

SHH Sheoak Hill Land System

Low hills east of Halbury

Area: 71.7 km²

Annual rainfall: 400 – 500 mm average

Geology: Quartzites, quartzitic shales, sandstones and siltstones of the River Wakefield Group, partially overlain by cemented Tertiary sands, with associated sandy clay and clay deposits. These sediments are commonly silicified and ferruginized, with silcrete outcrop and surface ironstone occurring sporadically. Both basement rocks and Tertiary sediments are generally mantled by soft carbonates of aeolian origin. These are cemented in places to rubble or sheet calcrete.

Topography: The Sheoak Hill Land System comprises undulating to rolling low hills forming the western margin of the North Mt. Lofty Ranges in the area east of Halbury. The western side of the System consists of gently to moderately inclined slopes (usually of less than 10%) grading to the Halbury plains. The eastern side is steeper, characterized by strongly dissected moderately inclined slopes of 10 - 30% with severely eroded water courses flowing into the Wakefield River. The steepest slopes are adjacent to the river where it has cut a gorge 50 to 70 m deep through the underlying rocks.

Elevation: 339 m (Sheoak Hill) in the north to 100 m at "The Rocks" on the Wakefield River

Relief: Maximum relief is 70 m in the River Wakefield gorge

Soils: Most soils are loamy to clay loamy with red clayey subsoils formed in freshly or deeply weathered rock. A range of additional soils, including deep sands, sand over clay and cracking clays occur on Tertiary sediments.

Main soils: *Soils formed on basement rocks*

D7 Hard clay loam over dispersive red clay on rock

D1 Hard loam over red clay on rock

Soils formed over Tertiary sediments

D3 Sandy loam over dispersive red clay

Minor soils: *Soils formed on basement rocks*

C3 Gradational clay loam

B4/B2 Shallow loam over calcrete

L1 Shallow stony sandy loam to loam

C2 Gradational clay loam on rock

Soils formed over Tertiary sediments

G1 Loamy sand over red sandy clay

H2 Deep sand

E2 Red cracking clay

Main features: The characteristic feature of the Sheoak Hill Land System is the extent of gully erosion in watercourses draining the slopes, particularly in the Wakefield River catchment. This is attributable to the predominant sodic texture contrast soils which have poorly structured surfaces over dispersive clay subsoils. These soils have low infiltration rates and low resistance to dislodgment by running water. Because most set down hard and seal, they are



also difficult to work and are responsible for patchy emergence and early growth. Other soils (loamy texture contrast, gradational and calcareous, and cracking clays) are better structured but often shallow. Limited areas of deep sands are susceptible to wind erosion.

Soil Landscape Unit summary: 13 Soil Landscape Units (SLUs) mapped in the Sheoak Hill Land System

SLU	% of area	Main features #
ARC	1.7	Low hills up to 50 m high with slopes of 15-30%, formed on quartzitic rocks of the Ingomar Quartzite Formation. There is minor rock outcrop and up to 20% surface quartzite. Main soils: <u>shallow stony loam</u> - L1 (E) and <u>hard clay loam over dispersive red clay on rock</u> - D7 (E). Land is too steep and stony for cropping, and is largely uncleared. Provides useful stock shelter.
AXI AXp	4.8 1.9	Rocky slopes formed on basement rocks, often deeply weathered and partly capped by Tertiary sands and silcrete. Water courses are often severely eroded. AXI Dissection slopes of 20-30%. AXp Irregular slopes of up to 60% in the Wakefield River gorge. Small terraces adjacent to the river are included. Main soils: <u>shallow stony loam</u> - L1 (E), with <u>shallow loam over calcrete</u> - B4/B2 (C), <u>hard clay loam over dispersive red clay on rock</u> - D7 (L) and <u>hard loam over red clay on rock</u> - D1 (L). These slopes are non arable because of their gradients, severe erosion, extensive rockiness and shallow, low fertility soils. Deeply weathered kaolinitic soils are often associated with high levels of stored salts, so recharge of groundwater should be controlled in these areas.
DDH DDI	6.7 1.9	Slopes formed on mixed siltstones, sandstones, quartzites and dolomites. DDH Undulating rises to 30 m high with slopes of 4-10% and some water course erosion. DDI Slopes of 10-18%, to 30 m high with up to 10% rocky areas and some erosion in watercourses. Main soils: <u>hard loam over red clay on rock</u> - D1 (E), with <u>hard clay loam over dispersive red clay on rock</u> - D7 (L), <u>gradational clay loam on rock</u> - C2 (L) and <u>shallow loam over calcrete</u> - B4/B2 (L). The soils are moderately deep, fertile and potentially productive, their main limitation being poor surface structure, with associated susceptibility to erosion. The steeper slopes of DDI are only semi arable.
DJH DJI	19.0 13.8	Slopes, rises and low hills formed on a complex of basement sandstones and shales, both freshly and deeply weathered and Tertiary sandstones and sandy clays. The substrate materials are commonly ferruginized or silicified, and sometimes calcreted. Silcrete outcrops sporadically, and there is variable surface ironstone. DJH Undulating slopes of 4-10% with moderate to severe water course erosion. DJI Moderate slopes of 10-20% with moderate to severe water course erosion. Main soils: <u>hard clay loam over dispersive red clay on rock</u> - D7 (E) and <u>sandy loam over dispersive red clay</u> - D3 (E), with <u>gradational clay loam</u> - C3 (L) and <u>deep sand</u> - H2 (M). These slopes are highly erodible due to their predominantly poorly structured soils (surface and subsoil). Eroded watercourses indicate substantial historic erosion. The hard setting surfaces shed water, reducing profile water storage, are difficult to work and may cause patchy emergence. Sub-optimal fertility and abrasive soils are additional limitations. The steeper slopes of DJI are only marginally arable. Sandy soils are prone to wind erosion.
DLD DLH DLI	3.6 5.1 9.7	Slopes formed on quartzitic shales, phyllites and quartzites of the Boconnoc Formation. DLD Low hills 30 to 50 m high with slopes of 10-20%. DLH Rises and gentle slopes of 5-10% with eroded water courses. DLI Rolling low hills to 50 m high, with slopes of 10-20% and eroded water courses. Main soils: <u>hard clay loam over dispersive red clay on rock</u> - D7 (E), with <u>hard loam over red clay on rock</u> - D1 (C) and <u>shallow loam over calcrete</u> - B4/B2 (C). These slopes are mainly arable, although often too steep for regular cropping. The predominant soils are poorly structured, with hard surfaces and dispersive subsoils making them highly erodible, difficult to work and unfavourable for plant establishment. Although soil depth and inherent fertility are satisfactory, high subsoil boron concentrations will cause loss of productivity in susceptible crops. Management strategies should focus on soil structure amelioration. Water course protection is also required.



