

*City of Decatur Tree Canopy Conservation Ordinance
Administrative Standards
May 19, 2014*

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I. Introduction

The standards contained in this document are part of the *City of Decatur's Tree Canopy Conservation Ordinance* and provide detailed information on how the ordinance is to be administered and implemented. These standards, as well as industry standards and best management practices, are applicable to any and all protected trees, properties and activities required by the ordinance. However, the city arborist at his/her discretion may modify or waive any standards based on site or tree conditions, property owner circumstances, or for the incorporation of alternative green technologies on a site.

II. Industry Standards and Best Management Practices

Industry standards and best management practices exist for most tree care activities and have been developed and published by the American National Standards Institute (ANSI) and the International Society of Arboriculture (ISA). ANSI standards are designed to be used in the development of specifications for tree purchases and work to be performed on, and around trees. The best management practices are more user friendly versions of the standards development by ISA.

The latest version of the standards and best management practices listed below are available for purchase on the ISA website at www.isa-arbor.com (except for ANSI Z60.1 which is available at the Urban Forestry South website at www.urbanforestrysouth.org).

Standards

- Z60.1 American Standard for Nursery Stock
- Z133.1 –Safety Requirements (also available in Spanish)
- A300 (Part 1) –Pruning
- A300 (Part 2) –Fertilization
- A300 (Part 3) –Supplemental Support Systems
- A300 (Part 4) –Lightning Protection Systems
- A300 (Part 5) –Management of Trees and Shrubs During Site Planning, Site Development, and Construction
- A300 (Part 6) –Transplanting
- A300 (Part 7) –Integrated Vegetation Management, a. Electric Utility Rights-of-way
- A300 (Part 9) – Tree Risk Assessment, a. Tree Structure Assessment

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Best Management Practices

- Tree Pruning (also available in Spanish)
- Tree and Shrub Fertilization
- Tree Support Systems: Cabling, Bracing, Guying, and Propping (Revised)
- Tree Lightning Protection Systems, 2nd Edition
- Tree Planting (also available in Spanish)
- Integrated Vegetation Management
- Utility Pruning of Trees (also available in Spanish)
- Integrated Pest Management
- Tree Inventories
- Tree Risk Assessment

III. Tree Species List

The *City of Decatur Tree Species List* is included in Appendix A. It is referred to in the remainder of this document as the tree species list.

Those species approved for planting and eligible for the standard tree canopy cover credit are identified on the tree species list. All species on the list are approved for conservation, except for those listed as unacceptable due to their poor quality or invasive nature.

The tree species list includes the amount of standard tree canopy cover assigned to each approved species. Invasive and non-native, flowering ornamental trees that are ineligible for tree canopy cover credit are also identified on the list. Tree species acceptable for planting in parking lot islands are also identified on the list.

IV. Tree Canopy Cover Credit

All existing, healthy trees greater than 4 inches DBH, with the exception of invasive and non-native, flowering ornamental species, are eligible for tree canopy cover credit. Invasive species and non-native, flowering ornamental species are identified in the tree species list.

The amount of tree canopy cover on a site shall be measured in percent of the lot area that is covered by tree canopy, including canopy that projects over buildings and impervious surfaces. The canopy projected over and onto the applicant's property by a tree growing on a neighboring property or on the boundary between properties or on public property may be included in the measurement of total tree canopy cover for a site.

Trees planted outside but within 3 to 10 feet of the perimeter of a parking lot shall receive one-half of the standard tree canopy cover credit for the purpose of meeting the 45 percent requirement for parking lots.

New trees shall receive credit at the time of planting based on the tree canopy cover potential for the species at maturity, and in urban settings, as listed in Table 1 and the tree species list.

Table 1. Tree Canopy Cover Credit by Mature Canopy Size

Typical Mature Canopy Size	Tree Canopy Cover Credit
Large	1,600 square feet
Medium	900 square feet
Small	400 square feet
Very Small	150 square feet

V. Measuring Tree Canopy Cover

The city’s goal is to have 45 percent of the geographic area within the city limits covered by tree canopy by 2039.

