

BRIGHTON SOIL REPORT

Reconnaissance Soil Map Series of Tasmania

A Revised Edition

by Stacey Spanswick
& Darren Kidd

Department of Primary Industries, Water and Environment
Tasmania
2000

of Divisional Report 2/57 Brighton

By G.M Dimmock

C.S.I.R.O Division of Soils, Adelaide, 1957

Brighton Report

and accompanying 1:100 000 Brighton
Soil Reconnaissance map



Tasmania

DEPARTMENT of
PRIMARY INDUSTRIES,
WATER and ENVIRONMENT



Natural Heritage Trust
Helping Communities Helping Australia

ACKNOWLEDGEMENTS

This report and accompanying map are revised versions of original work by CSIRO (Dimmock, 1957). We gratefully acknowledge the original work of Dimmock and the CSIRO Division of Soils, Adelaide for supporting this project.

We would like to acknowledge the contribution of the following groups and individuals who have assisted with the reprinting and updating of this report and accompanying map.

We would like to especially thank Mr G Dimmock for editing the draft map sheet and report.

The DPIWE staff who contributed to this project. Paul Pohlner for assisting with field work, Ron DeRose for his soil advice, Mark Brown and Tony Davidson for their SIS support, Linda Green for retyping the reports and Jim Talbot for providing Oracle technical assistance.

The members of the Steering Committee, Maureen Bennet, Kathy Noble, Chris Grose and Bill Cotching for their advice and support.

The Natural Heritage Trust for jointly funding this project.

PREFACE

The Reconnaissance Series

Over a 27 year period (1940 - 1967), the CSIRO Division of Soils, Adelaide undertook a series of reconnaissance (small scale) soil surveys and some more detailed (large scale) soil surveys of the agricultural land in Tasmania. However, most of these reports are out of print and of limited availability, the terminology is dated and inconsistencies in map units exist across map sheets. In 1997, the Department of Primary Industries, Water and Environment (DPIWE) and the Natural Heritage Trust, put together a project to correlate and reprint the maps and reports and to extend this information and its value as a tool for sustainable land management, to a variety of potential users.

This report is part of the “Reconnaissance Soil Map of Tasmania” series which were published at a scale of 1 inch to 1 mile (1:63 360). The reconnaissance series has been expanded to include the soil maps that were not part of the original “Reconnaissance Soil Map of Tasmania” series but mapped at scales of 1 inch to 1 mile and 1 inch to 2 miles (1:126 000). These maps have been reformatted and reprinted by the DPIWE at a scale of 1:100 000 to be consistent with more recent soil mapping scales (eg South Esk 1:100 000 soil map (southern half), Doyle, 1993), the land capability mapping series and the current Tasmanian Land Tenure map series.

It is not the aim of this project to remap the areas covered by the Reconnaissance series or to change the intensity of mapping, but to correlate, standardise and enhance existing information and provide the public and DPIWE staff with more consistent, reliable and accessible soil resource information.

Correlation of the Brighton Reconnaissance Soil Map

Defining Map units

In attempting to correlate soils across the reconnaissance soil maps around the State differences in the nature of the map units have caused some problems. Map units on the initial maps investigated (Longford, Quamby and South Esk), essentially depicted broad scale “soil associations”. These associations identified and described a dominant soil and a range of minor soils which were generally associated with recognisable landscape features. For example the Eastfield Association, dominated by the Eastfield Soil Profile Class (SPC), has a range of minor soils such as the Panshanger SPC and the Bloomfield SPC which are found on rolling to steep dolerite hills.

In other parts of the State, including the Brighton sheet, the map units of the Reconnaissance Soil Maps have been generally defined on the basis of Great Soil Groups (Stace *et al.*, 1968) and parent material, eg Podzolic Soils on Dolerite. In many instances a dominant or representative soil has been identified and, where adequate existing data is available, it is possible to define an SPC for that soil. In such cases it is sometimes possible to correlate with SPCs defined elsewhere. However because of insufficient data for the minor soils it is not possible to define and correlate the minor soils around the State. Therefore there is a unit “Podzolics on Dolerite” and another “Eastfield Association” both of which are dominated by the Eastfield SPC but which may have different minor soils. To correlate these two units based on the dominant soil only, would be incorrect and misleading. Instead the original map unit name has been retained. Where a dominant soil has been identified, the map unit has been assigned a number, eg Podzolics on Dolerite 1 (Pd1), with the identified dominant soil outlined in the report and on the legend of the map.

In some instances sufficient data exists to determine that a particular polygon or group of polygons, i.e areas which are enclosed by specific boundaries, have a different dominant soil to others of a similar map unit name. However the data is insufficient to allow the precise definition of that soil. These map units have been assigned a numerical value. (eg Pss1 & Pss2). The distinction between these polygons and polygons where a dominant soil has been defined (eg Pd1), is apparent by the absence of a defined dominant soil in the report and on the legend of the map.

Due to resource constraints only a limited amount of time could be spent investigating these less well defined soils and map units. Hence the term “insufficient data” occurs widely throughout the legend. The correlation of the Reconnaissance Soil Maps has highlighted how little information is available for some of Tasmania’s major soils.

The Brighton Map

The Brighton Reconnaissance Soil Map adjoins the Buckland map (Spanswick & Kidd, 2000a) on its eastern boundary, the Hobart map (Spanswick & Kidd, In prep) on its southern boundary the Ellendale map (Spanswick & Kidd, In prep.) on its western boundary and the Sorell map (Spanswick, 2000) on its south eastern corner. For an index map of the 1:100 000 Reconnaissance Soil Surveys of Tasmania, see Appendix 6.

Soil Taxonomic Units

A soil taxonomic unit is a general term for a grouping of soils based on similarities of the soils within the group, and differences compared with other groups. Map units consist of defined areas of contiguous soil taxonomic units. As outlined previously the soil taxonomic units used by Dimmock in this survey are Great Soil Group (Stace *et al.*, 1968). This has been replaced where possible by Soil Profile Class (SPC) as this will standardise taxonomic units across the Brighton map and be consistent with taxonomic units used within the more recent South Esk Soil Map and by other States. A SPC is a group or class of soil profiles within a map unit which have similar morphological characteristics, and may have similar chemical properties (Gunn *et al.*, 1988). The SPCs were constructed through the use of existing reports, historical soil data in the DPIWE soil database and additional field work. A key to soil horizon designations used within the SPCs is provided in Appendix 1. The lines separating horizons within the SPC reports are shown by broken and solid lines. The broken lines show a diffuse or gradual change to the next horizon whereas the solid lines show a clear or abrupt transition. If the horizon transition is unknown a larger broken line is used. Where we could not produce an SPC for a map unit, due to a lack of information, type profiles of a dominant soil, where identified by Dimmock on the original map, have been added to the report, wherever possible.

Map Edits

Dimmock mapped some of the polygons in the eastern half of the sheet as more than one type of map unit. For example a single map unit may be labelled both “Pd” and “Pd with Bd”. This is really a complex unit. However because the occurrence of Pd with Bd is in only a part of the polygon, it is not possible without significant additional field work and aerial photograph interpretation, to split this unit and other units like it. Therefore, we have left these units as is. They are identified on the paper maps and in a notes column attached to the polygon attribute table of the digital maps. This information has also been stored as a separate point coverage, however the coordinates used for the label points are only estimations taken from a visual interpretation of their location on the original published map.

The map units in this survey also include soil complexes. A soil complex consists of two or more dominant soils which occur in an intricate pattern that can't be separated at this scale of mapping without unwarranted effort.

There are two maps for this report in circulation. The map that accompanies this report has polygons coloured according to the different map units identified. The second map, which is intended solely for DPIWE in-house circulation, has map units coloured according to the Australian Soil Classification for the dominant SPC within each unit, no colour is assigned to a map unit if a SPC has not been identified.

Legend

Where possible the dominant soil of each map unit has been classified to soil order using the Australian Soil Classification (Isbell, 1996). Soils have also been classified according to Great Soil Group (Stace *et al.*, 1968).

Edits to the Brighton Report

The Brighton report has been reformatted to provide a more consistent structure with other similar reports. The soil terminology used within the Brighton report has been updated to be consistent with the Australian Soil and Land Survey Field Handbook (McDonald *et al*, 1990), old imperial measurements have been converted to the metric system and sentence structure has been changed where it did not read with clarity. Edits and additional information about the soils within map units has been recorded within the main body of this report. All the changes made to the report are shown in italics.

No changes have been made to Land Use within this report. This information is out of date and is an area that has been identified as requiring further work.

Laboratory Analysed Data

CSIRO laboratory data is available for some of the dominant soils identified on this map. Readers should be aware that some of the laboratory methods used by CSIRO in the 1950s and 1960s differ to the methods used in more recent DPIWE laboratory analyses. All CSIRO sites have the character “H” at the beginning of the profile number eg H68. An outline of the different methods used is located in Appendix 2.

Future Work

Correlation of the soils identified on this map with others in southern Tasmania has been extremely difficult due to the lack of existing soil profile data, the complexity of geology and local climate and topography variations. Except for the soils formed on basalt and dolerite, very little is known about the soils within this map sheet. Consequently a number of areas exist where additional work to identify and classify the dominant soil type would be valuable.

Alluvial Soils

The alluvial soils are important agriculturally, however very little is known about their properties or appropriate management. The soils within this unit vary considerably and it was impossible without significant additional field work and aerial photo interpretation to split the different soils of this unit. Further work is needed to differentiate the soils of this unit and provide land users and planners with more detailed information about their properties and behaviour under different land uses. More information about the alluvial soils may be found in Holtz (1987) and DeRose & Musk (In prep).

Soils on Triassic Sediments

A broad range of soils have formed on the Triassic sediments. Due to a lack of data and resource constraints we have been unable to define the major soils of this unit. In the lower landscape the Triassic soils are sodic to varying degrees, making them prone to dispersion and erosion. These soils are currently used for grazing, forestry and urban development. More work is required on these soils as their erosion risk has important land use implications.

Land Use

As mentioned previously no edits have been made to the land use section of this report. A more detailed description of land use and vegetation within the Brighton area may be found in

Davies (1988), Land systems survey of southern Tasmania and DeRose & Musk (In prep.), Land Capability survey of the 1:100 000 Derwent sheet.

Accuracy of Maps

Base data on the original Brighton Reconnaissance Soil Map was supplied by the Department of Lands and Survey, Hobart, in 1942. The original map used the Transverse Mercator Projection with Co-ordinates displayed in yards. Soil boundaries were delineated by stereoscopic interpretation of aerial photographs. The old paper soil maps were transferred to electronic form in the early 1990's with the Co-ordinate system converted to the Australian Map Grid, however no projection was recorded. Accuracy checks of the Brighton digital map have revealed a range of spatial errors. However the major source of spatial error on all the Reconnaissance Soil Maps has been caused by the absence of rectification of the aerial photographs during delineation of line work. Hence, Ground Control Points (GCP) in some areas on the map sheet, eg hilltops, do not match current true ground positions.

We have not had the resources or time to address all the inaccuracies within this map sheet. Corrections have been made to the coastline only and users need to be aware that in some areas the boundaries of map units may be out by considerable distances.

Appendices

A series of appendices have been attached providing additional information relevant to this report and the accompanying soil map. Much of this information was either unavailable or not recorded with the original report by Dimmock.

