

ASH Ashbourne Land System

Undulating rises and alluvial flats of the Ashbourne Valley

Area: 10.9 km²

Annual rainfall: 580 – 705 mm average

Geology: The Land System lies in a Permian glacial valley. It comprises three distinctive geological components. Weakly lithified sandy clays and calcareous clays of glacial origin occupy about half the area. These sediments are partly overlain by sandy clays and clays derived from the localized erosion of the surrounding hills of Kanmantoo Group metasedimentary rocks. Alluvial clays of the Bull Creek - Finniss River flood plain comprise the third type of deposit.

Topography: The Ashbourne Land System is an ancient glacial valley carved into the highlands of Kanmantoo Group rocks. The valley is typically U-shaped, with undulating rises of residual glacial sediments on its floor. At the margins of the valley adjacent to the steeply sloping valley sides are gently to moderately inclined outwash fans, grading to very gently inclined alluvial flats. The lowest lying areas within the System are the flood plains of two major water courses which join in the valley (viz. Finniss River and Bull Creek).

Elevation: 110 - 240 m

Relief: Up to 40 m

Soils: The characteristic soil of the System has a sandy but often hard setting surface over a dispersive heavy brown clay subsoil. Deep black clay loam to clay soils are common on flats. Loam over brown clay and deep grey loams are typical of outwash fans.

Main soils

Undulating rises formed on glacial sediments

F2a Sandy loam over poorly structured brown clay

Flats and outwash fans formed on alluvium or deeply weathered rock

F1a Loam over brown clay

F1b Sandy loam over brown clay

M2 Deep black clay loam

Minor soils

Flats and outwash fans formed on alluvium or deeply weathered rock

M4 Deep gradational loam

F2b Sandy loam over poorly structured brown clay

E1 Black cracking clay

Main features: The Ashbourne Land System comprises three distinctive land / soil types directly related to the underlying geology. The old glacial sediments occur on undulating rises and give rise to sandy surface texture contrast soils. Subsoil clays are sodic and restrict water movement and root growth. The soils are also highly erodible. Outwash fans adjacent to the surrounding ranges, and associated old alluvial flats are dominated by loamy surfaced texture contrast soils of moderate fertility, but prone to waterlogging. The alluvial flats of the Finniss River and Bull Creek are characterized by deep black clay loamy to clay soils of very high fertility with high production potential.



