Appendix E

SCREENING AND TREES - GUIDE FOR LANDSCAPING
(AMENDED 6/22/04)

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E-1 Guide for Protecting Existing Trees

Section 15-316 provides for the retention and protection of large trees when land is developed. In order to better ensure the survival of existing trees, the developer should heed the following guidelines:

(a) Protect trees with fencing and armoring (if needed) during the entire construction period. The fence should enclose an area 1-1.5 feet x the diameter inches of the tree to be retained. The area inside the fence should be off limits and no work should take place inside the tree preservation zone. **(REWRITTEN 06/24/14)**

(b) Avoid excavations beneath the crown of the tree as required by Section 15-316(b).

(c) Avoid compaction of the soil around existing trees due to heavy equipment. In areas where storage or vehicular access must take place within the tree preservation area outlined above, a drivable mulch pad with ½" plywood on top may be used to protect the tree's root system, maintaining a minimum distance of 8'from the trunk.. Mulch should be maintained at 12" depth. Preservation fencing should still be placed between the work zone and the tree's trunk. Trunk armoring may be needed when equipment will be used in close proximity to the tree. **(REWRITTEN 06/24/14)**

(d) Keep fires or other sources of extreme heat well clear of existing trees.

(e) Damaged roots should be cleanly cut and covered with topsoil to prevent drying. If damage to limbs or branches is anticipated in certain locations, pruning prior to beginning work may be considered. Limbs and branches broken during the construction process but still attached should be pruned to prevent further damage. An assessment should be performed and corrective pruning may be necessary after construction has been completed around the tree. Pruning / restoration work should be performed under the supervision of a Certified Arborist. **(REWRITTEN 06/24/14)**

(f) As is stipulated in Section 15-316(b), no paving or other impermeable ground cover should be placed within the dripline of trees to be retained. **(REWRITTEN 06/24/14)**

E-2 Standards for Street and Parking Lot Trees

Trees planted in compliance with the requirements of Sections 15-315 and 15-317 should have most or all of the following qualities. The trees recommended in Section E-10 represent the best combinations of these characteristics.

(a) Hardiness

(1) Resistance to extreme temperatures.
(2) Drought resistance.
(3) Resistance to storm damage.
(4) Resistance to air pollution.
(5) Ability to survive physical damage from human activity.

(b) Life Cycle

(1) Moderate to rapid rate of growth.
(2) Long life.

(c) Foliage and Branching

(1) Tendency to branch high above the ground.
(2) Wide spreading habit.
(3) Relatively dense foliage for maximum shading.

(d) Maintenance

(1) Resistance to pests.
(2) Resistance to plant diseases.
(3) Little or no pruning requirements.
(4) No significant litter problems.

(e) Flora Within Planting Strips **(AMENDED 11/19/96)**

(1) Match foliage size described in Section E-11 through E-16 with planting strip size.

E-3 Formula for Calculating 35% Shading of Vehicle Accommodation Areas **(REWRITTEN 06/24/14)**

Following is an elementary formula for determining the number of shade trees required in and around parking lots in order to presumptively satisfy the shading requirements of Section 15-317.

1.	Calculate square footage of the vehicle accommodation area. Include parking spaces, driveways, loading areas, sidewalks, and other circulation areas. Do not include building area and any area which will remain completely undeveloped:	_____ sq. ft.
2.	Multiply	x .35
3.	Areas 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: (if line #*7* is greater than line #*3*, then the shading requirement has been met. If not, go on to line #*8*)	_____ sq. ft.
8.	Enter the difference between line #*7* and line #*3*:	_____ sq ft.
9.	Divide line #*8*:	÷ 707
10.	Total number of shade trees required <u>within</u> the vehicle accommodation area:	_____ trees

_____

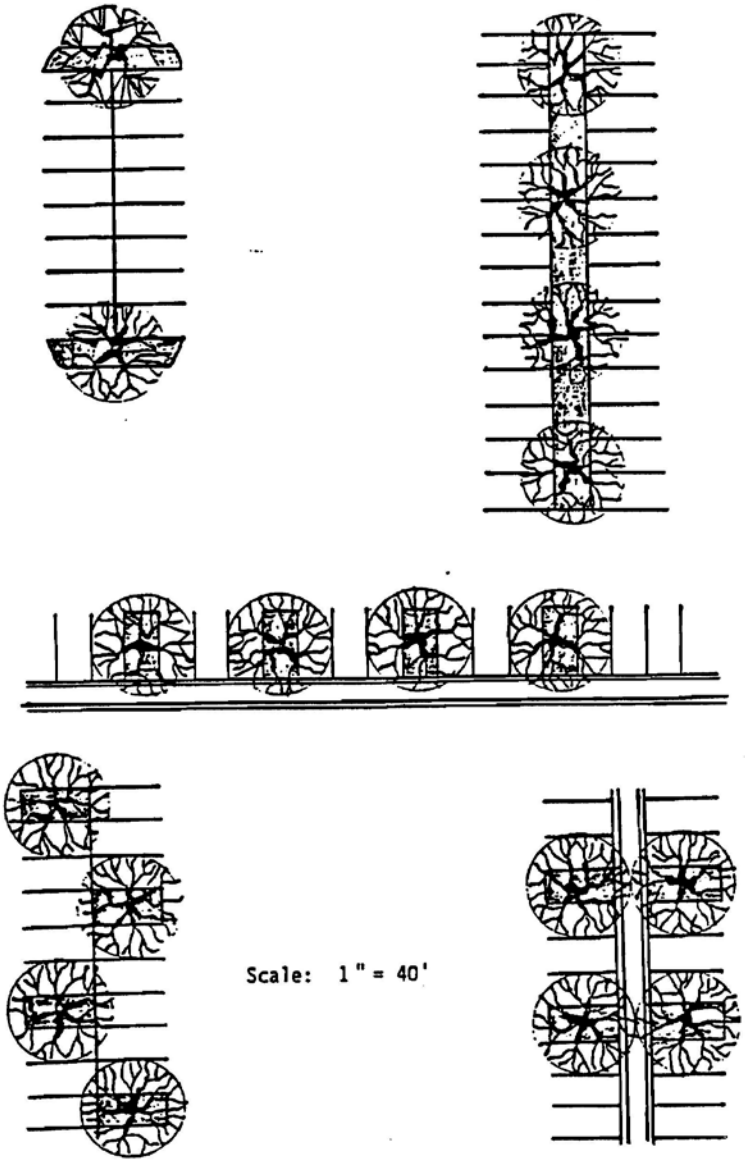
*Existing trees retained in compliance with Section 15-316 will be credited according to their actual crown radius. Shaded area may be calculated as follows:

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

Trees planted within the vehicle accommodation area are credited with shading <u>707 sq. ft.</u> (Based on a crown radius of 15) 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 <u>354 sq. ft.</u>). Generally, all trees planted in compliance with the screening requirements of Article XIX, Part I and the street tree requirements of Section 15-315 will be considered perimeter trees. When smaller trees such as Dogwoods are planted, the credited shading area will be adjusted downward to <u>314 sq. ft.</u> for interior trees and <u>157 sq. ft.</u> for perimeter trees. (Based on a crown radius of 10 ft.) **(REWRITTEN 06/24/14)**

GUIDE FOR LANDSCAPING

E-4 Typical Parking Lot Planting Islands



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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.)

