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GEOLOGICAL SURVEY OF CANADA / COMMISSION GÉOLOGIQUE DU CANADA

NATMAP
CARTNAT
Canada's National Geoscience Mapping Program
Le Programme national de cartographie géoscientifique du Canada

STRATIGRAPHIC SECTIONS

1
- LE — Dark grey silt and clay rhythmites. Scattered pebbles up to 6 cm. Sediments fine upward
- TC — Stony diamicton (till), grades upward into overlying stratified glaciolacustrine sediments
- R — Sandstone, shale, and low grade coal

2
- E — Massive silt (loess). Chernozemic soil developed within it
- A — Massive to crudely stratified gravel
- TC — Diamicton (till), grey massive, moderately stony, clayey silt matrix
- R — Flat-lying interbedded sandstone and shale

3
- LE — Dark grey laminated clay and silty clay
- TM — Stony diamicton (till), grey loamy matrix. Gradational basal contact due to glacial shearing of underlying bedrock (deformation till). Lineations and dcionette pebbles are highly striated and polished
- R — Dark-grey Raggy shale

4
- LE — Moderately stony silty clay. Stones to 30 cm, all of Rocky Mountains provenance including purple Main Ranges quartzite
- C — Covered
- LE — Laminated pebbly clayey silt and pebbly fine sand. Beds folded and disturbed by syndepositional soft sediment deformation
- TC — Diamicton (till), grey, moderately stony, matrix clayey silt. Stones are of Rocky Mountains origin including purple quartzite. Scattered Shield pebbles. Contact with overlying glaciolacustrine sediments obscured by colluvium. Base of the unit not visible

5
- E — Massive brown silt (loess). Crossbedded sand at base
- LE — Pebbly silt, crudely stratified to massive. Abrupt contact with underlying diamicton. Ranges from 0 to 1.8 m in thickness. Locally contains crossbedded sand along base
- TC — Stony diamicton (till). Light grey, sandy clay silt matrix. Angular blocky structures. Upper 80 cm to 1 m is highly fractured and contains large blocks of bedrock. Pebbles are almost entirely of Rocky Mountains provenance including purple Gog Group quartzite from the Main Ranges; some rare Shield pebbles are present
- TC — Angular blocks of sandstone and shale up to 30 cm in length in a matrix of sheared sandstone and shale (deformation till). Grades upward into overlying unit
- R — Massively bedded flat-lying sandstone and grey shale

6
- LE — Interstratified diamicton, sand, silt, and rythmically laminated silt and clay. Sand and silt dominate. Beds range from 5 to 50 cm in thickness and are horizontally bedded to rippled. Lenticular crossbedding. Diamicton is moderately stony with a silty sandy matrix. Laminated silt and clay beds are locally strongly deformed by slumping and diapirism
- TC — Diamicton, moderately stony. Contains Shield pebbles. Grades upward into overlying lacustrine sediments.

7
- LE — Thinly bedded fine sand, silt, and clay. Locally pinches out
- TC — Diamicton (till), grey, moderately stony, sandy silt matrix. Light grey. Large angular blocks of sandstone and shale bedrock (detached, almost 1 m are incorporated in the till. Till is highly fractured and contains large blocks of bedrock. Pebbles are of Rocky Mountains Front Ranges and Main Ranges origin (purple quartzites are common). Scattered Shield pebbles present. Limestone pebbles are highly striated. Two modes of striations were noted on large sandstone blocks: NE-SW and N-S
- R — Gently dipping sandstone and shale

8
- LE — Laminated and crossbedded fine sand interbedded with silt and clay rhythmites. Some scattered pebbles
- TC — Diamicton (till), grey moderately stony, clayey silt matrix, poorly indurated. Stones are almost entirely of Rocky Mountains origin including purple Main Ranges quartzite; rare Shield stones are present

