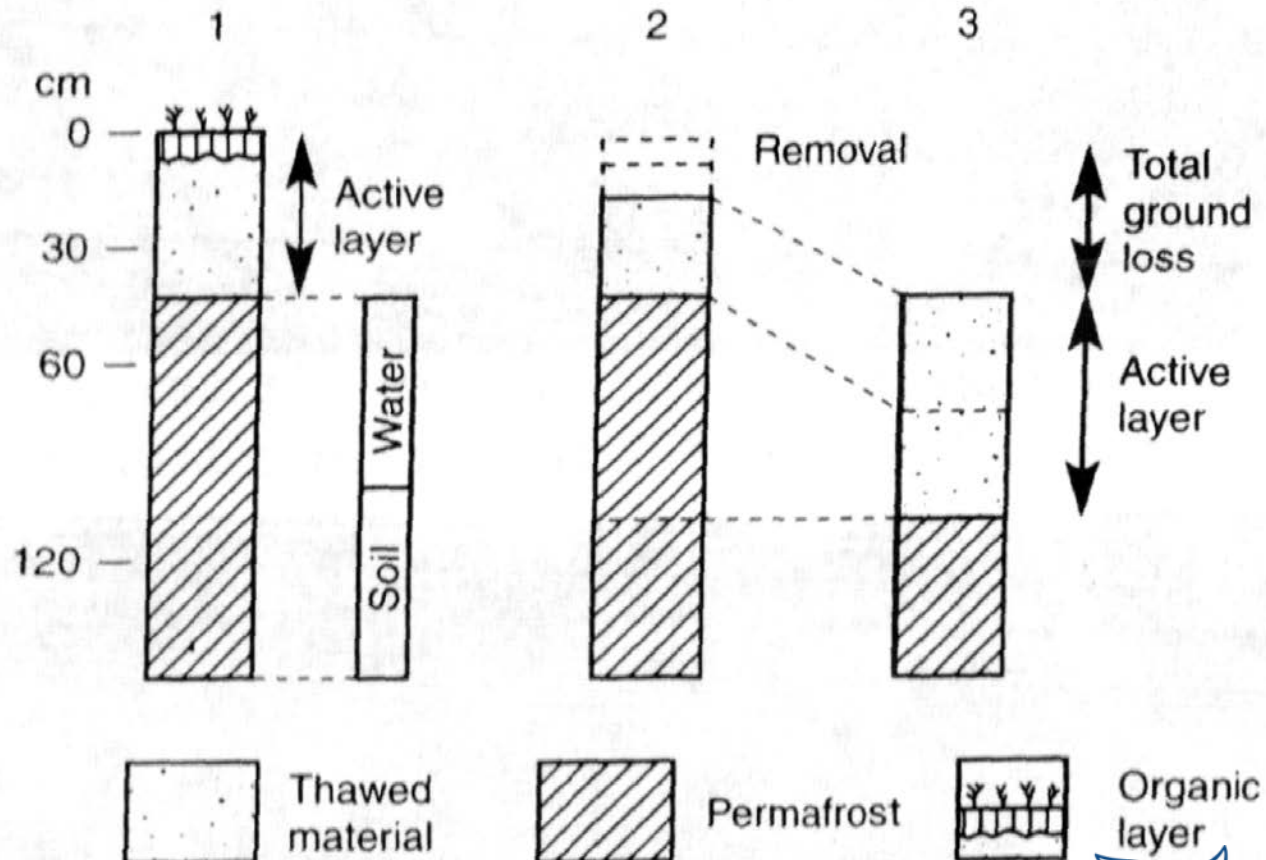


Permafrost thaw

Causes: Geomorphic, Vegetational, Climatic

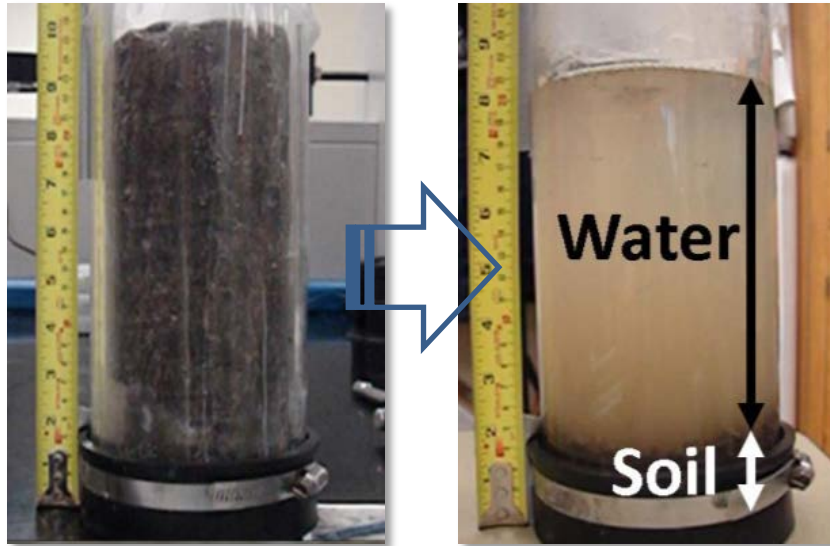
Origins: Natural, Man



Permafrost thaw - Thermokarst



