Idaho Geological Survey
University of Idaho

Published and sold by
Idaho Geological Survey
Moscow, Idaho 83843

ISBN 1-55765-154-X

Map 5
Othberg

LANDFORMS AND SURFACE DEPOSITS OF LONG VALLEY, VALLEY COUNTY, IDAHO

by

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1987

WHAT IS THIS MAP?

This map locates and describes landforms and surface deposits—the diverse features of our landscape shaped by geologic processes. For the terrain created in Long Valley, Idaho, the processes have been mountain building, glaciation, stream activity, weathering, and slope movements. Prominent features highlighted on the map include moraines left by glacier ice, outwash plains formed by glacier meltwater streams, bedrock foothills and mountains, alluvial fans, and other alluvial and colluvial landforms. The map presents the general deposits associated with the area's landforms and appraises the soil* conditions important to cultural activities such as construction and waste disposal.

Landforms are keyed by symbols assigned in the map's legend. In the *Explanation of Map Units*, each landform is defined by name, its landscape characteristics, a brief geologic summary, and a description of accompanying deposits. Landform symbols also key units to other information on weathering characteristics, general engineering properties, and flooding and drainage.

The reader should examine the unit descriptions and follow their properties in the tables. From this analysis, the reader can identify the significant attributes of a deposit. Various combinations of geologic and soil conditions may affect a proposed use for the land. For example, people need to consider water's effect on a landform or deposit. Some landforms tend to be flooded during spring runoff; some may be saturated with water because fine-grained sediments restrict infiltration; and others remain saturated because of high ground-water levels. Other deposits under possible evaluation, such as clay and peat, might perform poorly as engineering materials because of their low soil strength. Landforms change over many thousands of years, and older, more weathered landforms have pedogenic soils that are thicker and more clayey. It is important to assess both the properties of original deposits and the effects of pronounced weathering on older landforms.

The information on this map is intended to provide soil-engineering guidelines for predicting the performance of a landform or surface deposit. Any detailed geotechnical interpretation for a specific site will require more thorough analysis than this map can furnish. For that information the reader should consult a qualified geologist or geological engineer.

