

1979/42. Reference listing of photographs and colour slides showing engineering, structural and general demonstrations related to Jurassic dolerite.

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Abstract

Photographs and colour slides relating to Jurassic dolerite in the Department of Mines collection are listed and grouped according to demonstration. Several are selected for particular demonstrations and described. All relevant material is listed with a photo quality guide against the subjects most clearly indicated in the photograph. The selected demonstrations show topography and landforms, engineering properties, and general structural/petrological features.

INTRODUCTION

This report deals with black and white photographs (R series) and colour slides in the Department of Mines photographic collection. Colour prints and black and white photographs from the K series (35 mm) are not discussed as complete cataloging of these is yet to be undertaken. All relevant material is listed with a photo quality guide against the subjects most clearly indicated in the photograph. Thus several minor aspects reflected may not be cross indexed. The major demonstrations discussed show;

- (1) Engineering properties of dolerite
- (2) General structural/petrological features of dolerite
- (3) Topography and landforms.

The quality of slides in the collection is highly variable, due mainly to difficulties arising from poor weather (e.g. 1227-1238), difficult lighting conditions at some localities (e.g. 1274, 1456, 1478) and time constraints. Consequently, all photographs are rated according to a two letter code following the catalogue number. This code is;

A	B	C	D	E	F	(subject relevance)
a	b	c	d	e	f	(quality of photograph)
excellent	very good	good	fair	poor	bad	

Thus 999Ae would refer to slide 999; the matter shown in the slide is very relevant to the topic but that the quality of the slide is very poor. Where possible, poor quality slides of important features will be replaced. Catalogue numbers preceded by R refer to black and white photographs.

Cataloging of colour slides is done on a day by day basis and is therefore relatively complete. Some colour proof sheets of slides have been produced, but these cover slides 1 - 180 and 941 - 1080 only and are variable in quality owing to differences in slide density. A limited subject index of colour slides has also been compiled. Cataloging of R series photographs is in the form of bound print books which currently cover photographs R001 - R300. Some negatives remain to be catalogued in this series.

ENGINEERING PROPERTIES

a) *Appearance*

The appearance of dolerite depends largely on its original composition and climatic influences. The extent and age of weathering are also important.

All dolerite when fresh is some shade of blue-grey depending on the distance of sighting. With the exception of very fine-grained dolerite, which may be nearly black, the colour is always lightened by proximity and/or coarseness. At moderate distances, in excess of 15 - 20 m, the colour is generally mid-blue.

Weathering changes the blue colouration to yellows, browns or reds. The colour depends partly on the initial texture (finer rocks tend more toward the red browns) the local climate and the composition. In some areas black products result (e.g. Coal River valley). Wetter areas tend to produce yellow-browns. The age of weathering may also be relevant. Many older weathering coatings are red and derive from late Tertiary times of laterisation.

It will be obvious that many factors play a part in the derived appearance of dolerite and that it may be impossible on present data (there being no research into dolerite weathering) to determine which predominate.

In some cases, white coatings derived from carbonate weathering (travertine) may also be apparent.

Some selected photographs

Fresh rock colours	:	416Aa; 1444Aa; 1492Ac
Natural state colours	:	1135Aa
Yellows	:	1259; 1260; 1284
Browns	:	1259; 1378; 1389; 1494
Reds	:	416; 1378; 1379; 1405
Whites	:	1367Aa; 1368Aa; 1375

b) *Quality and weathering*

Several classifications are possible:

- i) fresh rock) virtually surface colourings only.
- ii) slightly weathered rock)
- iii) moderately weathered rock - effects apparent away from surfaces, solid untouched cores
- iv) deeply weathered rock - all minerals show signs of alteration. Strength only slightly diminished
- v) decomposed rock - texture apparent, total strength loss
- vi) soil
- vii) effect of composition on weathering
- viii) lateral variations) developed profiles are rarely consistent
- ix) vertical variations) tent on dolerite
- x) weathering products external to dolerite - usually travertine 'venation' fills joints in surrounding rocks
- xi) spheroidal weathering

