Landscapes for Life in the Desert

Whether you have lived here all your life or you have just moved from across the country, creating a landscape in the desert can be a challenging and exciting experience. A beautiful, easy care yard can bring you hours of enjoyment and can provide you with a lovely place to relax, entertain and spend time with family and friends.

Warm, sunny days and a year-round growing season provide gardeners with the opportunity to use a wide array of plants. You can achieve different looks to suit your taste, and your yard can serve a variety of functions that match your lifestyle. Landscaping can also help to decrease some of the harsh effects of our desert climate, as plants and other landscape components provide shade, increase the energy efficiency of our homes and extend our living space from the indoors to the outdoors.

However, the same climate that offers many choices also presents us with a special challenge. Because we live in the Sonoran Desert, we must use water wisely. Selecting low water use plants and using water efficient irrigation techniques will help you get the most from the water used to establish and maintain your landscape.

In the Sonoran Desert, many people call water efficient, creative landscapes Xeriscapes. This term comes from the Greek word xeros, which means dry, and refers to seven horticultural principles which help to ensure that landscapes, wherever they are located, reflect a sensitivity to the local environment and its climate. By using the Xeriscape principles, you can identify landscape options, express your creativity and, at the same time, be mindful and respectful of our unique desert environment.

This guide will provide the kind of information needed to plan, install and care for a Xeriscape. It is filled with ideas, instructions, tips and illustrations to help you create a landscape that will beautify your home and meet your recreational needs. The guide is organized into four sections, each covering a different aspect of the Xeriscape process. You can read the guide all at once or refer to specific sections as needed. An extensive list of resources is located at the end of the guide. It provides suggested reading material, websites, telephone numbers for organizations that offer information on Xeriscape, and places to visit to learn more about Xeriscape.

You may already have an established landscape and are reading this guide with the idea of converting your water intensive landscape to a Xeriscape or of modifying your existing Xeriscape to enhance its beauty, functionality or water efficiency. This guide is for you too. All of the steps included in the guide can be directly applied or modified to plan and incorporate changes into existing landscapes.

Opposite: Outdoor living in the Sonoran Desert – native plants provide shade, color and texture. (Palo Verde tree – by chair, Ocotillo – center, Desert Marigold – yellow/foreground, Blanket Flower – orange and yellow/foreground and Penstemon – dark red to right of Ocotillo)

Xeriscape: The Process at a Glance

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Using the Xeriscape Principles to Create Beautiful, Healthy, Water Efficient Gardens

The Xeriscape Principles

1. Good Landscape Planning and Design

Creating a plan will help you get the most out of your landscape while considering issues like cost, function, aesthetic preferences, maintenance requirements, water efficiency and energy efficiency. You can tailor the plan to suit your taste, your needs and your checkbook. The plan will serve as a guide throughout the landscaping process. It will help you stay focused and can help to avoid time consuming and costly mistakes. When developing a plan, think long-term. You may decide to complete your landscape all at once or in stages. Regardless of your approach, take the time to develop a complete plan for your yard.

2. Low Water Use Plants

There are hundreds of water thrifty native or desert adapted plant species available at local nurseries. Some varieties have been available for many years, while others are new on the market. They come in all shapes and sizes and serve a variety of purposes from shade to seasonal color to screening unsightly areas. Many low water use plants have beautiful flowers or interesting forms. They will help you create a

colorful, low-maintenance yard without taxing our limited water resources.

3. Appropriate Turf Areas

Although turf generally requires more water and more maintenance than low water use plants, sometimes only grass will do, especially if you are sports-minded or if there are children or pets at home. Small turf areas can be incorporated successfully into a Xeriscape if they are properly planned, installed and maintained.

4. Efficient Irrigation

In the Sonoran Desert, almost all new plants should be watered regularly to get them established; and most plants, low water use or not, need some kind of irrigation even after they become mature. The trick is to find out how much water your plants require and to apply only that much. When you design your irrigation system, try to put trees, shrubs, groundcovers and turf areas each on different valves so you can time their irrigations separately. Most plants will need more frequent irrigations during their first year. Usually, you can cut back on watering during the second and subsequent years, after the plants have become established. Also remember that plants need less water during the cooler months. Adjust your irrigation schedule at least four times each year.

5. Soil Improvements

Most low water use plants thrive naturally in our desert soils, so amendments such as fertilizers and soil supplements are usually not necessary. They do prefer good drainage, and soil should be loosened at planting time to encourage healthy root growth. Soil amendments most likely will be needed for turf areas and areas where more water thirsty plants are installed. Because there is quite a variation in soil quality and composition across the Sonoran Desert, soil amendments may be needed when unusual conditions exist. For more information about your specific soil type and about the possible need for soil improvements, contact your County Cooperative Extension office.

6. Use of Mulches

Mulches cover the soil and reduce evaporation from planted areas. They cool the soil beneath and also help to inhibit weed growth and erosion. There are organic mulches and inorganic mulches. The most popular organic mulches in our area are bark chips and wood grindings. These are often used in planting beds and other small areas. The natural drop of leaves, flowers and fruit can also be left on the ground as mulch. Decomposed granite and crushed rock are two of the most popular inorganic mulches.

7. Appropriate Maintenance

When properly designed and maintained, Xeriscapes save water, time and money through reduced plant water needs and lower maintenance requirements. But low water use and low maintenance do not mean no water use and no maintenance. All landscapes need some care and most plants need supplemental water in our desert environment. Proper pruning techniques can keep your yard beautiful and natural looking and save you trips to the landfill. A well-maintained irrigation system can keep plants healthy and water use low. Prudent use of fertilizers will help to avoid excessive plant growth which, in turn, will reduce water use and the need for excessive pruning.

A beautiful mix of colors – Lantana (purple and yellow), Cherry Sage (red plants by windows), Desert Spoon (foreground)

Eight Steps to Planning and Designing a Great Yard

A great yard begins with a great plan. When designing your landscape, take into account your own preferences and purposes. These considerations will include the look you want to achieve, the ways in which you will use your yard, the amount of time you want to spend taking care of your yard and, of course, your budget. The following steps will guide you through the design process.

STEP ONE

Make a Drawing of Your Site

Measure your lot, then draw a diagram of the site that includes the house and any existing features like a walkway, pool or patio. Make the drawing to scale by using grid paper or an enlargement of the plot plan provided by your builder. You may want to make two separate drawings; one for the front yard and one for the back yard. Consider enlarging the diagram so you have plenty of room to make drawings and notes. Make several copies to use during various stages of the design process and keep at least one clean copy for future use.

This space serves as an entertainment area and a play area. The convertible shade structure allows for sun during the cooler months and provides shade during the warmer times of year.

STEP TWO

Make a Wish List

If you don't already know what you want from your landscape, now is the time to decide. Ask yourself these questions:

- What do I want my yard to look like?
- What functions do I want my yard to serve?
- Do I want color and shade in my yard?
- Do I want my landscape to help conserve energy?
- Do I want to create wildlife habitat in my yard?
- Do I want a play area?
- Do I want a quiet place to relax?
- Do I want an entertainment area?
- Where would be the best places for functional areas like a pool or spa, a play area, a relaxation area, a veg-

Opposite: Dense plantings of Prostrate Evening Primrose (foreground), Tiger Aloe (background/left) and Parry's Penstemon (background/right) provide fabulous color and great wildlife habitat in this front yard.

ctable garden – close to the house? away from the house? in plain view? out of sight? – and how large should they be?

- What do I want to see when I look out my windows?

Start a wish list by writing down the answers to these questions. After completing the list, put it away for a while. Then look at it again to see if you have changed your mind or forgotten anything. Revise the list accordingly.

STEP THREE

Look at Your Site

Spend some time walking around your lot. Take a good look at every feature. Consider how your lot is graded. You may want to avoid putting a patio in a drainage area, but the same area might be a perfect rainwater catchment for a vegetable garden or wildflower patch. Identify sunny areas and shaded areas at certain times of day. Find out where your utility lines are located. Also, note views you want to preserve and those you want to screen out. If this is not a new landscape, note the location of existing plants and irrigation system components you wish to keep. Evaluate both the positive and negative aspects of your site. Use one copy of your site drawing to record everything you noted during the evaluation. A sample site drawing with notations can be found on page 25.

STEP FOUR

Learn About Plants and Other Landscape Materials

Plants that Make the Desert Bloom

An increase in the popularity of Xeriscape over the past fifteen years has led to widespread availability of low water use plants in our area. If you are new to the Sonoran Desert or if you have not been shopping for plants in a while, you are in for a treat. The wide variety of low water use plants available today offers many beautiful choices. Deciduous low water use trees can provide summer shade and let winter sunshine into your home. Low water use plants add texture, softness, seasonal color and form to the landscape. Desert wildflowers can provide extra color and interest during certain times of the year.

Many low water use plant species are native to our area, while others have been imported from other parts of the United States and from different continents around the world. Take some time to learn about the abundance of beautiful plants that are water thrifty and adapted to our desert climate.

Here are some tips for selecting low water use plants:

- Consider the mature size of the plant. A plant that outgrows the space available will require pruning and may crowd other plants located nearby.
- Consider color and texture. Foliage colors range from pale gray to dark green. Some plants bloom almost all year, while others display a great show of color only once or twice each year. You may want to choose plants with a variety of foliage colors that blend well together. For year-round color, choose a mix of plants that bloom during different seasons.
- Include in your selection plants that attract wildlife, such as butterflies, hummingbirds and other beautiful bird species.
- Keep poisonous plants and plants with thorns away from walkways and play areas.
- Keep plants that drop spent flowers, leaves or seed pods away from a pool area.

Mixed hardscape and boulders provide structural interest in this garden.

Adding Structural Interest to the Garden

Although plants are considered the mainstay of many landscapes, it is important to remember that other landscape materials are available that will add to the beauty and function of your yard. For example, you may want to incorporate hardscape or structures into your landscape plan. These include the following design elements:

- patios and ramadas
- walkways
- boulders
- a barbecue or fire pit
- built-in planters and seating areas
- a swimming pool, spa or fountain
- walls or fences to separate or screen an area
- trellises that support vines and soften the look of fences and exterior walls

You can choose from a wide variety of materials and colors. Consider materials like flagstone, bricks, exposed aggregate and colored concrete in addition to more traditional hardscape materials like natural colored concrete and pool-decking. Also consider adding interest in the landscape by incorporating unusual shapes or a combination of hardscape materials into your landscape design.

Inorganic mulches, also known as "top dressing," are commonly used in Xeriscapes to cover the soil and are considered part of a yard's hardscape component. Top dressing not only reduces water evaporation and weed growth, it also gives your planted areas a finished look.

Decomposed granite and crushed rock are the types of top dressing most commonly used in our area. Both are available in a variety of sizes and colors. Before selecting a top dressing, decide on the overall effect you want to achieve. Do you want your mulch to match the color of your house or would you like it to provide a bit of contrast? Do you like a very natural look or a more stylized look? Do you want your yard to blend with a common neighborhood landscape scheme or would you like something a little different from the neighborhood norm? Then consider your maintenance style. Some types of decomposed granite and crushed

Seat cushions and Mexican tile add color to this back yard Xeriscape.

Need Some Ideas for Your Wish List?

- Walk, bike or drive around your neighborhood to get some design ideas. You may want to visit commercial developments and other residential developments as well.
- Keep a camera handy and take photographs of everything you like, no matter where you find it; from fabulous model homes to the bank on the corner.
- Keep a scrapbook. Put your photos there along with pictures you've clipped from magazines, newspapers and catalogs. Include pictures of outdoor furniture, pools and spas, patios, walkways, lighting, outdoor barbecue areas and other interesting and attractive landscape features.

Get Help! Call the Arizona Blue Stake Center

Call 1-800-782-5348 (1-800-STAKE IT) for free assistance in locating underground power lines and other utilities. A free brochure is available.

rock are easier to rake than others. Some kinds minimize the appearance of plant litter. Finally, consider your long-term landscape plans. Top dressing is neither inexpensive nor easy to replace. Do some research and shop around before you buy.

Investigate your hardscape and structural options before planning your landscape. Purchase some landscape design books (there are several available in paperback) and house and garden magazines, or borrow some books from the library. While visiting neighborhoods and other public areas for plant possibilities, take time to observe how hardscape and structural features have been incorporated into landscape designs. You may want to visit some landscape materials suppliers as well to see what's available locally (look in the Yellow Pages under Landscape, Garden, and Lawn and Garden).

Other Ways to Add Pizzazz

Although hardscape, structures and plants will be the major components of your outdoor spaces, remember that there are dozens of ways to add color and interest to the landscape. Consider using garden artwork, fabric and paint to help complete your landscape design. People often overlook these materials when planning their landscapes, leaving plants to provide the only available color. Outdoor artwork can include ornamental doors and metal work. Colorful fabrics on seat cushions, umbrellas and awnings can brighten up the yard all year long. Paint applied to walls, fences, trellises and yard furniture can be used to add personality to the landscape and draw attention to certain spots in the yard. Fabric and paint are relatively inexpensive ways to "remodel" your outdoor spaces so you can change them from time to time. These are low risk ways to experiment and have some fun.

Check the Rules

During the research process, don't forget to consider any guidelines or restrictions imposed by your city, builder or homeowners association. Now is the time to review these and plan for any necessary applications or approvals.

STEP FIVE

Draw Your Preliminary Landscape Design and Irrigation Plan

The best way to design a house is to develop a plan and make a drawing. The same is true for a landscape. It is easier to visualize your plan when it's put on paper. Drawings also serve as a reality check to make sure all of the landscape components are the right

Opposite: Strategic placement of a deciduous tree helps with energy efficiency by creating shade during the summer and allowing sunlight into the home during the winter. Bougainvillea (red) and Brittlebush (yellow) are a lively color combination.

Low Water Use Plants: They're Everywhere!

Here are some great places to learn about low water use plants:

- Regional botanical gardens
- Local Xeriscape demonstration gardens
- Booklets and brochures distributed by your city's water conservation office (Several cities also offer free or low cost landscape classes.)
- County Cooperative Extension offices
- Books on low water use plants written specifically for our area
- Local retail nurseries
- Local newspapers (some have regular articles on desert gardening and low water use plants)
- The Internet

size and in the proper location. Also, a drawing helps to make changes easier and will provide a permanent listing of all of the plant and hardscape materials used in your yard. When it comes time to repair and replace irrigation system components, your irrigation system design drawing will help to locate them easily. Without a drawing, you may spend hours digging in the yard to find and repair an irrigation problem.

Your Preliminary Landscape Design

- ***Before drawing the preliminary design, review your wish list.*** Then, look at the notes you made during *Step Three - Look at Your Site* to determine the best locations for each of the features you want to include in the landscape.

