

**AN ORDINANCE AMENDING TOWN OF CARRBORO LAND USE ORDINANCE PROVISIONS RELATING TO TREE PROTECTION, AND SHADING AND CANOPY REQUIREMENTS**

\*Draft 5-12-2017\*

THE BOARD OF ALDERMEN OF THE TOWN OF CARRBORO ORDAINS:

Section 1. Section 15-314 (Board Findings and Declaration of Policy on Protecting Trees and Other Plants), subsection (a)(2) is amended to read as follows:

(2) Trees, shrubs, and other plants appreciably reduce carbon emissions by shading buildings thereby lowering energy use to cool buildings, and also store carbon as biomass; and

Section 2. Section 15-315 of Article XIX, (Definitions) is rewritten as follows:

Section 15-315 Definitions

Unless otherwise specifically provided, or unless the context clearly indicates otherwise, the words and phrases defined below shall have the meaning indicated when used in this Part.

- (1) CANOPY TREE. A healthy evergreen or deciduous tree species that matures at a height of at least thirty (30) feet.
- (2) DRIPLINE. Perimeter formed by the points farthest away from the trunk of a tree where precipitation falling from the branches of that tree lands on the ground.
- (3) CLEARCUTTING. The large-scale, indiscriminate removal of trees, shrubs, and undergrowth with the intention of preparing real property for nonagricultural purposes.
- (4) HABITAT. The natural environment in which an animal, plant, or other type of organism lives. It is made up of physical factors such as soil, moisture, range of temperature, and availability of light as well as biotic factors such as the availability of food, nesting sites, and shelter.
- (5) SPECIMEN OR RARE TREE. Any healthy tree that:
  - a. Has a trunk diameter at breast height (dbh) of twenty-four (24) inches or more for pine tree species; or
  - b. Has a trunk dbh of eighteen (18) inches or more for any species besides pine tree species; or
  - c. Has a trunk dbh of twelve (12) inches or more in the case of any of the species from the following list of North Carolina native canopy tree genera; or

<i>Aesculus</i> (Ohio Buckeye)	<i>Magnolia</i> (Magnolia)
<i>Chamaecyparis</i> (Atlantic White Cedar)	<i>Pinus</i> (Longleaf pine)
<i>Carya</i> (Southern Shagbark Hickory)	<i>Taxodium</i> (Bald cypress)
<i>Diospyros</i> (Persimmon)	<i>Tsuga</i> (Hemlock)
<i>Fagus</i> (Beech)	<i>Ulmus</i> (American Elm)
<i>Juniperus</i> (Eastern Red Cedar)	

- d. has a trunk dbh of six (6) inches or more in the case of the species from the following list of North Carolina native understory tree genera: or

<i>Amelanchier</i> (Serviceberry)	<i>Halesia</i> (Silverbell)
<i>Asimina</i> (Pawpaw)	<i>Hamamelis</i> (Witch-hazel)
<i>Carpinus</i> (Hornbeam)	<i>Ilex</i> (Holly)
<i>Cercis</i> (Redbud)	<i>Ostrya</i> (Hophornbeam)
<i>Chionanthus</i> (Fringetree)	<i>Oxydendrum</i> (Sourwood)
<i>Cornus</i> (Dogwood)	<i>Sassafras</i> (Sassafras)
<i>Crataegus</i> (Hawthorn)	

- e. is listed as a State or National Champion by the North Carolina Forest Service or the American Forestry Association; or
- f. provides unique habitat for any endangered or threatened wildlife species protected by Federal law; or
- g. has been cited by the Board of Aldermen as being historically significant; or
- h. any other tree species listed in the North Carolina Natural Heritage Program as being significantly rare, of special concern, threatened, or endangered.
- (6) TREE. A perennial woody plant, single or multiple trunks, with few if any branches on its lower part, which at maturity will obtain a minimum six (6) inch caliper.
- (7) TREE CANOPY. The combined area encompassing the drip zones of all canopy trees.
- (8) TREE PROTECTION PERIMETER. That area within a circle drawn with the tree's trunk as the center. Radius is dependent upon site conditions and the relative tolerance of tree species to construction damage. Standard accepted radius is 1-1.5 feet per diameter inch of tree to be retained.
- (9) TREE STAND. An aggregation of trees occupying a specific area and generally uniform in species composition, size, age, arrangement, and condition that distinguishes it from vegetation in adjoining areas.

