CHAPTER 2
LANDSCAPE DESIGN GUIDELINES

Section I. Principles of Landscape Design

2-1. Unity. Unity is the most important principle of good planting design.

a. One means of introducing unity into a planting design is to enclose open spaces or frame vistas. Large open spaces may be visually unified into attractive areas for a variety of uses such as athletic fields and parade grounds. Where a view beyond the open area reveals objectionable features in the winter, a screen composed primarily of evergreen plants should be used. Where the view beyond is pleasant, deciduous trees and shrubs may be used in the screen.

b. A plant or plant mass can be either a focal object that provides visual delight or a support element that helps to reinforce or frame a focal element such as a view, a piece of sculpture or a building (fig 2-1).

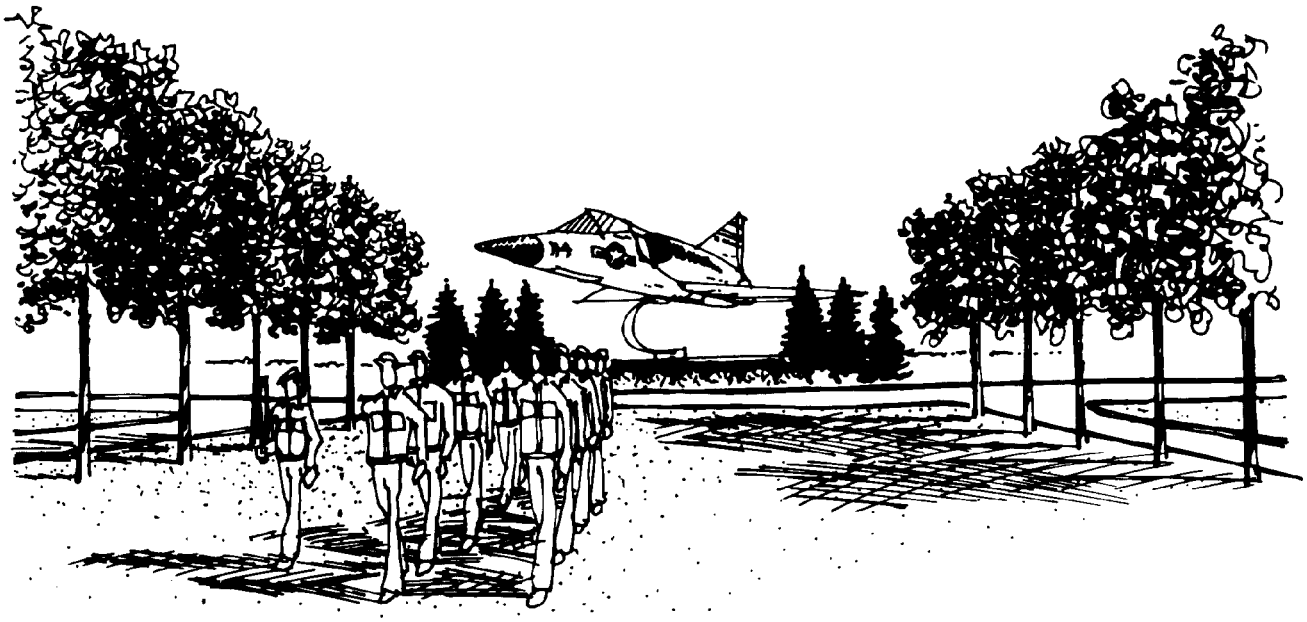

Figure 2-1. Creating a focal point.

c. In an area of buildings otherwise characterized by mundane or incompatible architecture, the colors and textures of mature trees and shrubs tend to lessen the contrast between buildings and visually unify the total composition of the area (fig 2-2).

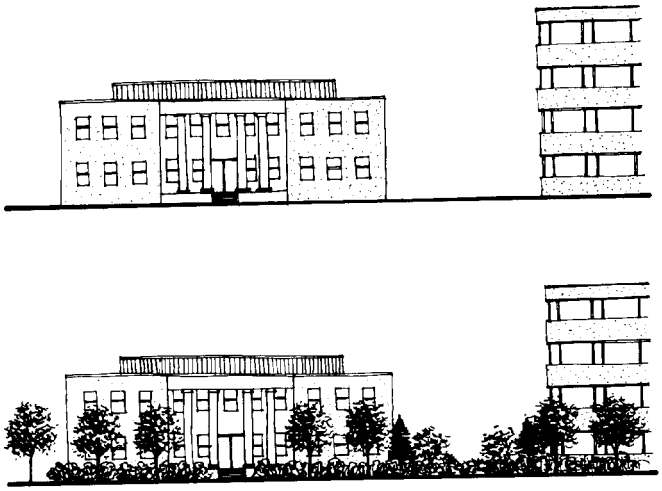

Figure 2-2. Mediating element.

d. Plants can play two roles in unifying a building with its setting. At a detail level, plants can visually integrate a building with its site where the outdoor ground plane meets the building mass (fig 2-3). On a larger scale, plants can blend a building into its overall setting.

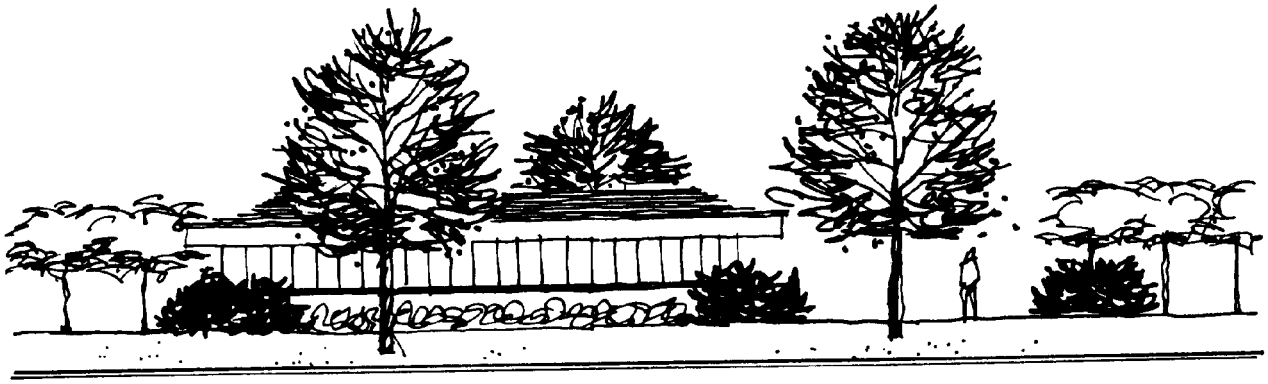

Figure 2-3. Transition/blending elements.

2-2. Balance. Balance is the arrangement of plants or groups of plants to achieve visual equilibrium by employing either a symmetrical or asymmetrical arrangement.

a. Symmetrical or formal balance exists where the same number, size and type of plants are placed on each side of a visual dividing line such as a walkway (fig 2-4). The important of certain areas or selected buildings and the approaches to them can be emphasized by formal planting. However, formal plantings require high maintenance to retain a consistently satisfactory appearance. Plant losses are conspicuous and replacement may be difficult and costly. To minimize labor and expense, planting should be predominantly informal with only occasional use of symmetry to accent a particular architectural or site feature.

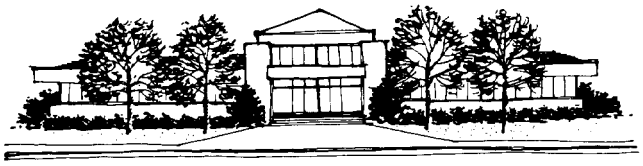

Figure 2-4. Symmetrical plantings.

b. Asymmetrical balance can be achieved by using different types of plants in a mass or group which appear to balance. For example, a large shade tree may have a balancing effect when used with a group of smaller ornamental trees or shrubs (fig 2-5). Asymmetrical balance is difficult to achieve because seasonal changes and growth alter the appearance of plants. However, if plants are carefully selected, a balanced appearance is possible throughout the year. Some deciduous plants, for example, have branching patterns which balance with other plants in the composition even during the winter when foliage color has changed or disappeared.

