



This is a common map legend for the surficial geology of northern Alberta. Coloured legend blocks indicate map units that appear on this map. Not all map symbols shown in the legend necessarily appear on this map.

UNIT UNIT NAME DESCRIPTION AND GENESIS

UNIT	UNIT NAME	DESCRIPTION AND GENESIS
QUATERNARY		
Holocene		
A	Anthropogenic materials	Culturally made or modified geological materials such that their physical properties (e.g., structure, cohesion, compaction) have been drastically altered.
O	Organic deposits	Undifferentiated peat (woody to fibrous muck) occurring in undifferentiated wetlands; commonly underlain by fine-grained, poorly drained glaciolacustrine or fine-grained moraine deposits; includes marshes, swamps, bogs and fens.
OB	Bog peat	Occurs in a peatland with a fluctuating water table and commonly a raised surface; peatland surface is dominated by sphagnum mosses, heath shrubs and short, stunted trees.
OF	Fen peat	Occurs in a peatland with water table at surface and slow internal drainage; peatland surface is dominated by sedges, with grasses and reeds near local pools, and is sparsely treed.
C	Colluvial deposits	Materials that have reached their present position as a result of direct, gravity-induced movement; commonly occurs as slope and slump deposits confined to valley slopes and floors; may include pre-existing bedrock, till, glaciolacustrine, glaciofluvial and eolian sediments, generally poorly sorted.
F	Fluvial deposits	Sediments transported and deposited by streams and rivers; synonymous with alluvial. Includes well-sorted stratified sand, gravel, silt, clay and organic sediments occurring in channel and overbank deposits (e.g., postglacial floodplains, terraces, fans and deltas).
L	Lacustrine deposits	Sediments deposited in and adjacent to recent and modern lakes; offshore sand, silt and clay, minor organic deposits; may include minor littoral (nearshore) beaches and bars; sand, silt and minor gravel.
E	Eolian deposits	Wind-deposited sediments; well-sorted, medium to fine-grained sand and minor silt (loess); generally massive to locally cross bedded or ripple laminated; includes both active and vegetated deposits.
Pleistocene		
LG	Glaciolacustrine deposits	Primarily fine-grained, distal sediments deposited in or along the margins of glacial lakes, including sediments released by the melting of floating ice. Includes laminated (rhythmically bedded) to massive fine sand, silt and clay, and may contain ice-rafted stones.
LGL	Littoral and nearshore sediments	Massive to stratified, well-sorted silty sand, pebbly sand and minor gravel; occurs as beaches, bars, spits and deltaic foresets deposited during regression and lowering of glacial lakes.
FG	Glaciofluvial deposits	Sediments deposited by glacial meltwater streams as subaerial or subaqueous outwash. Includes sand and gravel, often stratified, minor silt, and may show evidence of ice melting (slumped structures). Features may include meltwater channels, kettle holes, terraces and minor ice-contact sediments.
FGI	Ice-contact sediments	Sediments deposited by glacial meltwater streams in direct contact with glacial ice, either in front of (kame terraces) or within (eskers, crevasse ridges) glacial ice. May include massive to stratified, poor to moderately sorted, coarse sediments (predominantly pebble gravel and coarse sand, locally till) and may show evidence of ice melting (slumped structures).
M	Moraine	Nonsorted diamicton (till) deposited directly by glacial ice consisting of a mixture of clay, silt, sand and minor pebbles, cobbles and boulders. Locally, this unit may contain blocks of bedrock, pre-existing stratified sediment and till, and lenses of glaciolacustrine and/or glaciofluvial sediment.
MS	Stagnant ice moraine	Material resulting from the collapse and lateral movement of englacial and supraglacial sediment in response to melting (ablation) of buried stagnant ice at the ice margin; sediment is mainly diamicton, but locally includes stratified sediments of glaciolacustrine or glaciofluvial origin. Characterized by low to high-relief hummocky topography.
MIT	Ice-thrust moraine	Terrain resulting from glacio-tectonic transport of originally subglacial material deposited by the glacier more or less intact; deposits may include syngenetic till, as well as masses of pre-existing till, stratified drift and/or bedrock. Characterized by high to moderate relief and features include hill-hole pairs and glacio-tectonic moraine ridges.
MF	Fluted moraine	Glacially streamlined terrain; varies from alternating furrows and ridges to nearly equidimensional smoothed hills; all landforms parallel the local ice flow direction; includes flutes, drumlins and drumlinoids.
FP	Preglacial fluvial deposits	Sediments transported and deposited by streams and rivers prior to glaciation. This includes sand and gravel deposits occurring in paleovalleys (i.e., preglacial floodplains, terraces, fans and deltas) ranging from late Tertiary to middle Wisconsin.
Pre-Quaternary		
RT	Unconsolidated fluvial gravels	Predominately well-sorted, quartzite and chert gravel and cobbles; Cordilleran source, Paleogene (Tertiary) to early Quaternary.
R	Bedrock	Undivided; may include crystalline (Shield), carbonate or clastic sedimentary rock and/or coal.