Section 3. Section 15-317 (Retention and Protection of Specimen and Rare Trees), subsections (a) through (c) are rewritten to read as follows:

Section 15-317 Retention and Protection of Specimen and Rare Trees

(a) Every development shall retain all existing specimen and rare trees. When a site would be so unreasonably burdened by the retention of all such trees that a choice must be made as to which trees will be retained, the following criteria shall be used by the applicant, in consultation with the land use administrator and a landscape or forestry profession, who is a certified arborist, to evaluate the trees for the purpose of deciding which to retain:

- (1) The rareness of the species, relative to the species representation on the site and to the species representation within the region and the state. This shall be the most important criterion in the evaluation;

- (2) Size and age, large old trees being considered more valuable than smaller, younger trees of the same species;
- (3) The expected longevity of the tree, including such factors as the tree's relative health at the time of the evaluation;
- (4) The hardiness of the tree, including wind firmness, climatic requirements, susceptibility to insects and diseases;
- (5) Aesthetic values, including flowers, fruit, form characteristics, potential for autumn coloration;
- (6) Size at maturity; and
- (7) Potential to provide shading.

(b) Flexible approaches such as adjustments to lot layout, placement of buildings and paved surfaces and location of utilities should be pursued in order to save rare and specimen trees.

(c) Subsurface disturbance within the Tree Protection Perimeter around any tree to be retained in accordance with (a) above, shall be limited to the minimum extent practicable as determined by a certified arborist during construction or after completion of the development.

Section 4. Section 15-318 (Shade Trees in Parking Lots), is amended to read as follows:

(a) Vehicle accommodation areas containing more than four parking spaces that are required by Section 15-296 must be shaded by deciduous trees (either retained or planted by developer) that have or will have when fully mature a trunk at least twelve inches in diameter. When trees are planted by the developer to satisfy the requirements of this subsection, the developer shall choose trees that meet the standards set forth in Appendix E. As part of the redevelopment of an infill lot in the B-1(C), B-1(G) or B-2 districts, up to 25% of the shading requirement may be from existing or proposed buildings providing shadow as identified in the provisions of Appendix A, A-6 (26).

(b) Each tree of the type described in subsection (a) shall be presumed to shade a circular area having a radius of fifteen feet with the trunk of the tree as the center, and there must be sufficient trees so that, using this standard, thirty-five percent of the vehicle accommodation area will be shaded.

(c) No paving may be placed within 15 feet (measured from the trunk) of any tree retained to comply with subsection (a), unless such tree is eighteen inches or greater in diameter or a very rare species as described in Section 15-315, in which case no paving may be placed within the Tree Protection Perimeter for such trees as described in 15-315(8). New trees planted to comply with subsection (a) shall be located so that they are surrounded by at least 200 square feet of unpaved area. Notwithstanding the foregoing, new trees planted on infill lots in the B-1(C),

B-1(G) or B-2 districts may be surrounded by less than 200 square feet of unpaved area if installed with an urban tree planting system, specified by a professional engineer and landscape architect or certified arborist, that will ensure the survival of the tree for its typical life expectancy.

(d) Vehicle accommodation areas shall be laid out and detailed to prevent vehicles from striking trees. Vehicles will be presumed to have a body overhang of three feet six inches.

(e) The foregoing requirements shall not apply to 19.100 classification uses where such uses do not involve the construction of a permanent structure and are conducted not more than two days per week on the site of a vehicle accommodation area that is used primarily in connection with another use. Furthermore, when a 19.100 classification use meeting the foregoing requirements is installed on a lot that is nonconforming with respect to the shading requirements of this section, the lot shall not be required to comply with these shading requirements solely because of installation of such use, even though a new permit applicable to the entire lot may be required.

Section 5. Section 15-319 (Tree Canopy coverage Standards) is rewritten to read as follows:

Section 15-319 Tree Canopy Coverage Standards

(a) Minimum Canopy Coverage Standards. Subject to the remaining provisions of this section, the following minimum tree canopy coverage percentages are required within the boundaries of every lot or tract for which a zoning, special use, or conditional use permit is issued, exclusive of required cleared active recreation areas, water bodies, access easements, public and private right-of-way, stormwater and utility easements.

