominant on lower slopes and in drainage depressions. Main soils: Acidic sandy loam over brown clay - **K4b** (E) } on fine grained rocks Acidic gradational brown loam - **K1** (C) } Acidic gradational sandy loam on rock - **K5** (L) Shallow stony sandy loam - **L1** (L) on steeper and rocky slopes Sandy loam over brown sandy clay loam - **F1a** (M) and deep gradational sandy loam - **M1b** (M) occur on lower slope and creek flat alluvium. The soils are moderately deep and usually well drained, although infertile and acidic. Although the land is mostly too steep for annual cropping, potential for perennial horticulture is generally good.
BGD	0.4	Undulating rises and gently rolling low hills with relief to 50 m and slopes of 10-18%. Underlying rocks are siltstones, shales, phyllites and slates. Water courses are well defined in narrow drainage depressions. **BGD** Gently rolling rises ad low hills with relief to 30 m and slopes of 10-18%. The soils are predominantly loamy, usually with clayey subsoils. Main soils: Acidic loam over brown or red mottled clay - **K2b** (C) Acidic gradational loam - **K1b** (L) Acidic sandy loam over red clay - **K3** (L) Acidic loam over red clay - **K2a** (L) Shallow acidic gradational loam - **K1c** (L) upper slopes Loam over brown clay on deeply weathered rock or alluvium - **F1a**/**F1c** (L) lower slopes Soils are mostly moderately deep, adequately drained and inherently fertile, although prone to acidification. Productive potential is high, although moderate slopes are prone to erosion. The land is well suited to perennial horticulture or improved pastures.
CsD	3.9	Rolling rises and low hills formed on interbedded sandstones and siltstones of the Aldgate Sandstone Formation. Relief is 20 to 30 m and slopes are 8-18%. Water courses are well defined in drainage depressions up to 100 m wide. Soils are mostly moderately deep over bedrock. Surface soils are generally sandy loams to loams, with some sandier types on limited strata of coarse grained rocks. Subsoils are invariably friable yellow, brown or orange clays, but gravelly and sandier subsoils occur on coarser grained rocks. Deep sandy to loamy soils with sandy clay loam to clay subsoils are predominant on lower slopes and in drainage depressions. Main soils: Acidic sandy loam over brown clay on rock - **K4** (E) on medium to fine sandstones Acidic gradational brown loam - **K1** (C) on finest grained rocks Acidic gradational loamy sand on rock - **K5a** (L) on coarse sandstones Sandy loam over brown sandy clay loam - **F1a** (L) on lower slopes and creek flats Deep gradational sandy loam - **M1b** (L) on lower slope and creek flat alluvium These slopes are semi arable; the soils are moderately deep and usually well drained, although infertile and acidic. Erosion potential is high, but horticultural potential is generally good.
FbC	0.3	Isolated low rises formed on lateritized sandstones. There is minor surface ironstone. Main soils: Deep acidic sandy loam ironstone soil - **J2** (E) Acidic gradational sandy loam on rock - **K5b** (E). The predominant ironstone soils are infertile, phosphate fixing and acidic. The land has little agricultural potential.

LDC LDE	3.1 2.4	Gentle lower slopes and narrow creek flats formed on coarse grained alluvial deposits derived from the erosion of sandstones. The majority of soils comprise sandy and often gritty and stony surfaces overlying brown, yellow, grey and red sandy clay loam to clay subsoils. There are also deep coarse textured alluvial soils. The differences between the soils largely reflects varying parent sediments and drainage conditions. **LDC** Lower slopes of 4-10%. **LDE** Narrow valleys and drainage depressions. Main soils: Sandy loam over brown sandy clay loam - **F1a** (E) Deep gradational sandy loam - **M1b** (E) Sandy loam over brown clay - **F1b** / **F1c** (C) These soils are deep and imperfectly to moderately well drained. Natural fertility is low and most soils are acidic. Although the soils are potentially productive (provided fertility is maintained), the flats are narrow and dominated by water courses, which restrict accessibility and require erosion control management. The slopes of LDC offer better prospects, and are suitable for a range of intensive horticultural uses.
LHA LHE	1.0 0.4	Broad river flats and narrow valleys formed on medium to coarse grained sediments deposited by the larger streams of the Onkaparinga River system. Larger water courses (notably the Onkaparinga) are incised up to 10 metres. **LHA** Broad river flats with slopes of 0-2%. **LHE** Narrow drainage valleys with slopes of 0-5%. Most soils have sandy to sandy loam surfaces and brown and yellow mottled sandy clay to clay subsoils. Deep alluvial soils occur near watercourses. Main soils: Sandy loam over brown sandy clay loam - **F1a** (E) Sandy loam over brown clay - **F1b** (C) Deep sandy loam - **M1a** (L) Bleached siliceous sand - **H3** (L). Up to 100 cm of recent (flood deposited) silty to loamy sediments can overlie these soils. The soils are imperfectly to moderately well drained, deep with moderately low to moderate fertility. Being on river flats, productive potential is high, although there is a constant risk of flooding and stream bank erosion. There is minor soil salinity.
LtE	0.8	Drainage depressions formed on medium to coarse grained locally derived alluvium. Soils have thick sandy to loamy surfaces over mottled clayey subsoils. Main soils: Sandy loam over brown sandy clay loam to clay - **F1a** (E) and **F1b** (E) Deep sandy loam - **M1a** (L). These soils are deep and moderately fertile, but prone to waterlogging. Water courses are susceptible to erosion if banks are exposed. These areas are more sensitive than the surrounding flats or gentle slopes, with water course protection of prime importance.