The city’s tree canopy cover will be measured every 5 years using the latest satellite imagery technology. Measurements of tree canopy were completed for 2005 and 2010 and the results showed 45.7 percent tree canopy cover in 2005 and 45.1 percent tree canopy cover in 2010. The next measurement will be made in 2014 of the 2014 tree canopy cover, and then every 5 years thereafter of the previous year’s cover.

Measuring the amount of cover provided by trees on an individual property is a much simpler task than measuring the tree canopy cover across the city. There may be a need to measure just one tree, or the entire tree canopy cover on a lot.

For an individually growing tree with a crown that does not overlap other trees, it is first assumed that the outermost extent of the crown at the dripline will roughly form a circle when projected directly down onto the ground. This area beneath the tree’s crown can be calculated using the formula for the area of a circle: radius squared times a constant of 3.14, known as *pi*. Since no tree canopy projection will be a perfectly round circle, the average crown radius will be used to calculate the area of canopy cover. **See Figure 1 below.**

To calculate this average, the width of crown is measured at its widest point in feet (round to the nearest foot), as it is projected onto the ground. Then the width of the crown in a perpendicular (crosswise) direction is measured. Add these two crown widths (diameters) together and divide by 2 to get the average crown *diameter*, and by 2 again to get the average crown *radius*.

This radius squared multiplied by 3.14 will equal the tree canopy cover for the tree, in square feet.

To measure the canopy cover of a group of trees or all trees on a lot takes a few additional steps. First map the projection of the canopy onto the ground on a plat or aerial photograph of the property. Measure and map the extent of the canopy in relation to the house and property lines by recording the distances from the property lines, buildings, and other structures. Calculate the square foot area by sectioning the canopy off into squares, rectangles, triangles or circles. Multiply the length by the width of the sections if they are a square or rectangle, multiply length by width

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and divide by 2 for a triangle, and use the formula for the area of a circle if more or less circular. Add the various sections together to calculate the total tree canopy cover in square feet.

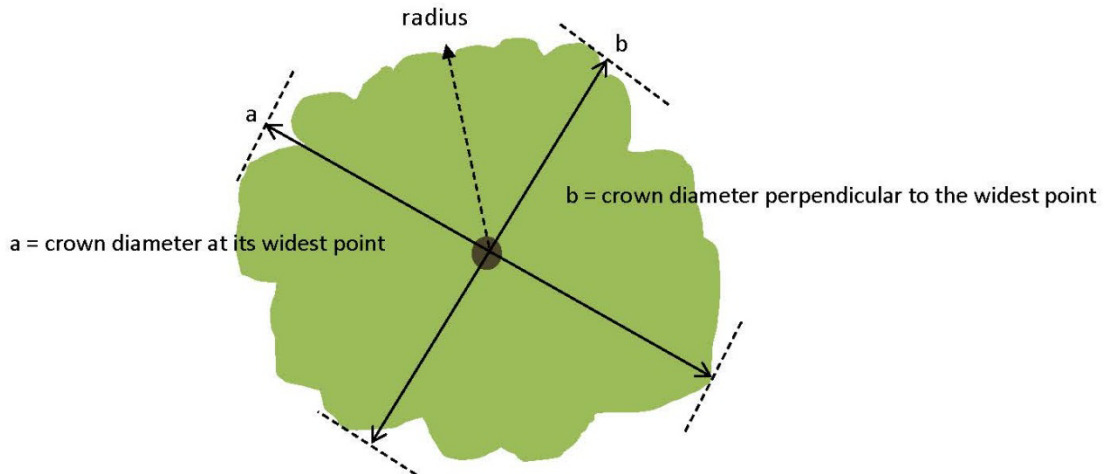
The existing cover of a single or multiple trees can also be estimated by visiting the city's website and navigating to the city's GIS mapping page, OneMap Decatur. Use the draw and measure tool to estimate tree canopy. This will be particularly helpful when trees have overlapping crowns or they project over a house or other structure on the site. Note that the canopy of hardwood trees in the winter can be more difficult to delineate than evergreen trees. Include all the area within the outer extent of the branches of hardwood trees, but do not include the shadows projected from your trees that are outside of the dripline. Again, the canopy you may have to be sectioned off and each section measured added together to get a more accurate measurement and total tree canopy cover amount. Verify the measurements outside, on the ground, to make sure that no changes to tree canopy have occurred since the aerial photographs on the website were taken.

