

APPENDIX B GUIDE FOR LANDSCAPING

B-1: Guide for Protecting Existing Trees

Article XVII, Part II provides for the retention and protection of large trees when land is developed. To better ensure the survival of existing trees, the developer should heed the following guidelines (in addition to the mandatory requirements of Article XVII):

- (1) Protect trees with fencing and armoring during the entire construction period. The fence should enclose an area 10 feet square with the tree at the center.
- (2) Avoid compaction of the soil around existing trees due to heavy equipment. Do not pile dirt or other materials beneath the crown of the tree.
- (3) Keep fires or other sources of extreme heat well clear of existing trees.
- (4) Repair damaged roots and branches immediately. Exposed roots should be covered with topsoil. Severed limbs and roots should be painted. Wherever roots are destroyed, a proportional amount of branches must be pruned so the tree doesn't transpire more water than it takes in. Injured trees must be thoroughly watered during the ensuing growing year.
- (5) Prune all existing trees that will be surrounded by paving to prevent dehydration.

B-2: Standards for Street and Parking Lot Trees

Trees planted in compliance with the requirements of Article XVII, Part II shall have most or all of the following qualities. The trees recommended in Section B-10 represent the best combinations of these characteristics.

- (1) Hardiness
 - (a) Resistance to extreme temperatures.
 - (b) Resistance to drought.
 - (c) Resistance to storm damage.
 - (d) Resistance to air pollution.
 - (e) Ability to survive physical damage from human activity.
- (2) Life Cycle
 - (a) Moderate to rapid rate of growth.
 - (b) Long life.
- (3) Foliage and Branching
 - (a) Tendency to branch high above the ground.
 - (b) Wide spreading habit.
 - (c) Relatively dense foliage for maximum shading.

(4) Maintenance

- (a) Resistance to pests.
- (b) Resistance to plant diseases.
- (c) Little or no pruning requirements.
- (d) No significant litter problems.

B-3: Formula for Calculating 20 Percent Shading of Vehicle Accommodation Areas

The following is an elementary formula for determining the number of shade trees required in and around paved parking lots in order to presumptively satisfy the shading requirements of Section 281.

