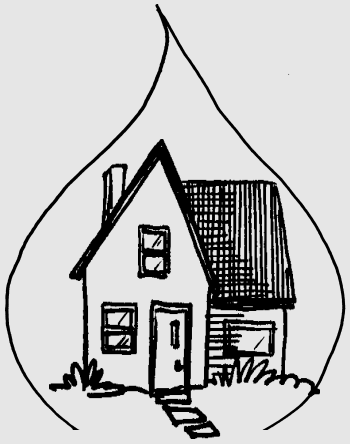


Is your soil type sandy or gravelly? Does it drain quickly? Does stormwater runoff from your property flow into a nearby lake or pond? Do you store hazardous chemicals on your homesite, and are they stored close to your well or next to a lake, stream, or river? This worksheet will help you become familiar with your homesite and how you manage it, so you can identify risks to your water resources. Completing the worksheet will provide background information you can use throughout the Home*A*Syst series. This worksheet covers two areas:

1. Physical Characteristics of Your Homesite.
✔ Soil type & depth
✔ Depth to bedrock
✔ Depth to the water-table
✔ Location of wetlands, streams, or lakes

2. A Site Map of Your Home. On a map of your homesite—with buildings, roads, possible pollution sources, and other human and natural features— you can identify potential trouble.

Home*A*Syst Program

for New Jersey

Site Assessment

Protecting Water Quality Around Your Home

Why should I learn about my homesite's physical characteristics and how I manage my home?

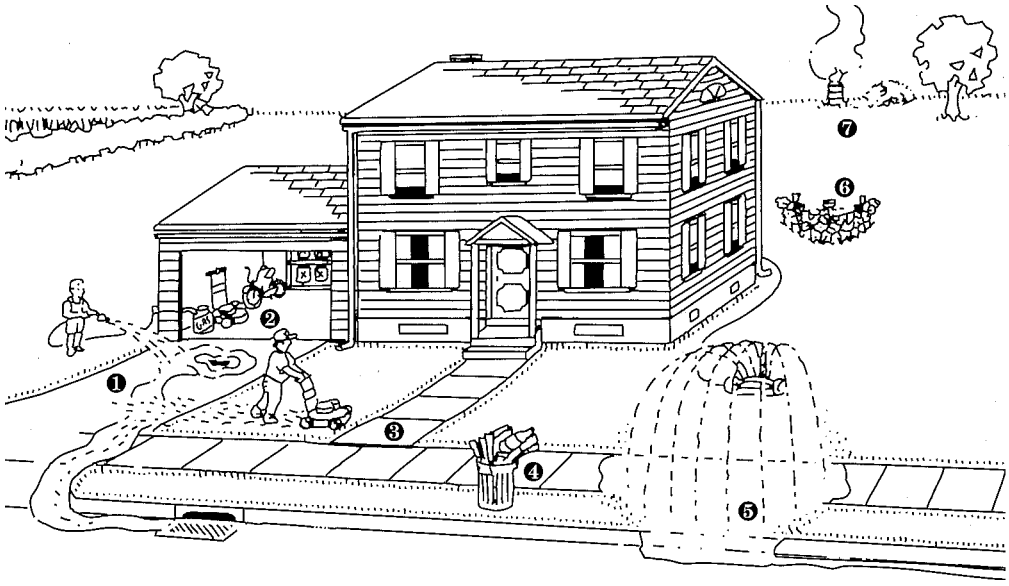
What you do in and around your home can affect water quality — both below the ground and in nearby lakes, streams, wetland, coastal ponds, or the ocean. This worksheet will help you identify some important physical characteristics of your homesite such as soils, geology, depth to groundwater, and nearness to surface water. It also invites you to draw a simple "aerial view" map of your homesite. Your completed map will show the locations of important features and activities in and around your home that may pose risks to your health and the environment. Remember, this assessment is a starting point. It is meant to encourage you to complete some — or all — of the other Home*A*Syst worksheets.

To begin thinking about how your activities and physical conditions can harm water quality, see Figure 1 on the next page. How many items can you find in this picture that could affect water quality?