E-5 Guide for Planting Trees (REWRITTEN 06/24/14)

The trees recommended in Section E-10 have minimal maintenance requirements. However, all trees must receive a certain degree of care, especially during and immediately after planting. In order to protect an investment in new trees, the developer and his or her agents should follow these guidelines in accordance with International Society of Arboriculture (ISA) Best Practices, when planting:

(a) All plant material shall conform to the current American Standards for Nursery Stock and must be free from injury, insect infestations and disease. Tree caliper at time of planting should be 2-3".

(b) The best times for planting are early spring and early fall, but may vary depending upon tree species and site conditions. These factors must be considered when selecting species and planting schedule. Trees planted in the summer run the risk of dehydration and precautions must be taken to ensure establishment.

(c) Plant all trees at least three-and-a-half feet from the end of head-in parking spaces in order to prevent damage from car overhang.

(d) Planting hole should be at least 2x the diameter of the root ball and not deeper than the distance from the bottom of the root ball to the root flair, which may be hidden beneath root ball soil. Excess soil above the root flair should be removed once the tree is in place. The tree should be planted so that its root flair is just above existing grade.

(e) Especially in areas where construction activity has compacted the soil, the sides of the planting hole should be scarified or loosened with a pick ax or shovel.

(f) After the pit is dug, observe sub-surface drainage conditions. Most soils in the Carrboro area are poorly drained. Planting depth where poor drainage exists should be dependent upon the water needs of the tree species. If the species is more sensitive to poor drainage, the tree should be planted higher than existing grade, not to exceed ¼ root of the ball above grade. Back fill should then be sloped gradually from top of root ball to existing grade. Gravel placed at the bottom of the hole will not improve drainage.

(g) Backfill should include a proper mix of soil, peat moss and nutrients. All roots must be completely covered. Backfill should be thoroughly watered as it is placed around the roots.

(h) Staking the tree is not recommended unless necessary to stabilize the tree e.g., a lose root ball, unstable bare root transplant, or large evergreen w/higher wind resistance. Staking a tree unnecessarily can reduce the development of structural roots and proper trunk taper. If tree is to be

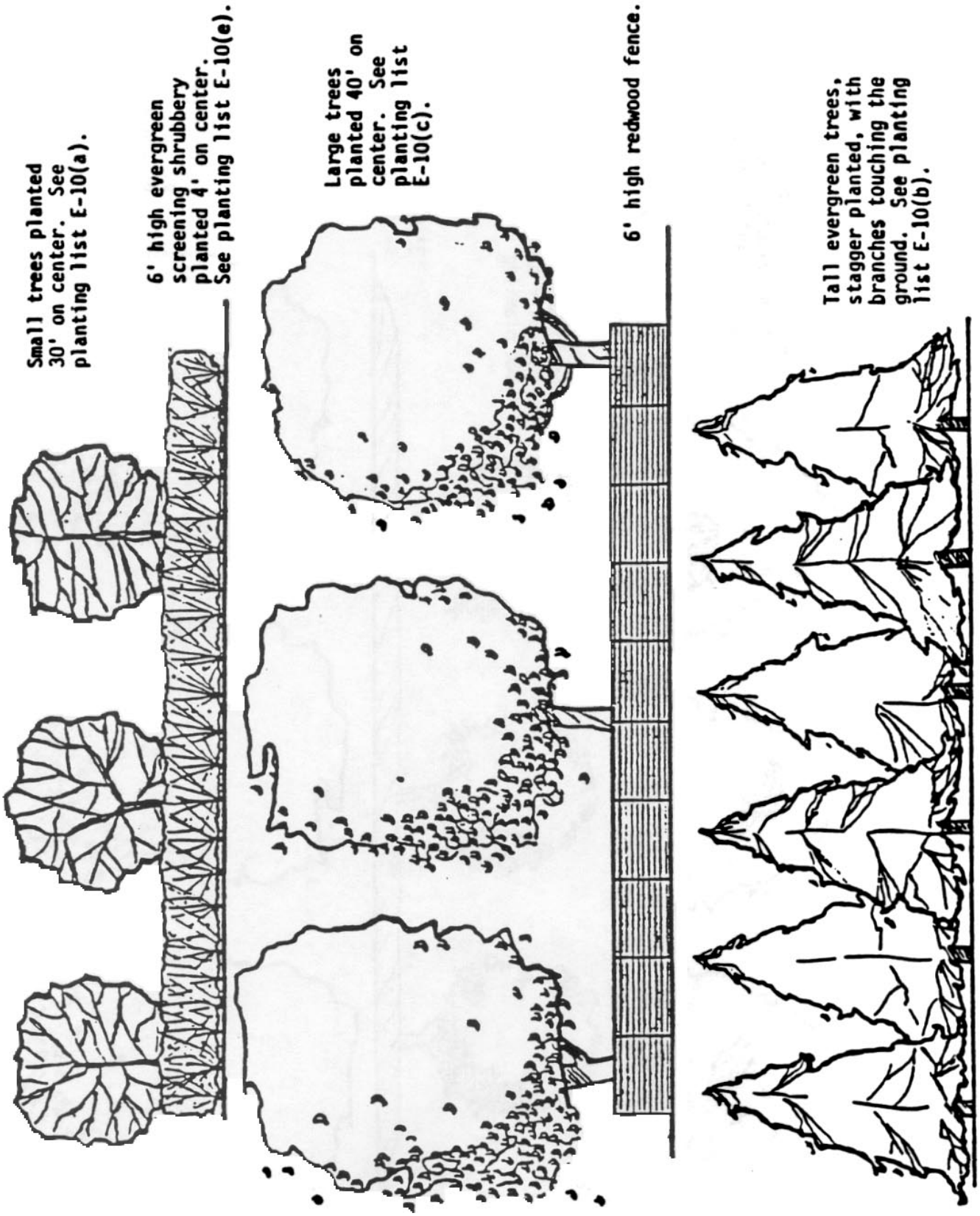
staked, it should be done so loosely and staking should be removed after the first year. Guying materials should not girdle or cut into the bark.

(i) Mulch should be spread at a depth of 2-3 inches maximum, ideally extending to the drip line. At a minimum, it should cover the entire excavation area in order to retain moisture and help to prevent weeds. Mulch should not be allowed to touch the trunk as this will cause moisture build up, increasing the chance of trunk decay. If necessary, on sloped locations, create a raised ring on the downhill side of the slope to catch rain runoff.

