

# HLT Hallett Land System

Hallett Valley, including the upper catchments of Uooloo and Cartapo Creeks

**Area:** 98.1 km<sup>2</sup>

**Annual rainfall:** 380 - 480 mm average

**Geology:** The Hallett Valley is essentially an alluvial system of fine grained sediments derived from rocks of the Tapley Hill, Saddleworth and Appila Formations. These rocks outcrop on the margins of the valley as footslopes grading to the higher hills of the Razorback and Cartapo Land Systems. Most of the sediments and rocks are mantled by a veneer of aeolian carbonates which are usually soft but may be indurated to rubbly calcrete.

**Topography:** The Hallett Valley is a flat to gently sloping alluvial plain with a weakly defined watershed crossing in an east - west direction at Hallett. The upper catchment of Uooloo Creek is to the north, and the upper catchment of Cartapo Creek is to the south. On the western side of the valley floor the land grades to gently inclined outwash fans with slopes of 2-10%, interspersed with basement rock highs with slopes up to 20%. There is a similar pattern on the eastern side but with a smaller proportion of basement rock rises. Water course erosion and saline seepage occur sporadically.

**Elevation:** The highest point is 690 m grading to 520 m where Cartapo Creek leaves the system, and 550 m where Uooloo Creek flows out.

**Relief:** Maximum local relief is 40 m. Overall relief from valley floor to crest of basement rock rise is typically 100 m.

**Soils:** Most soils are red sandy loams to loams with clayey subsoils, deep over alluvium. Shallower soils, either with thin red clayey subsoils or carbonate accumulations, occur on rising ground.

## Main soils

*Deep soils formed over alluvium on outwash fans*

**D3** Hard sandy loam over red dispersive clay

**D2** Hard sandy loam over red well structured clay

*Moderately deep to shallow soils on basement rock rises*

**D1** Hard sandy loam over red well structured clay on rock

**C2** Shallow gradational loam on rock

## Minor soils

*Deep soils formed over alluvium on outwash fans*

**C3** Gradational red loam

*Moderately deep to shallow soils on basement rock rises*

**A2** Calcareous loam

**D7** Hard sandy loam over poorly structured red clay on rock

**L1** Shallow stony loam

**Main features:** The flats and outwash fans have deep, inherently fertile and generally well drained soils. Their main limitations are physical, with poor surface structure and commonly dispersive subsoils as well. Excessive runoff, increased erosion potential, workability problems and patchy emergence are all caused by poor soil structure. Sporadic saline seepage is a further limitation on lower slopes and valley flats. The rising ground has similar soils, but a higher proportion of better structured profiles without abrupt texture contrast.



