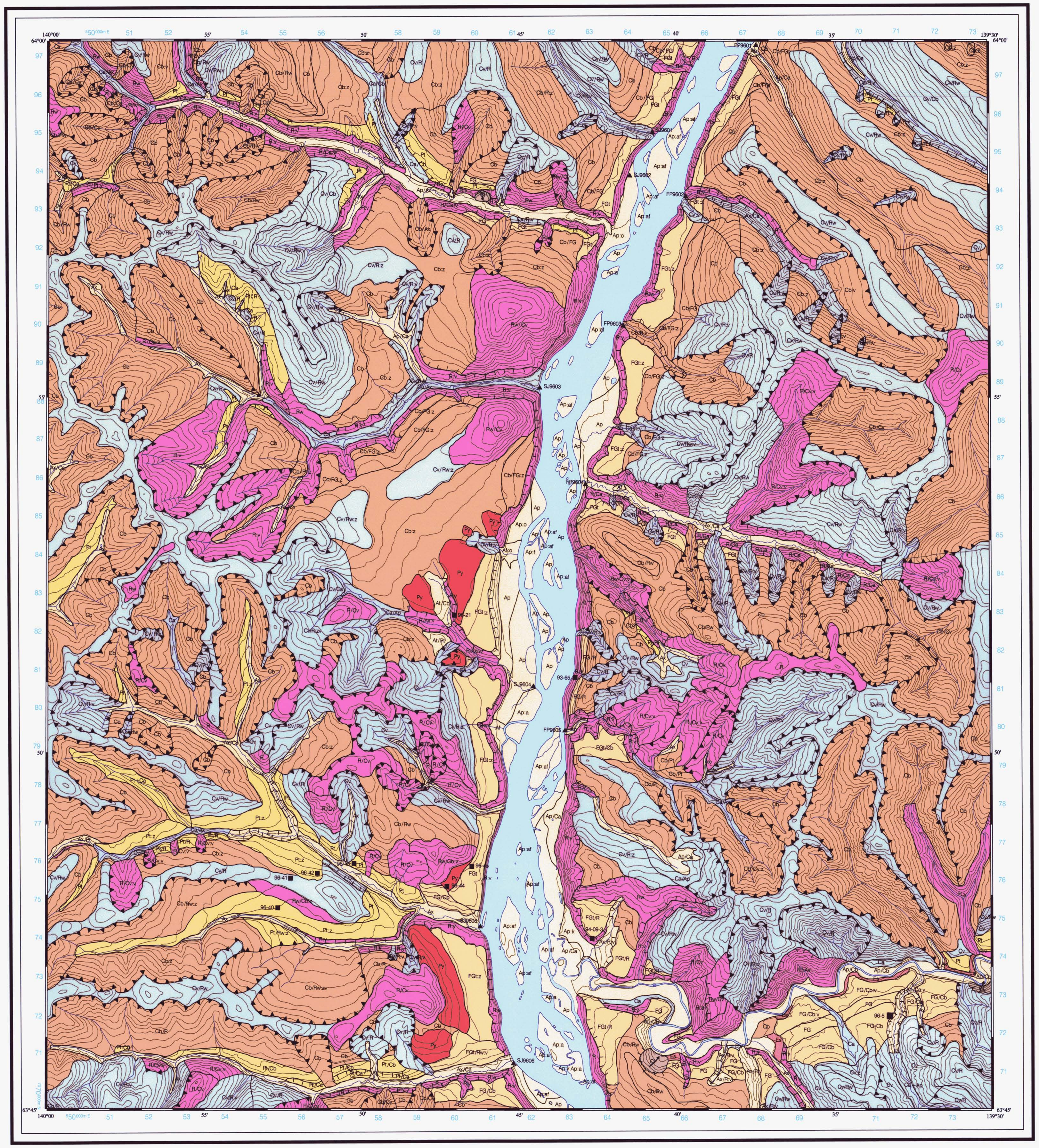
Canada

YUKON GEOLOGY PROGRAM

Yukon Government



SYMBOLS

Geological contact
Gully (teeth indicate downslope)
Landslide scarp
Steep slope (pegs indicate downslope)
Field study site ▲ FP9601
Heavy Mineral Sample site ■ 96-21

RECOMMENDED CITATION

MOUGEOT, C. and MORISON, S.R., 1998. Surficial geology of Garner Creek map area, Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada. Geoscience Map 1998-8, 1:50,000 scale.

This map accompanies Morison, S.R., Mougeot, C., and Walton, L., 1998. Surficial geology and sedimentology of Garner Creek, Ogilvie and Matson Creek map areas, western Yukon Territory (115 O/13, 115 O/12, 115 N/9-east half). Exploration and Geological Services Division, Indian and Northern Affairs Canada. Open File 1998-1.