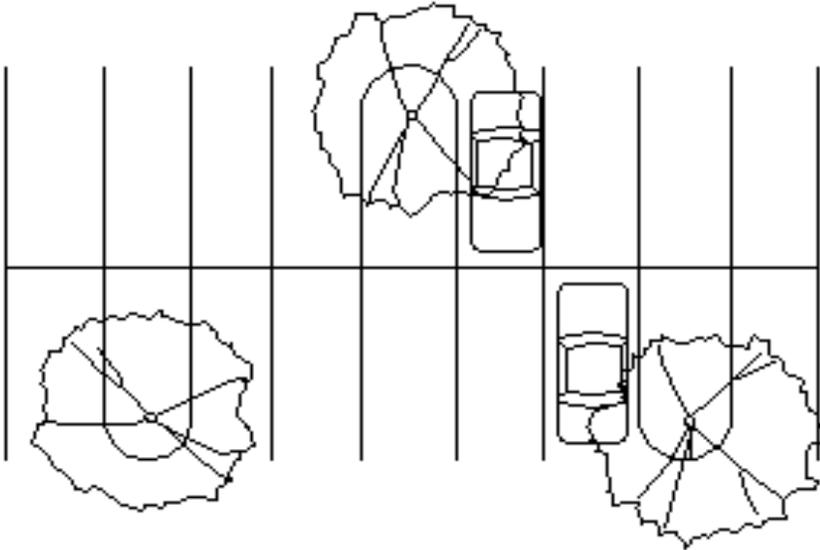
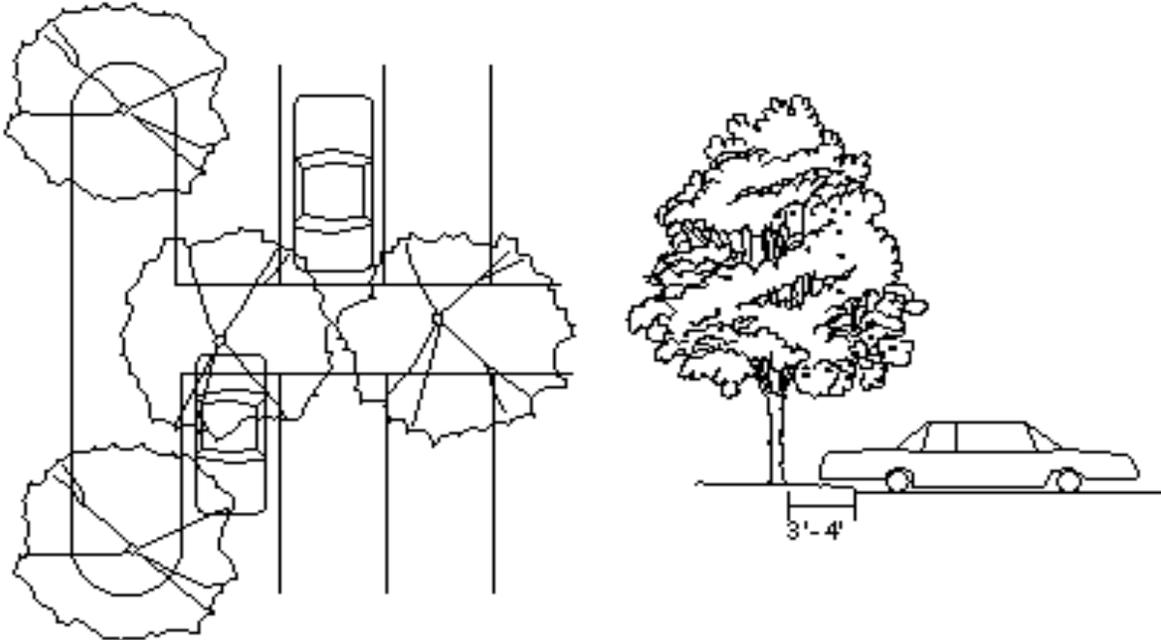
- | | |
|--|--------------------|
| (1) Including parking spaces, driveways, loading areas, sidewalks, and other circulation areas and not including building area or any area which will remain completely undeveloped, calculate square footage of the vehicle accommodation area: | sq.ft. |
| (2) Multiply | <u>x .20</u> |
| (3) Area to be shaded = | sq.ft. |
| Add: | |
| (4) Area shaded by existing trees to be retained in and around the vehicle accommodation area:* | sq. ft. |
| (5) Area shaded by required screening trees, if any:* | sq.ft. |
| (6) Area shaded by required street trees, if any:* | sq. ft. |
| (7) Subtotal = | <u>sq.ft.</u> |
| (If line (7) is greater than line (3), then the shading requirement has been met. If not, go to line (8).) | |
| (8) Enter the difference between line (7) and line (3): | sq.ft. |
| (9) Divide line (8): | <u><u>/707</u></u> |
| (10) Total number of shade trees required within the vehicle accommodation area = | trees |

*Existing trees retained in compliance with Section 285 will be credited according to their actual crown radius. Shaded area may be calculated as follows:

$$3.14 \times (\text{crown radius})^2 = \text{shaded area.}$$

Trees planted within the vehicle accommodation area are credited with shading 707 square feet (based on a crown radius of 15 feet). New or existing trees on the perimeter of the parking lot are credited for having only half a crown over the vehicle accommodation area (e.g., new perimeter trees will be credited for shading 354 square feet). Generally, all trees planted in compliance with the screening requirements of Article XVII, Part I, and the street tree requirements of Section 284 will be considered perimeter trees. When smaller trees such as Dogwoods are planted, the credited shading area will be adjusted downward to 314 square feet for interior trees and 157 square feet for perimeter trees. (Based on a crown radius of 10 feet.)

