LANDSCAPE MANUAL

A manual to assist meeting the landscaping, tree cover, screen and buffer requirements,
transitional buffering, and design standards of

Section 22-106.2 OF CHAPTER 22 OF THE CODE OF THE COUNTY OF HENRICO, VIRGINIA

EFFECTIVE
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It is hoped the following list is complete:

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- Many interested citizens

EXECUTIVE SUMMARY OF THE
LANDSCAPE ORDINANCE AND LANDSCAPE MANUAL

A. Landscape Ordinance

In June 1990, the Zoning Ordinance was amended by the adoption of Section 22-106.2 which has become informally known as the "landscape ordinance".

The ordinance was amended in November, 1991 as part of the coordinated amendments required to reflect needed changes and refinements as well as the Chesapeake Bay Preservation Effort.

B. Landscape Manual

The Landscape Manual required by the landscape ordinance is designed to provide the necessary guidelines to assist meeting the new landscape requirements, it is intended for use by anyone when preparing plans for submittal and approval and by administrative personnel who must review those plans for their completeness and compliance with the code. It provides written text and descriptions, guidelines, and drawings where necessary. It is anticipated that it will be updated as needed to maintain its usefulness.

The Manual provides general information concerning the applicability of the landscape ordinance and how its provisions will affect properties (essentially all land development activities that disturb 2,500 square feet or more). Procedures are established and guidelines set out to guide decision making at all steps of the process of planning for growth and development. Provisions are made to exempt certain activities: bona fide agricultural operations and certain publicly financed projects necessary for public health, safety and welfare. Provisions for deviations are made to accommodate many site specific problems.

There are sections of the Manual that are designed to assist meeting each of the major provisions of the landscape ordinance:

1. Tree Protection Plans
2. Tree Canopy Requirements
3. Transitional Buffer Requirements
4. Parking Lot Landscaping

The largest and most significant portion is the Tree Protection Plan section which describes what the plan must contain, how the requirements may be met and what procedures may be used. Provision is made to develop the Plan on a phased basis that reflects and is coordinated with normal development plan preparation steps. In so doing, the Tree Protection Plan will be an integral part of the overall development plan. Its preparation is expected to prevent significant detailed, time consuming special studies that may otherwise be required if it is not properly coordinated. Final development plans will include the complete Tree Protection Plan. The phases of the plan preparation will not conflict with current approval steps; rather those steps (such as the POD landscape plan) are incorporated into the phased preparation.

The Transitional Buffer section provides the guidelines and illustrations necessary to meet these new requirements in a uniform manner. Meeting the new requirements will include administrative findings relating to alternatives and permitted deviations. Therefore, it will become a very valuable reference. In this manner, the many individual and unique situations can be resolved in the manner most beneficial to all parties. These procedures will not conflict with normal landscape plan approval procedures, but will in fact, enhance them.

Parking lot landscaping is uniformly required by the landscape ordinance, regardless of the type of use served. Over the past several years this requirement has made major improvements in the quality of development in business areas. All parking areas are now required to be developed to a uniform standard. Several illustrations and provisions of the Manual will assist resolution of design problems associated with these requirements.

INTRODUCTION

Henrico County has long embraced a commitment to encourage and provide for the highest possible standard of development and quality of life for its citizens. This goal has always been balanced by an equally strong commitment to assure that required improvements to the built environment are affordable — that they contribute to the values of property and quality of life to a degree commensurate with their cost. Recognition of the environmental oriented aspects of these requirements over the years by businesses and the public and the increased attention to and emphasis on them is witness to their soundness.

For many years approval procedures for all significant developments have required that plans be prepared to conscientiously consider and correctly provide for such protective and environmental features as buffering and suitable landscaping. Some requirements originate in the zoning ordinance, some arise during the rezoning process and others are identified and shaped during the plan of development process. Regardless of their origin, appropriate procedures of responding to them have been developed and they are subject to continuous review in order to keep them up to date.

In mid-1990 this effort resulted in adoption of Section 22-106.2 of Chapter 22 (the Zoning Ordinance), which has become popularly known as "the landscape ordinance". It should be noted that this Section is but one part of Henrico's commitment to the Chesapeake Bay Preservation Program which also includes regulations set forth in Section 22-106.3 and Section 22-95 (q) (Controlled Density Development) of Chapter 22, as well as in Chapter 19 (the Subdivision Ordinance) and Chapter 9 (the Erosion and Sediment Control Ordinance) and Chapter 21 (Pertaining to Disposal of Sewage and Liquid Waste). These ordinances and the review and approval procedures necessary to satisfy them must be viewed in their entirety, as they are interdependent and coordinated.

The landscape ordinance establishes significant new requirements; the first being a Tree Protection Plan. The second new requirement is a series of transitional buffers of varying widths and densities designed to minimize the adverse relationships between dissimilar and generally incompatible land uses. The buffers vary in intensity and proportion to the degree of incompatibility between the uses being separated. The third new requirement uniformly extends to all types of development the previously established and acclaimed provisions for landscaping of parking lots.

It is the purpose and intent of this manual to assist the developer and/or property owner (and his advisors) to meet the requirements of the landscape ordinance and those associated ordinances relating to the physical aspects of development. Many of the special terms used in these codes are illustrated and found in appropriate sections. In order to properly maintain the goal of this manual, it will be updated and expanded as needed to keep abreast of needs experience and new techniques as they are developed.

ARTICLE I GENERAL REQUIREMENTS

Section 1. Applicability

The County of Henrico has a long history of development and redevelopment. These processes will continue in response to the various and changing needs and economic forces that will inexorably be translated into physical change — often called for lack of a better term: progress. Long ago it was deemed necessary to guide (or regulate) growth and development in order to assure that the many individual interest and actions that it is comprised of are balanced so that the overall welfare of the total community is furthered. This goal translates into various laws, ordinances and policies, which must periodically change to reflect new knowledge, techniques and changing needs. Most recently, the changing concept of the breadth of the community in regard to our use and stewardship of the land, which is our basic nonrenewable resource, has been broadened as witnessed by enactment of federal and state environmental legislation and regulations.

Henrico is appropriately responding to these changes and has designed a coordinated, administrative procedure: the land development approval process. It becomes effective when any significant land disturbing activity is begun, and is viewed as the most effective means of meeting these broad responsibilities.

Although each of the codes regulating land disturbing activities and requiring procedures embraced by the land development approval process contains detailed provisions, it may be generally stated that all activities that will disturb land area of 2,500 or more square feet (.057 acre) are affected. For each code, there are provisions for variations, deviations, or alternatives or clarifications of its applicability and/or effect when it can be demonstrated that strict application of the requirements is not appropriate.

Section 2. Exemptions

2.1 The following have been exempted by the definition of the Land Development Approval Process:

1. Bona fide agricultural operations
2. Publicly financed buildings and projects for public health, safety, welfare and preservation of life and property. Such actions, including emergency operations, include road, sewer, drainage and waste water projects.

ARTICLE II TREE PROTECTION PLANS

1. All non-exempt land disturbing and land development activities require submittal and approval of a Tree Protection Plan. The Tree Protection Plan shall be included with and become an integral part of the plan or permit to be submitted in the normal manner. The appropriate agency will transmit the plan to the director of planning for review and approval. The director may approve a plan which deviates from the strict requirements pursuant to Section 22-106.2(e)(2)e.

2. Preparation and submittal of a Tree Protection Plan is a primary component and must be prepared and submitted as part of the normal development plans. The Plan will be reviewed, commented upon and/or annotated as may be necessary throughout the various steps it will pass through before being completed and finally being approved as a component of the total development plan approval. The preparation sequence divides the Tree Protection Plan into four (4) distinct inter-related phases. Each progressive step builds on the information gained from the previous phase and each is designed to be compatible with the level of detail normally associated with the development planning stage with which it is associated thereby minimizing the impact of additional data required at any phase of the development plan preparation process.

2.1 The Tree Protection Plan Preparation Phases are:

Phase I. Conceptual Tree Protection Plan. This initial phase will provide the information which constitutes the basic framework of the Plan. It will be reviewed and commented on and may be annotated as necessary to provide the guidance needed for completion of the next phase. Phase I must contain the basic data:

A. A conceptual outline of the Plan to be developed. As such it will delineate its broad purposes and goals. It will also include the initial analyses of existing conditions and circumstances, including problems, and the anticipated means of resolving identified problems and preserving amenities.

B. A compilation of all applicable proffered zoning conditions and required buffers and delineation of all areas affected by each.

C. A compilation of all known easements, their locations, and nature of the restrictions each imposes on development and use of the area.

D. Location and basic characteristics of all wetlands, Chesapeake Bay Preservation Areas and 100 year floodplains.

E. General location of all specimen, significant, memorial and heritage trees and significant groups of trees to be saved.

Following submittal of the Conceptual Tree Protection Plan, it will be reviewed by staff which will provide comments, annotations and such additional information

as may be needed to assist preparation of the next phase of the Tree Protection Plan.

Phase 2. Preliminary Tree Protection Plan. The second step in the development of a complete Tree Protection Plan will build upon the information provided by phase I and provide an increasing level of detail that will facilitate the next phase and delineation of the final plan. The Preliminary Tree Protection Plan will include the essential phase 1 information and data which must be expanded and completed to provide the following:

A. Phase 1 information and data
B. Delineation and details of earthworks to include grading (all filling and cutting) and trenching
C. Confirmation of the location of all specimen, significant, heritage or memorial trees and significant groups of trees to be saved.
D. Location of all tree protection areas
E. Methods and details of tree protection
F. Preliminary calculations of tree cover which must include the area of tree cover required, the credit for existing tree cover; and the anticipated tree cover area deficiency to be provided by planted trees.

Following submittal of the Preliminary Tree Protection Plan, it will be reviewed by staff which will provide comments, and assistance necessary to permit the complete Tree Protection Plan to be submitted for final review and approval.

Phase 3. Tree Protection Plan. The completion and submittal of a Tree Protection Plan will provide the basis for completion of the last major step in the process of planning to meet the ordinance requirements. This plan, if properly completed, should receive approval by the Director of Planning or agent. To meet the requirements of this phase, the following will be required:

A. Phase 2 information and data
B. Verification of compliance with plan annotations and comments received in Phase 2 review.
C. Final tree cover calculations.

Upon approval, the complete Tree Protection Plan will become a major element of the approved construction plans for the development. Such approval may be subject to conditions which must be met prior to completion of construction and certification of use and occupancy permits.

Phase 3A. This optional step may be required but will be encouraged to be combined with phase 3 if the development plan permits. Phase 3A is defined as the traditional Landscape Plan phase during which Landscaping plans for Plans of Development are prepared. Such plans must include:

A. Data verifying that tree cover requirements are met. Such data will list required tree canopy area, credit for existing trees and additional tree canopy area to be provided by the trees shown on the plan.

B. Approval may be reserved by the Planning Commission in addition to the Director of Planning or agent, but in all cases the Plan must be approved by the Director or agent. The Planning Commission approval will be on the same design and layout basis that has traditionally been its responsibility. Approval by the Director of Planning or agent of the Tree Protection Plan will normally follow Commission approval of the layout plan.

Phase 4. This final phase constitutes certification that the development has been completed or installed in accordance with the Approved Tree Protection Plan or that proper assurances are provided to ensure completion of the designed improvements and plantings.

It must also contain certification that appropriate provisions have been made to maintain compliance with the approved Tree Protection Plan.

2.2 Coordination with development plans. The Landscape Ordinance requires submittal with and approval of a Tree Protection Plan with most land disturbing activities. In order to provide the greatest degree of coordination between the Tree Protection Plan and other increments of land disturbing activity plans, submittal of tree protection plans will be guided by the following schedule:

	DEVELOPMENT OF APPLICATION	REQUIRED PHASE OF TREE PROTECTION PLAN
* A.	Conditional Subdivision Plan	Phase 1
* B.	Final Subdivision Plan (review)	Phase 2
* C.	Subdivision Construction Plans	Phase 3
* D.	Subdivision Recordation	Phase 4
E.	Preliminary Plans of Development	Phase 1
F.	Plans of Development review/approval)	Phase 2
G.	Plans of Development (signature plans)	Phase 3
H.	Plans of Development, Landscape Plan	Phase 3A
I.	Plans of Development: (occupancy)	Phase 4
J.	Erosion and Sediment Control Plan	Phase 4
K.	Administrative Site Plan (review)	Phase 2
L.	Administrative Site Plan (signature)	Phase 3
M.	Conditional, Special and Provisional Use Permits	Phase 1
N.	Building Permits (if need determined by staff during permit review)	Phase 4
O.	Certificate of Use and Occupancy	Phase 4

* Tree Protection Plans for one-family subdivisions will be required only when site contains lands identified as Chesapeake Bay Preservation Areas.