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:

F1a Sandy loam over brown sandy clay loam (Bleached-Mottled, Eutrophic, Brown Chromosol)
Thick dark brown loamy sand to light sandy clay loam with a bleached A2 horizon, overlying a yellow brown and grey brown sandy clay loam to light clay with coarse prismatic structure, grading to a grey, brown and yellow mottled clayey sand.

F1b Sandy loam over brown clay (Bleached-Mottled, Hypocalcic, Brown Chromosol)
Thick loamy sand to sandy clay loam with a strongly bleached A2 horizon, overlying a yellowish brown, grey and red mottled clay grading to fine grained alluvium, weakly calcareous at base.

F1c Sandy loam over brown clay on deeply weathered rock (Bleached-Mottled, Mesotrophic, Brown Kurosol)
Thick grey loamy sand to sandy clay loam with a gravelly and bleached A2 horizon, overlying a brown, yellowish brown and red coarsely prismatic sandy clay to clay, becoming siltier and greyer (kaolinitic) with depth. Profile grades to kaolinitic and ironstone gravelly clay (highly weathered sandstone) below 100 cm.

H3 Bleached siliceous sand (Acidic, Regolithic, Bleached-Orthic Tenosol)
Very deep greyish brown massive sand, grading to white sand, overlying layers of brown, yellow and grey sand to clayey sand.

J2 Deep acidic sandy loam ironstone soil (Ferric, Mesotrophic, Brown Kandosol)
Medium thickness loamy sand to sandy loam with abundant ironstone gravel, grading to a brownish yellow and red clay with ironstone fragments, over light grey and red kaolinitic clay at about 100 cm.

K1 Acidic gradational brown loam (Eutrophic, Brown Dermosol)
Medium thickness loamy surface soil, becoming clay loamy and gravelly with depth, overlying an orange friable clay subsoil, grading to soft shale or siltstone.

K4 Acidic sandy loam over brown clay on rock (Bleached, Mesotrophic, Brown Kurosol)
Medium to thick gravelly loamy sand to sandy loam with a bleached and very gravelly A2 horizon, overlying a yellowish brown, red and brown sandy clay to clay grading to weathering medium to fine sandstone by 100 cm.

K5a Acidic gradational loamy sand on rock (Bleached-Acidic, Mesotrophic, Yellow Kandosol)
Thick gravelly loamy coarse sand to coarse sandy loam with a bleached and very gritty and gravelly A2 horizon, overlying a brown or yellow sandy clay loam to sandy clay with abundant rock fragments, grading to coarse grained sandstone.

K5b Acidic gradational sandy loam on rock (Bleached, Mesotrophic, Brown Kandosol)
Medium thickness loamy sand to sandy loam with a pale and gravelly A2 horizon, overlying a yellow and brown sandy clay loam grading to a clay loam or light clay formed in soft weathering sandstone.

L1a Shallow sandy loam (Acidic, Paralithic, Bleached-Leptic Tenosol)
Thick very gravelly loamy sand to sandy loam, overlying a brown gravelly clayey sand, grading to weathering sandstone by 50 cm.

L1b Shallow stony loamy sand (Acidic, Lithic, Bleached-Leptic Tenosol)
Thick grey loamy coarse sand to coarse sandy loam surface soil with abundant sandstone and quartzite fragments, grading to a bleached and very stony A2 horizon overlying rock, sometimes containing pockets of brown clayey sand.

M1a Deep sandy loam (Regolithic, Brown-Orthic Tenosol / Eutrophic, Brown Kandosol)
Thick brown sandy loam, overlying a grey to brown silty sand to silty clay loam with weak prismatic structure, grading to variable sandy, gritty and clayey alluvial sediments.

M1b Deep gradational sandy loam (Bleached-Acidic, Mesotrophic, Grey Kandosol)
Very thick sandy loam with a bleached A2 horizon, grading to a dark grey massive light sandy clay loam to sandy clay, overlying clayey sand alluvium.

Further information: DEWNR Soil and Land Program