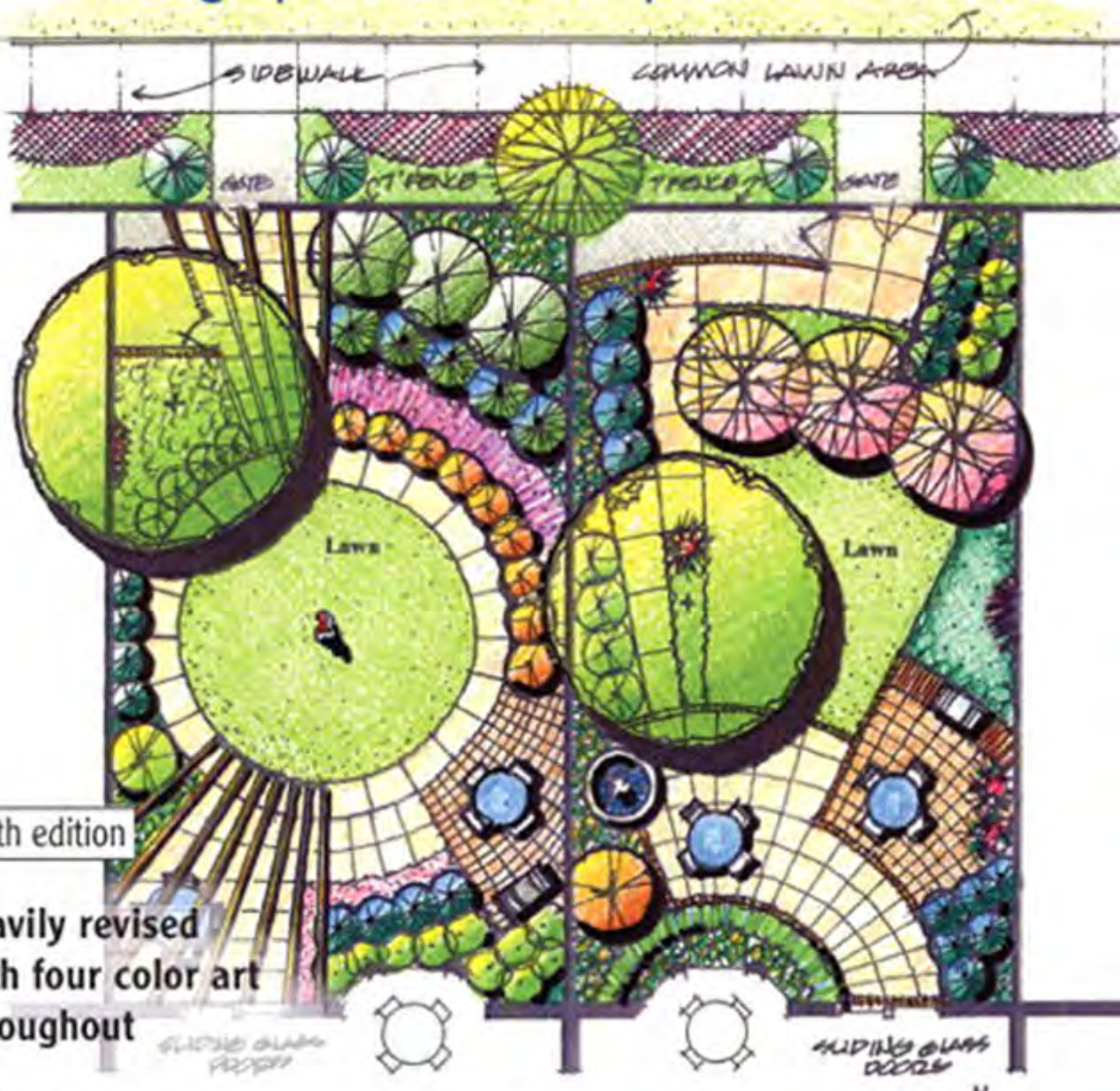
residential landscape architecture

design process for the private residence



sixth edition

heavily revised with four color art throughout

incorporates the latest green design principles

norman k. booth
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RESIDENTIAL LANDSCAPE ARCHITECTURE

Design Process for the Private Residence

SIXTH EDITION

Norman K. Booth, FASLA

James E. Hiss, FASLA

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To my father, C. Curtis Booth: for his enduring passion of geography and the natural environment, and for his quiet ambition to share that fascination with others.

I would like to dedicate this 6th edition to my colleagues at The EDGE Group who have supported my continued interest in residential landscape design. I especially want to thank Dick McBride, for his collaboration, expertise, and dedication to detail design that has made for some wonderful and enjoyable experiences in this specific area of landscape architectural design. Thanks, also, to my fellow EDGERS . . . Tedd Hardesty, Eddie George, John Haas, Buzz Foresi, Ryan Pearson, Greg Chillog, Bethany Rutter, Tim Bockbrader, Paul Lada, Tim Skinner, Forrest Gibson, Clint Genoble, Tom Boyd, Brian Gallagher, and Chelsea Thistlethwaite.

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Preface

The site that adjoins most American single-family homes is a principal component of the residential environment. It is frequently larger in area than the house itself and is more visible to the public than the interior of the house. The landscape surrounding a residence is more than just a piece of land. It is frequently the setting for varied family activities, gardening, and enjoying moments in the outdoors. For many families, the residential site is integral to their lifestyle and family history. It is often the location for large family gatherings, special events, or memorable times entertaining family and friends. The site is also a habitat for wildlife and place to interact with nature. The feel of the sun, the sense of a breeze, or the smell of flowers can only be experienced outside. And a well-designed and maintained landscape can add between 7 percent and 15 percent to the value of a property (The Gallup Organization). In fact, some experts suggest that investing in a well-designed landscape offers the best return a homeowner can make on an investment (*Money* magazine, May 2003).

The design of the residential landscape provides numerous challenges because it directly affects the quality of life of the people who live with the design each day. Well-executed residential site design can positively influence the quality of life by eliminating functional conflicts on the site, providing proper recreational and leisure amenities, and creating an environment that is visually and functionally pleasurable. Residential site design can likewise be a stimulating undertaking because the designer works closely with the clients on a personal basis, deals with the design in a detailed and artistic manner, and typically has the opportunity to see a design that has been created on paper become a three-dimensional reality in a rather short period of time. The residential site is also a potential laboratory to implement and test new ideas and materials. For many landscape architects, the residential site provides a chance to experiment and learn on a small scale before similar applications are made on larger and more public projects.

The design of the residential landscape represents a notable undertaking by design professionals. It is estimated that residential site design represents the largest market for landscape architects in the private sector and accounts for about 40% of their billable hours (Bill Thompson, "Winning Partnerships," *Garden Design*, November 2006, p. 10). Virtually all design/build firms and many nurseries are also involved in both the design and installation of residential landscapes. Most homeowners, in fact, receive design services from these types of companies.

Nevertheless, residential site design is an endeavor that is commonly done inadequately, inappropriately, and in some cases, incorrectly. A drive or a walk along a typical suburban street reveals a host of problems and offenses to the eye. Highly manicured foundation planting, overgrown plant material, inadequately sized driveways, poorly conceived approach walks and entrances, and shapeless lawn areas are just a few common problems. The areas in the back of homes are no less guilty of poor layout and visual chaos.

Consequently, the purpose of this book is to furnish the reader with the fundamentals of residential site design. It is written by designers/educators and presents basic principles, concepts, procedures, and examples for preparing site plans and associated documents for residential sites. This book is primarily intended for readers who are beginning their design careers, as well as for current practitioners who wish to enhance their skills and knowledge.

Residential Landscape Architecture is organized in three sections. Section 1, Philosophical Framework, provides the primary principles and concepts on which the remainder of the book is based and includes chapters on the current state of the art, sustainability, and outdoor rooms. Section 2, Design Process, details the process of preparing a design for a residential site from the initial contact with the clients to the completion of the master plan. It contains chapters on meeting and interviewing the clients, base map preparation, program development and site analysis, functional diagrams, preliminary design, form composition, and spatial composition. Section 3, Applications, demonstrates how the design process can be applied to different residential sites and has chapters on special site situations and case studies. In addition, Section 3 has an entire chapter devoted to the theory and techniques of color rendering.

Some of the thoughts and principles in this book represent commonly accepted design knowledge and are used as a matter of standard practice by experienced designers. Other ideas have evolved from the classroom where we have spent more than 60 combined years teaching college students, nurserymen, and landscape contractors. We have discovered numerous concepts and techniques that are felt to be essential in teaching and learning residential site design. Finally, there are a number of thoughts in this book that have resulted from our own practices in residential site design. We are both registered landscape architects and have designed more than 125 residential sites, many of them winning local, state, and national design awards.

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We hope that you appreciate this book as much as we enjoyed writing and illustrating it.

Norman K. Booth, FASLA
James E. Hiss, FASLA

section one
Philosophical Framework

CHAPTER 1 **The Typical Residential Site** CHAPTER 2 **Outdoor Rooms**
CHAPTER 3 **Sustainable Design**

This section of the book offers a philosophical framework for residential site design. There are numerous approaches and theories to residential site design that range from minimal site development to the elaborate garden settings that are oases from the bustle of urban and suburban living. Further, some design approaches stress plant materials and the gardening aspect of a residential site, whereas others emphasize a sought-after lifestyle.

Within that array of possibilities, it is the underlying notion of this book that sound residential site design is based on a respect for the environment and the need to create outdoor living spaces that extend a client's lifestyle into the exterior environment. Chapter 1 is a critical analysis of the typical single-family site found in all geographic areas of the United States and provides a point of departure for offering a better way to design the residential landscape. Chapter 2 outlines numerous strategies for creating and maintaining a sustainable landscape that is in sync with the environment and its ongoing processes. Chapter 3 describes the fundamental building block of residential site design: outdoor space. The ideal residential landscape should be composed of a range of outdoor spaces that provide settings for various activities and functions. Collectively, all three chapters give the reader the background for designing a thoughtful, comfortable, and environmentally sensitive residential landscape.

1

The Typical Residential Site

INTRODUCTION

Those who deal with the design and development of residential landscapes are concerned with three important and unique aspects of each project: (1) the client, (2) the site, and (3) the home. No two clients, no two sites, and no two homes are the same. Each client has his or her own set of attributes, desires, wishes, lifestyles, and so on, that makes each client special. Likewise, each site is distinctive from the next because of topography, views, vegetation, surrounding site conditions, and so on. In addition, each home is characteristically different because of such details as its architectural character, floor plans, decorations, furniture, and accessories.

The site surrounding a residence is a most important environment. It serves numerous utilitarian, aesthetic, and psychological functions for the residents as well as for visitors, neighbors, and passersby. As a setting for the house, the residential site is the context or surroundings within which one views the architecture of the house. As the location for outdoor living, the residential site can be thought of as an exterior extension of the functions that occur inside the home. Socializing, eating, cooking, reading, sunbathing, recreating, gardening, or simply relaxing are all activities that can take place on the residential site. In addition, the site can be considered an expression of the lifestyle and values of the residents. It can reflect their personality and attitude toward their own environment, and it can offer a refuge from the routine and pressures of daily events. The sound of birds in the trees, the fragrance of a flowering plant, or the sight of a picturesque tree can provide the mind and emotions with pleasurable thoughts and feelings.

Consequently, it is critical that the residential site be designed with the utmost care and sensitivity so that it fulfills its vital role in the overall residential environment. But, does the typical residential site actually meet this standard? Does it really provide a proper setting for the house, furnish pleasant outdoor spaces for living, or simply function in a desirable manner? Does the average site look attractive and provide a sense of pleasure for the eye and mind? And, does the residential site serve as a haven from daily rigors?

This chapter addresses these questions as they relate to the typical single-family residential site in the United States. The first section of the chapter provides an overview of what a common residential site looks like. The second section analyzes the

visual and functional qualities of front yards, backyards, and side yards of the typical residential site. The third section deals with some typical architectural styles of houses, the importance of architectural character, and the need for the landscape designer to develop landscape designs that blend the house and site together. This is done to provide the foundation for making suggestions on improving the process and quality of residential site design in subsequent chapters.

THE TYPICAL RESIDENTIAL SITE

A drive or walk through almost any residential neighborhood in the United States reveals a number of commonalities among the houses and sites surrounding them. What is usually seen (Figure 1–1) is a one- or two-story house surrounded by an expanse of lawn and various plantings. Regardless of the size of the site, the house is usually placed near the middle of the site, thus creating front yards and backyards of similar sizes and narrow side yards.

The front yard is most often thought of as a public setting for the house. A lawn, often manicured to create a lush green carpet, occupies most of this area with a driveway situated along one side of the site. In arid areas of the country, the lawn

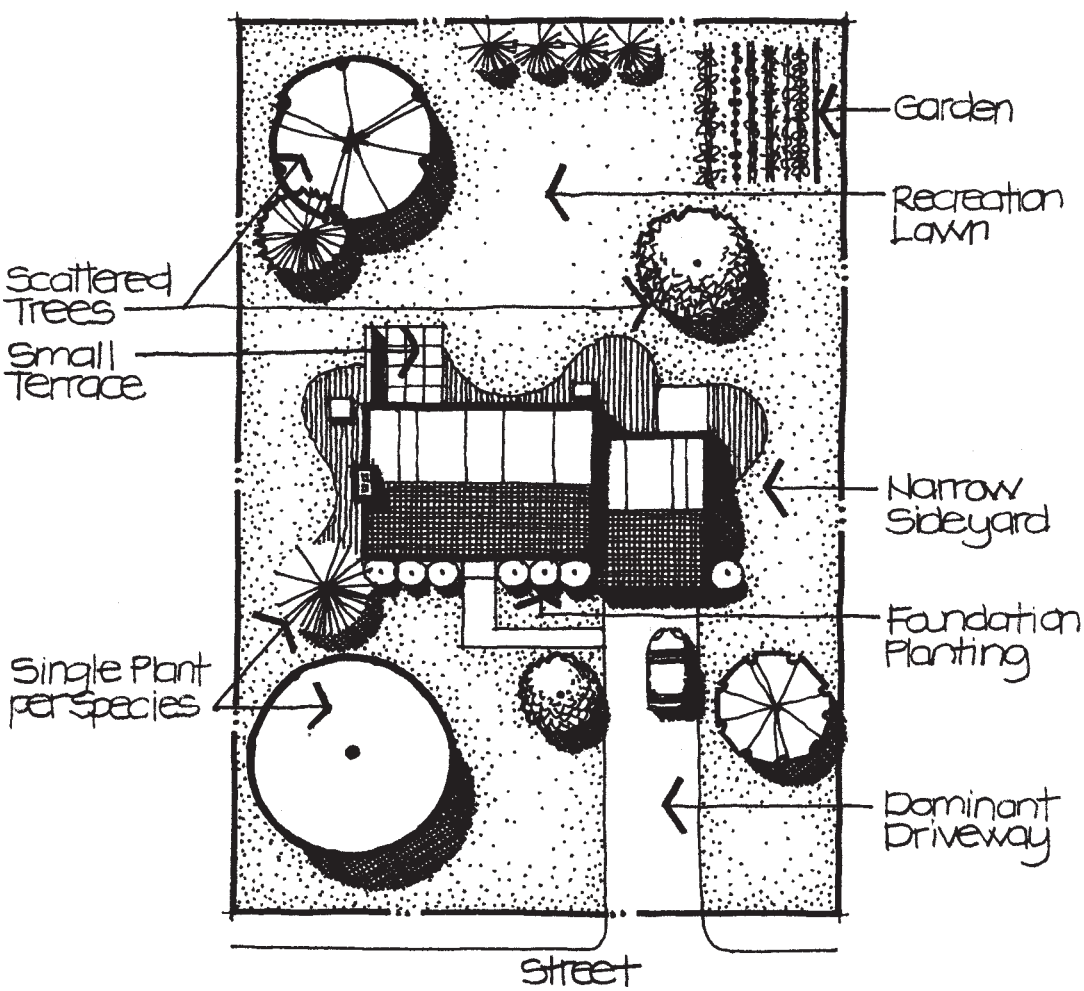


Figure 1–1
The typical residential site.

area may be replaced with gravel or decomposed granite. The front yard is often dotted with trees, shading various parts of the yard. Typically, a row of plants extends along the entire base of the house. This foundation planting often consists only of coniferous or broad-leaved evergreens that provide a year-round wall of green color. Finally, a narrow walk extends from the driveway and/or street to the front door of the house.

The backyard is the most varied area of the typical residential site. In older neighborhoods, or those found in western states of the country, the backyard is usually enclosed with walls, fences, or plantings. In these situations, the backyard is apt to be the most private area on the site. In newer neighborhoods, especially in the eastern and midwestern regions of the country, the backyard is often very open, with little or no definition of where one property ends and another begins. In these conditions, there is little privacy in the backyard. On most residential sites, the backyard is a more utilitarian area than the front yard and is the location of the outdoor terrace, work space, garden, and open lawn for recreation. It is usually the location for outdoor living activities. On other sites, the backyard provides little or no use to the residents; it is just leftover outdoor space that must be maintained.

The side yards are normally narrow leftover spaces with little use except to provide access between the front and back of the house. Consequently, there are few elements occupying this space except perhaps for scattered plantings, air conditioners or heat pumps, and stored objects such as wood, trailers, and other items that do not conveniently fit in the garage or basement.

Although this generalized description of the typical residential site does not apply to every site, it does summarize common characteristics of residential sites throughout the United States. What is particularly surprising and disturbing is that this "typical site" can be seen in all regions of the country from New England to Arizona, and from Florida to California. True, there are regional variations in use of materials (especially plant materials), construction techniques, and attitudes toward the use and style of the residential site. Still, many similarities prevail in terms of size, function, organization, and general appearance of residential sites.

Let us turn to a more critical analysis of the three major areas of the residential site: (1) front yard (often referred to as the public space), (2) backyard (commonly referred to as the private space), and (3) side yards (usually not thought of as space at all). The conditions cited in the following paragraphs are summaries of observations of single-family residential sites in the United States.

Front Yard

The front yard of most residential sites has two primary functions: (1) it is the setting or foreground for viewing the house from the street, and (2) it is the public area for arrival and entrance into the house. In terms of its function as a setting, the front yard provides the "frame" for viewing the "picture" of the house from the street. Much attention is given to arranging plant materials along the base of the house and in the yard to establish "curb appeal." That is, the front yard and house are attractive to look at from the street.

The front yard is also a public area where the main arrival and entry to the house are usually located. The residents of the house along with their relatives, friends, and other visitors use this public space as an introduction to the site.

Keeping these two functions in mind, let us look more closely at specific conditions of typical front yards.

1. *Front Lawn Lacks Edges.* On many residential sites, the house is placed near the middle of the lot in a manner that creates an open front lawn.

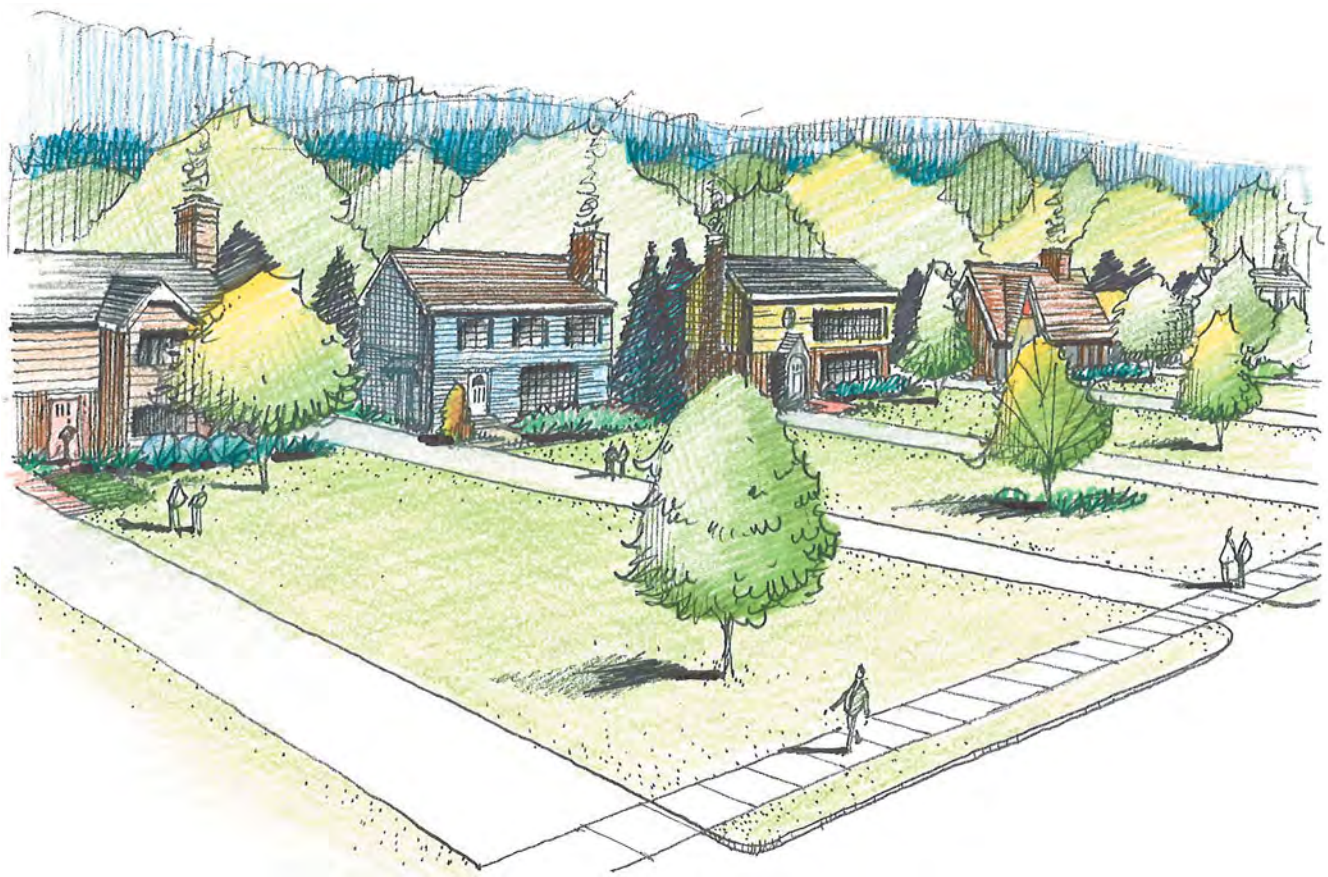


Figure 1–2
Many front yards lack defined edges.

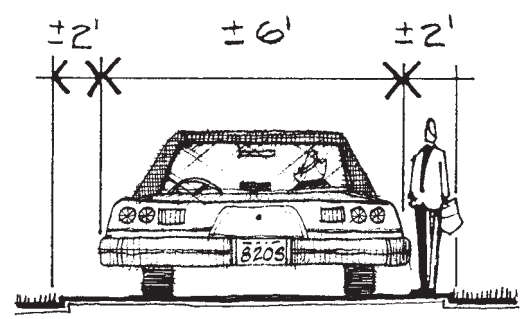
The scale of this area often gives a feeling of an anonymous "no-man's land" because of its openness and undefined edges. This quality is frequently compounded when the front lawn of one site blends into the neighboring front lawn with no separation or division between the two (Figure 1–2).

2. *Driveway Dominates View.* The driveway is a dominant visual element of many front yards (Figure 1–3). This extensive area of asphalt or concrete is generally not very appealing to the eye. With cars parked in the driveway, there is often little or no room for people to walk except along the narrow edge or on the lawn (Figure 1–4). This may be acceptable in good weather but can be an inconvenience in wet weather or during the winter when snow is piled along the edges of the driveway.
3. *Prominence of Garage Door.* A related problem of some front yards is the prominence of the garage door. A garage door that directly faces the street and takes up a large portion of the front of the house becomes a significant visual feature of the front yard. When a driveway is lined with shrubs, the garage door is accentuated even more because a noticeable axis is formed that leads the eye toward the garage door (Figure 1–5). By comparison, the front door often seems insignificant and secondary.
4. *Entry Walk too Narrow.* The walk leading from the driveway to the front door is often about 3 feet wide. This dimension is narrow and forces people to walk in single-file fashion (Figure 1–6).



Figure 1–3
The driveway is a dominant visual element of many front yards.

Figure 1–4
There is little room for a person to walk with a parked car in the driveway.



5. *Entry Walk Hidden from View.* Another problem of the entry walk is that it is not easily seen, especially where it connects to the edge of the driveway (Figure 1–7). In such cases, there is nothing to acknowledge or call attention to the location of the entry walk.
6. *Entry Walk Lacks Visual Interest.* As a person proceeds along the entry walk, there is very little visual interest. A large open expanse of lawn on one side of the walk and a wall of foundation planting on the other side (Figure 1–8) usually do not provide a memorable experience. And the walk's pavement material often lacks a distinct character or appeal. It is simply a rather dull environment to walk through to get to the front door.
7. *Entry Foyer too Small.* A concrete pad or stoop located at the front door serves as the outdoor foyer or arrival area. It is often so small that no one can



Figure 1–5
Shrubs lining a driveway overaccentuate the view to the garage.

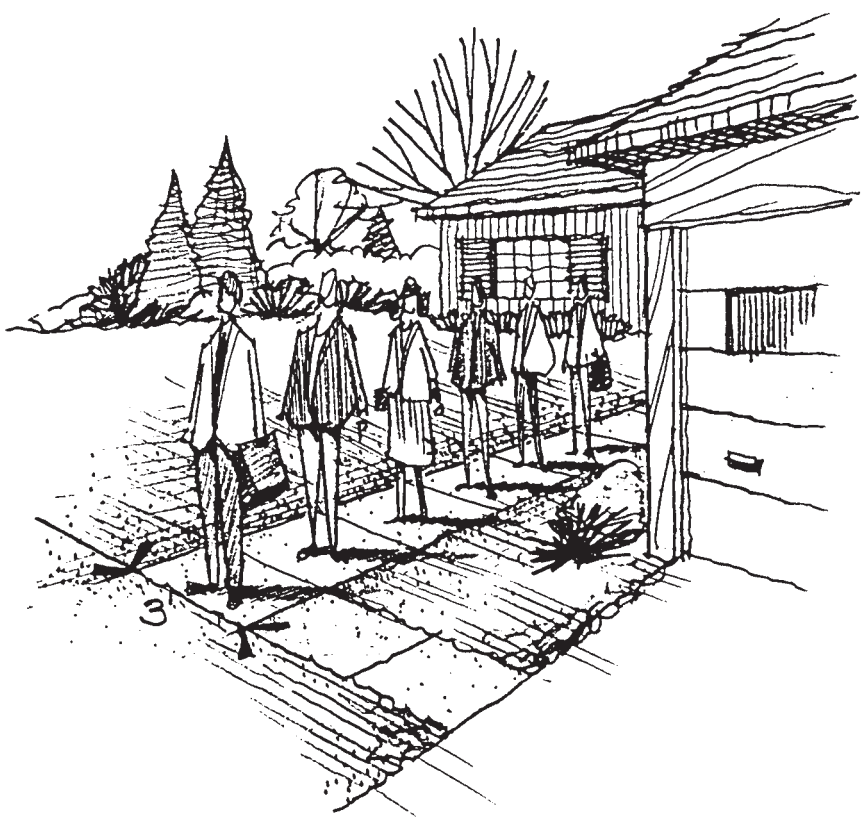


Figure 1–6
The typical 3-foot-wide entrance walk forces people to walk single file.



Figure 1–7
Many entrance walks are hidden from view.

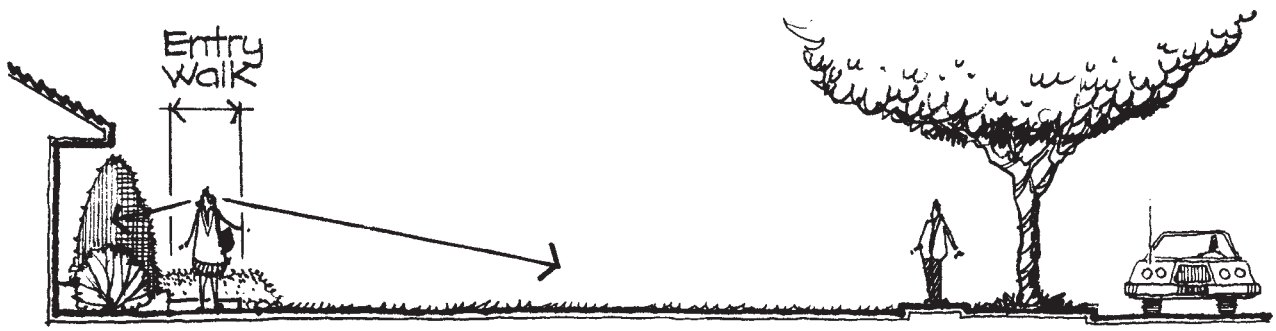


Figure 1–8
An open lawn and a dull foundation planting provide little visual interest from the entry walk.

stand on it while the storm or screen door is being opened without getting hit in the face or stepping away from the stoop (Figure 1–9).

8. *Entry Foyer Lacks Enclosure.* The entry area or foyer often lacks an adequate sense of separation from the street and the rest of the front yard. The stoop is often exposed directly to the street or even to the neighbor's house across the street so that everyone can easily see the comings and goings of visitors (Figure 1–10). Also, the entry is apt to be directly exposed to such climatic elements as hot summer sun, cold winter wind, or precipitation. All of these factors make it uncomfortable for a visitor to stand for very long outside the front door.
9. *Hidden Front Door.* An opposite problem of some outside arrival and entry areas is that the front door is hidden from view. This most often results from overgrown plant materials screening out the view of the front door (Figure 1–11). For a first-time visitor, not knowing exactly where the front door is can be an uncomfortable and confusing feeling.
10. *Foundation Planting.* The use of plants in the front yard is frequently limited to foundation planting—the practice of lining the foundation of a house with a row of shrubs (Figure 1–12). These shrubs, typically evergreen



Figure 1–9
Many entrance stoops are too small, making it awkward to open the door.

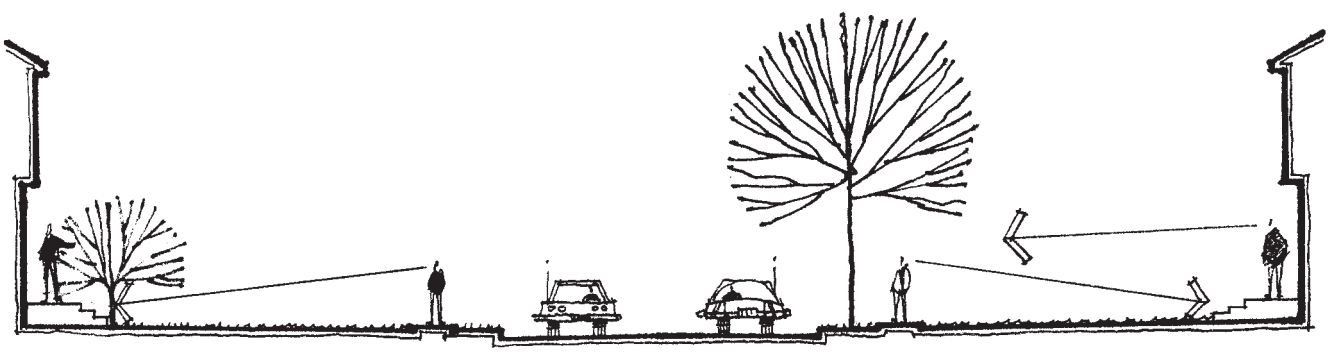


Figure 1–10
Many outdoor foyers lack spatial enclosure and separation from the front yard, the street, and neighbors.

for year-round green color, are often manicured to establish such geometric forms as cubes, pyramids, and spheres (or, if you like, footballs, pop cans, ice cream cones, boxes, and so on; Figure 1–13). This visual treatment of plant materials is characteristic of historic Italian and French gardens, where plants were sheared and clipped into formal shapes to reflect the strong formal character of the gardens and the architecture.

Foundation planting has been used in the United States since the late 1800s to hide high foundation walls that resulted from houses constructed several feet above the ground to provide basements for gravity-air furnaces.

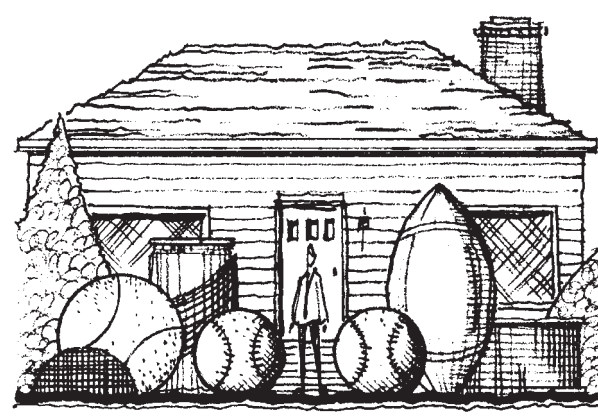
Figure 1–11
Overgrown plant materials sometimes hide the entry walk and front door.





Figure 1–12
Typical "foundation planting."

Figure 1–13
Foundation plants are often trimmed into precise geometric shapes resembling footballs, baseballs, etc.



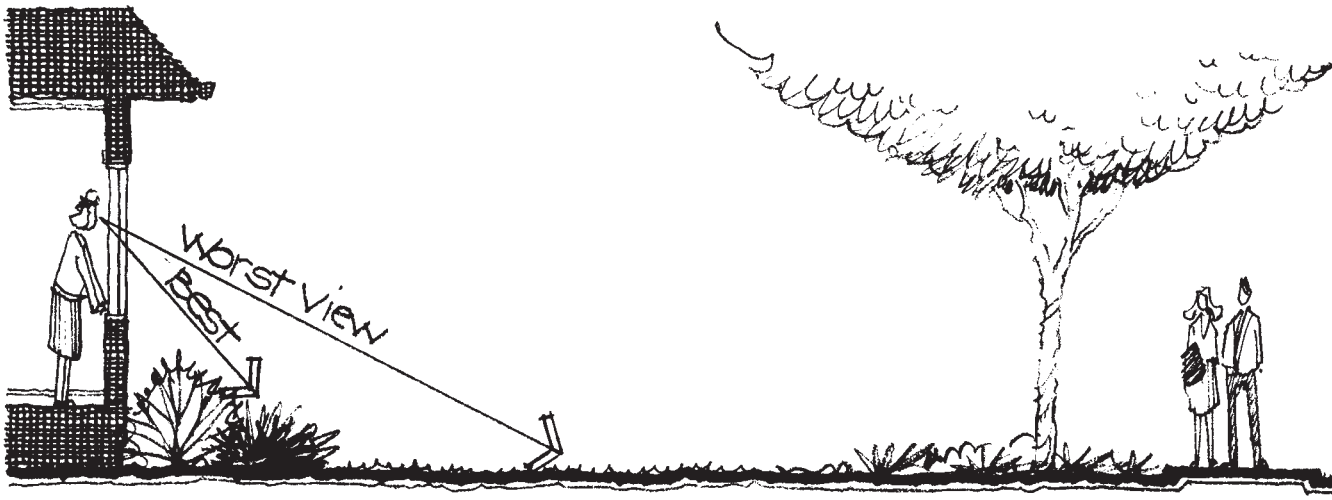


Figure 1–14
Sometimes foundation planting cannot be seen from inside the house unless a person is standing at the window.

However, most contemporary houses have little or no foundation wall exposed. Another problem of foundation planting is that it is seen more by passersby on the street than by the homeowners. Foundation planting cannot be seen from within the house unless a person is standing at the window (Figure 1–14).

11. *Overgrown Foundation Planting.* A major problem with many foundation plantings is that they are overgrown to the point of obstructing the windows of the house and crowding adjoining entry walks. On some sites, the windows on the first floor of the house are completely covered with a mass of foliage, thus blocking out light and views to the outdoors (Figure 1–15). One reaction some homeowners have to this is to permanently close the window shades to block the view of the back of the shrubs just outside.
12. *Scattered Plants in Lawn.* Trees and shrubs located in the front yard are sometimes placed randomly throughout the yard so as to "fill" the lawn area (Figure 1–16). This often makes maneuvering a lawn mower like driving through an obstacle course.
13. *Little Enjoyment of Front Yard.* One overall characteristic of many front yards is that they lack a memorable image or style. Many front yards are bland, unexciting, and similar to the others in the neighborhood.

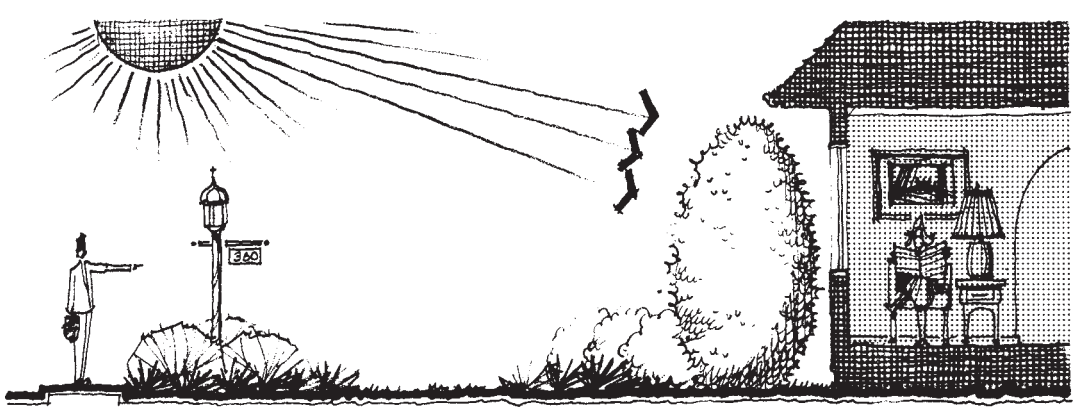


Figure 1–15
Overgrown foundation plants often hide windows and reduce the amount of sunlight entering the house.



Figure 1–16
Plants are often located randomly in front yards in a manner that fills the entire yard.

Most front yards are only public settings for the house and provide little opportunity for outdoor living or enjoyment by the residents. There are few places in most front yards to sit, have a cup of coffee, talk with a friend, or read a book.

The challenge is for designers to improve these conditions so that the front yard can become an attractive, useful, and inviting space on the residential site.

Backyard

The function of the backyard, on the typical residential site, is to accommodate a number of activities including (1) outdoor living and entertaining, (2) recreation, and (3) utilitarian activities, such as gardening and storage. To support these activities, backyards normally contain such elements as lawn furniture, barbeque grills, sandboxes, swing sets, swimming pools, cords of firewood, air conditioners, metal storage sheds, and so on. Although different and sometimes even incompatible, all these activities and elements are commonly placed in relatively close proximity to one another in the backyard. This makes the backyard the most intensely used portion of the typical residential site and also the most difficult to organize and design.

Let us take a closer look at the backyard and examine its specific qualities more critically. Following are typical conditions of the backyard:

1. *Lack of Separation.* The backyards in many newly developed neighborhoods are open and ill-defined areas. One yard blends into the next to form a giant green space accessible to everyone in the surrounding area (Figure 1–17). As a result, there is little sense of identity or privacy. The activity that goes on in one's backyard becomes the visual business of surrounding neighbors. This tends to discourage use of the backyard for people who enjoy privacy. With time, these same backyards generally become more enclosed by fences and plant materials to create some separation from neighboring sites.

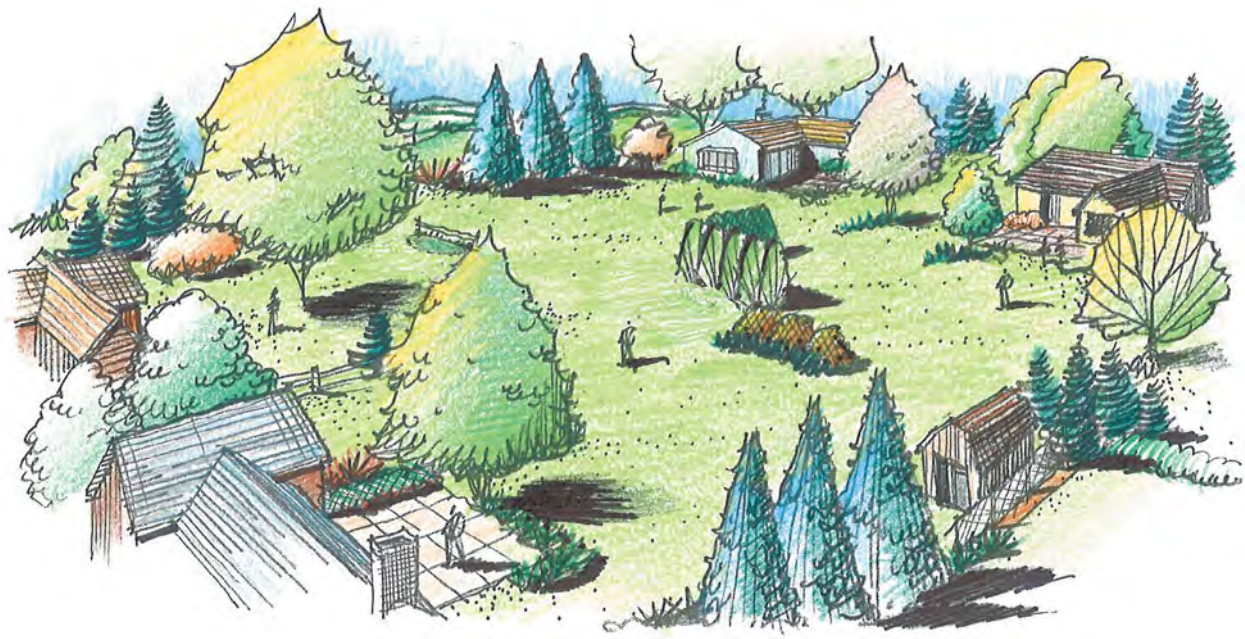


Figure 1–17
Many backyard areas blend in with each other to form an anonymous open space.

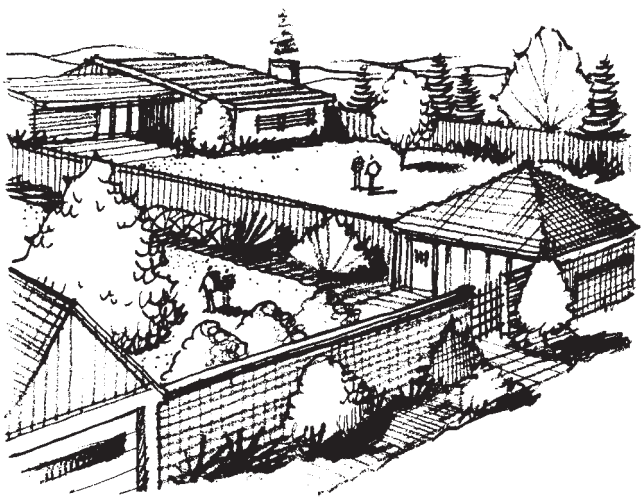


Figure 1–18
Some backyards, particularly in western states, are completely enclosed by walls.

2. *Walled/Fenced Backyards.* In the western part of the United States, backyards are apt to be totally enclosed by walls or fences (Figure 1–18). Sometimes alleyways are located behind these backyards for access to garages located at the back end of the property. The result is that backyards tend to be isolated from one another with few or no views to the landscape beyond.
3. *Dissimilar Visual Character.* There is generally a common character to the front yards of homes in a given neighborhood owing to similar size of the homes, similar setbacks, and similar lot sizes. By comparison, the backyards in the same neighborhood are apt to be very different from one another owing to variations in lifestyles, interests, personalities, and family size. When the backyards are open to each other, the overall result is visually chaotic (Figure 1–19).
4. *Undersized Outdoor Living Areas.* The outdoor living and entertaining space, if it exists at all, is often established by a terrace. One problem is that

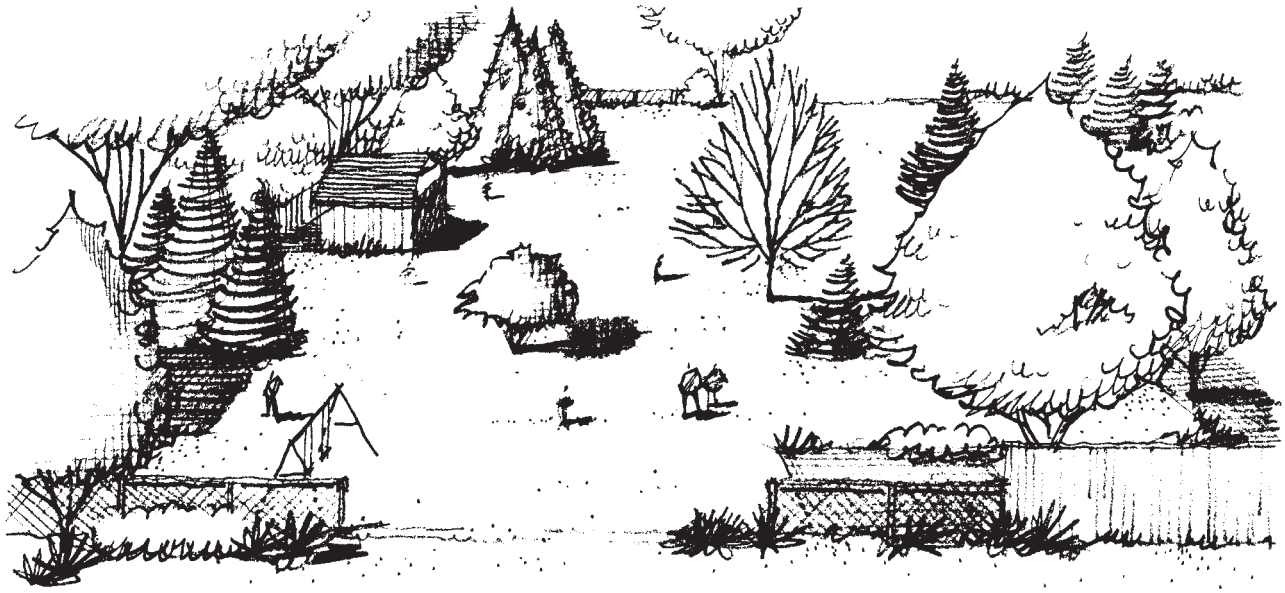
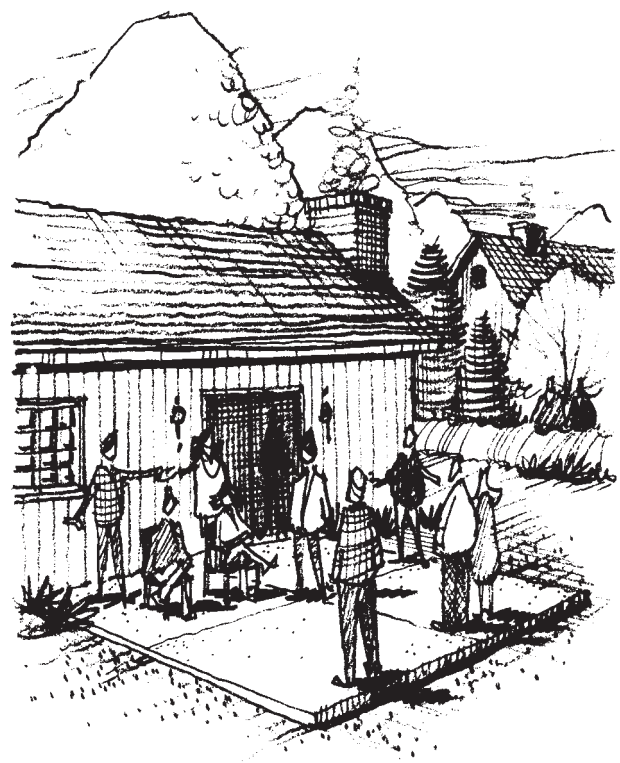


Figure 1–19
Backyards that are completely open to each other are apt to create unsightly views and visual chaos.

many are too small (Figure 1–20). A 12′ × 12′ area (or between 100 and 150 square feet) is common, especially in new subdivisions. Although this may be enough area for several chairs, a small table, and a lounge chair, it is hardly adequate for entertaining several guests.

5. *Lack of Privacy.* Terraces are usually intended for relaxation and entertainment. However, they are often uncomfortable to use because they commonly

Figure 1–20
A common 12′ × 12′ outdoor living and entertaining area is too small for comfortable entertaining.



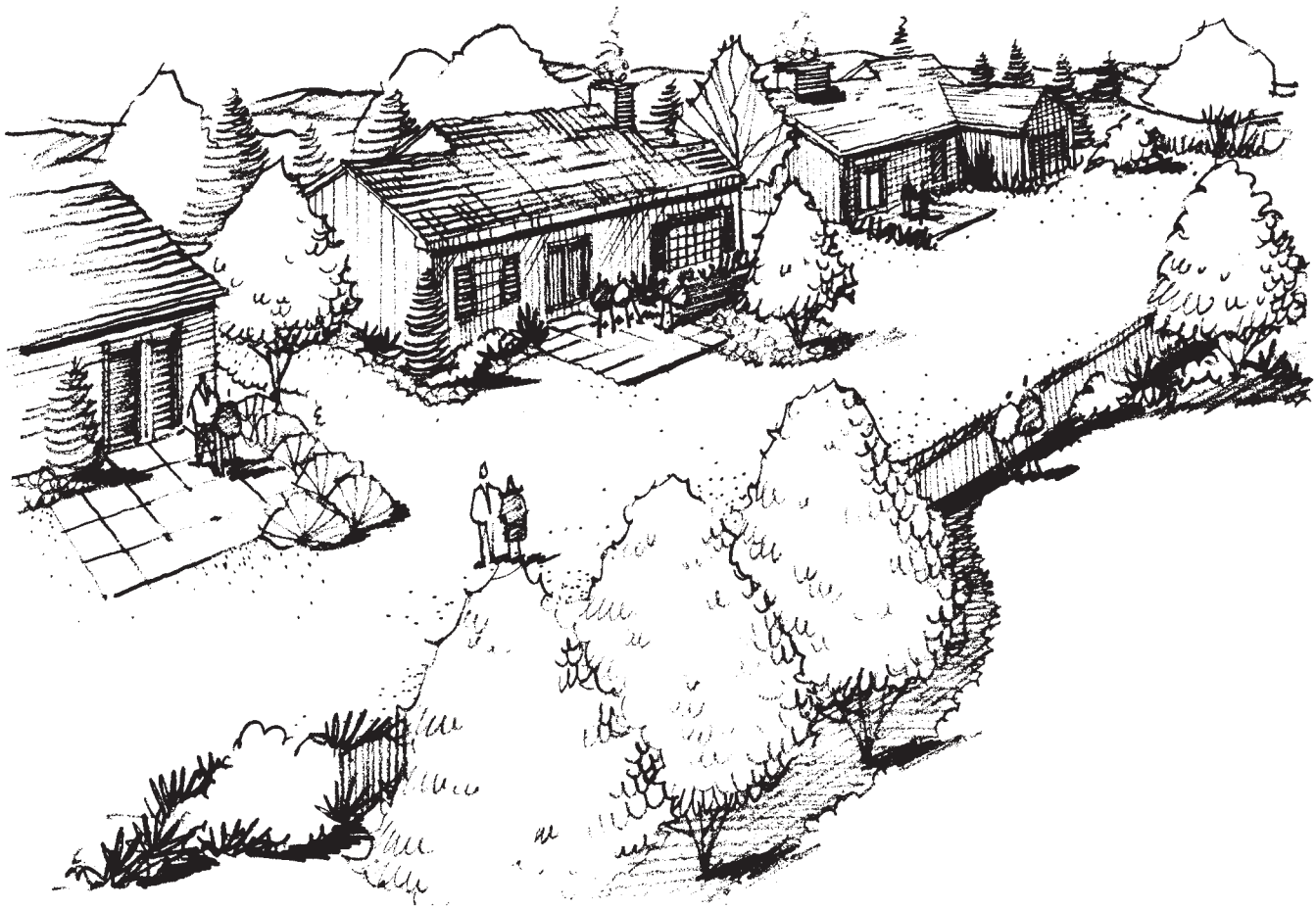


Figure 1–21
Many outdoor living and entertaining spaces lack spatial enclosure and visual separation from neighbors.

lack any sense of enclosure for privacy (Figure 1–21). They are open and exposed to the view of the surrounding neighbors. People may feel as if they are on public display when sitting on the terrace.

6. *Harsh Microclimates.* Another reason for the discomfort of many exterior living and entertaining spaces is that they are not located or designed with climate in mind. When located on the north side of the house, outdoor terraces are apt to be cool and damp much of the time, as well as exposed to cold winter wind (Figure 1–22). When located on the west side of a house, terraces tend to be very hot during summer afternoons, particularly when not adequately shaded. People will not use outdoor spaces where sun, wind, and precipitation have not been properly considered.
7. *Lack of Appealing Character.* Like front entry walks, many exterior terraces are devoid of any personality or character. They are cold, impersonal spaces that are uninviting to use for any length of time. For many, it is a drab experience to sit on a concrete slab with nothing to look at except an open expanse of lawn or the backs of the neighbors' houses (Figure 1–23).
8. *Weak Relation to House Interior.* Another problem of some exterior terraces is that they have a weak relationship to the interior of the house. Elevation changes and distance tend to isolate rather than to coordinate the indoors with the outdoors (Figure 1–24). Some back doors exit onto a concrete stoop that is smaller in scale than the front-door stoop. This can create the same problem as illustrated in Figure 1–9.

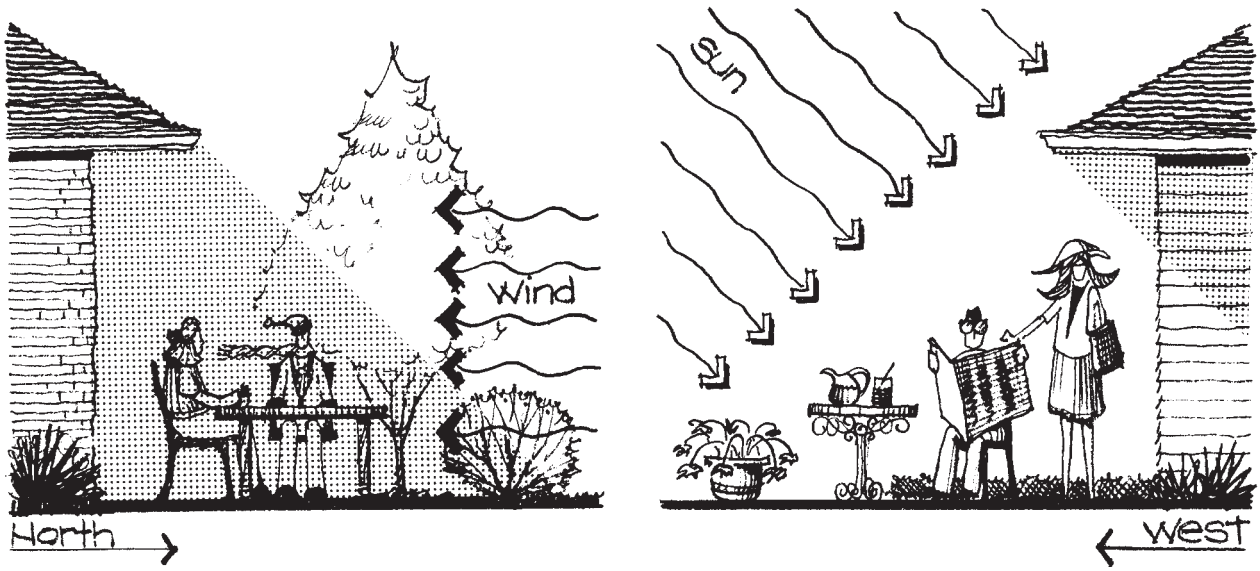


Figure 1–22
Some outdoor living and entertaining spaces lack consideration for sun and wind.

Figure 1–23
Some outdoor living and entertaining spaces are devoid of unique character and personality.



9. *Unsightly Storage Sheds.* Many families possess a collection of maintenance and recreational equipment such as lawn furniture, barbeque grills, lawn mowers, garden tools, wheelbarrows, children's toys, bicycles, skis, and so on. Even a typical 20′ × 25′ two-car garage has little extra space to store such things. Consequently, many homeowners erect metal or wood storage sheds in their backyards to take care of extra belongings. These sheds are usually different in style and character from the house and consequently can be eyesores.
10. *Vegetable Gardens.* A vegetable garden is often stuck in one of the back corners of the yard. It is placed some distance from the nearest water source yet still close enough to the house to be seen as a brown patch of bare earth in the nongrowing season (Figure 1–25).

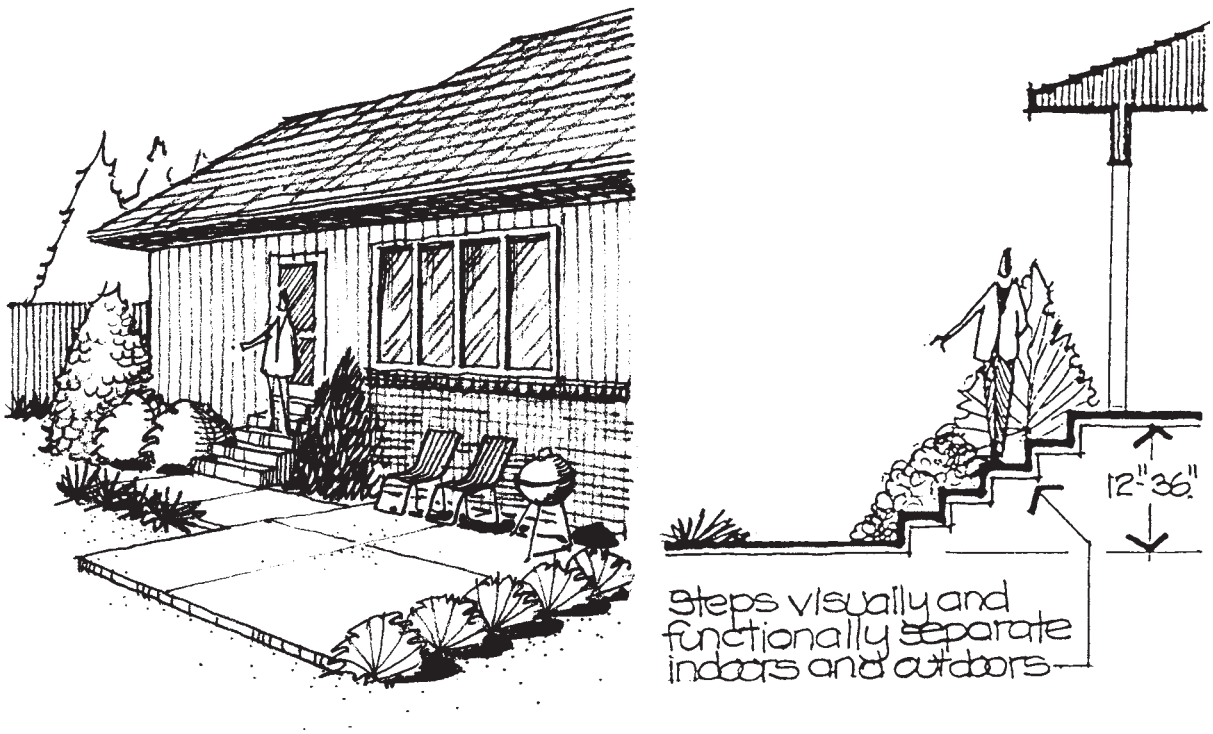


Figure 1–24
A flight of steps at the door can isolate the outdoor living and entertaining space from the indoors.

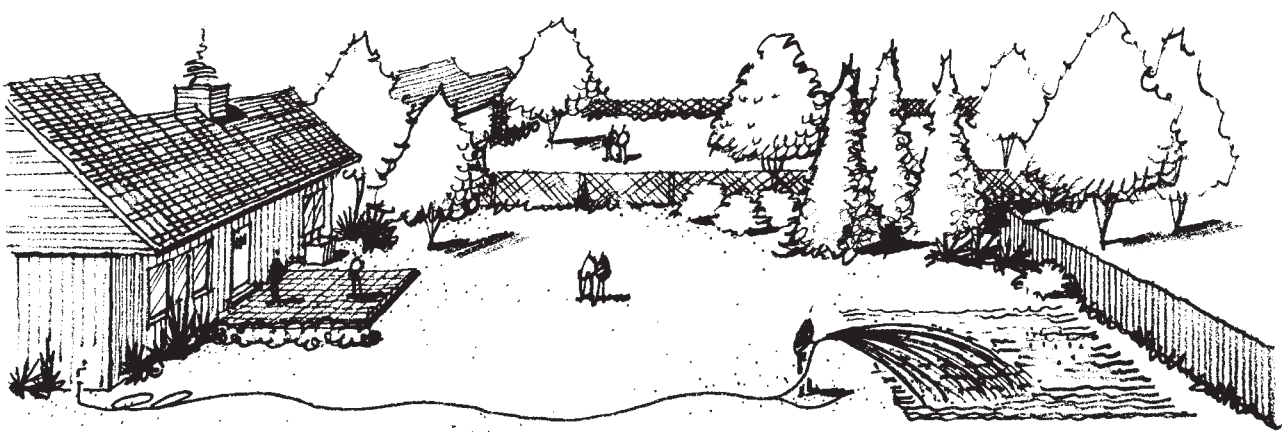


Figure 1–25
Vegetable gardens tend to be placed in far corners of backyards where they are eyesores and remote from a water source.

The real challenge of most backyards is to combine the numerous functional requirements with aesthetic considerations. The backyard doesn't have to be only an engineered organization of sitting, recreation, and gardening spaces. It can fulfill these needs while also being an attractive environment to experience.

Side Yards

Unlike the front yard or backyard, most side yards seem to have little use except to provide access around the side of the house. Consequently, most side yards are wasted and leftover areas (corner sites or those that do have generous space on one or both sides of the house are exceptions). They often tend to be trouble spots owing to the

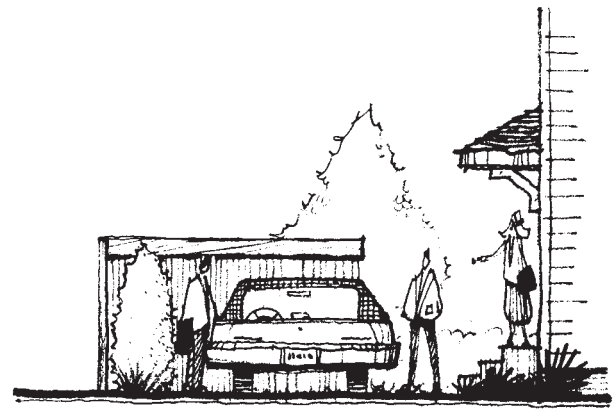


Figure 1–26
A driveway located in the side yard may leave little room for people to walk.

lack of direct access from the house and because of the narrow space that exists between the house and property line. Side yards vary in width from a narrow 3 to 5 feet to a normal 8 to 12 feet or more. The following list describes typical side-yard conditions:

1. *Dominated by Access.* Access through the side yard may be vehicular, pedestrian, or both. For vehicular access, a driveway usually fills the side yard, creating problems similar to those of a driveway along a side of the front yard (Figure 1–26). When cars are parked in a side-yard driveway, the limited space tends to feel even smaller and more cramped than the front yard.
2. *Preferred Location for Storage.* Because side yards tend to be out of the main areas of activity as well as primary lines of sight, they often tend to be used for storing visually objectionable equipment and materials. Larger side yards are apt to be storage areas for cars, boats, recreation vehicles, and so on (Figure 1–27).

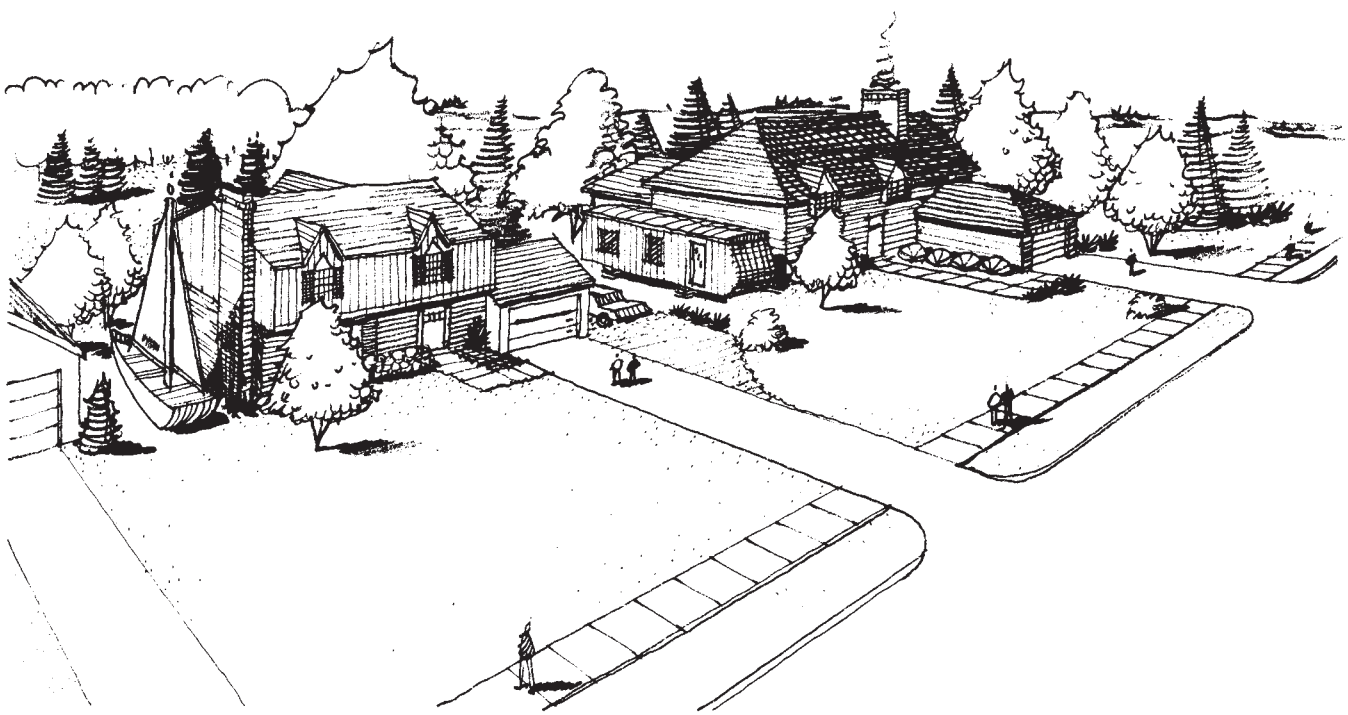


Figure 1–27
Side yards are sometimes used for storage of cars, trailers, boats, etc.

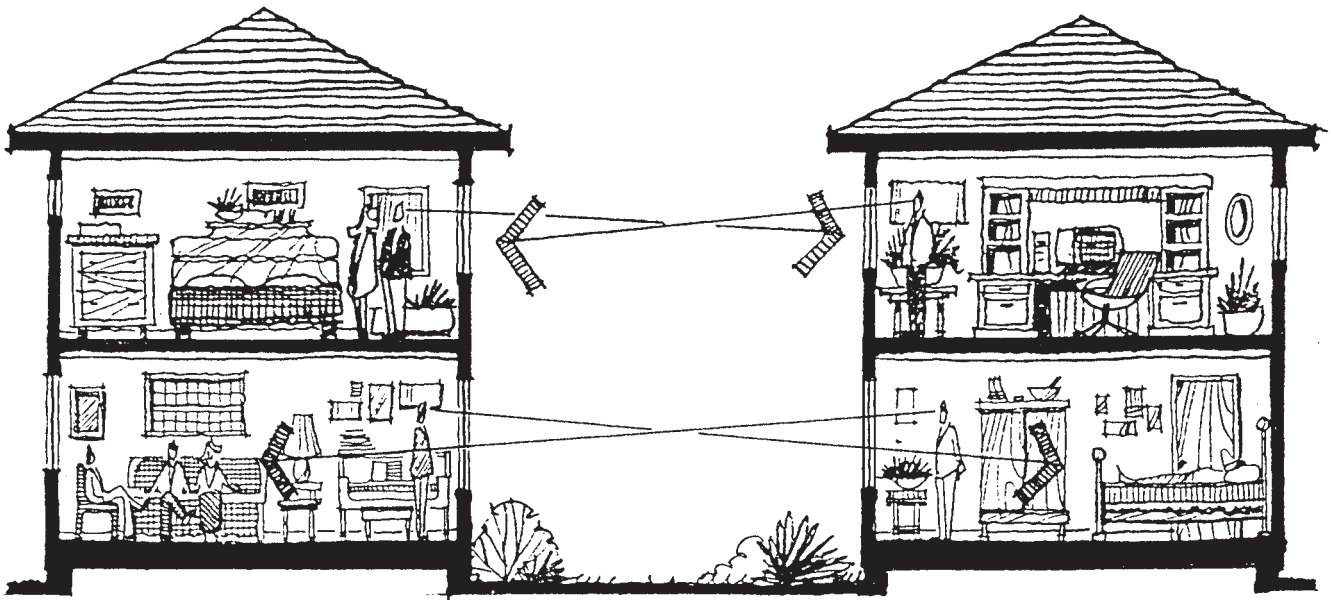


Figure 1–28
Narrow side yards minimize privacy between adjoining houses.

3. *Damp and Dark Microclimate.* Some side yards tend to be dark, damp, and humid owing to their narrowness and lack of sun exposure. This is especially true of regions that receive significant rainfall.
4. *Wasted Space.* Expansive side yards tend to be unused as activity areas owing to poor accessibility from within the house. This can amount to a sizable wasted area that still has to be maintained.
5. *Views Between Houses.* The narrow size of some side yards allows the windows of one house to directly face the windows of the neighboring house (Figure 1–28). This diminishes privacy from these windows. To minimize this problem, most homeowners keep the curtains in these windows closed all the time. A more extreme solution, which is a common occurrence, is the construction of houses with no windows facing the side yards.

HOUSES AND HOMES

Houses come in all sorts of shapes, sizes, and character. It's not easy to drive through a neighborhood and find two houses exactly the same. Although there may be some that are repeated throughout a neighborhood, it is hard to find two that look exactly alike. Owners want their houses to be unique in some way. Even if you were to look inside two houses that had the same floor plan and house character, you would undoubtedly experience two different homes. You would see distinctive wall coverings, paint, carpet, tile, furniture, wall hangings, curtains, and so on. Different people have varied personalities, occupations, hobbies, preferences, monetary resources, and so on. The relationship between an owner and a house gives rise to a home, a unique place for a unique individual or family. So although there may be two or more houses that have the same layout and house character, there are no two homes that are the same.

STYLE VERSUS NO STYLE

Different people like different things. I like this, she likes that, and he likes the other thing. This is quite an easy concept to comprehend. So, when something comes in a variety of styles, colors, textures, forms, or sizes, the diversity of that something is

likely to attract different people. When it comes to different styles of architecture, the same thing holds true. Different styles of architecture attract different people to those styles. Clients will have individual preferences of architectural style. Some clients may be very concerned that their house have a particular style, whether it be historical or contemporary.

There are many books that identify and show various architectural styles, including some that specifically illustrate the architecture of American houses. Some of these styles are based on architecture from other countries, whereas others are uniquely American (Figure 1–29). Whatever the style, it is critical that the landscape

Figure 1–29
Some houses have a recognizable and specific architectural style and therefore distinctive character. Design #N2979 (top), Design #N3382 (middle), and Design #N2975 (bottom) © Home Planners. Blueprints available, 800–322-6797.



Greek Revival Style



Victorian Style



Georgian Style

designer recognize that each house is unique with its own materials and material patterns, proportions, roof types and slopes, window and door patterns and trim, columns, railings, dormers, cornices, and chimneys.

When a landscape designer has a client with a house that has a definite style, it is strongly suggested that the designer spend time studying the house to identify what is distinctive about it. It may also be necessary to research that style in order to become familiar with patterns and details that are common to that style. This will help the designer to develop a landscape design that is reflective and responsive to the architectural character. Landscape designers who pay attention to each house's special features will find that new ideas for forms and patterns of proposed design elements will occur (see Chapters 10 and 12). This attention will help blend the house with the site. As always, the landscape designer needs to be objective about the house style and remove his/her own personal opinions from any decisions about what is appropriate. Remember, it is the clients' house, not yours.

There are many people who are not aware of the vast array of architectural styles, but are still concerned about the "overall character" of their house. It's on that character that landscape designers need to focus attention, not necessarily on the actual style. Why? Not all houses are built in a recognizable style of architecture. Some houses are easily recognized as having a particular style, while others may have some character that resembles a specific style. Still others may have character taken from different styles. And some can be seen to have no evidence of any style. As stated earlier, houses come in all sorts of shapes, sizes, and character.

ARCHITECTURAL CHARACTER

Whereas architectural style is important when it exists, architectural character is always important. Architectural character can be viewed as the composite of physical attributes and features that together display an overall integrity. Figure 1–30 shows three different houses that do not have styles that are easily recognizable. Each house has certain parts that resemble another style, but not in an overall sense. Houses like these that have aspects of different styles are often referred to as eclectic. If you were the landscape designer for a client with one of these houses, you might not be able to find resource material to help you become more acquainted with that particular type and character of house, and that is normal. These houses do not have to have a specific style for which the designer develops architecturally responsive landscape designs. All they need is architectural character, which each of them does possess.

It is normal for people to want landscapes that are similar to other people's landscapes, but they want them to fit themselves, not others. They want things to look like they belong, like the design was meant for that house and site. The uniqueness of a design lies in the relationship between the existing and the proposed. What can make something special or different is focusing, with your attention on the relevant detail, on the character of the client, house, and site as a landscape design evolves and unfolds.

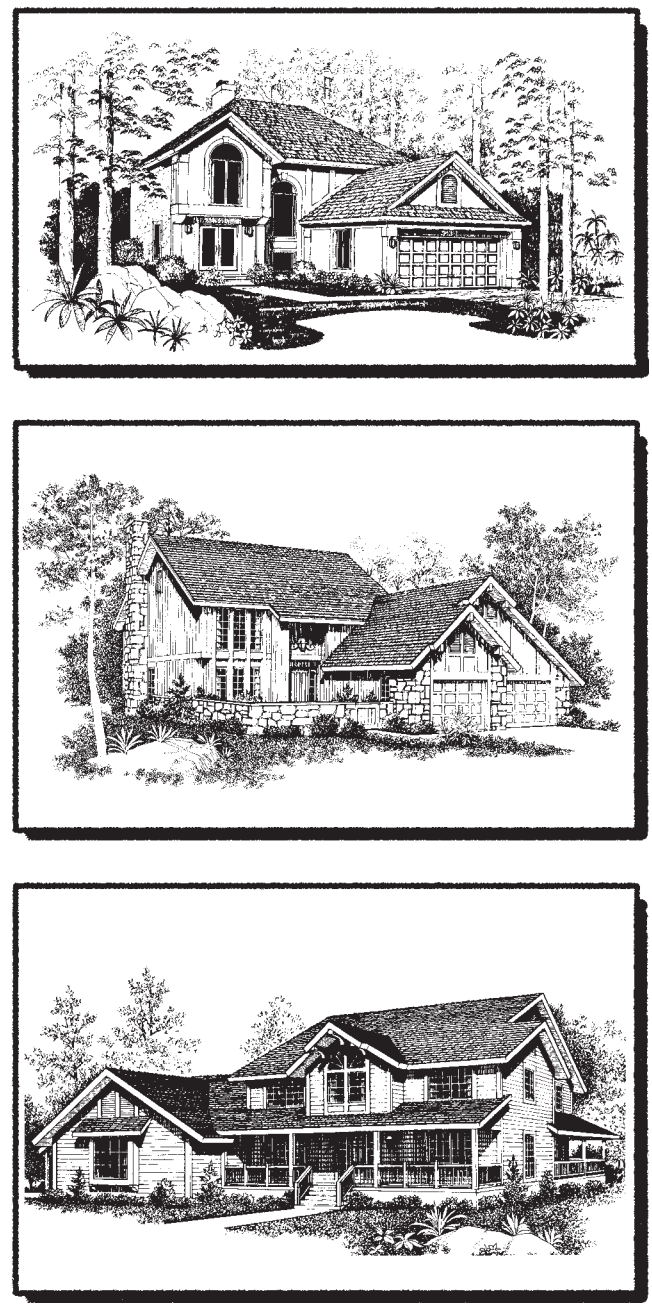


Figure 1–30
Some houses do not have a specific architecture style but still have distinctive character. Design #N3562 (top), Design #N3341 (middle), and Design #N3307 (bottom) © Home Planners. Blueprints available, 800–322-6797.

SUMMARY

The typical American residential site has a number of attributes as well as negative traits, as discussed in this chapter. Having read this chapter, you should know the following:

- Overall traits of the typical residential site such as location of house, types of yards, and the general characteristics and uses of each
- Conventional problems of the front yard that relate to the lawn edges, driveway, garage door, front walk, entry foyer, foundation planting, plantings, and use of the front yard
- Typical concerns of the backyard related to views to neighbors, enclosure, size of outdoor living areas, privacy, microclimates, visual character, relation to interior of the house, storage sheds, and vegetable gardens
- Ordinary difficulties of side yards such as access, storage, microclimate, efficiency of space, and views between houses
- Factors that establish an architectural style of a house and why some houses have no particular style
- Features of a house that give it character and can give visual clues for the adjoining landscape

2
Outdoor Rooms

INTRODUCTION

There are numerous factors to consider in the design of a residential site. The designer must take many items into account, including the clients' wants and needs, the relationship between the interior (rooms, doors, windows, etc.) and the exterior, budget limitations, and the opportunities and constraints of the existing site conditions. As the designer graphically begins to put ideas on paper to create a design solution, additional considerations should address the functional relationships among the required uses; the character of the spaces to be created; and the specific sizes, shapes, colors, and textures of the materials selected for the design. However, there should be one central theme that guides all reflections about residential design: *the creation of usable space.* Creating usable outdoor space, perhaps more clearly understood as *outdoor rooms,* should be the principal way of thinking about a residential site and the basic building block for developing a design solution.

The importance of outdoor space is based on the philosophy that residential site design is a three-dimensional organization of space and not just the creation of two-dimensional patterns on the ground or the arrangement of plant materials along the base of a house. Space is the entity where we live, work, and recreate. Consequently, all the site elements that make up the outdoor environment, such as plant materials, pavements, walls, fences, and other structures, should be considered as the physical elements that define outdoor space. A residential designer should think of design as the creation and organization of outdoor space and should study how these other components define and influence the character and mood of space.

This chapter discusses what outdoor space is, how it is created, and how it is used. We do this by comparing and contrasting outdoor space with indoor space. In addition, guidelines are suggested for the location and design of such outdoor rooms as the arrival and entry space, entertaining space, outdoor dining space, and recreation space. Overall, this chapter establishes the basic philosophy for residential site design that is followed throughout the remainder of the book.

OUTDOOR SPACE

What is space? When designers use the term *space* in a design context, they use it to describe any three-dimensional void or hollowness contained by the sides or edges of surrounding elements. For example, indoor space exists between the floors, walls, and

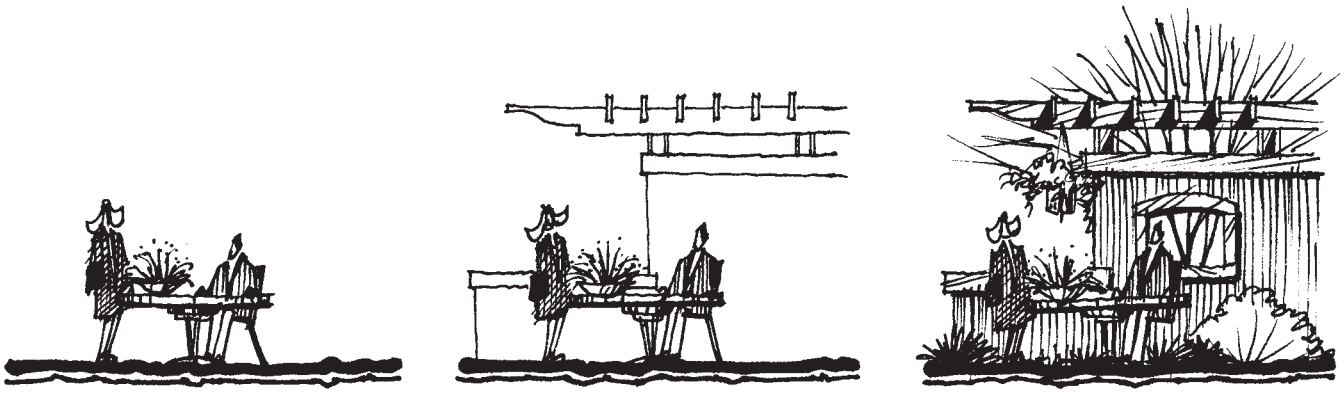


Figure 2–1
A successful space needs (1) sufficient space, (2) planes of enclosure, and (3) spatial character.

ceilings in all buildings. Similarly, outdoor space can be perceived as space bound by physical elements of the environment such as the ground, shrubs, walls, fences, awnings, and tree canopies.

For laypeople, the concept of space is often a difficult one to grasp initially because they are accustomed to describing the landscape as a collection of physical objects such as buildings, trees, shrubs, and fences rather than space itself. It takes some adjustment and training to view outdoor space as the void between those objects normally seen.

An indoor use area will function as a usable space if there is (1) sufficient space, (2) adequate privacy, (3) decoration, and (4) furnishings. The success of outdoor space can be looked at in a similar way. We find a space to be comfortable, pleasurable, and successful if it provides sufficient room to function in, enough privacy for the function to occur, decoration, and furnishings.

Figure 2–1 illustrates three sequential steps in the development of a successful space. The basic function of a space is established by the bare necessities, such as a table and chairs. The use of the space is not dependent on anything more than this. But the space is likely to feel empty, and the users are apt to feel uncomfortable, because of the lack of spatial definition. People appreciate the enclosure provided by floors, walls, and ceilings. So, with added outdoor design elements such as pavement, a fence, and an overhead arbor, the space has the ability to provide the user with a feeling of being in a room. But, until these three planes of enclosure have some material, pattern, and color applied to them, the space will feel like an empty model home. It is important to keep in mind that selecting materials, patterns, and colors is critical to the success of a space.

An effective means for understanding outdoor space is to think of it as a series of outdoor rooms similar to the interior rooms of a house (Figure 2–2). Each interior room has a definite sense of enclosure that is clearly defined by floor, walls, and ceiling. Similarly, there are potentially such rooms as the entry space, entertaining space, living space, dining space, and work space in the exterior environment of a residential site. Like their interior counterparts, exterior spaces are defined by three primary planes of enclosure: base plane, vertical plane, and overhead plane. These three exterior planes of enclosure, like the interior floors, walls, and ceilings, collectively define the edges or limits of outdoor rooms (Figure 2–3).

Base Plane

The base plane or floor of an outdoor space supports all activities and site elements in the outdoor environment. It is the plane on which people walk, run, sit, work, recreate,

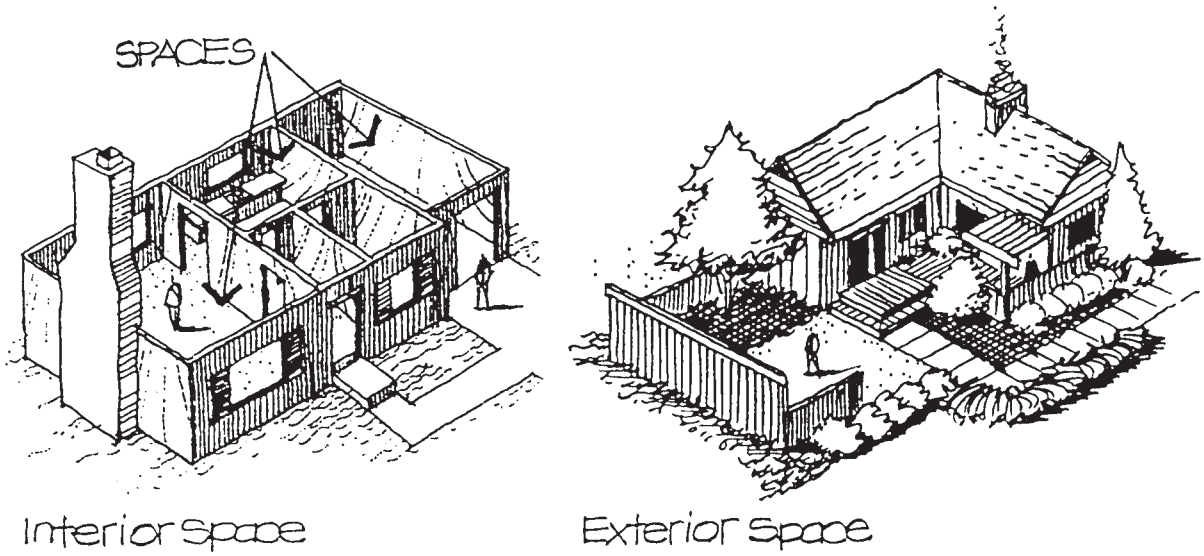


Figure 2–2
Outdoor space should be thought of as being similar to indoor spaces.

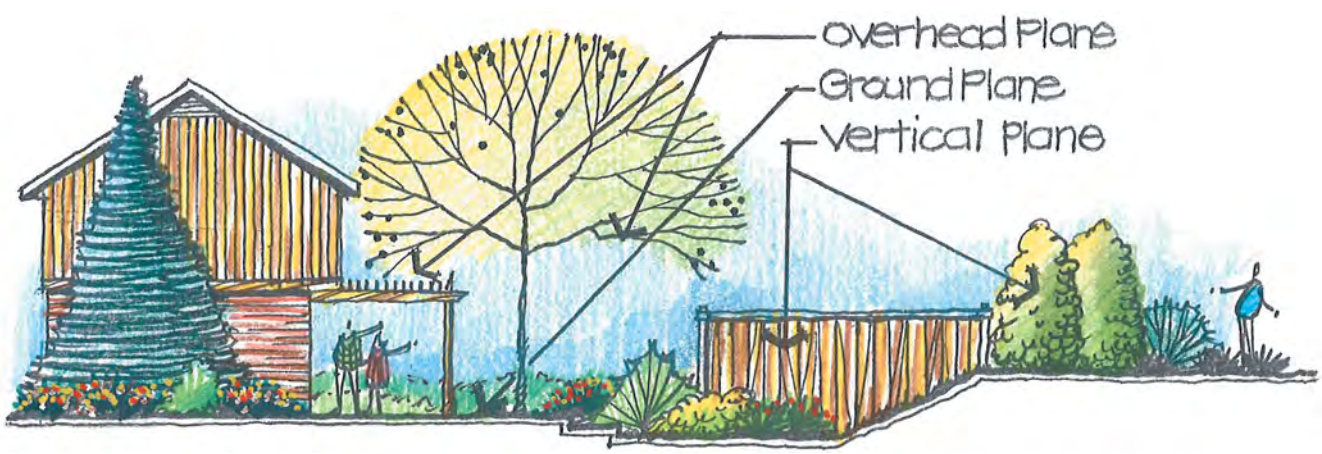


Figure 2–3
Examples of the three planes of spatial enclosure.

and play. As such, the base plane receives the most direct use and wear. Areas of a site that endure intense or concentrated use are typically covered with a hard surface such as pavement, whereas other areas that receive infrequent use are most often covered with a soft surface such as lawn, ground cover, or mulch. Significantly, the base plane is the primary plane on which the designer organizes the proposed design. The organization of uses (or functions) in residential design is determined directly on the base plane. It is important to understand that good design starts with function, and functional organization begins on the base plane.

Vertical Plane

Vertical planes are established by such site elements as the facades of a house, walls, fences, the foliage mass of trees and shrubs, tree trunks spaced close together, and/or steeply sloped ground. The vertical planes' most prominent role in the landscape is one of enclosure (Figure 2–4). Vertical planes define the surrounding edges of a space and separate one space from another. Similarly, vertical planes directly affect views.

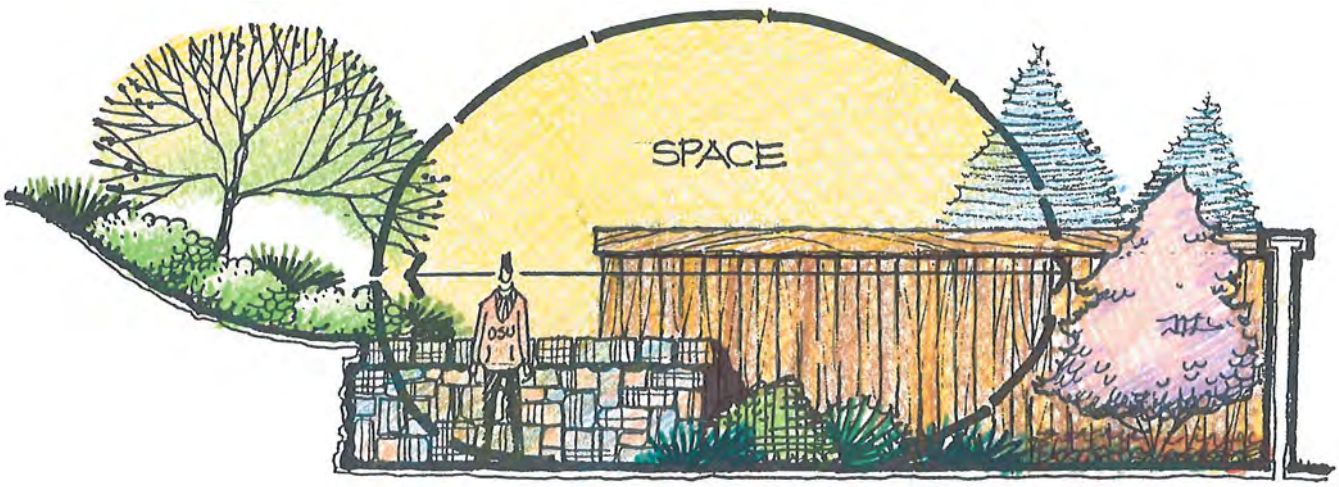


Figure 2–4
Vertical planes (landform, walls, fences, and plant materials) are used to provide spatial enclosure.

They control how much or how little is seen from any one place in the landscape and thus influence the degree of privacy that is felt in an outdoor space. An outdoor room may be rather open with views extending outward in many directions, partially enclosed on several sides, or totally enclosed with an inward orientation (Figure 2–5). Vertical planes may be used to direct and enframe views to desirable places or screen

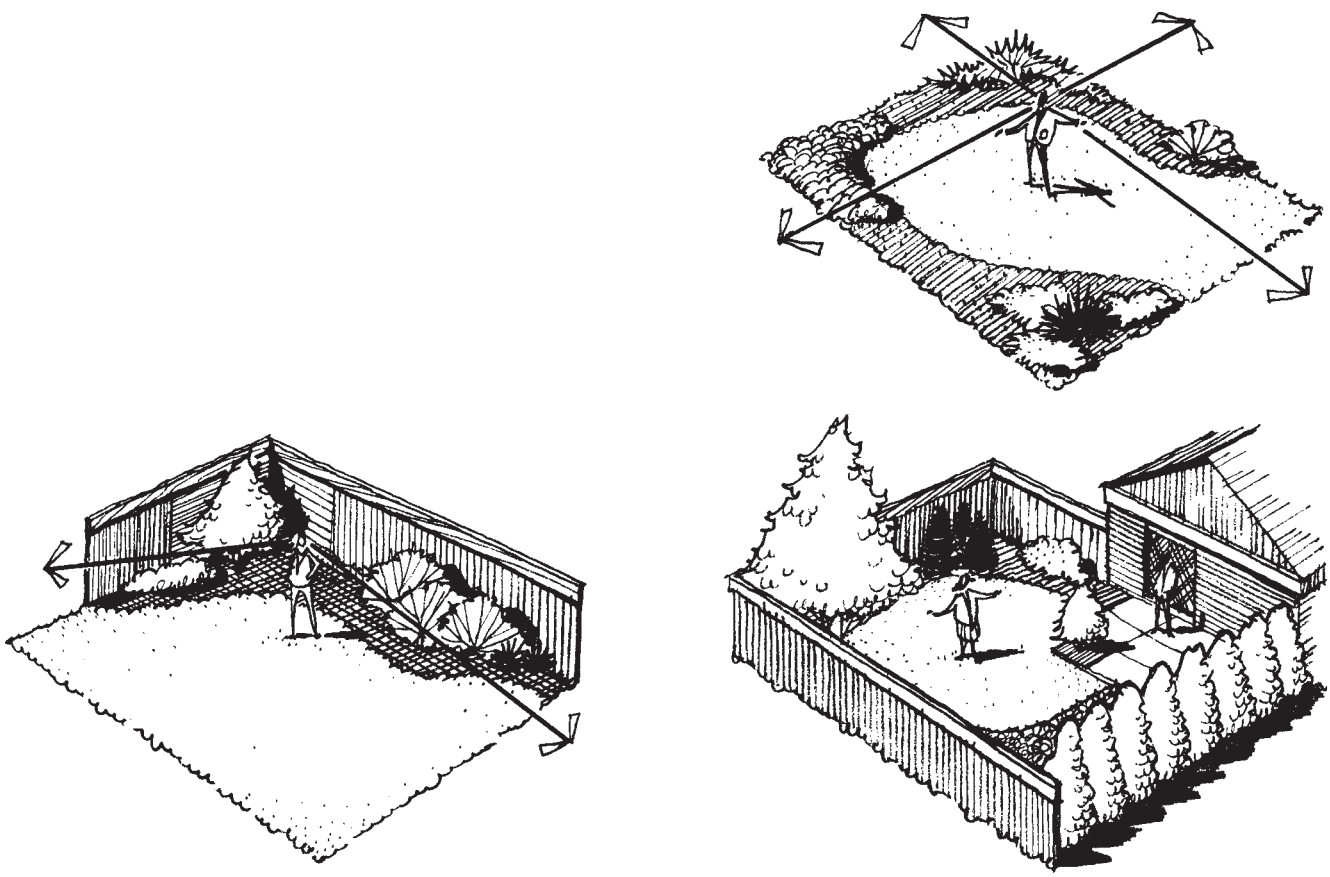


Figure 2–5
A space may have varying degrees of enclosure.

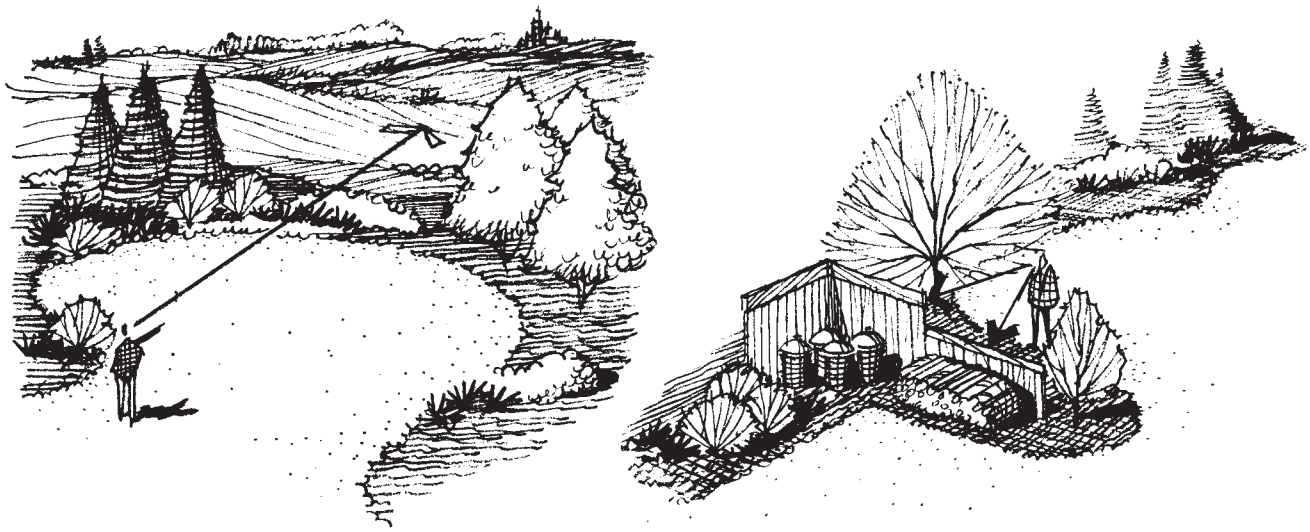


Figure 2–6
Vertical planes may enframe or screen views.

views from unattractive features (Figure 2–6). In addition, the character of vertical planes influences the feeling of the space. Vertical planes may vary from rough to smooth, light to dark, solid to transparent, and so on. Each of these variables influences the mood of a space.

Overhead Plane

Overhead planes are created by canvas awnings, overhead trellises, arbors, pergolas, the bottom of tree canopies, or even the clouds in the sky. Overhead planes have two functions. The first is to influence the amount and quality of skylight (including sunlight) that enters into a space (Figure 2–7). Overhead planes may be completely open where maximum skylight is desired or completely solid where little or no light is needed. In between these two extremes, overhead planes may be composed of various semitransparent and translucent materials that permit filtered and diffused light to enter into an outdoor space. Very dramatic light effects can be created by an overhead arbor (with or without vines), open trees such as a honey locust or palo verde, or light-colored canvas awnings. In a similar manner, a semitransparent or partially open overhead plane can cast attractive shadow patterns on the ground, adjacent walls, or fence (Figure 2–8). The second function of the overhead plane is to influence the perceived scale of a space. For instance, a low overhead plane is apt to create an intimate feeling, whereas a high overhead plane may establish a more uplifting or lofty setting (Figure 2–9).

In the outdoor environment, the base, vertical, and overhead planes function together to create a variety of spaces with different uses and feelings. For instance, an outdoor space may be almost completely enclosed to create a rather intimate and inward sensation (Figure 2–10). Such a space tends to have a strong sense of privacy and separation from other spaces. In contrast, an outdoor space may be quite open to provide an expansive feeling, outward-oriented views in many directions, and exposure to climatic elements such as sun and wind (Figure 2–11). Ultimately, the designer must decide what type and degree of enclosure is most suitable for an outdoor space to achieve the intended use and mood.

In some ways outdoor space is similar to indoor space. Both are volumes defined by the base plane, vertical planes, and overhead plane. People also live, work, and play

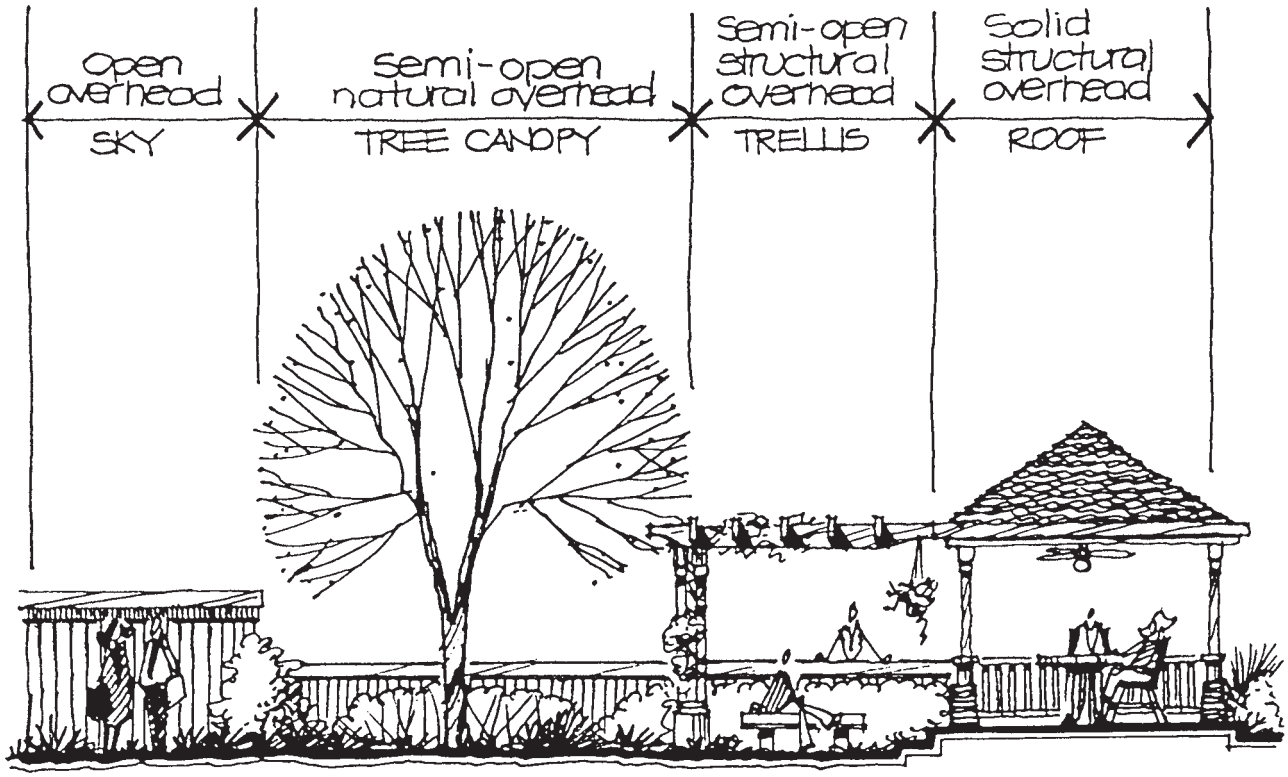


Figure 2–7
Overhead planes affect the amount of natural light entering a space.

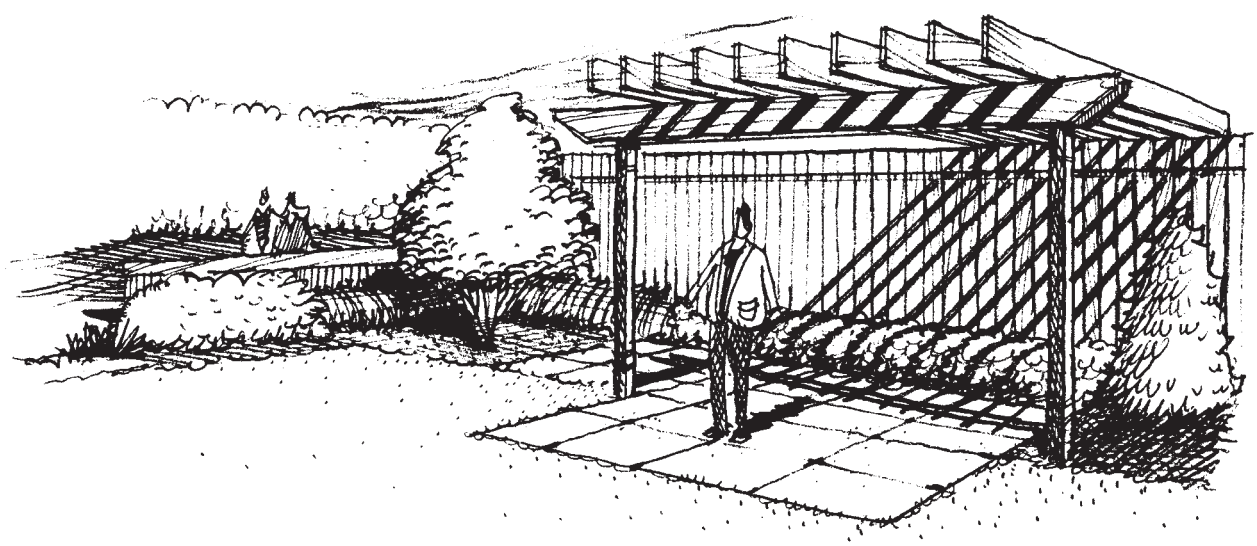


Figure 2–8
Overhead planes can create attractive shadow patterns.

in both indoor and outdoor spaces, but there are differences that should be recognized and appreciated as well. Generally, when a person is indoors, there is little question as to where one room ends and another begins. The walls separating one room from another are typically solid and fixed in place with doors or other openings being the only spatial connection between them. Another characteristic of interior space is that its sense of enclosure and light does not vary much over a period of time, especially if windows are small or lacking.

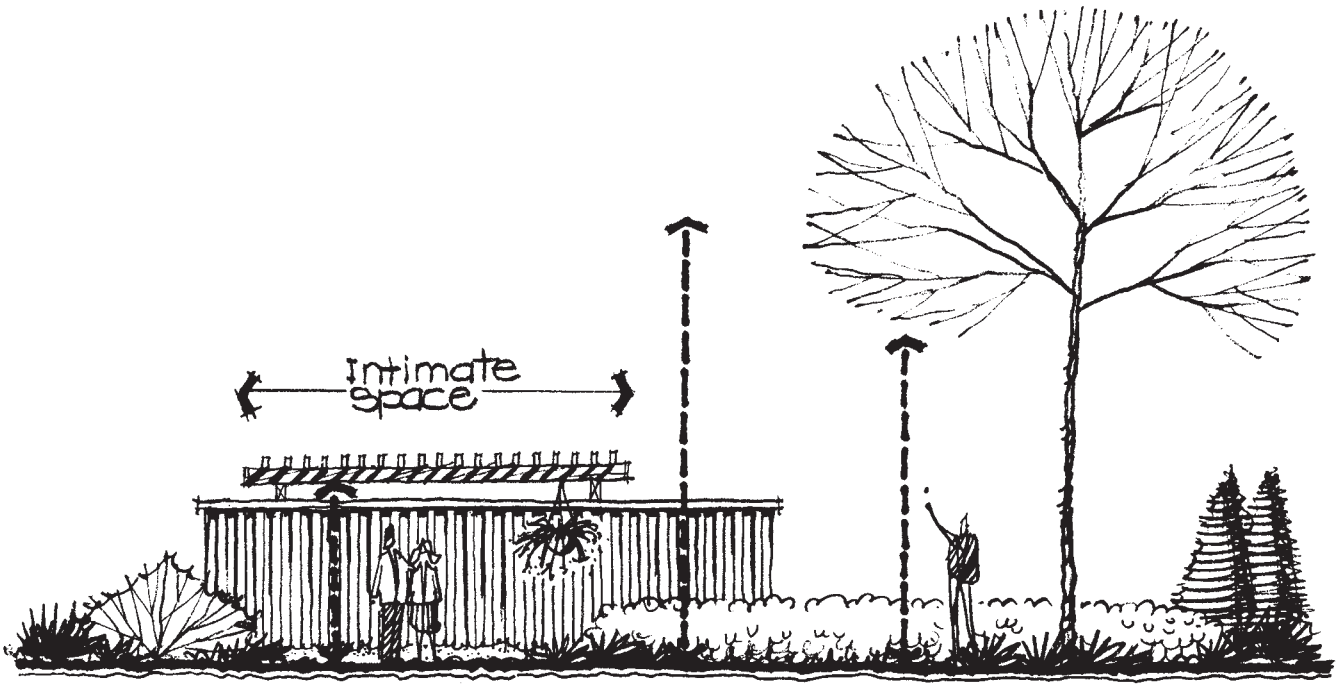


Figure 2–9
Varying heights of overhead planes create different feelings of enclosure.

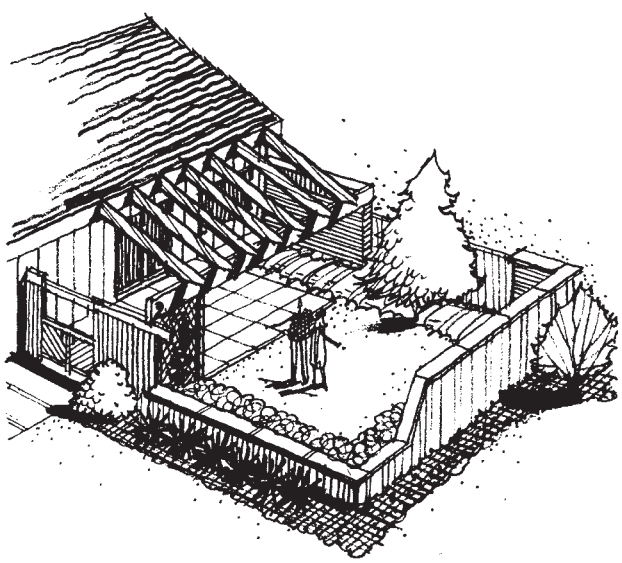
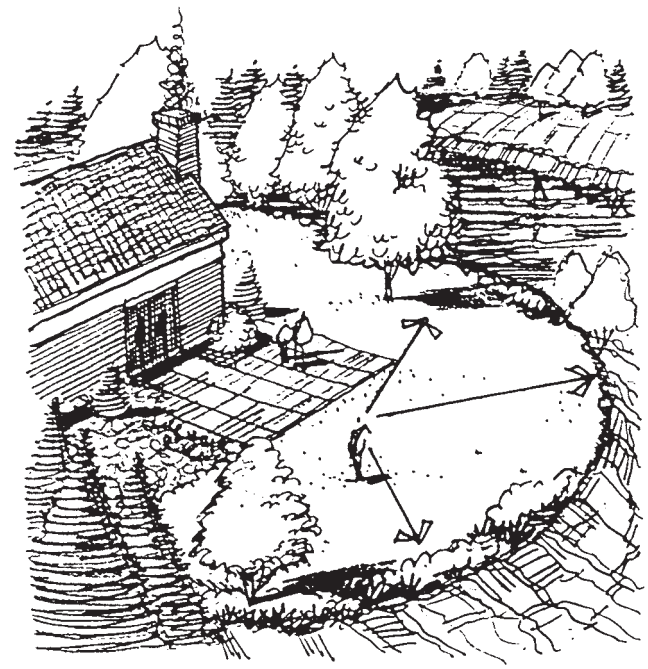


Figure 2–10
An outdoor space may be completely enclosed and isolated from its surroundings.

By comparison, the edges of outdoor spaces are not as rigidly defined. Consequently, it is sometimes difficult to perceive where one outdoor space ends and another begins. Outdoor spaces often tend to be defined more by implication than by obvious enclosures (Figure 2–12). Plant materials, for example, don't usually provide the sharp, clear edge that the walls inside a house do unless they are pruned to form precise hedges. Many plants have a fairly open character and are amorphous in shape, thus allowing views to extend to spaces and objects beyond. In addition, the elements that define outdoor space are often arranged in an informal manner, unlike the typical straight walls in a house.

Figure 2–11
An outdoor space may be open and allow views to the surrounding landscape.



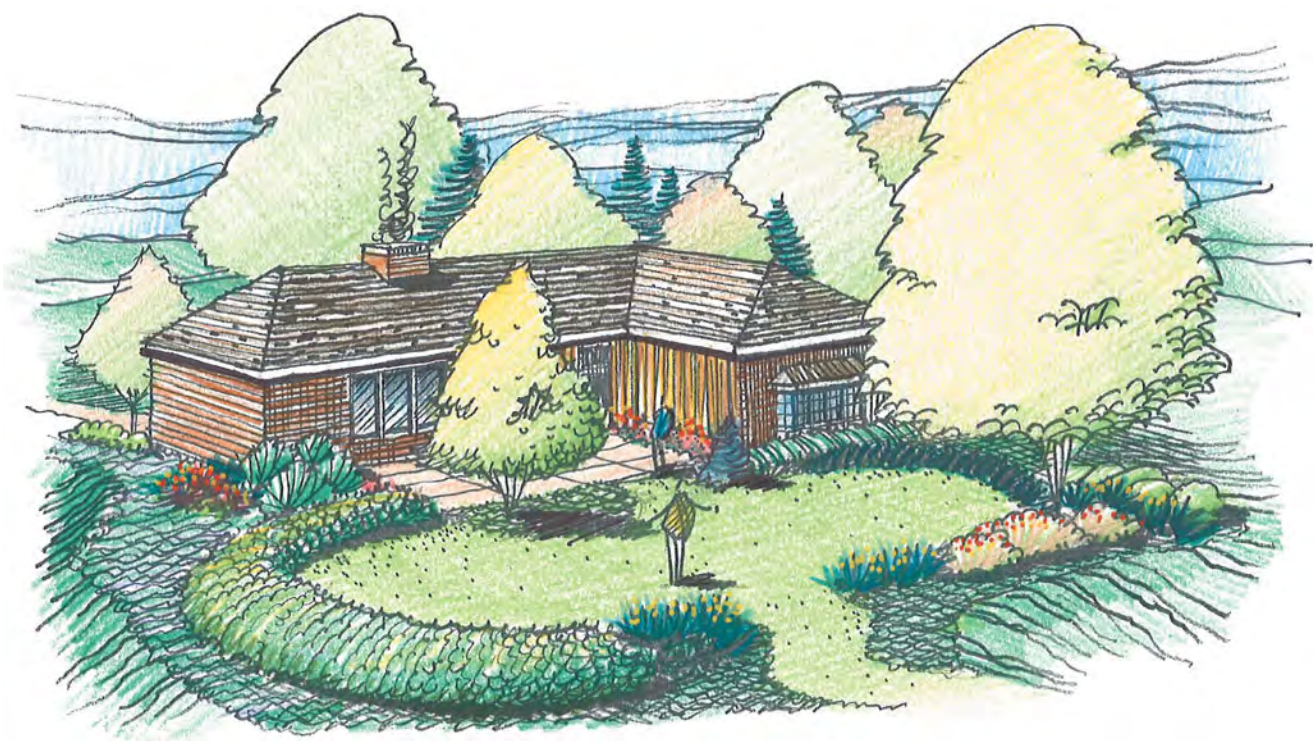


Figure 2–12
Unlike indoor spaces, outdoor spaces tend to be more open and less defined.

Outdoor spaces change more dramatically over a period of time in comparison to their interior counterparts. Growth and seasonal variations have a tremendous influence on the space-defining abilities of plant materials. In some locations of the country, a space defined essentially by plant materials may seem very enclosed during the summer but quite open during the winter when leaves drop off. Perception of outdoor space is also influenced by variations in weather (sun, clouds, fog, rain, snow)

and light. An outdoor space may seem very appealing on a warm, sunny day yet uninviting and dismal on another day. Spaces tend to feel smaller and more enclosed during the evening than during the day because of reduced viewing distance in the dark. All the possible combinations of factors make the perception of outdoor space highly variable.

Outdoor Rooms on the Residential Site

As stated earlier, a residential site can be thought of as a series of outdoor rooms or spaces. These spaces have numerous functions, some of which are similar to those found inside the house. On many residential sites, the most significant outdoor spaces include an outdoor arrival and entry space, entertaining or living space, eating or dining space, recreation space, work/storage space, and garden space. The intent of this section is to examine each of these spaces to more clearly understand their functions and to present design guidelines for their development. This is accomplished by first studying the indoor counterpart of each outdoor space in order to gain insights into how outdoor spaces might be designed.

Indoor Entry Foyer

The entry foyer is the space usually located immediately inside the front door. Its purpose is to serve as a transition space between the outdoor environment and the indoor environment. The foyer is a transition space in the sense that it acclimates a person after entering or before leaving the inside of the house. It is a place where people stand temporarily to welcome visitors or say goodbyes.

Outdoor Arrival and Entry Space

The outdoor arrival and entry space is of course the exterior complement to the interior entry foyer. It has many similarities, but a few differences as well. As discussed previously in Chapter 1, the outdoor arrival and entry space on the typical residential site lacks identity and character. Although people can in fact get to the front door, an important question is: Does this space provide a pleasant experience that says "welcome," or is it simply tolerated until one enters the house?

What are some design guidelines for the outdoor arrival and entry space that can assist a designer in developing a pleasant entry space to complement the residence? Of course, there are no easy answers to this question because each design project is unique, with its own particular set of circumstances. Still, there are some important thoughts and suggestions with wide application to many residential sites. To start with, a well-designed outdoor arrival and entry space should fulfill a number of objectives. At the very least, it should comfortably accommodate pedestrian movement from off the site to the front door of the house in a safe and orderly fashion. The route should be obvious and easy to negotiate during the day and at night. It might also be protected from the hot afternoon sun or strong winds.

But a well-designed arrival and entry space should do more than just satisfy these utilitarian considerations. It should display an attractiveness that complements the residence and provides a pleasant experience for the residents and visitors. This space should give comfort and interest to visitors and may also serve as a delightful place for the residents to sit and relax. The outdoor arrival and entry space might be designed to exhibit some of the character and personality of the home and the residents, thus providing an appropriate introduction to the site, house, and residents who live there.

The entire outdoor arrival and entry space can be divided into five subspaces or zones relating to arrival and entrance (Figure 2–13). A person proceeds through or by

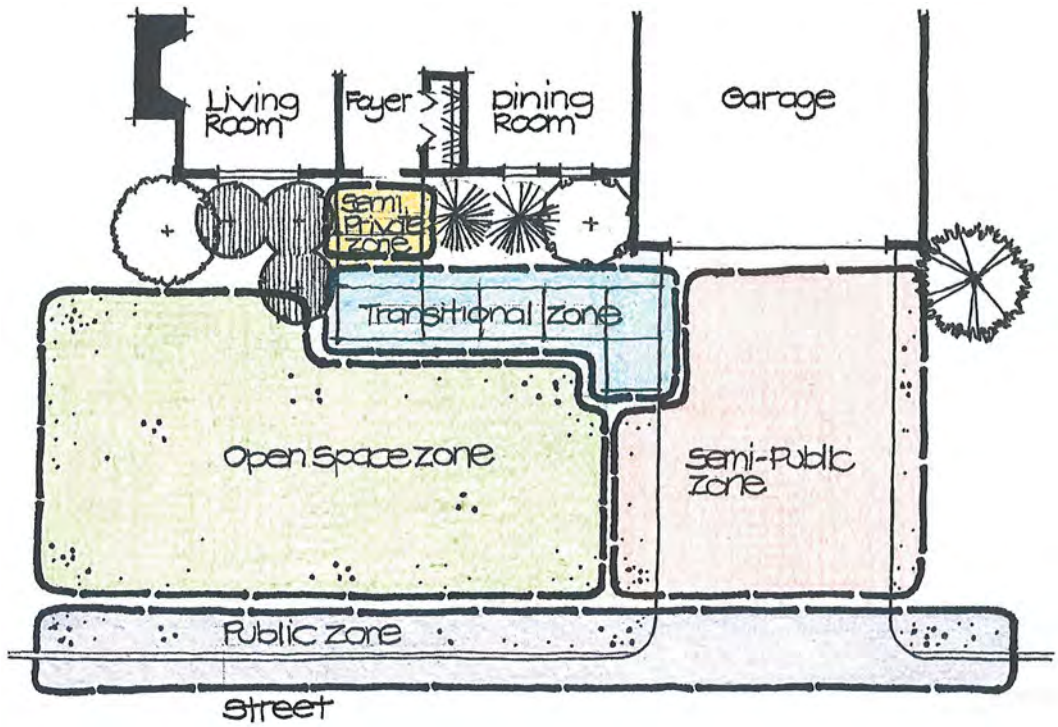


Figure 2–13
Zones of entry on the typical residential site.

each of these zones when arriving and leaving the property. The "public" zone occurs at the curb or property lines. Whether on foot or in a vehicle, a person begins the arrival sequence the moment the curb zone or property lines are crossed. The "semi-public" zone occurs on or along the driveway. This is normally the least defined or enjoyable part of the sequence. The walk between the driveway and the outdoor entry space represents the "transitional" zone. This zone is pedestrian oriented, thus making the scale and detail of this area critical. The "semi-private" zone is the outdoor foyer. Like its interior counterpart, this space serves as a transition zone as well as a place for meeting and greeting visitors. The "open space" zone is the space that occupies the remainder of the front yard. In many instances, this zone is taken up by the front lawn and plantings. Although a guest may not actually walk through the lawn, it nonetheless is a visual element.

Each of these zones contributes to the overall experience of arriving at the site and entering the home. Consequently, each should be carefully studied during the evolution of a design solution. To aid in this process, the designer should consider the following guidelines, keeping in mind that they should be applied thoughtfully to each site according to the specific circumstances.

Public Zone This first zone can be designed to acknowledge a sense of entry into the site in a variety of ways. In one instance, the borders of the site, particularly the front edge along the sidewalk or street, may provide a sense of enclosure for the front yard through low walls, fences, or plantings (Figure 2–14). A sense of entry is felt when walking or driving through this plane of enclosure just as when a person walks through a doorway of an interior room. Another advantage of spatial enclosure along the street is that it separates the front yard from the street and establishes a greater sense of privacy. This makes the front-yard space more comfortable if used for sitting and relaxing. Some words of caution need to be made about enclosure near the street. First, the height of walls or plantings in this zone should not interfere with the ability

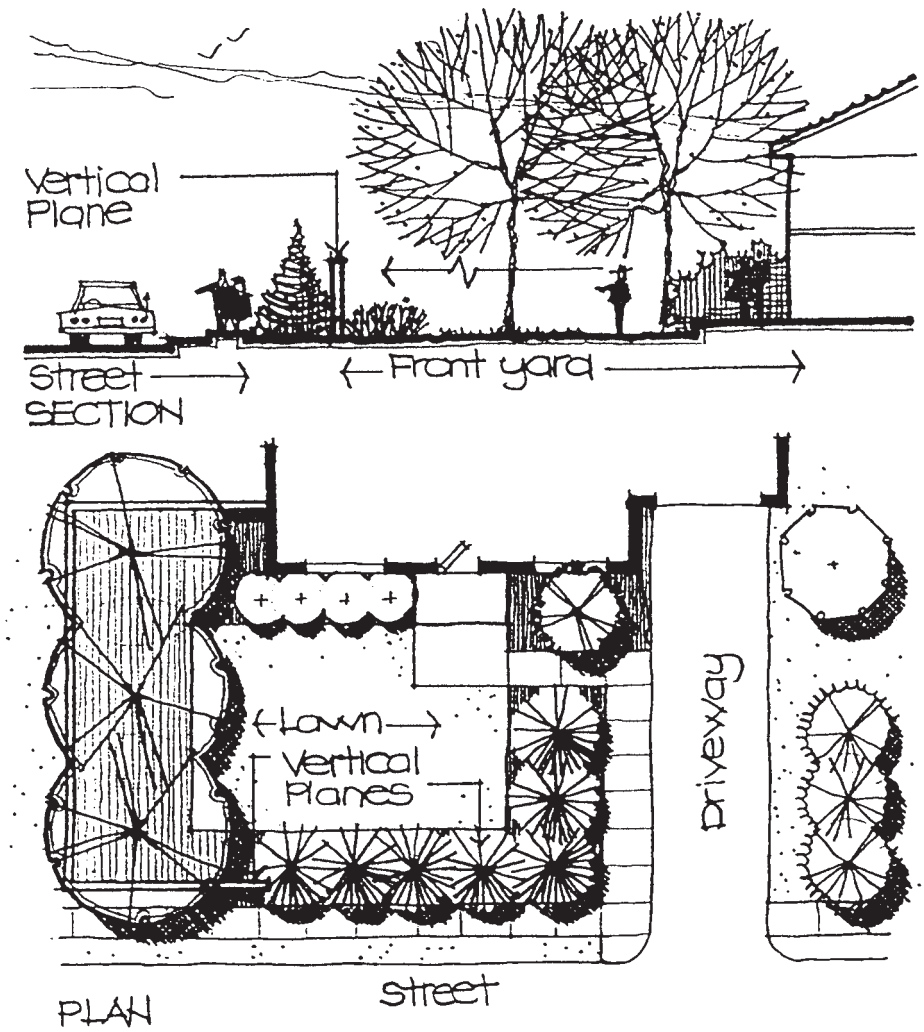


Figure 2–14
Vertical planes are used along the street to provide a sense of enclosure and separation from the street.

to see in and out of the driveway, especially for drivers backing into the street (Figure 2–15). A second concern for enclosure along the street is that it should comply with local zoning ordinances. There may be restrictions on the location and height of walls, fences, and plantings in the front yard.

Semi-public Zone The next zone is the driveway and the area along its sides. The major use of this zone should be to provide adequate space for parking cars and for moving people on foot through the space in a comfortable manner. The driveway

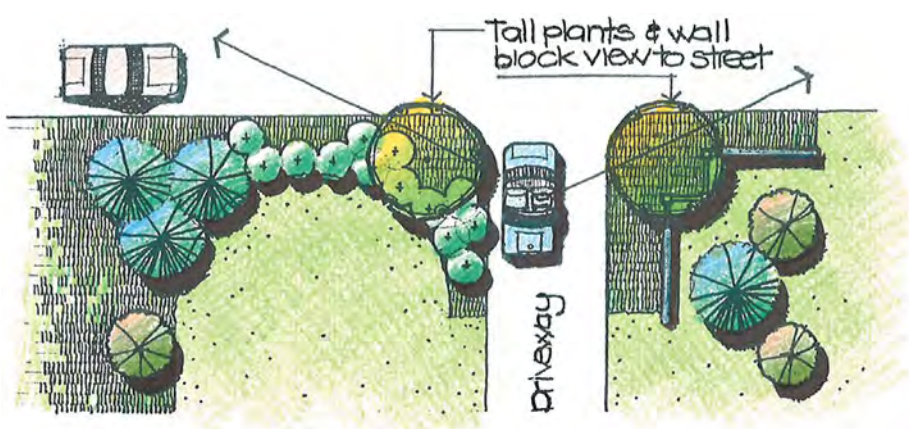


Figure 2–15
Tall plants and/or fences should not be placed in locations that inhibit the driver's view of the street.

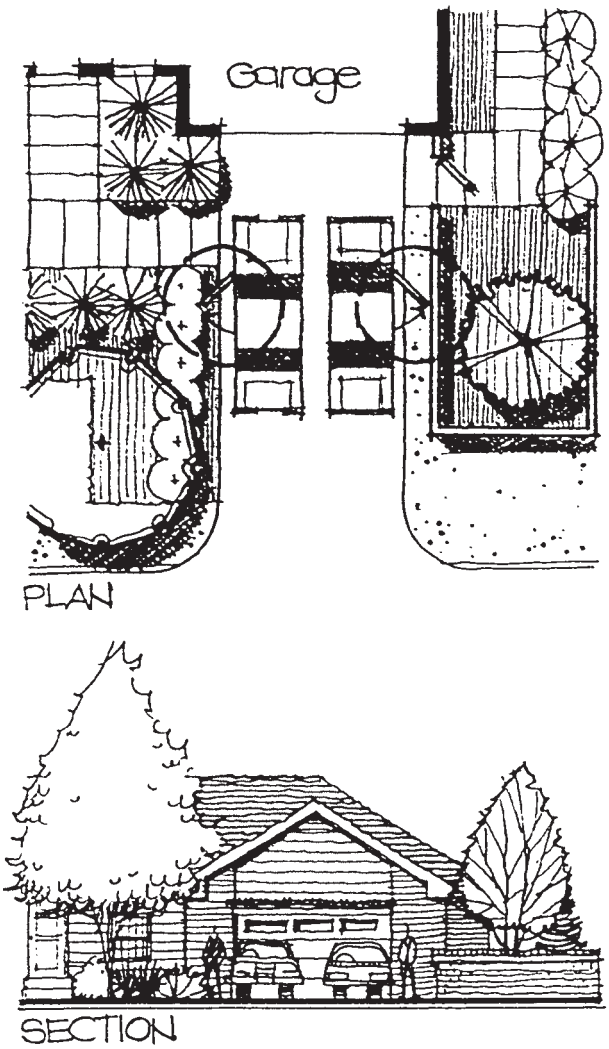


Figure 2–16
Plants, walls, and so on located too close to the driveway interfere with the opening of car doors and pedestrian circulation.

should be wide enough to allow the desired number of cars to park conveniently, but not so large as to visually dominate the arrival area or front yard. Most cars require a 9′ × 18′ space for parking. All walls, plantings, and so on should be kept back from the edge of the driveway so as not to interfere with the opening of car doors or people walking along the edge of the driveway (Figure 2–16).

The pavement material and pattern of this zone should be given careful thought. Owing to the relatively massive size of many driveways, the pavement material can have a direct influence on the perceived scale of the driveway and its visual appeal. Simply providing a scoring pattern in the concrete reduces the apparent size of the driveway (Figure 2–17).

Adequate space should be provided along the edge of the driveway to allow people to walk along it without having to rub against parked cars, or walk on wet grass or in snow piles. This can be accomplished by providing a walk that extends along one or both edges of the driveway (Figure 2–18). To identify this as a pedestrian area, the pavement should be a different material or pattern than the driveway itself. The walk surface should also be flush with the elevation of the driveway and should not contain steps or other abrupt elevation changes. Low plantings can be used to reinforce the edge of the walk or to separate it from adjoining spaces or lawn areas.

If the entry walk does not extend along the driveway's edge, there should be an obvious indication as to where the entry walk to the front door is located. This can be

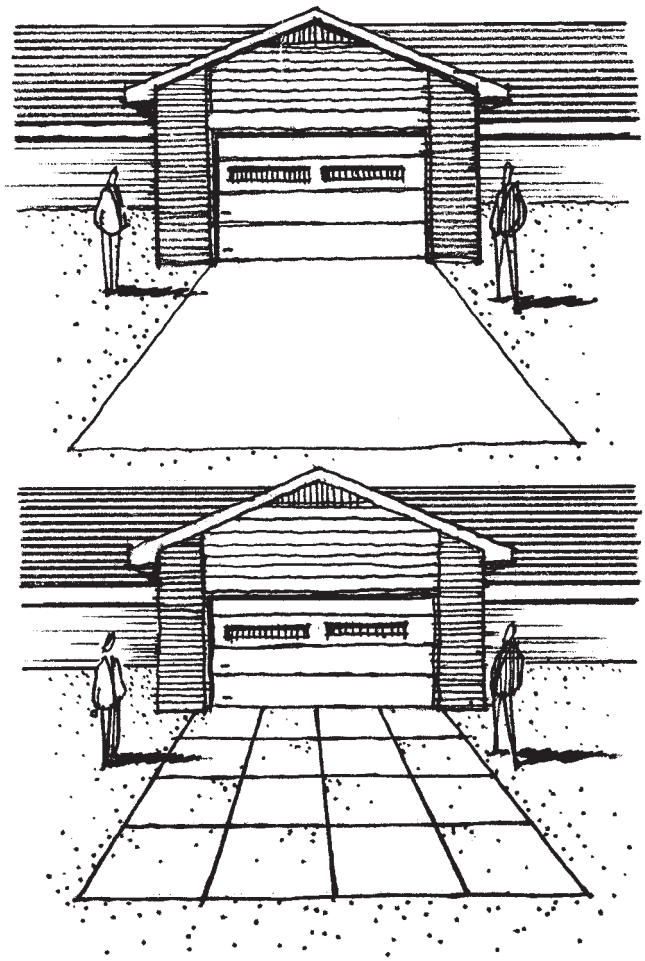


Figure 2–17
A simple scoring pattern can reduce the apparent size of the driveway.

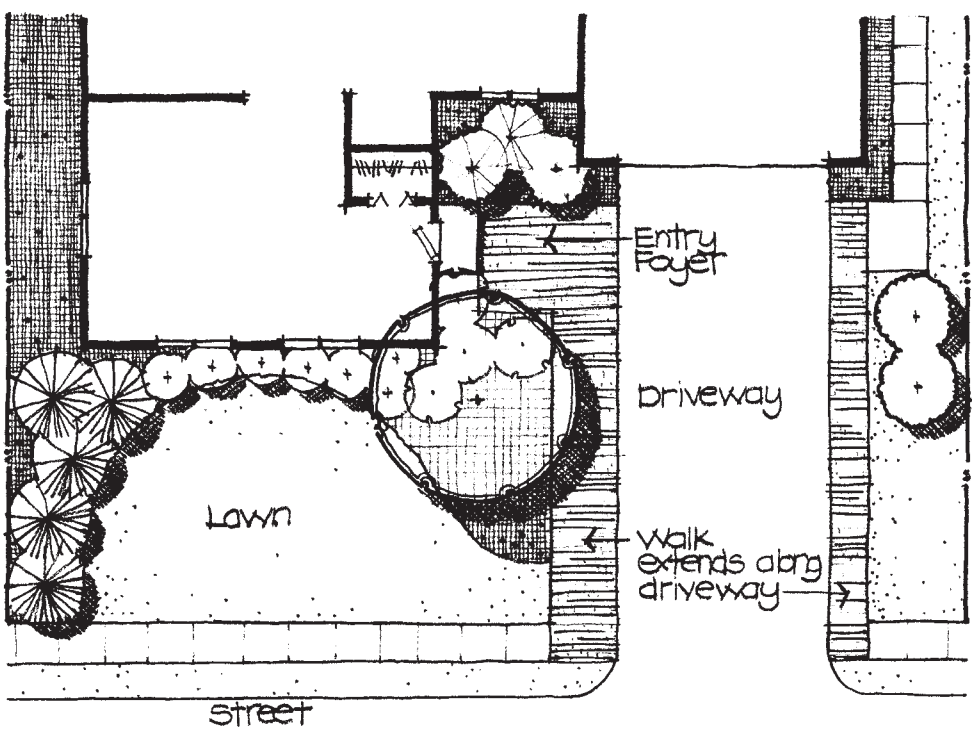


Figure 2–18
Walks on both sides of the driveway can provide easier access to the entry walk.

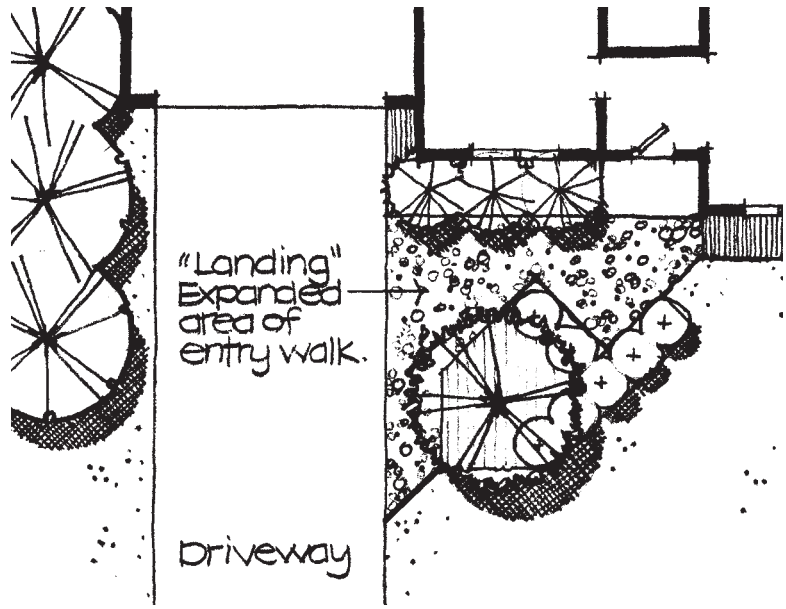


Figure 2–19
An expanded entry walk or "landing" provides a more welcoming approach.

done by providing an expanded area of walkway or landing at an appropriate place along the edge of the driveway (Figure 2–19). In plan, this landing should ideally resemble a funnel shape to permit easy recognition and to gently guide people onto the entry walk itself. In addition, this area should be located at a place along the driveway where most cars stop to park (Figure 2–20). This allows people on one side of the car to step directly out onto the landing. Steps should not be placed right next to the driveway where they can catch someone by surprise (Figure 2–21).

The landing area can be further acknowledged by the careful placement of an accent element to attract attention, such as an ornamental tree, a planting with seasonal color, a light fixture, or a combination of these elements (Figure 2–22).

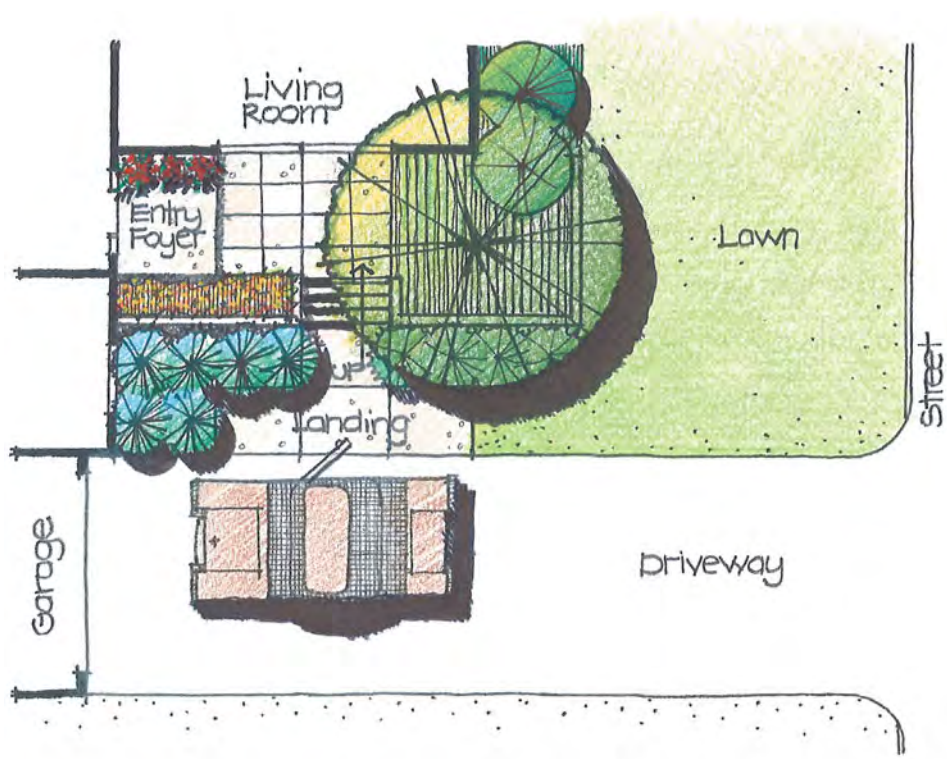


Figure 2–20
The "landing" should be located where a car would normally be parked in the driveway.

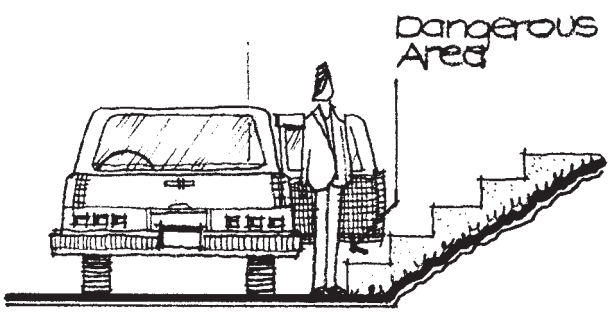


Figure 2–21
Avoid placing landing steps too close to the edge of the driveway.

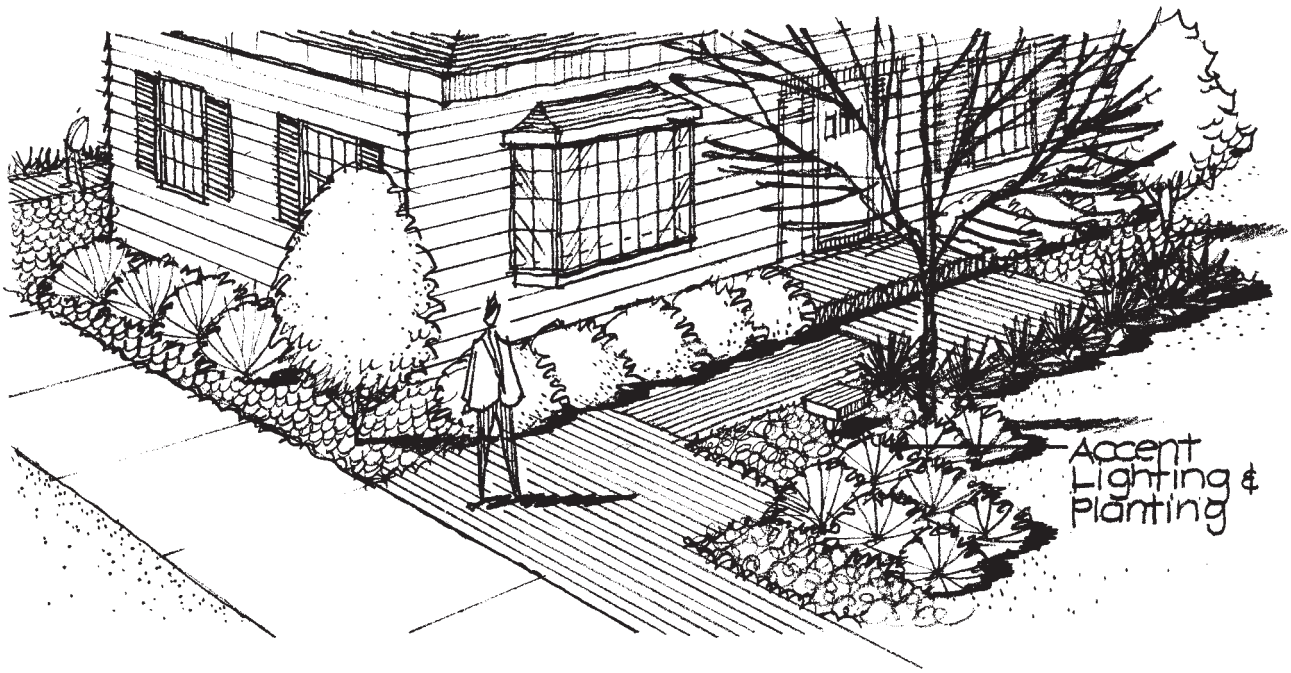


Figure 2–22
Ornamental plants, a light, and so on can accent the location of the "landing."

Transitional Zone The next zone or subspace in the arrival sequence is the entry walk. Its primary function is to accommodate and direct movement between the landing and the outdoor foyer. In addition, it should create a pleasant and safe walking experience with a variety of views along the walk. This can be done by slightly altering the direction of the entry walk and altering views and points of interest as a person moves toward the front door (Figure 2–23). Specimen plants, seasonal flowers, sculpture, water, or other elements can be incorporated along the walk to enhance its character. Low walls, fences, or plant materials can be incorporated with the walk to help direct and reinforce movement (Figure 2–24). These low vertical planes will also provide a sense of enclosure so a person will feel as if he or she is walking through a space rather than through an undefined open area. Although the entry walk should be interesting, it should not be so indirect that it confuses or frustrates a visitor (Figure 2–25).

In terms of safety and convenience, the walk should be at least 4½ feet wide so two people can walk side by side comfortably (Figure 2–26). In addition, the walk should not exceed a slope of 5 percent. If necessary, steps can be incorporated in the entry walk to take up any grade changes.

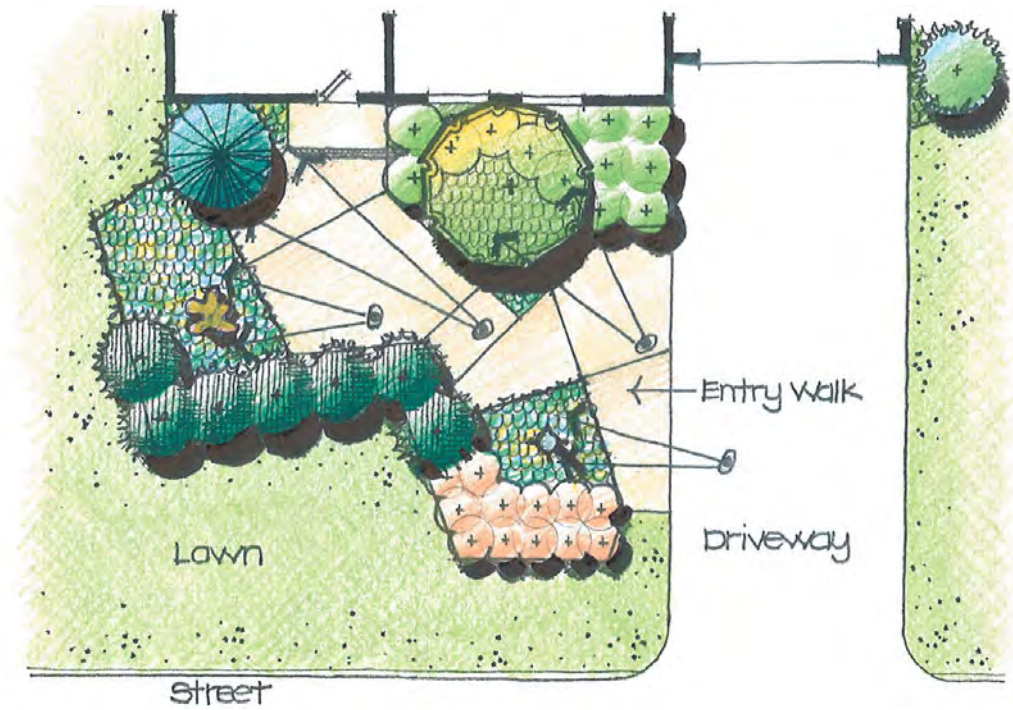


Figure 2–23
A "meandering" walk can provide different views as one moves toward the front door.

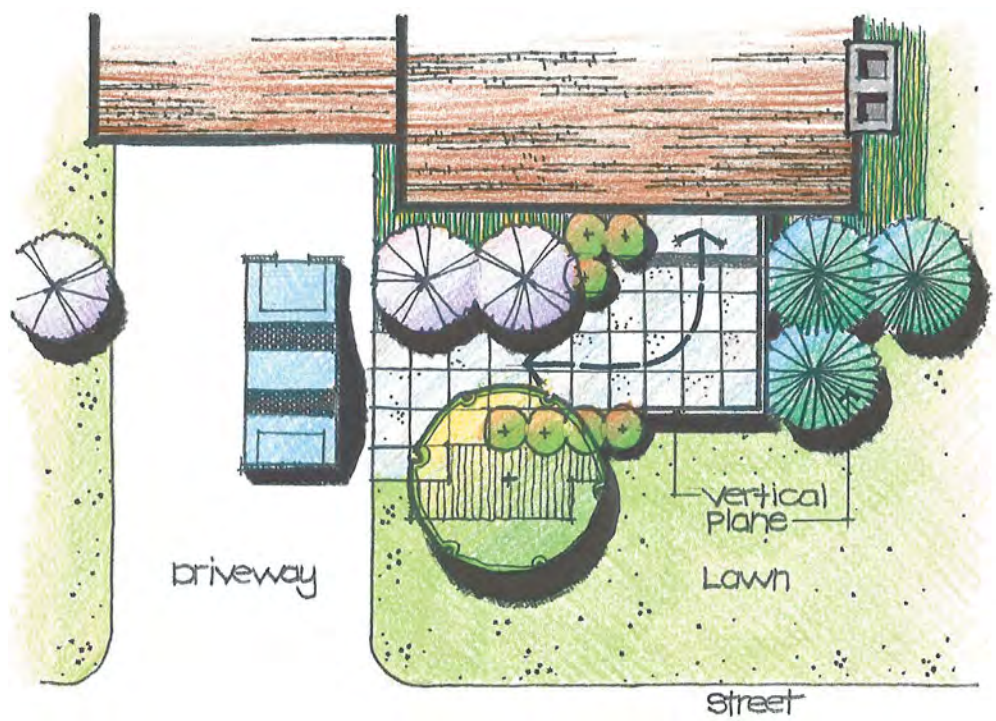


Figure 2–24
Low walls, fences, and plant materials can help direct movement through the space.

Semi-private Zone The outdoor foyer is the next zone of the arrival sequence. This space should have similar functions to the interior entry foyer by acting as the culmination of the arrival sequence, providing a stopping and gathering space to serve as a transition between indoors and outdoors. To support these functions, the outdoor foyer should be larger in size than the entry walk and have approximately equal plan proportions so it feels like an arrival space. This space should be large enough to allow for a small group of people to gather outside the front door without

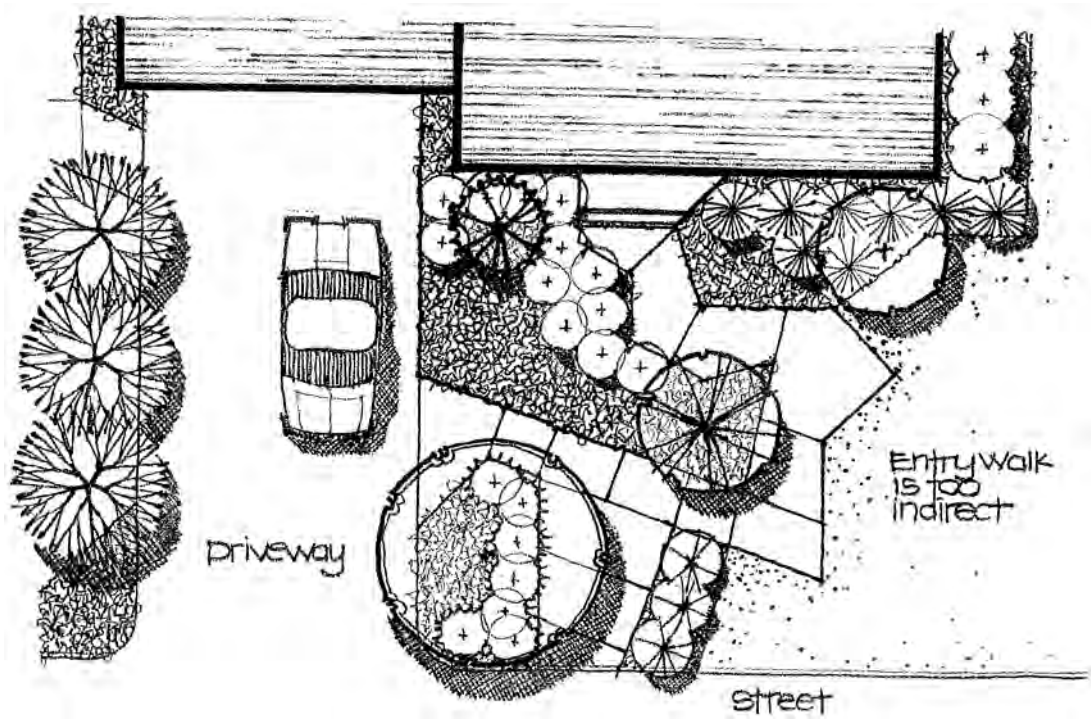


Figure 2–25
Avoid entry walks that are too long and indirect.

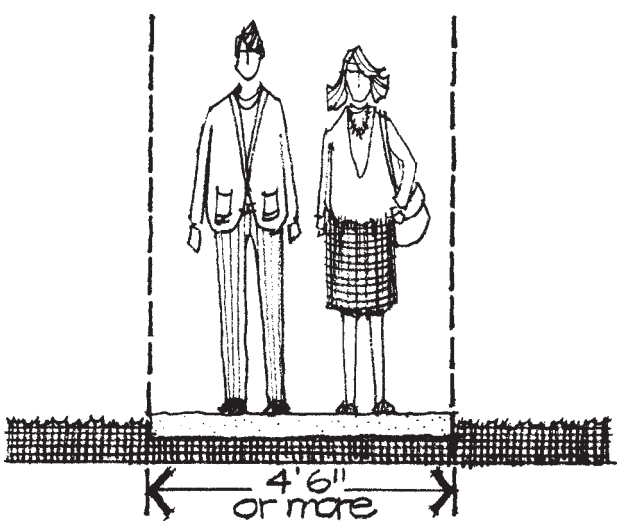


Figure 2–26
Minimum suggested walk width for two people.

being in the way of the opening and closing of the door. In addition, the outdoor foyer should be designed so the majority of its area is on the side where the front door opens (Figure 2–27). This allows for easier entry to and exit from the house.

To furnish an adequate sense of enclosure in the outside foyer, the designer should give careful consideration to all three planes of enclosure. The ground plane might be constructed of a different material or pattern than the entry walk to suggest its distinct use as a stopping and gathering space near the front door (Figure 2–28). Vertical planes can be utilized to control views into and out of the outdoor foyer and to give a sense of separation from adjoining areas of the front yard. As seen in Figure 2–29, the ornamental tree not only provides an accent element, but also serves as a screen

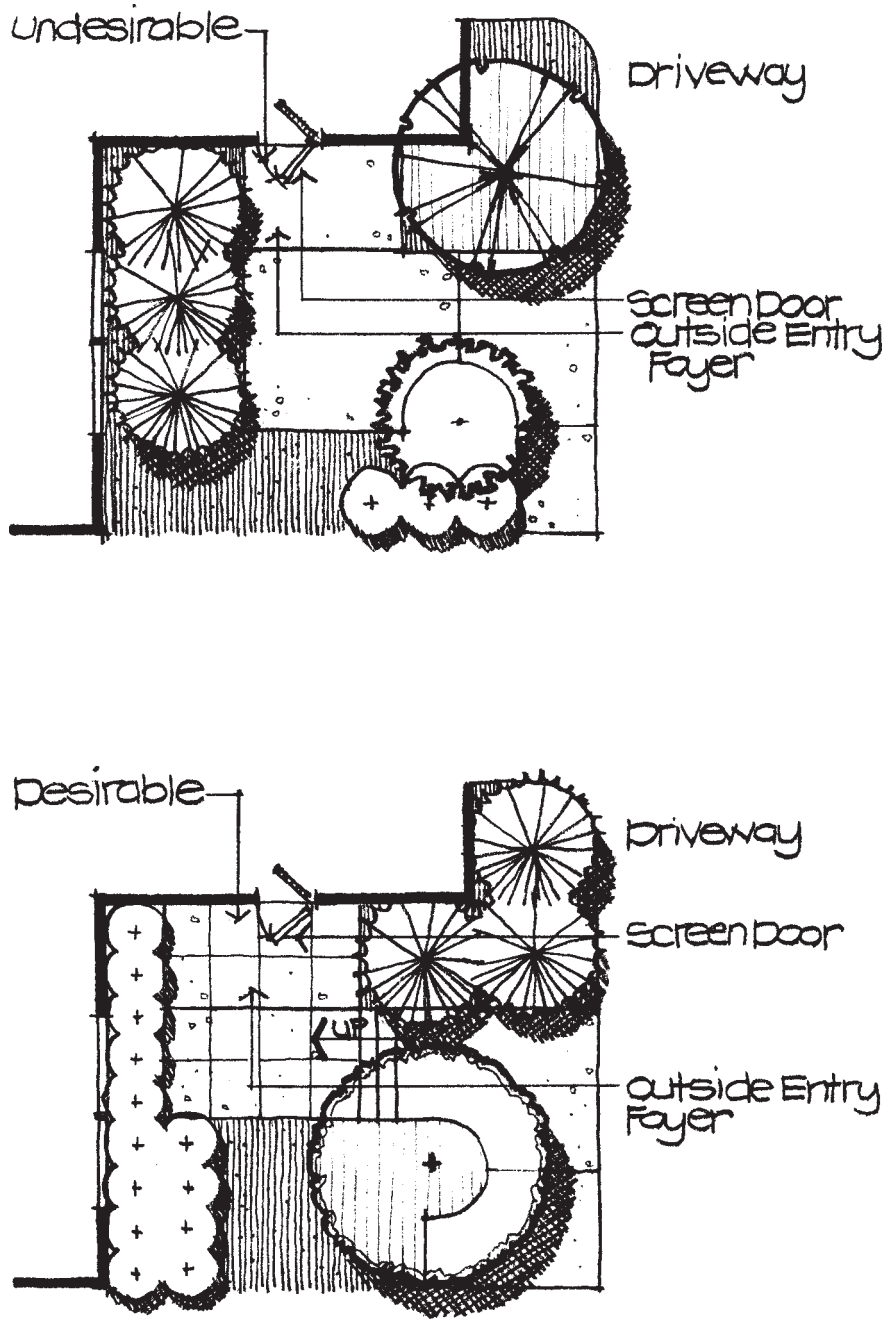


Figure 2–27
Provide adequate space for entry in relation to the swing of the door.

and "turning element" that directs people toward the front door. Depending on the degree of enclosure desired, the vertical planes may vary in height and transparency. In some instances, the outdoor foyer may be fairly enclosed for privacy, whereas in other situations, carefully selected views to other areas may be established. Again, the designer should check local zoning ordinances for restrictions of height and placement of any vertical structures such as walls or fences.

The overhead plane can be used in the outdoor foyer to provide an intimate scale to the space as well as to provide protection (if it is solid) from such climatic elements as hot summer sun or precipitation.

As with the interior entrance foyer, the outdoor foyer should also say "welcome" and provide a pleasant atmosphere. As with the inside of the house, this can be done by furnishing the space with such things as potted plants, sculpture, or other elements

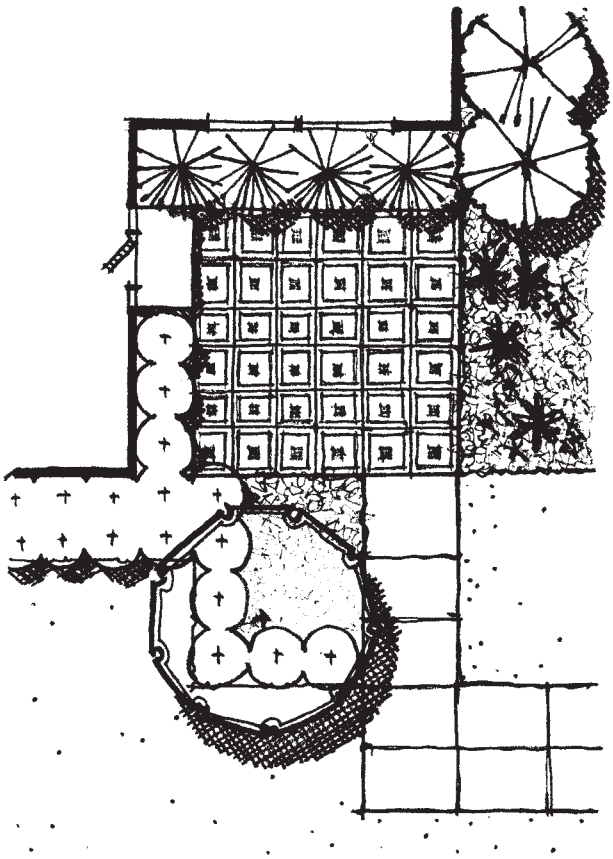


Figure 2–28
A change in the pavement material and/or pattern can be used to emphasize the entry foyer.

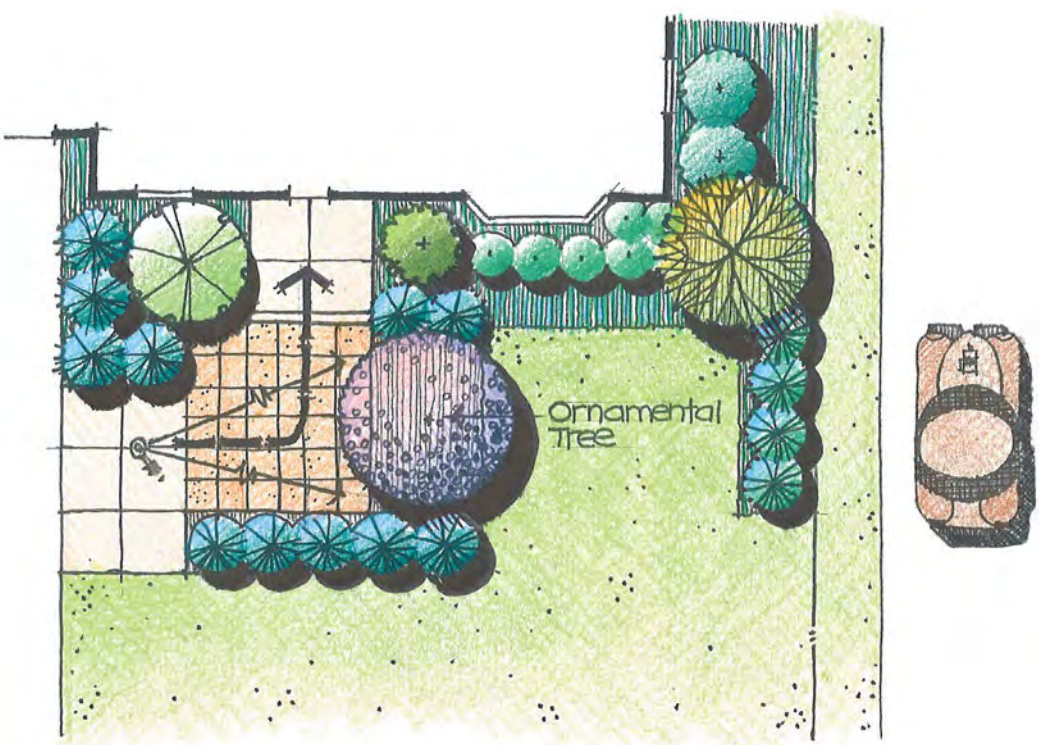


Figure 2–29
A tall element or ornamental tree provides accent, screens view, and directs movement.

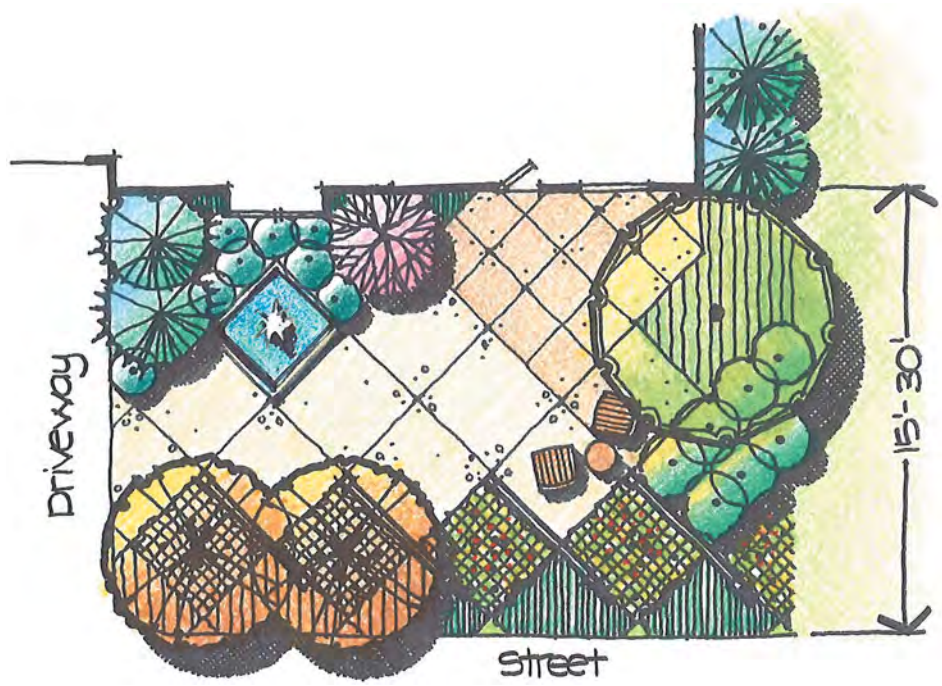


Figure 2–30
In small front yards, usable space and plantings may be used instead of lawn.

that give the space a personal touch. A bench may also be placed in the outdoor foyer, for it provides a place to sit and is a gesture of friendliness and hospitality on behalf of the residents.

Open Space Zone The last zone of the outdoor arrival and entry space is the remaining area in the front yard. Depending on the overall size of the site, this zone may vary from a small piece of ground to one that occupies many square feet. Its size will influence how this area is best used. For small sites, this zone may be used most effectively as a planting area incorporated into some of the other zones. In this situation, there may be no need for lawn. This zone may serve other uses such as an outside sitting space (Figure 2–30). Here, the sitting space is an integral part of the outside entry foyer so that the two functions work together. On larger sites, this last zone is often best taken up by an area of lawn, ground cover, decomposed granite, existing trees, and so on, serving as a foreground for both the house and other areas in the front yard. To what degree this area is incorporated into other zones of the front yard is a matter of circumstance and choice. The remaining yard area might be strongly separated (Figure 2–31) or integrated harmoniously with the other zones (Figure 2–32).

In conclusion, all the zones of the outdoor arrival and entry space can establish a friendly and welcoming atmosphere. Owing to the importance of producing this feeling, the arrival and entry space is one of the most significant outside spaces on the residential site and consequently deserves a great deal of attention on the part of the designer.

Indoor Living and Entertaining Room

One of the major rooms of the house is the living and entertaining space. Depending on the client, this space may be the living room, the family room, or the great room. In any case, the entertaining space is usually semi-public in nature because it is the place where visitors can be entertained and other business conducted. In addition, the residents often spend many hours in this space. Two reasons for its frequent use are (1) the decor and furnishings establish a comfortable and pleasant atmosphere, and

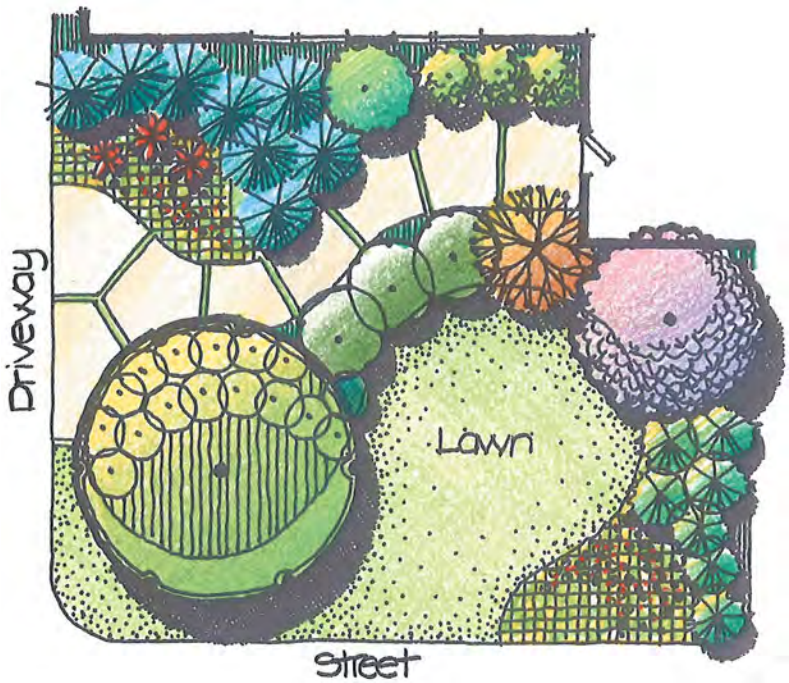


Figure 2–31
The entry walk may be separated from the lawn.

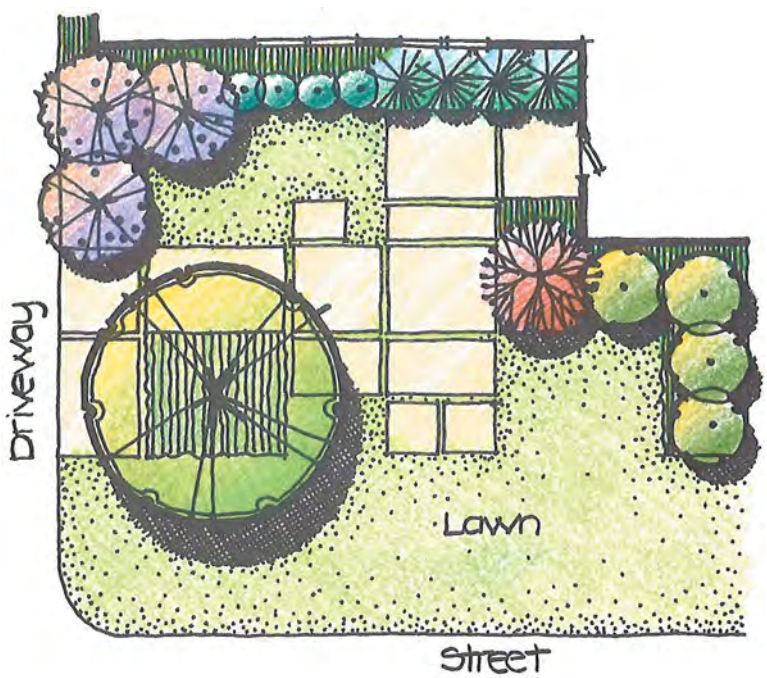


Figure 2–32
The entry walk may be integrated with the lawn.

(2) the space can be used for a variety of functions such as family gatherings, entertaining guests, eating, reading, listening to music, watching television, conversing, and so on. Lighting plays an important role in the utilization of the entertaining space, because it can normally be altered to match the mood of the activity taking place. A corner lamp may supply just enough light for reading while the fireplace may be used to create a special mood for a cozy and intimate get-together. Or, all of the lights may be lit to provide a bright and lively atmosphere for a party or family gathering.

One of the prime activities that occurs in this space is conversation. Consequently, the furniture usually is organized to allow conversation to happen in a comfortable and relaxing manner.

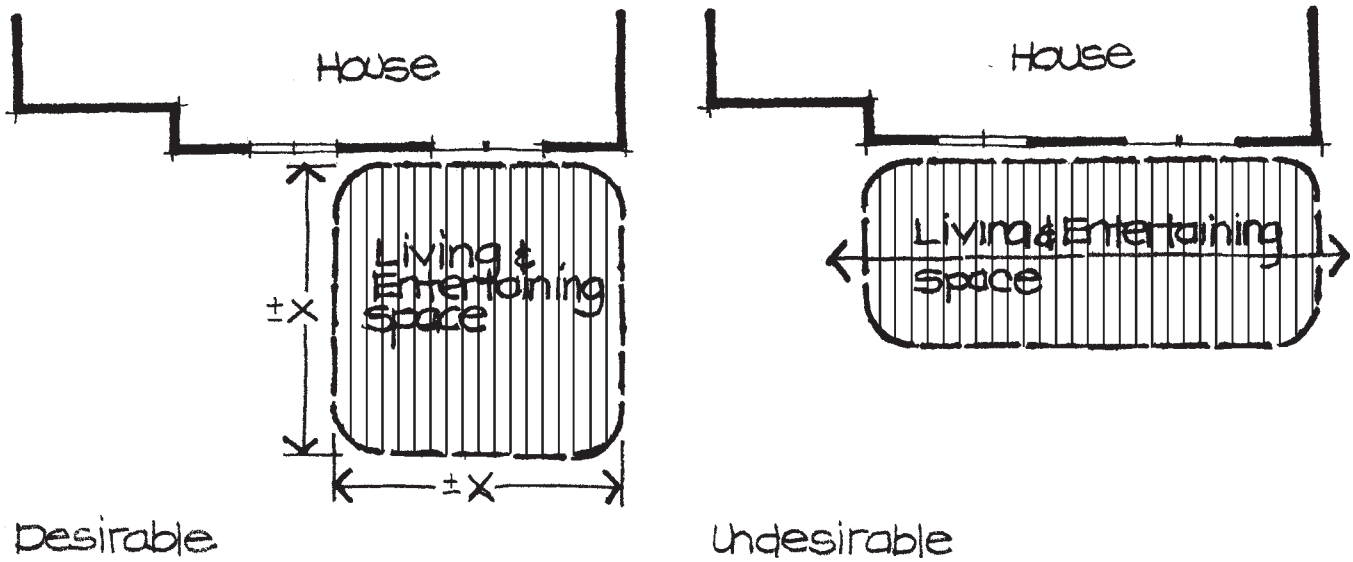


Figure 2–33
The outdoor living and entertaining space should have approximately equal plan proportions.

Outdoor Living and Entertaining Space

The outdoor living and entertaining space has a number of functions, like those of its indoor counterpart. It should be designed to accommodate individual and small-group relaxation, conversation, and interaction in relative peace and quiet, yet be flexible enough to hold larger groups of people for parties and other social gatherings.

One of the first considerations for designing the outdoor living and entertaining space is to establish the correct proportions and size so that it will function properly. This space (and its subspaces) should have fairly equal plan proportions to support its use as a gathering and meeting space (Figure 2–33). Long, narrow proportions should be avoided because they imply movement, like a hallway, and it is difficult to arrange furniture for conversation. The size of the space should be determined based on the anticipated number of people who will be using the space along with the required furniture. Information on the suggested sizes of typical spaces and elements is presented in Chapter 8. To prevent the outdoor living and entertaining space from becoming too large in scale, it can be organized as a series of smaller subspaces, each accommodating a particular function (sitting, entertaining, sunbathing, reading, and so on). This can be accomplished by varied plan configurations, differences in pavement material, and elevation changes (Figure 2–34).

The designer should also study the arrangement of furniture and other elements in the outdoor living and entertaining space so conversation, circulation, and other activities can take place appropriately. A designer should never just create a space or become overly enamored with its shape without an idea of how the space will actually function. Too many times, a space is designed with little or no idea in mind as to where people will actually sit, what they will look at, or where they will walk through the space. Chairs, for example, should be arranged in a generally circular group so people can face each other to talk. Circulation routes also need to be anticipated so they won't cut directly through a conversation group in a disruptive manner (Figure 2–35).

Another important consideration is for the designer to establish a sense of enclosure in the outdoor entertaining space, particularly with the vertical and overhead planes. Enclosure by the vertical planes can be created with walls, fences, steep slopes

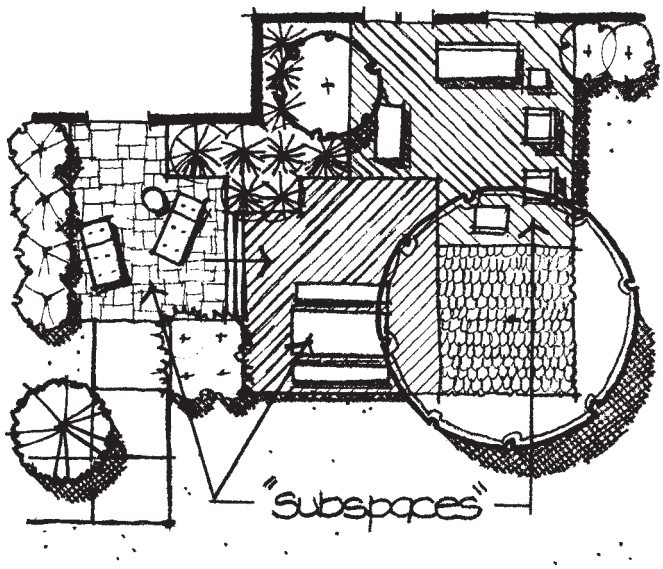


Figure 2–34
The outdoor living and entertaining space can be organized as a series of smaller subspaces, each with its own function.

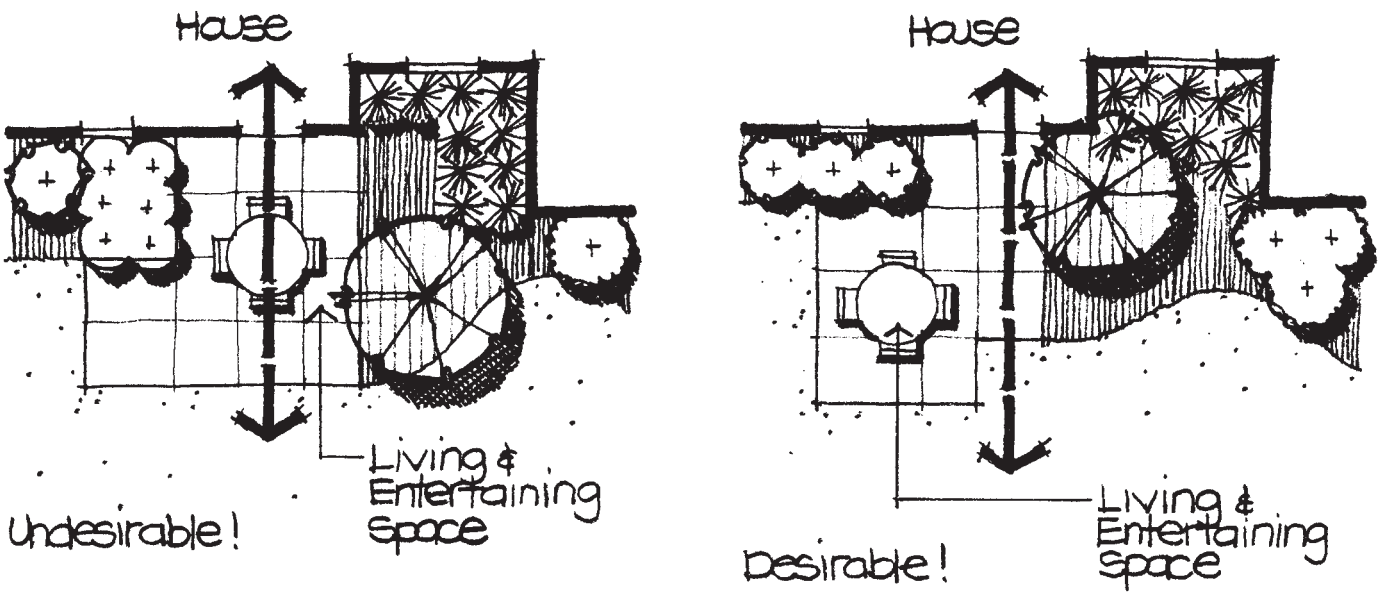


Figure 2–35
Circulation should pass along the edges of living and entertaining space.

of the ground, or plant materials either individually or in combination with each other. Vertical planes can also screen views of the neighbors and create privacy as well as block cold wind or hot late-afternoon sun (Figure 2–36).

The overhead plane can be defined with trellises, arbors, pergolas, canvas awnings, tree canopies, and so on (Figure 2–37). As in the outdoor entry foyer, the overhead plane can establish a "ceiling" and make the space seem more comfortable and intimate in scale. It is often more desirable to sit beneath an overhead plane with a partial or complete sense of cover than in a wide-open space with a totally open feeling. The overhead plane doesn't have to cover the entire space. It may extend over only a portion of the outside living and entertaining space rather than over the entire area (Figure 2–38). This creates subspaces, some shaded and some sunny. The overhead plane can also cast dramatic shadow patterns on the ground plane and provide places to hang such things as potted plants and wind chimes.

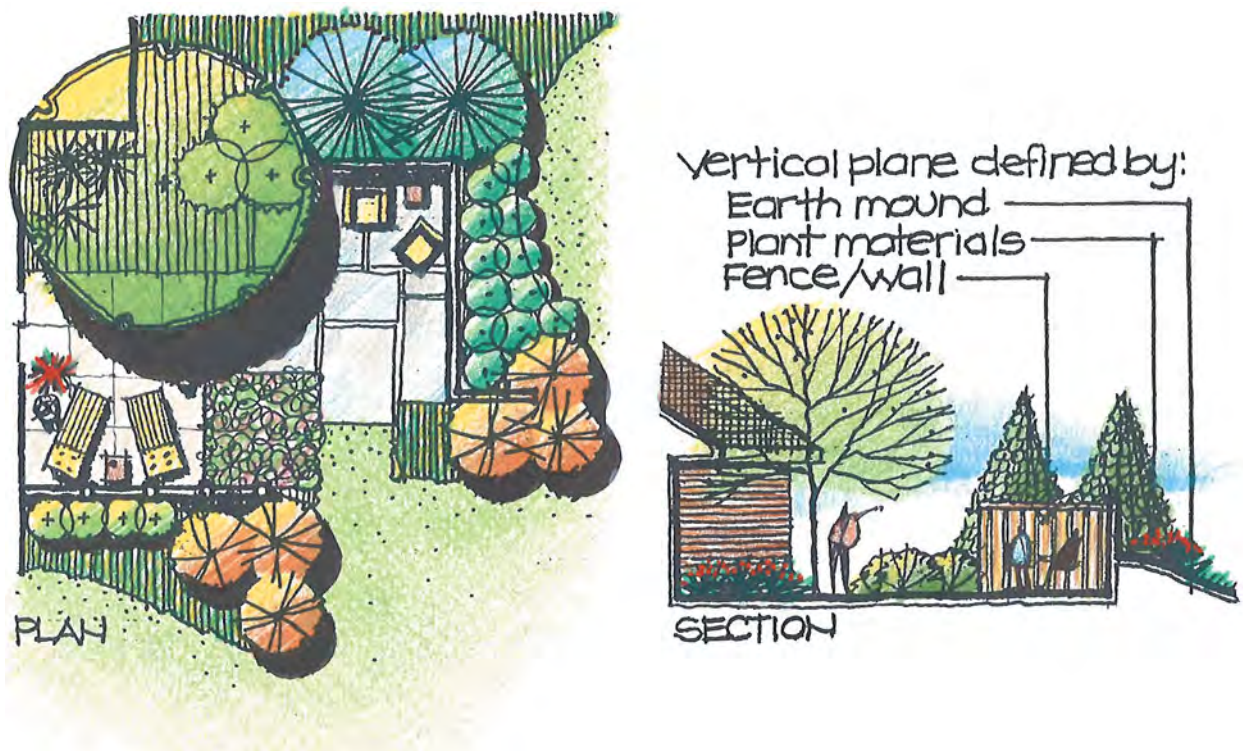


Figure 2–36
Vertical planes can be used to provide spatial enclosure and privacy in outdoor living and entertaining spaces.

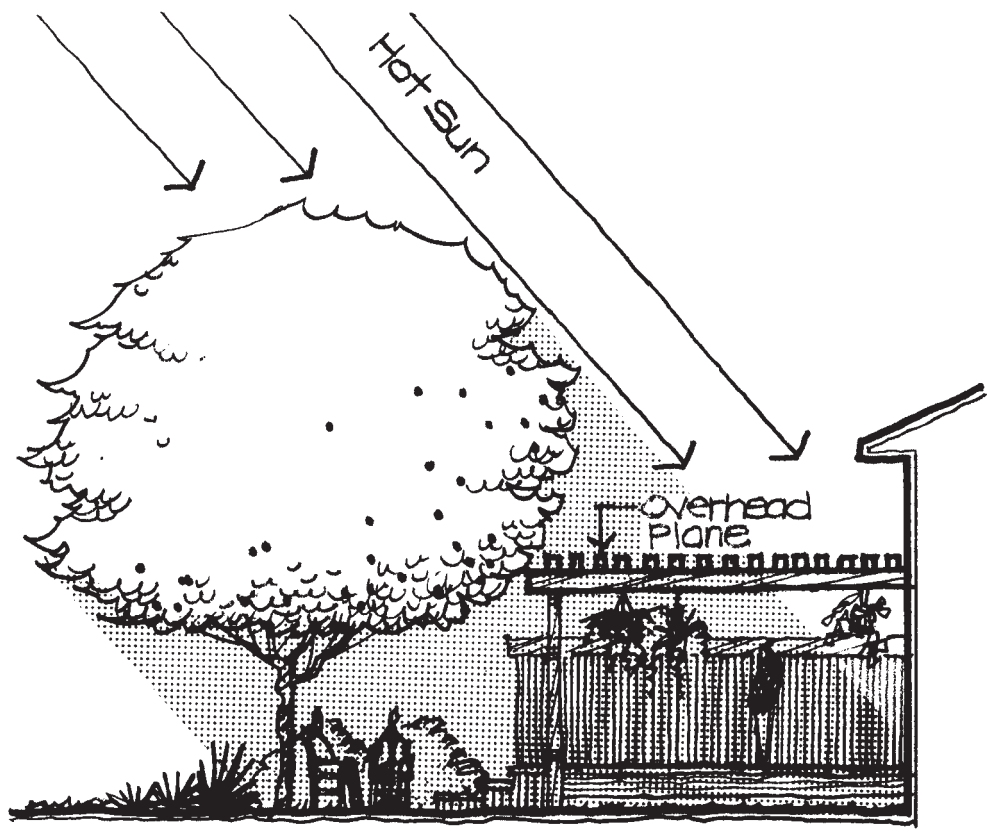


Figure 2–37
Overhead planes in the living and entertaining space can be defined by natural and artificial elements.

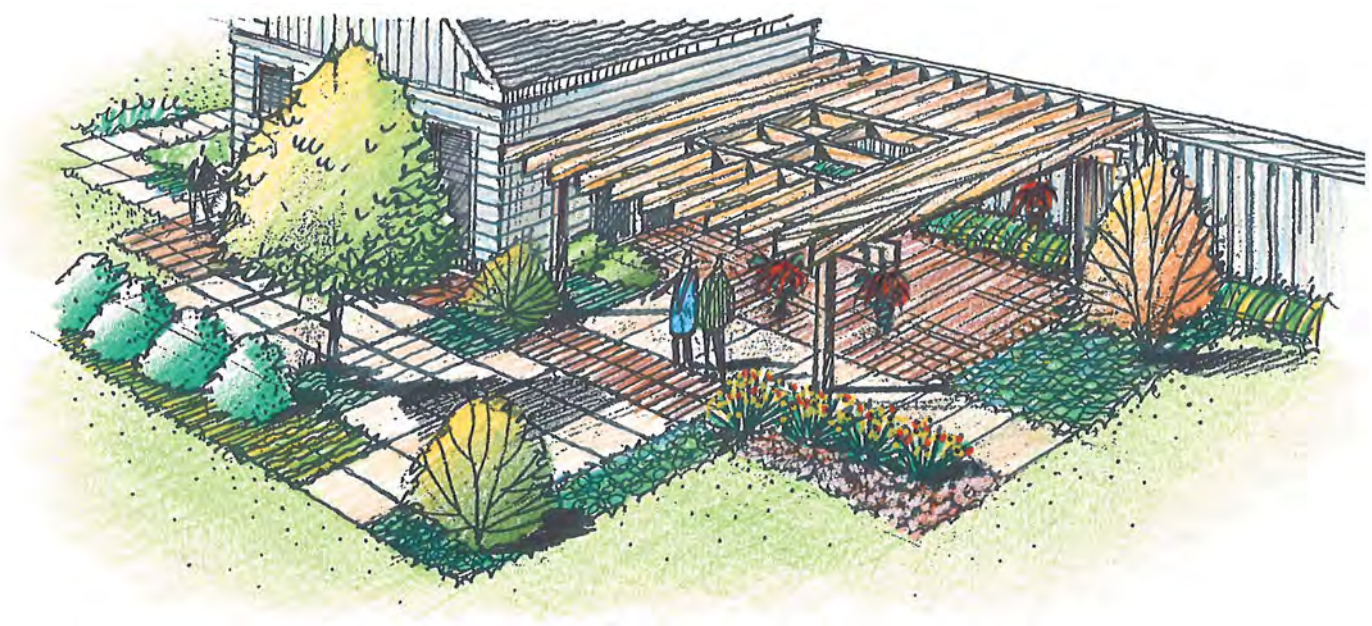


Figure 2–38
Living and entertaining spaces may be partially covered to create both sunny and shaded subspaces.

Although the outdoor entertaining space should have a sense of enclosure, especially for privacy, it should not feel totally walled in. There should be adequate openings in both the vertical and overhead planes of the space to allow for some views and sunlight. At strategic points along the vertical plane, views can be directed toward special accent areas situated on or off the site. In fact, there should be a conscious effort to establish focal points at various places throughout the site to capture views (Figure 2–39). In some instances, it may be desirable to take advantage of views off the site to a golf course, lake, or distant mountain range. However, views should not be allowed to drift off the site in an unplanned manner.

The ground plane in the outdoor entertaining space should also be given considerable attention. It should be constructed with a stable and durable material that reinforces the intended character of the space. The residents and their guests are apt to spend many hours in this space, allowing them to notice the detail and craftsmanship of materials more closely than in other areas. Therefore, the texture, color, patterns, and construction detail of the materials should be visually attractive and coordinated. Potential materials and patterns are discussed more thoroughly in Chapter 12.

Where appropriate, an attempt should be made to visually and functionally coordinate the outdoor entertaining space with the adjoining interior room(s) of the house. It is usually desirable to integrate the indoors and outdoors so they are perceived as a coordinated series of usable spaces linked together in the same overall environment. Again, the designer can work with all three planes of spatial enclosure to accomplish this. On the ground plane, one way to coordinate the indoors with the outdoors is by extending the indoor floor elevation to the outdoors by means of a wood deck (Figure 2–40). Indoor and outdoor spaces can also be visually integrated by repeating the same materials or patterns on the ground or walls. A ceiling can be extended to the outdoor living and entertaining space by means of an overhead arbor or awning (Figure 2–41).

In conclusion, the outside living and entertaining space is potentially one of the most intensely used spaces on the residential site. If designed properly, it will be the center of outdoor activity for the family's use as well as formal and informal entertaining of

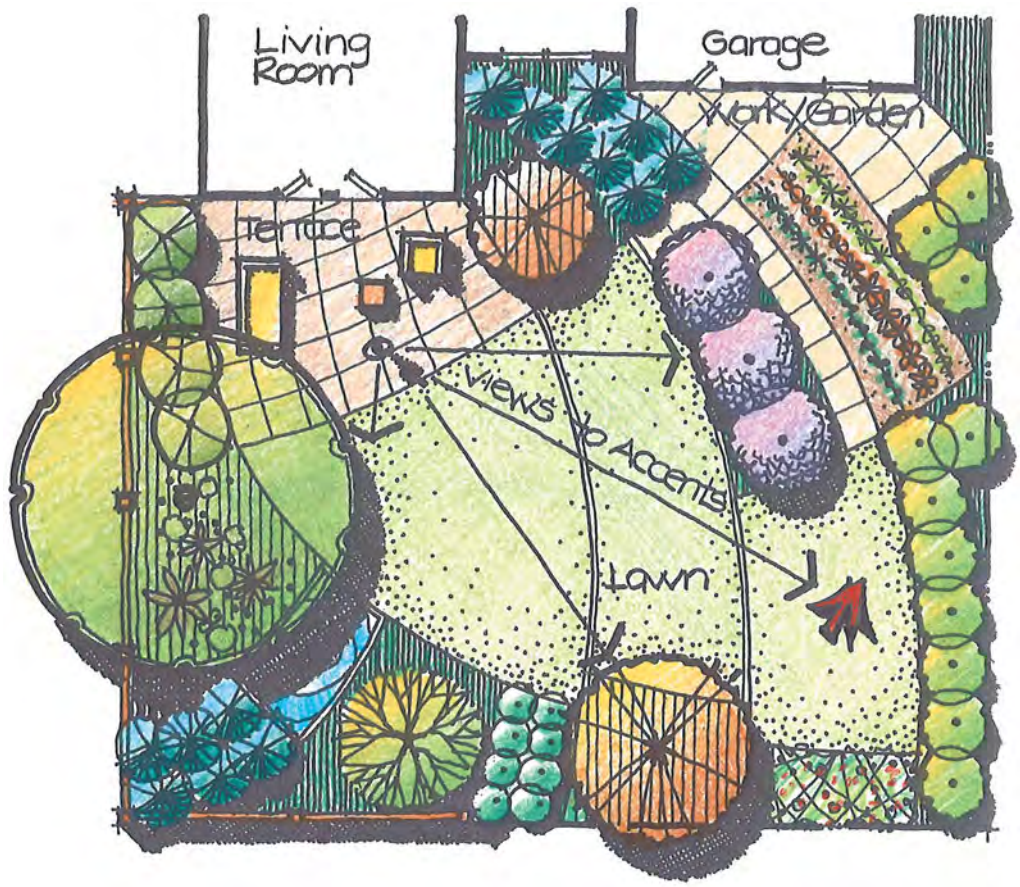


Figure 2–39
A variety of accents can be used to create views throughout the backyard.

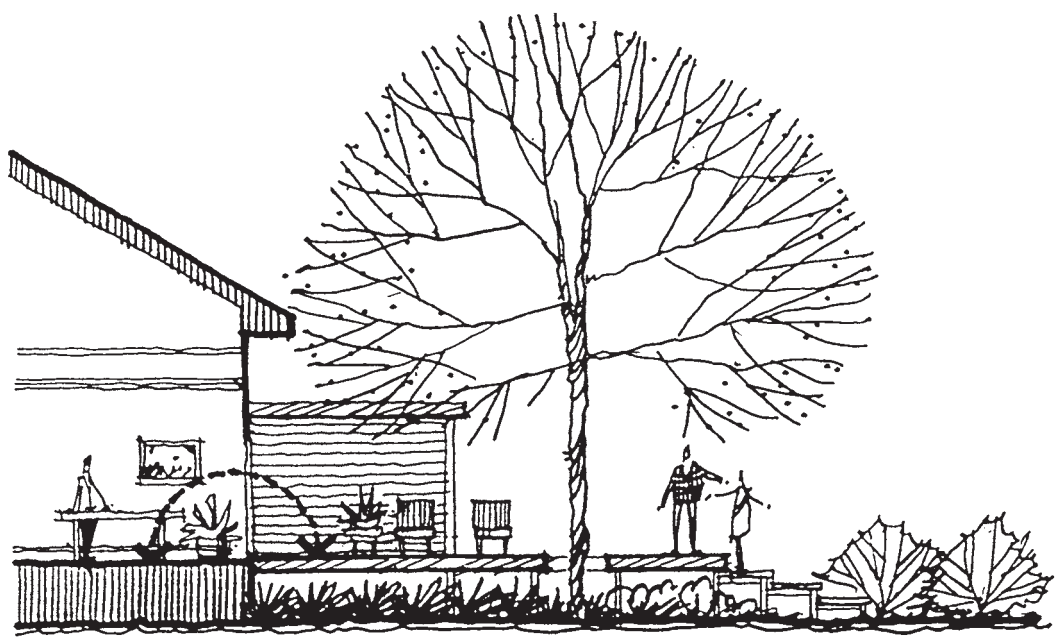


Figure 2–40
Indoor and outdoor spaces can be visually integrated by making the base plane the same elevation in both spaces.

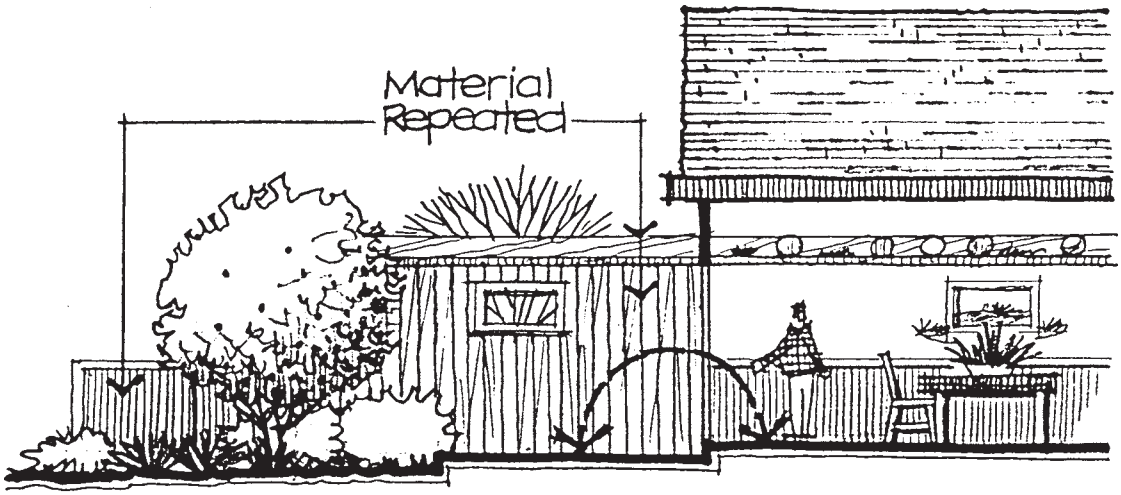


Figure 2–41
Indoor and outdoor spaces can be visually integrated by repeating the same material on the base plane of both spaces.

guests. For this to occur, the space should be comfortable to use throughout the day and evening, with characteristics similar to those of the indoor living and entertaining room.

Kitchen

The kitchen is normally a utilitarian room of the house. Its primary purpose is to prepare, cook, eat, and store food. But the kitchen can be a place for socializing, too. Have you ever noticed how many parties you have been to where people tend to congregate in and around the kitchen? But it is important to note that all the appliances are efficiently located around a central area for ease of working. A good kitchen typically has ample counter area for work space and for storing cooking utensils. It is normally located where there is easy access to and from outdoors for transporting groceries and taking out the garbage. The kitchen is often adjacent to the breakfast area and/or dining room, so food can be conveniently transported back and forth.

Outdoor Food Preparation Space

The outdoor food preparation space can vary from a simple area of pavement where a portable grill is located to an elaborate space containing built-in appliances, counters, and storage. Regardless of the particular situation, there are several guidelines for the design of this space.

The location of the outside food preparation space is critical. It should be placed where it is convenient to the kitchen, indoor dining room, and outdoor dining space (Figure 2–42). The food preparation space needs to be relatively close to the outdoor dining space so food can be easily and quickly transported between the spaces. Ideally, circulation between these spaces should be direct, for it is very easy to trip when carrying food, plates, utensils, and so on. Another consideration for the location of the outdoor food preparation space is the direction of the prevailing wind. The food preparation space should be placed so that the wind carries the smoke from the cooking fire away from the other outdoor spaces and the house (Figure 2–43). Whether a portable grill or built-in appliances are used, there should be some counter space or a surface on which to place food and cooking utensils. This doesn't have to be elaborate, but it does make cooking a lot easier. This surface works well when it is about 36 inches above the ground (typical counter height) and 24 inches deep (typical counter depth).

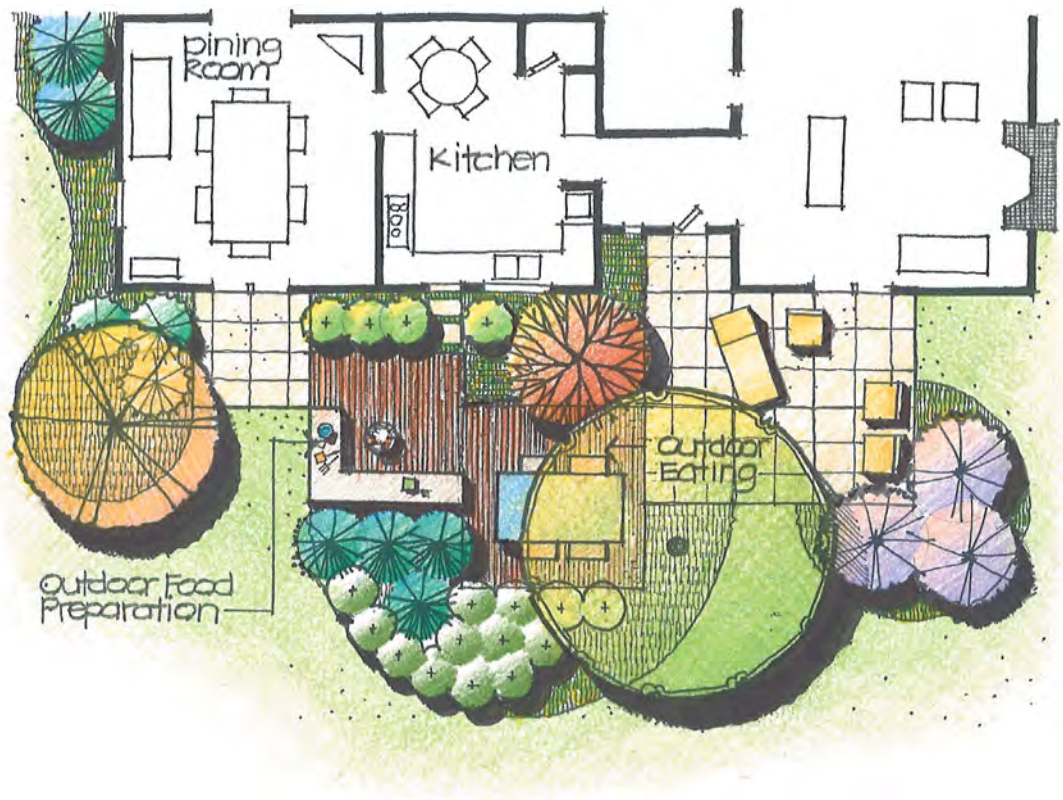


Figure 2–42
The outdoor food preparation space should be conveniently located near the dining room, kitchen, and outdoor eating space.

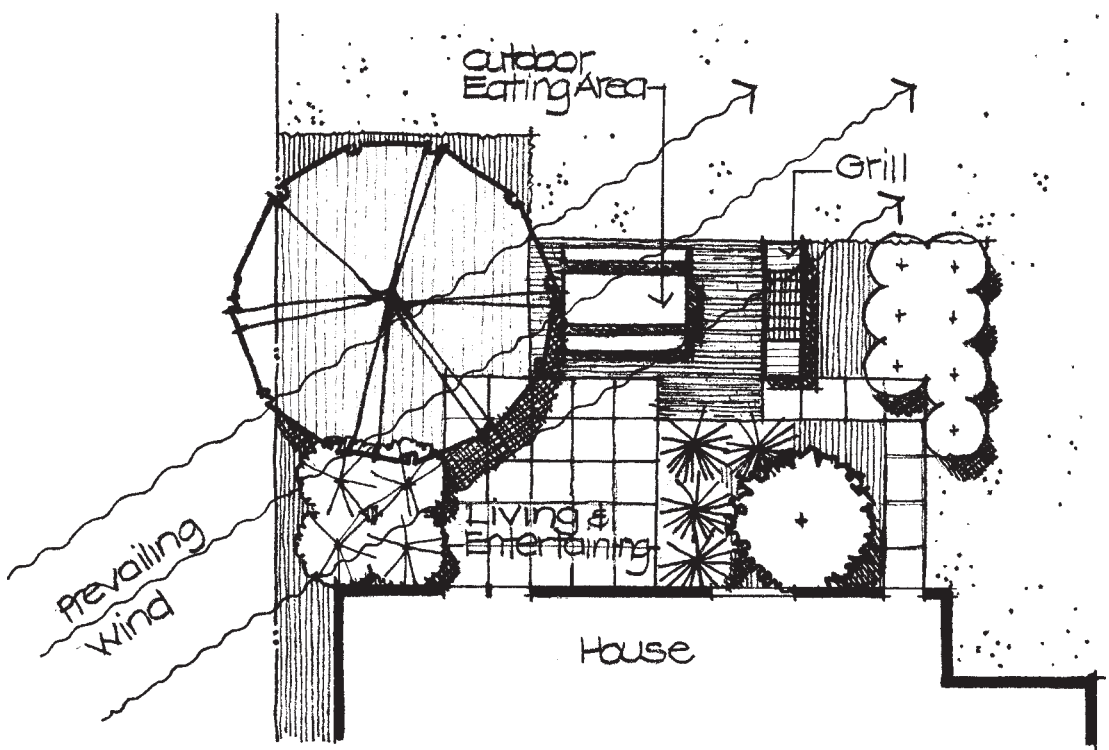


Figure 2–43
The grill should be located so that smoke is blown away from outdoor living and eating spaces.

Because fire in a grill or fireplace is an integral part of most outdoor food preparation spaces, it is necessary to keep its presence in mind. Branches of nearby trees should be kept some distance from the grill so that the generated heat doesn't burn any leaves above. And of course, wood surfaces should not be placed too close to the fire source.

The outdoor food preparation space should be studied carefully so that it fits into the overall design and works efficiently yet looks intentional and thought out. Too often, this space is simply left to occur wherever it may without much forethought and consideration. If well planned, it can add to the overall design rather than detract from it.

Indoor Dining Room

The inside dining room, although primarily used for eating, may also serve as a location for playing games, writing, studying, and so on, because of the presence of a reasonably sized table with several chairs. The dining room is usually simple in organization and design. The size of many dining rooms is about 125 square feet, with proportions that are equal or slightly longer than wide. More times than not, the dining room is located next to the kitchen and living room to be convenient to both. The dining room table is typically the dominant element of the dining room, with everything else in the room being secondary. The dining room does not possess the comfort and convenience of the living room and is not as utilitarian as the kitchen. However, it does combine eating, typically associated with the kitchen, with conversation, typically associated with the living room.

Outdoor Dining Space

The outdoor dining space on many residential sites is nothing more than a picnic table placed on the terrace or somewhere on the lawn. In some situations, this may be appropriate for casual eating but not for more private gatherings. In most cases, the outdoor dining space suffers from the same deficiencies as the outdoor living and entertaining space: little or no identity, spatial enclosure, privacy from neighbors, or protection from sun and wind. To address these problems, there are a number of design guidelines to consider.

As with all the other functions, the outdoor dining space should be designed as a room. Again, this means the designer should work with all three planes of outdoor space to create a sense of enclosure (Figure 2–44).

Like its indoor counterpart, the outdoor dining space should be located near the entertaining space and food preparation space for ease of access to both. In many cases, the outdoor dining space may be created as a subspace of the living and entertaining space (Figure 2–45). Again, this can be accomplished through a variation in shape, pavement material, or elevation change.

The plan proportions of the outside dining space should be equal or perhaps somewhat elongated to accommodate a picnic table. Its dimensions will vary depending on the size and number of tables and chairs that need to fit into the space.

Other Outdoor Rooms

Several other outdoor spaces or rooms also deserve attention. These include the recreation space, work/storage space, and garden space. Like the outdoor rooms already discussed, these spaces have a number of considerations that should be taken into account when designing them.

Recreation Space The outdoor recreation space should of course be located on flat ground, with a slight slope for adequate drainage. It should not be too close to other

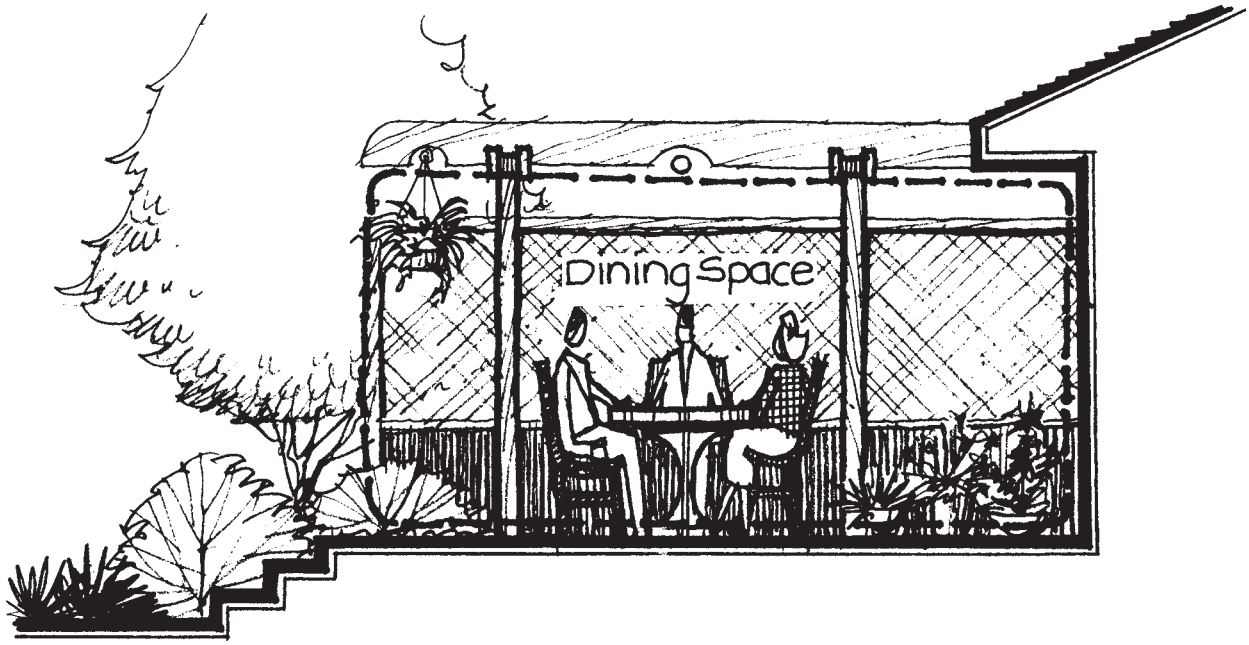


Figure 2–44
The outdoor dining space should use all three planes of enclosure for a roomlike feeling.

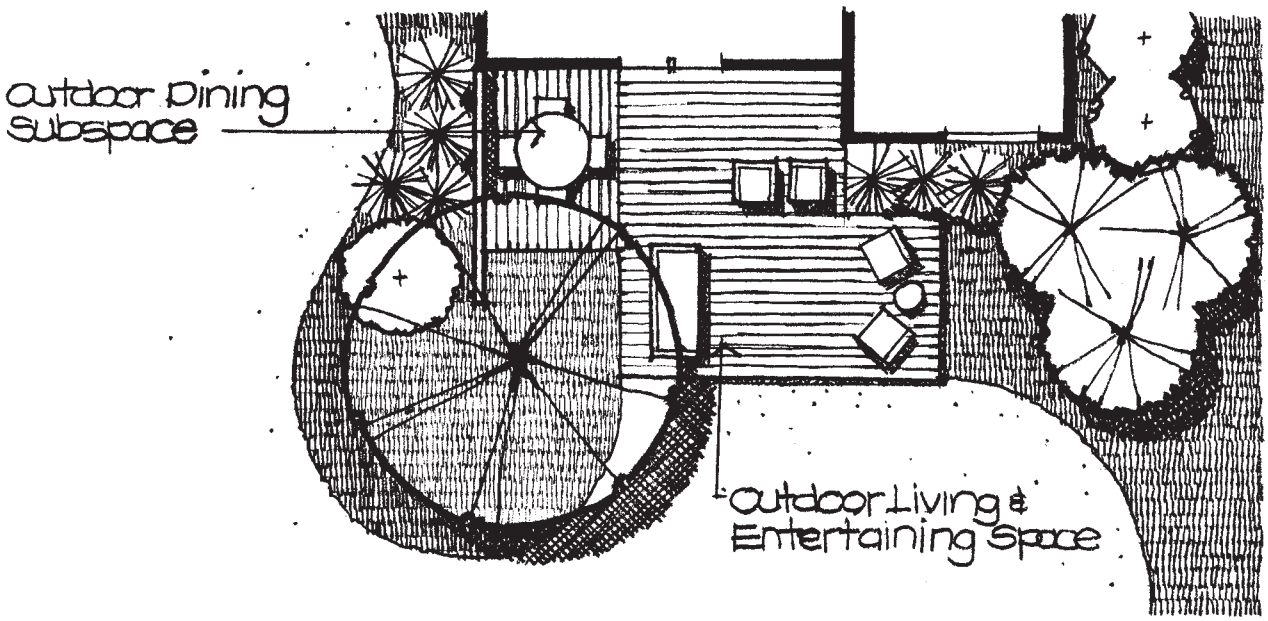


Figure 2–45
The outdoor dining space may be designed as a subspace of the living and entertaining space.

spaces that require peace and quiet or where delicate elements such as flowers and potted plants are located. The shape of the recreation space should be appropriately and adequately sized for the type of recreation. Beyond the functional requirements, the recreation space should be defined as an outdoor room. It should have a feeling of spatial definition whether it is by implication or actual physical enclosure. The lawn area is often an undefined entity that takes up all of the remaining area of the site after other elements are located. The edge and shape of the lawn area should not be an

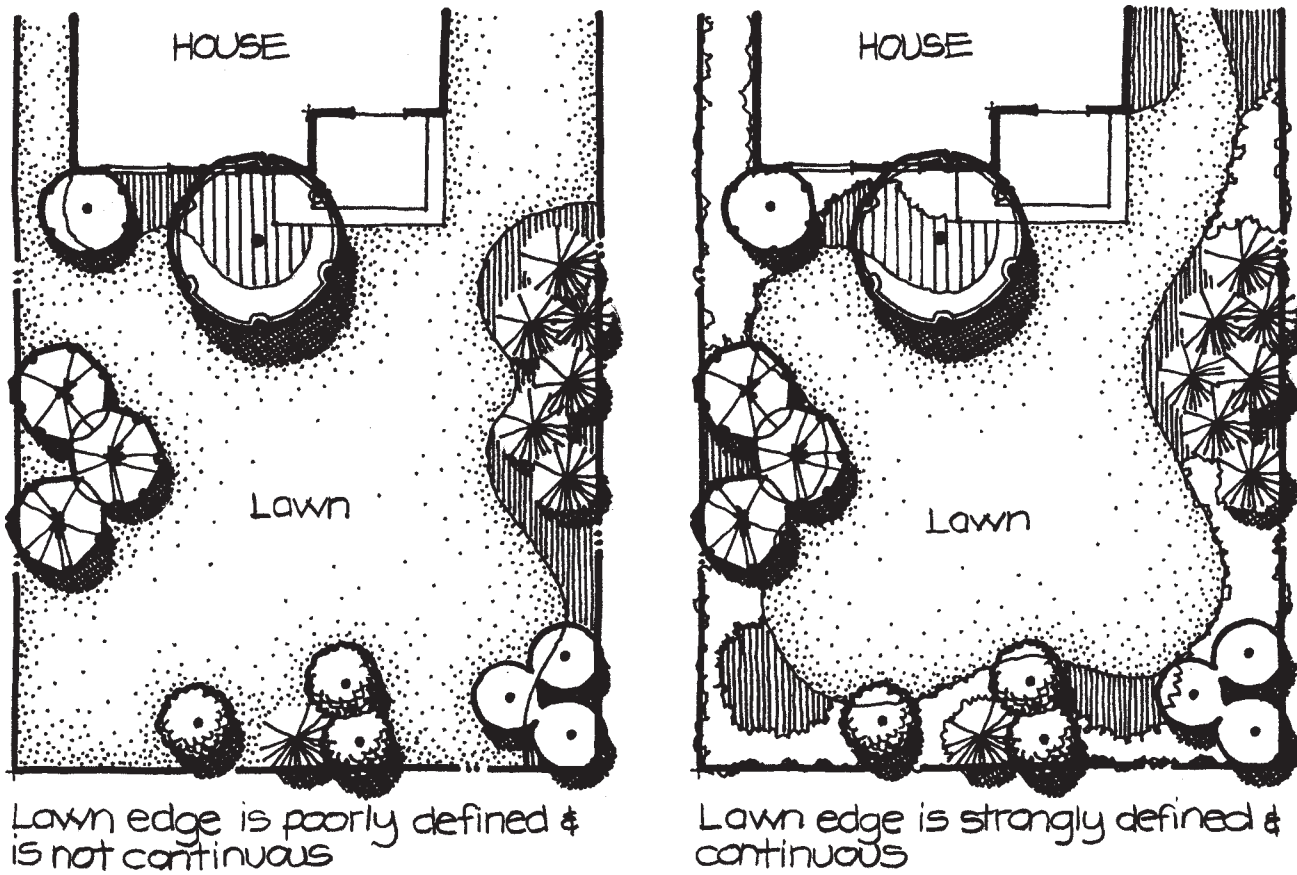


Figure 2–46
A continuous ground-cover edge and masses of plant materials can be used in designing the recreation area.

afterthought or be left to chance. As discussed later, the outer shape and outline of the lawn area should be given as much study as the form of any other space on the site. The edge of the lawn area can be established by a mulch bed, ground cover, masses of shrubs, trees, walls, and fences (Figure 2–46). Pools are a specialty item in some regions of the country, but quite typical in others. In all cases, thought should be given to (1) size of the pool desired based on the intended use (leisure, serious swimming, visual focal point), (2) adequate pedestrian circulation around the pool, (3) location of the pool in relation to the other functions on the site, (4) location of the pool's mechanical system and equipment, (5) ease of access by heavy equipment for constructing the pool, and (6) local ordinances governing fence type and height around the pool for protection of children and animals. Although there may be other important factors to consider, it should be stressed that a pool is likely to be the dominant element of a design owing to its uniqueness, thus making it an extremely important element requiring extensive study.

Outdoor Work/Storage Space The outdoor work/storage space is primarily a utilitarian room on the residential site. Its function is to store such things as firewood, garden and recreation equipment, and other items that are too large or unnecessary to keep in the house, garage, or cellar. The work/storage space is also a place where work can be done (light construction, potting plants, equipment repair, etc.). If properly designed, this space can act as an outdoor workshop. For these functions to occur, the outdoor work/storage space should be located near the garage or basement door so materials and equipment can be easily carried between them (Figure 2–47). The

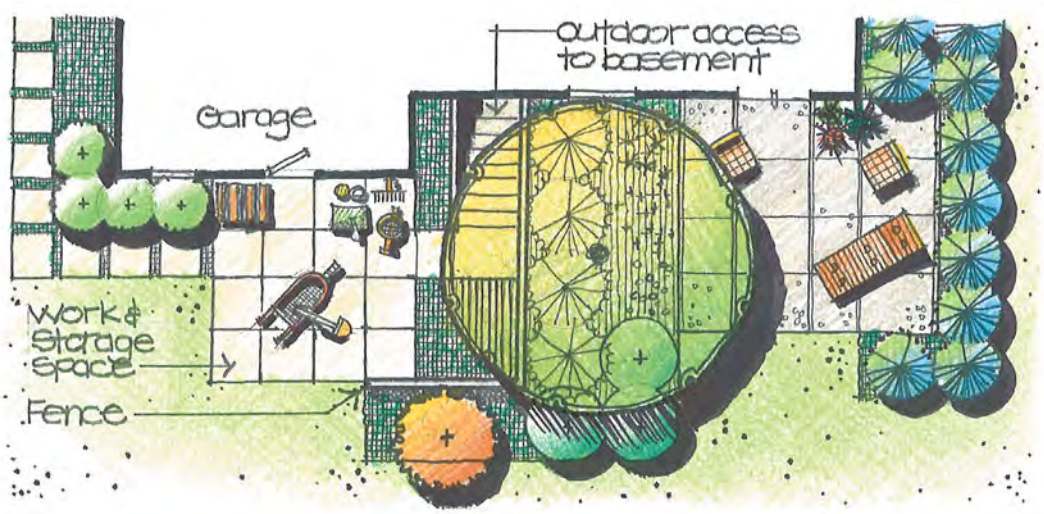


Figure 2–47
The work and storage space should be located near the garage and basement doors while also being separated from the living and entertaining space.

Figure 2–48
A work bench, potting area, and storage could be coordinated in one attractive structure.



work/storage space should have a hard, durable, and nonslip pavement surface. A wall or fence may be needed to enclose the work/storage space for security and/or to screen it from other spaces on the site. Inside the work/storage space, a work/potting bench, shelves, and enclosed or covered storage might be provided. Much of this can be designed and built in a coordinated manner (Figure 2–48).

Garden Space The garden space is another utilitarian area on the residential site. It exists as a work or hobby space for raising fruits, vegetables, and perennial flower beds. To function adequately, the location of the garden space is critical. It should be placed on fertile, well-drained soil on flat ground. The garden should be situated so it has adequate exposure to sunlight. If continuous sun exposure is not possible throughout the day, then morning and midday sun is preferred. Mid- to late-afternoon sun is the least desirable because it is the hottest and most drying. Ideally, the garden needs to be near a water source such as a well or outside water spigot. It is inconvenient if water hoses have to be stretched long distances to reach the garden. The garden space should also be located so it won't become an eyesore, especially during those times of the year when vegetables and other plants are not growing. It can be quite unsightly to look at a bare earthen patch in the backyard. Shrubs, fences, or walls may be used to provide varying degrees of screening of the garden (Figure 2–49). All of this suggests

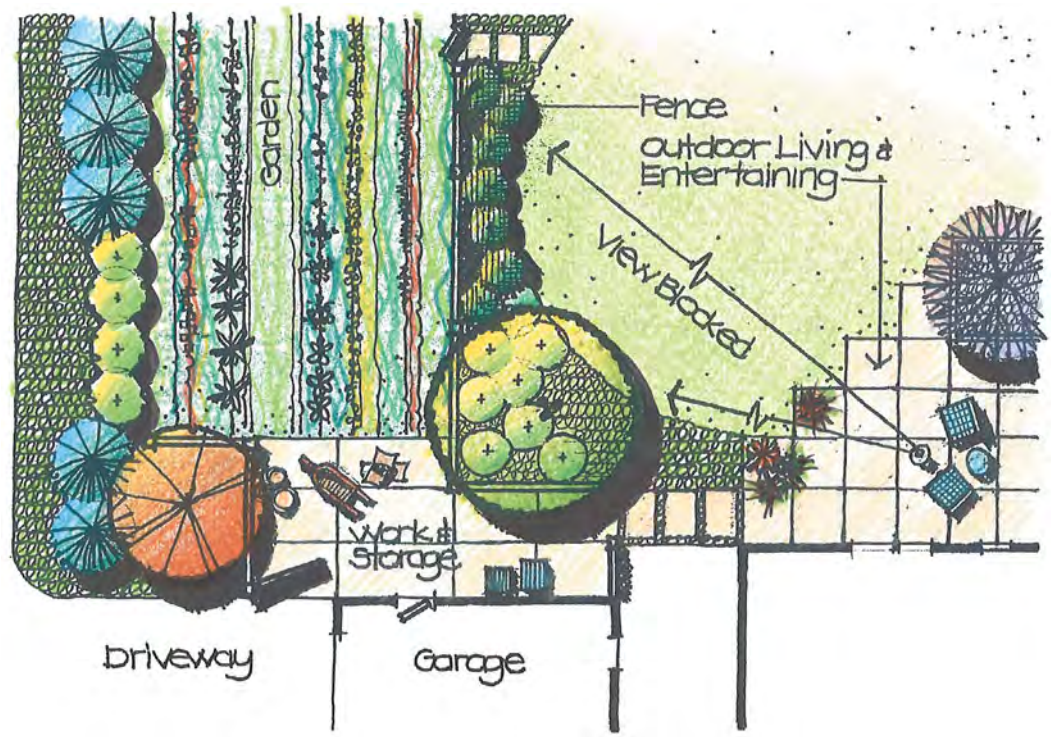


Figure 2–49
Plant materials and fences can be used to screen the garden.

that the back corner of the property, where the garden is commonly located by default on many sites, isn't necessarily the only or best location.

A few other ideas might also be considered for a vegetable garden. One is to incorporate the planting of vegetables with other plants in the yard rather than creating a separate vegetable garden. Many vegetables have attractive flowers and foliage texture. This concept treats vegetables like other plant materials that are used for a variety of functions, such as creating the edges of space or establishing points of interest (Figure 2–50).

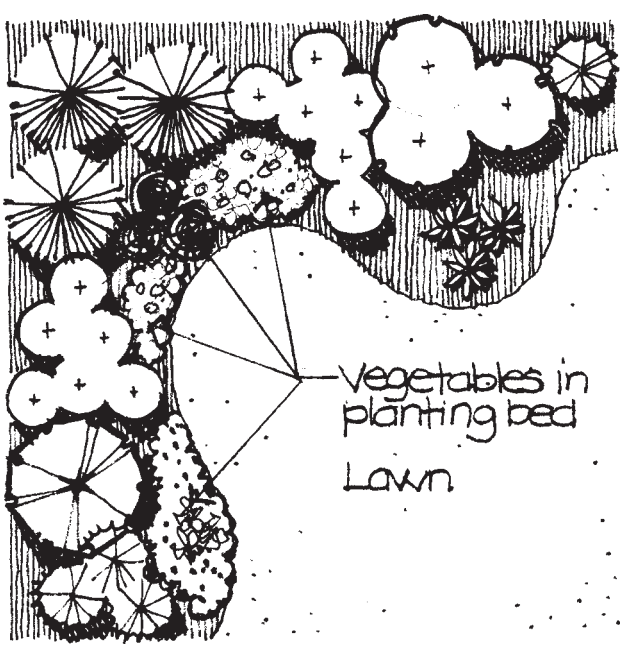


Figure 2–50
Vegetables can be integrated with masses of other plant materials.

Another idea is to design the garden as a series of raised garden plots. This gives the garden a neat and organized appearance and makes it easier to tend the vegetables while standing. Raised plots also make it possible to prepare one's own mix of fertile soil.

SUMMARY

Outdoor rooms are the residential designer's building blocks. They should be designed in imaginative yet practical ways to create exterior residential environments that enhance the quality and enjoyment of life. Having completed this chapter, you should now have an understanding of the following:

- Definition of outdoor space
- The three planes of spatial enclosure and the functions of each
- Landscape elements that define each of the three planes of spatial enclosure
- Outdoor rooms that are recommended for the residential landscape
- Zones of the outdoor arrival and entry space and the location of each
- Recommendations for views and legal constraints along the street in front of the residence
- Guidelines for the driveway dimensions, safety for the opening of car doors, driveway edge, and the landing within the driveway space
- Considerations for making a pleasant walk to the front door including walk width and slope, direction of walk, enclosure, views, and use of focal points in the entry walk space
- Suggestions for size, proportion, relation to front door movement, pavement, vertical and overhead planes, and use of feature elements in the outdoor foyer space
- Guidelines for the outdoor living and entertaining space including size and proportion, subspaces, arrangement of furniture, circulation, pavement, vertical and overhead planes, and connections to adjoining outdoor and indoor areas
- Recommendations for the outdoor food preparation space such as location, circulation, relation to wind direction and nearby plant materials, and ways to accommodate cooking tools and equipment
- Criteria for the outdoor dining space such as location and size, plan proportion, and planes of enclosure
- Requirements of the outdoor recreation space(s) including size, noise, and needed equipment
- Suggested location, pavement surface, enclosure, and ways to support potting, crafts, and other related gardening activities in the outdoor work/storage space
- Guidelines for the garden that consider location, sun, access of equipment, connection to utilities, and views

3
Sustainable Design

INTRODUCTION

Although there are many commonalities between designing interior and exterior rooms, one significant difference is that the exterior space exists in the outdoor environment where natural elements and processes are constantly present. A residential site is a living entity composed of abundant organisms including trees, shrubs, annuals, perennials, lawn, and even miniature flora such as moss and lichens. In addition, the residential site is a habitat for various animals, birds, and insects that live, feed, and nest in the ground, in woody and herbaceous plants, and in the tree canopies above. Less obvious to the eye are millions of microorganisms that exist in the air, plants, and soil. Collectively, these living organisms form an interconnected web of life embracing the entire residential landscape.

A range of natural processes such as growth, decay, sun, wind, precipitation, runoff, and fire collectively affect the presence and health of the various life forms on the residential site. These ever-present forces provide the necessary ingredients for life to exist, though they can be devastating when there is too much or too little of any of them. The natural forces likewise animate the landscape as they touch, move through, or seasonally alter every aspect of the outdoor environment.

All in all, the residential landscape is a living, dynamic setting that is constantly evolving and should be designed and managed as such. Proper residential design must promote the health of all living organisms on a site and be responsive to the natural forces that are always present. Accomplished design should also be considerate of the larger environmental issues affecting the region, country, and world. This approach to landscape design is commonly known as *sustainable design*. This chapter examines what sustainable landscape design is and presents numerous design and management strategies for making a residential site environmentally fit.

SUSTAINABLE DESIGN

The words “sustainable” and “sustainable design” have become common and even popular terminology in the design and environmental professions, though their definitions and relevance vary. Simply stated, “sustainable” means ongoing, enduring, and self-sufficient. Thus, “sustainable landscape design” is a process of creating an outdoor environment that is capable of enduring over time in a self-sufficient manner with minimal expense of energy and maintenance. Sustainable design is integrated into the

landscape with minimal impact on the land while supporting the health of all living organisms on the site. Similar terms for sustainable design are *design with nature*, *green design*, *environmentally sensitive design*, and *low-impact design*.

Sustainable landscape design is a desirable concept not only for the benefits to an individual residential site, but for the larger environmental context as well. It is important to realize that every residential site is not an isolated island but rather an integral part of an environmental continuum where all things and processes are interconnected. How a particular site is designed and managed can have potential consequences that extend to affect the region, country, and world. Our present-day world has numerous environmental challenges, including global warming, dwindling natural resources, air and water pollution, increasing cost of energy, water shortages, and so on. A sustainable landscape recognizes these issues and is designed to help alleviate them. True sustainability means environmental sensitivity for an individual piece of ground and everything else beyond.

To accomplish this, the sustainable residential site should:

- fit the regional context.
- have minimal site impact.
- restore damaged sites.
- coordinate with natural events and cycles.
- reuse and recycle.
- create a healthy environment.

The desire to create a sustainable residential site that is sensitive to both the near and distant natural environment is an encompassing design philosophy that affects all steps of the design process and numerous decisions about what elements to include in a design, along with their location and material. Like the concept of creating outdoor rooms or aesthetic guidelines, sustainable principles and techniques provide a framework to design within. However, sustainability does not mean that a site must look completely "natural" to be "sustainable." A sustainable site design can appear natural if desired, but it can also be created in many other styles in any geographic location. Nor does sustainability imply that a residential site will look messy, ill kept, or simply not designed. A sustainable design can potentially have a great deal of control and look highly maintained if that is the intent. Sustainable principles do guide design choices while simultaneously permitting considerable freedom and room for design creativity.

A range of sustainable principles and strategies are discussed in detail in the following sections of this chapter. As they are read and studied, please realize that many of these principles overlap and are mutually supportive. Undertaking one strategy often contributes to others as well. Thus, the various principles and strategies should be implemented collectively so that they can have the greatest opportunity of creating a sustainable residential landscape.

REGIONAL FIT

Principle: The residential site should conform to the regional context.

Every geographic location has its own unique ecology collectively established by climate, topography, geology, soil, vegetation, and fauna. These interdependent natural factors along with human-imposed territories such as municipalities, townships, or counties define a region. The size of a region varies from one location to another, though it is typically accessible within a one- to two-hour drive. However large, each region is distinguished by its own particular physical character and environment. Sustainable design recognizes the special qualities of each region and adapts site organization, materials, construction techniques, and overall visual quality to fit them.

Regional Climate Fit

Each region is distinguished by a set of climatic factors, including temperature ranges and cycles, precipitation amount and patterns, wind direction and strength, seasonal sun angles, the number of sunny days, and humidity. These factors should affect the size, location, and orientation of all outdoor spaces and use areas on the residential site. What is appropriate in one region is often not suitable in another. For example, an outdoor sitting space is best placed on the south side of a residence in New England to benefit from the warmth of the sun, and on the east or north side of a house in New Mexico to take advantage of the shade (also see "Study Sun and Shadow Patterns" in "Natural Events and Cycles" in this chapter).

The regional climate should affect what construction materials and techniques are employed (also see "Use Regional Materials" in this section). Wood, for example, works well as an exterior material in temperate climates but is not practical in hot, arid climates where intense sun rapidly deteriorates it. How materials are joined, are finished, or extend into the ground should similarly be determined by regional climate conditions. All structures and pavement areas must be detailed with frost in mind in cold regions, whereas there is no need for this in warm climatic regions.

How much water is used and where on the residential site should also be determined by the region's climate. Ideally, a landscape should be designed to use only as much water as is available from natural precipitation and augmented, if at all, with irrigation in selected areas (also see "Conserve Water" in "Natural Events and Cycles" in this chapter). In addition, plants should be selected based on temperature ranges (hardiness zones), precipitation amounts, and precipitation cycles.

Use Regional Materials

All materials used in the sustainable landscape should be manufactured, quarried, or found within the region as much as practically possible. Note that regional materials are not those purchased at a local supplier that originated somewhere else in the country or world. Employing materials obtained in the region has several advantages. First, local materials are visually harmonious with a site because their compositional makeup, color, texture, and so on are all around and part of the material palette that defines the regional character. A second benefit of utilizing regional materials is that they often cost less because transportation expenses are minimized. It is cheaper to ship stone from a local quarry than from one that is miles away in a distant part of the country or world. Further, the use of regional materials benefits the local economy by employing people who live in the area.

The use of regional materials applies to vegetation as well. Regional plant materials or "native plants" are those found growing naturally in the geographic region, which are inherently adapted to local climate, soil, insects, and so on. Regional plants might also include vegetation from other locations with similar climate and soil conditions, though care must be taken to ensure that such plants are not invasive or hosts to pests not normally found in the region. In addition to sharing the benefits of other regional materials, indigenous plant materials have the innate ability to survive unattended in the region and are often acclimated to growing in plant associations with other native vegetation.

Minimal Site Impact

> **Principle:** The residential site design should have minimal impact on the existing site.

A sustainable design alters the existing site conditions as little as possible by preserving the elements that are present on a site as well as the natural processes and cycles that support them. This goal is hardest to achieve yet most critical on an undisturbed

natural site where any activity at all alters the site. The very placement of the house and access to it usually requires grading and removal of vegetation. Beyond this primary impact zone, every effort should be made to work around existing trees and other significant vegetation, protect unique geological formations, minimize grading, and preserve natural drainage patterns. On sites that have been drastically changed by a previous homeowner or developer, as is common in many new subdivisions, the challenge is one of saving any remnants of a natural landscape or keeping natural features and elements that were sensitively introduced to the site. The following strategies foster minimal site impact.

Preserve Existing Vegetation

All vegetation that is present on a site should be retained as much as possible, especially trees, whose size and ecological impact are most significant. The one exception to this objective is in fire-prone regions where it is desirable to remove vegetation that is close to the house (also see "Protect from Potential Wildfires" in "Natural Events and Cycles" in this chapter). Existing vegetation fulfills a number of vital environmental functions, such as stabilizing soil, retaining soil moisture, cooling summer air temperatures, reducing the impact of wind, removing carbon dioxide and dust particles from the air, and producing oxygen. Vegetation is also a habitat for many birds, animals, and insects. Removing existing vegetation diminishes these potential benefits and exposes the site to increased runoff and erosion, higher summer air temperatures, wind, and other related problems. If some of it must be removed, then vegetation that is in poor health, invasive, or a nonnative species or that is simply in the way should be removed first. Judicious pruning or the limbing of selective branches should also be considered as an alternative to eliminating vegetation.

To safeguard trees that are to remain on a site, the ground below the canopy within a tree's drip line should not be altered or compacted in any manner. Most of a tree's roots exist within the first several feet of soil directly below the tree canopy, though some roots can extend well beyond the tree canopy (Figures 3–1 and 13–11).

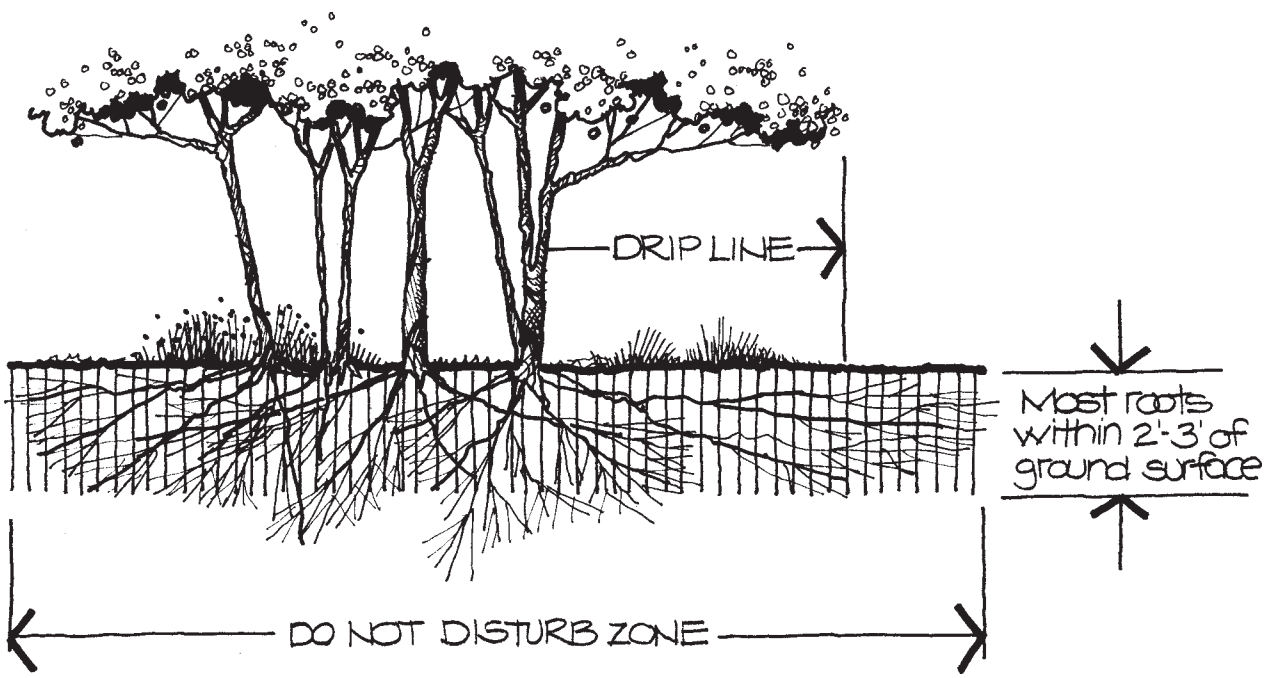


Figure 3–1
The ground directly below tree canopies should not be compacted or altered in any way.

During construction, the sensitive ground below all tree canopies should be fenced off to prevent grading, movement of construction equipment, and the storage of construction materials. The proposed design should locate all structures, paved areas, and heavily used lawns outside the tree drip line as well. Structures that must be located under a tree should be elevated above the ground on posts to minimize the necessity of excavating into the ground for linear footers. Likewise, paved surfaces under trees should be porous or in the form of a deck (also see "The Wooded Site," Chapter 13, page 456). The optimal ground surface for the area below the tree canopy is one covered with ground cover or other woody and herbaceous plants that can protect the tree roots and help to maintain soil moisture.

Minimize Grading

As already mentioned, some site grading or earth moving is a common and necessary activity during construction in order to fit the house and other structures into the landscape, to direct site drainage, or simply for aesthetic objectives. It is undertaken by heavy equipment such as a bulldozer, Bobcat, or backhoe, although fine grading is frequently done by hand. However it is performed, grading disturbs the soil by altering its natural profile and compacting it. Additionally, existing vegetation is almost always removed if not disturbed, and drainage patterns are modified. Poor grading can also produce extreme cut or soil removal in some areas of a site while creating excessive fill or added soil in other locations. This can create severe slopes that are susceptible to erosion and ruin the natural contours of the ground.

To minimize grading, the house and site structures should be located on relatively level ground or parallel to the contours, as portrayed in Figure 3–2. This may require the house being placed so that it is not in the middle of the site or aligned with the property lines. On steep sites, grading can be reduced by using retaining walls uphill and/or downhill from the house, building the house into the slope with a lower walkout level, or elevating the house above the slope with post-and-beam construction (Figure 3–3; also see "The Sloped Site," Chapter 13, page 460). Before construction begins, a clear edge to grading should be established both on paper and in the field with a visible barrier. Grading should be undertaken with the lightest equipment possible or even by hand when feasible to reduce soil compaction. Finally, all topsoil within the graded area should be carefully removed and stockpiled before additional grading takes place. The topsoil can later be spread back over the graded area to provide a beneficial growing medium.

Protect Surface Water

Surface water exists on all sites, if only temporarily. During and after a storm, water drains across and through a site seeking low channels and areas to collect. Surface water may be present longer or permanently in the form of wet areas or even wetlands. Some residential sites also adjoin streams, rivers, ponds, or lakes. Surface water in all these forms should be protected to maintain is natural flow, reduce erosion, minimize pollution, and protect aquatic life in the water.

The house, other structures, and paved areas should all be located outside natural drainage ways on a site to escape flooding and avoid negatively affecting the quantity and quality of water flowing through a site (Figure 3–4). Although small drainage ways can be relocated, it is nevertheless disruptive and may require unnecessary grading. Likewise, no structural element should be placed in low areas and wetlands, because these are critical wildlife habitats and places where water percolates into the ground to recharge subsurface water. A vegetative buffer should be established along the edge of all wetlands and water bodies to act as a filter for water draining into them, as shown in Figure 3–5. The vegetative buffer absorbs eroded

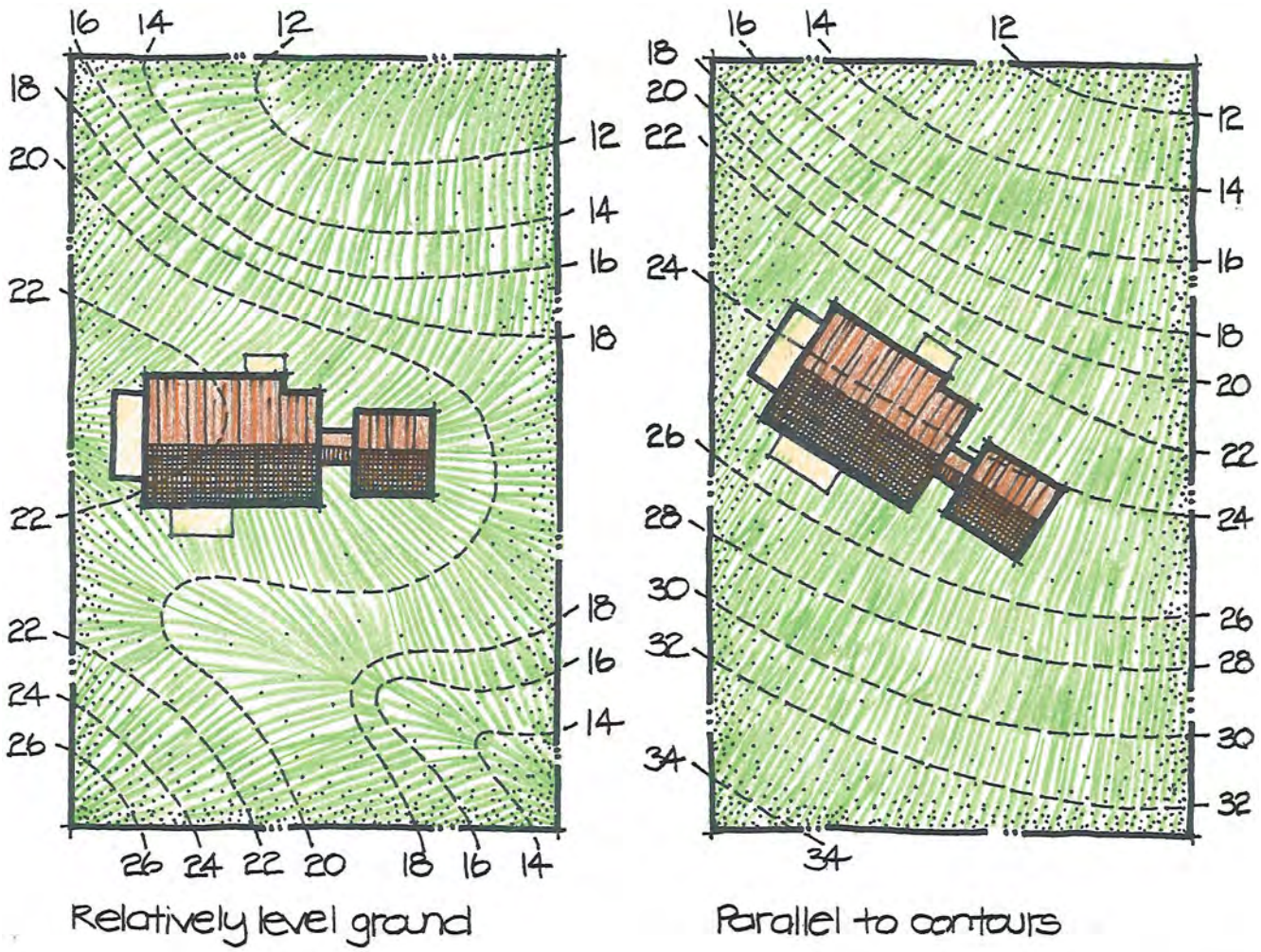


Figure 3–2
The house should be located on level ground or placed parallel to the contours to minimize site grading.

soil and pollutants, thus cleansing the water entering into a stream, wetland, or lake. This is especially desirable where water from driveways, pool areas, fertilized lawn areas, and vegetable gardens drains into a water body. A vegetative buffer likewise stabilizes the banks along rivers and streams, helping to minimize erosion. Local and regional environmental regulations should be consulted to determine the depth of the required buffer.

Maintain Wildlife Habitats

Birds, animals, insects, and microorganisms live in a range of habitats from within the ground to tree canopies above. These habitats are easily disrupted or removed when a house and associated landscape are inserted into a natural setting. Even the well-intentioned objective of preserving selected habitats or forms of wildlife while removing others can cause environmental harm because of the interdependent aspect of the life in a natural setting.

Wildlife habitats can be maintained by fulfilling the previous strategies for minimizing site impact. In addition, different habitats should be preserved if the site permits. Open lawn or meadow areas, perennial and annual gardens, woodland edges composed of shrubs and small trees, woodlands, wetlands, and so on should all be present in temperate climates to create diverse environments for a range of living

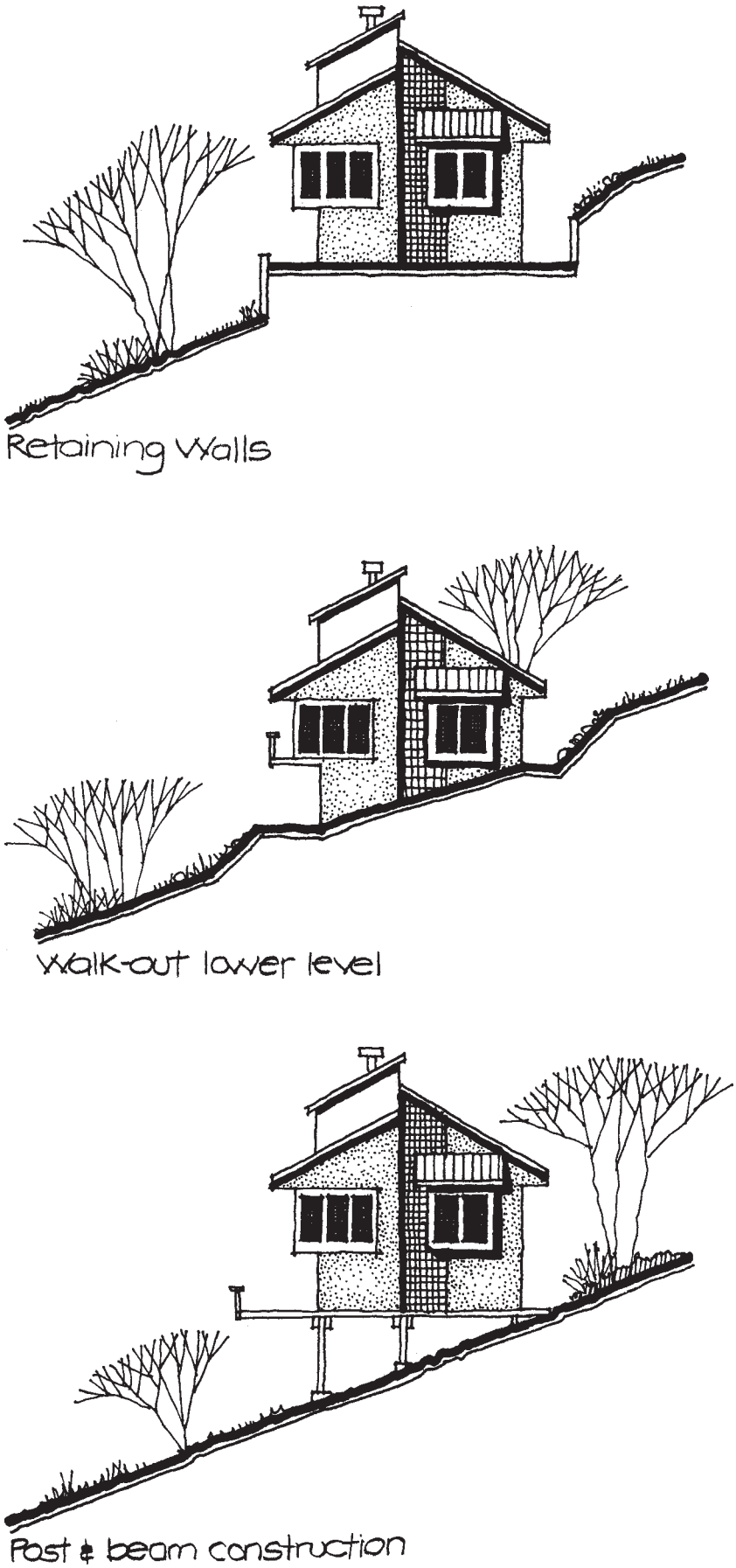


Figure 3–3
Alternative techniques for minimizing grading on steep sites.

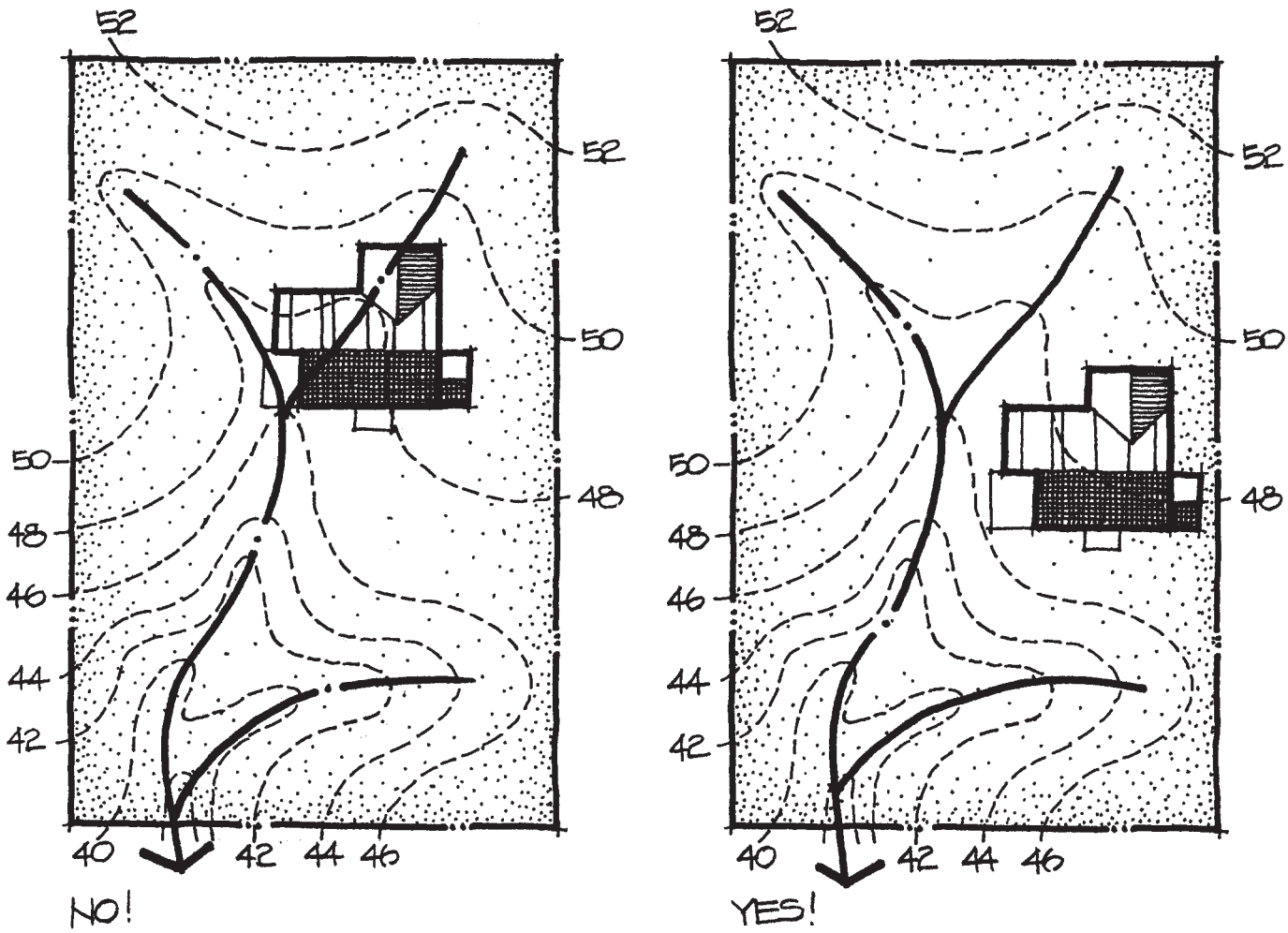


Figure 3–4
All structures and paved areas should be located outside drainage ways.

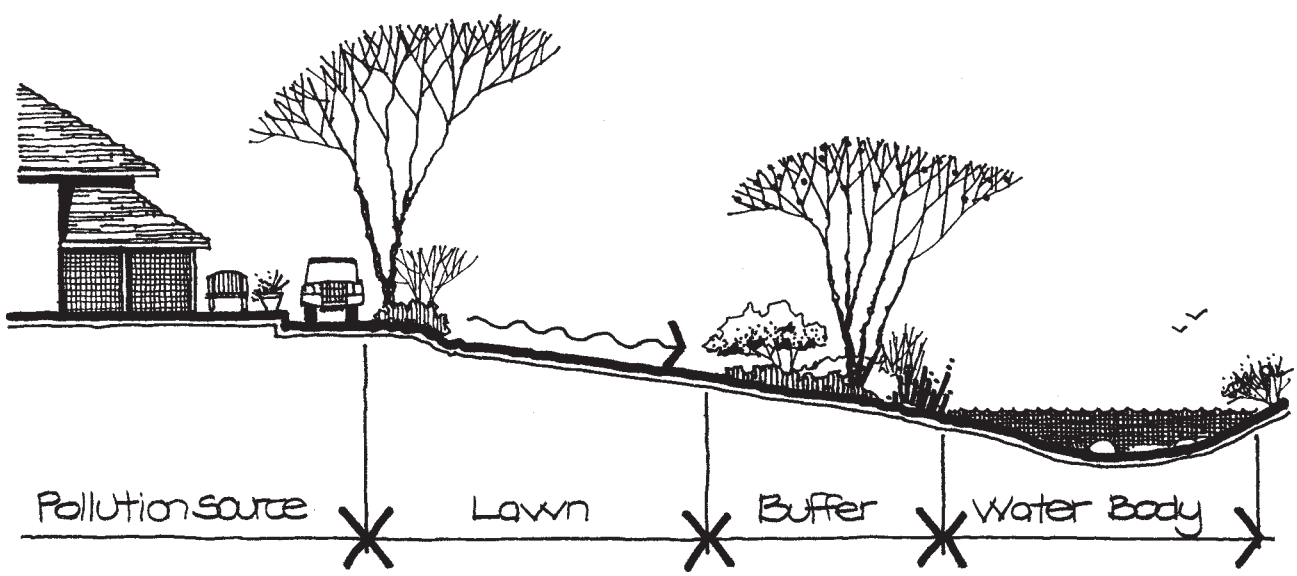


Figure 3–5
A vegetation buffer should be located at the edge of all water bodies to filter surface runoff.

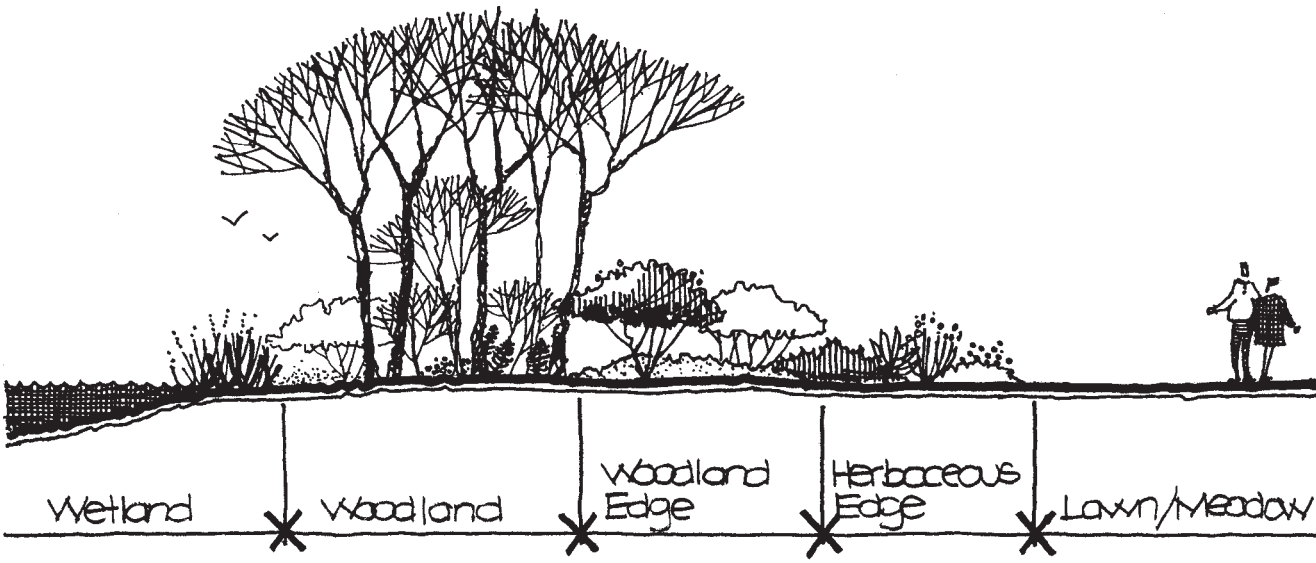


Figure 3–6
A diverse range of environments should be created for wildlife habitats.

organisms, as in Figure 3–6. These varied types of environment will translate to other habitats in dissimilar climatic regions. Diversity is essential to a healthy ecosystem because it supports interdependence and is more resistant to disease and stress. Retained natural habitats should be as large as possible and connected to each other within the site or to others in adjoining sites to promote species diversity and the movement of flora and fauna within them (Figure 3–7). Fragmented and isolated habitats should be avoided.

SITE RESTORATION

Principle: A flawed residential site should be restored to a healthy environment.

Many residential landscapes have been severely altered from their once natural state and are degraded environments, though they may not always appear that way. The most obvious impaired sites are the barren landscapes found around newly constructed homes in recently developed subdivisions. In worst-case scenarios, these sites are covered only with bare earth left behind by the developer. Furthermore, the indigenous landscape that might have originally existed on this land may have been displaced many years ago for agricultural fields. Thus, true "nature" has long been absent.

Less obvious altered landscapes also exist on residential sites where prevailing lawn and foundation planting are present. Though green and "landscaped," such sites often suffer from poor soil, lack of plant diversity, minimal wildlife habitat, and a maintenance practice fed by chemical fertilizers and pesticides (Figure 3–8). In addition, spoiled landscapes exist in older urban sites that have undergone years of poor management or neglect. Toxic materials in the soil and/or in the structural materials contribute to blight in other residential landscapes.

Consequently, the challenge with many residential sites is not to preserve the existing natural setting, but rather to restore the site to an improved, flourishing state. The theoretical ideal is to rehabilitate a flawed landscape to the natural condition it was in before development, though realistically this is often not possible or even desirable. The damaged site can and should, however, be restored to a healthy, sustainable

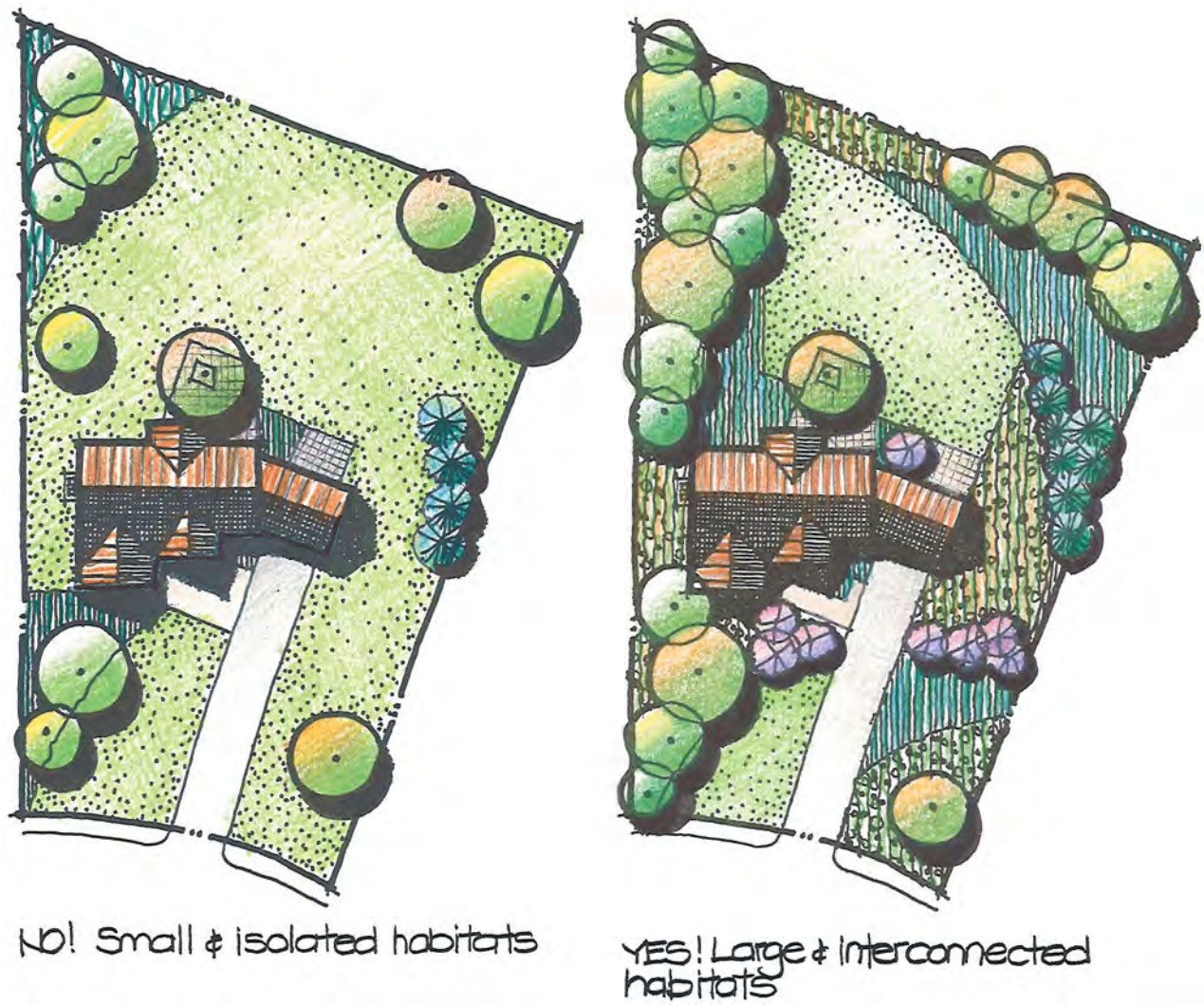


Figure 3–7
Wildlife habitats should be as large as possible and interconnected to each other.

condition that is a viable place for people, flora, and fauna. This goal is best accomplished in two general phases. First, all the problems and inappropriate materials found on the site must be corrected or removed, as discussed next. Second, the site must be redesigned based on sustainable principles presented throughout this chapter.