Once the total amount of tree canopy cover on a property has been measured, divide that total by the total area of the lot in square feet to calculate the percent canopy cover for the lot.

Foresters and arborists may also use an appropriately sized dot grid that can be placed over the top of an aerial photograph or map of a property to determine total tree canopy cover percent for a lot. All dots that fall on top of tree crowns are counted and divided by the total number of dots that cover the entire lot to arrive at an estimate of tree canopy cover percent.

For tree conservation plans and tree disturbance permits, tree canopy cover must be estimated by a qualified professional using one of the methodologies described above, or other methodologies approved by the city arborist.

Figure 1: Calculating Individual Tree Canopy Cover



CALCULATING TREE CANOPY COVER

1. Measure the diameter of the crown at its widest point in feet (a).
2. Measure the diameter of the crown perpendicular to its widest point in feet (b).
3. Add those two diameters together, divide by 2 to get the average diameter.
4. Divide the average diameter by 2 to get the average radius.
5. Square the radius (r) and multiply by π (a constant of 3.14) to get the canopy cover in square feet.

For example, if (a) is 65 feet and (b) is 55 feet, then:

$65 \text{ feet} + 55 \text{ feet} = 120 \text{ feet}$, $120 \text{ feet} / 2 = 60 \text{ foot average diameter}$

$60 \text{ feet} / 2 = 30 \text{ foot average radius}$

$30 \text{ feet} \times 30 \text{ feet} \times 3.14 = 2,826 \text{ square feet}$

You can also calculate the square foot area of a tree's crown using the city's GIS mapping tool, OneMap Decatur.

VI. Measuring Tree Trunk Diameter

Foresters use a standard measurement methodology to determine the trunk diameter of a tree. This standard measurement is known as DBH and is measured at 4.5 feet above the ground for trees that are not forked below 4.5 feet. Foresters often use a special diameter tape that while measuring the circumference of the trunk, it shows diameter inches on the tape. However, any tape may be used to measure the circumference of the tree and calculate its diameter. Once you have the circumference, divide by the constant π to calculate the diameter. The diameter should be rounded to the nearest whole inch and if exactly between two numbers, then rounded to the lower whole inch.

When trees are forked below 4.5 feet, the trunk diameter should be measured at the smallest point below the fork. For multi-trunked trees, measure the largest trunk diameter, or if all trunks provide significant crown cover, then add the diameters of the individual trunks together to get the effective trunk diameter.

For example, a single-trunked has a circumference of 37 inches and the trunk diameter is:

$$37 \text{ inches divided by } 3.14 = 11.783439 \text{ inches} = 12 \text{ inches DBH}$$

VII. Tree Risk Evaluation

Tree risk shall be determined by a certified arborist with experience in evaluating tree condition and risk factors, and preferably by a certified arborist who is tree risk assessment qualified by the International Society of Arboriculture. Tree risk evaluation shall conform to current *ANSI A300 Standards for Tree Care Operations—Tree, Shrub, and Other Woody Plant Management—Standard Practices (Tree Risk Assessment a. Tree Structure Assessment)* and ISA Best Management Practices for Tree Risk Assessment or other industry best management practices.

A tree risk assessment shall be submitted with an application for tree removal or a tree conservation plan for any tree that is proposed for removal due to its risk of failure. The tree risk assessment shall be completed by a certified arborist and shall include the objectives of the assessment, the level of assessment performed, risk rating (low, moderate, high, or extreme) tree species, DBH, tree canopy cover, description of tree condition, the type, severity, and location of the defect(s) present, presence or absence of reaction wood and compensatory growth, live crown ratio and crown density, site conditions and characteristics, site history, and past failure patterns. The city arborist will determine if mitigation options other than removal exist prior to the approval of a tree removal permit or a tree conservation plan.

