



APPENDIX 5.4-O
Terrain Symbol Information

Example of Basic Terrain Symbol

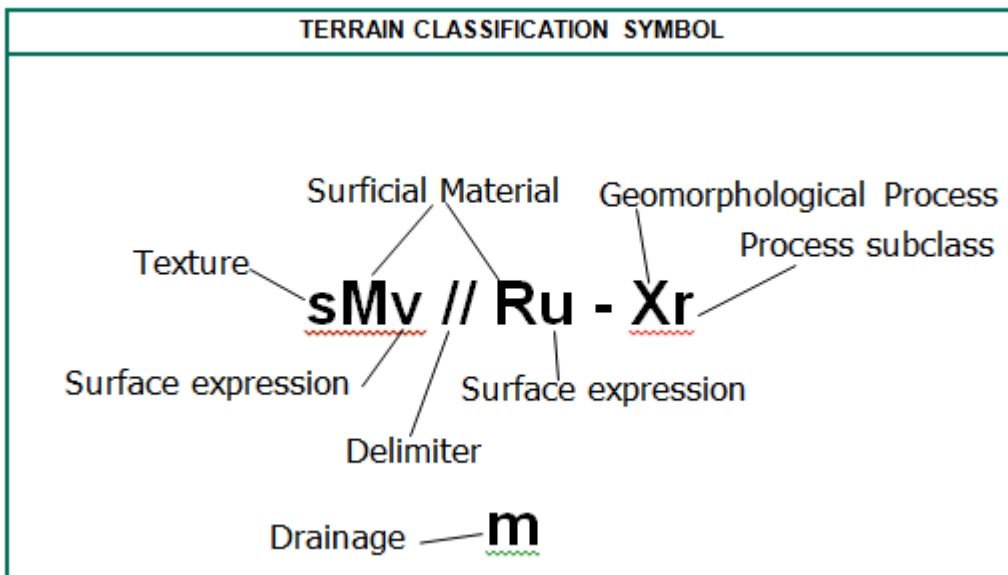
<p>TEXTURE (One to three lower case letters) describes the size, roundness and sorting of particles in mineral sediments and the fiber content of organic materials.</p>	<p>QUALIFIERS (Up to two superscript upper case letters) are used where appropriate to provide information about surficial materials and geomorphological processes.</p>
---	---

<p>SURFICIAL MATERIAL (One upper case letter) is classified according to its mode of deposition.</p>		<p>GEOMORPHOLOGICAL PROCESSES (One to three upper case letters) describes geomorphological processes that are modifying either surficial material or land forms.</p>
---	--	---

Surface Expression

(One to three lowercase letters) describes the form (shape) of the land surface or the thickness of the surficial material.

Example of Detailed Study Area Terrain Symbol





Composite Symbols

Areas of uniform terrain are commonly so small that they cannot be delimited individually at the scale of mapping. Consequently, a system of composite symbols is employed whereby up to three types of surficial material may be designated within a terrain unit boundary. A composite unit is made up of two or three simple symbols, each referred to as a component of the composite symbol, with the geological process symbols placed after a dash (hyphen). The components are arranged in decreasing order of areal extent, and are separated by delimiters or deciles. At present, delimiters are used for most mapping. Surficial material that occupies less than 10% of a polygon is generally not indicated in the terrain symbol. At the request of the client, delimiters were used for terrain symbols.

Delimiters

Delimiters indicate the relative amount of each surficial material type represented in a composite symbol. The delimiter symbols are a period sign (.) and a single or double slash (/, //).

Map Symbol	Definition
.	Components on either side of the symbol are approximately equal in proportion; (see "Terrain Database Manual").
/	The component in front of the symbol is more extensive than the one that follows; can also be used to indicate a discontinuous covering of material.
//	The component in front of the symbol is considerably more extensive than the component that follows.

