

MEL Melrose Land System

Very gently inclined plains north and east of Melrose at the foot of Mt. Remarkable

Area:	174.2 km ²
Annual rainfall	345 – 525 mm average
Geology:	Colluvial and alluvial sediments comprising boulder beds, stony silts and clays, and fine grained non-stony deposits (depending on depositional environment and distance from the ranges).
Topography:	Scree slopes, outwash fans and alluvial plains at the base of Mt. Remarkable in the headwaters of Willochra Creek. Immediately adjacent to the range there is abundant surface stone and gravel, and slopes are up to 15%. These gradients rapidly flatten to the north and east through fans with slopes of 1 - 2% to the alluvial flats and flood plain of Willochra Creek where slopes are less than 1% and there is no surface stone.
Elevation:	290 m on the flood plain to 450 m at the highest part of the scree slope near Melrose
Relief:	There is little relief on the fans and plains. On the scree slopes there is up to 10 m relief provided by weakly incised watercourses.
Soils:	Deep loamy to clayey soils are widespread. They generally have texture contrast or gradational profiles. Near the ranges and near creek lines, they tend to be very stony.

Main soils

Sandy loam to clay soils of alluvial flats

D2	Hard loam over red clay
D3	Hard clay loam over dispersive red clay
C3	Gradational clay loam

Minor soils

Sandy loam to clay soils of alluvial flats

E1	Black cracking clay
D5	Loamy sand over red mottled clay
M4	Gradational loamy sand
D4	Loam over red friable clay
E2	Red cracking clay
A5/A6	Calcareous clay loam
F1	Sandy loam over brown clay

Soils of marginally saline flats

E3	Brown cracking clay
F2	Sandy loam over brown dispersive clay

Stony alluvial soils

M2	(Stony) gradational loam
M3	Boulder bed sandy loam

Soils of basement rock rises

K3	Sandy loam over red clay on rock
A2/L1	Shallow calcareous loam
D1/D7	Loam over red clay on rock
C2	Gradational loam over rock



Main features: The Melrose Land System is characterized by gently sloping to flat land formed on a range of alluvial sediments. This range is reflected in a variety of soils including hard setting and poorly structured texture contrast types, well structured clay loams and cracking clays, stony soils and weakly structured sandy loams. Although most are naturally fertile and deep (except the stony soils), productive potential is often limited by poor soil structure which causes impeded water movement and restricted root growth. There are areas of marginally saline land in the north.

Soil Landscape Unit summary: 23 Soil Landscape Units (SLUs) mapped in the Melrose Land System:

SLU	% of area	Main features #
JAA JAB JAC	4.1 35.1 0.6	Outwash fans formed on stony alluvium. JAA Slopes of 1-2%. JAB Slopes of 2-4%. JAC Slopes of 4-10%. Main soils: <u>hard loam over red clay</u> - D2 (E) and <u>hard clay loam over dispersive red clay</u> - D3 (E), with <u>gradational loam</u> - C3 (L) and <u>black cracking clay</u> - E1 (L). Soils are fertile but commonly have physical limitations. These include hard setting surfaces which are difficult to work, have low infiltration rates and suffer patchy emergence. On slopes, they are susceptible to erosion. Dispersive clays in D3 soils restrict water movement and root development, leading to waterlogging and reduced moisture availability. Abundant surface quartzite abrades implements.
JBB JBE	3.3 2.2	Outwash fans and drainage depressions formed on clayey alluvium. JBB Outwash fans with slopes of 1-2%. JBE Drainage depression with stable watercourse. Main soils: <u>loamy sand over red mottled clay</u> - D5 (V) with <u>hard loam over red clay</u> - D2 (C). These soils are deep and fertile, but the D5 type in particular is poorly structured and prone to waterlogging and erosion.
JCA	5.5	Flats and gentle slopes formed on clayey alluvium. Slopes are 1-2%. Main soils: <u>loam over red friable clay</u> - D4 (E) and <u>gradational clay loam</u> - C3 (E), with <u>brown cracking clay</u> - E3 (C), and <u>red cracking clay</u> - E2 (L). These soils are deep and fertile with medium to fine textured surfaces. The main limitations to crop production are waterlogging in wet years and subsoil salinity caused by inadequate leaching.
JMB JME	0.8 0.7	Outwash fans and drainage depressions formed on clayey alluvium. JMB Fans with slopes of 1-2%. JME Drainage depression with stable watercourse. Main soils: <u>hard loam over red clay</u> - D2 (E), <u>loam over red friable clay</u> - D4 (C) and <u>calcareous clay loam</u> - A5/A6 (C), with <u>(stony) gradational loam</u> - M2 (L) and <u>red cracking clay</u> - E2 (M). These soils are deep and fertile, with sub-optimal structure the only significant limitation.
JNA	1.7	Flat plain formed on medium to fine grained alluvium. Main soils: <u>loam over red friable clay</u> - D4 (E) and <u>hard loam over red clay</u> - D2 (E), with <u>calcareous clay loam</u> - A5/A6 (C) and <u>red cracking clay</u> - E2 (L). These soils are deep and fertile with few limitations to crop growth.
JVA JVE	14.0 5.1	Fans formed on stony alluvium. JVA Slopes of 0.5-2%. JVE Flood outs. Main soils: <u>hard loam over red clay</u> - D2 (E) and <u>hard clay loam over dispersive red clay</u> - D3 (E) with <u>gradational loamy sand</u> - M4 (C). The soils of this landscape are poorly structured with hard setting surfaces. Problems include workability restrictions, poor infiltration and patchy emergence, and dispersive clays leading to waterlogging. Salinity is a problem in places and flooding occurs in wet years.
JXC	1.0	Footslopes formed on outwash sediments with basement rock rises occupying about 25% of the land surface. Slopes are 5-10%. Main soils: <u>hard loam over red clay</u> - D2 (V) on alluvium and <u>loam over red clay on rock</u> - D1/D7 (C) on rises. These soils are deep to moderately deep, with poor surface structure and potential for water erosion the main limitations.



