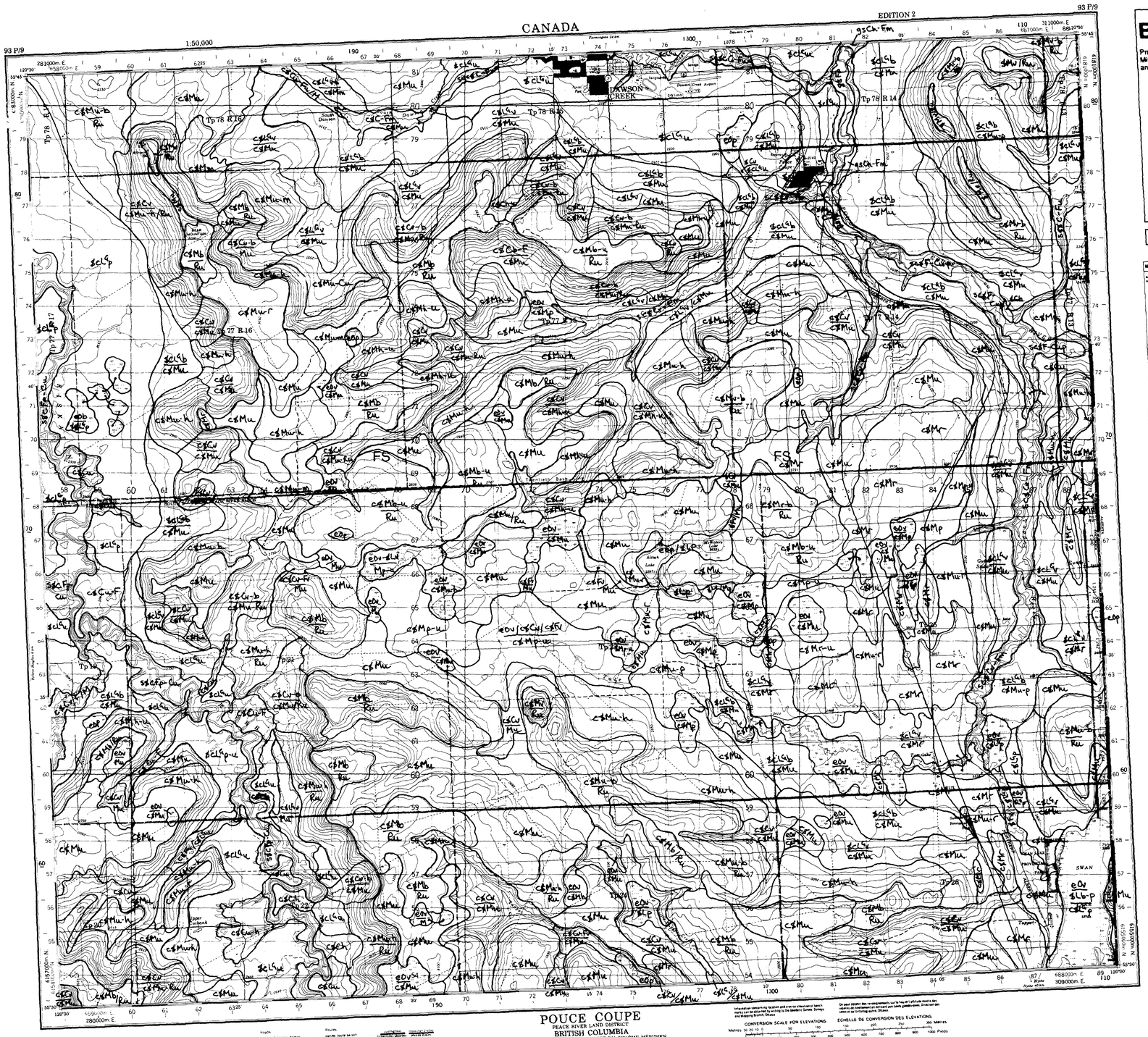

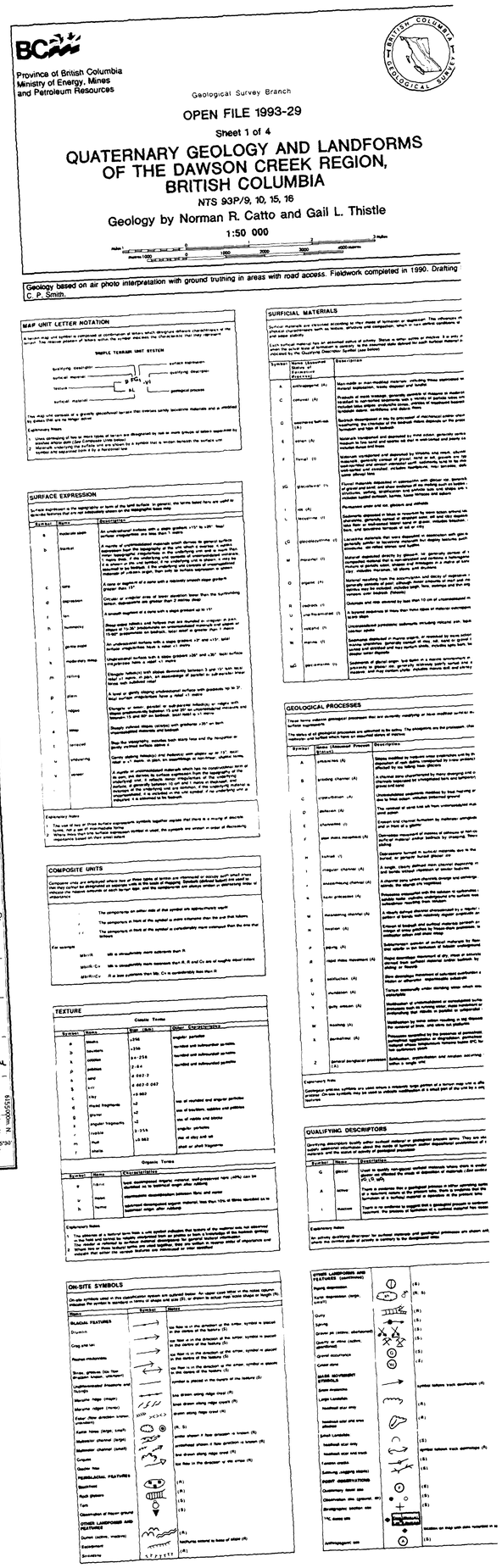

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Sheet 1 of 4

QUATERNARY GEOLOGY AND LANDFORMS OF THE DAWSON CREEK REGION, BRITISH COLUMBIA

NTS 93P/9, 10, 15, 16

Geology by Norman R. Catto and Gail L. Thistle

1:50 000

Geology based on air photo interpretation with ground truthing in areas with road access. Fieldwork completed in 1990. Drafting C. P. Smith.

