Rock Description

Explanation Sheet (1 of 2)

Coffey

The descriptive terms used by Coffey are given below. They are broadly consistent with Australian Standard AS1726-1993.

DEFINITIONS: Rock substance, defect and mass are defined as follows:

Rock Substance	In engineering terms rock substance is any naturally occurring aggregate of minerals and organic material which cannot be disintegrated or remoulded by hand in air or water. Other material is described using soil descriptive terms. Effectively homogonous material, may be isotropic or anisotropic.
Defect	Discontinuity or break in the continuity of a substance or substances.
Mass	Any body of material which is not effectively homogeneous. It can consist of two or more substances without defects, or one or more substances with one or more defects.

SUBSTANCE DESCRIPTIVE TERMS:

ROCK NAME	Simple rock names are used rather than precise geological classification.
PARTICLE SIZE	Grain size terms for sandstone are:
Coarse grained	Mainly 0.6mm to 2mm
Medium grained	Mainly 0.2mm to 0.6mm
Fine grained	Mainly 0.06mm (just visible) to 0.2mm
FABRIC	Terms for layering or penetrative fabric (eg. bedding, cleavage etc.) are:
Massive	No layering or penetrative fabric.
Indistinct	Layering or fabric just visible. Little effect on properties.
Distinct	Layering or fabric is easily visible. Rock breaks more easily parallel to layering or fabric.

CLASSIFICATION OF WEATHERING PRODUCTS

Term	Abbreviation	Definition
Residual Soil	**RS**	Soil derived from the weathering of rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported.
Extremely Weathered Material	**XW**	Material is weathered to such an extent that it has soil properties, ie, it either disintegrates or can be remoulded in water. Original rock fabric still visible.
Highly Weathered Rock	**HW**	Rock strength is changed by weathering. The whole of the rock substance is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Some minerals are decomposed to clay minerals. Porosity may be increased by leaching or may be decreased due to the deposition of minerals in pores.
Moderately Weathered Rock	**MW**	The whole of the rock substance is discoloured, usually by iron staining or bleaching, to the extent that the colour of the fresh rock is no longer recognisable.
Slightly Weathered Rock	**SW**	Rock substance affected by weathering to the extent that partial staining or partial discolouration of the rock substance (usually by limonite) has taken place. The colour and texture of the fresh rock is recognisable; strength properties are essentially those of the fresh rock substance.
Fresh Rock	**FR**	Rock substance unaffected by weathering.

Notes on Weathering:

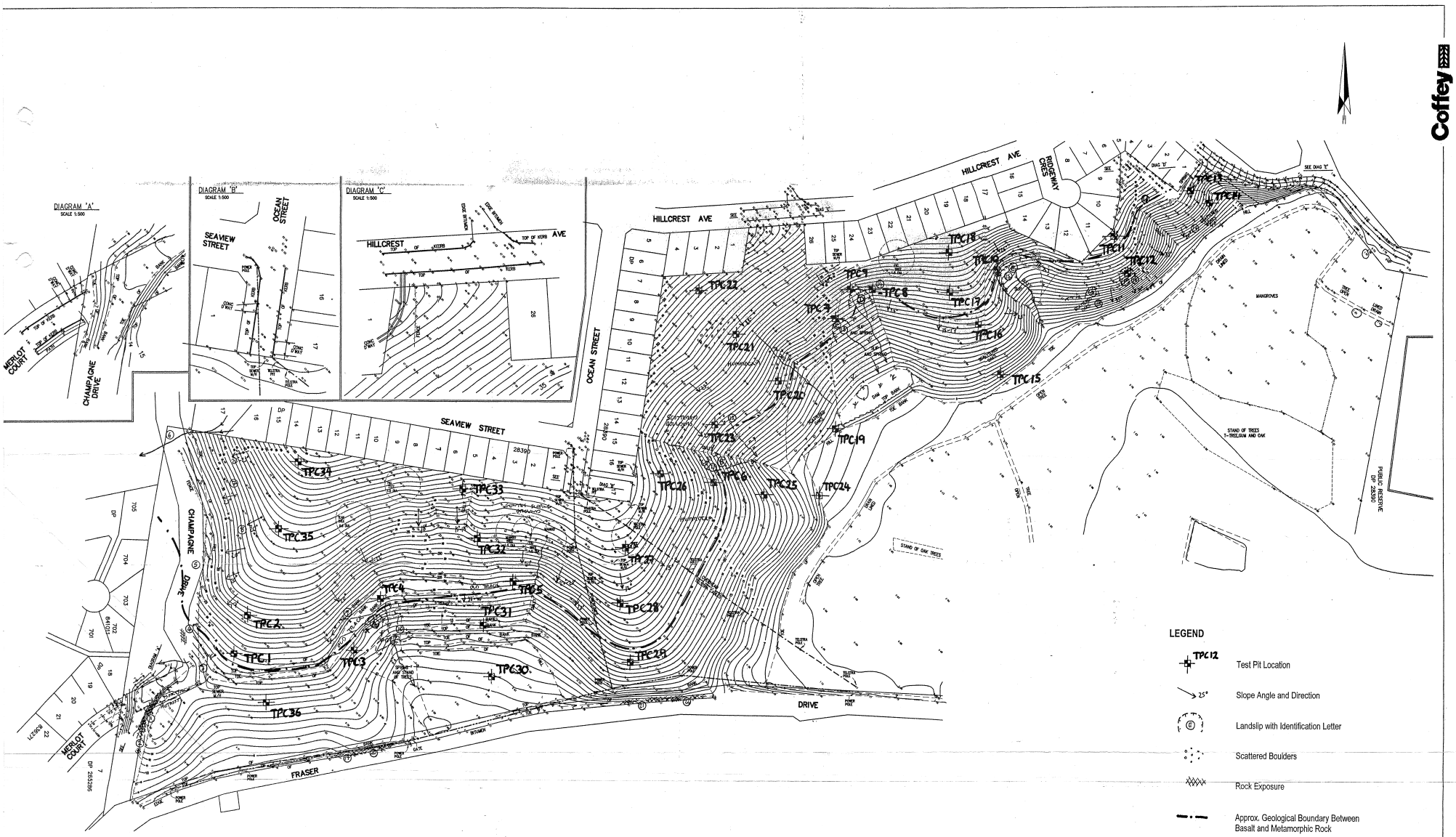
1. *AS1726 suggests the term "Distinctly Weathered" (DW) to cover the range of substance weathering conditions between XW and SW. For projects where it is not practical to delineate between HW and MW or it is judged that there is no advantage in making such a distinction, DW may be used with the definition given in AS1726.*
2. *Where physical and chemical changes were caused by hot gasses and liquids associated with igneous rocks, the term "altered" may be substituted for "weathering" to give the abbreviations XA, HA, MA, SA and DA.*

ROCK SUBSTANCE STRENGTH TERMS

Term	Abbrev-iation	Point Load Index, I_S50 (MPa)	Field Guide
Very Low	**VL**	Less than 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with a knife; pieces up to 30mm thick can be broken by finger pressure.
Low	**L**	0.1 to 0.3	Easily scored with a knife; indentations 1mm to 3mm show with firm blows of a pick point; has a dull sound under hammer. Pieces of core 150mm long by 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium	**M**	0.3 to 1.0	Readily scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.
High	**H**	1 to 3	A piece of core 150mm long by 50mm can not be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very High	**VH**	3 to 10	Hand specimen breaks after more than one blow of a pick; rock rings under hammer.
Extremely High	**EH**	More than 10	Specimen requires many blows with geological pick to break; rock rings under hammer.

