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The Soils of Falls Farms Catchment Cuballing Western Australia

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Disclaimer

The contents of this report were based on the best available information at the time of publication. It is based in part on various assumptions and predictions. Conditions may change over time and conclusions should be interpreted in the light of the latest information available.

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1. Introduction

This soil survey was undertaken as part of an on-going project at Falls Farm Catchment. The aim of the project is to investigate the potential of reducing groundwater recharge by agronomic manipulation. The soil survey is of significance to the hydrologic study in that it provides details of solum depth and internal drainage. The catchment's climate, physiography, vegetation and geology are briefly described and a 1:10,000 scale soil map is provided along with full descriptions of 50 soil pits.

2. Study Area

2.1 Location

Falls Farm Catchment lies 4 km north-east of Cuballing and 15.5 km north, north-east of Narrogin at 32° 48'S and 117°11'E. The catchment is part of a property owned by Mr R.E. Falls.

2.2 Climate

The catchment has a Mediterranean climate with mild wet winters and warm dry summers. The average rainfall for the area (from data gathered at Cuballing Post Office) is 462 mm with highest falls in June and July. Average temperatures range from a high of 31°C in January to a low of 14°C in July.

2.3 Physiography

The catchment is 170 ha in area; it has a mean elevation of 360 m ASL, ranging from 340 m ASL to 415 m and a relief of 75 m. (See Fig. 1)

The catchment drains to the north into a seasonally flowing tributary of the Hotham River. The catchment is 1300 m wide, the valley sides having gradients of 1:12 at the southern end decreasing to 1:50 at the northern. The floor of the valley is on a gradient of 1:30.

The catchment is bounded to the east, south-west and west by lateritic residuals of the old plateau (Mulcahy, 1967); these are bounded by breakaways and associated pediment slopes. To the south-east, a broken granite boss forms the catchment boundary. There are numerous rock outcrops in the raids lope areas.

2.4 Vegetation

Prior to European settlement the native vegetation over the catchment consisted primarily of open wandoo (*Eucalyptus wandoo*) woodland on the mid and lower slope areas. The pediment slopes below laterite breakaways were dominated by brown mallet (*E. astringens*) whilst the tops of the old plateau remnants would have been dominated by dryandra (*Dryandra* spp.), mallee (*Eucalyptus* spp.) and wandoo. Stands of York gum (*E. loxophleba*) are associated with red soils derived from dolerite and marri (*E. calophylla*) are associated with the sandy soils bordering granite rock outcrops. Other trees, which would have been common over the catchment, are raspberry jam (*Acacia acuminata*) and rock oak (*Casuarina heugeliana*).

Part of a 55 ha gravel pit reserve forms the north-western boundary of the catchment. This is the only area of the catchment, which remains largely uncleared.

Falls Farm Catchment – Figure 1

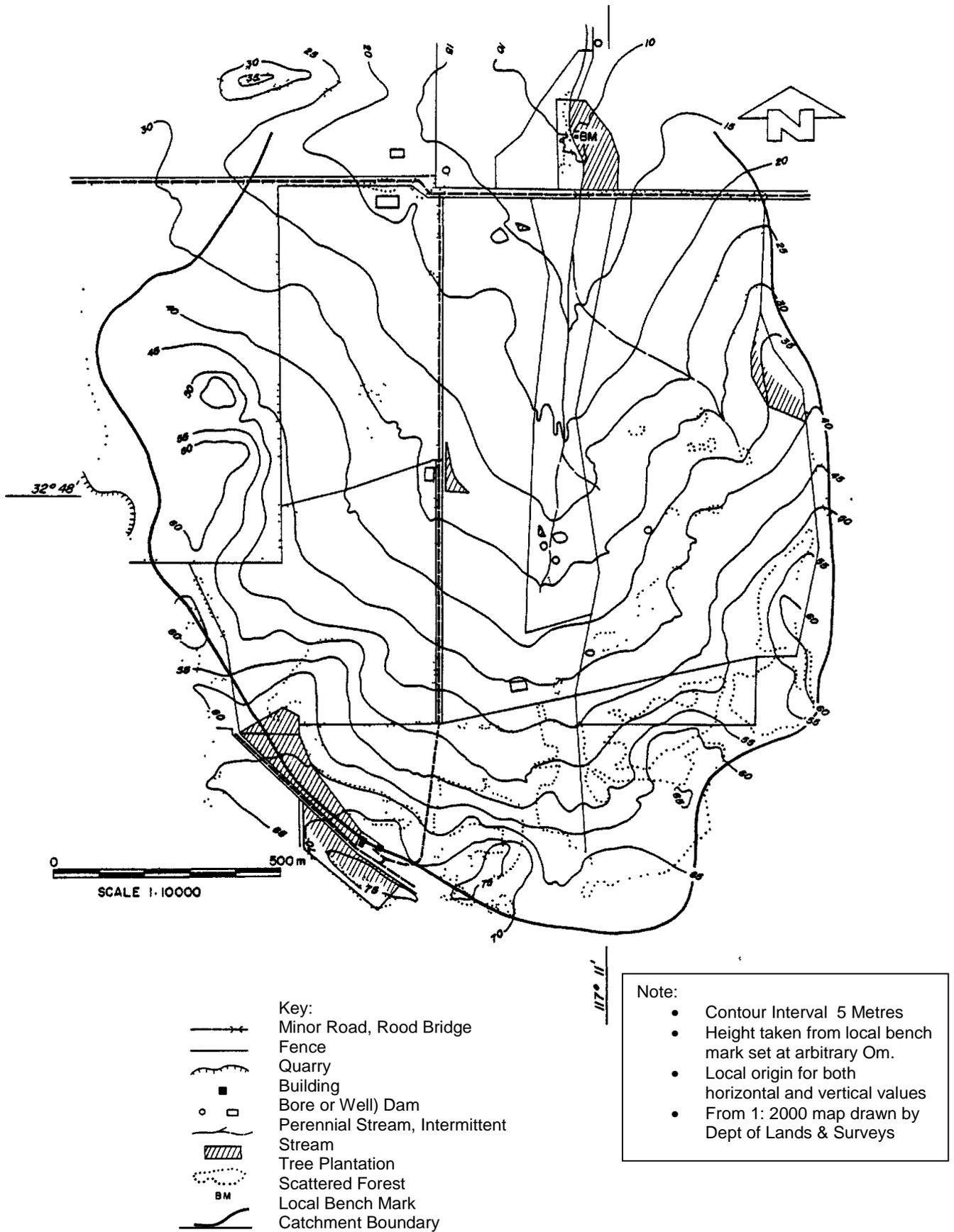
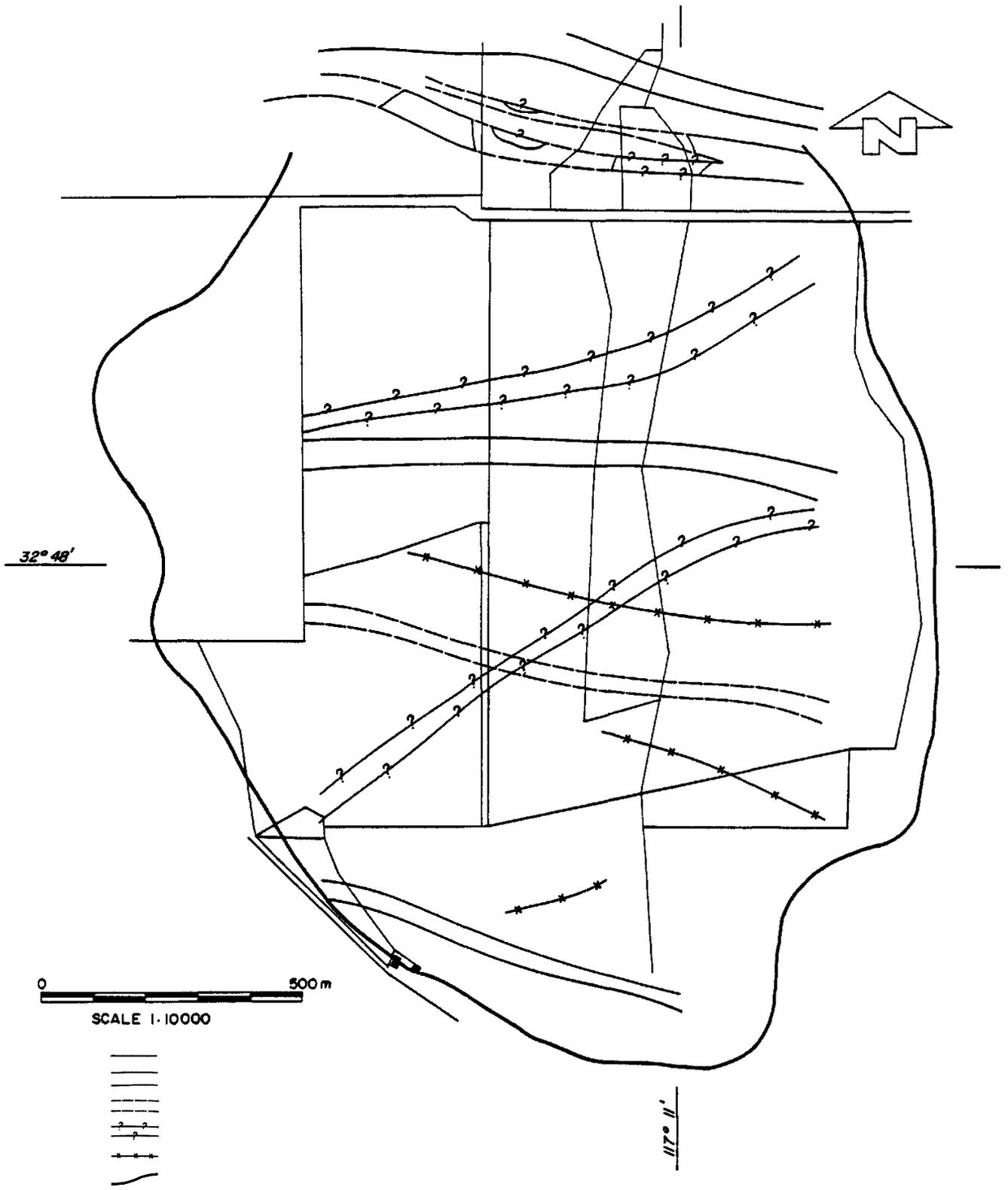


Figure 2. - Falls Farm Catchment - Ground Magnetic Survey Interpretation



The arable areas of the catchment were cleared for agriculture in the 1930's and 1960's and are farmed on a cropping, pasture rotation. The non-arable areas, (primarily rock outcrops, pediment slopes and areas of thin soil over massive laterite) are partially cleared and used for grazing.

2.5 Geology

Falls' Farm Catchment lies within the South-Western Province of the Yilgarn Block, and as such the country rock is primarily Archaean granites and migmatite intruded by mafic dykes composed of altered quartz, dolerite and gabbro (Williams, 1975).

The petrology of six rock samples taken from outcrops on the catchment have been described by Ahmat (1984). Four samples of mafic rock were shown to be fine to coarse grained moderately altered quartz dolerite. The rocks are probably from a dyke, which has close affinities with the Widiemooltha Dyke Suite. Two samples of granite were shown to be altered medium to coarse grained adamellite, the alteration in both indicating that they are associated with the alteration in the mafic rocks.

Magnetic anomalies associated with dolerite dykes have been mapped over the catchment using a magnetometer. The data, interpreted by Street (1984), has indicated several dykes with a predominately east-west orientation. (See Fig. 2)

A seismic refraction survey of the catchment (Kevi, 1984) indicated that the western side of the catchment, with average depths to bedrock of 20-30 m and a maximum of 49 m, is deeper than the eastern side, where depths to bedrock range from 0-20 m. The general trend is for the maximum depths to bedrock to be found around the catchment boundaries, particularly under areas of massive laterite. The midslopes, on which rock outcrops are common, have the shallowest depths to bedrock. Bedrock depth increases again under the lower slopes and drainage lines.