Placing tracing paper over the site drawing will allow you to experiment easily with different design alternatives before making decisions. Computer software packages also are available to help you during the design process. A sample landscape design can be found on page 26.

- ***Start by drawing in any hardscape elements you want to include in the landscape.*** If possible, draw them to scale.
- ***Mark areas where grading and contour changes are to be made.*** Grading may be used to add interest to a landscape and to direct drainage away from hardscaped areas. When planning grading and contour changes, make sure that modifications are made in accordance with the rules established by your city for on-site water retention and proper placement of the backflow preventer. If you need clarification, contact your city's water conservation office (addresses and telephone numbers can be found in the resources section of this guide). Be a good neighbor. Don't change the grade in your yard so that it redirects water into your neighbor's yard. Also, avoid making changes that would direct water toward the foundation of your house.

Desert Marigold provides a dramatic contrast against this red garden wall.

At this point, you also may want to consider water harvesting opportunities. You can use existing contours to collect rainwater for use by landscape plants or you can regrade part of the lot to create catchment areas for rain-

water. Rooftop runoff can be directed through gutters and channels toward trees and plants.

■ ***Now it's time to incorporate plants into the design.*** When placing plants, consider their growth characteristics, as well as their water and sun/shade requirements:

- Plants that need full sun should not be placed under trees.
- Plants with similar water needs should be grouped together.
- To avoid a cluttered look and the need for extra pruning, choose appropriately sized plants and place them an appropriate distance apart. Several of the publications presented in the resources section of this guide provide extensive information on low water use plants.

It is not necessary to make a realistic drawing of each plant. In fact, most landscape architects and designers use symbols, usually circles, to represent plants on their landscape plans. For each plant, draw a circle in a size that represents the plant at maturity (when it is largest in size).

Trees and large cacti, like saguaros, comprise the "backbone" of the landscape since they are permanent and clearly visible year-round. Place trees first, locating them to maximize their shading benefits and aesthetic functions (such as "framing" the corners of the house). Avoid placing trees near overhead and underground utility lines and take care not to block an especially nice view. Then, place large cacti in areas where you want to draw attention.

Next, draw in the shrubs. Shrubs can break up large spaces and visually anchor a home to the site. They also can be used to screen out undesirable views, soften the look of walls and fences and filter harsh reflective sunlight. Massing several shrubs of the same variety is usually more pleasing to the eye than mixing several different varieties together. A more formal look is achieved by using straight or geometric arrangements.

Groundcovers, vines and accent plants, such as small cacti and succulents, add color and texture to the landscape and provide continuity between major landscape components. In addition to adding color, groundcovers can be used temporarily to fill in

Parry's Agave teams beautifully with Purple Verbena.

Tips on Turf

- Since turf is relatively water thirsty, use it sparingly. If you like the green look that turf provides, you may be able to achieve a similar look with low water use groundcovers or a combination of turf and low water use plant material. There are many water thrifty plants that have a surprisingly lush look.
- Make turf areas functional, but use only as much as you really need.
- Install turf areas close to your house or in other areas where you want a cooling effect.
- Design your turf area so that it has a simple shape. Oddly shaped turf areas or narrow strips of turf are difficult to irrigate and mow.
- For ease of maintenance, locate turf away from sidewalks, fences and walls.
- Plant turf on level areas to avoid runoff and maximize irrigation efficiency. Most cities have an ordinance prohibiting excess irrigation water from entering the street.
- Irrigate turf efficiently. Design and manage your irrigation system properly.

Don't Take Granite for Granted: A Tip for Choosing the Mulch That's Best For You

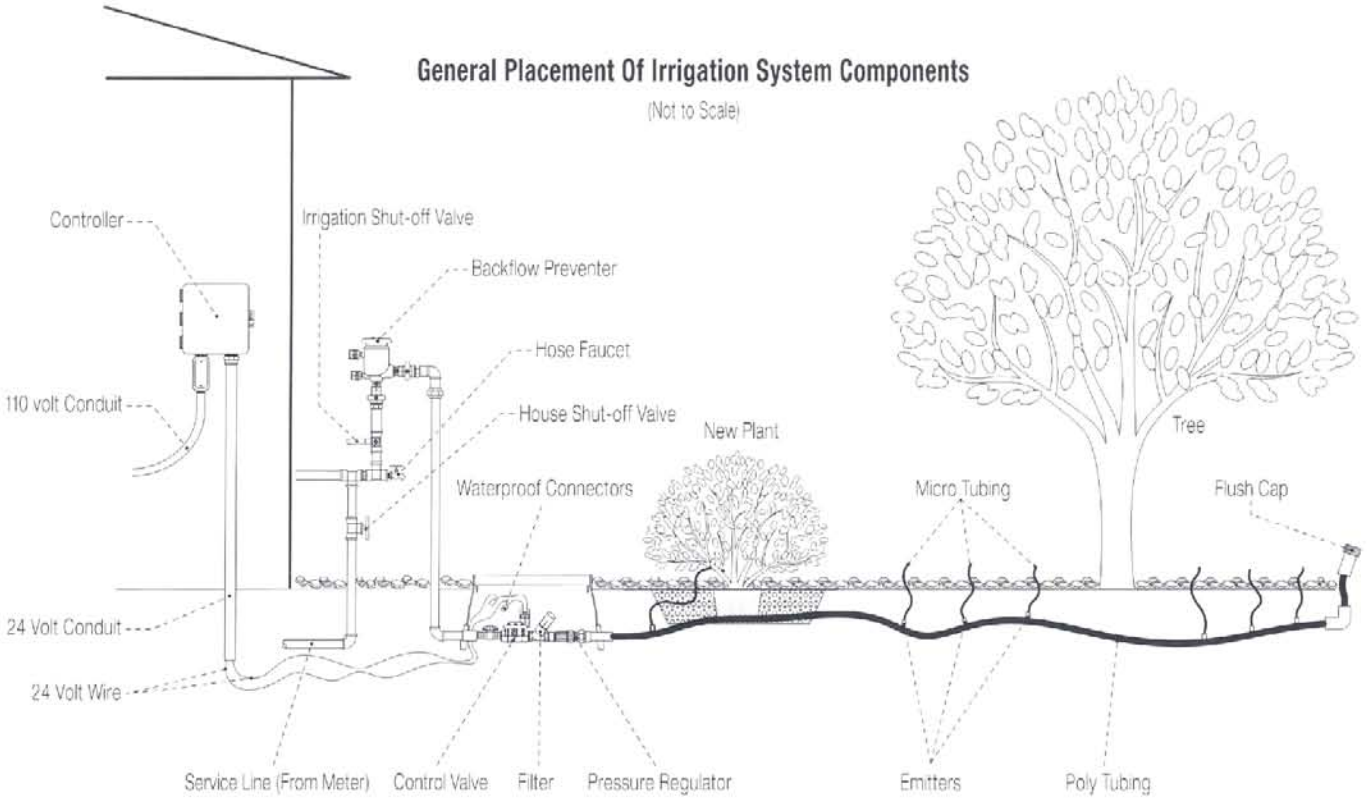
- Visit two or three rock suppliers and collect samples of decomposed granite or crushed rock in your favorite sizes and colors. Put the samples in plastic bags and take them with you for comparison purposes later on.
- Before making a final selection, find landscapes that are mulched with each of the samples you chose. Study each landscape to determine which mulch is your favorite when used in a real landscape situation.
- Top dressing is a lot like house paint. Colors and textures may look different when they cover a large surface area.

spaces in a new landscape. Use vines to soften the look of walls and fences and to create additional shade. Add accent plants to create interest and to achieve a unique look. The eye is naturally drawn to bold accents, color and unusual forms. Reserve these elements for those areas you want to emphasize, such as an entryway, a special tree, or a focal point in the landscape. After placing groundcovers, vines and accent plants, draw in any areas to be used for a vegetable garden or bedding plants. Make at least two copies of your plan.

Your Preliminary Irrigation Plan

Once the preliminary landscape plan is complete, you can plan an irrigation system that is appropriate for your Xeriscape design. In our area, turf is usually watered by a sprinkler system.

A small water feature surrounded by desert plants (Autumn Sage – red, Desert Marigold – yellow, and Parry's Agave – with compact gray rosette) creates an oasis for residents and wildlife.



Other ornamental plants, such as trees, shrubs, vines and groundcovers, are usually watered with a drip irrigation system. If you schedule watering times and maintain your drip system appropriately, this type of irrigation system can reduce evaporation and runoff, reduce weed growth and promote plant health by providing water to each plant's root zone, where it's needed most, without wetting leaves and soaking areas that don't need to be watered.

■ ***Before drawing the irrigation system design, learn as much about irrigation as possible.*** Find out the latest in water efficient irrigation materials by visiting local irrigation supply stores and by reading up on the subject. Reading materials are available from local libraries, bookstores, home and hardware stores and irrigation supply stores. There have been many advances in irrigation technology in recent years, so check the publication dates for the most current information.

When visiting irrigation supply stores, look closely at the irrigation system components and ask questions of the staff. If time is available, the sales staff should be able to review your plan for mistakes and offer advice on construction. In general, top quality materials will cost more to purchase but will be more reliable and will require less maintenance in the long run.

Here are some drip irrigation fundamentals to help get you started. The drawing above illustrates the placement of each of the irrigation system components. Page 16 contains a list of basic irrigation system components and the function each serves. A list of irrigation tips can be found on page 23 and a sample irrigation system plan can be found on page 27. If designing and installing an irrigation system seems like an overwhelming task, consider hiring a landscape professional to do this landscape component.

Mary, Mary Quite Contrary, How Does Your Drainage Flow?

It is a good idea to assess current drainage patterns before making any grading changes. Here are a few simple ways to identify drainage patterns:

- Put a piece of straight, flat lumber, such as a two-by-four, on a spot in your yard. Place a level on top of the board. This will tell you the direction of the slope. Repeat this procedure at various spots in your yard.
- Inspect your yard after a rain to identify spots that accumulate water. You can accomplish the same effect by running a lawn sprinkler over the yard until the ground is moistened and water begins to collect.
- Put a garden hose at the highest point in your yard. Run the water long enough to determine the direction of the flow and to identify where ponding occurs.
- To maximize water harvesting potential, identify the locations where rain water falls from the roof. Observe the direction of the flow after runoff from the roof reaches the ground.

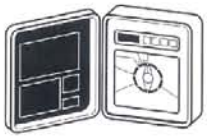
■ ***It's time to draw the line.***

Review your landscape plan before beginning the irrigation system design. Although it is possible to use a blank copy of your site plan, many people find it easier to draw the irrigation system design on a copy of their landscape plan.

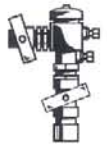
1. Mark on your plan the point where you plan to tie in to the water line that goes to your house. This is usually done near the front yard hose bibb. Many new homes have a stub-out (a protrusion with an end cap) on the riser pipe connected to the hose bibb for this purpose. This is where the backflow preventer should be placed.
2. Mark the location of each emitter. Drip systems should be designed to accommodate the watering needs of mature plants. If you are not sure of the number and flow rate of emitters needed by each plant, the chart on page 21 may be useful.
3. Using colored pencils, shade emitters that will be supplied by the same valve with the same color (for example: blue for trees, pink for shrubs, vines and groundcovers, yellow for planting beds, etc.).
4. Mark the location of the irrigation valves. They are usually placed next to the backflow preventer. Shade each valve to correspond with the colors you chose in Item 3.
5. Mark in the irrigation controller. Typically, it is installed next to an electrical outlet in the garage or by the breaker box outside.
6. Add the irrigation lines (PVC pipe/poly tubing), connecting them from the valves to the emitters. Make them the same color as the emitters they will serve. Use straight lines whenever possible to optimize the water flow. It might be necessary to use tees and elbows to direct irrigation lines to all of the planting areas. If you plan to use sleeves for running irrigation lines beneath hardscape or structures, mark their locations with a dashed line.
7. Then finish up by adding flush caps, which should be placed at the end of each pipe/poly tubing run.

This guide does not include instructions for designing and installing sprinkler systems generally used for lawns. If you are planning a lawn, learn as much as you can about sprinkler irrigation before adding this component to your irrigation system plan. Staff at local irrigation supply stores can be very helpful. Often, they can direct you to good reading materials, answer questions and offer advice.

The Basic Components of a Drip Irrigation System



Controller/Timer:
This controls the watering cycle by automatically activating the control valves on the days and times you pre-select, thereby directing when, how long, and how often the irrigation system operates.



Backflow preventer:
This device prevents irrigation system water from being siphoned back into the pipe that carries drinking water into your home. All cities have ordinances that require installation of a backflow preventer. Contact your city for permit and installation requirements.

Control valves:
Manually or automatically operated control valves are used to turn the water on and off. Automatic control valves are wired to a controller.

Filter:
All drip systems need some type of filter to keep dirt and debris from clogging the emitters.

Pressure regulator:
Most drip systems operate at low pressure, between 20 and 30 PSI (pounds per square inch). Pressure regulators reduce incoming water pressure to the ideal pressure for the drip system.

Pipe/Poly tubing:
This is the main water conduit in a drip irrigation system. It is also called an irrigation line or lateral. Polyethylene tubing and hard PVC pipe are the two most commonly used types of pipe.

Micro tubing:
This delivers water from the emitters or poly tubing to the plants.

Emitters:
These connect to the poly tubing or micro tubing and deliver water at a slow, consistent rate, usually 1/2, 1 or 2 gallons per hour (gph).

Goof plugs:
Goof plugs correct mistakes by plugging extra or misplaced holes in the poly tubing.

Flush cap:
A flush cap is attached to the end of each irrigation line so that dirt and debris can be flushed out of the irrigation system.

STEP SIX

Pre-Shop Till You Drop

Pre-Shopping Pays

Getting an accurate cost estimate before you make a final decision on your landscape plan will help to avoid costly surprises and can help you decide whether to install your landscape all at once, install it in stages, or revise your landscape plan to include more or fewer features. It is advisable to get a cost estimate for materials and services from more than one supplier. To ensure consistent cost estimates, ask for the same product or service from each supplier.

When pre-shopping for contractor services, ask for a written estimate that specifically identifies costs for all materials and labor and includes a time frame for completion. Remember, less is not necessarily best. While pre-shopping, consider product quality and durability, guarantees, warrantees, product availability and customer service. Here's how to get started:

■ ***First, make a list of all of the materials included in your landscape plan.*** Begin with the hardscape elements such as concrete walkways, benches, patios, walls and decomposed granite. Then list the plants you want to include in your landscape. Make sure to list the quantity and size of each plant.

