



# Physical Land Development Constraints of Whitehorse

YUKON

Geology by P. Lipovsky  
Physical land development constraint interpretations by Palmer



KILOMETRE SCALE

SCALE 1:20,000

PAGE SIZE 48 X 70"



**Palmer**



Shaded relief derived from digital elevation models supplied by Natural Resources Canada  
Horizontal control: 110° 45' 00" W, 63° 00' 00" N  
Vertical control: 1985 datum  
Universal Transverse Mercator Projection Zone 8 North  
North American Datum 1983  
Contour Interval: 20 m  
Compiled by: S. Murray & S. Elser  
October 2013

**LEGEND**

**Physical Land Development Constraint Severity and Implications**

Class	Typical Implications (at the scale of the map unit (polygon))
<b>H</b>	<b>High</b> - Restrictive for long-term residential or commercial development purposes. Recreational day use, such as hiking/trail and parks, may be suitable depending on applicable constraint type. Areas with high constraint due to mass movements (EH) should be avoided for any kind of development, except for carefully planned trail lines. Areas with high constraint due to ice-rich permafrost (XH) or flooding (FH) may be suitable for day use recreational development, but pose potential hazards for residential or commercial buildings. Areas with high constraint due to soil composition (SH) or water table (WM) require saturated and/or organic soils, detailed ground investigations may indicate limited organic deposits or deeper water table, decreasing the constraint. Areas with high constraint due to bedrock (BH) or topography (TH) assume complex ground conditions for building, but may be developed with increased cost for extensive earthworks.
<b>M</b>	<b>Moderate</b> - Not desirable for residential or commercial buildings but may be developed with special consideration of development constraints and increased costs. Areas with Moderate constraint due to slope erosion (EM) may require erosion control structures and special consideration of the influence of development on slope stability. Detailed ground investigation may suggest some portions of area are suitable for development (e.g., depth to bedrock may vary throughout polygon; permafrost may be deep and of low ice content; flooding may only affect the lowest elevations of the polygon). Suitable for day use recreational development such as hiking/trail and parks. Development of areas with Moderate constraint due to bedrock (BM) or topography (TM) is possible, especially if substrates are well-drained sand/gravel, but it may require more costly earthworks.
<b>L</b>	<b>Low</b> - Suitable for most residential, commercial or recreational development. Areas with Low constraint due to bedrock depth (BL) or topography (TL) may require additional development costs. Areas with Low constraint due to soil composition (SL) assume arbitrary soils; ground investigations may indicate coarser-grained soils, thus negating the constraint.
<b>N</b>	<b>None</b> - Area capable of supporting all conventional development (at least 80% of polygon).

Note: Severity classes represent the average, or typical, condition within the map unit (polygon) (e.g. Low). In some cases, actual classes at a specific location within the polygon may be higher (e.g. Moderate) or lower (e.g. None). Classes do not consider proximity to, or potential effects of, anthropogenic features such as roads, pipelines or other infrastructure.

Polygon symbology (based) based on highest severity constraint. Up to three of the highest severity constraint map codes, if all identified in the corresponding GIS file, may be listed within each polygon.

**Physical Land Development Constraint Subclasses and Map Codes**

LDC Type	Code	Description
Bedrock	BL	Bedrock is commonly 1-3 m from surface
	BM	Bedrock is commonly <1 m from surface, or up to 1/3 of the polygon is bedrock outcrop
	BH	Bedrock outcrop dominant
Erosion and Mass Movements	EM	Slope erosion (sheetwash, rilling and/or gullying), steep slopes with landslide or erosion potential, or fluvial erosion
	EH	Active or inactive mass movements (retention and/or raveling), or steep slopes adjacent to previous mass movements, includes permafrost-related flow-slide slides and subsidence
Soil Composition	SL	Clay-rich soils dominant
	SH	Compressible (organic) soils dominant, or potential soil contamination (e.g., landfill, mine tailings, sewage lagoon berms)
Topography <sup>1</sup>	TL	Average slope gradient 10-20%
	TM	Average slope gradient 20-30%
Permafrost Distribution	XH	Shallow (<1.5 m) permafrost with low to moderate ice content
	XM	Ice-rich permafrost potentially susceptible to differential ground settlement
Water Table Depth	WM	Water table <2 m from surface
	WN	Water table at surface (generally seasonally)
Flooding Recurrence	FM	Flooding recurrence assumed <5 years
	FH	Flooding recurrence assumed <5 years

<sup>1</sup> Slope classes consistent with those used by Krystek and Palmer (2014), Palmer (2010), and JAMA and Gartner Ltd (2004).

**Map Symbols**

Primary Road	—————
Secondary Road	.....
Other Road	.....
Watercourse	.....
Waterbody	.....
Study Area	.....

**KDFN Settlement Lands**

1. Physical land development constraints were assessed at a scale of 1:10,000 by the Yukon Geospatial Survey Society (2010).  
2. Constraints were derived from surface geology mapping and interpretation of 2010, 20-m-resolution LDM-derived elevation data, and 2010, 20-m-resolution orthophotography.  
3. Constraints were based on terrain conditions interpreted to pose a hazard for development and/or increase the cost of development. Colour-coded representation of the above constraint classification is based on the highest constraint, whether due to potential hazards or development complexity.