Rehabilitate Soil

The soil on a derelict site may lack topsoil, be compacted, be infertile, and/or contain pollutants such as lead, oil, pesticides, and so on. A sustainable landscape relies extensively on healthy soil to support all life in and above the ground, so it must be rejuvenated before other restoration strategies are applied. The soil should first be tested to determine its physical composition, pH, and availability of various soil nutrients. Then, the soil can be amended with what is deficient, but only in the necessary site locations and appropriate quantities. In some instances, clay or sand can give the soil more desirable structure. Calcium, gypsum, phosphorus, nitrogen, or other minerals might be added to affect fertility and pH.

The soil's organic content and overall health can likewise be dramatically improved by adding compost. Some soil scientists recommend that compost be tilled

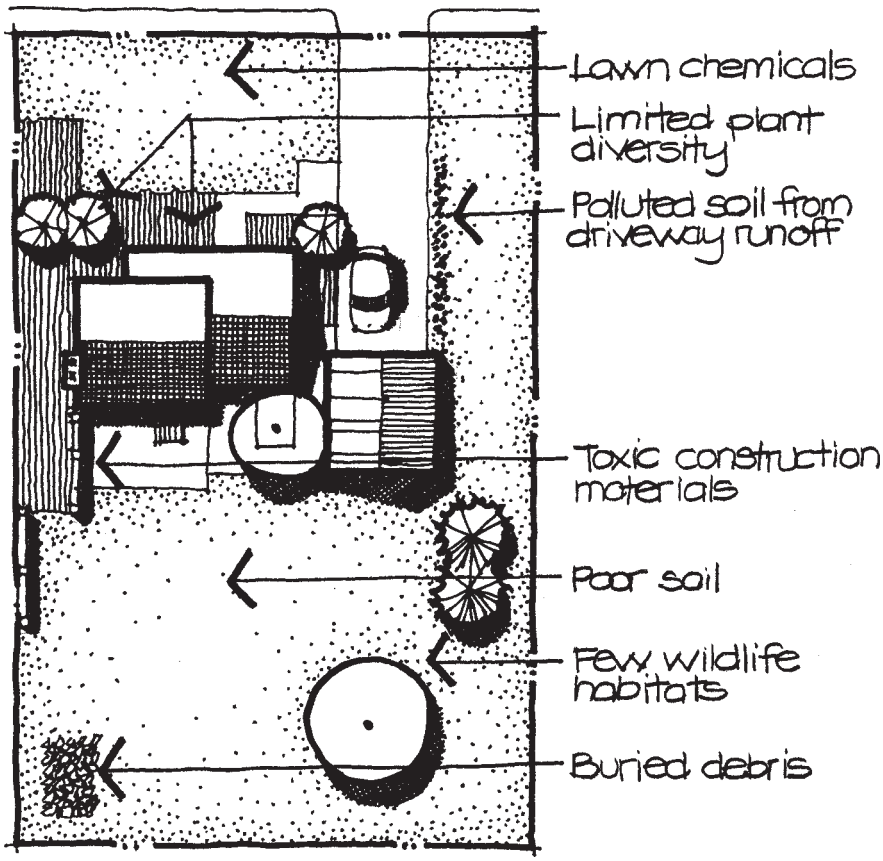


Figure 3–8
Common environmental problems of a degraded residential landscape.

into the soil to achieve a 2:1 ratio between existing soil and compost by loose volume.[1] This can be translated to adding 2″–4″ of compost for every 6″–8″ depth of soil (Figure 3–9). The compost not only adds organic content, but also provides a medium for microorganisms that in turn build soil by aggregating soil particles to create soil structure and pore spaces within the soil. The microorganisms can also break down organic pollutants and heavy metals in the soil. And compost-amended soil allows surface water to more effectively percolate down through the soil, thereby increasing soil moisture while reducing the quantity of runoff from a site (also see "Reduce Runoff" in this chapter). Adding compost is one of the most effective means of reviving poor and compacted soil.

Compost from on-site is best, though compost from a local source is acceptable if transportation distance is relatively short (also see "Reuse and Recycle" in this chapter). One caution in using community compost is to determine what materials were used to produce it. Unregulated compost may contain weed seeds, heavy metals, plastic remnants, or other pollutants. The compost should also be "mature" so that it doesn't deplete nitrogen from the soil to which it is added.

The traditional practice of importing new topsoil to a site as a growing medium should be minimized if not avoided altogether. Trucks and heavy equipment integral to such an operation require a proportionally large amount of fuel. In addition, this convention requires topsoil to be removed from another site, thus contributing to its degradation. And topsoil is often not necessary where native plants are used.

[1]Tracy Chollak and Paul Rosenfeld, "Guidelines for Landscaping with Composted Amended Soil," p. 22, prepared for Phil Cohen, City of Redmond Public Works.

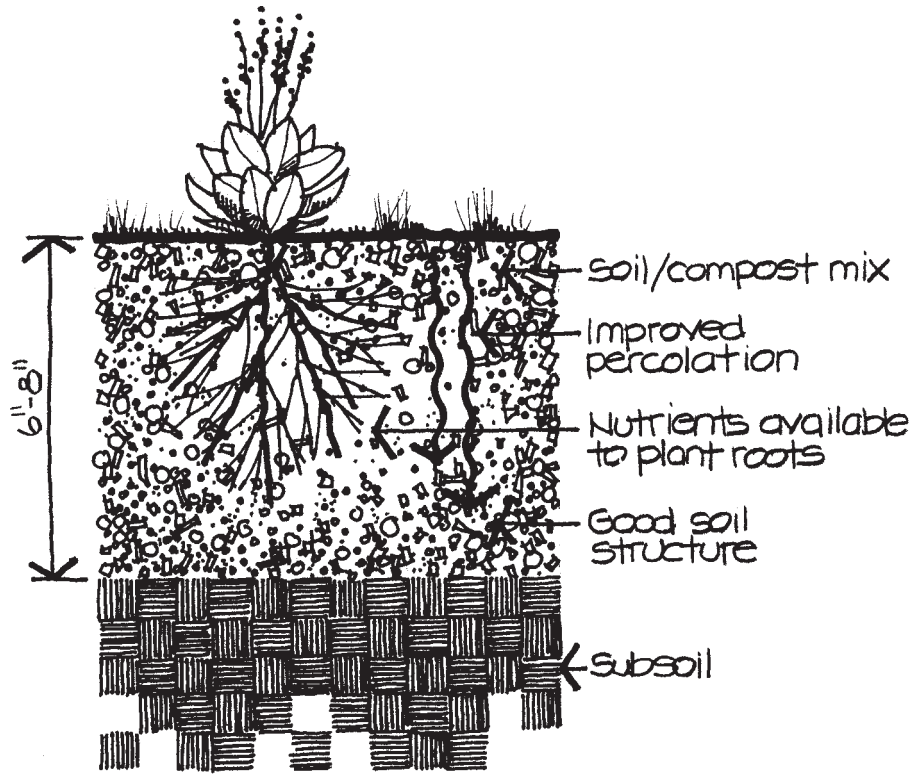


Figure 3–9
Benefits of compost in restoring poor soil.

Discard Toxic Materials

As already mentioned, some landscapes suffer from the presence of toxic materials in the soil or in structural materials (Figure 3–10). Newly built houses often have construction debris that has been left behind in various areas of the site or even buried out of sight in the ground. All of this must be removed, with special care given to paints, glues, chemical solvents, and so on. These should be separated from inert construction materials and taken to a local or regional hazardous waste collection facility.

Lead is a common soil pollutant in older urban landscapes, especially near the foundation of structures where lead-based paint has chipped and fallen to the ground. Heavy metals, oil, and other contaminated materials are also possible from dumping in earlier years when there was little knowledge about the potential harm of such materials. Locations near the back of older properties or garages should be carefully examined for the presence of such toxic substances. All these materials need to be carefully removed from the residential site after consultation with the proper government agencies such as state EPA or municipal health offices to determine how to remove and transport such materials. Polluted soil can be placed in tight, leakproof containers and taken to a local or regional collection point for toxic materials. Never put polluted soil or contaminated waste materials with other construction debris or household garbage.

Another source of toxic materials is pressure-treated wood used in decks, fences, and other site structures before 2003. Such wood usually contains chromated copper arsenate (CCA) as a preservative, a substance that is a known toxin. In the perfect world, all such wood should be removed and replaced by less toxic treated wood that is currently available (also see "Use Toxin-Free Materials" in "Healthy Environment" in this chapter). Cost and other practical considerations typically make this unrealistic. However, pressure-treated wood that is touched and used by children or is located where the chemicals can directly leach into wetlands, streams, or ponds should be replaced despite costs. Consult the state EPA or local health department to determine

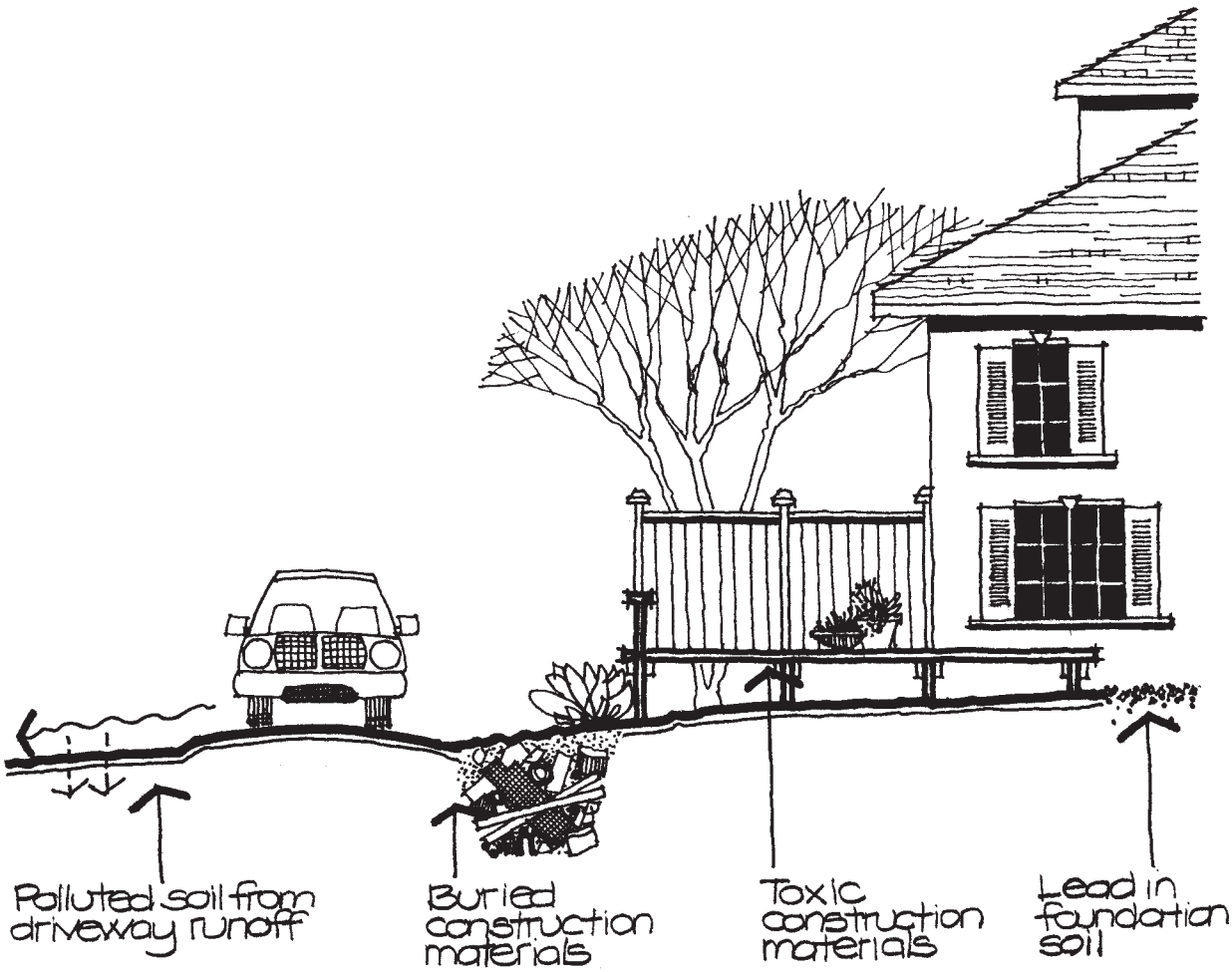


Figure 3–10
Typical toxic materials found in a residential landscape.

how best to dispose of CCA-treated wood in your area. Pressure-treated wood that is to remain can be periodically coated with an oil-based penetrating stain to help seal in preserving chemicals.

Remove Unsuitable Vegetation

Poor soil, incorrect maintenance practices, or simply wrong plant selections by a previous owner result in unhealthy or invasive plant materials on some residential sites. All weak and diseased woody vegetation should be carefully pruned or completely removed depending on the type and extent of the problem. Again, improving soil conditions will also help plants grow more vigorously. Plants that are in the wrong location because of improper hardiness or water requirement should also be taken out. Vegetation that is poorly located because of inappropriate sun exposure, soil, or drainage should be transplanted to a better location on the site if possible.

Invasive plants are nonnative plants that aggressively take over a site at the expense of other plants. Invasive plants often exist because they were incorrectly introduced or because of generally poor growing conditions that weaken native plants and permit invasive plants to dominate. One good source of information on what plants are considered invasive on a national basis is the Web site "Weeds Gone Wild: Alien Plant Invaders for Natural Areas" maintained by the National Park Service

(http://www.nps.gov/plants/alien/index.htm). Another excellent source is *Native Alternatives to Invasive Plants*, published by the Brooklyn Botanic Garden. In addition to identifying invasive plants and what states they are considered invasive in, this publication also provides a list and description of alternative native plants. Additionally, it is advisable to consult a local county or university extension service, botanical garden, or horticultural expert to determine what plants are considered invasive for your particular region. Some invasive plants such as Arborvitae (*Thuja occidentalis*) and English ivy (*Hedera helix*) may be a surprise because of their common usage. Even some species of lawn grass are invasive.

All invasive plants should be eliminated from a site, a task that may be more difficult than expected. Unlike typical plant removal or "grubbing," all parts of invasive plants including their root systems should be cleared away. This may require extra excavation and handwork to do a thorough job. Weeds in established planting areas call for removal by hand as well. Large areas of weeds and invasive herbaceous vegetation may involve the application of nontoxic herbicides.

NATURAL EVENTS AND CYCLES

Principle: The residential site should be in concert with natural events and cycles.

All residential environments are exposed to and dependent on a series of natural events, including sun exposure, wind exposure, and precipitation. The potential for fire and earthquakes impacts the landscapes in certain regions as well. Most of these phenomena occur in cyclical patterns that are seasonal and somewhat predictable. These events are ever-present and must be incorporated into residential design to make it sustainable, as discussed in the following sections.

Study Sun and Shadow Patterns

Before being able to effectively design with sun, it is necessary to understand the movement of the sun throughout the day and at different seasons of the year. The sun's relative position in the sky is constantly changing in its plan orientation as well as its angle above the horizon (Figure 3–11). In the summer season (June), the sun rises in the northeast and moves in a clockwise direction around a site until it sets in the northwest. In the temperate zone, the sun's total arc of transit is about 240 degrees between sunrise and sunset. At the same time, the angle of the sun above the horizon is constantly increasing to a zenith of about 72 degrees from the south at noon (Figure 3–12).

In the winter season (December), the sun rises in the southeast and sets in the southwest while moving through a total arc of transit of about 120 degrees in the temperate zone. At noon, the sun rises to an angle of 27 degrees above the horizon. The sun is essentially a southerly sun at a very low angle above the horizon during the winter season. Thus, the sun is less intense, restricted in its time of shining, and limited in its direction of exposure in comparison to other seasons of the year. In the equinox months of March and September, the sun's path and angle above the horizon are halfway between the extremes of June and December.

This information can be used to construct shadow patterns around a house on a residential site and to determine where the sunniest and shadiest zones are as well as the associated microclimates. Figure 3–13 through 3–15 illustrate the shadow patterns of a two-story house located on a level site in the temperate zone at four seasons of the year. Shadow patterns can be plotted by using information from sun charts available in many public libraries, some CAD programs, the National

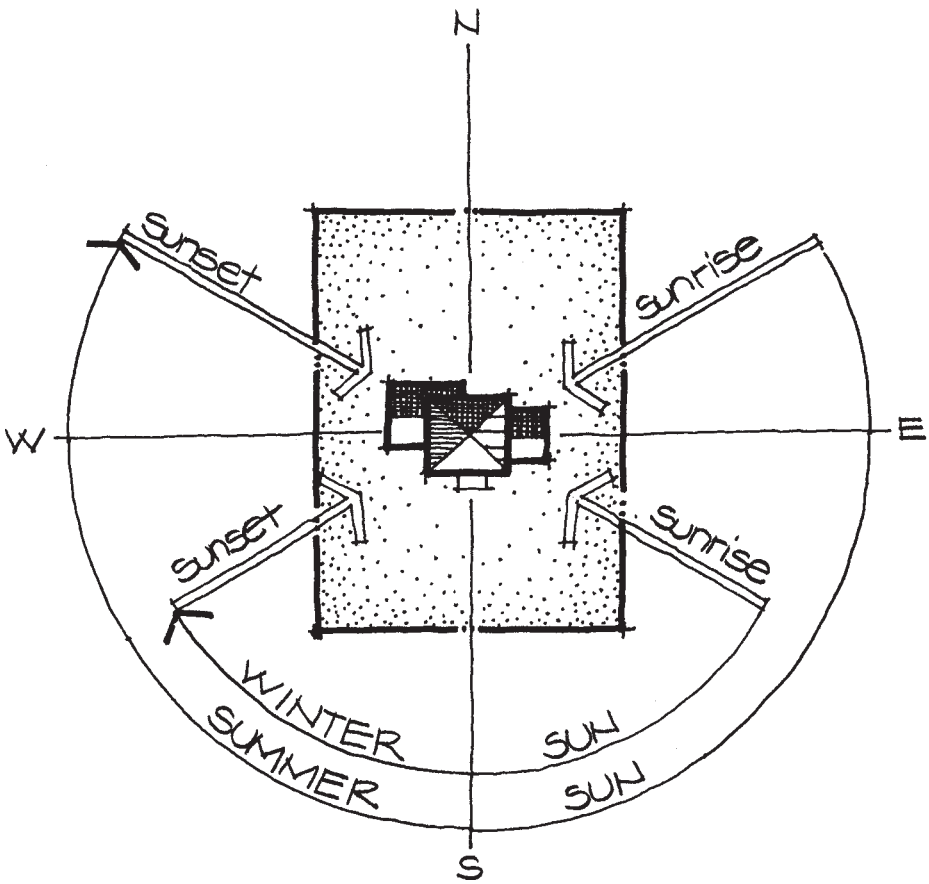


Figure 3–11
Plan direction of the sun at different times of the day and season.

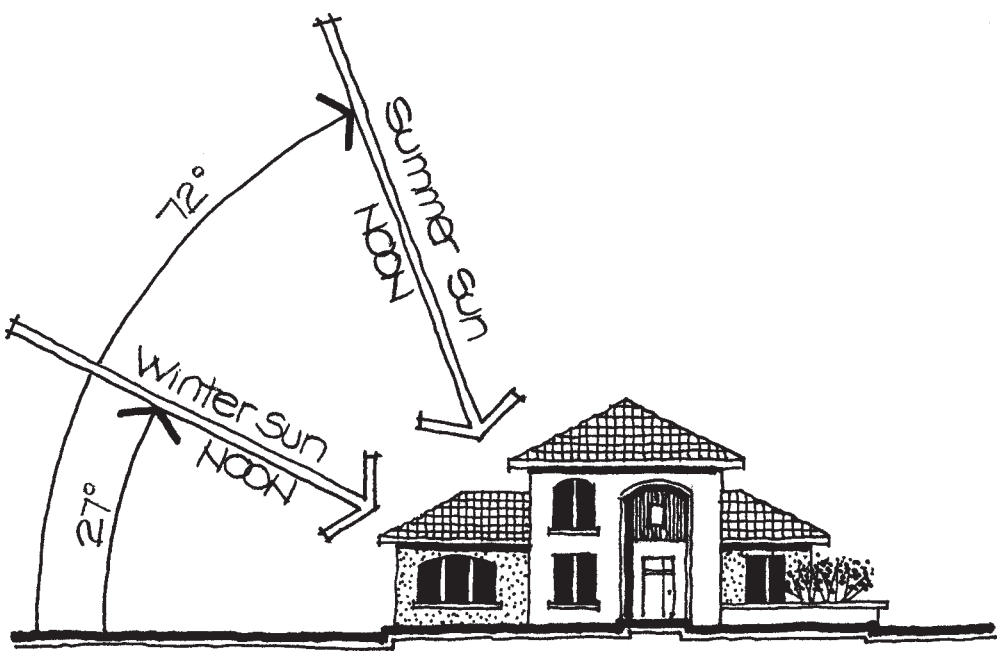


Figure 3–12
Vertical angle of the sun above the horizon at noon in the winter and summer.

Weather Service, and various Internet sites such as the U.S. Naval Observatory (http://aa.usno.navy.mil/data/docs/AltAz.html). General deductions from these patterns are that:

- all sides of the house receive sun exposure during the summer; similarly, all sides of the house experience shadow as well.

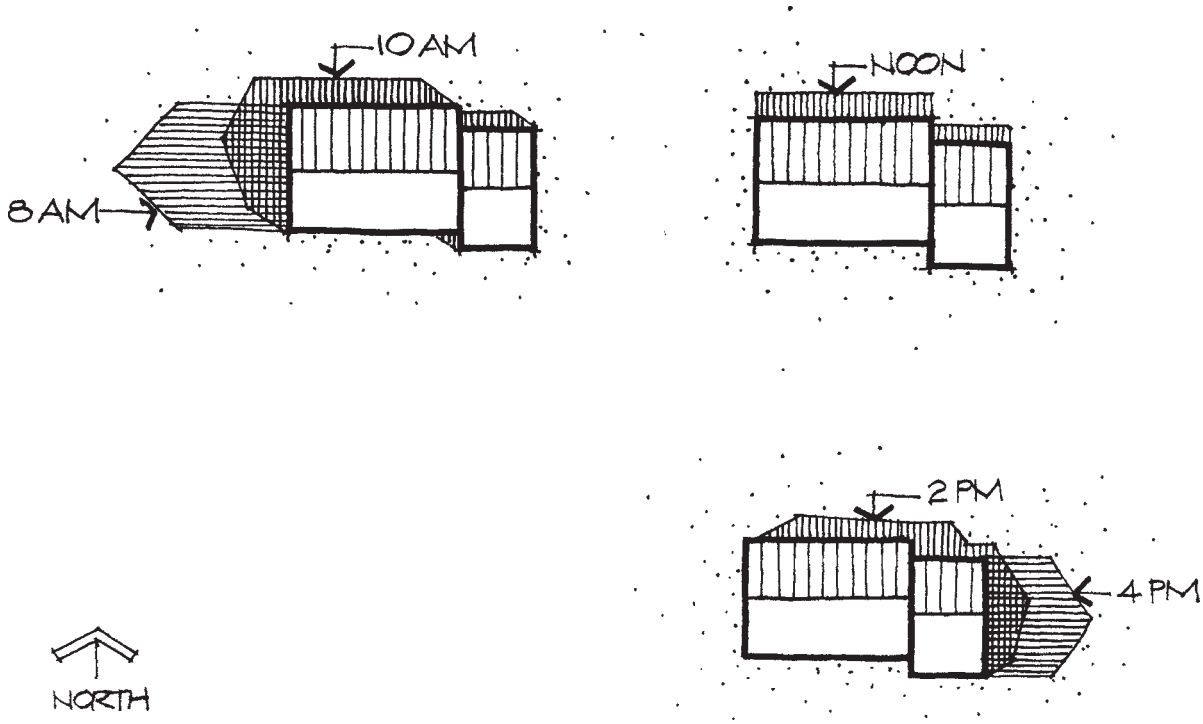


Figure 3–13
Shadow patterns from a two-story house at different times of the day in June.

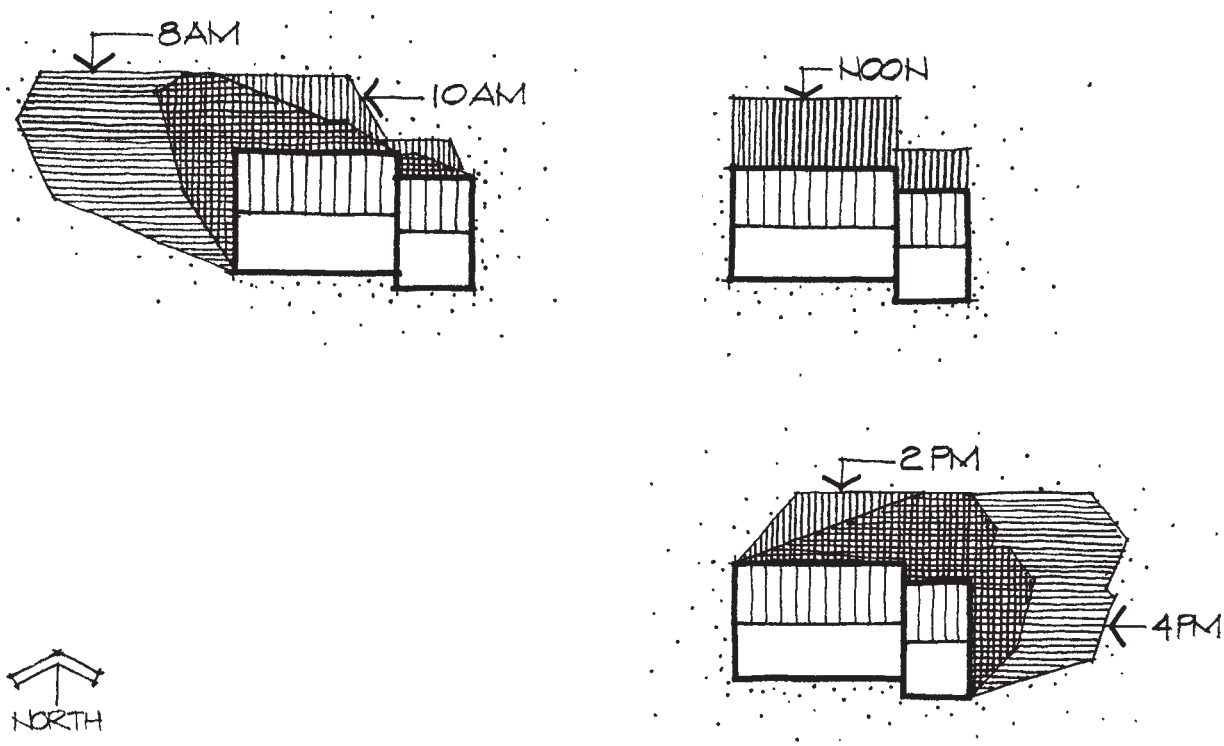


Figure 3–14
Shadow patterns from a two-story house at different times of the day in March and September.

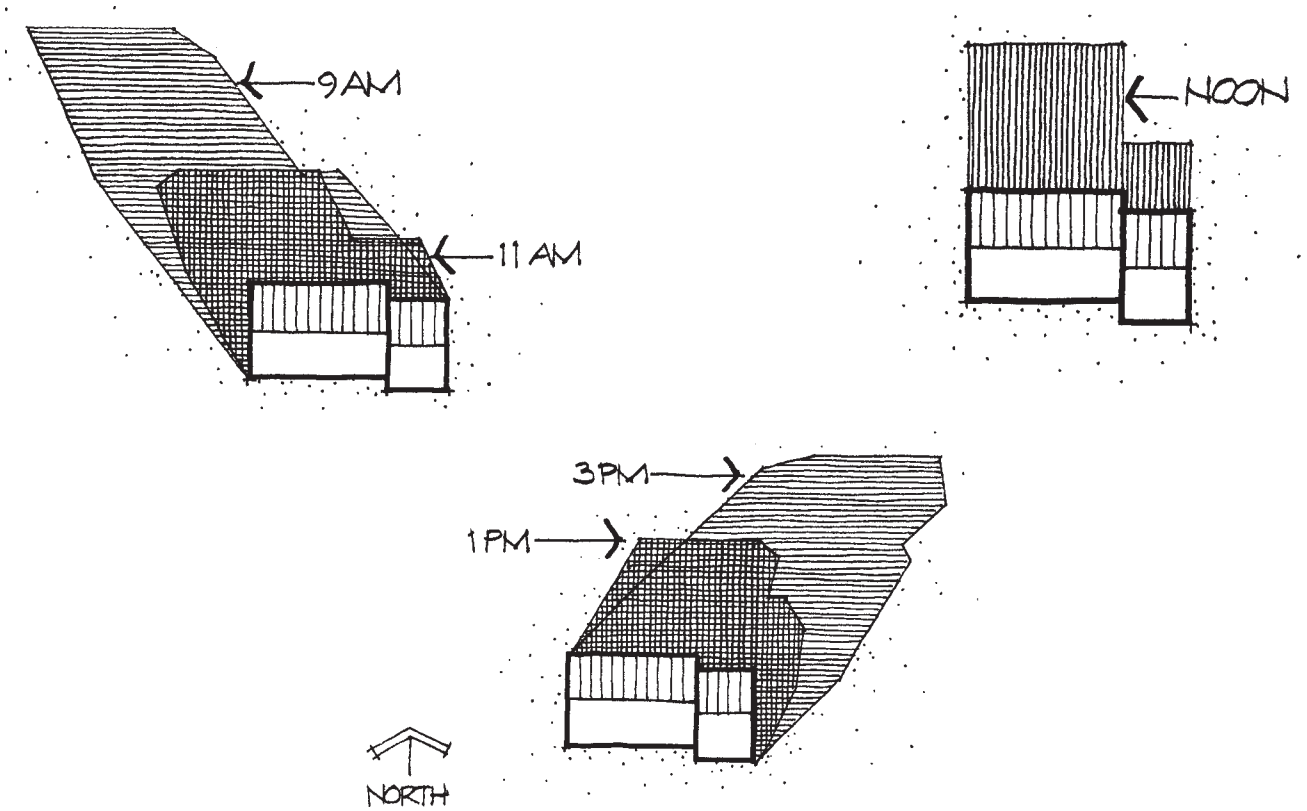


Figure 3–15
Shadow patterns from a two-story house at different times of the day in December.

- the largest areas of shadow during the summer occur on the east and west sides of the house; the north and south sides of the house experience less shadow.
- the largest areas of shadow during March and September occur on the east, north, and west sides of the house.
- only the south side of the house receives direct sun exposure in the winter; the northern side receives no sun exposure at this time of year.
- throughout the year, the south side of the house receives the most sun exposure; the north side of the house receives the least.

Similar observations can also be made about different slope orientations on a residential site. A south-facing slope, like the south side of a house, receives the most sun throughout the year and is the warmest of all during the winter season. A north-facing slope is the coolest of all, especially during the winter. The frost is apt to stay in the ground one to two weeks longer on a north-facing slope than on a south-facing slope. An east-facing slope experiences moderate temperatures, whereas a west-facing slope is the hottest and driest of all slopes during the summer months.

An understanding of the sun exposure and shadow patterns on a residential site suggests two requirements: (1) sun protection is needed from late spring through the early autumn and (2) sun exposure is desirable for late autumn through early spring months of the year. These objectives are true for outdoor spaces as well as for the house itself.

Minimize Sun Exposure During the Hot Season

Sun protection is most needed for the midday and afternoon hours during the summer season when air temperatures are the hottest. Exposure to the sun during these

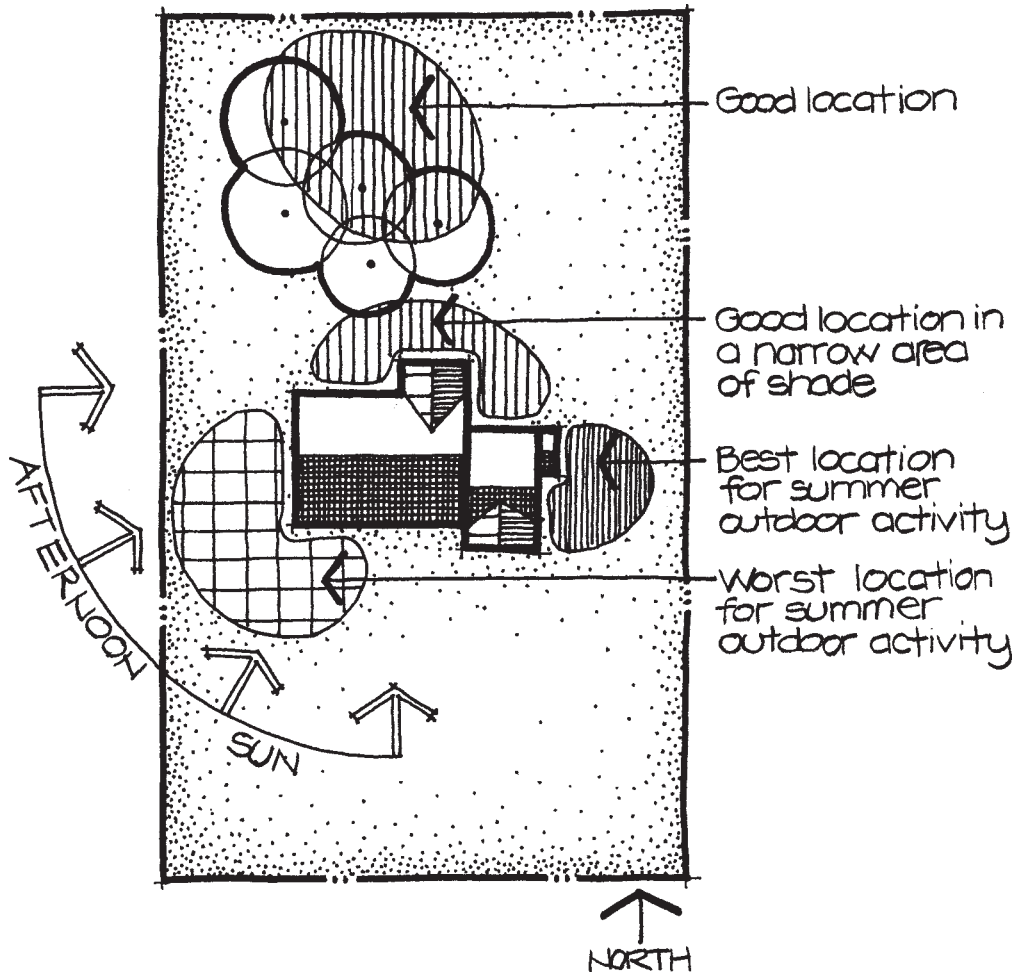


Figure 3–16
Desirable locations for outdoor spaces during the summer season.

times increases heat generated from exposed surfaces and reduces the ability of people and animals to shed heat from their bodies. As a general guideline, people feel most comfortable in the following conditions: (1) shade, (2) no air movement, (3) air temperatures between 70 and 80°F, and (4) relative humidity between 30 and 65 percent.[2] This so-called comfort zone is exceeded when air temperatures rise above this level and/or there is direct exposure to the sun. The broad intent should be to shield the sun from the house and outdoor spaces used during the summer season, especially during the afternoon hours.

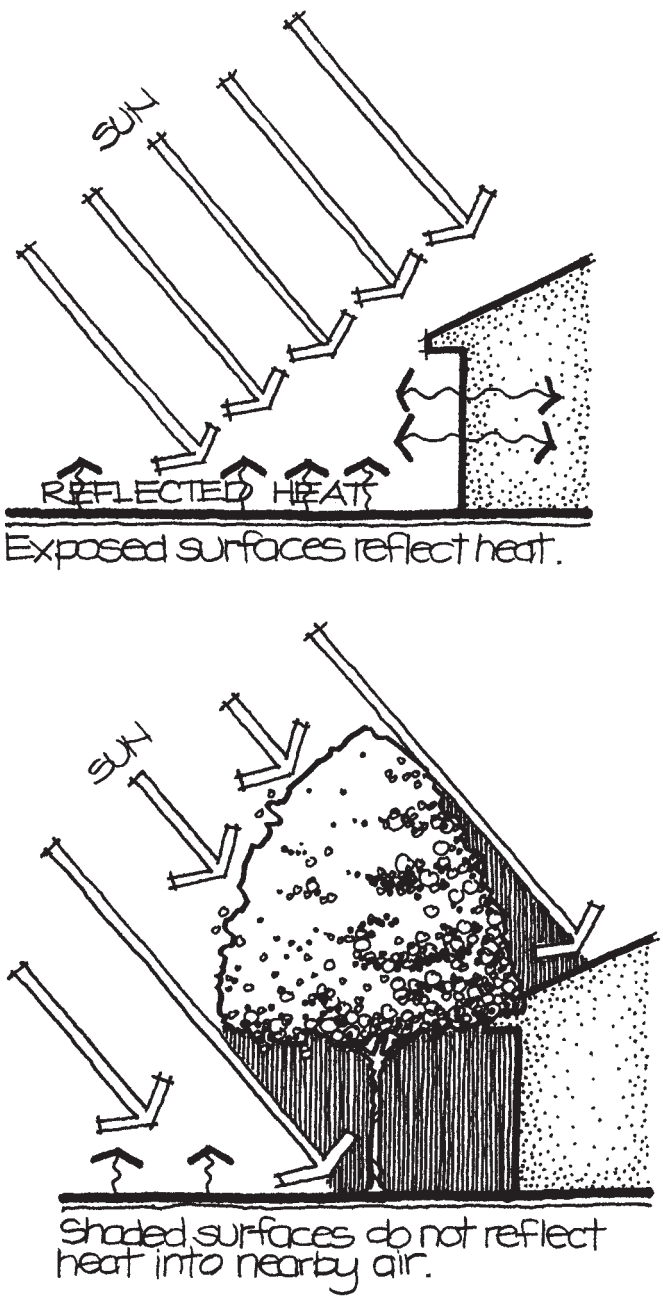
One way to accomplish this is to plan where outdoor uses are located with respect to sun. The best position for outdoor spaces used during a summer day is on the east or northeast side of the house or tree mass (Figure 3–16). An area immediately to the north of the house or a tree mass is also good, though the size of this shaded area is small because of the relatively high vertical sun angle shining from the south at midday in the summer. These locations are noticeably cooler and more comfortable than other potential locations on the residential site for the summer season.

Introducing elements that cast shade on a residential site can also create sun protection. The most common means is to strategically locate large shade trees to

[2]Victor Olgyay, *Design with Climate: Bioclimatic Approach to Architectural Regionalism*. (Princeton, NJ: Princeton University Press, 1963), pp. 17–23.

shield the midday and afternoon sun from the residence and outdoor spaces used during this time of day. Shade trees provide sun protection by several means. First, they block the sun's rays from striking roofs of one- and two-story buildings, exterior building walls, and ground surfaces throughout the landscape. When directly exposed to the sun, these surfaces convert sun rays into heat, which is radiated away from the surfaces (Figure 3–17). The heat generated by exposed building roofs, walls, and ground surfaces radiates out into the nearby air, thereby elevating the temperature. Heat is likewise transferred inward to interior spaces from exposed building surfaces. By comparison, shaded surfaces do not heat up beyond the ambient air temperature and thus do not add to the temperature of the adjoining air mass or building interior.

Figure 3–17
Shade trees can shield roofs, exterior house walls, and the ground from the sun's rays.



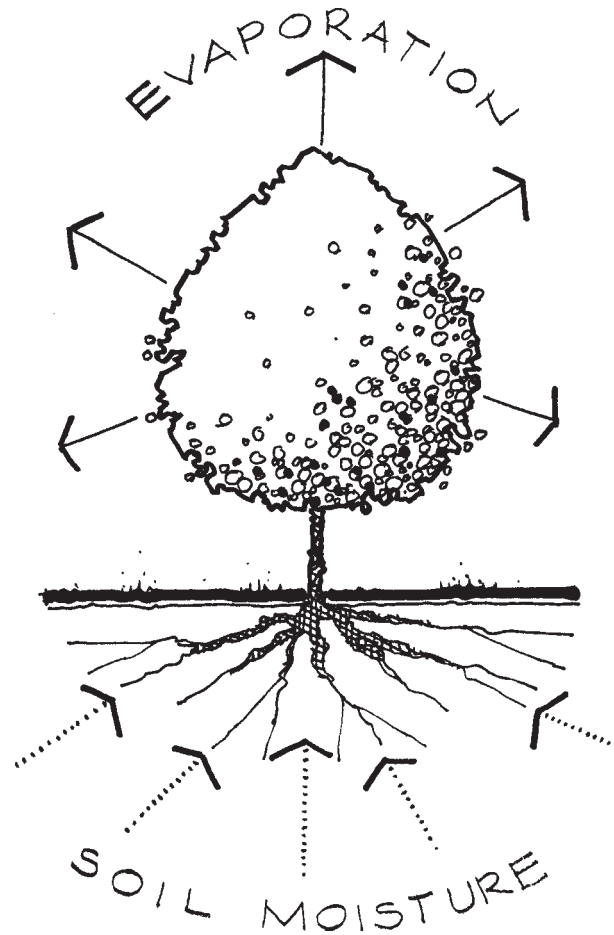


Figure 3–18
Shade trees cool the air around them through evapotranspiration.

Second, shade trees provide relief from hot air temperatures through evapotranspiration, a process of giving off moisture through leaf surfaces. Moisture is taken from the ground by a plant's roots, moves through its trunk and branch structure, and is released through the plant's leaf surfaces (Figure 3–18). As this moisture evaporates from the leaf surfaces, it simultaneously cools adjoining air temperatures. It has been estimated that a large shade tree can evaporate as much as 100 gallons of moisture per day, thus giving the cooling effect of five air conditioners.[3]

To provide shade, trees should primarily be located on the southwest and west sides of the house and outdoor spaces (Figure 3–19). Shade trees can be placed in other locations as well to accomplish other design objectives, such as creating spatial edges or controlling views. Still, the densest grouping of trees for shade should be placed to the southwest of areas that need shade. The best type of tree for shade is one that is relatively tall, broad, and densely foliated. A broad or wide tree canopy will cast more shade than a tree that is more upright or fastigiate.

Where possible, shade trees should be located over or as close as possible to the structure or outdoor space that is to be shaded because of the high summer sun angle previously described. A 25-foot-high tree located 10 feet from the west wall of a house may shade 47 percent of the surface while the same tree placed 20 feet from the wall will only shade about 27 percent of the surface.[4] One exception to this guideline is for

[3]Anne Simon Moffat and Marc Schiler, *Energy-Efficient and Environmental Landscaping* (South Newfane, VT: Appropriate Solutions Press, 1994), p. 9.
[4]Dr. James R. Fazio, editor, "How Trees Can Save Energy," *Tree City USA Bulletin #21* (Nebraska City, NE: The National Arbor Day Foundation), p. 3.

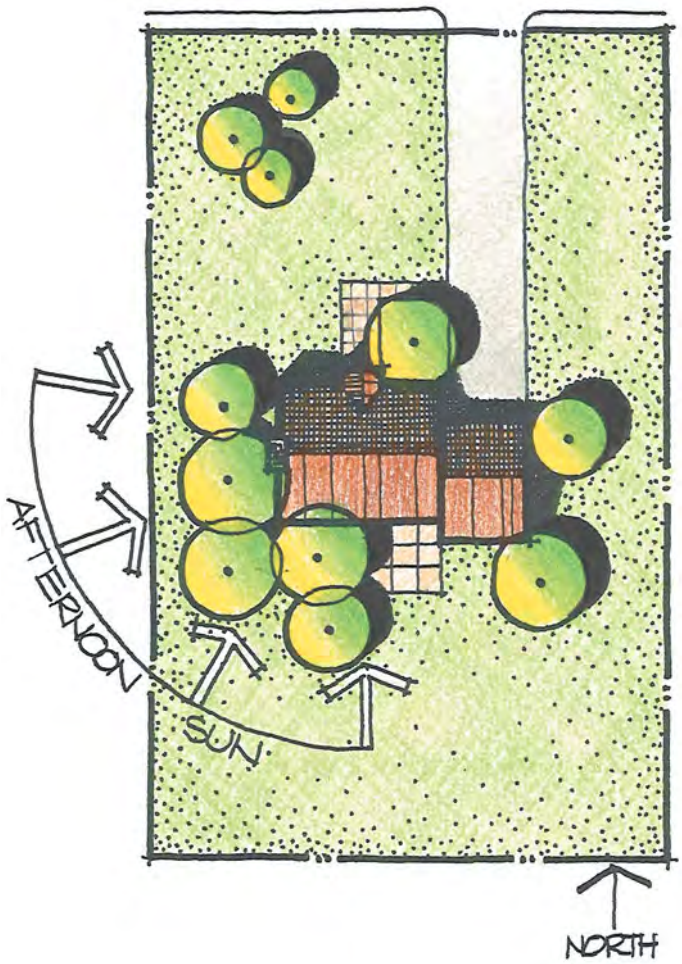


Figure 3–19
Shade trees should be located on the southwest side of the house and outdoor spaces for maximum benefit.

regions that experience severe fire hazard (see "Protect from Potential Wildfires" in "Natural Events and Cycles" in this chapter).

Vines and shrubs can also be used to shade the residence. Vines can be grown on exterior masonry walls of a house to shield the exterior wall surface from absorbing the sun's rays and converting them to heat, as discussed earlier. A mass of shrubs planted along an exterior wall will have a similar effect. These techniques are most effective on exterior walls that face either east or west because of the lower sun angle from these directions (Figure 3–20). Vine-covered or shrub-screened exterior walls are less useful on a south-facing wall because of the higher sun angle from this direction.

The provision of shade can have notable benefits. Houses that are shaded may have interior air temperatures up to 20°F lower and have uncomfortable internal air temperatures half the time as long as houses that are not shaded.[5] This translates to reducing the need for air conditioning and the associated electric bill. Similarly, an air conditioner located in the shade operates 10 percent more efficiently than an air conditioner in direct sun.[6] Overall, a shaded house is simply more energy efficient than one that is not. Similarly, outdoor spaces that are shaded by large trees are cooler than those in the direct sunlight. Areas below trees may be 5 to 10°F cooler than nearby areas in direct sun. Shade makes outdoor spaces more comfortable to use for longer periods of time during the summer.

[5]Anne Simon Moffat and Marc Schiler, *Landscape Design That Saves Energy* (New York: William Morrow and Company, Inc., 1981), p. 18.
[6]Dr. James R. Fazio, editor, "How Trees Can Save Energy," *Tree City USA Bulletin #21* (Nebraska City, NE: The National Arbor Day Foundation), p. 3.



Figure 3–20
Vines on exterior walls and tall shrubs can provide shade from the low sun angle to the east and west.

Overhead structures such as arbors, awnings, and pergolas can likewise be used to provide shade for outdoor spaces used during the summer months. These structures can stand alone or be attached to the house as an architectural extension. Vines may also be grown over and through overhead structures to soften their architectural character and to provide additional shade and cooling. One advantage of awnings and structures in comparison to trees is that awnings and structures provide shade immediately after construction. Shade trees may take years to grow large enough to provide effective shade.

Awnings and overhead structures are most effective in providing shade from the midday and early afternoon sun when the sun angle is high. Awnings and overhead structures are less useful for early morning and late afternoon/evening sun because of the lower angle of the sun at these times of day. Thus awnings and overhead structures are best located directly over or slightly to the south or west of outdoor spaces to be shaded (Figure 3–21).

A number of variables need to be considered when designing overhead structures. One is the density and pattern of the overhead members that cast shade. An awning or solid rooflike overhead plane provides the most shade and is most useful over an outdoor space that is used extensively from midday through midafternoon. However, a solid overhead plane can create a dark space below and may increase air temperatures by creating a cap that holds in the heat.

It is often better to create an overhead structure with multiple individual members spaced apart. The space between the individual members allows for heat to rise and escape through the overhead plane, thus helping to keep the space cooler. The size and spacing of the individual members has a direct effect on the amount of shade cast. Large and/or closely spaced members provide the most shade, whereas small and/or widely spaced members cast less shade. The amount of shade desired will depend on the use of the space, the regional location, and the time of day when shade is needed. The density and pattern also have a bearing on the visual shade pattern cast on the

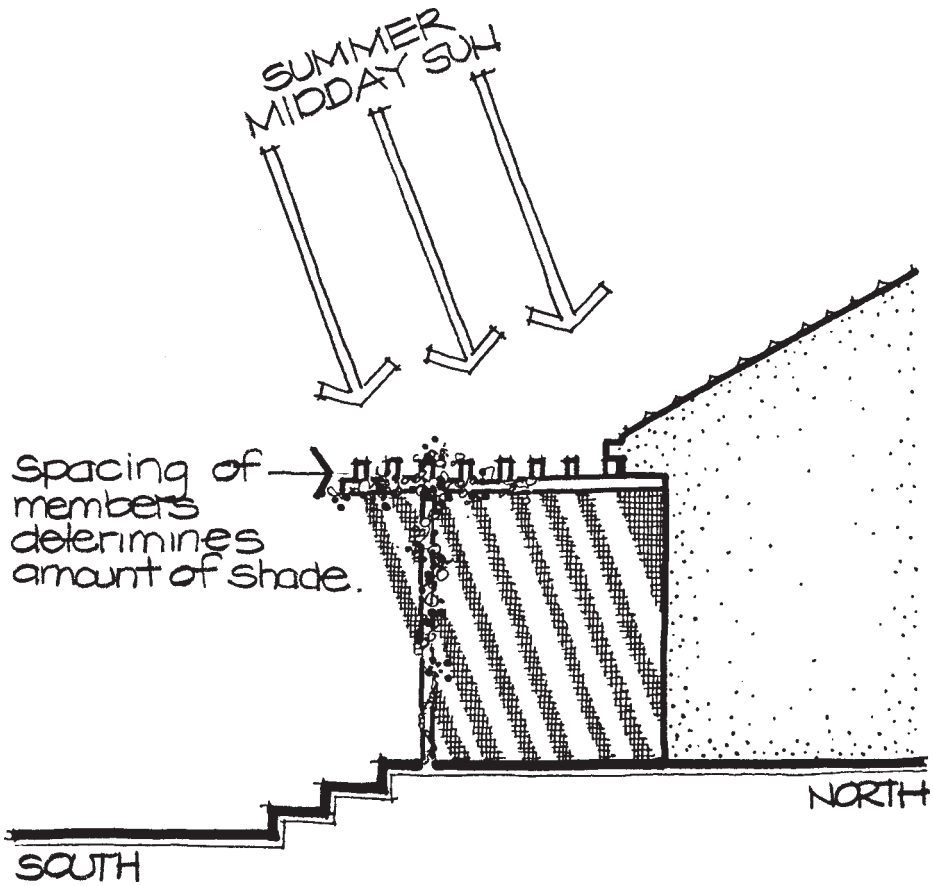


Figure 3–21
Overhead structures should be located over or slightly to the south of outdoor spaces for maximum shade.

ground plane. The shadow pattern on the ground plane can itself be an attractive quality in an outdoor space.

Another consideration for creating overhead structures is the direction of the overhead members. This, too, should be based on the amount of shade required. Density aside, more shade will be cast by individual members that are oriented perpendicular to the direction of the sun (Figure 3–22). Consequently, individual members should be placed in an east-west direction to cast effective shade from a southern sun at midday, whereas a north-south direction is more effective when the sun is shining from the west, as occurs from mid- to later afternoon in the summer. The angle of the individual members should also be considered. Members that are placed at right angles in relation to the sun's rays will provide more shade than members that are positioned parallel to the sun's rays.

Walls and fences also produce sun protection. These vertical planes are most effective in providing shade in the early to midmorning and from midafternoon to evening during the summer season. During these hours of the day, the sun angle is lower, and sunlight is more directly blocked by a vertical plane than an overhead plane. Therefore, walls and fences are best located to the east and/or west of the spaces that are to be shaded. These same elements are also effective in casting shade onto the west wall of a house to relieve a residence from the intense heat buildup in this microclimate. As with overhead structures, there are numerous design variables available to create a wide range of shade density.

Maximize Sun Exposure During the Cold Season

Exposure to the sun is desirable for the late autumn through early spring months of the year. This need is greatest in northern regions and less in southern regions of the country. During these months, exposure to sun can increase air temperatures in exterior

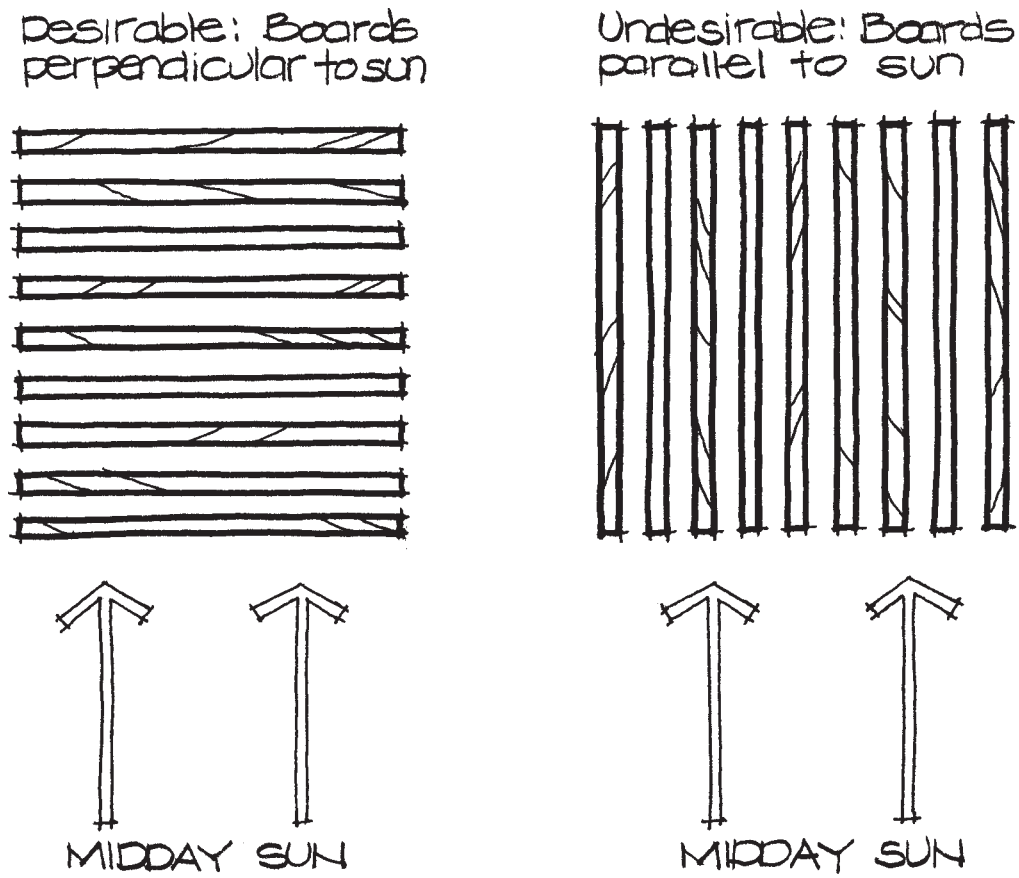


Figure 3–22
Individual members of an overhead structure should be oriented perpendicular to the direction of the midday sun.

spaces and make them more enjoyable to use for longer periods of time. This is especially true in the transitional months of October/November and March/April. Likewise, exposure of interior spaces to sun can increase ambient room temperatures and reduce heating costs during the winter season.

One technique for maximizing sun exposure of exterior spaces in the winter season is to locate the spaces properly. As previously suggested, outdoor spaces that are used during the cool season should, where possible, be put on the south side of the house to receive full sun exposure during the day. Outdoor spaces located on the south side of a residence will also benefit from a "heat pocket" effect created by heat reflected away from the exterior house wall and the adjoining ground plane (Figure 3–23). A dark-colored pavement can accentuate this heat buildup by absorbing more sun rays and converting them into heat. Outdoor spaces intended for the cool season should not be placed adjacent to the north side of a residence.

A number of site design concepts need to be considered to maximize sun exposure. One is to use a predominance of deciduous vegetation on the south side of a house. Deciduous trees and other vegetation are able to shade the house during the summer but allow the winter sun to pass through when leaves are absent. Even so, they also need to be carefully located and selected. Deciduous trees should be widely spaced on the southern side of the house so that as much sun exposure as possible is gained. Too many trees in this location will reduce the amount of sun that is able to strike the southern side of the house.

Furthermore, it is best to use trees that are limbed up and to locate them relatively close to the house, except in fire-prone areas (Figure 3–24). In this position,

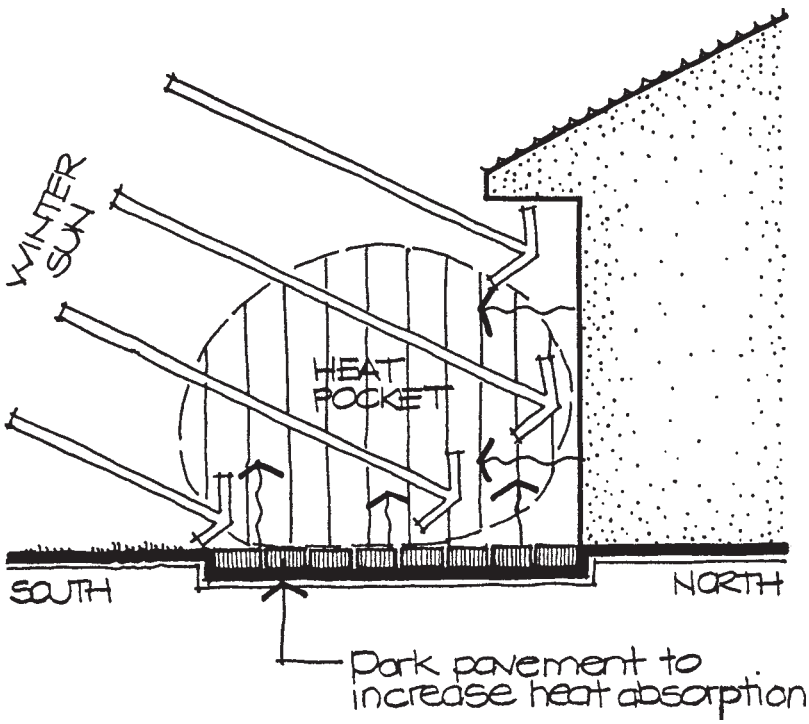


Figure 3–23
A winter "heat pocket" can be created on the south side of the house.

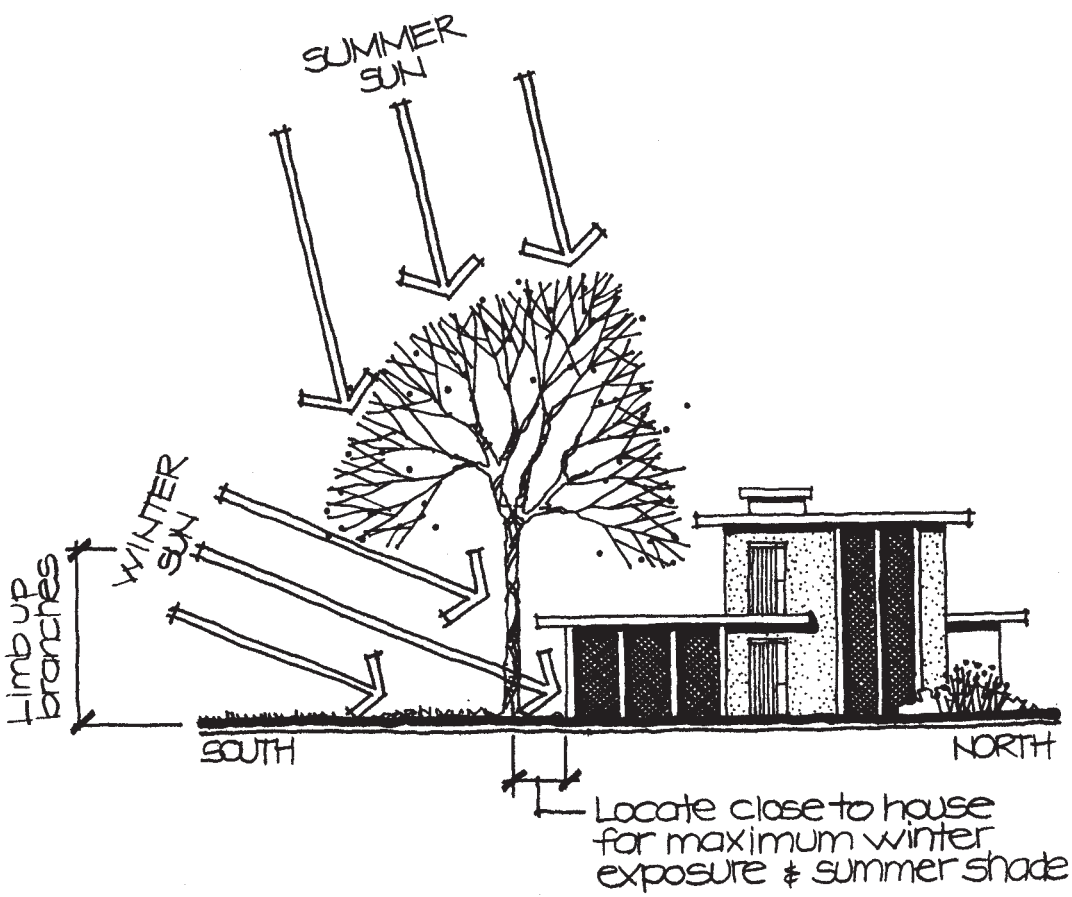


Figure 3–24
Deciduous trees should be limbed up and placed close to the residence for maximum winter sun exposure.

trees will provide effective shade over the house roof in the summer, but will allow the winter sun, with its lower sun angle, to shine below the tree canopy where it can directly strike the walls and windows of the house. Deciduous plants that have an open or loose branching structure are preferred for the south side of the house to minimize the number of individual branches that block the sun. Densely branched deciduous plants and most evergreen vegetation should be minimized, if used at all, on the south side of the house. Evergreen plants will, of course, completely block the sun's rays and eliminate their potential heating effect.

One other thought for amplifying sun exposure is to maximize the amount of window area on the south side of the house. When the sun's rays pass through a window, they are converted to heat energy by the surfaces they strike. This heat is retained inside the room, referred to as a "greenhouse effect." No shrubs should be planted that screen the sun from windows on the south side. When the arrangement of outdoor spaces allows, an area of pavement placed immediately adjacent to sliding glass doors or other similar expanses of windows can increase the heat gain by reflecting some sun into nearby rooms (Figure 3–25).

Study Wind Patterns

Wind is another climatic factor that must be considered when designing a residential site. Wind affects both human comfort and energy consumption of the house itself. Wind cools the body by increasing the amount of moisture evaporated at the skin's surface. This is desired when air temperatures exceed the comfort range of 70 to 80°F. When this occurs, wind functions like a fan to cool the body, making it feel cooler

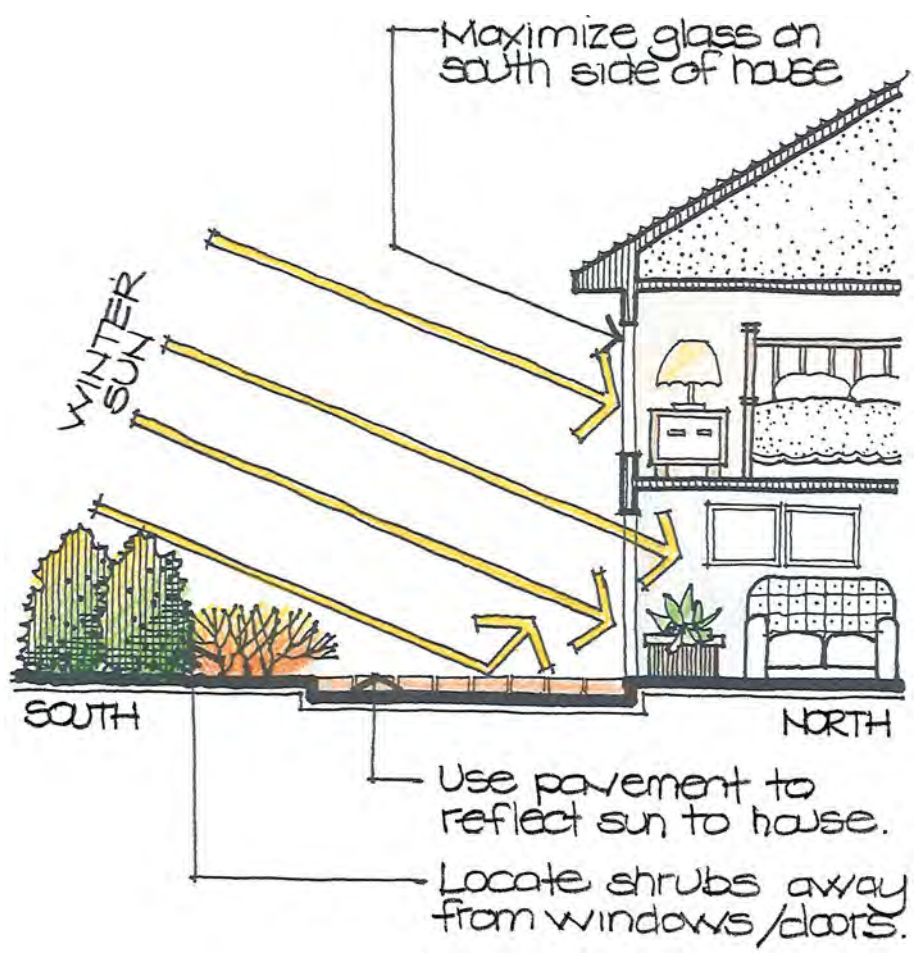


Figure 3–25
Rooms located on the south side of the house can benefit from the warming effects of winter sun with proper design.

than the ambient air temperature. On the other hand, wind exposure is not desired when air temperatures drop below 70°F. Wind accentuates the perception of cold air at these temperatures and creates what is commonly called "wind chill." Similar phenomena occur for the house itself. Wind carries away the heat of the house and affects the amount of energy required for heating and cooling.

Unlike sun, wind is not as precisely predictable. Wind is more variable on a daily basis than sun but does hold to some generalized patterns based on season and weather fronts. In broad terms, wind blows from all compass directions throughout the year. However, wind blows most commonly from a westerly direction throughout the United States. In the summer, the prevailing wind is from the south and southwest, and during the cool season it shifts more to the west and northwest (Figure 3–26). The wind direction also responds to weather fronts. For example, wind originates mostly from the south and southwest during a warm front but shifts to the northwest following the passage of a cold front. These general patterns are further modified by the presence of mountain ranges and large water bodies. It is best to refer to weather records kept by the National Weather Service to obtain more precise readings of wind direction in any given geographic setting.

Some broad patterns of wind are evident during the four seasons of the year for an open, level site surrounding a two-story house located in the temperate zone:

- All sides of the house are exposed to wind at some time during the course of the year.

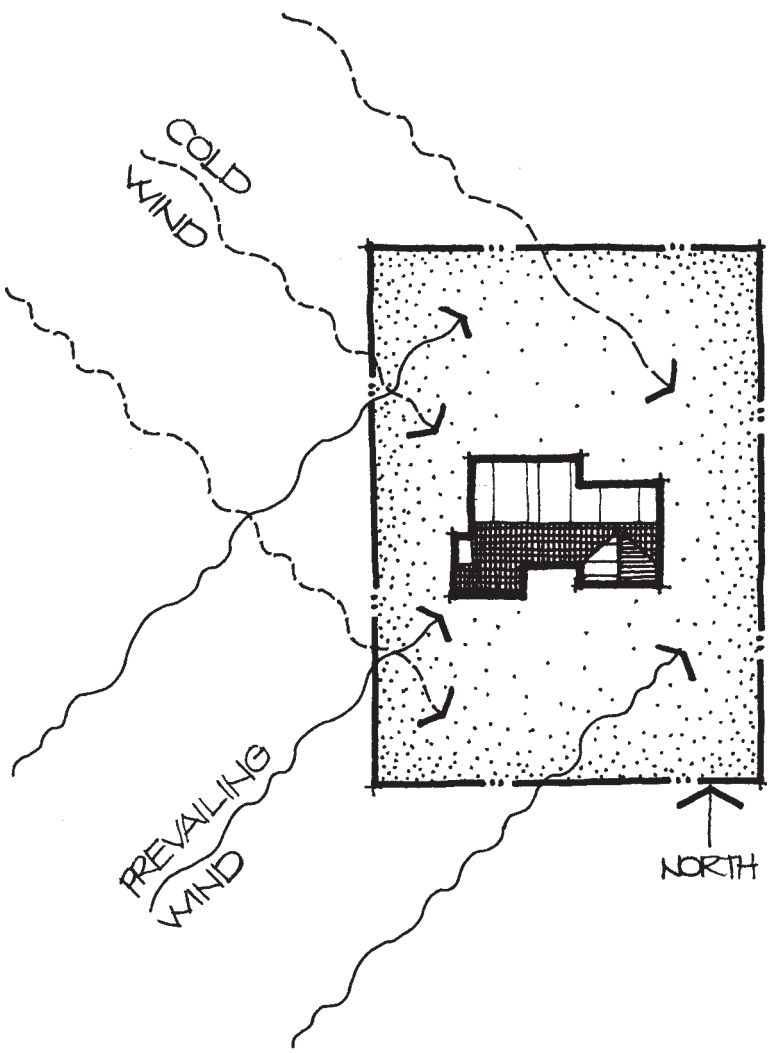


Figure 3–26
Typical wind patterns in the temperate zone.

- The south, southwest, and west sides of the house receive the most constant wind on a yearly basis.
- The south and west sides of a house are generally the most exposed to wind during the summer months and/or during a warm front.
- The north and west sides of a house are most exposed to the cooling effects of winds following the passage of a cold front; this outcome is most negative during the winter season.
- The eastern side of the house is the most protected from the wind during the year.

Topography, vegetation, and other buildings both on and off a particular site frequently modify these general conditions. It is essential that the nearby off-site conditions be studied to determine how wind will be affected in its flow. For example, Figure 3–27 illustrates how different locations of houses and vegetation on adjoining properties influence where wind is either concentrated or screened from a site.

Two overall recommendations for designing with wind on a residential site are: (1) protection is needed for winds blowing from the west and northwest and (2) exposure is desired for winds blowing from the south and southwest. These objectives apply both for outdoor spaces and for the house itself.

Provide Protection from Cold-Season Wind

There are numerous means for protecting both outdoor spaces and the house from the potentially detrimental effects of wind blowing from the westerly direction. These include proper location of outdoor use areas, use of vegetation, and employment of walls/fences as windscreens. Based on the microclimates around a house, it is best to place outdoor use areas requiring wind protection on the east and/or southeast side of

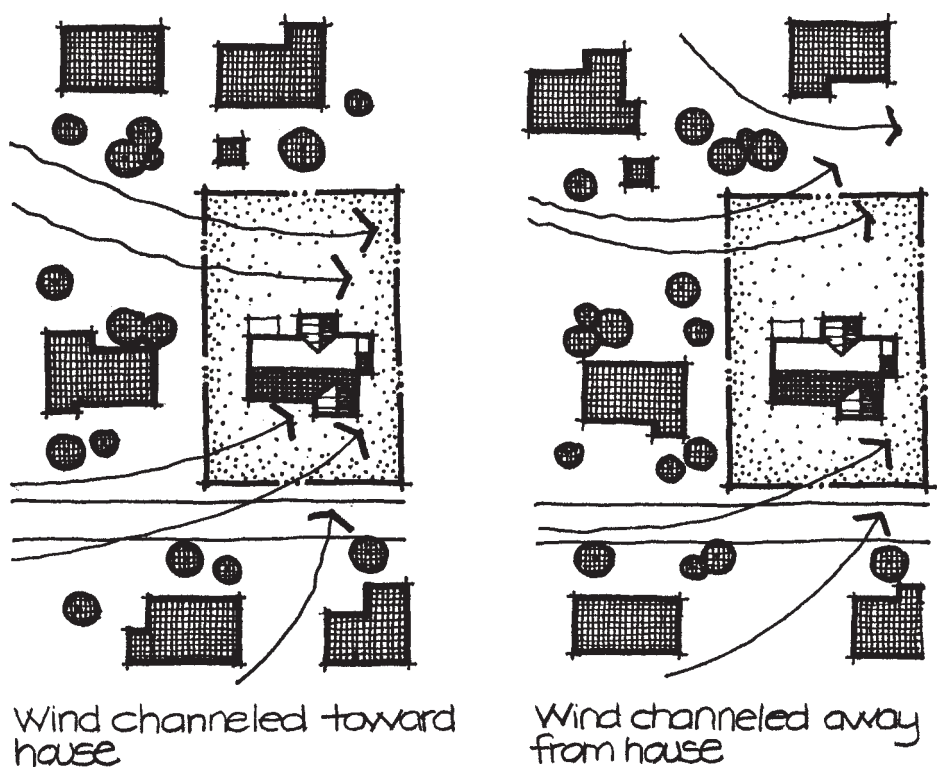


Figure 3–27
The effect of off-site conditions on the flow of wind toward and through a site.

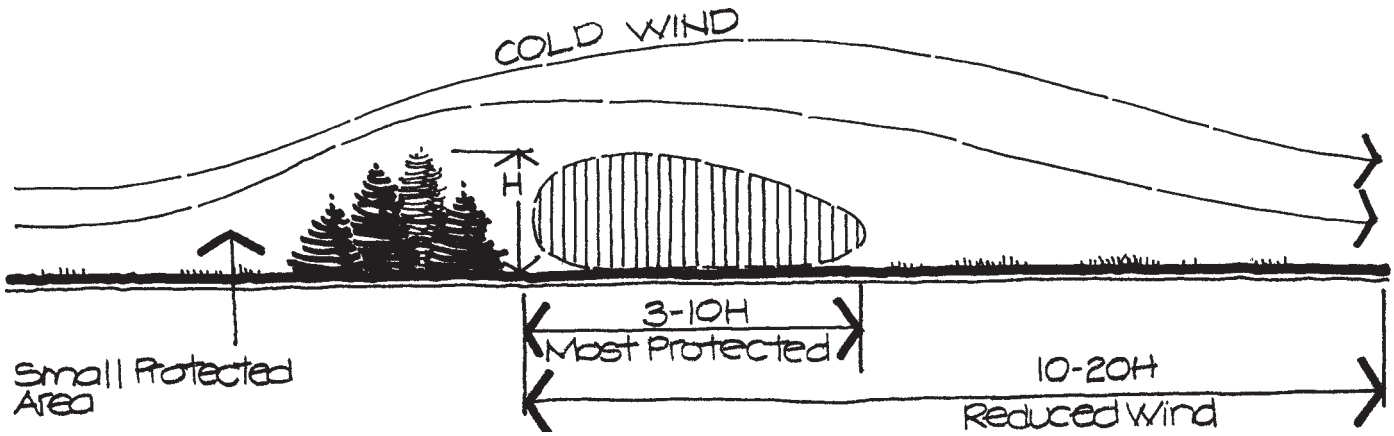


Figure 3–28
A mass of coniferous evergreen trees protects two areas from cold wind.

the house, where the house itself blocks direct exposure to the cold west and northwest wind. This location is most desirable for outdoor use areas in late autumn, winter, and/or early spring.

In addition, vegetation can be used to screen and direct wind on the residential site. The foliage mass of plants acts like a solid object in the landscape to direct the wind around and over itself, thereby creating a protected, calm zone on the "lee" or opposite side from the wind. Coniferous evergreen trees and shrubs do this best because they possess relatively dense foliage throughout the year. Closely spaced coniferous evergreen trees function like a wall to direct wind up and over their mass, creating two protected zones (Figure 3–28). The smallest zone exists on the windward side of the tree mass, whereas the largest zone is on the lee side of the tree mass.

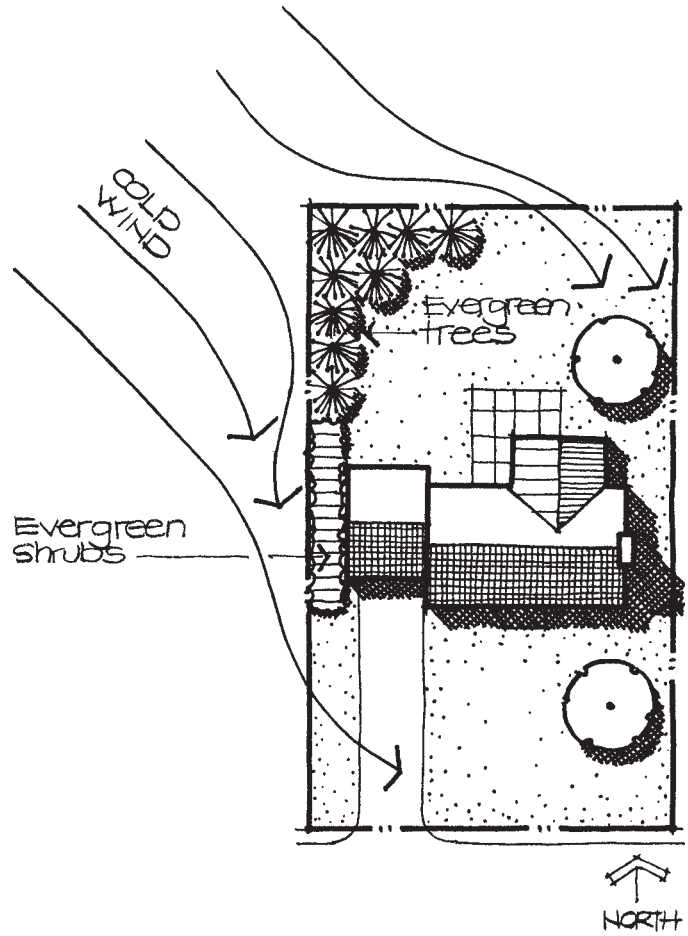
How much wind protection is created and for what distance beyond the tree mass depends on the height and density of the trees in the barrier. A general rule of thumb is that the open field velocity of wind can be reduced by up to 50 percent in the leeward zone for a distance that is approximately 10 to 20 times the height of the tree mass.[7] Within this zone, the maximum wind reduction occurs within a distance that is 3 to 10 times the height of the trees and becomes less pronounced as one moves further away. Thus, a 20′ high group of trees could be expected to notably reduce wind within a distance that is 60′ to 200′ from the tree mass.[8]

It should also be noted that the most efficient screening of wind from a group of trees occurs when the foliage density is approximately 50 to 60 percent.[9] That is, about 50 to 60 percent of the vegetation is foliage and trunk/branch structure while the remaining 40 to 50 percent is void or open space. This condition allows some wind to penetrate the tree mass and to uphold wind that is being pushed up and over the tree mass. When the density increases, the lack of wind through the mass permits the deflected wind to return to the ground more quickly, thus reducing the extent of the protected area. Thus, a moderately dense tree mass is actually more effective than a dense one.

To take advantage of their potential screening effect, coniferous trees and shrubs should be located on the west and northwest sides of the house as well as in outdoor spaces, where they can reduce the impact of cooling wind (Figure 3–29). To be effective, coniferous trees should be organized in a continuous band along the west and northwest edges of a site. Evergreen trees will not be effective if scattered in smaller

[7]Gary O. Robinette, *Plants People Environmental Quality* (Washington, DC: U.S. Department of Interior, 1972), p. 78.
[8]Ibid., p. 79 and p. 82.
[9]Ibid., p. 82.

Figure 3–29
Coniferous evergreen trees and shrubs should be massed on the west and northwest sides of the site for cold wind protection.



groups, because this will create openings allowing wind to flow through (Figure 3–30). In fact, gaps in the tree mass may actually increase the wind's velocity through these areas. Proper planting of coniferous evergreen vegetation can save up to 30 percent of the heating cost for the cool season of the year.[10]

Specific site conditions such as available space, orientation of the house to the street, and direction of desirable views may not always permit coniferous evergreen vegetation to be organized around the outer northwest quadrant of a site. Thus, one alternative approach is to mass coniferous evergreen shrubs immediately along the exterior wall of the house on the west and northwest sides (Figure 3–31). This coniferous shrub planting not only screens cold wind from the house wall, but also forms a "dead air space" between the plant mass and the house wall, in effect creating an additional layer of insulation. This technique also reduces heating costs.

A disadvantage of using coniferous vegetation to block wind is that it covers a relatively large area of ground. An alternative that requires less space is to use walls and fences to screen unwanted cold wind. These too can be used to lift the wind above an outdoor space or away from the west and northwest walls of the house. One potential application of this concept is to locate a wall or fence around the west and north sides of a front door entrance space on the north side of a house (Figure 3–32). Such a space is often inhospitably dark, cool, and windy because of its orientation. A carefully designed and located vertical plane can ameliorate the negative aspects of the space by blocking wind and permitting the front door to be opened and closed with diminished wind infiltration.

[10]Anne Simon Moffat and Marc Schiler, *Energy-Efficient and Environmental Landscaping* (South Newfane, VT: Appropriate Solutions Press, 1994), p. 75.

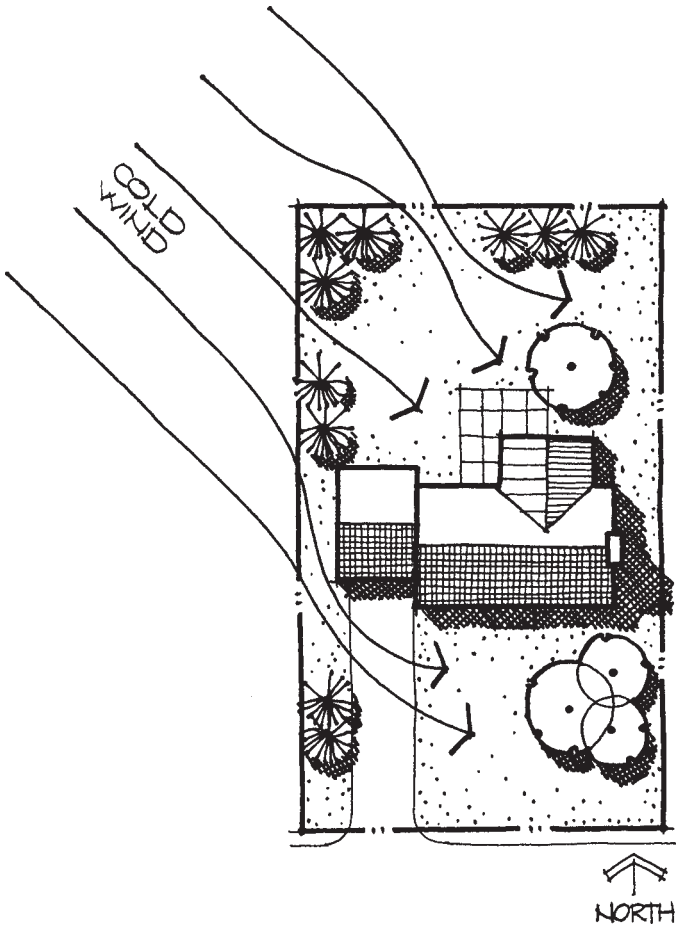


Figure 3–30
Scattered coniferous evergreen trees will allow cold wind to easily move through the site toward the house.

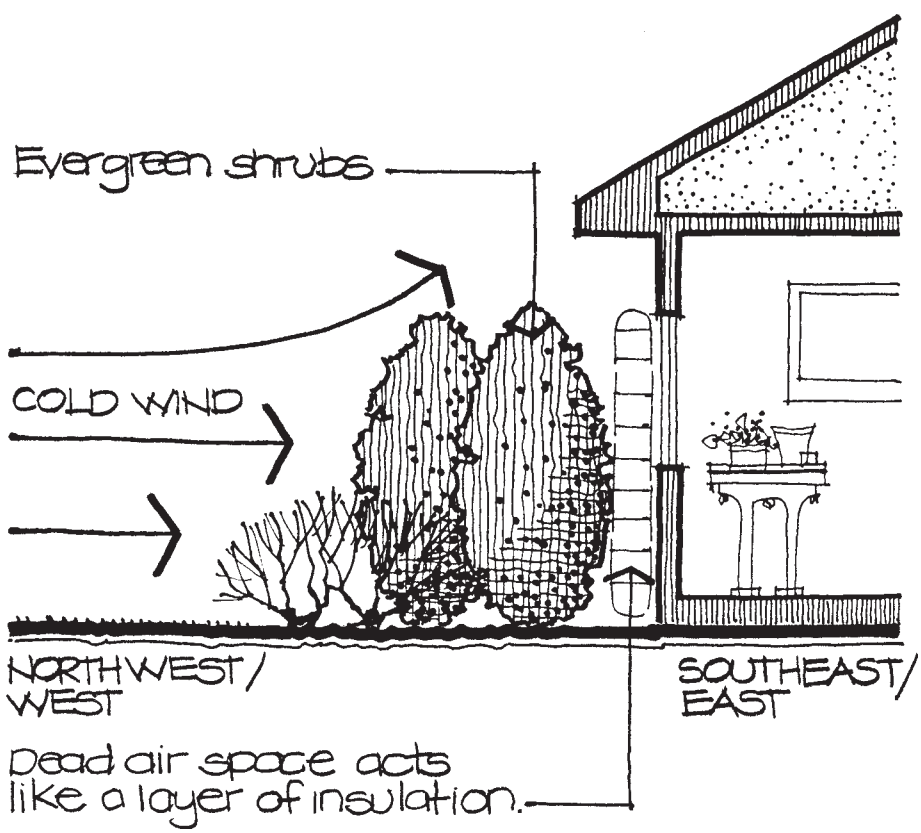


Figure 3–31
A mass of tall evergreen shrubs located next to the exterior house wall can protect the house from cold wind.

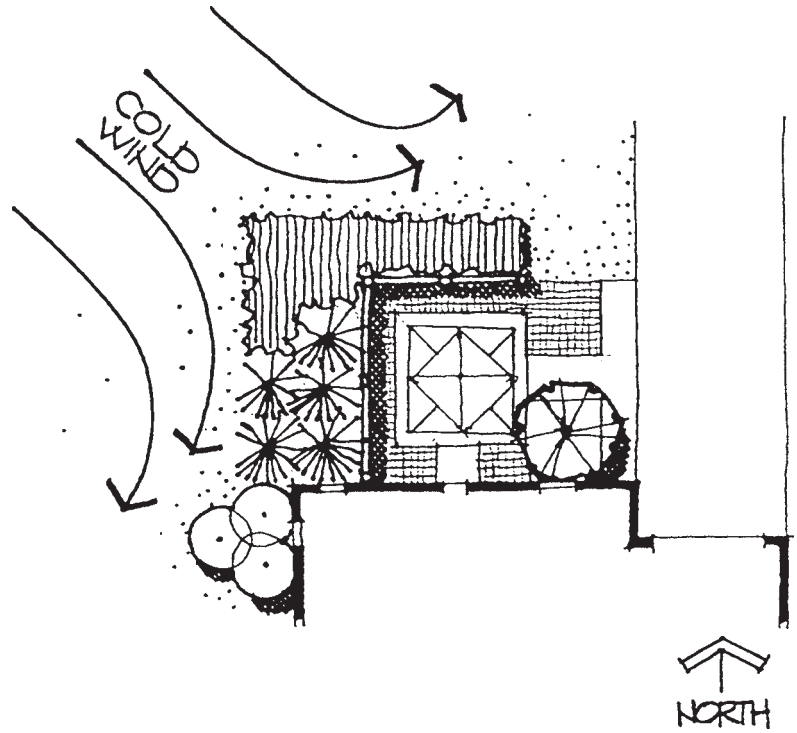


Figure 3–32
Coniferous evergreen plants and a wall/fence can protect a doorway on the north side of the house.

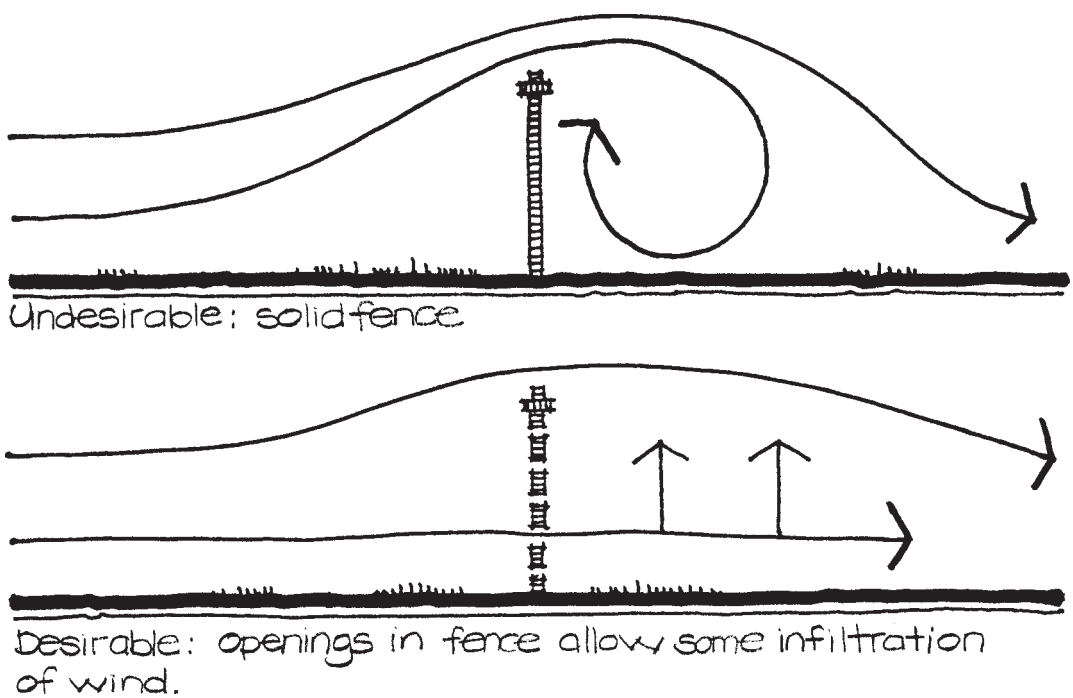


Figure 3–33
A fence with openings offers maximum protection from the wind.

As with vegetation, walls and fences are more effective windscreens when some wind is allowed to filter through them. A solid wall or fence acts like a dense vegetation mass by pulling the lifted wind back to the ground with eddies on the lee side (top of Figure 3–33). Therefore, walls or fences intended as windscreens should be designed with small openings or individual slats (louvers) that allow some wind to filter through (bottom of Figure 3–33). Some infiltration of wind helps to uplift the current that is

moving over the top of the fence. Vertical slats are often the best because they provide an even filtration of wind through the entire plane of the wall or fence. Horizontal slats that are angled upward will lift the wind somewhat above the space. Horizontal slats that are angled downward are not suggested because they direct the wind toward the ground, where it may disturb plants or move debris and dust about the space.

Several other approaches may also be taken to minimize exposure to cold wind. One is to use vertical panels of canvas that are suspended between posts or poles. This provides an opportunity for using bright color in a space while fulfilling the more utilitarian need to block wind. Tempered glass or Plexiglas panels may be desirable in locations where a view must be preserved while blocking wind. An outdoor space with a spectacular panoramic view that is intended for cool-season use is one example of a place where a glass wall would work well. The best method for screening wind is not necessarily achieved by either vegetation or walls/fences alone. Rather, it is frequently advantageous to combine these elements so they can form a coordinated approach to minimizing the potential negative effects of wind.

Maximize Exposure to Hot-Season Wind

Wind is also a potential asset in most regions. During the hot season of the year, air movement enhances the evaporation of moisture from people's skin and thus gives the perception of cooler air temperatures. Additionally, wind prevents the air in outdoor spaces from becoming too stagnant. The exception to this occurs in hot, arid climates where hot-season wind can magnify the perception of extreme temperatures rather than diminish them. There are a number of means of capturing and taking advantage of the possible benefits of wind on a residential site.

One is to provide generous open lawn or meadow areas to the south and southwest of the house and in outdoor spaces used in the warm season (Figure 3–34). Such an open area will permit the prevailing wind to move toward the house or outdoor

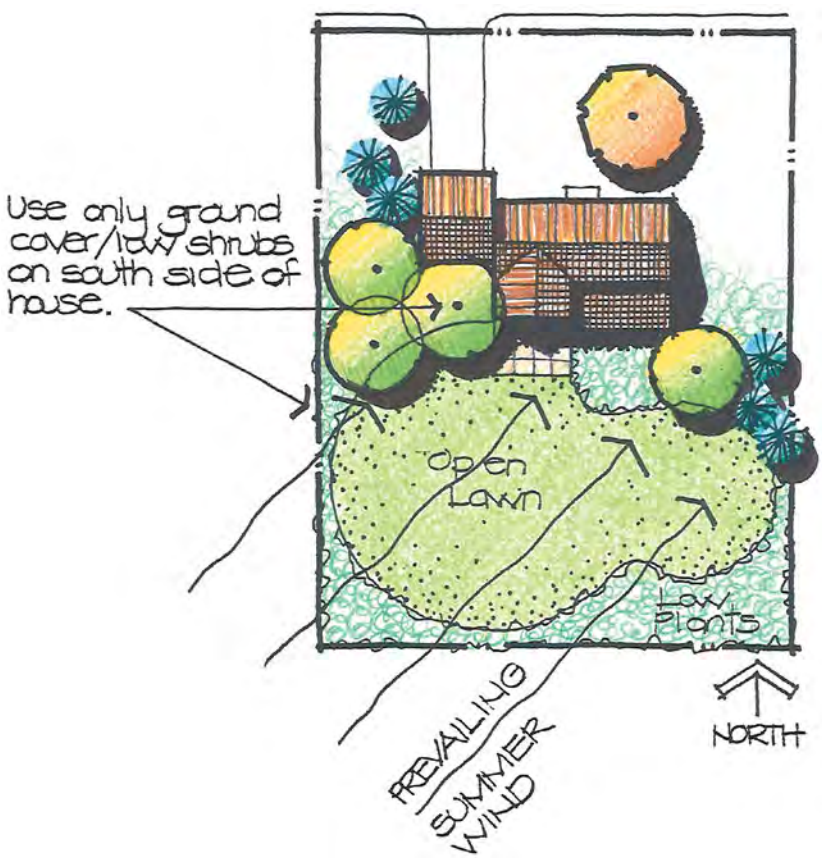


Figure 3–34
An open lawn area to the southwest of the house will give maximum exposure to prevailing summer wind.

space without obstruction. Similarly, plant materials and other elements of height should be kept low to the south and southwest sides. Areas of ground cover, low perennials, or shrubs below 2 feet will give maximum exposure to wind.

Channeling air movement can further enhance wind exposure. As with coniferous plants, wind is deflected in all directions around the canopy mass of a large deciduous tree; some wind is directed below the canopy where wind velocity is intensified between the canopy and the ground. Increased wind speed and shade make the space below a tree canopy feel cooler, an occurrence regularly appreciated by players who seek respite under a tree on a golf course on a hot summer day. To take advantage of this possibility on a residential site, deciduous shade trees should be located near the south or southwest side of the house or outdoor space (Figure 3–35).

The planned arrangement of vegetation, walls/fences, and landform, either singularly or collectively, can likewise funnel wind toward the house or outdoor spaces. These elements can be located in a broad V-shaped configuration that directs the prevailing wind to a specific area (Figure 3–36). When channeling wind, the surface material the wind is blowing over before it enters the house or outdoor space should be kept in mind. It is best to allow the wind to move across a vegetated surface such as lawn or ground because air temperatures above this type of ground material are comparatively cool. When possible, it is likewise desirable to allow wind to move over water such as a lake, pond, or even small water features such as a pool or waterfall. It is not wise to permit wind to move across a paved surface such as a parking lot or driveway because air temperatures above these areas are relatively high. These extreme temperatures are then transferred to the adjoining house or outdoor space.

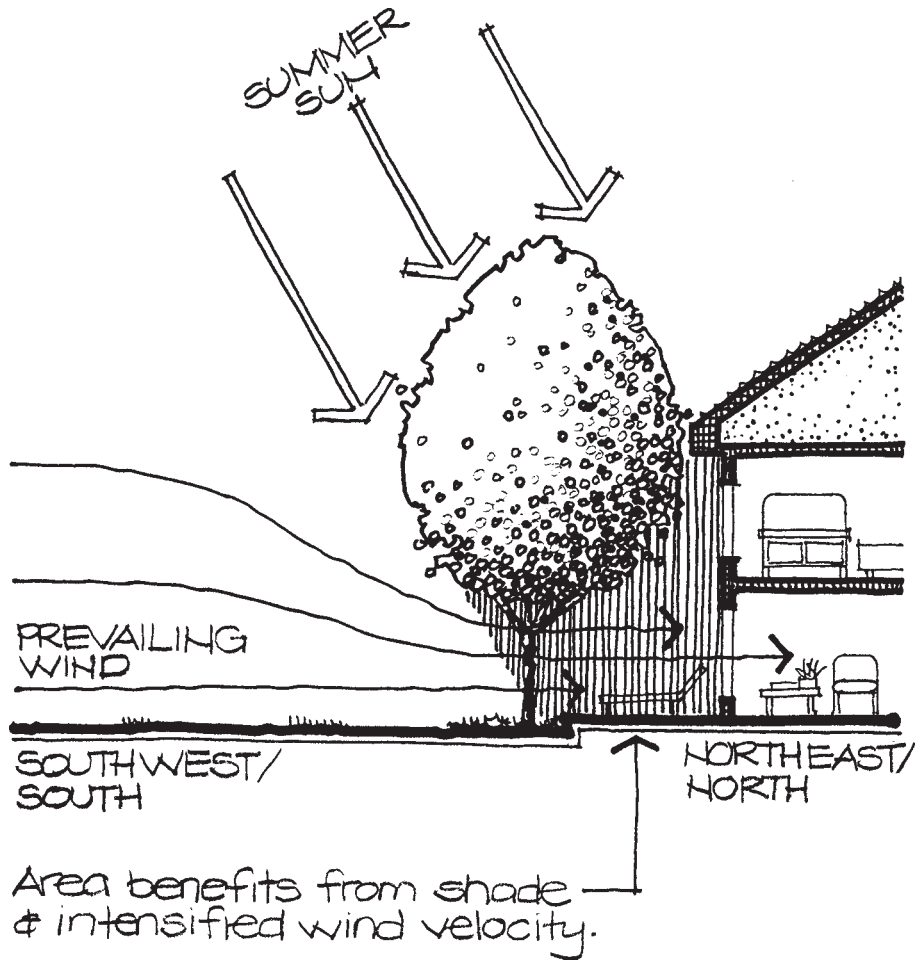


Figure 3–35
A deciduous shade tree can channel wind and provide shade for the outdoor space and house located beneath it.

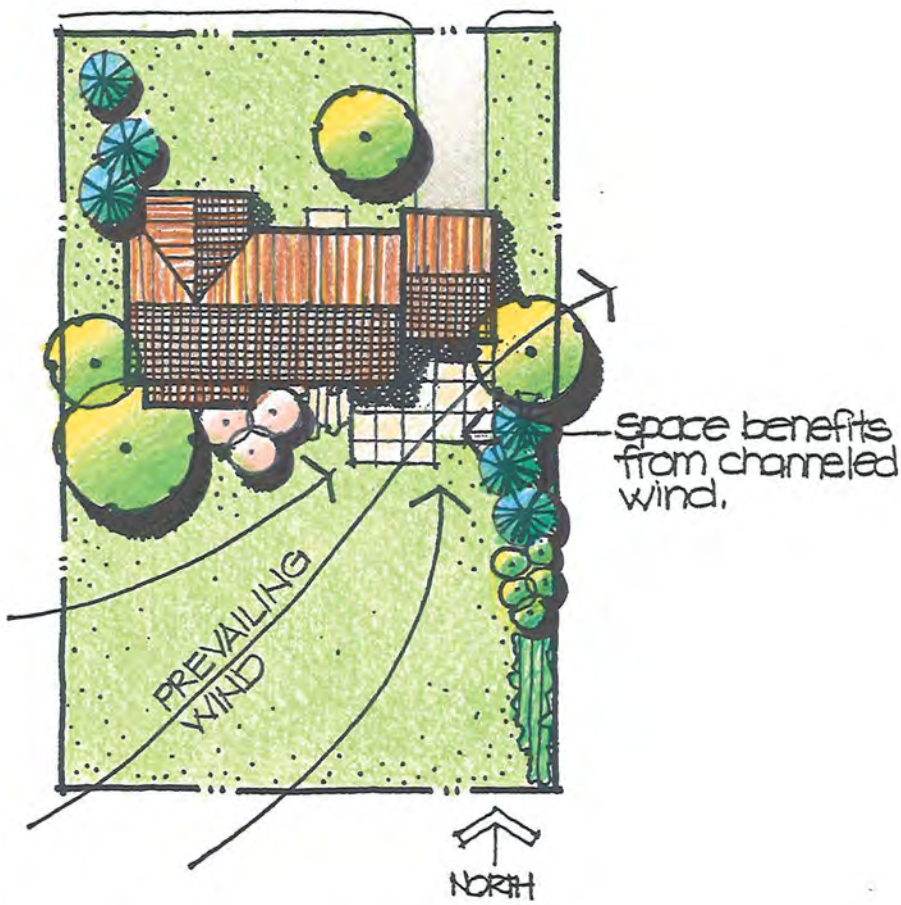


Figure 3–36
Plants can be arranged in a broad "V" configuration to channel the prevailing wind toward outdoor spaces.

Fences and walls can also enhance exposure to wind. As previously discussed, a wall or fence can be designed to direct the wind in different ways around and through an outdoor space. To assist wind exposure, a wall or fence should be designed with generous openings. An open wrought-iron fence or open grid of different materials allows maximum exposure to wind while also providing enclosure by the fence. A louvered fence is frequently an excellent approach as well. Louvers in a fence may be designed to swivel or turn so that they can be adjusted to affect the size and orientation of the openings. This allows the fence to respond to varying wind directions and velocities.

In summary, numerous techniques can be implemented on the residential site for properly designing with wind. Each needs to be analyzed with respect to the existing regional and specific site conditions to determine its feasibility and potential impact. These techniques should be coordinated with consideration for sun and other requirements of the site (see previous sections of this chapter). Using some or all of these means for designing with wind will ultimately benefit the quality of a residential site design and its associated enjoyment of use by the homeowners.

Conserve Water

Another naturally occurring event is precipitation, a necessary source of water for all life on the residential site. While essential, precipitation is not predictable in occurrence and varies widely in seasonal and regional amounts. Average rainfall is about 59″ in Miami, 42″ in Boston, 36″ in Seattle, and 7-1/2″ in Phoenix.[11] May through October

[11] http://www.worldclimate.com.

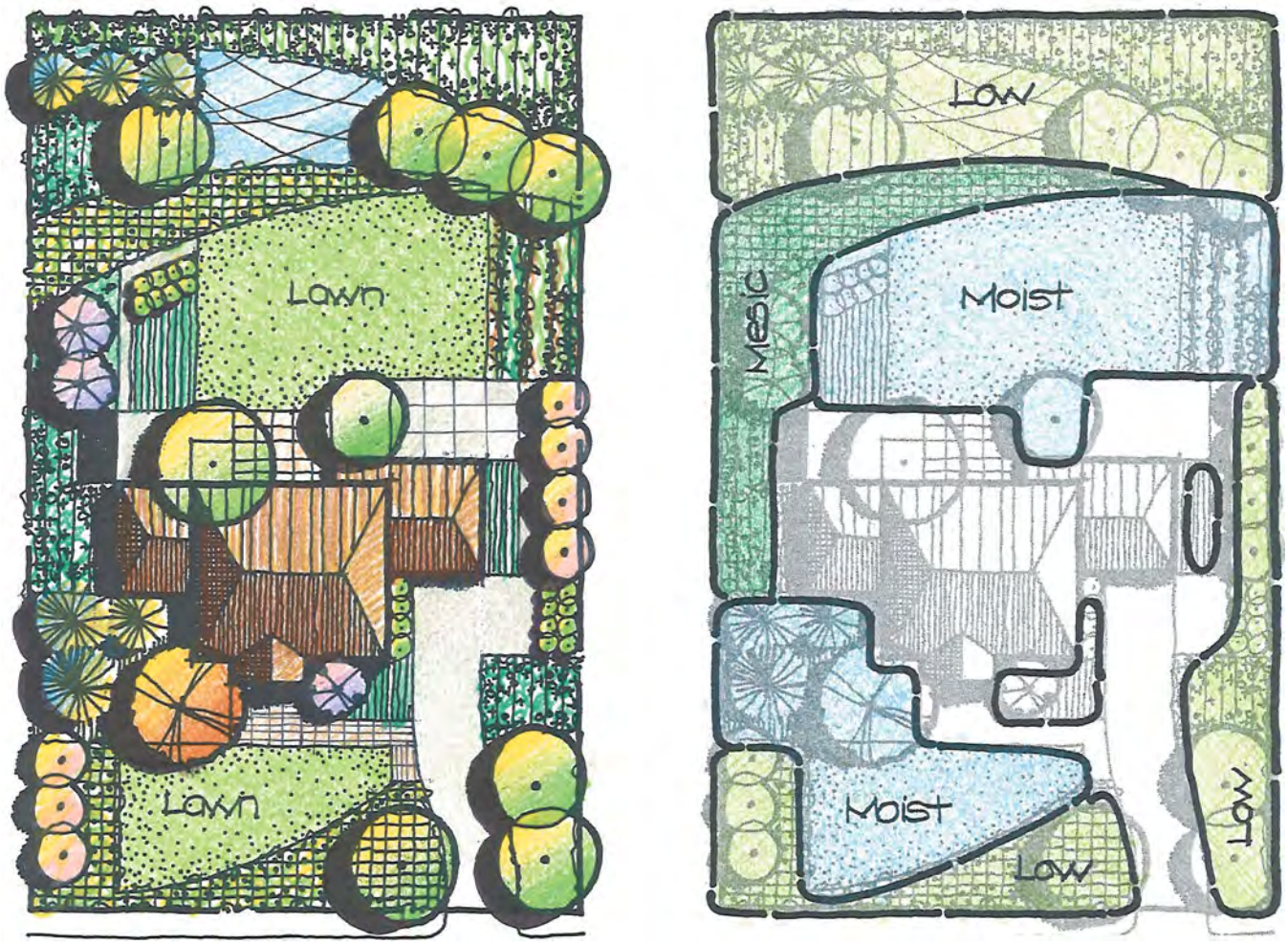


Figure 3–37
Site irrigation should be organized into zones of different water needs to conserve water.

are the wettest months in Miami, whereas April through June are the driest months in Phoenix. Natural precipitation is often supplemented in the residential landscape with various forms of watering to help plants and lawns survive dry spells. This provisional water can be substantial in terms of both volume and cost. It is estimated that the average family of four in the United States uses 400 gallons of water per day, 30 percent of which is devoted to outdoor uses.[12] Additionally, water is projected to become an increasingly scarce and precious resource in the future. Thus, the sustainable residential site must integrate various techniques for conserving water and using it wisely.

A landscape designed for minimal use of water is called a *xeriscape* and is most commonly used in arid regions, though it has applications in all areas that experience periodic droughts. A xeriscape can encompass the entire site or be a designated low-use water zone within the site. A well-conceived master plan, proper selection of plant materials (see "Select Plants for Regional Precipitation" in this chapter), efficient irrigation, and good maintenance practices can all contribute to a xeriscape. The master plan should incorporate a host of concepts so that water conservation is integral to the entire design.

The optimal xeriscape relies only on naturally occurring precipitation. If irrigation is used to supplement this, then it should be designed on the basis of different requirement zones as a means of conserving water (Figure 3–37). For example, a

[12]"Outdoor Water Use in the United States," *EPA Water Sense*, EPA-832-F-06-005.

low-water zone would have minimal or no irrigation with drought-tolerant plants. A low-water zone should be as large as possible and located the greatest distance from the residence because it would not need pipes and other connections to support it. A moderate or mesic water zone would require some irrigation during dry spells but little to no extra water the remainder of the time. A moist water zone, often including the lawn, would require the most irrigation and should be relatively close to the residence to reduce the length of pipe or hose to service it. This zone should be kept as small as possible to conserve water.

Ideal in planting beds and containers, drip irrigation or soaker hoses are the best methods of irrigation because water enters directly into the ground. New technologies in irrigation such as subsurface capillary systems are emerging and promise to provide significantly more efficient distribution of water to the landscape as well. These systems use a small tube that is connected to a matlike material below the ground's surface as a means of moistening the soil. Sprinkler- or spray-type irrigation should be minimized because some water is lost through evaporation and wind dispersal. Lastly, an irrigation system should have a rain-shutoff device and undergo regular maintenance to repair leaks, adjust volume, and correct aim of the sprinkler heads.

Other maintenance practices that conserve water include putting mulch on planting beds where there is exposed soil. Mulch reduces the amount of water that evaporates from the soil, lowers soil temperatures, reduces weeds that are unsightly and take moisture from landscape plants, and decomposes to form organic material. Lawns (also see "Select Plants for Regional Precipitation") should be regularly aerated to create air space within the soil and encourage the infiltration of surface water. The grass height in lawns should be maintained at 2 to 3 inches so the grass shades the soil and helps to retain soil moisture.

Water harvesting is a different technique for conserving water by catching precipitation on a hard surface such as a roof or pavement and then storing it as a source for watering plants. A simple way to collect rain from roof areas is with a rain barrel placed at the bottom of a downspout (Figure 3–38). Similarly, runoff from a roof or paved surface can be retained in a cistern, a large tank typically constructed underground. A cistern was a common method for storing water on farms before electric pumps became commonplace in wells.

A less conventional means for conserving water on a residential site is to use recycled water or "gray water" as a source for watering the landscape. Gray water originates

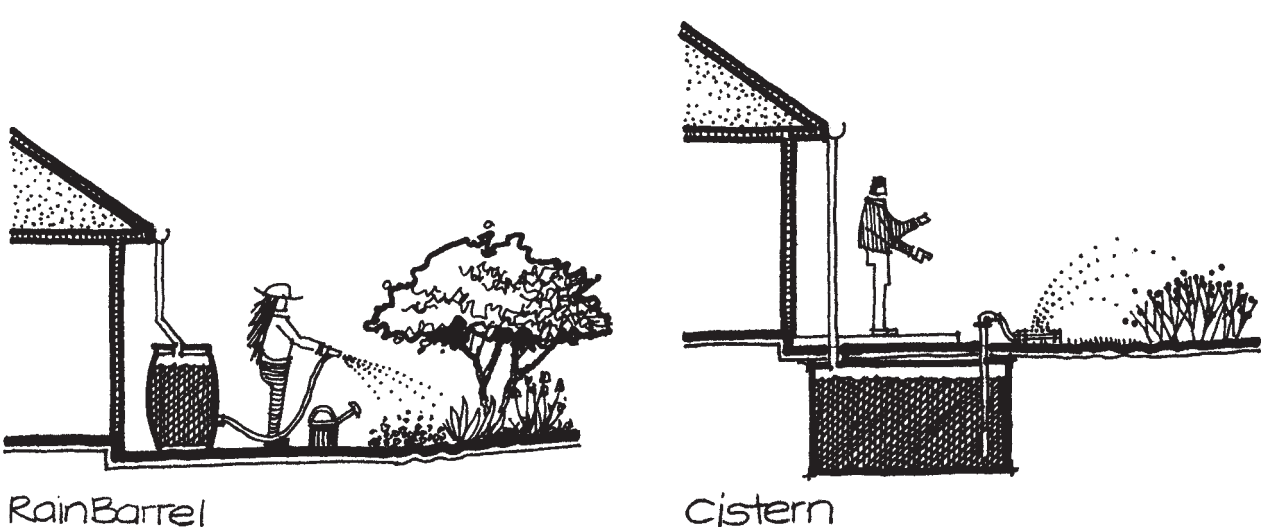


Figure 3–38
Harvested water can be stored in rain barrels or cisterns as a source for watering plants.

from various household washing practices such as dishwashing, laundry, and showers and is typically drained into a septic system or municipal sewer. Yet this water is only mildly "polluted" if no toxins or chemicals are used in washing. It should be noted that gray water is not sewage that originates from toilets. With proper plumbing changes, the water from sinks, showers, dishwashers, and laundry machines can be drained to a holding tank where it can be a source for watering plants. It is often suggested that gray water be combined with tap water before applying it to the landscape. This is a particularly useful concept in arid climate regions where any water is beneficial, though gray water should not be used for root or potted plants.

Select Plants for Regional Precipitation

A related strategy for reducing water consumption on the residential site is to select native or other similar plant materials that grow unassisted in the regional climate conditions. In addition to the normal consideration of hardiness, attention should be given to when precipitation falls and in what amounts. Many geographic locations have distinct cycles of precipitation with some months of the year being notably wetter or dryer than others, as previously noted. Plants must be compatible with these precipitation patterns, not just annual averages. This frequently means using native plants that are naturally acclimated to the natural precipitation cycles (see "Use Regional Materials" in "Regional Fit" in this chapter). Vegetation that has greater water needs should not be used or should be located in designated moist zones of the site where it can be given sufficient supplemental water.

Another "plant material" that must be thought about in terms of water usage is the lawn. A lawn requires relatively large amounts of water to maintain its health and attractive green carpet appearance. Lawn and the grasses that compose it are only indigenous to cool, wet regions such as those found in the northwestern United States and Great Britain, where lawn evolved as a design element. Lawn does not grow well in other climatic regions without special care.

The lawn has other environmental shortcomings, too. The lawn is an ecological monoculture composed of one plant type, an artificial habitat that rarely exists in nature. By comparison, almost all natural ecosystems are composed of numerous plant and animal species that are interdependent. An ecosystem composed of numerous species is healthy and sustaining because the system can usually survive if one species is harmed or lost. Not so with a lawn. Finally, the height of grass in a lawn is also unreal; most lawn grasses grow 6 to 8 inches in height if let alone. Lawn must of course be regularly mowed at great expense of time and energy to prevent the grasses from reaching their "natural" height.

As a synthetic environment, lawn must be supported by other means to maintain its health and vigor. Consistent watering, fertilization, pest control, and weeding are all necessary to preserve the appearance that is usually expected of a lawn area. This requires time and the input of numerous resources, some of which are environmentally harmful. For example, the pesticides and insecticides used on many lawns are directly harmful to people, especially children, and many birds and animals. The warning tags placed around a lawn after a chemical application are one indication of this. There are numerous reports about people who have become ill, sometimes severely so, after exposure to the chemicals applied to lawns. The quantity of use is also troublesome. About 40 percent of all private lawns are treated with pesticides at a rate that is three to six times more per acre than that used by farmers.[13] The fertilizers applied to lawns to make them grow vigorously are also potentially detrimental to the larger environment. Some of the fertilizer applied to the average lawn is carried away

[13]John Skow, "Can Lawns Be Justified?" *Time* (June 3, 1991), p. 63.

during a rainstorm and ends up in nearby streams and rivers. Here, the added fertilizer causes algae and other aquatic plants to dramatically grow, ultimately reducing the available oxygen for fish and other marine life. Fish and other aquatic life consequently die, creating a biologically barren marine environment.

Lawn areas on the residential site should therefore be considered carefully because of their demand for water and their other ecological deficiencies. Two general considerations should prevail with lawn areas: (1) reduce the amount of lawn area and (2) maintain lawn in an environmentally responsive manner. To reduce lawn area on the residential site, lawn should be located only in carefully selected areas of the site (bottom half of Figure 3–39). The remainder of the site can be designated for other uses and/or planted with other types of vegetation. Lawn should not be used on the ground plane in shaded areas below tree canopies, on slopes over a 3:1 gradient, in small pieces here and there, or in long narrow spaces, such as along the side of the house near the property line (top half of Figure 3–39). Lawn is difficult to grow and maintain in these instances. These areas are best covered with another material such as ground cover or, in some instances, porous pavement.

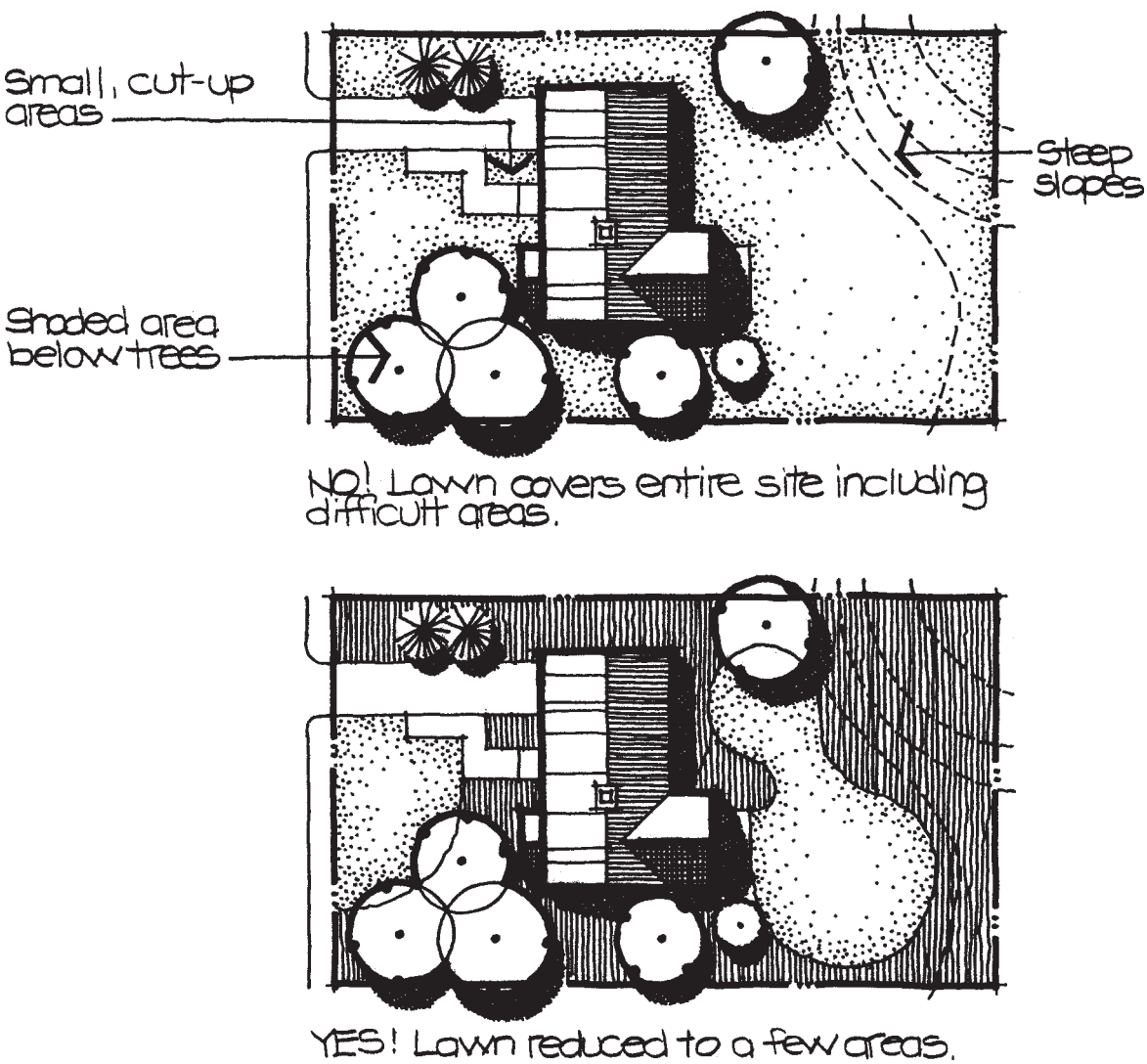


Figure 3–39
Lawn areas should be reduced in size and located only in relatively open and level areas.

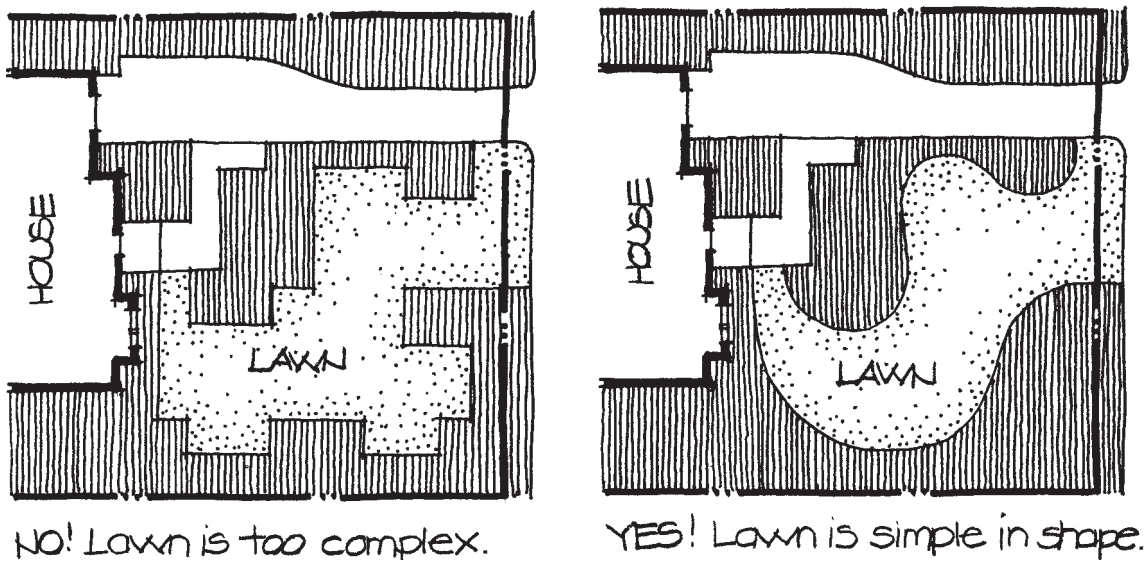


Figure 3–40
Lawn areas should be simple in shape for ease of mowing.

Areas where lawn is located should be well-defined, simply shaped areas (Figure 3–40). Uncomplicated and curved lawn edges are the easiest to mow along. Therefore, complex edges or right-angle corners should be avoided whenever possible. Additionally, the lawn should be relatively free of elements such as trees, light poles, boulders, and birdbaths, which act as obstacles for a lawn mower.

A number of lawn substitutes ought to be considered as alternatives to lawn. One is other low-growing, native grasses that can be found in almost all climatic regions. These grasses, such as red fescue (northern states), buffalo grass (Midwest prairie region), and California meadow sedge (West Coast), have the general appearance of lawn but do not require frequent mowing or watering.[14] A meadow of wildflowers and native grasses is another alternative, especially for relatively large areas. A meadow can offer a sense of change with its distinct seasons in addition to the splash of color it provides in the summer. An area with ornamental grasses of varied heights, textures, and colors can likewise provide a dramatic alternative to the conventional lawn. Ornamental grasses have visual appeal throughout the year and provide a soft texture that moves in the wind. A native prairie is similar and a possible substitute in many midwestern states. A wide range of cultivated ground covers can also occupy large areas of ground on a residential site instead of lawn. Finally, arid regions often incorporate gravel and decomposed granite as substitutes for the lawn. So, there are numerous options that offer creative solutions to providing a vegetative cover that have distinct environmental advantages compared to lawn.

Reduce Runoff

Increased runoff from compacted soil and from hard, impervious surfaces is a significant environmental problem in urban and suburban areas. Many urban soils have the consistency of concrete and effectively create a solid barrier that prevents surface water from percolating into the ground. Further, roofs, streets, driveways, parking areas, patios, and walks seal the ground's surface and prevent surface water from percolating into the soil. Not being able to enter the ground, the water runs off to nearby streams and rivers where it swells the volume of water flowing during and after a storm. This

[14]Ruth Chivers, "Alternative Lawns," *Garden Design* (June/July 2006), p. 70.

increased water volume in turn causes downstream flooding, stream erosion, and an elevated amount of soil and pollutants carried in the water.

A sustainable landscape design should reduce surface runoff to a volume that equals or is less than what would occur if the site were completely natural. Many of the techniques for conserving water (see "Conserve Water" in this chapter) reduce surface runoff as well. Furthermore, improving the overall soil structure on a site can notably diminish runoff. As previously discussed, one very effective way to accomplish this is by adding compost to the soil before planting (see "Rehabilitate Soil" in "Site Restoration").

Restricting the area of paved surfaces as much as possible can also moderate site runoff. Driveways, walks, patios, pool decks, and so on should be sized to minimum standards without sacrificing principles of good compositional design and needs for proper functioning. Paved areas that receive infrequent use or are inconsequential to the overall design should be reduced or eliminated (Figure 3–41).

Another approach to reducing surface runoff is to use porous pavement surfaces. Porous pavements have small gaps in the pavement material that permit surface water to seep through to the underlying ground, thereby reducing the quantity of runoff (Figure 3–42). Aggregate materials such as sand, gravel, crushed stone, wood chips, and so on are inherently porous surfaces. Brick, stone, concrete pavers, and wood laid with small spaces between the individual pieces of material on a sand or

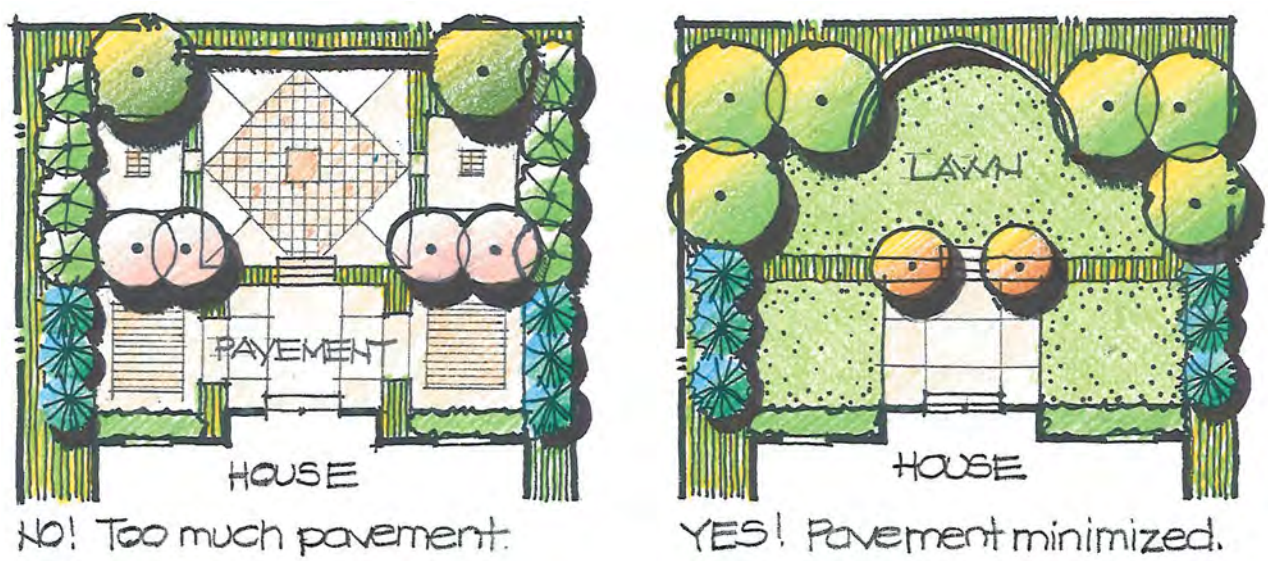


Figure 3–41
Paved areas should be minimized to reduce surface runoff.

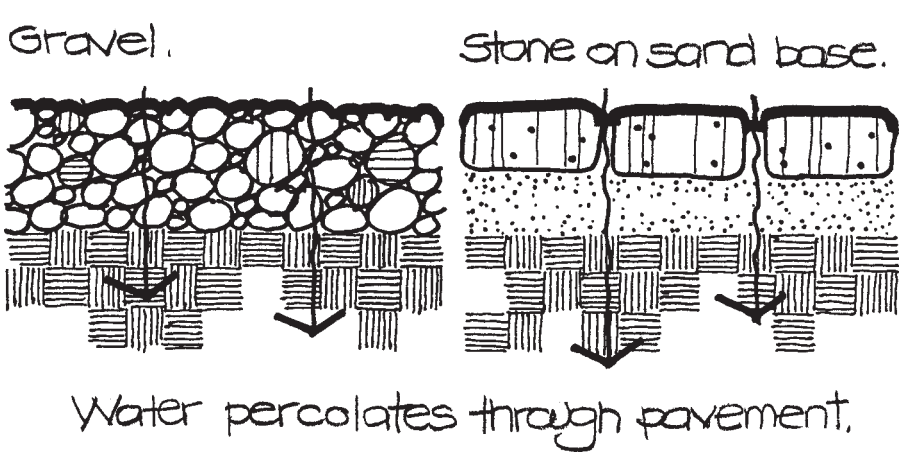


Figure 3–42
Porous pavements allow the water to percolate to the subsurface.

gravel base are also porous pavements. In addition, some concrete paver manufacturers offer specially designed concrete pavers that intentionally create gaps between individual paving units, thus permitting surface water to infiltrate to the ground below (see Chapter 12, Figures 12–27 and 12–28, pages 403–404). Conventional pavements such as concrete and asphalt are impervious and should be minimized, although specially mixed porous concrete and asphalt surfaces are available. The latter, however, are only feasible in warm climates where surface water does not freeze.

One other example of porous pavement is *grass pavement*, which is composed of a concrete or plastic mesh with regularly spaced openings extending through it. The interconnected concrete or plastic framework provides the structural support while the gaps are filled with soil and planted with lawn or ground cover (Figure 3–43). This is an ideal pavement for walks and infrequently used driveway areas, not only for the environmental benefits but also because the structural framework tends to visually disappear, giving the surface a lawn-like appearance. Grass pavement is not practical where there is intense, frequent use or where snow removal is necessary.

Surface runoff from a residential site can also be reduced by draining it toward lawn and planting areas where it can more readily enter the ground (Figure 3–44).

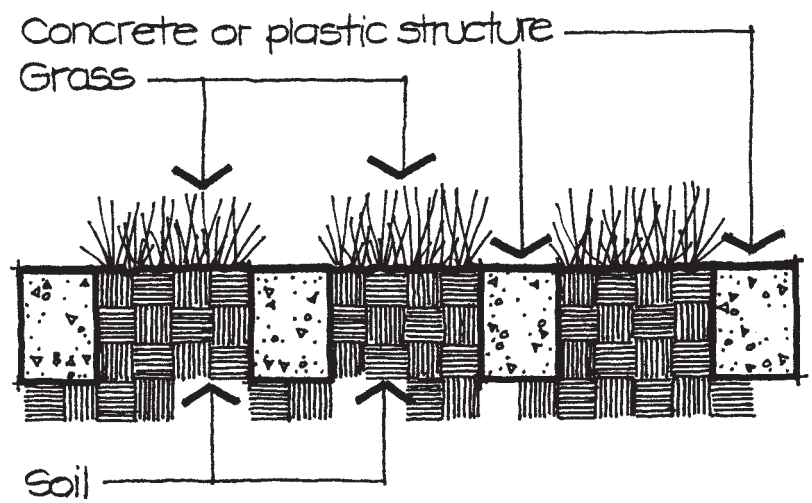


Figure 3–43
Cross-section through grass pavement.

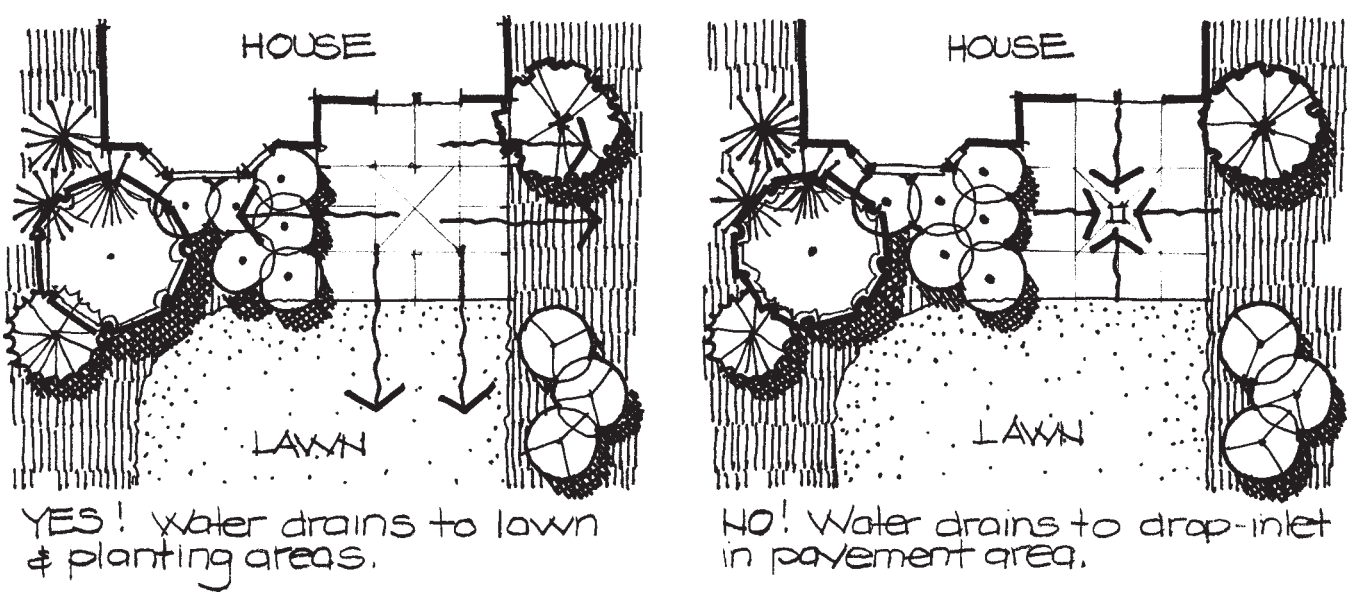


Figure 3–44
Surface water from pavement should be drained toward lawn and planting areas.

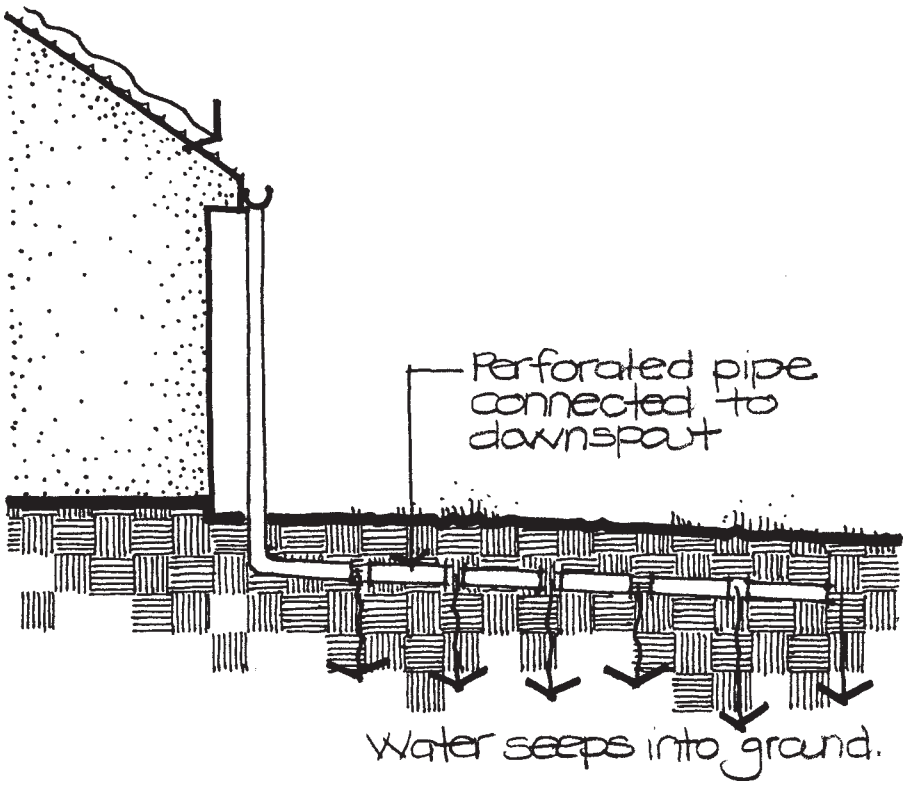


Figure 3–45
Water from downspouts can be directed to perforated pipes below ground to recharge groundwater.

Similarly, the water from roofs can be drained into the soil by connecting downspouts to underground perforated pipes, allowing the water to seep directly into the ground (Figure 3–45). One increasingly popular idea is a "rain garden," an artificially low area created to retain water that is drained toward it. Rain gardens should be placed downslope from where the surface water originates and integrated into the overall design of the site (Figure 3–46). A rain garden may be designed to look like a bog, a mini-wetland, a streamlike area with rocks, and so forth. Sandy or porous soil should be located underneath a rain garden to accommodate percolation of water into the soil, and the plants in a rain garden should be able to grow well in moist soil and to withstand periodic flooding (Figure 3–47). The surface water that is retained in a rain garden slowly percolates into the ground or is absorbed by the plants themselves.

Protect from Potential Wildfires

The possibility of wildfires is a real threat in western arid and semiarid regions of the country. Each year, thousands of acres of land are burned and millions of dollars in property damage result from wildfires. Sustainable residential sites located in these regions should be designed to minimize the potential threat of fire damage. The first step in reducing fire hazard is to determine likely paths for the movement of wildfire toward the site. Wildfires have a tendency to move with the prevailing summer wind and uphill from a valley or canyon bottom to the tops of slopes and ridges. The heat generated by a fire rises along slopes and accelerates the movement of fire toward higher ground, thus making houses located on or at the top of steep slopes the most vulnerable (Figure 3–48).[15] Houses located on high points but set back from the slope are less exposed because they are not in the direct path of rising heat. Another factor that should be studied is the type and density of vegetation that surrounds a site. Fire is more of a danger from directions that have dense vegetation between the

[15]Maureen Gilmer, *The Wildfire Survival Guide* (Dallas, TX: Taylor Publishing Company, 1995), p. 8

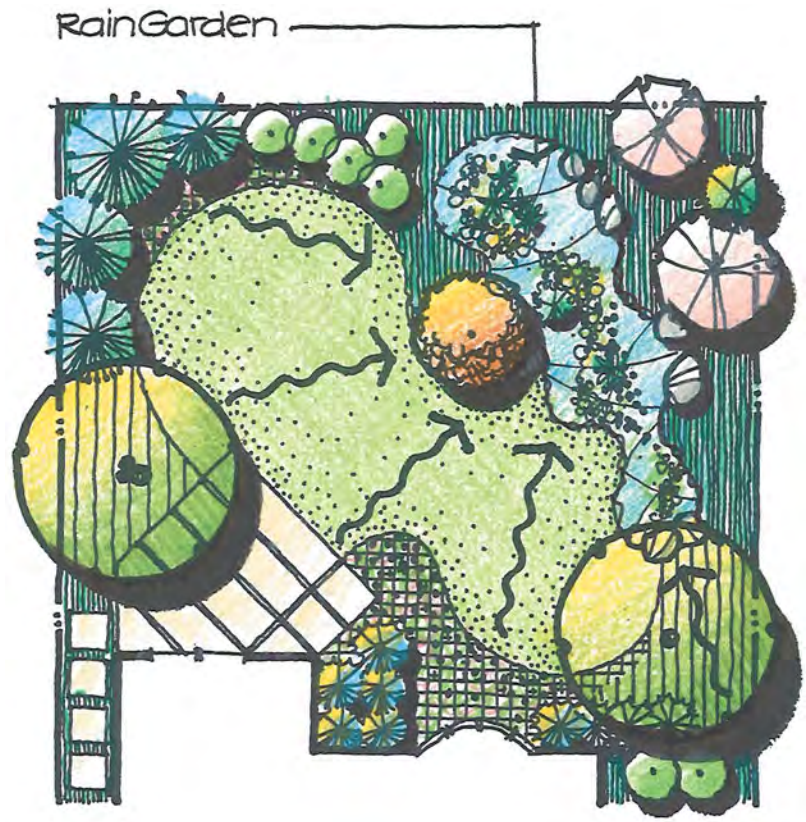


Figure 3–46
A rain garden is an artificial low area that is carefully integrated into the overall design.

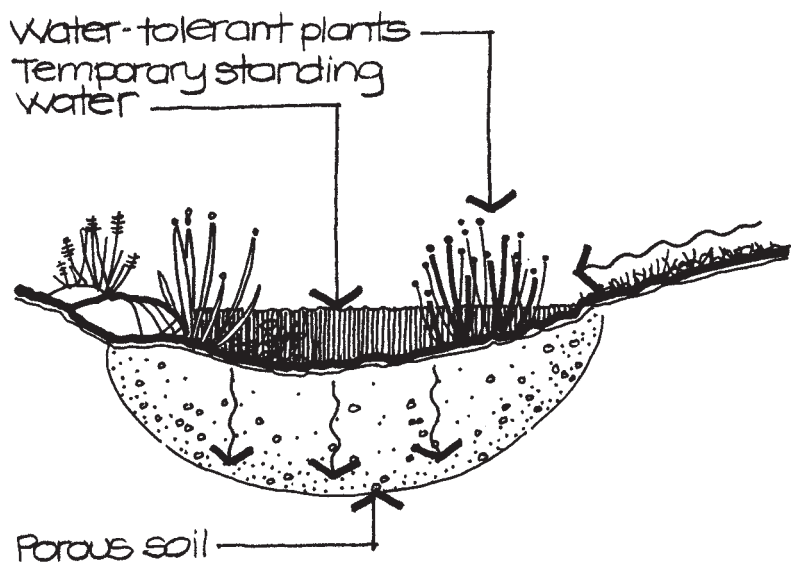


Figure 3–47
Cross-section through a rain garden.

ground and the treetops. Thickly massed living vegetation along with the remains of dead vegetation that has accumulated over years of time provides a rich fuel source for a fire and a continuous path of movement. Off-site areas that have this type of vegetation pose a threat to a residential site and should factor in when designing the site for wildfire protection.

With an understanding of the potential directions from which wildfire might approach, the residential site should be designed to create a "defensible space" that minimizes the ability of fire to spread from the perimeter of the site toward the house. The size and makeup of the defensible space should be based on topography, wind direction,

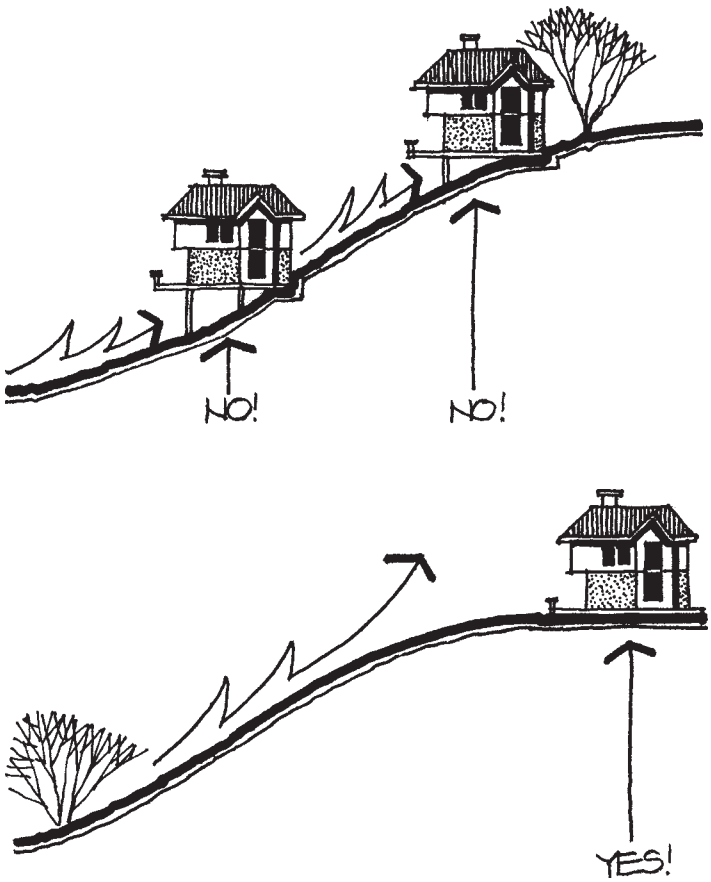


Figure 3–48
A house should be located back from the edge of a slope to be out of a fire's path moving uphill.

and off-site vegetation. The general rule of thumb is that the defensible space should extend 150 feet in all directions from the house on a site that is relatively flat or sloped up to a 20 percent gradient (Figure 3–49).[16] As the steepness of slope increases, so should the size of the defensible space, especially in the downhill direction from the house. Three subzones are recommended within the defensible space (Figure 3–50).[17] Zone 1 should extend 5 to 10 feet from the exterior wall of the house and should be treated as a break between the house and the surrounding landscape. Consequently, zone 1 may contain low plants, ground cover, and/or pavement but no tall shrubs or trees. Zone 1 should be the wettest area of the site and thus irrigated if necessary (also see "Conserve Water"). Zone 2 should extend 30 feet beyond the outside of zone 1 and can contain ground cover, low shrubs, lawn, pavement, and widely spaced trees (Figure 3–51). Plants with a high moisture content are preferred and may be native, introduced, or a combination of both. Zone 3 of the defensible space is located between zone 2 and the property line of the site. This zone may contain only native plants as long as they are thinned to prevent fire from moving between tree canopies or from the ground upward via a continuous vegetation mass. Similarly, all dead and diseased plants should be removed from zone 3 as well. Local fire regulations should be consulted to determine specific guidelines that might vary from these broad suggestions.

An associated strategy for minimizing fire hazard is to store water on a residential site as source for fighting a fire or for watering plants. Keeping plant materials watered and healthy minimizes their ability to catch fire. Dry plants, of course, readily act as tinder for a fire and promote its spread through the landscape. Again, the

[16]Ibid., p. 58.
[17]Ibid., pp. 59–60.

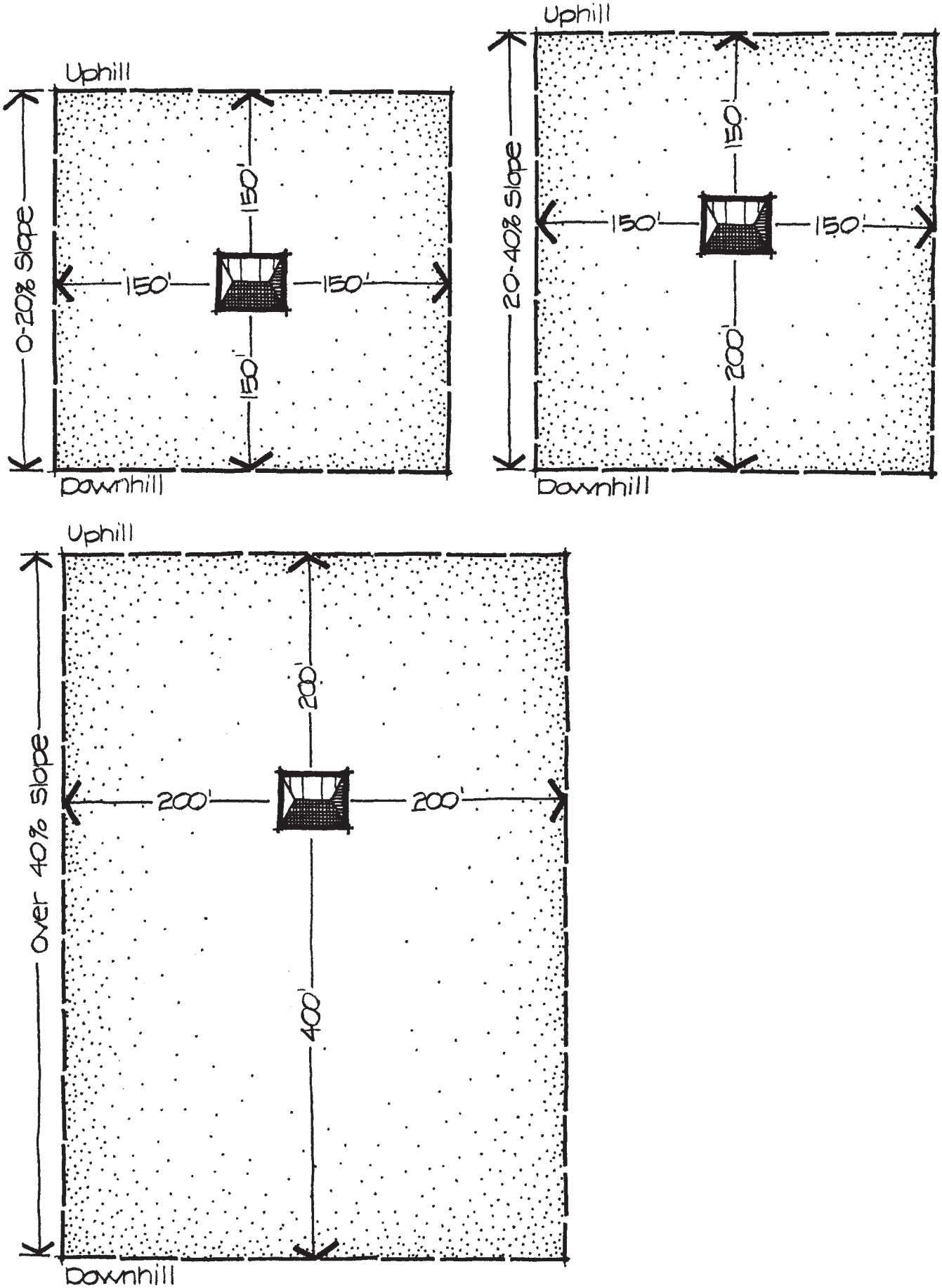


Figure 3–49
Recommended sizes of a defensible space for fire vary with steepness of a site.

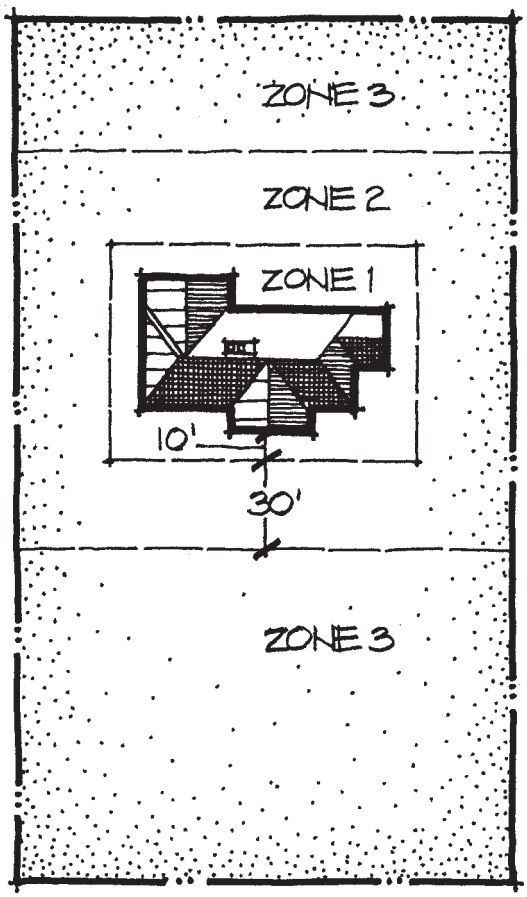


Figure 3–50
Three subzones within the defensible space for fire.

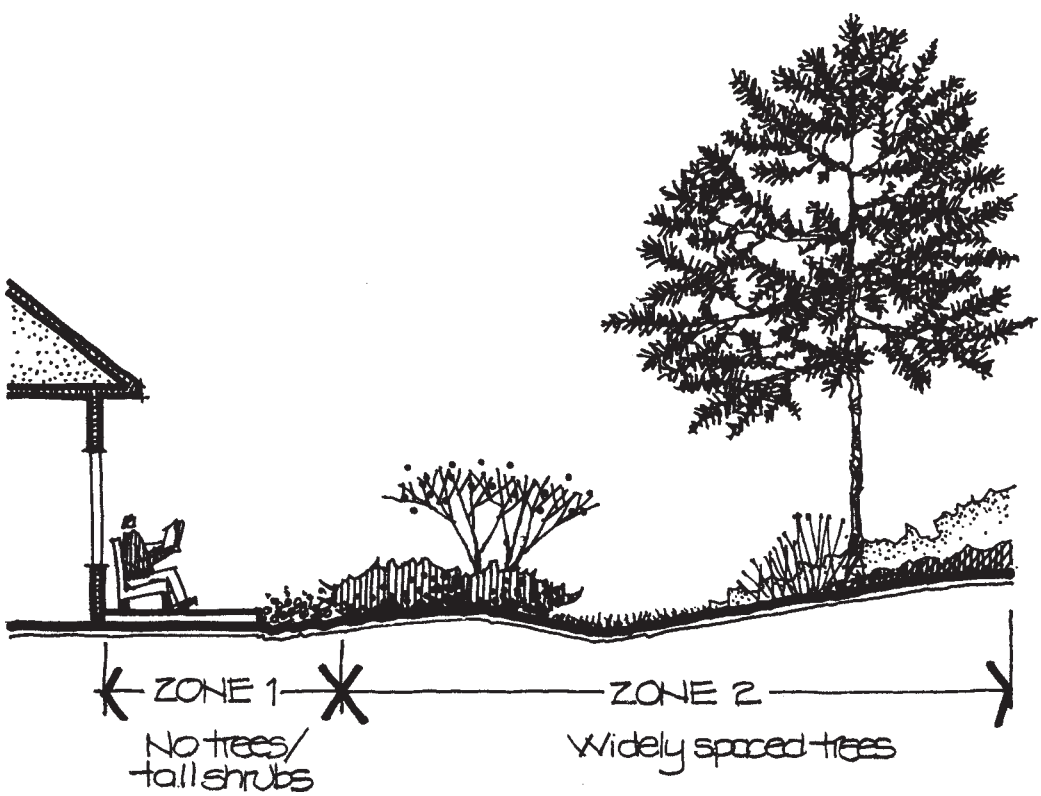


Figure 3–51
Zones 1 and 2 should prevent a fire from moving from the landscape to the house.

need for irrigation is greatest near the house and less so as distance from the house increases. Water can be stored in an above-ground tank or a cistern below the ground (also see "Conserve Water" in this chapter). A swimming pool is another source of water for firefighting and thus a good reason to have one in the landscape beyond the obvious recreational benefits.

REUSE AND RECYCLE

Principle: The residential site should maximize the reuse and recycling of materials that are on-site and in the surrounding region.

An integral part of sustainability is to produce the least impact on the environment through the wise use of materials. Reusing and recycling materials that are already on-site or in the nearby region can save raw material resources and the energy that is required to manufacture them. *Embodied energy* is the term used to describe the collective amount of energy it takes to obtain the resources for, manufacture, and transport a product to a site and is typically an invisible cost that can be surprisingly large. For example, the embodied energies for a few selected landscape materials are as follows.[18]

Common brick	1,075 to 4,085 ave. est. Btu/lb
Copper pipe	73,100
Cut granite	2,537
Earth	172
External oil-based paint	42,962
3/4″ ext. plywood	4,472
Phosphatic fertilizer	32,373
PVC plastic	35,130
Sand	16
Stone	446

Every attempt should be made to reduce the quantity of materials that have a relatively high amount of embodied energy or to substitute salvaged and recycled materials for them.

Transportation costs and air pollution are likewise minimized or eliminated when materials are reused and recycled. Materials that are given a second life do not add to the volume of already burgeoning landfills, either. In some instances, construction costs are reduced as well when materials are reused and recycled. There are a number of ways of reusing and recycling materials on the residential site.

Salvage Materials on Site

A number of materials on a site can potentially be salvaged and used in the design. One is the soil. Every effort should be made when grading a site to balance the amount of cut and fill so that no soil has to be hauled to the site or taken away. If extra soil exists, then creative ways, such as earth berms or sculptural mounds, should be created to eliminate the need to haul soil away. Boulders and fieldstone that are found on a site can be used for retaining walls, pavement, or steps whenever their size and shape permit. The use of on-site stone further establishes a site character that is compatible with the region. As previously discussed for minimizing site impact, existing vegetation should likewise be preserved as much as possible. When existing plant materials are in the wrong location for the design, they should be transplanted to a

[18]J. William Thompson and Kim Sorvig, *Sustainable Landscape Construction* (Washington, DC: Island Press, 2000), pp. 248–249.

different location where they fit the design rather than being cut down. Additionally, using existing vegetation gives a design a look of instant maturity, a quality that is sometimes years away when new vegetation is planted on a site.

Construction materials that already exist on a residential site should be salvaged, too. The ideal and most direct way to do this is to integrate existing pavement, decks, fences, and other structures into the new design without moving or reconfiguring them. When this is not feasible because their present location, condition, or appearance doesn't fit the new design, then their materials should be reclaimed. Brick and stone on sand are easily taken out and relocated as desired. Concrete can be cut into geometric slabs or simply broken apart and reused for new areas of pavement or retaining walls. The wood in existing decks and fences can often be used again if it is not rotten or structurally unsound. A new coat of paint or stain frequently disguises the fact that wood was reused.

Use Salvaged Materials from the Region

Salvaged materials that exist in the community or region can also be used to supplement or substitute for those found on a residential site. Used construction materials can be obtained directly from a site that is being demolished, from a retail company that specializes in reclaimed and refurbished materials, or sometimes from a municipality that has saved materials from various public works projects. Pavement materials, wood, and scrap metal are some of most readily available salvaged materials. In addition, less common materials such as crushed glass and rubber tires might be considered as well. Crushed glass or "cullet," available in different aggregate sizes, finishes, and color, potentially lends itself to the same uses as gravel. Crushed glass can similarly be used in exposed aggregate concrete to provide an attractive color and reflective quality to the concrete surface. Or crushed glass can be mixed into stone gravel walkways and driveways. Old rubber tires may be used in some instances for retaining earth or to augment earth used as fill. Further, numerous other materials found in junkyards provide limitless opportunities for creative solutions that give each design its own uniqueness.

Use Remanufactured Materials

Remanufactured materials are those that are partially or totally composed of recycled materials. A surprising number of remanufactured materials and products are now available for use in the landscape, with new ones becoming available all the time. A comprehensive reference for such materials is *The Resource Guide to Sustainable Landscapes,* by Wesley Groesbeck and Jan Streifel. Local remanufactured materials and suppliers can often be found in the Yellow Pages or on the Internet.

One of the most popular and available remanufactured materials is "plastic lumber," a good substitute for deck surfaces. Depending on the brand, plastic wood may be composed of only recycled plastic or a combination of recycled plastic and sawdust. Plastic lumber is available in a range of colors, is considered a safer material than pressure-treated lumber, and potentially lasts many years, thus reducing long-term maintenance. Several disadvantages of plastic lumber include higher costs, a potential for color fading, and heat buildup when directly exposed to sunlight.

Other remanufactured materials include tile, brick, and concrete pavers made with crushed glass or ground rubber. Some site furnishings such as benches, tables, pots, and so on are also available with recycled materials. One caution is to check the exact content of remanufactured materials to avoid using those that contain PVC or have a relatively large amount of embodied energy. Some remanufactured materials may actually be more harmful than beneficial.

Integrate a Compost Area

A compost area should be integrated into all sustainable residential sites because it epitomizes the concept of regeneration in the environment. A compost area can be used to collect a range of organic waste, including leaves, lawn clippings, plant pruning debris, and even vegetable discards from the kitchen (Figure 3–52). All these organic materials slowly decompose to form a nutrient-rich soil that can be used in the landscape as a soil additive or mulch. When compost is added back into the landscape to improve soil structure and support plant life, it truly is creating a self-supporting "cycle." Compost areas have the added benefit of collecting material that is otherwise taken away to already overflowing landfills. A compost area should be easily accessible and screened to block drying wind and views. The compost area can be a simple pile or a structure with different bins for collecting and decomposition. When a compost area is not feasible because of space limitations or other restraints, then provisions should be made to take green landscape material to municipal compost, where it serves a larger community good.

HEALTHY ENVIRONMENT

> **Principle:** The sustainable residential site should be a nurturing and safe environment for all life.

The underlying notion of all sustainable principles is to create an environment that not only is enjoyable and visually fulfilling, but also is wholesome to live in. All of the previously discussed sustainable principles and strategies contribute to such an environment. Nevertheless, there are additional tactics that can be employed to ensure that the residential landscape is indeed a healthy place. These primarily involve the use of materials and maintenance practices that are pollutant and toxin free.

Use Toxin-Free Materials

Much has already been said about appropriate materials for a sustainable residential site. In general, safe materials are toxin and pollutant free with relatively little embodied energy. Healthy materials are safe to produce, harmless to install, and benign to live with over an extended period of years. They are ideally made without poisonous chemicals, heavy metals, or oil. Although many materials fulfill these criteria to different degrees, some materials should ideally be avoided because they do not. Pressure-treated lumber manufactured with chromated copper arsenate (CCA) before 2003 is one such material and has already been discussed (see "Discard Toxic Materials" in "Site Restoration" in this chapter). Even new pressure-treated wood manufactured with amine copper quat (ACQ) or copper azone (CA) remains controversial because of the associated history with chromated copper arsenate. Again, the best procedure for working with pressure-treated wood is to handle it with gloves and apply a penetrating stain as a finish to seal in the chemical preservatives. Other wood, such as railroad ties or old utility poles, that contains creosote or pentachlorophenol is not recommended either because these chemicals are potentially harmful to touch or breathe.

Another material that has questionable use on a sustainable residential site is polyvinyl chloride (PVC), frequently found in plastic pipes and tubing. Although this is a popular and commonly used material in the landscape, the chlorine is a potentially harmful chemical when it leaches into ground water or outgases into the air. PVC plastic is also toxic if it burns. Other forms of plastic, clay, or metal pipes should be considered as alternatives to PVC pipes.

Two other commonly used materials that ideally should not be used in the sustainable landscape are asphalt and oil-based paint. Asphalt produces fumes when hot

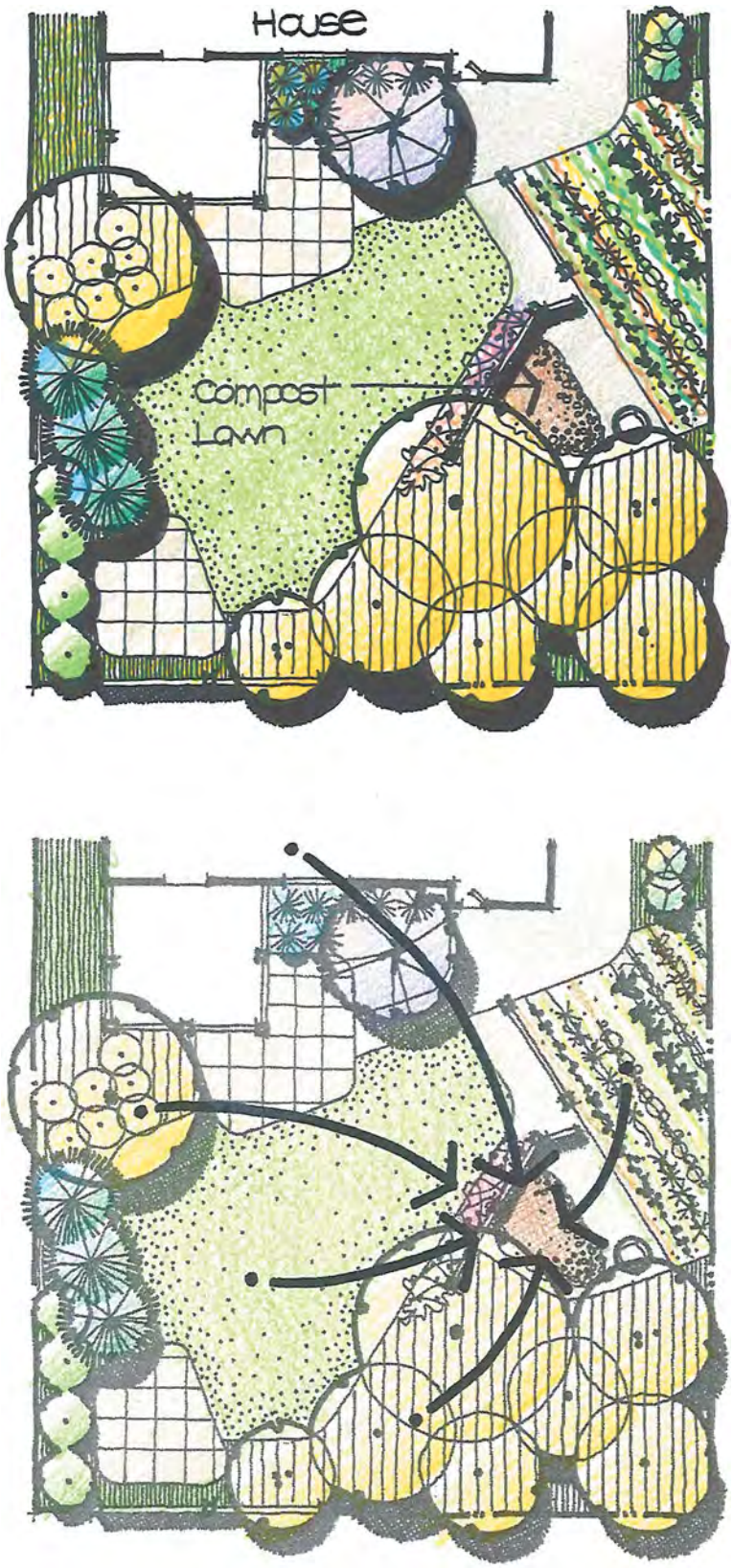


Figure 3–52
A compost area should collect and recycle vegetative material from the house and site.

that can be a problem for individuals who have chemical sensitivities. Further, asphalt is an oil-based material that relies on a dwindling resource that is ever increasing in fiscal and political costs. Asphalt also needs regular recoating to maintain its seal and structural integrity. There are numerous substitutes for asphalt, especially on a residential site where it is frequently limited to driveways. Oil-based paints are similar in that they produce toxic fumes when wet. Water-based paints are recommended replacements and often have similar durability over time.

Other landscape construction materials have varied degrees of toxicity. Background research should be conducted on each material by carefully reading manufacturers' specifications and product labels before it is adopted for use in a sustainable landscape. Another source is "The Hazards and Impacts of Landscape Materials," an appendix section in *Sustainable Landscape Construction*, by J. William Thompson and Kim Sorvig.

Integrate Healthy Maintenance Practices

Common maintenance procedures on many residential sites utilize relatively large volumes of toxic chemicals as a means of making them appear "healthy." These chemicals are often hazardous to people, plants, and wildlife while giving the false impression of a wholesome environment. Perhaps the most effective means of reducing this chemical dependency is to create a landscape that is vigorous enough on its own to resist pests and diseases. This can be accomplished by establishing deep, properly composed soil and specifying the right plants for the region and specific site locations. Vegetation, including lawn, growing in the correct location, in healthy soil, and supported by proper fertilization (discussed next) needs minimal, if any, pesticides to grow well.

An "integrated pest management" program should be used if additional support is required for plant materials to flourish. Integrated pest management uses biological controls such as predator insects and scent traps in combination with nontoxic chemicals. The chemicals are applied in low volumes to specific locations at the appropriate time to affect the insect or pest when it is most vulnerable. Integrated pest management requires knowledge of insect life cycles and weather conditions to properly apply chemicals.

Fertilizer application is another maintenance practice that needs to be considered for a healthy residential site. Most commercially available fertilizers actually do as much harm as good. Fertilizers applied to the residential landscape are in fact one of the major contributors of pollution in streams, rivers, and lakes. The added fertilizer loads in waterways contribute to algae growth that in turn depletes the water of oxygen, as previously discussed (see "Select Plants for Regional Precipitation" in "Natural Events and Cycles" in this chapter). Fertilizers also possess among the largest quantities of embodied energy of all landscape materials. Again, providing the right soil on a site can do much to minimize the need for fertilizer. If fertilizers are to be used, then organic fertilizers, manure, or compost should be used to supplement the soil. Some organic fertilizers have an added advantage because they use recycled material such as sewage sludge.

ADDITIONAL RESOURCES

The sustainable design concepts and techniques discussed in this chapter are integral to a growing body of knowledge and awareness about the need to "design green." More and more people and design firms are becoming aware of the benefits of adopting these principles, and more clients are demanding them. Likewise, an increasing number of government agencies are providing information and establishing performance

standards for sustainable design. Several sources recommended for additional information and support regarding sustainable design include the following:

LEED: The Leadership in Energy and Environmental Design (LEED) is a green building rating system managed by the U.S. Green Building Council for the design, construction, and operation of green buildings. In addition to having a rating system for determining how well buildings meet a number of performance standards, LEED also offers a certification program that verifies a building's green design. Overall, LEED provides a credible means for identifying and acknowledging buildings that are sustainable. Although most of the emphasis of LEED is on building design, some design criteria apply to the landscape as well. More standards for site deign are expected in the future. LEED is also a good source for case-study projects that are deemed "green" and information about how to design in a sustainable manner (http://www.usgbc.org/).

Sustainable Sites Initiative: *The Sustainable Sites Initiative* is an interdisciplinary partnership coordinated by the American Society of Landscape Architects (ASLA), the Lady Bird Johnson Wildflower Center at The University of Texas at Austin, and the United States Botanic Garden to promote green design by establishing voluntary national guidelines and benchmarks for sustainable landscape design construction, and maintenance. Modeled after and in coordination with LEED, *The Sustainable Sites Initiative* seeks to provide landscape architects and designers with a set of tools that can guide and evaluate landscapes for their effectiveness in creating a sustainable environment. *The Sustainable Sites Initiative* also provides educational material on various aspects of sustainable landscape design and a number of case studies including residential sites (http://www.sustainablesites.org).

GreenScapes: This is a program of the U.S. Environmental Protection Agency (EPA) that promotes environmentally beneficial landscape design and maintenance by providing numerous guidelines and sources of information. The program is organized into two general categories: one for large-scale or more public landscapes and one for homeowners. Further, there is a GreenScapes Alliance Program that seeks companies and organizations to commit to conducting their business in an environmentally responsible manner. The GreenScapes Web site and printed brochures offer many suggestions for sustainable design as well as examples of projects that utilize sustainable techniques (http://www.epa.gov/epawaste/conserve/rrr/greenscapes/index.htm).

WaterSense: This is a voluntary public-private partnership program that is also managed by the EPA in an effort to protect the future of the nation's water supply. WaterSense does this by promoting water-efficient products and services, including guidelines for wise use of water in the landscape (http://www.epa.gov/watersense).

SUMMARY

Creating a sustainable landscape is desirable because of the environmental consequences as well as the potential economic and functional benefits that are outlined throughout this chapter. It is the responsibility of the landscape designer to be a good steward of the land and to do everything possible to design intelligently based on concepts that are one with the environment and not at odds with it. Good residential site design is sustainable. To be a responsible steward, you should now know the following:

- Definition of sustainable design
- Six primary principles of sustainable landscape design

- Different strategies for making a residential landscape fit its regional context, including those that address climate and materials
- Techniques for minimally impacting a residential site, including ways to preserve vegetation, minimize grading, protect surface runoff, and maintain wildlife habitats
- Methods for restoring a degraded site that address soil rehabilitation, toxic material removal, and unsuitable vegetation removal
- Ways to design a residential site in coordination with natural events and cycles, including an understanding of sun and shadow patterns, methods for minimizing sun exposure in the hot season, ways to maximize sun exposure in the cold season, an understanding of wind patterns, techniques for minimizing wind exposure during the cold season, procedures for maximizing wind exposure in the hot season, tactics for conserving water, considerations for proper plant selection, methods for reducing runoff, and strategies for protecting a site from wildfires
- Different means to recycle and reuse on a residential site, such as ways to salvage materials on-site and in the region, use remanufactured materials, and establish a compost area
- Strategies for ensuring a healthy environment on a residential site, including the use of toxin-free materials and healthy maintenance practices

section two
Design Process

CHAPTER 4 **Design Process Overview** CHAPTER 5 **Meeting the Clients**
CHAPTER 6 **Site Measuring and Base Map Preparation** CHAPTER 7 **Site and Design Program**
CHAPTER 8 **Functional Diagrams** CHAPTER 9 **Preliminary Design and Design Principles**
CHAPTER 10 **Form Composition** CHAPTER 11 **Spatial Composition**
CHAPTER 12 **Material Composition and Master Plan**

Section 2 outlines a recommended design process for creating a residential site design that is based on the philosophical framework presented in Section 1. The design process is a series of steps that one should thoughtfully and creatively progress through as a means of meeting the requests of the clients, addressing the conditions of the site, and fulfilling the imagination of the designer. In essence, the design process is a methodology that helps the designer advance from broad intentions to specific design proposals. Although no design process can guarantee that every project will be award winning, it does help guide the designer's activities and thinking at different stages of a design's evolution.

Chapter 4 presents an overview of the design process along with a sample project that illustrates the individual steps of the process. Chapter 5 discusses how one should seek clients and involve them in the design process so the resulting design reflects their vision. Chapters 6 and 7 detail how the designer can acquire, organize, and evaluate critical site information that will be the basis for a design. Chapter 8 addresses functional diagrams, the first step for organizing the overall layout of a site. Chapters 9, 10, and 11 offer a range of design principles, guidelines, and techniques for creating a preliminary master plan. And finally, Chapter 12 explores potential structural materials and guidelines for their use during the preparation of the master plan. Collectively, these chapters and steps of the design process counsel the designer at all the critical stages of design.

4

Design Process Overview

INTRODUCTION

As suggested in Chapter 2, the residential site should be thought of as a series of outdoor rooms where people arrive, socialize, entertain, relax, recreate, eat, and work. These rooms are the basic framework of a well-designed residential site. To create these outdoor rooms, the landscape designer should utilize a sequence of problem-solving steps usually referred to as a *design process*. A design process, in one form or another, should be followed each time a designer engages in a new project because it aids in the organization of information and thoughts and helps in the creation of a suitable design solution for the given circumstances. This chapter identifies the importance of designing with a process and outlines the various steps involved. Later chapters explain many of these steps in greater detail.

DESIGN PROCESS

"What is a process?" A process may be defined as "a series of steps, actions, or operations used in making something or bringing about a desired result: a manufacturing process." Similarly, it is "a series of actions, changes, etc., by which something passes from one condition to another: a lake in the process of drying up."[1] It can be seen that our world is filled with numerous processes. Natural processes include the development of a mountain range over centuries of time, the formation of a valley by means of erosion, photosynthesis, and the evolution of a butterfly from a caterpillar. Artificial processes include the manufacturing of a car, the sequence of events for formulating and passing a piece of legislation, the construction of a building, and the diagnosis of a medical ailment. Again, all these processes involve a series of steps or events that lead to a change or product.

A design process is similar. It can be defined as a sequence of problem-solving and creative steps used by the designer to develop an appropriate design solution for a given client and site. The designer uses this process from the beginning to the end of a design project as an organizational framework.

A design process is critical for three reasons. First, the design process helps to organize information and thoughts. It allows the designer to obtain the right information at the right time and to use it in making decisions (Figure 4–1). Second, the design process provides an orderly approach to solving problems at appropriate times

[1] *The American Heritage Desk Dictionary* (Boston: Houghton Mifflin Company, 1981), p. 754.



Figure 4–1
A design process can help organize thoughts and events.

that leads the designer to develop an appropriate solution for the unique needs of the client and the particular conditions of the site. Third, the design process helps the designer to explain reasons for the design solution to the clients. A designer who uses a process typically has an easier time explaining the end results.

For the layperson, the idea of a design process may seem somewhat complex. In fact, creating designs is not simple because design solutions don't just happen by magic or fall out of thin air—although many people wish they did! On the other hand, everyone uses decision-making processes similar to the design process without realizing it to solve problems or plan events on a day-to-day basis. Such activities as getting dressed in the morning, buying a new car, cooking a meal, looking for a new place to live, or writing a paper all involve a series of steps that one must go through to solve the problem or complete the task at hand. These steps usually include analyzing the situation, defining the problem, developing ideas for solving the problem, selecting the best alternative, and then implementing the idea. As can be seen, we all use numerous processes in our lives. What is being suggested here is that the designer use a sequence of steps in creating a design solution for a residential site.

In residential site design, a logical design process includes the following major phases:

- Research and preparation
- Design
- Construction documentation
- Implementation
- Maintenance
- Evaluation

In one form or another, each of these phases is essential in the realization of quality residential site designs. Although the focus of this book is on the research and preparation phase and the design phase of the process, an overview of all phases of the process is necessary.

RESEARCH AND PREPARATION

During the research and preparation phase, the designer is "getting ready." Necessary information required later as background information in the design phase is collected and evaluated during research and preparation. This phase includes the following steps:

- Meeting the clients
- Signing the contract
- Preparing the base map
- Conducting a site inventory and analysis
- Developing the design program

Meeting the Clients

The design process for a residential site design project commonly begins with a meeting between the clients and designer. It is a time when both parties can get to know each other and discuss the prospect of preparing a design for the site. At this meeting, the clients typically convey information about their needs, desires, problems, and budget. The designer may ask a number of questions to learn important information about the clients. In turn, the designer describes the types of services that can be offered, the process used to prepare a design, and the general costs for the design work. A detailed outline of this first meeting with the clients is found in Chapter 5.

Signing the Contract

If the two parties are in agreement, the designer prepares, signs, and submits to the client a written "Proposal for Design Services" that clearly specifies the scope, schedule, and costs for intended design services. This is sent to the clients a few days after the meeting. If the clients agree with the proposal, they sign and return it to the designer. At this time, the Proposal for Design Services becomes a legal contract for design services to begin. This step of the design process is discussed further in Chapter 5.

Base Map Preparation

Before any design work can begin, a base map showing existing site conditions and features of the site is needed. The clients should supply information about their site including house plans, property survey, and topographic survey. If this information is complete enough, the designer is able to draw a base map of the site at an appropriately selected scale (Figure 4–2). If this information is not readily available, the designer may need to take and record measurements of the house and site. These measurements may then be used to draw a base map. A more thorough description of site measuring and preparation of the base map is given in Chapter 6.

Site Inventory and Analysis

The designer should conduct a site inventory and analysis (sometimes called a site study). In this step, the designer first catalogues (inventories) and then evaluates (analyzes) important existing site conditions that may influence the design, such as site location, character of the surrounding neighborhood, zoning ordinances, building codes, topography, drainage, soil, vegetation, climate, utilities, and views (Figure 4–3). The designer should become very familiar with the site and thoroughly understand the site's character, its problems, and its potentials. The more the designer is aware of the specifics of a particular site, the more easily and appropriately decisions can be made in preparing the design. Site inventory and analysis are discussed in greater detail in Chapter 7.

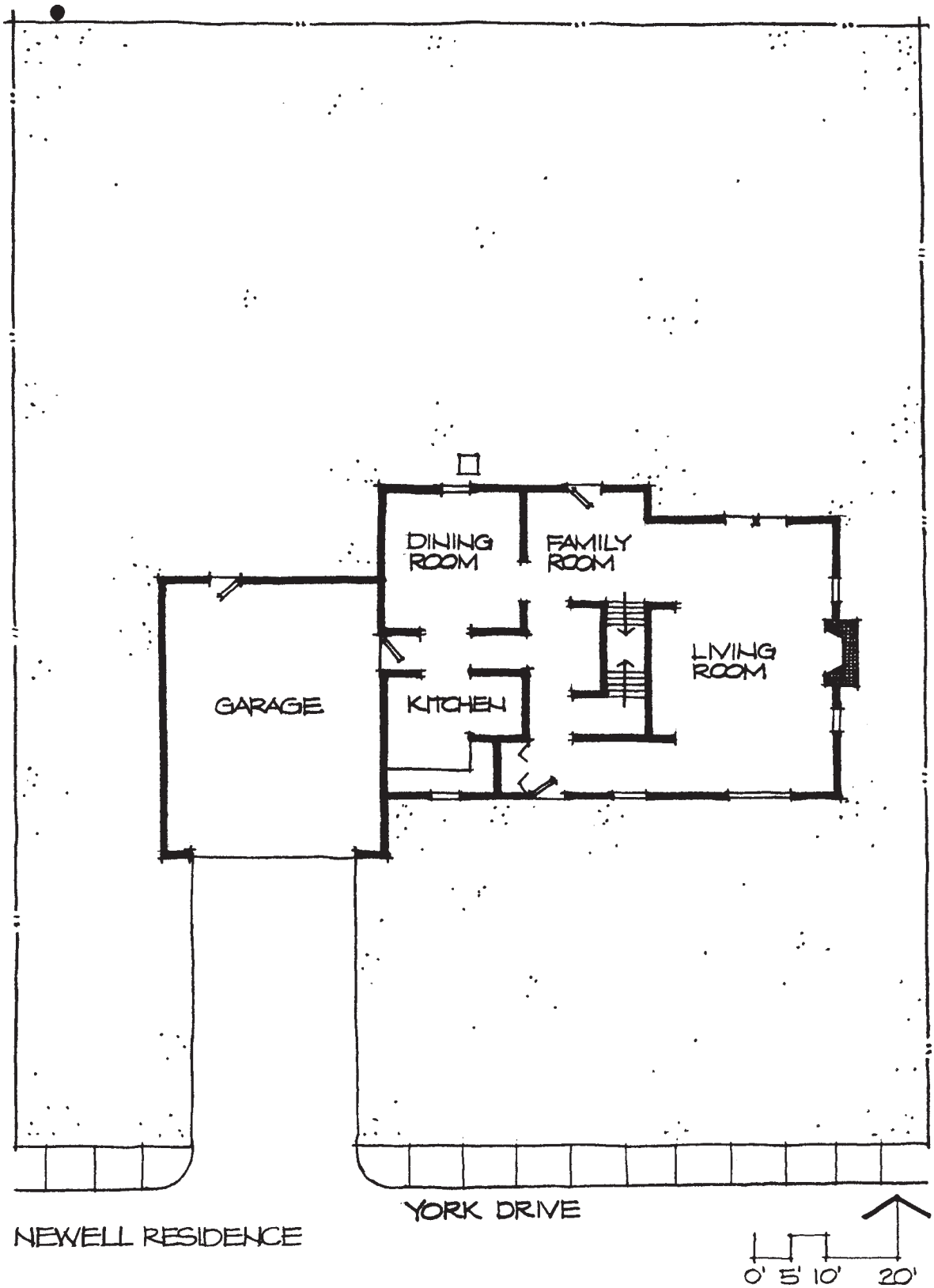


Figure 4–2
Base map.

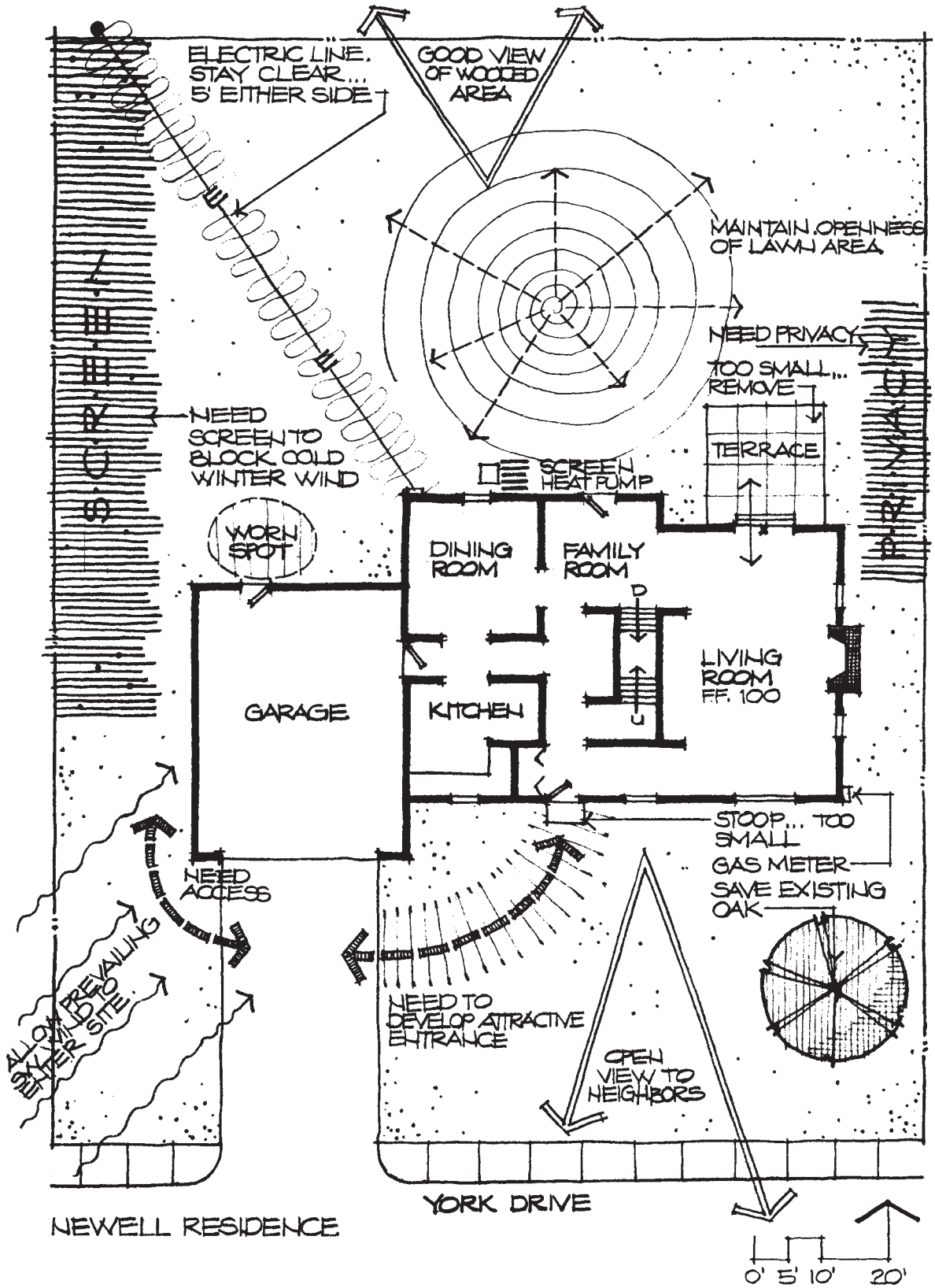


Figure 4–3
Site inventory and analysis.

Design Program

NEWELL RESIDENCE

1. Welcoming entrance walk
   - 4.5´ minimum
   - should provide access from both driveway and York Drive
2. Entry foyer
   - ±50–60 sq. ft.
3. Front yard lawn
   - ±400 sq. ft.
   - separate from neighbors to the east
4. Outdoor living space
   - ±300 sq. ft.
   - should have privacy from neighbors to the east
   - should be partially shaded
   - should provide good views to backyard plantings
5. Outdoor eating space
   - ±100 sq. ft.
   - should be convenient to outdoor living space and indoor kitchen
6. Backyard lawn
   - ±700 sq. ft.
   - separate from vegetable garden
7. Work and storage space
   - ±250 sq. ft.
8. Vegetable garden
   - ±400 sq. ft.
   - should be screened from rest of backyard
   - should have easy access to work and storage spaces and water
9. Wood storage
   - ±30 sq. ft.
   - provide access to back door of living room
10. Wind screen along west property line

Figure 4–4
Design program.

Design Program

The last step of the research and preparation phase is the development of the design program. A design program can be defined as a list or outline of the elements and requirements the design solution should incorporate. The design program serves as a combined summary of the site analysis and client interview. Later in the design process, when a preliminary design has been completed, the program serves as a checklist for the designer to determine whether or not everything necessary was in fact included in the design (Figure 4–4). The design program is discussed in Chapter 7.

DESIGN

Once the research and preparation phase of the design process is completed, the designer can proceed to the design phase. In this phase, the designer studies and prepares the actual design solution based on the client interview, site analysis, and program. Typically, the design phase progresses through three major steps from the

conceptual to the general to the specific. The steps of the design phase are as follows:

- Functional diagrams (conceptual)
- Preliminary design (general)
- Master plan (specific)

Functional Diagrams

The first step of the design phase is the development of functional diagrams (Figure 4–5). This is often the designer's first attempt at organizing the overall arrangement of the design on paper. The designer uses freehand diagrammatic symbols to show the plan relationships of all the major spaces and elements of the design to each other, to the house, and to the site. Each space is drawn as a freehand bubble that depicts its relative size, proportion, and configuration. During this step, the designer may explore alternative organizations of the basic functional layout before selecting the best idea. This type of diagram is sometimes referred to as a concept plan. Functional diagrams are discussed in Chapter 8.

Preliminary Design

The next step of the design process, preliminary design, converts the loose freehand bubbles and diagrammatic symbols of the functional diagrams into outdoor rooms that have general shapes and character. The result is an illustrative preliminary plan that can be presented to the clients for their review. There are three important aspects of preliminary design that are considered simultaneously to create the preliminary design:

- Design principles
- Form composition
- Spatial composition

Design Principles. Design principles are aesthetic guidelines that help the designer create a visually pleasing design solution. They aid the designer in making aesthetic judgments about the overall design layout as well as the composition of design elements such as plant materials, walls, and pavement patterns. The three design principles covered in this text are order, unity, and rhythm. Order is the overall framework or visual structure of the design. Unity is the visual relationship among the individual elements within the design. Rhythm concerns itself with the factors of time and movement. All three of these design principles are considered together when preparing the preliminary design. Chapter 9 explains each of the design principles and their application in residential site design.

Form Composition. Another key aspect of preliminary design is form composition. This step establishes specific shapes for all the spaces and elements developed in the functional diagram phase (Figure 4–6). For example, a bubble that represents an outside living space on the functional diagram is now given a definite form that may be composed of a series of specific shapes. Similarly, the edge of a lawn area is drawn with a definite line, such as an attractive curve. This development of forms establishes a visual theme, which furnishes an overall sense of order in the design. During form composition, the designer needs to consider the layout of the functional diagram as well as the appearance and geometry of forms. Form composition is elaborated on in Chapter 10.

Spatial Composition. To develop three-dimensional outdoor rooms, the designer uses grading (landform), plant materials, walls, fences, and overhead structures to

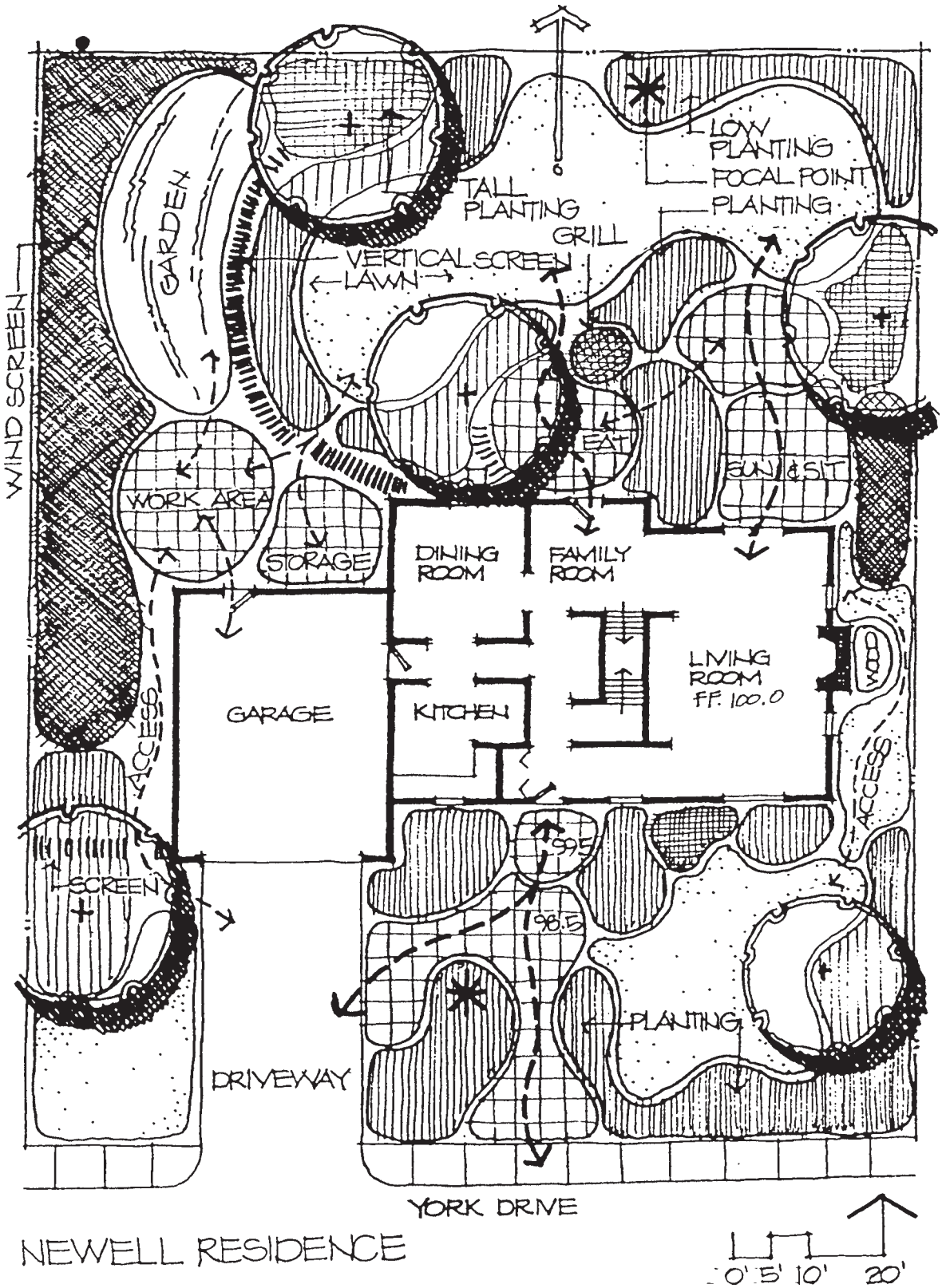


Figure 4–5
Functional diagram.

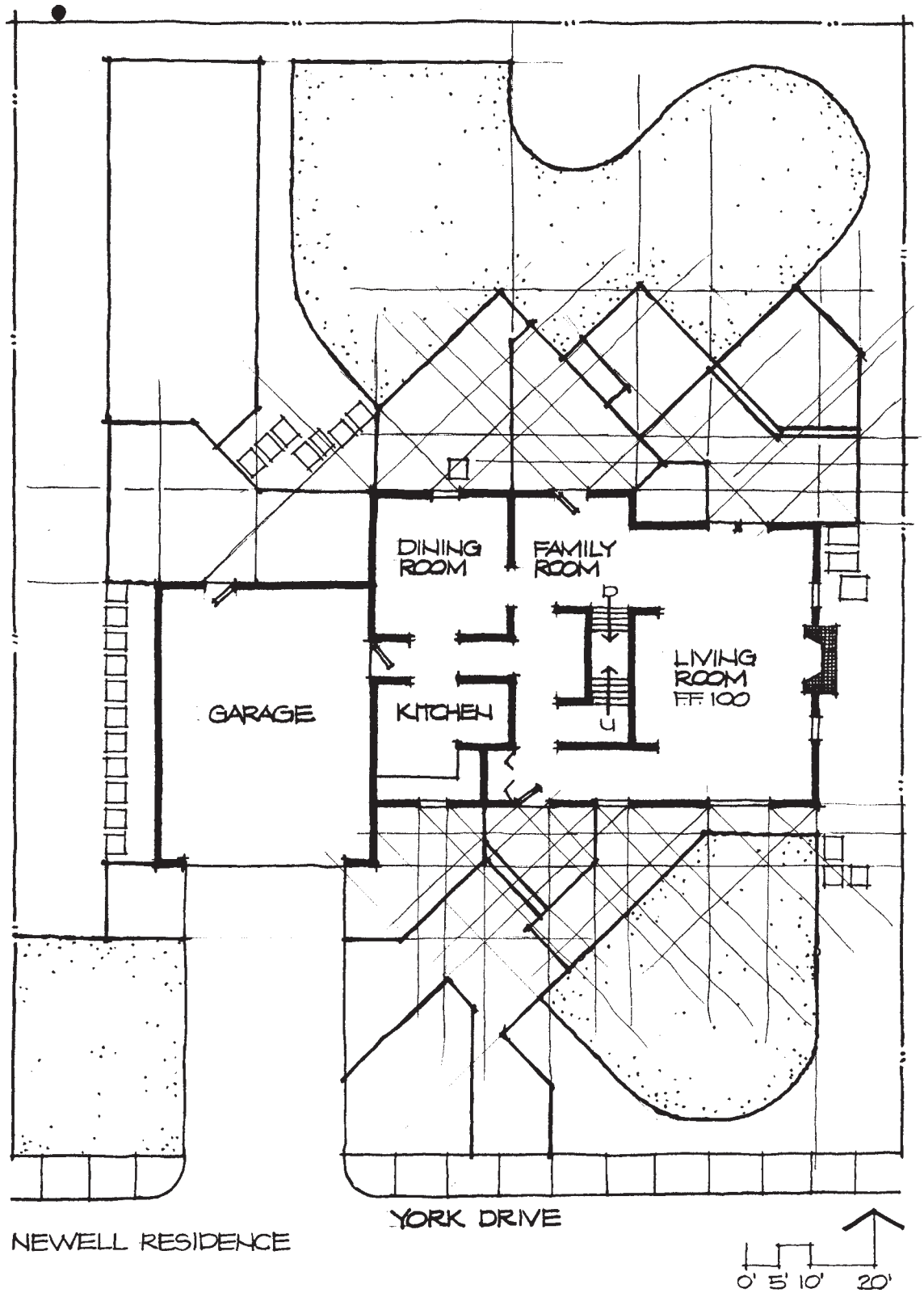


Figure 4–6
Form composition study.

define the three planes of spatial enclosure. This spatial composition must consider the height and volume relationships among the various design elements to create a design that is practical and pleasing to the eye. Spatial composition is discussed more in Chapter 11. Preliminary design concludes by drawing the preliminary plan (Figure 4–7), which is then presented to the clients for their review.

Master Plan

The master plan is a refinement or modification of the preliminary design that is drawn more precisely and with greater detail. For example, plant materials are usually drawn as generalized masses on the preliminary plan, whereas they are shown as individual plants within masses on the master plan. Also, the exact species of plant materials are likely to be specified on the master plan, whereas only general terms identify plants on the preliminary design. In addition, the form and outline of structural elements such as pavement areas, walls, and steps are apt to be drawn with more exactness in the master plan (Figure 4–8).

One key feature of the master plan is material composition. Material composition studies and develops the patterns on such structural elements as pavements, walls, and fences. Whereas the preliminary plan often identifies the general material of a given design element, the master plan goes further to study and show more detailed pattern. Chapter 12 discusses the various characteristics and activities of the master plan in greater depth.

As stated earlier in this chapter, research/preparation and design are the two phases of the design process addressed most comprehensively in this book. However, the design process doesn't stop with these two phases. There are a number of other phases essential in completing a project in a professional manner. These other phases are outlined in the following sections.

CONSTRUCTION DOCUMENTATION

Once the master plan has been completed and accepted by the clients, it may be necessary to prepare other drawings in order to sufficiently implement the design as expressed in the master plan. These drawings are referred to as construction drawings because they illustrate and explain to the contractor how to implement the design. The various drawings that may be prepared are the following:

- Layout plan
- Grading plan
- Planting plan
- Construction details

Layout Plan

The layout plan gives the horizontal dimensions of all the proposed design elements and areas of the design (Figure 4–9). The dimensions should be given in reference to fixed elements such as a property line or a side of the house.

Grading Plan

The grading plan identifies the existing and proposed elevations of the ground plane. For nonpaved areas such as lawns and planting beds, this is best shown with contour lines. For paved areas, proposed elevations are often communicated through the use of spot elevations (Figure 4–10).

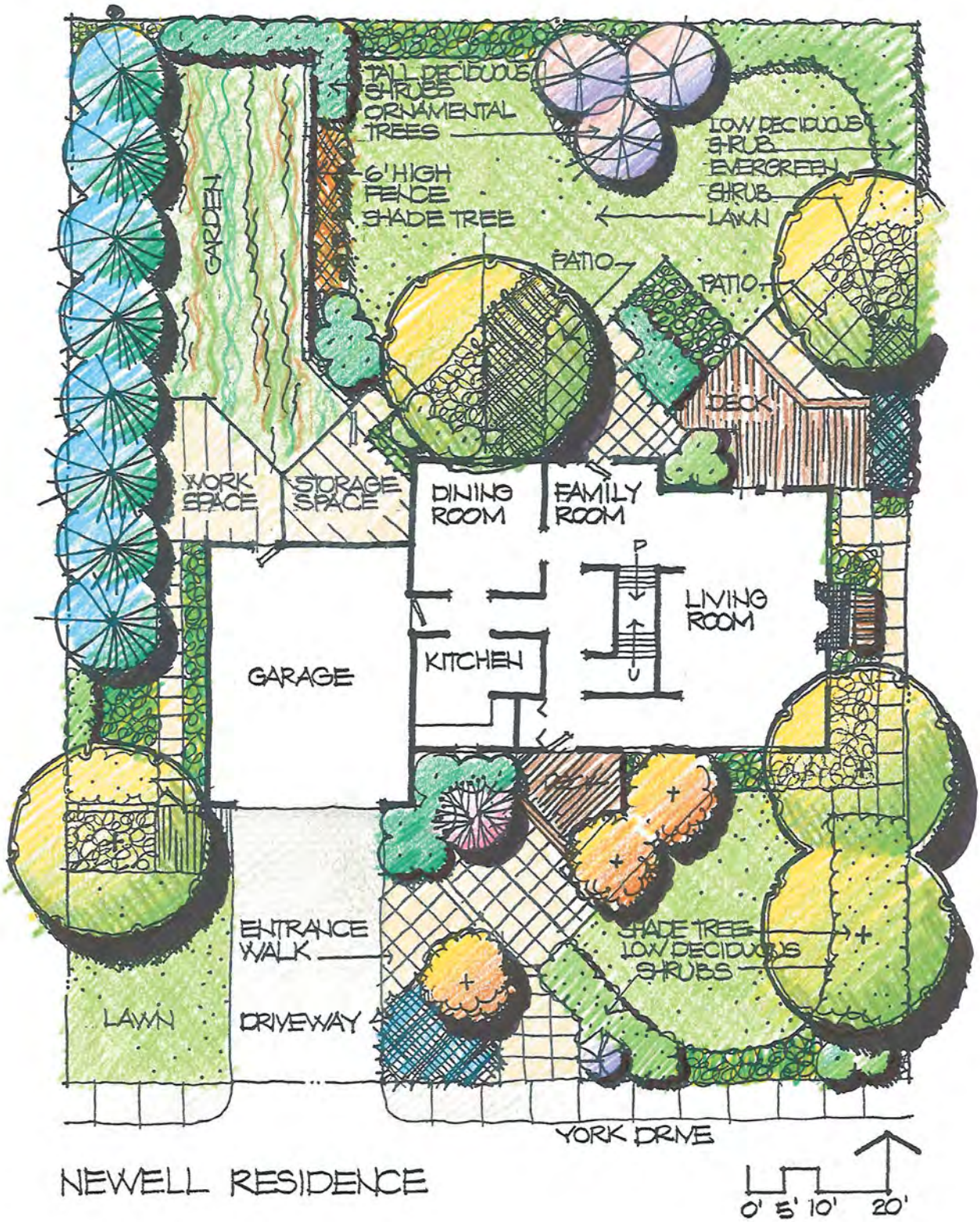


Figure 4–7
Preliminary plan.

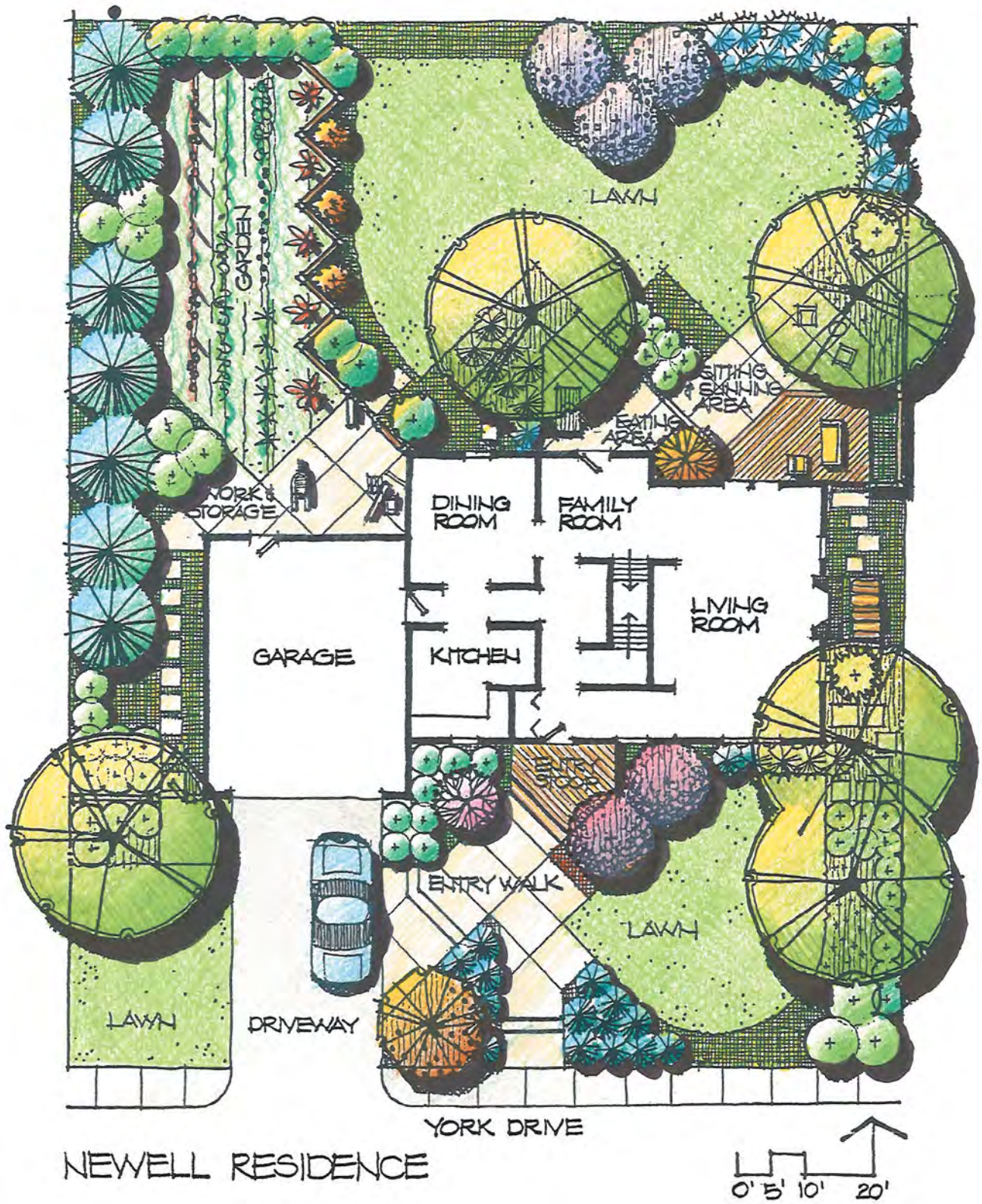


Figure 4–8
Master plan.

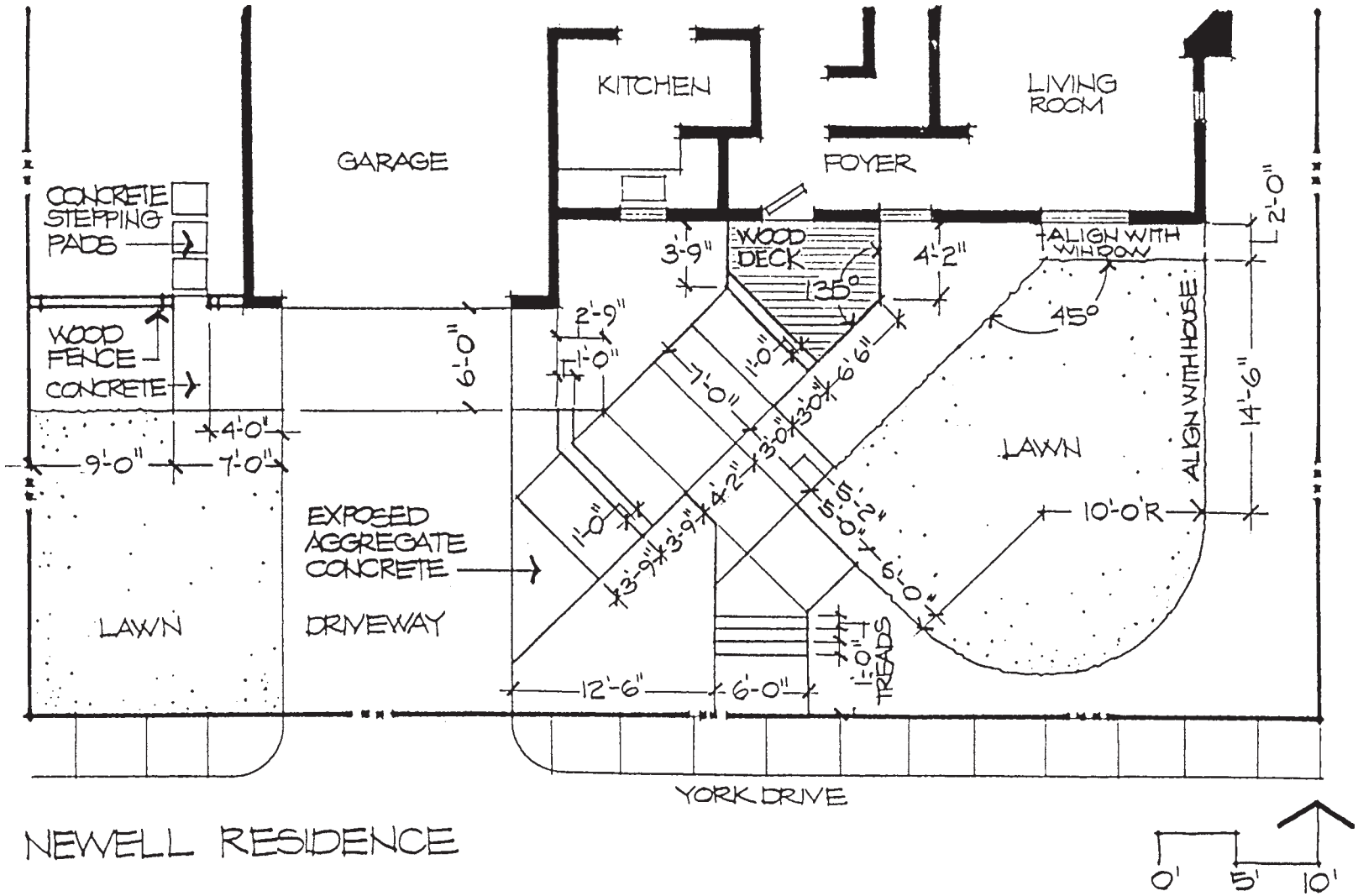


Figure 4–9
Layout plan.

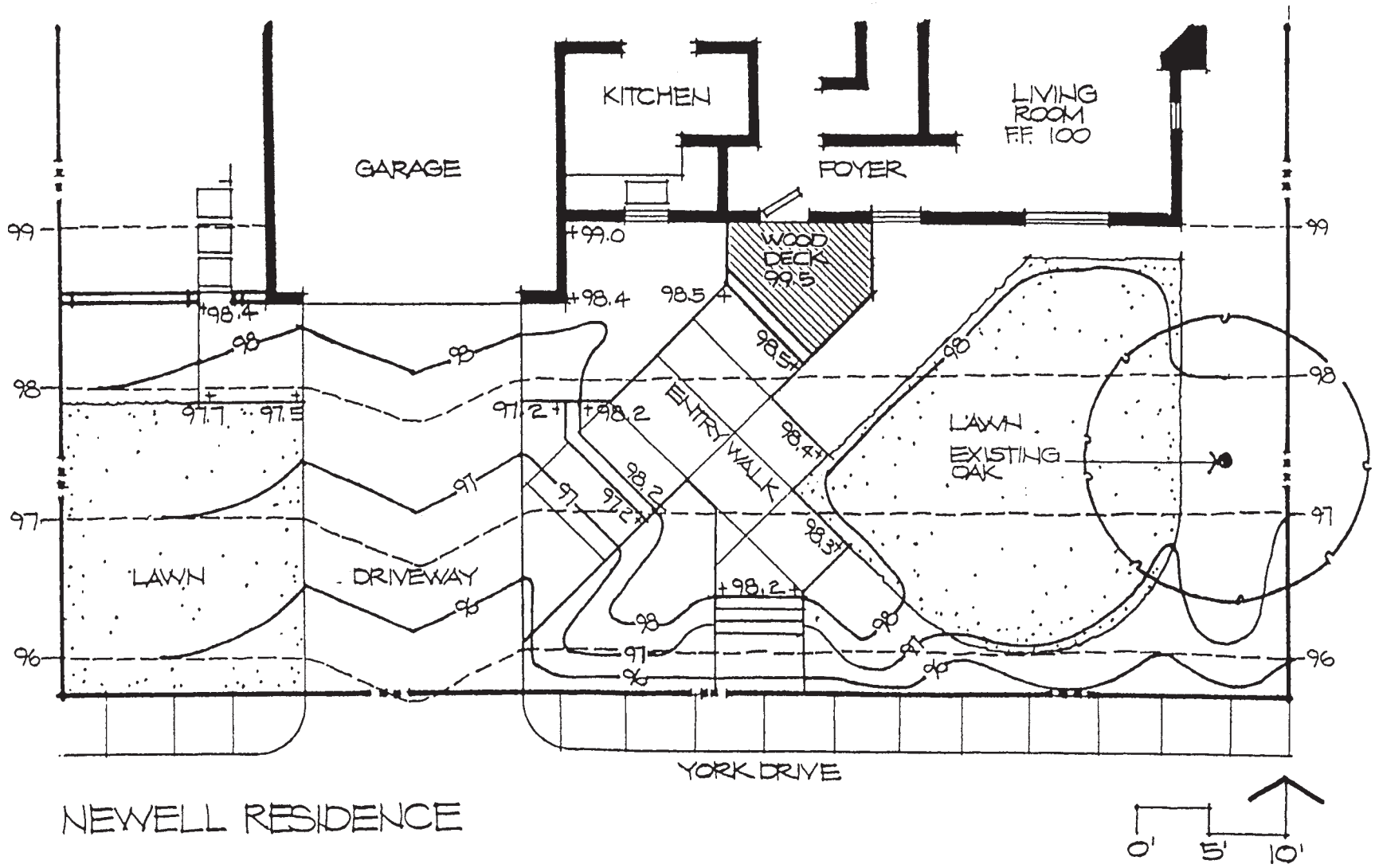


Figure 4–10
Grading plan.

Planting Plan

The planting plan shows the contractor what specific plants are to be planted and where they are to be located (Figure 4–11). A plant list that identifies the genus and species of all plants in the design should accompany the planting plan. The plant list normally indicates the quantity, size, condition, and other important notes about each of the specified plants.

Construction Details

Construction details often accompany the layout, grading, and planting plans. As the name suggests, construction details are drawn to communicate how specific portions of the design are to be built. For example, construction details might be drawn to show how a deck is to be built, how a fence is to be constructed, or how an area of pavement is to be installed. Sometimes several sheets or more of construction details are prepared to adequately explain how to build all the various parts of a project. A few examples of construction details are shown in Figure 4–12.

Need for Construction Drawings

The layout, grading, and planting plans along with the construction details should all be drawn in coordination with one another. When completed, these drawings inform the contractor(s) how the design is to be implemented. Whether or not these drawings are prepared for a particular project depends on the complexity and budget of the project. For example, if a design involves a simple terrace space with limited new planting and no additional structures, construction drawings are probably not needed. But where there is extensive proposed construction (decks, steps, walls, fences, trellises, and so on), planting, or regrading of the site, construction drawings are essential to ensure that the design is implemented to the level of quality desired by the designer.

The type of company will also determine whether or not construction drawings are used. When a company is strictly a "design firm," these drawings are more essential than when a firm is "design/build." A typical design firm only provides design services. It does not get directly involved with implementing a project. In this type of firm, the designer should document the intentions of the design as completely as possible so that a contractor who works with another company can implement the design correctly. Typically, a contractor is selected in this situation through a bidding process. That is, the construction drawings are "let out for bid" by having a selected number of contractors submit price quotations for the implementation of the design. This type of bidding process lets the homeowner compare prices among contractors before selecting the one to do the work.

On the other hand, when working for a design/build firm, the designer usually works directly with the foreman and crew within the same firm to see that the design is properly implemented. When this is possible, construction drawings may be very simple or even unnecessary to communicate how the design is to be implemented. And there is apt to be much more supervision of the implementation by the designer in a design/build firm.

IMPLEMENTATION

Once the contractor is selected, whether by a bidding process or by direct selection, the owner should enter into a written contract with the contractor. Then, the contractor can proceed to implement the design. There are two major steps within the implementation phase:

- Construction
- Installation

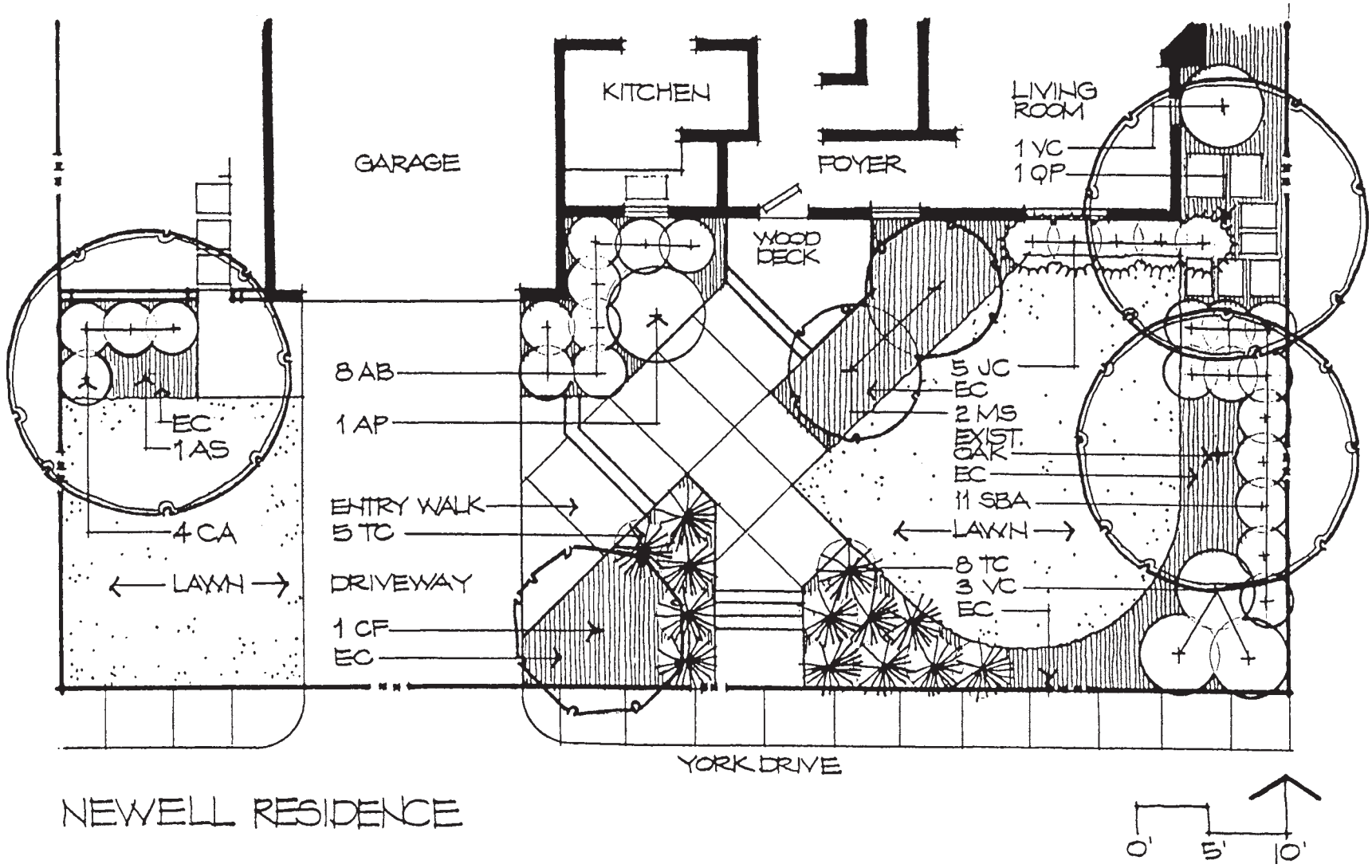


Figure 4–11
Planting plan.

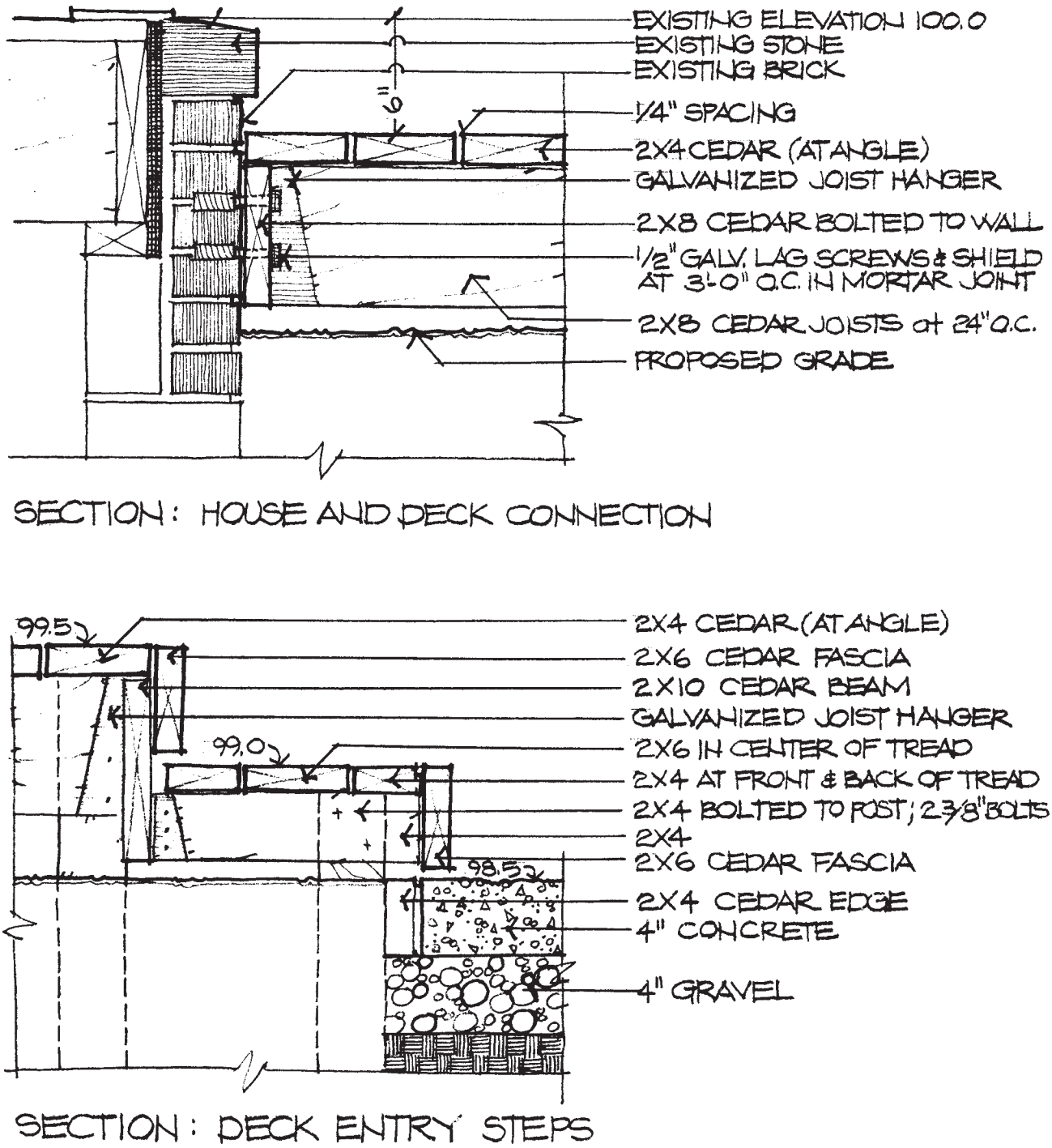


Figure 4–12
Construction details for a wood deck.

Construction refers to the building of structural design elements such as pavements, decks, walls, fences, steps, benches, railings, and trellises (the *hardscape*). *Installation*, on the other hand, refers to the planting of plant materials (the *softscape*). Some contractors specialize in the implementation of the hardscape and others specialize in the softscape. Still other contractors work with both the hardscape and the softscape.

Questions and problems typically occur during implementation that require the designer's attention. It is not unusual that something unforeseen happens or that additional information is needed to facilitate the design's implementation. The

designer's role during implementation may vary depending on whether or not the designer is part of a design/build firm. As a member of a design/build firm, the designer may closely supervise the implementation of the work and be on the jobsite to answer questions directly and quickly. As a member of a design firm, the designer may be hired under a separate contract to periodically observe the implementation to make sure everything is going as intended. In either case, the designer should continue to keep abreast of a project after it has left the drawing board.

MAINTENANCE

In a way, the implementation of a design is just the beginning of its life and usefulness. A design should continue to serve the clients for years, assuming that it is properly maintained. Most projects don't sustain themselves in perfect condition without periodic maintenance and upkeep. The following are some typical maintenance tasks:

- Irrigating
- Fertilizing
- Weeding
- Lawn mowing
- Painting and staining
- Replacing old plants or parts of structures

It has often been stated that the maintenance people, whether it be the homeowner or a hired company, are the ultimate designers of a project. This is because their efforts directly affect the size, shape, and health of plant materials; the alignment of bed lines; and the material and color of replaced structural elements, as well as the general appearance and cleanliness of a design over a period of years. Too often, a design deteriorates because of poor maintenance despite its good initial design qualities and proper implementation. Consequently, it is important (1) that maintenance people be knowledgeable and well trained in all aspects of site upkeep, and (2) that the designer clearly communicate the intentions of the design to the maintenance people. The designer should periodically visit the project to make sure it is being suitably maintained. If design is conceived of as being an ongoing process that includes maintenance, then the project should prove to be successful.

EVALUATION

The final phase of the design process is to evaluate the success of the design solution. This should be an ongoing procedure that, from time to time, analyzes various aspects of the implemented design. Often, the best way to evaluate is by observing the design over an extended period of time. What is learned through evaluation can be applied to subsequent designs that are created. The following questions can be asked periodically throughout the years:

- How does the design appear?
- How does the design function?
- What portions of the design are easy or difficult to maintain?
- Are all the plant materials doing well? Which ones are not, and why?
- How has the pavement material held up?
- Are there any problems with the wood structures?

As with maintenance, evaluation of a design project should be a continual effort. The designer should never stop looking, analyzing, judging, and questioning. From

this viewpoint, the design process is a continuous, ongoing effort extending beyond the limits of a single project.

OTHER THOUGHTS

From the preceding breakdown, it might seem that the design process is a straightforward and logical procedure that always leads to a well-executed and successful design. However, there are a number of qualifiers that should accompany this overview. First, the design process doesn't always occur as a well-defined sequence of steps, even though it was presented that way. In actual practice, some of the steps of the process may overlap and occur simultaneously. For example, gathering information for the preparation of a base map and conducting a site analysis may occur in the same visit. In other cases, certain steps of the process are repeated before being entirely completed. For instance, once the design is begun, the designer may wish to return to the site for a closer inspection. Often a renewed look at a site during the design phase can be valuable because the designer can view the site with a more critical and questioning eye. Thus, the site analysis may be seen as recurring throughout the development of the design solution.

There is nothing wrong with doing more than one of the steps of the process simultaneously or moving back and forth between steps in the different phases. In fact, such practice is quite healthy and often necessary to create a successful design solution. To follow the design process in a completely sequential and unyielding fashion may stifle the designer's imagination. This is not to say the designer can start anywhere in the process or jump randomly from one step to another. Nevertheless, the design process should be thought of as a general outline of steps for organizing design thoughts and procedures.

Similarly, the design process may be utilized slightly differently each time a new project is undertaken. The specific circumstances of each design project such as budget, scope of work, site characteristics, and clients' needs can influence how the process is applied. For example, a particular residential site may be so small that making an exhaustive site analysis would be a waste of time. In another instance, the clients' limited budget may restrict the number of drawings done for implementation. Or the clients' program may be very simple with obvious solutions. Consequently, the designer needs to carefully evaluate each new project at the beginning to determine what is required and how (by what process) the design should be solved.

There is another factor that should be understood about the design process. It is quite possible that a person can faithfully follow and thoroughly cover each of the steps of the design process and still end up with a design that is mediocre. The success of the design process and the resulting design depends ultimately on the designer's own abilities, experiences, knowledge, insights, judgments, and creativity. If the designer is weak in any one of these areas, the quality of the resulting design will also be diminished despite the designer's best intentions. Eventually, residential site designs that are visually and functionally successful as well as being emotionally satisfying require sensitive observation, thorough study, experience, inspiration, and subjective creativity. The design process is not a substitute for these qualities. But it does provide a framework for design talent to be used effectively.

The design process involves both rational and intuitive judgments and skills. Some steps in the design process (such as site inventory, site analysis, program development, and functional diagrams) require rational and logical thinking. Other steps in the design process (such as form composition, spatial composition, material composition, and incorporation of the design principles into the design) require more intuitive skills and aesthetic appreciation. The designer needs a sensitivity to shapes

and forms in addition to a feel for space and volume in undertaking these particular steps. Although these skills and sensitivities can be talked about, their execution often depends on an internal subjectivity that defies clear and logical explanation. Thus, the design process can also be considered a structure for the designer's both objective and subjective abilities.

One other thought should be expressed about the design process. Owing to its importance in systematizing a designer's thoughts and methods, it is essential that the inexperienced designer proceed thoughtfully through all the necessary steps. Just as in learning any new skill or procedure, it is helpful to move slowly and methodically. The beginning designer should carefully record and document each step of the process as a learning experience. Consequently, the use of the design process may seem rather tedious and laborious the first several times it is applied. But as one becomes more accustomed to the process, many of its steps will become more intuitive and may often occur more quickly. For the experienced designer, much of the process is apt to be second nature. Having used the process countless times, the seasoned designer will apply the process effortlessly yet intelligently. And having worked in a particular locale for some time, many of the aspects of the design process become common knowledge and standard methods of procedure. For example, soil, climate, building codes, plant materials, and construction methods are apt to be well understood and appreciated as standard working knowledge.

SUMMARY

The design process should be considered a useful organizational tool for the designer. Despite the particulars, it should guide a designer in seeking an appropriate design solution in a thoughtful yet creative manner. In conclusion, the reader should understand:

- What a design process is and why it is critical to creating design solutions for the residential site
- Six general phases of the design process
- Five steps of the research and preparation phase of the design process and what activities occur in each phase
- Three steps of the design phase of the design process and what activities occur in each phase
- Three key aspects of preliminary design and how they affect the preparation of a preliminary site plan
- Four types of drawings that are prepared during the construction documentation phase of the design process and what information is shown on each drawing
- Reasons for preparing construction documents
- Two primary steps of the implementation phase of the design process and what activities occur in each step
- Different activities that occur during the maintenance phase of the design process
- What questions should be asked during the evaluation phase of the design process

5
Meeting the Clients

INTRODUCTION

Before developing a design solution for a residential project, the designer must undertake several preparatory tasks. Each of these tasks involves gathering, organizing, and evaluating information that will serve as the foundation for the subsequent design phases. Meeting and talking to the clients is often the first task of the research and preparation phase and is addressed more thoroughly in this chapter. The other preparatory activities are related to the site itself and include (1) obtaining measurements of the site, (2) preparing a scaled base sheet and base map, (3) conducting a site inventory and analysis, and (4) writing a design program. These tasks are discussed in Chapters 6 and 7.

Meeting and talking to the clients is a critical step because it establishes the groundwork for the ensuing design phases. This step gives the designer the necessary information about the clients' wishes and requirements for the site. If undertaken properly, it also sets the overall tone for how the designer and clients will interact throughout the remainder of the design process. It is important that both parties develop trust and respect for each other through open and honest communication. This is a key ingredient in developing a design that both clients and designer can be proud of.

This chapter provides guidelines for getting the project started in a positive and constructive manner, including (1) learning about the designer, (2) initial client contact, (3) meeting the clients, and (4) developing a proposal for design services. All these topics and activities are the basis for a professional and enjoyable working relationship between the designer and the clients.

LEARNING ABOUT THE DESIGNER

There are many possible ways clients and designers initially meet. However it occurs, it typically begins by the clients first learning about the designer and basic business information regarding the designer or design firm. This process of learning must be easy and enticing enough for the potential client to follow up with a telephone call or office visit. Potential clients may learn about a design firm by a number of means. These include (1) advertisement, (2) brochure, (3) Web site, (4) jobsite sign, and (5) word of mouth. Thus, the designer must use various means to communicate with potential clients in a manner that attracts them to seek design services.

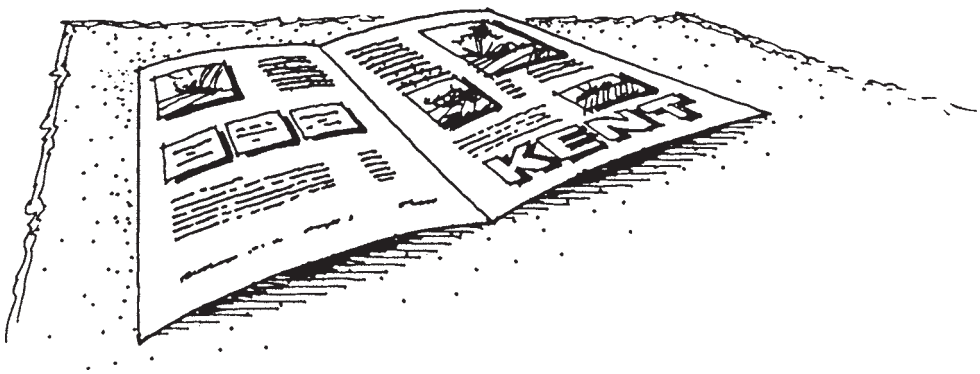


Figure 5–1
Example of a company brochure.

Advertisements Homeowners may learn about a design firm from advertisements placed in newspapers, local magazines, or programs for musical or sporting events, or on local TV and radio. These advertisements are typically small in size or short in length, so they must capture potential clients' attention with few words and captivating images. It is essential that the images or photographs in advertisements be engaging because they are apt to be the first thing seen and because they can potentially convey the feeling and style of the designer's work. When possible, it is wise to hire a professional graphic designer or production company to produce an advertisement that will reach the intended audience. An advertisement, although sometimes costly, has the potential to reach a wide audience.

Brochure It is good practice for a design firm to have a brochure that can be mailed or handed directly to potential clients. A brochure commonly contains text and photographs about the designer's work, design philosophy, process, and fees (Figure 5–1). Here, too, appearance and layout of the brochure is critical to communicating effectively and enticing the potential client. Professional input is once again suggested in creating a brochure that can effectively communicate to potential clients.

Web Site An Internet Web site is a business necessity in the electronic age (Figure 5–2). A Web site is in essence a digital version of a brochure, although it has the added advantage of being interactive and available at any time. It can permit the potential client to navigate among multiple pages with menus and click on information or photographs. Additional benefits of a Web site are that it can be frequently updated and linked with other Web sites, allowing for more connections.

Job Signs An effective way to reach potential clients is by erecting small, attractive signs at active jobsites. A sign can identify who designed the project that is under way, who is installing it, and the appropriate telephone numbers. Potential clients are often curious about what neighbors might be doing and who is doing the work, particularly if the work in progress is attractive as it nears completion.

Word of Mouth Finally, one of the best means of having potential clients learn about a designer's work is from past clients or others who have worked with the designer. Perhaps the best form of advertisement is to have previous clients give positive recommendations about the designer to friends and acquaintances. Thus, it is important for the designer to complete quality work and to maintain ongoing relationships with past clients. A once-a-year holiday greeting card or an occasional mailing that highlights recently completed work can keep past clients abreast of one's professional business status and make them feel that they are still valued.

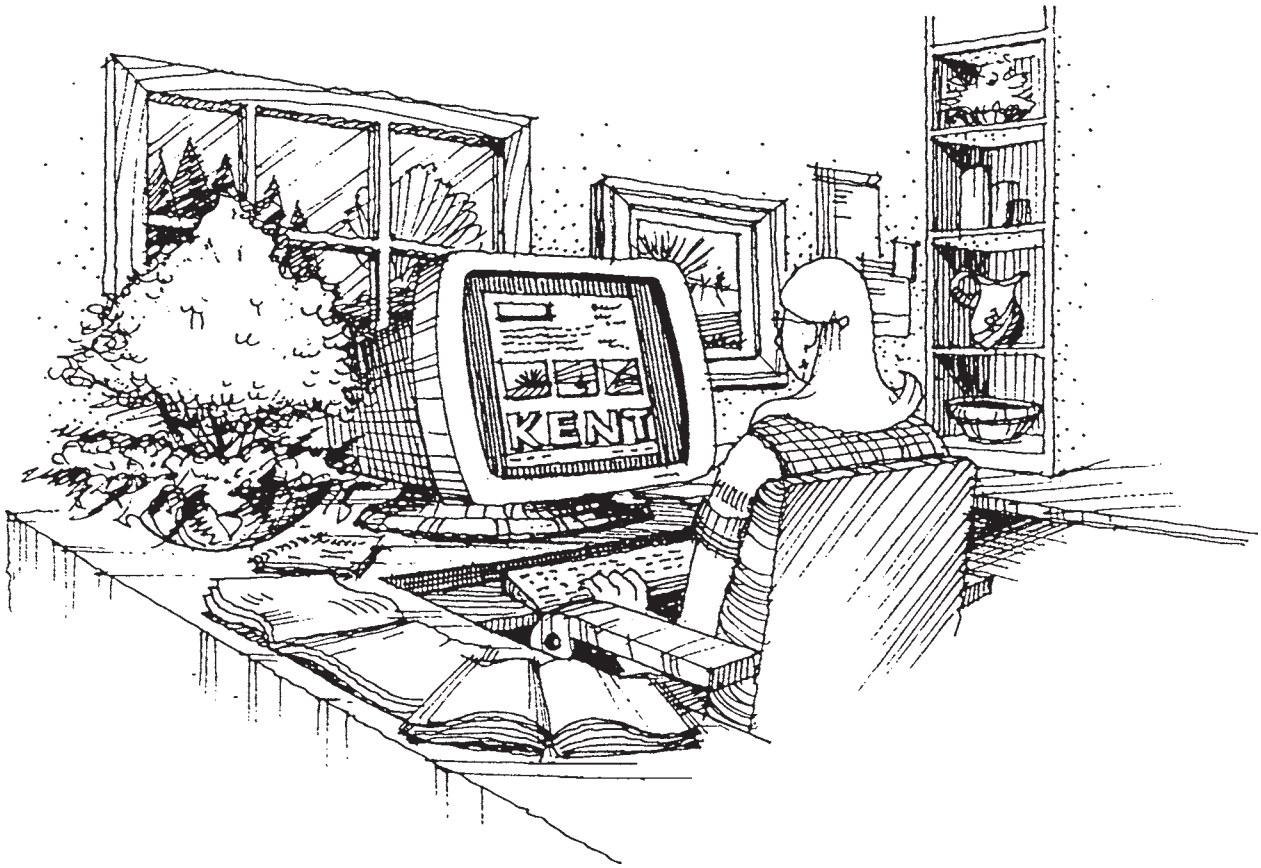


Figure 5–2
An Internet Web site is an excellent place to communicate with the public.

Information Provided

The previous methods for communicating with the public are alternative ways of informing potential clients about the designer or design firm. These diversified forms of communication are intended to arouse potential clients' interest while also providing basic information about the designer or design firm, such as (1) available services, (2) design philosophy, (3) design process, and (4) fees. The extent to which this information is presented varies widely depending on the media used, the targeted audience, available space or time, and budget. Advertisements and job signs provide the smallest opportunity to communicate this information, whereas brochures and Web sites offer the greatest chance.

Available Services Advertisements, brochures, Web sites, and so on should inform potential clients about what services the design firm offers. A variety of services are necessary for a design project to be fully realized. These include (1) design, (2) construction (dealing with structures such as terraces, decks, and fences), (3) installation (dealing with plant materials), and (4) maintenance (dealing with the ongoing care of the landscape after it has been built and installed). Potential clients should know to what extent the design firm is able to offer these various services because firms vary widely in their capabilities.

A residential design company that offers design, construction, installation, and maintenance services is generally known as a design/build firm or full-service firm. The advantage of this type of firm is that it can offer a coordinated package of services to clients and ensure a smoother flow from one phase to another. Other firms provide

only design services and then work with separate landscape contractors for implementation of the design. These firms typically provide excellent-quality design because that is their specialization. Further, such firms are not tied to inventories of plants or other materials and thus sometimes have more freedom to explore innovative designs. Still other firms place primary emphasis on plant materials including sales, installation, and maintenance, with less attention given to design and construction services. It is important to tell potential clients about a firm's expertise and professional capabilities so they know what the company can or cannot do for them.

Design Philosophy Potential clients should also be acquainted with the designer's "design philosophy," or the underlying principles and values that the designer applies to design projects. Design philosophies are those concepts and feelings that pervade a designer's work. Although a design philosophy can be based on almost any idea, most design philosophies express particular attitudes toward some or all of the following: (1) aesthetics or what is considered good design, (2) perceived benefits of design, (3) importance of outdoor space, (4) environmental stewardship, (5) preferred style(s), (6) preferred materials (both structural and plant materials), and (7) method of working with clients. The designer should attempt to define his or her design philosophy in a concise statement of two or three sentences. Ideally, potential clients should find designers with design philosophies that match their own set of values and attitudes toward landscape design. The entire process is much more enjoyable for everyone involved when this is the case.

Design Process Potential clients should be aware of the design process that will be employed in creating a residential design solution. Many homeowners don't fully understand what is required to prepare a master plan for a residential site or the various steps that are employed. It is very helpful for the designer to provide an outline of both the necessary design process steps and the relative time it takes for each. Potential clients might be exposed to the following phases of the design process: (1) site analysis, (2) design program, (3) functional diagrams, (4) preliminary design, and (5) master plan. Each step should be very briefly described in clear, common language that can be understood by anyone. Graphic examples can sometimes be used to supplement the written description.

The underlying idea is to make the potential clients aware that design is much more than the selection and arrangement of plant materials. Each design solution is a customized, functional, and aesthetic synthesis of the clients' needs with the site's problems and potentials, all of which is made possible through the expertise of a design professional. It is important that clients understand the tasks involved in the process.

Fees Last, most potential clients like to have some information about what it will cost for a master plan and its implementation. This can usually be accomplished by providing a general fee based on either an hourly rate or a typical lump sum for a master plan. Although most potential clients benefit from this information, some designers are skeptical about providing it because they are afraid that fee information might scare off clients or might give competing designers or firms the ability to undercut them. Both of these fears are legitimate. However, the designer must inform clients about fees at some point in the process. It is usually better to let potential clients know about fees sooner rather than later before either party wastes time only to find out that the fees are not acceptable for whatever reason.

One other concern is about whether or not to charge any design fees. Some designers do not charge clients directly for a design fee if the clients sign a contract for implementation of the design. This is what is commonly referred to as a "free plan."

Some free plans ought to be free because they are nothing more than a quickly sketched planting arrangement showing where particular plants are to be placed on the site. Often, these plans are drawn on a piece of company stationery with a list of plant materials and a price quotation. This type of plan is simply an estimate and should be as "free" as a plumber's estimate or an electrician's estimate.

However, there are other so-called free plans whose cost should in fact be billed to the clients. These are the plans that take a substantial amount of time to design and prepare and then are offered as "freebees" for the sake of luring potential clients into signing a contract for the project. Even if the designer tells the homeowners that the plan is free, the time spent to prepare the design is most certainly built into the total project cost. Thus, although the clients may think they have received something for nothing, they in fact have not.

A free plan is likely to influence the clients' perception of the worth of the designer's professional advice. Professionals charge for their advice, consultation, and services. If a designer "gives away" valuable and professional design time, what does that say for the talent it took to prepare the design? Surely the time spent designing is worth more than nothing, and clients should be made aware of that and charged for that time. Any wise consumer would look at something free as being worth nothing to the one giving it away. This same wise consumer also realizes that something "free" is a clever way of enticing them to buy something more expensive.

INITIAL CONTACT BY POTENTIAL CLIENTS

If the potential clients are positively affected by an advertisement or properly informed by a brochure or Web site, they are very apt to follow up by contacting the designer or firm directly. This most typically occurs by means of a telephone call or e-mail, though it sometimes takes place with a visit to the firm's office or jobsite (Figure 5–3). The clients make this inquiry to get more information, to have initial questions answered, and to schedule an appointment for a more serious discussion about retaining the designer or firm to develop a master plan for their site.



Figure 5–3
Initial contact with the designer is typically made by telephone.

The designer in turn must spend whatever time is necessary to answer the potential clients' inquiry. This might include reiterating information already given to the clients by other means because hearing it explained by someone in person can sometimes prove to be more effective. The designer should respond to the potential clients' questions in a manner that is informative and reassuring. The designer might also need to ask questions of the potential clients to make sure that they are properly informed and that they seem to be the type of client that is desirable to work with. If the conversation goes well, the designer should conclude by scheduling a meeting with the clients at their home.

MEETING THE CLIENTS

The next step in the process is for the designer and clients to meet face-to-face to discuss the particulars of the clients and their site. This meeting should take place at the clients' home to allow the designer to see both the site and house firsthand (Figure 5–4). A meeting at the clients' house gives the designer an excellent opportunity to fully understand the concerns and interests of the clients in their own setting where they are apt to feel most comfortable. It also affords the designer the best chance to obtain the necessary information to properly proceed with the subsequent design process. In some instances, it is acceptable or even necessary for this meeting to take place at the designer's office. If this occurs, the designer will need to make a trip to the clients' site at another time.

Client Information

The primary purpose of this meeting is for the designer to obtain essential information about the clients that will serve as the basis for the design solution. This information should include (1) family facts, (2) clients' wants and wishes (initial program), (3) clients' likes and dislikes regarding their landscape, (4) clients' lifestyle and characteristics, and (5) clients' observations about their house and site.

In addition, the meeting gives the clients and designer an opportunity to discuss the design process and design fees as they relate directly to the particular project. The meeting presents both parties with a chance to ask questions and to air whatever concerns they might have about the overall process. This meeting also allows the designer to see the site in person and to make initial judgments about it. Many times, the

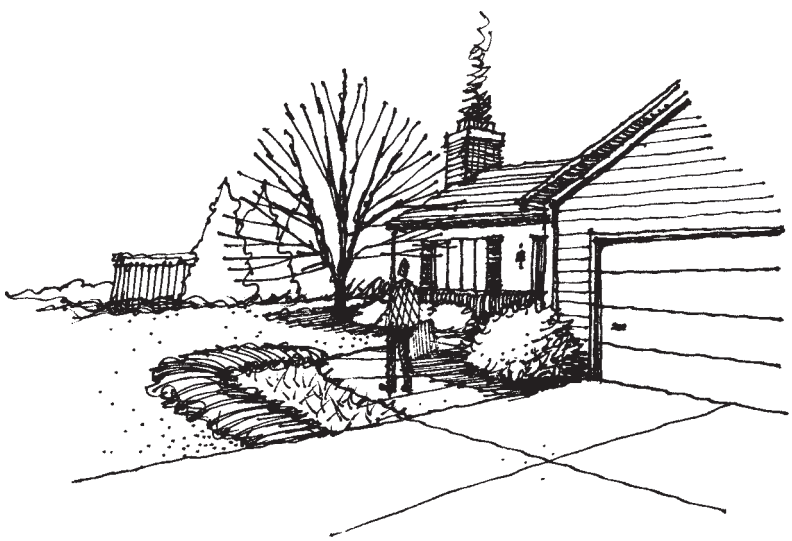


Figure 5–4
The initial meeting gives the designer a chance to see the site and house in person.

designer will need to return at a later time for a more in-depth study of the site (see Chapter 7). The ultimate purpose of this meeting is for the clients and designer to reach a professional agreement for working together on the design of the clients' site.

Family Facts The designer should obtain basic data about the clients, including the following:

- Family members and ages
- Occupation(s) of adults
- Interests of family members, particularly as they relate to outdoor activities
- Type and number of pets along with their use of the site

Clients' Wants and Wishes The designer needs to determine what the clients envision for their site in order to translate this into a "design program." To do this, the designer should attempt to have the clients identify their wishes by means of general descriptions of what they foresee as well as specific spaces or use areas they want included. The general descriptions or "goals" tend to describe the feeling or atmosphere that the clients want and may be phrased in statements such as the following:

"We want the front yard to be a place of inspiration and provide an attractive setting for our visitors."

"We envision a garden as a haven from the busy world where birds and other wildlife will visit."

"I foresee an environment where both family and friends can gather in a relaxing atmosphere."

The designer can use this information to help establish the style and character of the design. In addition, the designer should ask the clients to identify specific spaces or outdoor use areas that need to be included in the design. These wishes might be stated like:

"We would like a hot tub for four people in a fairly private place."

"I want to have about 12 apple trees near the back of the property."

"I want to have a multilevel deck instead of one main level."

"We need an extra parking space near the detached garage."

"We want a new area for entertaining, a large lawn area for children's play, and a quiet sitting space near the tree in the backyard."

The designer will use this type of information to create the design program (see Chapter 7).

Clients' Likes and Dislikes The designer should find out what the clients like and dislike with regard to landscape design. Although there may be some overlap with wants and wishes, this discussion typically relates to defining the clients' preferences with regard to design style, aesthetic taste, materials (both structural and plant materials), and special elements or features. The intent is to begin to define the aesthetics and palette of materials of the landscape design. The designer might inquire about each of these topics to stimulate response from the clients. The designer should also keep in mind that it is just as useful to know what the clients do not want. In some instances, clients have only vague notions of what they want, but are able to clearly state what they don't want.

Statements about likes and dislikes might be similar to the following:

"I would like something that is unique to me, but still looks like it belongs."

"We don't want anything that stands out; we are a fairly conservative family."

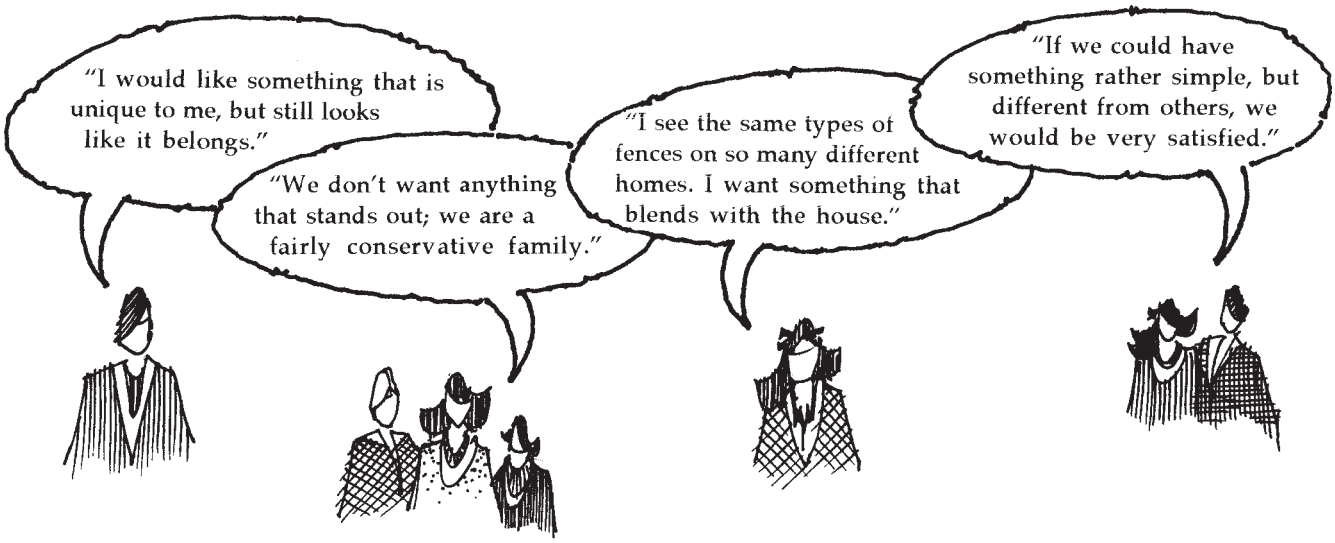


Figure 5–5
Some client likes and dislikes may be subjective and need clarification.

"I see the same types of fences on so many different homes. I want something that blends with the house."

"If we could just have something rather simple, but different from others, we would be very satisfied."

Some comments regarding likes and dislikes are specific and are often relatively easy to incorporate into a design program. Other remarks about likes and dislikes may be more general and open to interpretation (Figure 5–5). Comments that include words such as "special," "unique," "different," or "conservative" are subjective and reflect the clients' thoughts about their proposed project as they envision it.

How should a designer interpret these types of subjective statements?

How does a designer transform comments like those stated into meaningful and usable design information?

How does one incorporate these interpretations into the proposed design solution?

Carefully, very carefully! The word *special* to a layperson can mean something different to an experienced designer. The words *unique* and *different* to one person may mean something else to another. It is important to seek additional information in order to clarify subjective comments. The following questions are examples that can be asked to gain more objective information.

Original statement:

"I would like something that is unique to me, but still looks like it belongs."

Clarification questions:

"Can you define *unique* more specifically?"

"Do you want the design to reflect special things that you prefer, such as materials, patterns, or colors?"

Original statement:

"We don't want anything that stands out; we are a fairly conservative family."

Clarification questions:

"Can you give some examples of things that stand out to you?"

"Can you elaborate on the word *conservative?*"

Original statement:

"I see the same types of fences on so many different homes. I want something that blends with the house."

Clarification questions:

"Can you describe the sameness that you refer to in these other places?"

"What does the word *blend* mean to you?"

Original statement:

"If we could have something rather simple, but different from others, we would be very satisfied."

Clarification questions:

"Can you talk about or show us examples of what simple means to you?"

"What do you mean by different? Different than what? Are there things that you really don't like and therefore want yours to be different?"

These are just some examples. It is very important to have a better and more thorough understanding of what the client thinks and says. Questions alone may not always be enough. For a designer to get a better picture of what the client is thinking, it often takes actual pictures to stimulate additional comments. We have found that many subjective comments made by clients tend to relate to their concern for the design character or appearance of elements in the proposed design.

Clients' Lifestyle and Interests Additionally, the designer should try to determine the clients' lifestyle. That is, how do the clients currently use their house and site, and how might this change with an improved landscape? The designer might ask questions such as these:

How will you use the site around your house?

How much do you entertain and for whom?

How large are your social events?

Will you cook or eat outside? If so, how often?

Do you have any outdoor hobbies?

Do you like to garden?

What recreational activities do you enjoy outdoors?

Clients' Site Observations The designer should ask the clients to define what they think are the assets and problems of the site. Even though the designer should still conduct a thorough site analysis (see Chapter 7), it is very helpful for the designer to get the clients' insight as well. In fact, the clients are quite likely to know more about the site than anyone else because they have lived with and observed the site through the year in different conditions. Some site conditions may only be apparent to someone who has observed the site over a period of time. The designer should take advantage of this unique insight and use the clients' observations.

Clients' Architectural Observations Finally, it is very helpful for the designer to seek the clients' insight about their house and its architectural style. As with the site, the clients' thoughts and observations about their house can provide valuable information that might provide ideas for developing the site master plan.



Figure 5–6
The designer should encourage the clients to express their appreciation for their favorite interior architectural features.

First, the designer should ask the clients whether or not there are any interior features that are of special interest. For instance, Figure 5–6 shows a section through several rooms of a house. In this particular house, the clients like three special things. They are: (1) the archway and trim detail in the room on the left, (2) the angled roof and window pattern in the great room, and (3) the white stucco finish on many walls of the house. This information should be well documented, for it can be used later when materials, patterns, and trim details are studied.

In addition to getting comments from the clients concerning the interior of the house, it is also important to get their remarks as they relate to the exterior architectural character. They will likely point out particular aspects of their house that influenced them to select it. As you can see from Figure 5–7, different people will like different aspects of the architecture. Some are partial to roofs and windows, others to specific materials and colors, and still others to special features such as porches and chimneys. In any case, documenting their likes and dislikes relating to the exterior character is as crucial as documenting their comments concerning the interior.

It is helpful to discuss the architectural character while you are walking around the exterior grounds (Figure 5–8). Being able to discuss ideas as you point to certain architectural features can be beneficial. In addition, it is more effective to speak about landscape design possibilities while you are outdoors. For instance, it would be very easy to understand the following statement made by the designer as it relates to the house in Figure 5–8: "Since you have both identified the arched window as your favorite form, it is easy to conceive that form being used in the major patio area, in the pool area, or in the arched entry way into the garden from the side yard. The patterns in the upper window may provide an opportunity to use some irregular cut stone in the design to establish the same kind of contrast." Discussing ideas as you look at the architecture is very helpful. Again, make sure that comments made regarding any specific aspect of the architectural character, whether inside or outside, are thoroughly documented.

Methods of Inquiry

It should be apparent that there is much for the designer to learn about the clients, their site, and their house. Therefore, the designer needs to be well prepared for this first meeting with the clients. The designer should go to this meeting with a clear agenda of items that must be covered. If necessary, a set of notes can be organized before the meeting to remind the designer of key topics that must be addressed.

The designer must also be able to accurately record the information and insights provided by the clients during the meeting. This can be done by careful note taking or with a tape recorder. The advantage of the latter is that it frees the designer from the burden of writing everything down and allows the designer to more fully participate in the discussion. Taping the conversation is also apt to be more accurate and allows the designer to replay it as many times as necessary to understand what was said. The taped information can be converted to notes sometime following the meeting.

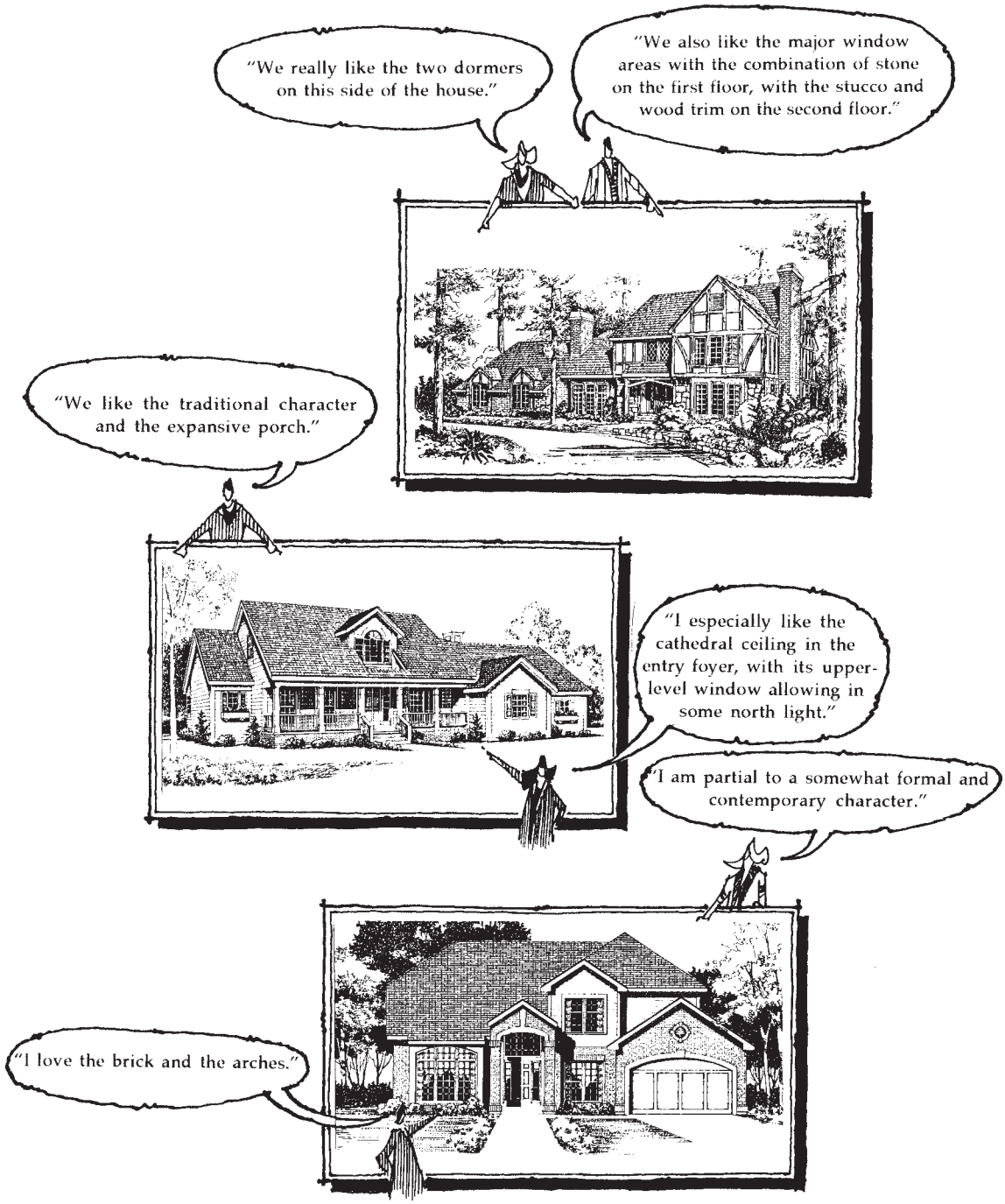


Figure 5–7
Different people like different houses for a host of varied reasons. Design #N2855 (top), Design #N3461 (middle), and Design #N3452 (Bottom). © Home Planners. Blueprints available, 800-322-6797.