Some selected photographs

- i) 1135Ba; 416Aa; 1444Aa; 1482Aa; R063
- ii) 1232Db; 1259Aa; 416Aa; 1447Ac; 1494Aa;
- iii) 1216Aa; 1215Aa; 1258Bb; 1387Ba; 1392Ba; 1389Ba; 1448Aa; 1289Aa; 1293Ab;
- iv) 199Ab; 1259Aa; 1273Aa; 1274Bc; 1275Aa; 1280Cd; 1286Aa; 1287Aa; 1288Aa; 1295Bb; 1367Ba; 1368Aa; 1375Ba; 1383Aa; 1384Aa; 1385Aa; 1402Ab; 1403Aa;
- v) 1277Bb; 1279Ab; 1281Aa; 1285Aa; 1286Aa; 1290Aa; 1291Aa; 1292Aa; 1294Aa; 1296Aa; 1284Aa; 1297Bb; 1298Aa; 1348Aa; 1351Aa; 1352Aa; 1375Ba; 1390Ab; 1391Aa; 1405Aa 1406Ad; 1452Aa; 1453Bb; 1480Bb; 1483Bb;
- vi) 1384Ba; 1385Ca; 1453Da; 1461Da; 1480Dc;
- vii) 1296Bb; 1297Bb; 1298Aa; 1460Aa; 1475Cb;
- viii) 1258Aa; 1259Aa; 1280Ba; 1282Aa; 1294Aa; 1295Bb; 1345Ca; 1346Aa; 1451Ab; 1453Ba;
- ix) 1282Aa; 1285Aa; 1286Aa; 1288Aa; 1278Ca; 1451Ab; 1461Aa; 1480-1485Aa;
- x) 1236Cc; 1234Ab; 1376Ba; 1377Aa;
- xi) 199Aa; 1283Aa; 1332Ba; 1476Aa; 1477Aa; R210; R211

c) *Jointing*

Several categories are considered

- i) columnar
- ii) prismatic
- iii) random, blocky
- iv) multi-age (produced where multiple intrusions are involved or subsequent tectonic effects)
- v) contact controlled (may include small versions of i, ii)
- vi) effect on weathering
- vii) fillings (often of calcite, zeolites etc)
- viii) fan/radial (normal near some, especially roof, margins)
- ix) sheet
- x) joint sets

Some selected photographs

- i) 1121Ab; 1122Ba; 1131Ba; 1134Aa; 1135Aa; 1138Cb; 1139Ba; 1141Ba; 1149Ca; R218; R219; R127; R119; R149;
- ii) 1257Bb; 1256Aa; 1399Aa; 1289Ba; 1293Cb; 1486Ad; 1354Aa; 1494Aa;
- iii) 1216Ba; 1232Cb; 1386Aa; 1387Aa; 1388Aa; 1393Aa; 1445Cb; 1453Bb; R106;
- iv) 1475Aa; R141; R142; R143

- v) 411Ba; 1177Aa; 1356Aa; 1355Aa; 1383Ba; 1384Ba; 1401Cc;
1402Bb; 1403Bb; R079;
- vi) 1291Aa; 1294Aa;
- vii) 1257Aa;
- viii) 1294Aa; 1295Bb; 1394Aa; 1395Aa; 1396Aa; 1397Ab; 1398Ab;
- ix) 1487Aa; 1445Aa;
- x) 1389Aa; 1447Ab;

d) *Rate of weathering*

The rate of weathering of dolerite depends on many factors alluded to above. Composition, climate, texture, physical destruction. In general, coarse rocks of high differentiation in wetter climates weather more rapidly than even, fine rocks in intensely jointed contact zones, especially in drier areas. Faulting incites more breakdown and increases the rate of weathering. The photos show the changes (in prepared faces) and the time scale. In some cases rock faces remain blue or virtually fresh, with only very light surface coatings after many decades. However many examples exist where rapid weathering has occurred and vegetation has become established.

e.g. Domain : 20 years : 1453Aa

e) *Effect of faulting*

Fault zones generally affect only a narrow band of rock directly, perhaps 10 m wide on average, but by producing changes in induced frequencies of joints may encourage increased weathering. The heart of the fault zone may be totally decomposed due to physical crushing and water passage.

Small scale: 1357Aa; 1358Aa; 1361Aa; 1362Aa.

Other: 1390Aa; 1391Aa.

f) *Slope stability*

The following categories are considered

- i) soil
- ii) talus deposits
- iii) general landforms, surface features
- iv) cuttings; form, features and failures
- v) treatments

In general dolerite soils are thin (see b(vi)) and show little sign of movement other than on steep slopes where wrinkles of slippage are sometimes encouraged by sheep.

Talus deposits are much thicker, often irregular in form and thickness, and may have properties substantially changed by changes in water content. In addition, the matrix may pipe and it is not unusual for tubes up to one metre in diameter to be found. The base of a tube is usually made up of free boulders or cobbles. On moderate slopes this type of material can be very unstable. General slope and landform failures are covered by (iii).

Cuttings pose various problems according to the type of material. Cuts in talus or decomposed rock may fail readily in the usual manner, whereas cuts in fractured or variably weathered rock may fail by block falls, slumps or combinations of both on various scales. Treatments depend on the exact character of the material and may be just as variable, e.g. 1495Aa.

