Natural Resources Canada / Ressources naturelles Canada
GEOLOGICAL SURVEY OF CANADA / COMMISSION GÉOLOGIQUE DU CANADA
EUB / AGS

DESCRIPTIVE NOTES

The Moody Creek (84 M/02) surficial geology map was produced as a part of a collaborative research project by the Geological Survey of Canada (Natural Resources Canada) and the Alberta Geological Survey (Alberta Energy and Utilities Board). This collaborative project also extends into northeast British Columbia (94 I and 94 P) with the participation of the British Columbia Ministry of Energy, Mines and Petroleum Resources. Other surficial geology maps within the 84 M map area include Andriashek (1985), Fox et al. (1987), Edwards et al. (2004), Paulen et al. (2006a; 2006b), Plouffe et al. (2006), and Smith et al. (in press).

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During the last glaciation (Late Wisconsinan), the Laurentide Ice Sheet advanced over the area in a general westward direction. During both advance- and retreat-phases, proglacial lakes formed as ice blocked the eastward drainage from the Cordillera (Mathews, 1980; Lemmen et al., 1994; Smith et al., 2005). In the low-lying areas along the southern portion of the map, till is overlain by a discontinuous glacial lake sediment veneer. A thin diamicton overlying contorted glaciolacustrine sediments observed in a number of borrow pits is interpreted as a surge into the north margin of glacial Lake Hay. Alternatively, it could represent the grounding of floating ice, as numerous iceberg scours are observed in the map area. The flat topography of the area and lack of natural sediment exposures will require the use of subsurface data (e.g. drill logs and drilling) in future stratigraphic studies.

Bedrock in the map area is only exposed in gullies incised into the slopes of the Alberta Plateau. The map area is extensively mantled by fine grained (clay rich) till (glacial sediment directly deposited by glacier ice) reworked from the regional weakly indurated Cretaceous shale bedrock of the upper Fort St. John Group (Shaftesbury Formation). Erratics found in till include Canadian Shield granitic and metamorphic lithologies, Devonian limestones and dolostones, and Proterozoic Athabasca sandstone.Till is the most common surficial material and is generally clay rich with clast concentrations of 5 to 15%. The high clay content of the till is a consequence of the reworking of advance-phase glacial lake sediments and shale bedrock. Till occurs as a veneer or a blanket, with the latter being further subdivided based on surface expression: blanket, ridged, and hummocky. Uplands in the northern portion of the map area reflect bedrock topography and are draped by a blanket of till between 1 and 10 m thick. In flat lowland areas, till is at least 8 m thick, and likely much thicker.

Glaciolacustrine sediments are also clay-rich, and form a veneer 1 to 4 m thick above till in low-lying areas in the south. These sediments form a continuous cover at elevations below 410 m, and occur discontinuously above this elevation. Glaciolacustrine sediments occur as massive silt and clay, contorted beds of sand, silt and clay, and as interstratified sand and clayey-silt. Where they are continuous they represent deposition in glacial Lake Hay, and where they are discontinuous, they are likely the result of local ponding.

Glaciofluvial sediments are rare. Gravel at surface was found at only one location in association with a meltwater channel (59°12'N 118°39'W). Two other glaciofluvial gravel deposits were likely deposited in subglacial conduits as they occur below the regional till (Smith et al., 2005); one is abandoned (59°09'N 118°47'W) while the other is still active (59°09'N 118°49'W). Their location is marked by a gravel pit symbol. Granular aggregate is in short supply in the region and most roads are surfaced with the same fine-grained till that is used for their foundations. Fine-grained till provides a good impermeable base in areas of permafrost and water saturated bog and fen deposits, however, only roads that are surfaced with gravel can be used during wet weather conditions. Gravel associated with the aforementioned meltwater channel may be a new source of local aggregate in the area. Alluvial sediments generally consist of fine sand and silt rich in organic detritus. Organic sediments include fibric bog material and water saturated mesic fen material that is commonly mixed with fine grained sediments. Large fens occupy the southeast portion of the map area and overlie glaciolacustrine sediments.