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VIII. Tree Conservation Plan

A tree conservation plan shall be submitted with any application for a tree disturbance permit. The plan shall be prepared and certified by a registered forester, registered landscape architect, or certified arborist. No tree disturbance permit shall be issued without an approved tree conservation plan.

A tree conservation plan shall include the following information as appropriate to the situation and as required by the tree ordinance, subject to the discretion of the City Arborist:

- **General Information**

- a. Project manager name and contact information
- b. Emergency contact name and 24-hour contact information
- c. Proposed project starting and ending dates
- d. Procedures and schedules for the implementation, installation and maintenance of tree protection measures
- e. Name and contact information for the individual responsible for monitoring tree protection and maintaining tree protection measures

- **Site Plan**

- **Identification of protected trees:**

- Proposed for conservation
- Proposed for removal
- Notification of potential tree impact

- **Location and spatial definition of:**

- Individually growing protected trees and their critical root zones
- Boundaries of contiguous stands of protected trees
- Limits of land disturbance, clearing, grading and trenching
- Erosion control fencing
- Proposed building, construction, demolition and all other land disturbance or site development activities
- Existing and proposed utilities
- Equipment and vehicle ingress and egress corridors
- Soil and materials storage areas
- Construction trailer, portable toilet and other temporary structures
- Tree protection design
- Tree planting design

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- **Tree canopy cover calculations showing:**
 - Total tree canopy cover existing on the site calculated by percentage and square feet of canopy
 - Tree canopy cover required: either no net loss (existing) or 55 percent
 - Tree canopy cover to be removed
 - Tree canopy cover to be conserved
 - Tree canopy cover to be planted

- **Detail drawings and specifications where appropriate**

- **Tree Protection Design (See Details Below)**

- **Tree Planting Design (See Details Below)**

a. Detail Drawings and Specifications

- a. Tree protection fencing and signage
- b. Tree planting detail
- c. Tree staking detail
- d. Tree well, if applicable
- e. Tree aeration system, if applicable

b. Tree Protection Design

Active tree protection measures, at a minimum, shall consist of the erection of tree protection fencing around the outer limits of the critical root zone, posting of tree protection area signs in both English and Spanish, and avoidance of any land disturbance or land development activities within the tree protection zone. Other tree protection measures may be required by the city arborist.

Prior to any land disturbance, tree protection fencing shall be installed at the limits of the critical root zone of all protected trees. Fences shall be at least four (4) feet high and shall be either a wood and post construction, orange polyethylene laminar safety fencing on sturdy metal posts, or if required by the arborist, temporary chain link fencing. All tree protection zones shall be designated as such with signs in both English and Spanish posted so that they are visible on all sides of the fenced area. The signs should say “tree protection zone” and “keep out.”

Passive forms of tree protection may be utilized to delineate large areas of conserved trees which are remote from areas of land disturbance if approved by the city arborist. These areas shall be completely surrounded with silt fencing or 4 inch wide, high-visibility, heavy mil plastic flagging at

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the limits of the critical root zone. No land disturbance, tree disturbance, or site development activity is allowed within the tree protection zone including, but not limited to, the following:

- Soil erosion and sedimentation
- Materials storage
- Concrete, paint, or chemical washout
- Fire and excessive heat
- Trenching
- Soil excavation
- Soil backfill
- Soil compaction
- Vehicle or equipment traffic or parking
- Placement of temporary buildings
- Placement of portable toilets

Improper maintenance practices shall also be prohibited for protected trees, including but not limited to, improper mulching, severe or improper pruning including topping, tipping, or heading back, and damage from mowers, string weed trimmers, and herbicides.

Protected trees growing on development sites that are deemed by the arborist to be unhealthy, irreparably damaged, structurally weak, or substantially disfigured shall be removed and their tree canopy replaced at the permit holder's expense.

The development of a tree protection design as part of the tree conservation plan is required prior to the issuance of a tree disturbance permit.