9
- LE — Massive silt (loess). Chernozemic soil developed within it
- LE — Interbedded pebbly clay and pebbly silt, locally grades into diamicton
- LE — Diamicton, clayey silt matrix
- LE — Laminated silt and clay locally deformed into flame structures
- LE — Moderately stony silty clay diamicton
- LE — Interstratified thinly bedded diamicton and laminated clayey silt and silty clay. Clay beds are slickensided. Slickensides are oriented at 350°. Beds are deformed by load structures
- TC — Indurated grey diamicton, moderately stony. Stones to 30 cm. Interstratified silt and clay beds at base. Stones are Rocky Mountains Front and Main Ranges provenance with rare Shield pebbles

10
- L — Organic rich clay, highly plastic
- TC — Gravelly silty, sandy clay (interpreted as till by L.E. Jackson Jr.)
- LE — Inorganic clay, high plasticity.
- R — Siltstone and shale

BORINGS C212 AND C213 CHAIN LAKES RESERVOIR
(Source: Prairie Farm Rehabilitation Administration, Saskatoon, Saskatchewan)

Vertical scale (metres): 5 — 0

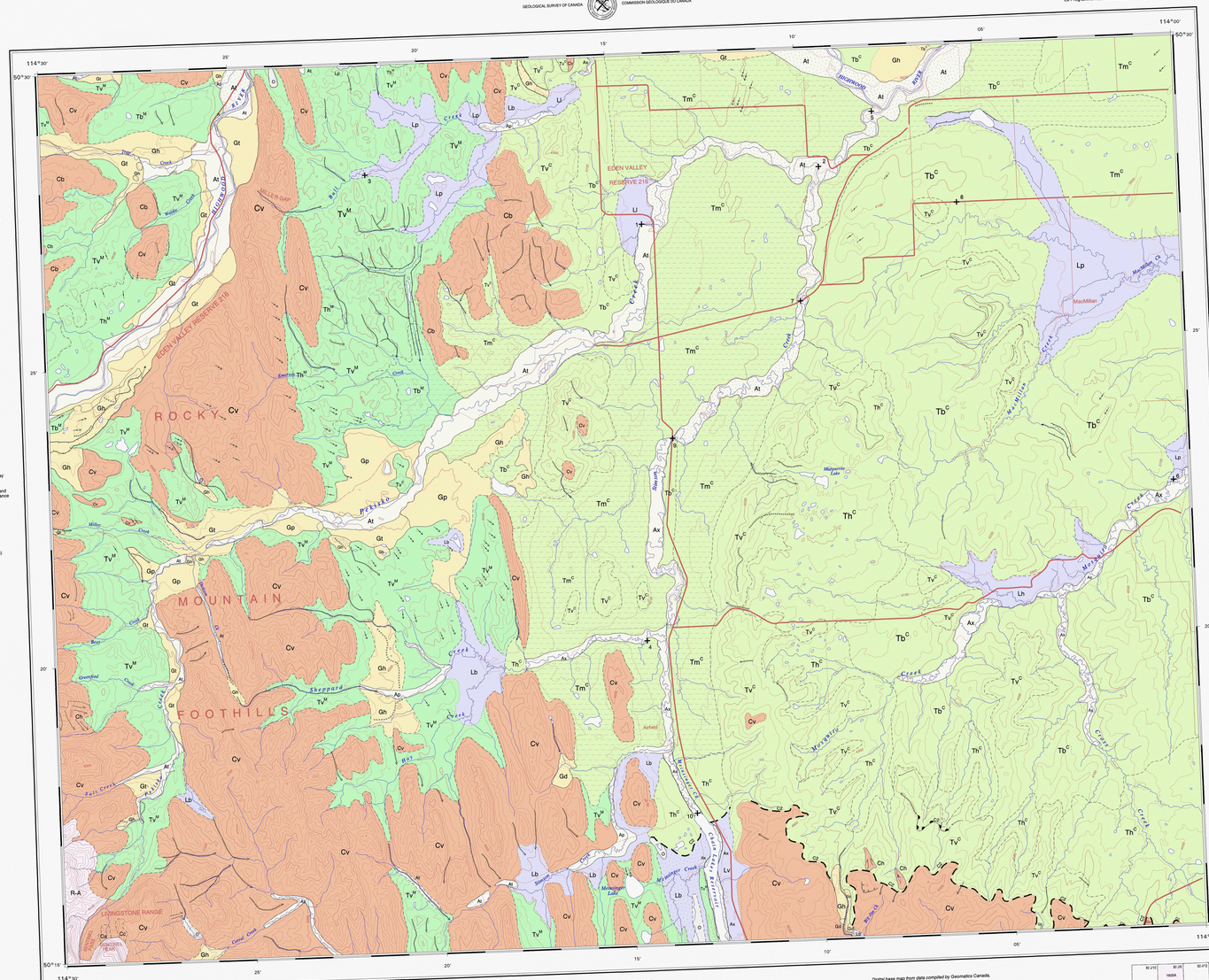
SUBSURFACE UNITS

Post Glacial
- O — Peat
- C — Colluvium
- E — Eolian fine sand and silt
- A — Alluvial sand and gravel
- L — Lacustrine sand, silt and clay

Wisconsinan – Erratics Train Glaciation
- LE — Laminated and thinly bedded glaciolacustrine sand, silt, and clay
- GC — Outwash gravel and sand containing clasts from Canadian Shield
- GM — Outwash gravel and sand (Rocky Mountain and Foothills provenance)
- TC — Till and related glaciogenic diamictons containing clasts transported from the Canadian Shield
- TM — Till and related glaciogenic diamictons of Rocky Mountain and Foothills provenance

Pre-Wisconsinan
- PW — Rocky Mountain provenance glacial sediments and interstratified paleosols