B-4: Typical Parking Lot Planting Islands



B-5: Guide for Planting Trees

The trees recommended in Section B-10 have minimal maintenance requirements. However, all trees must receive a certain degree of care, especially during and immediately after planting. To protect an investment in new trees, the developer should ensure that the following guidelines are followed when planting:

Selection. Select trees well adapted to the microclimates of individual planting sites. A poor tree match dooms the tree from the start no matter how much care is taken in planting.

Planting Times. The best times for planting are early spring and early fall. Trees planted in the summer run the risk of dehydration.

Drainage. Prior to planting, test soil drainage. If water does not drain out of a sample planting hole within a few hours, consider installing drainage in the bottom of the hole to drain away excess water. Also consider raising or berming the planting site, or adding several inches of good quality topsoil in the planting hole and the surrounding area, but do not simply amend the soil in the planting hole - water movement will be detrimentally altered. If none of the above is possible, select a more water tolerant tree species (red maple, sycamore, bald cypress, willow oak river birch, etc. - avoid trees like dogwoods that don't like "wet feet").

The Planting Hole. The planting hole that is dug should be wide and shallow. A flat, pancake-shaped hole that approximates the shallow, horizontal root growth that the tree will produce is recommended. In average soil, dig the hole only as deep as the root ball, and in heavy clay soil, to enhance drainage, dig the hole an inch or two shallow. Loose soil should not be put beneath the root ball in order to avoid having the tree end up planted too deep as the soil beneath it settles or compacts. The exposed top of the ball can be covered with mulch. Whenever possible, hole walls should gradually taper up to grade, rather than being straight, to more closely approximate where root growth will occur.

Soil Additives. Adding water-absorbing polymers (hydrogels, super slurpers, etc.) to the backfill soil has not proven beneficial in the majority of the landscape research that has been conducted with regard to tree planting. The same is true to adding organic amendments (peatmoss, compost, etc.). In general the only substitute for backfilling with the existing soil, unamended, is backfilling with better quality topsoil.

Planting Near Sidewalks, Driveways, and Other Areas. Plant all trees at least 3 1/2 feet from the end of head-in parking spaces to prevent damage from car overhangs. When planting near sidewalks, driveways and other areas where tree root surfacing can cause damage or be a maintenance problem, consider installing one of the physical root redirecting barriers being marketed, or try the herbicide treated landscape fabric now available for this purpose (Biobarrier). No long term research has yet been published on the use of these tree redirecting materials, so their long term effect on trees is not yet known.

Balled and Burlapped Trees. When planting balled and burlapped trees, closely inspect the material used to wrap the root ball. Many synthetic materials (nylons, etc.) are being used, as well as burlaps treated to retard their degradation. When in doubt as to whether or not these materials will degrade underground, do not leave them intact. Remove the pinning nails or

lacing, and roll back the top several inches. Make vertical slits in several places around the ball. You do not want a wrapping material that won't degrade to restrict root growth.

Wire Baskets. Research has shown that the wire baskets used to protect root balls, whether galvanized or not, are degrading only very slowly underground due to low oxygen. No long term root girding or damage has been found, however, so it does not appear that the baskets need to be removed. If the top loops of the wire basket will be at ground level or slightly above, it will be advisable to remove this section to keep equipment from hanging up in the loops.

Ropes. Be sure to remove all ropes, whether jute or nylon, that have been tied around the trunk. Again, degradation is slow or nonexistent, resulting in trunks being girded.

Containers. Be sure to remove all plastic containers from the root balls of container-grown or containerized trees. If trees have been grown or potted into fiber pots, break away the top several inches of the fiber pot. Many fiber pots are being coated with extra materials to extend their shelf life, but this can slow degradation below ground and retard root extension.