FALSE-COLOR INFRARED BASE

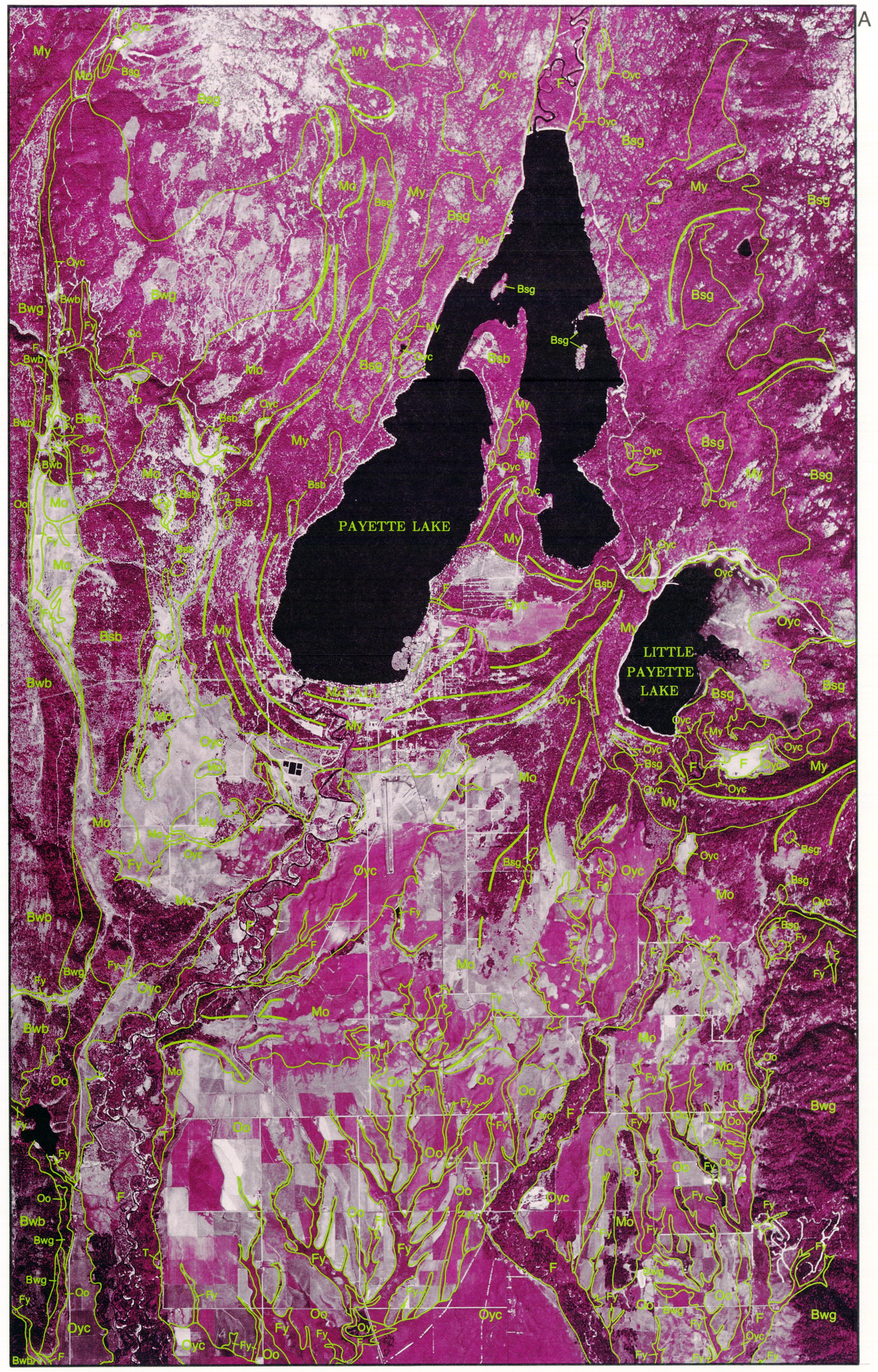
The base for this map is false-color infrared photographs taken by a high-altitude NASA aircraft. The patterns of vegetation on these photographs nicely portray many of the valley's landforms.

SOURCES ON GEOLOGY AND SOILS

Information on geology for this map was modified from U.S. Geological Survey Bulletin 1311-A, *Quaternary Geology of Long and Bear Valleys, West-Central Idaho*, by Dwight L. Schmidt and J. Hoover Mackin (1970), according to investigations by the author in 1983-1985. Information on soils was adapted from U.S. Department of Agriculture, Soil Conservation Service, *Soil Survey of Valley Area, Idaho, Parts of Adams and Valley Counties*, by L.M. Rasmussen (1981). For more information on the geology and soils of Long Valley, the reader should consult these two sources.

*Soil has different meanings to soil scientists (pedologists), geologists, and engineers. The pedogenic soils that soil scientists study are the relatively thin surface layers in which plants are rooted and which exhibit the effects of weathering. In general, geologists use the word "soil" in the same way as soil scientists. Engineers, on the other hand, refer to all unconsolidated earth materials overlying hard rock as soil. The tables of information about engineering properties on this map use the word "soil" in the engineering context.

