

DESCRIPTION OF SURFICIAL-GEOLIGIC MAP UNITS

This map shows the distribution of unconsolidated deposits and undifferentiated bedrock exposed at the surface in part of the central segment of the proposed Tanana Highway from Robertson River to Tetlin Junction in the Tanacross Quadrangle. Units were mapped by interpretation of false-color infrared -1:65,000-scale aerial photographs taken in July 1978, August 1980, and July 1983 and verified by field checking in 2007 and 2008.

Map units shown in parentheses such as (Qc-f), indicate combination map units consisting of bedrock overlain by thin to discontinuous material of the map unit shown.

UNCONSOLIDATED DEPOSITS

- Qa UNDIFFERENTIATED FLOODPLAIN ALLUVIUM—Chiefly well sorted and well stratified polyimic pebble gravel, sand, and silt comprising channel and overbank deposits of generally small streams; unfrozen to discontinuously frozen with low to moderate ice content.
Qab ACTIVE-FLOODPLAIN ALLUVIUM—Chiefly well sorted and well stratified layers and lenses of polyimic pebble gravel, sand, and silt with rare to scattered cobbles comprising river bars subject to recurrent inundation by streams every 5 yrs or less.
Qac UNDIFFERENTIATED FLOODPLAIN ALLUVIUM—Chiefly 10 to 20 ft (3 to 6 m) of overbank sandy silt and silt deposited overlying sandy, polyimic rived gravel beneath surfaces subject to flooding as often as to ten times per century.
Qad ALLUVIAL FAN DEPOSITS—Fan-shaped deposits of unsorted to well sorted gravel, sand, and silt with numerous cobbles and boulders in proximal zone; lithologies reflect bedrock of source area; in general, size of clasts decreases and degree of sorting increases downfan.
Qae INACTIVE-FLOODPLAIN ALLUVIUM—Chiefly 2 to 20 ft (0.6 to 6 m) of overbank silty sand and sandy silt overlying gravelly, polyimic rived sand and sandy gravel beneath surfaces subject to flooding as often as to ten times per century.
Qaf STREAM TERRACE ALLUVIUM—Chiefly 4 to 20 ft (0.6 to 6 m) of organic sandy silt and silt deposited overlying well sorted, polyimic sand and gravel beneath stream terraces thought no longer subject to inundations by the stream that deposited the alluvium.
Qag FLOOD DEPOSITS—Expansion fans, crevasse-splay complexes, point bars, and linear bars fanning away from the modern floodplains of the Tanana River on terraces along the southern margin of the Yukon-Tanana Upland; typically located downstream from bedrock ridges that trend transverse to the Tanana River.
Qah ZONE OF GROUNDWATER EMERGENCE ON OLDER TOK FAN—Surface features on typically well drained western, older Tok fan that indicate emergence of groundwater include swampy vegetation, peat, and standing surface water.
Qai SLACKWATER FLOOD DEPOSITS—Chiefly organic sandy and silty backswamp sediments deposited during floods in slackwater basins separated from source streams by expansion fans and natural levee and crevasse-splay complexes.
Qaj TERRACE DEPOSITS OF YOUNGER TOK FAN—Surface above inactive and abandoned floodplains of Tok River displays former meandering and anastomosing drainage channels of Tok River; composed of micaceous cover silt with trace clay up to 5 in (12.7 cm) thick overlying polyimic sand, generally massive to cross-bedded.
Qak ZONE OF GROUNDWATER EMERGENCE ON YOUNGER TOK FAN—Surface features on the eastern, younger Tok fan that indicate emergence of groundwater include swampy vegetation, peat, standing surface water, and networks of shallow drainage channels.