■ ***Next, choose the irrigation system components.*** With your preliminary landscape design in hand, make a list of all of the items needed to complete the irrigation system. Also note the quantity of each part needed.

■ ***Identify any additional items that must be purchased or rented.*** Pre-shop for any tools and supplies needed to complete the installation of your landscape. Identifying everything you will need prior to the installation process will help save time during installation and also will help you stay within your budget. Note those items that must be purchased, as well as equipment that is available to rent. Renting equipment can be a cost-effective way to save time and reduce the physical labor required to install your landscape. While pre-shopping, nursery professionals, irrigation suppliers and other materials suppliers should be able to advise you on the tools and supplies needed to do the job right.

Verdins love desert trees!

■ ***Investigate professional services.*** If you are not a full-fledged do-it-yourselfer, you may want to consider hiring someone to help you do all or part of the work. If obtaining professional landscape services is a possibility, give yourself plenty of time to find capable people to help you. Professional services can be incorporated into any aspect of the landscape process from design through installation and regular maintenance.

If you are not familiar with the types of landscape services available, the list of professional titles and certifications that starts on page 19 may be useful. For additional information, consult the listing of landscape professional associations located in the resources section of this guide.

■ ***Now go shopping.*** Visit local nurseries, garden centers and other landscape materials suppliers. Write to manufacturers, consult the Internet, send away for catalogs and, if appropriate, request written cost estimates. List all suppliers and costs on a separate sheet of paper along with any

Opposite top: A lovely little visitor comes to this Agave in flower.

Opposite bottom: Seasonal wildflowers create a natural look along this flagstone walkway.

Tips for Choosing Professional Services

ASK:

- What jobs have you done recently? May I visit them?
- May I have a list of references?
- Do you have professional certification or training?
- What kind of training do your employees have?
- Who will be supervising the work?
- Will you provide a written cost estimate?
- How long have you been in business?
- Are you licensed, bonded, insured?
- Do you guarantee your work?

DO:

- Meet with landscape professionals face to face, preferably at your home so you can show them what needs to be done.
- Check references. Before calling references, make a list of questions to ask them. If you think of other questions later, call them back.
- Ask for proof of professional certification, licensing and insurance. If you are not sure what their educational background is or what their professional certifications mean, ask for clarification or call a related landscape professional organization.
- Ask for an anticipated completion date. If it is important for you to have a job completed by a certain date, ask if the landscape professional will guarantee that completion date. Consider arranging for final payment when the job is complete.
- Call the Registrar of Contractors (1-888-271-9286). Staff in this office can tell you if someone is a state-licensed contractor and can help to explain the potential benefits of using a state-licensed contractor. You also can find out if this office has received complaints about a specific contractor. Call the State Board of Technical Registration (602- 255-4053) for questions regarding landscape architects. Staff can confirm whether an individual is registered as a landscape architect. You also can inquire if any complaints have been received about a specific landscape architect.

DON'T:

- Don't choose a particular landscape professional unless you feel comfortable with that person and his/her way of doing business.
- Don't hesitate to keep looking until you find someone you will enjoy working with.

notes you care to make. If you have questions, follow up with telephone calls or make additional visits. If possible, make some preliminary decisions on plant materials (especially tree sizes) and hardscape choices.

Know Your Pro

Arizona Certified Landscape Professional (ACLP)

An ACLP certified landscaper has attended courses and passed an examination sponsored by the Arizona Landscape Contractors Association.

Arizona Certified Nursery Professional (ACNP)

An ACNP certified nursery professional has attended courses and passed an examination sponsored by the Arizona Nursery Association.

Certified Arborist

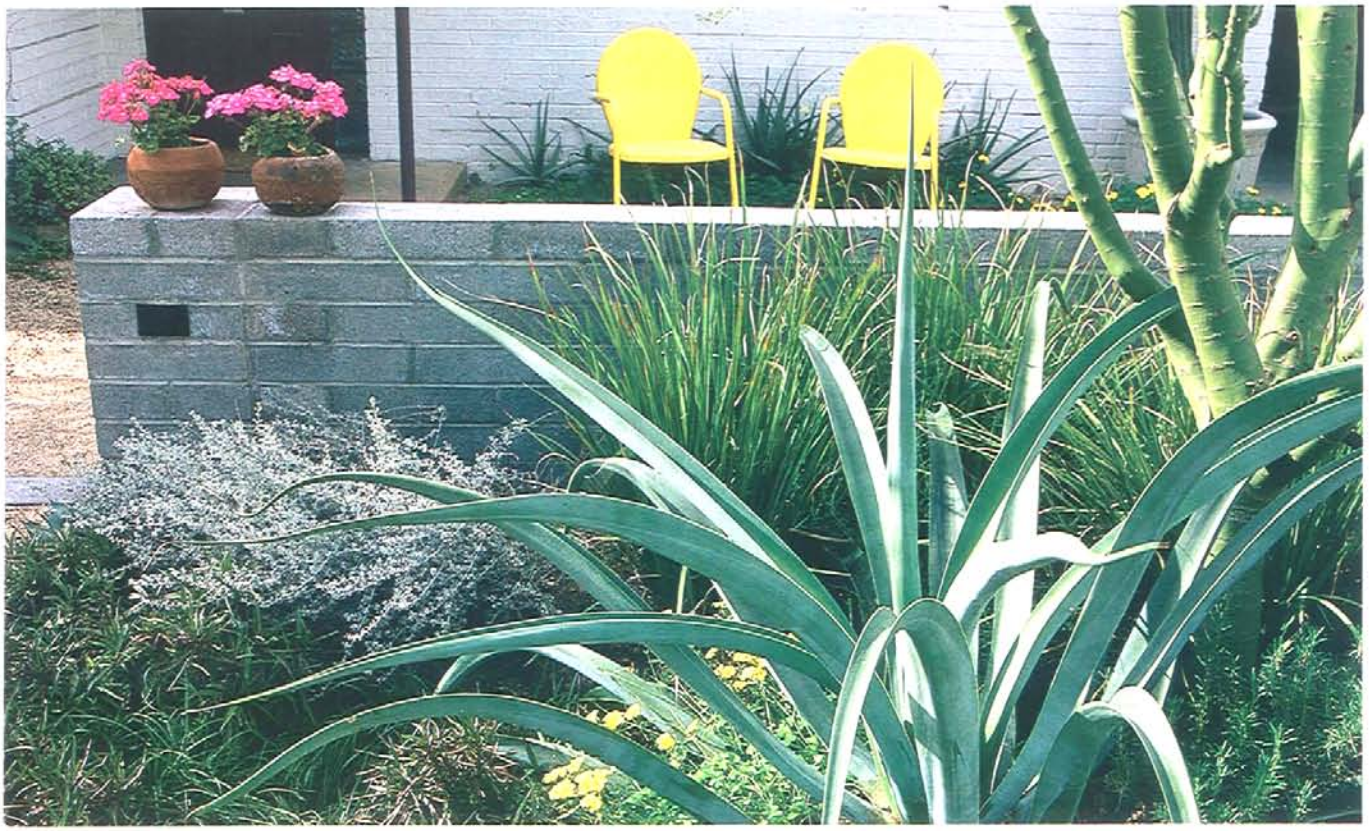
A certified arborist is a tree specialist who has been tested and certified by the International Society of Arboriculture.

Certified Tree Worker

A certified tree worker is trained to prune and care for trees. Certification comes from the International Society of Arboriculture.

Desert Landscaper Certification

This certification is sponsored by the Desert Botanical Garden. It is awarded to people who have completed a series of workshops and have passed examinations covering the workshop material.



Bright yellow garden chairs and potted annuals add color to this great front yard Xeriscape.

Horticulturist

A horticulturist has had formal training, such as a two-year, four-year or advanced degree in horticulture.

Irrigation Association Certification

The Irrigation Association provides instruction, testing and certification as an irrigation designer, contractor or auditor.

Landscape Architect

A landscape architect usually holds a college degree, has served as an apprentice to a licensed landscape architect and has passed a national exam. Landscape architects are licensed by the Arizona State Board of Technical Registration.

Landscape Consultant

This term is sometimes used by landscape professionals who offer landscape advice. A degree, license or certification is not required.

Landscape Contractor

Landscape contractors install some or all components of the landscape. Some offer design services. Some install irrigation systems. Some landscape contractors also provide landscape maintenance services. They are tested and certified by the Arizona Registrar of Contractors, which requires them to be bonded.

Landscape Designer

As their title indicates, landscape designers offer landscape design services. Although a degree, license or certification is not required, landscape professionals who use this title often possess knowledge, education, training and/or experience in landscape design. A person who is currently serving an apprenticeship under a licensed landscape architect may use this title.

Landscaper

A landscaper offers a variety of landscape services, typically in the areas of installation and maintenance. Licensing and certification are not required.

Master Gardener

Master Gardeners are volunteers who have received specialized training in horticulture from the University of Arizona Cooperative Extension.

Suggested Quantities of Drip Emitters for Mature Plants

Plant Type	Canopy Diameter (Feet)	Number of Emitters	Emitter Flow Rate (Gallons per Hour)
Small Shrubs/Groundcovers	1-3	1	1
Large Shrubs	4-6	2	2
Small Trees	7-10	3	2
Large Trees	11-14	4-6	2-4
	15-20	6-12	2-4
	21+	12+	4

Note: Sizes given for shrubs and trees indicate their full size at maturity. As plants mature and require more water, lengthen the watering time. It also may be necessary to add more emitters or replace existing emitters with those having a higher flow rate.

Granite - 3, Black Plastic - 0

- If you are in a quandary about how much crushed rock or decomposed granite (top dressing) to purchase and whether or not to put black plastic under it, just remember the score: 3 - 0.
- As a general rule, your layer of top dressing should be 2-3 inches thick. This will help to inhibit evaporation and weed growth and provide consistent coverage with less chance of developing bare spots in the future.
- Measure the total area of your yard to be covered with top dressing. Call or visit suppliers who can help you determine the amount of top dressing needed to cover the area. Typically, one ton of granite or rock covers about 120 square feet.
- It is NOT advisable to put a layer of black plastic beneath your top dressing. Over time, the edges will dry out and curl up and may become unsightly. In addition, black plastic prevents air and water from reaching plant roots.

Smartscape Certified

A person who holds Smartscape certification has completed a series of workshops which focus on landscaping practices that are appropriate for the Sonoran Desert. The Smartscape program is sponsored by the Arizona Municipal Water Users Association, the University of Arizona Cooperative Extension, the Arizona Nursery Association, the Arizona Landscape Contractors Association and Tucson Water.

STEP SEVEN

Prepare A Cost Estimate

Pre-shopping activities should provide the information needed to estimate the total cost of the landscape. Use the worksheet provided at the end of this guide (page 68) to generate the cost estimate. Make several copies of this worksheet in case you need additional space or want to revise your list of materials and services. It might save some time to list similar items on one line. For example, if you plan to purchase five fifteen gallon trees and they happen to be the same price, list all of the trees on one line, note the unit cost, then multiply that cost by five.

Once you have prepared a cost estimate, compare it with the amount you

have budgeted for the landscape. If your cost estimate is within range of your budget, proceed to *Step Eight – Draw Your Working Design*. If not, reevaluate your preliminary design or make the decision to install your landscape in phases.

Reevaluating Your Preliminary Design

If you have the good fortune of developing a plan that falls below your budget, consider the following options:

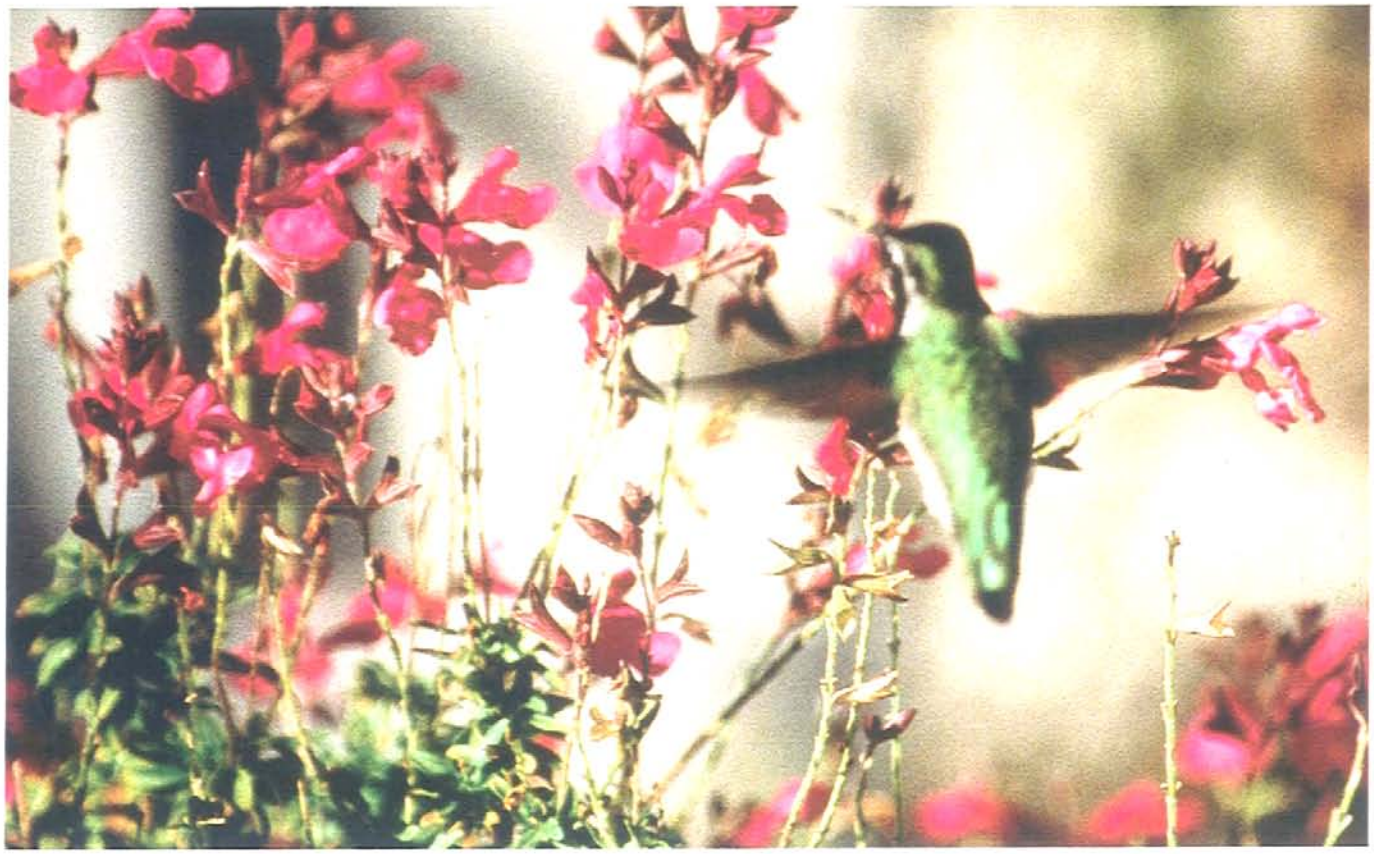
- Spend the surplus on upgraded irrigation system components.
- Spend the surplus on upgraded hardscape materials.
- Add a feature you did not include in the preliminary plan because you thought it would be too expensive.
- Set aside the surplus amount for future additions or modifications to your landscape.