Figure 2-5. Assymetrical plantings.

2-3. Contrast. Contrast is achieved by the arrangement of plants in relation to each other in such a way that differences in size, shape, texture or color are emphasized. Plants can be selected and arranged to focus attention on other plants, as in the case of an evergreen hedge used as a background for flowering shrubs. A mass of low plants provides a contrasting base for an entrance sign and in this way focuses attention on the sign. Similarly, large trees may be used to emphasize a building entrance or other important site feature, such as a gateway. In these cases, the contrast between trees and architectural features draws attention when seen either from a distance or nearby (fig 2-6).

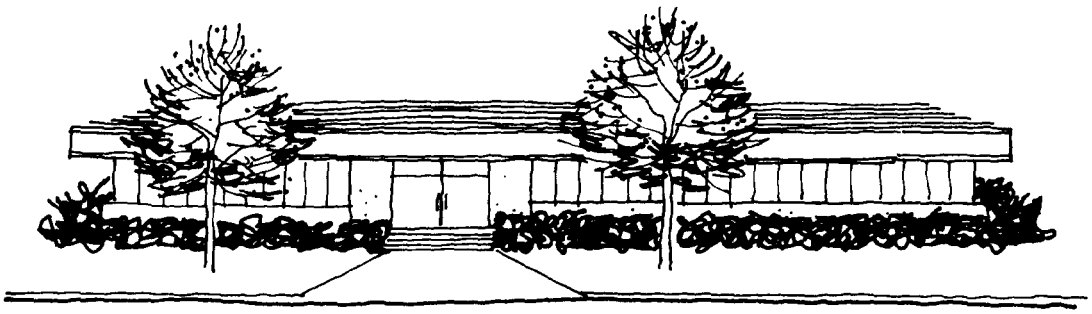

Figure 2-6. Emphasis.

2-4. Rhythm. Rhythm is achieved by a regular spacing of single plants or plant masses, such as a row of trees or shrubs, or the repetition of similar plant groupings. Rhythmic plantings produce emphasis and unity in the landscaping. Rhythmically spaced street trees create a strong visual pattern which is effective in drawing attention to main traffic circulation routes on the installation (fig 2-7). Rhythm may also be created by regular placement of landscape elements according to color, shape or size.

Figure 2-7. Directional element.

2-5. Color and texture. The color and texture of plants can improve the appearance of an area. Because light, shade and the location of the observer affect the perception of both color and texture, the amount of sunlight falling on plants should be considered in their placement. The appearance of plants with distinctive texture or color will change depending on whether they are seen with hack or front lighting, from a distance, or close-up. Plant surfaces may range from glossy to dull; this affects their ability to reflect light and alters their appearance.

a. Colors are classified in two basic categories: warm colors (red, orange, yellow), which are stimulating, and cool colors (violet, blue, green), which are calming. Color can provide contrast or emphasis in a planting design. Masses of foliage or blossoms of a single color generally have greater visual impact than a mixture of several colors. "One of each kind" is a design style to avoid. Care should be exercised to pick colors which are harmonious when seen together. Many deciduous plants provide a source of color in the fall with brightly colored foliage. The brightly colored berries of some evergreens, such as holly, provide fall and winter color.

b. Texture of plant materials can range from coarse to fine (fig 2-8). The texture of a particular plant may appear to change depending on the distance from which it is viewed and its relationship to surrounding materials. A planting screen which is intended to serve as a security aid can be very effective if it is composed of rough, thorny plants.

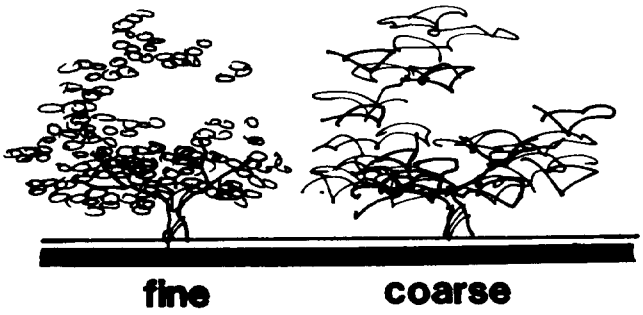

Figure 2-8. Texture.

2-6. Simplicity. Landscapes should be simple in design so that excessive maintenance is not required. The shapes of shrub beds should be uncomplicated where they border mowed turf. Large power mowing equipment cannot operate efficiently in areas cluttered with isolated plantings. Hand trimming or the use of small mowers is labor intensive and therefore costly. Lawn areas are simpler to mow if trees are confined to shrub beds or ground cover areas. Ground covers or shrubs should be considered for use in areas that are small or difficult to mow.

2-7. Ultimate effect. Planting should be as permanent as possible. The ultimate effect must be kept constantly in mind when selecting and arranging plants. The final landscape plan should indicate the plants at approximately two-thirds of their ultimate size to assist in correct spacing. Short-lived plants which grow quickly should be used only where an immediate effect is essential or where, in the course of time, they may be removed as the space they occupy is filled by growth of more permanent plants. Tall plants should usually not be planted under windows. For example, evergreen trees cut off light, air and views from windows unless they are pruned at frequent intervals. Plantings in the vicinity of traffic intersections should be low-growing or high-branching so that they do not block the vision of passing motorists. When limited budgets preclude the purchase of large plants, it is usually better to plant the desired trees and shrubs in smaller sizes and wait for the desired effect than to compromise by substituting inappropriate species. The use of even a few large trees can create an early effect of permanence.

2-8. Spatial articulation. Plants can be used to enclose spaces and to separate spaces from one another

(fig 2-9). Plantings can also be used to direct people through outdoor spaces by visually defining and rein forcing patterns of movement (fig 2-10). The degree of enclosure, separation, or movement depends to a large extent on the density and type of plantings. The effectiveness of deciduous plantings varies with the season, whereas evergreens are consistent year-round.

a. Planting screens. Plants with dense, abundant foliage may be used as screens to conceal objects or views. Plantings require more space and maintenance than fences or walls used for screening purposes. Where limited area prohibits use of plant screens, a fence or wall softened in appearance with vines or a few shrubs may be an effective and economical solution.

b. Buffer plantings. Plantings used as buffers may be composed of lawn areas; shade trees planted in groups; or combinations of lawn, shade trees, flowering trees and evergreen shrubs (fig 2-11).

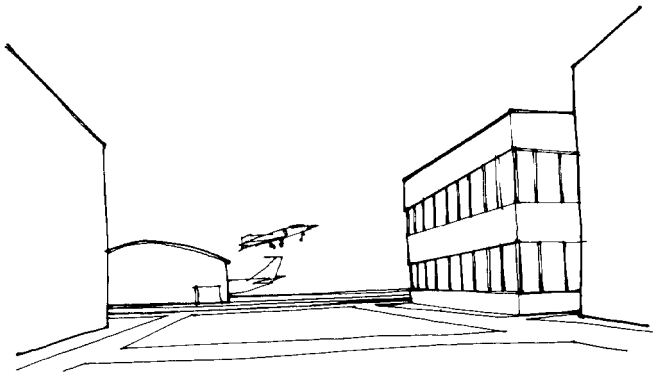

Figure 2-9. Spatial articulation.

