

# UBC Upper Brady Creek Land System

Dissected rises and low hills in the headwaters of Brady Creek, west of Robertstown

**Area:** 38.9 km<sup>2</sup>

**Annual rainfall:** 400 – 500 mm average

**Geology:** A band of Appila Tillite underlies the western quarter of the Land System, and the eastern three quarters is formed over fine grained rocks of the Tapley Hill Formation. Adjacent to the Tothill Range which marks the western edge of the System are stony coarse grained outwash sediments, deposited between rises of Appila Tillites. Elsewhere, outwash deposits are finer grained but restricted in area. There are some residual deposits of secondary carbonates mantling both rocks and sediments, but generally these materials have been eroded away.

**Topography:** The land system comprises undulating to strongly undulating rises which have been extensively dissected by stream action. This process has resulted in a characteristic topography of short moderately inclined slopes separated by frequent well defined watercourses. The network of watercourses converges on the main channel of Brady Creek in the north east corner of the System where it flows eastwards through a gorge in the adjacent Eudunda Escarpment Land System. Slopes of the rises are mostly in the range 5-20%, but there are some steeper areas. Rocky outcrops are widespread, with a pronounced linearity.

**Elevation:** 610 m on the southern watershed to 420 m where Brady Creek flows out

**Relief:** Maximum relief is 40 m

**Soils:** Hard poorly structured sandy loams to loams are typical, usually with red clayey subsoils. Secondary carbonates occur sporadically in the subsoils. On steeper slopes, shallow stony and / or calcareous loams are common.

**Main soils:** *Soils formed over basement rocks on rises*

- L1** Shallow stony loam to sandy loam- steeper and / or stony slopes
- D1/K2** Hard loam over well structured red clay on rock - Tapley Hill Formation rocks
- D7a/K3** Hard loam over dispersive red clay on rock - Tapley Hill Formation rocks

**Minor soils:** *Soils formed over basement rocks on rises*

- D7b/K3** Hard gravelly sandy loam over dispersive red clay on rock - Appila Tillite
- A2** Shallow calcareous loam - calcareous rocks
- C2/K1** Gradational clay loam on rock - fine grained Tapley Hill Formation rocks

*Soils formed on alluvium*

- D3a** Hard stony sandy loam over dispersive clay
- D3b** Hard loam over dispersive red clay

**Main features:** The Upper Brady Creek Land System is characterized by moderate slopes with variable rock outcrop making substantial areas semi or non arable. There are large areas of shallow stony soils (mostly on steeper slopes), but on the arable land, soils are moderately deep and fertile. Their main limitation is poor structure which results in excessive runoff (and associated erosion potential), workability problems and patchy early crop growth. The degree of dissection of the landscape indicates that the potential for erosion is high, with watercourses being particularly vulnerable.