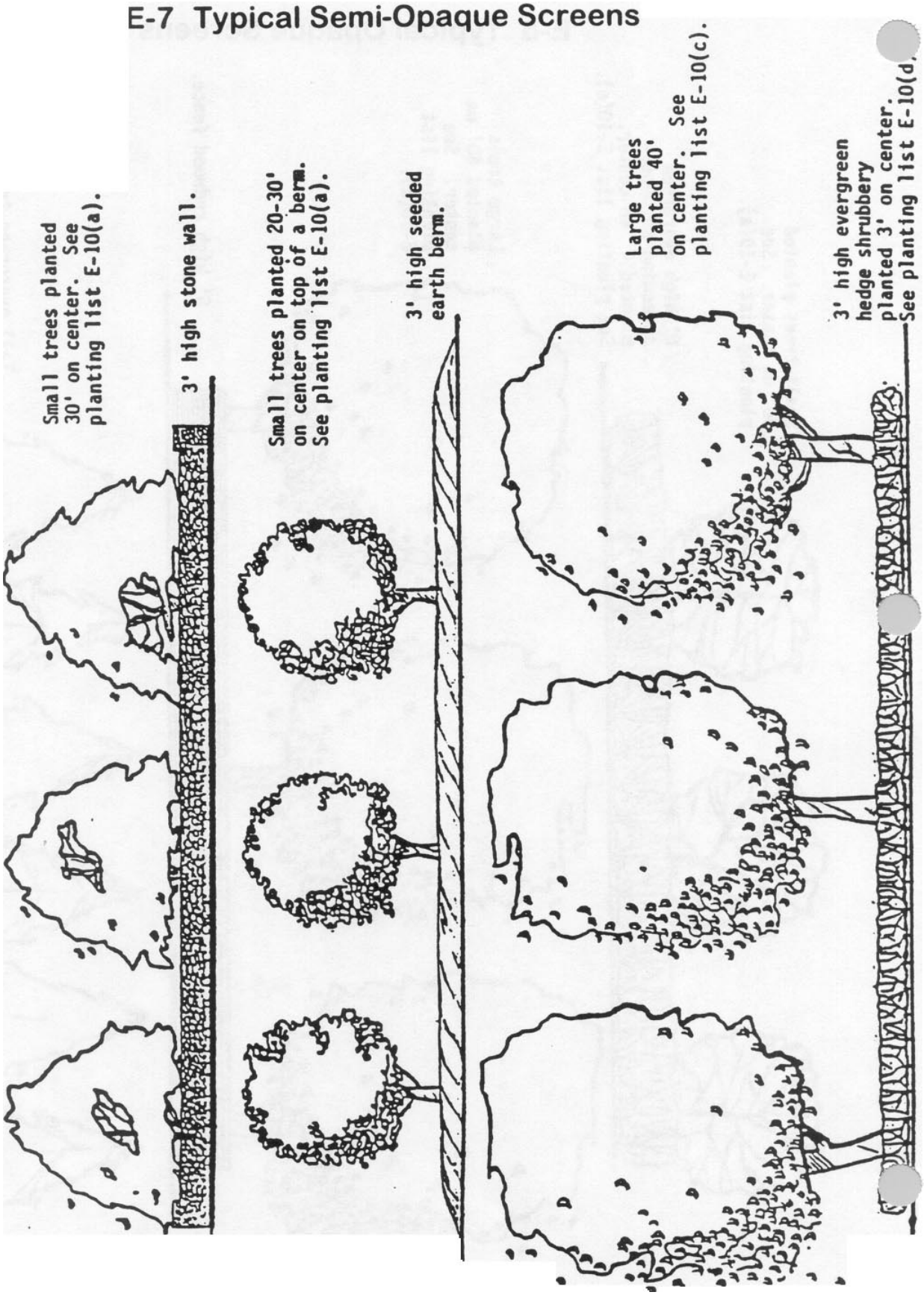
(j) Trunk wrapping is not required but may be considered for certain species with thin bark in certain locations. If wrap is to be used it should be light colored, biodegradable (paper) and be wrapped from the bottom up. This will help to prevent moisture build up along the trunk.

(k) Conscientious post-planting care, especially watering, pruning and fertilizing, is a must for street and parking lot trees. Minimal pruning should be performed during the first year, if at all. Watering and fertilization rates are dependent upon site conditions.

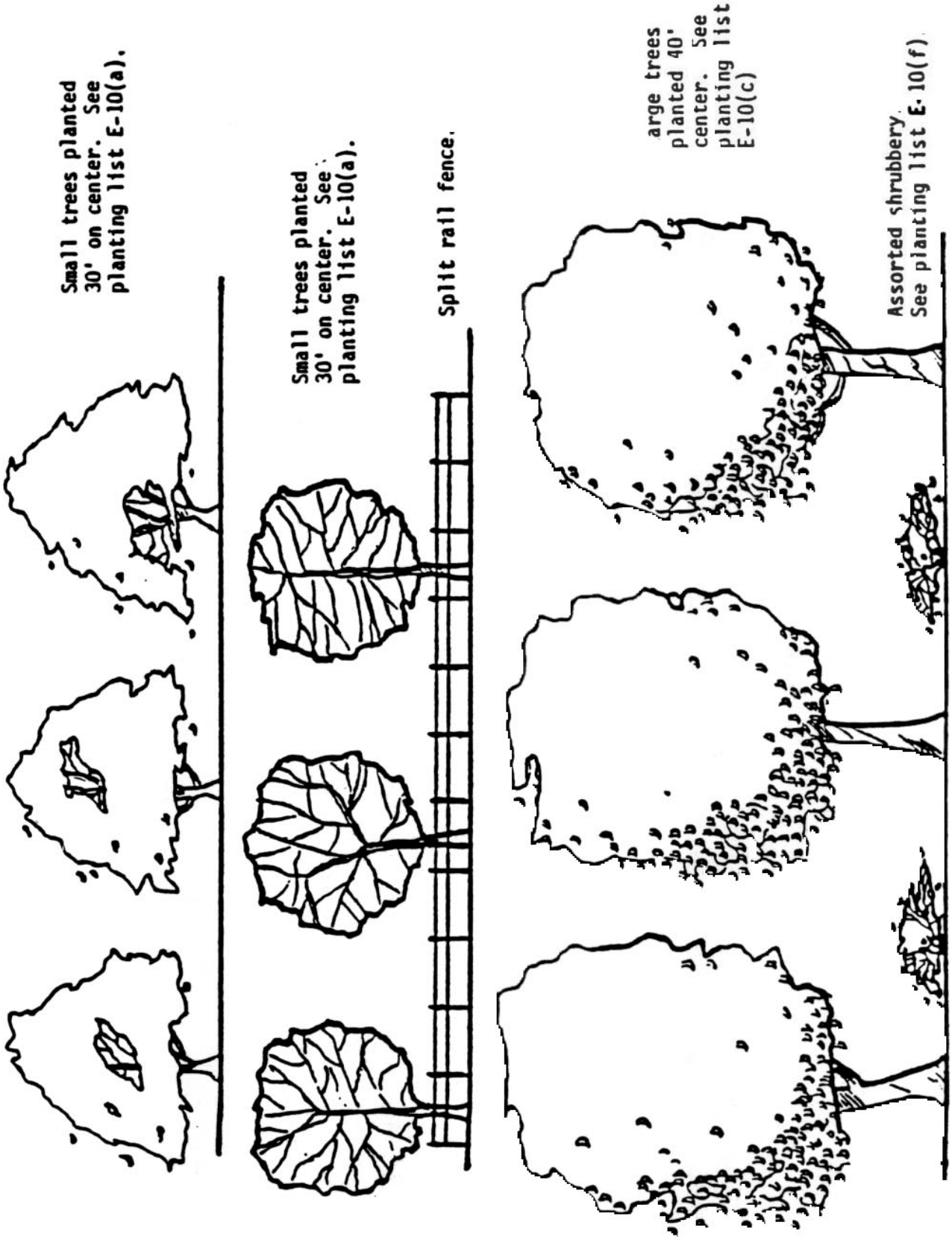
E-6 Typical Opaque Screens



E-7 Typical Semi-Opaque Screens



E-8 Typical Broken Screens



E-9 Guide for Planting Shrubs

Shrubs planted for screening purpose should be given a proper culture and sufficient room in which to grow. Many of the guidelines for tree planting listed in Section E-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: Landscape Plants of the Southeast by R. Gordon Halfacre and Anne R. Shawcroft. A copy of this book is available in the Carrboro Planning Department or by contacting Sparks Press, P.O. Box 26747, Raleigh, N.C. 27611.

E-10 Lists of Recommended Trees and Shrubs

The following lists indicate plantings which will meet the screening and shading requirements of Article XIX of the Land Use 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 Piedmont section of North Carolina; *ii.)* hardiness/tolerance of city conditions; *iii.)* ease of maintenance; and *iv.)* availability from area nurseries. When selecting new plantings for a particular site, a developer should first consider the type of plants which are thriving on or near the site. Accordingly, species native to North Carolina should often be favored. However, if an introduced species has proven highly effective for screening or shading in Piedmont Towns, it too may be a proper selection.

