

INTRODUCTION

- Rock types maps are intended to help planners and land users to:
- i) identify the characteristics of near surface rock types;
- ii) recognise areas of existing and potential mineral resources;
- iii) become aware of geological hazards.

ROCK TYPE DESCRIPTIONS (LITHOLOGIES)

The map unit symbols are listed alphabetically within the two major rock type categories — sedimentary and igneous. The first letter of each symbol indicates the major lithology, and the second letter (where present) a significant interbedded lithology. The numeral indicates the typical hardness (See Physical Characteristics Table) of the unweathered rock material, and the subscript numeral indicates variation.

The description for each map unit may include common name, distinctive landform, colour, hardness, grain size, bedding, fracturing and chemical composition. Major and minor lithologies are described and also the weathered material, in terms of changes in colour, hardness and grain size. The range of depths of the weathered mantle is also given. (See Definitions of Descriptive Terms)

SEDIMENTARY ROCK TYPES

- ALLUVIUM**
 - A1₁ Undifferentiated intertidal deposits: mud, sand, gravel and shell; unconsolidated.
 - A1₂ Alluvium: mud, sand and gravel with minor peat, forming river beds and flood plain deposits, unconsolidated to very soft, unweathered.
 - A1₃ Alluvium: mud, sand and gravel with minor peat, forming terrace deposits up to 10 m above stream or sea level; unconsolidated to very soft. Unweathered, or weathered to brown stained material to depths of 2 m.
- PEAT**
 - C1 Peat: dark brown, fibrous, carbonaceous deposits, some sand, usually less than 5 m thick; unconsolidated.
- DEBRIS**
 - P1 Earthflows, landslides: chaotic mixture of blocks, usually in a matrix of mud, sand and gravel, all derived from rock materials of the slope above; unconsolidated.
- CONGLOMERATE**
 - G1 Conglomerate: rounded, gravel to cobble sized fragments of basalt and diorite in a sandy matrix, thickly interbedded with minor volcanic and carbonaceous sandstone and mudstone, and minor lignite in places; widely fractured; moderately hard to very hard. Weathered to soft reddish brown clay containing moderately soft cores to depths of 20 m.
 - G2 Conglomerate: rounded, gravel to boulder sized fragments of muddy limestone and basalt in a matrix of volcanic sandstone, thickly interbedded with brown sandstone in places; widely fractured; moderately hard to hard. Weathered to soft reddish brown clay containing moderately soft cores to depths of 20 m.
- LIMESTONE**
 - L1 Muddy limestone: grey, 40-85% calcium carbonate, in places interbedded with minor greensand or multicoloured mudstone (M4₁); closely to moderately fractured; moderately hard to hard. Weathered to soft brown clay to depths of 2 m.
- MUD AND MUDSTONE**
 - M1 Mudstone: grey, brown, white and green, thinly bedded and closely fractured, locally calcareous or siliceous, with minor muddy limestone (L2₁), green-sand and micaceous sandstone (S2₁); moderately soft to moderately hard. Weathered to soft clay to depths of 10 m, unstable in places. (Not mapped separately on this sheet).
 - M2 Mudstone with blocks: matrix of closely fractured mudstone containing variably sized (one- to two-) blocks of sedimentary or volcanic lithologies (M4₁, M5, L5₁, S5₁, R6₁, B5₁); moderately soft. Weathered to soft clay to depths of 10 m, with weathering of blocks as given in individual descriptions; may be unstable, even on gentle slopes.
 - M3 Mudstone with sandstone: blue-grey, medium to thickly bedded mudstone, moderately fractured, with thin beds of fine sandstone in places, both lithologies locally calcareous; moderately soft to moderately hard. Weathered to soft silty clay to depths of 10m.
 - M5 Siliceous mudstone: dark grey and closely fractured with a silica content of up to 90%; moderately hard to hard. Weathered to light grey, soft clay containing harder cores to depths of 10 m.
- SAND AND SANDSTONE**
 - S1 Sand: quartz and feldspar, minor shell fragments, median grain size 220-290 microns, forming intertidal and beach deposits; unconsolidated.
 - S2 Sand: quartz and feldspar, median grain size 170-250 microns, forming active dunes; unconsolidated and unweathered.
 - S3 Sand: quartz and feldspar, minor dark minerals and clay, median grain size 170-250 microns, forming fixed dunes, with minor swamp deposits; unconsolidated to very soft. Unweathered, or weathered to brown-stained, very soft clayey sand to depths of 5 m.
 - S4 Sand: quartz and feldspar, limonitic or calcareous cementation in places, (median grain size unknown), forming damp interdunal areas, with minor swamp deposits; unconsolidated to very soft. Unweathered.
 - S5 Clayey sand: quartz with feldspar and a clay content of up to 10% forming high, dissected fixed dunes, some peaty or pumiceous layers; very soft. Weathered to grey or brown-stained, very soft, sandy clay to depths of 10m.
 - S6 Micaceous sandstone: blue-grey, quartz-feldspar sandstone, with a mica content of up to 5%, in places calcareous, thinly to thickly bedded and widely fractured, with minor interbedded mudstone (M4₁), hard conglomerate and carbonaceous material in places, and large calcareous concretions locally; moderately hard to hard. Weathered to soft, brown sandy clay to depths of 10 m.
- IGNEOUS ROCK TYPES**
 - VOLCANIC BRECCIA**
 - B2 Basalt and dolerite breccia: coarse angular fragments of very fine to medium grained crystalline basalt and dolerite, in a matrix of medium grained tuff, with minor blocks of sandstone (S2₁), mudstone (M4₁) and limestone (L2₁); in places, widely fractured; moderately hard to hard. Weathered to soft clay with moderately soft fragments to depths of 20 m. (Not mapped separately on this sheet).
 - EXTRUSIVE ROCK**
 - R1 Basalt with scoria: flows and cones of glassy and very fine to medium grained crystalline basalt, dense or vesicular, interbedded with scoria in places, moderately fractured; hard to very hard. Weathered to soft brown clay to depths of 10 m.
 - R2 Basalt and dolerite: very fine to medium grained crystalline basalt and dolerite, with some breccia (B2₁) and minor tuff, minor blocks of sandstone (S2₁), mudstone (M4₁) and limestone (L2₁); in places, moderately fractured with curved jointing; hard to very hard. Weathered to soft clay to depths of 30 m.
 - R3 Basalt: massive flows of very fine to medium grained, dense crystalline basalt, thickly interbedded with tuff, scoria and minor breccia in places; moderately to widely fractured; hard to very hard. Weathered to soft reddish brown clay to depths of 30 m.

