

Chapter 1

Understanding Plumbing

In This Chapter

- ▶ Knowing what you're getting yourself into
- ▶ Touring residential plumbing systems

To many people, a home's plumbing system is perceived as being extremely complex with lots of parts that only a professional plumber is qualified to work on. In some cases, it's true that you're better off in terms of both time and money calling in a professional; for example, only the most advanced do-it-yourselfer should consider taking on replacing the main drainpipe for a home's toilets. But for many plumbing jobs around the average home, even a plumbing novice can make the repairs the right way with good information to follow. And that's what this book is all about — providing the most up-to-date plumbing project information so that even a beginner can tackle many of the most common residential plumbing problems.

Establishing Your Plumbing Limits

If you consider yourself moderately handy (and be honest with yourself when you assess your plumbing skills), then you should be able to tackle most of the projects in this book. Remember, however, that plumbing repairs can be time-consuming and therefore require one important trait — patience! I've tackled (and successfully completed, I might add!) more plumbing repairs than I care to count. But I'm the first to admit that many of my projects took twice as long to complete as I had planned for. Some of that extra time was the result of buyer-error, less-than-cooperative existing plumbing, and not allowing for extra visits to the hardware store or home center. My plumbing projects have taught me that even a well-planned project can run into unexpected problems and delays. And when that happens, you should be ready and willing to call out for an extra helping of patience.

Ensuring Successful Plumbing Adventures



Working in a logical step-by-step order makes repairs — plumbing and otherwise — go more smoothly and keeps you safe. Trying to speed up a step or cut a corner only leads to an inferior and potentially dangerous repair. For example, virtually every plumbing repair project starts with turning off the water. I instruct you to do it upfront in most of the projects in this book, and it seems like a fairly obvious first step. But don't be surprised if you get soaked or sprayed when you disconnect that faucet or toilet valve because you forgot Step 1!

Making plumbing repairs isn't and shouldn't be frightening or utterly impossible. Today's plumbing product manufacturers have made installation instructions pretty easy to understand, and many companies have toll-free numbers or online technical support departments to turn to with questions. Plus, most home centers and hardware stores have at least a few salespeople who really do know their stuff! But it's important to remember that if you feel uncomfortable attempting a specific repair, don't be ashamed to call in a plumber.

Before you start a plumbing project, assess and evaluate if the project is something you can or even want to attempt. If you answer "no" or even "maybe," consider hiring a plumber from the start instead of starting the project yourself. You'll save money by only paying the plumber for the work and not for having to fix or undo the work you attempted. Here are a few plumbing realities to keep in mind when considering a project:

- ✓ Plumbing repairs require you to get your hands dirty. Some can get really messy — that's just the way it is.
- ✓ Some plumbing repairs require some physical labor and may require helpers. For example, lifting a toilet can be a job for two people, so don't be afraid to ask someone to help.
- ✓ You may have to work in some pretty uncomfortable and cramped areas, like under the kitchen sink or overhead when soldering copper supply lines.

The Residential Plumbing System

For the most part, the majority of your home's plumbing system is hidden in walls, floors, and ceilings. The parts you see — the fixtures and faucets — are only the end of the line. The lines and pipes that get water to you and waste away from you are the guts of the system. However, understanding a home plumbing system is really quite simple.

Most residential plumbing systems have three components:

- ✓ A water supply system that includes getting both hot and cold water to fixtures
- ✓ The fixtures that deliver the water
- ✓ A drain/waste/vent, or DWV, system

Figure 1-1 shows clearly how each of these components fit together to form the plumbing system.