MAP UNIT LETTER NOTATION

SURFICIAL MATERIALS

SURFACE EXPRESSION

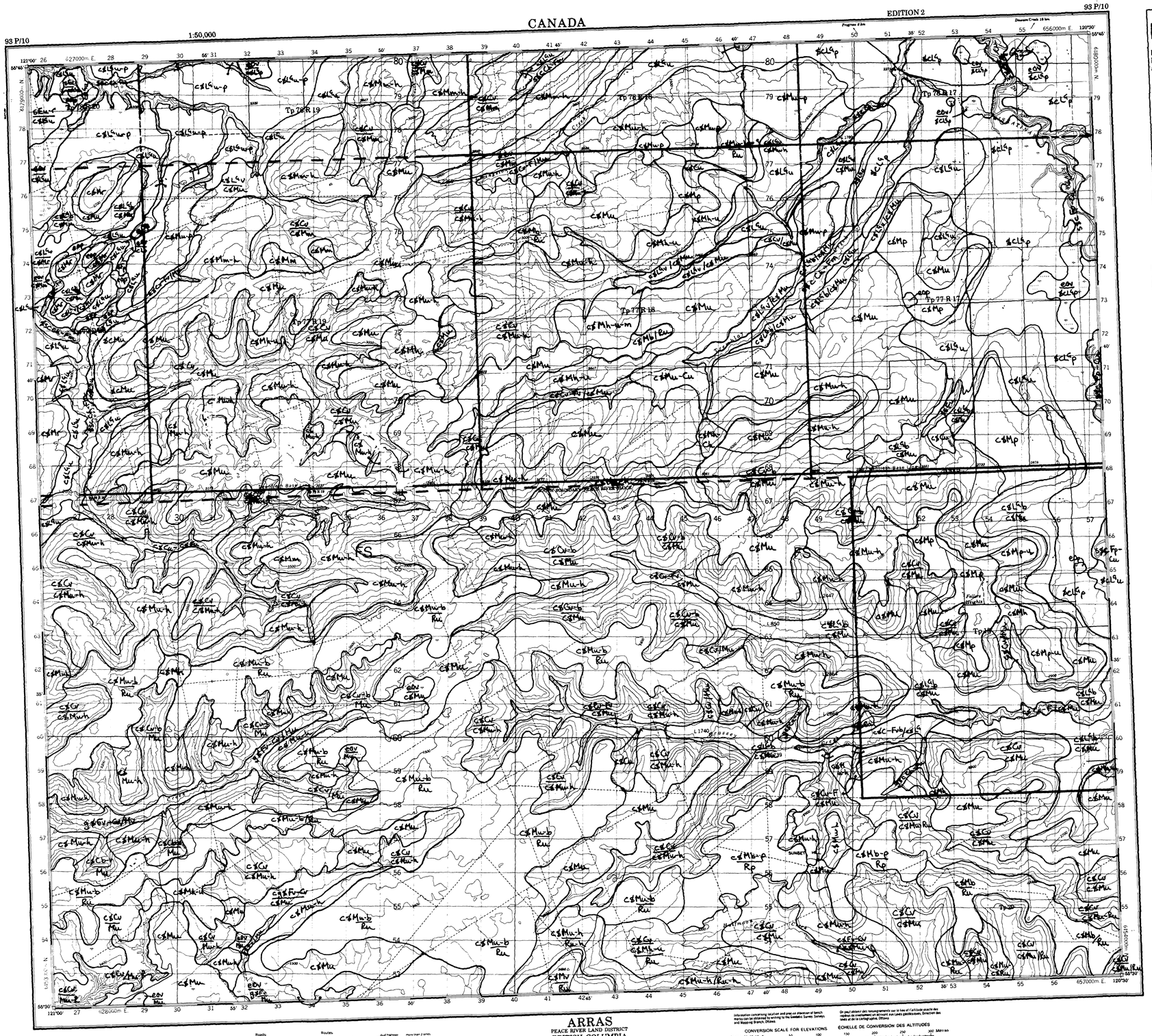
GEOLOGICAL PROCESSES

COMPOSITE UNITS

TEXTURE

QUALIFYING DESCRIPTORS

ON-SITE SYMBOLS



ARRAS

PEACE RIVER LAND DISTRICT
BRITISH COLUMBIA
WEST OF SIXTH MERIDIAN-OUEST DU SIXIÈME MÉRIDIEN

Scale 1:50,000 Échelle

Roads:	Routes:	surfaced	unsurfaced
hard surface, all weather	pavée, toute saison	2 lanes / 2 voies	more than 2 lanes / plus de 2 voies
hard surface, all weather	pavée, toute saison	2 lanes / 2 voies	more than 2 lanes / plus de 2 voies
loose or stabilized surface, all weather	gravier, aggloméré, toute saison	2 lanes / 2 voies	more than 2 lanes / plus de 2 voies
loose surface, dry weather	de gravier, temps sec	2 lanes / 2 voies	more than 2 lanes / plus de 2 voies
unclassified streets	rues non classées		
cart track	de seve		
trail, cutline or portage	sentier, percée ou portage		

FOR COMPLETE REFERENCE SEE REVERSE SIDE — POUR UNE LISTE COMPLÈTE DES SIGNES, VOIR AU VERSO

Miles 1 0 1 2 3 Miles
Metres 1000 0 1000 2000 3000 4000 Mètres
Yards 1000 0 1000 2000 3000 4000 Yards

Information concerning location and price can be obtained from a bench mark can be obtained by writing to the Geodetic Survey, Surveys and Mapping Branch, Ottawa.

On peut obtenir des renseignements sur le lieu et l'altitude exacte des repères de nivellement en écrivant aux Levés géodésiques, Direction des levés et de la cartographie, Ottawa

CONVERSION SCALE FOR ELEVATIONS

Metres 30 20 10 0 50 100 150 200 250 300 Metres
Feet 100 50 0 100 200 300 400 500 600 700 800 900 1000 Pieds

CONVERSION SCALE FOR ELEVATIONS
Elevations in Feet above Mean Sea Level
North American Datum 1927
Transverse Mercator Projection

ÉCHELLE DE CONVERSION DES ALTITUDES
ÉQUIDISTANCE DES COURBES 100 PIEDS
Altitudes en pieds
Système de référence géodésique nord-américain, 1927
Projection transverse de Mercator

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Sheet 2 of 4

QUATERNARY GEOLOGY AND LANDFORMS OF THE DAWSON CREEK REGION, BRITISH COLUMBIA

NTS 93P/9, 10, 15, 16

Geology by Norman R. Catto and Gail L. Thistle

1:50 000

Miles 1 0 1 2 3 Miles
Metres 1000 0 1000 2000 3000 4000 Metres

Geology based on air photo interpretation with ground truthing in areas with road access. Fieldwork completed in 1990. Drafting by C. P. Smith.