The tree protection design shall include:

- Drawing showing location of protected trees on the site and location of proposed land disturbance activities
- Description of proposed land disturbance activities
- List of protected trees with species, dbh and approximate tree canopy cover
- Radius in feet of critical root zone for each tree
- Tree protection measures to be installed
- Expected date of project completion
- Tree owner's contact information
- Contact information for all person(s) responsible for land disturbance
- Contact information for person responsible for monitoring tree protection and maintaining tree protection measures

Tree protection prescriptions developed by the city arborist may take the place of a tree protection design when a tree owner is unable to develop or have developed a tree protection design at the city arborist's discretion.

c. Tree Planting Design

A tree planting design is required for any site where tree planting to replace or increase tree canopy is required. The tree planting design may be separate from or may be part of a required tree conservation plan.

The tree planting design may be a parcel map or hand sketch that shows, at a minimum:

- Approximate location of property boundaries
- Approximate location of protected trees or tree stands, including boundary trees
- Extent of tree canopy cover on the site including that provided by trees on adjacent properties
- Approximate location of structures, driveways, and paved areas on the site
- The number of trees to be planted by species and caliper
- Approximate locations of trees to be planted

Tree planting prescriptions developed by the city arborist may take the place of a tree planting design when a tree owner is unable to develop or have a certified arborist develop a tree planting plan.

IX. Tree Establishment (Planting) Standards

Tree establishment consists of more than just planting and includes a series of steps to provide quality soil and an adequate volume of soil, selection of a site in general and exact placement of the tree, the selection of quality trees, proper planting of the tree and follow-up maintenance during the establishment period.

a. Soil Quality

The rooting zone of all trees planted for tree canopy cover credit shall contain quality soil to enhance, and not limit, tree growth. The minimum standards for soil quality include:

- Loamy, well-aerated soil that includes topsoil
- Approximately 5 percent organic matter, 45 percent mineral matter and 50 percent pore space for holding water and oxygen
- A pH (soil acidity) between 5.5 and 7.0

The arborist may require the applicant to submit a soil analysis performed by the University of Georgia Cooperative Extension Soil, Plant and Water Laboratory or other approved laboratory to determine soil fertility, organic matter content, or pH. The city arborist may perform on-site tests to assess compaction, determine the overall suitability of the soil for tree growth and additional steps that must be taken to provide quality soil.

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The city arborist may approve the use of suspended pavement systems, such as structural cells, to meet soil depth and volume requirements in areas where the soil surface must be covered by pavement for parking lots, driveways and sidewalks.

The planting site shall have good drainage from the bottom of the planting hole to ensure root health and tree survival.

Soil compaction shall be avoided within the critical root zone of protected trees.

Root barriers should be used to redirect root growth away from sidewalks, curbs, driveways and buildings.

b. Soil Volume

Trees planted for tree canopy cover credit shall have a minimum amount of soil volume present at the time of planting to promote health, growth and the ability to achieve the size potential for the species. The minimum depth of soil shall be 36 inches and the minimum open soil surface area, soil volume and planting area dimension for trees by mature canopy size are shown in Table 2.

Table 2. Required Minimum Open Soil Areas and Soil Volumes by Mature Canopy Size

Mature Canopy Size	Minimum Open Soil Area	Minimum Soil Volume	Minimum Planting Area Width for Landscape Strips
Large	400 square feet	1,200 cubic feet	5 feet
Medium	225 square feet	675 cubic feet	4 feet
Small	100 square feet	300 cubic feet	3 feet
Very Small	36 square feet	108 cubic feet	3 feet

In landscape strips, trees may share soil volume and tree placement standards shall govern the number of trees allowed within a particular landscape strip.

In parking lots and other paved areas, landscape islands shall be no less than 6 feet wide in any one direction. Two (2) trees may share the same required soil volume in landscape islands if the island is at least 325 square feet in size (the size of two parking bays). The city arborist may approve a reduction in the open soil surface area required with the use of suspended pavement systems that increase the rooting area for trees.

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c. Site Selection

The placement and spacing of trees must be compatible with site spatial limitations and with considerations toward the potential height and crown size of the tree. Required trees shall be placed where they are able to grow to maturity with a minimum of restriction to their roots, trunks and crowns, and where they will not create conflicts with sight, vehicle, and pedestrian clearance, infrastructure such as overhead and underground utility lines, streets, walkways, utility poles, and other infrastructure.