There are a number of possible ways for the designer to obtain the necessary information about the clients during their meeting. Each designer should consider these different methods of inquiry and determine which one (or ones) works best in any given situation. What might be appropriate for one designer or situation may not be suitable for another designer or set of circumstances. Ultimately, a designer should be able to use a number of these techniques to learn about clients.

Verbal Discussion Probably the most common method for gaining information about clients is through verbal discussion. This is a personable approach that engages



Figure 5–8
Designers should encourage clients to express their appreciation for their favorite exterior architectural features. Design #N3409 (top). © Home Planners. Blueprints available, 800-322-6797.

all parties and allows the clients to fully express themselves. The designer may permit the clients to talk freely or might direct the conversation with a series of questions. The clients should be given adequate time to respond to questions, though the designer may wish to interject from time to time to clarify points or ask other questions. In the end, the designer must be sure that the clients have discussed everything they wish to about their landscape and that they feel comfortable with moving ahead to the next steps of the design process.

Questionnaire Another form of inquiry is a written questionnaire. A questionnaire is a set of prepared questions that are organized on one or two sheets of paper (Figure 5–9). A questionnaire ensures that meaningful information is asked of the clients in a clear, orderly fashion. When completed, the questionnaire gives the designer a record of information about the clients that can be referred to throughout the development of the design. A disadvantage of a questionnaire is that it is sometimes seen as being too formalized and impersonal in nature.

Some designers like to send a questionnaire to the clients before the meeting to stimulate their thinking. This gives the clients time to think more thoroughly about their responses. The designer then uses the meeting to review the clients' answers to the questionnaire and to clarify questions that either party might have. Other designers like to have clients respond to the questionnaire during the meeting as a way of directing the conversation.

Review of Pictures One additional means for gaining critical information from clients is to review photographs or pictures of their favorite completed landscapes. Before the meeting, the designer might ask the clients to gather pictures or photographs that represent landscape styles, outdoor spaces, materials, special features, lighting, and so on that the clients like (or dislike). These pictures can be from places that the clients have visited or from various books and magazines.

Like the questionnaire, this technique engages clients in thinking about their project before meeting with the designer. For some clients, this process is very educational

CLIENT QUESTIONNAIRE

The purpose of this questionnaire is to obtain information that will be helpful in preparing a design for your residential site. All information you provide will be held in strict confidence and will aid in creating a design that fits the special needs of your family and conditions of your site. Please feel free to make additional comments or notes wherever you think it would be helpful. Thank you in advance for your cooperation.

I. Family Characteristics. Please list the names of all family members and identify each person's age, place of employment or school, and hobbies, especially as they relate to the outdoors.

_____
_____
_____
_____
_____
_____

II. Existing Site Conditions.

A. Front Yard Problems. Please list the current problems in the front yard that you think should be minimized or overcome in the design.

1. Visual. _____
_____
2. Functional. _____
_____

B. Backyard Problems. Please list the current problems in the backyard that you think should be minimized or overcome in the design.

1. Visual. _____
_____
2. Functional. _____
_____

C. Front Yard Potentials. Please list all the positive elements and qualities of the front yard that should be retained or enhanced in the design.

1. Visual. _____
_____
2. Functional. _____
_____

D. Backyard Potentials. Please list all the positive elements and qualities of the backyard that should be retained or enhanced in the design.

1. Visual. _____
_____
2. Functional. _____
_____

Figure 5–9
Sample questionnaire.

III. Desired Outdoor Activities. Place a check mark next to those activities in which you want to participate on your site. After each activity, please identify the season(s), average number of days per week, and time of day you would enjoy this activity.

	Season				Days per Week	Time of Day
	W	S	S	A		
_____ Barbecuing						
_____ Eating						
_____ Sitting/Relaxing/Reading						
_____ Sitting/Talking with family						
_____ Entertaining						
_____ 4–6 guests						
_____ 6–10 guests						
_____ more than 10 guests						
_____ Sunbathing						
_____ Watching birds						
_____ Gardening						
_____ Annuals						
_____ Perennials						
_____ Vegetables						
_____ Fruit trees						
_____ Woody shrubs						
_____ Recreation						
_____ Badminton						
_____ Volleyball						
_____ Croquet						
_____ Swimming						
_____ Basketball						
_____ Throwing baseball						
_____ Throwing football						
_____ Throwing frisbee						
_____ Other (please identify)						

IV. Desired Site Character. Please describe how you think your site should look (formal/informal, open/wooded, etc.)

_____

V. Materials.

A. Please list the types of materials you like most for pavements, fences, walls, etc. _____

_____

B. Please list your favorite plant materials. _____

_____

C. Please list the plant materials you do *not* want used on your site. _____

_____

VI. Budget. Please identify the budget you would be willing to spend annually on your site for the next five years.

Figure 5–9
(Continued)

because it begins to suggest different ideas that they might not have previously considered. It is also an effective method for the client to communicate what ideas or aspirations they have about the landscape. The adage that "a picture is worth a thousand words" is especially true for clients who are trying to communicate what ideas they have in mind or what kind of landscapes they find appealing. Sometimes, the designer may ask to borrow some of the photographs so they can be studied more closely during the early stages of creating the design.



Figure 5–10
A design firm should keep a portfolio of its past and present work.

Review of Designer's Portfolio A similar method for learning about the clients' preferences is for the designer to review examples of the firm's past and present work. It is an excellent business practice for a designer to keep a portfolio of work that can be used for promotional purposes, for showing clients the designer's capabilities, and for in-house record keeping (Figure 5–10). Although a portfolio can include many work examples, it is recommended that the portfolio include the following:

- A wide range of project types that vary in size, cost, and style
- Documentation of selected projects showing pictures of the design process from before the project started to its final completion
- Master plans and other types of drawings such as functional diagrams, detail enlargements, planting plans, construction details, sections, and so on

A review of a portfolio during this first meeting with the client serves several purposes. First, it gives the clients a chance to see what kind of work the designer has completed. Although the clients may be somewhat familiar with the designer at this point, the designer can nevertheless show a range of work that might expand the clients' understanding of his or her abilities. Second, a review of the portfolio allows clients to comment on the designer's work and to express opinions about what things they like or dislike. As with the other techniques discussed here, this, too, gives the designer insight about what will or will not be satisfactory for the clients. Last, a review of the portfolio permits the designer to explain how a project is undertaken and some of the thinking that goes into its development.

Concluding the Meeting

As the meeting approaches an end, there are still several items that may need to be addressed. First, it may be helpful for the designer to summarize what has been heard from the clients. This can be accomplished by repeating the major points and requests made by the clients. This helps to ensure that the clients' thoughts have been accurately heard. Likewise, it gives the clients a chance to correct an item if it has not been understood correctly or to add anything they might have forgotten.

At this point in the meeting, the designer may also need to review information about the firm's practice. This will be necessary if the clients have not reviewed a brochure, advertisement, or other resource, or have not talked very long to the designer before the meeting. The designer may need to review design philosophy, design process, and so on to make sure the clients understand how the designer intends to proceed and on what basis.

Client visits (3 at 1.5 hr. each)	4.5 hr.
Site measuring	1.5 hr.
Base map preparation	2.5 hr.
Site analysis	1.5 hr.
Concept development (2 alternatives)	2.0 hr.
Preliminary plans (2 alternatives)	4.0 hr.
Master plan	4.0 hr.
Total	20 hr.

Figure 5–11
A suggested breakdown of time spent by a professional designer for a site.

Finally, the designer needs to discuss both the clients' budget and design fees for the project. The designer should ask whether the clients have an overall budget for the design and its implementation. This discussion may require some education of the clients if they are not familiar with typical costs for master plans or with implementation costs. The designer should also make it clear that most master plans get implemented over time; thus, the overall cost of construction and installation can be spread out over a number of years.

The designer needs to explain what the master plan will cost. Again, the designer should not be hesitant to charge fees for the design and should not hide such costs in the charges that are made later on for materials or installation. Professional design services by a site designer should be a separate fee from the construction, installation, and maintenance contracts. Time accumulates while preparing all the phases leading up to and including a master plan. Client meetings, site measuring, base map preparation, site analysis, functional diagrams, preliminary design, and master plan design can all add up to a substantial amount of time. And that may mean a sizable design fee. There is no specific amount that one should charge, but it is typical for a residential master plan to cost between $1,000 and $2,000. This may be viewed as inexpensive by some designers and as ludicrous to others, depending on whether they currently charge for design services. A suggested breakdown of this time is shown in Figure 5–11.

When 20 hours are invested in the development of a residential site master plan, then that time should be converted to a dollar amount. Companies may charge clients three times the designer's hourly pay rate to cover overhead and profit. It is quite common for a company to charge a client $50 to $100 per hour for design services.

DEVELOPING A PROPOSAL FOR DESIGN SERVICES

After the designer and clients have discussed the topics presented thus far, the clients should be asked if they are interested in entering into a contract for design services. They may or may not be able to make a decision at the end of the first meeting. If they decide to go ahead with the project, then the designer should formalize the discussion by preparing and sending the clients a "Proposal for Design Services" within a few days of their meeting so the clients can study the specifics. Often, clients feel more assured about an agreement if everything is spelled out in writing. If the clients are in agreement with the proposal, they can sign it and return a copy to the designer.

Some firms have standard forms for "Proposals for Design Services" with spaces for filling in the times, dates, costs, stipulations, and signatures. Other firms prefer to prepare more personal proposals taking into consideration the first meeting's discussions. In either case, it is recommended that the proposal include the following: (1) names and addresses, (2) scope of work, (3) drawings/products, (4) client meetings, (5) time schedule, (6) fee and payment schedule, and (7) contract acceptance.

Names and Addresses As in any formal letter, the proposal should include both the clients' and the designer's names and addresses. It should also include the firm's or

designer's telephone number so it is easy for the clients to contact the designer if they have any questions about the proposal.

Scope of Work The proposal should identify specific tasks the designer intends to complete. In order to prepare a master plan, typical tasks involve completing the site measurements, base map, site analysis, design program, preliminary design alternatives, and final master plan. If there are any additional tasks required, they should be identified as well.

It is also recommended that the designer identify those things that are not part of the contract. Some homeowners assume that a master plan will contain all the information necessary to actually install and construct the entire design. Many master plans involve the construction of steps, walls, decks, fences, arbors, and so forth. The construction of these structures requires additional drawings in order to provide the contractor with necessary information to build them. Detailed construction drawings are typically not part of the "Proposal for Design Services" unless both the designer and clients agreed beforehand that it was something to be included.

Drawings The "Proposal for Design Services" should identify the specific drawings that will be given to the clients. On a typical project, the clients should be given copies of the preliminary designs and the master plan. In addition, the designer may wish to prepare other types of drawings such as sections and/or perspectives to supplement the plans. For each of these drawing types, the proposal should also identify its scale, what type of print or copy it will be, whether or not it will be rendered in color, and what it will show. Also, the proposal should indicate the number of copies of each drawing that will be given to the clients.

Client Meetings Important to the proposal is a description of the number of meetings that will take place with the clients to present various phases of the project. Typically, there are three meetings with the clients. The first meeting is the one already discussed in this chapter. The second meeting usually takes place when the designer has completed the preliminary plan(s). At this time, the designer should ask for feedback from the clients about the different design ideas. At the third meeting, the designer presents the master plan to the clients. Depending on the size of the project site and the scope of work, there may need to be more meetings, especially if the project is complex.

Time Schedule The proposal should identify when (1) work on the design will begin, (2) the preliminary plans will be completed, and (3) the master plan will be completed. With regard to setting completion dates for the various phases of the design project, the designer may prefer to pinpoint completion dates by telling the clients the exact date when work will be completed. However, this is not always a good practice. There may be times when unforeseen circumstances arise, causing work to be delayed. Because these situations are not predictable, identifying exact dates is not a recommended practice. Approximate due dates will usually suffice. When a phase of work is completed, the designer can then telephone the clients to set a specific date and time for a meeting.

Fee and Payment Schedule The "Proposal for Design Services" should outline the fees for design services. It is recommended that the total fee for design services be separated into (1) a retainer fee, (2) a partial completion fee, and (3) a final completion fee. A retainer fee is the amount of money the clients pay before the beginning of any work by the designer. It is similar to "earnest money" that a person pays to reserve a specific item for later purchase. A retainer fee is common practice in design professions. The amount may vary from project to project, but may be somewhere between 10 and 20 percent of the total design fee.

The partial completion fee is the amount of money paid at the presentation of the preliminary plans. This amount may vary from 40 percent to 60 percent of the

total design fee. Frequently, most of the design time is spent in this phase, and therefore it may show a substantial dollar amount.

The final payment is made at the presentation of the master plan. This amount may vary from 20 percent to 50 percent. There are some companies that collect the full design fee after completion of all the specified work. Regardless of which payment system is used, be specific about how much needs to be paid when.

Contract Acceptance Our discussion so far has concentrated on the proposal. A related document is the contract. But, there is a difference between the two. A proposal is a document that simply outlines the specific services that are to be rendered for a particular sum of money. Such a written proposal is not a legal contract. It is an offer that can be accepted or rejected by the clients. However, when both the designer and the clients sign a proposal, then the proposal becomes a legal contract. Therefore, when a proposal is submitted to the clients, the designer should sign it in order to establish it as an offer from the designer to the clients. If the clients accept the proposal, they can sign it to establish their acceptance. This signed document is then considered to be a legal contract between the designer and the clients according to the specifications in the proposal. Therefore, the proposal should contain spaces for the signatures of the designer and the clients, as well as the dates the signatures were made. It is recommended that the offer made in the proposal be open for acceptance for a limited amount of time, such as 30 days.

Upon receiving the signed contract, the designer can then begin the work. However, no work should be undertaken before receiving the signed contract because the designer has no legal authority to do so. Furthermore, the designer may be wasting time if the clients decide not to enter into the contract.

THE DUNCAN RESIDENCE

To provide additional explanation for each of the phases of the design process presented in this text, this and following chapters describe how each phase is actually applied to a sample design project. This sample project, the Duncan residence, begins here and is followed through other steps of the design process in subsequent chapters. The project is a real one and involves ordinary clients who live in a typical single-family suburban home.

The Duncans' house is a two-story, four-bedroom home with gray-blue siding, white brick, and white wood trim (Figures 5–12 and 5–13). It is situated on a site that is a little over a quarter of an acre in size and is surrounded on the west, north, and east sides by neighboring residential properties. The site is rather flat with some scattered existing trees in both the front and backyards. A more detailed description with additional photographs of the Duncan residence is found in Chapter 7.

To begin the process, Brian and Pamela Duncan telephoned James E. Kent, landscape designer, concerning the future development of their site. During this initial telephone conversation, they expressed the desire to enhance the appearance and usefulness of their site. To accomplish this, they indicated the need for privacy, an outdoor family and entertaining space, shade, development of a front entry, and some additional planting around the site. The Duncans' needs seemed to suggest the possibility of a challenging design project, and so Mr. Kent requested to meet with them at their house. Mr. Kent explained that there was no charge for this initial visit and accepted their invitation to meet with them.

Upon arriving at the Duncan residence, Mr. Kent was introduced to Brian, Pamela, and their three children. Initially they met in the living room, where Mr. Kent encouraged the Duncan family to talk about their needs, desires, and anticipations about the site. When necessary, Mr. Kent asked the Duncans questions to clarify their



Figure 5–12
View of the Duncan residence as seen from the street.

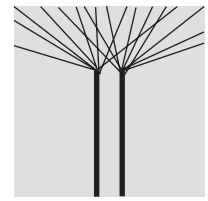
thoughts or to seek more specific information about their requests. Later in the meeting, they walked through the house and around the site as Mr. Kent listened to the Duncans discuss specific concerns and requests. He kept written notes of all the family's thoughts and ideas. After this, Mr. Kent talked about the capabilities of his firm and the preferred process for working with clients. He explained the need to develop an overall master plan for the site as the best way to accomplish everything the



Figure 5–13
View of the north side of the Duncan residence.

Duncans had in mind. Although the Duncans were somewhat apprehensive at first, they realized that a master plan was a comprehensive approach to developing their site. So as not to rush the Duncans into making an immediate decision, Mr. Kent told them that he would prepare a "Proposal for Design Services." If this met with their satisfaction, they could then sign the proposal and return it to begin the design process. He thanked the Duncans for the opportunity to meet with them and expressed hope that he would be able to provide them with design services.

Upon returning to the office, Mr. Kent prepared a "Proposal for Design Services" and sent two copies to the Duncans, one for their files and one to be returned to him. The cover letter and proposal he wrote are shown in Figures 5–14 and 5–15.



DESIGN RESPONSE II
62047 Bedford Court
Eugene, OH 10548
Tel: (614) 830-4900
FAX: (614) 830-2010

July 26, 2011

Brian and Pamela Duncan
4140 Willow Bend Road
Eugene, OH 10548

Dear Mr. and Mrs. Duncan:

Thank you very much for the opportunity to meet with you this past Wednesday evening and the informative discussion we had about the improvements for your residential site. The interests and ideas you shared with me are very important for properly developing a design for your residential site.

In response to all the ideas that were discussed during our first meeting, I am submitting the enclosed "Proposal for Design Services" in hope that I will be able to work with you on this forthcoming adventure. Although there are obvious site issues that must be contended with, I am confident that there are a variety of alternative ways to turn these problems into potentials while satisfying your specific needs and requirements.

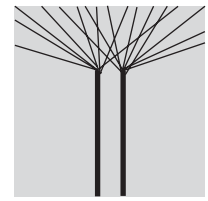
Respectfully submitted,

JamesE.Kent

James E. Kent
Landscape Designer

encl.

Figure 5–14
The cover letter.



DESIGN RESPONSE II
62047 Bedford Court
Eugene, OH 10548
Tel: (614) 830-4900
FAX: (614) 830-2010

PROPOSAL FOR DESIGN SERVICES

The Duncan Residence

SCOPE OF WORK. Outlined below are the proposed tasks to be accomplished.

1. Assimilation of all program and site data received from you.
2. Actual on-site measurement and development of a base map.
3. Analysis of existing on-site and immediate off-site conditions.
4. Preparation of two alternative preliminary plans, which will be presented to you at your home.
5. Further refinement of one of the alternative preliminary plans or a combination of the two to establish the final master plan.

PLEASE NOTE THAT THE SCOPE OF WORK DOES NOT INCLUDE THE FOLLOWING:

1. Detailed construction or working drawings for any site structure.
2. Actual construction or installation of the design.

DRAWINGS. I will submit the following drawings to you according to the time schedule outlined below:

1. Two preliminary plans for the entire site. These plans will be drawn at a scale of 1/8″= 1′-0″. They will show the location of all proposed site elements (and existing site features that are to remain) such as walks, driveway, terrace, fences, and planting. Notes will identify pavement and fence materials, fence heights, and general type of plant materials. You will receive two copies of each of these plans.
2. One master plan, drawn at a scale of 1/8″= 1′-0″ will show specific names of plant materials and other materials and patterns. You will receive two copies of this drawing.

TIME SCHEDULE. I will begin work upon receipt of the signed contract. The preliminary plans will be completed within 15 days, at which time I will contact you to set a specific time and date for presenting them to you. Following that meeting, and after a 10-day period for you to study the preliminary plans and get back to me with your comments, I shall begin the design of the final master plan. This plan shall be finished within 7 days. I shall again contact you to set a time and a date for presenting the final master plan.

FEE PAYMENT AND SCHEDULE. I propose to prepare and execute the above noted drawings and services for the lump sum of $750.00. The payment for the above services shall be as follows:

$150 submitted with the signed proposal/contract
$450 paid upon completion and presentation of preliminary plans
$150 paid upon completion and presentation of the master plan

CONTRACT ACCEPTANCE. This offer is valid for 30 days. If this proposal is satisfactory and acceptable to you, please sign the enclosed copy and return it to me for my files.

James E. Kent	Date	Pamela Duncan	Date
		Brian Duncan	Date

Figure 5–15
The Duncans' "Proposal for Design Services."

SUMMARY

The initial meeting with the clients is important because the designer acquires vital information about the clients that will be used as the foundation for the design solution. Having completed this chapter, you should specifically know the following about that first contact with clients:

- Different methods to communicate information about the designer or firm to potential clients
- Information about the designer or firm that is typically provided to potential clients
- General categories of information that are sought in the first meeting with clients
- Necessary facts about the family sought in the first meeting with clients
- Type of information obtained from the clients about their wants/wishes and likes/dislikes
- Questions that might be asked to learn about the clients' lifestyle and interests
- Information that can be sought about the clients' observations regarding their site and architecture of the house
- Alternative methods and techniques for obtaining information from clients
- Organization and potential content of a questionnaire
- Typical content of a portfolio
- Points a designer should discuss at the conclusion of the initial client meeting
- Content and organization of a proposal for design services

6

Site Measuring and Base Map Preparation

INTRODUCTION

The previous chapter addressed guidelines for meeting the clients and determining their vision for the landscape. This step culminates when the "Proposal for Design Services" is signed by both the designer and the clients, thus formalizing the agreement between the two parties. The designer is now ready to gather as much information as possible about the site so that the resulting design proposal sensitively fits all aspects of the site. This typically starts with obtaining accurate measurements of the site from legal documents, digital sources, and on-site measuring and concludes with the preparation of a base map. To make the most efficient use of time, acquiring site measurements may also coincide with site inventory and analysis. Doing these tasks in a thoughtful and organized manner saves many headaches later in the design process.

This chapter addresses site measuring and base map preparation including (1) terms related to this phase of work, (2) sources of information, (3) guidelines and techniques for taking and recording field measurements, and (4) procedures for drawing a base sheet and base map. Chapter 7 discusses how to undertake a site inventory and site analysis.

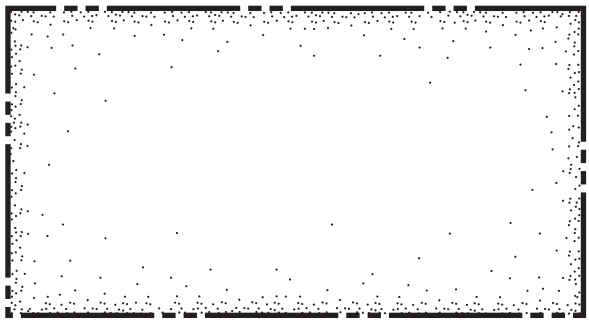
DEFINITION OF TERMS

There are five terms related to site measuring and drawing a base map that are used in the design professions: (1) *lot*, (2) *plot plan*, (3) *site plan*, (4) *base map*, and (5) *base sheet*. Each of these is a common expression used to define and/or graphically represent a residential site (Figure 6–1). As can be seen, these terms are similar to each other and thus easily confused. Nevertheless, each is unique with its own particular purpose and set of information.

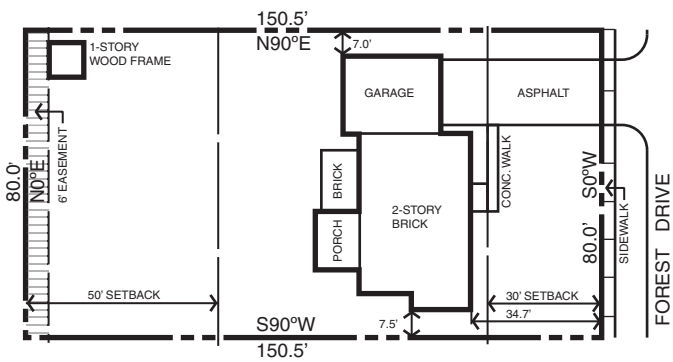
Lot

A *lot*, sometimes referred to as a *parcel*, is the area of ground on which a single-family residence is located (Figure 6–2). This is sometimes called a *plat* or *plot*. To avoid confusion with a subdivision map (often called a *plat*) or a scheme or secret plan (often called a *plot*), a residential property should be referred to as a *lot*.

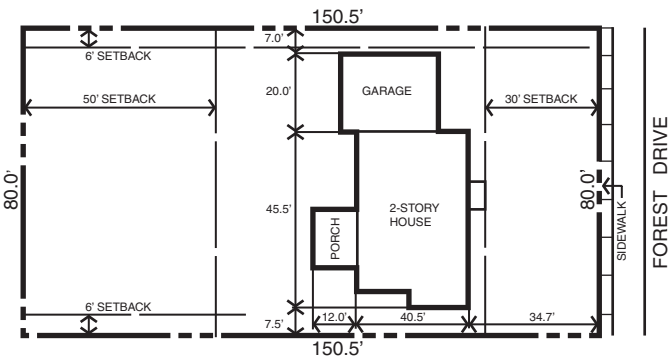
Lots range in configuration, although most residential lots are rectangular in shape with their width usually being shorter than their depth or distance from the



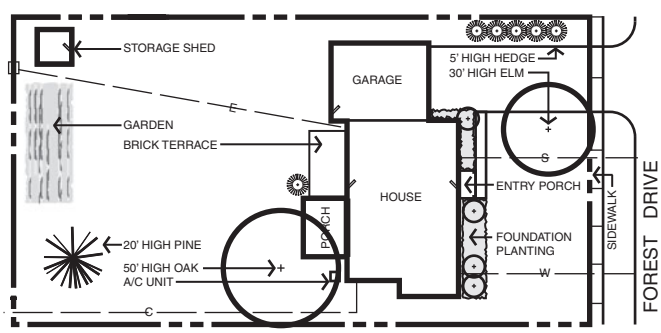
Lot



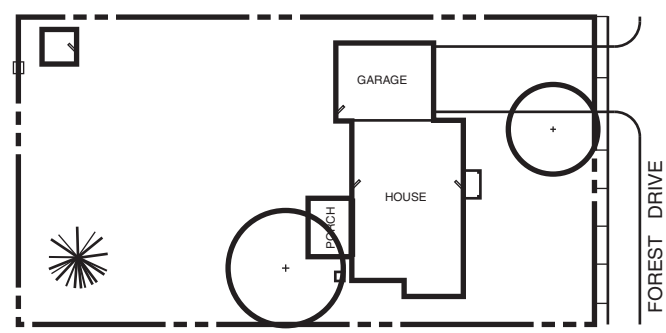
Plot Plan



Site Plan



Base Map



Base Sheet

Figure 6–1
Comparison of drawing terms.

street (Figure 6–3). Corner lots tend to be more equal in proportion, whereas lots located at the end of a cul-de-sac or along a road curve can be pie- or wedge-shaped. Lots located in areas of irregular topography, along a water edge, or near other unusual natural features may be more irregular in configuration.

Lots occur in a variety of sizes, too. Although there are no standard lot sizes, a designer is apt to encounter a range of typical sizes. These are listed next and shown in Figure 6–4 in relation to the size of one acre of land, which is 43,560 square feet, approximately 208′ × 208′.

Figure 6–2
A lot is an area of ground defined by property lines.

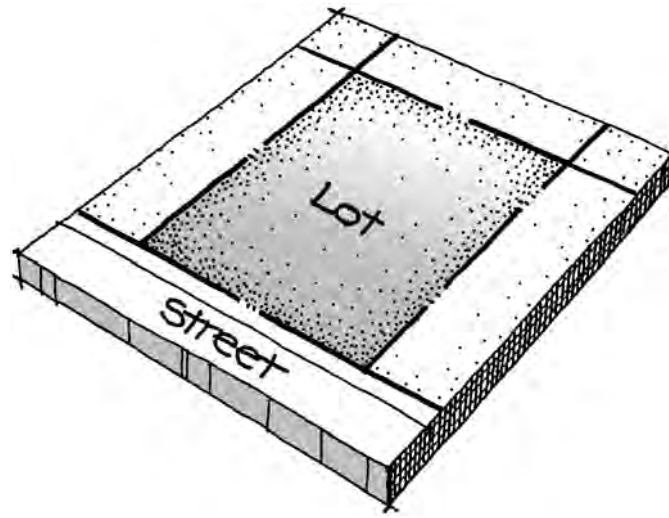
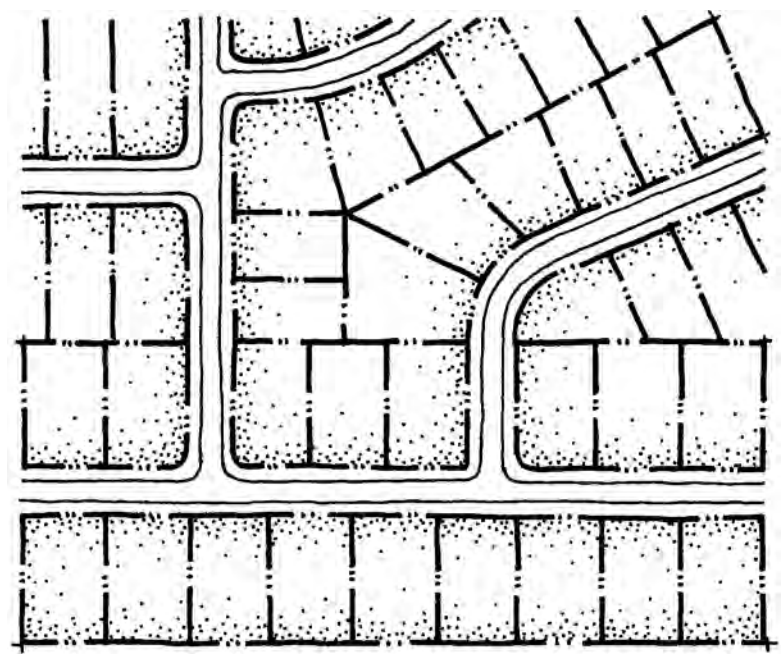


Figure 6–3
Typical lot configurations.



Small lot	1/8 of an acre
Average lot	1/4 of an acre
Medium lot	1/2 of an acre
Large lot	1 acre or greater

A lot is bounded by *property lines*, which are invisible lines defining the sides or edges of a lot. Each property line is identified by a *bearing* and a *distance* (Figure 6–5). A bearing is the horizontal direction of a property line expressed in degrees east or west of true north or south. A distance is the horizontal linear measurement of the property line. Iron pins or other permanent markers embedded in the ground typically identify the corners of a lot.

Plot Plan

A *plot plan* is a scaled drawing that accurately shows the lot's configuration, legal boundaries, and existing structures (Figure 6–6). Many times a plot plan is created by

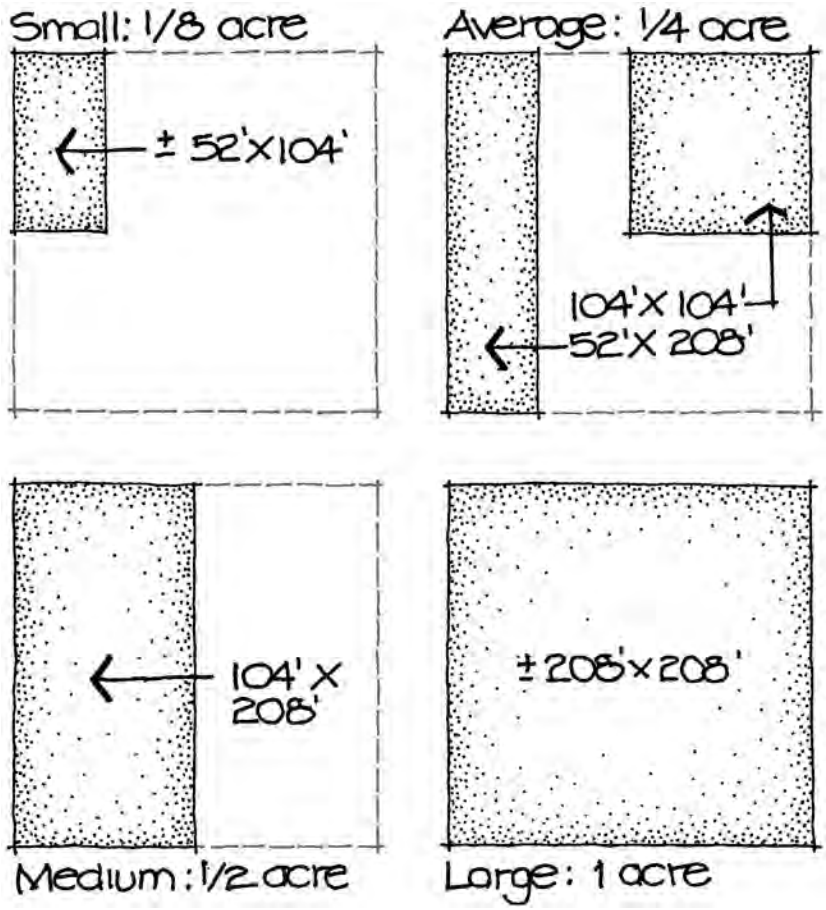


Figure 6–4
Typical lot sizes.

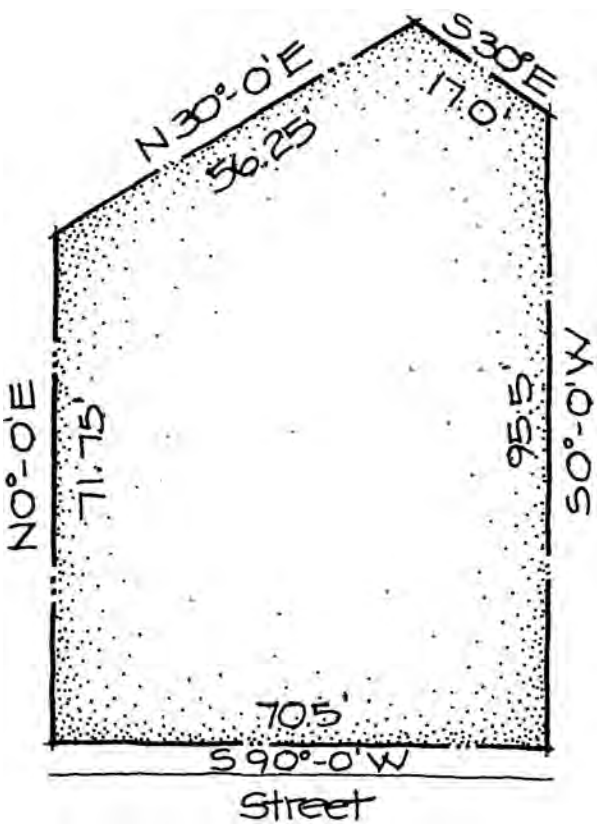


Figure 6–5
Typical notation of bearings and distances on property lines.

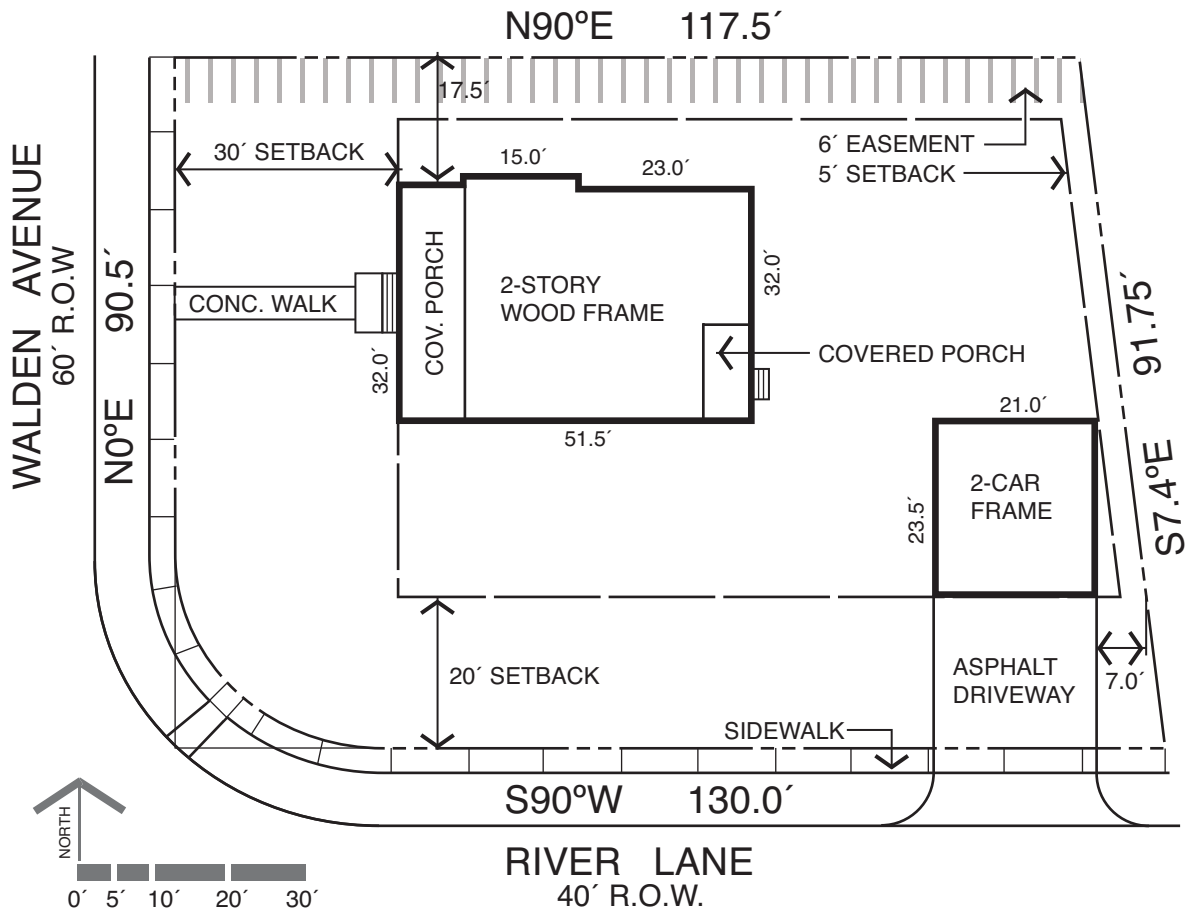


Figure 6–6
Example of a plot plan.

a professional surveyor and so is sometimes referred to as a *site survey*. A plot plan typically includes the following information:

- Property lines
- Bearings and distances of the property lines
- House footprint including overall dimensions
- Other structures like detached garages, walls, fences, and so on
- Orientation of the lot in relation to true north
- Right-of-ways
- Sidewalks and boulevards
- Setbacks and easements

The *right-of-way* is the publicly owned area of land along the front of a lot that includes the street or road, sidewalk if one is present, and boulevard (Figures 6–7 and 6–8). The average width of a right-of-way is 60 feet in a residential area, although the width may vary from 30 feet to 120 feet. Right-of-ways are regulated by the local governing body such as a village, township, city, or even county. Thus, it is necessary to check with the appropriate local government office to determine the regulations pertaining to the right-of-way.

A *sidewalk* is often located just inside the right-of-way (Figure 6–8). Consequently, most property lines and corners are found immediately adjacent to the edge of the sidewalk. Even though it is outside of the actual property lines, the maintenance of a sidewalk is typically the responsibility of the property owner.

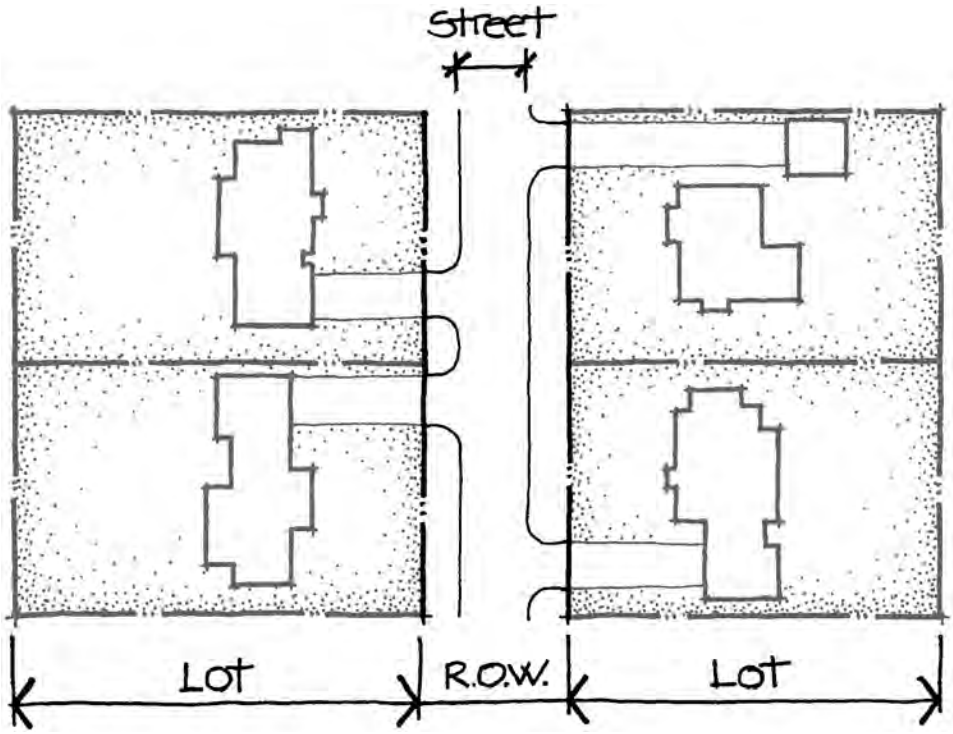


Figure 6–7
The right-of-way.

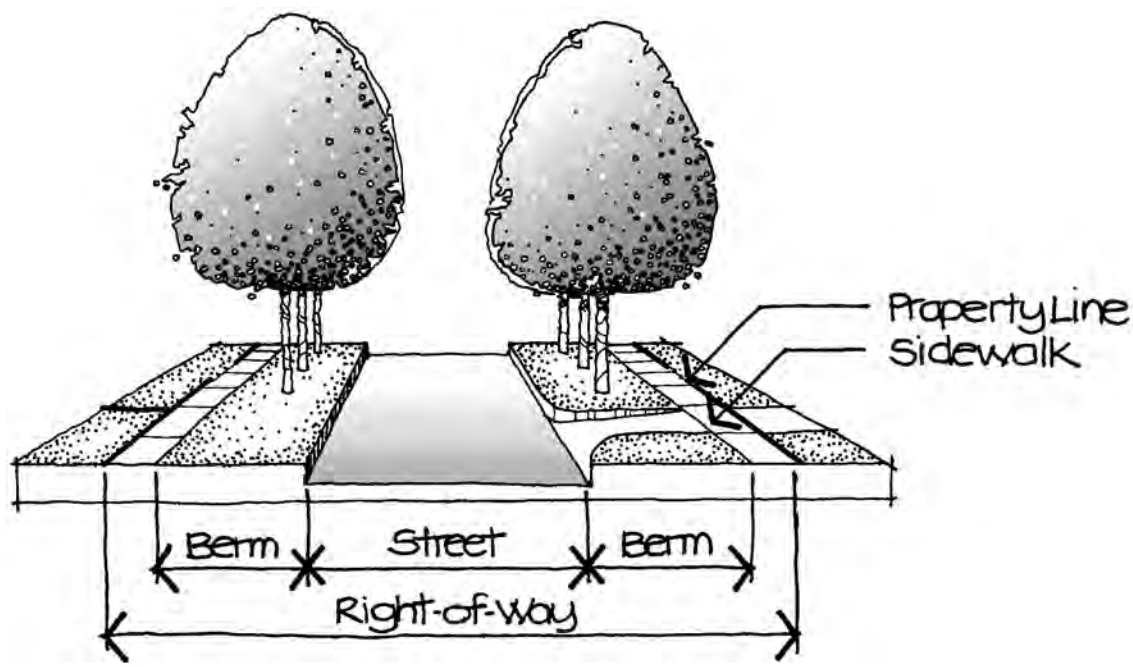


Figure 6–8
The location of street, berm, and sidewalk within a right-of-way.

A *boulevard*, also referred to as a *berm* or *tree lawn*, is the strip of land located between the sidewalk and street edge (Figure 6–8). The boulevard is sometimes the location of underground utilities and is where most street trees are planted if no utilities are present. Like the sidewalk, the boulevard is under the jurisdiction of the local municipality, a surprise to some homeowners who think they own all the ground between their house and the street edge. The property owner is responsible for the

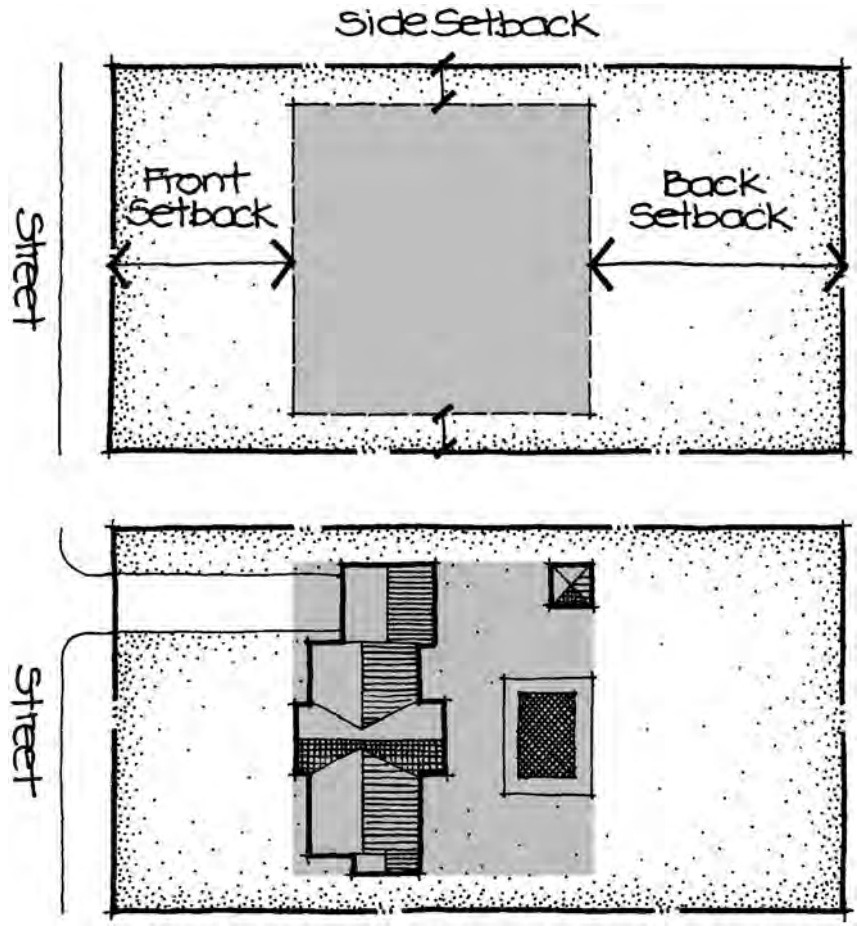


Figure 6–9
Sample setbacks.

maintenance of the boulevard but is usually restricted about what landscape treatment is permitted next to the street.

A *setback* is the minimum distance that any portion of a structure, such as the house or garage, must be located from a given property line. That is, a structure must be "set back" or built at least a specified number of feet from the property line. Consequently, most single-family residential lots have a "front-yard setback," a "back-yard setback," and two "side-yard setbacks" (Figure 6–9). A landscape designer should be aware of setbacks because they typically restrict the location of site structures such as fences, walls, gazebos, pool buildings, and so on, especially in the front yard.

An *easement* is a strip of land, usually situated along the sides or back of the lot, along which others (often utility companies) have the legal right of access (Figure 6–10). The easement may straddle a property line and be shared by adjoining properties, or it may occur entirely inside the lot. Utility companies have the freedom to locate utilities above or below ground, to excavate into ground, and move equipment within the easement for maintenance. Therefore, no structures or sizable plant materials should be located in an easement. If such obstructions are placed in an easement, a utility company has the right to remove and not replace them.

Site Plan

The term *site plan* has two definitions. As used by developers and building contractors, *site plan* refers to a drawing that shows the proposed location of a new house within the lot with dimensions and setbacks from the property lines (Figure 6–11). This drawing instructs the building contractor where to locate the new house on the

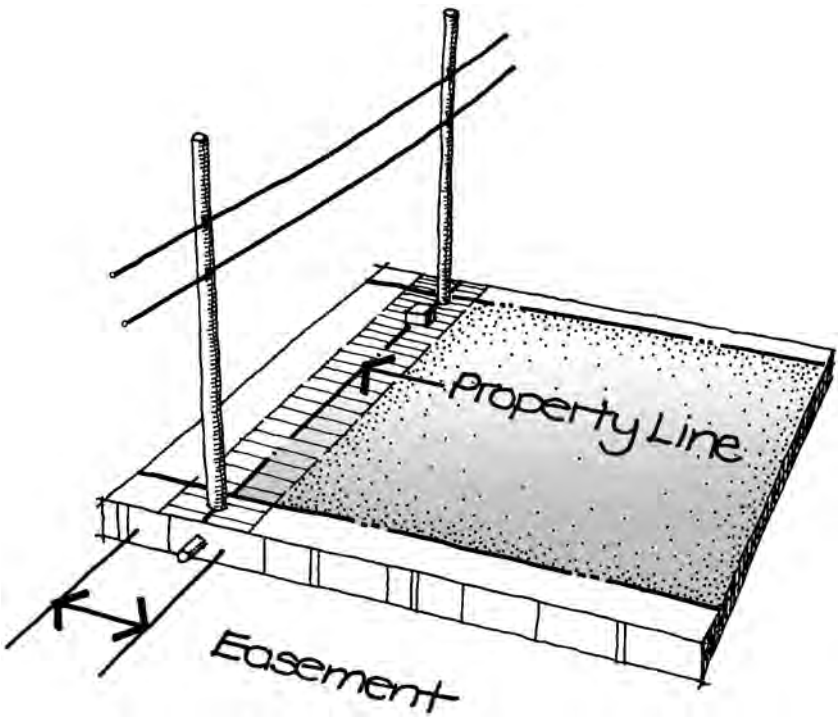


Figure 6–10
Sample easement.

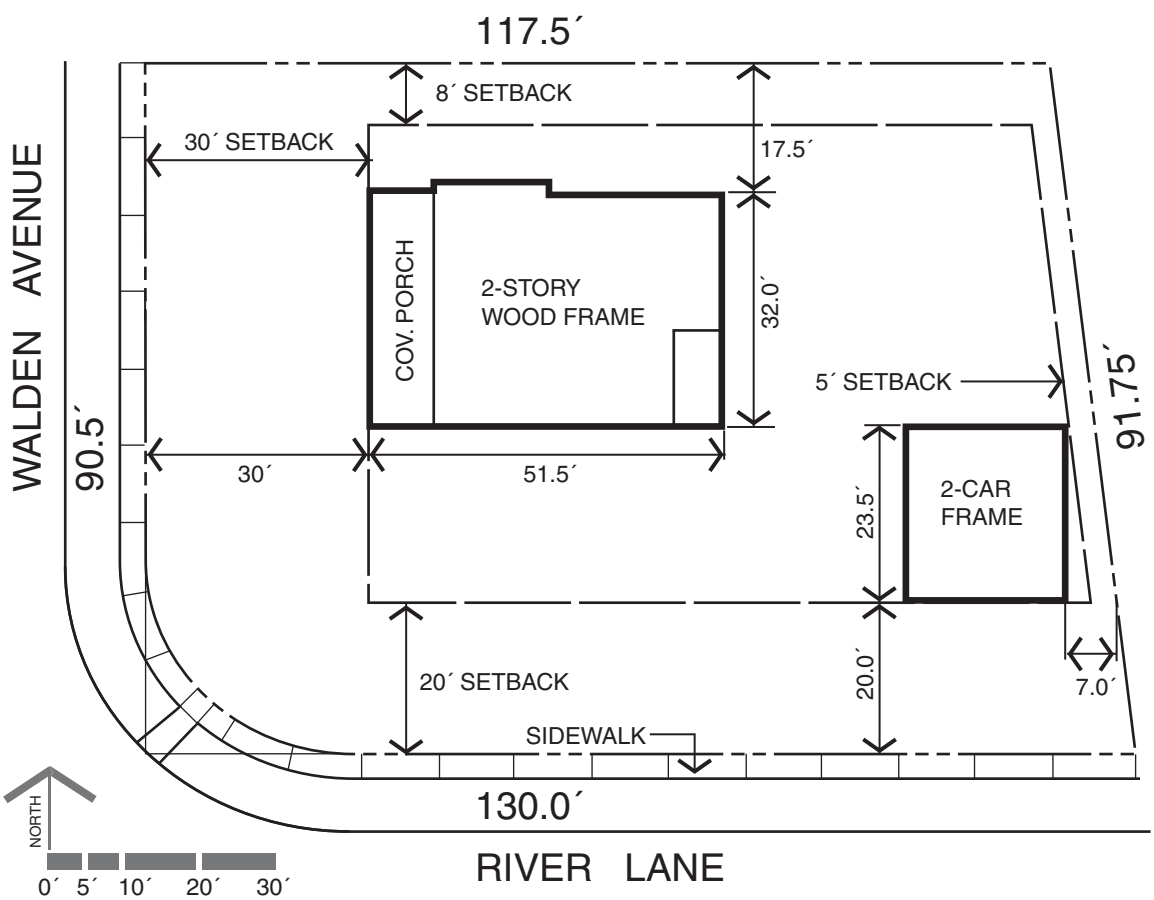


Figure 6–11
Typical site plan.

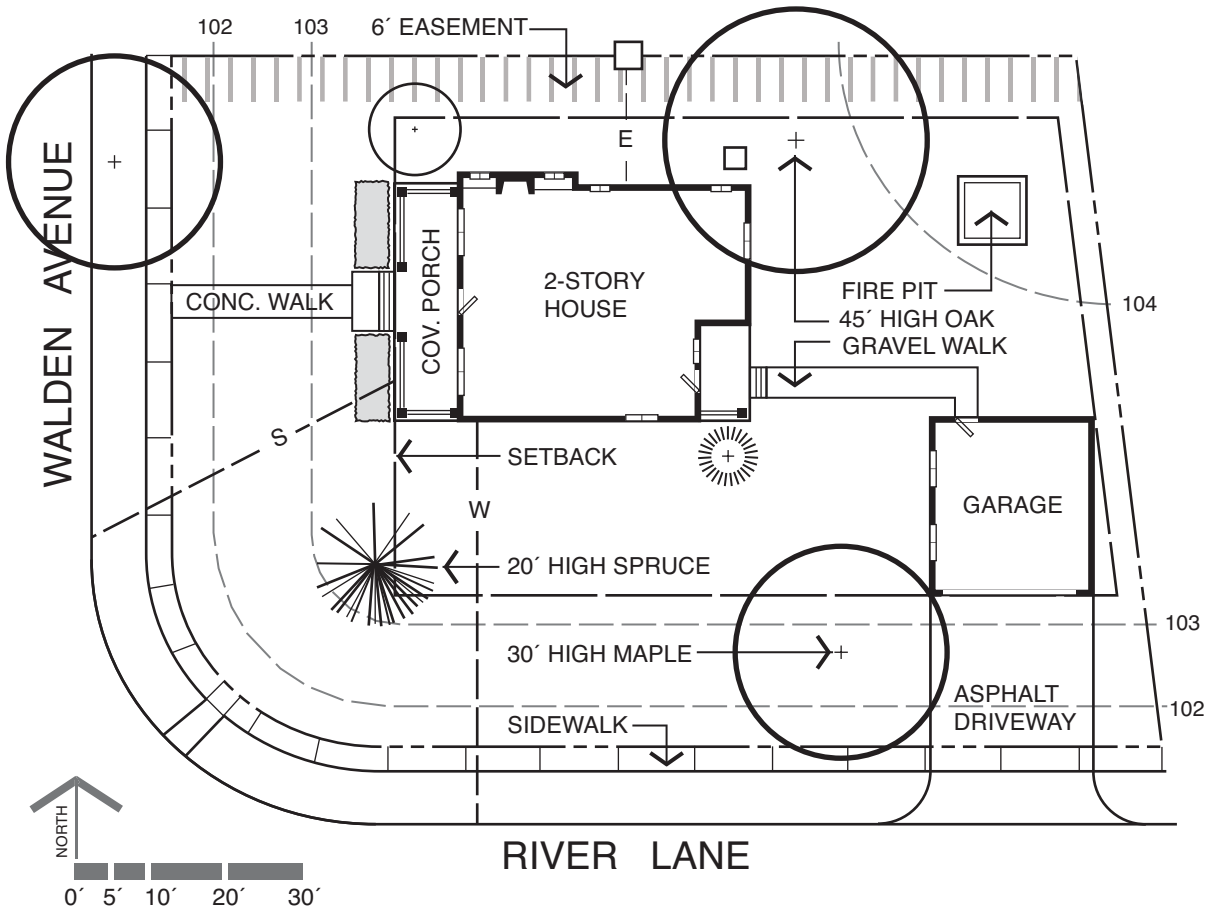


Figure 6–12
Typical base map (all existing conditions).

site. A site plan may also be used to show the location of house additions or other proposed structures such as detached garages, decks, and swimming pools.

The second use of the term *site plan* is by landscape architects, architects, and engineers to describe the scaled drawing that shows the proposed landscape design or layout of a site. The *preliminary design* and *master plan* discussed throughout this book are both site plans.

Base Map

A *base map* is a scaled plan drawing that documents the location of all the existing physical site elements such as driveways, walkways, patios, decks, terraces, walls, fences, steps, utilities, plant materials, and other visible elements (Figure 6–12). The landscape designer prepares the base map after all the necessary dimensions have been obtained from on-site measuring and other sources.

A base map is useful for two reasons. First, it records the existing site conditions before new design and construction. It can also help establish what specific elements need to be removed, replaced, replanted, or relocated later when actual construction begins. Second, the base map is used for the site inventory and analysis as discussed in Chapter 7. Both the base map and the site analysis are necessary in discussing the restrictions and potentials of a site with the clients. The designer will have difficulty relating new ideas to the reality of existing site conditions without an accurate recording of all existing physical site data.

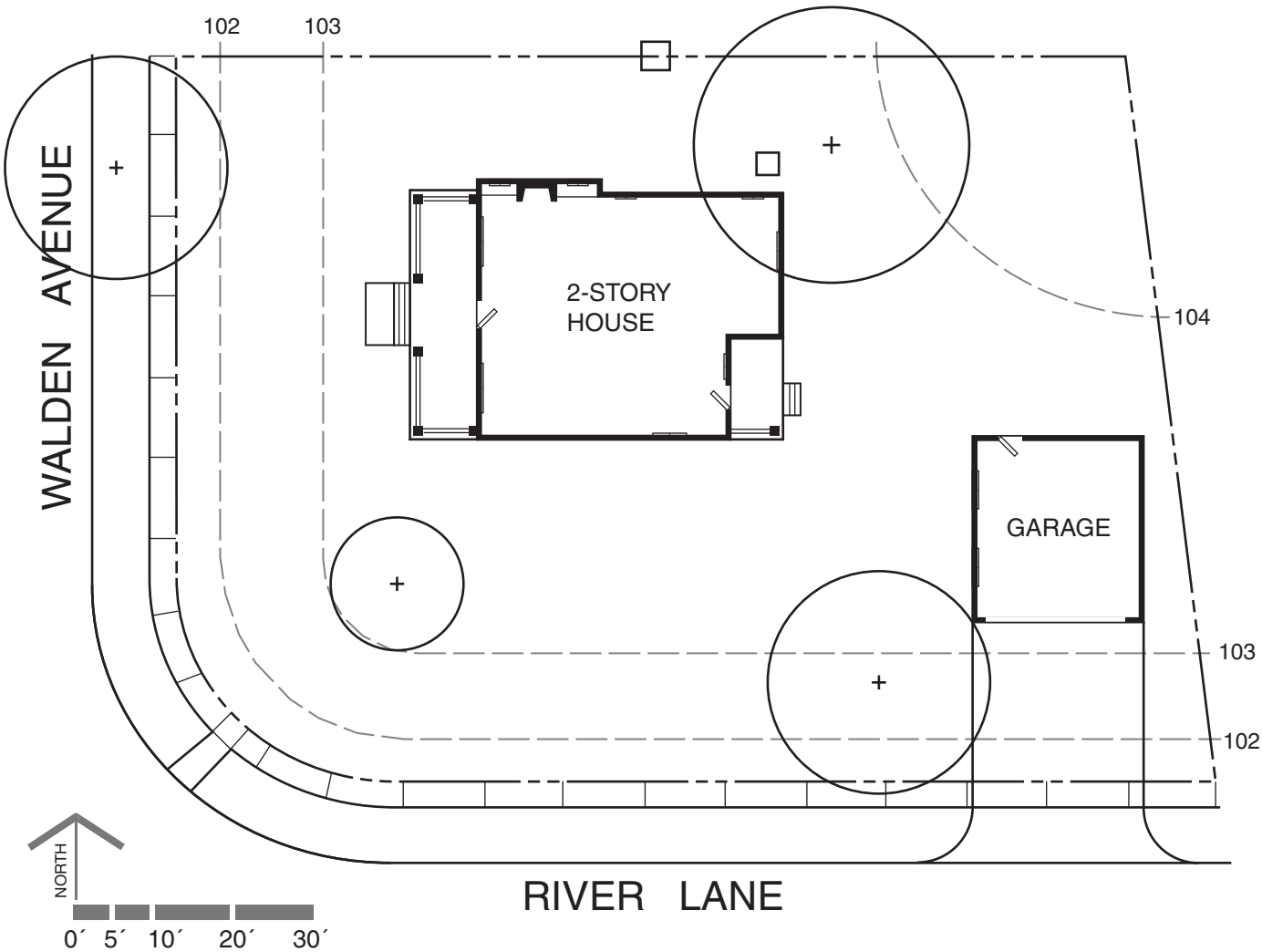


Figure 6–13
Typical base sheet (existing conditions that are to remain).

Base Sheet

A *base sheet* is a plan drawing that shows only those existing site elements that are to remain and be incorporated into the proposed design (Figure 6–13). This is a more simplified plan drawing in comparison to the base map. Site elements that will be altered or removed are not shown on a base sheet in order to give the designer a "blank slate" for maximum flexibility and creativity.

GATHERING EXISTING SITE DATA

Accurate information is needed about the location of all existing site elements and legal restrictions like easements in order to prepare the base map and base sheet. This information can be obtained from the following sources and then combined to produce the base map and base sheet:

- Legal documents
- Digital sources
- On-site measuring

Legal Documents

The owners of the site should provide the designer with copies of two essential documents: (1) the property deed and (2) the plot plan. The deed is a written, legal document that transfers the title of property ownership from one party to another. This typically includes a description of the site's size, dimensions, easements, and other legal restrictions. If the homeowner does not have a deed, the lending institution holding the mortgage on the house may have a copy in its files. Furthermore, a copy of the deed can sometimes be obtained from the city or county office that records property ownership and its transfer.

The deed is commonly supplemented by a plot plan or site survey (see previous discussion regarding the plot plan) and is considered a legal document when it has been stamped by a registered surveyor. Such a plot plan provides the most accurate dimensional information of all potential sources and is invaluable in making sure one is using correct information when preparing the base map and base sheet.

If no plot plan exists, needed site dimensions can sometimes be obtained from the city or county engineer's office that has a copy of the entire subdivision or plat showing each individual lot within the subdivision. A record of a plot plan may also exist in the architect's or building contractor's office.

If none of these potential sources has a plot plan or other scaled information of the site, then the designer and clients need to carefully consider whether or not a survey is needed. Sometimes, the site and design proposal are simple enough not to warrant a survey. An experienced designer can often get the necessary site dimensions from both digital sources and on-site measuring (see later discussion). But if there is any doubt about where the property lines and corners are or if the site is difficult to measure, then a survey is highly recommended. Property lines are legal boundaries of the site, and so their location should not be estimated.

It should also be kept in mind that visual clues such as fences and hedges that seem to identify the location of property lines are sometimes wrong. Fences and hedges are often put in place by one of the homeowners on their own property, but not necessarily on or immediately adjacent to the property line. Where two adjacent properties meet in a grassy yard, lawn mowers may create an identifiable line often misconstrued as a property line. Additionally, the centerline of the space between the sides of the two houses cannot be assumed to be the property line because of different setbacks. Likewise, edges of driveways should not be assumed to be property lines. A designer should always be careful not to misinterpret what may seem to be an obvious property line. Exact location of property lines is essential.

Digital Sources

There are a number of sources that should be investigated to obtain digital information on a site that can be used for creating the base map and base sheet. Some local governmental offices, such as the auditor's office, tax agency, zoning office, and planning department, have property records including maps in a digital format. Much of this data can be easily accessed online and sometimes can be purchased on a CD and then downloaded directly onto an office computer. Similarly, most surveyors retain their property surveys in a digital format that can be purchased as a CAD file or hardcopy.

A common form of the digital information available online from the various government sources is a Geographic Information System (GIS) database that can be viewed at any scale from the region to the individual property (Figure 6–14). The most detailed scale typically shows the configuration and length of property lines along with the location of the house and other structures on the site (Figure 6–15).

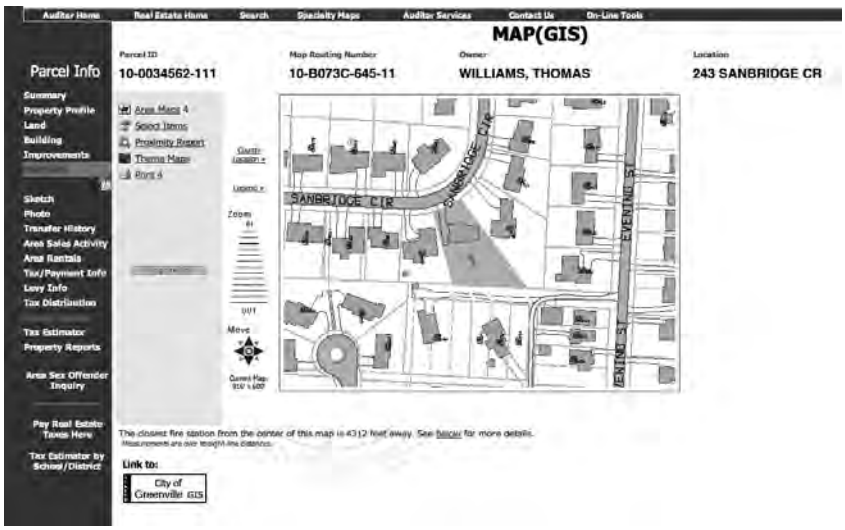


Figure 6–14
Example of a GIS Web site.

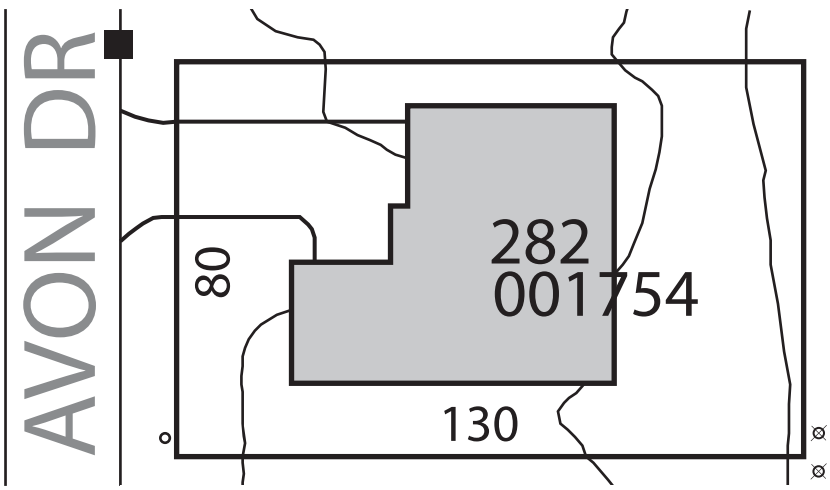


Figure 6–15
Example of GIS site information.

Some GIS systems allow the viewer to add or subtract various site features such as contour lines, flood plains, and utilities as well as view the site as an aerial photo.

If the digital information is obtained as a CAD file or GIS database on a CD, then it can be easily printed at a desired scale. If the information is obtained online, it will likely have to be printed at the size of the screen image and then enlarged via a copy machine to a common graphic scale such as 1″ = 10′. This typically requires some trial and error to make sure the written dimensions of the property lines match the scaled distances of the enlargement. Although this technique lacks the precision of a survey, it is nevertheless a viable substitute if no survey exists. The graphic plan that results from this process is good for recording dimensions taken during on-site measuring and as a drawing for noting observations of the site inventory.

On-Site Measuring

Taking and recording measurements directly on the site is the last and most detailed source of dimensional information. The amount and detail of on-site measuring that is required depends on what previous site data has been obtained. If a site survey and/or digital information are available, then on-site measuring serves the purpose of supplementing and adding to the information already obtained. In this situation, on-site measurements might be necessary to locate the doors and windows of the house, paved areas, fences/walls, utilities, plant materials, and so on.

If no site survey exists and/or digital information is unavailable, then on-site measuring is required to locate everything on a site including the property lines, house location, other structures, and relevant site elements. This can be a time-consuming undertaking that requires a high degree of accuracy and organization, as discussed in the following sections.

ON-SITE MEASUREMENT SYSTEMS

Regardless of the need or amount of on-site measuring required, it is a task that is best accomplished by the designer and an assistant using a metal or cloth tape measure, preferably 100 feet long. Two people can more accurately locate both ends of the tape measure and pull it taut to ensure correct measurements. When only one person can do the measuring, a long-necked screwdriver, stake, or similar item can be used to secure one end of the tape by inserting it through the hook at the end of the tape and pushing it into the ground (Figure 6–16). Although this is not always the case, it is usually best not to permit the homeowner to do the site measuring because of the lack of experience and appreciation for precise measurements. If the homeowner does the site measuring, the designer should double-check key measurements to verify their accuracy.

There are three techniques for measuring distances on a site: (1) direct measuring, (2) baseline measuring, and (3) triangulation. One needs to be acquainted with all these techniques because each serves a different purpose in locating existing site elements.

Direct Measuring Direct measurement is the most common method for taking measurements and is used between edges that are parallel to each other. The tape measure is simply stretched perpendicularly between the two edges, and the measurement is read. Figure 6–17 illustrates the use of direct measurement to locate (1) the edge of a sidewalk from the edge of a brick wall, (2) the edge of a concrete terrace from the face of the house, and (3) the edge of the sidewalk from the face of the house.

Baseline Measuring Baseline measuring is used to locate a series of points or elements that are on or very near a straight line or "baseline" such as a property line, fence, walk, or house wall. The tape measure is stretched along the line and measurements are taken where key points and edges are located. The top half of Figure 6–18 shows the tape measure stretched from the face of a house to the nearby property line. The fence is located 23 feet from the house and extends to a distance of 63 feet from the house. The tree is located at 79.5 feet from the house and the property line is 93.5 feet from the house.

It is recommended that the end of the tape measure be fixed in one location and that all the measurements along the baseline be taken in relation to this single beginning point. As can be seen, four separate measurements could have been taken in the

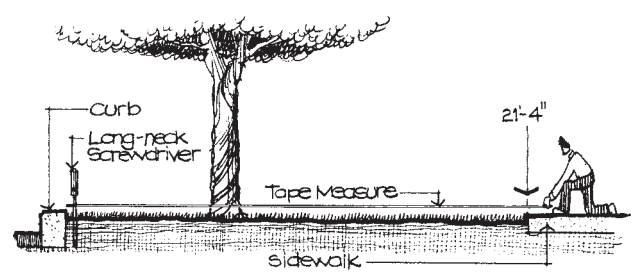


Figure 6–16
Use a screwdriver to secure one end of the tape measure.

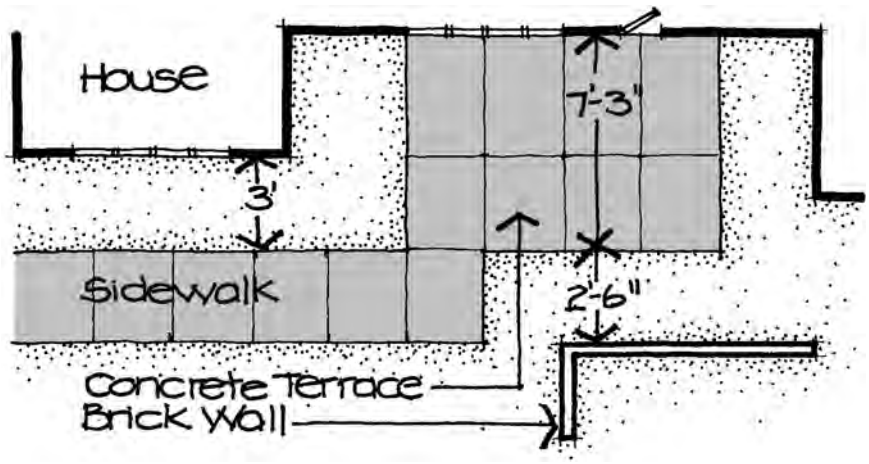


Figure 6–17
Direct measurement.

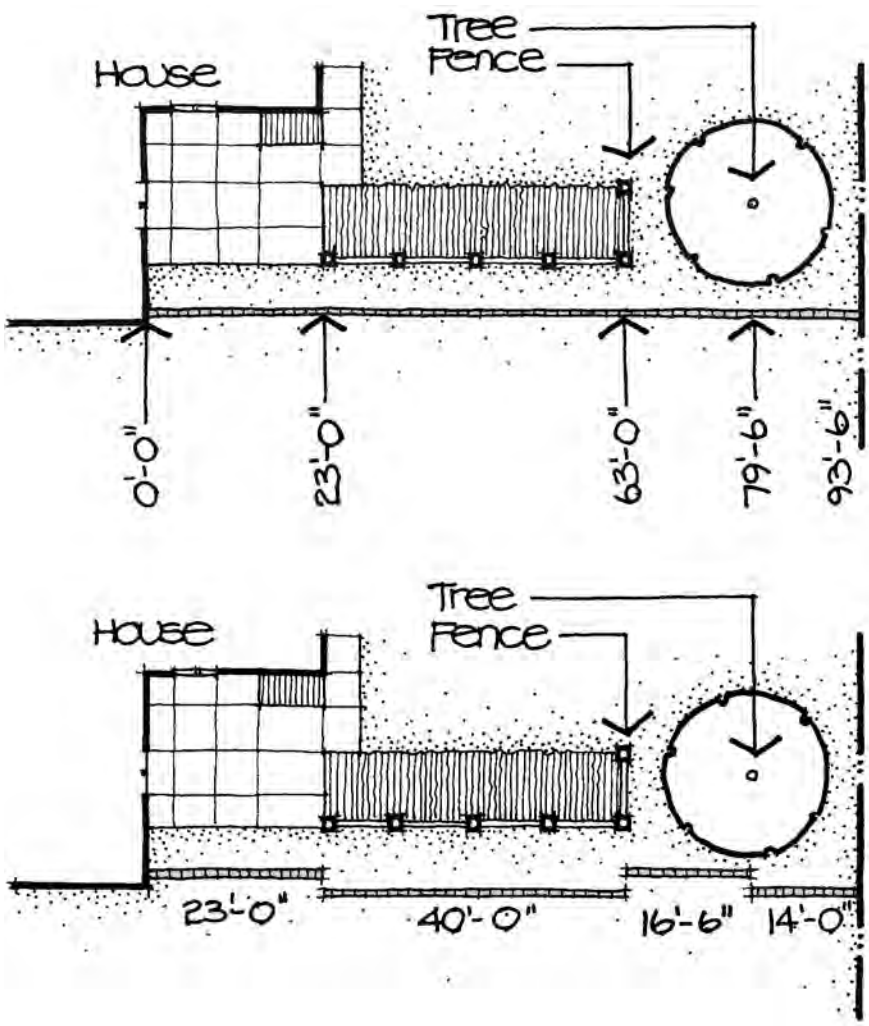


Figure 6–18
Baseline measurement.

preceding example (bottom of Figure 6–18). However, moving the tape measure consumes time and increases the possibility of misreading the tape measure.

The baseline method of measuring is strongly suggested when measuring the location of doors and windows of the house. Figure 6–19 illustrates the tape measure stretched along the side of the house. Each door and window jamb (side) is located a specific distance from one end of the house where the front end of the tape measure is

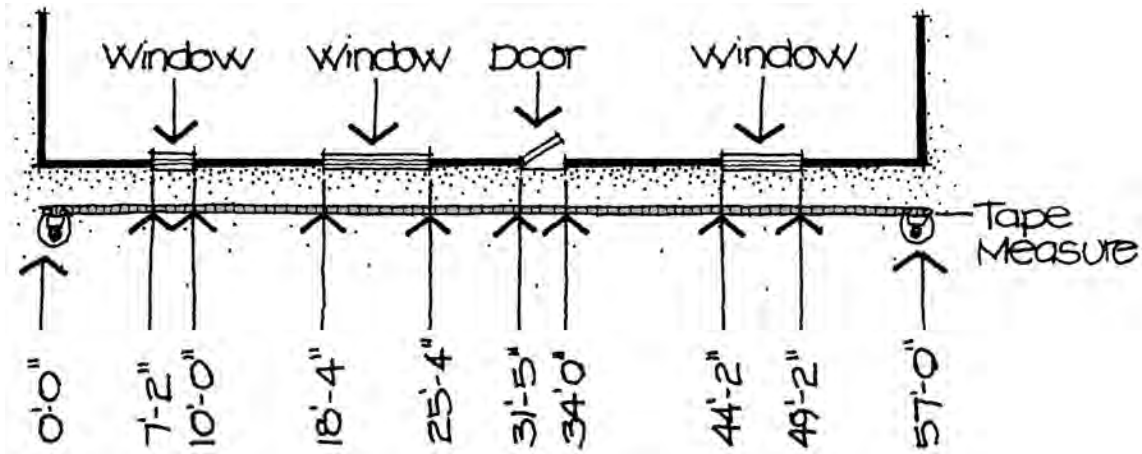
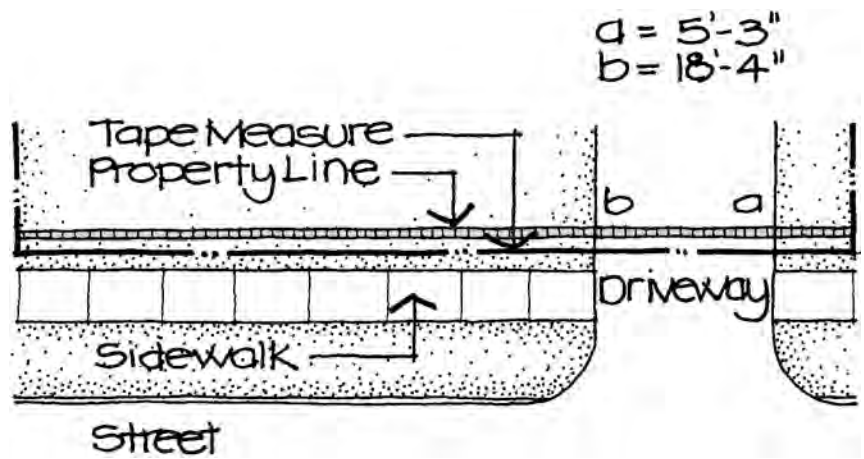


Figure 6–19
Baseline measurement should be used to locate doors and windows.

Figure 6–20
Example of locating the driveway at the property line.



placed. A separate baseline is used for each side or wall of the house. Another example of baseline measuring is to locate where the edges of the driveway cross the property line (Figure 6–20).

Triangulation The triangulation method of measuring is used to locate a point in relation to two other known points. For instance, assume there is a tree on a site that needs to be accurately located (Figure 6–21). To do so, two nearby corners of the house are used (Point A and Point E) as reference points. Simply measure and record the distance from each house corner to the center of the tree. Later when preparing the base map, each of the same corners of the house serves as the center of a circle with the radius being the distance measured to the tree. When the circles are drawn on the base map, they will intersect at the center point of the tree. This method of locating specific points is useful in locating other individual elements such as poles, lights, and utility boxes.

Triangulation is also a good method to use when lines or elements are not parallel to each other. Figure 6–22 shows a row of trees that are not parallel to the house. To locate these trees, both the southernmost tree and the northernmost tree are first independently measured using the triangulation method. Then the other five trees are found using the baseline method by stretching the tape measure from the southernmost tree to the northernmost tree.

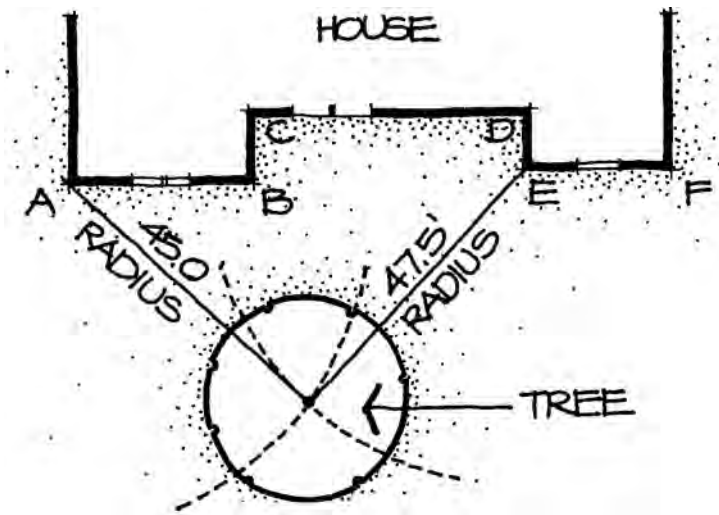


Figure 6–21
Triangulation measurement.

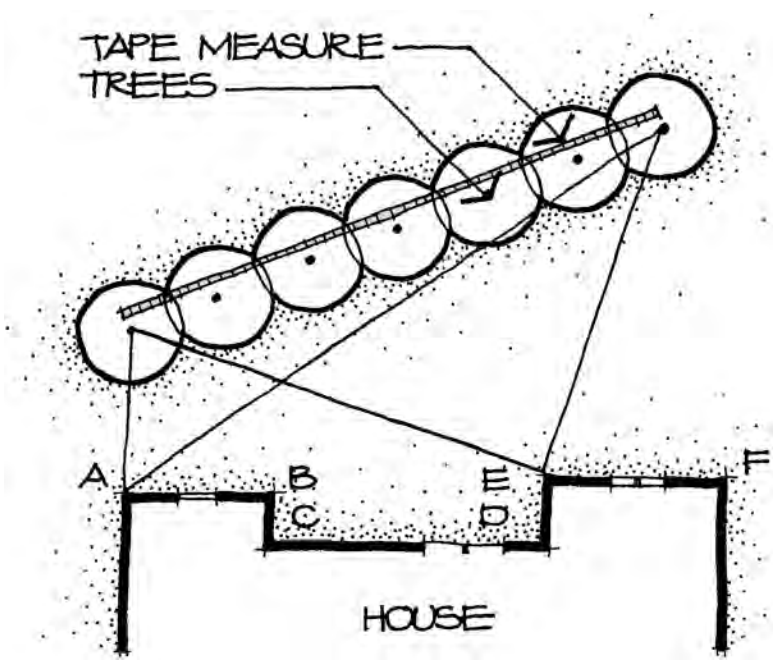


Figure 6–22
Triangulation and baseline measurements.

RECORDING SITE MEASUREMENTS

In addition to the process of taking measurements, one must also record the measurements in an organized and legible fashion. There are three reasons why site measurement notes should be orderly. First, the person who records the field measurements may not be the same one who draws the base map in the office. The individual in the office who is given the responsibility for preparing the base map and base sheet must easily understand the field measurement notes without additional explanation. The second reason is that the base map and base sheet may not be created until several days or even weeks after measuring the site. When the measurement notes are reviewed later, they still need to be easily understood. The third reason for clearly organizing field measurement notes is to eliminate the need to return to the site because a measurement either was totally forgotten or was recorded in an illegible manner. Ordered and legible notes save time and money.

To record measurements, it is suggested that graph paper, a copy of the site survey, and/or a printout from a digital source be attached to a sturdy clipboard.

Measurements should be recorded in pencil, because sometimes mistakes are made. The use of a pen or marker is not recommended.

Measuring the Lot

The first undertaking is to determine the shape and size of the lot if this has not already been established by a site survey or obtained from a digital source. The Duncan residence, first introduced at the end of Chapter 5, will be used to show how this should be done. First, sketch the general configuration of the lot on a piece of graph paper fastened to a clipboard. This does not have to be exact or to scale as long as the sketched shape corresponds to what is seen and has the correct number of property corners. Next, give each property corner a numerical notation, such as Roman numerals (Figure 6–23). Then, measure each of the property lines from corner to corner.

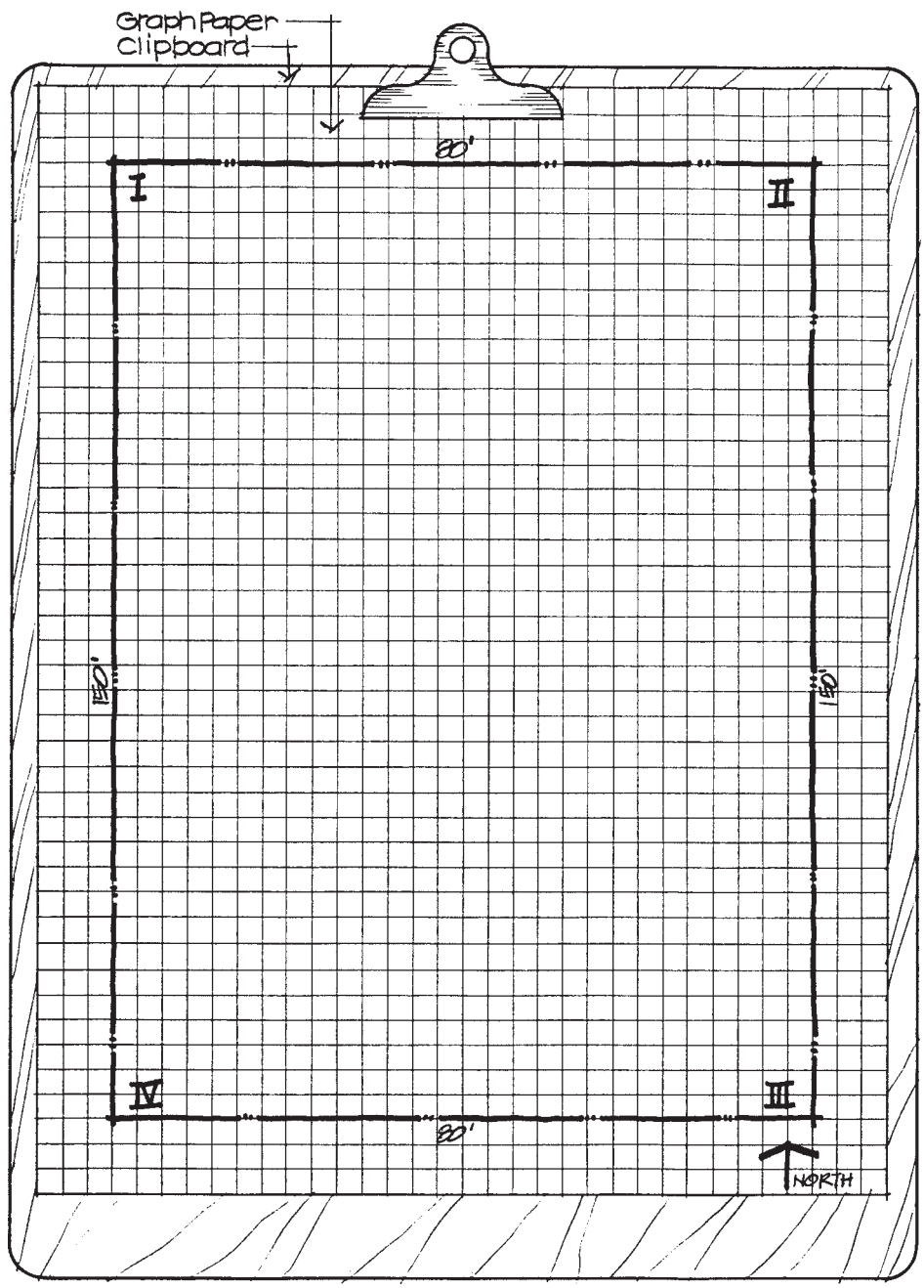


Figure 6–23
Use Roman numerals to note property corners.

As measurements are taken, record them on the sketch of the lot. The property for the Duncan residence is a rectangular shape measuring 80′-0″ × 150′-0″.

Locating the House on the Lot

The next job is to locate the house within the lot. The first step is to sketch the configuration of the house within the lot previously drawn on the graph paper. As can be seen from the photographs in Figures 5–12 and 5–13 from the previous chapter, the house configuration can be estimated easily. It is not necessary to draw in the doors and windows during this step; draw only the walls. Make sure that all house walls are shown in their correct direction. Next, label each principal corner of the house with a capital letter of the alphabet (Figure 6–24). The fireplace located on the east wall between corners D and E is not labeled because the fireplace corners are not major house corners.

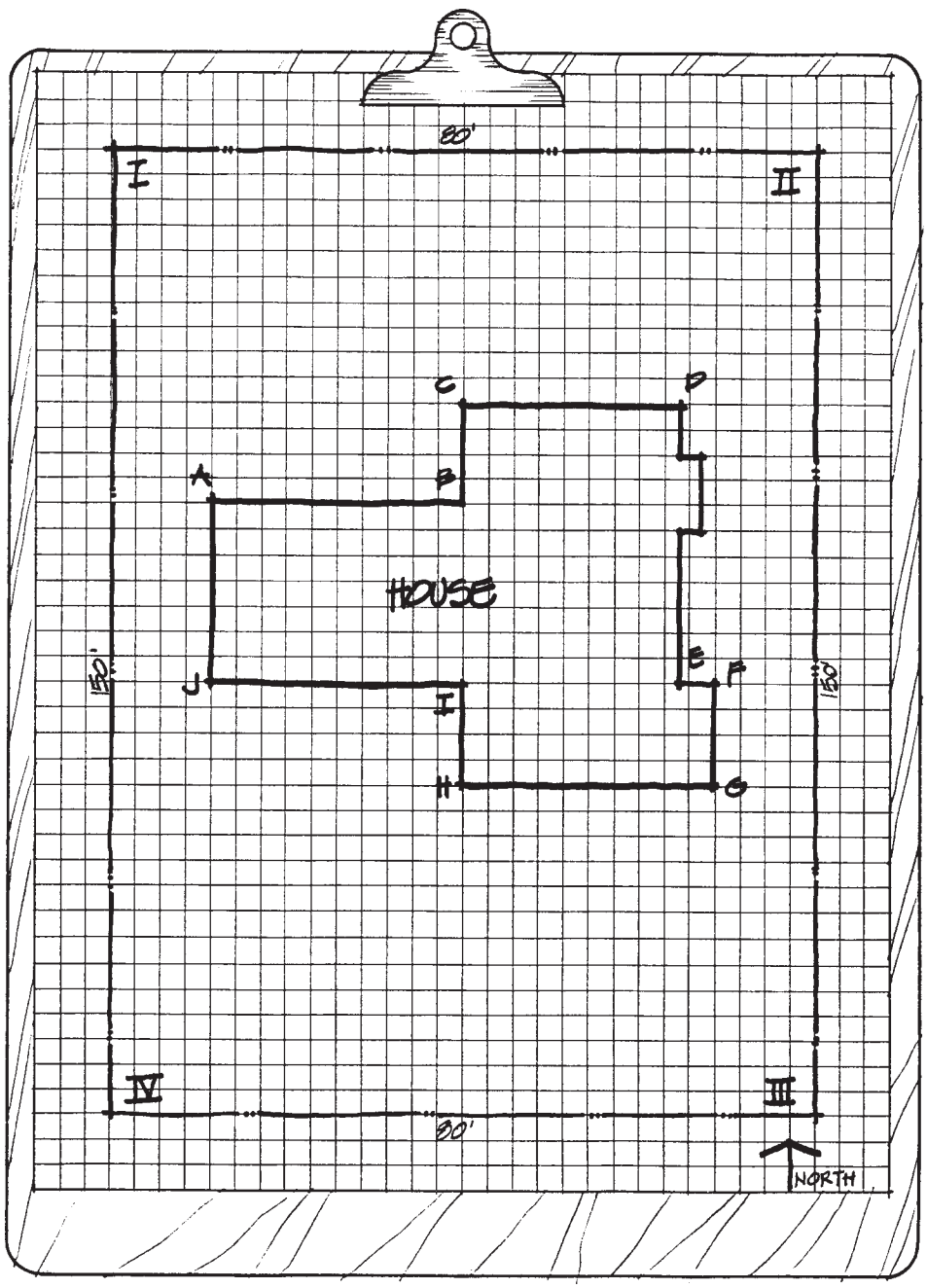


Figure 6–24
Use capital letters to note house corners.

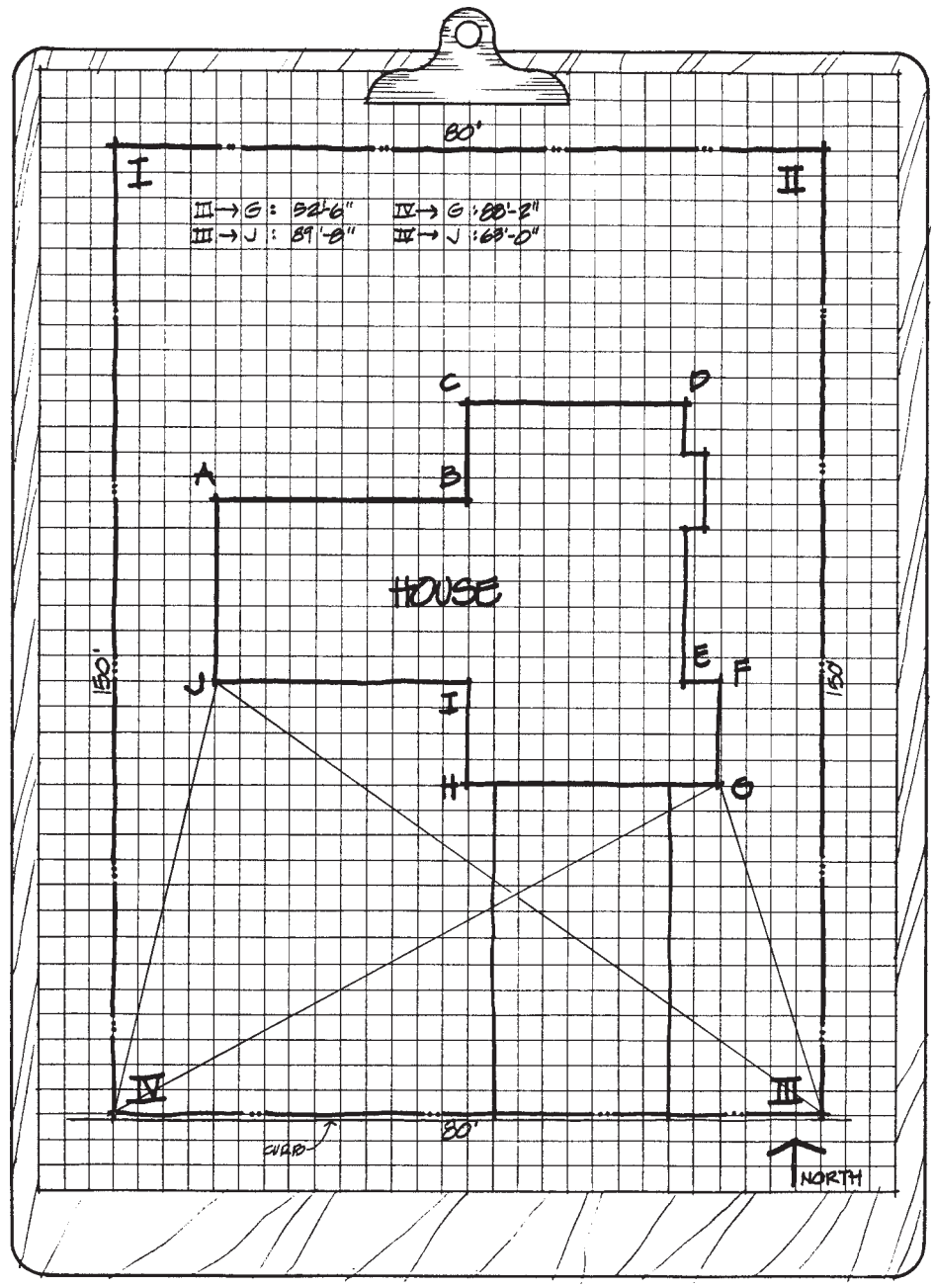


Figure 6–25
Triangulation measurement should be used to locate two house corners in relation to the property corners.

Once the house is sketched on the paper, triangulation is used to accurately locate the house in relation to the property corners. First, select two corners of the house that are easily accessed and have a direct, open line to two nearby lot corners. Next, take measurements from one of these house corners to two different lot corners. Repeat the process from a second corner of the house. For the Duncan residence, measurements were taken from Pt. G on the house to property corners Pt. III and Pt. IV and noted on the sketch (Figure 6–25). Likewise, measurements were taken from Pt. J on the house to property corners Pt. III and Pt. IV. These measurements located the two front corners of the house in relation to the front property line. With two house corners located, the entire house is accurately positioned on the lot.

In a similar fashion, the back side of the house can be located in relation to the back property line by measuring from house corners Pt. A and Pt. D to property corners Pt. I and Pt. II. Any two corners of the house can be used with any two nearby

and easily measured property corners. However, it is not necessary to measure from every corner of the house to every property corner.

Locating Walls, Doors, and Windows of the House

Now that the house has been located correctly in relation to the property corners, it is time to measure the walls of the house including the location of the doors and windows. On a second sheet of graph paper attached to the clipboard, again sketch the configuration of the house. This sketch of the house should be drawn larger than the previous sketch because there are many detail elements to be measured.

The following is a recommended process for establishing a relatively proportional sketch plan of the house.

Step 1. First, sketch the overall plan configuration of the house's outside walls by walking around the house and noting the number of corners and shape of the layout (Figure 6–26).

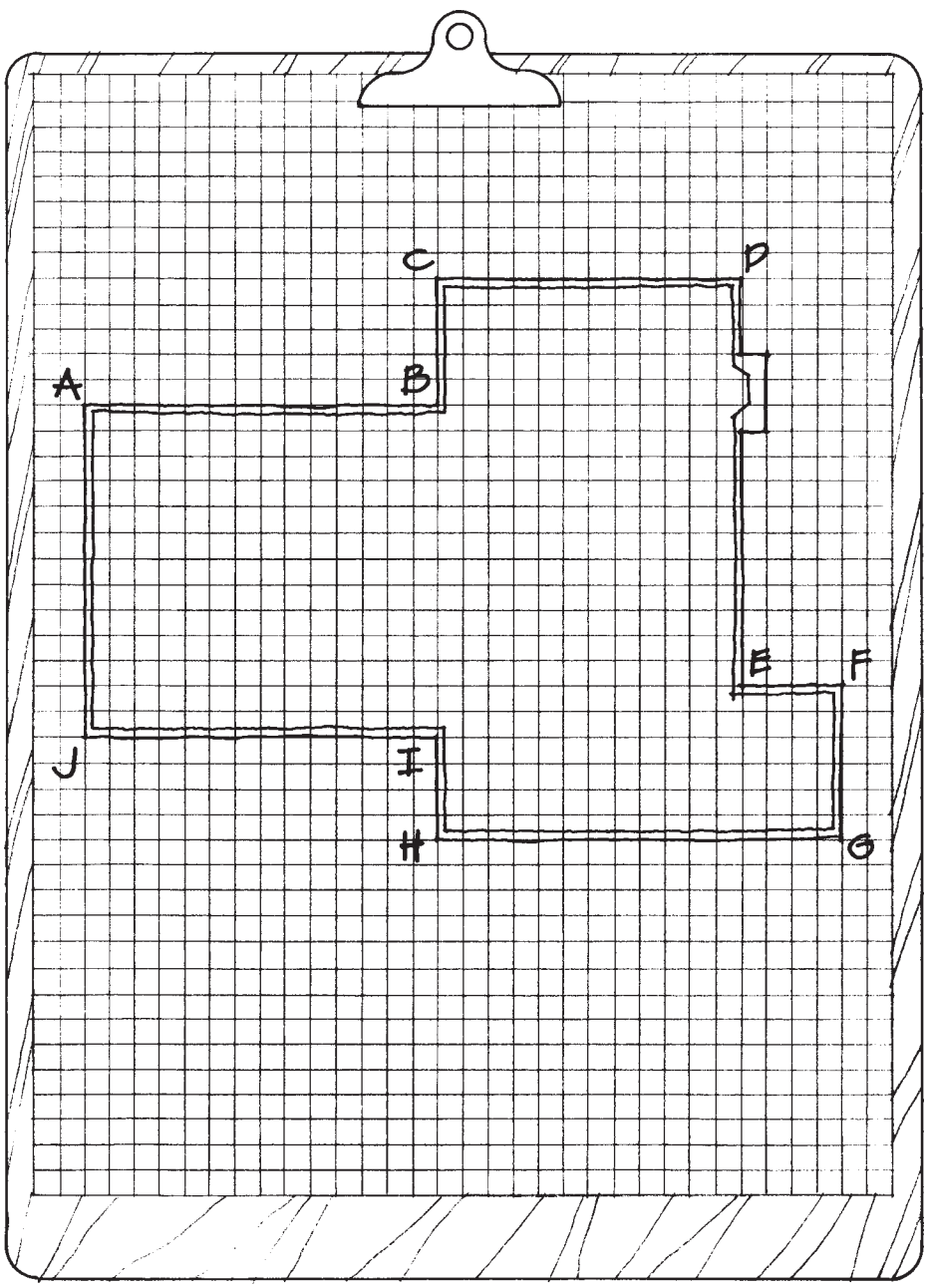


Figure 6–26
Estimation can be used to establish the general house plan configuration.

Step 2. Next, estimate the location of all the doors and windows of the house on the sketch plan drawn in Step 1. This can be done by erasing portions of the walls drawn in Step 1 and penciling in the doors and windows. It is helpful to identify doors with one notation and windows with another notation. Doors can be noted as D1, D2, and so on, whereas the windows can be identified as W1, W2, and so on (Figure 6–27). In later phases of the design process, it will be important to know where the most-used doors are, which way the doors swing, and where the major and minor views out of the house occur.

Step 3: It may also be necessary to measure the door and window jambs (sides) along house walls where detail construction such as a walk, deck, fence, and so on is anticipated. This information ensures more accurate alignment of these proposed elements with the house façade (face). Along these house walls, the two jambs (sides) for each door

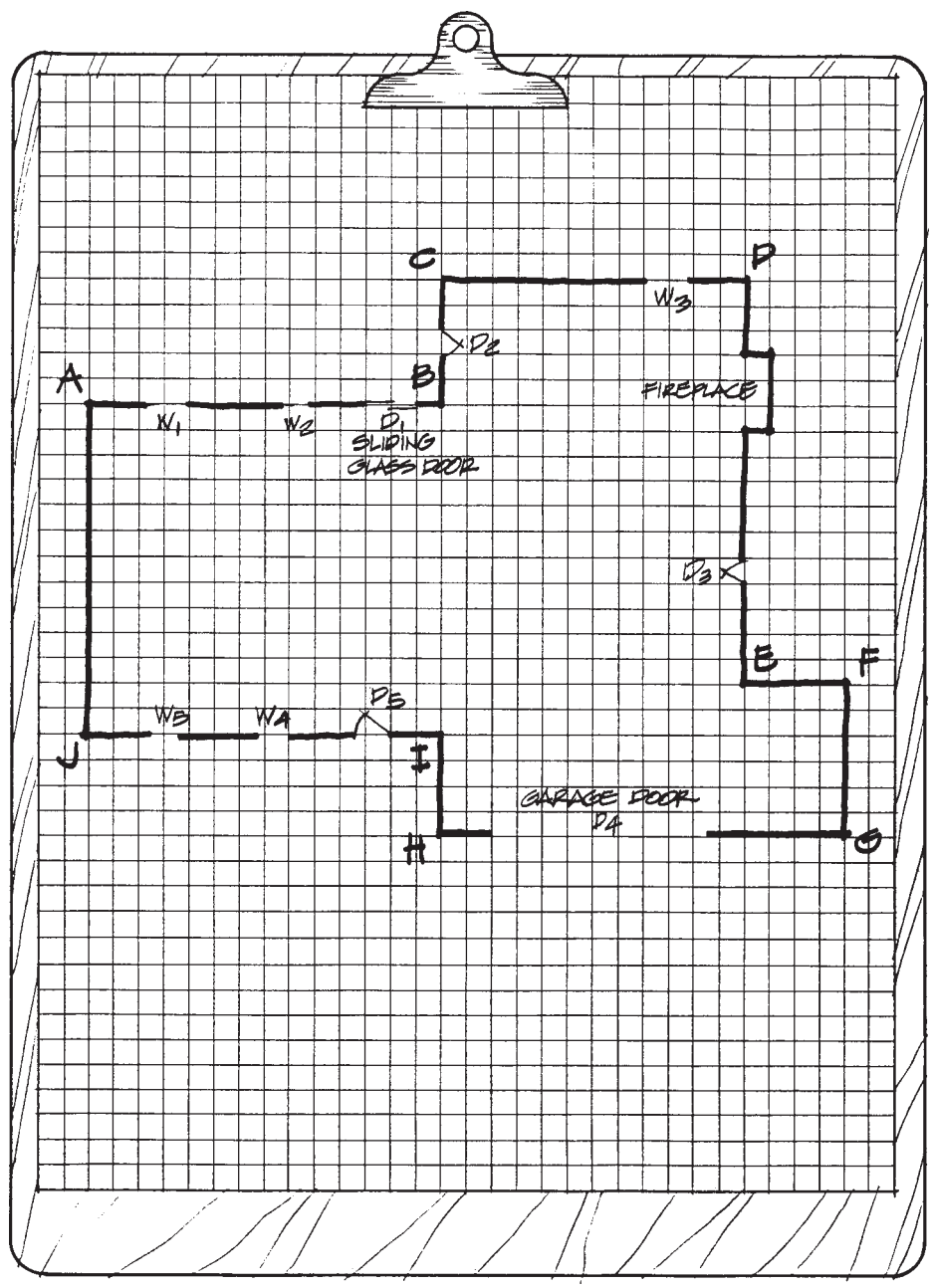


Figure 6–27
A method for noting doors and windows.

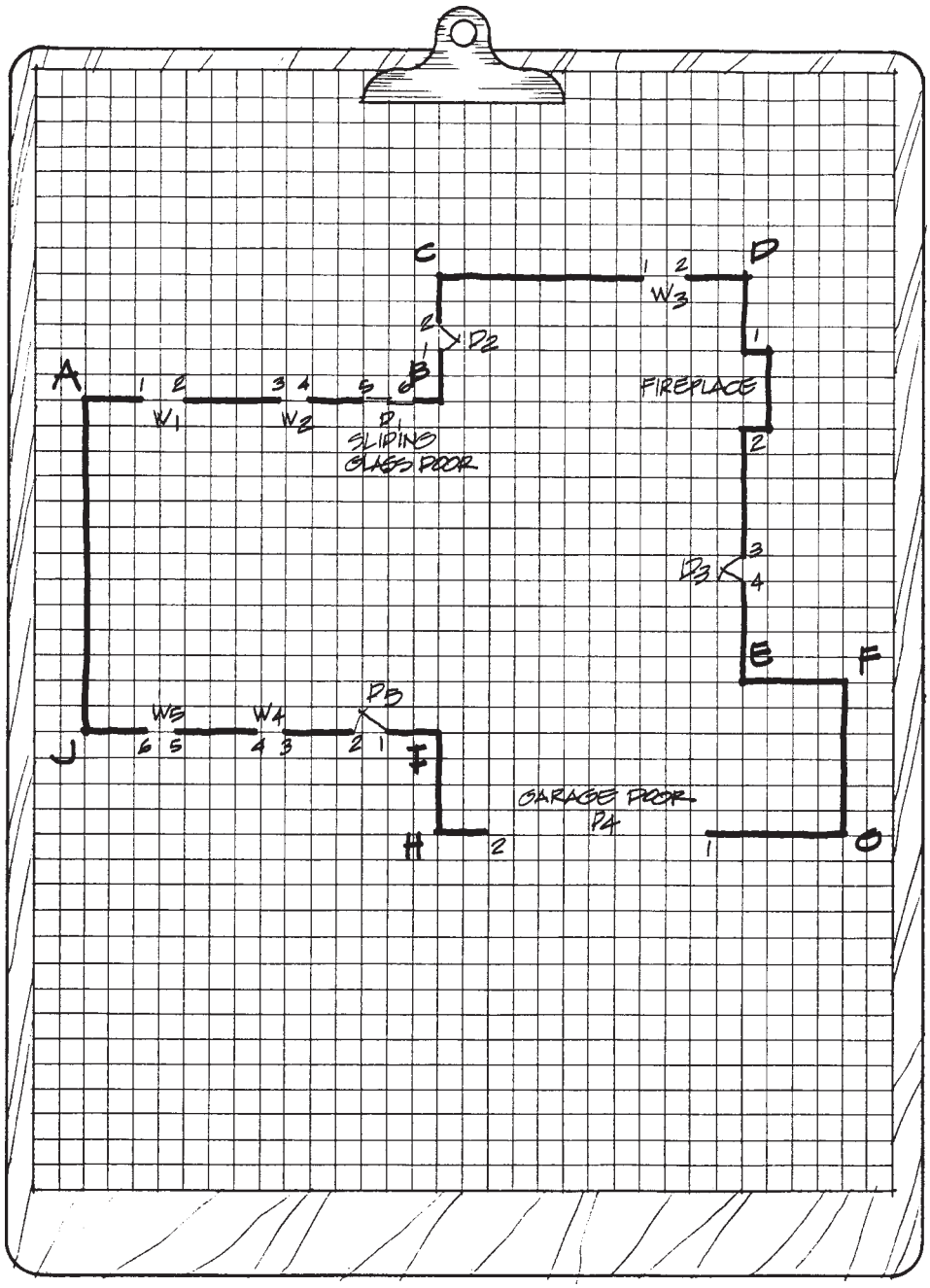


Figure 6–28
A method for noting the door and window jambs.

and window should be sketched in the plan. Each jamb should receive a specific notation for purposes of measuring. Starting with Pt. A and proceeding in the direction of Pt. B, number each of the jambs consecutively starting with 1 (Figure 6–28). Because there are three openings in wall AB, jambs are numbered 1 through 6. The same process can be repeated on other house walls as necessary.

After the house walls, doors, and windows have been sketched on paper, actual measurements can be taken along each side of the house. This is accomplished with the baseline measuring system by stretching the tape measure from one corner of the house to the next. For example, the tape measure is stretched along wall AB to determine the door and window locations in relation to Pt. A. Again, record all the measurements in a manner similar to that shown in Figure 6–29.

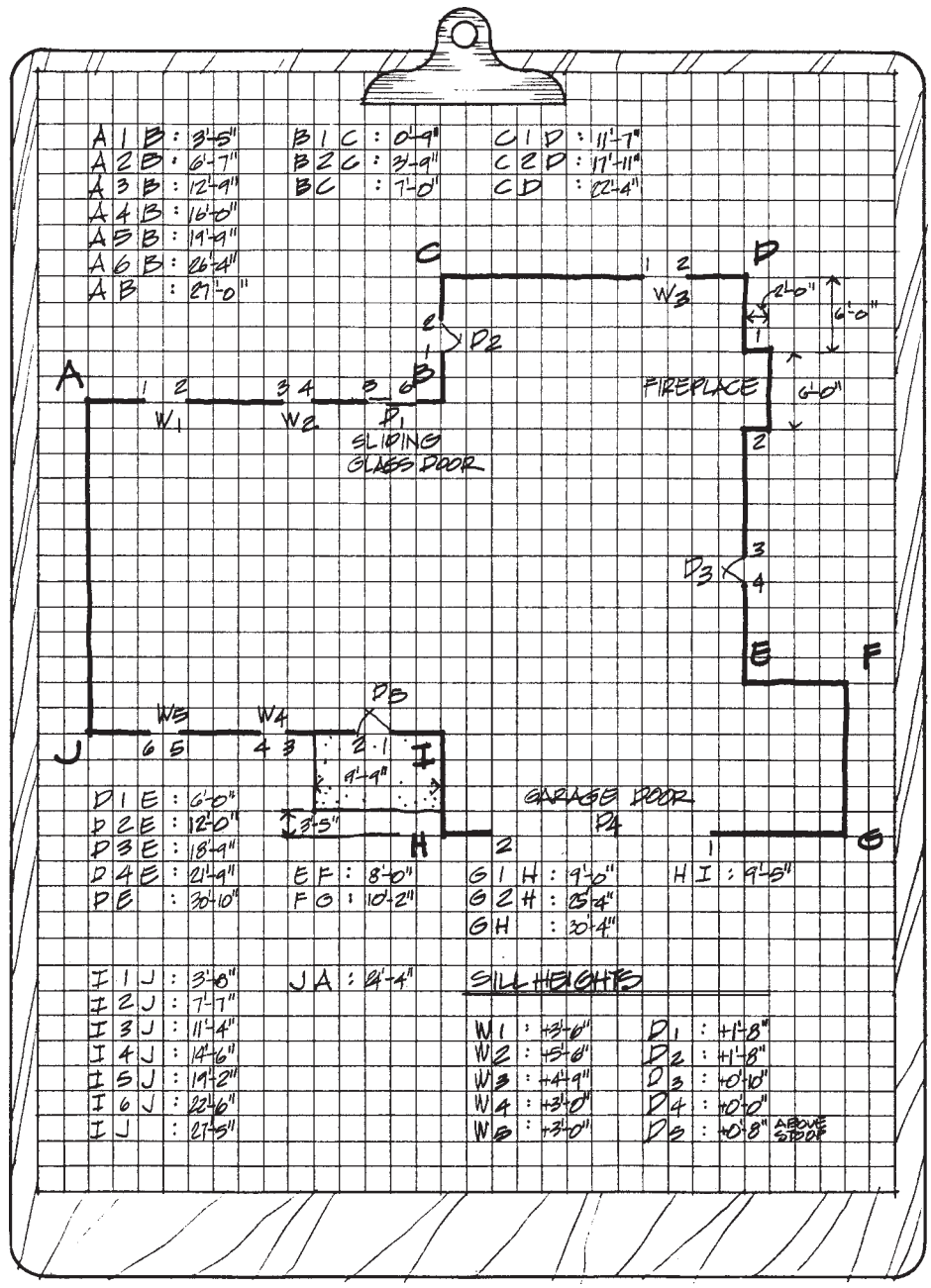


Figure 6–29
Door and window measurements for the Duncan residence.

After the horizontal measurements of all the doors and windows have been made and tabulated, it is recommended that the heights of first-floor window sills and door thresholds above the ground be determined. As an example, W1, whose sill measures 3′-6″ above the ground, is expressed as W1 + 3′-6″. All the window and door sill heights are also shown in Figure 6–29.

Locating Other Elements Along the House Wall

Other important elements found on or along the house walls, such as gas meters, electric meters, air conditioners, water spigots, downspouts, window wells (area ways), and fireplace cleanouts, should also be located.

The preceding elements can be sketched on the plan rather easily in relation to the doors and windows. When locating these elements on the sketch plan of the house, draw arrows pointing to their location on the house wall as shown for the

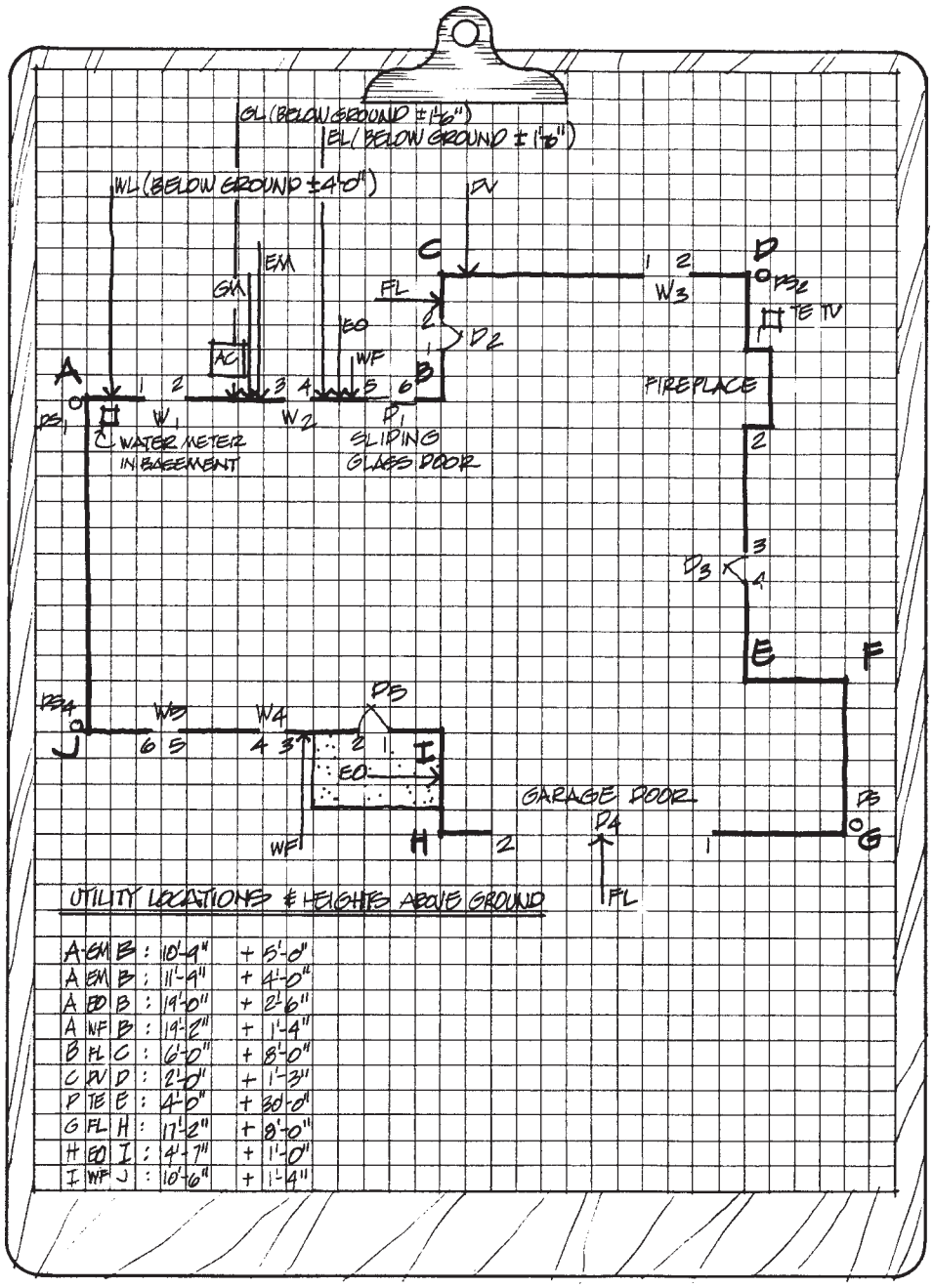


Figure 6–30
Utility measurements for the Duncan residence.

Duncan residence (Figure 6–30). This will help to separate their individual locations from other points or edges on the house wall. Each one of these elements should receive its own notation. The following list suggests abbreviations that can be used:

Gas meter	GM
Electric meter	EM
Water faucet	WF
Downspout	DS
Telephone box	TE
Electrical outlet	EO
Cable hookup	CA
Dryer vent	DV
Floodlight	FL

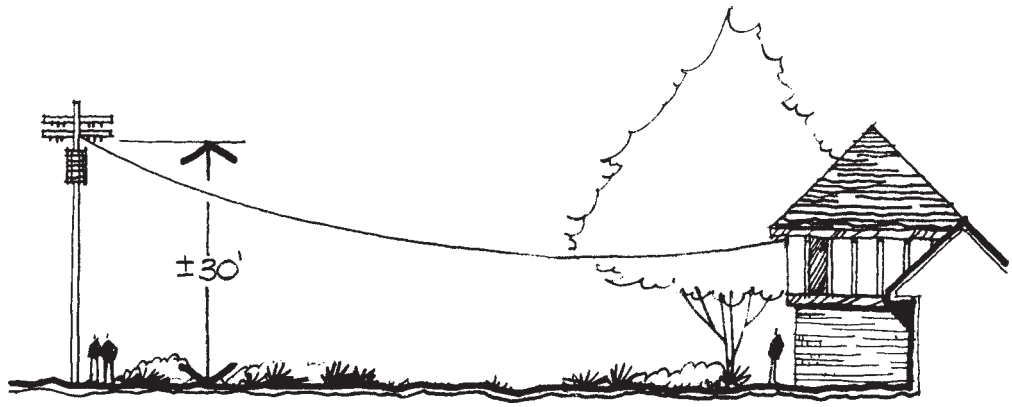


Figure 6–31
Estimate height of wire connection on telephone pole.

When measurements of these elements are taken, they can be recorded in a manner similar to the door and window jambs. For instance, the electric meter is located on the AB wall and is 11′-9″ from A. It is also positioned 4′-0″ above the ground. The heights above ground of other elements can also be recorded.

Locating Utility Lines

It is absolutely essential to accurately locate utility lines for safety during construction, future maintenance of the utilities, and layout of the proposed design. Some utility lines are above ground and are fairly easily to locate. Other utility lines are underground and potentially more problematic even though they cannot be seen.

Above-Ground Utilities There are five suggested measurements for locating aboveground utilities like electricity, telephone, and cable. First, locate utility poles on or near the site by determining their position in relation to the property corners or by triangulation from two nearby corners of the house.

Second, estimate the height of the wires on the utility pole. This can be done by having an assistant stand at the base of the pole and then estimating the pole's height in relation to this person (Figure 6–31).

Third, establish the point where the wires attach to the house by using the baseline method of measuring (Figure 6–32).

Fourth, estimate the height of the wires where they attach to the house by using the same method for approximating the height of the wires on the utility pole (Figure 6–31). Another method is to measure an individual feature or element on the house wall, such as a brick or a piece of siding. Then count the number of bricks or pieces of siding there are between the ground and the point where the wires attach to the house.

Finally, it is necessary to locate the low point in the height of the wires above the ground between the utility pole and the house. The plan location of the low point can be determined by measuring along the wire or by triangulation. The height of the low point is found with the same method previously described for estimating heights (Figure 6–33). These dimensions are vital when studying the location of proposed trees and structures.

Underground Utilities Underground utilities almost always include gas, water, and sewer. In addition, underground utilities may comprise electric, telephone, and/or cable, especially in neighborhoods developed in the past 25 years. Because they cannot be seen, underground utilities are difficult to locate and are a safety hazard if they are cut or punctured. The first thing that should be done to locate underground utilities is to ask the homeowner to contact the local underground utility locating service that is usually listed in the telephone directory under a "call before you dig" number. This service typically uses ground-penetrating radar (GPR) to locate utilities and then marks them on the ground surface with small colored flags and/or painted lines. This survey should be done before on-site measuring so that measurements can be taken of the markings.

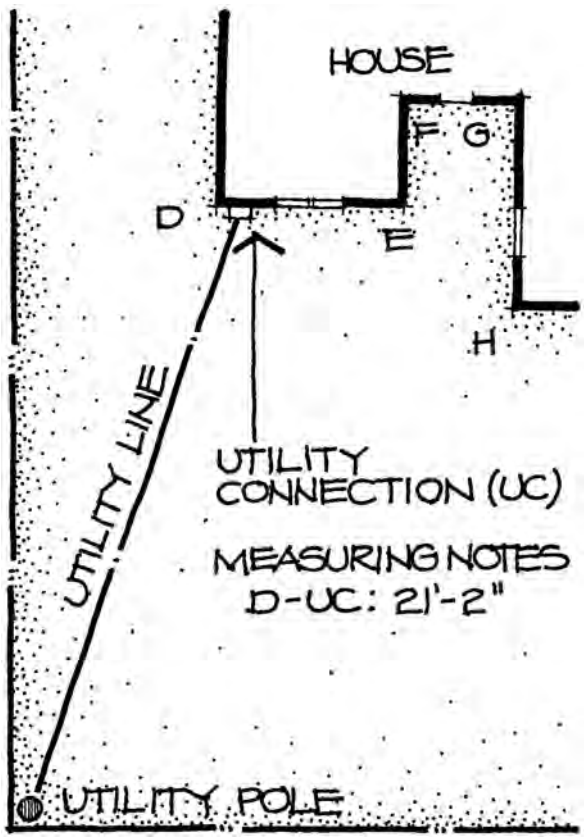


Figure 6–32
Record where wires attach to the house.

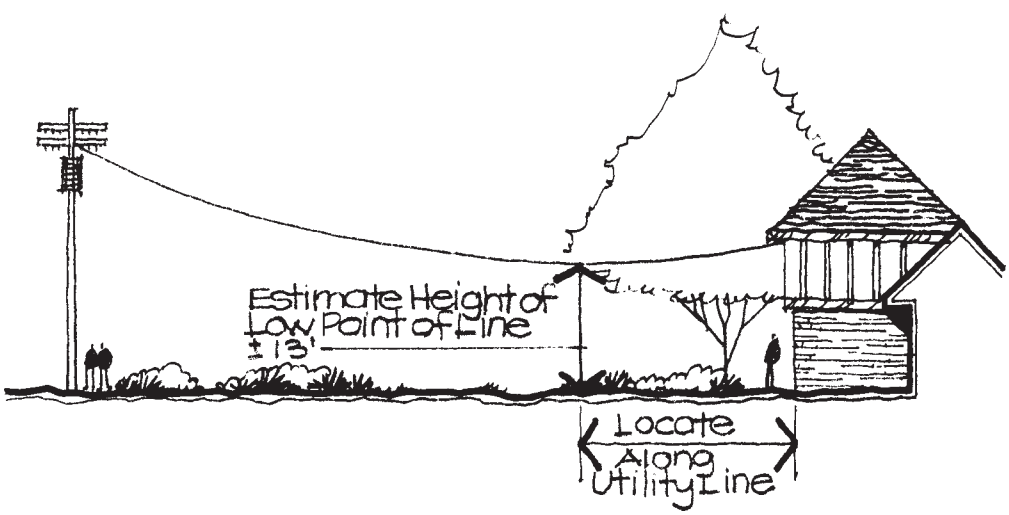


Figure 6–33
Locate the low point of the utility line.

The preceding method for locating underground utilities is the most reliable and should be followed whenever possible. However, when this process is not feasible or when it is necessary to augment the information it provides, then the following steps should be taken.

First, locate the source of underground utilities along the property line, in the right-of-way, or in adjoining yards. In the case of electric or telephone lines, there may be transformers, junction boxes, or other metal containers where these utilities originate. For gas and water lines, there should be shut-off valves located at or just below the ground's surface somewhere on the site or in the street right-of-way. They usually have a cast-iron cover that identifies their location. These features can be located with the triangulation method of measuring.

Second, note the length, width, and height of the electric and telephone transformers and junction boxes.

Third, locate where the utilities enter the house. With a house that has a basement, a close inspection of the basement wall usually reveals where this occurs. If a house doesn't have a basement, then carefully look in the crawl space or along the base of the first-floor wall to find where the utilities enter the house.

Finally, determine the depth at which the utility lines are located beneath the ground surface. This information may be difficult to find out, although contacting the various utility companies is a recommended place to start. The depths of the gas line, telephone wire, and cable are especially critical because they can easily be severed when digging into the ground.

Locating Trees and Other Plant Materials

It is suggested that each noteworthy tree, shrub, or mass of plants be located even if there is no final determination about whether or not they will be incorporated into the proposed design. As with other site elements, existing trees and plants should be sketched on paper and identified with a special notation. For instance, the principal trees that are to remain on the Duncan site are labeled T1 through T9 (Figure 6–38). A shrub or shrub mass can be noted as S1, S2, and so on.

Plantings near the house walls can be easily located with the baseline or direct measuring system, whereas shrubs located elsewhere on the site can be positioned with triangulation. Trees are the most time consuming to locate and require five separate measurements. First, locate the center of the tree by triangulation. Because the end of the tape measure cannot actually be placed at the very center of the tree, the tape should be held on the side of the tree trunk in line with the tree's center (Figure 6–34).

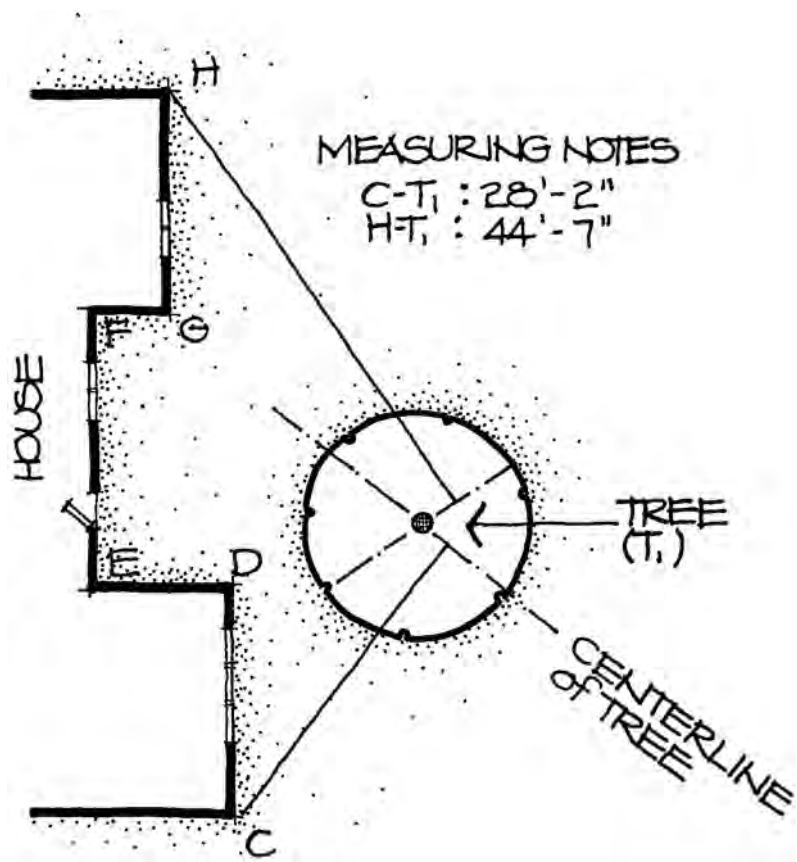


Figure 6–34
Example of locating a tree in relation to house corners.

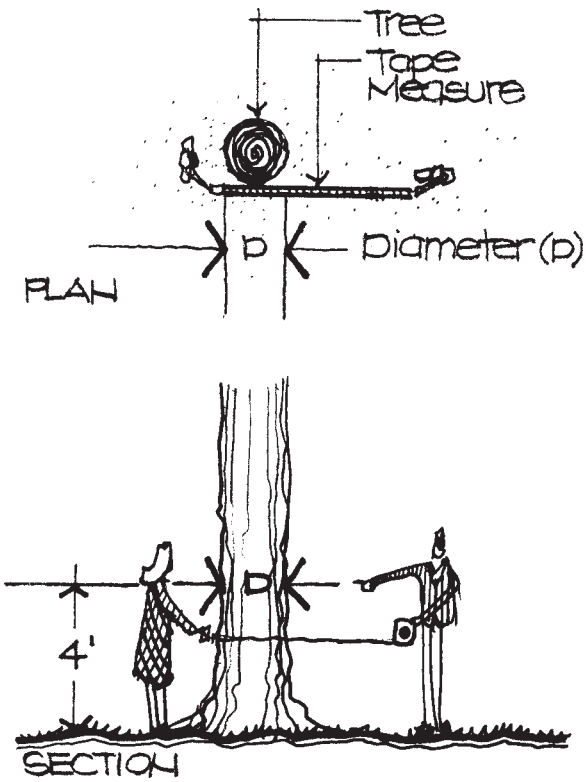


Figure 6–35
Measuring the diameter of a tree.

Second, measure the diameter of the tree trunk by holding the tape measure near the tree (Figure 6–35).

Third, calculate the distance between ground and the bottom of the tree canopy. This height can be estimated by relating it to the known height of another person (Figure 6–36).

Fourth, estimate the spread of the tree canopy by noting the drip line on the ground on opposite sides of the tree, and then measuring it with the tape measure (Figure 6–37).

Finally, estimate the total height of the tree by relating it to the known height of an assistant as suggested earlier for the height of the telephone pole.

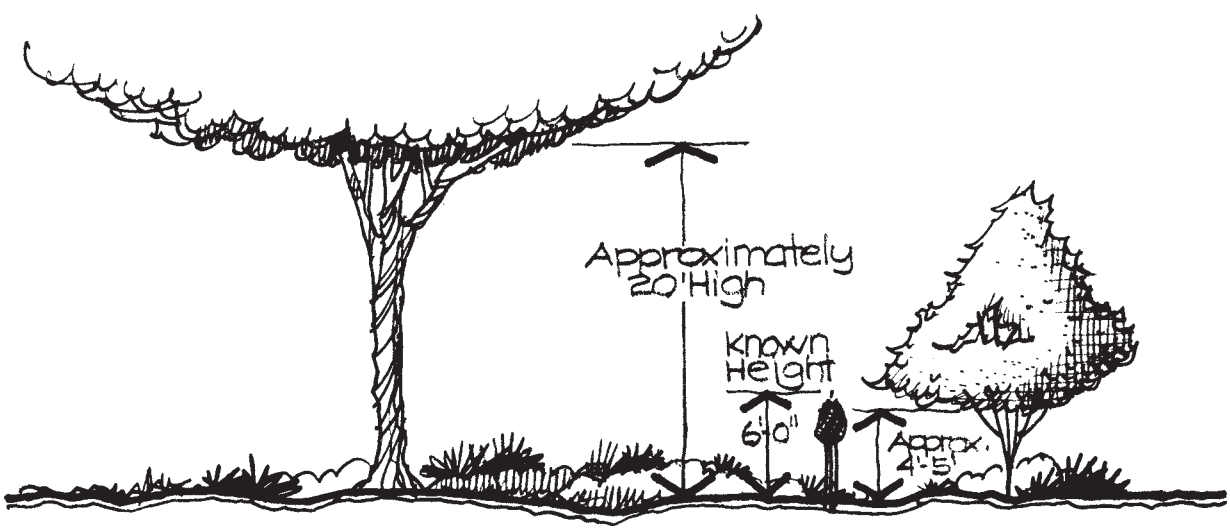


Figure 6–36
Use known height of a person as a reference in estimating canopy height.

Figure 6–37
Canopy spread is measured from drip line to drip line.

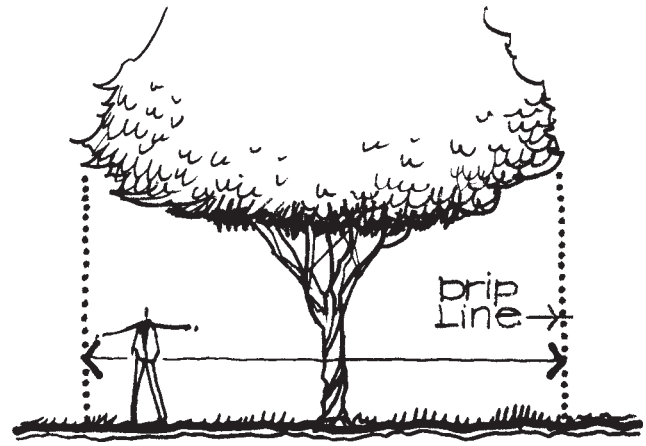
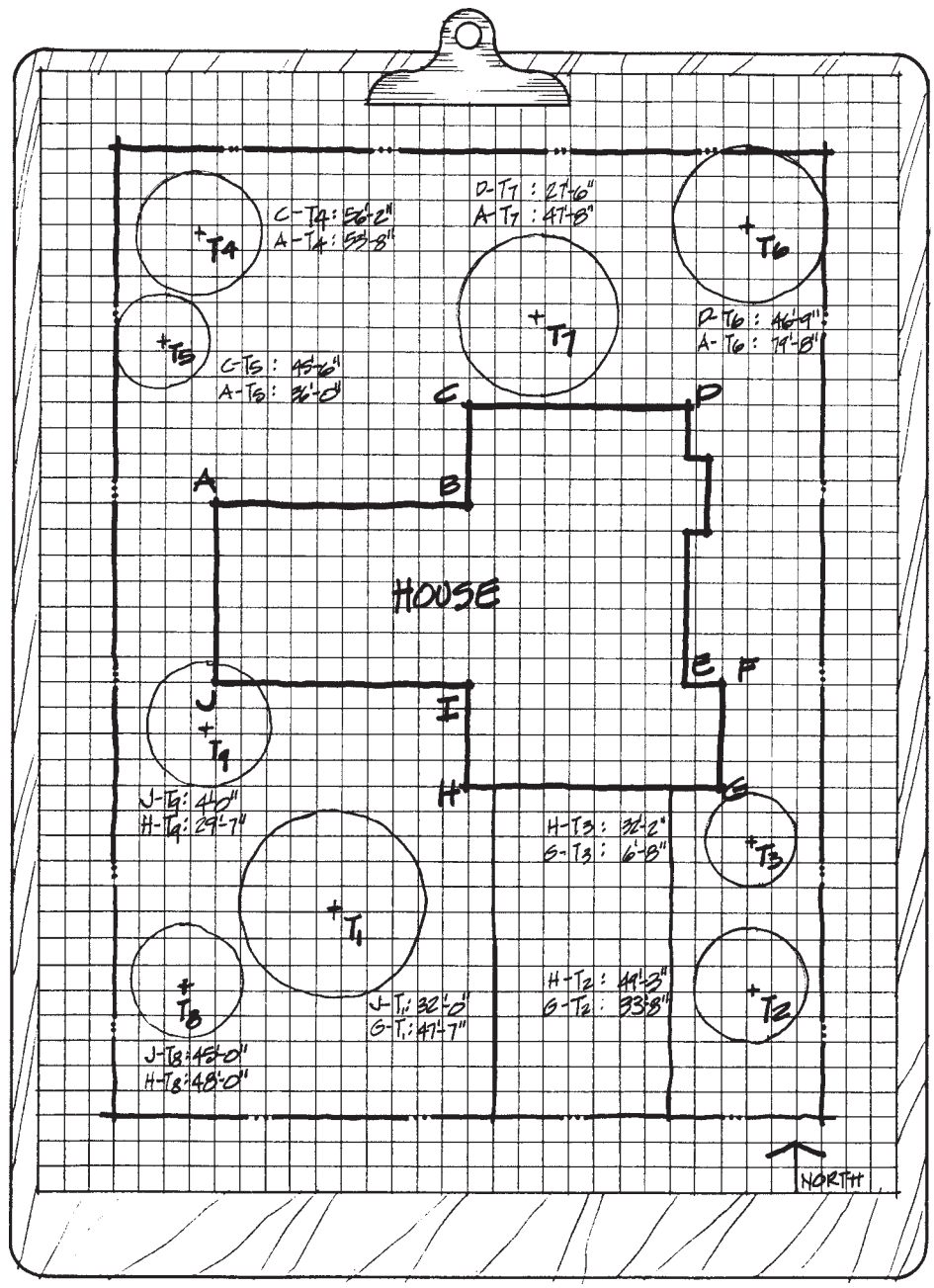


Figure 6–38
Tree location measurements for the Duncan residence.



Photographing the Site

It is highly recommended that the site be thoroughly photographed with a digital camera when visiting the site to take measurements. Photographs can also be taken during the process of site inventory if that occurs at another time. As previously suggested, it is sometimes more efficient to combine site measuring and site inventory in the same site visit to save time. Whenever photographs are taken, they can serve a number of purposes as discussed more thoroughly in the next chapter.

DRAWING PROCEDURES

Once the site measurements have been taken and recorded, the base sheet and base map can be drawn. Because these documents have a number of elements in common, it is useful to coordinate their preparation.

The base sheet should be generated first by drawing the property lines, house location, other structures such as detached garages, and all the existing site elements that are to remain unchanged and be incorporated into the design. This of course requires forethought and discussion with the clients about what the design program will include. If there is any question about what existing site elements are to stay or be removed, then few or no site elements should be drawn. The base sheet for the Duncan residence is shown in Figure 6–39.

The second step is to develop the base map by first duplicating the base sheet in one of several ways to serve as the beginning point of the base map. If the base sheet is created in a digital form on the computer, it is easy to copy the file and rename it as the base map. If the base sheet is drawn by hand, then it needs to be reproduced onto high-quality paper via a copy machine. The base map is completed by adding all other existing physical elements of the site onto the copy of the base sheet. The base map for the Duncan residence is shown in Figure 6–40.

Once the original base sheet and base map have been completed, they should be archived as a backup record. Digital files can be backed up to a CD or external hard drive, whereas hand-drawn documents should be put away in a safe, dry, flat file. Only copies of these original drawings should subsequently be used. Copies of the base sheet will serve as the beginning point in drawing the preliminary and master plans, and hard copies of the base map can be used for recording site inventory observations if this was not done previously while visiting the site to take measurements. The base map can also be used as the underlying layer for creating functional diagrams (Chapter 8) and preliminary design studies on tracing paper (Chapters 9 through 11).

Several decisions must be made while preparing these drawings. Selection of paper type and drawing medium, drawing scale, sheet size, and sheet layout are important factors to consider in drawing the base sheet and base map.

Paper Type and Drawing Medium

The base sheet and base map can be produced with a computer graphic program or drawn by hand. The decision as to which is best normally depends on the skill level of the design staff, available computer hardware and software, and budget. Hand-drawn base sheets and maps should be generated on vellum or Mylar. Vellum is a semitransparent paper used primarily when pencil is the chosen medium for drawing. Typical pencil grades are HB, H, and 2H. It is not recommended to draw with ink on vellum because it is difficult to erase. Vellum is generally cheaper than Mylar and slightly lighter in weight.

By comparison, Mylar or “drafting film” is a thin transparent plastic film used when either pencil or ink is the chosen medium for drawing. Extra care must be taken

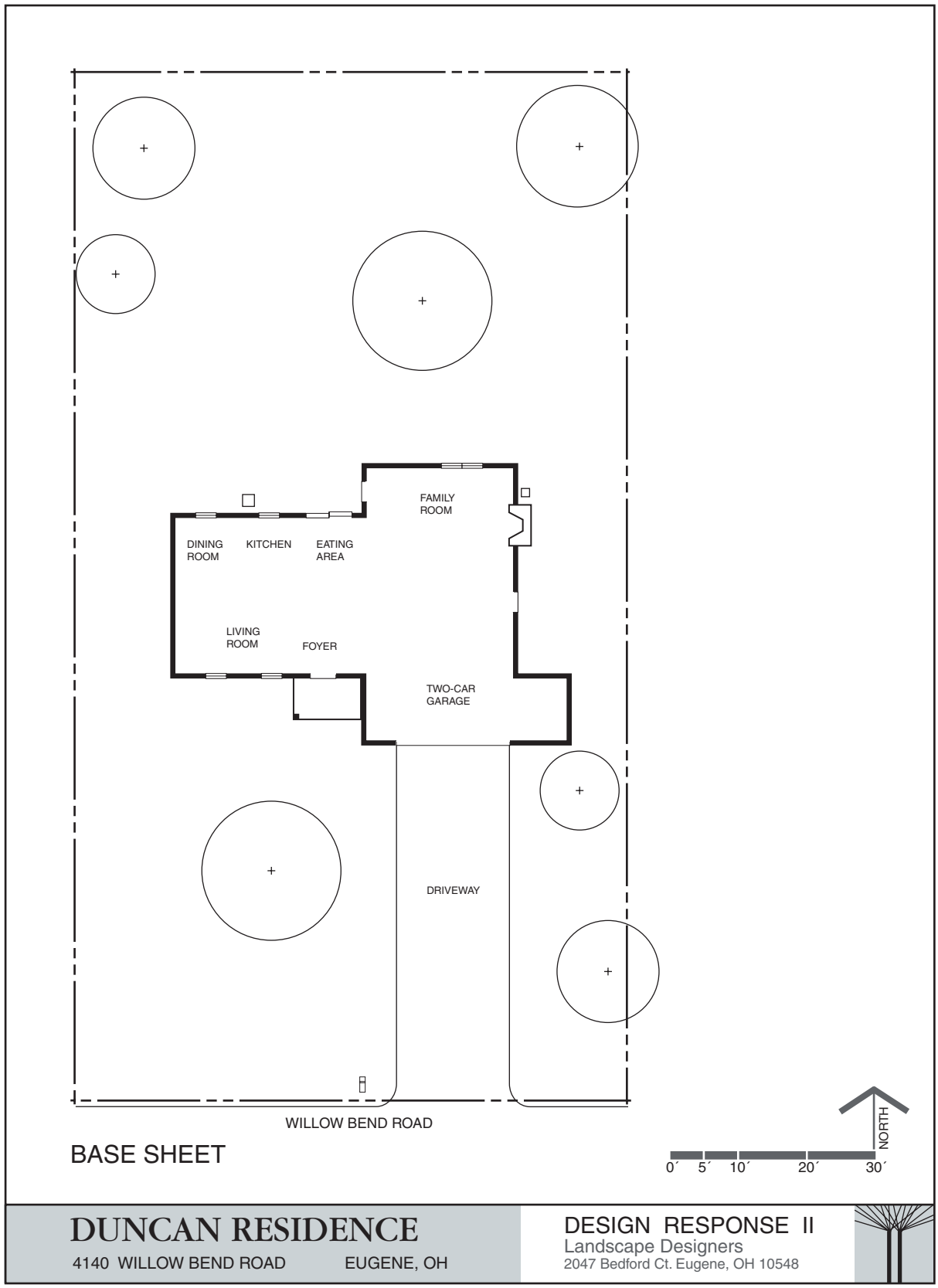


Figure 6–39
Base sheet for the Duncan residence.

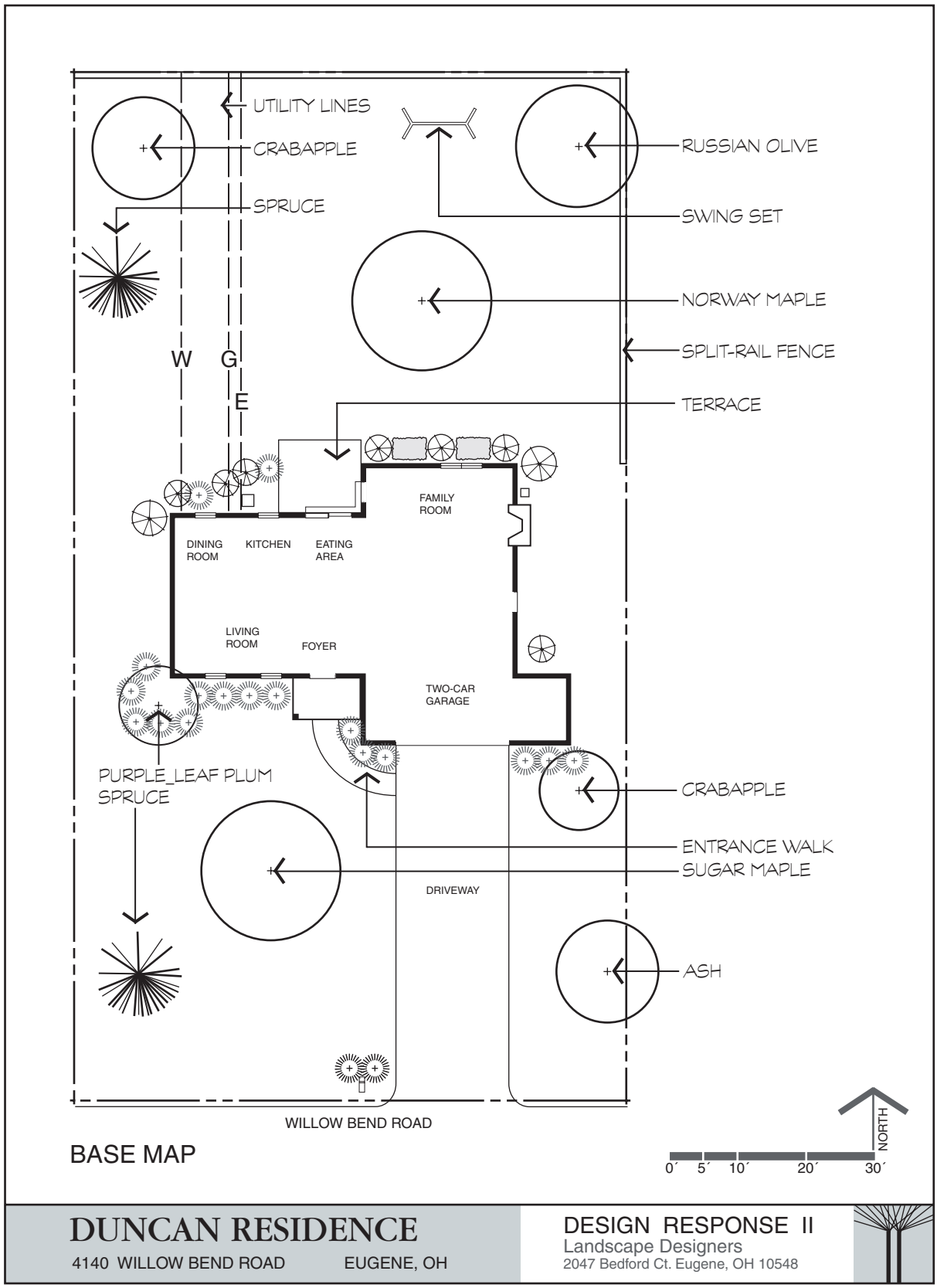


Figure 6–40
Base map for the Duncan residence.

when using pencil on Mylar because pencil tends to smear very easily on the plastic film. Pencil smears less on vellum than on Mylar because the lead of the pencil is embedded more in the texture (called *tooth*) of the vellum. Advantages of Mylar are that ink can be erased rather easily from it, and it is a little more durable than vellum because it is not as susceptible to tearing or wrinkling. However, the sturdiness of both vellum and Mylar enables numerous copies to be made from them. One caution: Refrain from using tracing paper to draw the base sheet or base map. Tracing paper is much too light and flimsy and, as a result, tears and rips easily.

Drawing Scale

Two scales are suggested for residential site design. If the designer typically works with engineering scales, then 1″ = 10′ is the recommended scale. This scale is also advantageous when measurements are obtained from surveyors because they almost always work in an engineer's scale. A 75′ × 150′ lot drawn at this scale would produce a plan measuring 7-1/2″ × 15″. On the other hand, if the designer normally deals with architectural scales, then 1/8″ = 1′-0″ is the recommended scale. The 1/8″ scale is also better to use if distances must be measured to less than 1 foot. And the 1/8″ scale is apt to be more easily understood by the homeowners because most people have a "ruler" on which they can read 1/8″. The same 75′ × 150′ lot drawn at this scale would produce a plan measuring 9-3/8″ × 18-3/4″. When areas of the design need to be enlarged to study in more detail, a scale of 1/4″ = 1′-0″ is suggested. Keep in mind that it takes considerably longer to draw a larger plan than a smaller one, and it costs more to reproduce it. Thus, there should be a balance between the amount of detail that needs to be shown in a design plan and the time it takes to draw it.

Graphic Style

The base map and base sheet are best drawn in a simplified graphic style for efficiency of time and to maximize flexibility in their use for subsequent drawings. Textures should be kept to a minimum and plant symbols should be simple circles or similar basic outlines. Notes on the base sheet should be few or completely eliminated for adaptability for subsequent design proposals that use it as a beginning point.

Sheet Size

The selection of sheet size for the base sheet and base map depends on a number of factors including size of the lot, the scale at which it is drawn, available sizes of vellum and Mylar, and standard copy paper sizes. All of these variables need to be coordinated so that there is as little waste of time and paper as possible.

Vellum and Mylar Sizes There are two general size standards for vellum and Mylar. One is based on a 6″ module with the 24″ × 36″ sheet size being the most routine. Other common sheet sizes are 18″ × 24″ and 30″ × 42″. Vellum may be obtained as individual sheets or on rolls that are 24″, 30″, or 36″ wide. The 24″ × 36″ sheet size is good for an entire residential site drawn at one of the preferred scales and usually allows for some additional white space for notes, legends, and so on (see Sheet layout). A 24″ × 36″ sheet must be printed on a large format copier or scanned and then printed on a plotter.

The other standard sheet size is based on common bond paper. The normal sheet sizes within this system include 8-1/2″ × 11″, 11″ × 17″, and 17″ × 22″ sheets. Vellum is available in these sizes as either single sheets or in pads. Mylar is similarly obtainable in 8-1/2″ × 11″ and 11″ × 17″ sheets. The 11″ × 17″ sheet size is suitable only when a portion of residential site is being designed at a typical scale like 1″ = 10′. This sheet size is also appropriate when the only means of reproducing a drawing is by means of a standard copy machine or inkjet printer.

Copy Machine/Plotter Paper The other consideration in selecting sheet size is the available sizes of copy and plotter paper. The ideal sheet size is one that requires no trimming of extra paper after a drawing has been reproduced. All standard copy machines use 8-1/2″ × 11″ or 11″ × 17″ bond paper. Wide-format copiers typically use 36″ wide paper that can be printed to any desired length. Similarly, plotter paper is available in 24″, 30″, 36″, and sometimes 42″ widths that can also be cut to any length.

Sheet Layout

Every base sheet and base map, regardless of the scale or sheet size, should have a well-organized layout. To accomplish this, consideration should be given to the placement of (1) title block or sheet title information, (2) plan, (3) north arrow, (4) scale, (5) notes and/or legends, and (6) sheet border. The following paragraphs provide guidelines for organizing these items on a sheet.

Title Information Each drawing that is produced for design and/or construction should have a title block with the following information:

A. Client/designer information
   1. Clients' names
   2. Clients' address
   3. Designer's or firm's name
   4. Designer's or firm's address
B. Drawing information. The drawing information can be located either inside or outside the title block because it relates more to the drawing itself than to the clients or the designer.
   1. Sheet title
   2. Written scale and graphic scale. A graphic scale is recommended because its represented distances remain the same even if the drawing is enlarged or reduced (Figure 6–41). A written scale, on the other hand, is only valid for the original drawing and becomes false if the drawing is reproduced at a different size.
   3. North arrow
   4. Date

The location and lettering size of this information are two important considerations when drawing the base sheet and base map (Figure 6–42). The most common placement is the bottom right corner of the sheet. A person turning the pages of a set of several drawings can read this location easily. Other good locations for the title block are along the bottom or on right side of the sheet. The title block should never be placed at the left side of the sheet because this becomes difficult to read when several sheets or more are stapled together.

There should be a hierarchy of lettering sizes used in the title block. The clients' names are the most important element and should be the largest and boldest letters of all. Letters about 1/2-inch high are typical for this. The designer's name is less important and should be in smaller print, approximately 1/4-inch high. The addresses and the drawing information, although important, should be identified with the smallest lettering (although not smaller than 1/8-inch high).

Plan The plan should be placed on the sheet so it can be easily viewed. Generally, the plan is best placed off center to allow for some "white space" or leftover area on one or more sides of the plan. This white space can be used as a location for notes, legends, or simply a blank background area (Figure 6–43).

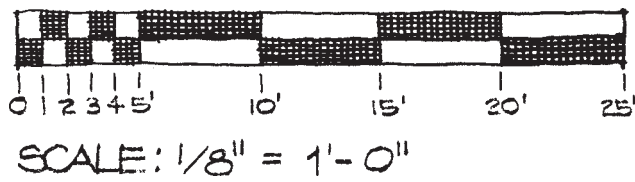


Figure 6–41
Sample of a graphic scale.

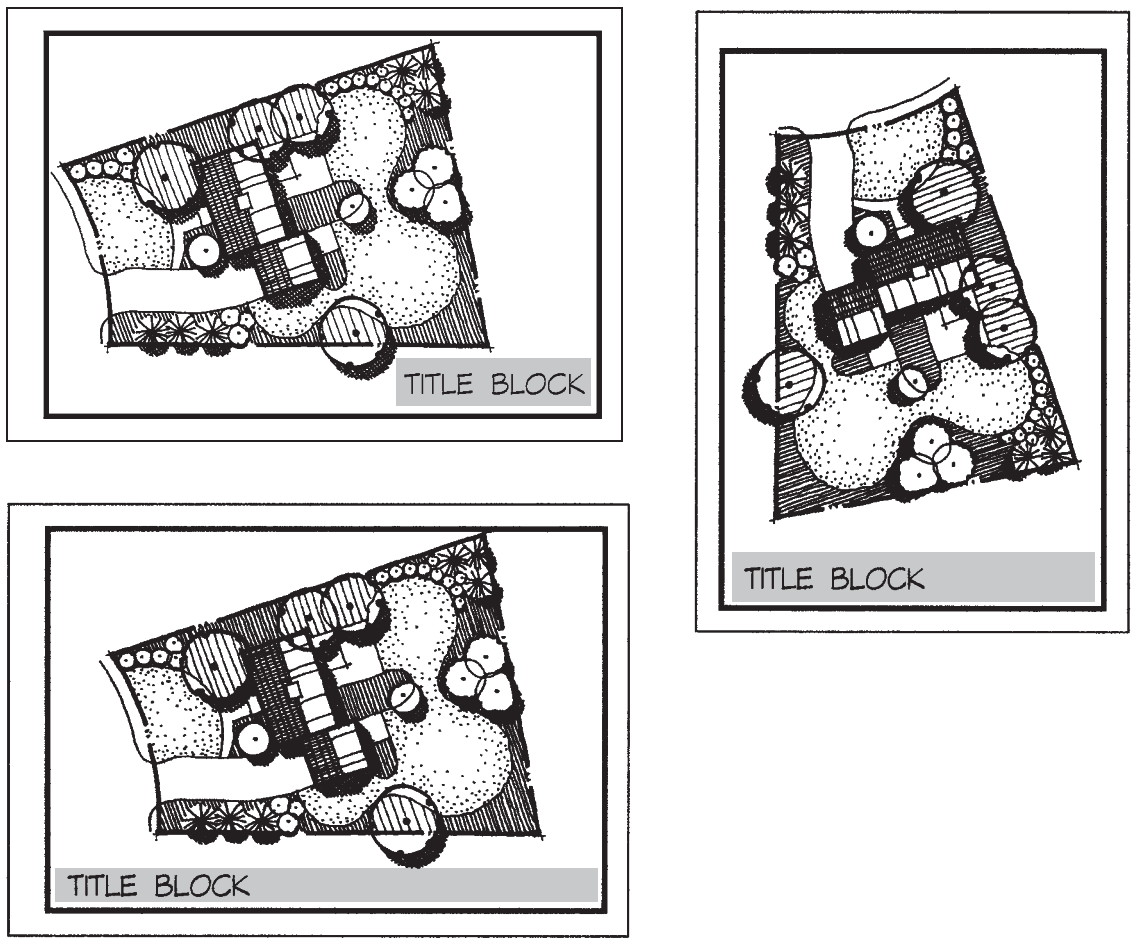


Figure 6–42
Possible title block locations on sheet.

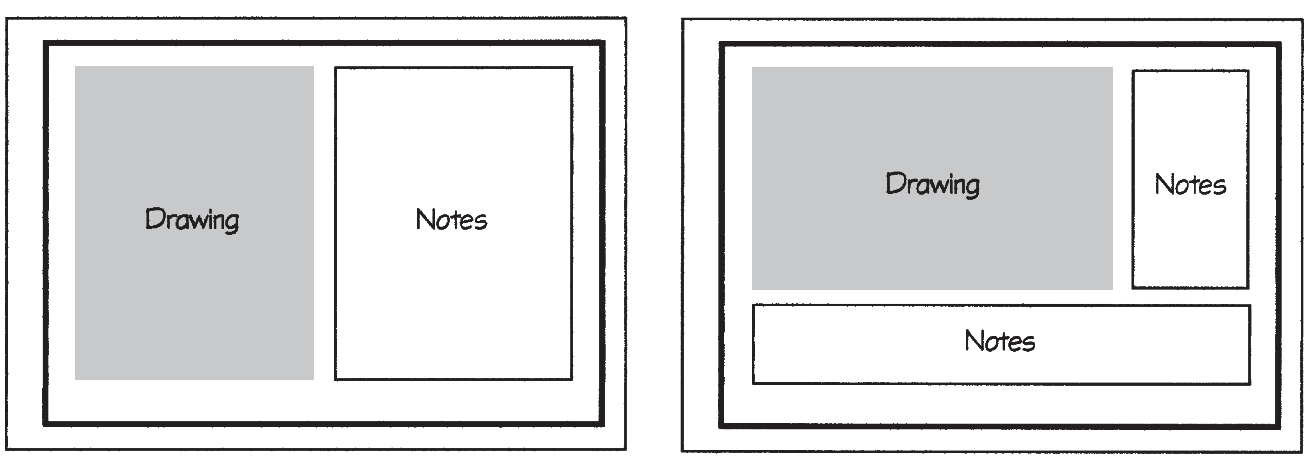


Figure 6–43
White space is useful for placement of notes and legends.

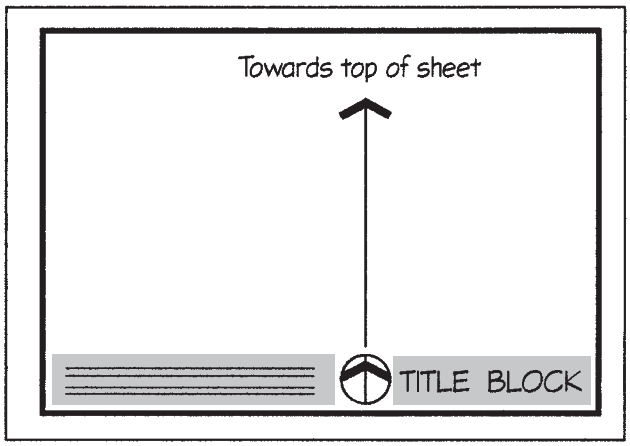


Figure 6–44
North should generally point toward the top of the sheet.

North Arrow and Scale These two items should be organized together and placed in an obvious position on the sheet, typically toward the bottom. The north arrow and scale can be incorporated inside the title block or located elsewhere on the sheet.

In terms of orientation, it is standard procedure to position the plan so that the north arrow points toward the top, the left side of the sheet, or somewhere in between (Figure 6–44). An exception to this rule of thumb is when the clients are used to viewing their property from a certain direction, such as the street. This may cause the north arrow to point in an atypical direction.

Notes and Legends Notes and legends are best placed in the white space next to the plan. In the case of notes, they should be placed as close as possible to the point or area

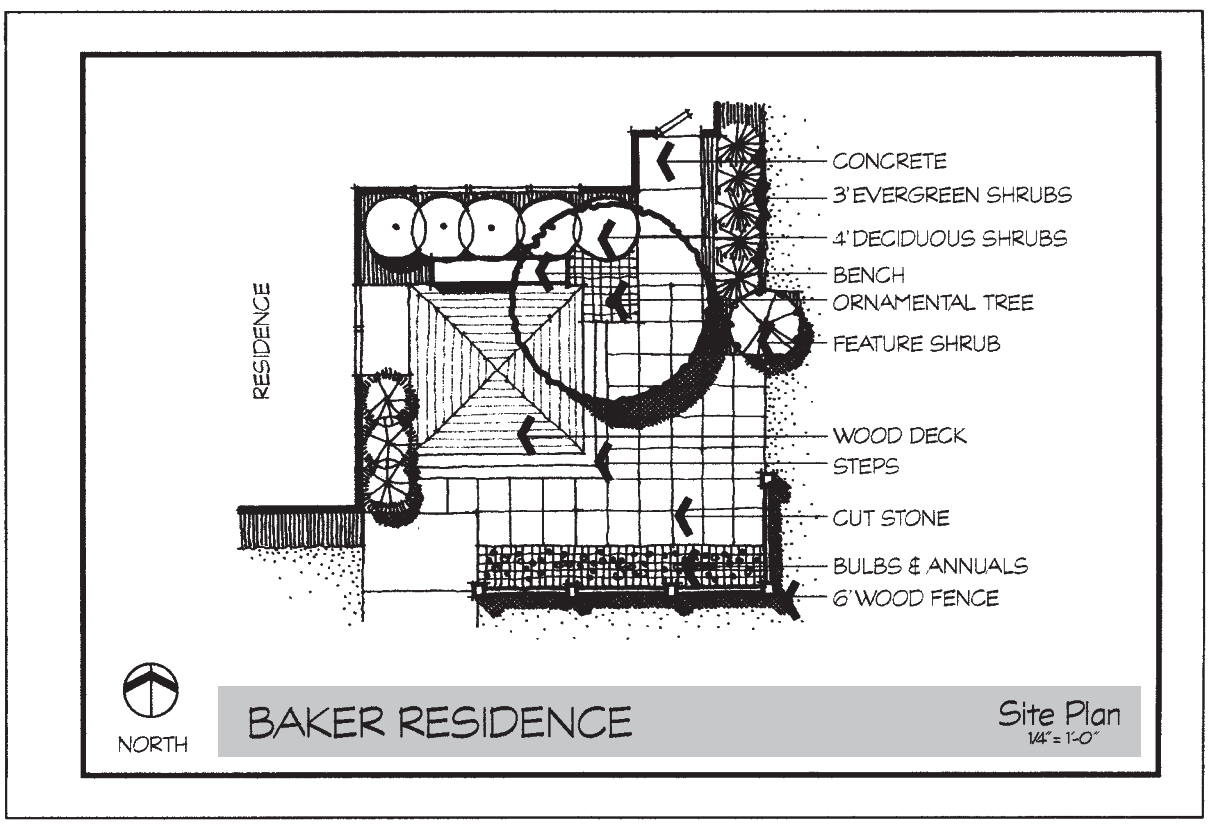


Figure 6–45
Notes should be organized in neat columns.

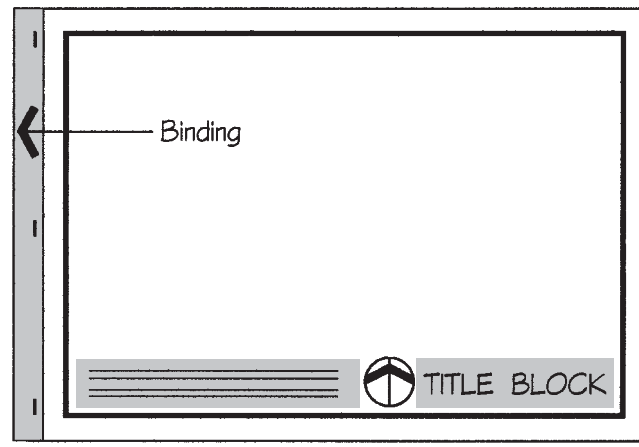


Figure 6–46
Binding strip is usually located on the left side of sheets.

they refer to on the plan. Lines (called leader lines) that extend from the note to a specific point on the plan should be kept as short as possible. Both notes and legends should be neatly lettered (1/8-inch high is ideal) and well-organized (Figure 6–45).

Borders Borders, although not absolutely essential, often give an appealing touch to a sheet. Borders act like picture frames and "hold" the drawing and notes on the sheet. Borders are generally placed between 1/2 inch and 1 inch from the edge of the sheet. More space is required on the left side of a sheet if the drawing is going to be combined and stapled with others in a package. When there is more than one sheet, it is common practice to put a binding strip on the left side of a package of drawings (Figure 6–46).

SUMMARY

Measuring the site and preparing a base sheet and base map are critical steps in establishing the base information of the site. Both steps should be undertaken with the utmost care in organization and accuracy because later steps of the design process use these drawings as their starting point. You should now understand the following about this critical step:

- Definition of a lot, plot plan, site plan, base map, and base sheet along with the information shown on each
- Three sources from which to obtain site data
- Visual clues that can suggest where the property lines might be located
- Three site measuring systems to determine distances and locations of site features
- Procedure for locating the property lines in relation to the house
- Procedure for locating the house on the lot
- Recommended process for locating the walls, doors, and windows of the house
- Technique for recording measurements of other site elements such as the gas meter, electric meter, downspout, and so on
- Methods for locating utility lines
- Procedure for locating trees and other plant materials
- Process for drawing the base sheet and base map
- Guidelines for paper type, drawing scale, sheet size, and sheet layout

7

Site Analysis and Design Program

INTRODUCTION

The site analysis and preparation of the design program are two other tasks undertaken in the research and preparation phase of the design process. The purpose of the site analysis, also referred to as site study, is to identify all the vital site conditions and determine how they might influence the eventual design solution. During the site analysis, the designer should become as familiar as possible with the site so a design solution can later be developed to suit the particular conditions of the site. The design program, which is usually prepared after the site study is completed, is the culmination of the research and preparation phase. The design program is an outline of all the elements and requirements that must be included in the design and provides the basis for the beginning of the design phase.

Before proceeding, it is important to understand that there are two distinct steps of the site study: (1) inventory and (2) analysis. Site inventory is the gathering of facts and information about a site. It identifies and records the location, size, material, and condition of existing site elements such as walkways, terraces, fences, utilities, and plant materials. The inventory also records other aspects of the site such as soil type, degree of slope, location of utilities, prevailing wind directions, sun and shade patterns, specific views of importance, and so forth. In other words, the site inventory is data collection.

Site analysis, on the other hand, is an evaluation of the information obtained in the site inventory. Site analysis makes judgments about this information and determines how the design solution should respond to these conditions. For instance, how should the proposed design relate to an inviting view of a stream just off the site? How might the buried cable line affect the layout of the front yard? How should the design of the terrace respond to the direct exposure to the hot afternoon sun? What plant materials should be retained and incorporated into the proposed design?

In theory, site inventory precedes site analysis because it necessary to collect the facts before making judgments about them. However, the reality is that the two steps often overlap, especially for experienced designers who can quickly and instinctively envision responses to various site conditions. For the inexperienced designer, the problem is often stopping at site inventory and not doing a thorough site analysis. It is difficult to understand the potential consequences of different site conditions

without prior experience of dealing with them. Nevertheless, it is vital for all designers to methodically go through each step in order to have a complete understanding of the site as the basis for a landscape design.

SITE INVENTORY

Generally speaking, the site inventory is relatively easy to do. The designer needs to (1) look at the site with an open and inquisitive mind, (2) be well organized (perhaps following an outline of items that need to be identified), and (3) be accurate in recording the required information. The gathered information should be organized in a manner that is easily read and understood so it will be a helpful reference in later design phases.

Sources of Information

As with site measuring, there are a number of potential sources for the needed site information including (1) local government offices, (2) online resources, (3) the clients, and (4) on-site observation. Whatever the source, the designer should only collect information that is directly applicable to the project. It is of course a waste of time and money to accumulate data just for the sake of doing so. To avoid this, the designer should repeatedly ask: "Do I need this? How will I use this information? Is it important? Will this information influence how I design?" If the answer is yes, then the information should be recorded.

Local Government and Community Offices Information regarding setbacks, permissible uses, fence/wall height and location, height restrictions for site structures, allowable materials, and so on should be obtained from the local governmental office that regulates and reviews zoning. It may also be necessary to determine what building permits if any are required. In addition to zoning, some communities and condominium associations have design standards that define acceptable styles, materials, and colors. Similarly, some municipalities have tree ordinances that specify what species of trees can or cannot be planted. This knowledge needs to be obtained each time a new design project is located in a district or neighborhood where one has not previously worked. Even when a designer has experience of working in a particular geographic area, it is advisable to periodically check these regulations because they do change over time.

Regional climatic summaries for temperature, precipitation, wind, frost dates, drought conditions, and so on should be sought from regional National Weather Service offices and/or from county and state agencies that advise farmers (also see Online Sources, next).

Online Sources There are a several online sources that can be consulted for usual information regarding a residential site. One is the online GIS mapping system available through a city or county auditor's Web site that was discussed in the previous chapter. In addition to providing useful dimensional information, this interactive GIS map system may also locate utilities, contours, flood plains, and neighboring houses and structures. Some online GIS maps also permit the plan view to convert to an aerial photograph that can be useful for locating trees and helping one to understand the areas immediately surrounding the site.

A similar source is *Google Earth*. This free application can be downloaded from the Internet and provides an interactive view of any place on Earth. It is useful for site inventory and analysis because one can view a residential site from any aerial distance or angle. Furthermore, one can add a three-dimensional view of the house by first creating a digital model of it with *Google SketchUp* (see Figure 7–11, later) and then importing it into Google Earth. The result can be printed and used to record site inventory notes or simply used as an analysis tool by itself.

In addition to these online map sources, much of the previously outlined information that is needed from governmental sources can also be acquired online. So, it is wise to do an Internet search for needed data before actually going to a governmental office or agency.

The Clients Another key source of information about a residential site is the clients themselves. Often, the clients have invaluable site information gained from observing a site over an extended period during varied weather and seasonal conditions. For instance, the clients may have noticed where snow drifts tend to accumulate, where surface drainage flows or where it accumulates after a heavy rain, where the ground dries out quickly, where the neighbor's children cut through the yard, where difficult areas to mow are, and so on. This site information supplied by the clients can be as beneficial as that collected by the designer. Therefore, it is important for the designer to seek the clients' input about existing site conditions.

On-Site Visit The most useful information about a site is normally obtained by walking around it with an observant eye, a clipboard and paper for taking careful notes, and a camera. This can occur during the same site visit for taking measurements or later once the base map has been completed. If the visit coincides with taking measurements, then field observations and notes can be recorded on a sketch of the site, plot plan, or printout from an online source. The copy of the base map is the best place to record field observations when the site visit occurs at a later time. Regardless of when they are observed, field notes and graphic symbols are used to identify and highlight necessary information. Typically, each landscape designer or firm has a particular vocabulary of symbols that has been developed through experience. The graphic plan that results from this careful on-site visit is the site inventory (see Figure 7–8, later).

In addition to making written notes about what is seen on base map or other plan drawing of the site, it is also helpful to take digital photographs of the site as recommended in the previous chapter. Photographs are beneficial for four reasons. First, they serve as visual reminders of the existing house and site conditions, ideally reducing the need to return to the site to gather additional information. Second, photographs document existing conditions and serve as "before" pictures prior to any construction. While taking pictures on the site, it is helpful to note the location on a plan where the photographs were taken so both "during" and "after" construction photographs can be taken from the same locations. These "before and after" photographic comparisons are extremely beneficial and rewarding. Third, digital photographs can be used to make recommendations during the site analysis as discussed later in this chapter. Fourth, the images can be used as the bases for hand-drawn or digitally created sketches of proposed design ideas (see Chapter 14).

Photographs should be taken from different vantage points throughout the site. In addition, it is wise to photograph those portions and features of the house that are of special interest to the client. And there should be a photograph of each side of the house to show changes in materials and patterns that may occur from one side to the next. The character on one side of a house does not always match the character on the other sides. In essence, enough photographs should be taken that they can be referred to later in the design process without any questions about the house or site.

A number of photographs have been taken of the Duncan residence that was introduced in Chapter 5. It will be recalled that the front yard of the residence is rather open with existing trees in good condition located on both sides of the driveway. Figure 7–1 shows the existing 3-foot-wide concrete walk leading to the front stoop with a low earth mound to its west. The side yards of the Duncan residence are narrow, have little practical use, and are an eyesore on the east side where garbage cans and debris are stored (Figure 7–2). The backyard is open and free of obstacles with the exception of a Norway



Figure 7–1
View of the existing concrete entry walk and earth mound in front of the Duncan residence.



Figure 7–2
View of garbage cans and debris along the east side of the Duncan residence.

maple and the swing set located on the northern part of the site. A split-rail fence and plantings on the northern and eastern property lines of the backyard give it a partially enclosed feeling. Nevertheless, there are some notable off-site views. When standing in the Duncans' backyard, the neighbors' houses to the west (Figure 7–3) and north (Figure 7–4) seem relatively close and are easily seen, whereas the view to the east



Figure 7–3
View of the neighbors' house to the west as seen from the Duncans' backyard.



Figure 7–4
View of the neighbors' house to the north as seen from the Duncans' backyard.

(Figure 7–5) is more pleasant through several neighbors' backyards. The views to the northwest (Figure 7–6) and northeast (Figure 7–7) are also attractive.

Needed Information

The following is an outline of site conditions that should be identified during the site inventory. Not all the listed items need to be addressed for every project. What is required for one project may be unnecessary for the next. So, use the outline as a helpful guide to be adapted as desired for each project.

A. Site location
   1. Identify surrounding land uses and their conditions.
      a. Are they residential, commercial, recreational, educational, and so forth?
      b. How well are the adjoining properties maintained?



Figure 7–5
View of the neighbors' backyards to the east as seen from the Duncans' backyard.



Figure 7–6
View to the northwest from the northwest corner of the Duncans' backyard.



Figure 7–7
View to the northeast from the northeast corner of the Duncans' backyard.

2. Identify the neighborhood's character.
   a. What is the style, age, and condition of the residential architecture?
   b. What is the size, type, and maturity of the vegetation?
   c. What is the character of the neighborhood?
      - Is it well established, open, wooded, ill-kempt, friendly, estate-like, and so on?
3. Identify the nature of vehicular circulation in the neighborhood.
   a. What type of street is the site located on?
      - Is it a through street, one-way, two-way, cul-de-sac, and so on?
   b. What is the volume of traffic on the street?
      - Does the intensity vary during the day? If so, when?
   c. How much noise and headlight glare into the windows is produced by the traffic on the street?
   d. What is the primary direction for arriving at the site?
      - Is there more than one approach?
      - Which approach is most frequently used?
      - Where is the most common "first view" of the site located?
4. Identify legal restrictions for new construction in the neighborhood.
   a. What building types and structures are allowed, especially detached buildings such as garages, tool sheds, gazebos, pergolas, and so on?
   b. What are the restrictions for heights and floor areas of new structures?
   c. What are the setback requirements for structures?
   d. What building permits are required for construction?

B. Topography
1. Identify degree of slope steepness at different areas throughout the site (slope inventory).
2. Identify potential areas of erosion or poor drainage.
3. Identify grade change between inside (finished floor elevation) and outside grade around the foundation of the house, especially at the doorways.
4. Determine the ease of walking on various areas of the site (this will also identify relative steepness).
5. Identify the elevation changes between the top and bottom of existing steps, walls, fences, and so forth.

C. Drainage
1. Identify direction(s) of surface water drainage.
   a. Does water drain away from the house on all sides?
   b. Where does the water flow from the downspouts?
2. Determine wet spots or areas of standing water.
   a. Where are they located and for what lengths of time?
3. Identify drainage onto and away from the site.
   a. Does any off-site surface water drain onto the site? How much, when, and where?
   b. Where does the water flow to when it leaves the site?

D. Soil
1. Identify soil characteristics (acid, alkaline, sandy, clay, gravel, fertile, and so on).
2. Identify depth of topsoil.
3. Identify depth of soil to bedrock.

E. Vegetation
1. Locate and identify existing plant materials.
2. Where appropriate, identify:
   a. plant species.
   b. size (caliper [diameter of a tree trunk 4 feet above the ground], spread, total height, and height to bottom of canopy).

c. form.
d. color (flower and foliage).
e. texture.
f. distinguishing features and characteristics.

3. Determine the overall condition, importance, potential use, and clients' opinion of existing plant materials.

F. Microclimate
1. Identify location of sun at sunrise and sunset at different times of the year (January, March, June, and September, for example).
2. Identify the vertical angle of the sun above the horizon at different times of the day and seasons of the year.
3. Determine areas of the site that are mostly sunny or mostly shady during different times of the day and seasons of the year.
4. Determine areas exposed to and protected from the intense summer afternoon sun.
5. Identify areas exposed to warming winter sun.
6. Identify prevailing wind direction throughout the year.
7. Determine site areas exposed to or protected from cooling summer breezes.
8. Determine site areas exposed to or protected from cold winter winds.
9. Identify depth of frost in winter months.

G. Existing house
1. Identify house type and architectural style.
2. Identify color and texture of facade materials.
3. Identify location of windows and doors.
a. For doors, identify direction of opening and frequency of use.
b. For both doors and windows, identify elevation of bottoms (sills) and tops (heads).
4. Identify interior room type and location.
a. Identify which rooms are used most often.
5. Locate basement windows and their depth below ground.
6. Locate outside elements such as downspouts, water spigots, electrical outlets, lights attached to house, electric meter, gas meter, clothes-dryer vent, and air conditioners.
7. Locate overhangs and note their distance beyond the face of the house and their heights above the ground.

H. Other existing structures
1. Locate and identify condition and materials of existing walks, terraces, steps, walls, fences, swimming pools, and so on.

I. Utilities
1. Locate utility lines (water, gas, electric, telephone, cable, storm sewer, septic tank, leach field, etc.).
a. Are there any easements associated with the utility lines?
b. Are there any telephone and electrical junction boxes?
c. Are there any utility shut-off valves?
2. Identify location and height of air conditioner or heat pump.
a. What direction is the intake and exhaust of the air flow?
3. Identify location of pool equipment and associated utility connections.
4. If existing, locate irrigation system.

J. Views
1. Take note of what is seen from all sides of the site looking off-site.
a. Do the views vary during different seasons?
2. Observe views from inside the house looking to the outside.

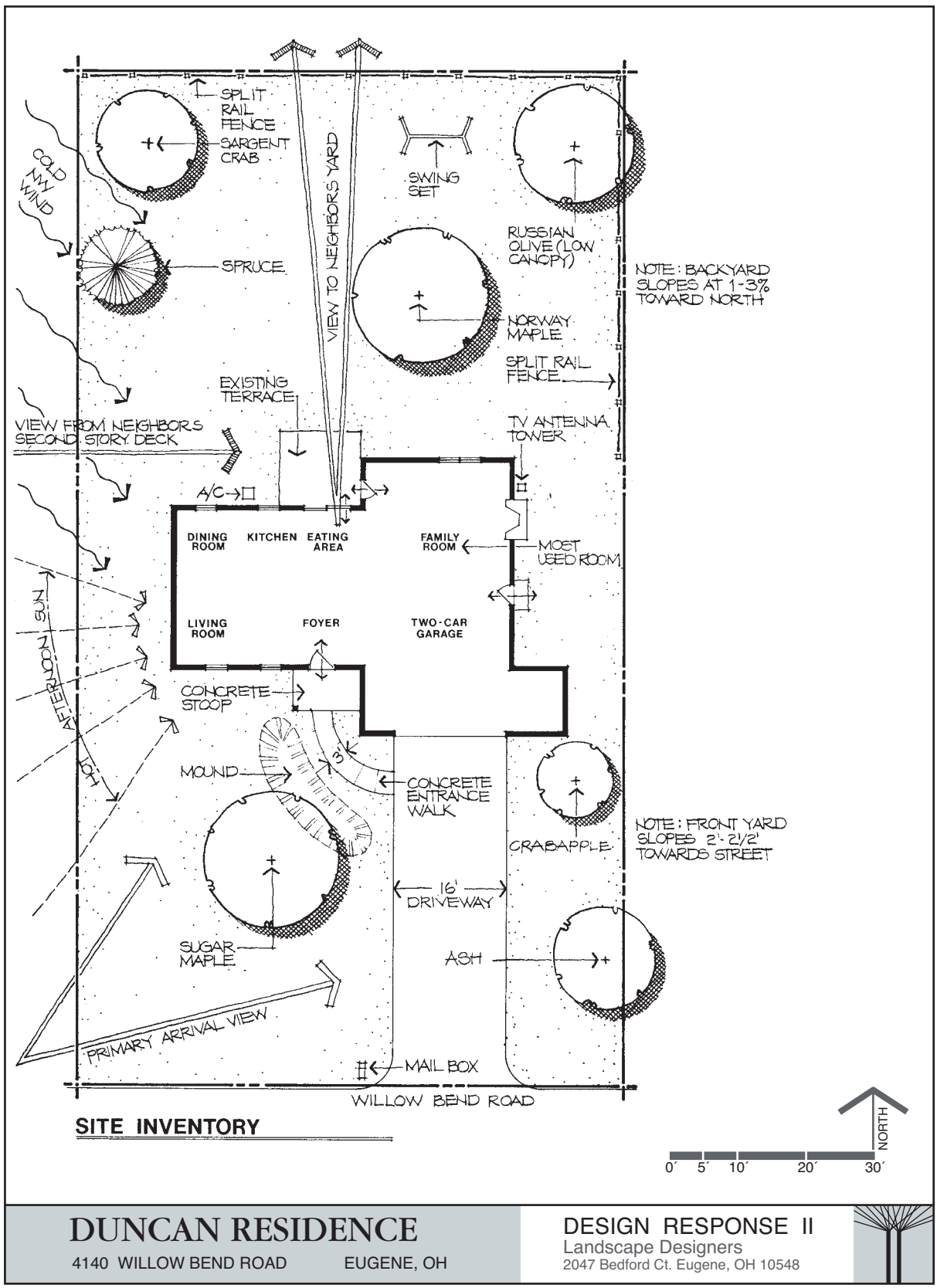


Figure 7–8
Site inventory of the Duncan residence.

3. Experience views from off the site looking onto the site (views from the street as well as from different sides of the site).
   a. Where are the best and worst views of the site?

K. Spaces and senses
1. Determine the location and extent of outdoor rooms. Identify materials of the floors, walls, and ceilings of the rooms.
2. Identify the feeling and character of these rooms (open, enclosed, light, airy, dark, gloomy, cheerful, restful, and so on).
3. Determine pleasant or disturbing sounds (singing birds, traffic noise, children playing, rustling leaves, and so on).
4. Identify fragrances and odors.

L. Existing site functions and problems
1. Identify how and when different areas of the site are currently used.
2. Determine location for such activities as daily leaving and arriving home, outside recreation, gardening, and work areas.
3. Determine site maintenance problems (unkempt lawn, worn lawn edges along walks, worn lawn areas due to intense use, lack of weeding, broken pavement, and so on).
4. Identify location of snowdrifts in the winter.

Figure 7–8 shows the site inventory for the Duncan residence.

SITE ANALYSIS

The site analysis is the second and more difficult phase of the site study. Whereas the site inventory merely collects and organizes information about the site, the site analysis evaluates the value and importance of this information. The purpose of the site analysis is to determine the problems and potentials created by the existing site conditions so that the eventual design solution can be tailored to meet the specific conditions of the site.

This is typically accomplished by making another drawing or set of notes that answers the following questions about each fact that was previously identified during the site inventory:

- Is this information important?
- If it is important, does it create a problem or offer a potential?
- If it creates a problem, how might it be solved?
- If it offers a potential, how might it be taken advantage of?

The designer should be aware of the differences in wording in comparison to the site inventory. Notes on the site inventory are simply statements of fact, whereas the notes on the site analysis are words of evaluation and action. Key words found on the site analysis include *should, need to, limit, allow for, make, save, take advantage of, screen*, and *enlarge*. Here are some examples:

Site Inventory	*Site Analysis*
• 3-foot-wide concrete walk	• too narrow; need to widen to 5 feet and change to a warmer material
• open view to wooded area at back of site	• maintain view by framing it on either side
• existing terrace is 100 square feet	• should enlarge to at least 200 square feet
• large sycamore tree is in good condition	• should be preserved; remote sitting area might be placed beneath it

- back of house and site are exposed to hot afternoon sun
- back of house should be shaded by trees or other means; any outside uses in this area must also be protected from sun

Figure 7–9 shows the site analysis for the Duncan residence. Recall that a number of factors and conditions were recorded about the Duncan residence on the site inventory (Figure 7–1). Now, the site analysis evaluates this information and makes recommendations about a number of actions that should be taken into account as the design solution is developed. For example, it is suggested that the following be considered for the front yard:

1. The existing trees should be kept and integrated into the design.
2. A more welcoming front entry should be established by widening the existing walk between the driveway and the front door. The adjacent earth mound should be removed or altered as necessary.
3. The view into the front entry space (outdoor foyer) should be emphasized and coordinated with views from the hallway and living room.
4. Shade is needed on the southwestern and western sides of the house to provide protection from the hot summer afternoon sun while allowing the winter afternoon sun to warm these sides of the house.
5. Paved access is needed from the driveway to the east-side garage door.

There are also a number of considerations for the backyard of the site. These include:

1. Screens or barriers need to be provided to establish privacy from the neighbors to the west and to block the views to the neighbors' entertaining space to the north. These same screens could serve as a wind break for the cold northwest winds during the winter.
2. An outside living/entertaining space needs to be developed with better access to the inside. Consideration should be given to the possibility of incorporating sliding glass doors in the north wall of the family room if the outdoor entertaining space is placed nearby.
3. The lawn area should be kept as open as possible for recreation. The existing Norway maple may provide shade on a nearby patio.
4. The swing set should be integrated into the backyard so as not to be an obvious eyesore.
5. The TV antenna tower should be screened to reduce its overwhelming scale.

These observations and recommendations are taken into account when the design program is written and during the subsequent steps of the design phase. It is a good idea to continually refer to the site analysis to make sure the design is responding to its conclusions and recommendations. In addition, it is usually advisable to present the site analysis to the client when the designer meets to present initial design ideas. The site analysis can set the stage and provide a rationale for the overall concept of the design and as well as decisions regarding specific design elements. In essence, the site analysis is a justification for the design proposal. Consequently, the site analysis should be organized in a presentable though loose manner that can be understood by the clients.

Supplementary Tools

In addition to the typical site inventory and site analysis plans, there are several other means for recording and communicating site observations. One is the use of photographs that can convey information about a site in ways that are usually more

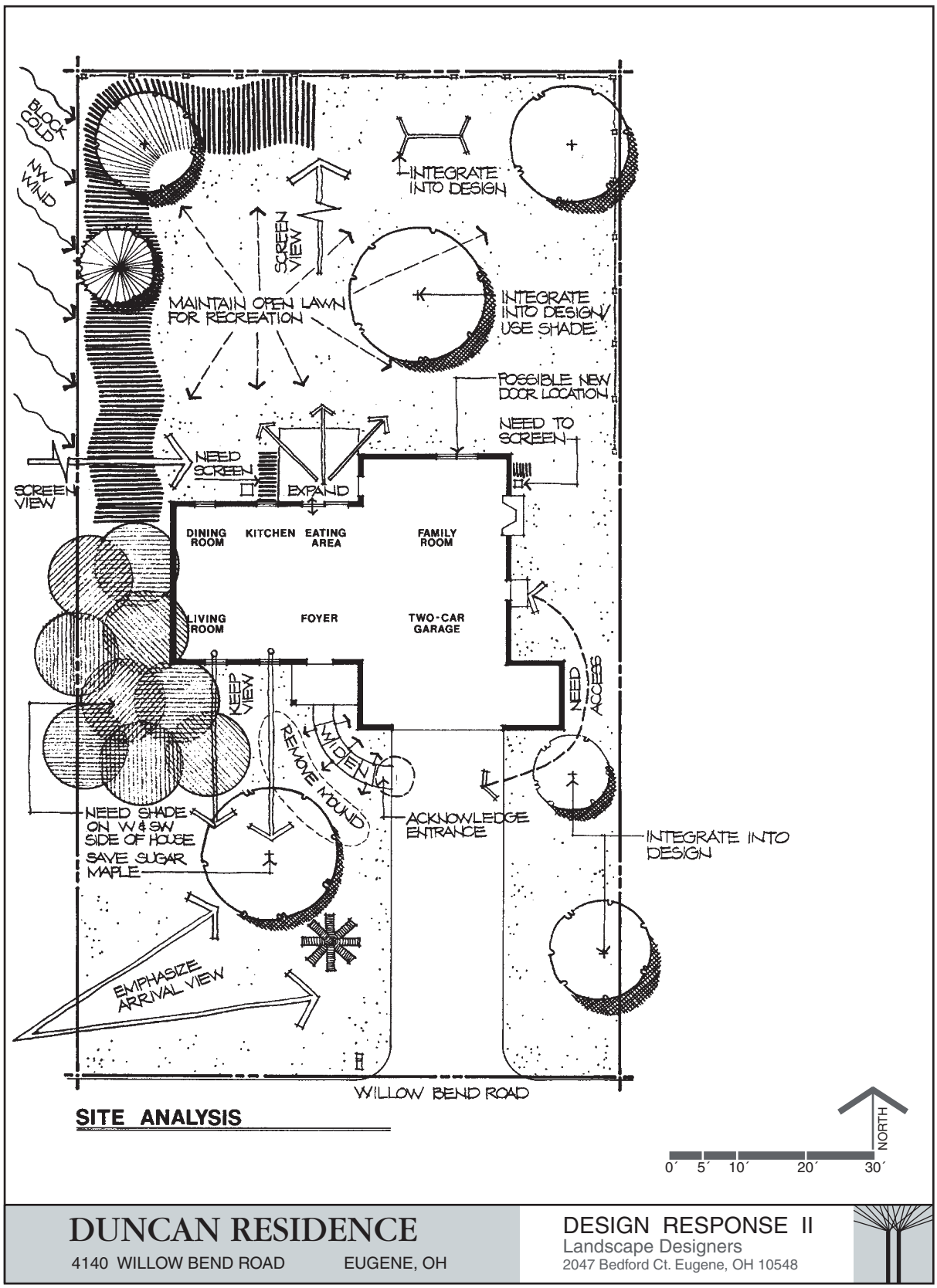


Figure 7–9
Site analysis of the Duncan residence.

understandable to a client than a graphic site analysis. Furthermore, photographs are potentially beneficial to site inventory and analysis because they can (1) record existing information (downspout locations, types and conditions of plant materials, views, and style and materials of the house), (2) provide visual reminders of what the house and site look like as design ideas are being generated, and (3) document specific details of the house and site that may be useful during later phases of design (pavement patterns, fence character, architectural detail, and patterns of windows, doors, etc.).

In addition to these uses, photographs can be employed to record site inventory observations and make analytic notes (Figure 7–10). This can be done directly on

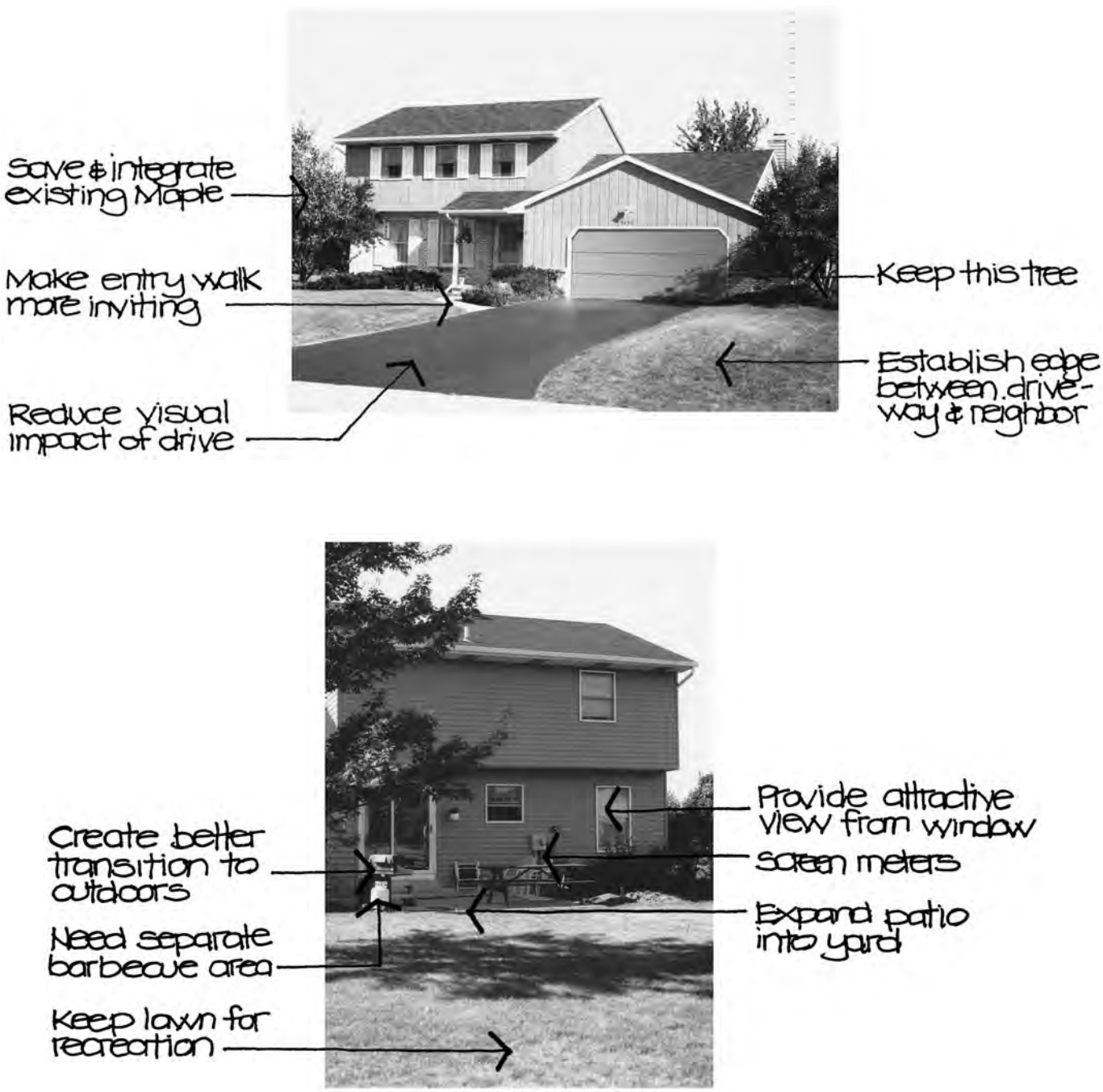


Figure 7–10
Use of photographs to record site analysis notes for the Duncan residence.

photographs printed on paper with an inkjet printer, with a tracing paper overlay, or in a computer program such as Photoshop. As with the plan site analysis, these noted photographs are excellent for communicating observations and general recommendations to the client.

Another way to visualize and analyze a site is to build a computer model in Google SketchUp or another similar modeling program (Figure 7–11). Such a model can often be assembled fairly quickly by someone experienced with the program, especially if it does not attempt to show every architectural or site detail. A Google SketchUp model has three benefits for site analysis. First, it gives the designer the ability to see the entire site from multiple vantage points, many of which are not possible from the ground. This provides a better understanding of the site. Second, shadows can be cast in the model for a range of geographic locations during different months of the year. One can very quickly see where the sun and shade areas are on the site throughout the year. Third, the computer model can be used to record site analysis notes and can serve as a base for exploring design ideas.

DESIGN PROGRAM

The *design program* is a written list or outline of all the elements, spaces, and requirements that should be incorporated into the design solution and is the final step in the research and preparation phase of the design process. Like the program guide for a theatrical play or a sporting event, the design program lists the "cast" of elements that will play a role in the design solution for a particular site and client.

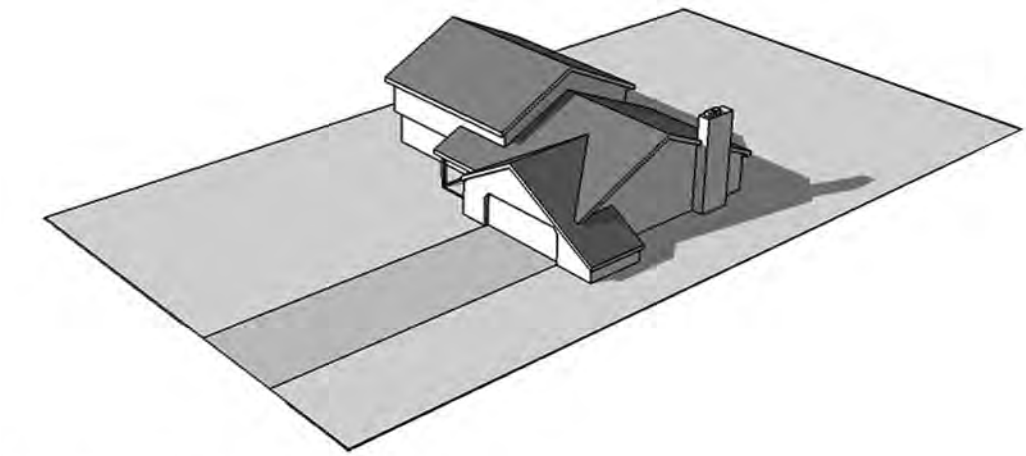
A design program brings together the expressed needs and wishes of the clients with the conclusions of the site analysis. The clients' needs and the information about the existing site conditions have been gathered and recorded separately until this point in the process. Now the design program combines the findings from these earlier steps to establish an overall summary of the requirements for the design.

A design program serves three functions. First, it provides the designer with a foundation of elements that need to be incorporated into the design solution. In a way, the design program's list of required elements tells the designer: "This is what the design must include and do."

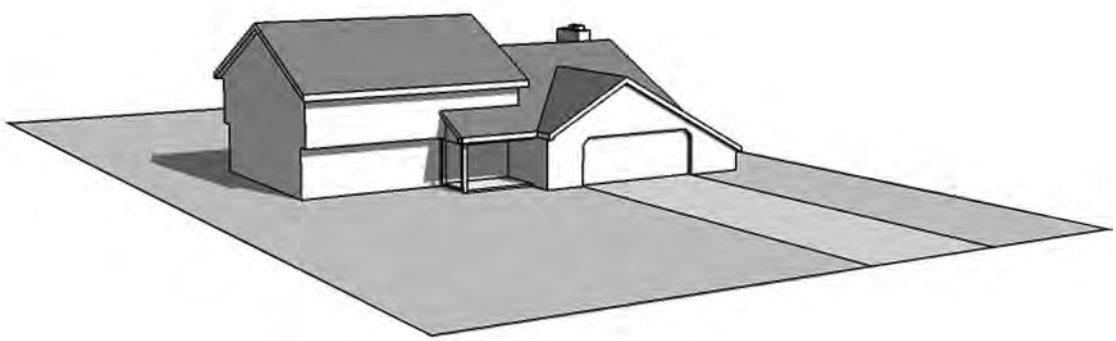
The second function of the design program is to serve as a checklist for the designer. The designer should periodically refer to the design program throughout the design process to make sure that all the elements of the program are being met. It is easy to forget about all the requirements and details without a list to refresh the designer's memory.

Finally, the design program can function as a communication tool between the designer and clients. After having prepared the design program, the designer should review it with the clients to make sure that it meets their approval. This can permit the designer to see whether or not the clients' expressed desires and needs were in fact understood correctly. It also allows the designer to suggest to the clients that other elements or requirements could be incorporated into the design solution based on the findings of the site analysis.

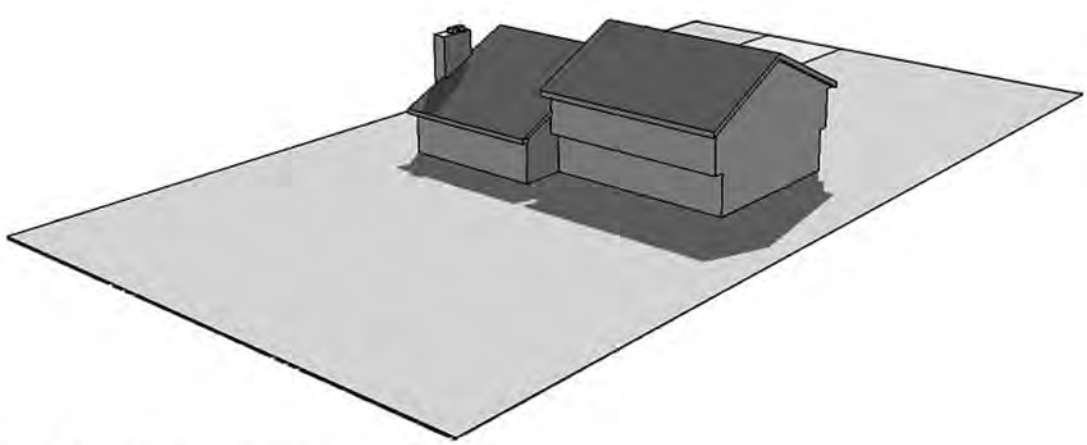
Like all other steps and phases of the design process, the design program should not be considered final by either the designer or the clients. Although it should be as complete as possible when it is prepared, it should not be thought of as absolute or beyond the possibility of change. As the development of the design solution proceeds with more and more definitive thinking, original ideas and intents may change. There is nothing wrong with this. In fact, it is quite healthy, because it is evidence that the designer and clients are open-minded about tailoring a design solution to the unique conditions of the situation; they are not forcing preconceived ideas onto a site.



VIEW FROM SOUTHEAST



VIEW FROM SOUTHWEST



VIEW FROM NORTHWEST

Figure 7–11
Different views from a Google SketchUp model of the Duncan residence.

The following design program has been prepared for the Duncan residence. It is presented as a sample program and is by no means the only way a design program can be written or organized. This particular design program resulted from meeting and talking with the Duncan family and from the conclusions of the site analysis of the Duncan residence presented in the previous section of this chapter.

Design Program for the Duncan Residence
Prepared by James E. Kent
Landscape Designer
Design Response Two

A. Warm and welcoming entry walk
   1. Size: minimum of 4-1/2 to 5 feet wide.
   2. Material: something that will complement the house materials.

B. Outside entrance foyer and sitting space
   1. Size: large enough for two chairs and a small table.
   2. Material: same as for entry walk, but in a different pattern to help imply a special place.

C. Paved access from driveway to east side door of garage
   1. Size: minimum of 3 feet wide.
   2. Material: undecided.

D. Outside entertaining space (terrace)
   1. Size: 250–300 square feet; must accommodate 8–10 people for social gatherings and informal dining.
   2. Material: possibly a raised wood deck due to the elevation change from the breakfast area to ground level.

E. Recreational lawn area
   1. Size: as large as possible.
   2. Material: grass.

F. Play area for swing set and additional equipment
   1. Size: 125–150 square feet.
   2. Material: sand or bark mulch.

G. Storage for one cord of wood
   1. Size: $4' \times 8'$.
   2. Materials: gravel or concrete.

H. Visual screen from neighbors on the west
   1. Size: unknown at this time.
   2. Materials: undecided; could be plant materials, a structure, or a combination of both.

I. Visual screen of bad view to the north of site
   1. Size: unknown at this time.
   2. Material: probably plant materials, due to available space.

J. Screen air conditioner on north side of the house
   1. Size: about 2–3 feet high.
   2. Materials: could be evergreen plant materials for year-round color or small fence structure.

K. Existing tree
   1. Should be retained.

L. Budget
   1. The Duncans realize that a master plan, when implemented, may cost more than they originally anticipated. To be realistic, they have established a five-year budget of between $22,500 and $30,000, which is 15 to 20 percent of the cost of their $150,000 home.

SUMMARY

A number of crucial tasks must be accomplished before actual design work can take place on paper. The information collected during the research and preparation phase of the design process provides a foundation for subsequent phases of design. You should now know the following about the site analysis and preparation of the design program:

- Difference between site inventory and site analysis
- Sources of information about the site
- Information that should be gathered about the site regarding site location, topography, drainage, soil, vegetation, microclimate, house and other structures, utilities, views, senses, and existing site functions
- Graphic character and information shown on the site inventory
- Questions that can be asked to analyze the collected information about the site
- Graphic character and information shown on the site analysis
- Supplementary digital tools for preparing a site analysis
- Definition and purpose of a design program
- Information commonly included in a design program

8

Functional Diagrams

INTRODUCTION

After gaining an understanding of both the clients and the site, the designer possesses two general sets of information. The first set stems from meeting the clients and is a written list of elements and spaces required to satisfy the clients' needs and expectations. The second set of information is the site inventory and analysis that is recorded with written notes and graphic symbols on a copy of the base map. The written portions of these two sets of information are combined in the final step of the research and preparation phase to establish the design program.

With the research and preparation phase completed, the landscape designer is ready to start designing. To do this, an effective method is needed for combining the written design program information with the specific conditions of the site. This is done with functional diagrams. This chapter discusses what functional diagrams are, their purpose and significance in the design process, a method for preparing them, and design qualities that can be studied by using functional diagrams.

DEFINITION AND PURPOSE

Functional diagrams are freehand drawings that use bubbles and diagrammatic symbols to graphically depict the program elements of a design as they relate to each other and to the specific conditions of the site. Whereas the site inventory and analysis are prepared with the aid of a base map, functional diagrams are developed using the site analysis and the base sheet.

The purpose of functional diagrams is to create a broad-brushed, conceptual layout of the proposed design, based on function. They provide the general organizational structure for a design, similar to what an outline does for a written report. Functional diagrams can be considered the underlying foundation of a design. Later phases of the design process are based on these diagrams.

Functional diagrams are used to study various factors that deal with the function and general layout of the design. At this time, less thought is given to specific appearance or aesthetics, which are dealt with later in the design process.

Designers can communicate with other designers and clients concerning the overall functional organization of the site with the graphic language of functional diagrams. This graphic language allows for quick expression of ideas. It is common for designers to initially formulate a number of mental images or preconceived ideas

about a design. Although some of these ideas might be specific, others are more general and need to be quickly transferred to paper to allow the designer to study them. The sooner these ideas are drawn on paper, the easier it is to evaluate them. The graphic vocabulary of functional diagrams is an invaluable tool for this much-needed quick expression. And because functional diagrams are freehand and general in their graphic style, they can be revised or altered rather easily. This encourages creativity by studying alternatives as one searches for an appropriate design solution.

IMPORTANCE OF FUNCTIONAL DIAGRAMS

Functional diagrams are crucial to the design process because they can (1) establish a sound functional basis for the design solution, (2) encourage the designer to remain general about the appearance of the design, (3) encourage the designer to explore alternatives, and (4) provide opportunities for the designer to go beyond preconceived ideas.

Establishing a Sound Functional Basis

A functional diagram that has been carefully thought out will provide a proper basis for the remaining design phases. The importance of this phase cannot be overstressed. Decisions made about a design at this early stage are apt to be carried throughout the remainder of the design process. Thus, it is critical that decisions made during this step be sound ones. If they are not, they will be continually revealed in later phases of the design project. Keep in mind that the appearance of a design as reflected in form, materials, and material patterns cannot overcome functional deficiencies. A design must first and foremost have a solid functional foundation.

Staying General

One of the most common faults of inexperienced designers is the inclination to begin a design project by drawing forms and design elements in the plan that are too specific (Figure 8–1). Novice designers frequently make the design look "real" as quickly as possible. For example, the edges of terraces, decks, walls, and planting beds are much too often given a highly defined form too quickly without sufficient thought toward the functions. Similarly, materials and their patterns are often drawn in too much detail

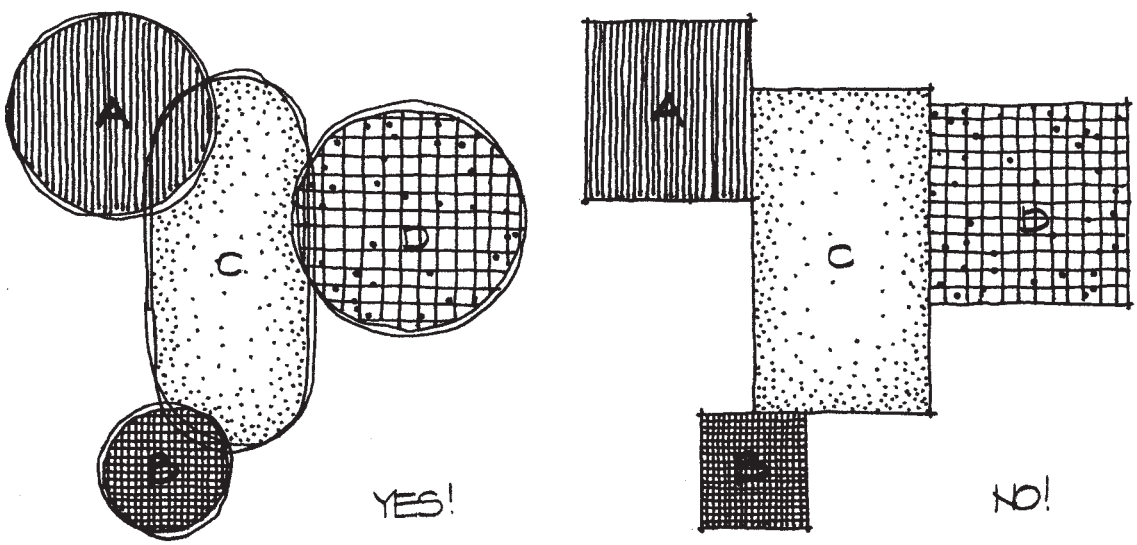


Figure 8–1
The spaces in a functional diagram should be drawn as freehand bubbles, not as exact forms.

without proper understanding of their location or intended function. Too much detail too soon is apt to cause the designer to overlook underlying functional relationships.

Another reason for studying a design in a general fashion before specifics are considered is the factor of time. Because changes are inevitable during the process of design, being too specific too soon will result in time-consuming changes made in later design phases. The more detailed a plan is, the more time it takes to redraw it when changes need to be made. Certainly all phases of design involve changes. But in the initial phases, general functional organization can change rather quickly and effortlessly when drawn appropriately with the graphic language of functional diagrams.

Studying Alternatives

It is obvious that a designer will accumulate a substantial mental library of ideas over time as design experience is gained. The more exposure one has to designs, whether it be through photographs or actual experience, the more images one has to draw on for future reference. This mental file of ideas has tremendous value, for it enables the designer to think of different options for any given project. These options (alternatives) are very important to the growth of designers. Growth occurs when a designer tries new ideas. Studying alternatives during design phases will prove to be valuable for formulating new ideas. Functional diagrams encourage the use of alternatives because of their quick and simple graphic character.

Going Beyond Preconceived Ideas

A mental library of ideas available for future reference is developed by every designer through experience and exposure. Owing to the wealth of this stored visual information, it is common to have preconceived ideas for a design. Sometimes these preconceived ideas are so strong that a solution can be imagined quite easily. This insight can be exciting for a designer, but it should be handled sensitively so it will contribute positively to a designer's growth. Too often preconceived ideas are the only ones that are considered. We are not suggesting that these insights be ignored, but keep in mind that the preconceived idea is only one idea and it is just the first one. Although the first idea may be a good one, the designer will never know if it is better than other ideas unless other ideas are explored. A designer should not accept the first idea without examining alternatives. Once this is done, a better design solution usually emerges.

FUNCTIONAL DIAGRAMS

To begin preparing a functional diagram, the designer should have a copy of the design program, site analysis, and base sheet. Each of these items will be used to develop functional diagrams. The designer should also have a roll of tracing paper and a supply of soft pencils. The use of drafting equipment (t-squares, triangles, templates, etc.) is not necessary, because everything will be drawn freehand during this step.

During functional diagrams, the designer locates all spaces and elements of the design program for the first time by using freehand diagrammatic symbols. Each space and element listed in the design program should be located on the site when the diagram is complete.

There are a number of design factors that can be dealt with during this phase of design. They are:

1. Size
2. Location
3. Proportion
4. Configuration

5. Internal subdivision
6. Edges
7. Circulation
8. Views
9. Focal points
10. Elevation change

Each of these factors is addressed individually in the following paragraphs, although each should be considered in conjunction with the others in actual practice.

Size

Before a functional diagram can be drawn, the designer should know the approximate sizes of the spaces and elements to be included in the design. In some situations, this information may already have been established in the design program. If size is unknown, the designer should consult references that identify the size of typical functions on a residential site. Some information is illustrated in Table 8–1. The sizes indicated are common standards; nevertheless, they may be adjusted as necessary to satisfy the particular needs of any given situation.

After determining the necessary sizes, sketch each space and element of the design program on a blank sheet of paper. Each should be drawn as a freehand bubble to approximately the correct size and proportion using the same scale as the base sheet. It is sometimes difficult to comprehend the size of scaled spaces when they are described only with numbers. For example, the area "100 square feet" may not mean much by itself. But when this area is graphically expressed as a freehand bubble at a given scale, the designer is able to see more clearly how much space it actually covers in the plan (Figure 8–2).

Once the spaces and elements have been sketched at their approximate scaled sizes, the designer should have a better understanding of where certain uses should be placed on the site. For example, the designer may need to look for especially open or generous areas of the site for spaces that are particularly large. Also, the designer should have a notion of whether or not all spaces and elements of the design program will fit on the site. It may be found that certain spaces or elements just don't fit. If this happens, then there needs to be a change in the design program after consulting with the clients.

Location

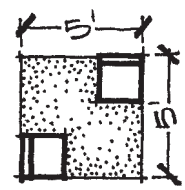
With a firm comprehension of the size needed for required spaces and elements, the designer is now ready to start actually drawing a functional diagram. The designer should first place a clean sheet of tracing paper on top of the site analysis. This should be done so that the observations and recommendations of the site analysis can be continually referred to during the first tries at placing the various spaces and elements on the site. With the site analysis serving as a base, it is more likely the designer will keep the site factors in mind while organizing the functional diagram.

The site location of each of the required spaces and elements should be based on functional relationships, available space, and existing site conditions.

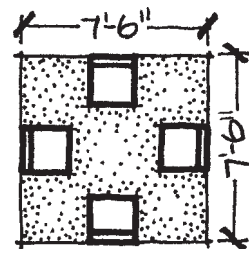
Functional Relationships Each space and element should be located on the site so that it is compatible with the functions of adjacent spaces and elements. For example, the designer might ask: Where should the living/entertaining space be placed? Should it be located near the play area? Or should it be located near the outdoor eating space? If the outdoor living/entertaining space is placed here, what might go on the west side of it? Questions should also be asked about the relationship between indoors and outdoors. For instance, where should the outside eating space be placed in relation to the kitchen?

TABLE 8–1 FUNCTIONAL SIZE REQUIREMENTS

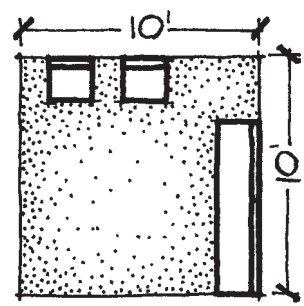
1. Person standing alone: 5 sq ft
2. People standing in conversation: 8 sq ft/person
3. Sitting
   a. Single aluminum lawn chair: 2′ × 2′
   b. Single wood deck chair with cushions: 2′-6″ × 2′-6″
   c. Groups of chairs:
      Two chairs



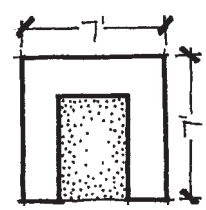
Four chairs



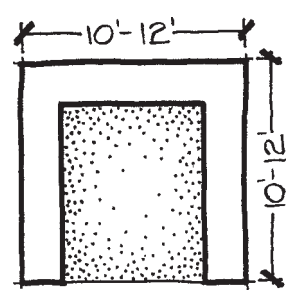
Two chairs and couch



   d. Bench: seat depth: 18″
      seat length: 2′-6″ linear feet/person
   e. Bench arrangement for conversation
      Intimate



Group

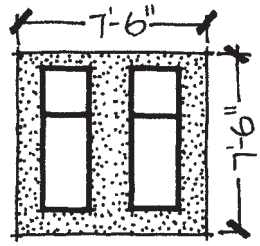


   f. Single aluminum lounge chair (for sitting or sunbathing): 2′ × 6′

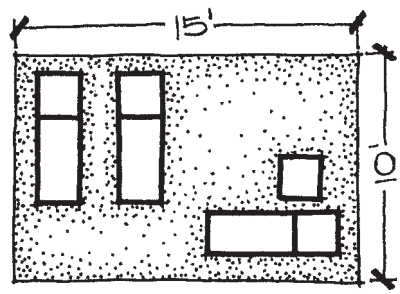
TABLE 8–1 CONTINUED

g. Groups of lounge chairs

Two lounge chairs



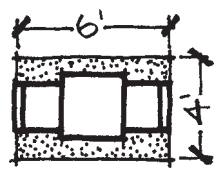
Three lounge chairs and coffee table



4. Eating

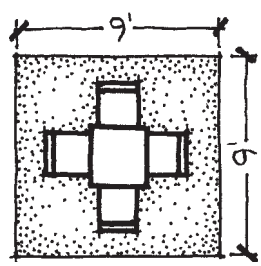
a. Two people

Chair by itself: 2′ × 2′
Table by itself: 2′ × 2′
Minimum area needed: 2′-6″ × 5′
Preferred area:



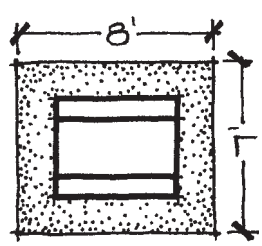
b. Four people

Chair by itself: 2′ × 2′
Table by itself: 2′-6″ × 2′-6″
Minimum area needed: 6′ × 6′
Preferred area:



c. Six people (picnic table)

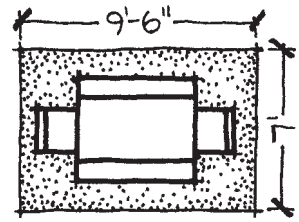
Bench by itself: 1′ × 5′
Table by itself: 2′-6″ × 5′
Minimum area needed: 5′ × 6′
Preferred area:



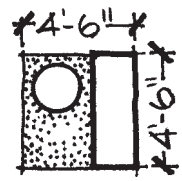
(*continued*)

TABLE 8–1 FUNCTIONAL SIZE REQUIREMENTS (*CONTINUED*)

d. Eight people (picnic area)
Bench by itself: 1′ × 5′
Table by itself: 2′-6″ × 5′
Minimum area needed: 5′ × 7′-6″
Preferred area:

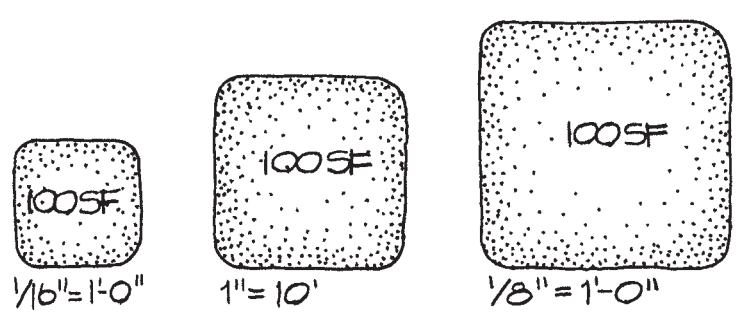


5. Cooking and food preparation
   a. Grill by itself: 2′ × 2′
   b. Counter top: 2′ × 4′
   c. Overall area needed: 20 sq ft



6. Recreation
   a. Badminton (doubles): 17′ × 39′ (playing surface)
      20′ × 44′ (overall area)
   b. Croquet: 38′ × 85′ (playing surface)
      50′ × 95′ (overall area)
   c. Frisbee, baseball, football throwing: 15′ × 40′
   d. Horseshoes: stakes 40′ apart
      10′ × 50′ (overall area)
   e. Tennis (doubles): 36′ × 78′ (playing surface)
      60′ × 120′ (overall area)
   f. Volleyball: 30′ × 60′ (playing surface)
      45′ × 80′ (overall area)
   g. Backyard basketball: 25′ × 25′ minimum
   h. Half-court basketball: 42′ × 40′
   i. Swimming
      Average-sized pool: 18′ × 36′ (without deck)
      need between 24 and 36 sq ft/swimmer
      Lap pool: 10′ × 60′
      Spa/Jacuzzi: 5′ × 5′
   j. Sandbox: 4′ × 4′
   k. Swing set: 10′ × 15′
7. Storage
   a. Garbage can: 2′ diameter
   b. Two garbage cans: 2′ × 6′
   c. Cord of wood: 4′ × 4′ × 8′
8. Parking
   a. Single car: 9′ × 18′

Figure 8–2
The designer is able to visualize the size of a space better when it is drawn at a given scale.



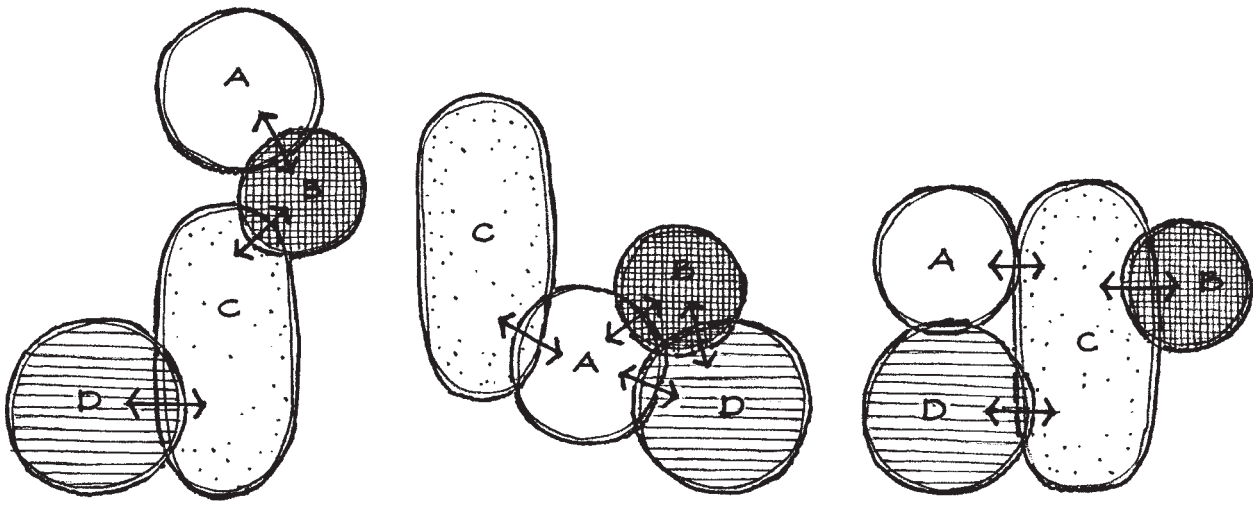


Figure 8–3
The designer should explore alternative functional relationships among the spaces.

Of course, functions that work together or depend on each other should be placed next to or near each other, whereas functions that are incompatible should be separated. Some decisions about the functional relationship between spaces and elements will be obvious while others need to be studied before decisions are made. The designer should try alternative relationships among the spaces (Figure 8–3). Quite frequently, new functional relationships are discovered through trial and error. The designer should not be afraid to make mistakes in this early phase of the design process. In most design professions, it is common to put ideas on paper that are not perfect or completely worked out during this conceptual phase. This is a better approach than trying to work everything out in one's head before drawing it.

Available Space The decision as to where to place the various spaces and elements is also dependent on the availability of space. Each space and element must fit its selected location. Problems arise when a space is too large for a particular area of the site. This situation may require a reorganization of the functional diagram, a reduction of the size of the space or element, or the elimination of the space or element from the design.

Existing Site Conditions Each space and element should be situated on the site so that it relates properly to the existing site conditions and the site analysis. For example, an outdoor living and entertaining space ideally should be located in a place that has partial shade, views of attractive site features, and direct access to the inside of the house. The vegetable garden should be placed on well-drained and fertile soil, in mostly full sunlight, and near a water source. And there are different ideal site conditions for other spaces. To identify and understand these conditions more clearly, the designer may want to make a list of the ideal site conditions for each space and element that is to be located on the site.

After identifying the ideal site conditions required for each space or element, the designer can proceed to locate the spaces and elements on the site where these ideal conditions exist. This sounds simple in theory and often is in practice. However, there are times when some or all of the ideal conditions desired for a required space or element do not exist on the site. For example, there may not be a place on the site with partial shade, attractive views, and direct access for the outdoor living and entertaining space. In this situation, the designer should attempt to place the space or element where as many of the ideal conditions as possible are located without jeopardizing the

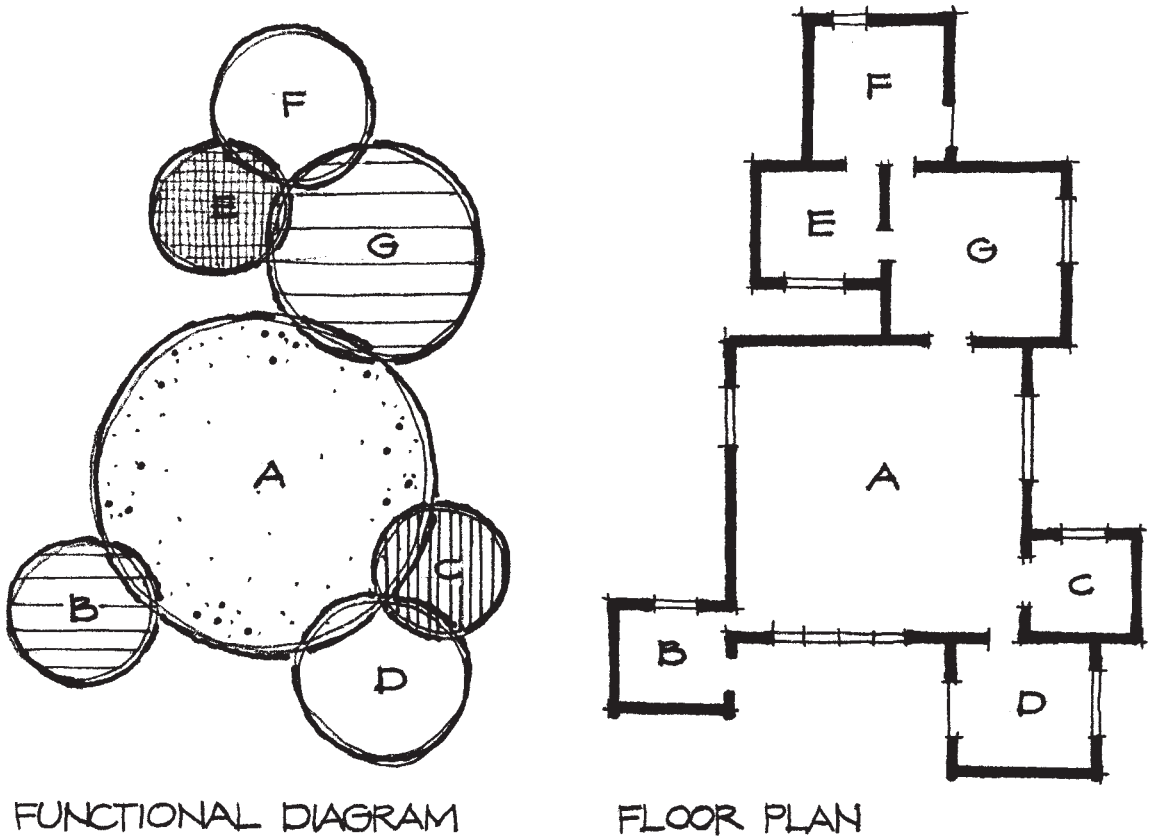


Figure 8–4
A diagram that has all the spaces drawn as circles is like a building in which all the rooms are square.

site or the ability of the space to function properly. Or, the designer may propose to carefully modify the existing site so it will serve as a proper setting for the space or element. For example, shade trees or attractive features could be added to the site if these conditions do not exist for the outdoor living and entertaining space.

Proportion

Another factor that should be taken into account when drawing the functional diagram is proportion. The proportion of an outdoor space is the relative relationship between length and width. One common tendency in this step is to draw most spaces as simple circular bubbles (Figure 8–4). This type of diagram makes each outdoor space similar to a building where every room is a perfect square. Of course, this would not be appropriate.

Each outdoor room needs special consideration based on the intended use of that space. Proportions should vary as intended uses vary. Generally, spaces can have equal plan proportions or unequal plan proportions.

Equal Plan Proportions A space that has equal plan proportions is one in which the length and width are about the same (Figure 8–5). Such a space lacks an implication of direction and therefore is well suited for collection, stopping, or gathering. A space of equal plan proportions can be inward oriented when proper enclosure exists (Figure 8–6). This type of space is often suitable for sitting and for conversation among individuals in a group. The outside entry foyer where people stop and gather before entering or after leaving the house is another space where equal plan proportions are appropriate (Figure 8–7).

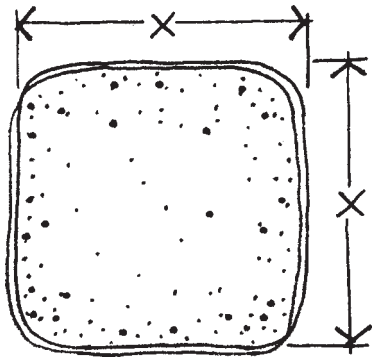


Figure 8–5
Length and width are approximately the same in a space with equal plan proportions.

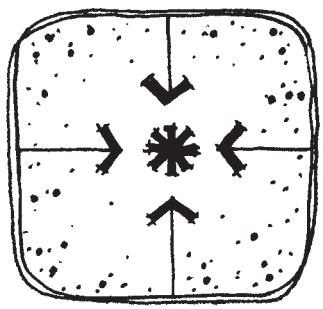
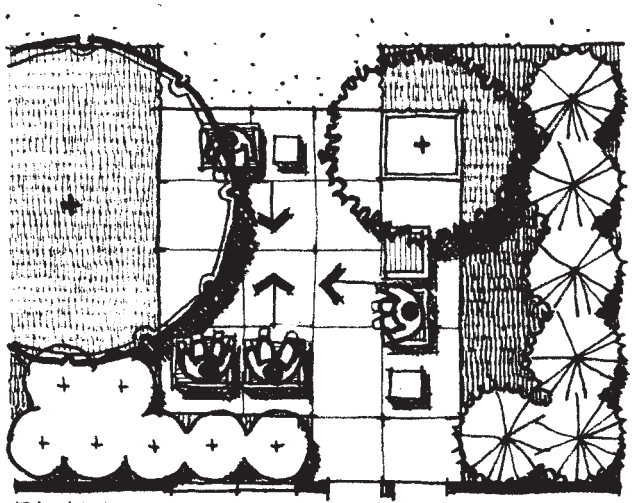


Figure 8–6
A space with equal plan proportions may suggest an inward orientation conducive to conversation.

DIAGRAM



PLAN

Unequal Plan Proportions A space with unequal proportions (Figure 8–8) is one in which length is greater than width or vice versa. Outdoor rooms with such proportions are like hallways in a building and suggest movement because of their long, narrow quality (Figure 8–9). Long enclosed spaces are also appropriate for directing views in the landscape toward their ends or terminus points (Figure 8–10). Although spaces with unequal plan proportions are good for circulation, they are not suited for gathering because such activity gets in the way of movement through the space. And it is difficult to arrange furniture for conversation in long, narrow spaces; such an arrangement looks similar to a subway car (the left side of Figure 8–11). It is easier for people to talk to each other when they face each other (the right side of Figure 8–11). However, long spaces are good for arrangement of furniture for looking out at other points in the landscape, such as from a porch or veranda (Figure 8–12).

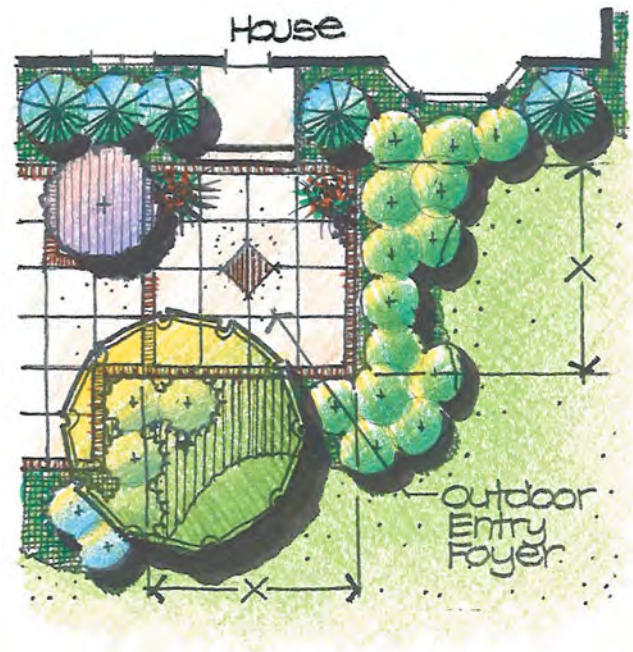


Figure 8–7
The outside entry foyer may have equal plan proportions to suggest stopping and gathering.

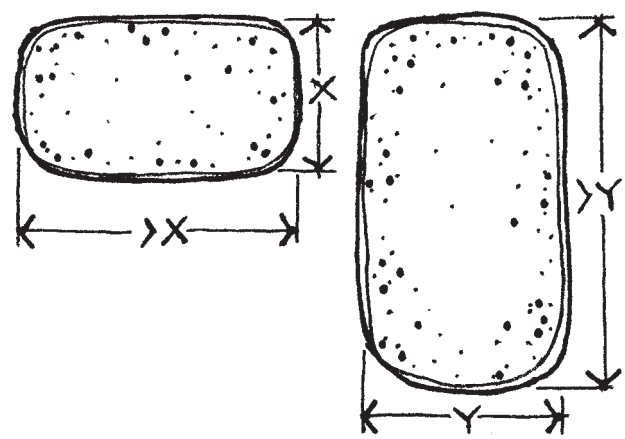


Figure 8–8
Length and width are not similar in a space with unequal plan proportions.

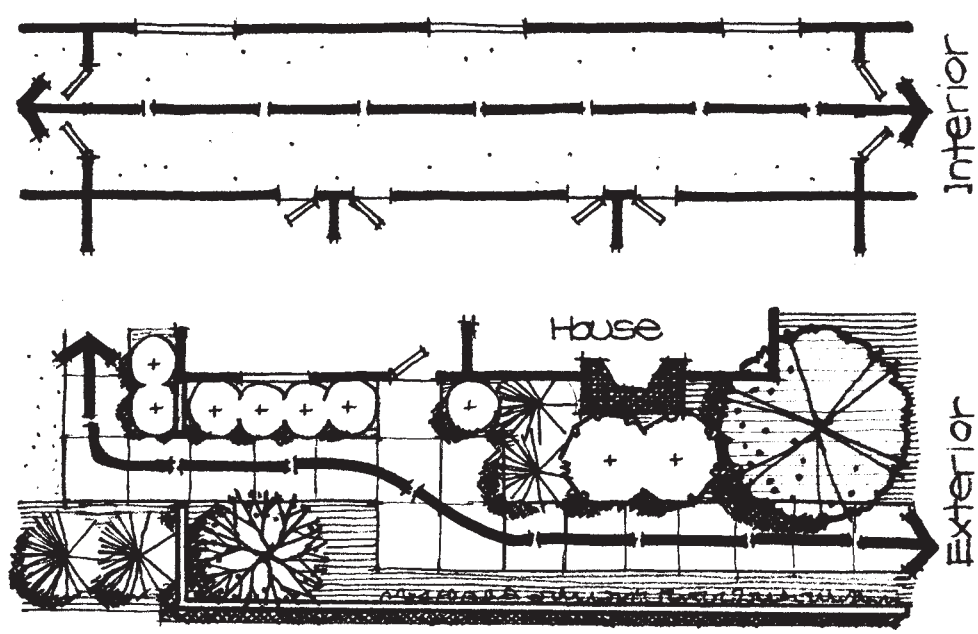


Figure 8–9
Spaces with unequal plan proportions are like hallways and suggest movement.

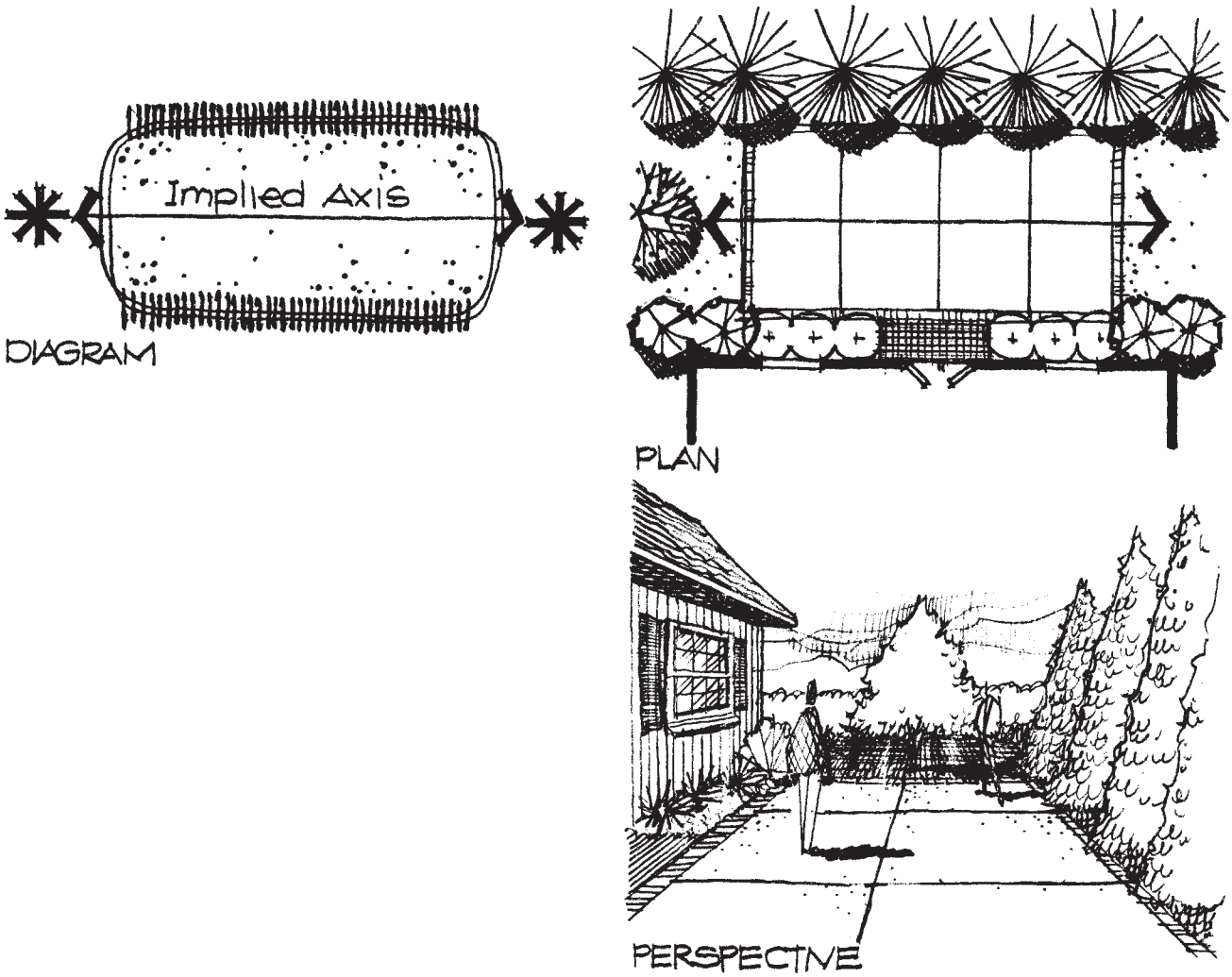


Figure 8–10
Spaces with unequal plan proportions tend to direct attention to their ends when the sides are enclosed.

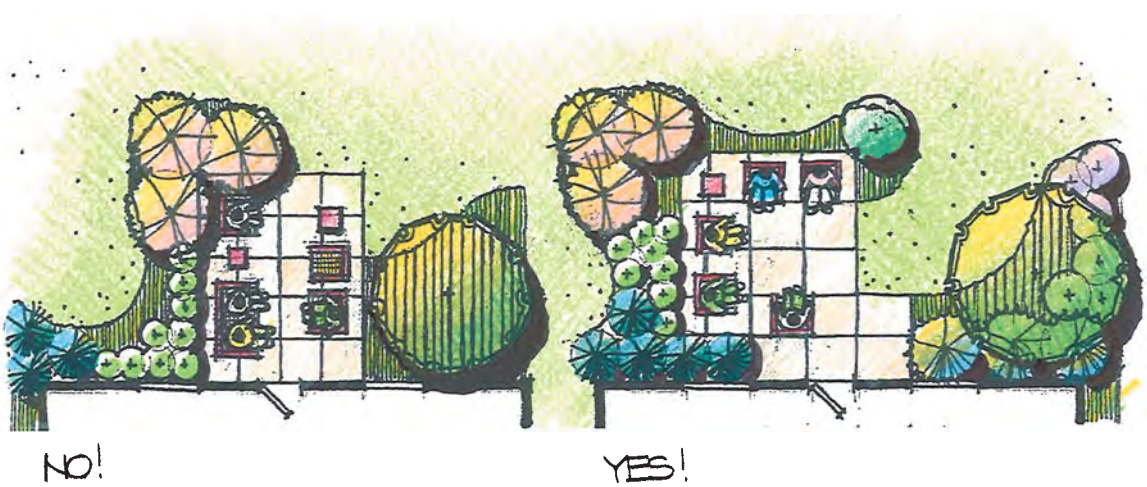


Figure 8–11
The plan proportions of a space influence its ability to be used for gathering and conversation.

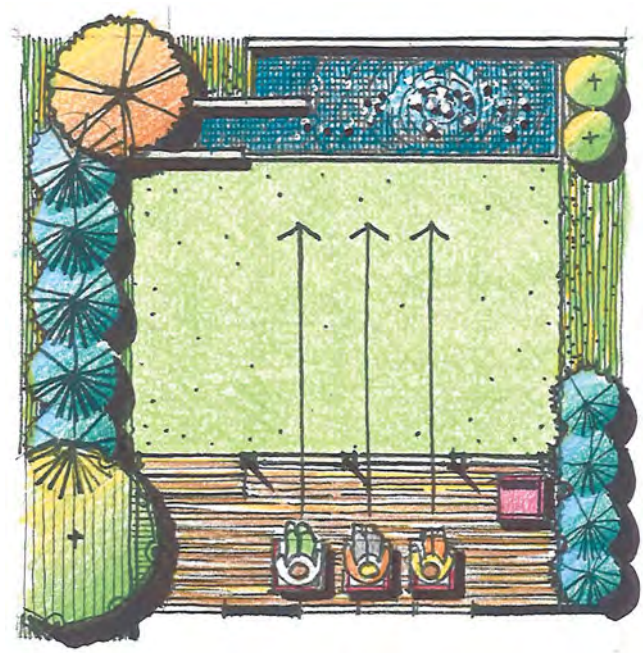


Figure 8–12
Spaces with unequal plan proportions permit furniture to be arranged to direct views outward into the landscape.

Configuration

Configuration is the general shape of a space. For example, the configuration of a space may be simple, L-shaped, or complex. However, configuration does *not* refer to the specific form of a space, such as whether an area is round, square, curved, or angled. Configuration is similar to proportion in that it is concerned with the outline of a space, although in more detail. Some basic plan configurations are described and illustrated in the following paragraphs.

Simple Configuration The generalized shape of a space can have a simple configuration (Figure 8–13). A space with this configuration has a strong sense of unity because the entire area can be seen easily and completely at one time from any location.

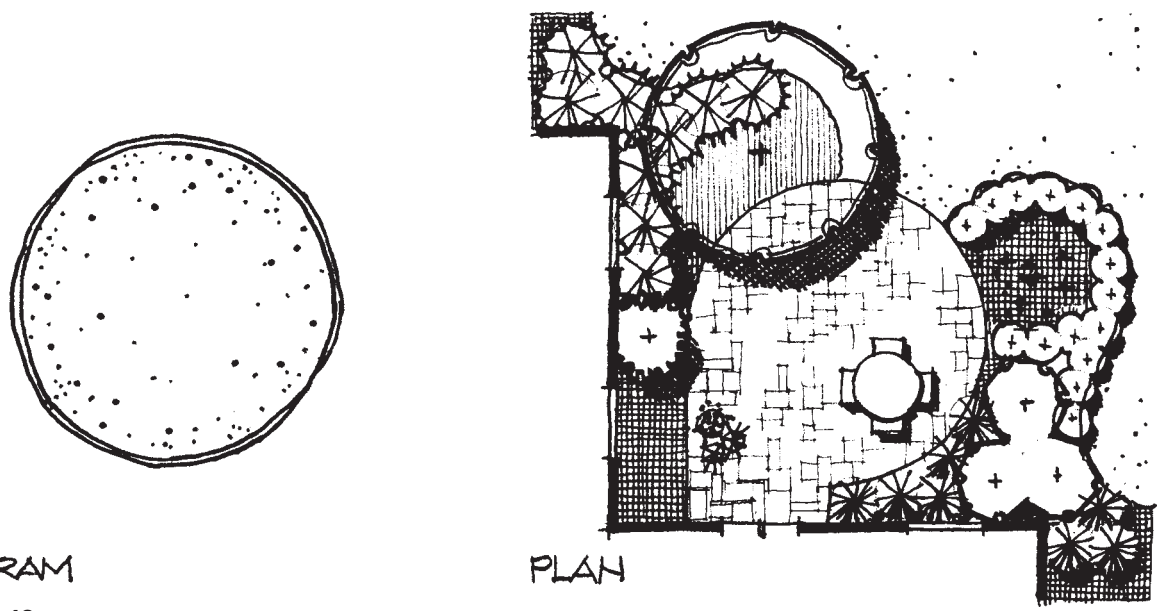


Figure 8–13
A space with a simple configuration has a strong sense of unity.

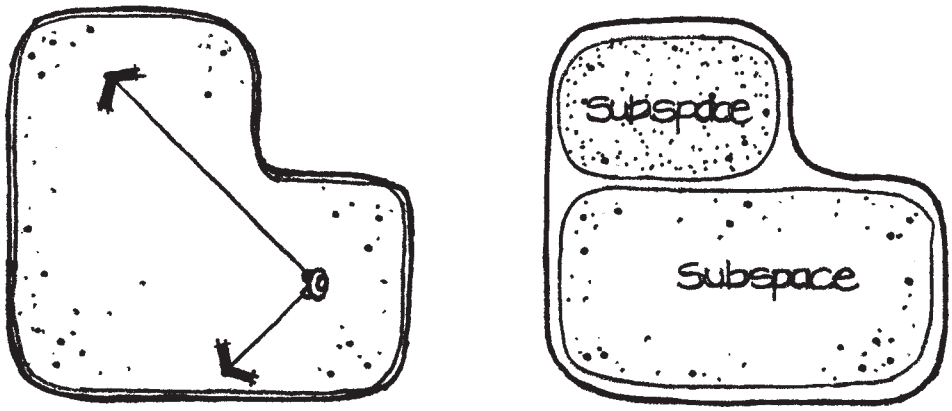


Figure 8–14
A space with an "L-shaped" configuration tends to divide itself into two subspaces.

A simple configuration is most suitable for gathering spaces such as an eating area or an outdoor entry foyer.

L-Shaped Configuration As the name implies, a space with this configuration bends around a corner (Figure 8–14) and establishes two smaller subspaces in the legs of the "L" while still maintaining a sense of connection between them. A space with an "L" configuration can offer a sense of intrigue because each subspace may not be entirely apparent as viewed from the other subspace. A feeling of mystery is created by what lies hidden around the corner (left side of Figure 8–15). The inside corner is a strategic place that can be seen easily from all locations within the "L" configuration and therefore is a potential place for a focal point (right side of Figure 8–15). Examples of L-shaped spaces might include a major entertaining space with a small seating area to the side (left side of Figure 8–16), or a wood deck with an eating area and an observation area adjacent to it (right side of Figure 8–16).

Complex Configuration A third possible configuration for outdoor space is composed of an edge that has many variations in its alignment (Figure 8–17). These edge variations or "pushes and pulls" add variety to the space they surround. Each "push" away from the space creates a small subspace and each "pull" provides some separation between the subspaces. When this is done with an outdoor entertaining space, small pockets of space (the "pushes") for small intimate groupings are created around the perimeter of the central space (Figure 8–18). Another example of a complex configuration is a wood deck designed to provide several different and unique views into the surrounding landscape (Figure 8–19).

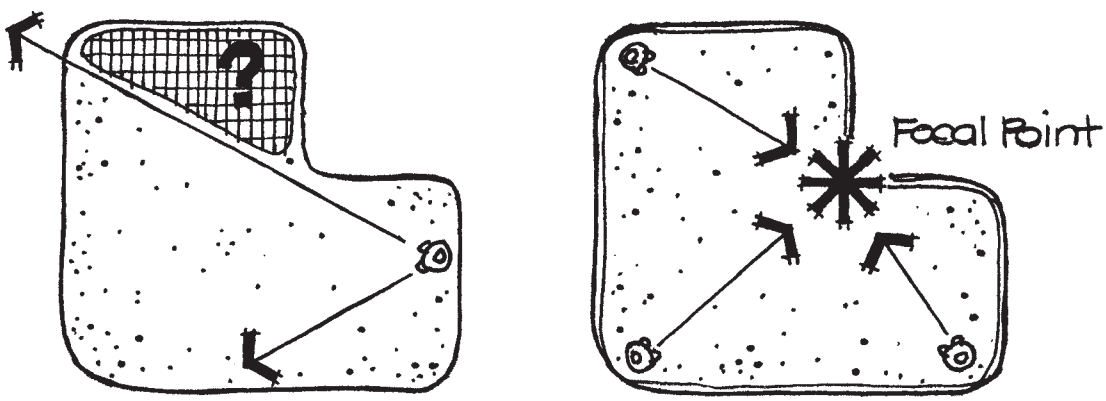


Figure 8–15
Characteristics of a space with an "L-shaped" configuration.

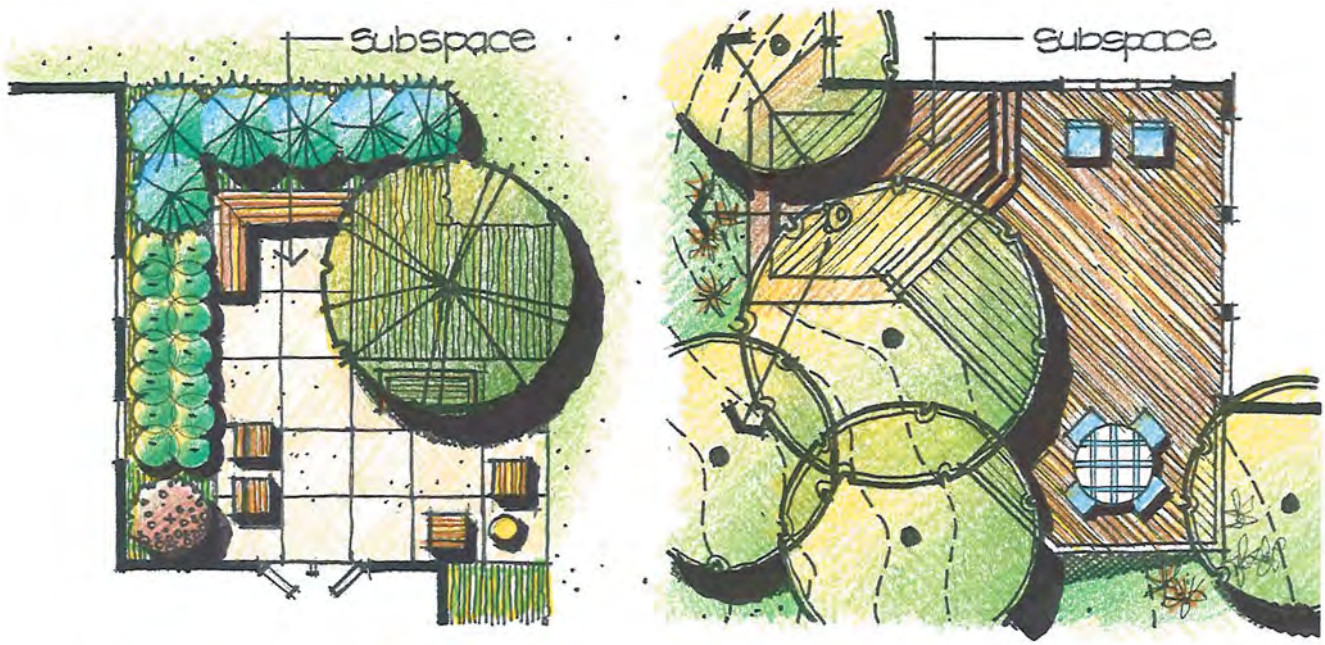
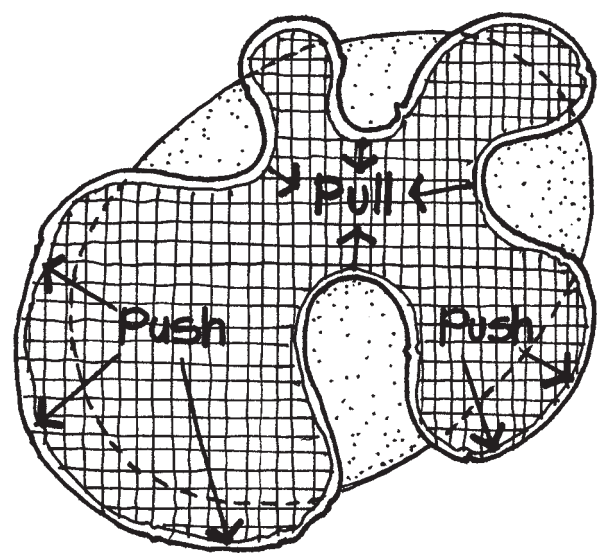


Figure 8–16
Spaces with an "L-shaped" configuration may have one corner function as a subspace of the other larger area.

Figure 8–17
A space with a complex configuration has "pushes" and "pulls" in its edge.



Internal Subdivision

Another important consideration of the functional diagram to address is the internal organization of each space. This step gives the designer the opportunity to understand more clearly how each space is to function within itself. One example of this is provided in Figure 8–20. Here the internal organization of an outdoor living and entertaining space was subdivided into more specific use areas. A conversation space (space "A" on the diagram), quiet sitting space (space "B"), and a sunning space (space "C") were all identified within the living and entertaining space. The same consideration is given to the planting areas, which can be divided into more specific plant types according to their size and type of foliage (Figure 8–21). However, no shrubs or other small-scale plant materials are shown or studied individually until the preliminary design phase is reached.