3. Methods

3.1 *Soil survey*

The soils on Falls Farm Catchment were classified according to the Northcote key (Northcote, 1979). Twenty-one soil pits were dug to a depth of 1.5 m and 39 were dug to the depth necessary to expose 15 cm of uniform B horizon. The information from each pit was recorded on the 'cross out sheet' format suggested by MacDonald, et al. (1984). (See Fig. 3 for pit locations)

Initially soil pits were located within soil types as indicated on 1:10,000 colour, and 1:10,000 black and white aerial photographs as well as an unpublished surface soil map of the catchment. Further pits were dug where indicated by ground traverses. Where discrete soil types were found the boundaries were defined using colour photographs and by auguring observation holes.

Wherever possible soil pits were located in undisturbed areas. Where pits had to be located in soils disturbed by cultivation, clearing or trampling by stock, the condition of the soil surface and A1 horizon of similar undisturbed soils was used in working through the Northcote key.

Figure 3 - Falls Farm Catchment - Soil Pit Locations

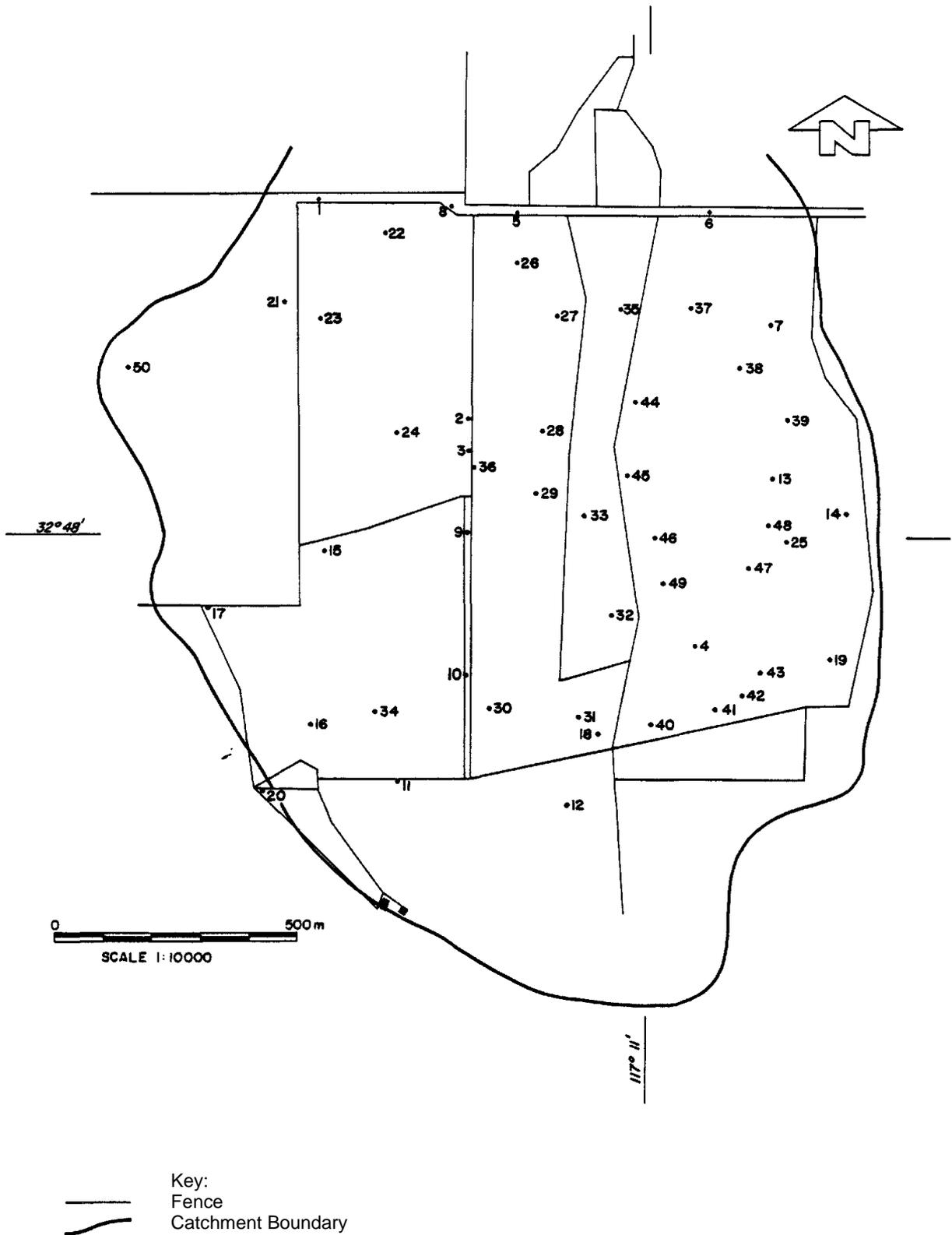
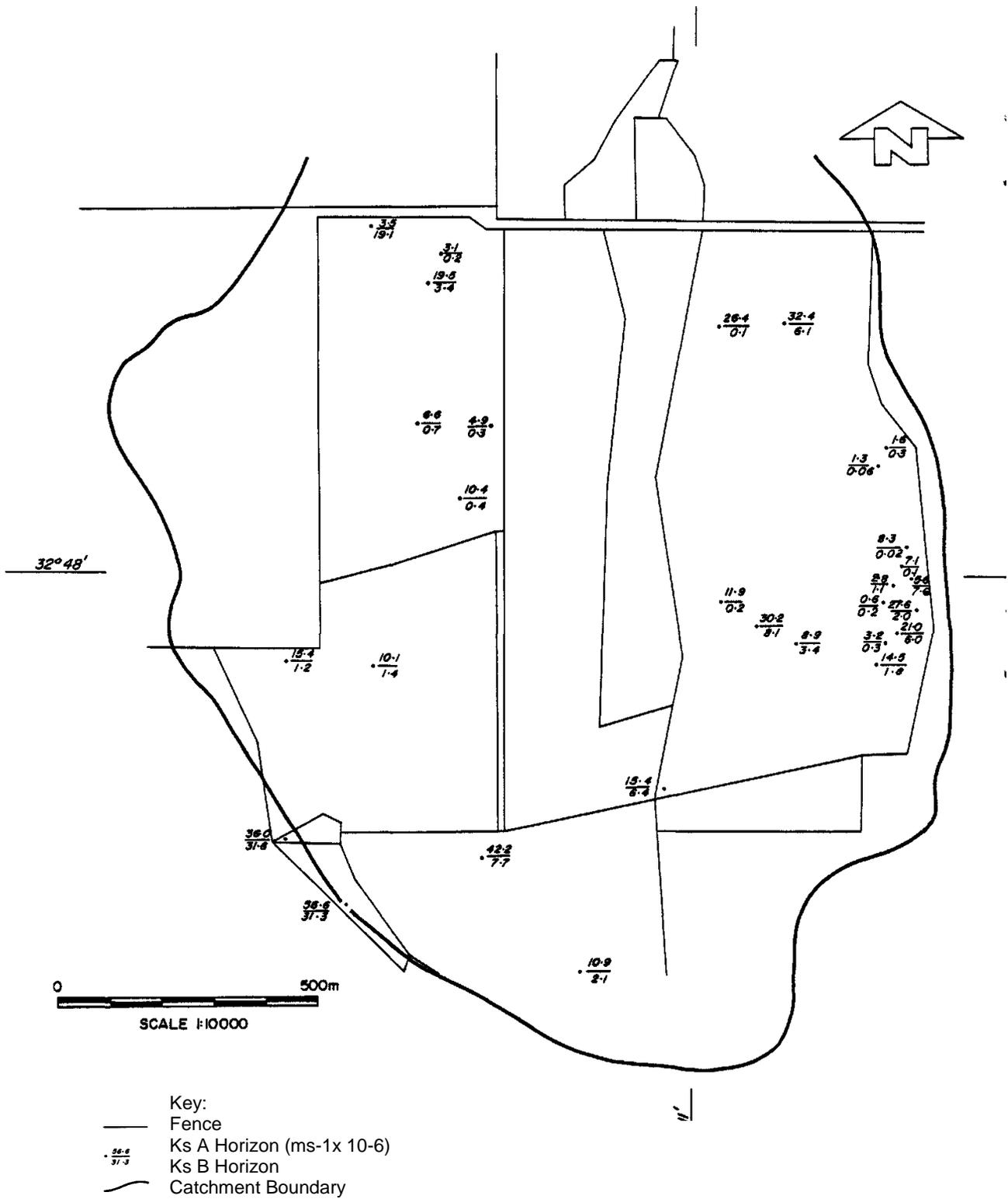


Figure 4 - Falls Farm Catchment



3.2 Saturated hydraulic conductivity

The saturated hydraulic conductivity of the A and B horizons at 31 sites were measured in situ using the constant head well permeameter technique of Talsma and Hallam (1980) as refined by Reynolds et al. (1983). (See Fig. 4 for locations and values).

4. Results

4.1 Soil survey

The soils of Falls Farm Catchment are closely related to the position in the landscape and the nature of the underlying country rock. (See Fig. 5)

Highest in the landscape are those soils overlying and bounded by massive duricrust on old plateau remnants, these soils are typically gravelly loams up to 2 m deep underlain by massive duricrust, pisolitic gravel is evident throughout the profile and there is evidence of profile development. A profile typical of these soils is Uc4:12.

Depth (cm)	Horizon	Description
0-7	A _{1p}	Dark yellowish brown (10 YR 4/6 moist) loamy sand, massive, loose, roots common, sandy fabric, pH 6.0, 2-10% pisolitic gravel 2 - 6 mm in diameter, smooth abrupt boundary to
7-45	A ₂₁	Yellowish brown (10 YR 5/8 moist) clayey sand, massive, very weak consistence, earthy fabric, 20-50% pisolitic gravel 6 - 20 mm in diameter, wavy gradual boundary to
45-80	A ₂₂	Yellowish brown (10 YR 5/8 moist) clayey sand, massive, very weak consistence, earthy fabric, pH 6.5, > 50% pisolitic gravel 6 - 20 mm in diameter, irregular sharp boundary to -
80+		Massive ironstone layer

Below the ironstone breakaways on the pediment upper and mid-slopes the most common soil types are to be found, these soils, Dy 5.41 and Dy 4.14, are formed in situ from weathered material. These soils are duplex yellow soils with 30 - 50 cm of sand or loamy sand (the greater depths being found in drainage lines) overlying clay, in both soils there is a bleached A2 horizon. The Dy 5.41 soils have a mottled B horizon whilst the Dy 4.41 soils have a whole coloured B horizon, though this may become mottled below the top 15 cm of the B horizon. The Dy 4.41 soils often have ferruginous nodules in the top of the B horizon.

A typical profile for a Dy 5.41 soil is;

Depth (cm)	Horizon	Description
0-12	A ₁	Olive (5 Y 4/3 moist) loamy sand, single grain, loose, many fine roots, sandy-fabric pH 5.5, smooth abrupt boundary to -
12-40	A _{21cb}	Yellow (2.5 Y 7/6 moist, 2.5 Y 8/2 dry) sand, massive, very weak consistence, pisolitic gravel 2 - 6 mm in diameter, irregular clear boundary to -
40-60	A _{22cb}	Olive yellow (2.5 Y 5/6 moist, 2.5 Y 8/2 dry) clayey sand, massive, moderately weak consistence, earthy fabric, 2-10% pisolitic gravel 2-6 mm in diameter, few medium faint brownish yellow (10 YR 6/8 moist) mottles, smooth abrupt boundary to -
60+	B	Strong brown (7.5 YR 5/8 moist) sandy clay, weakly pedal, polyhedral smooth peds, moderately firm consistence, pH 5.4, common distinct coarse light grey (10 YR 7/2 moist) mottles.

A typical profile for a Dy 4.41 soil is;

Depth (cm)	Horizon	Description
0 - 1	A ₀	Partially decomposed organic material, smooth sharp boundary to -
1-6	A ₁	Very dark greyish brown (10 YR 3/2 moist) sand, massive, moderately weak consistence, many roots, earthy fabric, 20-50% pisolitic gravel 2-6 mm in diameter, abrupt smooth boundary to -
6-24	A _{2cb}	Dark yellowish brown (10 YR 6/4 moist, 10 YR 8/3 dry) loamy sand, massive, very weak consistence, few roots, sandy fabric, 10-20% pisolitic gravel 2-6 mm in diameter, abrupt wavy boundary to -
24-50	B ₂₁	Olive yellow brown (10 YR 6/6 moist) sandy clay, weakly pedal, polyhedral rough peds, moderately firm consistence, 2-10% pisolitic gravel 2-6 mm in diameter, abrupt boundary to -
50-80	B ₂₂	Strong brown (7.5 YR 5/8 moist) silty clay, moderately pedal, polyhedral smooth peds, moderately strong consistence, few medium faint red (10 R 4/8 moist) mottles, abrupt irregular boundary to -
80+	B ₂₃	Pale yellow (5 Y 8/3 moist) silty clay, moderately pedal, polyhedral smooth peds, moderately strong consistence, pH 6.3, common coarse prominent red (10 R 4/5 moist) mottles.