DXH	9.7	Complex of rises formed on quartzitic shales, and outwash fans formed on outwash sediments. Slopes are 4-12%. Water course erosion is severe. Main soils: <u>hard clay loam over dispersive red clay on rock</u> - D7 (E) and <u>sandy loam over dispersive red clay</u> - D3 (E), formed on rock and outwash sediments respectively, with <u>shallow loam over calcrete</u> - B4/B2 (L) and <u>hard loam over red clay on rock</u> - D1 (L). This land is highly erodible and subject to considerable runoff from adjacent steeper slopes. Consequently there has been widespread erosion in the past. As for DLH , soil structure amendment is the main issue, as the soils are generally moderately deep and fertile. Watercourse protection is necessary.
GDZ	12.2	Gently undulating exposed upper slopes and crests with slopes generally less than 4%, steeper at the edges. The land is underlain by a complex of Tertiary sediments and deeply weathered basement rocks. Main soils: <u>loamy sand over red sandy clay</u> - G1 (E), with <u>gradational clay loam</u> - C3 (C), <u>red cracking clay</u> - E2 (L) and <u>shallow loam over calcrete</u> - B4/B2 (L). This land is fully arable, with short gentle slopes minimizing water erosion potential. Soils are variable, some sandy. These have low fertility and are subject to wind erosion. Fertility improvement and maintenance of surface cover are the main management issues. The more clayey soils are potentially highly productive.
HJC	9.9	Undulating slopes of 3-8% formed on Tertiary sandy clays, clays and sandstones, with some reworking of sands into drift deposits. There is minor watercourse erosion. Main soils: <u>sandy loam over dispersive red clay</u> - D3 (V), with <u>deep sand</u> - H2 (L). These slopes are highly erodible due to their predominantly poorly structured soils and sandy textured surfaces. The hard setting surfaces shed water, reducing profile water storage, are difficult to work and may cause patchy emergence. Fertility is marginal due to the low clay content of the surface soils. Sandy soils are prone to wind erosion.

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:

B4/B2 Shallow loam over calcrete (Petrocalcic, Red Dermosol / Petrocalcic Calcarosol)

15 - 25 cm loam to clay loam grading to dark brown or red clay loam to clay over sheet calcrete at about 30 cm over highly calcareous clay loam merging with weathered basement rock deeper than 50 cm.

C2 Gradational clay loam on rock (Hypercalcic, Red Dermosol)

Friable clay loam to light clay grading to a well structured red clay, calcareous from about 40 cm, grading to fresh weathering fine grained rock within 100 cm.

C3 Gradational clay loam (Hypercalcic, Red Dermosol)

Friable clay loam to light clay grading to a well structured red clay, calcareous from about 40 cm, grading to highly weathered rock deeper than 100 cm.

D1 Hard loam over red clay on rock (Hypercalcic, Red Chromosol)

15 - 35 cm quartz gravelly loam abruptly overlying a well structured red clay with soft carbonate from about 50 cm grading to siltstone deeper than 50 cm.

D3 Sandy loam over dispersive red clay (Hypercalcic, Red Sodosol)

10 - 30 cm hard sandy loam abruptly overlying a coarsely structured dispersive red clay, calcareous from about 50 cm, grading to Tertiary sandy clay to clay.

D7 Hard clay loam over dispersive red clay on rock (Hypercalcic, Red Sodosol)

10 - 30 cm quartz gravelly loam to clay loam sharply overlying a coarsely structured dispersive red clay with soft carbonate from about 50 cm grading to quartzitic shale, quartzite or outwash clay deeper than 80 cm.



- E2** Red cracking clay (Red Vertosol)
Dark, strongly structured seasonally cracking clay becoming coarser structured, redder, more clayey and calcareous with depth.
- G1** Loamy sand over red sandy clay (Hypercalcic / Lithocalcic, Red Chromosol)
10 - 40 cm soft loamy sand abruptly overlying a red massive sandy clay loam to sandy clay with soft to rubbly carbonate from about 40 cm grading to Tertiary sandstone as shallow as 40 cm.
- H2** Deep sand (Calcareous, Arenic/ Regolithic, Red-Orthic / Brown Orthic Tenosol)
30 - 70 cm loose loamy sand grading to a massive red sandy loam, calcareous at depth.
- L1** Shallow stony sandy loam to loam (Lithic, Leptic Tenosol / Rudosol)
Up to 50 cm stony sandy loam to loam directly overlying basement rock.

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