The plantings marked with an (±) on the following lists are appropriate for planting within plantings strips -- as defined under Section 15-216, Subsection (j).

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

(A) E-11 SMALL TREES FOR PARTIAL SCREENING (AMENDED 6/22/04)

(1) American Holly
(2) American Hop Hornbeam
(3) American Hornbeam ±
(4) American Smoketree
(5) Carolina Cherry Laurel
(6) Crabapple (southern)
(7) Eastern Redbud
(8) Flowering dogwood
(9) Fringetree
(10) Mock Orange
(11) Paw Paw
(12) Serviceberry ±
(13) Sourwood ±
(14) Viburnum (except V. opulus)
(15) Washington Hawthorn
(16) Yaupon

(B) E-12 LARGE TREES FOR EVERGREEN SCREENING (AMENDED 6/22/04)

(1) Atlantic White Cedar
(2) Eastern Red Cedar
(3) Laurel Oak (listed on E-13)
(4) Loblolly Pine
(5) Shortleaf Pine
(6) Southern Magnolia
(7) Virginia Pine
(8) Longleaf Pine

(C) E-13 LARGE TREES FOR SHADING - The trees on the following list marked with an (*) are appropriate selections to satisfy Section 15-315, Required Trees Along Dedicated Streets **(AMENDED 6/22/04)**

(1) Basswood
(2) Chestnut Oak
(3) Cucumber Tree
(4) Gingko (male only) *
(5) Laurel Oak *
(6) Post Oak
(7) Red Oak (Eastern) *
(8) Scarlet Oak *
(9) Southern Catalpa
(10) Southern Sugar Maple
(11) Swamp Chestnut Oak
(12) Swamp White Oak
(13) Sycamore
(14) Tulip Poplar *
(15) White Oak
(16) Willow Oak *

(D) E-14 SMALL SHRUBS FOR EVERGREEN SCREENING (AMENDED 05/25/99, 6/22/04)

(1) Convexa Japanese Holly
(2) Dwarf Horned Holly
(3) Glossy Abelia
(4) Ilex verticillata (Winterberry Holly)
(5) Indian Hawthorn ±
(6) Japanese Yew
(7) Otto Lukeyn Laurel ±
(8) Poet's Laurel
(9) Warty Blueberry
(10) **Carolina Jessamine
(11) **Trumpet Honeysuckle
(12)

**Vines - which if grown on a trellis would make a nice evergreen screen.

(E) E-15 LARGE SHRUBS FOR EVERGREEN SCREENING (AMENDED 6/22/04)

(1) Anise Bush ±
(2) Carolina Cherry-Laurel ±
(3) Cleyera ±
(4) English Laurel
(5) Fortune Tea Olive
(6) Loblolly Bay
(7) Loropetalum ±
(8) Red Bay
(9) Schipka Laurel
(10) Southern Wax Myrtle
(11) Yaupon Holly (standard) ±

(F) E-16 ASSORTED PLANTINGS FOR BROKEN SCREENS (AMENDED 5/25/99, 6/22/04)

(1) Beautyberry ±
(2) Blueberry
(3) Button Bush
(4) Carolina Allspice (Sweetshrub)
(5) Carolina Rose
(6) Clethra
(7) Devil's Walking Stick
(8) Drooping Leucothoe
(9) Fringetree
(10) Japanese Flowering Apricot (tree)
(11) Judd Viburnum
(12) Oakleaf Hydrangea
(13) Rhododendron
(14) Smoketree
(15) Star Magnolia (tree)
(16) Sumac
(17) Viburnum (except V. opulus)
(18) Witch Hazel (Common)
(19) Witch Hazel (Vernal) ±

The following plant species shall be prohibited when complying with the shading and landscaping provisions of this chapter. **(AMENDED 6/22/04).**

Species (Latin)	**Common Name**
Akebia quinata	Chocolate vine
Acer ginnala	Amur Maple
Acer platanoides	Norway Maple
Ailanthus altissima	Tree of Heaven
Albizia julibrissin	**Mimosa**
Ampelopsis brevipedunculata	Porcelainberry
Baccharia halimifolia	Baccharus spp
All Berberis species including	
Berberis julianae	Wintergreen Barberry
Berberis thunbergii	Japanese Barberry
Broussonetia papyrifera	Paper Mulberry
Celastrus orbiculatus	Bittersweet
All Cotoneaster species including	
Cotoneaster microphyllus	Littleleaf Cotoneaster
Cotoneaster horizontalis	Rockspray Cotoneaster
Crataegus monogyna	Singleseed Hawthorn
Crataegus laevigata	English Hawthorn
All Cytisus scoparius	Scotch Broom
Eleagnus angustifolia	Russian Olive
Eleagnus umbellata	Autumn Olive
Euonymus alatus	Winged Euonoymus, Burning Bush
Euonymus japonicus	Japanese Euonymus
Firmiana simplex	Chinese Parasol Tree

Species (Latin)	Common Name
Hedera helix	English Ivy
All Ligustrum species including	
Ligustrum japonicum	Japanese Privet
Ligustrum lucidum	Waxleaf Privet
Ligustrum obtusifolium	**Border Privet**
Ligustrum vulgare	European Privet
Ligustrum sinense	Chinese Privet
Ligustrim x vicari	Golden Vicary Privet
Lonicera japonica	Japanese Honeysuckle
Lonicera maackii	Bush Honeysuckle
Lonicera nitida	Boxleaf Honeysuckle
Lonicera tatarica	Tatarian Honeysuckle
Miscanthus sinensis	Eulalia, Maiden Grass
Mahonia **repens**	Oregon Grape
Morus alba	**White Mulberry**
Paulownia tomentosa	Princess Tree
Phyllostachys aurea	**Golden Bamboo**
Populus alba	**White Poplar**
Spirea Japonica	**Japanese Meadowsweet**
Taxus cuspidata	Japanese Yew
Viburnum opulus	European Cranberrybush Viburnum
Vinca major	Large Periwinkle
Vinca minor	Common Periwinkle
Wisteria **sinensis**	Chinese Wisteria
Wisteria japonica	Japanese Wisteria

E-11 Small Trees for Partial Screening (Amended 6/22/04)

The following trees are recommended for use in all types of screens. Though smaller than the trees listed in planting lists E-12 and E-13, each of these trees will reach a height of at least 20 feet. Selections marked with an (*) are also recommended as shade trees and may be credited for meeting the 20% shading requirement for paved parking lots.

AMERICAN HOLLY (Ilex opaca) Height: 15-30'; Spread: 10-20'.
This familiar native tree possesses a pyramidal evergreen crown with abundant red berries in the winter. It grows best in full sun and prefers moist yet well drained soils. If the lower limbs are allowed to grow naturally, they will branch to the ground. Hollies should be protected from high winds. The American Holly is a relatively slow grower.

AMERICAN HOP HORNBEAM (Ostryga virginiana) Height: 40 to 50 feet; Spread: 20 to 30 feet
Hophornbeam is a small short-lived understory tree in moist, well-drained forests. It has a slow to medium growth rate on a great variety of soils. It develops a finely branched round crown and is an attractive landscape tree that provides wildlife with a limited amount of seed. Fruit

***AMERICAN HORNBEAM (Carpinus carolinia) Height: 20-30'; Spread: 15-20'.**
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.