Rock outcrops occupy a significant area of the catchment, predominately in mid and upper-slope positions of the east and south-east part of the catchment. Closely associated with granitic rock outcrops are shallow uniform coarse soils. These soils (typically Uc 2.12) are commonly less than 1 m deep and have a bleached A2 horizon and no B horizon as they either directly overlie largely unweathered granite or grade into pallid saprolite.

A typical Uc 2.12 soil profile is:

Depth (cm)	Horizon	Description
0-1	A ₀	Partially decomposed organic material, smooth sharp boundary to -
1-8	A ₁	Black (5 Y 5/2 moist) loamy sand, massive, very weak consistence, abundant fine roots, earthy fabric, pH 5.5, smooth sharp boundary to -
8-42	A _{21cb}	Yellowish brown (10 YR 5/6 moist, 2.5 Y 7/4 dry) sandy loam, massive, very weak consistence, abundant roots, earthy fabric, irregular clear boundary to -
42-90	A _{22cb}	Yellowish brown (10 YR 5/6 moist, 2.6 Y dry) clayey sand, massive, moderately weak consistence, abundant roots, earthy fabric, pH 4.0, very few medium red (2.5 Y 4/8 moist) mottles, irregular gradual boundary to -
90+	C	Weathered granitic material.

On the lower slopes in the south-east of the catchment below rock outcrops and shallow Uc 2.12 soils are deeper uniform soils. Site 32 (Uc 2.21) was augured to 2 m and found to be a uniform sand with a bleached A2 horizon and site 46 (Uc 2.23) was sampled to 75 cms and had sand grading to clayey sand including a bleached A2 horizon.

These soils are probably colluvial and derived from material further upslope.

A typical Uc 2.21 soil profile is:

Depth (cm)	Horizon	Description
0-14	A ₁	Dark grey (10 YR 4/1 moist) sand, massive, very weak consistence, sandy fabric, roots common, smooth sharp boundary to -
14-100	A _{2cb}	Light yellowish brown (10 YR 6/4 moist, 10 YR 8/1 dry) sand, massive, weak consistence, sandy fabric, few roots, coarse fraction > 2 mm increasing to 20%, irregular diffuse boundary to -
100+	A ₃	Light yellowish brown (10 YR 5/6 moist) sand, massive, very weak consistence, sandy fabric, coarse fraction > 2 mm increasing to 40%.

A typical Uc 2.23 soil profile is:

Depth (cm)	Horizon	Description
0-11	A ₁	Dusky red (2.5 Y 3/2 moist) sand, single grain, loose, earthy fabric, many roots, smooth abrupt boundary to -
11-60	A _{2cb}	Pink (7.5 YR 7/4 moist, 7.5 YR 8/2 dry) sand, massive, very weak consistence, earthy fabric, few roots, macropores, smooth clear boundary to -
60+	B	White (10 YR 8/1 moist) clayey sand, massive, moderately firm consistence, earthy fabric, many very coarse prominent red (2.5 YR 4/8 moist) mottles.

The duplex red soils, which are found extensively over the catchment, are derived from dolerite, which is present in the basement rock as mafic intrusions. This is clearly shown when the map of the ground magnetic survey (Fig. 2) is overlain on the soil boundary map (Fig. 5). The linear discontinuities in the Dr 4.11 soils are probably due to the doleritic material on the lower slopes being buried by colluvial material of granitic origin from upslope, the granitic products forming duplex yellow soils. The Dr 4.11 soils typically have 8-20 cm of loam overlying clay loam to medium clay. Those soils derived directly from dolerite have a C horizon a metre deep and no pisolitic gravel in the A or B horizons, whilst those below breakaway slopes have deeper profiles and up to 20% pisolitic gravel in the A horizon and 50% in the B horizon. The pisolites are predominately composed of maghemite (there is a greater percentage of haematite in the duricrust formed over dolerite than in that formed over granite).

A typical example of a Dr 4.11 soil is:

Depth (cm)	Horizon	Description
0-1	A ₀	Partially decomposed organic material, smooth sharp boundary to -
1-20	A ₁	Very dusky red (2.5 YR 2.5/2 moist) loam, strongly pedal, polyhedral, smooth peds, moderately firm consistence, abundant fine roots, cracks 2-5 mm wide, pH 6.1, smooth clear boundary to -
20-40	B ₂	Dark reddish brown (2.5 YR 3/4 moist) medium clay, weakly pedal, polyhedral rough peds, very firm consistence, few roots, cracks 5 mm wide, irregular clear boundary to -
40-70	B ₃	Yellowish red (5 YR 4/6 moist) sandy clay, massive, very firm consistence, earthy fabric, pH 6.1, broken diffuse boundary to -
70+	C	Very weathered doleritic material, with some granitic material.

There are two soil types associated with the boundary between the duplex red and duplex yellow soils, these are Dy 4.31 and Dy 5.31 which are duplex yellow soils with a sporadically bleached A2 horizon and a whole coloured or mottled B horizon respectively. Uc 4.13 soils are found on the boundary of Uc 2.12 and Dr 4.11 soils and are shallow uniform coarse soils with an A2 horizon, which is not bleached, and has a value/chroma rating of five.

The lower slopes of the catchment are sands (to 1.5 m deep) with a bleached A2 horizon overlying sandy clay, which shows little pedological development; these soils are waterlogged for much of the year.

A typical Dy 4.81 soil profile is:

Depth (cm)	Horizon	Description
0-15	A ₁	Very dark greyish brown (10 YR 3/2 moist) sand, massive, very weak consistence, earthy fabric, roots common, smooth abrupt boundary to -
15-110	A _{2cb}	Light yellowish brown (10 YR 6/4 moist, 10 YR 8/3 dry) sand, massive, very weak consistence, earthy fabric, macrospores, few roots, irregular gradual boundary to -
110-130	A ₃	Yellowish red (5 YR 5/8 moist) clayey sand, massive, moderately firm consistence, earthy fabric, macrospores, irregular gradual boundary to
130+	B ₁	Yellowish brown (10 YR 5/8 moist) sandy clay, massive, moderately firm consistence, earthy fabric, few fine distinct red (2.5 YR 4/8 moist) mottles.

Immediately bordering the stream in the catchment the soils are derived from alluvial materials that show evidence of selective grain size sorting and deposition. A profile typical of this soil type is:

Depth (cm)	Horizon	Description
0-1	A ₀	Partially decomposed organic material, smooth sharp boundary to -
1-3	A ₁₁	Dark brown (10 YR 3/3 moist) loamy sand, massive, very weak consistence, abundant roots, earthy fabric, pH 6.5, smooth sharp boundary to -
3-5	A ₁₂	Black (10 YR 2/1 moist) loamy sand, single grain, very weak consistence, abundant roots, sandy fabric, < 2% pisolitic gravel 2-6 mm in diameter, smooth sharp boundary to -
5-8	A ₁₃	Dusky red (2.5 YR 3/2 moist) sandy loam, weakly pedal, polyhedral rough peds, abundant roots, 2-10% pisolitic gravel 2-6 mm in diameter, smooth sharp boundary to -
8-10	A ₁₄	Gritty sand > 2 mm in diameter, single grain, loose, < 2% pisolitic gravel 2-6 mm in diameter, many roots, smooth sharp boundary to -
10-18	2A _{11b}	Very dark grey (10 YR 3/1 moist) sandy loam, massive, moderately weak consistence, few roots, sandy fabric, smooth clear boundary to -
18-30	2A _{12b}	Very dark greyish brown (10 YR 3/2 moist) sand, massive, moderately weak consistence, few roots, sandy fabric, moderately cemented broken sesquioxide pan, gradual irregular boundary to -
30+	B	Brown (10 YR 5/3 moist) sandy clay, massive, moderately firm consistence, earthy fabric, pH 7.2, many medium prominent strong brown (7.5 YR 5/8 moist) mottles.

Five other distinct soil types are present on the catchment. The soil type Dd 1.11 is found in the middle of a Dr 4.11 soil along a drainage line that is subject to

waterlogging. The soil type Dy 5.11 is in a mid slope position and may be associated with the presence of dolerite dykes. Soil types Gn 3.74 and Dy 5.21 are found in mid slope positions on small hillocks and soil type Dy 4.11 is found on the western upper slope.

Full descriptions of all the soil pits are contained in the appendix.

4.2 Saturated hydraulic conductivities

The saturated hydraulic conductivity of A and B horizons were measured using Talsma Hallam tubes (See Fig. 4). The fastest values for Ks were found in the Uc4.12 soils, they were $56.6 \times 10^{-6} \text{ ms}^{-1}$ for the A21 horizon and $31.3 \times 10^{-6} \text{ ms}^{-1}$ for the A22 horizon. The Ks values for, a Uc2.12 soil were found to be $15.4 \times 10^{-6} \text{ ms}^{-1}$ for the A1 horizon and $6.4 \times 10^{-6} \text{ ms}^{-1}$ for the A2. The hydraulic conductivities for 22 sites in Dy5.41 and Dy4.41 soils were found to range from $1.0 \times 10^{-6} \text{ ms}^{-1}$ to $40.4 \times 10^{-6} \text{ ms}^{-1}$ for the A horizon and from $0.09 \times 10^{-6} \text{ ms}^{-1}$ to $2.33 \times 10^{-6} \text{ ms}^{-1}$ for the B horizon. The wide variation in Ks values for the duplex yellow soils can be in part explained by the presence or absence of pisolitic gravel in the solum; the value for Ks increasing with an increase in pisolitic gravel. Thus those soils on the pediment slopes have faster Ks values than those on the midslope gravely ridges, whilst the soils on the lower and mid slope areas without gravel have the slowest Ks values. The presence of pisolitic gravel providing a more porous framework for the A horizons and B1 horizon.

5. Discussion

Falls Farm Catchment is used for sheep and cattle grazing and grain production. The suitability of these land use activities is affected by the soil type and position in the landscape (Negus, 1977).

The uniform coarse soils associated with granitic rock outcrops are extremely erodable, due to runoff from nearby areas of surface rock, and the nature of the soil; its weak consistence, lack of structure and absence of a clayey B horizon to arrest gullyng. Rill and gully erosion was evident on these soils prior to commencement of the project. In 1982 the gullies were back-filled and spreader and contour banks constructed. The earth works have proved effective in halting erosion.

The uniform coarse soils, which have a shallow solum, particularly those near rock outcrops, exhibit problems with water logging. In cropping areas where waterlogging is likely to occur oats are sown as they exhibit some tolerance to waterlogging.

Investigations into the permeability of the soil in different landscape positions over the catchment indicated that the Uc 4.12 soils on the old plateau remnants are highly permeable ($K_s 31.3 \times 10^{-6} \text{ ms}^{-1}$), most of the incident rainfall going to recharge. The stony nature of these soils also presents problems with cultivation.

Four hectares of Uc 4.12 soils in the south-west of the catchment were fenced in 1984 and planted to alternating rows of Eucalyptus spp. and tree Lucerne (*Cytisus proliferous*). The trees were planted in an effort to reduce the deep drainage of water below the root zone of the crops and pastures previously being grown.

The duplex soils on the pediment slopes below breakaway faces have a non wetting A1 horizon, which in combination with the steep slopes on which they occur present problems downslope from runoff.

In 1982 level banks were constructed immediately below pediment slopes in the east and south of the catchment to control runoff.

By far the most common soils over the catchment are the duplex (Dy 4.41 and Dy 5.41) soils of the mid and lower slopes. These soils present a number of management problems. The A horizon is easily erodable and highly permeable (K_s up to $40 \times 10^{-6} \text{ ms}^{-1}$). The rapid infiltration of rainfall into the sandy "A" horizon leads to the formation of perched water over the less permeable clayey B horizon ($K_s < 2.33 \times 10^{-6} \text{ ms}^{-1}$), particularly on the lower slopes. Perched water tables affect crops through waterlogging. Infiltration of water from the saturated "A" horizon to the ground water table via preferred pathways may be a significant recharge mechanism.

