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RECONNAISSANCE ENGINEERING GEOLOGIC MAP OF THE HEALY A-6 QUADRANGLE, SOUTHCENTRAL ALASKA

by
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DISCUSSION

This map illustrates potential near-surface sources of various geologic materials that may be useful for construction. Field observations indicate that each geologic unit (for example, stream alluvium) has a definite composition or range of composition. Therefore, the probable presence of materials is interpreted from the distribution of geologic units on the geologic map of these quadrangles. This map is generalized and is not intended to show exact locations of specific materials. The purpose is to indicate general areas that deserve consideration for certain materials and to eliminate other general areas from consideration for these materials. Local variations are common, especially near unit boundaries.

Potential uses of map units are qualitatively summarized in Tables 1 and 2, which show potential availability of various construction materials in each engineering-geologic 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 water table as well as logistical factors, demand, and land ownership.

This map also addresses some of the principal hazards and engineering considerations that may be associated with mapped geologic units based on their general physical properties, conditions that are characteristic of their depositional environment, and topography. Potential geologic hazards directly relate to surficial-geologic units because (1) the processes that formed the deposits may be hazardous where still active, (2) postdepositional conditions (like ground ice) may present additional hazards, and (3) materials characteristically present in the deposits are known to be susceptible to certain hazards (like liquefaction). In general, natural hazards in lowlands are related to a lack of bearing strength (such as saturated, organic-rich swamp deposits and thawing of ice-rich permafrost) and to seasonal flooding. In highlands, mass movements may be a serious local concern. Local, unevaluated factors affecting mass movement (rock avalanches, landslides, and debris flows) include sediment textures, bedrock structures, and water content. This map is intended only as a general guide to some common hazards that may be present, depending on other factors like topography and water content, and does not preclude the presence of other unevaluated or site-specific hazards.

This map was derived electronically from the geologic map of the area (Clautice and others, 1999) using Geographic Information System (GIS) software. It is only locally verified by ground observations during brief field visits. The results should be considered reconnaissance in nature.

DESCRIPTION OF MATERIALS UNITS

Unconsolidated Materials

GS Fluvial and glaciofluvial gravel, sand, and silt. Chiefly (estimated >80 percent) clean sand and gravel. Grain size, sorting and degree of stratification are variable. Permafrost may be present, especially in older deposits. Older deposits may contain highly weathered clasts and thus may not be suitable as construction materials. Rare oversized materials. Includes primarily GP and GW of the Unified Soil Classification (Wagner, 1957).

GM Poorly- to moderately well-sorted clay, silt, sand, gravel, and diamicton of colluvial, fluvial and glacial origins. Includes angular, unsorted talus debris and chaotically deformed colluvium derived from landslides. Engineering applications vary widely due to large range of grain size and sorting properties. Commonly frozen. Estimated 20-80 percent coarse, granular deposits with considerable oversized material. Includes primarily GC and GM of the Unified Soil Classification (Wagner, 1957).

OR Organic-rich silt and peat in bogs and thaw lake basins. Commonly frozen and ice-rich due to the excellent insulating properties of peat. Generally water-saturated. Chiefly organic materials. Estimated >50 percent peat, organic sand, or organic silt. Includes Pt of the Unified Soil Classification (Wagner, 1957).

Bedrock Materials

BC Medium-jointed, fine- to coarse-grained sedimentary carbonate rocks. Includes limestone, dolostone, and marble.

BG Coarse-jointed, coarse-grained igneous lithologies. Chiefly granitic rocks.

BM Medium-jointed, fine- to medium-grained quartzose sedimentary rocks. Includes quartzose sandstone and conglomerate, quartzite, chert, and hornfels.

BV Medium-jointed, fine-grained igneous rocks. Chiefly volcanic flow rock, dikes, and greenstone.

BO Rocks of mixed lithology and very fine-grained sedimentary lithologies that are generally poorly suited for use as construction materials. Includes shale, siltstone, graywacke and argillite.

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