Digital cartography and drafting by Forest Pearson, Gartner Lee Limited and Will van Randen, Yukon Geology Program.

Any revisions or additional geological information known to the user would be welcomed by the Yukon Geology Program.

Copies of this map, the accompanying report and Yukon Minfile may be purchased from Geoscience Information and Sales, c/o Whitehorse Mining Recorder, Indian and Northern Affairs Canada, Room 102-300 Main St., Whitehorse, Yukon Y1A 2B5. Ph. 867-667-3266 Fax 867-667-3267.

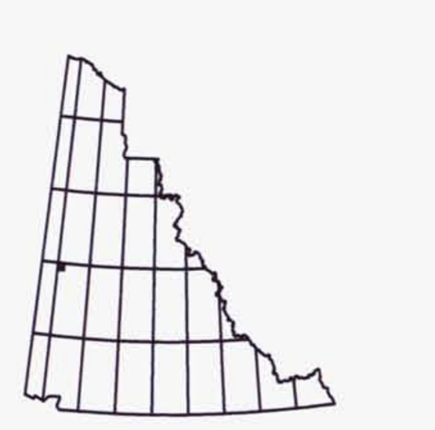
Keep this map stored in a dark area to prevent map colours from fading.

MAP SYMBOL	DESCRIPTION	COMPOSITION	TOPOGRAPHY AND THICKNESS	GEOGRAPHICAL DISTRIBUTION AND STRATIGRAPHY	POTENTIAL PROCESSES AND MODIFIERS MOST FREQUENTLY USED
ALLUVIAL DEPOSITS					
Af	Alluvial fan	Variable composition, from silt to coarse gravel. Poorly stratified, poorly sorted. Clasts often show imbrication subparallel to slope. Drainage usually poor at toe of slope. Organic sediments commonly present at the surface, and permafrost may be present at toe of north-northwest facing features.	Commonly moderate slope (less than 60%). Thickness increases towards the toe of slope and ranges between 1 to 5 m.	At the mouth of creeks and large gullies. Modern streams and gullies.	Most map units contain small streams with peak discharge in mid-summer. Slopes are susceptible to slow mass movement. Map unit is partially unvegetated and subject to seasonal flooding if modified by :af.
Ap	Alluvial plain	Variable composition, from silt to gravel. Clasts are mostly subrounded. Surface commonly capped by silt veneer. Can be well drained in coarse gravelly surface, and very poorly drained in depressions and fine sand to silt sediments.	Nearly level to undulating, terrace scarps may be present. Thickness varies between 2 and 6 m. Organic cover can be as thick as 2 m in some cases.	Lower terraces of streams. Floor of small creeks may have moderate slopes included in the map unit.	Most map units have very shallow water table. Not suitable for most development. Permafrost may be present under surfaces not covered by standing water. Removal of vegetation may cause ground subsidence and very poor drainage for several years. If modified by :a, map unit is actively reworked by fluvial processes. Most bars and small islands are modified by :af which inidicates high risk of flooding as well as active deposition or/and erosion. Channelled units with rapid change in drainage and textural conditions are modified by :c. Thermokarst depressions and permafrost are present in units modified by :k. A :o modifier indicates thick organic blanket and ice-rich permafrost is usually present.
At	Alluvial terrace	Loamy to sandy gravel. Gravel can be well stratified and well sorted with subrounded clasts. Organic or silt cap is common. Can be frozen at depth less than 1 m.	Nearly level to undulating surfaces.	Mostly along the Yukon and Stewart Rivers. Holocene and modern terraces.	Map units modified by :k have shallow permafrost and thermokarst depressions. Organic blanket, poor drainage and shallow permafrost are indicated by :o. These surfaces may become unstable if vegetation is removed and drainage may become very poor for several years.
Ax	Alluvium, mixed	Silt to gravel. Commonly poorly drained in depressions and at lower elevations. Organic cover common.	The upstream portion of this unit can have slopes has steep as 10%. Along streams and creeks, colluvium apron or fan can be included in the unit and topography and thickness can be variable.	This map unit is found in narrow drainages such as gullies which contain: mixed colluvial fans/aprons; alluvial fans and alluvial creek bottom deposits. These landforms cannot be separated at this scale of mapping.	Poor drainage, the presence of permafrost and the presence of fine-grained sediment in the gravel matrix may combine to form terrain which is highly susceptible to frost heaving and failure, spring thaw and runoff. Permafrost may be present in sheltered depressions. Flooding is possible during snow melt.
COLLUVIAL DEPOSITS					
Ca	Colluvial apron	Loosely consolidated diamicton; clasts range from cobble to boulder size. Lithologies are usually directly derived from rock located above such features.	Moderate to steep slopes. Thickness varies and is usually thicker toward base of slope.	Common along incised channels in creeks or gullies.	
Cb	Colluvial blanket	Silt loam to loam with 5 to 15 % coarse fragments. Deposits are poorly sorted and are weathered and frost shattered. Clasts are subangular to angular and are locally derived.	Moderate to steep slopes. Surface expression is controlled by underlying bedrock topography. The surface of colluvium blanket is smoother than colluvial veneer and commonly has denser vegetative cover. Thickness varies between 1 and 3 m, but may include pockets of thinner or thicker colluvium. Contact between colluvium and weathered rock is gradational.	Covers large surfaces on steep slopes such as gullies throughout the map area. It is associated with Cv or Rw in complex units.	Loose material which may be frozen at shallow depths (i.e., 30 to 40 cm). Mostly associated with steep slopes in gullies which are subject to slow mass movement such as soil creep and solifluction. Small detachment slides can also occur if the surface vegetation and permafrost are disturbed, or the water content increases during spring melt or after heavy rain. Solifluction lobes, sorted stripes and shallow permafrost is present in units modified by :z of :s.