Ground Ice and subsidence



Thaw consolidation

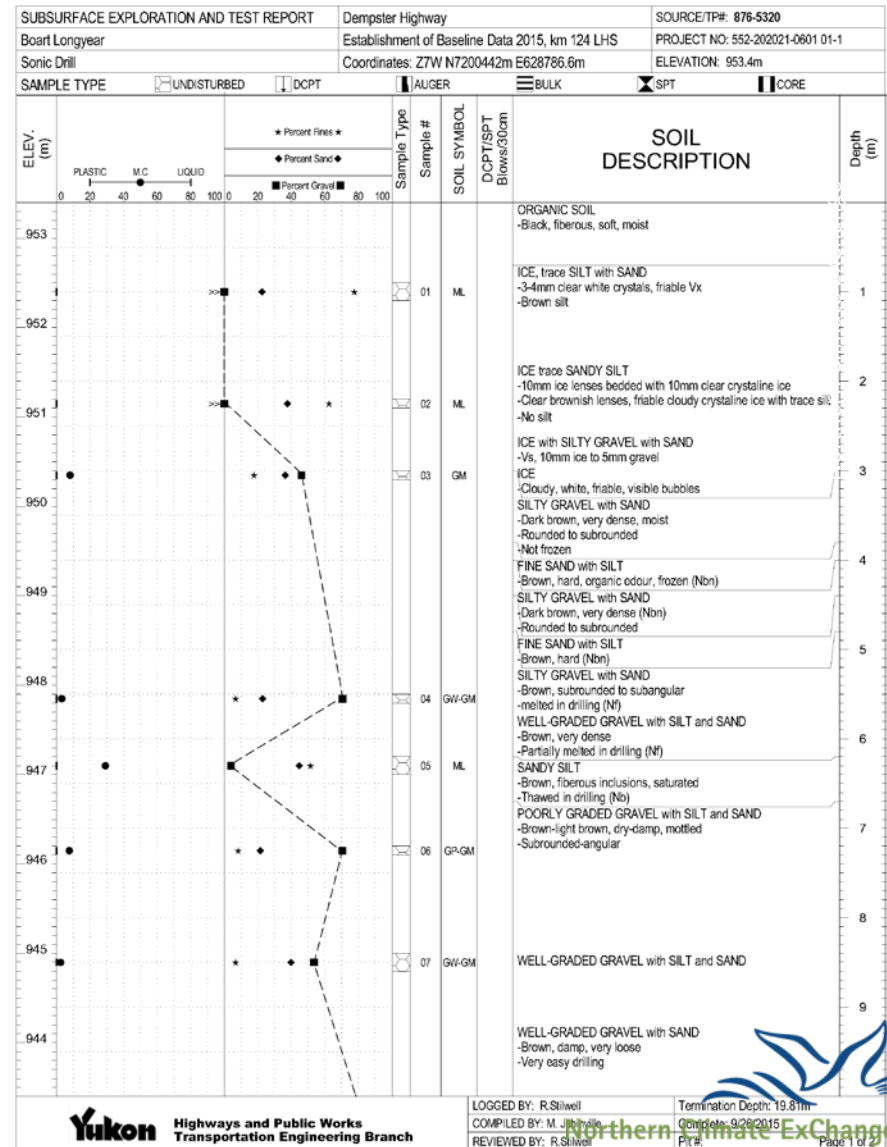
Time-dependent compression resulting from thawing of frozen ground and subsequent draining of excess water.