- i) 1244Cd; 1366Aa;
- ii) 902Ca; 900Ba; 1378Aa; 1379Aa; R233-R239; R253-R260; 901Ba; 679Af; 680Af; 1380Aa; R266-R269; R271; R273;
- iii) 1261Ab; 1244Ab; 1364Ab; 1365Aa; 1366Aa;
- iv) 900Ba; 898Ca; 1393Aa; 1389Aa; 1390Aa; 1443Aa; 1445Aa; 1446Aa; 1451Aa; 1478Ac; 1345Ba; 1344Ba; 1495Aa; R273; R239; R157-R161;
- v) 1393Aa; R271; R273

g) *Workability*,

Dolerite is normally worked by blasting (with or without extensive pre-drilling), splitting or ripping.

Material shown in 1216, 1274 or categories b(v) and certain types of c(ii), c(v) may be ripped. Allow for joint, block sizes. Examples of splitting are shown in 1443Ab; 1481Aa; 1492 and the effect of blasting in 1492; 1480-1485Ab.

Also R106-R110.

h) *Water movement*

In dolerite areas water movement is controlled by joints or surface deposits and only rarely as a porous medium. Totally decomposed rock may act as the latter but continuity and variability are significant restrictions. Sub-horizontal joints act as the master control in many cases and weathering commonly reflects this.

1445Aa; 1480-1485Aa/b; especially 1482Aa.

i) *Surface deposits*

Surface deposits have been referred to above and are cross-referenced hereunder:

- i) blockfields
- ii) talus deposits with much matrix
- iii) stability.

Blockfields are extreme examples of talus deposits where the blocks are commonly very large and where the matrix content is very low.

- i) real 1208De; 1134Aa; 1135Aa; 1121Aa; 1464Aa; 1465Ab; apparent 1261Ab;
- ii) 1239Ba; 1240Ba; 1271Aa; 680Af; 679Af; 1376Aa; 1380Aa; 902Ca; 900Aa; 1272Aa; 1260(large scale)Ba; 671Aa; 1377Aa; 901Aa; 1270Aa; 1263Aa; 1264Aa; 672Aa; 1378Aa; 1379Aa; 1462Ac; 1463Ab; R171; R172; R173-R176; R233-R239; R253-R260; R266-R269

- iii) 901(past)Aa; 1244Dd; 680Af; 679Af; 1378Aa; 1365Aa, 1377Aa; 1366Aa; 1380Aa;

STRUCTURAL PROPERTIES

a) *Sheet forms*

Dolerite sheets may take many forms as described by Leaman (1975) and Leaman (1978). The associated irregularities in intruded rocks were also discussed in the latter reference. The structural features are merely classified here.

- i) general form
- ii) details of concordance
- iii) transgressions
- iv) basal irregularities
- v) roof irregularities
- vi) effects on intruded rocks; warps, jointing etc., fractures about irregularities.
- i) 1409Ac; 1436Aa; 1470Aa; 1472Aa; R144; R209; 1471Aa; 1435Ac (in fault); 1490Aa;
- ii) 1177Aa; 1439Aa; 1443Aa; R115; R112; 1486Ab;
- iii) 1404Aa; 1403Aa; 1402Aa; 1401Aa; 1400Bb; 1436Aa; 1437Aa; 1438Aa; 1439Aa; 1449Aa; 1478Ad; 1479Ab; 1346Aa; 1347Aa; 1348Ca; R144; R148;
- iv) 1238Ac; 1232Ab; 1228Aa; 1237Bc; 1231Aa; 1227Aa; 1449Aa; 1236Cc; 1230Ac; 1277Aa; 1233Cb; 1229Ac; 1400Cb;
- v) 1406Ae; 1442Aa; 1456Ab; 1440Ab; 1454Ac; 1458Aa; 1441Ab; 1455Ad; R111; R113; R114; Neptunian dykes 1360Aa; 1359Aa; 1358Aa; 1357Aa;
- vi) 1440Aa; 1455Ac; 1459Aa; 1441Aa; 1458Aa;

b) *Scales*

Dolerite features may occur on all scales and some clearer understanding of overall form may be obtained from study of smaller, complete features.

Small 1470-1472Aa;

Large 1490

c) *Multiple intrusions*

Multiple intrusions are quite common. Some are late stage injections of differentiated material (i); either as layers or pods (ii, iii); some as dykes of new material either as dykes (iv) or co-occupiers of older fractures (v).

Weathering and textural evidence is usually clear cut upon close inspection. Weathering differences may be very obvious.

- i) 1361Ca; 1362Aa;

- ii) 1361Aa; 1362Aa; 1446Ac; 1473Ac; 1475Ab; R141; R142;
- iii) 1474Ac; 1475Ab; 1353Ab; R143;
- iv) 1448Aa; 1457Ab; 1460Aa;
- v) 1456Ac; 1493Aa; 1491Aa; R147;

d) *Metamorphic effects*

As noted in Leaman (1978) contact rocks may show a range of properties according to the angular relationships between the dolerite and the intruded rocks and/or whether the country rocks are above or below the intrusion.