MAP UNIT LETTER NOTATION

A letter map unit symbol is composed of combination of letters which designate different characteristics of the terrain. The relative position of letters within the symbol indicates the characteristic that they represent.

SIMPLE TERRAIN UNIT SYSTEM

qualifying descriptor — surficial material — lithologic — surficial material — surface expression — qualifying descriptor — geological process

Example: B FGl y l — B: qualifying descriptor; FGl: surface expression; y: surficial material; l: geological process

The area one contours of a gravelly glaciofluvial terrace that overlaps partly bouldrous materials and is modified by gullies that are no longer active.

Explanatory Notes

1. Units consisting of two or more types of terrain are designated by two or more groups of letters separated by slashes (refer also Composite Units below).
2. Materials underlying the surface are are shown by a symbol that is written beneath the surface unit symbol and separated from it by a horizontal line.

SURFACE EXPRESSION

Surface expression is the topography or form of the land surface. In general, the terms listed here are used to describe features that are not adequately shown on the topographic base map.

Symbol	Name	Description
a	escarpment slope	An unconsolidated surface with a slope gradient >15° to <35°. Scattered surface irregularities are less than 1 metre.
b	talus slope	A mantle of unconsolidated rock material (blocks) on the general surface which has the topography of the unit which it overlies. It indicates weathering and disintegration of the underlying unit and is more than 1 metre thick. If the underlying unit consists of unconsolidated material, it is more than 2 the underlying unit consists of unconsolidated material. Slopes are usually straight and uniform. If the underlying material is bedrock, it is the unit surface and is usually steeper than 35°. If the underlying unit is unconsolidated material, the surface slope is usually less than 35°. Surface irregularities are common in addition to those of underlying origin, there with the surface expression is unknown.
c	crest	A crest or segment of a crest with a relatively smooth slope gradient greater than 15°.
d	depression	Concave or irregular area of lower elevation lower than the surrounding terrain; depressions are greater than 2 metres deep.
f	flat	A smooth segment of a crest with a slope gradient up to 15°.
h	hummocky	Steep-sided hillocks and hollows that are irregular in shape; in plan, they are circular or elongate. Slopes are usually irregular and slopes of adjacent hillocks are in different directions. Relief is greater than 3 metres. 15-60° predominate on hillocks. Relief is usually greater than 3 metres.
j	gentle slope	An undulating surface with a slope gradient >2° and <15°. Relief is usually less than 1 metre.
k	moderately steep	Undulating surface with a slope gradient >35° and <55°. Relief surface irregularities have a relief <1 metre.
m	rolling	Elongate hillock(s) with slopes dimensionally between 2 and 15° with local relief <1 metre; in plan, an assemblage of parallel or sub-parallel linear hills, with subdued relief.
p	plain	A level or gently sloping unconsolidated surface with gradients up to 2°. Surface irregularities have a relief <1 metre.
r	ridged	Elongate or linear, parallel or sub-parallel hillock(s) or ridges with slopes dimensionally between 15 and 35° on unconsolidated materials and between 15 and 55° on bedrock. Local relief is greater than 1 metre.
s	steep	Steeply inclined slopes (escarps) with gradients >55° on both unconsolidated materials and bedrock.
t	terraced	Step-like topography, includes both stony tread and the horizontal or gently inclined surface above it.
u	undulating	Gently sloping hillock(s) and hollows(s) with slopes up to 15°. Relief is <1 metre; in plan, an assemblage of non-linear, shaped forms.
v	veneer	A mantle of unconsolidated materials which has no morphological form of its own, but derives its surface expression from the topography of the underlying unit. It reflects minor irregularities of the underlying unit. Slopes are usually uniform and relief is usually less than 1 metre. If the veneered material is between 2 metres and 10 metres thick, the surface of the underlying unit is indicated. If the veneered material is greater than 10 metres, the surface of the underlying unit is indicated. If the veneered material is greater than 10 metres, the surface of the underlying unit is indicated, it is assumed to be bedrock.

Explanatory Notes

1. The use of two or three surface expression symbols together implies that there is a mixing of discrete forms, not a new surface expression.
2. Where more than one surface expression symbol is used, the symbols are written in order of decreasing importance based on their areal extent.

COMPOSITE UNITS

Composite units are employed where two or three types of terrain are intermixed or similarly such small areas that they cannot be designated as separate units at the scale of mapping. Symbols (letters) are used to indicate the relative amounts of each terrain type, and the components are always written in descending order of importance.

/ The components on either side of the symbol are approximately equal
/ The component in front of the symbol is more extensive than the one that follows
/ The component in front of the symbol is considerably more extensive than the one that follows

For example:

Mb/R Mb is considerably more extensive than R
Mb/R-Cv Mb is considerably more extensive than R, R and Cv are of roughly equal extent
Mb/R/Cv R is less extensive than Mb, Cv is considerably less than R

TEXTURE

Clastic Terms

Symbol	Name	Size (mm)	Other Characteristics
a	blocks	>256	angular particles
b	boulders	>256	rounded and subrounded particles
c	cobbles	64-256	rounded and subrounded particles
p	pebbles	2-64	rounded and subrounded particles
s	sand	0.062-2	
z	silt	0.002-0.062	
y	clay	<0.002	
d	crystal fragments	>2	size of rounded and angular particles
g	gravel	>2	size of bedrock, cobbles and pebbles
r	angular fragments	>2	size of cobble and blocks
v	rubble	2-256	angular particles
m	mud	<0.062	size of silty and silt
f	shale		shale or shale fragments

Organic Terms

Symbol	Name	Characteristics
e	fabric	total decomposed organic material; rock-preserved fibre (40%) can be identified as to botanical origin after rubbing
u	sapric	intermediate decomposition between fibric and hemic
h	hemic	advanced decomposed organic material; less than 10% of fibres identified as to botanical origin after rubbing

Explanatory Notes

1. The presence of a surficial cover from a unit symbol indicates that texture of the material area not observed in the field or unknown to surficial material stratigraphy. In general the texture of the surficial material is the same as or coarser than the underlying material. Where two or three textural terms are used together, they are written in the relative order of importance and indicate that either the various textures are intermixed or layer presents.

ON-SITE SYMBOLS

On-site symbols used in this classification system are outlined below. An upper case letter in the notes column indicates the symbol is standard in terms of shape and size (S), or drawn to actual map scale shape or length (R).

