

PBR Peterborough Land System

Outwash fans and low rises in the Peterborough area

Area: 115.5 km²

Annual rainfall: 325 – 380 mm average

Geology: Fine grained rocks of the Tapley Hill and Saddleworth Formations, with interbedded Appila Tillites and quartzites. The rocks have been extensively covered by locally derived outwash sediments forming outwash fans and valley fill between the ridges of basement rock. Both rocks and sediments carry a veneer of secondary carbonate of aeolian origin.

Topography: The System is an undulating landscape of low rises with slopes usually less than 10% and less than 20 m high, scattered amongst extensive fans and flats with slopes of less than 4%. Weakly defined watercourses arise in the east and the south and flow in a general westerly direction between the low rises. There has been extensive erosion in the past, and some evidence of this persists as scalds on both rises and flats.

Elevation: 520 m to 640 m

Relief: Maximum local relief is 20 m

Soils: Most soils are moderately deep to deep over alluvium, on flats and outwash fans. They have sandy loam to loam surfaces, with red clayey subsoils. Calcareous loams are minor. Shallow to moderately shallow soils over basement rock characterize rises. Some of these have red clayey subsoils, and most have calcareous subsurface layers.

Main soils

Soils of outwash fans and flats formed on alluvium

D4 Loam over friable red clay

C1 Gradational sandy loam over sandy clay

D2/C3 Loam over red clay

Minor soils

Soils of rising ground formed on basement rock

A2 Shallow calcareous loam

L1 Shallow stony loam

D1/C2 Hard loam over red clay on rock

Soils of outwash fans and flats formed on alluvium

A4 (Rubbly) calcareous loam

Main features: Except for some minor moderately steep ridges, the land is flat to undulating, with moderately deep to deep soils on outwash fans and flats and shallow stony soils on rises. Low rainfall is the over-riding determinant of land use. In the western parts, the land is cropped regularly, but towards the east as the rainfall decreases, cropping becomes more opportunistic and is restricted to the lower areas with deeper soils. Extensive evidence of scalding from past erosion indicates that inadequately managed cropping will lead to land degradation. The main soil limitations to agricultural use are marginal to high salinity (especially in scalded areas), poor soil structure (particularly on fans and flats), and shallow, stony and alkaline profiles on rising ground.



Soil Landscape Unit summary: 15 Soil Landscape Units (SLUs) mapped in the Peterborough Land System:

SLU	% of area	Main features #
EFB EFC EFV EFW	3.9 2.5 1.2 10.0	<p>Rises formed on calcareous basement rock.</p> <p>EFB Isolated low rises to 10 m high with slopes of less than 3%.</p> <p>EFC Undulating rises, 20 m high with slopes of 3-10%, sporadic rock outcrop, minor scalding and minor gully erosion.</p> <p>EFV Very low rises (less than 10 m high) with slopes of 2-4% and up to 10% of the land affected by scalding.</p> <p>EFW Rises and slopes of 3-8% with up to 10% of the land affected by scalding.</p> <p>Main soils: <u>shallow calcareous loam</u> - A2 (E) and <u>shallow stony loam</u> - L1 (E) with <u>hard loam over red clay on rock</u> - D1/C2 (E) on lower slopes. The soils are well drained and well structured, but are shallow and only moderately fertile due to their relatively low clay content. The mainly calcareous soils are relatively resistant to water erosion, but they tend to powder easily, increasing the risk of both wind and water erosion. The effects of past erosion are still apparent particularly in EFW.</p>
ESD ESW	0.8 1.7	<p>Rises on basement rocks with 20-50% of the land surface occupied by rocky reefs.</p> <p>ESD Rises and ridges to 20 m high with slopes of 10-20%.</p> <p>ESW Rises to 20 m high with slopes of 5-10% and up to 10% of the land affected by scalding.</p> <p>Main soils: <u>shallow stony loam</u> - L1 (E) and <u>shallow calcareous loam</u> - A2 (E) with <u>hard loam over red clay on rock</u> - D1/C2 (E). Rocky reefs, shallow stony soils and sometimes moderate slopes restrict the use of these areas. Deeper soils are generally confined to strips between the reefs of rock. Water erosion is a potential problem because of the high runoff from the shallow soils and rocky areas.</p>
EZB EZV EZm	1.2 4.7 1.4	<p>Complex of low rises formed on siltstone basement rock and outwash fans formed on alluvium.</p> <p>EZB Gentle slopes of 1-3%.</p> <p>EZV Very gently undulating rises with slopes of 1-3%, sporadic rock outcrop and minor scalding.</p> <p>EZm Rises with slopes of 3-7% and fans of 3-5%, eroded watercourses and up to 10% of the land affected by scalding.</p> <p>Main soils: <u>shallow calcareous loam</u> - A2 (E) and <u>shallow stony loam</u> - L1 (C) on rises, with <u>loam over friable red clay</u> - D4 (C) and <u>gradational sandy loam over sandy clay</u> - C1 (L) on fans. This land has a higher proportion of deeper soils than surrounding rises, with consequent improved production potential. Limitations include marginal salinity (high on old scalded areas), poor soil structure on some outwash fan soils, and shallow stony soils on rises.</p>
JFA JFB JFU JFV JFo	10.8 29.1 14.7 10.8 5.6	<p>Gentle slopes and flats formed on alluvium with varying degrees of scalding and watercourse erosion.</p> <p>JFA Flats with slopes of less than 1% and minor scalding.</p> <p>JFB Fans with slopes of 1-3%.</p> <p>JFU Flats with slopes of less than 1% and 5-10% of the land affected by scalding.</p> <p>JFV Fans with slopes of 1-3% and 5-10% of the land affected by scalding.</p> <p>JFo Drainage depressions with slopes of 1-3%, eroded watercourses and 5-10% of the land affected by scalding.</p> <p>Main soils: <u>loam over friable red clay</u> - D4 (E), <u>gradational sandy loam over sandy clay</u> - C1 (C) and <u>loam over red clay</u> - D2/C3 (C), with <u>calcareous loam</u> - A4 (L). Land is flat to very gently inclined, but it is not regularly used for cropping due to the low rainfall and the effects of past erosion. Other limitations include marginal salinity (high on old scalded areas), poor soil structure (causing excessive runoff and erosion, emergence and root growth problems), and watercourse erosion.</p>
KQA	1.6	<p>Flats formed on calcreted alluvial sediments. Slopes are less than 1%.</p> <p>Main soil: <u>rubbly calcareous loam</u> - A4 (D). This is a limited area of shallow rubbly soils with restricted waterholding capacity and low fertility.</p>

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

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| (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:

- A2** Shallow calcareous loam (Paralithic, Calcic / Lithocalcic Calcarosol)
Calcareous loam over soft rubbly carbonate grading to weathering siltstone within 100 cm.
- A4** (Rubbly) calcareous loam (Regolithic, Hypercalcic / Supracalcic Calcarosol)
Calcareous sandy loam to sandy clay loam grading to soft or rubbly carbonate within 50 cm.
- C1** Gradational sandy loam over sandy clay (Hypercalcic /Supracalcic, Red Kandosol)
Massive sandy loam with variable stone becoming more clayey and calcareous (sometimes rubbly) with depth.
- D1/C2** Hard loam over red clay on rock (Calcic, Red Chromosol / Dermosol)
Loam to clay loam abruptly (Chromosol - D1) or gradually (Dermosol - C2) overlying a well structured red clay with soft carbonate at depth grading to weathering basement rock within 100 cm.
- D2/C3** Loam over red clay (Calcic, Red Chromosol / Dermosol)
Medium thickness loam to clay loam with up to 20% quartzite stones, over a well structured red clay with soft (occasionally rubbly) carbonate at depth. The change from topsoil to subsoil is abrupt in Chromosols (D2) and gradual in Dermosols (C3).
- D4** Loam over friable red clay (Pedaric, Red Sodosol)
Medium thickness sandy loam to clay loam sharply overlying a finely structured friable moderately saline clay (pedaric B horizon), calcareous with depth.
- L1** Shallow stony loam (Lithic, Leptic Tenosol / Rudosol)
Shallow stony loam grading to hard basement rock within 50 cm. Soft carbonate commonly occurs in rock fissures.

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