Staff will always be available for consultation and assistance in order to guide the planning and application process to ensure meeting all requirements in the most expeditious manner that is coordinated with other requirements.

3. A complete Tree Protection Plan will consist of drawings, text and tabular information and the content of each of these elements will vary in scope in recognition of the complexity and extent of the land disturbing activity. The plan must, however, delineate and/or consider and provide acceptable documentation and information regarding the following:

   A. Limits of land disturbance, clearing, grading, and trenching.
   B. Tree protection zones.
   C. Specimen trees or stands of trees and trees over 6" caliper within a setback from a public right of way.
   D. Areas of vegetation and tree cover calculations.
   E. Limits of wetlands, tributary streams, Chesapeake Bay Preservation Areas and hundred (100) year flood plains.
   F. Utility and drainage easements, and all other easements within which trees are not permitted or which conflict with purpose of the easement. Location of proffered buffers, landscaping, screening and mounds. Erosion and sediment control and water quality maintenance or protection devices and facilities.

   Detailed drawings of tree protection measures such as, but not limited to the following shall be considered where applicable:

   A. Protective tree fencing.
   B. Tree protection markers.
   C. Transplanting specifications.
   D. Tree wells and aeration systems.
   E. Staking specifications.
   F. Other applicable drawings.

Text information if not included and integrated within other portions of the plan shall:

   A. Establish procedures and schedules for the implementation, installation, and maintenance of tree protection measures. The procedures and schedule must require that the tree protection measures shall be installed prior to any land disturbing activity.

   B. Identify all zoning proffers relating to buffers, landscaping, screening, mounds, erosion and sediment control, and water quality maintenance or protection.

C. Provide other information as may be deemed necessary and appropriate to the specific site.

4. In order to assist in the preparation of the required plan, the following guidelines should be of value.

A. Design

(1) Existing vegetation

a. Existing vegetation that is intended to provide all or part of the tree cover requirements shall be accurately located, identified, and shown on the plan. The drip line of each major vegetation type shall be clearly shown on the plan.

b. When existing trees and associated understory plants are to be preserved for tree cover credit, efforts should be made to design the development to avoid fragmentation of the preservation areas from other woodlands within or contiguous to the site. Such a design should enhance the preservation of wildlife corridors and proliferation of the predominant vegetation types.

c. Tree cover credit shall only be given for trees with main trunks located on the site being developed.

d. Existing trees that are intended to be preserved for tree cover credit shall be selected in accordance with the, Guide for Selection of Trees and Other Vegetation to be Retained.

e. If during construction, vegetation that is shown on the Plan to be preserved is cleared or removed for any reason so that either the tree cover credit is no longer met or proffered conditions violated, replacement trees shall be required. Conversely, if additional trees are preserved, additional tree cover credit may be added to the calculations.

(2) Planted Trees

a. Trees planted to provide all or part of the tree cover requirement shall be shown on a landscaping plan. These trees shall be planted so as to meet appropriate planting specifications with the minimum size planting area provided for each tree according to its projected ten year tree cover area as found in the following chart. The minimum dimension for any planting area shall be 6 feet measured from the interior of the nearest restrictive barrier such as a curb or pavement.

TREE SIZE	10 YEAR TREE COVER AREA	MINIMUM PLANTING AREA REQUIRED FOR EACH TREE
Small Deciduous Trees Compact Evergreen Trees	< 75 square feet	30 square feet
Small/Medium Deciduous Trees	75 - 125 square feet	50 square feet
Medium Deciduous Trees Medium Evergreen Trees	126 - 175 square feet	90 square feet
Large Deciduous Trees Large Evergreen Trees	> 176 square feet	130 square feet

Note: These planting area specifications shall not apply to trees used to meet transitional buffer screening requirements.

b. Trees planted for tree cover credit (with the exception of trees used to meet transitional buffer screening requirements) shall be spaced no closer than the outer limit of their projected 10 years crown area listed in the Tree Selection and Cover Guide, or as determined by the director. Effort should be made to locate or space the trees in a manner that will promote long-term survival.

c. Trees used to satisfy the transitional buffer screening and parking lot landscaping requirements may also be used to satisfy the tree cover requirements.

d. The suitability of the trees proposed to meet the tree cover requirements shall be determined by the director based upon the Tree Selection and Cover Guide. Trees not listed in the Tree Selection and Cover Guide may be used if approved by the director prior to plan approval.

e. Trees proposed to be planted in sizes larger than 3-inch caliper may receive additional square footage credits.

f. Unsuitable and undesirable tree species shall not receive credit in the tree cover calculations if they are shown planted in an area where they will have an adverse impact on the development proposed. However, such tree species may receive tree cover credit if used where their positive attributes may enhance the environment such as in, or adjacent to, Environmental Protection Areas, wetlands or open bodies of water.

g. To minimize the spread of disease or insect infestation in a plant species, no more than seventy percent (70%) of the trees required to be planted on a site shall be of one genus. In addition, when more than twenty (20) trees are required on a site, no more than thirty-five (35%) of the required trees shall be of a single species. Exception can be made if the design concept dictates otherwise and is approved by the director.

h. The plan designer is encouraged to consider the placement of trees and shrubs in a manner that promotes energy conservation in residences and buildings by the moderating effects of shade and the manipulation of air currents provided by the strategic location of trees and woody plants.

B. Plan Requirements

1. All development plans requiring site, subdivision or grading plans shall also include a landscape plan designed to meet the 10-year tree cover requirements.

C. Calculations - Tree cover requirements shall be calculated using the following procedures:

1. Site Plans - Tree cover requirements for site plans shall be calculated as follows:

a. Calculate the gross site area in square feet.

b. Calculate in square feet the ground coverage area of all buildings. Exclude parking structures, easements, parking areas and other areas which are identified as exceptions (or modifications approved by the director) to the tree cover requirements. Subtract this total from the gross site area. If grading is not required for other purposes, calculate the area required to meet the 2% grade away from buildings and add to the foregoing subtotal. This is the adjusted gross site area.

c. Multiply the adjusted gross site area by the percentage of tree cover area required by the zoning district to obtain square feet of tree cover required. The minimum tree canopy cover required is found in Section 22-106.2(e)(2)a.

d. Calculate the square feet of tree cover provided by vegetation proposed to be preserved. Multiply this area by a factor of 1.25 to allow for 10-year growth of existing vegetation (a higher factor of up to 2.0 may be used for trees of outstanding size or quality if approved by the director). If the area of tree cover to be provided by preserved vegetation does not meet that required as calculated in c. above, the deficiency shall be met by planting acceptable landscape trees.

e. To calculate the area in square feet provided by proposed landscape trees consult the Tree Selection and Cover Guide. This Guide provides areas credited to the planting of specific tree species according to the proposed size at planting. Add the square footage credits provided by all

proposed trees to arrive at the total area to be provided by landscape planting.

f. Add the area provided by existing vegetation to be preserved to the area provided by landscape planting (if needed) to determine the total proposed tree cover area. The total of proposed tree cover area must meet or exceed the percentage of 10-year tree cover area as calculated in c. above.

2. Sections or Phases

a. When a development is divided into phases or sections, each phase or section shall be treated separately for tree cover requirements unless exemption is permitted by the director pursuant to finding that a proposed alternative meets the intent and spirit of this Section and all other requirements.

b. In the event a development provides conservation or scenic easements or provides dedicated open space, tree cover provided in the dedicated open space may be credited toward meeting the tree cover requirement for the entire development. The remaining tree cover requirements shall be met in the individual phases or sections of the development. In such cases, the calculations showing a breakdown of where tree cover is to be provided in the open space and each section or phase shall be shown on overall plan and on each incremental phase or section submitted within the overall development.

Guide for Selection of Trees and Other Vegetation to be Retained

1. Grading: Consideration must be given to the proximity of proposed grading to trees and other vegetation to be retained. Grading shall not take place within the drip line of trees to be retained unless an exemption is approved by the Director or agent.

2. Tolerance to sudden exposure: Consideration should be given to the tolerance of the trees and other vegetation to the new environmental conditions such as increase direct sunlight, increase radiant heat from proposed building and pavement, and increased wind. Trees with a strong tap or fibrous root system should be given priority over those with a weak root system.

3. Water table: Consideration should be given to the effect of grading on the water table and the accompanying effect on trees and other vegetation to be retained. Grades that are lowered will cause the water table to drop reducing the ground water available to the vegetation.

4. Outstanding specimens: Trees and other vegetation of impressive size or excellent shape, of historical significance, or rare species shall be preserved if possible. The Director of Planning or agent may grant tree preservation credit between 1.25 and 2.00 after a finding of fact.

5. Appearance: Trees with a well developed crown should generally be given preference over those with misshapen crowns or trunks, those with a small crown at the top of a tall trunk or those with a small crown at the top of a tall trunk or those with narrow, V-shaped crotches. Trees which grow in open areas usually possess better form than those which have grown in crowded conditions.

6. Wildlife value: The retention of trees and other vegetation is desirable to provide sources of food, cover and nesting sites for wildlife. Examples are Oaks, Hickories, and Dogwoods·

7. Other vegetation: Consideration should be given to other vegetation growing in the immediate area. Examples are Virginia Pine, which may not be of particular value if growing with hardwoods, but would increase in value if the only species present on the site. Trees which have been standing alone are usually of higher value than those in a wooded situation.

8. Comfort: Consideration should be given to the location of the trees to be retained in relation to the planned use of the site. Trees provide relief from summer heat and strong winds throughout the year.

9. Health and disease susceptibility: Trees should be inspected for scarring caused by fire or lightning, insect or disease damage, and rotted or broken trunks or limbs. Pest and pollution resistant trees are preferred.

Vegetation Preservation and Planting

Tree Species Found Undesirable In An Urban Environment

The following is a list of trees that have exhibited qualities that are undesirable when planted in an urban environment. These trees may have many values in a natural environment such as providing food and shelter for wildlife or serving to stabilize stream banks. In some instances these species may be considered for enhancing portions of sites abutting Chesapeake Bay Preservation areas, wetlands or open bodies of water. However, care should be given when considering these species for use near residences, buildings, parking structures, roads and pedestrian walkways. A short list of problems normally associated with each species is provided.

Botanical Names	Common Names	Problem
Acer negundo	Box Elder	Weak wood, short lived, insects
Acer saccharinum	Silver Maple	Objectionable root system, weak wood, insects, diseases and prolific seeds
Ailanthus altissima	Tree of Heaven	Weak wood, male flowers have bad odor, prolific seeds
Albizia julibrissin	Mimosa	Mimosa wilt disease, mimosa webworm
Betula pendula	White Birch	Severe borer damage
Ginkgo biloba (female only)	Ginkgo	Female plant produces messy seeds with bad smell. Male plant is recommended
Maclura pomifera (female only)	Osage-Orange	Messy fruit, thorns, shallow roots. Thornless male varieties recommended.
Morus species	Mulberries	Messy fruit
Paulownia tomentosa	Empress Tree	Weak wood, messy, prolific seeds
Populus species	Poplars	Short lived, objectionable roots, weak wood, and canker diseases
Prunus serotina	Black Cherry	Messy, prolific seeds, Eastern Tent Caterpillar damage
Salix species	Willows	Objectionable root system, weak wood
Ulmus americana	American Elm	Subject to Dutch Elm Disease, Elm Phloem Necrosis, insects.
Ulmus pumila	Siberian Elm	Short lived, insects, diseases

Vegetation Preservation and Planting
Codes for Tree Selection and Cover Guide

Location of trees	Codes
In parking lot planting areas	PL
As screening tree	
Categorized by Transitional Screening Requirements	
Large Evergreen Tree	LE
Medium Evergreen Tree	ME
Large Deciduous Tree	LD
Small Deciduous Tree	SD
Within rights-of-way	
Minor Trees	VTA
Major Trees	VTB
As planting in small areas	F
Near overhead utilities	U
Environmental Tolerances	
Restricted root zone	RZ
Poor soil conditions	SC
Partial shade	PS
Shade	SH
Air pollution	AP
De-Icing salts	IS
Wet soil conditions	W
Drought conditions	D
Associated Problems	
Disease Problems	DS
Insect Damage	IN
Storm and structural damage due to weak wood	WW
Objectionable fruit	FR
Objectional root system	RS

EXPLANATION OF TREE SELECTION AND COVER GUIDE COLUMNS AND CODES

Botanical/common name

This column lists trees categorized according to their projected ten-year crown cover area. Botanical names are given first including genus, species and in some cases cultivar. Common names used in the Mid-Atlantic region are given second. Deciduous trees are separated from evergreens in all size categories. Evergreens include both coniferous and broadleaf species. The species listed should thrive in most parts of Henrico County and are normally commercially available from local nurseries.

