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PRELIMINARY PHOTOINTERPRETIVE MAPS OF THE GEOLOGY, GEOLOGIC-MATERIALS, PERMAFROST, AND WETLANDS-CLASSIFICATION, FAIRBANKS C-5 QUADRANGLE, ALASKA

by

Richard D. Reger
Alaska Division of Geological and Geophysical Surveys

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794 University Avenue, Suite 200
Fairbanks, Alaska 99709

PRELIMINARY PHOTOINTERPRETIVE MAP OF GEOLOGY,
FAIRBANKS C-5 QUADRANGLE, ALASKA
(SHEET 1 OF 4)

This geologic map illustrates extents and types of unconsolidated deposits and bedrock in the Fairbanks C-5 Quadrangle. This map was prepared by interpreting 1:65,00-scale false-color and black-and-white aerial photographs. The user is cautioned that this geologic map has not been verified by field observations, although the photointerpreter has had some field experience in the quadrangle and during the interpretation referred to all available ground-truth data provided in published and unpublished reports. Physical properties of map units are obtained from previous reports or are extrapolated from similar deposits in the region; they may be later revised as a result of detailed field observations and laboratory tests. Evaluations of these deposits as construction materials and their estimated ice contents are presented on photointerpretive maps of geologic-materials (sheet 2) and permafrost (sheet 3), respectively

Preliminary legend

Symbols	Descriptions
Qaa	ACTIVE FLOODPLAIN ALLUVIUM---Chiefly well-sorted and well-stratified layers and lenses of silt, sand, pebbles, and cobbles comprising river bars subject to frequent inundation; generally unfrozen with shallow water table.
Qab	ABANDONED FLOODPLAIN ALLUVIUM---Chiefly 10 to 20 ft of overbank sandy silt and silty sand overlying sandy riverbed gravel beneath surfaces subject to rare inundations by streams; overbank sequences contain organic-silt channel-fills 7 to 20 ft thick; generally frozen.
Qai	INACTIVE FLOODPLAIN ALLUVIUM---Chiefly 10 to 20 ft of overbank silty sand and sandy silt overlying gravelly riverbed sand and sandy gravel beneath surfaces subject to infrequent inundation by streams; moisture contents range from 9 to 21 percent and average about 13 percent; generally unfrozen in younger areas and discontinuously frozen in older areas; active channels are floored by 5 to 20 ft of sand and silty sand that are generally unfrozen; fills of inactive channels include 7 to 12 ft of discontinuously frozen organic silt over sand and gravelly sand.
Qat	STREAM TERRACE ALLUVIUM---Chiefly 4 to 20 ft of organic sandy silt and silty sand overlying well-sorted sand and gravel beneath stream terrace treads no longer subject to inundation by the stream that deposited the alluvium; locally subject to seasonal stream icings; continuously frozen.
Qaf-f	FINE-GRAINED VALLEY FILL AND DISTAL ALLUVIAL-FAN ALLUVIUM---Chiefly silt and sand with lenses of gravel (channel fills) deposited by major streams and in distal zones of broad, gently sloping, and coalescing piedmont fans; locally subject to stream icings; continuously frozen.

Symbols	Descriptions
Qaf-c	GRANULAR CHANNEL DEPOSIT---Chiefly well-sorted sand and gravel deposited by streams in meandering channels on distal surfaces of broad, gently sloping, and coalescing piedmont fans; subject to local stream icings; discontinuously frozen.
Qc	UNDIFFERENTIATED COLLUVIUM---Mixed coarse- and fine-grained materials deposited at the base of steep bedrock slopes by mass movements; discontinuously frozen.
Qcl	SLIDE DEPOSIT---Chiefly weathered schist and micaceous quartzite transported en masse downslope by sliding along discrete planes; frequently subject to secondary flow; discontinuously frozen.
Qed	DEFLATION-BASIN DEPOSITS---Chiefly 5 to 10 ft of fine eolian sand with trace amounts of silt or up to 2 ft of surface organic silt and sandy silt (loess) overlying eolian fine sand in elongate basins deflated by winds scouring out dune sand; locally incorporates organic deposits of intermittent shallow lakes; discontinuously frozen.
Qel	LOESS---Silt with up to 10 percent very fine sand carried by winds and deposited as a blanket over the topography; organic rich on lower slopes and lowland sites; moderate to high moisture content (more than 15 percent moisture) in lowland sites; discontinuously frozen on some lower south-facing slopes and continuously frozen on some lower north-facing slopes and lowland sites.
Qes	DUNE SAND---Chiefly fine eolian sand (0.125 to 0.25 mm in diameter) with trace amounts (2 to 16 percent) of silt (Alaska Architectural and Engineering Company, 1981; Collins, 1985); generally covered by up to 13 ft of organic and inorganic silt with a trace to some sand (loess), which averages about 3 ft in thickness; sand blanket is as thick as 165 ft; moisture content is low (3 to 4 percent); discontinuously frozen.
Qhf	ARTIFICIAL FILL AND EMBANKMENT DEPOSIT---Mixed coarse- and fine-grained material comprising foundation and support structures for roads, railroads, airports, and bridges; discontinuously frozen.
Qrl	RETRANSPORTED SILT AND LOWLAND LOESS---Chiefly organic silt with variable amounts of sand and lenses of locally derived gravel that are deposited by slope runoff and streams draining bedrock slopes covered by upland silt; complexely mixed with primary airfall loess laid down on lowland sites and debris-flow deposits; subject to seasonal stream and slope icings; continuously frozen.
Qs	SWAMP DEPOSIT---Primarily fibrous and locally woody peat with organic silt and sand deposited in local basins; up to 8 ft thick; discontinuously to continuously frozen.