**Soil Landscape Unit summary:** 9 Soil Landscape Units (SLUs) mapped in the Upper Brady Creek Land System

SLU	% of area	Main features #
AAB AAC AAI	2.9 4.0 8.3	<p>Rocky slopes formed on fine grained rocks of the Tapley Hill Formation. There is variable rock outcrop up to 20% and extensive surface stone.</p> <p><b>AAI</b> Rises to 20 m high with slopes of 8-15%.</p> <p><b>AAC</b> Rises and low hills to 40 m high with slopes of 15-30%. There is minor watercourse erosion.</p> <p><b>AAI</b> Irregular dissection slopes of up to 50% and up to 30 m high, created by down cutting of major streams through basement rock.</p> <p>Main soils: <u>shallow stony loam</u> - <b>L1</b> (V), with <u>hard loam over dispersive red clay on rock</u> - <b>D7a/K3</b> (L) and <u>hard loam over well structured red clay on rock</u> - <b>D1/K2</b> (L). This land is non arable due to moderate slopes and rockiness. It provides useful grazing, provided that surface cover is maintained to prevent erosion. The slopes of AAI are particularly susceptible to severe erosion.</p>
ALI	18.1	<p>Moderately steep rocky low hills formed on tillites. Slopes are 15-30%, and relief is up to 60 m. There is 10-20% rock outcrop and 20% or more surface stone. Watercourses are commonly eroded.</p> <p>Main soils: <u>shallow stony sandy loam</u> - <b>L1</b> (V) with <u>hard gravelly sandy loam over dispersive red clay on rock</u> - <b>D7b/K3</b> (C). This land is moderately steep and rocky with shallow soils. Where tree cover remains, it provides useful stock shelter.</p>
DBC DBI	26.7 8.7	<p>Rises formed on fine grained Tapley Hill Formation rocks. There is up to 5% outcropping rock in linear reefs.</p> <p><b>DBC</b> Undulating rises to 30 m high with slopes of 4-12%.</p> <p><b>DBI</b> Strongly undulating dissected slopes of 10-20% with eroded watercourses.</p> <p>Main soils: <u>hard loam over dispersive red clay on rock</u> - <b>D7a/K3</b> (E), <u>hard loam over well structured red clay on rock</u> - <b>D1/K2</b> (E) with <u>shallow stony loam</u> - <b>L1</b> (L), <u>shallow calcareous loam</u> - <b>A2</b> (L) and <u>gradational clay loam on rock</u> - <b>C2/K1</b> (M). The soils are moderately fertile but are often shallow, reducing their capacity to store moisture. Poor surface structure is the main limitation on the deeper soils. Most of the land is arable (although at risk of erosion) and should be productive in seasons with extended spring rainfall to overcome soil moisture shortages.</p>
DSD	16.4	<p>Strongly undulating rises to 30 m high with slopes of 10-20% formed on fine grained Tapley Hill Formation rocks. There is up to 20% outcropping rock in linear reefs.</p> <p>Main soils: <u>loam over dispersive red clay on rock</u> - <b>D7a/K3</b> (E) and <u>hard loam over well structured red clay on rock</u> - <b>D1/K2</b> (E) with <u>shallow stony loam</u> - <b>L1</b> (L). This land is semi arable due to moderate slopes and associated erosion potential, and the extent of rocky outcrop. The soils are generally fertile but moderately shallow and stony. They have poorly structured surfaces which set hard and seal over. This leads to excessive runoff and erosion, workability difficulties and emergence/early growth problems.</p>
DZH	10.0	<p>Complex of rises formed on Appila Tillites and outwash fans formed on alluvium. Slopes are 4-10%. There is 2-5% rocky outcrop as linear reefs and up to 20% surface quartzite. Watercourses are commonly eroded.</p> <p>Main soils: <u>hard gravelly sandy loam over dispersive red clay on rock</u> - <b>D7b/K3</b> (E) and <u>shallow stony sandy loam</u> - <b>L1</b> (C) on rises, and <u>hard stony sandy loam over dispersive red clay</u> - <b>D3a</b> (E) on outwash fans. The predominant soils have low to moderate fertility and are poorly structured. This causes excessive runoff, high erodibility and poor establishment/early growth conditions for plants. Management strategies to improve soil structure and control erosion are essential.</p>
JBJ	4.9	<p>Drainage depressions formed on localized alluvial sediments with eroded watercourses. Slopes are up to 4%.</p> <p>Main soil: <u>hard loam over dispersive red clay</u> - <b>D3b</b> (D). These minor areas have deep fertile soils with poor physical characteristics. Restricted water infiltration, erosion, some waterlogging and patchy early growth are likely consequences. Watercourses are highly susceptible to erosion in this landscape.</p>

# 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** Shallow calcareous loam (Paralithic, Hypercalcic / Calcic Calcarosol)  
Calcareous siltstone gravelly loam over light brown soft silty carbonate grading to dolomite or calcareous siltstone.
- C2/K1** Gradational clay loam on rock (Calcic / Eutrophic, Red / Brown Dermosol)  
Medium thickness clay loam grading to a red or brown well structured medium to heavy clay, sometimes calcareous with depth, over weathering siltstone or phyllite.
- D1/K2** Hard loam over well structured red clay on rock (Calcic / Eutrophic, Red Chromosol)  
20 - 40 cm hard siltstone gravelly loam to clay loam abruptly overlying a well structured and friable red clay, sometimes calcareous with depth grading to weathering siltstone or phyllite within 100 cm.
- D3a** Hard stony sandy loam over dispersive clay (Calcic / Eutrophic, Red / Brown Sodosol)  
20 - 50 cm quartzite gravelly sandy loam to sandy clay loam with a bleached A2 layer, abruptly overlying a thick red or brown mottled coarsely structured dispersive clay.
- D3b** Hard loam over dispersive red clay (Calcic / Eutrophic, Red Sodosol)  
20 - 40 cm hard loam to clay loam abruptly overlying a coarsely structured dispersive red clay continuing below 100 cm.
- D7a/K3** Hard loam over dispersive red clay on rock (Calcic / Eutrophic, Red Sodosol)  
20 - 40 cm hard siltstone gravelly loam to clay loam abruptly overlying a coarsely structured and dispersive red clay, sometimes calcareous with depth grading to weathering siltstone or phyllite within 100 cm.
- D7b/K3** Hard gravelly sandy loam over dispersive red clay on rock (Calcic / Eutrophic, Red Sodosol)  
20 - 35 cm hard sandy loam with abundant quartzite and sandstone gravel, abruptly overlying a coarsely structured dispersive red clay, sometimes calcareous with depth, grading to weathering quartzitic or coarse grained rock within 100 cm.
- L1** Shallow stony loam to sandy loam (Paralithic / Lithic, Leptic Tenosol / Rudosol)  
Up to 40 cm very stony sandy loam to loam directly overlying soft to hard basement siltstone or tillite.

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