What is a Watershed?

The water from your tap and in nearby lakes or streams is part of a much larger water system. Not everyone lives next to a pond or stream, but we all live in a watershed — the land area that contributes water to a specific surface water body, such as a pond, lake, wetland, river, or estuary. The landscape's hills and valleys define the watershed or "catchment" area. It is like a bathtub. The watershed outlet — the mouth of a pond, lake or river — is the tub's "drain." The geographical area defining the watershed boundary is the tub's rim. A watershed's drainage system consists of a network of rivers, streams, man-made channels and storm drains, wetlands, and the underlying groundwater. Drainage basins generally refer to large watersheds that encompass the watersheds of many smaller rivers and streams. For example, the Barnegat Bay Watershed, or drainage basin, in Ocean County, encompasses many smaller watersheds, including Toms River, Cedar Creek, Metedeconk River, and Tuckerton Creek. Com-

mon activities — like how you dispose of used motor oil, or fertilize your lawn and garden — can affect water quality, even when you do these things far from any shore. By paying careful attention to how you manage activities in and around your home, you are protecting your watershed and the water you drink.



❶ Washing spilled motor oil and grass clippings into storm drains
❷ Storing gasoline and other hazardous chemicals near children's toys
❸ Paving walkways instead of using porous material, thus increasing runoff
❹ Not separating garbage for recycling
❺ Improperly adjusting sprinklers - wasting water
❻ Planting flowers that may require fertilizers and pesticides around the well cap
❼ Burning garbage, which adds toxics to air that eventually settle on the ground (open burning is not permitted in New Jersey without a permit)

Figure 1. Examples of practices that may harm the environment or home residents.

What's Your Watershed Address?

Where does the rain that falls on your home go? After it leaves your lawn, street, or sidewalk where is it headed? Does it flow downhill straight to a nearby stream or lake? Does it wander into a wetlands? Does it puddle in your backyard? Does it move down a storm drain to the local creek? That destination, whether it's a puddle, a pond, a bay, or a lake, is your watershed address. It could be the Delaware River, the Raritan River, Lake Hopatcong, or Barnegat Bay. Just like there are towns within counties within states, there are subwatersheds within watersheds within drainage basins. For example, the rain that falls on your driveway might flow into the Maple Root Branch, which flows into the Toms River, which flows into Barnegat Bay, even though your mail finds you through Jackson Township, Ocean County, New Jersey.

What influences the quality of my water?

Understanding the physical conditions of your residence and the location of potential contamination sources are important first steps in safeguarding your water supply. Physical characteristics, like soil type, depth to groundwater, and nearness to surface water may speed up or delay a contaminant's effect on water quality. Water quality is also affected by many activities: 1) improper drinking water well construction and maintenance, 2) pesticide and fertilizer use and storage, 3) improper septic system use and maintenance, and 4) garbage disposal methods. Animal wastes are another threat to water quality, particularly if large amounts from horses, dogs, or other animals are piled on your property. To protect your water, all of these factors need to be considered.

How much does clean water matter to you?