Cf	Colluvial fan	Silt loam to loam with variable coarse fragment content. Deposits are poorly sorted, weakly stratified to massive, and clasts may have crude imbrication subparallel to the slope. Coarse fragment clasts are subangular to angular and are locally derived.	Variable thickness.	Located mainly at the toe of steep slopes and can be associated with avalanche paths.	Unvegetated slopes are usually considered active, unstable and unsuitable for development. Vegetated slopes are considered less active but surface disturbances may promote instability.
Cl	Landslide	Silt loam to boulders. Deposit is not sorted and highly variable. Clasts are subangular to angular and are locally derived.	Thickness varies greatly. The map unit includes debris flow scar areas, as well chute areas and areas of failed sediment.	Can be located along failing, undercut river banks or associated with slumping colluvium/rock slide at higher elevations.	Slopes are considered unstable and unsuitable for any development. Areas immediately surrounding slides should be considered as potentially unstable as well. In the case of high elevation slide areas, rock slides and coarse bedrock material is more common.
Cv	Colluvial veneer	Silt loam to loam with 5 to 15 % coarse fragments. Deposits are poorly sorted, and are weathered and frost shattered. Clasts are subangular to angular, and are locally derived.	Moderate to steep slopes. Surface expression is controlled by underlying bedrock topography. Deposits are usually thinner than 1 m but include thicker accumulations in depressions.	Throughout the map area in upper and mid-slope positions.	Loose material which may be frozen at shallow depths (e.g., 30 to 40 cm). Mostly associated with steep slopes in gullies which are subject to slow mass movement such as soil creep and solifluction. Small detachment slides can also occur if surface vegetation and permafrost are disturbed, or the water content increases during spring melt or after heavy rain.
Cx	Colluvium, mixed	Silt loam to loam with 5 to 15 % coarse fragments. Deposits are poorly sorted and are weathered and frost shattered. Clasts are subangular to angular and are locally derived.			Loose material which may be frozen at shallow depths (e.g. 30 to 40 cm). Mostly associated with steep slopes in gullies which are subject to slow mass movement such as soil creep and solifluction. Small detachment slides can also occur if the surface vegetation and permafrost are disturbed, or the water content increases during spring melt or after heavy rain.
GLACIO-FLUVIAL					
FGt	Glaciofluvial terrace	Weathered distal proglacial gravel which is clast supported, and massive to distinctly stratified. Sorting ranges from well sorted to moderately well sorted and the matrix sediments are generally sandy. Clast are subrounded to rounded and pebble lithologies are representative of regionally derived bedrock sources. Many glaciofluvial terraces along the Yukon River have been scoured with only a veneer of sand and gravel.	Surfaces are gently undulating to flat. Gravel thickness ranges from less than 1 m on scoured surfaces to in excess of 10 m.	Glaciofluvial terraces are pre-Reid and were formed as a result of proglacial outwash from the Stewart River and White River drainage basins. Smaller tributaries such as Indian River received meltwater though a pass northeast of Wounded Moose Dome. These tributary valleys have thick accumulations of glaciofluvial gravel the scoured terrace surfaces in the Yukon River valley.	Locally colluviated gravel occurs on surface or in map units covered by bedrock colluvium (e.g., Cv/FG or Cb/FG). The gravel is often frozen at depths greater than 2.5 m. Placer gold sampling has shown limited quantities of placer gold is found in glaciofluvial terraces in the lower reaches of the Stewart River (see section descriptions from Fuller 1993, 1994 and 1995 in accompanying report). Favourable placer gold concentrating environments such as interglacial gravelly sedimentation or pre- glacial stream sedimentation is lacking (Froese, 1996; Ager at al., 1994).
PEDIMENT					
Py	Paleo-Yukon River terrace	Loess cap which covers a highly weathered, fine-grained and well sorted gravelly sediment. Distinct pebble lithology which suggests a northerly provenance (Duk- Rodkin, pers. comm.).	Flat and inclined surfaces which are dissected by creek and gulch channel systems. Gravel appears to be in excess of 5 m thick.	High terraces along the Yukon River above the 1500 foot contour.	Gravel is not generally frozen and this is considered to be an unfavourable setting for placer gold mineralization.
Pt	Pediment terrace	Thin, poorly sorted mixed gravel which is locally derived and is dominantly composed of local bedrock and rubbly fragments.	Narrow, gently sloping terraces with unconsolidated gravelly material which is usually thinner than 5 m and is often covered by slope colluvium. Mounded microtopography and permafrost may be present on northerly slopes.	Unglaciated tributary drainage systems such as Galena and Ten Mile creeks and many unidentified small tributaries of the Yukon River and the Sixty Mile River.	Fine-grained gravelly matrix may contain ice-rich permafrost in sheltered areas. Map units showing well developed gullying or rills are mapped by :v.
BEDROCK					
R	Bedrock		Cliffs, steep ridges, steep slopes.	Possible cirques around Mount Tyrrell from independent valley glaciers, however mapped as gullied. Bedrock outcrop found through map areas.	Avalanches and mass movement are probable in map units modified by :m.
Rw	Weathered bedrock	Fragmented, weathered rock fragments which are in place.	Upper slopes to apex positions.	Common throughout the map area.	
MIXED					
Es	Eroded Slope	Two or more of the above units.	Slopes usually steeper than 60%.	Mostly along streams.	Unvegetated slopes are usually actively eroding.