Contact zone base 1228Aa; 1227Ab;

Large scale 1409Bb;

General 1404Aa; 1346Ba; 1350Aa; 1349Aa; 1347Ba;

On dolerite by syenite 1341-1343Ab;

GENERAL

1120Da; 1111Ab; 1208Cd; 1144Ba; 1138Ab; 1121Ab; 1117Cc; 944Bd;
 1149Aa; 1141Aa; 1137Bb; 1122Bb; 1115Aa; 1265Cb; 1148Aa; 1139Aa;
 1364Bb; 1126Bb; 1466Ba; R152; R153; R297; R300

REFERENCES

LEAMAN, D.E. 1975. Form, mechanism and control of dolerite intrusion near Hobart, Tasmania. *J.geol.Soc.Aust.* 22:175-186.

LEAMAN, D.E. 1978. Some thoughts on dolerite intrusions with particular reference to marginal features. *Unpubl.Rep.Dep.Mines Tasm.* 1978/30.

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APPENDIX 1

Demonstration slides

DEMONSTRATION 1 : TOPOGRAPHY AND LANDFORMS

The collection is not well endowed with good photographs of this classification but the following show several key points:-

- 1111: Dominance of the topography by dolerite with slope changes at the basal contact with other rocks.
- 1121: As for 1111 but also showing talus rockfields and the columnar form of large intrusions.
- 1135: Natural colours and joint form at high altitudes. Note part of blockfield.
- 1261: Typical form of exposures at low levels. In this case examination of the 'outcrops' reveals no uniformity in joint directions and nearby exposures show this to be part of a large talus deposit. Uniformity of joint directions is not a wholly reliable indicator.
- 1365: Typical soil creep on steep slopes.

DEMONSTRATION 2 : ENGINEERING PROPERTIES

- 1444: Colour and character of fresh rock.
- * 416: Colour and character of fresh, slightly weathered rock with reddish surface coatings only. *Jointing* is moderately platy to prismatic and due to relative nearness of intrusion margin with siltstone.
- 1354: Detail of platy/prismatic *jointing*. Note brownish surface colour.
- 1355: As above but showing relationship to contact. (*jointing*).
- *1482: Colour change and water movement as controlled by a sheet *joint*. Note thin brown soil and very shallow weathering zone. Quarry worked by drilling and blasting.
- 411: Sheet *joints*. Note rock is only very slightly weathered, surface coatings only.
- 1260: Yellow colouration upon deep weathering. Note lateral variability of weathering. This cutting is a shallow section through a talus deposit. Note size of central coherent slab.
- 199: Spheroidal weathering. Moderate to deep weathering.
- *1477: Spheroidal weathering. Slight to moderate weathering. Core quite fresh.
- *1361: Effect of composition on weathering. Late stage granophyric differentiate has etched very differently from the fine-

grained marginal dolerite. Note the fracturing and weathering (white of travertine) associated with the small fault.

- 1362: Detail of 1361.
- *1279: Decomposed dolerite. Note yellow-brown colour. Texture, including joint positions, is retained by the material and can be dug with a shovel. Joints are filled with iron oxides. A few residual solid cores remain.
- 1352: Decomposed dolerite. Natural and newly exposed exposure. Discussion 1279 illustrated in detail.
- *1298: Decomposed granophyric dolerite. Very coarse-grained. Contrast style of decomposition with fine dolerite of 1279. See also 1361.
- *1367: Decomposed medium- to fine-grained dolerite. Note lateral variation shown by brown-white colour change. White is largely due to travertine from carbonate weathering.
- *1291: Variably weathered dolerite showing control of jointing on weathering. Note fresh cores and the irregularity of jointing.
- 1385: Intensely jointed highly discoloured dolerite with much surface travertine. Close inspection shows the rock to be only slightly to moderately weathered.
- 1286: Showing varied character of dolerite weathering and inexplicable selectivity.
- 1461: Lateral variation of weathering indicated here largely by colour. Note control of subvertical joint.
- *1282: Clearly demonstrated lateral and vertical variations in weathering and extent and colour developed in the process.
- *1294: Moderate to deep weathering. Note especially the irregular fans of joints and their control on the heterogeneity of the result. Some fresh cores are also apparent.
- 1396: Fan/radial jointing in a fresh exposure.
- 1346: Deeply weathered dolerite beneath metamorphosed siltstone. Dolerite is whitish material.
- 1280: Lateral variation of weathering showing all grades.
- *1257: Typical joint filling, calcite.
- 1448: Younger dyke intrusion showing different joint style and weathering colour.
- *1475: Detail showing how joint continuity is affected by later intrusions. Note also texture variation.
- *1377: Dolerite talus overlying disturbed mudstone. Note travertine stringers from weathering of dolerite boulders fill all

available fractures.