1. Where does your drinking water come from? _____
_____
_____

2. What nearby water resource do you want to protect? _____
_____
_____

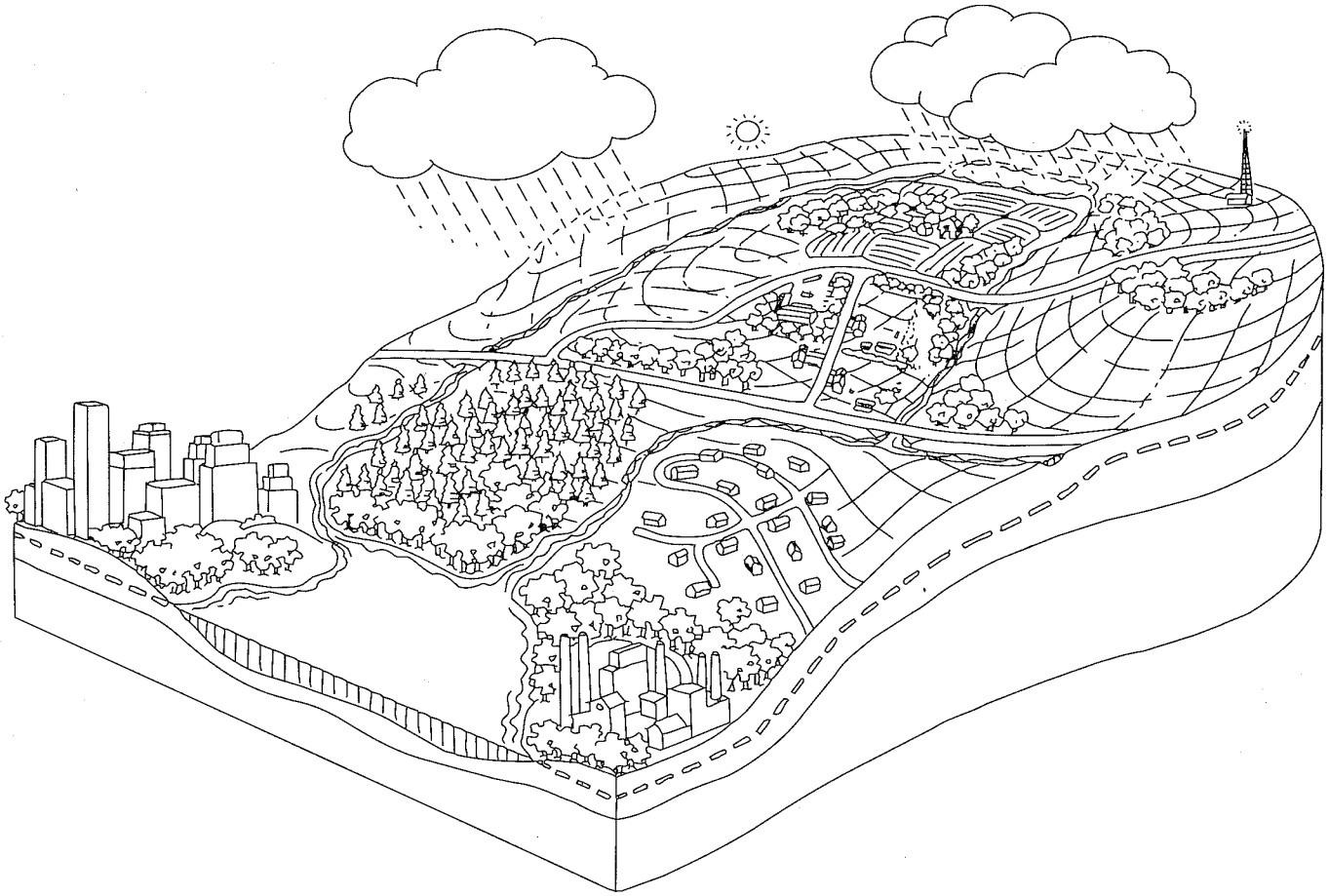


Figure 2. A watershed. Activities in the watershed can affect groundwater, stream, and lake quality at lower elevations in the watershed.

Part 1 — Physical Characteristics of Your Homesite

Every home comes with it's own unique set of physical conditions. You cannot change them, but once you know these characteristics, you can better understand risks that may result from activities you do control. At the end of Part 1 is an assessment table to determine your potential risks. The information below will help you answer the questions in the table.

How can soil type affect water quality?

Soil plays an important role in determining where contaminants go and how water moves. Nearly all soils are permeable — which means water and other fluids can percolate or move through them. Different soils have different properties that permit water—and contaminants—to seep through or run off at variable rates. Chemicals applied to a lawn and wastes from a leaking septic tank, for example, can flow downward into groundwater or run across the land into surface water. Many household activities can also produce problems that go beyond property boundaries. Contaminants that enter groundwater through a neighbor's abandoned well may flow underground until they reach your well.

What is your soil type?