Table of Contents

1. INTRODUCTION.....	9
2. PHYSICAL ENVIRONMENT	9
2.1 Geology & Geomorphology	9
2.2 Climate.....	10
2.3 Land Use.....	10
3. SOIL MAP UNITS AND SOIL PROFILE CLASSES.....	11
3.1 Soils on Basalt	11
3.1.1 Black Soils on Basalt (Blb)	11
3.2 Soils on Dolerite	14
3.2.1 Podzolic Soils on Dolerite (Pd).....	14
3.2.2 Brown Soils on Dolerite (Bd).....	18
3.2.3 Black Soils on Dolerite (Bld).....	22
3.3 Soils on Mudstone	27

3.3.1	Podzolic Soils on Mudstone (Pm)	27
3.4	Soils on Sandstone	30
3.4.1	Podzolic and Podzol Soils on Sandstone (Pss).....	30
3.5	Soils on Solifluction Deposits	31
3.5.1	Yellow-brown Soils on Solifluction Deposits (Ybs).....	31
3.6	High Moor Peats	33
3.6.1	High Moor Peats (HMP)	33
3.7	Soils on Limestone	36
3.7.1	Brown Soils on Limestone (BL)	36
3.8	Undifferentiated Alluvial Soils.....	36
3.8.1	Soils of Alluvial Deposits (A).....	36
3.9	Lateritic soils	37
3.9.1	Lateritic Soils (L)	37
REFERENCES		38
Appendix 1.....		41
Appendix 2.....		42
Appendix 3.....		44
Appendix 4.....		45
Appendix 5.....		46
Appendix 6.....		47
Appendix 7.....		49
List of Tables		
Table 1 Analytical data for Sorell SPC.....		5
Table 2 Analytical data for Eastfield SPC		8
Table 3 Analytical data for Tea Tree SPC		12
Table 4 Analytical data for Belmont SPC.....		16

Table 5 Analytical data for Forcett SPC	21
Table 6 Analytical data for High Moor Peat SPC.....	27

RECONNAISSANCE SOIL MAP OF TASMANIA

SHEET 75 - BRIGHTON

BY
G.M. Dimmock

1. INTRODUCTION

This report forms part of the "Reconnaissance Soil Map of Tasmania" series. The original soil map which is the main feature of this report is at a scale of 1:63 360. The revised version of the map accompanying this report is at a scale of 1:100 000. The maps are issued in this preliminary form essentially for local use. Discussion of the soils is limited to a brief explanation of the map, and further information is left to intended future publications. The survey of the Reconnaissance series is being intensified and the maps when finally published may be in revised form. However, in most cases, although the soil units are likely to be re-defined, major soil boundaries will be altered only slightly. As the accuracy of available base maps varies from sheet to sheet it has been necessary to indicate on each soil map the degree of reliability of the base detail.

2. PHYSICAL ENVIRONMENT

2.1 Geology & Geomorphology

The most striking topographic features are the south-east trending valleys of the Coal and Jordan Rivers, the Bagdad Rivulet and other major tributaries. Apart from the floors of these valleys most of the country is either hilly or mountainous. Elevations range from near sea level at Bridgewater on the Derwent estuary to around 910m at Mt. Dromedary and Quoin Mt.

Jurassic dolerite is the most widespread rock and has intruded Permian mudstones, shales, limestones and sandstones, and Triassic sandstones and shales. Tertiary lake sediments are found in a few small areas along the Coal River valley and near Rekuna. Tertiary basalt flows have filled parts of the lower reaches of the valleys of the Jordan and Coal Rivers and some of their tributaries. River terraces and more recent alluvium occupy the remainder of the valley floors.

2.2 Climate

Rainfall varies from *480 to over 740mm* per annum with the highest values in the south-western part around Mt. Dromedary, and the lowest in the rain shadow zone around Brighton and Kempton. There are no stations recording temperature in the area, but the mean annual temperature would probably be slightly less than that at Hobart (12.2 °C). Snowfalls are fairly common in the higher south-western region but snow does not lie. The average frost-free period is of the order of 3 to 4 months.

2.3 Land Use

About half the area is cleared, most of the remainder is too steep and stony for agriculture and carries medium to dense timber, some of which is millable and has been exploited extensively. Agricultural development is largely concentrated along the valley floors and lower slopes with the chief interests in dairying and fat lamb production on improved pastures, but berry fruits are grown on some steep slopes in the south-west. Pome fruit and apricot growing are important in the Bagdad valley.

3. SOIL MAP UNITS AND SOIL PROFILE CLASSES

3.1 Soils on Basalt

3.1.1 Black Soils on Basalt (Blb)

Black Soils on basalt are fairly extensive along the lower reaches of the Jordan and Coal River valleys. They are usually associated with a flat to gently sloping low plateau topography. The surface soil is a near black clay or clay loam frequently with a granular “self mulching” structure and subject to deep cracking in dry seasons. There is a gradual change to the dark yellow-grey or dark brown subsoil clay, and this in turn merges with decomposing basalt. Free carbonate is often present in this horizon.

Towards the plateau edges small patches of shallow red-brown soils occur. These have been mapped with the black soils.

Land Use

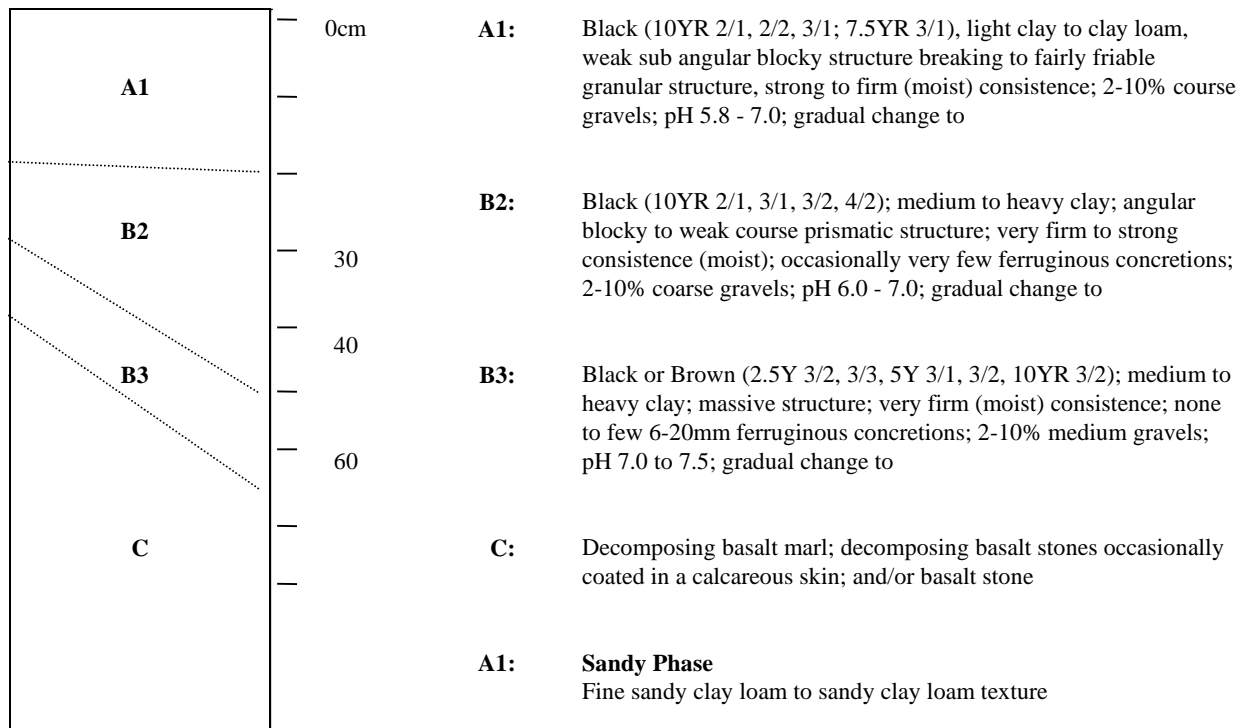
Soils of this group are mostly under improved pasture.

Correlation

The dominant soil of this unit (melanic-vertic black Dermosol or black Vertosol) correlates with the Sorell SPC. This unit has been renamed Black Soils on Basalt 1 (Blb1). In areas west of Brighton, east of Campania and south of Gagebrook the basalt soils have a lighter textured sandy clay loam to fine sandy loam surface. These soils are a sandy phase of the Sorell SPC.

Sorell Soil Profile Class

Concept	Shallow black friable clay on the slopes of low basaltic hills
Aust. Soil Classification	Melanic-Vertic Black Dermosol or Black Vertosol
Great Soil Group	Prairie Soil or Black Earth
Principal Profile Form	Gn, Ug
Mapping Units	Blb1 & Blb2
Geology	Tertiary Basalt
Landform	Upper part of gentle undulating low hills or hills
Vegetation	Mostly cleared or Savannah Woodland
Permeability	Very slowly to slowly permeable
Drainage	Moderate to imperfectly drained



Morphological sites: CSIRO H69, H77, H82, H234; CRGKH C219; LCDERW 25, 1029, 1030; SOILCO 66

Analysed sites: CSIRO H69, H77, H82, H234

Related soil names: Sorell clay

Correlation references: Loveday (1955), Loveday (1957), Loveday & Dimmock (1958), Holtz (1987), Spanswick (2000), Spanswick & Kidd (2000)

Soil Profile Class Grid Reference	Profile Number	Horizon	Sample Depth (cm)	pH water (1:5)	EC (d/sm)	Total P (mg/kg)	Org. Carb. (%)	Total N (%)	C/N Ratio	Ca	Mg	Na	K
Sorell 519099E 5268759N	H234	A11	0-13	6.1	0.113	0.041	4.65	0.348	13	23.6	12.1	0.75	0.7
	H234	A12	14-25	6.8	0.09	0.016	2.68	0.214	13				
	H234	A13	25-38	7.1	0.092		2.52	0.186	14	33.8	26.4	1.9	0.68
	H234	A14	38-47	7.4	0.101		1.65	0.133	12				
	H234	C	63-74	8.4	0.101		0.33	0.029	11	36.5	35.2	6.1	0.28

Soil Profile Class Grid Reference	Profile Number	Horizon	Sample Depth (cm)	Total Bases	BASE SAT (%)	ESP (%)	Ca/Mg Ratio	Gravel (of total) >2000 (um) (%)	Sand Coarse >200 (um) (%)	Sand Fine <200 (um) (%)	Silt (%)	Clay (%)
Sorell 519099E 5268759N	H234	A11	0-13	37.15	72	1.4	1.95	5	3	32	20	38
	H234	A12	14-25									
	H234	A13	25-38	62.78	89	2.7	1.28	6	2	18	13	64
	H234	A14	38-47									
	H234	C	63-74	78.08		7.8	1.04	45	28	17	11	49

Table 1. Analytical data for the Sorrell SPC

3.2 Soils on Dolerite

3.2.1 Podzolic Soils on Dolerite (Pd)

Podzolic soils are found on dolerite at elevations up to about 600m and wherever the rainfall exceeds about 630mm per annum. Slopes vary from gentle to steep and are usually rather stony.

The surface soil is a grey-brown sandy loam or fine sandy loam overlying a bleached fine sandy subsurface which may contain some ferruginous gravel. There is a sharp change to a weakly mottled light yellow-grey and yellow-brown subsoil clay which at depth gradually merges into decomposing dolerite. The subsoil varies from a rather dense, and in the moist state, sticky clay, to a more open and friable clay. Dolerite stones occur throughout the profile.

Besides the most common profile described above, there are some profiles without the bleached subsurface and also some which are transitional to the black or the brown soils on dolerite.

Land Use

The natural vegetation is a sclerophyll forest with a ground flora of native grasses, tussocks and heath plants, and provides rough grazing for sheep. However, in limited areas where slopes are not too steep and stony these soils are capable of development for improved pastures.