Pregiacial
- R — Sandstone and shale



Copies of this map may be obtained from the Geological Survey of Canada 601 Booth Street, Ottawa, Ontario K1A 0E8
3303-33rd Street, N.W., Calgary, Alberta T2L 2A7
101-605 Robson Street, Vancouver, B.C. V6B 5J3

LOCATION MAP

MAP 1926A

SURFICIAL GEOLOGY

STIMSON CREEK

ALBERTA

Scale 1:50 000 · Échelle 1/50 000

Kilometres 1 0 1 2 3 4 Kilometres

Universal Transverse Mercator Projection — Projection transverse universelle de Mercator

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Geology by L.E. Jackson, Jr., 1974, 1975 and 1993

Co-ordinated by D. Lebel through the auspices of the Southeastern Cordillera NATMAP Project

Digital cartography by K. Shimamura, Terrain Sciences Division and J.D. Narraway, Geoscience Information Division

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 Geomatics Canada, modified by the Geoscience Information Division

Copies of the topographic map for this area may be obtained from the Canada Map Office, Natural Resources Canada, Ottawa, Ontario, K1A 0E9

Some geographical names subject to revision

Magnetic declination 1998, 17°55'E, decreasing 6.7' annually

Elevations in feet above mean sea level

Published 1998

NATIONAL TOPOGRAPHIC SYSTEM REFERENCE AND INDEX
THE GEOGRAPHICAL SURVEY OF CANADA (GAPS)

82 J/15	82 J/5	82 I/12	82 I/11
	1925A		
82 J/7	82 J/6	82 I/5	82 I/6
	1925A		
82 J/2	82 J/1	82 I/4	82 I/3
	1927A		
82 I/13	82 I/16	82 I/13	82 I/14
	1926A	1926A	
82 I/10	82 I/9	82 I/12	82 I/11
	1950A	1951A	
82 I/7	82 I/8	82 I/5	82 I/6
	1952A	1953A	1954A
82 I/2	82 I/1	82 I/4	82 I/3
		1955A	1956A

LEGEND

Not all coloured units and symbols in legend necessarily appear on this map
This legend is common to maps 1925A to 1926A

