

FRK Frankton Land System

Gently undulating outwash fans and rises in the Frankton - Sutherlands area

Area: 64.1 km²

Annual rainfall: 310 – 405 mm average

Geology: The land system is underlain by metamorphosed rocks, mainly phyllites and metasilstones of the Tappanappa and Saddleworth Formations, with more resistant Backstairs Passage Formation metasandstones on the southern side. The rocks have been extensively covered by alluvial sediments washed from the higher land to the west. These deposits are fine to medium grained. All rocks and sediments are mantled by carbonates of aeolian origin. There has apparently been extensive atmospheric exposure of these materials as much of the carbonate has been indurated into rubbly or sheet forms.

Topography: The Frankton Land System is a complex of low rises and surrounding outwash fans, formed by the partial burial of basement rock highs by alluvial deposits. The rises are usually less than 30 m high with slopes of less than 10%; the fans mostly have slopes of less than 3%. Surface stones (mainly calcrete and sandstone) are widespread, up to 20% on rises and up to 10% on fans. There is negligible outcrop. There has been considerable erosion on the fans in the past, with gullied water courses and old scald scars still evident. All water courses flow in a general easterly direction.

Elevation: 270 - 200 m

Relief: Maximum relief is 45 m

Soils: Almost 60% of the soils are calcareous throughout, either shallow over rock or calcrete, or deep over alluvium. Texture contrast soils with loamy surfaces and red clayey subsoils are sub-dominant. These also have shallow and deep forms.

Main soils

- D3** Hard loam over dispersive red clay - common (outwash fans)
- A2b** Shallow rubbly calcareous loam - common (rises)
- A2a** Shallow calcareous loam - limited (rises)
- D1** Loam over friable red clay on rock - limited (rises)

Minor soils

- A6** Non rubbly calcareous loam - outwash fans
- A4** Rubbly calcareous loam - outwash fans
- D2** Hard loam over well structured red clay - outwash fans
- B2** Shallow calcareous loam over calcrete - stony rises

Main features: The Frankton Land System comprises two main components, viz rises formed on basement rock, and eroded outwash fans formed on alluvium. The basement rock rises have relatively shallow calcareous and texture contrast soils in which the main limitation is shallow soil depth. The fans are characterized by deep texture contrast soils with calcareous types. Although inherently fertile, these soils have been extensively eroded in the past, reducing their present productive capacity because of poor surface structure and high near surface levels of boron, sodicity, salinity and pH. Protection from further damage is needed on these areas. Elsewhere, potential yields should be achievable.



Soil Landscape Unit summary: 12 Soil Landscape Units (SLUs) mapped in the Frankton Land System:

SLU	% of area	Main features #
EEB EEC	17.0 5.3	<p>Low rises formed on phyllites and metasilstones of the Tappanappa Formation capped by soft to rubbly carbonates. There is 10-20% surface calcrete.</p> <p>EEB Rises to 15 m high with slopes of 2-4%. EEC Rises to 20 m high with slopes of 3-7%.</p> <p>Main soils: <u>shallow rubbly calcareous loam</u> - A2b (E) and <u>shallow calcareous loam</u> - A2a (E). Most of this land is cropped, although some paddocks are too stony. Soils throughout have restricted water holding capacity due to high rubble content and moderate depth over bedrock. Fertility is low to moderate due to low clay content and high pH, but structure, drainage and aeration are good. Very high subsoil pH (and possibly boron) levels may restrict root growth and water use efficiency.</p>
EFB EFC	3.7 24.1	<p>Rises and low hills formed on phyllites and metasilstones of the Tappanappa and Saddleworth Formations. There are 10-20% surface calcrete, quartzite and sandstone fragments.</p> <p>EFB Rises to 15 m high with slopes of 2-4%. EFC Rises and low hills to 45 m high with slopes of 3-12% (with occasional steeper knobs such as The Watchbox).</p> <p>Main soils: <u>shallow rubbly calcareous loam</u> - A2b (E) and <u>loam over friable red clay on rock</u> - D1 (E), with <u>shallow calcareous loam</u> - A2a (C) and <u>shallow calcareous loam over calcrete</u> - B2 (M). This land is fully arable, although most soils are moderately shallow over rock or rubble. Apart from a tendency for hard setting in the D1 soils, the soils are well structured. The calcareous soils are susceptible to lime induced nutrient deficiencies, but restricted moisture holding capacity is the main limitation. Erosion needs to be controlled on steeper slopes.</p>
EZI	3.6	<p>Dissected slopes formed on metasandstones of the Backstairs Passage Formation. The landscape includes moderate slopes of up to 20% and up to 20 m high, and the eroded land around the junction of Rocky and Levi Creeks.</p> <p>Main soils: <u>shallow rubbly calcareous loam</u> - A2b (E) and <u>loam over friable red clay on rock</u> - D1 (E) on slopes, and variable alluvial soils on the flats. This land is highly susceptible to erosion and is not cropped. Careful grazing management is needed to maintain protective surface cover.</p>
JDB JDE JDJ JDI JDo	13.0 7.8 6.4 6.4 8.9	<p>Outwash fans and creek flats formed on fine to medium grained alluvium.</p> <p>JDB Fans with slopes of 1-4%. JDE Drainage depressions with slopes of up to 3% and minor water course erosion. JDJ Drainage depressions and creek flats with slopes of up to 3% and moderate water course erosion. JDI Fans with slopes of 2-3% and moderate water course erosion. 5-10% of the land is affected by scalding. JDo Creek flats with slopes of less than 2% and eroded water courses. Up to 10% of the land is affected by scalding.</p> <p>Main soils: <u>hard loam over dispersive red clay</u> - D3 (E) with <u>hard loam over well structured red clay</u> - D2 (C), <u>non rubbly calcareous loam</u> - A6 (C) and <u>rubbly calcareous loam</u> - A4 (L). These soils are deep and moderately fertile but the D3 soils have hard setting surfaces which tend to shed water and impede uniform emergence and root growth. There has been severe erosion on much of this land in the past, and where this has exposed saline or sodic subsoils (scalds), productivity is low. Moderate salinity and high boron levels within rootzones further restrict plant growth. Management strategies should aim for protection from further erosion, establishment of perennial cover on scalded areas and amelioration of poor surface structure on undamaged soils.</p>
KLE	1.9	<p>Shallow drainage depressions associated with calcreted rises.</p> <p>Main soils: <u>rubbly calcareous loam</u> - A4 (E) and <u>non rubbly calcareous loam</u> - A6 (E). Although stony, these areas are arable, the main limitations being restricted water holding capacity and lime induced nutrient deficiencies.</p>