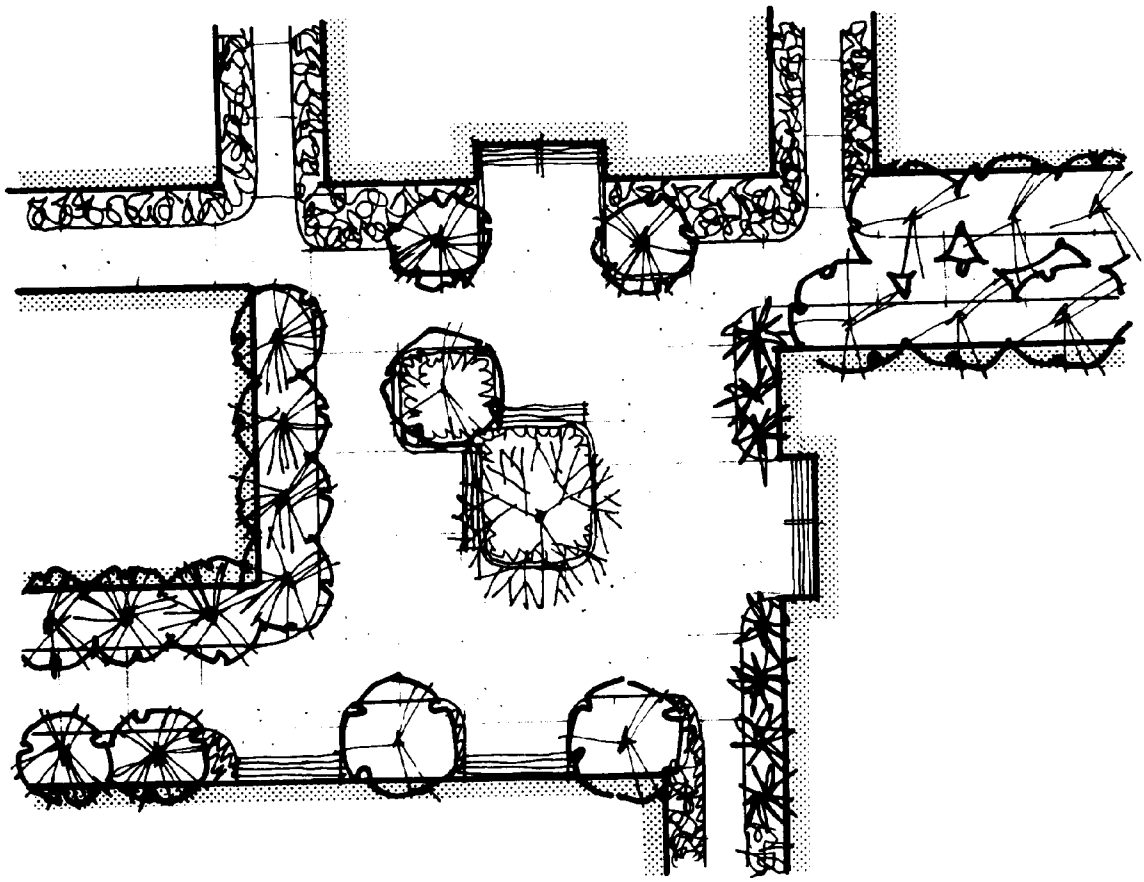

Figure 2-10. Movement sequence.

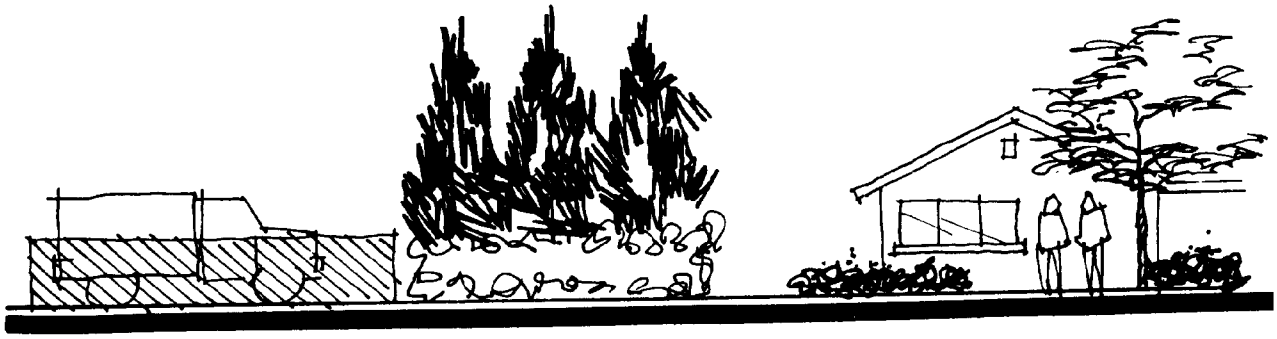

Figure 2-11. Buffering element.

Section II. Attributes of Planting

2-9. Aesthetic value. Plantings made for utilitarian purposes, such as screening service areas or shading hot pavements, will simultaneously improve the appearance and enhance the livability of an area. The use of plantings can introduce visual variety, create vistas, and relieve bareness. One desirable effect of planting is a reduction in the monumental scale of structures; this relieves the visual oppressiveness created by large buildings and adds to the psychological comfort of the viewer. Plantings can separate groups of buildings into several pleasantly framed units and enhance individual buildings within each group. Shrubs and small trees arranged in strategic groups around a building often improve overall appearance by softening structural lines. This technique integrates the building and its site and diverts attention from unattractive structural features. Vines on large, blank masonry walls can be attractive but should not be used where injury to the structure may result.

2-10. Wildlife conservation. Plant materials support wildlife and can be used to increase or decrease the number and variety of animal species. Landscaping so as to attract animal species such as songbirds and small game can add to the richness of residential and administrative areas. Plants used for this purpose usually have the added advantage of being native and requiring low maintenance. Care must also be taken so that wildlife habitats that are nuisances, such as black-bird roosts, do not contribute to bird aircraft strike hazard (BASH) problems.

2-11. Environmental Controls.

a. Energy conservation. Skillful utilization of plants significantly increase the energy efficiency of buildings. Air-conditioning requirements for most buildings result from solar energy absorbed by building surfaces. By shading those portions of the building receiving the most sun, cooling requirements can be significantly reduced (fig 2-12). During summer months, deciduous trees provide shade, while during winter months, their bare branches allow sunlight to reach exterior building surfaces and reduce heating requirements.

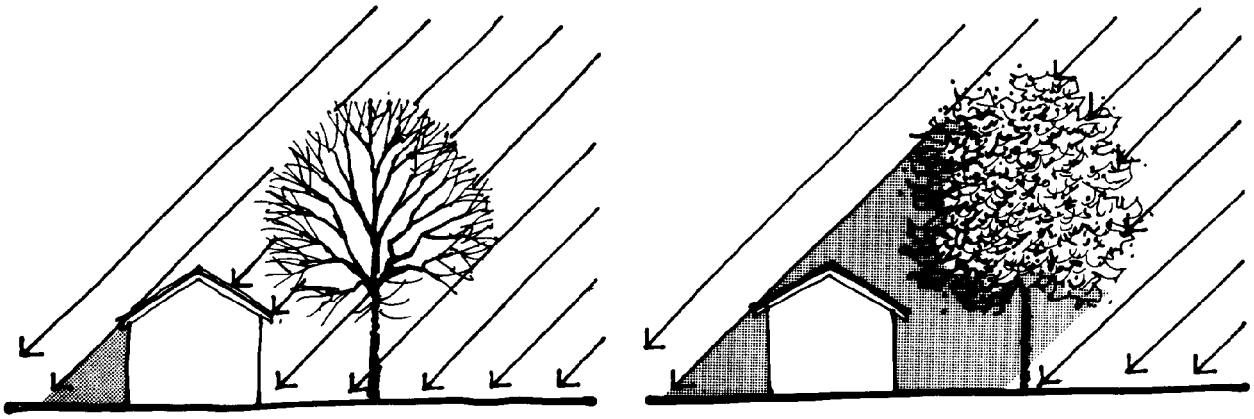

Figure 2-12. Solar radiation control.

b. Reduction of noise. Dense foliage is of some use in absorbing and deadening noise (fig 2-13). In locations such as family housing areas located near main traffic arteries, deep belts of planting may prove beneficial in reducing traffic noise. Sounds caused by breezes rustling through leaves and branches can mask undesirable noise.

c. Wind control. Wind is a climatic factor that can be either pleasant or unpleasant depending on air temperatures, relative humidity and air velocities. Plants can be used to break, guide, deflect or filter the wind and thereby alter its effects (fig 2-14). To properly design for wind control using plant materials, a basic knowledge of air dynamics is necessary. Information about the directions of prevailing winds and their average speeds for different seasons of the year is also necessary.