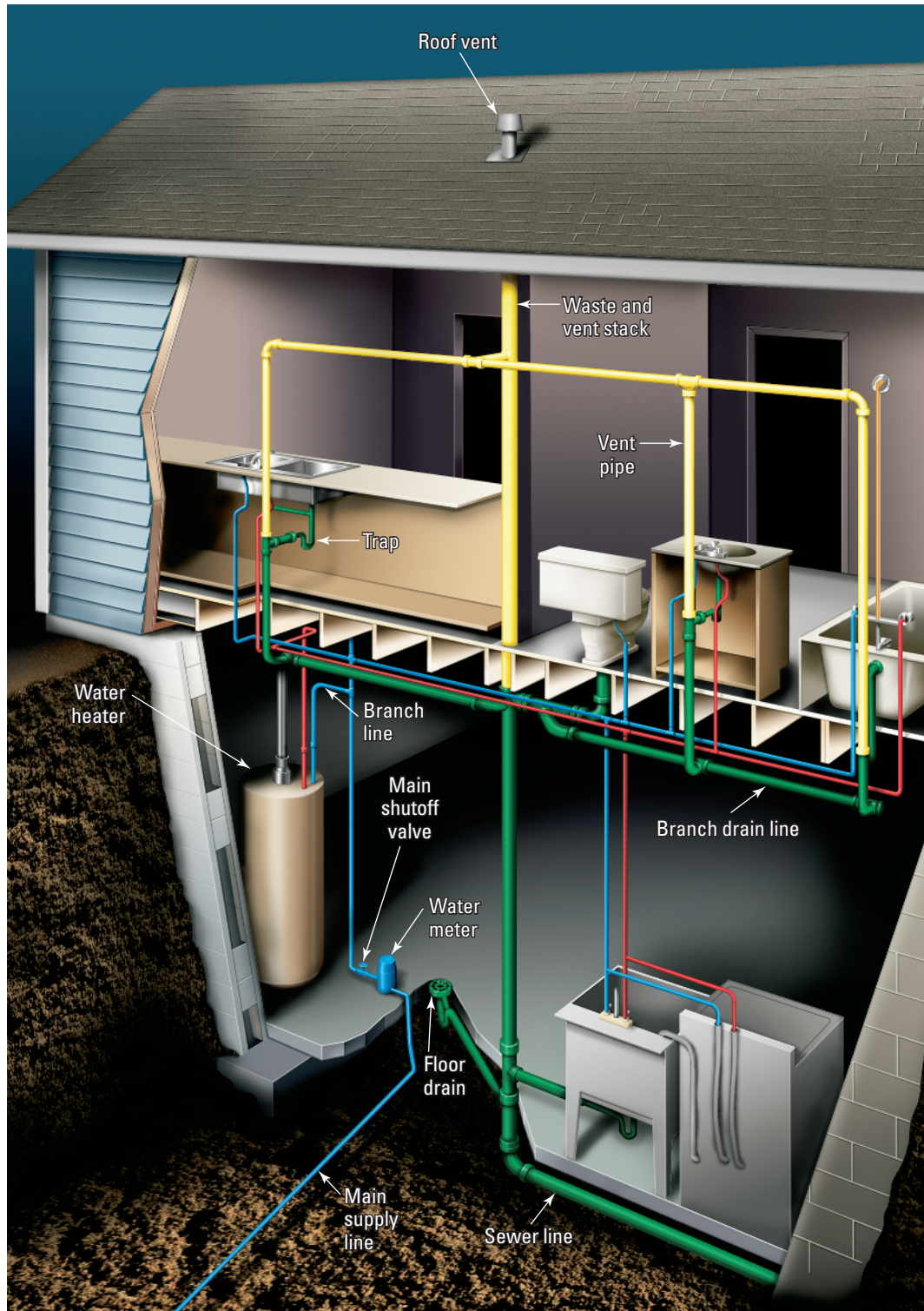


Figure 1-1: An overview of a home's entire plumbing system.

The supply side: Water comes in

The supply system, which is highlighted in Figure 1-2, begins where the water enters the house through a main supply line or water main. The water source is either provided by a municipal water company or a private underground well located on the property. If the source is a municipal supplier, the water runs through a water meter so that water usage can be recorded and the homeowner billed accordingly. There's no meter on a private well.

