

PAE Paechtoun Land System

Escarpment extending from Oakbank to Echunga

Area: 19.0 km²

Annual rainfall: 795 – 920 mm average

Geology: The System is underlain by fine grained metamorphosed sedimentary rocks of the Saddleworth Formation. Main rock types are phyllites, fine grained schists, slates and metasiltstones. There are minor interbedded quartzites and metasandstones of the Stonyfell Formation. Remnants of an old deeply weathered land surface, formed prior to the faulting which gave rise to the escarpment, occur on some upper slopes. Kaolinized rocks and laterites occur in these areas. Most of the lateritic materials were eroded away following uplift of the Meadows Block (of which the Paechtoun Land System is the western edge).

Topography: The Land System is the well defined escarpment at the northern end of the Meadows Fault. The landscape comprises a strongly dissected west facing slope with an overall gradient from crest to foot of about 10% (100 m over one km). However, dissection by west flowing watercourses and their tributaries has shortened and steepened most slopes. Gradients are anywhere between 10% and 50% depending on the degree of dissection. The lateritic remnants form a discontinuous chain of prominent crests along the eastern side of the System. Watercourses occupy narrow drainage depressions, few of which are wide enough to map out at 1:50,000 scale.

Elevation: 350 to 400 m along the base of escarpment to a maximum elevation of 470 m.

Relief: Maximum relief is 90 m.

Soils: The soils are predominantly loamy surfaced with friable clayey subsoils, although these are absent on steeper slopes. Ironstone soils are characteristic of the deeply weathered remnants. Deep loamy texture contrast soils occur in minor drainage depressions.

Main soils

Soils formed in weathering basement rock

- K2a** Acidic loam over red clay
- K2b** Acidic loam over brown clay
- K3** Acidic sandy loam over red clay
- K4** Acidic sandy loam over brown clay
- K1** Acidic gradational loam

Minor soils

Soils formed in weathering basement rock

- K2c** Dark loam over black clay
- L1** Shallow stony loam

Ironstone soils

- J2** Acidic, deep loamy (**J2a**) or sandy loam (**J2b**) ironstone soil

Deep soils over alluvium

- F1** Sandy loam over brown sandy clay (**F1a**) or clay (**F1b**)
- M1** Deep sandy loam



Main features: The Paechtown Land System is a dissected escarpment of gently rolling to moderately steep slopes. Almost a third of the land is too steep for cultivated agriculture. The soils are mostly loamy and usually have well structured clayey subsoils. They are inherently fertile, moderately deep and moderately well drained; consequently significant areas are intensively cultivated. However, slopes are sufficiently steep that erosion control is an important management consideration. Ironstone soils formed over deeply weathered rocks are characteristic of the upper escarpment slopes and occupy about 15% of the area. These are less fertile and mostly only used for grazing. Creek flats with deep alluvial soils are minor overall.

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

SLU	% of area	Main features #
AxC	31.5	<p>Moderately steep slopes formed on phyllites, fine grained schists, slates and metasilstones, with interbedded quartzites and metasandstones. Slopes are generally in the range 20% to 30%, but occasional slopes may reach 50%. Relief varies from 50 metres to 90 metres. The dominant soils have loamy surfaces and clay subsoils with variable colours and structure depending on the type of parent rock.</p> <p>Main soils: <u>Acidic loam over red clay on rock</u> - K2a (C) <u>Acidic sandy loam over red clay on rock</u> - K3 (C) <u>Acidic loam over brown clay on rock</u> - K2b (L) <u>Shallow loam on rock</u> - L1 (L) on steeper rocky slopes <u>Acidic loam over black clay on rock</u> - K2c (M) on slaty rocks <u>Acidic sandy loam over brown clay on rock</u> - K4 (M) on quartzites</p> <p>These soils are generally moderately deep, inherently fertile and moderately well drained. The main limitation is the topography although the more moderate slopes are suitable for perennial crops. Steeper slopes are prone to landslip.</p>
BbD	50.4	<p>Gently rolling low hills formed on phyllites, fine grained schists, slates and metasilstones, with relief to 60 m and slopes of 10-20%. The dominant soils have loamy surfaces and clayey subsoils with variable colours and structure depending on the type of parent rock.</p> <p>Main soils: <u>Acidic loam over red, brown or black clay on rock</u> - K2a / K2b / K2c (E) on fine grained rocks <u>Acidic sandy loam over red or brown clay on rock</u> - K3 / K4 (E) on quartzitic and coarser grained rocks <u>Acidic gradational loam</u> - K1 (L) on upper slopes <u>Shallow loam on rock</u> - L1 (M) on steeper rocky slopes</p> <p>These soils are generally moderately deep, inherently fertile and moderately well drained. Although they are inherently productive and used intensively, they are highly susceptible to erosion, so rigorous soil conservation management is needed. The land is well suited to perennial crops.</p>
CbD	0.9	<p>Gently rolling rises and low hills formed on micaceous sandstones, commonly kaolinized. Slopes range from 8% to 18% and relief varies from 20 m to 60 m. Watercourses are well defined in broad drainage depressions. The majority of soils have sandy to loamy surfaces overlying brown or red clay subsoils forming in fresh, or more commonly deeply weathered, basement rock. Deeper texture contrast soils on alluvium are common on lower slopes.</p> <p>Main soils: <u>Acidic sandy loam over brown clay on rock</u> - K4 (E) } on slopes <u>Sandy loam over brown clay on deeply weathered rock</u> - F1b (C) } <u>Acidic sandy loam over red clay on rock</u> - K3b (L) } <u>Sandy loam over brown clay</u> - F1c (L) on lower slope or creek flat alluvium</p> <p>These soils are deep but imperfectly drained due to the tendency for water to perch on the subsoil. Inherent fertility is low and all soils are susceptible to acidification. Erosion potential is moderately high even on gentler slopes as soils are highly erodible.</p>