QUATERNARY

HOLOCENE - Post Erratics Train Glaciation

- m — **MADE LAND:** *Artificial fill and mine waste*
- I — ***EXISTING GLACIERS, ICE:*** *Flowing or stagnant glacial ice; contains or is covered by variable amounts of rock debris ranging from clay to boulders; thickness of ice 20 - 40 m*
- O — ***ORGANIC SEDIMENTS:*** *Water-saturated* **Sphagnum** *peat and organic silt formed predominantly by the accumulation of vegetal material in bogs, fens, and swamps; organic deposits are usually underlain by lacustrine silt and clay; thickness up to 5 m*
- Eb — ***EOLIAN SEDIMENTS:*** *Sand and silt transported by wind*
  Eolian blanket: *Sand, well sorted, massive; forms gently undulating plains marked by crescent-shaped dunes; thickness up to 5 m*
- Cb — ***COLLUVIAL SEDIMENTS:*** *Stony diamicton resulting from the mixture of varying amounts of broken bedrock, soil, and regolith by nonfluvial gravitational processes such as creep, solifluction, debris flow, and rockfall; commonly unsorted. Reworked glacial sediments in colluvium occur within the limits of past glaciations*
  Colluvial blanket sediments: *Diamicton, stony, massive, 1 to 2 m thick*
- Cv — ***Colluvial veneer sediments:*** *Diamicton, stony, massive, <1 m thick or patchy; overlies bedrock*
- Ca — ***Colluvial apron sediments:*** *Bouldery diamicton and poorly sorted and stratified sand and gravel; sediments form a wedge-shaped slope-fine apron at the base of steep debris flow and avalanche-dominated fans and solifluction deposits derived from bedrock or glacial debris up slope; thickness ranges from <1 m at the up slope limit to up to 10 m in the thickest part of the apron*
- Cc — ***Rockfall sediments:*** *Bouldery rockfall deposits; forms cone-shaped landforms at the angle of repose below steep bedrock slopes; thickness ranges from <1 m at the margin to 10 m near the midpoint of the cone*
- Ch — ***Landslide sediments:*** *Diamicton formed of broken rock, soil, and bedrock; commonly forms a hummocky or ridged topography with ridges transverse to direction of movement; thickness variable, may range up to 10 m (direction of movement indicated by symbol)*
- Cx — ***Undivided colluvial sediments:*** *Hummocky apron terrain adjacent to mountainous uplands, possibly of mass wasting origin*
- Ap — ***ALLUVIAL SEDIMENTS:*** *Gravel to silt size sediments deposited by streams either within channels or as overbank deposits. Deposits are commonly stratified and moderately to well sorted, with the exception of some alluvial fan deposits*
  Alluvial plain sediments: *Gravel, sand, and mud, massive to stratified, moderately to well sorted; locally overlain by or includes lacustrine silt and clay and peaty to humic organic silt deposited in abandoned channels and along floodplain margins; forms plains within about 1 m of present stream level which are subject to inundation during floods; thickness 1 to 5 m*
- At — ***Alluvial terrace sediments:*** *Gravel and sand, massive to stratified, moderately to well sorted; sediments underlie terraces now isolated from flooding by stream incision; thickness ranges from a veneer to several metres; where alluvial terraces are cut into glaciofluvial plains, total thicknesses of gravel and sand may be 5 m or more*
- Af — ***Alluvial fan sediments:*** *Gravel and gravelly diamicton, stratified, poorly to moderately sorted; forms fan-shaped landforms at mouths of streams enter larger valleys; in mountainous terrain, alluvial fans may be subject to inundation of debris flows; thickness up to 10 m*
- Ax — ***Alluvial complex sediments:*** *Floodplains, fans, and terraces that cannot be subdivided at the scale of mapping*

WISCONSINAN - Erratics Train Glaciation
Sediments deposited during advances and retreats of glaciers from Rocky Mountains and continental interior