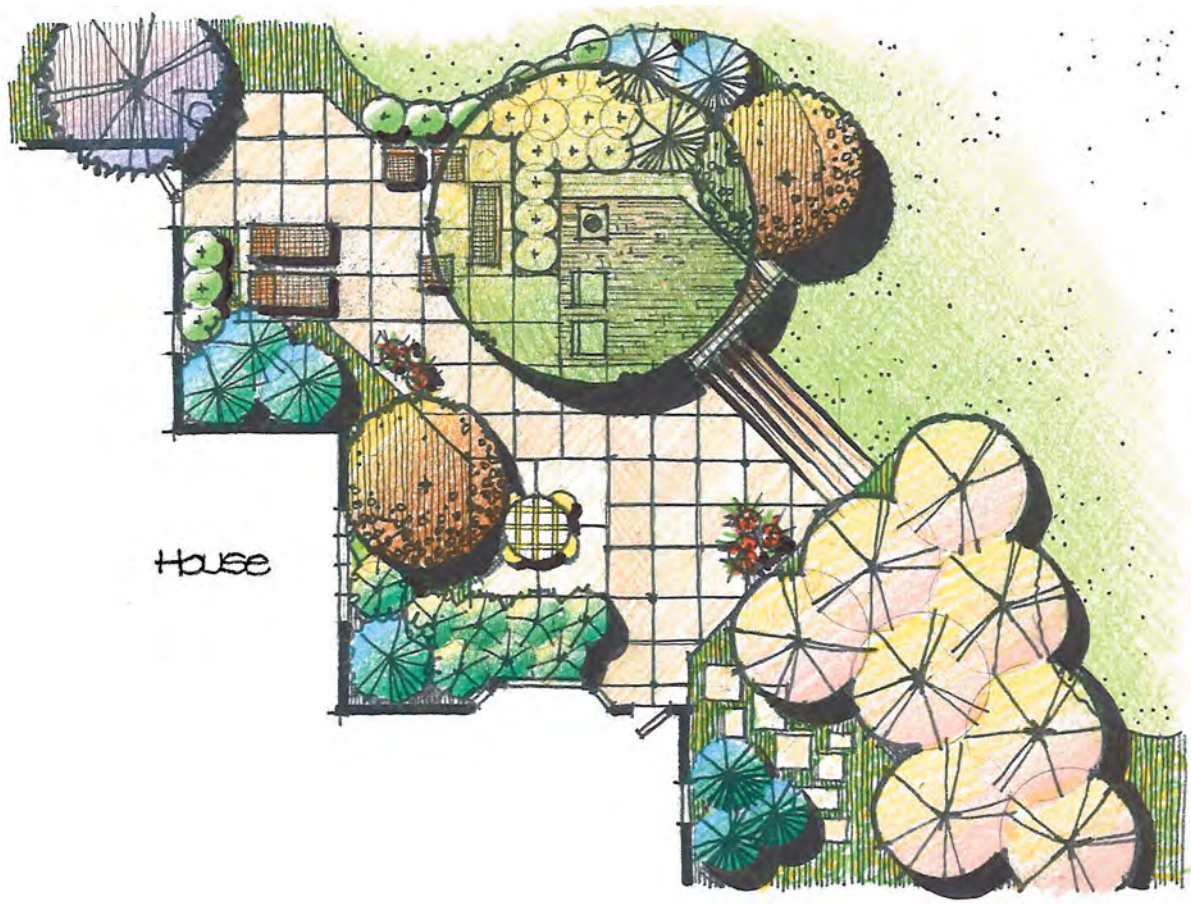


Figure 8–18
A complex configuration can create several small spaces around the perimeter of the central space.

Edges

The outside edge around a space can be established in different ways. It may be defined by a change of materials on the ground plane, slopes or changes in elevation, plant materials, walls, fences, and/or buildings. In turn, spatial edges may have a variety of characters based on the transparency of the edge. Thus, the line drawn around a bubble in the functional diagram can be elaborated to suggest transparency characteristics.

Transparency Transparency is the degree of opaqueness of a spatial edge, which influences how well it can be seen. Three types of transparency are (1) solid, (2) semitransparent, and (3) transparent (Figure 8–22).

1. Solid edges are those that cannot be seen through, such as a stone wall, a wood fence, or a dense mass of evergreen trees. This type of edge would be used where complete separation or privacy is desired.
2. Semitransparent edges are those that can be partially seen through, such as a wood lattice, a louvered fence, a panel of smoked Plexiglas, or a loosely foliated hedge. This type of edge provides a sense of spatial enclosure while maintaining some degree of openness.
3. Transparent edges are completely open, providing an unobstructed view into a desired area from the space. This type of edge could be created by a wall of glass or by the lack of a vertical plane.

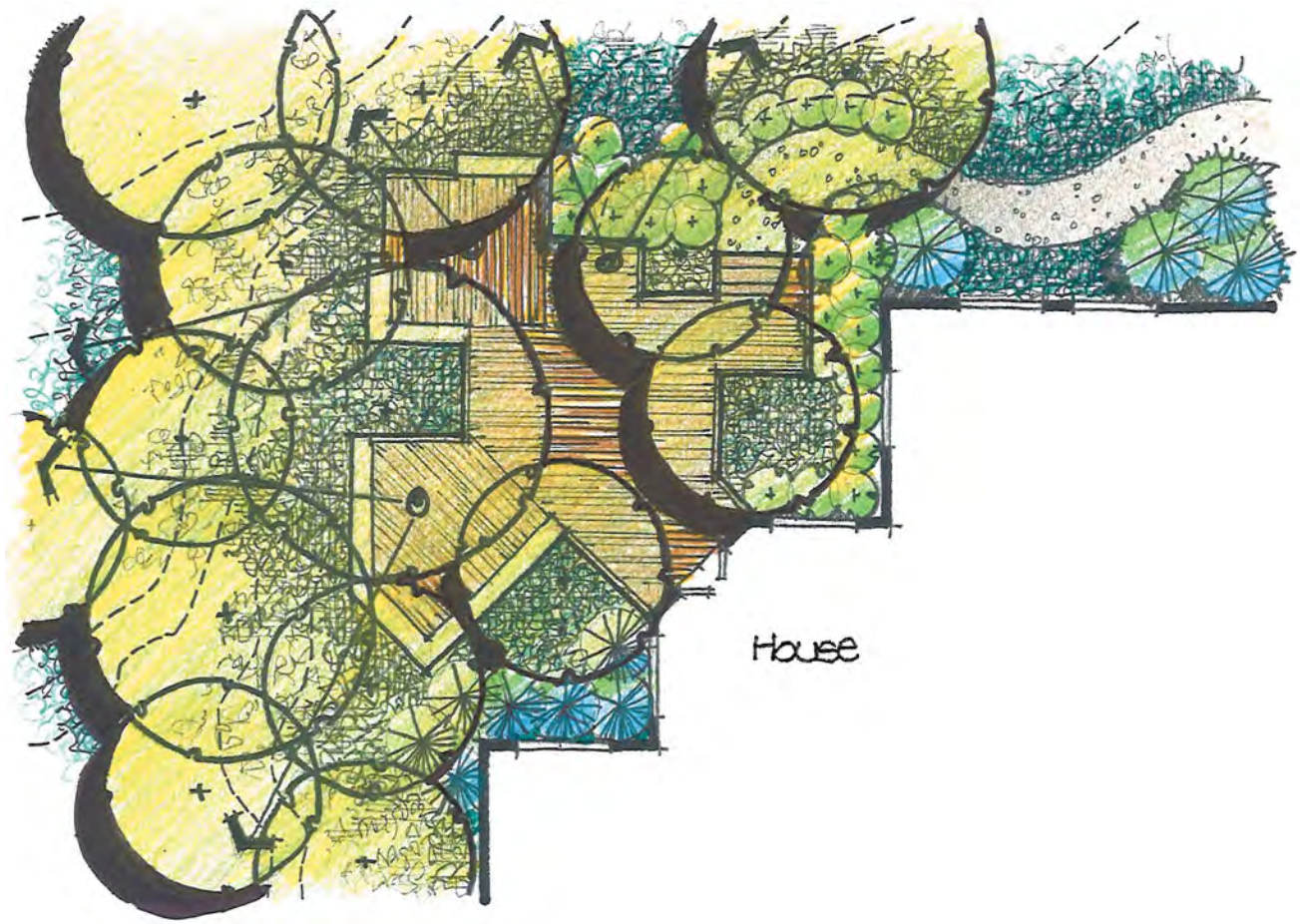


Figure 8–19
A complex configuration can provide perimeter subspaces with views directed out into the surrounding landscape.

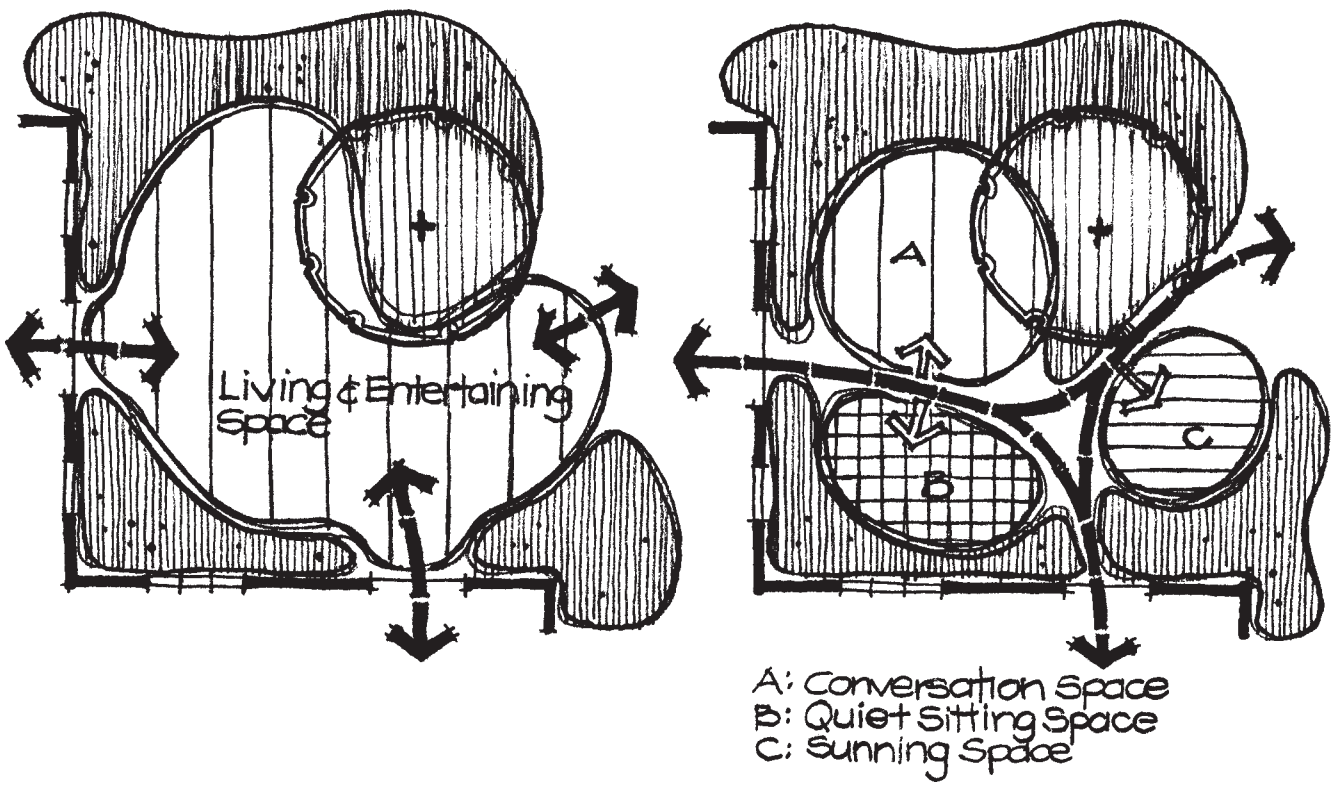


Figure 8–20
The spaces of a functional diagram can be subdivided into more specific functions.

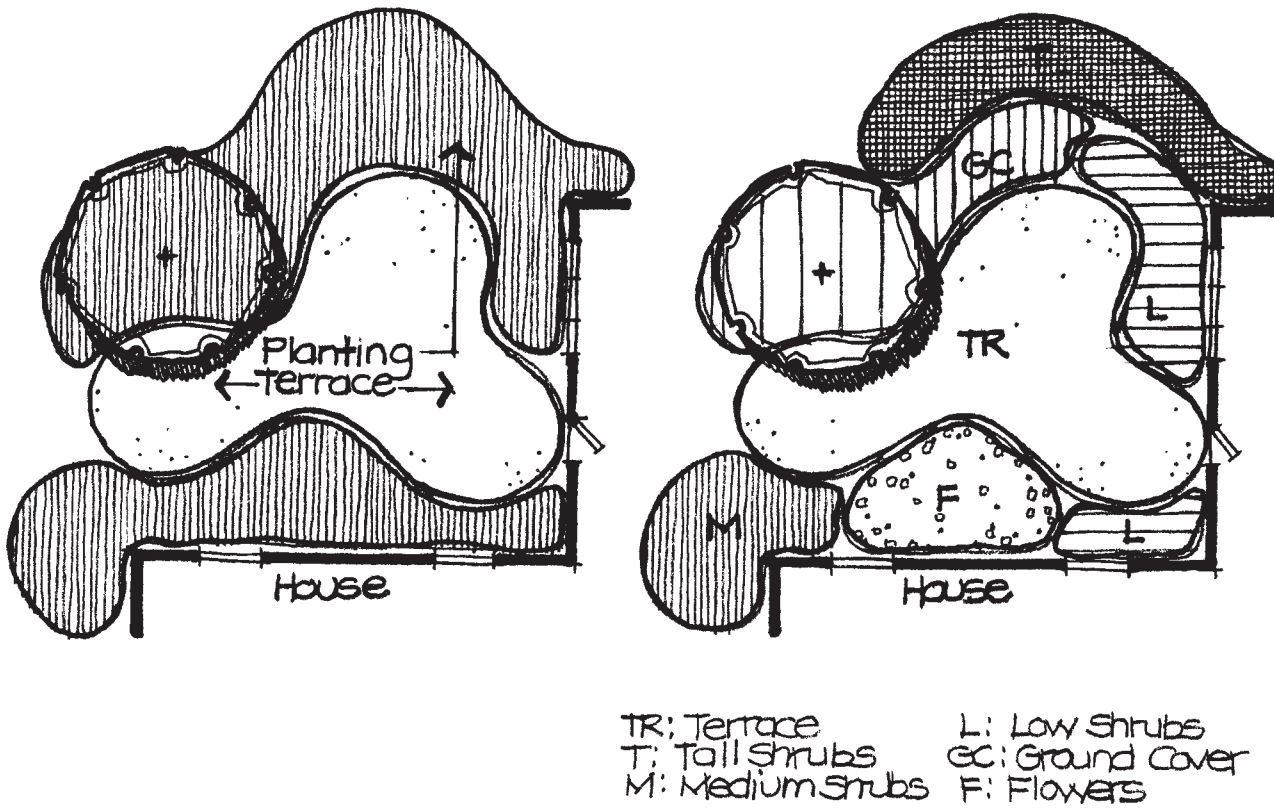


Figure 8–21
The planting areas on a functional diagram can be subdivided into more specific plant types.



Figure 8–22
Graphic examples of transparency.

Circulation

Circulation is concerned with the access points of spaces along with a generalized pattern of movement through the spaces. The points of entry and exit can be located on the diagram by drawing simple arrows at the desired locations (Figure 8–23). Here, the arrows indicate movement to and from the space. In addition to access, the designer should also study and determine the most significant paths of movement through those spaces where continuous circulation is planned. This can be designated with simple dashed lines and arrows pointing in the direction of movement. This should be done on the basis of the function of that space and should address only the major routes of movement, not every possible path of movement.

In considering circulation, the designer should ask several questions. Should the circulation occur through the middle of the space, around the outside edges of the space, or in a direct line from the entry to the exit, or should it casually meander throughout the space? The designer should study alternatives for circulation and decide which is most compatible with the intended function of the space (Figure 8–24).

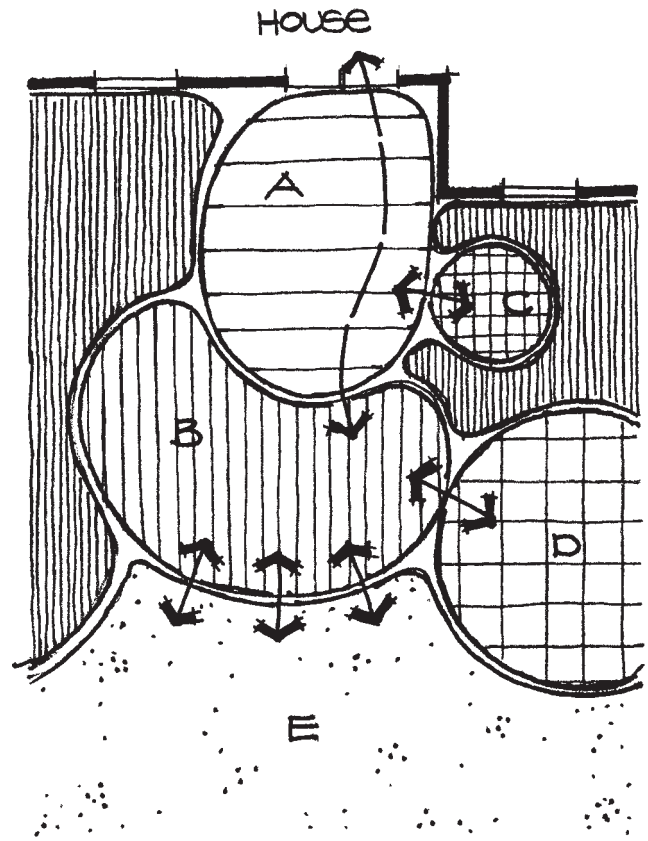


Figure 8–23
Entry and exit points as well as through circulation should be shown on a functional diagram.

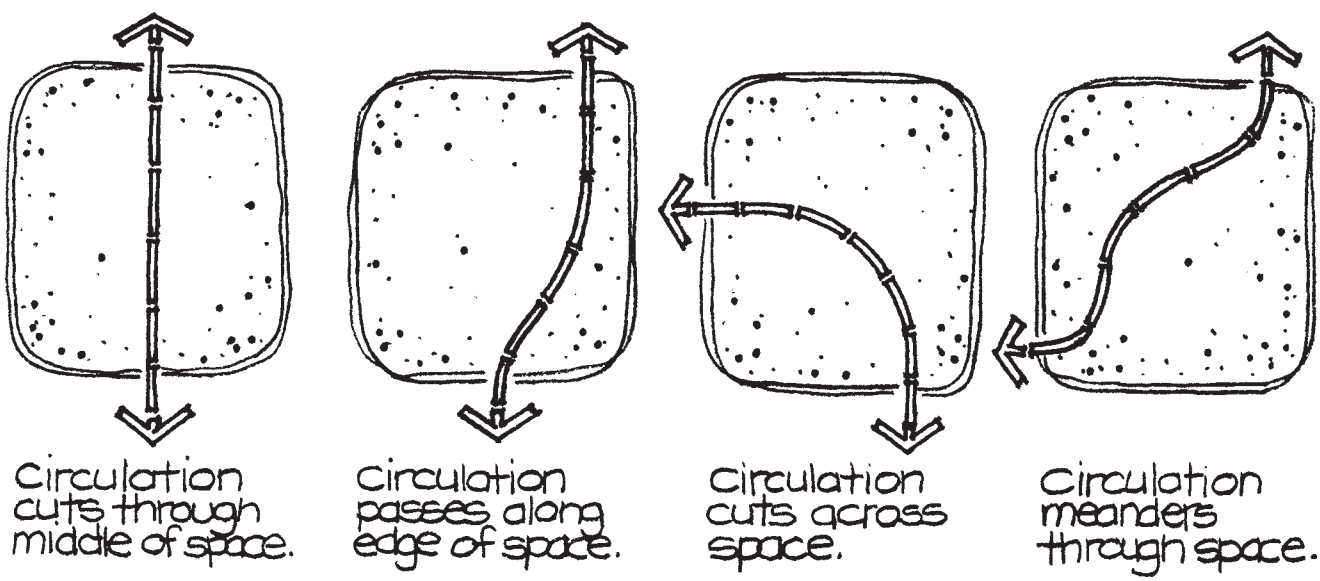


Figure 8–24
Alternative ways for circulation to move through a space.

Not only is the location of the circulation examined, but its intensity and character are also considered. As indicated before, the graphic symbols used to represent circulation are dashed lines and arrows. The specific type of arrow drawn can suggest, among other qualities, the intensity and character of the circulation.

Intensity The intensity of circulation is a factor of the frequency and importance of a circulation path. Two general types of circulation intensity are primary circulation and secondary circulation.

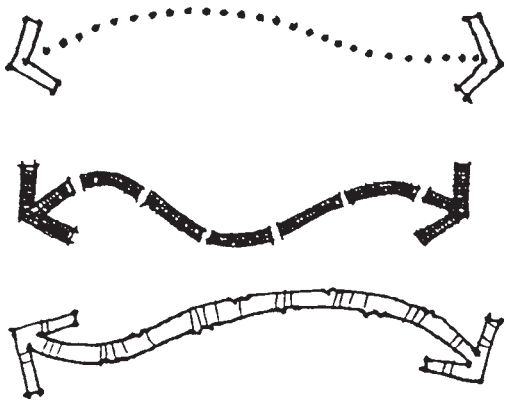


Figure 8–25
Graphic examples of primary circulation.

1. *Primary circulation.* This type of circulation is of major importance and occurs with moderate to high frequency. Examples of primary circulation include the front entry walk between the driveway and the front door or the connection from the inside living room through the exterior living and entertainment space into the lawn area.
2. *Secondary circulation.* This type of circulation is of less importance and occurs with lower frequency in comparison to primary circulation. A side route around the house or a casual garden path are examples of secondary circulation. Figure 8–25 and Figure 8–26 show graphic examples of primary and secondary circulation, respectively.

Views

Views are another factor that should be studied in a functional diagram. What a person sees or doesn't see from a space or a particular point within a space is important to the overall organization and experience of a design. During the development of a functional diagram, the designer concentrates on those views that are most significant to the major spaces of the design. The different types of views studied are (1) panoramic views or vistas, (2) concentrated or focused views, and (3) blocked views.

Panoramic View or Vista This type of view takes in a wide area and often emphasizes a view in the landscape that is some distance from the viewer. It is an encompassing view. A view to a distant mountain range, to the valley below, or out onto an adjoining golf course are a few examples. When these views extend off the site to adjoining or distant points in the landscape, they are referred to as *borrowed landscapes.* These are typically good views that a designer attempts to enframe or, at the very least, leave unobstructed so they become part of the design's visual experience. Figure 8–27 shows graphic examples of a panoramic view.

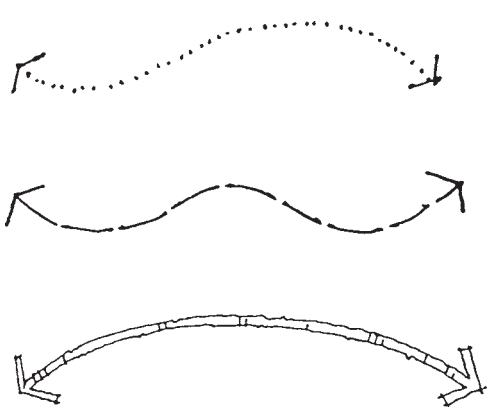


Figure 8–26
Graphic examples of secondary circulation.

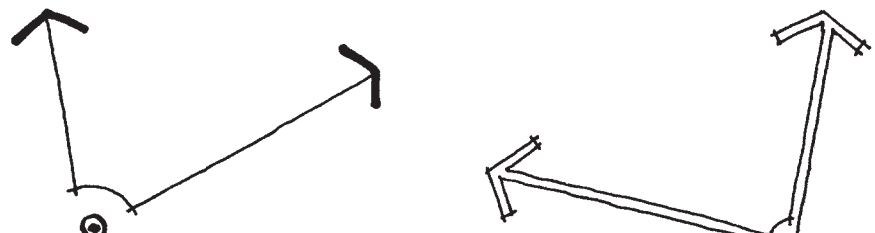


Figure 8–27
Graphic examples of panoramic views.

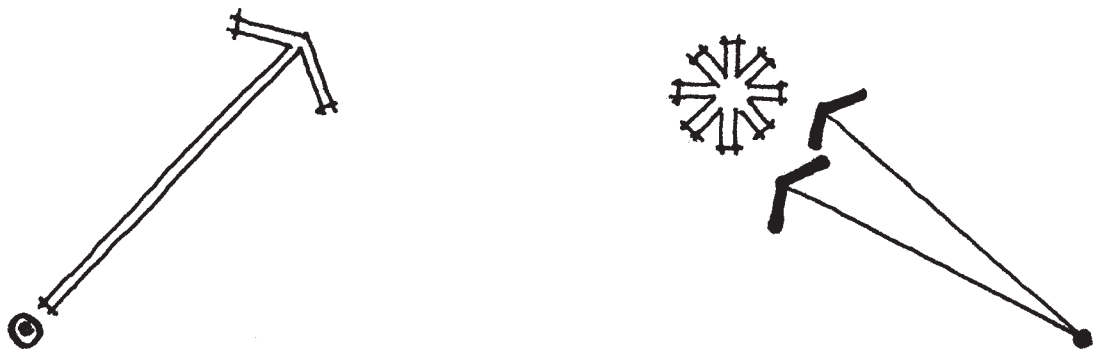


Figure 8–28
Graphic examples of concentrated views.

Concentrated or Focused View This type of view focuses on a particular point in the landscape, such as a piece of sculpture, a unique tree, or a bed of showy flowers. A concentrated view may be to a point either on or off the site. Figure 8–28 shows how a concentrated view might be shown in a functional diagram.

Blocked View This type of view is an undesirable view that needs to be screened. High plant materials, walls, fences, and so on can all be used to block unsightly views. Graphic examples for indicating blocked views are illustrated in Figure 8–29.

Focal Point

Focal points, closely associated with views, are visual accents or elements that are unique and stand out in contrast to their surroundings, such as a gnarled tree, a water feature, attractive spring flowers, a piece of sculpture, or a large tree. It is important to plan the location of focal points in functional diagrams so they can be coordinated with views. Focal points should be strategically placed to highlight special points of the landscape. They should not be overused and scattered indiscriminately throughout an area, as this will create a chaotic appearance requiring the eye to look at too many different accents. A few graphic examples for focal points are shown in Figure 8–30.

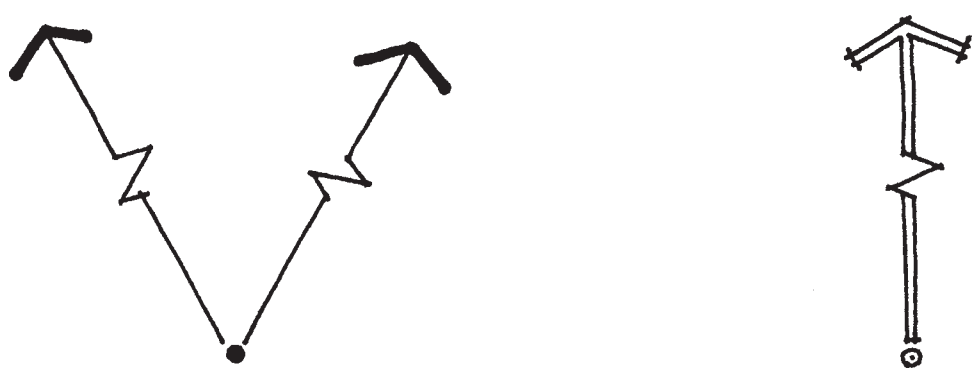


Figure 8–29
Graphic examples of blocked views.



Figure 8–30
Graphic examples of focal points.

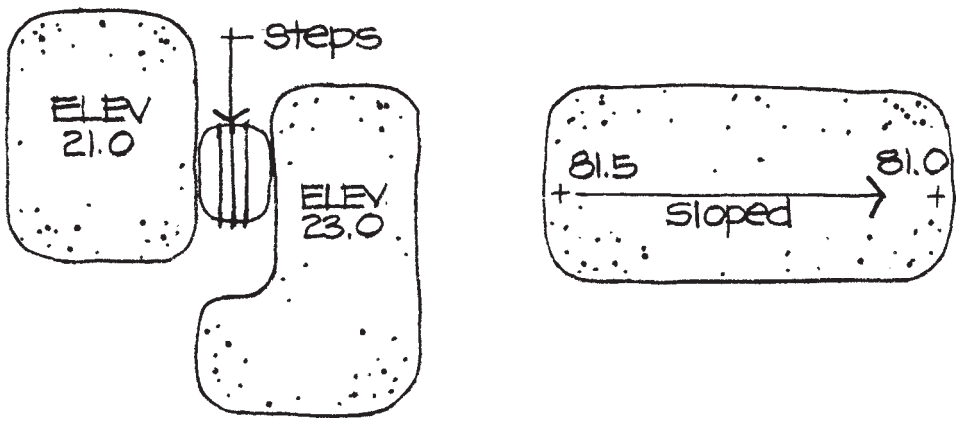


Figure 8–31
Elevation changes between spaces can be expressed with spot grades.

Elevation Changes

Elevation changes should also be studied during the development of functional diagrams. It is during this stage that the designer should start thinking about the third dimension of the ground plane. The designer might ask: "Should one have to go up from the lawn area to the outside entertaining space, or should the two spaces be at the same elevation? If there is to be a change, about how much should it be? One foot? Three feet?"

One way elevational changes between spaces can be expressed in a diagram is by means of spot grades (Figure 8–31). This method allows the designer to determine what space is higher than another and by approximately how much. Another way of indicating elevation change in the functional diagram is by lines that represent step locations along a circulation path (Figure 8–32).

As can be seen from the preceding paragraphs, there are a number of factors of design organization that need to be thought about during the functional diagram phase. It is not always easy to study all these factors together, but it is essential to do so. It is necessary to examine each of these factors in association with the others so the overall design can function in a logical, well-planned, and coordinated manner. The more study given to the organization of a design at this time in the design process, the easier the design decisions become in subsequent phases.

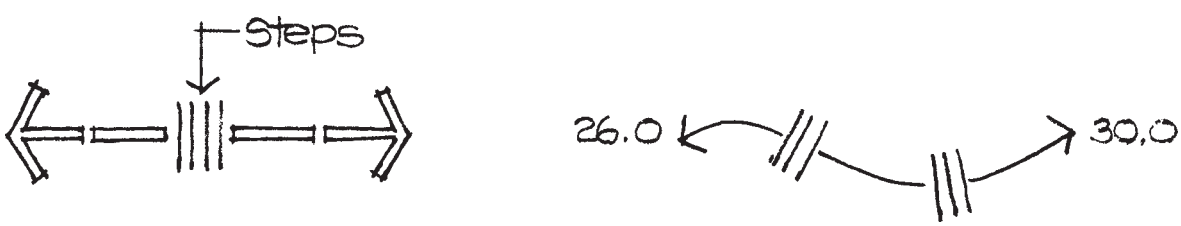


Figure 8–32
Lines can be used within a circulation path to graphically indicate general step locations.

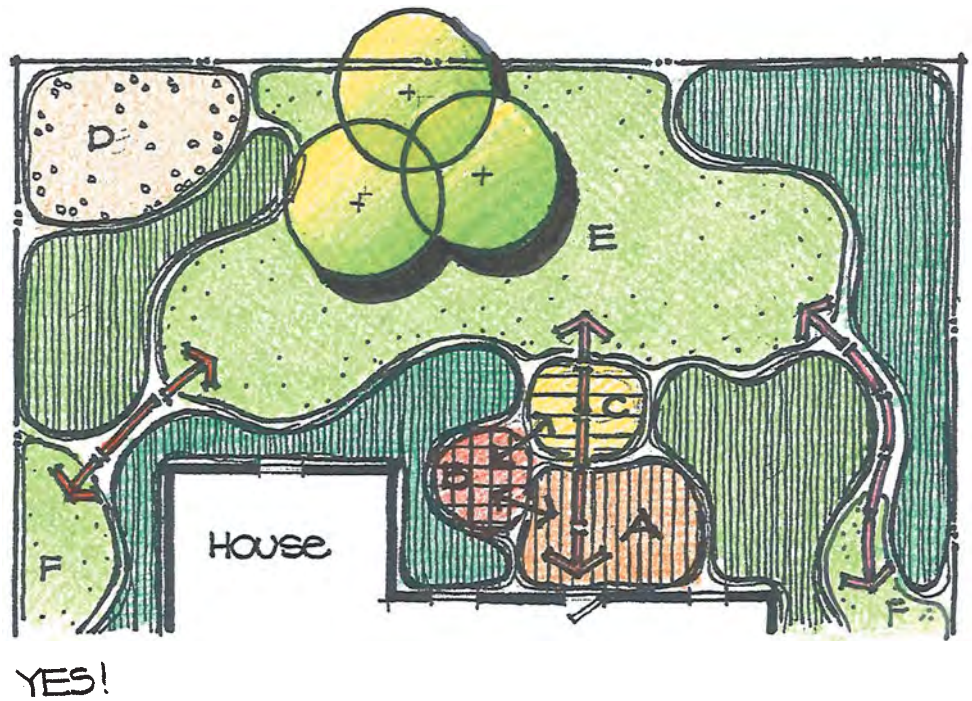


Figure 8–33
The entire site area should be covered with bubbles and other symbols in a completed functional diagram.

FUNCTIONAL DIAGRAM SUMMARY

As stated earlier, the designer should study the different design factors when preparing a functional diagram. Each of these factors influences the others and should be studied in concert with one another. When the functional diagram is completed, the entire site area should be covered with bubbles and other graphic symbols representing all the necessary spaces and elements of the design (Figure 8–33). There should be no blank areas or "holes" in the layout (Figure 8–34). When this occurs, it indicates the

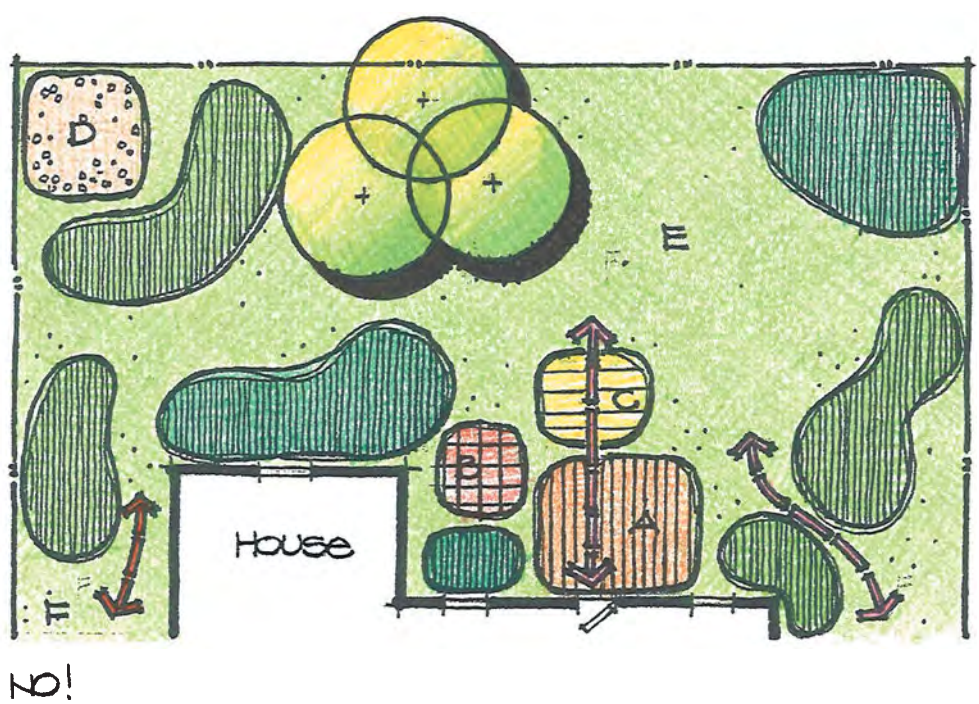


Figure 8–34
There should be no blank areas or holes on a completed functional diagram.

designer has not made a decision about the use of this area of the site, and it should be determined what will occur there.

Another suggestion for this step of the design process is to remember to use alternatives. In fact, it is advisable to try two or three quickly developed alternatives for the overall site organization. Alternatives encourage the designer to be creative about organizing the site functions and to perhaps discover a better way of solving a problem than was initially apparent. With a series of alternatives, the designer is better able to pick the one alternative or combination of alternatives that is best for further elaboration in the next step of design.

DUNCAN RESIDENCE DIAGRAMS

To better illustrate the thought process involved in the preparation of functional diagrams, let us return to the Duncan residence. Having completed all the steps of the research and preparation phase, the designer is now ready to prepare a series of functional diagrams for the Duncan residence.

Figure 8–35 shows the first attempt to organize all the major spaces and elements for the Duncan residence in a functional diagram. The diagram shows a widened entrance walk that extends some distance along the driveway to permit better recognition of the main entrance and easy access from the driveway. The sitting space is placed adjacent to, but separate from, the entrance walk so circulation will not disturb or divide the space. Planting areas are woven in and around these spaces to help define them and to provide visual interest for a person walking along the entrance walk. The existing Sugar Maple is integrated with this planting.

Secondary circulation has been provided around the east side of the house for access between the driveway and the proposed work/storage space. The work/storage space is located near the side door of the garage for convenience and placement out of view from both the indoor and outdoor living spaces. The west side of the house, by contrast, is left open except for a mass of trees for afternoon shade.

In the backyard, the proposed raised terrace would function as an outdoor eating space near the family room and sitting room. The grill is located to the northeast of this space so smoke from the fire would be blown away from the space (prevailing wind is from the southwest). The outdoor living and entertaining space is placed farther from the house so it can take advantage of views into the rest of the backyard. The eating space is made more private with the suggestion of a privacy fence on the east side of the space, and the living and entertaining space is partially surrounded by plant materials for privacy.

The lawn area in the backyard has been left open and spacious to allow for recreation and games. Some screening on the west, north, and east gives privacy that is now lacking in the backyard. The play area in the northeast portion of the site has been left where it presently exists so it will be very visible for supervision from the house. The existing tree in the northeast corner is also retained and integrated with additional plantings so it will not appear as an isolated element.

Figure 8–36 shows another alternative. In this concept, the sitting space in the front has been integrated with the existing stoop, making one large space rather than two isolated ones. The entrance walk has been separated from the driveway by planting areas to cut down on the visual massiveness of the driveway's pavement. In addition, a turn-around has been proposed to make it easier to back out of the driveway. Planting occurs on both sides of the driveway near the street to soften and subtly hide the driveway. In the backyard, the outside eating and living/entertaining spaces are located so they function as outdoor extensions of the family room by converting the existing window into a sliding glass door. The play area has been moved so it will not be

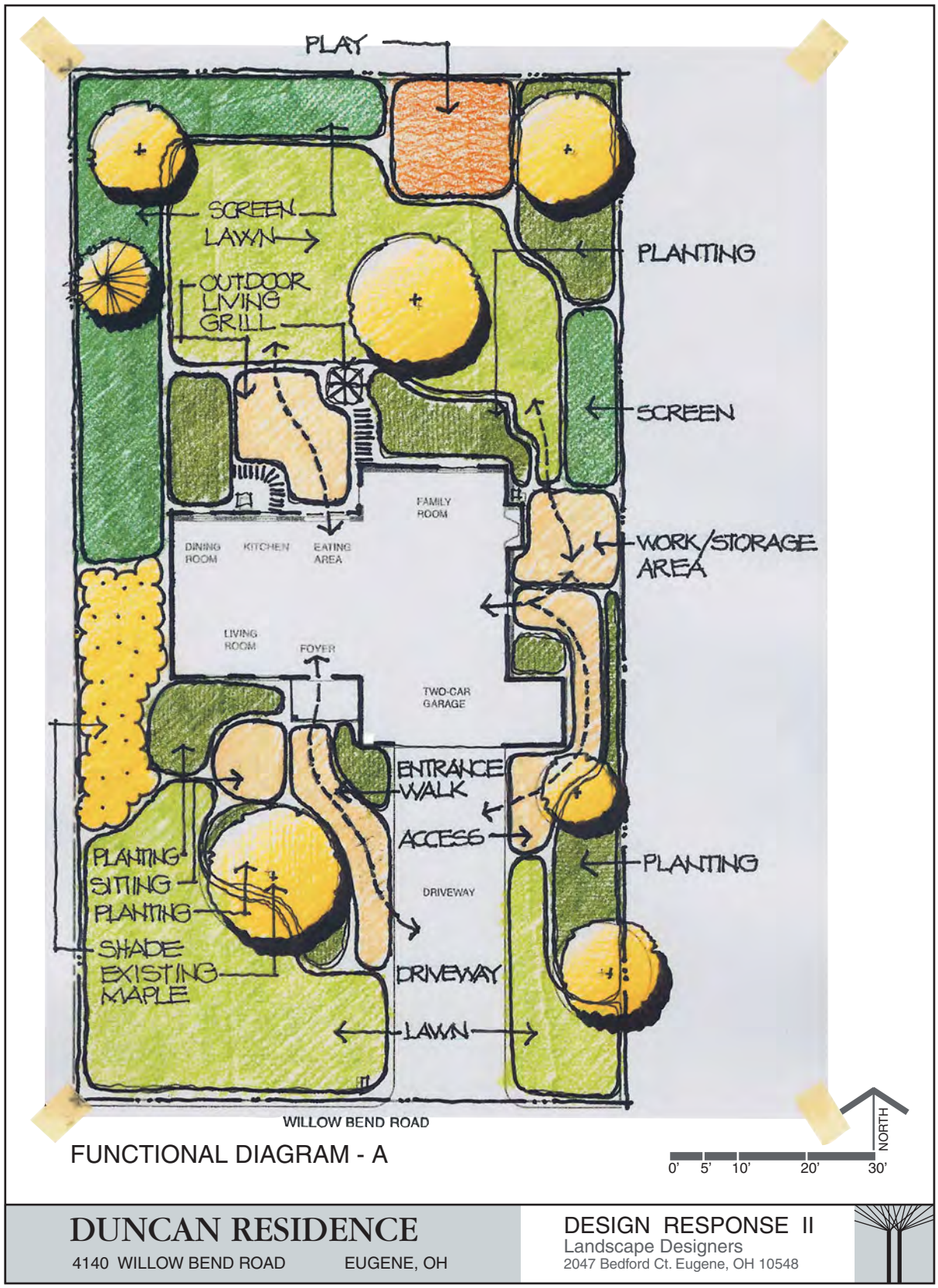


Figure 8–35
Functional Diagram "A" for the Duncan residence.

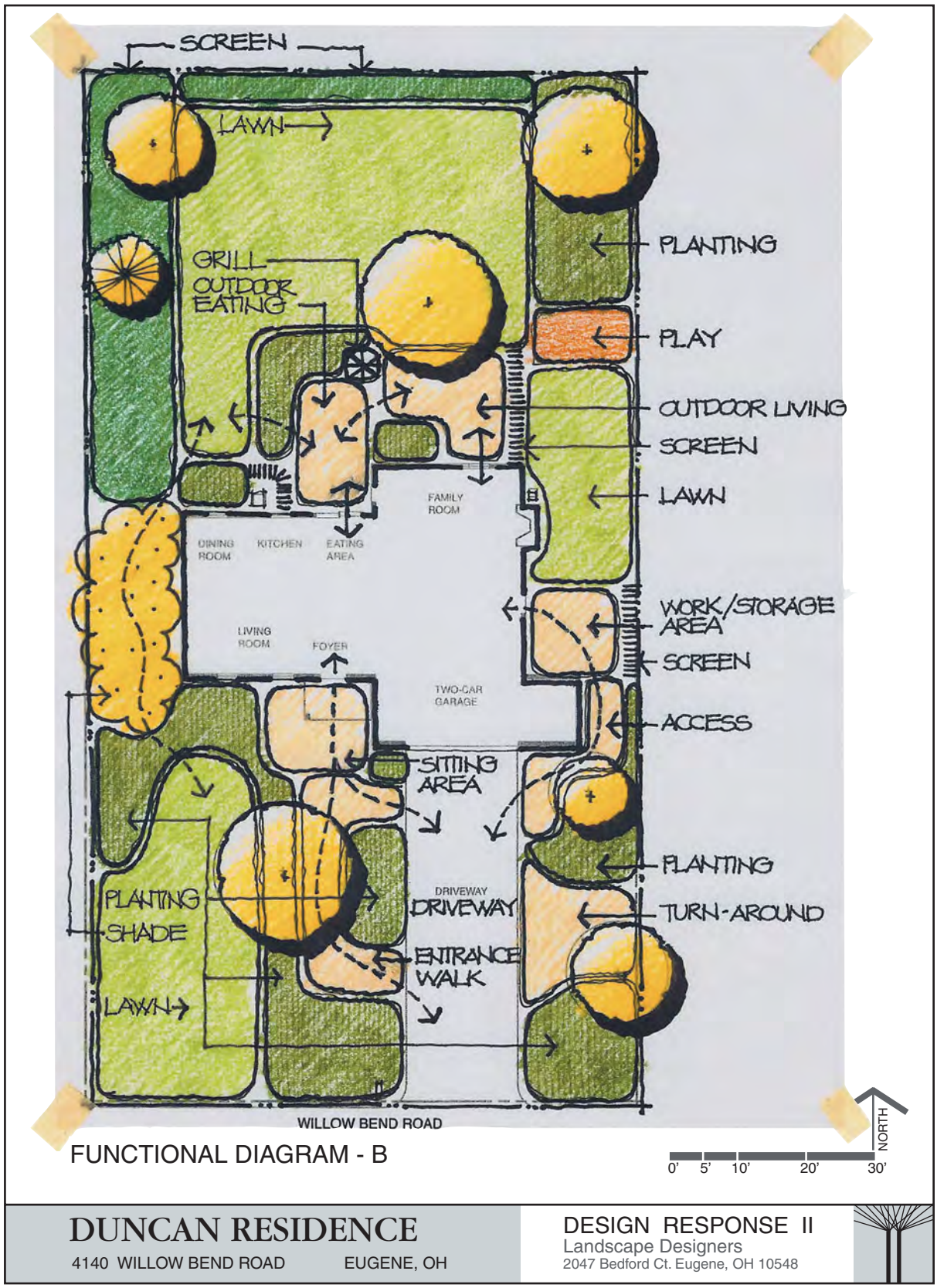


Figure 8–36
Functional Diagram "B" for the Duncan residence.

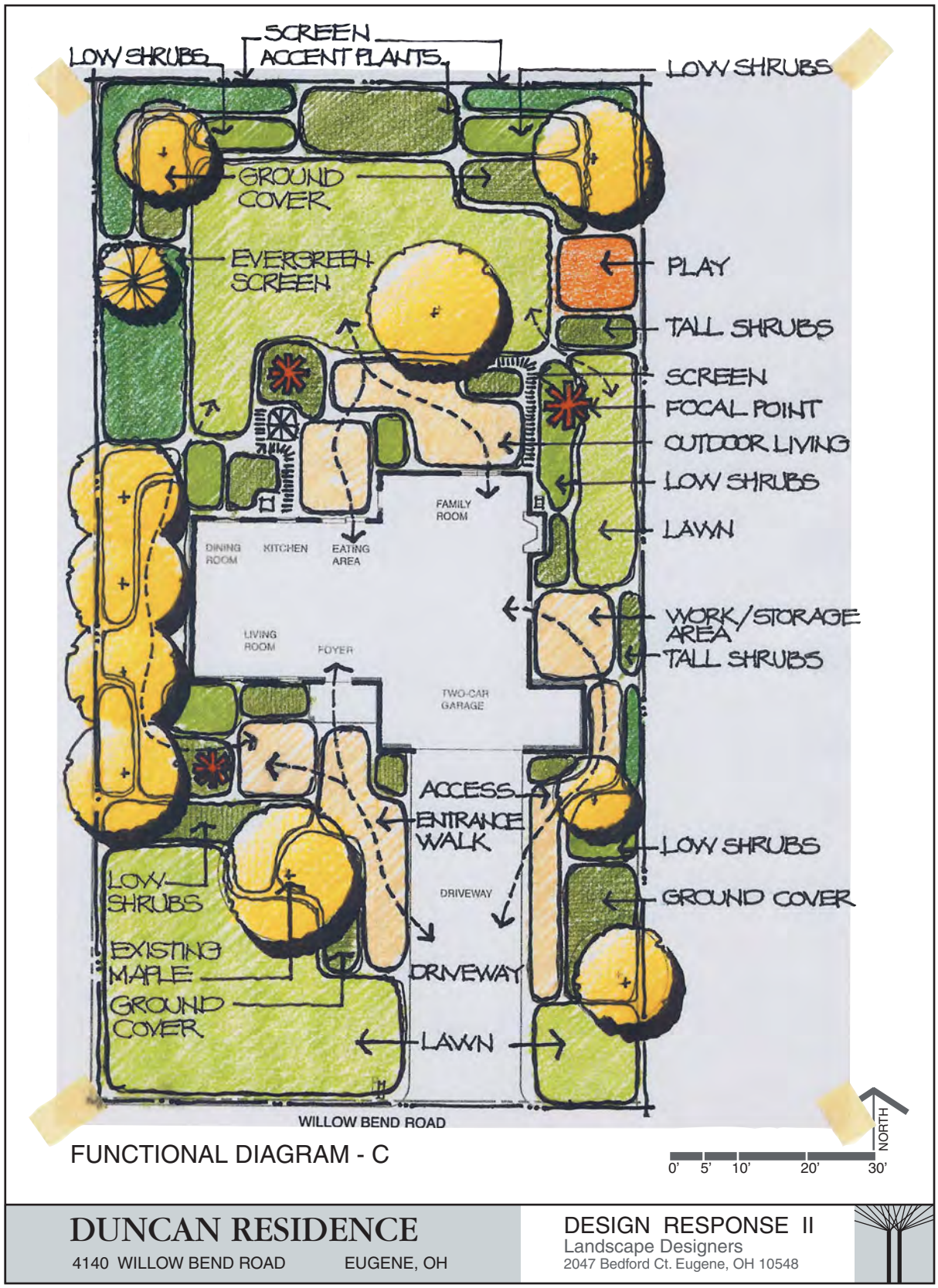


Figure 8–37
Functional Diagram "C" for the Duncan residence.

such an obvious element to look at. It is still located where it can be seen from the outdoor living spaces. And a narrower screen has been suggested along the northern property line so it will not take up as much area of the backyard.

Each of these alternative functional diagrams explores a different way of organizing the required spaces and elements on the site. As in most typical situations, the Duncans and the designer found some of these more appealing than others. After reviewing the two alternative diagrams, the Duncans decided they liked a combination of ideas from the different diagrams. So, the designer took the Duncans' preferences and produced one more functional diagram, Diagram "C" (Figure 8–37).

The front yard of the Duncan residence in the functional diagram has been given more study. The configuration of the entry foyer/sitting space, entrance walk, and lawn area have been modified. The entry foyer/sitting space has now been subdivided into more specific use areas and the location of the seating has been suggested. The planting areas have also been subdivided to indicate the general location of different types of plants (though no shrubs or ground cover have been shown as individual plants). In addition, study has been given to the relative ground elevation of the various spaces. This functional diagram indicates the entry foyer/sitting space is to be about one foot above the entrance walk. Views and focal points are other factors that now appear on this functional diagram. The same considerations are given to the backyard.

SUMMARY

The creation of functional diagrams entails logical, thoughtful attention to the site's functional organization. The more consideration given to this phase of the design process, the easier the subsequent steps are. You should understand the following about functional diagrams:

- Definition, purpose, and importance of functional diagrams
- Design factors that should be considered while preparing functional diagrams
- Role of the site analysis in creating functional diagrams
- Considerations for determining where spaces and uses should be located on a site
- Implications of different plan proportions on the use of outdoor space
- Potential configurations of a space and the effect of each on the quality and use of that space
- Alternative edge conditions of a space and the effect of each on the quality and use of that space
- Types of circulation that can occur in and/or through outdoor rooms
- Different types of views that can be planned for in functional diagrams
- How and why elevation changes can be studied in functional diagrams
- Overall graphic quality and typical symbols used in drawing functional diagrams

9

Preliminary Design and Design Principles

INTRODUCTION

Chapter 8 discussed how functional diagrams are used to establish the overall functional and spatial organization of a design during the first step of the design phase. The organization of all these factors in a functional diagram furnishes the structure and foundation for the next step of the design process: preliminary design.

Preliminary design starts with the functional diagram and ends with an illustrative site plan, which may be supplemented with sections, elevations, and perspectives depicting all the elements of the design in a semirealistic graphic manner. To complete a preliminary design, the designer examines three interrelated factors. The first is careful consideration of the aesthetic organization and appearance of the design based on knowledge and application of three basic design principles: order, unity, and rhythm. These principles help the designer create a visually pleasing design solution.

The second factor, called form composition, is the study of the exact location of all two-dimensional edges and lines of the design. The designer accomplishes this by converting the approximate outline of spaces developed earlier in the functional diagrams to specific two-dimensional forms. This step begins to establish the visual style or theme of the design.

The third factor examined in preliminary design is spatial composition. Spatial composition is the third dimension of outdoor rooms that are based on the foundation of the form composition. The designer uses grading (landform), planting, walls/fences, steps, overhead structures, and so on, to complete the total environment of the design during this step.

The objectives of this chapter are to (1) discuss the definition and purpose of a preliminary design, (2) outline the process for developing a preliminary design, and (3) discuss the basic principles of design. The other important aspects of preliminary design are discussed in Chapter 10 (form composition) and Chapter 11 (spatial composition).

DEFINITION AND PURPOSE

Preliminary design is the first step of the design process in which a freehand illustrative site plan is prepared in a semirealistic graphic manner. The term *semirealistic* means that the graphic symbols combine realism with abstraction. In other words, the

graphic symbols are stylized impressions of the actual elements. The plan gives the clients a view of the entire design "as seen from an airplane," with all the elements drawn to scale (Figure 9–1).

The purposes of preliminary design are to (1) provide the designer and clients with a comprehensive view of the entire design, (2) study the coordination of all elements of the design, (3) study the appearance and aesthetics of the design, and (4) provide the clients with an opportunity to give feedback to the designer.

Comprehensive View

One purpose of the preliminary design is to allow both the designer and the clients to study and analyze the design as a total environment. In a way, preliminary design is the first complete picture of the proposed design. Although the functional diagrams also showed the entire design solution, they did so in a more general and functional manner. By comparison, the preliminary plan studies all the design elements that will make up the environment and graphically depicts them in a more exact and realistic manner.

Coordination of Elements

Another purpose of preliminary design is to study the visual relationships among the design elements. The designer considers the placement, size, form, and general material of each element in the context of other surrounding elements. For example, a wall or fence is studied in association with an adjoining pavement. Or the placement of a shade tree is coordinated with other surrounding plant materials. Each element is studied as a portion of the overall design, not as an isolated or separate piece.

Design Appearance and Aesthetics

One of the major purposes of preliminary design is to study the design appearance of the spaces and elements. The aesthetics of the entire design as well as individual elements within the design are primary concerns during preliminary design. In this step, the designer begins to make choices about size, form, and general material of all elements in the design. Although decisions are not made about specific patterns of materials, the designer does select among general material types. For example, the designer might choose between stone or brick, wood or concrete, deciduous or evergreen, and so forth. The basic principles of design are also taken into account to create an overall design pleasing to the eye.

Clients' Feedback

The preliminary design can usually be understood by the clients with explanations by the designer, though some clients have difficulty understanding a plan drawing regardless of how nice it looks. In a preliminary plan, trees resemble trees, a deck seems believable because of the wood symbols, and pavement is understandable because the clients can see stone, brick, or concrete represented on the plan.

Frequently, the preliminary design is the clients' first exposure to the design, and it is often their first chance to voice thoughts and feelings about it to the designer. This is critical for both the designer and the clients. The designer needs to know how the clients feel about the design in order to understand whether or not it meets the clients' expectations. Likewise, it is important for the clients to give feedback. It is improper for the designer to possess a "take it or leave it" attitude toward the design. Ultimately, the design will be something the clients live with day in and day out, and so it must be acceptable to them. They are apt to feel more positive toward a solution when they have been involved in its creation. The clients will not only be more understanding about the design, but they will also have had a personal involvement in its growth.

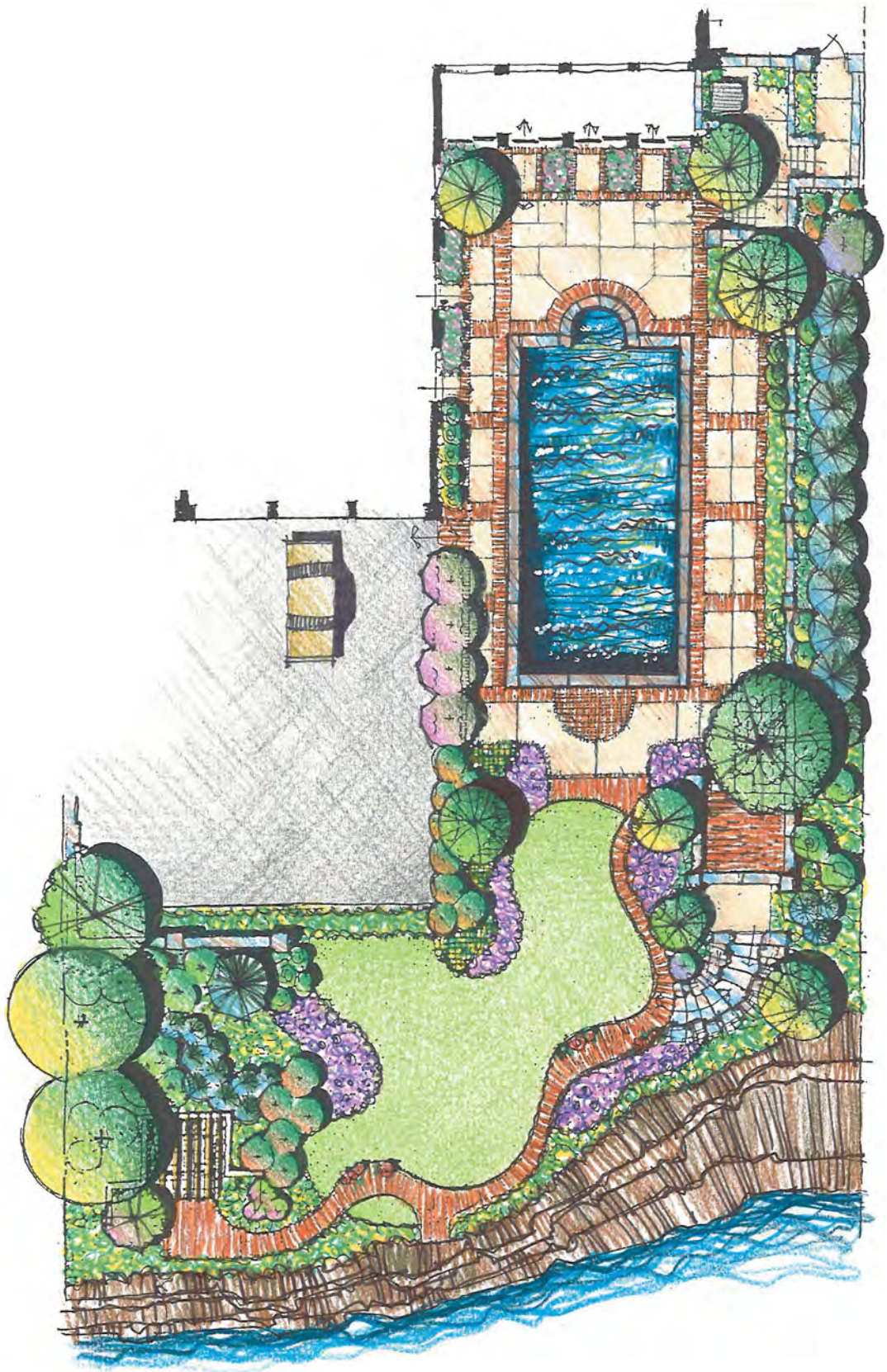


Figure 9–1
Sample preliminary site plan.

The preliminary design is an intermediate solution that requires further refinement based on the reactions of the clients and/or the designer. The clients often see things within the preliminary design that need to be changed. Likewise, the designer may want to restudy portions of the design in order to improve it. It is not unusual for the designer to study a series of alternatives and refinements during preliminary design. Because all the elements are being studied in a coordinated effort, the designer may very well see things differently in comparison to earlier phases, and thus may want to make appropriate adjustments.

PROCESS AND CONTENT

During preliminary design, the initial plan studies should be developed as tracing paper overlays on top of the best alternative functional diagram so that the organization of this earlier step can be carried directly into the preliminary design. Later, as the preliminary design evolves, the functional diagram may be set aside. In some cases, the initial layout of the functional diagram may be altered during preliminary design because the designer is now looking at the design in a more complete and detailed fashion. For example, a space designated for planting may have to be enlarged to accommodate the size and number of plants that are to be placed in the area. Or the proportion and/or configuration of a space may need to be revised to make it more visually attractive. The designer seldom considers any portion or phase of the design to be sacred or outside the possibility of improvement during preliminary design.

As during the development of the functional diagrams, preliminary design ideas are drawn freehand with a soft pencil on tracing paper. Drafting equipment should be set aside because these instruments only get in the way of the quick and spontaneous thinking desirable during preliminary design. For beginners, there is often a great temptation to use drafting equipment at this point, owing to the belief that the drawing will look neater and more professional. This is generally not true. As seen in Figure 9–1, a preliminary plan drawing can be clearly legible and professional looking even when drawn freehand.

The preliminary design, as mentioned before, should graphically show all the elements of the design solution in a semirealistic manner. This graphic style is sometimes referred to as being illustrative because it attempts to illustrate the appearance of the design elements. To do this, the designer should rely on fundamental principles of drawing such as line weight variation, value contrast, use of textures to describe the appearance of materials, and use of shadows to accentuate the third dimension in the drawing. Usually, a preliminary design plan should show the following to scale:

A. Property lines and adjoining street(s).
B. Outside walls, including doors and windows, of the house. Although it is desirable to have a scaled floor plan of the interior of the house, this is not necessary. However, it is recommended to at least label where the various rooms are within the house.
C. All elements of the design drawn and illustrated with the proper symbols and textures including:
    1. pavement materials.
    2. walls, fences, steps, overhead structures, and other structures.
    3. plant materials. Trees should be drawn as individual plants, whereas shrubs should be shown in masses.
    4. water fountains, pools, and so on.
    5. furniture, potted plants, and so on.

In addition, the preliminary design plan should identify the following with notes or a legend on the drawing:

1. Major use areas such as outside entry foyer, entertaining area, eating area, lawn, and garden.
2. Materials for pavements and other structures (walls, steps, overhead trellises, etc.).
3. Plant materials by general types and sizes (deciduous shade tree, 20-foot-high coniferous evergreen tree, 6-foot-high broad-leaved evergreen shrubs, and so on).
4. Major elevation changes on the ground plane by the use of contours and spot grades.
5. Other notes that help describe the design to the clients.
6. North arrow and scale.

DESIGN PRINCIPLES

A number of basic design principles give the designer aesthetic guidance during preliminary design. Just as functional diagrams help to provide the functional organization for a residential design project, the design principles aid in establishing the visual and aesthetic organization of a design. Different sources and authorities of design theory often identify slightly different terminology and cataloguing of the various design principles. Yet they are similar in contending that certain fundamental approaches to design contribute to a pleasing composition. This book suggests that the three primary design principles are order, unity, and rhythm.

The design principles of order, unity, and rhythm are guidelines for the design composition of forms, materials, and material patterns of the spaces and elements. When the design principles are not used, the design is apt to be unpleasant to the eye (Figure 9–2). Such a design is described as being uncoordinated, chaotic, and visually disturbing. On the other hand, when the design principles are sensitively applied, the design is apt to be visually attractive (Figure 9–3).

The design principles are fundamental concepts of composition that have evolved through time and experience and are applied in a range of design fields including landscape architecture, architecture, interior design, industrial design, graphic design, and photography. The design principles are extremely useful for beginning designers because they aid in making decisions about selection and composition of forms and materials. However, these principles are not formulas. Their application does not ensure that a design solution will automatically be visually pleasing. As you have learned throughout this book, a successful design depends on numerous factors. The design principles do help make a good design more possible, and neglecting them will almost certainly result in a less than adequate design. Like other design guidelines, the design principles are not absolute rules that must always be followed. A skilled designer may in fact contradict selected design principles and still create a visually successful design.

Order

Order is defined as the "big picture" or overall framework of a design. It is the underlying visual structure of a design. In trees, order is evident in the trunk and branch structure (as seen without leaves in the winter). It is the trunk and branches that determine the overall form of the tree. The leaves merely reinforce this structure. Similarly, the skeleton of any animal also establishes order. The height, width, and shape of the animal all depend on the skeleton. In man-made objects, we see the establishment of order in buildings in the structural frame that is constructed before the walls and roof are installed. Walls, roofs, doors, windows, and other architectural elements are then added over the underlying framework.

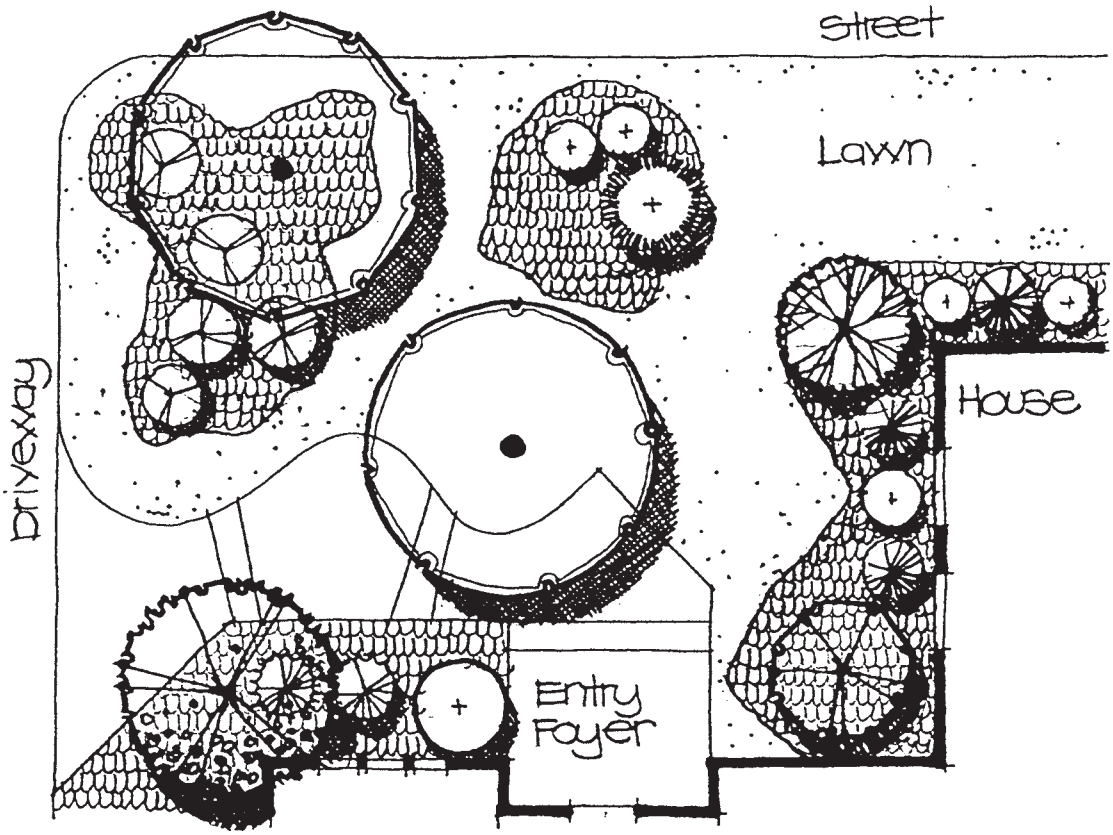


Figure 9–2
A residential site design is unappealing to the eye when basic design principles are not used.

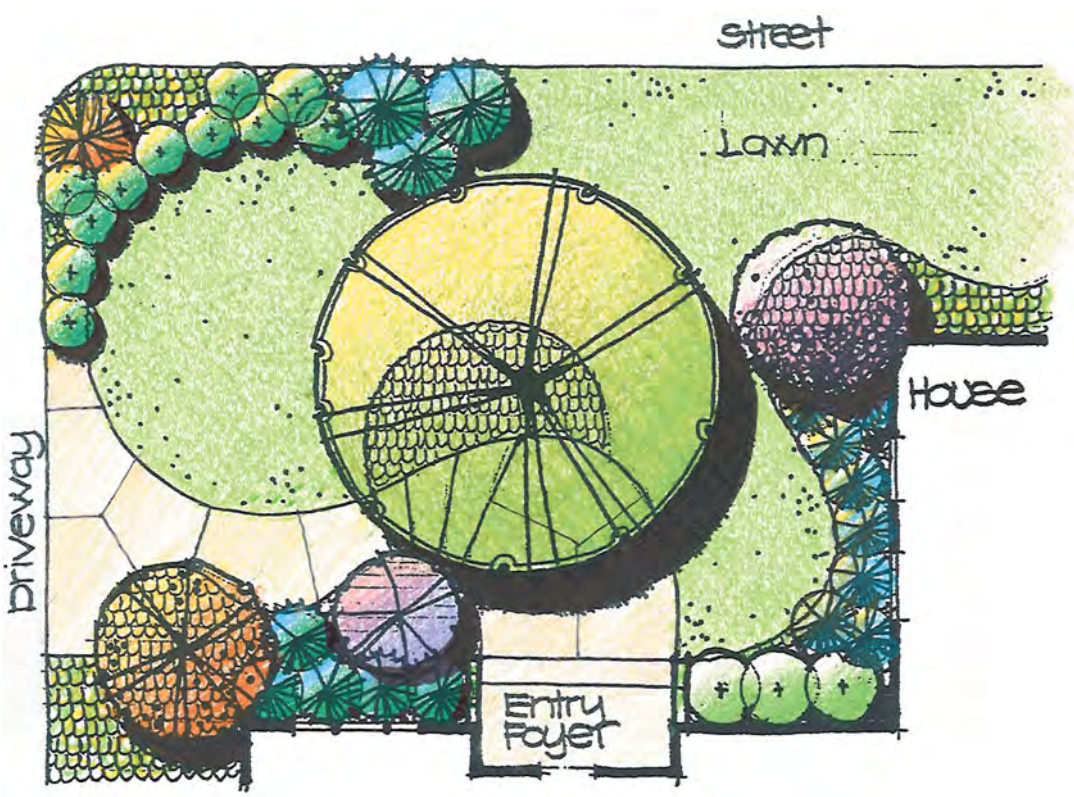


Figure 9–3
A residential site design is attractive and organized when basic principles of design are used.

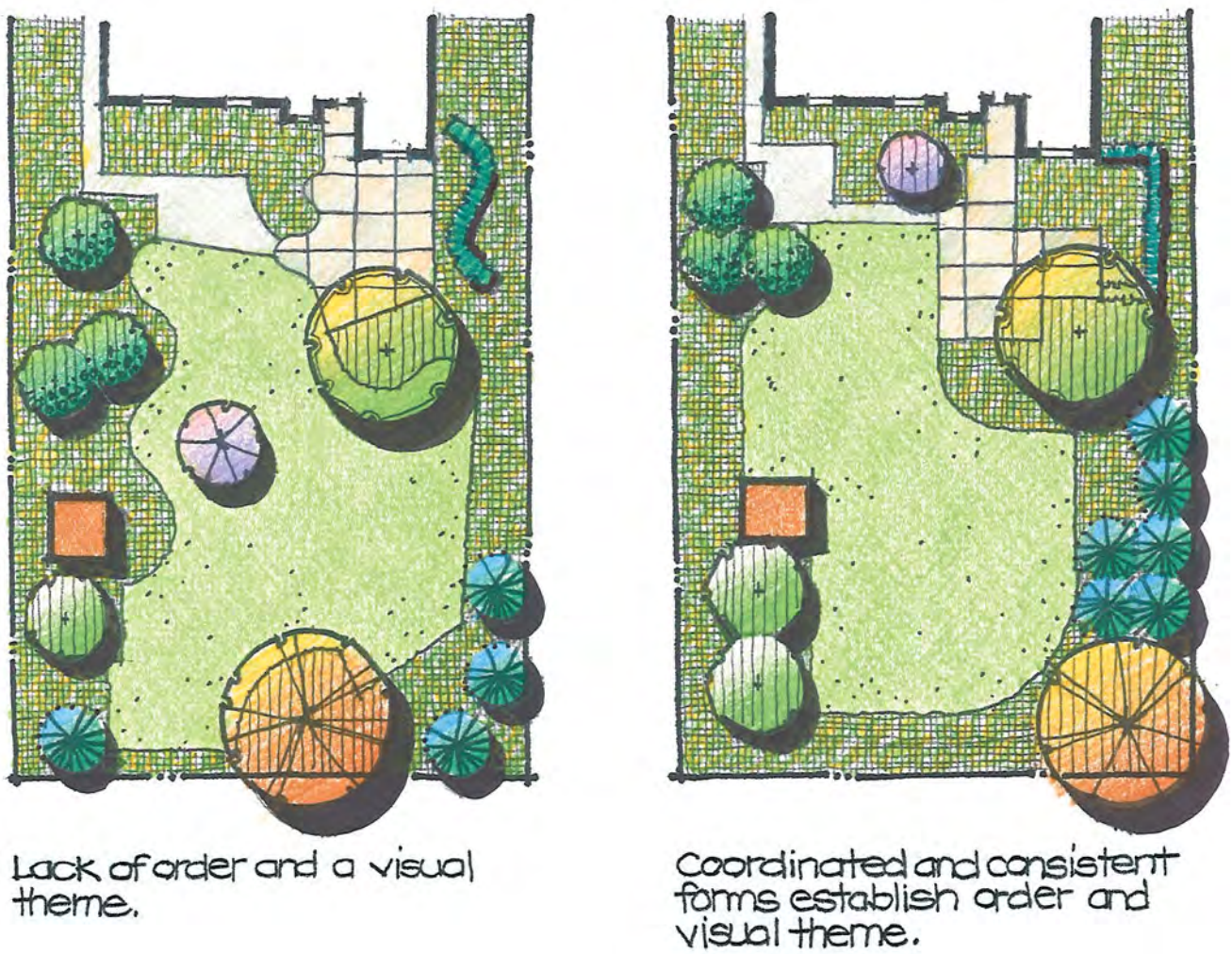


Figure 9–4
A consistent visual theme establishes order in a design.

During the preliminary design, visual order is created by establishing a coordinated composition of forms and materials. As suggested previously, form composition establishes a theme or style that in turn furnishes a strong sense of visual order. Figure 9–4 illustrates the difference between a plan that lacks a consistent theme and one that has a strong coordination of the forms. The plan on the right side of Figure 9–4 possesses a sense of order due to a consistency of forms. So as you read Chapter 10 on form composition, keep in mind that one of the underlying objectives of this step is to give a sense of visual order to a design.

Within the context of a design theme or style, there are three ways order can be established in a design composition: symmetry, asymmetry, and mass collection.

Symmetry There are two distinctly different ways of organizing the elements of a design composition to achieve order: symmetry and asymmetry. Both approaches create an overall feeling of balance in the design, but in different ways. Balance is the perception that the various portions of the design are in equilibrium with each other (Figure 9–5). In the left example, balance is lacking; too many of the design's elements have been located on one side of the property, making this area seem "weighted." The other side of the site looks very "light." In the right example, the elements of the design have been placed so the visual weight is evenly distributed. Each element and area of the design balances the others.

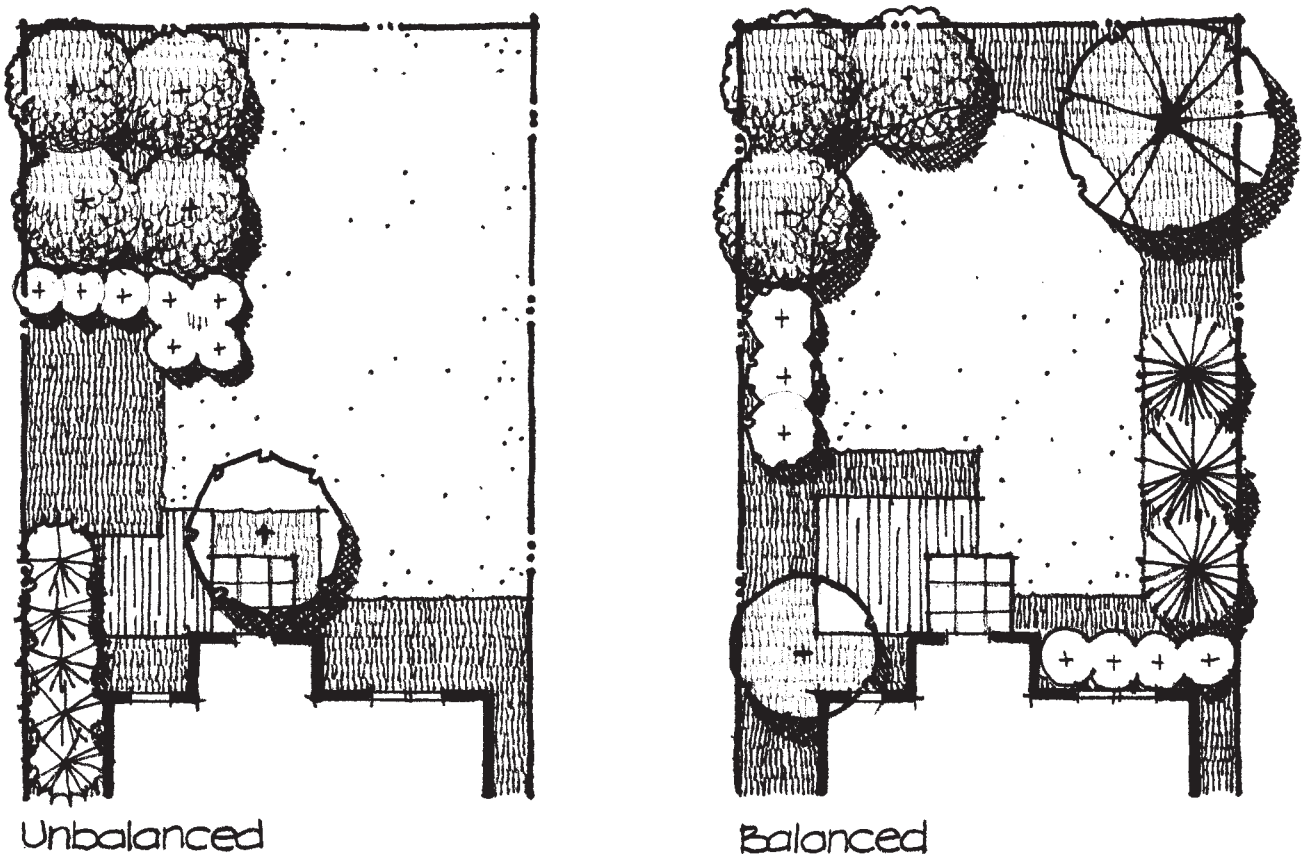


Figure 9–5
Balance is created when the visual weight of a design is evenly distributed.

Symmetry establishes balance in a design composition by arranging the elements of the design equally around one or more axes. Typically, what occurs on one side of the axis is repeated by a mirror image on the other side of the axis (Figure 9–6). This automatically produces balance because both sides of the axis are equal. Symmetry is relatively easy to achieve. When used in a design, symmetry provides a formal character. Many historical gardens were designed on a symmetrical basis to demonstrate people's ability to control nature. Even in contemporary settings, symmetry has its place where the designer wishes to create a formal character. Any axis of a symmetrical layout also has the ability to direct views to an end point or terminus in the landscape. When done correctly, this can produce a very powerful design theme.

Asymmetry The other primary way balance can be treated in a design composition is by asymmetry. With this approach, balance is produced more by feel than by equation, as in symmetry. A good way to understand the principle of asymmetry is to think of a teeter-totter at the playground. Symmetrical balance is created when two children of the same size balance each other by sitting the same distance from the fulcrum (left side of Figure 9–7). However, when the children are not the same size, they must sit an unequal distance from the fulcrum, thus establishing asymmetrical balance (right side of Figure 9–7). Balance has been created with unequal parts by means of placement.

Compared to symmetry, a design balanced by asymmetry tends to feel more casual and informal (Figure 9–8). In addition, an asymmetrical design layout does not have only one or two major vantage points as a symmetrical design does. Instead, there are numerous points to view the design, each with a different perspective.

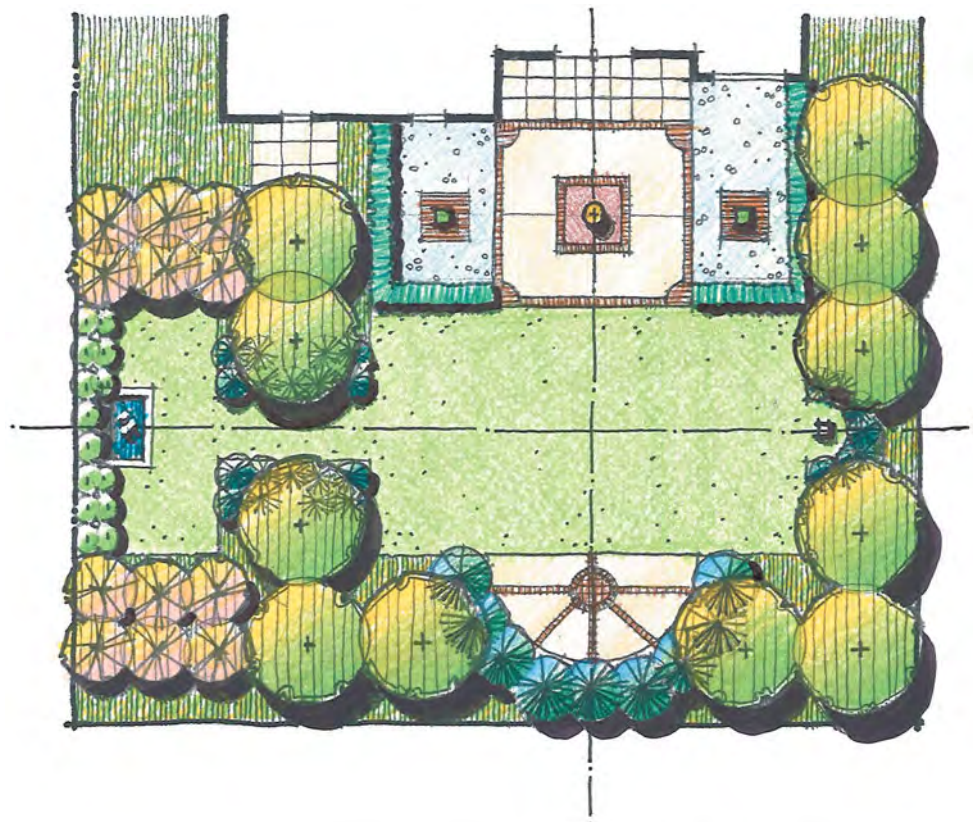


Figure 9–6
An example of a design that incorporates symmetrical balance around several axes.

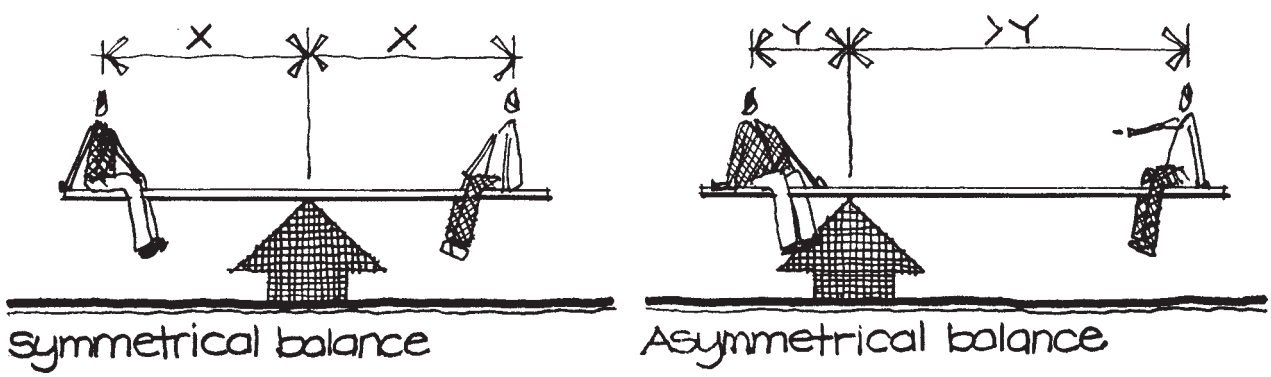


Figure 9–7
A comparison between the concepts of symmetry and asymmetry.

Consequently, an asymmetrical design tends to invite movement through it to discover other areas and points of interest.

Mass Collection Within the framework of either symmetry or asymmetry, mass collection is another method for establishing order in a design composition. Mass collection is the technique of grouping elements of a design together. Anytime the design elements are massed together in identifiable groups, a fundamental sense of order is created.

In residential site design all elements, such as pavement surfaces, walls, fences, plant materials, and so on, should also be massed together in the composition to establish order (right side of Figure 9–9). These elements should not be scattered (left side of Figure 9–9). This creates a chaotic and busy feeling in the composition. Although this principle applies to all elements of a design, it has particular relevance in the arrangement of plant materials. One of the most important guidelines of planting design is to organize plant materials in masses (Figure 9–10). Additional suggestions for planting design are given in Chapter 11.

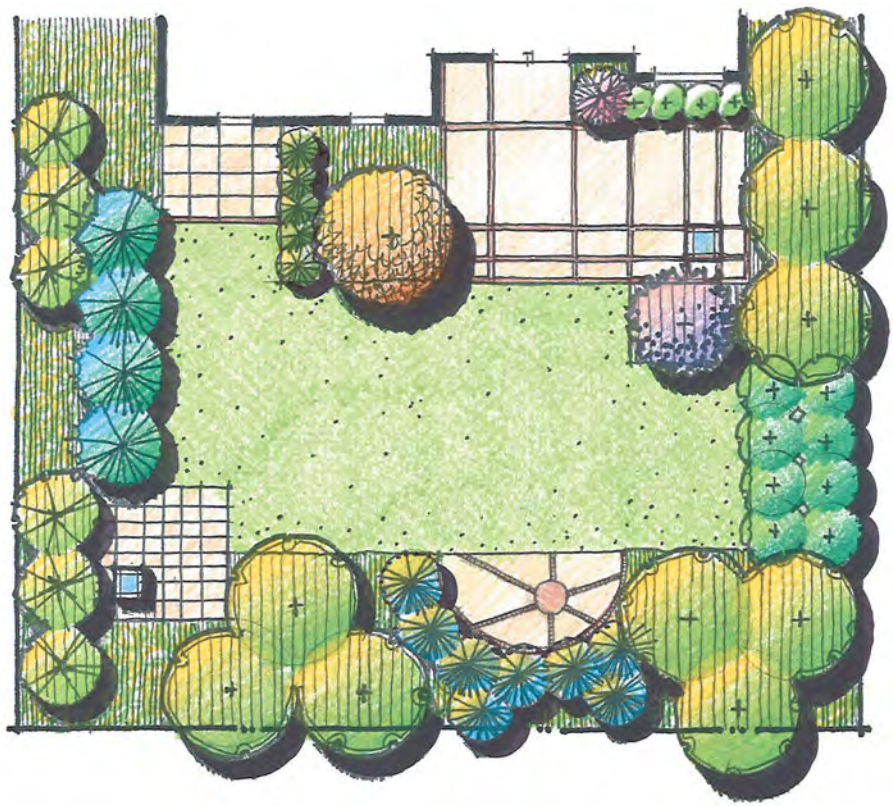


Figure 9–8
An example of a plan that incorporates asymmetrical balance.

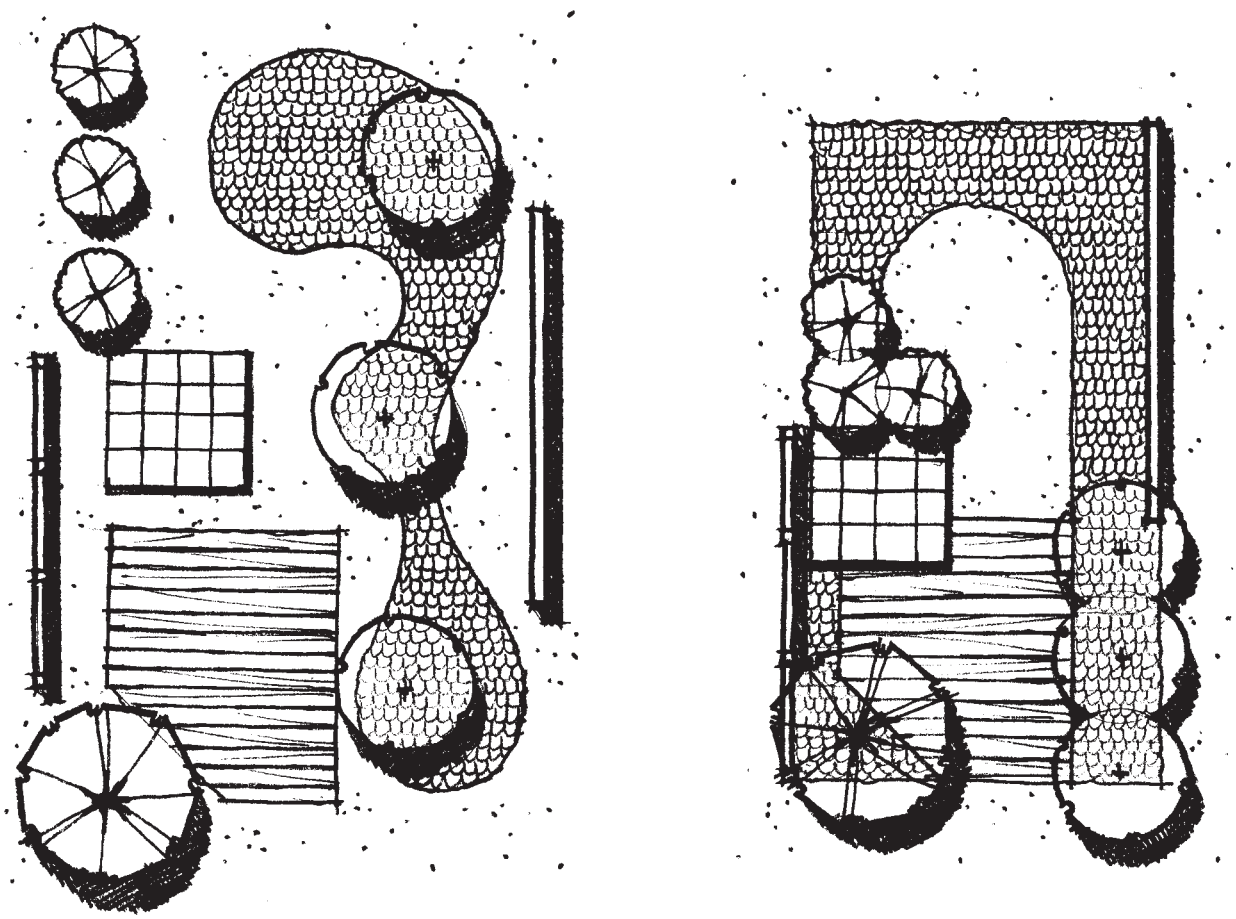


Figure 9–9
Order is created in the landscape when design elements are massed together.

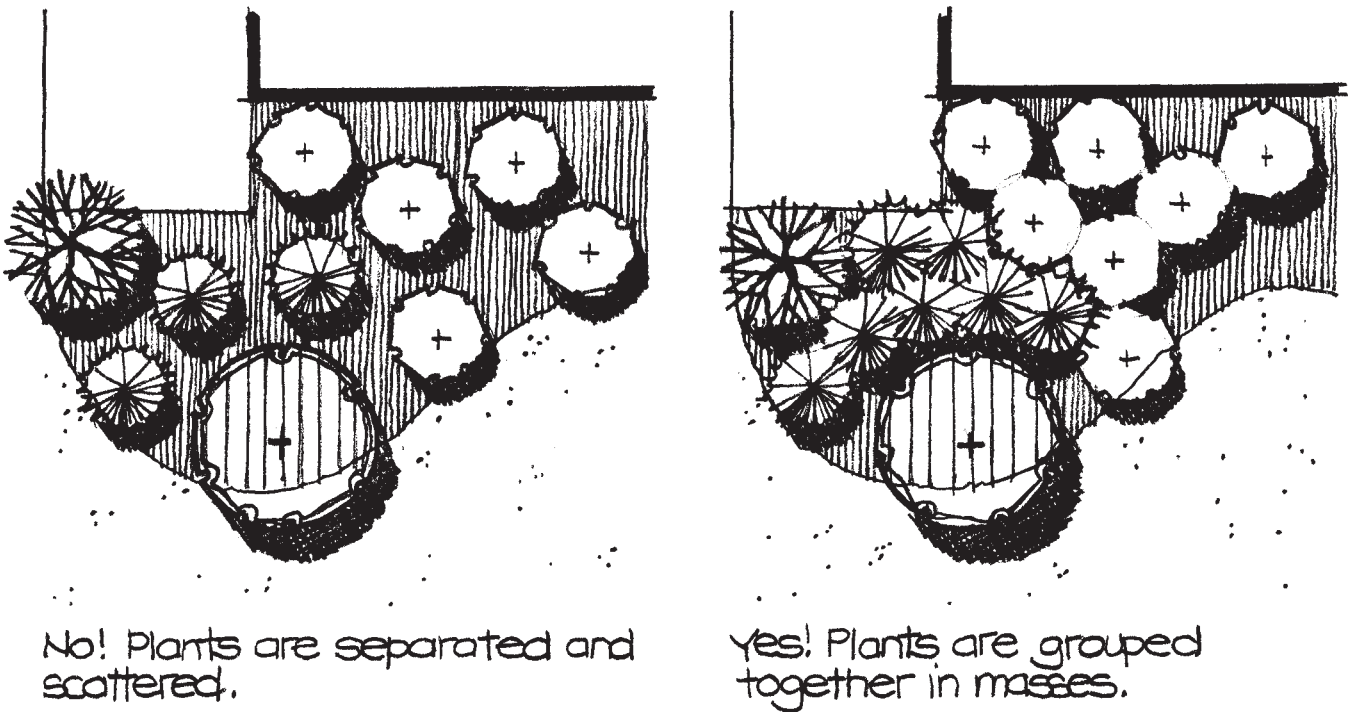


Figure 9–10
Plant materials should be massed in groups to create order.

One approach to mass collection that furnishes an especially strong perception of order is to establish groups of similar elements within the masses of the composition. In planting design, plants of the same species would be grouped within the same mass (Figure 9–11).

As the designer begins to organize the layout of a design, it is important to consider how order (the overall structure) is going to be provided in the composition. It is advisable to establish a consistent theme or style along with mass collection and either symmetry or asymmetry to achieve this. The earlier the principle of order is taken into account in the design process, the better the results are apt to be.

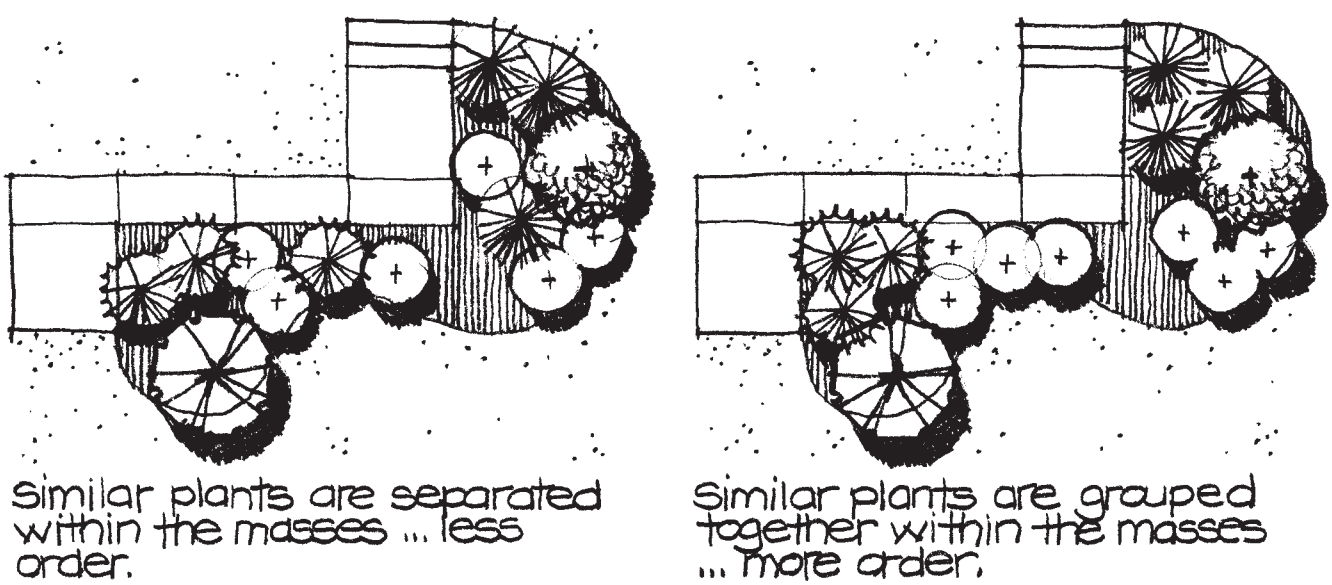


Figure 9–11
Similar plants should be massed together.

Unity

The second principle of design that should be considered during the preliminary design is unity. Unity is the harmonious relationship among the elements of a design composition. Whereas order establishes the overall organization of a design, unity provides an internal feeling of oneness within the design. The principle of unity influences how the size, shape, color, and texture of any element of a design will appear in the context of other elements of the design. When unity is achieved in a composition, all the elements of the design will feel as if they were meant to go together.

In the previous section, it was described how order is established in trees, animals, and buildings. Using these same examples, unity in a tree can be seen in the similar size, shape, color, and texture of the leaves. In other words, the similarities among the leaves on a tree give it the appearance of being "one" tree. Hair and skin color are unifying elements on animals; specific building materials and door/window types provide a sense of visual unity in a building.

Unity in landscape design is established using the principles of dominance, repetition, interconnection, and unity of three.

Dominance Dominance is created in a design composition by making one element or a group of elements more prominent in comparison with others. The dominant element is an accent or focal point of the composition. A dominant element establishes a sense of unity in that all other elements in the composition appear subordinate or secondary to it. These other elements are visually unified by their common subordination because the differences among these secondary elements seem small in comparison to their difference with the dominant element.

Without a dominant element in a composition, the eye tends to wander restlessly throughout the composition (left side of Figure 9–12). Here, no one element or portion of the design "holds" the eye. When a focal point is introduced into this same composition, it functions like a visual magnet to pull the eye to it (right side of Figure 9–12).

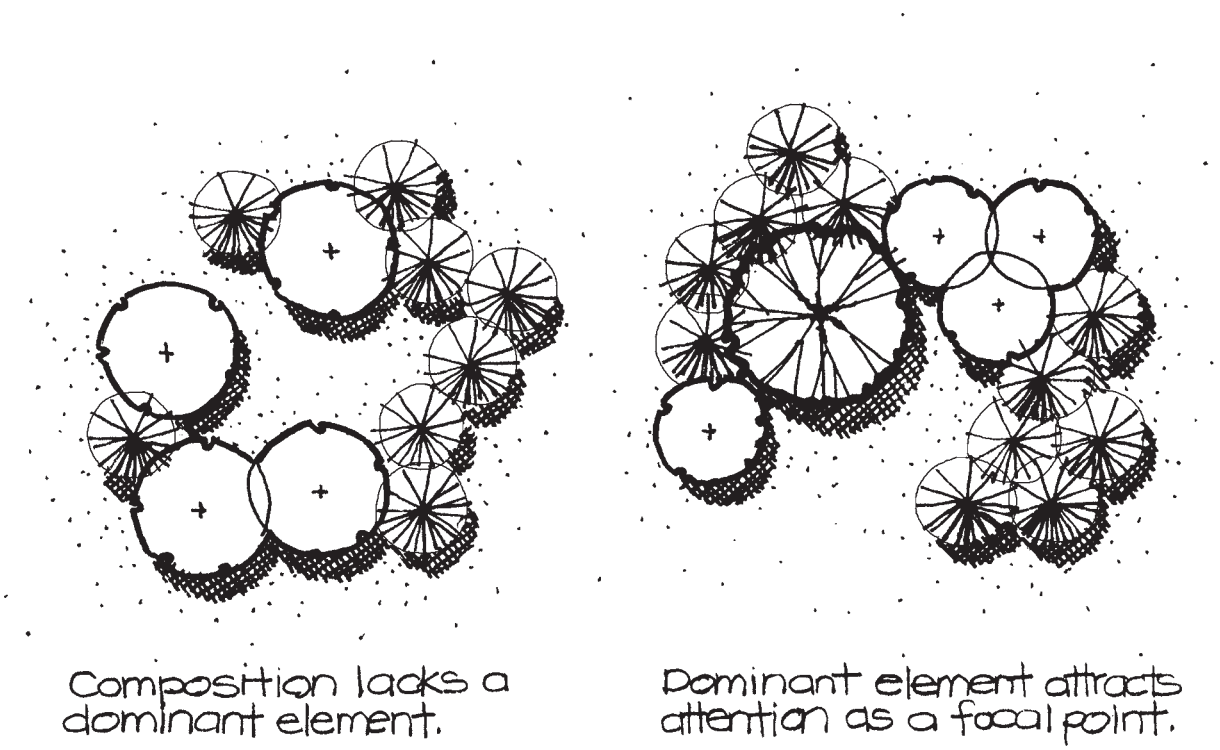


Figure 9–12
Dominance should be incorporated in a design composition.

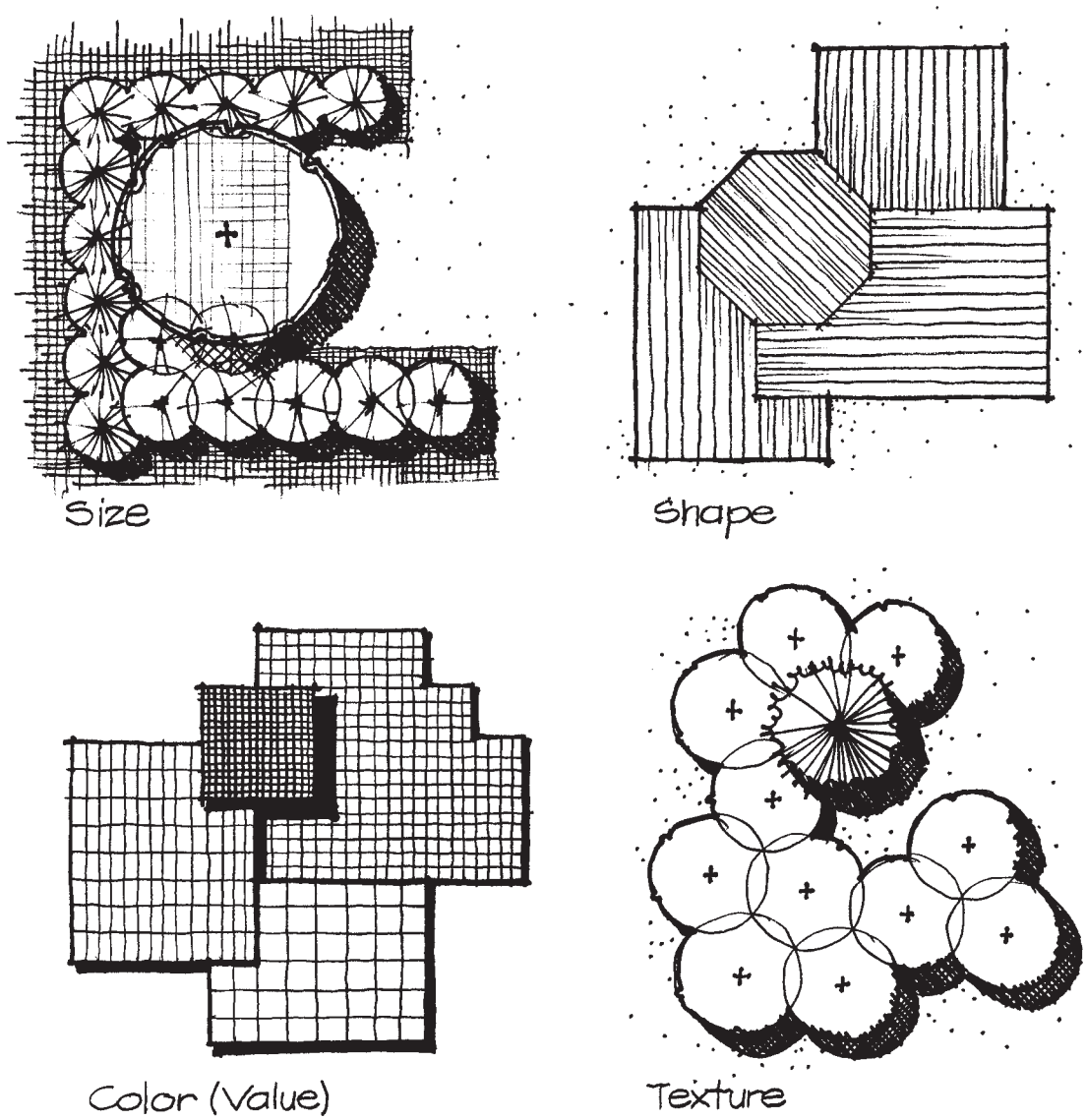


Figure 9–13
Dominance can be established by contrast of size, shape, color, and/or texture.

An element or group of elements in a design can be made dominant by contrast in size, shape, color, and/or texture (Figure 9–13). In creating a focal point in this manner, there are several words of caution. The dominant element should have some qualities that are in common with the other elements of the composition so it feels like it is part of the composition. Furthermore, although there may be more than one accent within a design, there should not be so many as to create a chaotic situation where the eye moves continually from one accent to another without rest (Figure 9–14).

The principle of dominance can be applied to landscape design in a number of ways. One way is in the spatial organization of a design. A common fault of many weak designs is the lack of a dominant space (left side of Figure 9–15). Without a dominant space, all the spaces seem rather equal in visual importance and function. A good landscape design typically possesses a hierarchy of spatial sizes with one or more spaces being dominant within the hierarchy. On some sites, a relatively large area of lawn establishes the dominant space (right side of Figure 9–15). On other sites, it is more appropriate for other spaces to be dominant, such as the outdoor entry foyer space (Figure 9–16) and the outdoor living and entertaining space (Figure 9–17).

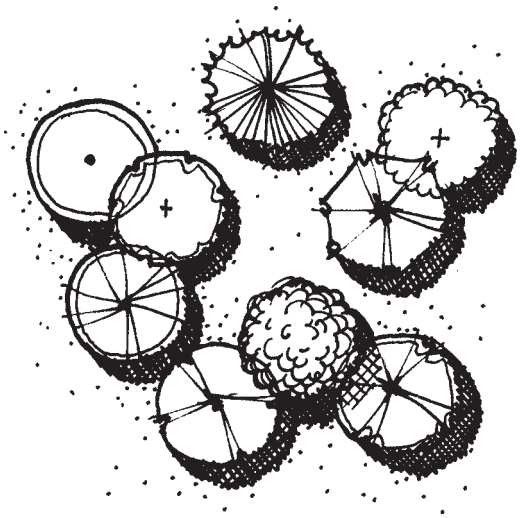


Figure 9–14
Too many competing accents in a composition create chaos.

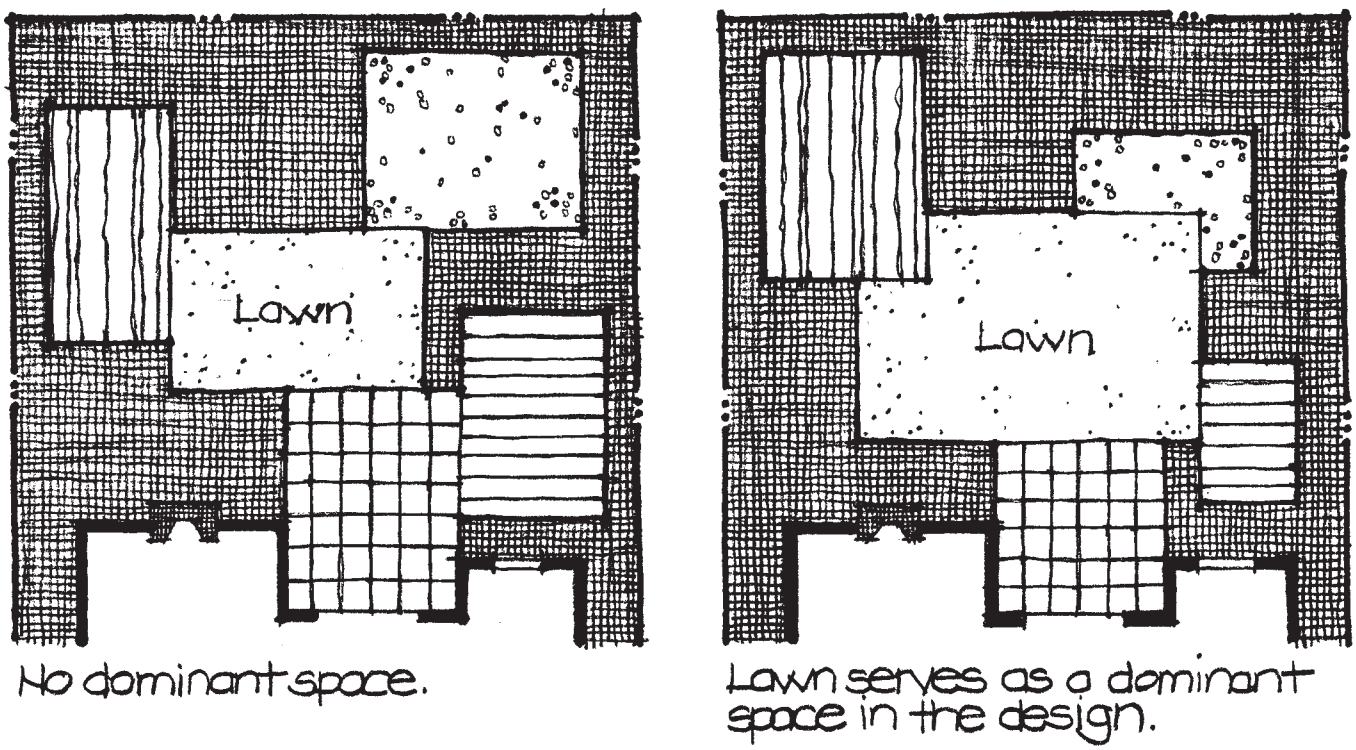


Figure 9–15
One space should be dominant within a site design.

Dominance can also be created on the residential site using an attractive water feature, a piece of sculpture, a prominent rock, or a spot of light at night. Each can draw the eye's attention in the landscape. In planting design, dominance can be created by shade trees, or by attractive plants such as ornamental trees, flowering shrubs, flowers, or other unique plant forms (Figure 9–18).

Repetition A second way unity can be created in a design composition is by repetition. Repetition is the principle of using similar elements or elements with similar characteristics throughout a design composition. Figure 9–19 illustrates the extremes of no repetition and total repetition in a design. As shown on the left side, all

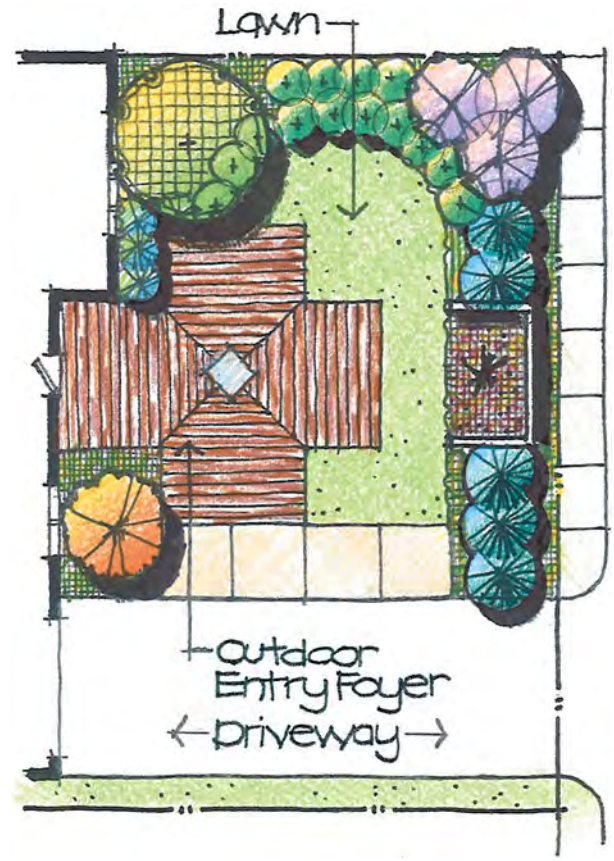


Figure 9–16
An example of the outdoor entry foyer serving as the dominant space.

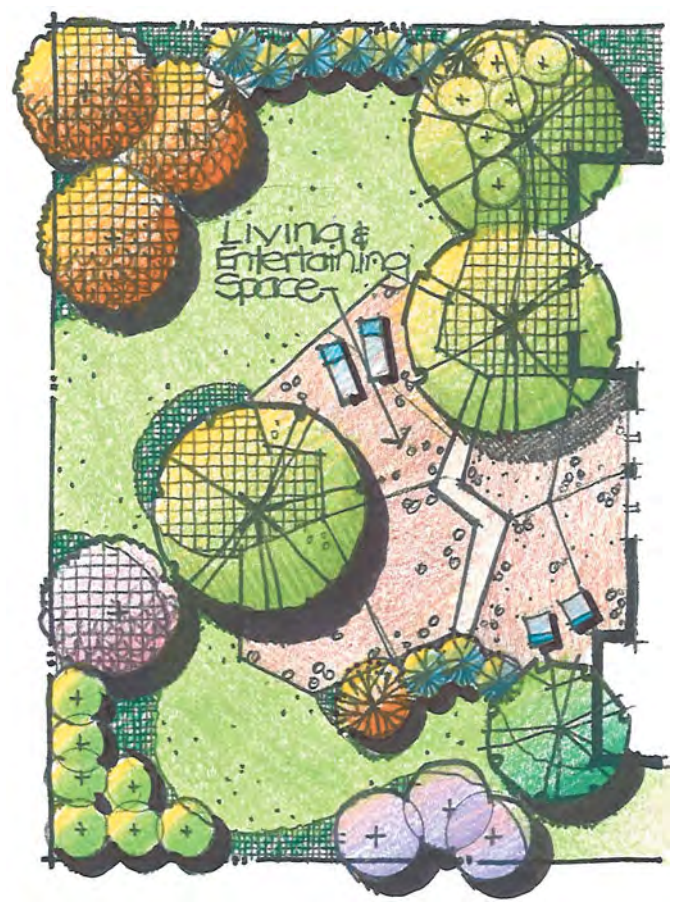


Figure 9–17
An example of the outdoor living and entertaining space serving as the dominant space.

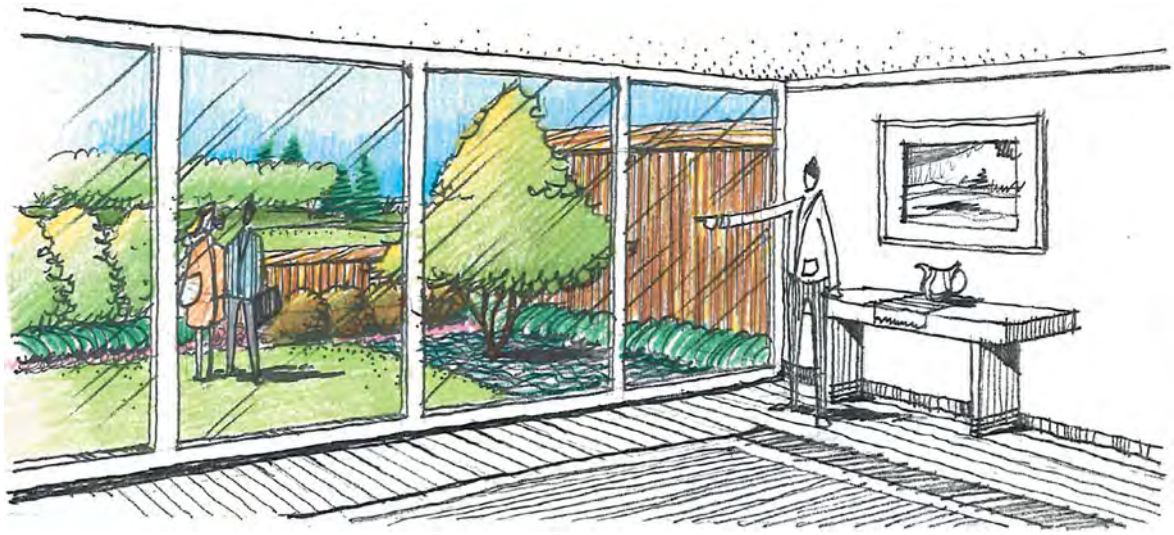


Figure 9–18
An ornamental tree's unique habit of growth allows it to serve as a dominant visual element.

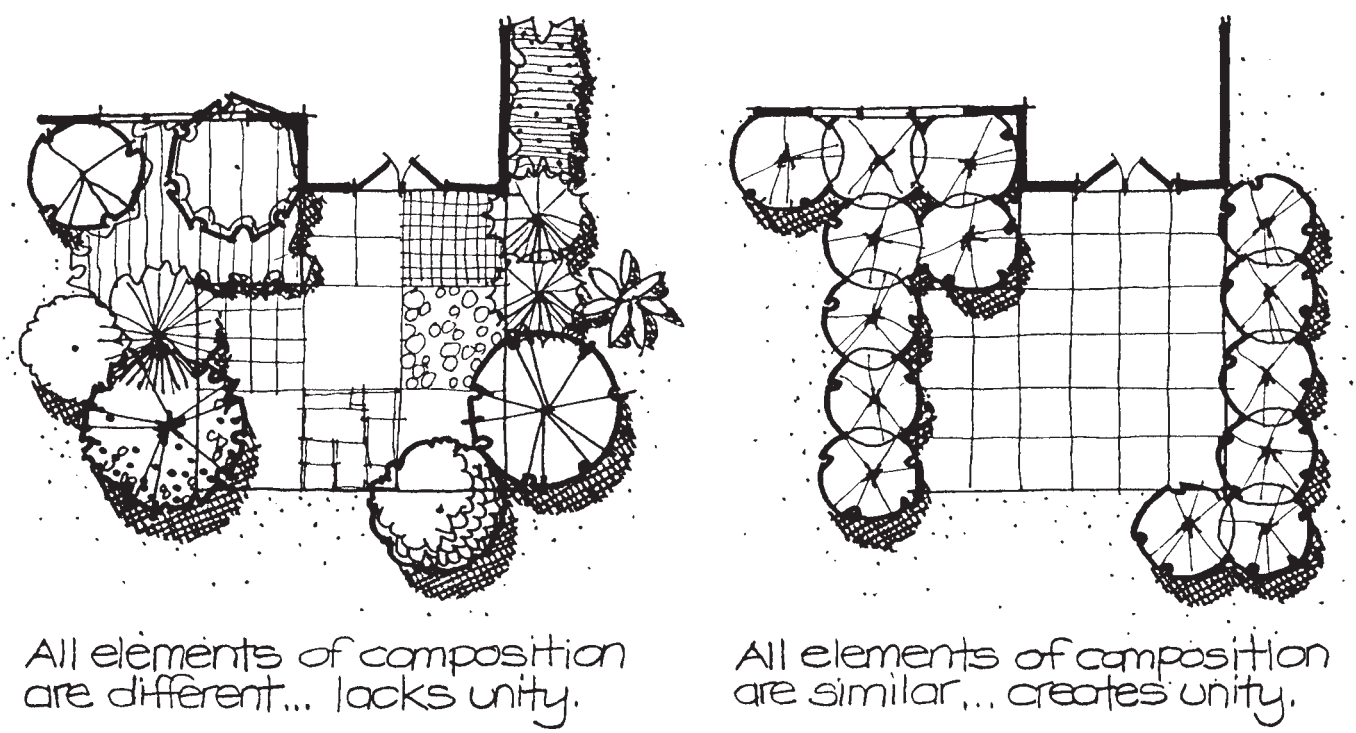


Figure 9–19
Unity can be created in a design composition when all the elements are similar in appearance.

the elements of the composition vary in size, shape, value (tone), and texture. This composition is too complex and consequently lacks unity. The right side shows all elements of the composition having similar size, shape, value, and texture. Here, there is a strong sense of visual unity owing to the commonality of all the elements.

No repetition or similarity results in a visually chaotic composition. Each element is seen as a unique item with no relationship to the other elements. On the other hand, total repetition, although providing unity, often results in monotony. The eye gets bored quickly when there is no variety. Therefore, the ideal approach is to repeat some elements throughout the design for the sake of unity while others vary for

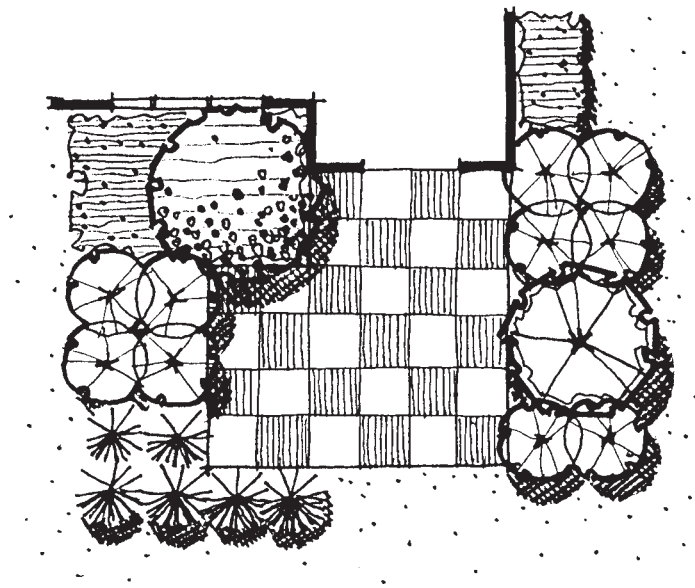


Figure 9–20
A design composition should have a balance between variety and repetition.

the purpose of maintaining visual interest (Figure 9–20). There should be a balance between variety and repetition. Unfortunately, there is no formula for providing this balance.

The principle of repetition can be used in residential site design in several ways. First, the number of different elements and materials should be minimized in any area of a design. For example, only one or two pavement materials should be used in an outdoor space because too many pavement materials can be visually disruptive. The designer should also limit the number of different plant materials used in any one area. A design resembling a botanical museum, containing many different types of plants, should be avoided regardless of the temptation to do otherwise.

Having limited the number of elements and materials used in a design, the next step should be to skillfully repeat these throughout the design. When the eye sees the same element or material placed at various locations in the design, visual recall is created. That is, the eye and mind make a connection between the two locations and mentally link them together. This, in turn, provides unity. One application of this is to use a particular material on the facade of the house and again on walls, fences, or pavement in the landscape (Figure 9–21).

A similar concept can also be applied in planting design. Although only five types of plants plus ground cover have been used in Figure 9–22, they have been woven throughout the composition. Note how the low evergreen shrub material ("A") has been placed at three locations for visual recall. Also, not every plant has been repeated. Some plants appear only once in the design for variety and accent. Thus, an attempt is made to strike a balance between repetition and variety.

Interconnection A third way unity can be established in a design composition is by interconnection. Interconnection is the principle whereby various elements or parts of the design are physically linked or tied together. When interconnection is used successfully, the eye can move smoothly from one element to another without interruption.

There are several ways the principle of interconnection can be applied to residential site design. On the left side of Figure 9–23, the different areas of the design are segmented. The plan lacks unity because it is fragmented into a number of isolated parts that have little or no visual relationship among them. On the right side of Figure 9–23, the same elements of the design have been revised so that the diverse areas of the plan physically connect. The previously isolated parts of the design have now



Figure 9–21
The repetition of brick on the house, low wall, and pavement provides visual unity.

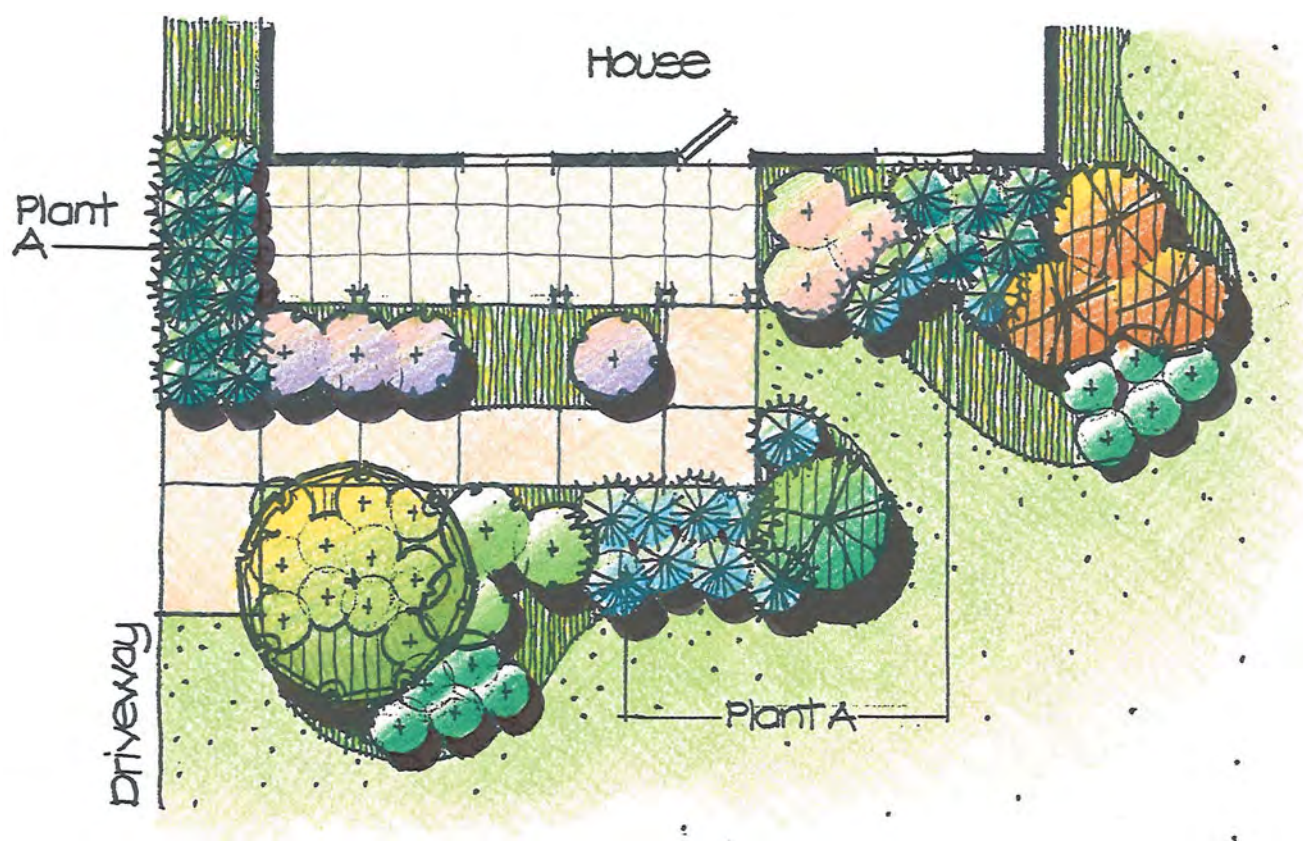


Figure 9–22
Selected plant materials should be repeated throughout a planting area.

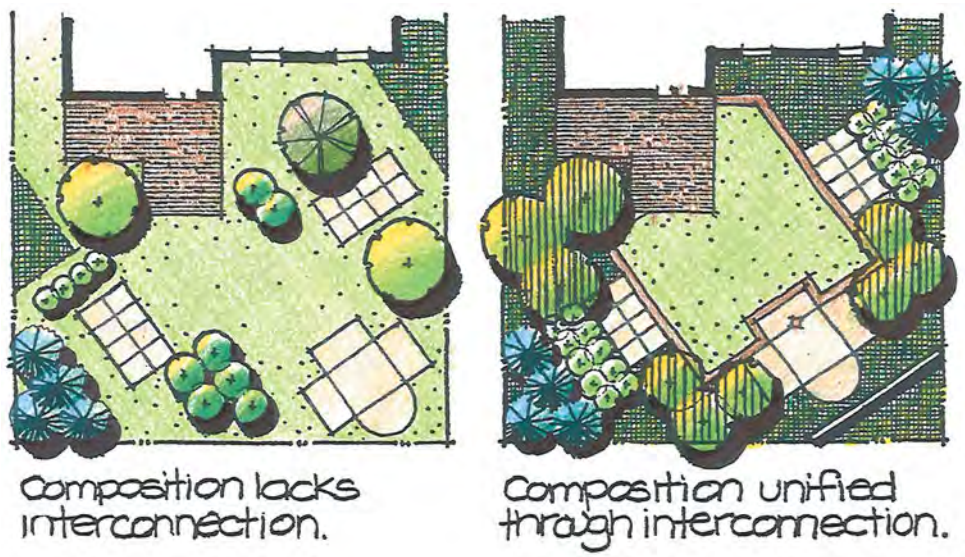


Figure 9–23
The different spaces and elements of the site should be interconnected.

been moved together to touch each other and new elements have been introduced to connect the separated ones. The revised plan has a continuity that helps to provide unity. This desirable approach to residential site design reinforces the need to consider the entire site or design area together as one large composition rather than as a number of smaller, separated parts that are merely pieced together.

The same idea can be applied to planting design as well. The left side of Figure 9–24 shows a scattering of isolated plants in a lawn area. Again, this type of arrangement lacks unity and is difficult to maintain. When these same plant materials are placed in a common ground cover or mulch bed as depicted in the right side of Figure 9–24, the eye is able to associate the plants with each other more easily owing to the visual interconnection of the bed on the ground plane.

Interconnection can be appreciated in the third dimension as well. A mass of shrubs, fence, wall, and so on can be used to physically link what otherwise would be separate elements of a landscape composition (Figures 9–25 and 9–26).

Unity of Three The fourth means of achieving unity in a design composition is by unity of three. Whenever three similar elements are grouped together, a sense of unity is almost automatically achieved. Three of a kind, as opposed to two or four of a kind, provides a strong sense of unity. When the eye perceives an even number

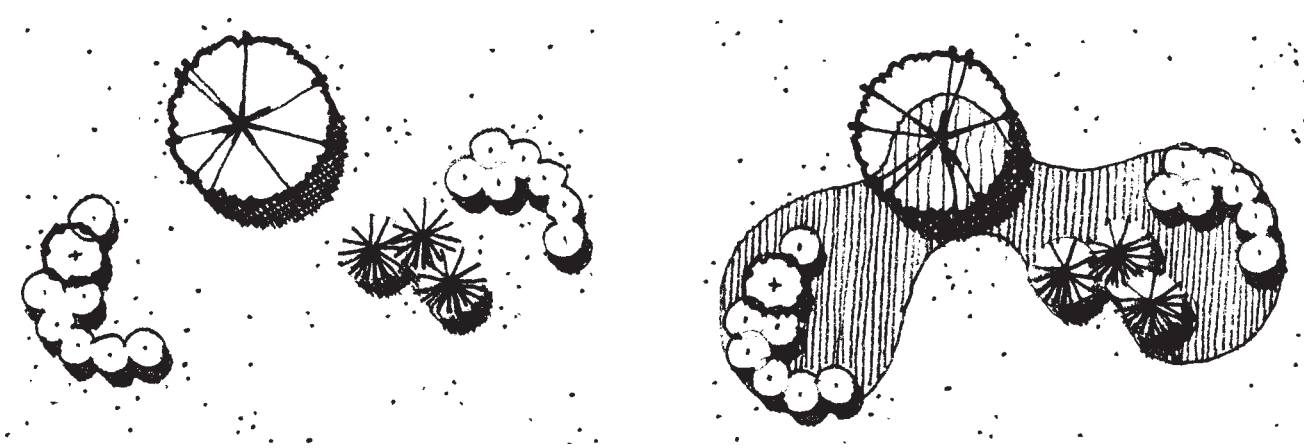


Figure 9–24
A ground cover bed can act as an interconnecting element in a planting composition.

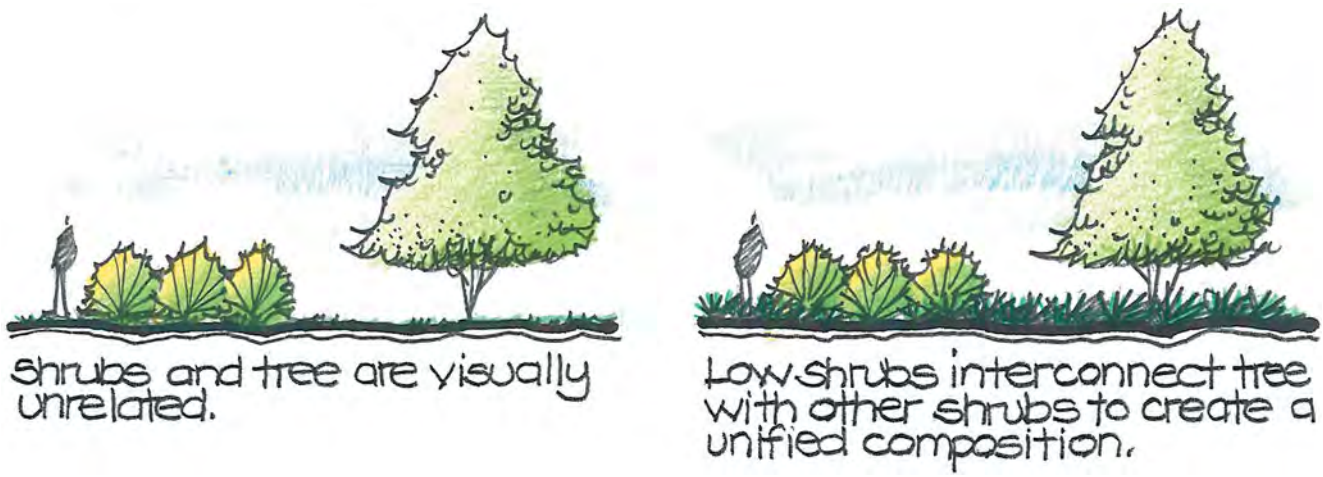


Figure 9–25
An example of low shrubs serving as interconnecting elements.



Figure 9–26
An example of low shrubs and a fence serving as interconnecting elements.

in a grouping, there is a tendency to divide it in half (Figure 9–27). A quantity of three is not easily split in half and therefore is seen as one group (Figure 9–28). As a general rule of thumb, it is better to use odd numbers than even numbers of elements in a single composition, although this is not a guideline to be applied thoughtlessly. For example, when there is a large number of plant materials in a composition, such as six, seven, eight, or more, the eye may see this as a group and not be able to detect whether there is an even or odd number. But when there are two, three, four, or five plants in a group, the eye can quickly depict even and odd amounts. However, there are some occasions when an even number of elements actually functions better than an odd number of elements, especially when there is a desire to achieve symmetry.

Rhythm

The third basic principle of design that should be used in preliminary design is rhythm. Whereas order and unity deal with the overall organization of a design and the relationship of the elements within that organization, rhythm in a composition addresses the factors of time and movement. When we experience a design, whether it be a two-dimensional graphic layout or a three-dimensional spatial composition, as is

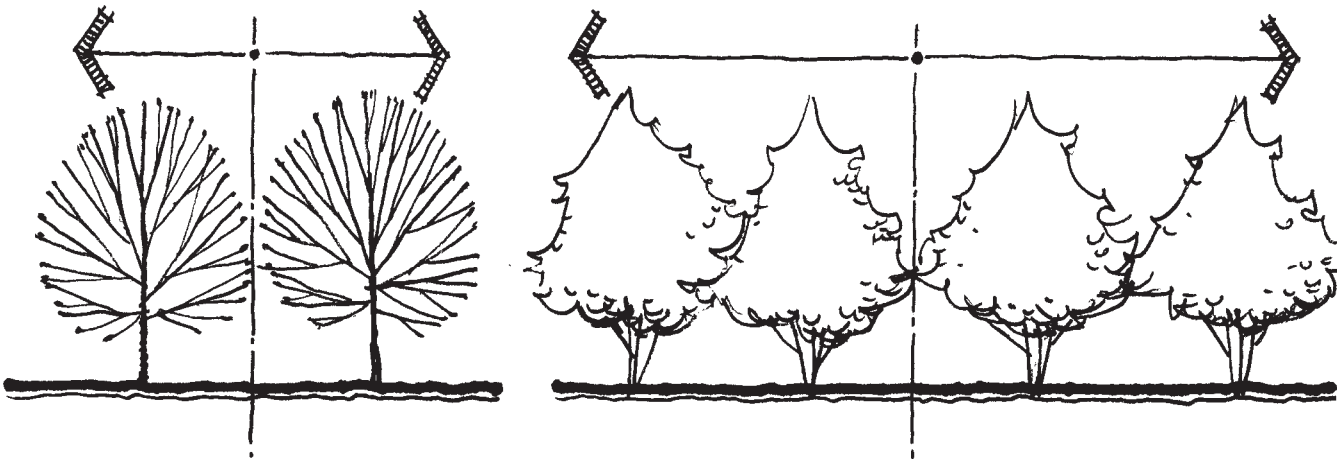


Figure 9–27
There is a tendency to visually split two or four elements of the same kind in a composition.

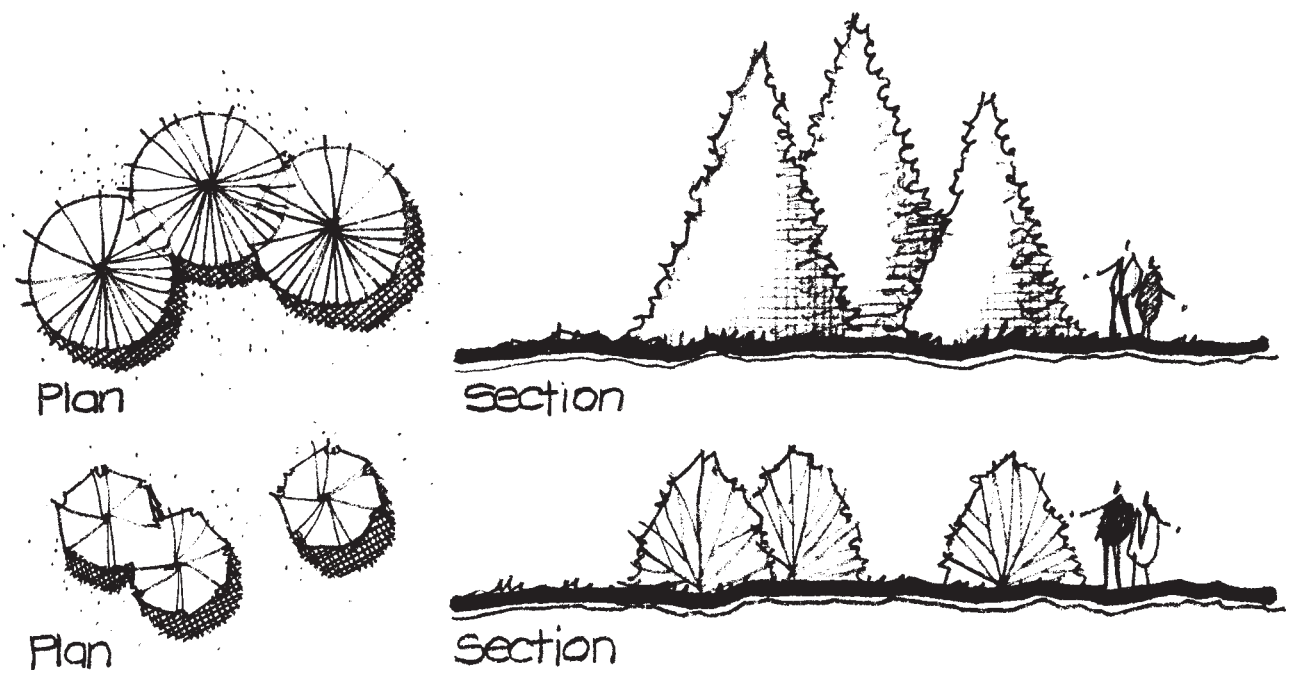


Figure 9–28
Groups of three similar elements in a composition have a strong sense of visual unity.

the case in residential site design, we do so over a period of time. But we rarely see and experience a complete landscape design instantaneously.

We tend to view various portions of a composition in sequence, often mentally collecting them to form patterns. It is the spacing and timing of these patterns that give a design a dynamic, changing quality. This might be understood more easily by thinking of rhythm in music. Here, rhythm is formed by the underlying sequence of notes, often referred to as the beat. The beat is a recognizable pattern that provides a dynamic structure to a musical piece and influences the timing of how we experience the music. Among numerous possibilities, it may be slow and casual or rapid and forceful.

Four ways rhythm can be created in residential site design are repetition, alternation, inversion, and gradation.

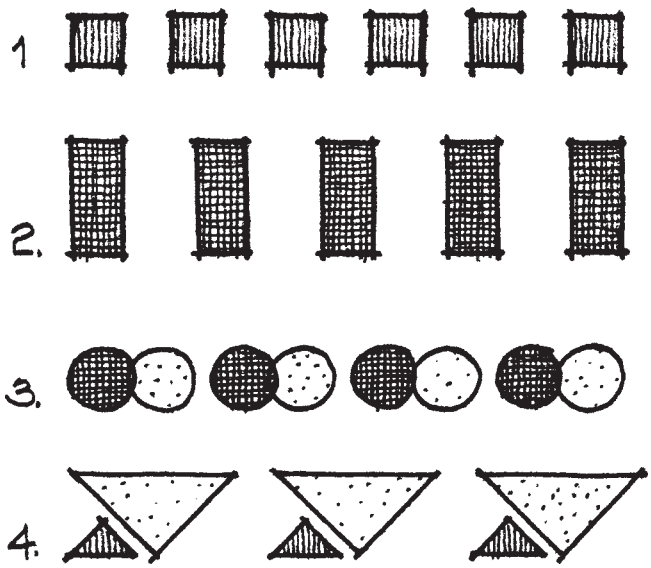


Figure 9–29
The repetition of elements in a sequence establishes visual rhythm.

Repetition The principle of repetition as it applies to rhythm differs slightly from the use of repetition for unity. To develop rhythm, repetition is used by repeating elements or a group of elements within a design to create an obvious sequence. For example, Figure 9–29 shows four different examples of elements repeated in linear sequences. In each, the eye moves from element to element in a rhythmic pattern, like the beat in music. In these examples, the spacing between the elements determines the character and pace of the rhythm. In residential site design, this principle applies to such elements as pavement, fences, walls, and plant materials (Figure 9–30). Again, the spacing of elements in these examples is critical in establishing the pace of the rhythm.

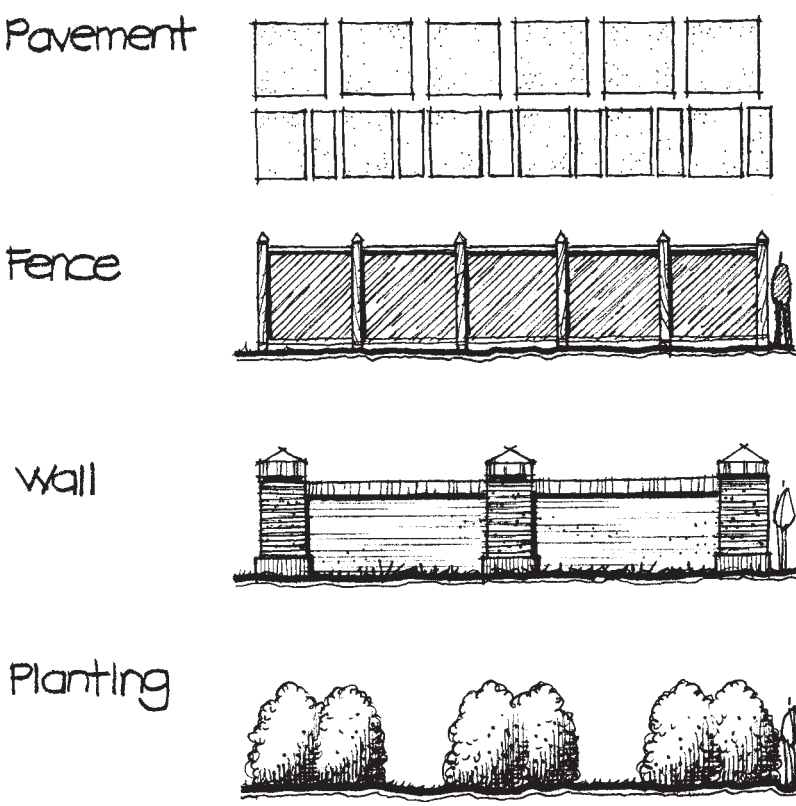


Figure 9–30
Repetition can be used to establish visual rhythm in different design elements.

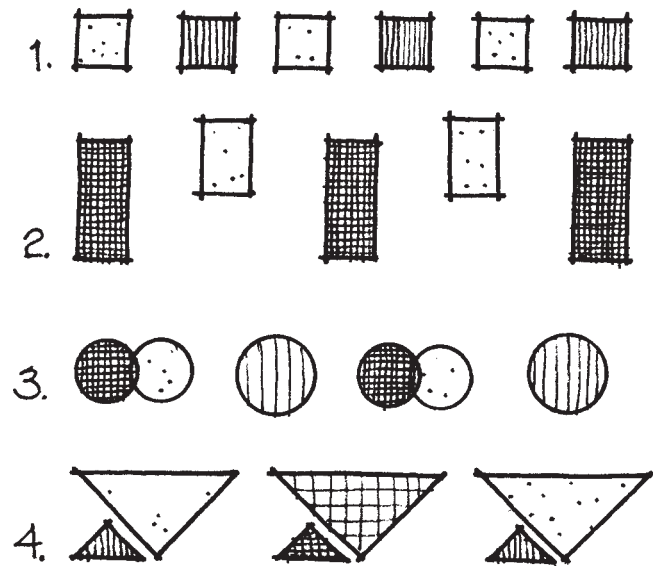


Figure 9–31
Alternation of size, shape, color, and/or texture can establish visual rhythm in a composition.

Alternation The second type of rhythm is alternation. To create this, it is easiest to first establish a sequential pattern based on repetition. Then, certain elements of the sequence are changed or altered on a regular basis (Figure 9–31). Thus, a rhythmic pattern based on alternation has more variation and sometimes more visual interest than one based only on repetition. The altered elements can furnish an aspect of surprise and relief in the sequence. As with repetition for unity, repetition for rhythm can get to be rather monotonous if it is overused. Figure 9–32 shows how alternation has been incorporated in the examples shown previously in Figure 9–30.

Inversion Inversion is a particular type of alternation in which selected elements are changed so their characteristics are in contrast to the initial elements of the sequence. In other words, the altered elements are inverted in comparison with the other elements. Big becomes small, wide becomes narrow, tall changes to short, and so on. Consequently, the

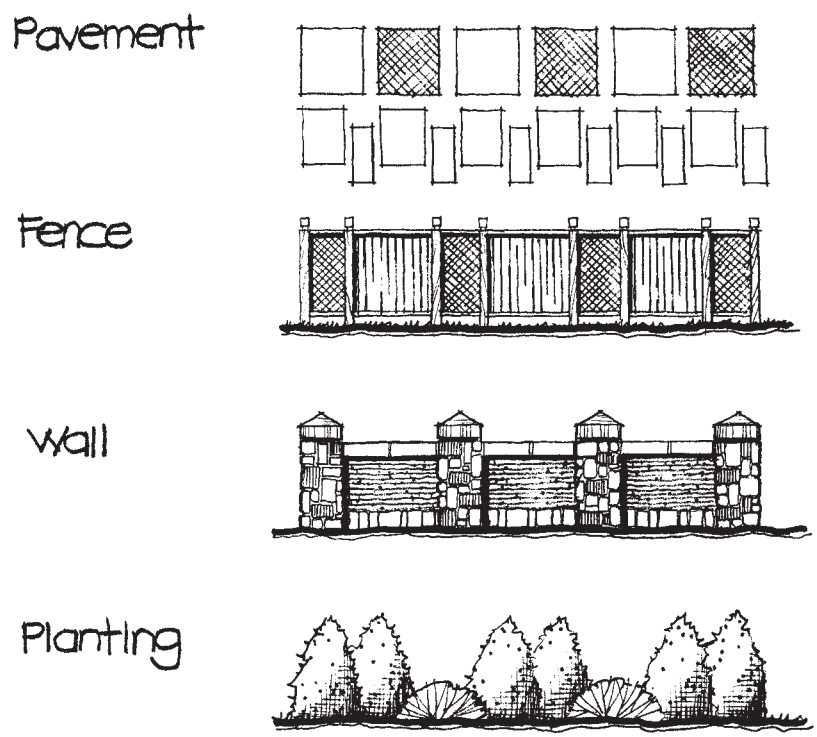


Figure 9–32
Alternation can be used to establish visual rhythm in different design elements.

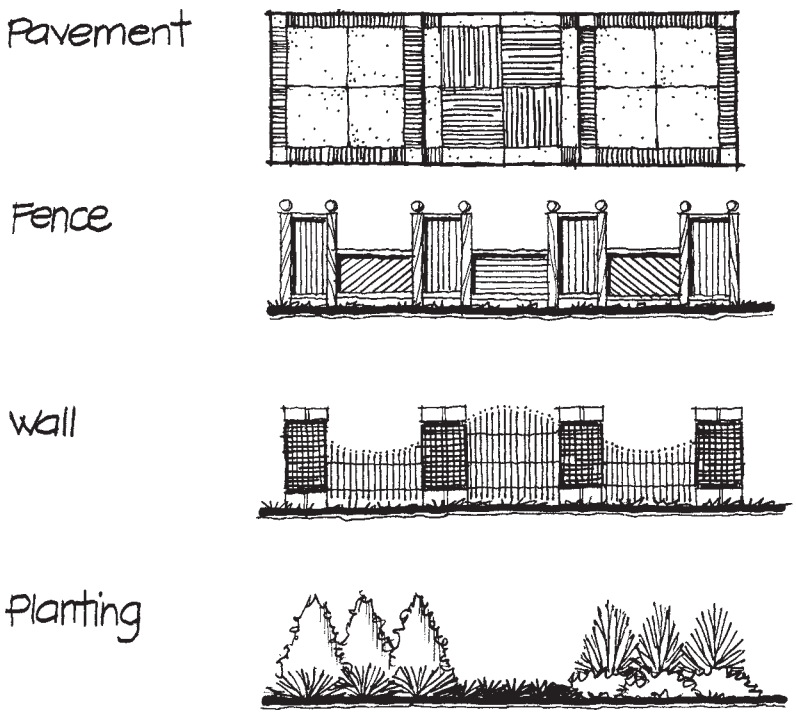


Figure 9–33
Inversion in the pavement pattern, fence heights, wall frame, and shrub masses creates visual rhythm.

changes that occur in this type of sequence can be dramatic and noticeable. Inversion can be incorporated in a landscape design in various ways (Figure 9–33).

Gradation Gradation is created by a gradual change in one or more characteristics of the repeated element of the sequence. For example, the repeated element in a rhythmic sequence may slowly increase in size (Figures 9–34 and 9–35). Or the characteristics of color, texture, and form may also vary as the sequence progresses. The change that occurs in gradation provides visual stimulation, but without causing sudden or incongruous relationships among the elements of the composition.

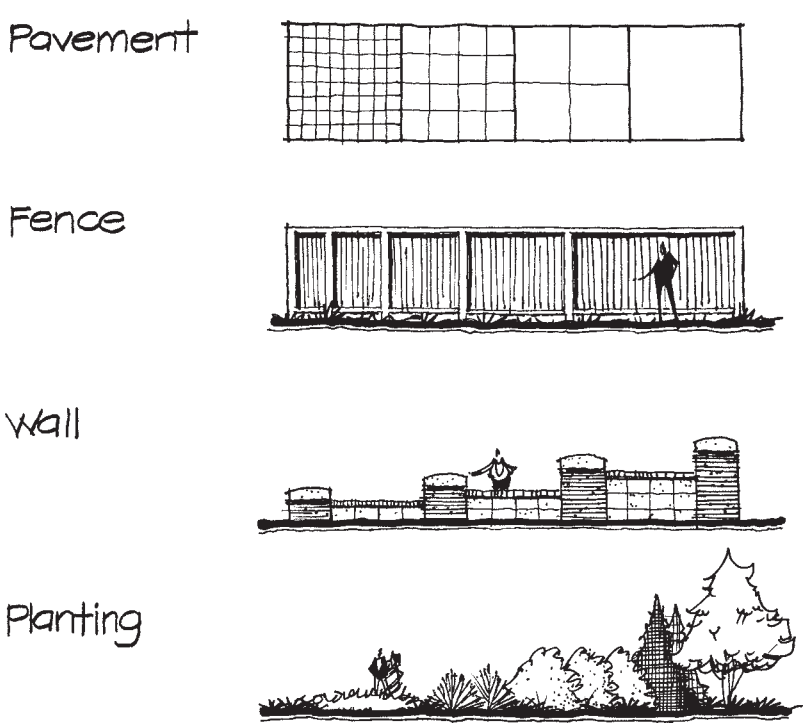


Figure 9–34
Rhythm can be established by means of a gradual increase in the size of the design elements in a sequence.

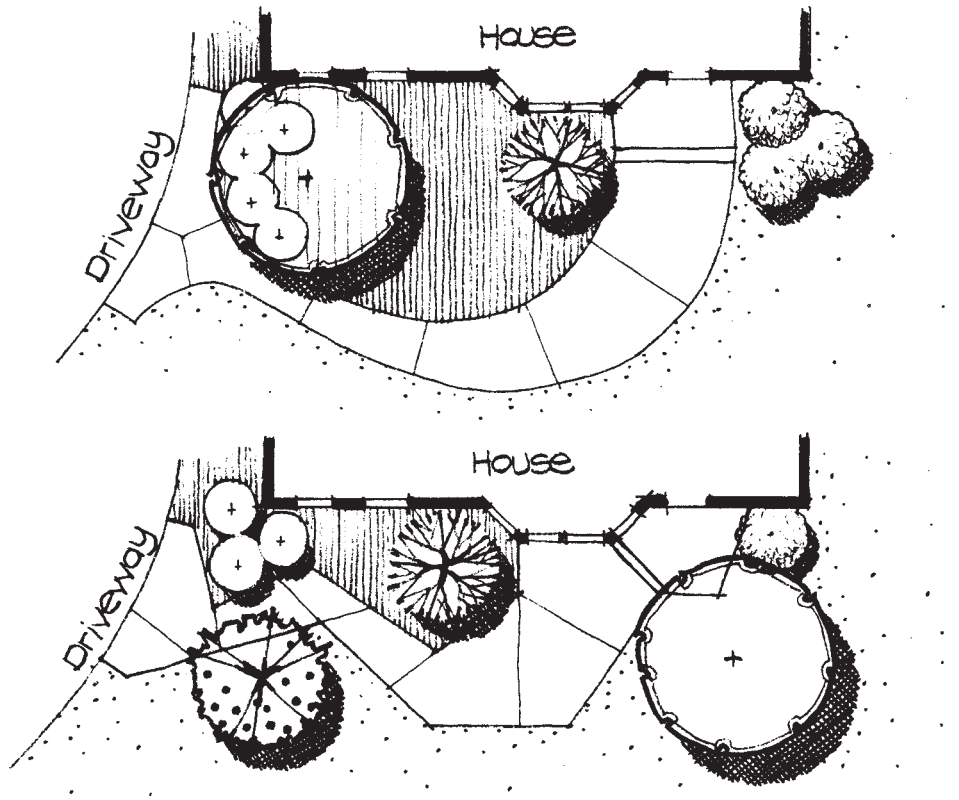


Figure 9–35
A gradual change in the width of a walk provides visual rhythm.

As can be seen from the previous sections, the design principles of order, unity, and rhythm can have a direct influence on the visual qualities of a design. They affect the location of elements in a composition as well as the size, form, color, and texture of the elements. During preliminary design, the designer should constantly keep these principles in mind when making key decisions about the appearance of the design. Like other aids in design, design principles are only helpful guidelines that should be carefully applied. They are not recipes for design success.

PRECONCEIVED IDEAS

As the design process proceeds into preliminary design, where some realism takes effect, a designer may have some preconceived ideas for design elements and their materials, patterns, character, and so on. It may help to stop and document any ideas that may exist. It is not that these ideas represent the final design decisions, but they should be documented before they are forgotten.

It is good to record ideas through the development of a "character palette." Figure 9–36 shows an elevation of a house (top of figure). The drawing below it is a "character palette." It is a group of design ideas for patios, fences, and overheads that are developed based solely upon the architectural character of the house. It is developed by "pretending" that selected patterns of the architecture could be adapted to resemble landscape structures. The following chart shows the relationship between the design ideas in the character palette and the feature of the house each design idea was modeled after.

Design Idea	*Architectural Feature*
Patio "A"	Decorative Vent over Garage Door
Patio "B"	Main Window in Right Gable of House

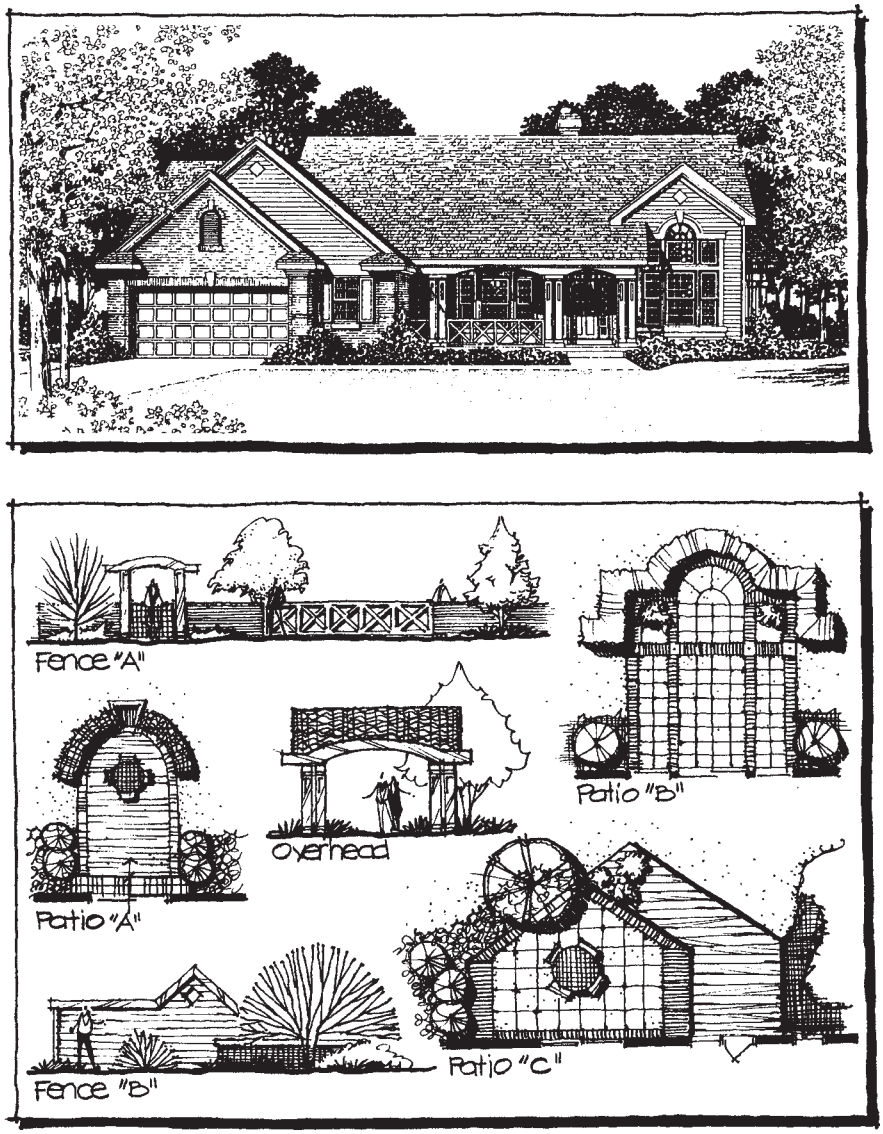


Figure 9–36
A "character palette" can help to record your preconceived design ideas that relate to the architectural character of the house. Design #N3600/N3601 (top) © Home Planners, LLC Wholly owned by Hanley-Wood, LLC. Blueprints available, 800-322-6797.

Patio "C"	Double Gable at Left Side of House
Fence "A"	Front Porch Railing and Archway
Fence "B"	Top Left Gable with Diamond Pattern
Overhead	Front Porch Archway and Roof

If you were to look carefully at each of these mini-designs in the character palette, you would notice that the general pattern of each architectural feature selected was transformed into a landscape structure for the hardscape. Exact replication is not necessary. It is not important to use each and every portion or detail of the architectural feature. The emphasis is to pretend and to explore ways that existing characteristics of the house can be blended into the character of the landscape. It is a design effort undertaken to provide opportunities to enhance and enrich exploratory techniques in developing design alternatives.

SUMMARY

Preliminary design is the most realistic and comprehensive phase of the design process discussed to this point. It is based on all the previous steps, though it goes beyond these in scope and detail. While the earlier steps gathered important site information and studied the general organization of the design, preliminary design emphasizes the visual and emotional aspects of design. Having completed this chapter, you should know the following about preliminary design:

- Definition and purpose of preliminary design
- Process of creating, information shown, and graphic style of a preliminary design
- Three primary design principles and their significance to design
- Definition of order and alternative ways to create it in a design
- Definition of unity and methods for establishing it in a design
- Definition of rhythm and techniques for creating it in a design
- Purpose and content of a character palette

10
Form Composition

INTRODUCTION

Chapter 9 outlined key thoughts on the preliminary design phase of the design process and made reference to two critical undertakings of preliminary design: (1) form composition and (2) spatial composition. Although these two aspects are separated in this book to clarify explanation, they are usually considered and studied jointly while a design solution is being developed.

This chapter presents the purpose of form composition, fundamental principles on which form composition is based, different form compositional themes and their potential uses, the relationship of form composition to existing structures, and a process for developing form composition studies for a residential project.

DEFINITION AND PURPOSE

Form composition can be defined as the process of converting the approximate area outlines of the functional diagram to specific forms to create visual order. The general edge or outline of each space in the functional diagram is given a definite location and shape during form composition. Figure 10–1 shows the graphic difference between a functional diagram and six different form compositions for the same diagram. The spaces in all six compositions are similar in size, proportion, and function to the outlines on the functional diagram, but their edges are more precise in form and location.

Some typical examples of edges of spaces in the outdoor environment include edges between the following:

- Planting bed and lawn
- Terrace and lawn
- Entrance walk and planting bed
- Driveway and entrance walk
- Steps and adjoining pavement
- Deck and terrace

In addition to establishing the exact edges of forms of a design, form composition also creates a visual theme. A visual theme provides a sense of consistency and harmony because it is created by the repetition of particular forms throughout the design. As pointed out in Chapter 9, this consistency of forms is one of the essential means for providing order in a landscape design. Particular forms may be

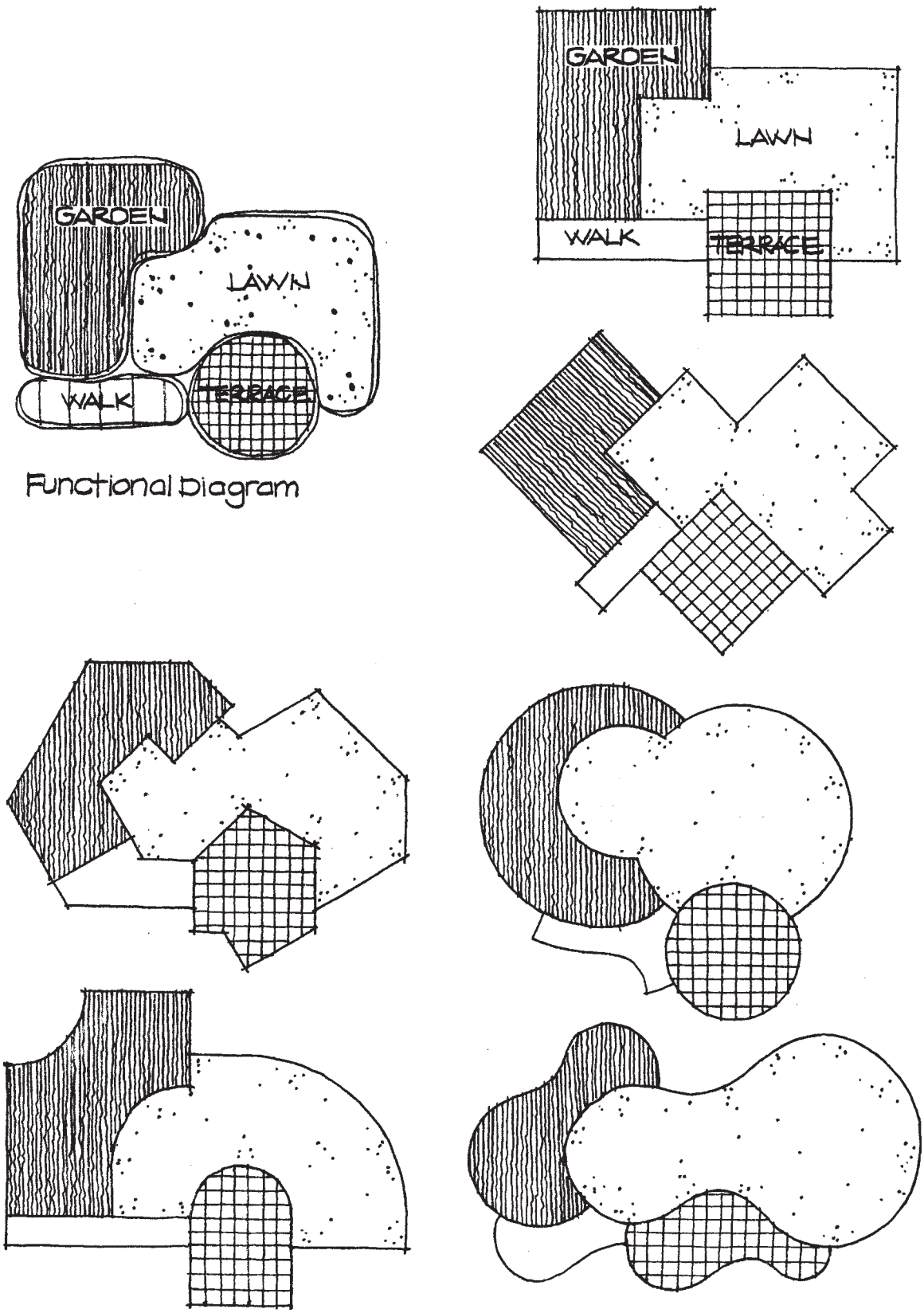


Figure 10–1
A graphic comparison between a functional diagram and six different form compositions.

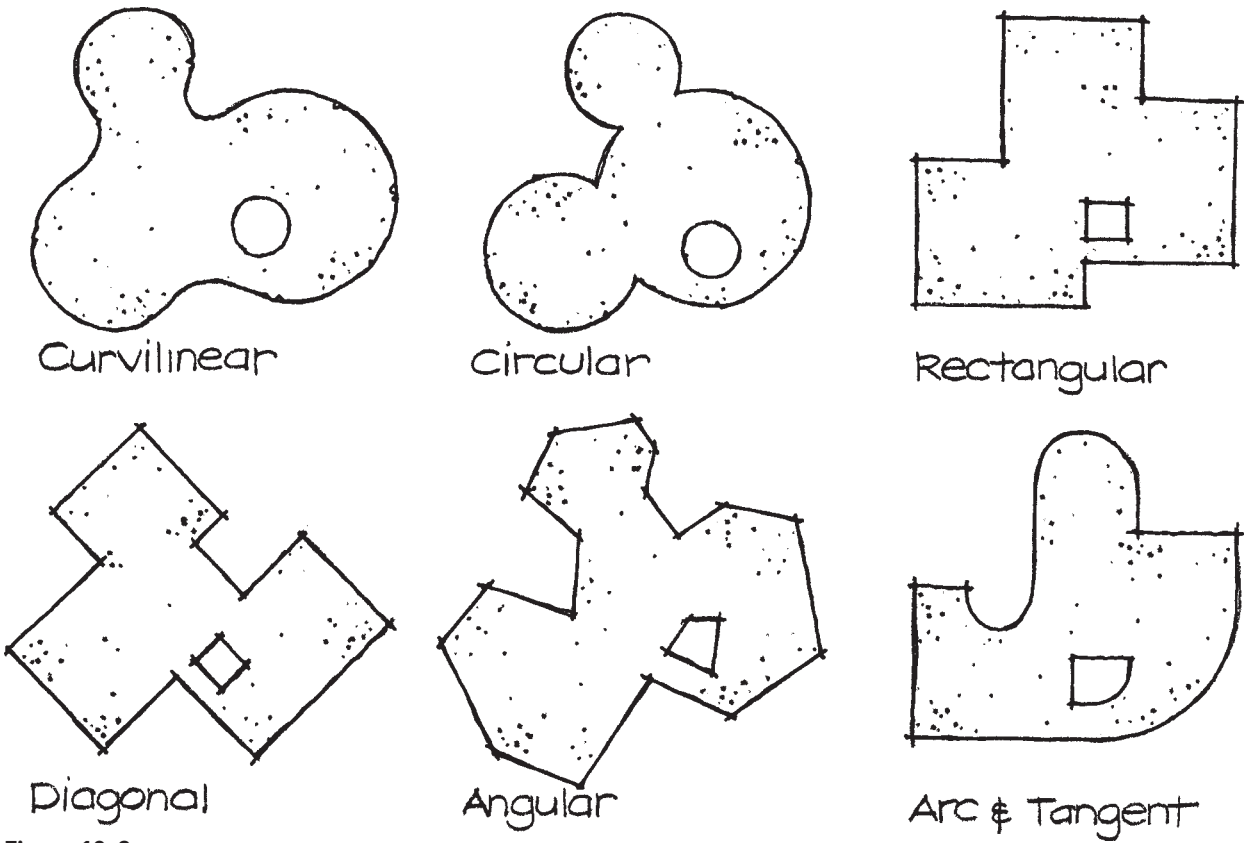


Figure 10–2
Potential visual themes created during form composition.

selected based on (1) the intended style of garden design (Italian Renaissance, English, Colonial, Victorian, Japanese, California, Post-Modernism, etc.), (2) a desired garden character (informal, structured, organic, passive, casual, wooded, flowing), and (3) characteristics of the site. Although there are a number of potential design themes that can be created for a residential design, some of the more common themes based on geometric shapes include (1) circular, (2) curvilinear, (3) rectangular, (4) diagonal, (5) angular, and (6) arc and tangent. These are illustrated in Figure 10–2.

Whereas functional diagrams establish an invisible framework that is only indirectly seen or felt, a design theme provides an order that can be directly seen. The lines of the design theme establish a consistent order of forms that harmoniously relates all the elements and spaces of the design to each other (left side of Figure 10–3). Without a consistent design theme, a design is apt to break apart into a number of visually unrelated parts (right side of Figure 10–3).

Form composition establishes a two-dimensional base that serves as the foundation for the walls and ceiling of outdoor space added during spatial composition. Collectively, all three of these planes of spatial enclosure can establish a distinct character or personality that is actually experienced.

Form composition is a critical step of the design process because it directly affects the aesthetics of a space. Most people are not able to determine whether or not a design works well functionally without studying or living with it for a period of time. On the other hand, people react almost immediately to the forms they see within the design. Often, a quick subjective approval or disapproval of the design is based on the visual structure created by the composition of forms.

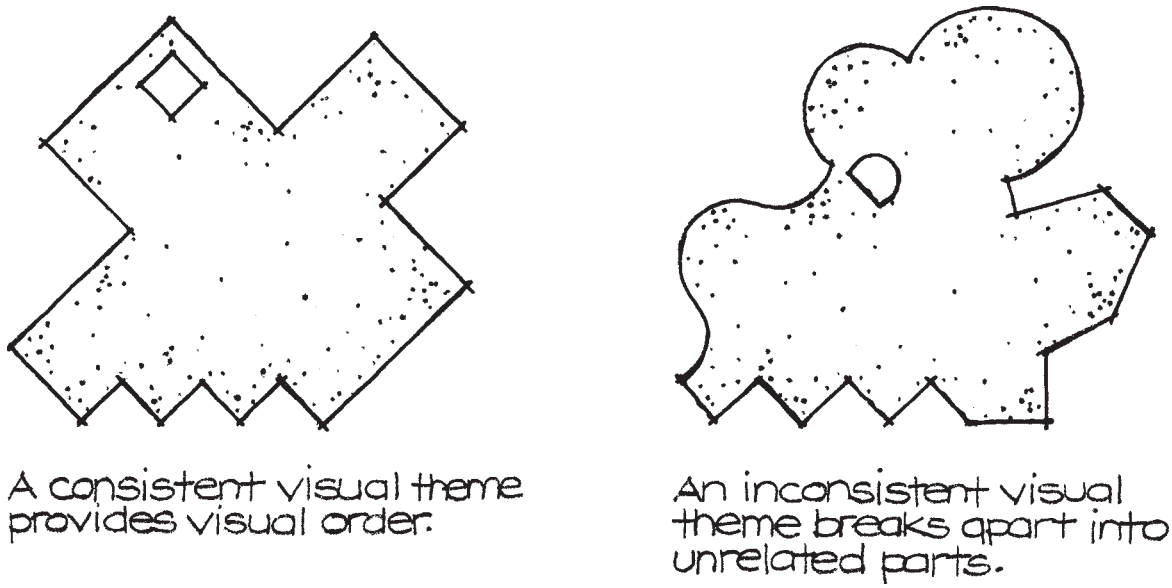


Figure 10–3
A consistent visual theme should be used in form composition to establish order.

GEOMETRY OF FORMS

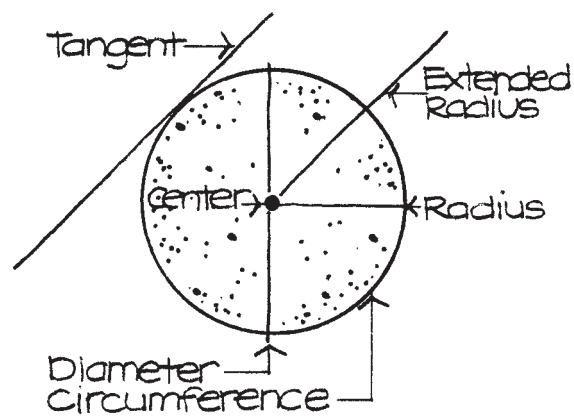
Most design themes, including those described in this book, are strongly related to two fundamental geometric shapes: the circle and the square. Visually pleasing design compositions are usually based on sensitive relationships between these two shapes (or their component parts), whereas visually disturbing compositions fail to consider them. It is important to understand these two forms when creating a design composition because both shapes have a number of inherent geometric characteristics and components that influence their use in design.

The Circle

Among the many and varied forms we see in the world around us, the circle stands out as being unique. Because of its simplicity and completeness, the circle has often been described as the most pure or perfect form.

The circle has a number of components that are critical to its use in a design composition. These are the (1) center, (2) circumference, (3) radii, (4) extended radii, (5) diameter, and (6) tangent (Figure 10–4). The center is, of course, the middle point

Figure 10–4
Component parts of the circle.



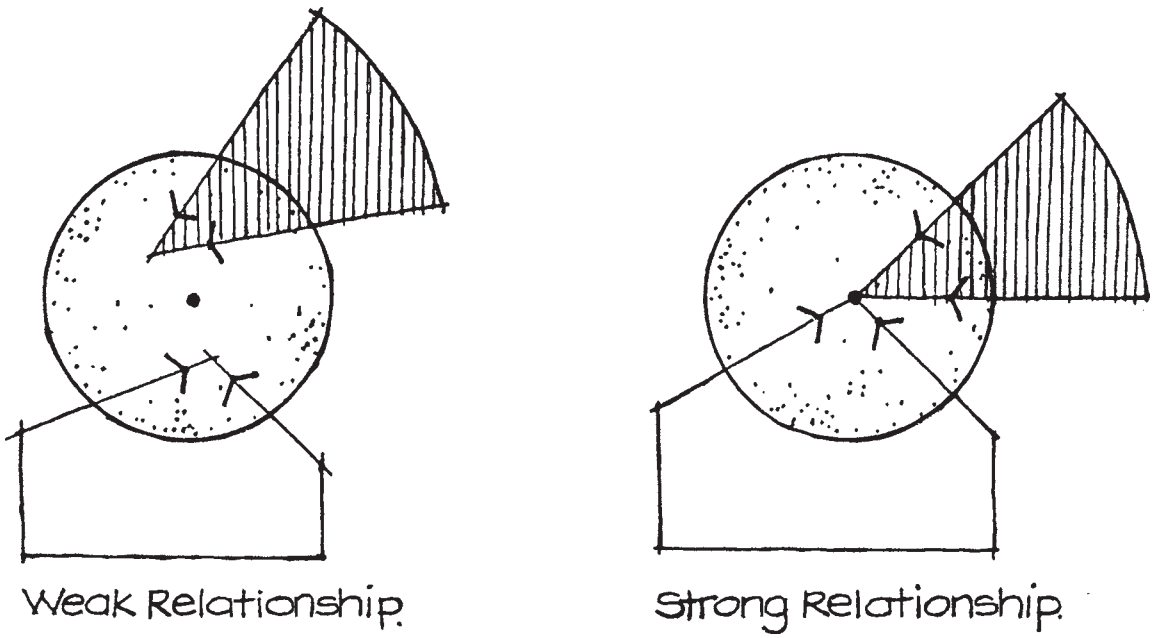


Figure 10–5
Lines should relate to the circle's center to create a visually strong composition.

of the circle. It is the place where all radii and diameters meet and/or cross each other. The circumference, or outer edge of the circle, defines the limits or edge of the circle. Radii are lines that originate at the center of the circle and extend outward to the circumference. Extended radii are similar, but extend beyond the circle's circumference. The diameter is a line that extends from one side of the circle to the other and passes directly through the center. A tangent is a line that touches the circumference while also establishing a right angle (90 degrees) with a radius.

Among all the circle's component parts, the center is perhaps the most important of all. First, the center is a point that inherently attracts attention. Most people can estimate the location of the center of a circle rather easily with a pencil or pen. Furthermore, the radii, extended radii, and diameters pass through the center, reinforcing its position and importance. So, one of the first considerations for designing with a circle is to realize that any line that directly points to a circle's center will create a strong relationship with the circle (right side of Figure 10–5). Lines that don't point to the circle's center are apt to seem awkward or unrelated in their relationship with the circle (left side of Figure 10–5).

In a similar fashion, the manner in which lines and forms meet the circle's circumference helps determine whether or not a composition is successful. Those compositions in which lines meet the circle's circumference by utilizing an extended radius are apt to be more pleasing than those that don't (Figure 10–6). In other words, lines and edges that form a 90-degree relationship to a circle's circumference are more stable looking than compositions that lack this relationship.

Because design involves the development of alternative ideas, it is important to realize that numerous design compositions can be generated by exploring the relationships possible among the basic components of a specific form. Each of the circle's components has the potential of becoming a form generator when combined with another component. Many design ideas are possible that use two, three, four, or all five of the circle components (Figure 10–7). This type of activity can stimulate design creativity and make designing an exciting process.

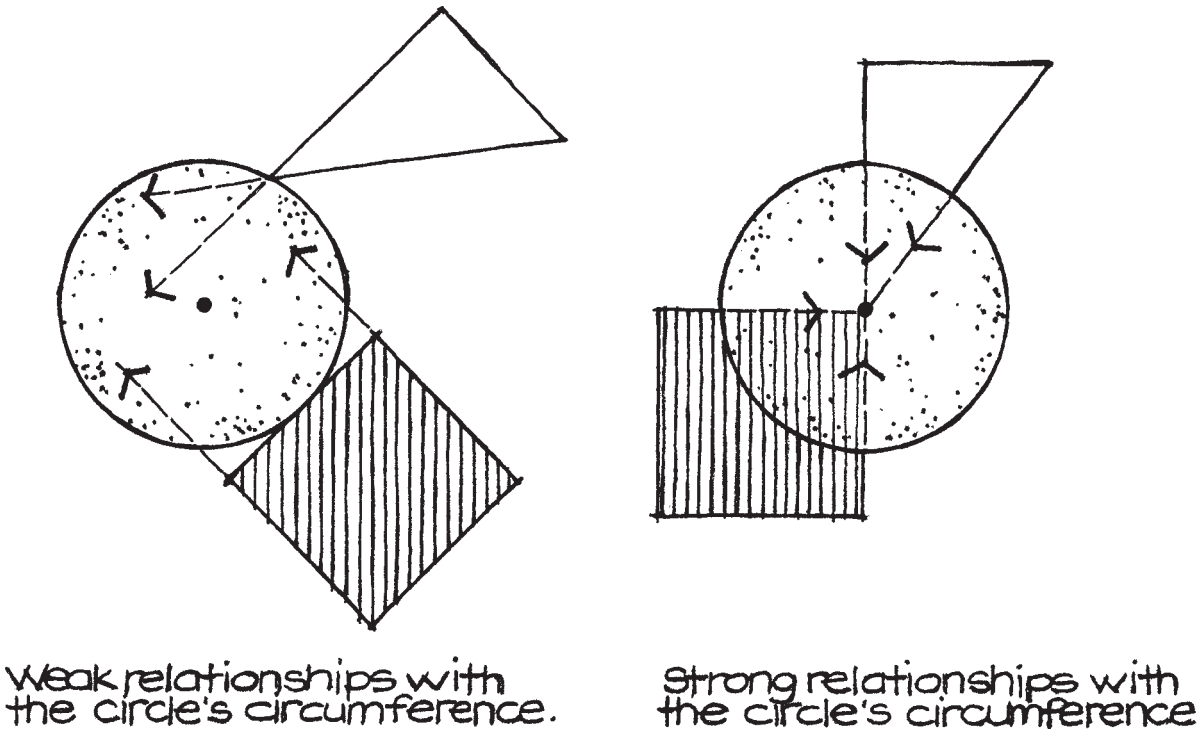


Figure 10–6
Lines should meet the circle's circumference at 90 degrees.

Equilateral polygons can be used in developing design compositions and can be formed within a circle. The forms presented here are (1) triangle (three sides), (2) square (four sides), (3) pentagon (five sides), (4) hexagon (six sides), and (5) octagon (eight sides).

Figures 10–8 through 10–12 illustrate how each of these polygons is formed within a circle, respectively.

The Square

A square, unlike a circle, is often considered a human-made form because it is made up of straight lines and is not found in nature. The square is also a formal form, owing to its symmetrical structure. All four sides are equal in length, and the interior angles each measure 90 degrees. A square's configuration suggests an axis (a centerline) that divides the form into equal halves. Two noticeable axes in a square pass through its center and are parallel to the sides (Figure 10–13).

A square has four definite directions of orientation because of its clearly delineated and separate sides. Unlike a circle, the square does not face outward in all directions (Figure 10–14). These four directions create blind spots at the square's corners. This reinforces the axial nature of the square. Despite their differences, the circle and square do have one important common characteristic: Each can fit within the form of the other (Figure 10–15).

Six specific components of a square are important to form composition: (1) sides, (2) extended sides, (3) axes, (4) extended axes, (5) diagonals, and (6) extended diagonals (Figure 10–16).

Experimentation and exploration with different combinations of the square's components, as with the circle's components, can lead to the development of creative design compositions (Figure 10–17).

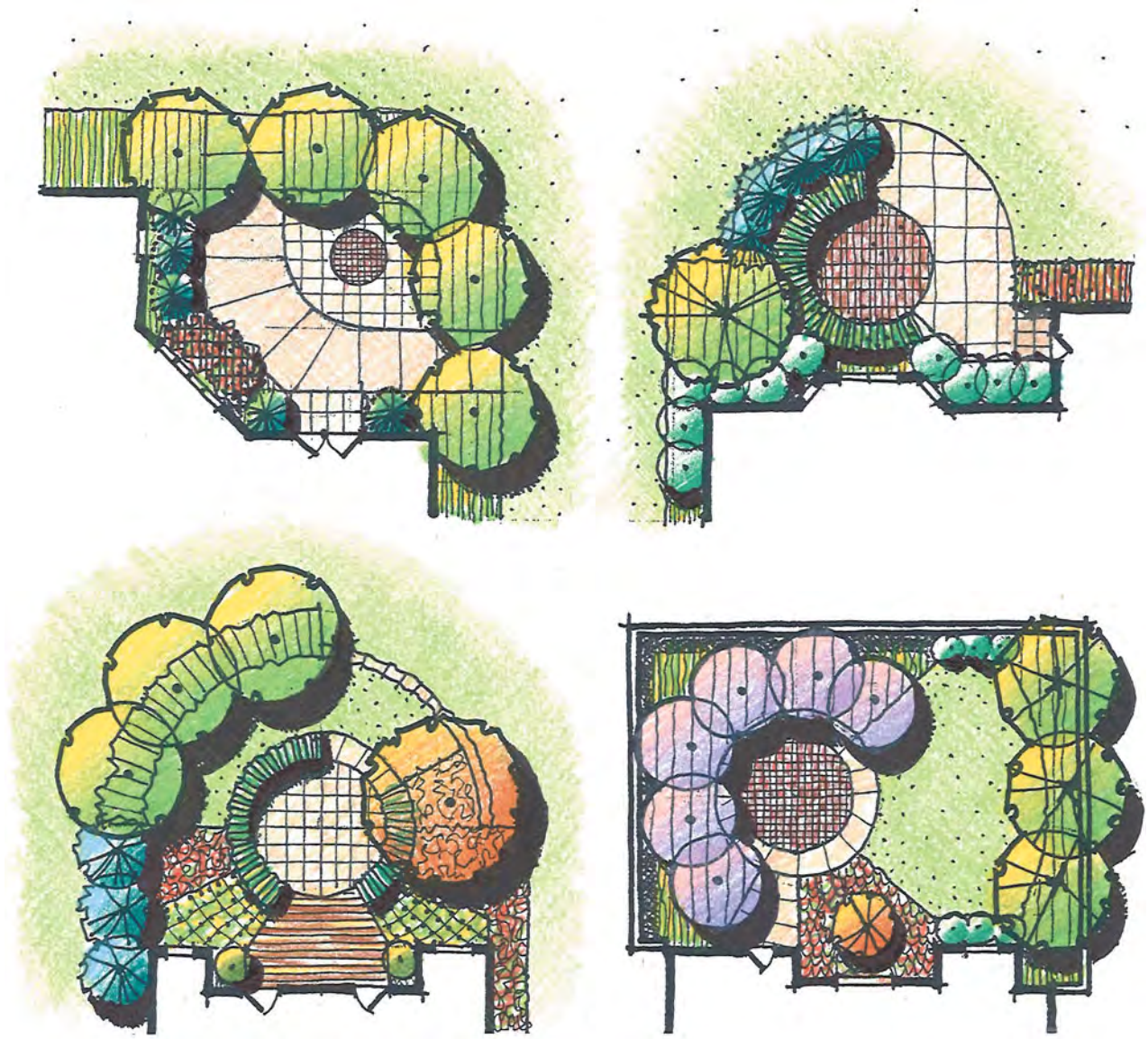


Figure 10–7
Various design compositions are possible when focusing on the component parts of a circle.

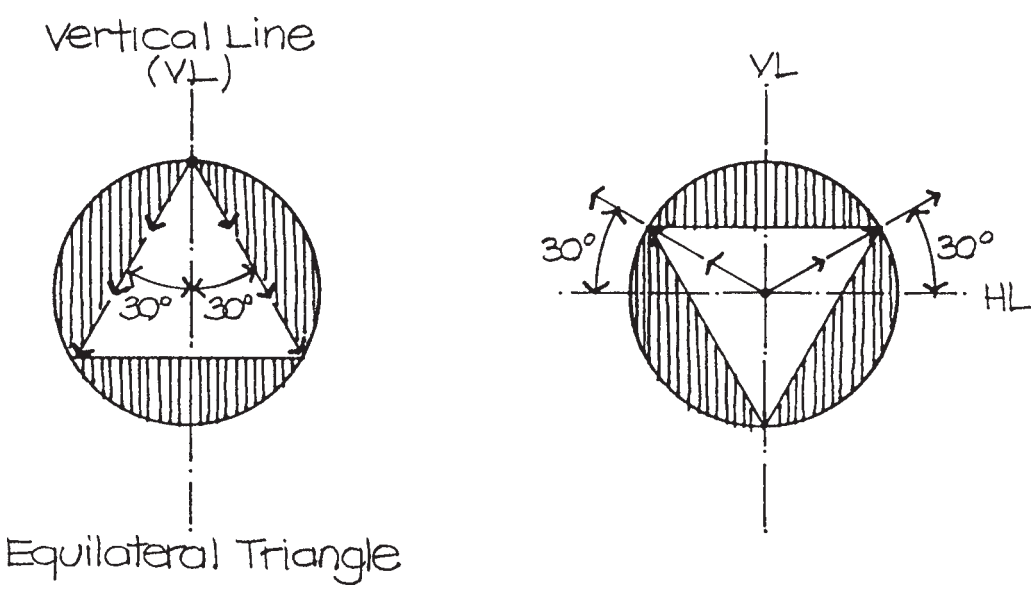


Figure 10–8
Developing an equilateral triangle within a circle.

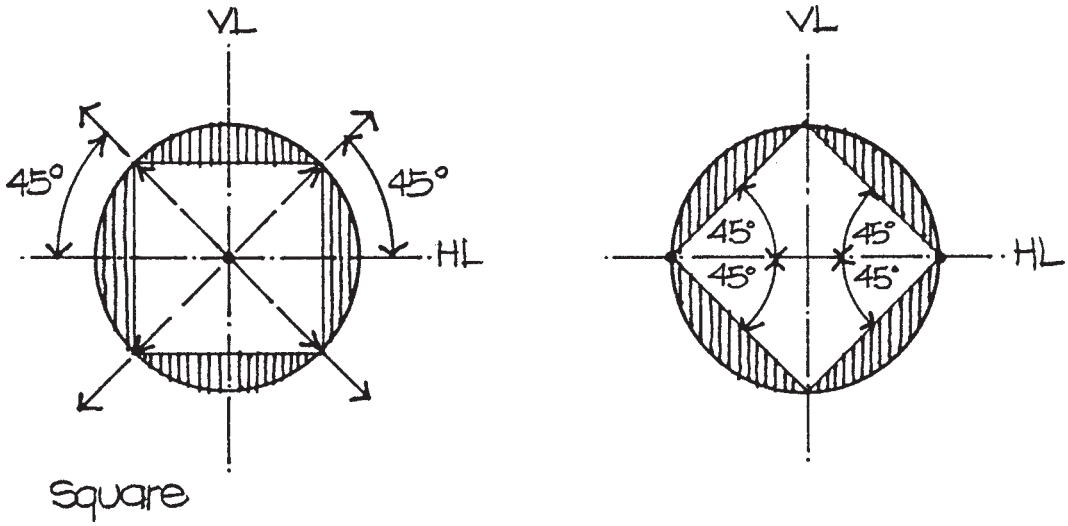


Figure 10–9
Developing a square within a circle.

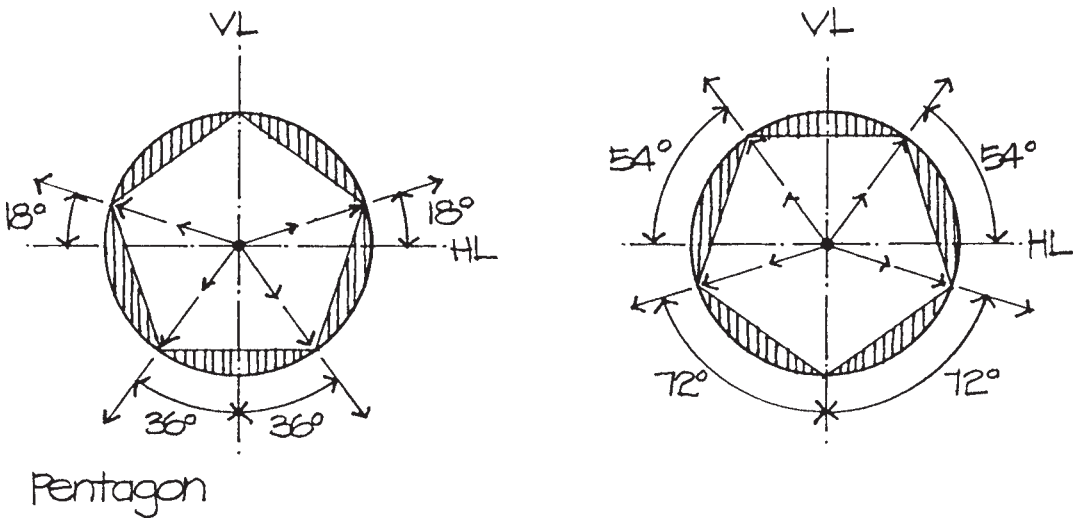


Figure 10–10
Developing a pentagon within a circle.

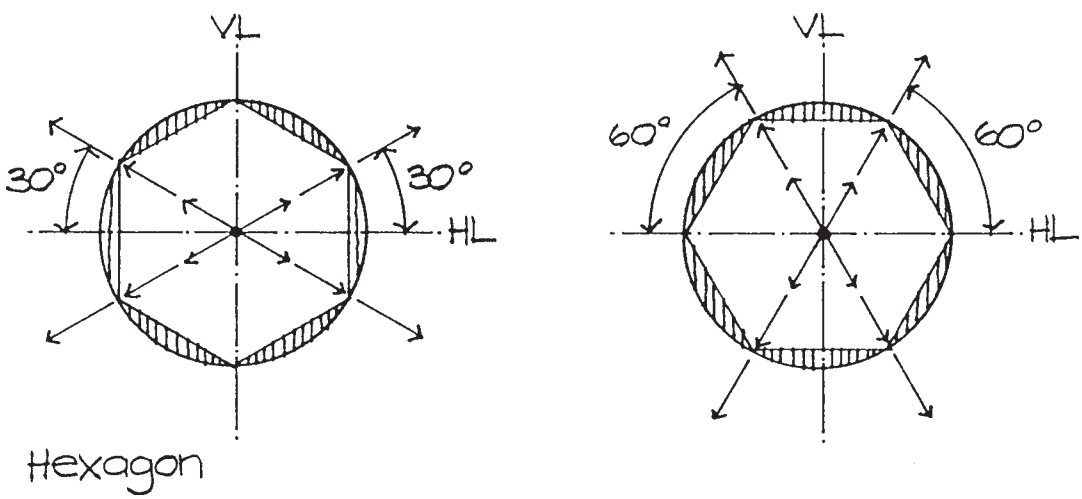


Figure 10–11
Developing a hexagon within a circle.

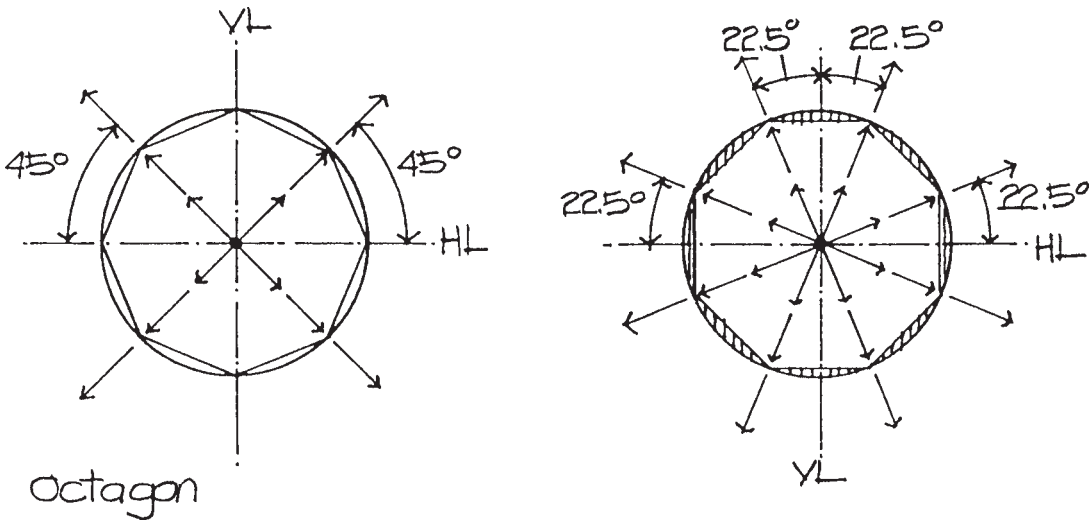


Figure 10–12
Developing an octagon within a circle.

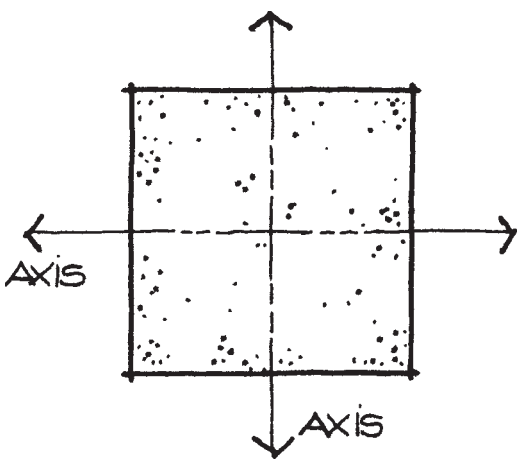


Figure 10–13
The square is inherently divided by two axes, which are parallel to its sides and pass through the center.

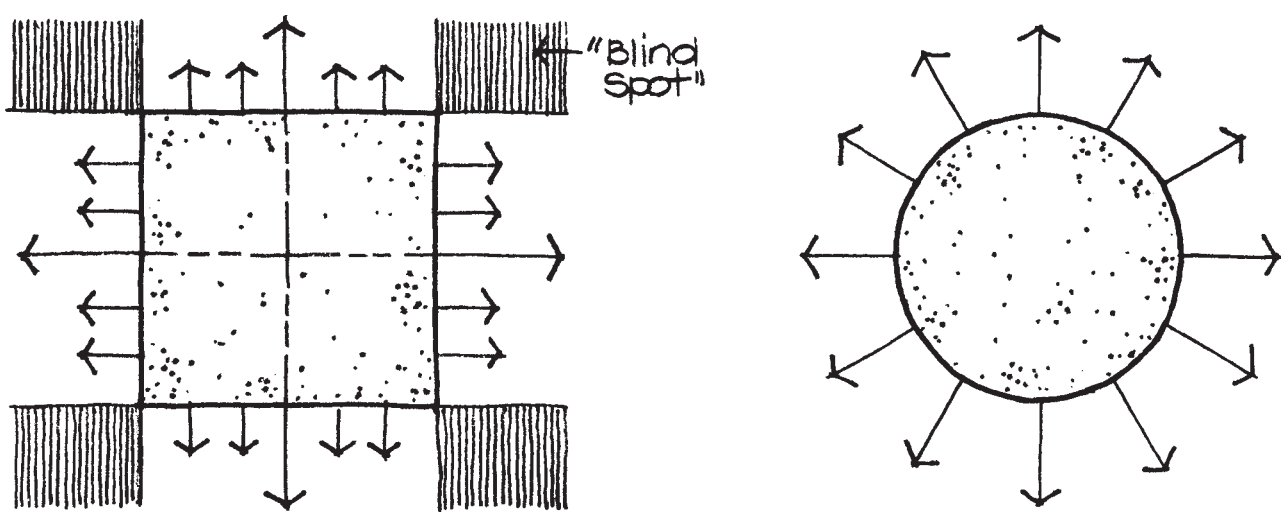


Figure 10–14
Unlike the circle, the square does not face outward in all directions.

Figure 10–15
The form of the circle and square fit within each other.

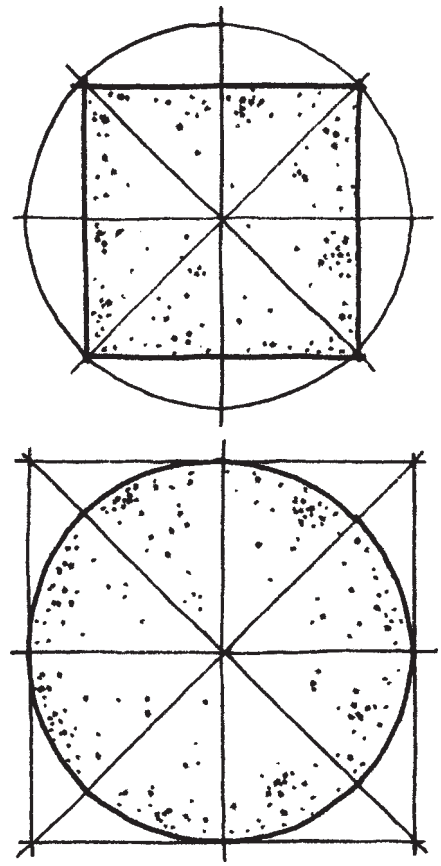
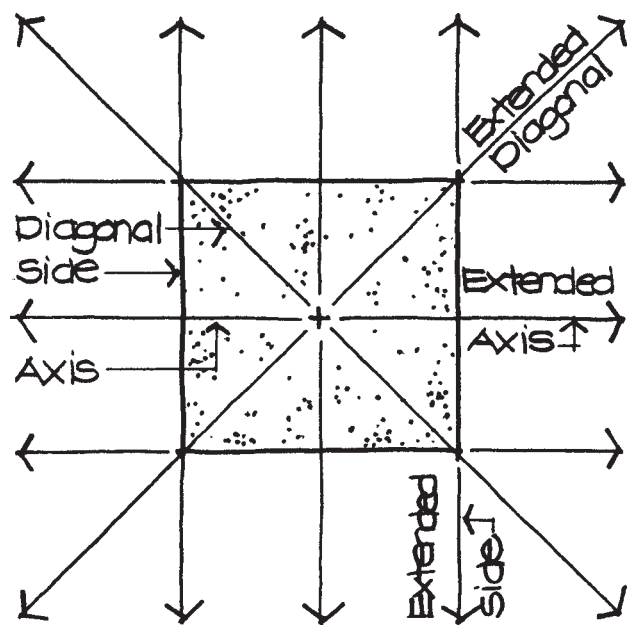


Figure 10–16
Component parts of the square.



Another idea for developing compositions with a square is to use it as a modular grid. The grid can be formed within the square by subdividing it into smaller squares of equal dimensions. For example, these smaller squares can be one-half, one-quarter, or one-third the length of the original square's sides. Once drawn, the grid can suggest an almost endless number of compositional possibilities

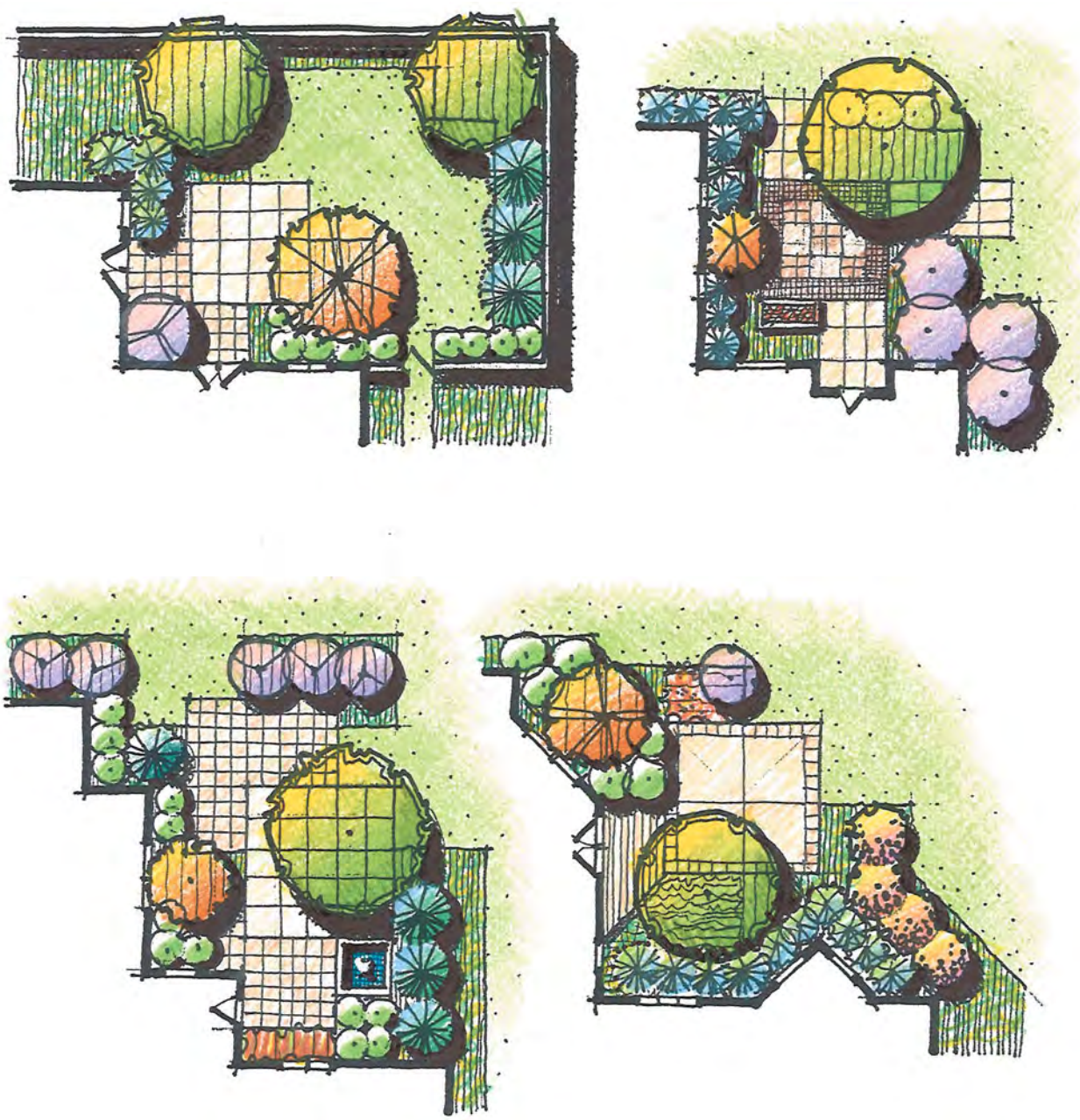


Figure 10–17
Various design compositions are possible when focusing on the component parts of a square.

(Figure 10–18). Diagonals can be added to the previous grids to provide different design compositions (Figure 10–19).

As has been shown, the circle and square along with their component parts are the foundation for a limitless variety of design compositions. It is important for the designer to explore these two geometric forms and their components to increase creative skills. As one engages in this type of activity, new forms are discovered that give rise to new ideas.

Guidelines for Combining Forms

In creating form compositions, the designer must also consider the relationships between adjoining forms and their component parts. These relationships are referred to as form-to-form relationships.

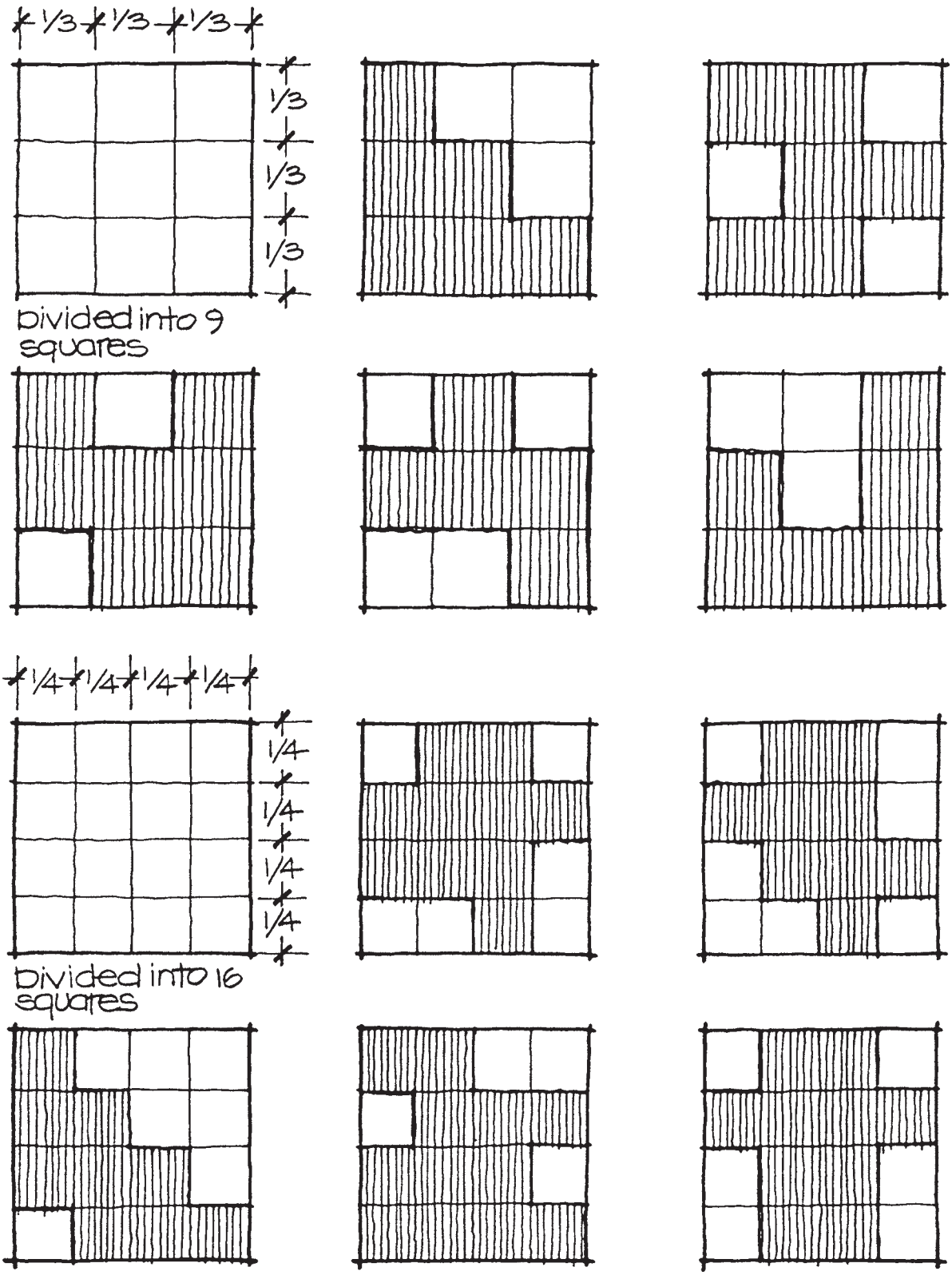


Figure 10–18
A modular grid can be created within a square as the basis for design compositions.

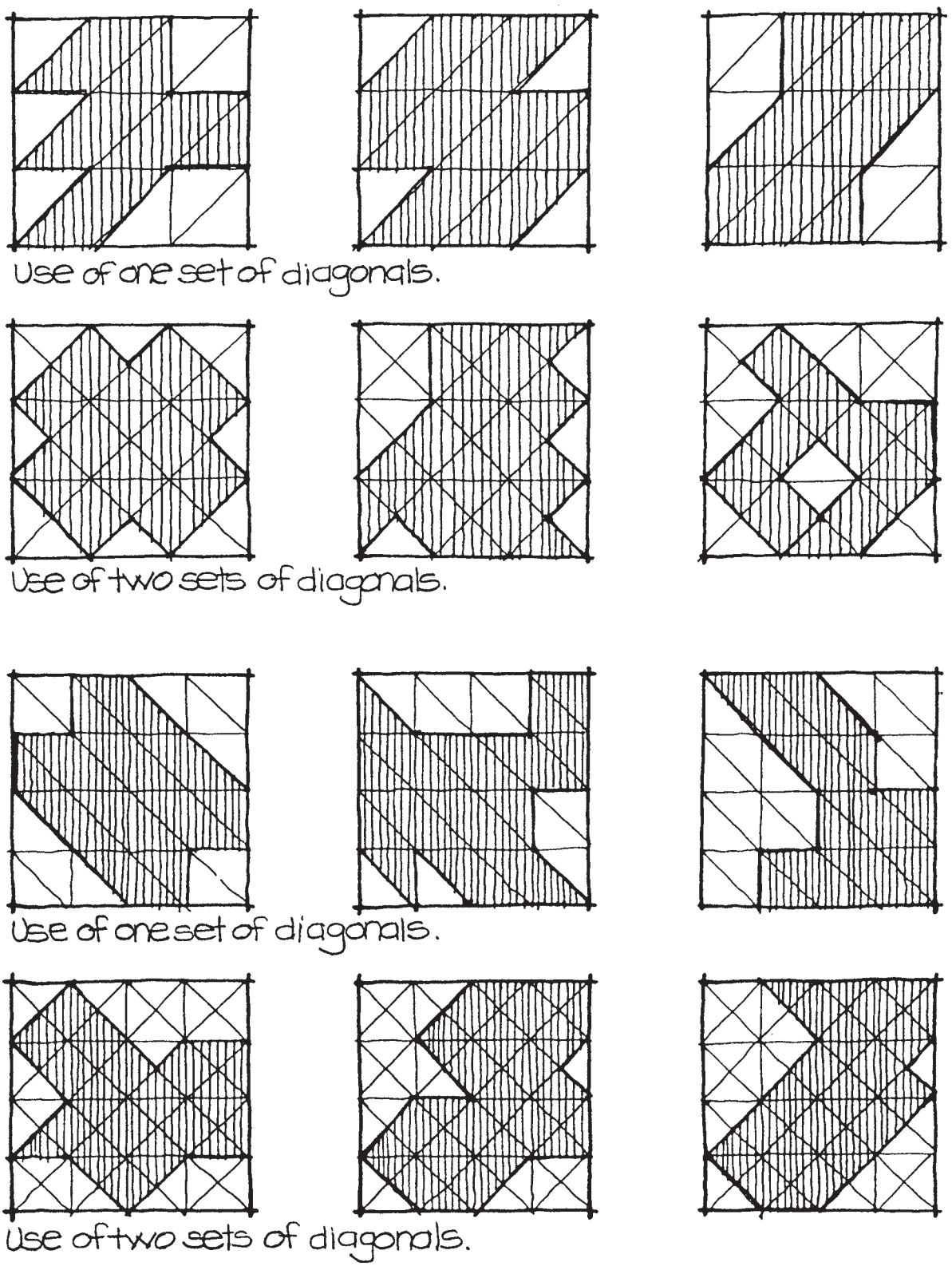


Figure 10–19
A diagonal grid can also be used to create design compositions.

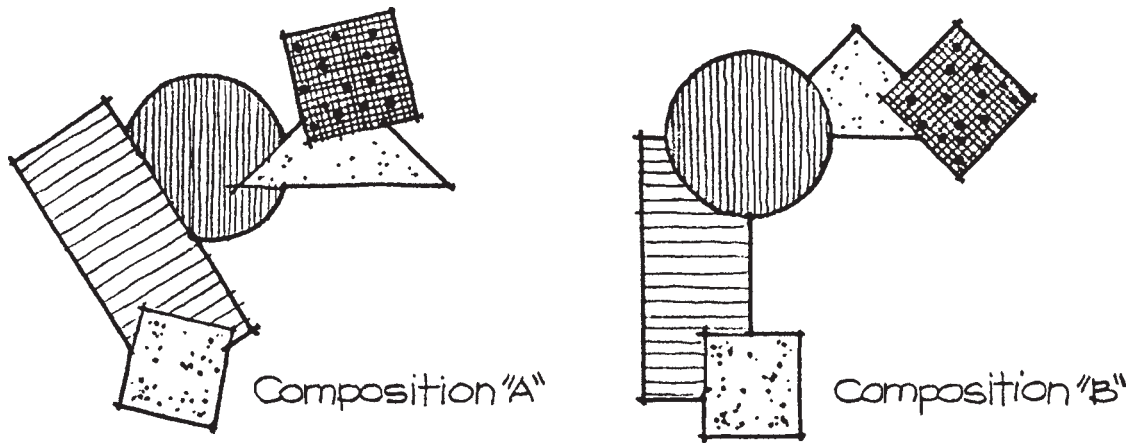


Figure 10–20
Form-to-form relationships are important in establishing visually attractive design compositions.

When any two or more forms are combined, attention should be given to the relationship established among the forms' components. Figure 10–20 shows two different compositions, each consisting of the same forms. The difference between these compositions is the relative positioning of the forms within each composition. It should be obvious that composition "B" seems more organized, whereas composition "A" tends to suggest random placement of forms. The organization of composition "B" is based on a conscious application of four sound guidelines for combining forms. They are (1) aligning component parts, (2) avoiding acute angles, (3) establishing form identity, and (4) form domination.

The first and foremost guideline is that the component parts of each form coincide, or be aligned, with the location of the component parts of adjoining forms. For example, notice the alignment of the various components in the composition on the right side of Figure 10–21. An extended radius of the circle (C) also serves as a side to the isosceles triangle (B) and is aligned with a side of the rectangle (D). Also, two sides of the triangle and two sides of the rectangle are extended radii of the circle. A corner of the rectangle is also the center of the square. By contrast, the internal relationship of the components on the left side of Figure 10–21 has an absence of

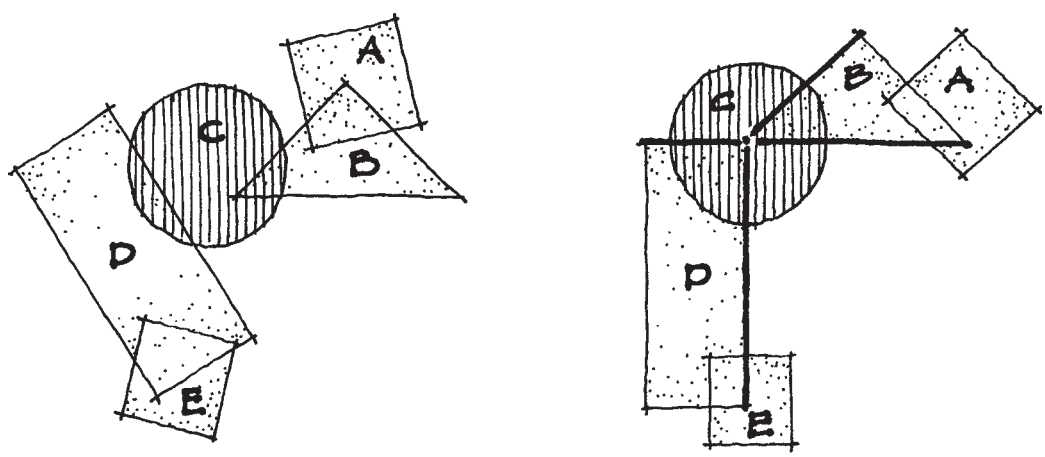


Figure 10–21
Component parts of adjoining forms should coincide and align with each other.

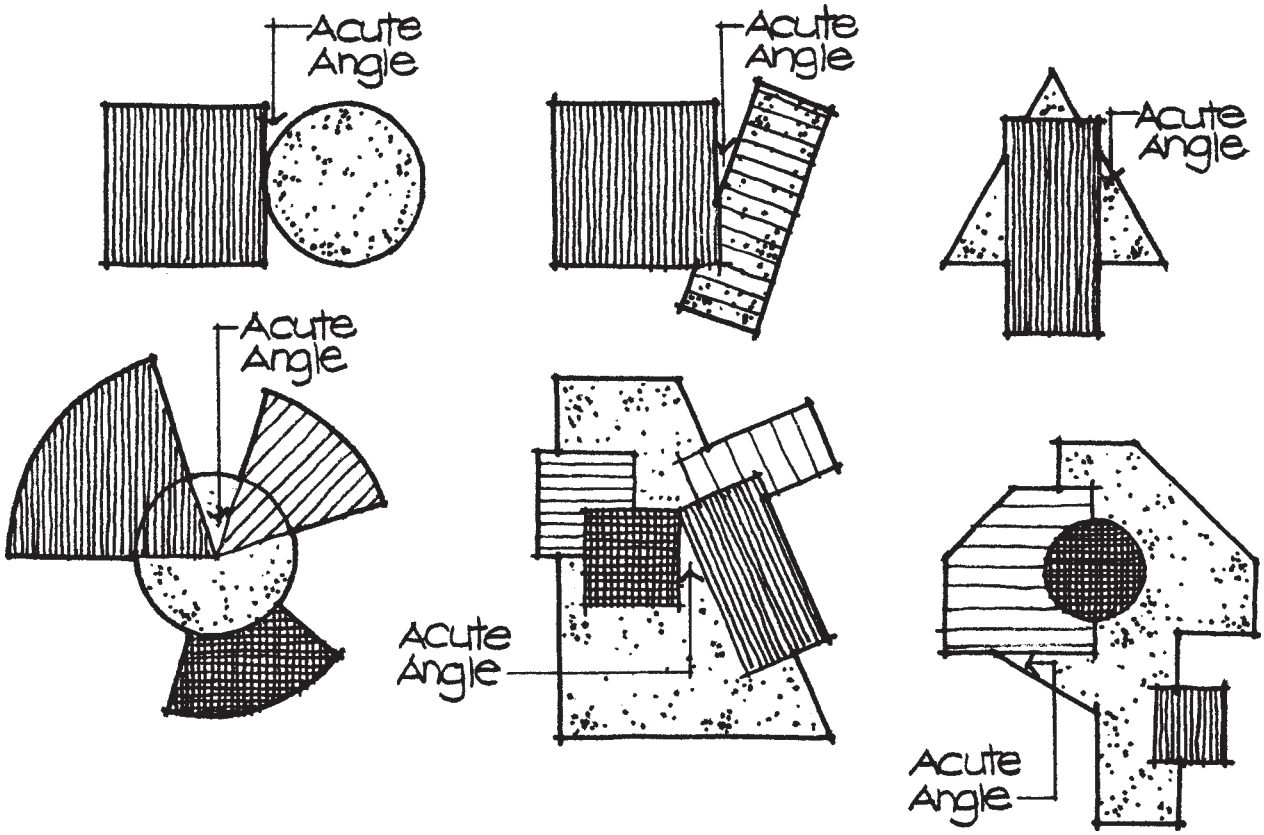


Figure 10–22
Acute angles should be avoided in design compositions.

sensitive form-to-form relationships. Here, none of the forms' components align with each other. This composition is, of course, considered to be very weak.

The second guideline for combining forms is to avoid the creation of acute angles. An acute angle is one having less than 45 degrees. Figure 10–22 shows a variety of form compositions with acute angles. Although some of the compositions may at first seem fairly well organized and visually acceptable, some of the relationships of lines and shapes within them create disturbing acute angles. These acute angles should be avoided for the following reasons:

1. They create visually weak relationships between forms and are points of visual tension.
2. When created within or at the edge of pavement areas, they create areas that are structurally weak and subject to breaking and cracking (Figure 10–23). The narrow, angular piece of material in this area has the tendency to crack, especially in the cycle of freezing and thawing.
3. When acute angles are formed at the edge of a planting bed, they create areas where it is difficult, if not impossible, to grow shrubs or even ground cover (Figure 10–24).
4. When acute angles make up a portion of a space intended for people to use, such as an eating space or an entertainment space, they produce a wasted and useless area because of their extremely narrow dimensions (Figure 10–25).

The third guideline for combining forms is to establish form identity. Form identity refers to the ability of individual shapes within a composition to be identifiable

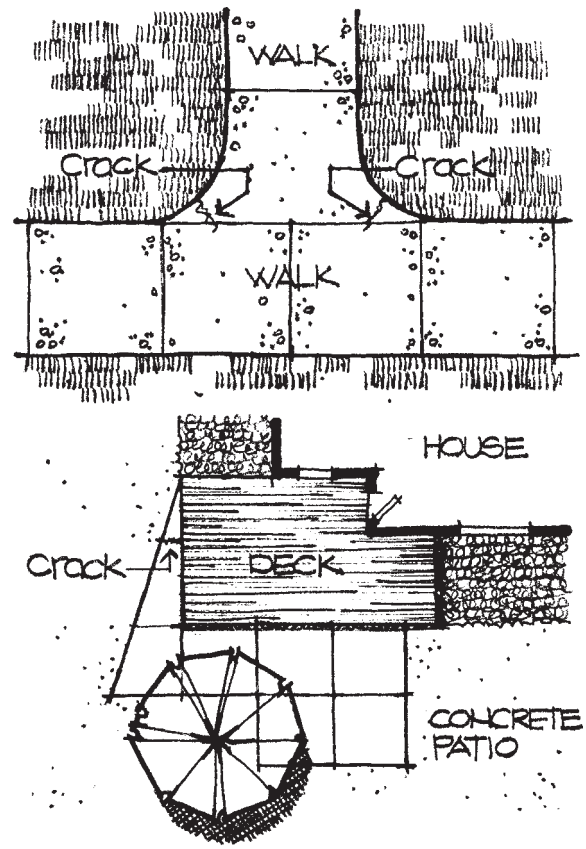


Figure 10–23
Acute angles in pavement create areas that are subject to cracking and breaking.

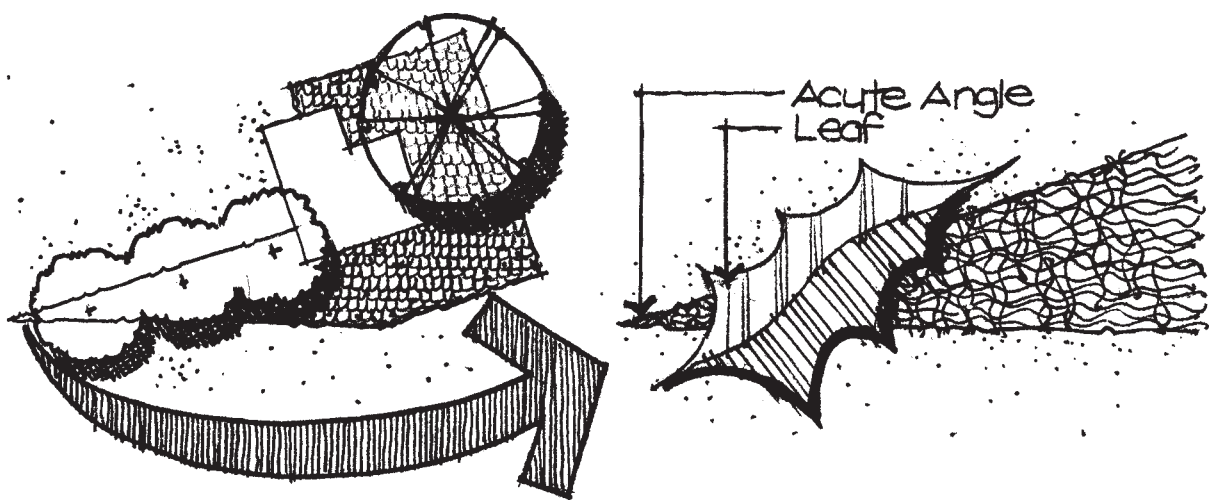


Figure 10–24
Acute angles in planting beds form areas that are too small to plant within.

and legible as distinct forms. For example, the circle and square shown in the composition in Figure 10–26 can be seen as identifiable shapes, with each lending some of its character to the overall composition. On the other hand, Figure 10–27 illustrates shapes within the composition that do not lend adequate visual support to the total composition. Some of the forms are nearly "lost" inside others. When this occurs, it is best to either eliminate the lost form or increase its identity by changing its size or position.

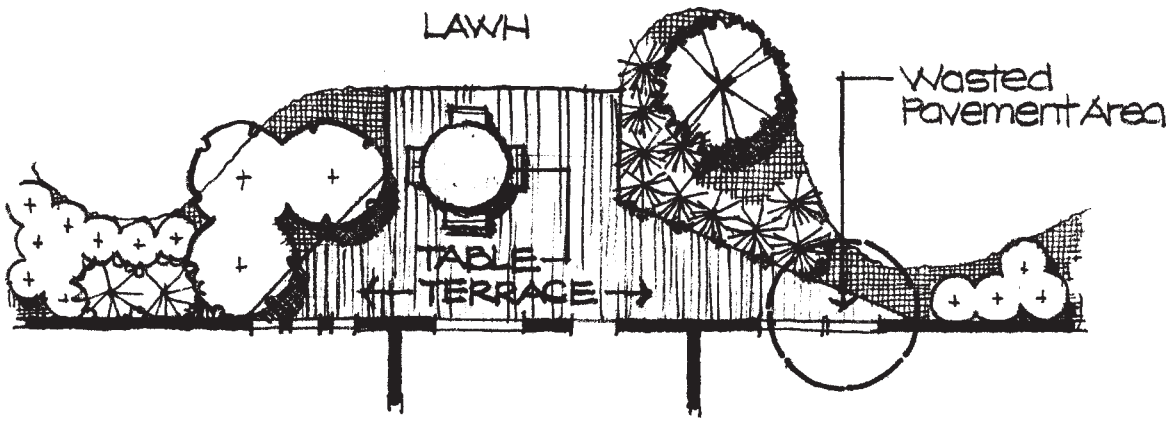


Figure 10–25
Acute angles within outdoor spaces create wasted areas.

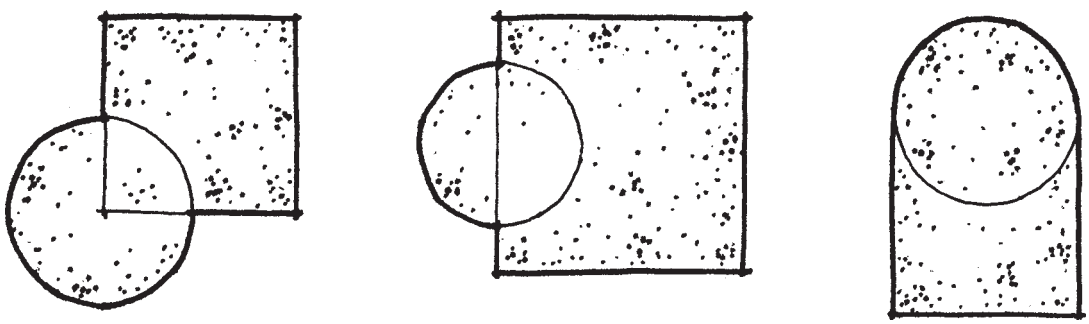


Figure 10–26
Examples of strong compositions where each individual form is identifiable and legible.

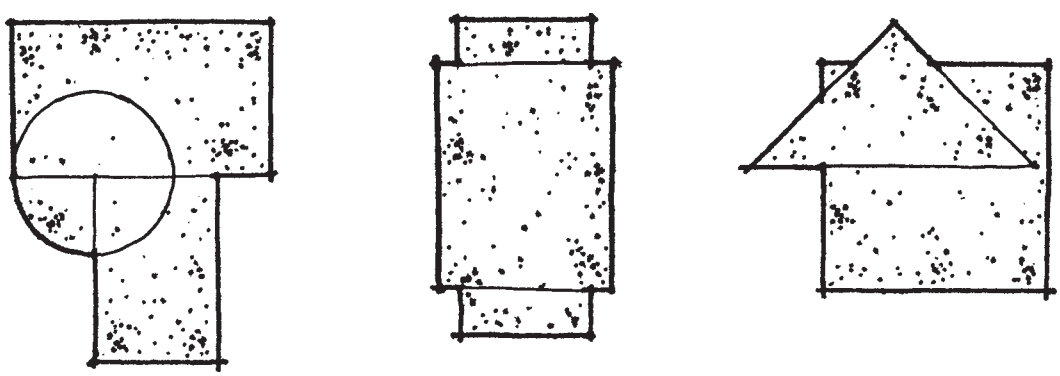


Figure 10–27
Examples of weak compositions where some of the individual forms are lost within the others.

One last guideline for combining forms is to have one form dominate in a composition. This provides greater form identity and adheres to the principle of dominance discussed in Chapter 9. A dominant form establishes a visual accent and provides a resting place for the eye (Figure 10–28).

In summary, these four guidelines for combining forms in a composition are valuable in organizing forms. Although there may be some instances where these guidelines will not be suitable, in most cases they should be considered.

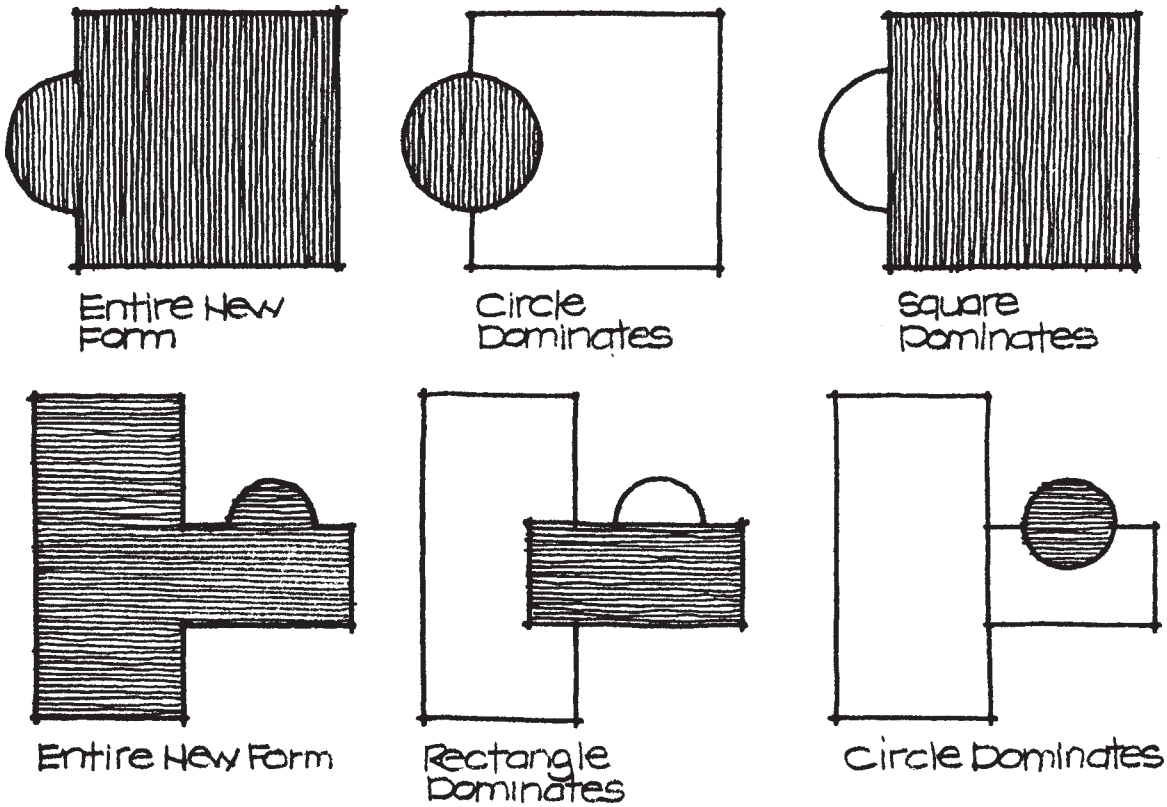


Figure 10–28
One form in a composition should usually dominate.

DESIGN THEMES

Earlier in this chapter, Figure 10–2 illustrated a variety of design themes composed of different sets of forms and lines. These six themes provide the designer with compositional options for creating visual structure in a landscape design. Some themes are made up of only one type of form; others include two. Rarely, however, will more than two different forms work together to create a recognizably consistent theme.

The following sections discuss characteristics of each of these themes along with their potential uses on residential design projects.

Circular Theme

A design theme made up primarily of circles or portions of circles is called a circular theme (Figure 10–29). Two potential types of circular themes are overlapping circles and concentric circles.

Overlapping Circles Overlapping circles create a composition with relatively "soft" edges. There are several guidelines for creating overlapping circular themes. First, it is desirable to use a variety of circle sizes. As suggested in Chapter 9, each composition should have a dominant space or form. Thus, one circular area of the composition should stand out as being the prominent element (Figure 10–30). Such a circular area could be used as a lawn area, a major entertaining and living space, or another important area of a design. Other spaces of the design should be smaller in size, although they should not all be the same size.

Second, when overlapping two circles, it is recommended that the circumference of one circle pass through or near the center of the other circle (Figure 10–31). There are two reasons for this. First, if there is too much overlap, then one circle is apt

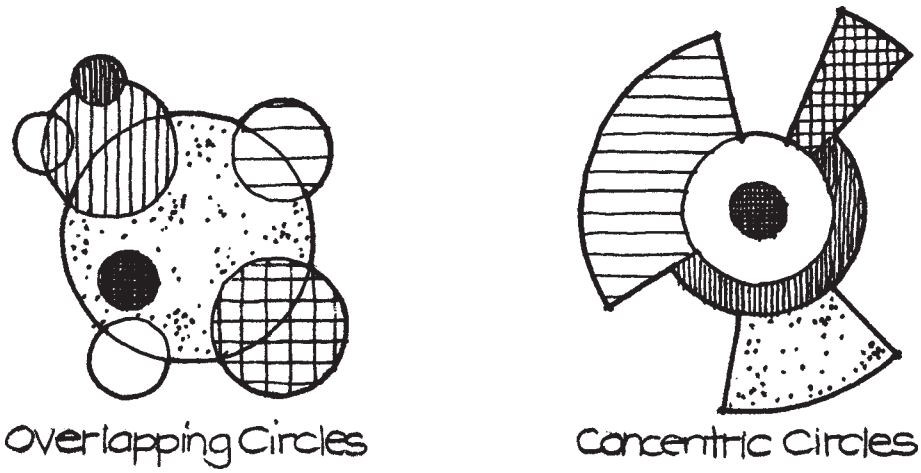


Figure 10–29
Two types of circular design themes.

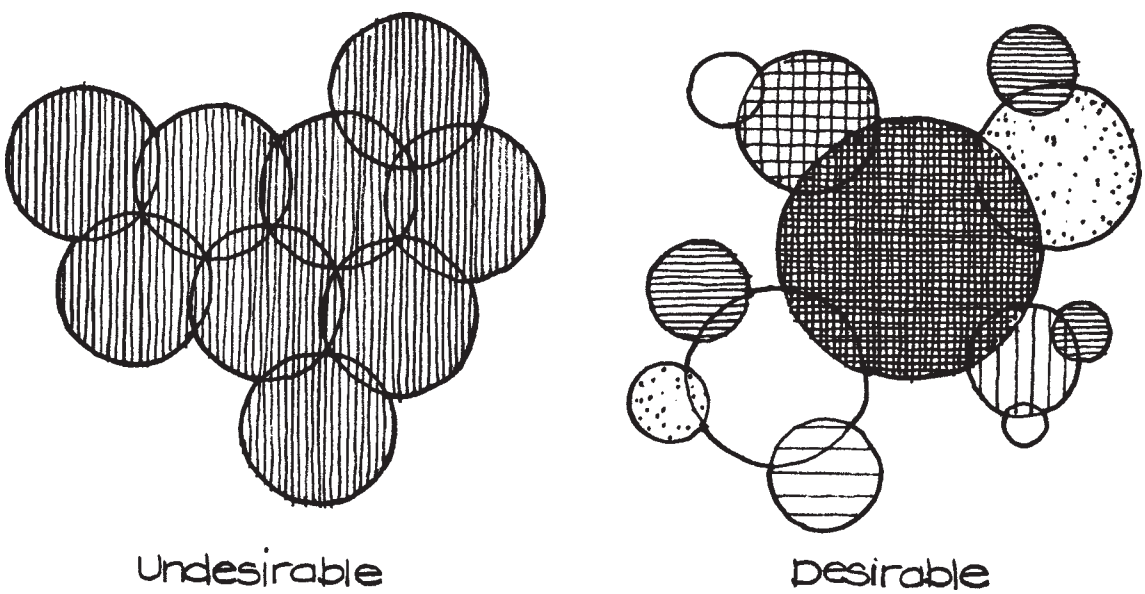


Figure 10–30
One circle within an overlapping circular theme should dominate.

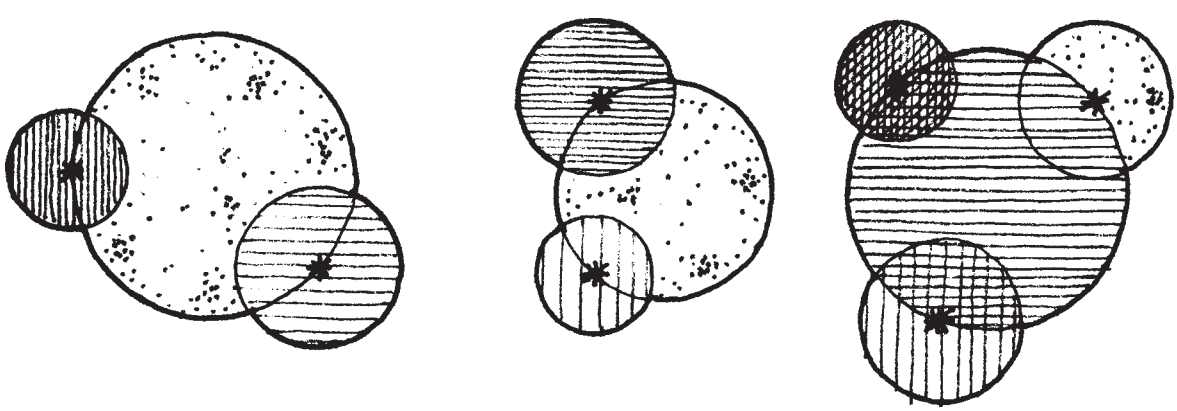


Figure 10–31
The circumference of each circle should pass through or near the center of adjoining circles.

to lose its identity, being too much inside the other circle (left side of Figure 10–32). On the other hand, if there is not enough overlap between the circles, then acute angles are likely to occur (right side of Figure 10–32).

An overlapping circular theme has several qualities. First, it provides several distinct, though still related, parts. This is advantageous where there are a number of distinct functions or spaces that comprise a design. An overlapping circular theme also has many directions or feelings of orientation. Such a composition can focus on several points in the landscape (Figure 10–33).

Because of the repetition of the circles, an overlapping circular theme is best situated on level ground or on a sloped site where each circular area is terraced at a different level into the slope (Figure 10–34). A rolling landform, on the other hand, would not be as compatible with the strong geometry of the circular forms.

Concentric Circles Concentric circles create a very strong composition due to the focus of attention at the center of the design where the radii and extended radii originate (Figure 10–35). It is quite difficult to deny the importance of the center in a concentric circular theme.

Compositional variety in a concentric circular theme can be created by varying the lengths and the amount of rotation of the radii and extended radii (Figure 10–36).

A concentric design theme is best used when there is an extremely important design element or space that is to be the center of attraction. The center point of a concentric circular theme should not be placed randomly on a site. It should be a significant existing or proposed feature or space that accentuates the entire composition. To acknowledge the importance of the center point, it should be a prominent focal point such as a sculpture, water feature, or special pavement pattern (Figure 10–37). In addition, a concentric circular theme can be used to suggest a broad, panoramic view of the surrounding landscape (Figure 10–38).

Curvilinear Theme

A very common design theme is the curvilinear theme. The term *curvilinear* is sometimes considered to be synonymous and occasionally used interchangeably with *natural* and *freeform.* However, it is strongly suggested that the words *natural* and *freeform* not be used to replace the term *curvilinear.* A curvilinear theme is not natural. The theme is a structured system even though the soft curves inherent to this

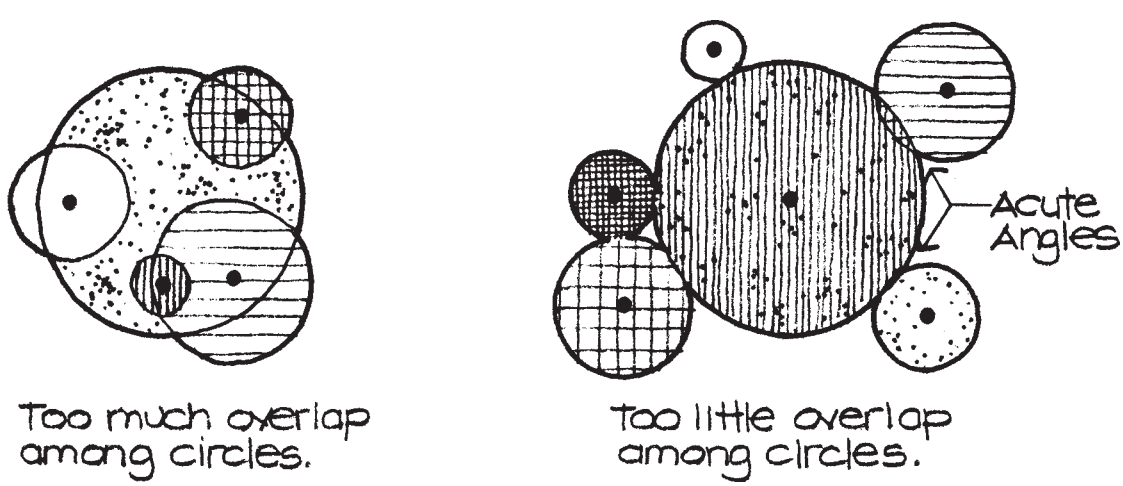


Figure 10–32
Weak circular compositions are created when there is too much or too little overlap among the circles.

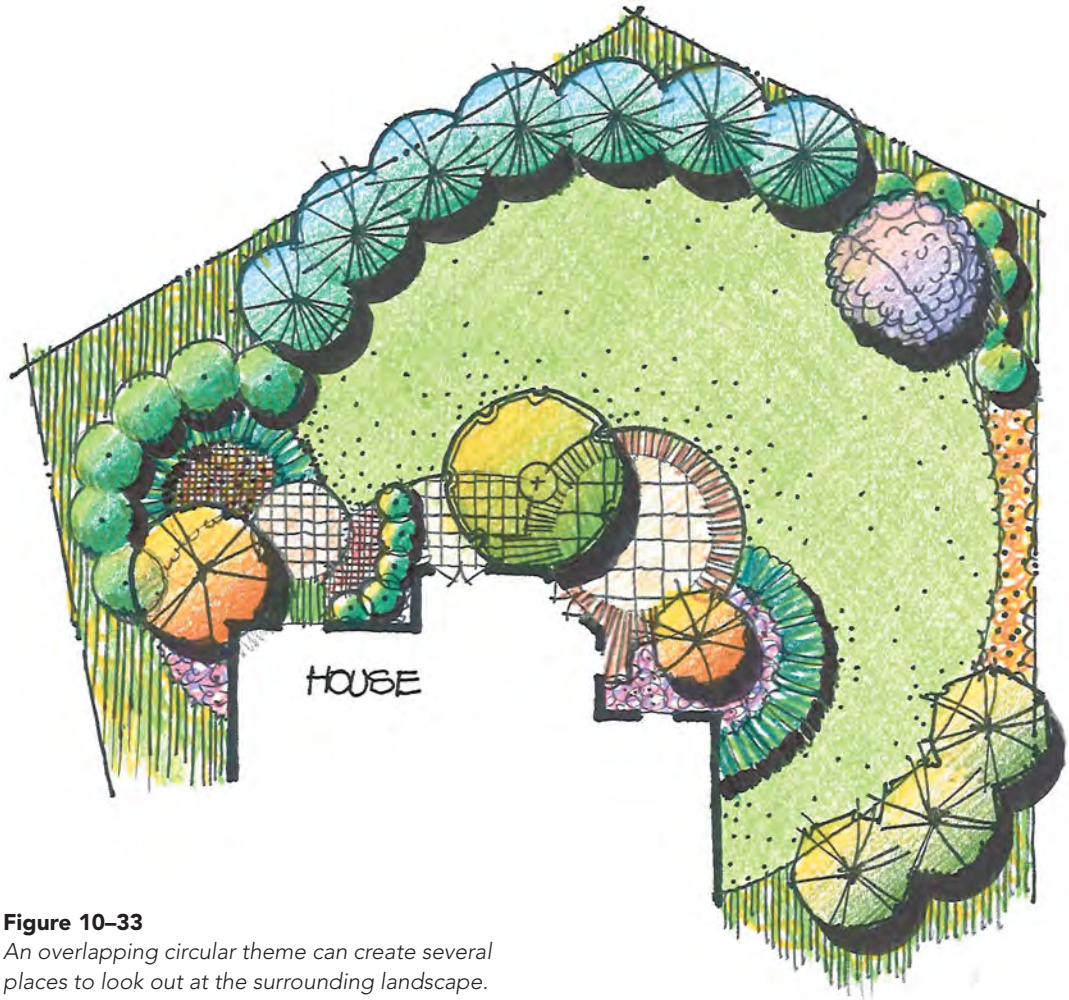


Figure 10–33
An overlapping circular theme can create several places to look out at the surrounding landscape.

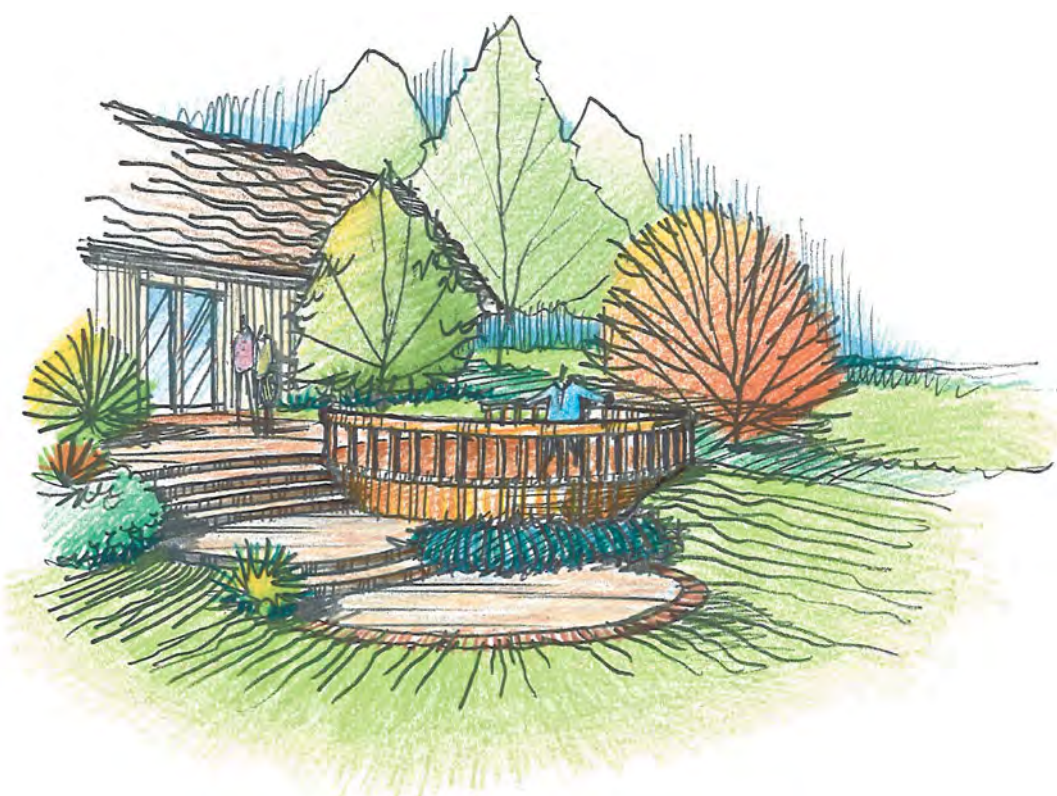


Figure 10–34
Each circle in an overlapping circular theme can be treated as a separate terrace on a sloped site.

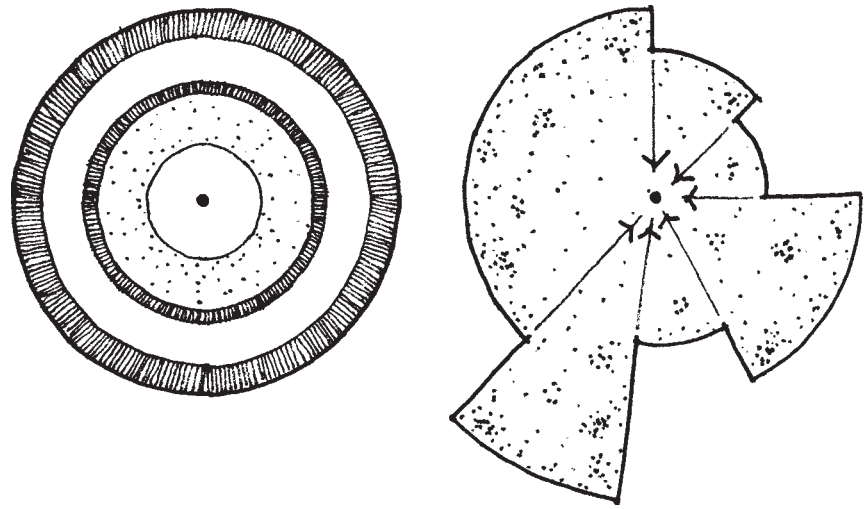


Figure 10–35
The center of the circle is the focus of attention in a concentric circular theme.

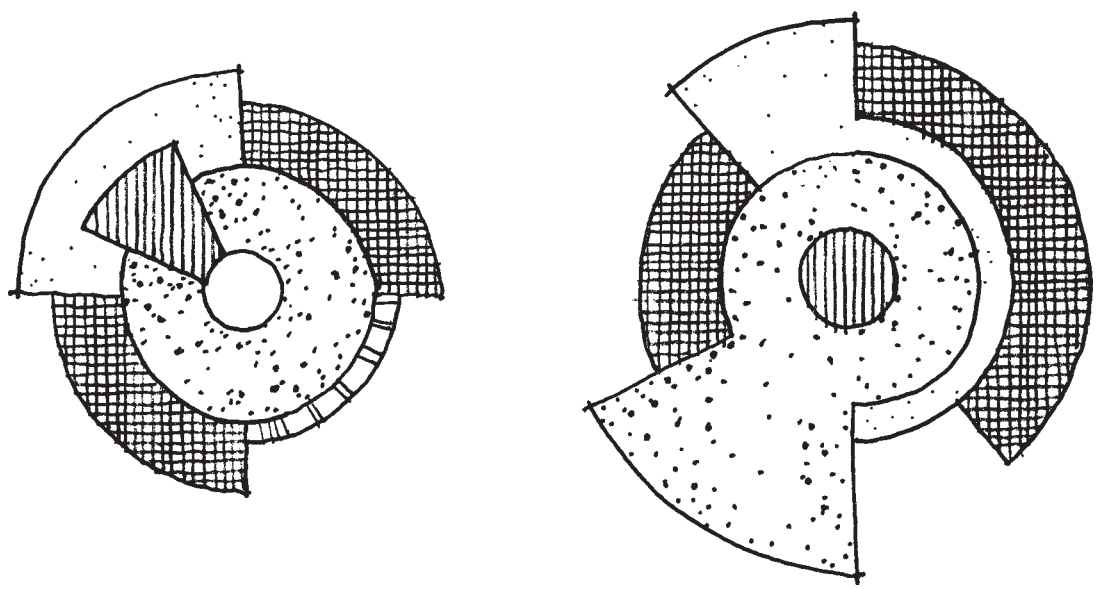


Figure 10–36
Interest can be created by varying the length of the radii and extended radii and/or amount of rotation.

scheme resemble the flowing lines seen in nature. Another reason for not using the term *natural* is to try to diminish the preconception that "everything in the landscape should be naturally arranged." Also, calling one theme natural implies that others are unnatural, which reflects a negative attitude. In reading this book, it is hoped that one will come to appreciate that outdoor spaces need not always be "naturally arranged" in order to be functionally and aesthetically successful. Likewise, *freeform* seems to denote something of little or no structure, like a *free spirit.* Geometric structure, although very subtle, still exists in a curvilinear theme.

The curvilinear theme uses portions of different circles' and ellipses' circumferences for its overall form. Unlike the overlapping and concentric circle themes, the curvilinear theme relies primarily on "the soft touch," in which portions of circles and ellipses connect with each other in smooth, continuous transitions (Figure 10–39).

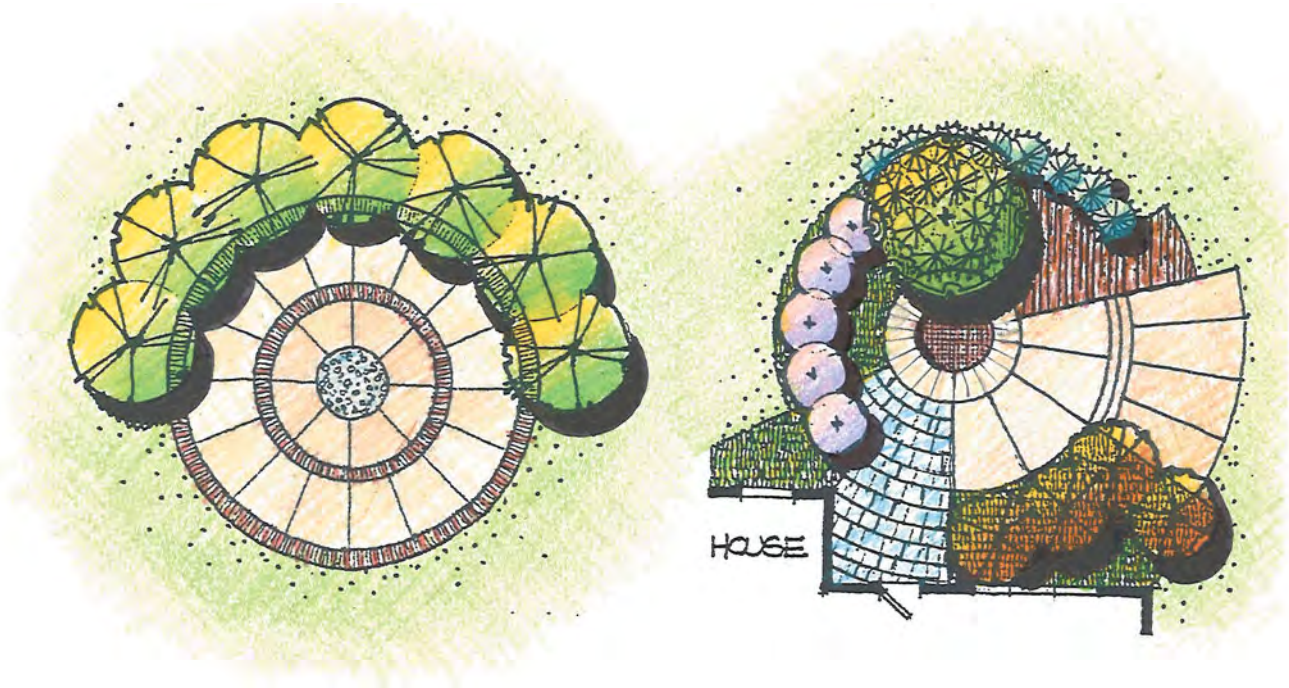


Figure 10–37
The center of the circle should be a prominent focal point created by special pavement or another element.

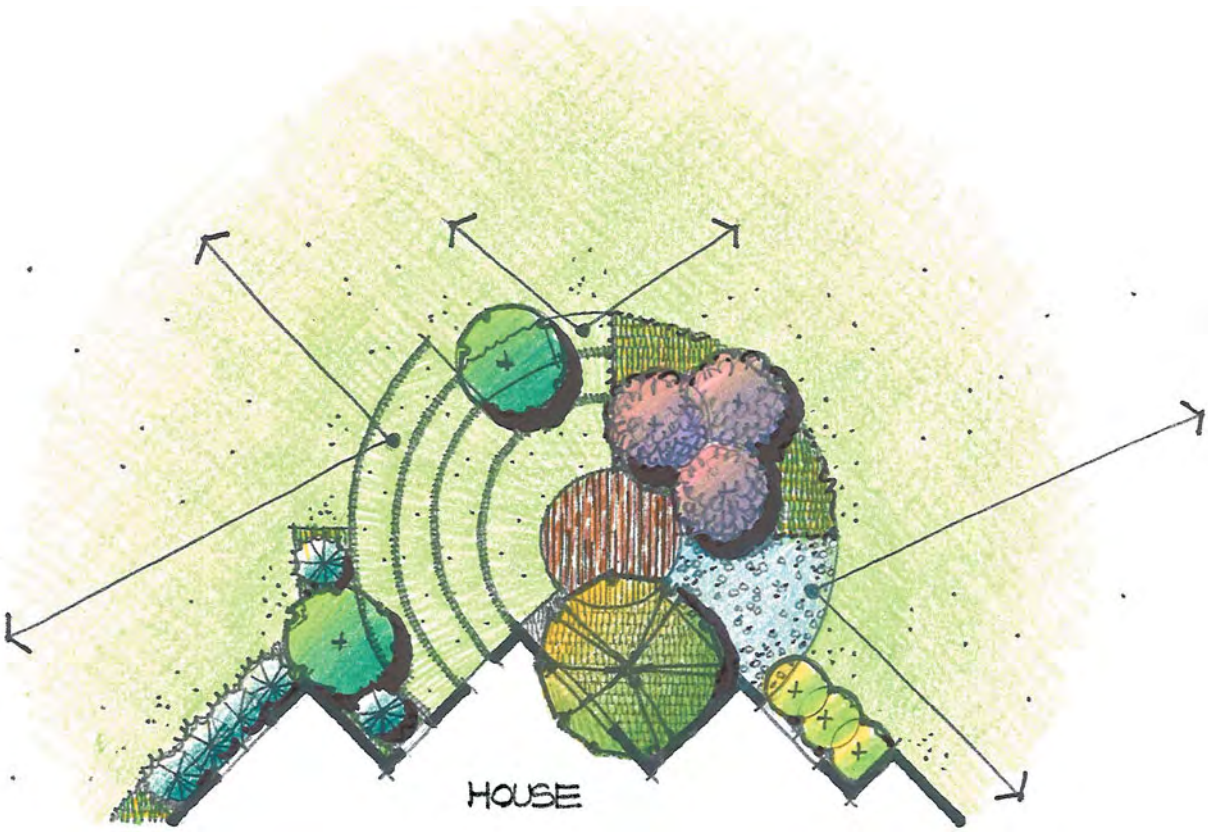


Figure 10–38
The outside of a concentric circular theme can provide panoramic views of the surrounding landscape.