Made	Symbol	Notes
GLACIAL FEATURES		
Striations		(R)
Crag and tail		(R)
Roches moutonnées		(R)
Striae, striations (ice flow direction known, unknown)		ice flow is in the direction of the arrow; symbol is placed in the centre of the feature (S)
Lineations (streamlined boulders and flutings)		ice flow is in the direction of the arrow; symbol is placed in the centre of the feature (S)
Moraine ridge (major)		ice flow is in the direction of the arrow; symbol is placed in the centre of the feature (S)
Moraine ridge (minor)		symbol is placed in the centre of the feature (S)
Esker (ice direction known, unknown)		line drawn along ridge crest (R)
Kettle holes (large, small)		dotted line drawn along ridge crest (R)
Meltwater channel (large)		dotted line drawn along ridge crest (R)
Meltwater channel (small)		(R, S)
Cirques		arrow shown if flow direction is known (R)
Glacial flow		arrowhead shown if flow direction is known (R)
PERIGLACIAL FEATURES		
Blockfield		(R)
Rock glacier		(R)
Tors		(R)
Observation of frozen ground		(R)
OTHER LANDFORMS AND FEATURES		
Dunes (active, inactive)		(R)
Escarpment		features extend to base of slope (R)
Strandline		(R)

SURFICIAL MATERIALS

Surficial materials are classified according to their mode of formation or deposition. This influences their physical characteristics such as texture, structure and stratigraphy, which in turn control conditions of drainage and slope stability.

Each surficial material has an assumed state of activity. Dormant is either active or inactive. It is only indicated when the state of formation is dormant, so the assumed state defined for each surficial material and a description of the Quaternary Dormant Symbol (see below).

Symbol	Name (Assumed Mode of Formation Process)	Description
A	anthropogenic (A)	Man-made or man-modified materials, including those associated with mineral exploration, waste disposal and landfills.
C	colluvial (A)	Accumulations of loose materials generally composed of material transported by non-fluvial processes, both a variety of partially sorted shapes, sizes and textures, including talus slopes, colluvial aprons, rockfall accumulations, landslide debris, mudflows and debris flows.
D	disaggregated bedrock (A)	Bedrock disaggregated in situ by processes of mechanical and/or chemical weathering; the character of the bedrock debris depends on the process of weathering and type of bedrock.
E	eolian (A)	Materials transported and deposited by wind action, generally consist of medium to fine sand and silt; dunes and sand sheets are common in areas of abundant sand supply.
F	fluvial (I)	Materials transported and deposited by streams and rivers, sorted materials, generally consist of gravel, sand or silt; gravels are typically well-rounded and stratified; deposits are found in the modern valley or as well-preserved terraces; includes floodplains, river terraces, deltas and alluvial fans.
FG	glaciofluvial (I)	Fluvial materials deposited in association with glacier ice, generally consist of gravel and sand, and deposits are found in or adjacent to modern or ancient valleys; includes eskers, kame terraces and outwash plains.
L	lake (A)	Sediments deposited in lakes or modified by wave action around lake shores; generally consist of stratified sand, silt and clay deposited on the lake floor, or sand/coarse material sorted in gravel; includes beaches, spits and bars, and lacustrine terraces of silt or clay.
LG	glaciolacustrine (I)	Lacustrine materials that were deposited in association with glacier ice; generally similar to lacustrine materials but display features such as dropstones and varves; includes kettles and kettles.
M	morainal (I)	Material deposited directly by glaciers, will generally consist of poorly sorted, unstratified mixtures of clay, silt, sand, gravel and boulders; a homogeneous mixture of particle sizes, shapes and lithologies is a matter of luck; and structure of particle sizes, shapes and lithologies is a matter of luck; and structure of glacial materials is dependent on the mode of deposition.
O	organic (A)	Material resulting from the accumulation and decay of vegetation; generally consists of peat, muck and mucky peat; permanently frozen organic deposits may be included; related bogs, fens, marshes and their organic components may be included.
R	bedrock (I)	Outcrops and rock covered by less than 10 cm of unconsolidated material
U	undifferentiated (I)	A layered sequence of more than three types of material encompassing on a study area
V	volcanic (I)	Unconsolidated pyroclastic sediments including volcanic ash, lapilli and volcanic bombs
W	marine (I)	Sediments deposited in marine waters, or modified by wave action along marine shorelines, generally consist of clay, silt, sand and gravel; marine deposits may be included; related bogs, fens, marshes and their organic components may be included.
MG	glaciomarine (I)	Glacial materials deposited in marine waters, or modified by wave action along marine shorelines, generally consist of clay, silt, sand and gravel; glacial materials may be included; related bogs, fens, marshes and their organic components may be included.

GEOLOGICAL PROCESSES

These notes describe geological processes that are currently modifying or have modified surficial materials and surface expression.

The extent of all geological processes are assumed to be active. The exceptions are the processes, characterized by inactive and dormant which indicate assumed states of inactivity.

Symbol	Name (Assumed Process State)	Description
A	avalanches (A)	Slopes modified by frequent snow avalanches and by the accumulation of avalanche debris and by snow avalanches; slopes affected by ice falling from glaciers.
B	breaking channel (A)	A channel zone characterized by rapid downcutting and downgrading; downcutting is accomplished by bedrock and temporary stands of ground and sand.
C	cryoturbation (A)	Deformation of surficial sediments, modified by frost heaving and churning due to frost action; includes patterned ground.
D	deflation (A)	The removal of sand and silt from unconsolidated materials by wind action
E	channelled (I)	Erosion and channel formation by subaerial streams, beneath and in front of a glacier
F	other mass movement (A)	Gravitational movement of masses of consolidated or non-consolidated surficial material by processes other than flowing or sliding
H	kettled (I)	Depressions formed in surficial materials due to the melting of buried, or partially buried glacier ice
I	irregular channel (A)	A single, shortly defined main channel displaying irregular turns and bends; includes braided and meandering features
J	anastomosing channel (A)	A channel zone where channels diverge and rejoin around many islands; the islands are vegetated
K	karst processes (A)	Processes associated with the solution of carbonates and other soluble rocks; includes the development and downgrading and downgrading from solution.
M	meandering channel (A)	A shortly defined channel characterized by a regular and repetitive pattern of bends with relatively regular amplitude and wave length
N	nivation (A)	Erosion of bedrock and surficial materials beneath and along the margins of snow patches by freeze-thaw processes, snow movement action and snow creep
P	piping (A)	Subsurface erosion of surficial materials by flowing water that results in the formation of tubular underground conduits
R	rapid mass movement (A)	Rapid downslope movement of dry, moist or saturated debris (derived from surficial material and/or bedrock) by falling, sliding or flowing
S	solifluction (A)	Slow downslope movement of saturated overburden across a frozen or another impermeable substrate
U	inundation (A)	Temporarily submerged under standing water which results from high water levels
V	gully erosion (A)	Modification of unconsolidated or consolidated surfaces by various processes such as heavy water, frost, dessication and snow; distinguishing that results in partial or subparallel courses
W	washing (A)	Modification by mass action resulting in big deposits formed by the action of flows, and water and platforms
X	permafrost (A)	Processes controlled by the presence of permafrost; and characteristics of permafrost; permafrost is a term material which temperatures remains below 0°C for more than two successive years
Z	general geological processes (A)	Solifluction, cryoturbation and nivation occurring together within a single unit

Explanatory Notes

Geological process symbols are used where a relatively large portion of a terrain map unit is affected by the process. On-site symbols may be used to indicate modification of a small part of the unit by a single or a few features.