AMERICAN SMOKETREE (Cotinus obovatus) Height: 15 feet; Spread: 15 feet
Smoketree is a small tree found on upland sites. This tree is planted as an ornamental for the attractive fruit that are presented on a feathery, hairy stalk, which gives a smoke-like appearance.

BLACK HAW (Viburnum prunifolium; V. dentatum) Height: 12 to 15 feet; Spread: 8 to 12 feet
Black Haw is a small tree with twisted trunk and arching branches with an overall round crown appearance. Does best on partially sunny sites on moist, well-drained soils.

CAROLINA CHERRY-LAUREL (Prunus caroliniana) Height: 20-30'; Spread: 15-20'.
This tree is prized for its dense evergreen foliage. It may be trimmed as a hedge, but also serves as an excellent screen in its natural form. The Cherry-Laurel grows rapidly and has no pests. However, it may not be as cold hardy as other trees on this list.

CRABAPPLE, SOUTHERN (Malus) Height: 15'-30'; Spread 10-20'
Slow to moderate growers, with springtime flowers in colors ranging from pink to red to white. Birds are fond of fruit. Care should be taken when choosing a specific variety to make certain that it is disease resistant. Some disease resistant varieties include 'Adams', 'Callaway', and 'Sentinel'.

EASTERN REDBUD (Cercis canadensis) Height: 20-30'; Spread: 12-25'.
This native tree is covered by beautiful pink flowers in the Spring and develops a dense round crown when allowed to grow in direct sunlight. The Redbud has some pests, and its fruit pods may present a litter problems, but it recommends itself by being drought resistant and tolerant of polluted city air.

***FLOWERING DOGWOOD (Cornus florida) height: 15-30'; Spread: 15-20'.**
The Dogwood is a native woodland tree which is very popular for landscape planting. It is considered to be a fairly hardy tree, but, when planted in direct sun, it must be frequently watered. A healthy Dogwood will develop attractive horizontal branches and bushy crown. Dogwoods look best when planted in groups or when used as an accent in borders. These trees should be guarded against borers and other pests.

FRINGE TREE (Chionanthus virginiana) Height: 12 to 20 feet; Spread:12 to 20 feet
Fringe-tree is a short trunk tree with a narrow, oblong crown found on moist soils. It is a popular ornamental because of the white fringe-like drooping white flower clusters in May and June that mature into inch-long blue-black fruit in September and October.

MOCK ORANGE (Philadelphius inodorus or other native cultivars) Height:3 to 6 feet; Spread: 3 to 9 feet
Mock Orange is a deciduous short shrub, suitable on a range of soil conditions along streams and bluffs, cliffs, and rocky banks, with full sun to partial shade. Best used as part of a shrub border or an edge to natural areas. Fragrant white flowers in spring on spreading branches that twist around each other and arch to the ground.

PAW PAW (Asimina triloba) Height: 15 to 40 feet; Spread: 15 to 30 feet
Pawpaw is an understory species found on moist, well-drained sites that has a tropical appearance in the landscape. Purplish-brown, broad bell shape flowers appear with or slightly before the leaves. Fall ripening fruit resemble a short, fat banana, that is very fleshy, tastes like a banana, and eaten by squirrel, fox, raccoon and small animals.

SERVICEBERRY (Amelanchier canadenis) Height: 10'-20'; Spread 8-15'
An upright shaped tree with a moderate growth rate. Serviceberry will thrive in sun or partial shade. White springtime flowers. Tolerant of most soil types, Serviceberry looks good planted along the edge of woods.

SOURWOOD (Oxyndrum arboreum) Height: 20-30'; Spread: 10-15'.
Sourwoods are handsome native trees which are most effective in landscape design when planted in groups. They are easy to transplant and as each tree matures it assumes a slender form with upright branches. Sourwood prefers relatively dry acid soils. Its only special maintenance problems may be infestations of webworms.

WASHINGTON HAWTHORN (Crataegus phaenophyrum) Height: 25-30'; Spread: 25-30'.
Hawthorns generally require spraying to prevent disease and insect infestation. However, they are an excellent choice for screening because of their extremely dense and thorny branches. They have proven to be excellent as a headlight screen on highway medians and, when planted close together, they form an

impenetrable living fence. They prefer sun and are tolerant to most types of soil. The Washington Hawthorn is generally considered to be the best of the Hawthorns.

YAUPON (Ilex vomitoria) Height: 15 to 20 feet; Spread: 10 to 20 feet

Yaupon is an upright evergreen shrub that forms thickets with numerous stems and branches. It grows well in full to partial shade and adapted to wet and dry sites. Small white flowers in spring yield to small shiny red berry clusters on the stems in the fall. Deer browse the foliage and fruit are eaten by birds and small mammals.

E-12 Large Trees for Evergreen Screening (Amended 6/22/04)

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. All three are moderate to fast growers. They are not considered to be shade trees.

ATLANTIC WHITE CEDAR (Chamaecyparis thyoides) Height: 40 to 50; Spread 10 to 20 feet
Atlantic White Cedar is a tall, slender columnar tree; that looses lower branches with age. It grows best in wet sites with full sun. Bluish green needles appear flattened and arranged in irregular sprays with pointed tips. Bluish purple cones are quarter-inch long.

EASTERN RED CEDAR (Juniperus virginiana) - Height 60'; Spread 15-20'.
This is a native evergreen tree that is very hardy in the area. Mature specimens have interesting bark. Has waxy fruit that birds enjoy. Slow growth.

LAUREL OAK (Quercus laurifolia) Height: 40-60'; Spread: 30'+.
The Laurel Oak grows more slowly than the other Oaks listed above, but it has the advantage of being nearly evergreen in Piedmont sections of North Carolina. It has proven to be a good street tree and does quite well under city conditions. It presents no special maintenance problems.

LOBLOLLY PINE (Pinus taeda) - Height 50 to 90; Spread 30 to 40 feet
Loblolly pine grows well on moderately acid soils with poor surface drainage and full sun. It is initially pyramidal until the crown becomes rounded with horizontal branches following the loss of lower branches. Excellent fast growing species for rapid vegetative screening.

LONGLEAF PINE (Pinus palustris) - Height 80 to 100; Spread 30 to 40 feet
Longleaf pine is found on well-drained sandy soils and on swamp edges and requires full sun. In the Piedmont, it rarely attains mature height due to susceptibility to ice storm damage, wind, lightning, high winds, and drought. It is also a nesting tree for red-cockaded woodpecker. It is slow to establish and grows in "grass like" stage for first 5 years.

SHORTLEAF PINE (Pinus echinata) Height 80 to 100; Spread 30 feet
Shortleaf pine is a medium-sized, native, evergreen conifer with relatively short needles and thin, flaky, black bark that becomes reddish brown with age. Shortleaf pine is suitable to sunny sites and a variety of soils. It is a medium to large tree with an initial small, open, pyramidal crown that becomes a small narrow crown with age.

SOUTHERN MAGNOLIA (Magnolia grandiflora) Height: 40-60'; Spread: 25'+.
Magnolias are striking trees which serve well as screens when their branches are allowed to grow to the ground. Generally, the 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.

VIRGINIA PINE (Pinus virginiana) - Height 60'; Spread 25-35'.

A native of the area, Virginia Pine is a short needled tree that is very tolerant of clay soils. More resistant to winter weather conditions than Loblolly Pine.

E-13 Large Trees for Shading (Amended 6/22/04)

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 thirty feet. The trees on the following list marked with an "*" are appropriate selections to satisfy Section 15-315, Required Trees Along Dedicated Streets.

