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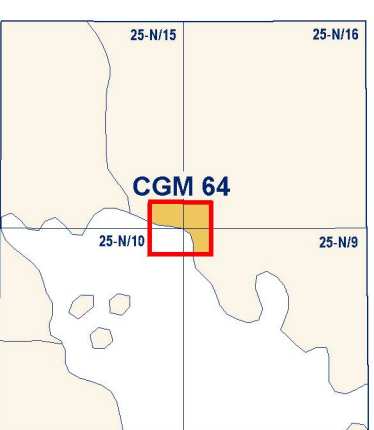
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Abstract

This map illustrates the surficial geology of Iqaluit, Nunavut's capital city. Rather than sandy and gravely glaciofluvial and glaciomarine sediments, the area is found under newly built areas on till terrain and plateaus. The area is underlain by continuous permafrost, which causes important technical challenges for the maintenance of infrastructure. A larger scale view of the airport sector emphasizes patterned ground features and the networks of frost cracks.

Résumé

Cette carte présente les dépôts de surface de la région d'Iqaluit, capitale du Nunavut. Des dépôts fluvioglaciaux et glaciomarine, sableux et graveleux, forment des reliefs peu accidentés s'étendant sous l'aéroport et ses environs de même que dans le secteur d'après. Le roc préconstruit est généralement couvert de till caractéristique la plupart des secteurs de construction récente sur les collines et les plateaux. La ville est entièrement bâtie sur le pergélift continu, ce qui représente un défi technique important pour la maintenance des infrastructures. Une étude à plus grande échelle de secteur de l'aéroport est aussi présentée afin d'illustrer le réseau de sols structurés et de lignes de contraction thermique.



