

Landscape Manual for Durham, North Carolina



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Durham City-County Planning Department

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New Editor's Note placed here (date here)

1. Introduction

The information included in this *Landscape Manual for Durham, North Carolina (Landscape Manual)* applies to all new development governed by the permitting process defined in the *Durham Unified Development Ordinance (UDO)**. Property developed or substantially changed under a permit approved by the Durham City-County Planning Department is subject to the Ordinance-based requirements of this *Landscape Manual*. Updates to the *Landscape Manual* will be made on a five-year cycle by the Planning Department after review and approval by the Joint City-County Planning Committee, City Council, and Board of County Commissioners.

A. Application.

The *Landscape Manual* is a compilation of the latest accepted horticultural practices. It is meant to be used by development and design professionals, landscape contractors, individual citizens, and Planning Department staff to maximize the chances for success of newly installed landscape plantings.

B. This *Landscape Manual* will be used by staff to assess proposed Ordinance-required landscape installations. The information is designed as a supplement to landscaping requirements set forth in the UDO. All persons who design or install Ordinance-required landscape material are expected to follow the required parameters of this *Manual*. Failure to follow the required element parameters can result in any or all of the following:

1. Issuance of a stop work order;
2. Failure to be approved for Certificate of Compliance, or
3. Issuance of a Zoning Notice of Violation.

C. Durham is a North Carolina Water-Wise Partner. The *Landscape Manual* incorporates Water-Wise landscaping principles. Specific passages are highlighted with “**Water-Wise Tip**” to emphasize opportunities for efficient use of water within the landscape. The seven principles of Water-Wise Landscaping include:

1. Planning and design;
2. Soil improvement;
3. Practical turf areas;
4. Efficient use of watering and irrigation;
5. Use of mulch;
6. Water-appropriate selection of plant materials, and
7. Appropriate maintenance practices.

D. Durham City and County recognize the need to protect the environment. The “Durham Roadmap to Sustainability” states: “The City has long recognized the need to protect and restore our natural resources and strives to take an ecosystem approach to conserving biodiversity and ecological integrity in our urban environment.” The 2018 “Durham County Sustainability Report” states: “Durham County works hard across various departments to protect and restore the natural systems that improve the quality of life of Durham residents.”

To promote ecologically sound practices, specific passages are highlighted with “**Eco-Friendly Tip**.” Principles of eco-friendly landscaping include:

1. Use of native southeastern plants, which support pollinators (non-native plants do not) and contribute to a functioning ecosystem in many other ways. Sites for native plant recommendations include:
 - a. New Hope Audubon Society:
<https://www.newhopeaudubon.org/wp-content/themes/nhas/library/docs/native-plant-growing-guide-piedmont-nc.pdf>
 - b. NC Native Plant Society:
https://ncwildflower.org/native_plants/recommendations#trees

- c. NC Botanical Garden:
<https://ncbg.unc.edu/files/2019/08/NativePlantsWoody.pdf>
 - d. <https://ncbg.unc.edu/files/2019/08/NativePlantsWildflowersEtc.pdf>
 - e. National Wildlife Federation:
<https://www.nwf.org/nativeplantfinder/about>
2. Avoidance of using invasive plants, which displace the native plants essential to a functioning ecosystem. Invasive plants negatively affect water quality, biodiversity, fish and wildlife habitat, tree cover, and fire risk and costs. Once an invasive plant has naturalized in an area, it is almost impossible to stop its spread. Sites for more information about invasive plants include:
 - a. North Carolina Invasive Exotic Species List:
https://ncwildflower.org/plant_galleries/invasives_list
 - b. Mid-Atlantic Invaders Tool Plant List:
<https://www.invasive.org/midatlantic/>
 - c. A Management Guide to Invasive Plants in Southern Forests:
<https://www.srs.fs.usda.gov/pubs/36915>
 - d. New Invaders of the Southeast:
<https://www.invasive.org/species/list.cfm?id=197>
 3. Use less turf. Lawns consume 8 billion gallons of water daily; 200+ million gallons of gas, 70 million pounds of pesticides, and the same amount of fertilizer as agriculture yearly, resulting in pollution of our air, land, and water.
 4. Landscape in layers—canopy, understory, shrubs, herbaceous layer. Introducing layers of native plants makes more habitat for dwindling plant and animal species and contributes to a wide range of beneficial ecosystem services—replenishing oxygen, sequestering carbon, recharging and filtering groundwater, conserving soil, and moderating weather extremes.
 5. Plan for leaves to be left under trees and shrubs. They are the perfect mulch, are free, they fertilize the soil as they decompose, they provide a place for a large number of beneficial insects to overwinter, and they do not have to be collected by the city, saving time, money, and other resources.
 6. Avoid invasive ground covers. When the ground layer is planted with non-native ground covers such as turf grass and English ivy, a desert is created, preventing important functions from taking place.

E. Coordination with Other City or County Requirements:

There are some plants not listed in the *Landscape Manual* which can be used to meet other City and County requirements. Specifically, plants listed in Section 8.3 of the *City of Durham Reference Guide for Development*, or in Chapters 9 and 12 of the *NC DENR Stormwater BMP Manual*, for use in stormwater best management practices (BMPs) or stormwater control measures (SCMs), but not otherwise listed in the *Landscape Manual*, are not subject to approval through the *Landscape Manual*, and can be used for these specific applications.

2. Landscape Plans

- A. Landscape plans shall be prepared by a person demonstrating knowledge and experience in the field of landscaping or site design such as a landscape architect, landscape designer, landscape contractor, or horticulturist. The landscape plan shall adequately detail the requirements of the UDO and this *Manual*. Plans shall include the following:
1. A plant list or table showing: quantity, scientific names, common names, sizes, and intended uses; and a key that identifies the species of all plant material on the landscape plan. It may also contain notes that further define characteristics of the plant that the designer wants in the plant selection (e.g. “matching specimens”).
 2. The size of the proposed plant material. Sizes of upright shrubs, as described in UDO paragraph 9.2.3C Shrubs, shall be specified by height only. Tree sizes, as described in UDO paragraph 9.2.3B, Trees, shall be shown by caliper or height, as applicable. Container sizes are not allowed to be used in lieu of height and caliper. If provided, a note must be included on the plant list stating that: “Container sizes listed are in addition to the required height and caliper minimums shown.”
 3. The location of all required landscape materials, including trees, shrubs, and structural elements, both existing and proposed.
 4. The planting area (in square feet) proposed to be provided for each tree. The planting area shall meet or exceed the minimum required root growth area for the applicable species listed in [Tables 1A and 1B, Allowed Trees](#).
 5. The location of preserved tree coverage and tree replacement areas, as applicable.
 6. The location of tree protection fences shall be shown on all exterior plans, including landscape, site lighting, grading, and irrigation plans.
 7. The locations of silt fences.
 8. Proposed drives, paving areas, decks, walks, pools, and other man-made structures, elements, and utilities that are to remain or be constructed on the property.
 9. All construction notes and details relating to construction, specific material, and planting procedures.
 10. Demonstration of compliance with the driveway and intersection sight distance triangle requirements in UDO paragraph 12.3.1D, Sight Triangles, and with safe sight distances within parking lots per UDO paragraph 9.8.1C, Standards. Plants located within driveway medians, at the ends of parking lot islands, and within sight distance triangles shall be a species with a maximum mature height of 30 inches, per UDO paragraph 9.8.1C, Standards.
 11. Per UDO paragraph 9.2.5A, Easements, plantings proposed within easements shall be approved by the utility provider. Trees proposed for planting within overhead electrical line (power line) easements shall use tree species approved for use under the power lines by the operating utility. Some of these allowable trees are noted with a “Y” in the “Street Trees - Under Power Lines” column of the “Approved Use Categories” portion of [Tables 1A and 1B, Allowed Trees](#). Specific written permission from the utility operating the easement shall be provided for any trees proposed for planting within overhead utility easements other than those so allowed in the *Landscape Manual*. If an overhead utility is not located within an easement (or a public right-of-way), it is recommended that tree plantings have a minimum setback of 30 feet from the centerline of the overhead utility. If a tree is proposed to be planted within this recommended setback to meet a UDO requirement, only tree species approved for use under power lines should be planted.
 12. Plants should not be placed where they will block or interfere with the operation of site features and utilities. Location of plantings near utilities such as those associated with fire safety, site lighting, water and sewer connections, and electrical access can result in violation of other City and County Code and Ordinance requirements. Therefore, the designer should show the location of all proposed utilities to verify that there are no conflicts with either underground or above-ground utilities. City, County, and State departments and agencies that review site plans will comment on plant location proposals that

violate their design manuals and ordinances. On planting plans, site utilities can be shown as half-toned to make it easier to see the proposed plantings, and their relationship to the utilities.

13. Avoid conflicts between trees and site lighting. Tree shadows can interfere with lighting performance, which could result in a violation of UDO utility requirements. Pruning of the obstructing trees could result in the loss of an Ordinance-required tree, resulting in possible violation of the Ordinance. To avoid such conflicts, the site designer should provide a minimum 10-foot horizontal clearance from the tree-trunk center to the center point of overhead lighting elements. If a fastigiate or columnar tree species is used, the required horizontal clearance can be reduced to a minimum of five feet.
14. Show location of proposed irrigation lines and sprinkler heads (if proposed).

Water-Wise Tip: Shrub, annual, perennial, and turf grass areas have different water requirements. Reduce over-watering by grouping plants with similar water needs into separate irrigation zones.

Eco-Friendly Tip: Native plants are indicated by an “N” in the “Allowed” plant tables. Choose native plants suited to the conditions of the site to increase biodiversity, feed birds and other wildlife, provide nectar for the pollinators all creatures depend on, improve the quality of our woodlands, air, and water, help slow climate change, and provide optimal habitat for beneficial insects, which are crucial to life on earth.

3. Tree Preservation and Care Before and During Construction

A. Tree Preservation

(See paragraph 8.3.2, Protection of Existing Vegetation, of the UDO)

1. Procedures

- a. Per UDO paragraph 8.3.2, Protection of Existing Vegetation, areas of vegetation to be preserved in order to meet Ordinance requirements shall not be disturbed or encroached upon. Allowed activities in “Preserved Tree Coverage” areas are listed in UDO paragraph 8.3.1D.5., Construction in Preserved Tree Coverage Area.
- b. Install tree protection fencing around areas of vegetation to be preserved in accordance with UDO paragraph 8.3.2, Protection of Existing Vegetation. See Figure 4, Tree Protection Fence Detail, for an example detail of tree protection fencing.
- c. The minimum size of the “Tree Preservation Area” shall be the area within the tree protection zone (TPZ) of the tree or group of trees to be preserved. Additional area can be preserved at the rate of 1.25 feet per one inch of diameter at breast height (DBH).
- d. When installing tree protection fencing for preserved trees along a wood’s edge, the fence shall be located at the edge of the TPZ of the outermost-protected trees, and on the wooded side of any silt fencing to be installed in the same location. Using silt fencing, or combining tree protection and silt fencing into one fence, is prohibited for tree protection per UDO paragraph 8.3.2C.
- e. Tree protection fencing, including warning signs as required in UDO paragraph 8.3.2E, shall be installed prior to starting any grading or land disturbing activity.
- f. The location of the tree protection fencing shall be inspected and approved prior to starting any grading or land disturbing activity. For projects requiring a Land Disturbance Permit, call the Durham County Engineering and Environmental Services Stormwater and Environmental Division (919-560-0735), to request that a Sedimentation and Erosion Control Officer visit the site to approve the placement of the fencing.
- g. For projects that do not require a Land Disturbance Permit, contact the City-County Planning Site Compliance staff (919-560-4137) to schedule an inspection of the fencing prior to beginning land disturbing activities.
- h. In order to protect the TPZ of a tree to be preserved, contractors performing grading and other land disturbance activities near tree preservation areas shall perform such activities in accordance with UDO paragraphs 8.3.2D and E.
- i. Trees with more than a third of their roots pruned or removed will be negatively impacted and could die or become unstable, depending on proximity of the construction to the trunk. See UDO paragraphs 8.3.1, Tree Coverage Standards, and 9.3.2, Existing Trees, for the minimum percentages of TPZ required to be protected for specific use applications of preserved trees. If existing trees, which are identified to be preserved in order to meet Ordinance requirements, have more of their TPZ damaged than the required maximum percentages during or after development activities, a revised land disturbance tree survey (see UDO paragraph 8.3.3B, Land Disturbance Tree Survey) and revised site plan shall be required in order to remove those trees from the plan. See Figure 6, Land Disturbance Tree Survey, for an example detail.
- j. Tree coverage calculations, as applicable, shall be adjusted accordingly. The developer shall be required to demonstrate that the amount of required tree coverage area is still being provided, including additional tree coverage areas if required.
- k. Developers, designers, and contractors can contact the Planning Department Site Compliance staff to arrange a site visit for an evaluation of tree protection areas, and permission to remove invasive, damaged, or diseased plant material prior to doing any of these activities.

Water-Wise Tip: Preservation of existing trees is preferable over tree replacement for several reasons:

- Existing trees require no water to become established and can typically be maintained with rainfall.
- Areas of tree coverage absorb rainfall and allow for groundwater recharge on site.
- Undisturbed soils prevent moisture loss that can occur when soils are graded and exposed to air.

Eco-Friendly Tip: Invasive plants negatively affect biodiversity, water quality, fish and wildlife habitat, tree cover, and fire risk and costs. Consult [Table 3, Trees Not Allowed for Ordinance-Required Planting Credit](#), [Table 4, Other Plants Not Allowed for Ordinance-Required Planting Credit](#), and [Table 5, Plants Prohibited for Any Use](#) for noted invasive species and to avoid these plants.

B. Root Pruning Prior to Construction

1. Procedures

- a. Root pruning shall be done on single, existing, City-owned trees (and at the edge of City- or County-owned wooded areas) located near proposed construction prior to the start of land-disturbing activities, where the critical root zone is outside the tree protection zone and will be impacted by grading. No root pruning of a City tree shall occur within six feet of such a tree without the approval of the Urban Forestry Manager.
- b. Cut roots no more than six inches back from new construction. Cuts shall be made to a maximum depth of two feet, with a sharp, vertical cut using an implement that will cleanly cut the root.
- c. Root pruning implements can be anything from a sharpened shovel, loppers, pruning saw, pavement saw, or similar sharp cutting tool. Circumstances and availability will dictate which tools will be best for the pruning application. Most plows, stump grinders, pavement saws, and sharp hand tools are acceptable if the root is cleanly cut, and not mashed or torn.
- d. Backfill with clean, dry soil within eight hours of root pruning. Moisten soil immediately after backfilling.

4. Selection of Plant Material

A. Plant Selection Practices and Plant Tables

1. Plant Tables

- a. As per UDO paragraph 9.2.3, Plant Material Requirements, plant material selections shall be made for Ordinance-required plantings in accordance with the tables provided in this *Landscape Manual*. Plants allowed to be used for Ordinance-required plantings, and generally well-suited to Durham's climate and soil conditions, are listed in [Tables 1A and 1B, Allowed Trees](#), and in [Tables 2A and 2B, Allowed Shrubs](#).
- b. These tables, found at the end of this section, include the category of use locations, such as street trees or parking lots, where trees and shrubs are allowed to be used to meet Ordinance requirements.
- c. The plants in each table are listed in alphabetical order by their accepted horticultural or Latin name. The 2009 edition of *The Manual of Woody Landscape Plants, Their Identification, Ornamental Characteristics, Culture, Propagation, and Uses*, by Michael A. Dirr, was the main source of the plant names listed in these tables. However, plant names change over time, and there may be some differences between the names listed here and in another source; where a more up-to-date name was discovered, it has been included.

1) Plants Not Allowed

Trees and other plants that are not recommended for use due to invasive tendencies, disease, lack of hardiness, or other factors are listed in [Table 3, Trees Not Allowed for Ordinance-Required Plantings](#), and [Table 4, Plants Not Allowed for Ordinance-Required Plantings](#). No landscaping credit is allowed for use of these plant materials. [Table 5, Plants Prohibited for Any Use](#), lists plant species that are recognized by the North Carolina Botanical Garden or by the United States Department of Agriculture Forest Service, Southern Research Station, for their invasive tendencies, and shall not be planted as landscaping for any purpose.

2) Approval of Plants Not in the Tables

Plants not found in any of the Allowed Trees or Allowed Shrubs tables can be approved for use if the proposed plant meets the specific location and use criteria in [Section 4C, Criteria for Determining Allowed Locations for Use of Ordinance-Required Plant Material](#), of this *Landscape Manual*. Additionally, the plant must be suitable for the proposed growing environment, must not be listed as a prohibited plant in this *Landscape Manual* or a plant not allowed for use in this *Landscape Manual*, and must be approved as non-invasive by the City of Durham's Urban Forester. Plant substitutes must be documented for suitability and sealed by a qualified and North Carolina Registered Landscape Contractor or North Carolina Registered Landscape Architect. The required documentation shall be provided to the Planning Director or designee for each such plant proposed for use in an Ordinance-required planting. Recommendations for additions to the Allowed Plant lists can similarly be made to the Planning Director or designee, to be included in periodic updates to the Tables, if the plants are so qualified.

2. Plant Selection Practices

a. Drought Tolerance

- 1) The degree of tolerance of a plant to drought conditions is indicated by the "W" symbol as set forth in the "Established Plant Dry & Soil Tolerance" portion of the Plant Table Key found in [Figure 7, Plant Table Key](#). The designation assigned to each plant is provided under the "Plant

Type” column of the plant tables. Please keep the following in mind when selecting plants for drought-tolerance:

“Most plants prefer a moist, well-drained soil. However, provided a plant is otherwise healthy, has had time to become established (normally one to two years after planting), and is provided appropriate cultural conditions (adequate soil drainage and aeration, mulch, moderate to low fertilization, proper pH, appropriate light level, etc.) those plants indicated as drought-tolerant should be able to survive a moderate period of limited moisture (rainfall, irrigation). Drought-tolerance does not mean the plants prefer hot, dry weather or that they will not be adversely affected by extended dry weather. High temperatures and wind, heat and light reflection from nearby hard surfaces, and high fertilization can increase the potentially damaging effects of low moisture on plant growth and survival. Fall-planted trees and shrubs have demonstrated an increased ability to survive moderate moisture levels compared to those transplanted in the spring or summer.”

Water-Wise Tip: The allowed plant tables highlight drought tolerant plants. This information can be used during the design process to group plants with similar water needs and achieve a landscape that is easy to maintain. Consider site characteristics such as soil drainage and nutrient-holding capacity, preferred sun exposure, and urban conditions when selecting plants.

B. Plant Material Quality Standards

1. Plant Material Quality

- a. Within sight distance triangles, plant material shall meet the requirements of UDO paragraph 12.3.1D.3, Design Standards.
- b. Per UDO paragraph 9.2.3A, Plant Materials, General, the physical characteristics of trees provided to meet Ordinance-required plantings shall be in accordance with *The American Standard for Nursery Stock* (most current edition). Some of these characteristics include:
 - 1) Plants used shall be nursery-grown (unless field harvested on-site and approved with the landscape plan), typical of their species or variety, with normal growth habit, well-developed branch structure, healthy foliage, and vigorous root systems. Plants should be free from defects,

- disfiguring knots, sunscald injuries, frost cracks, abrasions of the bark, plant diseases, insect eggs, borers, fire ants, and all forms of infestation.
- 2) Balled-and-burlapped (B & B) plants shall include the earth in which the plant has been growing and have a diameter meeting the specifications in *The American Standard for Nursery Stock*.
 - 3) Burlapped root balls shall be firm and undamaged from shipping or handling.
 - 4) The burlap used to secure the ball shall be untreated and biodegradable. The top two-thirds of the burlap and wire cage shall be removed upon planting.
 - 5) Plants containing or showing evidence of congestive, strongly circling (“girdling”) roots (indicative of future weak root growth and poor plant performance) shall not be accepted.
 - 6) Trees provided for street tree and parking applications should have straight trunks with an intact single central leader, unless the tree’s natural form does not support a central leader (for example, most flowering trees or Japanese maples), or a multi-stem tree is specified.
2. Trees which have had their branches shortened (sheared), leaders cut, or have damaged leaders requiring repair shall not be accepted.
 3. Plants of each particular variety shall be uniform in size, density, and configuration typical of the particular variety. Plants should have a fully developed form without voids and open spaces, consistent with the age and species of the plant.
 4. Field-collected plants shall not be used to meet Ordinance-required landscaping unless they have been specifically identified on the approved landscape plan, and a qualified plant professional (see [Section 4A, Plant Selection Practices and Plant Tables](#)) certifies the method and performance of their transplanting.
 5. Plants used for Ordinance-required landscaping and tree replacement shall be provided as specified in the plant list on the approved landscape plan. If a discrepancy exists between the number of plants specified in the Plant List and the graphic representation on the plan, the installer should use the number graphically represented on the plan.
 6. Prior to actual installation, plants used for Ordinance-required landscaping should be protected from sun and drying winds and extreme temperatures at all times. Plants that cannot be installed immediately upon delivery to the site should be kept in the shade or covered with burlap to prevent sun scorch.
 7. Plants that remain unplanted for longer than one day should be heeled in (i.e. covered with wet compost, soil, or other acceptable material) and their root ball kept moist by watering. Plants should not remain unplanted on site longer than three days unless a temporary irrigation system is used.

C. Criteria for Determining Allowed Locations for Use of Ordinance-Required Plant Material

The following tables describe the typical criteria used by the Planning Director or designee to determine allowed locations for use of the trees and shrubs found in the plant tables at the end of this *Landscape Manual*. Some plants are allowed to serve more than one use (e.g. both as a canopy tree and as an understory tree) and are, therefore, located within more than one table in the plant list. However, each site is unique, and a designer should consider these criteria, along with the recommendations provided in the tables, when selecting plants for a particular project’s landscape requirements.

1. Allowed Tree Table Category Criteria

Allowed Use/Location Category (Trees)	Typical Criteria for Specific Category of Use/Location
Street Trees, Rural and Suburban (UDO Sec. 9.6, Street Trees)	Trees that need large areas (35 feet minimum) between the street and building(s), especially suitable for use in the Suburban and Rural Tiers (as required).
Street Trees, Urban (UDO Sec. 9.6, Street Trees)	Trees that are adaptable to poor soil conditions and restricted growth areas, tolerant of pollution and possible (road) salt conditions, and tolerant of reflected heat from pavement and building surfaces.
Street Trees, Compact Neighborhood and Downtown (UDO Sec. 9.6, Street Trees)	Trees that are adaptable to urban conditions and smaller planting areas between the street and building(s); especially suitable for use in engineered planting areas and restricted spaces having pavement encroaching on the growing area.
Street Trees, Under Power Lines (UDO Sec. 9.6, Street Trees)	Street trees that meet the above criteria and are approved by Duke Energy Progress.
Vehicle Use Areas (UDO Sec. 9.8, Vehicle Use Area Landscaping)	Trees that tolerate pollution, poor soils, tight growing conditions, and reflected heat and typically have branching starting at six to seven feet above finished grade. Trees that are multi-stemmed or full to the ground shall be planted where their mature size and shape will ensure required sight clearances are provided and maintained, or specified as limbed up to at least six feet above finished grade.
Solid Hedge (UDO Sec. 9.4, Project Boundary Buffers; UDO paragraph 9.7.2C.2)	Evergreen understory trees that are dense, full to the ground, and capable of meeting Ordinance requirements.
Tree Coverage Replacement Areas (UDO Sec. 8.3, Tree Protection and Tree Coverage)	"Replacement" trees that are typically either canopy trees which tolerate some shade and tighter spacing (except where larger areas and spaces are available), or understory trees (usually deciduous) which tolerate shade competition from canopy trees.
Buffers, Constructed (UDO Sec. 9.4, Project Boundary Buffers)	Typically, trees native to the Durham area and generally suited to the growing conditions found within a constructed buffer; trees should be selected for each site based on adaptability to the unique site conditions. Non-invasive, non-native trees suited to the growing conditions within the proposed buffer can also be used.
Buffers, Riparian (UDO Sec. 8.5, Riparian Buffer Protection Standards)	Trees recommended by the North Carolina Ecosystem Enhancement Program (as specified in the Carolina Vegetation Survey Database, http://vegbank.org/) for stream buffer restoration plantings. Plantings must be native.

2. Allowed Shrub Table Category Criteria

Allowed Use/Location Category (Shrub)	Typical Criteria for Specific Category of Use/ Location
Vehicle Use Areas (UDO Sec. 9.8, Vehicle Use Area Landscaping)	Shrubs that tolerate pollution, poor soils, reflected heat, and tight spaces. Recommended shrubs shall be planted where the mature shrub size and shape will allow required sight clearances to be provided and maintained.
Sight Distance Triangles (UDO paragraph 9.8.1C.6)	Shrubs less than 30 inches in height at maturity, or easily maintained at that height while also maintaining all of the natural characteristics of the plants' form, leaves, and structure. These shrubs can be planted where safe sight clearances within parking lots, and at driveway and street intersections, are required.
Under Tree Coverage (Shrubs are not required in tree coverage areas per the UDO. However, shrubs in this category can be planted under tree coverage to also meet other Ordinance required landscaping, such as in buffers)	These species are adaptable to shade conditions and to competition with trees and can be used in tree coverage areas that serve to fulfill multiple Ordinance requirements. Similar to constructed buffers, shrubs should be selected for each site based on adaptability to the unique site conditions.
Solid Hedge (UDO Sec. 9.4, Project Boundary Buffers; UDO paragraph 9.7.2C.1)	Evergreen, understory trees (or large evergreen shrubs with mature heights of at least eight feet) that are dense and full to the ground.
Buffers, Constructed (UDO Sec. 9.4, Project Boundary Buffers)	Shrubs native to the North Carolina Piedmont region and generally suited to the growing conditions found within a constructed buffer; shrubs should be selected for each site based on adaptability to the unique site conditions. Non-invasive, non-native shrubs suited to the growing conditions within the proposed buffer can also be used.
Buffers, Riparian (UDO Sec. 8.5, Riparian Buffer Protection Standards)	Shrubs recommended by the North Carolina Ecosystem Enhancement Program (as specified in the Carolina Vegetation Survey Database, http://vegbank.org/) for stream buffer restoration plantings.