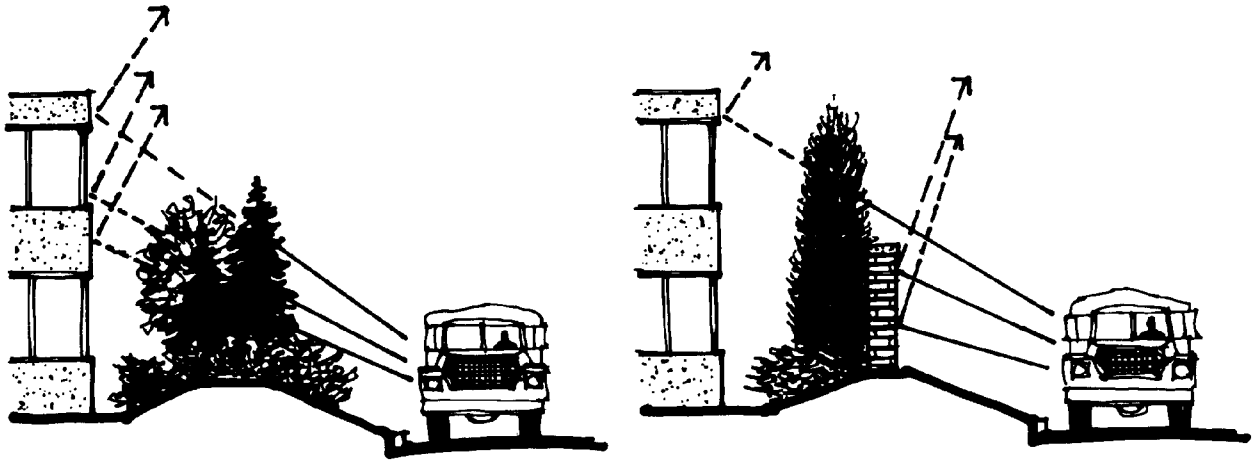

Figure 2-13. Traffic noise control.

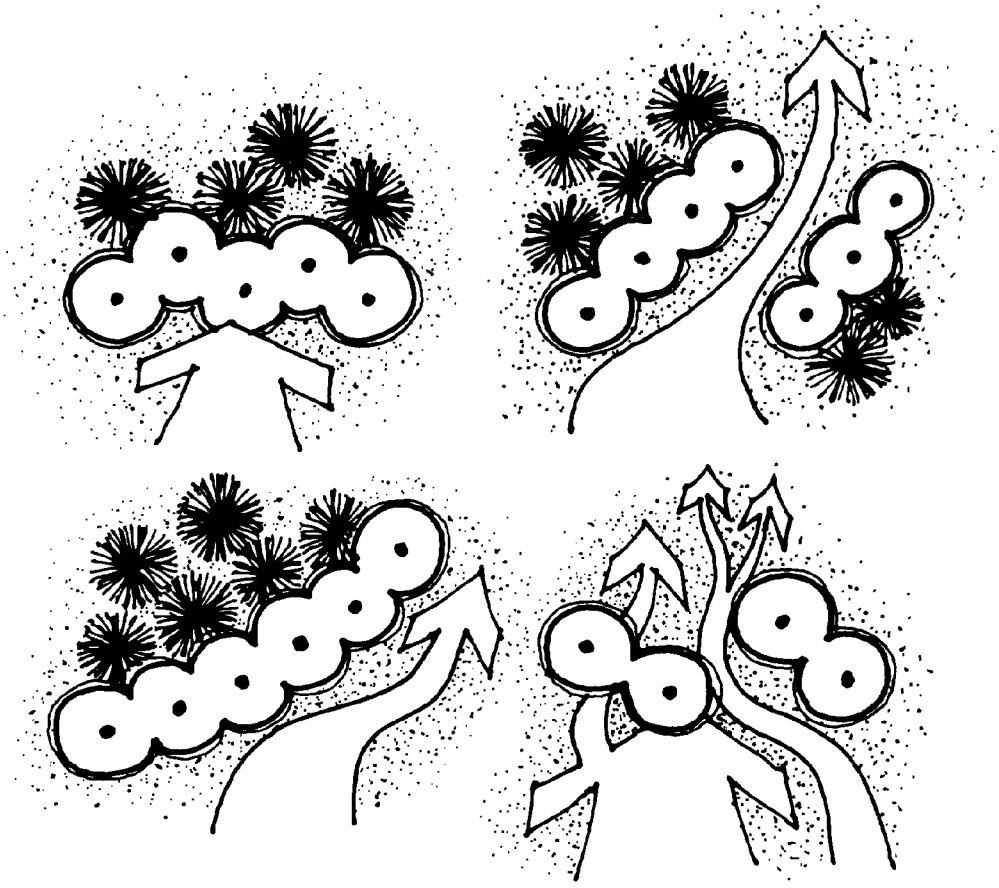

Figure 2-14. Wind control—directional.

(1) When plants are used as a wind barrier, wind can generally be affected for a lateral distance of 2 to 5 times the height of the barrier on the windward side and a lateral distance of 10 to 15 times the height of the barrier on the leeward side (fig 2-15).

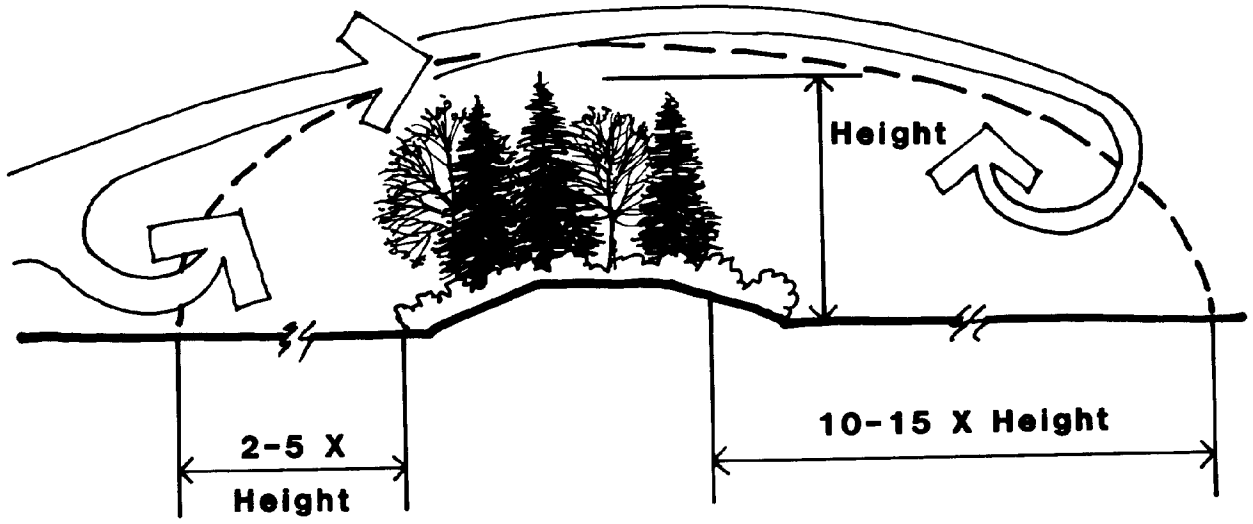

Figure 2-15. Wind barrier.