Textural Terms and Symbols

Specific Clastic Terms	
Name	Map Symbol
blocks	a
boulders	b
gravel	g
sand	s
silt	z



APPENDIX 5.4-O Terrain Symbol Information

Definition of Textural Terms

Table 1: Relations of Size and Roundness, Clastic Textural Terms

size mm		roundness					
		256	64	2	.062	.002	
s p e c i f i c	rounded	boulder b	cobble k	pebble p			
	rounded/ angular				sand s	silt z	clay c
	angular	block a					
c o m m o n	rounded	gravel g					
	rounded/ angular	mixed fragments d				mud m	
	angular		rubble r				
		angular fragments x					

Surficial Material Terms and Symbols

Material Name	Map Symbol	Assumed Status of Formative Process	Description
Anthropogenic Material	A	active	Man-made or man-modified material
Colluvium	C	active	Products of mass wastage
Weathered Bedrock (in situ)	D	active	In situ, decomposed bedrock
Eolian Material	E	inactive	Materials deposited by wind action
Fluvial Material	F	inactive	River deposits
Glaciofluvial Material*	F ^G	inactive	Ice contact fluvial material
Ice	I	active	Permanent snow, glaciers and ice fields
Lacustrine Material	L	inactive	Lake sediments: includes wave deposits
Glaciolacustrine Material*	L ^G	inactive	Ice contact lacustrine material
Morainal Material (Till)	M	inactive	Material deposited directly by glaciers
Organic Material	O	active	Accumulation decay of vegetative matter
Bedrock	R	-	Outcrops rocks covered by less than 10 cm
Undifferentiated Materials	U	-	Layered sequence: three materials or more
Volcanic Material	V	inactive	Unconsolidated pyroclastic sediments
Marine Material	W	inactive	Marine sediments: includes wave deposits
Glaciomarine Material*	W ^G	inactive	Ice contact marine sediments



APPENDIX 5.4-O Terrain Symbol Information

Surface Expression Terms and Symbols

Surface Expression Name	Map Symbol	Description
Moderate Slope	a	Unidirectional surface; $>15^\circ$ to $\leq 26^\circ$
Blanket	b	A mantle of unconsolidated materials; >1 m thick
Cone(S)	c	A cone or segment of a cone; $>15^\circ$
Depression(S)	d	A lower area surrounded by a higher surrounded terrain
Fan(S)	f	A segment of a cone; up to 15°
Hummock(S)	h	Hillocks and hollows, irregular in plan; 15 - 35°
Gentle Slope	j	Unidirectional surface; $>3^\circ$ and $\leq 15^\circ$
Moderately Steep Slope	k	Unidirectional surface; $>26^\circ$ and $<35^\circ$
Rolling	m	Elongate hillock; 3° to 15° ; parallel forms in plan
Plain	p	Unidirectional surface up to 30°
Ridge(S)	r	Elongate hillocks; 15° to 35° ; parallel forms in plan
Steep Slope	s	Steep slopes; $>35^\circ$
Terrace(S)	t	Step-like topography
Undulating	u	Hillocks and hollows; up to $<15^\circ$; irregular in plan
Veneer	v	Mantle of unconsolidated material; 10 cm to 1 m thick
Mantle of Variable Thickness*	w	A layer or discontinuous layer of surficial materials of variable thickness that fills or partially fills depressions in an irregular substrate. The thickness ranges from zero to about 3 m.
Thin Veneer*	x	A subset of v-veneer, where there is a dominance of surficial materials about 10 to 25 cm thick.