5. Successful Groundcover, Shrub, and Tree Installations

A. Site and Soil Preparation

1. For Ordinance-required tree planting, see [Figure 1, Required Tree Planting Detail](#).
2. Provide tree protection fencing (see [Figure 4, Required Tree Protection Fence Detail](#)) to protect any existing trees, shrubbery, and planting beds in the planting area.
3. Create plant beds of the size and location shown on the approved site plan.
4. Where several plants will be spaced close together, they should be planted in one larger bed to allow for sharing of root space and amendment of all the soil in that bed. All groundcovers and container shrubs should be planted in a shrub bed (see [Figure 3, Recommended Shrub Planting Detail](#)). Balled and burlapped material, or large container material, can be planted in individual planting holes, provided the area surrounding the holes is supportive of root growth. The planting area should be wide enough to accommodate all roots without crowding and contain nutrient-rich, friable soil.
5. Dig all planting holes a minimum three times the width of the root ball in highly compacted or clay soils, or two times the width of the root ball in all other soils, with a minimum of nine inches on each side of the root mass or ball for shrubs and 12 inches for trees. Tree planting holes should be wider at the top with tapered sides. This can be accomplished by digging with a large auger to the required depth, and then breaking down the sides with a shovel to eliminate glazing, transferring the material to the low side of the slope and creating the preferred slope. The sides of the pit must be scarified. Avoid creating smooth or “glazed” sides of the pit. The bottom of the hole should be flat and firm to prevent settling; do not dig or scarify the bottom of the planting hole.
6. For street trees proposed to be planted within a street right-of-way, see [Figure 2, Tree Planting within Right of Way Detail](#), for recommended planting practices if no planting detail is provided on the approved Landscape Plan. Contact the City’s Urban Forester for more details on procedures for planting trees within City street rights-of-way, when applicable. Contact the City Transportation Department or NCDOT, as appropriate, about requirements for encroachment agreements.
7. After digging plant holes, confirm positive drainage by filling with water and allowing it to percolate out before setting trees and shrubs. The hole should completely drain within 24 hours. If drainage is a problem, document solutions in writing.
8. Install a sufficient quantity of planting mix to replace the removed topsoil and to fill the hole. The replacement soil should be the following planting mix, unless otherwise specified: 10%-30% red clay, 30%-50% silt, 30%-45% coarse sand, 1.0 mm to 0.5 mm in diameter, maximum 5% organic material such as completely decomposed compost or humus. The acidity range of the plant mix should be pH5.5 to pH6.7. The planting mix should have the following nutrients at the specified percent base saturation: calcium at 55% to 80%, magnesium at 10% to 30%, and potassium at 5% to 8%.
9. To protect existing turf areas that will remain after completion of the project, bridge-over traffic areas with sheets of plywood, and cover non-traffic areas with tarps. Turf protection should be removed immediately as work is completed or at the end of every workday, whichever is shorter.
10. Remove all vegetation from the top three inches of the planting area for both planting beds and plant holes.
11. If native soil is to be used in lieu of replacement planting mix, remove all non-organic matter, stones 2” diameter, trash, and large woody material (over 2” diameter). Test the soil to determine what nutrients may be needed and in what amounts. Amend with organic matter (not to exceed 5% by volume) and other nutrients according to the soil test, at the rates specified on the packages or in accordance with [Section 5C, Fertilizing and Liming Shrubs and Trees](#).

B. Plant Installation

1. Plants installed to meet Ordinance requirements shall be alive and healthy at site inspection. They shall remain alive and healthy, and actively growing and thriving, during the life of the development and for

one year afterwards. Trees shall be planted according to [Figure 1, Required Tree Planting Detail](#). Dead or missing plants will result in UDO violations, requiring replacement of the dead and missing plant materials.

2. Prior to planting, remove trees, groundcover, and shrubbery from their containers. If their root balls are pot-bound (contain strangling or girdling roots), correct the roots and scarify the ball before installation.
3. For container grown trees, the root collar must be exposed and circling roots must be corrected. Shave about one to two inches off the outer edge and bottom of the root ball, then slice into the root ball, radially (like spokes of a wheel) staying about three inches away from the trunk. All girdling roots must be removed.
4. Set plants upright, plumb, and oriented to provide the best appearance and relationship to the viewer, each other, or adjacent structure.
5. No soil, mulch, stone or other materials shall cover the root flare of trees or shrubs. Landscape fabric is not permitted around trees or shrubs.
6. Soak all container plants with water before removing them from their containers to keep the plant moist and healthy during the planting process. Plant trees approximately one inch above finished grade. Then place one inch of quality soil across the hole and the planting bed, per planting details. Do not place backfill soil against the stems or trunks of plant material. Use large equipment as needed to properly set trees in pits. Do not bend the trunk or use the trunk as a lever to move the tree ball in the pit. This practice can damage the root system or cause the roots to become detached from the tree, which can kill the tree.
7. Backfill around the root ball of container plants, being careful not to pack tightly, but filling in all air pockets. Do not use muddy or frozen mixtures for backfilling.
8. Take extra care to adequately backfill B & B plants. Backfill and firm the soil around the bottom eighth of the root ball. Cut away the ball ties, the top two-thirds of the wire basket, and the exposed burlap. Do not remove the burlap from under the root ball. Backfill one-half of the remaining hole with the specified planting mix and water thoroughly. Backfill the rest of the hole with the specified planting mix; tamp down lightly to eliminate air pockets, but do not pack tightly.
9. Mulch with one to two inches of mulch (undyed, composted hardwood mulch is recommended). See [Section 5F, Mulching Trees and Shrubs](#).
10. The use of landscape fabric is not permitted. It has been shown to inhibit air, water, and nutrient movement to the soil and roots, resulting in poorly performing plantings. It has also been demonstrated that weed growth is only marginally diminished for one season at most.
11. Water all plants immediately after planting. See [Section 5D, Watering Shrubs and Trees](#), for more on watering.

Water-Wise Tip: New plantings should be watered deeply and thoroughly with a low-pressure water-dispersing device within the drip line of the plant.

C. Fertilizing and pH Adjustment for Shrubs and Trees

A soil test must be performed prior to the addition of any fertilizer, lime, acidifier, or phosphorous product. Only add these soil modifying chemicals based on rates dictated by a soil test.

1. First determine the soil texture and infiltration rate. Addition of pine bark humus (<1/2" diameter), fully composted leaf mold, or small pea gravel to clay soils, at a rate no more than 15% by volume, will help improve drainage. This will increase supply of both water and oxygen to the plants. Peat moss, sand, hardwood bark, sawdust, wood chips, or pine straw are not recommended as amendments to clay soils. Addition of these amendments can also help to raise the bed, which will both improve drainage and look

more attractive. Pine bark humus, composted leaf mold, or peat moss will improve water retention in sandy soils if added at a rate no more than 25% by volume.

2. Without a soils test, application of fertilizer could be detrimental to the landscape. Over-application or application of unneeded materials is not cost-effective, can result in chemical injury to plants and nutrient imbalances unsuitable for plant growth, and is environmentally unsound.

Water-Wise Tip: Over-fertilization can also lead to increased nutrient discharge into the groundwater and surface runoff.

Eco-friendly Tip: Consider using organic fertilizers. They contain important secondary and trace nutrients; improve soil texture, aeration, and drainage; provide slow-release nutrition; and are environmentally friendly. Native plants require little or no fertilizer.

3. Nitrogen, phosphorous, and potassium are the main nutrients tested. Calcium or magnesium may also be needed, if indicated by the soil test. Adding too much calcium will inhibit the absorption of potassium and magnesium, and many sources of calcium raise soil pH. If calcium is low, but a pH change is undesirable, gypsum can be incorporated into the soil prior to planting according to package directions.
4. Fertilizers should be of a slow-release variety. It is better to apply them more often during the growing season than to apply once for the entire year, since plants will not be able to absorb all the nutrients, which is not cost-effective. Typically, it is not recommended to fertilize at planting.

Water-Wise Tip: Withhold fertilization during times of drought. Nutrient application stimulates growth and increases water needs.

5. After using a soil test to determine what soil amendments (fertilizer, lime, etc.) are needed, incorporate recommended amendments uniformly in the top six to eight inches of the native soil using a rototiller prior to planting. If replacement soil is used, amendments should be mixed into that soil prior to filling around plant materials.
6. Where several trees or shrubs will be planted together in the same planting bed, soil amendments should be spread uniformly over the entire bed.
7. Do not wash loose soil amendments into stormwater inlets, as they can be highly damaging to streams. Be careful to sweep up and remove any stray nutrients that might otherwise be washed into stormwater inlets, to avoid pollution. Washing nutrients off hard surfaces without collecting them flushes the debris into the storm system, and eventually into the riparian system and water-supply lakes. Be careful when applying nutrients around water bodies, and do not to add nutrients directly into any body of water.

D. Watering Shrubs and Trees

1. Be sure water is free from oil, acids, salts, herbicides, or any other substances that are toxic or harmful to vegetation.
2. Water container plants thoroughly before removing from their containers to keep the plants moist and healthy during the planting process.
3. Water all plants immediately after planting. To water thoroughly, saturate all backfill in beds during the same day of planting. Apply water at low pressure to avoid soil erosion and injury to roots. Use of a water-dispersal device such as a watering wand is recommended to enable efficient and even water application to all parts of the root ball. Make sure plants are level and the top of the root ball does not sink below existing grade once they are watered and fully settled.
4. Thoroughly soak the tree root ball and adjacent prepared soil several times during the first month after planting and regularly throughout the following two summers.
5. Individual watering bags are recommended, especially when trees are planted in the warmer months. These watering bags need to be maintained, checked for leaks, kept full, and removed when damaged or no longer needed. The use of anti-desiccant is discouraged.

E. Irrigation (as Applicable)

It is not a requirement to have an automated irrigation system to maintain Ordinance required plantings.

1. Any automated irrigation system must be installed per regulations provided under North Carolina General Statute 89G.
2. The City of Durham regulates water usage in accordance with the Code of Ordinances, City of Durham, North Carolina (Durham City Code), Sections 70-554 and 70-555.
3. The City of Durham, under varying drought conditions, can enact water shortage response requirements that restrict the amount and frequency of water usage in accordance with Durham City Code Section 70-566.

F. Mulching Shrubs and Trees

1. All trees must be mulched to protect the roots and reduce the erosion of soil and nutrients from the planting beds. The mulch should not contain any trash or weed seeds.
2. Mulching must be performed within a week of installation.
3. No materials, mulch or otherwise, shall cover the root flare of trees or large shrubs.
4. Pine straw shall not be used as mulch or groundcover within ten feet of any structures consisting of exterior combustible construction, and shall conform to the requirements established in Chapter 46, Public Safety; Article III, Fire Prevention and Protection, Division 2, Fire Prevention Code; and Section 46-87, Use of Pine Straw Mulch, of the Durham City Code.
5. The use of dye mulches and shredded pallets for mulch is not allowed
6. Shredded, composted hardwood (triple, or double cut) is preferred as mulch. Pine straw may be used where a less formal finish is desired, such as in natural areas, subject to Fire Prevention Code restrictions.
7. Stone mulches may compact and decrease moisture to new plantings while reflecting heat and should be limited to unique site conditions where other mulches cannot be used. The site design must provide justification for utilizing stone mulches.
8. Apply mulch in a one- to two-inch layer within two days of planting. The use of landscape fabric is not permitted.
9. Mulch should not be applied closer than six inches to the trunk of a tree or against the main stems of shrubs. In all cases, mulch should not touch the trunk of trees or main stems of shrubs. After watering, rake mulch to provide a uniform, finished surface.

Water-Wise Tip: Mulching regulates soil temperature, decreases soil water loss from the root ball, and lessens weed growth. Weed control is important because weeds compete with trees and shrubs for moisture. Weed control fabric is not allowed because it can slow down water, air, and nutrient absorption into the root ball.

G. Staking Trees

1. Trees may only be staked to address specific site concerns such as high wind or slopes. Staking shall not be used to correct improper planting or cases where roots have been separated from the trunk. The stakes shall be removed after one growing season.
2. When staking a tree, the ties must be loose enough to allow the tree to move and flex slightly.
3. Staking for support is generally not needed for large (between 2 1/2-inch to 6 inch caliper) B & B trees if the tree is planted using the methods described in this *Landscape Manual*.
4. Do not stake trees less than two inch caliper and shrubs less than eight feet in height unless they were planted as bare-root specimens, or if they were planted in situations indicated below.
5. Under unusual conditions (such as high winds, steep slopes, etc.), staking may be desirable to stabilize the tree. It is recommended that the installer discuss proposed staking with the Planning Site Compliance Inspector. In these cases, it is recommended to stake the trees using two 1" x 2" x 18"

minimum size wood stakes on opposing sides of the tree, perpendicular to the prevailing wind direction. Drive anchors into undisturbed soil and never through the root ball. Loosely loop individual, flexible straps, or rope fed through sections of nylon or jute strapping, around the trunk to prevent damage to the bark. Do not tie strapping directly onto the tree trunk.

6. The stakes should offer support, but also not bind or bend the tree, because flexibility of the trunk is essential for its future growth and development. Generally, after the first growing season, the tree will be able to support itself and stakes should be removed.

H. Pruning Techniques for Trees

Trees shall not be pruned at the time of planting, unless to remove dead, diseased or significantly damaged branches. Trees may also be pruned to address site conflicts, as long as less than 10% of the total tree canopy is removed at the time of planting.

At no time may trees be “topped,” as defined by the International Society of Arboriculture.

The following is applies for trees that have reached the end of their warranty establishment period:

1. Remove water sprouts.
2. Remove crossing branches that rub against other branches. The rubbing weakens the growth of both branches.
3. Remove branches that grow at a sharp angle to the trunk. The sharp angle is a weak angle of attachment and may cause a weakened limb to split from the trunk, or cause rot by giving water a place to collect.
4. Remove parallel branches (those branches which attach to the trunk one above the other within inches up the trunk).
5. For street and parking lot trees, prune out the lower limbs of the tree to increase the height of the crown while respecting the form of the tree and keeping within the 2/3 crown to 1/3 trunk ratio. Repeat as necessary over time to reach the required eight-foot minimum clear areas in sight distance triangles, or the 84-inches minimum recommended clear area for trees in pedestrian access areas, or the 13-foot clear areas recommended over roadways or vehicular access areas.
6. Remove any branch competing with the central leader (single-stemmed trees only). If left on the tree it may cause the development of two leaders, and waste available growth energy. Later, as each leader gets larger, the fork may split and damage the tree.
7. Remove any dead or broken branches.
8. Pruning should be performed in compliance with *ANSI Standards for Tree Care Operations: Tree Shrub and Other Plant Maintenance – Standards Practices (Pruning)*.
9. Avoid improper pruning practices (which are any pruning techniques which cause injury, reduce health and vigor, or increase risk of future failure) such as the following:
 - a. For deciduous trees, improper practices include, for example:
 - 1) “Topping,” which is the removal of the central leader or the shortening of branch ends through the application of inter-nodal cuts;
 - 2) “Vista pruning,” which is the arbitrary removal of limbs to open the view over or under a tree’s canopy, and
 - 3) “Shearing,” which is the reduction of a tree’s overall profile to a pre-determined shape.
 - b. For deciduous shrubs: the removal of more than a third of healthy growth.
 - c. For evergreen trees and shrubs: the removal of more than a third of growth.
 - d. For all trees and shrubs: the use of tools that leave uneven or broken cuts or wounds.
 - e. The use of climbing spikes, irons, or gaffs is discouraged (and not permitted on City-owned trees), unless the tree is being removed.

I. Turf

1. Tall fescues, including Kentucky 31™, are not allowed for use in Ordinance-required revegetation of disturbed stream buffer and floodplain areas, and in areas draining into streams or wetlands, due to their invasive nature under wet growing conditions. See [Table 4, Plants Not Allowed for Ordinance-Required Plantings](#).
2. A seeding schedule for re-vegetating areas in floodplains and stream buffers disturbed during utility, stormwater facility, and road construction activities shall be provided on site plan landscape and utility sheets. The schedule shall include, at a minimum, the scientific and common names of the plants being installed, the type of plant material (seed, sprigs, plugs, sod, or other), the appropriate season during which the material can be successfully applied, and the rate (amount per area) of plant material to be planted.
3. Prior to adding soil amendments, installers are required to obtain a soil test. Phosphorous and lime may not be added to a turf location without a soil test dictating the needed application rates.
4. See [Section 5J, Native Grasses](#), below, for information about planting native grasses in lieu of tall fescues.
5. Winter cover crops are often specified if the prime season for planting of permanent grasses has not arrived when turf must be planted. Winter rye grain (not ryegrass) and barley are favorable for this use.
6. At the time of turf installation, fine-grade the surface relatively smooth and with a maximum of one-foot vertical to three-foot horizontal difference in elevation.
7. Incorporate lime and fertilizer in accordance with soil tests and the rates specified on the package, in the top six to eight inches of the soil using a rototiller, being careful to sweep up any nutrients that land outside lawn areas on pavement or other surfaces that drain to water bodies or stormwater inlets.
8. Remove all rocks larger than one-half-inch in size and other debris.
9. Use a rake to create a smooth and level bed, free of hollows and depressions, and soil particles no larger than pea size.
10. Water to settle the soil and rake again to break the crusty surface before seeding.
11. Seed can be applied with asphalt tack. If not applied with asphalt tack, weed-free straw or other erosion control measure should be applied to the seeded area within hours after seeding, and before any heavy rains or high winds.
12. Take precautions to keep vehicle and foot traffic off of seeded areas until after the first mowing.
13. Best practices for sod installation:
 - a. Spread four inches of topsoil and cultivate entire area to a depth of four to six inches.
 - b. Spread lime and fertilizer over cultivated topsoil (as per specifications on package and the results of soil testing) and hand rake to a smooth finish grade. As with seeding, be careful to sweep up any lime or fertilizer landing on pavement or other surfaces that drain to water bodies or stormwater inlets to minimize pollution.
 - c. Thoroughly water area to be sodded prior to installation.
 - d. Lay sod, roll, and water thoroughly.

Water-Wise Tip: Using warm season turf grass varieties in appropriate locations can decrease watering. In the design phase, avoid small areas of turf grass, such as parking lot islands, which have excessive water requirements and can be difficult to maintain.

Water-Wise Tip: Water during pre-dawn hours for optimal moisture absorption and disease control, but avoid over-saturation, which can lead to excessive surface runoff. Avoid over-fertilization, especially in times of drought.

J. Native Grasses

1. Designers are encouraged to use native grasses (in lieu of tall fescues or bermuda) on the outside of stream buffer strips, where stream buffers are disturbed (e.g. for road or utility crossings), and in any areas that drain to wetlands or streams.
2. Establishment of native grasses requires proper timing and bed preparation. Often a cover crop of barley or other non-invasive temporary legumes or grasses is used until the spring planting season. The following native grasses can be used in place of tall fescue (all are warm season grasses and perennial). Most have fall color, are drought tolerant, persist through the winter, and only need cutting once a year in the spring:
 - a. *Andropogon gerardii* – Big Bluestem – clumping, not tolerant of wet soils, taller than little bluestem. Use 10-12 pounds of pure live seed (about double bulk seed). Seed from April 15-May 30. Recommended soil pH is between 5.4 and 6.2.
 - b. *Panicum virgatum* – Switchgrass – useful in both wet and dry areas, good for erosion control and re-vegetation of large areas, but does poorly on heavy soils. Need to completely eradicate competing grasses and weeds for best survival. Some available varieties include ‘Blackwell,’ ‘Heavy Metal,’ ‘Alamo,’ ‘Kanlow,’ and ‘Shelter.’ These grasses perform best with a soil pH of around 5.0. These grasses can be drill-seeded on large acreage and can be broadcast on smaller plots at 5-10 pounds/acre depending upon the seed (live or bulk). A rate of 10 pounds/acre conventional planting (live seed) is recommended; eight pounds/acre drilled. Do not use nitrogen at seeding time, because it will stimulate weed growth. Phosphorus and potassium should be applied according to soil tests before or at seeding.
 - c. *Pennisetum glaucum* – Brown Top or Pearl Millet – fast-growing, robust, annual grass with good drought-tolerance. Good for warm season soil stabilization.
 - d. *Schizachyrium scoparium* – Little Bluestem – clumping, not tolerant of wet soils. Use 10-12 pounds of pure live seed per acre (about double bulk seed). Seed from April 15-May 30. Recommended soil pH is between 5.4 and 6.2.
 - e. *Tridens flavus* – Purple-Top – dry areas best. Seed in the springtime. Use 10-15 pounds of pure live seed per acre for drill seeding. Broadcast seeding should be 20-25 pounds of pure live seed per acre.
 - f. *Sorghastrum nutans* – Indian Grass – rhizomatous, perennial, native, warm-season bunchgrass. Best in deep, well-drained floodplain soils, but tolerant of poor conditions from sand to clay. Plant after last threat of frost, but before heat of summer (late April and May). Broadcast 10 pounds of pure live seed per acre (or drill 6-8 pounds/acre), pack after seeding. Best in moist but firm seedbed. Hold off nitrogen until after well-established; pH-adaptable.
3. Annual winter cover, if needed, should be planted in early to late fall at the rate of 50-60 pounds/acre if drilled, or 60-100 pounds/acre broadcast. Winter rye or rye grain (not rye grass) (*Secale cereale*, *S. cereale abrosses*, *S. cereale* ‘Winter Grazer 70’) or barley (*Hordeum vulgare*, *H. jubatum*, *H. murinum*, or *H. pusillum*) are recommended until ground is warm enough to plant with permanent cover.

6. Glossary

Term	Definition
Allelopathic	Suppression of growth of one plant species by another due to the release of toxic substances.
Annuals	Flowering plants used to provide seasonal color and interest. Their root stock dies in winter, therefore annuals need replanting each growing season. Annuals are often referred to as “bedding plants.”
Asphalt Tack	A slurry of nutrients, seeds, and asphalt that is used to apply grass seed, with the purpose of efficiently-distributing seed and mulch in a single application.
B & B	Abbreviation for “balled and burlapped” plants, as sold by a nursery. See UDO Section 17.2, Abbreviations.
Caliper	See UDO Section 17.3, Defined Terms, for definition and specifications.
Canopy	The branched portion of a tree or forest.
Canopy Cleaning	A recommended pruning technique involving the removal of dead or broken limbs of canopy trees in order to reduce potential risks.
Canopy Reduction	A recommended pruning technique involving the removal of carefully selected limbs back to appropriate lateral junctions to reduce the size of a tree’s canopy.
Canopy Restoration	A recommended pruning technique involving the removal of all or a portion of damaged, weakly-attached, or structurally compromised limbs, while leaving appropriate, healthy, lateral junctions to restore a tree’s canopy after it has been subjected to storm damage or improper pruning.
Central Leader	A primary or terminal shoot, i.e., the trunk of a tree.
Chlorosis or Chlorotic	A condition in which a plant’s leaves do not produce sufficient chlorophyll, resulting in pale, yellow, or yellow-white leaves; usually caused by a combination of factors including lack of vital nutrients or unsuitable growing conditions for the species. ¹
City Tree	Any tree living on property owned or maintained by the City of Durham, including those in City-managed rights-of-way.
Common Name	A non-scientific plant name used commonly by the citizens of a given region or country. ¹ The same plant may have many different common names. A trademark name, either registered (®) or unregistered (™), is often used as a plant’s common name. The common names used in this <i>Landscape Manual</i> are typical for each plant but may not include all local common names for a specific plant.
Cultivar	A cultivated variety ¹ of a plant species. See “Scientific (Latin) Name” for more detail on how these are usually listed.
Cut	Exposed wood area that remains after a branch has been removed.
dbh	Diameter-at-breast-height. See UDO Section 17.3, Defined Terms.
Deciduous	Plants that annually lose their leaves; literally “falling off.” ¹
Deciduous Canopy Tree	See UDO paragraph 9.2.2, Basic Plant Types, for definition and specifications. See Table 1A, Allowed Deciduous Trees of this <i>Landscape Manual</i> .
Deciduous Understory Tree	See UDO paragraph 9.2.2, Basic Plant Types, for definition and specifications. See Table 1A, Allowed Deciduous Trees of this <i>Landscape Manual</i> .
Dormant	A condition of non-active plant growth. Deciduous trees and shrubs are considered to be dormant from the time their leaves fall until new foliage begins to reappear
Ecosystem	A complex or community of organisms and its environment.
Evergreen	Plants that retain green or live foliage throughout the year.
Evergreen Canopy Tree	See UDO paragraph 9.2.2, Basic Plant Types, for definition and specifications. See Table 1B, Allowed Evergreen Trees of this <i>Landscape Manual</i> .
Evergreen Understory Tree	See UDO paragraph 9.2.2, Basic Plant Types, for definition and specifications. See Table 1B, Allowed Evergreen Trees of this <i>Landscape Manual</i> .

Term	Definition
Exotic	For this <i>Landscape Manual</i> , plants that are not generally considered native to Durham or the Piedmont region of North Carolina.
Fastigate (Form)	Branches erect and close together ¹ ; narrow and upright.
Friable Soil	Soil that is capable of sustaining plant growth by virtue of its pH, relative rate of compaction, organic content, particle size, positive drainage characteristics, and pore space distribution. “Native” undisturbed soils generally fall under this description; developed, disturbed, or degraded sites where topsoil has been removed generally require remediation to attain this designation. See Section 5C, Fertilizing and Liming Trees and Shrubs , of this <i>Landscape Manual</i> for further definition and specifications.
Ground Cover	See UDO Section 17.3, Defined Terms, for definition and specifications.
Herbaceous	Plants that die back to the ground each winter.
Height, Plant	Height for all plants is measured from the ground level at the base of the plant to the average height of the top branches of the plant, and not to the longest or tallest branch. For plants in containers, plant height does not include the height of the container.
Invasive Plant	A non-native species whose introduction does, or is likely to, cause economic or environmental harm, or harm to human health. Unless otherwise indicated, cultivars of invasive plants are also considered to be invasive.
Landscape Plan	Typically, a component of a site plan or preliminary plat, a landscape plan shows types, species, names, numbers, sizes, and locations of materials to be planted or preserved. See also UDO Section 3.7, Site Plan Review.
Limb-Up or Lift Up	Removal of lower branches for under-clearance, typically to allow for free passage of pedestrians and vehicles, or to improve sight distance. This procedure can also be used to change a large shrub into a tree-form plant.
Native	With respect to a particular ecosystem, a species that historically occurred or currently occurs in that ecosystem, rather than a species introduced more recently into that ecosystem. For the purposes of this <i>Landscape Manual</i> , native trees in Tables 1A, Allowed Deciduous Trees and 1B Allowed Evergreen Trees , are those that are generally considered native to Durham County. Native shrubs in Tables 2A, Allowed Evergreen Shrubs and 2B, Allowed Deciduous Shrubs , are generally considered native to the Piedmont region of North Carolina. Cultivars and clones of a native species, unless crossed with non-native species, are also considered to be native for the purpose of this <i>Landscape Manual</i> .
Ornamental Grasses	Herbaceous plants, which may be perennial or annual. They are typically used to provide color and textural interest. Ornamental grasses are not allowed for credit in Ordinance-required plantings.
Perennials	Flowering herbaceous plants whose root stock survives the winter. They are typically used to provide color/textural interest. Perennials are not allowed for credit in Ordinance required plantings.
Pruning	Removal of branches from live trees or shrubs for a specific purpose.
Riparian	Related to, or living or located along, the bank of a surface watercourse, such as a stream or river.
Tree Protection Zone (TPZ)	See UDO paragraph 8.3.2, Tree Protection and Tree Coverage, and Section 17.3, Defined Terms, for dimensional standards and definition.
Sample Area	See UDO paragraph 9.3.3, Sampling, for definition and requirements; and Figure 5, Sample Area Example , for one graphic representation example of the required information.
Scars (or Injuries)	Natural or man-made lesions of the bark ¹ in which wood is exposed.
Scientific (Latin) Name	An accepted, international method of scientifically naming plants for horticultural and botanical plant classification. The Latinized scientific name is called the “species” and consists of two parts: the plant genus and the specific identifier ¹ (e.g. <i>Acer rubrum</i> , or <i>A. rubrum</i> if already listed as an <i>Acer</i>) and is italicized. In this example, <i>Acer</i> identifies the plant as belonging to the Maple genus. The second name often indicates an identifying characteristic. In this case <i>rubrum</i> means “red” so it is easily recognized as a Red Maple (the tree’s common name), although that is not always the case. Botanical variety (var.), subspecies (subsp.), forma (f.), cultivar (‘Cultivar Name’) and hybrids (x) are listed as needed to differentiate between specific plants. Trademark names may be registered (®) or unregistered (™), and the trademarked plant is often also known by its cultivar name.

