

## ARE ALL SOILS ALIKE?

Each soil has unique physical and chemical properties. By studying the interaction of these properties soil scientists can predict how a soil will respond to specific land uses. More than 25 soil properties are used in determining the suitability of the soil for your home, septic tank absorption system, play areas, lawn and landscaping.

*Local consultant conducting an onsite investigation.*



## IS THE SOIL STABLE?

You have probably seen or heard about houses that have serious structural damage due to permafrost, flooding, frost heaves or other soil-related problems.

Permafrost and massive underground ice is a serious problem in Interior Alaska. If permafrost or ice is suspected on your home site, precautions such as a special foundation design should be taken to keep the ground frozen.

Frost heaves also can be a severe problem on the Interior's silty soils. Foundations should be designed to withstand the extra stress.

Organic soils also require a special foundation. Otherwise, if the soil fails, the structure may remain intact, but the soil may settle away from the foundation.

## IS THERE PERMAFROST OR ICE WEDGES?

Many homes have been damaged by melting permafrost or ice wedges. The damage may range from uneven settling to massive failure. When permafrost melts, it causes uneven settling. When large ice wedges melt, they cause large pits called "thermokarsts".

Permafrost soils often occur in flat areas. Soils with ice wedges occur on gently sloping areas. Both of these areas may appear ideal for building but could cost thousands of dollars for repair or relocation if the soil fails. Insurance does not cover permafrost damage.

Before you buy, find out the permafrost and ice wedge hazard. Soil surveys show areas of permafrost and indicate areas that have the potential for thermokarsts to form.



*Thermokarst pit in farm field near Fairbanks gives perspective to damage that melting ice lenses can do.*



Photo courtesy of Soils Alaska, PC

## WHERE IS SOIL INFORMATION AVAILABLE?

**Natural Resources Conservation Service**

**590 University Avenue, Suite B**

**Fairbanks, AK 99709**

**Phone: (907) 479-2657**

Soil survey information can be accessed online at  
<http://websoilsurvey.nrcs.usda.gov>.

### USDA Nondiscrimination Statement

"The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice or TDD). USDA is an equal opportunity provider and employer.

# Fairbanks Homebuyers!

## What you don't know about Fairbanks soils could hurt you!



Developed in cooperation with



**Fairbanks Soil and Water Conservation District**

and



**NRCS Natural Resources Conservation Service**



## HOMEBUYERS— NRCS CAN HELP YOU!

Are you planning to build or buy a house? If so, you've probably spent a long time thinking about your new home's design and location.

Interior Alaska soils can have problems such as permanently frozen ground or permafrost, ice lenses, high seasonal water tables or be located in areas prone to erosion or seasonal flooding.

Vegetation is not a good indicator of permafrost. Do not assume the site is suitable because it is in an approved subdivision or an existing house has been standing there for ten years.

However, a soil survey and careful on-site investigation can give a potential home builder an idea of whether permafrost or other problem soils are on the building site.

It only takes a few minutes to check the soils. Published soil surveys are available from the **Natural Resource Conservation Service** of the United States Department of Agriculture. Soil survey information can be accessed online at: <http://websoilsurvey.nrcs.usda.gov>.

## CAN YOUR SOIL DO THE JOB?

The foundation supports the walls, the walls support the roof and the soil supports them all. How can you tell if the soil will be good for your house? Here are some important questions to ask:

- Is the soil stable or does it have properties that can cause the foundation to crack or fail?
- Is the area subject to flooding?
- Does the soil have a high water table that may cause basement flooding or septic system failure?
- Is the soil deep enough for a basement or for garden and landscape plants to take root and thrive?
- Does the soil have erosion problems due to slope?

A soil survey can help you answer these and many other questions.

## WHAT A SOIL SURVEY CAN DO FOR YOU

NRCS soil scientists classify, test, and map soils. The maps are published with pertinent data from soil surveys.

Information about important soil properties such as flood hazard, wetness, erodability, permeability and permafrost are included in soil surveys in Alaska.

A soil survey does not replace the need for thorough on-site investigation. A soil survey, along with assistance from NRCS staff, will guide you through your home-site investigation and give you ideas of what to look for or if other professionals should be consulted.

Soil surveys accurately describe the dominant soil conditions. They are not site-specific. Pockets of other soil types called inclusions, may be present and can be important in planning and designing your house. Soil surveys describe the most likely inclusions and where they may occur on the landscape.

## IS THERE POTENTIAL FOR FLOODING?

Many people whose homes have been damaged by floods were not aware that their homes were built on flood plains. Because flood plains are generally level, they seem desirable for home sites.

Before you buy, consult a soil survey to find out the potential for flooding.



*Localized flooding can happen when fill and debris clog surface drainage ways.*

## IS THE SOIL SUITABLE FOR A SEPTIC TANK ABSORPTION FIELD?

If a house is located beyond sewer lines, a septic system may be required. The absorption field may not function if the soil is unsuitable.

If the soil absorbs waste too slowly, effluent may rise to the surface. If the site is too steep, the effluent may surface downslope. If the soil has a seasonal high water table the system may work in dry weather and fail when wet. If bedrock is near the surface, the system may not be feasible with the additional cost for installation. If the soil has permafrost the soil may not drain properly or the additional water from the septic system may melt the permafrost, causing uneven settling.

For each mapped soil, the soil survey indicates the suitability for a septic tank absorption field.



## IS EROSION A HAZARD?

Soils vary in their resistance to erosion, but erosion is generally worse in sloping areas. Soil surveys indicate the erodability of each mapped unit.

Bare eroded areas detract from a home's appearance, but erosion can also have serious consequences. Erosion along the foundation of a house can eventually undermine it. Poorly designed driveways and hillside cuts can collapse or wash out.

When surface runoff carries eroded soil into ditches and streams, the sediment may damage water quality, clog culverts, and increase the chance for down stream flooding.

The best defense against erosion is to control runoff with a well designed drainage plan and protect the soil with grass, shrubs, and other adapted plants. The soil survey indicates the suitability of the soil for lawns and landscaping.

## DOES THE SOIL HAVE A SEASONAL HIGH WATER TABLE?

When the water table rises close to the surface, basements may flood, septic systems may fail, and landscaping or lawn plants can be damaged or killed.

Soil surveys indicate soils that have seasonal high water tables and estimate the average depth to it.

## IS THE SOIL DEEP ENOUGH?

If the soil is shallow over bedrock digging a basement will be difficult. Generally, soil at least 6 feet deep is needed for basements.

Most plants grow poorly on shallow soils. You may need to buy topsoil, choose special plants, or use other aids to establish vegetation. The soil survey indicates areas where bedrock is at depth of less than 5 or 6 feet. Radon gas is also a concern where homes are built on bedrock.



Photo courtesy of Permafrost Technology foundation T. McFadden et.al.

*Structural problems that result from uneven settling from melting permafrost or ice can be reduced with a foundation that preserves the permafrost or ice. Example of an above-ground foundation.*

## SHOULD YOUR HOME HAVE A SPECIAL DESIGN?

Many soil problems can be overcome by special structural design. Homebuyers who are aware of potential hazards can get help from consultants for special investigations and designs. For example, subsurface drains can reduce soil wetness. Structural problems, due to frost heave, can be reduced by a foundation designed to withstand the extra stress.

Ventilation systems can and should be part of a home design where radon is likely.

If a home site is in a flood-prone area, it is best to find a new site. However, damage from flooding on a site can be reduced by properly designed and installed measures.