QUALIFYING DESCRIPTORS

Qualifying descriptors modify surficial material or geological process terms. They are used in order to supply additional information about the mode of formation and/or depositional environment of surficial materials and the mode or activity of geological processes.

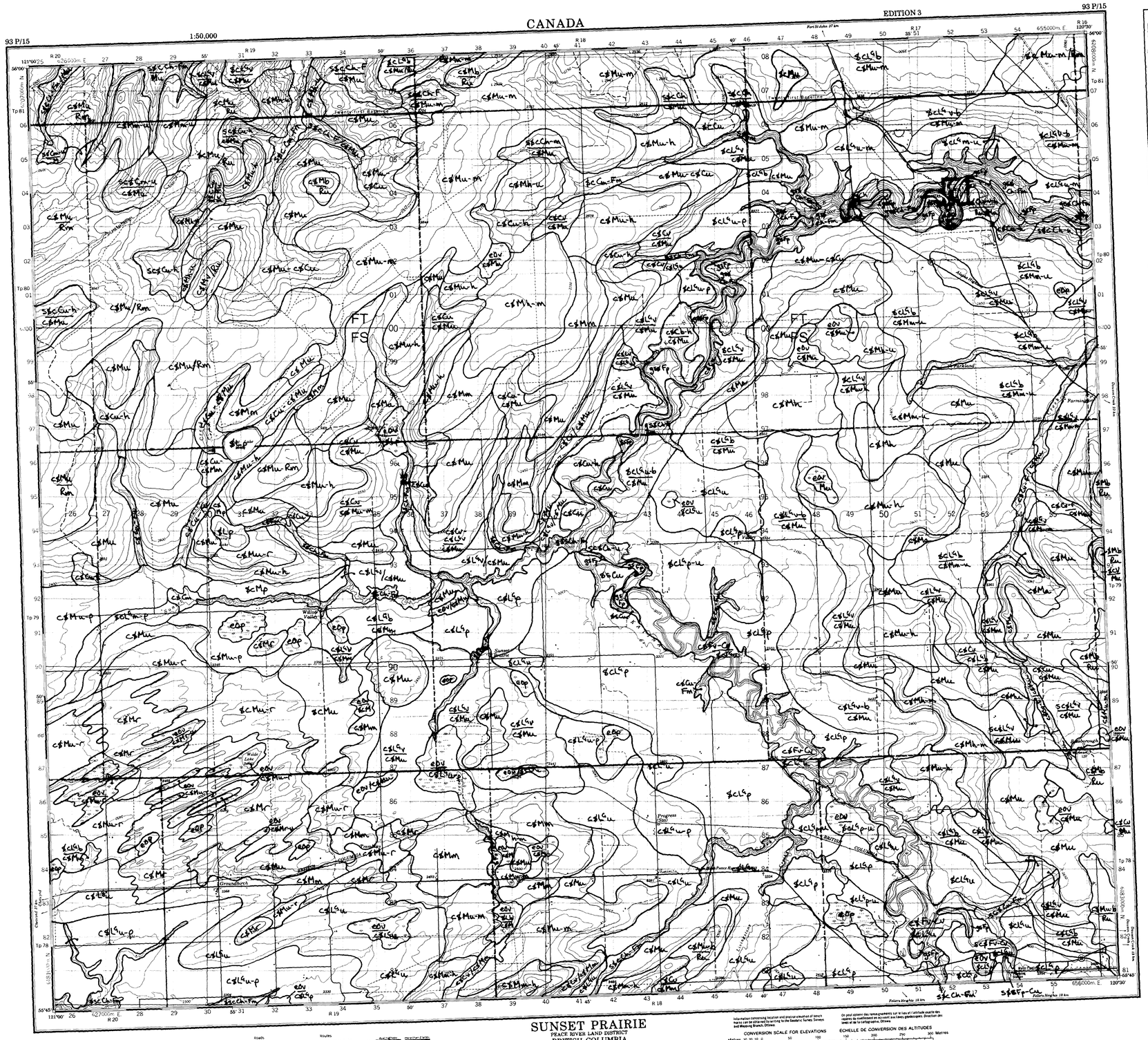
Symbol	Name	Description
G	glacial	Used to identify non-glacial surficial materials where there is evidence that glacial ice affected the mode of formation of materials (Also surficial materials [G], [G, MG])
A	active	There is evidence that a geological process is either operating continuously or is at a recurring interval in the present time; there is evidence that the process of formation of a surficial material is operative at the present time
I	inactive	There is no evidence to suggest that a geological process is continuing or dormant; the process of formation of a surficial material has ceased

Explanatory Notes

An activity qualifying descriptor for surficial materials and geological processes are shown only at unit symbols where the current state of activity is necessary to the designated mode

OTHER LANDFORMS AND FEATURES (continued)

Made	Symbol	Notes
Piping depression		(R)
Karst depression (large, small)		(R, S)
Gully		(R)
Spring		(S)
Gravel pit (active, abandoned)		(R)
Quarry or mine (active, abandoned)		(R)
Granite occurrence		(R)
Cinder cone		(R)
MASS MOVEMENT SYMBOLS		
Slump scarpmike		symbol follows track downslope (R)
Large Landslide:		
hatchwall scar only		(R)
hatchwall scar and area affected		(R)
Small Landslide:		
hatchwall scar only		(S)
hatchwall scar and track		symbol follows track downslope (R)
Tension cracks		(S)
Rolling (dragging slopes)		(S)
POINT OBSERVATIONS		
Quaternary basal site		(S)
Observation site (geologic, etc)		(S)
Stratigraphic section site		(S)
^{14}C dated site		location on map with date recorded in legend (S)
Anthropogenic site		(S)



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Sheet 3 of 4

QUATERNARY GEOLOGY AND LANDFORMS OF THE DAWSON CREEK REGION, BRITISH COLUMBIA

NTS 93P/9, 10, 15, 16

Geology by Norman R. Catto and Gail L. Thistle

1:50 000

Miles 1 0 1 2 3 miles

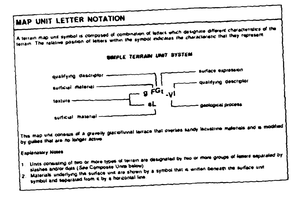
Metres 1000 0 1000 2000 3000 4000 Metres

Geology based on air photo interpretation with ground truthing in areas with road access. Fieldwork completed in 1990. Drafting by C. P. Smith.