Symbols	Descriptions
Qsr	RETRANSPORTED SAND AND LOESS---Chiefly 4 to 20 ft of silty organic sand formed by reworking of eolian sand by surface streams and complex mixing with primary airfall silt laid down on lowland sites; subject to local seasonal stream and slope icings; continuously frozen.
PzPesch	MICA-QUARTZ SCHIST AND MICACEOUS QUARTZITE---Foliose pelitic and quartzose metamorphic rocks of the 'Birch Creek Schist' complex (Prindle, 1913; Mertie, 1937; Péwé and others, 1966) underlying hills north of Nenana; weathered to depths of up to 50 ft; discontinuously frozen

Symbols

~	Approximate contact
D / U	Fault trace; dashed where approximate, dotted where inferred; relative upthrown block indicated by 'U', relative downthrown block indicated by 'D'
?	Questionable occurrence

References cited

Alaska Architectural and Engineering Company, 1981, Soils investigation for Totchaket agricultural road [Project Ag-107]: Fairbanks, 68 p.

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Mertie, J.B., Jr., 1937, The Yukon-Tanana region, Alaska: U.S. Geological Survey Bulletin 872, 276 p.

Péwé, T.L., Wahrhaftig, Clyde, and Weber, F.R., 1966, Geologic map of the Fairbanks Quadrangle, Alaska: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-455, scale 1:250,000, 1 sheet.

Prindle, L.M., 1913, A geologic reconnaissance of the Fairbanks Quadrangle, Alaska: U.S. Geological Survey Bulletin 525, 220 p.

PRELIMINARY PHOTOINTERPRETIVE MAP OF GEOLOGIC-MATERIALS,
FAIRBANKS C-5 QUADRANGLE, ALASKA
(SHEET 2 OF 4)

This geologic-materials map illustrates extents and types of geologic-materials useful for construction within the Fairbanks C-5 Quadrangle. Literature review and limited field observations in the vicinity of this quadrangle indicate that each geologic unit (for example stream-terrace alluvium) has a definite composition or range of composition wherever that unit occurs. Therefore, presence of certain materials is inferred from the presence of particular units on the geologic map of this quadrangle (sheet 1). The user is cautioned that this materials map has not been verified by field observations, although the photointerpreter has had some field experience in the vicinity of this quadrangle. Therefore, this map is subject to revision pending field verification. Physical properties of map units have been extrapolated from similar deposits in the region and later may be revised as a result of detailed field observations and laboratory tests.

This materials map is generalized; it does not attempt to show exact locations of specific materials. The intent is to indicate general areas that deserve consideration for certain materials and to eliminate other general areas from consideration for these materials. Local variations frequently occur, especially near unit boundaries. Potential uses of map units are qualitatively summarized in the table below, which shows potential availability of various construction materials in each geologic-materials map unit. Precise economic evaluations of specific deposits as sources of construction materials will require detailed examination of each deposit, including areal extent, volume, grain-size variation, thickness of overburden, thermal state of the ground, and depth to the water table as well as logistical factors, demand, and land ownership. Estimated ice contents of map units are presented on the photointerpretive map of permafrost in this quadrangle (sheet 3).

Preliminary legend

Symbols	Descriptions
G	GRAVEL AND SAND---Alluvium of former proglacial outwash streams; locally subject to seasonal stream icings; discontinuously frozen.
M	SILT---Upland loess; generally unfrozen.
S	SAND---Eolian sand forming sheets and dunes; generally covered by up to 13 ft of organic-rich lowland loess, except where recently scoured or reactivated; as thick as 165 ft; discontinuously frozen.
GM	MIXED COARSE- AND FINE-GRAINED MATERIAL---Colluvium and artificial fill and embankment deposits; discontinuously frozen.

Symbol	Description
SG	CHIEFLY SAND AND GRAVEL---Coarse-grained alluvium beneath active floodplains and terrace treads and in fillings of former channels meandering across distal surfaces of broad, gently sloping, and coalescing piedmont fans; may be subject to frequent flooding by streams or local inundation by seasonal stream icings; generally unfrozen to continuously frozen.
SM	CHIEFLY SAND AND SILT---Fine-grained alluvium laid down in distal parts of broad, gently sloping, and coalescing piedmont fans or deposited by streams draining bedrock slopes covered by upland silt; subject to local stream icings; continuously frozen.
SM/G	CHIEFLY SAND AND SILT OVERLYING GRAVEL---Alluvium beneath inactive and abandoned floodplains; thickness of fine-grained alluvial cover varies up to 17 ft; infrequently to rarely flooded; generally unfrozen to continuously frozen.
OM	CHIEFLY ORGANIC SILT---Retransported silt and lowland loess; subject to local seasonal stream and slope icings; continuously frozen.
OS	CHIEFLY ORGANIC SAND---Retransported sand and lowland loess; subject to local seasonal stream and slope icings; continuously frozen.
Pt	CHIEFLY PEAT---Swamp deposits; locally subject to seasonal stream icings; sporadically to continuously frozen.
Bm	FOLIATED METAMORPHIC ROCK---Chiefly mica-quartz schist and micaceous quartzite of the 'Birch Creek Schist' complex (Prindle, 1913; Mertie, 1937); weathered to depths of up to 50 ft; discontinuously frozen.

Symbols

⌒	Approximate contact
.2	Location of subsurface data
?	Questionable occurrence

Potential availability of various construction materials in geologic-materials map units, Fairbanks C-5 Quadrangle, Alaska

Map Unit	Composition	Probability of locating good sources of ____[1]: Gravel and Sand	Sand	Mixed coarse- and Fine-grained material	Clay	Crushed Aggregate	Riprap Armor rock	Building Stone
G	Gravel and sand	Good	Good	Poor	Nil	Good	Good	Nil
M	Silt	Nil	Nil	Nil	Nil	Nil	Nil	Nil
S	Sand	Nil	Good	Nil	Nil	Nil	Nil	Nil
GM	Mixed coarse- and fine-grained material	Poor	Poor	Good	Nil	Nil	Nil	Nil
SG	Chiefly sand and gravel	Good to moderate	Moderate	Poor	Nil	Moderate	Nil	Nil
SM	Chiefly sand and silt	Poor	Poor	Nil	Nil	Nil	Nil	Nil
SM/G	Chiefly sand and silt overlying gravel	Moderate	Moderate	Poor	Nil	Nil	Nil	Nil
OM	Chiefly organic silt	Nil	Nil	Nil	Nil	Nil	Nil	Nil
OS	Chiefly organic sand	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Pt	Chiefly peat	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Bm	Foliated metamorphic rock	Nil	Nil	Nil	Nil	Nil	Nil	Nil

[1]The imprecise terms 'good', 'moderate', 'poor', and 'nil' are purposely used to indicate the relative probability of locating good deposits of each construction material in various map units. No definitive values are assigned to each term, but they may indicate a probability of 80 percent or more for 'good', 30 to 80 percent for 'moderate', less than 30 percent for 'poor', and essentially zero chance for 'nil'.