COLLUVIAL DEPOSITS

- Qbc UNDIFFERENTIATED COLLUVIUM—Blanks, cones, and fans of heterogeneously mixed angular to subangular rock fragments, gravel, sand, and silt involving sliding, flowing, gelifraction, and down creep of weathered bedrock and later tectonically deformed bedrock.
Qbd SNOW-AVALANCHE DEPOSIT—Slope fans of heterogeneous rubble debris with some gravel, sand, and silt deposited by snow avalanches in and downslope of cool-toned in steep alpine terrain.
Qbe DEBRIS-FLOW DEPOSIT—Chiefly tongues of angular rock fragments and coarse gravel with a sandy matrix deposited on steep colluvial slopes and fans and in rock-walled upper stream courses.
Qbf MIXED COLLUVIUM AND ALLUVIUM—Primarily fan-shaped or elongate, massive to poorly stratified, coarse, sandy granitic silt mixed with angular to subangular pebble gravel derived from weathered bedrock uplands and loess-covered moraines.
Qbg TECTONICALLY DEFORMED COLLUVIAL-FLUVIAL DEPOSITS—Arcuate ridges of poorly stratified, coarse, sandy granitic fragments with trace silt, numerous pebbles and scattered subrounded to rounded granitic boulders up to 9 ft (2.7 m) diameter initially deposited as piedmont aprons southwest of Tanacross Airfield (sheet 3) by debris-flow from the steep mountain valley from the steep mountain valley and later tectonically deformed (Carver and others, 2010).
Qbh ROCK-GLACIER DEPOSIT—Tongue-shaped weathered surface blanket of angular to subangular blocks of bedrock derived from glacial overlying deformed ice, accumulated on floors and lower valleys of cirques and glaciated valleys by flow of rock glaciers derived from shrinking of former glaciers.
Qbi LANDSLIDE DEPOSITS—Landslide or fan-shaped, heterogeneous mixtures of large fractured bedrock blocks and pebble gravel with scattered to numerous cobbles and boulders and trace sand and silt deposited by near-surface deep creeping, flowing, and sliding of failed bedrock and unconsolidated surficial deposits.
Qbj ROCK-FALL DEPOSITS—Rubble blanket or apron of large, angular rock fragments of local bedrock formed by collapse of upslope outcrop; unfrozen to discontinuously frozen with low to moderate ice content.
Qbk TALLUS—Cone- and apron-shaped heterogeneously mixtures of frost-rived, angular rock fragments downslope of bedrock outcrops with trace to some gravel, sand, and silt deposited on steep bedrock slopes and at the mouths of steep bedrock couloirs with U-shaped cross profiles by snow avalanches, free fall, tumbling, rolling, and sliding; surface steep, slightly irregular, and covered with numerous rock fragments, particularly in distal zones.
Qbl UNDIFFERENTIATED EOLIAN DEPOSITS—Chiefly well sorted, massive to finely bedded, primarily airfall eolian sand and loess forming a blanket over bedrock ridges and hills and lowlands in the southern Yukon-Tanana Upland; complex stratigraphy may include retransported sand and silt; discontinuously to continuously frozen with low to high ice content.
Qbm LOESS—Silt with up to 15 percent very fine sand carried by winds and deposited as a blanket over downward topography.
Qbn RETRANSPORTED SILT AND SAND COMPLEXLY MIXED WITH LOWLAND LOESS—Chiefly massive to well stratified organic silt and sandy silt with lenses and tongues of locally derived gravel and scattered to numerous angular rock fragments (particularly in upper valleys of small ephemeral streams) in loess areas and organic fine sand and sand dunes; deposited primarily by hyperconcentrated flows.
Qbo EOLIAN SAND—Chiefly blankets and dunes of fine to medium, massive to cross-bedded eolian sand with trace to some silt (Kraig and Reger, 1982).
Qbp TILL AND ASSOCIATED MORAINAL DEPOSITS OF POST-DONNELLY GLACIATION—Heterogeneous, non-stratified, polyimic pebble-cobble gravel with some sand and silt and numerous angular to subrounded boulders deposited by glacial ice and associated colluvial processes in upper to middle Holocene; boulders of younger deposits are vegetated or bear crustose lichens; older moraines are typically covered with tundra; loess cover thin and patchy to nonexistent; ice cores may be present, especially in younger moraines; unfrozen to discontinuously frozen with low to moderate ice content.

