

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.

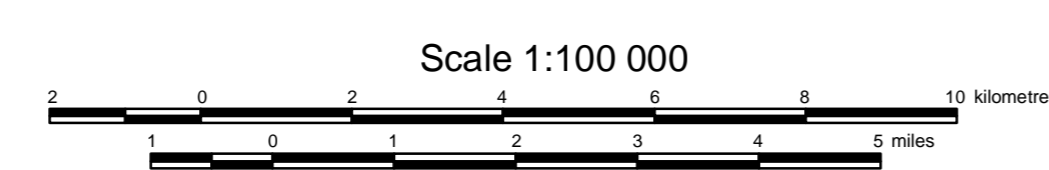
UNIT	UNIT NAME	DESCRIPTION AND GENESIS
QUATERNARY		
HOLOCENE		
A	ANTHROPOGENIC MATERIALS:	Artificially made ground or geological materials that have been disturbed by human activity, such that their physical properties (e.g. structure, cohesion, compaction) have been drastically altered.
O	ORGANIC DEPOSITS:	Undifferentiated peat (woody to fibrous muck) occurring in 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 peatland which receives water from slowly flowing streams and groundwater, with the water table lying at the land surface; 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 deposited to valley slopes and floors; includes 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 alluvium. 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; includes offshore sand, silt and clay, minor organic deposits; may also include minor littoral (nearshore) beaches and bars composed of sand, silt and minor gravel.
E	EOLIAN DEPOSITS:	Wind deposited sediments; comprise well-sorted, medium- to fine-grained sand and minor silt, generally massive to locally cross-bedded or ripple-laminated; includes both active and vegetated dunes and sand sheets.
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 debris.
LGL	Littoral and nearshore deposits:	Massive to stratified, well-sorted silty sand, pebbly sand and minor gravel; occurs in beaches, bars, spits and deltaic forests 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 meltwater streams flowing either in direct contact with the ice margin (kame terraces) or within and/or under glacial ice (eskers, crevasse ridges). Includes massive to stratified, poor to moderately sorted, coarse-grained sediments (predominately pebble gravel and coarse-grained sand, locally till) and may show evidence of ice melting (slumped structures).
M	MORAINES:	Diamicton (till) deposited directly by glacial ice and 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, or lenses of glaciolacustrine and/or glaciofluvial sediment.
MS	Stagnant ice moraine:	Material resulting from the collapse and slumping of englacial and supraglacial sediment in response to the melting 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.
MT	Ice-thrust moraine:	Terrain formed from the glaciotectionic displacement of materials as blocks or rafts in a more or less intact state. Materials may include syngenetic till, as well as masses of pre-existing sediments and/or bedrock. Characterized by high to moderate relief and features include hill-hole pairs and glaciotectionic moraines.
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 deposited in paleovalleys (i.e., preglacial floodplains, terraces, fans and deltas).
PRE-QUATERNARY		
RT	UNCONSOLIDATED FLUVIAL GRAVELS:	Predominantly well-sorted, quartzite and chert gravel and cobbles; Cordilleran source, Paleogene to Neogene.
R	BEDROCK	

SYMBOL LEGEND		BASEMAP LEGEND	
Permafrost; relict and/or active		Primary road, gravel	
Eolian forms; dune ridges		Unimproved road	
Beach or strandline		Truck trail	
Meltwater channel (minor, paleoflow direction known)		River	
Meltwater channel (major)		Lake	
Crevasse filling		UTM, Zone 11 Grid	
Esker (paleoflow direction unknown)		Contour, intervals 50 metres	
Esker (paleoflow direction known)			
Drumlinoid or streamlined landform			
Buried drumlinoid or streamlined landform			
Minor moraine ridge			
Major moraine ridge			
Iceberg scour			

UNIT NOTATION		
Example: sandy GLACIOLACUSTRINE plain		
Textural modifier	s L G p	
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 & GEOMORPHOLOGICAL MODIFIERS		
c	crevasse fill	ice-contact ridges formed by the slumping of sediment into crevasses on the ice surface or the squeezing of till into fractures at the ice base
d	doughnut rings and ridges	circular hummocks with a central depression, plateau mounds and brain-like pattern ridges, low to moderate relief
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, includes kettle holes, 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
s1	slide	movement of material down slope inferred to have occurred along zones of weakness; includes rotational and translational slides
s2	flow	movement of material down slope inferred to have occurred by internal deformation, similar to the flow of a viscous fluid; includes debris, earth and mud flows
t	terrace	glaciofluvial terraces, shoreline terraces and antiposition terraces
u	undulating	low-relief rolling terrain; swell and swale topography
v	veneer	thin mantle of unconsolidated sediment that is 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
y	dissected	channelled or dissected by glacial meltwater and/or Holocene fluvial activity
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. Examples are:		
'Mpl,LGv'	indicates the area is underlain by approximately 60% morainal plain and up to 40% glaciolacustrine veneer	
'MvL,Gv/FGp'	indicates 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'	indicates 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'	indicates sandy glaciolacustrine veneer deposited on morainal plain	
Transitional Association		
Locally, two or more terrain units are juxtaposed by reason of related origin, temporal sequence or ambiguous geomorphological 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:		
'Lg-LGL'	indicates glaciolacustrine indistinguishable from littoral and nearshore glaciolacustrine sediment	
Morphological Overprint		
Where a sequence of geomorphological processes has produced a multi-aspect or compound terrain fabric, the geomorphological modifier suffixes are appended in the inferred order of superposition. 'Mpry' indicates a morainal plain has been moulded into ridges and finally dissected by streams. 'FGphr' indicates a glaciofluvial plain that includes discontinuous hummocks and ridges.		
Methodology		
The Alberta Geological Survey conducted surficial geology field mapping in the area during 2012. Observations made during field mapping were combined with the interpretation of Light Detection and Ranging (LIDAR) bare-earth data (Figure 1) and image classification of peatlands from Landsat 8 multispectral data. The LIDAR digital elevation model was used to delineate landforms through shaded-relief images created from three illumination directions. The shaded relief shown as an underlay on the main map was produced by fusing shaded-relief (315° illumination azimuth, 45° declination) and slope-gradient images.		
Acknowledgements		
D. Utting and S. Pawley performed the fieldwork, and were assisted by B. Hogberg and I. Bystron. K. McKay completed the digital cartography and GIS. Government of Alberta provided the base data. N. Atkinson provided comments that improved this map.		
References		
Atkinson, N., Utting, D.J. and Pawley, S.M. (2014): Glacial landforms of Alberta; Alberta Energy Regulator, AER/AGS Map 604, scale 1:1 000 000.		
Fenton, M.M., Waters, E.J., Pawley, S.M., Atkinson, N., Utting, D.J. and McKay, K. (2013): Surficial geology of Alberta: Ungeneralized digital mosaic (GIS data, polygon features); Alberta Energy Regulator, AER/AGS DIG 2013-0001.		
Utting, D.J. and Pawley, S.M. (2016): Surficial geology of the Carcajou area (NTS 84F/NW); Alberta Energy Regulator, AER/AGS Map 560, scale 1:100 000.		

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Map 583
Surficial Geology of the Buffalo River Area (NTS 84F/NE)
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Projection: Universal Transverse Mercator
Datum: North American Datum, 1983