(2) Plants tend to be better windbreaks than fences or walls because they permit some degree of wind penetration. The effective distance of wind control on the leeward side is increased by use of penetrable screens because less turbulence is created. A planting density of about 60 percent offers maximum effectiveness (fig 2-16).

(3) The depth of a shelter belt, or wind screen, has no real effect on the amount of wind protection provided; the primary factors influencing effectiveness are the height and density of planting (fig 2-17).

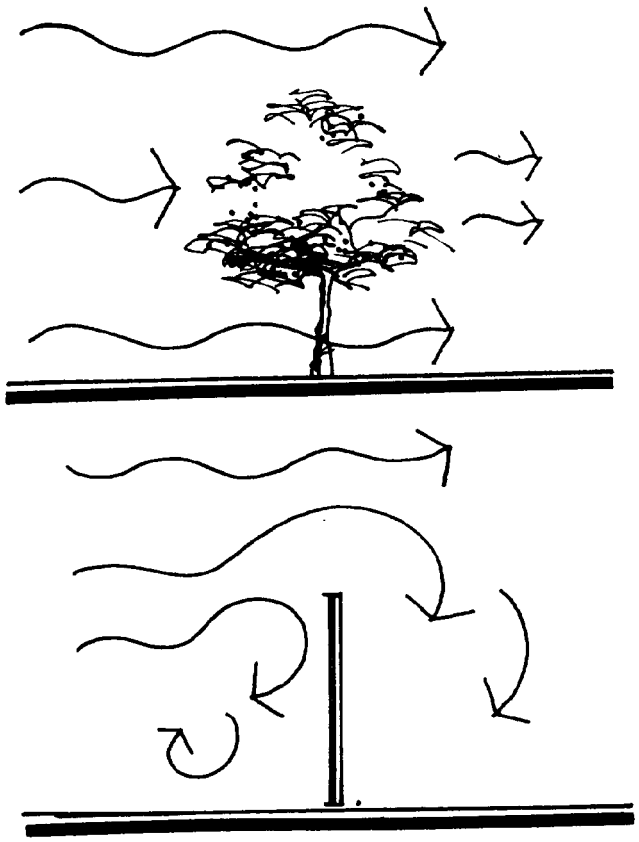

Figure 2-16. Wind turbulence.

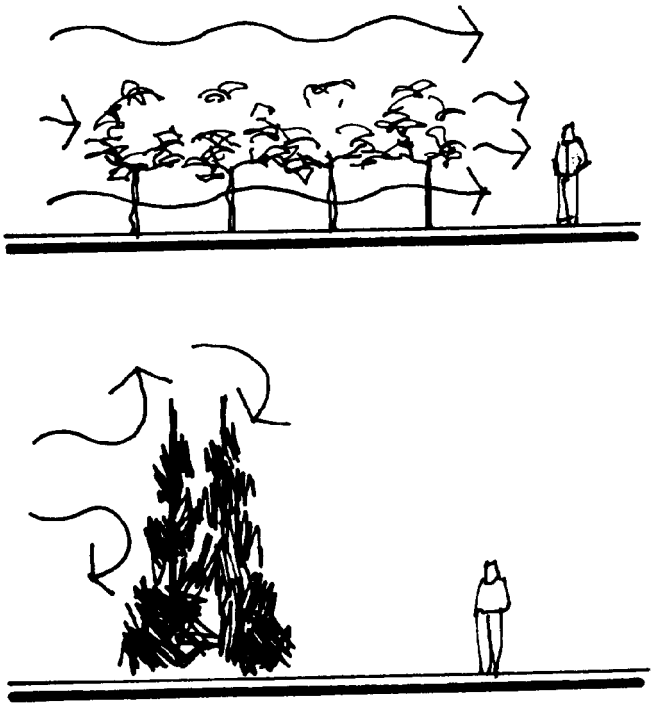

Figure 2-17. Increasing wind protection.

(4) Irregular forms and spacing tend to provide a more effective windbreak than evenly spaced, uniform plants. A variety of plant types and sizes should be included to improve the efficiency of a windbreak (fig 2-18).

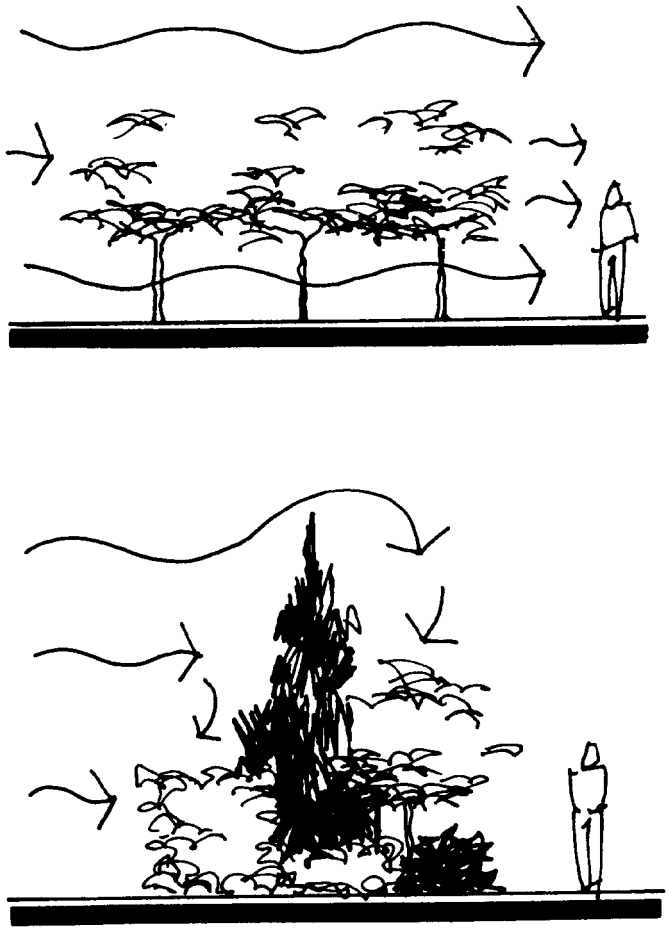

Figure 2-18. Use of irregular forms.

(5) Evergreen plants that branch to the ground are the most effective year-round windbreaks. Deciduous trees and shrubs are effective only in the summer.

(6) Wind velocities will be increased if wind is permitted to penetrate under a high-canopied tree. A gap in a windbreak tends to create stronger winds by funneling the air (fig 2-19).

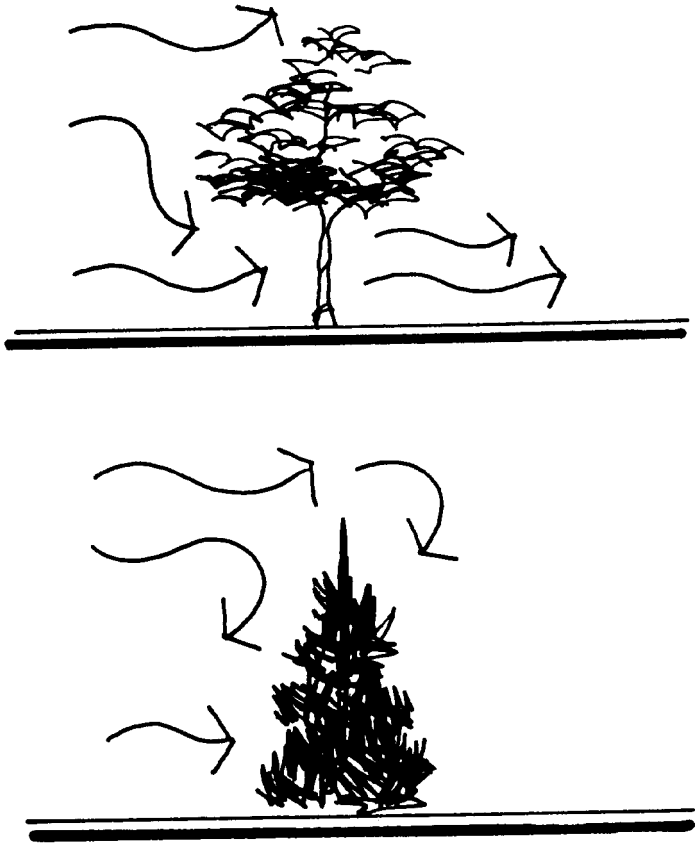

Figure 2-19. Wind velocities.