Root Care in Container Plants. When a container is removed, if roots are found circling around the outside of the root ball, cut them in a few places to remove the possibility of the curling root eventually girding the trunk. Select trees grown in pots with vertical ribs rather than ones with straight walls or horizontal ribs as the vertical ribs help reduce root circling.

Fertilizer. Fertilizer can be added to the backfill if it is a slow release form - Osmocote, Woodace briquettes, tree spikes, etc. The caution in the past against adding fertilizers at planting time was a result of not having slow release fertilizers available - agronomic fertilizers that were and still can be used in landscaping have the potential to burn, and should not be added.

Watering. Good follow-up watering is important to help establish a tree's root system. Several water reservoir devices are available, but may be too expensive or cumbersome to justify using.

Mulching. Trees should be mulched, but not over mulched, when planted. Two or three inches of organic mulches, such as shredded or chunk pine bark, or inorganic mulches, such as volcanic rock, is adequate. Keep mulches from touching the trunks of trees. With organic mulches, excessive mulch piled against tree trunks can hold too much moisture against the bark and lead to disease problems. It also may become a habitat for rodents that will feed on the bark. With inorganic mulches, if the tree is in a windy location and the trunk moves considerably, the bark may become abraded by the inorganic mulch.

Landscape Fabrics for Weed Control. The use of black plastic beneath mulch around trees is not recommended because air and water exchange is blocked. For added weed control try one of the landscape fabrics that has proven more weed root penetration resistant (Dalen's Weed-X, DeWitt's Pro 5, Weed Barrier, etc.) but do not pile too much mulch (not over two inches) atop the fabric or weeds will simply grow in the mulch layer.

Tree Staking. Don't automatically stake all trees, especially small ones. If a tree is in a windy location, or has a crown, stake for a maximum of one year. Try to stake so that the tree has a slight amount of flex rather than being held rigidly in place. Use guying or attaching material that will not damage the bark. If the stakes are to be left in place longer than one year to serve as a

barrier against equipment, be sure to remove the guying to prevent trunk girdling. A variety of protective devices are available for trunk protection if that is an important consideration.

Tree Wraps. The use of tree wraps and other protection materials that are applied directly to the trunk is currently under investigation. If a material is applied (paper, fabric, burlap, strips, etc.), remove it after one year. If materials are wrapped onto the trunk, wrap from the base of the tree upward so that water is shed off the wrap, not funneled under it.

Tags and Labels. Remove tags and labels from the trees to prevent them from girdling the trunk.

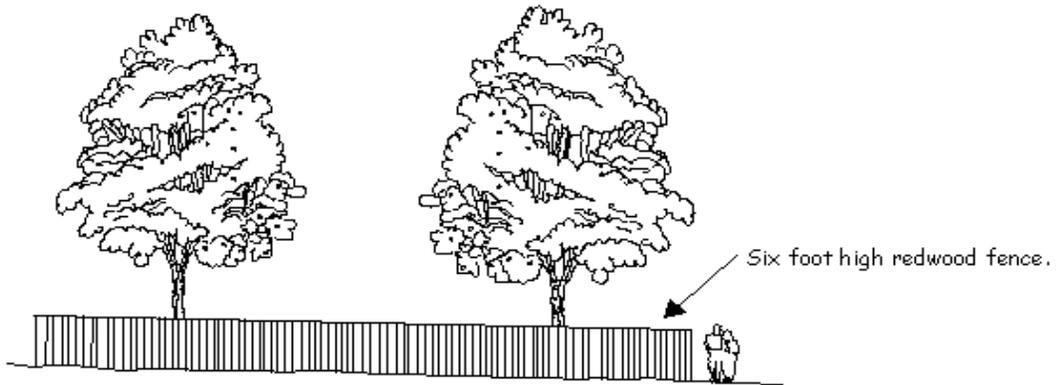
Postplanting Care. Conscientious postplanting care, especially watering, structural pruning and fertilizing, is a must for street and parking lot trees.

B-6: Typical Opaque Screens

Small trees planted 30 feet on center. See planting list B-10 (a).