Subsurface data

Abbreviations in subsurface-data descriptions

Org - Organic or Organic Material
Cl - Clay or Clayey
Si - Silt or Silty
Sa - Sand or Sandy
Gr - Gravel or Gravelly
Cob - Cobbles
Bol - Boulders
High - Highly
Wea - Weathered or Weakly Consolidated
Frac - Fractured
Fr - Frozen
Rock Frag - Angular Rock Fragments
WT @ - Water Table encountered at
T.H. - Test Hole
M.H. - Material Site Test Hole
? - Questionable

to - grading downward to
w/ - with
tr - a trace amount (4 to 12 percent) of
s - some (12 to 30 percent)
& - and (30 to 50 percent)
occ - occasional (4 to 8 percent by volume)
sc - scattered (8 to 13 percent by volume)
num - numerous (13 to 60 percent by volume)
interbed - interbedded with

Sample description of test-hole log

1) 0-3 ft Org; 3-25 ft SiGr w/s Sa, num Cob; 25-30 ft Wea Schist. WT @ 24 ft. Fr 0-20 ft. [3-15-65]. (Smith, 1967, T.H. 32).

Source and source reference number (see References cited)

Number refers to number by small dot on geologic-materials map

Soils encountered were: from the ground surface to a depth of 3 feet, organic material; from 3 to 25 feet deep, silty gravel with some (12 to 30 percent) sand and numerous (13 to 60 percent by volume) cobbles; from 25 to 30 feet deep, weathered schist. Water table was encountered at a depth of 24 feet. Soils were frozen from the ground surface to a depth of 20 feet. This test hole was drilled on March 15, 1965. It is listed in the References Cited section of this report in the 1967 report by Smith.

Subsurface data descriptions

1) 0-0.5 ft Org; 0.5-2.0 ft Si; 2.0-5.0 ft SiSa. Fr 0.3-5.0 ft. [2-2-68]. (Tudor and others, 1972, T.H. 3).

2) 0-2.0 ft Si; 2.0-6.0 ft Sa. Fr 0.2-2.0 ft. [2-2-68]. (Tudor and others, 1972, T.H. 4).

3) 0-3.0 ft ClSi; 3.0-4.5 ft Sa. [2-2-68]. (Tudor and others, 1972, T.H. 5).

4) 0-4.0 ft Si; 4.0-7.3 ft Sa. [2-4-68]. (Tudor and others, 1972, T.H. 7).

5) 0-7.0 ft Org. Fr 0.4-7.0 ft. [2-4-68]. (Tudor and others, 1972, T.H. 8).

6) 0-0.5 ft Org; 0.5-3.5 ft ClSaSi. Fr 1.7-3.5 ft. [10-1-70]. (Tudor and others, 1972, T.H. T-24-S).

7) 0-0.4 ft Org; 0.4-4.5 ft SaSi; 4.5-6.5 ft Sa; 6.5-11.0 ft SaGr; 11.0-16.0 ft GrSa; 16.0-23.0 ft SaGr. WT @ 6.5 ft. [10-15-63]. (Birch, 1976, M.H. 55).

8) 0-3.0 ft SaSi; 3.0-8.0 ft Sa; 8.0-23.0 ft GrSa. WT @ 4.5 ft. [10-8-63]. (Birch, 1976, M.H. 35).

9) 0-2.5 ft SiSa; 2.5-4.0 ft Sa; 4.0-23.0 ft Sa & Gr. WT @ 5.5 ft. [10-8-63]. (Birch, 1976, M.H. 36].

10) 0-0.4 ft Org; 0.4-3.0 ft Si; 3.0-7.5 ft Sa; 7.5-23.0 ft Sa & Gr. WT @ 6.0 ft. [10-5-63]. (Birch, 1976, M.H. 31).

11) 0-0.3 ft Org; 0.3-2.0 ft Si; 2.0-4.0 ft Sa; 4.0-4.5 ft Si; 4.5-8.0 ft Sa; 8.0-23.0 ft GrSa. WT @ 5.0 ft. [10-10-63]. (Birch, 1976, M.H. 39).

12) 0-0.3 ft Org; 0.3-2.5 ft Si; 2.5-8.0 ft Sa; 8.0-15.0 ft GrSa; 15.0-23.0 ft GrSa to SaGr. WT @ 6.0 ft. [10-10-63]. (Birch, 1976, M.H. 40).

13) 0-0.3 ft Org; 0.3-2.0 ft SiSa; 2.0-4.5 ft Sa; 4.5-5.0 ft Si; 5.0-16.0 ft Sa; 16.0-19.0 ft Sa & Gr; 19.0-23.0 ft Sa. WT @ 5.0 ft. [10-11-63]. (Birch, 1976, M.H. 42).

14) 0-0.2 ft Org; 0.2-2.5 ft Si; 2.5-3.5 ft Sa; 3.5-5.5 ft SaGr; 5.5-23.0 ft GrSa. WT @ 6.5 ft. [10-5-63]. (Birch, 1976, M.H. 25).

15) 0-1.5 ft SaGr (fill); 1.5-8.0 ft Si w/lenses Sa; 8.0-11.0 ft SaSi; 11.0-12.0 ft GrSa. WT @ 6.0 ft. [10-1-79]. (Grahek, 1980, T.H. 79-7).