➤ Simple to assess, yet quite destructive



Geotechnical boreholes

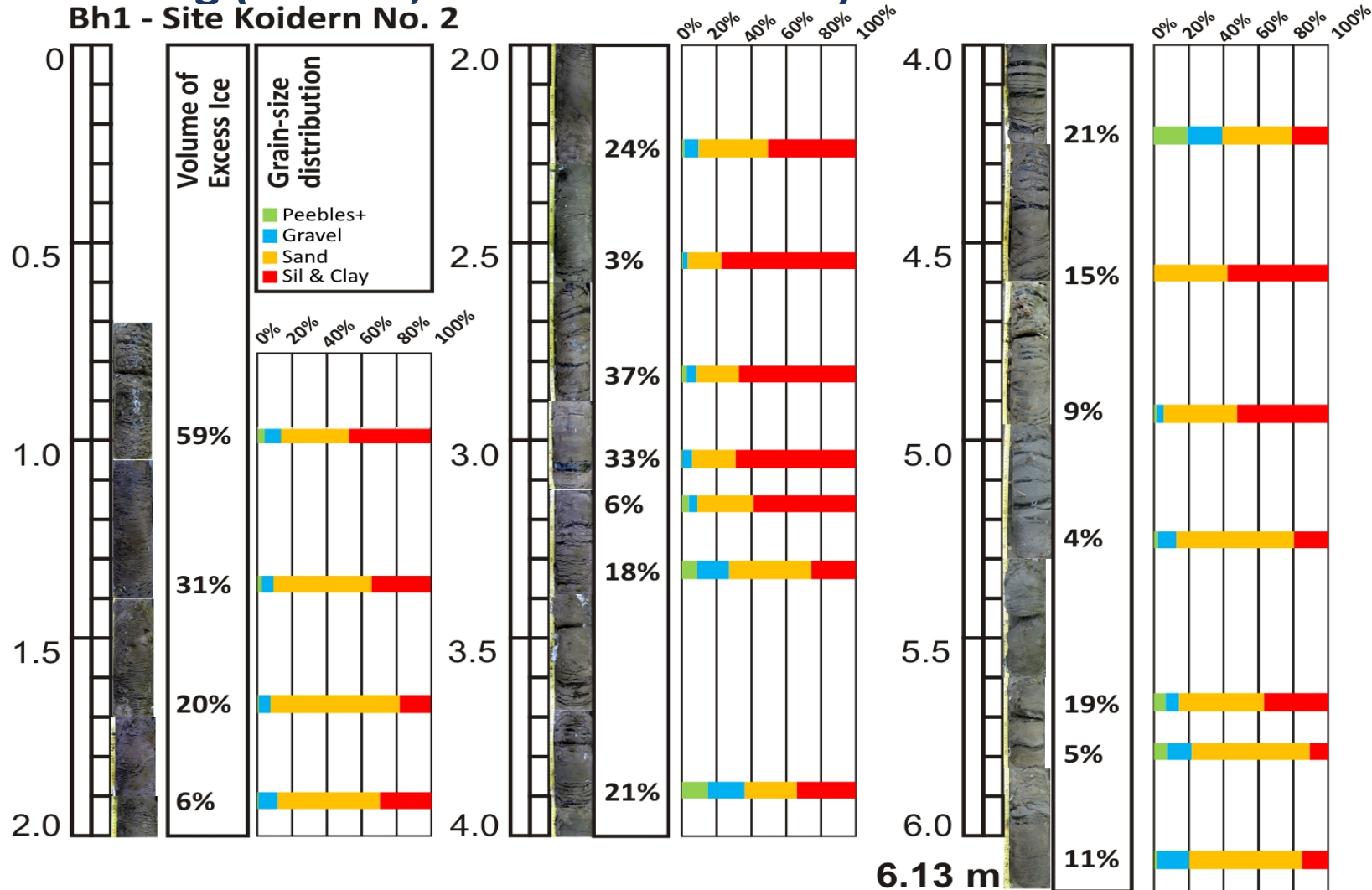
•Coring (texture, excess ice content)