Projected 10-year tree cover area in square feet and caliper at planting

These columns list the assigned 10-year tree cover area in square feet when a given species is planted as a 1", 2" or 3" caliper tree. Evergreens that are specified by height instead of caliper will receive the following credits: Evergreens 5 to 6 feet in height will receive 1" diameter credits, Evergreens 7 to 8 feet in height will receive 2" diameter credits, and Evergreens 9 feet in height or more will receive 3" diameter credits. This data will be used when calculating tree cover square footage requirements for planted trees only.

Minimum planting space

This column gives the minimum area in square feet that must be provided when planting a given species. This information will be useful in designing parking lots and any other areas where planting space is limited or confined.

Uses

This column may be used to select a species that should thrive and exhibit desirable characteristics suitable to the demands of the listed environment or situation. Five environments are listed: parking lot planting areas, transitional buffer screening areas, rights-of-way, planting in small areas and areas under or close to overhead utility lines.

1. ***In parking lot planting areas:*** These tree species have been selected for use in parking lots based on their historical tolerances to poor soils, drought conditions, reflected heat, restrictive root zones, and do not exhibit a pendulous or spreading branching habit that would restrict eye-level sight distance or impede vehicular or pedestrian traffic.

Trees to be planted in this harsh environment must be carefully chosen in order to reduce replacement and potential maintenance and safety problems associated with root damage that causes upheaval or cracking of concrete and asphalt surfaces.

Consideration of use of these species will assist in the design of required parking lot landscaping.

2. ***As screening trees:*** To meet Transitional Buffer Screening Requirements, these

species must exhibit the characteristics necessary to provide eye-level and/or overhead visual screening of undesirable views. Both deciduous and evergreen species are listed but it should be kept in mind that evergreens provide year round screening since they retain their foliage. Four codes are given to assist selection of an evergreen or deciduous species according to ultimate height as defined in the transitional buffer screening requirements.

3. ***Within rights-of-way:*** Trees have been suggested for planting within rights-of-way in the booklet "Guidelines for Planting Along Virginia's Roadways" published by the Commonwealth of Virginia. The suggested species have been divided into two categories, Minor Trees and Major Trees, based on their general form and potential dimensions. These codes will be useful to assist selection of species for street tree plantings. All trees to be planted in rights of way must be approved by the Department of Public Works.

4. ***As plantings in small areas:*** These species should be considered for planting near the foundations of structures such as residences, office buildings, or in other restricted areas where the ultimate size and form of a tree along with its root structure must be given consideration in order to avoid potential maintenance, safety and access problems.

5. ***Near overhead utilities:*** These trees are suggested for plantings that occur underneath or adjacent to overhead utility lines where ultimate heights and forms of trees can cause interference. Use of the suggested species can avoid disfigurement and associated structural and health problems caused by periodic "topping" or pruning of trees situated near power lines.

Environmental tolerances

This column is to assist in selection of species that are tolerant of specific environmental factors, both natural and manmade, that occur frequently in an urban setting. Eight factors are listed: restricted root zone, poor soil conditions, partial shade, shade, air pollution, de-icing salts, wet soil conditions and drought conditions.

1. ***Restricted root zone:*** Species that fall into this category will grow in a planting area relatively limited in soil Volume and surrounded by impervious barriers typical of parking lot islands and planting strips provided between sidewalks and curbing. Roots of these trees should develop without major disruption to surrounding structures such as pedestrian walkways, streets and curb and gutter. It is to be noted that limiting the area accessible to a root system will shorten the life expectancy of any plant. A larger planting space will result in a more healthy, vigorous specimen due to increased air and nutrient availability and improved soil conditions.

2. ***Poor soil conditions:*** These species are noted for their tolerance to a wide range of soil conditions found in the urban environment. It should be noted that most trees do not tolerate poor soils. Tolerant trees that may grow in poor soils will generally not thrive in them.

   A poor soil as defined herein is a soil intended for use as a growing medium that has marginal properties necessary to support plant life. These inadequate properties

include: low nutrient content — essential nutrients have been leached or the soil lacks nutrient holding capacity; improper Ph — a soil that is either too acidic or too alkaline; poor structure - highly compacted with little pore space for air and with low water infiltration and percolation rates.

Subsoils used to provide a stable base for sidewalks, parking lots, buildings, etc., and general grading purposes are often found to be inadequate for plant growth. Addition amendments such as composted organic matter and agricultural lime can improve soil Ph, structure and nutrient availability and should be considered before planting. Testing soil for Ph and nutrient content is advisable prior to amending soil.

3. ***Partial shade:*** These species should be planted in areas receiving partial amounts of direct sunlight such as on the eastern or northern sides of a structure.

4. ***Shade:*** These species can be planted in a shaded environment, although the deeper the shade the more difficult it is for any tree to thrive. This information will be helpful in selecting trees that can be planted in areas that receive little or no direct sunlight due to obstruction or in areas that receive filtered or diffused sunlight.

5. ***Air Pollution:*** This group of species will tolerate areas subject to exhaust gas emissions found along roadways and within parking lots with high amounts of stop and go traffic. These trees are typically deciduous and shed their leaves before particulate matter can damage leaf tissue. Evergreens are more susceptible to pollution injury as they retain leaves or needles longer allowing particulate matter to be absorbed and destroy plant tissue.

6. ***De-icing salts:*** These species are tolerant of exposure to de-icing salts such as sodium chloride and calcium chloride. This would include exposure in the form of foliar spray and the uptake of salts through the root system. This information is important when selecting trees to be planted along roadways and in the vicinity of parking lots, sidewalks, and asphalt paths subject to snow and ice removal operations.

7. ***Wet soil conditions:*** These species will tolerate moderate to excessive soil moisture. This information is important when selecting trees to be planted adjacent to waterways, ponds, lakes and storm water retention and detention facilities.

8. ***Drought conditions:*** These species will tolerate hot, dry conditions. They require less available soil moisture than most trees and should be considered when planting areas subject to heat, drying winds, and intense solar radiation without the benefit of supplemental moisture. These conditions are often found along roadways, parking lots, and around buildings that absorb heat and reflect sunlight.

Associated problems

This column is used to identify general problems associated with specific tree species. Five problem codes have been provided: disease problems, insect damage, storm damage and structural damage due to weak wood, production of objectionable fruit and characteristic development of objectionable root systems.

1. ***Disease problems:*** These species are susceptible to severe stress, disfigurement or death brought about by disease causing agents that produce symptoms which are not curable or controllable by known or practical methods. Some of these species are susceptible to one or more pathogens therefore no attempt has been made to list specific symptoms, causal agents or disease names.

   This general information will be useful in selecting trees that are relatively disease free and easy to maintain, especially if they must be planted in a harsh, stressful environment. Species that fall into this category are not recommended for planting, especially in groups. If such species are planted it likely that annual maintenance and periodic replacement of the entire tree may have to be provided.

2. ***Insect damage:*** These trees are subject to damage by insects or related organisms. Considerable damage such as defoliation or even death can result from these pests infesting host plants where they often cannot be effectively controlled without considerable expense and use of pesticides. Periodic inspection and maintenance may need to be provided if these species are planted.

3. ***Storm and structural damage due to weak wood:*** These species are subject to structural failures as falling branches and major portions of the main trunk breaking during storms. These species should not be planted near buildings or facilities where people gather or reside.

4. ***Objectionable fruit:*** These tree species will produce fruit with objectionable qualities. Included is fruit that is capable of causing damage when falling, fruit that is slick or sticky on roads or walkways, fruit that attracts pests, fruit that produces disagreeable odors and fruit which produces prolific numbers of seedlings.

5. ***Objectional root system:*** These trees will typically produce shallow or surface oriented roots that are capable of lifting and breaking curbs, sidewalks and asphalt surfaces and clogging or destroying sewer and drainage pipes. They may also pose a tripping or mowing hazard when planted in lawns. These trees are also capable of damaging foundations if planted too close to buildings.

TREE SELECTION AND COVER GUIDE

Botanical/Common Name	Projected 10 Year Tree Cover Area in Square Footage & Caliper at Planting			Minimum Planning Area Sq. Feet	Uses	Environmental Tolerances	Associated Problems
	8'	10'	12'				
SMALL DECIDULOUS TREES Acer palmatum/Japanese Maple	40	50	75	30	SD, VTA, F, U	SH, PS	
Amalanchier arborea/Downey Serviceberry	75	100	125	50	SD	PS, SH, W	IN
Americanchier laevis/Allegheny Serviceberry	75	100	125	50	SD	PS, SH, W	IN
Carpinus caroliniana/American Hombeam	75	100	125	50	SD, F	W, SH	
Carcis Canadensis/Redbud	75	100	125	50	SF, F, U, VTA	SC, D, SH, PS	
Chioanthus virginicus/Fringetree	40	50	75	30	SD, F, U	PS	
Comus florida/Flowering Dogwood	75	100	125	50	SD, VTA, F, U	PS, SH	D
Comus kousa/Comeliancherry Dogwood	40	50	75	30	SD, VTA, F, U	PS	
Cotinus coggygria/Smoketree	40	50	75	30	VTA, F, U		
Crateagus spp./Hawthorne	75	100	125	50	SD, U	SC, PS, W, D	DS, IN
Elaegnus angustifolia/Russian Olive	75	100	125	50	SD, F, U	SC, AP, O	
Koalreuteria paniculata/Panicied Goldenraintree	75	100	125	50	SD, VTA, U	SC, D	
Lagerstromia Indica	40	50	75	30	SD	PS, SH, W	
Magnolia stellata/Star Magnolia	40	50	75	30	SD, VTA, F, U	AP	
Magnolia soulangiana/Saucer Magnolia	75	100	125	50	SD, VTA, F, U	AP	
Oxydendrum arboreum/Sourwood	40	50	75	30	SD, VTA, F, U	PS	
Prunus cerasifera/Flowering Plum	40	50	75	30	SD, VTA, F, U, PL	AP	
Prunus sargentii/Sargent Cherry	75	100	125	50	SD, F, U		
Prunus X incam 'Okame'/Okame Cherry	75	100	125	50	SD, VTA, F, U		
Pyrus calleryana/Callery Pear 'Chanticleer' 'Whitehouse'	 75 75	 100 100	 125 125	 50 50	 PL, SD, F, U PL, SD, F, U		
Stewartia koreana/Korean Stewartis	40	50	75	30	SD, U		
Stewartia Ovata/Mountain Stewartia	40	50	75	30	SD, U		
Stewartia pseudocamellia/Japanese Stewartis	40	50	75	30	SD, U		
Stryrax japonicum/Japanese Snowball	40	50	75	30	SD, U	PS	

Botanical/Common Name	Projected 10 Year Tree Cover Area in Square Footage & Caliper at Planting			Minimum Planning Area Sq. Feet	Uses	Environmental Tolerances	Associated Problems
	8’	10’	12’				
Syringe reticulata/Japanese Tree Lilac	40	50	75	30	SD, F, U	PS	