Only small and very small species of trees shall be planted beneath or within 15 feet of overhead utility lines. Medium trees shall be planted at least 20 feet from overhead utility lines and large trees shall be planted at least 30 feet from overhead utility lines. Trees shall be planted at least 5 feet from underground utility lines.

Trees shall be planted a minimum of 35 feet from intersections.

Trees shall be planted a minimum of 15 feet from an existing or proposed building or driveway and 5 feet from walkways, except for planting strips in the public street rights-of-way.

In parking lots, trees shall be planted so their trunks are located a minimum of 30 inches from any barrier curb and aligned with the parking space boundary to prevent injury to trees from vehicle bumpers.

Where the city arborist determines that site spatial constraints result in an absolute inability to provide the required tree canopy cover on the site, as many trees as possible shall be planted on the site. The remaining balance of tree canopy may be made by a payment in lieu of planting to the Decatur tree bank in accordance with tree ordinance provisions.

d. Species Selection

Only those species listed on the tree species list shall be selected for planting. Species not on the list shall only be planted with the approval of the city arborist.

Species selected for planting shall be ecologically compatible with the intended growing site.

At least 90 percent of trees planted to meet tree canopy cover requirements must be large or medium sized canopy trees. Conifers may not account for more than 10 percent of the planted tree canopy. Small and very small trees may not account for more than 10 percent of the planted tree canopy. Invasive and non-native, flowering ornamentals shall not be used to satisfy canopy requirements.

e. Species Diversity

The species of trees planted to maintain no net loss of canopy or meet tree canopy cover requirements shall be diverse.

On a site where the planting of 10 or more trees is required, no more than 30 percent of any one species shall be planted, and on a site where the planting of 30 or more trees is required, no more than 10 percent of any one species shall be planted, unless otherwise approved by the city arborist.

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f. Tree Size and Quality

On residential sites, for replacement required by tree removal permits, trees must be a minimum of 6 feet tall at time of planting and if grown in a container, at least in a 15 gallon container. On all other sites, trees shall be no less than 2.5 inches caliper and 10 feet in height at time of planting. The city arborist may approve smaller size trees for difficult to obtain native shade trees along with documented and appropriate maintenance plans.

Trees selected for planting shall meet the current *ANSI Z60.1 American Standard for Nursery Stock*. Trees may be balled and burlapped, grown in containers, or bare root, however trees shall be free of root defects including kinked roots, stem encircling roots, and stem girdling roots.

Trees approved for planting shall:

- Have a healthy and extensive root system
- Have a trunk that stands upright without support
- Have a trunk free from wounds
- Have a central leader if typical for the species and shall not have co-dominant stems or included bark
- Have well distributed branches along the upper two-thirds of the stem
- Have a crown that has not been topped, tipped, or headed back
- Be free from insects and diseases

All plant materials shall be subject to approval by the city arborist.

g. Time of Planting

Required trees shall be planted between November 15 and March 1. The city arborist may approve planting at other times and approve a certificate of occupancy if tree planting funds are placed in escrow with the city prior to the final inspection. The total amount of the escrow funds shall include the purchase, transport and installation of plant materials.

h. Planting Specifications

Planting holes shall be at least 2 times the width of the root ball. When soils are compacted, the planting hole shall be at least 3 times and as much as 5 times the width of the root ball. The sides of the planting hole shall be sloped toward the bottom of the hole and scarified to allow penetration of developing roots.

Trees shall not be planted deeper than they were in their former location or container and the first woody root shall not be deeper than 2 inches below the ground line after planting.

No soil amendments or fertilizer shall be added to the planting hole unless soil conditions warrant amendments as determined by the city arborist.

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X. Tree Maintenance

Protected trees shall be maintained in a healthy and structurally sound condition by the owner. At a minimum, conserved trees shall be pruned to maintain public health and safety. After the establishment period, ongoing maintenance that includes mulching, clearance, structural and deadwood pruning, inspections and pest management as necessary is recommended to keep trees healthy and structurally sound.