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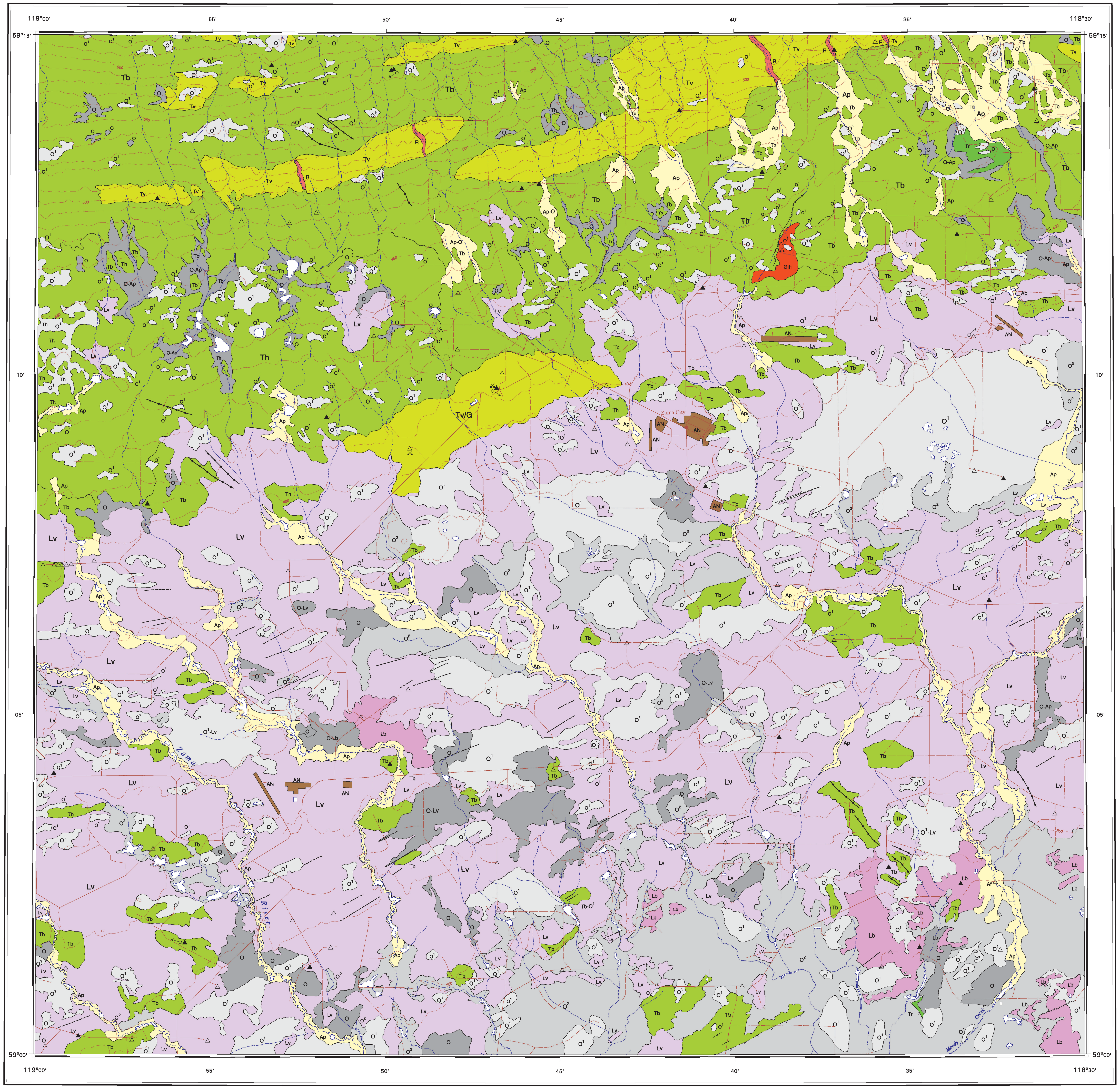

LEGEND

Note: In areas where the surficial cover forms a complex pattern, the area is coloured according to the dominant unit and labelled in descending order of cover (e.g. O-Tr). Where buried aggregate deposits (sand and gravel–commonly associated with Gt or Gd surficial units) are known, or suspected, areas are coloured according to the overlying unit and labelled in the following manner: Lv/Gd.

QUATERNARY
SURFICIAL DEPOSITS
POST LAST GLACIATION

NONGLACIAL ENVIRONMENTS

AN — ***ANTHROPOGENIC DEPOSITS:*** *culturally-made or modified geological materials such that their original physical properties (e.g. structure, cohesion, compaction) have been drastically altered; >1 m thick.*

ORGANIC DEPOSITS: *peat and muck; 1 to 3 m thick on average; formed by the accumulation of plant material in various stages of decomposition; generally occurs as flat, wet terrain (swamps and bogs) over poorly drained substrates.*

O^1 — ***Bog peat:*** *sphagnum or forest peat formed in an ombrotrophic environment; wet terrain; may be treed or treeless.*

O^2 — ***Fen peat:*** *peat derived from sedges and partially decayed shrubs in a eutrophic environment; forms relatively open peatlands with a mineral-rich water table that persists seasonally near the surface; generally covered with low shrubs and an occasional sparse layer of trees.*