CHESTNUT OAK (Quercus montana; Q. prinus) Height: 60 to 70 feet; Spread: 50 to 70 feet
Chestnut oak is a medium-sized, native, deciduous, tree that is suited to dry, infertile, rocky upland sites, yet grows best on rich well-drained soils along streams. At maturity, it is a medium-sized long-lived tree with an irregular dense crown. The sweet acorns are an important food for many wildlife species including deer, turkeys, squirrels, chipmunks, and mice, while small birds, mammals, and bees use chestnut oak cavities for nesting

CUCUMBER TREE (Magnolia acuminata; M. Fraserii) Height: 50 to 80 feet; Spread: 50 to 80 feet
Cucumber tree is the most widespread and hardiest of the eight native magnolia species. It grows fairly rapidly and well in rich, moist soils of slopes and valleys and matures in 80 to 120 years. This park-like tree is planted as an ornamental for its attractive leaves, flowers, and cucumber-shaped fruit, producing seeds that are eaten by birds and small mammals. Its shape is pyramidal when young, developing a straight trunk and a rounded crown.

***EASTERN RED OAK (Quercus rubra) Height: 50-70'; Spread: 40'+.**
This tree grows faster than any other Oak, two feet or more per year. It is prized as a street tree because its high branching habit gives it an ideal shape. The Red Oak grows in almost any average soil and presents no special maintenance problems.

***GINKGO OR MAIDENHAIR TREE (Ginkgo biloba) Height: 40-80'; Spread: 30'+.**
The Ginkgo is a tree which is recommended for several outstanding reasons. It is one of the oldest surviving species of trees. It is adaptable to any soil, climate, or degree of exposure to the sun. It does quite well in the city. It has no pests, no diseases, and no pruning requirements. In sum, it is a tree of exceptional vitality. The N.C. Department of Forest Resources calls the Ginkgo, probably the best all around street tree. Two reservations are worth stating, however. First, only male trees should be planted because female Ginkgos bear a messy, malodorous fruit. Second, the Ginkgo is a slow grower. When young, it has a rather gangly appearance. It takes 20 to 30 years to assume its mature, symmetrically spreading form.

***LAUREL OAK (Quercus laurifolia) Height: 40-60'; Spread: 30'+.**
The Laurel Oak grows more slowly than the other Oaks listed above, but it has the advantage of being nearly evergreen in Piedmont sections of North Carolina. It has proven to be a good street tree and does quite well under city conditions. It presents no special maintenance problems.

POST OAK (Quercus stellata) Height: 40 to 50 feet; Spread: 35 to 50 feet
Post oak is a small to medium-sized tree with a crown that has snarled and twisted branches and found on upland sites with full sun. This slow-growing drought resistant oak typically occupies rocky or sandy ridges and dry woodlands with a variety of soils. Acorns provide high-energy wildlife food during fall and winter for wild turkey, white-tailed deer, and squirrels, and provide habitat for birds and mammals. Post oak can be a beautiful shade tree for parks and to stabilize soil on dry, sloping, stony sites where few other trees will grow. It develops an attractive crown with strong horizontal branches.

***SCARLET OAK (Quercu Coccinea) Height: 60-80'; Spread: 40'+.**
This is a third Oak which grows rapidly and is easy to maintain. The Scarlet Oak is more difficult to transplant than the Red or the Willow, but it may be a worthwhile selection for its excellent foliage

SOUTHERN CATALPA (Catalpa bignonoides) Height:25 to 40 feet; Spread: 20 to 30 feet
Catalpa is a medium-sized tree with spreading branches, an irregular crown, and generally crooked bole that is suited to moist, well-drained soils with full sun. The flowers and leaves make this an interesting landscape tree but the fruit can be messy.

SOUTHERN SUGAR MAPLE (Acer saccharum; A. barbatum) Height: 20 to 25 feet; Spread: 20 to 40 feet
Sugar maple grows on moist, well-drained soils and is very tolerant of shade. Seeds are eaten by birds and small animals. A popular ornamental for the fall color, Sugar Maple at maturity is a medium to tall tree with very dense elliptical crown.

SWAMP CHESTNUT OAK (Quercus michauxii) Height: 60 to 70 feet; Spread: 50 to 70 feet
Swamp chestnut oak grows in full sun on moist and wet loamy soils of bottomlands, along streams and borders of swamps, tolerates saturated or flooded soils for a few days to a few weeks. The acorns are sweet and serve as food to wildlife. The crown is round, compacted, and narrow.

SWAMP WHITE OAK (Quercus bicolor) Height: 50 to 60 feet; Spread: 50 to 60 feet
Swamp white oak is a medium sized tree with an irregular crown suitable to river bottomlands, depressions, swamp borders, and along edges of streams. It is rapid growing and long lived, attaining 300 to 350 years. Many kinds of wildlife eat the acorns, particularly ducks. Swamp white oak is intermediate in shade tolerance but not very drought tolerant.

SYCAMORE (Platanus occidentalis) Height: 70-100'; Spread: 60'+.
The Sycamore is probably the fastest growing shade tree on this list. Within ten years, it can grow to a height of between thirty and forty feet. It is easily transplanted, but it needs plenty of space. As one of nature's most massive trees, Sycamores have been known to grow to a height of 170 feet with a trunk 10 feet across. The Sycamore is a native tree which typically grows in flood plains, but it thrives in a variety of situations. Its tolerance of severe conditions has long made it a favorite choice as a street tree. Sycamores are susceptible to fungi and leaf blight and their large leaves and seed balls may present a litter problem.

***TULIP POPLAR (Liriodendron tulipifera) - Height 60'-150'; Spread 30-40'.**
Very common in eastern woodlands, this is a rapidly growing tree with colorful yellow leaves in Fall. Spring flowers, however, are not very noticeable. Difficult to transplant except when young. Excellent street tree.

WHITE OAK (Quercus alba) Height: 60 to 100 feet; Spread:50 to 90 feet
White oak is found on fertile, moist, well-drained soils under partial sun. Acorns are eaten by game birds, deer, bear, and many small mammals. Pyramidal in youth, this species matures into a rugged, irregular crown that is wide spreading, with a stocky bole. While this species is potentially valuable for use in reforestation projects, it is not recommended near paved areas.

***WILLOW OAK (Quercus phellos) Height: 60-80'; Spread: 30'+.**
This is another rapidly growing Oak. It has proven to be quite successful as a street and parking lot tree in the Carrboro area. Its slender leaves give it a finer texture than that of other Oaks, but it still casts excellent shade. The Willow Oak is native to bottomland soils, and thus it needs plenty of moisture. It often spreads majestically as it matures so it should be given ample room to grow. No significant pests or diseases afflict the Willow Oak.

E-14 Small Shrubs for Evergreen Screening (Amended 6/22/04)

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.

CAROLINA JESSAMINE* (Gelsemium sempervirens) - Height up to 20'; Spread varies.
A moderate growing, mostly evergreen vine that grows very well on fences. Fragrant yellow flowers in springtime. Prefers sun or partial shade. All parts of this plant are poisonous.

CONVEXA JAPANESE HOLLY (Ilex crenata 'convexa') Height: 4-6'; Spread: 3-5'.
The Convexa Japanese Holly is another good Boxwood substitute. This shrub is considered to be one of the most attractive, hardy and serviceable Hollies for landscape use. It is attractive in either a clipped or unclipped form. It grows faster than the Littleleaf Japanese Holly.