Actions contrary to standards and best management practices that result in damage to trees is prohibited. The topping of any protected tree is prohibited; if topped, a protected tree shall be ineligible for tree canopy cover credit and replacement of the tree canopy provided by the tree shall be required.

It shall be the duty of any person owning or occupying real property bordering on any street upon which property trees may exist to prune such trees in such a manner that they will not obstruct or shade the streetlights, obstruct the passage of pedestrians on sidewalks or vehicles on streets, obstruct vision of traffic signs, or obstruct views of any street or alley intersection. The minimum clearance of any overhanging portion thereof shall be 10 feet over sidewalks and 12 feet over all streets except truck thoroughfares, which shall have a clearance of 16 feet.

a. Initial Maintenance

Trees planted to satisfy the requirements of this ordinance shall be maintained by the owner during the establishment period (the first 3 growing seasons after planting). Required maintenance for planted trees shall include:

- Regular watering to provide the equivalent of 1 inch of water per week
- Mulching once per year
- Training pruning to remove co-dominant stems and dead, diseased, dying, crossed, broken, rubbing and otherwise objectionable branches

All maintenance shall be done in accordance with the standards cited and described herein.

b. Tree Pruning

Only experienced professionals should prune conserved trees and the use of tree pruning contractors employing certified arborists who will supervise pruning activity are strongly recommended. Planted trees may be pruned by experienced and trained volunteers or city staff.

The following tree pruning specifications shall apply to all protected trees:

- Tree topping shall be prohibited.
- The objectives of tree pruning should be established prior to commencement of pruning activity.

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- Pruning at the time of planting shall be limited to the removal of co-dominant stems and dead, diseased, dying, crossed, broken, rubbing branches, and otherwise objectionable branches.
- The removal of live branches and foliage from a mature tree shall be limited to that required to ensure tree health and safety. No more than one-fourth of a mature tree's foliage and no more than one-third of a young tree's foliage shall be removed in any one growing season.
- Climbing spikes shall not be used in a tree pruning operation.
- Branches shall be pruned back to the parent branch or trunk and the pruning cut made just outside the branch collar. Flush cuts and stub cuts shall be prohibited.
- Wounds to the remaining limbs and trunk shall be avoided.

d. Tree Mulching

Mulching benefits a tree by retaining soil moisture, moderating soil temperatures, suppressing weed growth, reducing soil compaction and reducing the potential for mower and string weed trimmer damage. The purpose of mulch is to cover the root system of the tree, not the trunk.

The following mulching specifications shall apply to all protected trees:

- Mulch shall be applied annually, preferably in the late winter or early spring. Mulch from the previous year should be removed and replaced with fresh mulch, or the older and new mulch mixed to ensure good aeration through the mulch.
- Only organic materials, such as pine straw, leaves, aged wood chips, and compost, shall be used as mulch. Grass clippings, plastic sheeting, landscape fabric, or rocks shall not be used as mulch.
- Mulch shall be applied in an even layer to the tree's dripline, or to the greatest extent possible, in an even layer 2 to 4 inches deep.
- For newly planted trees, mulch shall be applied in a minimum 4.5 foot radius around the trunk.
- Mulch shall be kept at least 6 inches from the trunk of young trees and at least 12 inches from the trunk of mature trees. Mulch mounded up around the trunk shall be prohibited.

e. Tree Fertilization

The following fertilization specifications shall apply to all protected trees:

- Trees in an urban growing environment with limited natural nutrient cycling should be fertilized on a regular basis, every 3 to 5 years, according to recommendations based on a soil sample analysis.
- For trees that are exhibiting signs and symptoms of nutrient deficiency, soils or foliage should be tested prior to fertilization and the fertilizer formulation should be adjusted to address the specific deficiency.
- Newly planted, drought stressed, or severely damaged trees shall not be fertilized.
- Fertilizer should be applied when roots are actively growing, in late winter, early spring, and through early summer.

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- Slow release organic fertilizers with a salt index less than 50 are recommended at a rate of 2 to 4 pounds of elemental nitrogen per 1,000 square feet of rooting area.
- The use of trunk fertilizer injections or implants is not recommended.

f. Irrigation

Adequate soil moisture levels result in better tree growth, reduced stress, and reduced susceptibility to insect and disease problems. Mulching trees helps to conserve soil moisture. Excessive soil moisture can result in anaerobic conditions, nutrient deficiencies, and tree decline.