O — ***Undifferentiated bog and fen deposits:*** *bog and fen deposits undifferentiated at this map scale.*

ALLUVIAL DEPOSITS: *sorted gravel, sand, minor silt, and organic detritus deposited by streams; commonly stratified.*

Ap — ***Floodplain deposits:*** *sorted gravel, sand, silt, and organic detritus >1 m thick; forming active floodplains close to river level with meander channels and scroll marks.*

Af — ***Alluvial fan deposits:*** *poorly sorted gravel, sand, and organic detritus >1 m thick.*

POSTGLACIAL OR LATE WISCONSINAN

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GLACIOLACUSTRINE DEPOSITS: *fine sand, silt, and clay, with minor debris-flow diamicton, deposited in glacier-dammed lakes in valleys and along the margin of the retreating Laurentide Ice Sheet; usually overlain by organic deposits in lowlands.*

Lb — ***Glaciolacustrine blanket:*** *>1 m thick.*

Lv — ***Glaciolacustrine veneer:*** *thin and discontinuous; <1 m thick.*

GLACIOFLUVIAL DEPOSITS: *well to poorly stratified sand and gravel; minor diamicton; deposited behind, at, or in front of the ice margin by glacial meltwater; represents a potential aggregate source.*

G — ***Proglacial outwash:*** *cross-stratified gravel and sand deposited in front of the ice margin; 1 to 10 m thick; underlies Tv on this map.*

Gih — ***Ice-contact stratified drift:*** *poorly-sorted sand and gravel with minor diamictons; deposited in contact with the retreating glacier; 1 to >20 m thick; forming hummocky topography relating to melting of underlying ice.*

TILL: *diamicton deposited directly by the Laurentide Ice Sheet; sandy to clayey matrix with striated clasts of various lithologies, including many Canadian Shield, carbonate, and sandstone erratics; clast content is typically low (<10 %).*

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PRE-QUATERNARY
BEDROCK

R — ***Sedimentary bedrock:*** *Cretaceous Fort St. John Group shales (including the Shaftesbury Formation) and Dunvegan Formation sandstone exposed in highlands and along meltwater channel and canyon walls.*

Geological boundary (defined)
Meltwater channel small (direction unknown)
Major moraine
Paleoshorelines
Iceberg scours
Fluting or drumlinoid ridge parallel to ice flow (direction unknown)
Till clast fabric
Gravel pit
Field observation site (with, without sample)

LOCATION MAP

Authors: C.J. Kowalchuk, B.C. Ward, R.C. Paulen, and A. Plouffe

Geology by C.J. Kowalchuk, B.C. Ward, R.C. Paulen, and A. Plouffe, 2004-2005

Airphoto interpretation by C.J. Kowalchuk, 2004-2005

Digitizing and digital cartography by Géotech, Geomatic services

Digital map compilation by L. Robertson, Northern Canada Division, 2006

Digital cartography by J.D. Narraway, Data Dissemination Division (DDD)

GSC OPEN FILE 5283

EUB/AGS MAP 397

SURFICIAL GEOLOGY

MOODY CREEK

ALBERTA

Scale 1:50 000/Échelle 1/50 000

kilometres 1 0 1 2 3 4 kilomètres

Universal Transverse Mercator Projection
North American Datum 1983

Projection transverse universelle de Mercator
Système de référence géodésique nord-américain, 1983

This map was produced from processes that conform to the Scientific and Technical Publishing Services Subdivision (DDD) Quality Management System, registered to the ISO 9001: 2000 standard

Any revisions or additional geological information known to the user would be welcomed by the Geological Survey of Canada

Digital base map from data compiled by Alberta Sustainable Resource Development, modified by DDD

Mean magnetic declination 2006, 21°27'E, decreasing 23.2' annually

Elevations in metres above sea level

84 M/6	84 M/7	84 M/8
84 M/3	84 M/2 OF5283	84 M/1
84 L/14	84 L/15	84 L/16

NATIONAL TOPOGRAPHIC SYSTEM REFERENCE

OPEN FILE
DOSSIER PUBLIC
5283
GEOLOGICAL SURVEY OF CANADA
COMMISSION GÉOLOGIQUE DU CANADA
2006

Open files are products that have not gone through the GSC formal publication process.

Les dossiers publics sont des produits qui n'ont pas été soumis au processus officiel de publication de la CGC.

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2006: Surficial geology, Moody Creek, Alberta; Geological Survey of Canada, Open File 5283; Alberta Energy and Utilities Board, Alberta Geological Survey, Map 397, scale 1:50 000.

Canada

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