- 1390: Effect of major fault: Production of a deeply weathered zone and wide band of disturbed material.
 - *1389: Joint alignment induced by faulting. Note orientation of slabs and cutting direction has resulted in considerable instability. Away from the structure jointing is blocky and irregular. Weathering condition ranges from slight to deep away from the fault.
 - 1393: A different cutting showing bad combinations of road alignment and jointing. Colour patches reflect recently failed zones.
 - *1365: Typical soil creep failures.
 - *1261: Typical surface expression of dolerite and soils. In fact these 'exposures' are part of a large talus deposit.
 - *1240: Typical small scale talus deposit. Note colouration, fresh kernels and larger block breaking up.
 - 1375: An extreme example of talus weathering. Smaller material has almost completely decomposed but the larger piece is only moderately weathered. Note the relatively thin soil.
 - * 901: Section through a failed talus slope, which failed again on cutting. Note involved mudstone which forms bedrock on the slope behind.
 - 1378: Various ages of slides are indicated by the differing colours. The material is variably weathered.
 - 1121: Described in Demonstration 1.
 - 1135: Described in Demonstration 1.
- * recommended basic selection.

DEMONSTRATION 3 : GEOLOGICAL FEATURES

- 1470(detail 1471) show sheet form on a small scale. Note the dilation and fracture occupancy (shown by transection of granite erratic).
- 1490: Shows large scale intrusion in granite basement.
- 1443: Fine example of concordance. Fresh rock presplit.
- 1439: Bed by bed transgression. Very low angle.
- 1227: Sheet base irregularities are shown. Note contact zone revealed by selective weathering. No clear evidence of faulting occurs.
- 1458: Warped roof rocks. Pick at dolerite contact.
- 1456: Wedge of younger intrusion into contact of main intrusion.

Overlying rocks are warped upward and wedge end filled with debris (1454 shows detail of debris and warp). Main contact shown in 1456 by pick.

1448: Dyke intrusion, second order.

1475: Detail of granophyric injection (see also Demonstration 2).

1361: Detail of granophyric layers and subsequent faulting. Detail 1362.

1360: Neptunian dyke. Mudstone metamorphosed at contact.

1479: Detail of a typical discordant major margin. Note lack of coherent orientation.

1343: Alteration by syenite intrusion.

Slides 1111, 1135, 1121 also recommended. See Demonstration 1.

APPENDIX 2

Catalogue listing - slides

199	EN	Summerleas Road	Spheroidal weathering
411	EN334540	Mornington	Steeply dipping jointing
416	EN334540	Mornington	Dolerite in quarried face
671	EN222574	Glenorchy	Dolerite boulder bed
672	EN222574	Glenorchy	Dolerite boulder bed
679	EN150589	Molesworth	Slope deposit, mainly dolerite
680	EN150589	Molesworth	Failed slope deposit
898	EN185857	Dysart	Cutting in slope deposits
900	EN185857	Dysart	Cutting in slope deposits
901	EN185857	Dysart	Cutting in slope deposits
902	EN185857	Dysart	Cutting in slope deposits
944	View	Western Tiers	Dolerite capped mountains
1111	from DP135803	Cradle Mt	Dolerite capped mountain
1115	from DP126873	Cradle Mt	Dolerite capped mountain
1117	from DP126872	Barn Bluff	Dolerite capped mountain
1120	from DP122862	Barn Bluff	Dolerite capped mountain
1121	from DP122862	Barn Bluff	Dolerite capped mountain
1122	from DP124854	general	Dolerite capped mountain
1126	from DP124854	general	Dolerite capped mountain
1131	from DP125849	Cradle Mt	Dolerite columns
1134	from DP126848	Cradle Mt	Dolerite columns
1135	from DP126848	Cradle Mt	Dolerite columns
1137	from DP122852	Barn Bluff	Dolerite capped mountain
1138	from DP121861	Cradle Mt	Dolerite capped mountain
1139	from DP125860	Little Horn	Dolerite capped mountain
1141	from DP125860	Little Horn	Dolerite capped mountain
1144	from DP123861	Barn Bluff	Dolerite capped mountain
1148	from DP126872	Cradle Mt	Dolerite capped mountain
1149	from DP126873	Cradle Mt	Dolerite capped mountain
1177	DQ622343	Port Sorell	Intrusive contact
1208	from EQ345310	Mt Barrow	Dolerite capped mountain
1215	DQ462387	Devonport	Irregular weathering
1216	DQ462387	Devonport	Irregular weathering
1227	EP337255	Antill Ponds	Basal contact in Triassic sediments
1228	EP337255	Antill Ponds	
1229	EP337255	Antill Ponds	
1230	EP337255	Antill Ponds	
1231	EP337255	Antill Ponds	
1232	EP337255	Antill Ponds	
1233	EP337255	Antill Ponds	
1234	EP337255	Antill Ponds	
1235	EP337255	Antill Ponds	Weathering products, especially travertine
1236	EP337255	Antill Ponds	Mudstone enclosed in dolerite mass
1237	EP337255	Antill Ponds	
1238	EP337255	Antill Ponds	General view of basal contact
1239	EN315947	Rhyndaston	Dolerite derived talus
1240	EN315947	Rhyndaston	Dolerite derived talus
1244	EN333855	Colebrook	Topographic form of dolerite plug
1256	EP774097	Ravensdale	Prismatic jointing
1257	EP774097	Ravensdale	Calcite vein in contact zone
1258	FP019574	Llandaff	Weathering and jointing in apparent in situ exposures,
1259	FP019574	Llandaff	