Large trees planted 40 feet on center. See planting list B-10 (c).



Tall evergreen trees, stagger planted, with branches touching the ground. See planting list B-19 (b).

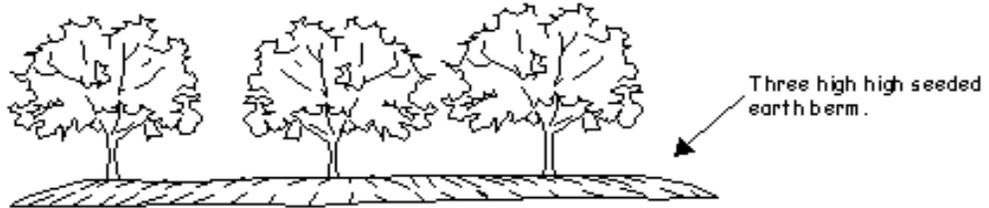


B-7: Typical Semi-Opaque Screens

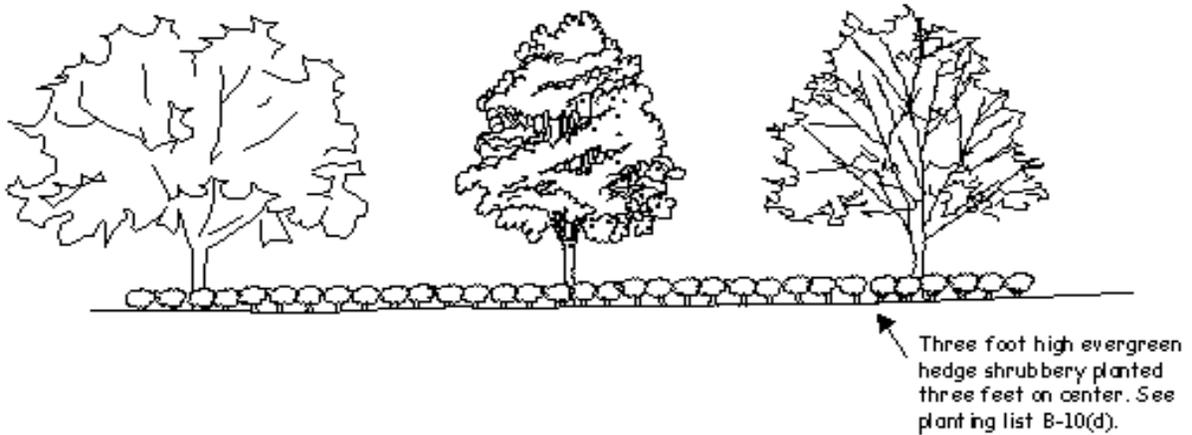
Small trees planted 30 feet on center. See planting list B-10(a).