16) 0-0.1 ft Asphalt; 0.1-2.0 ft SaGr (fill); 2.0-4.0 ft Si; 4.0-5.5 ft SaSi; 5.5-12.0 ft SiGrSa. WT @ 8.0 ft. [10-1-79]. (Grahek, 1980, T.H. 79-6).

17) 0-0.1 ft Asphalt; 0.1-1.5 ft SaGr (fill); 1.5-2.0 ft Si; 2.0-3.5 ft SaSi; 3.5-5.0 ft Si; 5.0-6.0 ft GrSa; 6.0-12.0 ft SaGr. WT @ 6.5 ft. [10-1-79]. (Grahek, 1980, T.H. 79-5).

18) 0-3.0 ft SaGr (fill); 3.0-4.5 ft SaSi; 4.5-7.0 ft Si; 7.0-12.0 ft Sa. WT @ 7.0 ft. [10-1-79]. (Grahek, 1980, T.H. 79-4).

19) 0-3.0 ft SaGr (fill); 3.0-4.0 ft SaSi; 4.0-7.0 ft Si; 7.0-12.0 ft Sa. WT @ 6.0 ft. [10-1-79]. (Grahek, 1980, T.H. 79-3).

20) 0-3.5 ft SaGr (fill); 3.5-5.0 ft GrSa; 5.0-10.0 ft Si; 10.0-12.0 ft Sa. WT @ 5.0 ft. [10-1-79]. (Grahek, 1980, T.H. 79-2).

21) 0-6.0 ft SaGr (fill); 6.0-12.0 ft Si; 12.0-17.0 ft Sa. WT @ 8.0 ft. [10-1-79]. (Grahek, 1980, T.H. 79-1).

22) 0-2.5 ft Si; 2.5-3.0 ft SaSi; 3.0-7.0 ft Sa. [2-4-68]. (Tudor and others, 1972, T.H. 9).

23) 0-1.0 ft Si & Org; 1.0-3.0 ft Si; 3.0-9.5 ft Cl & Si. [2-4-68]. (Tudor and others, 1972, T.H. 10).

24) 0-3.5 ft Si; 3.5-6.0 ft ClSi. [2-4-68]. (Tudor and others, 1972, T.H. 11).

25) 0-0.5 ft Org; 0.5-3.0 ft Cl & Org; 3.0-12.0 ft ClSi. Fr 3.0-5.6 ft. [10-1-70]. (Tudor and others, 1972, T.H. T-23-S).

26) 0-10.0 ft Sa & Org; 10.0-15.0 ft Sa; 15.0-21.0 ft GrSa. [8-6-71]. (Tudor and others, 1972, T.H. A-10-N).

27) 0-0.3 ft Org; 0.3-1.0 ft SiSa; 1.0-17.5 ft SaGr. WT @ 7.0 ft. Fr 0-0.5 ft. [10-13-75]. (Birch, 1976, T.H. 75-197).

28) 0-0.3 ft Org; 0.3-1.0 ft OrgSi; 1.0-7.0 ft Si; 7.0-7.5 ft SaGr. WT @ 5.0 ft. Fr 0-1.0 ft. [10-13-75]. (Birch, 1976, T.H. 75-199).

29) 0-0.5 ft Org & Si; 0.5-4.5 ft Sa; 4.5-22.5 ft SaGr. WT @ 8.5 ft. Fr 0-0.8 ft. [10-13-75]. (Birch, 1976, T.H. 75-196).

30) 0-0.3 ft Org; 0.3-1.0 ft Si; 1.0-17.5 ft SaGr. WT @ 6.0 ft. Fr 0-0.5 ft. [10-13-75]. (Birch, 1976, T.H. 75-200).

31) 0-0.3 ft Org; 0.3-1.5 ft Si; 1.5-5.0 ft Sa; 5.0-17.5 ft SaGr. Fr 0-1.0 ft. [10-13-75]. (Birch, 1976, T.H. 75-201).

32) 0-0.5 ft Org & Si; 0.5-1.5 ft Sa; 1.5-4.0 ft Si; 4.0-17.5 ft SaGr. WT @ 5.0 ft. Fr 0-0.5 ft. [10-13-75]. (Birch, 1976, T.H. 75-193).

33) 0-0.1 ft Asphalt; 0.1-1.0 ft SaGr (fill); 1.0-1.5 ft GrSa (fill); 1.5-4.5 ft Si; 4.5-5.0 ft SaSi; 5.0-7.5 ft GrSa. Fr 0-4.5 ft. [11-14-75]. (Birch, 1976, T.H. 75-1).

34) 0-2.5 ft SaGr; 2.5-5.0 ft Si; 5.0-7.5 ft OrgCl. Fr 0-5.0 ft. [11-14-75]. (Birch, 1976, T.H. 75-2).

35) 0-3.0 ft SaGr; 3.0-5.0 ft Si; 5.0-7.5 ft OrgSi. Fr 0-5.0 ft. [11-14-75]. (Birch, 1976, T.H. 75-3).

36) 0-0.5 ft Gr (fill?); 0.5-3.9 ft Si; 3.9-5.2 ft Sa. Fr 5.0-5.2 ft. (Birch, 1976, T.H. 57-53).

37) 0-3.4 ft Gr (fill?); 3.4-11.0 ft Sa & Gr. WT @ 6.7 ft. (Birch, 1976, T.H. 57-56).

38) 0-0.5 ft Org; 0.5-5.1 ft Si; 5.1-9.0 ft SiSa. (Birch, 1976, T.H. 57-66).

39) No Data.

40) 0-0.4 ft Org; 0.4-2.5 ft Si; 2.5-3.5 ft SiSaGr. (Birch, 1976, T.H. 57-72).

41) 0-0.3 ft Org; 0.3-2.1 ft Si. Fr 2.0-2.1 ft. (Birch, 1976, T.H. 57-84).