Geotechnical boreholes

•Coring (texture, excess ice content)

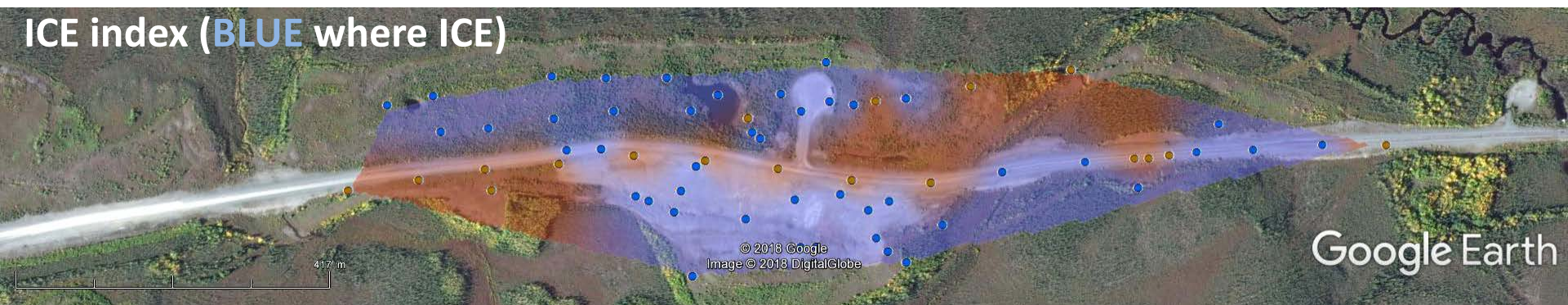
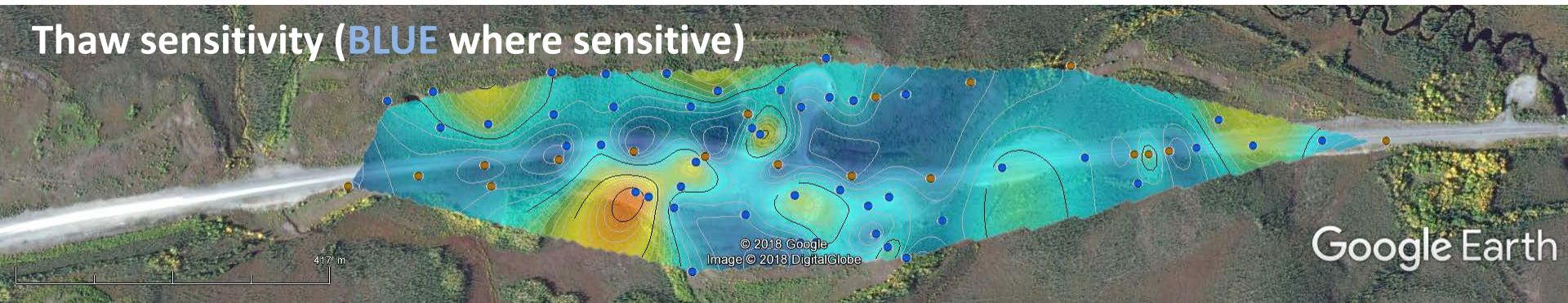
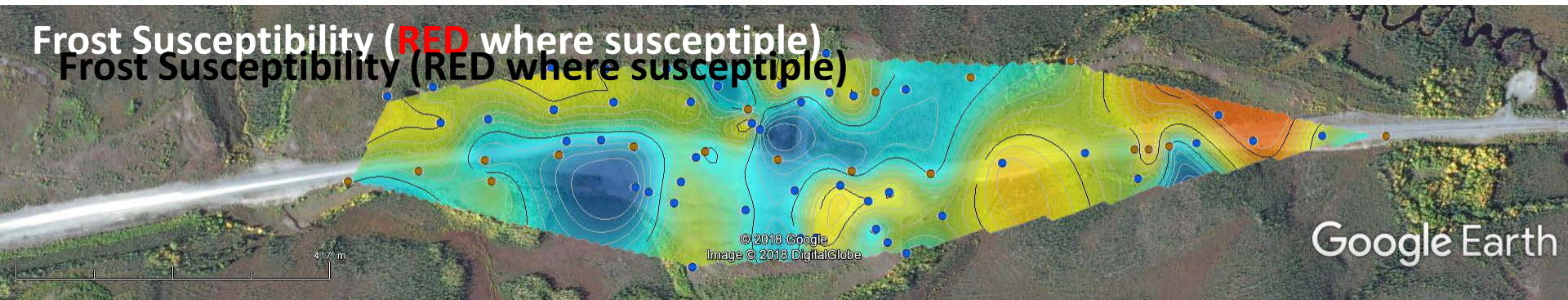
Bh1 - Site Koidern No. 2