If your ultimate landscape design has exceeded your budget, consider these options:

- Scale back the original plan by excluding one or more features you can live without.
- Reduce the cost by purchasing smaller trees.
- Purchase fewer services and do more of the work yourself.
- Retain your complete plan and install it in phases.

Installing Your Landscape in Phases

Phasing in a landscape means installing it in stages rather than all at once. There are several advantages to retaining the landscape plan as you conceived it originally. First, you can install each phase of your landscape with the knowledge that, eventually, you will have exactly what you want. You also will be able to concentrate on installing high quality plants and materials during each phase. You won't have to cut corners or settle for something you don't really like. Phasing in your landscape also gives you some extra time – to install the components of each phase carefully and properly, to



Hummingbirds are frequent visitors to desert gardens with red flowering plants like Autumn Sage.

Tips for the Irrigation Novice

- If at all possible, put trees on a different valve from low water use shrubs, vines and groundcovers. Use a separate valve for vegetable gardens, areas dedicated to bedding plants, plants in pots, and areas to be planted with other water thirsty plant material. Accommodating different water needs by using multiple valves will allow you to apply water more wisely and efficiently.

- If your landscape plan includes a turf area, use separate valves for the sprinkler system. This is necessary because sprinkler systems and drip irrigation systems apply water at substantially different rates.

- Measure and measure again. If your landscape plan is drawn to scale, calculate the amount of irrigation line needed by measuring distances on your landscape plan. Then, to verify the calculation, go outside and measure the actual distances. If the plan is not drawn to scale, measure the actual distances twice to avoid overestimating or underestimating the amount of irrigation line you will need. The same goes for sprinkler system lines.

- Add it up, then buy a little extra. Save time and frustration by buying a few extra irrigation system components prior to installing the irrigation system. If you break or lose parts during the installation process, you won't have to make extra trips back to the irrigation supply store. Also, having extras on hand will provide you with some spare parts for future repairs.

- Install protective sleeves for those lengths of poly tubing that will be located beneath hardscape areas and structures. A sleeve is a PVC pipe 1½-2 times the diameter of the irrigation line that allows for insertion of the irrigation line beneath hardscaped areas.

- If you decide not to use self-piercing emitters, you will need to punch holes in the poly tubing to add adapters that connect to each length of micro tubing. Ask your salesperson for assistance in selecting an emitter punch that is the proper size for your project. Don't cut corners by using a nail or other sharp object that can make the hole too large or pierce the bottom side of the tubing.

- Do not exceed 200 feet of poly tubing from the valve to the flush cap.

- Do not exceed a total flow of 200 gallons per hour (gph) per valve.

- Micro tubing that exceeds six feet in length is NOT recommended.

- Several types of controllers/timers are available from irrigation suppliers. Features such as multiple program capability, the capability to program watering intervals of at least fourteen days, and the capability to program run times of at least two hours add to the versatility of an automatic controller/timer.

continue pre-shopping for items to be installed during the next phases, to learn to maintain the existing components of your landscape and, of course, to save up for the supplies and materials needed for future phases.

Don't Let Phasing In Faze You

If you're wondering how to go about installing your landscape in phases, the following tips can help you get started:

- ***Analyze and Prioritize***

  Review your landscape plan. Identify the essential elements on your plan and label them with a 1 to designate first priority. Repeat this process for second, third and fourth priority items. During the process of prioritizing landscape elements, consider those elements that will be the easiest to add or move and those that will be the most difficult. Ask yourself questions like, "Will I be **willing and able** to move this play structure or add this planter later?" Identifying and prioritizing these elements accordingly will help to ease installation of items earmarked for future phases.

- ***Put Irrigation and Grading First***

  It is easiest and most cost effective to complete all grading activities at once, before installing the landscape. As a general rule, it is easier to install all of the major components of the irrigation system, such

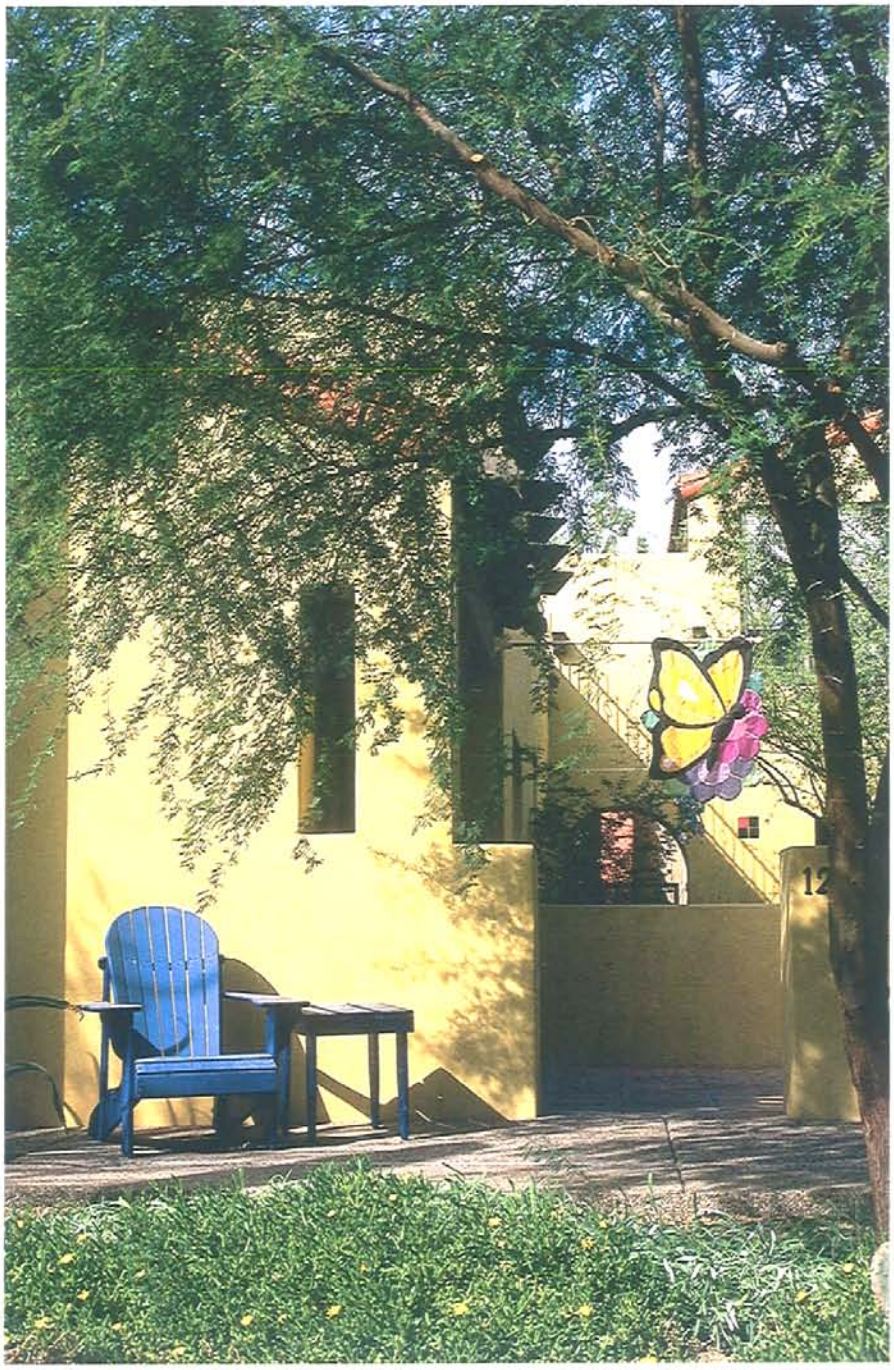
as the poly tubing or PVC pipe, at the same time. Therefore, they should be included in the first phase of your installation.

- ***Maintain Access***

  Try not to block gates or build fences or walls that will hinder installation of landscape elements planned for later phases. Put sleeves under sidewalks or block outs (also called stub outs) in walls to make way for features, such as wiring for lighting, to be added in future phases.

- ***Consider Temporary Solutions***

  If your plan to phase in the landscape leaves you with some temporary bare spots, consider covering them with a layer of top dressing or sowing those areas with wildflower seeds until you are able to finish the installation. This will help with dust control and also will provide you with something nice to look at while you are waiting to finish up.