Correlation

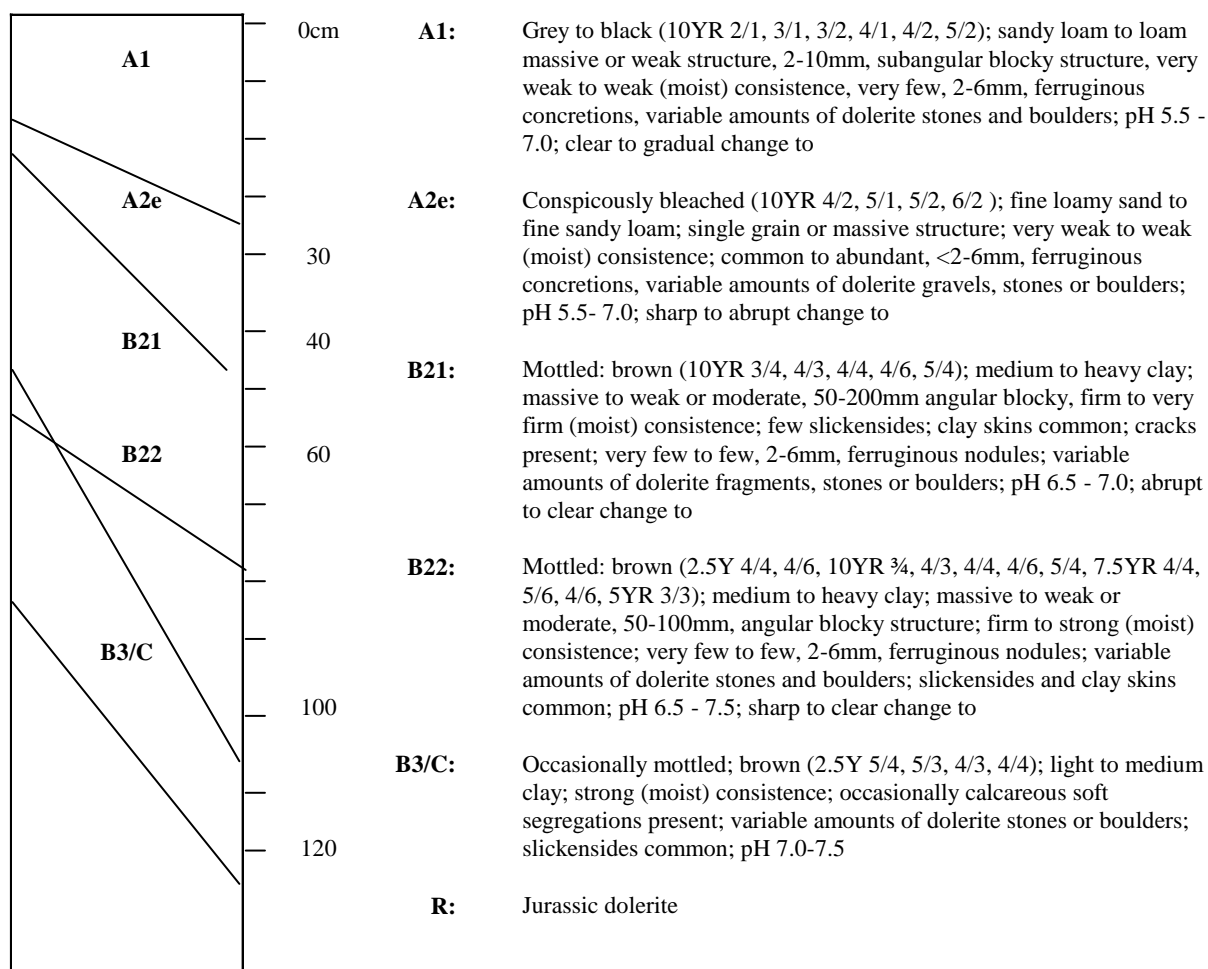
The dominant soil of this unit correlates with the Eastfield SPC. This unit has been renamed Podzolic Soils on Dolerite 1. The podzolic soils on dolerite as outlined by Dimmock (1957) occur on dolerite hills at elevations up to 600m where annual rainfall is greater than 630mm. Nicolls (1957) found that the rainfall cut off for these soils is generally less than 1020mm. On the steep colluvial dolerite slopes a very shallow stony texture contrast soil without an A2 is common (eutrophic grey Kurosols). As slope angle decreases the soils become deeper and less stony with a bleached A2 horizon dominated by ferruginous gravels becoming evident. This soil is the most common soil within this unit and correlates with the Eastfield SPC described on the surrounding map sheets. It is a grey brown podzolic (grey or brown sodic Chromosol). Included within this unit in the high rainfall areas are strongly acidic texture contrast soils (bleached eutrophic grey Kurosols) and friable gradational soils (acidic dystrophic red Ferrosols).

As noted by Dimmock transitional soils to the brown soils on dolerite and the black soils on dolerite are also found in drier areas of the unit at elevations generally below 600m.

No chemical data is available for the Eastfield SPC within this mapsheet. Chemical data has been extrapolated from the Buckland and Hobart Reconnaissance Soil Maps.

Eastfield Soil Profile Class

Concept	Brown, mottled, texture contrast soils with dolerite fragments throughout, loamy topsoils, sandy sub-surface, with ironstone, and clayey subsoils developed on dolerite hills.
Aust. Soil Classification	Brown or Grey Chromosols and Sodosols
Great Soil Group	Grey-Brown Podzolics & Soloths
Principal Profile Form	Db, Dd
Mapping Units	Ea, Ea-Bo, Ea-Bm, Pd1
Geology	Jurassic Dolerite
Landform	Moderate to steeply undulating hills
Permeability	Slowly permeable
Drainage	Imperfectly drained



Morphological sites: CSIRO H86, H78, H24, H163, H125, H237: LRRBD L6, 34, 93, 126; SOILCO 70, 72, 73

Analysed sites: CSIRO H86, H78, H24, H163 H125, H237: LRRBD L12, 43

Related soil names: Eastfield Series, Eastfield Sand, Type I, Eastfield SPC, Podzolic on dolerite, Shawfield Series

Correlation references: Stephens et al (1942), Loveday (1955b) & (1955c), Loveday (1957), Dimmock (1957c), Loveday & Dimmock (1958); Doyle (1993), Spanswick & Zund (1999a & 1999b), Spanswick (2000), Spanswick & Kidd (2000a)

Soil Profile Class Grid Reference	Profile Number	Horizon	Sample Depth (cm)	pH water (1:5)	EC (d/sm)	Total P (mg/kg)	Org. Carb. (%)	Total N (%)	C/N Ratio	Ca	Mg	Na	K
Eastfield 571475E 5286454N	H237	A1	0-1	7.0	0.14	0.014	13.6	0.452	30	16.8	3.8	0.77	0.58
	H237	A21	1-4	5.9	0.054	0.005	2.91	0.139	21	5.8	3.4	0.42	0.14
	H237	A22	4-9	6.0	0.042	0.002	1.64	0.079	21	4.4	3.2	0.36	0.10
	H237	B21	10-20	6.1	0.057					12.7	14.3	0.99	0.25
	H237	B22	20-33	6.4	0.06								
	H237	B23	22-48	7.2	0.063								
	H237	B24	48-61	7.6	0.083					26.2	33	3.1	0.51
	H237	BC	61-81	8.2	0.321								
	H237	C	81-86	8.6	0.295					43.7	27.9	3.1	0.46

Soil Profile Class Grid Reference	Profile Number	Horizon	Sample Depth (cm)	Total Bases	CEC	BASE SAT (%)	ESP (%)	Ca/Mg Ratio	Gravel (of total) >2000 (um) (%)	Sand Coarse >200 (um) (%)	Sand Fine <200 (um) (%)	Silt (%)	Clay (%)
Eastfield 571475E 5286454N	H237	A1	0-1			59	2.1	4.42	8	6	36	19	18
	H237	A21	1-4			57	2.4	1.71	10	9	51	22	13
	H237	A22	4-9			59	2.6	1.38	31	18	45	20	13
	H237	B21	10-20			77	2.7	0.89	9	12	25	12	49
	H237	B22	20-33										
	H237	B23	22-48										
	H237	B24	48-61			96	4.7	0.79	6	7	15	5	73
	H237	BC	61-81										
	H237	C	81-86				4.1	1.57	37	16	23	14	44

Table 2. Analytical data for the Eastfield SPC

Soil Profile Class Grid Reference	Profile Number	Horizon	Sample Depth (cm)	pH water (1:5)	Total P (mg/kg)	Org. Carb. (%)	Total N (%)	C/N Ratio	Ca	Mg	Na	K
Eastfield 527312E 5247131N	H125	A1	0-6	5.2	0.002	1.7	0.092	18	1.8	1.6	0.21	0.12
	H125	A21	6-10	5.3	0.001	1	0.076	13	1.1	1.5	0.27	0.07
	H125	A22	10-13	5.5			0.061					
	H125	B21g	17-25	5.6	0.002	0.89	0.049	18	6.5	10.5	1.02	0.05
	H125	B22g	25-41	5.6								
	H125	B23	41-53	5.6					3.8	6.2	1.7	0.06
	H125	B24	61-76	6.7								
	H125	B25	94-107	7.7					7.6	8.9	3.5	0.09

Soil Profile Class Grid Reference	Profile Number	Horizon	Sample Depth (cm)	Total Bases	BASE SAT (%)	ESP (%)	Ca/Mg Ratio	Gravel (of total) >2000 (um) (%)	Sand Coarse >200 (um) (%)	Sand Fine <200 (um) (%)	Silt (%)	Clay (%)
Eastfield 527312E 5247131N	H125	A1	0-6	3.73	33	1.9	1.13	1	9	65	14	8
	H125	A21	6-10	2.94	32	2.9	0.73	1	9	65	15	9
	H125	A22	10-13					15	16	58	14	10
	H125	B21g	17-25	18.07	68	3.8	0.62	4	12	49	9	31
	H125	B22g	25-41					3	14	42	8	35
	H125	B23	41-53	11.76	63	9.1	0.61	13	18	39	9	33
	H125	B24	61-76					50	45	28	15	9
	H125	B25	94-107	20.09	93	16.1	0.85	60	54	25	11	8

Table 2 Cont.

3.2.2 Brown Soils on Dolerite (Bd)

These soils are widespread in the drier parts of the area, up to elevations of about 300m. They occur on slopes varying from gentle to steep and are often stony and shallow. Where rainfall approaches about 630mm, as for instance on some of the hills around Richmond, it is fairly common to find them on slopes having a northerly or north-easterly aspect, with soils of the podzolic group on the opposite side.

The most extensive soil is one which has a brown to dark brown friable loam or clay loam surface overlying a brown or red-brown fairly friable clay subsoil. Decomposing dolerite is usually found at moderate depths and dolerite floaters occur throughout the profile. Free carbonate is occasionally present in the decomposing dolerite.

In downslope situations the brown soil may give way to the black soil on dolerite described below. Also mapped with this group are some soils transitional to the podzolic group.

Land Use

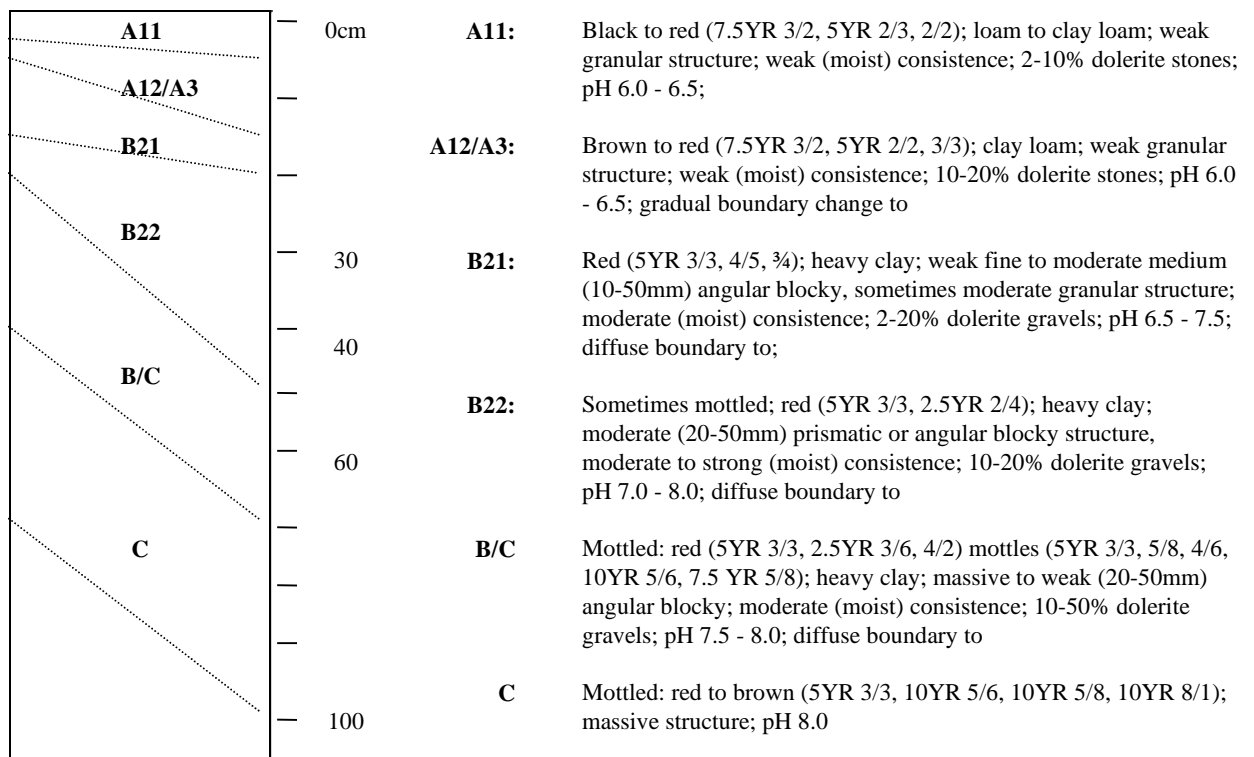
The natural vegetation is a savannah woodland, and is commonly used for rough grazing of sheep. However, considerable improvement of pastures should be possible where slopes are not too steep and stony, nor the soils too dry.

Correlation

The dominant soil of this unit (eutrophic brown Dermosol or red Ferrosol) has been defined and is called the Tea Tree SPC. This unit has been renamed Brown Soils on Dolerite 1.

