GEOLOGICAL SURVEY OF CANADA — COMMISSION GÉOLOGIQUE DU CANADA

DEPARTMENT OF ENERGY, MINES AND RESOURCES
MINISTÈRE DE L'ÉNERGIE, DES MINES ET DES RESSOURCES

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LEGEND TO ACCOMPANY SURFICIAL GEOLOGY/GEOMORPHOLOGY MAPS OF SOMERSET AND PRINCE OF WALES ISLANDS, N.W.T.

by J.A. Netterville, A. S. Dyke, R.D. Thomas

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MAP UNIT	MATERIAL	LANDFORM: ORIGIN	LANDFORM: TOPOGRAPHY	DRAINAGE	THICKNESS OF ACTIVE LAYER (est. range in metres based on field observations, Aug. 1975)	GROUND ICE	ADDITIONAL COMMENTS
tMv	till; mostly sandy and high in igneous rock detritus where unit overlies Precambrian granitic rocks; mostly silty and high in sedimentary rock detritus where unit overlies Paleoozic and younger bedrock.	ground moraine	commonly gently to strongly irregular where unit overlies Precambrian bedrock; gently irregular to broadly rolling where unit overlies Paleozoic or younger bedrock; scattered outcrops of bedrock	units overlying rugged Precambrian terrain are commonly well drained; scattered small poorly drained to partly flooded depressions occur on broadly rolling granitic terrain between Aston Bay and Stanwell-Fletcher Lake	0.6 - 0.8	limited subsurface information indicates the presence of ice crystals, coatings and lenses; little or no tabular massive ice is expected where till cover is thin (less than 1.5 m); elsewhere, the presence of numerous high centred polygons suggests that ice wedges are a common phenomena occurring in till deposits greater than about 1.5 m thick; massive ice bodies are known to occur in the silty till south of Stanwell-Fletcher Lake on Somerset Island and south of Emily Bay on Prince of Wales Island	silty till deposits south of Stanwell-Fletcher Lake on Somerset Island and south of Emily Bay on Prince of Wales Island believed to be partially derived from marine sediments lying in Peel Sound and Viscount Melville Sound, respectively
tMp	as above, moderately stony to sandy and silty till of very low plasticity overlies granitic bedrock along the west coast of Somerset Island and south of Stanwell-Fletcher Lake		little or no surface undulation; surface tilt provides relief and slope marked on map by appropriate designators	moderately to poorly drained			
tM(m,h,r)		as above; mainly disintegration moraine on northwest Prince of Wales Island	broadly rolling to hummocky or ridged; high-centred ice wedge polygons are common and impart a degree of roughness to the surface	predominantly well drained			
gIv	gravel	ice-contact outwash	commonly reflects the gently to strongly irregular relief of underlying granitic bedrock	well drained	06. - 1.0	abundant ice wedges in non-veneer units, as shown by the presence of ice wedge troughs and high centred polygons; no subsurface information available	limited source of coarse aggregate; occur at widely scattered localities primarily on hillsides within granitic terrain northwest and northeast of Stanwell-Fletcher Lake on Somerset Island and on carbonate and shale bedrock southwest of Drake Bay on Prince of Wales Island
gI(h,m,r,k)			gently to strongly irregular; occur as isolated features or clusters of features, often along a linear trend				
gIp			little to no surface undulation; occasional small terraces or channel scars; surface tilt provides relief and slope marked on map by appropriate designators				
gIt		terraced ice-contact outwash	little or no surface undulation other than that imparted by terrace scarps, the heights of which vary directly with unit relief				
gFv		proglacial outwash	relief is variable, reflecting topography of underlying material				
gFp			little or no surface undulation; occasional small terraces or channel scars; surface tilt provides relief and slope marked on map by appropriate designators				
gFt		terraced proglacial outwash	little or no surface undulation other than that imparted by terrace scarps, the heights of which vary directly with unit relief				
(s,g)Dp	sand, gravel, minor amounts of silt; high in angular carbonate rock detritus where deposit overlies Paleozoic bedrock; high in igenous rock detritus where deposit overlies granitic bedrock	delta	nearly flat surfaces marked in places by shallow abandoned channels or low terrace scarps	commonly moderately drained	0.6 in sand, increasing to 1.0 in gravel	ice wedges occur infrequently as most of these deposits are currently aggrading their beds	limited source of fine and coarse aggregate occurring primarily where rivers and streams enter standing bodies of water