In an effort to control waterlogging and erosion reverse seepage interceptor banks were constructed in 1982. These banks built across the slope control runoff and the channel, which is cut into the clayey B horizon, intercepts seepage. Surface and seepage waters are diverted into grassed waterways. High water using crops are being grown in a continuous rotation on those parts of the catchment thought to be broad recharge areas. These crops; lupins and barley; transpire more water than the oat and clover pasture rotation (Nulsen 1984) that was grown prior to the

commencement of the project. Those areas of the catchment where waterlogging and associated salinity was severe enough to prevent the growth of conventional crops and pasture were fenced to exclude stock and planted with the salt tolerant grass *Puccinellia ciliata*.

There are several dolerite dykes striking east-west through the catchment. The surface indicator of these dolerite dykes is Dr 4.11 soils, which are shallow brown loams overlying reddish brown clays. The solum is highly pedal. Where rock outcrops form a barrier to the vertical and horizontal drainage of water waterlogging may occur. This is evidenced on the catchment by a small area of Dd 1.11 soil found in a drainage line, which runs through Dr 4.11 soil. The Dd 1.11 soil is upslope of a rock outcrop and is subject to waterlogging.

The weathering products of dolerite form compact clays of low permeability when compared to clays formed from granite, in which the presence of abundant coarse, angular quartz forms a more porous framework for the clay (Sadleir et al., 1976). Doleritic clays form hydraulic barriers to ground water movement and cause saline groundwaters to discharge into surface soils. Saline seeps and salt/waterlogging interactions result (Engel et al.. (in press).

There is a groundwater high in the catchment where the road crosses the creek. Here high saline water tables have produced a large salt scald. This is directly upslope of a dolerite dyke. Trees near the scald are dying and the ground cover over it has died leaving the soil bare. Extensive rilling, and some gullying has begun as seepage flows over the bare ground.

In an effort to establish a vegetative cover over the area it has been fenced and *Puccinellia ciliata*, salt water couch (*Paspalum vaginatum*), *Eucalyptus* spp. and *Atriplex* spp. have been planted.

6. References

- Ahmat, A.L. (1984). Petrological Report 1349, A Dolerite Sample From Cuballing. (Western Australian Geological survey, Perth, W.A. unpublished).
- Engel, R., McFarlane, D.J., Street, G. (in press). The influence of dolerite dykes on saline seeps in south Western Australia. (Accepted for publication in Australian Journal of Soil Research).
- Kevi, L. (1984). Geophysical Report 1/84, Cuballing Catchment Seismic Refraction Survey. (Western Australian Geological Survey, Perth, W.A. unpublished).
- McDonald, R.C., Isbell, R.F., Speight, J.G., Walker, J. and Hopkins, M.S. (1984). Australian Soil and Land Survey, (Inkata Press Pty Ltd, Melbourne Aust).
- Mulcahy, M.J. (1967). Landscapes, Laterites and Soils in South Western Australia from: Jennings, J.N. and Malibut J.A., (Landform Studies from Australia and New Guinea). (P 211-229).
- Northcote, K.H. (1979). A factual key for the recognition of Australian soils, 4th ed. (Rellim Tech Pubs., Glenside S.A.).
- Negus, T.R. (1977). Land Classes in the Upper Great Southern of Western Australia, Bulletin 4016, (Western Australian Department of Agriculture).
- Nulsen, R.A. (1984). Evapotranspiration of four Major Agricultural Plant Communities in the south-west of Western Australia measured with large ventilated chambers. (Agric. Water Manage., 8: 191-202).
- Reynold, W.V., Elrick, D.E. and Topp, G.C. (1983). A re-examination of the constant head well permeameter method for measuring saturated hydraulic conductivity above the water table. (Soil Sci. 136(4): 250-268).
- Sadleir, S.B. and Gilkes, R.J. (1976). Development of Bauxite in Relation to Parent Material Near Jarrahdale, Western Australia. (J. Geol. Soc. Aust., Vol. 23, Pt 4. pp. 333-344, Dec., 1976).
- Street, G., (1984). Geophysical Report Cuballing Catchment. Total Magnetic Field Survey. (Western Australian Geological Survey, Perth W.A. unpublished).
- Talsma, T. and Hallam, P.M. (1980). Hydraulic conductivity measurement of forest catchments. (Aust. J. Oil Res. 30: 139-148).
- Williams, I.E. (1975). South Western Province in: Geology of Western Australia. (Western Australian Geological Survey, Mem 2, p65-71, Perth W.A.).

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The co-operation of Mr Ray Falls on whose property the catchment is located is also appreciated.

8. Appendix

Profile No. 1

Type Of Soil Observation:	Soil Pit 1.5 M Deep
Landform:	Mid-Slope
Vegetation:	Mid-dense Eucalyptus wandoo
Condition Of Surface Soil:	Firm
Disturbance Of Site:	Limited Clearing, Road Reserve
Northcote Classification:	Dy 5.31

Profile Description

Depth (cm)	Horizon	Description
0-5	A11	Very dark grey (5 YR 3.5/1 moist) sand, single grain, loose, abundant fine roots, sandy fabric, pH 5.6, smooth abrupt boundary to -
5 – 12	A12	Dark greyish brown (10 YR 4/2 moist) sand, single grain, very weak consistence, abundant roots, sandy fabric, clear wavy boundary to -
12 – 25	A21	Yellowish brown (10 YR 5/4 moist) sand, apedal massive, moderately weak consistence, roots common, sandy fabric, gradual wavy boundary to -
25 – 34	A22cb	Very pale brown (10 YR 6/4 moist, 10 YR 7/4 dry) sandy loam, apedal massive, moderately firm consistence, few roots, earthy fabric, gradual irregular boundary to -
34+	B	Brownish yellow (10 YR 6/8 moist) light clay, moderate pedality, polyhedral smooth peds, moderately strong consistence, few roots, pH 6.4, many prominent, medium, red (2.5 YR 5/8 moist) mottles.

Profile No. 2

Type Of Soil Observation:	Soil Pit 1.5 Ra Deep
Landform:	Lower Slope
Vegetation:	Ryegrass Pasture
Condition Of Surface Soil:	Hard setting
Disturbance Of Site:	Completely Cleared, Pasture, Never Cultivated, Along Old Fence Line
Northcote Classification:	Dy 5.31

Profile Description

Depth (cm)	Horizon	Description
0-6	A1	Very dark brown (10 YR 2/2 moist) sand, single grain, very weak consistence, abundant fine roots, sandy fabric, pH 5.7, sharp boundary to -
6-28	A21	Brown (7.5 YR 4/4 moist) sandy loam, massive, moderately firm consistence, few roots, earthy fabric, abrupt boundary to -
28 – 38	A22cb	Yellowish brown (10 YR 5/4 moist 10 YR 7/3 dry), fine sandy loam, weak pedality, polyhedral rough peds, moderately strong consistence, clear boundary to -
38 – 85	B21	Yellowish brown (10 YR 5/8 moist) light clay, moderate pedality, polyhedral rough peds, moderately strong consistence, coarse common light grey (SYR 7/1 moist) mottles, clear boundary to -
85+	B22	Yellowish brown (2.5 YR 5/8 moist) light clay, moderate pedality, polyhedral rough peds, moderately firm consistence, pH 6.5, common coarse light grey (5 YR 7/1 moist) mottles.

Profile No. 3

Type Of Soil Observation:	Soil Pit 1.5 M Deep
Landform:	Lower Slope
Vegetation:	Ryegrass Pasture
Condition Of Surface Soil:	Hard Setting
Disturbance Of Site:	Completely cleared, pasture never cultivated, on old fence line
Northcote Classification:	Dy 4.31

Profile Description

Depth (cm)	Horizon	Description
0-9	A1	Very dark greyish brown (10 YR 3/2 moist) loamy sand, single grain, very weak consistence, abundant fine roots, sandy fabric, pH 5.3, smooth abrupt boundary to -
9 - 23	A21	Brown (10 YR 4/3 moist) loamy sand, massive, moderately firm consistence, few roots, sandy fabric, smooth clear boundary to -
23 - 40	A22cb	Yellowish brown (10 YR 5/4 moist, 10 YR 7/3 dry), sandy loam, massive, moderately firm consistence, few roots, sandy fabric, smooth abrupt boundary to -
40 - 80	B21	Yellowish brown (10 YR 5/8 moist) light clay, moderate pedality, polyhedral, smooth peds, very firm consistence, irregular gradual boundary to -
80+	B22	Light grey (5 Y 7/1 moist) light medium clay, weakly pedal, polyhedral rough peds, moderately firm consistence, pH 5.4, common very coarse prominent red (10 R 4/8 moist) mottles.

Profile No. 4

Type Of Soil Observation:	Soil Pit 1.5 M Deep
Landform:	Mid-Slope, Drainage Line
Vegetation:	Mid-Dense Trees; Eucalyptus Loxophleba, Acacia Aneuria
Condition Of Surface Soil:	Periodic Cracking, Hard Setting
Disturbance Of Site:	Limited Clearing, Pasture
Northcote Classification:	Dd 1.11

Profile Description

Depth (cm)	Horizon	Description
0-9	A1	Black (5 Y 2.5/1 moist) silty clay loam, moderate pedality, polyhedral smooth peds, moderately weak consistence, many roots, pH 5.7, wavy clear boundary to -
9-30	B21	Very dark greyish brown (10 YR 2/2 moist) heavy clay, strong pedality, polyhedral smooth peds, very strong consistence, few roots, 5 - 10 mm cracks, gradual smooth boundary to -
30 – 35	B22	Olive (5 Y 4/3 moist) heavy clay, strong pedality, polyhedral smooth peds, very strong consistence, few roots, > 5 mm cracks, clear smooth boundary to -
35+	B23	Olive yellow (2.5 Y 6/6 moist) silty clay loam, weak pedality, polyhedral, rough peds, moderately strong consistence, pH 6.6, few prominent fine pale yellow (2.5 Y 8/4 moist) mottles.

Profile No. 5

Type Of Soil Observation:	Soil Pit 1.5 M Deep
Landform:	Lower Slope
Vegetation:	Wild Oats
Condition Of Surface Soil:	Hard Setting
Disturbance Of Site:	Completely Cleared Never Cultivated Road Reserve
Northcote Classification:	Dy 4.41

Profile Description

Depth (cm)	Horizon	Description
0-1	A0	Partially decomposed organic material, smooth sharp boundary to -
1-7	A1	Very dark grey (10 Y 3/1 moist) sand, massive, very weak consistence, many roots, earthy fabric, pH 5.4, <2% pisolitic gravel 2-6 mm in diameter, smooth sharp boundary to -
7-36	A2cb	Light olive brown (2.5 Y 5/4 moist, 2.5 Y 7/4 dry) loamy sand, massive, moderately weak consistence, roots common, sandy fabric, 2 - 10% pisolitic gravel 6 - 20 mm in diameter, abrupt wavy boundary to -
36 – 51	B11	Light yellowish brown (2.5 Y 6/3 moist) sandy clay, weakly pedal, polyhedral rough peds, moderately firm consistence, few roots, 10 - 20% pisolitic gravel 6 - 20 mm in diameter, clear irregular boundary to -
51 – 70	B12	Yellowish brown (10 YR 5/8 moist) light clay, weak pedality, polyhedral rough peds, moderately firm consistence, 20 - 50% pisolitic gravel 6 - 20 mm in diameter, clear irregular boundary to -
70+	B13	Yellowish brown (10 YR 5/6 moist) light clay, weakly pedal, polyhedral rough peds, moderately firm consistence, pH 5.3, many medium distinct red (10 R 4/6 moist) mottles).