(b) Zoning permit applications for structures that are exempt from building permit requirements, or are the lessor of either i) additions to existing permitted structures that do not exceed 25% of an existing building footprint or ii) do not increase the footprint of the existing building by more than 250 square feet, shall be exempt from the tree canopy standards.

Table 1: Minimum Tree Canopy Coverage Standards

Land Use	Minimum Canopy Coverage
Residential	40%
Other than residential excluding districts (B-1(C), (B-1(G), (B-2)	30%
Other than residential in districts (B-1(C), (B-1(G), (B-2)	15%

- (1) When a tract is subdivided and pursuant to the provisions of Article XIII the developer sets aside open space areas or recreation areas that contain canopy trees (with a minimum caliper of six inches) or when a developer of a subdivision plants canopy trees to comply with the shading requirements of Article XIII, the total tree canopy area so preserved or established shall be credited against the minimum canopy coverage percentages set forth above. The remaining required tree canopy coverage area shall be allocated by the subdivider among the subdivided lots, and this allocation shall be shown on

the recorded plat of such subdivision with a disclosure note that such trees, to fulfill the requirements of this section, shall be subject to maintenance and replacement.

(c) **Modifications to Canopy Coverage Standards.** The permit issuing authority may approve a development application that does not fully comply with the canopy coverage standards when it finds that the application substantially (50 % or more) complies with these standards and that such a deviation:

- (1) Enables the development to better achieve other Town objectives such as: i) the promotion of solar access to encourage active and passive solar technology for water and space heating and renewable energy generation, ii) improved stormwater management, and iii) the preservation of established landscapes professionally designed and installed by an architect or landscape architect; or
- (2) Is for property enrolled in the present use value taxation program or subject to a forest management plan; or
- (3) Is part of the redevelopment of an infill lot in the B-1(C), B-1(G) or B-2 districts, where the applicant is seeking a reduction of the shading requirement per Section 15-318, and has planted trees in the right-of-way to count toward the canopy coverage.

Large expanses of open space, meadowland, or manicured lawn shall not satisfy the canopy coverage standards of this section.

(d) **Implementation of Standards.** Compliance with the tree canopy standards shall be achieved as follows:

- (1) **Protection of existing tree canopy.** The extent of existing tree canopy coverage retained at the time of permit application may be documented by survey or by using current aerial photographs available on the Town's web page or similar resource. Protection of the existing tree canopy will be demonstrated by the tree protection plan required by Section 15-320.
- (2) **Replacement of canopy.** If the existing protected tree canopy is less than the minimum standard as shown in Table 1, the deficit shall be made up by the planting of additional trees as provided herein:
  - a. One (1) or more replacement tree(s) shall be planted in accordance with an approved planting plan. When trees are planted by the developer to satisfy the requirements of this subsection, the developer shall choose trees that meet the standards set forth in Appendix E. Each tree shall be presumed to create a canopy circular area with the trunk of the tree as the center, and there must be sufficient trees so that, using this standard, the canopy requirements in 15-319(a) are met.

- b. Canopy trees planted to meet the Town's screening and parking lot shading standards can be counted toward the replacement canopy tree calculation.
- c. Supplemental canopy trees planted to complete the canopy coverage requirements shall be planted no less than twenty (20) feet from any other proposed or existing canopy tree.
- d. Replacement trees that are planted in an adjacent right-of-way may count toward total tree canopy.
- e. Replacement tree caliper shall be at least two and one-half (2.5) inches at installation.

Section 6. Appendix A, Section A-5. (Existing, Natural, Man-Made and Legal Features) (b)(2), is rewritten to read as follows:

(b) Existing natural features:

- (1) Tree line of wooded areas.
- (2) The location and sizes of all trees which are to be retained in accordance with Section 15-317, and which are to be removed; a written justification for the need to remove any specimen or rare species trees protected by the provisions of Article XIX, along with a description of the extent of the hardship that would occur if such removal were not permitted to occur.