MAP UNIT LETTER NOTATION

A terrain map unit symbol is composed of combination of letters which designate different characteristics of the terrain. The relative position of letters within the symbol indicates the characteristics that they represent.

SIMPLE TERRAIN UNIT SYSTEM



This map unit consists of a gravelly glaciofluvial terrace that overlies sandy lacustrine materials and is modified by gullies that are no longer active

Explanatory Notes

1. Units consisting of two or more types of terrain are designated by two or more groups of letters separated by a plus sign (See Complex Units below)
2. Materials underlying the surface are shown by a symbol that is written beneath the surface unit symbol and separated from it by a horizontal bar.

SURFACE EXPRESSION

Surface expression is the topography or form of the land surface. In general, the terms listed here are used to describe features that are not adequately shown on the topographic base map

Symbol	Name	Description
a	moderate slope	An unconsolidated surface with a slope gradient >15° to ≤26°, local surface irregularities are less than 1 metre
b	blanket	A mantle of unconsolidated material that obscures its general surface expression from the topography of the unit which it overlies. It exists independent of the topography and contents of unconsolidated materials in which it is in contact. It may be underlying one or more units, but is assumed to be blanket, if the underlying unit consists of unconsolidated materials of a different origin, then only its surface and physical properties of unknown materials of unknown origin, then only its surface and physical properties
c	cone	A cone or segment of a cone with a relatively smooth slope gradient greater than 15°
d	depression	Concave or irregular areas of lower elevation lower than the surrounding terrain. Depressions are greater than 2 metres deep
f	fan	A smooth segment of a cone with a slope gradient up to 15°
h	hummocky	Stony-veiled hillocks and mounds that are irregular in "organic" or plan. Slopes at 15-30° gradient are common. Hummocks and mounds and slopes of 15-30° predominate on bedrock, local relief is greater than 5 metres
i	gentle slope	An unconsolidated surface with a slope gradient >3° and ≤15°, local surface irregularities have a relief <1 metre
k	moderately steep	Unconsolidated surface with a slope gradient >26° and ≤35°, local surface irregularities have a relief <1 metre
m	rolling	Elongate hillocks with slopes dominantly between 3 and 15° with local relief <1 metre, in plan, an assemblage of parallel or sub-parallel linear forms with subdued relief
p	plain	A level or gently sloping unconsolidated surface with gradients up to 3°, local surface irregularities have a relief <1 metre
r	ridged	Elongate or linear, parallel or sub-parallel hillocks) or ridges with slopes dominantly between 15 and 30° on unconsolidated materials and between 15 and 60° on bedrock, relief is >1 metre
s	steep	Steeply inclined slopes (escarp) with gradients >35° on both unconsolidated materials and bedrock
t	terraced	Step-like topography, includes both scarp face and the horizontal or gently inclined surface above it
u	undulating	Gently sloping hillocks) with slopes up to 15°, local relief is <1 metre, in plan, an assemblage of non-linear, chaotic forms
v	veneer	A mantle of unconsolidated materials which has no controlling form of its own, but derives its surface expression from the topography of the underlying unit. It reflects most irregularities of the topography of the surface. It generally thins out over the crests of hills and ridges, exposing the underlying unit. If the underlying unit is bedrock, and veneer is thin, the surface of the underlying unit is considered to be the surface. If the underlying unit is unknown, the underlying material is indicated. It is assumed to be bedrock

Explanatory Notes

1. The use of two or three surface expressions symbols together implies that there is a mixing of discrete forms, not a set of intermediate forms.
2. Where more than one surface expression symbol is used, the symbols are written in order of decreasing importance based on their areal extent

COMPOSITE UNITS

Composite units are employed where two or three types of terrain are intermixed or occur such that areas that they cannot be symbolized on separate units on the map. Symbols (alphabetic letters) are used to indicate the relative amounts of each terrain type, and the components are always written in decreasing order of importance.

,	The components on either side of this symbol are approximately equal
/	The component in front of the symbol is more extensive than the one that follows
/ /	The component in front of the symbol is considerably more extensive than the one that follows

For example

Mb/R	Mb is considerably more extensive than R
Mb/R/Cv	Mb is considerably more extensive than R, R and Cv are of roughly equal extent
Mb/R//Cv	R is less extensive than Mb, Cv is considerably less than R

TEXTURE

Symbol	Name	Clastic Terms: Size (mm)	Other Characteristics
b	blocks	>256	angular particles
b	boulders	>256	rounded and subrounded particles
k	cobbles	64-256	rounded and subrounded particles
p	pebbles	2-64	rounded and subrounded particles
s	sand	0.062-2	
z	silt	0.002-0.062	
c	clay	<0.002	
d	fine fragments	<2	fine of rounded and angular particles
g	gravel	<2	fine of boulders, cobbles and pebbles
r	angular fragments	<2	fine of cobbles and blocks
r	rubble	2-256	angular particles
m	mud	<0.062	fine of clay and silt
l	shells		shell or shell fragments

Organic Terms

Symbol	Name	Characteristics
f	fibric	least decomposed organic material; well-preserved fibre (40%) can be identified as to botanical origin after rubbing
m	mesic	intermediate decomposition between fibric and mesic
h	humic	advanced decomposed organic material; less than 10% of fibres identified as to botanical origin after rubbing

Explanatory Notes

1. The absence of a textural term from a unit symbol indicates that texture of the material was not observed or is not known. Or that the relative proportion of the various textural classes is not known.
2. Where two or three textural terms are used together, they are considered in order of importance and indicate that either the various textures are intermixed or inter stratified.

ON-SITE SYMBOLS

On-site symbols used in this classification system are outlined below. An upper case term in the notes column indicates the symbol is standard in terms of shape and size (S), or drawn to actual map scale shape or length (R).