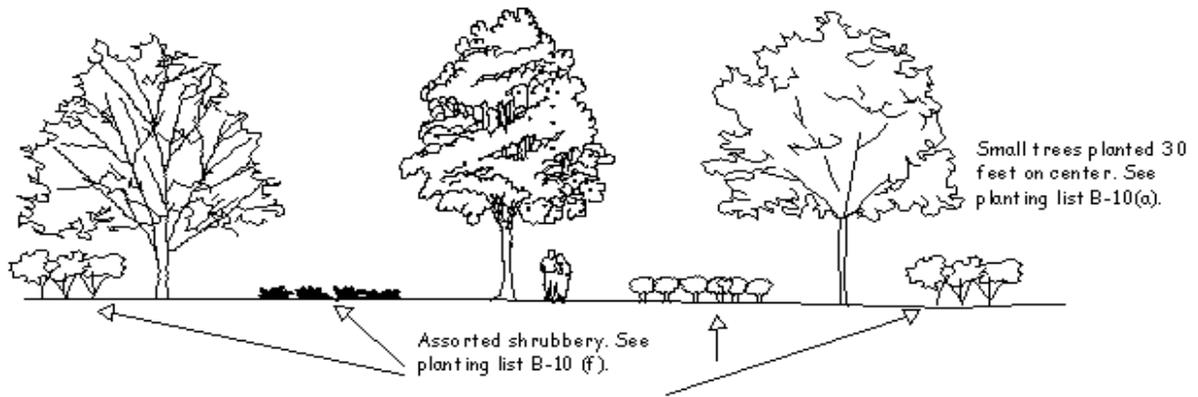
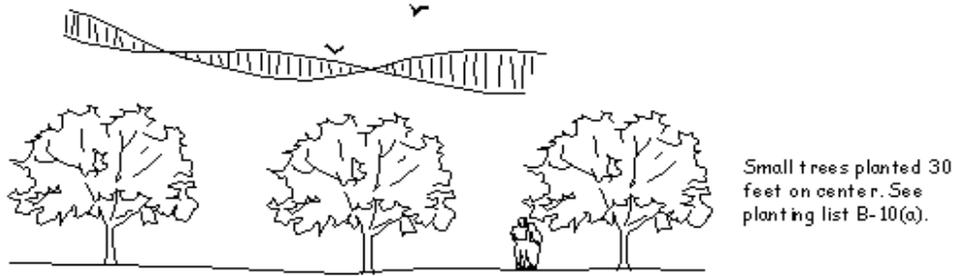
Small trees planted 20-30 feet on center on top of a berm. See planting list B-10(a).



Large trees planted 40 feet on center. See planting list B-10(c).



B-8: Typical Broken Screens



B-9: Guide for Planting Shrubs

Shrubs planted for screening purposes should be given a proper culture and sufficient room in which to grow. Many of the guidelines for tree planting listed in Section B-5 also apply to shrubs. However, because specific requirements vary considerably between shrub types, this appendix does not attempt to generalize the needs of all shrubs. For detailed planting information on individual species, refer to:

Manual of Woody Landscape Plants by Michael Dirr

B-10: Lists of Recommended Trees and Shrubs

The following lists indicate plantings which will meet the screening and shading requirements of Article XVII of the development ordinance. The lists are by no means comprehensive and are intended merely to suggest the types of flora which would be appropriate for screening and shading purposes. Plants were selected for inclusion on these lists according to four principal criteria; (i) general suitability for the climate and soil conditions of this area, (ii) ease of maintenance, (iii) tolerance of urban conditions, and (iv) availability from area nurseries. When selecting new plantings for a particular site, a developer should first consider the types of plants which are thriving on or near that site. However, if an introduced species has proven highly effective for screening or shading in this area, it too may be a proper selection.

Sections B-11 through B-16 contain descriptions of some of the trees and shrubs listed here.

(a) Small Trees for Partial Screening

- | | |
|-------------------------|-----------------------------|
| (1) River Birch | (8) American Holly |
| (2) American Hornbeam | (9) Golden Rain Tree |
| (3) Eastern Redbud | (10) Crape Myrtle |
| (4) Flowering Dogwood | (11) Sourwood |
| (5) Washington Hawthorn | (12) Caroline Cherry-Laurel |
| (6) Russian Olive | (13) Callery Pear |
| (7) Mountain Silverbell | |

(b) Large Trees for Evergreen Screening

- (1) Deodar Cedar
- (2) Southern Magnolia
- (3) Carolina Hemlock

(c) Large Trees for Shading

- | | |
|-----------------------|------------------------|
| (1) Norway Maple | (7) Sycamore |
| (2) Red Maple | (8) Eastern Red Oak |
| (3) Ginkgo | (9) Willow Oak |
| (4) Honeylocust | (10) Scarlet Oak |
| (5) Sweet Gum | (11) Laurel Oak |
| (6) London Plane-Tree | (12) Littleleaf Linden |