APPENDIX 5.4-O Terrain Symbol Information

Geomorphological Process Terms and Symbols

Group	Geomorphological Process Name	Map Symbol	Assumed Status of Geomorphological Process	
Erosional Processes	Deflation	D	active	Removal of sand and silt by wind action
	Karst Processes	K	active	Processes associated with the solution of carbonates
	Piping	P	active	Subterranean erosion by flowing water
	Gully Erosion	V	active	Parallel/subparallel ravines due to erosion by various processes
	Washing	W	active	Removal of fines by waves and running water
Fluvial Processes	Braiding Channel	B	active	Diverging/converging channels; unvegetated bars
	Irregularly Sinuous Channel	I	active	A single, clearly defined main channel displaying irregular turns and bends
	Anastomosing Channel	J	active	A channel zone where channels diverge and converge around vegetated islands
	Meandering Channel	M	active	Channels characterized by regular patterns of bends with uniformed amplitude and wave length
Mass Movement Processes	Snow Avalanches	A	active	Terrain modified by snow avalanches
	Slow Mass Movements	F	active	Slow down-slope movement of masses of cohesive or non-cohesive material and/or bedrock
	Rapid Mass Movements	R	active	Rapid downslope movement of dry, moist, or saturated debris
Periglacial Processes	Cryoturbation	C	active	Sediment modified by frost heaving and churning
	Nivation	N	active	Erosion beneath and along the margin of snow patches
	Solifluction	S	active	Slow downslope movement of saturated overburden across a frozen or otherwise impermeable substrate
	General Periglacial Processes	Z	active	Solifluction, cryoturbation and nivation processes occurring within a single unit
	Permafrost Processes	X	active	Processes controlled by the presence of permafrost
Deglacial Processes	Channeled by Meltwater	E	inactive	Channel formation by glacial meltwater
	Kettled	H	inactive	Depressions due to the melting of buried glacier ice
Hydrologic Processes	Inundated	U	active	Abundant surface seepage
	Surface Seepage	L	active	Seasonally under water due to high water table



APPENDIX 5.4-O Terrain Symbol Information

Subclasses for Mass Movement Processes

The following subclasses can be used, where appropriate, with the following symbols:

- -F (slow mass movement);
- -R (rapid mass movement); and
- -A (snow avalanches).

Table 2: Subclasses for Mass Movement Processes

Subclass Name	Map Symbol	Definitions*
<i>Initiation Zone</i>	"	Terrain unit includes sites or zones of instability, such as the headscarps of debris slides or earthflows and source areas for rockfall and debris flows; use with -F and -R to distinguish initiation zones from runout zones.
<i>Slow Mass Movement: use the following symbols with -F</i>		
Soil Creep	c	Slow movement of soil
Rock Creep	g	Slow movement of angular debris under periglacial conditions (e.g., rock glaciers)
Tension Cracks	k	Open fissures, commonly near crest of slope
Lateral Spread	p	Lateral extension of a fractured mass of bedrock or surficial material; movement is predominantly horizontal
▪ in bedrock	j	
▪ in surficial material		
<i>Rapid Mass Movement: use the following symbols with -R</i>		
Debris Fall	f	Descent of a mass of surficial material by falling, bouncing and rolling
Rockfall	b	Descent of masses of bedrock by falling, bouncing and rolling
Debris Flow	d	Rapid flow of saturated debris torrent
Debris Torrent	t	Rapid flow of a mixture of water, earth and vegetation debris down a steep, well-defined stream channel
<i>Slow or Rapid Mass Movement: use the following symbols with -F or -R</i>		
Earthflow	e	Slow viscous flow of material containing a high proportion of silt and clay
Slump	m	Sliding of internally cohesive masses of bedrock or surficial material along a slip plane that is concave upward or planar
▪ in bedrock	u	
▪ in surficial material		
Slump-Earthflow	x	Combined slump (upper part) and earthflow (lower part)
Debris Slide	s	Sliding of disintegrating mass of surficial material
Rockslide	r	Descent of large masses of disintegrating bedrock by sliding
<i>Snow Avalanches: use the following symbols with -A</i>		
Major Avalanche Tracks; Active	f	In zones of coniferous forest: broad avalanche track(s) occupied by predominantly shrubby, deciduous vegetation; conifers are largely absent
Minor Avalanche Tracks; Active	m	Similar to above, but relatively narrow; generally narrower than the height of adjacent trees
Mixed Major and Minor Avalanche Tracks; Active	w	Polygon includes both major and minor avalanche tracks
Old Avalanche Tracks	o	Tracks are clearly visible on air photos but are less well defined than active avalanche tracks because they are partly or completely occupied by young conifers



Subclasses for Fluvial Processes

The following subclasses can be used, where appropriate, with the process symbols

- -B (Braided Channel);
- -I (Irregularly Sinuous Channel);
- -J (Anastamosing Channel); and
- -M (Meandering Channel).