BOTANICAL/COMMON NAME	Projected 10 Year Tree Cover Area in Square Footage & Caliper at Planting		Minimum Planning Area Sq. Feet	Uses	Environmental Tolerances	Associated Problems
MEDIUM DECIDUOUS TREES Acer campestral/Hedge Maple	150	175	90	SD, U	AP, D	
Acer ginnala/Amur Maple	150	175	90	SD, U, VTA	PS, D	
Aesculus hippocastanum/Horsechestnut	150	175	90	LD	RZ, SC, IS	
Betula nigra/River Birch	150	175	90	LD	W	
Carpinus betulus/Ruropean Hornbeam	150	175	90	PL, LD, VTB	SC, PS, AP	
Carya ovota/Shagbark Hickory	150	175	90	LD		
Castanea molissima/Chinese Chestnut	150	175	90	LD		
Celtis occidentalis/Hackberry	150	175	90	LD	SC, W, D	
Cercidiphylium japonicum/Katsuratree	150	175	90	LD		
Diospyros virginiana/Persimmon	150	175	90			
Ginkgo bibloba/Ginkgo, Maidenhair Tree* **Gingko – Male Only*	150	175	90	PL, LD, VTB	RZ, AP, D	FR
Gymnolcladus diocus/Kentucky Coffeetree	150	175	90	PL, LD	SC, W, D	
Juglans nigra/Black Walnut	150	175	90	LD	SC, W	FR
Larix deciduas/European Larch	150	175	90	LD	D	
Liuidambar styraciflua/Sweetgum	150	175	90	LD	W	FR
Magnolia macrophylla/Bigleaf Magnolia	150	175	90	LD		
Malus Spp./Crabapples	150	175	90	SD, F, U	AP	FR
Metasequoia glyptostroboides/Dawn Redwood	150	175	90	LD	AP, W, SC, AP, D	
Nyssa sylvatica/Black Gum, Tupelo	150	175	90	LD, VTB	PS, W	
Prunus serotina/Black Cherry	150	175	90		IS	
Prunus subhirtella 'Pendula'/Weeping Japanese Cherry	150	175	90	SD		
Prunus yedoensis/Yoshino Cherry	150	175	90	SD, U		
Pyrus calleryana 'Redspire'/Redspire Pear	150	175	90	PL, LD	AP	
Quercus alba/White Oak	150	175	90	LD	IS	IN
Quercus imbricaria/Shingle Oak	150	175	90	LD	W	
Quercus robur 'Fastigiata'/Columnar English Oak	150	175	90	PL, LD	SC	
Salix nigra/Black Willow	150	175	90	LD	W	
Sophora japonica/Japanese Pagoda Tree	150	175	90	PL, LD	SC, AP, D	FR

BOTANICAL/COMMON NAME	Projected 10 Year Tree Cover Area in Square Footage & Caliper at Planting		Minimum Planning Area Sq. Feet	Uses	Environmental Tolerances	Associated Problems
Tilia Americana/American Linden, Basswood	150	175	90	LD		
'Redmond'	150	175	90	PL, LD		
'Legend	150	175	90	PL, LD		
LARGE DECIDUOUS TREES						
Acer platanoides/Norway Maple	200	150	130	LD, VTB	SC, PS, IS	RS
Acer rubrum/Red Maple	200	250	130	PL, LD, VTA	PS, IS, W	RS
Acer saccharum/Sugar Maple	200	250	130	LD, VTB	PS	
Carya illinoinensis/Pecan	200	250	130	LD	W	
Fagus grandifolia/American Beech	200	250	130	LD	PS	
Fagus sylvatica/European Beech	200	250	130	LD	PS	
Fraxinus Americana/White Ash	200	250	130	LD	IS, W	
Fraxinus pennsylvanica/Green Ash						
'Marshall's Seedless'	200	250	130	LD, VTB	RZ, SC, IS, W, D	
'Patmore'	200	250	130	PL, LD, VTB	RZ, SC, W, D	
'Summitt'	200	250	130	PL, LD, VTB	RZ, SC, W, D	
Gleditsia triacanthos inermis/Thornless Honeylocust						
'Imerpial'	200	250	130	PL, LD, VTB	SC, AP, W, D	WW, IN, FR
'Skyline'	200	250	130	PL, LD, VTB	SC, AP, W, D	WW, IN, FR
'Shademaster'	200	250	130	PL, LD, VTB	SC, AP, W, D	WW, IN, FR
Liriodendron Tulipfera/Tulip Poplar	200	250	130	LD	AP, W	WW
Magnolia acuminata/Cucumber treet	200	250	130	LD		
Phellodendron amurense/Amur Corktree Macho	200	250	130	PL, LD	AP, D	
Platanus acerfolia/London Planetree	200	250	130	LD	AP, D	RS
Platanus occidentalis/Sycamore	200	250	130	LD	W	DS
Prunusserrulata 'Kwanzan'/Kwanzen Cherry	200	250	130	SD, VTA, U	AP	
Pyrus calleryana/Callery Pear						
'Aristocrat'	200	250	130	PL, LD	AP	
'Autumn Blaze'	200	250	130	PL, LD	AP	
'Bradfordi'	200	250	130	LD	AP	W
Quercus acutissima/Sawthooth Oak	200	250	130	PL, LD		
Quercus bicolor/Swamp White OAK	200	250	130	PL, LD	SC, IS, W, D	
Querous coccinea/Scarlet Oak	200	250	130	LD		
Quercus palustris/Pin Oak	200	250	130	LD, VTB	W	
Quercus phellos/Willow Oak	200	250	130	PL, LD		
Quercus rubra/Red Oak	200	250	130	PL, LD	IS	
Salix babylonica/Weeping Willow	200	250	130	LD	W	
Taxodium distichum/Bald Cypress	200	250	130	LD	W	

BOTANICAL/COMMON NAME	Projected 10 Year Tree Cover Area in Square Footage & Caliper at Planting		Minimum Planning Area Sq. Feet	Uses	Environmental Tolerances	Associated Problems
Tilia cordata/Littleaf Linden	200	250	130	PL, LD, V, TB	AP	IN
'Glenleven'	200	250	130	PL, LD, V, TB	AP	IN
'Grrenspire'	200	250	130	PL, LD, V, TB	AP	IN
Ulmus hollandica 'Groenveldt'/Groenveldt Elm	200	250	130	LD	D	IN
Ulmus parvifolia/Chinese Elm	200	250	130	LD		IN, RS
Zelkova serrata/Zelkova	200	250	130	LD		IN

Botanical/Common Name	Projected 10 Year Tree Cover Area in Square Footage & Caliper at Planting 1'	2'	3'	Minimum Planning Area Sq. Feet	Uses	Environmental Tolerances	Associated Problems
COMPACT EVERGREEN TREES	5-6'	7-8'	9' +				
Abies concolor/White Fir, Concolor Fir	40	50	75	30	LE		
Chamaecyparis lawsoniana/Lawson Falsecypress	40	50	75	30	LE	PS	
Chamaecyparis obtuse/Hinoki Faise Cypress	40	50	75	30	ME		
Chamaecyparis pisifera 'Plumosa'/Plume Sawara False Cypress	40	50	75	30	LE		
Cunninghamia lanceolata/China Fir	40	50	75	30	LE		
Ilex aquifolia/English Holly	40	50	75	30	ME	PS, SH	
Ilex X attenuata 'Fosten'/Foster's Holly	40	50	75	30	ME, VTA	PS, SH	
Ilex opaca/American Holly	40	50	75	30	ME, VTA	PS, SH, IS	
Juniperus chinensis/Chinese Juniper							
columnar Varieties of Chinese Juniper							
'Denserecta'	40	50	75	30	ME	D	
'Hetzl columnaris'	40	50	75	30	ME	D	
'Keteleen'	40	50	75	30	ME	D	
'Robusta Green'	40	50	75	30	ME	D	
'Torulosa'	40	50	75	30	ME	D	
Juniperus scopulorum/Rocky Mountain Juniper							
'Blue Haven'							
'Cologreen'	40	50	75	30	ME	D	
'Columnaris'	40	50	75	30	ME	D	
'Grey Gleam'	40	50	75	30	ME	D	
'Erecta Glauca'	40	50	75	30	ME	D	
'Moonglow'	40	50	75	30	ME	D	
Juniperus virginiana/Eastern Red Cedar							
'Canaert'	40	50	75	30	ME	D	
'Manhattan Blue'	40	50	75	30	ME	D	
'Princeton Sentry'	40	50	75	30	ME	D	
Libocedur decurrens/Incense Cedar	40	50	75	30	LE	W	
Thuja occidentalis 'Nigra'/ Dark Green American Arborvitae	40	50	75	30	ME	W	
Thuja orientalis (Platcladus orientalis)/ Columnar Oriental Arborvitae	40	50	75	30	ME, VTA	W, PS, SH	

Botanical/Common Name	Projected 10 Year Tree Cover Area in Square Footage & Caliper at Planting			Minimum Planning Area Sq. Feet	Uses	Environmental Tolerances	Associated Problems
	1’	2’	3’				
SMALL EVERGREEN TREES Cadrus deodora/Deodar Cedar	75	100	125	50	LE		
Crptomeria japonica/Japanese Cryptomeria	75	100	125	50	LE	IS	
Cupressocyparis leylandi/Leyland Cypress	75	100	125	50	LE	PS, W	
Picea glauca/White Spruce	75	100	125	50	LE		
Picea omorika/Serbian Spruce	75	100	125	50	LE		
Picea pugens/Colorado Blue Spruce	75	100	125	50	LE		
Pseudotsuga menziesii/Douglas Fir	75	100	125	50	LE		
Tsuga Canadensis/Canadian Hemlock	75	100	125	50	LE	PS, SH	
Tsuga caroliniana/Carolina Hemlock	75	100	125	50	LE	PS, SH	
MEDIUM EVERGREEN TREES Cedrus atlantica/Atlas Cedar	5’ 125	6’ 150	7’ 175	90	LE		
Picea abies/Norway Spruce	125	150	175	90	LE		
Pinus bungeana/Lace-Bark Pine	125	150	175	90	LE		
Pinus echinata/Shortleaf Pine	125	150	175	90	LE		
Pinus nigra/Austrian Pine	125	150	175	90	LE, VTB, DS, IN		
Pinus thunbergiana/Japanese Black Pine	125	150	175	90	LE		
LARGE EVERGREEN TREES Magnolia grandiflora/Southern Magnolia	6’ 150	7’ 200	8’ 250	130	LE		
Pinus rigida/Pitch Pine	150	200	250	130	LE	SC	
Pinus strobes/White Pine	150	200	250	130	LE	PS, D	WW
Pinus sylvestria/Scotch Pine	150	200	250	130	LE		
Pinus taeda/Loblolly Pine	150	200	250	130	LE		

The Placement of Trees and Woody Plants for Energy Conservation

Landscaping may be used to effectively reduce the amount of energy needed to cool residences and buildings. The placement of trees and shrubs reasonably close to buildings can minimize heat gain during the peak load demands of the hottest months by:

1. Blocking solar radiation from the building envelope, the adjacent ground and foundation.

2. Creating cool microclimates near the building by evapotranspiration, and

3. Either channeling or block air flows through and around the structures.

This proximity planting provides optimal shading patterns and also uses solar radiation for evapotranspiration by landscape plants thereby creating cool microclimates directly adjacent to walls and windows. The resulting reduction in ambient air temperatures and direct solar exposure reduces the rate of heat transfer through walls and windows. A landscape design which maximizes this effect involves the use of a multi-layer canopy of trees with dense shrubs underneath and immediately adjacent to the walls and windows.

The trees and shrubs are oriented to provide maximum shading of windows and walls directly exposed to solar angles during the hottest times of the day during the hottest months. In Henrico County this is typically between 1 to 5 o'clock in the afternoon in the months of June through September.

Trees and shrubs may be placed in the following manner to provide the following benefits:

1. Trees and shrubs planted on the south side of a building insulate the lower sections of the walls and the adjacent ground during the long afternoons of August through September when solar angles are low.