Name	Symbol	Notes
GLACIAL FEATURES		
Drumlin		ice flow is in the direction of the arrow; symbol is placed in the centre of the feature (S)
Crag and tail		ice flow is in the direction of the arrow; symbol is placed in the centre of the feature (S)
Roches moutonnée		ice flow is in the direction of the arrow; symbol is placed in the centre of the feature (S)
Striae, grooves (ice flow direction known, unknown)		ice flow is in the direction of the arrow; symbol is placed in the centre of the feature (S)
Undifferentiated striations and flutings		symbol is placed in the centre of the feature (S)
Moraine ridge (image)		line drawn along ridge crest (R)
Moraine ridges (minor)		line drawn along ridge crests (R)
Esker (flow direction known, unknown)		drawn along ridge crest (R)
Kettle holes (large, small)		(R, S)
Meltwater channel (large)		arrow shown if flow direction is known (R)
Meltwater channel (small)		arrowhead shown if flow direction is known (R)
Cirques		line drawn along ridge crest (R)
Glacier flow		ice flow in the direction of the arrow (R)
PERIGLACIAL FEATURES		
Blockfield		(R)
Rock glaciers		(R)
Tors		(S)
Observation of frozen ground		(S)
OTHER LANDFORMS AND FEATURES		
Dunes (active; inactive)		(R)
Escarpment		features extend to base of slope (R)
Strandline		(R)

SURFICIAL MATERIALS

Surficial materials are classified according to their mode of formation or deposition. They influence their physical characteristics such as texture, structure and compaction which in turn control conditions of drainage and slope stability.

Each surficial material has an assumed status of activity. Status is either active or inactive. It is only indicated when the actual state of formation is certainty. In the absence of indicated state defined for each surficial material and is indicated by the Qualifying Descriptor Symbol (see below)

Symbol	Name (Assumed Status of Genetic Process)	Description
A	anthropogenic (A)	Man-made or man-modified materials, including those associated with mineral exploitation, waste disposal and landfill
C	colluvial (A)	Products of mass wastage, generally consists of material in moderately well sorted and stratified deposits with a variety of particle sizes and shapes including debris, rockfall and talus deposits, modified by creep, rockfall, avalanche debris, solifluction and debris flows
D	weathered bedrock (A)	Bedrock disintegrated in situ by processes of mechanical weathering and chemical weathering. Degree of weathering is variable depends on the process of formation and type of bedrock
E	eolian (A)	Materials transported and deposited by wind action, generally consist of medium to fine sand and dunes set that is well-sorted and poorly compacted. Includes dune and loess
F	fluvial (I)	Materials transported and deposited by streams and rivers, alluvial deposits, generally consist of gravel, sand or silt, poorly to moderately well-rounded and poorly stratified sand, gravel, cobbles, boulders, and silt, stratified and poorly stratified, includes fans, terraces, deltas and some alluvial fans
FG	glaciofluvial (I)	Fluvial materials deposited in association with glacier ice, generally consist of gravel and sand, and show evidence of an active water source, bedded and well-sorted, including deltas, kames, eskers, outwash and braided and meltwater channel deposits, generally coarser than glaciofluvial materials and may include bedded sediment, kettles, kettle sediment and debris
I	ice (A)	Permanent areas and ice glaciers and icefields
L	lacustrine (I)	Materials deposited in lakes or modified by wave action around lake shorelines, generally consist of stratified silt, fine sand clay deposited on the lake floor, or coarser material such as gravel, includes beaches, spits and bars, and shoreline features of cliff or clay
LG	glaciolacustrine (I)	Lacustrine materials that were deposited in association with glacier ice, generally similar to lacustrine materials but display features such as varved sediment, ice rafted sediment and dropstones
M	morainal (I)	Material deposited directly by glaciers, silt, generally consist of very poorly sorted material that is non-stratified and contains a wide range of mixture of particle sizes, shapes and lithologies in a matrix of sand, silt and clay, includes moraines, till plains and drumlins
O	organic (A)	Material resulting from the accumulation and decay of vegetation, generally consists of peat, deposits contain amounts of organic material, distinction must be included, includes bogs, fens, swamps and the original sediment over bedrock (bedrock)
R	bedrock (I)	Outcrops and rock covered by less than 10 cm of unconsolidated material
U	unclassified (I)	A layered sequence of more than three types of material outcropping on a cliff face
V	volcanic (I)	Unconsolidated pyroclastic sediments including volcanic ash, lapilli and coarser ejecta
W	marine (I)	Sediments deposited in marine waters, or modified by wave action along marine shorelines, generally consist of clay, silt, sand or gravel, may include stratified and poorly stratified glacial till, includes bars, beaches and deeper water deposits
MG	glaciomarine (I)	Sediments of glacial origin, laid down in a marine environment in close proximity to glacier ice, generally relatively poorly sorted and stratified or bedded and may contain shells, includes marine till and sandy silt

GEOLOGICAL PROCESSES

These symbols indicate geological processes that are currently modifying or have modified surficial materials and surficial expressions

The status of all geological processes is assumed to be active. The exceptions are the processes characterized by inactive and active which have an assumed status of inactive

Symbol	Name (Assumed Process Status)	Description
A	avalanches (A)	Slopes modified by frequent slope instabilities and by the accumulation of debris transported by avalanches, slopes affected by ice falling from glaciers
B	braiding channel (A)	A channel zone characterized by many diverging and intersecting channels separated by unvegetated bars and temporary islands of gravel and sand
C	cryoturbation (A)	Unconsolidated sediments modified by freezing and churning due to frost action, includes patterned ground
D	deflation (A)	The removal of sand and silt from unconsolidated materials by wind action
E	channelled (I)	Erosion and channel formation by meltwater alongside ice-contact ice or bedrock, or both
F	slow mass movement (A)	Downslope movement of masses of cohesive or non-cohesive surficial material and/or bedrock by creeping, flowing or sliding
H	hummocks (I)	Depressions formed in surficial materials due to the melting of buried or partially buried glacial ice
I	irregular channel (A)	A single, clearly defined main channel displaying irregular turns and bends without repetition of similar features
J	anastomosing channel (A)	A channel zone where channels diverge and converge around many islands, the islands are vegetated
K	karst processes (A)	Processes associated with the solution of carbonates and other soluble rocks, includes underground and surface weathering and subsidence resulting from karst
M	meandering channel (A)	A clearly defined channel characterized by a regular and repeated pattern of bends with relatively regular amplitude and wave length
N	nivation (A)	Erosion of bedrock and surficial materials beneath and along the margin of snow patches by freeze-thaw processes, snow meltwater action and creep
P	piping (A)	Subterranean erosion of surficial materials by flowing water that results in the formation of tubular subterranean conduits
R	rapid mass movement (A)	Rapid downslope movement of dry, moist or saturated debris derived from surficial material and/or bedrock by falling, sliding or flowing
S	solifluction (A)	Slow downslope movement of saturated unconsolidated surface material or otherwise saturated
U	inundation (A)	Terrain seasonally under standing water which results from high water table
Y	gully erosion (A)	Modification of unconsolidated or consolidated surfaces by rainwater processes such as running water, more developed and wider than rills, generally shaped like a "V"
W	washing (A)	Modification by wave action resulting in lag deposits formed by the removal of fines, and bars and platforms
X	permafrost (A)	Processes controlled by the presence of permafrost and permafrost conditions, including thermokarst, thermal contraction cracking, solifluction or degradation, (permafrost is earth material where temperature remains below 0°C for more than one complete year)
Z	general periglacial processes (A)	Solifluction, cryoturbation and nivation occurring together within a single area

Explanatory Note

Geological process symbols are used where a relatively large portion of a terrain map unit is affected by the process. On site symbols may be used to indicate modification of a small part of the unit by a single or a few processes

QUALIFYING DESCRIPTORS

Qualifying descriptors qualify either surficial material or geological process terms. They are used in order to supply information concerning either the mode of formation and/or depositional environment of surficial materials and the status of a geological process.