Profile No. 6

Type Of Soil Observation:	Soil pit 1.5 m deep
Landform:	Lower slope
Vegetation:	Wild oats and isolated Eucalyptus wandoo
Condition Of Surface Soil:	Hard setting
Disturbance Of Site:	Road verge extensively cleared
Northcote Classification:	Dy 4.41

Profile Description

Depth (cm)	Horizon	Description
0-1	A0	Partially decomposed organic material, smooth sharp boundary to -
1-6	A1	Very dark greyish brown (10 Y 3/2 moist) sand, massive, moderately weak consistence, many roots, earthy fabric, 20 - 50% pisolitic gravel 2 - 6 mm in diameter, abrupt smooth boundary to -
6-24	A2cb	Dark yellowish brown (10 YR 6/4 moist, 10 YR 8/3 dry) loamy sand, massive, very weak consistence, few roots, sandy fabric, 10 - 20% pisolitic gravel 2 - 6 mm in diameter, abrupt wavy boundary to -
24 – 50	B1	Olive yellow brown (10 YR 6/6 moist) sandy clay, weakly pedal, polyhedral rough peds, moderately firm consistence, 10 - 20% pisolitic gravel 2-6 mm in diameter, abrupt irregular boundary to -
50 – 80	B21	Strong brown (7.5 YR 5/8 moist) silty clay, moderately pedal, polyhedral smooth peds, moderately strong consistence, few medium faint red (10 R 4/8 moist) mottles, abrupt irregular boundary to -
80+	B22	Pale yellow (5 Y 8/3 moist) silty clay, moderately pedal, polyhedral smooth peds, moderately strong consistence, pH 6.3, common coarse prominent red (10 R 4/6 moist) mottles.

Profile No. 7

Type Of Soil Observation:	Soil Pit 1.5 M Deep
Landform:	Upper Slope
Vegetation:	Closed Trees; Eucalyptus Wandoo, Eucalyptus Astrinqens
Condition Of Surface Soil:	Loose
Disturbance Of Site:	No Effective Disturbance Except For Hoofed Animals
Northcote Classification:	Dy 5.41

Profile Description

Depth (cm)	Horizon	Description
0-1	A0	Partially decomposed organic material, smooth sharp boundary to -
1-4	A1	Black (5 Y 2.5/1 moist) sand, single grain, loose, abundant fine roots, sandy fabric, > 50% pisolitic gravel up to 60 mm diameter, pH 5.8, smooth abrupt boundary to -
4-83	A2cb	Yellowish brown (10 YR 5/6 moist, 10 YR 7/4 dry) sand, single grain, loose, many roots, sandy fabric, > 50% pisolitic gravel up to 60 mm in diameter, smooth abrupt boundary to -
83+	B2	Yellowish brown (10 YR 5/6 moist) light clay, moderate pedality, polyhedral smooth peds, moderately strong consistence, few roots, pH 5.0, common medium distinct red (10 R 5/6) mottles.

Profile No. 8

Type Of Soil Observation:	Soil Pit, 1.5 M Deep
Landform:	Mid-Slope
Vegetation:	Scattered Eucalyptus Wandoo
Condition Of Surface Soil:	Loose
Disturbance Of Site:	No Effective Disturbance
Northcote Classification:	Gn 3.74

Profile Description

Depth (cm)	Horizon	Description
0-1	A0	Partially decomposed organic material, smooth sharp boundary to -
1-7	A1	Greyish brown (2.5 Y 5/2 moist) sand, massive, loose, abundant fine roots, sandy fabric, 20 - 50% pisolitic gravel 20 - 60 mm in diameter, pH 5.4, smooth abrupt boundary to •
7-36	A2	Yellowish brown (10 YR 5/6 moist, 10 YK 6/6 dry) loamy sand, weak pedality, polyhedral smooth peds, moderately strong consistence, 20 - 50% pisolitic gravel 2 - 6 mm in diameter, wavy abrupt boundary to -
36+	B1	Brownish yellow (10 YR 6/8 moist) loam, weak pedality, polyhedral smooth peds, moderately strong consistence, 10 - 20% pisolitic gravel 2 - 6 mm in diameter, pH 5.5

Profile No. 9

Type Of Soil Observation:	Soil Pit 1.5 M Deep
Landform:	Lower Slope
Vegetation:	Grasses, Predominately Barley Grass
Condition Of Surface Soil:	Hard Setting
Disturbance Of Site:	Completely Cleared Never Cultivated, Old Fence Line
Northcote Classification:	Dy 4.81

Profile Description

Depth (cm)	Horizon	Description
0-1	A0	Partially decomposed organic material, smooth sharp boundary to -
1-12	A1	Dark reddish grey (5 YR 4/2 moist) loamy sand, single grain, very weak consistence, fine roots common, sandy fabric, 2 - 10% pisolitic gravel 2 - 6 mm in diameter, pH 6.2, smooth abrupt boundary to -
12 - 56	A2cb	Pale yellow (2.5 Y 7/4 moist, 10 YR 7/4 dry) sandy clay, massive, moderately weak consistence, sandy fabric, 20 - 50% pisolitic gravel up to 60 mm in diameter, wavy clear boundary to -
56+	B	Yellow (2.5 Y 7/8 moist) sandy clay, massive moderately weak consistence, earthy fabric, pH 5.9, few medium faint reddish yellow (5 YR 5/8 moist) mottles.

Profile No. 10

Type Of Soil Observation:	Soil Pit 1.5 M Deep
Landform:	Mid-Slope
Vegetation:	Grasses; Predominately Wild Oats And Rye Grass
Condition Of Surface Soil:	Firm
Disturbance Of Site:	Completely Cleared Pasture Never Cultivated Old Fence Line
Northcote Classification:	Dy 4.21

Profile Description

Depth (cm)	Horizon	Description
0-8	A1	Black (2.5 Y 2/0 moist) sandy loam, single grain, very weak consistence, abundant fine roots, > 2% pisolitic gravel 2 - 6 mm in diameter, pH 5.8, wavy sharp boundary to -
8-21	A2	Strong brown (7.5 YR 4/6 moist) light sandy clay loam, weakly pedal, polyhedral rough peds, moderately weak consistence, 2 - 10% pisolitic gravel 6 - 20 mm diameter, many roots, smooth sharp boundary to -
21 - 50	B21	Yellowish red (5 YR 5/8 moist) sandy clay, weakly pedal, polyhedral rough peds, moderately weak consistence, few roots, < 2% pisolitic gravel 2 - 6 mm in diameter, few medium faint red (10 R 4/6 moist) mottles, wavy clear boundary to -
50+	B22	Strong brown (7.5 YR 5/8 moist) light medium clay, weakly pedal, polyhedral rough peds, moderately firm consistence, few roots, < 2% pisolitic gravel 2 - 6 mm in diameter, pH 6.6, common medium faint red (10 R 4/6 moist) mottles.

Profile No. 11

Type Of Soil Observation:	Soil Pit 1.5 M Deep
Landform:	Upper Slope
Vegetation:	Mallee Scrub
Condition Of Surface Soil:	Hard Setting
Disturbance Of Site:	Limited Clearing, Fence Line
Northcote Classification:	Dy 5.11

Profile Description

Depth (cm)	Horizon	Description
0-1	A0	Partially decomposed organic material smooth sharp boundary to -
1-16	A1	Yellowish brown (10 YR 5/4 moist) clayey sand, massive, moderately weak consistence, abundant fine roots, sandy fabric, 10 - 20% pisolitic gravel 2 - 6 mm in diameter, pH 5.7, smooth clear boundary to -
16 - 60	A3	Reddish yellow (7.5 YR 6/8 moist, 10 YR 7/6 dry) sandy loam, massive, moderately weak consistence, earthy fabric, many roots, 2 - 10% pisolitic gravel 2 - 6 mm in diameter, irregular clear boundary to -
60+	B2	Reddish yellow (7.5 YR 6/8 moist) sandy clay, weakly pedal, polyhedral smooth peds, very firm consistence, few roots, pH 5.5, common coarse distinct yellowish red (5 YR 5/6 moist) mottles.

Profile No. 12

Type Of Soil Observation:	Soil Pit 1.5 M Deep
Landform:	Mid-slope
Vegetation:	Eucalyptus calophylla, Casuarina huegeliana
Condition Of Surface Soil:	Hard Setting
Disturbance Of Site:	Limited Clearing, grazed
Northcote Classification:	Uc 4.12

Profile Description

Depth (cm)	Horizon	Description
0-1	A0	Partially decomposed organic material, smooth sharp boundary to -
1-8	A1	Black (15 Y 5/2 moist) loamy sand, massive, very weak consistence, abundant fine roots, earthy fabric, pH 5.5, smooth sharp boundary to -
8-42	A21cb	Yellowish brown (10 YR 5/6 moist, 2.5 Y 7/4 dry) sandy loam, massive, very weak consistence, abundant roots, earthy fabric, irregular clear boundary to -
42 - 90	A22cb	Yellowish brown (10 YR 5/6 moist, 2.5 Y 7/4 dry) clayey sand, massive, moderately weak consistence, abundant roots, earthy fabric, pH 4.0, very few medium faint red (2.5 Y 4/8 moist) mottles, irregular gradual boundary to -
90+	C	Weathered granitic material.

Profile No. 13

Type Of Soil Observation:	Soil Pit 1.5 M Deep
Landform:	Upper Slope
Vegetation:	Grasses
Condition Of Surface Soil:	Periodic cracking, Hard Setting
Disturbance Of Site:	Completely cleared pasture, never cultivated
Northcote Classification:	Dr 4.11

Profile Description**Depth (cm) Horizon Description**

0 - 1	A0	Partially decomposed organic material smooth sharp boundary to -
1-20	A1	Very dusky red (2.5 YR 2.5/2 moist) loam, strongly pedal, polyhedral smooth peds, moderately firm consistence, abundant fine roots, cracks 2 - 5 mm wide, pH 6.1, smooth clear boundary to -
20 - 40	B2	Dark reddish brown (2.5 YR 3/4 moist) medium clay, weakly pedal, polyhedral rough peds, very firm consistence, few roots, cracks > 5 mm wide, irregular clear boundary to -
40 - 70	B3	Yellowish red (5 YR 4/6 moist) sandy clay loam, massive, very firm consistence, earthy fabric, pH 6.1, broken diffuse boundary to -
70+	C	Weathered doleritic material with some weathered granitic material.

Profile No. 14

Type Of Soil Observation:	Soil Pit 1.5 M Deep
Landform:	Upper Slope
Vegetation:	Oats stubble recently cultivated
Condition Of Surface Soil:	Completely cleared, cultivated
Disturbance Of Site:	Completely cleared pasture, never cultivated
Northcote Classification:	Dy 4.41

Profile Description

Depth (cm)	Horizon	Description
0-10	A1p	Brown (10 YR 5/3 dry) sand, single grain, loose, roots common, sandy fabric, 2 - 10% pisolitic gravel 2 - 6 mm in diameter, pH 5.8, wavy clear boundary to -
10 – 55	A2cb	Olive yellow (2.5 Y 6/6 moist, 10 YR 8/2 dry) loamy sand, single grain, loose, few roots, sandy fabric, 20 - 50% pisolitic gravel up to 60 mm in diameter, wavy clear boundary to -
55 – 100	B1	Yellowish red (5 YR 5/8 moist) sandy clay, weakly pedal, polyhedral rough peds, very weak consistence, 20 - 50% pisolitic gravel up to 20 mm in diameter, clear wavy boundary to
100+	B2	Strong brown (7.5 YR 5/8 moist) light medium clay, moderately pedal, polyhedral rough peds, moderately firm consistence, pH 5.8, common coarse distinct red (2.5 YR 4/8 moist) mottles.

Profile No. 15

Type Of Soil Observation:	Soil Pit 1.5 M Deep
Landform:	Mid-slope
Vegetation:	Grasses; primarily rye and brome
Condition Of Surface Soil:	Hard setting
Disturbance Of Site:	Completely cleared pasture, has been cultivated
Northcote Classification:	Dy 5.41

Profile Description

Depth (cm)	Horizon	Description
0 – 12	A1p	Olive (5 Y 4/3 moist) loamy sand, single grain, loose, many fine roots, sandy fabric, pH 5.5, smooth abrupt boundary to -
12 - 40	A21cb	Yellow (2.5 Y 7/6 moist, 2.5 Y 8/2 dry) sand, massive, very weak consistence, few roots, earthy fabric, 2 - 10% pisolitic gravel 2 - 6 mm in diameter, irregular clear boundary to -
40 - 65	A22cb	Olive yellow (2.5 Y 5/6 moist, 2.5 Y 8/2 dry), clayey sand, massive, moderately weak consistence, earthy fabric, 2 - 10% pisolitic gravel 2 - 6 mm in diameter, few medium faint brownish yellow (10 YR 6/8 moist) mottles, smooth abrupt boundary to -
65+	B2	Strong brown (7.5 YR 5/8 moist) sandy clay, weakly pedal, polyhedral smooth peds, moderately firm consistence, pH 5.4, common distinct coarse light grey (10 YR 7/2 moist) mottles.