(7) Drifting snow may be controlled by a series of plant barriers which alternately increase and decrease wind velocities. This can be accomplished by sweeping an area of snow with strong winds and depositing the snow where wind velocity decreases (fig 2-20).

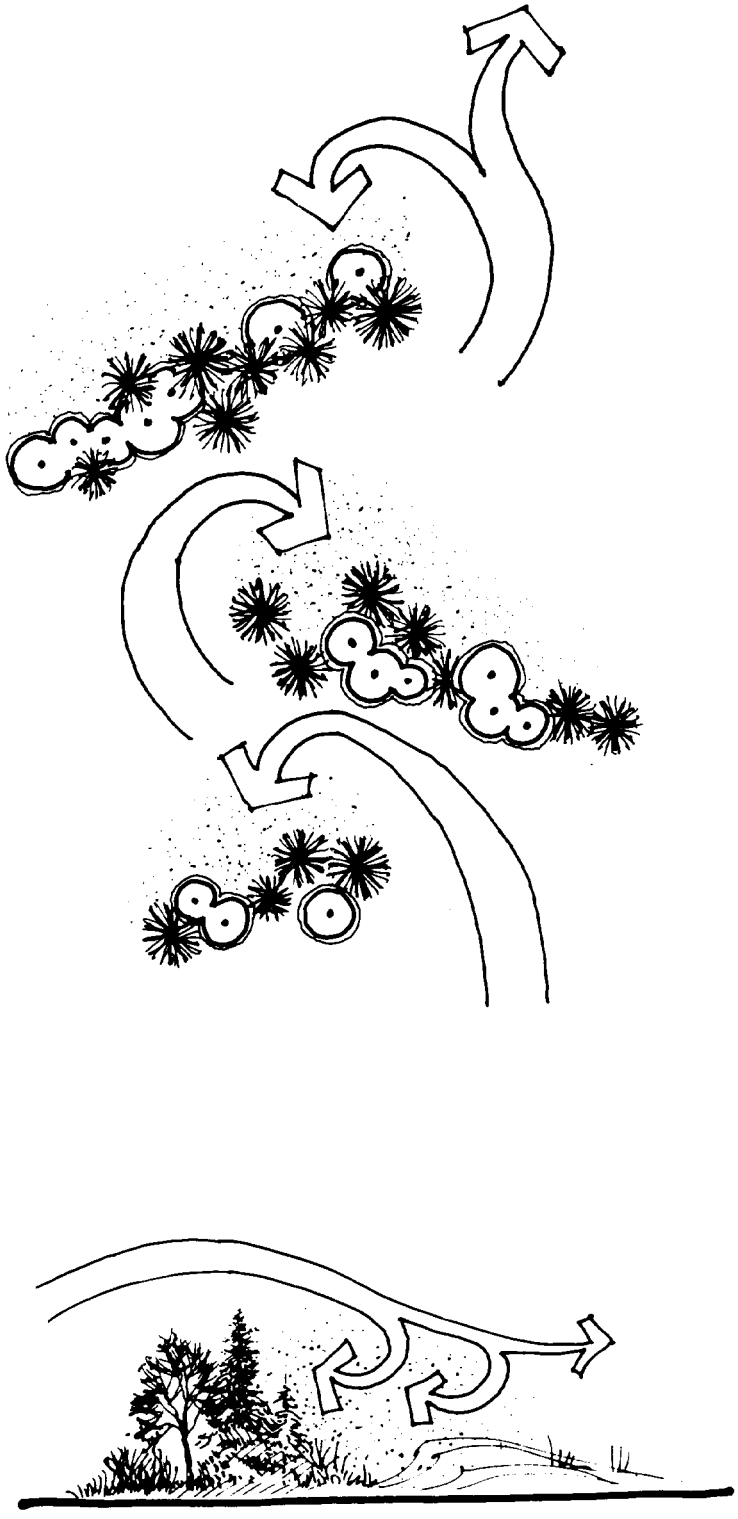

Figure 2-20. Snow drift control.

d. Temperature modification. Vegetation reduces the ambient air temperature by the cooling effect of transpiration (evaporation) of water through the leaves and by shading the ground. Vegetation covering the ground tends to stabilize temperatures by reducing extremes, whereas paved surfaces usually tend to increase temperatures in the surrounding air by reflecting absorbed heat. Shade trees are important for comfort practically everywhere in the United States. In all areas except genuinely subtropical and tropical areas, deciduous trees are best for this purpose because they furnish shade only during the summer and permit sun to penetrate in winter. Shade in parking areas may be introduced by planting large-growing trees about 40 to 50 feet apart. Trees which exude gummy substances or attract insects should not be selected for use in parking areas.

e. Glare and reflection. Glare from highly reflective surfaces or car headlights can cause visual discomfort. Plants can effectively soften glare and reflected light while adding to the aesthetic quality of an area. The degree to which plants are effective in absorbing and deflecting glare depends on their height, density and location (fig 2-21).

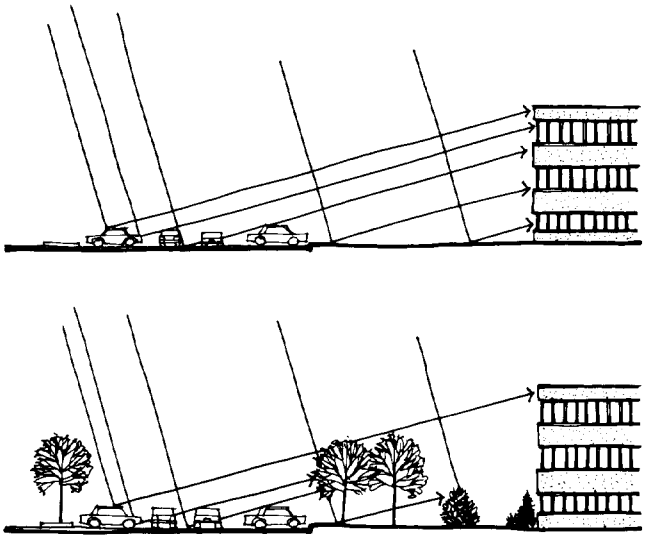

Figure 2-21. Glare and reflection control.

f. Erosion and dust control.

(1) Water is the most significant agent of soil erosion. The two basic types of water erosion are caused by splash and runoff. Splash erosion is best controlled by ground covers and leafy deciduous or evergreen plants. Runoff or sheet erosion is best controlled by grasses and other plants with very fibrous root systems. (fig 2-22).

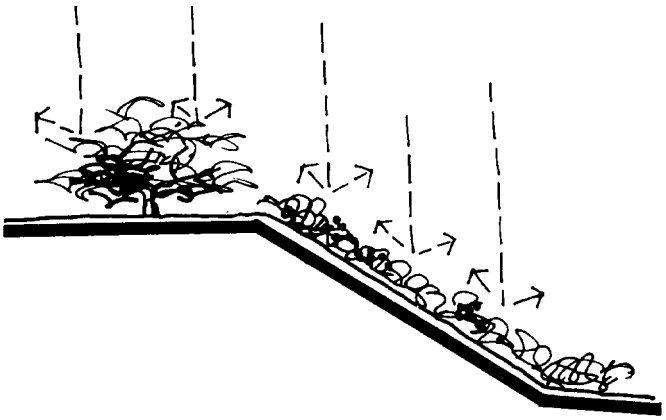

Figure 2-22. Erosion control—water.