Notes on Rock Substance Strength:

1. *In anisotropic rocks the field guide to strength applies to the strength perpendicular to the anisotropy. High strength anisotropic rocks may break readily parallel to the planar anisotropy.*
2. *The term "extremely low" is not used as a rock substance strength term. While the term is used in AS1726-1993, the field guide therein makes it clear that materials in that strength range are soils in engineering terms.*
3. *The unconfined compressive strength for isotropic rocks (and anisotropic rocks which fail across the planar anisotropy) is typically 10 to 25 times the point load index (Is50). The ratio may vary for different rock types. Lower strength rocks often have lower ratios than higher strength rocks.*



Coffey

Coffey Geosciences Pty Ltd ACN 056 335 516 | Geotechnical | Resources | Environmental | Technical | Project Management

15 0 15 30 45 60 75
Scale (metres)

Revision	Description	Drawn	Approved	Date

Drawn	SPP
Approved	
Date	27/3/02
Scale	1:1500

MARTIN FINDLATER AND ASSOCIATES PTY LTD
GREENVIEW DEVELOPMENTS PTY LTD
RESIDENTIAL DEVELOPMENT FRASER DRIVE
TWEED HEADS SOUTH
SITE CONTOUR PLAN

Drawing No: DRAWING 1

Job no: B17439/1 - B

APPENDIX A

ENGINEERING LOGS

Coffey Geosciences Pty Ltd ACN 056 335 516

Excavation No. TPC1

Engineering log - Excavation

Sheet 1 of 1

Office Job No.: B17439/1

Client: MARTIN FINDLATER & ASSOCIATES PTY LTD

Date started: 5.2.2002

Principal: GREENVIEW DEVELOPMENTS PTY LTD

Date completed: 5.2.2002

Project: FRASER DRIVE, TWEED HEADS SOUTH

Logged by: KU

Test pit location:

Checked by: KM

equipment type and model: CAT 330 EXCAVATOR | Pit Orientation: | Easting: 877.4 m | R.L. Surface: 21.63

excavation dimensions: 3m long 1m wide | Northing: 5087.4 m | datum:

excavation information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	hand penetrometer kPa 100 200 300 400	structure and additional observations
E		N	NOT OBSERVED	D	21.5	0.5		CH	**SILTY CLAY:** high plasticity, red-brown, trace of fine grained gravel, trace of plant roots.	M	VSt	×	COLLUVIUM / RESIDUAL SOIL pp 320-350kPa
				D	21.0	1.0		CH	**SILTY CLAY:** high plasticity, grey to red-brown mottled, blocky.			×	pp 350-400kPa RESIDUAL SOIL
				D	20.5	1.5		MH	**CLAYEY SILT:** pale grey to yellow-brown, with some fine grained sand.		D	×	pp 320kPa
				D	20.0	2.0		CL	**SILTY CLAY:** low plasticity, pale grey to yellow-brown, with trace of fine grained sand.		H	×	pp 500kPa
					19.5	2.5						×	pp >600kPa
					19.0	3.0							
					18.5	3.5			**METASANDSTONE:** extremely to highly weathered, pale grey to yellow-brown, low strength.				WEATHERED ROCK
					18.0	4.0			Test pit TPC1 terminated at 3.5m				

Sketch

method
- N natural exposure
- X existing excavation
- BH backhoe bucket
- B bulldozer blade
- R ripper
- E excavator

support
- S shoring
- N nil

penetration
1 2 3 4 — no resistance ranging to refusal

water
- water level on date shown
- water inflow
- water outflow

notes, samples, tests
- U_{50} undisturbed sample 50mm diameter
- U_{63} undisturbed sample 63mm diameter
- D disturbed sample
- V vane shear (kPa)
- Bs bulk sample
- E environmental sample
- R refusal

classification symbols and soil description
based on unified classification system

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- W_L liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Form GEO 5.2 Issue 3 Rev.2 TESTPIT EXCALOGS.GPJ COFFEY.GDT 04.04.02