2. At least one or more trees should be placed fairly close to air conditioning units so that after a five-year growth period their canopies will provide shade to the unit from morning and afternoon solar exposure. Caution should be used however, to avoid lower branches and foliage from blocking the air intakes and exhausts of air conditioning units.

3. If a building will be air conditioned during most of the cooling season, low canopy trees and shrubs should be used to block prevailing winds. For example, if summer winds are from the southeast, tall shrubs positioned on the south sides of east windows can significantly reduce warm air infiltration through the windows. These same shrubs will provide shade for adjacent walls and windows.

4. For buildings in which air conditioning will be used only minimally, care should be taken to place trees and shrubs so that winds are channeled into the building when windows are open.

5. Deciduous trees planted to shade parking and other paved or land surface areas reduce heat buildup in summer months thereby further moderating the micro climate around buildings and reducing heat gain air conditioning costs.

Detailed studies have shown that judicious placement of landscaping can reduce the electrical energy used to air condition building interiors by 58% to 65% on very warm summer days.

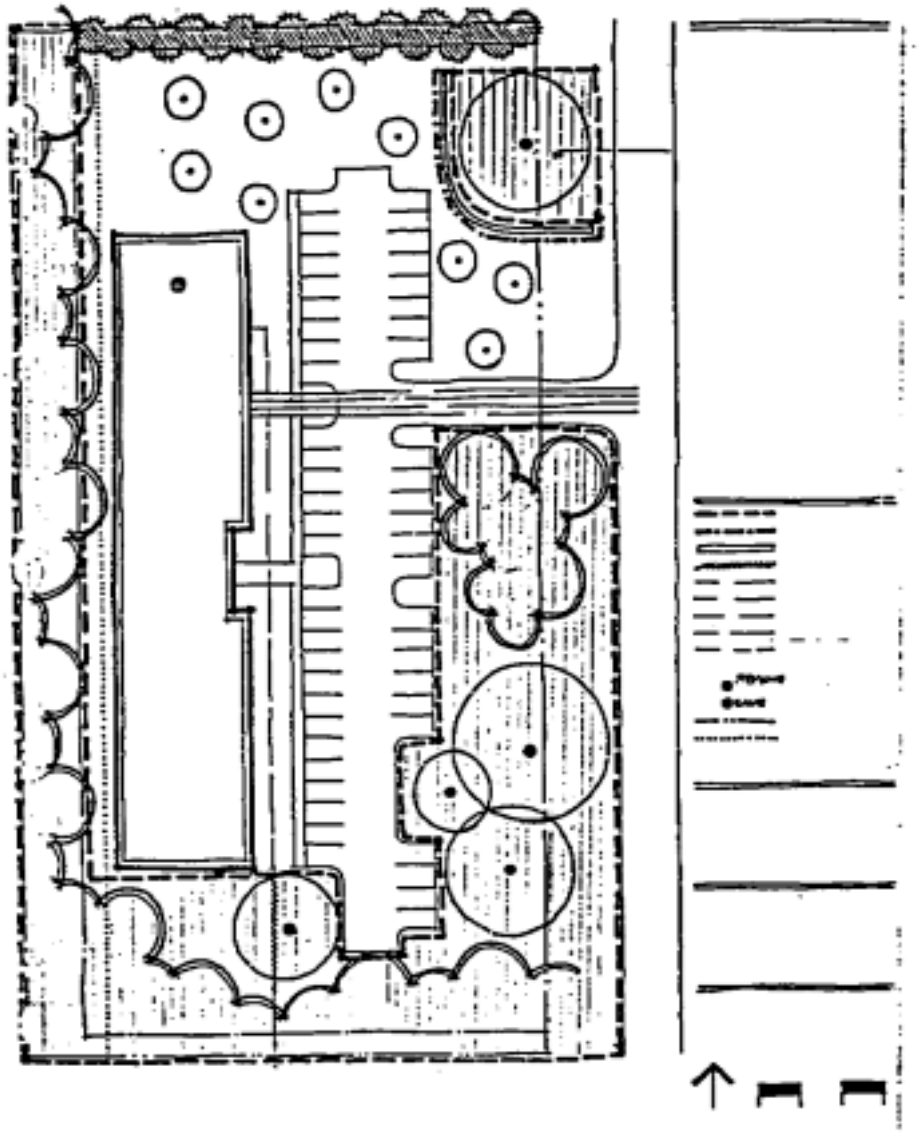
The types of plants used in energy conservation landscaping is very important. For southern building exposures deciduous trees are appropriate since they permit passive solar heating during the winter months, yet block or filter solar radiation in the summer. Evergreen trees and shrubs should be used on the northern exposures since they are useful in insulating winter winds from walls, windows and foundations.

The placement of trees near buildings for energy conservation should be tempered with safety in mind. The ultimate height and spread of trees and shrubs should be considered when placing these close to buildings. Potential conflicts can result from plants overgrowing the site where they are placed. Trees and shrubs that are in scale to the building and environment should be selected. Preference should be given to tree varieties with strong branching habits and without objectionable root systems.

ILLUSTRATIVE SKETCHES

The following figures illustrate and assist in the explanation of forms and suggestions of means that may be suitable to assist resolution of various design problems.

Tree Protection Plan - A plan for the protection and/or replacement of trees within the protected zone of a lot in accordance with this Chapter.



Protection Zone - Any area of a lot outside of the buildable area, within which existing trees and other natural vegetation are subject to regulation pursuant to Section 22-1062 of this Chapter. Such zones must be clearly delineated on an approved plan in order to be considered for tree cover credit.

FIGURE II-1

Dripline - A vertical line extending from the outermost edge of the tree canopy or shrub branch spread to the ground.

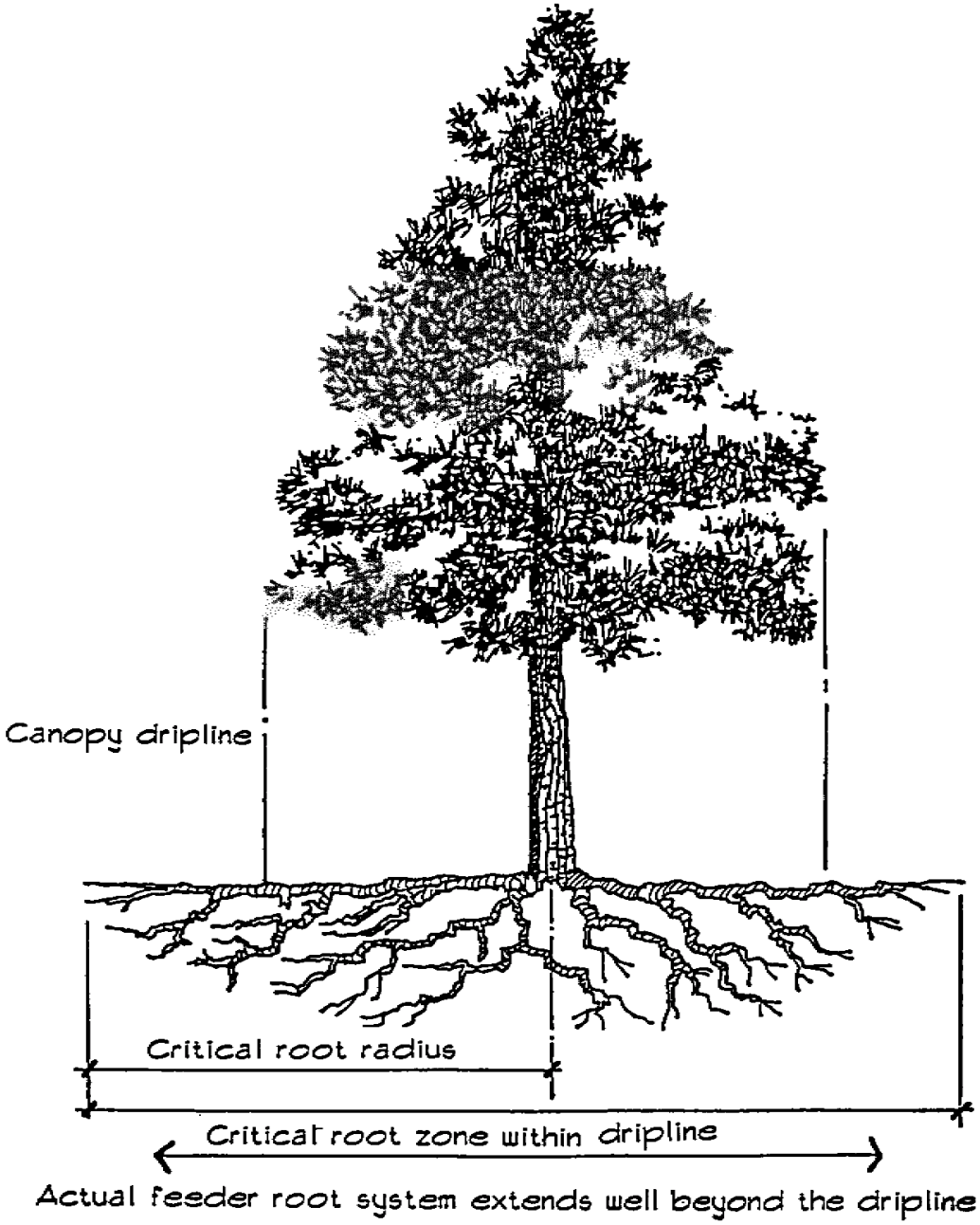
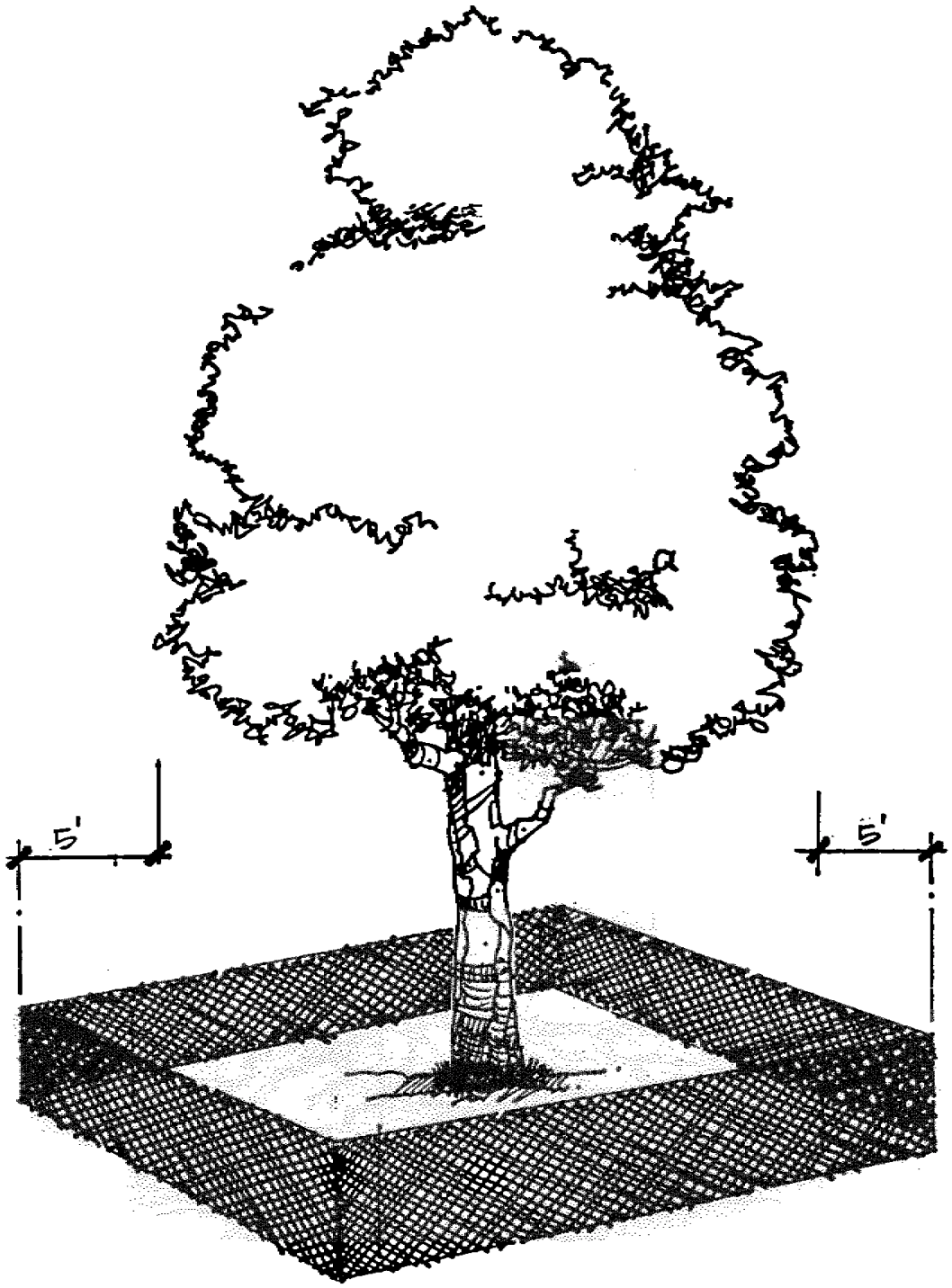