Profile No. 16

Type Of Soil Observation:	Soil Pit 1.5 M Deep
Landform:	Upper slope
Vegetation:	Mid-dense trees; Eucalyptus wandoo
Condition Of Surface Soil:	Loose
Disturbance Of Site:	No effective disturbance except hooved animals
Northcote Classification:	Dy 5.41

Profile Description

Depth (cm)	Horizon	Description
0-15	A1	Very dark greyish brown (2.5 Y 3/2 moist) loamy sand, single grain, loose, many roots, sandy fabric, pH 5.8, 20 - 50% pisolitic gravel up to 20 mm in diameter, irregular gradual boundary to
15 - 100	A2cb	Pink (7.5 YR 6/6 moist, 7.5 YR 7/4 dry) sandy clay loam, massive, moderately weak consistence, earthy fabric, > 50% pisolitic gravel up to 60 mm in diameter, irregular gradual boundary to
100+	B1	Brownish yellow (10 YR 6/6 moist) light clay, moderately pedal, polyhedral rough peds, moderately weak consistence, pH 6.8, 20 - 50% pisolitic gravel 20 - 60 mm in diameter, common coarse distinct red (2.5 YR 5/8) mottles.

Profile No. 17

Type Of Soil Observation:	Soil Pit 1.5 M Deep
Landform:	Ridge
Vegetation:	Low shrubs
Condition Of Surface Soil:	Hard setting
Disturbance Of Site:	Completely cleared pasture, never cultivated
Northcote Classification:	Dy 4.11

Profile Description

Depth (cm)	Horizon	Description
0-9	A11	Yellowish brown (10 YR 5/6 moist) silty loam, massive, moderately weak consistence, earthy fabric, roots common, pH 5.2, 2 - 10% pisolitic gravel 2 - 6 mm in diameter, wavy clear boundary to -
9 - 100	A12	Strong brown (7.5 YR 5/8 moist, 10 YR 7/6 dry) loam, single grain, loose, sandy fabric, roots common, > 50% pisolitic gravel up to 60 mm in diameter, irregular clear boundary to -
100+	B2	Yellow (10 YR 7/8 moist) silty clay loam, moderately pedal, polyhedral smooth peds, moderately firm consistence, pH 6.0, very few faint red (2.5 YR 5/8 moist) mottles.

Profile No. 18

Type Of Soil Observation: Soil Pit 1.5 M Deep
 Landform: Mid-slope
 Vegetation: Sparse Trees; Eucalyptus calophylla
 Condition Of Surface Soil: Hard setting
 Disturbance Of Site: Completely cleared pasture
 Northcote Classification: Uc 2.12

Profile Description

Depth (cm)	Horizon	Description
0-1	A0	Partially decomposed organic material, smooth sharp boundary to -
1-12	A11	Dark yellowish brown (10 YR 3/4 moist) loamy sand, massive, very weak consistence, abundant roots, sandy fabric, pH 5.8, wavy clear boundary to -
12 - 32	A12	Strong brown (5 YR 4/6 moist) sand, massive, very weak consistence, many roots, sandy fabric, wavy gradual boundary to -
32 – 60	A2cb	Brownish yellow (10 YR 6/6 moist, 10 YR 8/3 dry) sand, massive, moderately weak consistence, roots common, sandy fabric, pH 6.3, irregular gradual boundary to -
60+	C	Weathered granitic material.

Profile No. 19

Type Of Soil Observation: Soil Pit 1.5 M Deep
 Landform: Upper slope
 Vegetation: Mid-dense trees; Eucalyptus astringens
 Condition Of Surface Soil: Loose
 Disturbance Of Site: No effective disturbance except hoofed animals
 Northcote Classification: Dy 5.41

Profile Description

Depth (cm)	Horizon	Description
0-18	A1	Very dark brown (10 YR 2/2 moist) loamy sand, massive, very weak consistence, abundant roots, earthy fabric, 20 - 50% pisolitic gravel 6 20 mm in diameter, pH 5.0, wavy clear boundary to -
18 - 60	A2cb	Dark yellowish (10 YR 4/6 moist, 10 YR 7/4 dry) loamy sand, massive, loose, roots common, earthy fabric, > 50% pisolitic gravel up to 60 mm In diameter, wavy clear boundary to -
60+	B2	Yellow (10 YR 7/8 moist) sandy clay, moderately pedal, polyhedral smooth peds, moderately strong consistence, pH 5.8, many very coarse prominent red (2.5 YR 4/8 moist) mottles.

Profile No. 20

Type Of Soil Observation:	Soil Pit 1.5 M Deep
Landform:	Crest
Vegetation:	Grasses
Condition Of Surface Soil:	Firm
Disturbance Of Site:	Completely cleared, has been cultivated
Northcote Classification:	Uc 4.12

Profile Description

Depth (cm)	Horizon	Description
0-7	A1p	Dark yellowish brown (10 YR 4/6 moist) loamy sand, massive, loose, roots common, sandy fabric, pH 6.0, 2 - 10% pisolitic gravel 2 - 6 mm in diameter, smooth abrupt boundary to -
7 - 45	A21	Yellowish brown (10 YR 5/8 moist) clayey sand, massive, very weak consistence, earthy fabric, 20 - 50% pisolitic gravel 6 - 20 mm in diameter, wavy gradual boundary to -
45 - 80	A22	Yellowish brown (10 YR 5/8 moist) clayey sand, massive, very weak consistence, earthy fabric, pH 6.5, > 50% pisolitic gravel 6 - 20 mm in diameter, irregular sharp boundary to -
80+	-	Massive ironstone.

Profile No. 21

Type Of Soil Observation:	Soil Pit 1.5 M Deep
Landform:	Mid-slope
Vegetation:	Mid-dense trees; Eucalyptus wandoo
Condition Of Surface Soil:	Firm
Disturbance Of Site:	No effective disturbance
Northcote Classification:	Dy 5.41

Profile Description

Depth (cm)	Horizon	Description
0-1	A0	Partially decomposed organic material, smooth sharp boundary to -
1-11	A1	Dark reddish brown (5 YR 2.5/2) loamy sand, single grain, loose, abundant roots, sandy fabric, pH 6.0, wavy abrupt boundary to -
11 - 43	A2cb	Strong brown (7.5 YR 4/6 moist, 7.5 YR 7/4 dry) clayey sand, massive, moderately weak consistence, few roots, earthy fabric, wavy clear boundary to -
43+	B2	Strong brown (7.5 YR 5/6 moist) medium clay, moderately pedal, polyhedral smooth peds, few roots, common coarse distinct red (2.5 YR 5/8 moist) mottles.

Profile No. 22

Type Of Soil Observation: Soil Pit 1.5 M Deep
 Landform: Open depression
 Vegetation: Pasture grasses; predominately rye and brome
 Condition Of Surface Soil: Hard setting
 Disturbance Of Site: Completely cleared, has been cultivated
 Northcote Classification: Dy 4.41

Profile Description

Depth (cm)	Horizon	Description
0-10	A1p	Dark greyish brown (10 YR 4/2 moist) loamy sand, massive, very weak consistence, sandy fabric, abundant fine roots, smooth abrupt boundary to -
10 - 40	A2cb	Light brown grey (2.5 Y 6/2 moist, 2.5 Y 7/2 dry) clayey sand, massive, very weak consistence, earthy fabric, many fine roots, irregular clear boundary to -
40+	B1	Brownish yellow (10 YR 6/8 moist) sandy clay, weakly pedal, polyhedral smooth peds, moderately weak consistence, 10 - 20% pisolitic gravel 2 6 mm in diameter.

Profile No. 23

Type Of Soil Observation: Soil Pit 1.5 M Deep
 Landform: Hillock
 Vegetation: Pasture grasses; predominately rye grass and brome grass
 Condition Of Surface Soil: Hard setting
 Disturbance Of Site: Completely cleared, has been cultivated
 Northcote Classification: Dy 5.41

Profile Description

Depth (cm)	Horizon	Description
0-10	A1p	Very dark greyish brown (10 YR 3/2 moist) loamy sand, single grain, loose consistence, sandy fabric, abundant fine roots, > 50% pisolitic gravel 6 - 20 mm in diameter, irregular clear boundary to -
10 - 40	A2cb	Yellowish brown (10 YR 5/6 moist, 10 YR 7/4 dry) loamy sand, single grain, loose, sandy fabric, many roots, > 50% pisolitic gravel 20 - 60 mm in diameter, irregular clear boundary to -
40+	B2	Yellowish brown (10 YR 5/6 moist) sandy clay, weakly pedal, polyhedral rough peds, moderately firm consistence, few roots, common coarse faint red (2.5 YR 5/8 moist) mottles.

Profile No. 24

Type Of Soil Observation:	Soil pit 40 cm deep
Landform:	Mid-slope
Vegetation:	Pasture grasses; predominately rye grass and brome grass
Condition Of Surface Soil:	Hard setting
Disturbance Of Site:	Completely cleared, has been cultivated
Northcote Classification:	Dr 4.11

Profile Description

Depth (cm)	Horizon	Description
0-10	A1p	Dark reddish brown (5 YR 3/3 moist) loam, moderately pedal, polyhedral rough peds, moderately firm consistence, many roots, cracks 5 - 10 mm wide, wavy clear boundary to -
10 - 20	A12	Dark red (2.5 YR 3/6 moist) loam, moderately pedal, blocky rough peds, moderately firm consistence, roots common, cracks 5 - 10 mm wide, wavy clear boundary to -
20 +	B2	Dark red (2.5 YR 3/6 moist) medium clay, moderately pedal, blocky rough peds, very firm consistence, few roots.

Profile No. 25

Type Of Soil Observation:	Soil pit 50 cm deep
Landform:	Upper slope
Vegetation:	Oats stubble
Condition Of Surface Soil:	Recently cultivated
Disturbance Of Site:	Completely cleared, cultivated
Northcote Classification:	Dy 4.41

Profile Description

Depth (cm)	Horizon	Description
0-13	A1p	Dark brown (7.5 YR 3/2 moist) loamy sand, massive, loose consistence, sandy fabric, many roots, smooth abrupt boundary to -
13 – 31	A2cb	Strong brown (7.5 YR 5/6 moist, 7.5 YR 7/4 dry) clayey sand, massive, very weak consistence, sandy fabric, few roots, macrospores, irregular gradual boundary to -
31+	B2	Yellowish red (5 YR 5/8 moist) light sandy clay loam, weakly pedal, polyhedral rough peds, very weak consistence, few medium faint red (2.5 YR 2/6 moist) mottles.

Profile No. 26

Type Of Soil Observation: Soil pit 55 cm deep
 Landform: Lower slope
 Vegetation: Pasture grass; predominately barley grass and brome grass
 Condition Of Surface Soil: Hard setting
 Disturbance Of Site: Completely cleared pasture, has been cultivated
 Northcote Classification: Dy 4.81

Profile Description

Depth (cm)	Horizon	Description
0-10	A1p	Very dark greyish brown (2.5 Y 3/2 moist) sand, massive, very weak consistence, sandy fabric, roots common, smooth abrupt boundary to -
10 – 40	A2cb	Light olive brown (2.5 Y 5/6 moist, 10 YR 7/4 dry) sand, massive, very weak consistence, sandy fabric, few roots, irregular clear boundary to -
40+	B	Yellowish brown (10 YR 5/8 moist) sandy clay loam, massive, moderately firm consistence, earthy fabric, very few medium distinct light grey (2.5 Y 7/2 moist) mottles.

Profile No. 27

Type Of Soil Observation: Soil pit 50 cm deep
 Landform: Hillock
 Vegetation: Pasture species; predominately brome grass and rye grass
 Condition Of Surface Soil: Hard setting
 Disturbance Of Site: Completely cleared pasture, has been cultivated
 Northcote Classification: Dy 5.21

Profile Description

Depth (cm)	Horizon	Description
0-10	A1p	Dark yellowish brown (10 YR 3/4 moist) loamy sand, weakly pedal, granular rough peds, very weak consistence, 20-50% pisolitic gravel 20-60 mm in diameter, roots common, wavy clear boundary to -
10 – 35	A3	Strong brown (7.5 YR 4/6 moist, 7.5 YR 6/4 dry) sandy loam, weakly pedal, granular rough peds, moderately weak consistence, few roots, 20-50% pisolitic gravel 20-60 mm in diameter, gradual irregular boundary to -
35 +	B2	Strong brown (7.5 YR 5/7 moist) clay loam, moderately pedal, lenticular smooth peds, moderately firm consistence, common medium distinct olive brown (2.5 YR 4/4 moist) mottles.