Term	Definition
Semi-Evergreen	Plants that usually retain green or live foliage through mild winters but may lose their foliage during colder ones.
Shrubs	See UDO paragraph 9.2.2, Basic Plant Types, for definitions and specifications. See Tables 2A, Allowed Evergreen Shrubs and 2B, Allowed Deciduous Shrubs , of this <i>Landscape Manual</i> .
Species	A group of organisms, all of which have a high degree of physical and genetic similarity, generally interbreed only among themselves, and show persistent differences from members of allied groups of organisms. ¹
Specimen Tree	See UDO paragraph 8.3.5, Major Specimen Trees, and Section 17.3, Defined Terms, for dimensional requirements and definition.
Stolon	A horizontal branch from the base of a plant that produces new plants from buds at its tip or nodes (as in the strawberry or bamboo) —also called a runner. ²
Stoloniferous	Bearing or developing stolons ² as a means of spreading and propagation.
Suckering	Sending out shoots from the base of a plant ² as a means of spreading to form colonies of the plant.
Variiegated	Leaves that are striped, margined, or mottled with a color other than green, where green is normal. ¹
Water Sprouts	Vertical sprouts or shoots which grow up through the middle of the tree or shrub, usually from the base. ¹
Water-Wise Landscaping	Landscaping for the efficient use of water. Based on the original seven principles of Xeriscape™.
Weeping (Form)	A conspicuously drooping, pendant ¹ form, usually of a tree or shrub.

¹ After Dirr, Michael A., *Manual of Woody Landscape Plants, Their Identification, Ornamental Characteristics, Culture, Propagation and Uses*, Sixth Edition. Champaign, IL: Stipes Publishing Company, Revised 2009.

² The Merriam-Webster Unabridged Dictionary, <http://www.merriam-webster.com/dictionary/>.

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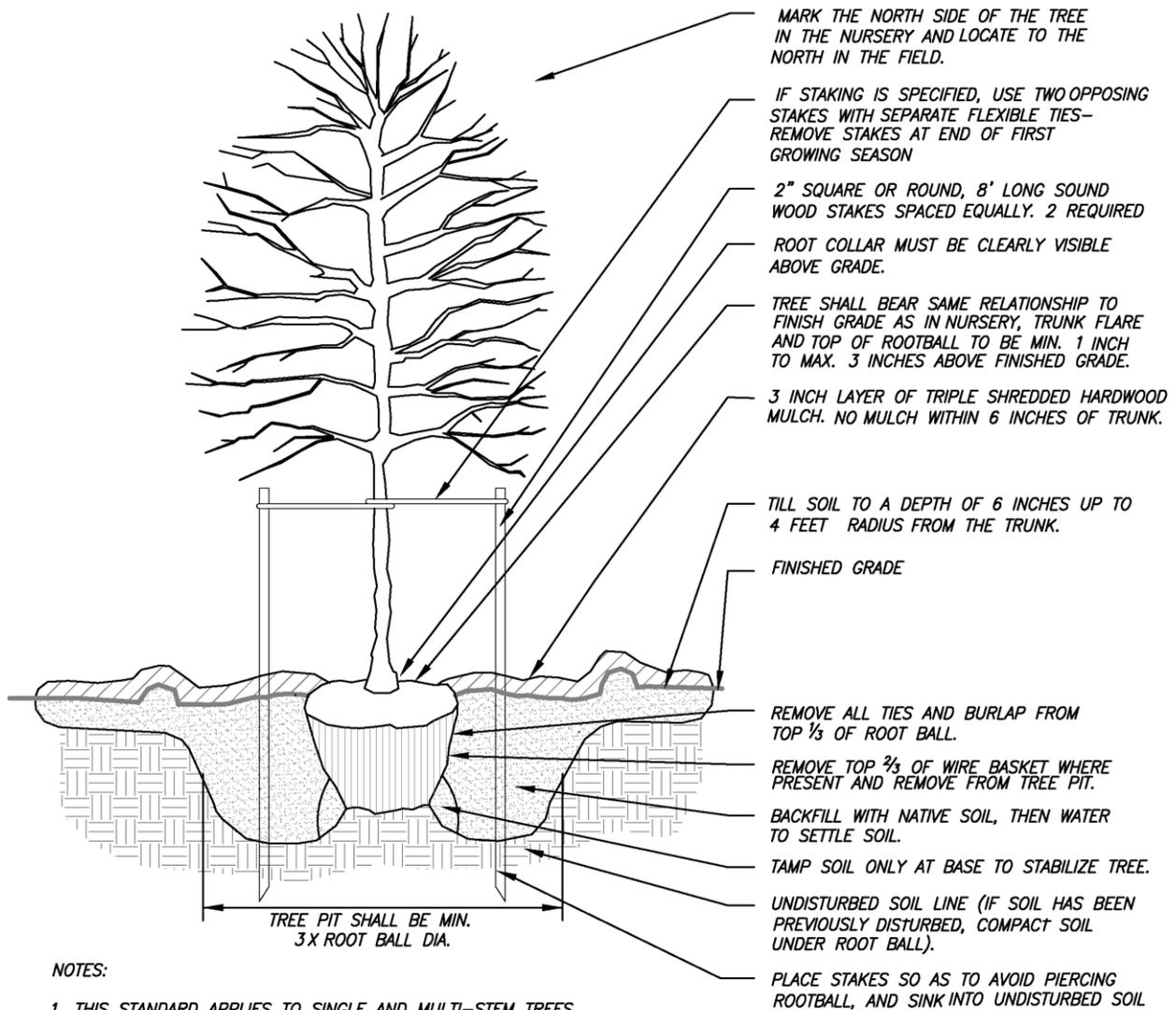
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***Special thanks to Trees Durham, New Hope Audubon Society, and Dr. Barbara Fair (N.C. State Horticultural Science) for contributing to the Recommended Practices sections of the 2020 *Manual* revision.

Figure 1: Required Tree Planting Detail



NOTES:

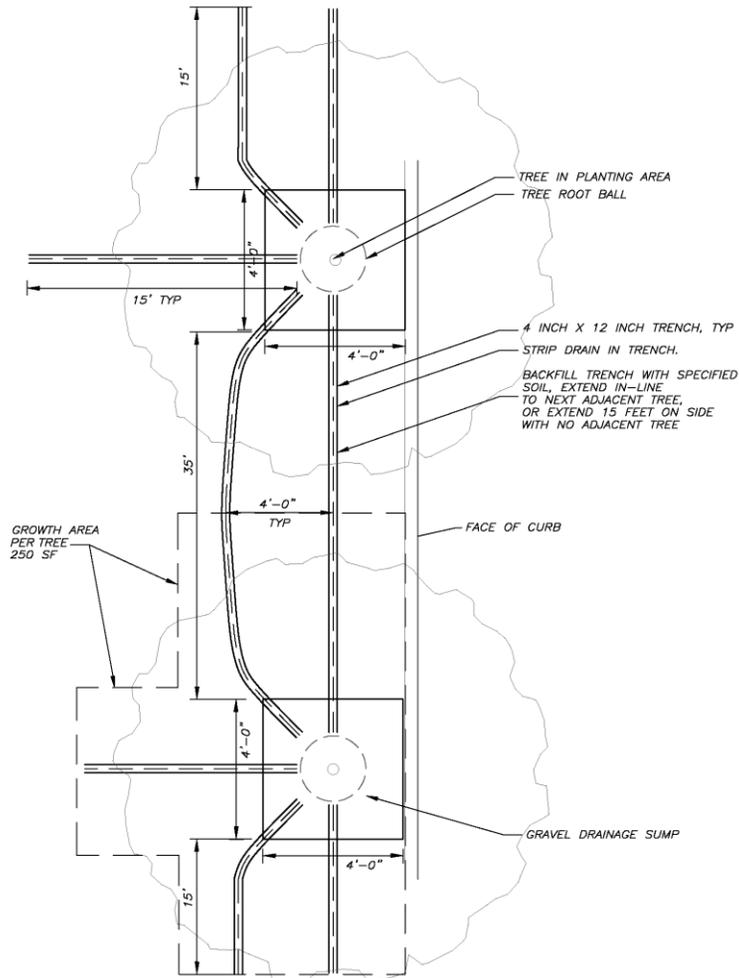
1. THIS STANDARD APPLIES TO SINGLE AND MULTI-STEM TREES.
2. NO SYNTHETIC FABRIC IS ALLOWED ON ROOT BALL.
3. REMOVE ALL BALL TIES OR STRAPPING FROM ROOT BALL.
4. DO NOT INSTALL TREES DURING PERIODS OF WET OR FROZEN SOIL CONDITIONS.
5. SOAK ROOT BALL AND PLANT PIT IMMEDIATELY AFTER INSTALLATION.
6. SET TREE PLUMB IN ALL DIRECTIONS.
7. THE CONTRACTOR IS RESPONSIBLE FOR KEEPING THE TREE UPRIGHT AND PLUMB IN ALL DIRECTIONS. DO NOT STAKE TREES EXCEPT WHERE SPECIFIED OR DIRECTED BY LANDSCAPE ARCHITECT. IF STAKED, STAKE ONLY AS SHOWN.

TREE PLANTING DETAIL
NTS

Courtesy of
Coulter Jewell Thames P.A.

Figure 2: Recommended Tree Planting Within Right Of Way Detail

(See Sec. 2.3.3, Planting Details, of *The Durham Design Manual*.)



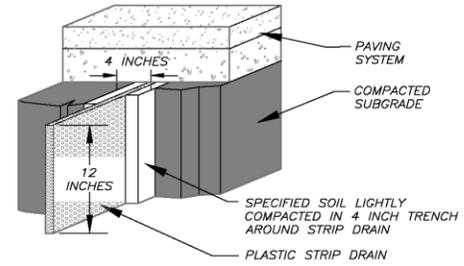
ROOT PATH LAYOUT AT CURB

ROOT PATH LAYOUT DETAIL

NTS

NOTES:

- DO NOT INSTALL ROOT PATH SYSTEMS DURING PERIODS OF WET OR FREEZING SOIL CONDITIONS.
- COORDINATE ROOT PATH INSTALLATION WITH ALL UTILITIES, SIGNAGE, FURNISHINGS, AND IRRIGATION.
- TRENCH SHALL BE DUG 12 INCHES DEEP AND 4 INCHES WIDE.
- SECURELY TAPE ALL JOINTS AS RECOMMENDED BY THE MANUFACTURER USING MIN. 3 INCH WIDE POLYETHYLENE UNDERGROUND TAPE.
- SEAL THE OPEN END OF THE DRAIN WITH GEOTEXTILE FABRIC AS RECOMMENDED BY THE MANUFACTURER.
- LIGHTLY COMPACT ENTIRE ROOT PATH AREA WITH A PLATE VIBRATOR AFTER BACKFILLING WITH SPECIFIED SOIL.
- PROTECT THE ROOT PATH AND SPECIFIED SOIL FROM DAMAGE AND FURTHER COMPACTION UNTIL THE PAVING IS INSTALLED.

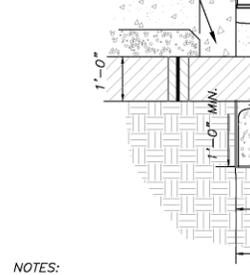


MARK THE NORTH SIDE OF THE TREE IN THE NURSERY AND LOCATE TO THE NORTH IN THE FIELD

TRUCK FLARE SHALL BE VISIBLE AND AT GRADE IN WELL DRAINED SOILS

ROOT BALL

8 INCH WIDE CONTINUOUS CONCRETE FOOTING, DEPTH MAY VARY.



NOTES:

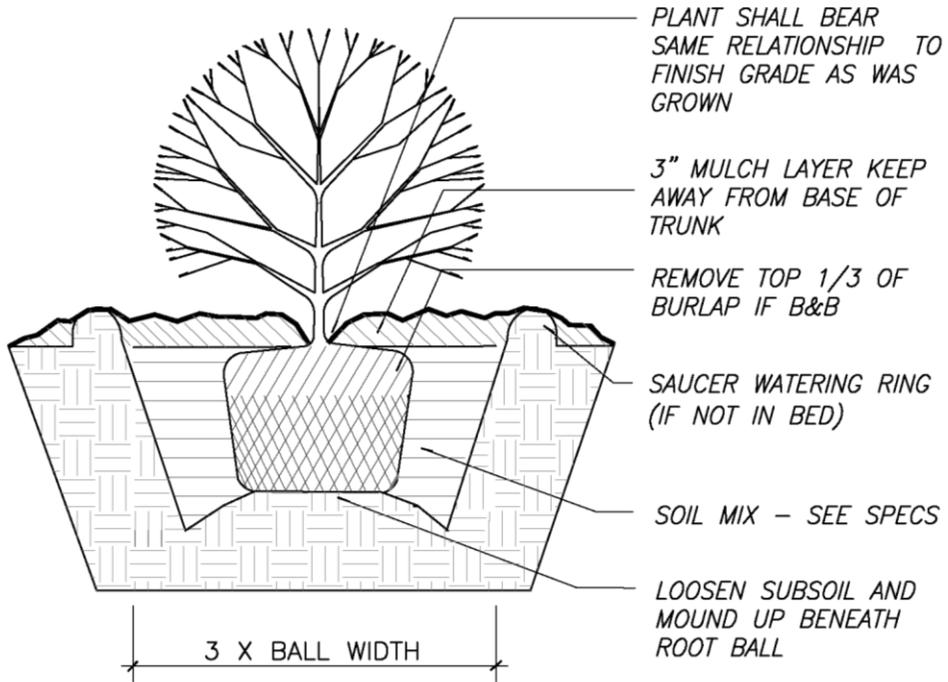
- COORDINATE WITH SITE DRAWINGS FOR POSSIBLE FURNITURE, SIGNAGE & LIGHTING FOOTING LOCATIONS (IF ANY) BETWEEN TREE PITS OR GRATES. WHERE FURNITURE FOOTINGS ARE IN CONFLICT WITH STRIP DRAINS, SHIFT STRIP DRAINS, BUT MAINTAIN 4 FOOT SEPARATION.

TREE PLANTING DETAIL

NTS

Courtesy of
Coulter Jewell Thames P.A.

Figure 3: Recommended Shrub Planting Detail



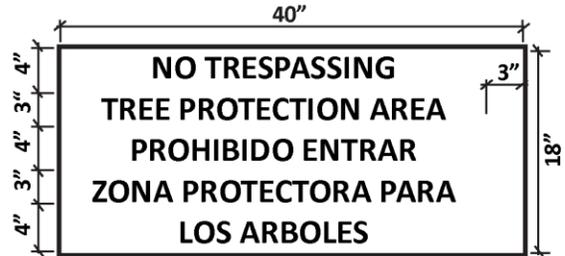
SHRUB PLANTING DETAIL
NTS

Courtesy of
Coulter Jewell Thames P.A.

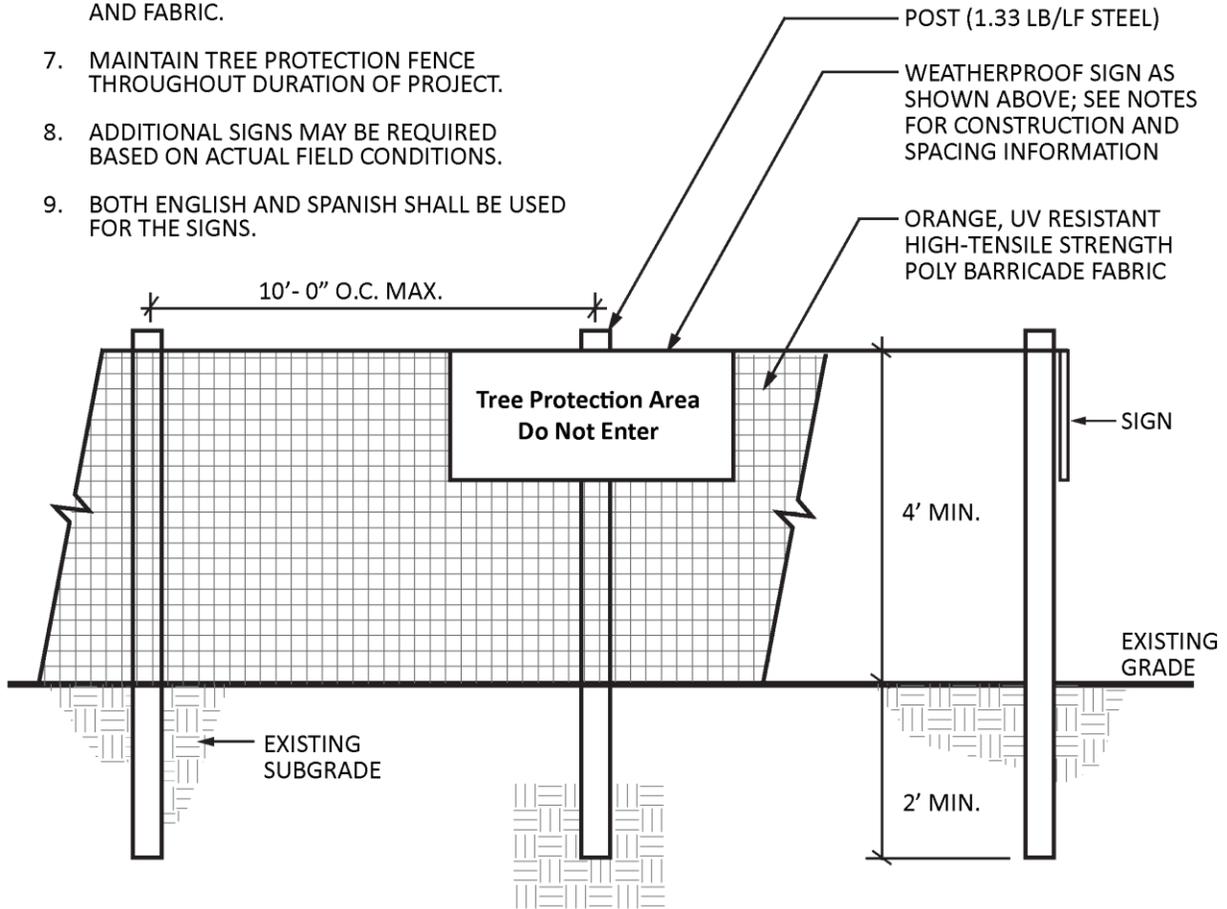
Figure 4: Required Tree Protection Fence Detail

NOTES:

1. WARNING SIGNS SHALL BE MADE OF DURABLE WEATHERPROOF MATERIAL.
2. LETTERS SHALL BE 3" HIGH MINIMUM, CLEARLY LEGIBLE, AND SPACED AS SHOWN.
3. SIGNS ARE TO BE PLACED NO GREATER THAN 100 FT. ON CENTER.
4. PLACE SIGN AT EACH END OF LINEAR TREE PROTECTION AREAS AND 100 FT. ON-CENTER THEREAFTER.
5. FORE TREE PROTECTION AREAS LESS THAN 100 FT. IN PERIMETER, PROVIDE NO LESS THAN ONE SIGN PER AREA.
6. ATTACH SIGNS SECURELY TO FENCE POSTS AND FABRIC.
7. MAINTAIN TREE PROTECTION FENCE THROUGHOUT DURATION OF PROJECT.
8. ADDITIONAL SIGNS MAY BE REQUIRED BASED ON ACTUAL FIELD CONDITIONS.
9. BOTH ENGLISH AND SPANISH SHALL BE USED FOR THE SIGNS.



SIGN DETAIL
NO SCALE

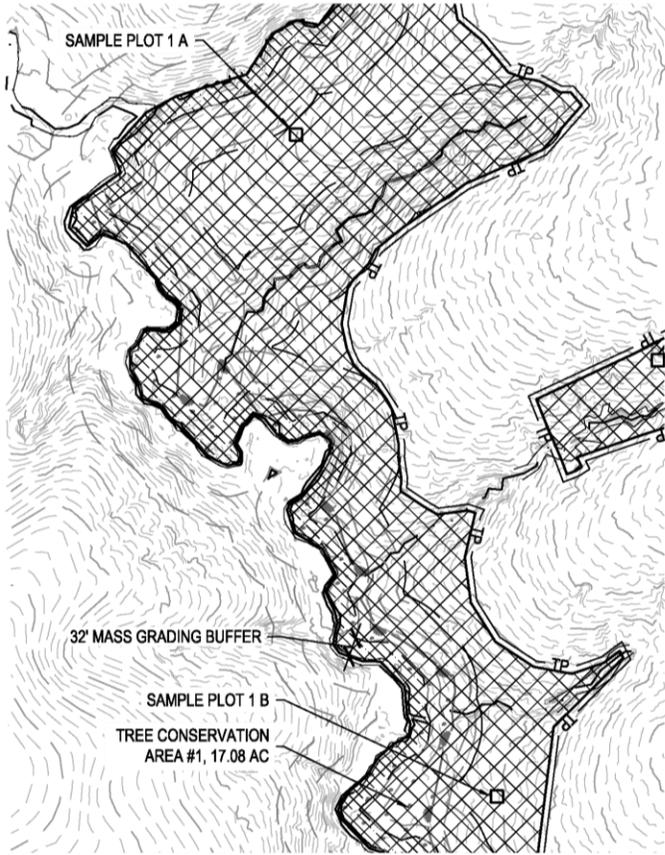


INSTALL TREE PROTECTION FENCE & SIGNAGE PRIOR TO CALLING FOR THE INITIAL ON-SITE INSPECTION

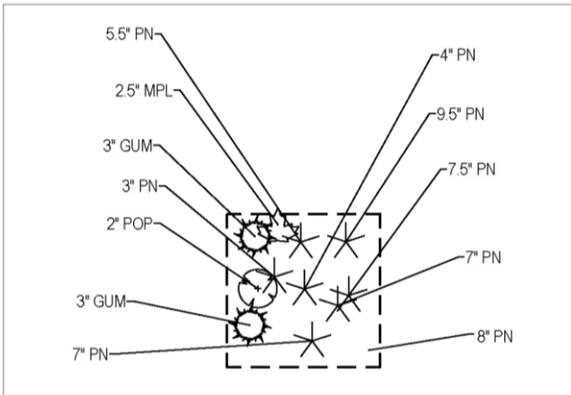
TREE PROTECTION FENCE

Figure 5: Sample Area Example

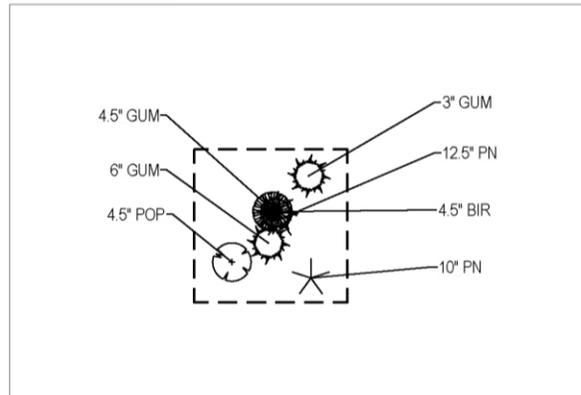
(See paragraph 9.3.3, Sampling, of the *Durham Unified Development Ordinance*.)



Tree Cover Area # 1	
DBH (in)	Tree Species
1A	
8	Pinus taeda
7	Pinus taeda
3	Liquidambar styraciflua
2	Liriodendron tulipifera
3	Pinus taeda
7	Pinus taeda
7.5	Pinus taeda
4	Pinus taeda
5.5	Pinus taeda
9.5	Pinus taeda
2.5	Acer rubrum
3	Liquidambar styraciflua
1B	
3	Liquidambar styraciflua
12.5	Pinus taeda
4.5	Betula nigra
4.5	Liquidambar styraciflua
6	Liquidambar styraciflua
4.5	Liriodendron tulipifera
10	Pinus taeda



1A SAMPLE PLOT 1 A
7.1 Scale: 1" = 20'

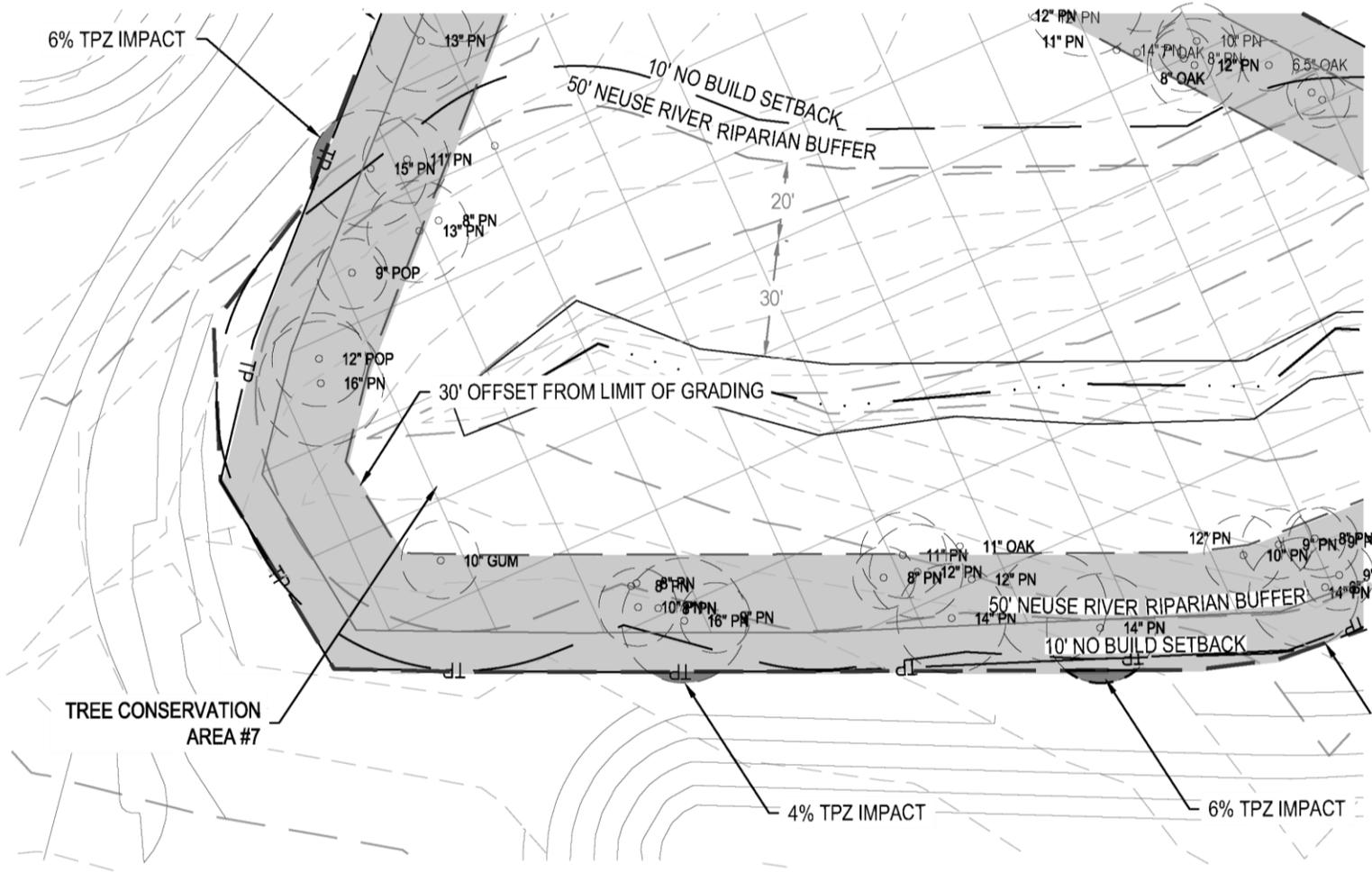


1B SAMPLE PLOT 1 B
7.1 Scale: 1" = 20'

Courtesy of WithersRavenel, Inc

Figure 6: Land Disturbance Tree Survey Example

(See paragraph 8.3.3, Tree Survey, of the *Durham Unified Development Ordinance*.)