Soil is grouped into three basic types based on particle size, including clay (small particles), silt/loam (medium particles) and sand/gravel (large particles). You can get a good idea about your soil type by rubbing a moistened sample between two fingers. Is it sticky like clay, gritty and crumbly like sand, or somewhere in between?

On your property, what are the risks to groundwater?

Groundwater is the water below the surface of the earth that—from the water table down—saturates the spaces between soil particles or fills cracks in underlying bedrock. Soil particle size influences which pollutants are able to reach groundwater. Clay soils, which are made of tiny particles, slow the downward movement of water and in some cases can impede water movement completely. Sandy soils allow for rapid water movement, and silty soils occupy the mid range. Soils made of large particles pose the greatest risk because they may act like a sieve, letting water seep downward readily. The ideal soil is a mix of mid-size particles to allow infiltration but enough tiny particles, like clay or organic matter, to slow water movement and filter pollutants.

What are the risks to surface water?

Soil type can also affect surface water contamination. Clay soils—which are less permeable—encourage surface water runoff. During a storm or flood — or even when watering your lawn—this runoff can wash contaminants from the land's surface into nearby surface waters.

What is your soil depth?

The depth of soil influences risks to groundwater. Usually, the greater your soil depth, the farther water must seep down before reaching groundwater. Deep soils offer a better chance of filtering or breaking down pollutants before they reach groundwater. Generally, soils that are less than three feet deep present the highest risks for groundwater contamination.

How can you find out what's going on underground?

There are several ways to find out about soil depth, bedrock type and other features below the ground. Check your well drilling records (if you have them), ask a neighbor who has a well, call a local well drilling company, talk to your county Rutgers Cooperative Extension agent, your local health department, or your local Soil Conservation District.

How far down to reach bedrock?

Bedrock depth varies; it can be at the land's surface, just below the surface, or hundreds of feet down. The depth of the soil and the type of bedrock influence pollution risks. Shale, granites, and other dense types of rock make an effective barrier that blocks the downward movement of water and contaminants. Other rocks such as limestone can be highly permeable, allowing water to move freely. When bedrock is split or fractured, water can move through it unpredictably, spreading pollutants rapidly over long distances.

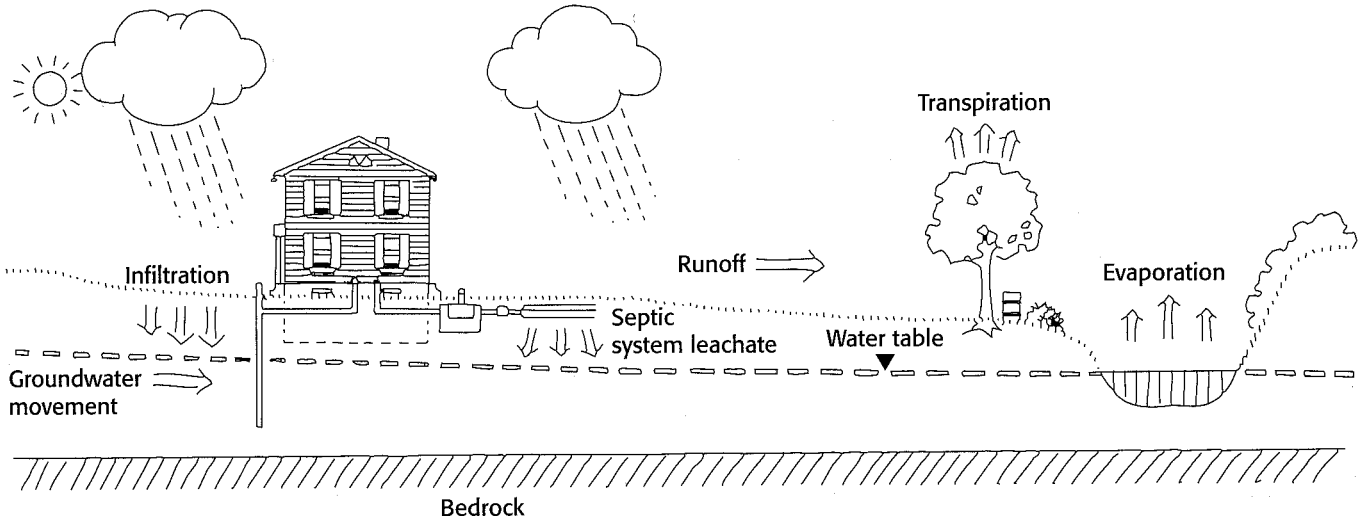


Figure 3. In the hydrologic cycle, water falls to the earth as rainfall and snow and returns to the atmosphere through transpiration and evaporation.

