CAG Carey Gully Land System

Rolling to steep hills in the Forest Range - Ashton - Verdun area

Area: 52.1 km^2

Annual rainfall: 815 – 1,040 mm average

Geology: The land is formed on fine, medium and coarse grained sandstones of the Aldgate Formation, and schists and gneisses of the Barossa Complex. The Barossa Complex rocks represent one of the few outcrops of the crystalline basement of the Mount Lofty Ranges. The strata have been folded into an anticline and exposed by the partial erosion of overlying and younger Aldgate Sandstones. This has produced a pattern of wedges of older schists and gneisses outcropping between the sandstone beds. The basement rocks are at or near the surface over more than 90% of the area. Locally derived coarse to medium grained alluvial sediments occupy minor narrow drainage depressions.

Topography: The landscape is characterized by deeply dissected rolling to steep low hills to hills, deeply dissected by water courses which typically occupy narrow, well defined drainage depressions. Slopes are mostly in the range 20-30%, but more than a quarter of the land has slopes between 30% and 75%. Drainage is irregular, with water courses in the north flowing into the Torrens catchment, and in the south flowing to the Onkaparinga.

Elevation: 310 m to 610 m

Relief: Up to 150 m but commonly about 50 m

Soils: The soils are predominantly shallow to moderately deep over weathering rock. Most are texture contrast or gradational types with sandy loam to loam surfaces and well structured clayey subsoils. There are shallow stony soils on rocky or steeper slopes. A range of texture contrast or deep coarse to medium textured soils occurs on the alluvium of creek flats and lower slopes.

Main soils

Soils formed on weathering basement rock

K4a Acidic sandy loam over brown clay on gneiss
K4b Acidic sandy loam over brown clay on sandstone
L1 Shallow sandy loam
K1 Acidic gradational brown loam
K5 Acidic gradational sandy loam

Minor soils

Soils formed on weathering basement rock

K2a Acidic clay loam over mottled brown and red clay
K2b Acidic loam over brown clay

Soils formed on alluvium or deeply weathered rock

F1a Sandy loam over brown sandy clay loam over alluvium
F1b Sandy loam over brown clay over alluvium
F1c Sandy loam over brown clay on deeply weathered rock
M1a Deep sandy loam over alluvium
M1b Deep gradational sandy loam over alluvium
M2 Deep black clay loam over alluvium

Main features: The Carey Gully Land System is characterized by sandy loam to loam soils with well structured clayey subsoils on a moderately steep to steep landscape. More than a quarter of the land is too steep for general access and is of limited value for uses other than grazing, but most of the remainder has potential for perennial horticulture as the soils are moderately fertile, although acidic, and reasonably well drained. Only about 15% of the land is arable, so opportunities for annual crops are limited. All land is susceptible to severe soil erosion if poorly managed. Landslips occur sporadically on steeper slopes.

Soil Landscape Unit summary: 9 Soil Landscape Units (SLUs) mapped in the Carey Gully Land System:

SLU	% of area	Main features #
AfC AfD	7.0 10.0	Rolling to steep low hills and hillslopes formed on schists and gneisses of the Barossa Complex. **AfC** Rolling low hills, with minor rock and stone. Relief is up to 100 m and slopes are 18-30%. **AfD** Steep to very steep rocky hillslopes with narrow crests and creek lines. Relief is up to 150 m and slopes are 30-75%. The soils are generally texture contrast with loamy surfaces overlying clayey subsoils. These are formed on basement rock on hillslopes and local alluvium on lower slopes and in depressions and valleys. Shallow stony soils are common on steeper or rocky slopes. Main soils: Acidic sandy loam over brown clay - **K4a** (E) Shallow sandy loam - **L1** (E) on steeper rocky slopes of **AfD**; (L) in **AfC** Acidic loam over brown clay - **K2b** (L) on fine grained inter-beds Sandy loam over brown sandy clay loam - **F1a** (M) in **AfC** on alluvial flats. This land is non arable, but the more moderate slopes are suitable for perennial crops. The soils on these slopes are moderately deep to deep, with satisfactory inherent fertility and structure, although acidity and erosion need to be managed. There is a tendency for the soils to have high deep subsoil magnesium and / or sodium, so careful irrigation management is required. The steeper slopes of **AfD** are of little productive value, being largely inaccessible, often rocky and susceptible to landslip.
AuC AuD	2.4 18.1	Rolling to steep low hills formed on medium to coarse grained Aldgate 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 with 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. The soils are generally shallow to moderately deep over bedrock, with grey sand to sandy loam surfaces with abundant gravel overlying yellowish subsoils varying from clayey sand to clay 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 fine grained rock strata. Deep sandy loam over sandy clay loam soils occur on the limited lower slopes. Main soils: Acidic sandy loam over brown clay - **K4b** (V) in **AuC**; (L) in **AuD** Acidic gradational sandy loam - **K5** (L) in AuC; (E) in **AuD** Shallow sandy loam on rock - **L1** (L) in **AuC**; (E) in **AuD** Acidic gradational brown loam - **K1** (M) on fine grained rocks Sandy loam over brown sandy clay loam - **F1a** (M) and 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	47.3	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.
AwC	0.9	Low ridges of Stonyfell Quartzite up to 50 m high with slopes of 15-30%. There is up to 20% surface stone and minor outcrop. Soils have sandy loam surfaces and are shallow to moderately deep over rock. Main soils: Acidic sandy loam over brown clay - **K4b** (E) Shallow sandy loam on rock - **L1** (E) Acidic gradational brown loam - **K1** (L) These isolated ridges are moderately steep and stony with soils of variable depth, low fertility, and prone to acidification.
BtD	0.6	Moderate slopes with negligible rock and stone formed on schists and gneisses of the Barossa Complex. Relief is less than 30 m and slopes are 10-18%. The soils are generally texture contrast with loamy surfaces overlying clayey subsoils. These are formed on basement rock on hillslopes and local alluvium on lower slopes and in depressions and valleys. Main soils: Acidic sandy loam over brown clay - **K4a** (E) Acidic loam over brown clay - **K2b** (E) Sandy loam over brown sandy clay loam - **F1a** (L) and sandy loam over brown clay on deeply weathered rock - **F1c** (L) on lower slopes and alluvial flats. This land is semi arable, marginally suitable for cultivated crops, but well suited to perennial crops. The soils are moderately deep to deep, and with satisfactory inherent fertility and structure, although acidity and erosion need to be managed. There is a tendency for the soils to have high deep subsoil magnesium and / or sodium, so careful irrigation management is required.
CsD	8.1	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 - **K4b** (E) on sandstones Acidic gradational brown loam - **K1** (C) } on fine Acidic clay loam over brown and red mottled clay - **K2a** (L) } grained rocks Acidic gradational sandy loam on rock - **K5** (L) on coarse sandstones Sandy loam over brown sandy clay loam - **F1a** (L) and deep gradational sandy loam - **M1b** (M) are limited on lower slope and creek flat alluvium. These slopes are semi arable; the soils are moderately deep and usually well drained, although infertile, acidic and erosion prone, but horticultural potential is generally good.
LDE	5.6	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. Main soils: Sandy loam over brown sandy clay loam - **F1a** (E) Sandy loam over brown clay - **F1b** / **F1c** (C) Deep sandy loam - **M1a** (L) Deep gradational sandy loam - **M1b** (L) Deep black clay loam - **M2** (L). 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 often narrow and dominated by water courses, which restrict accessibility and require erosion control management.

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 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 with depth. Soft weathering sandstone occurs from about 150 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.

K2a Acidic clay loam over brown and red mottled clay (Eutrophic, Brown / Red Kurosol)
Medium thickness loam to clay loam with a bleached and gravelly A2 layer, over a red and brown mottled well structured medium to heavy clay, grading to weathering siltstone from about 100 cm.

K2b Acidic loam over brown clay (Eutrophic, Brown Chromosol)
Medium thickness fine sandy loam to loam with a gravelly A2 layer, over a strong brown well structured clay grading to fine sandstone within 100 cm.

K4a Acidic sandy loam over brown clay (Bleached, Eutrophic, Brown Chromosol)
Thick sandy loam to loam with a pale coloured or bleached and gravelly A2 horizon, overlying a brown or yellowish red well structured clay grading to weathering gneiss by 100 cm.

K4b Acidic sandy loam over brown clay (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 sandstone by 100 cm.

K5 Acidic gradational sandy loam 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.

L1 Shallow sandy loam on rock (Acidic, Paralithic, Bleached-Leptic Tenosol)
Thick very gravelly loamy sand to sandy loam, overlying a brown gravelly clayey sand, grading to weathering sandstone or gneiss by 50 cm.

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.

M2 Deep black clay loam (Melanic, Eutrophic, Black Dermosol)
Thick black silty loam to clay loam with strong granular structure, overlying a black to dark brown clay with strong blocky structure, becoming yellow and grey mottled with depth.

Further information: DEWNR Soil and Land Program