Courtesy of
WithersRavenel, Inc.

Figure 7: Plant Table Key

Heading	Code and Meaning
REQUIREMENTS:	
<p>Plant Type</p>	<p>For Trees: Native = N Canopy = C Understory = U Water-Wise = W For Shrubs: Native = N Water-Wise = W</p> <p>Suggested Established Plant Dry & Soil Tolerance: All new plantings require regular watering to establish. Shrubs are generally established after one year. Trees establish at an average rate of one-year-per-caliper-inch-equivalent, installed.</p> <p>W = Water-Wise species</p> <p>Plant species with a Water-Wise designation fall into one of the following categories:</p> <ul style="list-style-type: none"> ▪ Performs best in minimal moisture. Will tolerate prolonged drought. Requires well-drained soils. Not suited to heavy clays, compacted soils, or flood conditions. ▪ Can tolerate prolonged drought. Somewhat adaptable to poorly drained sites, compacted soils, and heavy clays. Will not withstand prolonged flood conditions. <p>Performs best in moist, poorly drained soils. Adaptable to compacted soils, heavy clays, and flood conditions.</p>
<p>Required Minimum Root Area (Trees):</p>	<p>150 square feet 250 square feet 350 square feet</p> <p>Requires the surface area listed in the table, and two foot average depth of friable soil throughout planting area or equivalent volume in engineered root pathways, soil vaults, or Silva Cells™. (TM = DeepRoot Green Infrastructure, LLC)</p>
<p>Approved Location of Use Categories: Specific locations or purposes where Ordinance-required plantings can be used for credit.</p> <p>Exceptions: The “Allowed” shrub location of “Under Tree Coverage,” is not required, but indicates the plant’s suitability for use in those locations.</p>	<p>Y = Approved for the listed Location of Use Category.</p> <p>Blank = Not approved for the Location of Use Category.</p>
CULTURAL INFORMATION – PROVIDED FOR GENERAL REFERENCE, USUALLY IN THE ORDER SHOWN:	
<p>Notable Plant Characteristics</p>	<p>As written, highlighting specific characteristics of the species or cultivar</p>
<p>Size</p>	<p>H = Mature Height in Feet. W = Mature Spread in Feet.</p>
<p>Suggested Sun Exposure: Preferred amount of sun exposure for best performance of plants.</p>	<p>Full Sun =At least 6 full hours of direct sun each day Part Sun / Shade = 3-6 hours of direct sun each day Shade =Less than 3 hours of direct sun each day, and filtered sunlight during the rest of the day</p>
<p>Suggested pH Range: Indicates adaptability over a range of soil pH and, especially, plants that perform best in a specific pH range.</p>	<p>Below 5.5 = Strongly Acidic 5.5 – 6.2 = Acidic (Sour) 6.2 – 6.8 = Neutral 6.8 – 7.4 = Basic (Sweet) Above 7.4 = Strongly Basic</p>
<p>Overall Plant Shape</p>	<p>Per nursery standards for each plant</p>

TABLE 1A: ALLOWED DECIDUOUS TREES

ALLOWED TREES Native = N Canopy = C Understory = U Water-Wise = W				APPROVED LOCATION OF USE CATEGORIES Allowed = Y							CULTURAL INFORMATION			
Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage			Buffers	
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines						Constructed	Riparian
N C W	<i>Acer barbatum</i>	Southern Sugar Maple	350 sf	Y	Y	Y		Y		Y	Y		Heat-tolerant <ul style="list-style-type: none"> ▪ H 50' x W 50' ▪ Full Sun, Part Sun / Shade ▪ pH 5.0-7.0 ▪ Round 	
C W	<i>Acer buergerianum</i>	Trident Maple	250 sf	Y	Y		Y	Y		Y	Y		More compact than red or sugar maples; widely adapted to tough conditions; slow growing; later, red/orange fall color; peeling bark <ul style="list-style-type: none"> ▪ H 30'-40' x W 25'-35' ▪ Full Sun, Part Sun / Shade ▪ pH 5.6-6.5 ▪ Oval, round 	
C W	<i>Acer buergerianum</i> 'ABMTF'	Aeryn® Trident Maple	250 sf		Y	Y		Y		Y	Y		Uniform canopy; lustrous dark green leaves; yellow-red fall color <ul style="list-style-type: none"> ▪ H 35'-40' x W 25'-30' ▪ Full Sun ▪ pH 5.6-6.5 ▪ Global 	
C W	<i>Acer griseum</i>	Paperbark Maple	250 sf				Y				Y		Narrow <ul style="list-style-type: none"> ▪ H 30' x W 15' ▪ Full Sun ▪ pH 6.1-7.5 ▪ Upright, oval 	

TABLE 1A: ALLOWED DECIDUOUS TREES

ALLOWED TREES Native = N Canopy = C Understory = U Water-Wise = W				APPROVED LOCATION OF USE CATEGORIES Allowed = Y							CULTURAL INFORMATION		
Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage		Buffers	
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines					Constructed	Riparian
C W	<i>Acer leucoderme</i>	Chalkbark or Whitebark Maple	250 sf				Y			Y	Y	<p>Often multi-stemmed</p> <ul style="list-style-type: none"> ▪ H 30' x W 20' ▪ Full Sun, Part Sun / Shade ▪ pH 5.1-7.8 ▪ Oval 	
U	<i>Acer palmatum</i>	Japanese Maple (species and cultivars)	150 sf		Y	Y		Y				<p>Slow growing, eventually reaching 20 feet; great variation in this species due to a large number of cultivars; exceptional fall color</p> <ul style="list-style-type: none"> ▪ H 15'-25' x W 15'-25' ▪ Full Sun, Part Sun / Shade ▪ pH 5.1-7.8 ▪ Rounded to broad-rounded 	
N C	<i>Acer rubrum</i>	Red Maple	350 sf	Y	Y					Y	Y	<p>Thin bark susceptible to heat scorch; planting in poor soils will produce a shallow root system; not for Downtown due to scale</p> <ul style="list-style-type: none"> ▪ H 50' x W 50' ▪ Full Sun, Shade ▪ pH 5.0-7.0 ▪ Rounded 	
N C	<i>Acer rubrum</i>	Red Maple (medium, fastigate cultivars)	350 sf	Y	Y					Y	Y	<p>Medium-maturing varieties with conical or conical form</p> <ul style="list-style-type: none"> ▪ H 50' x W 20' ▪ Full Sun, Shade ▪ pH 5.0-7.0 ▪ Conical to columnar 	

TABLE 1A: ALLOWED DECIDUOUS TREES

ALLOWED TREES Native = N Canopy = C Understory = U Water-Wise = W				APPROVED LOCATION OF USE CATEGORIES Allowed = Y								CULTURAL INFORMATION	
Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage	Buffers		
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines				Constructed		Riparian
N C	<i>Acer rubrum</i>	Red Maple (large, oval cultivars)	350 sf	Y						Y	Y	Pyramidal crown in youth, mature to oval form <ul style="list-style-type: none"> ▪ H 55' x W 50' ▪ Full Sun, Shade ▪ pH 5.0-7.0 ▪ Oval 	
N C	<i>Acer rubrum</i>	Red Maple (smaller cultivars)	350 sf	Y	Y					Y	Y	Compact cultivars <ul style="list-style-type: none"> ▪ H 25'-35' x W 35' ▪ Full Sun, Shade ▪ pH 5.0-7.0 ▪ Round 	
N C	<i>Acer rubrum</i>	Red Maple (medium cultivars)	350 sf	Y	Y					Y	Y	Medium-maturing varieties with mature oval form (pyramidal in youth) <ul style="list-style-type: none"> ▪ H 40'-50' x W 30'-40' ▪ Full Sun, Shade ▪ pH 5.0-7.0 ▪ Oval 	
N C	<i>Acer saccharum</i>	Sugar Maple (Species and cultivars)	350 sf	Y	Y	Y				Y	Y	Selected for urban sites and heat-tolerance <ul style="list-style-type: none"> ▪ H 50' x W 30' ▪ Part Sun / Shade, Shade ▪ pH 5.0-7.0 ▪ Oval 	

TABLE 1A: ALLOWED DECIDUOUS TREES

ALLOWED TREES Native = N Canopy = C Understory = U Water-Wise = W				APPROVED LOCATION OF USE CATEGORIES Allowed = Y								CULTURAL INFORMATION	
Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage	Buffers		
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines				Constructed		Riparian
N C W	<i>Acer saccharum</i> subsp. <i>leucoderme</i>	Chalk Maple	250 sf				Y			Y	Y		<p>Not a canopy tree in Rural/Suburban Tiers</p> <ul style="list-style-type: none"> ▪ H 25'-30' x W 15'-30' ▪ Shade, Part Sun / Shade ▪ pH 5.5-7.0 ▪ Oval, round
C W	<i>Acer truncatum</i>	Shantung Maple	150 sf		Y	Y	Y	Y		Y	Y		<p>A tough, heat- and drought-tolerant small Maple; not a canopy tree in Rural/Suburban Tiers</p> <ul style="list-style-type: none"> ▪ H 20'-25' x W 20' ▪ Part Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Small, rounded, dense
N C	<i>Aesculus flava</i>	Yellow Buckeye	350 sf							Y	Y		<p>Fruit and leaf scorch may be problematic</p> <ul style="list-style-type: none"> ▪ H 45' x W 50' ▪ Part Sun / Shade, Shade ▪ pH 5.0-7.0 ▪ Round
U	<i>Aesculus pavia</i>	Red Buckeye	150 sf				Y	Y		Y	Y	Y	<p>Tends to sucker and form colonies</p> <ul style="list-style-type: none"> ▪ H 10'-20' x W 15'-25' ▪ Part Sun / Shade, Shade ▪ pH 6.2-6.8 ▪ Spreading habit

TABLE 1A: ALLOWED DECIDUOUS TREES

ALLOWED TREES Native = N Canopy = C Understory = U Water-Wise = W				APPROVED LOCATION OF USE CATEGORIES Allowed = Y							CULTURAL INFORMATION		
Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage		Buffers	
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines					Constructed	Riparian
U	<i>Amelanchier arborea</i>	Serviceberry	150 sf				Y	Y		Y	Y	Multi-stemmed, shrubby <ul style="list-style-type: none"> ▪ H 20' x W (variable) ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.2 ▪ Upright, open habit 	
N C	<i>Betula nigra</i>	River Birch (cultivars)	250 sf	Y	Y			Y		Y	Y	Dura-Heat® or Heritage® are less prone to leaf spot and aphids <ul style="list-style-type: none"> ▪ H 40' x W 25' ▪ Full Sun, Part Sun / Shade ▪ pH 4.0-6.0 ▪ Oval, round 	
C W	<i>Carpinus betulus</i>	European Hornbeam (cultivars)	250 sf	Y	Y	Y		Y		Y	Y	Avoid full sun if possible, especially in Urban, Compact Neighborhood, and Downtown Tiers <ul style="list-style-type: none"> ▪ H 40' x W 30' ▪ Full Sun, Part Sun / Shade ▪ pH 6.1-8.5 ▪ Conical 	
N C U	<i>Carpinus caroliniana</i>	American Hornbeam	150 sf		Y	Y	Y	Y		Y	Y	Slow-growing; if used in Urban, Downtown, or Compact Neighborhood Tiers, provide some winter sun and wind protection and good drainage <ul style="list-style-type: none"> ▪ H 20'-30' x W 20'-30' ▪ Full Sun, Shade ▪ pH 4.0-7.0 ▪ Oval, round 	

TABLE 1A: ALLOWED DECIDUOUS TREES

ALLOWED TREES Native = N Canopy = C Understory = U Water-Wise = W				APPROVED LOCATION OF USE CATEGORIES Allowed = Y								CULTURAL INFORMATION	
Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage	Buffers		
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines				Constructed		Riparian
N C	<i>Carya illinoensis</i>	Pecan	350 sf							Y	Y	Leaves and nut husks stain pavement; “messy” <ul style="list-style-type: none"> ▪ H 80’ x W 50’ ▪ Full Sun, Part Sun / Shade ▪ pH 5.0-7.3 ▪ Upright 	
N C	<i>Celtis laevigata</i>	Sugar Hackberry	350 sf	Y	Y			Y		Y	Y	Heat and drought-tolerant <ul style="list-style-type: none"> ▪ H 50’ x W 50’ ▪ Full Sun, Part Sun / Shade ▪ pH 4.8-6.8 ▪ Round 	
N C W	<i>Celtis occidentalis</i>	Common Hackberry	350 sf	Y	Y					Y	Y	Cultivars recommended <ul style="list-style-type: none"> ▪ H 40’ x W 40’ ▪ Full Sun, Part Sun / Shade ▪ pH 6.0-7.8 ▪ Round 	
C	<i>Celtis occidentalis</i> ‘Prairie Pride’	Prairie Pride Hackberry	350 sf	Y						Y	Y	More compact than species in youth; fewer spur branches and witches’ broom; less fruit <ul style="list-style-type: none"> ▪ H 40’ x W 40’ ▪ Full Sun, Part Sun / Shade ▪ pH 6.0-7.8 ▪ Round 	

TABLE 1A: ALLOWED DECIDUOUS TREES

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Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage		Buffers	
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines					Constructed	Riparian
U	<i>Celtis tenuifolia</i>	Dwarf Hackberry	250 sf				Y	Y		Y	Y		Small, native tree or large shrub <ul style="list-style-type: none"> ▪ H 25' x W 25' ▪ Full Sun, Part Sun / Shade ▪ pH 5.0-7.0
N C	<i>Cercis canadensis</i>	Eastern Redbud (species and cultivars)	150 sf				Y	Y		Y	Y		'Forest Pansy' cultivar valued for purple foliage <ul style="list-style-type: none"> ▪ H 20'-30' x W 25'-30' ▪ Part Sun, Shade ▪ pH 4.5-7.5 ▪ Round, spreading
U W	<i>Cercis canadensis</i> subsp. <i>texensis</i> (formerly <i>C. reniformis</i>)	Redbud (subspecies)	150 sf		Y	Y	Y	Y			Y		Thicker, more leathery leaves than eastern redbud <ul style="list-style-type: none"> ▪ H 15'-25' x W 20' ▪ Part Sun / Shade ▪ pH 6.1-7.5 ▪ Compact, rounded or vase
U	<i>Cercis chinensis</i>	Chinese Redbud	150 sf		Y	Y	Y	Y			Y		Shrubber and more showy than eastern redbud; more flowers and seedpods; 'Avondale' produces a profusion of deep rose-purple flowers <ul style="list-style-type: none"> ▪ H 10' x W 15' ▪ Part Sun / Shade ▪ pH 6.1-7.5 ▪ Vase

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Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage		Buffers	
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines					Constructed	Riparian
U	<i>Chionanthus retusus</i>	Chinese Fringetree	150 sf					Y			Y	Y	<p>Large, multi-stemmed shrub, but can be grown as a small tree; tough; snow white flowers</p> <ul style="list-style-type: none"> ▪ H 15'-25' x W 12-15' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Rounded
N C	<i>Cladrastis kentukea</i> (formerly <i>C. leutea</i>)	Yellowwood	350 sf	Y						Y	Y		<p>White flowers</p> <ul style="list-style-type: none"> ▪ H 35' x W 40' ▪ Part Sun ▪ pH 4.8-6.5 ▪ Round, spreading
N C U	<i>Cornus florida</i>	Flowering Dogwood (species and cultivars)	150 sf							Y	Y	Y	<p>Cultivars more disease-resistant than species; 'Rubra' and 'Cherokee Chief' have pink flowers, others white; only grow in shaded areas</p> <ul style="list-style-type: none"> ▪ H 20'-30' x W 20'-30' ▪ Part Sun / Shade, Shade ▪ pH 5.0-7.0 ▪ Broad, spreading
C	<i>Cornus kousa</i>	Kousa or Japanese Dogwood	150 sf				Y	Y		Y	Y		<p>Many cultivars; <i>C. kousa</i> var. <i>chinensis</i> 'Milky Way Select' is best as a single-stemmed tree; not a canopy tree in Rural/Suburban Tiers</p> <ul style="list-style-type: none"> ▪ H 30' x W 30' ▪ Part Sun / Shade ▪ pH 6.1-6.5 ▪ Round

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				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines				Constructed		Riparian
C	<i>Corylus colurna</i>	Turkish Filbert, Hazel	350 sf	Y						Y			<p>Not commonly available</p> <ul style="list-style-type: none"> ▪ H 30' x W 30' ▪ Full Sun, Part Sun / Shade ▪ pH 5.6-7.0 ▪ Pyramidal
U	<i>Cotinus coggygria</i>	Smoketree	150 sf				Y	Y		Y	Y		<p>Multi-stemmed; shrubby</p> <ul style="list-style-type: none"> ▪ H 15' x W 15' ▪ Full Sun ▪ pH 6.1-7.8 ▪ Round
U	<i>Cotinus obovatus</i>	American Smoketree	150 sf				Y	Y		Y	Y		<p>Valued for bluish green foliage and brilliant fall color</p> <ul style="list-style-type: none"> ▪ H 15'-30' x W 15'-25' ▪ Full Sun, Part Sun / Shade ▪ pH 6.5-8.0 ▪ Rounded, spreading
U	<i>Crataegus crusgalli</i>	Cockspur Hawthorn	250 sf									Y	<p>Dangerous two-inch thorns; best not to use near children; a NC DENR stormwater BMP tree; credited for riparian buffer restoration only</p> <ul style="list-style-type: none"> ▪ H 20'-30' x W 20'-35' ▪ Full Sun ▪ pH 5.5-7.4 ▪ Rounded, spreading, dense, horizontal branching

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Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage		Buffers	
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines					Constructed	Riparian
U	<i>Crataegus marshallii</i> (and other Southeastern <i>Crataegus</i> species)	Mayhaw Hawthorn	250 sf									Y	Very thorny; a NC DENR stormwater BMP tree; credited for riparian buffer restoration only <ul style="list-style-type: none"> H 15'-30' x W 15'-30' Full Sun, Part Sun / Shade pH 5.8-7.2 Rounded, spreading, dense
NC	<i>Diospyros virginiana</i>	Persimmon	250 sf									Y	Susceptible to leaf spot and caterpillars <ul style="list-style-type: none"> H 35' x W 25' Full Sun, Shade pH 5.0-7.0 Irregular, oval
NCW	<i>Fagus grandiflora</i>	American Beech	350 sf							Y	Y	Y	Very sensitive to soil conditions <ul style="list-style-type: none"> H 50' x W 40' Part Sun, Shade pH 5.0-8.0 Oval
CW	<i>Fagus sylvatica</i>	European Beech	350 sf							Y	Y		Many cultivars available; slow-grower; doesn't like extreme heat <ul style="list-style-type: none"> H 60' x W 45' Part Sun / Shade pH 6.1-7.8 Oval

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C	<i>Ginkgo biloba</i>	Ginkgo (cultivars)	350 sf		Y	Y		Y					<p>Male cultivars only.</p> <ul style="list-style-type: none"> ▪ H 40'-70' x Spread varies by cultivar ▪ Full Sun, Part Sun / Shade ▪ pH 5.6-7.5 ▪ Upright
C	<i>Ginkgo biloba</i> 'Fastigiata'	Ginkgo (columnar cultivars)	350 sf		Y	Y		Y					<p>Slow-growing, thin and open during first 15 to 20 years; Male cultivars only.</p> <ul style="list-style-type: none"> ▪ H 70' x Spread varies by cultivar ▪ Full Sun, Part Sun / Shade ▪ pH 5.6-7.5 ▪ Narrowly upright
C W	<i>Gleditsia triacanthos</i> <i>var. inermis</i>	Thornless Honeylocust (cultivars)	350 sf	Y	Y			Y		Y			<p>Needs high pH soils; typically a poor performer as a street tree in Durham; long thorns; all have messy fruit</p> <ul style="list-style-type: none"> ▪ H 60' x W 40' ▪ Full Sun, Part Sun / Shade ▪ pH 6.2-8.5 ▪ Rounded
N C	<i>Gymnocladus dioicus</i>	Kentucky Coffeetree (fruitless only)	350 sf	Y	Y					Y	Y		<p>Needs deep soil profile and alkaline soils; fruitless varieties only</p> <ul style="list-style-type: none"> ▪ H 60' x W 60' ▪ Full Sun, Part Sun / Shade ▪ pH 6.0-8.0 ▪ Round

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Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage		Buffers	
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines					Constructed	Riparian
N U	<i>Halesia carolina</i> (<i>H. tetraptera</i>)	Carolina Silverbell	150 sf	Y			Y	Y		Y	Y	Needs moist, well-drained soils; can tolerate rocky soils, but not drought <ul style="list-style-type: none"> ▪ H 20'-40' x W 15'-35' ▪ Full Sun, Part Sun / Shade ▪ pH 5.0-6.0 ▪ Broad, Rounded 	
N U	<i>Ilex decidua</i>	Possumhaw	150 sf				Y			Y	Y	Best berry set with use of one male plant for every 3-5 female plants <ul style="list-style-type: none"> ▪ H 10'-15' x W 8'-12' ▪ Full Sun, Part Sun / Shade ▪ pH 3.5-6.5 ▪ Vase-shaped 	
C W	<i>Koelreuteria paniculata</i>	Goldenraintree	150 sf		Y	Y	Y	Y		Y	Y	Do not plant in wet areas <ul style="list-style-type: none"> ▪ H 40' x W 40' ▪ Full Sun ▪ pH 4.6-9.0 ▪ Round or vase 	
C W	<i>Lagerstroemia fauriei</i> 'Fantasy'	'Fantasy' Crape Myrtle	250 sf		Y	Y		Y		Y		White blossoms; excellent dark red bark; good fall color; may not harden off early enough in fall, likely due to fertilizer and watering <ul style="list-style-type: none"> ▪ H 40' x W 30' ▪ Full Sun ▪ pH 5.1-6.5 	

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C W	<i>Lagerstroemia fauriei</i>	Japanese Crape Myrtle (large cultivars)	250 sf		Y	Y		Y		Y			Same as previous; not a canopy tree in Rural/Suburban Tiers <ul style="list-style-type: none"> ▪ H 20'-30' x W 20'-25' ▪ Full Sun ▪ pH 5.1-6.5
C W	<i>Lagerstroemia indica</i>	Crape Myrtle (large cultivars)	250 sf		Y	Y	Y	Y		Y			Not a canopy tree in Rural/Suburban Tiers <ul style="list-style-type: none"> ▪ H 20'-35' x W 15'-30' ▪ Full Sun ▪ pH 5.1-6.5-7.8
U	<i>Lagerstroemia indica</i> and <i>L. indica</i> x <i>L. fauriei</i>	Crape Myrtle (small <i>L. indica</i> cultivars)	150 sf				Y	Y		Y	Y		Multiple bloom color selections; good fall color; winter bark <ul style="list-style-type: none"> ▪ H 8'-15' x W 6'-15' ▪ Full Sun ▪ pH 4.5-8.0 ▪ Form varies by cultivar
U	<i>Lagerstroemia indica</i> and <i>L. indica</i> x <i>L. fauriei</i>	Crape Myrtle (medium-sized)	150 sf		Y	Y	Y	Y		Y	Y		Same as previous <ul style="list-style-type: none"> ▪ H 15'-20' x W 10'-15' ▪ Full Sun ▪ pH 4.5-8.0 ▪ Form varies by cultivar
	<i>Lagerstroemia</i> spp.	Crape Myrtles	NOTE: In order to get credit for a crape myrtle as a canopy tree, add a note on plans NOT to prune leaders, head back, or otherwise reduce height, and specify single-stem or maximum of 3-5 stems, if multi-stemmed.										