FaD	2.3	Moderately steep upper slopes with prominent pointed crests formed on deeply weathered and kaolinized siltstones and sandstones, representing the last remnants of an old lateritic weathering surface. Slopes are 10-20%. There is minor surface ironstone. The soils have ironstone gravelly topsoils and thick orange to brown coloured clay subsoils with variable ironstone. They extend to depths often exceeding several metres in soft kaolin rich silt or silty clay. Main soils: <u>Acidic, deep loamy and sandy loam ironstone soil</u> - J2a / J2b (V) <u>Acidic gradational loam</u> - K1 (C) These soils, although deep, are infertile due to a high degree of leaching and weathering. Ironstone fixes phosphate, and acidification potential is high. Drainage is moderate to imperfect because of the thick clayey subsoil. The soils are highly susceptible to erosion.
FcD	12.0	Moderately steep upper slopes with prominent pointed crests formed on deeply weathered, kaolinized and lateritized siltstones. The land is similar to that of FaD , but soils tend to be more loamy. Slopes are 10-20%. The soils are deep and strongly leached. They extend to depths often exceeding several metres in soft kaolin rich silt or silty clay. Main soils: <u>Acidic, deep loamy ironstone soil</u> - J2a (E) <u>Acidic gradational loam</u> - K1 (E) These soils are deep but of moderately low fertility. Drainage is moderate to imperfect. The moderately steep slopes and exposed position of this land limit its potential usefulness. Erosion potential is moderately high.
LtE	2.9	Narrow drainage depressions formed on medium to coarse grained locally derived alluvium. Soils have thick sandy to loamy surfaces overlying mottled clayey subsoils. Main soils: <u>Sandy loam over brown sandy clay to clay</u> - F1a / F1b (V) <u>Deep sandy loam</u> - M1 (C) These soils are deep and moderately fertile, but prone to waterlogging and erosion. The narrowness of the depressions severely limits their development potential. Watercourses are well defined and susceptible to erosion if banks are exposed.

PROPORTION codes assigned to soils within Soil Landscape Units (SLU):

(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:

Soils formed in weathering basement rock

- K1** Acidic gradational loam (Mesotrophic, Red Dermosol)
Thick loam with minor ironstone, grading to a brownish or reddish coarsely blocky clay loam to clay, siltier with depth, grading to kaolinized phyllite or siltstone, continuing to depths of 200 cm or more.
- K2a** Acidic loam over red clay (Eutrophic, Red Chromosol)
Medium thickness reddish loamy to clay loamy surface soil, with a gravelly and paler coloured A2 horizon, overlying a red, very well structured clay subsoil grading to weathering phyllite from about 100 cm.
- K2b** Acidic loam over brown clay (Mottled, Eutrophic, Brown Chromosol)
Thick loam with a paler coloured gravelly A2 horizon, overlying a dark brown, yellowish brown and red mottled, coarsely structured clay, grading to weathering metasiltstone or phyllite deeper than 100 cm.
- K2c** Dark loam over black clay (Melanic, Eutrophic, Black Dermosol)
Medium thickness, black, crumbly clay loam, overlying a black or dark reddish brown, very well structured clay subsoil, grading to weathering slate from about 100 cm.
- K3** Acidic sandy loam over red clay (Bleached-Mottled, Eutrophic, Red Chromosol)
Medium thickness loamy surface soil with a paler or bleached A2 horizon, overlying a dark red and brown mottled prismatic structured clay, grading to weathering schist or phyllite by 100 cm.



- K4** Acid sandy loam over brown clay (Bleached-Mottled, Eutrophic, Brown Kurosol)
Thick gravelly sandy loam to sandy clay loam with a bleached A2 horizon, overlying a yellowish brown, red and greyish brown coarsely prismatic clay subsoil, grading to weathering metasandstone below 100 cm.
- L1** Shallow stony loam (Acidic, Paralithic, Leptic Tenosol)
Thick, stony sandy loam to loam, forming in weathering schist or phyllite at 50 cm or less.

Ironstone soils

- J2a** Acidic, deep loamy ironstone soil (Ferric, Eutrophic, Red Chromosol)
Medium thickness dark brown loam with a pink A2 horizon containing abundant fragments of ferruginized siltstone, overlying a red and yellow brown clay with blocky structure, grading to grey mottled kaolinitic silty clay. Hard siltstone is deeper than 200 cm.
- J2b** Acidic, deep 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.

Loamy soils with brown clayey subsoils over alluvium

- F1a** Sandy loam over brown sandy clay (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 with coarse prismatic structure, grading to a grey, brown and yellow mottled clayey sand.
- F1b** Sandy loam over brown clay (Bleached-Mottled, Eutrophic / Hypocalcic, Brown Chromosol)
Thick loamy sand to sandy clay loam surface soil with a strongly bleached A2 horizon, sharply overlying a yellowish brown, grey and red mottled clay subsoil grading to fine grained alluvium.

Deep alluvial sandy loams

- M1** 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.

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