gDt	gravel, as above	terraced delta	one or more relatively level or gently inclined surfaces, commonly bounded along the lower edge by a steep descending slope; shallow abandoned channels 1 to 2 m deep mark the surface of some terraces		0.6 - 1.0	ice wedges occur infrequently, as suggested by the sporadic occurrence of ice wedge troughs and high centred polygons; no subsurface information available	good local sources of coarse aggregate; occur at widely scattered localities primarily along the 500 ft (150 m) contour southwest of Arabella Bay on Prince of Wales Island and the 300 ft (90 m) contour between Birmingham Bay and Four Rivers Bay on the west coast of Somerset Island
(f,s)ffIv	clay to fine sand, sand	marine, primarily offshore	relief and slope are variable, reflecting topography of underlying material; earth and vegetation hummocks with 20 to 30 cm relief are abundant on deposits containing a high percentage of silt or clay	clay and silt are poorly to moderately drained; sand surfaces are well drained except in areas with numerous low-centred polygons, which often contain small ponds of standing water	0.2 - 0.5 in clay and silt; increasing to 0.6 in sand	massive tabular ground ice often forms a layer 20 to 40 cm thick just below or at the permafrost table in silty deposits; moisture contents of 25 to 50 percent (by weight) are common below a depth of 1.75 m; sand-silt mixtures generally have a higher water (ice) content than clean sands; moisture contents generally decrease with depth; flat lying sandy deposits contain numerous ice wedges, as shown by the presence of numerous ice wedge polygons; retrogressive thaw-flow slides expose massive ice several metres thick and tens of metres across in silt-sand deposits north of Stanwell-Fletcher Lake and south of Cresswell Bay on Somerset Island, and along Beams Brook on Prince of Wales Island	limited aerial extent occurring primarily on lowland terrain north of Cresswell Bay on Somerset Island and at the head of the northern arm of Backs Bay on Prince of Wales Island
(f,s)ffI(p,m)			nearly flat or gently irregular surfaces; earth and vegetation hummocks abundant on clay and silt				common landforms along coastal lowlands on both islands; occur up to 750 ft. (225 m) a.s.l. west of Fury Beach; cover extensive tracts of lowland terrain north and south of Creswell Bay on Somerset Island and between Backs Bay and Browne Bay on Prince of Wales Island
gffI(v,r)	gravel; high in angular carbonate rock detritus where deposit overlies Paleozoic bedrock; high in igneous rock detritus where deposit overlies granitic bedrock	marine nearshore, including beaches, spits and bars	relief and slope are variable, primarily reflecting topography of underlying material; areas with abundant beach ridges (1 to 3 m in height) are marked on the map by the appropriate designator	predominantly well drained; poorly to moderately drained in low areas between ridges and mounds where fine-grained sediments have accumulated	0.6 - 1.0	ice wedges occur frequently in thick, gently sloping deposits, as suggested by the frequent occurrence of narrow ice-wedge troughs	a good source of coarse aggregate occurring extensively along most coastlines up to an elevation of 500 ft (150 m) on southeast Somerset Island and 300 ft (90 m) elsewhere
gffIr			single ridge or series of ridges and intervening elongate depressions; individual ridges generally 1 to 3 m in height; unit relief and slope dependent upon relief and slope of underlying material				
gffI(p,r)			commonly gently dipping surfaces marked by a series of narrow, low relief (1 m or less) terrace-like steps; areas with abundant beach ridges (1 to 3 m in height) are marked on the map by the appropriate designator				excellent source of coarse aggregate primarily in areas of sedimentary bedrock
(f,s,g) Av	clay to fine sand, sand, gravel; as above for gravel size material	alluvial floodplain	reflects topography of underlying material; normally almost flat	inactive floodplains and terraces are commonly moderately to well drained; deposits mapped as active often include small inactive portions along the margins of the unit.	0.3 - 0.5 in clay and silt; increasing to 1.0 in gravel	ice wedges occur frequently on both fine and coarse grained inactive floodplains and terraces, as suggested by the presence of numerous ice wedge troughs; no subsurface information available	inactive deposits occur only rarely and form a limited local source of fine and coarse aggregate
(f,s,g) Ap			nearly flat surfaces marked in places by shallow channels usually less than 2 m deep; low centred polygons commonly with less than 1 m relief are abundant on inactive, finer grained deposits				
(s,g,)At	sand, gravel; as above for gravel size material	alluvial terrace	as for gDt		0.6 - 1.0		limited source of mainly coarse aggregate