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N C	<i>Liquidambar styraciflua</i> 'Rotundiloba'	Sweetgum (fruitless cultivar)	350 sf	Y	Y			Y			Y		Brittle wood; can revert to fruiting; poor nursery tree <ul style="list-style-type: none"> ▪ H 50' x W 50' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-7.0 ▪ Round
N C	<i>Liquidambar styraciflua</i> 'Slender Silhouette'	Sweetgum columnar cultivar	250 sf	Y	Y	Y		Y		Y	Y		Narrow crown for tight spots; has fruit <ul style="list-style-type: none"> ▪ H 50' x W 15' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-7.0 ▪ Narrowly columnar
N C	<i>Liriodendron tulipifera</i>	Tulip Poplar	350 sf							Y	Y	Y	Best in areas where space is not limited <ul style="list-style-type: none"> ▪ H 70' x W 35' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-6.5 ▪ Pyramidal
N C	<i>Liriodendron tulipifera</i> (dwarf cultivar 'Little Volunteer')	Tulip Poplar 'Little Volunteer'	250 sf	Y	Y	Y	Y	Y			Y		Drought-tolerant <ul style="list-style-type: none"> ▪ H 30'-35' x W 18'-20' ▪ Full Sun, Part Sun / Shade ▪ pH 7.0-8.0 ▪ Pyramidal

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N C	<i>Liriodendron tulipifera</i> 'fastigiatum' ('Arnold')	Columnar Tulip Poplar	350 sf	Y	Y	Y					Y		Wood is brittle; handle carefully at time of planting <ul style="list-style-type: none"> ▪ H 60' x W 20' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-6.5 ▪ Columnar
U	<i>Magnolia</i> 'Jane' (<i>M. liliiflora</i> 'Nigra' x <i>M. stellata</i> 'Rosea')	'Jane' Saucer Magnolia	150 sf				Y	Y		Y	Y		<ul style="list-style-type: none"> ▪ Less messier than Sauser Magnolia.H 8'-15' x W 15' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-8.0 ▪ Oval to round
C U	<i>Magnolia stellata</i>	Star Magnolia	250 sf		Y	Y	Y			Y	Y		Avoid southern exposure and siting in cold, frost-prone areas for best flowering; not a canopy tree in Rural/Suburban Tiers <ul style="list-style-type: none"> ▪ H 20' x W 15' ▪ Full Sun, Part Sun / Shade ▪ pH 4.6-6.0 ▪ Oval to round
C	<i>Magnolia tripetala</i>	Umbrella Magnolia	250 sf								Y		Vigorous, unkempt; prefers moist, shady locations; can attain heights of over 40 feet <ul style="list-style-type: none"> ▪ H 35'-40' x W 25' ▪ Part Sun / Shade ▪ pH 5.6-7.5 ▪ Oval to round

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C	<i>Magnolia x soulangeana</i>	Saucer Magnolia	250 sf		Y	Y	Y			Y	Y		<p>Prefers moist, deep, acid soils, rich in organic content; good pollution tolerance; try to avoid siting in cold, frost-prone areas for best flowering; not a canopy tree in Rural/Suburban Tiers</p> <ul style="list-style-type: none"> ▪ H 20'-30' x W 20' ▪ Full Sun, Part Sun / Shade ▪ pH 4.6-6.0 ▪ Oval to round
U	<i>Magnolia x loebneri</i>	Loebner Magnolia	150 sf							Y	Y		<p>Flowers later than Saucer Magnolias; like Star Magnolia</p> <ul style="list-style-type: none"> ▪ H 18-25' x W 20'-25' ▪ Full Sun, Part Sun / Shade ▪ pH 4.6-6.5 ▪ Rounded, spreading
C	<i>Metasequoia glyptostroboides</i>	Dawn Redwood	350 sf							Y	Y		<p>Large deciduous conifer; needs a lot of space</p> <ul style="list-style-type: none"> ▪ H 80' x W 60' ▪ Full Sun ▪ pH 4.5-7.5 ▪ Pyramidal
N C	<i>Nyssa aquatica</i>	Water Tupelo (fruitless only)	250 sf	Y						Y	Y	Y	<p>Moist to wet soil but drought tolerant</p> <ul style="list-style-type: none"> ▪ H 50'-80' x W 25'-50' ▪ Full Sun, Part Sun / Shade ▪ pH 4.0-6.0 ▪ Round

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N C	<i>Nyssa ogeche</i>	Ogeechee Tupelo (fruitless only)	250 sf	Y				Y		Y	Y	Y	Wet to very wet soil but drought tolerant <ul style="list-style-type: none"> ▪ H 35'-45' x W 25'-35' ▪ Full Sun, Part Sun / Shade ▪ pH 4.0-6.0 ▪ Round 	
N C	<i>Nyssa sylvatica</i>	Black Gum	250 sf	Y	Y					Y	Y		Some heat and drought-tolerance <ul style="list-style-type: none"> ▪ H 50' x W 40' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 4.5-6.0 ▪ Pyramidal 	
N C	<i>Nyssa sylvatica</i> var. <i>biflora</i>	Swamp Tupelo	350 sf							Y	Y	Y	Moist to wet soils <ul style="list-style-type: none"> ▪ H 40'-50'x W 25' ▪ Full Sun ▪ pH 4.5-5.7 ▪ Pyramidal 	
N U	<i>Osmanthus americanus</i>	Devilwood	150 sf							Y	Y		Found in the wild along swamp margins and streams; some urban tolerance <ul style="list-style-type: none"> ▪ H 12'-20'x W 8'-12' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 	

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N C	<i>Ostrya virginiana</i>	American Hophornbeam, Ironwood	250 sf							Y	Y	Y	<p>Not commonly available, but has good tolerance of urban conditions</p> <ul style="list-style-type: none"> H 25'-40' x W 20'-30' Full Sun, Part Sun / Shade pH 4.2-7.6 Pyramidal, becoming rounded with age
N U	<i>Ostrya virginiana</i>	American Hophornbeam, Ironwood	250 sf		Y	Y	Y	Y		Y	Y		<p>Not commonly available, but has good tolerance of urban conditions</p> <ul style="list-style-type: none"> H 25'-40' W 20'-30' Full Sun, Part Sun / Shade pH 4.2-7.6 Pyramidal, becoming rounded with age
N U	<i>Oxydendrum arboreum</i>	Sourwood	250 sf				Y			Y	Y	Y	<p>Intolerant of pollution and urban conditions</p> <ul style="list-style-type: none"> H 25'-30' x W 20' Full Sun, Part Sun / Shade pH 4.0-6.5 Pyramidal
C	<i>Parrotia persica</i>	Persian Parrotia	150 sf			Y	Y	Y		Y	Y		<p>Small canopy tree with three-season interest</p> <ul style="list-style-type: none"> H 30' x W 30' Full Sun, Part Sun / Shade pH 5.1-6.5 Round

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C W	<i>Pistacia chinensis</i>	Chinese Pistache	250 sf	Y	Y	Y	Y	Y		Y			<p>Tough, small canopy tree with good fall color</p> <ul style="list-style-type: none"> ▪ H 35' x W 35' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-7.5 ▪ Round
N C	<i>Platanus occidentalis</i>	Sycamore, American-Planetree	350 sf									Y	<p>Massively-large tree of bottom lands and moist, deep soils; <i>Anthracnose</i> severely limits use; see <i>P. x acerifolia</i></p> <ul style="list-style-type: none"> ▪ H 70'-90' x W 60'-80' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.5 ▪ Large, wide spreading, irregular
C	<i>Platanus x acerifolia</i>	London Planetree (cultivars)	350 sf							Y	Y	Y	<p>Hybrid sycamore; tougher than <i>P. occidentalis</i>; very adaptable to soil conditions, moisture, and pH; very pollution-tolerant; resists pest and disease problems better than species; needs room to grow; use cultivars</p> <ul style="list-style-type: none"> ▪ H 70'-90' x W 60'-80' ▪ Full Sun, Part Sun / Shade ▪ pH 5.6-7.5 ▪ Large, wide spreading, irregular

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U	<i>Prunus mume</i>	Japanese Apricot	150 sf		Y	Y	Y	Y		Y	Y	Best in groupings <ul style="list-style-type: none"> ▪ H 15' x W 20' ▪ Full Sun ▪ pH 5.6-6.0 ▪ Vase 		
U	<i>Prunus sargentii</i>	Sargent Cherry hybrids	250 sf		Y	Y	Y	Y		Y	Y	Numerous cultivars; needs cool locations; three-season interest; somewhat short-lived; prone to pests and disease <ul style="list-style-type: none"> ▪ H 20' x W 30' ▪ Full Sun, Part Sun / Shade ▪ pH 5.0-7.0 ▪ Rounded typically, varies by cultivar 		
C W	<i>Prunus sargentii</i> 'Columnaris'	Upright Sargent Cherry	150 sf		Y	Y	Y			Y		Large pink flowers later than the species, ahead of leaves; fall color is yellow-bronze-red; fruit; not as heat-tolerant as <i>P. subhirtella</i> or <i>P. xyedoensis</i> ; not a canopy tree in Rural/Suburban Tier unless > 30 feet tall <ul style="list-style-type: none"> ▪ H 20'-35' x W 10'-15' ▪ Full Sun ▪ pH 4.5-7.5 ▪ Columnar or narrow vase 		

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Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage		Buffers	
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines					Constructed	Riparian
U	<i>Prunus serrulata</i> 'Kwanzan'	'Kwanzan' Cherry (Japanese double-flowering hybrids)	250 sf				Y	Y		Y	Y		Trees grown on own rootstock are rarer, but usually longer-lived and larger; grafted trees somewhat short-lived; typical cherry pests and diseases <ul style="list-style-type: none"> ▪ H 20'-30' x W 25' ▪ Full Sun, Part Sun / Shade ▪ pH 5.0-7.0 ▪ Rounded typical
U	<i>Prunus serrulata</i>	Japanese Cherry (single-flowering hybrids)	250 sf				Y	Y		Y	Y		Numerous cultivars; 'Snowgoose' somewhat pest-resistant <ul style="list-style-type: none"> ▪ H 20'-30' x W 25' ▪ Full Sun, Part Sun / Shade ▪ pH 5.0-7.0 ▪ Rounded typical, varies by cultivar
U	<i>Prunus subhirtella</i> var. <i>autumnalis</i>	Higan Cherry (upright cultivars)	250 sf		Y	Y	Y	Y		Y	Y		This cherry, 'Okame,' and 'Yoshino' are the better cherries for the South; once established, can be long-lived; three- season interest <ul style="list-style-type: none"> ▪ H 20'-30' x W 15'-35' ▪ Part Sun / Shade ▪ pH 5.0-7.0 ▪ Rounded, Spreading, varies by cultivar

TABLE 1A: ALLOWED DECIDUOUS TREES

ALLOWED TREES Native = N Canopy = C Understory = U Water-Wise = W				APPROVED LOCATION OF USE CATEGORIES Allowed = Y							CULTURAL INFORMATION			
Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage			Buffers	
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines						Constructed	Riparian
U	<i>Prunus subhirtella</i> var. <i>pendula</i>	Weeping Higan Cherry (cultivars)	250 sf							Y	Y	<p>Same as above except year-round interest due to form and bark; fast-growing</p> <ul style="list-style-type: none"> ▪ H 20'-25' x W 20'-30' ▪ Part Sun / Shade ▪ pH 5.0-7.0 ▪ Weeping, Rounded, Spreading, varies by cultivar 		
U	<i>Prunus</i> x 'Okame' (and other <i>P. incise</i> x <i>P. campanulata</i> hybrids)	Okame Cherry	250 sf		Y	Y	Y	Y		Y	Y	<p>Good heat tolerance; three-season interest; better longevity than many other cherries</p> <ul style="list-style-type: none"> ▪ H 25' x W 30' ▪ Full Sun, Part Sun / Shade ▪ pH 5.0-7.0 ▪ Round (typical) varies by cultivar 		
U	<i>Prunus x yedoensis</i>	Yoshino Cherry (cultivars)	250 sf		Y	Y	Y	Y		Y	Y	<p>Three-season interest; somewhat short-lived (usually 25-40 years); cultivars less than 30 feet</p> <ul style="list-style-type: none"> ▪ H 25'-35' x W 20'-35' ▪ Full Sun / Part Sun / Shade, varies by cultivar ▪ pH 5.1-6.0 ▪ Varies by cultivar 		
U	<i>Prunus x yedoensis</i>	Weeping Yoshino Cherry (cultivars)	250 sf							Y	Y	<p>White flowers in late March; year-round interest due to form (wildly-arching branches); somewhat short-lived (~25-40 years)</p> <ul style="list-style-type: none"> ▪ H 6'-20' x W 6'-30' ▪ Part Sun / Shade ▪ pH 5.1-6.0 ▪ Weeping, varies by cultivar 		

TABLE 1A: ALLOWED DECIDUOUS TREES

ALLOWED TREES Native = N Canopy = C Understory = U Water-Wise = W				APPROVED LOCATION OF USE CATEGORIES Allowed = Y								CULTURAL INFORMATION	
Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage	Buffers		
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines				Constructed		Riparian
N C	<i>Quercus alba</i>	White Oak	350 sf	Y						Y	Y	Taproot makes it difficult to transplant <ul style="list-style-type: none"> ▪ H 60' x W 50' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-6.8 ▪ Round 	
N C	<i>Quercus bicolor</i>	Swamp White Oak	350 sf	Y	Y			Y		Y	Y	Well adapted to urban sites <ul style="list-style-type: none"> ▪ H 50' x W 50' ▪ Full Sun, Part Sun / Shade ▪ pH 4.3-6.5 ▪ Round 	
N C	<i>Quercus coccinea</i>	Scarlet Oak	350 sf	Y				Y		Y	Y	<ul style="list-style-type: none"> ▪ H 60' x W 50' ▪ Full Sun ▪ pH 4.5-6.9 ▪ Round 	
N C W	<i>Quercus falcata</i>	Southern Red Oak, Spanish Oak	350 sf	Y	Y			Y		Y	Y	Var. <i>pagodifolia</i> preferred, but less Water-Wise <ul style="list-style-type: none"> ▪ 60' x W 50' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-7.0 ▪ Round 	
N C	<i>Quercus falcata</i> var. <i>pagodifolia</i>	Cherrybark Oak	350 sf	Y	Y			Y		Y	Y	Preferred to species <ul style="list-style-type: none"> ▪ H 60' x W 50' ▪ Full Sun, Part Sun / Shade ▪ pH 4.8-7.0 ▪ Round 	

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ALLOWED TREES Native = N Canopy = C Understory = U Water-Wise = W				APPROVED LOCATION OF USE CATEGORIES Allowed = Y							CULTURAL INFORMATION		
Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage		Buffers	
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines					Constructed	Riparian
U W	<i>Quercus georgiana</i>	Georgia Oak	250 sf		Y	Y		Y		Y	Y		<p>Species useful as small lawn, planter, or park tree; red to reddish-purple fall color</p> <ul style="list-style-type: none"> ▪ H 15'-30' x W 30' ▪ Full Sun ▪ pH 5.0-6.5 ▪ Round
N C	<i>Quercus laurifolia</i> (<i>Q. imbricaria</i> , <i>Q. darlingtonia</i> , <i>Q. hemisphaerica</i>)	Laurel Oak	350 sf	Y	Y			Y		Y	Y	Y	<p>Semi-evergreen</p> <ul style="list-style-type: none"> ▪ H 50' x W 40' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 4.2-6.0 ▪ Round
N C	<i>Quercus lyrata</i>	Overcup Oak	350 sf	Y	Y			Y		Y	Y	Y	<p>Well adapted to urban sites</p> <ul style="list-style-type: none"> ▪ H 45'-50' x W 35'-40' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-6.0 ▪ Round, oval
N C	<i>Quercus lyrata</i> 'QLFTB'	Highbeam® Overcup Oak	350 sf	Y	Y			Y		Y	Y		<p>More upright and uniform than seedling</p> <ul style="list-style-type: none"> ▪ H 45' x W 30' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-6.0 ▪ Oval

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Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage		Buffers	
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines					Constructed	Riparian
C W	<i>Quercus macrocarpa</i>	Bur Oak	350 sf							Y			<p>Not commonly available; needs space; best as a specimen in open areas</p> <ul style="list-style-type: none"> ▪ H 70'-80'+ x Same Spread ▪ Part Sun, Part Sun / Shade ▪ pH 4.5-7.5 ▪ Round
N C W	<i>Quercus marilandica</i>	Blackjack Oak	350 sf							Y	Y		<p>Has problems with untreatable decay</p> <ul style="list-style-type: none"> ▪ H 50' x W 50' ▪ Full Sun ▪ pH 4.8-5.8 ▪ Round
N C W	<i>Quercus michauxii</i>	Swamp Chestnut Oak	350 sf	Y				Y		Y	Y		<p>Similar to Chestnut Oak; needs space</p> <ul style="list-style-type: none"> ▪ H 60' x W 60' ▪ Full Sun ▪ pH 4.5-6.5 ▪ Irregularly dense, rounded
N C W	<i>Quercus montana</i> (formerly <i>Q. prinus</i>)	Chestnut Oak	350 sf	Y	Y			Y		Y	Y		<p>Usually found on dry, upland sites, in rocky, poor soil, but best growth in low, rich, moist sites; needs space</p> <ul style="list-style-type: none"> ▪ H 60' x W 60' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-6.0 ▪ Irregularly dense, rounded

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Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage		Buffers	
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines					Constructed	Riparian
N C W	<i>Quercus nigra</i>	Water Oak	350 sf							Y		Y	<p>Has problems with untreatable decay; don't use as street tree or in parking lots</p> <ul style="list-style-type: none"> ▪ H 50' x W 50' ▪ Full Sun ▪ pH 4.8-5.8 ▪ Round
C	<i>Quercus nuttallii</i> (<i>Q. texana</i>)	Nuttall Oak	350 sf	Y						Y	Y		<p>Needs space; acid clay soil; irrigation; cultivars available; tolerates wet soils</p> <ul style="list-style-type: none"> ▪ H 70' x W 50' ▪ Full Sun ▪ pH 4.5-5.5
N C	<i>Quercus phellos</i>	Willow Oak	350 sf					Y		Y	Y	Y	<p>Species has variable form and character</p> <ul style="list-style-type: none"> ▪ H 60' x W 50' ▪ Full Sun ▪ pH 4.5-5.5 ▪ Oval, round
C	<i>Quercus robur</i> 'Fastigiata'	English Oak (fastigate cultivars)	350 sf	Y	Y	Y		Y		Y	Y		<p>Mildew is a problem on 'Fastigiata'; better than species for use in smaller spaces</p> <ul style="list-style-type: none"> ▪ H 50' x W 15' ▪ Full Sun, Part Sun / Shade ▪ pH 5.1-6.0 ▪ Columnar

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Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage		Buffers	
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines					Constructed	Riparian
C W	<i>Quercus robur</i> 'Fastigiata' x <i>Q. bicolor</i> 'Long'	Regal Prince® Hybrid Oak	350 sf	Y	Y	Y		Y		Y	Y		<p>Cross between fastigiata English oak and swamp white oak; avoids mildew issues</p> <ul style="list-style-type: none"> ▪ H 50' x W 20' ▪ Full Sun, Part Sun / Shade ▪ pH 4.7-6.3 ▪ Upright, oval
C W	<i>Quercus robur</i> x <i>Q. macrocarpa</i> 'Clemons'	Heritage® Hybrid Oak	350 sf	Y				Y		Y	Y		<p>Not commonly available; needs space</p> <ul style="list-style-type: none"> ▪ H 60' x W 40' ▪ Full Sun, Part Sun / Shade ▪ pH 4.8-7.0 ▪ Oval, broadly rounded with age
C	<i>Quercus rubra</i>	Northern Red Oak, Red Oak	350 sf	Y				Y		Y	Y		<p>Needs well-drained soil; not as well-adapted to Zone 7(8) due to heat and drought, so tends to be smaller here than in the North</p> <ul style="list-style-type: none"> ▪ H 50' x W 40' ▪ Full Sun, Part Sun / Shade ▪ pH 4.3-6.5 ▪ Oval
N C W	<i>Quercus shumardii</i>	Shumard Oak	350 sf	Y				Y		Y	Y	Y	<p>Needs well-drained soil</p> <ul style="list-style-type: none"> ▪ H 50' x W 50' ▪ Full Sun ▪ pH 5.8-7.6 ▪ Round

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Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage			Buffers	
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines						Constructed	Riparian
N C W	<i>Quercus shumardii</i> 'QSFTC'	Panache® Shumard Oak	350 sf	Y	Y			Y		Y	Y	Y	<p>More uniform and upright than species</p> <ul style="list-style-type: none"> ▪ H 50' x W 50' ▪ Full Sun ▪ pH 5.8-7.6 ▪ Round 	
N C W	<i>Quercus stellata</i>	Post Oak	350 sf	Y	Y	Y		Y		Y	Y	Y	<p>Well-adapted to urban sites; typically found on dry, gravelly, or sandy sites; seldom found in landscape situations</p> <ul style="list-style-type: none"> ▪ H 40' x W 35' ▪ Full Sun ▪ pH 4.8-7.0 ▪ Round, oval 	
N C	<i>Quercus velutina</i>	Black Oak	350 sf							Y	Y		<p>Taproot makes it difficult to transplant; existing, healthy trees can be used in other locations if protected</p> <ul style="list-style-type: none"> ▪ H 45' x W 45' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-6.0 ▪ Round 	

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ALLOWED TREES Native = N Canopy = C Understory = U Water-Wise = W				APPROVED LOCATION OF USE CATEGORIES Allowed = Y							CULTURAL INFORMATION		
Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage		Buffers	
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines					Constructed	Riparian
N C U	<i>Salix caroliniana</i>	Coastal Plain Willow	150 sf									Y	<p>Prefers Coastal Plain conditions; often used in stream-bank stabilization; a NC DENR stormwater BMP tree</p> <ul style="list-style-type: none"> ▪ H 15'-30' x W 15'-30' ▪ Full Sun ▪ pH 4.5-6.8 ▪ Rounded, irregular. dense
W C	<i>Salix humilis</i>	Prairie Willow	150 sf									Y	<p>Large shrub or small multi-stemmed tree; often used in streambank stabilization; a NC DENR stormwater BMP tree</p> <ul style="list-style-type: none"> ▪ H 10'-25' x W 10'-30' ▪ Full Sun ▪ pH 5.5-6.8 ▪ Rounded, Dense
N C U	<i>Sassafras albidum</i>	Sassafras	250 sf							Y	Y		<p>Tends to sprout from roots and form extensive thickets; difficult to cultivate and transplant (poor root system) and hard to find, especially in larger sizes</p> <ul style="list-style-type: none"> ▪ H 35' x W 35' ▪ Full Sun ▪ pH 4.5-7.2 ▪ Irregular, pyramidal
C	<i>Sophora japonica</i> (see <i>Styphnolobium japonicum</i>)												

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Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage	Buffers		
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines				Constructed		Riparian
C W	<i>Styphnolobium japonicum</i>	Japanese Pagodatree (cultivars)	250 sf	Y						Y			Impressive white flowers; may not tolerate excessive heat; messy (drops flowers, fruit, leaves, etc.) <ul style="list-style-type: none"> ▪ H 50' x W 35' ▪ Full Sun, Part Sun / Shade ▪ pH 5.1-7.5 ▪ Round to Upright
U	<i>Styrax japonicus</i> (<i>Styrax japonica</i>)	Japanese Snowbell	150 sf				Y	Y		Y	Y		Best in partial shade <ul style="list-style-type: none"> ▪ H 20'-30' x W 20'-30' ▪ Part Sun / Shade ▪ pH 5.6-7.5 ▪ Round
N C	<i>Taxodium ascendens</i> (see <i>T. distichum</i> var. <i>imbricarium</i>)	Pondcypress											
N C	<i>Taxodium distichum</i>	Baldcypress	350 sf	Y	Y			Y		Y	Y	Y	"Knees" form near water; taproot makes it difficult to transplant; needs space; deciduous conifer; wet and dry sites ok <ul style="list-style-type: none"> ▪ H 70' x W 30' ▪ Full Sun ▪ pH 4.5-6.0 ▪ Conical

TABLE 1A: ALLOWED DECIDUOUS TREES

ALLOWED TREES Native = N Canopy = C Understory = U Water-Wise = W				APPROVED LOCATION OF USE CATEGORIES Allowed = Y							CULTURAL INFORMATION			
Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage			Buffers	
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines						Constructed	Riparian
N C	<i>Taxodium distichum</i>	Baldcypress (cultivars)	350 sf	Y	Y	Y		Y		Y	Y	Y	<p>More columnar than species; sage green foliage</p> <ul style="list-style-type: none"> ▪ H 60'-70' x W 25'-30' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-7.2 ▪ Varies by cultivar 	
N C	<i>Tilia americana</i> species or <i>T. caroliniana</i>	American Linden, Basswood	350 sf	Y						Y	Y		<p>Not to be confused with <i>T. cordata</i> (Littleleaf Linden).</p> <ul style="list-style-type: none"> ▪ H 70' x W 50' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 4.5-7.5 ▪ Pyramidal 	
C	<i>Tilia cordata</i>	Littleleaf Linden (species only, not cultivars)	350 sf	Y	Y	Y				Y	Y		<p>Needs space; use species – cultivars tend to have disease problems in this area; not recommended for parking lots</p> <ul style="list-style-type: none"> ▪ H 60' x W 30' ▪ Part Sun / Shade ▪ pH 4.8-7.2 ▪ Pyramidal 	
N C	<i>Ulmus americana</i> 'Princeton'	'Princeton' American Elm	350 sf	Y	Y			Y		Y	Y	Y	<p>Plant named cultivars with resistance to Dutch Elm Disease only, such as 'Princeton', although some have been infected</p> <ul style="list-style-type: none"> ▪ H 70' x W 70' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 5.5-8.0 ▪ Vase-shaped 	

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ALLOWED TREES Native = N Canopy = C Understory = U Water-Wise = W				APPROVED LOCATION OF USE CATEGORIES Allowed = Y							CULTURAL INFORMATION			
Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage			Buffers	
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines						Constructed	Riparian
C	<i>Ulmus parvifolia</i>	Chinese Elm or Lacebark Elm (species and cultivars)	250 sf	Y	Y	Y		Y		Y	Y		<p>Medium to fast growth rate; magnificent and often beautiful bark; tough durable tree for almost any situation</p> <ul style="list-style-type: none"> ▪ H 40' x W 50' ▪ Full Sun, Part Sun / Shade ▪ pH 5.6-8.5 ▪ Vase-shaped 	
C	<i>Zelkova serrata</i>	Japanese Zelkova (species and cultivars)	250 sf	Y	Y	Y		Y		Y			<p>Needs space; straight trees are rare in the species</p> <ul style="list-style-type: none"> ▪ H 70' x W 60' ▪ Full Sun, Part Sun / Shade ▪ pH 5.6-8.5 ▪ Vase-based 	

TABLE 1B: ALLOWED EVERGREEN TREES

ALLOWED TREES				APPROVED LOCATION OF USE CATEGORIES							CULTURAL INFORMATION		
Native = N Canopy = C Understory = U Water-Wise = W				Allowed = Y									
Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage		Buffers	
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines				Constructed	Riparian	
C	<i>Calocedrus decurrens</i>	California Incensecedar (species and tall cultivars)	250 sf						Y		Y		<p>Prefers moist, well-drained, fertile soil, but tolerant of many soil types; intolerant of smog, pollution, and high wind areas; once established, is drought and heat tolerant</p> <ul style="list-style-type: none"> ▪ H 30'-50'+ x W 8'-10' ▪ Full Sun ▪ pH 6.2-6.8 ▪ Narrowly pyramidal
U	<i>Camelia japonica</i>	Japanese Camellia	150 sf						Y	Y	Y		<p>Add "No Pruning" note to plan; tree size not widely available; prefers moist, acid, high organic content, well-drained soils; shallow-rooted, so mulch and do not cultivate around base; numerous cultivars with different color blooms, some double</p> <ul style="list-style-type: none"> ▪ H 10'-25'+ x W 6'-10' ▪ Part Sun / Shade ▪ pH 5.5-6.0 ▪ Densely pyramidal, formal and stiff
U	<i>Camellia sasanqua</i>	Sasanqua Camellia (species and large-growing cultivars)	150 sf					Y	Y	Y	Y		<p>Add "No Pruning" note to plan; tree size not widely available, one of the hardiest camellias; shallow roots prefer mulch; more refined and open than <i>C. japonica</i>; culture similar to <i>C. japonica</i>; hardier than <i>C. japonica</i>; blooms September to December</p> <ul style="list-style-type: none"> ▪ H 10'-15' x W 8'-12' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.0 ▪ Densely branched, rounded, multi-stem

TABLE 1B: ALLOWED EVERGREEN TREES

ALLOWED TREES				APPROVED LOCATION OF USE CATEGORIES							CULTURAL INFORMATION	
Native = N Canopy = C Understory = U Water-Wise = W				Allowed = Y								
Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage		Buffers
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines				Constructed	Riparian
C	<i>Cedrus deodara</i>	Deodar Cedar (species and tall cultivars)	350 sf							Y	Y	<p>Not cold-hardy; generally, prefers Zones 7 to 9; specimen tree; needs space and shelter from wind; foliage color varies by cultivar</p> <ul style="list-style-type: none"> ▪ H 40'-70' x W 40'-70' ▪ Full Sun ▪ pH 6.0-7.5 ▪ Broadly pyramidal
U	<i>Chamaecyparis pisifera</i>	Sawara or Japanese Falsecypress	250 sf						Y		Y	<p>Prefers moist, well-drained soil, and humid atmosphere; specimen plantings, protect from winter wind and sun; deer-resistant</p> <ul style="list-style-type: none"> ▪ H 10'-20' x W 8'-15' ▪ Full Sun ▪ pH 5.5-6.5 ▪ Upright, dense, pyramidal
C	<i>Chamaecyparis thyoides</i>	Atlantic Whitecedar, Whitecedar Falsecypress (cultivars)	250 sf							Y	Y	<p>Prefers wet areas, swamps; needles turn brown second year but persist; not for shade; only those trees attaining and maintained at least 20 feet in height at maturity are canopy trees</p> <ul style="list-style-type: none"> ▪ H 40'-50' x W 13'-20' ▪ Full Sun ▪ pH 5.5-6.8 ▪ Upright, conical