42) 0-5.0 ft SaGr; 5.0-16.5 ft SiSa; 16.5-17.5 ft OrgSi. Fr 0-5.0 ft. [11-14-75]. (Birch, 1976, T.H. 75-5).

43) 0-0.4 ft Org; 0.4-5.0 ft Org Si; 5.0-7.5 ft Cl. Fr 0-7.5 ft. [11-14-75]. (Birch, 1976, T.H. 75-8).

44) 0-0.3 ft Org; 0.3-4.0 ft Si; 4.0-8.5 ft SiCl; 8.5-12.5 ft GrSa. Fr 0-1.0 ft. [11-14-75]. (Birch, 1976, T.H. 75-7).

45) 0-4.0 ft SaGr; 4.0-11.0 ft SaSi; 11.0-11.5 ft OrgSi; 11.5-12.5 ft Cl. Fr 0-4.5 ft. [11-14-75]. (Birch, 1976, T.H. 75-6).

46) 0-0.4 ft Org; 0.4-8.2 ft Si. (Birch, 1976, T.H. 57-92).

47) 0-0.7 ft Org; 0.7-1.5 ft Si. Fr 1.0-1.5 ft. (Birch, 1976, T.H. 57-100).

48) 0-1.0 ft SaGr; 1.0-4.0 ft GrSa; 4.0-6.0 ft SiSa; 6.0-7.0 ft Cl; 7.0-7.5 ft OrgSi. Fr 0-6.0 ft. [11-14-75]. (Birch, 1976, T.H. 75-9).

49) 0-1.0 ft Si; 1.0-3.7 ft Sa. [2-2-68]. (Tudor and others, 1972, T.H. 1).

50) 0-0.5 ft Org; 0.5-2.5 ft Si; 2.5-4.0 ft SiSa. [2-2-68]. (Tudor and others, 1972, T.H. 2).

51) 0-5.0 ft Si & Sa; 5.0-39.0 ft Sa & Gr; 39.0-159.0 ft SaGr; 159.0 ft Schist. WT @ 7.5 ft. Fr 0-5.0 ft. [4-16-63]. (U.S. Geological Survey Water Resources Division, Unpublished Nenana Bridge relocation T.H. B-4).

52) 0-5.0 ft SaGr & OrgSi; 5.0-60.0 ft Sa & Gr; 60.0-147.5 ft ClSa & Gr; 147.5 ft Schist. WT @ 8.1 ft. Fr 0-5.0 ft. [4-10-63]. (U.S. Geological Survey Water Resources Division, Unpublished Nenana Bridge relocation T.H. B-3).

53) 0-5.0 ft SiSa & GrSa; 5.0-161.0 ft interbed Sa & Gr; 161.0 ft Schist. WT @ 6.7 ft. Fr 0-5.0 ft. [4-18-63]. (U.S. Geological Survey Water Resources Division, Unpublished Nenana Bridge relocation T.H. B-5).

54) 0-5.0 ft SaSi & Gr; 5.0-65.5 ft Sa & Gr; 65.5-128.3 ft ClSa & Gr. WT @ 8.6 ft. Fr 0-5.0 ft. [4-2-63]. (U.S. Geological Survey Water Resources Division, Unpublished 1963 Nenana Bridge relocation T.H. B-2).

55) 0-8.0 ft Si & Sa; 8.0-158.0 ft interbed Sa & Gr; 158.0 ft Schist. Fr 0-8.0 ft. [4-23-63]. (U.S. Geological Survey Water Resources Division, Unpublished Nenana Bridge relocation T.H. B-6).

56) 0-4.5 ft Ice; 4.5-9.5 ft Water; 9.5-86.0 ft Sa & Gr; 86.0-91.0 ft Sa; 91.0-94.0 ft ?; 94.0-104.0 ft SiSa; 104.0-139.8 ft Sa & Gr. [3-25-63]. (U.S. Geological Survey Water Resources Division, Unpublished Nenana Bridge relocation T.H. B-1).

57) 0-8.0 ft Fill; 8.0-31.0 ft SiSa & Gr; 31.0-66.0 ft Sa & Gr; 66.0-176.0 ft ClSa & Gr. WT @ 6.3 ft. Fr 0-8.0 ft. (U.S. Geological Survey Water Resources Division, Unpublished Nenana Bridge relocation T.H. B-7).

58) 0-8.0 ft Sa & Gr; 8.0-96.0 ft interbed Sa & Gr. Fr 0-8.0 ft. [5-2-63]. (U.S. Geological Survey Water Resources Division, Unpublished Nenana Bridge relocation T.H. B-8).

59) 0-135.0 ft interbed Sa & Gr. WT @ 1.9 ft. [5-3-63]. (U.S. Geological Survey Water Resources Division, Unpublished Nenana Bridge relocation T.H. B-9).

60) 0-145.0 ft interbed Sa & Gr. [5-7-63]. (U.S. Geological Survey Water Resources Division, Unpublished Nenana Bridge relocation T.H. B-11).

61) 0-6.0 ft SiSa; 6.0-52.0 ft Sa & Gr; 52.0-130.0 ft interbed Sa & Gr. WT @ 2.0 ft. Fr 0-6.0 ft. [5-6-63]. (U.S. Geological Survey Water Resources Division, Unpublished Nenana Bridge relocation T.H. B-10).

62) 0-2.0 ft Cl; 2.0-20.0 ft Sa; 20.0-47.5 ft Gr. WT @ 7.5 ft. [9-15-77]. (U.S. Geological Survey Water Resources Division, Unpublished well data).

63) 0-2.0 ft Cl; 2.0-18.0 ft Sa; 18.0-24.5 ft Gr. WT @ 5.7 ft. [9-11-77]. (U.S. Geological Survey Water Resources Division, Unpublished well data).