Tea Tree Soil Profile Class

Concept	Shallow moderately structured gradational to weakly duplex red brown soils formed on dolerite.
Aust. Soil Classification	Eutrophic brown Dermosols or red Ferrosols
Great Soil Group	Non calcic Brown soils
Principal Profile Form	G or D
Mapping Units	Bd,
Geology	Jurassic Dolerite
Landform	Moderate to steep slopes
Surface Conditions	Many coarse fragments
Permeability	Moderate permeability
Drainage	Moderately well drained



Morphological sites: CSIRO H245, H114, H167

Analysed sites: CSIRO H245, H114, H167

Related soil names: Brown Soils on Dolerite

Correlation references: Dimmock (1957), Holtz (1987), Spanswick & Kidd (2000a)

Soil Profile Class Grid Reference	Profile Number	Horizon	Sample Depth (cm)	pH water (1:5)	Total P (mg/kg)	Org. Carb. (%)	Total N (%)	C/N Ratio	Ca	Mg	Na	K
Tea Tree 515281E 5289431N	H114	A11	0-6	6.0	0.024	3.1	0.229	10	17.2	1.4	0.22	0.73
	H114	A12	6-10	6.5	0.02	2.2	0.229	10	18.8	2.8	0.3	0.44
	H144	B21	13-19	7.3		0.9	0.114	8				
	H114	B22	20-33	7.7	0.015	1	0.125	8	29.6	29.6	1.1	0.16
	H114	BC1	33-53	7.7		0.6	0.08	8				
	H114	BC2	53-63	7.7		1.5	0.069	22				
	H114	C	71-81	7.8								

Soil Profile Class Grid Reference	Profile Number	Horizon	Sample Depth (cm)	Total Bases	BASE SAT (%)	ESP (%)	Ca/Mg Ratio	Free Fe %	Gravel (of total) >2000 (um) (%)	Sand Coarse >200 (um) (%)	Sand Fine <200 (um) (%)	Silt (%)	Clay (%)
Tea Tree 515281E 5289431N	H114	A11	0-6	19.55	63	0.7	12.29	2.17	18	9	43	18	21
	H114	A12	6-10	22.34	76	1.0	6.71	1.96	38	8	16	19	21
	H144	B21	13-19						22	13	34	20	32
	H114	B22	20-33	60.46	130	2.4	1.0	4.19	3	5	14	12	64
	H114	BC1	33-53						8	9	14	16	60
	H114	BC2	53-63										
	H114	C	71-81										

Table 3 Analytical data for the Tea Tree SPC

Soil Profile Class Grid Reference	Profile Number	Horizon	Sample Depth (cm)	pH water (1:5)	EC dS/m (1:5)	Total P (mg/kg)	Org. Carb. (%)	Total N (%)	C/N Ratio	Ca	Mg	Na	K
Tea Tree 513684E 5287737N	H167	A11	0-4	6.1	0.08	0.028	6.3	0.442	14	21.9	6.5	0.1	1.3
	H167	A12	4-8	6.1	0.063	0.023	4.6	0.34	14	20	6.6	0.17	0.39
	H167	B21	10-14	6.7	0.042	0.019	2.9	0.246	12	22.2	6.5	0.29	0.2
	H167	B22	14-19	7.0	0.042		2.4	0.198	12				
	H167	B23	19-23	7.2	0.042		1.8	0.15	12				
	H167	B24	25-41	7.5	0.045	0.019	1.3	0.114	11	24.2	13.8	0.65	0.22
	H167	B25	41-51	7.5	0.048		1.3	0.107	12				
	H167	BC2	56-67	7.9	0.042	0.025	0.63	0.053	12	22.4	10	0.69	0.13
	H167	C1	67-76	7.9	0.051								

Soil Profile Class Grid Reference	Profile Number	Horizon	Sample Depth (cm)	Total Bases	BASE SAT (%)	ESP (%)	Ca/Mg Ratio	Free Fe %	Gravel (of total) >2000 (um) (%)	Sand Coarse >200 (um) (%)	Sand Fine <200 (um) (%)	Silt (%)	Clay (%)
Tea Tree 513684E 5287737N	H167	A11	0-4	29.8	64	0.2	3.37	3.56	7	12	31	16	29
	H167	A12	4-8	27.16	66	0.4	3.03	3.7	6	14	29	17	31
	H167	B21	10-14	29.19	78	0.8	3.42	4.26	61	19	27	13	34
	H167	B22	14-19						54	20	21	15	40
	H167	B23	19-23						54	22	19	14	43
	H167	B24	25-41	38.87	85	1.4	1.75	4.4	41	10	27	14	48
	H167	B25	41-51										
	H167	BC2	56-67	33.22	92	1.9	2.24	1.89	29	28	26	13	28
	H167	C1	67-76										

Table 3 Cont

3.2.3 Black Soils on Dolerite (Bld)

Despite the large extent of dolerite, these soils are restricted to small areas generally to the south of Mangalore. Slopes are usually gentle to moderate and stony in places. The surface horizon is a black granular clay loam or clay which cracks deeply when dry. This merges into a dark yellow-grey or dark brown subsoil which overlies yellow decomposing dolerite. Free carbonate is often abundant in the lower profile but may sometimes be absent. Dolerite stones may occur throughout. Some small areas of the brown soils on dolerite and soils transitional to the podzolic soil group on dolerite described previously have been mapped with this group.

Land Use

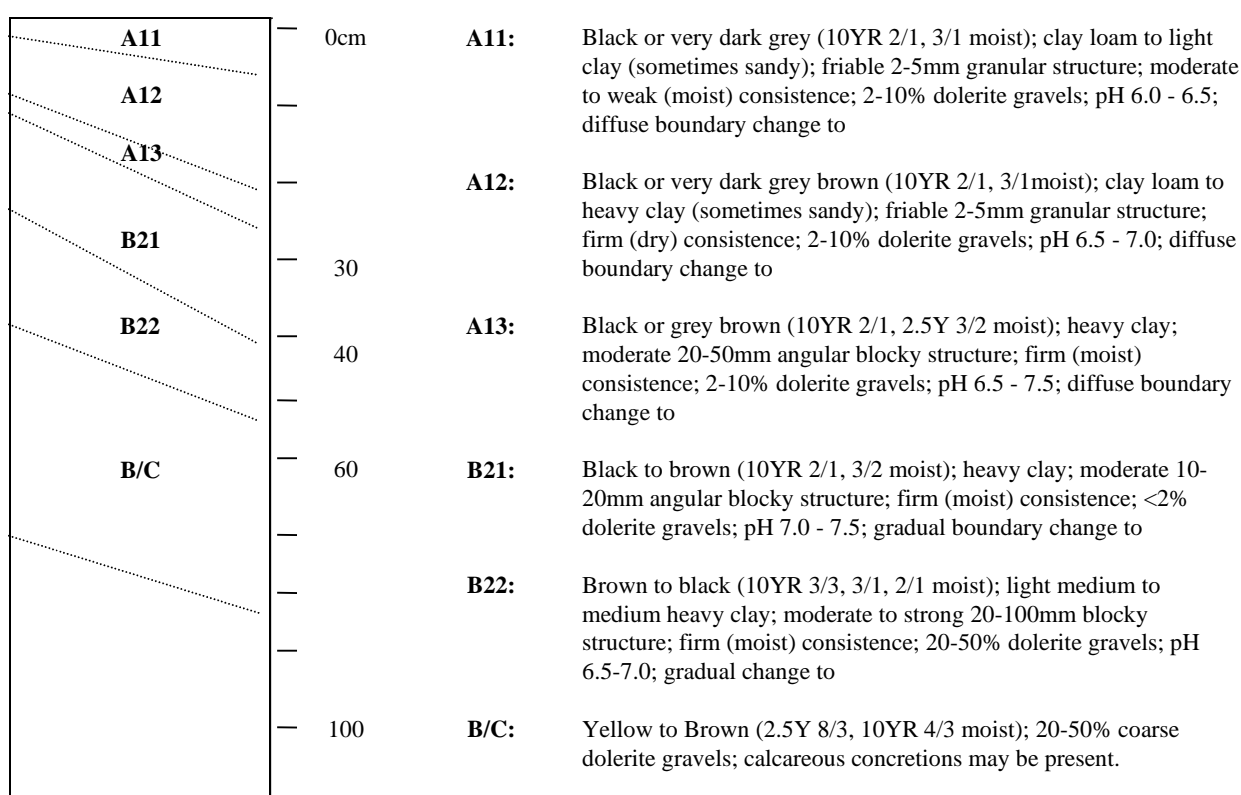
The native vegetation is a savannah woodland but this has been largely cleared. The present land use varies from rough grazing to improved pasture and horticultural production.

Correlation

The dominant soil of this unit (vertic black Dermosol) correlates with the Belmont SPC. This unit has been renamed Black Soils on Dolerite 1. Black Vertosols may be found on the gentle dolerite slopes.

Belmont Soil Profile Class

Concept	Black cracking minimal textural differentiation soils with a clay loam to clay surface and clay subsoil, carbonate often present in subsoil and decomposing rock. Limited to a general extent of 40km from Hobart
Aust. Soil Classification	Vertic black dermosol
Great Soil Group	Black Earth or prairie Soil
Principal Profile Form	U or G
Mapping Units	Bld1, Bld1-Bd1, Bld1-Pd1
Geology	Jurassic Dolerite
Landform	Steep to gentle sloping hills
Vegetation	Savannah woodland, mostly cleared
Surface Conditions	Coarse fragments common
Permeability	Slow to moderately permeable
Drainage	Moderately well drained



Morphological sites: CSIRO H70, H22, H174, H173; SOILCO 31

Analysed sites: ; CSIRO H70, H22, H174, H173

Related soil names: Belmont Clay loam, Black soils on dolerite

Correlation references: Loveday (1955b), Loveday (1957), Loveday & Dimmock (1958), Dimmock (1957c), Holtz (1987) Spanswick (2000), Spanswick & Kidd (2000a)

Soil Profile Class Grid Reference	Profile Number	Horizon	Sample Depth (cm)	pH water (1:5)	EC (d/sm)	Total P (mg/kg)	Org. Carb. (%)	Total N (%)	C/N Ratio	Ca	Mg	Na	K
Belmont 529121 E 5272267 N	H174	A11	0-2	6.3	0.179	0.039	10.9	0.798	14	40.8	4.5	0.26	2.3
	H174	A12	2-9	6.5	0.107	0.025	7.4	0.483	15	39.5	4.3	0.24	1.7
	H174	A13	9-23	6.9	0.086	0.013	2.8	0.204	14	38.4	7.1	0.52	1.1
	H174	B21	23-38	7.1	0.077		1.5	0.114	13				
	H174	B22	38-51	7.6	0.077	0.009	1.1	0.091	12	45.7	12.6	1.3	0.2
	H174	B23	51-63	8.0	0.077		0.71	0.069	10				
	H174	B/C	63-71	8.2	0.077		0.5	0.052	10	41.6	7.4	0.15	1.4
	H174	C	71-81	8.3	0.098		0.39	0.034	11				
Belmont 547711 E 5263068 N	H70	A11	0-8	6.2		0.017	4.9	0.44	11	18	8.25	1	0.98
	H70	A12	8-18	6.6			3.9	0.34	11				
	H70	A13	18-25	6.8		0.018	2.8	0.228	12				
	H70	A14	28-42	7.6			1.49	0.168		21.1	19.1	5.3	0.25
	H70	AC1	42-51	8.4		0.018							
	H70	AC2	51-61	8.7									
	H70	C	66-81	8.9		0.2				14.2	12	6.9	0.17

Soil Profile Class Grid Reference	Profile Number	Horizon	Sample Depth (cm)	BASE SAT (%)	ESP (%)	Ca/Mg Ratio	Gravel (of total) >2000 (um) (%)	Sand Coarse >200 (um) (%)	Sand Fine <200 (um) (%)	Silt (%)	Clay (%)
Belmont 529121 E 5272267 N	H174	A11	0-2	72	0.4	9.07	0	9	28	17	28
	H174	A12	2-9	76	0.4	9.19	3	10	31	16	31
	H174	A13	9-23	86	0.9	5.41	6	7	27	11	53
	H174	B21	23-38								
	H174	B22	38-51	93	2.0	3.63	13	6	23	8	65
	H174	B23	51-63								
	H174	B/C	63-71		2.8	5.62	40	29	21	11	41
	H174	C	71-81								
Belmont 547711 E 5263068 N	H70	A11	0-8	64	2.3	2.18	3	18	31	21	26
	H70	A12	8-18				18	19	31	20	24
	H70	A13	18-25				25	25	28	16	28
	H70	A14	28-42	90	10.5	1.1	7	18	21	10	47
	H70	AC1	42-51				15	17	16	3	44
	H70	AC2	51-61				29	20	11	4	40
	H70	C	66-81		20.7	1.18	53	47	19	13	15