GLACIOPOLYGENIC DEPOSITS

- Qc-f TILL AND ASSOCIATED MORAINAL DEPOSITS OF DONNELLY GLACIATION—Heterogeneous, nonstratified, polyimic pebble-cobble gravel with some sand and silt and few to numerous subangular to subrounded boulders deposited by glacial ice and locally reworked by meltwater washing and associated mass-movement processes.
Qg TILL AND ASSOCIATED MORAINAL DEPOSITS OF DELTA GLACIATION—Heterogeneous, nonstratified, polyimic pebble-cobble gravel with some sand and silt and few to numerous subangular to subrounded boulders deposited by glacial ice and massive, sandy pebble gravel with rare cobbles deposited by glacial meltwater and associated mass-movement processes.
Qh UNDIFFERENTIATED GLACIAL DRIFT OF PRE-DELTA GLACIATIONS—Thin, discontinuous to continuous sheets of heterogeneous pebble gravel, sand, and silt with rare to numerous cobbles, boulders, and blocks up to 8 ft (2.4 m) in diameter deposited directly from melting glacial ice and reworked by meltwater streams; includes drift of Darling Creek age and perhaps other pre-Delta glaciations on alpine surfaces and lower mountain slopes south of Tanana River.
Qi OUTWASH OF POST-DONNELLY GLACIATION—Massive to well sorted, polyimic pebble-cobble gravel with some sand and numerous subrounded to angular boulders deposited by meltwater streams from Holocene glaciers in river mountain valleys; locally include deposits of debris flows and rockfalls; clasts are generally fresh; surfaces unvegetated to vegetated with thin tundra; loess cover nonexistent in thin and patchy; unfrozen to discontinuously frozen with low ice content.
Qj OUTWASH OF LATE DONNELLY AGE—Course outwash gravel in steep-walled, flat-floured, flat-bottomed channel incised into surface of outwash fan of Robertson River glacier north of Jan Lake; connects with kame-esker deposits in the southeastern corner of Corridor Segment 1.
Qk OUTWASH OF DONNELLY GLACIATION—Massive to well sorted, polyimic pebble gravel with some sand and scattered to numerous subrounded to subangular cobbles and boulders 3 to 5 ft (1 to 1.5 m) in diameter in proximal zones; surface weathering profiles 3 to 10 ft (0.9 to 3.0 m) deep; sand matrix color varies from pale brown (10YR6/3) to brown (10YR5/3); 5 to 10 percent of foliated illite clays are typically split into plates by frost action and granitic illite clays are fresh to slightly weathered in meltwater profiles.
Ql OUTWASH OF DELTA GLACIATION—Massive to well sorted, polyimic pebble gravel with some sand and numerous subrounded to subangular cobbles and boulders 3 to 5 ft (1 to 1.5 m) in diameter; courses in proximal zones and finer where distal.
Qm LAKELAKE DEPOSITS—Chiefly silt and clay with some organic material deposited in ephemerally lakes in backwater areas of inactive floodplains and behind ice-sloved ramparts in large lakes.
Qn DELTA DEPOSITS—Chiefly sand and silt with some organic material deposited in a lake basin entering the lake; during floods of the Tanana River, streams normally draining the lake into the river reverse directions and carry floodwaters and sediments into the lake basin; sporadically freezes with moderate to high ice content.
Qo DEPOSITS OF ICE-SHOVED RIDGES—Single or multiple 3- to 5-ft-high (0.9- to 1.5-m-high) ridges of adjacent lake bed and 2 to 15 ft (0.6 to 4.5 m) above modern lake shorelines; composed of overturned and severely and completely deformed deposits of parallel to basal, including fine to coarse clastic lake-bottom sediments and peat with thin interlayered light gray lacustrine sands; built by shoreward transport of lake-bottom sediments by wind-driven, drifting lake ice.
Qp SWAMP DEPOSITS—Primarily fibrous and locally woody, autochthonous peat with organic silt and sand deposited in lowland sites.
Qq BLOCK RUBBLE—Nests and blankets of angular to subangular blocks derived by frost wedging and jacking of underlying bedrock (autochthonous block fields) on high-level surfaces (escarpment of Carra, 2004) and by or on lags left by winnowing of sandy matrix from gelifraction deposits or thin silt fill by subsequent piping (allochthonous block fields); locally may be included in units of thinly covered bedrock (b) and in shallow strath terraces; sizes of blocks are function of joint spacing in clastic bedrock; associated microcliff features formed by frost action and mass movement include stone piles, stone nets and circles, stone boulders, nonsorted circles and hummocks, and soil lobes and benches; frost jacking locally active; discontinuously frozen with low to moderate ice content.