64) 0-5.0 ft OrgSi & Cl; 5.0-10.0 ft Sa w/s OrgSi; 10.0-12.0 ft Sa, w/s Gr; 12.0-14.0 ft. Sa & Gr; 14.0-19.0 ft SaGr w/s Si; 19.0-41.0 ft Sa & Gr; 41.0-51.0 ft SaGr w/s Cl; 51.0-60.0 ft Sa & Gr. WT @ 12.0 ft. Fr 0-5.0 ft. (U.S. Geological Survey Water Resources Division, Unpublished well data for FAA utility building).

65) 0-6.0 ft Fill; 6.0-22.0 ft Si w/s Gr; 22.0-38.0 ft Sa & Gr; 38.0-40.0 ft SaGr w/s Cl; 40.0-46.0 ft Sa & Gr. WT @ 41.0 ft. Fr 0-6.0 ft, 15.0-41.0 ft. (U.S. Geological Survey Water Resources Division, Unpublished well data for FAA control building).

66) 0-0-3.0 ft OrgSi; 3.0-95.0 ft Sa w/tr Si; 95.0-144.0 ft Sa w/s Si; 144.0-165.0 ft Sa w/tr Si; 165.0-172.0 ft Gr w/s Sa; 172.0-175.0 ft Sa & Gr; 175.0-193.0 ft Sa & Si. WT @ 93.0 ft. Fr 0-5.0 ft. [3-20-81]. (Peterson and Associates, 1981, fig. 2).

67) 0-7.5 ft Si; 7.5-11.0 ft Si w/tr Sa; 11.0-16.0 ft Sa & Si; 16.0-20.0 ft SiSaGr. Fr 0-7.5 ft. (Alaska Architectural and Engineering Company, 1981, T.H. 45).

68) 0-6.5 ft Sa; 6.5-10.0 ft GrSa. (Alaska Architectural and Engineering Company, 1981, T.H. 1).

69) 0-2.0 ft Si; 2.0-4.5 ft Si w/tr Sa; 4.5-17.0 ft Si & Sa; 17.0-20.0 ft GrSaSi. Fr 0-2.0 ft. (Alaska Architectural and Engineering Company, 1981, T.H. 44).

70) 0-2.0 ft Ice; 2.0-2.5 ft Water; 2.5-19.5 ft Sa; 19.5-24.5 ft Sa w/tr Gr; 24.5-30.0 ft Sa. (Alaska Architectural and Engineering Company, 1981 T.H. 2).

71) 0-7.0 ft Pt & OrgSi; 7.0-11.5 ft Si w/tr Sa; 11.5-25.0 ft SiSaGr. Fr 0-2.5 ft. (Alaska Architectural and Engineering Company, 1981, T.H. 43).

72) 0-1.5 ft Pt; 1.5-13.5 ft OrgSi; 13.5-18.0 ft Si w/tr Sa; 18.0-25.0 ft SiSaGr. Fr 0-1.5 ft. (Alaska Architectural and Engineering Company, 1981, T.H. 42).

73) 0-1.0 ft Si w/tr Sa; 1.0-6.5 ft Sa w/tr Si; 6.5-20.0 ft Si w/tr Sa. Fr 0-1.0 ft, 6.5-20.0 ft. (Alaska Architectural and Engineering Company, 1981, T.H. 41).

74) 0-6.5 ft Si w/tr Sa; 6.5-10.0 ft Sa w/s Si. Fr 0-6.5 ft. (Alaska Architectural and Engineering Company, 1981, T.H. 40).

75) 0-6.5 ft Si w/tr Sa; 6.5-10.0 ft SiSa. Fr 0-6.5 ft. (Alaska Architectural and Engineering Company, 1981, T.H. 3).

76) 0-1.0 ft Pt; 1.0-7.0 ft OrgSi; 7.0-16.5 ft Si w/tr Sa; 16.5-20.0 ft SiSa. Fr? 0-7.0 ft. (Alaska Architectural and Engineering Company, 1981, T.H. 4).

77) 0-3.5 ft Si w/tr Sa; 3.5-10.0 ft Sa w/tr Si. Fr 0-1.5 ft. (Alaska Architectural and Engineering Company, 1981, T.H. 5).

78) 0-2.0 ft SaSi; 2.0-10.0 ft Sa w/tr Si. Fr 0-4.0 ft. (Alaska Architectural and Engineering Company, 1981, T.H. 6).

79) 0-1.0 ft Pt & OrgSi; 1.0-13.5 ft OrgSi; 13.5-16.0 ft SaSi. Fr 0-13.5 ft. (Alaska Architectural and Engineering Company, 1981, T.H. 6A).

80) 0-2.5 ft OrgSi; 2.5-8.0 ft SaSi; 8.0-10.0 ft Sa w/tr Si. Fr 0-8.0 ft. (Alaska Architectural and Engineering Company, 1981, T.H. 7).

81) 0-2.5 ft Si w/tr Sa; 2.5-7.0 ft Sa w/tr Si; 7.0-10.0 ft Sa. Fr 0-2.5 ft. (Alaska Architectural and Engineering Company, 1981, T.H. 8).

82) 0-5.0 ft Si w/tr Sa; 5.0-7.5 ft Sa w/tr Si; 7.5-10.0 ft Sa. Fr 0-5.0 ft. (Alaska Architectural and Engineering Company, 1981, T.H. 9).

83) 0-2.5 ft Si w/tr Sa; 2.5-7.0 ft Sa w/tr Si; 7.0-10.0 ft Sa. Fr 0-2.5 ft. (Alaska Architectural and Engineering Company, 1981, T.H. 10).

84) 0-2.5 ft Si w/tr Sa; 2.5-7.0 ft Sa w/tr Si; 7.0-10.0 ft Sa. Fr 0-2.5 ft. (Alaska Architectural and Engineering Company, 1981, T.H. 11).

85) 0-2.5 ft SaSi; 2.5-7.5 ft SiSa; 7.5-40.0 ft Sa w/tr Si. Fr 0-2.5 ft. (Alaska Architectural and Engineering Company, 1981, T.H. 12).