TABLE 1B: ALLOWED EVERGREEN TREES

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Native = N Canopy = C Understory = U Water-Wise = W				Allowed = Y									
Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage		Buffers	
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines				Constructed	Riparian	
N U W	<i>Chamaecyparis thyoides</i>	Atlantic Whitecedar, Whitecedar Falsecypress (cultivars)	250 sf						Y		Y	Y	<p>Prefers wet areas, swamps; not for shade</p> <ul style="list-style-type: none"> ▪ H 15'-30' x W 13'-20' ▪ Full Sun ▪ pH 5.5-6.8 ▪ Upright, Conical
U	<i>Cryptomeria japonica</i>	Japanese Cedar	250 sf						Y		Y		<p>Needs deep, rich, well-drained soil with dependable moisture, and protection from wind for best growth; withstands heat well; good specimen, tip and stem dieback a problem</p> <ul style="list-style-type: none"> ▪ H 10'-30'+ x W 10'-30' ▪ Full Sun ▪ pH 5.5-6.2 ▪ Upright, pyramidal
C	<i>Cryptomeria japonica</i>	Japanese Cedar, Japanese Cryptomeria (species and tall cultivars)	250 sf					Y	Y	Y	Y		<p>Needs space and shelter from wind; proven cultivars for Durham area are best</p> <ul style="list-style-type: none"> ▪ H 30'-50' x W 20'-80' ▪ Full Sun ▪ pH 5.5-7.0 ▪ Pyramidal or conical

TABLE 1B: ALLOWED EVERGREEN TREES

ALLOWED TREES				APPROVED LOCATION OF USE CATEGORIES							CULTURAL INFORMATION		
Native = N Canopy = C Understory = U Water-Wise = W				Allowed = Y									
Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage		Buffers	
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines				Constructed	Riparian	
C	<i>Cupressus arizonica</i>	Arizona Cypress, Smooth Cypress	250 sf					Y	Y	Y	Y		<p>Will thin with competition; subject to canker and not long-lived; can become more open with age; only trees attaining and maintained at least 20 feet in height at maturity are canopy trees</p> <ul style="list-style-type: none"> ▪ H 30'-40' x W 15'-20' ▪ Full Sun ▪ pH 6.5-8.0 ▪ Narrow to broadly pyramidal
C	<i>Eriobotrya japonica</i>	Loquat	250 sf								Y		<p>Give protection from winter sun and wind in Zone 7b; prefers moist, well-drained soils, but adaptable once established, showing some drought-resistance; only trees attaining and maintained at least 20 feet in height at maturity are canopy trees</p> <ul style="list-style-type: none"> ▪ H 15'-25' x W 15'-25' ▪ Full Sun ▪ pH 5.8-7.4 ▪ Large, broad-spreading, rounded
U W	<i>Ilex</i> 'Clusterberry' ('Nellie R. Stevens' x <i>I. leucoclada</i>)	'Clusterberry' Hybrid Holly	150 sf					Y	Y	Y	Y		<p>Prefers loose, loamy, well-drained soils, but is adaptable; good specimen holly</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 6'-10' ▪ Full Sun, Part Sun / Shade ▪ pH 6.2-7.4 ▪ Rounded, spreading

TABLE 1B: ALLOWED EVERGREEN TREES

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Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage	Buffers		
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines				Constructed	Riparian	
U W	<i>Ilex</i> 'Emily Bruner' (<i>I. cornuta</i> 'Burfordii' x <i>I. latifolia</i>),	'Emily Bruner' Holly	150 sf					Y	Y	Y	Y		<p>A dense form with large, dark green, evergreen leaves; 'Emily Bruner' (sometimes 'Emily Brunner' or 'Emily Bruner') and 'Ginny Bruner' have large, red fruits and 'James Swan' is the male pollinator; others are male (no fruit); widely available</p> <ul style="list-style-type: none"> ▪ H 20' - 30' x W 10' - 18' ▪ Full Sun, Part Sun / Shade ▪ pH 5.0 - 6.5 ▪ Broadly pyramidal
U	<i>Ilex</i> 'Nellie R. Stevens' (<i>I. cornuta</i> x <i>I. aquifolium</i>)	'Nellie R. Stevens' Holly	150 sf				Y	Y	Y	Y	Y		<p>Relatively fast-growing; limb-up if used as a small street tree under power lines; pollinated by male <i>I. cornuta</i>.</p> <ul style="list-style-type: none"> ▪ H 25' - 30' x W 10' - 12' ▪ Full Sun, Part Sun / Shade ▪ pH 4.0 – 7.5 ▪ Broadly pyramidal
U W	<i>Ilex</i> 'Nellie R. Stevens' (<i>I. cornuta</i> x <i>I.</i> <i>aquifolium</i>)	'Nellie R. Stevens' Holly	100 sf				Y	Y	Y	Y	Y		<p>Relatively fast-growing; limb-up if used as a small street tree under power lines; prefers loose, loamy, well-drained soils, but is adaptable; good specimen holly; best fruit when pollinated by male <i>I. cornuta</i></p> <ul style="list-style-type: none"> ▪ H 15' - 30' x W 8' - 12' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5 - 7.0 ▪ Dense, broadly pyramidal

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Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage		Buffers	
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines				Constructed	Riparian	
C	<i>Ilex aquifolium</i>	English Holly (tall cultivars)	250 sf						Y	Y	Y		<p>Best berries if both males and females used; good hedges; dense; for this and all <i>Ilex</i> species and cultivars, only trees attaining and maintained at least 20 feet in height at maturity are canopy trees</p> <ul style="list-style-type: none"> ▪ H 25' - 40' x W 15' - 25' ▪ Full Sun, Part Sun / Shade ▪ pH 5.0 – 7.0 ▪ Upright
U W	<i>Ilex Arcadiana</i> ™ ('Magiana')	Red Hybrid Hollies	150 sf					Y	Y	Y	Y		<p>leaves prominently-spined; prefers loose, loamy, well-drained soils, but is adaptable; good specimen holly; best fruit with pollinating males</p> <ul style="list-style-type: none"> ▪ H 10' - 15' x W 5' - 8' ▪ Full Sun, Part Sun / Shade ▪ pH 5.0 - 6.5 ▪ Upright, pyramidal
U	<i>Ilex latifolia</i> 'Mary Nell' (<i>I. cornuta</i> 'Burfordii' x <i>I. pernyi</i> 'Red Delight' x <i>I. latifolia</i>)	'Mary Nell' Holly	150 sf					Y	Y	Y	Y		<p>Leaves are large, magnolia-sized, spiny, and dark green; flowers are fragrant, yellow-white in early April; lots of red fruit; full and dense but requires pruning to keep dense and full</p> <ul style="list-style-type: none"> ▪ H 20' - 25' x W 10' ▪ Full Sun, Part Sun / Shade ▪ pH 5.0 – 6.5 ▪ Pyramidal

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				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines				Constructed	Riparian	
U W	<i>Ilex latifolia</i> 'Mary Nell' (<i>I. cornuta</i> 'Burfordii' x <i>I. pernyi</i> 'Red Delight' x <i>I. latifolia</i>)	'Mary Nell' Holly	150 sf					Y	Y	Y	Y		Big, magnolia-sized, spiny, dark green leaves; fragrant, yellow-white flowers in early April; lots of red fruit; full and dense but requires pruning to keep dense and full <ul style="list-style-type: none"> ▪ H 20' - 25' x W 10' ▪ Full Sun, Part Sun / Shade ▪ pH 5.0 - 6.5 ▪ Pyramidal
U	<i>Ilex opaca</i>	American Holly (species and larger cultivars)	150 sf						Y	Y	Y		Denser in full sun; slow growth; cultivars tend to be more robust <ul style="list-style-type: none"> ▪ H 30' x W 18' ▪ Part Sun / Shade, Shade ▪ pH 5.5 – 6.2 ▪ Densely, pyramidal
N U W	<i>Ilex opaca</i>	American Holly (smaller, upright cultivars)	150 sf						Y	Y	Y	Y	Slow growing; protect from winter wind and sun; must be pruned to maintain as an understory tree <ul style="list-style-type: none"> ▪ H 15' - 30' x W 15' - 20' ▪ Full Sun, Part Sun / Shade ▪ pH 5.0 - 6.5 ▪ Pyramidal
N U W	<i>Ilex vomitoria</i>	Yaupon Holly (weeping cultivars)	150 sf					Y		Y	Y	Y	Same as previous <ul style="list-style-type: none"> ▪ H 12' - 20'+ x W 6' - 12' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5 - 6.8 ▪ Weeping form, irregular

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Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage		Buffers	
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines				Constructed	Riparian	
U C W	<i>Ilex vomitoria</i> 'Shadow's Female'	Shadow's Female Yaupon	150 sf						Y		Y		Same as previous <ul style="list-style-type: none"> ▪ H 10' - 12'+ x W 6' - 12' ▪ Full Sun ▪ pH 4.5 - 7.0 ▪ Upright
U C W	<i>Ilex vomitoria</i> 'Will Fleming'	'Will Fleming' Yaupon Holly	150 sf					Y		Y	Y	Y	Same as previous <ul style="list-style-type: none"> ▪ H 10' - 15'+ x W 1.5' - 2' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5 - 6.8 ▪ Upright, columnar
U	<i>Ilex vomitoria</i>	Yaupon Holly (species and tall, upright cultivars)	150 sf					Y	Y	Y	Y		Can be pruned into tree form; adaptable in a range of very dry to wet conditions; tolerates salt spray and pruning; good as a specimen, in groupings, hedges; poisonous leaves <ul style="list-style-type: none"> ▪ H 20' - 25' x W 6' - 12' ▪ Full Sun, Part Sun/Shade ▪ pH 5.5 – 6.8 ▪ Tall, upright, dense, irregularly rounded

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Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage		Buffers	
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines				Constructed	Riparian	
U N W	<i>Ilex vomitoria</i>	Yaupon Holly (species and tall, upright cultivars)	150 sf					Y	Y	Y	Y		<p>Can be trained to tree form; must be pruned to maintain as an understory tree; adaptable in a range of very dry to wet conditions; tolerates salt spray and pruning; good as hedges; poisonous leaves</p> <ul style="list-style-type: none"> ▪ H 20' - 30' x W 12' - 20' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5 - 6.8 ▪ Upright, Dense, Irregularly rounded
U W	<i>Ilex x aquipernyi</i>	Aquipern Holly	150 sf						Y	Y	Y		<p>Best berries if both males and females used; showy; 'Aquipern' is a male clone</p> <ul style="list-style-type: none"> ▪ H 12' - 25' x W 8' - 15' ▪ Full Sun, Part Sun / Shade ▪ pH 5.0 - 6.5 ▪ Upright, dense, pyramidal
U	<i>Ilex x attenuata</i> (<i>I. cassine</i> x <i>I. opaca</i>)	Foster's Hybrid Hollies (tall cultivars)	150 sf					Y	Y	Y	Y		<p>Limb-up if used as street tree; transplant shock often causes heavy leaf drop and long recovery; 'Foster's #2' is good for hedges; 'Savannah' can be chlorotic, especially in high pH</p> <ul style="list-style-type: none"> ▪ H 20' - 30' x W 12' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5 - 6.2 ▪ Densely pyramidal

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Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage		Buffers	
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines				Constructed	Riparian	
U W	<i>Ilex xattenuata</i> (<i>I. cassine</i> x <i>I. opaca</i>)	Foster's Hybrid Hollies	150 sf				Y	Y	Y	Y	Y		<p>Must be pruned to maintain under 20 feet tall as an understory tree; 'Savannah' tends to be chlorotic in high pH; good berries and leaf color otherwise; limb-up if used as a street tree; 'Foster's #2' is good for hedges; Dixie™ series are slower-growing</p> <ul style="list-style-type: none"> ▪ H 25' - 30' x W 6' - 10' ▪ Full Sun, Part Sun / Shade ▪ pH 5.0 - 6.5 ▪ Upright, narrow, pyramidal
U W	<i>Juniperus chinensis</i>	Chinese Juniper	150 sf					Y	Y		Y		<p>Prefers moist, well-drained soils, but not wet, conditions; withstands dry conditions and drought once established; pH-adaptable; after 10-15 years, Chinese junipers can get much larger than specified in literature</p> <ul style="list-style-type: none"> ▪ H 8' - 15'+ x W 2' - 6' ▪ Full Sun ▪ pH 5.5 - 7.4 ▪ Erect, form depends on cultivar
U N W	<i>Juniperus communis</i> 'Hibernica'	Common Juniper	150 sf								Y		<p>Not as heat-tolerant as other junipers, otherwise tough plant; can be short-lived</p> <ul style="list-style-type: none"> ▪ H 10' - 15' x W 4' - 6' ▪ Full Sun ▪ pH 5.5 - 7.4 ▪ Upright

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U W	<i>Juniperus scopulorum</i>	Rocky Mountain Juniper	150 sf					Y	Y		Y		<p>Not well-suited to Zone 7; other juniper species handle high humidity and high night-time temperature of Southeast better; color varies by cultivar</p> <ul style="list-style-type: none"> ▪ H 15' - 20' x W 4' - 8' ▪ Full Sun ▪ pH 5.5 - 7.5 ▪ Narrow, columnar
N U W	<i>Juniperus virginiana</i>	Eastern Redcedar (medium, upright-growing forms)	150 sf					Y	Y	Y	Y		<p>Does not tolerate wet sites; tolerates dry conditions and poor soils, best in deep, loamy soils with good drainage; must be pruned to maintain as an understory tree</p> <ul style="list-style-type: none"> ▪ H 8' - 15' x W 4' - 8' ▪ Full Sun ▪ pH 4.0 - 6.8 ▪ Upright, conical, dense
C	<i>Juniperus virginiana</i>	Eastern Redcedar (medium-tall, columnar cultivars)	150 sf					Y	Y	Y	Y		<p>Does not tolerate wet sites; needs full sun; tolerates dry conditions and poor soils, but best in deep, loamy soils with good drainage; only trees attaining and maintained at least 20 feet in height at maturity are canopy trees</p> <ul style="list-style-type: none"> ▪ H 15' - 30' x W 6' - 8' ▪ Full Sun ▪ pH 4.0 - 6.8 ▪ Columnar

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				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines				Constructed	Riparian	
U C W	<i>Juniperus virginiana</i>	Eastern Redcedar (medium-tall, columnar cultivars)	150 sf					Y	Y	Y	Y		Same as previous <ul style="list-style-type: none"> ▪ H 15' - 30' x W 6' - 8" ▪ Full Sun ▪ pH 4.0 - 6.8 ▪ Columnar
C	<i>Juniperus virginiana</i>	Eastern Redcedar (species and tall, tree-form cultivars)	150 sf					Y	Y	Y	Y		Same as previous; form depends on cultivar; species is variable; only those trees attaining and maintained at least 20 feet in height at maturity are canopy trees <ul style="list-style-type: none"> ▪ H 20' - 40' x W 8' - 20' ▪ Full Sun ▪ pH 4.0 – 6.8 ▪ Columnar to pyramidal
U	<i>Loropetalum chinensis</i> <i>var. rubrum</i>	Burgundy Loropetalum, Chinese Witch Hazel, Fringe Flower	150 sf					Y	Y	Y	Y		Purple and green leaf varieties available; pink and white flowering; can prune to multi-stem tree and to keep to desired height; size may vary within same cultivar; does not do well in high pH or dry soils <ul style="list-style-type: none"> ▪ H 8' - 20' x W 6' - 15' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5 - 6.5 ▪ Rounded, arching

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C	<i>Magnolia grandiflora</i>	Southern Magnolia (medium-sized cultivars)	250 sf	Y	Y	Y		Y	Y	Y	Y		<p>Susceptible to cold; slow growth rate; not easy to transplant; ‘Hasse’, ‘MGTIG’ cultivars recommended for use in Downtown and Urban Tiers</p> <ul style="list-style-type: none"> ▪ H 40’ x W 15’ ▪ Full Sun, Part Sun / Shade ▪ pH 5.5 – 6.2 ▪ Narrowly pyramidal
C	<i>Magnolia grandiflora</i>	Southern Magnolia (small cultivars)	150 sf		Y	Y		Y	Y	Y	Y		<p>Dense; compact; only trees attaining and maintained at least 20 feet in height at maturity are canopy trees</p> <ul style="list-style-type: none"> ▪ H 20’ x W 10 ▪ Full Sun, Part Sun / Shade ▪ pH 4.5 – 5.5 ▪ Ovate, pyramidal
N U W	<i>Magnolia grandiflora</i> ‘Little Gem’	‘Little Gem’ Southern Magnolia	150 sf				Y	Y	Y	Y	Y		<p>Dense; compact</p> <ul style="list-style-type: none"> ▪ H 20’ x W 10’ ▪ Part Sun, Part Sun / Shade ▪ pH 4.5 - 5.5 ▪ Ovate, pyramidal
C	<i>Magnolia grandiflora</i>	Southern Magnolias (species and large-growing cultivars)	350 sf	Y				Y	Y	Y	Y		<p>Slow growth rate; susceptible to cold; larger varieties need space</p> <ul style="list-style-type: none"> ▪ H 60 x W 30’ ▪ Full Sun, Part Sun / Shade ▪ pH 5.5 – 6.2 ▪ Pyramidal

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N U W	<i>Magnolia grandiflora</i> , 'Saint Mary' (‘Glen St. Mary’)	‘St. Mary’ Southern Magnolia	150 sf					Y	Y	Y	Y		Compact; bushy <ul style="list-style-type: none"> ▪ H 18’ - 22’ x W 10’ - 20’ ▪ Part Sun, Part Sun / Shade ▪ pH 4.5 - 5.5 ▪ Ovate, pyramidal
C	<i>Magnolia virginiana</i>	Sweetbay Magnolia	150 sf							Y	Y		Multi-stem tree; really only semi-evergreen; does well in wet, even swampy conditions; only trees attaining and maintained at least 20 feet in height at maturity are canopy trees <ul style="list-style-type: none"> ▪ H 15’ - 40’ x W 10’ - 25’ ▪ Full Sun, Part Sun / Shade ▪ pH 4.5 – 6.0 ▪ Upright, pyramidal, spreading
U	<i>Osmanthus fragrans</i>	Fragrant Tea Olive	150 sf					Y	Y		Y		Multi-stem tree; least hardy of the genus in cold weather; tallest growth along the Coast <ul style="list-style-type: none"> ▪ H 10’ - 20’ x W 8’ - 15’ ▪ Part Sun / Shade, Shade ▪ pH 4.5 - 7.0 ▪ Rounded, upright

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U	<i>Osmanthus heterophyllus</i> (<i>O. ilicifolius</i>)	Holly Osmanthus	150 sf					Y	Y		Y		<p>Hardest of the genus; spiny leaves; good for borders, screens, hedges or formal specimen; nice smelling flowers in autumn</p> <ul style="list-style-type: none"> ▪ H 6' - 20' x W 3' - 15' ▪ Part Sun / Shade, Shade ▪ pH 4.5 - 7.0 ▪ Rounded, upright, depending on cultivar
U	<i>Osmanthus xfortunei</i> (<i>O. heterophyllus</i> x <i>O. fragrans</i>)	Fortune's Osmanthus	150 sf					Y	Y	Y	Y		<p>Nearly as hardy as holly osmanthus; dark green, full and dense leaves; good for screening, borders, hedges or formal specimen</p> <ul style="list-style-type: none"> ▪ H 12' - 25' x W 10' - 18' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 4.5 - 7.0 ▪ Rounded, upright
U	<i>Photinia glabra</i>	Japanese Photinia	150 sf					Y	Y		Y		<p>Smallest Photinia; unpleasant flower smell; less cold-hardy than Fraser and Chinese Photinias</p> <ul style="list-style-type: none"> ▪ H 10' - 12' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 4.5 - 7.5 ▪ Rounded, upright
U	<i>Photinia serratifolia</i> (formerly <i>P. serrulata</i>)	Chinese Photinia	150 sf					Y	Y		Y		<p>cold damage; insect and disease issues; flowers foul-smelling; limit use</p> <ul style="list-style-type: none"> ▪ H 20' - 30' x W 13' - 20' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 4.5 - 7.5 ▪ Rounded, upright

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U	<i>Photinia xfraseri</i>	Fraser Photinia ('Red Tip')	150 sf					Y	Y		Y		<p>Good screen and hedge; cold damage, insect and disease issues in moist, humid weather; flowers foul-smelling; limit use. Do not plant in wet areas or areas with limited air flow.</p> <ul style="list-style-type: none"> ▪ H 10' - 18' x W 7' - 15' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 4.5 - 7.5 ▪ Rounded, upright
C	<i>Picea orientalis</i>	Oriental Spruce	250 sf								Y		<p>Prefers moist, well-drained, deep, rich soils, but tolerates poor, gravelly soils; provide winter wind protection; does okay in Zone 7, but not as fast or vigorous as in the North; dwarf and weeping cultivars also available (not as canopy trees)</p> <ul style="list-style-type: none"> ▪ H 40' - 60' x W 20' - 25' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5 - 6.4 ▪ Slender, pyramidal, with drooping branches
C	<i>Pinus taeda</i>	Loblolly Pine	250 sf	Y						Y	Y		<p>Pioneer plant; rapid growth; existing mature pines in good condition can be used as street trees in Rural/ Suburban Tiers</p> <ul style="list-style-type: none"> ▪ H 60' x W 40' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5 – 6.5 ▪ In landscape, oval, rounded crown

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U W	<i>Platycladus orientalis</i> (formerly <i>Thuja orientalis</i>)	Oriental Arborvitae	150 sf					Y	Y		Y		<p>Prefers well-drained soils, but is tolerant of most soils; less appealing to deer than <i>Thuja occidentalis</i>; yellow to golden leaves; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 6' - 18'+ x W 4' - 12' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5 - 7.4 ▪ Depending on cultivar, fine textured, pyramidal to upright oval
U W	<i>Platycladus orientalis</i>	Oriental Arborvitae	150 sf					Y	Y		Y		<p>Same as previous but with blue-green to green leaves; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 6' - 18'+ x W 4' - 12' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5 - 7.4 ▪ Depending on cultivar, fine textured, pyramidal to upright oval
C	<i>Prunus caroliniana</i>	Carolina Cherry laurel (species and cultivars)	250 sf				Y		Y	Y	Y	Y	<p>Tree form; can be pruned to a hedge; fast grower; only trees attaining and maintained at least 20 feet in height at maturity are canopy trees; 'Bright 'N Tight' cultivar superior to species for most situations</p> <ul style="list-style-type: none"> ▪ H 20' - 30' x W 15' - 25' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5 – 6.2 ▪ Pyramidal to oval

TABLE 1B: ALLOWED EVERGREEN TREES

ALLOWED TREES				APPROVED LOCATION OF USE CATEGORIES								CULTURAL INFORMATION	
Native = N Canopy = C Understory = U Water-Wise = W				Allowed = Y									
Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage	Buffers		
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines				Constructed	Riparian	
N U	<i>Prunus caroliniana</i> 'Compacta'	Bright 'N Tight™ Carolina Cherrylaurel	250 sf				Y		Y	Y	Y	Y	<p>Tree form; can be pruned to a hedge; fast grower;</p> <ul style="list-style-type: none"> ▪ H 20' x W 15' ▪ Part Sun, Part Sun / Shade ▪ pH 5.5 - 6.2 ▪ Pyramidal to oval
U	<i>Prunus laurocerasus</i>	English Laurel	150 sf					Y	Y		Y		<p>Use species for understory planting; intolerant of poor drainage; "shothole bacterium," dieback common</p> <ul style="list-style-type: none"> ▪ H 10' - 18' x W 8' - 20'' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 5.5 - 6.5 ▪ Rounded
C	<i>Quercus myrsinifolia</i>	Chinese Evergreen Oak	250 sf	Y	Y	Y	Y	Y	Y				<p>Good for street trees, parking lots, containers; very tolerant of soil ranges; only trees attaining and maintained at least 20 feet in height at maturity are canopy trees</p> <ul style="list-style-type: none"> ▪ H 20' - 30+ x W 20' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5 – 6.5 ▪ Round

TABLE 1B: ALLOWED EVERGREEN TREES

ALLOWED TREES				APPROVED LOCATION OF USE CATEGORIES							CULTURAL INFORMATION		
Native = N Canopy = C Understory = U Water-Wise = W				Allowed = Y									
Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage		Buffers	
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines				Constructed	Riparian	
U	<i>Thuja occidentalis</i> 'Emerald' ('Smaragd')	Eastern or American Arborvitae, Whitecedar	150 sf					Y	Y	Y	Y		<p>Prefers moist, fertile, well-drained soils; pH-adaptable; reportedly needs weekly watering in dry conditions; species as a whole is not well-suited to the South; some cultivars perform better than others</p> <ul style="list-style-type: none"> ▪ H 10' - 16' x W 3' - 5' ▪ Full Sun, Part Sun / Shade ▪ pH 6.2 - 7.0 ▪ Narrow, upright, conical
U	<i>Thuja orientalis</i> (see <i>Platyclusus orientalis</i>)	Oriental Arborvitae											
U	<i>Thuja plicata</i>	Western Arborvitae	150 sf						Y	Y	Y		<p>Prefers moist, fertile, well-drained soils; pH-adaptable; reportedly does not do well in dry conditions; species as a whole is not well-suited to the South; only trees attaining and maintained at least 20 feet in height at maturity are canopy trees</p> <ul style="list-style-type: none"> ▪ H 50' - 70' - ' x W ' - 15' - 25' ▪ Full Sun, Part Sun / Shade ▪ pH 6.2 – 7.4 ▪ Upright, dense, fine-textured

TABLE 1B: ALLOWED EVERGREEN TREES

ALLOWED TREES				APPROVED LOCATION OF USE CATEGORIES							CULTURAL INFORMATION		
Native = N Canopy = C Understory = U Water-Wise = W				Allowed = Y									
Plant Type	Scientific Name	Common Name	Required Minimum Root Area	Street Trees				Vehicle Use Area	Solid Hedge	Tree Coverage		Buffers	
				Rural/Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tier	Under Power Lines				Constructed	Riparian	
U	<i>Thuja plicata</i> 'Green Giant'	'Green Giant' Western Arborvitae	150 sf					Y	Y	Y	Y		<p>Prefers moist, fertile, well-drained soils; pH-adaptable; reportedly does not do well in dry conditions; species as a whole is not well-suited to the South; must be maintained between 10 and 20 feet to use in this category</p> <ul style="list-style-type: none"> ▪ H 20' - 40' x W 8' - 15' ▪ Full Sun, Part Sun / Shade ▪ pH 6.2 - 7.4 ▪ Upright, dense. Fine-textured
U	<i>Viburnum awabuki</i> 'Chindo'	'Chindo' Viburnum	150 sf					Y	Y	Y			<p>Similar to 'Nellie R. Stevens' holly, bigger leaves; large, pendulous fruit clusters if cross-pollinated; protect from wind, cold, and winter sun; fragrant, showy flowers; deer resistant</p> <ul style="list-style-type: none"> ▪ H 10' - 20' x W 6' - 15' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5 - 6.6 ▪ Upright, pyramidal

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Abelia</i> 'Edward Goucher' (<i>A. x grandiflora</i> <i>x A. parvifolia</i> (<i>A. schumanii</i>))	'Edward Goucher' Abelia	Y	Y	Y		Y		More showy than <i>A. x grandiflora</i> , but less cold-hardy; may also be known as "Dwarf", 'Dwarf Pink', or 'Dwarf Purple'; draws bees and butterflies <ul style="list-style-type: none"> ▪ H 5' x W 5' ▪ Full Sun, Part Sun / Shade ▪ pH 5.0 - 6.5
W	<i>Abelia chinensis</i>	Chinese Abelia	Y	Y	Y		Y		Large; white flowering; semi-evergreen; bees and butterflies <ul style="list-style-type: none"> ▪ H 5'-7' x W 4'-5' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Upright, spreading
W	<i>Abelia x grandiflora</i>	Glossy Abelia (weeping cultivars)	Y	Y	Y		Y		Same as previous <ul style="list-style-type: none"> ▪ H 3'-4' x W 3'-6' ▪ Full Sun, Part Sun / Shade ▪ pH 5.0-6.5 ▪ Weeping, arching, spreading mound, fine textured
W	<i>Abelia x grandiflora</i>	Glossy Abelia (medium-height cultivars)	Y		Y		Y		Same as previous <ul style="list-style-type: none"> ▪ H 3' x W 5' (up to 8' x 8') ▪ Full Sun, Part Sun / Shade ▪ pH 5.0-6.5 ▪ Rounded, dense, spreading