National Topographic System reference

Cover illustration: City of Iqaluit. Photograph by A.-M. LeBlanc, 2011-050

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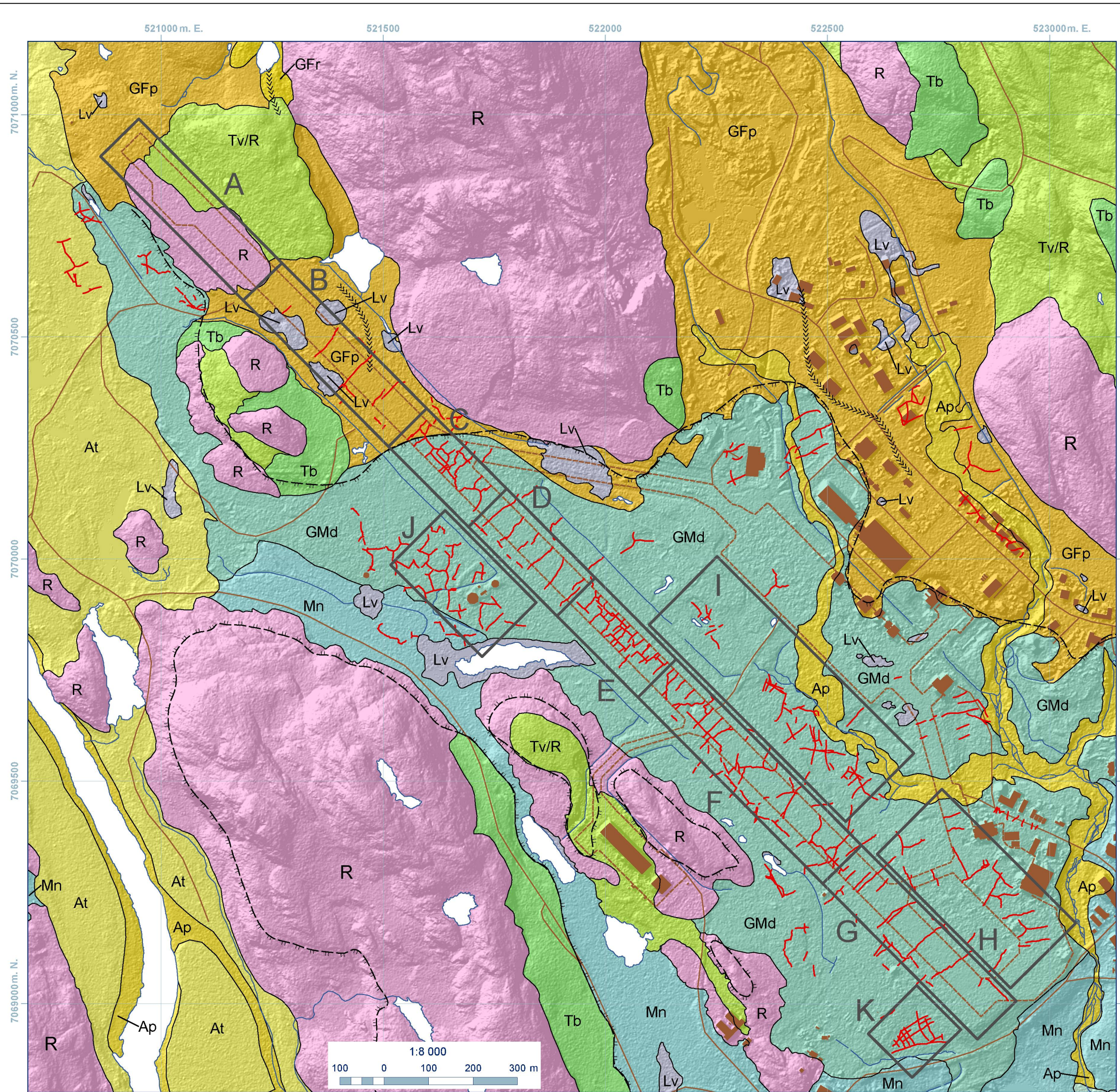
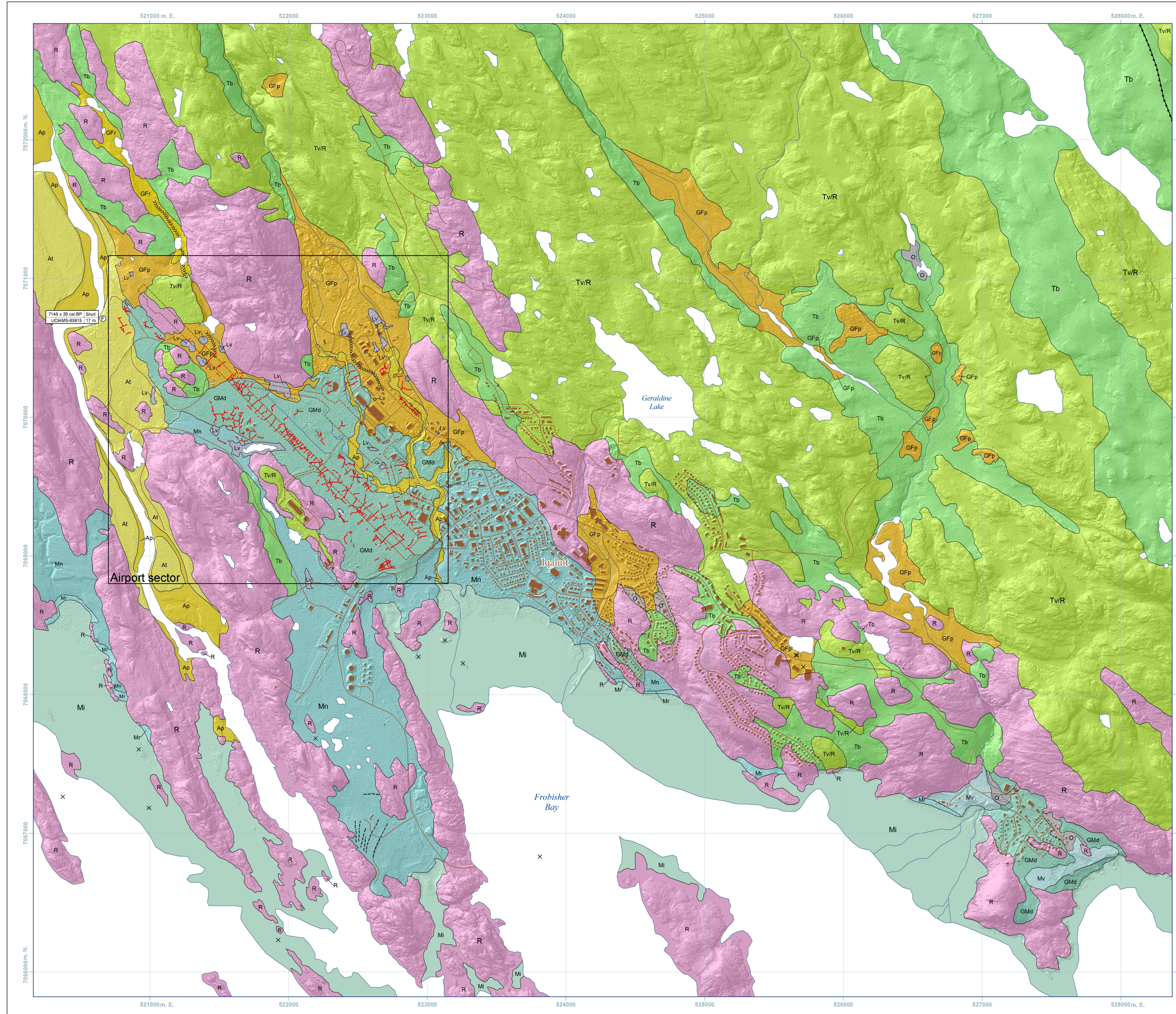
CANADIAN GEOSCIENCE MAP 64