Table 4 Analytical data for Belmont SPC

Soil Profile Class Grid Reference	Profile Number	Horizon	Sample Depth (cm)	pH water (1:5)	EC (d/sm)	Total P (mg/kg)	Org. Carb. (%)	Total N (%)	C/N Ratio	Ca	Mg	Na	K
Belmont 519902 E 5271375 N	H173	A11	0-2	6.3	0.092	0.2	8.3	0.539	15	24.9	12.7	0.38	0.99
	H173	A12	2-10	6.5	0.08	0.13	5.8	0.39	15	23.8	14	0.57	0.36
	H173	A13	10-18	6.7	0.071		4.1	0.316	13				
	H173	A14	18-29	7.2	0.08	0.13	2.6	0.202	13	27.5	20.6	1.4	0.3
	H173	A15	29-41	7.6	0.08	0.007	1.7	0.14	12	28.9	25.2	1.7	0.28
	H173	AC1	41-48	8.0	0.11		1.4	0.11	12				
	H173	AC2	48-58	8.2	0.131		1.3	0.11	12	28.4	27.9	2	0.29
	H173	C1K	58-66										
	H173	C2K	66-76	8.9	0.369		0.98	0.038	26				
	H173	C3k	76-81	9.0	0.313								
Belmont 528567 E 5248360 N	H22	A11	0-13	6.8		100	4.3	0.381	11	28.5	17.2	0.94	0.32
	H22	A12	13-25	7.2		70	3.3	0.202	16	33.1	18.4	1.37	0.16
	H22	A13g	25-48	7.7		50	1.26	0.095	13	27	22.7	1.8	0.09
	H22	A3g	51-61	8.4			0.52	0.035	15				
	H22	Ck	61-89	8.8			0.2	0.022	9	32.2	28.2	3.9	0.09
	H22	Rw	89-109	8.7									

Soil Profile Class Grid Reference	Profile Number	Horizon	Sample Depth (cm)	BASE SAT (%)	ESP (%)	Ca/Mg Ratio	Gravel (of total) >2000 (um) (%)	Sand Coarse >200 (um) (%)	Sand Fine <200 (um) (%)	Silt (%)	Clay (%)
Belmont 519902 E 5271375 N	H173	A11	0-2	69	0.7	1.96	0	5	28	20	34
	H173	A12	2-10	75	1.1	1.70	0	6	31	18	36
	H173	A13	10-18								
	H173	A14	18-29	86	2.4	1.33	5	6	26	10	60
	H173	A15	29-41	92	2.8	1.15	7	7	22	6	65
	H173	AC1	41-48								
	H173	AC2	48-58		3.4	1.02	12	10	21	5	63
	H173	C1K	58-66								
	H173	C2K	66-76								
	H173	C3k	76-81								
Belmont 528567 E 5248360 N	H22	A11	0-13	80	1.6	1.66	1	7	34	15	40
	H22	A12	13-25	88	2.3	1.80	2	5	29	11	50
	H22	A13g	25-48	93	3.2	1.19	0	9	25	11	57
	H22	A3g	51-61				1	11	22	13	49
	H22	Ck	61-89		6.10	1.14	0	23	22	23	30
	H22	Rw	89-109				18	34	21	16	19

Table 4 Cont

Soil Profile Class Grid Reference	Profile Number	Horizon	Sample Depth (cm)	pH water (1:5)	Total P (mg/kg)	Org. Carb. (%)	Total N (%)	C/N Ratio	Ca	Mg	Na	K
Belmont	H126	A11	0-10	6.2	0.021	5.4	0.447	12	16.9	11.7	0.96	0.42
544330E	H126	A12	10-18	6.5	0.014	2.7	0.243	11				
5267409N	H126	A13	18-33	7.0	0.006	1.45	0.104	14	15.6	12.1	2	0.49
	H126	A14	33-48	8.5		1.01	0.08	13				
	H126	A15	48-64	8.2			0.066		17.8	16.4	2.6	0.23
	H126	BC	79-89	7.9					22.2	17	4.9	0.13
	H126	C1	89-109	7.1					17.4	13.5	5.9	0.11

Soil Profile Class Grid Reference	Profile Number	Horizon	Sample Depth (cm)	BASE SAT (%)	ESP (%)	Ca/Mg Ratio	Gravel (of total) >2000 (um) (%)	Sand Coarse >200 (um) (%)	Sand Fine <200 (um) (%)	Silt (%)	Clay (%)
Belmont	H126	A11	0-10	67	2.2	1.44	2	13	37	20	20
544330E	H126	A12	10-18				2	17	36	17	23
5267409N	H126	A13	18-33	87	5.7	1.29	1	10	33	15	38
	H126	A14	33-48				1	9	33	15	42
	H126	A15	48-64		7.0	1.09	1	9	29	12	48
	H126	BC	79-89	97	10.7	1.31	19	16	18	15	52
	H126	C1	89-109	93	14.8	1.29	16	33	22	14	30

Table 4 Cont

3.3 Soils on Mudstone

3.3.1 Podzolic Soils on Mudstone (Pm)

Grey soils on mudstone are found chiefly in the southern part of the area on the lower slopes of Mt Dromedary and west from Mangalore. Slopes vary from gentle to steep, and rock outcrops and low cliffs are fairly common.

Many of the soils are shallow, and angular fragments of rock are found throughout most profiles. There is a slight darkening by organic matter of the surface horizon which is most commonly sandy loam but may vary from loamy sand to fine sandy clay loam. This overlies a bleached subsurface which may occasionally rest directly on rock, but more often there is a weakly mottled grey-brown or yellow-grey clay subsoil, usually less than 30cm thick.

Land Use

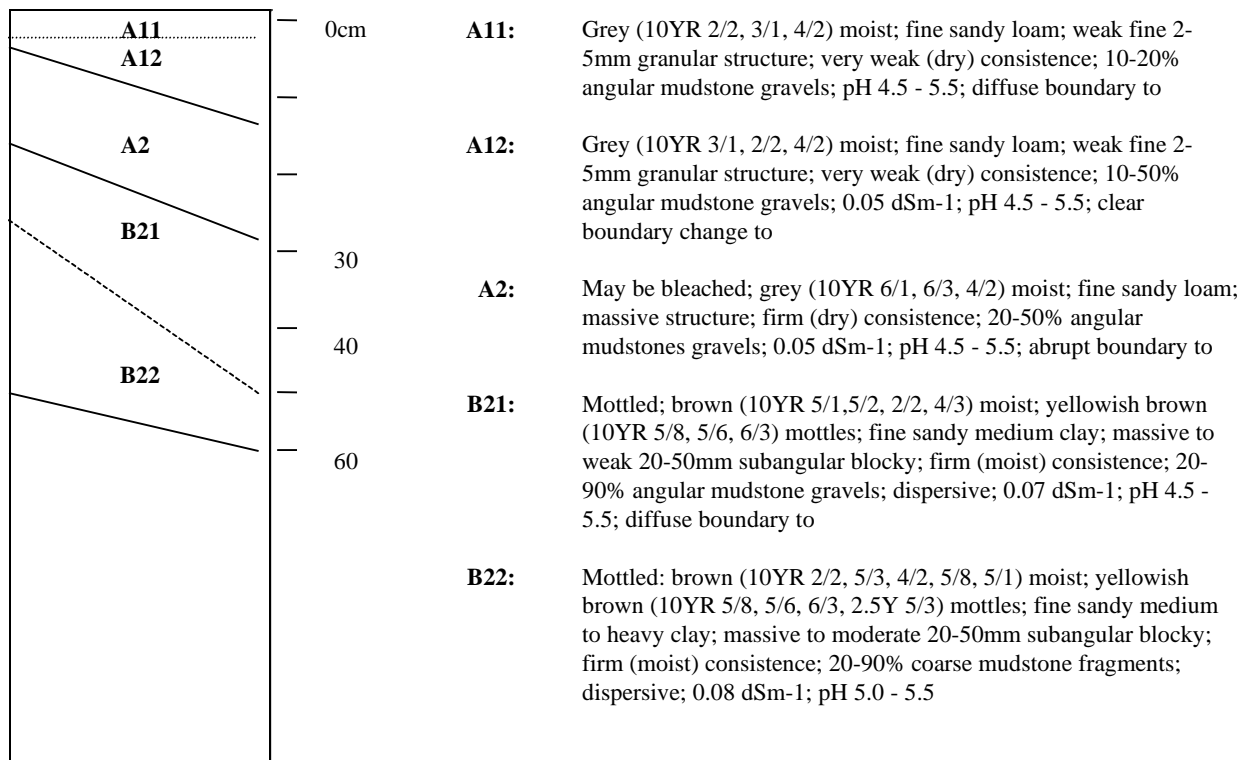
The mudstone soils inherit a low nutritional status from their parent rock and generally appear unattractive for development. On some deeper soils, orchards and pastures have been established but more often the natural vegetation of sclerophyll forest with a rather sparse ground cover still remains.

Correlation

This unit has been renamed Podzolic Soils on Mudstone 1. The soils of this unit have generally formed on Permian sediments of the Fern Tree group. The Fern Tree group is dominated by quartz mudstone with some interbedding of Risdon Sandstones. Small occurrences of siltstone, shale, conglomerate and limestone are also found within this map sheet (Leaman, 1975). The Permian lithologies form rolling hills up to elevations of 600m with rainfall generally below 750mm. The soils within this unit vary considerably due to variations in lithology and topography. However the most common soil is a grey or brown shallow, stony acidic texture contrast soil (grey or brown dystrophic Kurosol). This soil correlates with the Forcett SPC.

Forcett Soil Profile Class

Concept	Shallow stony acidic soils, with a brown to grey weakly structured surface over a bleached, hardsetting subsurface over a weak to moderate structured clay subsoil.
Aust. Soil Classification	Dystrypic brown or grey kurosol
Great Soil Group	Grey brown podzolics or soloth
Principal Profile Form	Dy , Db
Mapping Units	Pm1, Pm2
Geology	Permian sandy mudstones with interbedded shales and sandstones
Landform	Coluvial slopes
Vegetation	Dry Sclerophyll forest, <i>E. saliciflora</i> , <i>E. risdoni</i> , <i>E. tasmanica</i> , <i>E. viminalis</i> & in moister situations <i>E. obliqua</i>
Surface Conditions	Hard setting and stony
Permeability	Slow to very slow
Drainage	Poor to imperfect



Morphological sites: CSIRO H154, H221, H199, H225; SOILCO 33

Analysed sites: CSIRO H154, H199, H221, H225

Related soil names: Podzolics on Mudstone

Correlation references: Loveday (1955b), Loveday (1957), Loveday & Dimmock (1958), Dimmock (1957c), Spanswick (2000), Spanswick & Kidd (2000a.)

Soil Profile Class Grid Reference	Profile Number	Horizon	Sample Depth (cm)	pH water (1:5)	EC (d/sm)	Total P (mg/kg)	Org. Carb. (%)	Total N (%)	C/N Ratio	Ca	Mg	Na	K
Forcett 538782E 5290731N	H199	0	0-1	5.5	0.086	0.031	16.8	0.627	27	17.7		0.47	0.92
	H199	A1	1-6	5.4	0.054	0.019	8.7	0.256	34	8.8		0.28	0.42
	H199	A2	6-9	5.2	0.03	0.017	1.7	0.146	12	1.4		0.24	0.26
	H199	B1	9-15	5.4	0.021		0.82	0.059	14				
	H199	B2	15-23	5.7	0.015			0.035		0.25		0.21	0.18
	H199	BC1	23-30	5.5	0.015								
	H199	BC2	30-38		0.018					0.35		0.42	0.24

Soil Profile Class Grid Reference	Profile Number	Horizon	Sample Depth (cm)	ESP (%)	Ca/Mg Ratio	Gravel (of total) >2000 (um) (%)	Sand Coarse >200 (um) (%)	Sand Fine <200 (um) (%)	Silt (%)	Clay (%)
Forcett 538782E 5290731N	H199	0	0-1	0.7		52	3	27	26	18
	H199	A1	1-6	0.6		33	5	31	28	19
	H199	A2	6-9	0.8		35	4	33	31	22
	H199	B1	9-15							
	H199	B2	15-23	1.7		9	5	33	32	28
	H199	BC1	23-30							
	H199	BC2	30-38	2.9		33	2	18	18	55

Table 5 Analytical data for Forcett SPC

3.4 Soils on Sandstone

3.4.1 Podzolic and Podzol Soils on Sandstone (Pss)

Siliceous sandstones are very common, and there are a few small occurrences of feldspathic sandstone. Slopes vary from gentle to steep, with fairly frequent rock outcrops and sometimes prominent cliffs. Podzolic soils make up most of this group. On the siliceous sandstones they have a grey to grey-brown loamy sand to sandy loam surface over a bleached sandy subsurface. The subsoil is usually a variously mottled dark grey-brown, yellow-grey, and yellow-brown sandy clay or clay which overlies decomposing sandstone. On the feldspathic sandstones the soils are generally browner with less prominent bleaching in the subsurface, and a subsoil texture usually not finer than clayey sand. The symbol Pss(F) on the map denotes localities where these soils have been observed.