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Abelia x grandiflora</i>	Glossy Abelia (medium-tall cultivars)	Y		Y		Y		<p>Same as previous</p> <ul style="list-style-type: none"> ▪ H 4.5'-5' x W 6'-10' ▪ Full Sun, Part Sun / Shade ▪ pH 5.0-6.5 ▪ Rounded, dense, spreading
W	<i>Abelia x grandiflora</i>	Glossy Abelia (low-growing cultivars)	Y	Y	Y		Y		<p>Semi-evergreen in cold winters; draws bees and butterflies; occasional pruning of shoots needed</p> <ul style="list-style-type: none"> ▪ H 1.5'-3.5' x W 2.5'-4' (up to 8' x 8') ▪ Full Sun, Part Sun / Shade ▪ pH 5.0-6.5 ▪ Rounded, dense, spreading
	<i>Agarista populifolia</i> (formerly <i>Leucothoe populifolia</i>)	Florida Leucothoe			Y			Y	<p>More tolerant of diseases and conditions than <i>L. fontanesiana</i> or <i>L. axillaris</i>; can be maintained at smaller, shrub height with pruning; needs, cool, moist, environment; prefers acid, high-organic-content soil, shade; good along streams; tends to form suckering communities</p> <ul style="list-style-type: none"> ▪ H 8'-12' x W 4'-8' ▪ Part Sun / Shade, Shade ▪ pH 4.5-6.2 ▪ Drooping, arching, multi-stemmed

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Aspidistra elatior</i>	Cast-Iron Plant	Y	Y	Y			Y	<p>Large-leaf groundcover or edging plant along shady sidewalks; needs deep, rich, well-drained soil for good drought-tolerance; leaf edges turn brown in winter unless well-protected and well-suited</p> <ul style="list-style-type: none"> ▪ H 1.5'-2.5' x W 2'-3' ▪ Part Sun / Shade, Shade ▪ pH 6.2-6.8 ▪ Upright, coarse texture
W	<i>Aucuba japonica</i>	Japanese Aucuba, Spotted Laurel (lower-growing, variegated cultivars)			Y			Y	<p>Prefers moist, high-organic, well-drained soil, but tolerant of a mix of soils; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 4'-8' ▪ Part Sun / Shade, Shade ▪ pH 5.4-6.8 ▪ Broad leaf, dense, upright, rounded
W	<i>Aucuba japonica</i>	Japanese Aucuba, Spotted Laurel (lower-growing, green-leaved cultivars)			Y			Y	<p>Same as previous</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 4'-8' ▪ Part Sun / Shade, Shade ▪ pH 5.4-6.8 ▪ Broad leaf, dense, upright, rounded
W	<i>Aucuba japonica</i>	Japanese Aucuba, Spotted Laurel (species and taller cultivars)			Y			Y	<p>Same as previous</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 4'-8' ▪ Part Sun / Shade, Shade ▪ pH 5.4-6.8 ▪ Broad leaf, dense, upright, rounded

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Berberis julianae</i>	Wintergreen Barberry			Y		Y		<p>A barrier plant with thorns; does not prune well; cut to six inches above ground to rejuvenate as needed</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 6'-10' ▪ Full Sun, Part Sun / Shade ▪ pH 6.2-6.8 ▪ Rounded, impenetrable mass
W	<i>Berberis x gladwynensis</i> 'William Penn'	William Penn Barberry			Y		Y		<p>Does best with moist, well-drained soil, but tolerates poor soils; a barrier plant; not widely available</p> <ul style="list-style-type: none"> ▪ H 3'-4' x W 3'-4' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Dense, rounded
W	<i>Berberis x mentorensis</i> (<i>B. julianae</i> x <i>B. thunbergii</i>)	Mentor Barberry			Y		Y		<p>Semi-evergreen; does best with moist, well-drained soil, but tolerates poor soils; a dense barrier plant if not pruned extensively; not widely available</p> <ul style="list-style-type: none"> ▪ H 5'-7' x W 5'-7' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ upright, stiff, rounded, spreading with age

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Buxus microphylla</i> var. <i>japonica</i>	Japanese Boxwood	Y	Y	Y			Y	<p>Slow growing; needs high pH; a surface-rooter, so keep mulched and do not cultivate around base of plant; takes pruning; good for hedges, edging, formal gardens, urban planting, if maintained; deer-resistant, but some diseases</p> <ul style="list-style-type: none"> ▪ H 3'-4' x W 3'-4' ▪ Full Sun ▪ pH 6.8-7.5+ ▪ Loose, rounded, formal
W	<i>Buxus sempervirens</i>	Common Box or Boxwood (medium-height cultivars)	Y		Y			Y	<p>Same as previous; 'Asheville', 'Elegantissima' are pyramidal; 'Dee Runk', 'Liberty' are narrow, columnar-pyramidal</p> <ul style="list-style-type: none"> ▪ H 5'-10' x W 4'-10' ▪ Full Sun, Part Sun / Shade ▪ pH 6.0-7.4 ▪ Dense, shape varies by cultivar, formal
W	<i>Buxus sempervirens</i>	Common Box or Boxwood (medium-height, weeping cultivars)	Y		Y			Y	<p>Same as previous, but weeping forms; large shrub or small tree</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 6' ▪ Full Sun, Part Sun / Shade ▪ pH 6.0-7.4 ▪ Weeping
W	<i>Buxus sempervirens</i>	Common Box or Boxwood (lower-growing cultivars)	Y		Y			Y	<p>Same as previous</p> <ul style="list-style-type: none"> ▪ H 2'-5' x W 4'-5' ▪ Full Sun, Part Sun / Shade ▪ pH 6.0-7.5+ ▪ Dense, rounded, formal

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Buxus sempervirens</i> 'Suffruticosa'	English Boxwood, "True Edging" Boxwood	Y	Y	Y			Y	<p>Cold-hardiness depends on cultivar; not as slow-growing as Japanese boxwood; very long-lived in ideal conditions; takes pruning; surface-rooter, so keep mulched and do not cultivate around base of plant; does best in rich, well-drained, limestone soils; heavy soils (local Triassic clay) increases stress and nematode damage; deer-resistant; some issues with "English Boxwood decline" in Zone 6</p> <ul style="list-style-type: none"> ▪ H 2'-4' x W 3'-5' ▪ Full Sun, Part Sun / Shade ▪ pH 6.0-7.4 ▪ Dense, formal, if left alone, like 'fused clouds'
W	<i>Buxus sinica</i> var. <i>insularis</i> (formerly <i>B. microphylla</i> var. <i>koreana</i>)	<i>Buxus sinica</i> var. <i>insularis</i> (formerly <i>B. microphylla</i> var. <i>koreana</i>)	Y	Y	Y			Y	<p>Extremely cold-hardy compared to other boxwoods; slow growing; prefers high pH; a surface-rooter, so keep mulched and do not cultivate around base of plant; takes pruning; good for hedges, edging, formal gardens, urban planting, if maintained; deer-resistant, but some diseases</p> <ul style="list-style-type: none"> ▪ H 2'-3' x W 3'-6' ▪ Full Sun, Part Sun / Shade ▪ pH 5.4-6.8 ▪ Dense, rounded, becoming loose, open, spreading
W	<i>Calocedrus decurrens</i> (formerly <i>Libocedrus decurrens</i>)	California Incense Cedar (Compact growing shrub cultivars)						Y	<p>Prefers moist, well-drained, fertile soil, but tolerant of many soil types; intolerant of smog, pollution, and high wind areas; once established, is drought- and heat-tolerant</p> <ul style="list-style-type: none"> ▪ H 6' x W 6' ▪ Full Sun ▪ pH 6.2-6.8 ▪ Globe

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Calocedrus decurrens</i>	California Incense Cedar (Medium growing shrub cultivars)					Y		<p>Same as previous;</p> <ul style="list-style-type: none"> H 8'-15' x W 4'-5' Full Sun pH 6.2-6.8 Columnar
	<i>Camellia japonica</i>	Japanese Camellia			Y	Y	Y		<p>Prefers moist, acid, high organic content, well-drained soils; high Pine shade best; shallow-rooted, so mulch and do not cultivate around base; bloom January-April, depending on cultivar; numerous cultivars with different color blooms, some double; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> H 10'-15' x W 6'-10' Part Sun / Shade pH 5.5-6.0 Densely pyramidal, sometimes open, formal, stiff
	<i>Camellia oleifera</i>	Tea-Oil Camellia			Y		Y		<p>Culture similar to <i>C. japonica</i> and <i>C. sasanqua</i>; blooms October to January; hardier than other camellias (look for Ackerman Hybrids); less formal than other camellias; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> H 12'-15' x W 8'-12' Full Sun, Part Sun / Shade pH 5.5-6.0 Pyramidal to rounded; multi-stem

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
	<i>Camellia sasanqua</i>	Sasanqua Camellia (lower-growing cultivars)	Y		Y	Y	Y		<p>Smaller leaf, and more refined and open than <i>C. japonica</i>; culture similar to <i>C. japonica</i>; hardier than <i>C. japonica</i>; blooms September to December; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 6'-10' ▪ Part Sun / Shade ▪ pH 5.4-6.2 ▪ Pyramidal to round; densely branched
W	<i>Camellia sinensis</i>	Tea			Y		Y		<p>Hardest of Camellias; not as particular about soil or sun exposure – will tolerate full sun or heavy shade; good drought- and heat-tolerance; blooms September to November; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 4'-8' x W 4'-6' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 5.4-6.8 ▪ Rounded shrub
W	<i>Cedrus deodara</i>	Dwarf Deodar Cedar	Y						<p>Requires well-drained and somewhat dryer soils in part shade due to the heat; protect from winter winds; drought-tolerant once established; specimen plantings; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 4'-6' x W 4'-6' ▪ Full Sun ▪ pH 6.2-7.4 ▪ Dwarf, pyramidal

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Cephalotaxus harringtonia</i>	Plum Yew (lower-growing, spreading cultivars)	Y	Y	Y		Y		<p>Prefers moist, well-drained soils, but is adaptable and drought-tolerant once established; can take full sun; deer resistant</p> <ul style="list-style-type: none"> ▪ H 2'-3' x W 4'-10' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 6.2-7.4 ▪ Dense, spreading
W	<i>Cephalotaxus harringtonia</i>	Plum Yew (medium-height, spreading cultivars)	Y		Y		Y		<p>Same as previous</p> <ul style="list-style-type: none"> ▪ H 3'-6' x W 6'-15' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 5.8-7.4 ▪ Dense, spreading
W	<i>Cephalotaxus harringtonia</i>	Upright Plum Yew	Y		Y		Y		<p>Same as previous; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 8'-10' x W 6'-8' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 5.8-7.4 ▪ Upright, somewhat columnar
	<i>Chamaecyparis obtusa</i> 'Nana',	Dwarf Hinoki Falsecypress	Y		Y		Y		<p>Prefers moist, well-drained soil, and humid atmosphere; water weekly or more often in extreme heat; specimen plantings; protect from winter wind; deer resistant</p> <ul style="list-style-type: none"> ▪ H 3'-6' x W 6'-15' ▪ Full Sun ▪ pH 5.5-6.8 ▪ Dense, pyramidal

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
	<i>Chamaecyparis pisifera</i>	Dwarf Sawara Falsecypress (medium height cultivars)	Y					Y	<p>Same as previous; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 4'-8' ▪ Full Sun ▪ pH 5.5-6.5 ▪ Upright, dense, pyramidal
	<i>Chamaecyparis pisifera</i>	Dwarf Threadleaf Falsecypress (yellow and golden cultivars)	Y					Y	<p>Same as <i>C. obtusa</i>, above</p> <ul style="list-style-type: none"> ▪ H 2'-3' x W 2' ▪ Full Sun ▪ pH 5.5-6.5 ▪ Dense habit, arching branchlets
	<i>Chamaecyparis pisifera</i>	Dwarf Moss Falsecypress (low-growing, blue cultivars)	Y	Y				Y	<p>Same as previous; can shear annually to maintain shape and fullness</p> <ul style="list-style-type: none"> ▪ H 2'-3' x W 2' ▪ Full Sun ▪ pH 5.5-6.5 ▪ Dense, globose to irregularly fluffy or pyramidal depending on cultivar
	<i>Chamaecyparis pisifera</i>	Dwarf Sawara Falsecypress (low-medium height, gold cultivars)	Y					Y	<p>Same as previous</p> <ul style="list-style-type: none"> ▪ H 5'-7' x W 3'-5' ▪ Full Sun ▪ pH 5.5-6.5 ▪ Upright, globose

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
	<i>Chamaecyparis pisifera filifera</i>	Dwarf Threadleaf Falsecypress (low-medium height, gold cultivars)	Y				Y		Same as previous <ul style="list-style-type: none"> ▪ H 5'-6' x W 7'-8' ▪ Full Sun ▪ pH 5.5-6.5 ▪ Upright, compact, pyramidal
N W	<i>Chamaecyparis thyoides</i>	Atlantic Whitecedar (dwarf cultivars)					Y	Y	Wet areas, swamps, many cultivars; not for shade; lower-growing cultivars are usually slow-growing and may eventually get taller than 10 feet; these cultivars have not proven to be drought-resistant <ul style="list-style-type: none"> ▪ H 6'-10' x W 4'-10' ▪ Full Sun ▪ pH 5.5-6.8 ▪ Varies depending on cultivar
W	<i>Cotoneaster adpressus</i>	Creeping Cotoneaster (species and cultivars)	Y	Y					Tough once established; salt-tolerant; prefers well-drained, moist soils; lace bug, fireblight, aphids and mites a problem, especially in the South (all Cotoneasters) <ul style="list-style-type: none"> ▪ H 1'-3' x W 4'-6' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Dwarf, compact, spreading
	<i>Cotoneaster dammeri</i>	Bearberry Cotoneaster (species and cultivars)	Y	Y					Same as <i>C. adpressus</i> , but needs to be replaced after 4-6 years (does not age well) <ul style="list-style-type: none"> ▪ H 1'-3' x W 4'-6' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Dwarf, compact, spreading

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Cotoneaster horizontalis</i>	Rockspray Cotoneaster (species and cultivars)	Y	Y					<p>Same as <i>C. adpressus</i></p> <ul style="list-style-type: none"> ▪ H 1'-3' x W 4'-6' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Dwarf, compact, spreading
W	<i>Cotoneaster lacteus</i> (formerly <i>C. parneyi</i> , <i>C. coriacus</i>)	Parney Cotoneaster	Y	Y	Y		Y		<p>Tough once established; salt-tolerant.; prefers well-drained soils; more tolerant of Southern pests and conditions</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 5'-9' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Upright, rounded, spreading
W	<i>Cotoneaster lucidus</i> (<i>C. acutifolius</i> var. <i>lucidus</i>)	Hedge Cotoneaster	Y	Y	Y		Y		<p>Same as <i>C. horizontalis</i></p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 6'-10' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Erect, rounded
W	<i>Cotoneaster salicifolius</i>	Willowleaf Cotoneaster (species and taller cultivars)			Y	Y			<p>Same as previous</p> <ul style="list-style-type: none"> ▪ H 10'-15' x W 6'-10' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Upright, rangy, arching

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Cotoneaster salicifolius</i>	Willowleaf Cotoneaster (low-growing, groundcover cultivars)	Y	Y					<p>Same as <i>C. adpressus</i>, gets rougher-looking with age; deer resistant</p> <ul style="list-style-type: none"> ▪ H 1'-3' x W 6'-10'+ ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Wide-spreading ground cover
	<i>Cryptomeria japonica</i>	Japanese Cedar (mid-size cultivars)	Y			Y	Y		<p>Same as previous, except good as a specimen, or in groups, and for screening; tip and stem dieback are problems; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 4'-7', depending on cultivar ▪ Full Sun ▪ pH 5.5-6.2 ▪ Upright, pyramidal
	<i>Cryptomeria japonica</i>	Japanese Cedar (dwarf cultivars)	Y	Y			Y		<p>Needs deep, rich, well-drained soil with dependable moisture, and protection from wind for best growth; withstands heat well; more of a specimen plant; slow growth rate</p> <ul style="list-style-type: none"> ▪ H 2'-6' x W 2'-6' ▪ Full Sun ▪ pH 5.5-6.2 ▪ Dwarf, mounding

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
N	<i>Cyrilla racemiflora</i>	Swamp Cyrilla, Leatherwood					Y	Y	<p>Prefers wet areas, next to ponds, lakes; semi-evergreen; large shrub or small tree</p> <ul style="list-style-type: none"> ▪ H 10'-25' x W 10'-15' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.2 ▪ Sprawling, rounded
	<i>Daphne odora</i> (and other <i>Daphne</i>)	Winter Daphne (and other <i>Daphne</i>)			Y	Y			<p>Needs well-drained soil and regular (but not standing) moisture; temperamental and will die for no apparent reason; very fragrant; recommend specimen plantings only</p> <ul style="list-style-type: none"> ▪ H 1'-4' x W 2'-5', depending on species or cultivar ▪ Part Sun / Shade, Shade ▪ pH 5.5-7.0 ▪ Rounded
	<i>Daphniphyllum macropodum</i> (formerly <i>D. himalense</i> subsp. <i>macropodum</i>)	Daphniphyllum			Y	Y			<p>Prefers well-drained soils rich in organic content; leggy in shade; foliage effect like Rhododendrons</p> <ul style="list-style-type: none"> ▪ H 12'-20' x W 12'-20' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Full to ground, rounded
W	<i>Euonymus japonicus</i>	Japanese Euonymus (tall cultivars)	Y		Y		Y		<p>Same as previous; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 5'-10' x W 3'-6' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 5.5-7.5 ▪ Stiff, upright, rounded

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Euonymus japonicus</i>	Japanese Euonymus (dwarf cultivars)	Y	Y	Y				<p>Adaptable to soil and exposure; salt-tolerant; can be decimated by aphids, white fly, scale, mildew, scab and other diseases, and deer love it; some cultivars are variegated</p> <ul style="list-style-type: none"> ▪ H 1'-3' x W 1'-3' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 5.5-7.5 ▪ Low, upright growing, stiff, rounded
W	<i>Euonymus kiautschovicus</i>	Spreading Euonymus (taller cultivars)	Y		Y			Y	<p>Adaptable to soils and exposure; salt-tolerant; has the typical <i>Euonymus</i> pest problems; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 8'-10' x W 10'-12' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.5 ▪ Rounded
	<i>Gardenia jasminoides</i>	Cape Jasmine, Gardenia	Y		Y			Y	<p>Best performance with winter protection from sun and wind; needs acid, moist, well-drained soils; recommend using the more cold-hardy cultivars, such as 'Billie Holliday', 'Chuck Hayes', and others; tough once established; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 4'-8' x W 4'-10' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.2 ▪ Dense, rounded

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
	<i>Gardenia jasminoides</i>	Dwarf Gardenia (dwarf cultivars)	Y	Y	Y				<p>Same as for larger gardenias</p> <ul style="list-style-type: none"> ▪ H 1'-3' x W 2'-5' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.2 ▪ Low growing, spreading
N W	<i>Gelsemium rankinii</i>	Swamp Jessamine	Y	Y	Y		Y		<p>All parts are poisonous; use as a vine or groundcover; fragrant, yellow, early spring flowers</p> <ul style="list-style-type: none"> ▪ H 10'-20' as climbing vine H 2'-4' as groundcover ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Spreading
N W	<i>Gelsemium sempervirens</i>	Carolina Yellow Jessamine	Y	Y	Y		Y		<p>All parts are poisonous; use as a vine or groundcover; fragrant, yellow, early spring flowers</p> <ul style="list-style-type: none"> ▪ H 10'-20' as climbing vine H 2'-4' as groundcover ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Spreading
N W	<i>Hypericum densiflorum</i>	Dense St. Johnswort	Y				Y		<p>Prefers wet areas, next to ponds, lakes; semi-evergreen; large shrub or small tree</p> <ul style="list-style-type: none"> ▪ H 4'-6' x W 3'-4' ▪ Full Sun ▪ pH 6.2-7.4 ▪ Upright, oval

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
N W	<i>Hypericum frondosum</i>	Golden St. Johnswort	Y	Y			Y		<p>Semi-evergreen; stout stems with exfoliating, brown bark; 'Sunburst' lower-growing than the species and superior to the species in the heat, humidity, and poorly-drained soils of the Southeast</p> <ul style="list-style-type: none"> ▪ H 3'-4' x W 3'-4' ▪ Full Sun ▪ pH 6.2-7.4 ▪ Upright, rounded
N W	<i>Hypericum prolificum</i>	Shrubby St. Johnswort	Y	Y					<p>Semi-evergreen; upright, stiff stems; most <i>Hypericum</i> species do not last long in local conditions (heat, humidity, and poorly-drained soils)</p> <ul style="list-style-type: none"> ▪ H 1'-4' x W 1'-4' ▪ Full Sun ▪ pH 6.5-7.4 ▪ Dense, rounded, spreading
W	<i>Ilex</i> 'Clusterberry' (<i>'Nellie R. Stevens'</i> x <i>I. leuococlada</i>)	Hybrid Holly	Y		Y	Y	Y		<p>Prefers loose, loamy, well-drained soils, and full sun, but is adaptable; good specimen holly; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 6'-10'+ x W 6'-10'+ ▪ Full Sun, Part Sun / Shade ▪ pH 6.2-7.4 ▪ Rounded, spreading

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
	<i>Ilex crenata</i>	Japanese Holly (low-growing cultivars)	Y	Y			Y		<p>Prefers light, moist, well-drained, slightly acid soils; withstands hard pruning, but not often needed if using the right variety for the space provided; susceptible to spider mites, nematodes, root rot, especially with stress (wet, clay soils); 'Carefree' prefers part shade</p> <ul style="list-style-type: none"> ▪ H 2'-4' x W 3'-6' ▪ Full Sun, Part Sun / Shade ▪ pH 6.2-7.4 ▪ Dense, rounded, spreading
	<i>Ilex crenata</i>	Japanese Holly (tall, pyramidal-columnar cultivars)	Y		Y		Y		<p>Same as low-growing <i>I. crenata</i>; withstands pruning, but not needed to maintain a dense plant; potential for screens; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 4'-6' ▪ Full Sun, Part Sun / Shade ▪ pH 6.2-7.4 ▪ Upright, dense, rounded to pyramidal
	<i>Ilex crenata</i>	Japanese Holly (medium to tall cultivars)	Y		Y		Y		<p>Same as low-growing <i>I. crenata</i>; withstands pruning, but not needed to maintain a dense plant; potential for screens</p> <ul style="list-style-type: none"> ▪ H 4'-10' x W 6'-15'+ ▪ Full Sun, Part Sun / Shade ▪ pH 6.2-7.4 ▪ Dense, shape depends on cultivar

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
	<i>Ilex crenata</i>	Japanese Holly (upright, narrow-columnar growing)	Y			Y	Y	Y	See low-growing <i>I. crenata</i> ; stiff stems often break or split apart; a specimen plant; location of use is predicated on the mature or maintained height of the plant or cultivar <ul style="list-style-type: none"> ▪ H 5'-12' x W 0.5'-2' ▪ Full Sun, Part Sun / Shade ▪ pH 6.2-7.4 ▪ Upright, narrow column
N W	<i>Ilex glabra</i>	Inkberry Holly (tall cultivars)	Y		Y		Y	Y	potential for fence screening; good in wet areas and swamps <ul style="list-style-type: none"> ▪ H 5'-10' x W 4'-6' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Taller form, upright, rounded
N W	<i>Ilex glabra</i>	Inkberry Holly (low-growing cultivars)	Y	Y	Y		Y	Y	Good in wet areas and swamps; 'Green Billows' about 18 inches tall, but not in commercial production <ul style="list-style-type: none"> ▪ H 2'-3' x W 6'-7' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Spreading
N W	<i>Ilex glabra</i>	Inkberry Holly (compact cultivars)	Y		Y		Y	Y	Often thins on lower half; good in wet areas and swamps <ul style="list-style-type: none"> ▪ H 3'-5' x W 3'-4' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ compact, upright rounded

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
N W	<i>Ilex vomitoria</i>	Dwarf Yaupon Holly (dwarf cultivars)	Y	Y	Y		Y	Y	<p>Low-growing cultivars; adaptable in very dry to wet conditions; tolerates salt spray; tolerates pruning</p> <ul style="list-style-type: none"> ▪ H 2'-5' x W 3'-8' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ rounded, mounding cushion
W	<i>Ilex x attenuata</i> 'Fosteri'	Dixie Star™ Hybrid Holly (Small growing cultivars)	Y			Y	Y		<p>Prefers loose, loamy, well-drained soils, but is adaptable; good specimen holly; other Dixie Series hybrid hollies must be pruned to maintain as shrubs; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 6' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Upright, open when young
	<i>Illicium anisatum</i>	Japanese Anise-Tree					Y	Y	<p>Prefers moist, rich, well-drained soil, and part-shade; variably hardy in Zone 7</p> <ul style="list-style-type: none"> ▪ H 6'-12' x W 6'-10' ▪ Part Sun / Shade, Shade ▪ pH 5.5-6.8 ▪ Dense, pyramidal

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Illicium floridanum</i>	Florida Anise-Tree			Y		Y	Y	<p>Prefers moist, rich, well-drained soil, and part shade; often found in swampy areas in wild; crushed leaves smell like licorice; habit depends on amount of sun and pruning</p> <ul style="list-style-type: none"> ▪ H 6'-12' x W 4'-10' ▪ Part Sun / Shade, Shade ▪ pH 5.5-6.8 ▪ Upright, dense to loose, usually compact
W	<i>Illicium henryi</i>	Henry Anise-Tree	Y		Y		Y	Y	<p>Prefers moist, rich, well-drained soil; part-shade best, but also performs well in full sun; withstands heat well; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 6'-15' x W 4'-10' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 5.5-6.8 ▪ Dense, pyramidal
W	<i>Illicium parviflorum</i>	Small Anise-Tree	Y		Y		Y	Y	<p>Prefers moist, rich, well-drained soil; part-shade best, but also performs well in full sun; will form suckering colonies; found in wet areas in the wild; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 8'-15' x W 6'-10' ▪ Part Sun / Shade, Shade ▪ pH 5.5-6.8 ▪ Upright, pyramidal