(d) Small Shrubs for Evergreen Screening

- | | |
|--------------------------|----------------------------|
| (1) Glossy Abelia | (6) Convexa Japanese Holly |
| (2) Warty Barberry | (7) India Hawthorn |
| (3) Wintergreen Barberry | (8) Azaleas/Rhododendrons |
| (4) Dwarf Horned Holly | (9) Japanese Yew |
| (5) Little Holly | |

(e) Large Shrubs for Evergreen Screening

- | | |
|-------------------------|--------------------------|
| (1) Hedge Bamboo | (6) Japanese Privet |
| (2) Thorny Elaengus | (7) Fortune Tea Olive |
| (3) Burford Holly | (8) Red Photinia |
| (4) Yaupon Holly | (9) Laurentinus Viburnum |
| (5) Laurel or Sweet Bay | |

(f) Assorted Shrubs for Broken Screens

- | | |
|------------------------|--------------------------|
| (1) Japanese Barberry | (7) Drooping Leucothoe |
| (2) Fringetree | (8) Winter Honeysuckle |
| (3) Border Forsythia | (9) Star Magnolia |
| (4) Vernal Witch Hazel | (10) Northern Bayberry |
| (5) Common Witch Hazel | (11) Judd Viburnum |
| (6) Pfitzer Juniper | (12) Doublefile Viburnum |

B-11: Small Trees for Partial Screening

The following trees are recommended for use in all types of screens. Though smaller than the trees listed in planting lists B-12 and B-13, each of these trees will reach a height of at least 20 feet.

- (1) River Birch (**Betula nigra**). Height 20-40 feet; Spread: 8-16 feet. The River Birch is a native tree which usually grows along stream banks. In landscape design, it is adaptable to either high or low locations, but still requires a lot of moisture. This tree has an interesting papery bark and a graceful branching habit. It has no special pest or maintenance problems.
- (2) American Hornbeam (**Carpinus carolinia**). Height 20-30 feet; Spread: 15-20 feet. This native tree has a natural yet refined appearance. It is slow growing, but at maturity it serves as an excellent small shade tree. Its fluted muscular trunk is an interesting feature. In the wild, the American Hornbeam is common in moist rich soil, yet, when used in landscape design, it is soil tolerant and does not require an unusual amount of water. It has no pests and no special maintenance problems.

B-12: Large Trees for Evergreen Screening

The following trees are ideal for screening large scale areas such as shopping centers and industrial sites. They are also effective in combination with other smaller screening plants. Both are moderate to fast growers. They are not considered to be shade trees.

- (1) Deodar Cedar (**Cedrus deodara**). Height: 40-150 feet; Spread: 30 feet +. The Deodar Cedar is a useful and attractive evergreen. It should be allowed plenty of room in order to assume its beautiful natural form. Its pendulous branches should be allowed to touch the ground. It prefers relatively dry soils, grows rapidly, and is easy to maintain. "True Cedars" such as the Deodar are not native to North America, but they have become quite popular in the South as a landscape tree.
- (2) Southern Magnolia (**Magnolia grandiflora**). Height: 40-60 feet; Spread: 25 feet +. Magnolias are striking trees which serve well as screens when their branches are allowed to grow to the ground. Generally, this tree does well in city conditions, but it should be planted in quite rich acidic soils and it requires a lot of moisture. Furthermore, magnolias require ample space for growth. If planted in full sunlight, they will grow rapidly. Because it drops large waxy leaves, seed pods, and flowers, the magnolia may present a litter problem.

B-13: Large Trees for Shading

The following trees may be used for screening, but they are recommended especially for shading streets and parking lots. Unless otherwise noted, they will grow rapidly. Each species will attain a mature spread of at least 30 feet.

- (1) Red Maple (**Acer rubrum**). Height: 40-50 feet; Spread 25 feet +. This tree is an example of a maple which is not recommended where there will be high concentrations of air pollution. However, with its excellent shading characteristics and beautiful colors, it should not be ignored. This tree grows rapidly, but, unlike the Norway Maple, it does not become brittle with age. The Red Maple is a native tree which is usually found in moist, even swampy areas, but it adapts well

to a variety of situations. Although subject to maple insects and diseases, it is usually a long-lived tree.