How deep is the water table?

If you dig a hole, you will eventually reach soil saturated with water. This water table marks the boundary between the unsaturated soil (where the pore spaces between soil or rock contain air, plant roots, soil organisms, and some water) and the saturated soil or groundwater (where water fills all pore spaces). In a wetland, the water table is at the surface or just below. Your local water table fluctuates throughout the year, but is usually highest in the wet months of spring and in late fall. In general, the closer the water table is to the land's surface, the more the groundwater is susceptible to contamination. Usually, a water table that is less than ten feet from the surface presents a high risk for groundwater contamination.

Groundwater and surface water are interconnected. Groundwater generally flows downhill, following the same path as surface water, and eventually discharges into rivers, lakes, springs and wetlands. If you keep impurities out of surface water but do not protect groundwater—or vice versa—contaminated waters may occur where you least expect.

Assessment — Homesite Characteristics: Identifying the Risks

The table below is similar to the assessment tables in other Home*A*Syst worksheets. For each question, three choices are given that describe situations or activities that could lead to high, medium and low risks to human or environmental health.

Do the best you can. For some questions, your well drilling records or local well drillers may be able to help. Some choices may not be exactly like your situation, so choose the response that best fits. Put the risk-level number (1, 2, or 3) in the column "Your Risk." Refer to Part 1 above if you need more information to complete the table.

Responding to Risks

Do not depend solely on the physical characteristics of your soil, bedrock, or other site features to protect water quality. You must take informed steps to prevent pollution.

ASSESSMENT — Homesite Characteristics: Identifying the Risks

	LOW RISK	MEDIUM RISK	HIGH RISK	YOUR RISK
Soil type and risks to lakes, rivers, wetlands, or other surface water	Sand/gravel (large particles)	Silt/loam (mid-size particles)	Clay (very tiny particles)	
Soil type and risks to groundwater	Clay (very tiny particles)	Silt/loam (mid-size particles)	Sand/gravel (large particles)	
Soil depth	Deep (over 12 feet)	Moderate depth (3 to 12 feet)	Shallow (less than 3 feet)	
Bedrock	Solid, not permeable or fractured	Solid limestone or sandstone. Fractured granite or shale.	Fractured limestone or sandstone.	
Depth to water table	Over 20 feet	10 to 20 feet	Less than 10 feet	
Nearness to surface water	Over 100 feet	25 to 100 feet	Less than 25 feet	

Make it your goal to lower the pollution risks identified above. Although you can't change your soil type or the depth to bedrock, you can account for these factors when choosing home management practices that are better for preventing environmental problems. Note especially the medium and high risks you identified. Keep them in mind as you complete the map below and work on other Home*A*Syst worksheets.

Part 2 — Making a Map of Your Homesite

Why make a map?

By drawing a map of your homesite, you will take another step towards more fully understanding your pollution risks. Although your property has physical features you cannot change, there are many things that you can do to minimize risks. Your map will identify areas where you can focus your efforts. It will also assist you in completing other Home*A*Syst assessments. And if you involve children as you make your map and conduct the assessment — you will help teach them the importance of having clean water.

The materials you need are readily available: a measuring tape (optional), clipboard, pencil, and the grid on the last page. The map you create will be an aerial view—the way your property would look if you took a photo of it from the air.