A



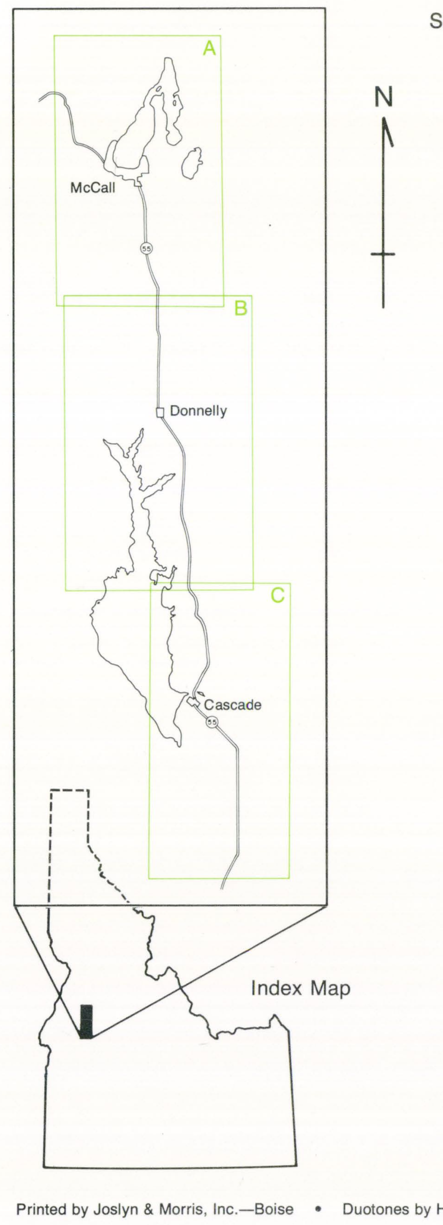
B

C

Scale is distorted toward edges of the maps

0 1 Mile
Scale (Approximate)

CONTACT:
CRESTLINE OF MORAINE:
APPROXIMATE HIGH-WATER LINE OF CASCADE RESERVOIR:



EXPLANATION OF MAP UNITS

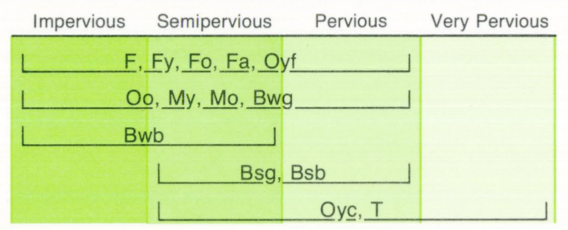
LANDFORM	LANDFORM FEATURES	GEOLOGY	DESCRIPTION OF DEPOSITS
Flood Plain **F**	Floodable bottomlands; stream channels and bars; very low terraces.	Holocene alluvium	Surface: highly variable—silt, clay, sandy silt, and silty sand; local peat and muck; gray, brown, and black (locally mottled: gray, yellow, brown, and olive). Below 1 meter: highly variable—clayey silt, silty sand, gravelly sand, and sandy gravel. Gravel clasts rounded to subrounded. Bedding: distinct to indistinct beds of sand and gravel; thin to thick beds of silt and clay.
Terrace **T**	Benches bordering valley bottomlands; outwash terraces.	Holocene to Pleistocene alluvium	Surface: silty sand and gravelly sandy silt; grayish brown, yellowish brown, and dark brown. Below 1 meter: sand, pebbly sand, and granule- to cobble-sized gravel with silty sand to coarse sand matrix; yellowish brown, pale brown, and gray. Gravel clasts rounded to subrounded. Bedding: distinct to indistinct beds of sand and gravel.
Outwash Plain (young)	Broad, relatively flat surface and narrow channels formed by deposits of glacial meltwater streams.	Late Wisconsin outwash	
Oyc (coarse)	Near moraines (close to meltwater sources).		Surface: silty sand, silty pebbly sand, sandy gravel, local silt, and clay; pale brown, yellowish brown, and dark brown (locally mottled: gray, yellow, brown, and olive). Below 1 meter: near moraine—(primarily gravels) silty sandy gravel and gravelly coarse sand; granule- to small boulder-sized clasts; grain size decreases with distance away from moraine. Away from moraine— (primarily sands) silty sand, coarse sand, pebbly sand, and sandy gravel; gray and grayish brown (locally mottled: gray, yellow, brown, and olive). Gravel clasts rounded to subrounded. Bedding: distinct to indistinct beds of sand and gravel.
Oyf (fine)	Far from moraines (away from meltwater sources).		Surface: silty sands and local areas of clay and silt; gray, brown, and dark gray (locally mottled: gray, yellow, brown, and olive). Below 1 meter: silty sand and pebbly sand; gray, brown, and dark gray (locally mottled: gray, yellow, brown, and olive). Pebble clasts rounded to subrounded. Bedding: distinct to indistinct beds of sand and pebbly sand.
Outwash Plain (old) **Oo**	Flat to gently undulating remnants of a broad plain deposited by glacial meltwater streams. Includes a few narrow channels.	Early Wisconsin outwash	Surface: silty clay and clayey silt; brown and dark brown. 0.5-2 meters: sandy clayey silt, clayey silt, clayey silty sand, and clayey pebbly sand; dark brown, brown, and yellowish brown. Below 2 meters: silty sand, sand, and pebbly sand; brown, pale brown, and light gray. Pebble clasts rounded to subrounded. Bedding: indistinct to distinct beds of sand.
Moraine (young) **My**	Hummocky to sharp-crested ridges deposited at terminus of glacier; common bouldery surface.	Late Wisconsin till	Surface: cobbly and bouldery silty sand; grayish brown, yellowish brown, and brown. Below 1 meter: massive, loose to compact till deposited by glacier ice; consists of gravelly coarse sand with a silty fine sand matrix; pebble- to boulder-sized gravel clasts; grayish brown and gray. Gravel clasts primarily subangular to angular; many are faceted by glacial abrasion. Bedding: unbedded.
Moraine (old) **Mo**	Broadly undulating upland to steep-sided, broad ridges deposited at terminus of glacier; local bouldery surface.	Early Wisconsin till	Surface: cobbly and bouldery silty clay and clayey silt; brown and dark brown. 0.5-2 meters: gravelly sandy clayey silt and gravelly clayey silty sand; pebble- to boulder-sized gravel; dark brown, brown, and yellowish brown. Below 2 meters: massive till deposited by glacier ice; consists of gravelly silty sand; pebble- to boulder-sized gravel clasts; brown and gray. Gravel clasts primarily subangular to angular; many are faceted by glacial abrasion. Bedding: unbedded.
Fan/Colluvial Slope (young) **Fy**	Fan-shaped to narrow alluvial surfaces formed by small streams and down-slope mass movements.	Late Wisconsin	Surface: highly variable—clay, silt, sand, and organic material; gray, brown, and black (locally mottled). Below 1 meter: clayey silt, sandy silt, silty sand, and pebbly sand, local layers of organic material, gravel in foothill drainageways; gray and grayish brown (locally mottled: gray, yellow, brown, and olive). Gravel clasts subrounded to subangular. Bedding: distinct to indistinct beds of sand and pebbly sand; thin to thick beds of silt, clay, and organic material.
Fan/Colluvial Slope (old) **Fo**	Gently to moderately sloping, broad surfaces and narrow drainageways formed by small streams and down-slope mass movements during the late Pleistocene.	Early Wisconsin alluvium and periglacial colluvium	Surface: clayey silt, silty clay, and silty clayey sand; grayish brown and dark brown. 0.5-2 meters: silty clay, sandy clayey silt, silty sand, and pebbly silty clayey sand; dark brown and brown. Below 2 meters: silty sand, pebbly sand, sandy gravel, and gravel in foothill drainageways; brown, pale brown, and light gray. Gravel clasts subrounded to subangular. Bedding: indistinct to distinct beds of sand.
Fan/Colluvial Slope (ancient) **Fa**	Broad, undulating surface to low, rolling hills.	Early to middle Pleistocene glacial and nonglacial deposits	Surface: clayey silt and silty sandy clay; grayish brown and dark brown. 0.5-2 meters: clayey silt, clayey silty sand, and clayey pebbly sand; dark brown and brown. Below 2 meters: silty sand, sand, pebbly sand, and granule gravel; brown, pale brown, and light gray. Pebbles subrounded to subangular. Bedding: indistinct to distinct beds of sand to sandy granule gravel.
Bedrock Hill/ Foothill	Low, gentle- to steep-sloping knobs and hills, broad foothills, and mountain slopes.		
Bwb (weathered basalt)		Miocene Columbia River Basalt	Surface: clayey silt, clayey sand, and clayey gravel; pebble- to cobble-sized gravel clasts; brown and dark brown. Gravel clasts subangular to angular. Bedding: massive to crudely bedded. Bedrock surface: weathered, fractured basalt with clayey silt extending down into fractures; dark brown and dark gray.
Bsb (glacier-scoured basalt)		Miocene Columbia River Basalt overridden by glacier ice	Surface: silty sand to silty clayey gravel; pebble- to cobble-sized gravel clasts; brown. Gravel clasts angular to subangular. Bedding: massive to crudely bedded. Bedrock surface: fractured basalt; dark gray and brown.
Bwg (weathered granite)		Cretaceous granitic rocks	Surface: silty sand, coarse sand, and sandy granule gravel; grayish brown and brown. 0.5 meter to bedrock: grus (granulated granitic rock)—pebbly coarse sand and granule gravel to crumbly granitic rock (grades downward into hard rock); brown, dark brown, pale brown, gray, and white. Gravel clasts subangular to angular. Bedding: massive to crudely bedded.
Bsg (glacier-scoured granitic rocks; thin and patchy glacial deposits)		Cretaceous granitic rocks overridden by glacier ice	Surface: silty sand and gravelly sand; pebble- and cobble-sized gravel clasts; light gray, grayish brown, and brown. Gravel clasts subangular to angular. Bedding: massive to crudely bedded. Bedrock surface: crumbly to fractured granitic rock; brownish gray and white.