LACUSTRINE DEPOSITS

- Qn LAKELAKE DEPOSITS—Chiefly silt and clay with some sand and organic material deposited in ephemerally lakes in backwater areas of inactive floodplains and behind ice-sloved ramparts in large lakes.
Qn DELTA DEPOSITS—Chiefly sand and silt with some organic material deposited in a lake basin entering the lake; during floods of the Tanana River, streams normally draining the lake into the river reverse directions and carry floodwaters and sediments into the lake basin; sporadically freezes with moderate to high ice content.

PALUDAL DEPOSITS

- Qp SWAMP DEPOSITS—Primarily fibrous and locally woody, autochthonous peat with organic silt and sand deposited in lowland sites.
Qq BLOCK RUBBLE—Nests and blankets of angular to subangular blocks derived by frost wedging and jacking of underlying bedrock (autochthonous block fields) on high-level surfaces (escarpment of Carra, 2004) and by or on lags left by winnowing of sandy matrix from gelifraction deposits or thin silt fill by subsequent piping (allochthonous block fields); locally may be included in units of thinly covered bedrock (b) and in shallow strath terraces; sizes of blocks are function of joint spacing in clastic bedrock; associated microcliff features formed by frost action and mass movement include stone piles, stone nets and circles, stone boulders, nonsorted circles and hummocks, and soil lobes and benches; frost jacking locally active; discontinuously frozen with low to moderate ice content.