Potential sources of contaminants

There are several home management practices and home structure situations that could result in major impacts on water quality. As you survey your property to make your map, be especially watchful for the following:

- Improperly located or unmaintained septic system or cesspool
- Underground storage tank containing fuel oil, gasoline, or other petroleum products
- Improperly constructed well or abandoned well
- Stockpiled animal waste or animal pens, corrals, or kennels close to a well or surface water body
- Improper storage, use, or disposal of yard and garden chemicals and other hazardous products
- Machine maintenance workshop near well
- Road deicing materials that flow toward a well or nearby surface water body

Instructions for your homesite map

Homesite features to include are:

- ❑ Property boundaries
- ❑ House & garage
- ❑ Outbuildings, sheds
- ❑ Animal pens & yards
- ❑ Septic system, drainfield
- ❑ Nearest surface water
- ❑ Water wells
- ❑ Dry or abandoned wells
- ❑ Heating oil or other fuel storage tanks
- ❑ Building perimeter drains
- ❑ Vegetable and flower garden
- ❑ Lawn areas
- ❑ Other cultivated areas
- ❑ Roads, driveways
- ❑ Drainage ditches
- ❑ Impervious surfaces (such as patios or sidewalks)

Location codes. On your map, note the areas where you store and use chemicals and other potential hazards by using letter codes. Make up your own code letters or symbols as needed. Examples:

F = Fuel tanks for gasoline or heating oil
A = Automotive products like motor oil, gasoline, and antifreeze
P = Pesticides, herbicides
H = Hazardous products like solvents, acids, paints, and thinners

Other map-making ideas. For larger view maps, add landscape and human built features such as hills, rivers, lakes, ponds, roads, bridges, and runoff drainways. Draw arrows to indicate the direction of river and stream flow, and stormwater runoff. Note potential sources of contamination beyond the boundaries of your property such as farm fields, dumps, and gas stations. Indicate seasonal changes at your homesite. For example, are there wet areas in the spring? Such areas might indicate a high water table.

Don't leave out things you cannot see. Inquire about previous or current industrial or