SURFACE WEATHERING FEATURES

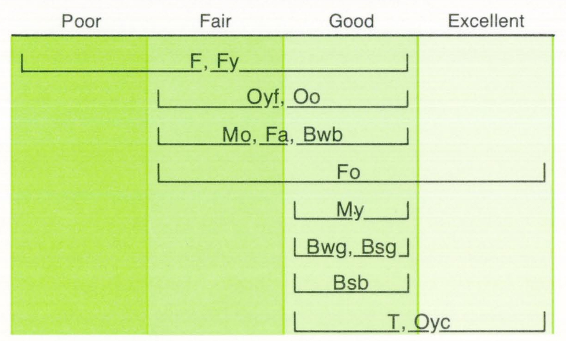
Weathering Characteristics	Landform
Little evidence of weathering. Weak pedogenic soil development. Locally gleyed.	F
Oxidation extends to about 1 meter. Moderate soil development. Minor pedogenic clay. In subsurface, layers, bands, streaks, and splotches of iron and manganese oxides occur locally as a result of percolating water and fluctuating ground-water tables.	T, Oyc, Oyf, Fy
Oxidation extends to about 1 meter. Moderate soil development. Minor pedogenic clay. Unweathered below pedogenic soil.	My
Oxidation extends to about 1 meter. Moderate soil development. Minor pedogenic clay. Common oxidation along fractures in bedrock to depths of several meters. Common hard bedrock near surface.	Bsg
Oxidation extends to 2 meters or more in depth. Considerable soil development including pedogenic clay. Common effects of oxidation in the subsurface due to movement of ground water and percolating water. Gravel clasts that are present are commonly softened or disintegrated within the upper 4 meters.	Oo, Fo, Fa
Oxidation extends to 2 meters or more in depth. Considerable soil development including pedogenic clay. Unweathered below pedogenic soil (with exception of local, buried pedogenic soils). Common softened or disintegrated gravel clasts within upper 2 meters.	Mo
Oxidation extends to bedrock surface and along fractures for several meters in depth. Considerable soil development including pedogenic clay. Bedrock exhibits softening or disintegrating effects within upper several meters.	Bwb, Bwg