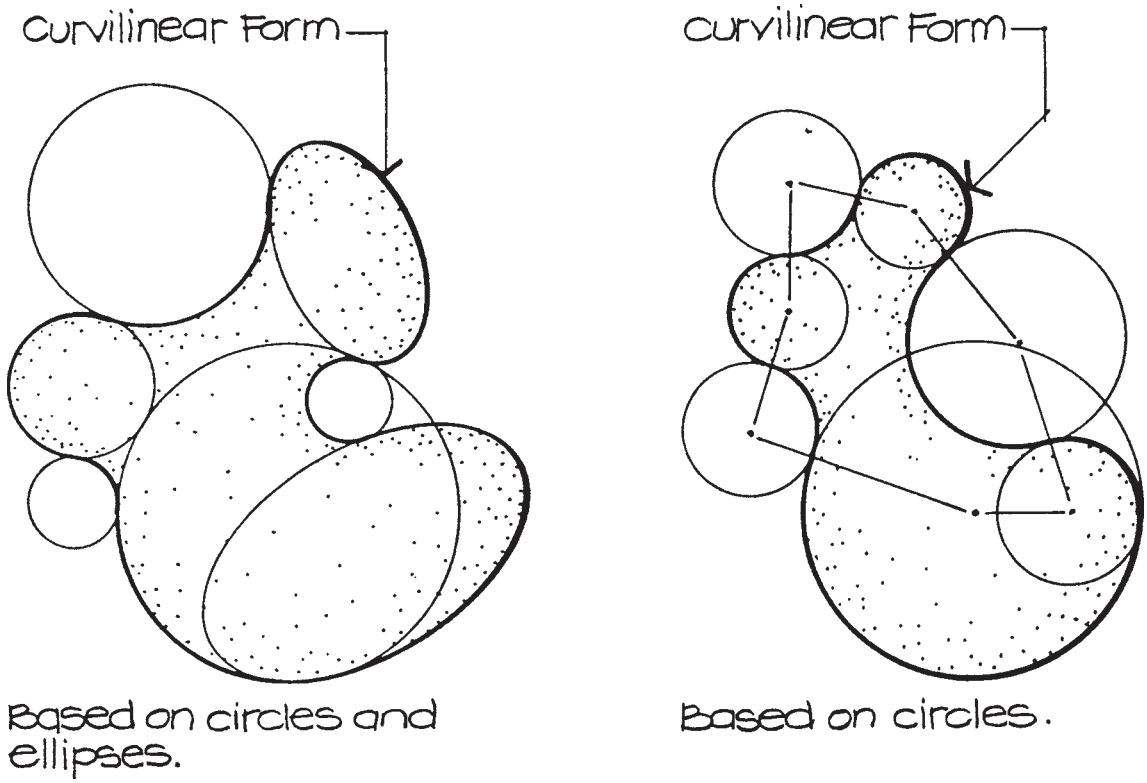
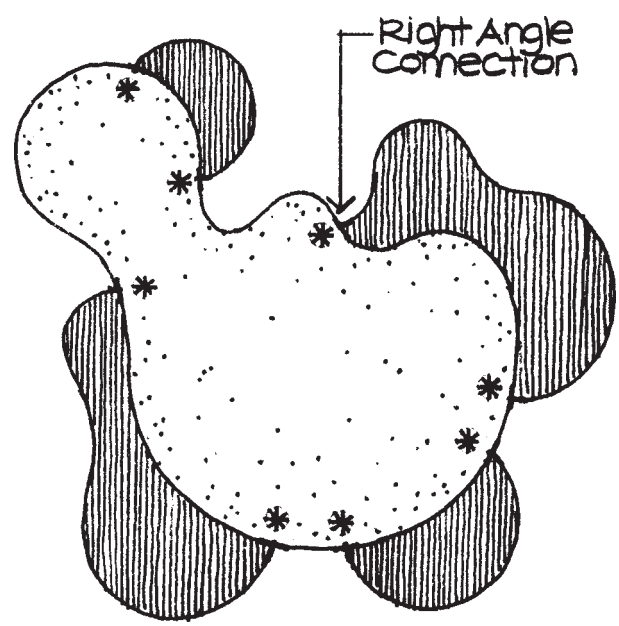


Figure 10–39
A curvilinear design theme has continuous flowing lines using the circumferences of nearby circles and ellipses.

One guideline of the curvilinear theme is to have all intersecting curved lines meet each other at right angles (90 degrees; Figure 10–40). This approach will eliminate acute angles as discussed previously. For many designers, this suggestion may seem hard to accept because there usually is a tendency to have curves taper out into other lines (Figure 10–41). Although this creates an apparently smooth

Figure 10–40
Intersecting lines in a curvilinear design theme should make a right angle.



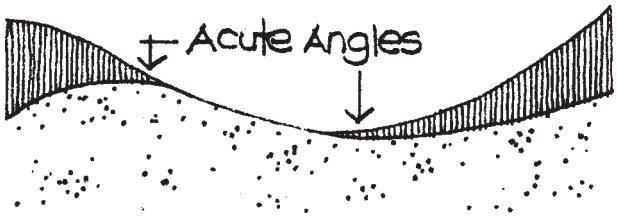


Figure 10–41
Intersecting lines should not create acute angles in a curvilinear theme.

and gradual transition between lines, it also creates acute angles, and thus implementation problems.

It is also important to establish bold and generous curves in curvilinear compositions in combination with smaller curves to give the design variety and interest (right side of Figure 10–42). Although variety is important, it is recommended that the size and sharpness of the curves be carefully considered in relation to scale, material, and function of the composition. Too many curves with small radii will make a design look busy and sometimes erratic (left side of Figure 10–42). This type of design is also difficult to maintain.

The curvilinear theme has a passive, relaxing, and contemplative character. Such a design theme is suggested when there is a desire to create a composition with a serene, pastoral feeling. The flowing, sweeping lines of a curvilinear design also provide a great deal of movement for the eye. Curving edges between areas are apt to captivate the eye and lead it to another portion of the composition in a smooth fashion. There are times when curved forms are difficult to manipulate in confined areas and sometimes result in insufficient use of space for outdoor rooms (Figure 10–43).

The landform may be rolling in profile in a curvilinear theme or have an outcropping of stone as contrasting accent. Landform that is very flat can also accept a curvilinear design, but must rely extensively on using other vertical elements to accentuate a flowing character.

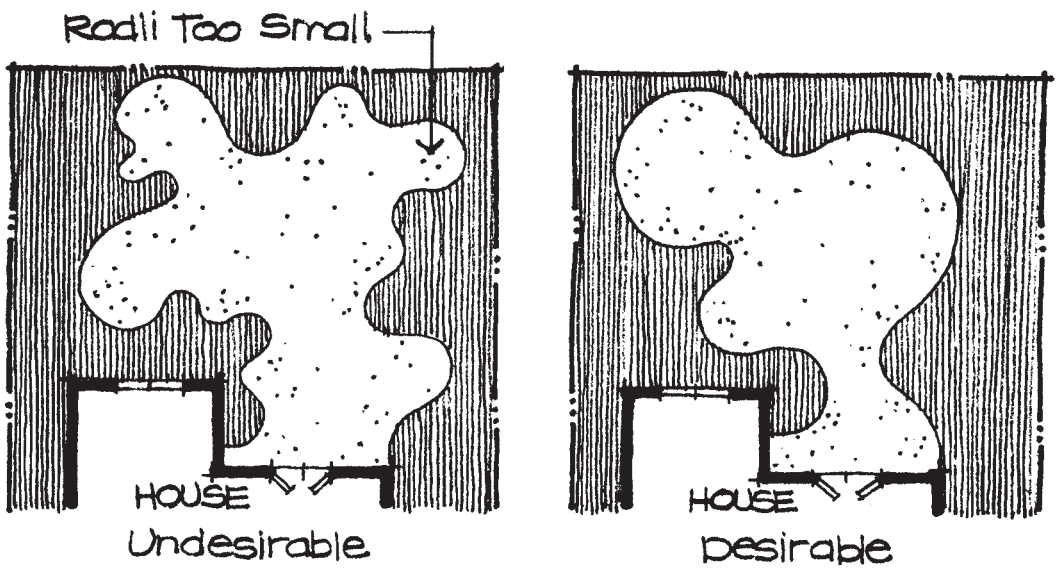


Figure 10–42
Curves should be strong and bold in a curvilinear theme.

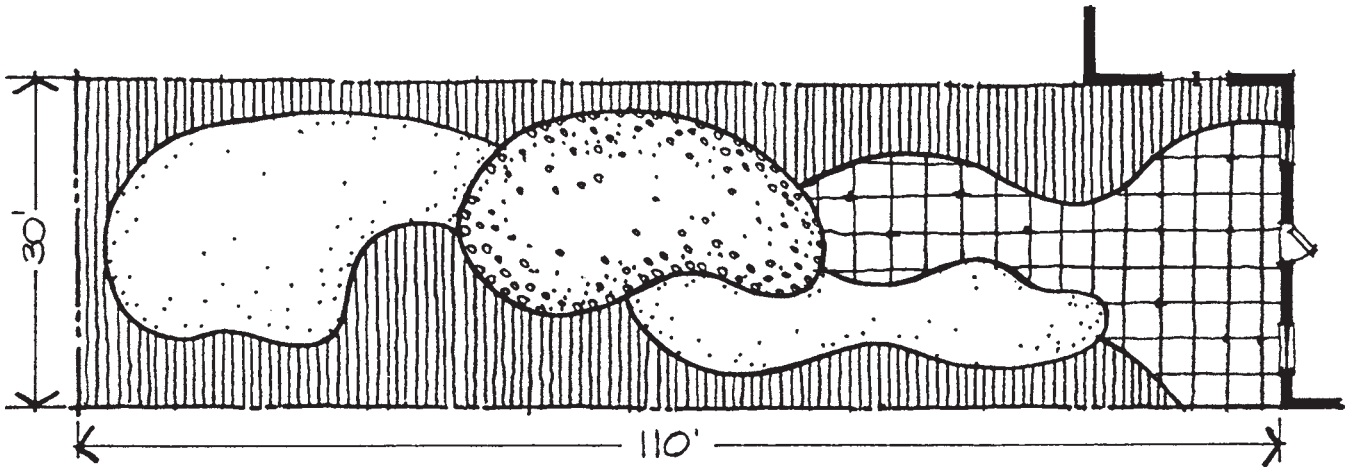


Figure 10–43
A curvilinear theme is not recommended for a site that is small or narrow.

Rectangular Theme

The rectangular theme is composed of squares and rectangles that establish 90-degree relationships between all shapes and lines. This theme may be used in either a formal or an informal fashion (Figure 10–44). The rectangular theme is normally oriented parallel to the sides of a house, thus complementing and reinforcing the typical rectangular layout of many houses. For some people, this type of theme may seem to be foreign to the desired pastoral outdoor environment dominated by living and changing plant materials. Although numerous straight lines in a site may take time to get used to, they are nevertheless able to structure pleasing outdoor spaces. Remember, most people live in pleasing indoor spaces consisting of rectangular forms.

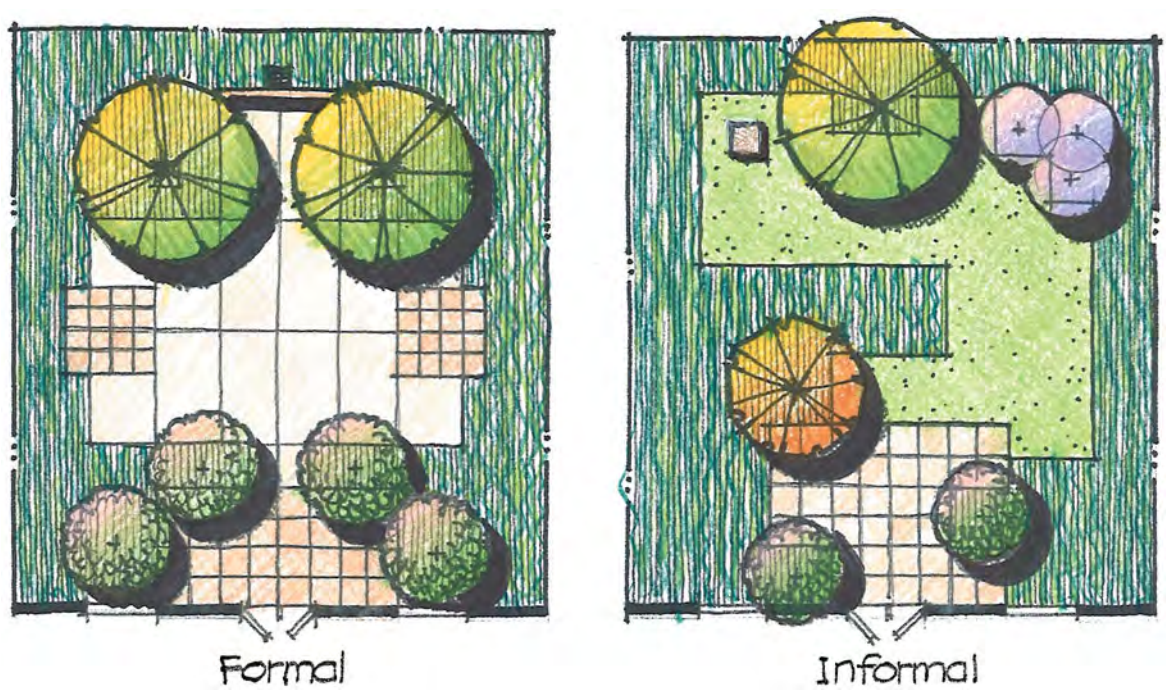


Figure 10–44
A rectangular theme may be either formal or informal.

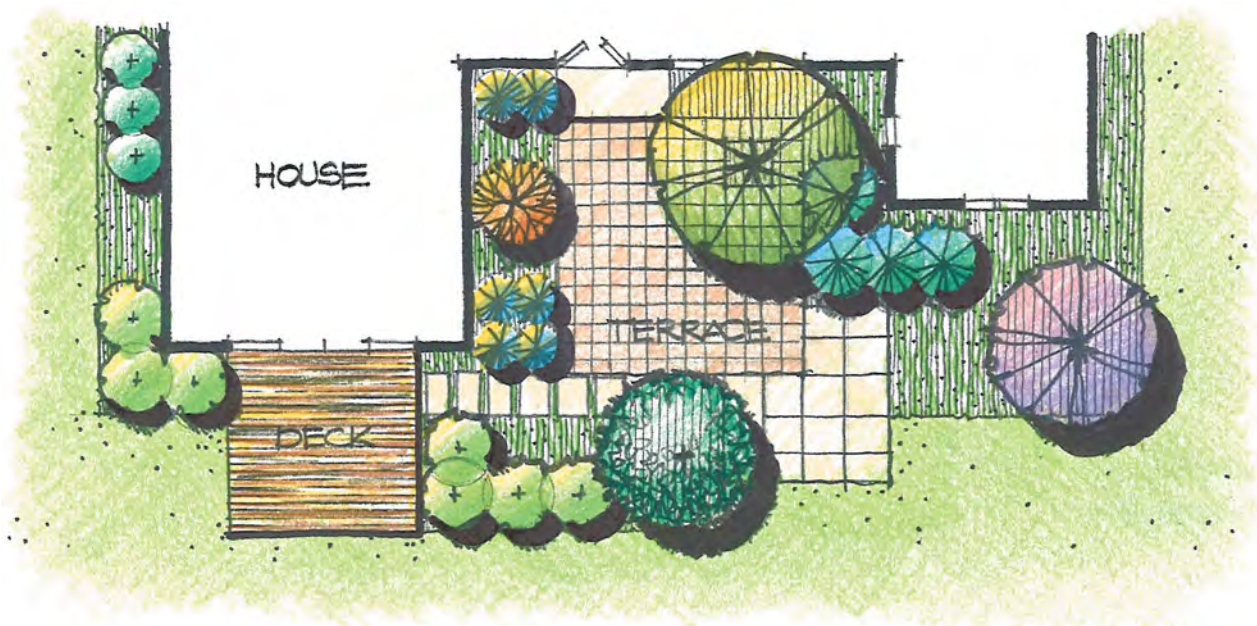


Figure 10–45
There should be a hierarchy of spatial size in a rectangular theme.

When using a rectangular theme in a design, consideration should be given to (1) the variety of sizes, (2) the scale of the forms, and (3) the amount of overlap among the forms. A variety of sizes of squares and/or rectangles should be used in a rectangular theme. This establishes visual interest and a hierarchy of spatial importance within the composition. The more important spaces of the design should have larger and bolder forms, and the less important spaces should have smaller, less prominent forms (Figure 10–45).

The scale of the forms or areas within the composition also needs thought. Too many short lines and small forms (Figure 10–46) will make a design busy, disjointed, and often difficult to maintain.

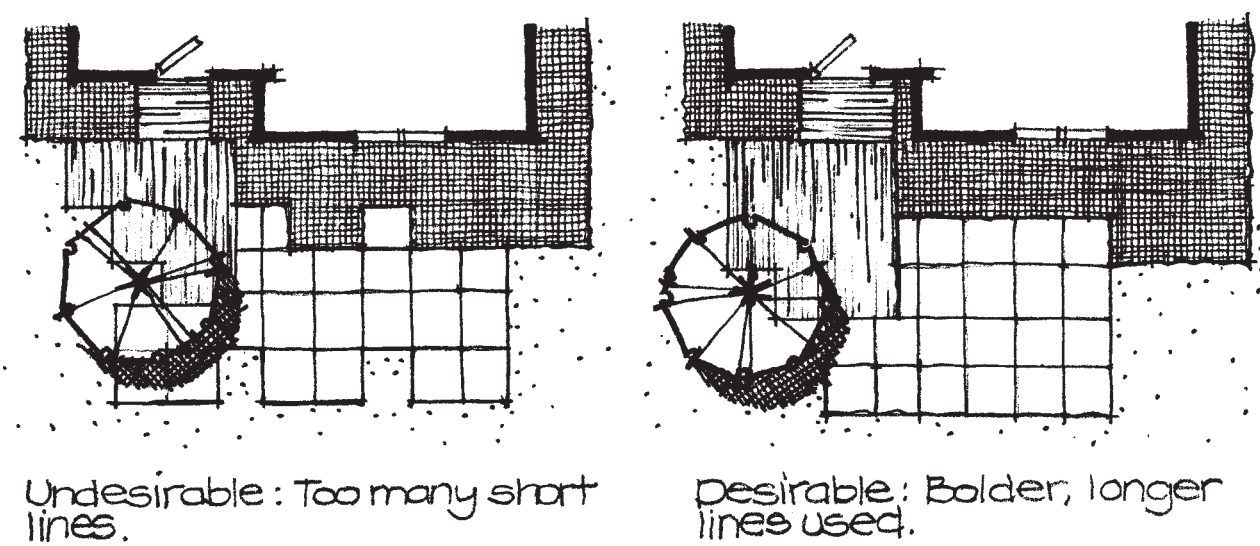


Figure 10–46
Too many short lines in a rectangular theme will give it a busy, disjointed appearance.

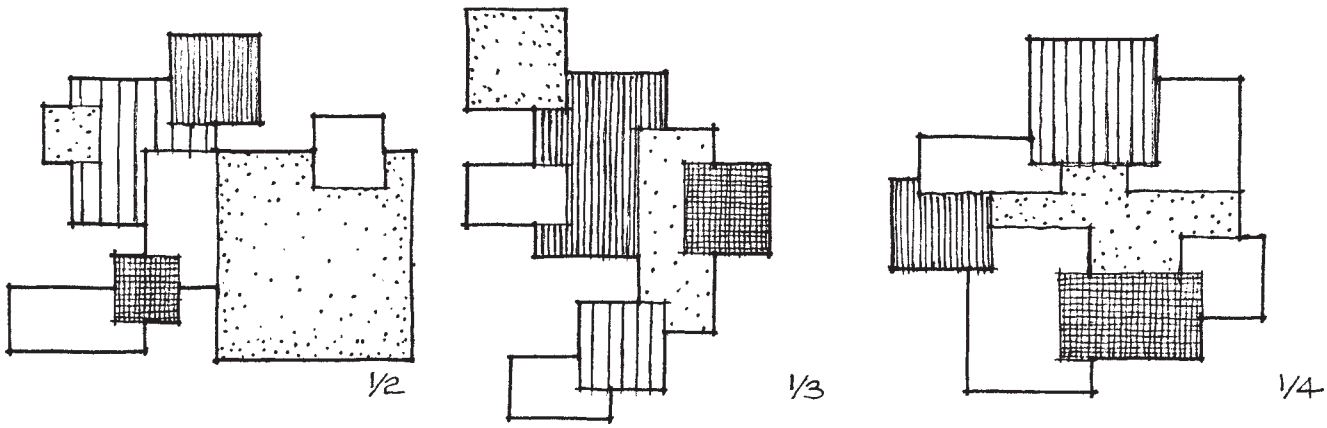


Figure 10–47
Thought should be given to the amount of overlap in a rectangular theme.

When overlapping two or more forms in a design, one guideline is to limit the overlap to one-fourth, one-third, or one-half of the dimension of the adjoining shapes (Figure 10–47). This will allow each shape to maintain its individual identity and be an adequate size and configuration for the intended use. Again, this is only a guideline and not a rule.

The rectangular theme is very appropriate to use when developing exterior spaces as extensions of indoor living spaces. This can create a strong relationship between the house and its surrounding site. A rectangular design theme is also appropriate when the site area is narrow (Figure 10–48) because such a theme is able to make efficient use of space, unlike the curvilinear theme discussed previously (see Figure 10–43).

Some individuals feel that a rectangular theme is often too boring or too formal because of the predictability of the right angles. This can happen if the third dimension is not handled appropriately. However, a well-designed rectangular theme, including one organized on a central axis, can be every bit as exciting as any other design theme if the third dimension provides proper enclosure and variety (Figure 10–49). And it should be remembered that plant materials will add natural softness and a bit of irregularity (if they are pruned in a natural fashion) to a rectangular design theme, making it more attractive in actuality than it might appear on paper.

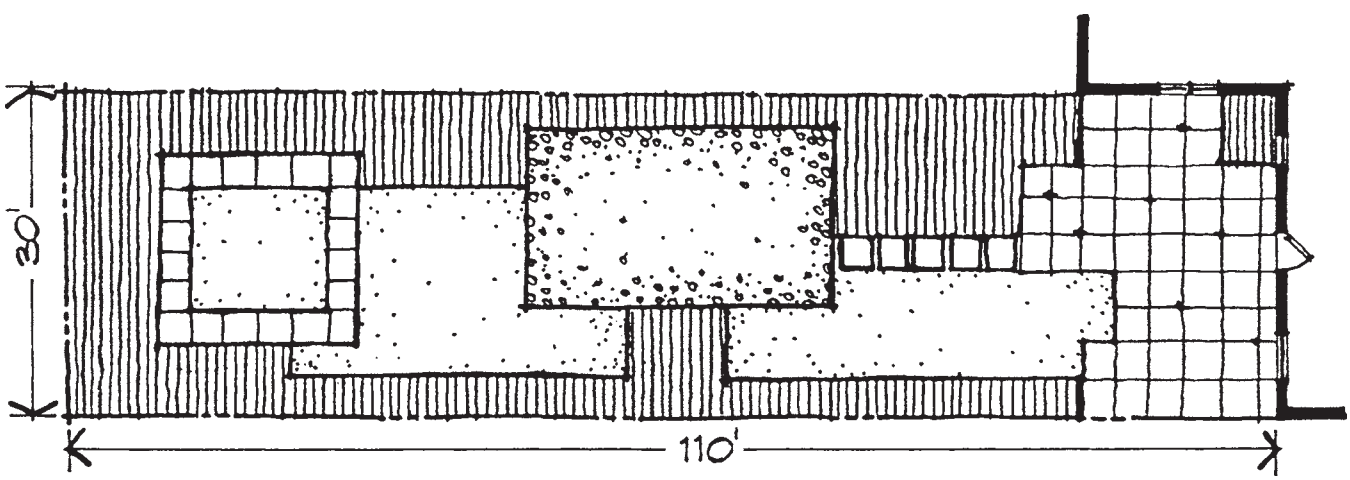


Figure 10–48
A rectangular theme is appropriate for sites that are small or narrow.

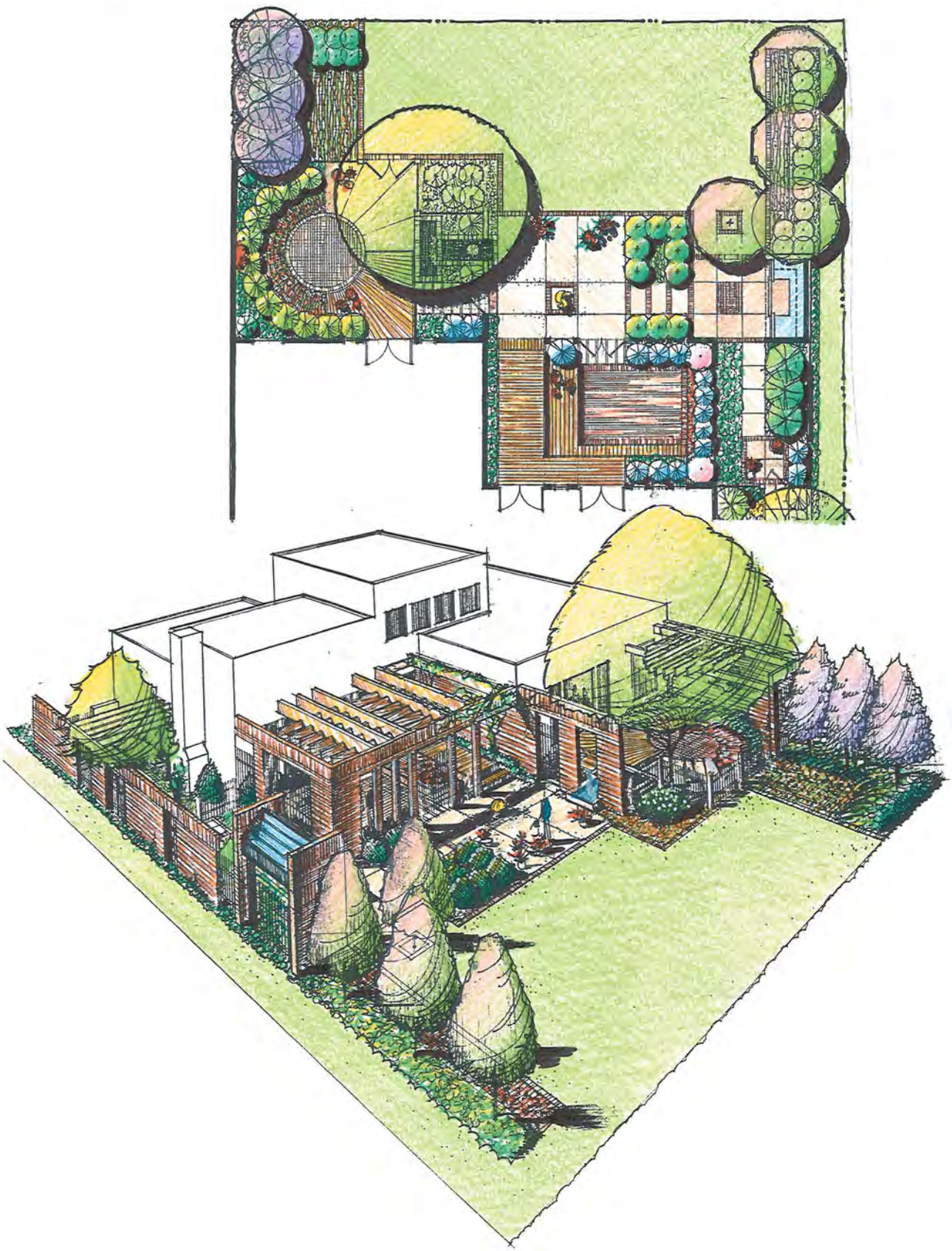


Figure 10–49
A rectangular theme can be enjoyable to experience if the third dimension provides variety of enclosure.

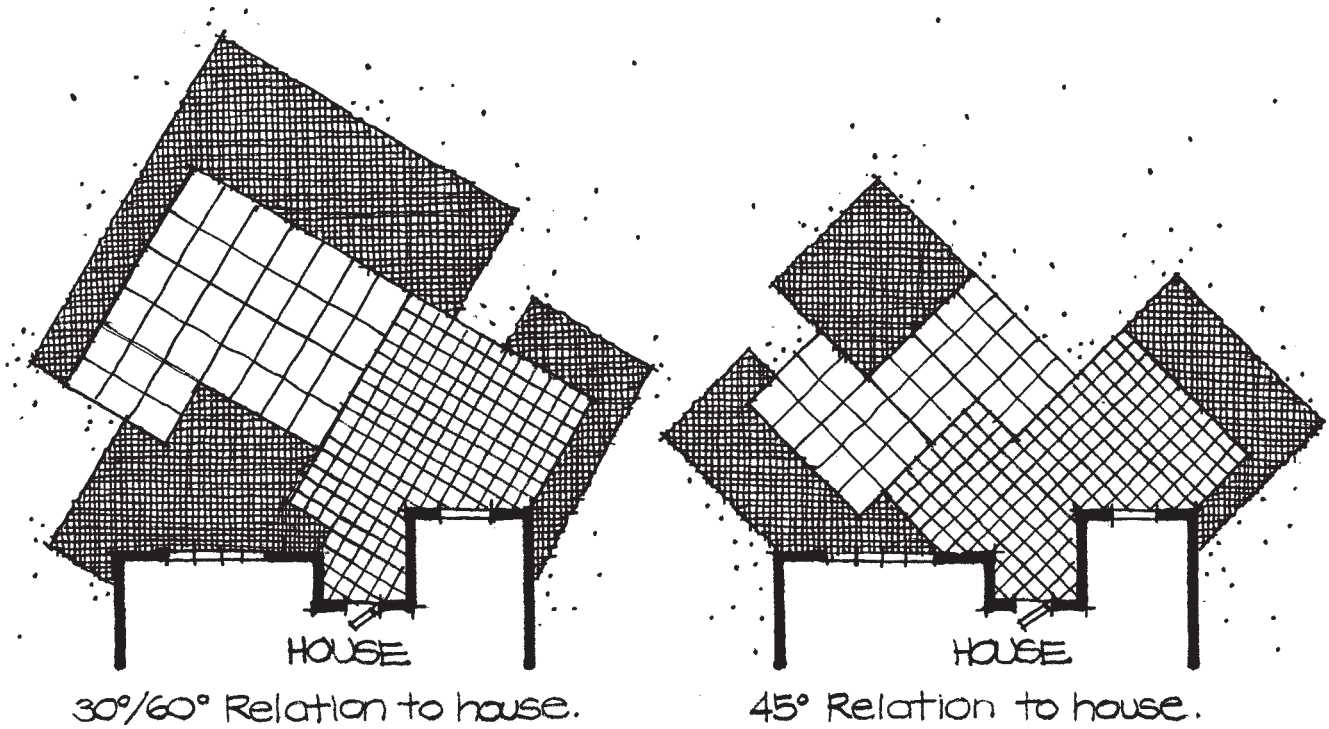


Figure 10–50
Examples of pure diagonal design themes.

When considering landform, a rectangular theme, like a circular theme, is best located on either level ground or on sloped ground where the different areas and forms of the design can be terraced in relation to each other.

Diagonal Theme

Two variations of the diagonal theme used on a residential site are the pure diagonal and the modified diagonal.

Pure Diagonal The pure diagonal theme is essentially a rectangular theme turned at an angle in relation to the house (Figure 10–50). Thus, the compositional guidelines for the pure diagonal theme are similar to those for the rectangular theme. Although many angles can be selected for the relation of the diagonals to the house, it is suggested that either a 60-degree or 45-degree orientation be selected. Both of these angles are directly related to the geometry of the circle and the square and help to minimize acute angles.

When the lines of a pure diagonal theme connect to a house, angular spaces may be created that are not totally functional. This situation can be handled in two ways. First is to allow the angular relationships to form between the house and site (left side of Figure 10–51). This is permissible as long as the angular spaces are kept away from doors or other traveled areas and do not create awkward visual or functional relationships. Second, a designer may use transition lines between the house and the diagonal lines in the site (right side of Figure 10–51).

Modified Diagonal The modified diagonal theme is a combination of the rectangular theme and the pure diagonal theme (Figure 10–52). When diagonal emphasis is preferred without the strength of the pure diagonal theme, the modified diagonal theme offers a pleasant combination. This theme can easily be related compositionally to the 90-degree lines of a house yet offers boldness with the angled lines in the site.

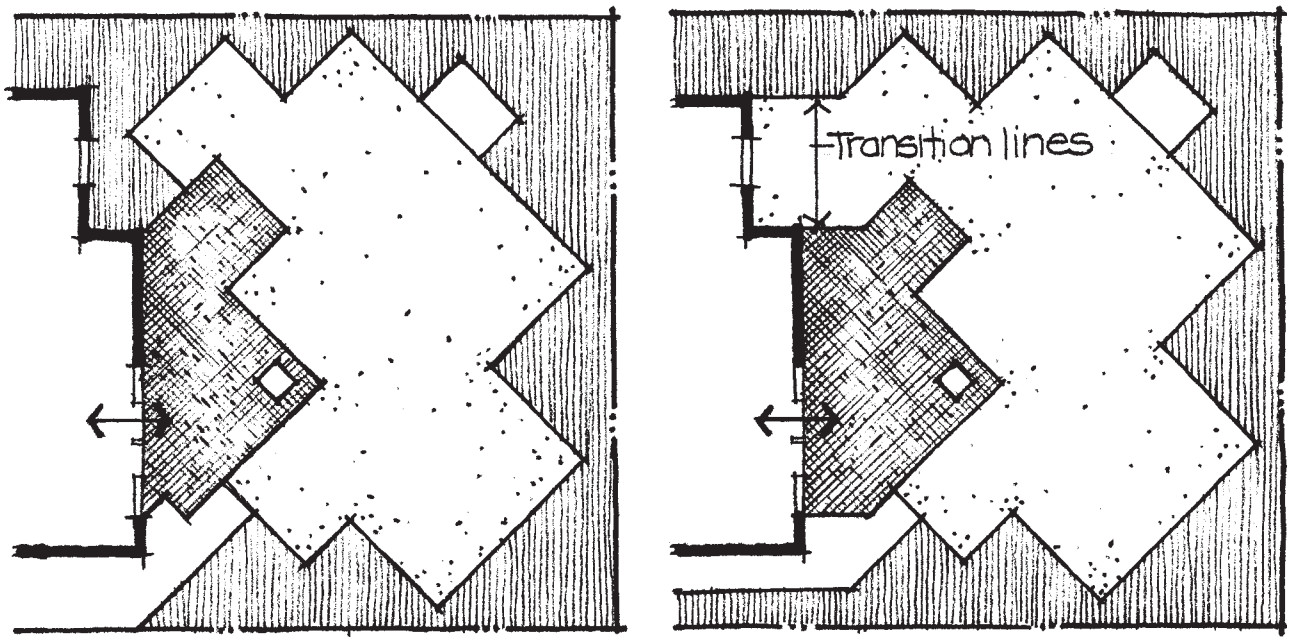


Figure 10–51
Two alternative ways to connect a diagonal design theme to the house.

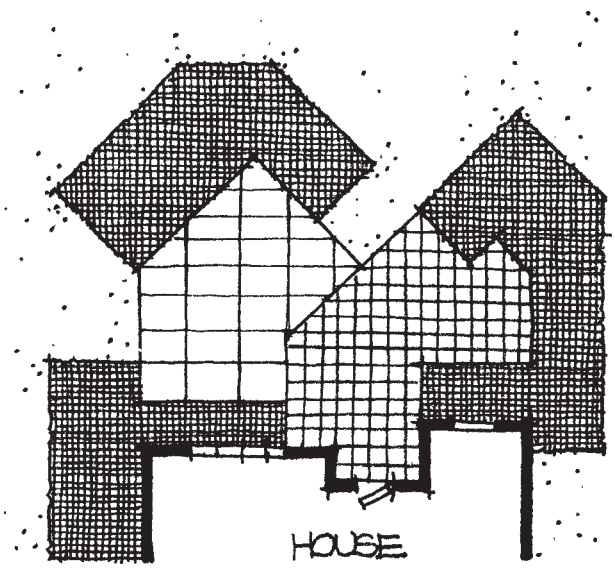


Figure 10–52
An example of a modified diagonal design theme.

There are several advantages and uses for both the pure diagonal theme and the modified diagonal theme. One possible use is on sites where there is a need to emphasize an orientation other than a direct 90-degree relationship with the house and/or property lines. With the facades of most houses in a neighborhood directly facing each other, there is often a desire to establish a different orientation that eliminates a forced view of the neighbors' houses. This is especially true when the depth of the surrounding yards is very shallow and/or the neighboring houses are rather close. An angled orientation can provide a more desirable view to some other point of interest within or off the site (Figure 10–53).

A diagonal layout is also advantageous for alleviating the perceived narrow dimensions of a small site. Diagonal lines and spaces may actually provide longer

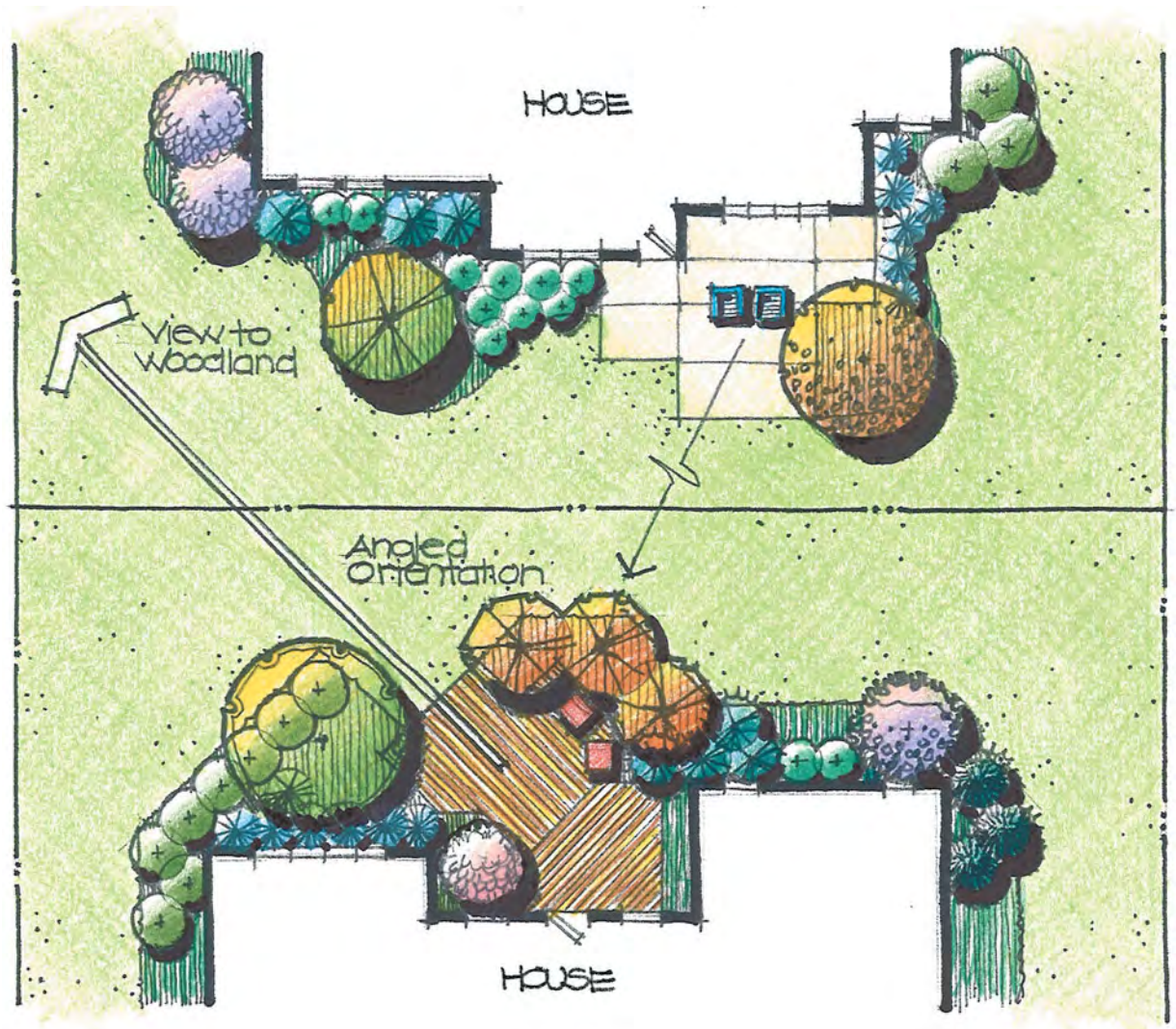


Figure 10–53
A diagonal design theme can establish a strong angled orientation toward a desired area in the landscape.

dimensions than possible with lines and spaces that have a 90-degree relationship with the site property lines (Figure 10–54). The result is that the spaces appear larger, giving the site a more spacious feeling. There may also be a desirable view, favorable orientation to the sun, or good exposure to cool summer breezes that calls for a diagonal direction. When it is suitable to emphasize a diagonal orientation, the diagonal theme offers a feasible compositional alternative for reinforcing and enhancing existing site potentials. The landform could be terraced into flat areas to reinforce the straight-line character of diagonal themes.

Arc and Tangent Theme

A design theme that is derived from a combination of different themes is the arc and tangent theme (Figure 10–55). This theme combines arcs from circles of the circular theme and straight lines from the rectangular theme. The straight lines provide a feeling of structure while the curves counter this with soft, sweeping lines. Both can work well together.

Parts of the circle that can be used in the arc and tangent theme are the quarter-circle, half-circle, and three-quarter-circle. To create an arc and tangent theme,

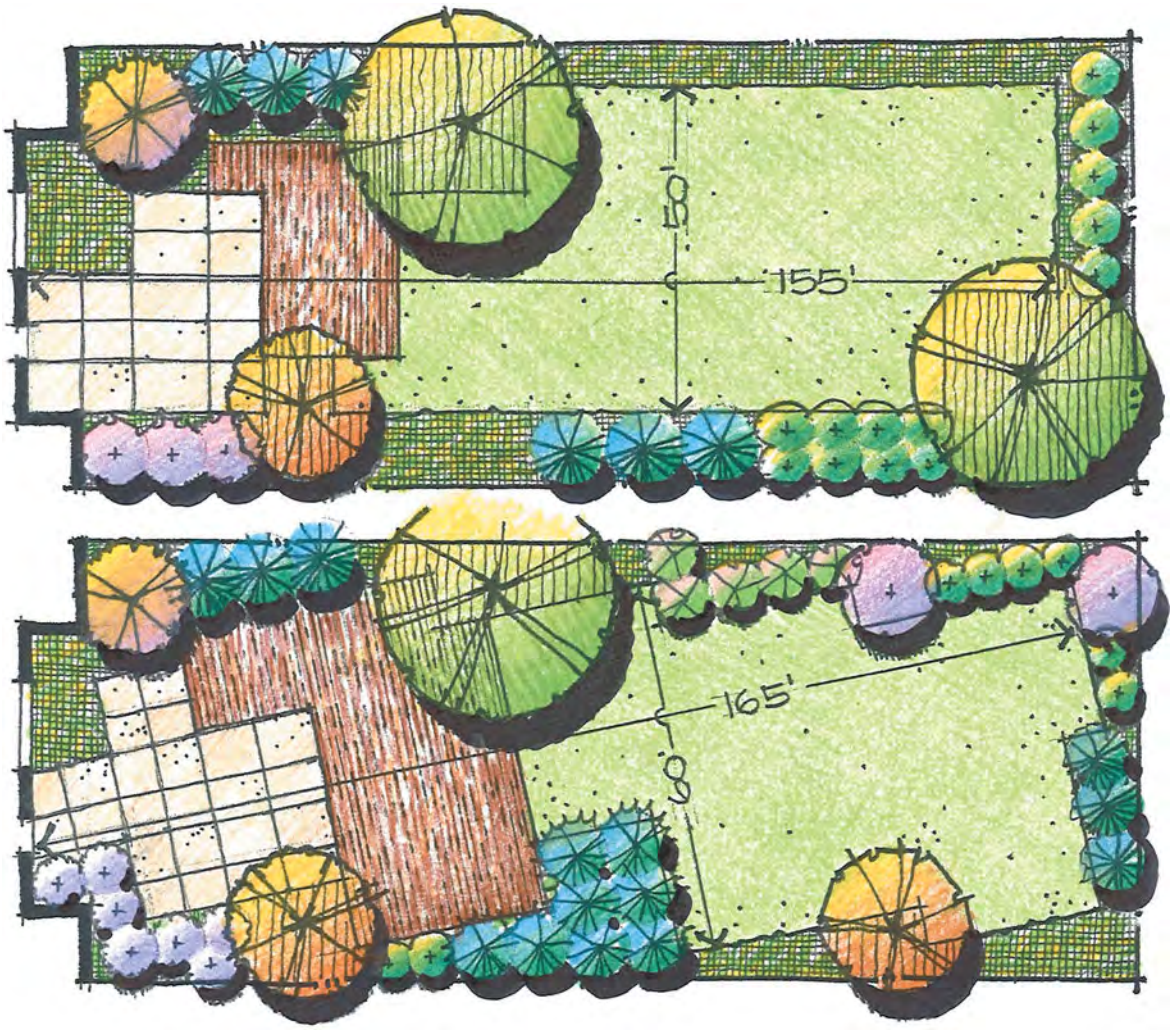


Figure 10–54
A diagonal design theme can make a small site seem larger by emphasizing the longest possible dimensions.

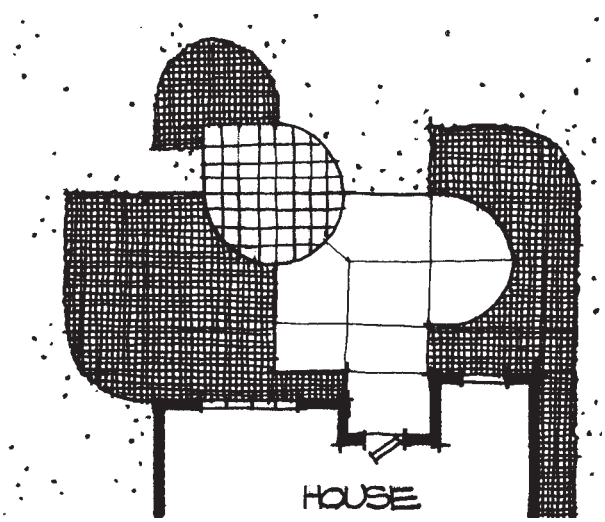


Figure 10–55
An example of an arc and tangent design theme.

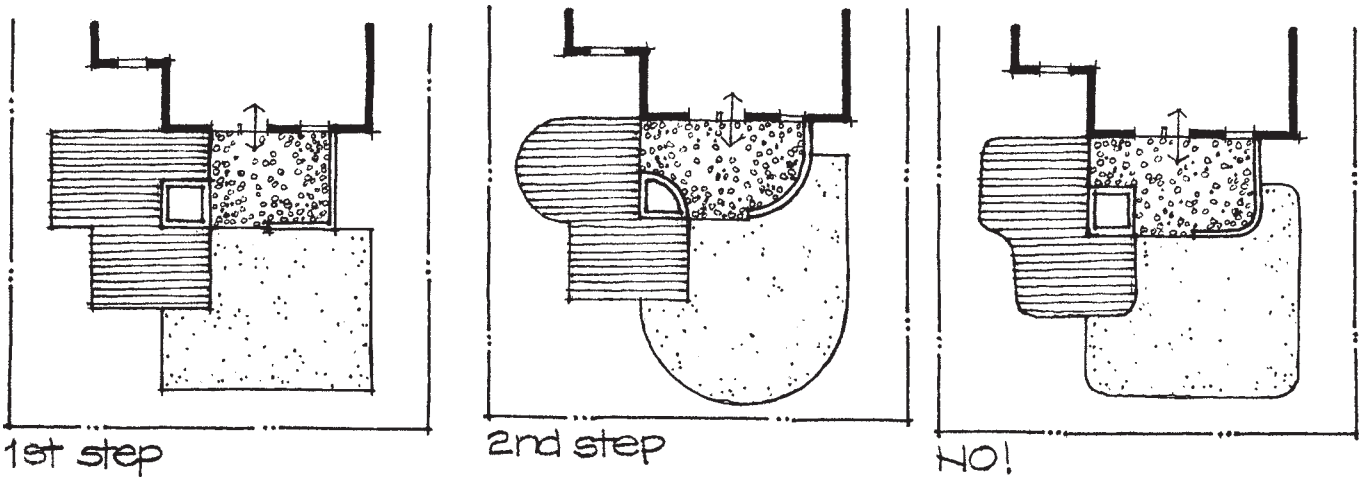


Figure 10–56
A process for creating an arc and tangent theme.

the designer might first develop the composition as a totally rectangular scheme (left side of Figure 10–56). Then, selected portions of the design can be converted to selected arcs of a circle (center of Figure 10–56). The introduction of arcs is not done randomly. Rather, the designer must carefully decide which areas or lines of the composition require the use of arcs for soft corners and rounded edges. However, the designer should not merely round corners of the rectangular forms (right side of Figure 10–56). This creates a weak design with difficult corners to maintain.

Again, the designer needs to consider variety of size, scale, and overlap of forms as they relate to the arc and tangent theme. In terms of landform, sloping sites should be terraced in an arc and tangent theme owing to the structured character of many of the spaces. Rolling landform will not be very compatible with the character of the strong, bold lines and arcs of the arc and tangent theme. Although the plan drawing might seem appropriate in terms of form-to-form relationships, the boldness of the arcs may be lost in the actual profile of the rolling landform.

Angular Theme

The angular theme is composed of a series of angled lines that work together to create an active and eye-catching design composition (Figure 10–57). This system of lines and forms can produce a very dynamic composition, even though it is a difficult theme to develop. At first glance, the angles drawn in Figure 10–57 may seem to be randomly drawn. But a closer examination reveals that most lines are parallel, perpendicular, 45 degrees, or 60 degrees to the back of the house. When using this theme, it is suggested that a system of guidelines that are 0, 45, 60, and 90 degrees in relation to the face of the house be used (Figure 10–58). If a system of guidelines is not used, too many different angles are apt to be used, causing the composition to seem uncontrolled and chaotic.

There is one other suggestion when developing an angular theme. Mostly obtuse angles (angles greater than 45 degrees) should be used; acute angles should be avoided. This will alleviate the possibility of drawing a composition that would create problems in using and maintaining the design (Figure 10–59).

The angular design theme offers an extremely bold and dynamic design system. It has a rugged character and fits appropriately in areas that have irregular or abrupt

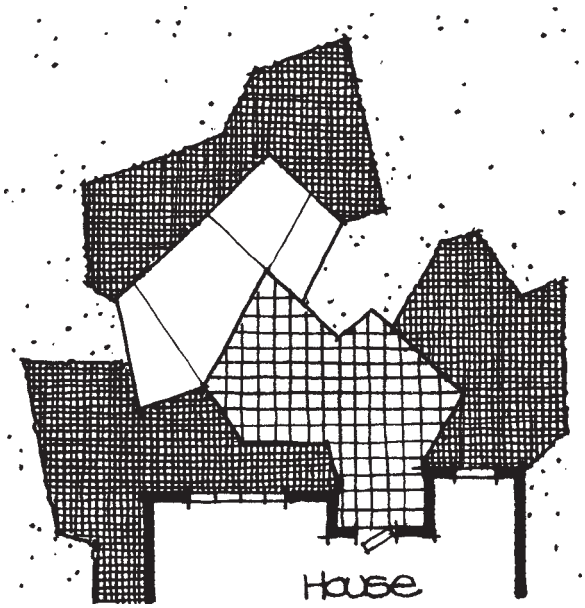


Figure 10–57
An example of an angular design theme.

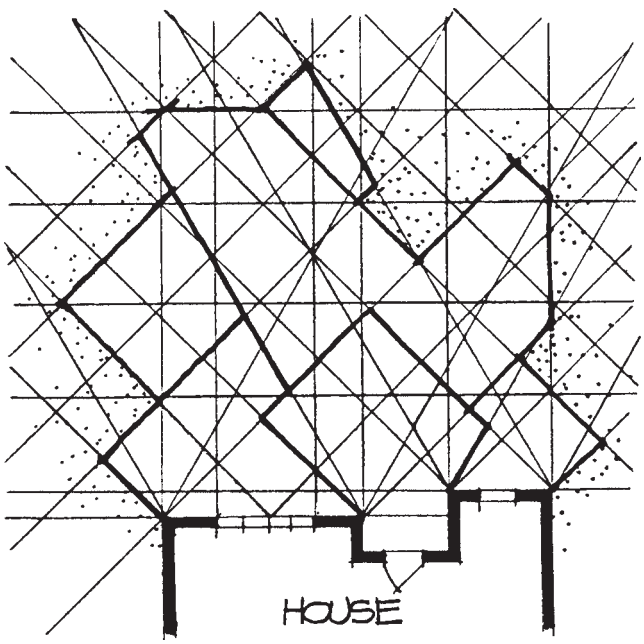


Figure 10–58
Guidelines should be used to form the basis of an angular design theme.

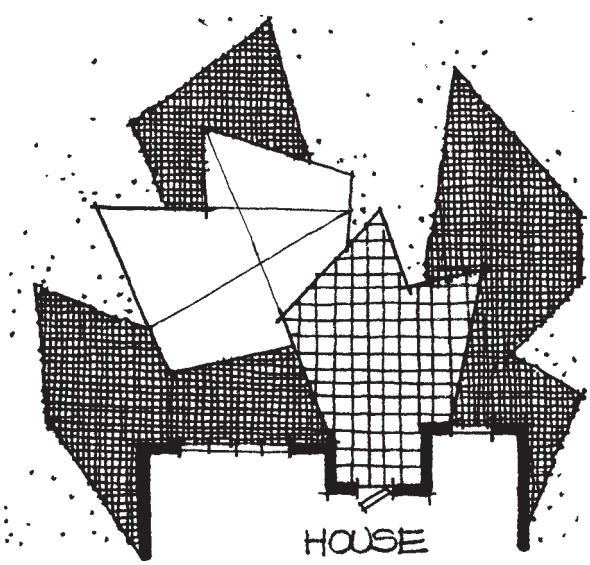


Figure 10–59
Acute angles and sharply pointed forms should be avoided in an angular design theme.

topography with rock outcrops and boulders. For example, this theme relates well to the desert Southwest with its rugged landscape.

Theme Combinations

When designing a residential site, one design theme will probably prevail throughout the site. Although the same design theme may be used in the front, sides, and back of the site, it is also possible to use one design theme in the front of the house and a different theme in the back of the house (Figure 10–60). This approach is appropriate for two reasons. First, the designer may wish to create environments of different character. For example, it may be desirable to create a formal setting for the house in the front yard while providing a casual or natural feeling in the backyard. Second, because a person can be in only one area of the site at one time, spaces can have different characters without clashing or conflicting with each other. However, when designing adjacent spaces with different design themes, sensible and comfortable transitions between the two should be considered.

There are times when a designer may choose to create an overall composition that combines two design themes. For instance, Figure 10–61 shows a design that incorporates a rectangular theme for the structured elements (terraces, decks, walkways, and fences), while a curvilinear theme is used for all the planting areas. The straight lines of the rectangular theme reinforce the lines of the house, and the curvilinear theme is associated with the softer character of plant materials. This approach works especially well when the straight lines are placed near the house and the curved lines are located away from the house, establishing a transition from structure to informality as one moves away from the house.

When two similar design themes are combined, the result is not always successful. For instance, a rectangular theme and a modified diagonal theme are so similar to each other that neither will seem to be of major importance when used together. Also,

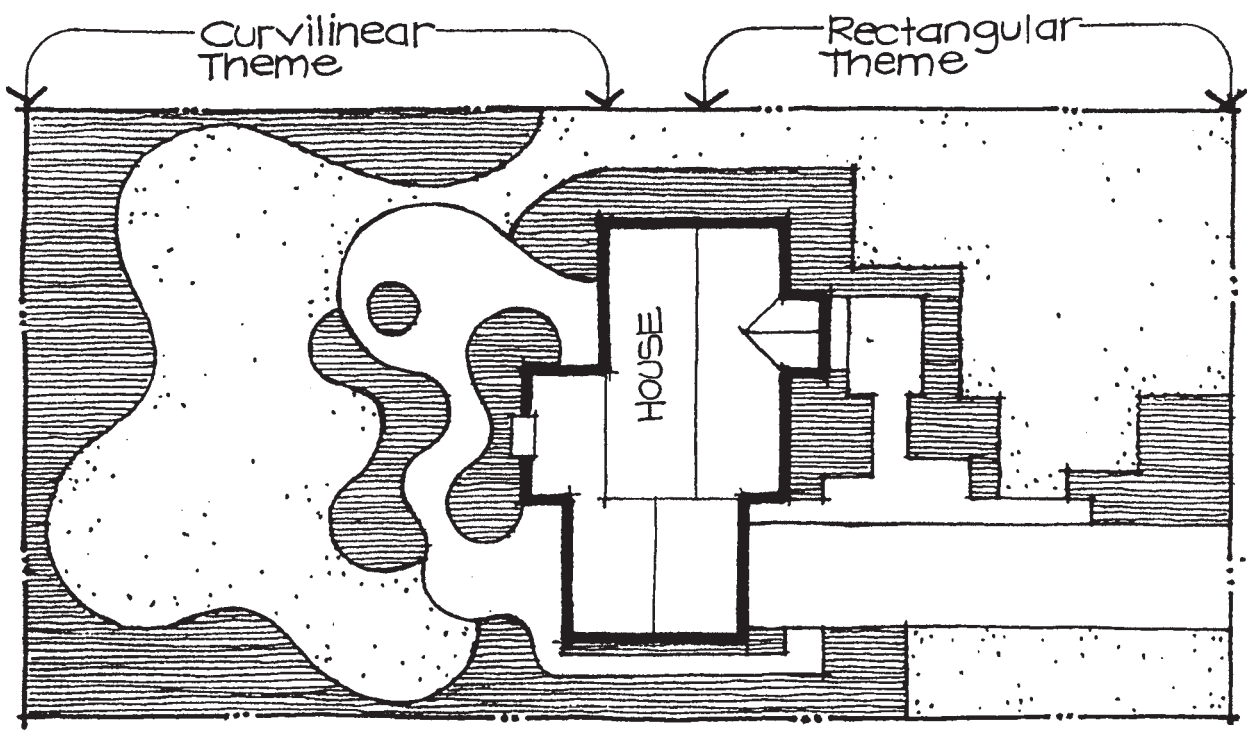


Figure 10–60
The design theme used in the front yard may be different from the one used in the backyard.

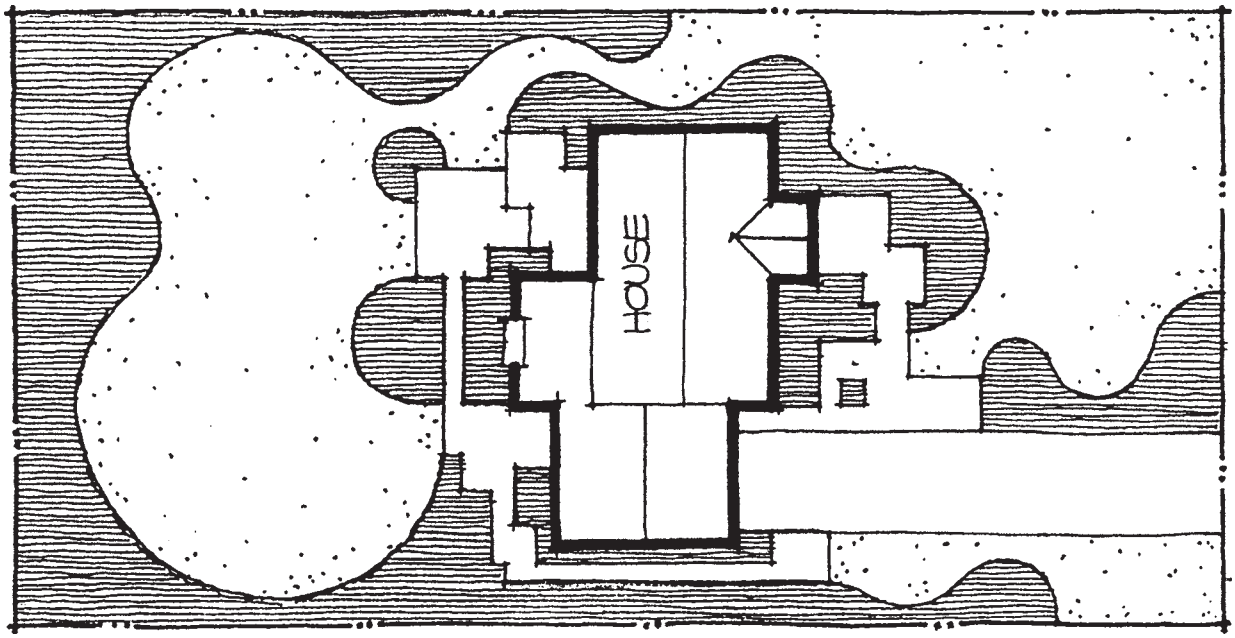


Figure 10–61
An example of a rectangular design theme combined with a curvilinear design theme.

if the modified diagonal theme is used in a subordinate fashion, the design will most likely be perceived as a rectangular theme with a few corners angled in a weak manner (Figure 10–62).

Another way to combine themes together is to add an accent form to a selected design theme. For example, Figure 10–63 illustrates a rectangular theme with a special circular feature as an accent. This accent could be a fountain or a bed of ground cover with a sculpture displayed in it. Specific shapes furnishing a strong contrast to the overall theme can add interest to a composition.

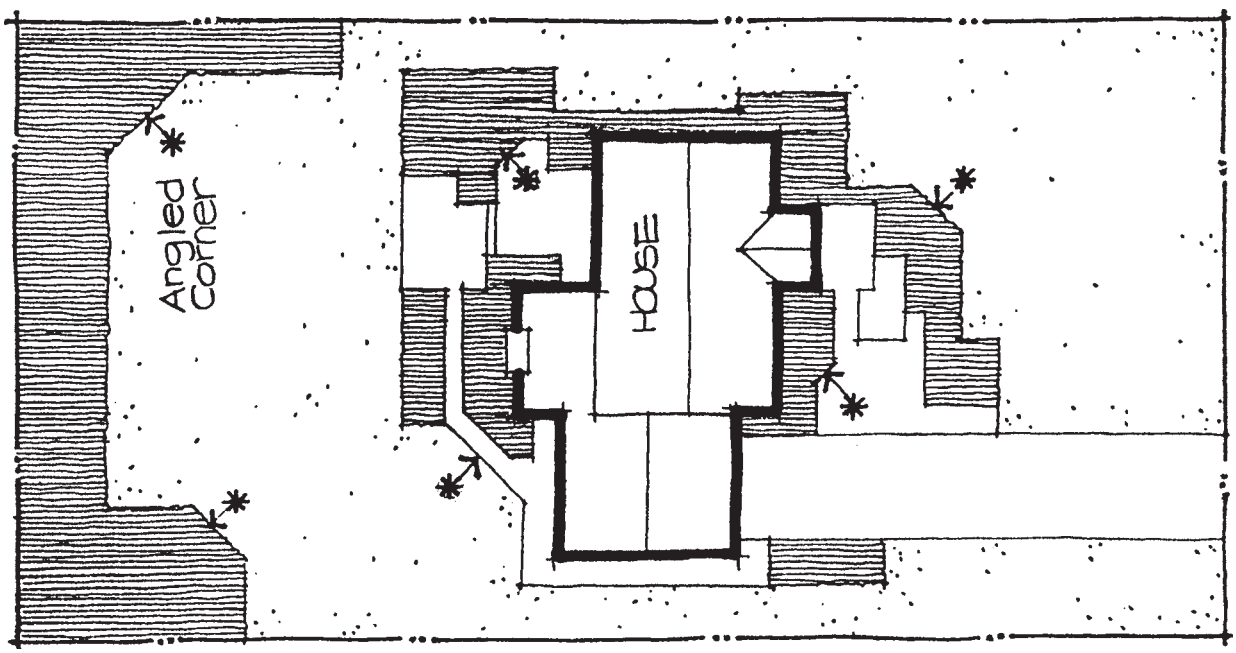


Figure 10–62
An example of a weak combination of a rectangular theme and a modified diagonal theme.

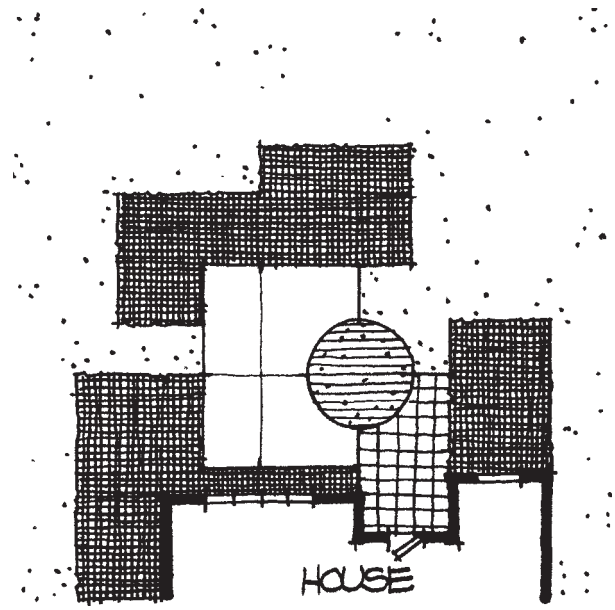


Figure 10–63
A different form, such as the circle in this example, may be used as an accent in a design theme.

ARCHITECTURAL ATTENTION AND DESIGN THEMES

Architectural attention can be influential in selecting a design theme in the form composition phase.

There are times when a particular design theme might be selected to reflect the client's preference regarding overall design character. For instance, a client may be interested in having a very energetic design with a lot of visual action. This might lead to the use of an angular design theme, one that is usually quite different from most landscapes and can be quite visually active. In a different situation, a client might want a very conservative, casual, and soft character in the design. A curvilinear design might suit these clients well. But, many clients rely on the designer's discretion as to the proposed character of the landscape design. In these situations, it is suggested that the designer look toward the architecture for design suggestions. This can occur in a few different ways.

First, a specific design theme (rectangular, circular, angular, etc.) may be selected because it seems to be strongly related to the distinctive character of the architecture. For instance, a house with a variety of angular patterns of roofs, windows, and walls may best be suited to a diagonal or modified diagonal theme. Likewise, an arc and tangent theme may be very suitable for a house that has strong vertical and horizontal lines with circular and semi-circular archways and windows. The overall character of the house may lend itself to one particular design theme instead of others.

Second, when clients do not have preferred design themes, which is often the case, attention should focus on the architectural character. It is especially important to attend to those architectural features that were addressed and discussed at the client meeting, and subsequently photographed. Therefore, if the clients are not attracted to a specific design theme, and the house does not have a specific style, the designer may incorporate specific architectural features into the main forms of the design. For instance, even for a house that does not have a strong style, a client may really like the character of the porch—in particular, the arches of the porch. So, the designer may choose to use the forms and patterns of the arches as strong accents within the design. In this case, the designer would select a design theme that would allow for those particular forms to be the accented areas.

Four examples are presented to illustrate how the design theme responded to certain aspects of the architecture. Figure 10–64 shows the first example. The client, a

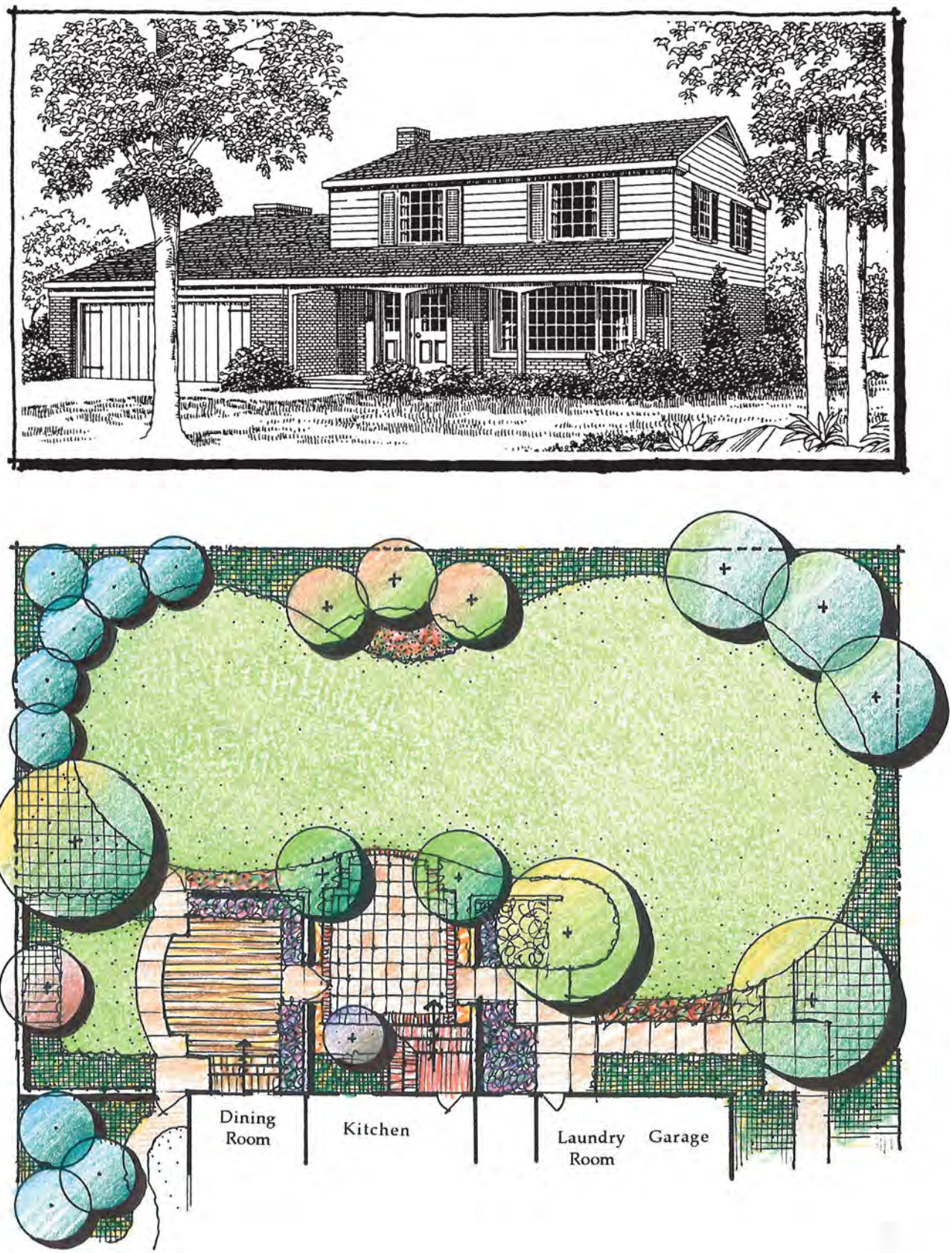


Figure 10–64
Form composition that uses the front porch arch as an accent in the landscape design. Design #N1956 (top) © Home Planners, LLC Wholly owned by Hanley-Wood, LLC. Blueprints available, 800-322-6797.

single mother with three children, did not have any preferences concerning the proposed character of the landscape design. She stated that she was mostly a casual individual who enjoyed reading, exercising, and occasional entertaining. Because she would entertain fairly often, she wanted enough patio space to set up a few tables with chairs. In addition, she wanted a private space not only for reading and exercise, but also for entertaining an intimate group.

As you can see, the arches on the porch provide a subtle change from the strong overall rectangular pattern of the house. In response, a rectangular design theme was selected for the hardscape structures (steps, walks, patios, decks, fences, etc.). These architectural elements will have a strong relationship to the existing architecture. Then, an arc similar to the porch arches was used to accent the edge of the major gathering space. The rest of the yard was configured with a curvilinear design theme, which blends with the arch character and the softness of the curves. The private space, near the dining room, is enclosed with a fence high enough to provide the requisite separation for her reading and exercising activities. The form of the patio in this space also reflects the slight arch.

Figure 10–65 illustrates another example. In this case, the clients really liked (1) the strong angular patterns of the roof, (2) the variety of window sizes and shapes, and (3) the irregular stone pattern. In addition, they wanted to entertain larger groups of people, about 15 to 20, approximately once a month. They wanted a larger than normal patio space that would even offer the lawn as an overflow area in case they entertained a larger group. They also requested a private place for a hot tub, with a view to the river. Because they both enjoyed the water for fishing and skiing, they wanted to emphasize views up and down the river.

A modified diagonal theme was used for the major wood structures to conform with the overall character of the house. The wood deck system was used to provide easy access and views through each of the several sliding glass doors. The shape of the decks was established to emphasize access down the steps to the lower stone patio in directions of the best views to the river. Stone, similar to the stone on the front of the house, was used with a curvilinear layout to provide for a casual, welcoming connection to the lawn area and the river. A private space for the hot tub was included near the bedroom. It is separated from the entertaining space and the adjacent property with a high fence, but allows for a view of the river.

The third example is illustrated in Figure 10–66. The clients are a middle-aged couple who both have top management positions in local companies. Their children are grown and married. They are champion bridge players, and usually entertain 12 people once a month. Outdoor patio spaces would need to support three sets of tables and chairs. With regard to overall garden character, they prefer a formal garden design that is clean and crisp and that responds to the architecture. In particular, they like the half-circular patterns of the windows.

As you can see, an arc and tangent design theme was selected. It responds not only to the half-circular patterns on the house, but to some of the horizontal lines of the roof. The form and pattern of the major patio space adjacent to the family room came from the arched window pattern on the front façade of the house. The two side patios, which will allow for additional table placement, are situated at an angle to reflect the strong roof pattern and to focus attention to the corners of the property where special plant masses might be established. The focal point of attention is directly out and through the central patio space into an ornamental planting area. Materials for the patios are a combination of brick and stone, both of which match the colors of the material on the house.

The fourth and final example of architectural attention in the form composition phase is illustrated in Figure 10–67. These clients are a young couple with two

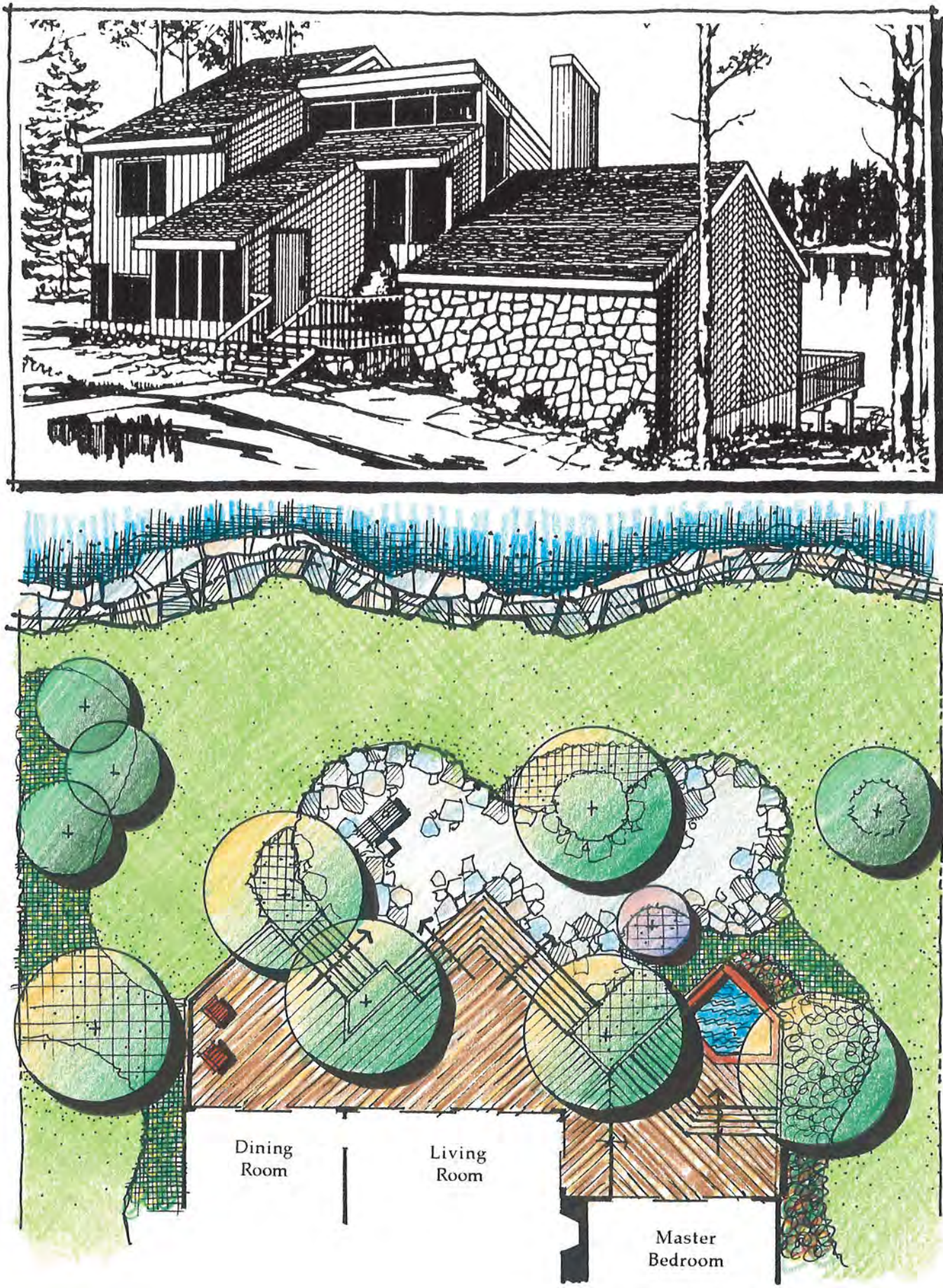


Figure 10–65

Form composition that is modeled after the (1) strong angles of the roof and windows, (2) wood siding, and (3) irregular stone pattern. Design #N4115 (top) © Home Planners, LLC Wholly owned by Hanley-Wood, LLC. Blueprints available, 800-322-6797.

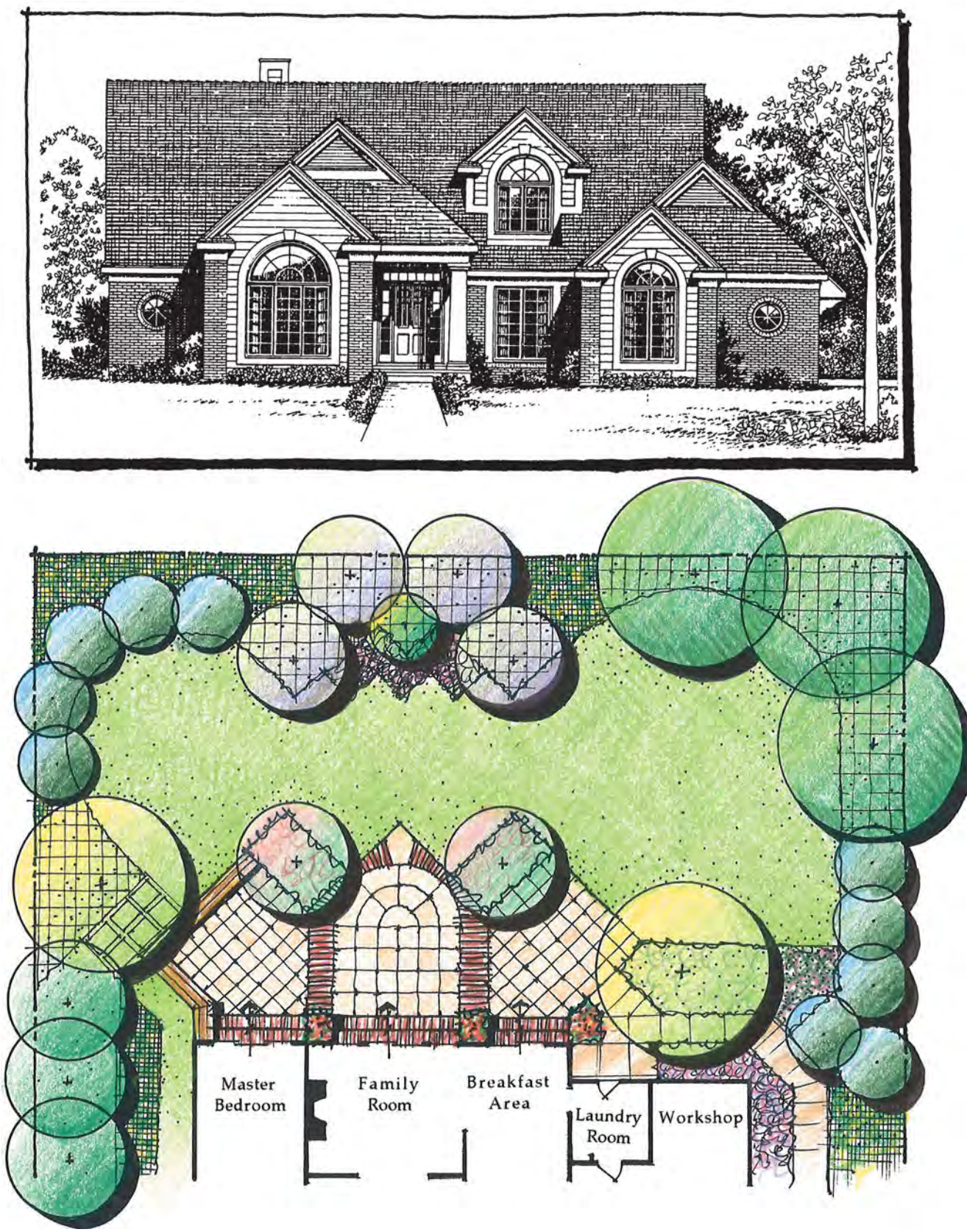


Figure 10–66

Form composition was designed to reflect the special character of the angled roofs and circular window patterns. Design #N3458 (top) © Home Planners, LLC Wholly owned by Hanley-Wood, LLC. Blueprints available, 800-322-6797.

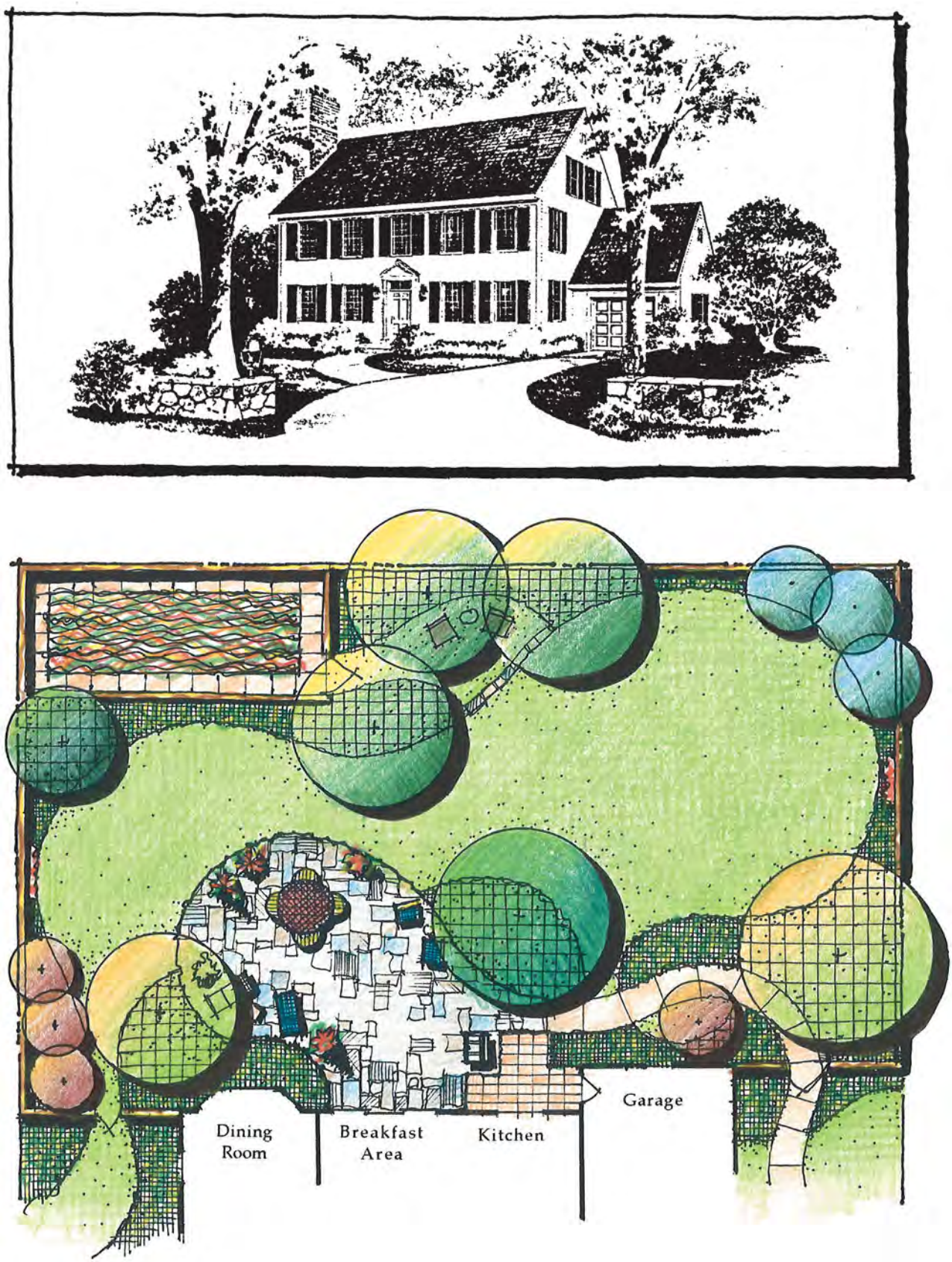


Figure 10–67
Form composition that reflects the clients' desire for a casual, informal, and soft garden design. Design #N2659 (top) © Home Planners, LLC Wholly owned by Hanley-Wood, LLC. Blueprints available, 800-322-6797.

grade-school-aged children and two dogs. They are working parents who enjoy relaxing when they get home. They have always been partial to houses with a formal character, and really enjoy the clean, white look of this one. Although much of the interior decor is also quite formal, they are more interested in having a very informal garden design. For relaxation, they plan to maintain vegetable and perennial gardens. Eating outdoors is a real pleasure for them and they plan to install a permanent grill for cooking near the kitchen and breakfast areas. They entertain small groups, approximately six to eight people, every other month or so. Stone is their favorite material for patio spaces because they love the low stone wall along the front edge of the property. They requested fences for retaining the dogs within the property and away from the vegetable garden.

The designer selected a curvilinear design theme that would provide for smooth, casual, flowing lines. The major patio would be large enough for a table and chairs, with room for some other groupings of furniture, as well as potted plants. Stone, reflective of the front stone wall, was selected for the major patio space. The vegetable garden was placed in the back corner with a small sitting/relaxing area adjacent and beneath some shade trees. The fence is situated directly on the property line to maximize their usable space and provide a play area for the dogs. A place for the grill has been established near the indoor eating areas.

As demonstrated in these four examples, architectural character can be incorporated into a designer's thinking in the form composition phase of design. The reason there were more design decisions shown in the examples (patterns, plant materials, etc.) was to provide a better understanding of some of the other aspects that also influence a designer when selecting design themes. It is important to note that major decisions concerning design forms can be made at this form composition phase. Then, in the spatial and material composition phases of design, decisions can be made regarding the detailed forms, materials, and patterns.

FORM COMPOSITION PROCESS

Previous sections of this chapter have focused on the design themes that can be used on a residential site and some of the basic geometric principles on which these themes are based. Yet, the process for selecting and developing form composition studies for a residential site is more complex than just drawing attractive forms. The process should involve a simultaneous consideration of (1) geometry of form, (2) desired feeling or character of the design, (3) relationship to existing structures, and (4) relationship to the functional diagram. A good form composition is a sensitive blending of all these factors.

To begin the process of form composition, the designer starts with a functional diagram. Next, the designer selects a design theme or combination of themes. This decision should be based on (1) desired character and/or style of the design (that is, formal or informal, relaxing or stimulating, contemporary or historic, and so on), (2) appropriateness to the architectural style of the house, (3) appropriateness to the existing site conditions, and (4) preference of the clients.

Once a design theme is chosen, the designer is ready to start the process of developing a series of form studies. The two critical steps in this process are (1) relating the proposed design forms to the existing structures, and (2) relating the proposed design forms to the functional diagram. Although these two steps should take place at the same time, they will be discussed separately in the following paragraphs.

Relationship of Form Composition to Existing Structures With few exceptions, almost all residential site designs are developed in association with either existing or

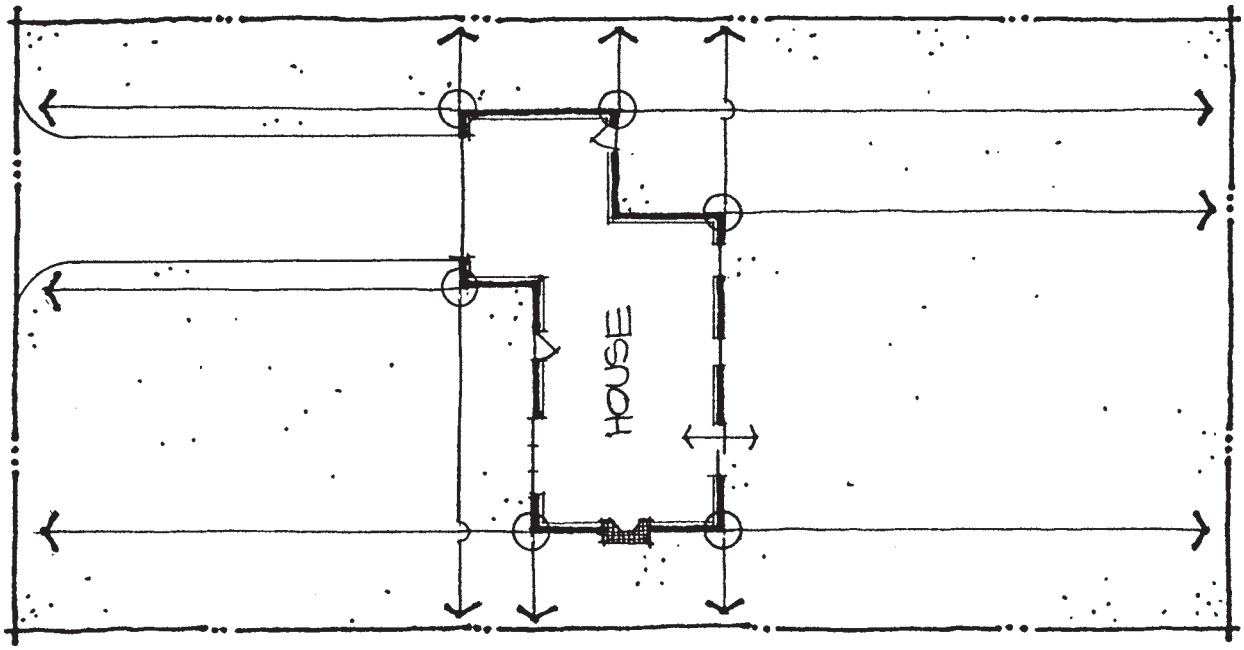


Figure 10–68
Outside walls and corners are of primary importance in form composition.

proposed structures, such as the house, garage, storage shed, gazebo, walks, terraces, or walls. Existing structures should influence where lines and edges of spaces are located on the site so they blend in with the proposed design and the final result is a visually coordinated and unified residential environment. When done appropriately, it may be difficult to distinguish between what originally existed on the site and what was added.

This objective can be accomplished by relating the edges of new forms with the edges of existing elements or structures. To do this, the designer should first obtain a copy or print of the base sheet, which shows existing structures to be retained. On this copy of the base sheet, the designer should identify the prominent points and edges of the existing structures. For an existing house, there is a hierarchy of points and edges that should be considered:

1. Primary importance: outside walls and corners of the house (Figure 10–68).
2. Secondary importance: edges of elements on outside walls that touch the ground surface such as edges of doors or lines created by material changes (between brick and siding, for example, Figure 10–69).
3. Tertiary importance: edges of elements on outside walls that do not touch the ground surface, such as windows that are above the ground (Figure 10–70).

The next step is to draw lines on the base sheet from these prominent points and edges into the immediately surrounding area of the site (Figure 10–71). A color pen or pencil is suggested so that the lines are easily distinguished from other lines on the base sheet. These three sets of lines are referred to as *lines of force* because they guide or force a connection between existing and proposed compositional forms. The lines of primary importance have been drawn darker for emphasis. In addition, other lines have been drawn to create an overall grid system. These other lines were drawn perpendicular to the original set of lines of force at a selected interval. For instance, the distance *X* between lines A and B has been repeated away from the house to establish the location of lines C and D. In the backyard, the distance *Y* has been used to space

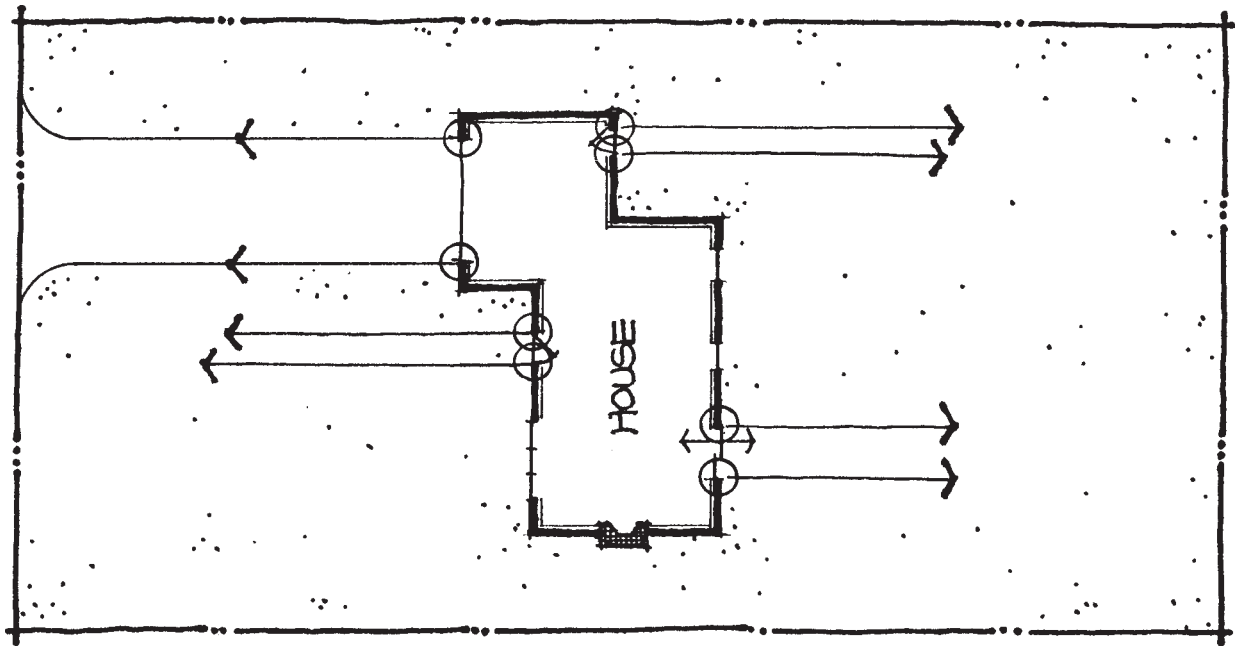


Figure 10–69
Edges of doors and material changes are of secondary importance in form composition.

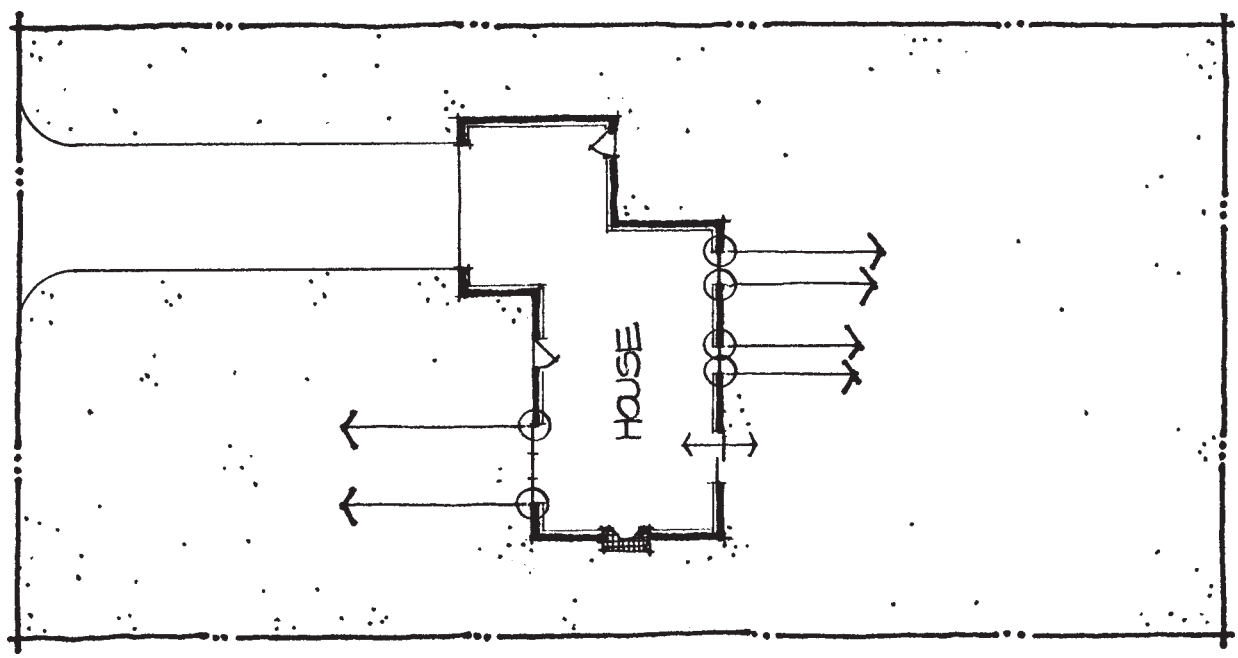


Figure 10–70
Edges of windows are of tertiary importance in form composition.

the lines of force, with some lines, such as G and H, being a distance 1/2 *Y* apart. No rules govern the spacing of these additional lines.

After the lines of force and grid system have been drawn on the base sheet, the designer should overlay a sheet of tracing paper on top of the base sheet. A form composition study can be prepared on the tracing paper (1) in coordination with the lines of force and grid system beneath, and (2) in relation to the functional diagram (explained in the next section). An example of a form composition study that has been

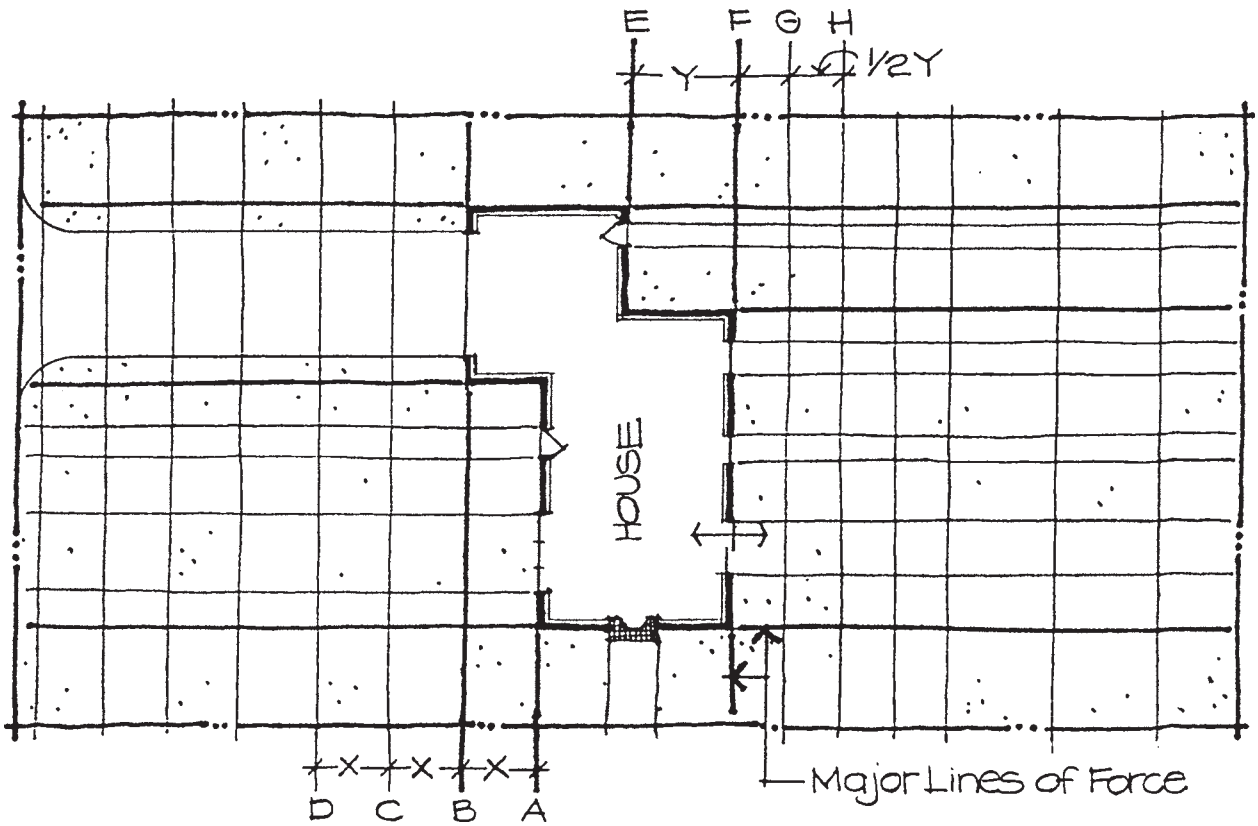


Figure 10–71
Lines of force are extended into the site away from prominent points of the house.

created based on the lines of force without having it relate to a specific functional diagram is shown in Figure 10–72. Several things should be apparent from this example. First, a rectangular theme can easily be developed using a 90-degree grid system. Second, the grid is used as the foundation for the form composition over the entire site, not just near the house. Yet, at several places, such as the front entry and the back terrace, the edges of the forms have been located between the lines of force. The designer should not feel obligated to draw all the edges of forms—only where there are lines of force.

The designer does not always have to use a grid system that has a 90-degree relation to the house. As seen in Figure 10–73, lines of force can be extended away from the house in any direction. In this example, the lines of force and grid system were drawn on a 45-degree angle in relation to the important points and edges of the house. Then, other lines based on a repetitive distance were added to formulate the grid. Following this, the diagonal form composition theme was drawn in response to the grid system.

Grid systems can also be used to aid in creating other design themes. One possibility is to combine the 90-degree and 45-degree grid systems to develop a modified diagonal design theme. The 90-degree or 45-degree grid system can be used as the basis for an arc and tangent theme. The grid system is most useful for rectangular, diagonal, angular, or arc and tangent design themes, because they incorporate straight lines. The lines of force and grid system have limited use for the circular and curvilinear design themes (Figure 10–74). These latter schemes might relate to a particular point or edge of an existing structure, but on the whole they are difficult to correlate to a grid system. Consequently, the grid system, except for perhaps the primary lines of force, can be dispensed with while developing circular and curvilinear design themes.

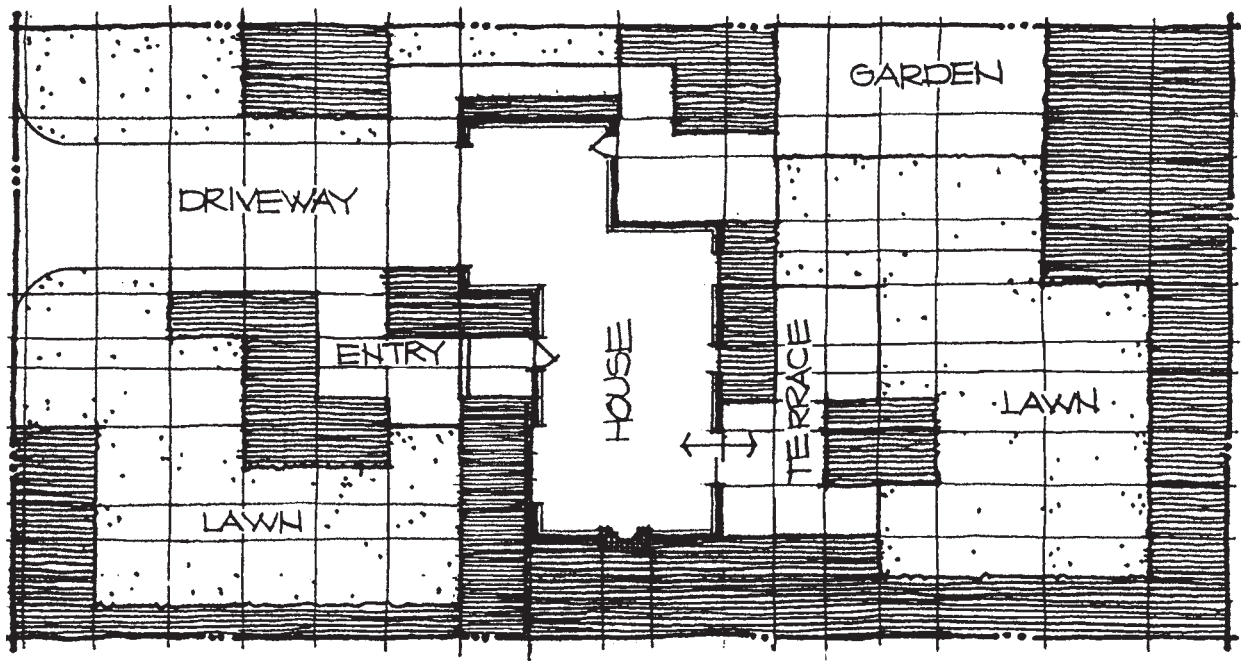


Figure 10–72
An example of a rectangular design theme based on the underlying grid system.

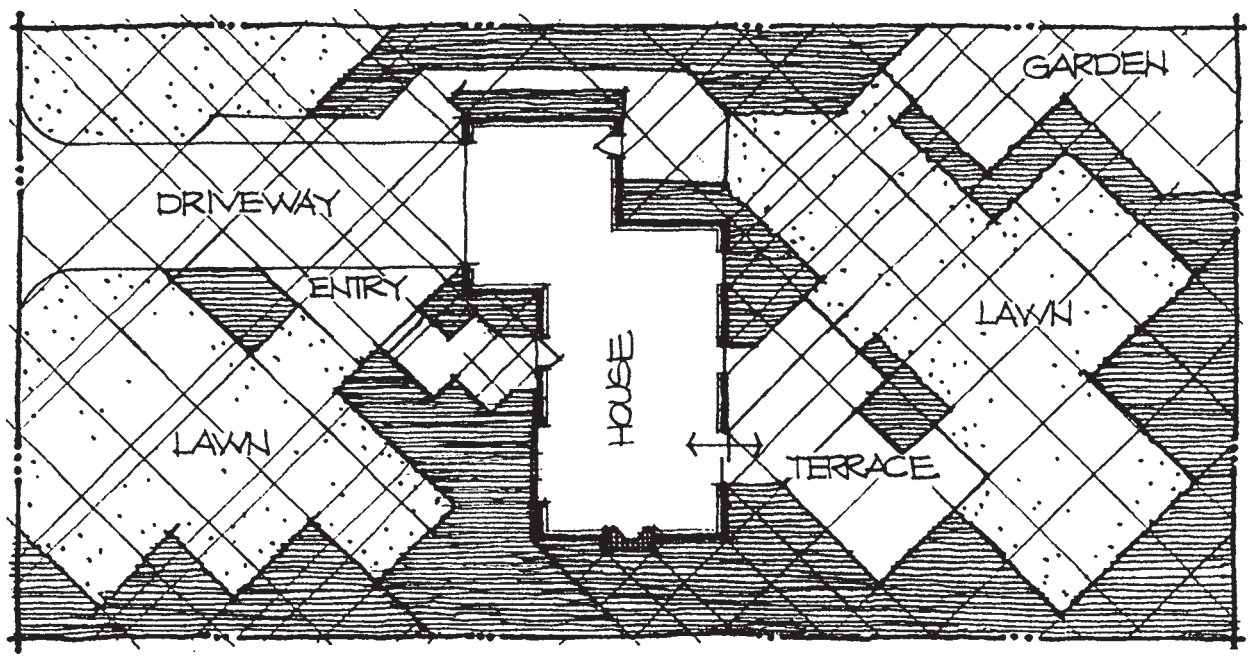


Figure 10–73
An example of a 45-degree diagonal design theme based on the underlying diagonal grid system.

What is important in the circular and curvilinear design themes is how the lines and edges in the site connect with the sides of the house and other straight edges. Every possible attempt should be made to avoid acute angles or other awkward visual relationships in the transition areas between new forms and existing structures. In Figure 10–74, most of the circular arcs meet the house at 90 degrees. When there is not enough room for an arc to meet at a 90-degree angle (left of the driveway), then the connection should be greater or equal to a 45-degree angle. Remember, avoid acute angles.

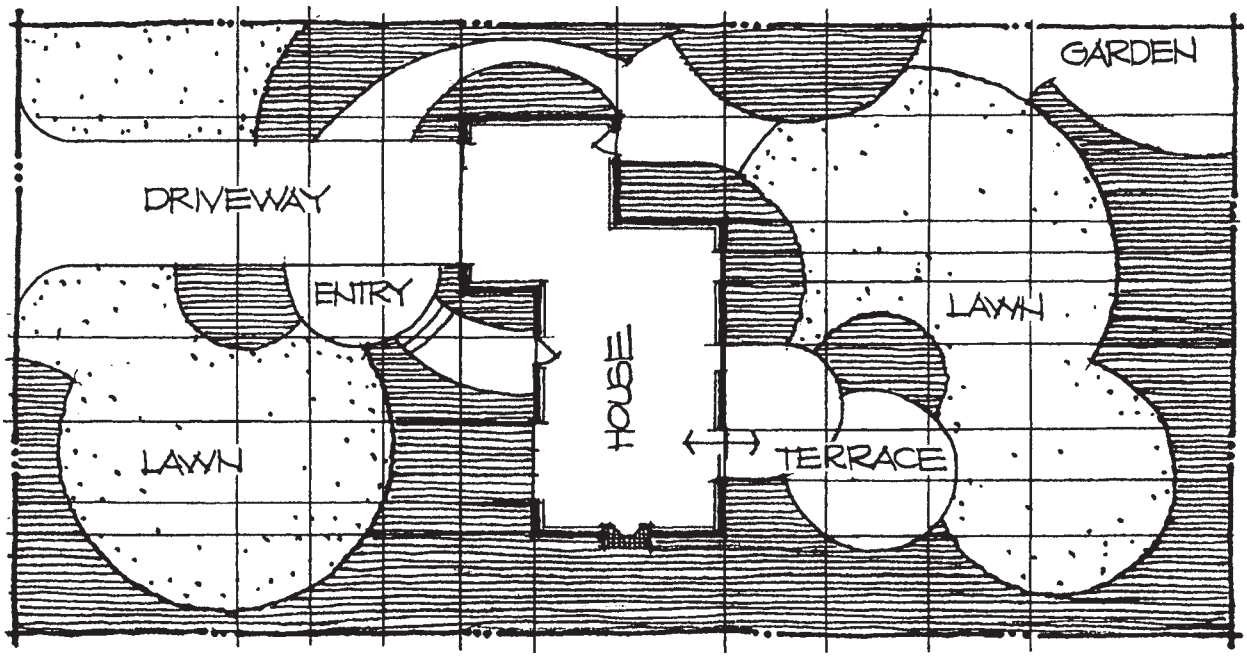


Figure 10–74
A grid system has limited use in developing circular or curvilinear design themes.

Several points must be kept in mind while drawing the grid system for the form composition. First, this grid system is drawn to provide guidelines or clues for locating the edges of the new forms in the design. When the edges of the new forms are aligned with the points and lines of the grid system, the new forms will have a stronger visual relationship to the points and edges of the house. The result is a coordinated integration of house and site. Yet, there is nothing wrong if some of the design's points and edges do not align with the exact lines of the grid system. The grid system developed through the use of the lines of force is only a helpful tool and not an absolute necessity for the location of all new forms. The grid system is by no means a magic formula that ensures success.

The lines of force and grid system are most important for aligning the forms of the design near the house or other structures and are much less significant farther away from structures. The visual association between the site and any structure is greatest immediately around the structure. In this area, it can be readily seen whether or not the edge of a form in the site aligns with the corner of the house or edge of a door. But as distance increases away from a structure, it becomes more difficult to notice and appreciate any coordinated alignment between the structure and site.

Because the lines of force and grid system are only hints or clues, there is no absolute right or wrong way to establish them on the site. Given the same site and a handful of different designers, each would be very apt to place a slightly different grid system on the site. Although the primary lines of force would probably be the same, the other lines might vary substantially from one designer to the next. A suggestion is to locate only as many lines in the grid as will eventually prove useful. Too few may not suggest anything to the designer; too many may be too confusing.

Relationship of Form Composition to the Functional Diagram In addition to relating to existing structures on the site, the new forms of the design should also relate to the selected functional diagram completed in the previous step. This functional diagram or concept plan also serves as the foundation for the development of the form

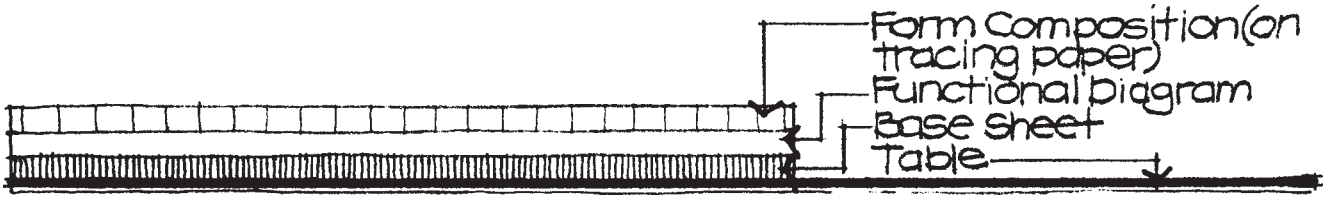


Figure 10–75
A system of overlays should be used for developing the form composition in relation to the functional diagram.

composition. Remember, the objective of the form composition phase is to convert the generalized or rough outlines of the functional diagram to specific edges.

The procedure for developing the form composition studies in relation to the functional diagram begins by placing the functional diagram over the base sheet that has the lines of force and grid system drawn on it. Next, a clean sheet of tracing paper, on which the first form composition study will be developed, is overlaid on top of the diagram (Figure 10–75). This permits the designer to see through the tracing paper to the functional diagram and grid system and use them as references (Figure 10–76).

Using the functional diagram and lines of force as bases, the designer next begins to convert the outlines of the bubbles in the diagram to specific edges using one of the design themes. An attempt should be made to relate the new design forms to both the functional diagram and the lines of force and grid system that are on the base sheet. The form composition can be thought of as a careful and coordinated marriage of the lines of force and the functional diagram. This process is not easy because there is much to consider. And the result may not exactly reflect either the lines of force or the functional diagram. Figure 10–77 shows a modified diagonal form composition, using some of the lines of the grid system but also adding others. At the same time, the edges of the form composition approximate the outline of the functional diagram underneath, though again there are some variations.

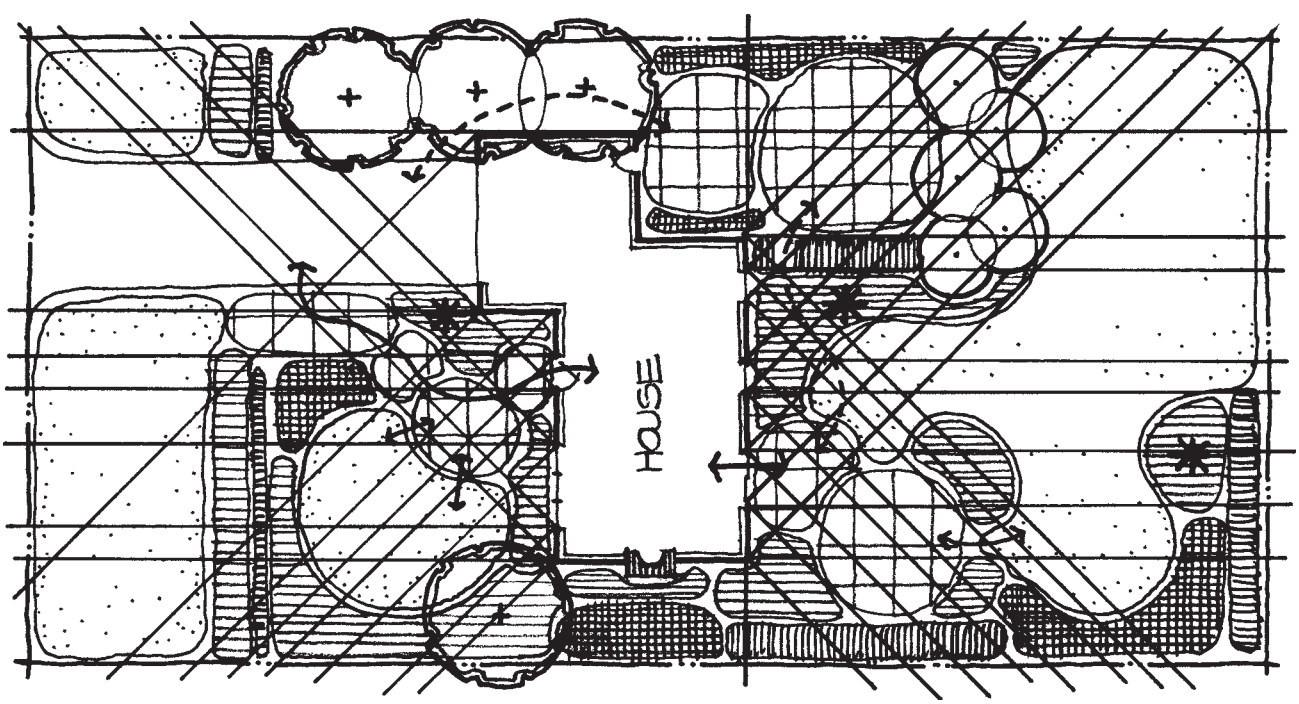


Figure 10–76
An example of the functional diagram overlaid on top of the grid system on the base sheet.

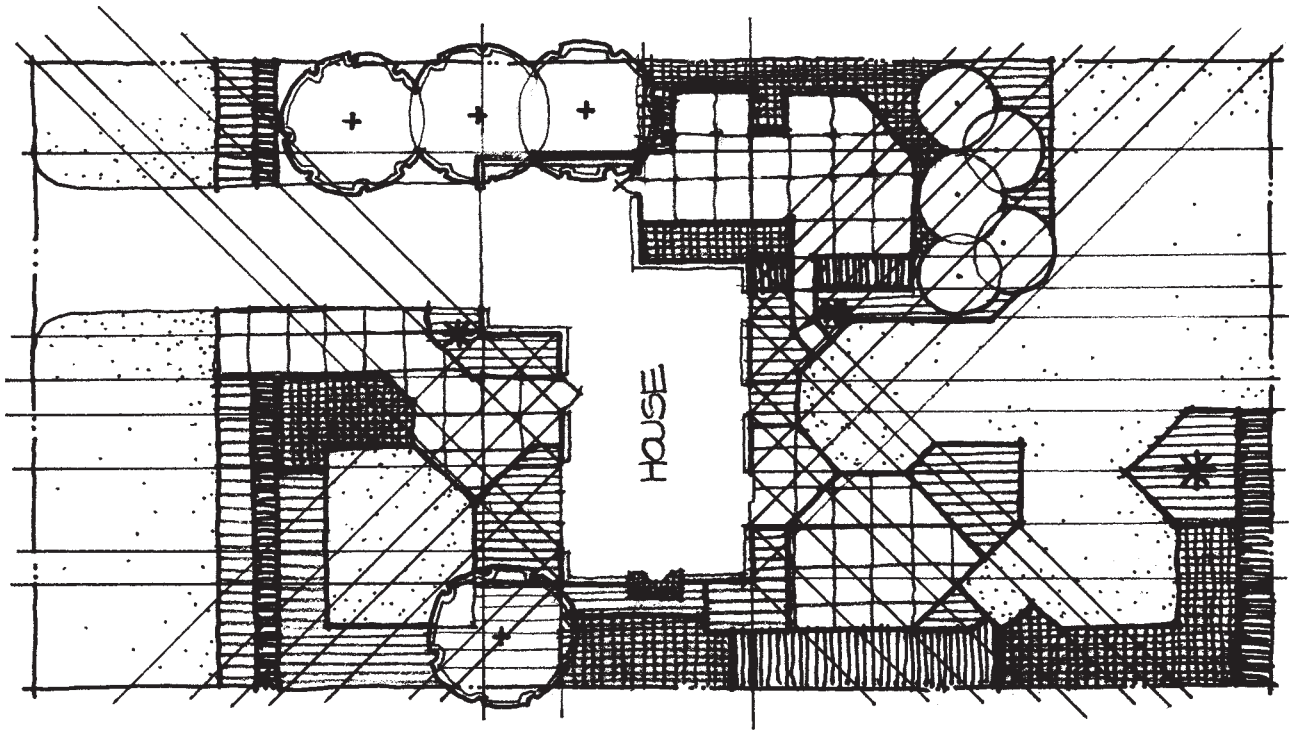


Figure 10–77
An example of a design theme that relates to both the functional diagram and the grid system.

In relating the new design forms to the functional diagram, the designer does not literally trace the diagram's bubbles. Instead, the diagram may be thought of as providing hints or approximate guidelines where the edges of the form composition may be positioned. Thus, where necessary, the designer should take the liberty of slightly altering the position of the edges to relate to the lines of force and to establish pleasing form relationships. But the overall size, proportion, and configuration stay generally the same as originally drawn on the functional diagram.

The first attempt at this will no doubt be rather rough, with a number of flaws. Another sheet of tracing paper can then be overlaid on the first sheet so that the first form composition study can be refined. Several attempts and refinements on tracing paper may be needed before the designer is satisfied with the results. And again, the development of alternatives is highly encouraged. The first and obvious solution may not be the best, a fact the designer may not see until the solution is compared and tested with alternatives (Figure 10–78). This overlay process should continue until the form composition is attractive as well as practical.

Now, perhaps, the significance of functional diagrams discussed in Chapter 8 can be better appreciated. A sound functional diagram will result in a form composition that also possesses a solid functional basis. Unfortunately, weaknesses of the functional diagrams are also apt to be continued. So again, it is critical that the designer take the necessary time to adequately study the functional diagrams to prevent organizational flaws from becoming a problem in later phases of the design process.

When developing form composition studies in coordination with the functional diagram, it is quite possible that the designer may formulate a new idea for the design's organization that is better than the original functional diagram. When this occurs—and it will—the designer should feel free to build on the better idea. The designer may go back to the functional diagram stage to make improvements and then return to the form composition phase.

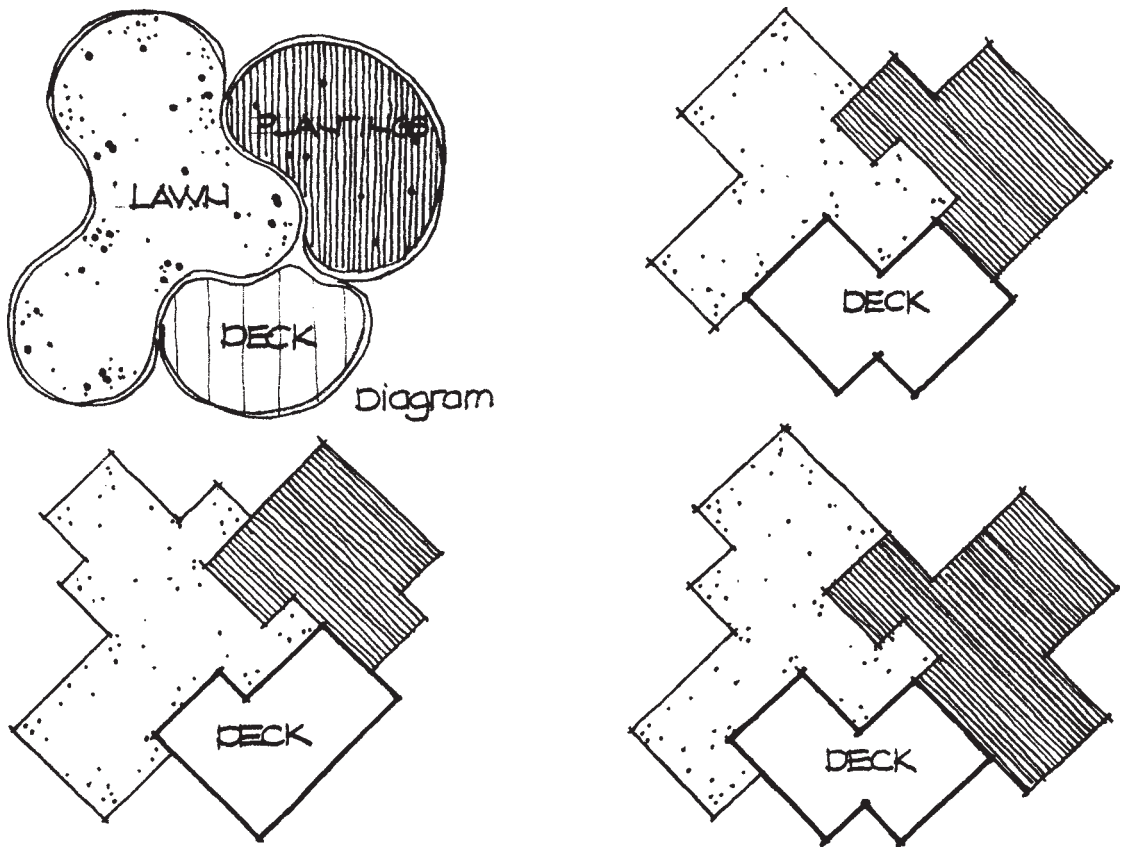


Figure 10–78
Examples of alternatives based on the same functional diagram and the same design theme.

DUNCAN RESIDENCE FORM COMPOSITION

At the end of Chapter 8, three functional diagrams were developed for the Duncan residence. The third, Diagram C, resulted from combining ideas from the other two. Diagram C can now be used as the base for drawing a few alternative form composition studies for the Duncan residence.

The first alternative is a rectangular design theme (Figure 10–79). Note how this composition relates to both the functional diagram that preceded it and the lines of force. For example, notice how certain edges of the eating area and living area relate to edges of the house, doors, and windows.

The second alternative is a combination of a rectangular theme and an arc and tangent theme (Figure 10–80). The rectangular forms are used for most of the hard surfaces, whereas arcs are used for the softer edges of the lawn and planting beds. This also makes good use of the site's limited area and provides a good blend of structure and casualness in meeting the preferences of the Duncans.

The third alternative, Figure 10–81, combines a modified diagonal theme with a curvilinear theme. Structured diagonal forms are used for structures (walks, steps, fences, etc.), whereas softer, sweeping forms are used for the lawn edges and planting beds. The diagonal orientation of the eating and living areas in the backyard directs views from these spaces toward the planting areas along the site's boundaries, while the flowing curves furnish motion for the eye.

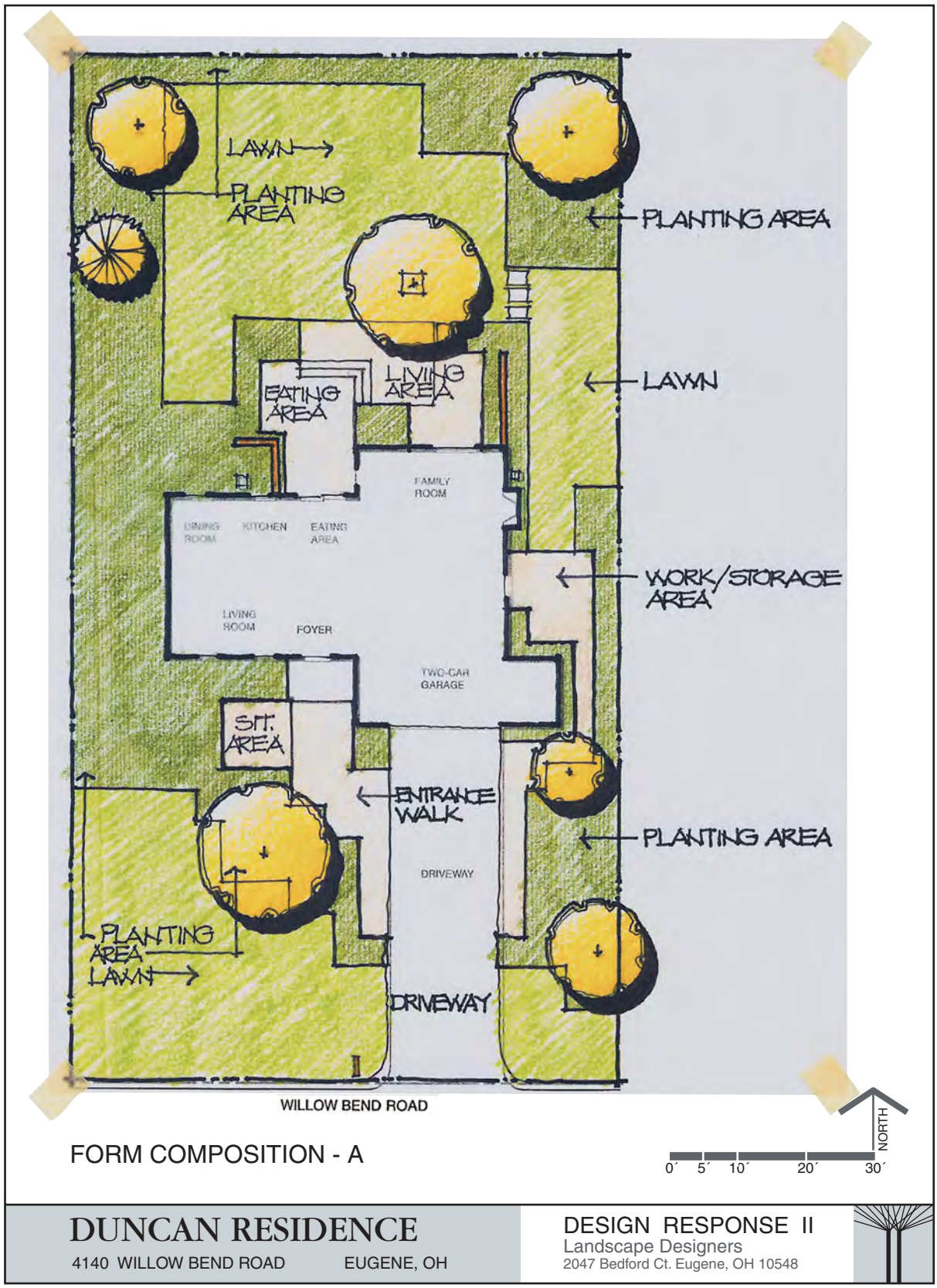


Figure 10–79
A rectangular design theme for the Duncan residence.

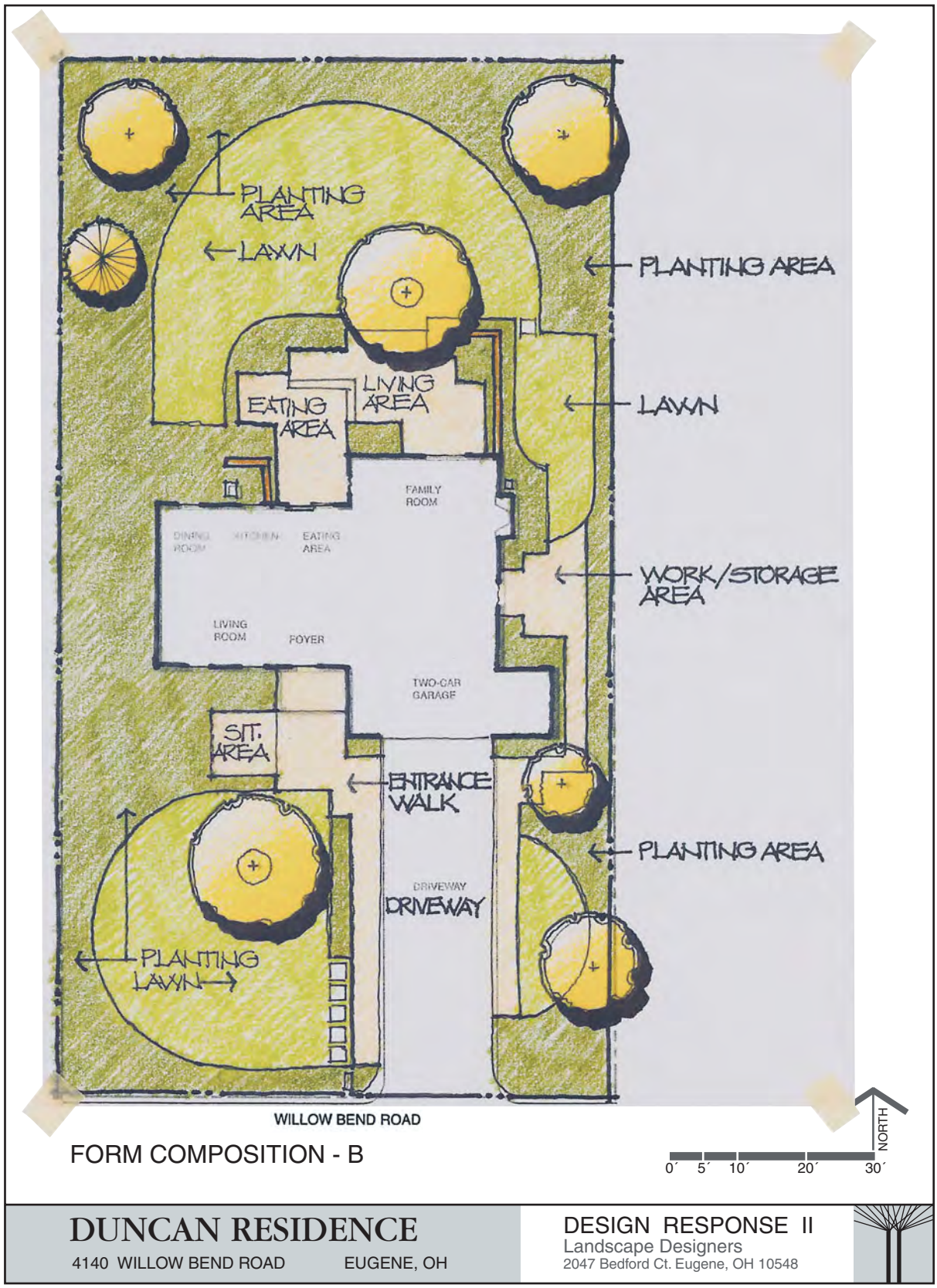


Figure 10–80
A combination of rectangular and arc/tangent design themes for the Duncan residence.

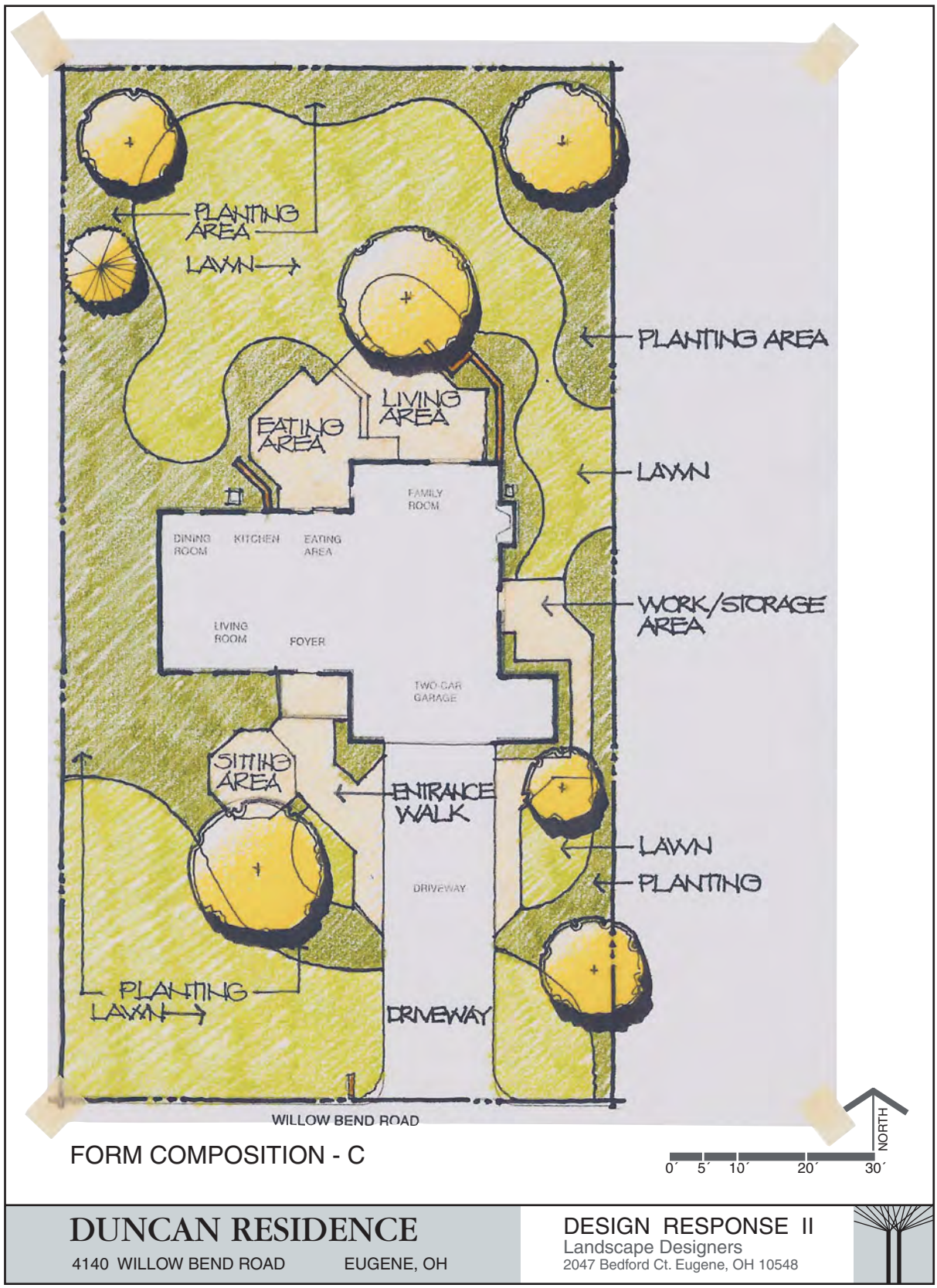


Figure 10–81
A combination of diagonal and curvilinear design themes for the Duncan residence.

SUMMARY

The composition of two-dimensional forms during preliminary design is vital because it builds on the functional diagrams that preceded it while simultaneously providing the foundation for three-dimensional study. Two-dimensional forms that are pleasing to the eye yet practical to build and maintain are based on principles of sound geometric relationships among forms, a direct correlation to the functional diagrams, a respect for existing structures and site conditions, the desired character of the design, and the wishes of the client. You should know the following about form composition:

- Definition and purpose of form composition in creating a preliminary design
- Similarities and differences between form composition and functional diagrams
- Critical components of the circle and how they should be used when integrating circles with other forms
- Critical components of the square and their use in creating two-dimensional compositions
- Guidelines for combining forms in a design
- Potential design themes based on two-dimensional forms
- Alternative circular themes and the characteristics and possible uses of each
- Characteristics of and guidelines for using a curvilinear design theme
- Guidelines for using a rectangular design theme
- Possible diagonal themes along with their characteristics and possible uses
- Characteristics and guidelines for arc and tangent and angular themes
- Reasons and guidelines for combining different design themes on one site
- Considerations for coordinating a design theme with the architectural style and features of the house
- Overall process for creating a form composition on a site
- Definition of lines of force, why they are helpful, and how they can be coordinated with the house
- Relationship between form composition and functional diagrams

11

Spatial Composition

INTRODUCTION

Chapter 10 discussed the various aspects of form composition, the first step of the preliminary design phase. When completed, form composition provides the basic structure and visible skeleton on which the remainder of the design will be built.

An essential point to realize about form composition is that it is only the beginning step of preliminary design and by itself does not create a complete residential site design. Form composition is essentially only a two-dimensional study of the design and does not fully consider the desired total spatial experience of the outdoor environment. The next step in preliminary design, spatial composition, proceeds beyond the two-dimensional form composition to establish the spatial shell or envelope of a residential site design. Spatial composition builds on the form composition's framework by adding the third dimension, very much as the walls and ceilings of indoor rooms build on the underlying floor plan of a house. It considers how the overall space is formed and develops ideas for vertical and overhead planes of enclosure. As indicated before, spatial composition usually occurs simultaneously with form composition. However, the two steps are being separated here for the sake of explanation.

This chapter discusses the different aspects of spatial composition including preliminary grading, planting design, use of vertical planes such as fences and walls, and use of overhead structures in residential site design.

PRELIMINARY GRADING DESIGN

Spatial composition in residential site design should start with the ground plane. There are several reasons for this. First, the three-dimensional design of the ground can and should be done in close association with form composition. A second reason is that the ground plane is the foundation for every other design element, such as plant materials, pavement, walls, fences, and overhead structures. Thus, the elevation of the ground has a direct influence on the function and appearance of other elements. And finally, the ground plane is the surface on which we walk, run, sit, drive, and so on. It receives the most direct use and wear in the outdoor environment. Therefore, its three-dimensional composition is critical.

The term *grading* is commonly used to refer to the manipulation of the ground's third dimension and is defined as shaping or molding the ground's surface for both functional and aesthetic purposes. Grading involves physical movement of soil from

one area of the site to another. When earth is added to an area, it is called *fill*. When earth is removed or excavated from an area, it is called *cut*. Generally, there is an attempt to balance the quantity of cut and fill on a given project to eliminate the need for transporting earth to or from the site.

Two general purposes for grading on a residential site are necessity and aesthetics. For necessity, grading is undertaken to properly drain surface water and to accommodate circulation or other uses on the site. For aesthetics, grading is done to create space, screen or direct views, and provide visual interest. Grading for necessity is a utilitarian and engineering process, whereas grading for enhancement is an aesthetic and artistic endeavor. Both types of grading should be undertaken together so that all grading is both functional and appealing to the eye. Each specific purpose for grading is discussed more in the following sections.

Drainage

One utilitarian purpose for grading is to provide proper drainage across the ground's surface. There are a number of places on the residential site where special effort should be made to correctly drain surface water.

1. Surface water should be drained away from the house and other structures on the site to reduce problems. There are several general existing slope conditions the designer may encounter on residential sites (Figure 11–1). In the first condition, where the ground slopes naturally away from the house, the designer should maintain the slope so water continues to drain away from the house. This situation typically requires little or no regrading of the existing site. In the second situation, where the house is located on level ground, the surface must be regraded to slope gradually away from the house. It is usually recommended that the ground's surface be sloped away from the house or other structures at a rate of 1 percent to 10 percent (Figure 11–2).

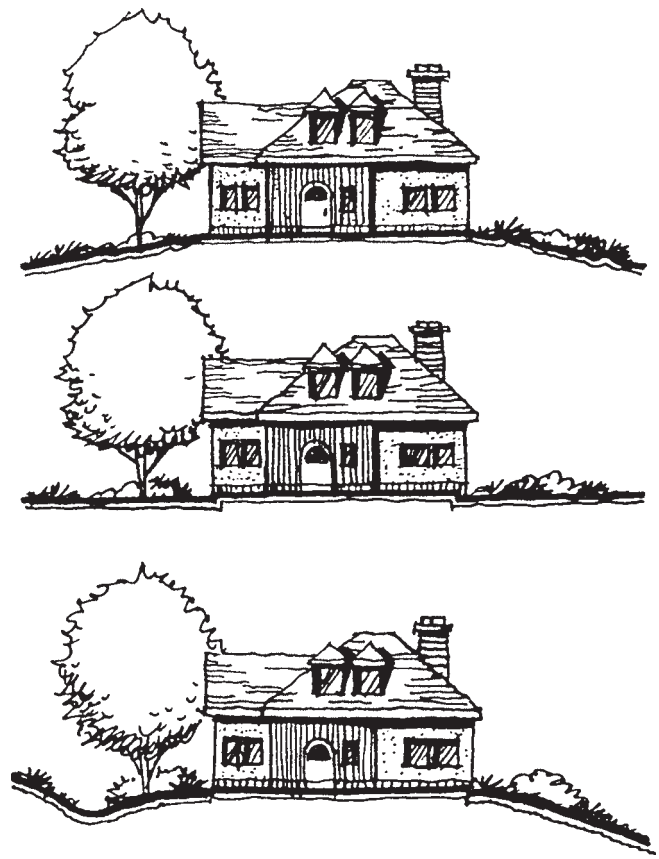


Figure 11–1
General types of existing slope conditions found on residential sites.

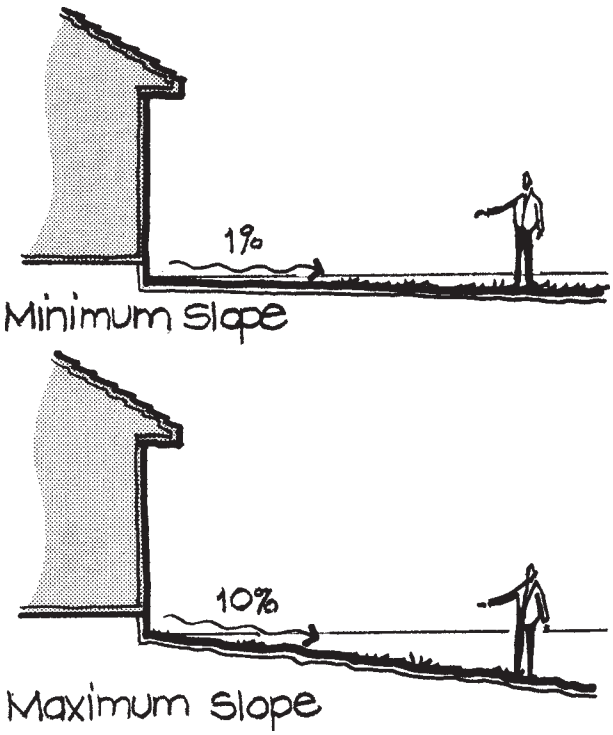


Figure 11–2
The ground should slope away from the house foundation within these suggested limits.

A slope of 1 percent is approximately equal to 1/8-inch vertical elevation change for every 1 horizontal foot across the surface (Figure 11–3). Another way to understand this is by applying the formula for percent of slope:

Rise divided by run = percent of slope

Rise is the vertical elevation change of the slope and *run* is the horizontal distance across the slope (Figure 11–4). Therefore, a slope of 1 percent rises or falls 1 foot for every 100 horizontal feet (1 divided by 100 = 0.01 or 1 percent). A slope of 10 percent rises or falls at a rate of 10 feet for every 100 horizontal feet or 1 foot for every 10 horizontal feet.

The third situation for existing slope conditions is where the house is located on a sloped site (bottom of Figure 11–1). Here it will be necessary to create a swale or shallow valleylike landform on the uphill side to collect surface drainage and direct it around the house.

2. Water should be drained as quickly as possible from paved walks and driveways so they can be used safely during and immediately after a rainstorm. It is also desirable to prevent water from accumulating during the winter season in northern climates because wet areas are apt to become covered with ice, causing a real safety problem. In addition, it is important to drain surface runoff from paved outdoor use areas such as the outdoor living and entertaining space so they can be used as soon as possible after it rains. Pools of standing water on any paved surface reduce its safety and usefulness. For adequate drainage, paved surfaces of concrete or asphalt should

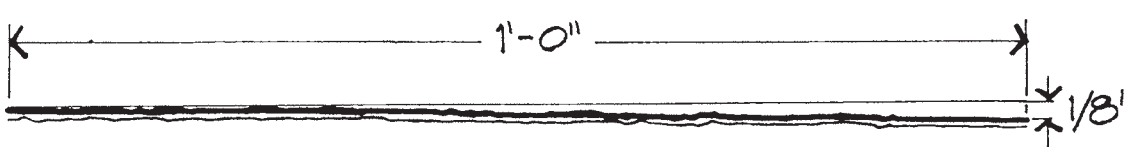


Figure 11–3
An example of a slope of 1 percent.

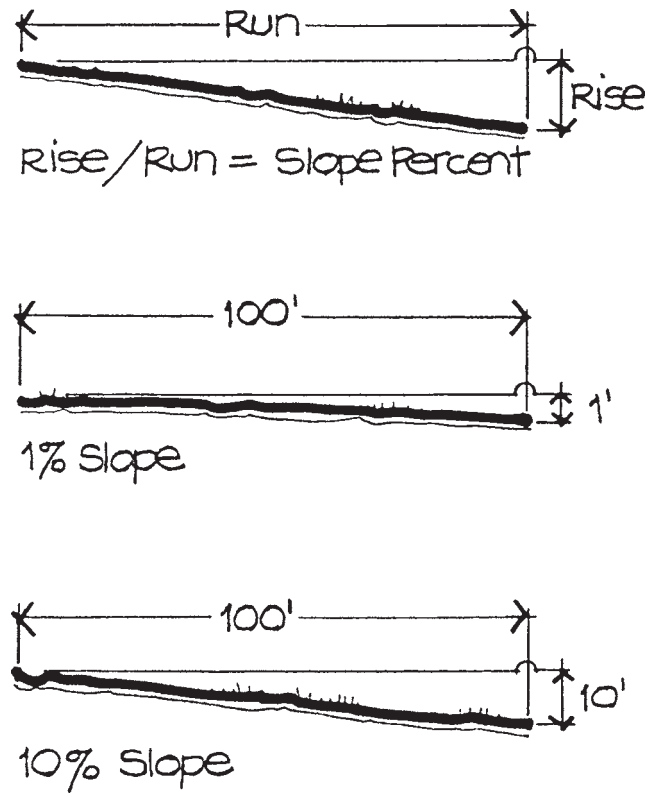


Figure 11–4
A method for determining percent of slope.

have a minimum slope of 1 percent. Exposed aggregate concrete, brick, stone, or other rough pavement materials should have a minimum slope of 1.5 percent (a 1–1/2-foot vertical change for every 100 horizontal feet). At the other extreme, paved surfaces in outdoor spaces where people stand or sit for any length of time should not exceed a maximum of 3 percent. A paved surface that is steeper than 3 percent is perceived as having a definite slope and gives a space an uncomfortable or unstable feeling. Paved walks should not exceed a slope of 5 percent and driveways and parking areas should not be steeper than 8 percent.

3. Water should be properly drained from lawn surfaces to prevent standing water or soggy, wet areas. For positive drainage, it is recommended that lawn surfaces slope at 2 percent or 2 feet fall in every 100 horizontal feet (Figure 11–5). However, lawn surfaces should not exceed 25 percent (a 1-foot vertical elevation change for every 4 horizontal feet). Above this maximum, it becomes dangerous to operate a lawn mower. It should be noted that in some locations, such as arid regions or areas with problems of too much runoff from urban development, it may actually be desirable to temporarily hold water on a site during and after a storm. In this situation, lawns and planted areas may be designed to retain water until it can seep into the ground or be slowly drained away.

4. Planting beds or other vegetative surfaces should be drained to prevent damage to plant materials. For plant beds, it is recommended that the ground slope at a rate of at least 2 percent, but not more than 10 percent. A planting bed that is steeper than this is susceptible to erosion unless protected by ground cover.

Accommodating Circulation

Another purpose for grading is to accommodate circulation on sloped ground or between spaces of different ground elevations. As stated in the previous section, walks should not exceed a slope of 5 percent (or a 1-foot vertical change for every 20 horizontal feet; Figure 11–6). This guideline is especially applicable for entry walks where comfort and safety of people are important.

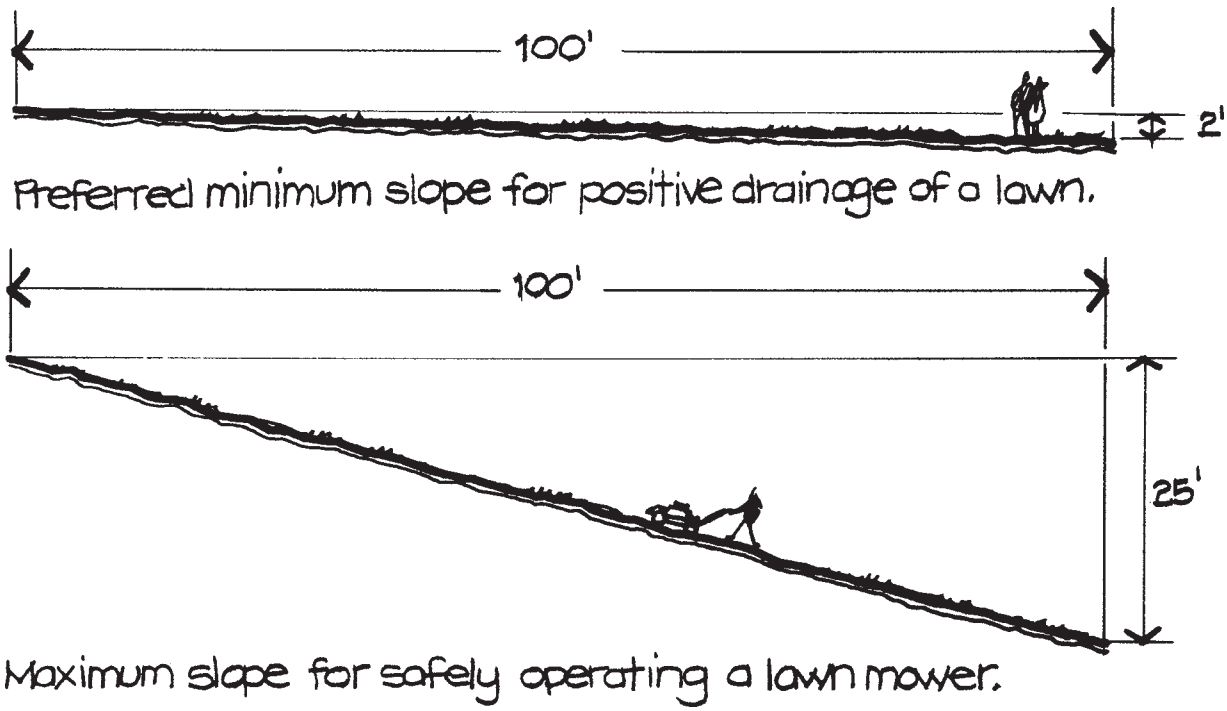


Figure 11–5
Minimum and maximum slopes for lawns.

Where the ground is too steep to provide a properly sloped surface, steps may be necessary to take up the elevation change between two spaces. There are a number of guidelines for the design of steps. First, they should be designed as an integral part of the overall design (Figure 11–7). Steps should not be designed as an afterthought to other aspects of the design and made to appear as an "add-on" (see the top portion of Figure 11–7). In addition, steps should have forms that are consistent with the overall design theme, and thus should be studied during form composition.

Steps also must have appropriate dimensions. Both the *tread*, the horizontal portion of the step on which the foot is placed, and the *riser*, the vertical portion of the step (Figure 11–8), must have the correct depth and height to be safe and feel comfortable. A guideline that is commonly used to establish the tread and riser dimensions is the following formula:

Twice the riser height plus the tread depth should equal 26″, or $2R + T = 26''$.

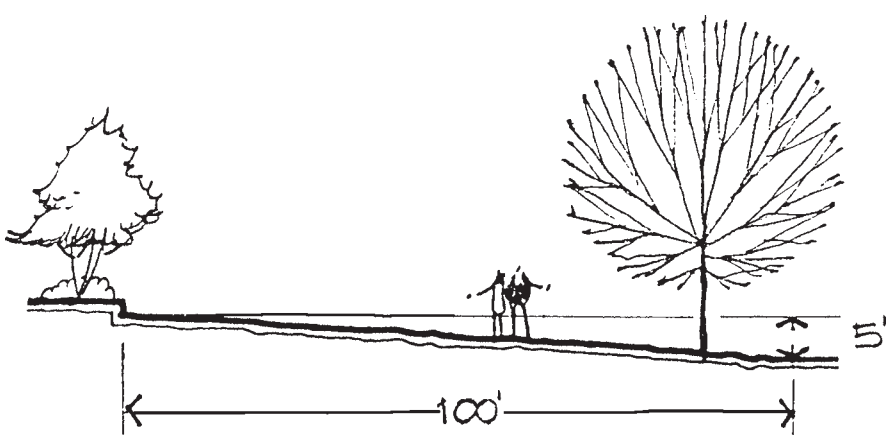


Figure 11–6
Maximum slopes for pedestrian walks.

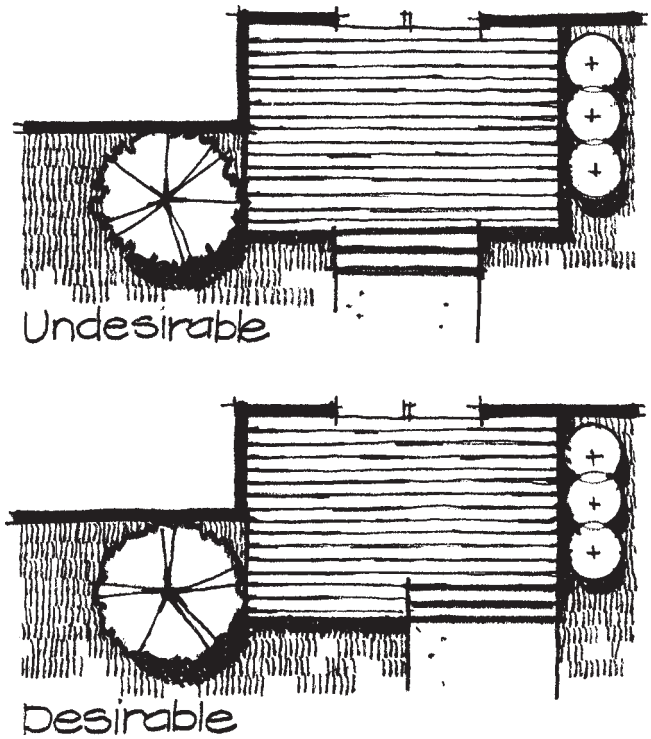


Figure 11–7
Steps should be designed as integral parts of the overall design composition.

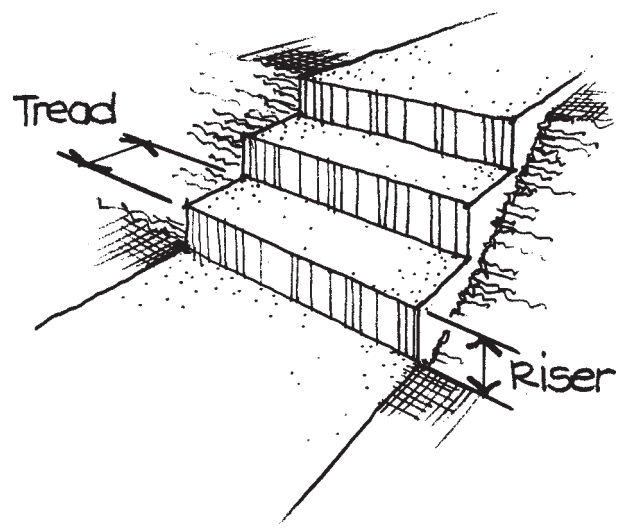


Figure 11–8
An example of step risers and treads.

The examples in Figure 11–9 demonstrate how the formula can be applied. If the riser (R) is to be 6 inches high, then the formula is used to determine the proper tread depth (T) as follows:

Step 1: $2(6'') + T = 26''$
Step 2: $12'' + T = 26''$
Step 3: $T = 26'' - 12'' = 14''$

Or, if each tread (T) is to be 15 inches, the riser height (R) is found as follows:

Step 1: $2R + 15'' = 26''$
Step 2: $2R = 26'' - 15'' = 11''$
Step 3: $R = 5.5''$

As can be seen from this formula, the dimensions of the treads and risers in a flight of outdoor steps are interdependently related. As the dimension of one becomes greater,

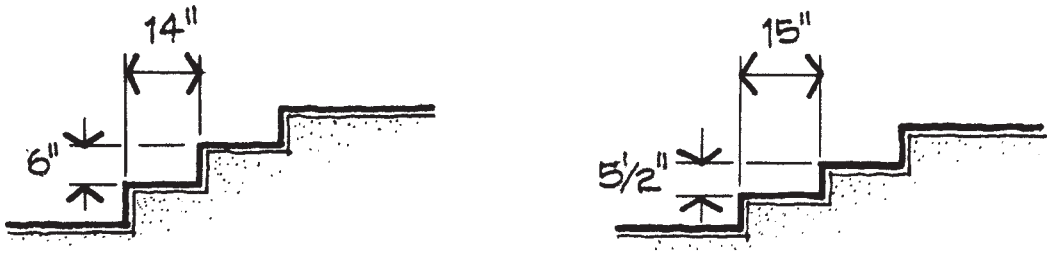


Figure 11–9
Examples of ideal riser/tread relationships.

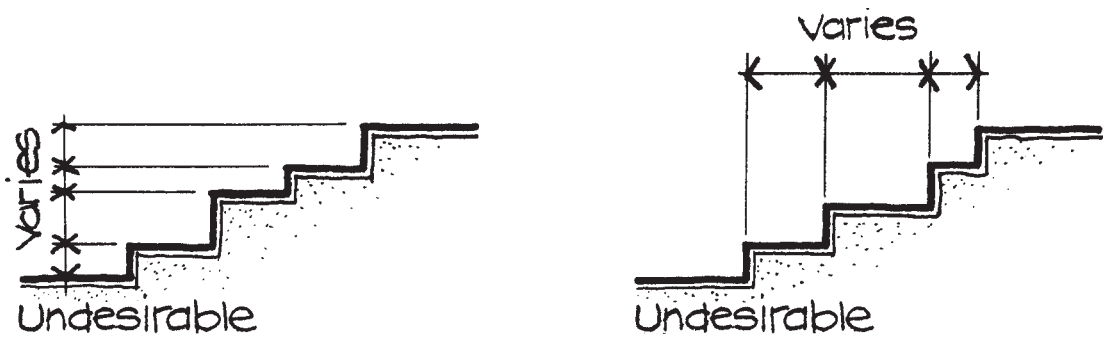


Figure 11–10
The dimensions for risers and treads should not vary in a flight of steps.

the other becomes smaller. Once dimensions are established for a given set of steps, they should not be varied (Figure 11–10). That is, all the risers should be the same height and all the treads should be the same depth within the flight of steps. If these dimensions vary, they are apt to catch people by surprise and cause them to trip or fall.

There are several limitations on minimum and maximum dimensions for risers and treads (Figure 11–11). Each tread should be at least 12 inches deep. A tread that is smaller than this is too shallow for the average foot. The height of each riser should be at least 4 inches but no more than 6–1/2 inches. Below 4 inches, the height becomes insignificant and is not easily seen in the outdoors. This short dimension also creates the need for too many risers in a set of steps. Above 6–1/2 inches, the height of a riser becomes difficult for elderly people, children, and others with walking disabilities to negotiate.

Steps function best when they are oriented 90 degrees or at a right angle to the prime direction of movement (Figure 11–12). It is easier to walk up a flight of steps "head-on." The designer should avoid placing steps so that people have to walk up or down them across a sharp corner (right side of Figure 11–12). This is awkward and frequently dangerous.

Steps are often the best way to get people from one elevation to another. However, they do have one major problem: they cannot be negotiated by wheeled

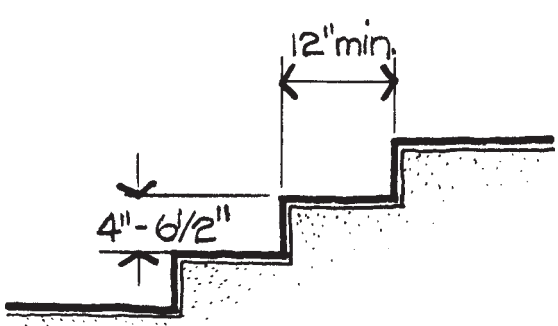


Figure 11–11
Minimum and maximum dimensions for risers and treads.

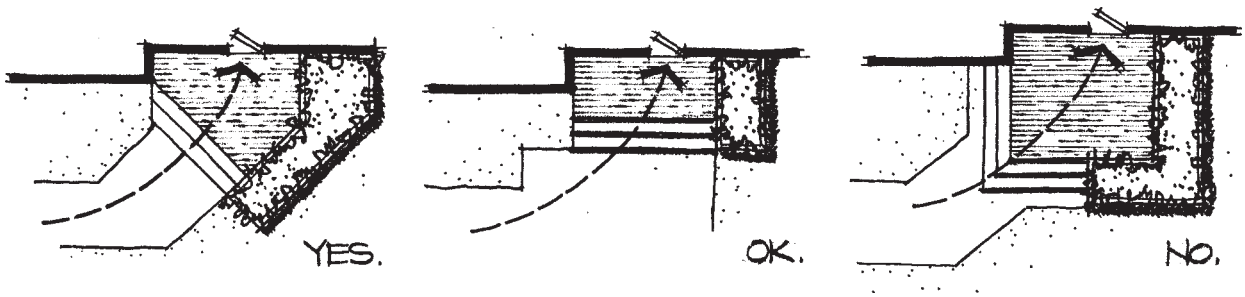


Figure 11–12
Steps should be oriented 90 degrees to the direction of movement.

vehicles such as wheelchairs. Steps act like barriers in the landscape to free movement. Consequently, there is sometimes a need to provide ramps on a residential site to allow wheelchairs and other wheeled vehicles to move without limitation.

There are a number of challenges in designing ramps. First, they need to be located and designed along with every other element in the design so that they appear as an integral element. Too often, ramps are added as an afterthought. When this happens, ramps usually look poorly related and out of place. Second, ramps need to conform to proper dimensions. The slope or gradient along the ramp should not exceed 8.33 percent (Figure 11–13). The slope should not rise more than 1 vertical foot for every 12 horizontal feet along the ramp. The result of this is that most ramps take up a large horizontal distance on a site, especially when compared to steps. For example, to accommodate 2 feet of elevation change between two levels, a ramp needs to extend 24 horizontal feet. This is extensive compared to only a few feet needed for a set of steps for the same elevation change. One last dimensional guideline is that ramps should be at least 5 feet wide.

Creating Space

There are several aesthetic purposes for grading on a residential site. First, grading can define edges between spaces and partially enclose space in the vertical plane. The first and simplest method is to provide an elevation change between two adjoining spaces (Figure 11–14). A small difference in elevation between one space and another makes each seem like a distinct place. The greater the change in elevation between spaces, the greater the feeling of spatial separation.

Grading can also be used to provide vertical planes around the outside of a space for implied enclosure. The existing ground can be excavated, built on with earth

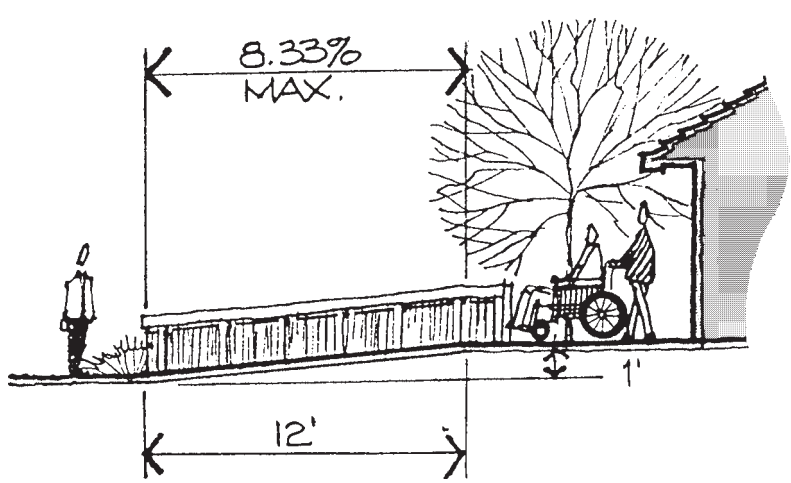


Figure 11–13
Maximum gradient for a handicap ramp.

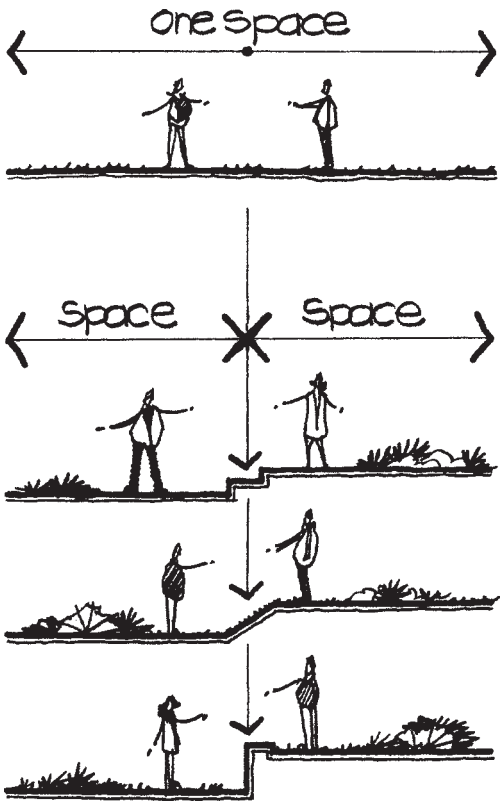


Figure 11–14
A feeling of space can be created by a simple grade change between adjoining areas.

mounds to provide spatial enclosure (Figure 11–15), or both excavated and filled (Figure 11–16).

In all these situations, the higher the surrounding ground, the greater the sense of spatial enclosure. The greatest feeling of enclosure is gained when the ground fills a 45-degree cone of vision or extends above eye level (Figure 11–17). Whatever height is

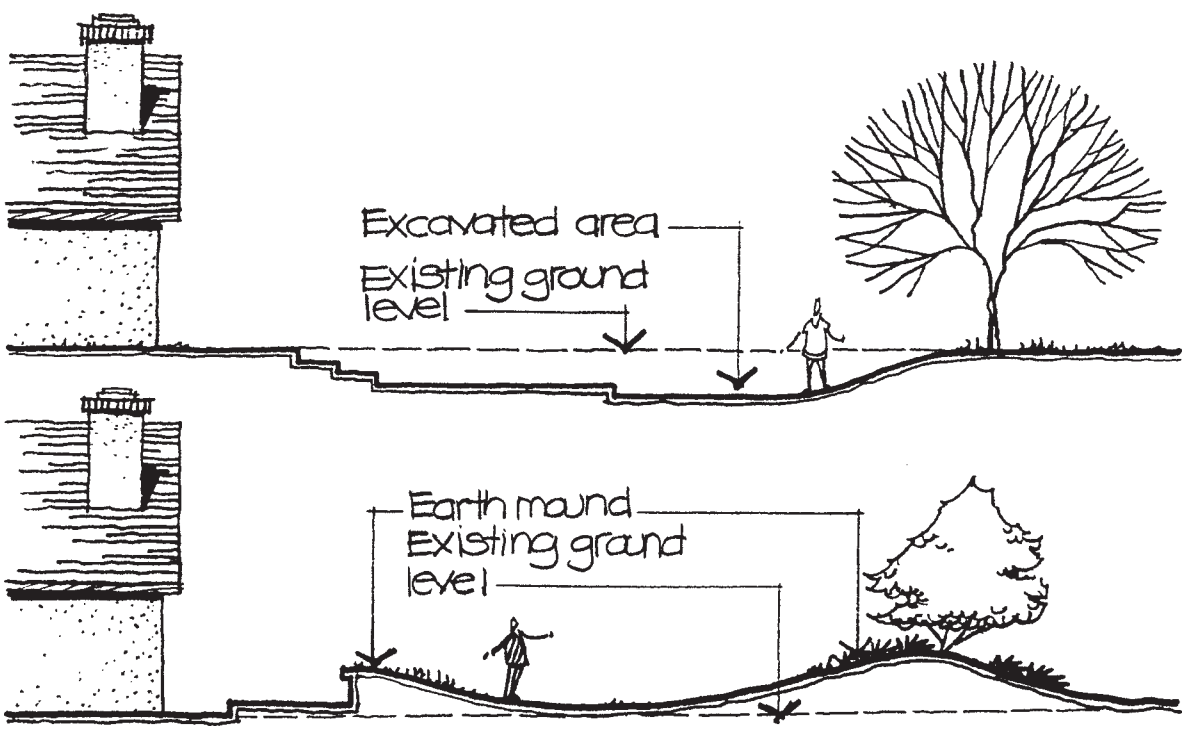


Figure 11–15
Vertical planes around a space can be created by excavating into the existing ground or building on it with earth mounds.

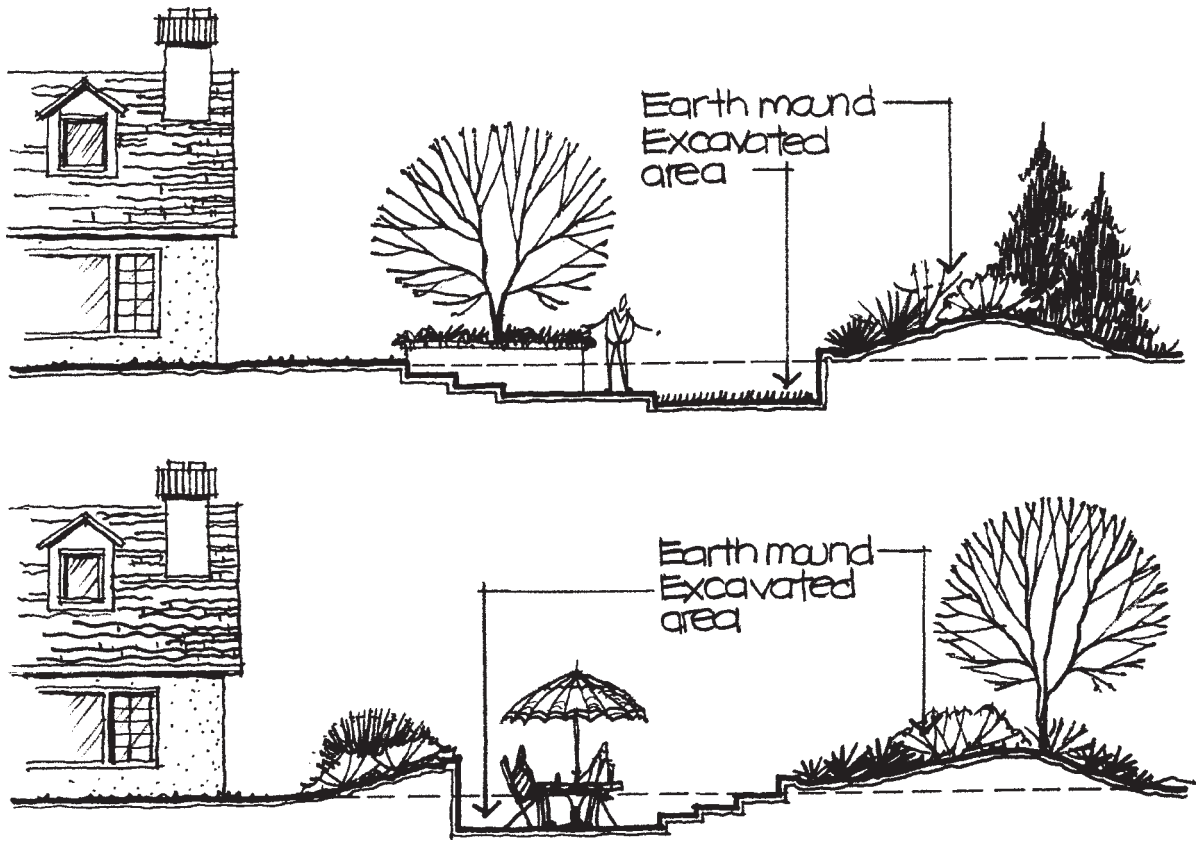
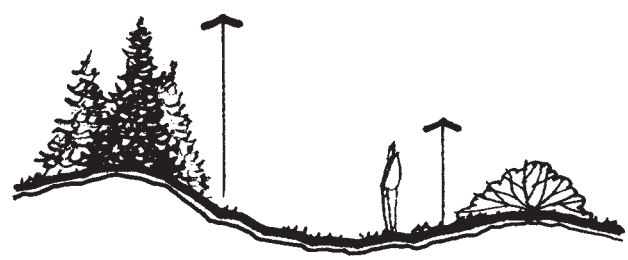


Figure 11–16
A combination of excavation and mounds can be used to enclose space in the vertical plane.

created, plant materials can be added to the surrounding slopes or walls of a space to accentuate the ground's height, thus giving the space an even more pronounced sense of enclosure (Figure 11–18).

Full enclosure with surrounding ground is most appropriate where a sense of privacy is desired, such as in a small sitting area or private outdoor lounging area.



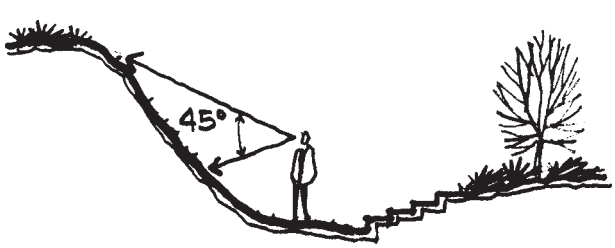


Figure 11–17
The greatest sense of enclosure occurs when surrounding ground fills a 45-degree cone of vision.

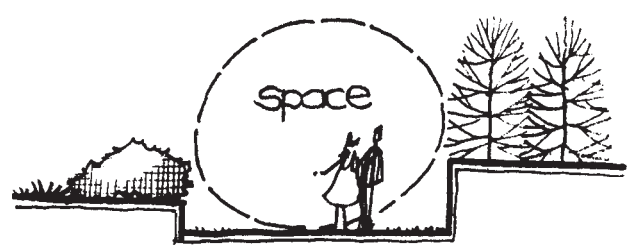


Figure 11–18
Plant materials can be used to accentuate the height of ground around a space.

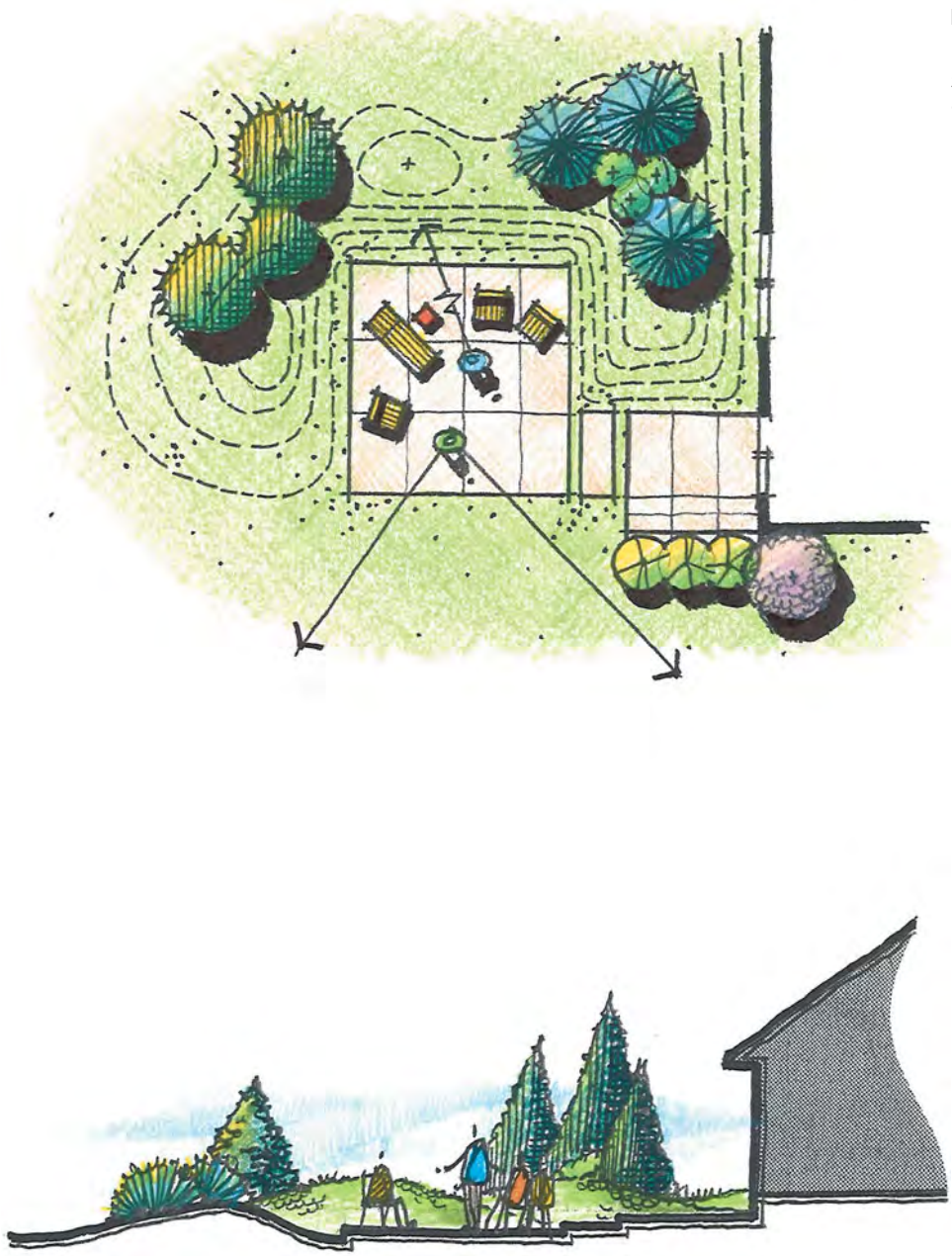


Figure 11–19
The location and height of ground can be varied to provide different degrees of enclosure.

Often, a space requires enclosure on only one side with a more open feeling provided on another (Figure 11–19). The height of the surrounding ground can be varied to give different feelings of enclosure.

In all situations, the height of the surrounding ground should be limited by several guidelines. For slopes, the incline should not exceed a rise of 1 foot vertical change for every 2 horizontal feet—referred to as a 2:1 or 50 percent slope (Figure 11–20). Slopes steeper than this are subject to slippage and erosion.

When enclosing space in the vertical plane, the designer should use slopes or low retaining walls to reinforce the style or design theme established by the form composition. For example, a curvilinear design theme should be enhanced with soft, sweeping slopes or mounds (left side of Figure 11–21). The slopes should move around the outer edge of the curves to reinforce their form in the third dimension. A rectangular design theme can be reinforced with retaining walls or rigid slopes (right

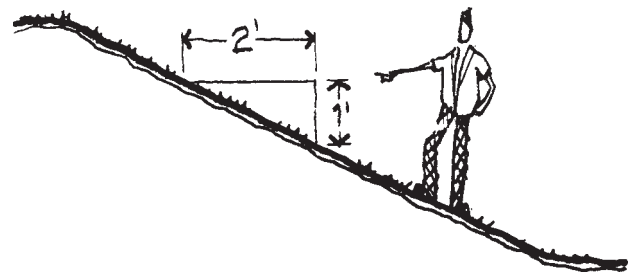


Figure 11–20
Maximum slope steepness without erosion.

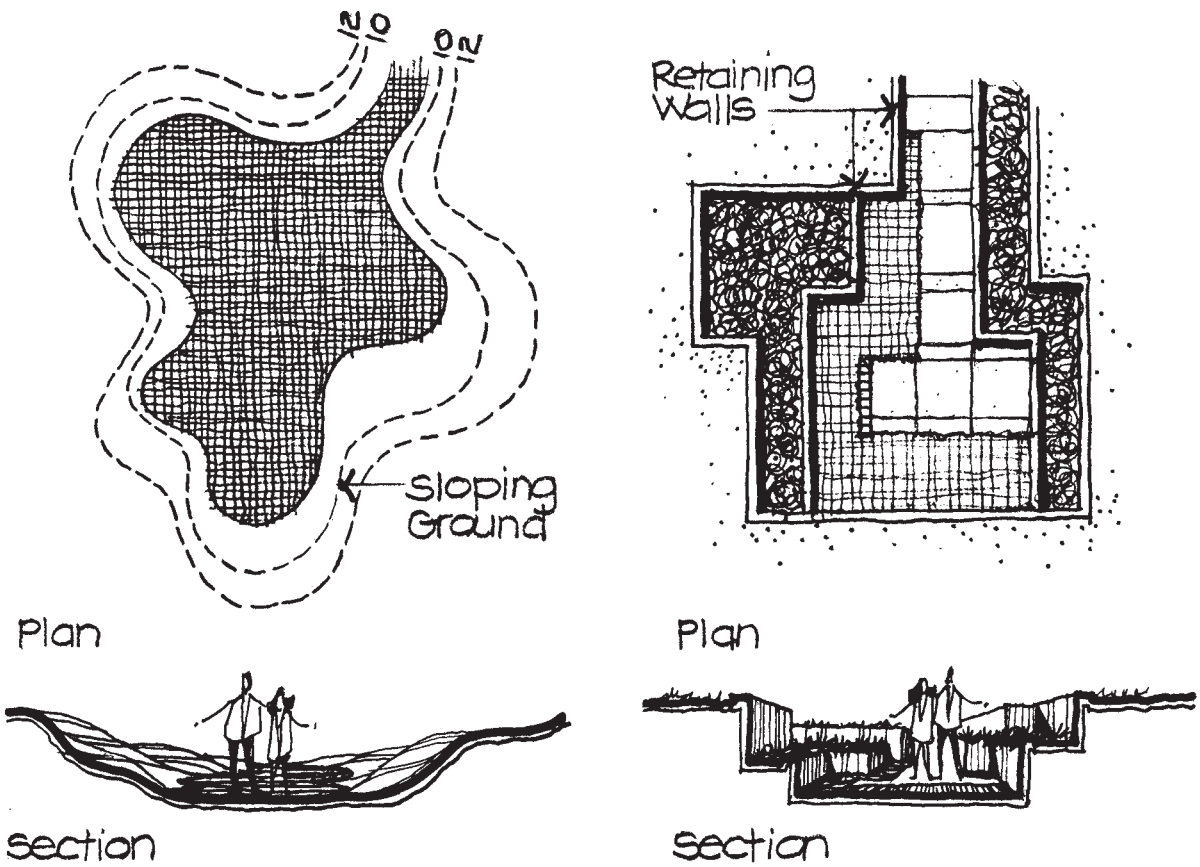


Figure 11–21
Slopes and retaining walls should relate to and reinforce the established design theme.

side of Figure 11–21). The designer might also use a combination of slopes and retaining walls (Figure 11–22).

The character of the base plane or floor of spaces created with ground should also reinforce the intended design theme. For curvilinear design themes, the base plane might be gently sloped and contoured with gradual transitions from one space to another (left side of Figure 11–23). For rectangular or other structured themes, the floor of spaces could be kept relatively level (though still providing for proper drainage), with definite grade changes (made with steps or terraces) between one level and the next (right side of Figure 11–23).

Screening and Directing Views

The second aesthetic purpose for grading is to either screen or direct views. Grading of the ground plane can elevate selected areas of the site to block undesirable views

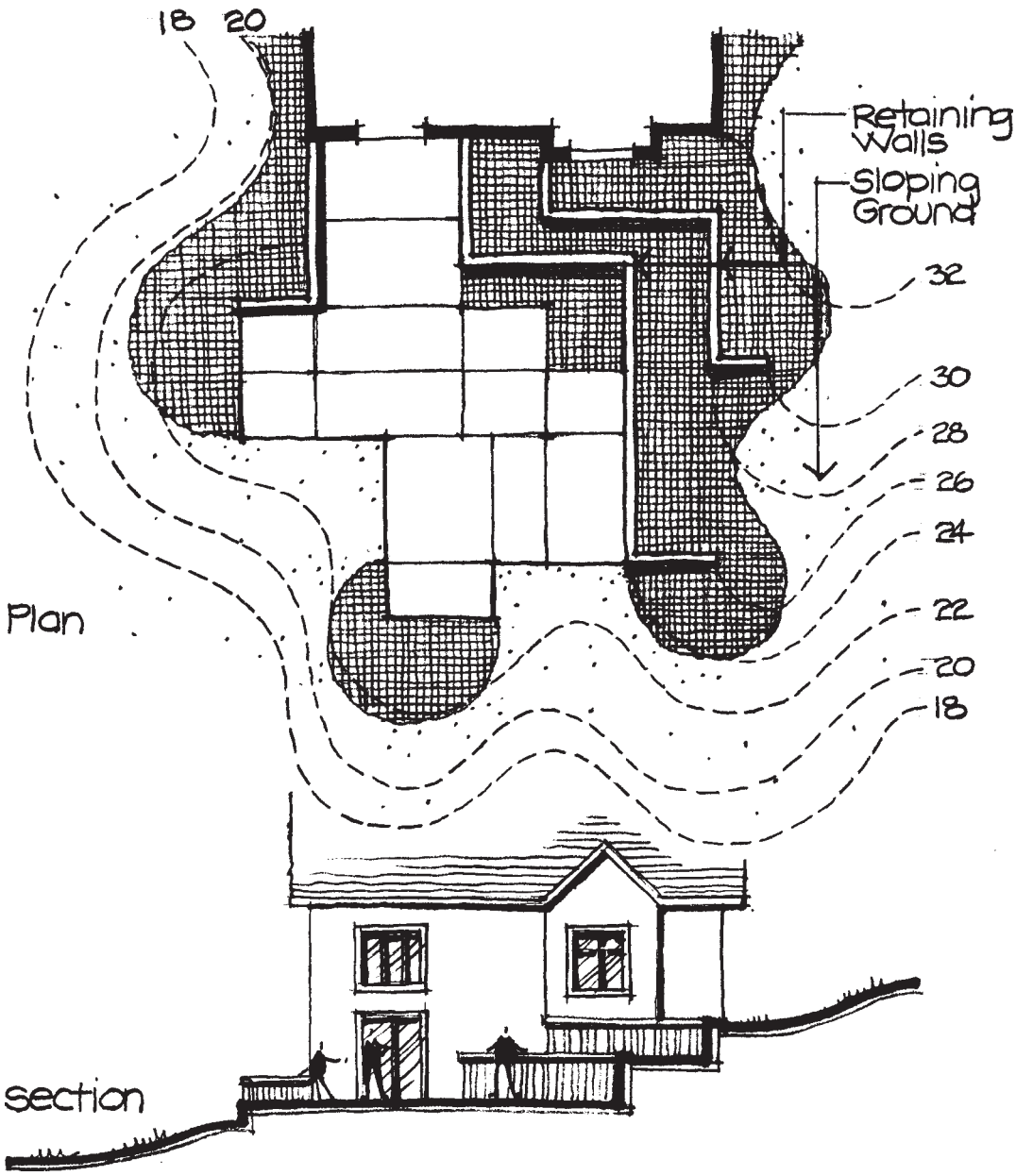


Figure 11–22
A combination of slopes and retaining walls can be carefully coordinated in terms of form composition.

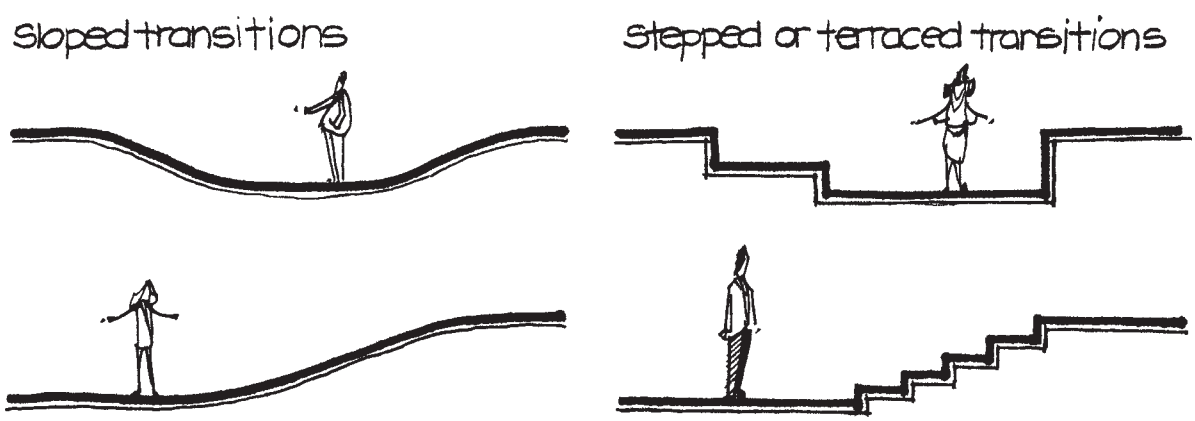


Figure 11–23
The slope of the base plane in spaces created with ground should relate to the overall design theme.

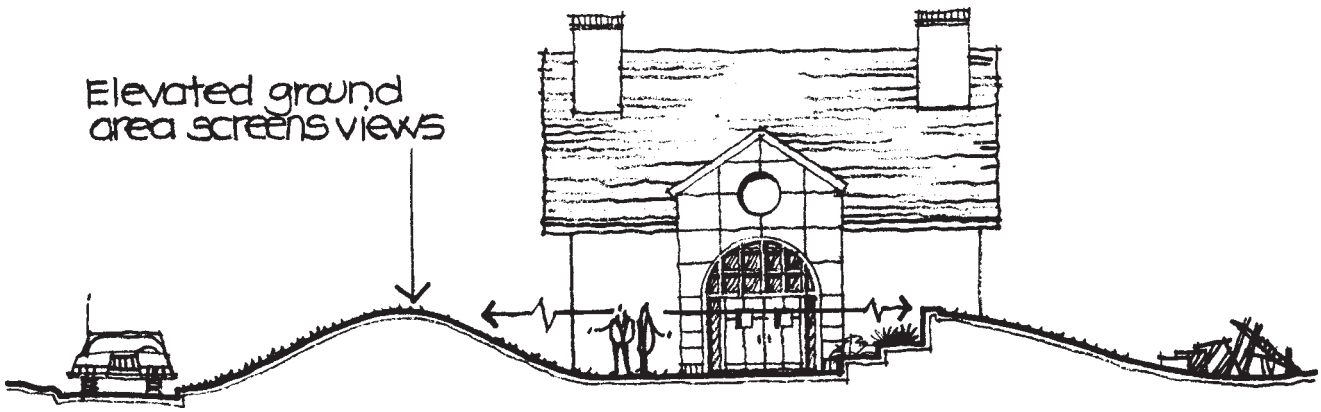


Figure 11–24
The ground can be graded to screen undesirable views.

(Figure 11–24). Mounds or berms can be placed to screen views of the street, the neighbor's driveway, the adjoining backyard, and so on. One other suggestion is to make mounds or berms look as if they were part of the existing site. Earth mounds are sometimes graded with abrupt slopes that make the mounds look like unappealing bumps on the site (top half of Figure 11–25). Mounds should gradually flow into each other and the surrounding site (bottom half of Figure 11–25).

The ground plane can also be molded to direct views toward certain points in the landscape. The side slopes of a valley landform can function like blinders to block out all but the intended view (Figure 11–26).

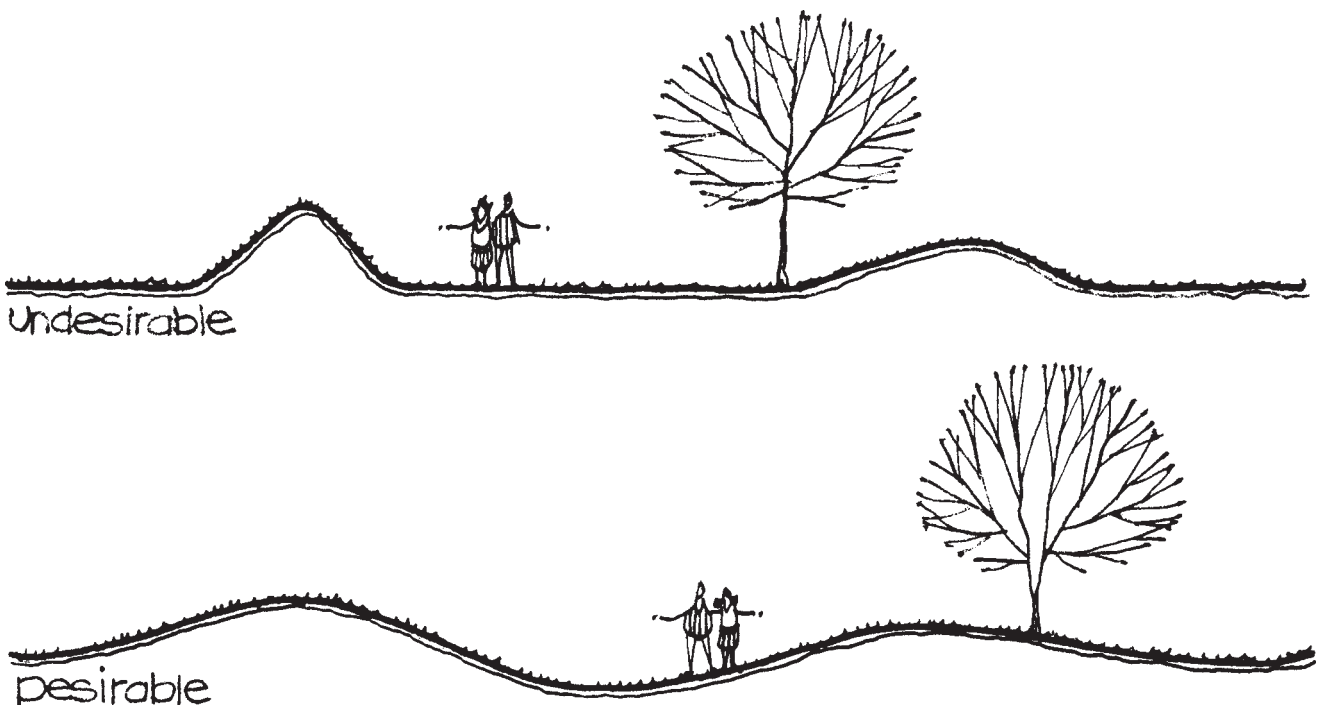


Figure 11–25
Earth mounds should blend smoothly with the surrounding ground.

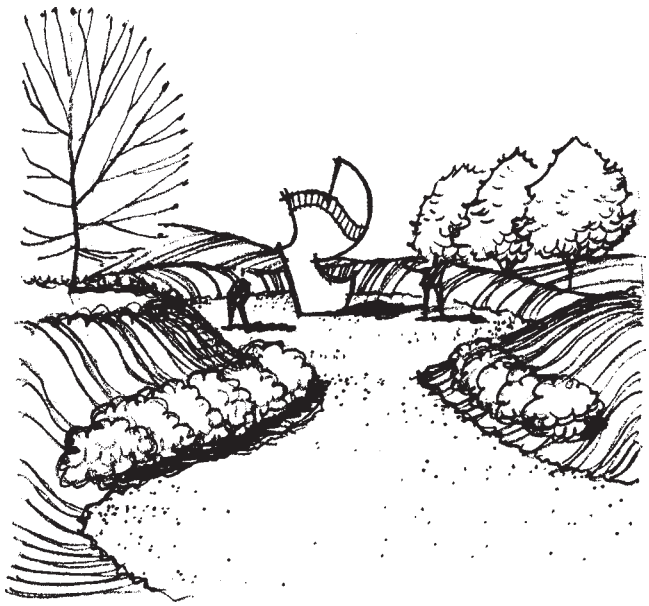


Figure 11–26
The ground can be graded to direct views to desirable points in the landscape.

PRELIMINARY PLANTING DESIGN

Plant materials are another element used in the spatial composition. On the residential site, plant materials are one of the most important design elements for the floor, walls, and ceiling of outdoor rooms. They are living elements and need special care in selection and placement in the landscape. They can be used by themselves or in conjunction with other elements to create outdoor rooms and reinforce the design theme.

During preliminary design, the designer takes a "broad brush" approach to the use of plant materials by deciding where plant materials should be located and what function they serve in the design. Their selection must be based on function, appearance (size, form, foliage color, flower color, foliage texture, fruit size, and color), and environmental conditions present on the site (sun exposure, wind exposure, precipitation, soil characteristics).

Although plant materials can be categorized in numerous ways, one such way is by "type." They are (1) deciduous plants, (2) coniferous evergreen plants, and (3) broad-leaved evergreen plants. Each of these types is briefly described in the following paragraphs.

Deciduous plant materials lose their leaves in the autumn and regain them in the spring. Because of this quality, they are often used to emphasize seasonal change and variation. In addition, many deciduous plants are distinguished by showy spring flowers and dramatic autumn foliage color. Ornamental trees, such as flowering dogwoods, crab apples, and Canadian redbuds, are deciduous plants that are used particularly for their appeal of seasonal change. Deciduous trees can be used for shade during the hot months of the summer while allowing exposure to the sun during the cool months of the winter.

Coniferous evergreen plants are those that have needlelike foliage. Because coniferous plants retain their foliage throughout the year, they can be used wherever a permanent mass of foliage is required. The permanence of coniferous evergreens should be used in direct association with deciduous plants so that a composition of plant materials retains some structure and green color during the times of the year when deciduous plants are without leaves. Coniferous evergreens are particularly useful for screening undesirable views or blocking cold winter winds. In addition, they can be grouped together in a mass to create a backdrop for showy deciduous plants.

Broad-leaved evergreens have leaves that resemble deciduous foliage in appearance. However, broad-leaved evergreens retain their leaves throughout the year. Broad-leaved evergreens as a group are best used in a design for their foliage texture and for their showy spring flowers. However, they should not be used only for their flowers because these last only a few weeks of the year. Broad-leaved evergreens can also be used to give a dark yet shiny leaf surface to a planting composition.

Specific selection and identification of plants by genus and species are usually done when the master plan is prepared.

Plant materials can function in a variety of ways on the residential site.* These functional uses can be: (1) architectural, (2) aesthetic, or (3) engineering.

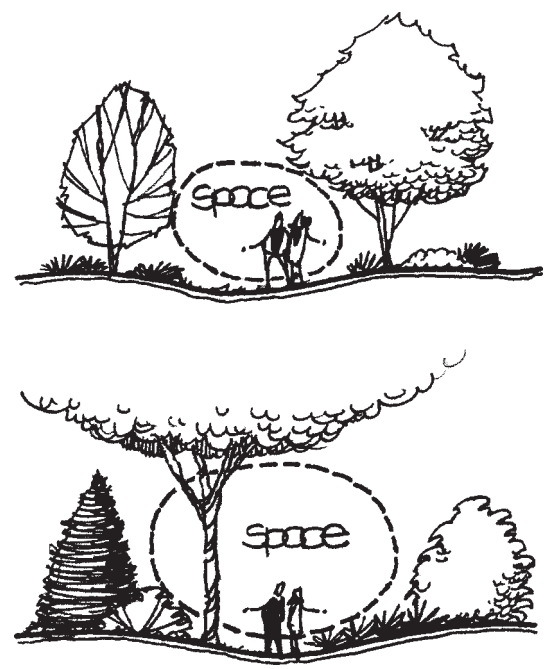
Architectural Uses

Plant materials serve two primary architectural uses on the residential site by creating space and either screening or enframing views. Plant materials can function as floors, walls, and ceilings to establish the spatial envelope of a residential design, just as the architectural components of a building create indoor rooms. It should be noted that the term *architectural* refers only to enclosing space and does not mean using plants in straight lines or formal layouts. Plant materials can be used architecturally in any design theme.

Creating Space Plant materials of all sizes and types can be used to define outdoor space. However, it is best to locate trees first when creating outdoor rooms with plant materials because their size and mass establish the overall framework of the spatial composition. Trees should be placed in a design to create vertical walls and overhead ceilings of foliage (Figure 11–27). After the trees have been arranged in the design, smaller plant materials can be located to complement the spatial organization of the trees.

In the vertical plane, trees can define space by two different means. First, the trunks of trees can suggest the edges of space, particularly when they are massed or

Figure 11–27
Trees can be used to create walls and ceilings in outdoor spaces.



*One system for categorizing these functions was developed by Gary O. Robinette in his book, *Plants, People, and Environmental Quality* (Washington, D.C.: U.S. Department of Interior, National Park Service, 1972), p. 56.

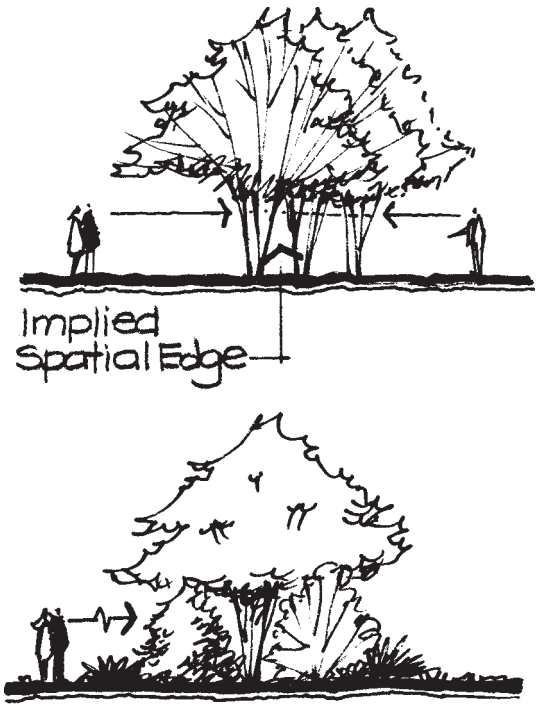


Figure 11–28
Tree trunks can be used to imply vertical planes in outdoor spaces.

lined up (top of Figure 11–28). The tree trunks can act like the columns in a building, subtly separating one room from another. Tree trunks only imply the edge of a space because views are not completely contained within the space. To create complete enclosure, smaller trees or shrubs must be used in association with the tree trunks (bottom of Figure 11–28).

The second way trees create space in the vertical plane is by means of their foliage mass. Two different levels of spatial enclosure are possible (Figure 11–29). Large trees provide walls of foliage that define the upper limits of outdoor spaces, while smaller trees create lower walls for enclosure at eye level. The residential site designer can work with these two planes to make varied degrees of spatial enclosure (Figure 11–30). Large trees are best for outdoor rooms where views below the tree canopy are desired, while smaller trees are appropriate where walls of foliage are needed at eye level. In creating vertical enclosure of outdoor space with trees, the designer should decide whether year-round or seasonal enclosure is desired. Evergreen trees should be used for year-round

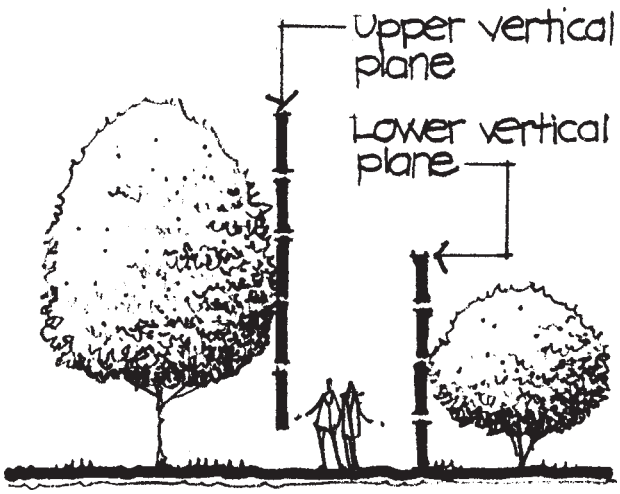


Figure 11–29
The foliage mass of trees can define the vertical plane in outdoor spaces at different levels.

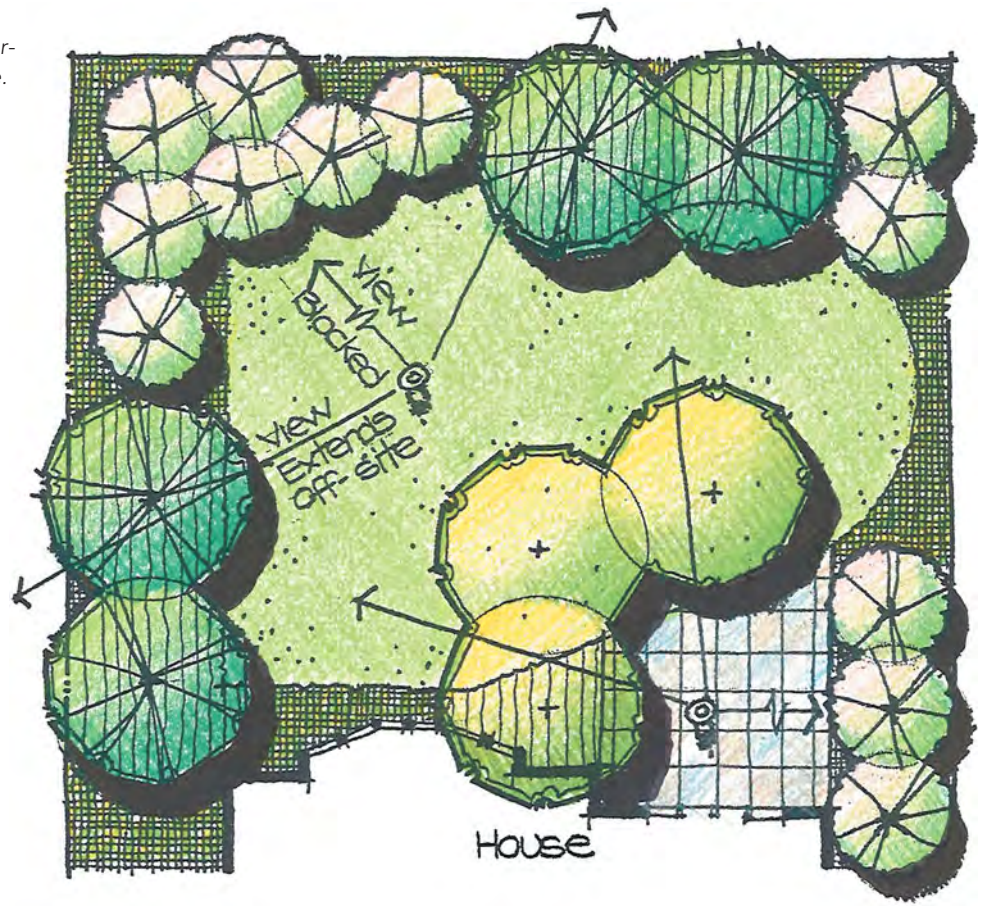


Figure 11–30
Different sizes of trees create varied degrees of spatial enclosure.

enclosure whereas deciduous plants can be used to enclose a space during the late spring, summer, and early autumn months of the year.

Trees can also be used to furnish ceilings over outdoor rooms. As discussed in Chapter 2, a vegetative ceiling can provide a sense of vertical scale in an outdoor space, a feeling of comfort, and shade. These uses are frequently desirable where people spend time sitting and socializing in the outdoors, such as in the outdoor entry foyer, the outdoor living and entertaining space, or other sitting and gathering spaces. The spacing of the trees, density of the canopy, and height of the canopy above the ground are variables that influence the degree of overhead enclosure in outdoor space (Figure 11–31).

In defining space with trees, thought should be given to coordinating their placement with the desired design theme and grading of the ground plane. Trees should reinforce the shapes in the form composition by extending the lines and forms of the ground plane upward into the third dimension. Trees should not be scattered indiscriminately in a design but should be massed together so their trunks and foliage mass reinforce the base plane patterns. Figure 11–32 shows both a bad and a good example of coordinating trees with the underlying ground plane. Trees should be placed in a structured alignment in an axial design theme and in a flowing composition in a curvilinear theme (Figure 11–33).

Outdoor space can be established with other plant materials. Tall shrubs that are 6 feet or more in height enclose space at a lower level than trees. Tall shrubs can be used by themselves to create space or in association with trees (Figure 11–34). The tall shrubs can function like walls below the ceiling of the canopy overhead.

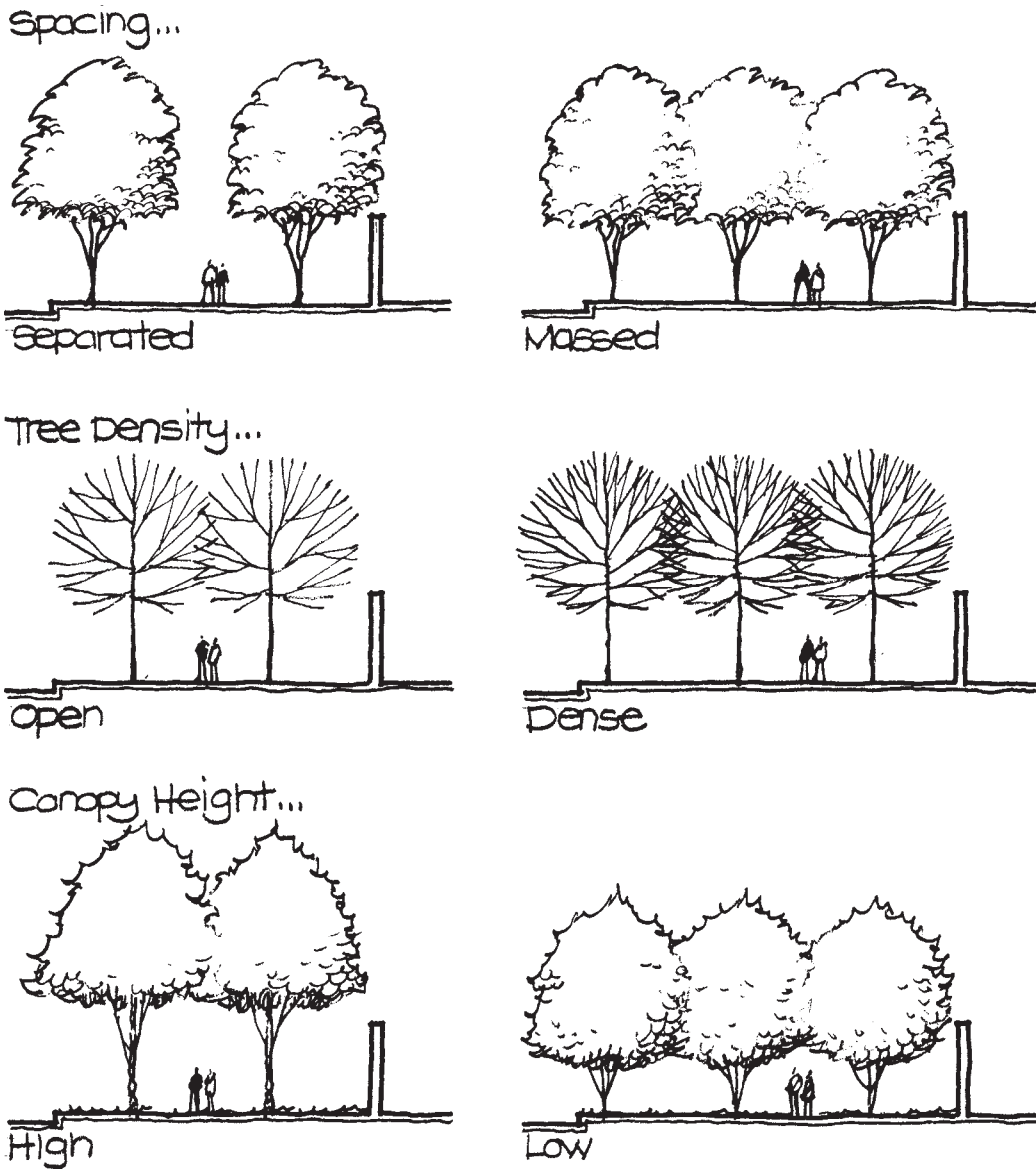


Figure 11–31
Different variables influence how tree canopies create the overhead plane of outdoor space.

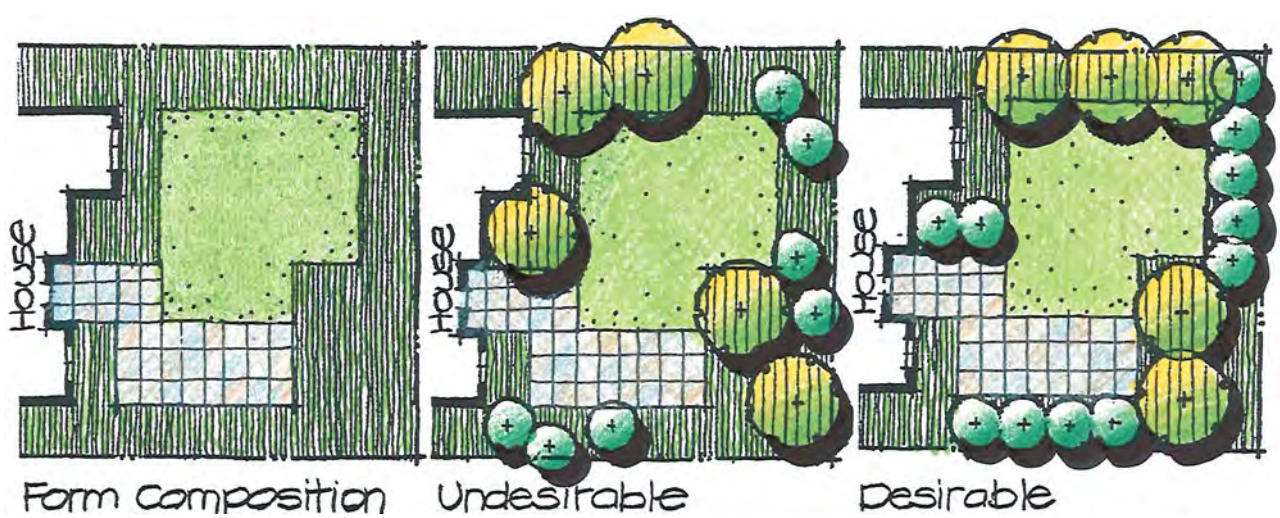


Figure 11–32
The location of trees should be coordinated with the overall design theme.

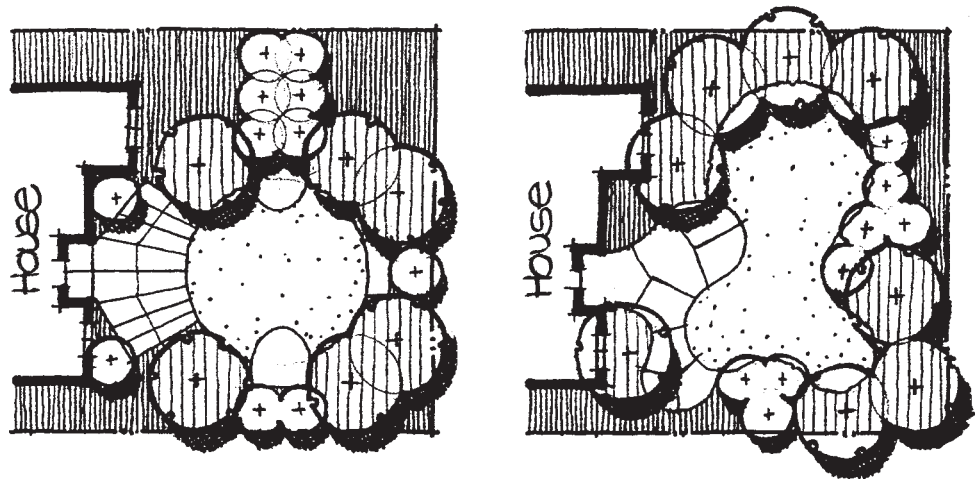


Figure 11–33
Different design themes and corresponding tree locations.

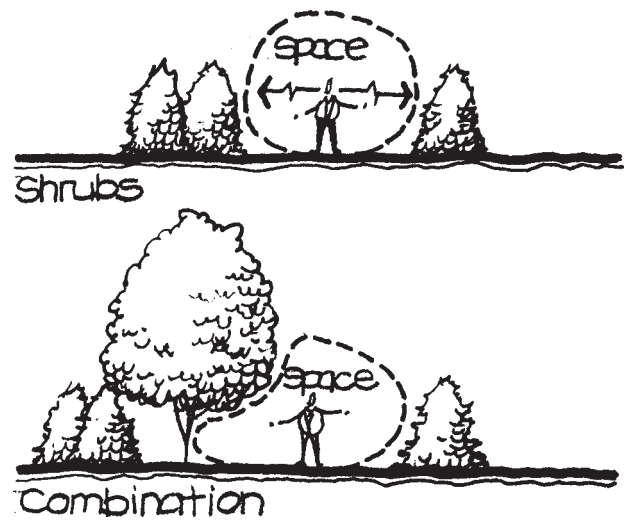


Figure 11–34
Tall shrubs can be used by themselves or in combination with other plants to enclose space.

Low shrubs, between 1 foot and 3 feet high, can also be used to indicate the limits of outdoor space much like low walls, which define a space's edges without limiting views outward to other areas of the landscape (Figure 11–35). This is desirable treatment for outdoor living and entertaining spaces or entry foyers where partial containment with views to other points in the landscape gives a sense of separation without

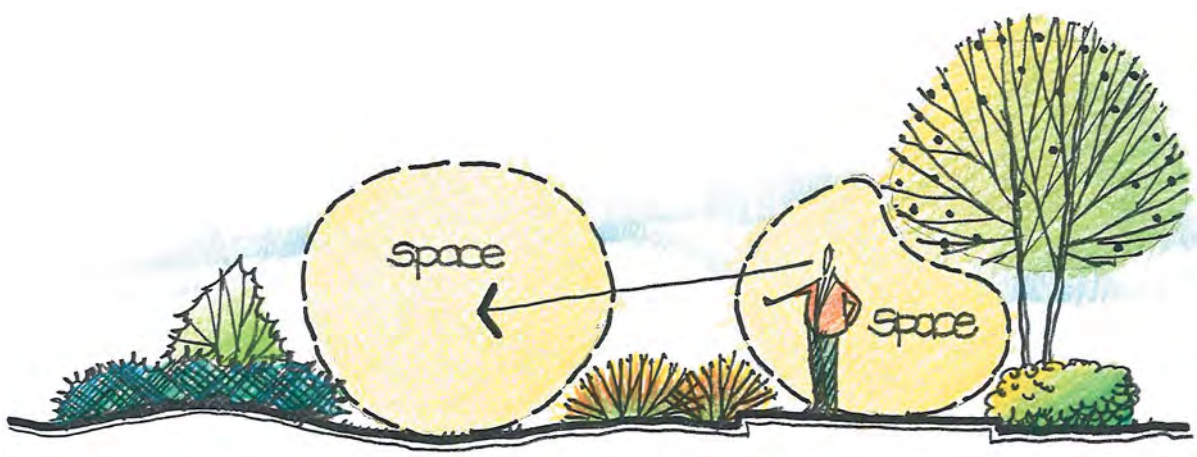


Figure 11–35
Low shrubs imply spatial separation without screening views between adjoining spaces.

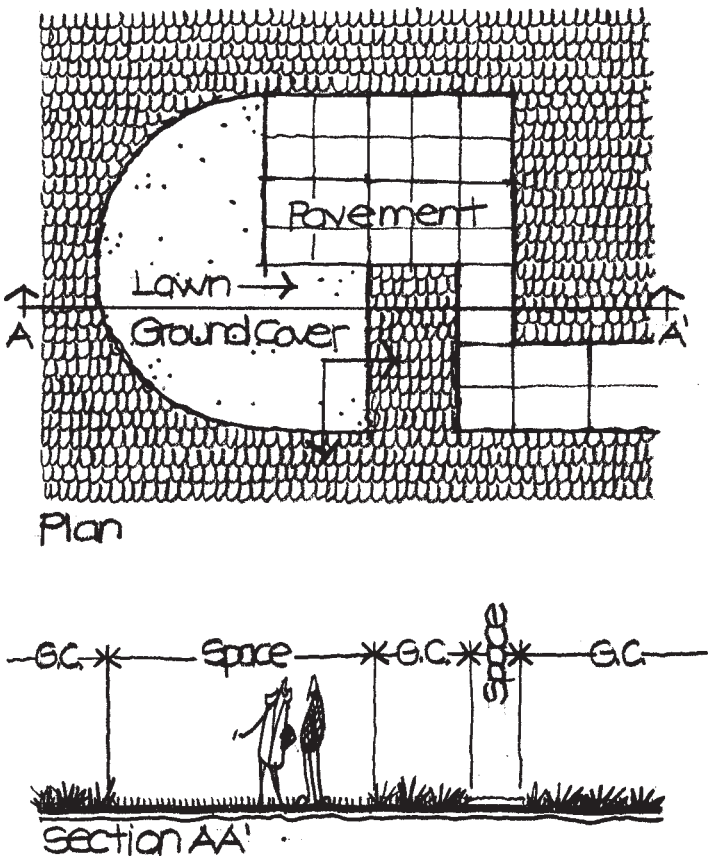


Figure 11–36
Ground cover can imply the edges of outdoor space.

complete enclosure. Partial containment is often a good balance between complete enclosure (with no views) and no enclosure (with unlimited views in all directions).

Ground cover, spreading plants growing to a maximum height of 1 foot, low annuals, and perennials can likewise imply the edges of space. A bed of ground cover next to an area of lawn or pavement can imply an edge to a space (Figure 11–36). The change in material and the slight height of the ground cover suggest where the outdoor room stops on the ground plane. The shape and edges of ground cover beds should be consistent with the overall design theme of the site (Figure 11–37).

Screening and Directing Views Another architectural use of plant materials on a residential site is to screen and enframe views. In relation to other design elements, plant materials have several advantages and disadvantages for screening and directing views. In comparison to steep slopes or berms, plant materials take up less room and provide more height (Figure 11–38). Therefore, plant materials are usually better than slopes or berms for screening views on a small residential site. However, plants occupy more room than a fence or wall. Plant materials also require some time to reach mature height and may vary in their density with the season if they are deciduous. Plants also require proper conditions for growth. Walls and fences, on the other hand, give instant screening and separation.

On a residential site, plants can screen undesirable off-site views to neighboring driveways, backyards, and storage areas or to unsightly on-site elements such as an air conditioner, vegetable garden, and so on. Plants may also give a sense of privacy by screening views to the neighbor's outside living and entertaining space or recreational lawn area (Figure 11–39). Evergreen plant materials are usually more desirable for screening views than deciduous plants because they furnish year-round screening,

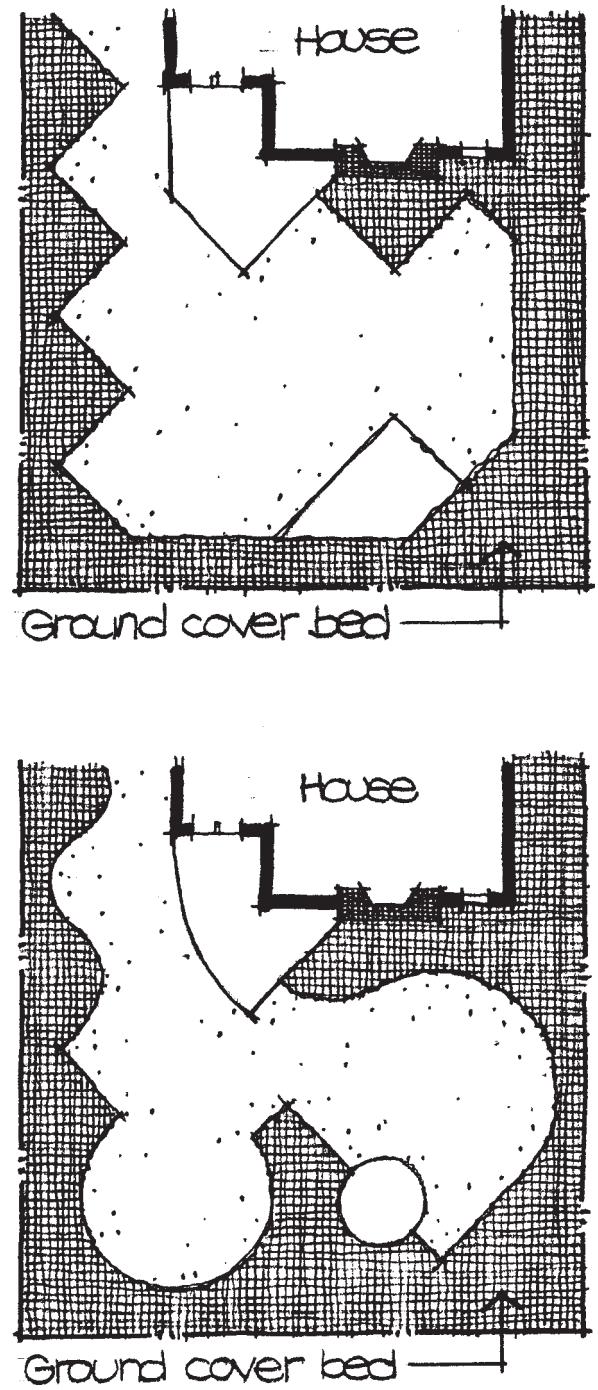


Figure 11–37
The edge of ground cover beds should be coordinated with the overall design theme.

though a mixture of evergreen and deciduous plants provides the most visual balance and interest.

Both foliage mass and tree trunks can be used to enframe views (Figure 11–40). Again, they should be coordinated with other elements to enhance their ability to direct views to selected areas or points of the landscape.

Aesthetic Uses

Plant materials can be used to provide several aesthetic functions on the residential site, including providing visual accents and complementing the architectural style of the house.

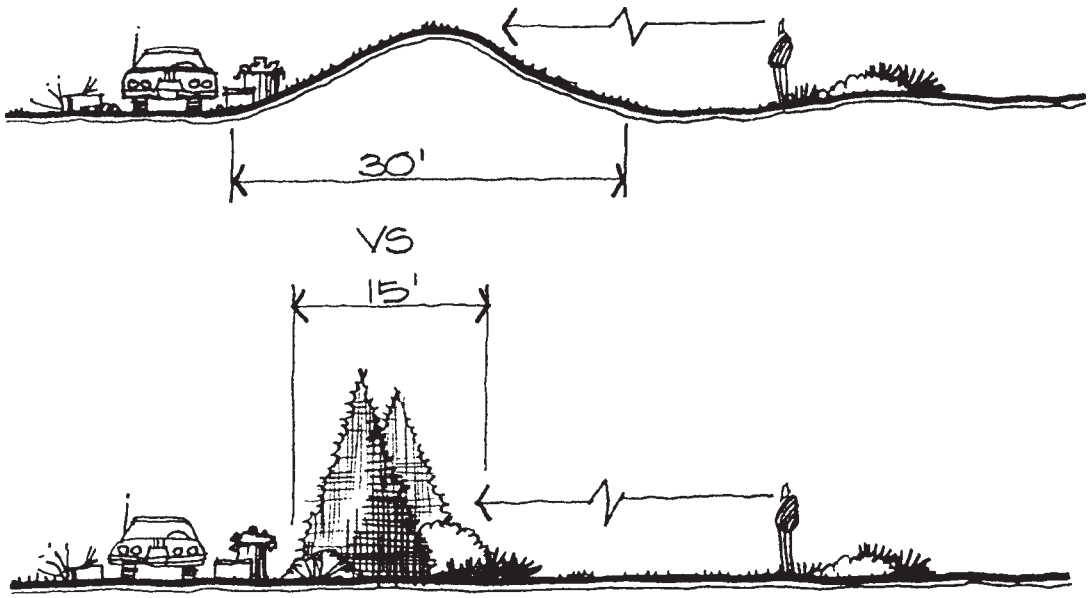


Figure 11–38
Plant materials take up less space than earth mounds in screening views.

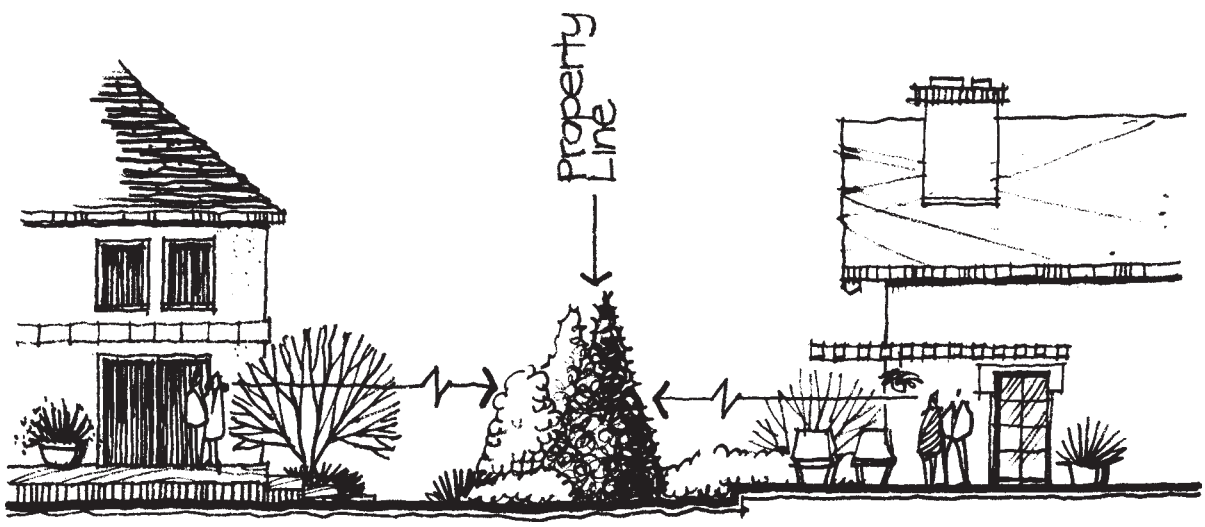


Figure 11–39
Plant materials can provide privacy between adjoining neighbors' living and entertaining spaces.

Providing Accents The residential site designer should have established the location of focal points or accents of the design composition while preparing the functional diagrams. During preliminary design, many of these focal points can be established with plant materials that stand out in contrast to their surroundings due to size and form.

1. *Size.* Plant materials that are larger and especially taller in size than surrounding plants act as visual accents. Trees can act as dominant plants when they are the largest element among other plants (left side of Figure 11–41), or when they are placed by themselves in an open lawn area (right side of Figure 11–41). Tall shrubs or ornamental trees can also serve as accents when they are larger than surrounding plants in a group (Figure 11–42). In all these situations, care must be exercised not to use plants that are too large

Figure 11–40
Tree trunks and foliage mass can enframe a view to a selected point in the landscape.



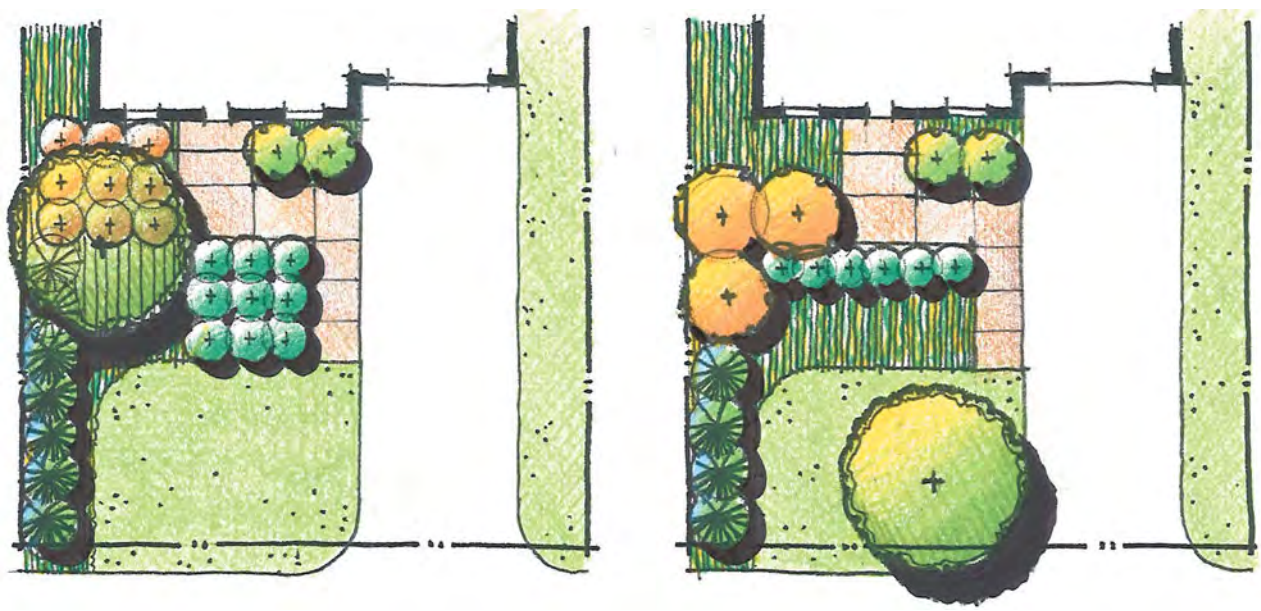


Figure 11–41
Examples of trees used as dominant elements based on size.

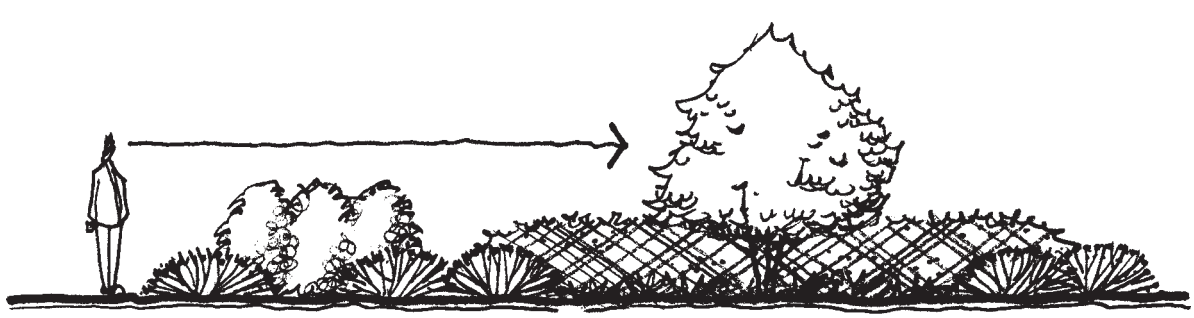


Figure 11–42
Plants that are larger than surrounding ones in a mass serve as accents.

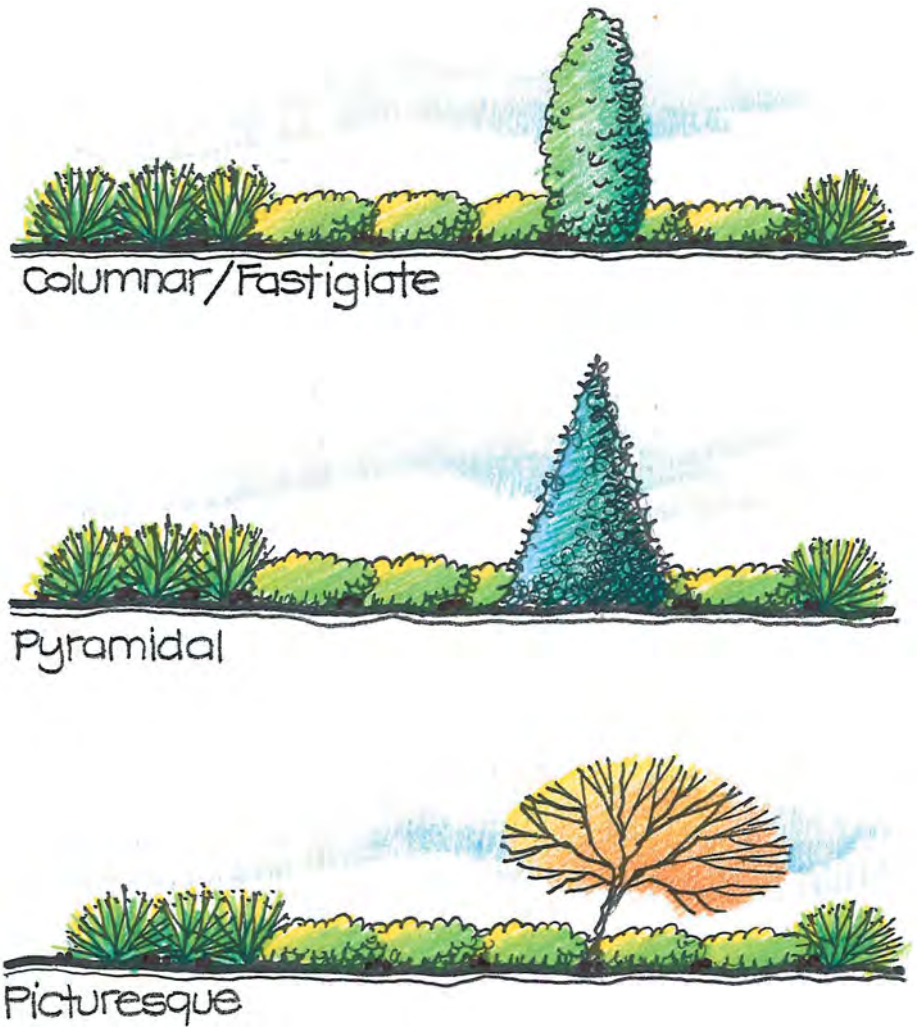


Figure 11–43
Columnar/fastigiate, pyramidal, and picturesque plant forms can be used as accents in a planting composition.

for their context. Plants that overpower their setting can make all the other elements of a design seem too small.

2. *Form.* Plant forms that differ from a neutral rounded form are commonly seen as accents in a design. Focal points are most easily created by plants that are columnar/fastigiate, pyramidal, or picturesque in form (Figure 11–43).

Ornamental trees work especially well as accents based on their size and form. Ornamental trees are small- to medium-sized trees (10- to 15-feet height and spread) that have appealing form, color, and texture throughout the year, such as crab apples (*Malus* sp.), dogwoods (*Cornus* sp.), hawthorns (*Crateagus* sp.), or olives (*Olea* sp.). Ornamental trees can be located at strategic points such as near the entrance walk, near the outdoor living and entertaining space, or at a distant point in the yard (Figure 11–44).

Often, accent plants are best placed at prominent points of planting beds, corners, areas that will be seen from many different vantage points, or the end of an axis (Figure 11–45). The shape of these areas (form composition) and the placement of accent plants within them (spatial composition) need to be carefully coordinated during preliminary design. The organization and shape of outdoor spaces must allow the accent plant to be fully expressed.

Complementing the House Another aesthetic use of plant materials is to complement the architectural style of the house. Forms, lines, and colors of the house can be

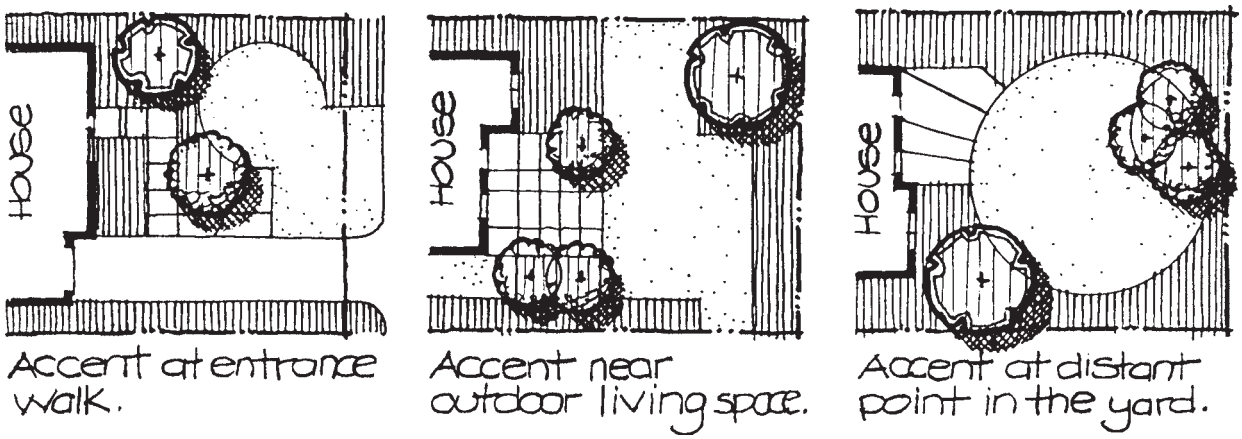
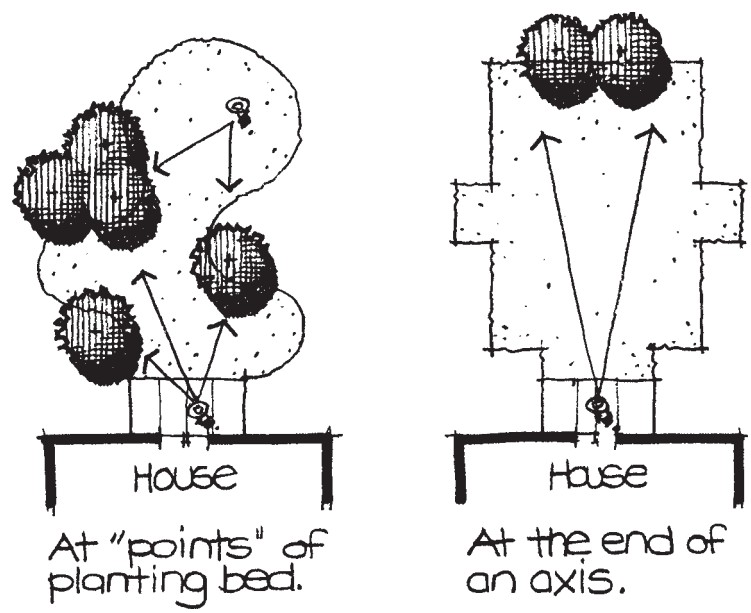


Figure 11–44
Examples of ornamental trees used as accents at strategic points of the site.

Figure 11–45
Accent plants should be placed at prominent points within the design.



echoed or repeated in the site with plants. For example, the horizontal mass and lines of a one-story house can be carried into the adjoining site with a mass of plants that continues the horizontal line (top of Figure 11–46). Or a house with numerous peaks and gables can be complemented with a grouping of fastigiate and pyramidal plant forms (middle of Figure 11–46). Sometimes, it is desirable to contrast the architecture with plants of opposite forms (bottom of Figure 11–46).

Engineering Uses

Engineering uses of plant materials on a residential site include controlling erosion, directing pedestrian and vehicular circulation, and screening glare from reflective surfaces.

Controlling Erosion Plant materials can be used on steep slopes or areas of loose soil to minimize erosion. Ground covers and plants with dense root systems are especially valuable because their roots hold the soil in place. The vegetative cover of plant leaves also protects slopes from the potential damage of precipitation striking the ground and from the eroding effect of blowing wind. Plant materials can be used on

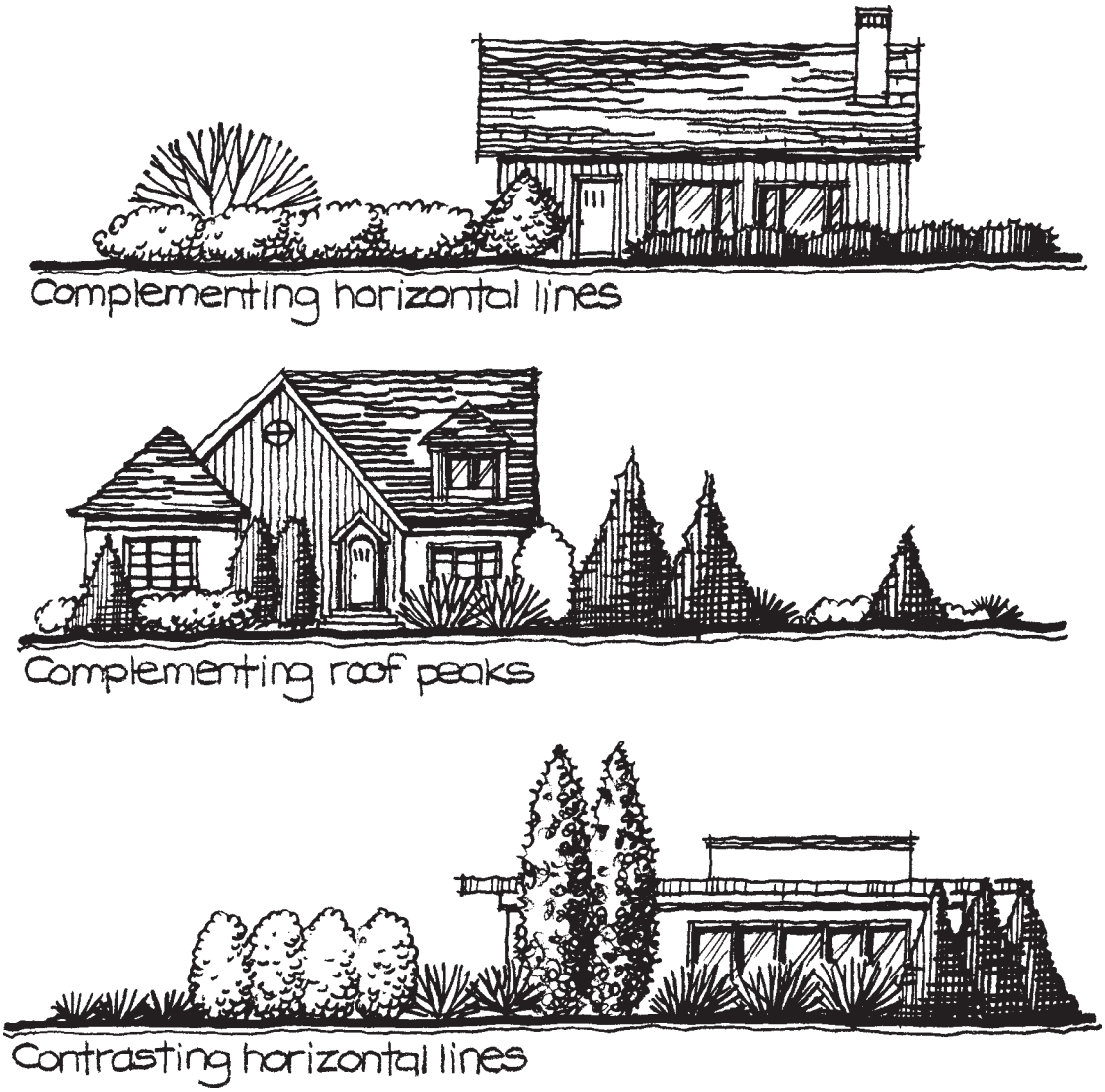


Figure 11–46
Plant materials can complement or contrast the architectural style of the house.

loose soil or slopes up to 2:1 or 50 percent in steepness. Even plant materials have limited usefulness in preventing erosion on slopes that are steeper than this.

Directing Circulation Plant materials can be used as walls to direct how and where people and vehicles move on a residential site. One good application of this is along the front entrance walk leading from the driveway to the outdoor entry foyer. A mass of low plants can contain people on the walk as well as reinforce the direction of movement (Figure 11–47). A similar use of plants is along the driveway to keep vehicles on the driveway surface (Figure 11–48). However, plants should not crowd the driveway in such a way as to hinder the opening of car doors, or the removal and piling of snow in northern climates.

Screening Glare Plants can also minimize and screen glare from reflective surfaces. One way is to shade reflective surfaces such as cars or water. Glare is eliminated when the sun cannot strike the reflective surface directly. Glare can also be screened when plant materials are placed between the reflective surface and the viewer (Figure 11–49). One possible application of this is the placement of a low-to

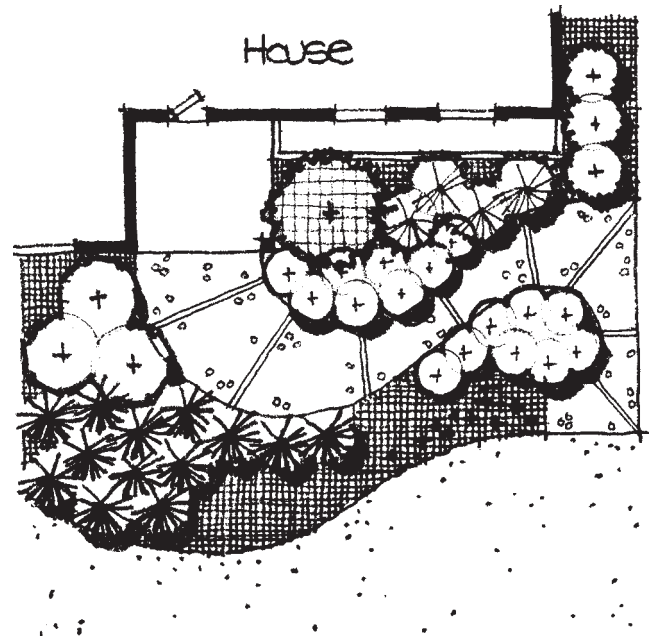


Figure 11–47
Plant materials can direct pedestrian movement along the entrance walk.

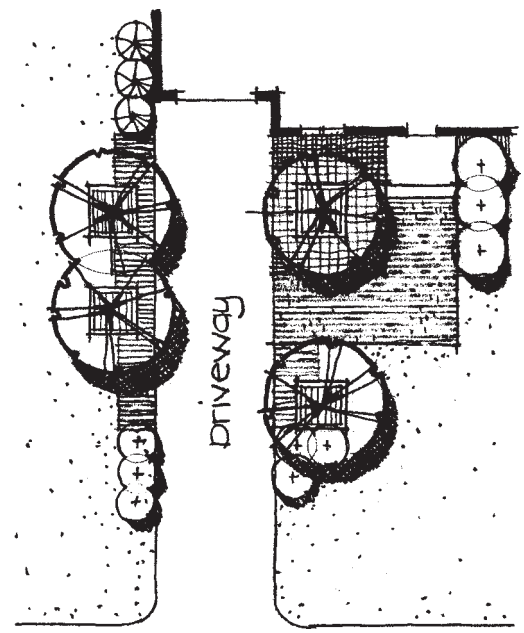


Figure 11–48
Plant materials can direct vehicular movement along the driveway without limiting pedestrian circulation.

medium-height hedge between a swimming pool or large panel of glass windows and an outdoor sitting space.

Planting Design Process

The process of designing with plant materials during preliminary design is one of studying and using plants in a broad-brushed manner. Plants are located to fulfill architectural, aesthetic, engineering, and environmental functions while complementing the overall intended character and style of the landscape design. Consideration is also given to the desired visual characteristics of plants, including size, form, foliage color, and foliage texture. At the conclusion of preliminary design, plants should be located in general masses within the design and identified in generic terms such as "shade tree," "low evergreen shrubs," or "perennials." The identification of plant ma-

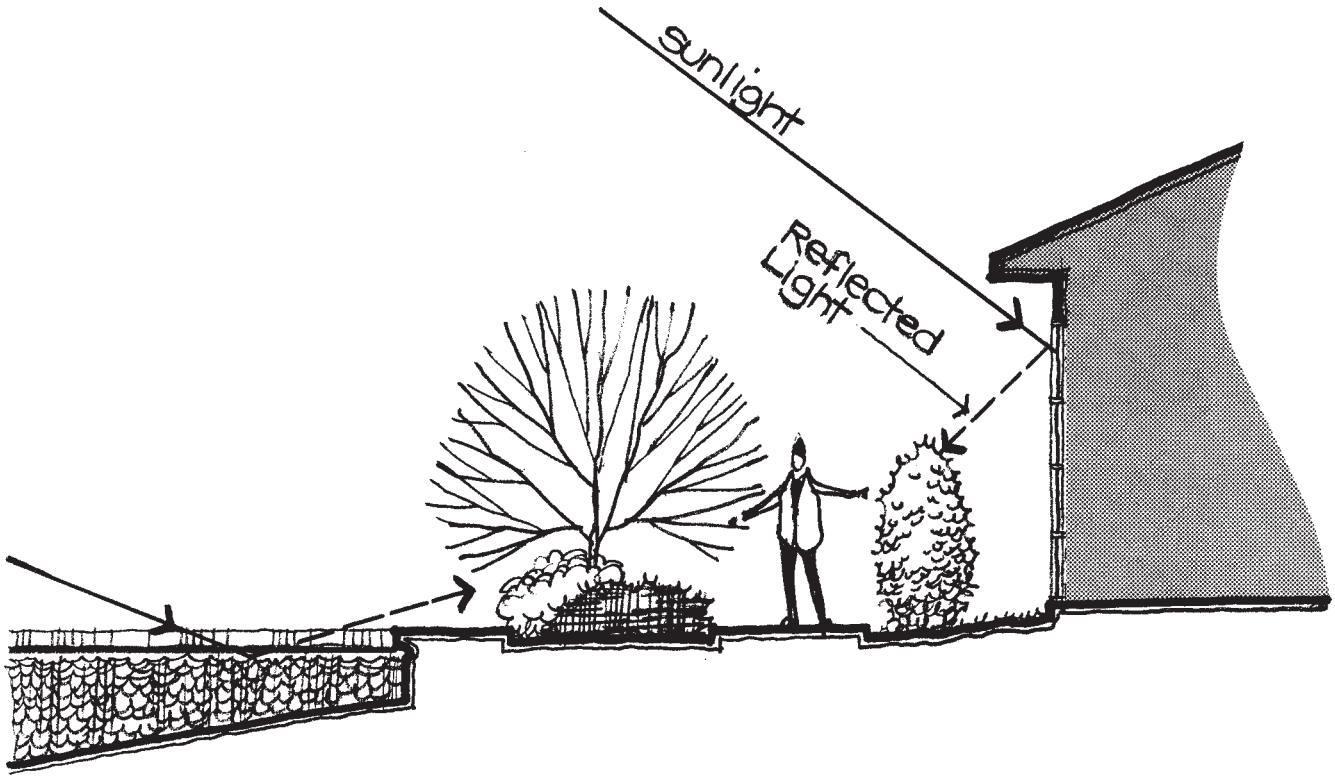


Figure 11–49
Plant materials can screen the reflection from glass, water surfaces, and so on.

terials by specific common or botanical names usually waits until the preparation of the master plan.

It is critical to understand that the process of designing with plant materials is an integral part of the overall design process. Planting design is not a separate activity that occurs by itself, nor is it simply the procedure of picking plant names from catalogs or other available sources. Plant materials should first be studied during the development of functional diagrams and then in all of the following steps of the design process. During preliminary design, plants should be considered in terms of both form composition and spatial composition. The design of forms on the ground plane and the related consideration of three-dimensional space must occur with plants in mind. For example, Figure 11–50 shows two alternative proposals for a backyard (also see Figure 11–32). In each instance, the ground forms, space, and plant materials are all coordinated and studied simultaneously. Note how the ground forms and tree locations reflect each other in all of these examples.

To organize and select the plants in preliminary design, the designer should start with general concepts and then add detail through a series of refinements. The first step should be to establish the structure of the planting design in a loose, freehand drawing (Figure 11–51). At this stage, the main concern is to determine the location of trees, shrub masses, and general ground cover areas for definition of space, shade, screening, visual accent, and so on. Trees are usually located first because their relative large size has the greatest impact on the design. Next, shrub masses are added to complement the trees and to fulfill additional design objectives. Again, this should be done in direct coordination with form and spatial composition. One may need to work back and forth between ground forms and plants, first adjusting one, then the other, so they work together compositionally.