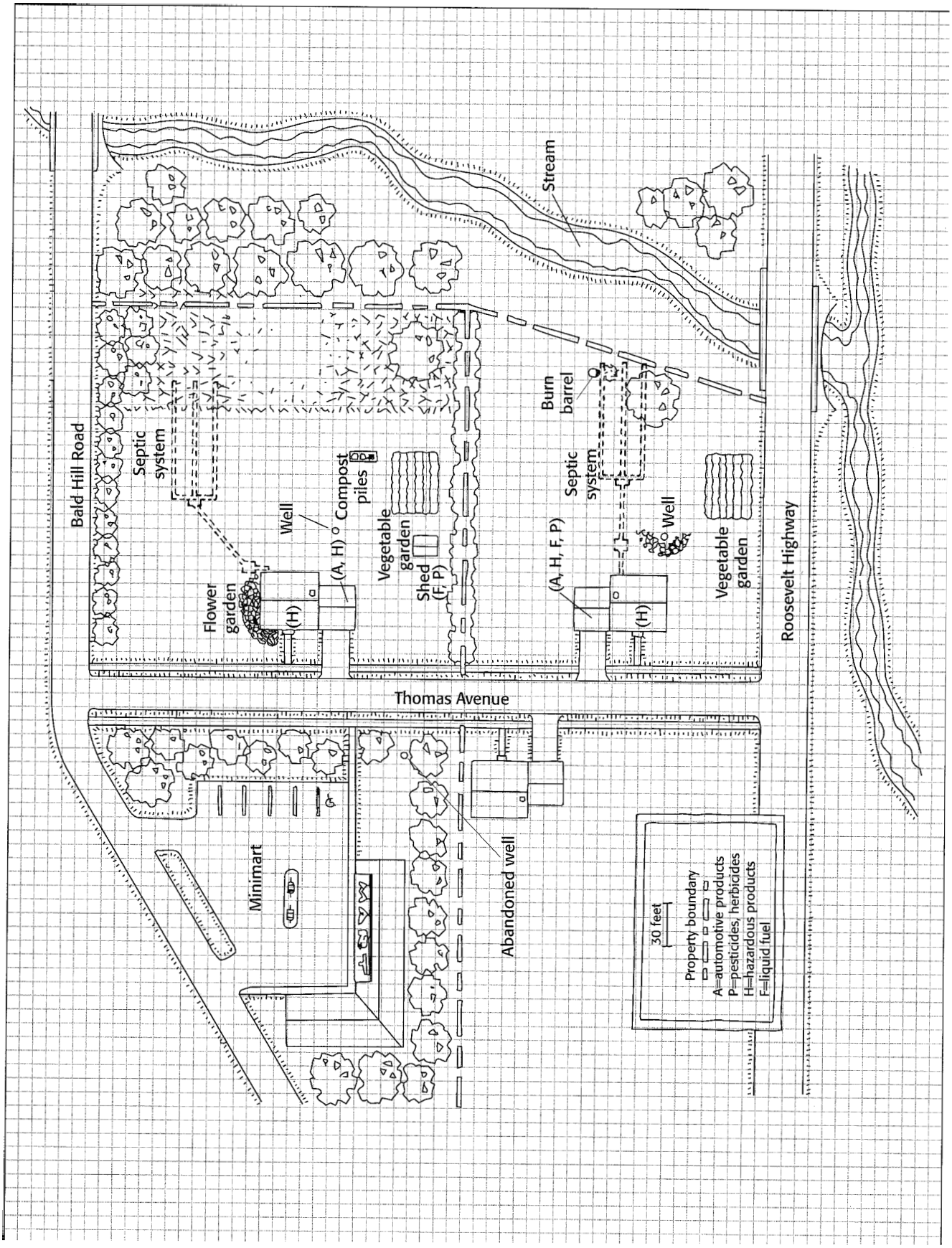


Figure 4. A sample homesite map.

agricultural activities in the area. Check with your town or city hall for information. Old landfills and buried fuel tanks are just a few of the possibilities. Find out if any underground fuel tanks exist on neighboring properties. If there are tanks, septic systems, or other potential sources of contaminants upgradient (that is, "upstream") from your well, they could affect the safety of your groundwater. These issues will be discussed in-depth in subsequent chapters.

Putting It All Together— And Taking Action

The final step is to put both pieces of your assessment together — the table and map — so you can identify potential problem areas on your property. If you have rated any of the items in the table as medium or high risk (#2 or #3), and have identified potential contamination sources in these areas, then you should be concerned.

For example, you may have discovered that your heating oil tank is located in an area with a high water table, or that you apply lawn or garden chemicals within 25 feet of a lake or stream. Perhaps your soil is sandy and your gasoline storage tank is close to your drinking water well. Is there an old, abandoned well on your property that isn't properly sealed? To protect your family's health and the environment, and to safeguard your financial investment, you will want to take steps to correct these problems.

How Home*A*Syst can help

If you identify potentially hazardous or unsafe situations, what should you do? There are ten worksheets in the Home*A* Syst series that address your specific concerns. For example, the worksheet on Liquid Fuels contains information on the safe management of gasoline, heating oil, diesel, and other fuels. Drinking Water Wells will explain how to manage your private well water supply. These worksheets will help you identify problems and develop an action plan for protecting your family's health and the local environment.

Home*A*Syst Helps Ensure Your Safety

This Home*A*Syst workbook covers a variety of topics to help homeowners examine and address their most important environmental concerns. See the complete list of chapters in the table of contents at the beginning of the workbook. For more information about topics covered in Home*A*Syst or for information about laws and regulations specific to your area, contact your county office of Rutgers Cooperative Extension or your local health department.

This worksheet was written by Alyson McCann, Water Quality Program Coordinator, University of Rhode Island Cooperative Extension, Kingston, Rhode Island.

This worksheet was adapted for use in New Jersey and technical review provided by Susan Lance, Program Associate in Water Quality, Rutgers Cooperative Extension; and Jan Larson, Program Associate in Resource Management, Rutgers Cooperative Extension of Ocean County, and Theodore B. Shelton, Ph.D., Rutgers Cooperative Extension.

Graph Paper for Homesite Map
(one block = $^{1}/_{10}$ inch = 10 feet)