Limited occurrences of podzols on sandstone are found in some of the higher rainfall areas around Colebrook, Campania and Dysart. They have a dark grey sandy surface over a bleached sandy subsurface over a dark-coloured cemented organic pan at depths varying from 30 to 90cm. The underlying horizon is either a light-coloured sand or a mottled sandy clay passing into decomposing sandstone.

Also mapped with the sandstone soils are small occurrences of podzolic soils on shales. These are similar to the podzolic soils on sandstone except for generally brighter coloured subsoils, and sometimes fine sandy textures in the surface horizons.

Land Use

Except for some areas on gentle slopes which have been cleared for orchards and pastures, the soils still carry their natural sclerophyll forest vegetation. These areas could be extended in a few instances, but most of the remaining uncleared country is too steep and stony for agriculture.

Correlation

The Triassic lithologies, like the Permian, are complex. A broad range of soils were found within this unit. The Triassic soils include brown soils (Kandosols or Dermosols), yellow-brown and grey-brown podzolics (Kurosols) and yellow brown podzols or deep grey quartz podzols (Podosols). The podzolic soils are generally associated with thickly bedded coarse-medium siliceous sandstone while the brown soils are associated with the finer textured feldspathic sandstone on valley margins. Podosols are often found in higher elevations and rainfall. Due to limited data we were unable to define the dominant soils of this unit. For more information about the soils within this unit refer to DeRose & Musk (In prep).

3.5 Soils on Solifluction Deposits

3.5.1 Yellow-brown Soils on Solifluction Deposits (YBs)

Above an altitude of approximately 610m it is common to find solifluction deposits overlying the country rock. The deposits are largely dolerite boulders, stratified weathered material and rock fragments. Slopes vary from gentle to steep.

The soils vary depending on the situation but are all stony, particularly in the surface layers, and most are of bright yellow-brown colour throughout. The texture is commonly clay loam or clay, often gritty and sometimes sandy. At high altitudes there is usually a layer of peat overlying the stones on the surface, while at depth in the yellow-brown subsoil there may be a thin, contorted and strongly cemented iron pan. At lower altitudes under forest vegetation the surface is darkened considerably by organic matter and the yellow-brown material beneath is more open and friable than under the peat vegetation.

The boundaries of areas of these soils on the map are necessarily arbitrary in many places, because of difficulty of access. It is likely that such areas may include a fair proportion of other soils, particularly the podzolic soils on dolerite and possible small areas of high moor peats. Small exposures of bare rock are also wide spread in this higher country.

Land Use

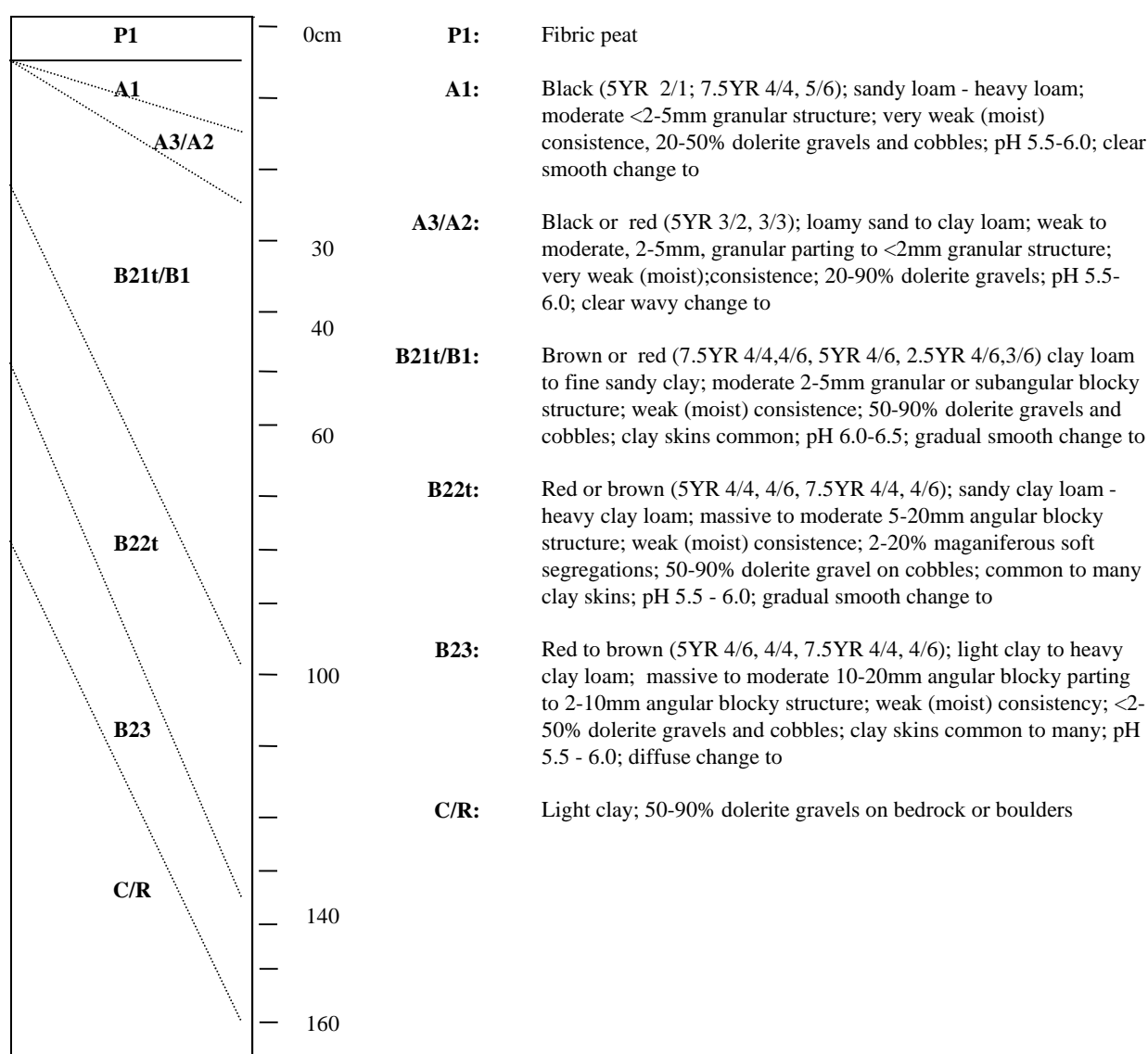
At moderate altitudes the yellow brown soils carry dense eucalypt forests which provide much timber suitable for milling. Small areas in the Black Hills district are used for berry - fruit culture, but the greater part is too stony for agriculture.

Correlation

The soils of this unit generally correlate with the Miscellaneous Soils Mapping Unit 1 described by Doyle (1993). A broad SPC has been defined for the Yellow Brown Soils, however variation from the SPC can be expected with profiles having thicker peaty topsoils and yellower subsoils in areas of restricted drainage. These soils are generally eutrophic red Ferrosols or brown Dermosols. As no data was available for this unit the SPC has been extrapolated from available data on surrounding soil maps. No chemical data is available for this unit.

Yellow Brown Soils on Solifluction Deposits Soil Profile Class

Concept	Stony/bouldery soils with gritty sandy loam surface soils and brown, clayey, structured subsoil developed on dolerite solifluction deposits.
Aust. Soil Classification	Eutrophic Red Ferrosols & Brown Dermosols
Great Soil Group	Red - Yellow Podzolic ,Krasnozem soil
Principal Profile Form	Gn
Mapping Units	M1, Lw, M1-Lf, M1-Qu, Ybs1
Geology	Jurassic or Quaternary dolerite solifluction deposits
Landform	Upper slopes, crests and simple slopes of moderate to very steep hillslopes on the Western Tiers and Plateau.
Vegetation	Wet sclerophyll forest - Eucalyptus delegatensis
Permeability	Moderate to highly permeable
Drainage	Well drained



Morphological sites: LRRBD L155, L153, L154, H182

Analysed sites: LRRBD L153, L154, H182

Related soil names: Holloway (Ho), Excalibur (Ex), Yellow Brown Soils on Solifluction deposits

Correlation references: Dimmock (1957c), Laffan (1995), Leamy (1961), Doyle (1993), Spanswick & Zund (1999b)

3.6 High Moor Peats

3.6.1 High Moor Peats (HMP)

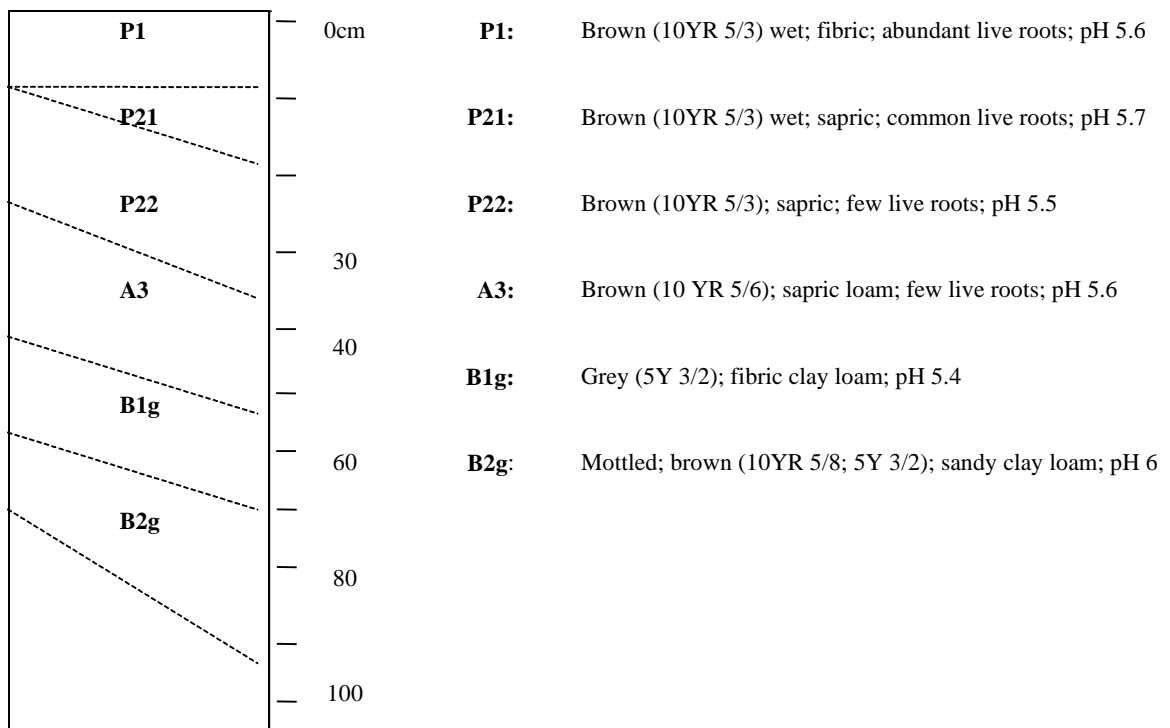
Only one small area of peat, at an altitude of about 820m, has been mapped; this is on a gentle slope on the north-western flanks of Mt. Dromedary. The peat is shallow, with many large dolerite boulders protruding. It carries a typical high moor vegetation.

Correlation

The High Moor Peats (acidic fibric or hemic Organosols) are generally similar across the state. Data for the High Moor Peat SPC has been extrapolated from the Hobart Reconnaissance Soil Map. This unit correlates with the Miscellaneous Soils Mapping Unit 3 first described by Doyle (1993).