- Lv — ***GLACIOLACUSTRINE DEPOSITS:*** *Well stratified sand, silt, and clay deposited in lakes dammed by glacial ice. Where deposition was distant from ice margins, glaciolacustrine sediments underlie plains or gently rolling terrain. Where deposition was near ice, they may underlie ridged, hummocky, or pitted terrain left by subsequent ice meltout. May include some postglacial lacustrine sediments*
  Glaciolacustrine veneer sediments: *Silt, clay, and fine sand, well stratified, thinly bedded to laminated or discontinuous; thickness <1 m thick to discontinuous*
- Lb — ***Glaciolacustrine blanket sediments:*** *Silt, clay, and fine sand; surface morphology conforms to underlying topography*
- Ll — ***Glaciolacustrine plain sediments, local relief <1 m:*** *Silt, clay, and fine sand, thinly bedded to laminated; surface morphology is a plain and underlying topography is generally obscured by these sediments; thickness 1 to 20 m*
- Lp — ***Rolling glaciolacustrine plain sediments, local relief 1-2 m:*** *Fine sand, silt, and clay; thinly to massively bedded; surface morphology undulating; underlying topography is generally obscured by these sediments; thickness 1 to 20 m*
- Lh — ***Ice-contact glaciolacustrine complex sediments:*** *Predominantly silt and sand; gravel, diamicton lenses and strayatrines may comprise up to 10% or more of this unit; bedding thin to massive; bedding is commonly deformed by slumping, dewatering and ice meltout; surface morphology is hummocky, jutted, and ridged with relief up to 30 m; commonly underlain by hummocky moraine sediments; thickness 5 to 10 m*
- Gp — ***GLACIOFLUVIAL SEDIMENTS:*** *Sand, gravel, and minor silt and diamicton deposited by streams flowing in contact with glacial ice. Sorting ranges from poor to good and stratification from thinly bedded to massive; many deposits display evidence of syndepositional collapse due to meltout of buried or supporting ice. In areas far from the Rocky Mountains and Foothills, lithologies include Precambrian rocks and Paleozoic limestone, dolostone, sandstone, shale, and coal; in areas near the Rocky Mountains and Foothills, lithologies include mafic and felsic volcanic rocks in the Crowsnest River basin. Influenced by montane glaciers and glacier ice from the continental interior; additional lithologies include sandstone, mudstone, siltstone, and Canadian Shield provenance granitic and metamorphic lithologies*
  Glaciofluvial plain and fan sediments: *Gravel and sand; massive to thickly bedded; former outwash plains and fans; thickness 1 to 10 m*
- Gt — ***Terraced glaciofluvial sediments:*** *Gravel and sand; massive to thick bedded; former outwash plains and fans incised into a succession of terraces; thickness 1 to 10 m*
- Gd — ***Glaciofluvial delta sediments:*** *Sand, gravel, and minor silt and clay; thinly bedded to massive, flat surfaced, delta-form in plan view; deposited as a delta along the margin of a former glacial lake; thickness from 5 to 10 m*
- Gh — ***Glaciofluvial ice stagnation complex sediments:*** *Sand, gravel, diamicton, and minor silt and clay; poorly bedded to massive; bedding is commonly deformed and folded due to syndepositional collapse; surface morphology includes hummocks, kettle, esker and crevasse-fill ridges 2 to 10 m in relief with minor elements of unit Gp and Gt; thickness 5 to 10 m*
- Gx — ***Undivided glaciofluvial and ground moraine sediments:*** *A patchwork of glaciofluvial sediments and ground moraine (till) too variable to resolve at the scale of mapping*
- Gv — ***Glaciofluvial veneer sediments:*** *Gravel and sand, massive to thickly bedded; thickness <1 m or patchy; overlies bedrock*