Homes built before 1960 generally have galvanized pipe for the original supply lines, whereas homes built after 1960 usually have rigid copper pipe supply lines. Some of today's new homes have plastic supply line pipes; this setup now is being accepted by most local plumbing codes. I cover supply line pipes in more detail in Chapter 3.

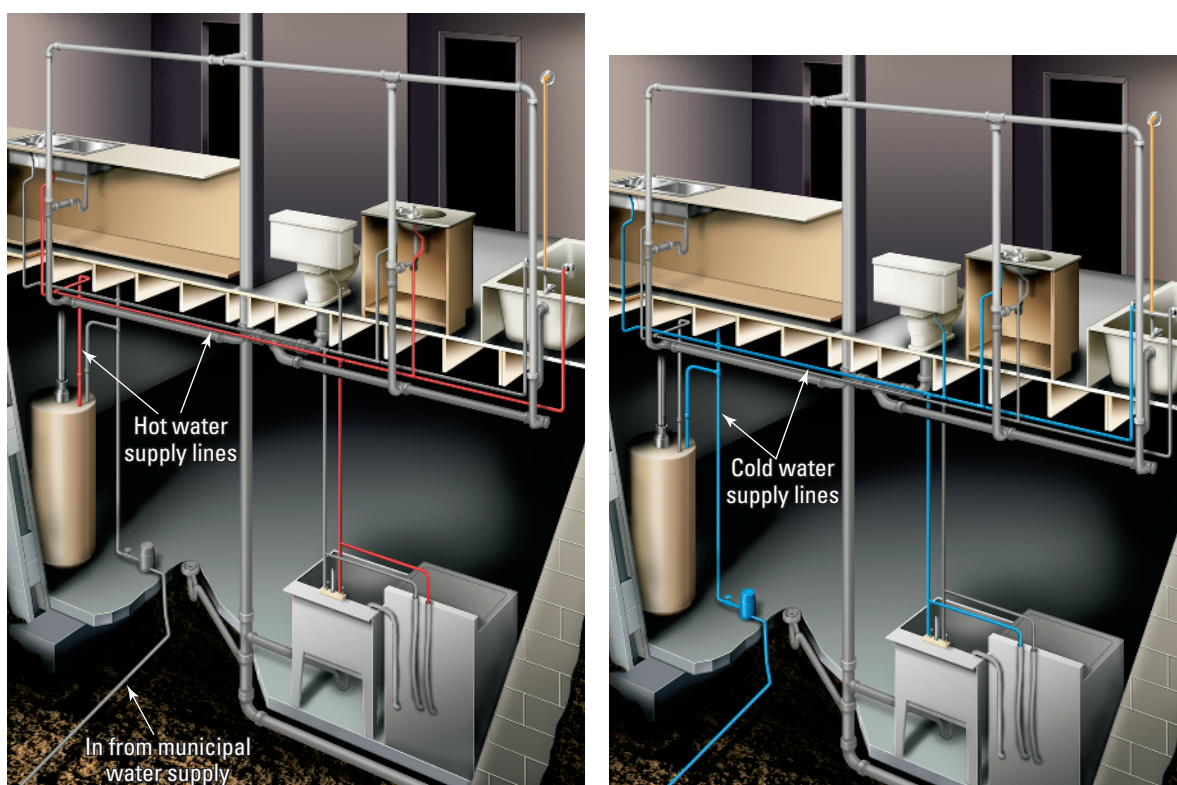


Figure 1-2: The water supply system.

Is your water safe?

Municipal water companies regularly test the water they supply to homes to make sure that it's safe to drink. If you have a private well, it's your responsibility to test the water for purity. Most areas require private wells to be tested at least once a year. Check with your city's water officials for the testing frequency requirements in your area. They can also provide you with a list of companies that do qualified well water testing.