SHEET INDEX



COMPILATION NOTE: The base map is compiled from the NZMS 1 series (1:63360) dated 1967/68, 69, 70, 72, 73.

EDITION 1 1982

NEW ZEALAND LAND INVENTORY

SCALE 1 : 100 000



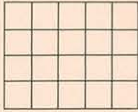
REFERENCE

- WHANGAREI Cities
- KAIOHĒ Towns
- Houhora Settlements
- State highways
- Other roads
- Tracks
- Railways
- Rivers and streams
- Triq stations
- Vincula (separate parcels under same ownership)
- Land holding boundaries
- Sand and mud
- Wetlands

This map is one of a series. Themes mapped in this study are: Land Tenure and Holding, Rock Types, Soils, Existing Land Use, Wildlife, Indigenous Forest.

This map is drawn on the New Zealand Map Grid Projection, a minimum-error conformal projection. The grid is the New Zealand Map Grid, showing coordinates in metres in terms of the Geodetic Datum 1949, based on the International (Hayford) Spheroid.

The smallest area mapped is generally not less than 10 hectares. Calculation of areas from this map should be within the limitations of scale. For example, individual areas should be rounded to the nearest 5 hectares. Accumulated areas should be rounded to the nearest 50 hectares.



AREAL SCALE
500 hectares divided into units of 25 hectares



Compiled by L.O. Kermode, New Zealand Geological Survey, Department of Scientific and Industrial Research.

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*Refer to hand sized samples of fresh rock of the map unit.

If fractures can have a significant effect on the use of excavation, e.g. hard rocks if closely fractured, may be excavated as readily as softer material. (See table on fracture spacing)

Units such as gravel or scoria are unconsolidated as a mass but consist of fragments with individual hardnesses of up to 7.

DEFINITION OF DESCRIPTIVE TERMS				
GRAIN SIZE				
SIZE	CRYSTALLINE ROCK	UNCONSOLIDATED SEDIMENT	CONSOLIDATED SEDIMENT	FRAGMENTAL VOLCANIC DEBRIS
less than 2 microns	glassy			
2 to 60 microns	very fine grained crystalline	clay	claystone	tuff
60 microns to 2mm	fine grained crystalline	silt	siltstone	
2 to 60mm	medium grained crystalline	sand	sandstone	
more than 60mm	coarse grained crystalline	gravel cobbles and boulders	scree (angular) conglomerate (angular)	volcanic breccia
BEDDING				
The following terms denote bedding thickness ranges:				
thinly bedded	less than 200mm			
medium bedded	200-600mm			
thickly bedded	more than 600mm			
FRACTURING				
The following terms denote fracture spacing ranges:				
closely fractured	less than 20mm			
moderately fractured	20-200mm			
widely fractured	more than 200mm			

Refer to this map at: Kermode L.O. 1981. Waipoua-Aranga NZMS 290 Sheet 006/07 1:100 000 New Zealand Land Inventory, Rock Types. Department of Lands and Survey, Wellington, New Zealand.