(preliminary version) SURFICIAL GEOLOGY

IQUALUIT

Nunavut

1:15 000



Airport sector: frost crack patterns

This map enlargement shows the surficial geology and frost crack patterns in the Iqaluit airport area. These patterns have been mapped based on ground surveys (2011) and from aerial photographs from 1976 (A24492-86 to 92 and 120 to 125) at the nominal scale of 1:6000. Only the cracks visible on the photographs (the main ones) were mapped. The current interpretation is that in runway sectors with widely spaced frost cracks transverse to the runway (B, D, G), winter frost contraction takes place principally in the thick embankment. Runway sectors on a thin embankment (C, E, F, H) have polygonal crack patterns similar to nearby natural terrain (I, J, K). Therefore frost cracking would have propagated from the underlying pre-construction patterned ground. Sector A, with no large frost cracks is built on bedrock.

Table 1. Large crack pattern. Table with columns: Sector, Pattern, Average crack spacing (m), Interpretation. Rows A through K describe different crack patterns and their geological interpretations.

Table 1. Large crack pattern

QUATERNARY

- HOLOCENE SEDIMENTS
O Undifferentiated organic deposits: thin organic rich soils in poorly drained sites.
Alluvial and lacustrine deposits
Ap Alluvial floodplain sediments: gravel, sand, boulders, minor silt, and muck; 1-10 m thick; deposited in broadplains, actual floodplain.
Al Alluvial terraced sediments: gravel, sand, boulders, minor silt, and muck; 1-10 m thick on raised fluvial terraces. Ice-wedges present in the near surface permafrost.
Lv Lacustrine veneer: gravel, sand, silt and clay deposited in a lacustrine environment; includes allochthonous organic sediment and drained kettle lake sediments; may include reworked sediments from underlying units; includes drained kettle lake sediments.
Actual marine deposits
Mi Interstitial sediments: silt and sandy silt deposited in the intertidal zone, mostly boulder mudflats. No permafrost exposed.
Mr Littoral and nearshore sediments: sediments deposited as beaches. Permafrost may be present.
Postglacial marine deposits: sediments deposited during post-glacial regression of a high sea level.
Mn Littoral and nearshore sediments: sand, silt, gravelly sand, and gravels generally stratified and well sorted; deposited as beaches where ice wedges in permafrost may occasionally be present.
Mv Marine veneer: sand, silt, gravelly sand, and gravel; 0.5-2 m thick; discontinuous cover of littoral and offshore sediments; characterized by beach ridges. Ice wedges occasionally present.
Glaciomarine deposits: sediments deposited in the high pro-glacial sea.
GMd Glaciomarine delta: sand, silt, boulders, and gravel; 2-20 m thick; massive to cross-bedded sediments that coarsen upwards in ice-contact deposits or at termination of outwash fans or meltwater channels; deposited in a higher postglacial sea. Near surface deposits are affected by extensive ice-wedge networks.
Glaciofluvial deposits: sediments deposited by meltwater behind, at, and in front of ice margins.
GFr Glaciofluvial esker deposits: poorly stratified to sorted gravel, sand, and boulders; 5-20 m thick; forming ridges and hummocks; sediments deposited by meltwater behind, at, and in front of ice margins. May contain ice wedges and massive ice bodies.
GFp Glaciofluvial subaerial outwash plain: stratified gravel and sand; 1-30 m thick; proglacial floodplains, terraces, and fans; includes laminae terraced, buried esker ridges, minor subglacial and subaqueous deposits, locally settled, sediments deposited by meltwater behind, at, and in front of ice margins. May contain ice wedges and massive ice bodies.
PLEISTOCENE AND EARLY HOLOCENE
Tb Till: sediments deposited in subglacial and ice-marginal environments.
Tb Till blanket: diamictite; sand, gravel, and boulders in a silt and sand matrix; 1-10 m thick; generally masks bedrock structure; also appears in end moraines, affected by periglacial processes such as solifluction lobes, frost boils, and sorted patterns. Susceptible to thaw slumping on slopes or in excavations.
Tv Till veneer: diamictite; contains sand, stones, and boulders in a silt and sand matrix; 0.5-2 m thick; bedrock topography is evident.
PRE-QUATERNARY
R Bedrock: Precambrian
Geological boundary
Esker ridge
Moraine
Limit of submergence, glaciomarine - approximate
Beach crest
Frost cracks and ice wedge furrows - most evident
2006 drainage network
Bedrock outcrops
C date location
Limit and label of frost cracks pattern sectors - airport area

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