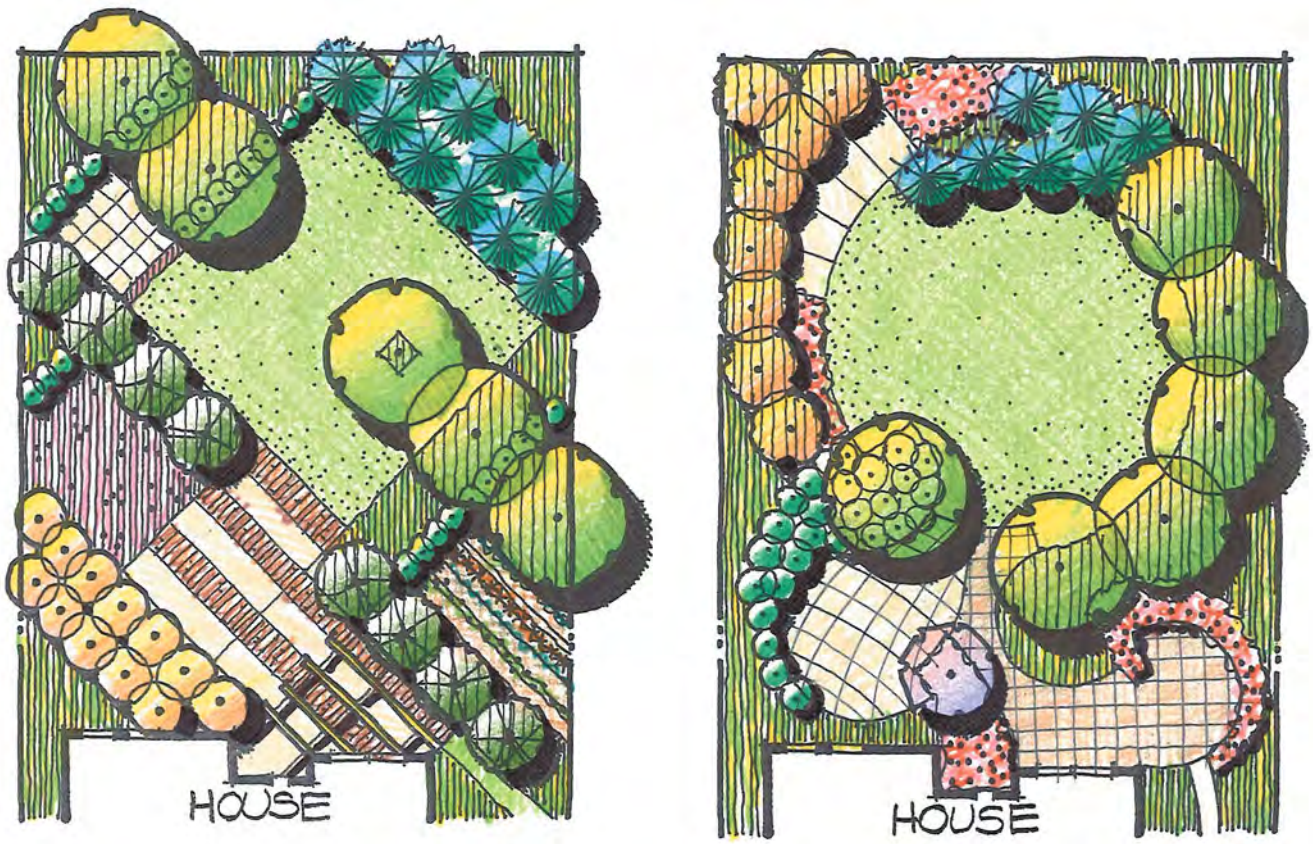


Figure 11–50
The location and arrangement of plants must be directly coordinated with the form and spatial composition of a design.

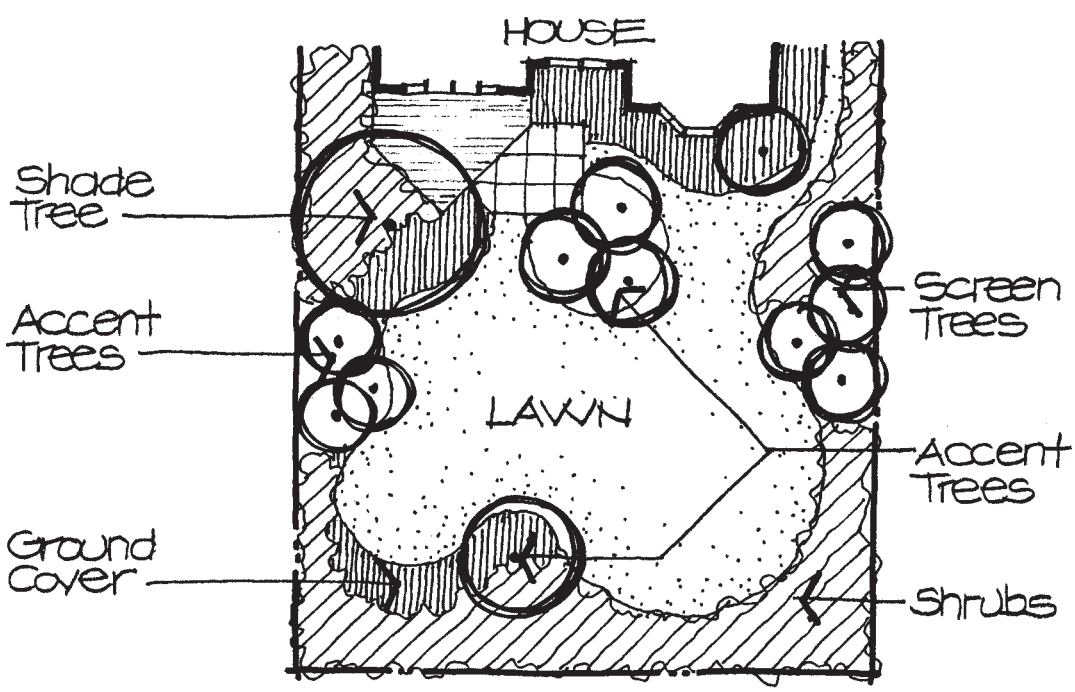


Figure 11–51
First, establish the overall structure of the planting with trees and general shrub masses.

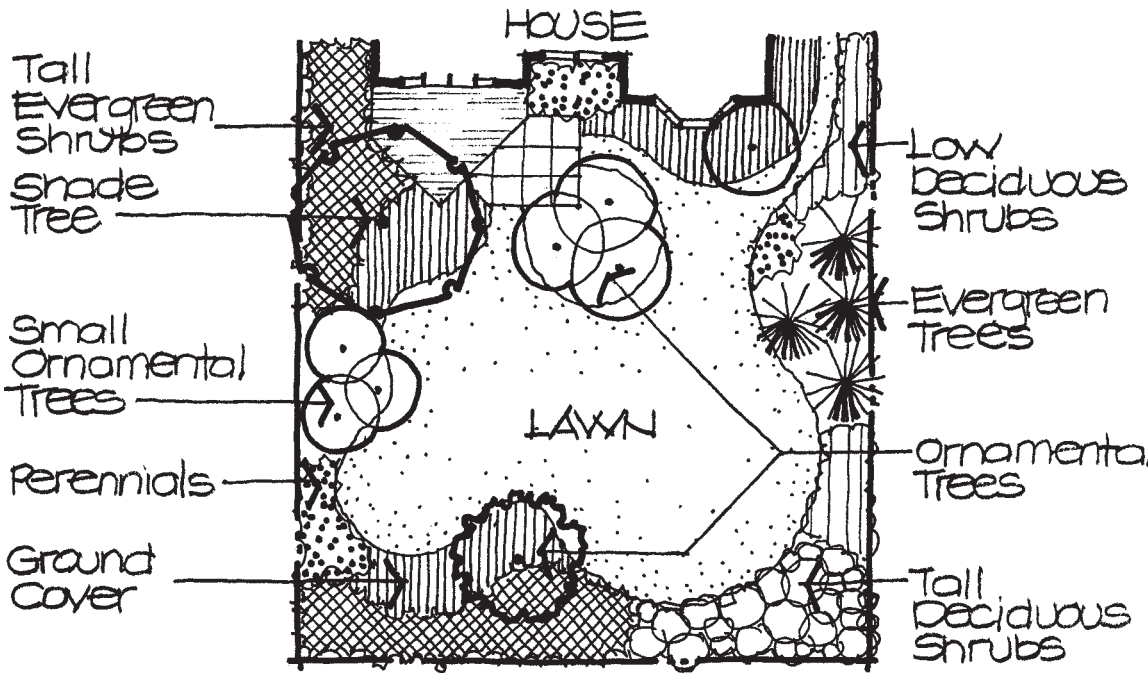


Figure 11–52
Second, refine tree locations and subdivide shrubs into more specific masses.

The second step of planting design builds on the first by studying the organization of plants in slightly more detail (Figure 11–52). The location and size of trees are refined as necessary. In addition, shrub areas are subdivided into generic types such as "deciduous," "coniferous evergreen," and "broad-leaved evergreen." Ground cover areas are likewise given more specificity by identifying general areas of ground cover, perennials, and annuals. Shrubs, ground cover, perennials, and annuals are graphically shown only by outline. The height of these plants is also studied and proposed at this stage, allowing plants to be given labels such as "tall evergreen shrubs" or "small ornamental tree." The intent is to visually link (interconnect) the primary plants and to provide a composition of varied heights. The designer has now established the skeletal framework of the planting design.

The next step should be to study the relative foliage color and texture of the plants. This can be done by adding graphic value with lines or color to the drawing in Figure 11–53. The objective is to create a tapestry of varied colors of green along with a range of textures. Plants with dark green foliage are typically used as backgrounds or as visual "anchors" below the canopy of lighter or more open deciduous trees. Plants with light green foliage are best used as foreground plants or as contrasting elements in relation to darker ones. Coarse-textured plants are commonly located to serve as accents while fine textures are used for contrast. After completing this step, the designer has defined the visual characteristics (size, color, and texture) of all the plants in the design and has coordinated them to fit appropriately into the overall scheme. It should be pointed out that specific plant names have not been considered—only plant characteristics.

The final step in the planting design process is to complete the drawing of the plants on the preliminary design (Figure 11–54). All the primary plants, such as trees, are drawn as single plants or masses of single plants, while shrubs are shown as large undifferentiated masses. An attempt should also be made to use graphic symbols that represent the visual character of the plants. For example, dark foliated plants should ideally be drawn with a darker value while coarse-textured plants can be given a

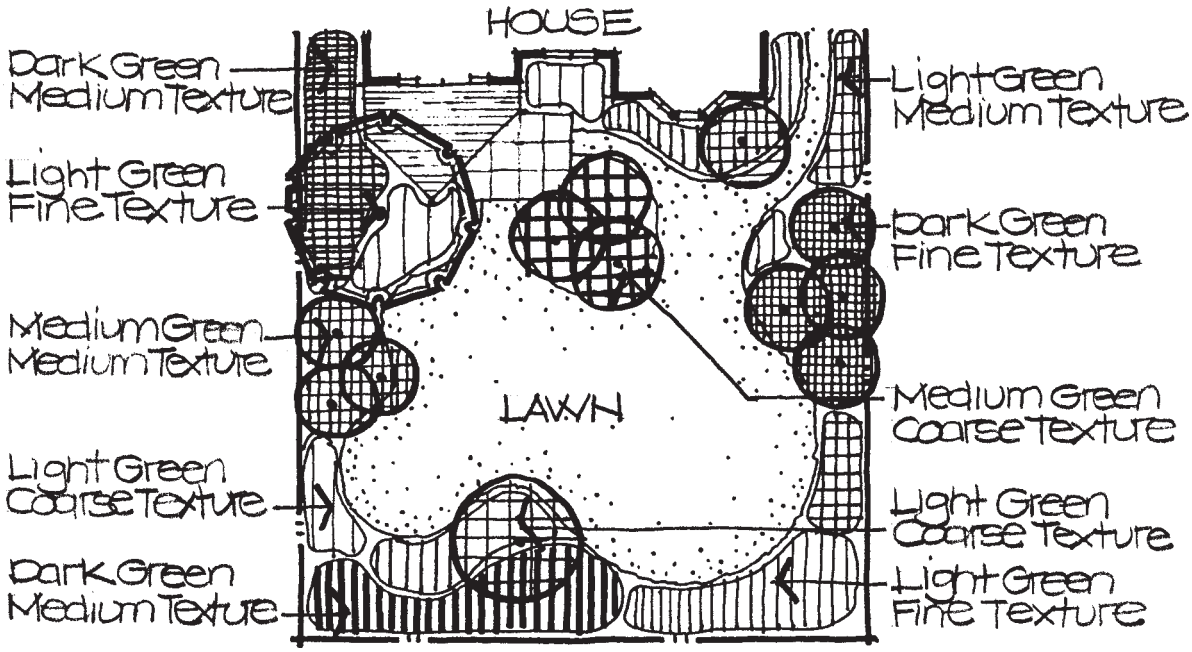


Figure 11–53
Third, select the foliage color and plant textures.

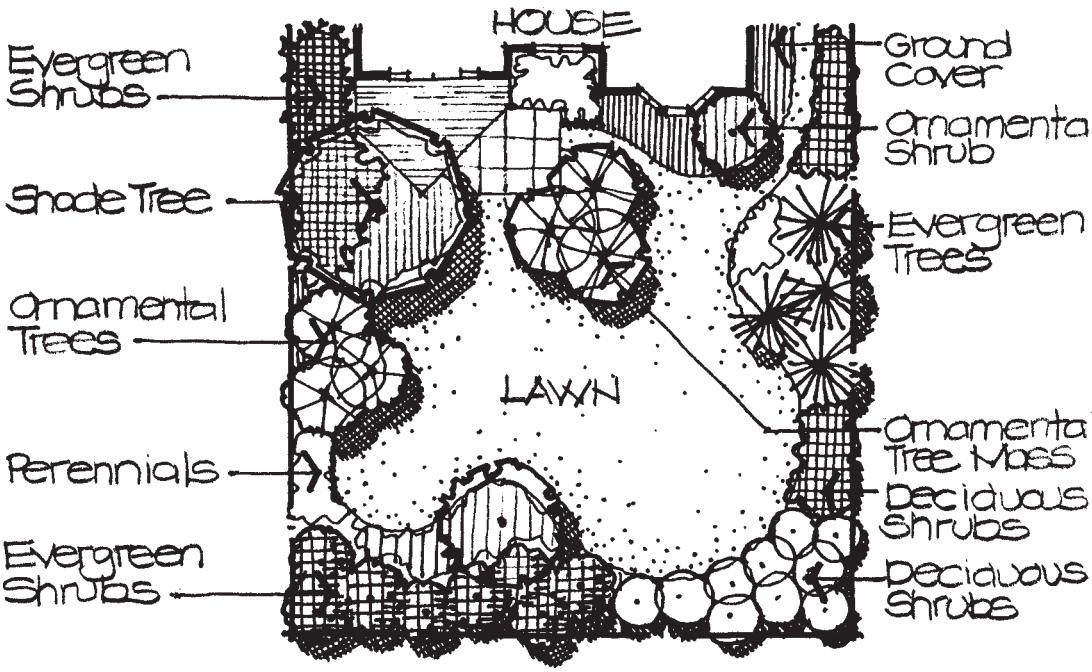


Figure 11–54
Fourth, draw the plants in a semirealistic fashion.

rougher outline. Nevertheless, good graphic techniques should prevail, making it likely that not all characteristics can be illustrated. As is typical of preliminary design, specific botanical or common plant names are not identified or included. This occurs during the development of the master plan.

Planting Design Guidelines

There are a number of guidelines that the residential site designer should consider when designing with plant materials in preliminary design. Some of these were covered

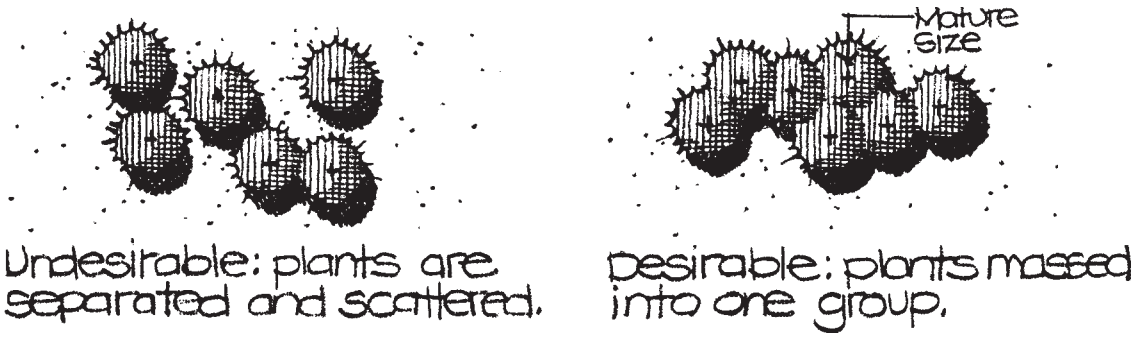


Figure 11–55
Plants should be organized in masses.

in the section on design principles in Chapter 9. The reader is urged to review the various techniques for establishing unity, including mass collection, dominance, repetition, interconnection, and unity of three.

Use Plants in Masses Perhaps the most fundamental guideline of planting design is that plants should form a continuous mass when they reach their mature size (Figures 9–10 and 11–55). Plants that are grouped together are more visually unified (the principle of mass collection) than those that are scattered about as individual elements. Massed plants are often healthier, too, because they protect one another from sun and wind.

Furthermore, it is desirable to mass plants so they form groups of multiple plants of the same species. Masses of plants, whether woody, perennial, or annual, should not be composed of numerous singular plants as depicted on the left side of Figure 11–56. Rather, plant masses should be composed of subgroups of numerous plants of the same species, as seen on the right side of Figure 11–56 (also see Figure 9–11). Single plants of a species can be used, but should be reserved for carefully placed accents rather than being located throughout a plant mass.

Organize Plants in Layers Another concept for planting design is to think about and use plants in both vertical and horizontal layers. Studying plants in layers helps the designer to create outdoor rooms, to provide visual depth, and to establish engaging complexity in the landscape.

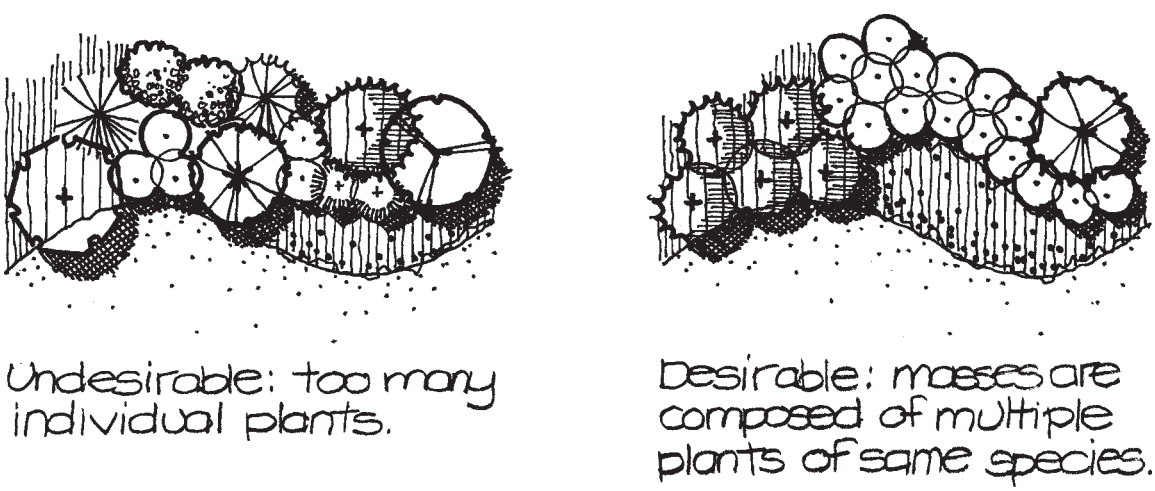


Figure 11–56
Plant masses should be composed of multiple plants of the same species.

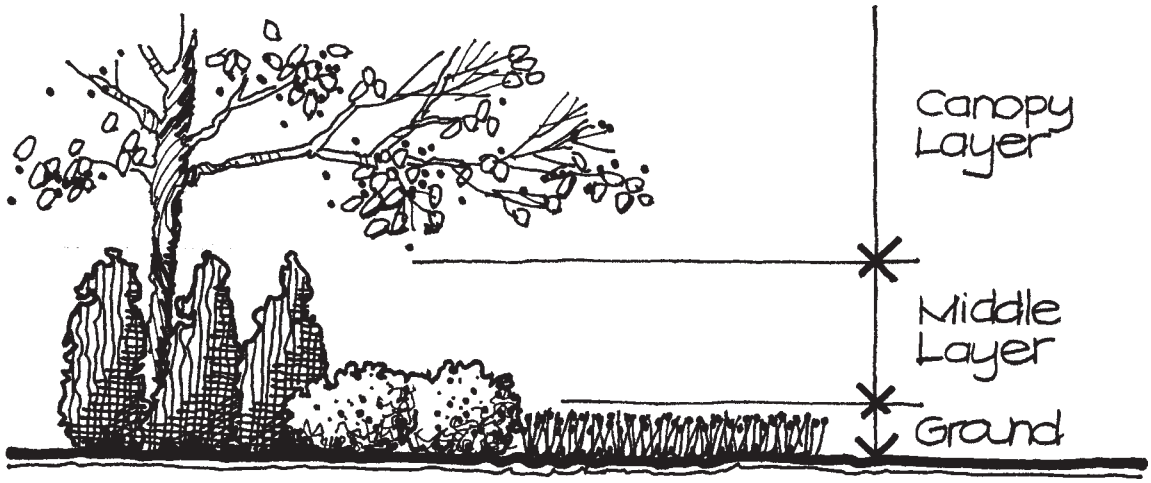


Figure 11–57
A planting design should be composed of three vertical layers of plants.

Vertically, plants typically occupy three primary layers: ground, middle, and canopy, as seen in Figure 11–57. These equate to the ground plane, vertical plane, and overhead plane of outdoor rooms described in Chapter 2. Most designs organize plants in each of these layers to provide the maximum visual interest in the vertical cone of vision and to create the strongest feeling of outdoor space. In some instances, one or more layers are intentionally omitted to create a desired spatial effect.

The ground layer is the floor or foundation of a planting design. It is usually defined with mulch, ground cover, and/or other low plants to establish a low "carpet" or "planting bed" where the majority of plants in the other two layers are located. The design of the ground layer occurs early in the planting design process, concurrently with form composition, because planting beds occupy one of the largest areas of the ground plane of a site. The size and shape of the ground layer are critical because the planting bed's configuration directly influences the location of plants in the two layers above.

The middle layer is the vertical plane of planting design and is established by both shrubs and tree trunks. This is the most important layer in terms of creating enclosure around outdoor rooms, as well as controlling views into, through, and from outdoor spaces. Shrubs and most trees are located within the planting beds, so there must be a coordinated study of the ground and middle layer of plants. It is common to work back and forth between these two layers, adjusting one to the other. Particular thought should be given to the height and density of plants in this layer as a means of affecting enclosure and views.

The canopy layer is the overhead plane or ceiling of outdoor space and is created by tree canopies. It is the layer that provides shade, controls the amount of light, and provides a sense of refuge in the landscape. The canopy layer is most needed over areas that are frequently used, such as those for entry, sitting, and social gatherings. A canopy layer may also be desired to extend the height of a planting area and to provide shade and protection over plants located below. Attention should be given to this layer's density and height above the ground.

It is easy to forget the presence of all three vertical plant layers when looking at a plan view of a design as in Figure 11–58. A trained designer should be able to interpret such a drawing and "see" the separate layers as they are portrayed in the bottom portion of Figure 11–58. All three layers need to be considered in concert with each other so they function as a coordinated composition. However, this does not mean that each layer has to exactly repeat the layout of the other two. Many successful

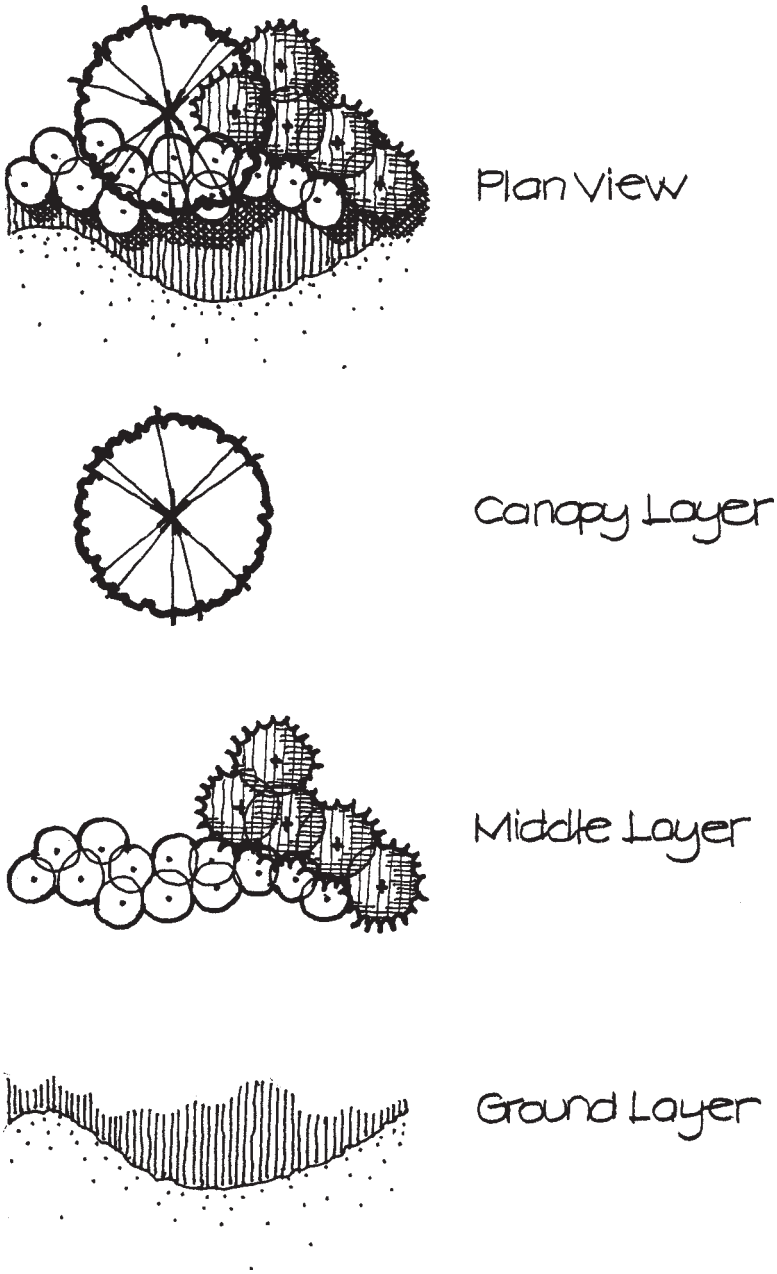


Figure 11–58
The three vertical layers of plants should be "seen" and considered when studying a design in plan view.

designs allow each vertical layer to be designed with a different configuration as long as it still fits the other two, as seen in Figure 11–59.

Horizontal layering of plants is also recommended within individual planting beds to furnish a feeling of depth and to create a tapestry of plant forms, colors, and textures displayed one against another. Where the size of a planting bed allows, foreground, middle ground, and background layers can be formed with different heights of plants, as illustrated in Figure 11–60. The foreground is frequently established with ground cover and/or annuals. The middle ground can be formed with low shrubs and perennials. The background is often composed of tall perennials, tall shrubs, and/or trees. It is frequently desirable to establish contrasts of color and texture among these horizontal layers so that each layer "reads" against the others. Too much similarity among the horizontal layers makes a plant composition that is one undistinguished mass of plants with little excitement.

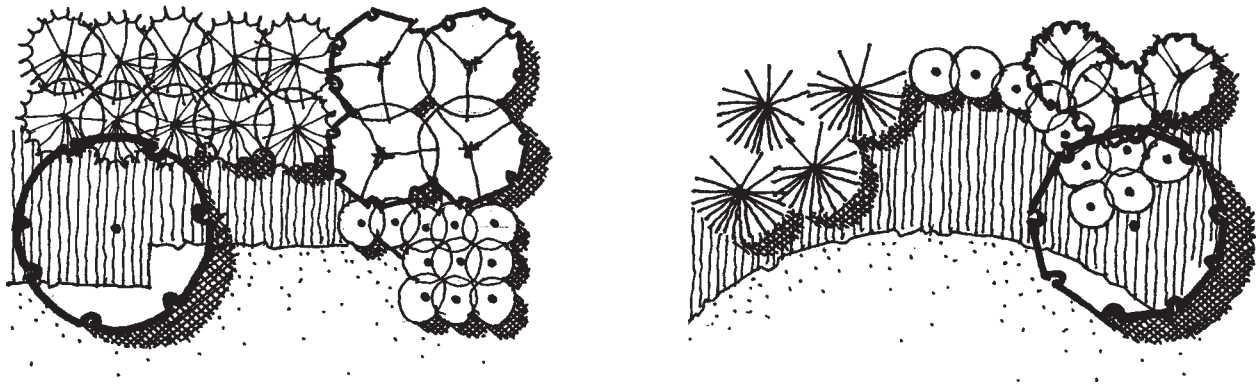


Figure 11–59
The three vertical layers of plants should be coordinated, but not repetitious of each other.

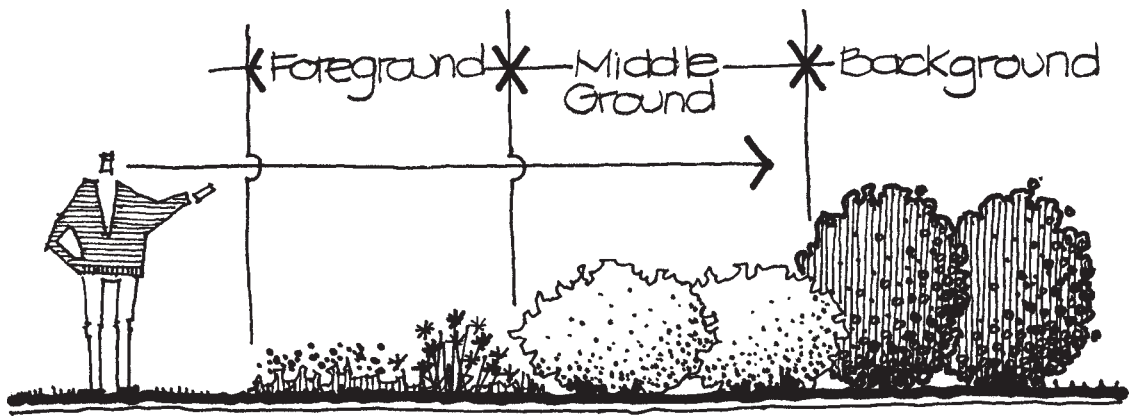


Figure 11–60
A planting design should be composed of three horizontal layers of plants.

The depth and composition of the different horizontal plant layers can remain similar in controlled spaces, but should vary from one area of a planting bed to another to create visual attraction, as indicated in Figure 11–61. Likewise, it is not desirable or even necessary to always have a foreground, middle ground, and background. Some planting areas may benefit from only one or two layers to create special visual effects, as in Figure 11–62.

Coordinate Plants with Overall Design Character The organization and selection of plants should conform to the overall style of the landscape design. Plant materials should not be arranged based on the designer's personal preferences for appearance but rather on a conscious effort to continue the design theme established early on in the design process. In doing this, the designer should be aware of three broad ways of organizing plants: (1) in rows and geometric blocks, (2) in drifts, and (3) in a combination of blocks and drifts.

Plants can be located in straight lines to form rows or placed in a series of parallel rows to form geometric blocks, as seen in Figure 11–63. Often the rows and blocks are linear and rectangular in nature. This method of organizing plants is a stylization of the agrarian practices of lining plants in rows for cultivation and irrigation. Rows and blocks of plants should be used in formal or axial designs where rectangular geometry prevails, as in Figure 11–64. This character of plants is also suitable for orthogonal modern designs or contemporary designs where rows of plants form a complex pattern of overlapping lines and forms, as shown in Figure 11–65.

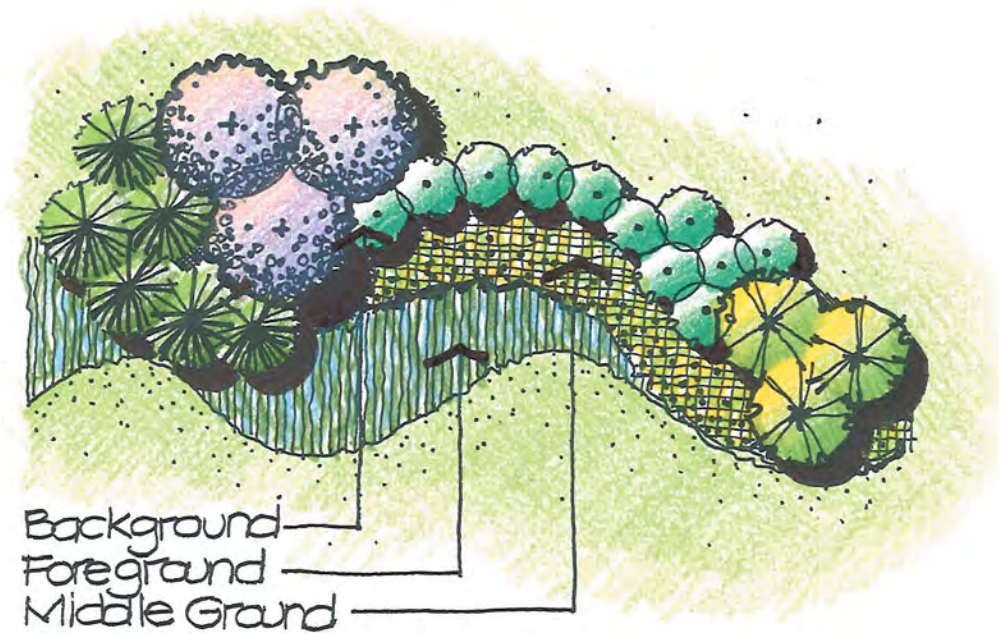


Figure 11–61
The three horizontal layers of plants may vary in depth throughout a planting bed.

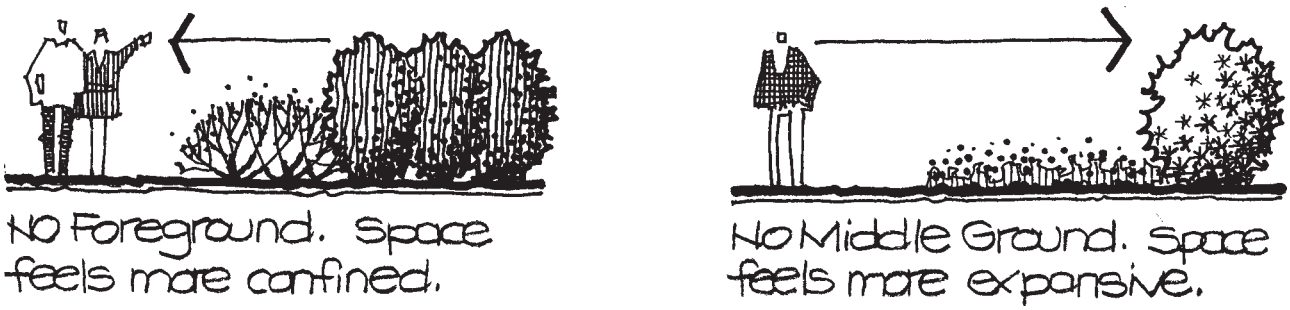


Figure 11–62
The presence of the three horizontal layers of plants may vary to create different spatial effects.

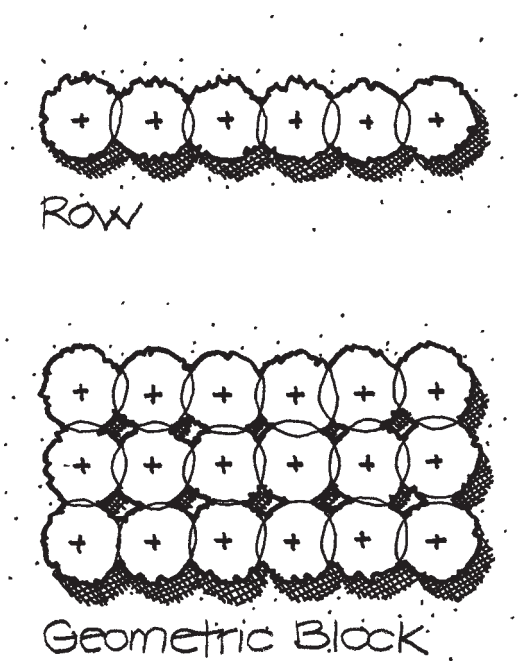


Figure 11–63
Example of rows and geometric blocks of plants.

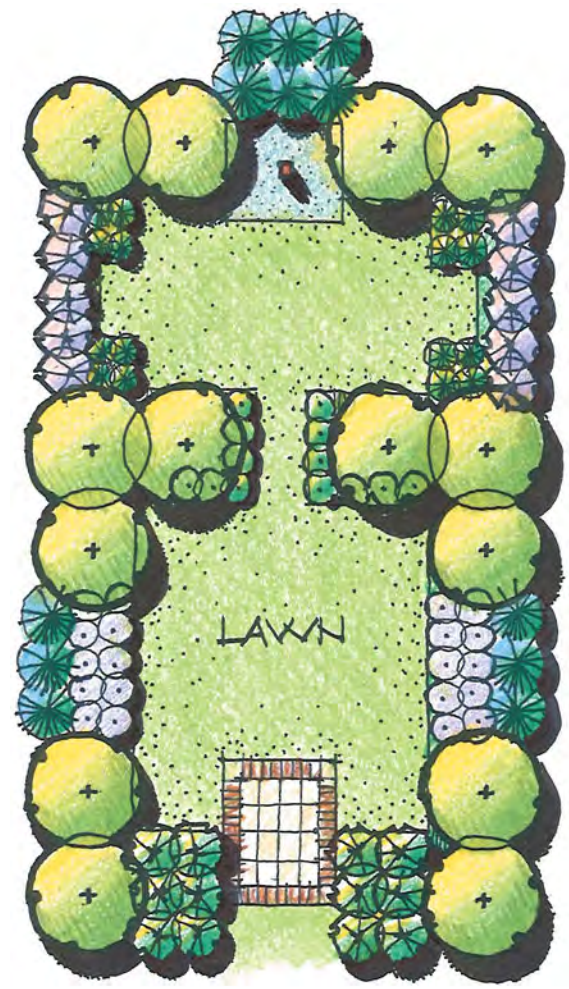


Figure 11–64
Rows and blocks of plants are appropriately used in formal designs.

The second general technique for arranging plants is in drifts. Drifts are amorphous, naturalistic masses of plants that are curved and/or irregular in their overall shape, as in Figure 11–66. Drifts of plants are an attempt to replicate the organization of plants in natural habitats and should be used to complement designs that are curvilinear, naturalistic, or cottage style, as in Figure 11–67. Typically, one drift of plants is layered on others to form a complex pattern of heights, colors, and textures within the planting area. Drifts of plants should not be used in formal and modern design styles.

The third way of arranging plants is a combination of blocks and drifts. With this technique, plants are typically placed in rows or blocks to form a frame around the outside of the planting area, as in Figure 11–68. Then plants, often perennials and/or annuals, are located in drifts within this architectural outline. The rows of plants give structure and order to the planting while the interior provides a sense of randomness. The two opposite styles are often attractive complements to each other. This approach to planting design is most appropriate to geometric design layouts.

Design for Different Seasons Another consideration for planting design is to plan for different seasons of the year. That is, one should study how plants will look by themselves and with surrounding plants throughout the year. Almost every geographic region has distinct seasons of one type or another. Spring, summer,

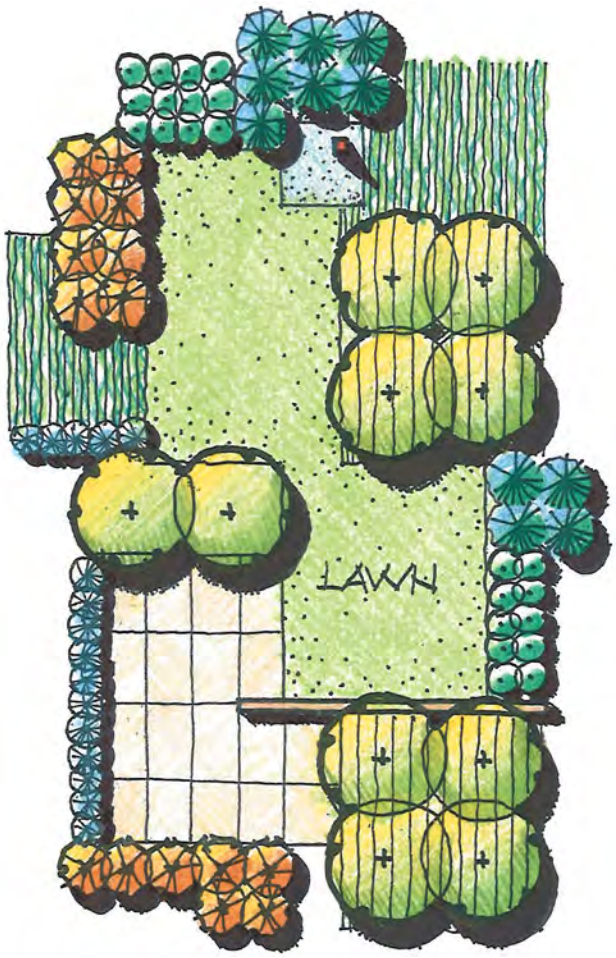


Figure 11–65
Rows and blocks of plants reinforce the character of modern and contemporary designs.

autumn, and winter are the most notable seasons. In addition, some regions experience recurring cycles in precipitation, humidity, and/or wind that establish seasonal variations.

It is important to consider these seasonal variations because plants are not static elements. Many plants respond to and often change with annual climatic cycles, even in regions that have a seemingly uniform climate. The appearance and health of plants is linked to seasonal fluctuations.

Thinking in terms of seasons has a number of design benefits. One is that it creates a planting design that is attractive throughout the year. A frequent mistake is to design exclusively for summer, a problem that is reinforced by countless plant pictures in books and magazines taken during the summer. In some northern regions, summer is, in fact, a relatively short three months or so out of the entire year. What about the other nine months? Does the landscape disappear then? A successful planting design is one that considers all seasons and creates a landscape that is equally as attractive in December as it is in June.

Another consequence of studying a planting design in multiple seasons is that it should help the designer select plants that more dramatically express the notable characteristics of each season. For example, plants that emphasize flowers in spring, attractive foliage texture in summer, vibrant color in autumn, and interesting trunk and branch structure in winter highlight important qualities of each time of year. In some

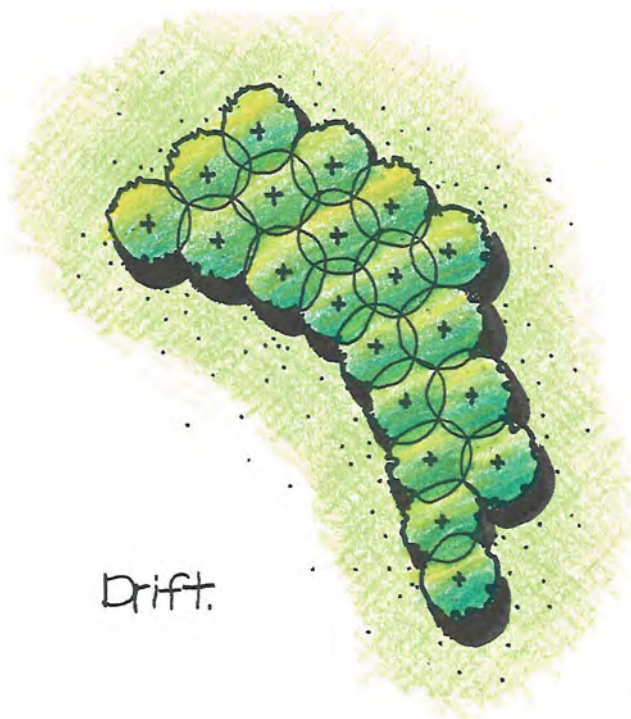


Figure 11–66
Example of a drift of plants.

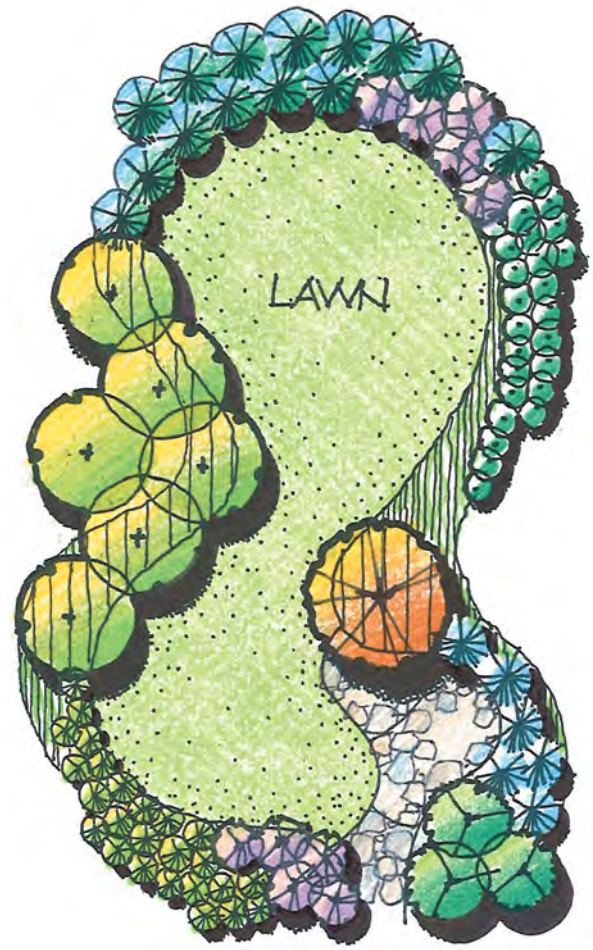
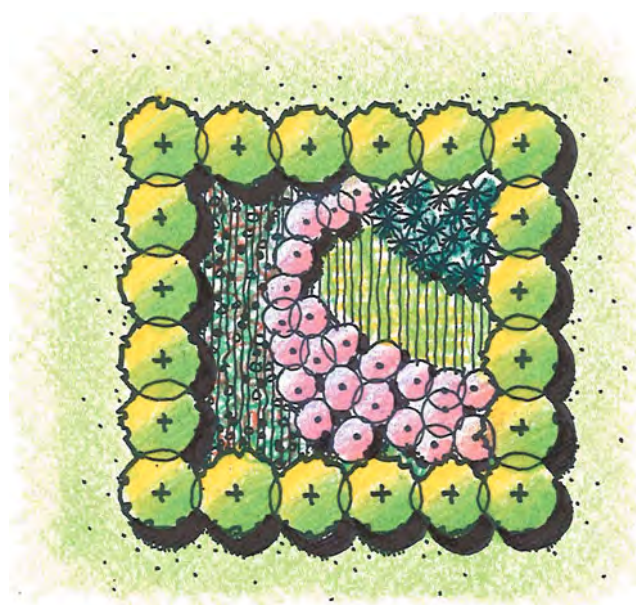


Figure 11–67
Drifts of plants are appropriately used in curvilinear and naturalistic designs.

Figure 11–68
Example of plants in a combination of rows and drifts.



regions, it is important to use plants that are attractive during an annual dry period and other plants that respond to rain after the dry period has ended.

There are several techniques for studying seasonal shifts. One is to examine a planting design's appearance in different seasons by doing a quick color study of the same plan for each season. Another is to use a chart that shows how the majority of plants will look and change during the course of a year, as seen in Figure 11–69. This allows the designer to see what each plant looks like in relation to other plants for any given time of year. It also helps the designer to determine if some times of the year have too much or too little plant interest. Ideally foliage, flowers, and fruit should alter in a continuing sequence throughout the year, not all at once in one season. However one approaches season, it is one of the most challenging aspects of residential landscape design. It is not easy to think in terms of a dynamic, changing landscape. It is in some ways easier to design building interiors where the elements remain relatively fixed over a period of time.

Use a Variety of Plant Types As a general rule of thumb, it is advisable to use a variety of plant types in any planting scheme. Annual, perennial, and woody plants, including a mix of deciduous, coniferous evergreens, and broad-leaved evergreens, should all be used to establish visual interest in a landscape. A range of plant types is more able to establish layers and to express seasonal change as discussed in the previous sections. Furthermore, a variety of plant types tends to replicate conditions similar to natural plant habitats where an interrelated combination of plants typically exists.

The extent of plant variation incorporated in any given residential site is a matter of judgment. While some variety is desirable for visual stimulus, too much diversification can be chaotic. Unfortunately, there is no rule of thumb for defining when too few or too many different types of plant materials have been used in a design. There should be some balance between using some plants for repetition throughout a site (Figure 9–22) and other plants primarily to extend the plant palette (Figure 11–70). The decision regarding plant variety should also take into account the desired character of the landscape design and the house's architectural style. Formal and modern design styles typically require more control and simplification of a plant palette, and an informal or cottage style accommodates a broader range of plants. The character of the regional setting should likewise have an effect on plant diversity. A region that itself has a limited range of plants

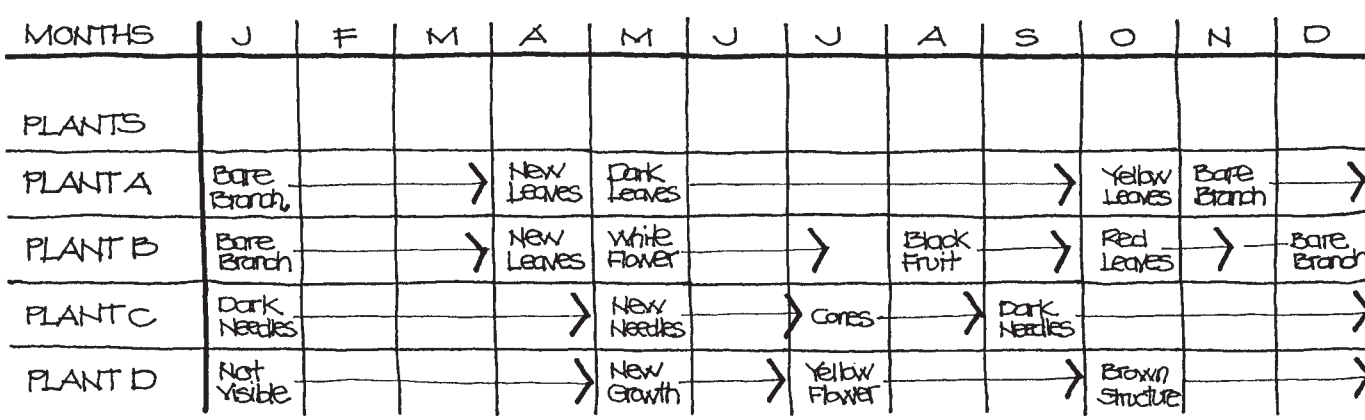


Figure 11–69
An example of a chart that identifies the appearance of plants in a design throughout the year.

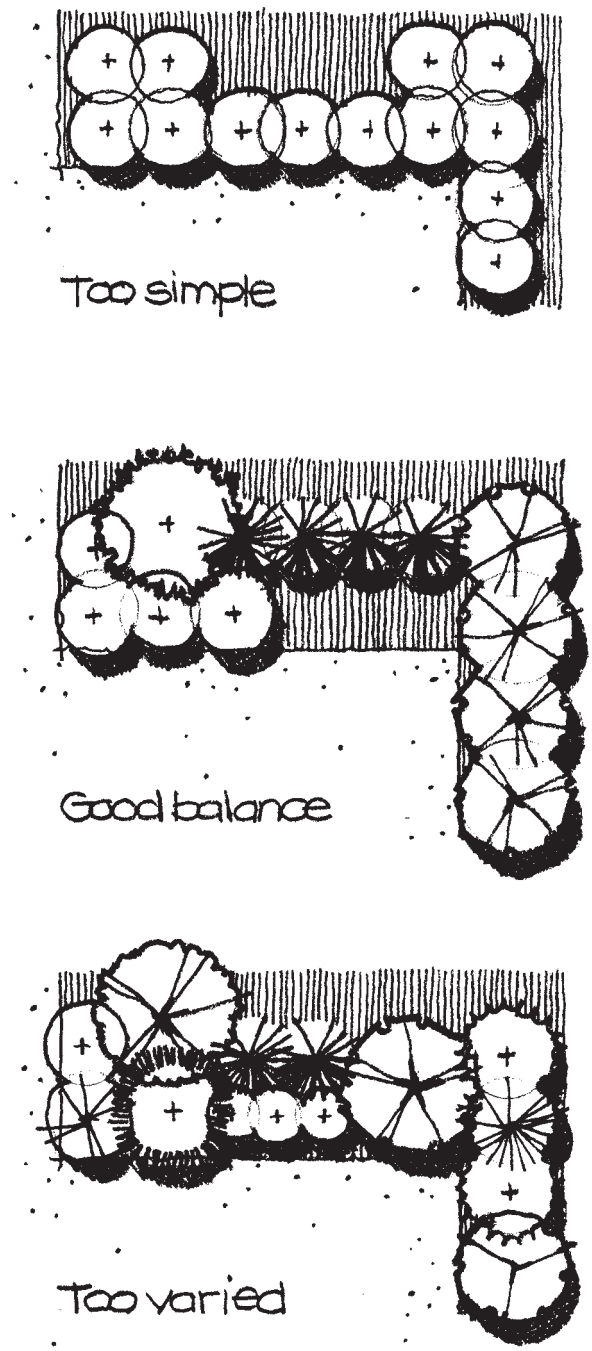


Figure 11–70
There should be a balance between simplicity and variety in a planting composition.

because of various ecological conditions might suggest a similar response in a residential landscape located there.

In general, variety can be established in a planting design with a combination of woody, perennial, and annual plants. Woody plant materials are those with permanent woody structure that exist in the landscape throughout the year. They should be used in the landscape to create the primary structure of the planting design because they are typically the largest and the most enduring plants. Woody plants often form the architectural edges around the perimeter of outdoor spaces and provide the background in plant beds. Woody plants are also the most prominent and sometimes the only plants in a winter landscape in northern climates. Consequently, woody plants should be the first plants organized in terms of process.

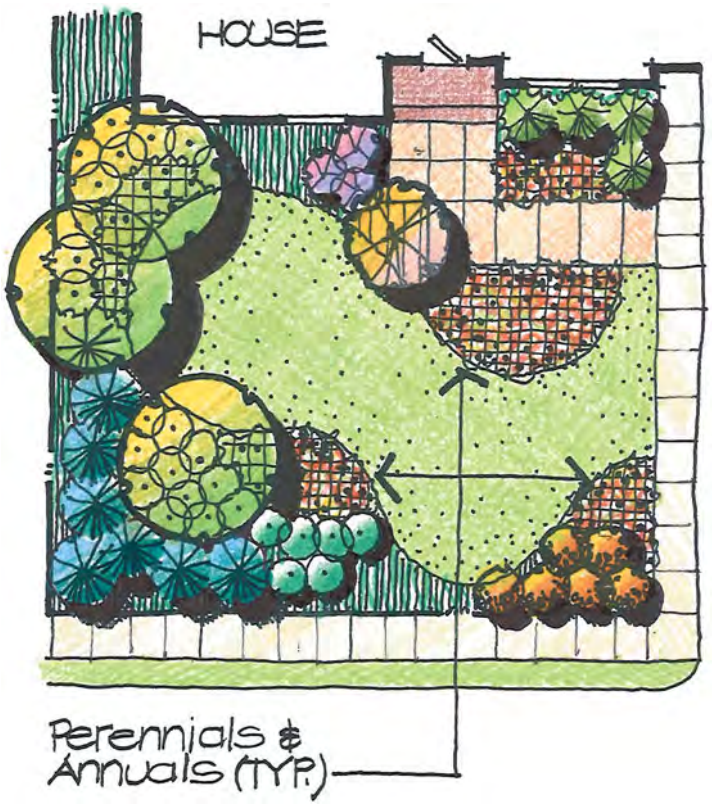


Figure 11–71
Annuals and perennials are best used as accents in strategic locations near entrances and on prominent peninsulas of a planting bed.

Perennials and annuals give the landscape seasonal interest. Perennials are plants that die back at the end of the growing season but reemerge the following spring to grow to maturity again. Perennials exist in many forms and provide the designer with a great number of design options. However, most perennials are used for their flower color and/or their foliage texture. Perennials are best used for visual accent near house entrances, at the end of a planting bed peninsula, at the end of an axis, or in a perennial border that is composed of a range of perennial plants (Figure 11–71). Perennials sometimes are used creatively in pots placed around outdoor living areas or house entrances. Perennials are most commonly placed as foregrounds to woody plants, though they can also be used as background in their own right. Annuals are plants that last for only one growing season. They are used primarily for their flower color and are located in the landscape to provide visual interest and accent. They are best used as foreground plants in the same locations defined for perennials.

Among woody plant materials, a balanced mix between deciduous, coniferous evergreens, and broad-leaved evergreens should be the goal. This is especially needed in those climatic zones where deciduous plants lose their foliage in the winter. A winter landscape with too many deciduous plants will lack weight and be too transparent because of the lack of evergreens (top of Figure 11–72). On the other hand, a winter landscape with too many evergreen plants (middle of Figure 11–72) will look too dark and gloomy—not a pleasant sight when the general climate conditions are similar. Ideally a proper balance among the various plant types will make the winter landscape a visual success (bottom of Figure 11–72).

Deciduous plants should be used in a planting for other reasons as well. One is that deciduous plants accentuate seasonal change. Deciduous plants typically establish a dynamic landscape with four distinct seasons. Each season has its own character

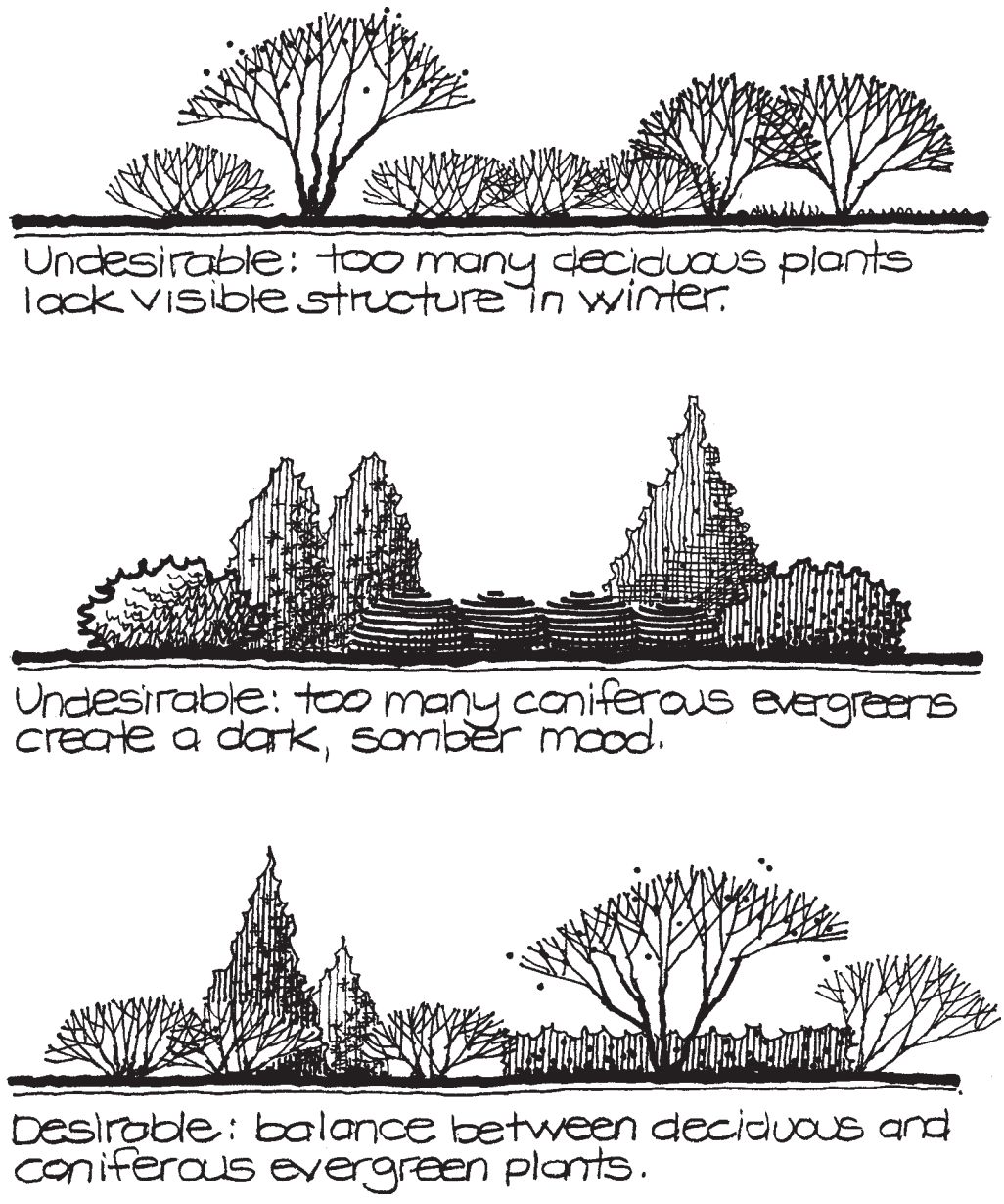


Figure 11–72
There should be balance between deciduous and coniferous evergreen plants in a composition.

and interest, and collectively they express a sense that the landscape is indeed alive. By contrast, a landscape dominated by coniferous or broad-leaved evergreens frequently tends to appear static and fixed, as if composed of inanimate objects. Deciduous plants can also be used in planting for their flowers. Many ornamental deciduous shrubs and trees have attractive spring flowers that merit strategic placement in a design. Another use of deciduous plants is as foreground or middle-ground plants in a planting bed, especially when the background is evergreen or structural in nature. Spring flowers, autumn fruit, and winter branch structure are often better seen when placed against a dark background, as in Figure 11–73. Likewise, deciduous trees can be used to express a sense of buoyancy and airiness when they occupy the canopy layer in a planting composition, as portrayed in Figure 11–74.

By contrast, coniferous evergreen plants can be used in a planting to establish a sense of permanence. Although coniferous evergreen plants evolve with growth, they do not change dramatically from one season to the next. Their relatively fixed appearance

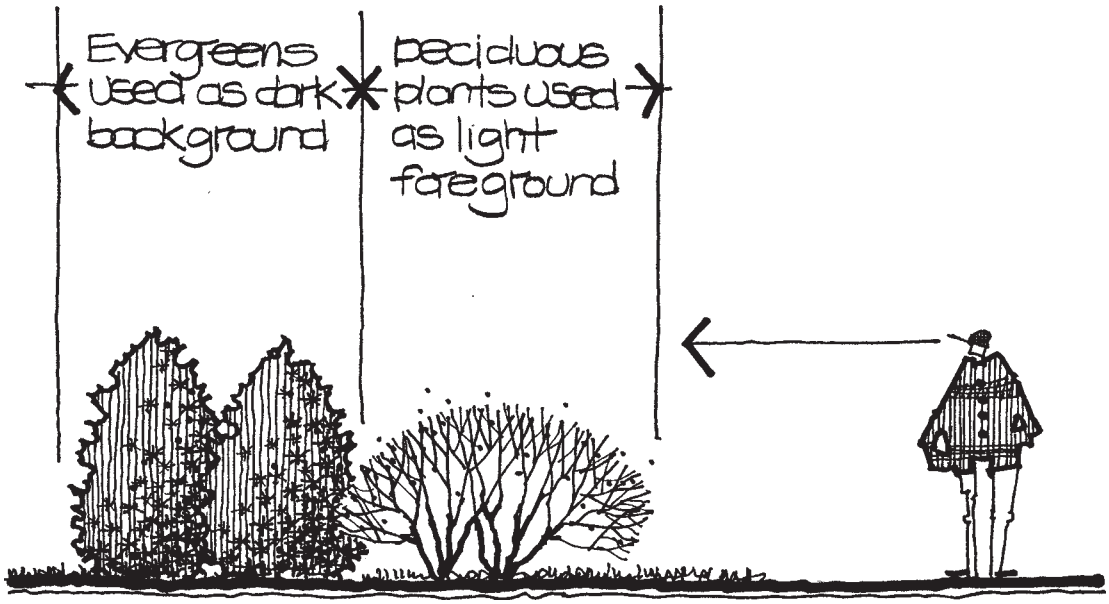


Figure 11–73
Deciduous plants are often used well as foregrounds while coniferous evergreen plants provide dark backgrounds.

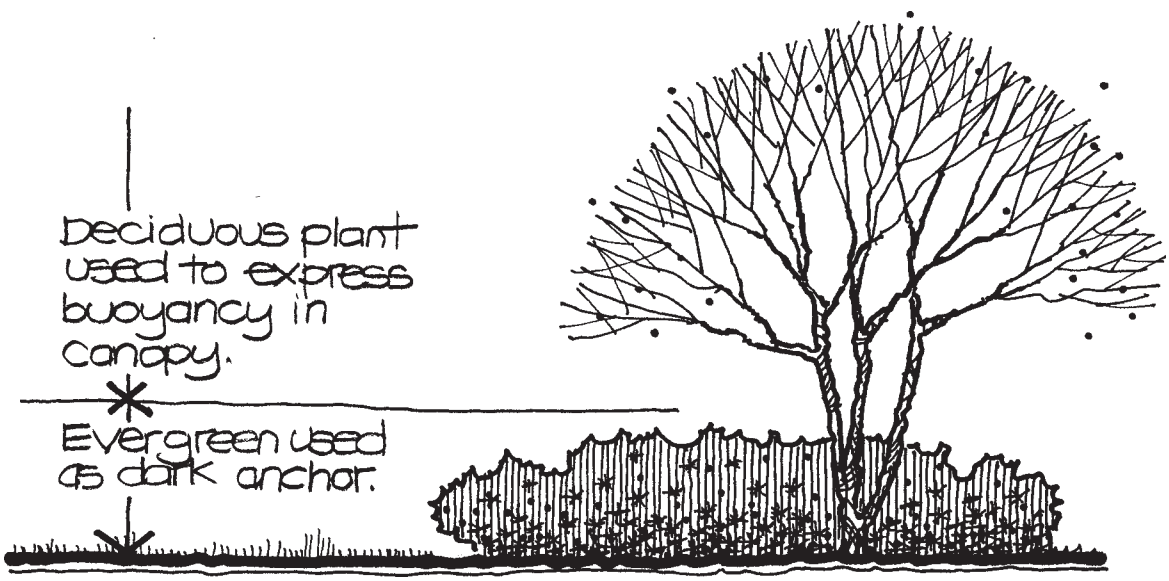


Figure 11–74
Deciduous plants can be used successfully to establish a light canopy while coniferous evergreen plants provide a dark anchor near the ground.

provides stability and contrast to the more shifting quality of deciduous plants. Coniferous evergreen plants can also provide visual weight in a planting composition. As a group, coniferous evergreen plants have some of the darkest foliage of all plants, though exceptions do exist. Consequently, coniferous evergreens are good plants to place as backgrounds to deciduous plants or accents (Figure 11–73), or near the ground as visual anchors in a design (Figure 11–74). As previously stated, deciduous and coniferous evergreen plants often work best with each other because each tends to bring out the best qualities of the other.

Broad-leaved evergreen plants have deciduous-like leaves that are held on the plant throughout the year. Rhododendron, azaleas, mountain laurel, and magnolia are examples. Most broad-leaved evergreen plants require acidic soil and shade or partial shade conditions for proper growth. As a group, broad-leaved evergreen plants are noted for their showy spring flowers and are often placed in the landscape for this quality. As with all plants, caution should be exercised in selecting plants for a quality that only lasts several weeks. Fortunately, many broad-leaved evergreen plants also have attractive foliage texture, which makes them appealing even when not in flower.

Compose Plants by Texture In addition to all the other considerations in organizing and selecting plants in preliminary design, it is also advisable to think about plant texture. Plant texture is the visual, tactile quality of plants and is primarily the result of foliage size. The foliage shape, a plant's overall growth habit, and the distance from which a plant is viewed also affect plant texture. In general, large leaves generate coarse texture and small leaves produce fine texture. Pointed leaves establish a sharp texture, round leaves produce a neutral texture, and small, needle-like foliage forms fine textures.

It is usually advisable to organize plants to create contrasts in foliage texture from one species of plants to the next. Foliage texture is more lasting in plants than in flowers or fruit, so it has greater visual impact over time. Contrasting foliage texture establishes visual interest and helps one plant type read against another, as suggested in Figure 11–75. Without contrast in foliage texture, there is apt to be a dull sameness in a plant composition.

Coarse-textured plants are best used as visual accents because they readily stand out among other plants. Coarse-textured plants can also visually move toward a viewer, thus making distance across a space feel shorter, as indicated in Figure 11–76. Fine-textured plants have an opposite effect and tend to recede away from a viewer.

Locate Plants in Proper Ecological Habitat Plants should be organized and selected based on the habitat where they are located. Such factors as sun exposure, wind exposure, soil moisture, soil composition, and soil pH all affect the growing conditions of plants. Likewise, these conditions tend to vary throughout a residential site.



Figure 11–75
Contrasting plant textures based on foliage size and shape can provide visual appeal in a planting composition.

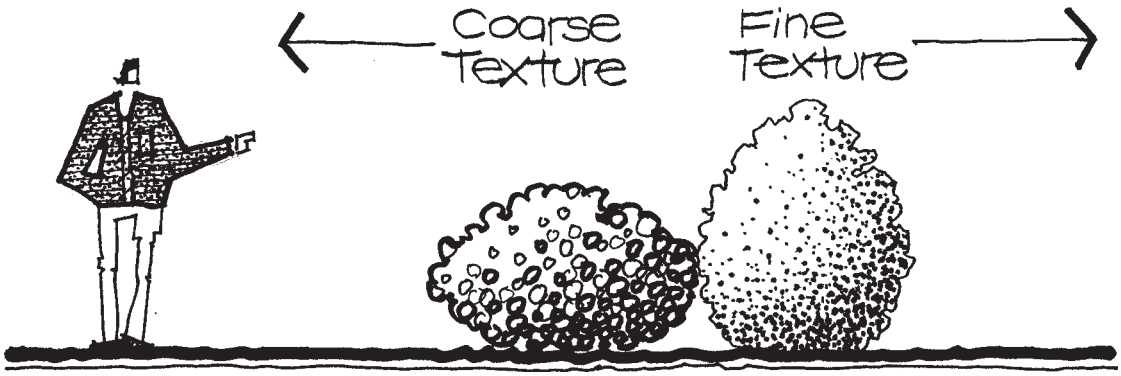


Figure 11–76
Coarse-textured plants visually "move" toward the viewer, whereas fine-textured plants recede.

One of the most critical ecological factors is sun exposure. Typically, ideal growing conditions for plants can be classified into three categories of sun exposure: full sun, partial sun/partial shade, and shade. The amount of sun exposure at any given location on a residential site is primarily affected by the house and both existing and proposed trees. It is advisable to develop a sun exposure map of a site, as in Figure 11–77, to aid in determining where to place plants with different requirements for sun and shade.

As discussed in Chapter 3, a house creates four general microclimates around its exterior based on sun and wind exposure (see Figure 3–1). In terms of planting, these microclimates can be interpreted in the following way:

South side of house:

- Plants located here must tolerate full sun exposure because this area receives sun from mid-morning through late afternoon during the summer.
- Irrigation or other means of watering may be necessary because plants dry out here more quickly because of continuous sun exposure.

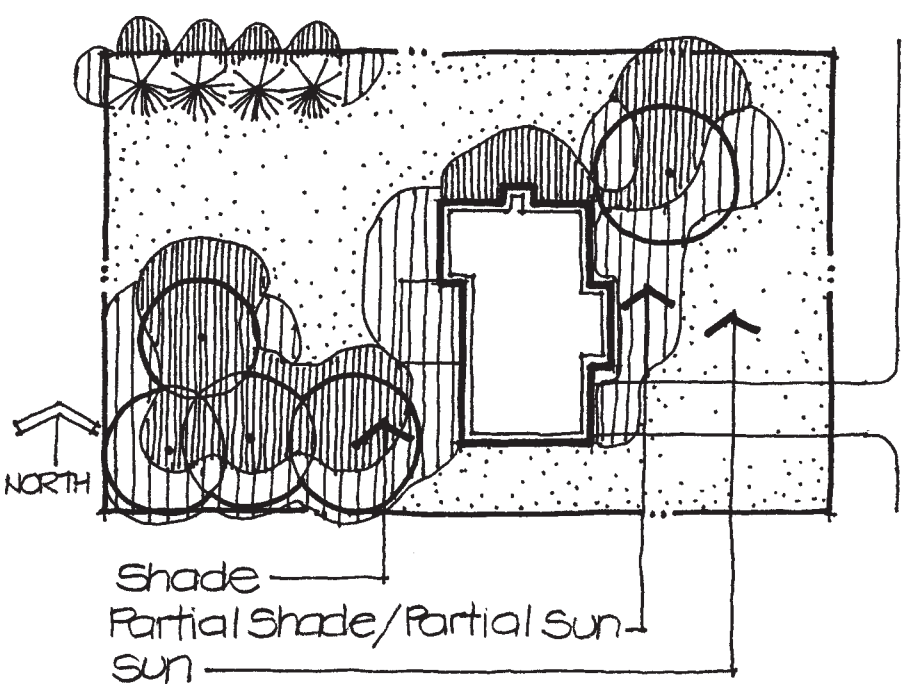


Figure 11–77
An example of a sun exposure map used to determine appropriate plant locations.

- Some plants that normally grow in a more southerly hardiness zone may be located here because this area has the warmest temperatures in early spring and late autumn, thus extending the growing season.
- Care should be given to coniferous evergreen and broad-leaved evergreen plants situated here in northern climates because of the potential damage that occurs during sunny winter days when plants transpire without being able to draw moisture from frozen ground.

East side of house:

- This is a good location for plants that require partial sun/partial shade conditions, especially those that benefit from gentle morning sun and generally cool temperatures.
- This is an ideal location for native woodland edge plants and most broad-leaved evergreens that require a protected transitional zone.

North side of house:

- This is an ideal place for plants that require full shade and cool, damp soil conditions; however, this is a surprisingly narrow zone during midsummer because of the relatively high sun angle.
- Caution should be exercised for plants that cannot tolerate cold wind exposure if the house is located in an unprotected spot in relation to north and northwest wind.
- Spring flowering bulbs and shrubs located here will bloom later than those planted on the other sides of the house because there is less sun here.

West side of house:

- Plants grown here must benefit from the intense, hot, afternoon sun.
- Plants located here must be drought and heat tolerant because this is the hottest side of the house; in many ways, this is the harshest microclimate of all for growing plants near a house.
- Plants that require a moderate sun/shade condition should generally not be placed here unless other means of creating shade is provided.
- Irrigation or other means of watering are often necessary because plants dry out quickly here.
- Plants that cannot tolerate the drying effect of summer wind exposure or the damaging consequences of cold winter should be avoided in this location.

Similarly, there are different areas of sun and shade exposure around and below trees. Though the exact configuration and amount of shade in these areas varies with the shape, size, and density of a tree, the general characteristics and suitability for planting are similar to the distinct microclimates that exist around a house. The sun/shade zones for existing trees are relatively easy to determine through actual observation or calculation from sun charts based on the size and height of the trees. The determination of shade from proposed trees is more difficult because of the initial tree size and future growth rate. The amount of shade from newly installed trees is commonly rather minimal, so plants located nearby should be sun tolerant. With a number of years of growth, the initial areas of sun nearest to the tree will have converted to shade. Thus, the landscape designer must think of both the short-term and long-term microclimatic consequences of proposed trees.

There are several other things that should be kept in mind about the planting habitat around trees:

- The sun/shade zones that exist on the east, south, and west sides of a shade tree actually extend below the tree canopy because of the sun angle. More sun is received below the tree canopy on the east and west sides in comparison to

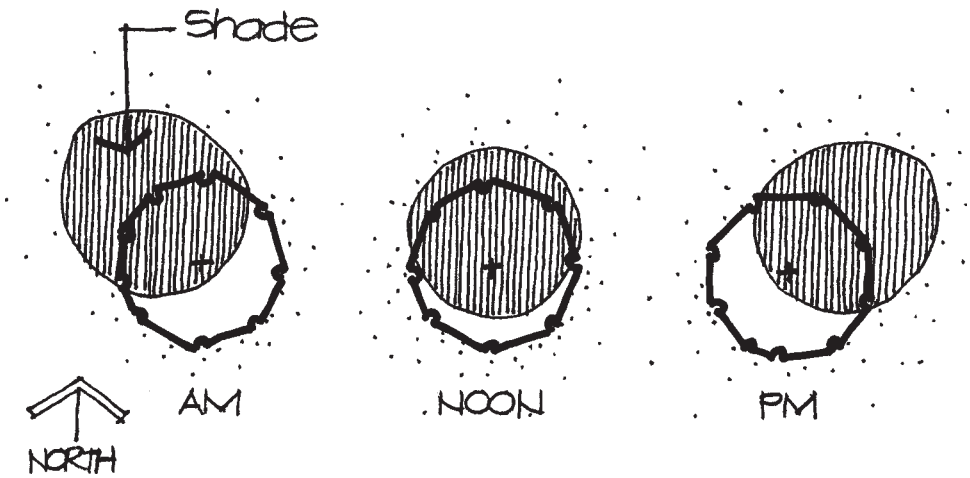


Figure 11–78
The location and size of sun exposure below a tree canopy varies throughout the day.

the south side, as illustrated in Figure 11–78. Thus plants that require some sun can actually be planted slightly under a tree on these sides.

- Planting areas directly below the tree canopy are typically drier than planting areas outside the canopy because the tree foliage catches and holds some precipitation. In addition, the root system of the tree takes moisture from the ground and reduces soil moisture available for other plants. Plants under a tree canopy either need to be more drought tolerant or need to be supplemented with irrigation or other means of watering during hot summer months.
- The largest areas of shade occur on the east and west sides, not the north side of the shade tree, as indicated in Figure 11–79. This is because the sun is at a relatively high angle in the sky when shining from the south at midday, thus producing a comparatively shallow area of shade to the north. Shade-loving plants should not be planted too far north of a shade tree, or they will be in the sun during mid-summer.

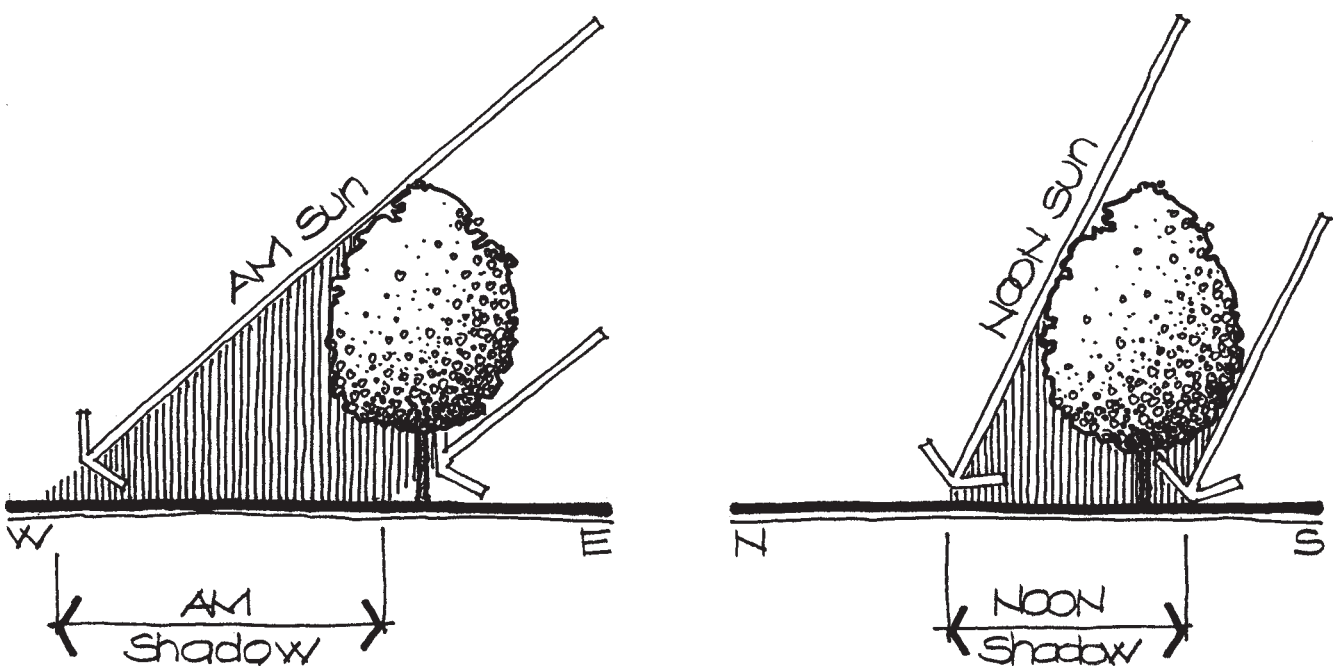


Figure 11–79
The area of summer shade is greater on the east and west sides of a tree in comparison to the north side.

In addition to considering sun exposure, the landscape designer should also identify drainage patterns and soil moisture on a site. If necessary, a map of these conditions might need to be prepared during site inventory and analysis. Such a map can guide the selection of plants to fit the various soil moisture conditions.

Graphic Guidelines

Size There are several guidelines for graphically portraying plants in a preliminary design. First, all plant materials should be drawn in the plan as mature or near-mature plants. This is especially true of shrubs and small trees. Large trees can be drawn at 50 percent to 100 percent mature size because they take many years to reach full growth. This requires the designer to be familiar with plants and their mature sizes. If this guideline is followed, the installation of immature nursery-stock plant materials will at first appear spotty because there will be space between individual plants. However, with time and growth, the plants will fill in to create a continuous mass (Figure 11–55). When presenting preliminary plans to clients, it is important to tell them that the plant arrangement portrayed may take several years or more to achieve.

Shrub Masses On preliminary designs, it is typical to represent shrubs as masses without distinguishing the individual plants within these masses. The drawing of individual plants within a mass is usually reserved for the master plan. Figure 11–80 shows the graphic differences for showing plant materials in a functional diagram, preliminary design, and master plan of a selected portion of a site. The diagram is the most generalized, and the master plan is the most detailed. The detail in the preliminary design is between these other two types of drawings.

WALLS AND FENCES

Walls and fences comprise still another set of elements the landscape designer can use to define the third dimension during spatial composition. As with plant materials, the designer is typically most concerned with the location and function of walls and fences as well as with their general materials during preliminary design. For example, the designer may decide that a wall near the outdoor entry foyer should be stone, whereas a fence along the east property line should be constructed of rough-sawn cedar. The designer usually does not determine the actual appearance of walls or fences or the specific pattern that the materials will have on these vertical planes. Again, this study of details occurs in a later step (see Chapter 12).

There are two general categories of walls and fences that can be used on the residential site: (1) retaining walls and (2) free-standing walls or fences. Retaining walls hold back a slope or upper level of ground from a lower area of ground (Figure 11–81). As indicated in the earlier section on grading, retaining walls can be considered a visual and functional part of the ground plane. Their location and function is directly tied to the grading of the ground's surface. Retaining walls are usually constructed with a masonry material, such as stone, brick, or masonry block, or with a pressure-treated wood that can withstand constant contact with the ground.

Free-standing walls or fences are elements that stand in the landscape without the support of other structural elements (Figure 11–82). Free-standing walls are most often constructed of a masonry material, whereas fences are usually built with wood or one of the many types of metals.

Both retaining walls and free-standing walls can be used for a number of functions on the residential site. Walls and fences can fulfill the same functions as plant materials do in the vertical plane by serving as spatial edges, screening views, creating privacy, directing views, modifying exposure to sun and wind, and directing movement

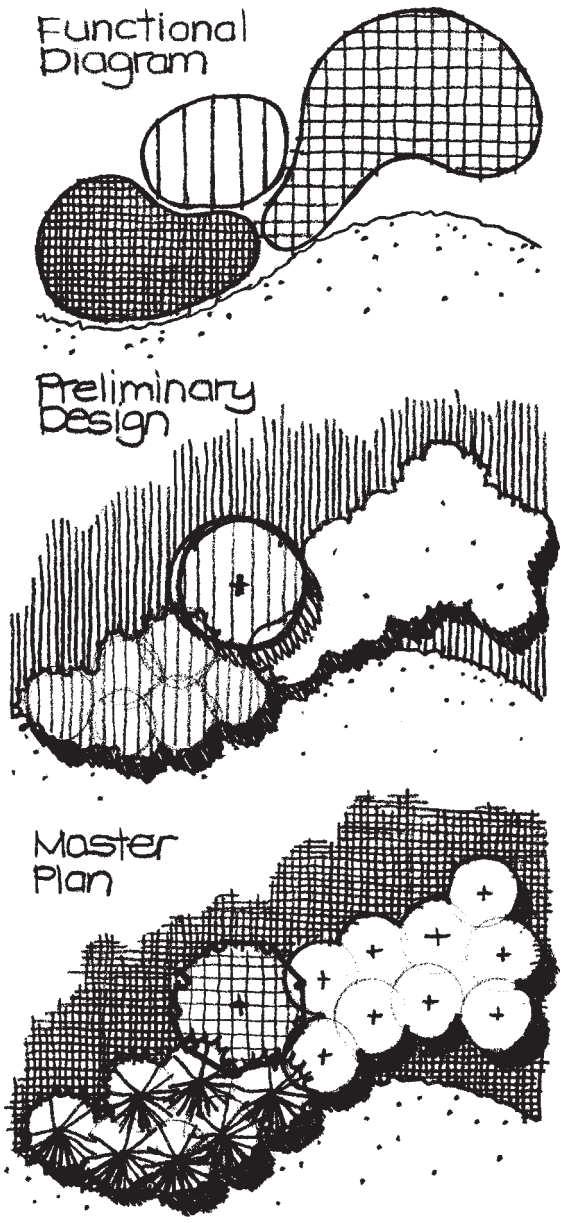


Figure 11–80
An example of the graphic differences among the functional diagram, preliminary design, and master plan.

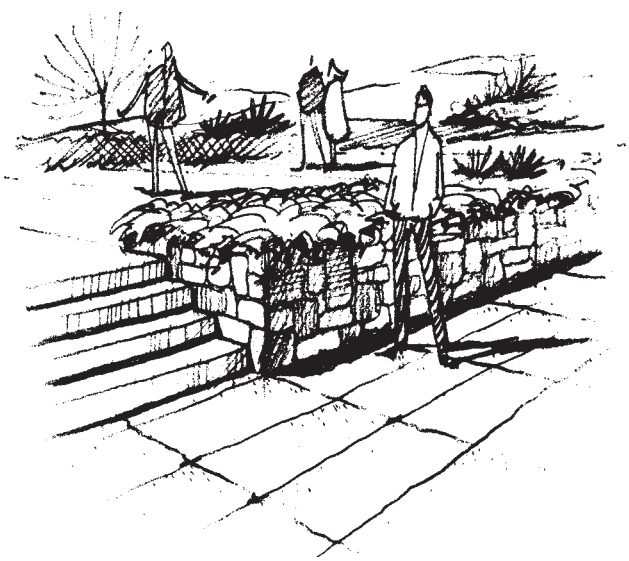


Figure 11–81
An example of a retaining wall.

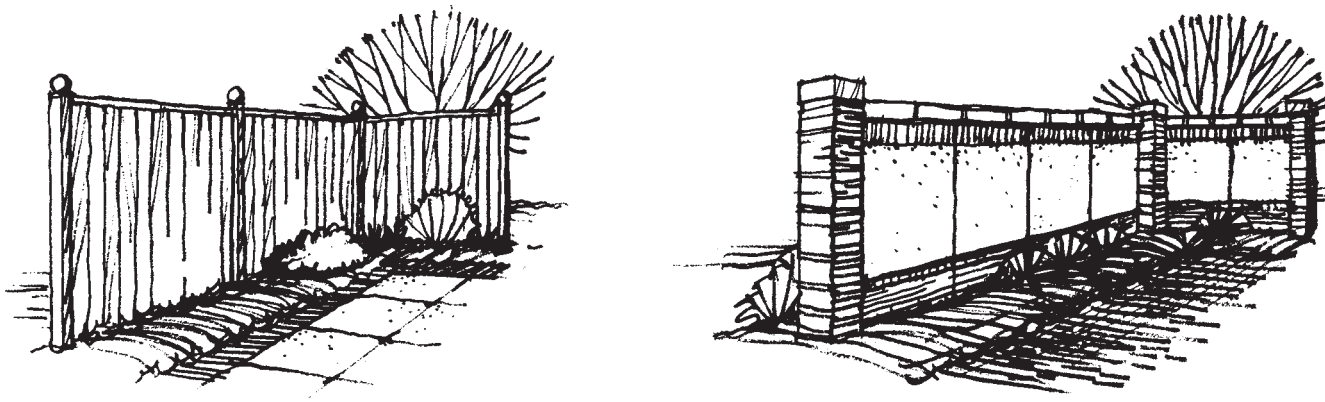


Figure 11–82
An example of a free-standing fence and wall.

through the landscape. As stated before, the advantages that walls and fences have in fulfilling these functions in comparison to plant materials are that walls and fences do not take time to mature and they do not require specific environmental conditions for location. Walls and fences also do not take up much area on the site and are very practical where space is limited.

In addition, walls and fences can be used for several other purposes: (1) architectural extension of the house, (2) background to other elements, (3) unifier, and (4) visual interest of form and pattern.

Architectural Extension Walls and fences can be used to visually and functionally connect a house or other building to its surrounding site in several distinct ways. First, walls and fences can repeat the materials that are on the house's façade in the landscape, thus providing a visual link between the house and the site (Figure 11–83). This repetition of materials creates a strong sense of unity between house and site. The second way walls and fences can connect a house to its surroundings is by serving as extensions of the house that stretch out into the site from the house (Figure 11–84). Such architectural extensions act like "arms" that reach out to "embrace the site." Both these techniques make the house and site appear as a totally integrated environment.

Background Walls and fences can serve as neutral backgrounds to other foreground elements if the color and material patterns of the walls or fences are subdued. In this use, walls and fences can screen out distracting views so the eye can rest comfortably

Figure 11–83
Walls and fences can repeat the material of the house façade in the site.



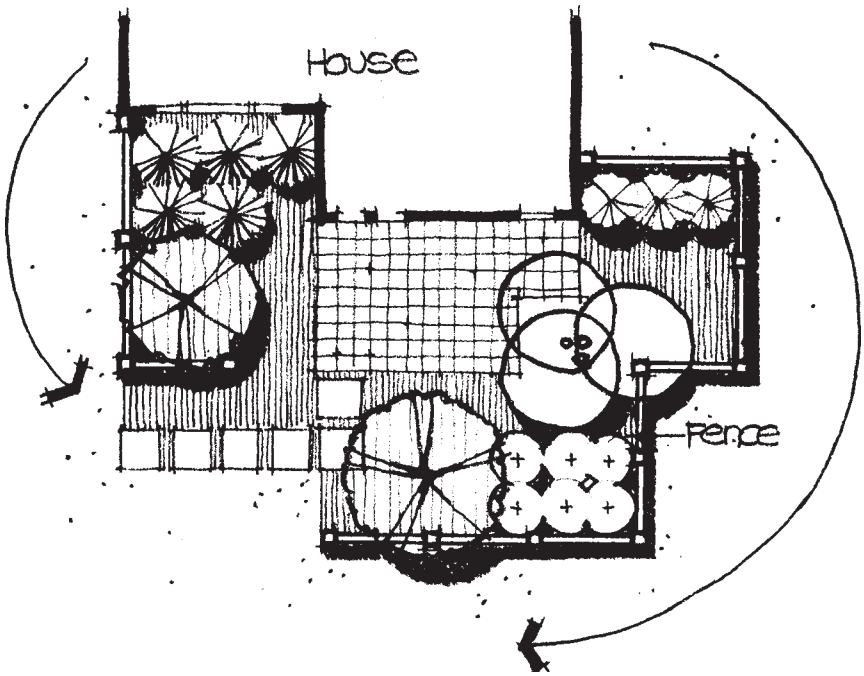


Figure 11–84
Walls and fences can extend out from the house into the site like arms.

on the intended focal point in the foreground (Figure 11–85). Walls and fences used for this purpose are often best placed at the edge of a space or along the site boundary.

Unifier A similar use of walls and fences is to visually connect or link otherwise unrelated elements (Figure 11–86). A fence or wall can unify separate elements and make them all seem like they are a part of a cohesive composition.

Visual Interest Walls and fences can be designed and detailed with attractive patterns of materials and textures that delight the eye (Figure 11–87). Walls and fences can also be designed so that protrusions or indentations cast attractive light and shadow patterns that change throughout the day and year. Although the designer might not detail these ideas during preliminary design, they can still be considered as part of the concept and intent at this point.

The layout of walls and fences can also furnish visual interest. Walls and fences do not always have to be placed in absolutely straight lines. Instead, walls and fences can create attractive lines and patterns in their plan alignment (Figure 11–88). The layout of walls and fences can accentuate the overall design theme architecturally. Here again, the design of walls and fences needs to be closely coordinated with form composition so that it is reinforced in the third dimension.

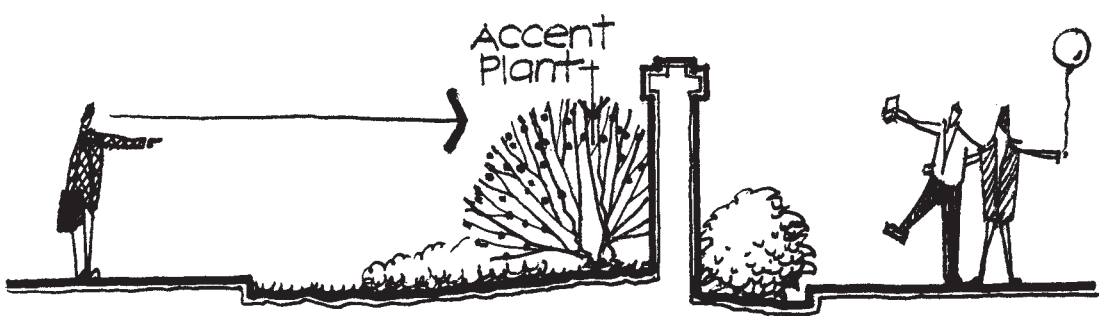


Figure 11–85
Walls and fences can serve as a neutral background to accent features while also screening out distracting sights.

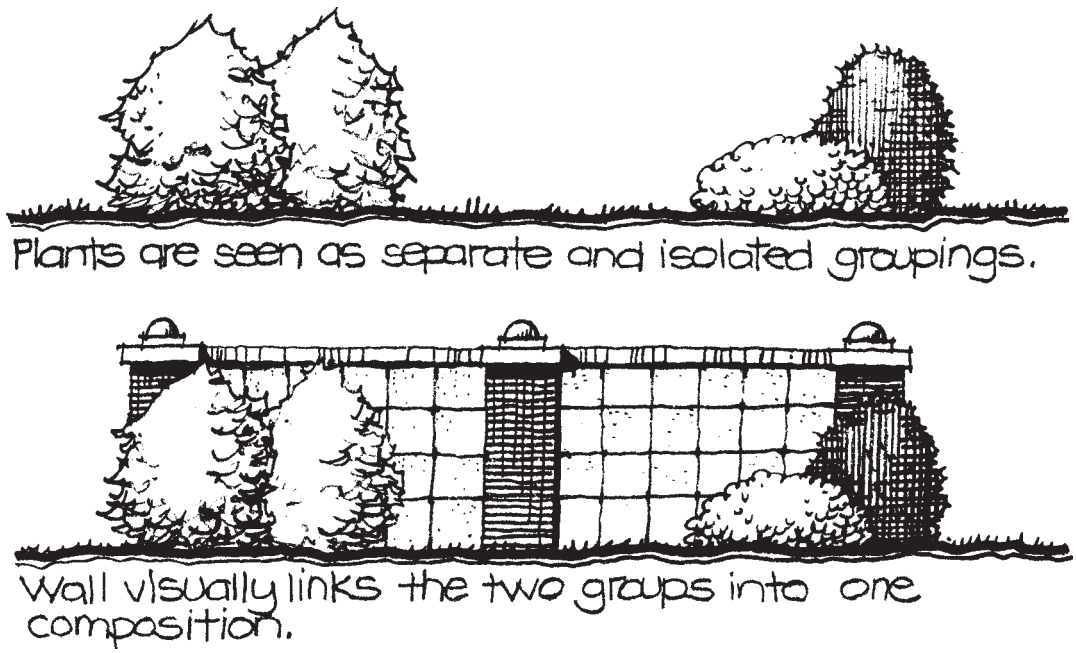


Figure 11–86
Walls and fences can visually unify elements that are otherwise seen as separate elements.

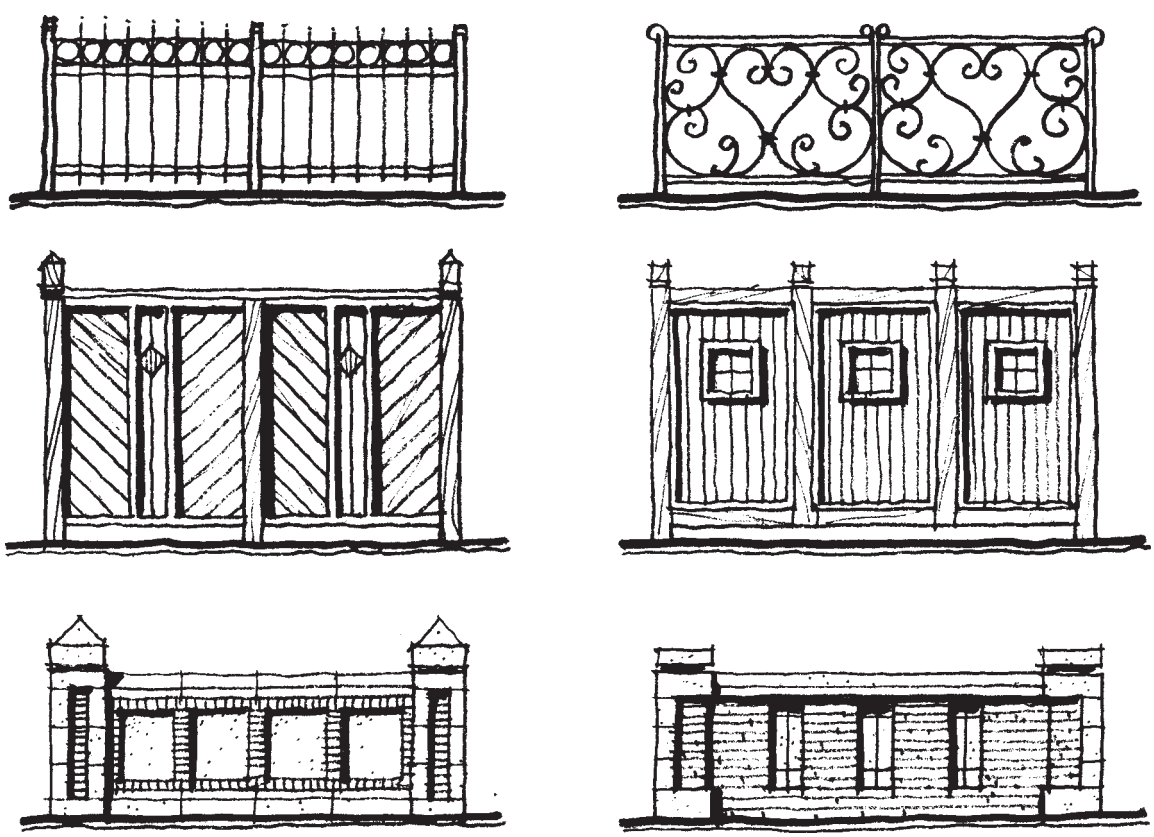


Figure 11–87
Examples of walls and fences detailed with decorative material patterns.

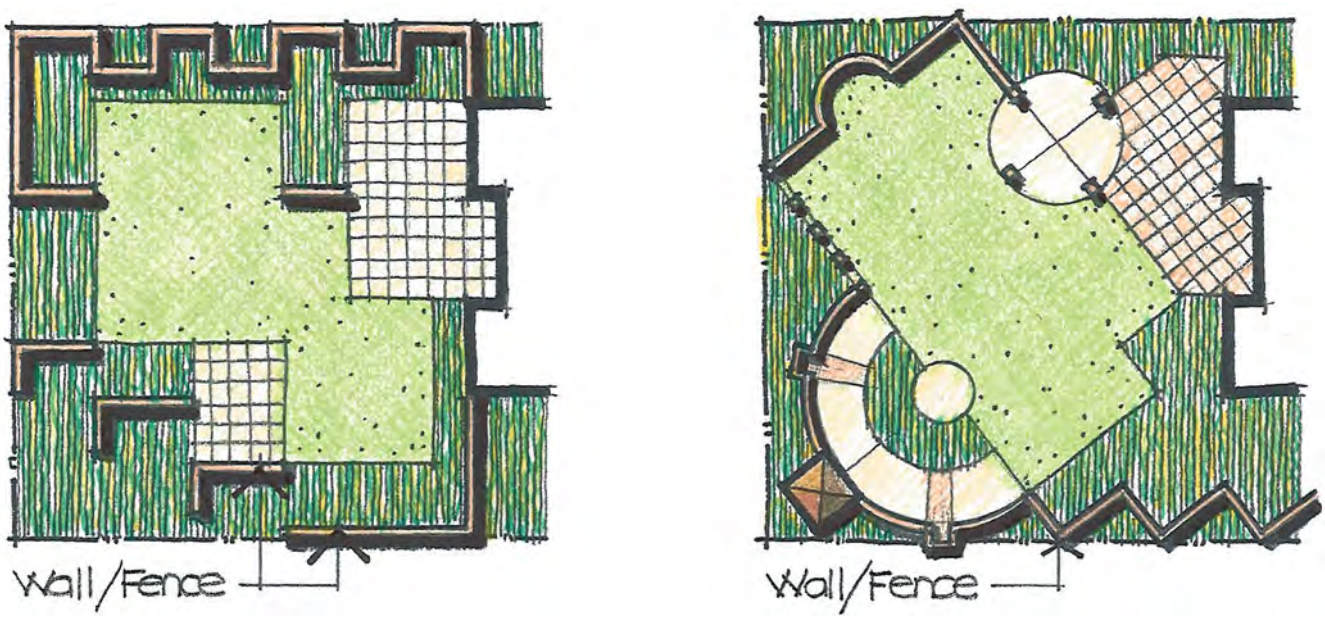


Figure 11–88
The plan layout of walls and fences can provide visual interest while complementing the design theme.

The material presented here on walls and fences has shown the basic and typical ways these two design elements are used in landscape design. But, it is important for the landscape designer to go beyond the norm to realize the variety and opportunities that these vertical planes offer in the spatial development of quality residential design. To do this, walls and fences should be designed with as much concern, attention, and sensitivity as interior walls.

The illustration in Figure 11–89 shows an interior and exterior setting in which walls and fences (1) help create a variety of spaces, (2) vary in height to provide different degrees of privacy, (3) include openings (windows) for defining special areas and views, and (4) support a number of furnishings (potted plants, sculpture, pictures, etc.) that provide additional character to each of the spaces.

These four aspects of designing with walls and fences need to be explored so that these design elements can be as spatially valuable as interior walls.

Height Variation and Spatial Separation

Walls are commonly thought of as (1) separations between other rooms and (2) background settings for furnishings. However, exterior walls can be incorporated to serve other uses. Figure 11–90 illustrates nine different heights and uses.

When designing walls or fences for outdoors, it is strongly suggested that the designer incorporate them in a variety of heights to provide heights similar to those used each day indoors. This will make walls more usable, and thus more appreciated.

Transparency and Degree of Privacy

Walls and fences, regardless of height, can also be designed to provide varying degrees of openness. By allowing vertical planes to have openings in them, walls and fences provide opportunities for viewing beyond, as well as for adding character to the space. Windows are very important parts of interior walls and should also be so for outside walls.

A solid fence is best for cases where complete privacy is needed (top of Figure 11–91). It is recommended that changing patterns be explored to create special

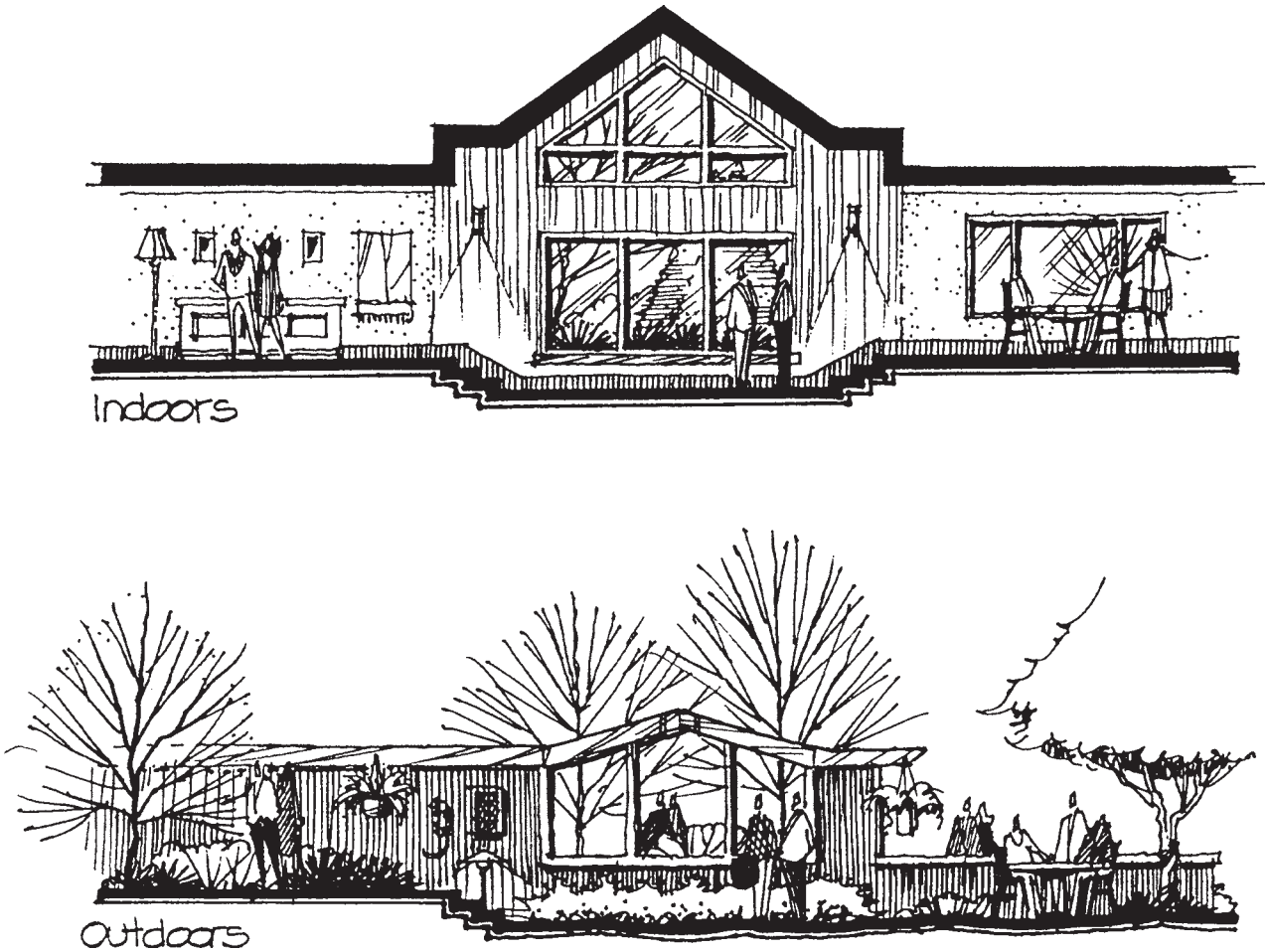


Figure 11–89
Varied heights and character of outdoor walls can be as spatially valuable as indoor walls.

places along the fence to serve as focal areas to display a special plant or sculpture. The center of Figure 11–91 shows a privacy wall with some open pattern in it. This area, because of its design, provides an accent area where vines can grow, as well as a place to have a partial view into the distance.

The bottom portion of Figure 11–91 shows a wall with varied heights and patterned openings. These small open areas can provide places for small pots or outdoor knickknacks.

The degree of transparency will vary depending on how much open area is planned for the wall or fence. Some localities, like those adjacent to large bodies of water, may specify the minimum amount of openings for fences or walls. Some codes require at least 50 percent openness in a vertical screen to allow breezes to travel throughout the neighborhood. Figure 11–92 illustrates several examples of varying percentages of openness in fences that are constructed of 2 × 2 wood. The smaller the open pattern, the lower the percentage of openness in the fence.

Support for Furnishings

Like interior walls, exterior walls and fences can support many different elements. One such use for exterior walls is to serve as a background surface on which to display

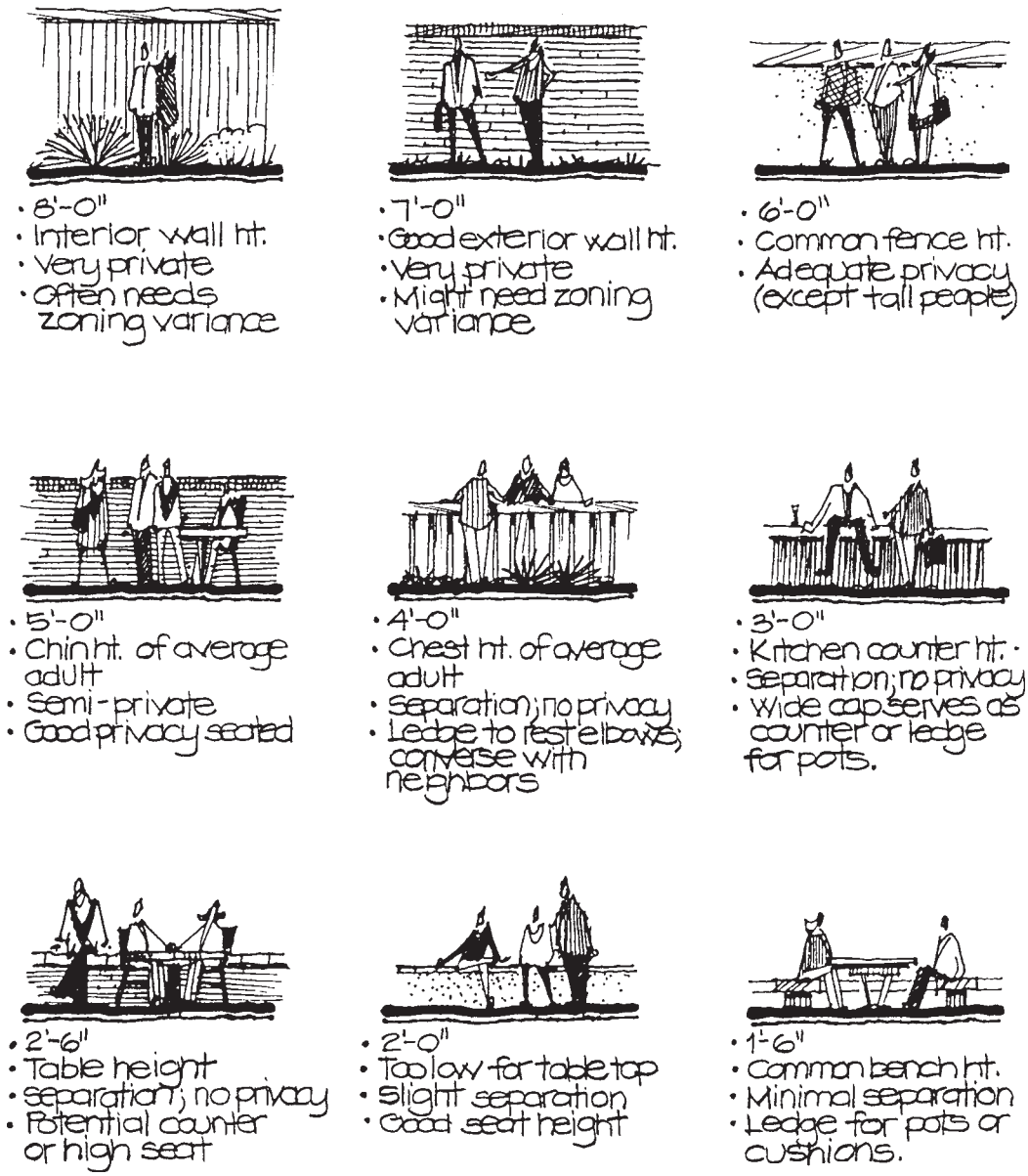


Figure 11–90
Different wall heights have different functions.

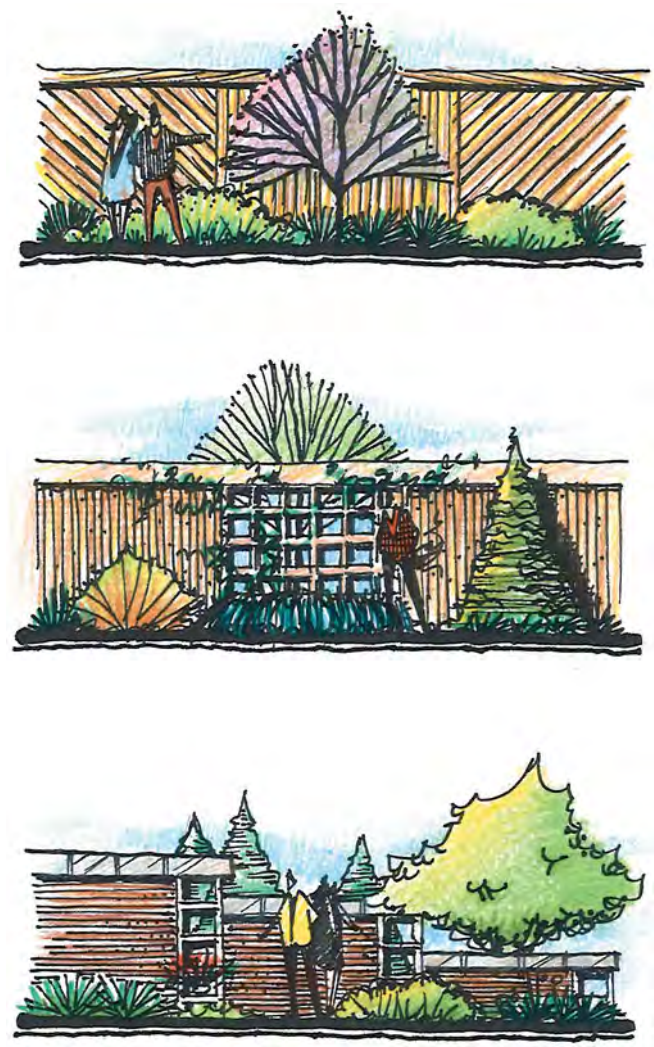
various wall decorations (Figure 11–93). Strong privacy is provided at the left side of the space, while an open feeling is kept to the right side of the space.

A similar concept is to use walls to support shelves on which potted plants, sculptures, or other objects can be placed (Figure 11–94). This example shows a stucco wall built to reflect an arc and tangent landscape design theme.

A fence or wall can likewise be used to support hanging plants (Figure 11–95). Here, a fence is built with vertical panels on the sides of a special pattern. The location of this pattern is adjacent to an outdoor eating area. It accents the area, especially with a higher, arched area in the center of the panel.

Just as interior spaces can be used in the nighttime hours, so can outdoor spaces. Lights can be positioned across the top of a fence (Figure 11–96) to light the vertical

Figure 11–91
Outdoor walls can be solid, partially open, or mixed.



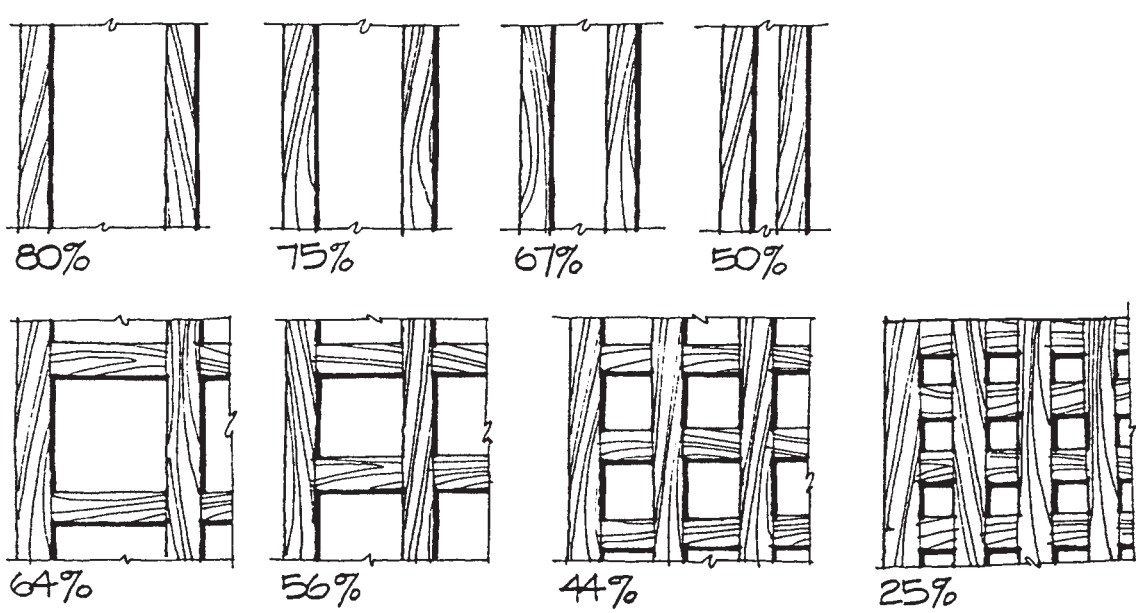


Figure 11–92
Percentage of openness depends on the amount of solid area versus open area.



Figure 11–93
Walls can be used as background for wall hangings.



Figure 11–94
Shelves can be incorporated in a wall to provide places for potted plants.



Figure 11–95
Walls can be decorated with hanging baskets to add spatial character.

panels. The reflected light of the fence would then provide enough light to use the adjacent space.

Windows are an integral part of indoor rooms. Without them we would feel too enclosed. They provide for views and light to enter into a space. They are made in many sizes and shapes and are often complemented with drapery or blinds for varying the degree of privacy or darkness. Windows may be used similarly for exterior walls



Figure 11–96
Lights can be incorporated into walls to provide for night use.



Figure 11–97
Openings can be used as windows or wall lights.



Figure 11–98
Patterned openings can be incorporated in low walls to allow pets to look out of the space.

and fences (Figure 11–97). The left side of the illustration shows an opening that can be adjusted with an exterior blind. It can be closed when privacy is needed and opened when one wants to talk with neighbors or provide a view. The right side shows a stained glass wall light, built into the wall, with the same size and trim as the opening on the left.

When privacy is not needed but containment for pets is critical, lower fences and walls can be incorporated into a design. Just as in the taller walls, patterns can be used to provide additional character to the wall, as well as places for pets to view into the adjoining spaces (Figure 11–98).

OVERHEAD STRUCTURES

The last element that should be considered during spatial composition is overhead structures such as gazebos, arbors, and pergolas. All these have outdoor ceilings that provide scale and protection from the elements in spaces where people will congregate.

Outdoor ceilings are very important design elements. Their heights, patterns, and character can be as varied as the walls and fences used in the design. Overhead structures should be given as much attention and used in similar ways as ceilings inside homes are used. It is important for designers to realize the potential of overhead planes as they relate to (1) height, (2) degree of openness, and (3) support of other furnishings.

Figure 11–99 shows an interior and exterior section through several different spaces. Changes in height and openness coupled with elevational change on the ground plane make for a variety of spaces. The far left spaces in both sections are closed and intimate in scale. As one moves through the other spaces to the right, they open up and become larger in scale. The important thing to note is that outdoor ceilings are as spatially valuable to outdoor use as indoor ceilings are to indoor use.

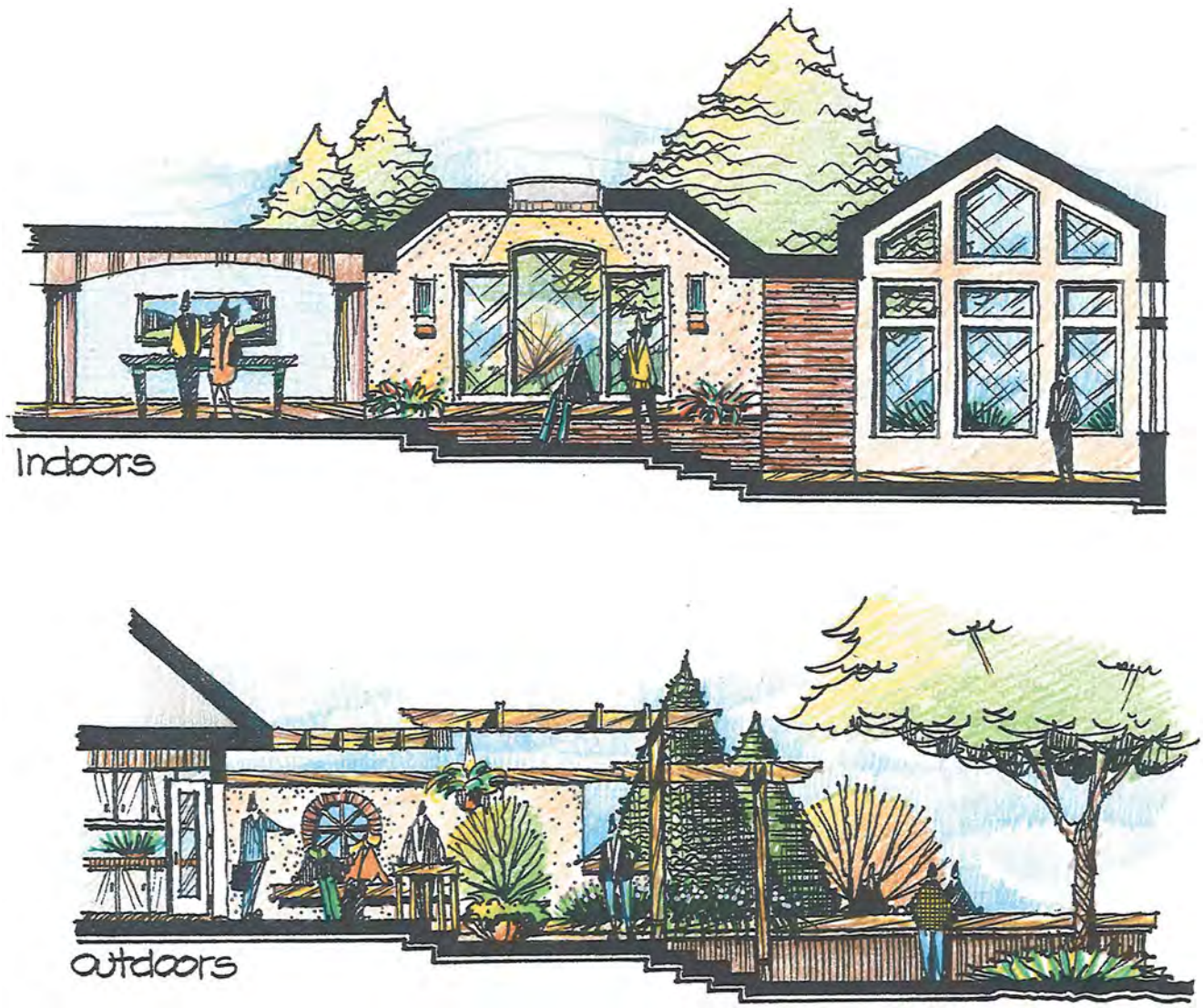


Figure 11–99
Outdoor ceilings can be just as spatially valuable as indoor ceilings.

Not only can ceilings be altered to provide for different senses of scale, they can also be designed with varying degrees of openness for functional and aesthetic purposes. Figure 11–100 shows an outdoor structure that primarily serves as a shelter from the elements. Yet, portions of the structure hover over other parts of the space to create a patterned overhead plane, as well as places for hanging plants.

Figure 11–101 shows a structure that is supported partially by the fence. This overhead structure provides shelter from the elements over the table space and identifies a subspace beneath the lower patterned overhead to the right.

Depending on the situation, there may be times when there is no need to create a sheltered area, especially where houses have screened-in porches. In cases like these, clients may wish to have some partial protection from the hot afternoon sun. Figure 11–102 demonstrates how a patterned overhead arbor can be used to provide protection from the sun. The fence in the background, with a partially open central panel, was designed to accent this area beneath the arbor.

Figure 11–100
Overhead structures can provide protection from sun and rain.



Figure 11–101
Overhead structures can be partially solid and partially open for varied use.

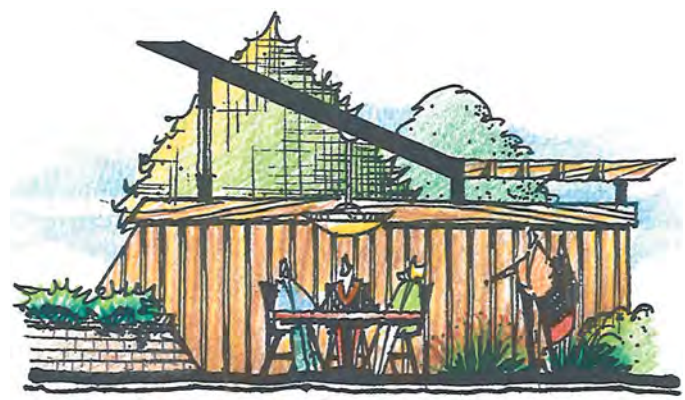


Figure 11–102
Arbors can provide partial protection from the sun and create interesting shadow patterns.



Arbors can also cast interesting shadow patterns on the ground and vertical planes. These shadow patterns provide texture and depth to an outdoor space and, by changing throughout the day, give it a dynamic, evolving quality.

In addition to ceilings being varied in height and in openness, it is important to use them to support other spatial furnishings. Figure 11–103 shows three examples of how overheads can be varied in height, character, and pattern and can provide places for hanging potted plants, swings, and lights.

ARCHITECTURALLY RESPONSIVE STRUCTURES

Four examples will be presented to illustrate how architectural character of the house can be incorporated into a designer's thought process and design studies. Each figure depicts how (1) a patio, (2) a fence/wall, and (3) an overhead structure could be designed to reflect the architectural character of the house. It is assumed at this point in

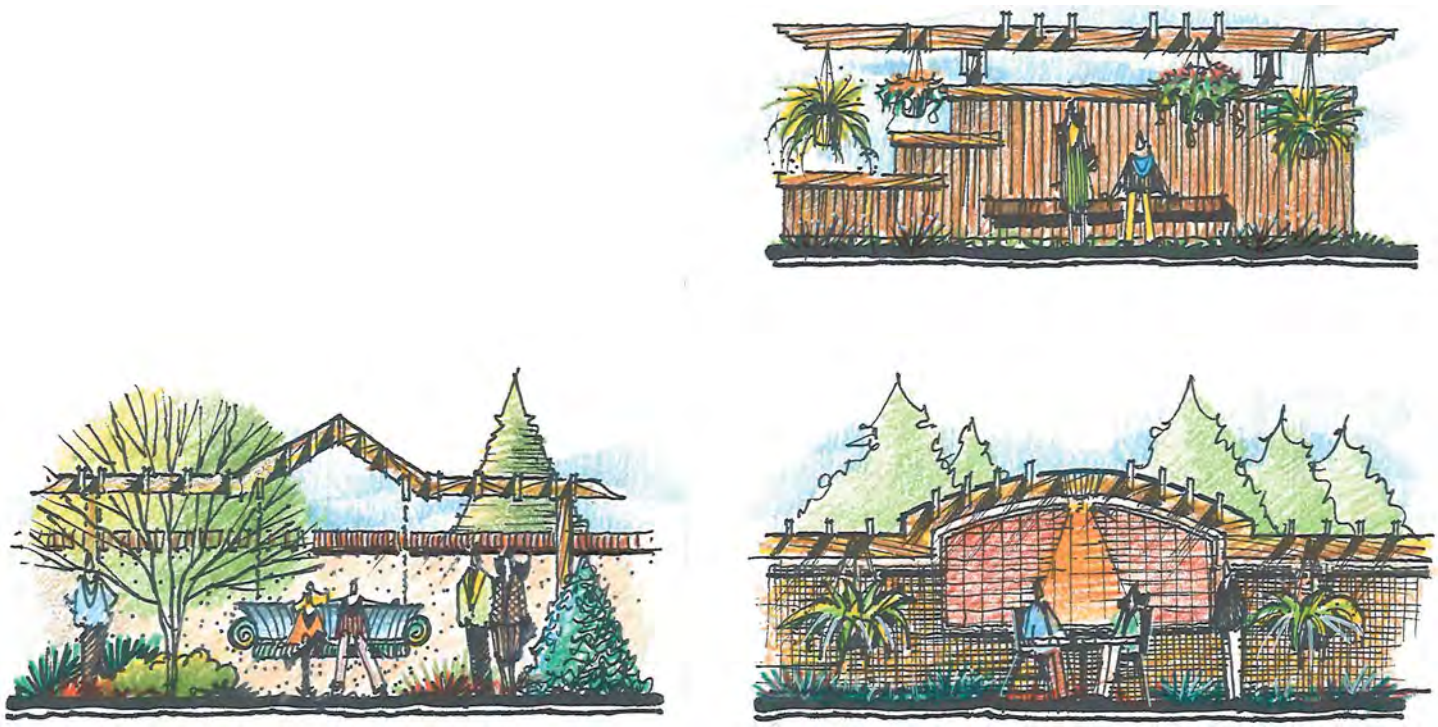


Figure 11–103
Overhead structures can support hanging plants, swings, and lights to help furnish the space.

the process that the major design theme and forms have been selected. So, the designer's next step is to create the vertical and overhead structures in an architecturally sensitive manner and to be reflective of the form composition.

In Figure 11–104, the patio was generally modeled after the major front window. The arch is the key accent of the patio layout. The majority of material could be concrete or stone to match the patterns of the windowpanes.

The wall is made of brick and changes direction and elevation to reflect the angles of the roofs of the house. This allows for some strong privacy to the right side of the yard, where it might be needed, and more open space to the left, where views are important. An arched entryway provides an accent to the low wall. The circular opening in the high wall provides a view into a pleasing area beyond. It mimics the character of the decorative vent above the garage door.

The overhead arbor was designed to have simple repetitive arches, similar to the main entry arch. It would be supported by columns that would have some detail taken from some of the interior or exterior trim work.

A much different house is pictured in Figure 11–105, so it is likely that the three hardscape structures would look much different than the previous ones. Because of its height and contrasting colors, the large gable on the second floor is a strong architectural feature. As you can see, the patio was designed to resemble this gable pattern. The edges of the patio could be landscape timbers that are stained to match the wood trim on the house. The light-colored material could be concrete to match the stucco in color and texture, or concrete pavers with a light color. The central portion of the patio is an accented area reflecting the window area. In this example, a basket-weave brick pattern at a 45-degree angle was selected.

The fence is modeled after three elements. The lower portion is a paneled system that reflects the panels of wood and stucco on the house. The wooden open

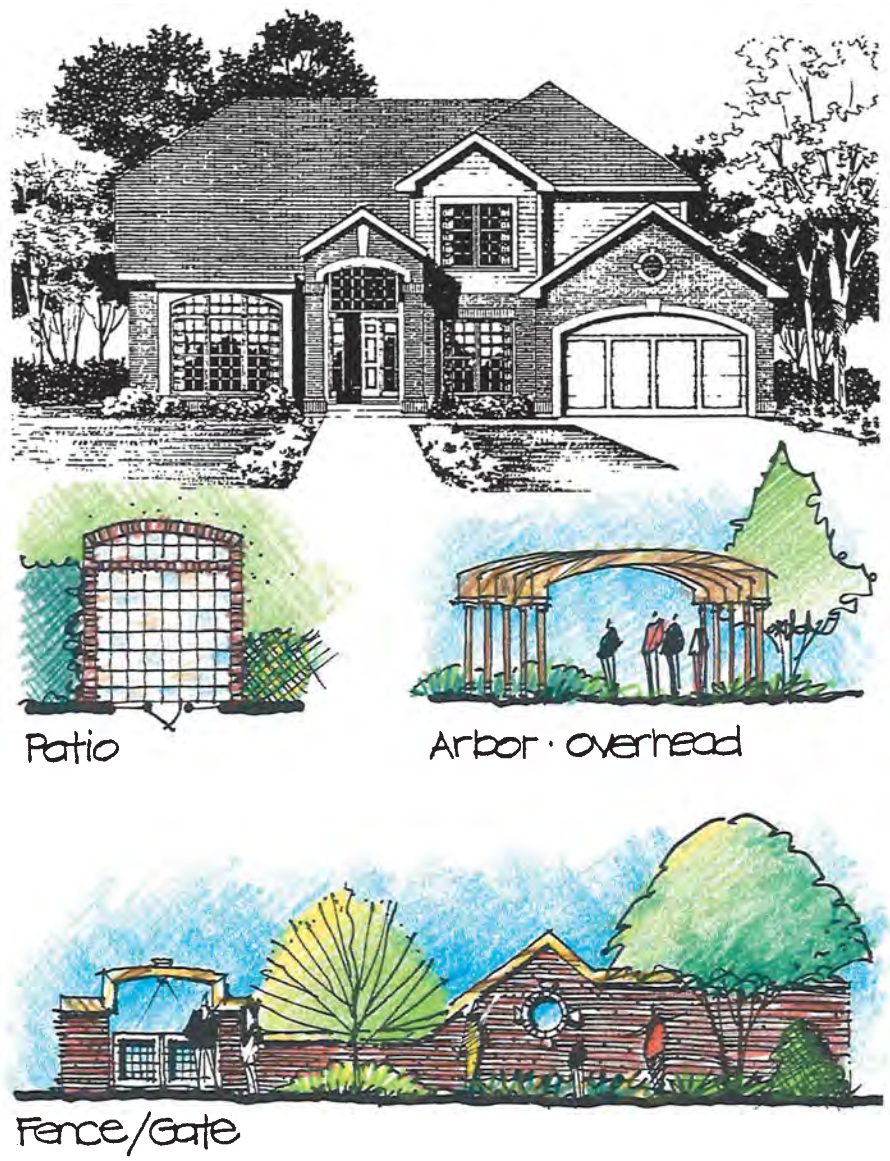


Figure 11–104
The patio, wall, and arbor are modeled after the character of the house. Design #N3452 (top) © Home Planners, LLC Wholly owned by Hanley-Wood, LLC. Blueprints available, 800-322-6797.

grillwork above the fence is meant to be similar to the windows of the house. This type of grillwork can serve as an excellent structure for growing vines. The gated area is reflective of the window patterns and the peaked roof.

The design for the overhead structure was related specifically to the entry way detail at the front of the house. The small, curved brackets reflect the same brackets seen as detail just beneath the large second-story gable.

Figure 11–106 shows another example. The major patio spaces were designed to reflect the double gable to the left side of the house. The top level is a stone terrace that steps down to a wood deck, which then steps down to the lawn area. The stone and wood patterns are used in a very similar fashion to how they are used on the front of the house.

The privacy fence extends from one end to the other. It is constructed of material and color similar to the horizontal wood siding on the house. A window box with plants was placed on it to resemble the window box on the front window of the house. The fence was also designed to have an accent area, in this case a place to grow

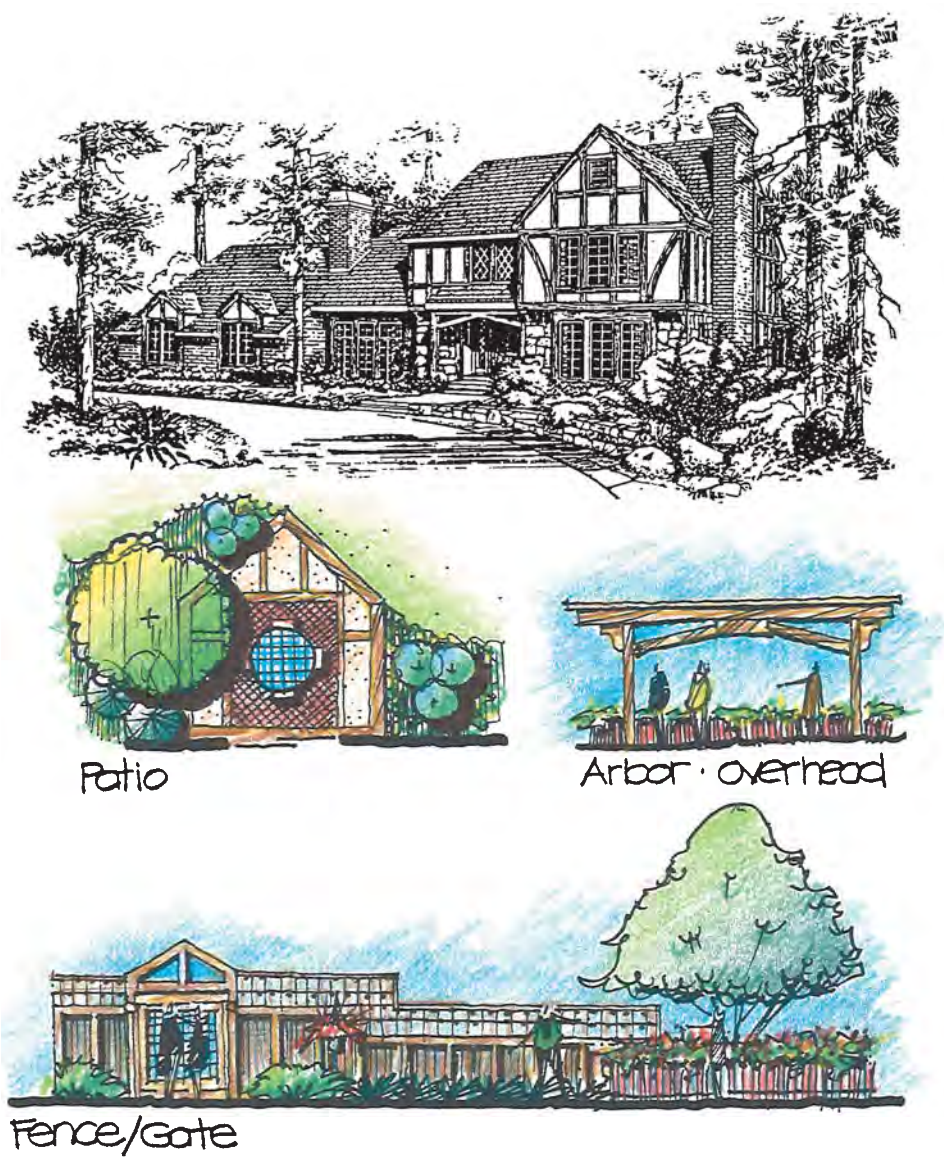


Figure 11–105
The patio, wall, and arbor are modeled after the character of the house. Design #N3452 (top) © Home Planners, LLC Wholly owned by Hanley-Wood, LLC. Blueprints available, 800-322-6797.

some vines. This area was accented by using the arch from the front porch and a grillwork to match the windowpane pattern.

The overhead gazebo was developed from the design of the arches on the front porch, including the columns. The roof was made into a hip roof to reflect both angles of the roof.

The last example to illustrate architectural attention in the spatial composition phase is shown in Figure 11–107. Here the patio was designed to reflect the major window designs in the front of the house. The patio might be made of concrete, and the banding and borders could be brick to match the brick on the house. Even though the major windows have large wood members as borders to the window, that doesn't mean the patio has to be done in the same way. Again, landscape structures can be modeled after a feature to whatever degree the designer feels it could be or in whatever way that seems appropriate to the materials being used.

Brick is used to create a low wall to lean or sit on, as well as for the higher wall to the right. An open, wood grillwork is also used here to provide a place for vines.

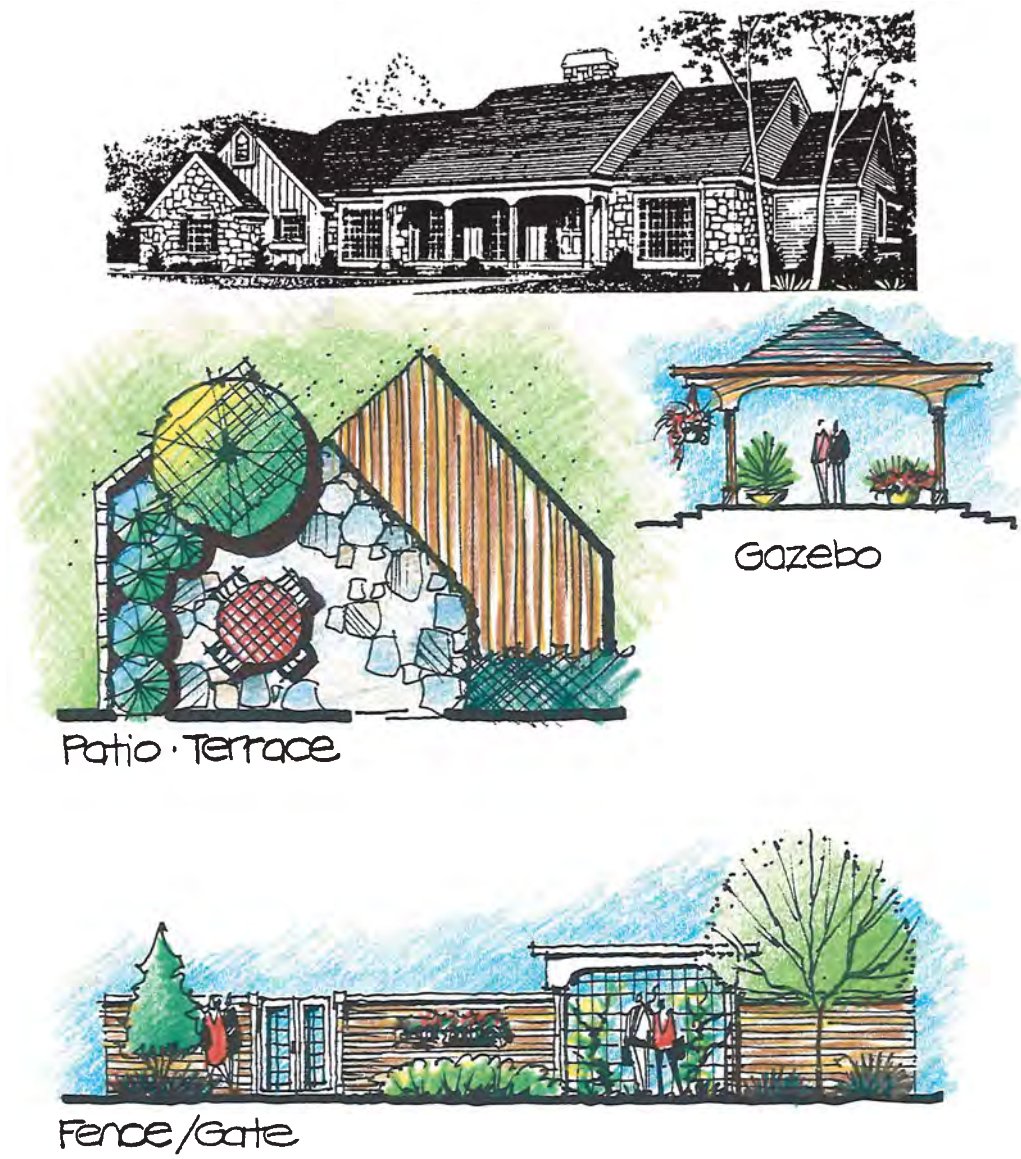


Figure 11–106
The patio, fence, and gazebo are modeled after the character of the house. Design #N2791 (top) © Home Planners, LLC Wholly owned by Hanley-Wood, LLC. Blueprints available, 800-322-6797.

This will eventually provide a partial view into the space beyond. The wall is angled to a peak to match the peak and pattern of the roofs.

The overhead arbor is a simple structure that uses the exact pattern of the wood eaves and trim work at the major peaks of the house. The arbor is shown to rest on a lower brick wall that could provide for partial enclosure. This, too, is seen at the base of the major windows in front of the house.

Developing the character of the hardscape structures can be an exciting design adventure during the spatial composition phase. Creating floors, walls, and ceilings to have architectural detail that is responsive to the house is something that should be done for all landscape designs, because these are highly visible three-dimensional objects in the landscape. What better way to design these structures than to blend them into the landscape with the same character as the house?



Figure 11–107
The patio, wall, and arbor are modeled after the character of the house. Design #N3351 (top) © Home Planners, LLC Wholly owned by Hanley-Wood, LLC. Blueprints available, 800-322-6797.

DUNCAN RESIDENCE PRELIMINARY DESIGN

After reviewing the three form composition studies prepared earlier in Chapter 10, the designer decided to develop two preliminary designs. The preliminary design shown in Figure 11–108 was prepared on the basis of the form composition study of Figure 10–79, whereas the preliminary design in Figure 11–109 was prepared based on the form composition study of Figure 10–80. It is suggested that the reader take a moment at this point to compare the preliminary designs with the form composition studies. As can be seen, the preliminary designs have essentially completed the spatial composition with the addition of plant materials, fences, and pavement.

In Figure 11–108, plant materials and other elements reinforce the organization of the form composition in a number of locations. In the front yard, low evergreen shrubs and ground cover along the entry walk help to define this space and separate it from the lawn area, and ornamental shrubs have been placed next to the sitting area as accents. All the new planting has been organized around the existing

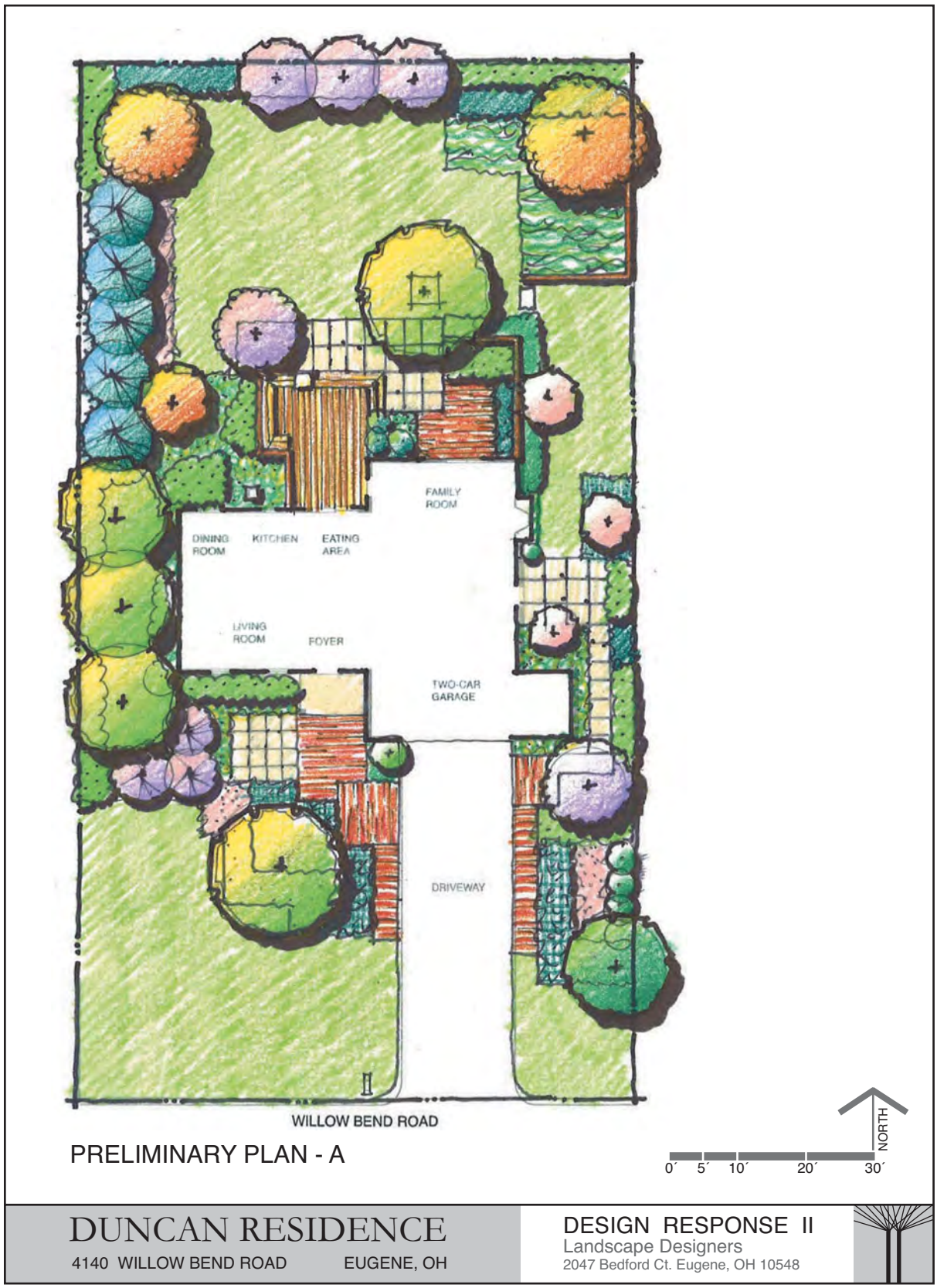


Figure 11–108
Preliminary Plan A for the Duncan residence.

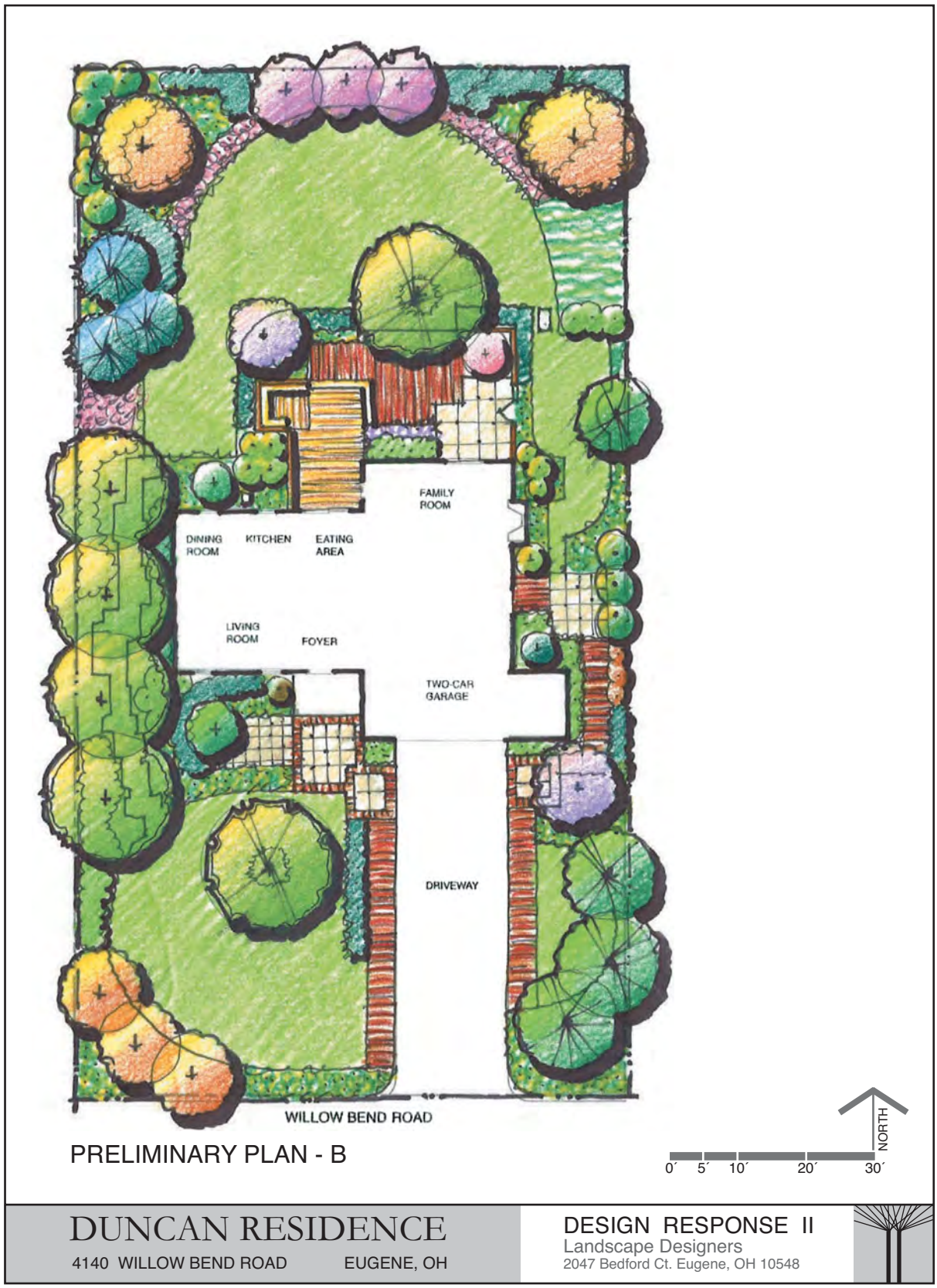


Figure 11–109
Preliminary Plan B for the Duncan residence.

sugar maple. Additional shade trees have been located along the west side of the house to screen hot afternoon summer sun. The planting on the east side of the driveway provides balance to the front yard while incorporating the existing trees and screening views of the work/storage area. In the backyard, the largest plants have been placed along the property lines for screening and spatial enclosure. Evergreen trees on the west side screen views from the neighbor's second-story deck and block cold northwest winter winds. The ornamental trees on the north property line provide focal points to view from the house and the outside eating and living areas. Fences immediately adjacent to these outside living spaces provide additional enclosure and privacy.

The thoughts for the preliminary design shown in Figure 11–109 are similar. In the front yard, low shrubs, ornamental trees, and medium-sized trees have all been used to accent the curve of the arc on the ground plane. The planting immediately adjacent to the entrance walk is more limited, thus allowing the existing sugar maple to stand out in the lawn as a prominent focal point. Again, an ornamental shrub is used near the sitting area as an accent. In the backyard, the planting concept is very much like that depicted in Figure 11–108, except here it has been molded to the curve of the arc. The ornamental trees again serve as accents and are strategically placed at the apex of the curve, where they are most visible.

SUMMARY

Spatial composition addresses the third dimension of a residential site and creates the spatial shell of the design's outdoor rooms. Using form composition as a foundation, spatial composition studies the grading of the ground plane, steps, walls, fences, plant materials, overhead structures, and other architectural features that create outdoor space. All in all, the designer choreographs the experience people will have in the landscape. You should now know the following about spatial composition:

- Definition and purposes for grading
- Guidelines for grading a site to ensure proper drainage, including standards for slope steepness next to the house and on pavement, lawn, and planting bed surfaces
- Guidelines for designing safe steps
- Concepts for creating outdoor space and screening views by shaping the ground plane
- General categories of plant materials designated on a preliminary design
- Architectural, aesthetic, and engineering uses of plant materials on a residential site
- Steps of the planting design process and the purpose of each
- Planting design guidelines, including those that address massing, layering, overall design character, seasonal change, type of plant material and their uses, texture, and ecological habitat
- Graphic guidelines for drawing plants in a preliminary design
- Potential uses of walls and fences
- Effect of different heights and transparency of walls and fences on enclosure, views, and other uses
- Uses of overhead structures and how these vary with different heights and transparency
- Techniques for coordinating site structures with architectural features of the house

12

Material Composition and Master Plan

INTRODUCTION

As discussed in the previous three chapters, preliminary design addresses and studies two key issues. First, it establishes the two- and three-dimensional spatial frameworks of the outdoor environment through form composition and spatial composition. The two-dimensional forms creatively organize and coordinate three-dimensional elements such as earth, plant materials, walls, fences, and overhead structures to create outdoor rooms. Second, preliminary design studies the general appearance and style of the design. The design theme, the overall organization of design elements, and the tentative selection of materials collectively establish the visual character of the proposed design.

But as the name itself suggests, decisions made about these key issues are open to change. The designer often uses preliminary design as an exploratory step to study different ideas, especially if alternative design solutions are prepared. Furthermore, choices about materials are vague with only broad-brushed determinations (brick versus wood, evergreen versus deciduous, and so on) and little consideration for the exact texture, color, or pattern of the materials.

The more complete and detailed decisions about the design are made during the preparation of the master plan after feedback has been received from the clients regarding the preliminary design. The master plan builds on all the previous steps of the design process to formulate a proposed design that the clients will use to guide the development of their residential site. The master plan is the culmination of all the designer's efforts and is sometimes the end of the designer's involvement with the clients. Other times, the designer carries the project on to subsequent phases as discussed in Chapter 4.

This chapter presents criteria for selecting materials, a palette of potential materials, guidelines for their composition in the master plan, the process for preparing the master plan, and the master plan's graphic style and content.

MATERIAL SELECTION

The general selection of materials during preliminary design and the refined selection during the preparation of the master plan should be based on (1) function, (2) form, (3) style/character, (4) regional climate, (5) sustainability, (6) budget, and (7) availability. Additional consideration should also be given to the clients' preference, compatibility

with the architecture of the house, and regional appropriateness. Specifying the right material for any given element or area of the design should evolve from a thorough knowledge of materials and not be limited to the designer's personal preference.

Function

The appropriate material for a pavement, vertical surface, or overhead plane is partially dependent on when, how, and for how long the material is used. More specific considerations include what uses the material needs to support, whether the material is in contact with the ground, and the amount of exposure to sun, wind, and precipitation.

Form

The shape of all elements, especially pavement, has a direct bearing on what materials are suitable. Generally speaking, forms that are rectangular are better created with modular and unit materials that are themselves rectangular in shape, whereas more curvilinear shapes are better delineated by loose and/or pliable materials that can bend to flowing edges.

Style/Character

The style of the house and the intended character of the landscape should be considered before selecting materials. For example, gravel, rough cut stone, and naturally weathered wood are suitable for a rustic, unrefined, rugged landscape, whereas brick, cut stone, and metal are suggestive of a polished and urban setting.

Regional Climate

The amount, frequency, and timing of sun exposure, precipitation, frost, and even wind should have a direct bearing on material choice. Materials appropriate for a warm climate often do not work as well in a colder climate that experiences extreme temperature swings, frost, and winter snow. Similarly, dark-colored materials may be desirable in colder climates but not warmer ones because of the absorption and reflection of heat back into the air. Some materials weather fast and are slippery to walk on in areas of heavy rainfall.

Sustainability

As previously discussed in Chapter 3, every design proposal must consider its impact on the environment and should attempt to create a small footprint on the land. Some materials require the mining and use of scarce resources in addition to being manufactured many miles away from where they are to be used. Other materials recycle previously used materials and/or are derived from local sources. Furthermore, the toxicity and long-term maintenance of materials need to be considered.

Budget/Maintenance

The client's budget is a big factor in determining what materials are suitable for a landscape design. It is a waste of time to dream about expensive materials or devise elaborate patterns and construction methods if the client is on a tight budget. Furthermore, no client wants to spend more money than necessary, so it is always advisable to select materials with cost in mind.

Availability

Only local materials or those that are easily acquired should be used in the landscape for both budget and sustainability considerations. Nevertheless, there are circumstances when a unique material or installation technique for a special feature and outdoor space warrants inclusion.

PAVEMENT MATERIAL PALETTE

The following paragraphs outline the different categories of pavement materials typically used on a residential site. The summary of pavement materials focuses on their appearance and design character, but does not discuss their recommended installation techniques. The reader should consult other sources for this information. Pavement or hardscape materials are categorized according to their physical characteristics as (1) loose materials, (2) unit materials, and (3) adhesive materials.

Loose Materials

Loose materials, also called "aggregates," are small individual stones or chips that are amassed as a pavement surface without being physically held together by an adhesive. The material is put down on the ground to a desired depth and held in place by a containing edge. The most common loose materials include gravel and various recycled materials.

Gravel Gravel is a small stone that is between 1/4″ and 3/4″ in size (Figure 12–1). Two common types of gravel are bank run gravel and pea gravel, so named because of its pea size. Both types of gravel are rounded, and so individual stones easily move against one another. Consequently, most gravel has a slight give to it underfoot that is often accompanied by a distinct crunching sound. A potential range of colors including black, gray, buff, golden yellow, red, and off-white augment the appealing texture of gravel. A particular mixture of gravel may consist of one color or be an assortment of many colors, giving it a more mottled appearance.

Gravel has a number of uses as a pavement surface in the landscape, including:

- to create an informal and naturalistic character like a garden path or walk through a wooded area.
- to define secondary walks or infrequently used spaces. Gravel is potentially difficult to walk on or to push wheeled equipment across and so should not be used for frequently used spaces or paths.
- to define curvilinear surfaces or irregularly shaped areas. Because gravel has no predetermined shape, it can be easily molded to any form on the ground plane (Figure 12–2).
- to establish an attractive, pliable texture on the ground plane.
- to furnish a textural contrast with smooth or precisely edged pavement materials (Figure 12–3).
- to serve as a ground cover in arid climatic zones or other locations where it is difficult for plants to grow.



Figure 12–1
Typical gravel size.

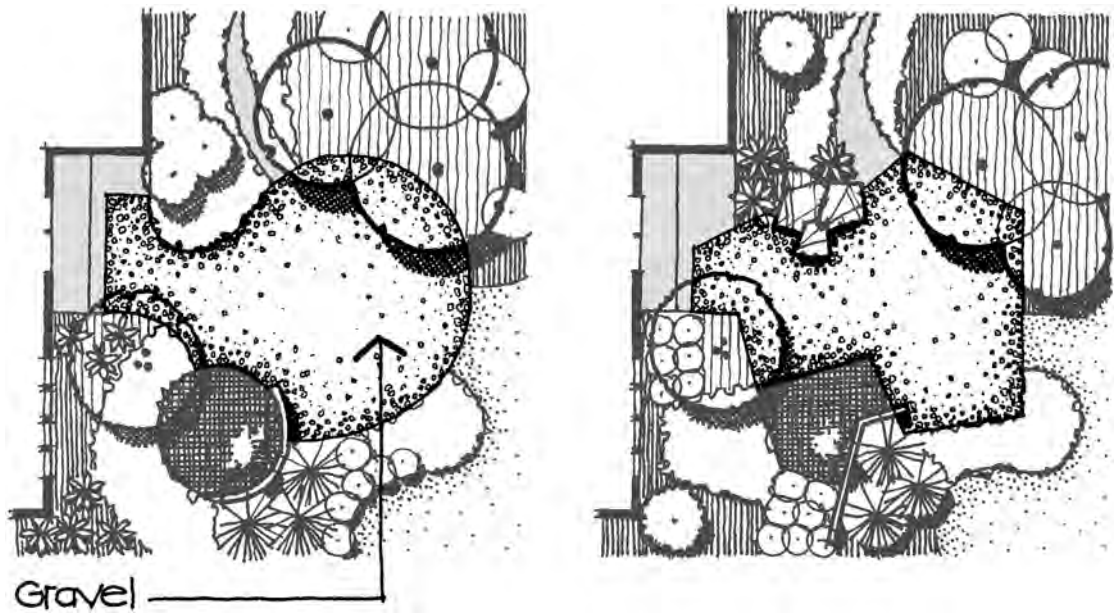


Figure 12–2
Gravel readily defines curved and irregular paved areas.

- to produce a permeable pavement surface. Gravel is ideal for the sustainable landscape where the objective is to minimize surface runoff (also see Chapter 3).

The loose quality of gravel is a potential disadvantage and so it should not be used:

- for pavements where there is a need for snow removal.
- where there is need for low maintenance. Gravel is easily kicked or tracked out of its location and carried to adjoining areas of the landscape, thus requiring extra upkeep.

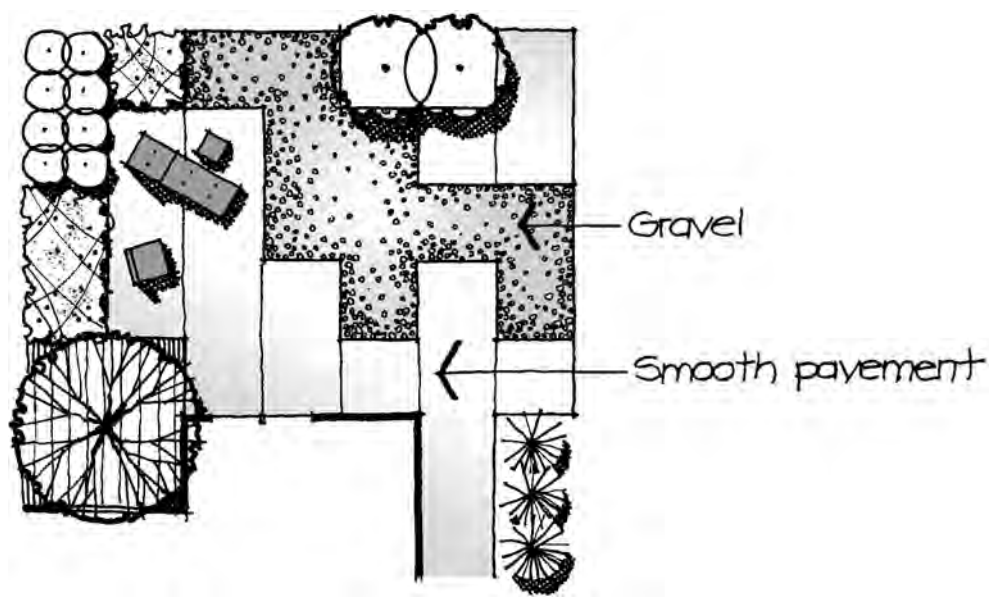


Figure 12–3
Gravel can provide textural contrast with smooth pavement.

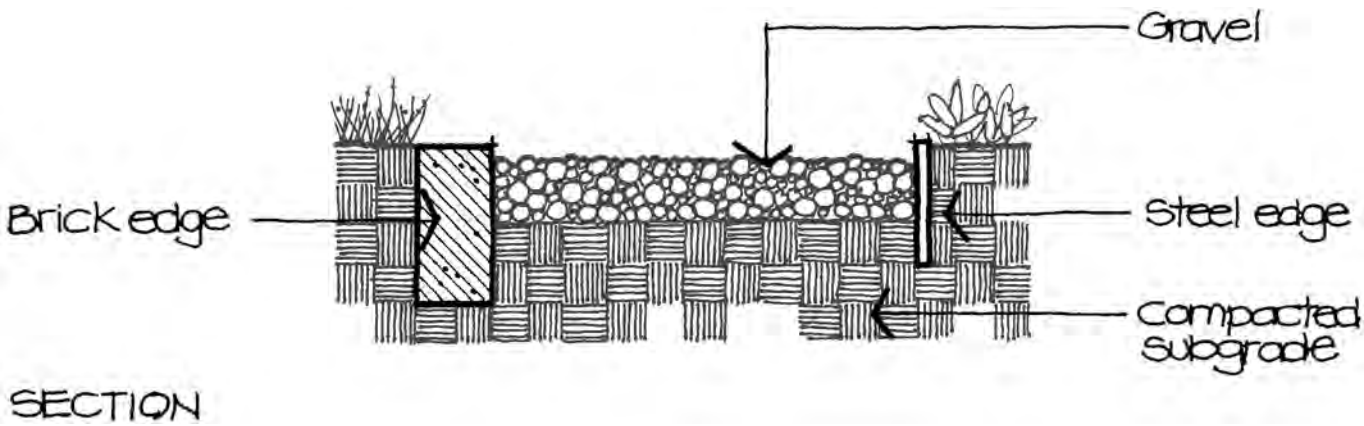


Figure 12–4
Gravel needs to be contained on its edges.

The principal recommendation for designing with gravel is that metal or plastic edging, wood, or another pavement material should contain it (Figures 12–4 and 12–5). Without an edge, gravel is a formless material that has indistinct edges that merge into surrounding areas.

Recycled Materials There are several recycled materials that are available in an aggregate form much like gravel. The most notable among these is crushed recycled glass, a relatively new pavement material that has become available in the past five years because of the general movement toward finding new uses for discarded materials. Glass from bottles and other products is crushed and then tumbled to slightly round off jagged edges and points. The result is smoothed angular aggregate that can vary in size from 1/8″ to 1/2″ across, although most glass used for pavements is in the smaller size range (Figure 12–6). The unique aspect of recycled glass in comparison to more traditional pavement materials is its availability in a range of bright, vibrant colors in addition to clear glass. The limitations and design guidelines for recycled glass and other recycled materials are similar to those for gravel.

Recycled crushed glass is a specialty material that can be used in the landscape to:

- create areas of bright color that sparkles in the sun light. Like gravel, the color may be uniform or a mixture of a range of colors.
- produce an animated, glittering look that changes with the angle of the sun and direction from which it is viewed.

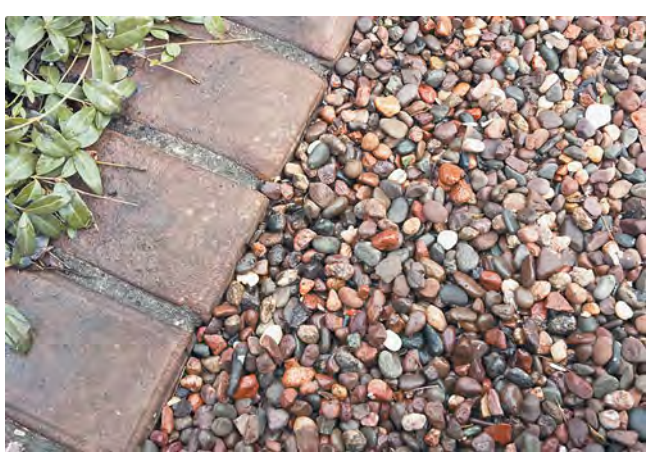


Figure 12–5
Example of a brick edge containing a gravel pavement.



Figure 12–6
Example of recycled glass.

- establish a decorative contrast to more earthy ground plane materials.
- produce a contemporary character and/or compatible fit with hot, arid climates where bright colors are more easily absorbed into the landscape.
- produce a permeable pavement surface like gravel.

Other recycled materials that can be used as pavement are shards from shattered clay pots and ground rubber produced from tires. Crushed clay pots create an angular, irregular aggregate that varies from about 1/2″ to 2″ in size depending how much it has been broken. Clay pot fragments furnish a walking surface that has a deep red color and a distinct texture (Figure 12–7). Ground rubber, or crumb rubber, generally varies in size from 1/8″ to 1″. The color is usually black, although it can be purchased in dark browns, a range of brick reds, or other colors depending on the manufacturer. Crumb rubber can be used as a loose material like gravel to produce a soft, flexible surface that gives somewhat underfoot or to provide a safe surface under play areas.

Unit Materials

Unit materials are found or manufactured in fixed sizes and shapes, such as stone, brick, tile, concrete pavers, and wood. Generally, unit materials are more expensive to use than either loose materials or adhesive materials because they require more labor to quarry, manufacture, and install.

Stone Stone is a unit material that embraces a broad range of types and shapes depending on where it is found and how it is processed for use. The most common categories

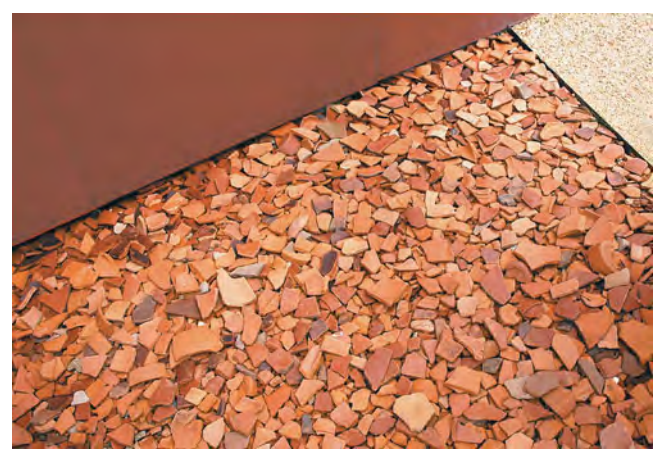


Figure 12–7
Example of shattered clay pots used as a pavement surface.



Figure 12–8
Example of attractive irregularity and coloration of fieldstone.

of stone include fieldstone, quarried stone, and riverstone. These types of stone have numerous shapes, colors, and uses as outlined in the following paragraphs.

Fieldstone Fieldstone is any irregularly sized and shaped stone randomly found at or near the earth's surface without quarrying. Fieldstone may be angular or somewhat rounded depending on its geological source. Fieldstone is typically used in the form in which it is unearthed and can be employed in the landscape to:

- create a naturalistic, rugged surface characterized by random sizes, nonuniform shapes, bumpy surface texture, and deformities. Some fieldstones are further noted for fossil imprints, embedded aggregates, and/or erratic veining of color (Figure 12–8).
- define secondary paths or infrequently used spaces (Figure 12–9). Fieldstone's irregularity makes it a potentially difficult surface to walk across, especially for anyone with walking impairments. Additionally, fieldstone may not provide an even, level surface for outdoor furniture.

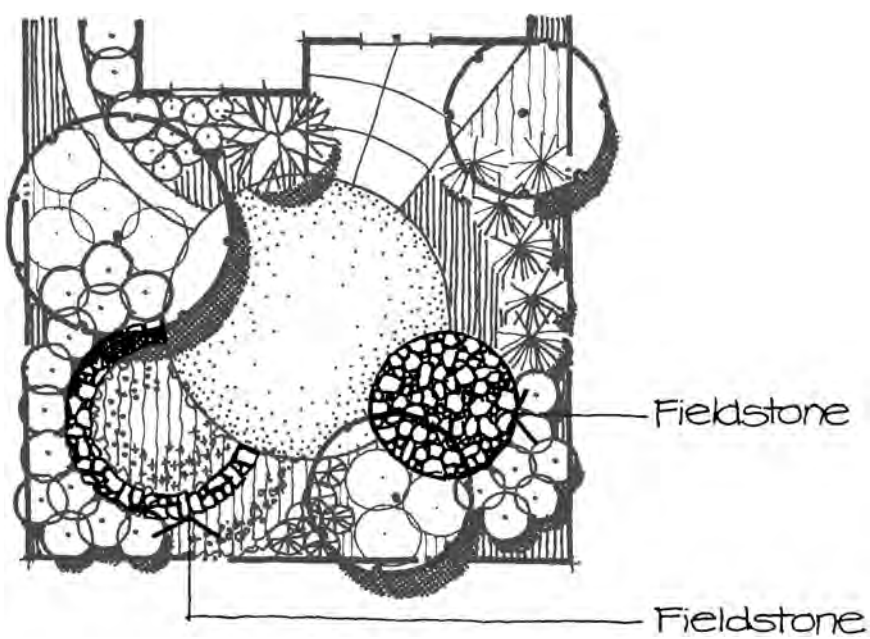


Figure 12–9
Fieldstone is best used as pavement in secondary use areas.



Figure 12–10
Use of fieldstone to create broken joints for stepable groundcovers.

- establish a visually broken surface with joints filled with gravel, grass, stepable ground cover, and so on (Figure 12–10). Because of the irregular nature of fieldstone and the challenge of putting oddly shaped pieces together, it is easier to establish a fragmented pavement surface than a continuous one.
- establish a contrast in texture and shape with pavement materials that are more uniform and smooth.

Quarried Stone As the name implies, quarried stone is any stone that is obtained through a mining-like process that removes the stone from the earth and cuts it into a desired size and shape. The exact appearance of quarried stone varies widely depending on the geological source of the stone and how it is processed.

Flagstone is one of the most common types of quarried stone and is characterized by being split into relatively thin slabs or "flags" that are customarily 1″ to 1–1/2″ thick. Unlike fieldstone, flagstone is typically cut into either irregular, polygonal shapes or rectangular shapes (Figure 12–11). The size of individual flags usually fluctuates from 1 foot across or less to 3 feet, although larger slabs are available. The typical color of flagstone varies from gray to a limestone yellow, including many subtle variations of gray that are shaded with blue (often called bluestone), buff, light red, or brown (Figure 12–12). Flagstone is much more expensive than fieldstone.

Flagstone is suitably used to:

- create a smooth surface that simultaneously suggests refined permanence and an association with nature.
- establish a relatively dark gray surface that has subtle variations in tone and color.

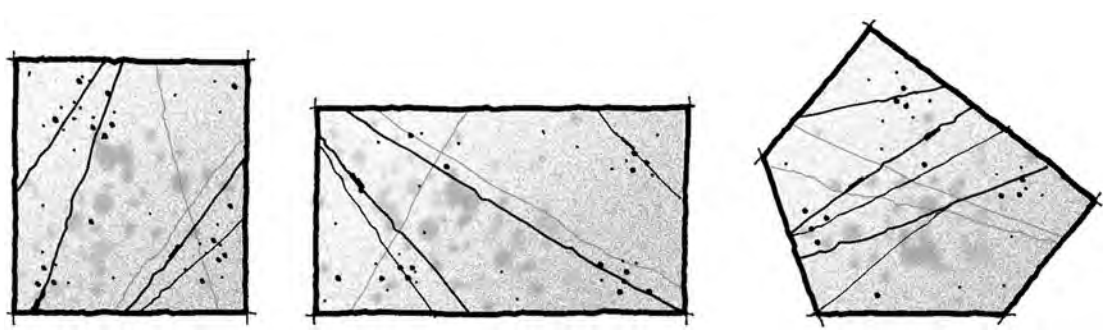


Figure 12–11
Typical flagstone shapes.



Figure 12–12
Typical flagstone colors.

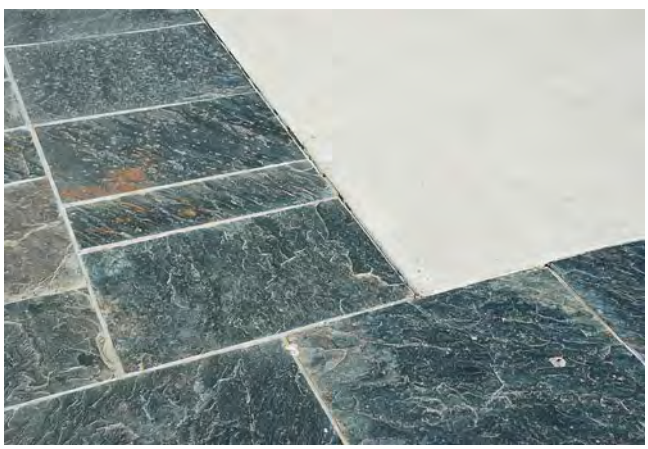


Figure 12–13
Example of flagstone contrasting an adjoining smooth pavement.

- establish a contrast in shape and character with uniform, fabricated pavements such as concrete (Figure 12–13).
- produce either directional or static patterns depending on the shape and organization of the stone (Figure 12–14).
- like fieldstone, establish a visually broken surface with joints filled with gravel, grass, or stepable ground cover or a continuous surface if the stones are tightly spaced and mortared in place.

There are other types of quarried stone as well. Many are stones cut into precise square and rectangular shapes from limestone, travertine, and quartzite. Colors vary

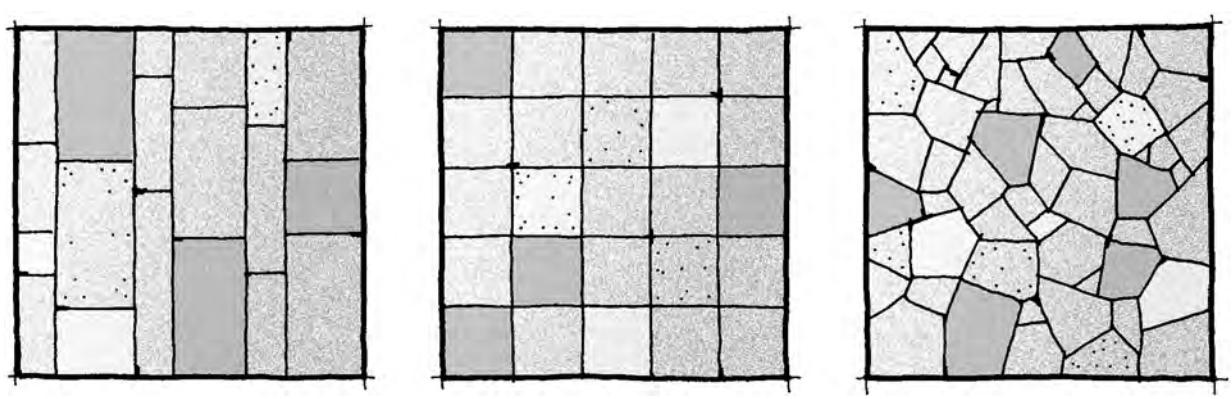


Figure 12–14
Flagstone patterns.



Figure 12–15
Subtle color variations of cut stone.

widely but typically include yellows, warm buffs, rose reds, and so on (Figure 12–15). These stones are sometimes sanded or slightly polished to give them a highly refined appearance. Cut stone is relatively expensive and so is commonly reserved for clients who have more expansive budgets. Precisely cut stone can be used to:

- create elegantly smooth pavement surfaces that are often accented by attractive veining of color.
- express a refined and formal design style.
- be visually compatible with rectangular paved areas.

Another form of cut stone is tumbled stone. This stone is rectangular in shape, usually thicker than flagstone, and characterized by slightly rough or irregular edges (Figure 12–16). Some tumbled stone resembles concrete pavers, although it costs more per square foot. Tumbled cut stone can be used to:

- give a paved surface an aged or antique appearance.
- define edges and nonwalking surfaces because of its relatively rough quality.
- create either rectangular or circular patterns.

Riverstone Riverstone is a round stone that has been shaped by the force of moving water over thousands of years. It is obtained from riverbeds and lakeshores, thus sometimes being referred to as "river wash." The normal size of riverstone used as a pavement material is from 1″ to 2″ even though larger dimensions are available for other landscape applications. Riverstone is routinely black, gray, tan, wheat yellow, or off-white (Figure 12–17). Most riverstone possesses a uniform surface color; some possesses a mottled appearance with specks and streaks of different colors.

Riverstone is appropriately used as a pavement material to:

- provide a distinct bumpy texture of numerous rounded stones partially protruding up from the pavement surface (Figure 12–18).

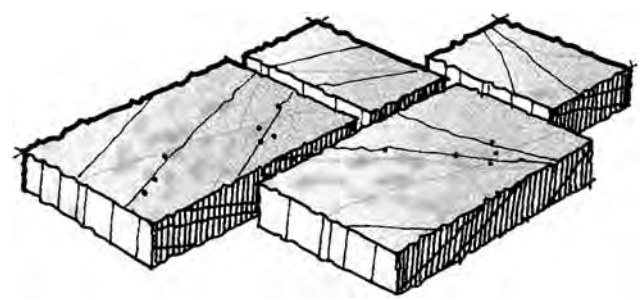


Figure 12–16
Appearance of tumbled cut stone.



Figure 12–17
Assorted examples of riverstone.



Figure 12–18
Appealing texture of riverstone.

- similarly, provide textural contrast to smoother pavement surfaces and/or establish a decorative surface treatment.
- slow the rate of movement across an area. Riverstone is comparatively difficult to walk on and so tends to reduce the pace of walking across it.
- define nonwalking areas. Riverstone can be used to discourage a space from being used or serve as a warning edge along another, smoother pavement material (Figure 12–19).

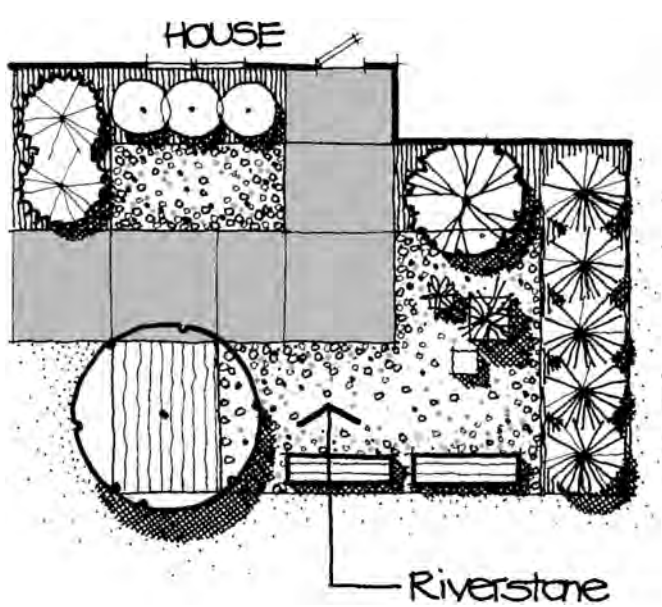


Figure 12–19
Use of riverstone to define a nonwalking surface.

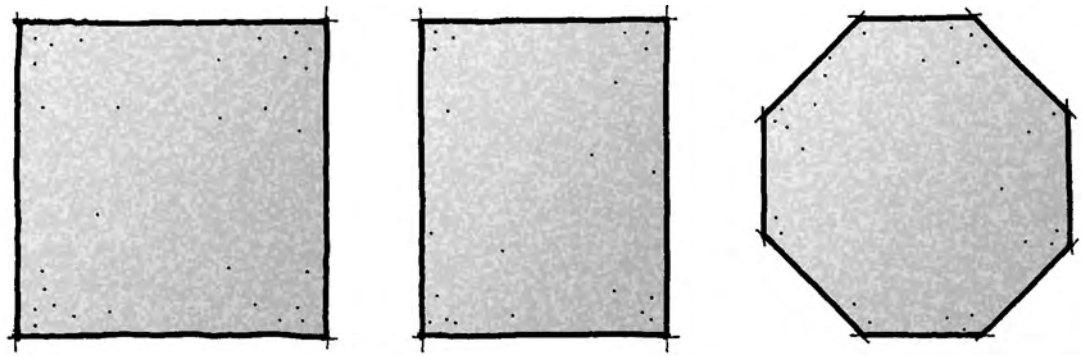


Figure 12–20
Examples of precast concrete.

Precast Concrete Precast concrete pavement looks very similar to cut stone except that it is fabricated. The term *precast* means that the concrete is poured into a reusable mold in a manufacturing plant, cured, and sold as a unit pavement material. Most precast concrete is square or rectangular in shape with a smooth, concrete-gray surface (Figure 12–20). Other shapes, such as octagons, and colors are also available. The size of most individual precast concrete paver units is between 1 and 2 feet across. Precast concrete pavers cost less that similarly sized and shaped cut stone because they are mass-produced.

Square and rectangle precast concrete pavers are suitable to:

- create the appearance of cut stone, but for much less cost. Consequently, precast concrete is a good option for a budget-minded client.
- produce unique patterns based on different colors of concrete units (Figure 12–21).

Figure 12–21
Example of mixing different colors of precast concrete units.



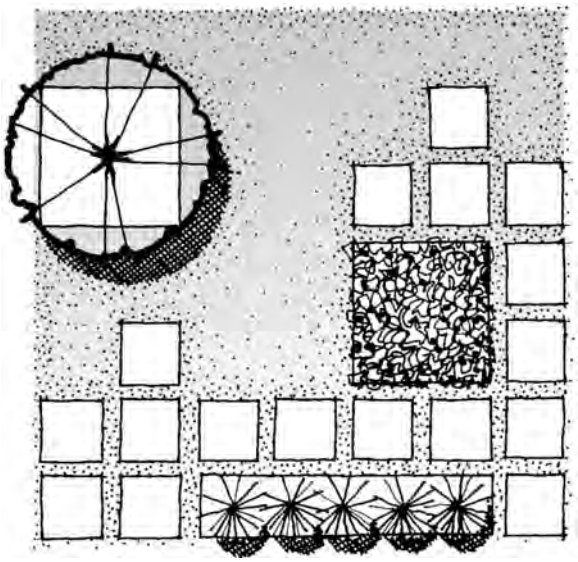


Figure 12–22
Precast concrete units separated by a small space for vegetation.

- establish a continuous surface if the paver units are tightly spaced and mortared in place or a visually separated surface with joints filled with gravel, grass, or stepable ground cover (Figure 12–22).
- produce a permeable pavement surface if the joints are filled with ASTM #8 or #9 gravel or lawn.

Precast concrete is also available in blocks that look like flagstone. The paving block is again manufactured in a mold that produces a unit resembling a group of individual stones mortared together side by side (Figure 12–23). The shape of this unit is such that it can be added to other units in a modular form to cover an entire paved surface. A quick glance suggests that the pavement is composed of different "stones," though a closer inspection reveals the repetitive nature of the pavement. This is a viable, cost-effective alternative to stone. This type of precast concrete paver has similar uses as fieldstone except that it establishes a more uniform surface with tight joints between the modular units.

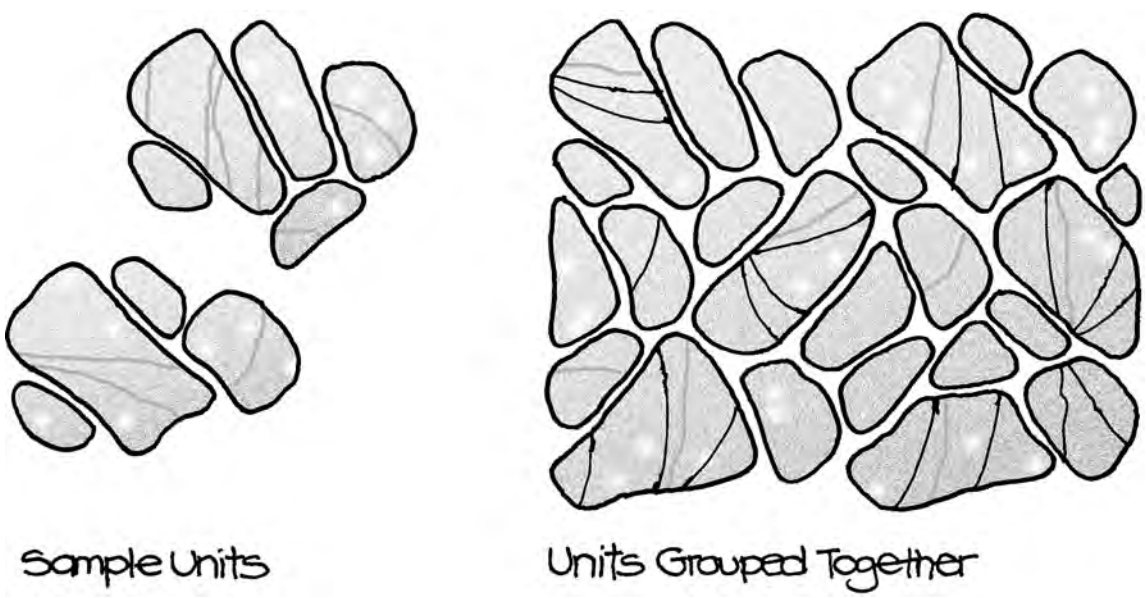


Figure 12–23
Example of precast concrete units that replicate the appearance of flagstone.

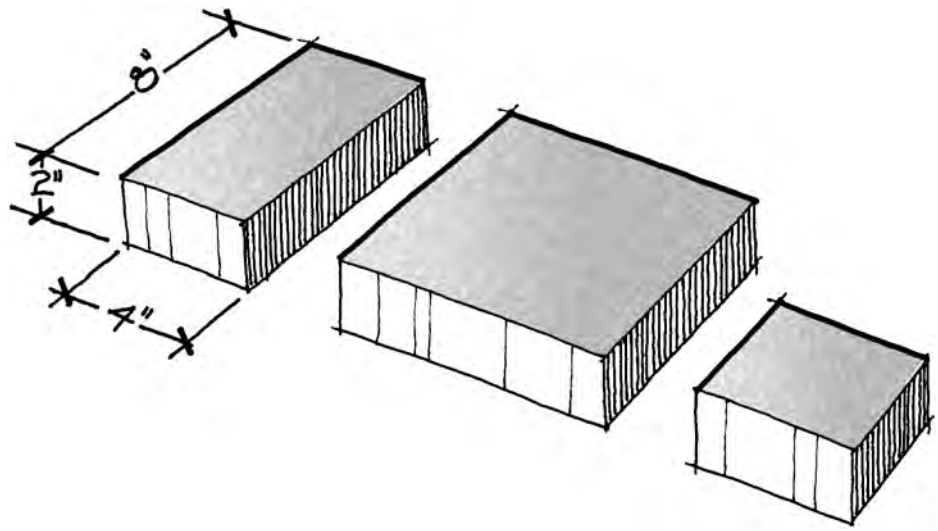


Figure 12–24
Typical shapes and sizes of concrete pavers.

Concrete Pavers Concrete pavers are another form of precast paving units with an extensive range of potential shapes and colors. Consequently, concrete pavers are one of the most popular and widely used pavement materials on the residential landscape. The most common form of concrete paver is the brick shape that measures about 2″ × 4″ × 8″. In addition, concrete pavers are obtainable in rectangles, squares, octagons, and a host of other shapes that fit together in a modular fashion (Figure 12–24). Some concrete pavers have a cleanly defined form; others possess a tumbled appearance with rough edges. Potential colors range from brick-like reds to various shades of gray, buff, tan, and brown (Figure 12–25). Each manufacturer has its own color palette, so it is best to contact them to determine the exact colors available.

Another variable of concrete pavers is the ability for some of them to interlock with each other. Many concrete paving units are simple, flat-sided forms like brick that fit together by adjoining the straight edge of one with another. However, other concrete pavers are fabricated with a more elaborate profile so that they interlock with adjacent paver units of the same shape (Figure 12–26). Some of these interlocking units look like they are separate pavement blocks on the surface but are actually one unit. Interlocking concrete pavers have the advantage of forming a structurally strong pavement surface that supports more weight in comparison to a pavement composed of many flat-sided units.

One specialized type of interlocking concrete paver is permeable pavement. Although the exact form varies with manufacturer, some have holes cut in a corner,



Figure 12–25
Sample concrete paver colors.

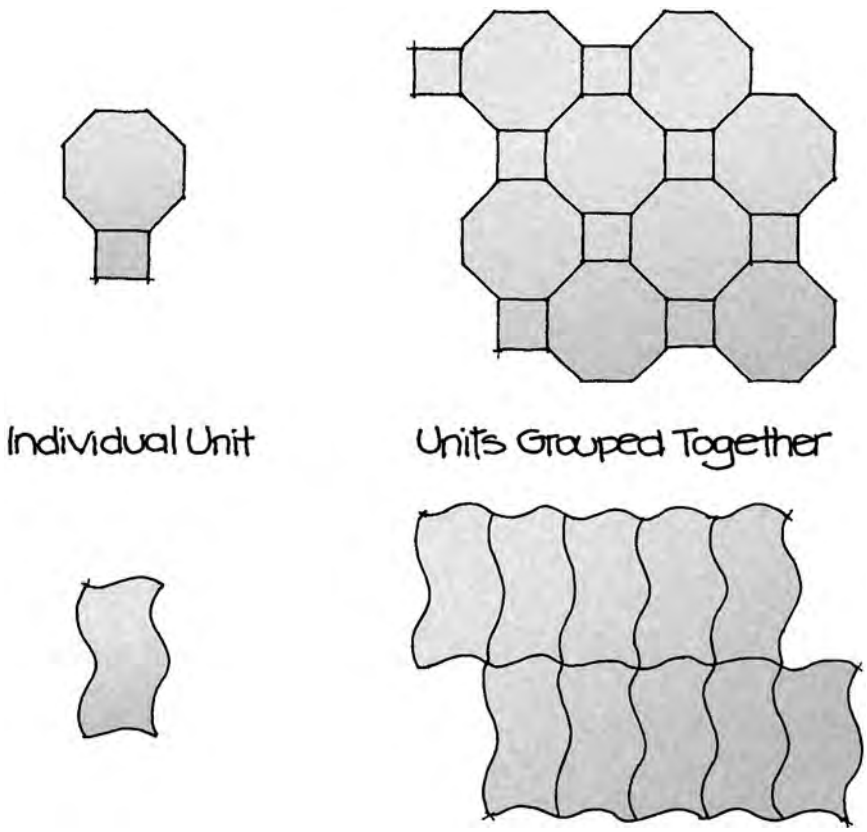


Figure 12–26
Examples of interlocking concrete pavers.

whereas others possess small protrusions along their sides (Figure 12–27). When assembled together, these pavers create spaces between individual units that should be filled with ASTM #8 or #9 gravel to allow water to percolate to the ground below (Figure 12–28).

A distinguishing quality of all concrete pavers is the diverse range of possible patterns that are available as standard designs for any given product line (Figure 12–29). Some potential patterns mimic brick (see Brick, later), whereas others resemble stone in both shape and surface treatment. Furthermore, many more designs are possible by combining different shapes and colors within the same pavement surface. Some patterns can even create a letter, symbol, or logo by selecting appropriate colors and carefully cutting the individual paver units to the required size and shape.

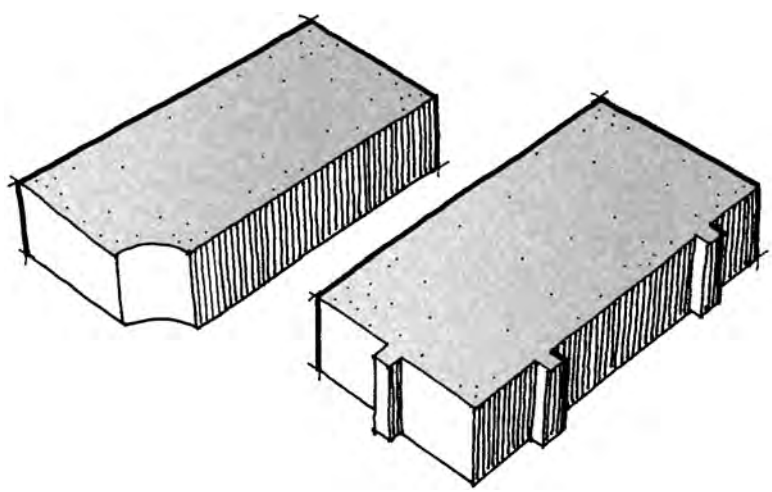


Figure 12–27
Examples of permeable paver units.



Figure 12–28
Permeable concrete pavement with gravel-filled spaces.

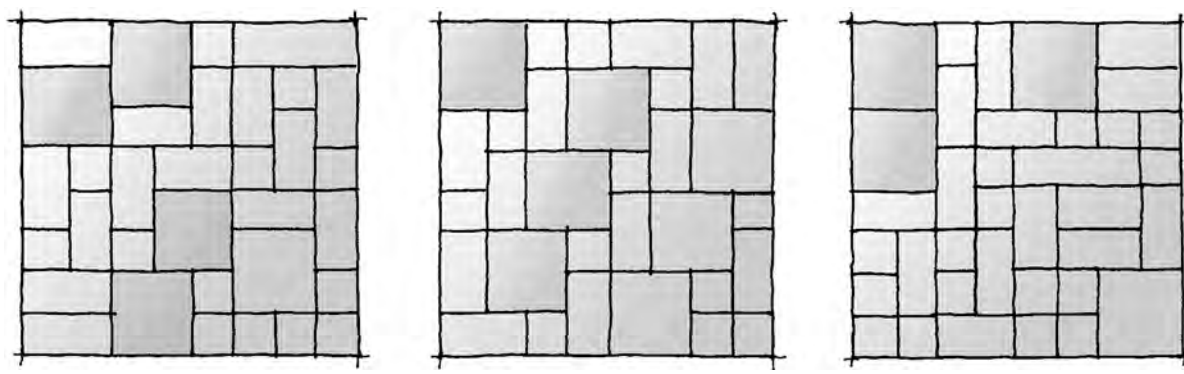


Figure 12–29
Sample concrete paver patterns.

Concrete pavers are appropriately used to:

- provide a utilitarian surface that can be used in almost any pavement, including walks, entrance ways, terraces, work areas, driveways, and so on.
- mimic traditional brick or stone patterns, but for less cost.
- create striking patterns composed of different shapes and colors within the pavement surface. Concrete pavers make it possible to create distinct patterns that are not achievable with other materials (Figure 12–30).



Figure 12–30
Examples of unique patterns created with concrete pavers.

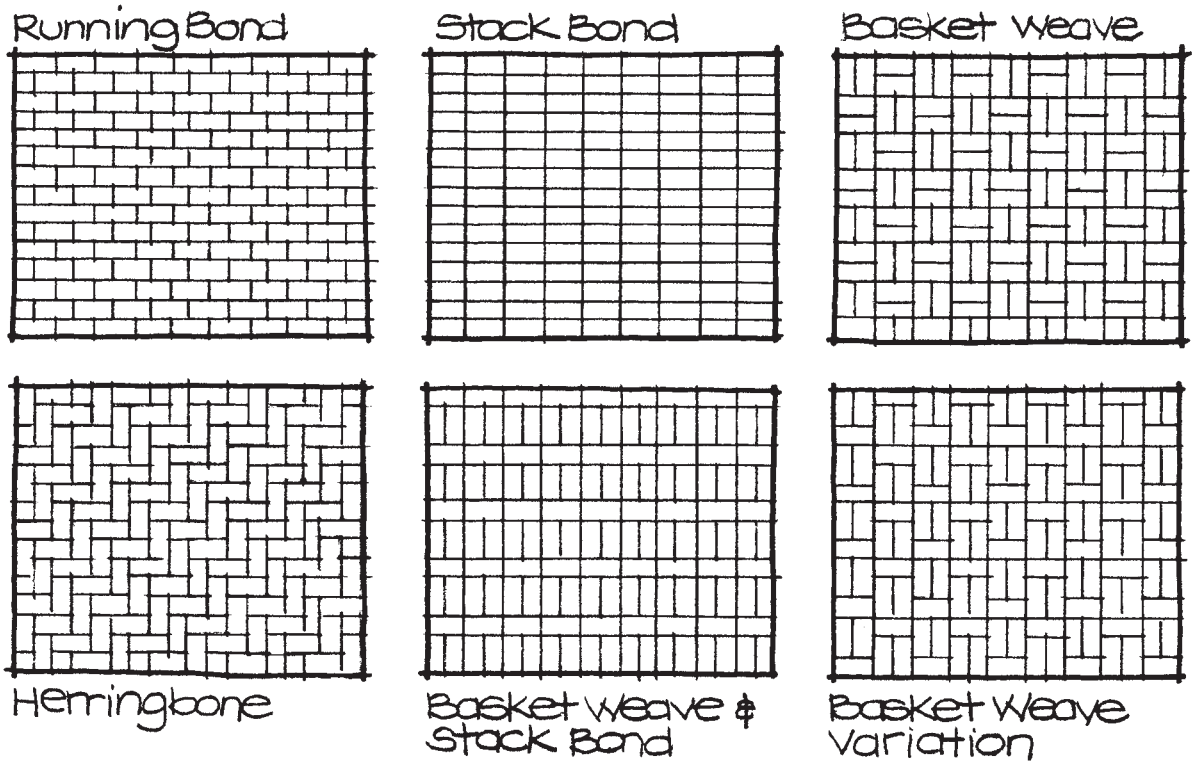


Figure 12–31
Common brick patterns for pavement.

- fit a variety of pavement shapes. Although concrete pavers are more readily adapted to rectangular paved areas like brick, they can be cut with a masonry saw to fit the edges of almost any ground shape.
- produce a permeable pavement surface with certain available pavers or when the individual paver units are separated by ASTM #8 or #9 gravel.

Brick Brick, or clay paver, is a unit pavement material manufactured by pouring liquid clay into a mold and then firing it at extremely high temperatures to harden it into its permanent form. Brick has been used as a pavement material for centuries and is commonly known for its standardized 2–1/4″ × 4″ × 8″ size. This conventional size can be assembled into a number of patterns, some directional and some static (Figures 12–31 and 12–32).



Figure 12–32
Sample brick patterns.

The dark orange-red color of brick is the most universal, although darker and lighter variations along with shades of gray and brown are also obtainable.

Brick can be employed as landscape pavement to:

- establish an appealing color and texture in places where a warm, friendly atmosphere is desired.
- suggest a historical character. Because brick was the construction material in many buildings built in past centuries, brick implies a traditional, old-world quality.
- visually unify a pavement surface with a brick house.
- provide contrast with visually colder materials such as concrete and flagstone.

For proper design and installation, brick should:

- be contained by a metal or plastic edge, stone or brick mortared into place, pressure-treated wood, or another pavement surface.
- be placed in rectangular or circular pavement areas to minimize installation costs associated with cutting and fitting individual brick to an irregular or curved edge (Figures 12–33 and 12–34). Although brick can be cut and fitted to any ground shape, it costs more to do so.

Tile Tile is another unit paver that has a manufacturing process similar to brick. However, tile is much thinner than brick and is often unable to withstand freeze-thaw cycles, thus restricting its use to warmer climates. Tile is available in a diverse range of sizes from several inches across to approximately 18 inches across. The color of tile varies from earth tones to glazed colors. Because of its thin dimension, tile must usually be placed as veneer on top of a concrete base.

Tile is suitable to:

- complement a Mediterranean style design (Figure 12–35).
- create an elegant, smooth pavement surface.

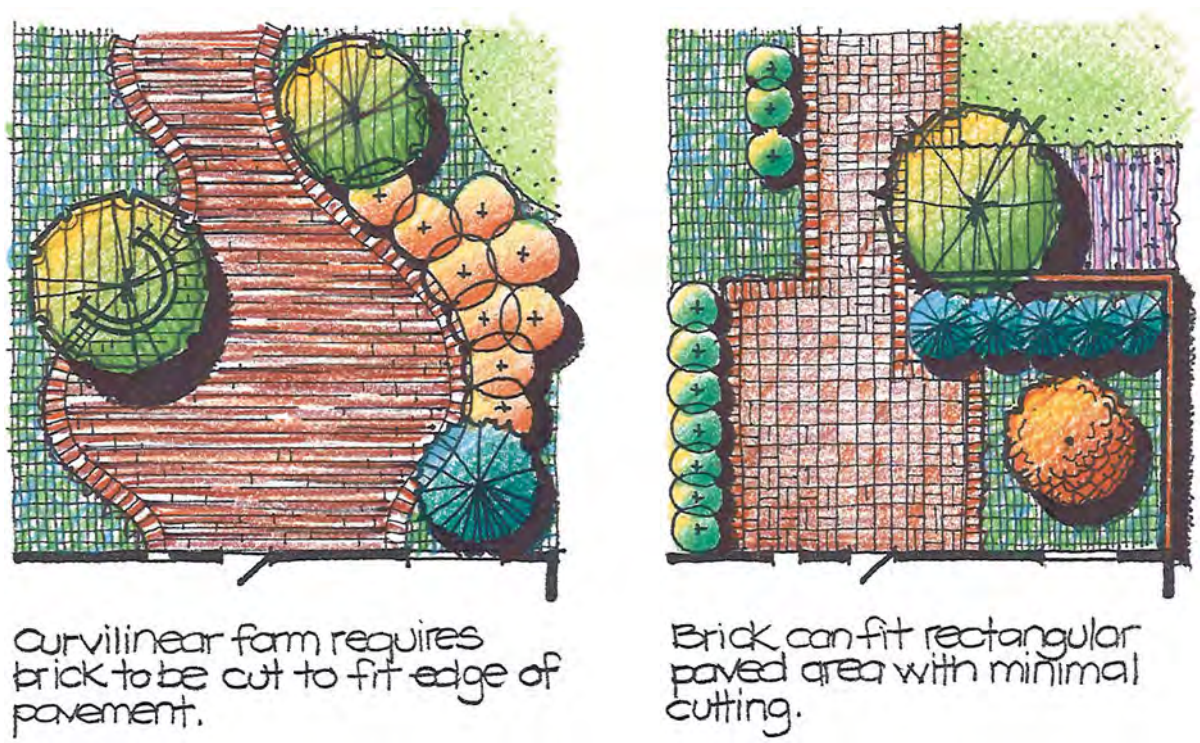


Figure 12–33
Brick is best used in areas that require little cutting of individual bricks.

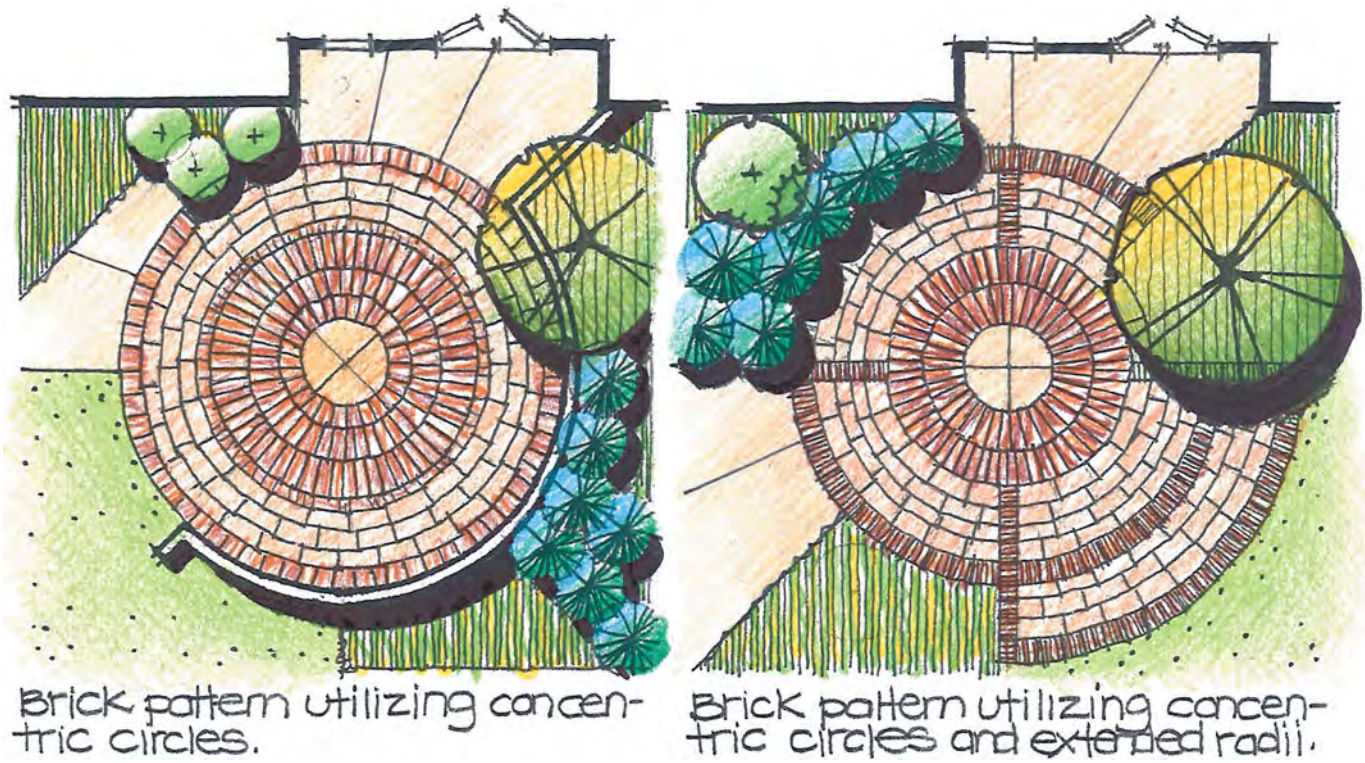


Figure 12–34
Examples of brick pavement patterns for circular areas.

- create elaborate patterns of mixed shapes and/or colors.
- provide vibrant color accents with glazed tiles.

Wood Wood is a commonly used unit pavement material that is modular and yet somewhat flexible in its potential uses. Wood used for pavement material is milled in standard sizes of 2″ × 2″, 2″ × 4″, 2″ × 6″, 2″ × 8″, and so on. The 2″ × 4″ and 2″ × 6″ dimensions are the ones most commonly used for pavement, although these can be cut and/or combined to create variations in patterns (Figure 12–36). Wood has an appealing natural color and texture that can be stained or painted any color, thus adding to its versatility.

Wood differs from other unit materials by virtue of the fact that it is an organic material that weathers and decomposes over time. To slow this process, wood used for a pavement surface is infused with chemicals that preserve its longevity and is generically

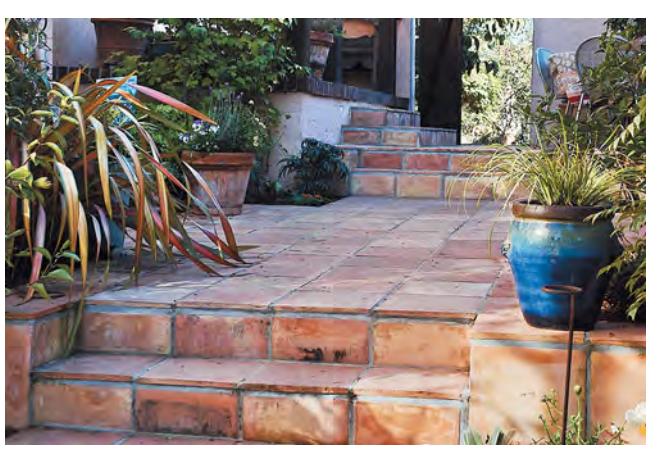


Figure 12–35
Tile suggests a Mediterranean character.

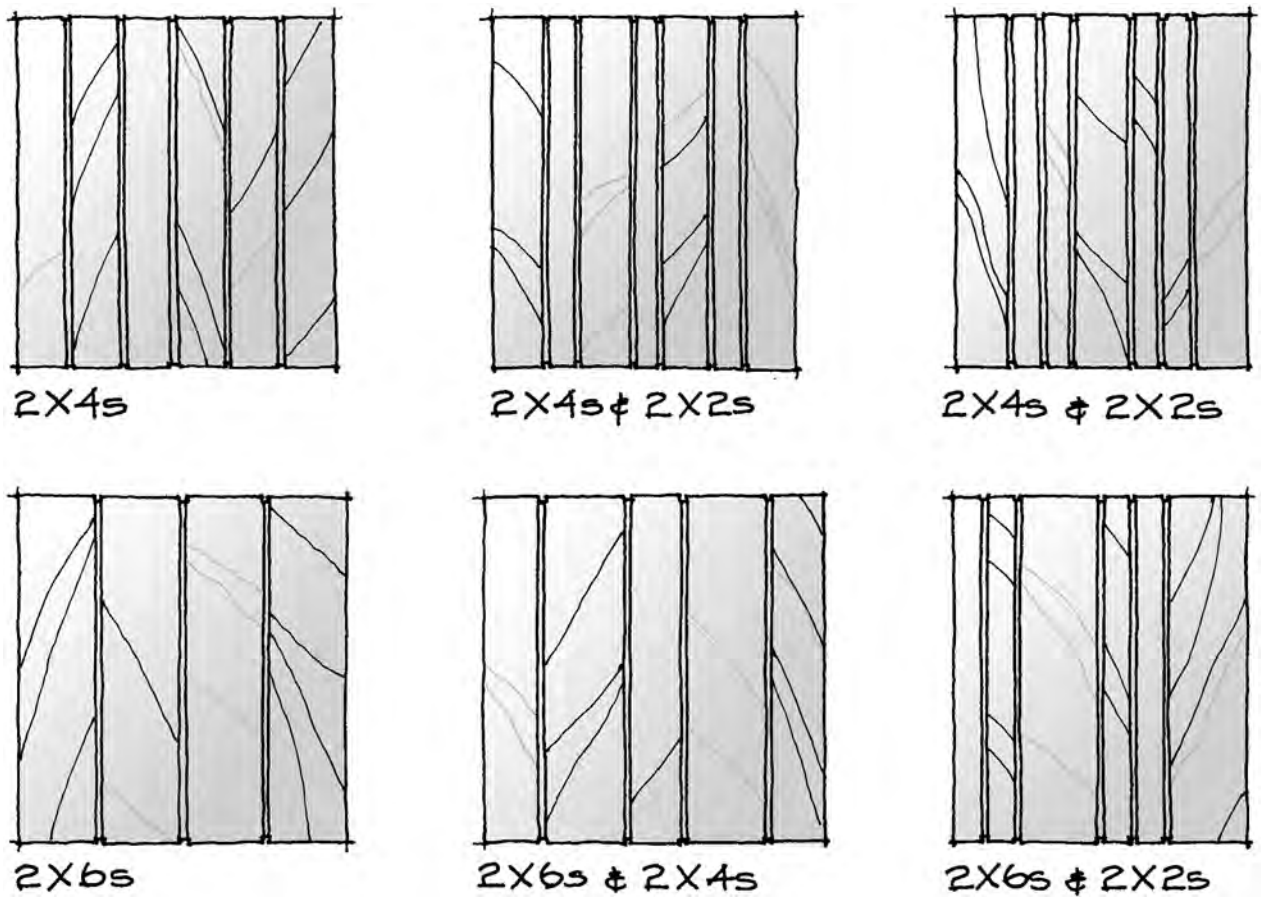


Figure 12–36
Possible patterns created by standard lumber sizes.

referred to as *pressure-treated wood*. Some wood such as cedar and redwood naturally possesses chemicals that slow its decomposition and so is a good, though more expensive, alternative as a pavement material. To further its longevity in the landscape, wood should be used in places such as decks where it will not be in direct contact with ground. Wood can sometimes be placed directly on the base plane when the ground below is gravel or well-drained soil with a substantial sand content.

Wood is a good pavement material to:

- create a relatively soft surface that has a very slight give underfoot.
- extend parallel to or at an angle to the sides of a rectangular area (Figure 12–37). Wood is less adaptable to curved areas, although it can be cut to define broad curves if the individual wood planks are cut at their ends.
- create a distinct directional pattern resulting from the linear quality of wood (Figure 12–38).
- produce a permeable pavement surface by allowing surface water to drip between individual boards to the ground below.
- establish an elevated "paved" surface that does not compact the ground or severely disrupt tree roots.

Plastic Wood Plastic or synthetic wood is an alternative wood decking material that is available in the same dimensional sizes as true wood. The term is derived from the fact that it is a plastic material, often generated from recycled milk, water, and juice containers. In addition, some manufacturers add recycled sawdust or other minuscule wood

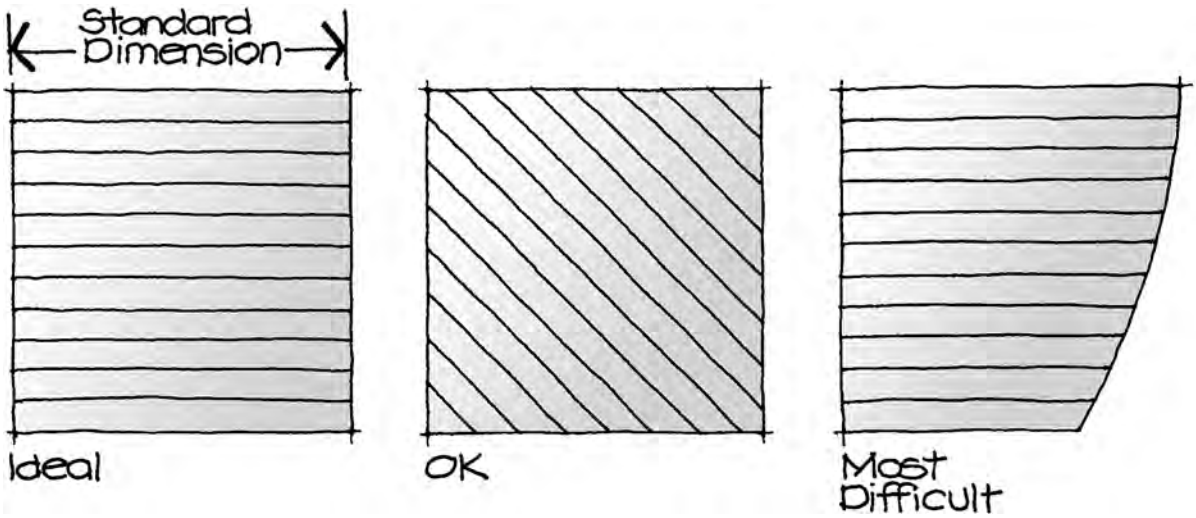


Figure 12–37
Wood is best used when it is parallel or at an angle to the sides of an area.

by-products. Consequently, plastic wood is an environmentally friendly material because it uses recycled materials rather than harvesting existing trees (see Reuse and Recycle, Chapter 3). Plastic wood is available in a number of colors, many of which simulate various colors of stain. The advantage of plastic wood is that it does not require periodic surface treatment to preserve its water resistance. However, plastic wood is more expensive to purchase than true wood, and it absorbs and reradiates heat when exposed to the sun.

Plastic wood is a good pavement surface to:

- fulfill the same uses as real wood but without the long-term maintenance requirements.
- use as a sustainable alternative to real wood.
- establish a wood-like surface that is in direct contact with the ground.



Figure 12–38
Wood can create a pronounced directional pattern.

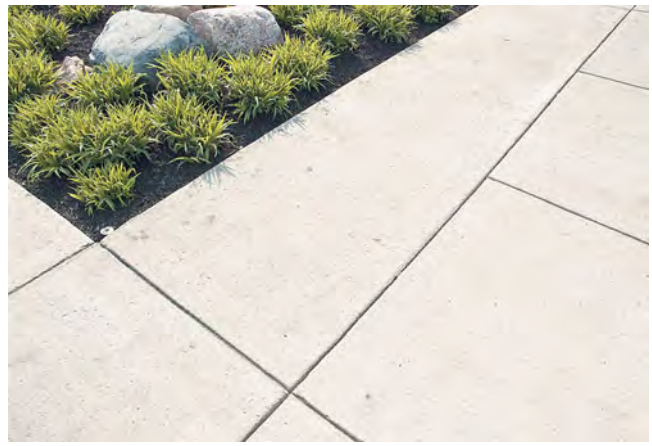


Figure 12–39
Examples of expansion and control joints.

Adhesive Materials

Adhesive pavement materials are those that are pliable when they are first installed. That is, these materials have no predetermined shape and are poured as a "plastic" material into a temporary form of any shape or size. Adhesive materials are highly adaptable and relatively inexpensive in comparison to other pavement materials, especially for irregularly shaped paved areas.

Concrete Concrete is the most commonly used adhesive material that is relatively inexpensive and adaptable to numerous landscape uses. Concrete is poured in place to a depth of about 4 inches for most residential landscape pavements and is characterized by its gray color and relatively smooth surface. However, expansion and control joints that appear as surface lines extending across the pavement typically divide concrete's surface (Figure 12–39). Expansion joints are vertical cuts that extend through the entire concrete slab and are then filled with a rubberized or asphalt-like material. Expansion joints are needed to allow the concrete to expand and contract without cracking. Control joints are vertical cuts that extend to about 1/4″ below the surface and are located in order to "control" the location of cracks if they occur. The location of expansion and control joints should be considered from both a technical and visual standpoint so that they are intentionally placed (Figure 12–40).

One of the potential disadvantages of concrete is its drab gray color. This can be altered in a number of ways. First, color pigments can be added to the concrete while it is being mixed, thus changing the color to various shades of gray, black, buff, or red. Additionally, the surface of concrete can treated with chemicals to give it a "wet" appearance, or it can be buffed to highlight its color and texture. And gravel aggregates can be added to the concrete while it is being mixed and then revealed by washing or treating the surface when it is curing. This technique is called exposed aggregate concrete and gives the concrete surface a gravel-like appearance.

Concrete is an apt pavement material to:

- fit irregularly shaped, curved, or complex paved areas (Figure 12–41).
- define fluid, flowing ground forms that wind through the landscape.
- cover a large ground area with minimum cost.
- provide a utilitarian surface that can be used for almost any landscape use.
- create patterns of lines generated by expansion and control joints.
- imprint patterns of other materials and elements on its surface to produce custom designs and textures (Figure 12–42).

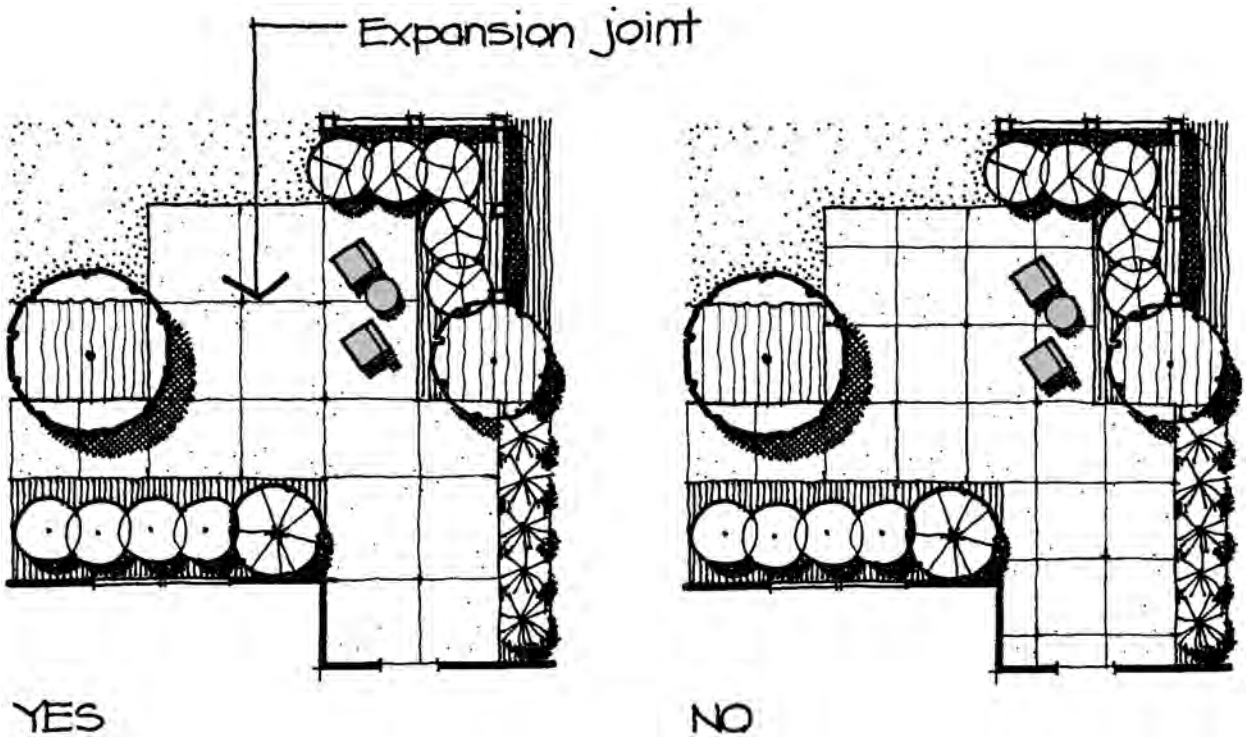


Figure 12–40
Expansion joints should extend from the edges and corners of a pavement area.

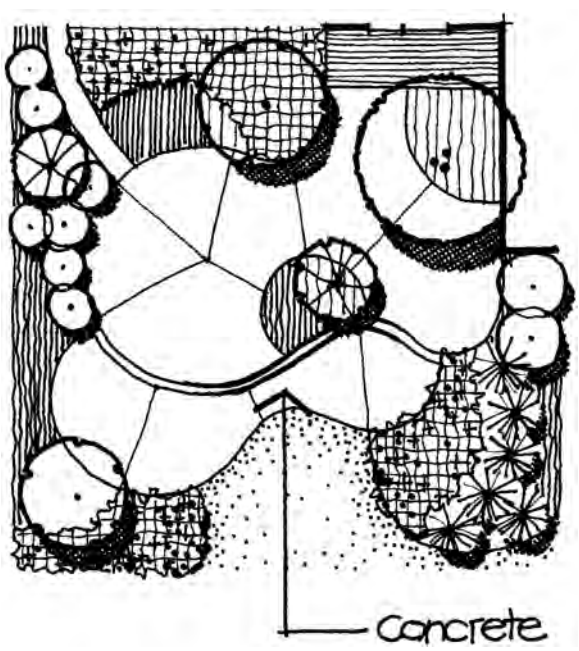


Figure 12–41
Concrete is an appropriate pavement for curvilinear or irregularly shaped areas.



Figure 12–42
Concrete can be imprinted with patterns before it hardens.

PAVEMENT PATTERNS AND GUIDELINES

In addition to selecting the appropriate material for a paved area in the landscape, it is also necessary to determine its pattern. A pavement's pattern is produced by the pavement material's size, shape, color, arrangement, and whether the material is used by itself or in combination with other materials. In studying a pavement's pattern, the designer should consider (1) the complexity of the pattern, (2) the suitability of the pattern to the shape of the paved area, and (3) the fit of the pattern to its surroundings.

Pattern Complexity

There are three general levels of material complexity as determined by the number of materials used: (1) one uniform material, (2) one varied material, and (3) multiple materials.

One Uniform Material The first and simplest pavement design is created with one material that has the same pattern throughout the entire paved area (top left Figure 12–43). The material is laid uniformly with no variation in size, color, or direction. This approach is suitable for richly colored and textured materials such as gravel and brick that have inherent visual appeal, but it does not work as well for bland materials such as concrete. One uniform pavement material can be used to:

- provide visual unity when the pavement connects multiple spaces or areas in the landscape.
- unify a complex paved area that has numerous sides and/or subspaces.
- create a ground surface that settles into the landscape and calls little attention to itself.
- establish a simple background for furniture or other elements placed on it.
- reduce cost because of comparative ease of installation.

One Varied Material This pavement pattern is generated with one material that has variation in size, shape, color, and/or direction across the paved surface. Concrete pavers lend themselves to this type of pattern especially well because of their numerous shapes and colors as previously described. The variations in pattern with one material can be subtle or pronounced depending on the degree of contrast that is generated with material differences. There are numerous ways of creating patterns within one material, including:

- border; the creation of edge pattern that is different from the pattern within (top middle, Figure 12–43).

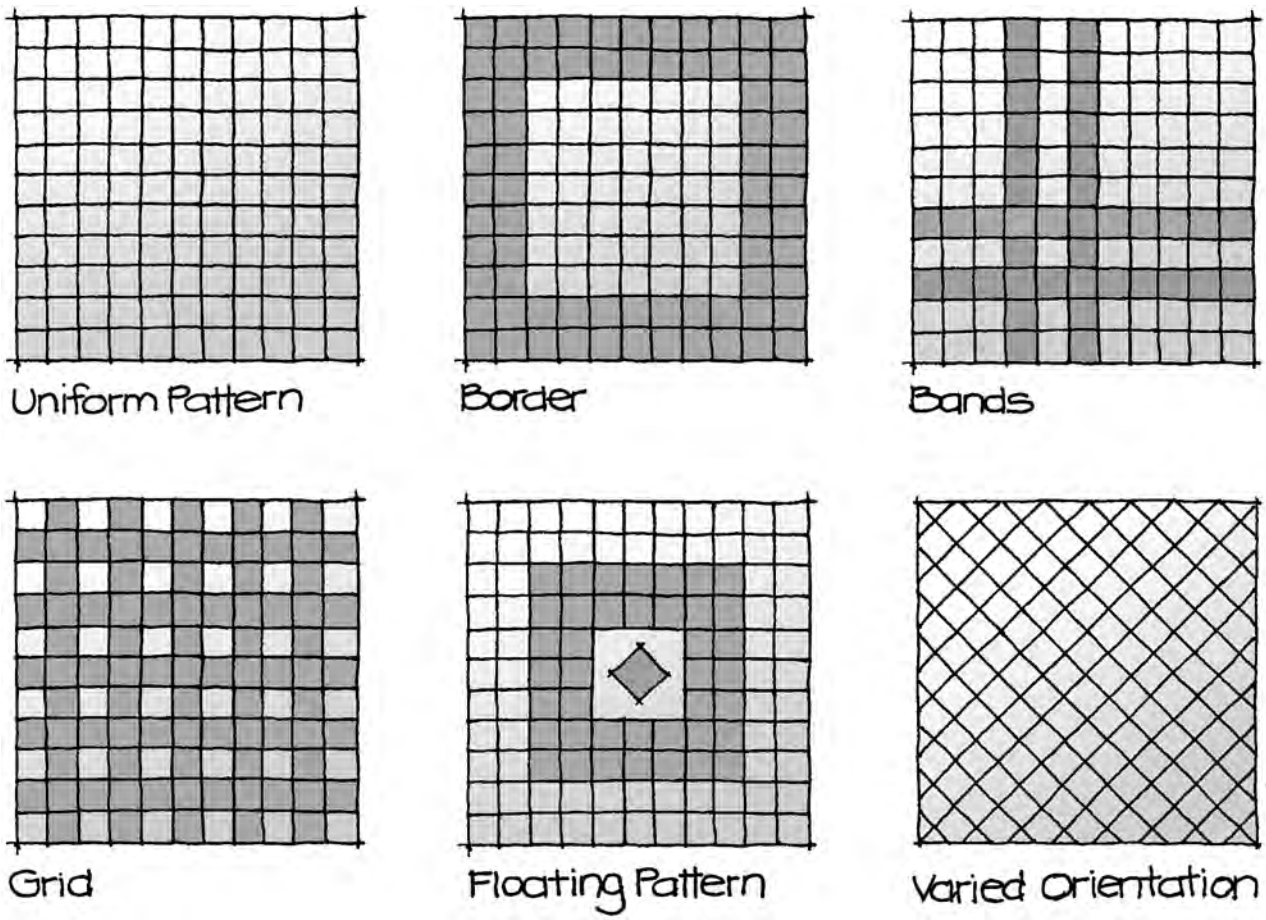


Figure 12–43
Alternative ways to treat a pavement area composed of one material.

- bands; lines or bands of a contrasting pattern extending through the pavement surface (top right, Figure 12–43).
- grid; the formation of a grid with lines, bands, or repetitive areas (bottom left, Figure 12–43).
- internal design; the formation of a "floating" design inside the pavement area with an altered pattern (bottom middle, Figure 12–43).
- different orientation; establish a contrasting visual direction in the pattern to counter the overall shape of the paved area (bottom right, Figure 12–43).

One varied pavement material can be employed to:

- create visual interest while maintaining uniformity of material type.
- express creativity and/or produce an unusual pavement surface.
- call attention to the ground plane, especially in areas free of furniture or other objects.
- create visual directionality and/or linkage with surroundings.
- define subspaces or different use areas within the same paved area.

Multiple Materials A third option for creating pavement patterns is to combine different materials within the same paved area. This extends the possibilities previously discussed for creating patterns and allows the designer to combine materials in ways that feature the best qualities of each. The techniques for creating patterns with separate materials are the same as previously outlined for one varied material. The one

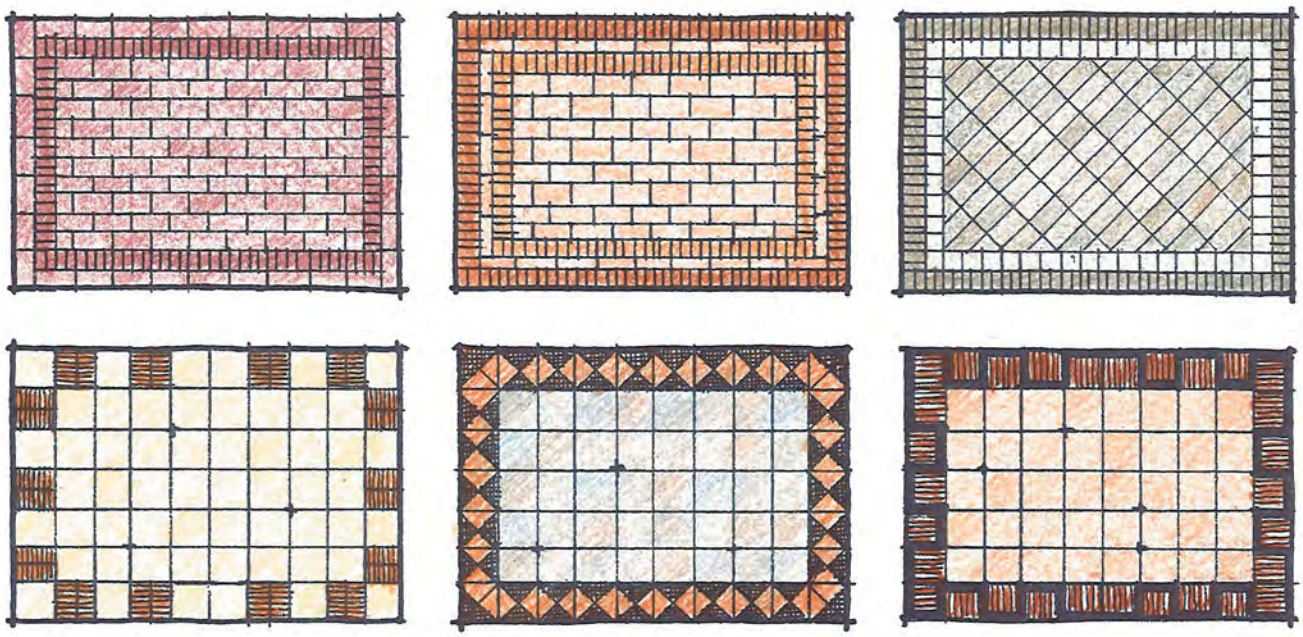


Figure 12–44
Examples of patterns created by combining different materials.

caution for integrating different materials is to make sure that they indeed go together both compositionally and technically from an installation standpoint. Multiple materials can be utilized in a pavement to:

- create visual interest and/or express creativity (Figure 12–44).
- enhance a material such as concrete that is otherwise dull and unappealing.
- emphasize material characteristics by combining materials that have divergent texture, color, shape, and so on (Figure 12–45).
- create visual directionality and/or linkage with surroundings.
- define subspaces or different use areas within the same paved area.

Suitability to Area Shape

The design of a pavement pattern should be directly related to the shape of the overall paved area. A paved area and its internal design go hand-in-hand and need to be considered in concert with one another. The following paragraphs outline fundamental considerations for variously shaped paved areas.

Rectangular Areas The pattern within a rectangular pavement area can be treated in a number of ways depending on the material used and the complexity of the overall shape.

- Rectangular-shaped paving material such as stone, concrete pavers, and brick is compositionally most compatible when placed parallel to the sides of the pavement area. In addition, this orientation minimizes cutting of individual paving units at the edges.
- Borders, bands, and grids can easily be created within simple paved areas. These patterns can be either symmetrical or asymmetrical within the pavement, depending on the surrounding context and the degree of formality sought (Figure 12–46).
- Pattern lines and bands are best treated as extensions of corners and edges in complex rectangular paved areas (Figure 12–47).

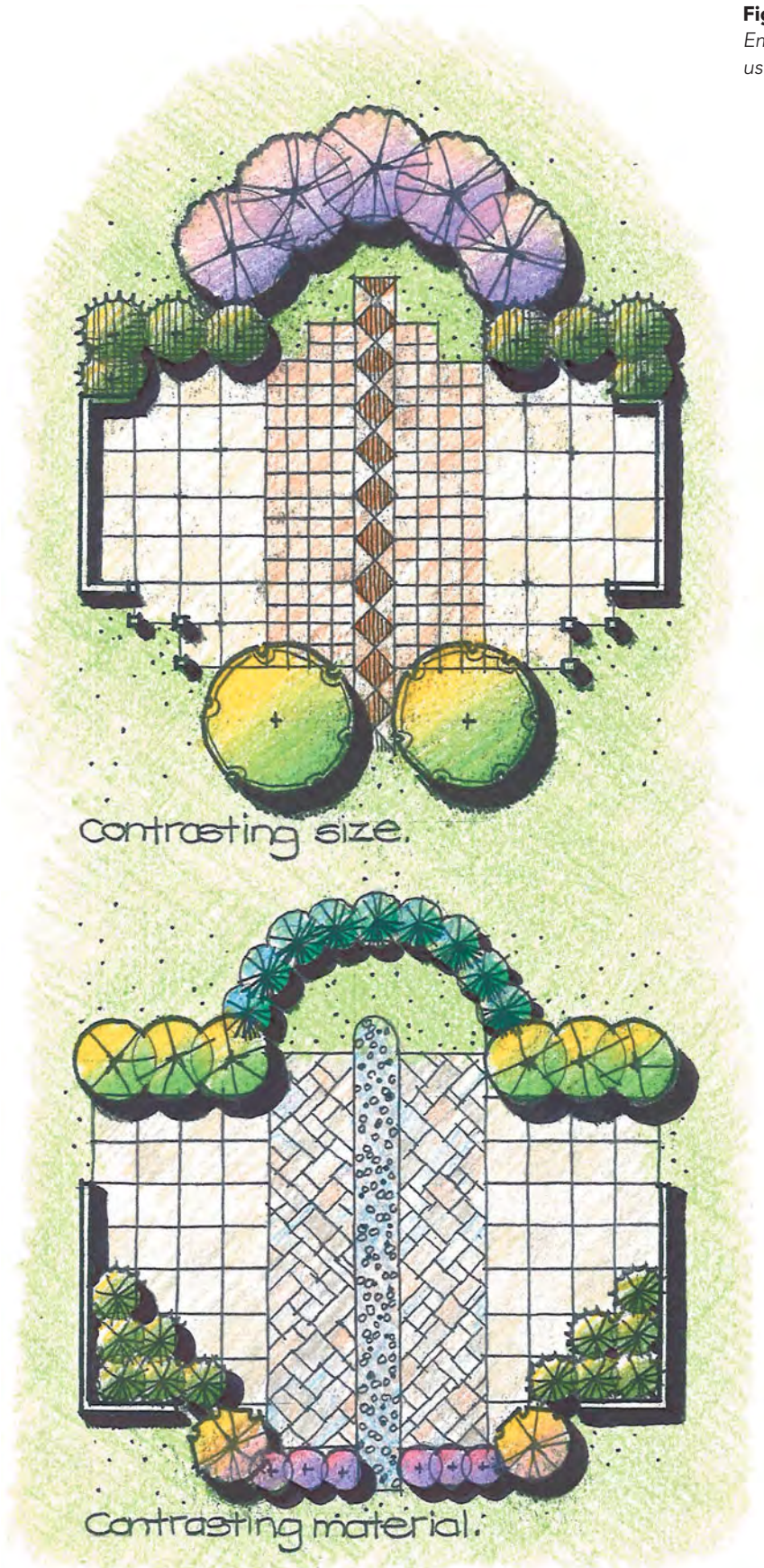
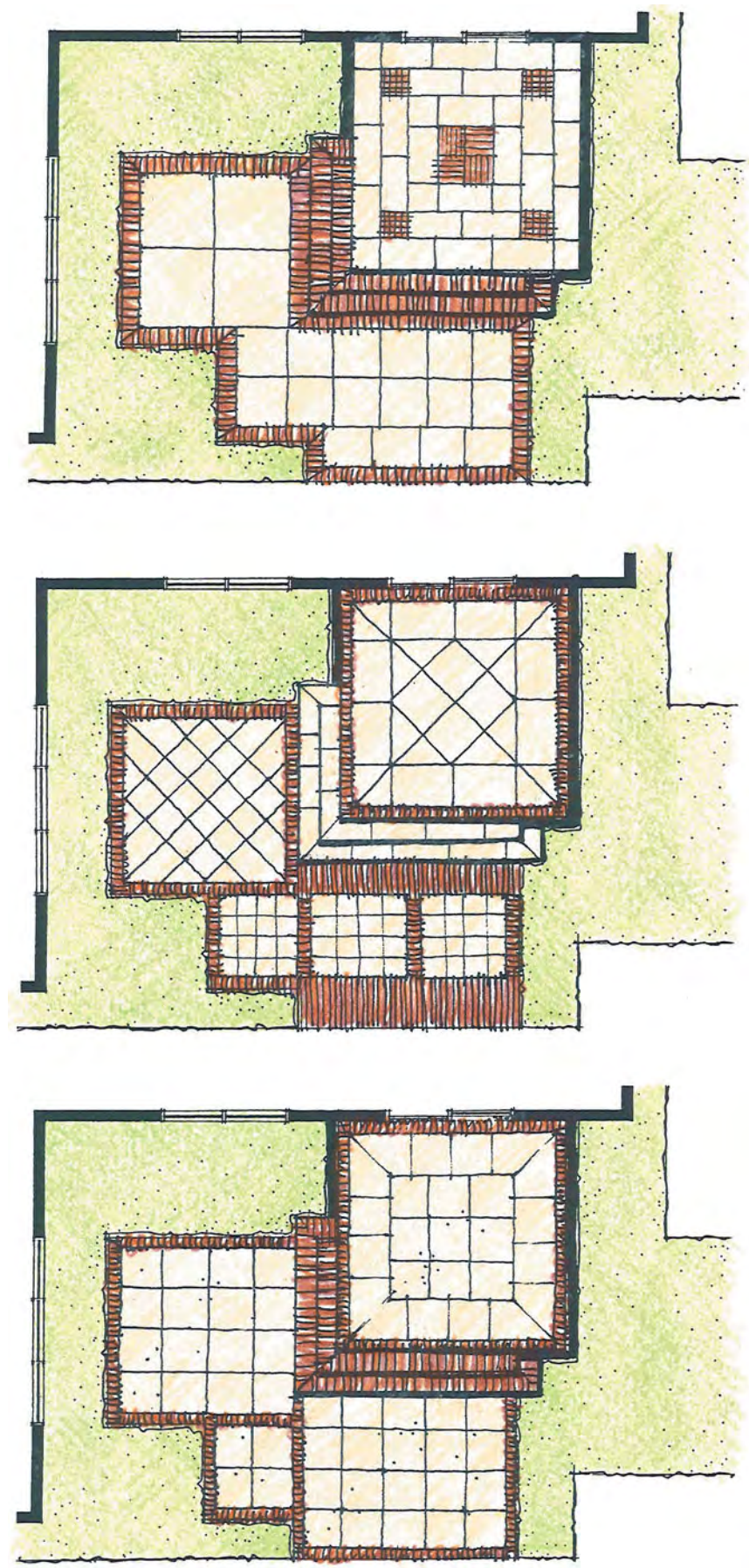


Figure 12–45
Emphasis can be created in a pavement area by using contrasting materials and/or patterns.

Figure 12–46
Alternative examples of bands, borders, and/or grid patterns in a rectangular patio area.



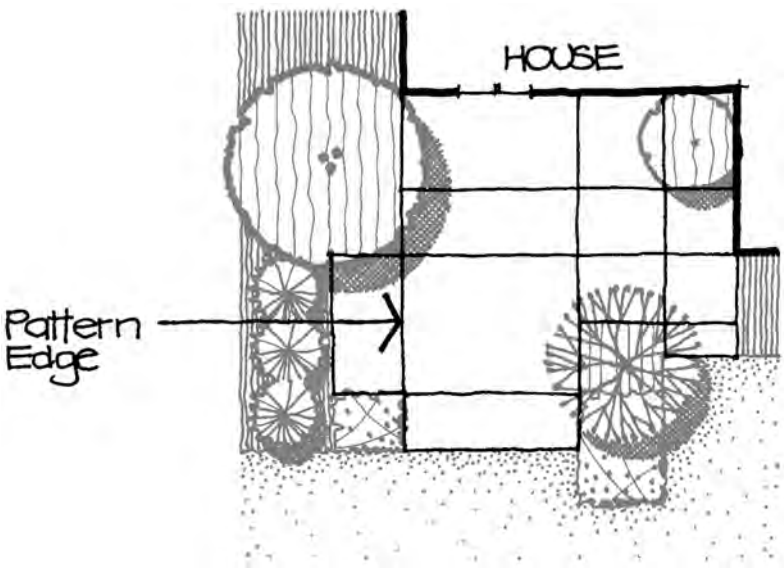


Figure 12–47
Pattern edges and bands should be aligned with perimeter edges and corners of a pavement area.

Irregular Areas The pattern within an irregularly shaped or angular pavement area is usually more challenging to design because of the lack of parallel sides. Nevertheless, the following should be considered.

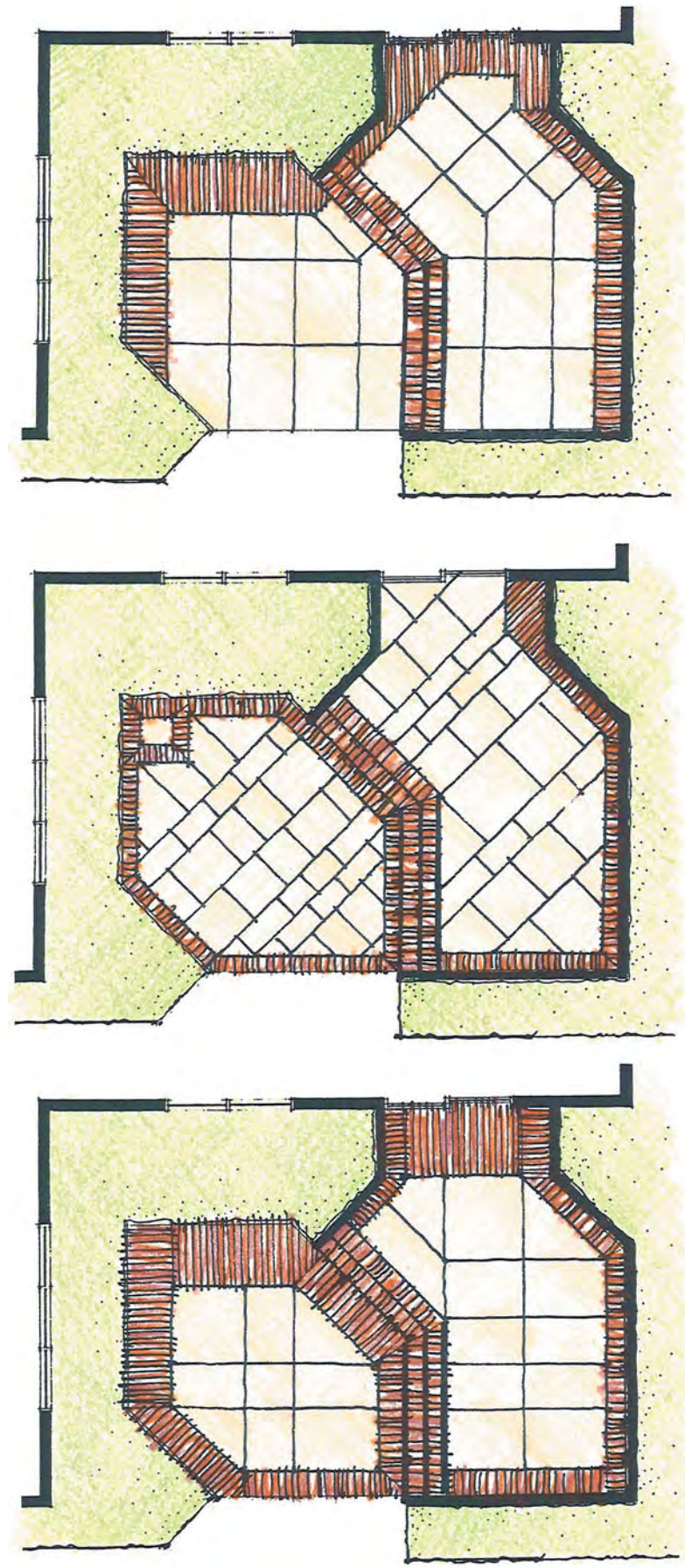
- Directional patterns or those composed of unit pavers should be oriented parallel to the most prominent pavement edge for visual compatibility and to minimize cutting of individual units.
- Similarly, borders and internal patterns can be created within simple paved areas if they parallel selected sides of the pavement and/or the adjoining house (Figure 12–48).
- Lines and bands are easily located to be extensions of the sides, cutting across the pavement surface to an opposite side (left side of Figure 12–49).
- Likewise, the pavement can be subdivided into smaller areas that echo the overall form (right side of Figure 12–49).

Circular Areas Designing a pavement pattern within a circle is often challenging because many materials are themselves rectangular or linear in form and so do not lend themselves to curved edges. Wood is especially unsuitable to adapt to circular paved areas. Nevertheless, there are four fundamental approaches for establishing material patterns based on the internal geometry of the circle.

- Use the circle's radii as the basis of a pattern. When employing this approach, care should be taken to study the center of the circle where the radii converge (Figure 12–50). Too many radii may create tight spaces between the radii and make it difficult to cut pavement units to fit. Placing a small circle at the center can solve this. This creates a wider distance between radii and eliminates acute angles.
- Use the concentric circles to create circular bands that are equal or varied in spacing (Figure 12–51).
- Use a combination of the two previous strategies. This approach creates the most possibilities for elaborate patterns (Figure 12–52).
- use a border to frame an independent internal pattern within a circular or semicircular pavement area (Figure 12–53).

Curvilinear Areas Curvilinear paved areas are the most challenging to design patterns within because of the complete lack of straight lines and edges. As previously

Figure 12–48
Alternative examples of aligning the pavement pattern with the edges and/or adjoining house in a diagonal patio design.



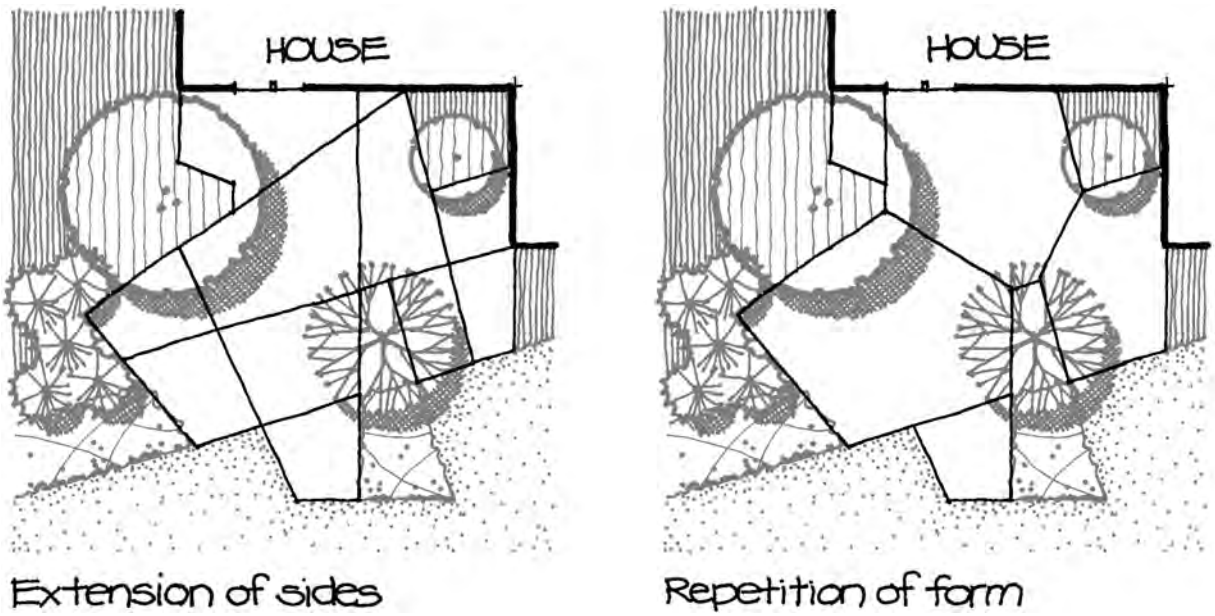


Figure 12–49
Different techniques for establishing pattern edges within an irregularly shaped pavement area.

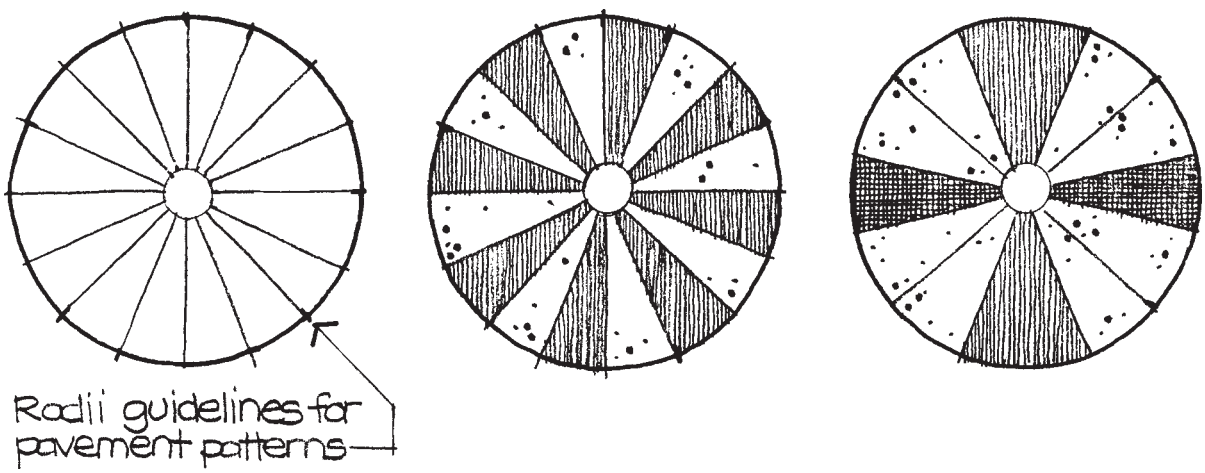


Figure 12–50
Pavement patterns in circular areas can be based on radii guidelines.

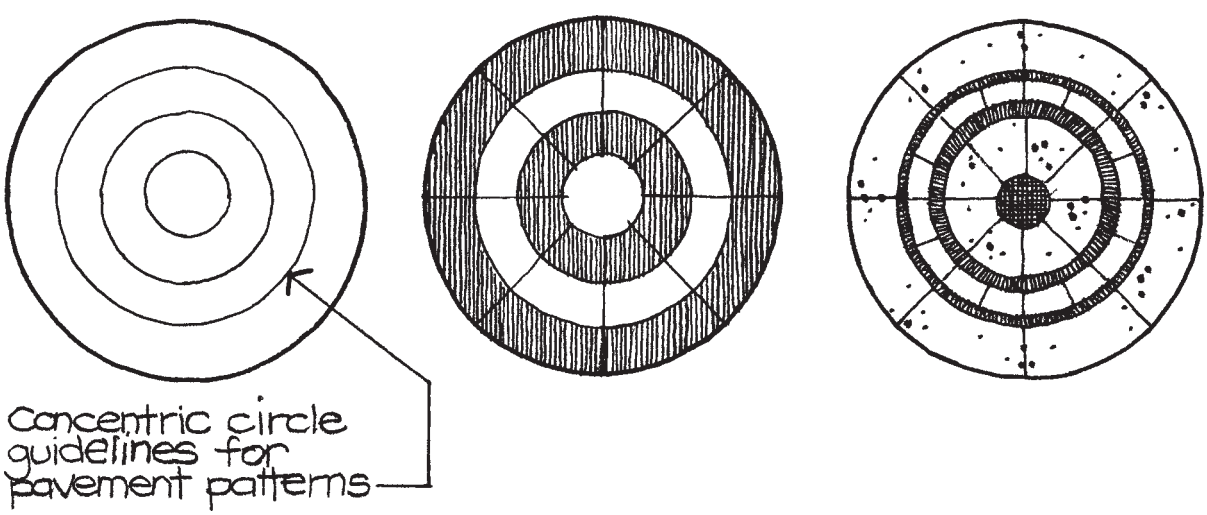


Figure 12–51
Pavement patterns in circular areas can be based on concentric circle guidelines.

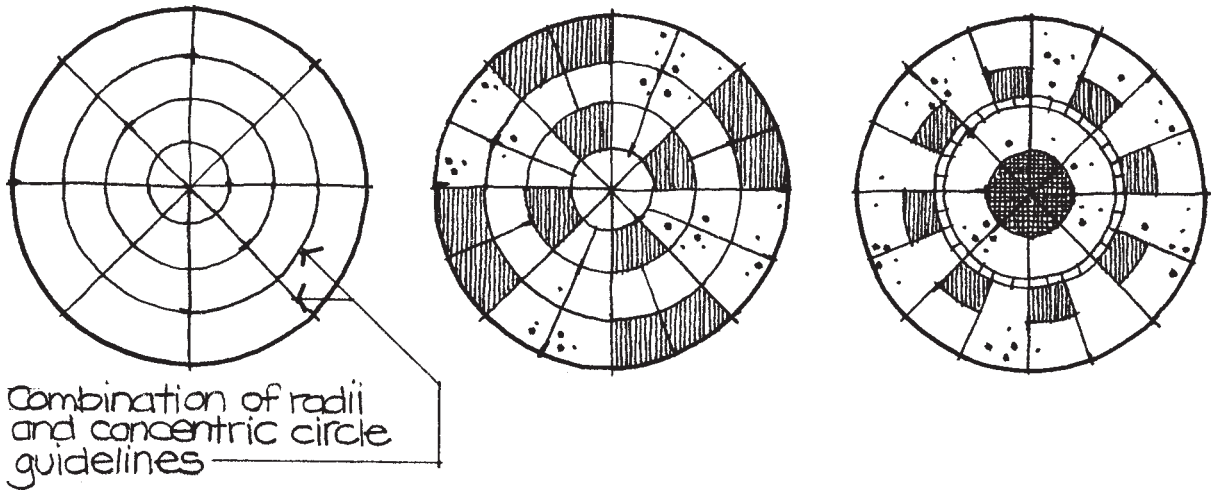


Figure 12–52
Pavement patterns in circular areas can be based on a combination of radii and concentric circle guidelines.

discussed, loose and adhesive materials are the easiest to conform to a curvilinear area. But straight lines can be introduced if the internal geometry of the shape is worked with. There are two basic techniques for creating a pattern within a curvilinear paved area.