UNIT NOTATION

Example: sandy GLACIOLACUSTRINE plain

Textural modifier | Genetic unit | Geomorphic modifier

Textural Modifier

Textural characteristics may be applied to the terrain classification as a prefix based on field observations or by inference from distinctive genesis and/or morphology. When two modifiers are given, the second letter is the dominant texture, with the first letter indicating the secondary texture; i.e., sc for sandy clay.

p = pebble
g = gravel
s = sand
S = silt
c = clay
a = sand-silt-clay

GENETIC & GEOMORPHIC MODIFIERS

Letter	Geomorphic Feature	Description
c	crevasse fill	ice-contact ridges, ice-squeeze deposits and linear forms deposited by meltwater in stagnant ice
d	doughnut rings and ridges	circular hummocks with a central depression, plateau mounds and brain-like pattern ridges, low to moderate relief
e	eroded	planar surface eroded by glacial meltwater, often capped by a boulder lag deposit and/or thin deposit of sand and gravel
f	fan	gently sloping fan-shaped mass of detrital debris
g	gullied	slopes dissected by modern ravines created by intermittent runoff
h	hummock	assemblage of approximately equidimensional hills and hollows; moderate to high relief (commonly greater than 2 m)
k	collapse	depression, including kettles, pitted morphology, thermokarst depressions, karst sinkholes
k1	thermokarst	topography consists of mounds and circular, poorly drained lowlands. Local melting of ground ice and the subsequent settling of the ground creates this uneven topography, so it is most common where massive ice formations or segregated ice exists. In this case, this is often associated with ice rich permafrost in thick peat blankets over fine grained moraine
k2	kettled	topography often associated with circular depressions caused by the melting of glacial ice in stagnant ice terrain
m	meander	sinuous curves, loops and oxbows produced as meltwater and modern streams shift their channels over time
p	plain	deposit greater than 2 m thick; commonly masks geomorphic pattern of underlying deposits; flat to gently rolling topography (commonly less than 2 m relief)
r	ridged	one or more parallel or subparallel, convex, linear morphological elements with a length-to-width ratio greater than 2; low to high relief
s	slumped	landslide blocks, slope failure debris
t	terrace	terrace bench cut by either meltwater or wave action; antiplation terrace, kame terrace
u	undulating	low-relief rolling terrain; swell and swale topography
v	veneer	thin mantle of unconsolidated material too thin to mask the minor irregularities of the surface of the underlying material; it ranges in thickness from 10 cm to 1 metre and may be discontinuous. In places material, particularly the lacustrine sediment, may be 2 m or more thick
w	wash	low-relief transverse moraine ridges, usually formed from basal ice shearing
x	fast creep	indicates slow mass movement, frost creep and solifluction related to permafrost, may occur on slopes as gentle as three degrees
y	dissected	channelled or dissected by glacial meltwater flow, dissected terrain by Holocene fluvial activity
z	delta	lake delta; ice-contact delta

Complex

Where two or more classes of terrain are interspersed in a mosaic or repeating pattern on a scale too small to warrant meaningful differentiation, the proportion of each component in the combination is given in a two or three-position designation set off by slashes denoting arbitrary percentage limits. For example,

'Mp/LGv' means the area is underlain by approximately 60% morainal plain and up to 40% glaciolacustrine veneer.
'Mv/LGv/FGp' means at least 60% of the area is underlain by morainal veneer, with up to 40% glaciolacustrine veneer and less than 15% glaciofluvial plain.
'LGp/M' means more than 60% of the area is underlain by a glaciolacustrine plain, with less than 15% moraine.

Stratigraphic Sequence

Where materials of different origins or textures are known to be superimposed or can be confidently inferred, the sequence is indicated in conventional order using vertical separators, such as:

'sLgV | Mp' Thin sandy glaciolacustrine sediment deposited on morainal plain

Transitional Association

Locally, two or more terrain units are juxtaposed by reason of related origin, temporal sequence or ambiguous geomorphic distinction. In the last case, both components may or may not be present. Such situations are identified by a compound designation marked by a hyphen. Examples are

'FGz-LGz' indicating ice-contact delta indistinguishable from glaciolacustrine delta, or
'LG-LGL' indicating glaciolacustrine indistinguishable from littoral and nearshore glaciolacustrine sediment

Morphologic Overprint

Where a sequence of geomorphic processes has produced a multi-aspect or compound terrain fabric, the geomorphic modifier suffixes are appended in the inferred order of superposition. 'Mpy' means a plain of till has been moulded into ridge forms and finally dissected by modern streams. 'FGhr' means a glaciofluvial plain has been discontinuously covered by ice-contact hummocks and ridges.

Methodology

This map was prepared by airphoto interpretation of 1:60 000-scale images flown in 1994. Airphoto interpretation was completed by C. Mougeot, Milestone Environmental Planning Ltd. There was no ground-truthing.

Acknowledgements

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SYMBOL LEGEND		BASEMAP LEGEND	
Permafrost; relict and/or active		Road-paved-primary	
Thermokarst depression		Road-gravel-primary	
Landslide and active layer failure scar (small)		Road-paved-secondary	
Symbols may represent more than one slide		Road-improved	
Landslide and active layer failure scar (large)		Road-unimproved	
Eolian forms; dune ridges		Trail-truck	
Beach or strandline		River	
Wave-cut bench		Lake	
Escarpment		UTM, Zone 11 Grid	
Meltwater channel (minor)		Contour, intervals 50 metres	
Meltwater channel (minor, flow indicated)		Town	
Meltwater channel (major)			
Meltwater channel (major, flow indicated)			
Beaded stream			
Crevasse filling			
Ice-contact slope			
Kettle			
Esker, direction of paleoflow unknown			
Esker, direction of paleoflow indicated			
Drumlinoid or streamlined landform			
Drumlinoid, down-ice flow indicated			
Buried drumlinoid or streamlined landform			
Minor moraine ridge			
Major moraine ridge			
Iceberg scour			
Ice thrust ridge			
Striation (direction unknown)			
Striation (direction known)			
Bedrock outcrop			
Gravel and/or sand pit			
Section of stratigraphic interest			

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Website: www.ags.gov.ab.ca

Map 423
Surficial Geology of the South Whitesand River Area, Alberta (NTS 840/S)

Geology by: C. Mougeot