The following irrigation specifications shall apply to all protected trees:

- Tree species should be selected to match soil conditions on the site.
- In the absence of adequate rainfall, trees should be irrigated at the rate of 1 inch of water per week throughout the growing season and the establishment period.
- Water should be applied evenly throughout the outer 75% of a tree's critical root zone and runoff should be avoided.
- Avoid wetting the tree trunk during irrigation.

XI. Inspections

The city arborist will conduct a preliminary on-site analysis of all projects prior to permitting to evaluate the potential for tree conservation, tree protection, and tree planting relative to the proposed site design.

All tree protection measures shall be installed prior to land disturbance. The city arborist shall be contacted for an on-site conference after tree protection measures are installed and prior to land disturbance.

The city arborist and/or building inspector shall conduct follow-up site inspections to monitor compliance with the tree ordinance.

The city arborist shall make a final site inspection upon completion of the project and prior to the issuance of a certificate of occupancy. Certification by the city arborist of compliance with the ordinance is required before a certificate of occupancy can be issued.

Additional site inspections may be made by the city arborist after project completion to monitor compliance with tree canopy conservation and cover requirements. At any time if trees conserved or planted for tree canopy cover credit die or are in irreversible decline as determined by the city arborist, then additional planting shall be required to replace the tree canopy cover credit assigned to the dead or declining tree.

XII. Tree Planting on City Property

No trees shall be planted on city property unless approved in writing by the city arborist or unless included in an annual work plan approved by the city arborist. The cutting of paved sidewalks for tree planting shall require the approval of the City Manager or his/her designee.

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Trees planted within rights-of-way may be counted toward the minimum tree canopy cover requirements if approved by the city arborist and when the city arborist has determined that these requirements cannot be met on site.

If approved, the following conditions must be met to plant trees on the city street rights-of-way:

- A shoulder cross-section must be provided indicating the placement of the trees in relation to the curb and underground utilities.
- Root barriers to prevent root and infrastructure conflict must be provided, subject to approval by the city arborist.
- Suspended pavement systems that use structural cells to increase rooting volumes may be installed with approval of the city arborist.
- Location and details of root barriers and/or suspended pavement systems shall be provided.
- The placement and species of trees are subject to the approval of the city arborist and Director of Public Works.
- Minimum soil volumes shall be provided.
- Drawings for irrigation systems within rights-of-way must indicate the location of lines, heads, spray radius, shut off valves, timer and a 24-hour emergency contact phone number.

XIII. Annual Work Plans

Any person, organization, or company that proposes to routinely remove, prune, or work within the tree protection zone of protected trees shall be required to submit an annual work plan to the city arborist by December 1 each year, or prior to the commencement of any routine work.

The work plan shall include:

- Company or organization name and contact information (name, address, city/state/zip, contact phone number, city business license number)
- Name of person responsible for work to be performed with contact information
- Names of subcontractors with contact information
- Proposed locations of work, described in writing and identified on a map of the work area
- Type of work to be performed; extent of work to be performed
- Schedule of work to be performed
- Type of tree disturbance that is expected
- Tree protection measures to be installed
- Plans for tree canopy cover replacement

When changes are required to the annual work plan, notice shall be submitted to the city arborist in writing prior to the changes taking place. These changes may include, but are not limited to, utility infrastructure installation, repair, and tree removal or disturbance not described in the annual work plan.

All work to be performed on protected trees shall be done in accordance with current *ANSI A300 Standards for Tree Care Operations*, *ANSI Z133 Safety Standards*, industry best management practices and the administrative standards that accompany this ordinance.

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All tree pruning shall be supervised by a certified arborist. Pruning cuts shall be made in accordance with ANSI standards. Topping, tipping or heading cuts, flush cuts and stub cuts shall be prohibited. No climbing spurs or spikes shall be used in trees except when trees are to be removed or in cases of a public safety emergency, natural disaster or aerial rescue of personnel.