GENERAL ENGINEERING PROPERTIES

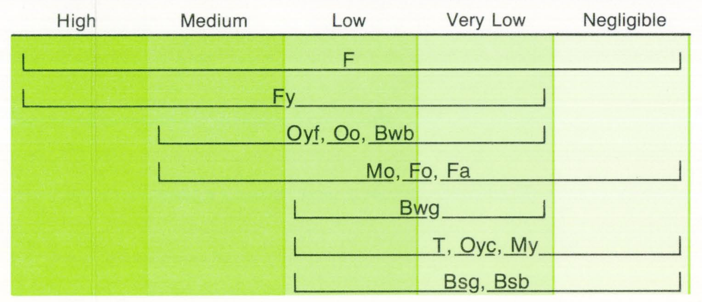
PERMEABILITY†



SHEAR STRENGTH‡



COMPRESSIBILITY§



CONSTRUCTION MATERIAL

WORKABILITY #

SAND SOURCE

Generally Unsuited	Local Potential	Good Potential
F, Fy	Oyf, Oo	T, Oyc
My, Mo	Fa, Fo	
Bwb, Bwg		
Bsg, Bsb		

GRAVEL SOURCE

Unsuited	Local Potential	Good Potential
F, Fy	Oyf	T
My, Mo	Oo	Oyc
Fo, Fa		
Bwb, Bwg		
Bsg, Bsb		

† Permeability is the measure of water movement through the interconnected voids within a soil. In general, the interconnectedness of soil voids, and thus permeability, increases as more particles of sand and gravel are present in the soil. Permeability is expressed as a rate. Soils with permeabilities less than 1 foot per year are customarily described as impervious; those with permeabilities between 1 and 100 feet per year as semipervious; and those with permeabilities greater than 100 feet per year as pervious.

‡ Shear strength is the primary property measured by engineers to compute the strength of a soil. Shear strength is the resistance to sliding of one mass of soil against another. It is a function of both the internal friction and the cohesiveness of a soil. Under conditions of saturation by water, pore-water pressure within soil voids will reduce the shear strength. To be conservative, the values listed here are for saturated conditions.

§ Compressibility refers to decreases in the volume of a soil caused by the weight of an overlying mass during a period of time. It is a function of load, density, water content, and soil texture. For the most part, compressibility is associated with changes in the volume of voids. The potential for a high compressibility is usually associated with fine-grained, highly plastic soils.

¶ Shallow depth to bedrock

Workability of a construction material is a value describing the effects of all soil properties on the relative efficiency of excavation, placement, or treatment (such as compaction) of a deposit. The amount of fine material in a soil is a primary controlling factor.

WATER

FLOODING

Spring Flooding[1]	Landform
Highly Probable[2]	F
Probable[3]	Fy, Oyf
Rare[4]	Oyc, Fo, T
None[5]	Oo, My, Mo, Fa, Bwb, Bwg, Bsg

[1] Adapted from flooding interpretations in the U.S. Department of Agriculture, Soil Conservation Service's *Soil Survey of Valley Area [Valley County], Idaho*.
[2] Local potential for flooding is more than once every 2 years.
[3] Local potential for flooding is once or less every 2 years in small drainageways unrepresentative of the entire landform.
[4] Only unusual, extreme weather will cause local flooding in small drainageways unrepresentative of the entire landform.
[5] Flooding does not occur.

DRAINAGE

Surface Drainage[1]	Landform
Slow to moderate infiltration. Local potential for seasonal saturation due to low permeabilities or high water tables.	F, Oyf, Fo, Fy
Moderately slow infiltration. Potential for moderately high runoff where slopes steepen.	Oo, My, Mo, Fa, Bwb
Moderately rapid infiltration. Potential for moderate runoff where slopes steepen.	Bwg, Bsg
Rapid infiltration. Low runoff potential.	T, Oyc

[1] Adapted from interpretations of hydrologic groups in the U.S. Department of Agriculture, Soil Conservation Service's *Soil Survey of Valley Area [Valley County], Idaho*.

Printed by Joslyn & Morris, Inc.—Boise • Duotones by Hi-tech Color—Boise • Typography by Eileen Cline, University of Idaho Central Typesetting • Cartography by Jon Gustafson