Profile No. 28

Type Of Soil Observation:	Soil pit 60 cm deep
Landform:	Lower slope
Vegetation:	Pasture species; predominately rye and brome grass
Condition Of Surface Soil:	Hard setting
Disturbance Of Site:	Completely cleared pasture, has been cultivated
Northcote Classification:	Dy 4.41

Profile Description

Depth (cm)	Horizon	Description
0-13	A1p	Dark greyish brown (2.5 Y 4/2 moist) sand, single grain, very weak consistence, sandy fabric, macrospores, 2-10% pisolitic gravel 2-6 mm in diameter, few roots, smooth sharp boundary to -
13 – 45	A2cb	Pale olive (5 Y 6/4 moist, 5 Y 7/2 dry) sand, massive, moderately weak consistence, sandy fabric, macrospores, 10-20% pisolitic gravel 2-6 mm in diameter, few roots, irregular abrupt boundary to -
45 +	B2	Yellowish red (5 YK 5/8 moist) light clay, weakly pedal, polyhedral smooth peds, moderately firm consistence, very few medium prominent weak red (2.5 YR 4/2 moist) mottles.

Profile No. 29

Type Of Soil Observation:	Soil pit 60 cm deep
Landform:	Lower slope
Vegetation:	Pasture species; predominately rye and barley grass
Condition Of Surface Soil:	Hard setting
Disturbance Of Site:	Completely cleared pasture has been cultivated
Northcote Classification:	Dy 4.41

Profile Description

Depth (cm)	Horizon	Description
0 – 15	A1p	Dark brown (10 YR 3/3 moist) loamy sand, massive, very weak consistence, earthy fabric, many roots, macrospores, smooth sharp boundary to -
15 - 45	A2cb	Light yellowish brown (2.5 Y 6/3 moist, 2.5 Y 8/2 dry) clayey sand, massive, moderately weak consistence, earthy fabric, few roots, irregular clear boundary to -
45 +	B2	Yellowish brown (10 YR 5/8 moist) clay loam, weakly pedal, polyhedral rough peds, moderately firm consistence, few medium distinct yellowish red (5 YR 5/8 moist) mottles.

Profile No. 30

Type Of Soil Observation: Soil pit 70 cm deep
 Landform: Mid - slope
 Vegetation: Pasture species; predominately rye and brome grass
 Condition Of Surface Soil: Hard setting
 Disturbance Of Site: Completely cleared pasture has been cultivated
 Northcote Classification: Dy 4.41

Profile Description

Depth (cm)	Horizon	Description
0 – 12	A1p	Very dark greyish brown (2.5 Y 3/2 moist) sandy loam, massive, very weak consistence, sandy fabric, roots common, 20-50% pisolitic gravel 6-20 mm in diameter, irregular clear boundary to -
12 – 60	A2cb	Yellowish brown (10 YR 5/6 moist, 10 YR 7/4 dry) clayey sand, massive, moderately weak consistence, earthy fabric, few roots, > 50% pisolitic gravel 20-60 mm in diameter, irregular clear boundary to -
60 +	B2	Strong brown (7.5 YR 5/8 moist) sandy clay, weakly pedal, polyhedral rough peds, moderately firm consistence, macropores, few, medium distinct red (2.5 YR 4/8 moist) mottles.

Profile No. 31

Type Of Soil Observation: Spade dug soil pit and existing vertical exposure
 Landform: Open depression, bottom of drainage line
 Vegetation: Pasture species; predominately rye and brome grass
 Condition Of Surface Soil: Hard setting
 Disturbance Of Site: Completely cleared pasture, some gully erosion
 Northcote Classification: Dg 1.81

Profile Description

Depth (cm)	Horizon	Description
0-15	A	Very dark grey (5 Y 3/1 moist) loamy sand, massive, moderately weak consistence, sandy fabric, few roots, macrospores, smooth abrupt boundary to -
15 - 70	A2cb	Light brownish grey (2.5 Y 6/2 moist, 2.5 Y 8/2 dry) sand, massive, moderately weak consistence, sandy fabric, macrospores, irregular gradual boundary to -
70 +	B1g	Pale yellow (5 Y 7/3 moist) light sandy clay loam, massive, moderately firm consistence, earthy fabric, very few medium distinct yellowish brown (10 YR 5/8 moist) mottles.

Profile No. 32

Type Of Soil Observation:	Soil pit and auguring to 2 m
Landform:	Hillock on lower slope
Vegetation:	Pasture species predominately rye grass and capeweed
Condition Of Surface Soil:	Hard setting
Disturbance Of Site:	Completely cleared has been cultivated
Northcote Classification:	Uc 2.21

Profile Description

Depth (cm)	Horizon	Description
0-14	A1p	Dark grey (10 YR 4/1 moist) sand, massive, very weak consistence, sandy fabric, roots common, smooth sharp boundary to -
14 - 100	A2cb	Light yellowish brown (10 YR 6/4 moist, 10 YR 8/1 dry) sand, massive, weak consistence, sandy fabric, few roots, coarse fraction > 2 mm increasing to 20%, irregular diffuse boundary to •
100 +	A3	Light yellowish brown (10 YR 5/6 moist) sand, massive, very weak consistence, sandy fabric, coarse fraction > 2 mm increasing to 40%.

Profile No. 33

Type Of Soil Observation:	Soil pit 50 cm deep
Landform:	Open depression (drainage line)
Vegetation:	Pasture, barley grass
Condition Of Surface Soil:	Hard setting
Disturbance Of Site:	Completely cleared pasture, never cultivated
Northcote Classification:	Alluvial soil

Profile Description

Depth (cm)	Horizon	Description
0-1	A0	Partially decomposed organic material, smooth sharp boundary to -
1-3	A11	Dark brown (10 YR 3/3 moist) loamy sand, massive, very weak consistence, abundant roots, earthy fabric, pH 6.5, smooth sharp boundary to -
3-5	A12	Black (10 YR 2/1 moist) loamy sand, single grain, very weak consistence, abundant roots, sandy fabric, < 2% pisolitic gravel 2-6 mm in diameter, smooth sharp boundary to -
5-8	A13	Dusky red (2.5 YR 3/2 moist) sandy loam, weakly pedal, polyhedral rough peds, abundant roots, 2-10% pisolitic gravel 2-6 mm in diameter, smooth sharp boundary to -
8-10	A14	Gritty sand > 2 mm in diameter, loose single grain, < 2% pisolitic gravel 2-6 mm in diameter, many roots, smooth sharp boundary to -
10 – 18	2A11b	Very dark grey (10 YR 3/1 moist) sandy loam, massive, moderately weak consistence, few roots, sandy fabric, smooth clear boundary to -
18 – 30	2A12b	Very dark greyish brown (10 YR 3/2 moist) sand, massive, moderately weak consistence, few roots, sandy fabric, moderately cemented broken sesquioxide pan, gradual irregular boundary to -
30 +	B	Brown (10 YR 5/3 moist) sandy clay, massive, moderately firm consistence, earthy fabric, pH 7.2, many medium prominent strong brown (7.5 YR 5/8 moist) mottles.

Profile No. 34

Type Of Soil Observation:	Soil pit 75 cm deep
Landform:	Spur
Vegetation:	Lupin stubble
Condition Of Surface Soil:	Recently cultivated
Disturbance Of Site:	Completely cleared, cultivated
Northcote Classification:	Dr 4.11

Profile Description

Depth (cm)	Horizon	Description
0-9	A1p	Dusky red (10 R 3/2 moist) fine sandy loam, single grain, loose consistence, earthy fabric, 10-20% pisolitic gravel 2-20 mm in diameter, few roots, smooth clear boundary to -
9-50	B1	Red (2.5 YR 4/8 moist) clay loam, weakly pedal, polyhedral rough peds, moderately weak consistence, macrospores, 20-50% pisolitic gravel 2-6 mm in diameter, few roots, irregular gradual boundary to -
50 +	B2	Red (10 R 4/8 moist) light clay, weakly pedal, polyhedral rough peds, moderately weak consistence, 2-10% pisolitic gravel 6-20 mm in diameter, common fine faint dark red (7.5 R 3/6 moist) mottles.

Profile No. 35

Type Of Soil Observation:	Soil pit and auguring 1.5 m deep
Landform:	Lower slope
Vegetation:	Pasture species; predominately rye grass and capeweed
Condition Of Surface Soil:	Hard setting
Disturbance Of Site:	Completely cleared, has been cultivated
Northcote Classification:	Dy 4.81

Profile Description

Depth (cm)	Horizon	Description
0-15	A1p	Very dark greyish brown (10 YR 3/2 moist) sand, massive, very weak consistence, earthy fabric, roots common, smooth abrupt boundary to -
15 - 110	A2cb	Light yellowish brown (10 YR 6/4 moist, 10 YR 8/3 dry) sand, massive, very weak consistence, earthy fabric, macrospores, few roots, irregular gradual boundary to -
110 - 130	A3	Yellowish red (5 YR 5/8 moist) clayey sand, massive, moderately firm consistence, earthy fabric, macrospores, irregular gradual boundary to -
130 +	B	Yellowish brown (10 YR 5/8 moist) sandy clay, massive, moderately firm consistence, earthy fabric, few fine distinct red (2.5 YR 4/8 moist) mottles.

Profile No. 36

Type Of Soil Observation:	Soil pit 60 cm deep
Landform:	Mid-slope
Vegetation:	Pasture species; predominately rye grass and capeweed
Condition Of Surface Soil:	Hard setting
Disturbance Of Site:	Completely cleared, has been cultivated

Northcote Classification: Dy 4.41

Profile Description

Depth (cm)	Horizon	Description
0-16	A1p	Dark grey (10 YR 4/1 moist) sand, massive, very weak consistence, earthy fabric, roots common, smooth abrupt boundary to -
16 - 46	A2cb	Light brownish grey (10 YR 6/2 moist, 10 YR 8/1 dry) sand, massive, very weak consistence, earthy fabric, few roots, 20-50% pisolitic gravel 6-20 mm in diameter, wavy clear boundary to -
46 +	B	Strong brown (7.5 YR 5/8 moist) sandy clay, weakly pedal, polyhedral rough peds, macropores, few fine distinct pale yellow (2.5 Y 7/4 moist) mottles.

Profile No. 37

Type Of Soil Observation: Soil pit 50 cm deep
 Landform: Mid-slope
 Vegetation: Oat crop stubble
 Condition Of Surface Soil: Recently cultivated
 Disturbance Of Site: Completely cleared, cultivated
 Northcote Classification: Dy 5.41

Profile Description

Depth (cm)	Horizon	Description
0 – 12	A1p	Very dark greyish brown (2.5 Y 3/2 moist) sandy loam, single grain, loose consistence, sandy fabric, 20-50% pisolitic gravel 6-20 mm in diameter, many roots, wavy clear boundary to -
12 - 32	A2cb	Light yellowish brown (10 YR 6/4 moist, 10 YR 8/2 dry) sandy loam, massive, very weak consistence, 20-50% pisolitic gravel 6-20 mm diameter, earthy fabric, macropores, roots common, wavy abrupt boundary to -
32+	B2	Light yellowish brown (2.5 Y 6/4 moist) sandy clay, moderate pedality, platy smooth peds, moderately firm consistence, many coarse prominent red (7.5 R 4/8 moist) mottles.

Profile No. 38

Type Of Soil Observation:	Soil pit 60 cm deep
Landform:	Mid-slope
Vegetation:	Oat crop stubble
Condition Of Surface Soil:	Recently cultivated
Disturbance Of Site:	Completely cleared, cultivated
Northcote Classification:	Dy 4.41

Profile Description

Depth (cm)	Horizon	Description
0-13	A1p	Very dark greyish brown (2.5 Y 3/2 moist) loamy sand, massive, very weak consistence, sandy fabric, smooth abrupt boundary to -
13 - 42	A2cb .	Light yellowish brown (2.5 Y 6/4 moist, 10 YR 8/3 dry) loamy sand, massive, very weak consistence, earthy fabric, macrospores, 2-10% pisolitic gravel (in bottom 5 cm of horizon) 2-20 mm in diameter, few roots, wavy clear boundary to -
42+	B2	Yellowish brown (10 YR 5/8 moist) sandy clay, moderately pedal, polyhedral smooth peds, moderately firm consistence, macropores, few medium distinct red (7.5 R 4/8 moist) mottles.