Even if your water is safe to drink, it could still have tastes and odors that you find less than desirable. Water filters, both whole-house and point-of-use, can eliminate or greatly reduce poor tasting or smelling water. Check out your local home center or hardware store for the type of filters or filtering systems that are recommended for your area.

Within just feet of where the main line enters the home, a branch line splits off the main and connects to your water heater. From the water heater, the hot water line runs parallel to the cold water line to fixtures (including sinks, bathtubs, showers, and laundry tubs) and appliances (including washing machines, dishwashers, and water softeners). Toilets and exterior faucets (called *sillcocks*) are fixtures that require only cold water. A refrigerator icemaker also only requires cold water, which often is tapped off of a nearby cold water line.

The water pressure to the fixtures in your home is determined by the size of the pipe's inside diameter. The larger the pipe, the greater the pressure, so if your water pressure is too weak, the problem may be undersized pipes. The pipe entering the house usually has an inside diameter of 1 or 1¼ inches. Soon after the main line enters the house, the pipe reduces to ¾ inch. Pipes that carry water to rooms throughout the house have an inside diameter of either ¾ or ½ inch. Pipes that supply water to each fixture are usually ½-inch inside diameter to the shutoff valve and then ¼-inch inside diameter to the fixture.

Drain, waste, and vent: Water goes out

Getting rid of used or waste water is achieved through your home's DWV system, which stands for drain, waste, and vent. The drains (D) are the pieces that hold and then carry the waste water to the main drain lines (W). Without a constant air supply, a vacuum would build up in the drain lines, eventually stopping the water from flowing; To prevent this, each DWV system requires adequate and proper venting (V). The drain pipes use gravity to carry waste and waste water away from fixtures, drains, and appliances. The waste water is carried out of the house through the main drain line to a municipal sewer system or a septic tank (if you have a private well). Figure 1-3 shows the system in detail.



Never install or alter your home's DWV system without consulting a building inspector. All three parts of this system must be installed according to precise specifications in order to work properly and safely.

