

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
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 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; includes pre-existing bedrock, till, glaciolacustrine, glaciolacustrine 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; littoral (nearshore) beaches and bars; sand, silt and minor gravel; minor organic deposits.
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 floating of 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 forest deltaic deposits 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 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. Includes 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 diamict (fill) 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 glaciolacustrine 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 undisturbed, but locally includes stratified sediments of glaciolacustrine or glaciolacustrine origin. Characterized by low to high-relief hummocky topography.
MT	Ice-thrust moraine:	Terrain resulting from glacio-tectonic transport of originally subglacial material deposited by the glacier more or less intact; deposits may include syndynetic 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. Includes sand and gravel deposits occurring in paleovalleys (i.e., preglacial floodplains, terraces, fans and deltas); ranging from middle Wisconsin to late Tertiary.
PRE-QUATERNARY		
RT	UNCONSOLIDATED FLUVIAL GRAVELS:	Predominately well-sorted, quartzite and chert gravel and cobbles; Cordilleran source, Paleogene (Tertiary) to early Quaternary.
R	BEDROCK:	Undifferentiated; may include clastic sedimentary rock, shale, carbonate and crystalline (Shield), Kimberlite and/or coal.

SYMBOL LEGEND	
Permafrost; relict and/or active	
Thermokarst depression	
Landslide and active layer failure scar (small)	
Landslide and active layer failure scar (large)	
Eolian forms; dune ridges	
Beach or strandline	
Wave-cut bench	
Escarpment	
Meltwater channel (minor)	
Meltwater channel (minor, flow indicated)	
Meltwater channel (major)	
Meltwater channel (major, flow indicated)	
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	

BASEMAP LEGEND	
Road-paved-primary	
Road-gravel-primary	
Road-paved-secondary	
Road-improved	
Road-unimproved	
Trail-truck	
Hamlet	
River	
Lake	
UTM, Zone 11 Grid	
Contour, intervals 50 metres	