DWARF HORNED HOLLY (Ilex cornuta 'rotunda') Height: 3'; Spread: 3-4'.
This shrub is an excellent selection for a low hedge. It is soil tolerant and requires no pruning or other special care once established. With its spiny leaves, this plant appears to be and is in fact rugged. Like all Hollies, it grows best in full sun, but unlike others of its species, it produces bright red berries without both sexes being present.

GLOSSY ABELIA (Abelia grandiflora) Height: 4-6'; Spread: 3-5'.
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.

INDIAN HAWTHORN (Raphiolepis indica) Height: 3-4'; Spread: 4-5'.
With its spreading, irregular branching, the India Hawthorn makes an excellent informal hedge. It is tolerant of a variety of soils and is fairly drought resistant. However, it may not be as cold tolerant and pest resistant as other shrubs on this list.

JAPANESE YEW (Taxus cuspidata) Height: 4-6'; Spread: 5-7'.
The versatile Yew is commonly available from local nurseries in a wide variety of sizes and shapes. The Japanese Yew serves as excellent screening material in either a clipped or unclipped form. It tolerates poor growing conditions and flourishes in almost any kind of soil. (Soggy soil may hamper its growth, however.) It is comparatively pest free and is hardy under trying winter conditions. The Yew's best feature is its rich shiny green needles which grow densely on all varieties.

OTTO LUKEYN LAUREL (Prunus laurocerasus var. 'Otto Lukeyn') - Height 4'; Spread 4-7'.
A cold hardy, broad leaved evergreen shrub. Prefers sun, but will grow in fairly shady conditions. Good green color even in winter. This is a shorter growing variety of the Schipka Laurel.

POET'S LAUREL (Danae racemosa) Height: 2 to 3 feet; Spread: 2 to 3 feet
Poet's Laurel prefers partial to full shade, moist, well-drained soil enriched with organic matter; but does tolerate clay soils. It has an open growth habit with slender branches that arch up and away from center of crown. It can spread by rhizomes. While foliage discolors in sun; it can be long-lasting for flower arrangements.

TRUMPET HONEYSUCKLE* (Lonicera sempervirens) - Height up to 50'; Spread varies.
A rapid growing, mostly evergreen vine with beautiful orange to red to yellow flowers occurring in late spring and throughout the summer. Best in full sun.

WARTY BARBERRY (Berberis verruculosa) Height: 3-4'; Spread: 3-4'.
Barberrys as a group have proven to be excellent as 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 3 to 4 feet within five years.

WINTERBERRY HOLLY (Ilex verticillata) Height: 6 to 15 feet; Spread:6 to 10 feet
With a slow to moderate growth rate, this species is suited to partial to full sun on moist soils, but can tolerate drought. Early summer brings small white flowers that mature into dense clusters of bright red berries.

WINTERGREEN BARBERRY (Berberis julianae) Height: 4-6'; Spread: 2-5'.
This is another Barberry which forms an impenetrable thorny hedge. In fact, it grows even more densely than the Warty Barberry. It is pest resistant and is very hardy. No pruning is required. Because it is fairly slow growing, it will take eight to ten years to reach a height of 5 to 6 feet.

Note: * Vines - which if grown on a trellis would make a nice evergreen screen.

E-15 Large Shrubs for Evergreen Screening (Amended 6/22/04)

The following shrubs are recommended for high hedges or screens. Each species grows to a height of more than 6 feet; therefore, these shrubs are appropriate for Opaque Screens.

ANISE BUSH (Illicium anisatum) - Height 8-12'; Spread 8-10'.
moderate growing, evergreen shrub with an open habit. Small flowers appear in mid-Summer. Prefers a fair amount of moisture, with partial to full sun. Subject to damage during very cold winters.

CAROLINA CHERRY-LAUREL (Prunus caroliniana) Height: 20-30'; Spread: 15-20'.
This tree is prized for its dense evergreen foliage. It may be trimmed as a hedge, but also serves as an excellent screen in its natural form. The Cherry-Laurel grows rapidly and has no pests. However, it may not be as cold hardy as other trees on this list.

CLEYERA (Cleyera japonica) - Height 8-10'; Spread 5-6'.
A slow-moderate growing evergreen shrub. Its new foliage is reddish in color, like the Photinia. However, unlike the Photinia, Cleyera is much more disease resistant and thus a better option. Prefers shade or partial shade, with moist, but well drained soil.

ENGLISH LAUREL (Prunus laurocerasus) - Height 10-12'; Spread 8-11'.
A large leaved, evergreen shrub with moderate growth. Prefers well drained soils. Grows best in sun or partial shade, but will survive in shade. Cold hardy. Makes an excellent evergreen screen.

FORTUNE TEA OLIVE (Osmanthus fortunei) Height: 9-12'; Spread: 5-7'.
This Osmanthus hybrid is a popular, though non-descript, shrub. With its vigorous growth, it will form an excellent screen or border. It is soil tolerant. The Fortune Tea Olive is most notable for its inconspicuous yet highly fragrant flowers.

LOBLOLLY BAY (Gordonia lasianthus) Height 30 to 60 feet; Spread 10 to 15 feet
Loblolly-bay is a small to medium-sized native, evergreen tree that grows on acid soils in flat woodlands or shallow depressions with little or no slope, slow runoff, and poor to very poor drainage. It has a narrow crown and straight trunk.

LOROPETALUM (Loropetalum chinese) - Height 6-10'; Spread 8-9'.
Fast growing evergreen shrub with colorful Spring flowers. Prefers sun or partial sun, in moist, but well drained soil. Excellent substitute for Photinia. Variety 'rubrum' has purplish leaves.

RED BAY (Persea borbonia) Height: 15 to 40 feet; Spread 10 to 20 feet
Redbay is an attractive aromatic evergreen tree suitable for sites with partial to full sun and prefers drier soils. Birds and small mammals eat the fruit.

SCHIPKA LAUREL (Prunus laurocerasus 'schipkaensis') - height 6-8'; spread 3-5'.
A cold hardy, broad leaved evergreen shrub. Prefers sun, but will grow in fairly shady conditions. Good winter color.

SOUTHERN WAX MYRTLE (Myrica cerifera) Height 40 feet; Spread 20 to 25 feet
Southern wax myrtle is an erect, shade tolerant, ornamental, evergreen, small tree or shrub. Its flat leaves are aromatic when crushed and may repel. Underground runners extend the growth laterally and root nodules are capable of atmospheric nitrogen fixation.

YAUPON HOLLY (Ilex vomitoria) Height: 5-15'; Spread: 6-12'.
This is another versatile Holly, slower growing than the Burford, but equally as adaptable to adverse conditions. It is a native shrub which has proven to be one of the most drought resistant of all Hollies. It may be clipped to maintain any desired height. The Yaupon Holly is very heavily fruited and will attract birds.

E-16 Assorted Plantings for Broken Screens (Amended 6/22/04)

The following is a sampling of shrubbery which 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 E-14 and E-15 are also suitable for Broken Screens.)

AZALEAS (Rhododendron calendulaceum (Flame); R. nudiflora & R. periclymenoides (Pinxterbloom); R. prunifoloium (Plumleaf)) Height 3 to 10 feet; Spread 4 to 8 feet.
These three azaleas are excellent naturalizing plants that do not require a lot of space. With great orange, pink, and red colors, these species attract hummingbirds and butterflies. Good for sites with full sun to part shade with medium moisture on well-drained soils with a southwest aspect.

BEAUTYBERRY (Callicarpa americana) - Height 6'.
Very colorful deciduous shrub with springtime flowers, followed by purple fruit which lasts into winter. Prefers full sun.