1260	FP019574	Llandaff)	possibly talus
1261	FP029582	Llandaff	Surface expression of talus blocks
1263	FP045733	Douglas River	Reworked talus deposit overlying coal measures
1264	FP045733	Douglas River	
1265	from FP045733	Nicholls Cap	Dolerite topography
1270	EP796889	Fingal	Weathering characteristics of massive talus deposit
1271	EP796889	Fingal	
1272	EP796889	Fingal	
1273	EP478704	Llewellyn	Cutting containing basalt, dolerite and sediment
1274	EP478704	Llewellyn	
1275	EP478704	Llewellyn	
1277	EQ003384	Bell Bay Railway	Irregular basal contact
1278	EQ005383	Bell Bay Railway	Fresh rock in decomposed dolerite
1279	EQ005383	Bell Bay Railway	Evenly weathered rock, joint fillings
1280	EQ005383	Bell Bay Railway	Patchy weathering in vertical zone
1281	EQ002387	Bell Bay Railway	Joint etching
1282	EQ002390	Bell Bay Railway	Overview of weathering
1283	EQ002390	Bell Bay Railway	Spheroidally weathered kernel
1284	DQ926367	Batman Bridge	Mass decomposition
1285	DQ926367	Batman Bridge	Mass decomposition
1286	DQ926367	Batman Bridge	Decomposition, firmer centres
1287	EQ018356	Bell Bay Railway	Etched joints
1288	EQ018356	Bell Bay Railway	Discrete angular zonal weathering
1289	EQ018356	Bell Bay Railway	Weathered joints, fresh rock
1290	EQ018356	Bell Bay Railway	Total decomposition
1291	EQ018356	Bell Bay Railway	Detail of joint weathering
1292	EQ018356	Bell Bay Railway	Intense jointing character, weathered
1293	EQ018356	Bell Bay Railway	Intense jointing character, fresh
1294	EQ018356	Bell Bay Railway	Varied joint orientation
1295	EQ018356	Bell Bay Railway	Fresh kernels in blockily jointed rock
1296	EN198278	Oyster Cove	Granophyric dolerite
1297	EN198278	Oyster Cove	<i>In situ</i> appearance, weathered dolerite
1298	EN198278	Oyster Cove	Granophyre kernel
1332	DQ552333	Sassafras	Spheroidal weathering
1341	EN065195	Regatta Point	Dolerite intruded by alkaline liquors
1342	EN065195	Regatta Point	
1343	EN065195	Regatta Point	
1344	EN355567	Eastern Outlet	Dolerite/siltstone contact
1345	EN355567	Eastern Outlet	Dolerite/siltstone contact
1346	EN355567	Eastern Outlet	Dolerite/siltstone contact, fault
1347	EN355567	Eastern Outlet	Contact detail
1348	EN355567	Eastern Outlet	Fault zone
1349	EN355567	Eastern Outlet	Unaltered and baked siltstone
1350	EN355567	Eastern Outlet	Contact, altered and unaltered siltstone
1351	EN367571	Eastern Outlet	Basalt flow on weathered dolerite
1352	EN367571	Eastern Outlet	Preserved Tertiary weathering on dolerite