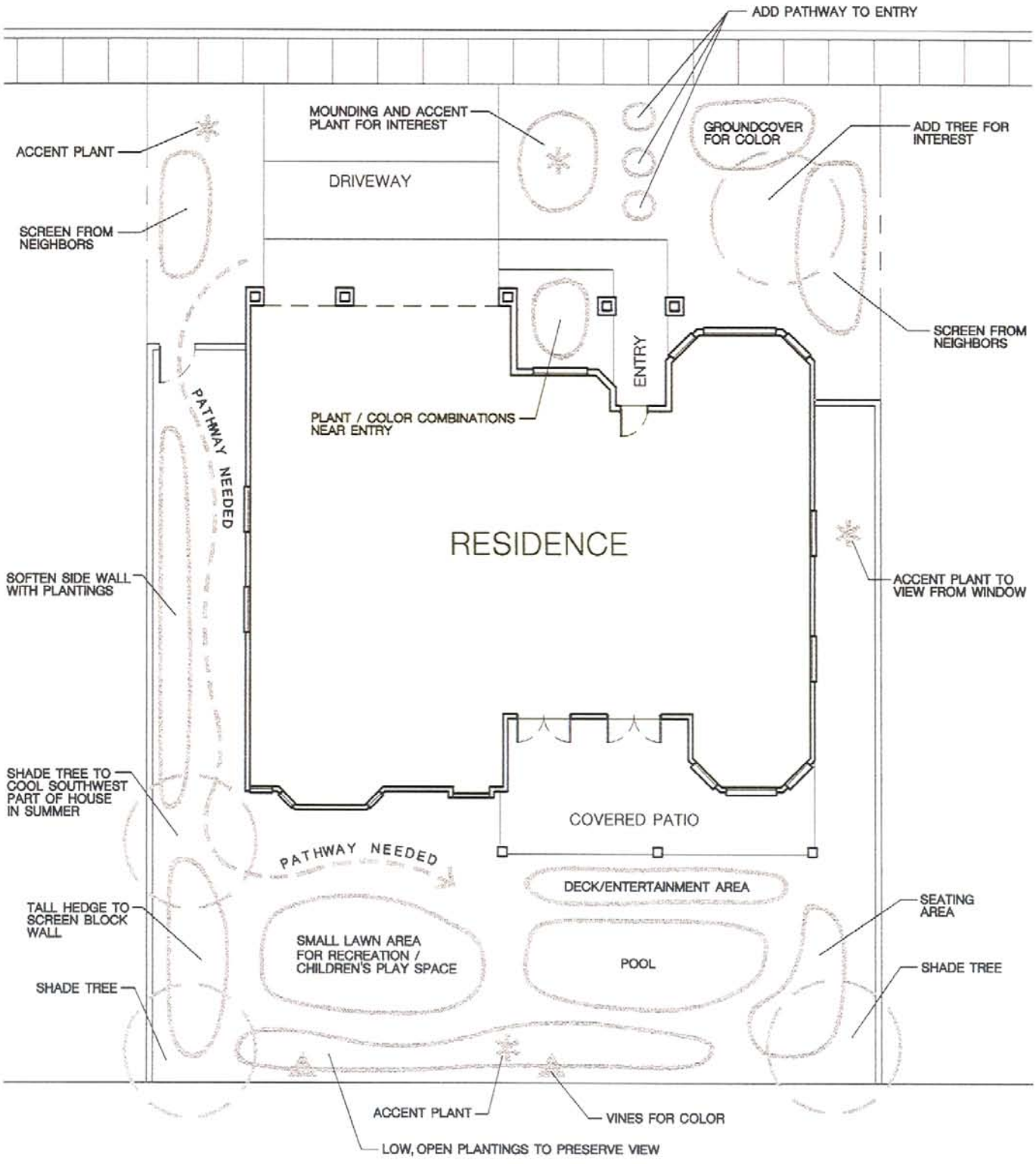


A colorful, comfortable relaxation area at this beautiful downtown Phoenix home

STEP EIGHT

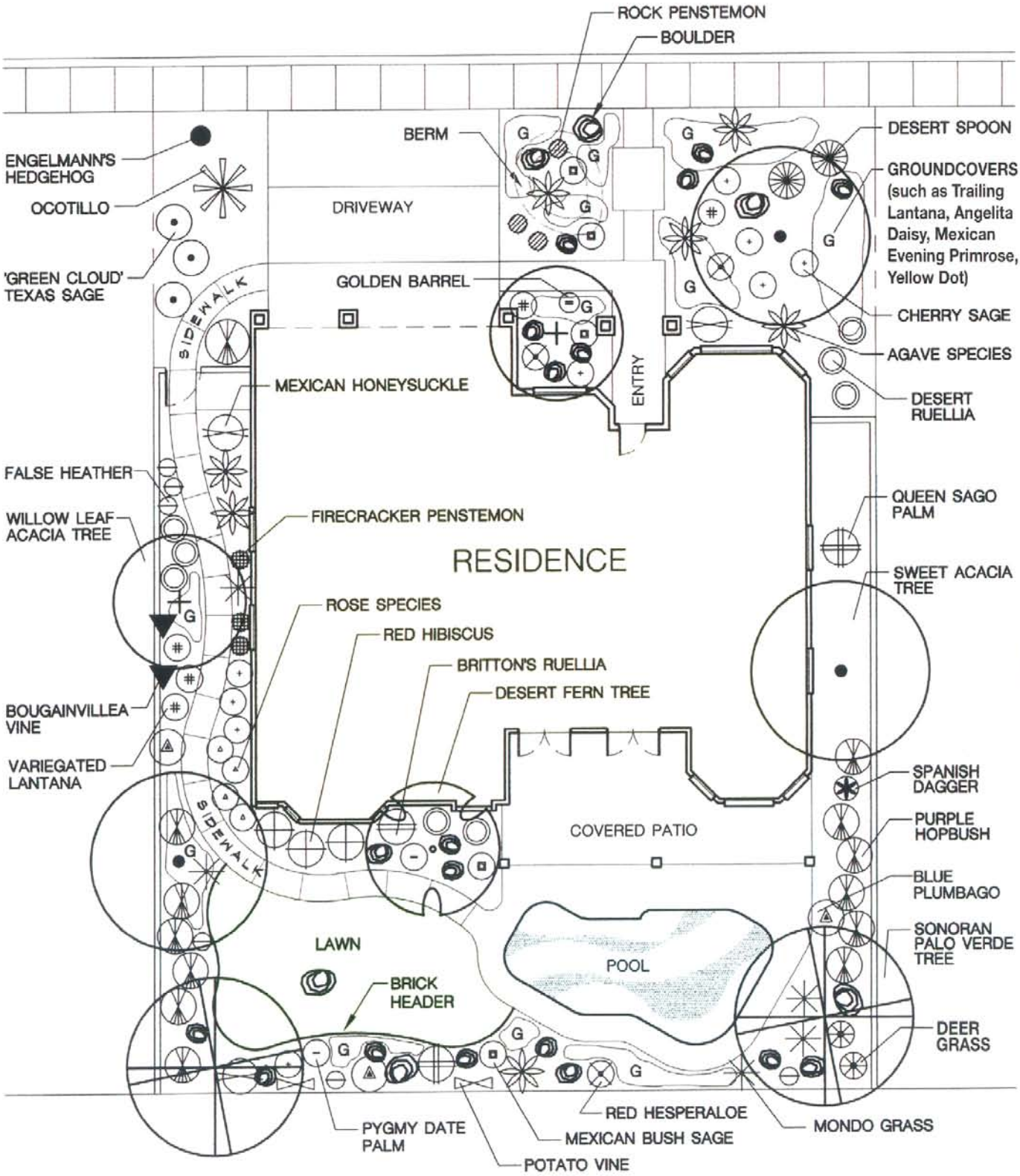
Draw Your Working Design

At this point, you should have gathered all of the information needed to finalize the landscape design and irrigation plan. If you have decided not to make any modifications to the preliminary drawings, then it's time to start planning your installation. If you have made more than a few minor changes, you probably will want to redraw the preliminary plan. If you have decided to phase in portions of the landscape, note your priorities on the working design. Make some copies of the completed working design. It's easy to lose or damage landscape plans, so keep a few extras on hand for future reference.



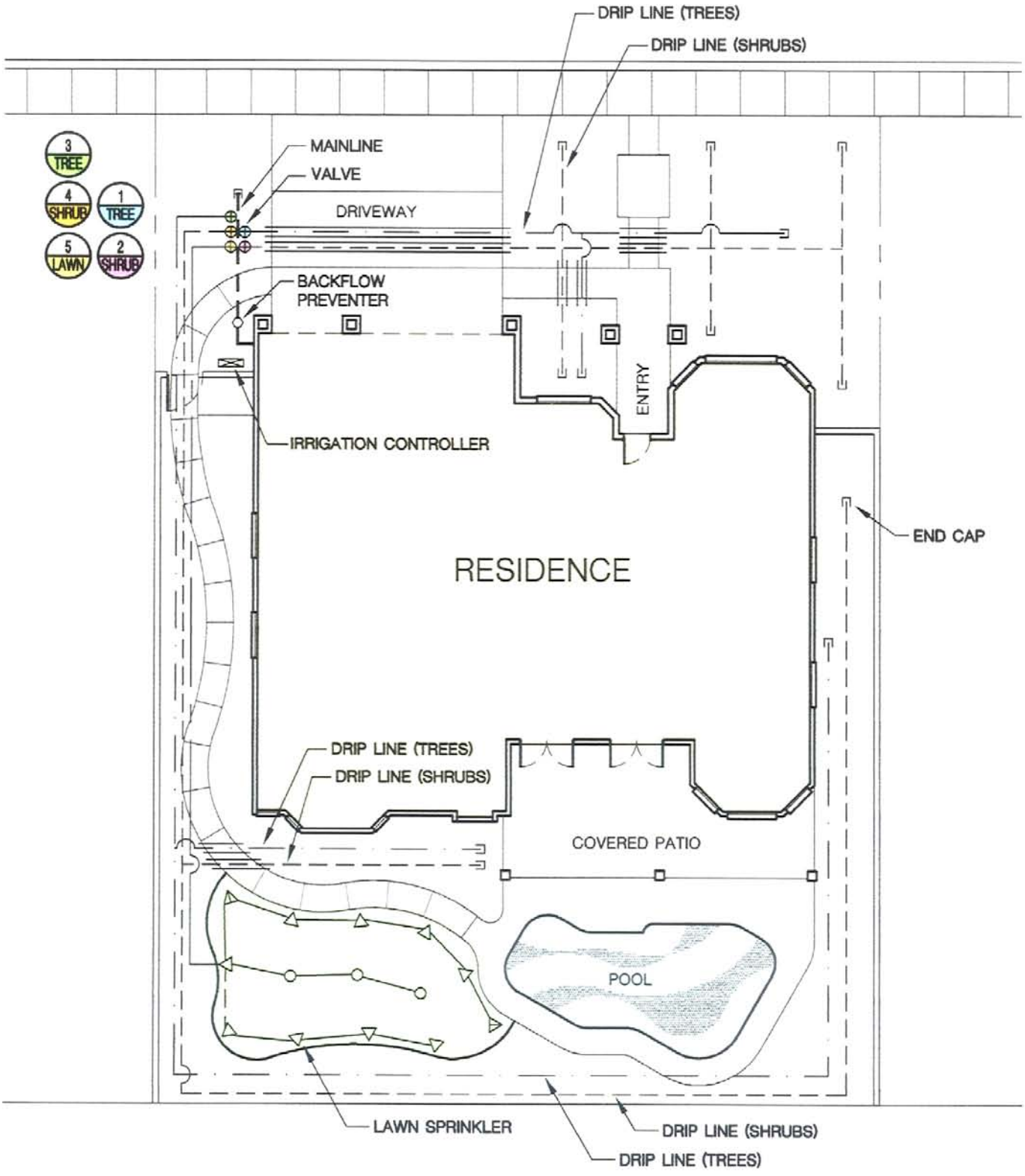
SITE DRAWING

SCALE: 1/16" = 1'-0"



LANDSCAPE PLAN

SCALE: 1/16" = 1'-0"



IRRIGATION PLAN

SCALE: 1/16" = 1'-0"

Cost Estimate Worksheet

Item	Size	Amount Needed	Unit Cost	Total Cost for that Item
Total Project Cost				

Notes:

Your Installation Checklist

The planning process is now complete and you are ready to install your landscape. The checklist below will guide you through the installation process step-by-step and includes some tips to get your new landscape off to a good start. Don't forget to call the Blue Stake Center at 1-800-782-5348 (1-800-STAKE IT) at least three days before you dig.

✔ Prepare Your Site

If you plan to contour or grade areas of your site, now is the appropriate time to complete this task.

Boulders also should be placed at this time, since they probably will require use of the same equipment needed for grading and contouring. It also is a good time to remove rocks and construction debris from the site. Completing this task now will make it easier to install your irrigation system and plants.

✔ Measure, Mark and Install Hardscape Areas

It is best to install most hardscape areas before the irrigation system and plants. (Although top dressing is considered a hardscape element, it is usually installed after the plants.) As a last check prior to installation, measure and mark off hardscape areas. Temporary marking paint and marker flags are two tools that can be used to mark landscape components. Both can be purchased from local landscape and irrigation suppliers.

This raised bed planting area is an attractive, water-efficient way to grow vegetables. Like the rest of the yard, it is watered with a drip system.

If irrigation lines run beneath fences, walls and other hardscape areas, it is a good idea to install a sleeve under those spots. Mark and install sleeves for irrigation lines and outdoor lighting now.

If possible, purchase the entire quantity of each type of hardscape material at the same time. This will help to ensure color consistency, as colors in natural materials may vary somewhat, and will save time during the installation process.

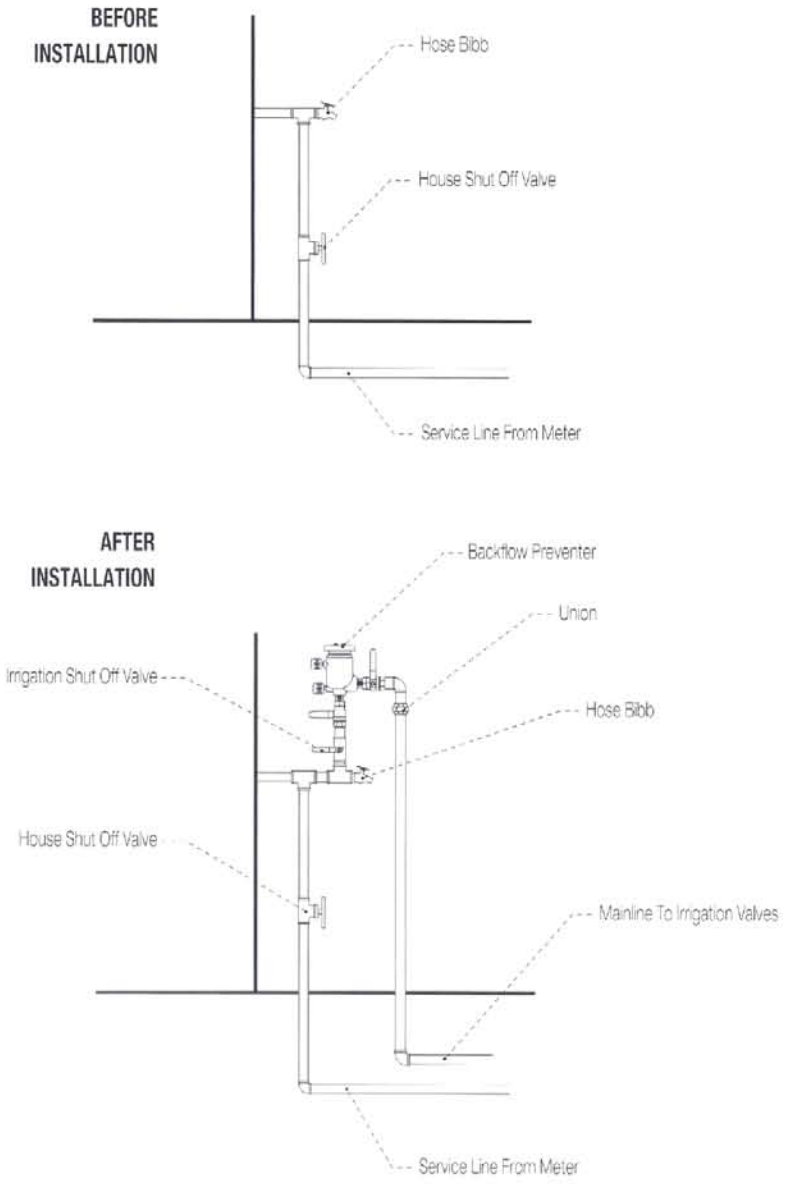
✔ Prepare the Soil

In most cases, soil amendments are not necessary for native and desert adapted plants. However, it is beneficial to loosen the soil in planting areas.

If your plans include a vegetable, herb or rose garden, planting beds for annual flowers, or a lawn, now is the time to prepare the soil in these areas. Cultivate the soil and add any necessary soil amendments prior to planting.

Opposite: Used as a temporary solution or as a staple in the landscape, wildflowers such as California Poppies, California Bluebells and Red Flax (shown here) provide a burst of seasonal color.

Standard Installation Detail And Examples For Points Of Connection



✓ Mark Plant Locations

Using your completed landscape plan, mark the location of each plant with temporary marking paint or marker flags. Make a final check after marking all plant locations. Do the marks correspond with plant locations noted on your plan? Try to visualize the finished product. Are plants and trees spaced appropriately? Is this arrangement what you had in mind?

✓ Purchase and Install Irrigation Materials

Get Prepared

The general instructions provided in this guide are for systems and components commonly used in residential landscapes but do not necessarily apply to all types of systems and components. Read and follow any instructions that come with your irrigation system components and contact your salesperson if you need advice. Construction drawings for the major irrigation system components are provided to the left and on pages 34 and 35 to serve as a guide during the installation process.

- Review your irrigation system plan thoroughly to get reacquainted with the plan and its components. Also, reread the section of this guide that

Irrigation components that are properly installed and easy to reach will contribute toward a water-efficient irrigation system.

pertains to developing an irrigation system plan (pages 13-16). A short refresher course now may save time and effort later.

- Take your plan to an irrigation supply store and ask for help with selecting the equipment. Take this guide along to show them the construction details for the backflow preventer and irrigation valves.
- If possible, purchase all of the irrigation system components at the same time. Don't forget smaller items like pipe cutters, Teflon® tape, primer, glue and temporary marking paint.
- Buy extra irrigation line and fittings to handle unexpected problems.
- Before digging, mark the locations of all irrigation lines and valves with temporary marking paint. This will provide a visual layout for the work ahead.
- Now is the time to make any changes to your irrigation system design to properly route the irrigation lines. If you do make changes, revise your irrigation plan accordingly.

Install the Backflow Prevention Assembly

Backflow prevention assemblies are required for all irrigation systems regardless of size. The purpose of these devices is to prevent contaminated water from getting into the drinking water system. If you need to install a backflow preventer, it is necessary to obtain a plumbing permit and follow all

Color-coded irrigation lines

city code requirements. If you haven't done so already, call your city for permit information. To ensure proper installation that will pass a city inspection, it is recommended that you hire a contractor to install this irrigation system component. Here are some guidelines that your contractor should follow during the installation process:

- Backflow preventer assemblies are typically installed near the water source at least twelve inches from a wall to allow for access. There are many types of backflow preventers available. The Uniform Plumbing Code (UPC) has specific installation requirements depending on type.
- Pressure vacuum breakers (PVBs) or reduced pressure assemblies (RPs) are recommended since one assembly can serve multiple valves. Although atmospheric vacuum breakers (AVBs) are easier to install, they cannot be tested to see if they are functioning properly. In addition, an AVB is required for every control valve.
- Type K copper pipe should be used for all above ground piping and requires a torch and non-lead solder ("sweat") to connect the copper fittings.
- A ball valve should be installed on the riser going to the backflow preventer to shut off the water during emergencies or repairs.
- At least one union should be installed within one foot of the backflow prevention assembly for ease of repair or replacement.
- With a PVB or RP, the irrigation valves must be installed **after** the assembly. However, the AVB must have the valve installed **before** the assembly.
- If your home already has a front yard landscape with a backflow preventer, it is fairly easy to extend additional valves from the front yard to the back yard. If you extend the existing system, follow the rules specified in the Uniform Plumbing Code.

