

APPENDIX A

Symbols and Terms Used on Borehole and Test Pit Records

SYMBOLS AND TERMS USED ON BOREHOLE AND TEST PIT RECORDS

SOIL DESCRIPTION

Terminology describing common soil genesis:

- Topsoil* - mixture of soil and humus capable of supporting good vegetative growth
- Peat* - fibrous fragments of visible and invisible decayed organic matter
- Till* - unstratified and unsorted glacial deposit which may include particle sizes from clay to boulders
- Fill* - materials not identified as deposited by natural geological processes

Terminology describing soil structure:

- Desiccated* - having visible signs of weathering by oxidization of clay minerals, shrinkage cracks, etc.
- Fissured* - material breaks along plane of fracture
- Varved* - composed of regular alternating layers of silt and clay
- Stratified* - alternating layers or beds greater than 6mm (1/4") thick
- Laminated* - alternating layers or beds less than 6mm (1/4") thick
- Blocky* - material can be broken into small and hard angular lumps
- Lensed* - irregular shaped pockets of soil with differing textures
- Seam* - a thin, confined layer of soil having different particle size, texture, or color from materials above and below
- Well Graded* - having wide range in grain sizes and substantial amounts of all intermediate particles sizes
- Uniformly Graded* - predominantly one grain size

Soil descriptions and classification are based on the Unified Soil Classification System (USCS) (ASTM D-2488), which classifies soils on the basis of engineering properties. The system divides soils into three major categories: (1) coarse grained, (2) fine-grained, and (3) highly organic. The soil is then subdivided based on either gradation or plasticity characteristics. This system provides a group symbol (e.g. SM) and group name (e.g. silty sand) for identification. The classification excludes particles larger than 76 mm.

Terminology describing materials outside the USCS, (e.g. particles larger than 76 mm, visible organic matter, construction debris) is based upon the proportion of these materials present and as described below in accordance with the standard of the Ministry of Transportation of Ontario:

<i>Trace or occasional</i>	Less than 10%
<i>Some</i>	10-20%
<i>With</i>	20-30%

The standard terminology to describe cohesionless soils includes the compactness as determined by the Standard Penetration Test 'N'-value*.

Compactness	'N'-value
Very loose	<4
Loose	4-10
Compact	10-30
Dense	30-50
Very dense	>50

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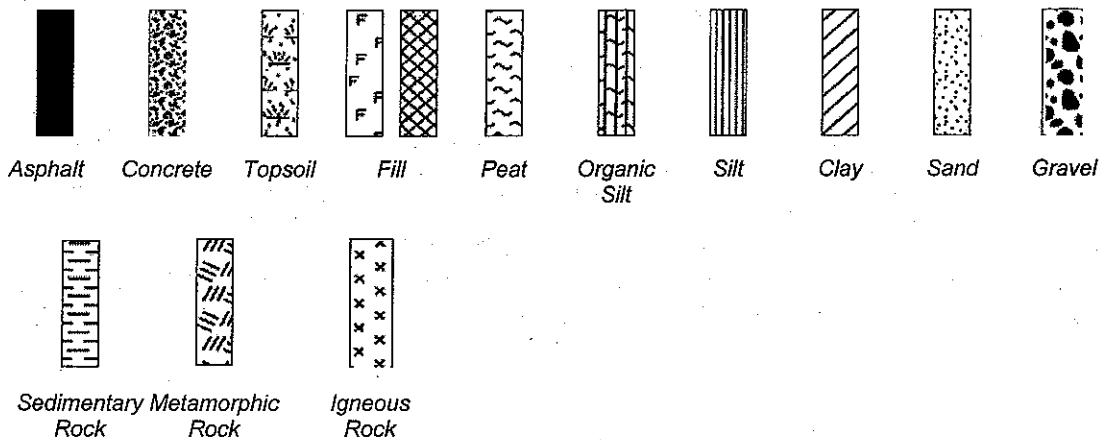
The standard terminology to describe cohesive soils includes consistency, which is based on undrained shear strength as measured by insitu vane tests, penetrometer tests, unconfined compression tests or similar field and laboratory analysis. Standard Penetration Test 'N'-values* can also be used to provide an approximate indication of the consistency and shear strength of fine grained, cohesive soils.