86) 0-0.5 ft Org & Si; 0.5-1.5 ft Sa; 1.5-4.0 ft Si; 4.0-17.5 ft SaGr. WT @ 9.0 ft. Fr 0-0.5 ft. [11-13-75]. (Brazo, 1985, M.H. 75-193).

87) 0-0.3 ft Org; 0.3-6.0 ft Si; 6.0-12.5 ft SiSa. WT @ 6.0 ft. Fr 0-0.7 ft. [11-13-75]. (Brazo, 1985, M.H. 75-194).

88) 0-0.3 ft Org; 0.3-1.5 ft Si; 1.5-5.0 ft Sa; 5.0-17.5 ft SaGr. Fr 0-1.0 ft. [11-13-75]. (Brazo, 1985, M.H. 75-201).

89) 0-0.3 ft Org; 0.3-1.0 ft SiSa; 1.0-17.5 ft SaGr. WT @ 13.0 ft. Fr 0-0.5 ft. [11-13-75]. (Brazo, 1985, M.H. 75-197).

90) 0-0.3 ft Org; 0.3-3.0 ft SiSa; 3.0-22.5 ft SaGr. WT @ 12.0 ft. Fr 0-1.0 ft. [11-13-75]. (Brazo, 1985, M.H. 75-198).

91) 0-0.3 ft Org; 0.3-1.0 ft Si; 1.0-10.0 ft SiSa; 10.0-23.0 ft Sa w/s Gr; WT @ 5.0 ft. [10-63]. (Brazo, 1985, M.H. 46).

92) 0-0.3 ft Org; 0.3-2.5 ft Si; 2.5-4.5 ft SiSa; 4.5-15.0 ft Sa; 15.0-23.0 ft GrSa. WT @ 5.0 ft. [10-63]. (Brazo, 1985, M.H. 22).

93) 0-0.2 ft Org; 0.2-1.0 ft Sa; 1.0-2.0 ft SaSi; 2.0-23.0 ft Sa. WT @ 2.0 ft. [7-10-84]. (Brazo, 1985, M.H. 84-1).

94) 0-0.2 ft Org; 0.2-4.0 ft SaSi; 4.0-5.0 ft Sa; 5.0-7.0 ft GrSa; 7.0-15.0 ft Sa; 15.0-23.0 ft SaGr. WT @ 2.0 ft. [7-10-84]. (Brazo, 1985, M.H. 84-3).

95) 0-0.3 ft Org; 0.3-3.0 ft SaSi; 3.0-4.0 ft Sa; 4.0-33.0 ft Sa & Gr. WT @ 6.0 ft. [10-63]. (Brazo, 1985, M.H. 27).

96) 0-3.0 ft SaSi; 3.0-8.0 ft Sa; 8.0-23.0 ft GrSa. WT @ 5.0 ft. [10-63]. (Brazo, 1985, M.H. 35).

97) 0-0.4 ft Org; 0.4-1.0 ft Si; 1.0-3.0 ft SaSi; 3.0-6.0 ft Sa; 6.0-11.0 ft GrSa; 11.0-23.0 ft SaGr. WT @ 5.0 ft. [10-63]. (Brazo, 1985, M.H. 52).

98) 0-0.3 ft Org; 0.3-2.5 ft Si; 2.5-5.0 ft SiSa; 5.0-6.5 ft Sa; 6.5-33.0 ft Gr & Sa. WT @ 5.0 ft. [10-63]. (Brazo, 1985, M.H. 28).

99) 0-0.4 ft Org; 0.4-2.5 ft Si; 2.5-8.0 ft Sa; 8.0-23.0 ft GrSa. WT @ 5.0 ft. [10-63]. (Brazo, 1985, M.H. 30).

100) 0-0.2 ft Org; 0.2-2.0 ft Si; 2.0-5.0 ft Sa; 5.0-22.0 ft GrSa. WT @ 7.0 ft. [10-63]. (Brazo, 1985, M.H. 14).

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PRELIMINARY PHOTOINTERPRETIVE MAP OF PERMAFROST, FAIRBANKS C-5 QUADRANGLE, ALASKA (SHEET 3 OF 4)

Permafrost, or perennially frozen ground, is rock or soil that has remained continuously colder than 32°F (0°C) for 2 yr or longer and it represents the most widespread deleterious soil condition in interior Alaska. Although it causes freezing of unprotected utility lines and water wells, the most important aspect of permafrost affecting construction is its ground-ice content (Muller, 1947; Péwé, 1966, 1982). Disturbance and subsequent thawing of ice-rich permafrost result in differential ground settlement as well as problems of slope instability and excessive sedimentation (Ferrians and others, 1969). In its undisturbed state, ice-bearing permafrost, because it is practically impermeable, inhibits infiltration of surface waters, thereby promoting problems related to seasonal frost and seriously limiting the effectiveness of modern sewage-disposal systems.

This permafrost map illustrates the inferred extent and estimated ice content of permafrost between the ground surface and a depth of about 20 ft in the Fairbanks C-5 Quadrangle. This map was prepared by interpreting 1:65,000-scale false-color and black-and-white aerial photographs. The presence or former presence of permafrost and its ground-ice content are inferred from several indicators: vegetation; slope and aspect; landform; soil type; local drainage; and terrain microrelief features such as polygonal ground and thermokarst pits, gullies, and ponds (Kreig and Reger, 1982). The user is cautioned that this permafrost map is not verified by field observations, although the interpreter has had field experience in the quadrangle and during the interpretation referred to all available ground-truth data provided in published and unpublished reports. Physical properties of map units are obtained from previous reports and are extrapolated from similar deposits in the region; they may later be revised as a result of detailed field observations and laboratory tests.

Preliminary legend

Symbols indicate the continuity of permafrost in upper-case letters and the estimated ice content in lower-case letters. For example, 'Dm' indicates the presence of discontinuous permafrost with a low to moderate ice content. The compound symbol 'Dr/Dl' indicates that discontinuous permafrost with a moderate to high ice content overlies discontinuous permafrost with a low ice content.