(2) Plants can be used to control dust by providing wind barriers or stabilization for bare soil. Twiggy, dense-branching plants are effective as wind barriers. Ground covers, grasses and plants with fibrous root systems are most effective as soil stabilizers (fig 2-23). See TM 5-830-3/AFM 88-17 Chap 3, for specific guidance on dust control.

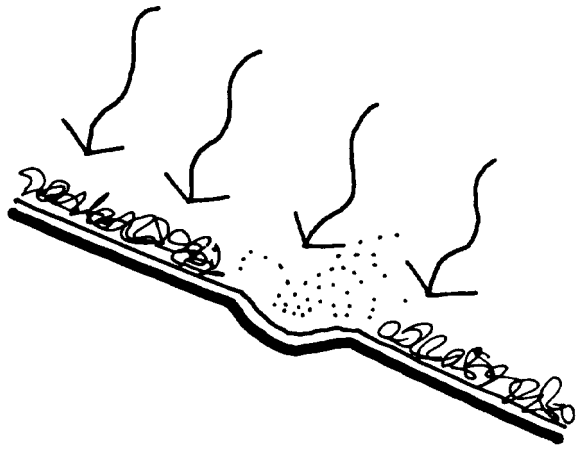

Figure 2-23. Erosion control—wind.

Section III. Design Process.

2-12. Process. A design process that includes conscientious analysis and design of the site, plant selection and development of design details should be employed to achieve the desired objectives of a planting program.

a. Site analysis. A complete site survey and analysis of existing conditions should be undertaken including an inventory of both natural and built features. Site factors of fundamental concern relative to both the retention of existing, as well as the installation of new, plant materials include:

— Visual factors.
— Climatic data.
— Existing vegetation.
— -Soils.
— Hydrology.
— Topography/slope analysis.
— Spatial analysis.
— Program analysis.
— Circulation patterns.
— Noise factors.
— Security requirements.
— Maintenance requirements.

b. Programming. Before a planting design is begun, development of a program is necessary. The program consists of a description of user requirements and environmental design objectives. User needs, environmental problems and maintenance capabilities should be carefully and thoroughly studied. In general, facilities in the 300, 500, 600 and 700 classes, as described in AR 415-28 and AFR 700-20, Volume 3, require some planting. The extent of the planting will vary with each class and with each category of facility within the class. The function and prominence of the facility should be the guiding factor in determining the scope of planting.

c. Conceptual design. After site analysis and program data have been evaluated, work on a conceptual design should begin. This involves arranging masses of plant material masses to satisfy the needs and requirements established by the site analysis and program. Plant masses should be arranged in terms of intended use and size rather than according to species or variety. The primary concern of the conceptual design phase is to provide solutions to the functional requirements of the site so that preliminary cost and phasing plans can be developed.

d. Specification of plant materials. After a satisfactory conceptual design is developed and adequate funding is assured, a final planting plan should be prepared. This involves translating the desired forms and sizes of plant masses into specific plant selections. A thorough knowledge of available plant materials and their characteristics is required.

2-13. Final landscape plan. The final landscape plan consists of a series of working drawings and a set of

specifications. These documents are used by the landscape contractor for bidding and constructing the project. Working drawings, with the exception of construction details, are based on a scale drawing of the site. The type and number of drawings required for a particular project may vary, but usually include the plans described below.

a. Planting plan. The planting plan shows the location and names of all plant materials. The following information about each plant species should be included on or with the plan:

— Common and botanical names.
— Size.
— Type of root preparation (i. e., container-grown, balled and burlapped or bare-rooted).

The required quantity of each plant should be indicated in the plant list.

b. Staking and layout plan. The locations of trees, shrubs, plant beds, hedges and other elements which pertain to planting are illustrated on the staking and layout plan. The exact location of each element is determined by measuring distances from established baselines or, in the case of very large sites, from coordinates of a grid system developed for the site.

c. Landscape grading plan. The landscape grading plan includes information for finish grading of lawns, berms and shrub beds. This plan should be coordinated with other grading and drainage plans for the project.

d. Irrigation plan. An irrigation plan should include the location, size and type of sprinkler heads, drip emitters, pipelines, manual or automatic valves and the water source and meter. Symbols for the various components of the system should be included. Detail drawings which illustrate back-flow prevention devices, system construction and assembly requirements or installation of various components of the system may be added to the plan.

e. Construction details. Detail drawings are used to clarify the construction requirements of various components of a landscape project such as paved landscape areas, retaining walls, footbridges, benches and fences. Detail drawings should include sizes and dimensions of materials to be used and, whenever necessary, construction techniques. Cross sections and elevations may be used to convey this information.

f. Specifications and cost estimates. Specifications for the project include technical data to support information contained in the working drawings and must coincide with information contained in existing military guide specifications. Cost estimates may be used for establishing a budget and a phasing schedule for construction of the project.

Section IV. Design Considerations

2-14. Objectives of landscape design. The overall objective of landscape design is to improve the physical and psychological well-being of people who live and work on military installations by enhancing their environment. Specific objectives are described below.

a. Preserve and enhance existing landscape resources. Existing trees, forest lands and detail planting features are important resources and visual assets that should be preserved and enhanced for functional as well as aesthetic reasons.

b. Improve overall visual quality. Aesthetic and functional applications of appropriate plant materials should be employed to improve the visual character of military installations. Plantings improve visual quality by:

— Harmoniously blending the built with the natural environment.
— Providing scale and comfort to the pedestrian environment.
— Visually reinforcing the hierarchy of the road network (see App B).
— Screening unsightly views or elements.
— Buffering incompatible land uses.

c. Improve the environmental quality of the installation. Better use should be made of plant materials to improve environmental quality and conserve energy. Plants can be effectively used in a variety of environmental applications including erosion control, air purification, noise abatement and climate modification.

d. Minimize maintenance requirements. Appropriate plant selection and detailing can minimize maintenance requirements while improving the visual quality of an installation.

2-15. Preservation of existing vegetation. For the general enhancement of developed areas, as much of the existing vegetation should be saved as is reasonably possible.

a. When the high cost of the extensive planting operations necessary to restore cleared areas is taken into account, complete clearing often cannot be justified. Costs of replacing existing vegetation should be weighed against costs of any special measures which must be taken for preservation. However, there are factors other than cost which must be considered, such as the time required to reestablish equivalent plant growth. Careful analysis may indicate that existing vegetation should be saved even if initial costs are higher. This is especially true in areas where immediate control of dust or erosion

is of prime importance. Limiting the extent of clearing and grading operations protects the environment and lowers construction costs.

b. Fast-growing trees regarded as weed types may comprise the predominant native vegetation in certain areas. Such trees are sometimes worthy of preservation until new ornamental plantings have matured, at which time the weed trees can be removed.

c. During site construction, minor variations in road and walk layout should be made to avoid damage to important vegetation.

2-16. Maintenance. Maintenance and its resultant costs may be kept to a minimum by coordinated planning. The design factors described below are essential for economical grounds maintenance and should be considered in the early design stages of a project.

a. Drainage. Good drainage of the surface and subsoil is necessary for successful plant growth and erosion control. Subsurface drains should be installed to correct conditions of excessive water retention in the soil. An alternative to subsurface drains, in some cases, is the selection of plants tolerant of wet conditions. Surface drainage in planted areas will be aided by proper grading. TM 5-820-4/AFM 88-5, Chap 4 contains further information concerning drainage.

b. Grading. Steep slopes are difficult and expensive to mow and maintain and are subject to erosion. Good grading design can often reduce the steepness of slopes. Slopes which must be mown should not exceed a grade of 3:1; top and bottom should be rounded to prevent erosion and facilitate mowing. Slopes steeper than 3:1 should be riprapped or planted with ground cover or other low maintenance plants which do not require mowing. Extensive grading should be avoided near existing trees; addition of deep fill or compaction of the soil within the drip-line can eventually kill the tree. Each site should be studied carefully to minimize grading and take maximum advantage of existing topography, vegetation and topsoil.

c. Detail planting. Flower beds and sheared hedges require a great deal of costly maintenance and should be used sparingly in selected locations. Where flower beds and sheared hedges are appropriate restraint in design can minimize maintenance.