Install the Valves, Filter, Pressure Regulator and Valve Box

- The valves, filter and pressure regulator are typically located inside a valve box which is usually placed near the backflow preventer.

Four Things You May Not Know About Mulches

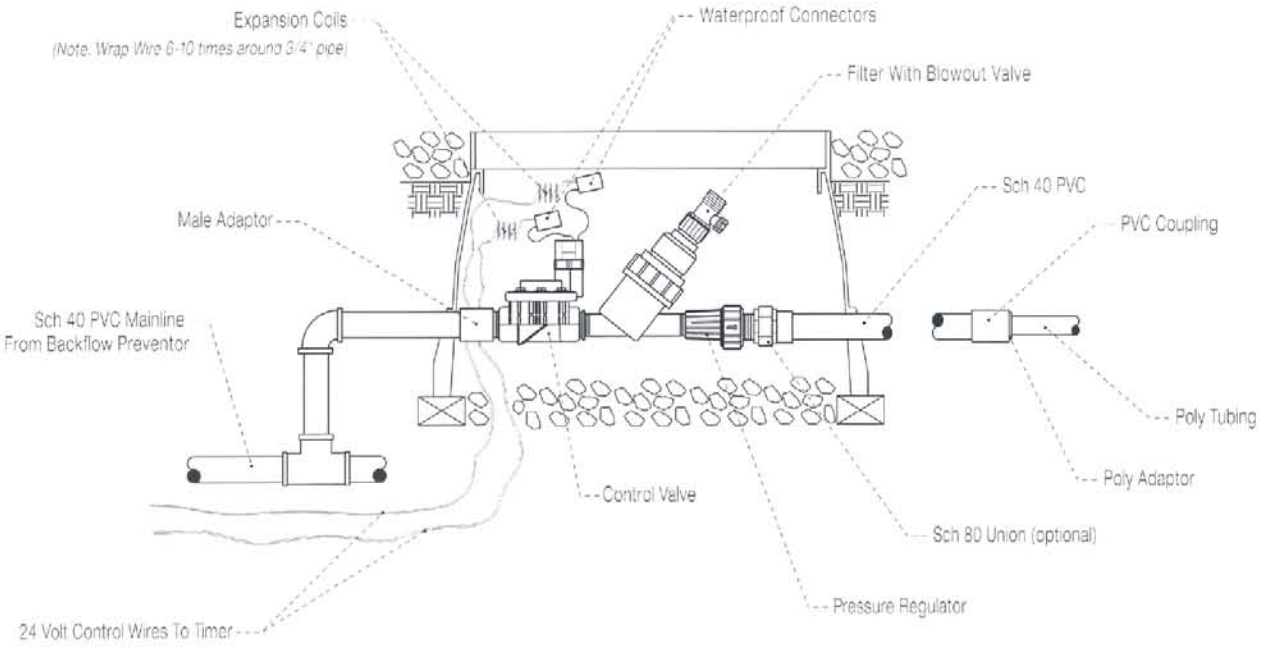
- Mulches cover and cool the soil. During the summer, cooler soil temperatures help to improve root growth.
- Water evaporates more slowly from soil surfaces that are covered and cool. Mulches help to reduce water use by reducing evaporation so more water stays in the soil for plants to use. They also help to reduce salt buildup in the soil.
- Mulches help water to penetrate the soil more effectively, reducing runoff from planted areas. Reduced runoff keeps water where plants can use it.
- Mulches help to keep sunlight from reaching weed seedlings in the soil. Less sunlight means less weed growth. Weeds use water that would otherwise be available for landscape plants. Fewer weeds means more water for your plants and less maintenance time for you.

- Do not put too many valves in one valve box. Two valves per box are recommended. Leave enough room in each valve box to allow yourself to work comfortably with the valves and wires and to easily remove and replace the filter later on during routine maintenance.
- For aesthetic and practical reasons, it is better to place valve boxes below ground, making the top of each valve box about two inches above grade (this will put valve boxes at ground level after the top dressing has been installed).
- After determining the best place for the valve box, dig out the area adequately so that the top of the valve box will rest at grade (it will be raised above grade as mentioned in the previous step later on during the installation process).
- Because the system will experience higher pressure before the valve, schedule 40 PVC pipe should be used between a PVB or RP backflow preventer assembly and the valve.
- After the control valves are installed, attach a filter and a pressure regulator to each one.
- Wrap a small amount of Teflon® tape around all threaded fittings to help lubricate and seal them. Make sure all fittings are good and tight.
- Now it is time to place the box over the valves. You may have to cut additional holes in the sides of each box to allow for proper location of the pipe/poly tubing.
- Place bricks or blocks strategically under the edges of each box to provide stability. This should raise your box two inches above grade.
- Be sure the box is level; then replace soil around the outside edges of the box. Cover excess openings around pipes with fabric or tape to keep soil from entering the box.
- Fill the bottom of each valve box with one to two inches of gravel to promote drainage and to avoid muddy conditions inside the box.

Dig the Trench

- If you haven't done so already, mark the location of all trenches with temporary marking paint.
- About two days in advance, soak areas to be trenched with water. This will make digging a lot easier.
- Dig the trenches six to eight inches deep, rounding corners to prevent the poly tubing from kinking during installation.
- You can use a common trench for pipe/poly tubing connecting to different valves and wiring for low-voltage outdoor lighting.

Standard Installation Detail For Valve Boxes, Valves, Filters, And Pressure Regulators



Install the PVC Pipe/Poly tubing

- If you are using PVC pipe, make sure the pipe and fittings are clean. Then apply a light, even coat of primer and glue to both the pipe and the fitting. After connecting the pipe and fitting, wipe off any excess glue. Allow the glue to set for twenty-four hours before pressure testing for leaks.
- Poly tubing has a tendency to roll back on itself. If you are using poly tubing rather than pipe, allow the tubing to warm in the sun. It will become softer and easier to work with. To hold the tubing in place, put some soil back in the trench (spot backfilling) about every five feet.
- If a common trench is used, consider painting each pipe or poly line a different color to identify the type of plant or planting area each line waters. Colors should correspond with those used on your irrigation plan.
- Leave fittings exposed so they can be pressure tested for leaks.
- Flush the lines before installing emitters. Open one flush cap at a time and let each valve run for about two minutes.

Install the Irrigation Controller (Automatic Timer)

- Indoor controllers plug into electrical outlets whereas outdoor controllers have wires that run directly to the breaker box. Do NOT mount indoor controllers outside.
- If possible, mount the controller in a shady location.
- **Danger: There is live voltage electricity in the circuit breaker box.** All 110 volt electrical work must be done by a licensed electrician. A permit may be required by your city.
- It is recommended that you connect the controller to its own dedicated breaker. Do not connect the con-

No Heroism Required

It is important to be realistic about your capabilities during the landscape process. Landscaping can be hard work and requires time and patience. Here are some suggestions to help maintain endurance and get the job done with fewer hassles.

- Take weather into account during the installation process. If you are installing your landscape during the warmer months, make sure to drink plenty of water, protect yourself from the sun (a hat, sun block, protective clothing) and avoid strenuous jobs during the hottest times of day.
- You may want to rent a trencher, a front-end loader and/or other labor saving equipment to make your installation job a little easier.
- Rest often.
- Get a good pair of garden gloves.
- Consider asking for help. Got a friend who owes you a big favor? Maybe you can ask for some assistance. Were you able to achieve some cost savings on another part of your landscape budget? You might want to use the savings to hire a few helping hands.

troller to a GFI (ground fault interrupt) circuit.

- Irrigation controllers must be properly grounded. Follow the manufacturer's instructions carefully.

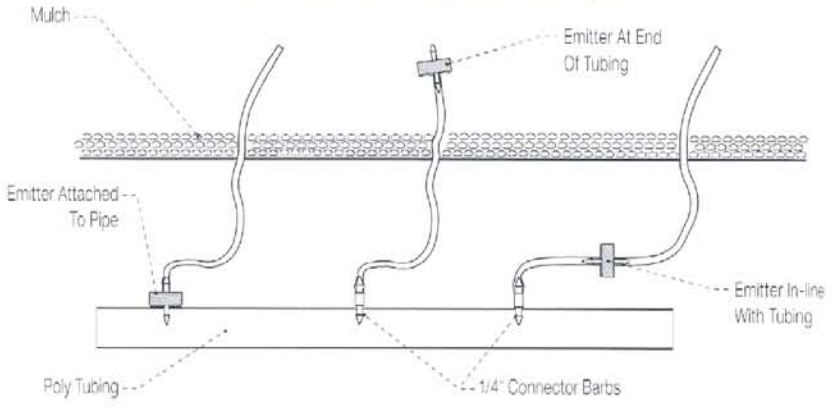
Connect the Controller to the Valves

- Use "direct burial wires" or an irrigation controller cable. The cable has color coded wires to make it easy to match the valves to the proper stations in the controller. For most residential irrigation systems, 18 gauge wire is acceptable.
- Wire expands and contracts with changes in weather. Leave some slack in the wire when running it from the controller to the valves. It also is a good idea to coil some wire at the end of each connection to give you ample wire to work with in the future, when it's time for maintenance or repairs.
- Connect the wire to the valves with waterproof connectors.
- If wire is being placed in the same trench with the irrigation lines, protect it from damage during installation and future repairs by tucking it under the lines.

Install the Emitters and Micro tubing

- Install micro tubing and emitters prior to planting so water is available immediately after plants are installed.
- Use self-piercing emitters or a hole punch that is the proper size for the emitter. Your irrigation supplier can help you choose the proper hole punch. If you make a mistake, use a goof plug to seal the hole.
- After installing emitters and micro tubing, spot backfill to keep them in place.

Three Emitter and Tubing Installation Options



Emitter tubing outlets should be placed between one and three inches above the ground. Proper placement will allow you to observe the wetting pattern for each plant and will reduce the likelihood that dirt from the surrounding area will clog the tubing. Emitters can be placed directly into the poly tubing or anywhere along the micro tubing as long as the tubing outlets are above ground. Above ground emitters are easier to maintain, whereas underground emitters cannot be chewed by rodents.

Take Photos and Update the Irrigation System Plan

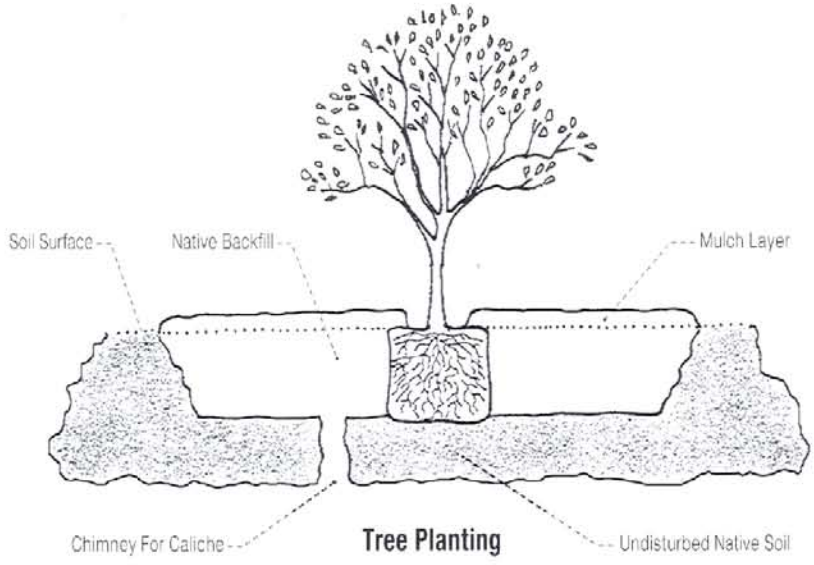
- Before backfilling the irrigation lines, photograph each section of the yard. Begin at one end and work in strips, either lengthwise or vertically.
- Label the photos to correspond with the sequence you chose and keep them with your irrigation system plan. These photographs will help to verify the exact location of your irrigation system components when it is time to make repairs.
- If you installed trenches or other system components differently than what appears on the irrigation system plan, revise the plan to show the actual location of each line. This updated "as built" plan can save time and labor in the future.

Inspect the System

- Before backfilling, turn on the irrigation system and inspect it for leaks.
- Also check to see if each emitter is operating properly.
- Make any necessary repairs, then run the system again as a final check.

Backfill

- Prior to backfilling, remove rocks and other debris from the surrounding soil. These might damage the pipe/poly tubing.
- Backfill the trench half-way, lightly tamping the soil with your foot. Then fill it with water to settle the soil.



Tree Planting

- Backfill the remainder of the soil. Then water again.

✓Purchase and Install Plants

Although native and desert adapted plants can be planted any time of year, plants installed during the summer will need more attention. Try to purchase plants just prior to installation. Plants dry out much more quickly when left in their containers, which may result in plant loss. Water containerized plants daily and, in hot weather, find shade for those plants that need protection from the sun.

Before installation, set plants on the marks made earlier in the installation process. This will help ensure that they are installed in the correct location. It also will give you a picture of what your yard will look like when the installation is complete. Make any last minute modifications now.

Planting

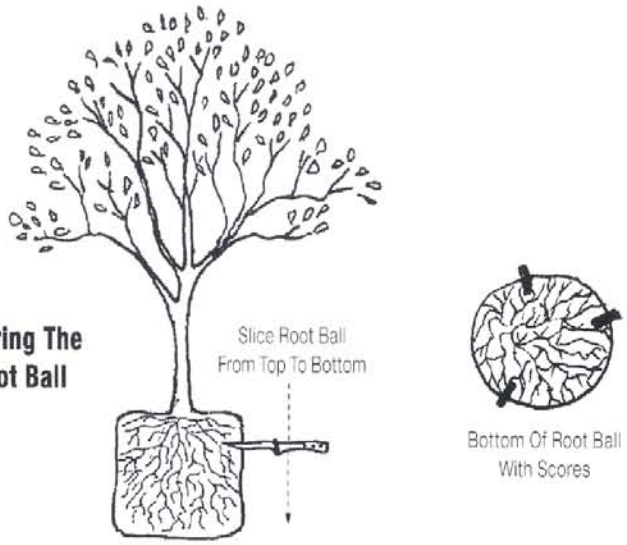
Here are some instructions for installing low water use plants:

1. Dig a hole for each plant that is three to five times wider but no deeper than the plant's root ball. This will help to encourage outward root growth and to prevent the plant from sinking below the surrounding soil surface.
2. Tap the side of the container with a hammer or trowel to loosen it from the root ball. (Place larger plants on their sides.) Remove the plant from its container taking care not to damage the roots. Handle plants by the root ball rather than the branches or foliage.
3. If the roots are compact or circling the container, score the root ball or loosen the roots around the circum-

The Health of Your Trees is at Stake

Here are some guidelines for staking newly planted trees:

- Use two wooden stakes, preferably two inches round or square. Place stakes outside of the root ball, inserting them at least six inches below undisturbed soil (go at least six inches below soil that has been tilled in preparation for planting).
- Ties should be made of smooth, flexible material such as horticultural tape, nylon tree ties, or wire securely wrapped in rubber tubing. Grasping the trunk with one hand, find the point on the tree trunk where the tree will stand upright. Place the ties six inches above this point.
- Loop the ties around the trunk and secure them to the stake. Ties should support the trunk but should not inhibit movement (trunk and ties should move as a unit). This is important for proper trunk development.
- To minimize damage to tree limbs, cut the stakes four to six inches above the tie.
- Check staked trees periodically, preferably once a month, and loosen the ties as needed. Ties that dig into the trunk can damage the tree.
- Remove the stakes as soon as a tree can stand on its own; almost always within one year of installation.