(s,g)Af		alluvial fan	sloping surfaces forming a segment of a cone, commonly at places where there is a noticeable change in stream gradient; abandoned channels are present on some fan surfaces	well drained			
(ƒ,s,r)Cv	generally sand and rock rubble in areas of granitic terrain; silt, sand and rock rubble in areas of sedimentary bedrock	colluvial	reflects topography of underlying material	well drained on scarps; moderately to well drained on areas of rolling granitic bedrock.	0.5 in rubbly silt increasing to 1.0 in gravel-size rubble	not applicable as colluviation occurs only in active layer	a common deposit along most scarps in bedrock dominated terrain; includes colluvial fans as well as solifluction deposits in areas of granitic bedrock; areas of intense solifluction have not been mapped in areas of sedimentary bedrock due to generally poor tonal contrast with adjacent areas of stable ground
(ƒ,s,r)Wv	variable; finer grained fractions reflect grain or crystal size of underlying bedrock; generally sandy to gravelly on areas of sedimentary rock; predominantly rock rubble up to boulder size in areas of granitic terrain	mechanical and/or chemical weathering	relief and slope reflect topography of underlying bedrock; small (2 - 5 m high) tors and tor-like features occur as isolated features or in clusters at many localities; development of boulder felsenmeer on granitic terrain north of Stanwell-Fletcher Lake has created a rough surface with variable microrelief dependent upon size and spacing of the frost-riven blocks.	predominantly moderately to well drained		ice coatings around clasts and pebbles; irregular inclusions and lenses of ice a few centimetres thick; water (ice) content of permafrost likely exceeds 25 percent; numerous ice wedges in weathered material overlying carbonate and sandstone bedrock of north-central Prince of Wales Island, as shown by the presence of numerous ice wedge troughs	material cannot be considered in situ due to intense cryoturbation in active layer; includes colluvium and solifluted material, particularly in areas underlain by sedimentary bedrock; also includes glacial erratics and relatively small amounts of till admixed or on the surface
$^{ES}R(m,h)$	Eureka Sound Formation (unconsolidated to poorly consolidated siltstone, sandstone, shale, lignite)	preglacial, glacial and post-glacial erosion	broadly rolling to nearly flat; commonly deeply dissected by stream erosion along major drainage courses north of Stanwell-Fletcher Lake		0.6 to 0.8	low ice content north of Stanwell-Fletcher Lake and at well drained localities near Cunningham Inlet; sharp drop in mositure content with depth; segregated ice usually confined to uppermost 1.5 - 2 m; ice lenses commonly limited to uppermost 3-4 m; massive ice not expected in deposit near Cunningham Inlet	depressions often contain scattered thin drift deposits; small areas of weathered bedrock on southern Somerset Island have not been mapped; colluvial (talus) deposits consisting primarily of frost-shattered bedrock have accumulated at the base of most scarps; bedrock geology based primarily on Map 3-1967 by R.G. Blackadar, R.L. Christie and F.C. Taylor, "Precambrian Geology of Boothia Peninsula, Somerset Island, and Prince of Wales Island, District of Franklin", Geological Survey of Canada, Bulletin 151, 1967 and on more recent maps by R. L. Christie in "Geology of Prince of Wales and adjacent small islands, District of Franklin", Geological Survey of Canada, Open File 66, 1971. The bedrock map of Somerset Island is currently under revision.
$^{(c,s,s,cgl)}R(m,h,r,p,s)$	carbonate, shale, sandstone, conglomerate		mostly broadly rolling to nearly flat; marked at scattered localities by generally low and irregular scarps formed by frost action and mass wasting locally intensified along bedding planes which outcrop at the surface; hummocky, ridged and strongly rolling topography superimposed upon gently rolling terrain is best developed over much of the extreme northern and eastern parts of Somerset Island		no quantitative information available	low centred ice wedge polygons are known to occur in carbonate bedrock west of Cape Briggs on Prince of Wales Island; no subsurface information available	
$^{g}R(m,h,r,s)$	granitic bedrock		gently to strongly irregular near coastline; predominantly gently to strongly rolling in inland areas north and south of Stanwell-Fletcher Lake; areas characterized by numerous residual rock knobs, hillocks, and tors are marked onthe map by the appropriate designator; relief and slope classes indicated are median figures, which, due to boundary positioning, generally represent maximum figures for the unit.			no subsurface information available	