1353	EN512518	Single Hill	Granophyric inclusion
1354	EN432755	Black Charlies	Prismatic joints
		Opening	
1355	EN432755	Black Charlies	Base of upper sill
		Opening	
1356	EN432755	Black Charlies	Dipping contact
		Opening	
1357	EN432755	Black Charlies	Dislocated roof of lower sill
		Opening	
1358	EN432755	Black Charlies	
		Opening	
1359	EN432755	Black Charlies	Hornfelsed strip inclusions
		Opening	
1360	EN432755	Black Charlies	Detail of 1359
		Opening	
1361	EN432755	Black Charlies	Granophyric layers with dis-
		Opening	
1362	EN432755	Black Charlies	
		Opening	
1364	from EN319871	Coal River	Typical plug landforms
1365	EN319871	Ring Hill	Slope failure
1366	EN333856	Birmingham Creek	Soil creep on dolerite slope
1367	EN342828	Cashman Creek	Deeply weathered intensively
1368	EN342828	Cashman Creek	jointed dolerite, banded car-
			bonate deposits
1375	EN242609	Mt Direction	Extreme weathering
1376	EN242609	Mt Direction	Talus/coal measures contact
1377	EN242609	Mt Direction	Detail of 1376
1378	EN243608	Mt Direction	Disturbed talus deposits
1379	EN243608	Mt Direction	
1380	EN243608	Mt Direction	
1383	EN337851	'Lynwood'	Fine jointing, extreme weather-
1384	EN337851	'Lynwood'	
1385	EN337851	'Lynwood'	
1386	EP841238	Mayfield	Fault zone in dolerite, joints
			parallel to fault
1387	EP841238	Mayfield	Blocky jointing
1388	EP841238	Mayfield	Jointing parallel to face of
			cutting
1389	EP841238	Mayfield	Joint alignment parallel to
			fault
1390	EP841238	Mayfield	Fault zone in dolerite
1391	EP841238	Mayfield	Detail of 1390
1392	EP841238	Mayfield	instability due to joint orien-
			tation
1393	EP847245	Tirzah Beach	Unstable face due to joint
			arrangement
1394	EP878287	Spiky Bridge	Random near-vertical joints -
			radial joint
1395	EP878287	Spiky Bridge	Random near-vertical joints -
			radial joint
1396	EP878287	Spiky Bridge	Random near-vertical joints -
			concentric
1397	EP878287	Spiky Bridge	Random near-vertical joints -
			contrary orientations
1398	EP878287	Spiky Bridge	Random near-vertical joints -
			contrary orientations
1399	EP878287	Spiky Bridge	Random near-vertical joints -
			prismatic nature

1400	EP774098	Ravensdale	
1401	EP774098	Ravensdale	
1402	EP774098	Ravensdale	
1403	EP774098	Ravensdale	Irregular intrusion roof, contact chilling and selective weathering
1404	EP774098	Ravensdale	
1405	EP774098	Ravensdale	
1406	EP774098	Ravensdale	
1409	EN675864	Black Bridge	Transgressive sheet in hornfelsed siltstone
1435	EN340557	Tunnel Hill	Thin dyke in fault zone
1436	EN251486	Tolmans Hill	Small discordant intrusion
1437	EN251486	Tolmans Hill	
1438	EN253487	Tolmans Hill	Roof of major sheet, stepping
1439	EN253487	Tolmans Hill	
1440	EN251479	Southern Outlet	Small warp over roof irregularity
1441	EN251479	Southern Outlet	
1442	EN248477	Southern Outlet	Small inclusion in sheet roof
1443	EN247473	Southern Outlet	Roof contact
1444	EN247473	Southern Outlet	Fresh high quality dolerite
1445	EN247473	Southern Outlet	Sheet jointing
1446	EN248468	Southern Outlet	Banded upper part of sheet
1447	EN252463	Southern Outlet	Blocky joint sets
1448	EN252463	Southern Outlet	Small dyke in main body
1449	EN253445	Southern Outlet	Irregular discordant contact
1451	EN254433	Southern Outlet	Weathering/joint variations
1452	EN258548	Domain	Deep weathering
1453	EN257547	Domain	Intra-intrusional contact
1454	EN253487	Southern Outlet	Wedge of dolerite intruding mudstone
1455	EN253487	Southern Outlet	Mudstone bent over wedge
1456	EN253487	Southern Outlet	Very weathered
1457	EN253487	Southern Outlet	Small transgressive bodies
1458	EN253487	Southern Outlet	Small warp over sheet roof
1459	EN253487	Southern Outlet	Small warp over sheet roof
1460	EN254490	Proctors Road	Transecting dyke and contact
1461	EN254490	Proctors Road	Contact, weathered/fresh dolerite
1462	EN145590	Molesworth	Talus
1463	EN145590	Molesworth	Talus
1464	EN143587	Molesworth	Scree, rockfields
1465	EN143587	Molesworth	Scree, rockfields
1466	from EN173586	Mt Direction	Topographic expression
1470	EN412518	Single Hill	Small transgressive intrusion
1471	EN412518	Single Hill	Transection of an erratic
1472	EN412518	Single Hill	Small transgressive intrusion
1473	EN413520	Single Hill	Granophyric banding
1474	EN412517	Single Hill	Granophyric intrusion, late stage
1475	EN412517	Single Hill	Granophyric intrusion, late stage
1476	EN412515	Single Hill	Spheroidal weathering
1477	EN412515	Single Hill	Spheroidal weathering
1478	EN352567	Cambridge	Irregular discordant contact
1479	EN352567	Cambridge	Detail of 1478
1480	EP283131	Oatlands	Typical weathering profile, control by sub-horizontal or sheet joints
1481	EP283131	Oatlands	
1482	EP283131	Oatlands	
1483	EP283131	Oatlands	
1484	EP283131	Oatlands	
1485	EP283131	Oatlands	