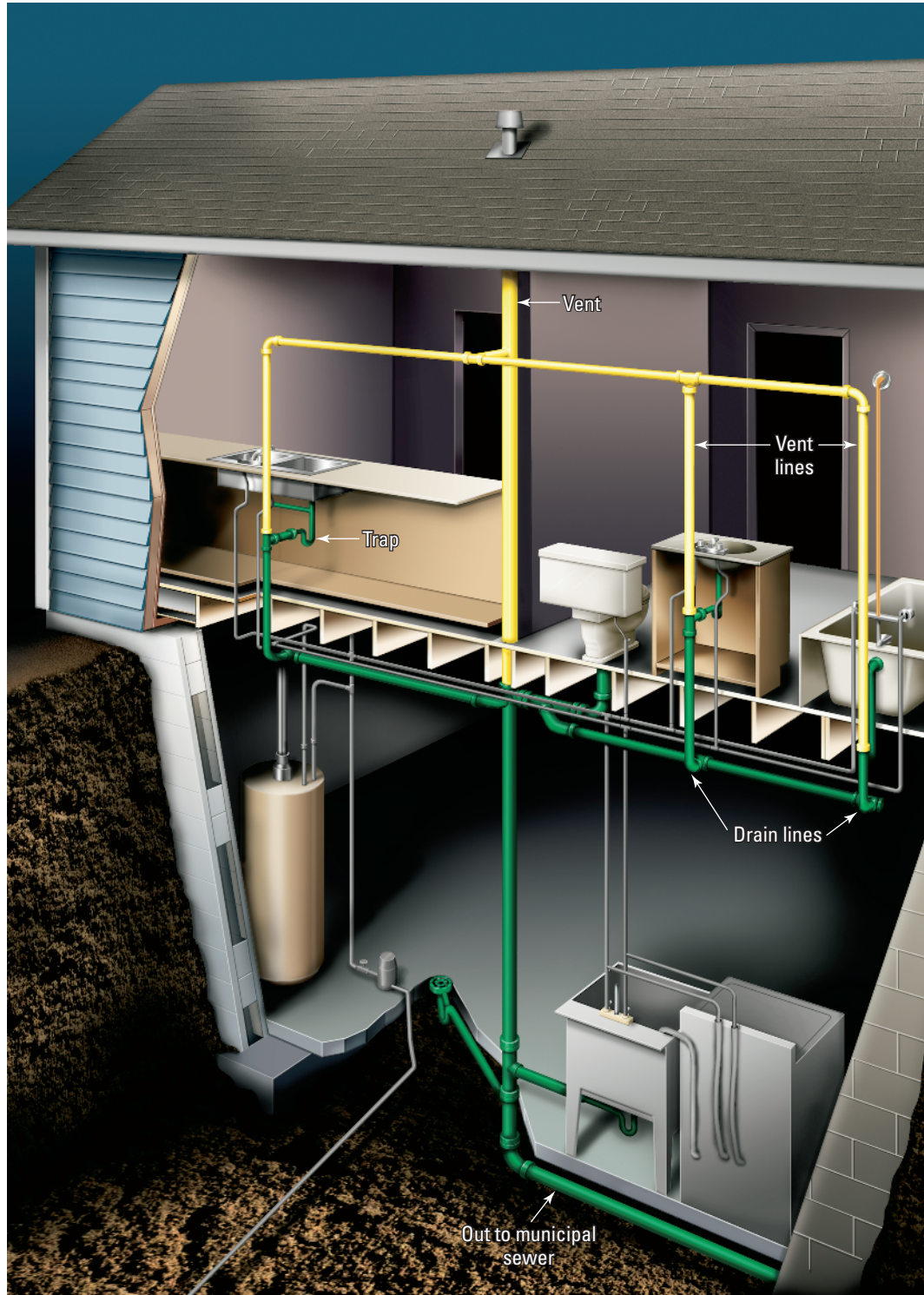


Figure 1-3: The DWV system.

The main stack

The primary component in a DWV system is the *main stack* (sometimes called the *main soil stack*). The stack pipe is usually 3 or 4 inches in diameter and made of plastic or cast iron. Located near the center of the house, the main stack goes down below the basement floor or under the house slab (if there's no basement) and empties into the sewer or septic tank. The main stack also has a vent pipe connected to it that extends up through the roof. Without the vent, the waste water wouldn't flow quickly enough to clear the pipes, eventually leading to severe main line clogs. A house may also have one or two secondary vent stacks located above and off the bathroom drain lines.

Branch drain lines carry water from specific fixtures to the main stack. The branch lines are smaller diameter than the main stack — usually 1½ or 2 inches in diameter. Drain lines must be sloped so that water runs freely to the main stack. The slope is usually ¼ inch per foot. For branch lines, local plumbing codes require special fittings that have sweeping turns and not abrupt angles that could lead to clogged pipes.

Traps

Traps are a critical part of the DWV system. These curved pieces of pipe hold water inside the curve that prevents sewer gas from backing up into the house. Each time the drain in a fixture or appliance is used, the standing water is flushed down the drain and replaced with new water.

Vents

Venting is required for the DWV system to operate properly. Without an air passage-way behind the water flow, the system would run slow and gurgle. Each fixture is required to be vented, but you don't need a vent stack through the roof for each fixture. If you did, your home's roof would look like a smokestack-filled industrial factory! Individual fixture vent stacks often are connected to a revent pipe that eventually connects to the main stack vent in the roof.



If one or more of your fixtures runs slow, or if a toilet gurgles when you flush it and you know it's not clogged, chances are good that the vent stack is blocked. This fix is best left to a professional plumber to determine if it's just a blocked vent or if the plumbing itself is improperly installed and needs correction.

Septic systems: Don't mess with them!

If your home is outside city or suburb limits, it probably isn't connected to a municipal water system, which means that you have your own well and septic system.