2-17. Plant selection. Trees, shrubs, ground covers, vines and turf make up the palette used in planting compositions (fig 2-24). Selected varieties should be as few as necessary to satisfy the requirements and objectives of the design. By limiting varieties, clashing colors and forms are less likely to occur, and a unified composition can be created. In selecting plants for a specific project, growth characteristics must be considered. These characteristics are documented in landscape architecture literature, available through libraries, and government publications. Only those plants which can thrive with low maintenance under actual site conditions and produce the desired effect should be chosen. An investigation of plants growing at the project site and also at the oldest parks and cemeteries in the same general vicinity will suggest plants that may be used with confidence; plants found thriving under adverse conditions are likely to succeed with minimal maintenance. The ecological association of plants is an additional factor in plant

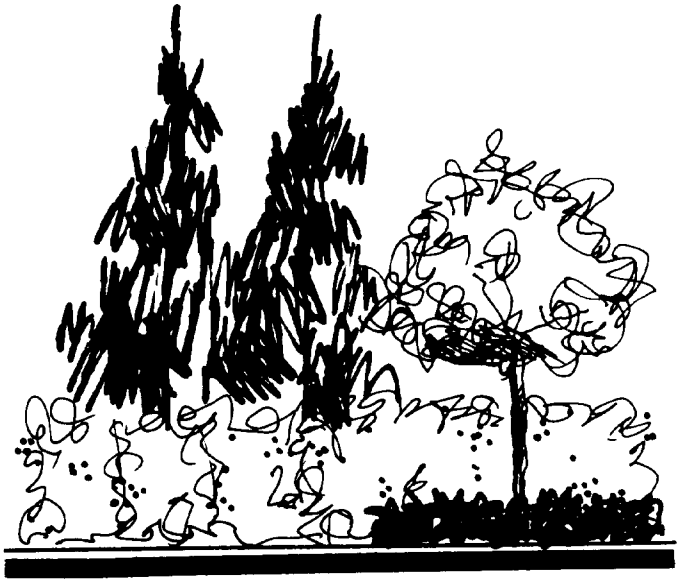

Figure 2-24. Palette of plant materials.

selection since plants naturally grow in groups requiring similar soil and climatic conditions. Other important plant selection factors are hardiness to temperature extremes; soil fertility requirements; ability to survive in very wet or dry soil conditions; the degree of tolerance for wind or salt air; ability to be transplanted; and resistance to insects and diseases. Recommendations on the selection of plants tolerant of specific site conditions can be obtained from the Agricultural Extension Service; Soil and Water Conservation District; or from federal, state, county and city park and forest agencies.

a. Trees and shrubs. To achieve maximum visual and functional effectiveness with minimum maintenance, emphasis should be placed on the use of trees instead of the extensive use of shrubs. Properly selected trees will be less expensive to maintain than shrubs and have greater visual impact on the landscape. Simple and effective planting designs can be achieved with trees, lawns and a limited use of shrubs.

b. Evergreen and deciduous. Deciduous trees offer a wide variety of effects because of seasonal changes, flowers, berries, fruit, and color and texture of bark. Evergreen trees and shrubs provide green color during seasons when deciduous plants are leafless and adds permanent structural value to the landscape. The areas of the country where evergreen plants are not readily available, deciduous ones may be used for a greater part of the planting, with evergreens used only at focal points in conjunction with important features and structures.

c. Vines. Vines must be carefully selected. Many vines climb by means of tendrils, disks or root-like hold-fasts which can damage wood or masonry walls. Maintenance and repair work can be difficult and costly if vines must first be removed. Generally, vines should be restricted to fences, trellises and structures other than buildings.

2-18. Irrigation Systems.

a. Basis for requirement. Irrigation requirements depend on several factors. In selected areas, it may be necessary to use irrigation to promote the healthy and attractive growth of turf. The use of drought-tolerant ground covers, gravel or rock mulch will minimize the need for irrigation systems. However, in some cases, the location, importance or use of an area makes the substitution of alternative ground covers undesirable. Irrigation requirements depend on several factors:

— Precipitation deficiency.
— Soil’s water holding capacity.
— Seasonal distribution of rainfall.
— Quality of turf to be maintained.

Irrigation should generally be provided in arid and semi-arid regions to enhance the quality of turf, even though lawns or other grasses may survive without irrigation. Supplemental irrigation may be needed in subhumid and humid regions where many adapted non-native grasses tend to become dormant during periods of drought.

b. Design factors. The following factors should be evaluated when designing an irrigation system:

— Availability and accessibility of existing water supplies, including non-potable sources.
— Amount of water required, as determined by type of turf to be irrigated, climate, terrain and soil conditions.
— Budget.

TM 5-630/NAVFAC MO-100.1/AFM 126-2 provides further guidance for the design of irrigation systems.

c. Types of systems. The use of pop-up systems is justifiable in arid and semi-arid regions where frequent irrigation is required. Quick-coupling sprinkler systems are mainly used for areas where only supplemental irrigation is necessary. Where pop-up spray systems are used, automatically controlled, clock-timed systems are recommended to save labor and facilitate non-peak water use. Hose bibs on building exteriors may be used for limited irrigation and hand-watering. Any irrigation system, either hand-watering or automatic pop-up systems, should be based on a feasible irrigation schedule in terms of hours per day or per week.

d. Project justification. Projects using either pop-up or quick-coupling sprinkler systems must be justified on the basis of amortization and operating costs. An analysis should include:

— Estimated precipitation deficiency on an annual basis and for the summer season (June through August).
— Acres of installation grounds currently irrigated by underground systems and all other means (hose bibs, flooding or portable systems).
— An analysis of the system's impact on water usage rates, especially during peak usage periods, in relation to current installation water resources.
— A discussion of any soil factors or turfgrass management conditions affecting the irrigation requirement.

e. Sewage plant effluent. Sewage treatment plant effluent may be used for irrigation wherever feasible. In addition to the justifications and information considered in the proceeding paragraphs, answers to these questions should be provided:

— Is there enough effluent available to support both short and long-term irrigation needs?
— Is the proposed irrigation distribution system isolated from existing distribution systems for potable water supplies?
— Will site-users have direct contact with irrigation water?
— Will Federal, state and local health requirements be met?

f. Planting design in arid areas. Landscape designs, plantings and irrigation systems in arid regions should be appropriate to the natural environment. Careful water management is the key to making an arid landscape succeed. Characteristics of a water-conserving landscape are:

- — Overall reduction of turf area.
- — Turf used only in large, level areas to provide for better irrigation efficiency.
- — No turf planted within drip-lines of trees, along narrow paths or median strips, or adjacent to foundations.
- — Buildings clustered around the periphery of green "oasis" areas.
- — Drought-tolerant plants used whenever turf is not used.
- — Moisture-loving plants confined to drainage areas where water naturally accumulates or to "oasis" areas.
- — Grouping of plants with similar irrigation requirements. For example, plant species may be grouped in zones that radiate outward from the building and require progressively less water as the distance from the building(s) increases.
- — Restriction of turf and other moisture-loving plants to entrances or focal points of buildings. This technique localizes areas of frequent water use. The lush greenery near the building contrasts with the drier landscape further away from the building and serves to identify areas of major use on the installation.