REFERENCES CITED:

AGER, T. A., MATHEWS, J.V. Jr., and YEEND, W., 1994. Pliocene terrace gravels of the ancestral Yukon River near Circle, Alaska: palynology, paleobotany, paleoenvironmental reconstruction and regional correlations. Quaternary International, vol. 22/23, p. 185-206.

FROESE, D.G. and HEIN, F.J., 1996. Sedimentology of a high level terrace placer gold deposit, Klondike Valley, Yukon. In: Yukon Quaternary Geology, Volume 1, Exploration and Geological Services Division, Yukon Region, Indian and Northern Affairs Canada, p. 13-25



Topographic base produced by SURVEYS AND MAPPING BRANCH, DEPARTMENT OF ENERGY, MINES AND RESOURCES.

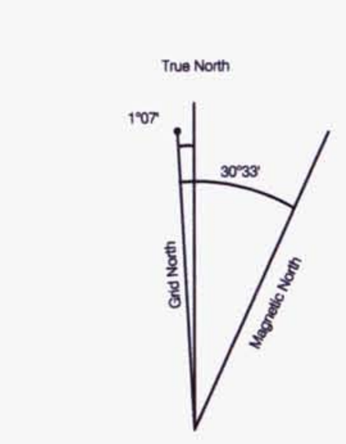
ONE THOUSAND METRE
Universal Transverse Mercator Grid
ZONE 7

GARNER CREEK
YUKON TERRITORY
SCALE 1:50 000

Miles 1 0 1 2 3 Milles

Metres 1000 0 1000 2000 3000 4000 Mètres

CONTOUR INTERVAL 100 FEET Elevations in Feet above Mean Sea Level
North American Datum 1927 Transverse Mercator Projection



Use diagram only to obtain numerical values
APPROXIMATE MEAN DECLINATION 1961
FOR CENTRE OF MAP
Annual change decreasing 3.5'

116 C/1	116 B/4	116 B/3
115 N/16	115 O/13 THIS MAP	115 O/14
115 N/9 Geoscience Map 1998-7	115 O/12 Geoscience Map 1998-7	115 O/11

Indian and Northern Affairs Canada
Exploration and Geological Services Division
Yukon Region

Geoscience Map 1998-8

SURFICIAL GEOLOGY OF GARNER CREEK NTS 115 O/13

by

Geology by Mougeot GeoAnalysis
and Gartner Lee Limited, 1996, 1997.