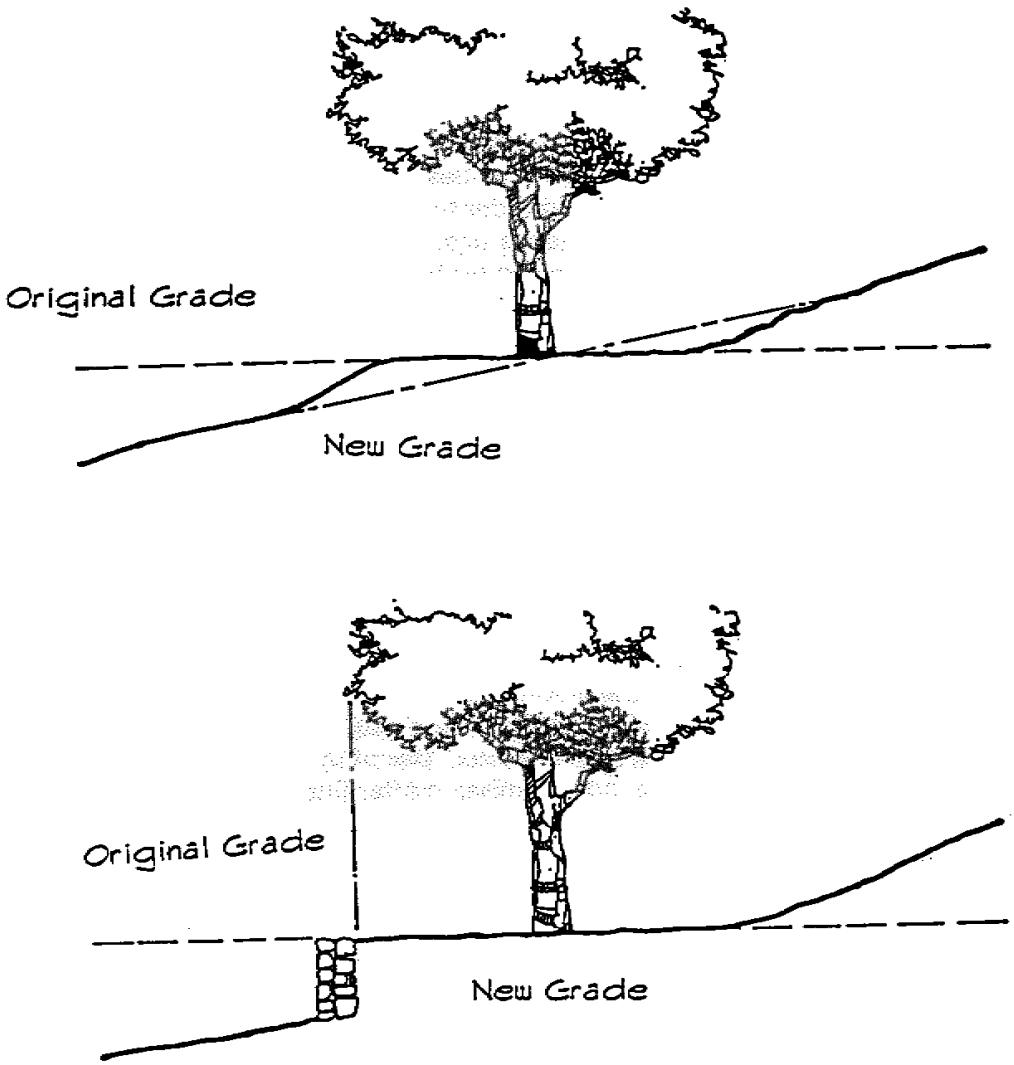
FIGURE II-2



Tree Protection Area

FIGURE II-3

Lowering the Grade



When lowering the grade of the soil surrounding a protected tree, the maximum number of tree roots within the drip line shall be preserved by using any of the following methods:

(1) Terracing. The area within the drip line is left at the original grade by terracing.

(2) Retaining wall. The area within the drip line is left at the original grade constructing a dry retaining wall. The retaining wall shall be porous to allow for aeration.

(3) Terracing and retaining wall. The area within the drip line is left at the original grade by the combined use of terracing and dry retaining wall.

FIGURE II-4

ARTICLE III TRANSITIONAL BUFFER PLANS

1. General. The landscape ordinance provides a series of four (4) transitional buffers of varying widths and densities to be situated between uses of differing characteristics (see Matrix) in order to reduce the adverse impacts of the more intense use of the lower intense use. Where required they must be provided on the site of the most intensive (or least restrictive) use.

   The ordinance also provides the means whereby a modification may be approved or an alternative buffer may be provided either where strict application of the basic ordinance requirements would not be appropriate or practicable or where it is desirable and possible to employ both vegetative and a structural rather than only a vegetative buffer. Appropriate alternatives may be permitted after a finding by the director or planning commission pursuant to action on an appropriate complete request.

2. In order to assist in the preparation and design of the required transitional buffers (see Matrix), the figures which follow should be beneficial.

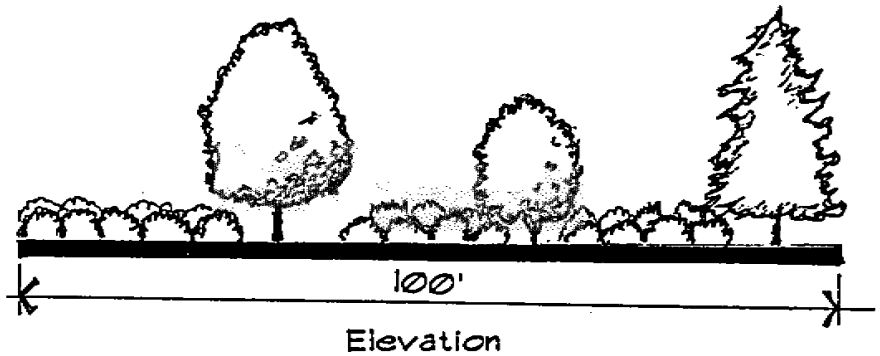
3. A series of seven (7) transitional buffer screen structural alternatives may be used to reduce the width and planting requirements in those locations and combinations specified on the Matrix. Use of the alternatives may be permitted by the director or planning commission after finding that it is appropriate to do so. In such cases the transitional buffer width may be reduced two times (2X) the height of the approved alternative. The matrix lists, under each required type buffer, those alternatives that may be considered.

4. In situations where unusual topographic or structural situations prevent strict application of the transitional buffer requirements or where they would be ineffective and an alternative type of buffer is appropriate and would properly reflect the intent and purpose of the code, the applicant may present a request for such special consideration. In the event a finding determines that it is appropriate, reasonable and would meet the intent of the transitional buffer requirement, the director may approve the alternative.

5. It is the purpose and intent of the transitional buffer requirements to retain existing mature vegetation whenever practicable and to supplement such vegetation where necessary to meet the intent and specified vegetative density requirements. To that end, existing tree cover credits are allowed. In all cases and locations, it is expected that required transitional buffers will be properly maintained to assure that they will function continuously.

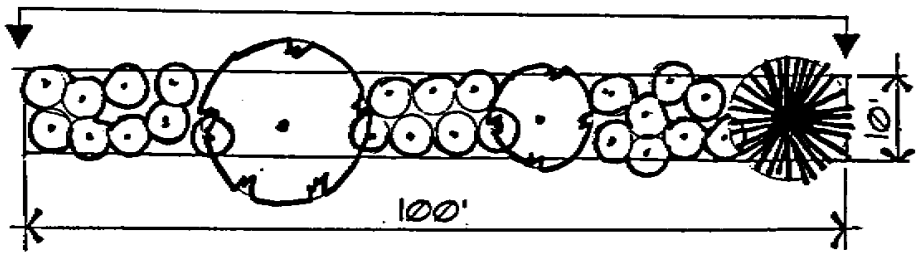
6. Transitional buffer types and specifications and a possible use of an alternative screen are illustrated by the following figure.

a. Transitional Buffer 10 shall consist of an unbroken strip or open space a minimum of ten (10) feet wide planted with two (2) large deciduous or evergreen trees with an ultimate height of fifty (50) feet or greater and one (1) small deciduous or evergreen tree with an ultimate height of twenty (20) feet or greater and twenty five (25) shrubs for every hundred (100) linear feet or portion thereof.



Elevation

Scale: 1" = 20'

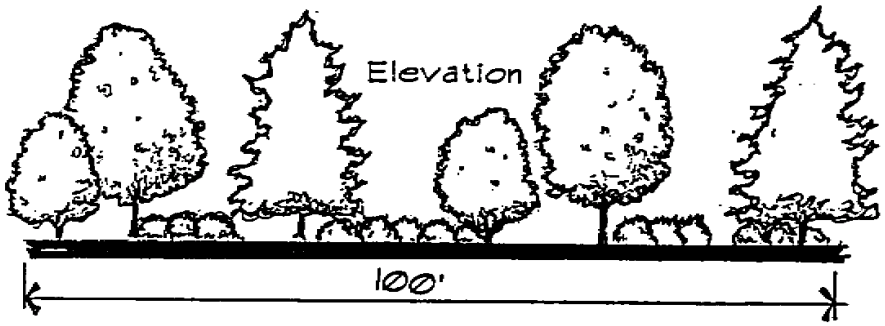


Plan View

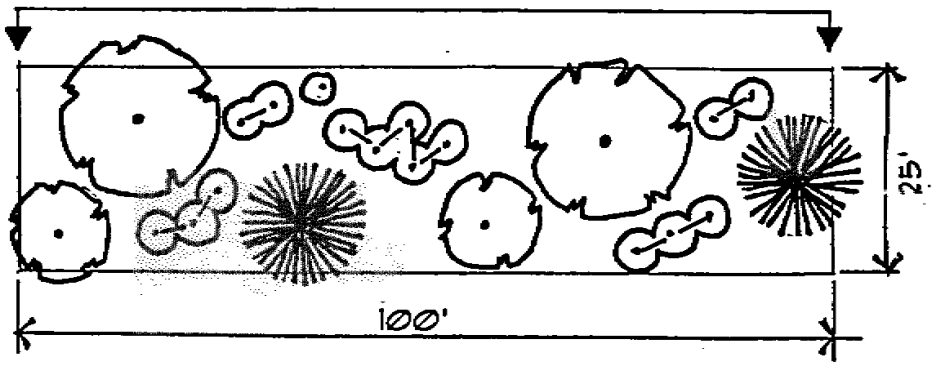
FIGURE III-1

b. Transitional Buffer 25 shall consist of an unbroken strip of open space a minimum of twenty five (25) feet wide and planted with:

(1) Four (4) large deciduous or evergreen trees with an ultimate height of fifty (50) feet or greater plus two small evergreen or deciduous trees with an ultimate height of twenty (20) feet or greater and sixteen (16) shrubs with an ultimate height of ten (10) feet or greater for every hundred (100) linear feet.



