How can you get a soil survey?

To determine whether a soil survey is available for your area of interest, or to obtain other assistance, contact the local **NRCS** office. The telephone number is generally listed in municipal phone directories under *"United States Government, Department of Agriculture."* If the survey has not yet been published, you can arrange to examine completed soil maps and other available data in preliminary form.

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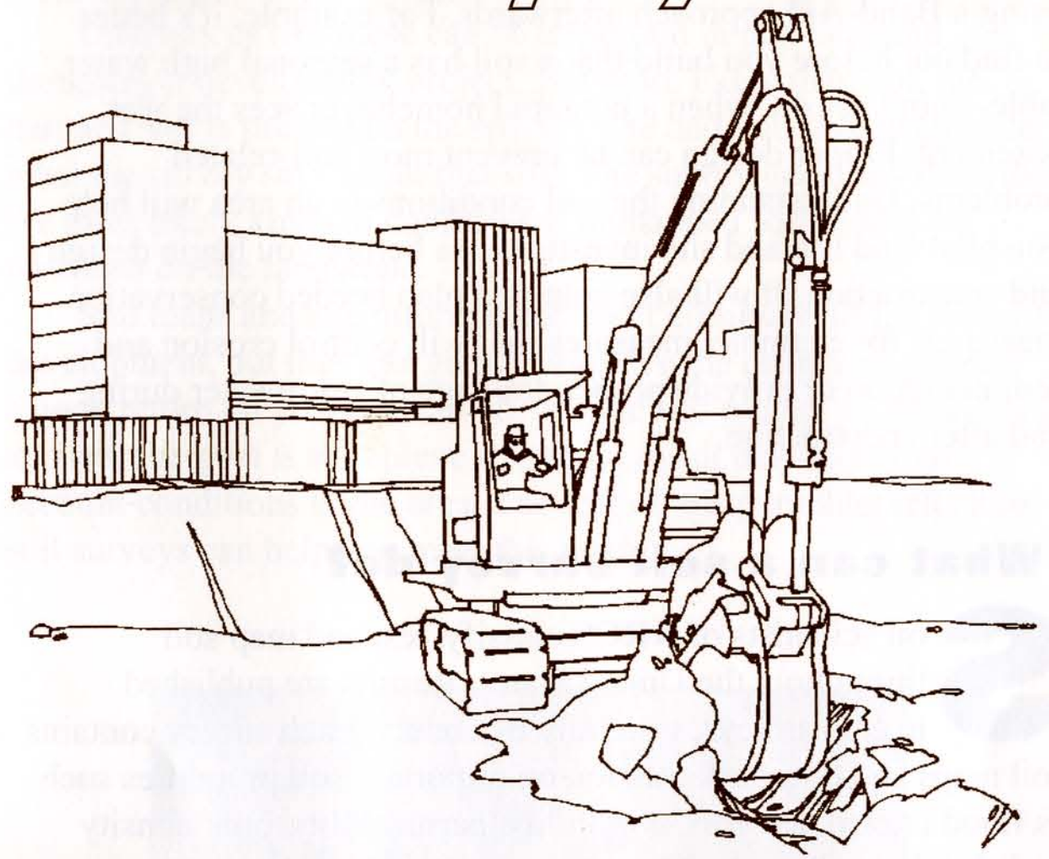
SOIL SURVEYS
can help you...



Developers & Builders

USDA NRCS
Natural Resources Conservation Service–Lakewood, Colorado
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Developers and Builders

Proper use of a soil survey, along with appropriate onsite investigation, is a wise investment. Building a solution into the design of your project generally is cheaper than using a Band-Aid approach afterwards. For example, it's better to find out before you build that a soil has a seasonal high water table—not later on, when a potential homebuyer sees the wet basement. Proper design can be prevent most soil-related problems. Understanding the soil conditions in an area will help you plan land use and site investigations before you begin design and construction. It will also help you plan needed conservation measures, for example, measures that will control erosion and sedimentation or provide proper drainage of stormwater during and after construction.