**Soil Landscape Unit summary:** 17 Soil Landscape Units (SLUs) mapped in the Hallett Land System:

SLU	% of area	Main features #
DGC DGM DGc	9.9 6.0 5.9	<p>Rises formed on siltstone basement rock.</p> <p><b>DGC</b> Rises with slopes of 5-15% and relief to 30 m</p> <p><b>DGM</b> Rises with slopes of 5-15% (some short slopes to 20%) and minor saline seepage on lower slopes.</p> <p><b>DGc</b> Rises up to 40 m high with slopes of 5-15% (some short slopes to 20%), eroded water courses and minor saline seepage on lower slopes.</p> <p>Main soils: <u>hard sandy loam over red well structured clay on rock</u> - <b>D1</b> (E) and <u>shallow gradational loam on rock</u> - <b>C2</b> (C) with <u>hard sandy loam over poorly structured red clay on rock</u> - <b>D7</b> (L), <u>calcareous loam</u> - <b>A2</b> (L) and <u>shallow stony loam</u> - <b>L1</b> (L). The soils are moderately deep and naturally fertile but have surface structure limitations (hard setting and surface sealing) which cause excessive runoff and associated erosion, difficult working conditions, patchy seedling emergence and impaired root development.</p>
DXB DXC	6.3 6.4	<p>Complex of low basement rock rises and gently sloping fans</p> <p><b>DXB</b> Slopes of 1-4%.</p> <p><b>DXC</b> Slopes of 4-12% with minor steep banks.</p> <p>Main soils: <u>hard sandy loam over red well structured clay on rock</u> - <b>D1</b> (E) with <u>hard sandy loam over poorly structured red clay on rock</u> - <b>D7</b> (L), <u>calcareous loam</u> - <b>A2</b> (L) and <u>shallow gradational loam on rock</u> - <b>C2</b> (M) on rises, and <u>hard sandy loam over dispersive red clay</u> - <b>D3</b> (L) and <u>hard sandy loam over well structured red clay</u> - <b>D2</b> (M) with <u>gradational red loam</u> - <b>C3</b> (M) on fans. Hard setting surface soils and poorly structured subsoils are characteristic of the D3 soils, dominant on the fans, and the D7 soils of the rises. The texture contrast soils with well structured subsoils on both the rises and the fans have similar but less severe conditions. Reduced infiltration, erosion, poor workability and root growth, and patchy emergence result from poor structure. The other soils of the rises are better structured although shallower, and have good productivity potential.</p>
ESD	6.6	<p>Rocky upper slopes and crests with slopes of 10-20%. Rocky reefs are common, with up to 50% of the land area rendered non arable.</p> <p>Main soils: <u>shallow gradational loam on rock</u> - <b>C2</b> (E) and <u>calcareous loam</u> - <b>A2</b> (E), with <u>shallow stony loam</u> - <b>L1</b> (L) typical of stony areas on harder rocks. Rocky reefs, shallow stony soils and sometimes moderate slopes limit cropping of these areas. The arable land is 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>
JBB JBG JBH JBK JBP JBQ JBe	16.8 3.4 3.2 21.1 0.5 0.8 1.1	<p>Outwash fans formed on locally derived alluvium:</p> <p><b>JBB</b> Very gently inclined fans with slopes of 2-3%.</p> <p><b>JBG</b> Very gently inclined fans with slopes of 2-3% and eroded water courses.</p> <p><b>JBH</b> Gently inclined fans with slopes of 3-8% and eroded water courses.</p> <p><b>JBK</b> Flats with slopes of less than 1% and sporadic saline seepage.</p> <p><b>JBP</b> Marginally saline flats with less than 1% slope.</p> <p><b>JBQ</b> Marginally saline gentle slopes of 2-3%.</p> <p><b>JBe</b> Narrow drainage depression with a severely eroded water course and sporadic saline seepage.</p> <p>Main soils: <u>deep hard sandy loam over dispersive red clay</u> - <b>D3</b> (E) and <u>hard sandy loam over well structured red clay</u> - <b>D2</b> (E) with <u>gradational red loam</u> - <b>C3</b> (L). The soils are deep and naturally fertile, but are generally poorly structured in the surface and often dispersive in the subsoil. This leads to excessive runoff and erosion, difficulty in working and patchy emergence. Erosion of moderate slopes is a constant threat. Sporadic saline seepages should be monitored to assess the status of the problem.</p>
JXB JXC JXV JXW	2.8 5.9 1.4 1.9	<p>Complex of outwash fans and intervening basement rock rises.</p> <p><b>JXB</b> Very gentle slopes of 1-3%.</p> <p><b>JXC</b> Gentle slopes of 3-10%</p> <p><b>JXV</b> Very gentle slopes of 2-3% with scalded patches.</p> <p><b>JXW</b> Gentle slopes of 3-10% with scalded patches.</p> <p>Main soils: <u>Deep hard sandy loam over dispersive red clay</u> - <b>D3</b> (E) and <u>hard sandy loam over well structured red clay</u> - <b>D2</b> (C) on fans; and shallower <u>hard sandy loam over red well structured clay</u> - <b>D1</b> (L) and <u>shallow gradational loam on rock</u> - <b>C2</b> (L) with <u>hard</u></p>



	<p><u>sandy loam over poorly structured red clay on rock - D7 (M) and calcareous loam - A2 (M) on rises.</u></p> <p>The soils on the fans are deep and naturally fertile, but are generally poorly structured in the surface and often dispersive in the subsoil. This leads to excessive runoff and erosion, difficulty in working and patchy emergence. Soils on the rises are usually better structured (exception is D7), but all land is prone to water erosion. The land which has been scalded in the past is particularly susceptible.</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:

- A2** Calcareous loam (Paralithic, Hypercalcic / Supracalcic Calcarosol)  
Calcareous loam grading to a very highly calcareous clay loam or rubble layer merging with calcareous weathering rock within 100 cm, usually 50 cm.
- C2** Shallow gradational loam on rock (Hypercalcic / Supracalcic, Red Dermosol)  
Loam to clay loam grading to a well structured clay with soft to rubbly carbonate at depth, merging with weathering rock by 100 cm.
- C3** Gradational red loam (Hypercalcic / Supracalcic, Red Dermosol)  
Loam to clay loam grading to a well structured clay with soft to rubbly carbonate at depth, continuing below 100 cm.
- D1** Hard sandy loam over red well structured clay on rock (Calcic, Red Chromosol)  
Medium thickness hard setting sandy loam to loam abruptly overlying a well structured red clay with soft carbonate accumulations, grading to weathering rock within 100 cm.
- D2** Hard sandy loam over red well structured clay (Calcic, Red Chromosol)  
Medium thickness hard setting sandy loam to sandy clay loam abruptly overlying a well structured red clay with soft carbonate accumulations at depth, continuing below 100 cm.
- D3** Hard sandy loam over red dispersive clay (Calcic, Red Sodosol)  
Medium thickness hard setting sandy loam to sandy clay loam abruptly overlying a poorly structured dispersive red clay with soft carbonate accumulations at depth, continuing below 100 cm.
- D7** Hard sandy loam over poorly structured red clay on rock (Calcic, Red Sodosol)  
Medium thickness hard setting sandy loam to sandy clay loam abruptly overlying a coarsely structured dispersive red clay, with fine carbonate accumulations at depth, grading to weathering quartzitic rock from about 100 cm.
- L1** Shallow stony loam (Paralithic, Leptic Tenosol)  
Shallow stony loam, sometimes calcareous with depth, overlying basement rock within 50 cm.

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