JYB JYC	1.0 0.3	Complex of gentle slopes on alluvium and steeper slopes on basement rock. JYB Slopes of 2-6%. JYC Slopes of 4-10%. Main soils: <u>hard loam over red clay</u> - D2 (E) and <u>hard clay loam over dispersive red clay</u> - D3 (E) on alluvium, and <u>gradational loam on rock</u> - C2 (C), <u>shallow calcareous loam</u> - A2 and <u>shallow stony loam</u> - L1 (C) on basement rock. These slopes are highly variable. Some soils have hard setting surfaces and dispersive clays resulting in problems with workability, infiltration, crop emergence and erosion. Shallow soils on weathering rock or hard carbonate have low moisture holding capacities. Stoniness and associated implement abrasion is widespread.
KBB	0.6	Outwash fans formed on clayey alluvium. Slopes are 1-2%. Main soils: <u>calcareous clay loam</u> - A5/A6 (E) and <u>gradational clay loam</u> - C3 (E). These soils are deep and fertile with no significant limitations to cropping.
KWp	3.7	Flats on clayey alluvium with saline, scalded and gilgai patches. Main soils: <u>brown cracking clay</u> - E3 (E) and <u>sandy loam over brown dispersive clay</u> - F2 (E). These soils are very poorly structured and are prone to waterlogging, working difficulties and patchy emergence. Salinity is common and some areas have been scalded in the past.
KZC KZD	6.4 2.6	Stony lower slopes formed on stony alluvium / colluvium. KZC Slopes of 4-10%. KZD Slopes of 10-20%. Main soils: <u>stony gradational loam</u> - M2 (E) and <u>boulder bed sandy loam</u> - M3 (E). These soils are generally very stony and have low waterholding capacities and fertility. Slopes moderate with potential for erosion. The land has limited potential for more intensive development.
LpC LpD	1.3 0.4	Footslopes comprising outwash fans and associated basement rock rises. LpC Footslopes of 3-12% with eroded watercourses. LpD Footslopes of 5-12%. Main soils: <u>sandy loam over brown clay</u> - F1 (E) with <u>red cracking clay</u> - E2 (C) and <u>brown cracking clay</u> - E3 (L) on fans, and <u>sandy loam over red clay on rock</u> - K3 (E) on rises. The main limitations to land use are poor surface structure and potential for water erosion.
LqC	1.1	Outwash fans of 5-12% slope formed on clayey and gravelly alluvium. There is moderate watercourse erosion. Main soils: <u>sandy loam over brown dispersive clay</u> - F2 (E) and <u>red cracking clay</u> - E2 (E), with <u>hard loam over red clay</u> - D2 (C) and <u>brown cracking clay</u> - E3 (M). These soils are deep and fertile. Potential for erosion is the main management issue.
XGS	1.4	Boulder bed creek flats. Main soils: <u>boulder bed sandy loam</u> - M3 (V) and <u>stony gradational loam</u> - M2 (L). Creek beds are virtually 100% stones and boulders. Although the adjacent flats are less stony, there is sufficient volume in most profiles to impose limitations on water holding capacity and fertility. Other soils are inherently fertile and with low stone content, but the overall limitations of difficulty of access (through the creek), large trees, flooding potential and stoniness restrict use to grazing only.
XJJ	0.8	Modern alluvial flats. Main soils: <u>stony gradational loam</u> - M2 (E), with <u>hard loam over red clay</u> - D2 (C), <u>hard clay loam over dispersive red clay</u> - D3 (L) and <u>gradational loamy sand</u> - M4 (L). Flats have deep soils, some of which have poor structure affecting root growth and water movement, workability and seedling emergence. Additional management issues include periodic flooding, mild salinity and stream bank 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:

- A2/L1** Shallow calcareous loam (Paralithic, Hypercalcic / Lithocalcic Calcarosol) OR Shallow stony loam (Calcareous, Paralithic, Leptic Tenosol)
Shallow stony loam, calcareous throughout or with depth, overlying weathering rock shallower than 50 cm.
- A5/A6** Calcareous loam (Regolithic / Pedal, Hypercalcic / Supracalcic Calcarosol)
Calcareous loam to clay loam becoming more clayey and calcareous (sometimes rubbly) with depth grading to clayey alluvium.
- C2** Gradational loam on rock (Calcic / Hypercalcic Red Dermosol)
Loam to clay loam grading to a friable red clay with soft Class I carbonate within 50 cm, grading to weathering rock within 100 cm.
- C3** Gradational clay loam (Calcic / Hypercalcic Red Dermosol)
Loam to clay loam grading to a friable red clay with soft Class I carbonate within 50 cm, grading to alluvium within 100 cm.
- D1/D7** Loam over red clay on rock (Hypercalcic / Calcic, Red Chromosol / Sodosol)
Medium thickness hard gravelly loam over a red clay, friable and finely structured (D1), to hard, coarsely structured and dispersive (D7), calcareous with depth, grading to weathering basement rock within 100 cm.
- D2** Hard loam over red clay (Calcic / Hypercalcic, Red Chromosol)
Hard setting sandy loam to clay loam (with variable quartzite stones) abruptly overlying a well structured red clay with soft Class I carbonate at depth.
- D3** Hard clay loam over dispersive red clay (Calcic, Red Sodosol / Sodic, Calcic, Red Chromosol)
Medium thickness hard clay loam with up to 50% quartzite stones over a coarsely prismatic dispersive red clay, calcareous with depth over stony and clayey alluvium.
- D4** Loam over red friable clay (Calcic, Pedaric, Red Sodosol)
Thin to medium thickness fine sandy loam to loam over a finely structured friable red clay, calcareous from about 50 cm, grading to fine or medium grained alluvium.
- D5** Loamy sand over red mottled clay (Hypocalcic, Red Chromosol / Sodosol)
Thick soft to hard loamy sand with a bleached or paler coloured and often quartz gravelly A2 layer, over a red and brown mottled coarsely structured clay, weakly calcareous at depth, grading to clayey alluvium with variable quartzite gravel and stones.
- E1** Black cracking clay (Endocalcareous, Self-mulching, Black Vertosol)
Self-mulching black cracking clay, becoming coarser structured and more clayey with depth and containing variable soft carbonate.
- E2** Red cracking clay (Epicalcareous, Epipedal, Red Vertosol)
Dark strongly structured clay grading to a well structured red calcareous medium to heavy clay continuing below 100 cm.
- E3** Brown cracking clay (Endocalcareous-Endohypersodic, Epipedal, Brown Vertosol)
Coarse blocky grey brown cracking clay, becoming more clayey and variably calcareous with depth.
- F1** Sandy loam over brown clay (Eutrophic, Brown Chromosol / Sodosol)
Medium thickness hard sandy loam with a bleached and quartz gravelly A2 layer over a brown, red and dark coloured coarsely structured clay, continuing below 100 cm.
- F2** Sandy loam over brown dispersive clay (Hypocalcic, Brown Sodosol)
Medium thickness hard setting fine sandy loam sharply overlying a brown mottled poorly structured dispersive heavy clay, calcareous with depth.



- K3** Sandy loam over red clay on rock (Eutrophic, Red Chromosol)
Medium thickness hard gravelly sandy loam over a strongly structured red clay grading to weathering basement rock within 100 cm.
- M2** (Stony) gradational loam (Eutrophic, Red Dermosol)
Thick to very thick sandy loam with up to 50% quartzite stones grading to a stony moderately well structured red clay.
- M3** Boulder bed sandy loam (Fluvic, Clastic Rudosol)
Sandy loam with more than 50% quartzite stones and boulders.
- M4** Gradational loamy sand (Hypocalcic, Red / Brown Kandosol)
Medium to thick massive (often powdery) loamy sand to sandy loam grading to a red or brown sandy clay loam becoming more clayey and weakly calcareous with depth.

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

