

EXPLANATION

The unit descriptions below are based in large part on observations made in the course of geologic mapping. Consequently, the factors considered are geologic in nature; before excavation is undertaken such nongeologic factors as accessibility, slope, forest cover, zoning regulations, and land ownership should be considered.

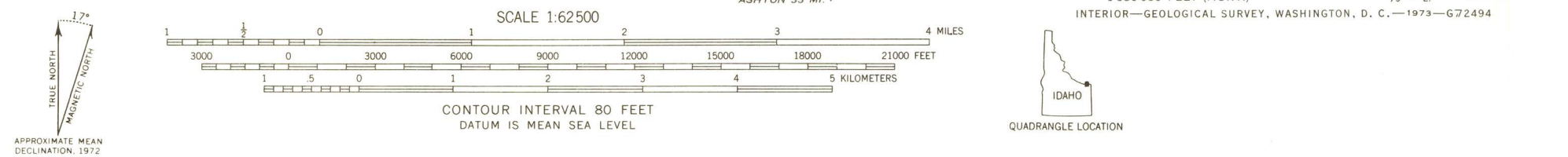
The unit descriptions are generalized statements that suggest average characteristics for whole geologic units and groups of units. Detailed field investigations will be required to determine the engineering properties of individual units for any specific operation. One contractor equipped with limited power equipment may need to drill and blast, whereas another contractor equipped with the most modern heavy equipment may be able to do the same job without any need for blasting.

Some earth materials can be excavated without the need for explosives; others first need to be drilled and blasted. This requirement — the need for explosives — has led to a simple classification widely used in the construction industry to describe the relative ease of excavating earth materials: Earth materials that can be removed by hand tools or by power equipment without the use of explosives are grouped as *common excavation*. Earth materials that must be blasted before they can be excavated are grouped as *rock excavation*.

Within each category there are broad differences. *Common excavation* includes earth materials that range from easily excavated unconsolidated sand and gravel to others more difficult to move such as boulder fields. *Rock excavation* includes units that range from friable sandstones easily drilled and easily broken by blasting to hard durable limestones that are difficult to drill and that require much blasting. These differences in relative ease of excavation of materials are shown on this map by indicating for each major category whether the earth materials are *easy* to excavate, require a *moderate* amount of effort, or will be *difficult* to handle.

- COMMON EXCAVATION** — Without recourse to explosives
 - CE** Easy — Materials that are easily excavated. Includes well-sorted deposits of unconsolidated silt, sand, and gravel in stream valleys and on the floor of Henrys Lake basin
 - CM** Moderate — Materials that are excavated with moderate difficulty. Includes shale, semiconsolidated deposits, and tills (glacial deposits that consist of an unsorted mixture of clay, silt, sand, gravel, cobbles, and boulders of all sizes)
 - CD** Difficult — Materials that are excavated with considerable difficulty. Includes large boulder fields
- ROCK EXCAVATION** — Drilling and blasting required
 - RE** Easy — Materials that require some blasting before they can be excavated. Includes weakly to moderately cemented sandstones
 - RM** Moderate — Materials that may require minor to moderate blasting before they can be excavated. Includes siltstones and volcanic flows
 - RD** Difficult — Materials that can be excavated only with considerable blasting. Includes limestones, dolomites, well-cemented sandstones, and a variety of layered crystalline rocks
- CM-RE** COMBINATION OF SYMBOLS — Bulk of unit has excavation characteristics described under CM, but one or more beds within unit have excavation characteristics described under RE. An example is siltstone containing interbedded sandstones
- RD** OVERSCORE — Part of largely buried unit projects through surrounding overlying thin unit
- RM** UNDERSCORE — Thin remnant of rock unit or surficial detritus, such as boulder field
- CONTACT BETWEEN TWO UNITS OF DIFFERING EASE OF EXCAVATION
- FAULT — Dashed where inferred; dotted where concealed. U, upthrown side; D, downthrown side. Bedrock broken and fragmented along fault trace and so will have variable excavation characteristics
- SLUMP BLOCK — Arrows indicate direction of movement. Bedrock broken and fragmented along fault trace and so will have variable excavation characteristics

Base from U.S. Geological Survey, 1964
10,000-foot grids based on Idaho coordinate system, east zone and Montana coordinate system, south zone
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue



MAP SHOWING RELATIVE EASE OF EXCAVATION OF GEOLOGIC UNITS IN THE HENRYS LAKE QUADRANGLE, IDAHO AND MONTANA

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