1486	EP195013	Lovely Banks	Roof contact, prismatic jointing
1487	EN442657	Orielton	Sheet joints
1490	EN813434	Cape Surville	Major sheet intruding granite
1491	EN251486	Nelson Saddle	Discordant sheet
1492	EN247473	Southern Outlet	Good quality dolerite
1493	EN251486	Nelson Saddle	Detail, internal contact
1494	EN260590	Risdon	Prismatic joints
1495	EQ001388	Bell Bay Railway	Rock fall

APPENDIX 3

Catalogue listing - black and white photographs

R058	EN252492	Tolmans Hill	General cutting view down
R059	EN252492	Tolmans Hill	General cutting view down
R060	EN252492	Tolmans Hill	General cutting view down
R061	EN252492	Tolmans Hill	General cutting view up
R062	EN255495	Tolmans Hill	Joint faces/cutting face
R063	EN255495	Tolmans Hill	Joint faces/cutting face
R064	EN255495	Tolmans Hill	Joint faces/cutting face showing rock fall
R065	EN255495	Tolmans Hill	Joint faces/cutting face
R066	EN255495	Tolmans Hill	Open joints
R067	EN255495	Tolmans Hill	Fallen blocks
R068	EN255495	Tolmans Hill	General view, unsupported face
R079	DQ630345	Port Sorell	Basal contact. (also slide 1177)
R106	EN255495	Tolmans Hill	Blocky joints
R107	EN255495	Tolmans Hill	Jointing
R108	EN255495	Tolmans Hill	Jointing
R109	EN255495	Tolmans Hill	Jointing
R110	EN255495	Tolmans Hill	Jointing
R111	EN248477	Nelson Saddle	Raft in roof of sheet
R112	EN248477	Nelson Saddle	Concordant contact
R113	EN248477	Nelson Saddle	Raft in roof of sheet
R114	EN248477	Nelson Saddle	Detail of R113
R115	EN247473	Southern Outlet	Concordant contact
R116	EN247473	Southern Outlet	Concordant contact
R119	from EN226480	Mt Wellington	View of Organ Pipes
R127	from EN226480	Mt Wellington	View of Organ Pipes
R141	EN415525	Single Hill	Granophyre intrusion
R142	EN415525	Single Hill	Granophyre intrusion
R143	EN415525	Single Hill	Granophyre inclusions
R144	EN415525	Single Hill	Small transgressive sheet (slide 1470)
R147	EN252488	Nelson Saddle	Multiple contacts at roof main sheet
R148	EN250488	Nelson Saddle	Transgressive sheet
R149	from EN202484	Mt Wellington	Organ Pipes
R152	EN188497	Mt Wellington	Mountain plateau
R153	EN188497	Mt Wellington	Mountain plateau
R157	EN077807	Elderslie	Talus slip
R158	EN077807	Elderslie	Talus slip
R159	EN077807	Elderslie	Talus slip
R160	EN077807	Elderslie	Talus slip
R161	EN077807	Elderslie	Talus slip
R171	EN189653	Granton	Talus over mudstone
R172	EN193644	Hilton Road	Talus
R173	EN194641	Hilton Road	Talus slides, sections
R174	EN194641	Hilton Road	Talus slides
R175	EN194641	Hilton Road	Detail
R176	EN194641	Hilton Road	Detail
R209	EN415525	Single Hill	Small transgressive sheet
R210	EN415525	Single Hill	Spheroidal weathering
R211	EN415525	Single Hill	Spheroidal weathering
R218	EN192495	Mt Wellington	Columns
R219	EN192495	Mt Wellington	Columns
R233	EN185860	Dysart	Talus in cutting
R234	EN185860	Dysart	Talus in cutting

R235	EN185860	Dysart	Talus in cutting
R238	EN185860	Dysart	Talus in cutting
R239	EN185860	Dysart	Talus in cutting (detail)
R253	EN185860	Dysart	Talus in cutting
R254	EN185860	Dysart	Talus in cutting
R255	EN185860	Dysart	Talus in cutting
R256	EN185860	Dysart	Talus in cutting
R257	EN185860	Dysart	Talus in cutting
R258	EN185860	Dysart	Talus in cutting
R259	EN185860	Dysart	Talus in cutting
R260	EN185860	Dysart	Talus in cutting
R266	EN185860	Dysart	Talus in cutting
R267	EN185860	Dysart	Talus in cutting
R268	EN185860	Dysart	Talus in cutting
R269	EN185860	Dysart	Talus in cutting
R271	EN185860	Dysart	Drains above cutting
R273	EN185860	Dysart	Failed section of cut
R297	DP126873	Cradle Mountain	View
R300	DP122862	Barn Bluff	View
R301	DP122862	Cradle Mountain	View
R302	DP122862	Cradle Mountain	View
R306	DP126846	Cradle Mountain	Summit
R307	DP126846	Cradle Mountain	Summit
R308	DP125848	Cradle Mountain	Columns on face
R314	DP125848	Cradle Mountain	Columns on face