High Moor Peat Soil Profile Class

Concept	Soils formed from the accumulation of organic matter
Aust. Soil Classification	Organosol
Great Soil Group	Acid peat, alpine humus
Principal Profile Form	O
Mapping Units	HMP, YBs1, M3, M1
Geology	Jurassic Dolerite
Landform	depressions, hollows and swamps
Surface Conditions	self-mulching
Permeability	slowly permeable
Drainage	poorly drained



Morphological sites: H21, H23, H110, H28

Analysed sites: H21, H23, H110, H28

Related soil names: HMP, Organic soils on alluvium, Unnamed Miscellaneous Soil Mapping Unit 3

Correlation references: Dimmock (1957c), Spanswick & Zund (1999a & 1999b), Doyle (1993)

Soil Profile Class	Profile Number	Horizon	Sample Depth (cm)	pH water (1:5)	EC (d/sm)	Total P (mg/kg)	Avail P (mg/kg)	Avail K (mg/kg)	Org. Carb. (%)	Total N (%)	C/N Ratio	Ca	Mg	Na	K
HMP	H21	P1	0-8	5.6		0.122			21.4	1.44	15				
517697E	H21	P21	8-20	5.7		0.089			14.1	1.07	13	2.4	2.1	1.05	1.2
5252105N	H21	P22	23-36	5.5					15.4	1.1	14				
	H21	A3	46-56	5.6					8.9	0.52	17				
	H21	B1g	61-71	5.4					3.3	0.231	14				
	H21	B2g	71-96+	6.0		0.046			0.9	0.055	16	0.2	0.1	0.08	0.22

Soil Profile Class	Profile Number	Horizon	Sample Depth (cm)	Total Bases	CEC	BASE SAT (%)	ESP (%)	Ca/Mg Ratio	Gravel (of total) >2000 (um) (%)	Sand Coarse >200 (um) (%)	Sand Fine <200 (um) (%)	Silt (%)	Clay (%)
HMP	H21	P1	0-8										
517697E	H21	P21	8-20			101	15.7	1.14					
5252105N	H21	P22	23-36										
	H21	A3	46-56										
	H21	B1g	61-71										
	H21	B2g	71-96			2	0.3	2.0	2	24	33	16	24

Table 6 Analytical data for High Moor Peat SPC

3.7 Soils on Limestone

3.7.1 Brown Soils on Limestone (BL)

This group is restricted to two small areas - one on the south side of the Derwent River above the Granton limekilns, and the other about 3km north-east from Mt. Dromedary. Slopes are moderate to steep. The surface soil is a dark greyish-brown loam to sandy loam and the subsoil a brown or reddish-brown clay loam or clay. Below about 45cm, fragments of impure limestone are present in the clay, which merges with the decomposing parent rock.

In one or two other places, similar soils are developed on calcareous mudstones and shales but the occurrences are too small to be mapped separately from the podzolic soils on mudstone with which they are usually associated. Their presence is indicated on the map by the label “with BL”.

Land Use

The vegetation is a savannah woodland, sometimes with a dense Poa sward, and has been partly cleared to provide rough grazing for sheep.

Correlation

No work was undertaken within this unit. However work by DeRose & Musk (In prep) found that the soils developed on limestone near Granton were generally well drained brown Dermosols.

3.8 Undifferentiated Alluvial Soils

3.8.1 Soils of Alluvial Deposits (A)

This group includes a wide variety of soils formed on present day flood plains, various terrace remnants up to 45m above present stream level sometimes with superimposed sand dunes, and alluvial fans. The deposits vary from sands to clays and gravels, often showing stratification.

Some of the more common profiles are:

- (i) A sandy loam surface overlying a bleached subsurface occasionally with ferruginous gravel, over a clay or sandy clay subsoil, sometimes with free carbonate.
- (ii) Various profiles with clayey textures throughout, including some black granular clays subject to deep cracking.
- (iii) A brown sandy loam surface over a reddish-brown sandy clay loam or sandy clay subsoil with weak prismatic structure, over a yellow-brown clayey sand with free carbonate in cracks.
- (iv) Brown sands with little profile differentiation.

In all the soils developed on water-deposited material, waterworn gravels may be present, sometimes in considerable amounts.

Soils (iii) and (iv) are on windblown deposits which occur adjacent to the eastern side of certain stretches of the Derwent, Jordan and Coal Rivers.

Land Use

These soils are important agriculturally. Practically all have been developed either for improved pastures or orchards.

Correlation

No work was undertaken to differentiate the soils within this unit. However a detailed survey of the alluvial soils in the Coal river valley was undertaken by Holtz (1987). For further information about the alluvial soils refer to DeRose et al. (In prep.).

3.9 Lateritic soils

3.9.1 Lateritic Soils (L)

These comprise the northern extremity of a larger area extending into the Hobart sheet to the south and described in the report on that sheet, Loveday (1955).

Correlation

No work was undertaken within this unit.

REFERENCES

- Bond R.D. and Tucker B.M. (1954), *Chemistry and Industry*, 40, 1236. *Publisher unknown*.
- Davies J. (1988), *Land Systems Surveys of Tasmania Region 6: South, East and Midlands*, Department of Agriculture, Tasmania.
- DeRose R. & Musk R (In prep) , *Land Capability Survey of Tasmania. Derwent Report*. Department of Primary Industries, Water and Environment, Tasmania, Australia.
- Dimmock G.M (1957c), *Reconnaissance soil map of Tasmania Sheet 75 – Brighton*. CSIRO Div. Report 2/57. Scale 1 inch : 1 mile.
- Doyle R.B. (1993), *Soils of the South Esk Sheet, Tasmania (southern half)*, Department of Primary Industries, Water and Environment Tasmania Australia.
- Graley A.M. (1961), *The Laboratory Examination of Soils of Sheet 47 - Longford, Tasmania* CSIRO Division of Soils, Divisional Report 2/61, Adelaide.
- Gunn R.H., Beattie J.A., Reid R.E. and van de Graaff R.H.M. (1998), *Australian Soil and Land Survey Handbook - Guidelines for Conducting Surveys*. Inkata Press, Australia.
- Haldane A.D. (1956), *Journal of Soil Science*. Vol 82: 483-489.
- Holtz G.K. (1987), *Soils of Part of the Lower Coal River Valley Tasmania*. Department of Primary Industries, Queensland.
- Hutton J.T. (1954), *A method for the determination of calcium plus magnesium by titration with ethylenediamine tetraacetic acid*. Divisional report 9/54, part C, CSIRO Division of Soils, Adelaide.
- Hutton J.T. (1955), *A method of particle size analysis*. Divisional report 11/55, CSIRO Division of Soils, Adelaide.
- Isbell, R.F. (1996), *The Australian Soil Classification*. CSIRO Publishing, Australia.
- Leaman, D.E, (1977), *Geological Atlas 1 mile series. Sheet 75 (8312N)*. Brighton. Explanation Report Department of Mines Tasmania.
- Loveday J. (1955b), *Reconnaissance soil map of Tasmania. Sheet 83, Sorell*. Div rep Div Soils CSIRO Aust 10/55; Scale 1:63 360
- Loveday J (1957), *Soils of the Sorell-Carlton-Copping area, south-east Tasmania, with special reference to the soils formed on basalt*. CSIRO Division of Soils, Adelaide. Publication No. 8

- Loveday J & Dimmock G.M (1958), Reconnaissance soil map of Tasmania. Sheet 13, Buckland. Div rep Div Soils CSIRO Aust 13/57; Scale 1:63 360
- Marshall T.J. (1956), A plummet balance for measuring the size distribution of soil particles. *Australian Journal of Applied Science*. 7: 142-147.
- McDonald R.C, Isbell R.F., Speight J.G., Walker J., & Hopkins M.S. (1998), *Australian Soil and Land Survey Field Handbook*, Second Edition, Goanna Print Canberra.
- Murphy J. and Riley J.P (1962), A modified single solution method for the determination of phosphate in natural water. *Anal. Chim. Acta* **27**, 31-6.
- Noble K. E. (1992a), *Land Capability Survey of Tasmania, Land Capability Handbook*. Department of Primary Industry, Tasmania.
- Piper C.S. (1942), Examination of soil and distribution of the inorganic constituents of plants. *Soil and Plant Analysis*. University of Adelaide.
- Raupach M. (1956), *Australian Journal of Agriculture Research*. Vol 5: 716-729.
- Rayment G. E and Higginson F.R., (1992), *Australian Soil and Land Survey Handbook – Australian Laboratory Handbook of Soil and Water Chemical Methods*. Inkata Press, Australia.
- Spanswick S.B. and Zund P. (1999a), Revised Longford Reconnaissance Soil Map of Tasmania. Department of Primary Industry Water and Environment, Tasmania.
- Spanswick S.B. and Zund P. (1999b), Revised Quamby Reconnaissance Soil Map of Tasmania. Department of Primary Industry Water and Environment, Tasmania.
- Spanswick S.B. (1999), Revised Sorell Reconnaissance Soil Map of Tasmania. Department of Primary Industry Water and Environment, Tasmania. In press.
- Spanswick S.B. and Kidd D.B. (2000a), Revised Buckland Reconnaissance Soil Map of Tasmania. Department of Primary Industry Water and Environment, Tasmania. In press.
- Spanswick S.B. and Kidd D.B. (In prep), Revised Hobart Reconnaissance Soil Map of Tasmania. Department of Primary Industry Water and Environment, Tasmania. In press.
- Stace H.C. and Hutton J.T (1958), *Flame Excitation methods of Spectrochemical Analysis*. CSIRO Melbourne.
- Stace H.C., Hubble G.D., Brewer R., Northcote K.H., Sleeman J.R., Mulcahy M.J., and Hallsworth E.G. (1968), *A Handbook of Australian Soils*, Rellim Technical Publications, South Australia.

Stephens C.G., Baldwin J.G. and Hosking J.S (1942), Soils of the parishes of Longford, Cressy, and Lawrence, County of Westmoorland, Tasmania. CSIRO Bull. No. 150.

Taylor R.M. and Pickering J.G. (1963), Clay mineralogy of soils of the Launceston Tertiary Basin, Tasmania. CSIRO Divisional report 9/63.

Tiller K.G. (1962), Weathering and Soil Formation on Dolerite in Tasmania with Particular Reference to Several Trace Elements. *Aust. J. Soil Res.*, Vol 1, No. 1. 74-90p.

Appendix 1

List of Key Soil Horizon Designations Used in SPC's

Horizons (some of which may be subdivided eg, A11 and A12)

- A1** Topsoil, zone of maximum biological activity, usually dark in colour.
- A2** Grey, generally sandy, sometimes bleached, eluvial horizon (less clay, organic matter and sesquioxides than horizons above and below).
- A3** Transitional horizon between A and B horizon and more similar to A than B horizon.
- B1** Transitional horizon between A and B horizon and more similar to B than A horizon.
- B2** Main subsoil horizon, either:-
 - 1) illuvial clay, humus or sesquioxide accumulations or
 - 2) maximum pedological development such as structure or colour.
- B3** Transitional horizon between B2 and C horizon and having significant amount of clay to still be classed as part of the solum.
- BC** As above.
- C** Weathered parent material and partially weathered rock from which the soil has formed.
- D** Buried horizon which is unlike the pedological organisation of the overlying horizons.
- R** Bedrock.
- P1** Primarily undecomposed organic matter (peat).
- P2** Primarily decomposed organic matter (peat).

Horizon Suffixes Used

- e** conspicuously bleached horizon, for example A2e.
- g** Gleyed horizon caused by very poor drainage.
- h** accumulation of humified, well decomposed organic matter.
- j** sporadically bleached horizon, for example, A2j.
- k** accumulation of carbonate.
- t** accumulation of silicate clay (illuviation).
- w** weakly developed B horizon, ie, colour or structured B horizon, little or no illuviation.

For full horizon definitions refer to MacDonald *et al.* (1998). This figure has been modified from Doyle (1993), p 118.

Appendix 2

Analytical Methods for CSIRO sites

The following analytical methodology, taken from Graley (1961), is assumed to be similar for the sites analysed by CSIRO Division of Soils on this map.

The methods of analyses used were essentially those of Piper (1947) but with the following modifications:

pH was determined using a glass electrode and the system described by Raupach (1954).

Phosphorus is reported as “total” P dissolved by four hours boiling with concentrated hydrochloric acid. It was determined by a colorimetric method using butanol to extract the ammonium phosphomolybdate prior to its reduction with stannous chloride to the blue complex.

“Free” ferric oxide was determined using a modification by Haldane (1956) of Jeffries’ method.

Particle size distribution was determined on a number of samples by the International pipette method and on others by the rapid plummet balance method (Marshall, 1956) after dispersion of the soil using “calgon” (Hutton, 1955). Use of the pipette method is indicated in the tabulated data by quoting the results of the silt and clay fractions to one decimal place and of the plummet method to the nearest whole number. Coarse and fine sands are quoted to the nearest whole number for both methods.

Exchangeable metal cations were extracted by leaching with normal ammonium chloride and the leachate examined by titration with E.D.T.A for calcium and magnesium (Bond and Tucker, 1954 and Hutton, 1954) and by the “Eel” flame photometer for potassium and sodium (Stace and Hutton, 1958).