***BLUEBERRY (Vaccinium ashei) - Height 4-6'; Spread 3-5'.**
Also known as Rabbiteye blueberry, this is a heat tolerant, native shrub. White flowers in springtime followed by blue fruits that birds enjoy. Has a moderate growth rate. This shrub prefers well drained, acid soil.

***BORDER FORSYTHIA (Forsythia intermedia) Height: 8-10'; Spread: 7- 10'.**
Forsythias are well known shrubs which bloom bright yellow quite early in the Spring. There are two commonly available forms of this shrubs: the weeping Forsythia suspensa and the more upright Forsythia intermedia. The latter is preferred for screening purposes. With its graceful branches, the Border Forsythia presents a good deciduous foliage mass and should be given plenty of room to grow. It transplants easily and withstands poor growing conditions. It should be thinned occasionally to ensure vigorous growth.

BUTTON BUSH (Cephalanthus occidentalis) Height: 6 to 10 feet Spread: 6 to 10 feet
Buttonbush is a deciduous, warm-season, tall shrub or small tree that grows along swamps, marshes, bogs, ditches, and other riparian areas that are seasonally inundated for at least part of the year. Its base is often swollen, with green branches when young but turns brown at maturity. Tiny, white flowers occur in dense, spherical clusters at branch ends attract bees and butterflies with fruits arranged in a round cluster of brown, cone-shaped nutlets.

CAROLINA ALLSPICE OR SWEETSHRUB (Calycanthus floridus) - Height 6-9'; Spread 5-8'.
This is a deciduous shrub native to the Southeast. Fragrant, maroon flowers appear in late Spring. Takes sun or shade.

CAROLINA ROSE (Rosa carolina) Height 3 to 6 feet Spread: 5 to 10 feet
Best grown in average, medium-wet to wet, well-drained soil in full sun. Fragrant, showy flowers attract birds and butterflies, but this plant does have thorns.

CLETHRA (Clethra alnifolia) - Height 10'.
Another native of the Eastern United States, Clethra has fragrant white flowers in late Summer. Grows well in acid soils. Full sun, however in the Piedmont it would do best with some shade. Varieties are available with pink flowers.

COMMON WITCH HAZEL (Hamamelis virginiana) Height: 8-15'; Spread 7-14'.
This shrub is a larger version of Vernal Witch Hazel with many of the same qualities. It is another native woodland plant which has adapted well to landscaping uses. The Common Witch Hazel is recommended for shady areas, but when planted in the sun it grows to be a splendid well rounded specimen. It is especially useful in large areas.

DROOPING LEUCOTHOE (Leucothoe fontanesiana) Height: 3-4'; Spread: 4-6'.
Drooping Leucothoe is a moundlike shrub which is good for planting in front of and between other flora and beneath trees. It is hardy in city conditions and gives a natural effect when planted along borders. This native evergreen is graceful and attractive in all seasons. It is easy to transplant but requires a heavy mulch and should be provided with at least partial shade. Old branches should be pruned occasionally to stimulate new growth.

FRINGETREE (Chioanthus virginicus) Height: 10-30'; Spread: 8-10'.
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 the Spring.

JAPANESE BARBERRY (Berberis thunbergii) Height: 3-5'; Spread: 3- 5'.
This extremely common deciduous shrub is considered to be one of the toughest members of the Barberry family. It survives drought, poor soils, exposures, 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 singularly, needs no pruning.

JAPANESE FLOWERING APRICOT (Prunus mume) - Height 15' (tree).
Deciduous tree with small, but profuse flowers that have a spicy fragrance. Blooms in February or March. Varieties are available with pink, red, or white flowers. Prefers full sun or partial shade.

OAKLEAF HYDRANGEA (Hydrangea quercifolia) - Height 4-6'; Spread 3-5'.
Deciduous shrub with large, white flower clusters during the Summer. Colorful crimson foliage in Fall. Makes an excellent specimen plant.

SMOKETREE (Cotinus coggygria) - Height 10-15'; Spread 8-14'.
Large shrub or small deciduous tree with attractive round leaves. Colorful lavender panicles appear in Summer. Prefers well drained soil, but otherwise does well in poor soils. Full sun is best for this shrub.

STAR MAGNOLIA (Magnolia stellata) Height: 10-12'; Spread: 8-10'.
This handsome specimen shrub is considered to be the hardiest of all the Magnolias. It forms a broad, rounded mass. It becomes tree-like with age but continues to branch to the ground. Early in the spring, it produces numerous fragrant white flowers. The Star Magnolia should not be planted adjacent to shallow rooting trees. It should be allowed plenty of sun.

SUMAC (Rhus copallina (Shining); R. glabra (Smooth) R. typhina (Staghorn)) Height 7 to 40 feet; Spread 9 to 20 feet
These species are perennial, deciduous, sun-loving, thicket-forming shrubs or small trees with branches that tend to be fairly sparse and stout. Sumac does well on dry to medium moisture sites. The tart fruits are eaten by birds and are very tart in taste. These species provide good fall color.

****** SWAMP WHITE OAK (Quercus bicolor) Height: 50 to 60 feet; Spread: 50 to 60 feet**
Swamp white oak is a medium sized tree with an irregular crown suitable to river bottomlands, depressions, swamp borders, and along edges of streams. It is rapid growing and long lived, reaching 300 to 350 years. Many kinds of wildlife eat the acorns, particularly ducks. Swamp white oak is intermediate in shade tolerance but not very drought tolerant.

VERNAL WITCH HAZEL (Hamamelis vernalis) Height: 4-6'; Spread: 2- 3'.
This rapidly growing native shrub is excellent for bordering and naturalizing. It assumes a dense, upright form, thriving in even the most polluted air. Other than plenty of watering, the Vernal Witch Hazel requires no special maintenance.

******Viburnum (Viburnum prunifolium; V. dentatum) Height: 12 to 15 feet; Spread: 8 to 12 feet**
Black Haw is a small tree with twisted trunk and arching branches with an overall round crown appearance. Does best on partially sunny sites on moist, well-drained soils.

E-17 List of Invasive Plant Species (AMENDED 6/22/04; 6/22/10)

The following plant species shall be prohibited when complying with the shading and screening provisions of this chapter and shall not be shown on any plans submitted in support of a Land Use Permit application. Further information on invasive pest plants that applicants may wish to avoid may be found on the website for the North Carolina Native Plant Society.

Plant Type: A=Aquatic, H=Herbaceous, W=Woody Plant

Species (Latin)	Common Name	Type
Ailanthus altissima	Tree of Heaven	W
Albizia julibrissin	Mimosa	W
Alliaria petiolata	Garlic-Mustard	W
Celastris orbiculatus	Asian Bittersweet	W
Eleagnus angustifolia	Russian Olive	W
Eleagnus umbellata	Autumn Olive	W
Hedera helix	English Ivy	W
Hydrilla verticillata	Hydrilla	A
Lespedeza bicolor	Bicolor Lespedeza	W
Lespedeza cuneata	Sericea Lespedeza	H
Ligustrum sinense	Chinese privet	W
Lonicera fragrantissima	Bush Honeysuckle	W
Lonicera japonica	Japanese Honeysuckle	W
Microstegium vimineum	Japanese Stilt-grass	H
Murdannia keisak	Asian Spiderwort	H
Myriophyllum aquaticum	Parrotfeather	A
Paulownia tomentosa	Princesstree	W
Phragmatis australis	Common Reed	H
Polygonum cuspidatum	Japanese Knotweed	H
Pueraria montana	Kudzu	H
Rosa multiflora	Multiflora Rose	W
Salvinia molesta	Aquarium water-moss	A
Wisteria sinensis	Chinese wisteria	W