EXPLANATION OF MAP SYMBOLS

DOMINANT TEXTURE
(lower case letter)

r - rock rubble
g - gravel
s - sand
ƒ - silt and fine sand
f - clay to fine sand
t - till

BEDROCK TYPE
(superscript)

g - granitic
c - carbonate
s - sandstone
ƒ - shale
cgl - conglomerate
ES - Eureka Sound Formation

ORIGIN
(upper case letter)

M - morainal
I - ice-contact outwash
F - proglacial outwash
ff - marine
D - deltaic
A - alluvial (inactive)
A - alluvial (active)
R - bedrock
W - weathered product

MORPHOLOGY
(lower case letter)

p - plain
m - rolling
h - hummocky
r - ridged
t - terraced
k - kettled
f - fan
t - tan

MORPHOLOGIC MODIFIER
(upper case letter)

D - dissected
W - washed

RELIEF CLASS
(numeric)

1 - less than 5 metres
2 - 5 to 20 metres
3 - 20 to 50 metres
4 - greater than 50 metres

SLOPE CLASS
(numeric superscript)

1 - less than 5 degrees
2 - 5 to 15 degrees
3 - 15 to 35 degrees
4 - greater than 35 degrees

Glacial striae (ice direction known, not known)
Drumlin, drumlinoid, fluting (ice direction indicated, not indicated)
Crag - and - tail (ice movement in direction of arrow)
Moraine ridge
Esker (direction of flow assumed, uncertain)
Meltwater channel (large, small)
Abandoned beach ridge
Escarpment
Retrogressive thaw-flow slide
Ice wedge polygons (areas known to contain ice wedges)
Rock glacier

STRATIGRAPHY

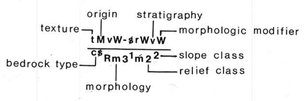
Veneer units (less than 1.5 metres thick) are indicated by the lower case letter "v" after the generic symbol. A horizontal line separates the veneer unit symbols from the symbols representing the underlying unit.

COMPOSITE UNITS

/ first of units covers more than 80% of total unit area
- first of units covers 60 - 80% of total unit area
= units are of roughly equal proportions

Note: units which comprise less than 5% of the total area of another unit are not mapped

EXAMPLE



Describes an area which consists of gently rolling carbonate and shale bedrock with macroscopic relief of 20 - 50 m and slopes commonly less than 5°. Superimposed on this gently rolling landscape occur lower bedrock hills (relief 5-20 m) with steeper slopes of 5 - 15°. About 60 - 80% of the area is covered by a veneer (less than 1.5 m) of till; the remainder (20 - 40% of the area) is covered by a veneer of silty rubble produced by weathering of the bedrock. The entire area was once below water. This has to some extent modified the original materials through sorting and/or redeposition.

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EXPLANATION OF TERMS

Texture:

gravel	>1 mm (>25% of deposit)
sand	0.5 - 4 mm
silt and fine sand	.002 - .25 mm
clay to fine sand	<.25 mm

Till Predominantly unsorted and unstratified drift consisting of a heterogeneous mixture of clay, silt, sand, gravel and boulders

Rock rubble Angular frost-shattered bedrock of gravel and boulder (>256 mm) size (>25% of deposit)

Bedrock type:

GRANITIC A term broadly applied to identify coarse-grained igneous or metamorphic rock containing quartz as an essential component, along with feldspar and mafic minerals; mainly refers to granite and granite gneiss; may include minor outcrops of other igneous, volcanic, or metamorphic rocks.

CARBONATE A term intended to identify rocks which consist primarily of carbonate minerals; mainly refers to limestones or dolomites; may include minor occurrences of conglomerate, breccia, sandstone, or shale.

SHALE A laminated sedimentary rock in which the constituent particles are predominantly of the clay or silt grades; may include minor outcrops of sandstone or carbonates.

SANDSTONE A cemented or otherwise compacted detrital sediment composed predominantly of sand-sized quartz grains; may include minor outcrops of conglomerate, carbonates, or shale.