What can a soil survey do?

Soil scientists of **NRCS** classify, test and map soil throughout the United States. Results are published in soil surveys, generally by county. Each survey contains soil maps and other information on important soil properties such as flood hazard, wetness, erodibility, permeability, bulk density and shrink-swell potential.

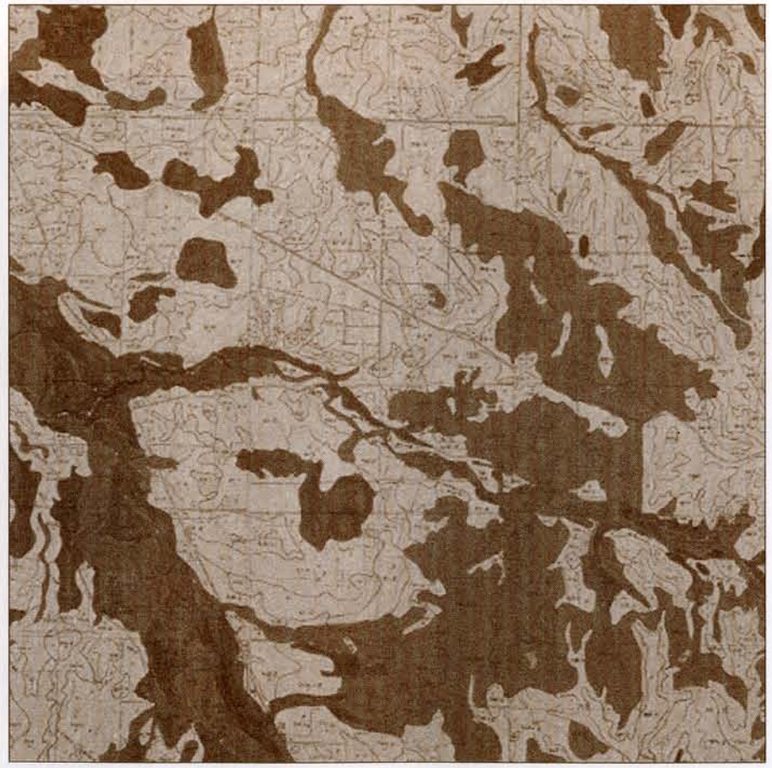
The survey also interprets some effects of soil properties on many specific land uses. But even if a mapped soil has no potential hazards, the survey does not replace the need for thorough onsite investigation and testing or analysis by soil engineers and other professionals.

Most information in a soil survey applies to the upper five or six feet of soil. The survey may describe general features of deeper material, but you should consult geologists for detailed descriptions and interpretations. Geologic and groundwater maps may also be available.

Soil surveys accurately describe the dominant soil conditions, but they are not site-specific. Many areas shown on a soil map contain small areas of other soil which may differ greatly from the mapped soil. For example, an area mapped as well-drained soil can contain pockets of poorly drained soil—or the reverse can be true.

Differences like these can be important in planning and designing a development project. But more likely than not, the mapped soil is present on the specific site and you should consider what the survey says about that soil. The survey generally describes the most likely kinds of contrasting, unmapped soils and their positions on the landscape.

Soil maps and site information won't eliminate all the risks of development, but they can greatly improve the chance of getting a good return on your investment of time and money. In developing an area, the goal is to achieve a specific result that takes into account conditions in the area. The rest of this pamphlet tells how soil surveys can help you meet this goal.