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84K	
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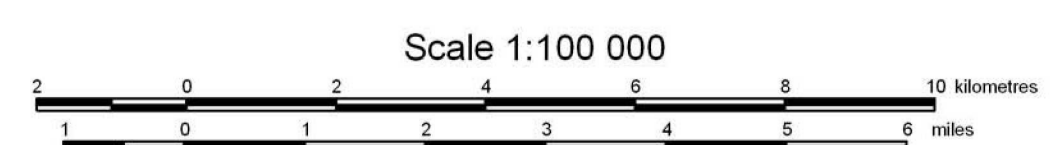
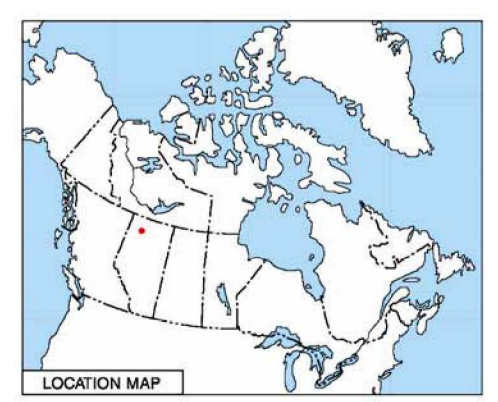
UNIT NOTATION		
Example: GLACIOLACUSTRINE plain		
Textural modifier	GLP	
Genetic unit	L	
Geomorphic modifier	p	
Textural Modifier		
Textural characteristics may be applied to the terrain classification as a prefix based on field observations or by inference from distinctive genesis and/or morphology. 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	
sl	silt	
c	clay	
a	sand-silt-clay	
GENETIC & GEOMORPHIC MODIFIERS		
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 kettle, pitted morphology, thermokarst depressions, karst sinkholes
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; antiplanation terrace, kame terrace
u	undulating	low-relief rolling terrain; swell and swale topography
v	venerer	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
w	washboard	low-relief transverse moraine ridges, usually formed from basal ice shearing
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,		
"M ₁ L ₂ G ₃ V"	means the area is underlain by approximately 60% morainal plain and up to 40% glaciolacustrine veneer.	
"M ₁ V ₂ L ₃ G ₄ V ₅ F ₆ G ₇ P"	means at least 60% of the area is underlain by morainal veneer, with up to 40% glaciolacustrine veneer and less than 15% glaciolacustrine plain.	
"L ₁ G ₂ P ₃ 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:		
"SLG ₁ M ₂ "	This 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 be present. Such situations are identified by a compound designation marked by a hyphen. Examples: "FGz-LGz" indicating ice-contact delta indistinguishable from glaciolacustrine delta, or "FGk-MS ₁ " indicating ice-contact kame and kettle topography that blends with hummocky stagnant ice moraine.		
Morphologic Overtprint		
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. "M ₁ p ₂ y" means a plain of till has been moulded into ridge forms and finally dissected by modern streams. "FG ₁ p ₂ " means a glaciolacustrine plain has been discontinuously covered by ice-contact hummocks and ridges.		
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Selected Bibliography		
Bayrock, L.A. (1960). Surficial geology, appendix; in Exploratory soil survey of Alberta map sheets 84J, 84K and 84L; Research Council of Alberta, Preliminary Soil Survey Report 60-1, p. 43-49.		
Edwards, W.A.D., Budney, H.D., Berezniuk, T. and Burkovic, L. (2004). Sand and gravel deposits with aggregate potential, Mount Watt, Alberta (NTS 84K); Alberta Energy and Utilities Board, EUB/AGS Map 308, scale 1:250 000.		
Fox, J.C. (1984). Aggregate resources of the Mount Watt map area, NTS 84K; Alberta Research Council, Map A84K, scale 1:250 000.		
Fox, J.C., Richardson, R.J.H. and Sham, P.C. (1987). Surficial geology of the Peace River - High Level Area, Alberta; Alberta Energy and Utilities Board, EUB/AGS Map 295, scale 1:500 000.		
Lemmen, D.L., Duk-Rodkin, A. and Bednarski, J.M. (1994). Late glacial drainage systems along the northwestern margin of the Laurentide ice Sheet; Quaternary Science Reviews, v. 13, p. 805-828.		
Lindsay, J.D., Pawluk, S. and Odymsky, W. (1960). Exploratory soil survey of Alberta map sheets 84J, 84K and 84L; Research Council of Alberta, Preliminary Soil Survey Report 60-1, 49 p.		
Mathews, W.H. (1980). Retreat of the last ice sheets in northeastern British Columbia and adjacent Alberta; Geological Survey of Canada, Bulletin 331, 22 p.		
Paulen, R.C. and Plouffe, A. (2007). Surficial geology of the Bushe River - Ponton River area (NTS 84K/NE); Alberta Energy and Utilities Board, EUB/AGS Map 413 and Geological Survey of Canada, Open File 5525, scale 1:100 000.		
Plouffe, A., Kowalchuk, C.J. and Paulen, R.C. (2007). Surficial geology, Meander River, Alberta (NTS 84K/NW); Geological Survey of Canada, Open File 5401, Alberta Energy and Utilities Board, EUB/AGS Map 414, scale 1:100 000.		
Plouffe, A. and Paulen R.C. (2007). Surficial geology, Caribou Creek, Alberta (NTS 84K/SW); Geological Survey of Canada, Open File 5460, Alberta Energy and Utilities Board, EUB/AGS Map 415, scale 1:100 000.		
Tokarsky, O. (1972). Hydrogeology of the Mount Watt area, Alberta; Alberta Research Council, Alberta Geological Survey, Earth Sciences Report 1972-03, 10 p.		

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Website: www.ags.gov.ab.ca

EUB/AGS Map 412
GSC Open File 5526

Surficial Geology of the La Crête Area (NTS 84K/SE)

Geology by: R.C. Paulen and A. Plouffe



Projection: Universal Transverse Mercator
Datum: North American Datum, 1983
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