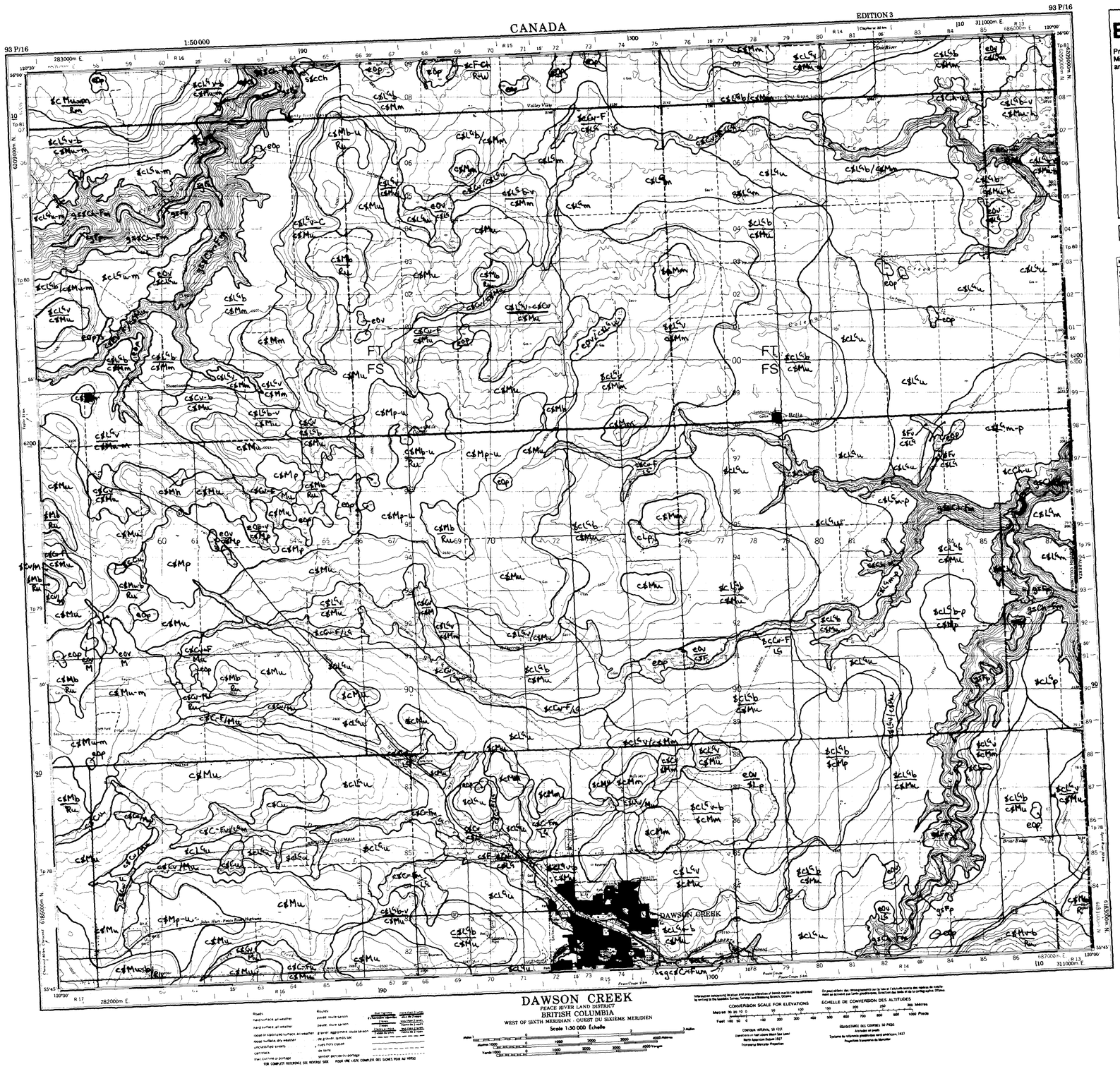
Symbol	Name	Description
G	glacial	Used to qualify non-glacial surficial materials where there is evidence that glacial ice affected the mode of deposition (See surficial materials (R) (S) (W))
A	active	There is evidence that a geological process is either operating continuously or at a recurrent nature, at the present time, there is evidence that the process of formation of a surficial material is operating at the present time
I	inactive	There is no evidence to suggest that a geological process is continuing or however, the process of formation of a surficial material has ceased

Explanatory Notes

An activity qualifying descriptor for surficial materials and geological processes are shown only in unit symbols where the current state of activity is contrary to the designated state

OTHER LANDFORMS AND FEATURES (continued)

Name	Symbol	Notes
Piping depression		(S)
Karst depression (large, small)		(R, S)
Gully		(R)
Spring		(S)
Groove pit (active; abandoned)		(S)
Quarry or mine (active; abandoned)		(S)
Gravel volcanoes		(S)
Cinder cone		(S)
MASS MOVEMENT SYMBOLS		
Snow avalanche		symbol follows track downslope (R)
Large Landslide:		
headwall scar only		(R)
headwall scar and area affected		(R)
Small Landslide:		
headwall scar only		(S)
headwall scar and track		symbol follows track downslope (R)
Talus slope		(S)
Solifluvial (creeping slope)		(S)
POINT OBSERVATIONS		
Quaternary fossil site		(S)
Observation site (ground, air)		(S)
Stratigraphic section site		(S)
TAC dated site		location on map with date recorded in legend (S)
Anthropogenic site		(S)


CANADA
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93 P/16
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Pouce Coupe 2 km
Pouce Coupe 5 km
Brassey
Valley View
Sunnybank
Belloy
Farmers Corner
Rolla
Bear Ridge
Dawson Creek Airport
John Hart - Peace River Highway
Alberta
British Columbia
Peace River Regional District
Fort St. John District
Dawson Creek District
Fort St. John District
Grande Prairie District
Grande Prairie District
Peace River District
Peace River District
Fairview District
Fairview District
Fairview