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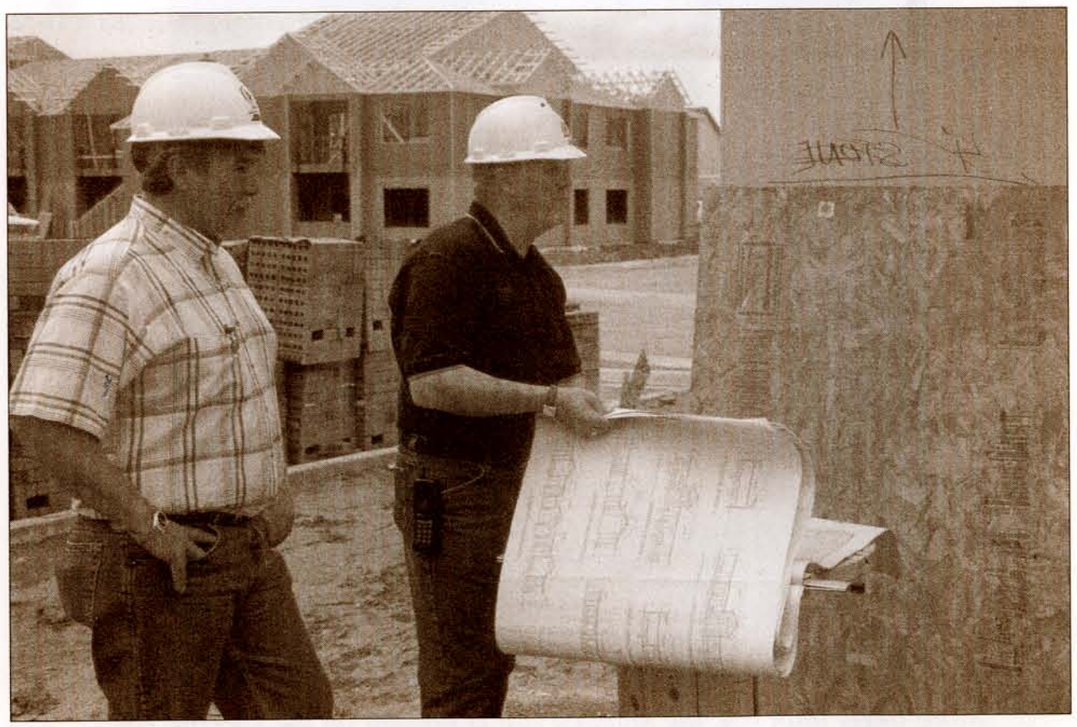
Area Planning and Development

A soil survey can help you evaluate the suitability of large areas for residential, commercial, industrial or recreational development. For example, a developer used a soil survey to prepare an alternative plan for a 330-acre tract. The developer originally planned a subdivision of 600 single-family lots. But county authorities pointed out that 120 acres had severe limitations for housing because of soil that was steep, shallow, stony or susceptible to flooding. Under the alternative plan, the same number of dwelling units were built, but construction was confined to soil with favorable properties. Garden apartments replaced some of the single-family homes, and steep areas and a flood plain were reserved for public use. The developer was given density credit for the land assigned to public use.

Soil surveys can help in area planning and development in other ways, such as evaluating alternative routes for roads and pipelines and identifying areas that may require control of water flow on or below the surface.



Using soil surveys can prevent problems . . .

Soil Hazards and Corrective Measures

By indicating potential soil hazards, the soil survey can help you avoid failure of foundations, flooded basements and other structural problems. By anticipating the hazards, you can plan for further investigations and corrective measures such as special foundations. The soil survey describes these major soil properties, features and hazards:

Available water capacity
Bulk density
Clay minerals
Color
Corrosivity
Depth to bedrock
Depth to seasonal high water table
Engineering classifications
Erodibility
Flooding
Frost-action potential
Grain-size distribution
Hardness of bedrock within 5 or 6 feet
Kind of water table
Liquid limit
Mineralogy of sand and silt fractions
Natural soil drainage
Organic matter content
Pans *(hard or cemented layers)*
Permeability
Plasticity index
Reaction (pH)
Salinity
Shrink-swell potential
Slippage
Slope
Stoniness
Subsidence characteristics
Texture
Wetness

Most of these items impact builders and developers. For example, salinity and other soil conditions can corrode concrete and steel. Permeability, slope, depth to bedrock or depth to a seasonal high water table, and other properties affect the performance of septic tank absorption fields. Improper location or design of the absorption field can lead to groundwater pollution or to surfacing of the effluent downslope.