- Use radii that extend from the center of the underlying circles within the curvilinear area to the outside edge. The radii should be placed so that they meet the pavement edge at a right angle. This is a common approach for locating expansion joints within a curvilinear concrete pavement (left side of Figure 12–54).
- Use curved lines to subdivide the pavement into smaller areas. Again, the internal curved lines should connect to the outside edge at a right angle (right side of Figure 12–54).

Contextual Fit

In addition to being suitable to the shape of the paved area, a pavement pattern should be compatible with its surroundings including the house, nearby site structures, and the landscape beyond.

House Paved areas that directly abut the house or are in close proximity to it should be designed to visually fit with the house. To do so, the material patterns of these paved areas should:

- be compatible with the style and character of the house.
- align with prominent corners, doors, and windows of the house so that the pavement and house appear as a unified composition (Figure 12–55).
- take into account the directionality of the pattern in relation to the house. Lines that extend away from the house can visually extend the space into the landscape, whereas lines that parallel the house do the opposite (Figure 12–56). Furthermore, extended lines need to be perfectly aligned because any imperfections will be easily seen from the house.
- consider repeating or echoing distinctive architectural details and features of the house in the material pattern itself (Figure 12–57). Figure 12–58 shows how the unique arch of the house portico has been repeated in the adjacent pavement.

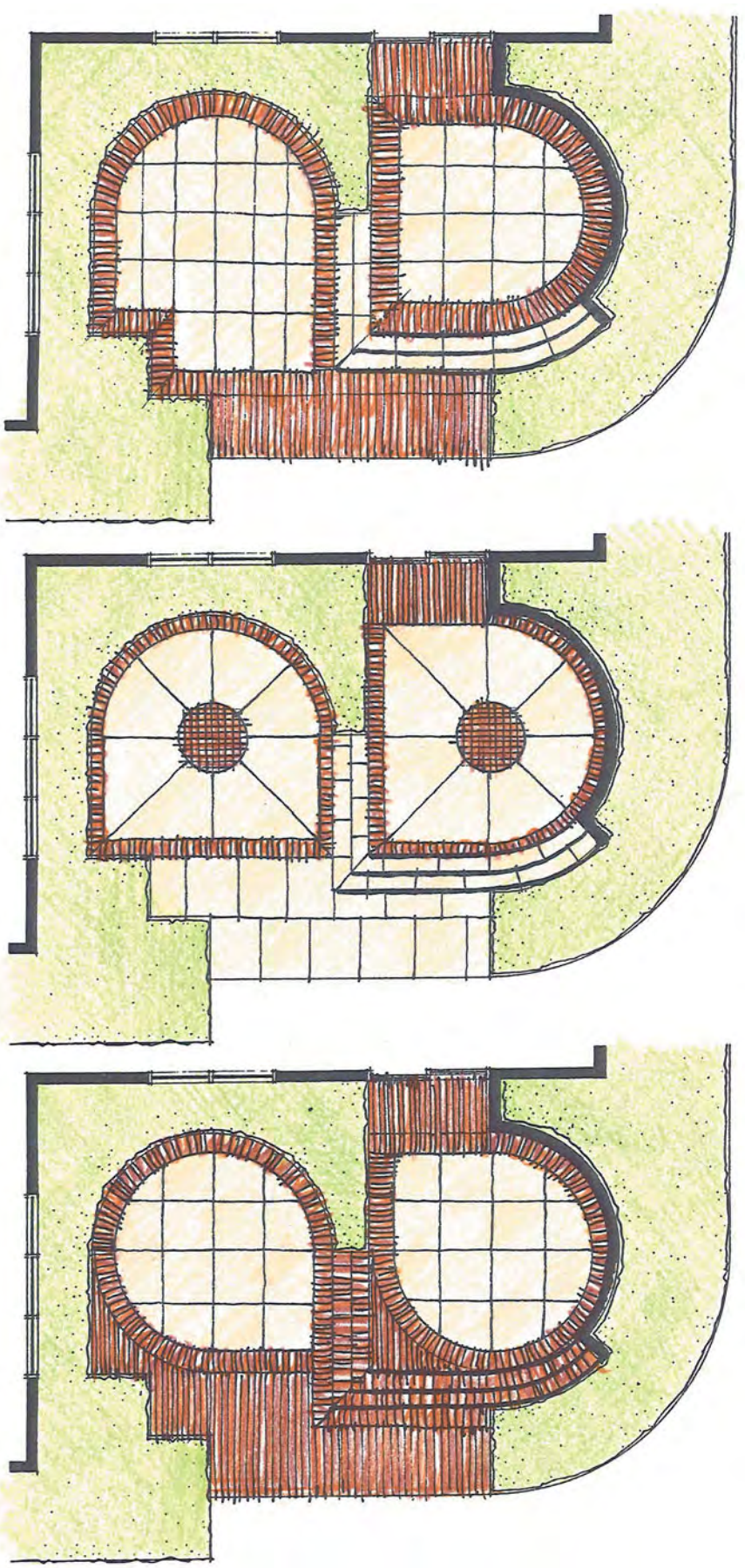


Figure 12–53
Use of borders to frame internal patterns within a circular patio area.

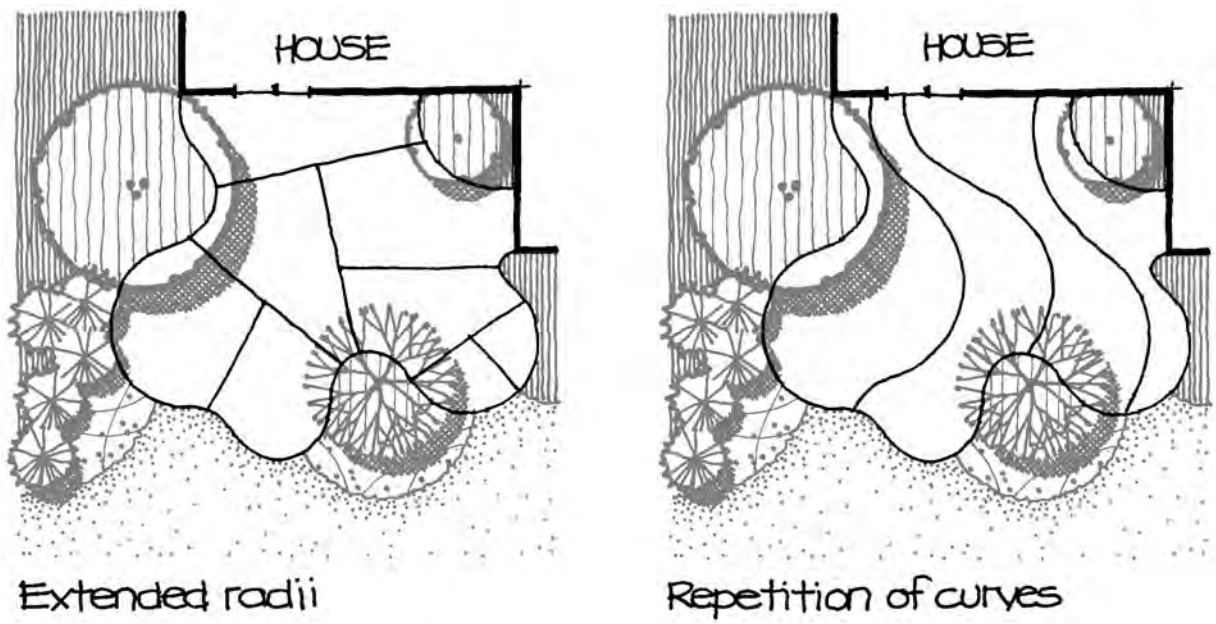


Figure 12–54
Different techniques for establishing pattern edges within a curvilinear-shaped pavement area.

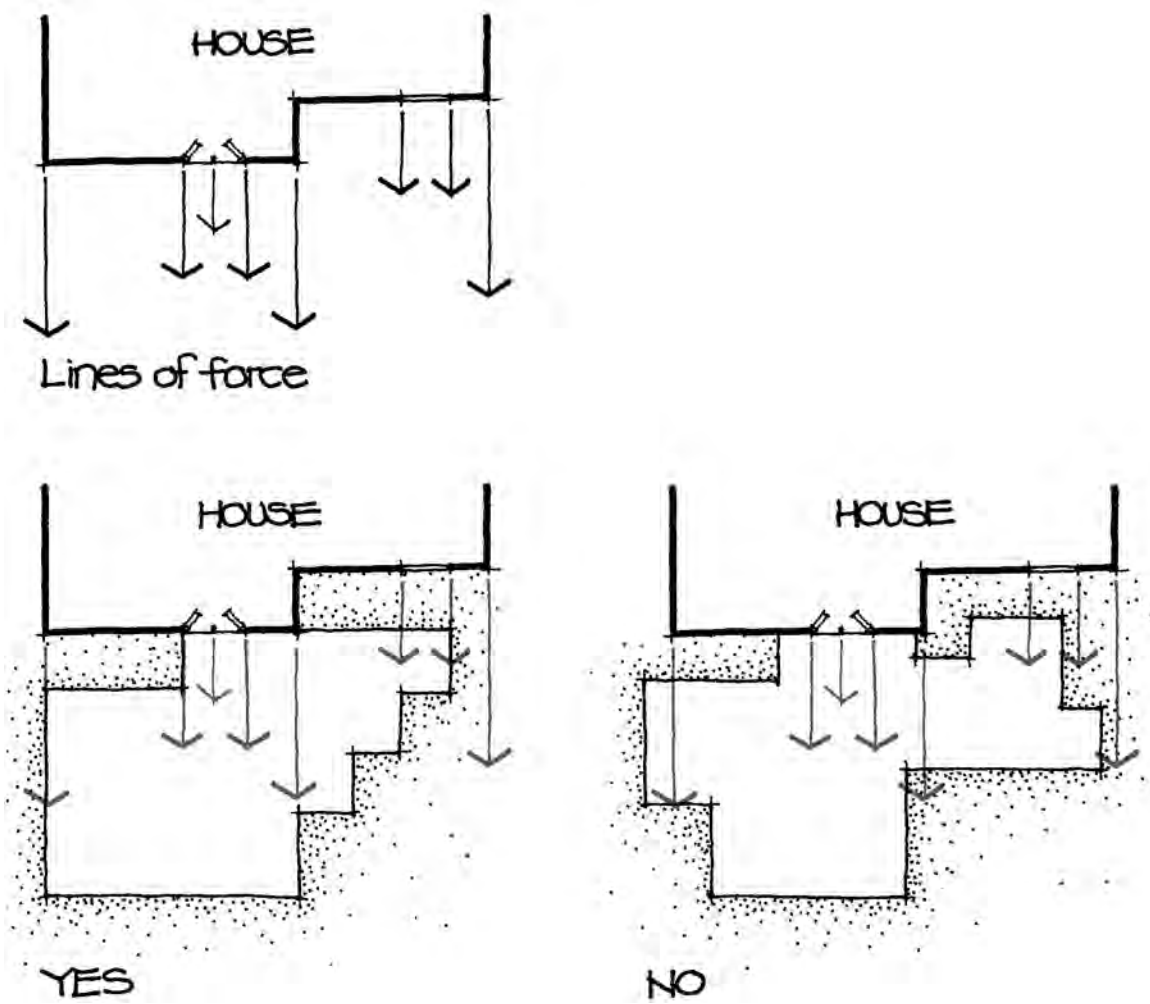


Figure 12–55
The edges of a pavement area should align with prominent corners, doors, and windows of the house.

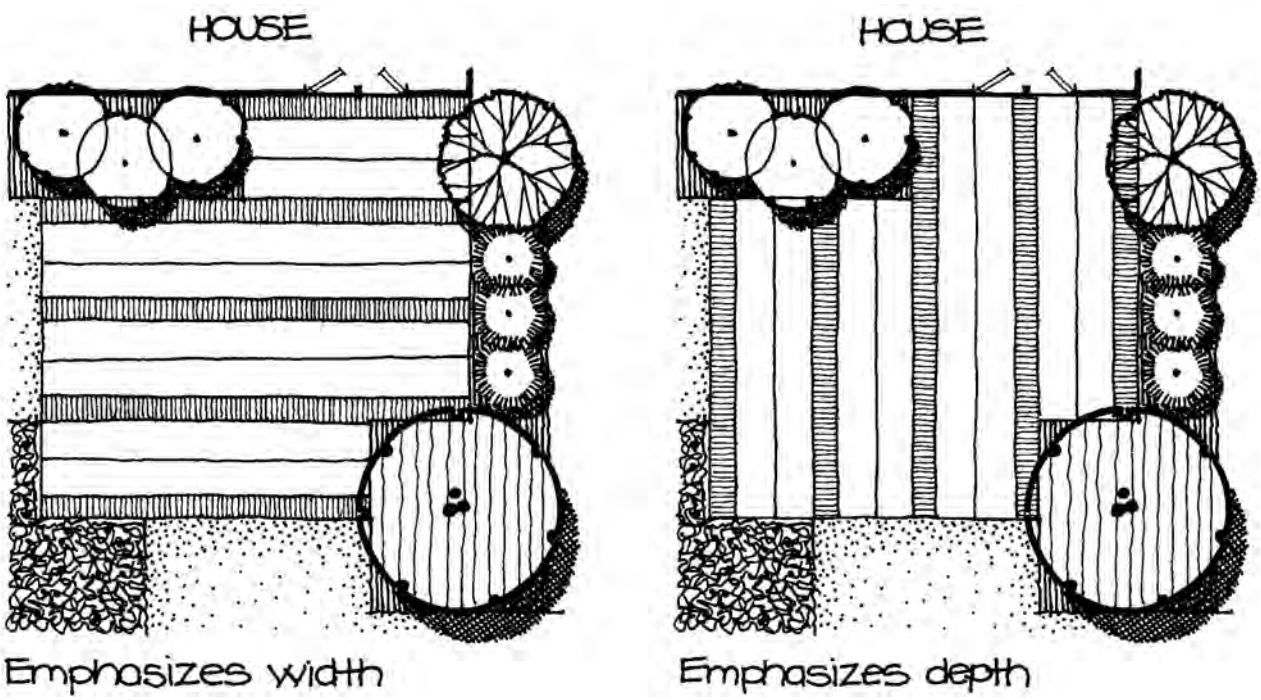


Figure 12–56
Directional lines in a pavement can visually expand the perceived width or depth from the house.

Site Structures Similarly, pavement patterns should be designed to fit with adjoining or nearby walls, fences, steps, overhead structures, pools, and so on (Figure 12–59). Again, pavement patterns should:

- be compatible with the style and character of neighboring structures.
- align with prominent corners, edges, and posts of structures.

Landscape Beyond Pavement patterns should also connect to the larger landscape setting on a residential site. To do so, pavement patterns should:

- meet adjoining planting bed lines.
- be visually compatible with the character of the neighborhood and region.

STRUCTURE MATERIAL PALETTE

In addition to considering the pavement materials on a site, the landscape designer must also determine the materials and patterns of walls, fences, benches, trellises, overhead structures, and so on. The following paragraphs outline a palette of common materials used on the residential site for these structures. As can be seen, many of these materials are similar to those used on the ground plane, although their composition and patterns are often different when applied to site structures.

Stone

As with pavement, there are many types and shapes of stone that are available for use in landscape structures. The most common types fall in three broad categories: boulders, slabs, and cut stone.

Boulders Boulders are a generally rounded stone that is found unquarried along water bodies or in regions of rocky terrain (Figure 12–60). Boulders commonly range

Figure 12–57
Material patterns can be coordinated with significant historical patterns of an adjoining house.

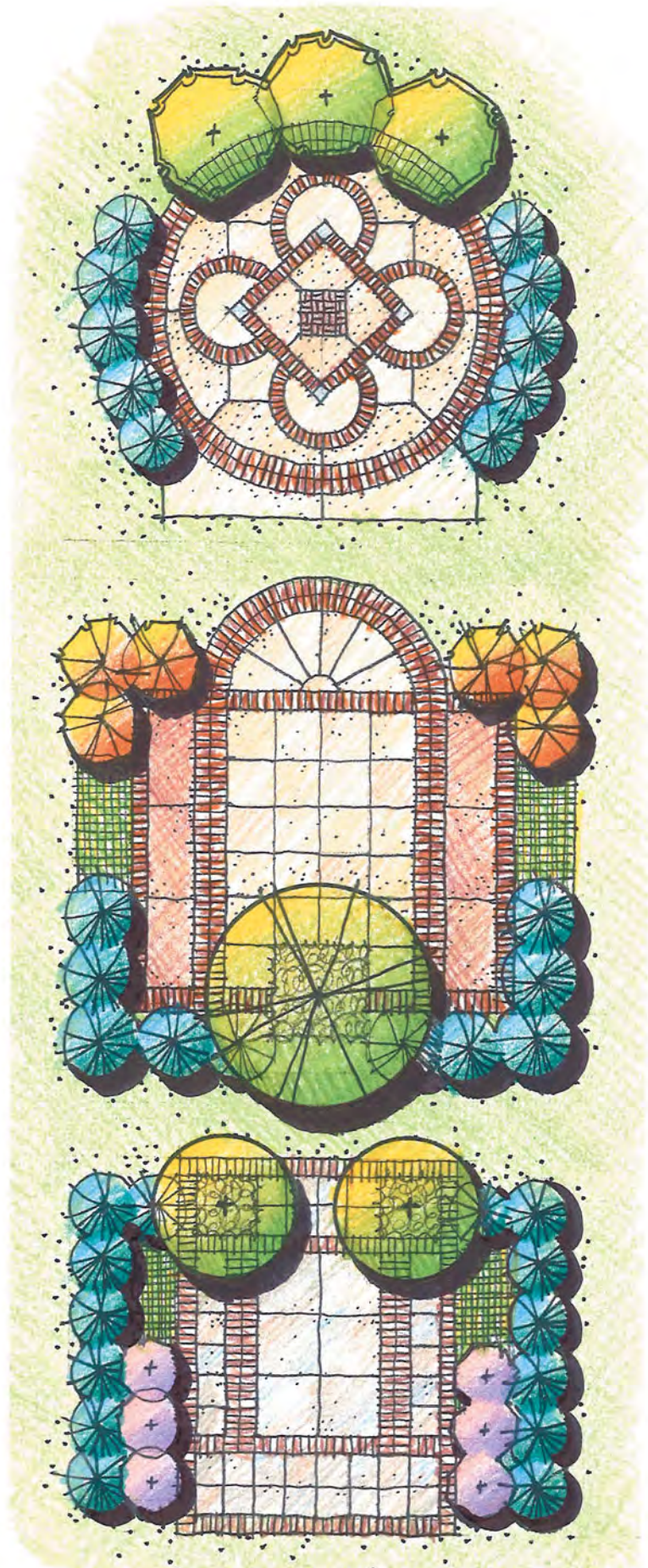




Figure 12–58
Material patterns can echo notable architectural features of the house.

in size from 3 to 12 inches and are gray, tan, and buff in color, although they may be found in other colors depending on the region and their geological source. Boulders can be used to:

- construct retaining walls and free standing walls if they are mortared in place (Figure 12–61).
- provide a rustic character appropriate for sites near water or rural sites surrounded by a native landscape.
- create a distinct rounded surface texture.
- furnish accents within planting areas.

Slabs Slabs are large dimensional stones that are quarried and cut, but often retain a rough, irregular character. Slabs vary widely in size from 6 to 12 inches in height and 2 to 4 feet in depth and length, although larger sizes are available. The color of stone slabs depends on their geological source, with many being gray, buff, or light yellow in color. Streaks of yellow, orange, or blue tones are common in some slabs. Slabs are appropriately used on the residential landscape to:

- create low retaining walls that have a hefty, solid appearance.
- replicate rock outcrops when they are set into a slope in a stepped fashion (Figure 12–62).
- create rugged steps.

Cut Stone Cut stone is stone that is quarried and cut into relatively flat units. The exact quality of cut stone varies widely depending on the geological source and the degree of precision in cutting. Some cut stone retains a rough, tumbled appearance, whereas other cut stone has very clean and straight edges (Figure 12–63). The size of cut stone generally ranges from about 1 to 6 inches in height and 1 to 2 feet in length. Cut stone can be used to:

- create either mortared or dry-laid stone retaining walls, many with a distinct horizontal character.
- construct free-standing walls.

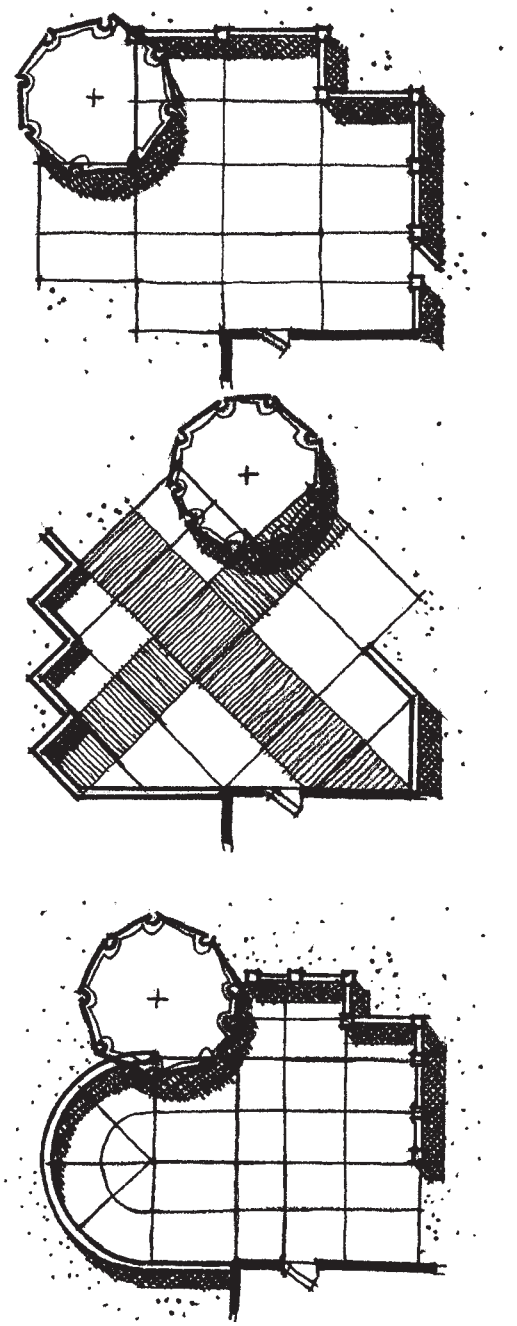


Figure 12–59
Pavement patterns can be coordinated with walls and fences by relating to corners, edges, posts, and so on.

- establish either a rough, irregular visual character or a refined, elegant quality depending on the exact type of cut stone selected.
- define any plan form including curves and arcs (Figure 12–64).
- visually associate a stone house with the landscape.

Brick

Brick used for landscape structures has the same dimensional and visual qualities as brick used for pavement. However, brick used for structures doesn't have the same physical makeup as pavement brick and will usually break apart over time when placed on the ground because of wear and freeze/thaw cycles. Brick is suitably used to:

- be the sole material or the veneer of free-standing walls.
- establish distinct patterns on walls (Figure 12–65).

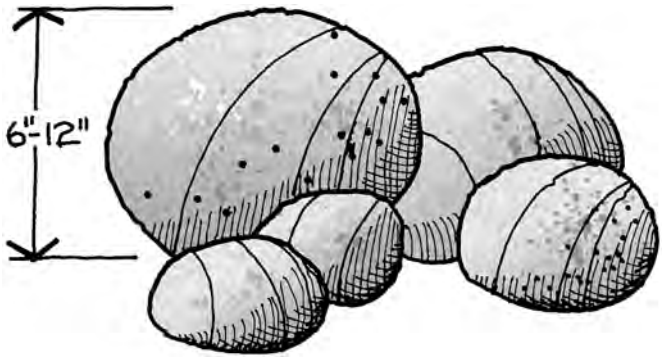


Figure 12–60
Typical appearance and size of boulders.

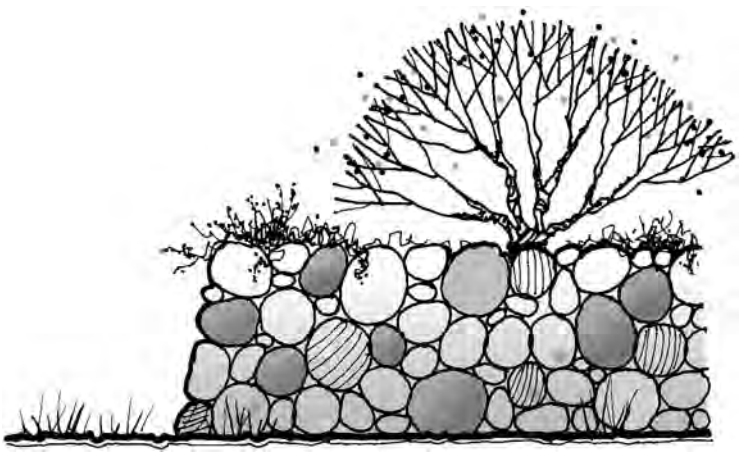


Figure 12–61
The use of boulders in a low retaining wall.



Figure 12–62
Stone slabs can replicate the appearance of rock outcrops.

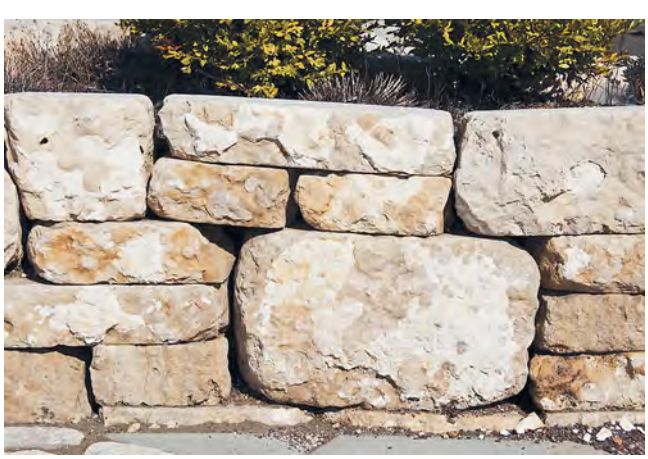




Figure 12–63
Examples of the potentially different appearance of cut stone used in site structures.

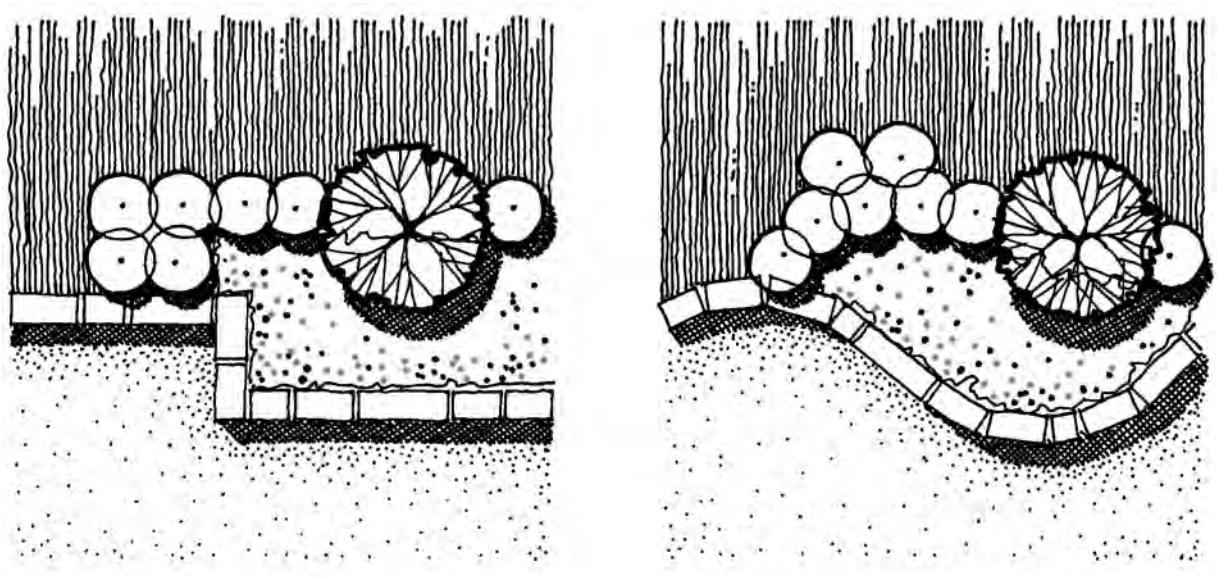


Figure 12–64
Cut stone can be used to define retaining walls in different forms and styles.

- visually link a brick house with the landscape.
- create a historic character, especially in areas where brick is a prevalent construction material.
- furnish a warm color in the landscape that contrasts with the green of most plant materials.

Concrete Masonry Units

Concrete masonry units (CMU) are precast concrete blocks that are prefabricated in specific sizes and shapes. Unlike the typical gray concrete blocks used for house foundations or other structural applications, these concrete units are decorative in nature and intended to be seen (Figure 12–66). The exact size of concrete masonry units fluctuates widely among manufactures, although most concrete masonry units are between 4″ to 12″ wide, 4″ to 8″ high, and 4″ to 8″ deep. Some concrete masonry units used for landscape structures are exactly the same as those for pavement. Colors vary, with shades of gray, tan, and brown being most common. The finish also ranges from clean, straight edges to rough, tumbled surfaces. The advantage of concrete masonry

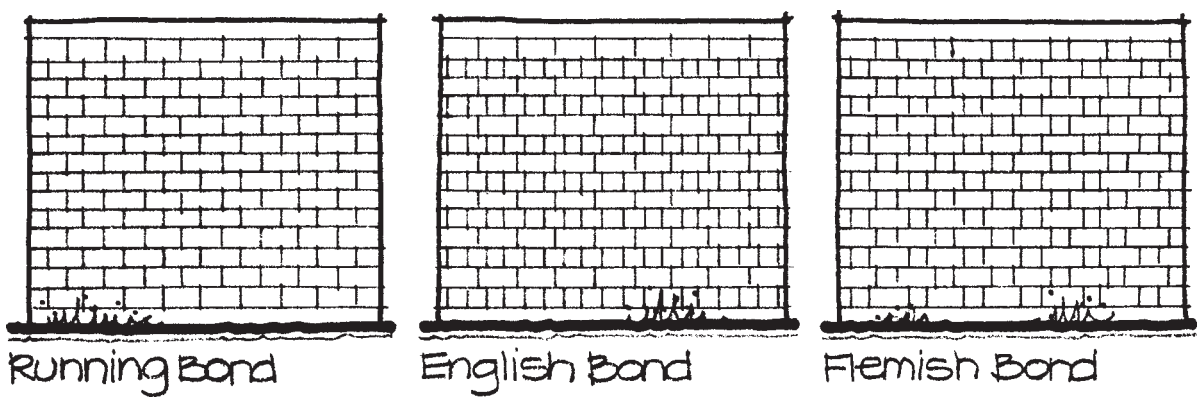


Figure 12–65
Common brick patterns for walls.



Figure 12–66
Examples of precast concrete block walls.

units in comparison to stone or brick is that they cost less and are available in predetermined sizes that are often more easily and quickly installed. Concrete masonry units can be used to:

- construct retaining walls, free-standing walls, and steps.
- fabricate cabinet and fireplace enclosures associated with outdoor kitchens.
- repeat the color and appearance of precast concrete pavers (assuming that a given manufacturer makes both).
- create a uniform color and texture across a wall surface.
- provide colors not available with stone or brick.

Wood

Wood is a widely used material for landscape structures because of its availability and relative low cost in comparison to masonry materials. The dimensional sizes of wood used in landscape structures vary more widely than sizes of wood used for pavement. In addition, wood possibilities include plywood, tongue-and-groove material, and cut wood for posts, caps, and rails. Most wood used for landscape structures is pressure-treated wood, especially if it is in contact with the ground. Although it is more expensive, cedar is also a good choice of wood because of its natural preservatives that decrease decay. Other types of wood may also be used for structures if they do touch the ground. A distinct advantage of wood is its ability to be painted or stained, thus giving it a wide range of color and finish possibilities. Wood can be employed in landscape structures to:

- construct straight fences of many designs and patterns (Figure 12–67). The lightweight quality of wood and its ability to be easily cut into any dimension give it great flexibility to create fences of various heights, material patterns, and openness (Figure 12–68).
- repeat house colors in the landscape.
- construct trellises and overhead structures of many designs and openness (Figures 12–69 and 12–70).

Other Materials

In addition to the more common structural materials previously outlined, there are several other materials that are occasionally used in the landscape as discussed in the following paragraphs.

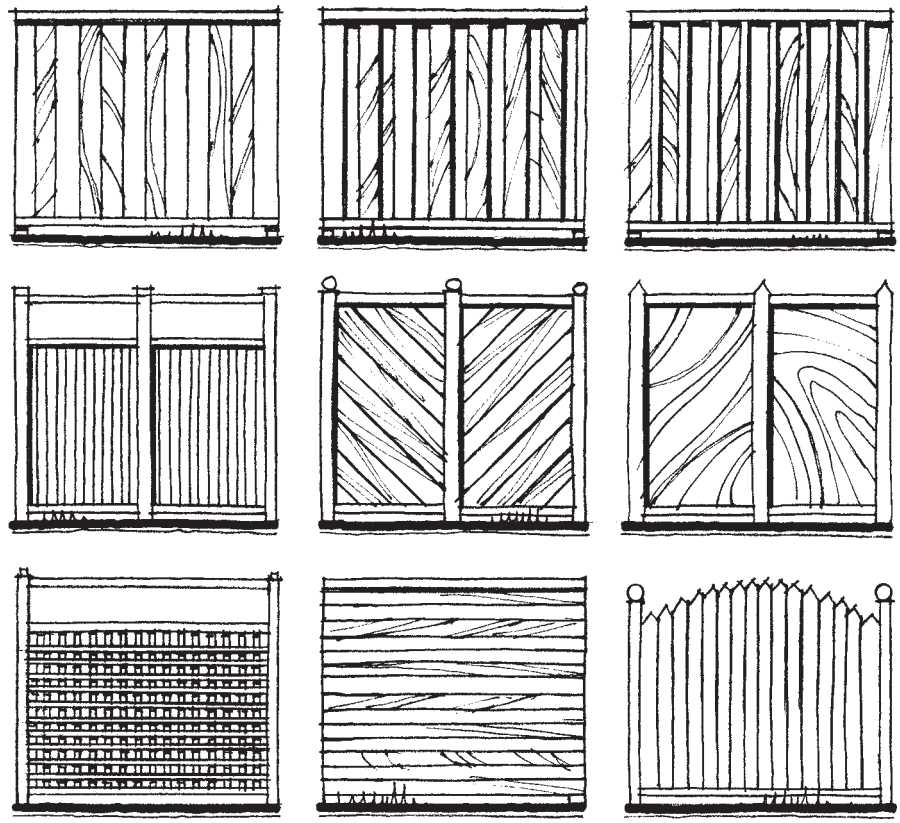


Figure 12–67
Potential patterns for a wood fence.

Wrought Iron Wrought iron is a tough iron alloy that can be bent and welded. Wrought iron is available in long, relatively thin dimensions of various caliber sizes that are either solid or hollow. One distinct quality of wrought iron is that it can be twisted and shaped into simple or elaborate patterns, thus giving it great flexibility in use and appearance. One other aspect of wrought iron is that most features made with the material are custom handcrafted and so are relatively expensive to fabricate. Wrought iron can be used to:

- construct custom fences to the exact specifications established by the designer.
- establish a historic quality, especially when painted black.
- create simple or highly elaborate patterns that are appealing when seen silhouetted against a simple background.
- provide a semitransparent screen that can be partially seen through.



Figure 12–68
Example of the variable openness achievable with a wood fence.

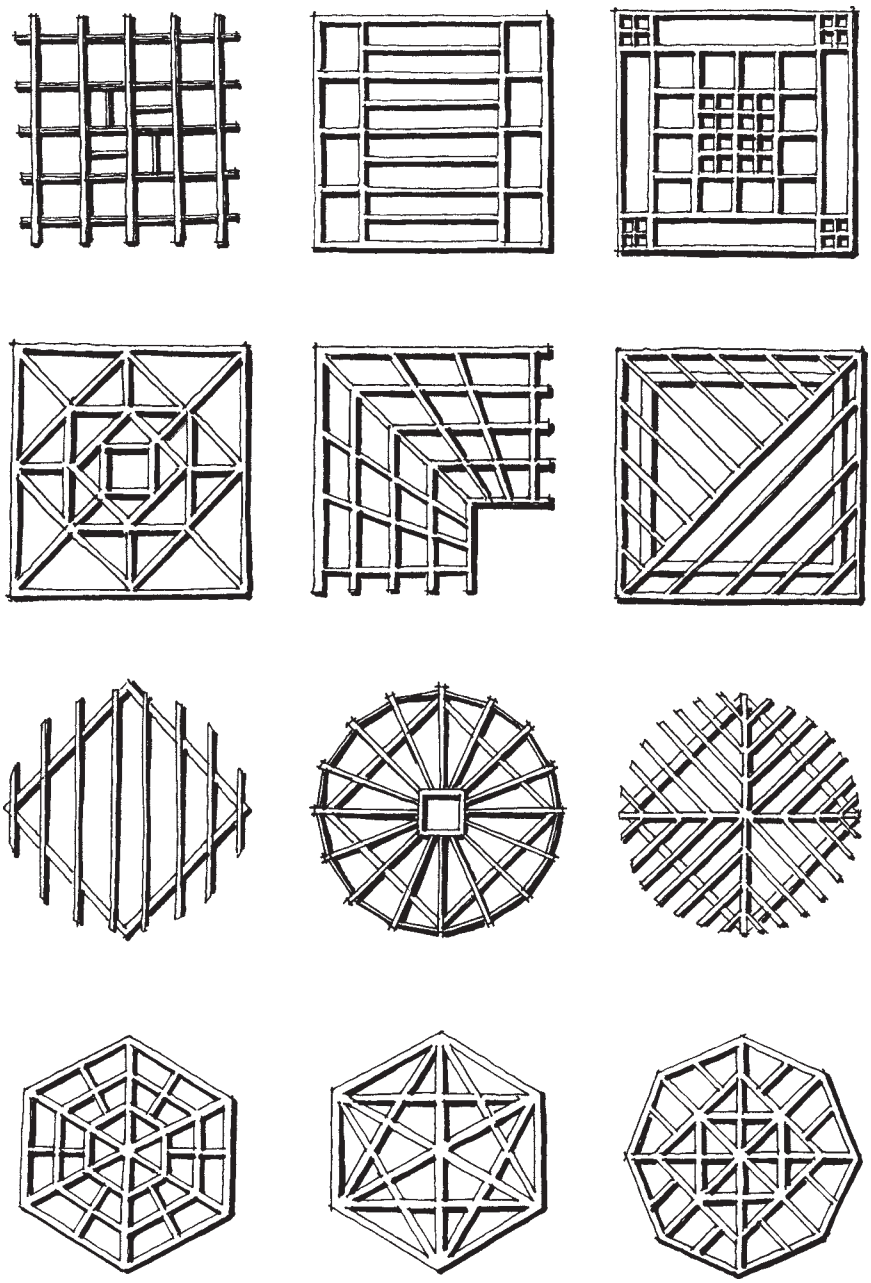


Figure 12–69
Possible overhead arbor patterns based on the square, circle, hexagon, and octagon patterns.



Figure 12–70
Example of the potential openness of a wood overhead structure.

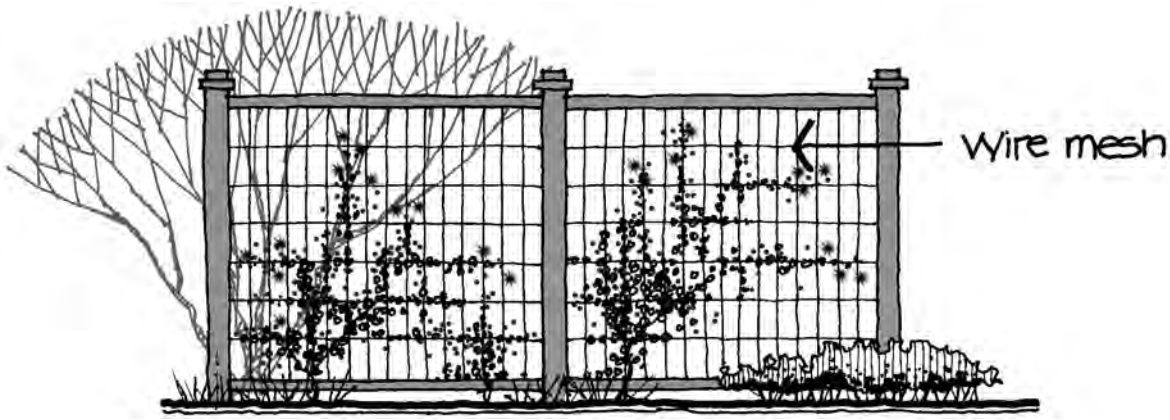


Figure 12–71
A metal mesh screen can provide a semitransparent plane and support for vines to grow on.

Metal Screens Metal screens are typically constructed of wire to form panels of a given size. The thickness of the wire and the spacing varies with manufacturer, so there is a range of available screen units. Panels of metal screen are often used in the vertical plane and must be attached to another element such as a wood post or masonry wall for support. Metal screen material can be employed in the landscape to:

- create a semitransparent screen that functions like a scrim to partially conceal or reveal what is on the other side.
- provide structural support for vines or other plants to climb through, thus creating a "green wall" (Figure 12–71).
- establish a foreground texture and color when placed against a flat surface.
- establish a hip urban and industrial appearance in a landscape.

STRUCTURAL PATTERNS AND GUIDELINES

As with pavement, there are a number of considerations to keep in mind when selecting materials and designing patterns for landscape structures.

Relation to House

Every attempt should be made to visually connect site structures to the house so that the landscape and house appear as one unified design statement (Figure 12–72). This can be accomplished by repeating materials such as stone, brick, or paint color on the façade of the house in nearby walls, fences, arbors, and so on. In addition, the designer might carefully select certain architectural details of the house and replicate them in nearby site structures (Figure 12–73).

Character and Function

As discussed at the beginning of this chapter, materials should be selected for their appropriateness to the region and neighborhood in terms of visual character, climate, and availability of materials. It is necessary to look beyond the particular residential site to determine what is suitable or not suitable for the setting. In addition, the character of structures should fit the style of other landscape features. It is often helpful to study alternatives to determine which is most fitting for the overall design (Figure 12–74).

Fence Caps and Frames

Free-standing walls and fences are often more appealing when they have interesting details that give relief from an otherwise flat surface. One technique is to emphasize



Figure 12–72
Material patterns on walls and fences should relate to the adjoining house and pavement.



Figure 12–73
Site structures can repeat architectural details in the landscape.

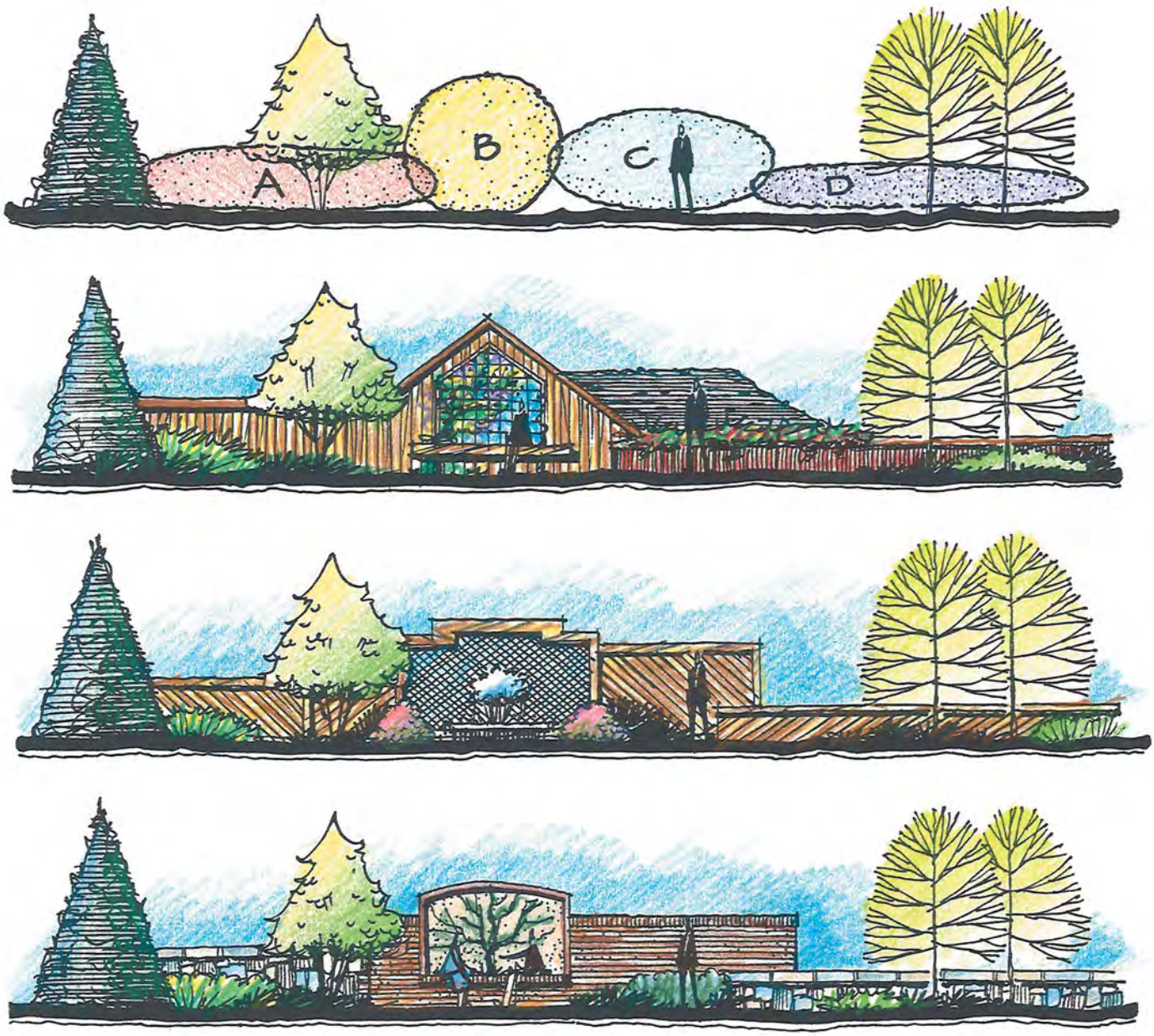


Figure 12–74
Alternative studies of site structures can help determine what is the most appropriate character for the house and site.

the top of the wall and fence with a linear cap (Figure 12–75). Such a cap visually terminates the wall and fence surface and reduces the chances of the eye wandering off into the background or sky. The cap along with posts and bottom railings can help to frame the surface much like the frame around a picture.

MASTER PLAN PROCESS

The master plan starts with the preliminary design and goes beyond it to study the design in a more detailed manner. If the preliminary design consists of only one alternative, then the master plan proceeds to add more refinement and detail to it. If the preliminary design is made up of two or more alternative plans, then the master plan is based on the best alternative or combination of alternatives.

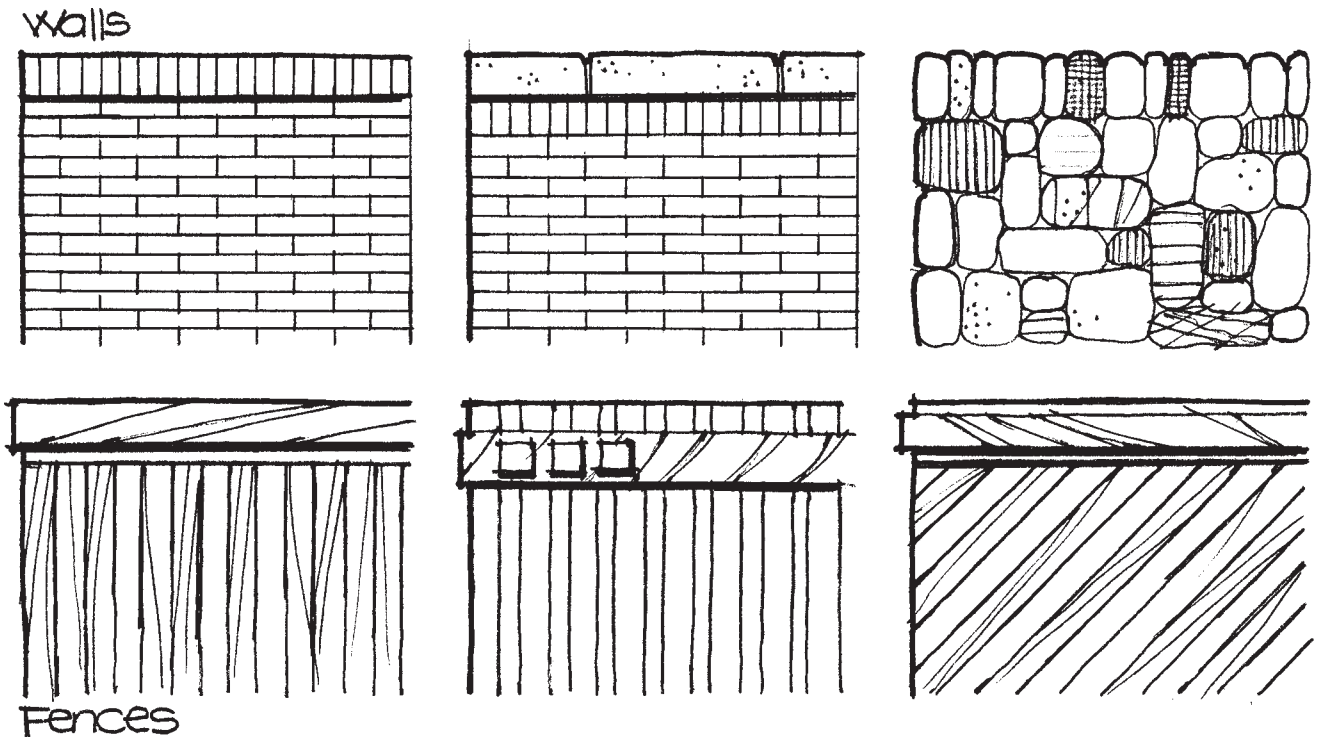


Figure 12–75
Examples of potential caps for walls and fences.

One of the first steps in preparing the master plan is to seek the clients' feedback about the preliminary design. Typically, the clients will offer some reactions and opinions while the designer is presenting the preliminary design to them. If they don't, the designer should ask for their thoughts after the presentation has been completed. The feedback at this point is a first impression and can help the designer to judge the general acceptance of the proposal. The designer should be able to assess where and how the clients generally agree or disagree with what was presented.

However, the designer should also give the clients some additional time to absorb the preliminary design(s). The clients are apt to need time to think about important ideas or to make decisions about key aspects of the design. The designer should not expect the clients to make hasty judgments that both parties may regret later. The time required for this extended thought about the preliminary design may vary from several days to a week. On the other hand, it is best not to give clients too much more time than this because they may begin to forget many of the points that were made during the presentation.

To facilitate the process of getting feedback, the designer should leave an extra copy or two of the preliminary design(s) with the clients. Remember, never leave the original drawing with the clients; the designer should keep that in the office. The clients should be encouraged to study the drawings thoroughly and to write comments directly on the copies. After the clients have been given adequate time to comment on the preliminary designs, the designer should have a clear direction for proceeding with the master plan.

In addition to seeking the clients' feedback, the designer should also take time alone to review the preliminary design. More often than not, the designer will identify certain areas of the preliminary design that need additional study. In some cases, the designer may discover some areas that simply do not work. These will have to be reworked. In other places, the design may work, but doesn't yet "feel right" to the

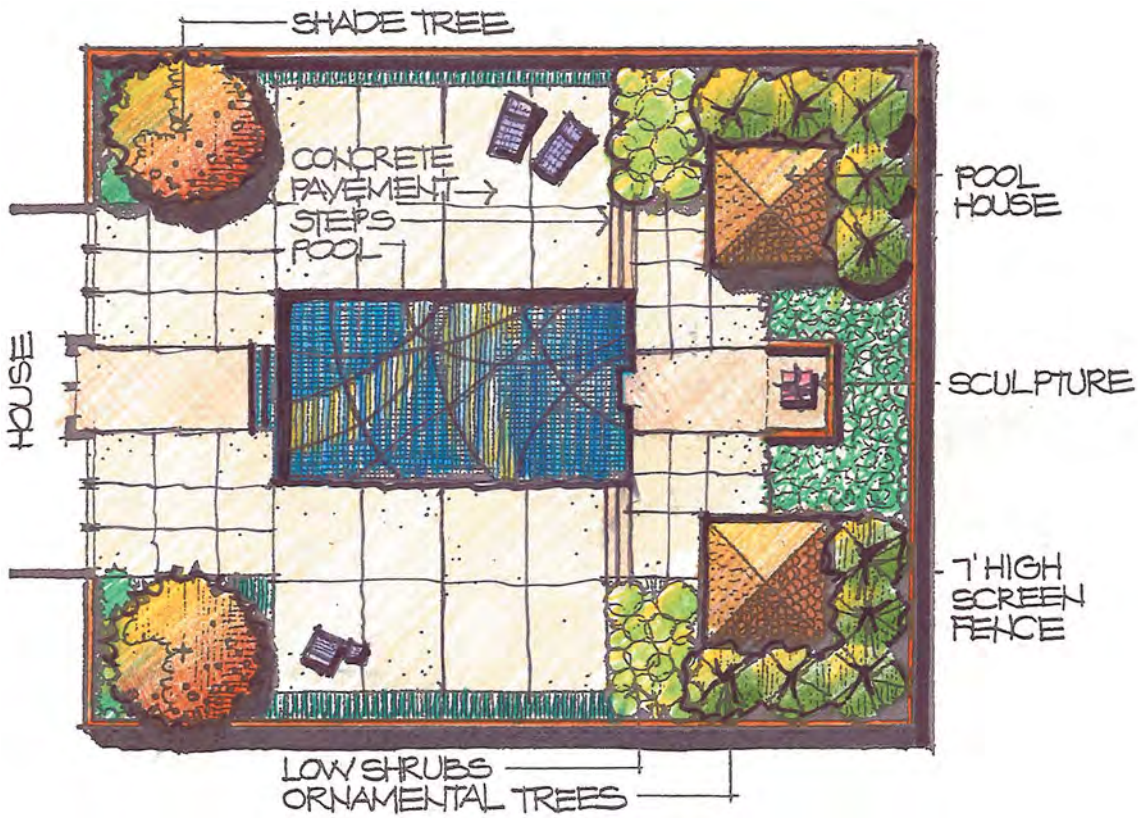


Figure 12–76
Example of a preliminary design.

designer. These areas may need some "massaging" and adjustment to improve their quality. And in still other places, the designer may find a better solution than was originally developed.

After receiving the clients' feedback and reviewing the preliminary design(s), the designer can "return to the drawing board" to revise the design. As the designer revises the plan in preparation of the master plan, there may be three related and simultaneous activities that take place: (1) redesign, (2) refinement, and (3) more detail. The following paragraphs describe how a preliminary plan for a pool area was revised in terms of the three master plan activities (Figure 12–76).

1. *Redesign.* First, the designer may have to change certain areas of the design so that a new solution is created. This is the most radical type of revision and often involves completely altering some forms and/or elements of the design (Figure 12–77). In this example, the shape of the pool and location of the pool house have been changed while still maintaining an overall axial design.
2. *Refinement.* Second, the designer may revise or improve certain areas of the design. This often involves selective repositioning and modifying of certain forms and/or elements of the design (Figure 12–78). In this example, the shape of the pavement, design of the steps, and organization of the plant materials have been refined in relation to the preliminary design.
3. *More detail.* And finally, the designer may study and show some areas or elements of the design in greater detail in comparison with the preliminary design (Figure 12–79). Here, the pavement pattern and plant materials are shown in greater detail than in the preliminary design.

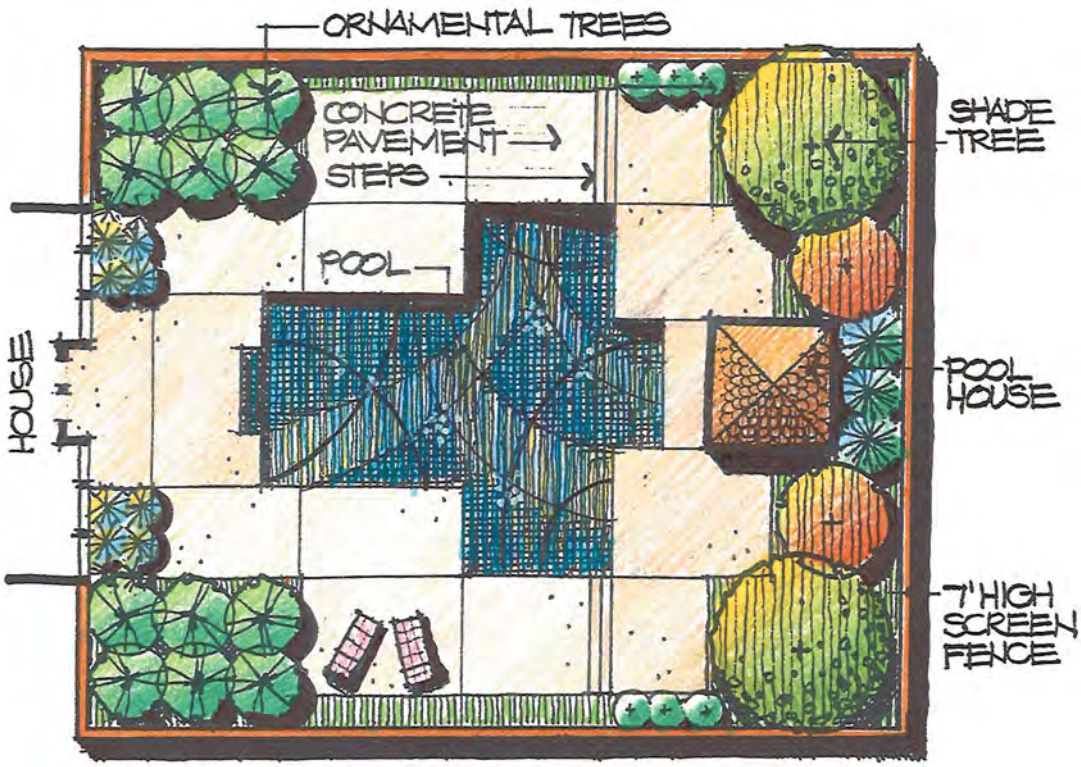


Figure 12–77
An example of a master plan that has been redesigned in comparison with the preliminary design.

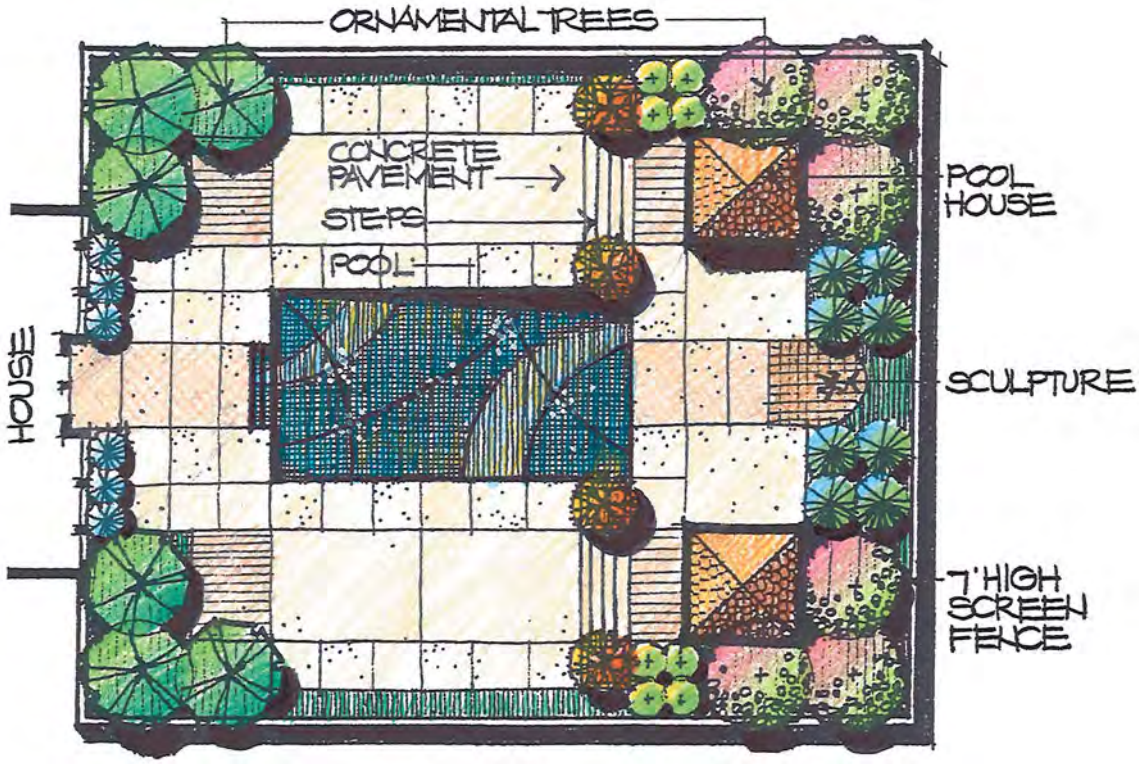


Figure 12–78
An example of a master plan that has been refined in comparison with the preliminary design.



Figure 12–79
An example of a master plan that has greater detail in comparison with the preliminary design.

It should be noted that the combination of refinement and more detail are the most typical activities if the designer was thorough during the preliminary design phase.

After the master plan has been completed along with other drawings, such as sections and perspectives, the designer once again meets with the clients for a final presentation. During this presentation, the designer should review all the changes, refinements, and additions made to the design after the preliminary design presentation.

In many instances, this final presentation of the master plan is the end of the project for the designer. However, the designer should make it clear to the clients that there are many critical steps that must be undertaken before the master plan can become reality. The designer should offer (with proper compensation) to stay involved with the installation and implementation of the design so that the intended quality is fulfilled. Depending on the nature of the situation, this involvement may vary from occasional supervision or review of the implementation to direct and complete control. Whatever the role the designer plays, some involvement is better than none.

Graphic Style and Content

The master plan is drawn in a more exact and controlled graphic manner in comparison with the preliminary design. This is most evident when the preliminary plan is drawn freehand in a loose graphic manner but less obvious if the preliminary drawing was drawn with CAD. All edges of structural elements (*hardscape*) such as the house walls, free-standing walls/fences, pavement, steps, pools, and so on are hand drafted or laid out with a computer CAD program to give them precision (Figure 12–80). It should be noted that some individuals prefer to draw a master plan freehand because of speed and the less mechanical style. This is perfectly acceptable if all structural lines are drawn precisely.

Plant materials and other natural elements (*softscape*) in the master plan can be drawn freehand or by means of CAD. For plant materials drawn freehand, it is best to first use a circle template to lightly draw the outlines of plant masses as well as the

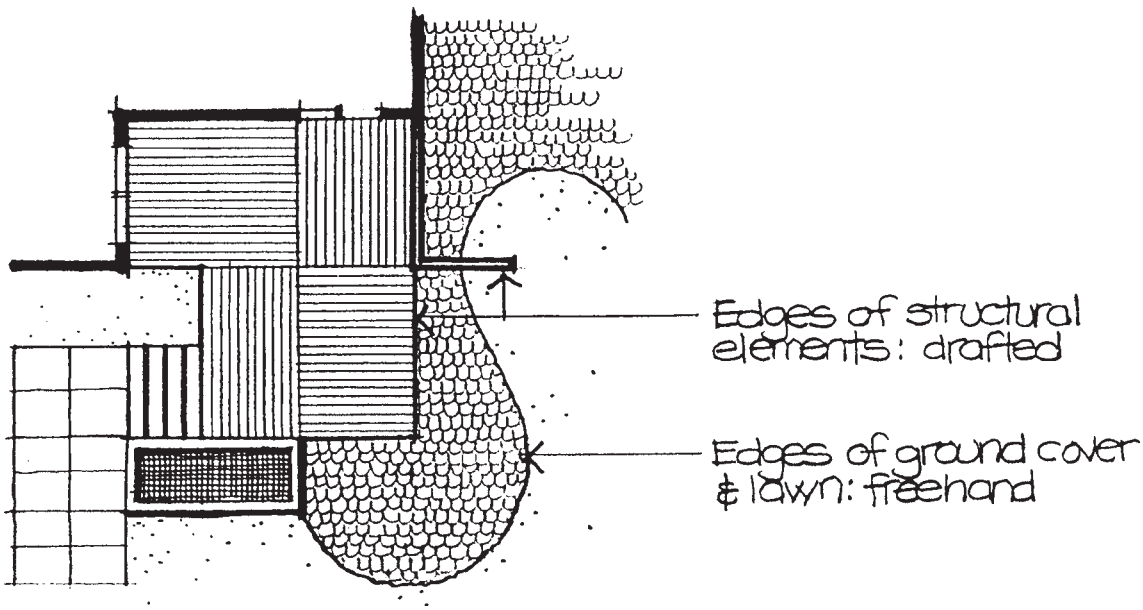


Figure 12–80
The edges of structural elements in the master plan can be drafted or drawn in CAD.

individual plants within them (left side of Figure 12–81). When the light outlines or guidelines have been completed, the designer can go back over them with a pen or soft pencil to draw darker outlines around plant materials (right side of Figure 12–81). This technique gives plant materials a somewhat natural appearance in comparison with the structural elements in the drawing. Plant materials and other natural elements should not be drafted in the master plan because this gives these elements a stiff, engineered look.

The master plan should graphically show essentially the same information as the preliminary plan that preceded it. The master plan should show the following to scale:

A. Property line and adjoining street
B. Outside walls of the house including doors and windows

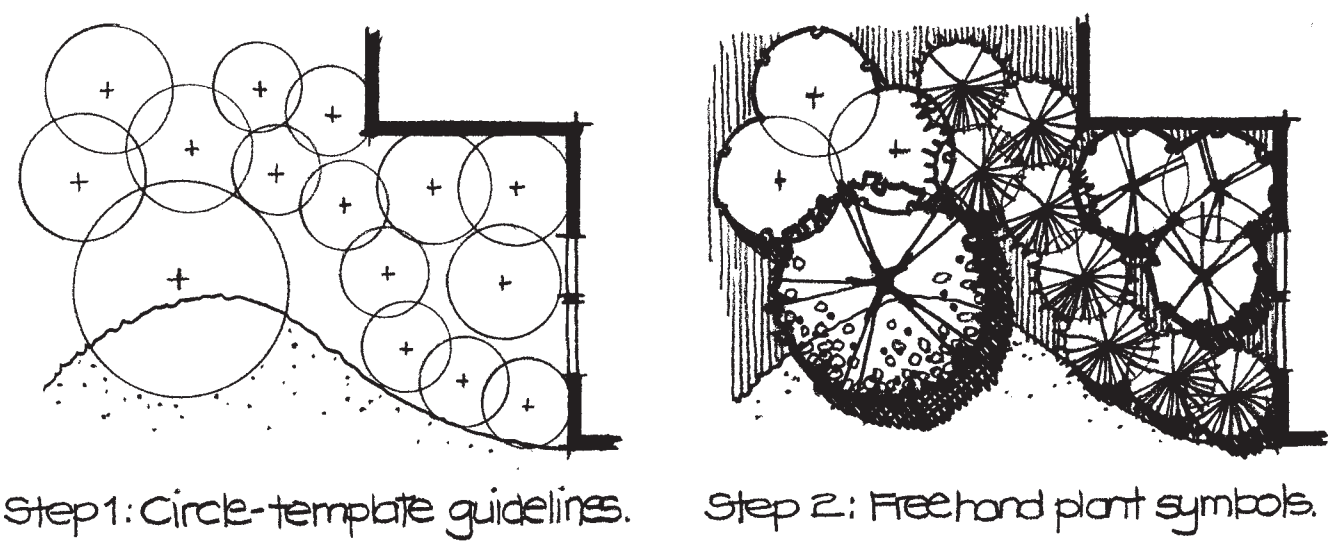


Figure 12–81
A process for drawing plant materials in the master plan.

C. Existing site elements or features that are to remain part of the design solution (should be on the base sheet)
   1. Utilities such as air conditioner, heat pump, gas meter, and telephone poles
   2. Existing areas of pavement such as driveway and walks
   3. Existing vegetation that is to remain

D. All elements of the design drawn and illustrated with the proper symbols and textures, including the following:
   1. Pavement materials and patterns
   2. Walls, fences, steps, and other structures; overhead structures may need to be shown on a separate drawing so they do not become confused with pavement, plant materials, and so on
   3. Woody plant materials shown as individual elements (though still in masses) so exact quantity and location can be determined
   4. Perennials, annuals, herbs, and so on, shown as generalized masses
   5. Water fountains, pools, streams, and so on
   6. Outdoor lighting locations
   7. Rocks, boulders, and so on
   8. Furniture, planter boxes, sculpture, and so on

In addition, the master plan should identify the following with notes and/or a legend on the drawing:

1. Major use areas such as outside entry foyer, living and entertaining area, terrace, pool, lawn, and garden
2. Materials and patterns of pavement, walls, fences, overhead structures, and so on
3. Plant materials by quantity and scientific name (unless a separate planting plan is to be drawn)
4. Ground elevations defined with spot grades and/or contour lines
5. Heights of walls, fences, steps, benches, and so on
6. Other notes that help explain the design to the clients
7. North arrow and scale (graphic and written)

If the landscape designer anticipates that additional plan drawings of the design such as a planting plan, layout plan, and/or grading plan will also have to be completed, then the master plan should be drawn so that copies can be used for bases of these additional drawings. To do this, the master plan is at first only partially completed. The house, property lines, and all elements and edges of spaces that are common to all these drawings should be drawn first (Figure 12–82). The title block information, north arrow, scale, and borders should also be completed at this time. However, no plant materials, textures, shadows, or labels should be drawn. Hard or digital copies of this partially completed master plan should be made before proceeding so they can be used for subsequent drawings.

After this has been accomplished, the master plan drawing can be completed by adding plant materials, textures, shadows, labels, and so on (Figure 12–83). The copies of the partially completed master plan can now be used as a base for any additional plan drawings (Figures 12–84 and 12–85). This procedure will save the time needed to redraw all the lines and symbols that are common to the master plan and additional drawings.

Duncan Residence Master Plan

After reviewing the two preliminary plans (Figures 11–108 and 11–109), the Duncans decided on Preliminary Plan "B" (Figure 11–109). After further discussions about this particular preliminary design, Mr. Kent, the landscape designer, undertook another study of the design to incorporate a few revisions and refinements. The result is the master plan shown in Figure 12–86.

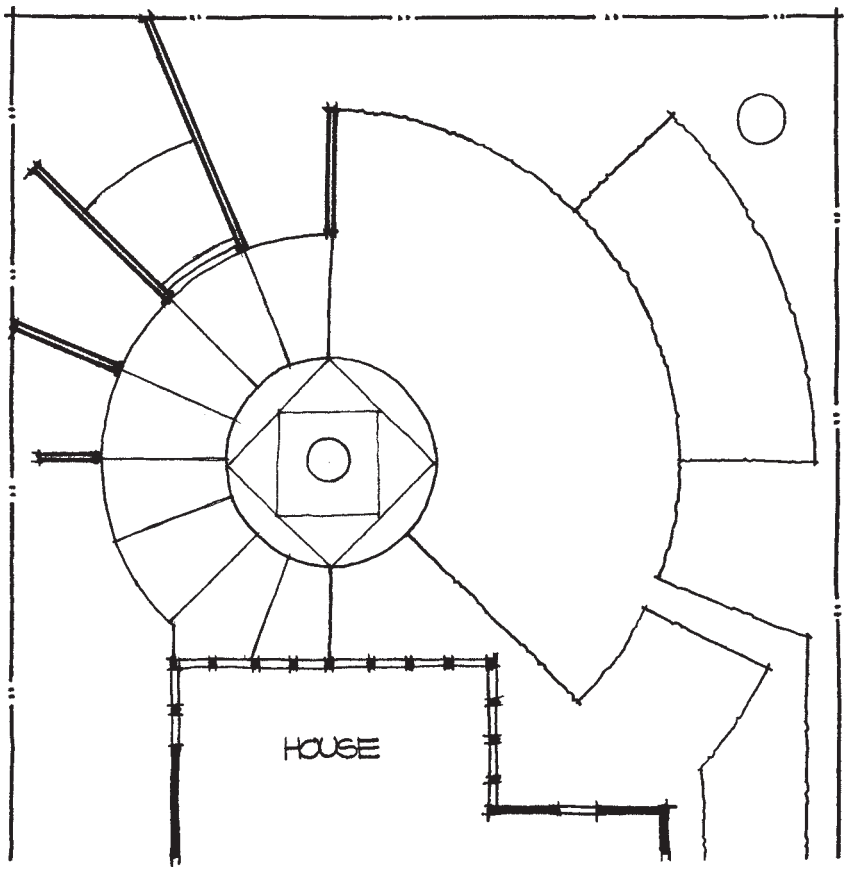


Figure 12–82
An example of a partially completed master plan used as a base for other drawings.

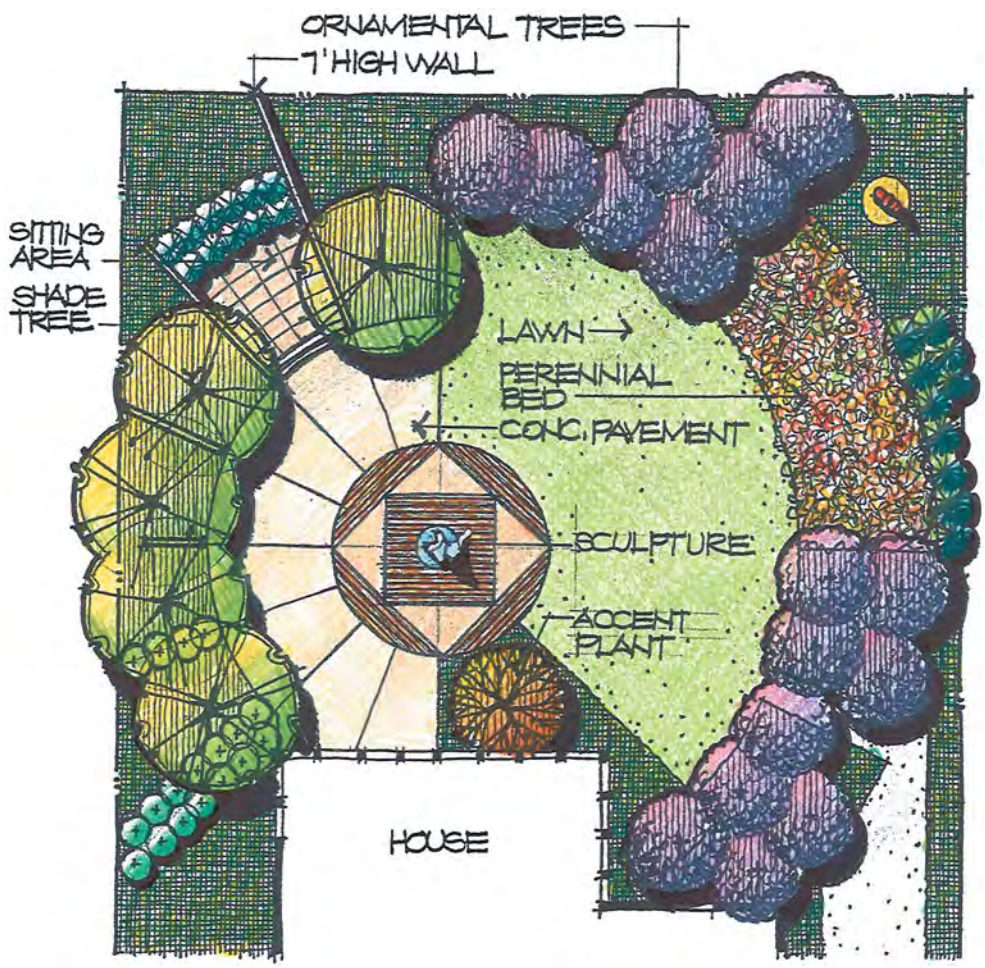


Figure 12–83
An example of a master plan.

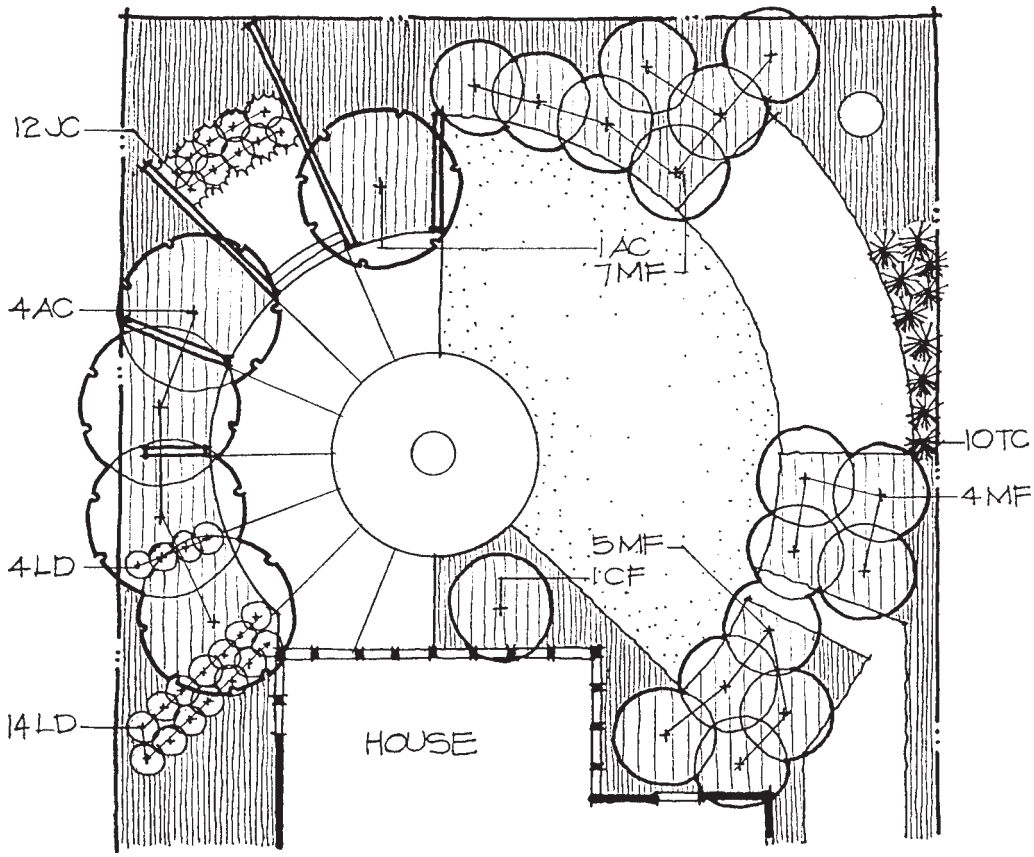


Figure 12–84
An example of a planting plan.

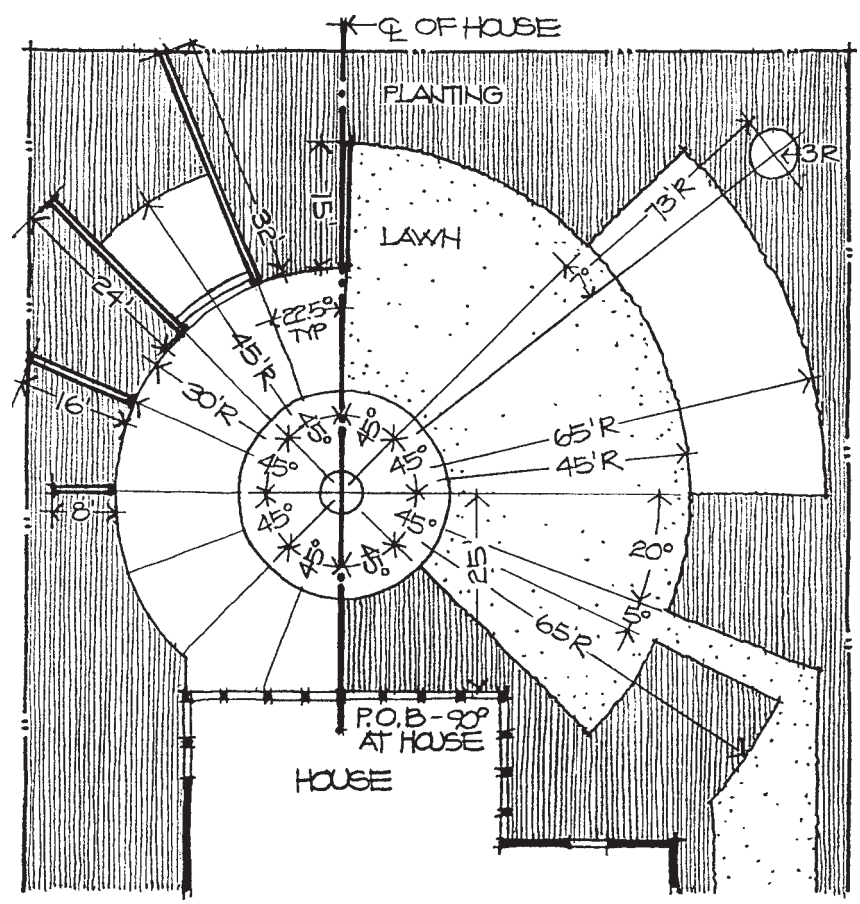


Figure 12–85
An example of a layout plan.

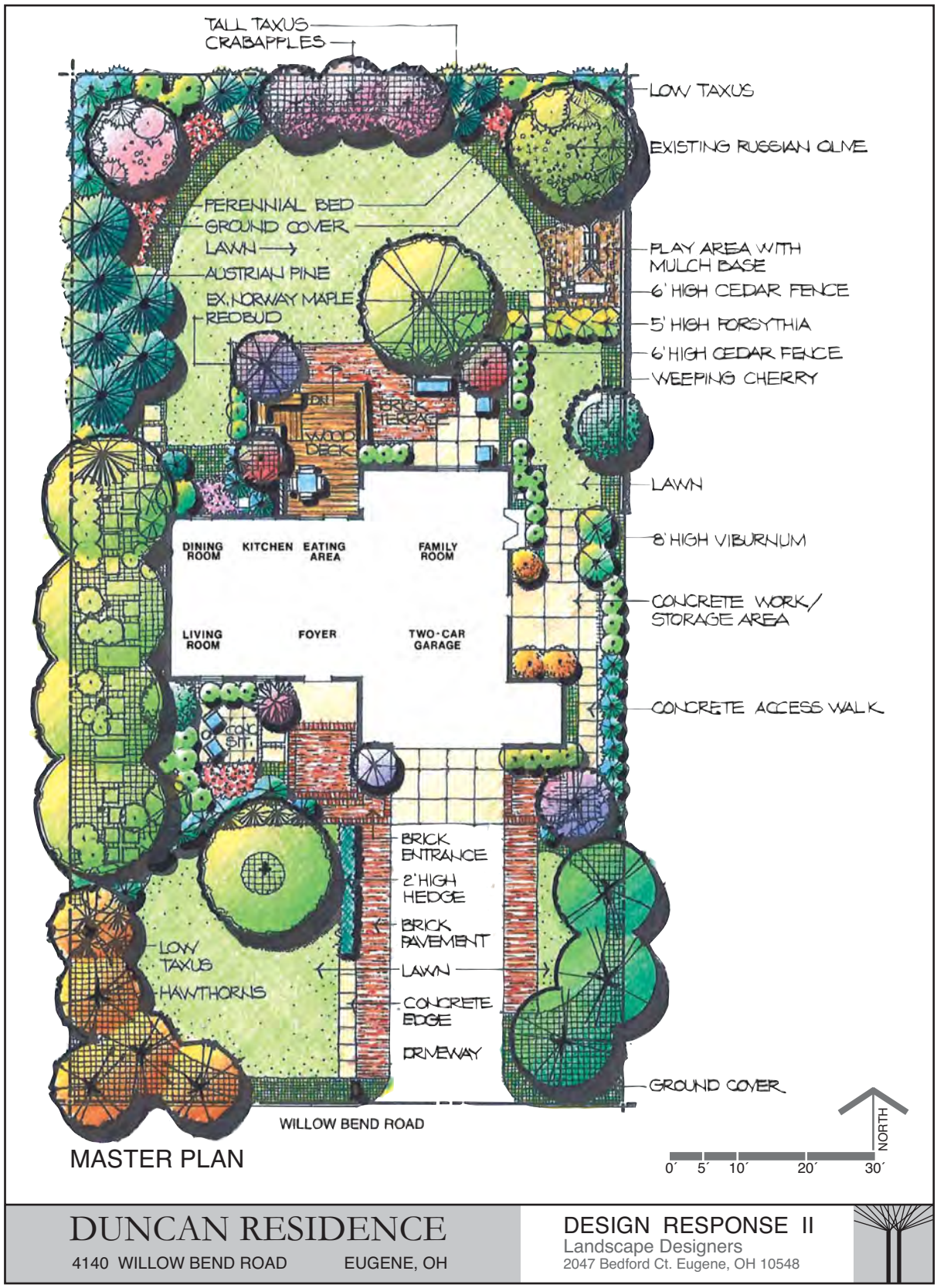


Figure 12–86
Master plan for the Duncan residence.

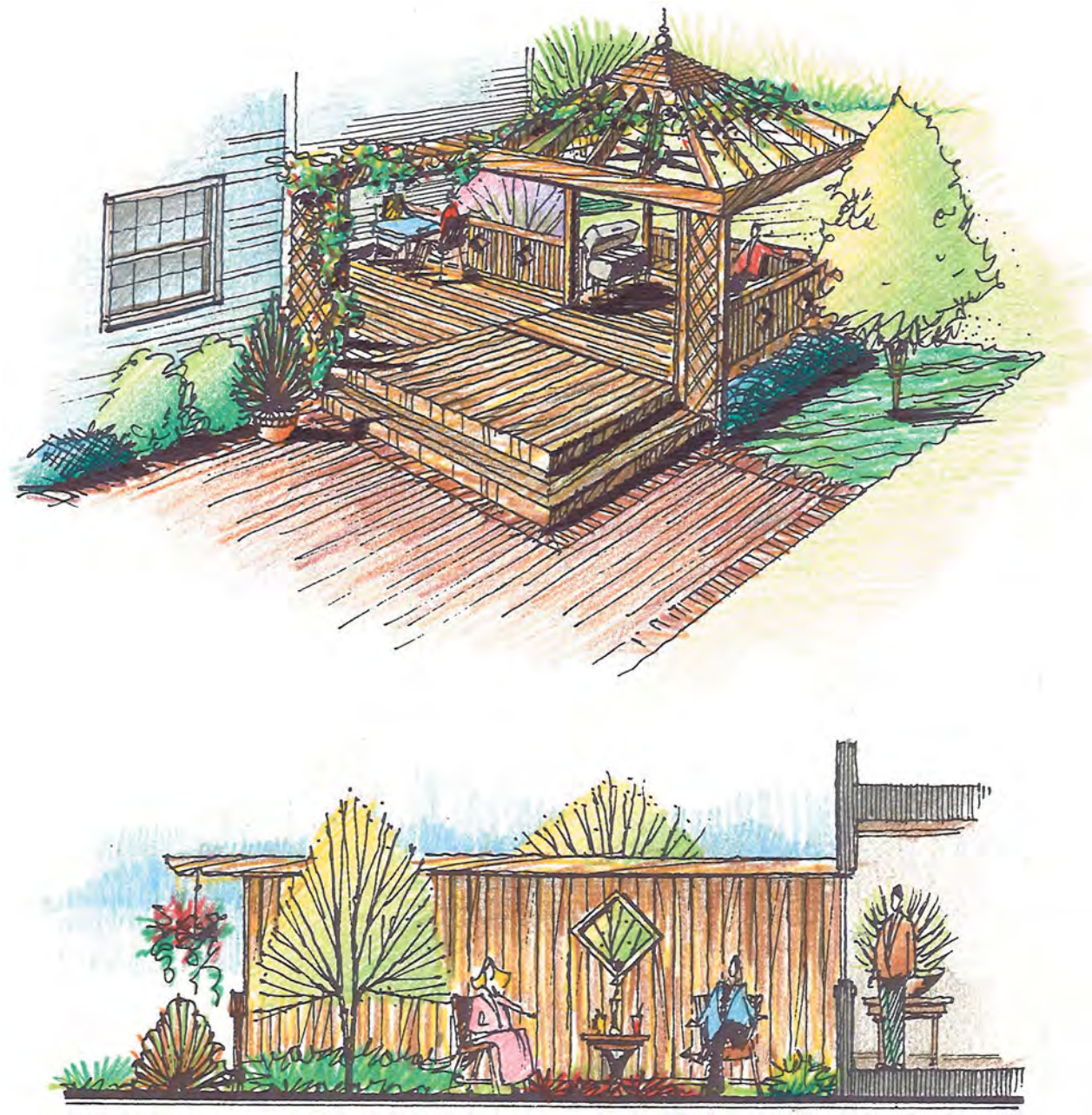


Figure 12–87
Arbor, railing, and fence patterns for the Duncan residence.

As can be seen, this master plan is very similar to the preliminary design that preceded it. However, a close inspection will also reveal a number of subtle changes. In the front yard, the shape of the sitting area has been revised and the planting has been refined. For example, the massing of low *Taxus* and the group of hawthorns in the southwest corner more clearly define and strengthen the arc of the lawn area. The western side of the house has been treated in a manner very much like the preliminary design. The area along the eastern side of the house has been revised slightly. The shape of the work/storage area and lawn has been made more rectangular to fit the narrow yard area more comfortably. In addition, the shrub planting near the weeping cherry has been eliminated to make this ornamental tree more prominent. In the backyard, the planting has been refined in a number of locations. The existing Norway maple has been incorporated with the planting bed adjacent to the brick

terrace. The planting near the air conditioner has also been altered. Along the northern edge of the lawn area, a ground cover bed is used to define the edge between the lawn and planting bed. A perennial bed is placed behind the ground cover to provide height and a splash of color during the summer. All of this is backed by a massing of shrubs, which has been refined.

Figure 12–87 shows the proposed designs for (1) an arbor over the deck and (2) the fence on the east side of the brick terrace. The arbor is partially open for filtered sun and to support vines. The terrace fence serves as a screen to separate the terrace from the side yard. It provides an extra layer of privacy from the east. The patterns and character of these structures are reflective of the rectangular design theme.

SUMMARY

The master plan is the end of the design phase of the design process. It shows the clients in a graphic form what their site will eventually look like if everything in the plan is implemented. The master plan also ensures that the landscape will be treated as a coordinated environment tailored to the specific site conditions and needs of the clients. In preparing the master plan, special study is given to the materials and appearance of the design. You should understand the following about the master plan and its proposed materials:

- Factors that should be considered in determining the selection of materials
- Characteristics and potential uses of loose pavement materials including gravel and recycled materials
- Characteristics and potential uses of unit pavement materials including stone, concrete pavers, tile, brick, and wood
- Characteristics and potential uses of adhesive pavement materials such as concrete
- Design guidelines for composing pavement patterns
- Characteristics and potential uses of materials used in site structures including stone, brick, precast concrete block, wood, and metal
- Design guidelines for composing materials in various site structures
- Design process steps for preparing the master plan and relation to preliminary design
- Graphic style of the master plan and information shown on it

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section three
Applications

CHAPTER 13 **Special Project Sites** CHAPTER 14 **Case Studies in Alternative Design Solutions**
CHAPTER 15 **Rendering Landscape Design Drawings in Color**

The final section of this book provides a series of examples for applying the design process to varied clients and site conditions. Every residential site is unique and requires a distinct application of the design process. Sites differ in location, size, shape, surrounding context, vegetation cover, topography, and architectural style of the house. The family size, ages of members, requests, tastes, and available budget likewise vary from one client to the next. Collectively, the designer must be prepared to encounter many different situations and create design solutions appropriate to each.

Chapter 13 examines challenges and design guidelines for special types of residential design projects including the corner site, the wooded site, the sloped site, and the townhouse garden. Chapter 14 presents a variety of case study design projects. Four of them illustrate the development of a series of alternative design solutions for different projects including a front yard, backyard, and condominium courtyard. The final project of this chapter offers a unique process of using perspectives as a design and sales tool. These sketches were developed as overlays on digital images. Chapter 15 demonstrates a variety of techniques, supplemented with examples, for using color pencils in rendering landscape design drawings. The chapter illustrates ways to render common design elements including trees, shrubs, ground covers, flower bed color, concrete, brick, stone, wood, water, and so on. In addition, there are examples of using the computer programs of Illustrator and Photoshop to render plans.

13
Special Project Sites

INTRODUCTION

The previous chapters discussed the ideal process and guidelines for designing the site around a private single-family residence. From this, it is hoped the reader understands that there is much to consider in creating a master plan that meets the requirements of the client, fits the existing site conditions, and is something that is enjoyable to look at and be in. Designing a master plan for a single-family residential site is a complex undertaking that also requires the best effort from a talented individual or firm. Ultimately, the success of the project depends not only on following a process or adhering to a set of principles, but also on the inherent abilities of gifted designers who can creatively solve problems and sensitively assemble elements and materials into an attractive spatial composition.

The Duncan residence was used in the previous chapters as a way to illustrate how the different steps of the design process can be applied to an actual project site. The Duncan residence is similar to many single-family residential properties found in suburbs throughout the United States and Canada. The two-story house is located in the middle of a rectangular lot that is about a quarter of an acre in size. The level site is clearly divided into a front yard facing the street and a backyard behind the house. Like many residential sites, the house was originally built on a cleared site and so was essentially a blank canvas for the original homeowners. The relatively flat, open qualities of the Duncan residence provided few restraints and easily permitted the designer to create a series of well-articulated outdoor rooms with plant materials, structures, and pavement.

Though prototypical, the Duncan residence does not represent all potential site conditions that one encounters as a residential landscape designer. Some sites are smaller and others are larger. Other sites have distinct topographic change in some or all areas of the property. Still other residential sites have large areas covered with trees or other types of native vegetation. Some residential projects are limited to an enclosed space adjacent to a townhouse, and other projects are surrounded by and open to a rural wilderness. All in all, the landscape designer is apt to discover a wide variety of site conditions, each requiring a slightly different application of the design process to create a master plan. The purpose of this chapter is to demonstrate how the design process and guidelines presented in the previous chapters can be modified and adapted to sites that have special conditions.

THE CORNER SITE

Most suburban subdivisions are planned so that the majority of lots are similar to the Duncan residence, with a public street on one side and other single-family properties on the remaining adjoining sides. However, a small portion of the lots in most subdivisions are located at the corners of intersecting streets. Corner lots are typically rather square-like in area with two sides that face the public right-of-way. This lot configuration creates a number of distinct site conditions that require special attention.

Special Site Conditions

Double Front Yard A unique quality of the corner lot is that it faces two intersecting streets and therefore has two "front yards." The corner lot may have as much as two to three times the length of adjoining street and curb as a typical lot (Figure 13–1). Thus, all the attention that is commonly afforded the front yard in a typical property must be doubled on the corner lot. The site areas that directly face the streets must establish "curb appeal" and provide the proper "public image." This requires extra effort and sometimes twice the expense. Even the tax or charge for public services such as sidewalk installation, lighting, and sewer or water line replacement is frequently more expensive for a corner lot because of the double frontage.

Majority of Site in the "Public Realm" Directly associated with the double front yards of a corner lot is the fact that the majority of a site area is located in the "public realm" (Figure 13–2). That is, the largest area of the site is located between the house and the two intersecting streets. This situation results from both the double street frontage and the setback requirements that locate the house toward the back of the site. The house placement increases public surveillance of the site and simultaneously reduces privacy. It may force activities such as lawn recreation or outdoor sitting that are normally reserved for the backyard to take place in the more public area of the site.

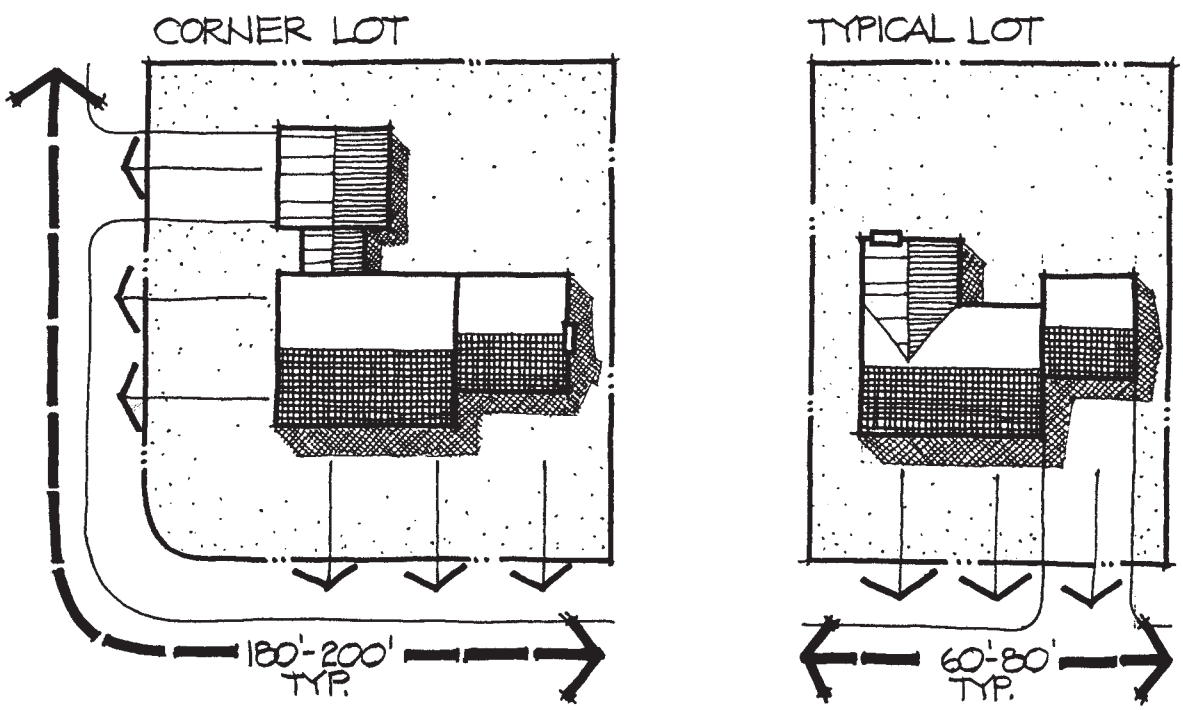


Figure 13–1
The street frontage is two to three times greater on a corner lot than on a typical lot.

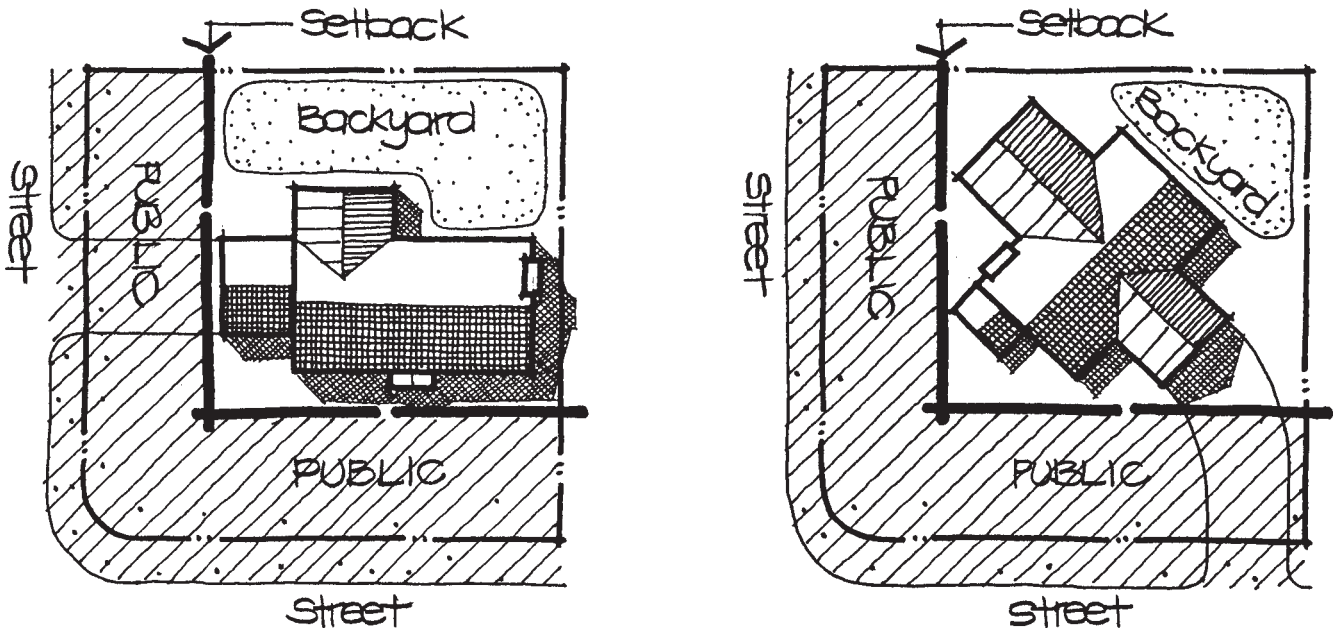


Figure 13–2
The majority of a corner lot's area is located in the public realm with little space available for the backyard.

Limited Backyard Space While the majority of a corner lot's area is located in the public realm, the private domain or backyard is simultaneously reduced to a relatively small area (Figure 13–2). In fact, some houses are located on corner properties in such a way that the backyard is reduced to the size of a standard side yard, leaving little room for outdoor activities. Common outdoor features such as decks, terraces, recreational lawns, and vegetable gardens must be drastically reduced in size, moved to the "public" street sides, or eliminated altogether.

Front Entry Confusion The double frontage sometimes creates puzzlement about where the front of the house is and where the appropriate location is for entering the house from the street or driveway. This occurs for several reasons. One cause is that the front door of houses on some corner lots faces one street while the driveway connects to the other street. A second reason for confusion is that some corner lot houses have several doors, one facing one street and another facing the other street. Which one is *the* front door? Unless there is a clear distinction about entry, the first-time visitor may well end up entering the site from the wrong street or arriving at the improper door.

Lack of Privacy Privacy on the corner lot is reduced because of the increased public surveillance from the two adjoining streets and from the close proximity of the house to the back and side property lines. On some corner lots, views from the streets not only extend into the front yard, but also directly into the backyard (Figure 13–3). In this situation, the house and yard are seen from almost three different sides of the property. Furthermore, the reduced backyard area easily allows views, sounds, and smells to extend back and forth to the neighbor's yard. Limited area also means there is less space for screen planting. The house location on other corner lots reduces privacy by orientating the back of the house directly toward the backyard of the adjoining property (Figure 13–4). The result is that the neighbor's backyard is directly seen from windows and spaces located at the back of the house.

Design Guidelines

The designs of a corner site possess a number of challenges. The following design guidelines are offered as a means to address these special site conditions associated with a corner residential property.

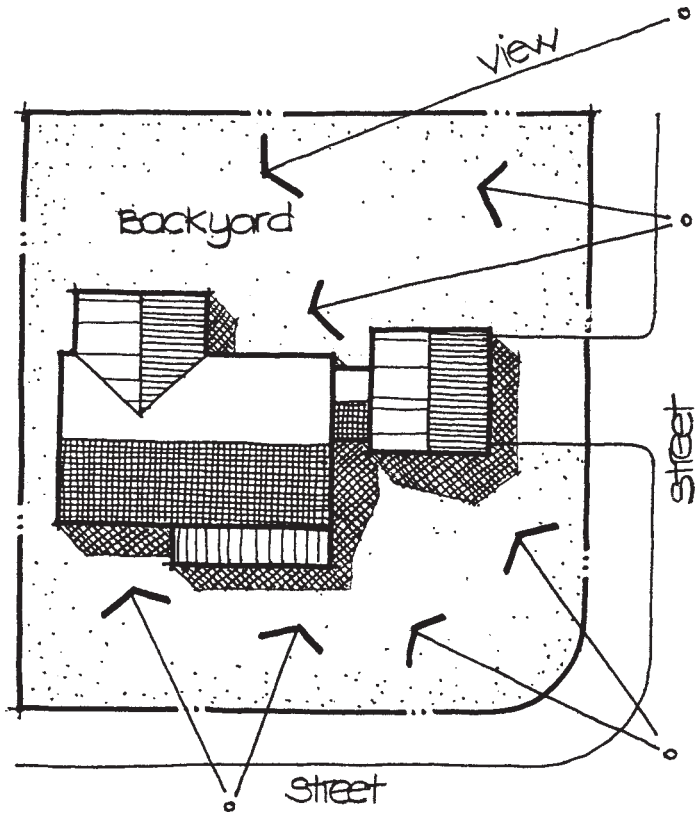


Figure 13–3
Views from the adjoining streets may extend into both the front yard and backyard, thus reducing privacy.

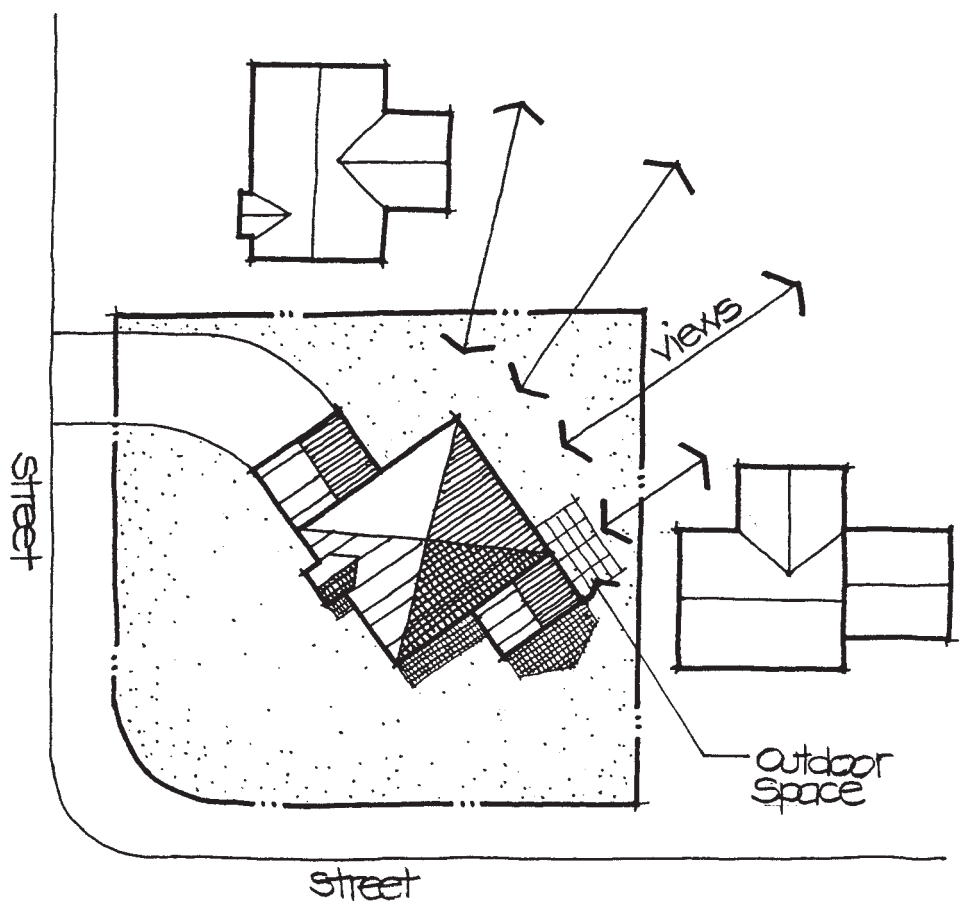


Figure 13–4
The lack of privacy in some corner sites is exaggerated by the house's orientation toward the backyards of the neighbors.

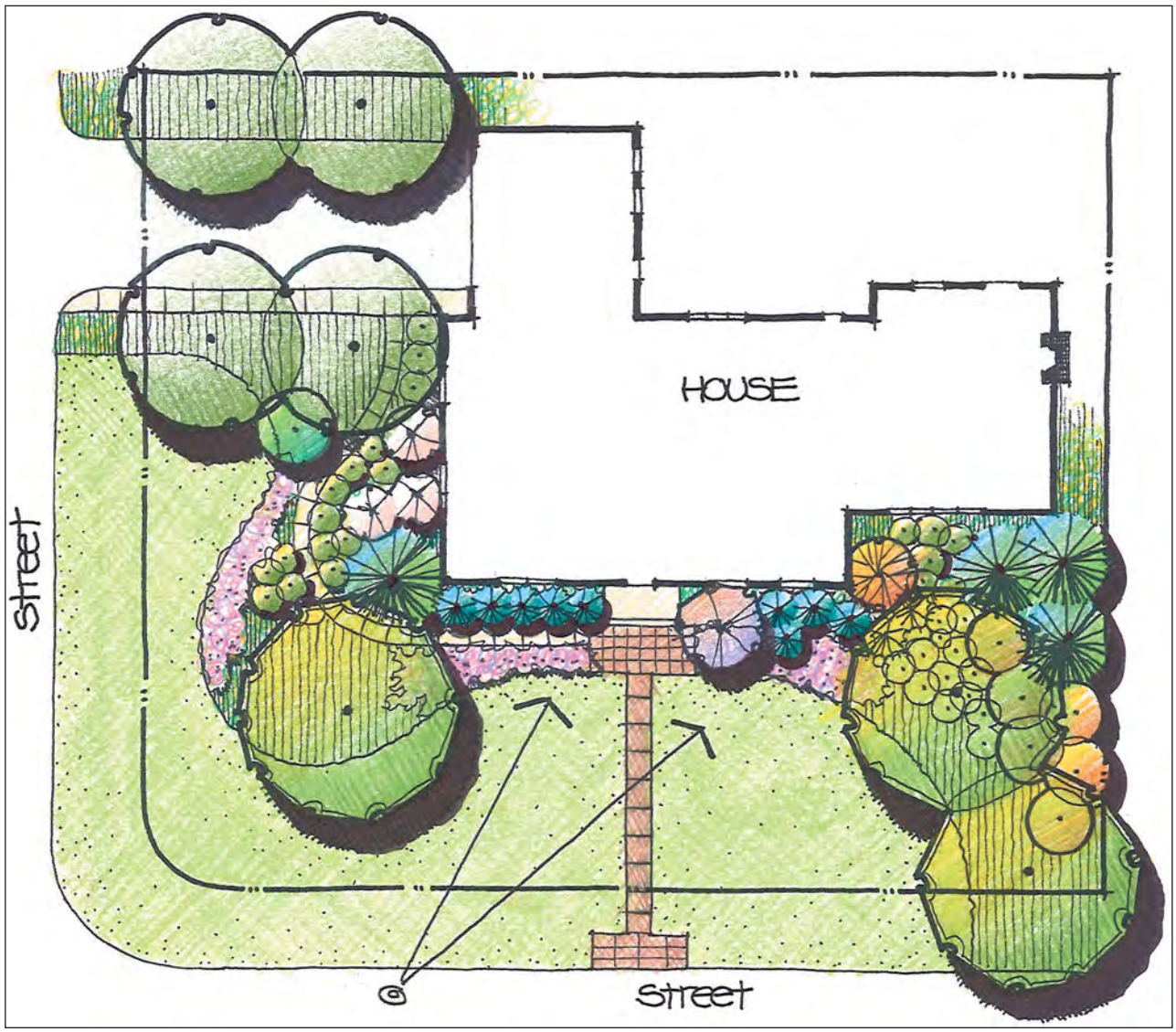


Figure 13–5
The front door should be emphasized to attract the eye and visitor.

Unify Street Frontage The site design for a corner lot should unify the two street frontages through a common set of design forms and palette of materials (Figures 13–5 and 13–7). It is important for the designer to treat the two sides as one so the house and property appear as one site, not two competing or unrelated areas. This should be done even if there is a clear "front" and "side" to the orientation of the house toward the streets. A unified composition for the areas facing both streets will provide a consistent public identity to the site and house from all vantage points.

Establish a Hierarchy of Emphasis There should also be relative importance placed on a selected area or areas within the framework of a unified public frontage. One area, usually the front of the house and its associated entry, should be emphasized to visually lead the eye and visitors to the front door (Figure 13–5). This concept will likewise avoid the possibility of a monotonous appearance along the street frontage.

Identify Entry Walks A directly related need is to clearly identify where and how one gets to the front door of the house, especially when it cannot be immediately seen from all site entry points. In addition to visually emphasizing the front door itself, it

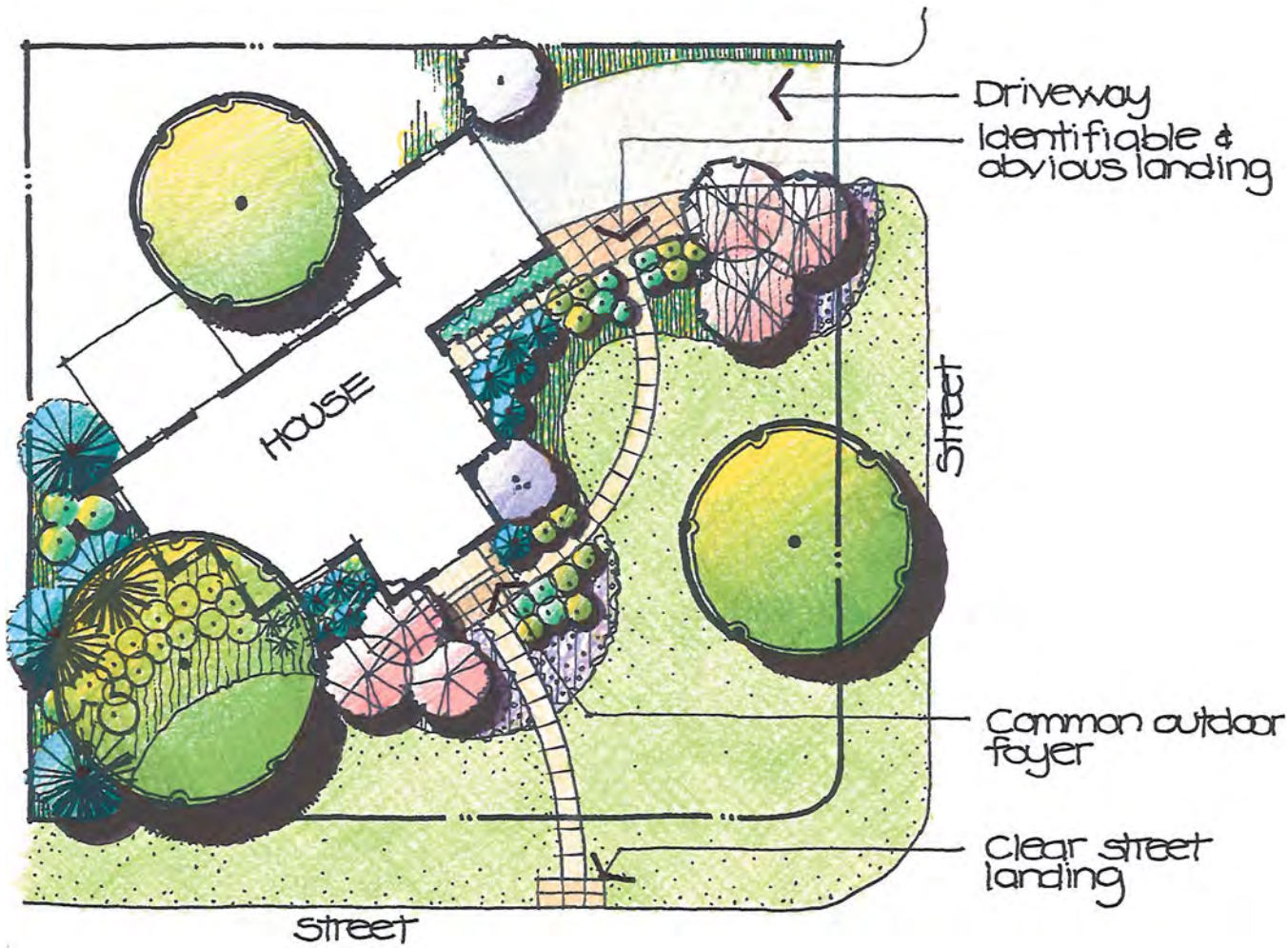


Figure 13–6
Two entry walks are often necessary and should meet at a common outdoor entry foyer near the front door.

is important to locate and design entry walks so guests and service people can easily find their way to the door. Two different walks are often required on a corner site. One walk should extend directly from one of the streets to the front door and be emphasized with showy planting, accent lighting, address sign, and so on to acknowledge its prominence (Figure 13–5). A second walk is frequently necessary from the driveway. It, too, should be clearly visible and lead directly to the front entry area. The two walks should meet at one common outdoor entry foyer, giving everyone the same experience of entering the house (Figure 13–6).

Locate Selected Uses in Front Because space is often limited in the backyard, the designer should consider locating appropriate uses in the more public areas facing the streets. Small sitting or eating areas may be located adjacent to the public side of the house if proper separation and screening from the street is established. The ideal situation is to create a space that is partially enclosed from the street, but allows for some view out. Plants, walls, and/or fences that are about 3 to 4 feet high can provide a low partition while sitting, but still allow homeowners to view other areas of the front yard and the street. This locality gives homeowners a direct connection to the activity of the street without jeopardizing privacy. Lawn areas along one of the streets might also be used for recreation. Again, separation from the street might be provided with plants or structures if local zoning codes permit.

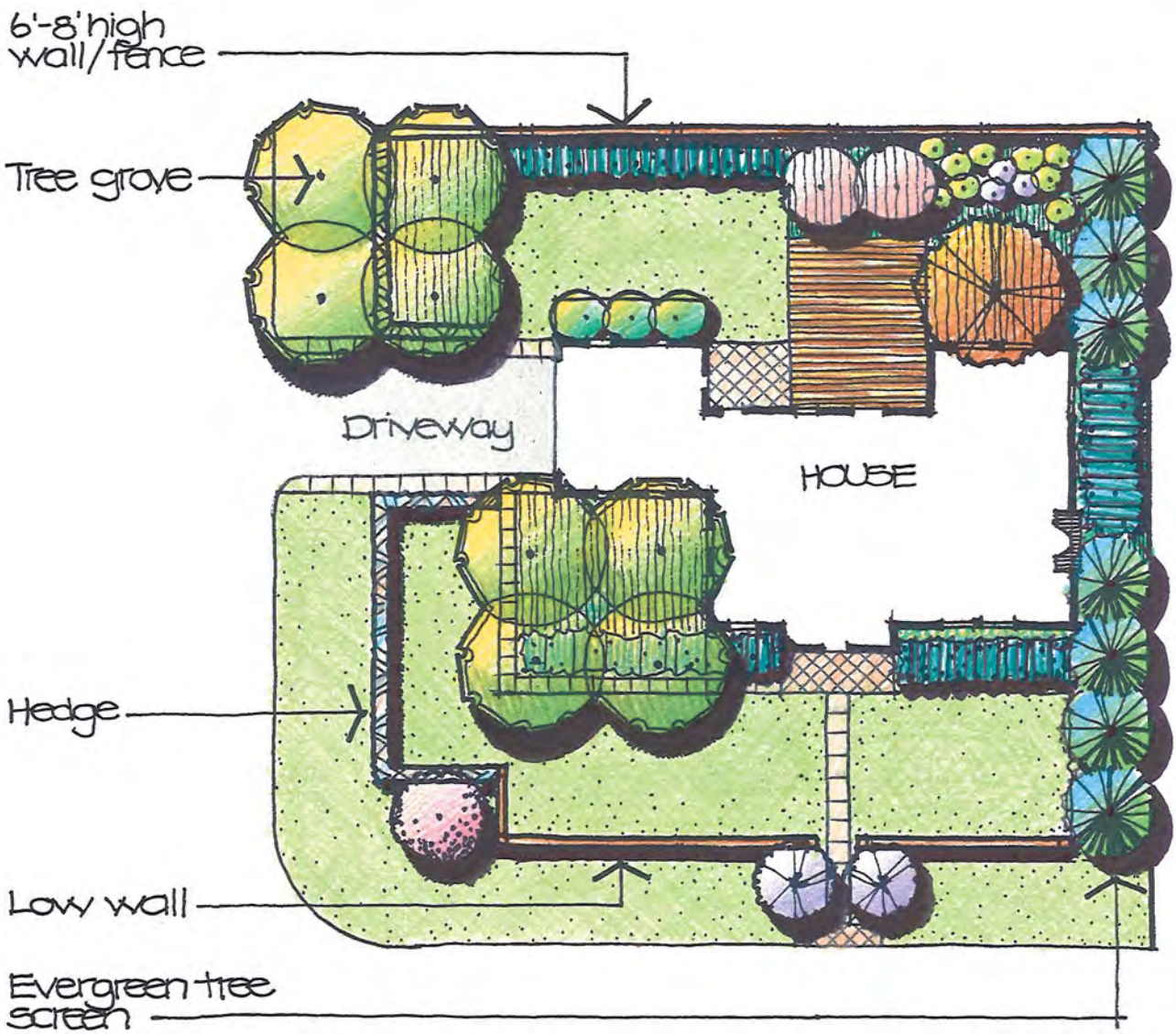


Figure 13–7
Walls and hedges can be used to separate yard areas from the adjoining streets.

Establish Privacy It is critical to establish privacy in a corner lot because it is so often jeopardized owing to the location of the house on the site. Screening should be provided both from the adjoining streets and from neighboring properties. To separate the site from the streets, walls, fences, or hedges may be placed along the street or sidewalk edge in selected locations if local zoning permits this (Figure 13–7). Even a low vertical plane that is between 2 and 3 feet in height can provide a sense of partition and help separate the public street from the yard area of the home. Screening along the property lines is most critical in the backyard because of the close proximity of the house to the property line and the lack of outdoor area. Here walls and fences are usually the best solution because they can provide a solid structural separation from neighbors without taking up much space. In addition, it may be necessary to provide overhead planes to screen views from the upper stories of nearby houses (Figure 13–8).

Urbanize Backyard Because it is usually small in size, it is recommended that the backyard of the corner lot be treated like a small urban space rather than a typical suburban backyard (Figure 13–9). Thus, lawn should be minimized or eliminated

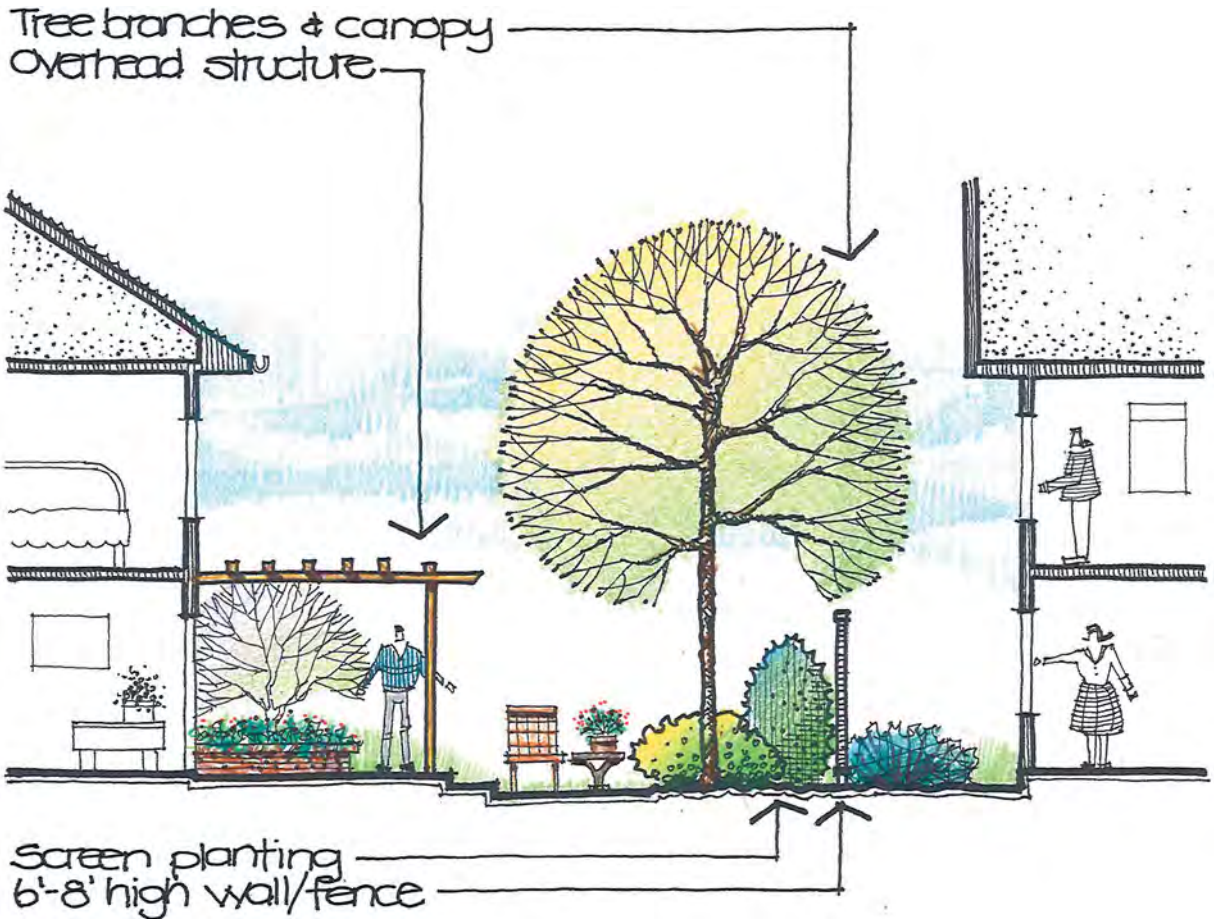


Figure 13–8
Overhead planes and fences/walls should be used in the backyard to establish privacy from nearby neighbors.

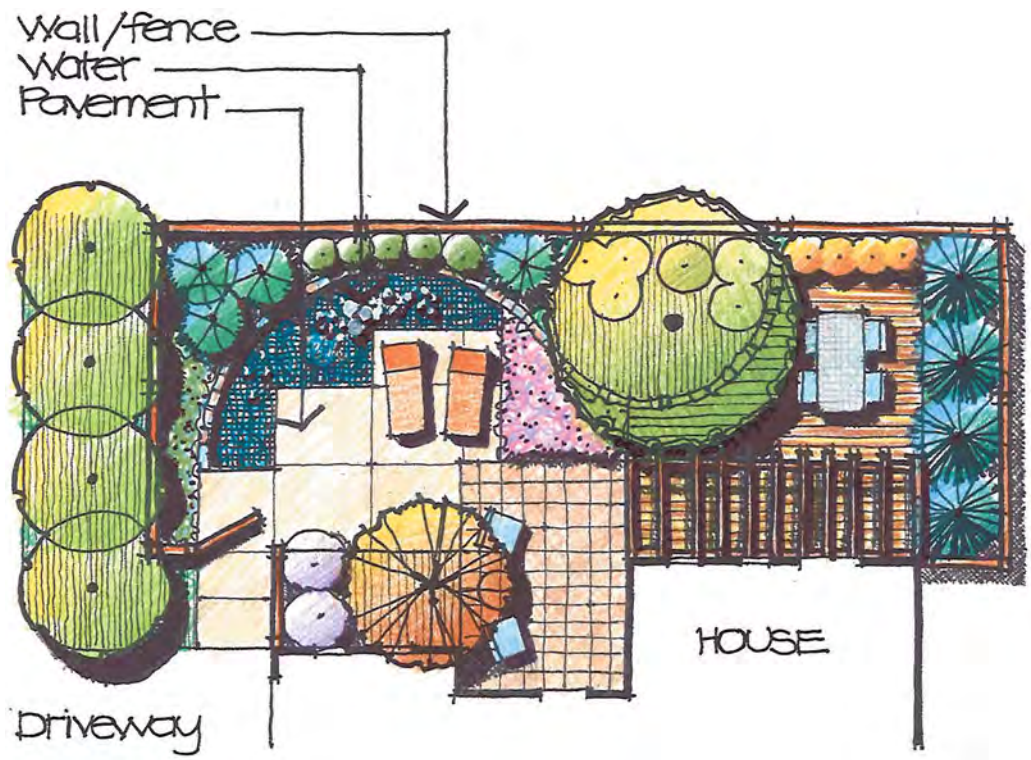


Figure 13–9
The backyard of a corner site should be treated as an urban garden with a series of well-defined outdoor rooms.

altogether with a series of paved outdoor sitting, entertaining, and/or eating spaces established in its place. These should be carefully detailed to provide spatial enclosure in both the vertical and overhead planes. Walls, fences, and overhead trellises may be used with plants to create space and separation from neighbors. Attractive pavement should dominate the ground plane and be balanced by carefully located planting beds. If treated appropriately, the backyard of a corner lot can be viewed as an architectural extension of the house with a room or series of rooms that visually and functionally carry the indoors into the exterior (also see "The Townhouse Garden," the last section of this chapter).

THE WOODED SITE

Many suburban lots, like the Duncan residence, are laid out on an existing site that either is devoid of trees before development or is cleared in the process of development. In either case, new suburban single-family sites oftentimes have few or no existing trees to consider when creating a master plan. Conversely, some residential properties are placed in wooded locations where they are partially or even completely covered by existing trees. The presence of trees on a residential site establishes a unique environment that must be understood and respected if the trees are to be preserved as an integral part of the site over a number of years.

Special Site Conditions

Microclimate A stand of deciduous trees creates a distinct microclimate that varies over the course of a year (Figure 13–10). In the summer season, the leaves in the tree canopies block a significant amount of sunlight along with some precipitation. This creates a relatively dark, cool, and dry environment below. Air temperatures may be as much as 10 to 15 degrees Fahrenheit cooler in the shaded area below trees than in an open area exposed to direct sunlight. This microclimate is generally more comfortable and can produce substantial savings in air-conditioning costs for houses in wooded

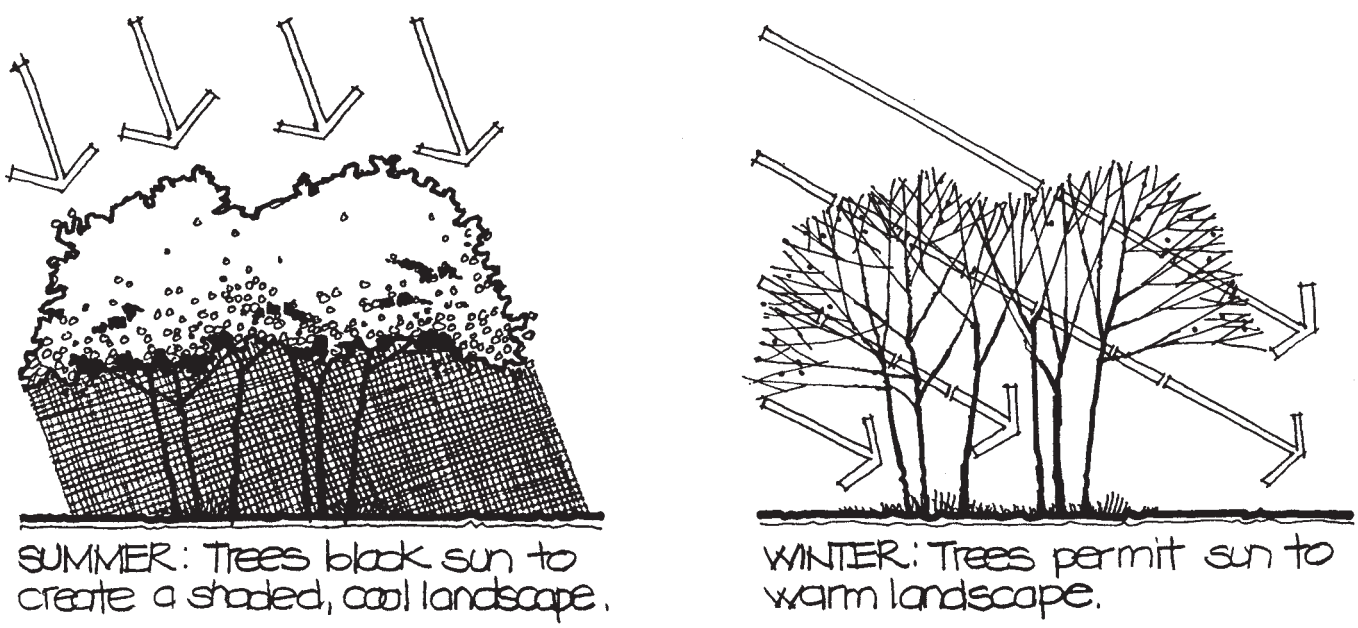


Figure 13–10
The presence of deciduous trees will create distinctly different seasonal microclimates on a residential site.

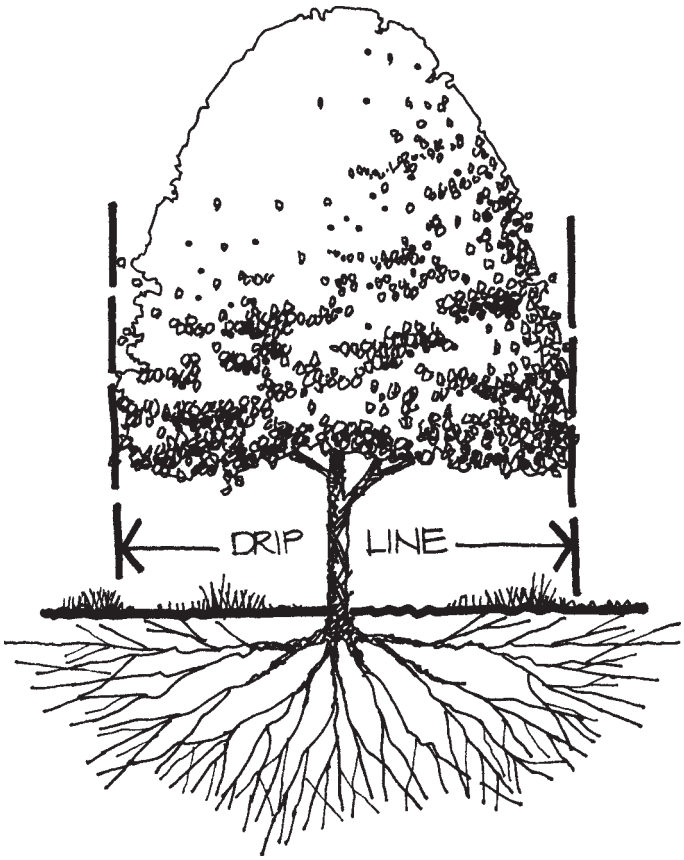


Figure 13–11
Most tree roots are in the top two to three feet of soil directly below the tree's canopy; however, some roots extend well beyond the dripline.

areas (also see "Minimize Sun Exposure During the Hot Season" in Chapter 3). During the winter season, deciduous trees lose their leaves, thus allowing considerably more sunlight to penetrate. This sun exposure creates a warming effect during the season when it is needed. Thus, the presence of trees can work favorably with the cooling and heating needs of both indoor and outdoor spaces.

Tree Roots Tree trunks are obvious physical elements that must be worked around in a wooded site. Numerous tree roots are woven in a complex network below the ground surface and are usually located within the top several feet of soil directly below the tree canopy, though some roots extend well beyond the tree canopy (Figure 13–11). Tree roots are the source of food, water, and air for trees in addition to providing structural support. Tree roots are healthiest in a naturalized condition where a layer of leaf debris and rich, porous humus soil exist. Tree roots also need adequate moisture and air in the soil. Tree roots, and the related trees they support, are susceptible to soil compaction or change in drainage across the ground's surface.

Visual Separation A grove of trees can create visual separation from nearby residential sites and the adjoining street. A cluster of tree trunks functions like a group of columns that helps to define and separate one space from another. Although tree trunks may not be dense enough to completely screen views, they nevertheless do imply a partition of one area from another. Thus, a wooded site frequently has a greater sense of seclusion and privacy even though it may not be completely screened from its surroundings (Figure 13–12).

Design Guidelines

Wooded sites require special design consideration in order to preserve and enhance existing trees. A number of design guidelines should be considered to accomplish this.



Figure 13–12
A clump of tree trunks can provide a feeling of visual separation from nearby properties.

Minimize Lawn The typical suburban lawn should be minimized or even eliminated on a wooded site. There are several reasons for this recommendation. As already identified, a wooded area has noticeably little sunshine and relatively dry soil conditions during the summer season. A lawn frequently struggles under these circumstances, even if it is a variety that will tolerate some shade. A wooded environment is simply not conducive to lawn. In addition, the installation of lawn generally requires that understory plants be removed and that the ground surface be regraded. The loss of understory plants is apt to reduce the overall health of a wooded ecology while also eliminating the ability of the wooded area to regenerate itself. Regrading is apt to harm tree roots and change drainage patterns, both of which can injure or even kill trees.

If a lawn area is deemed necessary, it should be minimized in size and located in an area that receives some sunshine during the course of a summer day. It might be located adjacent to the street where sun probably shines through because of the open street corridor, or the lawn might form a space near the house where it can provide some separation between the house and preserved woods (Figure 13–13). The rest of the site should be allowed to remain in its naturalized state with native ground covers and understory trees.

Design Around Trees Every effort should be made to design outdoor spaces and functions around existing trees. This requires extra effort because the exact locations of trees must first be mapped. Then, spaces must be carefully woven among tree trunks so that few, if any, trees are removed to accommodate exterior functions. This is especially necessary for structured outdoor spaces such as sitting, entertaining, or eating spaces that have paved or wood deck ground planes. Existing trees may need to be allowed to extend up through these surfaces and will probably result in spaces that are more divided and complex than if the trees were not present (Figure 13–14). This approach is also likely to require field adjustment during construction.

Maintain Existing Grade There should be minimal grading or alteration of the existing ground elevation on a wooded site in order to minimize disturbance of tree roots. If the site is a newly built house, it is likely that the ground will have been altered most around the house. Beyond this construction zone, every effort should be made to retain the existing ground level. Again, this is most significant in locating

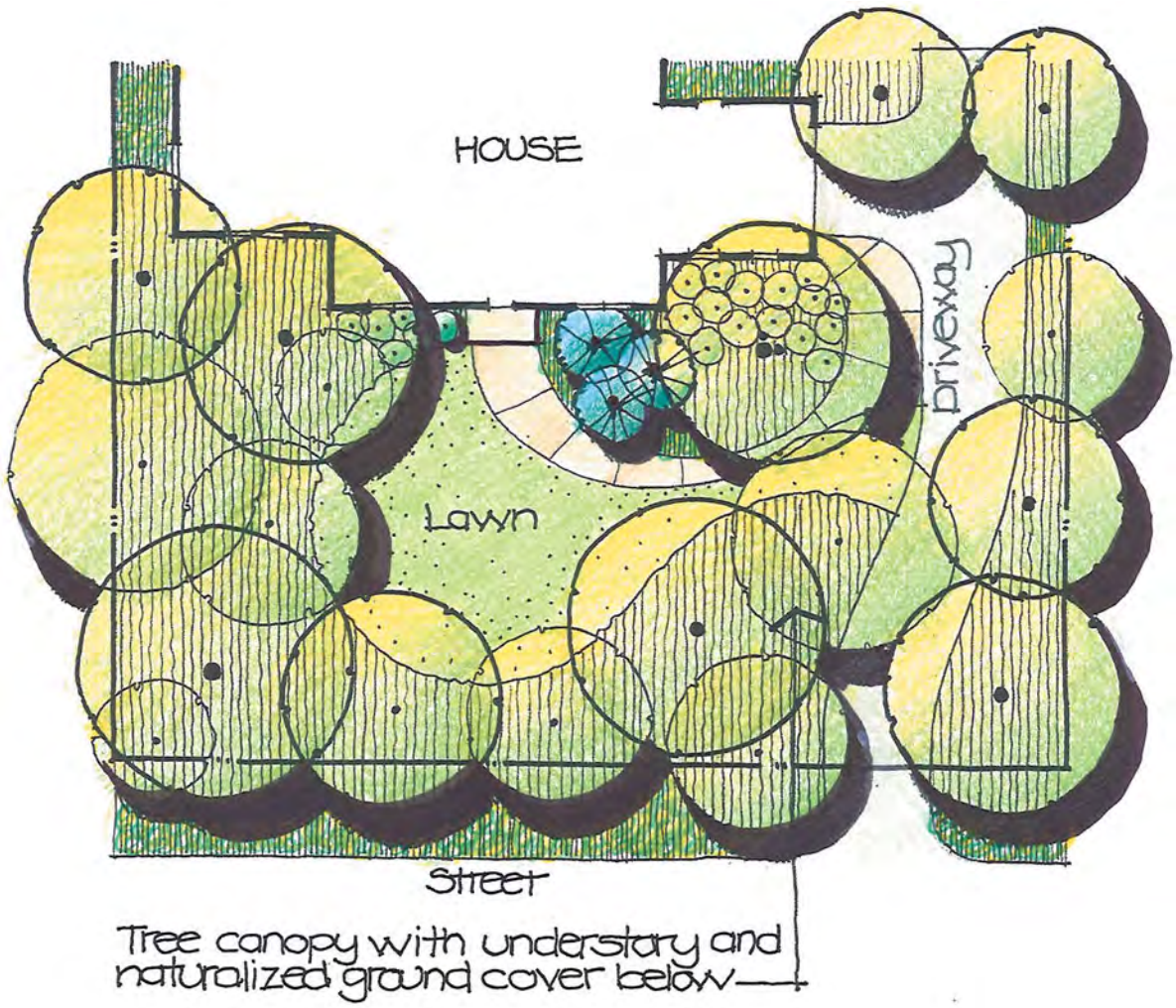


Figure 13–13
Lawn should be eliminated or minimized in area on a wooded residential site.

paved walks, structured outdoor spaces, walls, or even lawn areas if they are part of the design. These uses should, as much as possible, be molded to the existing ground while also maintaining proper standards of construction. If significant regrading is necessary, then retaining walls or tree wells should be used to maintain the existing grade around the base of existing trees. At a minimum, the existing grade should be preserved within the entire drip line of a tree or grove of trees. Never place fill (soil that is added to the existing ground surface) below the drip line of a tree because this will change the ability of existing tree roots to obtain air and moisture from the soil.

Minimize Soil Compaction The existing soil on a wooded site should not be compacted because this too reduces the amount of both air and water in the soil. Compacted soil is also more difficult for roots to grow through. Soil compaction results from the constant use or movement, including foot traffic, across the ground. Although occasional walking through a wooded area will probably do little harm, repeated movement over the same ground will compact and damage the underlying soil. One way to avoid soil compaction is to elevate walks and outdoor use areas on decks above the existing ground level (Figure 13–15). The initial installation of posts to support a deck system will cause some disturbance, but in the long term the ground soil will be preserved. This concept also minimizes regrading and allows precipitation to still reach the ground.

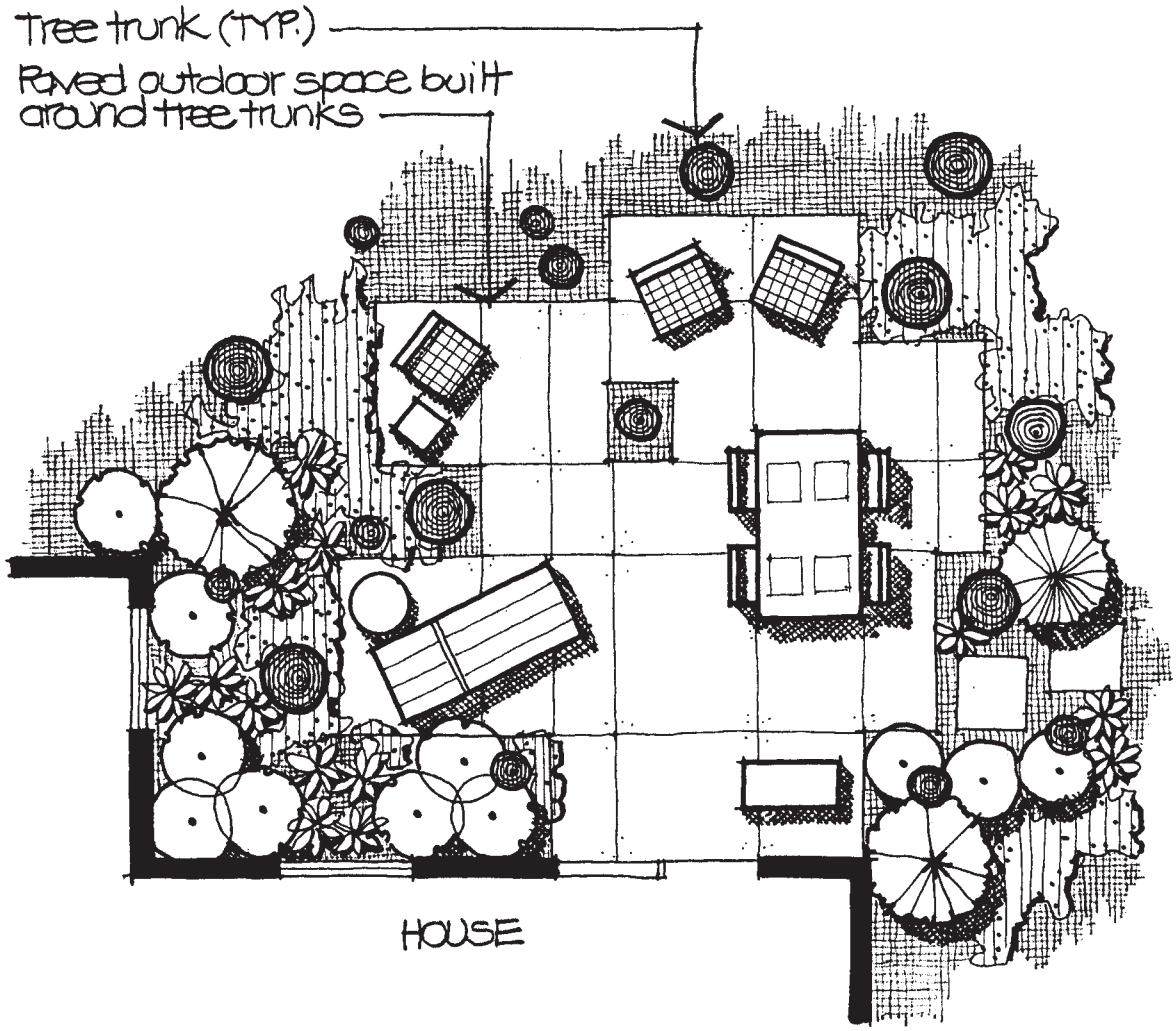


Figure 13–14
Outdoor use areas must be designed in and around the trunks of existing trees on a wooded site.

Use Shade-Tolerant Plants Plant materials introduced to a wooded site should be carefully selected for shade tolerance. Some zones on wooded sites may receive no direct sunlight during the course of a summer day, whereas other areas may receive sun during only a portion of the day. Plants must be chosen to fit each of these conditions. Thus, the palette of plants should be different from that used on a more typical residential site. One approach to planting in a wooded site is to use native plants that are already found on or near the site. Native wooded plants not only tolerate the special wooded conditions, but also look as if they belong to the wooded environment.

THE SLOPED SITE

A sloped site is one that has some portion of the ground surface located on an inclined plane. Commonly, the ground has to be steeper than 3 percent (3 feet vertical change in 100 horizontal feet) to be perceived as being sloped. At 5 percent, the ground does indeed have a distinct slope to it. Ground surfaces greater than 5 percent are perceived as being more sloped and become increasingly difficult to work with as their degree of slope increases. However steep, all sloped sites possess a number of special circumstances

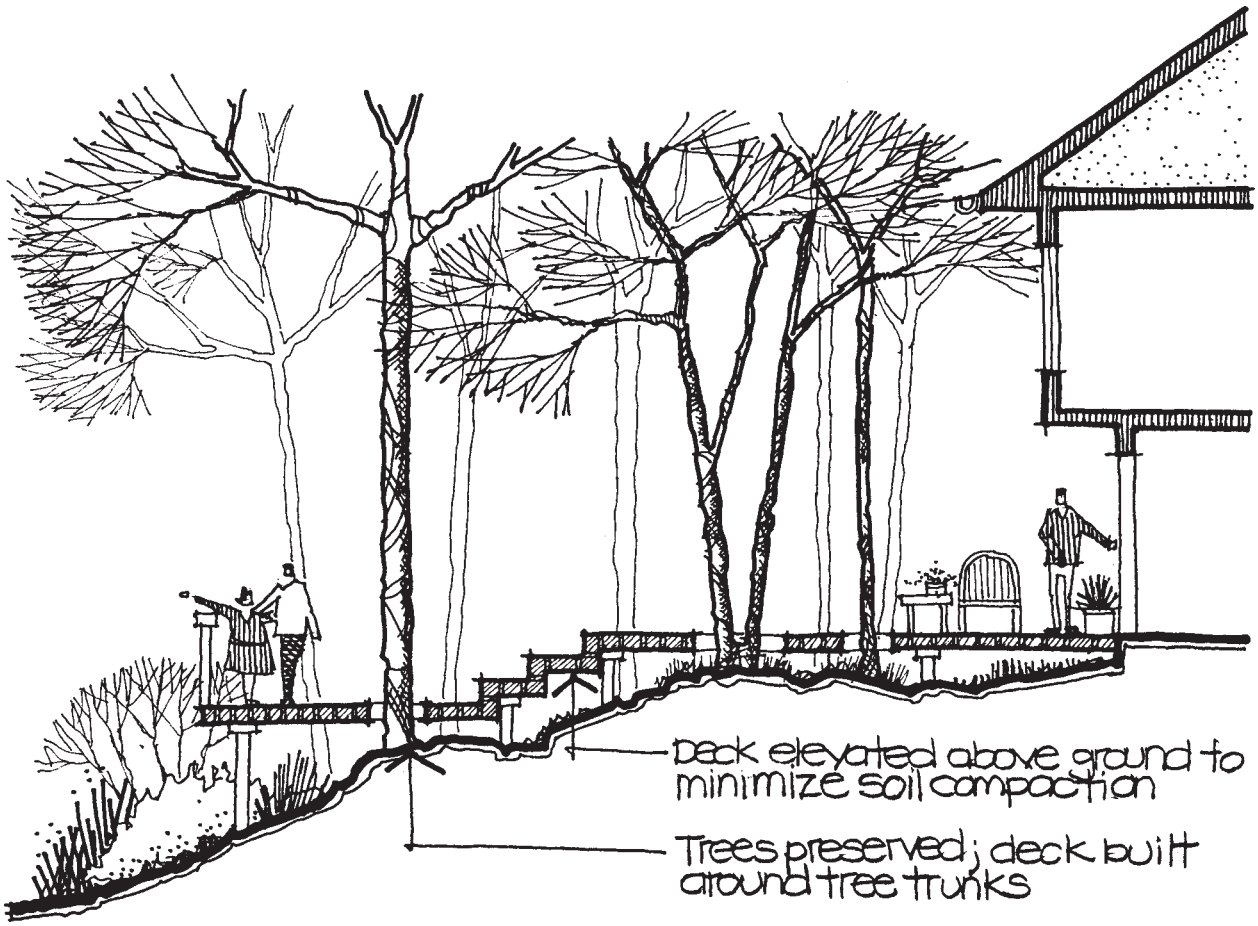


Figure 13–15
Outdoor use areas and walks should be elevated on decks above the ground to minimize soil compaction in a wooded site.

that should be thought about in designing a single-family residential site. The steeper the site, the more pronounced these conditions are.

Special Site Conditions

Instability All sloped ground has an unsteady feeling to it for several reasons. First, it is difficult to get stable footing on sloped ground. A person must exert continual energy to stay put in any given location because there is a constant feeling of being pulled downhill. While standing on sloped ground, one foot is invariably higher than the other (Figure 13–16). This is also true for buildings and other structures placed on a sloped site. They, too, must be designed to get "stable footing" by creating level terraces for their location or by special structural systems that connect them to the sloped ground. In either situation, extra time and money must often be spent to overcome the inherent instability of a sloped site.

The instability of a sloped site is also a visual one. When compared with a level or horizontal plane, a sloped plane visually implies potential movement, action, or change. The eye is invited to move along a sloped plane rather than resting as it is able to do in a level surface. This can be exciting in some cases, but disconcerting in others.

Downhill Orientation Both objects and views on a sloped site have a tendency to move downhill. It is obvious that any mobile object that is placed on sloped ground will likely move downhill. Water, soil, stones, debris, and so forth all gravitate down

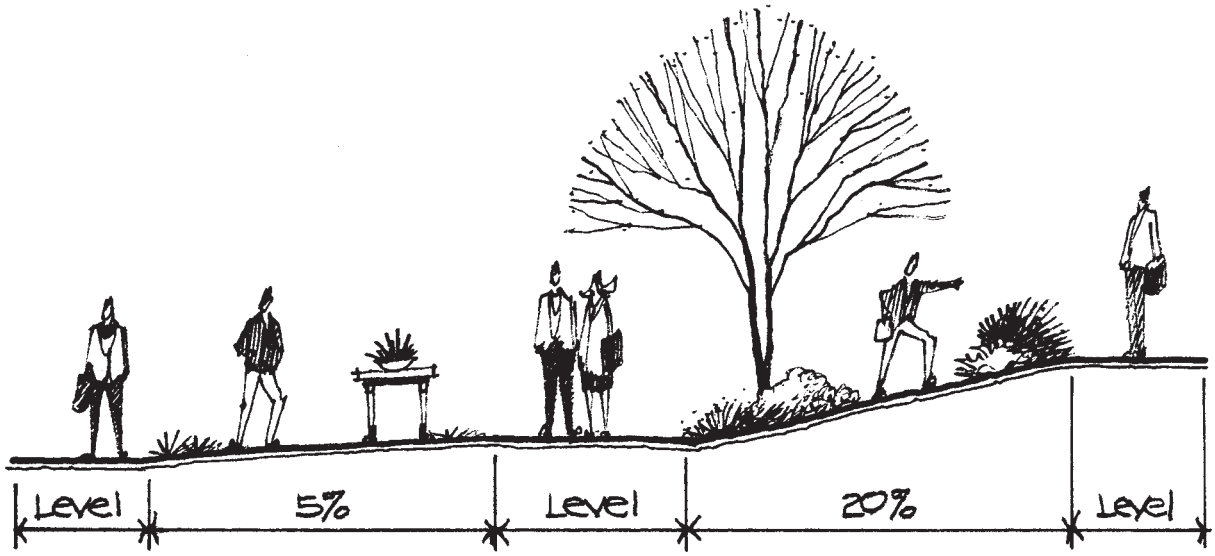
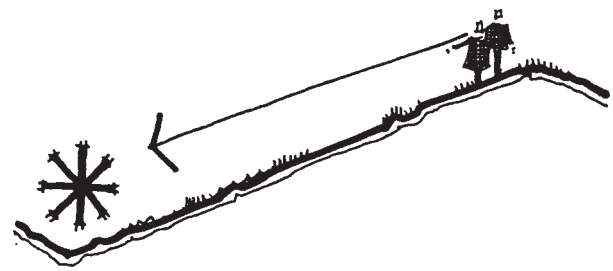


Figure 13–16
Sloped ground creates unstable footing for people and structures.

Figure 13–17
The natural orientation on sloped ground is downhill toward a lower elevation.



the slope over time. Even people usually find it easier to walk down a slope than up one. In addition, the visual orientation for people on a slope is also toward the lower slope. People readily see objects or areas of the landscape located at the bottom of a slope very much like they do in an outdoor amphitheater (Figure 13–17). On steep sites, the orientation is very likely to be away from the site toward some distant area of the landscape. Steeply sloped sites located in areas of distinct topography are frequently valued for the views they afford.

Drainage Surface drainage is a constant issue on a sloped site. Unless the house is located on the crest of a hill, it is quite likely that some portion of a sloped site will drain toward the house (Figure 13–18). As discussed in Chapter 11, it is necessary to

Figure 13–18
Some areas of a sloped site may drain toward the house, thus creating potential wet conditions and damage in the house and basement.



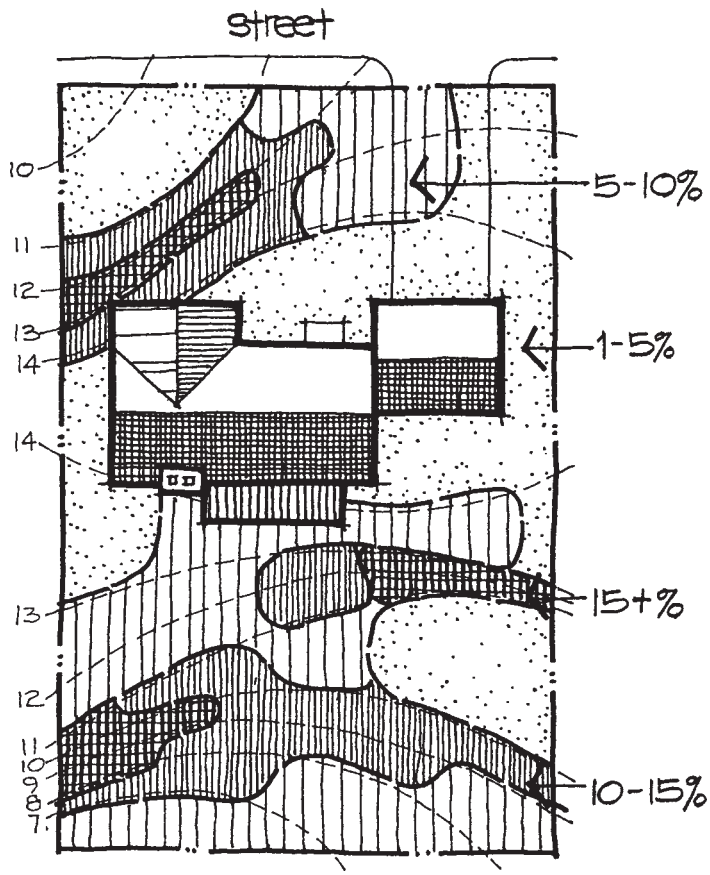


Figure 13–19
A slope analysis identifies different categories of slope steepness on a site.

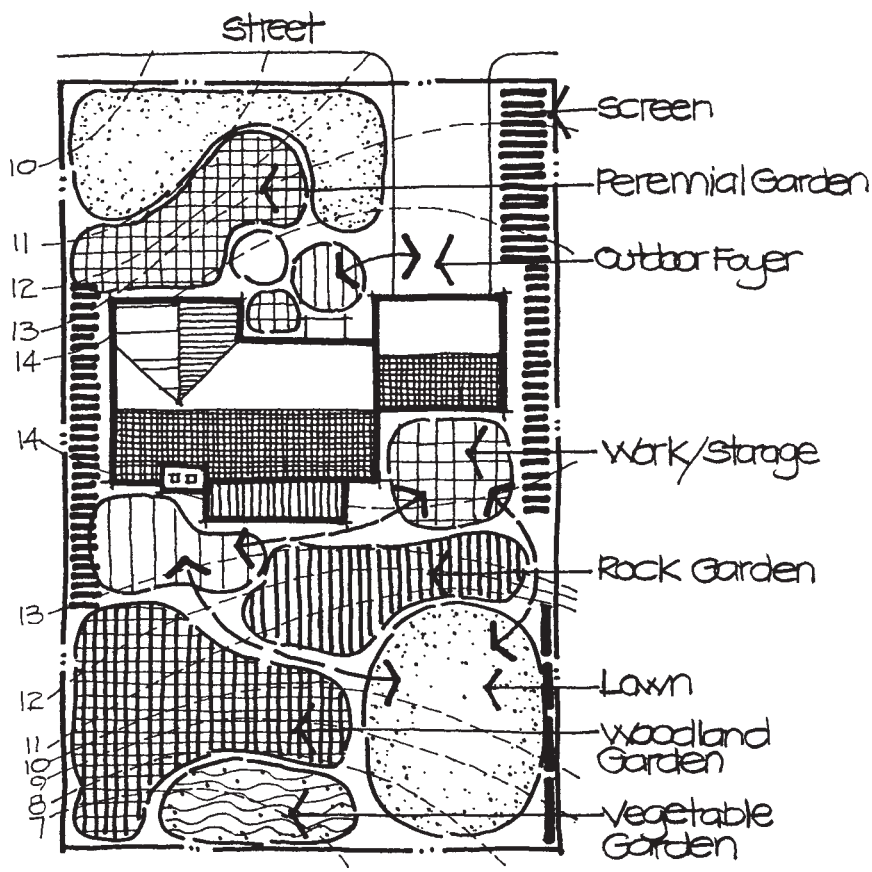


Figure 13–20
Outdoor use areas should be carefully matched to the different slope conditions of the site.

regrade the uphill area of the site to divert the surface drainage around the house. If not handled correctly, some walls and floor areas of the house may get wet, causing visual and structural damage. Drainage becomes more problematic as the degree of steepness increases. Steeper slopes have a greater amount of surface water moving across them at faster velocities than do more gentle slopes or level ground. Therefore, there is more water to drain away on steeper slopes. The likelihood of erosion increases as well on steeper slopes because exposed soil is easily washed downhill by a greater volume of surface water draining at a faster velocity.

Design Guidelines

The design of sloped sites should be undertaken with care and understanding for the unique conditions that exist. The design guidelines that follow will help to accomplish this objective.

Fit Uses to Slope Extra study is typically needed to mold proposed site uses to a sloped site. This should start with the preparation of a slope analysis, a map depicting the different categories of slope on the site. A slope analysis will show which areas of the site are steepest and which are the most gentle (Figure 13–19). Then, the designer should attempt to match the proposed uses to slope conditions where they will fit the site with minimal grading (Figure 13–20). For example, a recreational lawn area should ideally be placed in a location that has a slope between 2 and 4 percent. A lawn that is not for recreation can be placed on an area that is up to 25 percent slope. Above this, it is too steep to safely mow. An outdoor entertaining space, on the other hand, could be placed on a slope that is between 5 and 15 percent by terracing it on different levels. The reader is referred to Chapter 11, where slope standards for other uses are outlined.

Outdoor use areas can also be properly tailored to a sloped site by orienting them on the site to minimize grading. This is frequently accomplished by placing the long dimension of outdoor spaces parallel to the contours (Figure 13–21). This stretches the space out along the slope rather than into the slope. Cut (soil that is excavated) and fill (soil that is added to existing ground) and costs are reduced by the approach.

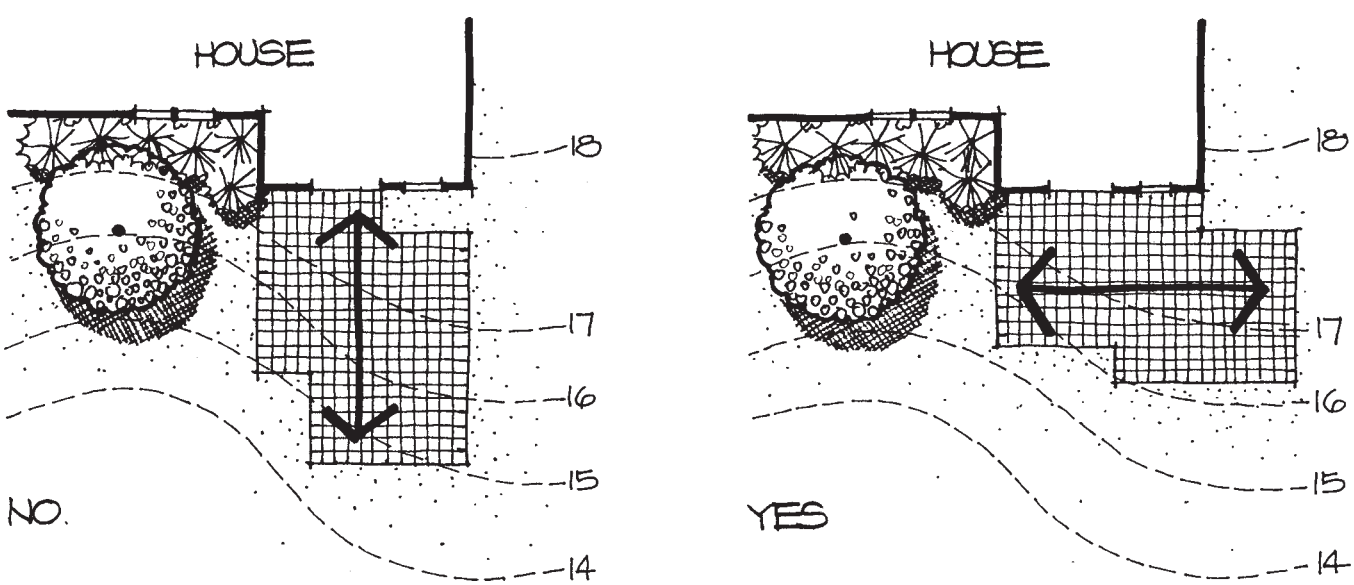


Figure 13–21
Outdoor use areas should be oriented parallel to the contours to minimize grading on a sloped site.

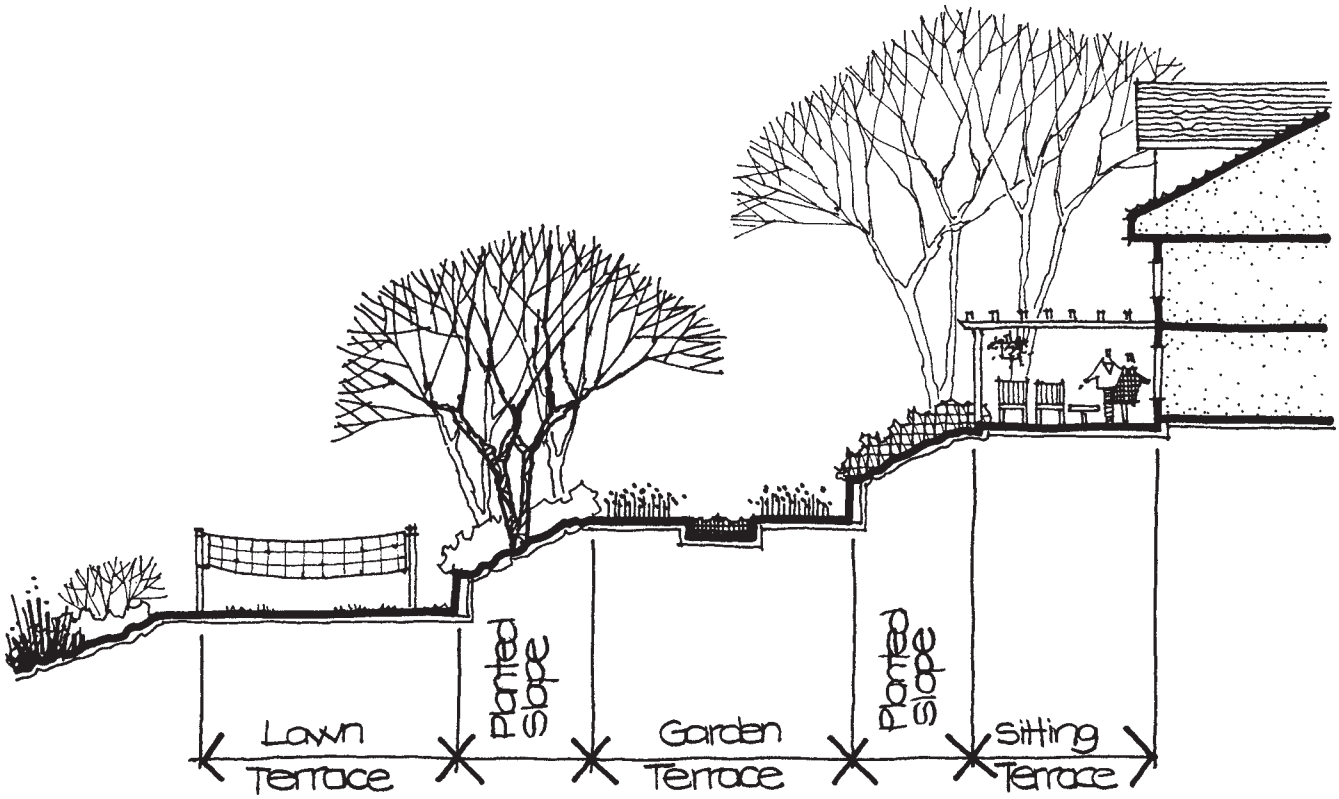


Figure 13–22
A series of terraces can be established to fit outdoor use areas into a sloped site.

On steeper site areas, outdoor uses may need to be molded to the site by creating terraces that are cut into the slope at different elevations. This creates a series of large "stair-steps" on which outdoor uses are placed (Figure 13–22). Planted slopes that do not exceed a 50 percent or 2:1 grade can serve as a transition between the elevation of the individual spaces. This approach gives a soft appearance to the landscape and separates spaces by the horizontal distance across the slopes. Retaining walls, sometimes located on both the uphill and downhill sides of spaces, can also be employed as a means of accommodating the different elevation between spaces. Retaining walls give a landscape a more architectural appearance and allow spaces to be placed closer together (Figure 13–23). They likewise can be designed as visual extensions of the house by extending materials and edges of the house into the adjacent landscape. Retaining walls should not exceed 3 or 4 feet in height without requiring special engineering and cost.

To locate outdoor use areas on sloped areas in excess of 15 percent most often requires a deck. A deck is simply built above a slope, allowing the existing grade underneath to remain essentially as is (Figure 13–24). Decks work well for spaces of limited size such as outdoor sitting, entertaining, and eating and many times can serve as architectural extensions of the house (see the section, "Take Advantage of Views").

Some outdoor uses may not be possible on steeply sloped sites. Outdoor areas that are large in size and/or require a gentle ground surface may need to be eliminated from a design program for a steep site. There is a point where it is simply best not to force a use onto a site if it does not easily fit. The steepest areas of a site are often best left alone. This is especially so where existing trees or other forms of natural vegetation cover the site. The designer might reserve the steepest areas for revegetation on disturbed or regraded lots as well.

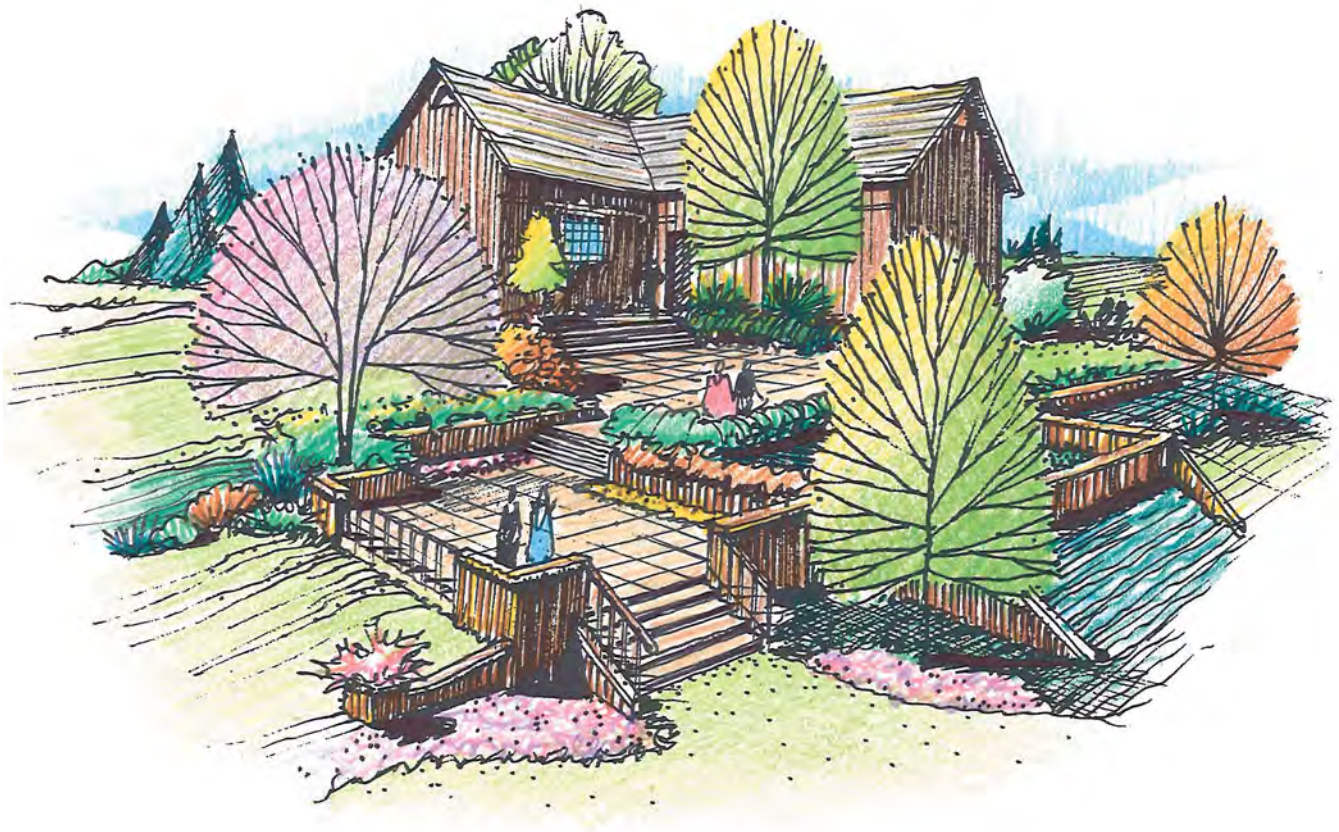
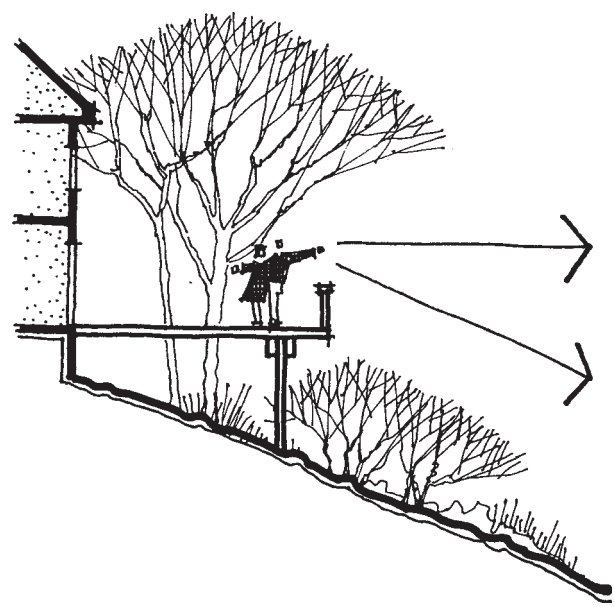


Figure 13–23
A series of terraces separated by walls can establish an architectural character on a sloped site.

Figure 13–24
A deck preserves the existing steep slope of a site while affording outward views.



Accommodate Movement Special attention should be given to accommodating movement on a steep site. This is required because movement, particularly foot traffic, is frequently difficult and restricted on a sloped site. Walks or paths, as suggested in Chapter 11, should not exceed a 5 percent grade. Walks that are between 5 and 8.33 percent are considered to be ramps and must adhere to ADA (American with

Disabilities Act) standards. To maintain this standard, walks may need to take a more indirect route between two points. In other words, the elevation difference between the top and bottom of the walk should be spread out over a greater distance in order to reduce the walk gradient. In extreme situations, walks or paths may need to "switch back" to avoid being too steep.

Steps are also a common necessity on sloped sites to provide access between nearby spaces. Where possible, extreme elevation differences between adjoining spaces should be avoided to minimize the number of steps that are required. Steps should follow the guidelines provided in Chapter 11 when they are incorporated into a design. In addition, they should visually fit into the site context in terms of form and materials. Steps between adjoining spaces might also be wider than necessary so that the spaces feel more connected. Wide steps allow adjoining spaces to visually flow together.

The one disadvantage of steps is that they form barriers to universal accessibility. Therefore, it may also be necessary to incorporate ramps, especially in the public areas such as the approach to the front of the house.

Take Advantage of Views Everything possible should be done to take advantage of the inherent views from a sloped site, assuming they are worth capturing. During site analysis, the designer should determine what locations on the site have the best views, both toward other areas of the site and to the landscape beyond. Then, selected uses should be consciously placed in these locations to utilize the views (Figure 13–25).

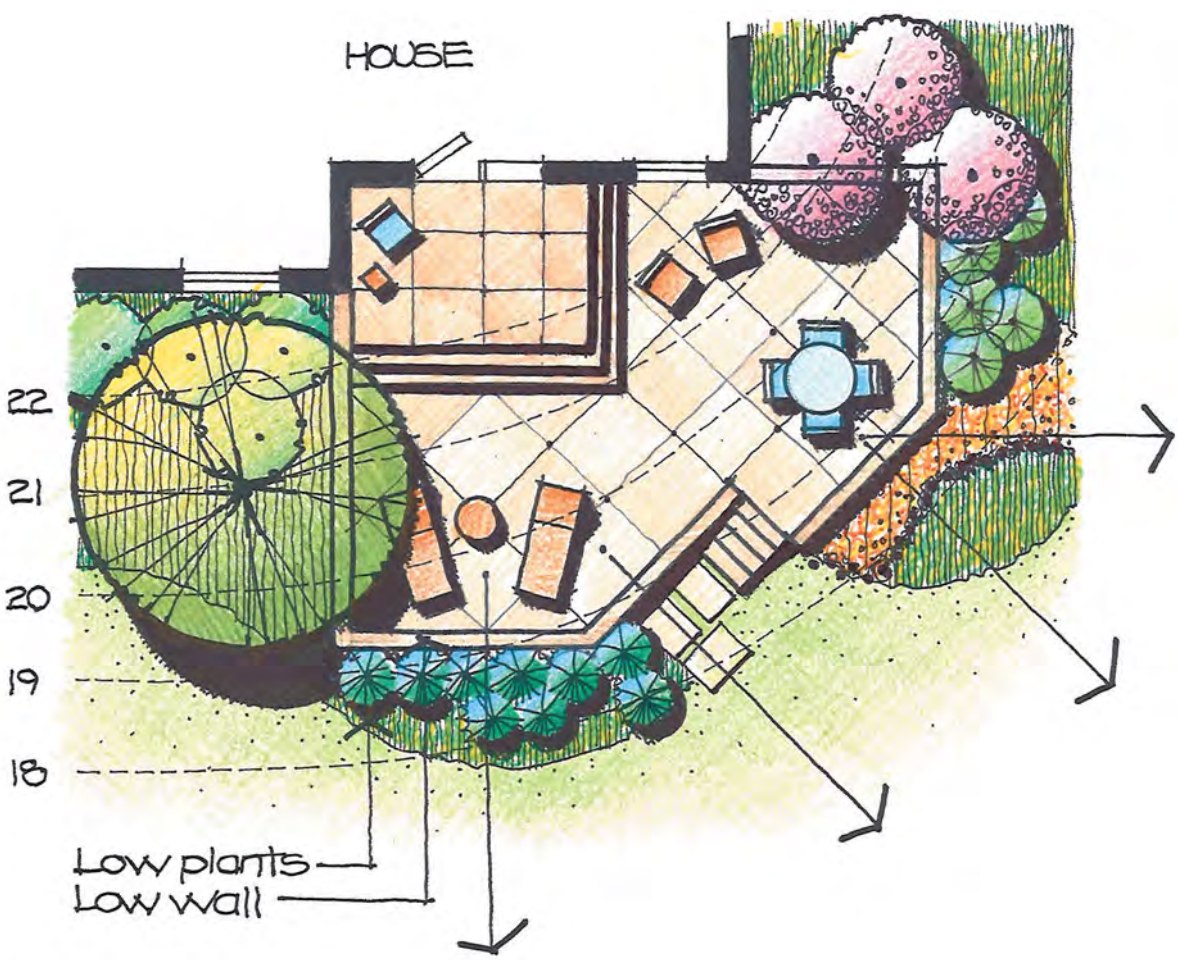


Figure 13–25
Outdoor use areas should be located and designed to take advantage of views downhill or off the site.

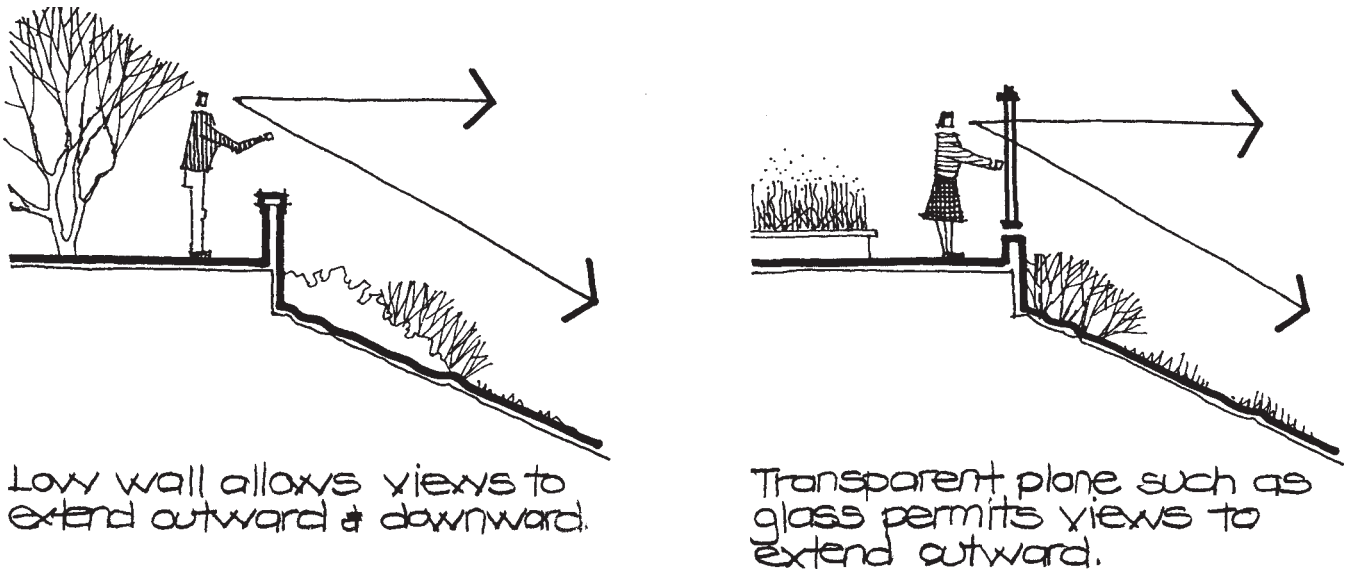


Figure 13–26
The vertical planes should be low or transparent to allow views to extend outward from a space.

Some sitting or gathering spaces might even be located on the front or public side of the house if the views there are worth savoring. Portions of the site that lie downhill from the remainder of the site should likewise be studied and enhanced if necessary. Remember, these low areas will definitely be looked at and so they should be worthy of the attention they will receive.

The spaces themselves should also be designed to take advantage of the views. Reducing the height of the vertical plane on the side with the best view can accomplish this (left side, Figure 13–26). Vertical planes that must extend above eye level should be as transparent as possible. Even glass or Plexiglas might be used for vertical enclosure along the downhill side of a space (right side, Figure 13–26). In some instances, it may be desirable to frame views by locating vertical objects on either side of the view as well as placing an overhead plane above. Again, decks should be used to take advantage of views on especially steep ground. On dramatically sloped sites, decks may be at the level of or higher than surrounding trees, thus providing a panoramic view into the distance.

Control Runoff and Erosion As indicated previously, care must be taken to drain surface runoff around the house and drain outdoor use areas from portions of the site that are located uphill. This is necessary on all sloped sites, but becomes more difficult on steeper sites because of the potential for erosion. Swales, valley-like excavations into the earth, that are cut into the site to catch and direct water should be designed so they visually fit into the topography of the site. Swales that look like gashes because of overly steep side slopes should be avoided. The low side of the site, on the other hand, may be wetter because of the water that drains to it. This location is usually not good for many outdoor uses and may be best set aside as a planted area or place where native vegetation is allowed to grow. Finally, all slopes that are over 50 percent also should be left untouched to minimize erosion on a sloped site.

THE TOWNHOUSE GARDEN

The townhouse garden is different from the typical suburban single-family lot. It is normally a relatively small, walled or fenced space that is located immediately adjacent to an urban townhouse. Similar outdoor spaces are also associated with many

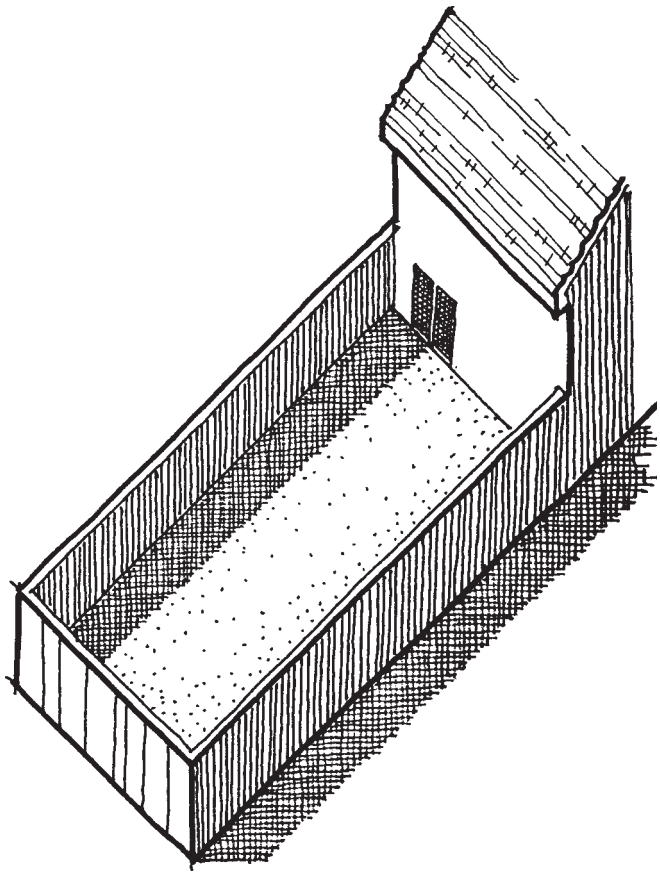


Figure 13–27
The townhouse garden site is like an open-topped box.

one- and two-story condominiums, some first-floor apartments, duplexes, and even diminutive backyards of some single-family lots. This small architecturally defined garden requires special consideration.

Special Site Conditions

Space in a Box For all intents and purposes, the typical townhouse garden site is a rectangular box with an open top. Walls or fences commonly enclose the "box" on three sides while the residence forms the fourth side (Figure 13–27). The top of the "box" is ordinarily open to the sky, and the ground is often a simple, level plane. The wall-like vertical planes and relatively flat ground surface establish a precise, architectural quality that is very much like the interior room of a house. From inside the house, the townhouse garden site appears to be just another room with the same inherent characteristics as other rooms throughout the dwelling.

Limited Views and Interest The surrounding walls and/or fences of a townhouse site create a space that is inward and self-focused (Figure 13–28). Views and contact with the nearby environment are limited at best because of the separation created by the walls. Thus, views tend to be contained internally on the townhouse site.

Simultaneously, the townhouse garden site has little spatial interest in and of itself. The singular spatial quality is frequently stark and completely without intrigue or appeal. Everything within the space is seen from all vantage points. This is true when standing in the space and when viewing it from inside the house. One look reveals all.

Furthermore, most views into or through the townhouse garden site tend to be directed to the back or outside wall. This is particularly true for views from inside the house (Figure 13–29). Anything placed on or in front of this end wall is readily seen and typically functions as a focal point.

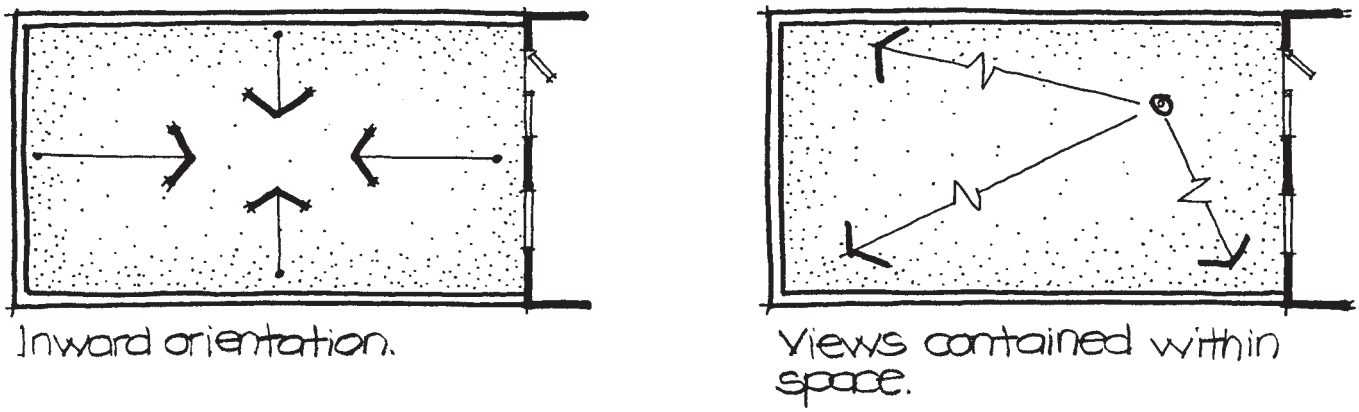


Figure 13–28
The townhouse garden site has an inward orientation with few views extending to areas outside the site.



Figure 13–29
Views from inside the house tend to be focused on the back wall of the townhouse garden site.

Limited Area The townhouse garden is relatively modest in size. It may be as small as 100 SF, and usually not any larger than 500 SF. This diminutive size accentuates the qualities already discussed and limits the uses or elements that can be placed within the space. The little townhouse garden site creates a rather intimate and personal setting that often fits the relative scale of the human being. However, for some people, this kind of space can also feel claustrophobic. The petite size additionally makes all decisions about its design critical. There is little room to make mistakes or adjust to special site issues.

Fixed Access Points Fixed entry and exit points frequently determine access into and through the townhouse garden site (Figure 13–30). One point of access is from the house itself. This may be through a standard door or sliding glass doors, which are included on most houses built in the past 40 years. Another point of entry is often from a gate or door in the end wall. This may lead to a street, parking area, garage, or public green space. Access points are located less frequently on the side walls. The

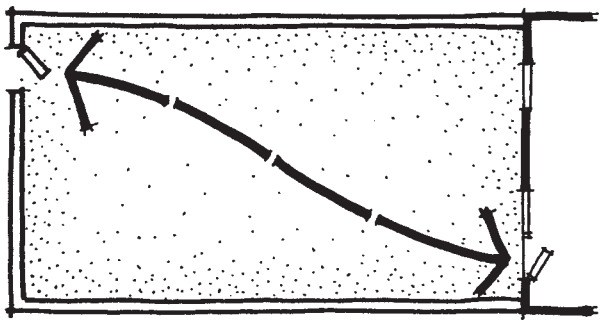


Figure 13–30
Access into and circulation through the townhouse garden site tend to be fixed by door and gate locations.

points of entry and exit normally cannot be altered because of the fixed position of existing doors, gates, windows, or off-site conditions.

Lack of Privacy Even though solid walls or fences enclose the townhouse garden site, it commonly lacks privacy because nearby neighbors can see into the garden space from upper-story windows (Figure 13–31). This creates a "fish-bowl" like experience for people in a townhouse garden site. Whatever happens in this space is

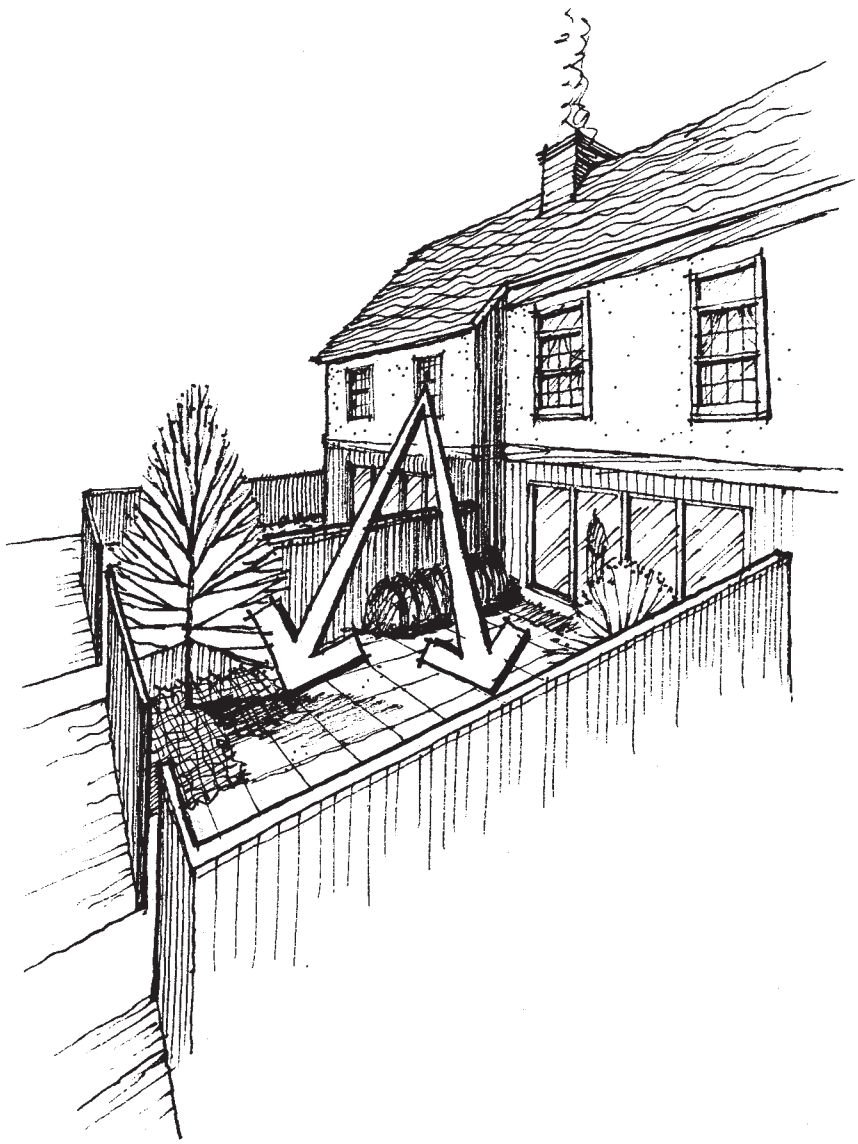


Figure 13–31
Views from upper-story neighboring windows reduce the privacy in a townhouse garden.

like being on a theater stage to nearby upper-story windows. The limited size of the townhouse garden site makes this experience a difficult one to escape. Some townhouse garden owners simply choose not to use their outdoor space because of this quality. They give up what little outdoor space they have because they do not wish to be "on display."

Design Guidelines

Designing a townhouse garden is like no other residential design project. It requires the designer to think more like an interior designer or architect, but with a different palette of materials. As with the other sites that have special conditions, there are a number of suggestions to guide the designer of a townhouse garden.

Divide into Subspaces A townhouse garden site should be divided into subspaces to provide spatial and visual interest. This is typically a necessity to relieve the monotony created by the existing simplicity of the box-like space. Spatial subdivision can be created by a combination of techniques. Like other residential design projects, the designer should start by organizing the site into different outdoor uses (Figure 13–32). Functions such as entertaining, sitting, eating, reading, and potting that meet the clients' wishes and fit within the garden area should each be given their own space. The individual subspaces may be allowed to overlap or might be separated by a short distance depending on functional and spatial considerations.

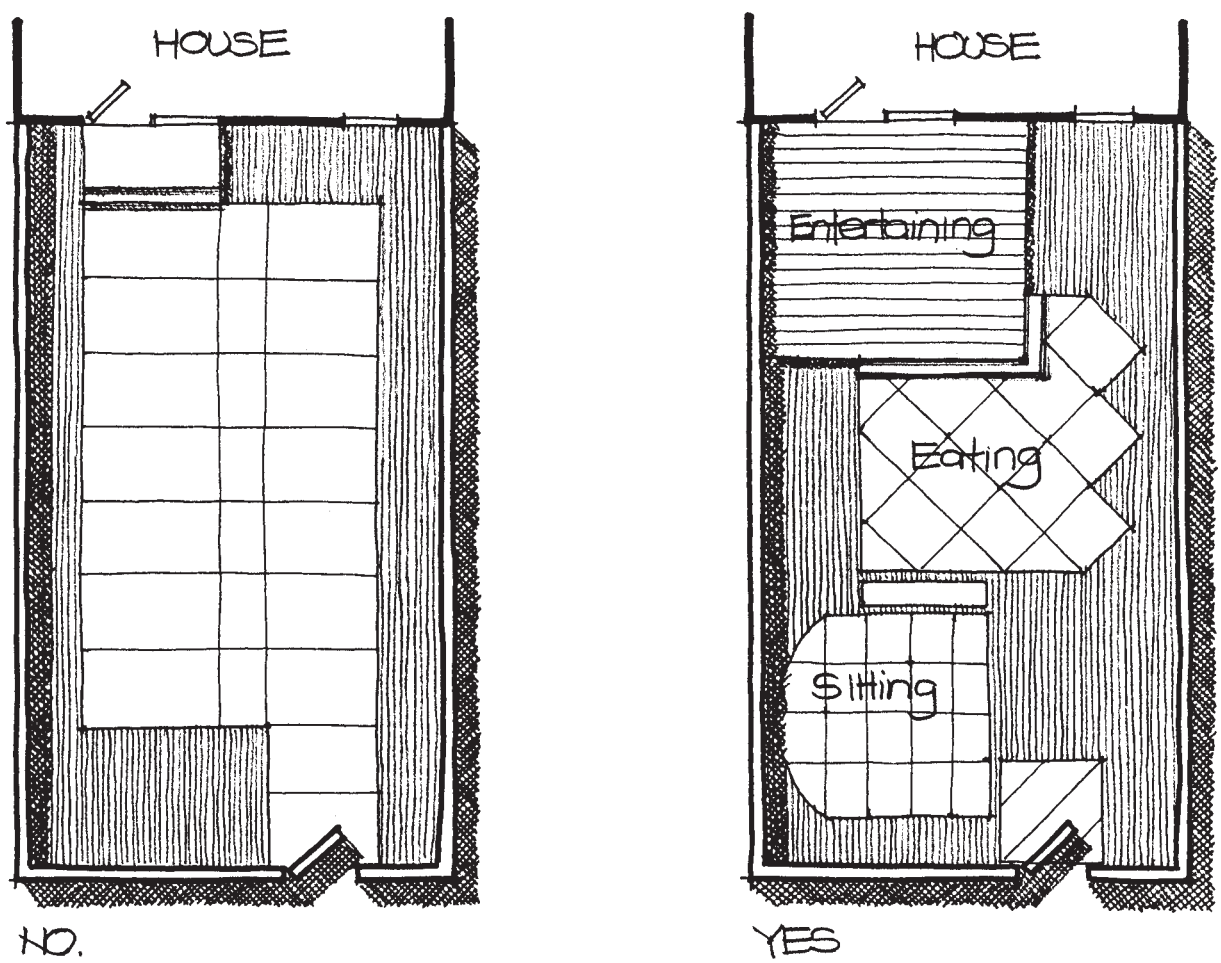


Figure 13–32
The townhouse garden should be divided into subspaces for visual interest and to create an illusion of a larger site area.

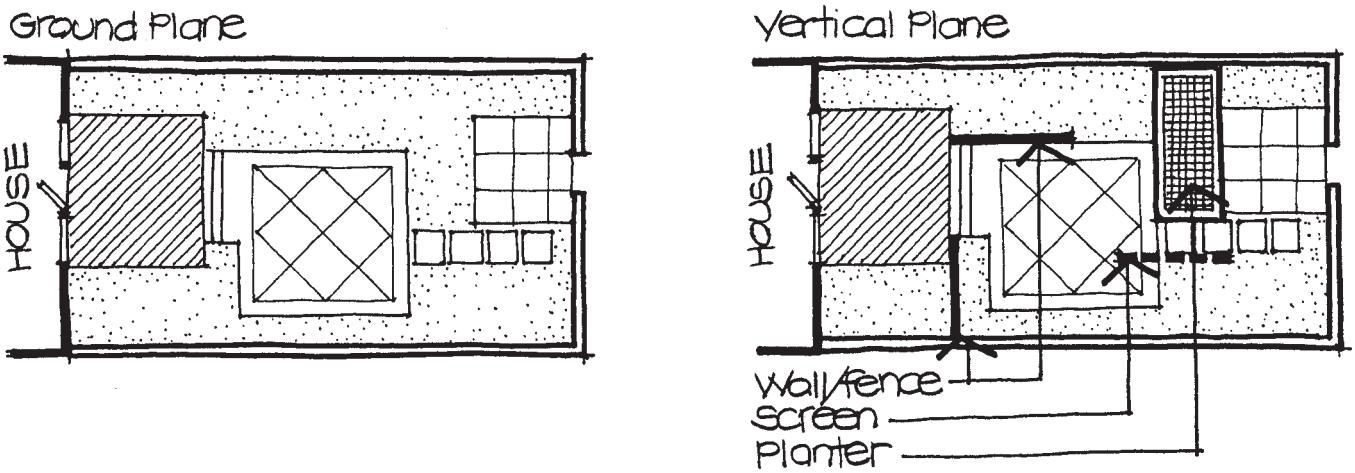


Figure 13–33
Different pavement materials and wall/fences can be used to subdivide the spaces in a townhouse garden.

At a more detailed scale, individual spaces can be given definition and identity by a number of means. Plant materials, walls/fences, or even low earth mounding can be used to enclose the spaces in the vertical plane while simultaneously letting the spaces flow from one to another (Figures 13–33 and 13–34). On the ground plane, different pavement materials can be employed to give each space its own character and identity. Grade changes between individual spaces also help to subtly separate spaces. Collectively, these techniques create multiple subspaces within the framework of the perimeter garden walls, just as furniture, room dividers, house plants, rugs, and so on do in interior rooms.

Increase Perception of Spatial Size Every effort should be made to increase the perceived size of the townhouse garden site. Subdividing the site into different spaces with overall organization, different pavement patterns, and the careful placement of internal vertical planes as previously suggested is one way to accomplish this. Another technique for giving the illusion that the townhouse garden is larger than its actual dimensions is

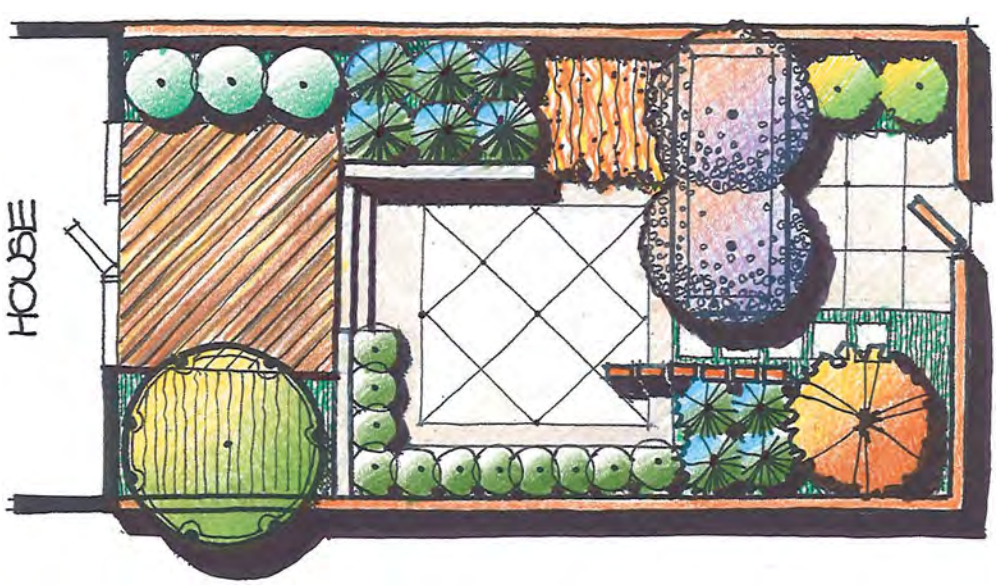


Figure 13–34
Plant materials can be coordinated with other vertical planes to define subspaces within the garden.

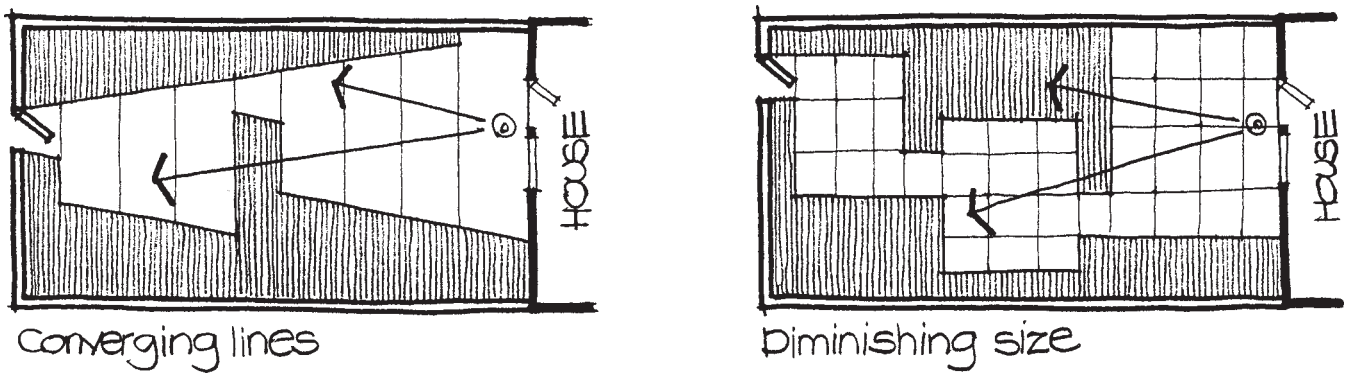
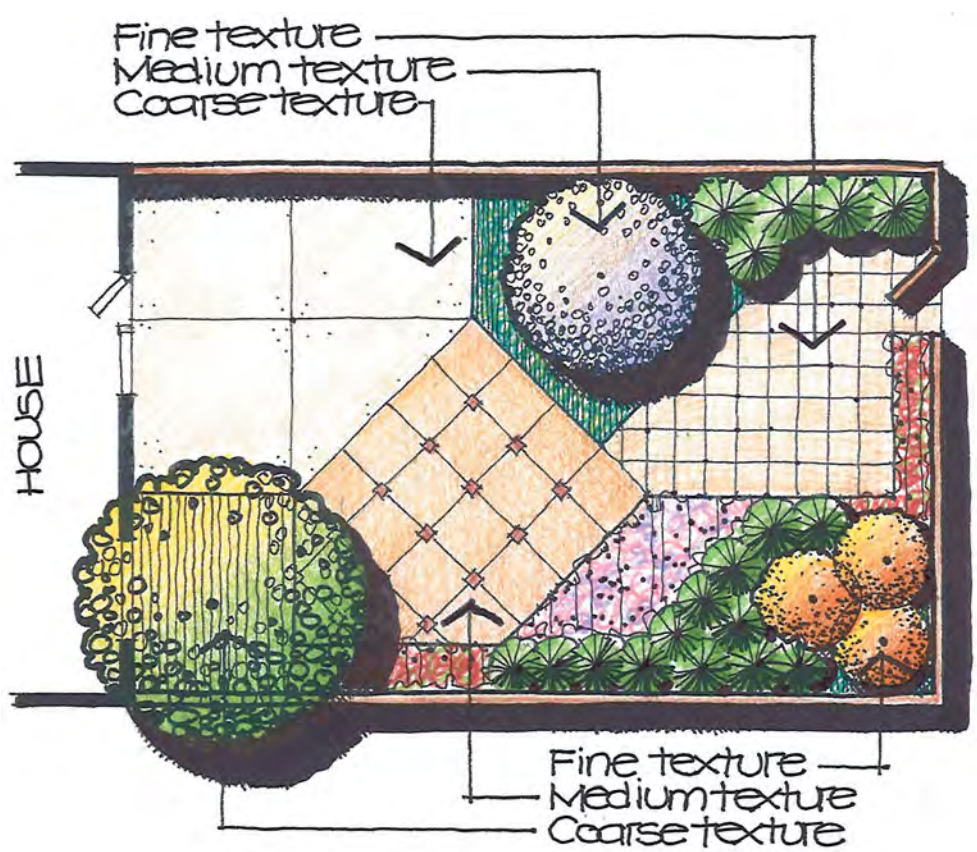


Figure 13–35
Various techniques of forced perspective can give the illusion of a greater distance through a townhouse garden.

through forced perspective. One way this can be done is by converging the edges of spaces as they extend farther away from the house (left side of Figure 13–35). This will give a greater sense of depth and distance to the spaces as viewed from inside or near the house. A similar approach is to make the spaces located near the house comparatively large while making other spaces progressively smaller the farther away they are located from the house (right side of Figure 13–35). This, too, gives the illusion of greater distance through the garden. Material colors and textures can likewise establish forced perspective by contrasting materials that are coarse textured and/or bright colored near the house with materials that are fine textured and/or light hued at the back end of the garden area (Figure 13–36).

One other way to increase the overall feeling of size is to force views through and/or around various elements such as trees, walls/fences, water features, and sculpture.

Figure 13–36
Locating coarse-textured materials near the house and fine-textured materials away from it can give the townhouse garden a greater sense of depth.



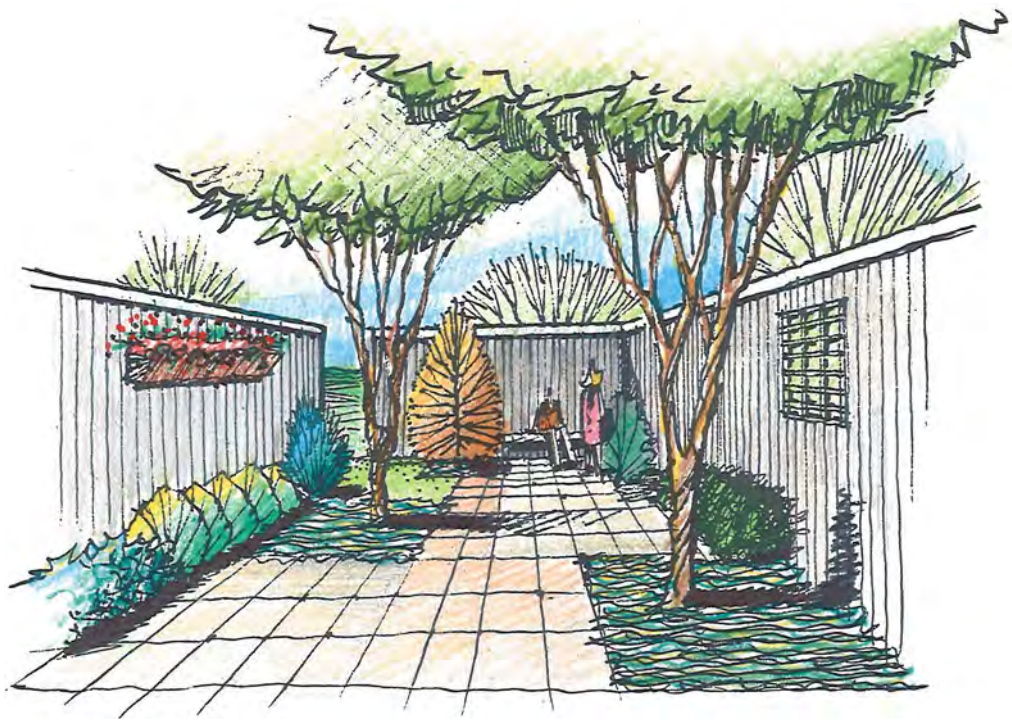


Figure 13–37
Forcing views through or around tree trunks or other vertical objects can increase spatial depth.

When a person looks around an object or through a semitransparent plane such as a multistemmed tree, the background on the other side appears to be farther away (Figure 13–37). Thus, the designer might carefully place an open-canopied tree or similar architectural element in a location where views from the house pass through the tree. This will make the remainder of the garden area behind the tree look farther away. Additionally, vertical planes can be located to hide selected areas of the garden. The feeling that a space is larger than it actually is occurs when not everything can be seen at once and when a space is seen disappearing behind an object or vertical plane (Figure 13–38). Concealing the terminus of space or view is a technique common to small gardens in China and Japan.

Provide Overhead Planes Overhead planes should be strategically located throughout a townhouse garden in coordination with the other elements of the design. This is a desirable objective for all residential sites, but is more critical in a townhouse garden where small size and upper-story views from neighbors are frequently a notable problem. A tree canopy, pergola, canvas awning, or other covering should be located over frequently used spaces in a townhouse garden to screen upper-story views and provide a ceiling (Figure 13–39). Various types of overhead planes might be used for different subspaces in the garden to reinforce spatial identity as discussed in the previous paragraphs. Overhead planes will also create shade, a factor that is a necessity for townhouse gardens located on the south or west side of a dwelling. Overhead planes should be more open in garden areas on the north or east sides of a house to allow more light into these potentially dark areas. Architectural overhead planes such as a pergola should be carefully detailed because of the small scale of the spaces they help to define.

Use Existing Perimeter Walls/Fences The existing walls or fences that surround a townhouse garden should be utilized for various purposes. Like interior walls, these vertical planes should be taken advantage of to enhance the quality of the different

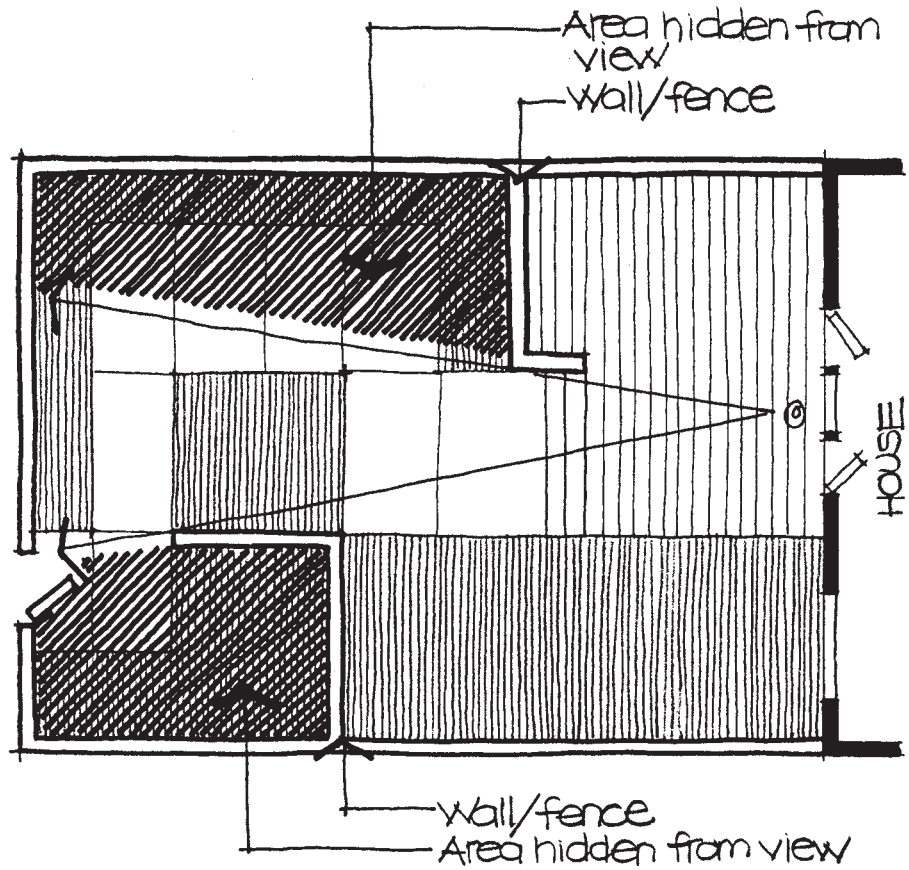


Figure 13–38
The perceived size of a townhouse garden can be increased when some areas of the site are hidden from view.

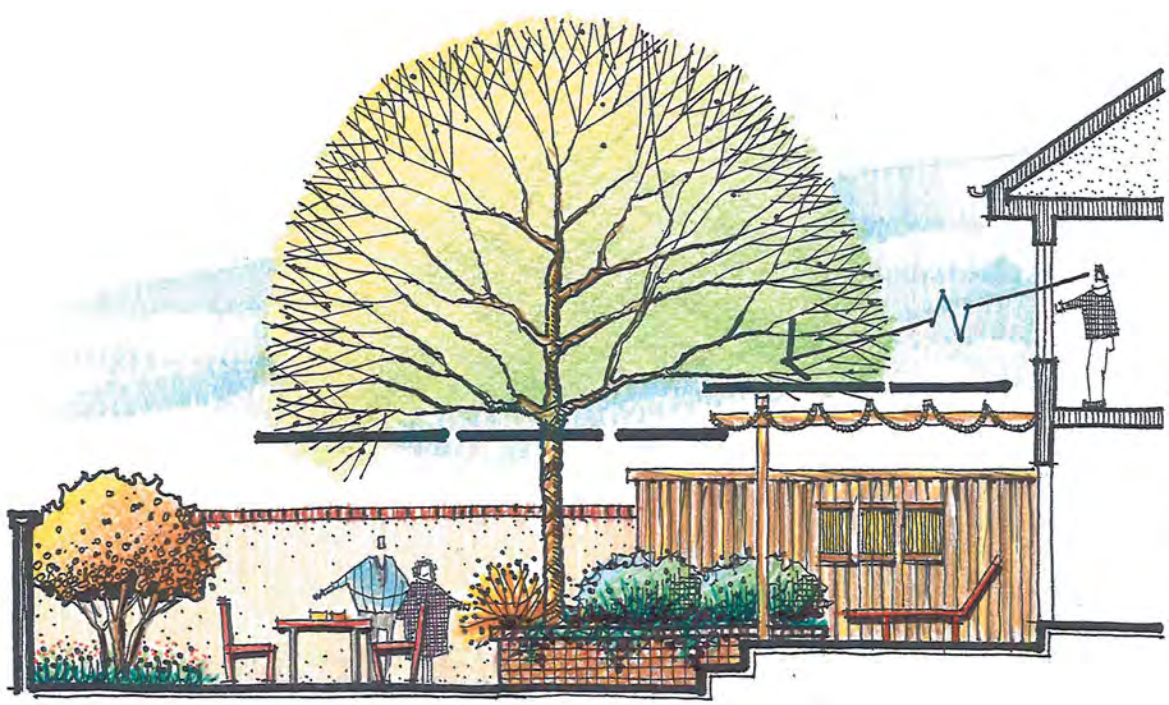


Figure 13–39
Overhead planes created by trees or structures should be used to screen views from upper-story windows.

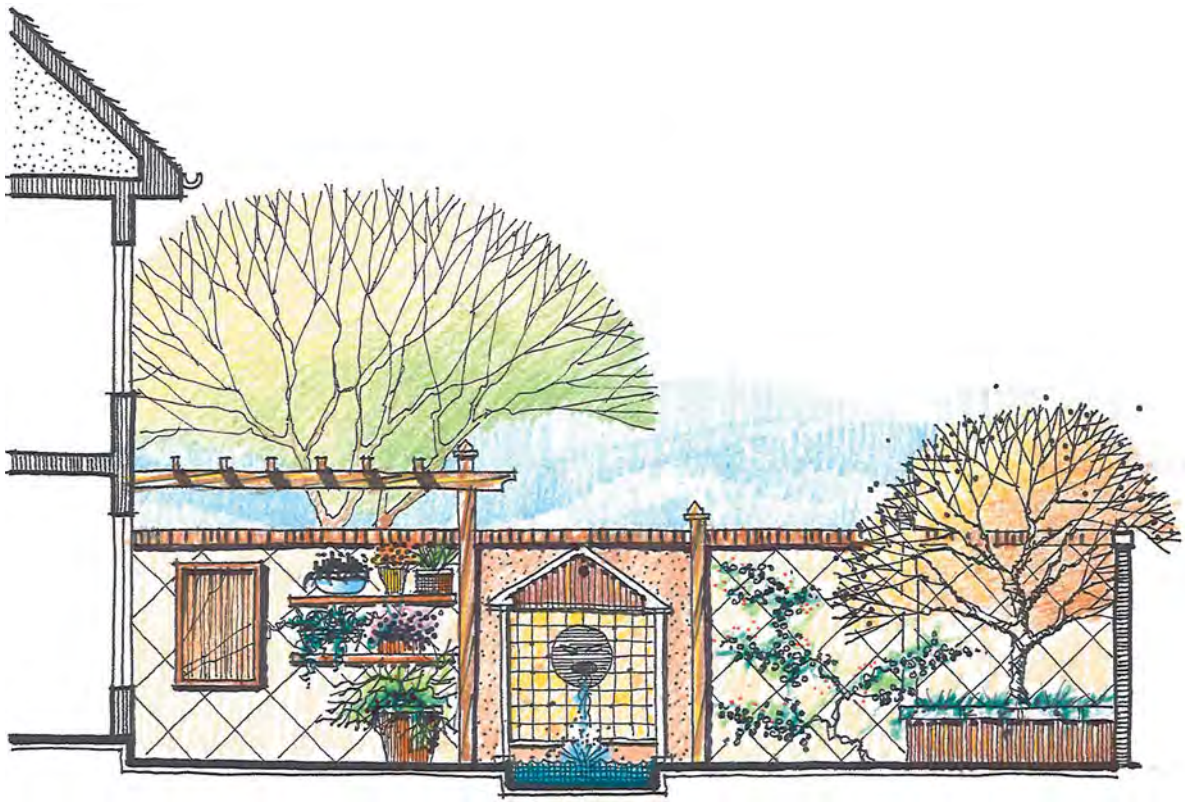


Figure 13–40
The visual interest of the surrounding walls in a townhouse garden can be enhanced with shelves of potted plants, mirrors, murals, niches, vines, etc.

garden spaces (Figure 13–40). One use of perimeter walls/fences is to hang plants. Given the limited size of the townhouse garden, the surrounding walls are good locations for shelves of plants, hanging plants, or even vines that can grow up the wall surface. These techniques are sometimes referred to as "vertical gardens" and are an excellent means of incorporating vegetation in a narrow area. These approaches also soften the surrounding vertical planes and make their presence less obvious.

Art and sculpture can also be hung on the perimeter walls, again just as in indoor rooms. This provides visual interest and can give relief to an otherwise monotonous wall surface. A similar concept is to place mirrors in selected locations of the exterior walls. Mirrors act very much like windows in interior rooms and reflect a space back onto itself. This, too, helps to give the illusion of a greater spatial volume.

SUMMARY

Although each site is unique, some sites require special consideration and design solutions because of their location in relation to the street, wooded conditions, steep topography, or confined size. These types of sites require distinctive design solutions that solve the particular issues each of these sites possess. You should comprehend the following about these special sites:

- Special conditions or problems of a corner site
- Design guidelines for developing a site plan for a corner site
- Special conditions and issues of a wooded site
- Design guidelines for developing a site plan for a wooded site
- Unique conditions and issues of a sloped site
- Design guidelines for developing a site plan for a sloped site
- Special conditions or problems of a townhouse garden site
- Design guidelines for developing a site plan for a townhouse garden

14

Case Studies in Alternative Design Solutions

INTRODUCTION

Throughout this design textbook, much has been presented regarding the development of alternatives in various stages of the design process. In the early stages of design, when the designer is beginning to organize functional relationships between the elements of the design program and the site, it was suggested that alternative ways be explored to solve the problem functionally. Also, during form composition, it was advised that alternative design patterns be studied that would provide major structure to a design. In addition, during the spatial composition phase, it was suggested that various ways be investigated to create spatial edges, overhead canopies, framing of views, and so forth. Hardscape and softscape elements can be used separately, or in conjunction with one another, in further developing ideas for spaces and subspaces. Lastly, when specific materials and patterns are selected, it was recommended that the designer study alternative ways of combining materials in developing the final patterns of the hardscape and the softscape.

As designers make decisions to explore alternatives at various stages of the design process, these efforts will undoubtedly serve to enhance their abilities to create unique, exciting, and personal spaces for clients.

This chapter includes four different projects, each with a series of alternatives for front and/or backyards. Each set of alternatives is different from the others. Some are based on the same client, the same site, and the same design program. The differences are based on the functional organization of the site and the design theme used to create overall patterns in the design solution. Other sets of alternatives are based on the same site, but different clients and design programs. In any case, it is important to understand that alternatives are (1) valuable tools to assist in the development of a final design decision, (2) beneficial in selling design ideas to clients, and (3) helpful in the growth of the designer.

PROJECT #1: RESIDENCE OF NORA AND THOMAS MACINTOSH

This project illustrates four different design solutions for the front yard and backyard of the Macintosh residence. Although the solutions are different, each was based on the same client, the same site, and the same design program. The differences vary with the function and the design themes used in the solution.

Nora and Thomas Macintosh were born and raised in Columbus, Ohio. They met at The Ohio State University when they were juniors in the business management program. After graduation in the early 1980s, they married and moved to Boston. Nora took a job with the local office of Hartwell Publishing Company (HPC). Thomas accepted a position with Slumen-Lokes Enterprises (SLE), a venture capital company. After nearly 10 years at these companies, they decided to move to upstate New York. Thomas was given the opportunity to lead a newly developed branch office of SLE as the chief executive officer (CEO). Nora was excited about the move, because she was looking forward to spending several years at home raising their newborn triplet girls. She was also quite pleased because her parents lived less than 45 minutes from their new home.

They enjoyed the next 12 years in their new home in New York. Once the girls entered the first grade, Nora began working part time. She became a freelance editor for HPC. In early 2003, SLE was absorbed by a larger company, leaving Thomas in a position to stay as CEO or be transferred to central Ohio to head another new branch office. Although the entire family had never planned on moving, they saw this as an excellent opportunity. Nora could take a full-time management position with the Columbus office of HPC, while Charlotte, Emily, and Anne would begin their high school years with their several cousins.

They bought a piece of property on the outskirts of Worthington, Ohio. The architect has finished the floor plans for the house, but the exterior character is still undecided. The Macintoshes like a variety of house styles and are having a difficult time selecting a final one. Because they have decided to hire your firm as the landscape design consultant, they are interested in some preliminary design ideas for their residence. A base map of the front yard is shown in Figure 14–1, and a base map of the backyard is shown in Figure 14–6.

Nora Macintosh has provided the following thoughts and concerns regarding the site development of their property.

Front-Yard Comments for the Macintosh Residence

- We are all music lovers and enjoy playing the piano. My mother was a concert pianist, and she gave us her Steinway baby grand piano when she moved into a small condominium. As you can see, we have a special room in the house for the piano. It will be a place for us to sit, play, learn, and read. We would like to have a variety of nice views from this room of the landscape in several directions.
- We have a small covered area at the front entry. We anticipate sitting on the porch, oftentimes even when it is raining.
- Because we enjoy sitting outdoors, we would like to have a courtyard where we can sit in the front and still feel separated from the rest of the front yard. We like the idea of using either a small hedge or low wall to help create this space.
- Because we entertain fairly often, we would like to have space for a few parked cars. Although there is street parking, we prefer to have some spaces within the property. It won't be long before the girls will be driving, and we anticipate having a few extra cars.
- We would like to have some paved access to the backyard on the west side.
- The neighbors to the east have a small front sitting area that is in direct line from the view out of the library and music room. We really need some privacy in this area. We don't want to just fill the side yard with a bunch of evergreens. We would like to have a nice place to view.
- There is a small, passive neighborhood park located to the north of our property. It is maintained by the association. We would like to have some views to this park from the front yard.

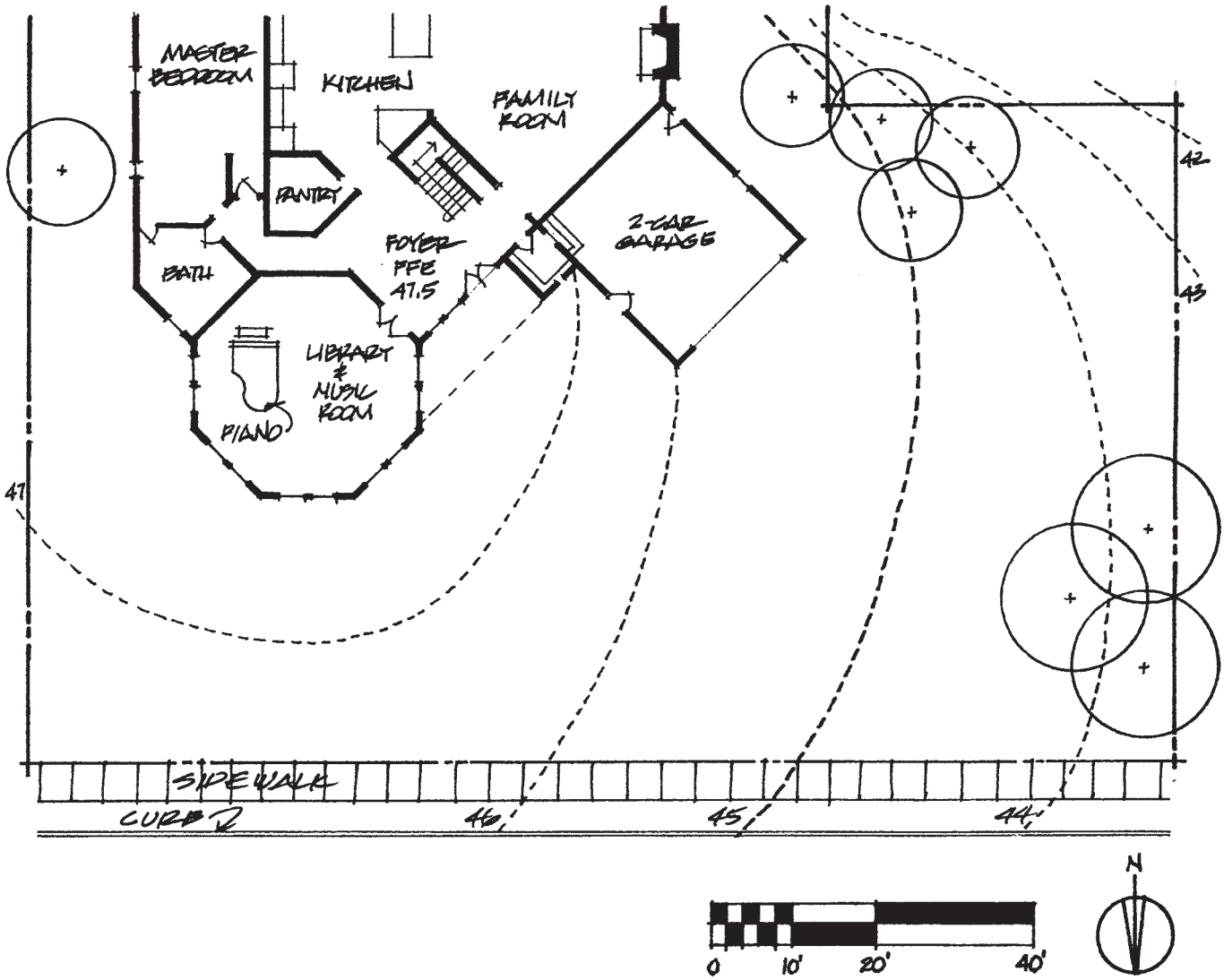
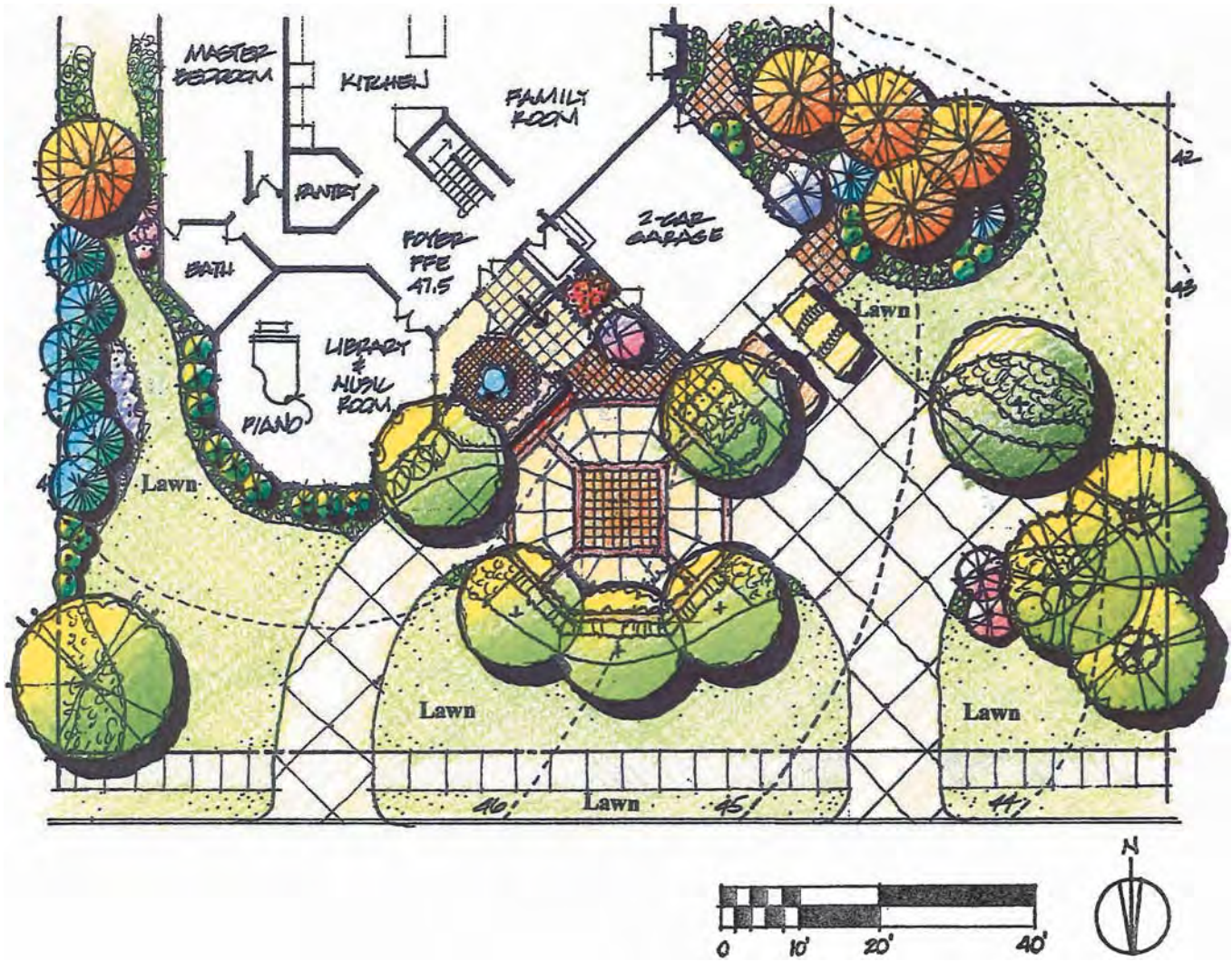


Figure 14–1
Base map for the front yard of the Macintosh residence.

- There are three maple trees in the northwest portion of the yard. They are in great condition. We hope they can be saved. They also serve to help block a view from our front porch to a somewhat dilapidated empty lot to the northwest.
- There are also some smaller maple trees located to the west of the garage. We don't want them removed, as they seem to help create a pleasant setting for the house.
- We realize that we have room to have a U-shaped driveway. If this type of driveway were to be incorporated, we could have a drop-off area near the front entry courtyard, and could even park our car there. We are not sure we want this but would like to see how it might work.

Alternative Design Solutions for the Macintosh Front Yard

Four alternatives for the front yard are shown in Figures 14–2 through 14–5. Although each of them has dealt with the same client, the same site, and the same



Major Design Aspects

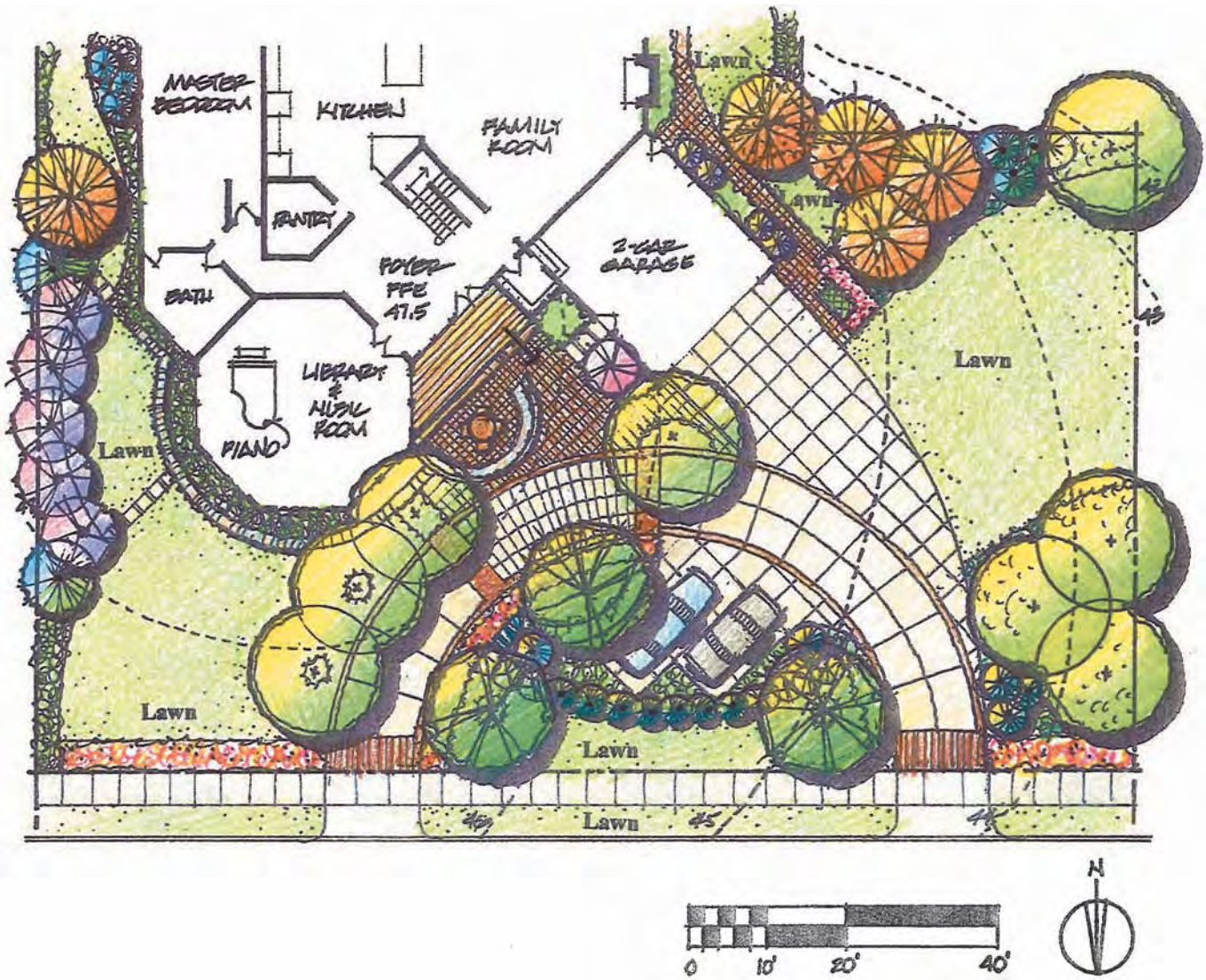
Form. Octagonal forms, to reflect the shape of the library and music room, define major portions of the landscape—the drop-off area and front courtyard.

Vehicular Circulation. A U-shaped driveway was incorporated, along with parking for two extra cars. There is enough room for these cars to pull straight in to these spaces, and adequate space to back up and leave, even with cars parked at the garage.

Drop-off and Entry. The drop off area was designed to reflect the shape of the music room, a prominent space in the house. This space is separated from the front yard with a low hedge, an area for seasonal color, and several ornamental trees. It is strongly connected to the front entry courtyard.

Entry Courtyard. This outdoor sitting space, also an octagon, is adjacent to the main walkway, and is viewed from both the foyer and the music room. It is separated from the drop-off area, yet allows views into the drop-off area and to other parts of the front yard.

Figure 14–2
Front-yard alternative #1 for the Macintosh residence.



Major Design Aspects

Form. Semicircles and arcs were used to develop some of the elements of design. These include the driveway, seat wall in the entry courtyard, masonry edge around the library and music room, and some of the major hedges.

Vehicular Circulation. A semicircular driveway provides for a very smooth entry, drop-off, and exit. Two extra parking spaces are located directly off the drive, and with plenty of pavement for ease of backing up and exiting the site. This area is separated from the front walk with an arc-shaped hedge that responds to the circular drive.

Drop-off and Entry. This area is identified by a change in pavement from the rest of the circular drive and directs the visitor into the main entry space at the front of the house.

Entry Courtyard. The porch is shown as a simple, open wood deck with steps along the entire front, providing places for placing pots and urns. The courtyard is defined by a low seat wall with planting.

Figure 14–3
Front-yard alternative #2 for the Macintosh residence.



Major Design Aspects

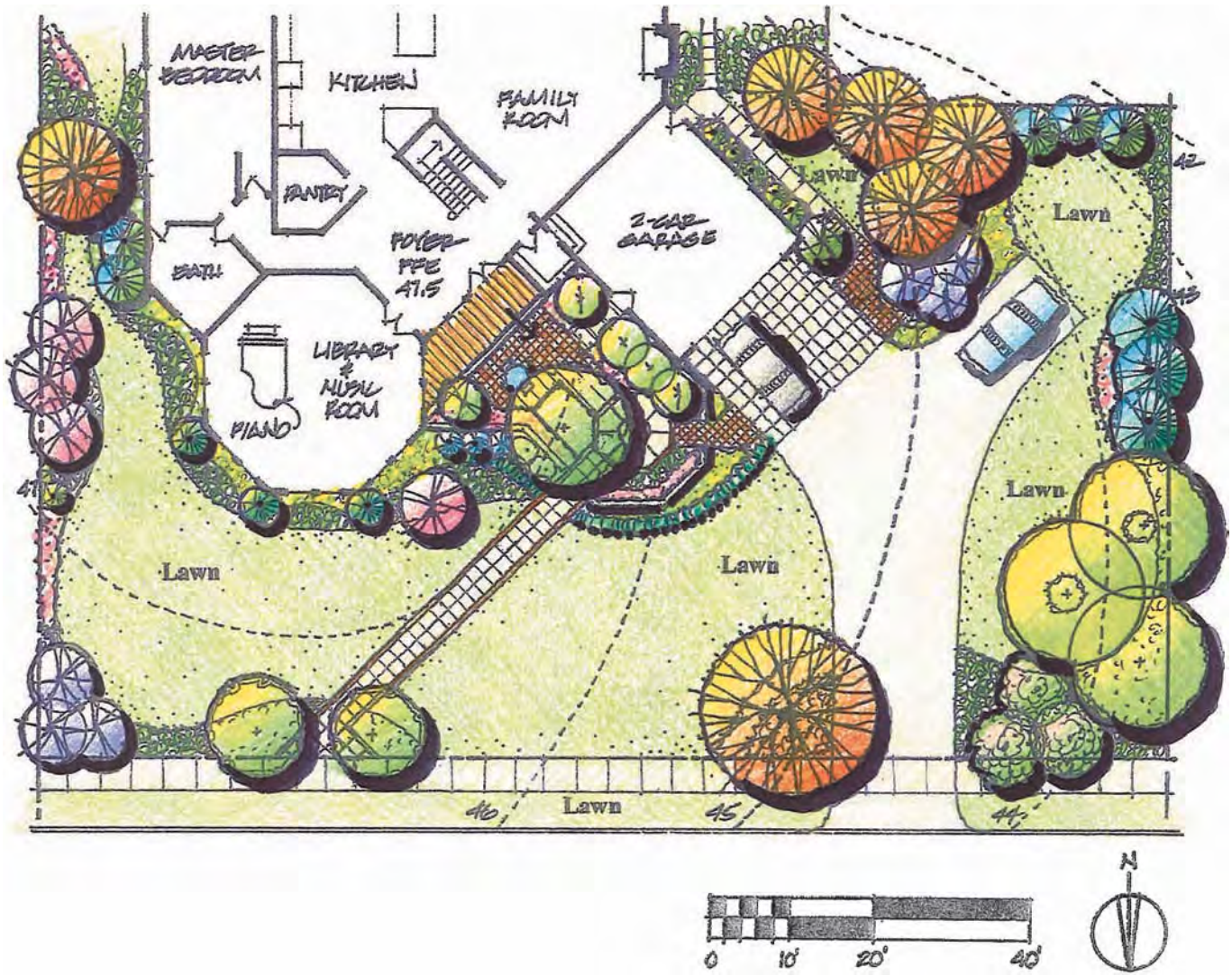
Form. This design is composed of rectangular patterns that relate to the face of the front of the house and garage. These rectangles are set at a 45-degree angle to also relate to the octagonal library and music room.

Vehicular Circulation. This scheme uses the western portion of the property so as to maintain as large a front lawn as possible. This was done by having the driveway enter the site near the property corner and lead directly to the garage. Two additional parking spaces are located to the northeast and southwest of the smaller patterned area of the driveway.

Drop-off and Entry. There is no separate drop-off area as in the previous designs. The entry walk is an extension of one of the parking spaces. A separate walk near the vehicular entry allows visitors to walk to the front door without using the driveway. Because of this layout, there is a strong axis that leads people into the front entry court.

Entry Courtyard. This entry court is designed as a formal entry with planting and low walls or fences accenting the central axis.

Figure 14–4
Front-yard alternative #3 for the Macintosh residence.



Major Design Aspects

Form. This alternative minimizes the hardscape so as to maximize the softscape. Most pavements, other than the driveway and a major walk, were designed to respond to the façades of the house, rectangular and 45-degree angles.

Vehicular Circulation. This simple driveway provides for easy access to the garage, and for one extra parking space. The area in front of the garage was delineated with a smaller pattern to scale down the space and make it more pedestrian in character.

Drop-off and Entry. There is no separate drop-off space in this design. An octagonal paved area serves as a transition space into the entry courtyard. It connects to the driveway and to a major walk that extends out to the northeast to intersect the public sidewalk.

Entry Courtyard. The entry courtyard is composed of an open deck and partially octagonal space for a table and chairs. A low wall and planting helps separate this space from the front yard.

Figure 14–5
Front-yard alternative #4 for the Macintosh residence.

program, each is unique with regard to overall function, form composition, spatial composition, and material composition.

Backyard Comments for the Macintosh Residence

- We have a great view to the association's common green space to the southwest. We feel fortunate to be able to have such a nice open view to numerous trees and a large expanse of lawn.
- Cooking and eating outside has always been part of our lifestyle. We would like a permanent gas grill, along with some built-in counter space.
- We entertain 10 to 12 people approximately twice a month for business. In addition, we enjoy having friends and neighbors over to eat, relax, and enjoy party games. With the small hill behind the house, we would love to see a multilevel deck, with some built-in benches. We would like to have space to place a few tables and chairs for feeding our guests, as well as a few lounge chairs and places for some potted plants. We love urns of all sizes and shapes.
- Because we love to cook, we spend quite a bit of time in our large kitchen, so we would love to have a great view to a nice courtyard garden. Maybe we could use this as a private space, because it is also adjacent to the bedroom, or we could use this as a formal place to sit and eat. (A table as large as the one in our breakfast area would be sufficient.)
- Lawn area is critical, as the triplets are currently soccer and softball players. They would like a solid wall somewhere to practice kicking goals, without losing the ball to the neighbors' yard.
- We all would love to have an enclosed gazebo (approximately 12-foot diameter) located in a prominent place for views and "mosquito-free entertaining."
- We grow herbs and would love to have a small formal garden, although we don't want the entire design to look too formal. We are mostly casual people.
- We really don't want a fountain anywhere. We had one at our other home and it was more trouble than we wanted.
- We are not pleased with the view directly out the bedroom window to the south, as it looks onto the rear neighbors' patio space, which is located about 50 feet south of our property line, and directly in line with the bedroom window. So, something needs to be done there.
- We like the idea of steps from the upper-level paved area to the lower lawn area near the bedroom.
- Please save the trees; they provide some shade, which we desperately need on this side of the house. An overhead arbor might be nice.
- The neighbors to the east of us have a patio that is very close to the property line. Now that we are building a house, we need to make sure that we have some quality privacy.

Alternative Design Solutions for the Macintosh Backyard

There are four alternatives for the backyard. As mentioned earlier, the base map for the backyard is shown in Figure 14–6. The backyard alternatives are shown in Figures 14–7 through 14–10. As with the front yards, each alternative has dealt with the same client, the same site, and the same program, but each is unique with regard to overall function, form composition, spatial composition, and material composition.

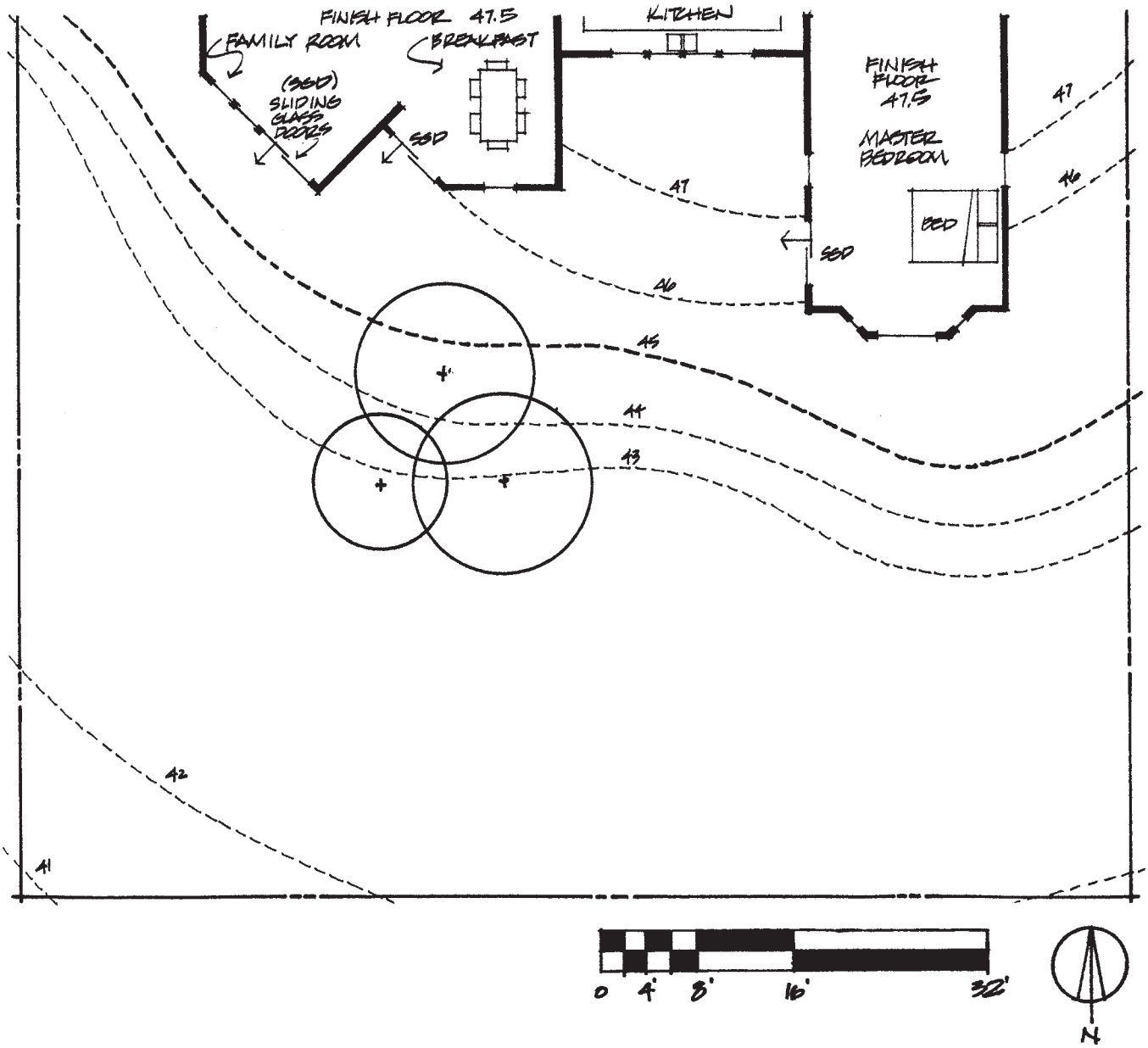
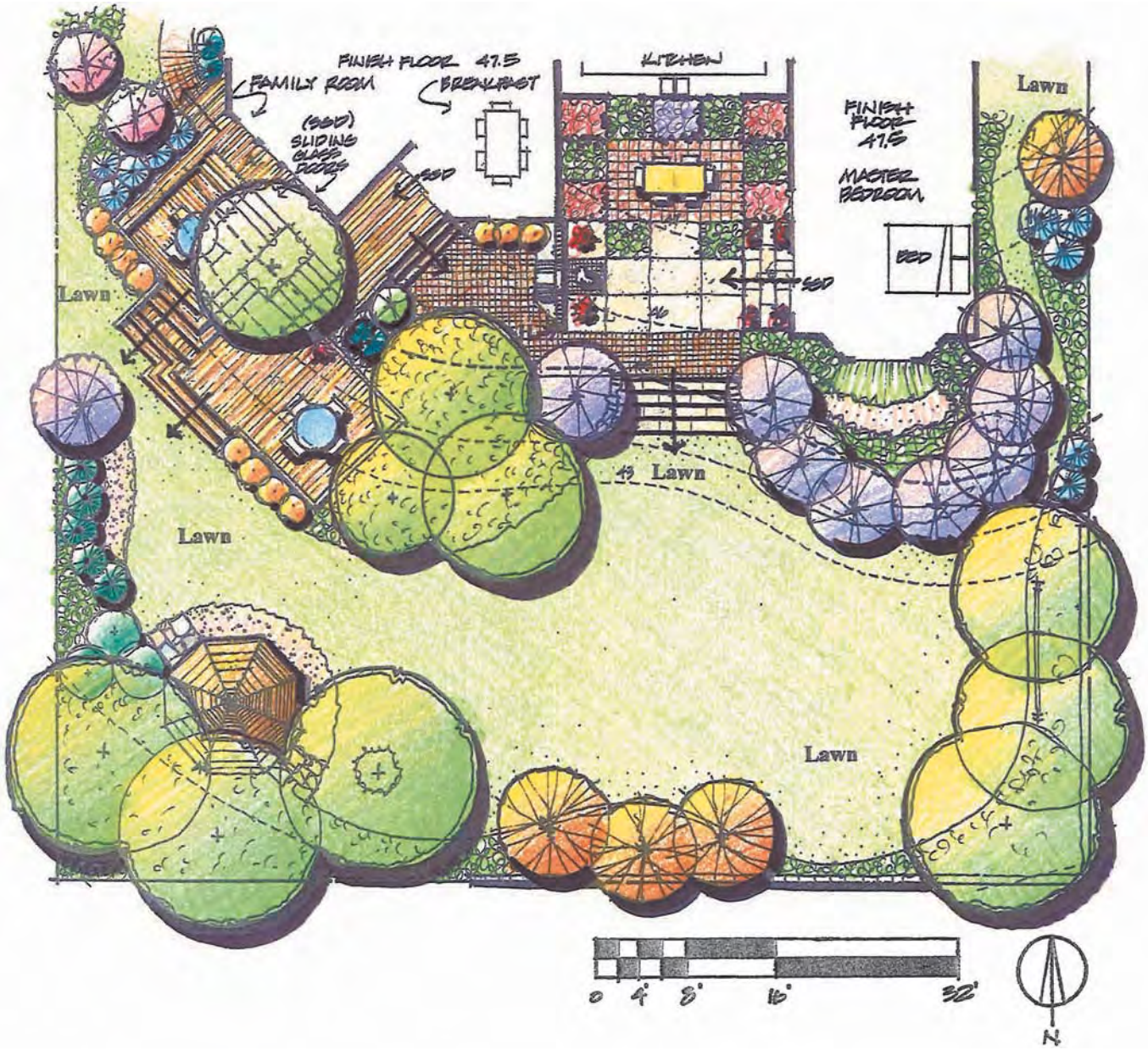


Figure 14–6
Base map for the backyard of the Macintosh residence.

PROJECT #2: RESIDENCE OF JESSICA AND BRIAN FLEMING

This project illustrates four different alternative design solutions for the front yard. Although the solutions are different, each was based on the same client, the same site, and the same design program.

Approximately 18 months ago, Jessica and Brian Fleming purchased a home in central Ohio. Over this past year, they have had their house modified drastically to fit their lifestyle, as well as their family and personal needs. A base map of the site is shown in Figure 14–11. The formal living area used to be the garage. The front entry was extended out into the front yard. A new three-car garage was added to what used to be a generous side yard. They are looking forward to moving in several months from now, so they are contacting you to begin developing ideas for their front yard site development.



Major Design Aspects

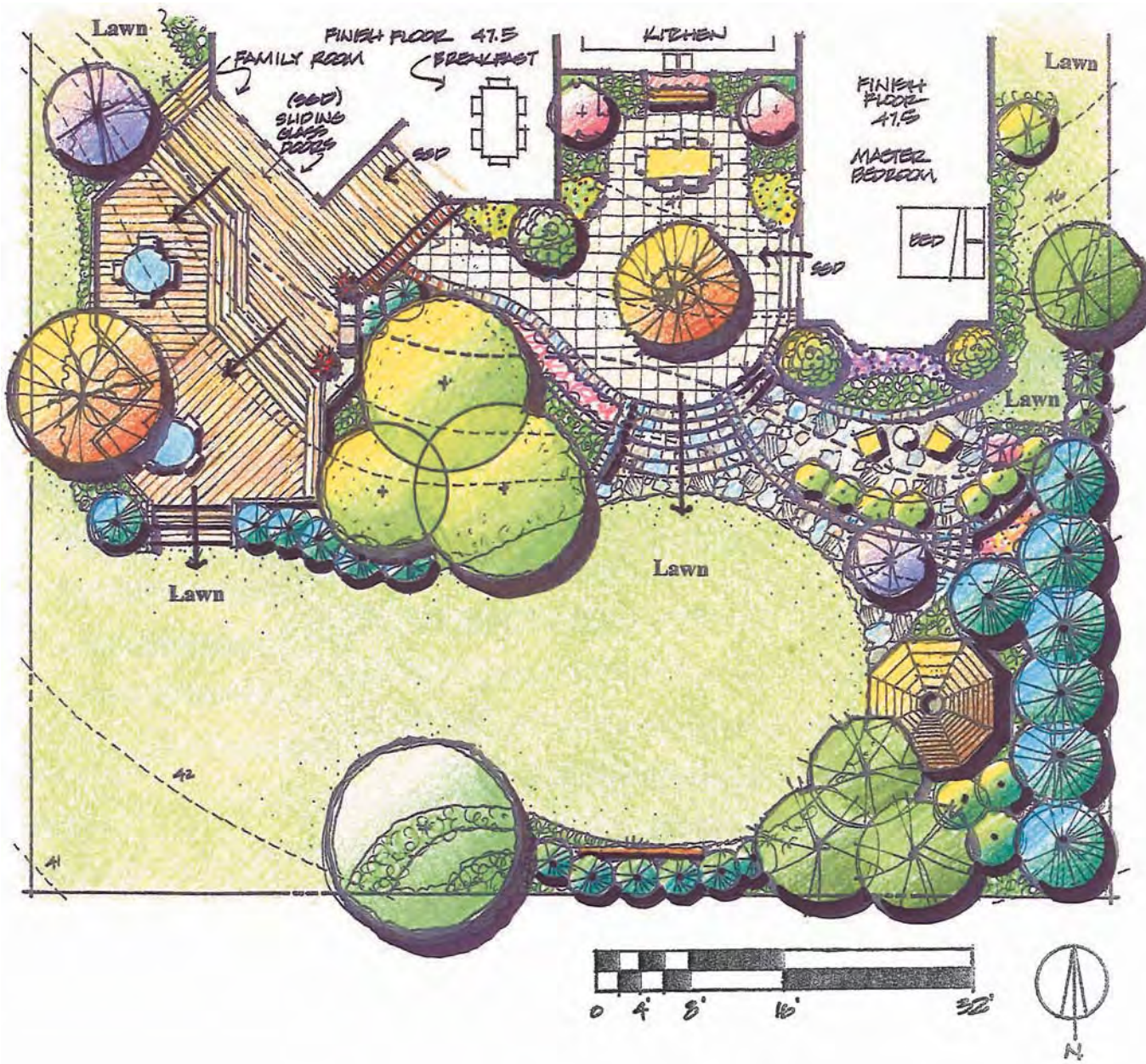
Form. The majority of this alternative, primarily in the hardscape, consists of a series of rectangular patterns, whereas the softscape has a more informal and organic character. The kitchen garden is a formal system of rectangular forms and establishes a strong axial view out of the kitchen window.