Dry Creek Area



Dry Creek Area

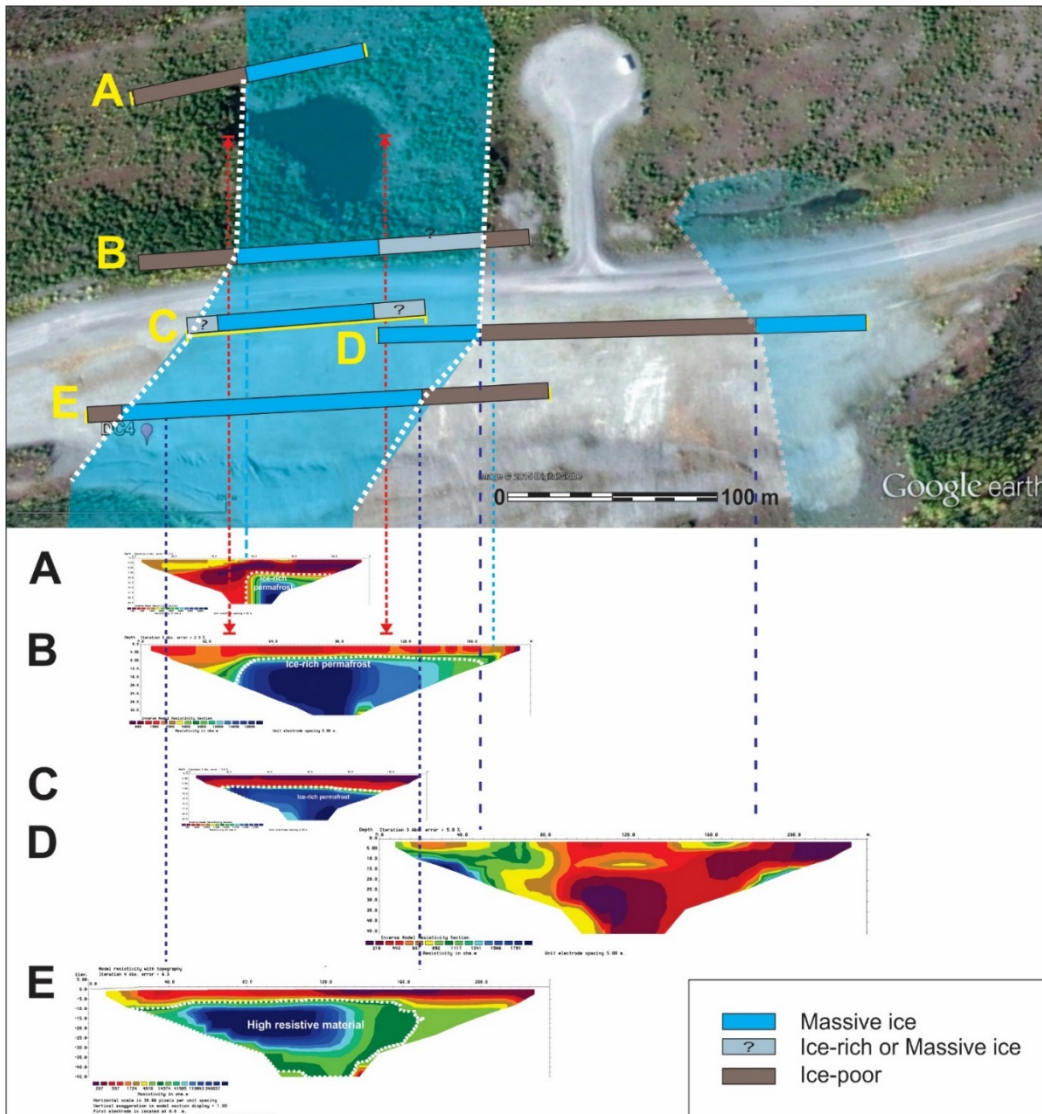


Dry Creek Area

Boreholes missed the ice because:

- Drilled from the embankment
- Not deep enough (< 10 m)

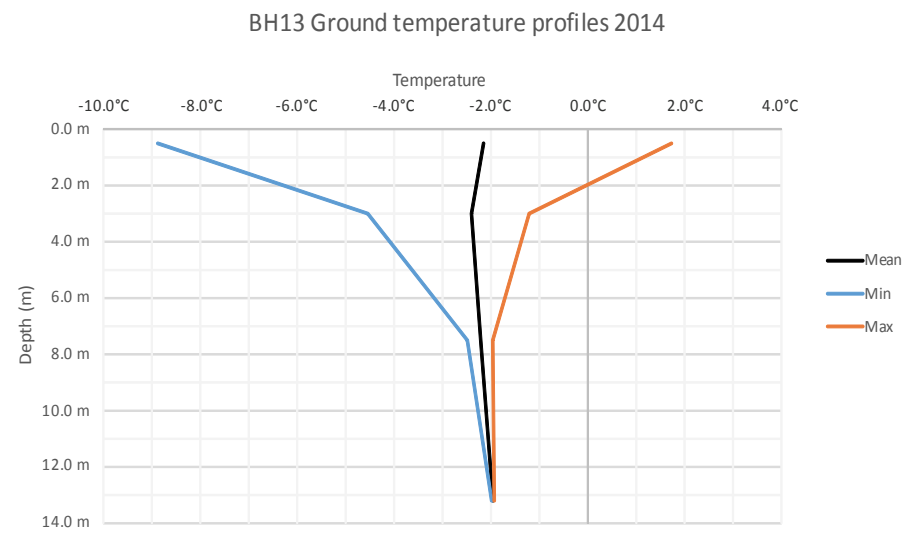
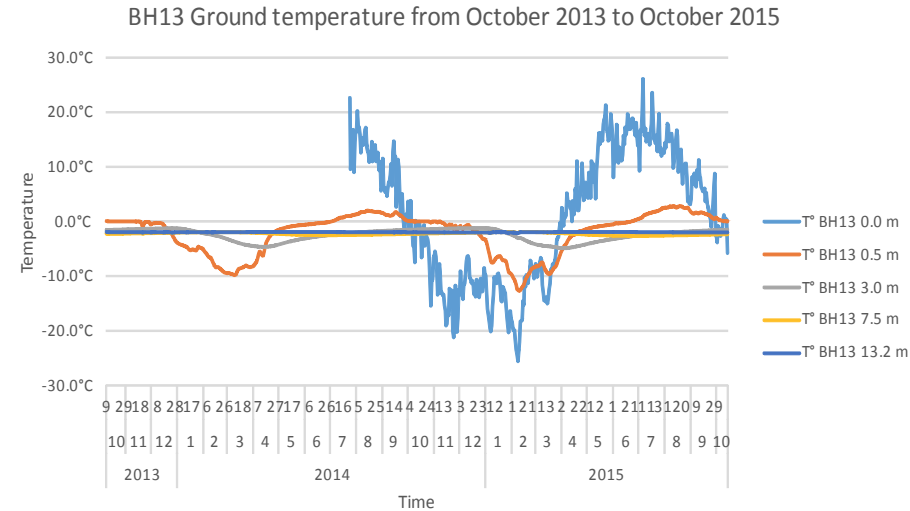
ERT helped to orient deeper borehole, that confirmed geophysical information.