Exchangeable hydrogen has been determined by both the paranitro phenol (to pH 7.0) and meta-nitrophenol (to pH 8.4) methods of Piper (1942) but the total exchangeable cations recorded are the sum of the metal ions and exchangeable hydrogen to pH 8.4.

Values are reported for fractionation of the coarse and fine sands from certain samples. These were determined by sieving through five inch sieves with hand shaking for twenty minutes.

Analytical methods for DPIWE sites

Soil pH and electrical conductivity were measured in a 1:5 soil:water ratio.

Clay mineralogy was determined by the Tasmanian Department of Mineral Resources using X-ray diffraction.

Exchangeable Aluminium and Acidity was measured using method 15G1 described by Rayment and Higginson (1992).

Organic Carbon was measured using the Walkley and Black method described in Rayment and Higginson (1992).

Available phosphorus was measured using method 9B2 described by Rayment and Higginson (1992) based on Murphy and Riley (1962).

Air-dry moisture content has been expressed as a percentage based on method 2A1 described by Rayment and Higginson (1992).

Total nitrogen was measured using an auto analyser following method 7A2 in Rayment and Higginson (1992).

Copper, Zinc, Manganese and Iron was measured using method 12A1 described in Rayment and Higginson (1992).

Exchangeable Calcium, Magnesium, Sodium and Potassium was measured by ammonium chloride at pH 7.0 using method 15B3 in Rayment and Higginson (1992).

Appendix 3

Rating table for analytical properties

General analytical properties

	Very low	Low	Medium	High	Very High
Organic Carbon (%)	<1	1-2	2-4	4-8	>8
Total Nitrogen (%)	<0.1	0.1-0.2	0.2-0.4	>0.4	
Total Phosphorus (mg/kg)	<100	100-200	200-500	500-1000	>1000
CEC (meq/100g soil)	<6	6-12	12-25	25-50	>50
Base Saturation (%)	<20	20-40	40-60	>60	

Note: Organic matter content can be estimated by multiplying organic carbon contents by 1.724.

Colwell Extractable Phosphorus and Potassium

Light soils (sandy loams)	Low	Medium	High
P (mg/kg)	<10	10-35	>35
K (mg/kg)	<100	100-200	>200
Heavy soils (clays)	Low	Medium	High
P (mg/kg)	<30	30-80	>80
K(mg/kg)	<150	150-300	>300

Salinity

	None	Slight	Moderate	High	Very High
(dSm-1)	<0.2	0.2-0.7	0.7-1.2	1.2-3.0	>3.0

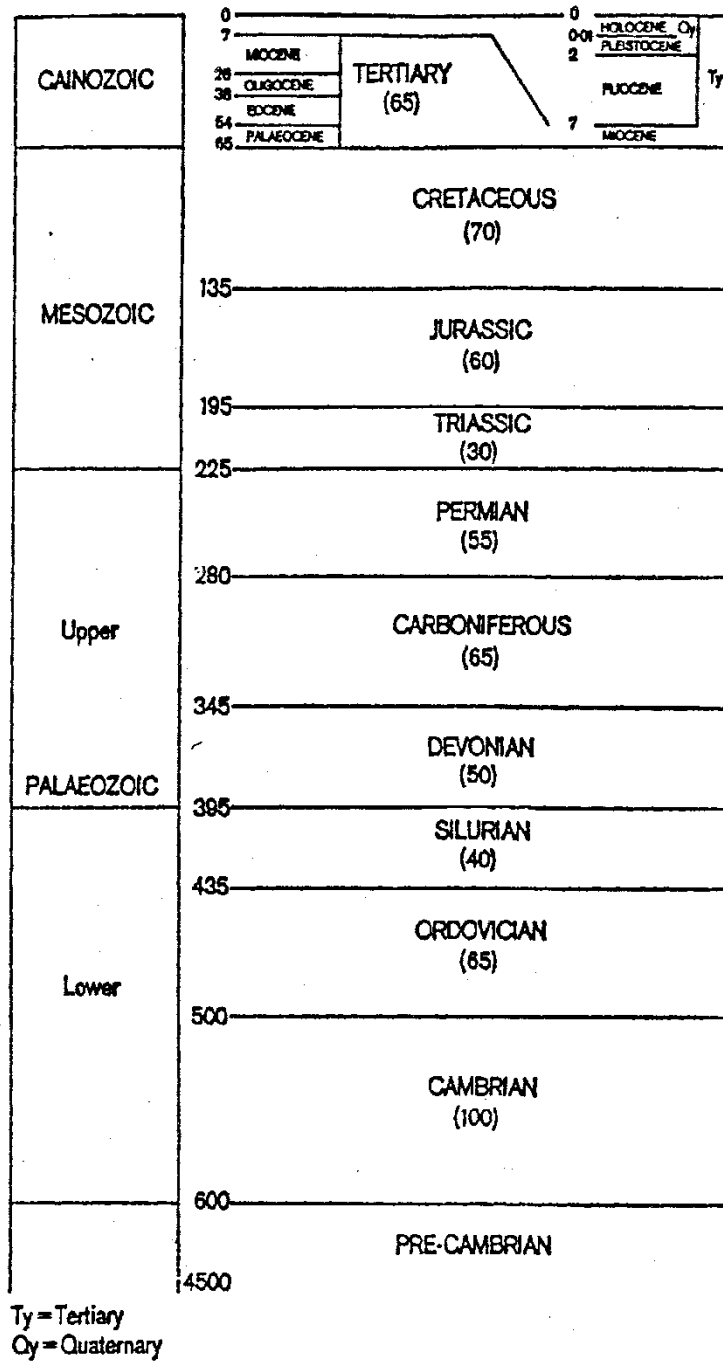
Soil Acidity

	Slightly	Moderately	Strongly	Extremely
pH range	6.5-6.0	5.9-5.3	5.2-4.5	<4.5

This table has been taken from Doyle (1993) p115

Appendix 4

Geological Timeline



Taken from Brooks J.R.V., and Whitten D.G.A., (1972) Dictionary of Geology . Published by Penguin, England.

Appendix 5

Additional Relevant Information

Detailed Maps

Holtz G. K. (1987), Soils of Part of the Lower Coal River Valley Tasmania. Department of Primary Industries, Queensland.

Geology Maps

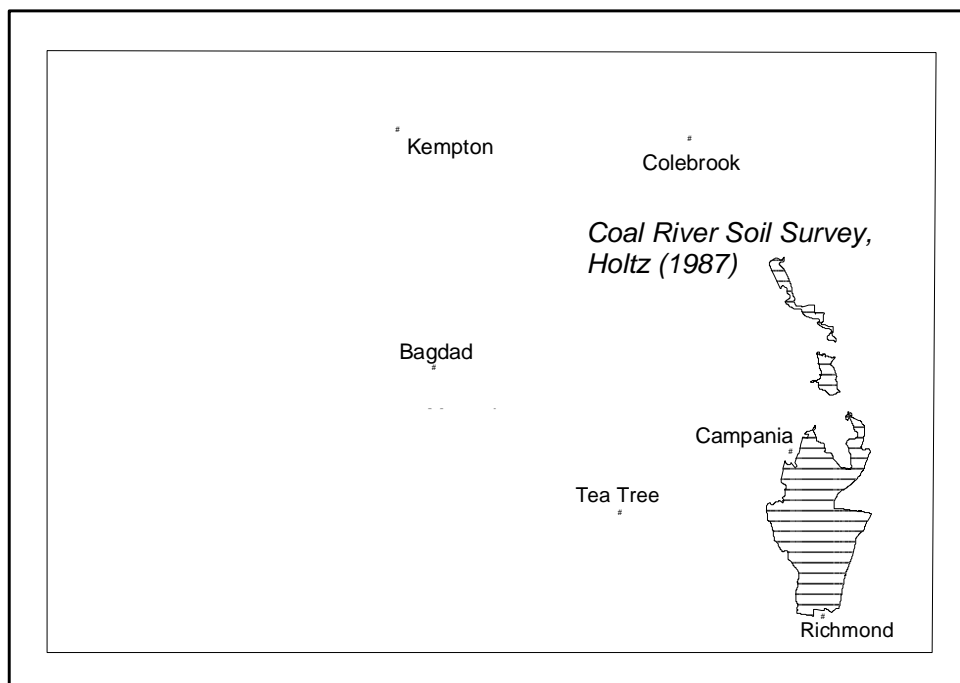
Gulline A. B. (1982) Tasmanian Department of mines Geological Atlas 1:50 000 series Sorell.

Additional Literature & Surveys

Nicolls K.D (1957b), Soil Formation on Dolerite in Tasmania. *In Dolerite a Symposium*, University of Tasmania, Geology Department, Convenor S.W. Carey.

DeRose R. & Musk R. (In prep), Land Capability Survey of Tasmania. Derwent Report. Department of Primary Industries, Water and Environment, Tasmania, Australia.

Detailed Surveys within the Brighton Reconnaissance Soil Map



Appendix 6

List of Reports in the Reconnaissance 1:100 000 Soil Map Series

Cowie, J.D. (1959), Reconnaissance soil map of Tasmania. Sheet 68, **Oatlands**. Div. Rep. Div Soils CSIRO Aust. 4/59; Scale 1:63 360

Doyle, R.B. (1993), Soils of the **South Esk** Sheet Tasmania (southern half) Reconnaissance Soil Map. DPIF Soil Survey Series of Tasmania No 1. Scale 1:100 000

Dimmock, G.M. (1956), Reconnaissance soil map of Tasmania **Flinders Island**. Div. Rep. Div. Soils CSIRO Aust. 8/56; Scale 1: 63 360

Dimmock, G.M. (1960), Soil reconnaissance of the area between the **Tomahawk and Ringarooma Rivers**, N.E Tasmania. Tech memo. Div. Soils CSIRO Aust. 7/60; Scale 1:63 360

Dimmock, G.M. (1961), Reconnaissance soil map of Tasmania. Sheet 74, **Ellendale**. Div. Rep. Div. Soils CSIRO Aust. 5/61; Scale 1:63 360

Dimmock, G.M. (1964), **Beaconsfield** Soil Survey. CSIRO (unpublished); Scale 1: 100 000

Hubble, G.D. (1951), Reconnaissance survey of the **Coastal Heath Country, N.W** Tasmania. Div. Rep. Div. Soils CSIRO Aust. 10/51 ; Scale 1:126 720

Leamy, M.L. (1961), Reconnaissance soil map of Tasmania, Sheet 61. **Interlaken**. Div. Rep. Div. Soils CSIRO Aust. 6/61; Scale 1:63 360

Loveday, J. (1955), Reconnaissance soil map of Tasmania, sheets 22 and 28 - **Table Cape and Burnie**. Div. Rep. Div. Soils CSIRO Aust. 14/55; Scale 1:126 720

Nicolls, K.D. (1955), Soils, geomorphology and climate of an area between the **Lagoon and Arthur Rivers**, West Coast of Tasmania Div. Rep. Div. Soils CSIRO Aust. 7/55; Scale 1:126 720

Nicolls, K.D. (1957), Reconnaissance of the soils around **Georgetown**, Tasmania. Tech. Memo Div Soils CSIRO Aust 3/57; Scale 1: 126 720

Spanswick S.B. and Zund P. (1999a), Revised **Longford** Reconnaissance Soil Map of Tasmania. Department of Primary Industry Water and Environment, Tasmania. Scale 1:100 000.

Spanswick S.B. and Zund P. (1999b), Revised **Quamby** Reconnaissance Soil Map of Tasmania. Department of Primary Industry Water and Environment, Tasmania. Scale 1:100 000.

Spanswick S.B.. (1999), Revised **Sorell** Reconnaissance Soil Map of Tasmania. Department of Primary Industry Water and Environment, Tasmania. In press. Scale 1:100 000.

Spanswick S.B. and Kidd D.B. (2000a), Revised **Buckland** Reconnaissance Soil Map of Tasmania. Department of Primary Industry Water and Environment, Tasmania. In press. Scale 1:100 000.

Spanswick S.B. and Kidd D.B. (2000b), Revised **Brighton** Reconnaissance Soil Map of Tasmania. Department of Primary Industry Water and Environment, Tasmania. In press. Scale 1:100 000.

Spanswick S.B. and Kidd D.B. (In prep), Revised **Hobart** Reconnaissance Soil Map of Tasmania. Department of Primary Industry Water and Environment, Tasmania. In press. Scale 1:100 000.

Stephens, C.G. and Hosking, J.S. (1932), A soil survey of **King Island**. Bull. No 70 CSIRO Aust; Scale 1:126 720.

Appendix 7

Index Map of the 1:100 000 Reconnaissance Soil Surveys of Tasmania