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

SLU	% of area	Main features #
AhC	0.2	<p>Geology: Metasandstones, metasiltsstones and phyllites of the Backstairs Passage, Tappanappa and Carrickalinga Head Formations.</p> <p>Main soils: <u>Acidic sandy loam over red clay on rock</u> - K3 (E) <u>Acidic loam over red clay on rock</u> - K2b (C) <u>Acidic gradational brown loam on rock</u> - K1b (C) <u>Shallow loam on rock</u> - L1b (M) } on steeper and rocky slopes <u>Shallow sandy loam on rock</u> - L1a (M) }</p>
LAB LAG LAH LAI	0.6 8.5 1.7 10.1	<p>Outwash fans formed on either clayey sediments derived from Kanmantoo Group rocks, or on highly weathered rock.</p> <p>LAB Low rise on alluvial flat. LAG Gently inclined plains of 2 - 3% slope with eroded water courses. LAH Lower slopes and fans with slopes of 3 - 8% and eroded water courses. LAI Lower slopes of 8 - 16% with eroded water courses.</p> <p>Main soils: <u>Loam over brown clay</u> - F1a (V) flats, slopes and fans <u>Sandy loam over poorly structured brown clay</u> - F2b (C) slopes and fans</p> <p>These soils are deep but are imperfectly drained due to the restricting effect of the subsoil clay. Fertility is moderate, and water holding capacity is high. The slopes and fans are subject to large runoff volumes from surrounding hills, so potential for erosion is high, as evidenced by the degree of water course damage.</p>
LgA	22.7	<p>Alluvial flats at the junction of the Finniss River and Bull Creek.</p> <p>Main soils: <u>Deep black clay loam</u> - M2 (V) <u>Deep gradational loam</u> - M4 (L) <u>Black cracking clay</u> - E1 (L).</p> <p>These soils are deep, moderately well drained and highly fertile. Surface soils are sticky and difficult to work when wet. The flats are potentially highly productive.</p>
LtA	4.8	<p>Alluvial flats associated with Bull Creek.</p> <p>Main soils: <u>Sandy loam over brown clay</u> - F1b (D).</p> <p>These soils have very thick sandy surfaces with clayey subsoils for moisture storage. Although waterlogging may be a slight limitation, they are potentially highly productive.</p>
PPJ	0.8	<p>Gently inclined lower slopes, drainage depressions and outwash fans with slopes of 2% to 5% formed over clayey sand and sandy clay outwash sediments derived from the erosion of hillside glacial deposits. Well defined and often badly gullied water courses are characteristic of these landscapes.</p> <p>PPJ Drainage depressions with well defined and eroded water courses.</p> <p>Soil profiles include soft and hard sandy soils with clayey subsoils, and deep sandy soils.</p> <p>Main soils: <u>Thick sand over sandy clay</u> - G3b (E) <u>Sandy loam over poorly structured brown clay</u> - F2 (C) <u>Bleached siliceous sand</u> - H3a (L) <u>Wet highly leached sand</u> - I2b (L)</p> <p>These soils are deep but infertile and often prone to waterlogging. The texture contrast soils often have compact surfaces which are particularly susceptible to erosion.</p>
PuH	50.6	<p>Undulating rises with slopes of 4 - 8% formed on weakly lithified sandy clays and calcareous clays of glacial origin. Eroded water courses and occasional granite boulders (glacial erratics) are distinctive features of this landscape.</p> <p>Main soil: <u>Sandy loam over poorly structured brown clay</u> - F2a (D).</p> <p>These soils are imperfectly drained due to the shallow thickness of sandy topsoil over dispersive clay subsoils. For this reason the soils are also highly erodible. Inherent fertility is moderate, and the soils are prone to acidification.</p>

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:

- E1** Black cracking clay (Self-mulching, Black Vertosol)
Medium thickness crumbly and seasonally cracking black medium clay, grading to a black strongly blocky heavy clay with slickensides, becoming dark grey and yellow brown mottled with depth.
- F1a** Loam over brown clay (Sodic, Hypocalcic, Brown Chromosol)
Thick brown loamy sand to clay loam with a bleached A2 horizon, overlying a dark brown, red and yellowish brown mottled firm heavy clay, grading to clayey alluvium below 100 cm.
- F1b** Sandy loam over brown clay (Eutrophic, Brown Chromosol)
Very thick fine sandy loam with a bleached and sandy A2 layer, over a weakly structured grey brown and yellow brown mottled fine sandy clay loam to fine sandy clay.
- F2a** Sandy loam over poorly structured brown clay (Hypocalcic, Subnatric, Brown Sodosol)
Medium thickness dark brown sand to sandy clay loam with a bleached and hard A2 horizon, overlying a dark grey brown and yellow brown mottled heavy clay with strong prismatic structure, grading to a light grey, yellow and red massive sandy clay to clay with minor soft carbonate segregations from 85 cm.
- F2b** Sandy loam over poorly structured brown clay (Eutrophic, Subnatric, Brown Sodosol)
Thick hard loamy fine sand to fine sandy loam with a bleached and gravelly A2 layer over a dark brown, yellow brown and grey mottled clay with strong angular blocky structure grading to very highly weathered metagreywacke below 100 cm.
- M2** Deep black clay loam (Eutrophic, Black Dermosol)
Medium thickness black clay loam with strong granular structure grading to a strongly structured black medium clay, becoming grey brown and yellow brown mottled from about 90 cm, with occasional soft calcareous segregations.
- M4** Deep gradational loam (Eutrophic, Grey Kandosol)
Very thick black loam with a bleached clay loamy A2 layer grading to a dark grey weakly structured light clay, becoming sandier with depth.

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