Ground temperature

- **Ground Temperature monitoring**

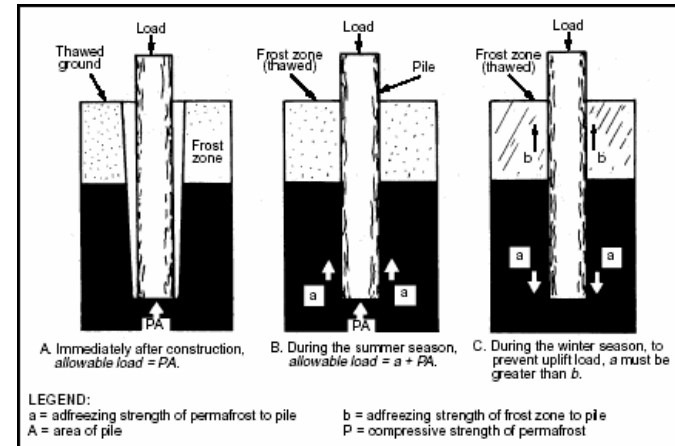
- Active layer thickness
- Ground thermal regime
- Long term trend
- Modelling



Temperature

Active layer thickening

- Frost jacking
- thermokarst



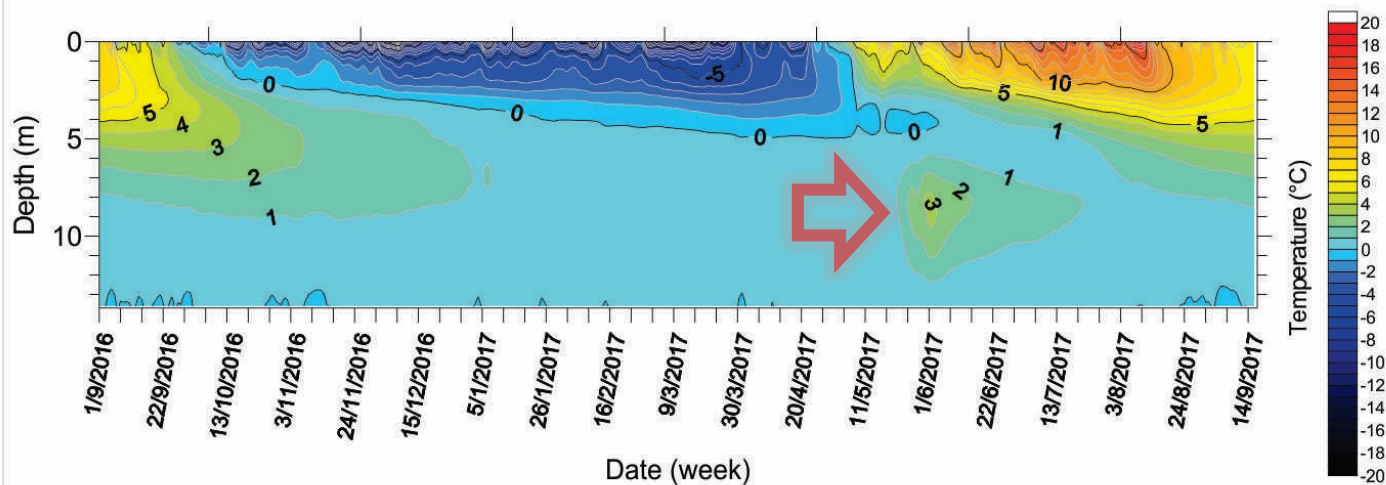
Temperature

Ground thermal regime

- multi-sensor monitoring
- long term monitoring
- Cheap logging system (>\$500)



Ground temperature at km 82
September 1st 2016 to August 31st 2017



Flat Loop Thermosyphon Foundations in Warm Permafrost

Prepared for
Government of the NT
Asset Management Division
Public Works and Services
and
Climate Change Vulnerability Assessment
Canadian Council of Professional Engineers



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I. Holubec Consulting Inc.

March 2008

Guides

GEOTECHNICAL SITE INVESTIGATION GUIDELINES FOR BUILDING FOUNDATIONS IN PERMAFROST



Prepared for:

Department of Public Works and Services
Government of the Northwest Territories

I. Holubec Consulting Inc.
January 2010



NATIONAL STANDARD OF CANADA

CAN/BNQ 2501-500/2017

Geotechnical Site Investigations for Building
Foundations in Permafrost Zones



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