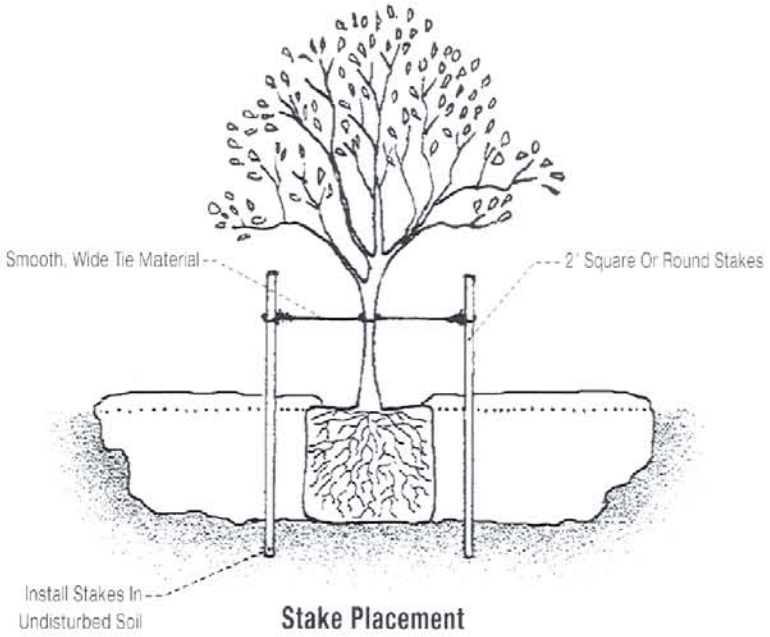
ference of the plant. This helps the roots to spread to the adjacent soil after planting.

4. Place the plant in the hole so that the top of the root ball is even with or just a bit above the soil surface. Fill in the hole with soil, pressing firmly around the root ball to minimize soil settling.
5. Remove nursery stakes (from trees) and trim off any dead or broken branches. No other pruning is necessary at this time.
6. If you don't have a drip irrigation system, make an irrigation well around the plant, forming the well at the outer edge of the plant's canopy. Although they are not necessary, shallow irrigation wells are suggested for plants on drip systems also. Water each plant thoroughly, wetting the soil to the bottom of the root ball.
7. Make any necessary irrigation system adjustments to ensure that water is going to the root ball of each plant.
8. It is a good idea to spread a thin layer of organic mulch around new plantings. Tips on application of mulches are offered on page 39.
9. Do not fertilize new plants. Although organic mulch is helpful to new plants, fertilizing immediately can damage them.

Staking

Under normal conditions, it is not necessary to stake trees after planting if they can stay upright on their own after the nursery stakes are removed. In very windy areas it may be helpful to stake trees for a while even if they are able to stand on their own. This will give new trees a little extra anchorage. In any case, staking should be temporary.

Opposite top and bottom: Although adjacent to a golf course, this homeowner-designed Xeriscape features the bold forms and textures of cacti and succulents.



Stake Placement

Staking trees improperly or for too long can weaken or damage them.

✔Purchase and Install Top Dressing and Other Mulches

After the irrigation system is installed and the plants are in, it's time to spread the decomposed granite or crushed rock and any other mulches planned for your landscape. If you have chosen to spread organic mulch around your plants, do this first. A layer one to three inches thick is sufficient. Top dressing can go right on top of the organic mulch. Take care to keep all mulches two to four inches away from the trunks of the plants.

It may seem as though you will never finish spreading that enormous pile of top dressing you ordered. Here's a tip: Start at the point farthest from the pile. This will help to avoid disturbing newly mulched areas. In addition, looking back on your work will give you a sense of accomplishment (and hope!).

✔Assess Your Accomplishments

Now that your landscape has been installed, it's time to assess your accomplishments. Make a tour of your yard and look at every detail. Remember to take pictures of your brand new landscape so you can chart its progress as it grows and matures. If you chose not to install all of your landscape at once, this is also a perfect time to begin planning for the next phase.

Just after installation, your new plantings probably will look very small and your yard may seem like a sea of decomposed granite. This is natural for a newly installed Xeriscape. If mature plant sizes were taken into account during the planning process, the landscape will be properly proportioned. It will take a few years to achieve the ultimate effect you visualized while preparing your landscape plan. Try to avoid the urge to purchase and install additional plants. Instead, consider seeding bare areas with seasonal wildflowers until your plants become large enough to hold their own.

It is important to note that some of your plants may not make it to maturity. A certain percentage of plant mortality is normal within the first few months of installation. Plants installed during the summer have a lower chance of surviving because extreme heat can stress plants regardless of how much water is applied. If you have installed the plants carefully and if you follow good maintenance practices, plant loss can be minimized. If you do lose plants, try to determine the reason. Were they overwatered? Not watered enough? Did they receive too much or not enough sun? Before replacing any lost plants, review available reference materials to determine whether or not they were planted in the right location. You may want to consider replacing the lost plant with a species that is better suited to the conditions present in that specific spot.

Opposite top and bottom: The plants in this newly installed landscape may look a bit lonely at first... but after a few years, the plants have grown and matured. With the help of seasonal wildflowers, this yard looks spectacular.

Xeriscape Maintenance: Healthy Landscapes for Lasting Beauty

Xeriscapes can be quite water efficient and require less maintenance than traditional, water intensive landscapes. Low water use plants and new irrigation technologies provide the potential for substantial water savings outdoors. Because Xeriscapes require less pruning, less mowing and less fertilizing, they provide the added benefit of lower maintenance for those who choose this type of landscaping. But the full water saving potential that Xeriscapes provide can't be fully realized without some regular care, repair and observation.

Taking care of your yard can be fun, relaxing and very rewarding. Follow a maintenance routine that takes into account our desert climate conditions and the growth characteristics of native and desert adapted plants. The maintenance practices presented in this section can help keep your yard healthy, beautiful and water efficient.

Watering Schedules Tailored for Landscapes in the Sonoran Desert

Nearly all of the landscape plants available for use in the Sonoran Desert need regular irrigation to get them established and keep them healthy.

Red Bird of Paradise

This is due to high temperatures, low humidity, near year-round sunshine, very low rainfall (only seven to ten inches a year) and frequent windy conditions that speed water evaporation from the soil. Generally, new plants need to be watered more frequently than established plants. Those in sunny areas need more water than plants in shaded areas and plants that are exposed to the wind need more than those that are protected.

Although many plants need irrigation year-round, far less water is required during the cooler times of the year than during the summer months. Seasonal adjustment of irrigation schedules is one of the easiest and most effective ways to avoid wasting water. **Irrigation schedules should be adjusted at least four times a year. Change the frequency of irrigations to accommodate differences in seasonal water requirements.**

Two watering schedules are provided on pages 43 and 44: one for new plants and another for established plants. Please note that these are general guidelines. Inspect your plants

Opposite: This Xeriscape features a variety of groundcovers, cacti and succulents against a backdrop of efficiently watered turf.

Can You Feel Their Pain?

Here are some typical signs of plant stress.

Signs of underwatering:

- Soil in the lower portion of the root zone is dry.
- Older leaves turn yellow or brown and drop.
- Leaves are wilted or drooping.
- Leaves curl.
- Stems or branches die back.

Signs of overwatering:

- Soil is constantly damp.
- Leaves turn lighter green or yellow.
- Young shoots are wilted or drooping.
- Leaves are green yet brittle.
- Algae and/or mushrooms are on or around plants.
- Growth is excessive.

regularly for signs of overwatering or underwatering and adjust irrigation schedules to accommodate the conditions and plants in your yard.

A Watering Schedule for New Plants

The guidelines presented here are for native and desert adapted plants. High water use plants will require more frequent and/or longer irrigations. Follow these watering guidelines until your plants are established - approximately one year for shrubs and three years for trees. Watch your plants closely for signs of stress, especially during extremely hot temperatures.

- ***Weeks 1 and 2***

Water every 1-2 days in summer, every 3-4 days fall through spring.

- ***Weeks 3 and 4***

Water every 3-4 days in summer, every 6-7 days fall through spring.

- ***Weeks 5 and 6***

Water every 4-6 days in summer, every 7-10 days fall through spring.

- ***Weeks 7 and 8***

Water every 7 days in summer, every 10-14 days fall through spring.

- ***After week 8***

Gradually extend the time between irrigations until plants are established.

After the eighth week, check the position of each water distribution end point (drip emitter or micro tubing). Move the end points closer to the outer edge of the root ball. After the first summer, there is rarely a need to irrigate low water use trees and shrubs more than once a week.

The yellow color of the Palo Verde tree in bloom works beautifully against the red garden wall in this Xeriscape.

Even though these guidelines are appropriate for most landscapes, new plants in your yard may need water more or less frequently. As a rule of thumb, each irrigation should wet the root ball and one to two inches of surrounding soil.

A Schedule for Established Plants

The following watering schedule includes guidelines for many types of established landscape plants. Again, check periodically for plant stress and adjust your irrigation schedule as needed. It might be helpful to put a copy of this watering schedule in your controller box.

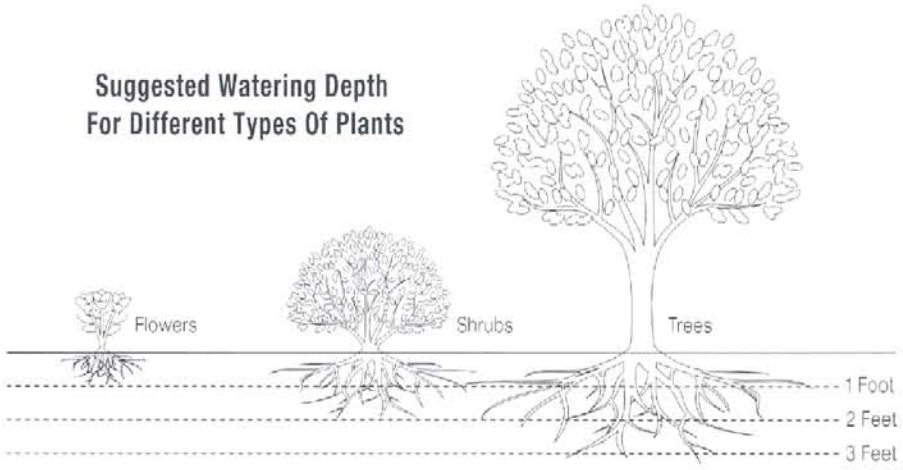
Cassia (far left), Trailing Dalea (to left of waterfall), Bougainvillea (to right of waterfall) and Lady Banks Rose (against wall) soften this private relaxation space.

General Guidelines for Landscape Watering

Here are some tips to help save water and maximize plant health:

1. Use two simple tools to help you water more efficiently. Put a rain gauge in your yard. If it rains 1/2 inch or more at one time, skip the next irrigation. Use a soil probe to determine whether or not irrigation water is reaching the entire root zone. The soil probe will move easily through moist soil and will stop or become very difficult to move when you reach dry soil. A long screwdriver or a piece of rebar with one end sharpened can be used instead.
2. Microclimates are landscape situations where the conditions are different from those in other parts of your yard. Different microclimates exist in nearly every yard and can be created by differing soil types, exposure to sun and wind, and reflective surfaces like walls and driveways. Water requirements of plants can be affected by microclimates. You may find that some trees and shrubs need more water than others. In these areas, it may be necessary to supplement regular irrigations with some hand watering. Soaker hoses or a garden hose and diffuser are especially good tools to use in these instances.