RESIDUAL DEPOSITS

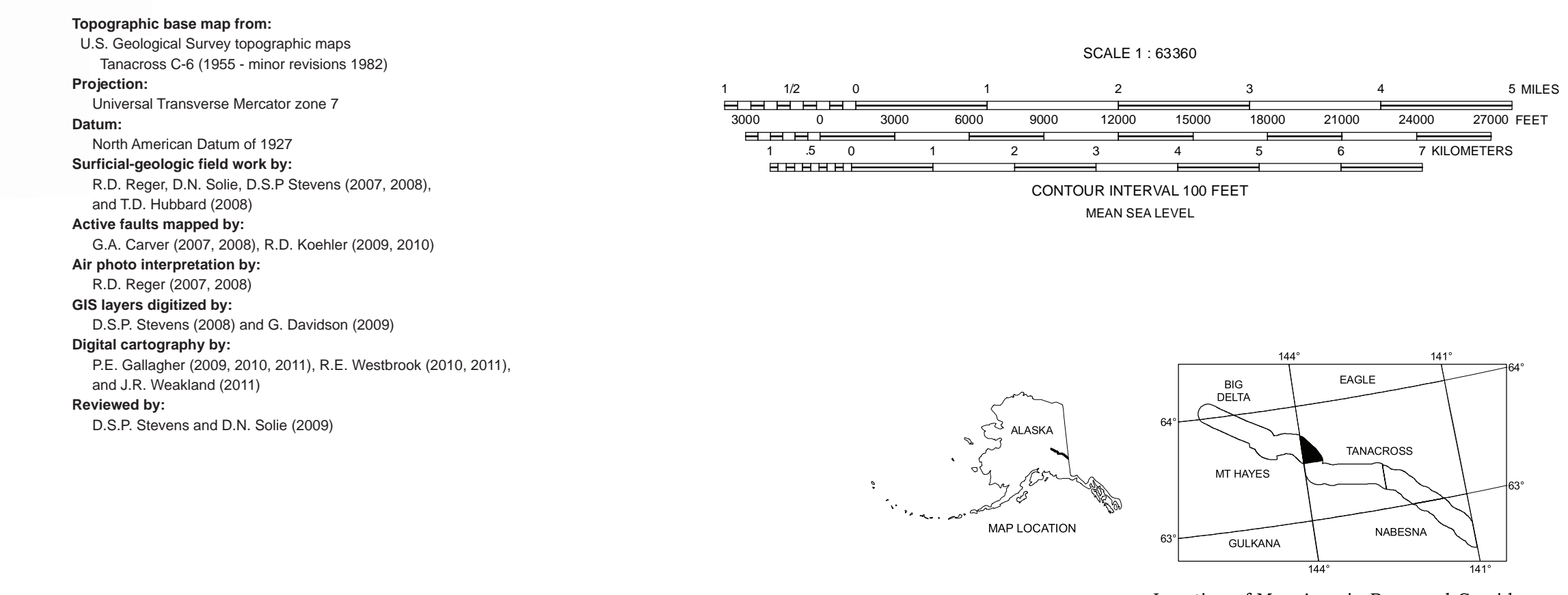
- Qq BLOCK RUBBLE—Nests and blankets of angular to subangular blocks derived by frost wedging and jacking of underlying bedrock (autochthonous block fields) on high-level surfaces (escarpment of Carra, 2004) and by or on lags left by winnowing of sandy matrix from gelifraction deposits or thin silt fill by subsequent piping (allochthonous block fields); locally may be included in units of thinly covered bedrock (b) and in shallow strath terraces; sizes of blocks are function of joint spacing in clastic bedrock; associated microcliff features formed by frost action and mass movement include stone piles, stone nets and circles, stone boulders, nonsorted circles and hummocks, and soil lobes and benches; frost jacking locally active; discontinuously frozen with low to moderate ice content.