- (2) Honeylocust (**Gleditsia triacanthos**). Height: 50-75 feet; Spread: 25 feet +. It's open, spreading form and feathery leaves may give the Honeylocust a frail appearance, but it is fact a quite sturdy tree, notable for it's resistance to storm damage. It is a native tree which is drought resistant and adaptable to city conditions. Grass and shrubs thrive beneath a Honeylocust because it casts light shade. This tree is especially useful for its ability to be transplanted at a relatively advanced age. Accordingly, it may be used for immediate effect in a landscape design. The Honeylocust has its pests and diseases, but it is fairly hardy. Thornless and fruitless varieties such as "Moraine" are recommended.

B-14: Small Shrubs for Evergreen Screening

The following shrubs are recommended for informal (unclipped) hedges or screens. Each species grows to a height of less than six feet; therefore, these shrubs are appropriate for semi-opaque screens.

- (1) Glossy Abelia (**Abelia grandiflora**). Height: 4-6 feet; Spread: 3-5 feet. Abelia is quite common in local nurseries and tends to be less expensive than other shrubs on this list. It bears pale pink flowers throughout the summer. Although it has proven quite popular for informal hedges, it has several drawbacks. Abelia should be pruned and thinned to maintain its best form. It may drop its leaves due to low temperatures, lack of pruning, or starvation.
- (2) Warty Barberry (**Berberis verruculosa**). Height: 3-4 feet; Spread: 3-4 feet. Barberrys as a group have proven to be excellent hedge plants. With their dense, spiny limbs, they are effective barriers in public places. The Warty Barberry is a shrub with a neat, compact habit. It is soil tolerant and has no special maintenance requirements. It grows slowly, but it will reach a height of three to four feet within five years.

B-15: Large Shrubs for Evergreen Screening

The following shrubs are recommended for high hedges or screens. Each species grows to a height of more than six feet; therefore, these shrubs are appropriate for opaque screens.

- (1) Hedge Bamboo (**Bambusa multiplex**). Height: 10-12 feet; Spread: 4-6 feet. Hedge Bamboo grows rapidly yet is more easily confined to a limited area than most types of bamboo. It is adaptable to a variety of situations, but requires plenty of water. For best effect as a screen, Hedge Bamboo should be stagger planted.
- (2) Thorny Elaengus (**Elaengus pungens**). Height: 8-10 feet; Spread: 6-10 feet. This shrub tolerates many adverse conditions. It will grow rapidly in relatively infertile, dry soils. It's dense thorny branches form an excellent natural hedge. It is one of the most common evergreen shrubs in the south.

B-16: Assorted Shrubs for Broken Screens

The following is a sampling of shrubbery that would be appropriate in a broken screen. Because many of these plants are deciduous, they are not suitable for opaque and semi-opaque screens. (Note: Many of the evergreen shrubs described in planting lists B-14 and B-15 are also suitable for broken screens).

- (1) Japanese Barberry (***Berberis thunbergii***). Height: 3-5 feet; Spread: 3-5 feet. This extremely common deciduous shrub is considered to be one of the toughest members of the Barberry family. It survives drought, poor soils, exposure, and the worst city conditions. With its many thorns, the Japanese Barberry is often used as an impenetrable barrier, but it is attractive enough to stand alone as a specimen plant. It requires no special maintenance and, when planted singly, needs no pruning.

- (2) Fringetree (***Chioanthus virginicus***). Height: 10-30 feet; Spread: 8-10 feet. The Fringetree is known for its profusion of beautiful flowers. It is considered to be one of the most striking native American shrubs. It is relatively difficult to transplant, but once established it does well in cities as it endures heavy smoke and dust. The mature Fringetree's only drawback is that its leaves appear rather late in spring.