Symbols	Descriptions
F	CONTINUOUSLY FROZEN---More than 90 percent of the area is inferred to be underlain by permafrost.
D	DISCONTINUOUSLY FROZEN---Between 50 and 90 percent of the area is inferred to be underlain by permafrost.

Symbols	Descriptions
S	SPORADICALLY FROZEN---Between 10 and 50 percent of the area is inferred to be underlain by permafrost.
G	GENERALLY UNFROZEN---Between 0 and 10 percent of the area is inferred to be underlain by permafrost.
U	NO PERMAFROST---Seasonally frozen but the ground is inferred to warm to a temperature above 32°F (0°C) at least once during 2 yr.
r	MODERATE TO HIGH ICE CONTENT---Inferred to typically contain 50 to more than 1,000 percent soil moisture relative to dry weight.
m	LOW TO MODERATE ICE CONTENT---Inferred to typically contain 25 to 50 percent soil moisture relative to dry weight.
l	LOW ICE CONTENT---Inferred to typically contain 6 to 25 percent soil moisture relative to dry weight.
d	DRY FROZEN---Inferred to typically contain less than 6 percent soil moisture relative to dry weight.

Symbols

~ - -	Approximate contact
.2	Location of subsurface data (see descriptions on Sheet 2)
?	Questionable occurrence

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PRELIMINARY PHOTOINTERPRETIVE MAP OF WETLANDS-CLASSIFICATION,
FAIRBANKS C-5 QUADRANGLE, ALASKA
(SHEET 4 OF 4)

Wetlands are habitats dominated to varying degrees by water. In these areas, water table is at, near, or above the land surface long enough each year to influence the types of plants growing or soils developed on that surface (Cowardin and others, 1979). As a result of frequent flooding, vegetation may even by lacking or soils undeveloped. Wetlands provide highly productive habitats for wildlife, especially waterfowl and fish, as well as important sources of surface wate- for domestic and commercial uses, public recreation, and navigatable waterways.

This map illustrates types and extents of wetlands in the Fairbanks C-5 Quadrangle. This map was prepared by interpreting 1:65,00-scale false-color and black-and-white aerial photographs. Each wetlands class is interpreted from several indicators: landform, vegetation, and photo color or tone. For example, certain landforms typically are frequently flooded or contain shallow permafrost that promotes saturation of soils and lush development of vegetation in the active layer. The user is cautioned that this wetlands-classification map is not based on water-level records and has not been verified by field observations. Water conditions attributed to each wetlands class are extrapolated from known conditions elsewhere in interior Alaska and may be revised as a result of detailed field observations.

Preliminary legend

Symbols	Descriptions
R	RIVERINE---All wetlands and permanent-water habitats contained within stream channels that are bounded by uplands or by wetlands dominated by trees, shrubs, persistent emergent plants, nonaquatic mosses or lichens; water is usually, but not always, flowing.
Rb	UNCONSOLIDATED OR ROCK BOTTOM---All rivers and other streams permanently containing water; characterized by water and aquatic grasses, mosses, and algae.
Rs	UNCONSOLIDATED SHORE---Frequently flooded active floodplains and linear phases of inactive floodplains (Weber and Péwé, 1961, 1970) between average and highest flood levels; mostly barren, but where vegetated is characterized by scouring rushes, carices, extensive willows, small balsam poplar and spruce, and uncommon alders (Viereck, 1970a, b).
Re	EMERGENT RIVERINE---Seasonally to semipermanently flooded modified linear and coalescent floodplain phases (Weber and Péwé, 1961, 1970); vegetated by scouring rushes, extensive willows, dense alder clumps, small balsam poplar and spruce, shrub birch, and a ground cover of sphagnum moss as thick as 12 in. (Viereck, 1970a, b).

Symbols	Descriptions
P	PALUSTRINE---Ponds, marshes, swamps, bogs, and fens not affected by wave action or wind and stream erosion, except during flooding, and dominated by trees, shrubs, persistent emergent plants, and nonaquatic mosses or lichens; may occur in isolated small thermokarst basins or on slopes, especially in areas underlain by permafrost; bounded by uplands and streams but not lakes; may comprise very slow-flowing segments of stream courses.
Pe	EMERGENT PALUSTRINE---Seasonally flooded and permanently or semipermanently saturated bogs, fens, tundra, and herbaceous wetlands not bounded by lakes; less than 30 percent of the plant cover is shrubs and small trees.
Ps	SCRUB/SHRUB PALUSTRINE---Temporarily flooded phases of abandoned floodplains vegetated by numerous to dense (more than 30 percent of the vegetation cover), low shrubs of birch and willows, by scattered black spruce, larch, and birch trees less than 20 ft tall and by clumps of these small trees, all growing on boggy ground.
Pf	FOREST PALUSTRINE---Temporarily flooded phases of abandoned floodplains vegetated more than 30 percent by numerous to dense black spruce, birch, and larch trees more than 20 ft tall and growing on boggy ground.
L	LACUSTRINE---Wetlands and permanent open-water habitats situated in topographic depressions or dammed stream channels and commonly affected by wave action; bounded by uplands and palustrine habitats; less than 30 percent of the plant cover is trees, shrubs, persistent emergent plants, and nonaquatic mosses or lichens.
Lw	LIMNETIC LACUSTRINE---All permanent lakes and ponds, including ox-bow lakes and ponds on inactive floodplains; vegetated by hydrophytic plants such as aquatic mosses and grasses, pond and water lilies, reeds, rushes, and floating organic mats.
Ls	LITTORAL LACUSTRINE---Seasonally or semipermanently flooded, generally treeless, peaty and grassy lake and pond margins between low and high water levels, including seasonally flooded sloughs, or parts of sloughs on inactive floodplains.
U	UPLAND---Well-drained surfaces very rarely or never flooded and saturated only for short periods of time; vegetated by deciduous, mixed deciduous and coniferous, and coniferous forest/woodland.

Symbols

~—~ Approximate boundary

? Questionable occurrence

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