CONGLOMERATE A cemented clastic rock containing rounded fragments corresponding in their grade size to gravel or pebbles; may include minor outcrops of sandstone.

Origin:

MORAINAL Relating to accumulations of unsorted, unstratified glacial drift (till) deposited chiefly by the direct action of glacier ice in a variety of landforms that are primarily independent of control by the surface on which the drift lies.

ICE-CONTACT OUTWASH Landforms consisting of stratified deposits formed in contact with melting glacier ice, such as an esker or kame.

PROGLACIAL OUTWASH Pertaining to the landforms and stratified deposits produced by meltwater flowing from wasting glacier ice.

MARINE Pertaining to materials deposited in marine enviornments. These may form a blanket of offshore silts and clays, or may occur as a series of marine nearshore features, largely composed of gravel and sand, such as spits, bars and beaches.

DELTAIC Refers to alluvial sediments deposited where rivers or streams enter (entered) standing bodies of water, forming broad, nearly horizontal tracts of land, large or small, which extend (extended) into the present (former) water body.

ALLUVIAL Sorted sediments of wide particle size range, transported and deposited by running water in postglacial time. Units are subjectively mapped as active or inactive. Active floodplains are those immediately adjacent to and below the assumed or apparent maximum annual flood level of the river or stream which deposited them. They commonly support only scant vegetation due to yearly flooding and deposition of fresh sediment. The surfaces of inactive floodplains are generally at an elevation of 1 to 3 m above the assumed or apparent maximum annual flood level.

COLLUVIAL A general term applied to loose and incoherent deposits, usually at the foot of a slope or cliff and brought there chiefly by gravity; may include solifluted material on gentle or strong slopes.

EOLIAN Pertains to deposits such as loess or dune sand whose constituents were transported, and deposited, by wind.

WEATHERED PRODUCT A general term referring to any significant occurrence of essentially in situ or cryoturbated unconsolidated or partially consolidated material derived from an underlying bedrock source through the action of mechanical and/or chemical weathering.

BEDROCK A general term for the rock, usually solid, that underlies unconsolidated surficial material, or is exposed.

Morphology:

PLAIN An area of terrain, large or small, with little or no surface undulation; total relief and average slope indicated by appropriate numeric symbols.

ROLLING A gently to strongly defined succession of hills or broad undulations that impart a wave effect to the surface.

HUMMOCKY A term referring to the presence of moderately to strongly defined mounds, knolls, hillocks, or tors which may occur in closely spaced groups mappable as a single terrain unit, or as individuals superimposed upon a rolling, ridged, or plainar landscape.

RIDGED A term referring to the prescence of gently to stronglydefined linear hills or smaller surface undulations which may occur as large individuals or in closely-spaced groups mappable as a single terrain unit, or as individuals or closely-spaced groups of individuals superimposed upon a rolling or plainar landscape.

TERRACED Refers to the presence of one or more, relatively level or gently inclined surfaces, bounded along one edge by a steep ascending slope and along the other by a steep descending slope. Terraces commonly occur along the margin, and above the level of an ocean, lake or river, marking former water levels.

KETTLED An area characterized by numerous steep-sided, bowl- or basin-shaped depressions often containing a small lake or pond; primarily occurs only in ice-contact, or near-glacial, outwash deposits.

FAN A gently to strongly sloping mass of alluvial or colluvial material forming a segment of a cone, commonly at a place where there is a noticeable change in gradient. Colluvial fans, deposited chiefly by mass wasting, are generally too small to map at a scale of 1:125,000. They are a common landform situated at the base of most scarps in bedrock-dominated terrain.

SCARPED An area containing one or more escarpments, cliffs or very steep slopes of some extent along the margin of a plateau, mesa, terrace, bench, or forming the sides of a valley.

Morphologic modifier:

DISSECTED A term referring to a pattern of closely spaced gullies, ravines, valleys, or other linear depressions, and the remnant interfluve ridges, formed by water erosion acting upon a gently undulating or plainar topographic surface.

WASHED A general term referring to landforms which have been modified in some manner by wave action. The process has resulted in the sorting of in some manner by wave action. The process has resulted in the sorting of surface material, such that fine-grained sediment has been moved from high ground to adjacent depressions, or in the formation of scattered minor beaches.