Consistency	Undrained Shear Strength (kPa)	'N'-Value
Very Soft	<12.5	<2
Soft	12.5-25	2-4
Firm	25-50	4-8
Stiff	50-100	8-15
Very Stiff	100-200	15-30
Hard	>200	>30

Note: **N'-VALUE- The Standard Penetration Test records the number of blows of a 140 pound (64kg) hammer falling 30 inches (760mm), required to drive a 2 inch (50.8mm) O.D. split spoon sampler 1 foot (305mm). For split spoon samples where full penetration is not achieved, the number of blows is reported over the sampler penetration in millimeters (e.g. 50/75).

STRATA PLOT

Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols:



WATER LEVEL MEASUREMENT



Open Borehole or Test Pit



Monitoring Well, Piezometer or Standpipe

SAMPLE TYPE

SS	Split spoon sample (obtained from the Standard Penetration Test)	BS	Bulk sample
TW	Thin Wall Sample or Shelby Tube	WS	Wash sample
PS	Piston sample	HQ, NQ, BQ, etc.	Rock core samples obtained with the use of standard size diamond drilling bits.
GS	Grab sample		
AS	Auger sample		
VT	Vane Test		

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ROCK DESCRIPTION

Total Core Recovery (TCR): The percentage of drill core recovered, regardless of quality, or length measured relative to the length of the total core run.

Solid Core Recovery (SCR): The percentage of solid drill core, regardless of length, recovered at full diameter, measured relative to the length of the total core run.

Rock Quality Designation (RQD): The percentage of solid drill core, greater than 100 mm length, recovered at full diameter, measured relative to the length of the total core run.

RQD	ROCK QUALITY
90-100	Excellent, intact, very sound
75-90	Good, massive, moderately jointed or sound
50-75	Fair, blocky and seamy, fractured
25-50	Poor, shattered and very seamy or blocky, severely fractured
0-25	Very Poor, crushed, very severely fractured

Terminology describing rock mass:

Discontinuities		Bedding, Lamination, Bands
Spacing (mm)	Description	
2000-6000	Very Wide	Very Thick
600-2000	Wide	Thick
200-600	Moderate	Medium
60-200	Close	Thin
20-60	Very Close	Very Thin
6-20	Extremely Close	Laminated
<6		Thinly Laminated

Strength classification of rock:

Strength Classification	Field Identification Method	Range of Unconfined Compressive Strength (MPa)
Extremely weak	Indented by thumbnail	<1
Very weak	Crumbles under firm blows of geological hammer; can be peeled with a pocket knife	1-5
Weak rock	Can be peeled by a pocket knife with difficulty; shallow indentations made by a firm blow with point of geological hammer	5-25
Medium strong	Cannot be scraped or peeled with a pocket knife; specimen can be fractured with a single firm blow of geological hammer	25-50
Strong	Specimen requires more than one blow of geological hammer to fracture	50-100
Very strong	Specimen requires many blows of geological hammer to fracture	100-250
Extremely strong	Specimen can only be chipped by geological hammer	>250

Weathering:

Unweathered: no signs of discoloration or oxidation of rock material

Slightly Weathered: discontinuities are stained or discolored; rock material partially discolored

Moderately Weathered: total discoloration; generally surface of core is intact and not friable; discontinuities may contain filling of altered material

Highly Weathered: total discoloration; surface of core is friable and usually pitted due to washing out of highly altered minerals by drilling water; discontinuities frequently contain filling of altered material

Completely Weathered: total discoloration; appearance of core is that of soil although internally the rock texture is usually partly preserved; discontinuities frequently contain filling of altered material