BEDROCK

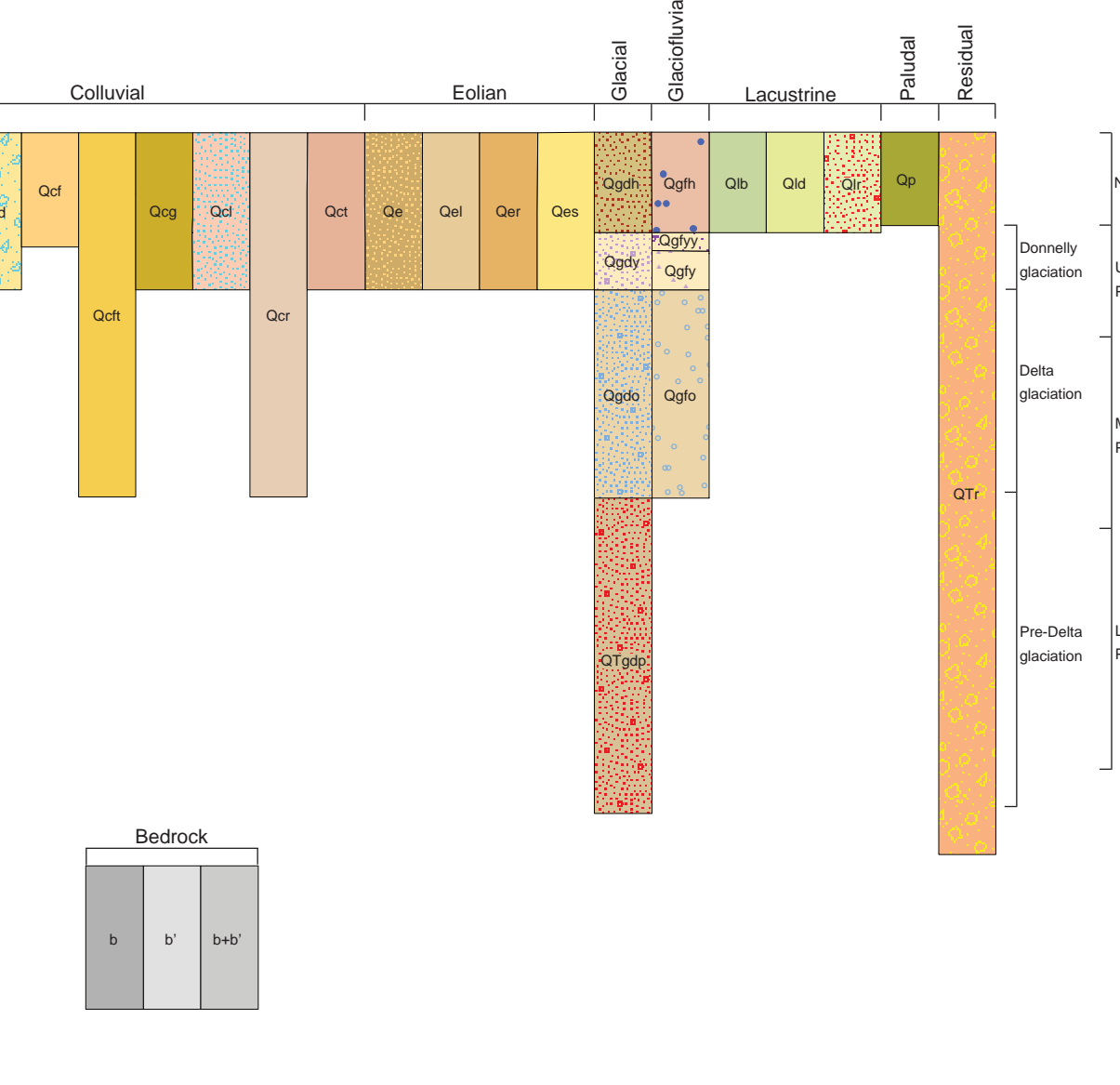
- u UNDIFFERENTIATED BEDROCK—Outcrops of igneous, metamorphic, and sedimentary rocks; linear and curvilinear shallow troughs and narrow channels of surface vegetation indicate the presence of planar bedrock structure.
v THINLY COVERED BEDROCK—Subcrops with <3 ft (<0.9 m) of loess cover; bedrock structures recognizable through thin veneer of surficial debris.
w Complex map unit consisting of bedrock outcrops and thinly buried subcrops that cannot be mapped separately.

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CORRELATION OF MAP UNITS



SURFICIAL-GEOLIGIC MAP, ALASKA HIGHWAY CORRIDOR, PART OF THE TANACROSS C-6 QUADRANGLE, ALASKA

by
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MAP SYMBOLS

- PHOTOINTERPRETED CONTACT—Dashed where approximately located
QUESTIONABLE IDENTIFICATION
ACTIVE HIGH ANGLE FALL—Dashed where approximately located, dotted where concealed
ANTIFORM—Dashed where approximately located, dotted where concealed
LOCATION OF RADIOCARBON SAMPLE DISCUSSED IN TEXT
LOCATION OF SOIL PIT DISCUSSED IN TEXT
LOCATION OF VEGETATION SITE DISCUSSED IN TEXT
MAP LOCALITY DISCUSSED IN TEXT
GEOLOGIC PROFILE DISCUSSED IN TEXT

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