Your home's water supply and DWV systems are usually the same as those in a house that's connected to a municipal water system and sewer (see the earlier sections "The supply side: Water comes in" and "Drain, waste, and vent: Water goes out.") The difference is that in a typical septic system, the waste water flows from the house out through a main stack into the septic tank, as shown in Figure 1-4. The tank usually is made of concrete or plastic.

A septic system has two tanks: the primary tank that collects most solids and the secondary tank that collects the remaining solids. The solids or sludge sink to the bottom of the primary tank while baffles inside the tank trap the scum (floating grease and soap) so that only liquid (called *effluent liquid*) leaves the tank. The effluent liquid moves by gravity through a drain pipe and empties into the septic system's leach field, where the effluent liquid is broken down by naturally occurring microbes. Then it either evaporates or is absorbed by the soil and plants.



A septic system needs to be monitored and either cleaned or pumped on a regular basis, although not every year because each time waste water flows into the tanks, an equal amount of effluent liquid is pushed out the other end into the leach field. If the system is properly sized for your house and properly installed, it probably only needs to be pumped every three to four years. Use a wooden pole to check the sludge level in the tanks once a year. If the tank is almost half filled, hire someone to pump the system. If the leach field starts to smell bad, or if water backs up out of the drains, call a septic company immediately! The cause may just be a clog that's easily cleared if you catch it soon enough. Leave the work of repairing a septic system to professionals.

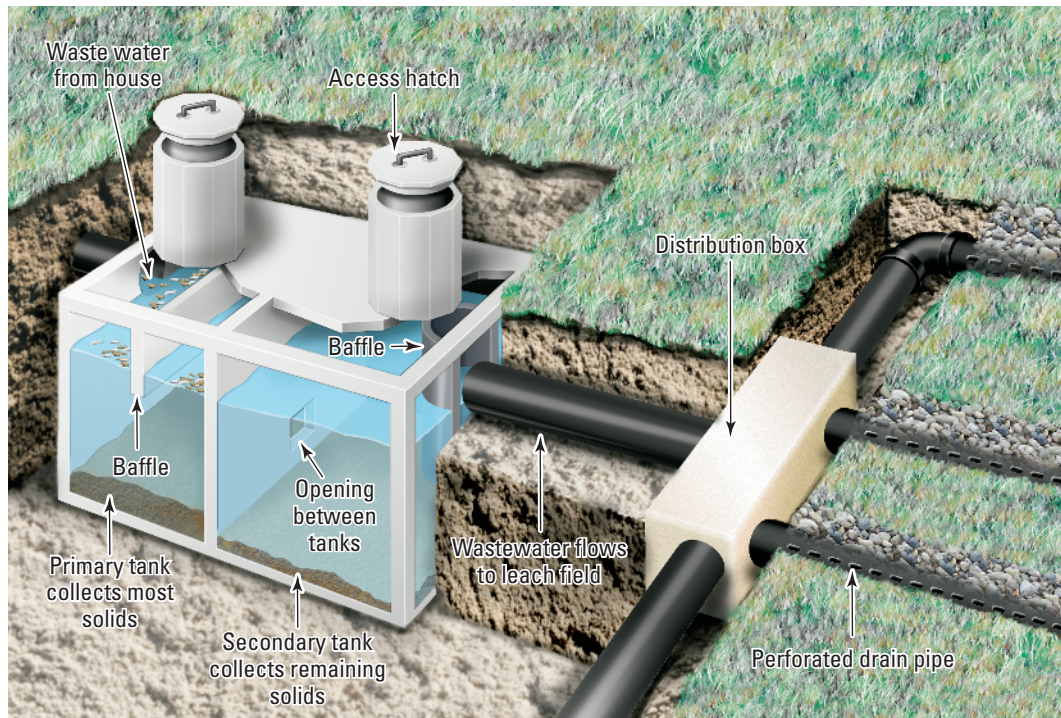


Figure 1-4: A septic system.