Section 7. Appendix A, Section A-6. (Proposed Changes in Existing Features or New Features), provisions (b)(23) and (b)(24) are rewritten to read as follows:

- (23) Proposed plantings or construction of other devices to comply with the screening requirements of Article XIX, Part I, as well as proposed plantings of trees to comply with the shading, street tree, and canopy requirements of Article XIX, Part II. Plans shall label shrubbery by common or scientific name, show the distance between plants and indicate the height at the time of planting and expected mature height and width. Plans shall label trees by common or scientific name, show the circles of the mature crowns (major trees shall be drawn at diameter = 30 feet; dwarf or decorative trees shall be drawn at their actual mature crown), and indicate the height at the time of planting.
- (24) A Tree Protection Plan, will be completed and stamped by a certified arborist or landscape architect, illustrating the methods proposed to be used to protect, during construction, the trees that are required to be protected under the provisions of Chapter XIX including specifications as to how the grade, drainage, and aeration will be maintained around the trees. The location of all rare and specimen trees to be retained on the site that will not be within the area to be disturbed by construction activities near a building site, or near roads within the development shall also be shown on the plan, along with a note stating that these trees will not be within the area to be disturbed by construction activities. The Administrator may recommend that applicants consult with experts in arboriculture, landscape architecture or forestry about appropriate tree protection methods for the particular conditions and species in question, and request that their contractors review two

videotapes on tree protection during construction developed by the International Society of Arboriculture, entitled “Effect of Building Construction on Trees in Wooded Lots” and “Avoidance of Construction Damage to Trees on Wooded Lots” that are on file in the Public Works Department.

Section 8. Appendix E (Screening and Trees – Guide for Landscaping), provision title for E-3) shall be amended to read as follows:

**E-3 Formulas for Calculating Thirty-five Percent Shading of Paved Vehicle Accommodation Areas and Tree Canopy Deficit Replacement.**

Section 9. Appendix E-1 (Guide for Protecting Existing Trees), (b) shall be amended to read as follows:

**E-1 Guide for Protecting Existing Trees**

Section 15-317 provides for the retention and protection of large trees when land is developed. In order to better ensure the survival of existing trees, the developer should heed the following guidelines:

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

(b) Avoid excavations beneath the crown of the tree as required by Section 15-317(c).

Section 10. Appendix E-2 (Standards for Street and Parking Lot Trees), shall be amended to read as follows:

Trees planted in compliance with the requirements of Sections 15-316, 15-318 and 15-319 should have most or all of the following qualities. The trees recommended in Section E-10 represent the best combinations of these characteristics.

Section 11. Appendix E-3 (Formulas for Calculating 35% Shading of Vehicle Accommodation Areas and Tree Canopy Deficit Replacement) shall be rewritten to include a new formula for determining the number of replacement trees required to presumptively satisfy the tree canopy requirements of Section 15-319, as follows:

**E-3 Formulas for Calculating 35% Shading of Vehicle Accommodation Areas and Tree Canopy Deficit Replacement**

Following is an elementary formula for determining the number of shade trees required in and around parking lots in order to presumptively satisfy the shading requirements of Section 15-318.

1. Calculate square footage of the vehicle accommodation area. Include parking spaces, driveways, loading areas, sidewalks, and other circulation areas. Do not include building area and any area which will remain completely undeveloped: \_\_\_\_\_ sq. ft.
2. Multiply x .35
3. Areas to be shaded: \_\_\_\_\_ sq. ft.  

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 Add:
4. Area shaded by existing trees to be retained in and around the vehicle accommodation area: \* \_\_\_\_\_ sq. ft.
5. Area shaded by required screening trees, if any: \* \_\_\_\_\_ sq. ft.
6. Area shaded by required street trees, if any: \* \_\_\_\_\_ sq. ft.
7. Subtotal: \_\_\_\_\_ sq. ft.  
 (if line #7 is greater than line #3, then the shading requirement has been met. If not, go on to line #8)
8. Enter the difference between line #7 and line #3: \_\_\_\_\_ sq. ft.
9. Divide line #8: ÷ 707
10. Total number of shade trees required within the vehicle accommodation area: \_\_\_\_\_ trees

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\*Existing trees retained in compliance with Section 15-316 will be credited according to their actual crown radius. Shaded area may be calculated as follows:  $3.14 \times (\text{crown radius})^2 = \text{shaded area}$

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

**Formulas for Calculating the Number of Replacement Trees Required to Satisfy the Tree Canopy Deficit**

Following is an elementary formula for determining the number of replacement trees required to presumptively satisfy the tree canopy requirements of Section 15-319.