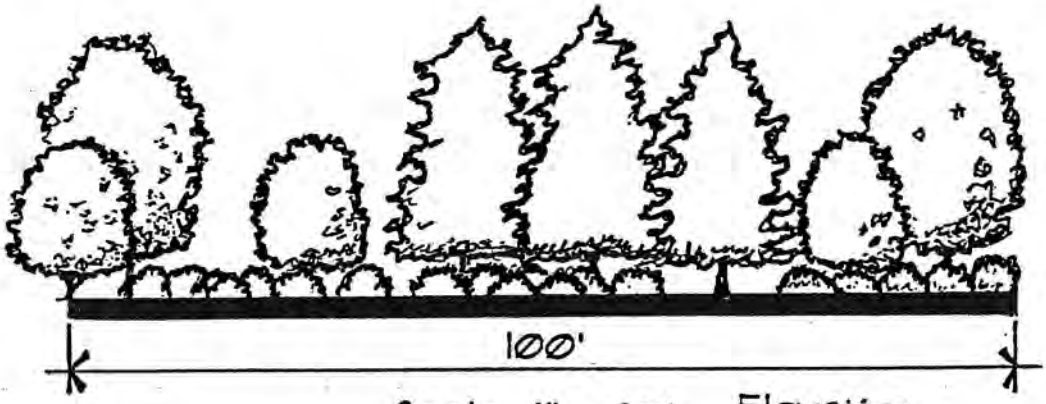
Scale: 1" = 20'



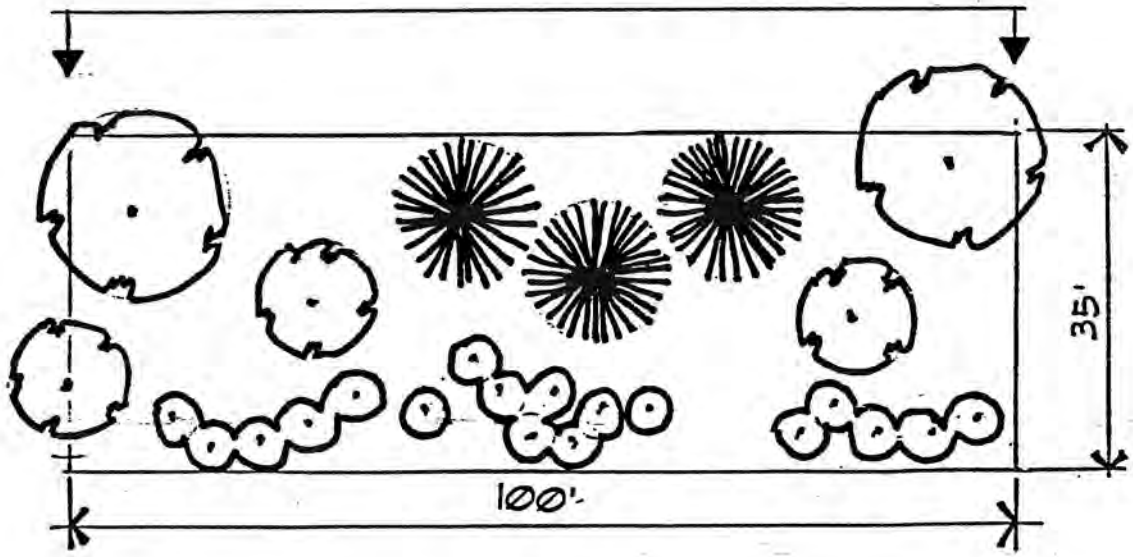
Plan View

c. Transitional Buffer 35 shall consist of an unbroken strip of space a minimum of thirty-five (35) feet wide and planted with:

(1) Five (5) large deciduous or evergreen trees with an ultimate height of fifty (50) feet or greater plus 2.5 small deciduous or evergreen trees with an ultimate height of twenty (20) feet and nineteen (19) shrubs with an ultimate height of 10 feet for every hundred (100) linear feet.



Scale: 1" = 20' Elevation



Plan View

d. Transitional Buffer 50 shall consist of an unbroken strip of space, a minimum of fifty (50) feet wide planted with:

(1) Seven (7) large deciduous or evergreen trees with an ultimate height of fifty (50) feet or greater plus four (4) small deciduous or evergreen trees with an ultimate height of twenty (20) feet or greater and twenty-four (24) shrubs with an ultimate height of ten (10) feet for every hundred (100) linear feet± or

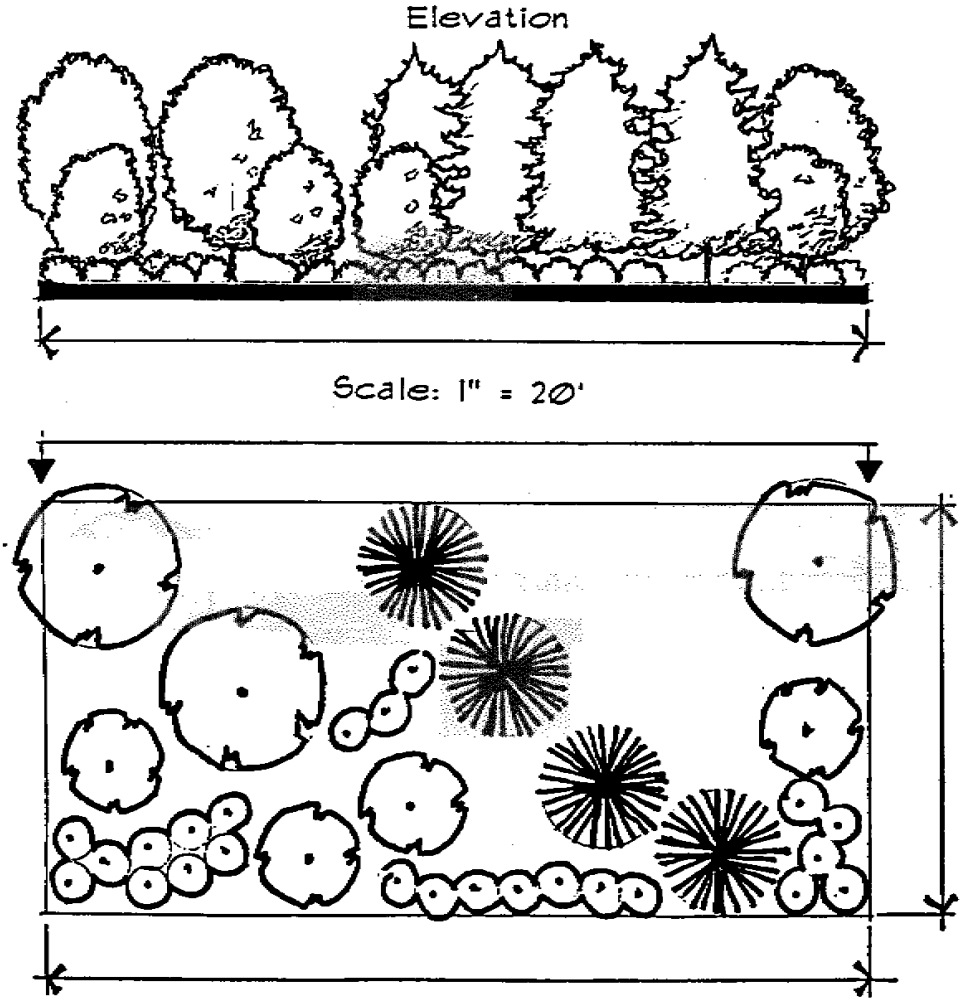
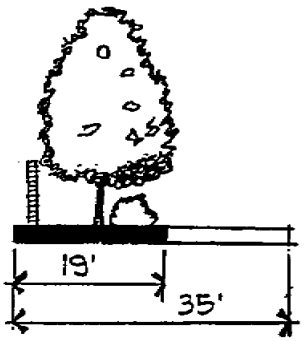


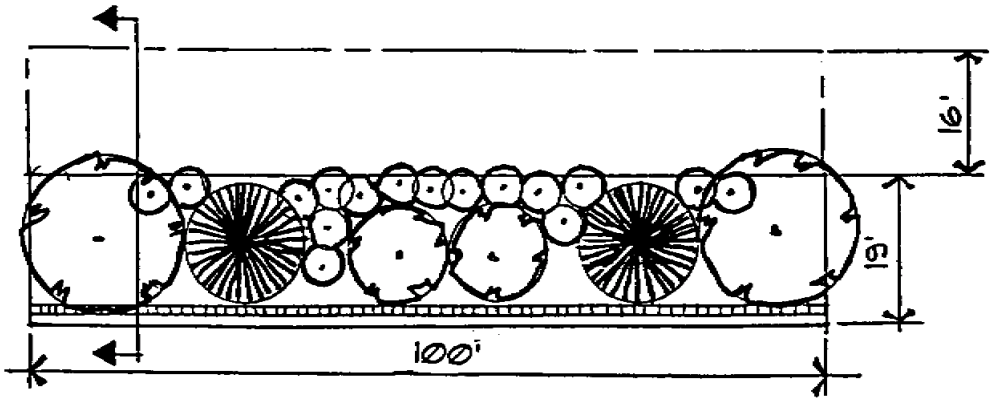
FIGURE III-4

(2) A screen, wall or fence of approved design and materials may be placed at property line to reduce the width of the buffer area by as much as twice the height of the screen, wall, or fence. Permitted buffer alternative screens are identified on the matrix chart.



Elevation

Scale: 1" = 20'

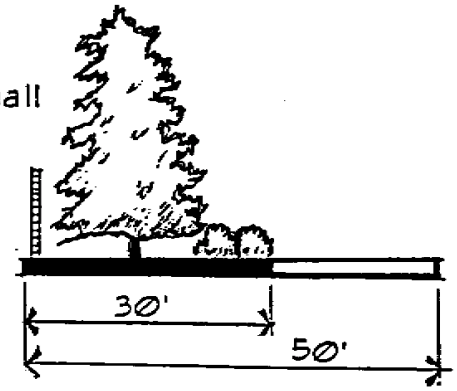


Plan View

FIGURE III-5

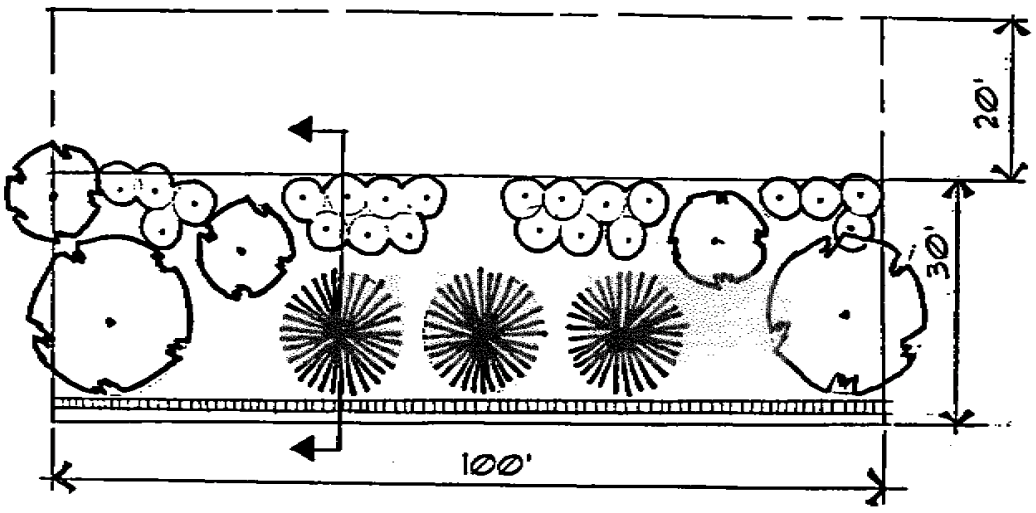
(2) A screen, wall or fence of approved design and materials may be placed at property line to reduce the width of the buffer area by as much as twice the height of the screen, wall, or fence. Permitted buffer alternative screens are identified on the matrix chart.

Screen G - 10' high wall



Elevation

Scale: 1" = 20'



Plan View

FIGURE III-6

ARTICLE IV PARKING LOT LANDSCAPING

1. General

The Landscape Ordinance requires that any parking lot containing six (6) or more spaces be landscaped. The ordinance requires both peripheral and internal landscaping. It further specifies that interior landscaping area contain not less than five (5) percent of the total area of the parking lot, exclusive of the peripheral area landscaping and any planting or landscaping within six (6) feet of a building, and any transitional buffering that is otherwise required.