Terraced Entertaining. The entertaining deck is designed in an informal manner, with decks at various levels, at a 45-degree angle, and creates a strong relationship to the family room. There are built-in benches as well as some expanded steps near the access to the lawn. These expanded steps provide for informal seating, places for cushions, and potted plants.

Kitchen Courtyard. The courtyard is like a mosaic of various pavement types and various plant masses. It is nearly a bilaterally (both sides of the axis being the same) symmetrical design. There is a sculpture on the west side of the courtyard, whereas on the east side is a set of steps for access from the bedroom. The grill is situated on the west side of the screen behind the sculpture. The central view from the kitchen captures the kitchen garden and a pleasant view to the three ornamental trees at the south end of the lawn.

Lawn Play. A large open lawn is provided across the back of the yard. Ball play is designed to be on the east side, with a length of wall serving as a soccer goal. A fence is situated on the east and south to prevent the ball from entering the neighbor's yard. The gazebo is situated in the southwest corner to provide a view from the deck and from the gazebo to the green space to the southwest.

Figure 14–7
Backyard alternative #1 for the Macintosh residence.



Major Design Aspects

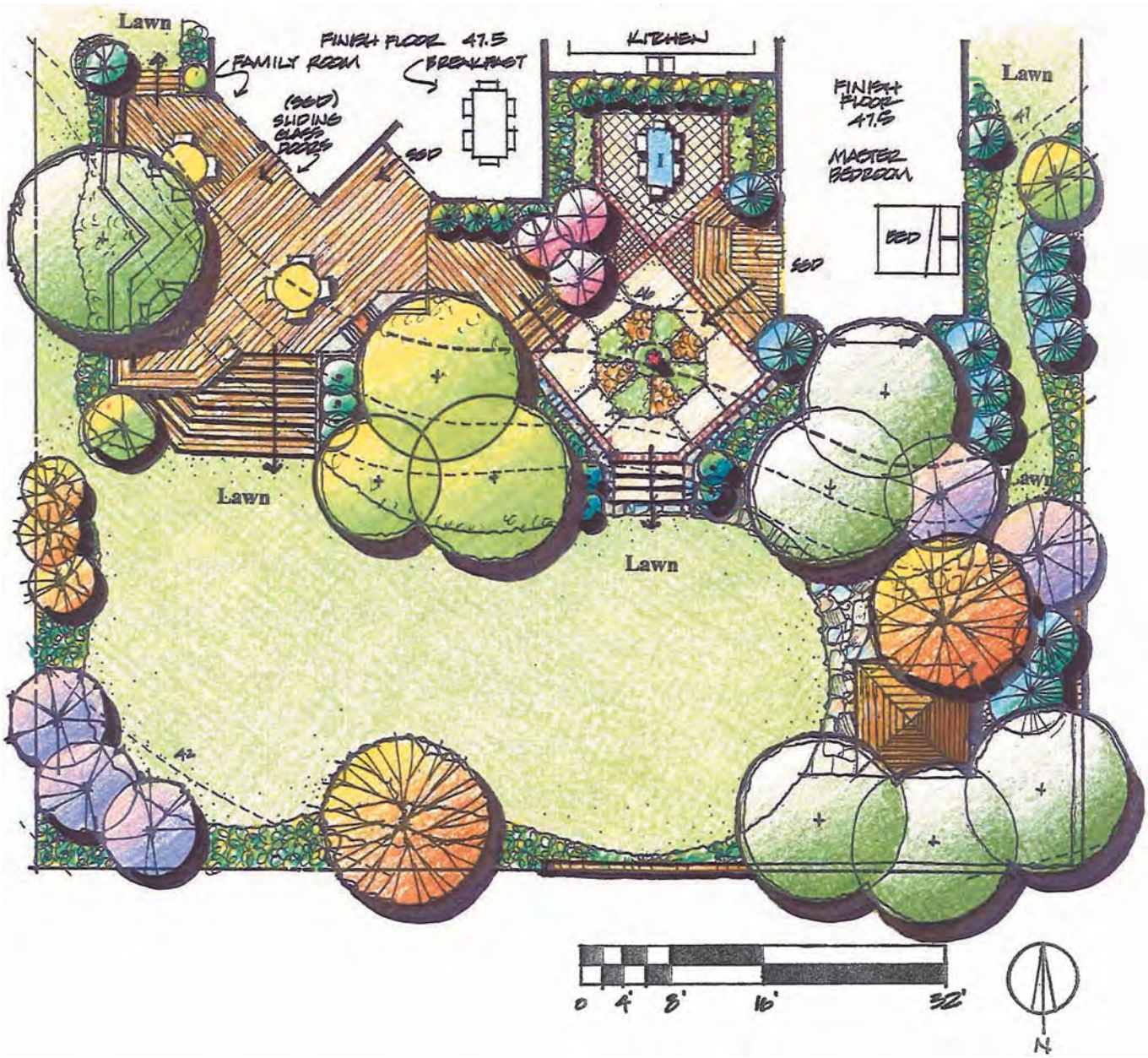
Form. The modified diagonal theme was used for the entertaining deck, which responds to façades of the house. The rest of the project is of a curvilinear pattern, to provide a more informal and natural character to the yard.

Terraced Entertaining. The deck is divided into two levels, separated by four risers, giving various places to set tables and chairs. The steps between these two levels are extended across the entire length of the deck, providing plenty of room for informal seating and potted plants. The grill is in the southeast corner of the upper level. A small set of steps provides access to the lawn, maintaining a more enclosed feeling within the deck.

Kitchen Courtyard. Although the space is a curvilinear pattern, it is still designed as a formal courtyard. Similar plantings are located on the sides of this space to create an axial view from the kitchen window (similar to Alternative #1). This courtyard is very open, with a single tree planted as a focal point. The steps widen as they approach the lawn, making for an easy and open connection.

Lawn. There is no planting in the southwest portion of the yard, so as to maintain very open views to the common green space. A soccer wall is located on the south property line, with evergreens behind it. The gazebo is located in the southeast corner and tucked between deciduous and evergreen trees.

Figure 14–8
Backyard alternative #2 for the Macintosh residence.



Major Design Aspects

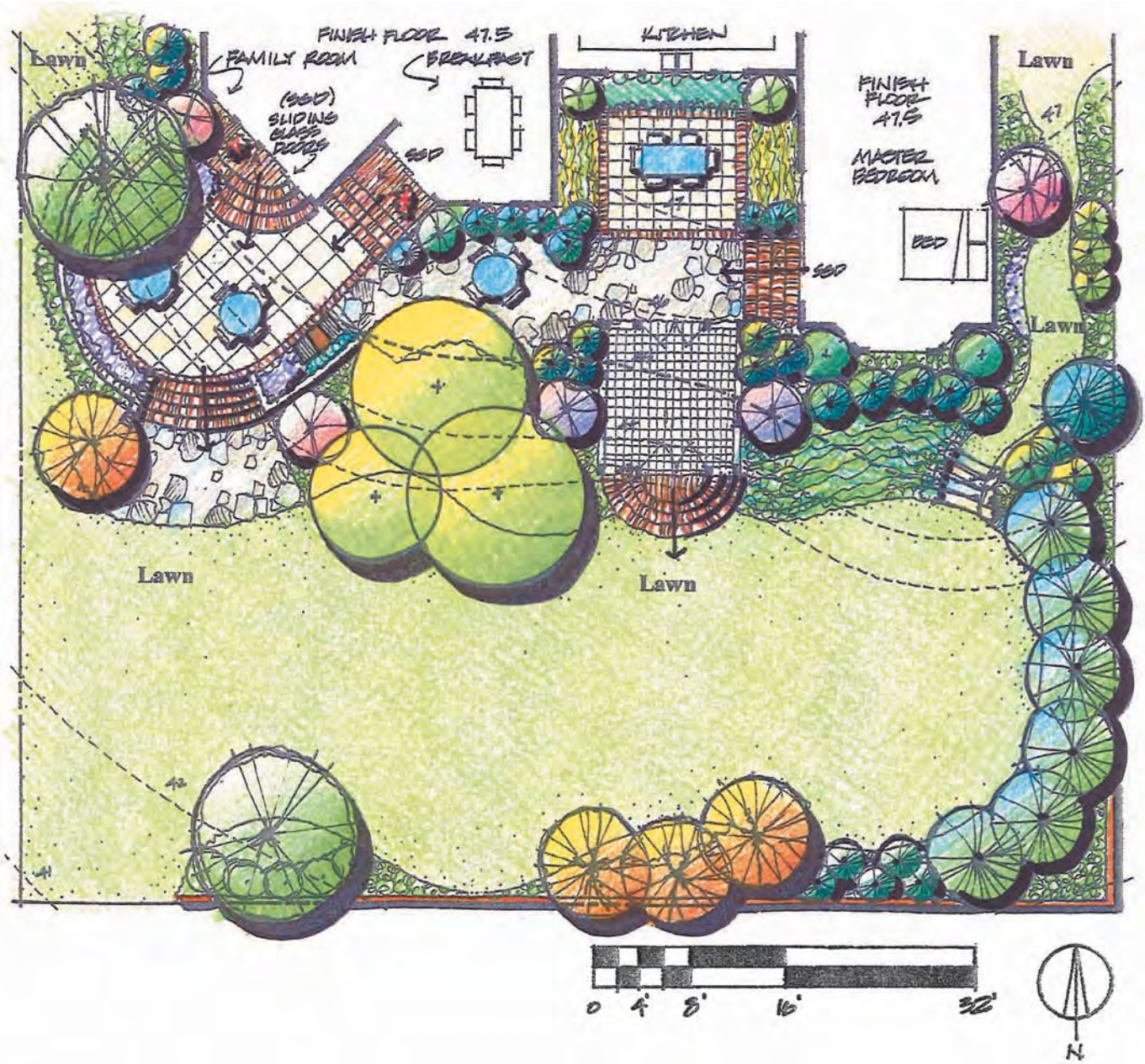
Form. The modified diagonal theme was used for the design of all the hardscape, and again, as in the other alternatives, the planting beds are more curvilinear and informal.

Terraced Entertaining. This alternative establishes all the entertaining deck at one upper level. This helps maximize the visible useable space as seen from the interior, and it eliminates the need to walk up and down stairs while entertaining. There is a long built-in bench that stretches along the west sides of the deck. With the open deck, tables and chairs can be placed at any number of locations. The grill is situated on the southeast portion of the deck.

Kitchen Courtyard. As in the previous alternatives, a symmetrical design is established for the courtyard. The central focal point of the courtyard is the octagonal herb garden. This provides for a pleasant view from the kitchen window. Providing more of an angular design allows views to the southwest and the southeast to be emphasized.

Lawn Play. Similar to Alternative #2, the gazebo is located in the southeast corner. A fence is located on portions of the southeast and the south property lines, which will provide stronger privacy for those sitting in the gazebo. Some planting is situated in the southwest corner, to help enhance the views to the common green space.

Figure 14–9
Backyard alternative #3 for the Macintosh residence.



Major Design Aspects

Form. A series of circular forms were used to develop this alternative for all the hardscape. And, to provide a different material, this design did not utilize any wood.
It was designed with pavements, steps, and walls made from concrete and/or masonry (brick, stone, modular wall units).

Terraced Entertaining. Two brick landings and steps connect the main terrace with the family room. There is one major open terrace at this mid-level, with opportunity to place tables and chairs. Steps lead down to a small patch of stone that can be used as a small patio at lawn level. The grill is located in the southeast side of the terrace.

Kitchen Courtyard. The kitchen garden has a simple rectangle as the central place for the main table and chairs. Plantings on the sides are reserved for smaller plantings and herbs. Access from the bedroom, into this space, is from a set of brick steps similar to the entertaining terrace.

Lawn Play. A major difference in this alternative is the location of a gazebo/shelter between the kitchen garden and steps to the lawn. This is intended to be like a screened porch with access through doors on the north and south sides of the structure. An open lawn stretches across the backyard and is bound by a small fence along a portion of the east property line and a longer fence on the south side. The fence does not approach the southwest corner of the property to make sure views to the green space are preserved.

Figure 14–10
Backyard alternative #4 for the Macintosh residence.

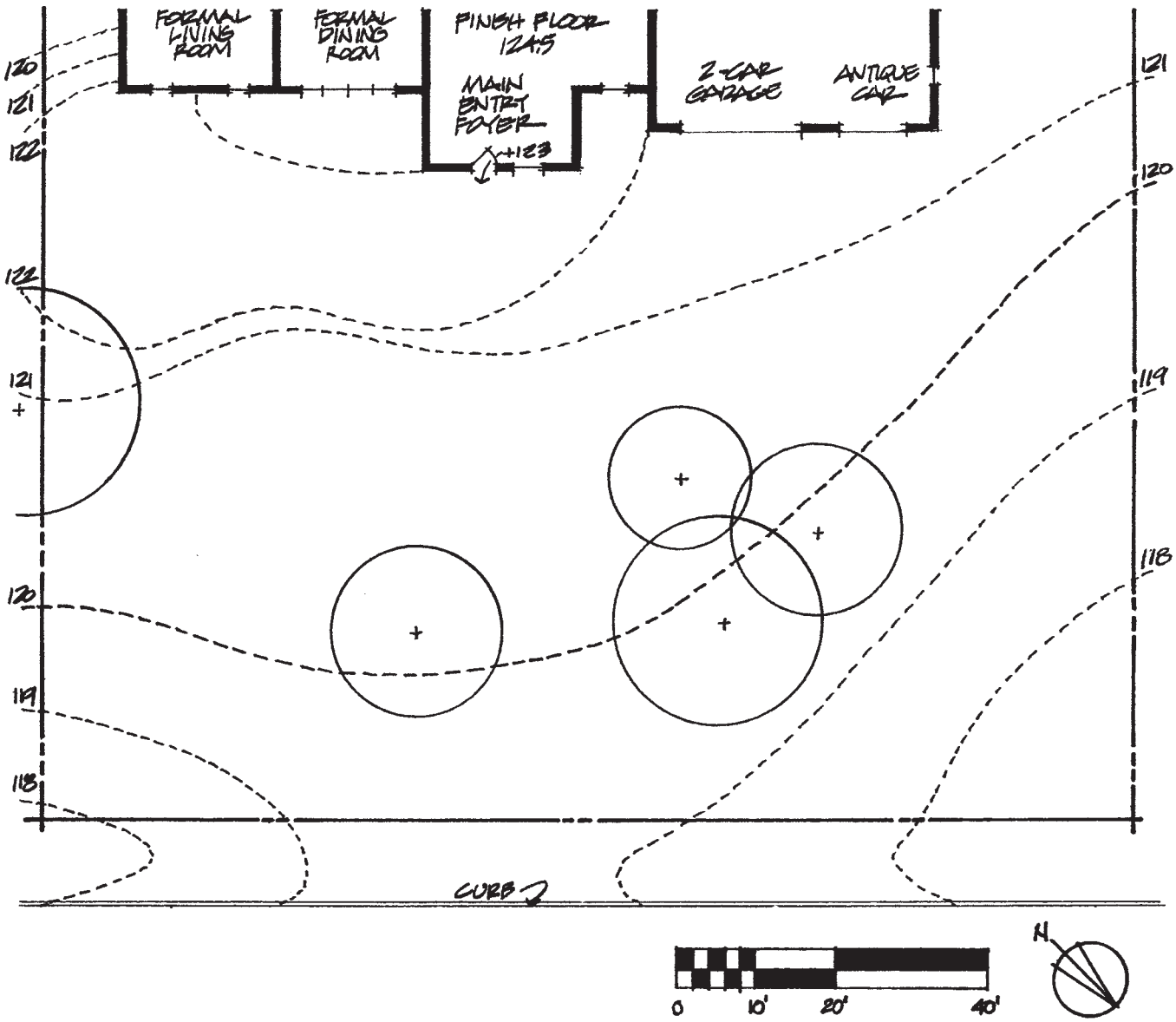


Figure 14–11
Base map for the Fleming residence.

Jessica has been a thoracic surgeon for approximately 10 years. After having two children and being a stay-at-home mom, she decided to finish her residency requirements and practice medicine. She is quite busy, sporadically, but still finds time to enjoy her family. She is a marathon runner and seems to be running all the time. She enjoys lying outside in the late spring and summer writing in her journals and reading novels written by her two favorite authors—Anne Rice and Stephen King.

Brian is a retired U.S. Marine who has recently taken a top management position for a local group of physicians. At 46, he is actively involved with the local Audubon Society and is an avid bird watcher. He loves sitting outside, reading, listening to music (all kinds), and writing humorous fiction.

Their two children, Chad and Brad, are 12 and 13, respectively. They can usually be found playing the seasonal "ball-sport" in the front yard. They would love to have some generous lawn space, but realize some of it will be taken up by other necessary amenities.

The site is relatively open, except for several different but healthy trees. The trees are situated toward the front central portion of the site. The Flemings would like to keep these trees, but are open to transplanting a few of them, if needed. The landform varies about 5 feet from the front corners of the property (Elev. 118.0) to the ground in front of the main entry (Elev. 123.0). Neighbors to the adjacent properties are pleasant people. The physical aspects of the neighbors' houses and site development create no visual problems for the Flemings.

Program Elements for the Fleming Residence

After meeting with the Flemings at their residence and following up with phone conversations to verify a few things, the following design program was established.

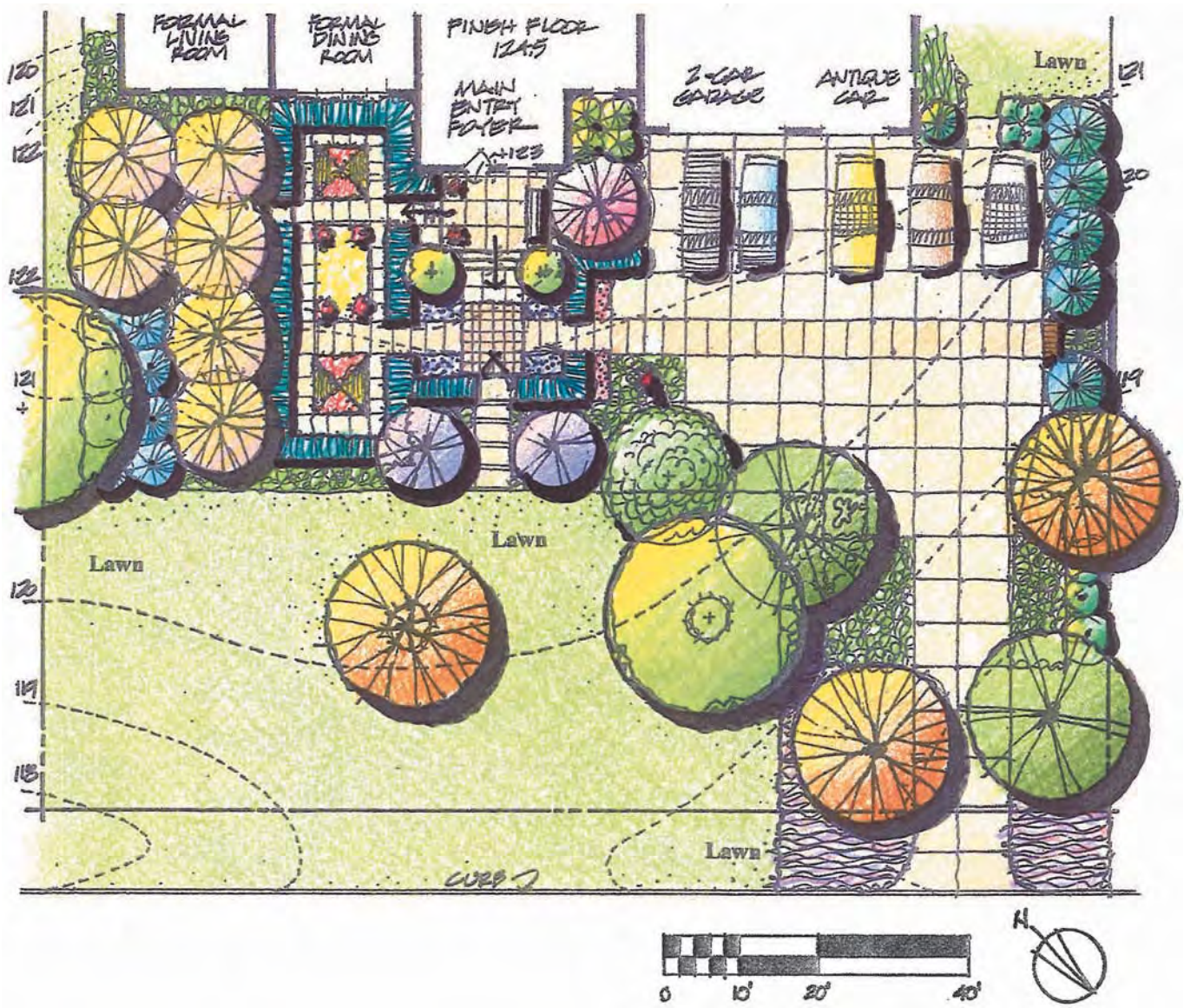
- Provide new vehicular driveway not less than 12 feet wide.
- Incorporate space to park two additional cars for visitors.
- Design an entry courtyard with sitting area near the main entry of approximately 100–150 SF.
- Incorporate a formal geometric garden with annuals, perennials, hedges, sculpture, and/or bench, of approximately 200–250 SF.
- Establish a vegetative viewing area, on the northern corner of the property, to block an objectionable view to a vacant lot across the street. A neighbor bought it to prohibit another house from being built. Unfortunately, it opens a view further into a small industrial site.
- Retain and enhance a very pleasant view to the eastern corner of the property. There is a great view through a common area into a nearby golf course.
- Provide plantings to enhance a view from the street to the house.

Alternative Design Solutions for the Fleming Residence

There are four different alternatives presented for the Fleming residence. These alternatives are shown in Figures 14–12 through 14–15. As with the Macintosh residence in the previous example, each of these alternatives has dealt with the same client, the same site, and the same program, yet is unique with regard to overall function, form composition, spatial composition, and material composition.

PROJECT #3: THE ENGLEWOOD, GLENGARY, AND ALLENDORF RESIDENCES

This project illustrates three alternative design solutions for a front yard. Unlike the previous two examples, this project varies the client and design program, yet the site remains unchanged. The base map for this project is shown in Figure 14–16. The front of the house faces southeast with a direct view to the water. A small 50-foot-wide beach is located approximately 200 feet from their property. There will be a detached garage at the rear of the property to house two cars, a small boat, and a golf cart. An existing concrete driveway, in good condition, is located along the southern part of the property. It extends to the backyard and connects to the garage. The elevation from the sidewalk to the ground near the front door changes by approximately 3 feet. A sloped area that extends across the front yard may need to be modified to incorporate the client's wishes. Underground water and gas lines are shown on the base map. Four young maple trees are located at various places in the front. Although the clients may want to save them, they can be transplanted. The adjacent houses are about the same size as this residence and are set back from the street approximately 50 feet. The owners of each adjacent property are quite friendly and look forward to having another new house with new neighbors next door to them.



Major Design Aspects

Form. This entire design was developed with a rectangular theme. As a powerful architectural form, this design allows for some very strong symmetry. Several axes in the design include:

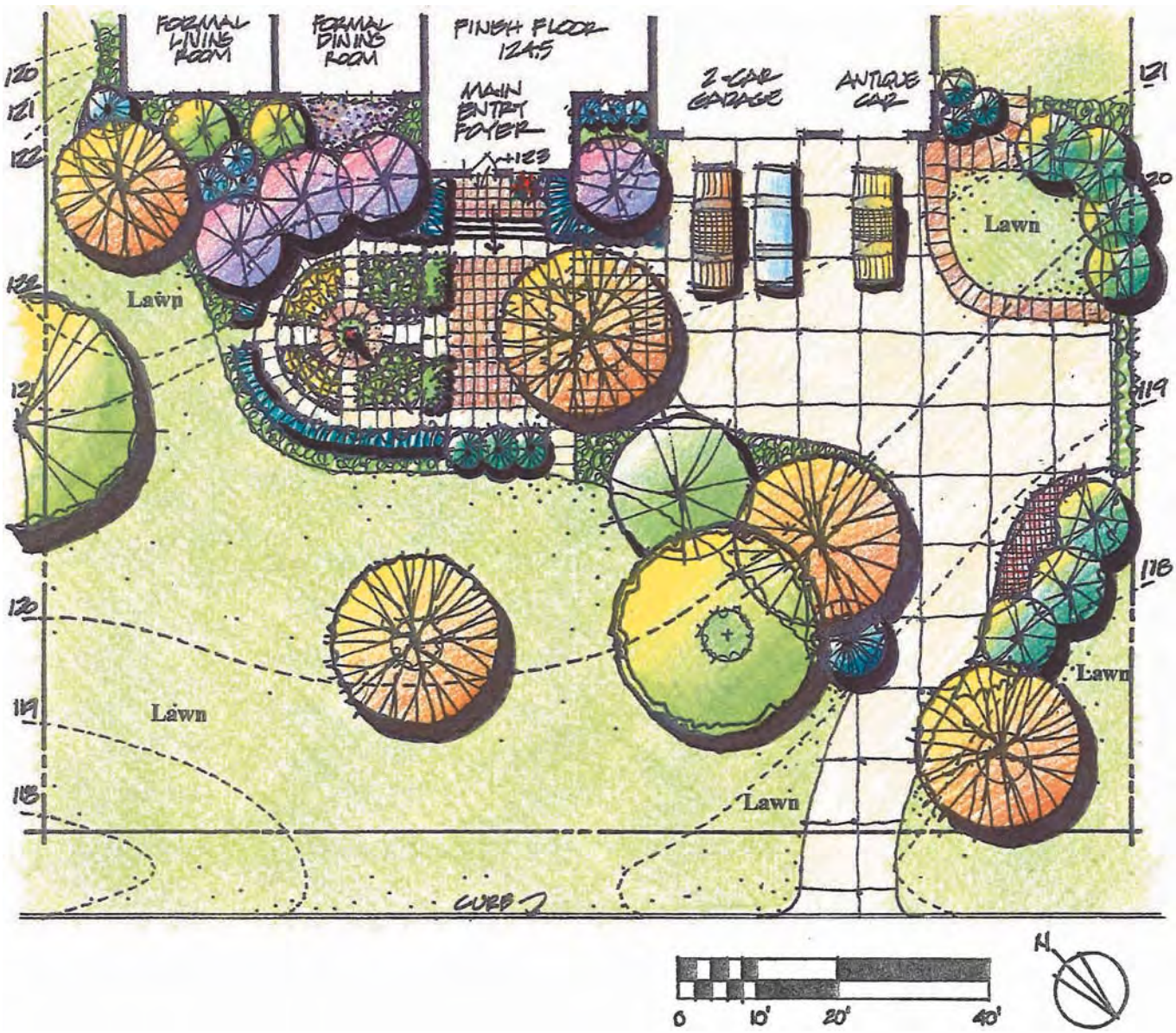
- One at the site entry
- One that is parallel to the front of the house and runs from the fence through the entry court and into the formal garden
- One that extends from the space immediately outside the front door into the formal garden
- One that links the front door, through the entry walk and out into the front lawn
- One that is in line with a view out the formal dining room window and through the formal garden

Vehicular Circulation. The drive was situated to the far northwest of the property to maximize lawn and planting areas in the front yard. In addition to space necessary to park three cars in front of the garage, two more parking spaces are located immediately adjacent to these and with adequate back-up space.

Entry Court. An entry space is defined by a low hedge, central paving, and steps up to the upper entry level. There is a bench located on this upper level to allow for outdoor sitting and viewing into the formal garden. Access to the formal garden is from both the lower and upper entry spaces.

Formal Garden. The formal garden is centered on axis with the formal dining room. It is defined by a low hedge, similar to the entry space, and incorporates a narrow walk throughout the entire garden. A grouping of trees adjacent to the formal garden provides strong privacy from the neighbors.

Figure 14–12
Alternative #1 for the Fleming residence.



Major Design Aspects

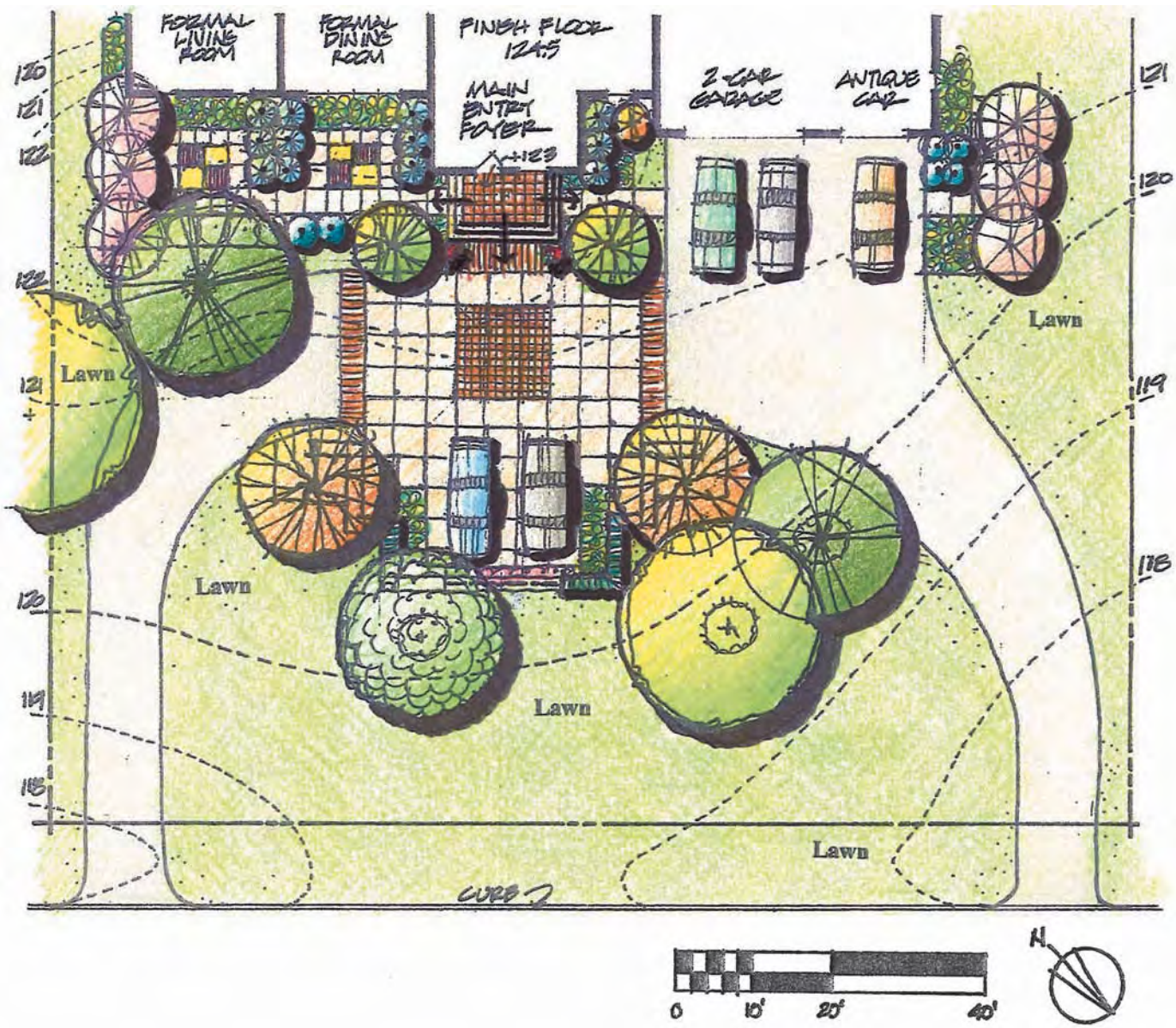
Form. A series of semicircular forms are used to define a lawn panel, planting areas, the formal garden, and the walkway. Together, these forms establish a softer landscape character than Alternative #1, which used a rectangular pattern for all hardscape edges and planting beds.

Vehicular Circulation. This alternative illustrates another approach to maximizing lawn and planting area. Vehicular access and parking are pushed close to the property line, yet still allowing enough space for easy exit. Plantings are massed near the entry to the site to help separate the driveway visually from the street.

Entry Court. The front entry space is divided into two walkways around a central tree, providing a canopy as one walks from the driveway into the entry space. The entry space is generous and focuses attention on the front door, with access to the front lawn.

Formal Garden. The formal garden is designed to be part of the entry experience. A narrow walkway wraps around the formal garden and provides a central focal point in the formal garden, which could be an ornamental urn, a small sculpture, or a small water fountain.

Figure 14–13
Alternative #2 for the Fleming residence.



Major Design Aspects

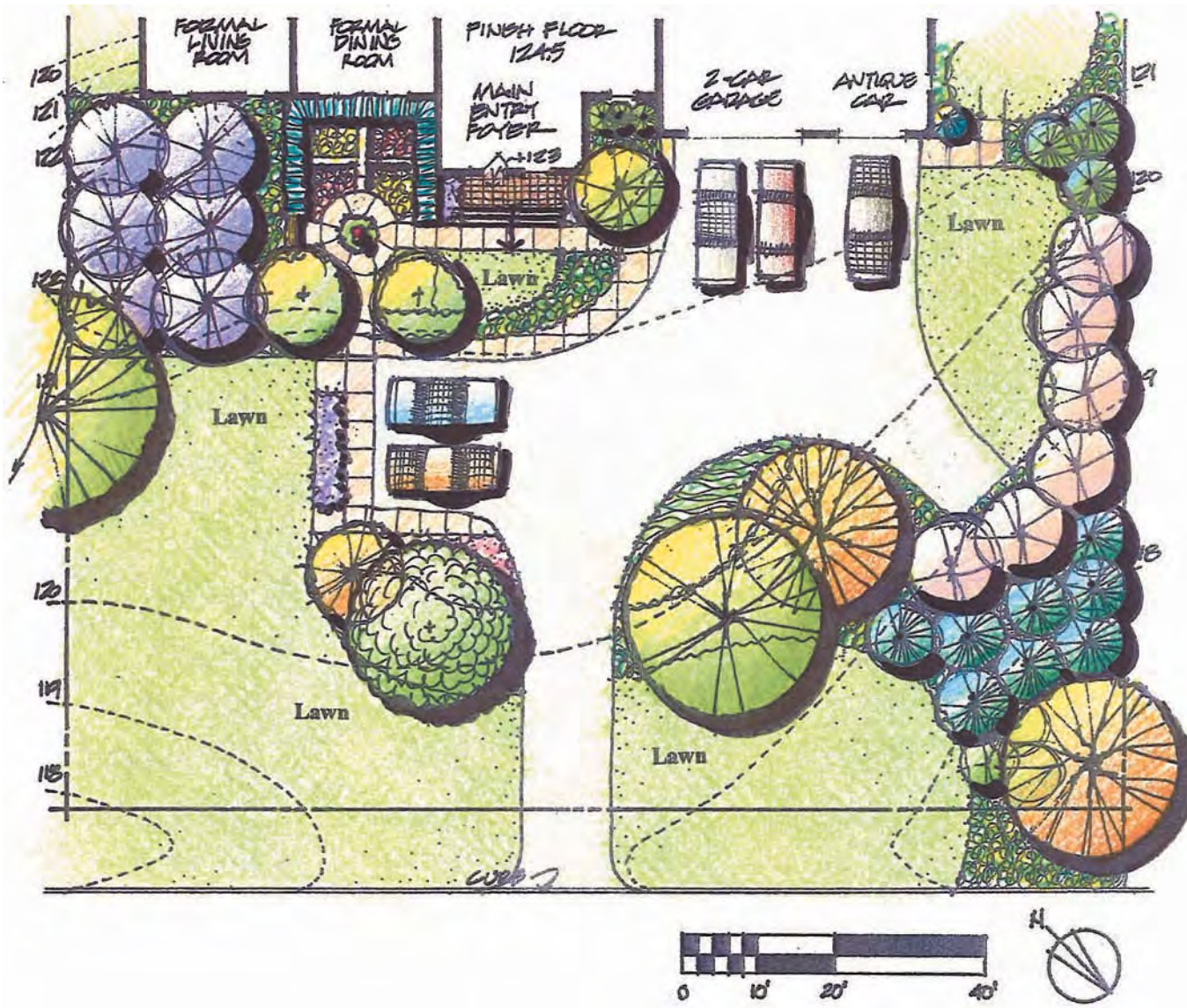
Form. A rectangular design theme is used to create a dominant entry/drop-off space near the front entry to the house.

Vehicular Circulation. A U-shaped driveway is incorporated to allow easy entrance in and out of the site, without backing up. Plenty of space is provided for three cars to park in front of the garage. The two additional parking spaces are located off the drop-off area near the front entry.

Entry Court. This scheme establishes a large entry/drop-off space with a few different materials to create patterns that reflect the design theme. The entry court is separated from the front lawn by a combination of low rectangular hedge and a low decorative fence.

Formal Garden. The formal garden is located directly outside the formal living room and formal dining room. The garden is designed to reflect the windows in these rooms. Again, a narrow walkway exists for easy access to the garden from the main steps outside the front door.

Figure 14–14
Alternative #3 for the Fleming residence.



Major Design Aspects

Form. Most of the forms in this alternative are curvilinear, except for the entry and formal garden. This provides for an overall softer setting for the house than some of the other more structured design themes.

Vehicular Circulation. The driveway is placed near the center of the property to allow for easy access to the garage and to the additional parking spaces. A back-up area is provided for ease of exiting the site without backing into the street.

Entry Court. This scheme situates the front walk adjacent to the parking spaces and centers the front walk on the formal garden, providing a strong visual focal point as one approaches the front door. Additional access from the driveway is also provided.

Formal Garden. The formal garden focuses on the formal dining room and from the walkway by the driveway. A focal point with a walkway around it emphasizes the entrance into the garden.

Figure 14–15
Alternative #4 for the Fleming residence.

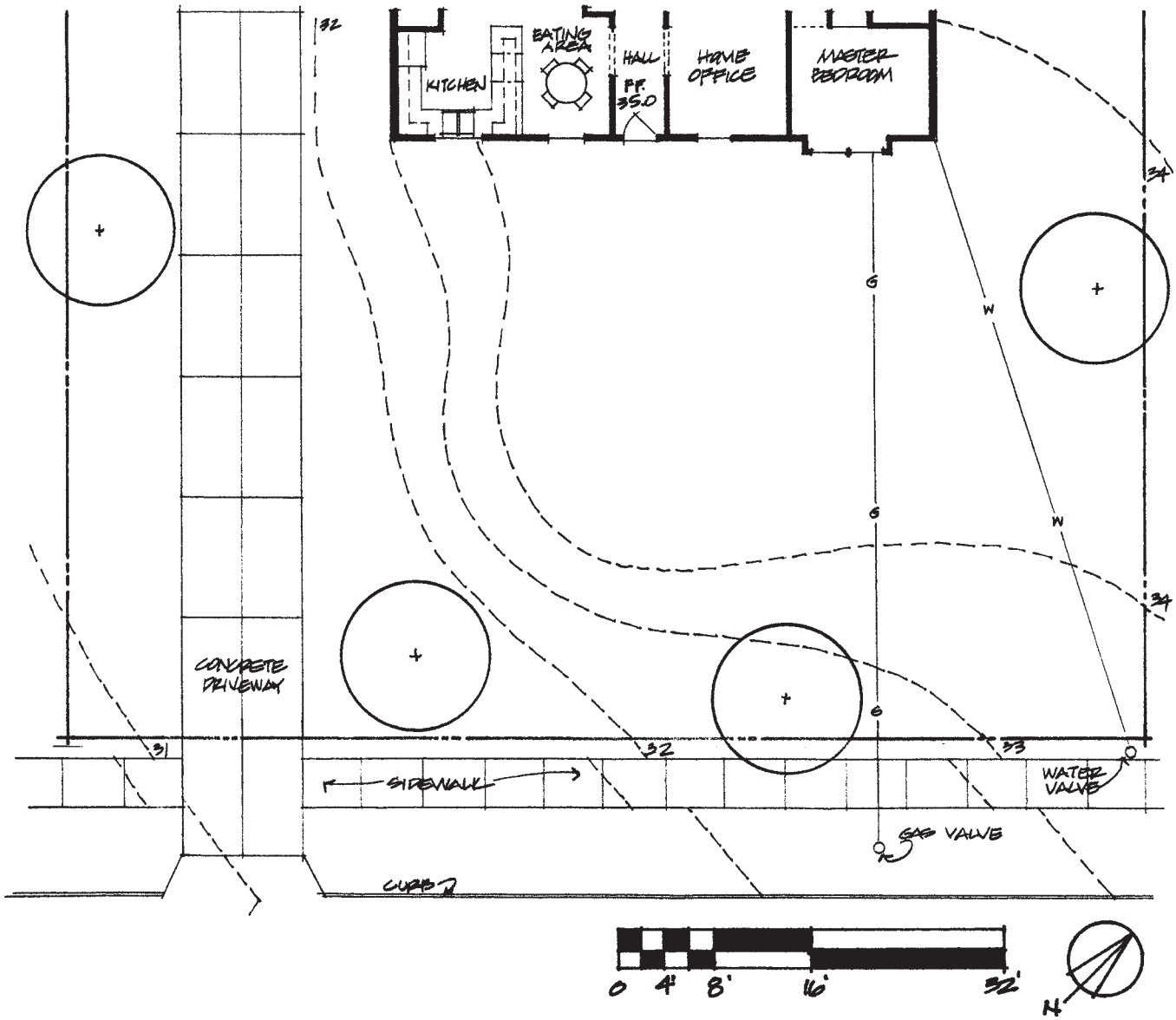


Figure 14–16
Base map for the Englewood, Glengary, and Allendorf residences.

Alternative #1: Residence of Priscilla and Kirk Englewood

Priscilla and Kirk Englewood have recently purchased this small lot on the shores of Kelly's Island in Lake Erie. After raising three children and assisting them in completing college, they decided to step into their next dream. They are setting the stage to retire from their current engineering positions, build this cottage by the water, and put their efforts into a new home-based company.

The Englewoods are very friendly, but very private people. They enjoy planting and maintaining their lavish annual and perennial gardens at their current residence, and look forward to doing the same at their new cottage. They love to walk and play tennis, and to cook. Being a rather organized and formal couple, they envision a formal landscape to accent their small but formal house. They would like to have a two-level entry terrace with a place to set a few chairs, a small table, and some potted plants. They enjoy sitting outside to talk, read, or listen to music. Although they enjoy the spectacular views from their front yard in all directions toward the water,

they would still like their front yard to seem more private than open. They would prefer to have friends and neighbors walk onto their property from a designated place along the proposed sidewalk, as well as from the driveway. They love the idea of a wrought-iron fence and gate near the front face of the house to keep their several Lhasa Apso dogs in the backyard.

Alternative #2: Residence of Katherine and Donald Glengary

The Glengarys are pleasant people who love the outdoors. They enjoy bird watching, stargazing, and yoga. They have a rather formal landscape at their current home, but look forward to a more casual, playful, and imaginative landscape at this new cottage. They like curved forms, especially arcs. With the architecture of the house consisting of stone and wood, they feel it would be appropriate to incorporate the same materials into the landscape. They would like to have a two-level deck at the main entry of the house. They plan to have a few chairs, a small table, and potted plants to help create a pleasant space for reading, relaxing, and performing their morning yoga exercises. They would like to provide an expansive walkway along the driveway to offer a warm and welcoming entrance to their home. They would prefer to have a fairly flat lawn area as a setting for the house. Because there is a small hill along the front yard, they envision a raised lawn with a low wall to retain the soil. They are not in favor of any fences, because they would feel too confined to their front yard.

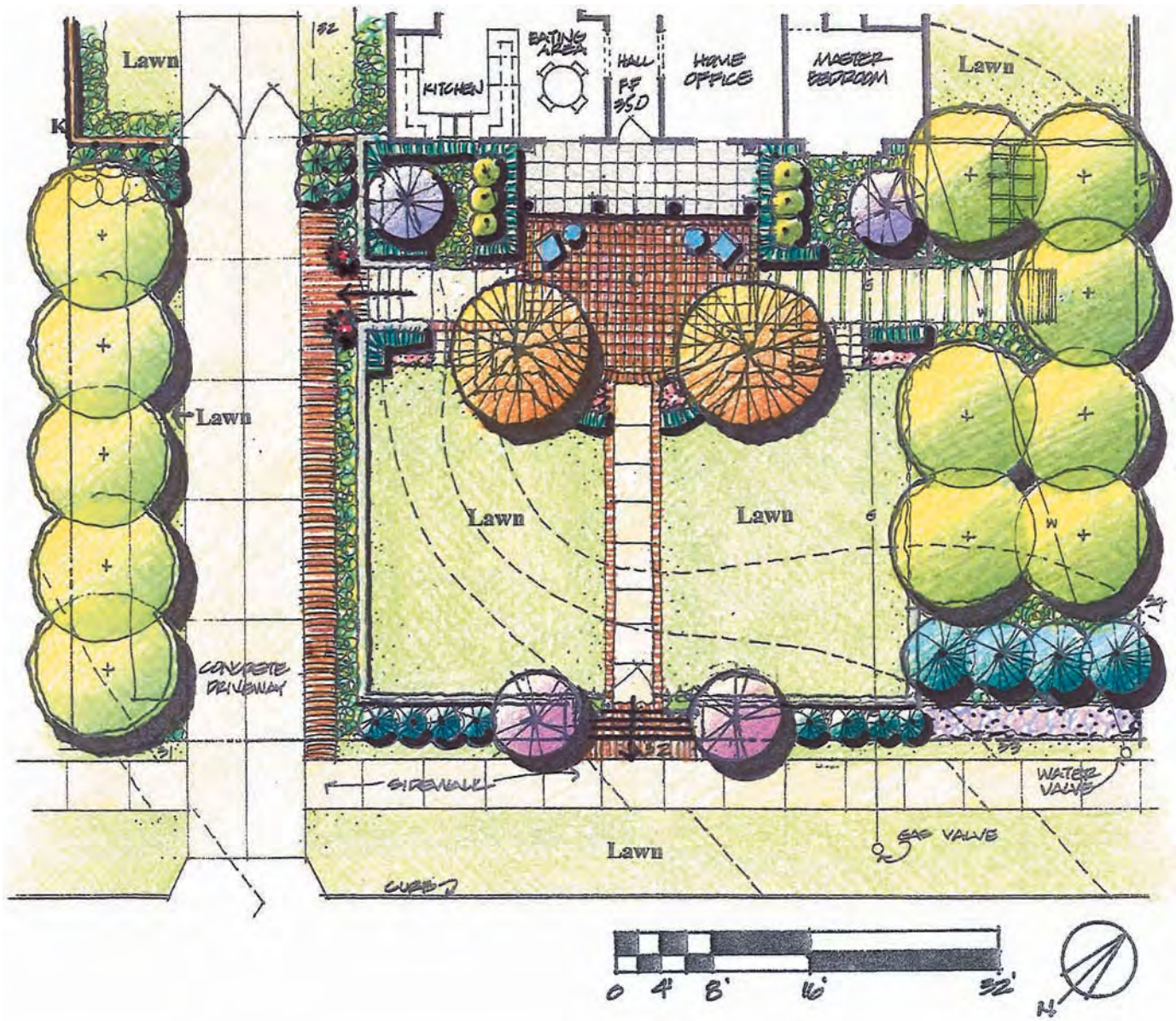
Alternative #3: Residence of Amy and Travis Allendorf

The Allendorfs are a very gregarious couple. They enjoy having neighbors over to visit, eat, and play card games. They enjoy sitting, reading, lying in the sun, and listening to music. Although they plan to spend some time on their boat fishing and sightseeing, they are mostly planning to have enjoyable, restful, and fun times with their friends and neighbors. They are active people who love to walk, golf, and play tennis. Being very casual, they anticipate having a rather natural-looking front yard. They prefer circular and flowing lines over straight or angled lines in a landscape design. Although they are a friendly couple, they would like to have some sense of separation from the street and sidewalk. With their front yard being a major focus of their outdoor living, some privacy would be appropriate. In addition, they would love to have some trees lined up along some of the arcs of the design, so as to create the sense of having a curved front yard, rather than a rectangular one.

PROJECT #4: IES INTERNATIONAL CONDOMINIUMS

IES International, a very successful computer software company, has recently purchased 12 condominiums within the Sand Pebble Condominium Development, which includes a total of 72 condominiums. IES has created a relationship with a nearby major university in developing a program that hires visiting computer specialists from around the world. Each of these individuals has a two-year contract and a dual appointment with the university and the computer software company. They and their families will occupy these 12 condominiums.

These condominiums are in a great location and are fairly close to the university. In addition, the site is in an area that has seen some rapid increases in real estate appreciation. Several new shopping developments and nearly a dozen restaurants have been built within the past several years within a mile of these condominiums.



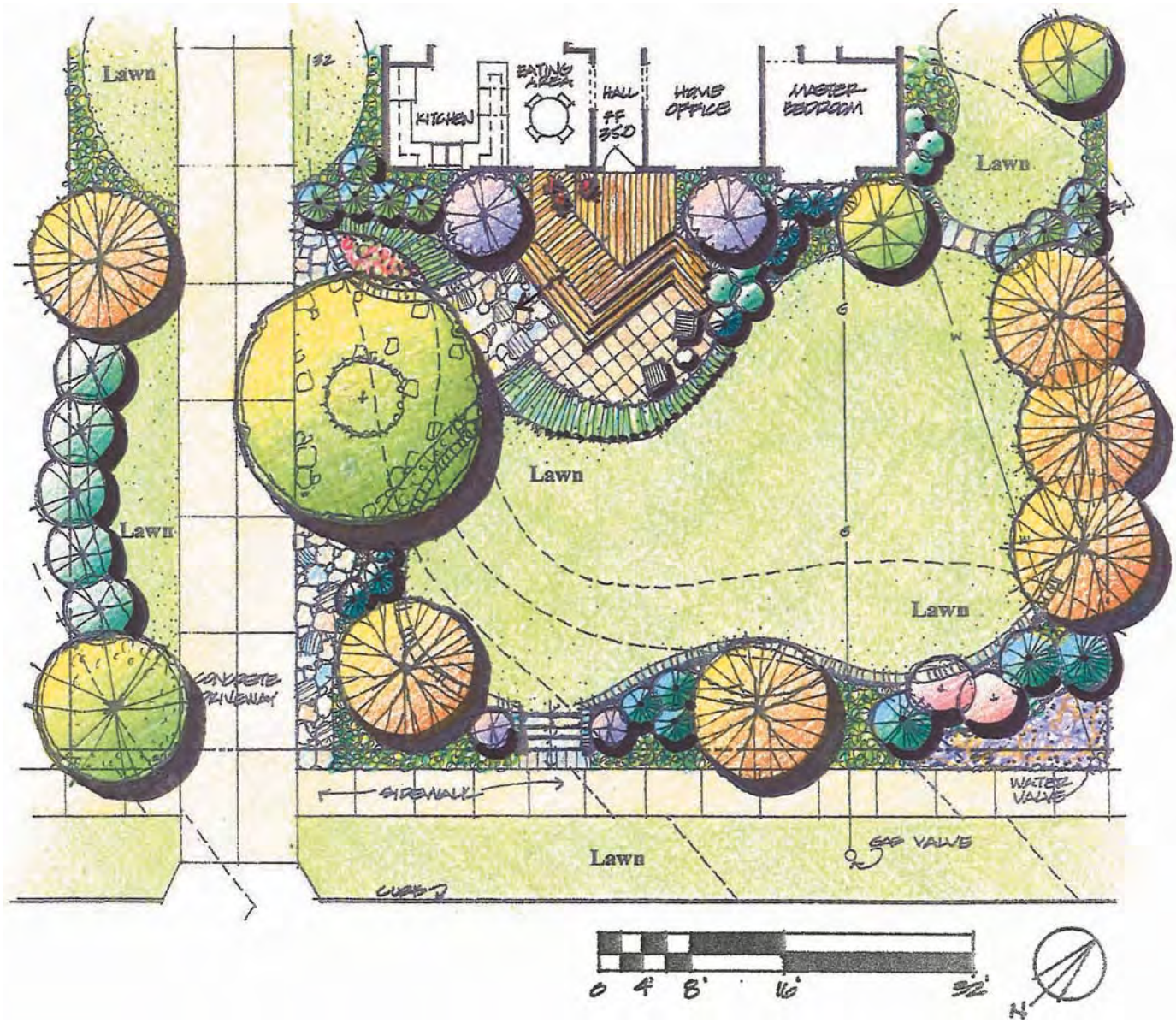
Major Design Aspects

Form. Formality is the overriding character of this design. Two strong axes exist to structure this entire front yard. The major axis centers on the entry to the house and connects to the front walkway with an expanded set of steps. The secondary axis is parallel to the front of the house and provides the entry from the driveway, with a decorative bench as a focal point at one terminus of the axis.

Front Entry. A porch is proposed for this alternative. A semicircular terrace extends from the length of the porch, creating a large entry space that is partially covered and partially open.

Front Yard. A low wall is used to raise the front yard to create a uniform and flat lawn panel. Low hedges are used to separate the entry space from the front lawn. Planting is symmetrical with the major axis. Lines of trees are situated near the property lines to provide screening and structure to this formal design.

Figure 14–17
The Englewood residence.



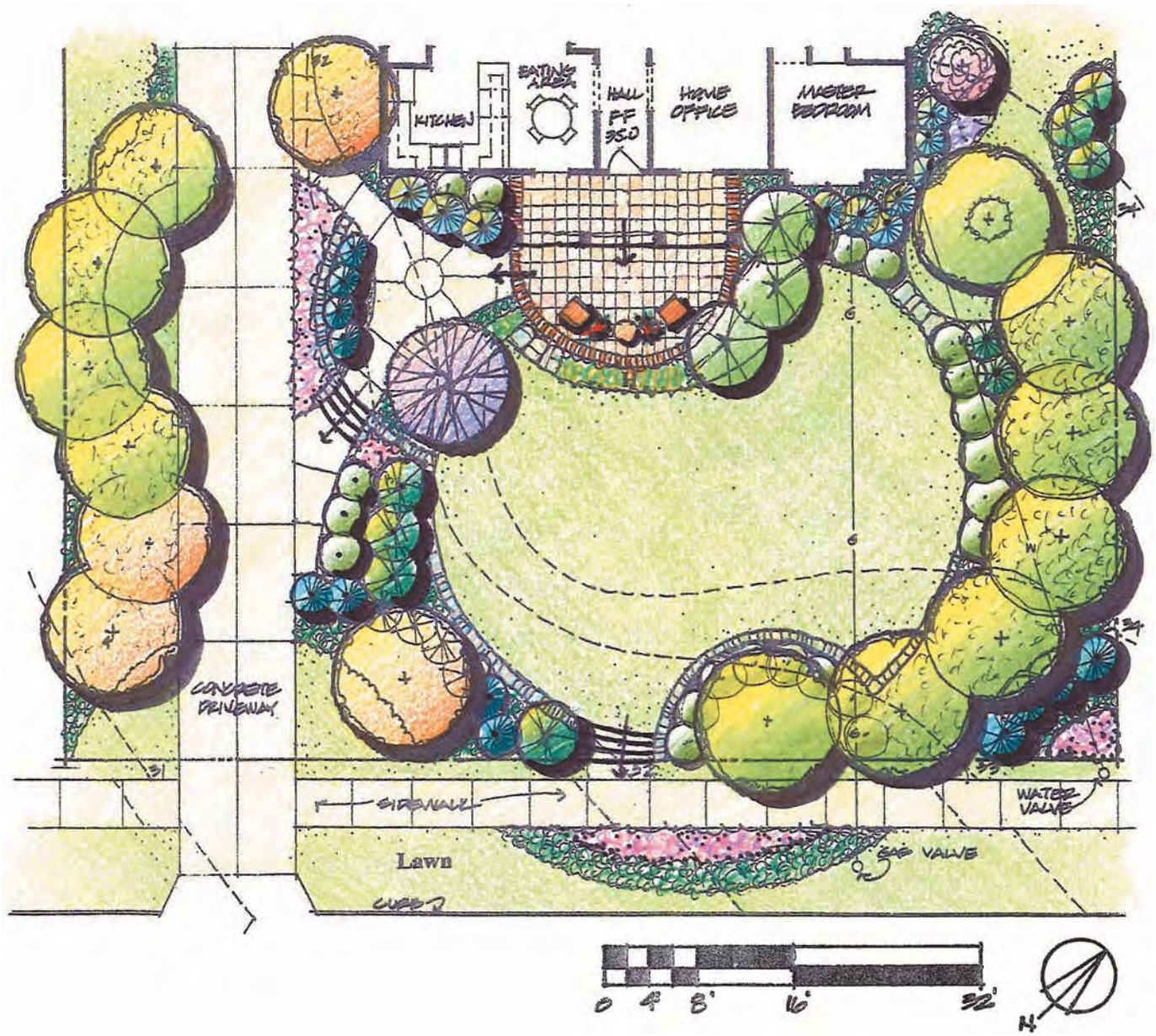
Major Design Aspects

Form. This design is an informal design solution. With mostly curvilinear forms of the hardscape and all curvilinear forms for the plant beds and plant arrangements, this design creates a softer character than the previous formal design.

Front Entry. Stone pavement extends from the front entry to the sidewalk, providing a warm and welcoming walkway to the home. A wood deck, with angled and expanded steps, creates a place for informal seating in the front yard, as well as places for potted plants. A small curved paved space provides a place for a few chairs and a small table.

Front Yard. The lawn is edged with a low stone wall to enhance the informal character of the design. Pockets of plants are used to highlight various views from the entry as well as provide privacy where needed.

Figure 14–18
The Glengary residence.



Major Design Aspects

Form. A series of arcs and circles of various sizes help create a strong informal design. Circular, semicircular, and arced forms are used to identify edges of walks, walls, steps, lawn panels, and planting.

Front Entry. This scheme also suggests a porch to provide a covered seating area. A sitting area, open to the sun, runs the full length of the porch. The walkway leading away from the house is focused on a small planting with trees in the background across the driveway. Access to the front and back of the house are split at this central planting.

Front Yard. The front lawn is a simple circular form with a few notches removed, identifying the front entry and a major planting by the sidewalk. Major trees are used to reflect the arcs and serve to create walls that define a curved space, which creates a strong separation from the front lawn and the street.

Figure 14–19
The Allendorf residence.

The condominiums were built in 1972, are in mediocre condition, and need substantial work on both the interior and exterior. Each has an exterior space measuring 30′ × 55′. Most of them are quite plain; each has a simple concrete patio, a small tree, and a grouping of several shrubs. Most of the areas in between are made up of lawns.

With each of the interiors and the exterior façades receiving major renovations, IES would also like the exterior spaces to be designed. They would like each to be unique from the others and to provide the tenants with great opportunities for outdoor living and entertainment. They have hired you because of your quality reputation in residential landscape architectural design. Although there are some existing trees in these spaces, they are not very healthy. In addition, they have never been properly pruned. After consulting with your on-staff arborist, it was decided that these trees would be removed. The concrete patios and existing plant material will also be removed. This leaves each space completely empty, like a new canvas. There are six sets of two outdoor spaces, as illustrated in Figure 14–20.

Having spent some time consulting with the designer, the following design program was established:

- Paved area of approximately 400 SF for setting two 36-inch-diameter tables, each with four chairs. These areas will provide the tenants with the option to seat eight people for outdoor dining. When there are no guests, it allows the tenants to sit in two different locations.
- An area for a permanent grill/bench/counter.
- A large partial-shade tree approximately 20-foot spread.
- Two or three ornamental trees, each with a 10-foot spread and a 3-foot canopy.
- Water feature or sculpture of about 25 SF.
- Screened area (solid fence of approximately 4′ × 8′) for trash containers.
- Several places on the fence for espaliered plants.
- Paved access from condominium to exit gate.
- Masses of mixtures of deciduous and evergreen plants.
- Areas of ground cover.
- Areas for annuals/perennials.
- Various places for potted plants.
- Option to have an overhead arbor covering one of the seating areas. Although this is a nice idea, this type of structure would need to be approved by the condominium's Architectural Review Board and the local Board of Zoning Appeals.

The alternative design solutions for the IES condominiums have been developed in two different ways. First, alternative design solutions with six different design themes have been developed, based on one particular functional diagram. This was done to illustrate that, regardless of the functional organization of a space, the overall character can be unique. Figure 14–21 shows the functional diagram that was used to develop these six alternatives. This diagram also indicates the various elements and spaces proposed for each of the six alternatives.

Figures 14–22 through 14–24 show solutions using the following design themes:

- Rectangular (left side of Figure 14–22)
- Diagonal (right side of Figure 14–22)
- Arc and tangent (left side of Figure 14–23)
- Modified diagonal (right side of Figure 14–23)

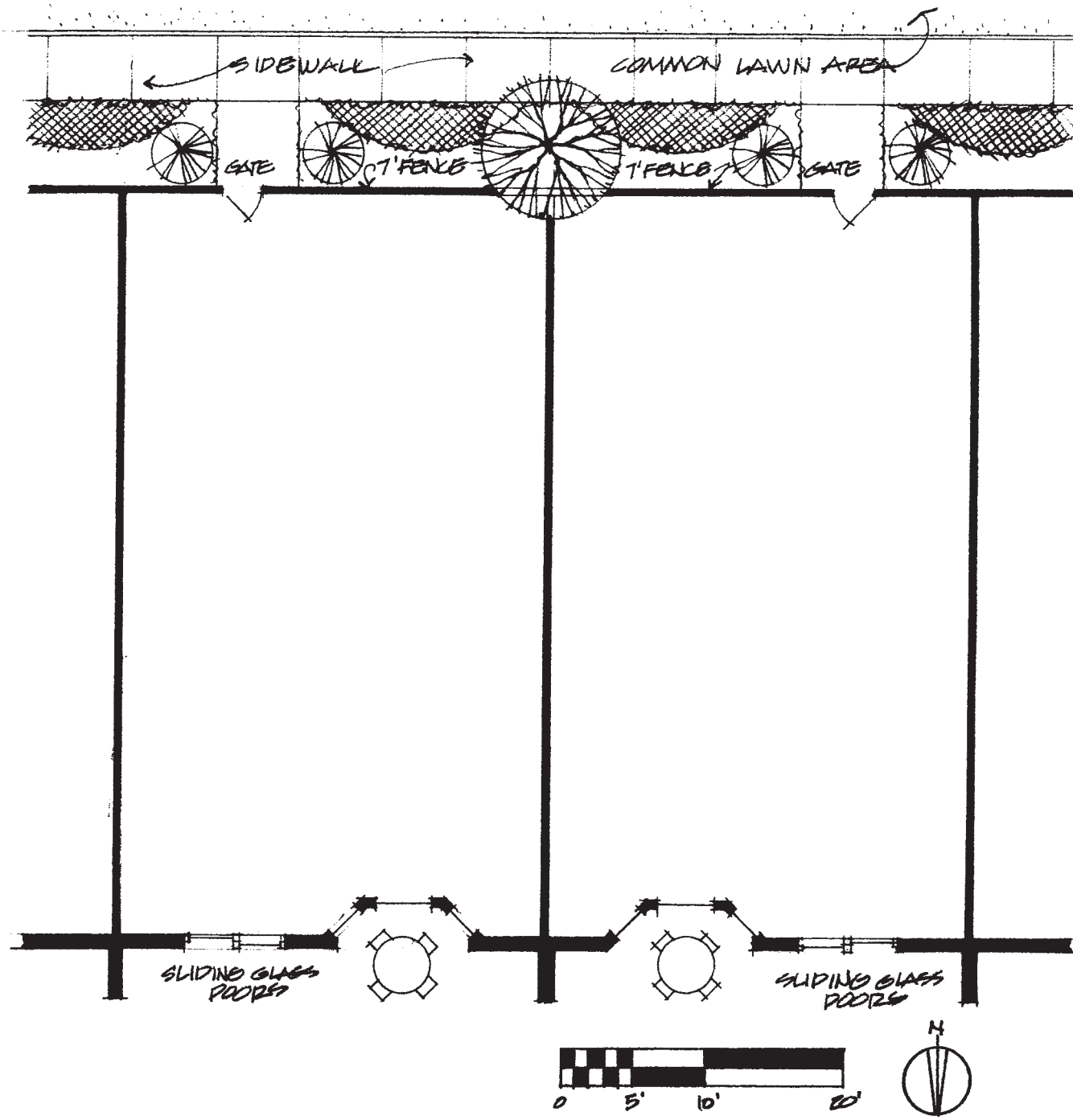


Figure 14–20
Base map for the IES condominiums.

- Curvilinear (left side of Figure 14–24)
- Angular (right side of Figure 14–24)

Second, there are six additional alternative design solutions based on different functional organizations and form compositions. We are not suggesting that a designer always prepare this many alternatives. But in this case, 12 unique designs are requested. As stated earlier, designers should be aware that there are numerous ways to solve the same design problem by modifying function, form, and pattern. Figures 14–25

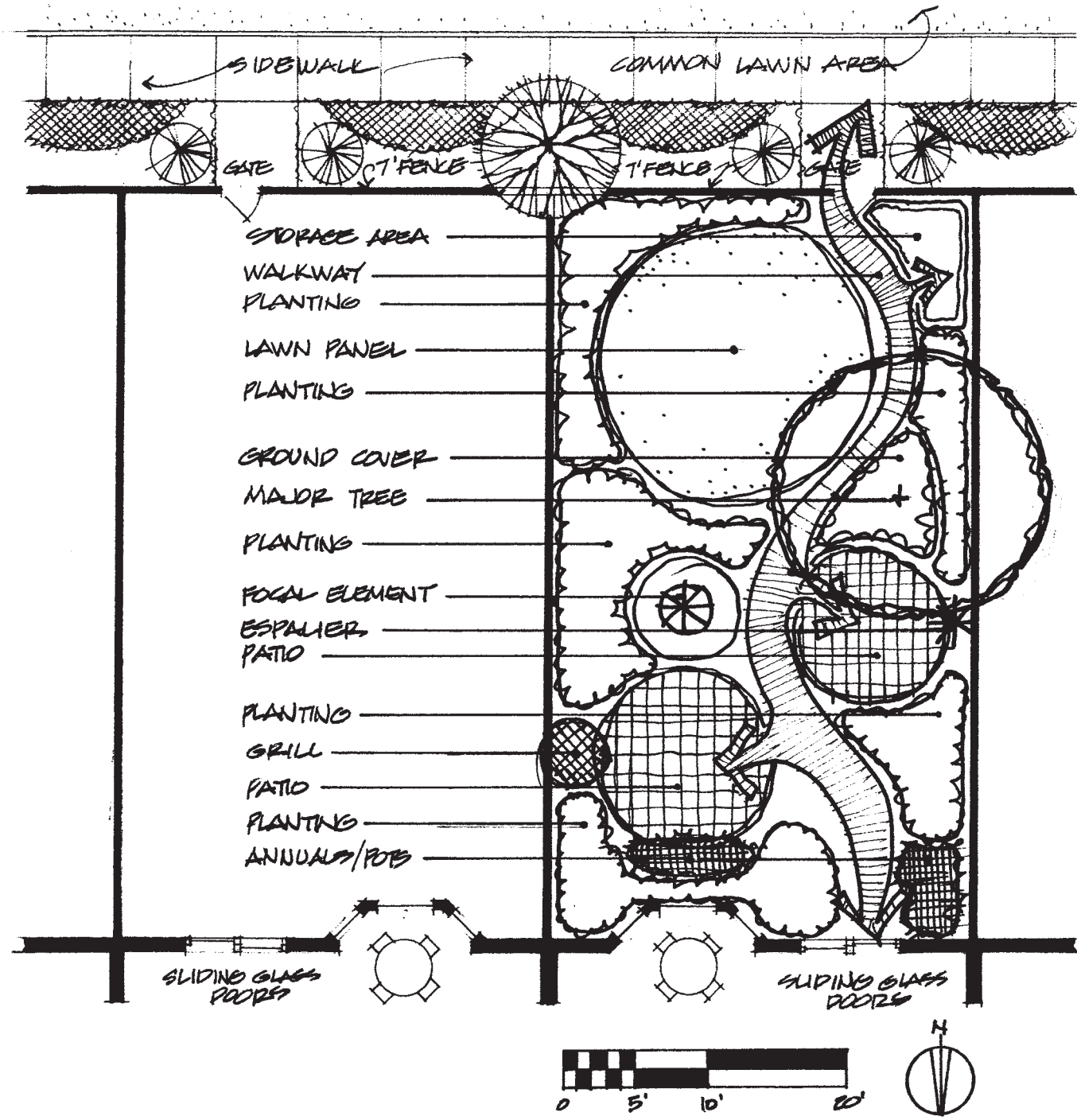
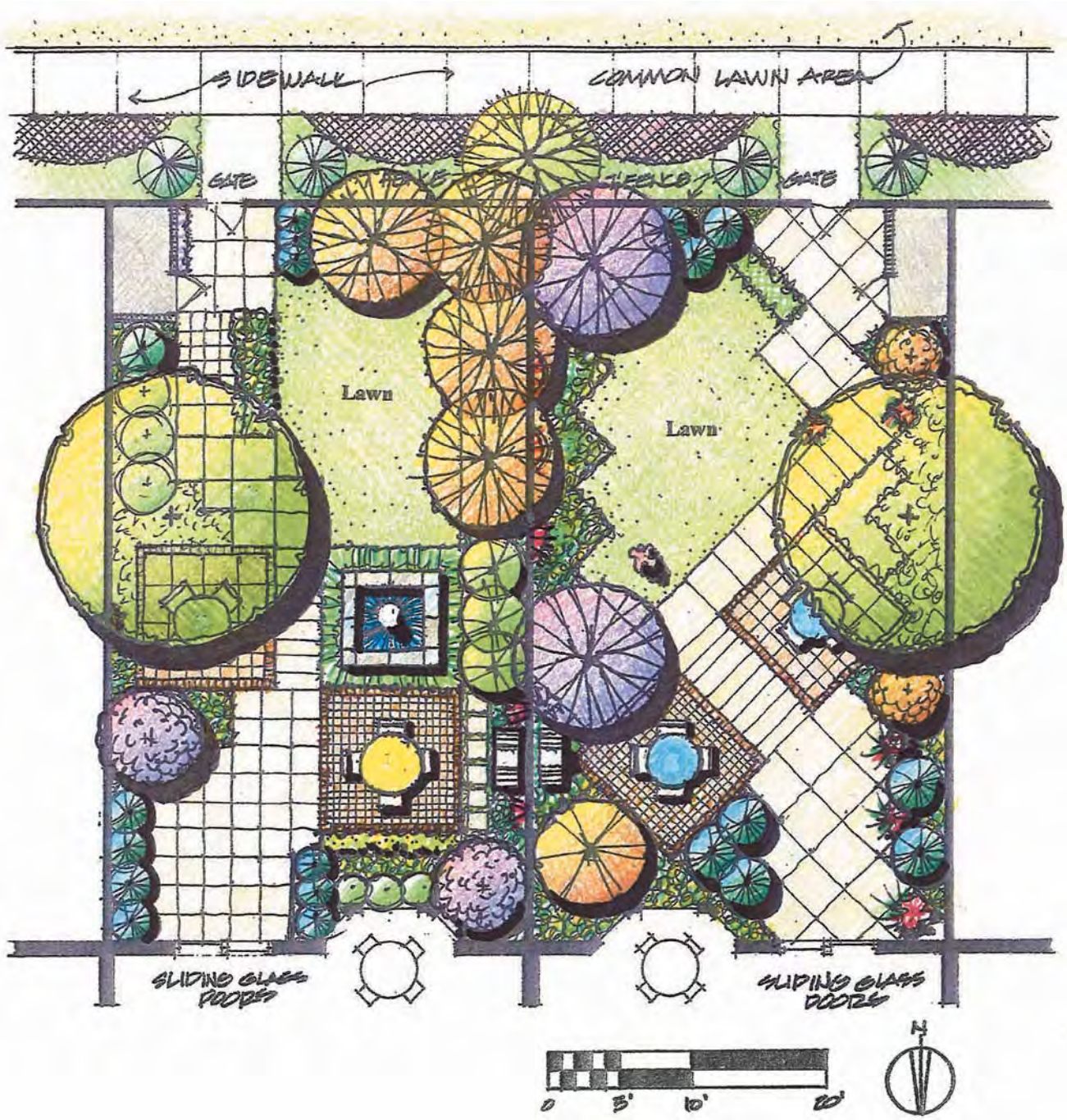


Figure 14–21
Functional diagram for alternatives #1–#6 of the IES condominiums.

through 14–27 show design solutions based on different functional organizations and the following design themes:

- Circular, with concentric circles (left side of Figure 14–25)
- Circular, with radiating lines (right side of Figure 14–25)
- Diagonal (left side of Figure 14–26)
- Combination of circular and curvilinear (right side of Figure 14–26)
- Rectangular (left side of Figure 14–27)
- Curvilinear and arcs to imply a fish pattern design (right side of Figure 14–27)



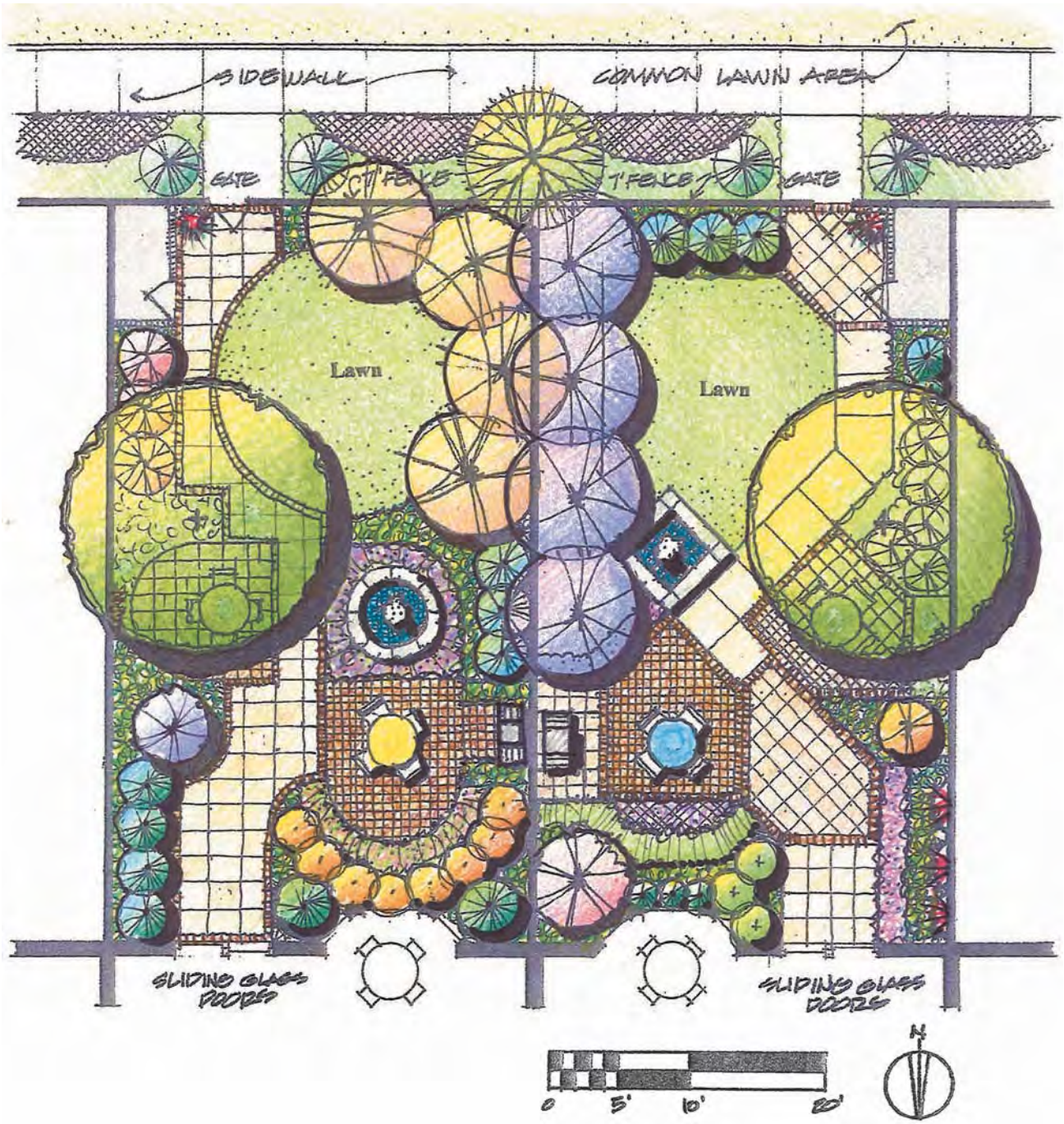
Major Design Aspects

- Rectangular design theme.
- Major seating space, located in a sunny area, and the fountain are centered on the bay window.
- Secondary seating area is located for shade, also with a strong view to the fountain.
- The grill is located to the west of the major seating area and flanked by espaliered plants.
- A rectangular lawn panel has a line of ornamental trees to create a formal viewing area.
- Pavement is mostly concrete or stone of different sizes, and pavers for the seating areas.
- The storage area is in the southeast corner.

Major Design Aspects

- Diagonal design theme.
- Seating areas have specialty pavement and have great views to the lawn panel and sculpture.
- The grill is situated on the east side of the major space between a few ornamental trees.
- Three espaliered plants are located on the fence to the east of the lawn panel.
- Potted plants, rendered in red and green, are placed in the corners of some of the diagonal pattern, creating bright visual accents on the pavement.
- Pavement is concrete or stone of different sizes. Pavers are used for the seating areas.
- The storage area is in the southwest corner.

Figure 14–22
Alternatives #1 and #2 for the IES condominiums.



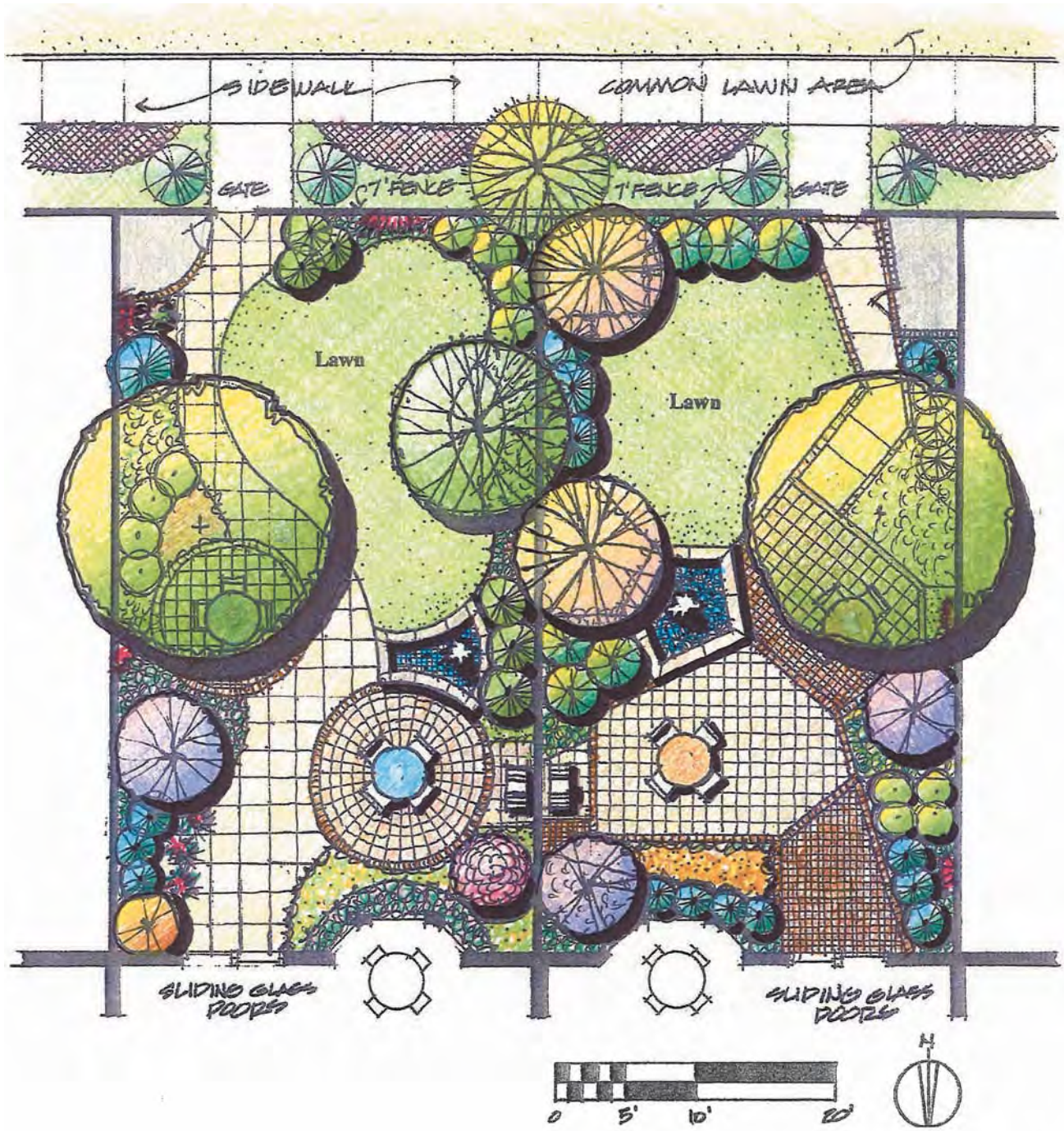
Major Design Aspects

- Arc and tangent design theme.
- Seating areas are semicircular in shape and centered on the circular fountain as a focal point.
- The grill is on the west wall flanked by ground cover and shrubs.
- Pavement is either stone or concrete with a paver edge. Pavers are used in the seating areas.
- The storage area is in the southeast corner.

Major Design Aspects

- Modified diagonal design theme.
- Seating areas are positioned to have a combination of sun and shade, as well as great views to the fountain.
- The grill is on the east side of the seating area centered on the bay window.
- Three espaliered plants are located on the west fence immediately outside the main entrance to the garden.
- Pavement is concrete or stone, with some areas edged in a paver. Pavers are used in the seating areas.
- The storage area is in the southwest corner.

Figure 14–23
Alternatives #3 and #4 for the IES condominiums.



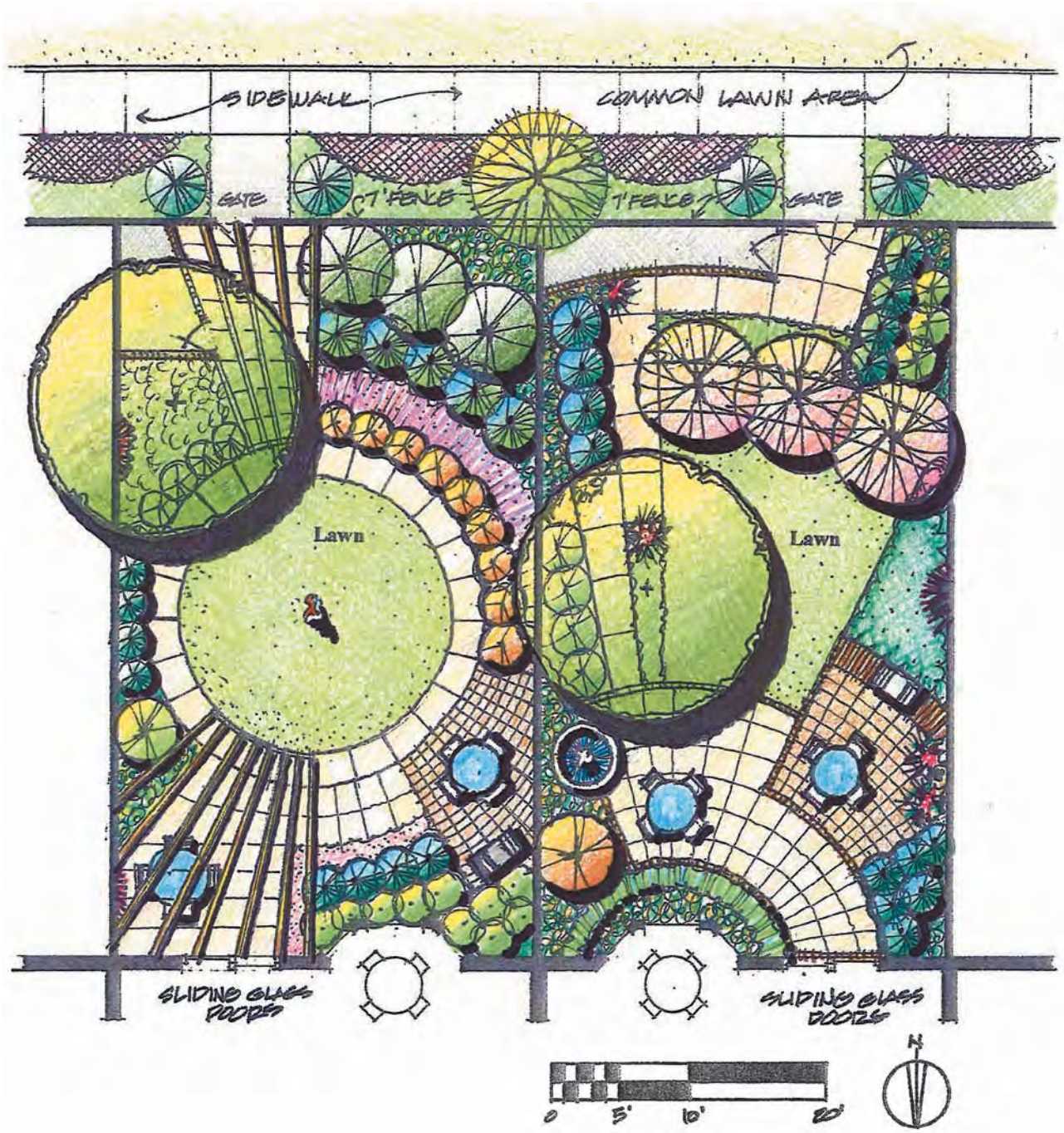
Major Design Aspects

- Curvilinear design theme.
- Sitting areas, for sunny and shady seating, are centered on the sliding glass doors and the bay window.
- The grill is located on the west side of the major seating area.
- The fountain is defined by edge forms of the patio space and the lawn area.
- Pavements are concrete or stone, with pavers for the seating areas.
- The storage area is in the southeast corner.

Major Design Aspects

- Angular design theme.
- Sitting areas, for sunny and shady seating, are centered on the sliding glass doors and the bay window.
- Grill is located on the east side of the major seating area.
- The fountain is situated to be a strong part of each of the seating areas.
- The walkway, although angled in shape, provides for a fairly direct access through the garden.
- The storage area is in the southwest corner.

Figure 14–24
Alternatives #5 and #6 for the IES condominiums.



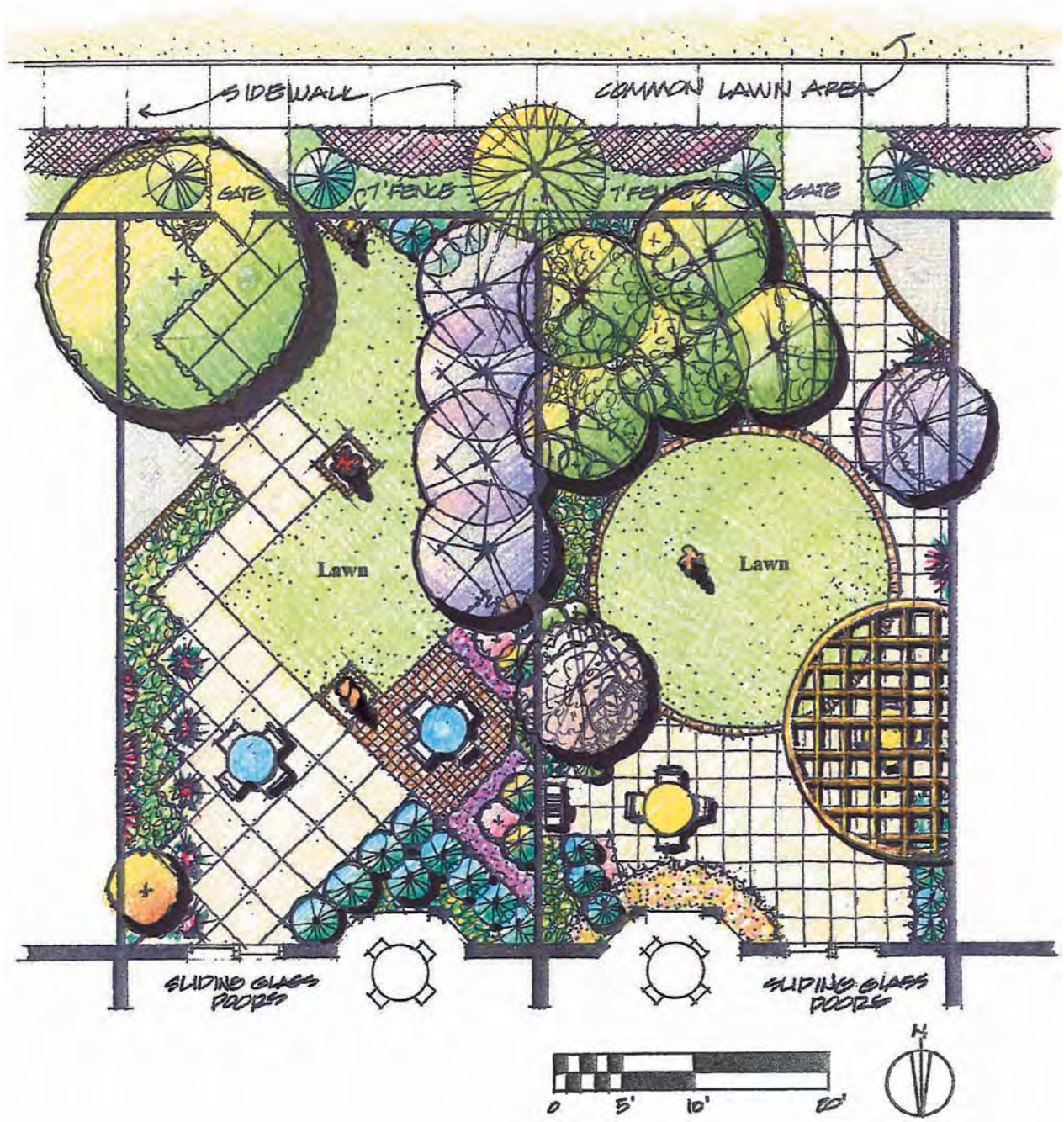
Major Design Aspects

- A circular design theme is used, with the center of the garden being the center of the design. The circumferences of the concentric circles, along with some radii, define the major edges of the design.
- Sitting can occur under an arbor or in the sunny area.
- The grill is tucked away in the open and sunny sitting area.
- A central sculpture in the lawn serves as the major focal point of the garden.
- Another arbor accents the entry to the garden from the public sidewalk.
- An espaliered plant is located on the east fence beneath the large tree.
- The storage area is in the southeast corner.

Major Design Aspects

- A circular design theme is used, with the interior sitting area being the center of the design. The radii, along with some concentric arcs, define the major edges of the design.
- Sitting can occur in two areas, with the western one receiving more sunlight.
- The grill is located in the west patio and is focused on an espaliered plant on the fence.
- Potted plants, to highlight seasonal color, are located throughout the garden.
- A circular fountain is located near the east patio.
- The storage area is in the southeast corner.

Figure 14–25
Alternatives #7 and #8 for the IES condominiums.



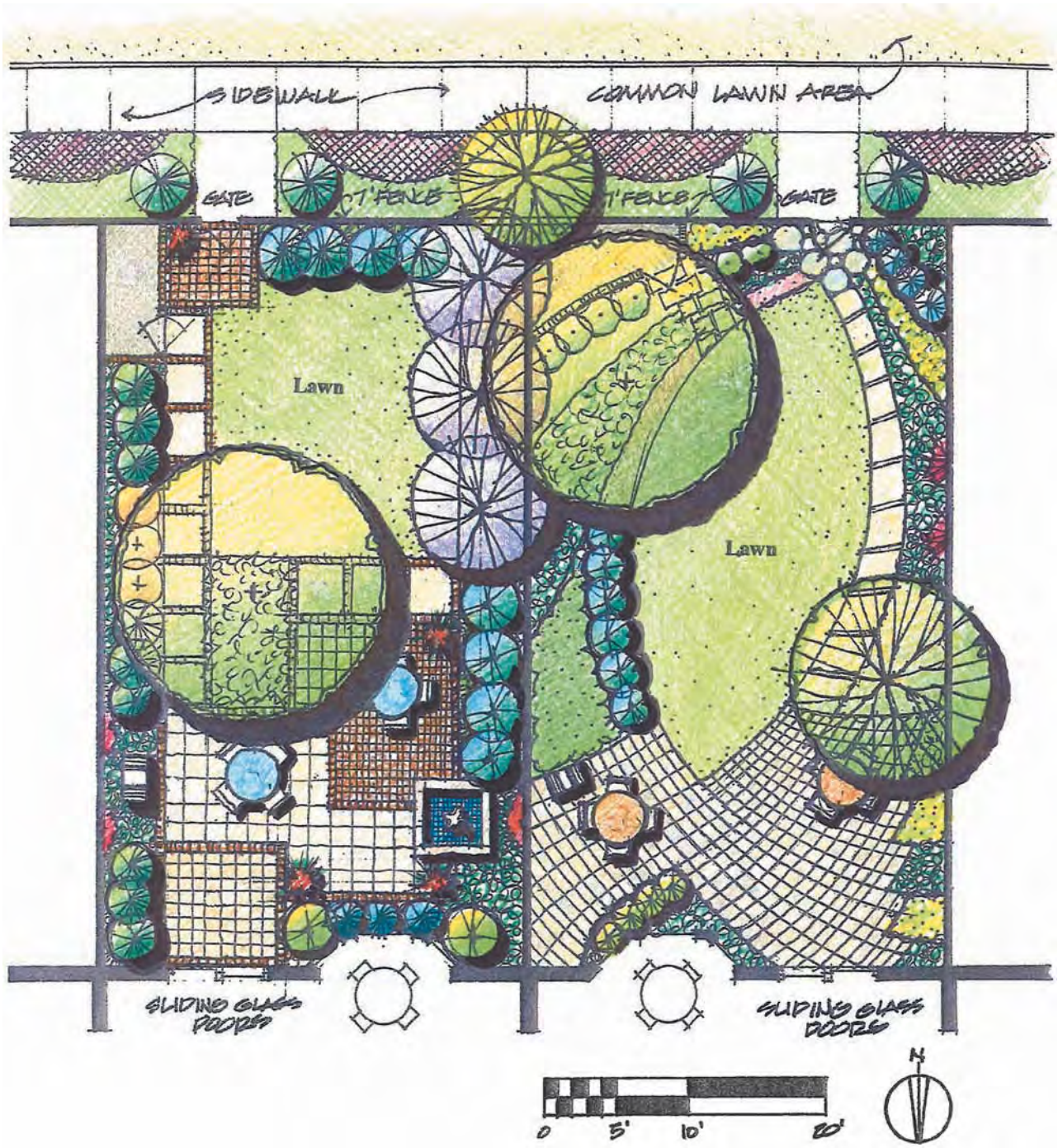
Major Design Aspects

- A diagonal design theme creates a strong pattern for this sculpture garden.
- The sitting areas are in the open for those clients who want more sun than shade.
- Three different places are established to display pieces of art.
- No grill is incorporated in this alternative.
- Potted plants situated in corners of diagonal pattern establish a strong directional view line.
- Three espaliered plants on the east wall add character to this east sitting area.
- The storage area is in the east central part of the garden.

Major Design Aspects

- A circular design theme, with curved arcs acting as radii, creates the edges in this design.
- There are two sitting areas, one in the sun and one under the shade of a circular arbor.
- The central lawn area, with a sculpture on line with the bay window, is the major visual focal place of the design.
- The pavement is of one material and pattern. This establishes a strong base plane wrapping around most of the circular lawn panel. With this one pattern, tables and chairs can be situated in any number of locations.
- The grill is on the east fence tucked into a pocket of pavement flanked with plants.
- The arced radii to the south define bands of different plantings.
- The storage area is in the southwest corner.

Figure 14–26
Alternatives #9 and #10 for the IES condominiums.



Major Design Aspects

- A rectangular design theme defines a very direct access from the gate to the sliding glass door.
- Both sitting areas are designed to be more shady than sunny.
- The grill is located on the east wall centered between two espaliered plants.
- A square water fountain has an espaliered plant as a backdrop.
- Pavements are concrete or stone, some with paver bands, and few areas with all pavers.
- Potted plants are situated in corners of the diagonal paving pattern.

Major Design Aspects

- Fish enthusiasts would love this garden design motif, for it has several design elements that reflect certain aspects of a fish.
  - The lawn shape defines the body of the fish.
  - Concrete scored into arc patterns resemble the fins.
  - The small circular stones at the gated entry reflect bubbles of water.
  - The north/south arced lines of the planting signify the waves of water made by the fish.
- Planting reinforces the major lines of the design.

Figure 14–27
Alternatives #11 and #12 for the IES condominiums.

PROJECT #5: RESIDENCE OF ANGELA AND DAVID MELECA

Introduction

The day-to-day practice of residential landscape design typically involves the development of plans, sections, and elevations for use as design tools as well as sales tools. All of these drawing types are two-dimensional in nature. Plans depict aspects of the design involving length and width. Sections and elevations illustrate parts of the design regarding length or width and height. Although these are standard drawing types and prove to be necessary documents, they are not capable of portraying the three-dimensional quality of the proposed design. A different drawing type that proves to be a great design and visual sales tool is the perspective sketch. These drawings can provide the client with realistic images of how design changes can help solve site problems or improve the aesthetic quality of outdoor spaces. Because perspective sketches involve all three dimensions, it takes some additional study and practice to learn and use them.

Perspectives are often prepared after a design has been developed. The perspective drawings are then presented to the client to help clarify the character and quality of the proposed design solution. Clients are usually impressed when they are able to visualize the reality of proposed design ideas through the use of perspective sketches. Although perspectives make for great final presentation sales tools for the client, they are also very valuable design tools for the designer. Through the normal use of plans, design ideas are typically generated by a combination of looking at and focusing on the existing conditions of a site, coupled with exploring and imagining a variety of ways to solve problems and create spaces. This can also be done with perspective sketches. Through the use of photography, existing images can be captured and produced quickly and easily with a digital camera, a card reader, and a photo printer. These existing-conditions photographs can be used as a base for ideas to be sketched on with tracing paper and pens/pencils. Design ideas can be explored and imagined three-dimensionally. These "design idea" sketches can also be used as discussion tools with the client during the early stages of design.

Developing a master plan for Angela and David Meleca was an adventurous, unique, and successful design project because of the use of a series of perspective sketches to portray proposed design ideas. As always, a meeting with them provided important information related to the landscape design. This discussion included the development of program elements, existing site concerns and problems, future changes in the house, and the design character of the gardens, as well as their personal preferences regarding important aspects of design. A series of photographs was taken to record existing physical conditions. David, being an architect, copied a few different site plans, floor plans, and house elevations onto a CD. This CD was used later to print out necessary documents for the preparation of an existing base map.

Rather than starting to study and explore design ideas in plan, this project began with a three-dimensional design journey. Twenty different images were used as 8×10 photographic bases for sketching a variety of design ideas. Alternative ideas for several different areas were developed. All of the major site design ideas were prepared in three-dimensional form over a period of three days. Then, based on these sketches, a freehand preliminary master plan was developed, along with some alternative ways to deal with several major spaces. Because design ideas were being translated from three-dimensional images to a two-dimensional plan, time was needed to coordinate the various ideas into the plans.

Presentation to Angela and David took place at their home. The photographs were used to show the existing conditions. Tracing paper overlays on each sketch were used to illustrate proposed design changes. The preliminary master plan, along with some alternatives for several areas, was used as an overall coordinating tool to tie all the sketch ideas





Figure 14–28
Meleca residence front approach.

together. The presentation meeting produced helpful dialogue. Based on the feedback and design discussion, the next step was to refine the preliminary plan into a master plan.

The following design drawings have been included, with some explanation of each.

- 12 sets of sketches
- Existing conditions photographs (Before)
- Overlay design sketches (After)
- Preliminary master plan
- Two additional alternatives for the front entry/garden space
- One alternative for the backyard and walkway
- One alternative for the entertaining space and side yard

Front Entry Approach

Existing (Figure 14–28, left) The front entry, complete with white trim, decorative door, and overhead lamp, makes this entrance easy to see from the street. But, the actual entry space and access steps to it are very much hidden from view. It is not until the visitor is immediately adjacent to the steps that the view becomes more open and inviting. The large shrub and hedges create a fairly tight and enclosed space. The owners wish to have a more open and inviting approach to their front door.

Proposed (Figure 14–28, right) Removing the existing shrubs and hedges will open up the front entry space. To provide a sense of space, it is recommended that a low formal hedge be established that highlights a few ornamental urns. Being able to see the stone steps and stone ashlar paving pattern will add to the formal character. Increasing the area at the top step, curving the steps, and flanking the steps with a railing will also make for a more welcoming entry.

Front Entry Terrace

Existing (Figure 14–29, left) Once visitors arrive at this entry space, the view into it is very bland and limited. Other than the two pots adjacent to the steps, there is a lack of annual/perennial color to help highlight the space. Some of the plant materials along the front of the house are overgrown and poorly maintained. Although there is access from this space into the front yard, it looks incidental to the design. The view over the shrubs along the front of the house emphasizes a view into the neighbor's front yard.





Figure 14–29
Meleca residence front entry terrace.

Proposed (Figure 14–29, right) Several things can be done to improve this front entry space. Redesign the entry steps and railing to make for a more open and comfortable approach. Provide a shorter formal hedge with enough room for annual/perennials. Create a space across the front of the house to provide a view from the entry space as well as from the bay window. Incorporate a group of ornamental trees with a special urn to serve as a focal point for visitors as they approach the front door.

Side Driveway Entrance

Existing (Figure 14–30, left) This type of space can be a very difficult one to design. The wall and window patterns of the house and the addition create odd areas of open wall space. The window well and minimal planting strip make for a difficult place to provide attractive planting arrangements and still provide light to the basement. The side entry is small and confined by the raised stone strips. In addition, there doesn't seem to be anything that accents or highlights this entry.

Proposed (Figure 14–30, right) In tight spaces like this, it is important to explore the walls as places for design change. Using a larger stone area at the side door along with an ornamental urn and vertical planting will accent this entry. Using





Figure 14–30
Meleca residence side driveway entrance.





Figure 14–31
Meleca residence garage.

lower plants in front of the window well will allow light for the basement, yet an ornamental shrub can be positioned to hide a view to the well. Providing a window box beneath the window and incorporating an espaliered plant in the archway will make the wall a stronger design element.

Garage

Existing (Figure 14–31, left) This view will change, for the owners plan to have an addition put on the garage to house another car. This will extend the garage further back into this space and reduce the amount of room for the vegetable and herb gardens behind the garage. The garden will still be fenced, and access will still be provided through these gardens into the backyard.

Proposed (Figure 14–31, right) This sketch illustrates just how much room will be needed to add another car space. The existing door to the garage will also be relocated to the back edge of the garage. This sketch also illustrates how much room will be left for the formal vegetable garden. There was uncertainty at this time as to the type, height, or location of a gate into and through the garden to the backyard.

Property-Line Buffer

Existing (Figure 14–32, left) This view from the back part of the driveway looking toward the front of the house shows nothing more than ground cover and a 3-foot chain-link fence. Views into the neighbors' yard are wide open along the entire driveway. Just as important are the weak views from inside the windows on this side of the house. Blinds and drapes are usually closed, for there isn't anything to block views into the neighbor's side yard and backyard.

Proposed (Figure 14–32, right) To provide a more pleasant edge to the driveway, it is important to solve different problems. Removing the chain-link fence and constructing a taller wall or fence will certainly help with keeping views within the space. Mixing patterns and heights of ground covers and plantings will add textural interest and rhythm along the fence. Also, placing a group of upright ornamental trees directly across from important windows of the house will open views into these newly defined areas.

Entry to Backyard

Existing (Figure 14–33, left) On entering the garden space, existing views focus on the adjacent houses and garages, the 3-foot garden fence, the 6-foot property-line fence beyond, and a mass of existing vegetation to the right. With the construction of the garage



Figure 14–32
Meleca residence property-line buffer.

addition, the garage will extend further into the garden space, making it smaller as well as restricting some of the existing views into and through the garden and yard.

Proposed (Figure 14–33, right) The garage addition will take up more of this existing view and focus attention into a narrower area. Views to the houses will be eliminated from this view, but will be more evident as one travels through the garden. Changing the fence to a solid one will decrease the views into the neighbors' yard. A line of ornamental trees is suggested near the property line to provide a better view as one enters the backyard. This will also allow views above the ornamental trees into some of the existing vegetation beyond.

View into Backyard

Existing (Figure 14–34, left) On entering the backyard, it is obvious that the neighbor's two-story house is the most dominant visual element. Both its massiveness and its architectural character are like visual magnets. The second-story screened porch is positioned to have a direct view into the Meleca property. Other than the three large trees on site, there is little to attract the interest of the visitor. Design attention should focus on masking the view to the neighbor's house and establishing other areas of interest.



Figure 14–33
Meleca residence entry to backyard.





Figure 14–34
Meleca residence view into backyard.

Proposed (Figure 14–34, right) Several things can be done to mediate the existing problems. By positioning a large tree with a substantial crown of foliage in a strategic location, the view to the neighbor's house can be greatly diminished. An ornamental tree can be added in the center of this view to screen additional views of the house. A grouping of ornamental trees deeper in the side yard can attract the visitor's view into the yard. A small hedge can be incorporated to establish a separation between the entertaining area and the backyard.

Garage Wall

Existing (Figure 14–35, left) The large blank wall of the garage contributes little or no interest to the character of the yard. This wall will seem even more blank when the garage addition increases by another 10 to 12 feet in length. When faced with situations like this, it is suggested that these types of walls be designed with as much concern and creativity as interior walls. Other windows, patterns, and textures can be added to provide a visual attractiveness to the design.

Proposed (Figure 14–35, right) It is suggested that a window, similar to the existing one, be located in the garage addition. This will help with additional light in the garage as well as help break up the larger wall into smaller lengths. A wall trellis with vines can be located between two of the windows. The other length of wall between the existing and the new window can be used to position a hanging planter beneath a wall sculpture. A variety of plantings along the base of the garage will add color and character.





Figure 14–35
Meleca residence garage wall.





Figure 14–36
Meleca residence view along walkway.

View Along Walkway

Existing (Figure 14–36, left)
As one enters the backyard and begins to walk toward the back of the house, the entire view is seen as wide open. There isn't any sense of spatial separation between the backyard and the entertaining area. In addition, there is nothing more than lawn and ground cover throughout this entire view. Visually, the screened porch is the focal point of this view. The design challenge is to create a visually attractive view through the yard, along the walk, and into a recognizable entertaining space.

Proposed (Figure 14–36, right) The walkway might be aligned to focus on an ornamental urn and vertical plant at the end of the view. A small hedge would help define the walkway as an entrance to the entertaining area. An overhead arbor could be used to create a separation and act as a transition between the backyard and the entertaining area. Climbing vines can be used to add color and texture to this structure. Modifying the roof of the porch and adding a railing could help create another outdoor space.

View from Major Patio Space

Existing (Figure 14–37, left) The view from the central area of the entertaining space focuses directly to the south. The neighbor's house, and particularly the second-floor porch, is the background to this important view. Although the fence does provide a





Figure 14–37
Meleca residence view from major patio space.



Figure 14–38
Meleca residence side yard.

physical barrier, it does little to restrict views. Additional plantings of various types and sizes can be used to help create a more private space as well as a more visually attractive space.

Proposed (Figure 14–37, right) Whether or not a different fence type is proposed, the addition of a taller line of vertical shrubs can be used to block views of the first floor of the neighbor's house as well as serve as a background for an ornamental tree. This ornamental tree can be sized and positioned as a sculpture, in a lawn panel, to block a view to the second-floor porch. Additional ornamental shrubs and trees can be positioned on the sides to help enframe this fairly formal view.

Side Yard

Existing (Figure 14–38, left) This side yard is like many other narrow side yards. It seems just large enough to include a variety of shrubs along the side of the house, different shrubs along the fence line, a walkway through and into the front yard, and a few trees placed near the property line. Oftentimes, these spaces have little sun and make for sparse lawn areas. These types of spaces are usually linear in quality because of the limited space on the site. The challenge is to create a visually appealing space that also provides access.

Proposed (Figure 14–38, right) This could be an optimal space to use and view as a potted garden. Rather than trying to grow lawn in this space, there can be a series of regularly spaced stone slabs, like a checkerboard, as the base for placing pots and urns. Depending on the sun patterns in this space, the pots and urns can be moved rather easily, offering visual changes in the garden. Additional plants can be positioned to help block the views of adjacent as well as distant house façades to keep views focused within the garden.

View into Entertaining Area

Existing (Figure 14–39, left) This is the most important area of the entertaining space, being adjacent to two often-used interior spaces. The view into this area is rather bland. Other than the small ornamental furnace, there is little to contain one's interest. Because it is critical to maintain as much paved space as possible, it is strongly suggested to focus attention on potential changes in the walls to help establish character and ambience for this important exterior space.



Figure 14–39
Meleca residence view into entertaining area.

Proposed (Figure 14–39, right) Two elements can be modified to help create a more comfortable and visually appealing space. The patio paving can be changed to incorporate two contrasting materials to form a more formal look. A regular stone pattern with a brick edge can help call attention to the space. Stone can be added at the corner to provide for a more symmetrical wall panel. A wood mantel for small potted plants and outdoor accessories can be centered on this wall. A wall sculpture can then serve as a major display in the space.

Meleca Master Plan (Figure 14–40)

The master plan consists of 10 specific areas that were developed based on the design sketches previously presented in this case study. They include:

Front Entry Space: Raised geometric stone terrace with a formal boxwood hedge separating it from the front yard.

Central Viewing Garden: A place for ornamental urns and specialty pavement on axis with the central bay window.

Sculpture Area: A grove of four trees, along with hedges and annual color, creates a special place for a piece of sculpture.

Potted Garden: A formal space is designed for viewing a changing collection of potted plants throughout the year.

Formal Lawn Panel: This simple carpet of lawn acts as a base for a sculptural ornamental tree.

Entertaining Space: An outdoor gathering space includes two ornamental architectural columns with an overhead beam.

Lawn and Walk: A brick walk provides a pleasant connecting link to the entire backyard and entertaining space.

Formal Vegetable/Herb Garden: The formal and orderly garden is in keeping with the rest of the design.

Additional Parking Spaces: Pavement has been added to provide two more parking spaces for visitors.

Side Entry and Drive: A variety of colorful plantings, espaliered plants on a trellis, and window box add more character.

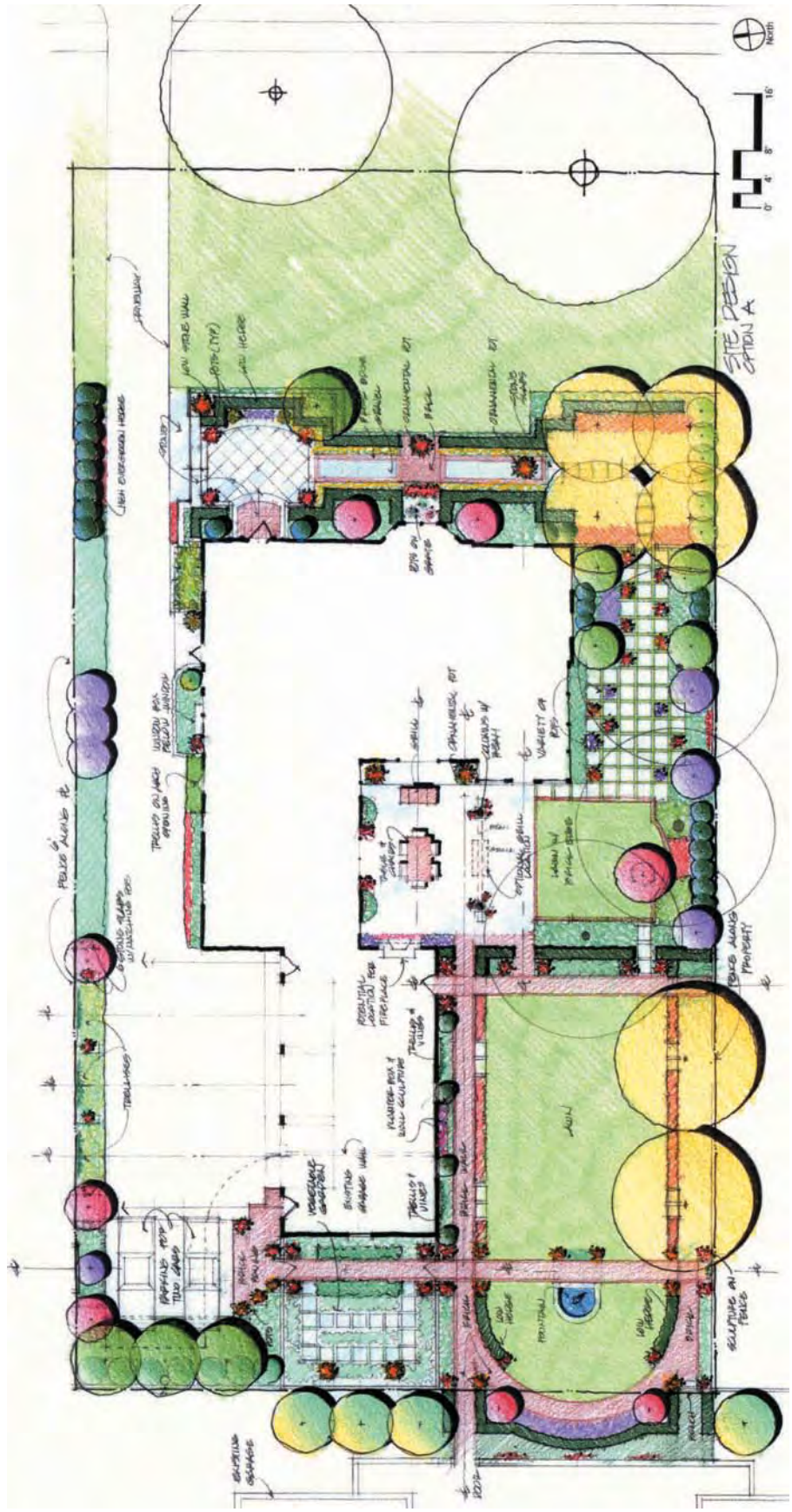
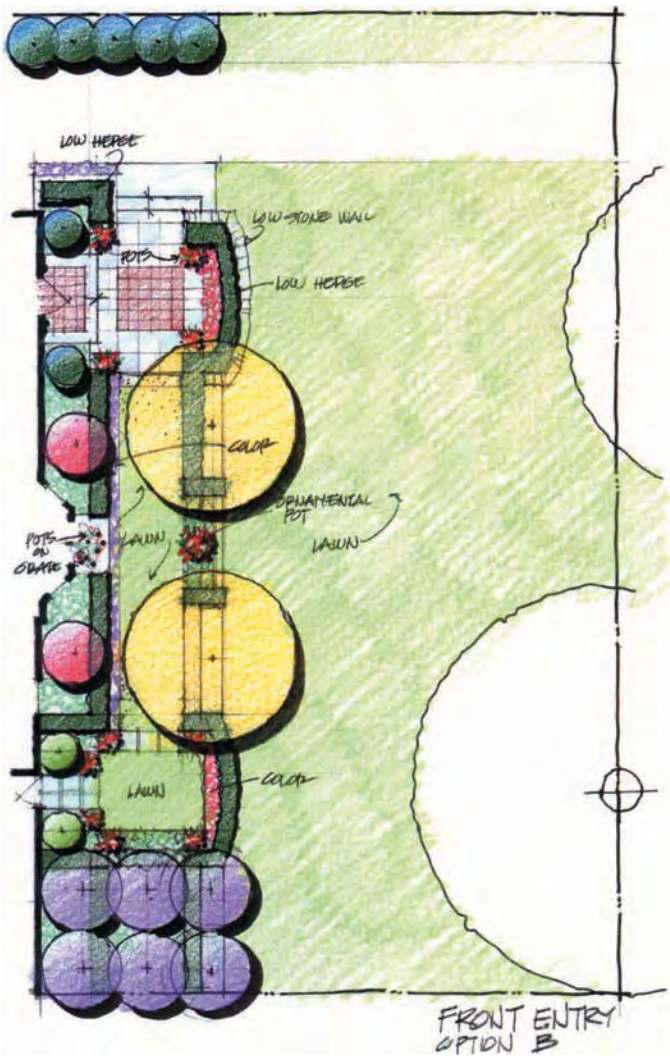
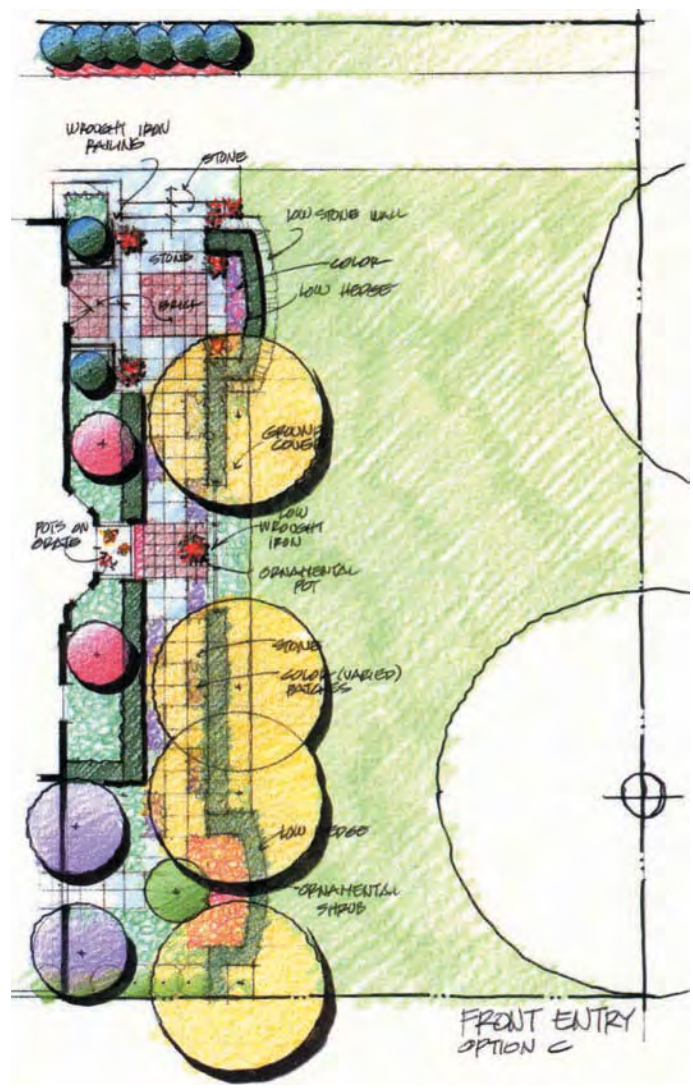


Figure 14–40



Front Entry Plan—Option B (Figure 14–41, top left drawing)

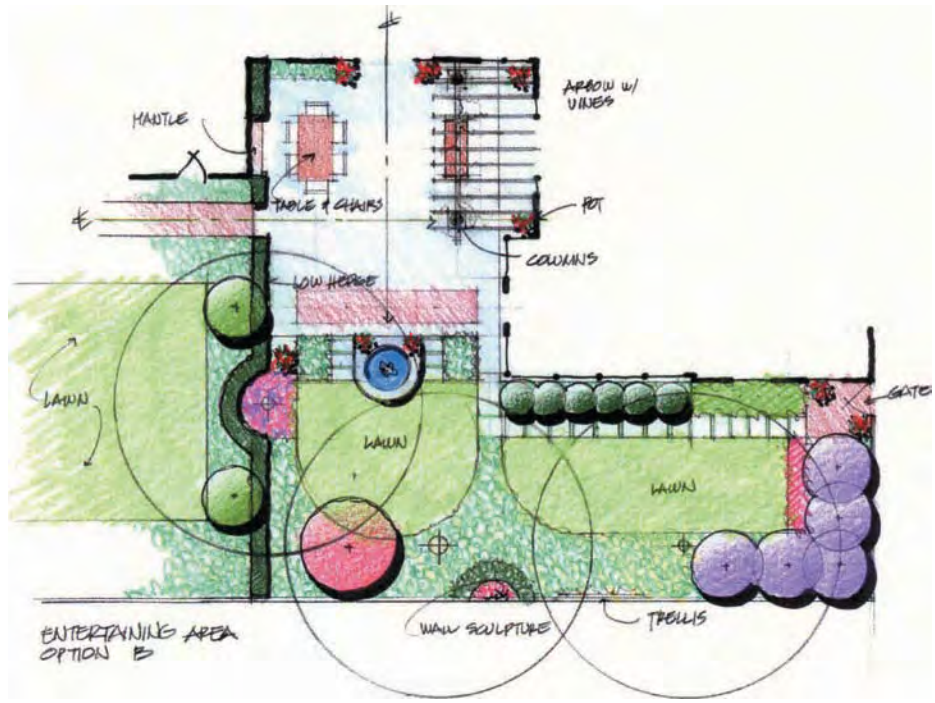
This alternative for the front entry space offers the following. A low, curved, stone retaining wall provides a visual accent to the entry. The entry space and top step are each composed of a central brick pattern edged with a wide band of stone. A low, curved hedge is used to reflect the arc of the wall. The central viewing garden consists of a lawn panel for access and an ornamental urn centered on the bay window. The southern portion of the garden focuses on a small grove of ornamental trees adjacent to a formal lawn panel. This formal lawn panel also has a low, curved hedge to balance and reflect the front entry wall.



Front Entry Plan—Option C (Figure 14–41, bottom right drawing)

This alternative for the front entry space has the same major front entry space as Option B, with several modifications. The central viewing garden provides for a more permanent access. It consists of an alternating pattern of stone paving and annual flower beds with a narrow central stone walk. The ornamental urn, on center with the bay window, is set apart with a brick paved area and a low wrought-iron railing. The southernmost portion of the garden focuses on a specimen ornamental shrub, a background of higher shrubs, a large bed of annual color or ground cover adjacent to it, and a curved hedge to reflect the front entry wall.

Figure 14–41


MANTLE
TABLE & CHAIRS
ARBOR w/ VINES
POT
COLUMNS
LOW HEDGE
LAWN
LAWN
LAWN
LAWN
TRELLIS
WALL SCULPTURE
ENTERTAINING AREA OPTION B

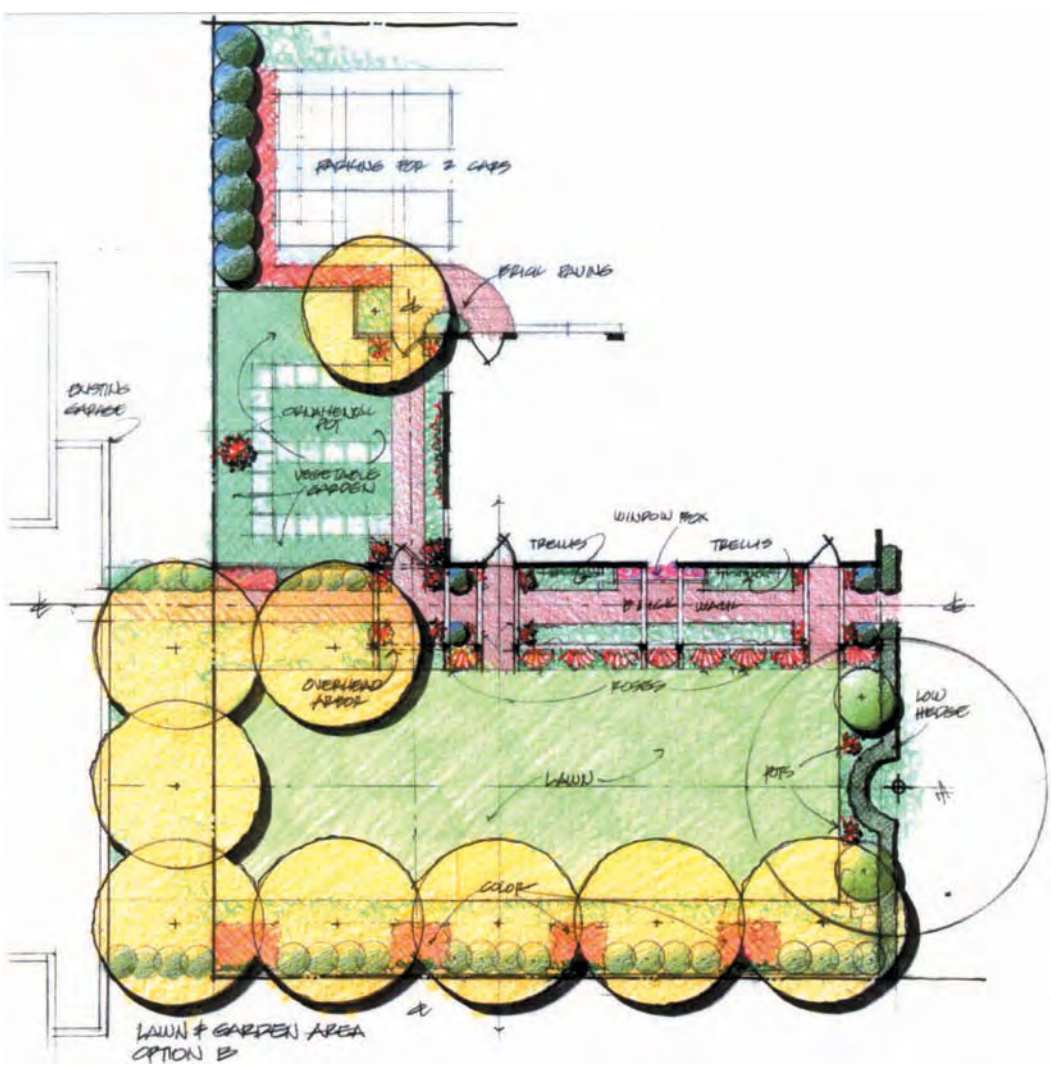

BRICK PAVING
EXISTING GARAGE
OVERHEAD POT
VEGETABLE GARDEN
TRELLIS
WINDOW BOX
TRELLIS
OVERHEAD ARBOR
LOW HEDGE
LAWN
POTS
COLOR
LAWN & GARDEN AREA OPTION B

Figure 14–42

Entertaining Area—Option B (Figure 14–42, top right drawing)

This alternative for the entertaining area offers the following. An overhead arbor is incorporated to provide shade and ground pattern adjacent to entry in this space. This arbor is supported by two special architectural columns. A grill is centered at the end of this arbor for easy access from the house. The major table is placed nearer to the mantel wall, creating easier access through this space. A small ornamental fountain is centered on one of the accesses into the space, with paved access on each side. Additional lawn area for play is provided in lieu of the potted garden. This might serve as an early phase of design, with the potted garden following in later years.

Lawn and Garden Area—Option B (Figure 14–42, bottom left drawing)

This alternative for the lawn and garden area offers the following. The entrance to the formal vegetable/herb garden has a less formal character than that shown in the master plan. A curved paved area coupled with a curved planting bed make for a softer transition into the garden. The formal garden has a different pattern for paved access. The backyard is simplified. There is no walkway around the lawn, making for a more passive lawn space. A series of large shade trees is designed with an alternating pattern of flower beds and shrubs to add variety and rhythm along the property line and fence. Overhead arches and trellises are used to provide for a prominent rose garden along the walkway.

SUMMARY

This chapter was developed to encourage designers to continue exploration in developing alternative design ideas. There are many ways to solve any given design problem. Although it is often quite easy to imagine a solution very early in the design process, it is strongly encouraged that additional effort be put forth to pursue ideas that are different from those first conceived. One idea can never be objectively evaluated unless there are others to compare it with regarding function, form, pattern, materials, and so on. Developing a series of design ideas at the preliminary stage of design is extremely helpful to the clients. With a variety of potential design solutions facing them, they are often impressed with the thought and attention given to their project. In addition, some of these solutions are often different from any they have imagined. This is always good for the designer, as the client will usually see the value in such steps of the process and will, more often than not, feel better about selecting a particular designer. Although developing alternatives does take time, and time is money, it is important to eventually build enough time into a design contract to allow for such important design studies.

As seasoned professionals, we are thoroughly convinced that alternative design development is a powerful growth tool for the designer, as well as a valuable sales tool in dealing with current and future clients.

15

Rendering Landscape Design Drawings in Color

INTRODUCTION

Landscape design includes the development of plans, sections, elevations, and sometimes perspective sketches. These are key tools to help clients understand the proposed design. The more convincing the drawings are in depicting content and character, the easier it will be to sell the design. It goes without saying that *good graphic quality* is essential for landscape designers. Landscape drawings are often produced in black-and-white format. Although black-and-white drawings can have a high level of graphic quality, there is something else that can add significant value in clearly portraying and selling a landscape design: Black-and-white photographs can tell the basic story of an image, but color provides a deeper understanding and adds more interest to a photograph. Landscape drawings are no different. Adding color to landscape drawings has the opportunity to add a layer of interest and a layer of understanding that a black-and-white drawing lacks.

COLOR MEDIA

The specific medium used in producing color drawings depends on the individual interests and abilities of the designer. If the designer elects to color by hand, two of the most common methods are color pencils and color markers. And, with the increasing use of the computer, more and more designers are using computer programs to draw as well as color their landscape design drawings.

COLOR PENCILS

Color pencil is our medium of choice. Although some people use computer programs for drawing a design and coloring it, there are many more who still produce them by hand. Also, we choose color pencils over color markers because they are less expensive, they are more forgiving, and they can be blended more easily with other colors. A color pencil can be bought for at least half, if not a third, of the cost of a marker. Also, if a mistake is made with a color pencil, it can often be erased, unlike the marker, which is permanent. Blending colors with pencils is much easier than with markers. Rendering with color pencils is much easier to learn. Although most of this chapter deals with the use of color pencils, fine-tipped black markers and white-out, as well as some computer-generated samples, are also covered.

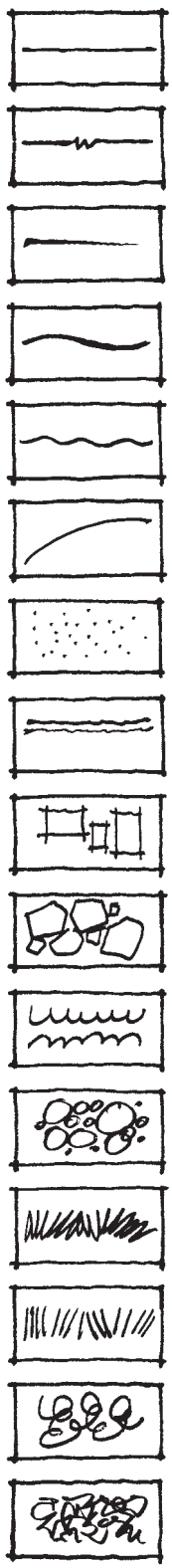
COLOR CONTENT

This chapter consists of the following aspects of color rendering with regard to landscape design drawings:

1. Sixteen basic "line types" used in landscape design drawings
2. Suggested materials (pencils, pens, white-out)
3. Eleven basic techniques of using color pencils
4. Color examples
   - Softscape (trees, shrubs, lawns, ground covers, planting beds, gardens, etc.)
   - Hardscape (concrete, brick, stone, wood, houses, gazebos, fences, arbors, benches, etc.)
   - Water elements (pools, fountains, streams, ponds, etc.)
   - Furniture and accessories (tables, chairs, potted plants, etc.)
   - Individual plants such as trees and shrubs (deciduous, conifers, tropical)
   - Plans of patios with a variety of material types and plant types
   - Elevations of structures with a variety of material types and plant types
5. Color rendering samples
   - Color rendering a plan with black-and-white graphics
   - Color rendering a plan without black-and-white graphics
   - Color rendering with the computer (Illustrator, Photoshop)
   - Color rendering at various design phases (diagram, concept, preliminary, final)
6. Master plan examples (8–9 acres, 5–6 acres, 3/4 acre, 1/2 acre, 1/3 acre)

BASIC LINE TYPES USED IN LANDSCAPE DESIGN DRAWING

Figure 15–1, 15–2, and 15–3 identify, define, and illustrate 16 basic line types that are used in all the landscape design drawings found in this textbook and in professional design work. Figure 15–1 shows the following types of lines:



1. Simple
   - A plain straight line.
2. Blip
   - A plain straight line interrupted with a series of slight bumps (blips).
3. Fray
   - A plain straight line with one end emphasized and the other tapering out.
4. Meander
   - A smooth curved line in a back-and-forth movement.
5. Wave
   - A meandering line with repetitive back-and-forth movement.
6. Arc
   - A smooth curved line in one direction.
7. Pepper
   - A series of dots to highlight the edge of a form or material.
8. Echo
   - Repeating any line type with a lighter or thinner line.
9. Box
   - A square or rectangular shape.
10. Polygon
    - A shape with more than four sides.
11. Scallop
    - Repeating the letter "u" or letter "m" end to end.
12. Bubble
    - A simple circle or slight oval.
13. Accordion
    - A taller and tighter scallop.
14. Bookshelf
    - A series of short simple lines in a row. They may be parallel or angled.
15. Swirl
    - Overlapping loops in a particular direction.
16. Jitter
    - An irregular line made with a "nervous" hand.

Figure 15–1

Figure 15–2 shows sample line types 1 through 8 of the previous list;

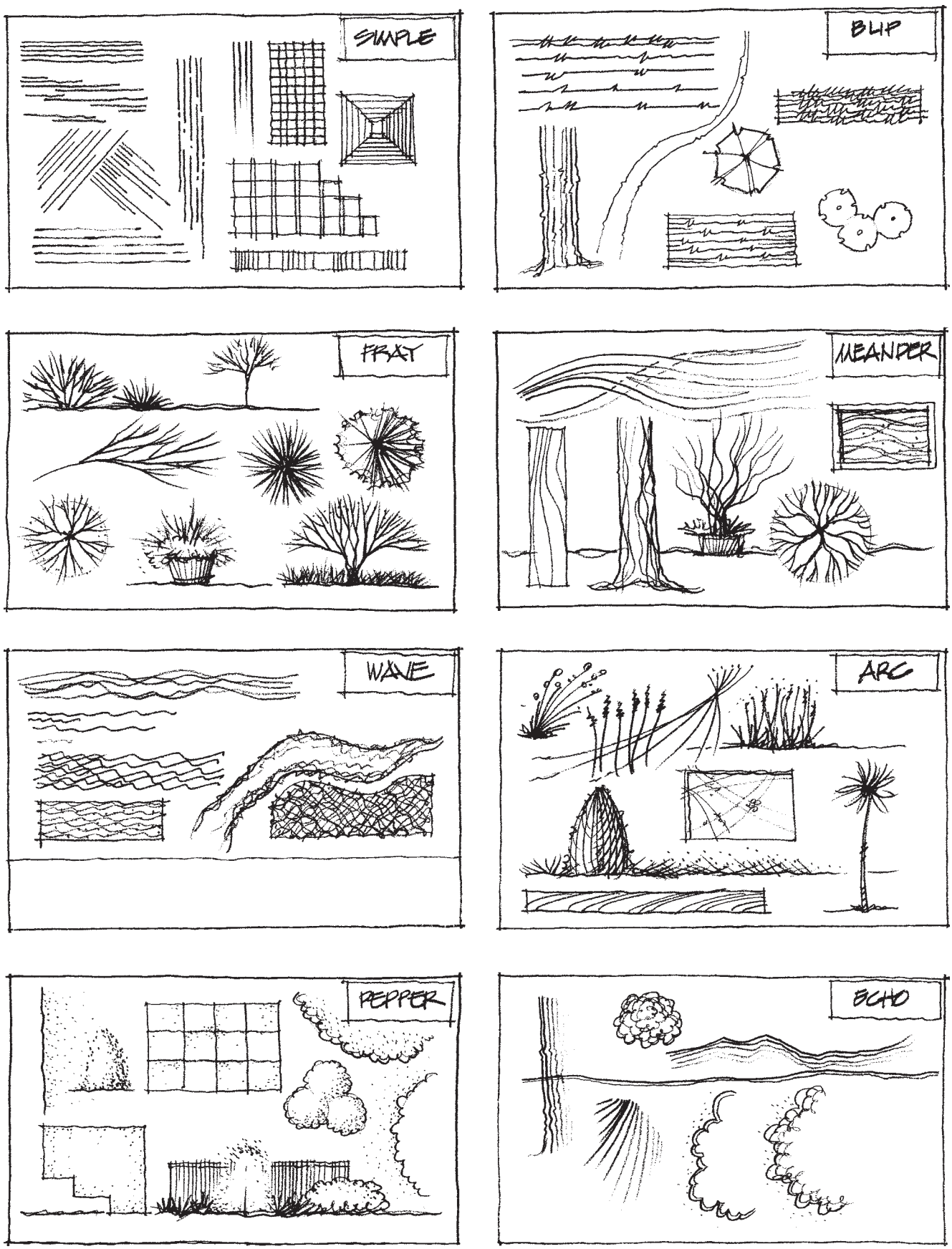


Figure 15–2

Figure 15–3 shows sample line types 9 through 16.

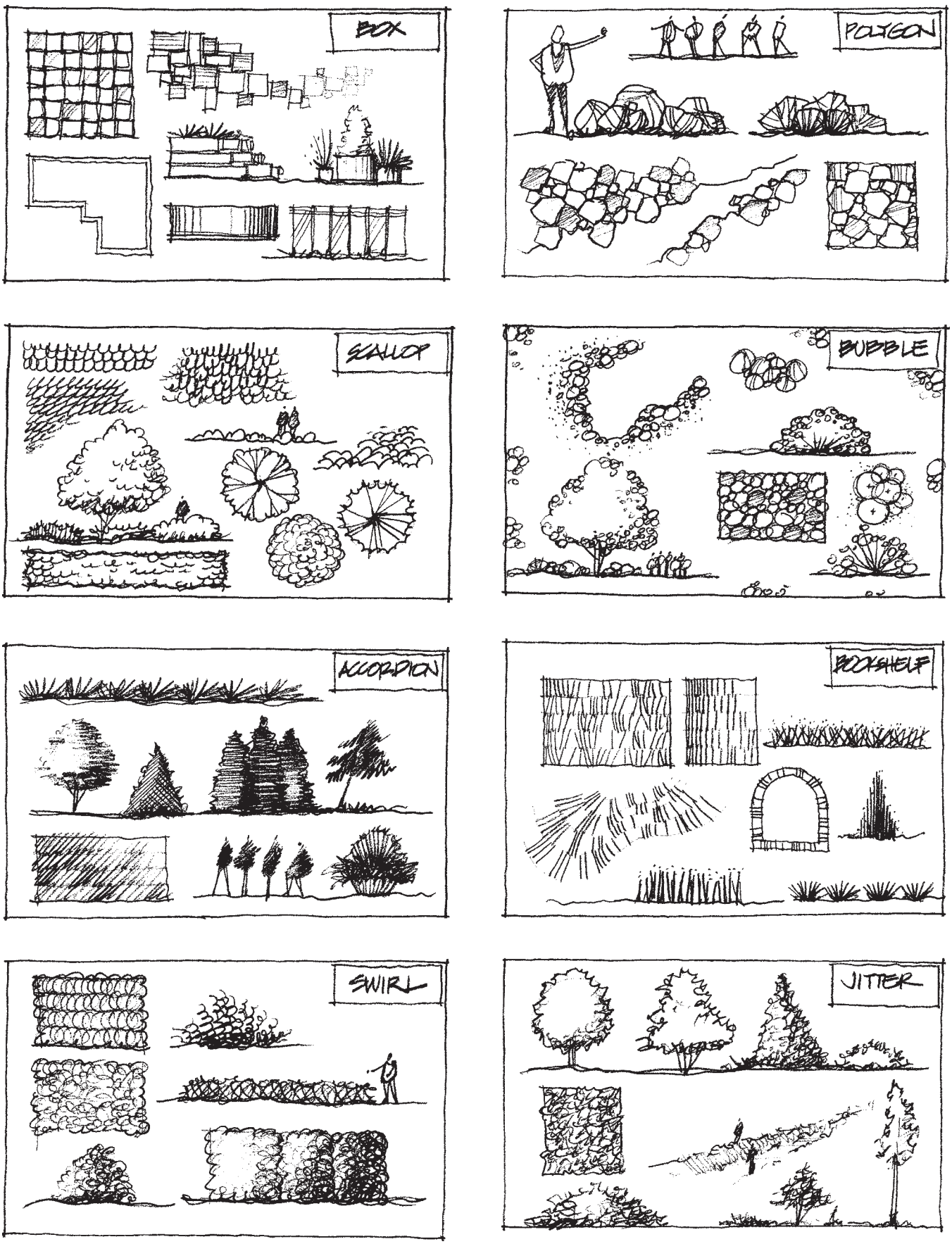


Figure 15–3

DRAWING MEDIA

Figure 15–4 illustrates the color effects of Sanford Prismacolor Pencils. Figure 15–5 illustrates the effects of various black markers.

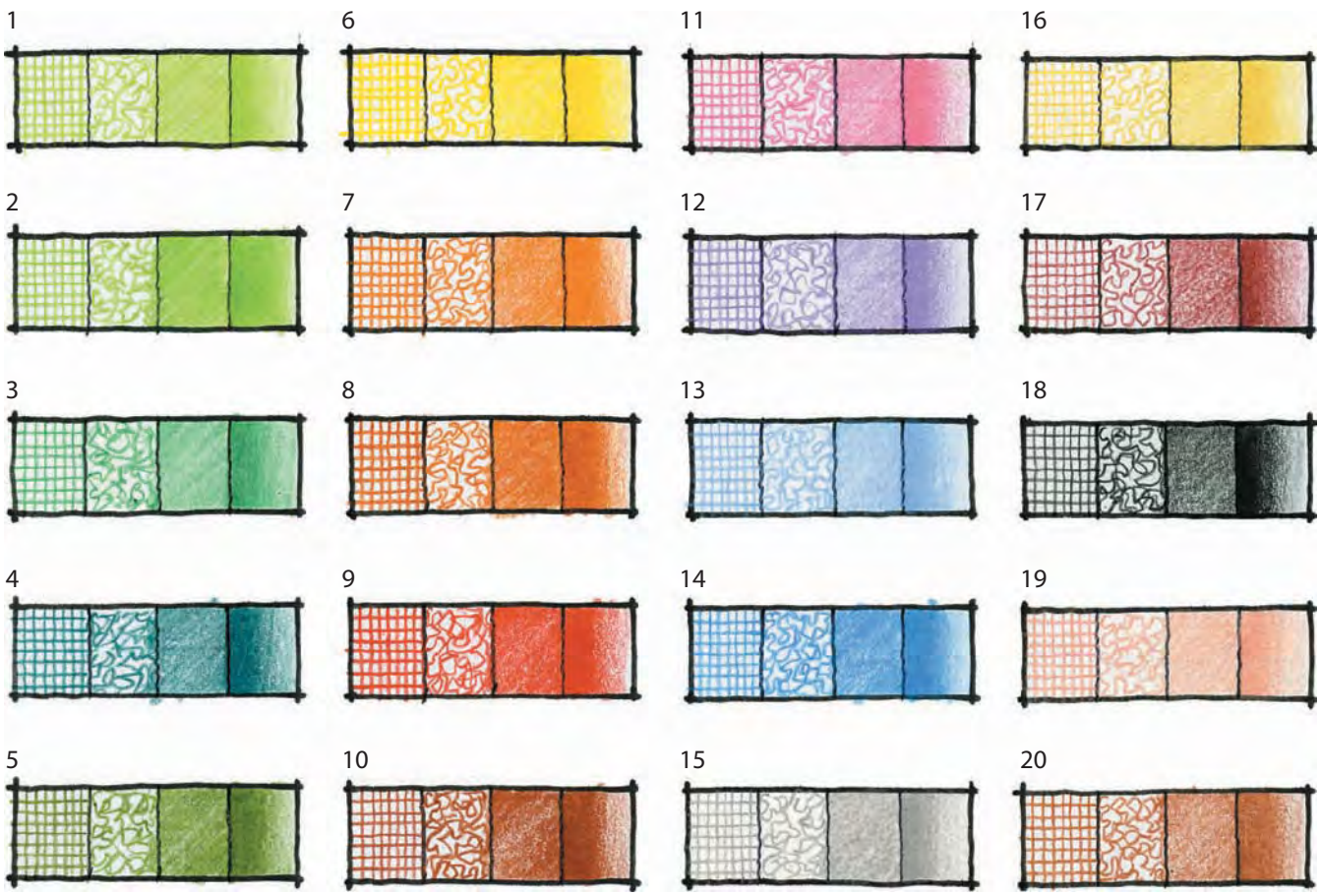


Figure 15–4

Sanford Prismacolor Pencils

1. Spring Green	PC 913	11. Rose	PC 929
2. Apple Green	PC 912	12. Lilac	PC 956
3. Grass Green	PC 909	13. Light Cerulean Blue	PC 904
4. Peacock Green	PC 907	14. True Blue	PC 903
5. Olive Green	PC 911	15. Warm Gray 30%	PC 1052
6. Sunburst Yellow	PC 917	16. Sand	PC 940
7. Orange	PC 918	17. Henne	PC1031
8. Pumpkin Orange	PC 1032	18. Black	PC 935
9. Scarlet Lake	PC 923	19. Peach	PC 939
10. Terra Cotta	PC 944	20. Burnt Ochre	PC 943

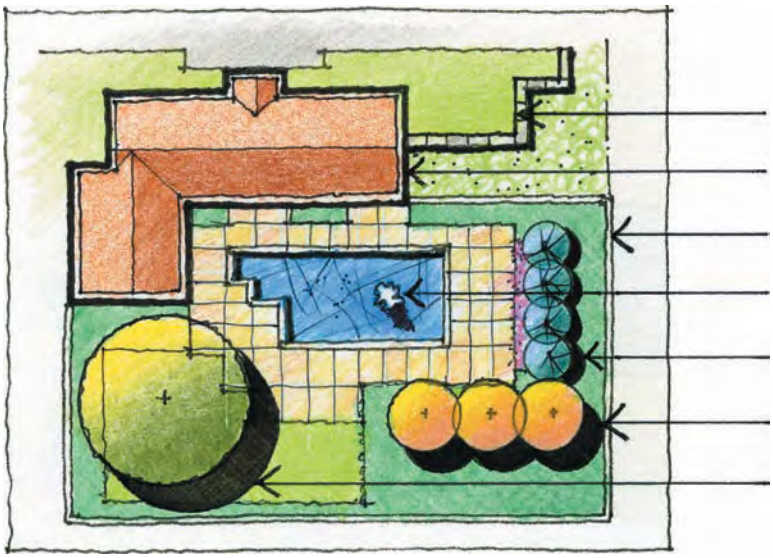


Figure 15–5

COLOR PENCIL TECHNIQUES

Color pencils can be used in two primary ways to render landscape design drawings. First, just as black-and-white drawings can be developed using a variety of line types, these same drawings can be developed using the same line types, but with the use of color pencils. The following are common examples:

- A gray pencil can be used to draw a series of varied sizes of polygons to represent a stone patio.
- A blue pencil can be used to draw a pattern of cross-hatched waves to represent a body of water.
- A green pencil can be used to draw accordion lines to represent small evergreens.
- A pink and a purple pencil can be used to fill an area with jitter lines to represent a bed of annual color.

Second, color pencils can be used with a series of techniques that can add character and contrast to landscape design drawings. Eleven techniques will be presented, each with a series of examples to aid in illustrating variations in the techniques.

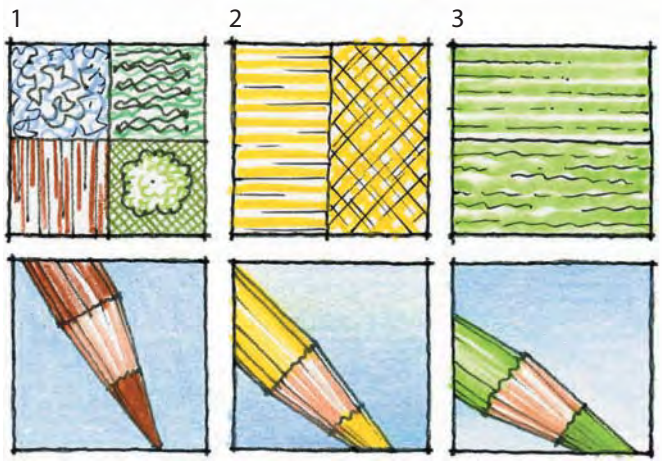


Figure 15–6

Vary the Line Width (Figure 15–6)

The width of lines drawn with color pencils can vary from thin to medium to wide.

1. A sharp pencil point can be used to draw thin lines of any line type. Press lightly so as not to break the point of the pencil. The angle of the pencil is similar to that when writing or printing with a pencil.
2. Angle the pencil more and press harder to draw medium lines. These wider lines are quite well suited for delineating things such as wood planks, courses of brick, roof shingles, and so on.
3. Angle the pencil even more so as to develop even wider lines. This technique is often used for coloring in large areas such as expansive lawn or a pond of water.

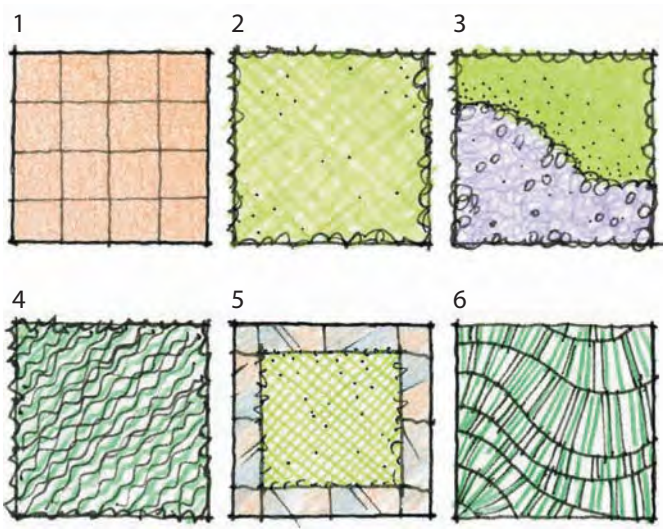


Figure 15–7

Soft Is Safe (Figure 15–7)

Soft tints of color are very effective when coloring a drawing that is already rendered in pen or pencil.

1. Use medium or wide lines to provide a consistent color and avoid identifiable streaks.
2. When drawing a mesh texture, color in opposite directions for an even pattern.
3. Use a smooth texture on one material and a sharper point with a visible texture on another.
4. A texture can be created by using wide lines of a color and fine lines of a pen.
5. Thin, simple parallel lines in a 45-degree crisscross pattern can be used to depict a lawn panel.
6. Contour lines can be drawn with a fine-tipped black marker, with sharp to medium lines.

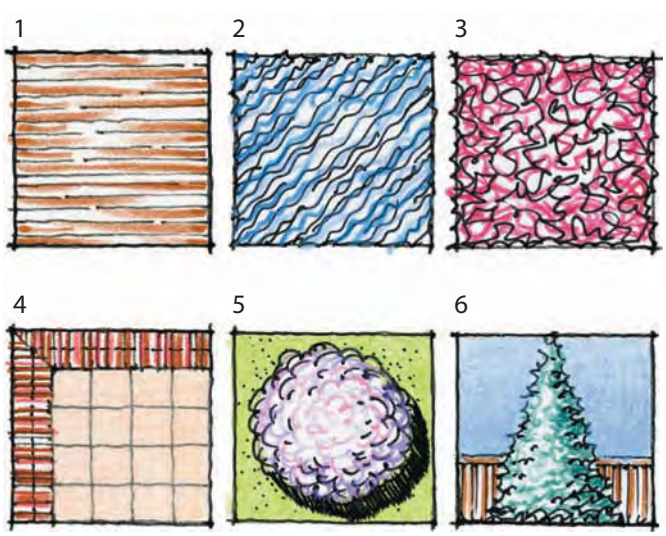


Figure 15–8

Respect the Line Type (Figure 15–8)

When adding color to a black-and-white rendered drawing, color in the pattern using the same line types.

1. Use a medium to wide fray line to indicate elements such as wood planks or courses of brick.
2. Layering two colors of blue with different point widths can create a pleasing water pattern.
3. A single color used to create a jittered pattern will quite easily represent a bed of annual color.
4. Using two colors to draw simple short lines can show brick edging for a paved area.
5. Using pink and violet in a circular scallop pattern can indicate an ornamental tree.
6. Use sharp pencil lines to capture the smaller texture of the plant, such as that of a conifer.

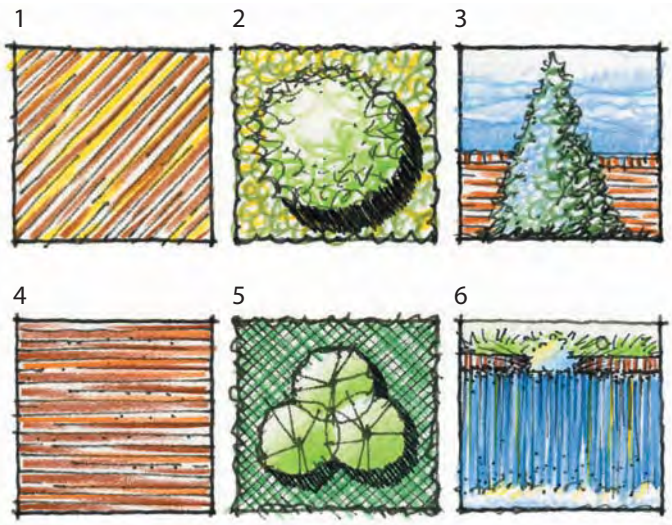


Figure 15–9

Combine Colors (Figure 15–9)

Coloring an item with two or three colors will add more interest than if it were colored with one color.

1. Mixing brown and yellow medium lines is very effective in delineating a wood deck.
2. Using white on the upper left and green on the bottom right indicates the round form of a tree.
3. Blues and greens are good combinations for coniferous evergreen trees.
4. Mixing brown with orange or red fray lines works well to represent a brick running-bond pattern.
5. White and medium green for the tree shows good contrast against the dark green ground cover.
6. Two blues, white, and a tint of yellow make for a shiny and sparkling water effect.

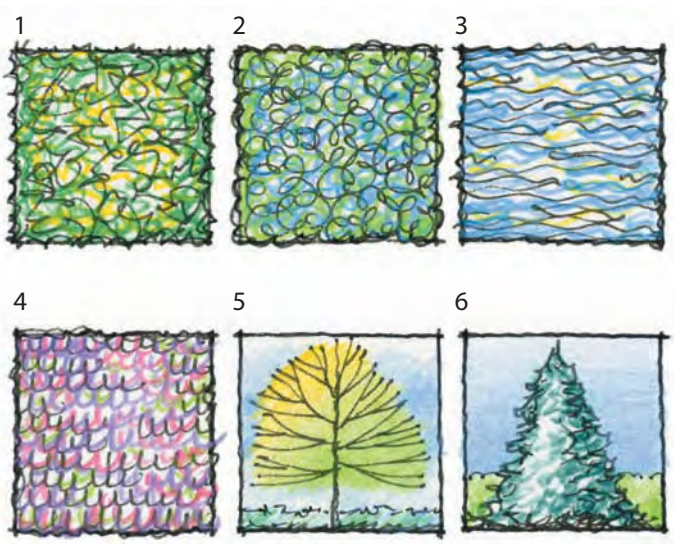


Figure 15–10

Save the White (Figure 15–10)

Saving some white of the paper, combined with additional colors, provides a sparkling character to the drawing.

1. White, yellow, and green are used for depicting a ground cover.
2. White, blue, and green are used for a different ground cover.
3. White, blue, and yellow are used to show wavy patterns of water.
4. White, violet, pink, and green are used to delineate a flower bed.
5. White is used with blue to illustrate a sky background.
6. White is used on the evergreen to help indicate a cone shape.

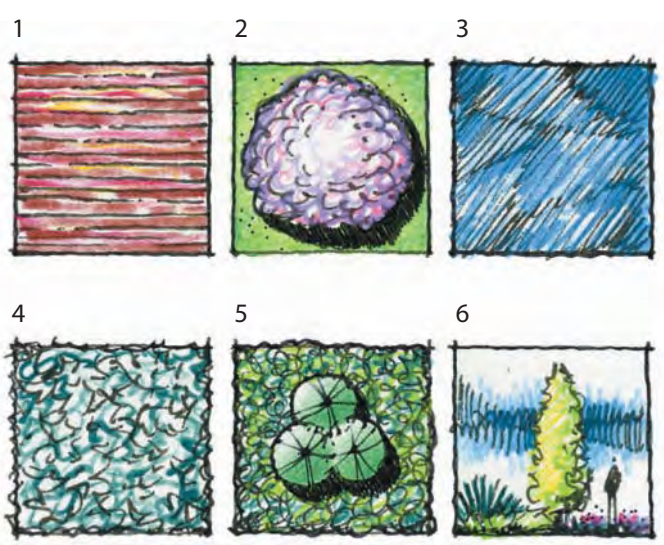


Figure 15–11

Vary the Pressure (Figure 15–11)

Learning to vary the pressure in applying color will add a sense of depth and layering to the rendering.

1. Texture is created by varying the pressure in drawing the wide brown lines.
2. Wide violet lines and thinner pink lines provide textural interest to this ornamental tree.
3. Varying the pressure of a blue pencil in an accordion pattern adds additional texture.
4. Using the same color pencil with varying pressure will often look like two colors.
5. Heavy, dark texture lines of ground cover create a contrast with a soft, even-colored tree symbol.
6. Varying the darkness and lightness with pressure will add contrast and interest.

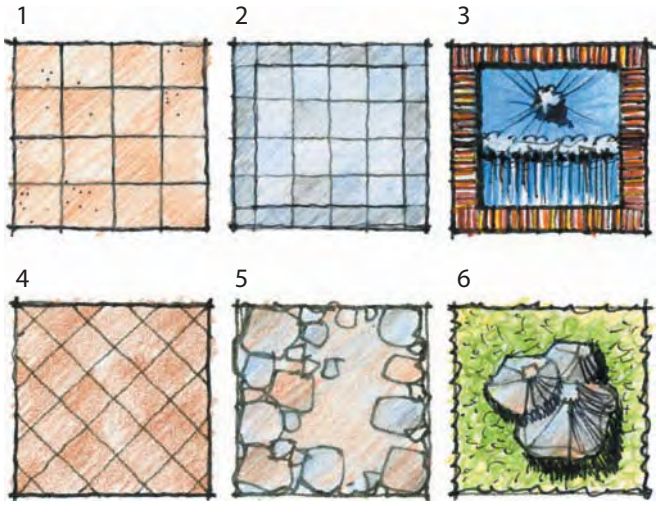


Figure 15–12

Vary the Shading (Figure 15–12)

The values (light/dark) of the colors of hardscape materials should be varied to create additional interest.

1. Applying various values of a tan color will indicate a mottled look for concrete.
2. Using grays and blues of different values helps represent differences in stone color.
3. Light, medium, and dark values of blue can depict various textures of water.
4. A tile patio can be highlighted by varying the pressure on one single color of brown.
5. Blues, grays, and tans provide an effective combination for depicting a stone pattern.
6. Boulders can be represented by coloring separate sides with varied colors in different values.

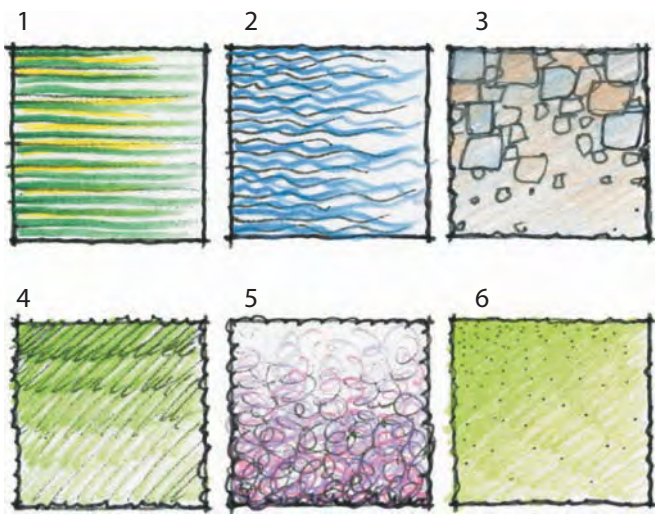


Figure 15–13

Highlight Edges (Figure 15–13)

The edge of an area of material can be highlighted by fading out the pattern and color across the entire area.

1. Using a combination of wide green and yellow frayed lines can emphasize an edge.
2. Light and dark blue wavy frayed lines can highlight the edge of a water body.
3. A portion of a patio can be faded out to highlight an important edge of the design.
4. Fading out of a ground cover symbol is done by rows of lighter and lighter color application.
5. Violet and pink swirl lines become increasingly lighter and thinner from one edge to another.
6. Varying the pressure of each of several strands of an accordion symbol provides an easy fade out.

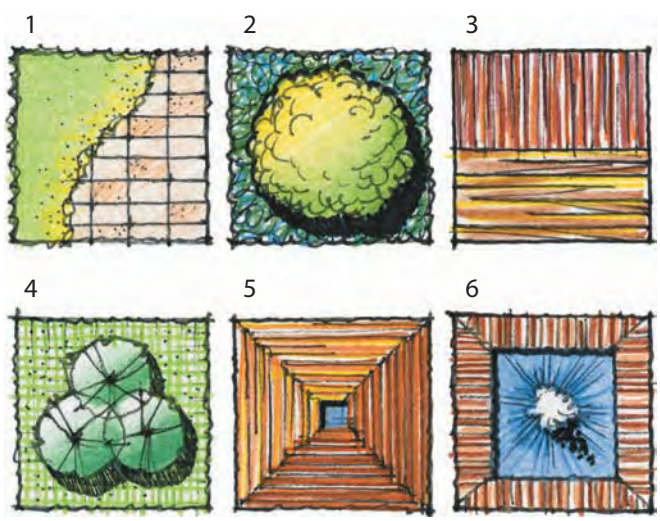


Figure 15–14

Let the Sun Shine (Figure 15–14)

White, yellow, and strong contrast in colors can provide bright areas within various design elements.

1. Highlighting the edge of a ground cover with yellow calls attention to the paving edge.
2. Using yellow on the upper left of a tree symbol represents the sunny side of the tree.
3. Using pink with brown and yellow with brown depicts brick and wood, respectively.
4. Using white on the upper left of plant symbols, along with a dark side, highlights the symbol.
5. The sides of roofs facing the sun are rendered lighter than the darker-shaded sides.
6. Using darker blue with some black radiating lines works well to highlight a water jet.

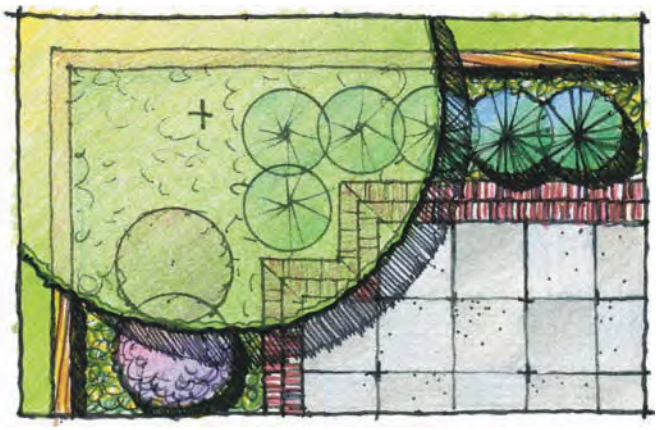


Figure 15–15

Lighten Beneath Tree Canopies (Figure 15–15)

When large trees hover over important parts of a design, it is important to lighten the colors beneath the tree.

1. The wood fence has a light tint of brown on the area beneath the tree canopy.
2. The pink ornamental shrubs have just a tint of pink within the tree canopy.
3. The evergreen shrubs have less lines and lighter color under the tree.
4. The brick edging is still colored beneath the tree, but with thinner and light lines.
5. The lawn area outside the tree canopy is darkened to emphasize the edge of the tree.
6. Ground cover symbols are light and faint in character so as not to overpower the tree.

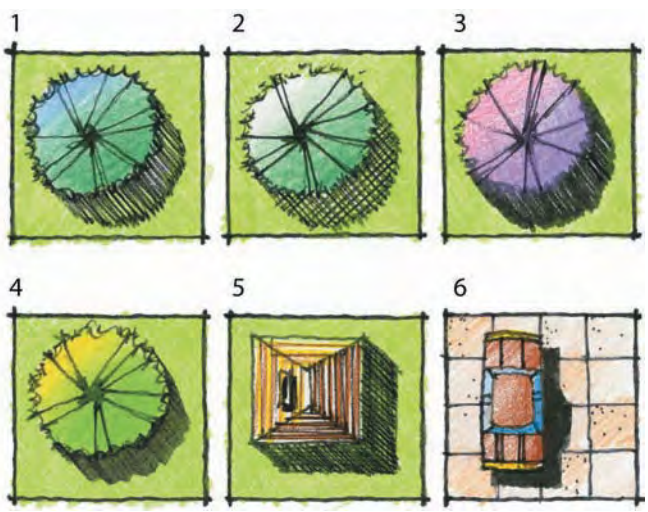


Figure 15–16

Shadows (Figure 15–16)

Shadows, usually shown to the bottom right, add three-dimensional quality to any landscape design plan.

1. Thin parallel black lines spaced close together make for a reasonable shadow.
2. Thin black lines in a consistent mesh pattern make for an even shadow pattern.
3. A black fine-tipped marker is often used to draw a tight accordion line type.
4. A black or dark gray calligraphy pen provides for an easy and even shadow.
5. Shadows on walls originate at the corners of the form.
6. Shadows on cars and benches are offset to indicate that the supports are set within the form.

INDIVIDUAL TREE SYMBOLS AND CONTRASTING GROUND COVERS

Figure 15–17 gives examples of individual tree symbols and contrasting ground covers.

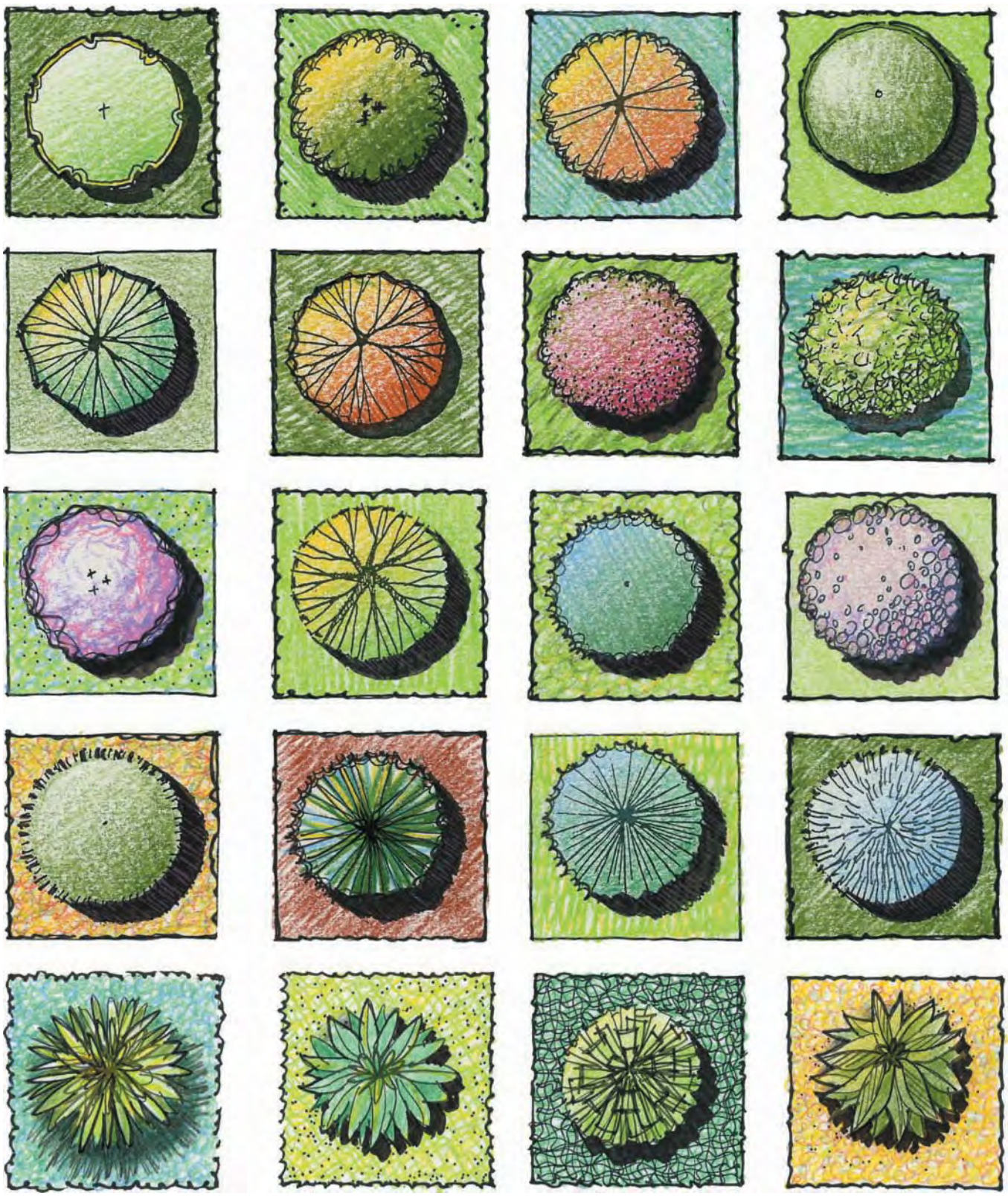
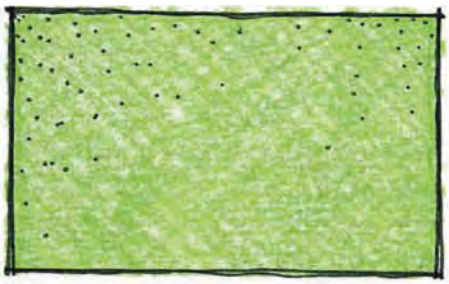


Figure 15–17

LAWNS, GROUND COVERS, ANNUALS, AND PERENNIALS (FIGURE 15–18)



Lawn Area (Left) Use medium to wide lines in opposite 45-degree angles to an edge and add peppering to emphasize the edge.

Lawn Area (Right) Use medium to wide lines in one 45-degree direction to depict a faintly seen directional pattern.

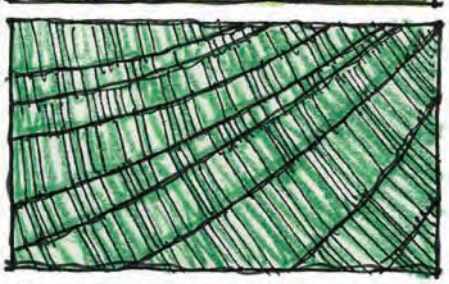




Lawn Area with Contours (Left) Highlight each contour line with peppering and fade from darker to lighter from one edge.

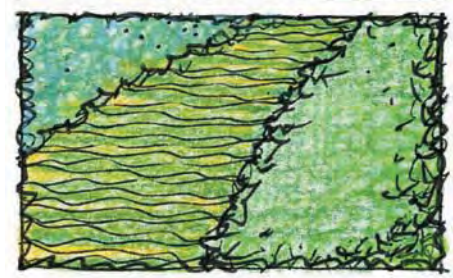
Lawn Area (Right) With a consistent softness, fade the peppering and the color intensity from one edge to another.





Lawn with Contour Lines (Left) Green "hachure lines" (perpendicular to contours) can be used to render a sloped hillside.

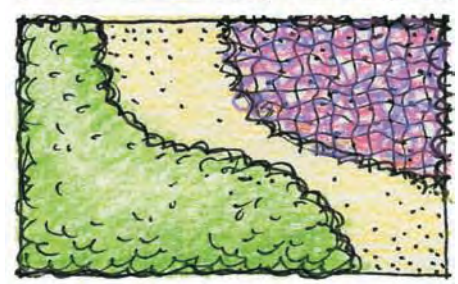
Two Ground Covers (Right) A subtle change in ground covers can be accomplished with a different line type and a little yellow.





Three Ground Covers (Left) A dark green scallop, a light tan peppered scallop, and a three-colored jitter and peppered reverse scallop are shown here.

Taller Ground Cover (Right) Highlighting the center and darkening the edges will depict a higher plant mass.

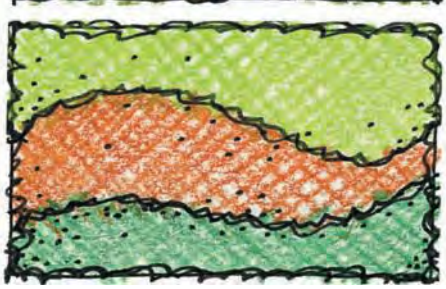




Formal Garden (Left) The plant can be emphasized with angled frayed lines and subtle changes in color of opposite garden sections.

Colorful Garden (Right) Use various line types in different colors to attain a multicolored annual or perennial garden.





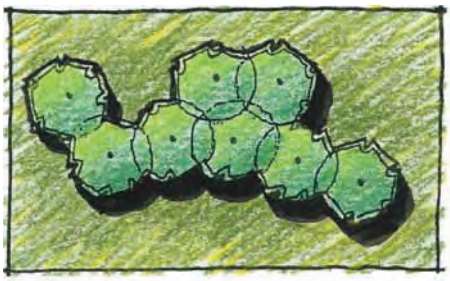
Mulched Path (Left) Use simple angled and brown-tinted lines in a 45-degree mesh pattern, along with some periodic peppering.

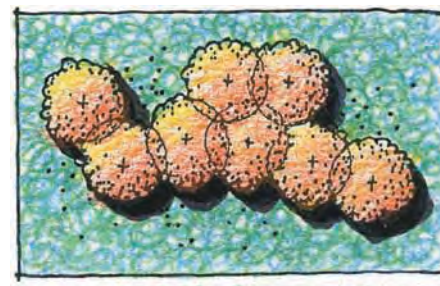
Linear Vegetable Garden (Right) Use a variety of line types with different colors and a peppered shadowing against a consistent green background.



Figure 15–18

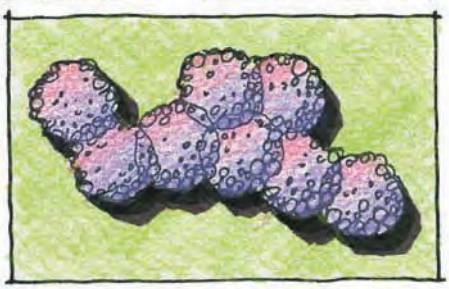
PLANT MASSES AND CONTRASTING GROUND COVERS (FIGURE 15–19)

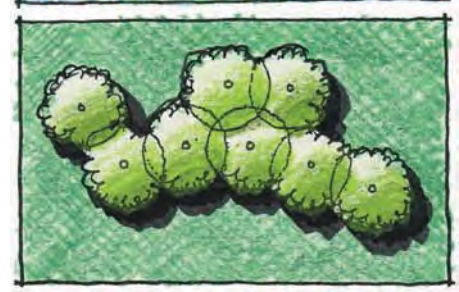




(Left) Use light and medium green for the plants against a 45-degree angled pattern of dark green with some yellow.

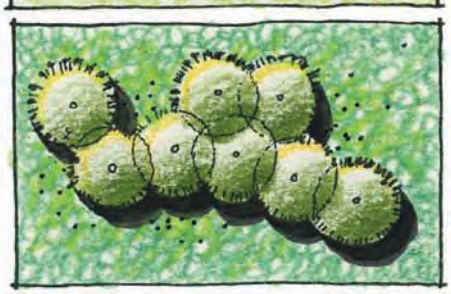
(Right) More contrast is evident with yellow and orange plants against a blue and green swirled ground cover.





(Left) Use violet and pink ornamental plants against a light green pattern drawn in opposite 45-degree angled direction.

(Right) White-tinted plants allow for a strong contrast against a darker, two-directional patterned background.

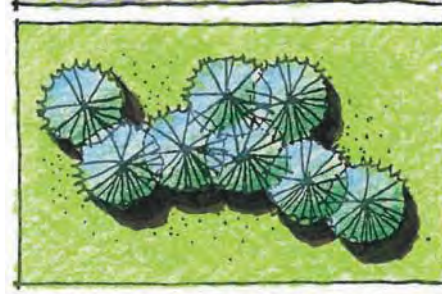




(Left) A partial yellow outline, along with the white tint, highlights the plants against a darker green peppered swirl.

(Right) The bright yellow tinted plants have a sharp contrast with the violet and light green swirled ground cover.

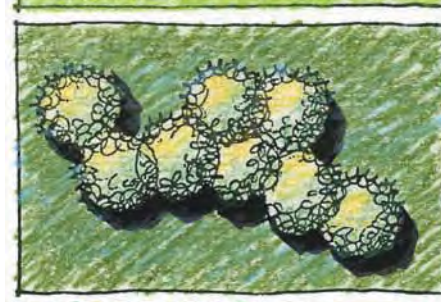




(Left) The green ground cover can be darkened near the edges of the plants to create a stronger value contrast.

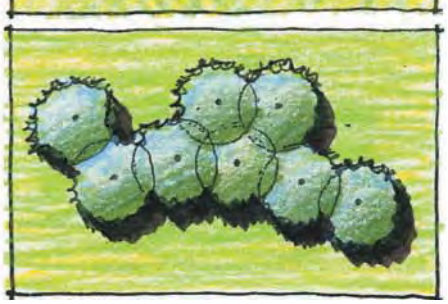
(Right) Light blue is often used as the lighter tint for darker evergreen plants, especially with a light green background.

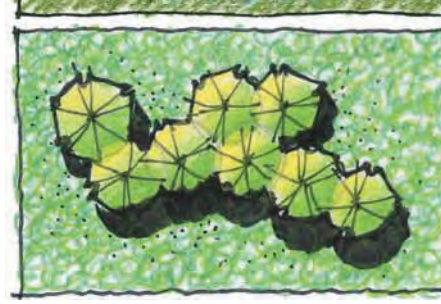




(Left) White tint on red/orange colored plants provides a distinct separation from the yellow and light green ground cover.

(Right) Tan-tinted green plants against an olive green background create a softer, more subtle color change.



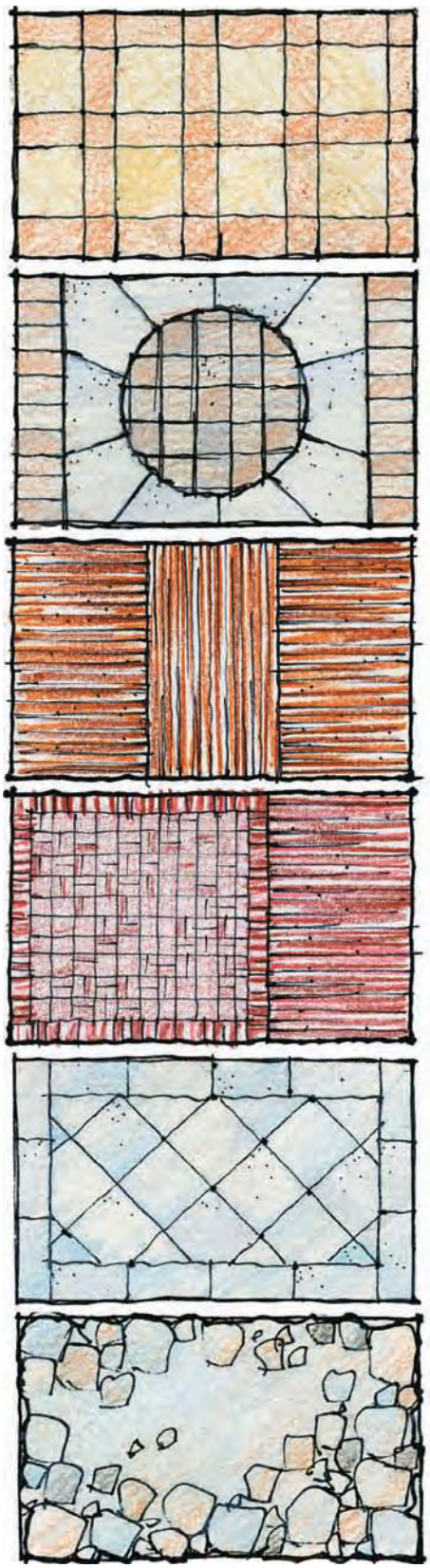


(Left) Blue tint on olive green plants provides a distinct contrast when used with yellow and light green ground cover.

(Right) Yellow-tinted green plants are set against a background of a swirl of similar colors with a slight addition of blue.

Figure 15–19

PAVING MATERIALS (FIGURE 15–20)



Concrete

(Left) Varying the pressure of tan and peach colors, in different directions, helps create a mottled character.

(Right) A single color, with varied pressures in opposite 45-degree directions, implies subtle changes in value.

Concrete

(Left) Grays and tans can be mixed together, with varied pressures, to indicate different shades of colored concrete.

(Right) Tans and peach colors are also easily mixed, with varied pressures, to establish a mottled concrete character.

Brick or Concrete Pavers

(Left) Varied widths of rust and orange frayed lines, along with some saved white, provide for a running bond pattern.

(Right) Peach, along with wide bands of rust color and some saved white, provide for a soft brick color.

Brick or Concrete Pavers

(Left) Bands of red and brick colors drawn with varied pressures can create a more common red brick pattern.

(Right) Browns and grays can also be combined to create an earth-toned pattern of brick or concrete pavers.

Stone

(Left) Varying the pressure and direction of gray and light blue is commonly used for delineating limestone.

(Right) Adding peach to gray and light blue allows for more subtle changes in color, thus resembling sandstone.

Stone

(Left) Irregular patterns of sandstone are often rendered with a combination of gray, blue, and peach.

(Right) Eliminating peach from stone color will suggest more of a bluestone paving character.

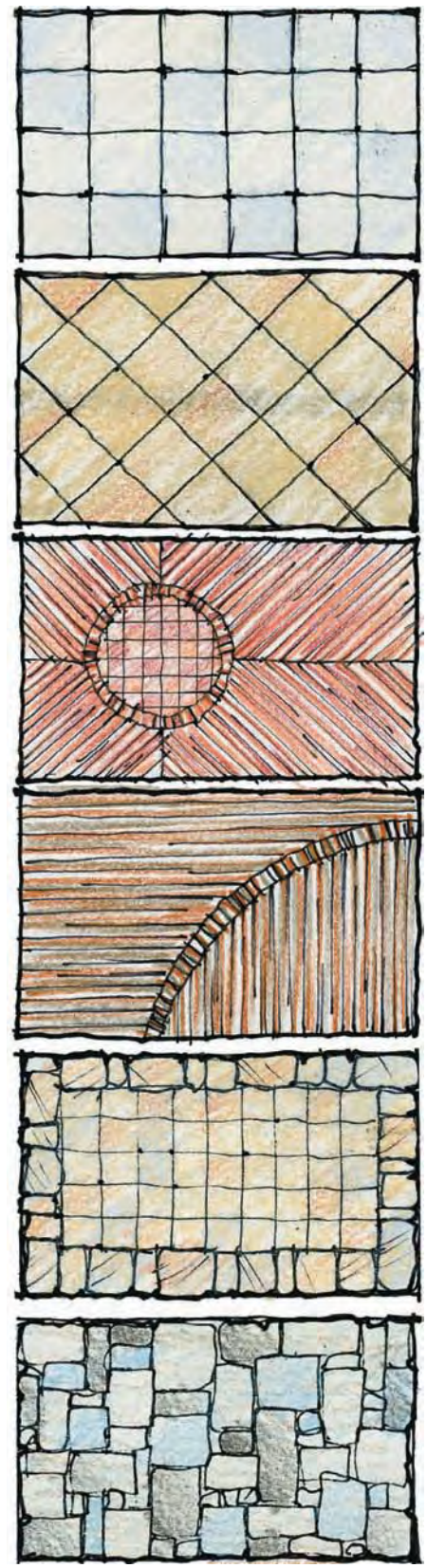


Figure 15–20

PAVING MATERIALS (FIGURE 15–21)

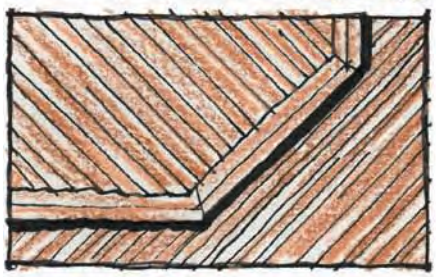


Wood

(Left) Wide bands of browns and yellow, with some saved white, are commonly used for wood decking.

(Right) Using wide bands of brown, with some bands of pumpkin orange and tan, will make for a darker wood.

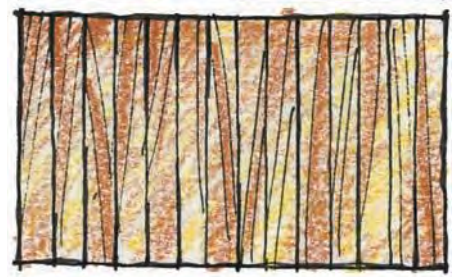


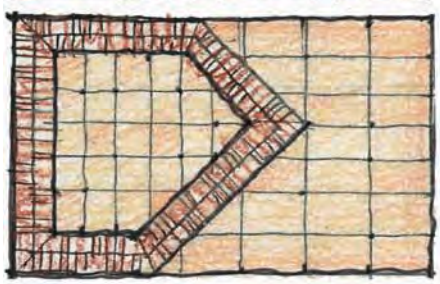


Wood

(Left) Wide brown bands mixed with peach bands, along with white, suggest a softer-colored wood deck.

(Right) Wood grain, drawn with long slight arcs, can be colored in with browns, tans, and yellow for a cedar deck.

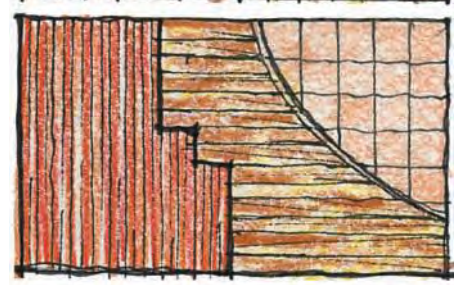




Material Combinations

(Left) Peach and tan are used to create a mottled concrete character, with brick and peach colors for the edging.

(Right) Provide strong changes in contrast, with colors and line types, when delineating several adjacent materials.



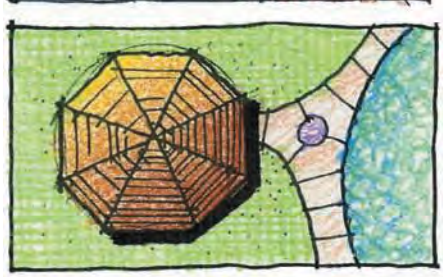


Material Combinations

(Left) Stronger contrast will occur when completely different colors are used for different materials.

(Right) A more blended look happens when some similar colors are used on different patterns of varied materials.

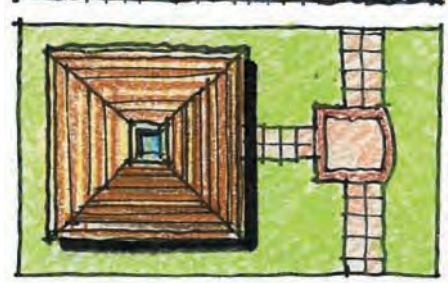




Structures

(Left) Gazebos are rendered with the top left roof tinted lighter and with fewer lines than the bottom right darker color.

(Right) Provide a bolder black line around major structures (houses, garages, gazebos) to emphasize these elements.





Structures

(Left) The sunny parts of roofs can be colored yellow with the shaded side colored with browns or grays.

(Right) If yellow is not used, peach and brown make for a handsome combination for roof colors.

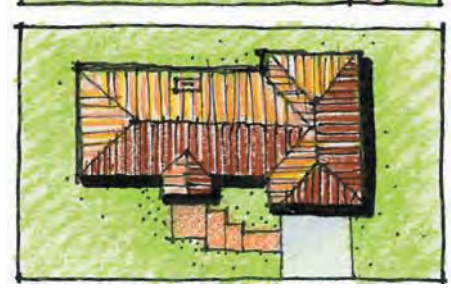
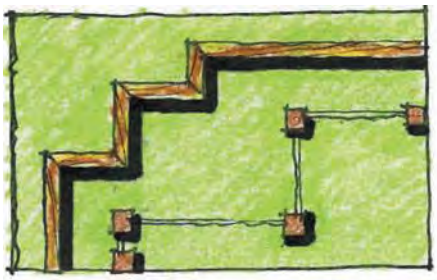
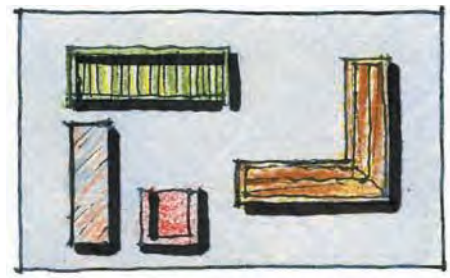


Figure 15–21

WALLS, FENCES, BENCHES, PLANTERS, ARBORS, AND WATER ELEMENTS (FIGURE 15–22)





Fences and Benches

(Left) Use a brown and yellow combination for wood fences and posts, along with some shadow to the bottom right.

(Right) Benches are rendered in any combination of colors. Shadow them to portray their three-dimensional quality.

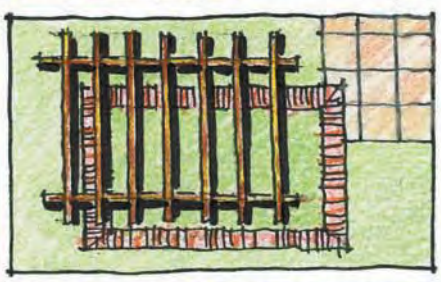




Walls and Planters

(Left) Use gray and light blue for limestone caps, rust colors for brick, and tans and peach for sandstone.

(Right) Differentiate planter walls with different colors than the planting within, and make the sculptures colorful.

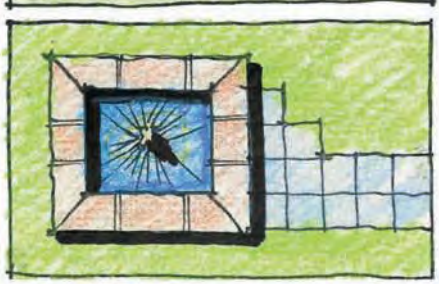


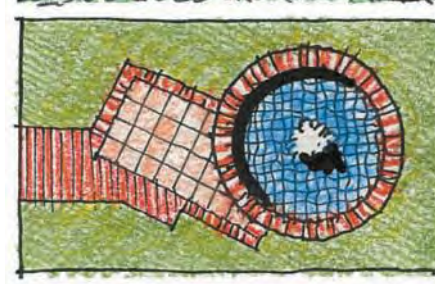


Arbors

(Left) Color wood arbors with brown and yellow, and then color the rest of the elements between the arbor patterns.

(Right) Create contrast in the colors of the arbor and the adjacent elements, and add some shadow to the framework.



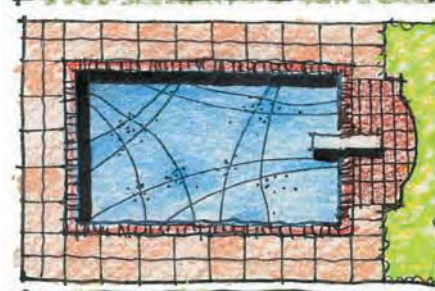


Water Fountains

(Left) Darken inside edges of fountains with darker blue, add a little yellow, and provide a strong shadow to the water jet.

(Right) After the entire pool pattern is rendered, use "white-out" and a black edge line and shadow to highlight the water jet.





Streams and Pools

(Left) Draw meandering blue lines for running water. Add tints of yellow and violet. Then, pepper in various places.

(Right) Use varied pressures and fading of blue to fill some of the arcs in the water pattern. Pepper at some arc intersections.





Spas and Waterfalls

(Left) Darken the top left portion of the spa, highlight the bottom right, and pepper periodically throughout the spa.

(Right) Keep a band of white at the location of a waterfall. Scallop it in black and highlight it with faded peppering.

Figure 15–22

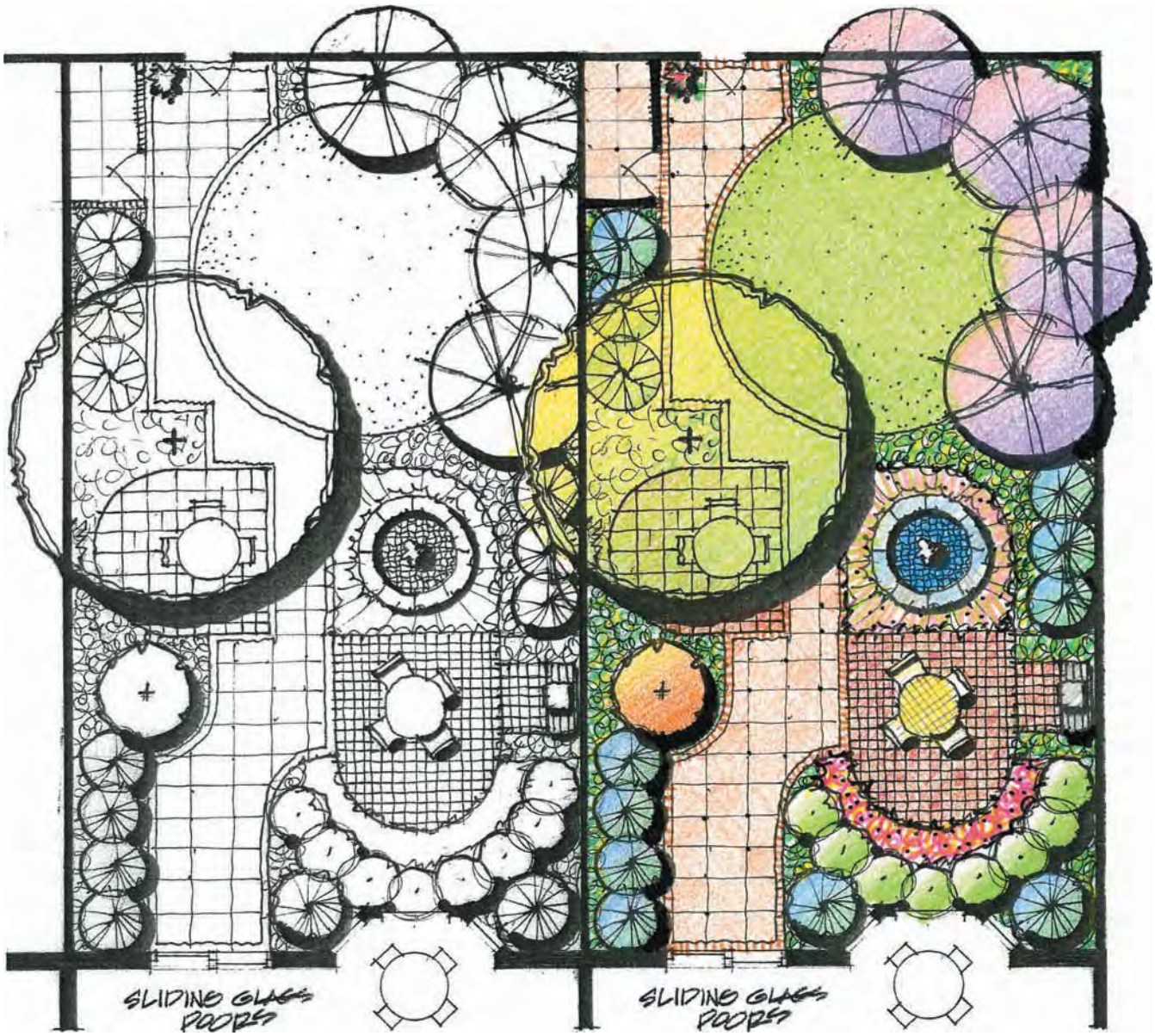


Figure 15–23

COLOR RENDERING AN ALREADY RENDERED BLACK-AND-WHITE PLAN

The plan on the left in Figure 15–23 has already been rendered in black and white. The line weights, values, and textures are very well coordinated in representing the variety of items in this design. All that is missing is a series of labels identifying all the design elements. A number of landscape designers may elect to prepare their landscape design plans in this fashion. This type of plan can be copied much more cheaply than a color copy, but it does not have the sales potential of a color drawing.

When a designer decides to add color to such a plan, it is important to follow a simple yet important guideline: *Use a soft touch as you apply thin and transparent layers of color so as not to lose the graphic character of the existing landscape symbols.* If colors are added too heavily and are too dark, they will often eliminate the evidence of the existing symbols.

Following are some of the suggested color techniques used in the plan shown in Figure 15–23:

1. The large shade tree has very light tints of yellow and green to allow elements beneath the tree to be seen.
2. Shrubs, pavements, and ground cover located beneath the tree canopy are given just a hint of color.
3. The ornamental trees are shown with a soft tint of pink and violet.
4. Evergreen shrubs are highlighted with light blue on the top left and a darker green on the bottom right.
5. The circular hedge of deciduous plants is easily visible because of the saving of white on the top left of the shrubs.
6. The flower bed around the fountain is colored with the same line type and radiates toward the fountain center.
7. The circular flower bed was rendered with two colors and some peppering to provide additional visual interest.
8. The color of the ground cover is filled in with the same swirl line type as was used to draw the initial symbol.
9. The pavements are kept light and transparent. Varied pencil pressures were used to create highlights.

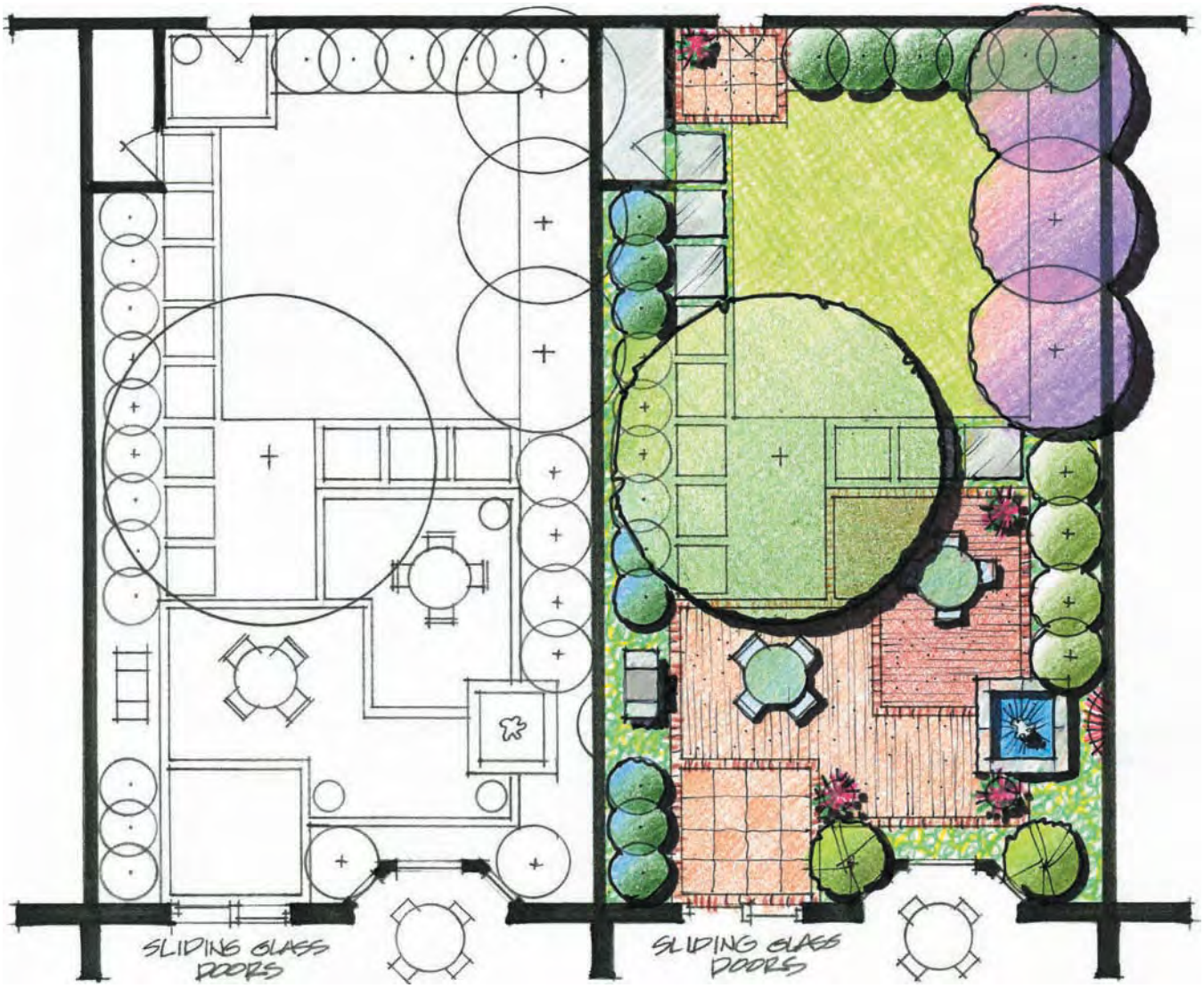


Figure 15–24

COLOR RENDERING A BASIC PLAN (FIGURE 15–24)

There may be times when only a color rendered plan is desired. This second method of color rendering deals with the application of color on a basic plan, one in which only simple circles and lines are drawn. This will undoubtedly save time, but it will usually require most of the needed copies to be reproduced in color.

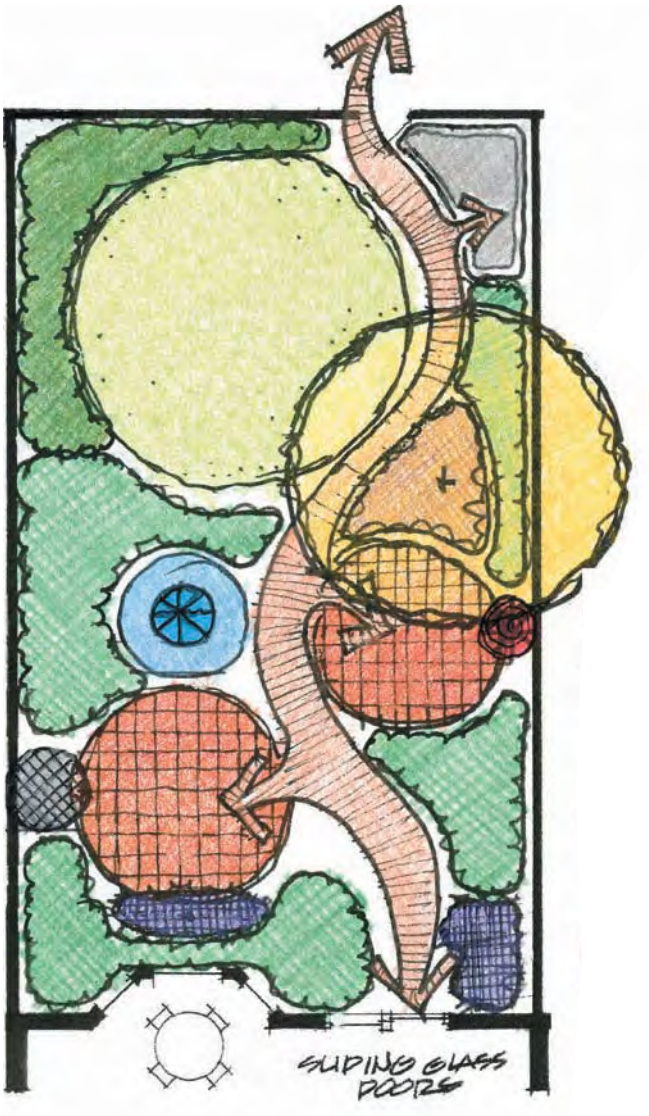
When a designer decides to add color to a basic plan, it is important to follow another simple yet important guideline: *When coloring a basic plan, use the pencils and fine-tipped markers in drawing a variety of line types to provide visual texture to some symbols.* Because there are no textures rendered on a basic plan, adding some texture will produce a more exciting drawing.

Rendering on a basic plan does allow heavier and darker color application, because the textures can be applied after the color is applied. Be careful not to color too heavily, however, because some symbols may tend to become too overpowering.

Following are some of the suggested color techniques used in the plan shown in Figure 15–24:

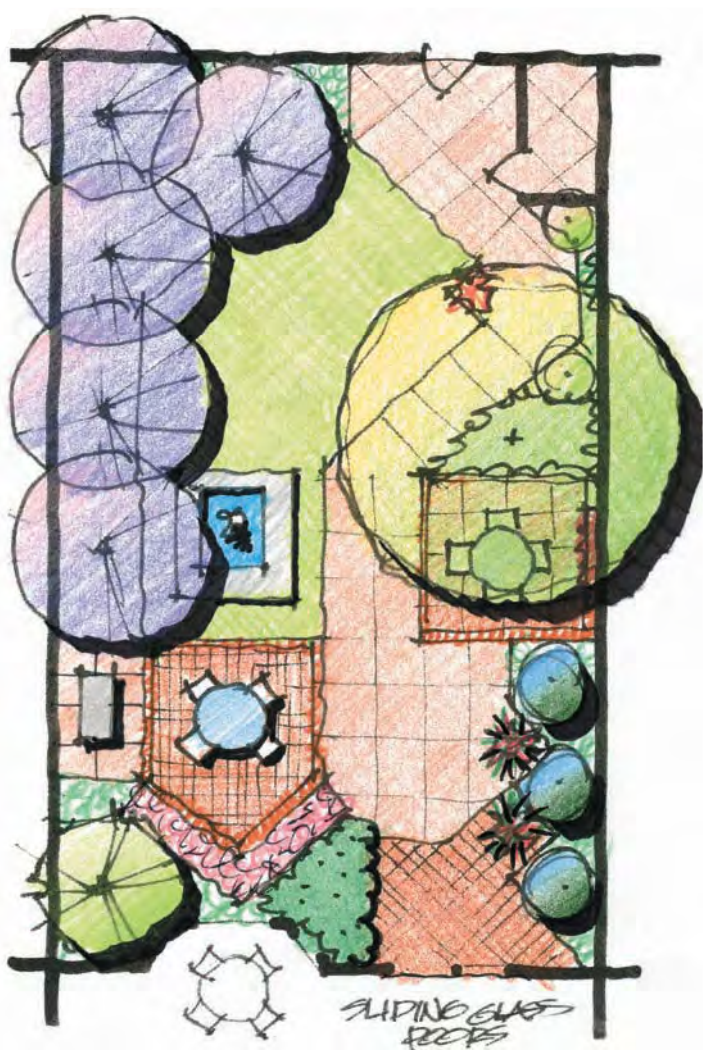
1. The shade tree is colored with one green color, from light on the top left to a medium on the bottom right.
2. Tints of color are used on the pavements and ground cover beneath the tree, but no texture is added.
3. The ornamental trees are shown as in the similar plan, with some branching added for texture.
4. The evergreen shrubs are drawn as in the previous plan, but no texture is added. This is acceptable.
5. The deciduous shrubs are colored by saving some white, and some simple branching is added.
6. The ground cover is drawn with yellow and green swirls to provide a textural background.
7. The pavements are colored to represent various pavement types.
8. A fine-tipped marker was used to draw in pattern for the concrete, brick courses, and brick edging.
9. The lawn was rendered with a consistent two-directional pattern to provide a visible texture.
10. Potted plants are drawn with simple red and green radiating lines, with some peppered shadowing.

COLOR RENDERING AT VARIOUS DESIGN STAGES



Functional Diagram Stage (Figure 15–25, Top Left)

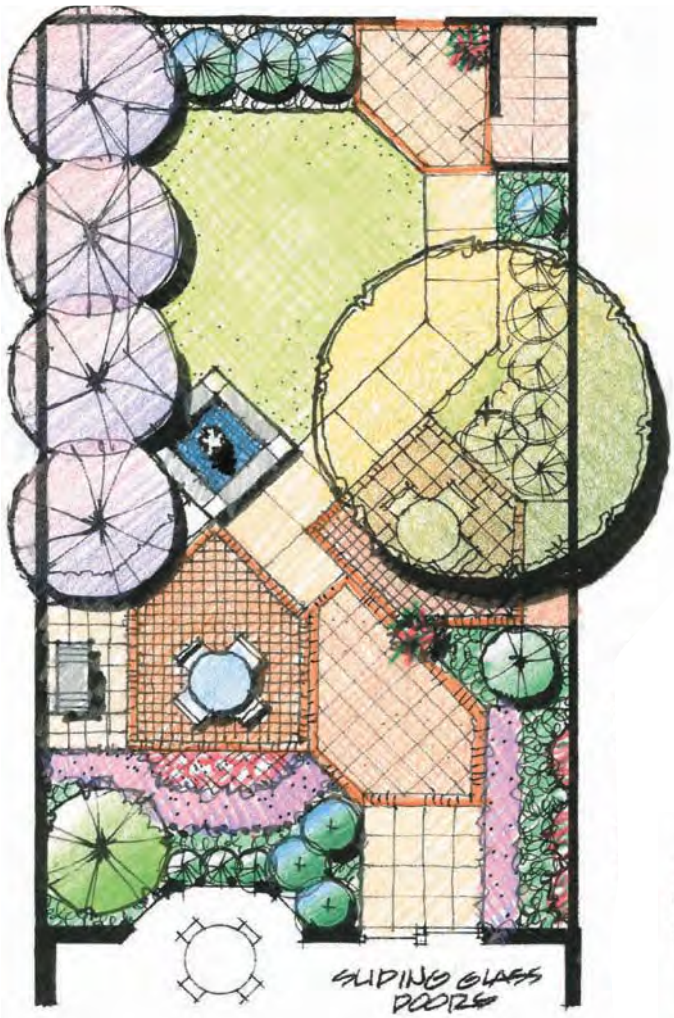
In presenting color-rendered functional diagrams to a client, there are a few major guidelines. First, *use simple individual colors to represent the various design elements.* For instance, use yellows and greens to denote plant materials, earth tones to represent paving materials, blues to identify water elements, and purples, pinks, and reds to identify specialty areas. Second, *use some variety of line types to draw the outline of the forms to help differentiate the elements.* Scallop and reverse scallop outlines can be used to differentiate deciduous trees from evergreen. Square patterns are appropriate for representing pavements. Large trees can be rendered with a simple outline and a faded color from top left to bottom right. Arrows can be shown to identify pathways, entrances into doors, gates, or outdoor spaces. Keep the symbols diagrammatic and abstract, for these are design diagrams and not final plans. This plan was colored in five minutes.



Conceptual Design Stage (Figure 15–25, Bottom Right)

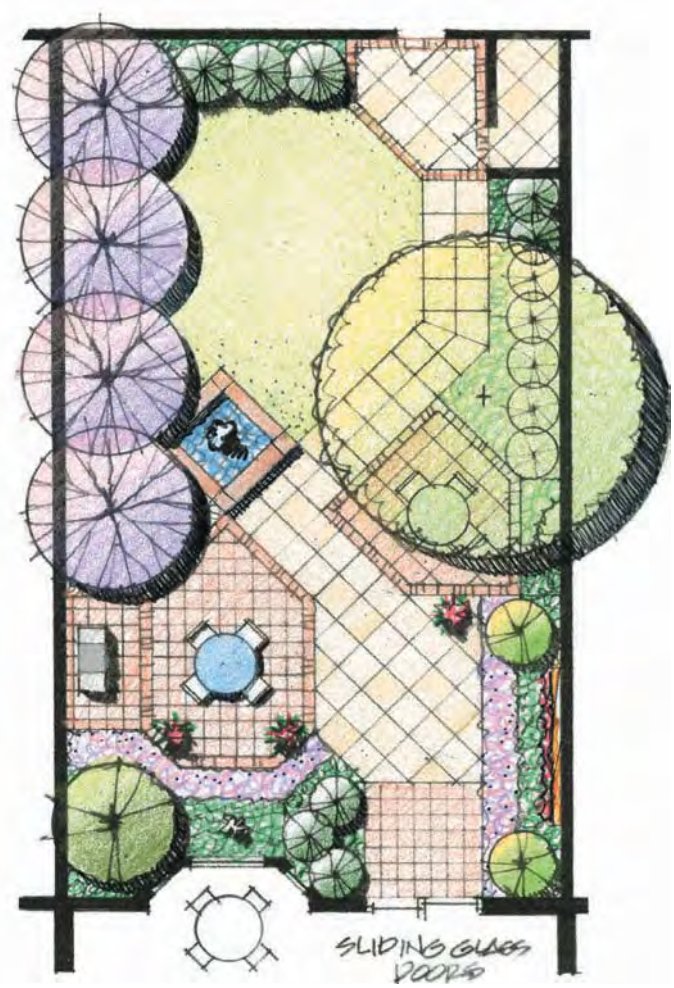
As a design becomes more realistic, specific elements are given form, individual plants may appear, groups of plants become more realistic, and patterns of pavements are suggested. As design ideas take this form, there may be a series of alternatives that are developed to present to the client. In situations like this, it is recommended that the drawings remain freehand and to scale, that textures be used to help define elements, and that quick color techniques be used to render the alternatives. Color-rendered alternatives are very helpful to clients, because things are drawn and rendered more realistically. Although alternatives are beneficial, it is important to keep the color rendering simple, loose, and quick. The rendering may consist primarily of coloring a freehand basic plan, with minimal texture added. The plan was rendered in 10 minutes.

Figure 15–25



Preliminary Master Plan Stage (Figure 15–26, Top Left)

Once the concept alternatives are presented to the client, discussion and feedback are used to begin the development of a more directed plan. This usually involves modifying and/or refining one or a combination of the concept alternatives into one preliminary master plan. More detail occurs in the types, amount, and location of plant materials. The types and patterns of pavement areas are more closely configured. Specialty elements, such as water features, are also more carefully defined. Depending on the designer, this preliminary plan may be drawn on the computer, may be left in the freehand format, or may be hand drafted in a more refined form. In any case, the coloring of this plan will likely pay more attention to some of the additional detail drawn. Because of this, additional time may be spent in the coloring phase. The plan shown was developed in a black-and-white format initially. The color applied to this plan took 15 minutes.



Final Master Plan Stage (Figure 15–26, Bottom Right)

Eventually, a final master plan is developed. At times, this plan is not color rendered, but drawn in black and white in the form of a hand-drafted drawing or a computer-generated drawing. But, there are times when one decides to color the master plan. In this case, the color will most likely take a little longer, because there is more detail than in previous phases. The more detailed a drawing, the more time it takes to ensure that the color is attentive to this detail. Coloring of this plan took 20 minutes.

No two designers operate in the same way throughout a design process or in the development of drawings. Some begin with a few color-rendered preliminary plans as alternatives, and then draw the final master plan on the computer in black and white. Others may elect to draw most plans by hand or on the computer and then choose to color only the master plan. Regardless of when and where color is decided to be utilized, it is an extremely valuable design and sales tool.

Figure 15–26

COMPUTER RENDERING WITH ILLUSTRATOR (FIGURE 15–27)

As stated earlier in this chapter, some designers have the requisite computer skills to develop color renderings using various programs—among many others are Adobe Illustrator and Adobe Photoshop. The two renderings in Figure 15–27 were developed using Adobe Illustrator. Both were developed as "analogous color schemes." Rather than using colors from most of the color spectrum (reds, oranges, yellows, greens, blues, and violets), each of these renderings focuses on a small range of colors that are closely related.

The drawing on the left uses various values of yellows, tans, and browns. Accent colors include (1) white, for texture on ground cover and water, as a well as for branches in the evergreen shrubs, and (2) rust, for texture on the ornamental tree and for banding in the circular patio. Values are changed to highlight the pattern of the walkway. A variety of values was used for peppering the lawn area and some of the ornamental trees. Yellows and light tans were used on the top left (sunny) portions of the trees, with darker values of tan and brown on the bottom right (shaded) parts.

The drawing on the right uses greenish tints of blues and browns. Just as in the left rendering, a variety of values and colors of peppering and textures was used to add textural interest and highlights to the rendering.

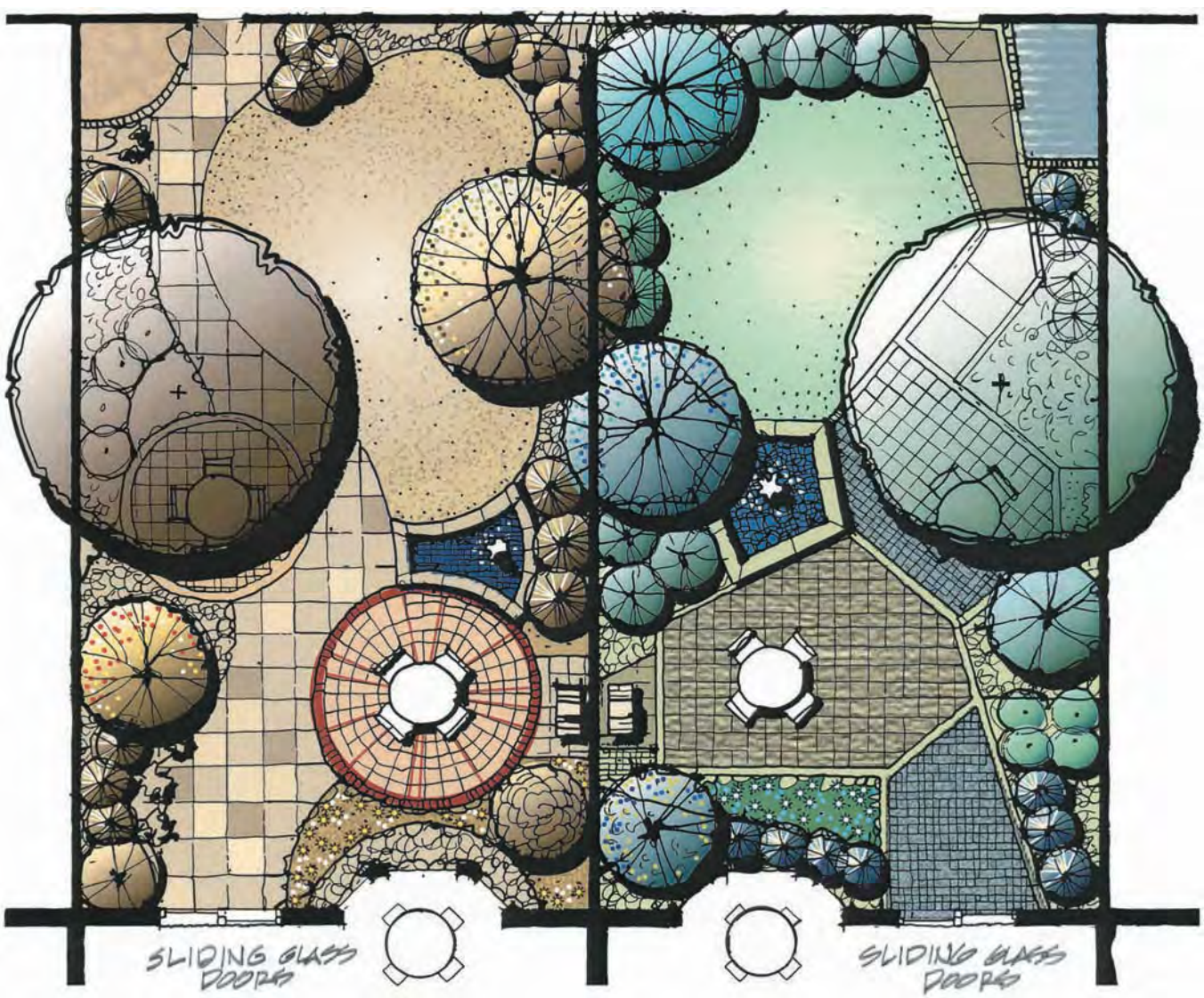


Figure 15–27

COMPUTER RENDERING WITH PHOTOSHOP (FIGURE 15–28)

The two renderings in Figure 15–28 were also computer generated. Adobe Photoshop was used to develop them. Just as in hand-drawn rendering, the computer can be utilized to produce loose and freehand-like drawings, as well as more refined drawings that look more computer generated. Both renderings use colors from around the color wheel, which is different from the "analogous" schemes.

The rendering on the left uses a variety of techniques developed by changing the patterns of the brushes and the mixture of colors used for each design element. Once these patterns are selected, each element is outlined to separate it. Then the application of the color is like painting with a roller. Trees and shrubs still have a sunny side and a shady side, which always helps with portraying a conical or rounded form. Some of the color runs outside the outlines of the trees to give more of a freehand character. This rendering took approximately one hour.

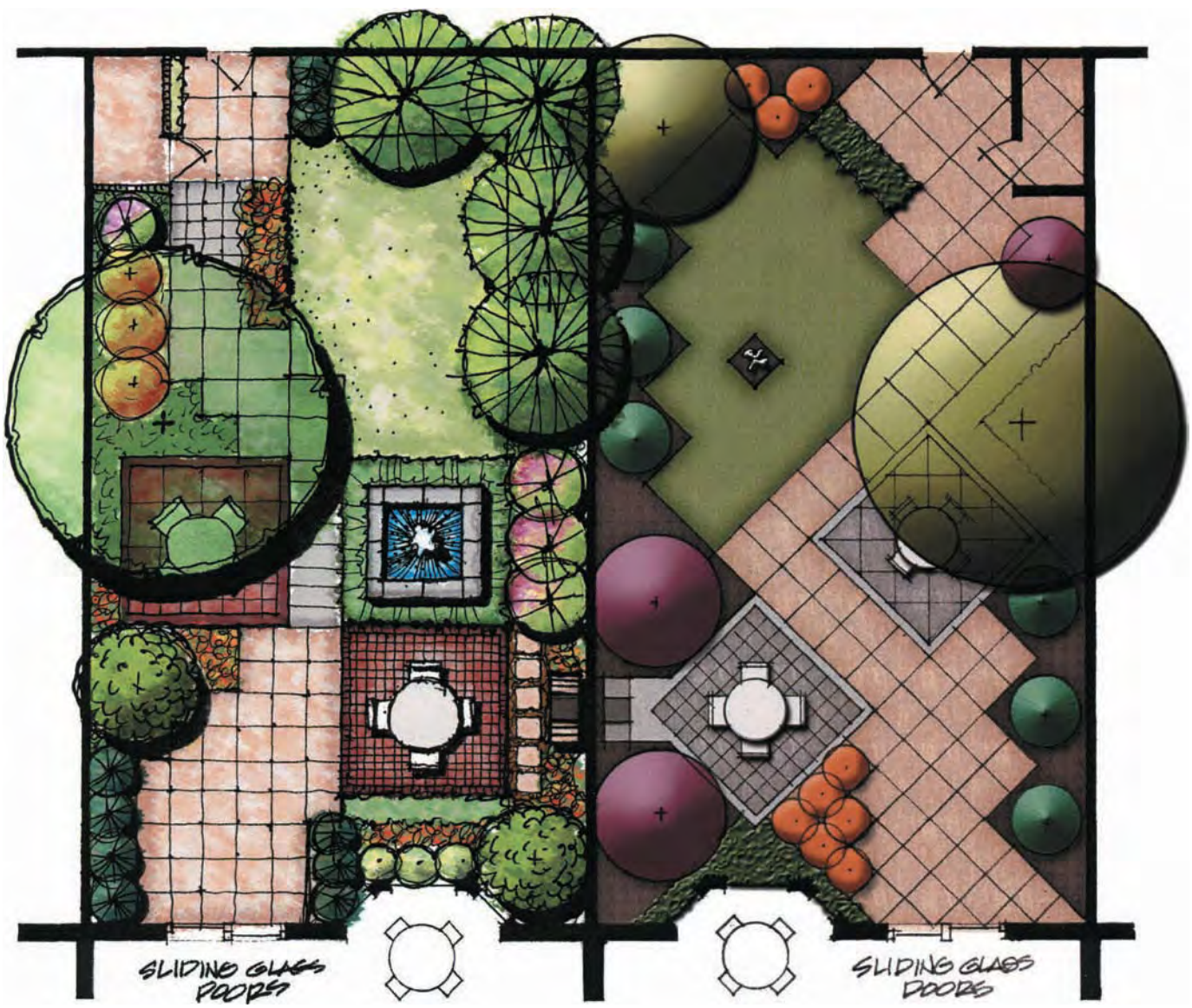


Figure 15–28

The rendering on the right, which looks more refined and has less textural interest, is a strong contrast to the other. Though they are rendered differently, both attend to the importance of contrast, consistency in texture, sun and shade, as well as changes of color to help identify different design elements.

It is important to remember that color renderings will always have some labeling accompanying the drawing. Whether the elements are labeled directly on or adjacent to the plan, or through the use of a key or legend, labeling is critical. Words and graphics work together for the benefit of understanding the drawing. This color plate was prepared by The EDGE Group—Planning, Landscape Architecture & Graphic Design, Columbus, Ohio.

SECTION DRAWINGS OF A VARIETY OF INDIVIDUAL TREES (FIGURE 15–29 AND 15–30)

Figures 15–29 and 15–30 each show 20 examples of section drawings of individual trees.

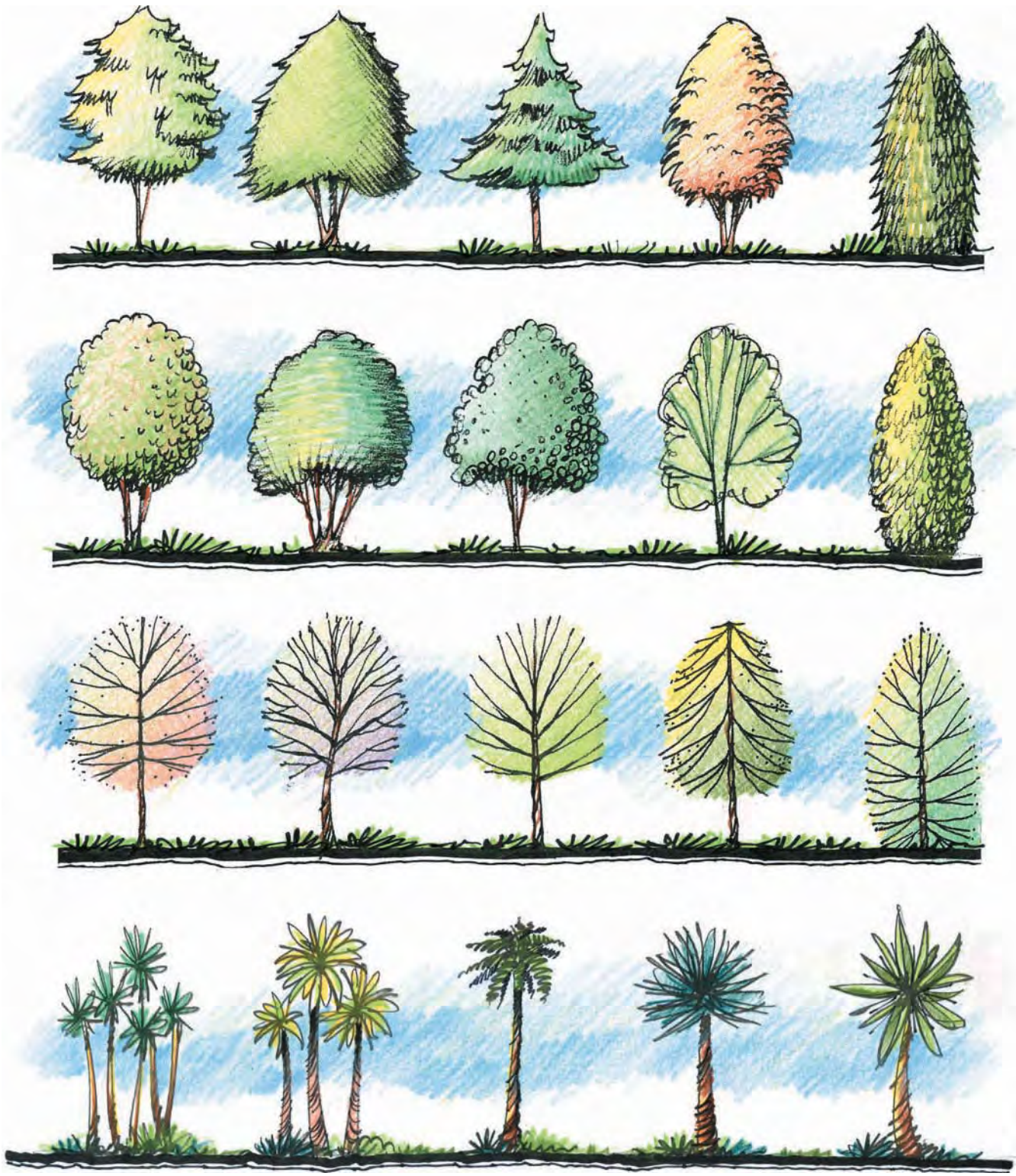


Figure 15–29

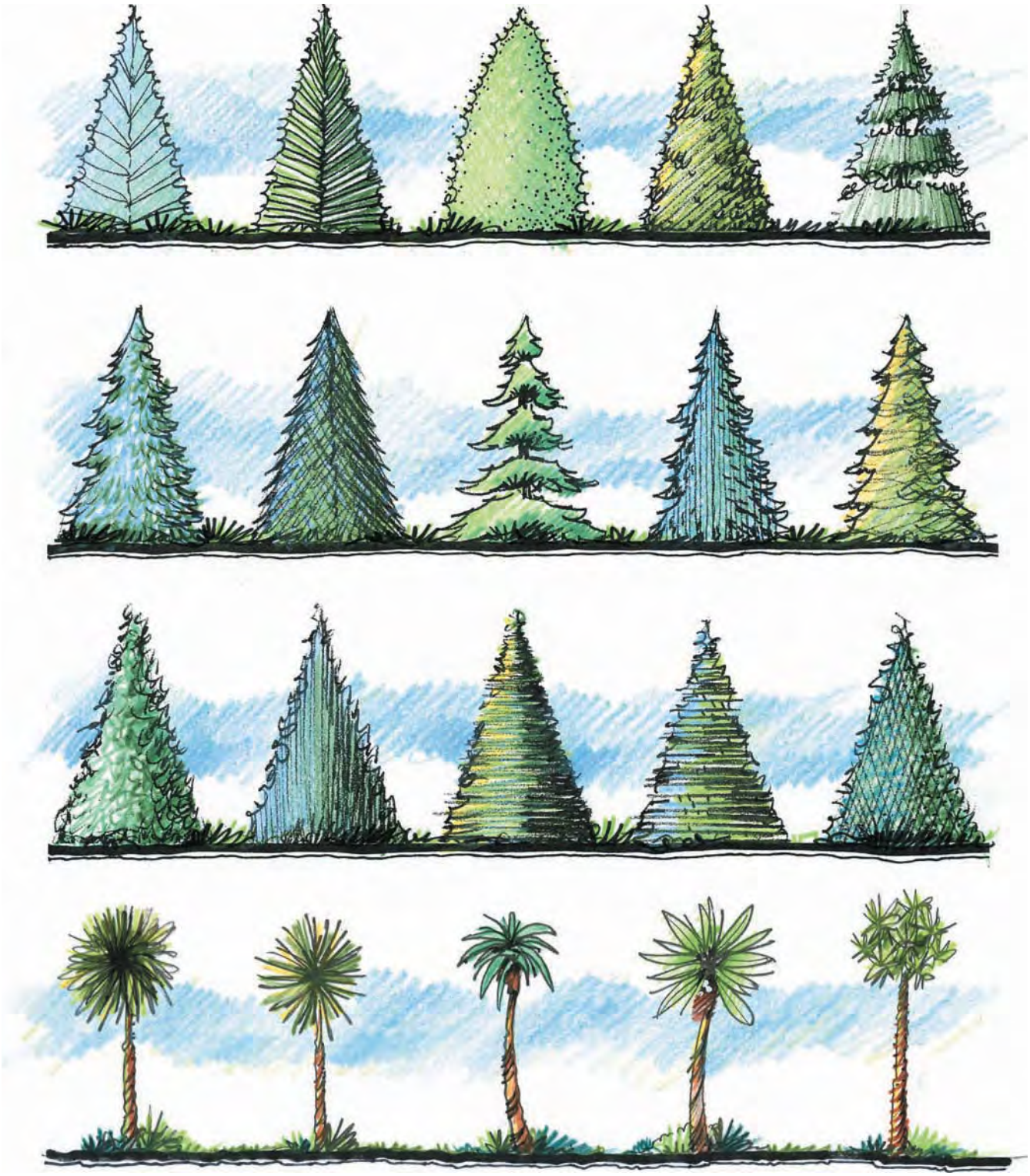


Figure 15–30

SAMPLE PLAN DRAWINGS OF OUTDOOR ENTERTAINING SPACES (FIGURE 15–31)

Figure 15–31 shows eight sample drawings of outdoor entertaining spaces.



Figure 15–31

SECTION DRAWINGS OF A VARIETY OF OUTDOOR SPACES (FIGURE 15–32)

Figure 15–32 shows nine examples of section drawings for outdoor spaces.

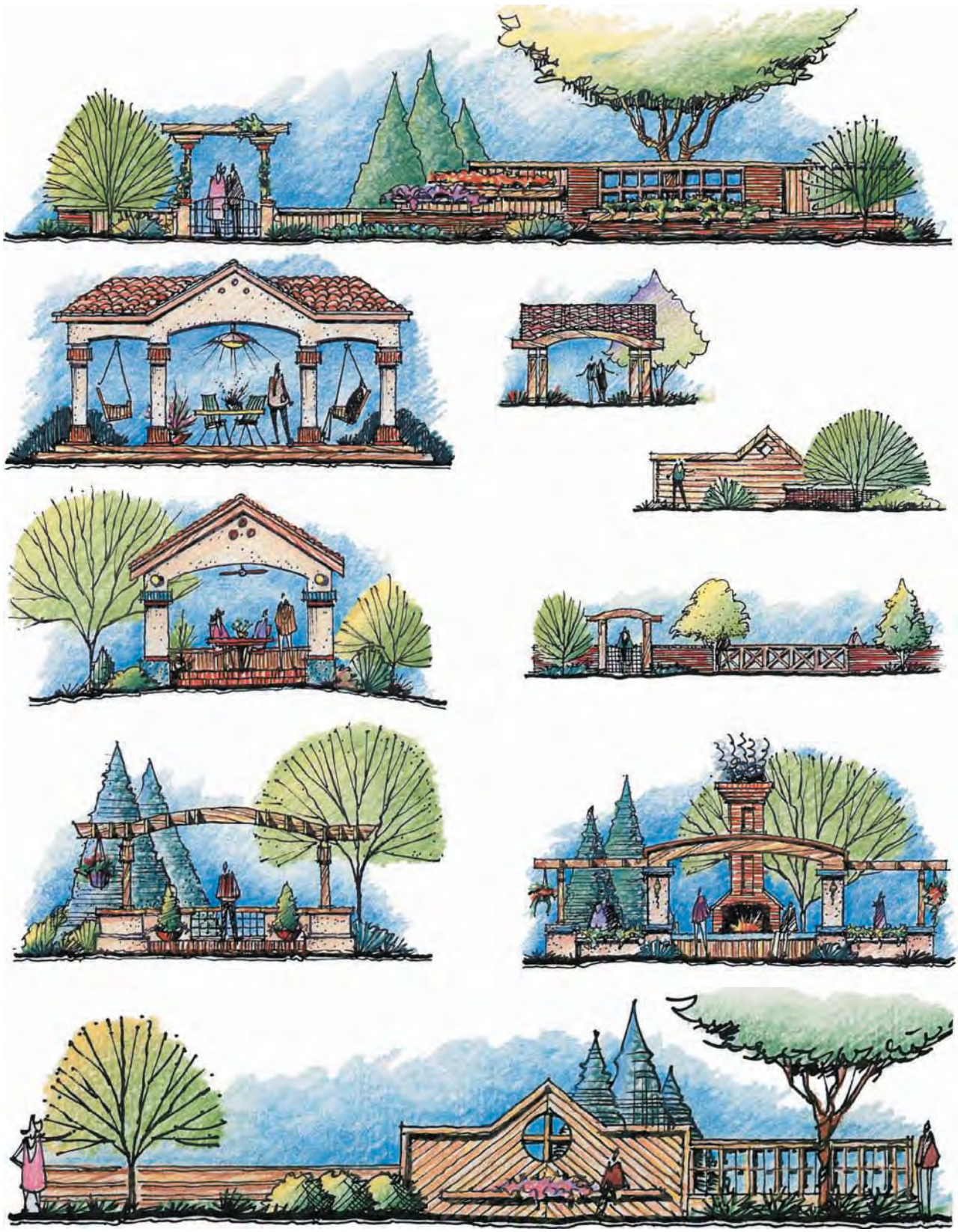


Figure 15–32

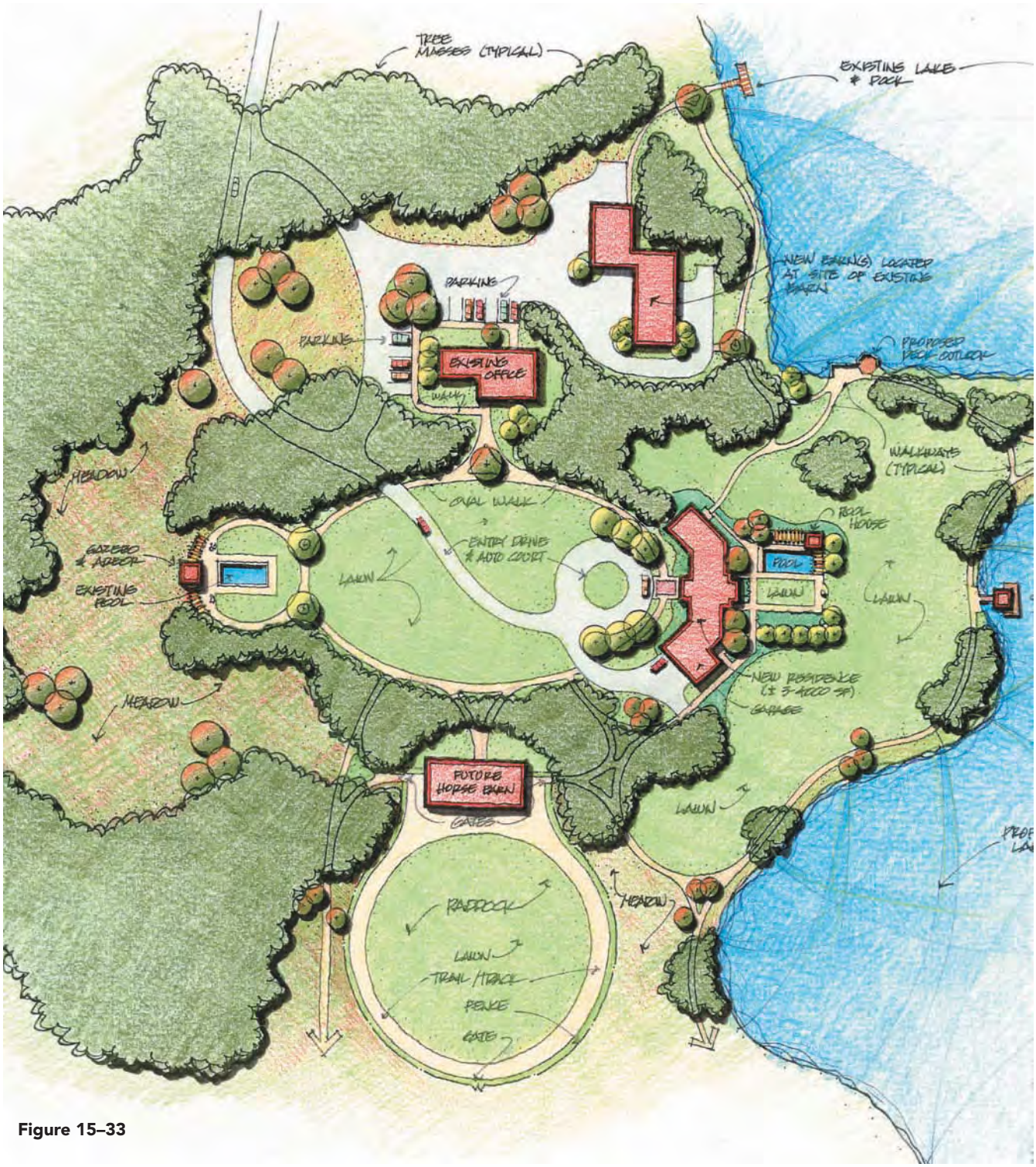


Figure 15–33

MASTER PLAN RENDERING: 8–9 ACRES (FIGURE 15–33)

The site plan in Figure 15–33 represents about a quarter of the entire site. This residential property consists of the main house, the business office of the owners, barns for agricultural equipment, a horse barn with paddock, formal lawns, meadows, masses of woodlots, and a large proposed pond, as well as roads and walks throughout. When developing landscape designs of this size, initial design and planning are

directed primarily toward the location of major structures, locations of vehicular and pedestrian circulation, major masses of plant materials, large individual shade trees, and general sizes and forms of lawn panels, terraces, pools, and so on. Given the scale of the plan, only so much detail is appropriate. Therefore, color rendering of a plan of this type should stay simple, with minimal color for the various design elements. This color plate was prepared by The EDGE Group—Planning, Landscape Architecture & Graphic Design, Columbus, Ohio.

MASTER PLAN RENDERING: 5–6 ACRES (FIGURE 15–34)

The main drive of this site passes through an allee of trees into the front court. A four-car garage is to the right, which exits into the minor auto court and out to the drive. Adjacent to the front court is a central lily garden with walkways and pools. The recreation area contains a tennis court, a half-court basketball court, and a gazebo for relaxation and viewing. A special walkway leads from the house to a gathering space with a grand view to the adjacent pond. The back area of the house is the entertaining area. The living area and master bedroom view onto this space and to the pond. A swimming pool and terrace are the central features. Adjacent to these are a series of terraced gardens, a guest house, and a large spa, all overlooking the entertaining area. This color plate was prepared by The EDGE Group—Planning, Landscape Architecture & Graphic Design, Columbus, Ohio.

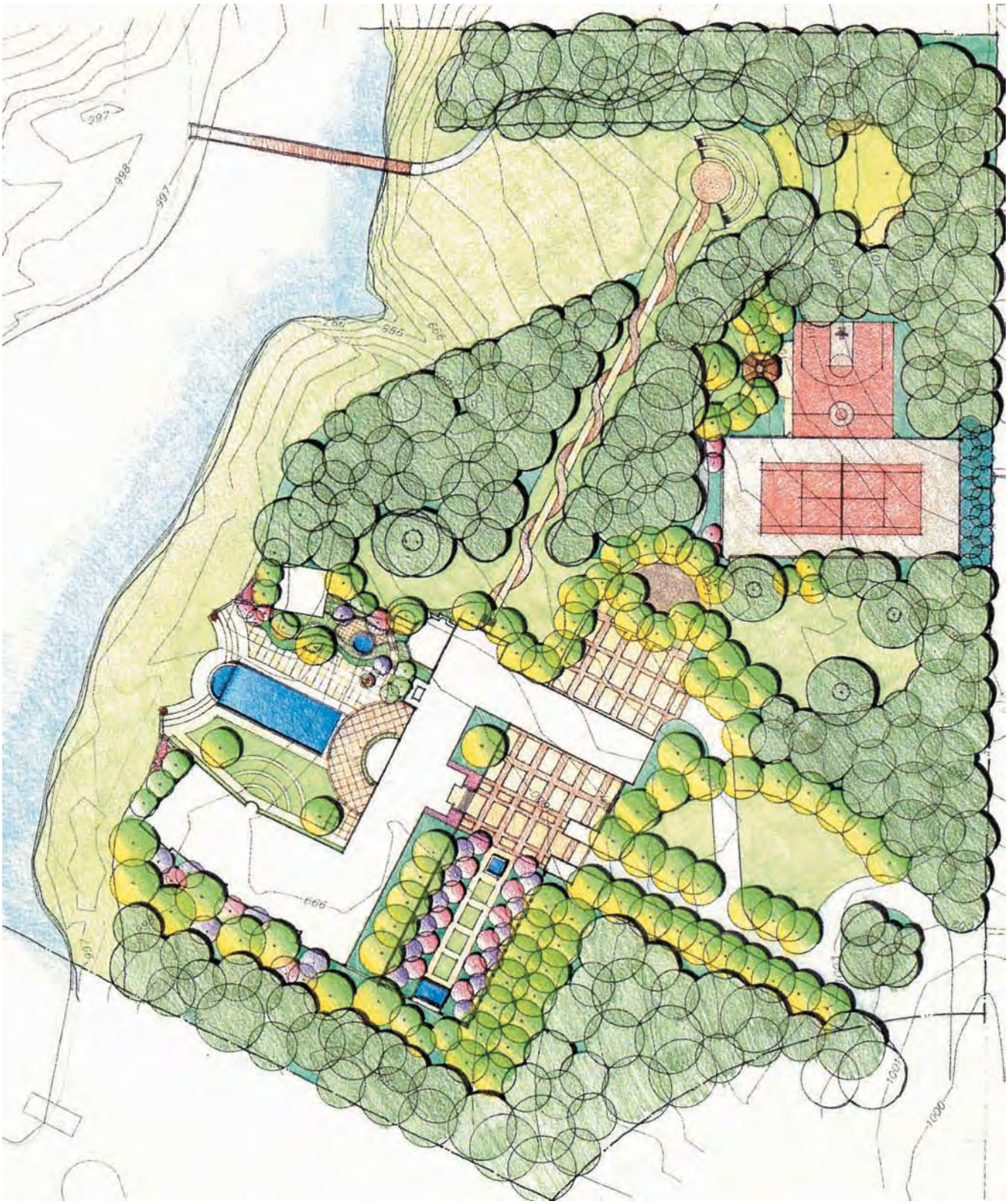


Figure 15–34

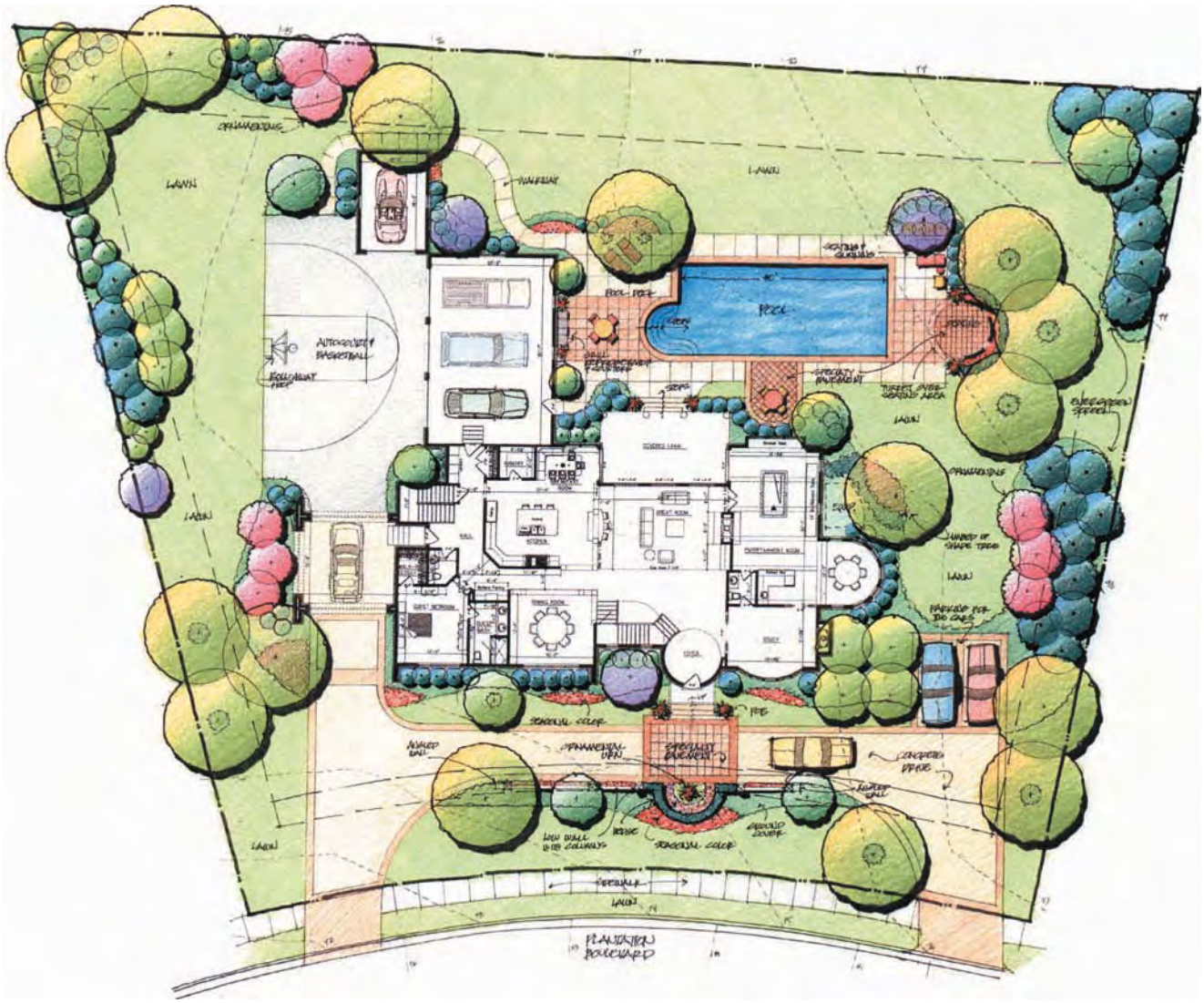


Figure 15–35

MASTER PLAN RENDERING: 3/4 ACRE (FIGURE 15–35)

There are two driveway entries on this property. One serves as place for visitors to arrive, to drop people off at the front door, as well as for deliveries. The side entry leads to the auto court and garages, which also serves as a basketball court. This access also serves as an exit for those entering the other end of the drive. The front entry space, defined by low walls and hedges, focuses on a specialty paved area and small central viewing garden. The major entertaining area is in the back of the house. The pool, terrace, outdoor kitchen, special seating areas, and overhead arbor make for pleasant places to sit, relax, cook, and entertain. The views to the rear of the property are kept quite open to allow for spectacular views to an adjacent golf course. This color plate was prepared by The EDGE Group—Planning, Landscape Architecture & Graphic Design, Columbus, Ohio.

MASTER PLAN RENDERING: 1/2 ACRE (FIGURE 15–36)

This property has a U-shaped entry drive with a specialty pavement drop-off area. The front door looks out onto a small lawn area, a low stone wall with some focal planting, and two large trees to enframe the house from the street. The driveway

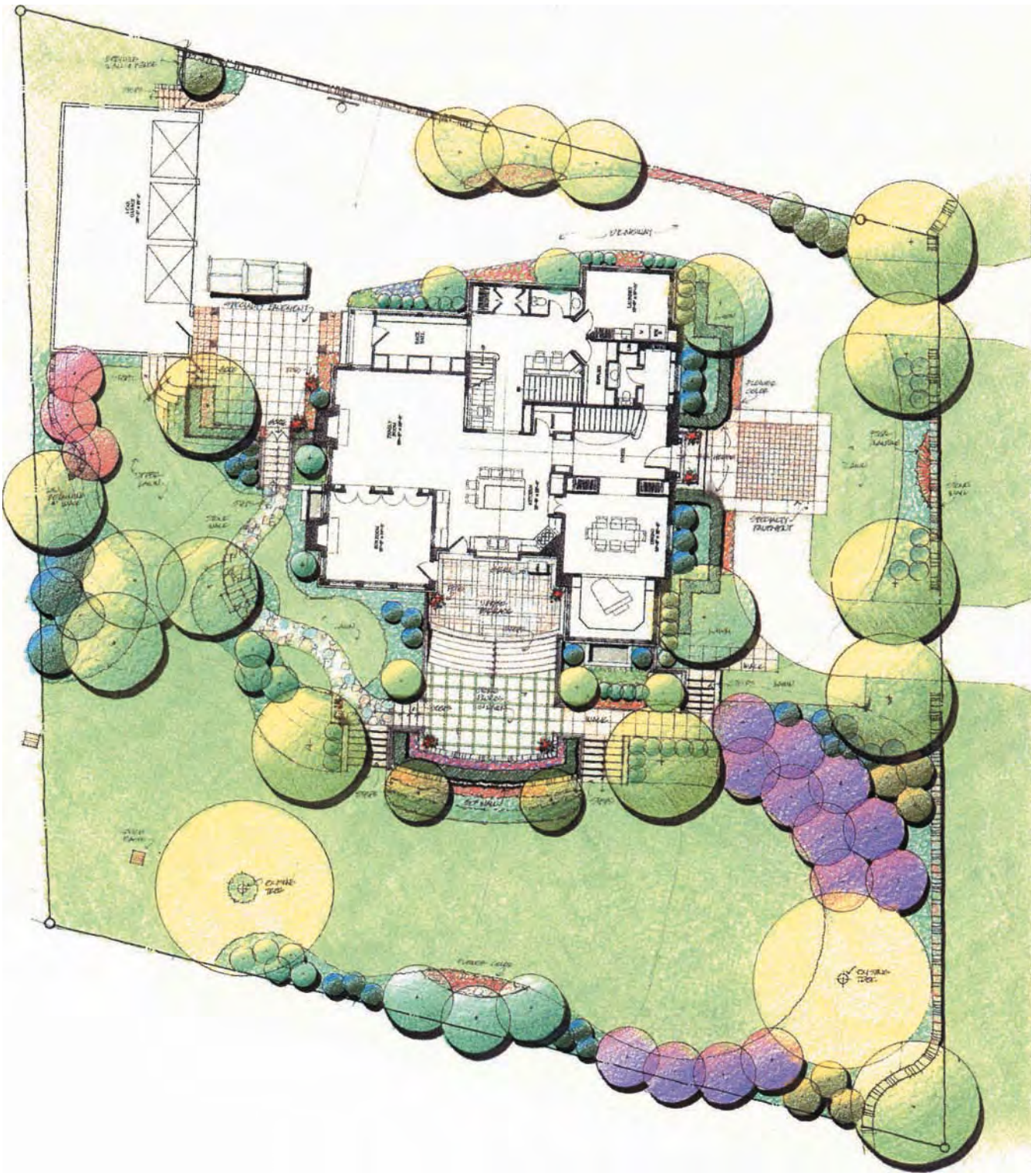


Figure 15–36

extends to the right back to the garage. There is a patio space adjacent to the driveway that serves as an outdoor entertaining area, as well as a place to back out of the garage or for parking another car. From there, a set of steps leads to a lower lawn for the owners' dogs, and then onto a stone path that leads to a two-level formal entertaining space adjacent to the kitchen/breakfast area. Two sets of steps lead to the lowest lawn area, where the major space is located for the kids' soccer play. Another set of steps leads back up to the front of the house. This color plate was prepared by The EDGE Group—Planning, Landscape Architecture & Graphic Design, Columbus, Ohio.

MASTER PLAN RENDERING: 1/3 ACRE (FIGURE 15–37)

Based on this house addition, which consisted of a large family room and a second-story master bedroom, two major spaces were developed to provide useable outdoor space. A major formal entertaining garden is located just outside both the living room

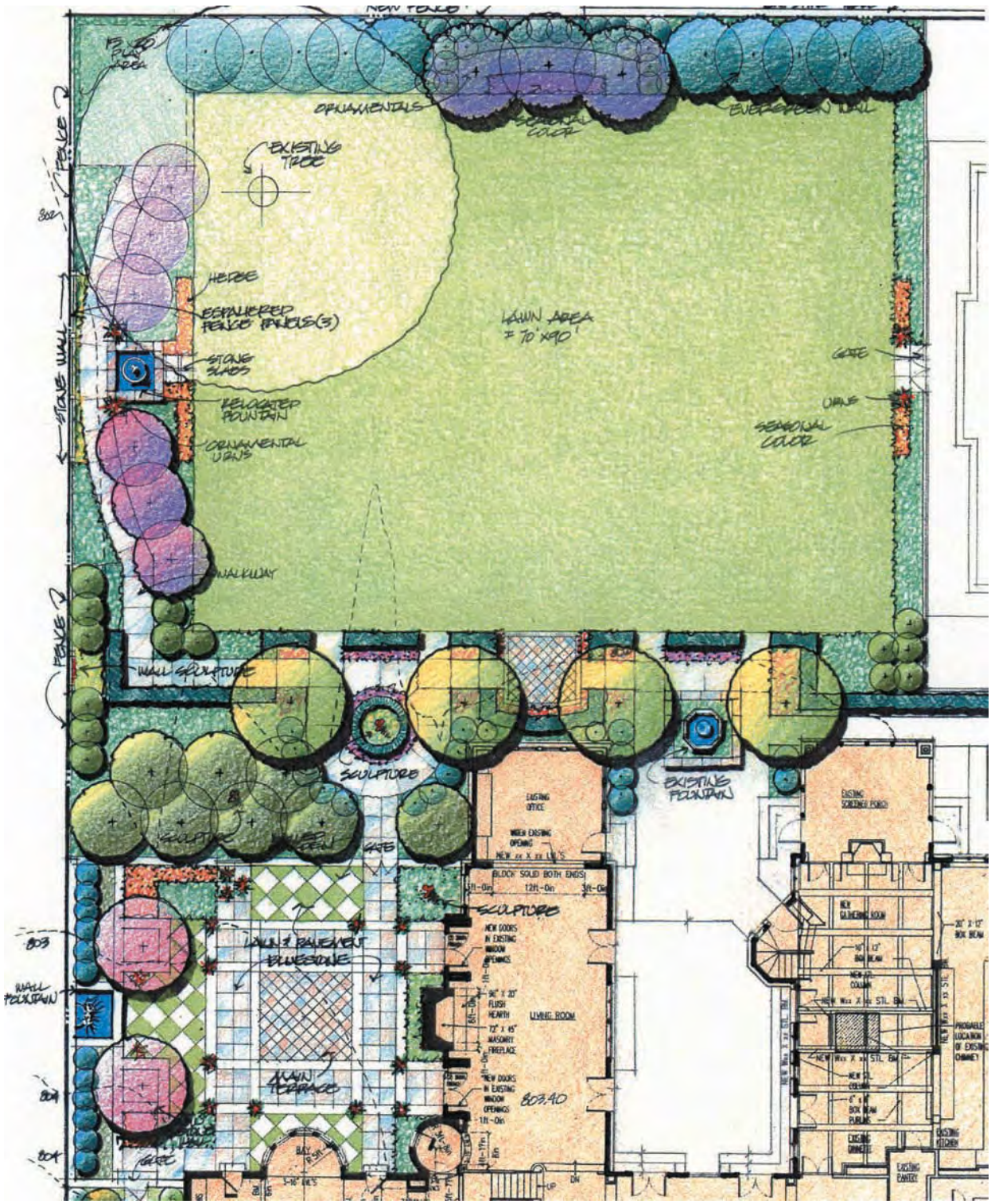


Figure 15–37

and the family room. The central part of this space is a large formal stone terrace. An ornamental stone wall fountain is centered between the two doors of the living room and on axis to the large fireplace. An angled checkerboard pattern of stone slabs and lawn provides a visual pattern for the garden. A stone path leads from this space, around a small formal garden sculpture, into the major lawn area for children's play. An ornamental garden sculpture, in a small pool flanked by annuals and ornamental urns, makes for a major view from the gated pool area to the right. This color plate was prepared by The EDGE Group—Planning, Landscape Architecture & Graphic Design, Columbus, Ohio.

SUMMARY

Color rendering your landscape designs, in both plan and section, can be very beneficial in portraying design ideas to clients. The use of color will assist the client in differentiating between the design elements. Having completed this chapter, you should understand and/or be able to do the following.

- Identify, draw and use the 16 different line types in a variety of ways.
- Identify and demonstrate the 11 color pencil techniques in both plan and section.
- Render the following design elements in a variety of ways in both plan and section:
  - Lawns and ground covers
  - Deciduous plants
  - Coniferous evergreen plants
  - Tropical plants
  - Paving materials
  - Structures
  - Water
  - Specialty elements
- Know and demonstrate the differences in rendering (1) an already rendered black and white drawing, and (2) a basic plan (nonrendered black and white drawing).
- The differences in color rendering drawings during the various stages of design.
- The differences in color rendering drawings developed at a variety of scales.

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