1. Enter square footage of the site to which canopy standards apply (15-319(a)): \_\_\_\_\_ sq. ft.
2. Multiply (by 40%, 30%, or 15% depending on the Land Use) x .4, .3, or .15
3. Canopy Required \_\_\_\_\_ sq. ft.  

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 Add:
4. Canopy from existing trees to be retained: \* \_\_\_\_\_ sq. ft.
5. Canopy area of required screening trees, if any: \_\_\_\_\_ sq. ft.
6. Canopy area of required shade trees, if any: \_\_\_\_\_ sq. ft.
7. Subtotal (add lines 4-6) \_\_\_\_\_ sq. ft.

(if line #7 is greater than line #3, then the canopy requirement has been met. If not, go on to line #8)

- |    |  |               |
|----|--|---------------|
| 8. | Enter the difference between line #7 and line #3 | _____ sq. ft. |
|    | Divide line #8:                                  | ÷ 707         |
| 9. | Total number of replacement trees required**:    | _____ trees   |

\*Existing trees retained will be credited according to their actual crown radius on the site as determined by survey or aerial photography.

\*\*The actual number of replacement trees to be planted will be determined as described below.

Trees planted that are generally recognized as canopy or overstory trees are credited with shading 707 sq. ft. (based on a crown radius of 15'). New trees planted within 5' of the lot line are credited for having only half a crown (e.g., new perimeter trees will be credited for 354 sq. ft.). When smaller trees generally recognized as understory trees such as Dogwoods are planted, the credited area will be adjusted downward to 314 sq. ft. for interior trees and 157 sq. ft. for perimeter trees (based on a crown radius of 10').

Section 12. Appendix E-9 (Guide for Planning Shrubs) is amended to read as follows:

#### **E-9 Guide for Planting Shrubs**

Shrubs planted for screening purpose should be given a proper culture and sufficient room in which to grow. Many of the guidelines for tree planting listed in Section E-5 also apply to shrubs. However, because specific requirements vary considerably between shrub types, this Appendix does not attempt to generalize the needs of all shrubs. For detailed planting information on individual species, refer to: Landscape Plants of the Southeast by R. Gordon Halfacre and Anne R. Shawcroft. A copy of this book is available in the Carrboro Planning Department or by contacting Sparks Press, P.O. Box 26747, Raleigh, N.C. 27611.

Section 13. Appendix E-10 (Recommended Trees and Shrubs) is rewritten read as follows:

#### **E-10 Lists of Recommended Trees and Shrubs**

The following lists indicate plants which will meet the screening, shading, and tree canopy replacement requirements of Article XIX of the Land Use Ordinance. Additional desirable aspects of plants are also provided. The lists are not intended to be comprehensive, but rather are intended as guidance for species that are appropriate.

Plants were selected for inclusion on these lists according to two principal criteria: i.) suitability for the Piedmont of North Carolina and support of Piedmont ecosystems and food webs; and ii.) hardiness/tolerance for local conditions and ease of maintenance. When selecting new plantings for a particular site, a developer should first consider the type of plants which are thriving on or near the site. Species native to the Piedmont of North Carolina should be favored. When trees are planted to replace native tree specimens removed, native tree species should always be selected.

Further information on recommended native plants is available from the North Carolina Native Plant Society. The Land Use Administrator has the discretion to not approve of planting plans to comply with Article XIX that substantially deviate from the list provided.

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

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

Section 14. Appendix E-11 (Small Trees for Partial Screening) is amended to read as follows:

The following trees are recommended for use in all types of screens. Though smaller than the trees listed in planting lists E-12 and E-13, each of these trees will reach a height of at least 20 feet. Selections marked with an (\*) are also recommended as shade trees and may be credited for meeting the 35% shading requirement for paved parking lots.

Section 15. The title for Appendix E-15 (Large Shrubs for Evergreen Screening) is amended to read as follows:

**E-15 Large Shrubs and Trees for Evergreen Screening**

Section 16. Appendix E-16 is amended to remove table (F) E-16 Assorted Plantings for Broken Screens.

Section 17. Appendix E-17 (List of Invasive Plant Species) is rewritten to read as follows:

**E-17 Invasive Plant Species**

Invasive plant species identified by the North Carolina Native Plant Society are prohibited from planting for all plantings to comply with Article XIX.