2. Peripheral parking lot landscaping

A. Where a property line abuts land other than a right of way and transitional buffering is not required, a landscape strip six (6) feet in width must be provided except where driveways and other openings may be required. Examples of such locations are property lines between adjacent businesses situated along thoroughfares. In such situations, the six (6) foot strip must be landscaped with the equivalent of two (2) trees for each hundred (100) linear feet. Each strip must contain at least one (1) tree. Figure IV-1 at the end of this article illustrates this requirement.

Where the planting strip cannot be provided without adversely affecting efficiency, function and vehicular circulation, an equivalent area may be provided elsewhere in landscape islands.

B. Where the property line abuts the right of way of a street, a landscape strip ten (10) feet in width must be provided between the parking area and the property line. If easements preclude the landscape strip adjacent to the right of way, it must be located either adjacent to or as close as practicable to the easement or right of way. In any event, an equivalent area must be provided.

This landscape strip must be landscaped with the equivalent of two and one half (2.5) trees for each hundred (100) linear feet. Each strip must contain at least one (1) tree. Figure IV-1 illustrates this requirement.

3. Interior parking lot landscaping

The code also requires that interior landscaping be provided equivalent to five percent of the area of the parking lot exclusive of any required peripheral landscaping, the landscaping or planting within six (6) feet of any building and any required transitional buffering. This required landscaping must be reasonably dispersed through the parking lot and situated in planting areas of sufficient size and dimensions to both protect the landscape as well as provide sufficient space for adequate growing conditions. Figure IV-1 at the end of this article illustrates these principals.

The Code states that a line with a maximum of nineteen (19) parking spaces uninterrupted by a landscape island is permitted. The island must be at least 9 feed wide and contain at least 162 square feet of area.

4. The landscape ordinance exempts the following parking areas from the above

requirements provided they are constructed in accordance with an approved plan and further provided such areas are screened:

a. Vehicle storage areas
b. Non-public parking areas

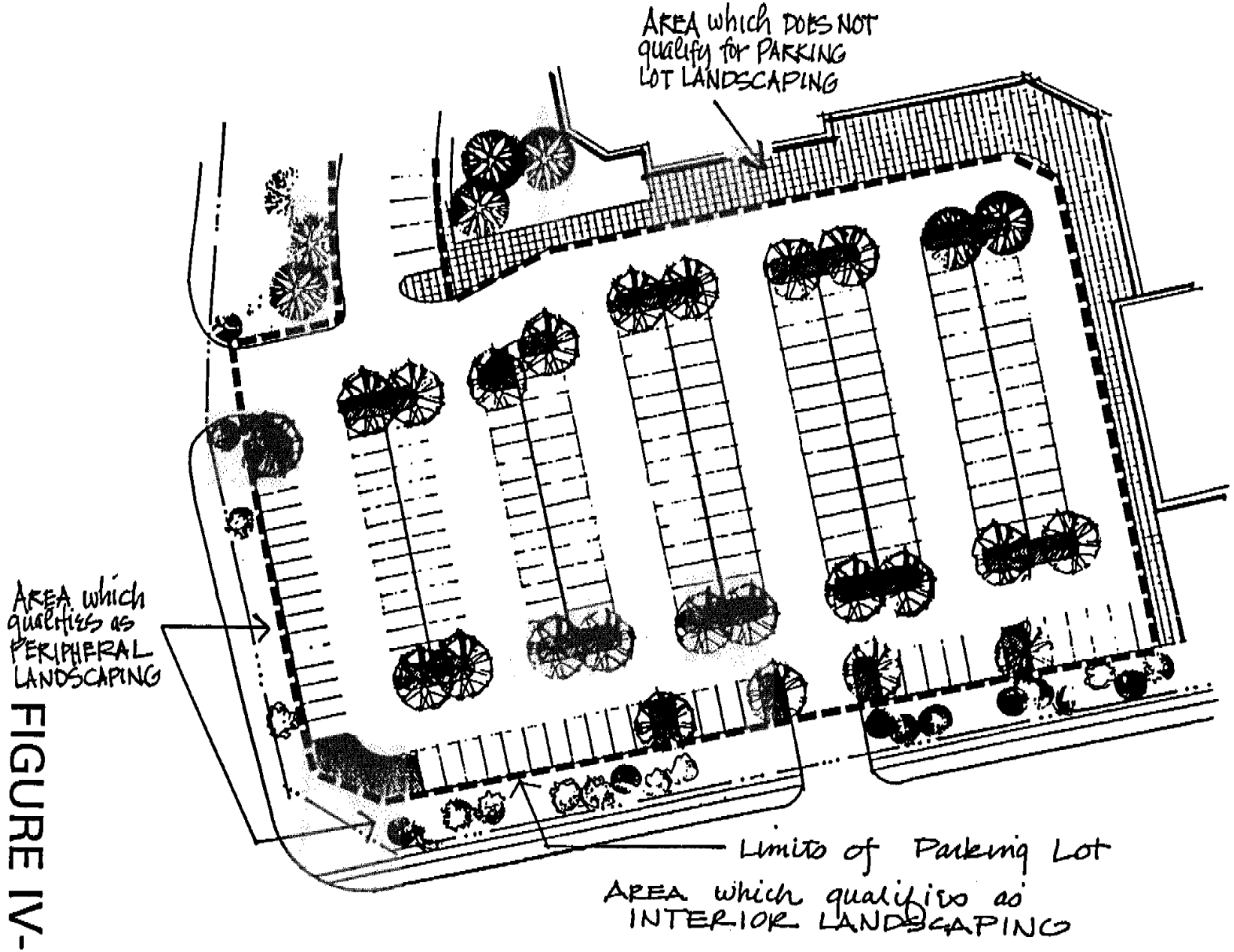

AREA which DOES NOT qualify for PARKING LOT LANDSCAPING
AREA which qualifies as PERIPHERAL LANDSCAPING
Limits of Parking Lot
AREA which qualifies as INTERIOR LANDSCAPING

FIGURE IV-1

ARTICLE V ADMINISTRATIVE PROCEDURES, DEVIATIONS, REVISIONS AND APPEALS

SECTION 1. GENERAL GUIDELINES AND PROCEDURES

The director of planning may approve plans which deviate from the specific requirements of the landscape ordinance under circumstances set forth in the ordinance. However, in all such cases this action may be authorized only after finding that the specific code requirement, for all practical purposes, cannot be met or will not do what was intended; and further, that the proposed alternative is both appropriate and will meet or exceed the spirit and intent of the code. After such finding the director may grant the requested alternative which may be subject to such conditions as may be reasonable and necessary to assure that the spirit and intent of the ordinance is met.

To qualify for consideration, the applicant must file a written request with the director of planning. Such request must provide evidence and justification as may be necessary and appropriate to:

1. Identify the specific ordinance requirements from which relief is requested.

2. Clearly delineate and/or specify using such graphic exhibits and/or written text necessary to clearly identify, explain, justify and document the circumstances and conditions that the applicant believes make the requirement inappropriate, impracticable, ineffective or would create an unnecessary and unreasonable hardship.

3. Clearly delineate and/or specify using such graphic exhibits and/or written text necessary to clearly identify, justify and document why and how the proposed alternative resolves the conditions or problems identified above and would more closely satisfy the purpose and intent of the landscape ordinance. Such requests must meet all other provisions of the Zoning Ordinance.

Upon receipt of a complete request, the director of planning shall act upon the request and respond to the applicant within thirty (30) days unless the applicant agrees to an extension of time.

The director of planning shall consider and be guided by the following criteria to determine appropriate action on the request.

1. All applicable ordinance requirements, including the intent and purpose of the requirement.

2. Proffered zoning conditions that have been accepted by the Board of Supervisors.

3. The applicant's analysis of the nature and extent of adverse impacts of the requirement(s) for which relief from or an alternative to is being requested.

4. The applicant's analysis of the nature and extent of potential adverse impacts of the alternative being proposed as requested·

5. Other alternatives that may be feasible and appropriate·

6. The public records of hearings, meetings and/or other actions that may have bearing on the existing situation and/or the proposed alternative being considered·

7. Such conditions of approval as may be reasonable, appropriate and necessary to assure that potential adverse effects of the alternative are mitigated to the greatest possible extent and that the 'intent and spirit of the landscape ordinance is furthered.

The director of planning may deny or approve the request in whole or in part as may be deemed appropriate. If the request is denied, the reason(s) for denial must be communicated to the applicant in writing. The director of planning or agent may attach such conditions to an approval as may be necessary and appropriate to assure that the intent and spirit of the landscape ordinance and all other applicable requirements are met. No approval may be in conflict with an accepted proffered zoning condition·

SECTION 2. TREE PRESERVATION CREDIT BETWEEN 1.25 AND 2.00

2.1 The director of planning may grant tree preservation credit between 1.25 and 2·00 for trees of outstanding size and/or quality provided:

1. The applicant files a request and documentation from a competent qualified authority certifying that the tree(s) in question meet or exceed the definitions of Section 22-3 for *significant or mature trees.*

2. The applicant provides documentation from a competent qualified authority certifying the tree(s) in questions have a growth habit and/or size that is outstanding for the species in question.

3. The applicant provides certification from a competent qualified authority that the development plan for the area within which the tree(s) is located provides for such protective measures and devices and/or facilities/structures deemed appropriate and necessary to provide the horticultural conditions necessary for survival and growth of the tree(s) in question. Appropriate considerations shall be given to a planned maintenance program as may be recommended by the certifying authority.

4. The applicant provides documentation from a competent qualified authority that there is reasonable probability that the tree(s) in question will be viable and survive three or more years from completion of construction/development in accordance with the aforementioned procedures/facilities.

2.2 The director of planning may grant tree preservation credit between 1.25 and 2.00 for *heritage, memoria/and specimen* trees provided:

1. The applicant provides documentation that the tree(s) in question currently meet(s) or exceed(s) the standards defined in Section 22-3 and that their designation is currently valid.

2. The applicant provides certification from a competent qualified authority that the development plan for the area within which the tree(s) is located provides for such protective measures and devices and/or facilities/structures deemed appropriate and necessary to provide horticultural conditions necessary for survival and growth of the tree(s) in questions. Appropriate consideration shall be given to a planned maintenance program as may be recommended by the certifying authority.

3. The applicant provides documentation from a competent, qualified authority that there is reasonable probability that the tree(s) in question will be viable and survive three years from completion of construction/development in accordance with the aforementioned procedures/facilities.

2. When granting tree preservation credit between 1.25 and 2.00, the director of planning may attach such conditions of approval as may be deemed appropriate and necessary to assure that the spirit and intent of the landscape ordinance is maintained.

Section 3. SUBSTITUTIONS OR MODIFICATIONS OF PLANTINGS WITHIN TRANSITIONAL BUFFER AREAS OR ALTERNATIVES

The director of planning or planning commission may approve plans that include substitutions of plantings or modifications of requirements under certain circumstances and provided the approved substitutions or modifications do not violate the purpose and intent of the landscape ordinance. Permitted modifications should be minimized in number and extent -- being no greater deviations from strict ordinance requirements than are necessary to relieve the conflicts between ordinance requirements and what may be practicable in a peculiar situation.

Approval of the modified plan shall only be permitted after finding that the alternative confirms both the need for and appropriateness of the permitted modification. The director of planning or planning commission shall review and act upon all complete requests for substitutions and/or modifications of transitional buffer requirements or alternatives in accordance with the landscape ordinance.

SECTION 4. REVISIONS

The Code requires that revisions, modifications and/or additions to approved plans shall be made in the same manner as the original approval.

SECTION 5. APPEALS

Appeals of the decisions by the director of planning in regard to landscape ordinance matters may be made to the planning commission. Appeals must meet the normal filing deadlines for planning commission plan of development hearings, and the public notice procedure for plans of development must be met before the planning commission may consider the appeal.

Appeals of planning commission decisions in regard to landscape ordinance matters may be made to the Board of Supervisors in the same manner as plan of development matters.