Table 3: Subclasses for Fluvial Processes

Subclass Name	Map Symbol	Definitions
Progressive Bank Erosion	u	Persistent bank erosion indicated by the presence of undercut banks, overhanging and fallen trees, and much timber in the channel; old air photos and historical information can be used as evidence also. Example: sF ^A p-Mu
Abrupt Channel Diversion; Avulsion	a	The present channel has recently shifted abruptly to a previously vegetated area; the former channel can be identified by air photos or on the ground. Example: gF ^A p-Ja Example: gF ^A f-Ba
Backchannels	b	Small channels which may or may not be connected to the main channel. Example: sgF ^A p-lb
Permanent River-Fed Backchannels	p	Backchannels joined to the main channel at the upstream end, allowing flowing or standing water all year. Example: sgF ^A p-Jp
Ephemeral River-Fed Backchannels	e	Backchannels joined to the main channel at the upstream end, but dry during the late summer. Example: sgF ^A p-Je Example: sgF ^A p-Jpe Example: gF ^A f-Be
Spring-Fed Backchannels	s	Backchannels in which water is maintained during the late summer by The emergence of floodplain groundwater. Example: sF ^A p-Ms Example: sF ^A p-Msu
Permanent Tributary-Fed Backchannels	t	Either flowing or standing water from tributaries is present in the backchannel all year. Example: sgF ^A p-Jt
Ephemeral Tributary-Fed Backchannels	d	Backchannels normally fed by tributaries, but dry during late summer. Example: sgF ^A p-Jtr



Subclasses for Permafrost Processes

The following subclasses can be used, where appropriate, with the process symbols

- -X (permafrost processes); and
- -Z (periglacial processes).

Table 4: Subclasses for Permafrost Processes

Subclass Name	Map Symbol	Definitions
Palsas, Peat Plateaus	p	Flat-topped or rounded mounds and ridges of peat or peaty earth formed by differential frost-heaving; contain perennial ice lenses and a core of permafrost. Example: Op-Xp
Thermokarst: Subsidence	t	Ground-surface depressions which are created by the thawing of ice-rich permafrost and associated soil subsidence. Example: zLpd-Xt
Thermokarst: Thermal Erosion by Water	e	Gullies and depressions created by melting of ice-rich permafrost due to heat transfer from water bodies; either streams or lakes. Example: mWj-XeV
Thaw Flow Slides	f	Slope failures caused by the thawing of permafrost. Example: dzsMb-Xf
Ice Wedge Polygons	w	Intersecting narrow cracks that contain ice-wedges comprise polygonal patterns on the ground underlain by permafrost. Example: sFt-Xw
Patterned Ground	r	Collective term for the regular surface features, such as stone polygons, frost boils and stone stripes, that are characteristic of ground that is subject to intensive frost (freeze-thaw) action. Example: rCv-Xr Example: rCv-Zr

Drainage Codes

Code	Definition
r	rapidly drained
w	well drained
m	moderately well drained
i	imperfectly drained
p	poorly drained
v	very poorly drained



APPENDIX 5.4-O Terrain Symbol Information

Drainage Separator Codes

Code	Definition
'	e.g., "w,i" indicates that no intermediate classes between well and imperfectly drained are present
-	e.g., "w-i" indicates that all intermediate classes between well and imperfectly drained are present
/	e.g., "r/p" rapid drainage is dominant, poor drainage is sub-dominant
//	e.g., "r//p" rapid drainage is significantly dominant, poor drainage is minor

o:\final\2011\1422\11-1422-0046\1114220046-570-app 5.4-rev0\app\appendix 5.4 - o - terrain label definitions.docx