- Tv^c / Tv^M — ***MORAINAL SEDIMENTS (till):*** *Diamicton (pebble to boulder size clasts suspended in a poorly sorted clay to sand size matrix) deposited directly by glacial ice, or where it has occured, has been directly modified by gravity flow and/or ductile deformation. Tills of two provenances were deposited during the Erratics Train Glaciation: 1) Tv^c contains clasts of Rocky Front and Main Ranges provenance; 2) Tv^M contains clasts of Rocky Front and Main Ranges, Foothills and Interior Plains Paleozoic limestone, dolostone, and quartzite; Foothills and Interior Plains Paleozoic limestone, dolostone, mudstone, and coal; as well as Canadian Shield provenance granitic and metamorphic rocks. T^c contains Rocky Mountain Precambrian and Paleozoic limestone, dolostone, argillite, and quartzite (may locally contain reworked clasts south of Crowsnest River); and Foothills Mesozoic and lower Tertiary sandstone, Crowsnest Volcanics, and Upper Cretaceous volcanics in the Crowsnest Pass area). Trace amounts of Canadian Shield provenance clasts are present only where montane ice overran pre-existing drift containing Canadian Shield provenance clasts*
  Till veneer: *<1 m thick or discontinuous diamicton with patchies of exposed bedrock; Tv^c generally contains more and coarser pebble and larger clasts than does Tv^M and both may contain extensive areas of thin (<1 m) and patchy colluvium; overlies bedrock*
- Tv^c Tv^M
- Tb^c Tb^M — ***Till blanket:*** *1 to 5 m of diamicton that conforms to the underlying bedrock topography. Tb^c generally contains more and coarser pebble and larger clasts than does Tb^M*
- Th^c Th^M — ***Hummocky moraine:*** *Diamicton and interstratified glaciofluvial gravel and sand; massive to thick bedded; bedding slumped, contorted and folded by syndepositional ice meltout; may contain variable amounts of ice-walled lake fine sand and silt; forms hummocky, kame and kettle topography; local relief up to 30 m; thickness may be tens of metres*
- Tm^c Tm^M — ***Rolling till plain:*** *More than 5 m of diamicton; surface morphology undulates with 1-2 m local relief; totally or largely obscures surface morphology of underlying bedrock*

EARLY PLEISTOCENE OR PLUOCENE GLACIAL OR NONGLACIAL SEDIMENTS

- Tb^E — ***Till blanket:*** *Stony diamicton cemented to a calcrete; contains striated clasts; thickness 2 to 3 m; rests on a succession of similar sediments of glacial or nonglacial origin*

PALEOZOIC TO EARLY TERTIARY ROCK

- R — *Sandstone, siltstone, shale, mudstone, conglomerate, coal, and minor volcanic rocks of early Tertiary and Mesozoic age; limestone, dolostone, and quartzite of Paleozoic and Precambrian age (includes areas of thin colluvial cover; bedsheets, sorted stone polygons in alpine areas)*
- R-A — *Areas of rock as above subject to rapid mass wasting processes (rockfall and snow avalanches)*
- R-G — *Upper Mesozoic and Early Tertiary rock eroded into badland topography*

VENEER

- Glaciolacustrine
- Eolian
- Organic

Geological boundary (defined, assumed, inferred)
Neoglacial lateral or end moraine
Arête
Cirque
Meltwater channel;
large
small (flow direction known, unknown)
edge of ice-walled channel
Esker (flow direction defined, undefined)
Landform streamlined by glacial ice (direction of flow known, unknown)

Ice limit (defined, assumed, inferred)
- M1 *Maximum ice limit of Late Wisconsinan montane glacial ice*
- M2 *Ice limit of first major readvance of Late Wisconsinan montane glacial ice*
- C1 *Maximum ice limit of Late Wisconsinan continental glacial ice*
- C2 *Readvance position of Late Wisconsinan continental glacial ice*

Lateral and end moraine (associated with advance M1, M2, or retreat of continental ice sheet from limit C2)
Former ice contact face in stratified drift
Stratigraphic section
Vertebrate fossil locality — 10600U100 GSC 21182
Radiocarbon age (years before present)
One or more Foothills Erratics Train Erratic >1 m in length
Cosmogenic ^{10}Cl exposure age on Foothills erratic (years before present) — 15000±400
Montane erratic close to or at the all time upper limit of montane glaciation
Canadian Shield erratic at or near the all time upper limit of continental glaciation
Cosmogenic ^{10}Cl exposure age of Canadian Shield erratic at or near the all time upper limit of continental glaciation (years before present) — 22550±1300
Arrows indicating direction of landslide movement (associated with the unit Ch)

** Assumes a zero erosion rate and no cosmic ray blockage by snow cover*

Recommended citation:
Jackson, L.E., Jr., 1998: Surficial geology, Stimson Creek, Alberta; Geological Survey of Canada, Map 1926A, scale 1:50 000

Canada