QMB	1.9	<p>Low rises with slopes of 2-3% formed on rubbly carbonates. There are 20-50% surface calcrete and sandstone fragments.</p> <p>Main soil: <u>shallow calcareous loam over calcrete - B2 (D)</u>. There is variable rubble content in these soils, resulting in variable effective soil depth. Moisture holding capacity is generally restricted. Remnant scrub patches indicate areas where rock or shallow depth do not allow cultivation. Fertility is generally low to moderate due to low clay content and high pH, but structure, drainage and aeration are good. Very high subsoil pH levels may restrict root growth and water use efficiency.</p>
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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:

- A2a** Shallow calcareous loam (Paralithic, Hypercalcic Calcarosol)
10 - 20 cm calcareous loam becoming gradually more clayey and calcareous with depth over soft carbonate from 30 cm, grading to weathering rock at 55 cm.
- A2b** Shallow rubbly calcareous loam (Paralithic, Lithocalcic / Supracalcic Calcarosol)
10 - 30 cm calcareous fine sandy loam to loam over rubbly Class III C/B carbonate, becoming less rubbly with depth and merging with weathering rock at 60 cm.
- A4** Rubbly calcareous loam (Regolithic, Lithocalcic / Supracalcic Calcarosol)
10 - 30 cm calcareous fine sandy loam to loam over rubbly Class III C/B carbonate, becoming less rubbly with depth and merging with alluvial sediments deeper than 100 cm.
- A6** Non rubbly calcareous loam (Regolithic / Pedal, Hypercalcic Calcarosol)
10 - 20 cm calcareous loam becoming gradually more clayey and calcareous with depth over soft carbonate from 30 cm, grading to alluvial clay from 85 cm.
- B2** Shallow calcareous loam over calcrete (Petrocalcic, Lithocalcic Calcarosol)
25 - 45 cm calcareous fine sandy loam to loam with Class III C carbonate rubble at shallow depth over calcrete.
- D1** Loam over friable red clay on rock (Hypercalcic, Red Chromosol)
10 - 25 cm hard gravelly fine sandy loam to loam abruptly overlying a well structured clay loam to clay with soft carbonate from 40 cm, grading to weathering rock at 90 cm.
- D2** Hard loam over well structured red clay (Hypercalcic, Red Chromosol)
10 - 40 cm hard fine sandy loam to loam abruptly overlying a well structured and friable red clay with soft carbonate from 40 cm, grading to alluvial clay to silty clay loam.
- D3** Hard loam over dispersive red clay (Hypercalcic, Red Sodosol)
10 - 40 cm hard fine sandy loam to loam abruptly overlying a coarsely structured, dispersive and sodic red clay with soft carbonate from 40 cm, grading to alluvial clay to silty clay loam.

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