Profile No. 39

Type Of Soil Observation:	Soil pit 70 cm deep
Landform:	Mid-slope
Vegetation:	Oat crop stubble
Condition Of Surface Soil:	Recently cultivated
Disturbance Of Site:	Completely cleared, cultivated
Northcote Classification:	Dy 5.31

Profile Description

Depth (cm)	Horizon	Description
0-12	A1p	Dark reddish brown (5 YR 2.5/2 moist) sandy loam, massive, very weak consistence, earthy fabric, macrospores, < 2% pisolitic gravel 2-6 mm in diameter, abundant roots, wavy gradual boundary to -
12 - 32	A21sb	Strong brown (7.5 YR 4/6 moist, 10 YR 7/4 dry) loamy sand, massive, moderately weak consistence, earthy fabric, macrospores, 2-10% pisolitic gravel 2-6 mm in diameter, many roots, smooth gradual boundary to -
32 - 52	A22cb	Yellowish brown (10 YR 5/6 moist, 10 YR 7/4 dry) sandy loam, massive, moderately weak consistence, earthy fabric, macrospores, 2-10% pisolitic gravel 2-6 mm in diameter, irregular clear boundary to -
52+	B	Yellowish red (5 Y 5/6 moist) light clay, moderately pedal, polyhedral smooth peds, very firm consistence, macropores, common medium distinct red (10 R 4/8 moist) mottles.

Profile No. 40

Type Of Soil Observation:	Soil pit 1 m deep
Landform:	Mid-slope
Vegetation:	Oat crop stubble
Condition Of Surface Soil:	Recently cultivated
Disturbance Of Site:	Completely cleared, cultivated
Northcote Classification:	Uc 2.12

Profile Description

Depth (cm)	Horizon	Description
0-15	A1p	Very dark brown (10 YR 2/2 moist) loamy sand, single grain, loose, sandy fabric, abundant roots, smooth clear boundary to -
15 - 63	A2cb	Yellowish brown (10 YR 5/6 moist, 10 YR 7/4 dry) loamy sand, massive, very weak consistence, earthy fabric, 10-20% coarse quartz fragments, 2-6 mm in diameter, many roots, 10-20% soft segregations at bottom of horizon, irregular gradual boundary to -
63 - 78	A3	Broken moderately cemented sesquioxide pan
78+	C	Weathered pallid granitic material

Profile No. 41

Type Of Soil Observation:	Soil pit 70 cm deep
Landform:	Mid-slope
Vegetation:	Oat crop stubble
Condition Of Surface Soil:	Recently cultivated
Disturbance Of Site:	Completely cleared, cultivated
Northcote Classification:	Uc 2.12

Profile Description

Depth (cm)	Horizon	Description
0-18	A1p	Very dark brown (10 YR 2/2 moist) loamy sand, massive, very weak consistence, earthy fabric, abundant roots, irregular abrupt boundary to -
18 - 60	A2cb	Yellowish brown (10 YR 5/6 moist, 10 YR 7/4 dry) loamy sand, massive, very weak consistence, earthy fabric, roots common, 10-20% quartz and felspar fragments increasing in size down the horizon to 60 mm in diameter, some granitic rock fragments broken diffuse boundary to -
60+	C	Weathered, pallid, granitic rock.

Profile No. 42

Type Of Soil Observation:	Soil pit 65 cm deep
Landform:	Mid-slope
Vegetation:	Oat crop stubble
Condition Of Surface Soil:	Recently cultivated
Disturbance Of Site:	Completely cleared, cultivated
Northcote Classification:	Uc 4.13

Profile Description

Depth (cm)	Horizon	Description
0 – 20	A1p	Very dark brown (10 YR 2/2 moist) sandy loam, massive, very weak consistence, earthy fabric, 10-20% coarse quartz fragments, macrospores, many roots, irregular gradual boundary to -
20 - 60	A2	Dark yellowish brown (10 YR 4/6 moist, 7.5 YR 5/6 dry) loamy sand, massive, very weak consistence, earthy fabric, macrospores, 25-50% coarse quartz and felspar fragments increasing in size down the horizon to 60 mm, roots common, broken diffuse boundary to -
60+	C	Weathered, pallid, granitic rock.

Profile No. 43

Type Of Soil Observation: Soil pit 40 cm deep
 Landform: Open depression, mid-slope
 Vegetation: Oat crop stubble
 Condition Of Surface Soil: Recently cultivated
 Disturbance Of Site: Completely cleared, cultivated
 Northcote Classification: Dr 4.11

Profile Description

Depth (cm)	Horizon	Description
0-8	A1p	Dark brown (7.5 YR 3/4 moist) fine sandy loam, massive, very weak consistence, earthy fabric, abundant roots, smooth abrupt boundary to -
8-20	B1	Dusky red (10 R 3/4 moist) fine sandy clay loam, weakly pedal, angular blocky smooth peds, moderately weak consistence, macrospores, few roots, < 2% pisolitic gravel < 2 mm in diameter, cracks < 5 mm in width, wavy abrupt boundary to -
20+	B2	Dark reddish brown (5 YR 3/4 moist) sandy clay, moderately pedal, polyhedral smooth peds, moderately weak consistence, macrospores, 2-10% pisolitic gravel 2-20 mm in diameter.

Profile No. 44

Type Of Soil Observation: Soil pit 50 cm deep
 Landform: Lower slope
 Vegetation: Oat crop stubble
 Condition Of Surface Soil: Recently cultivated
 Disturbance Of Site: Completely cleared, cultivated
 Northcote Classification: Dy 5.31

Profile Description

Depth (cm)	Horizon	Description
0 – 12	A1p	Very dark brown (10 YR 2/2 moist) fine sandy loam, massive, loose, earthy fabric, abundant roots, < 2% pisolitic gravel 2-6 mm in diameter, smooth abrupt boundary to -
12 - 22	A21	Strong brown (7.5 YR 4/6 moist) loamy sand, massive, very weak consistence, earthy fabric, macrospores, roots common, 2- 10% pisolitic gravel, 2-20 mm in diameter, irregular clear boundary to -
22 – 32	A22cb	Yellowish brown (10 YR 5/6 moist) loamy sand, massive, moderately weak consistence, earthy fabric, macrospores, few roots, 2-10% pisolitic gravel 2-20 mm in diameter, smooth sharp boundary to -
32+	B2	Yellowish brown (10 YR 5/8 moist) heavy clay, moderately pedal, polyhedral smooth peds, very firm consistence, few roots, common medium distinct red (10 R 4/8 moist) mottles.

Profile No. 45

Type Of Soil Observation:	Soil pit 40 cm deep
Landform:	Lower-slope
Vegetation:	Oat crop stubble
Condition Of Surface Soil:	Recently cultivated
Disturbance Of Site:	Completely cleared, cultivated
Northcote Classification:	Dy 5.41

Profile Description

Depth (cm)	Horizon	Description
0-10	A1p	Very dark brown (10 YR 2/2 moist) sandy loam, single grain loose, earthy fabric, many roots, 2-10% pisolitic gravel 2-6 mm in diameter, smooth clear boundary to -
10 – 25	A2cb	Strong brown (7.7 YR 5/6 moist, 7.5 YR 7/4 dry), clayey sand, massive moderately weak consistence, earthy fabric, roots common, 2-10% pisolitic gravel 2-6mm in dia, irregular gradual boundary to-
25+	B1	Yellowish red (5 YR 5/8 moist) medium clay, moderately pedal, polyhedral smooth peds, moderately weak consistence, few roots, < 2% pisolitic gravel 2-6 mm in diameter.

Profile No. 46

Type Of Soil Observation: Soil pit 75 cm deep
 Landform: Lower-slope
 Vegetation: Oat crop stubble
 Condition Of Surface Soil: Recently cultivated
 Disturbance Of Site: Completely cleared, cultivated
 Northcote Classification: Uc 2.

Profile Description

Depth (cm)	Horizon	Description
0 – 11	A1p	Dusky red (2.5 Y 3/2 moist) sand, single grain, loose, earthy fabric, many roots, smooth abrupt boundary to -
11 - 60	A2cb	Pink (7.5 YR 7/4 moist, 7.5 YR 8/2 dry) sand, massive, very weak consistence, earthy fabric, few roots, macrospores, smooth clear boundary to
60+	A3	White (10 YR 8/1 moist) clayey sand, massive, moderately firm consistence, earthy fabric, many very coarse prominent red (2.5 YR 4/8 moist) mottles.

Profile No. 47

Type Of Soil Observation: Soil pit 70 cm deep
 Landform: Mid-slope
 Vegetation: Oat crop stubble
 Condition Of Surface Soil: Recently cultivated
 Disturbance Of Site: Completely cleared, cultivated
 Northcote Classification: Uc 4.13

Profile Description

Depth (cm)	Horizon	Description
0 – 15	A1p	Dark reddish brown (5 YR 3/2 moist) sandy loam, massive, very weak consistence, earthy fabric, abundant roots, wavy clear boundary to -
15 - 50	A2	Dark reddish brown (2.5 YR 3/4 moist) clayey sand, massive, very weak consistence, earthy fabric, roots common, 50% coarse fragments, dolerite rocks up to 50 cm diameter, diffuse broken boundary to -
50+	C	Weathered granitic rock.

Profile No. 48

Type Of Soil Observation:	Soil pit 50 cm deep
Landform:	Mid-slope
Vegetation:	Oat crop stubble
Condition Of Surface Soil:	Recently cultivated
Disturbance Of Site:	Completely cleared, cultivated
Northcote Classification:	Dr 4.51

Profile Description

Depth (cm)	Horizon	Description
0-14	Ap	Very dark brown (10 YR 2/2 moist) loamy sand, massive, very weak consistence, earthy fabric, abundant roots, wavy abrupt boundary to -
14 - 30	B2	Yellowish red (5 YR 4/5 moist) sandy clay loam, massive, earthy fabric, roots common, irregular diffuse boundary to -
30+	B3	Strong brown (7.5 YR 5/8 moist) sandy clay loam, massive, very weak consistence, earthy fabric, 25-50% coarse fragments > 2 mm diameter increasing with depth, common coarse distinct red (10 R 4/8 moist) mottles.

Profile No. 49

Type Of Soil Observation:	Soil pit 60 cm deep
Landform:	Lower slope
Vegetation:	Oat crop stubble
Condition Of Surface Soil:	Recently cultivated
Disturbance Of Site:	Completely cleared, cultivated
Northcote Classification:	Dy 4.61

Profile Description

Depth (cm)	Horizon	Description
0-20	A1p	Very dark brown (10 YR 2/2 moist) sandy loam, massive, very weak consistence, earthy fabric, many roots, 10-20% coarse fragments 2-6 mm in diameter, gradual irregular boundary to -
20 - 40	A2	Yellowish brown (10 YR 5/6 moist) light sandy clay loam, massive, very weak consistence, earthy fabric, 25-50% coarse fragments 2-20 mm in diameter, gradual irregular boundary to -
40+	B2	Strong brown (7.5 YR 5/6) sandy clay loam, massive, very weak consistence, earthy fabric, 10-20% coarse fragments 2-60 mm in diameter.

Profile No. 50

Type Of Soil Observation: Soil pit 50 cm deep
 Landform: Upper slope
 Vegetation: Mid-dense woodland principally Eucalyptus wandoo
 Condition Of Surface Soil: Soft
 Disturbance Of Site: No effective disturbance
 Northcote Classification: Dr 4.11

Profile Description

Depth (cm)	Horizon	Description
0-20	A1	Dark red (2.5 YR 3/6 moist) clay loam, massive, moderately weak consistence, earthy fabric, macrospores, few roots, 2-10% pisolitic gravel 2--6 mm in diameter, irregular gradual boundary to -
20+	B2	Dark red (2.5 YR 3/6 moist) medium clay, strongly pedal, polyhedral smooth peds, moderately weak consistence, few roots, very few medium prominent yellow (2.5 YR 7/8 moist) mottles.