For specific land uses, NRCS soil scientists, engineers and other professionals estimate soil suitability or indicate the degree and kind of soil limitations on each mapped soil. The results are published in the soil survey. Major land uses of interest to builders and developers are:

- **Building site development**—shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, lawns, and landscaping
- **Construction materials**—roadfill, sand, gravel, topsoil
- **Recreation development**—camp and picnic areas, playgrounds, paths, and trails
- **Sanitary facilities**—septic tank absorption fields, sewage lagoon areas, trench and area sanitary landfills, daily cover for landfill
- **Water management**—pond reservoirs; embankments, dikes and levees; aquifer-excavated ponds; drainage; irrigation; terraces and diversions; grassed waterways
- **Windbreaks** and environmental plantings

Conservation Planning

Soil surveys provide basic information for planning conservation practices during and after construction. Practices often include measures to control erosion and sedimentation and to provide storage and safe removal of stormwater runoff. Many communities require such measures.

A plant cover is generally the best defense against erosion and sedimentation. Soil characteristics determine which plants are adapted. Information about the soil is also useful in the design of functional and attractive landscapes.

Covering the soil with buildings and paved surfaces increases storm runoff and can increase the likelihood of flooding. Flood damage in the United States between 1992 and 1998 is estimated at more than $4 billion annually. You should select a flood-free site or include flood-proofing measures in the development plan. There are many simple and effective flood-proofing measures, including building on pilings or columns, constructing levees, or adding fill material to raise the site above expected flood levels.

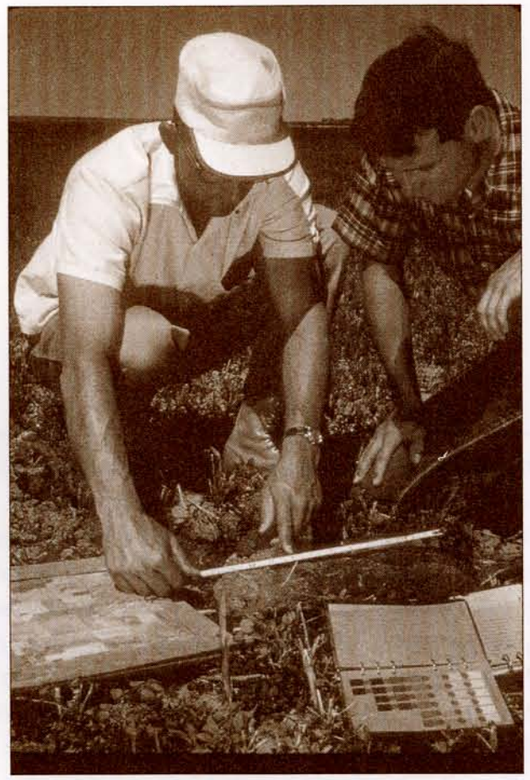
Soil surveys provide an estimate of flood hazard for each soil. The estimates are useful in preliminary plans, but they are not a substitute for detailed hydrologic surveys and professionally designed flood-proofing measures.

Soil surveys describe soil properties and potential soil hazards that may indicate the need for specific temporary and permanent conservation practices such as land grading and shaping, terraces, surface and subsurface drains, diversions, berms, sediment basins, waterways, grade stabilization structures, plant cover on critical sites, and mulching.

Other Assistance Available from NRCS

Soil surveys are conducted cooperatively by the NRCS and other federal and state agencies, including state agricultural experiment stations and conservation districts. Besides soil surveys, NRCS offers other information and technical assistance that can help you in planning development projects.

In some areas, local information is available on soil potential, corrective measures and continuing limitations for specific urban uses such as septic tank absorption fields. In many communities NRCS has prepared detailed flood hazard studies. NRCS also tests, selects and releases plants for specific conservation uses, including erosion control on disturbed areas such as construction sites.



Soil surveyors determining soil properties