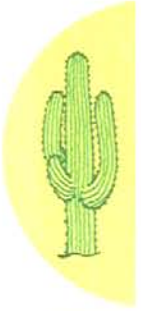
Suggested Watering Depth For Different Types Of Plants



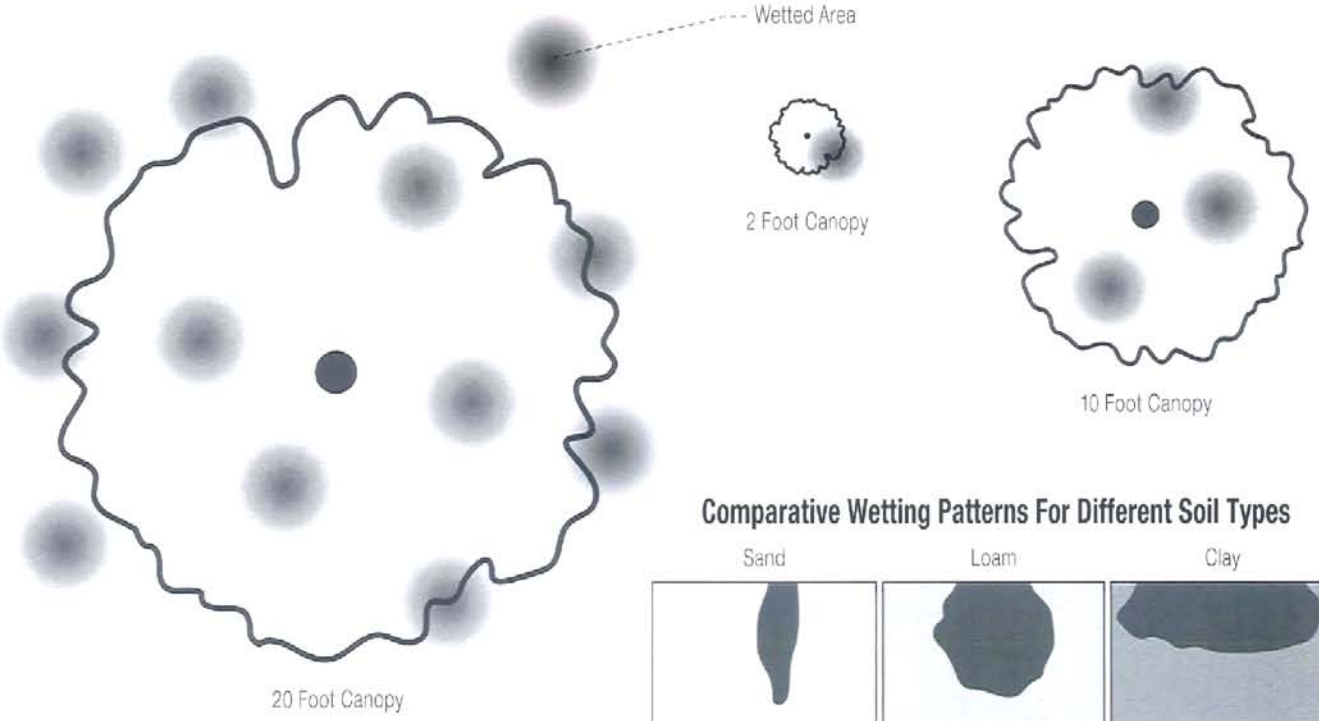
LANDSCAPE WATERING GUIDELINES

Plant Type		Spring (Mar. - May)	Summer (May - Oct.)	Fall (Oct. - Dec.)	Winter (Dec. - Mar.)	Watering Depth
Trees	Desert adapted	14-30 days	7-21 days	14-30 days	30-60 days	24-36 in.
	High water use	7-12 days	7-10 days	7-12 days	14-30 days	24-36 in.
Shrubs	Desert adapted	14-30 days	7-21 days	14-30 days	30-45 days	18-24 in.
	High water use	7-10 days	5-7 days	7-10 days	10-14 days	18-24 in.
Groundcovers and Vines	Desert adapted	14-30 days	7-21 days	14-30 days	21-45 days	8-12 in.
	High water use	7-10 days	2-5 days	7-10 days	10-14 days	8-12 in.
Cacti and Succulents		21-45 days	14-30 days	21-45 days	if needed	8-12 in.
Annuals		3-7 days	2-5 days	3-7 days	5-10 days	8-12 in.
Warm Season Grass		7-10 days	3-5 days	7-10 days	20-30 days	6-10 in.
Cool Season Grass		3-5 days	none	3-5 days	5-10 days	6-10 in.

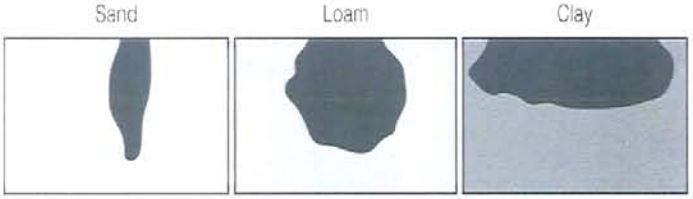
Guidelines for established plants (1 yr. for shrubs, 3 yrs. for trees). Additional water is needed for new plantings, sandy soils, and extremely hot, dry weather. Water to the depth indicated and 1.5 times the plant canopy width.



Wetting Pattern Examples



Comparative Wetting Patterns For Different Soil Types



3. Salts occur naturally in our local water supplies. Fertilizers also contain salts that accumulate in the soil around landscape plants. High salt levels can damage many kinds of plants. An extra-long irrigation will help reduce salt buildup around plants. (This practice is called leaching.) Leach salts from the soil every six to twelve months by irrigating twice as long as usual. If you live in an area with a high concentration of salts in the water, more frequent leaching may be necessary (perhaps two or three times during the summer and once during the cooler months). A good, long rain that comes at the right time may flush extra salts from the soil and eliminate the need for this activity.
4. To minimize evaporation, water turf very early in the day (ideally between 1:00 a.m. and 7:00 a.m. during the warmer months).
5. In general, it's time to water when the top one-half to one-third of the soil around a plant dries out. Water moves more quickly through sandy soils than it does through the clay loam soils that are most common in our area. If your plants are in sandy soil conditions, you may need to water them more often with shorter irrigation times.
6. Between six months and one year after planting, move drip emitters farther away from plants to encourage a well-developed root system.

Taking Care of Your Plants

Fertilizing: Think Thin

Most native and desert adapted plants need little or no fertilizing. If plants look healthy and are growing properly, it is probably best to leave them alone. Although uncommon for native plants, some desert adapted plants from other parts of the world can suffer if there is a lack of nitrogen or iron availability in the soil. Deficiencies in both of these soil nutrients can cause the same effect; a yellowing of the leaves, commonly called chlorosis. If the entire leaf turns yellow, the problem is probably due to a nitrogen deficiency. If the veins of the leaf stay green, but the rest of the leaf turns yellow, it is more likely due to an iron deficiency. **It is important to note that chlorosis also can be a result of overwatering.** Before adding fertilizer, check your plants and your irrigation schedule to rule out this possibility. Check with your County Cooperative Extension office or with staff at a local nursery for help with plant problems.

Nitrogen-based fertilizers and chelated iron are widely available. Because application rates and amounts vary among fertilizer types and brands, follow the instructions on the label. In general, it is best to fertilize before a plant's primary growing season (usually in the spring or summer).

Pruning: Love it and Leave it Alone

The watchword for pruning desert adapted trees and shrubs is **WAIT**. Normally, there is no need to prune for

This Texas Sage looks lovely in the landscape and thrives with a minimum of pruning.

Get in Tune to Prune

Here are some tips:

- Leaving growth on lower tree trunks for one to two years results in increased trunk size and strength.
- It is preferable to prune trees while they are still fairly young (but older than one year). This will minimize the exposed or "wounded" area and speed healing.
- Use appropriate tools that are properly sharpened. This will expedite the pruning process and will minimize damage to trees and shrubs. A pruning saw is best for limbs over one inch in diameter. Pruning loppers are good for mid-sized limbs, 1/2 to one inch in diameter, and pruning shears are best for thinner branches, 1/2 inch in diameter or smaller.
- Be alert and careful. Wear protective gear: a hat, glasses and gloves. Don't work when you are tired.
- **Do not work near power lines.** For large or difficult pruning jobs, consider hiring a certified arborist.
- Prune deciduous trees during their dormant period.
- Prune trees sparingly during the summer to avoid sunburn on trunks.
- If a large pruning job is necessary, complete it in stages, preferably over a period of a few months. Don't remove more than 1/3 of the plant's mass during any one season.
- To reduce the possibility of spreading disease, disinfect your tools after pruning each plant. Use alcohol or a 10% bleach solution in water.
- Use of pruning paint or sealant is not recommended.
- When in doubt, don't prune.

the first year or two.

Watch your plants during the establishment period and you will find that most desert adapted plants and trees have a beautiful natural form that requires little or no pruning. Too much pruning leads to unnaturally shaped plants, inhibits the plant's food-making capability, reduces flowering and heightens a plant's water demand due to increased growth from new shoots. It also sends too much waste material to local landfills.

There are some instances where pruning is appropriate:

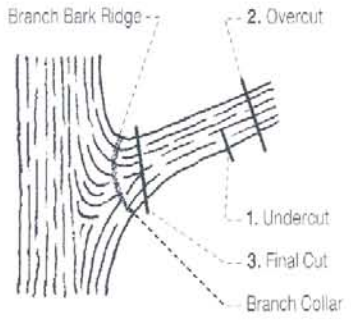
- To remove dead, diseased or weakened branches.
- To keep walkways, driveways and other high traffic areas in your yard passable and safe.
- To remove branches that rub against each other.
- To control or direct growth.

Before pruning, take a good look at the tree or shrub. Think about the reason for pruning and plan to remove only the limbs or branches necessary to accomplish your objective. After removing one limb, stand back and take a look before removing anything else. It's better to remove one limb at a time than to remove too many and be sorry later. It is important to remember that every time you prune, a wound is created that must heal. Proper pruning

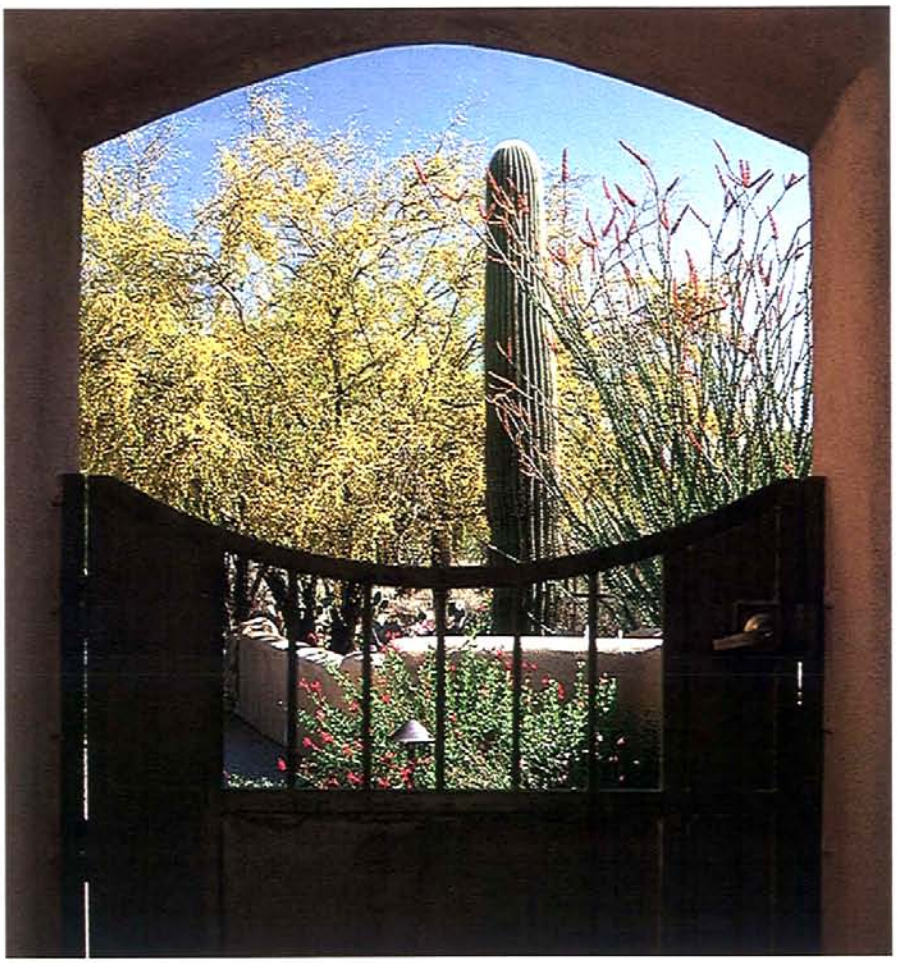
will speed the healing process, minimize cracks along the trunk, reduce the potential for disease and insect infestation and reduce unwanted new sprouts.

It is best not to remove larger limbs (over two inches in diameter) in a single cut. Use three cuts instead. Follow these general instructions for making proper pruning cuts:

- Start by sawing into the bottom of the limb one to two feet out on the branch to be removed. Saw about half way through the limb. This will prevent the branch from breaking and ripping bark from the tree.
- Then saw from the top of the limb, an inch or two farther out from the first cut. Saw all the way through the branch. This will leave a stub. This cut removes the weight of the branch so your final cut can be made safely.
- Finish up by removing the stub. The last pruning cut should be made just outside a line that would connect the bark ridge (top of limb) and the branch collar (bottom of limb). If it's hard to see the branch collar, angle the last cut slightly away from the bark ridge. Cutting too close to the remaining limb removes the tissue that would allow the healing tissue to grow over the wound. Cutting too far away leaves a stump that will die and creates an entryway for pests and disease.



Three-Point Cut For Large Branches



This beautiful garden gate provides a dramatic entry to a colorful, water-efficient yard.

The University of Arizona Cooperative Extension offers several free publications that contain specific information on pruning.

Taking Care of Your Irrigation System

Since your irrigation system provides a life line to the plants in your landscape, remember to include it in your regular maintenance routine. Here's a handy schedule for drip irrigation system care:

Once a month:

Inspect your irrigation system to check for leaks, clogged emitters and other problems.

- Turn on the system at least thirty minutes before the inspection to allow enough time for emitter wetting patterns to show.

Beavertail Prickly-pear

- Walk through the yard, checking the pipe/poly tubing for leaks and checking each water distribution end point (emitters or micro tubing) to see if it is functioning properly.
- Replace or repair damaged or clogged emitters and micro tubing.
- Check the location of water distribution end points. Emitters and micro tubing can be moved as a result of yard maintenance activity (i.e., raking) and pet activity (i.e., digging). Return stray emitters and micro tubing to their proper positions.
- Check the schedule on your irrigation controller. Sometimes power failures and other factors will cause the controller to return to a default schedule. Reset the controller if necessary. If the weather has changed, reprogram the controller to accommodate changing plant water needs.

Once a year

(preferably during the spring):

Flush the irrigation lines.

- Start with the cap that is closest to the control valve and work your way toward the end of the system.
- Flush each line for about a minute, until the water runs clear. Remember to close each cap before moving on to the next. Do not allow contaminated water to flow back into the line.
- Check valve boxes to make sure they are clear of debris.

Clean and inspect the filters.

- Inspect filter screens for holes. Replace as needed.
- Clean the system by opening the end of the filter and turning on the system briefly.
- If there is calcium buildup on the screen, remove it and soak it in a solution of 50% water and 50% vinegar until the buildup is removed.

Replace the controller battery.

- A fresh battery will prevent the controller from reverting to the default program in the event of a power failure.

Revisiting Your Xeriscape: Additions, Conversions and Improvements

Many people think of their homes as a work in progress with something new or different planned for the future. That's the way it often is with the landscape as well. In addition to regular maintenance activities, you probably will want to begin planning for at least one of the items slated for a later phase in your new landscape. Even if you were able to install every component of the landscape plan, you may have decided to add or change something at a later time.

Take some time to walk through your yard. Look at your plants and irrigation system. Imagine what it might be like with an added gate, some paint on the far wall, seasonal wildflowers, an herb garden in the corner, a cactus collection or a small, private area to call your own...the possibilities are endless. Plan for change the same way as you would plan for a brand new landscape. Remember to make notes, draw a landscape plan or modify your existing plan, do a budget analysis for significant modifications and plan to phase in big changes to accommodate time constraints and financial considerations.

We are fortunate in this part of the country to have a year-round growing season and many months of great weather each year. Your Xeriscape can be not only beautiful and water efficient, it also can be an extension of your home and a place for you to relax, unwind and enjoy.

Opposite top and bottom: Although they are different in style, both of these homes are complimented by a colorful, low-maintenance Xeriscape.