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
N W	<i>Itea virginica</i>	Virginia Sweetspire	Y				Y	Y	<p>May form large, dense colonies in wet or moist soils; some drought-tolerance; fragrant flowers, red fall color, evergreen to semi-evergreen</p> <ul style="list-style-type: none"> ▪ H 3'-6' x W 4'-6'+ ▪ Full Sun ▪ pH 5.5-6.8 ▪ Erect, twiggly
W	<i>Jasminum nudiflorum</i>	Winter Jasmine	Y				Y		<p>Prefers well-drained soil, but does well in poor soils and slopes; roots where branches touch the ground, forming colonies—almost a weed; good urban plant; not for naturalizing (will become invasive)</p> <ul style="list-style-type: none"> ▪ H 3'-4' x W 4'-7'+ ▪ Full Sun, Part Sun / Shade ▪ pH 6.2-7.4 ▪ Broad spreading, weeping mass of ground cover
W	<i>Juniperus chinensis</i>	Chinese Juniper (tall cultivars)	Y			Y	Y		<p>Same as previous</p> <ul style="list-style-type: none"> ▪ H 8'-15' x W 8'-12' ▪ Full Sun ▪ pH 6.2-7.4 ▪ Pyramidal to spreading, form depends on cultivar
W	<i>Juniperus chinensis</i>	Chinese Juniper (tall and narrow cultivars)	Y			Y	Y		<p>Same as previous</p> <ul style="list-style-type: none"> ▪ H 8'-10'+ x W 2'-6'+ ▪ Full Sun ▪ pH 6.2-7.4 ▪ Erect, form depends on cultivar

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Juniperus chinensis</i>	Chinese Juniper (medium height cultivars)	Y				Y		Same as previous; location of use is predicated on the mature or maintained height of the plant or cultivar <ul style="list-style-type: none"> ▪ H 4'-8' x W 3'-12'+ ▪ Full Sun ▪ pH 6.2-7.4 ▪ Form depends on cultivar
W	<i>Juniperus chinensis</i>	Chinese Juniper (low-growing, spreading cultivars)	Y	Y					Depending on cultivar; prefers moist, well-drained soils, but not wet, conditions; withstands dry conditions and drought once established; pH-adaptable; some have yellow/gold foliage; after 10-15 years, many Chinese junipers get much larger than specified in literature <ul style="list-style-type: none"> ▪ H 1'-2.5' x W 3'-8'+ ▪ Full Sun ▪ pH 6.2-7.4 ▪ Spreading ground cover
W	<i>Juniperus chinensis</i>	Chinese Juniper (low to medium, spreading cultivars)	Y				Y		Same as previous <ul style="list-style-type: none"> ▪ H 2'-4' x W 3'-8'+ ▪ Full Sun ▪ pH 6.2-7.4 ▪ Spreading ground cover, form depends on cultivar
W	<i>Juniperus chinensis</i>	Chinese Juniper (medium to tall cultivars)	Y				Y		Same as previous <ul style="list-style-type: none"> ▪ H 8'-10'+ x W 8'-12' ▪ Full Sun ▪ pH 6.2-7.4 ▪ Form depends on cultivar

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Juniperus conferta</i>	Shore Juniper	Y	Y					<p>Prefers well-drained soils (sand); pH-adaptable; will grow in clay soils if drainage is good (no excess moisture); salt-tolerant; will tolerate some shade better than other junipers</p> <ul style="list-style-type: none"> ▪ H 1'-2' x W 6-9' ▪ Full Sun, Part Sun / Shade ▪ pH 6.2-7.4 ▪ Low, trailing ground cover
W	<i>Juniperus davurica</i>	Parson's Juniper	Y	Y					<p>Prefers well-drained soils, pH-adaptable; will grow in clay soils, if drainage is good; salt-tolerant; great heat-tolerance, and will tolerate some shade better than other junipers; great plant for the South</p> <ul style="list-style-type: none"> ▪ H 1.5'-3' x W 5'-9' ▪ Full Sun, Part Sun / Shade ▪ pH 6.2-7.4 ▪ Rigid horizontal sprays, mounding ground cover
W	<i>Juniperus horizontalis</i>	Creeping Chinese Juniper	Y	Y					<p>Prefers well-drained soils (sandy, rocky), pH-adaptable, salt-tolerant; will grow in clay soils, if well-drained; does well in hot, dry conditions; can be seriously affected by Juniper blight</p> <ul style="list-style-type: none"> ▪ H 0.5'-2' x W 8'-10' ▪ Full Sun ▪ pH 6.2-7.4 ▪ Low trailing or spreading ground cover

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Juniperus procumbens</i>	Japanese Garden Juniper, Creeping Juniper	Y	Y					<p>Prefers well-drained soils, but is tolerant of many soils (including chalky, calcareous soils), thriving under adverse conditions</p> <ul style="list-style-type: none"> ▪ H 0.5'-2' x W 8'-15' ▪ Full Sun ▪ pH 6.2-7.4 ▪ Mounding, spreading ground cover
W	<i>Juniperus sabina</i>	Savin Juniper (very low cultivars)	Y	Y					<p>Prefers well-drained, dry sites, limestone soils; not as tolerant of heat and humidity; upright shrub forms also available (2-8 feet tall) as well as other groundcover forms; species can grow to 4'-15' x 5'-10'</p> <ul style="list-style-type: none"> ▪ H 0.5'-1' x W 8'-10' ▪ Full Sun ▪ pH 6.2-7.4+ ▪ Low trailing ground cover
W	<i>Juniperus scopulorum</i>	Weeping Rocky Mountain Juniper	Y				Y		<p>Silver-blue foliage on arching branches for an interesting form; some success growing in as far south as Florida; 'Tolleson's Green Weeping' has green foliage; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 15'-20' x W 6'-10' ▪ Full Sun ▪ pH 5.5-7.5 ▪ Weeping

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
N W	<i>Juniperus virginiana</i>	Eastern Redcedar (low-growing cultivars)	Y				Y		<p>Tolerant of poor, dry, rocky and urban soils, but does best in deep loamy soils with good drainage; ‘Kosteri’ spreads up to 25-30 feet</p> <ul style="list-style-type: none"> ▪ H 3’-6’ x W 4’-8’ ▪ Full Sun ▪ pH 5.5-7.4+ ▪ Wide spreading, feathery, horizontal
N W	<i>Kalmia latifolia</i>	Mountain Laurel (compact, medium-height cultivars)			Y		Y	Y	<p>Same as previous</p> <ul style="list-style-type: none"> ▪ H 4’-10’ x W 4’-10’ in 10 years ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.2 ▪ Rounded, symmetrical when young, irregular with age
N W	<i>Kalmia latifolia</i>	Mountain Laurel (dwarf cultivars)			Y		Y	Y	<p>Prefers acid, cool, moist, well-drained soil; best on steep, north-facing stream banks where used in riparian buffers; fibrous roots make these relatively easy to root; drought-tolerant when given preferred growth conditions</p> <ul style="list-style-type: none"> ▪ H 1.5’-3’ x W 1.5’-3’ ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.2 ▪ Rounded, symmetrical when young, irregular with age
N	<i>Leucothoe axillaris</i>	Coastal Leucothoe, Dog-Hobble			Y		Y	Y	<p>Prefers acid, moist, well-drained, organic soil; not for drought; part or full shade and good drainage</p> <ul style="list-style-type: none"> ▪ H 2’-6’ x W 3’-6’ ▪ Part Sun / Shade, Shade ▪ pH 5.5-6.2 ▪ Graceful, drooping, arching, zigzag branches

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
N	<i>Leucothoe fontanesiana</i>	Drooping Leucothoe, Dog Hobble, Fetterbush			Y			Y	<p>Same as previous</p> <ul style="list-style-type: none"> ▪ H 3’-6’ x W 3’-6’ ▪ Part Sun / Shade, Shade ▪ pH 5.5-6.2 ▪ Graceful, drooping, arching
W	<i>Loropetalum chinense</i> var. <i>rubrum</i>	Burgundy Loropetalum (medium to large cultivars)	Y		Y	Y		Y	<p>Same as previous; keep as a shrub, or prune larger cultivars into tree-form; ‘Zhuzhou Fuschsia’ seems to be the most cold-hardy cultivar; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 6’-15’ x W 8’-15’ ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.2 ▪ Dense, irregularly rounded
W	<i>Loropetalum chinense</i> var. <i>rubrum</i>	Burgundy Loropetalum (smaller cultivars)	Y		Y			Y	<p>Burgundy leaf varieties; best in acid, moist, well-drained, highly-organic soils with mulch; not for high pH soils; once established, withstands drought; “smaller” varieties have a habit of out-growing size predictions; withstands pruning well; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 2’-6’ x W 4’-8’ ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.2 ▪ Dense, rounded

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Loropetalum chinensis</i>	Green-Leaf Loropetalum (species and medium-height cultivars)	Y		Y	Y			<p>Same as previous; species can grow to 20 feet tall; keep as a shrub, or tree-form the larger varieties; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 6'-10' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.2 ▪ Dense, irregularly rounded
W	<i>Loropetalum chinensis</i>	Green-Leaf Loropetalum, Chinese Witch-Hazel (smaller cultivars)	Y		Y	Y			<p>Green leaf varieties; best in acid, moist, well-drained, highly-organic soils with mulch; not for high pH soils; once established, withstands drought; "smaller" varieties have a habit of out-growing size predictions but withstands pruning well</p> <ul style="list-style-type: none"> ▪ H 1.5'-4' x W 4'-6' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.2 ▪ Depends on variety, dense, mounding
	<i>Mahonia aquifolium</i>	Oregon Grape Holly			Y	Y			<p>Protect from heat, dry soils and winter sun and wind (best protected by buildings in urban areas); acid, moist, well-drained soils; will sucker and form colonies, if good conditions; unusual blue berries, winter flowering</p> <ul style="list-style-type: none"> ▪ H 3'-6' x W 3'-5' ▪ Part Sun / Shade, Shade ▪ pH 5.5-6.2 ▪ Coarse, spiny, thick branches

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
	<i>Mahonia fortunei</i>	Chinese Mahonia			Y		Y		<p>Same culture as <i>M. aquifolium</i>; more graceful and less coarse than <i>M. aquifolium</i></p> <ul style="list-style-type: none"> ▪ H 3'-6' x W 3'-5' ▪ Part Sun / Shade, Shade ▪ pH 5.5-6.2 ▪ Irregular texture
	<i>Michelia figo</i>	Banana Shrub			Y		Y		<p>Prefers well-drained, fertile, sandy loam soils; best in half-shade; fruity smelling</p> <ul style="list-style-type: none"> ▪ H 6'-12' x W 6'-12' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.2 ▪ Dense, rounded
W	<i>Myrica cerifera</i>	Southern Wax Myrtle	Y		Y	Y	Y		<p>Adaptable to many soil types; grows in sand or clay; best growth in well-drained soils; salt-tolerant; will sucker and form colonies, especially in loose soils; prune to make a dense screen, or limb-up for multi-stemmed small tree; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 10'-15' x W 10'-15' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Somewhat open, rounded

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Myrica cerifera</i> 'Don's Dwarf'	Dwarf Southern Wax Myrtle	Y		Y		Y		<p>Tolerant of salt spray (seaside plant); grows in sand and swamps, best in fertile, moist soils; can prune to densify or tree-form; can sucker and spread</p> <ul style="list-style-type: none"> ▪ H 3'-6' x W 3'-6' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Rounded, spreading
W	<i>Myrica heterophylla</i>	Swamp Bayberry	Y		Y		Y		<p>Grows in bogs and wet areas in wild; foliage larger and denser than Southern Wax Myrtle; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 8'-12' x W 8'-12' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Rounded
W	<i>Myrica pensylvanica</i>	Northern Bayberry	Y		Y		Y		<p>Better plant in the North; suckers and forms colonies; semi-evergreen to deciduous; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 5'-12' x W 5'-12' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Dense, rounded, massing

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Nandina domestica</i>	Dwarf Nandina (low-growing cultivars without fruit)	Y	Y	Y				<p>Can use other cultivars with no, or very low, berry production (invasiveness); adaptable to pH and soil types, sun and shade; best growth in moist, well-drained soils; withstands drought and abuse</p> <ul style="list-style-type: none"> ▪ H 1'-3' x W 2'-3' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 5.5-7.4 ▪ Upright, spreading (by slow suckering), flat top
W	<i>Nandina domestica</i>	Nandina (taller cultivars without fruit)	Y		Y		Y		<p>Same as previous</p> <ul style="list-style-type: none"> ▪ H 3'-5' x W 3'-5' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 5.5-7.4 ▪ Upright, spreading (by slow suckering), flat top
W	<i>Osmanthus fragrans</i>	Fragrant Tea Olive	Y		Y	Y	Y		<p>Least cold-hardy <i>Osmanthus</i>; moist, acid, well-drained soils best, but is adaptable; most fragrant <i>Osmanthus</i>, flowering September to October, and into late Fall; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 10'-12' x W 10'-12' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Dense, rounded, full to ground

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Osmanthus heterophyllus</i> (formerly <i>O. ilicifolius</i>)	Holly Osmanthus	Y		Y	Y	Y		<p>Extremely spiny leaves; moist, acid, well-drained soils best, but is adaptable; urban-tolerant, shade-tolerant; variegated cultivars tend to be less cold-hardy than the species; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 10'-12' x W 10'-12' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Dense, rounded, full to ground, impenetrable
W	<i>Osmanthus xfortunei</i>	Fortune's Tea Olive, Fortune's Osmanthus	Y		Y	Y	Y		<p>Can be pruned to any height; spiny leaves; moist, acid, well-drained soils best, but is adaptable; urban-tolerant, shade-tolerant; very fragrant flowers October into late fall; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 10'-18' x W 10'-15' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Dense, rounded, full, green haystack

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Photinia xfraseri</i>	Fraser Photinia ("Red Tip")	Y			Y	Y		<p>Prefers well-drained soil, pH-adaptable, will not tolerate wet soils; good tolerance to shade, and urban conditions; distinctive red new growth; good screen and hedge; cold damage, insect, and disease issues, especially in moist, humid weather – look for resistant varieties; flowers are foul-smelling; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 10'-15'+ x W 6'-10' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Upright, oval, dense
W	<i>Picea abies</i> 'pendula', others	Dwarf Norway Spruce							<p>Prefers moist, acidic, sandy, well drained soils; can tolerate denser if provided good drainage. shallow, spreading root system, so mulch, best used as a specimen in a customized environment</p> <ul style="list-style-type: none"> ▪ H 2'-6' x W 3' x 6' Dwarf Forms ▪ H 2'-20' x W 3'-8' Weeping Forms ▪ Full Sun ▪ pH 5.5-6.4 ▪ Weeping: if not staked, then prostrate and trailing ▪ Dwarf: stiff, compact mound
	<i>Picea glauca</i> 'Conica'	Dwarf Alberta Spruce, Dwarf White Spruce							<p>Same as <i>P. abies</i>, although very slow-growing and usually shorter but location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 3'-12' x W 2'-4' ▪ Full Sun ▪ pH 5.5-6.4 ▪ Broad, dense, pyramidal

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
	<i>Picea pungens</i>	Dwarf Colorado Spruce (low-growing cultivars)							<p>Prefers moist, well-drained, deep, rich soils, but very adaptable; more drought-tolerant than other spruces; does better in North, like other spruces; 'Pendula' is weeping-to-prostrate ground-cover; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 3'-12' x W 3'-10' ▪ Full Sun ▪ pH 5.5-7.5 ▪ Dense, flat, rounded-to-conical depending on cultivar
	<i>Pieris japonica</i>	Japanese Pieris (smaller cultivars)			Y		Y		<p>NEEDS Excellent growing conditions: moist, acid, well-drained soil, high in peat/organic material; very fussy in our area; needs at least Part Sun / Shade here; can get bigger – to 9-12 feet tall and like a haystack; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 3'-12' x W 3'-5' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 5.5-6.2 ▪ Upright, stiff. spreading branches, rounded outline
	<i>Pinus mugo</i> var. <i>mughus</i> (var. <i>mugo</i>)	Dwarf Mugo Pine, Swiss Mountain Pine	Y				Y		<p>Prefers deep, moist, well-drained, loamy soils, but adaptable, as long as well-drained; does better in North; suspect high night- time temperatures negatively impact growth; form extremely variable depending on cultivar and from plant to plant in same cultivar</p> <ul style="list-style-type: none"> ▪ H 2'-10' x W 2'-10' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.5 ▪ Low, dense, spreading

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Pinus thunbergii</i>	Dwarf Japanese Black Pine	Y				Y		<p>Best growth in moist, fertile, well-drained soil, but will grow in sand; salt-, heat-, and drought-tolerant; usually short-lived inland in the South (5-15 years); pyramidal-to-wide-spreading, irregularly rounded; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 3'-9' x W 3'-12' ▪ Full Sun, Part Sun / Shade ▪ pH 6.2-7.4 ▪ Dense, form variable depending on cultivar
W	<i>Platyclusus orientalis</i> (formerly <i>Thuja orientalis</i>)	Oriental Arborvitae (dwarf cultivars)	Y				Y		<p>Prefers well-drained soils, but is tolerant of most soils; less appealing to deer than <i>T. occidentalis</i></p> <ul style="list-style-type: none"> ▪ H 3'-4' x W 3'-4' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Dwarf globe or conical, fine-textured
W	<i>Platyclusus orientalis</i>	Oriental Arborvitae (yellow to golden, medium-tall cultivars)	Y			Y	Y		<p>Same as previous but with yellow to golden leaves; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 6'-18' x W 4'-12' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Fine textured, pyramidal to upright-oval, dense

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Platycladus orientalis</i>	Oriental Arborvitae (blue-green to green, medium-tall cultivars)	Y			Y	Y		<p>Same as previous but with blue-green to green leaves; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 6'-18' x W 4'-12' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Fine textured, pyramidal to upright-oval, dense
W	<i>Prunus laurocerasus</i>	English Laurel	Y		Y	Y	Y		<p>Needs moist, WELL-DRAINED, highly- organic soils; adaptable to pH; salt-spray-tolerant; wet, poorly-drained soils and overhead irrigation hard on these plants leading to root rot and fungal leaf diseases; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 6'-15'+ x W 4'-25' ▪ Part Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Upright, dense, wide spreading
W	<i>Prunus laurocerasus</i>	Dwarf English Laurel	Y		Y		Y		<p>As previous does not like wet soil</p> <ul style="list-style-type: none"> ▪ H 3'-10' x W 4'-25' ▪ Full Sun to Part Sun / Shade ▪ pH 5.5-7.4 ▪ Dark green, dense, upright spreading

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Raphiolepis indica</i> (many cultivars, many are <i>R. xdelacourii</i>)	Yeddo Hawthorne, Indian Hawthorn (low-growing cultivars)	Y	Y	Y			Y	<p>Prefers moist, well-drained soils; will grow in moist sand; drought- and salt-tolerant; good planter and container plant; leaf spot a problem in wet locations; white or pink flowers in spring; “deer candy”</p> <ul style="list-style-type: none"> ▪ H 2.5’-5’ x W 3’-5’ ▪ Full Sun, Part Sun / Shade ▪ pH 6.2-7.4 ▪ Dense, rounded to mounding
W	<i>Raphiolepis indica</i>	Yeddo Hawthorne, Indian Hawthorn (species and taller cultivars)	Y		Y			Y	<p>As previous</p> <ul style="list-style-type: none"> ▪ H 4’-8’x W 4’-10’ ▪ Full Sun, Part Sun / Shade ▪ pH 6.2-7.4 ▪ Larger, dense, rounded to mounding
	<i>Rhododendron</i> ‘Gable’ Hybrids	Gable Hybrid Azalea (many cultivars)			Y			Y	<p>Prefers moist, well-drained soil rich in organic content; mulch shallow roots; high shade usually best; lace bug, voles, deer are all problems; blooms late April to May, (some) early June</p> <ul style="list-style-type: none"> ▪ H 2’-4’ x W 2’-4’ ▪ Full Sun, Part Sun / Shade ▪ pH 5.2-6.4 ▪ Varies by cultivar, generally rounded, open mound
	<i>Rhododendron</i> ‘P.J.M.’	PJM Rhododendron (many cultivars)			Y			Y	<p>Blooms late March to April; otherwise same as previous</p> <ul style="list-style-type: none"> ▪ H 3’-6’ x W 3’-6’ ▪ Full Sun, Part Sun / Shade ▪ pH 5.2-6.4 ▪ Courser texture, rounded, open mound

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
N	<i>Rhododendron carolinianum</i> (see <i>R. minus</i>)	Carolina or Piedmont Rhododendron							
N	<i>Rhododendron catawbiense</i>	Catawba Rhododendron (species and cultivars)			Y		Y		Needs acid, moist, well-drained soil, winter sun protection (north-facing slopes, foundations best); locally-grown cultivars best <ul style="list-style-type: none"> ▪ H 4'-10'+ x W 5'-8' ▪ Part Sun / Shade, Shade ▪ pH 5.5-6.2 ▪ Rounded, full
N	<i>Rhododendron maximum</i>	Rosebay Rhododendron					Y		Needs acid, moist, well-drained soil, winter sun protection; prefers north-facing slopes of mountain streams; found along parts of the Flat River; large shrub to small tree <ul style="list-style-type: none"> ▪ H 5'-20' x W 4'-10' ▪ Part Sun / Shade, Shade ▪ pH 5.5-6.2 ▪ Loose, open, multi-stemmed
N	<i>Rhododendron minus</i> (formerly <i>R. carolinianum</i>)	Carolina or Piedmont Rhododendron			Y		Y		Needs acid, moist, well-drained soil, winter sun protection; locally-grown cultivars best <ul style="list-style-type: none"> ▪ H 3'-6' x W 3'-8' ▪ Part Sun / Shade, Shade ▪ pH 5.5-6.2 ▪ Rounded, often open

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
	<i>Rhododendron</i> x (many hybrid groups and cultivars)	Hybrid Evergreen Azaleas			Y			Y	<p>Bloom times range from March to June, and then again in the Fall for some varieties; otherwise as previous</p> <ul style="list-style-type: none"> ▪ H 1'-10' x W 2'-8' ▪ Full Sun, Part Sun / Shade ▪ pH 5.2-6.4 ▪ Mostly dense, twiggy, mounding. Larger varieties are more open
W	<i>Rosa banksiae</i>	Lady Banks' Rose			Y				<p>Prefers well-drained soil rich in organic content; tolerant of pH range, some salt- and urban-tolerance; easy to grow, requires some restraint once established; fairly pest free; "thorn-less," evergreen rose; 'Lutea' has yellow blooms</p> <ul style="list-style-type: none"> ▪ H 15'-20' (Climbing) x W 10'-15' x 2'-4' thick ▪ Full Sun, Part Sun / Shade ▪ pH 6.2-7.4 ▪ Dense, sprawling, climbing rose
W	<i>Rosmarinus officinalis</i>	Rosemary (upright cultivars)	Y	Y				Y	<p>Same as previous; can prune into fairly tight, low hedge</p> <ul style="list-style-type: none"> ▪ H 3'-5' x W 3'-4' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Fine textured, upright, rounded
W	<i>Rosmarinus officinalis</i>	Rosemary (groundcover cultivars)	Y	Y					<p>Prefers well-drained soil (not wet); salt-tolerant; deer-resistant; very aromatic, mostly evergreen in south</p> <ul style="list-style-type: none"> ▪ H 1'-2' x W 3'-8' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Prostrate, fine, dense

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Santolina chamaecyparissus</i>	Santolina, Lavender Cotton	Y	Y					<p>Prefers, dry, well-drained, low-fertility soils; adaptable; will grow in sand; avoid excessive moisture and fertility; drought- and salt-tolerant</p> <ul style="list-style-type: none"> ▪ H 1'-2' x W 2'-4' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Low, mounding, fine-textured ground cover
W	<i>Sarcococca confusa</i>	Sarcococca	Y	Y	Y				<p>Prefers loose, acid, moist, well-drained soils rich in organic content; will sucker and form colonies; good atmospheric pollution and drought-tolerance once established; fragrant; deer-resistant; not as cold-hardy as other <i>Sarcococca</i></p> <ul style="list-style-type: none"> ▪ H 3'-4' x W 3'-4' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.2 ▪ Medium-to-fine textured, dense, rounded
W	<i>Sarcococca hookeriana</i>	Himalayan Sweetbox, Sarcococca	Y	Y	Y		Y		<p>Most cold-hardy <i>Sarcococca</i>; otherwise same as <i>S. confusa</i></p> <ul style="list-style-type: none"> ▪ H 4'-6' x W 4'-6' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.2 ▪ Dense, Mounding
W	<i>Sarcococca hookeriana</i> var. <i>humilis</i>	Low-growing Himalayan Sweetbox, Sarcococca	Y	Y	Y				<p>Same as previous, but less cold-hardy than <i>S. hookeriana</i> species; groundcover or low shrub</p> <ul style="list-style-type: none"> ▪ H 1'-2' x W 2'-4' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.2 ▪ Low, mounding, dense

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Sarcococca orientalis</i>	Sarcococca	Y	Y	Y		Y		<p>Same as <i>S. hookeriana</i></p> <ul style="list-style-type: none"> ▪ H 2'-4' x W 2'-4' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.2 ▪ Low, mounding, dense
W	<i>Sarcococca ruscifolia</i>	Sarcococca ruscifolia	Y	Y	Y		Y		<p>Zones 7-9; otherwise same as <i>S. hookeriana</i>, but not as cold-hardy; very fragrant flowers</p> <ul style="list-style-type: none"> ▪ H 2'-3'+ x W 2'-3'+ ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.2 ▪ Low, mounding
W	<i>Serissa foetida</i> (formerly <i>S. japonica</i>)	Yellow-Rim	Y		Y		Y		<p>Prefers moist, well-drained soils, but is very adaptable; no standing water or permanently wet soils; has great drought-tolerance; competes very well under shade trees; variegated leaf edge indicates name</p> <ul style="list-style-type: none"> ▪ H 3'-4' x W 3'-4' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.8 ▪ Fine-Textured, rounded

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
	<i>Skimmia japonica</i>	Japanese Skimmia	Y		Y			Y	<p>Prefers well-drained soil rich in organic content; will grow in chalky (limestone) soil; mites damage foliage; best performance in Pacific Northwest where it is usually larger; high heat and humidity seem to this drain plant in the South</p> <ul style="list-style-type: none"> ▪ H 3'-4' x W 3'-4' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.2 ▪ Dense, rounded, haystack
	<i>Skimmia reevesiana</i>	Reeves Skimmia	Y	Y	Y				<p>Prefers rich, moist, acid soil; appears to be more adaptable than <i>S. japonica</i></p> <ul style="list-style-type: none"> ▪ H 1.5'-3' x W 2'-3' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.2 ▪ Low growing groundcover
	<i>Taxus cuspidata</i>	Japanese Yew (low-growing cultivars)	Y		Y			Y	<p>Needs good drainage, does not like 'wet feet'; poisonous leaves; good urban-tolerance; slow growth rate; often used for foundations, topiary, screens, massing; most adaptable for the yew for the southeast</p> <ul style="list-style-type: none"> ▪ H 1'-5' x W 3'-8' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-7.0 ▪ Low, dense, spreading mass

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
	<i>Taxus cuspidata</i>	Japanese Yew (species and large cultivars)	Y		Y			Y	<p>Same as previous; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 8'-20' x W 8'-20' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-7.0 ▪ Upright to tall spreading – depending on cultivar
	<i>Ternstroemia gymnanthera</i>	Cleyera, Japanese Ternstroemia (species and cultivars)	Y		Y	Y		Y	<p>Prefers moist, well-drained soils; not tolerant of wet, poorly-drained soils; Part Sun / Shade on north or east side of structures is best; prunes well; 'Phyllis Ann' cultivar is resistant to shot-hole fungus; also listed as <i>Cleyera japonica</i>; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 8'-10' x W 5'-6' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Upright, oval, full, dense
	<i>Teucrium chamaedrys</i>	Wall Germander	Y	Y					<p>Needs well-drained soils; not suited to excessive moisture; used for edging, low hedges, and rock gardens</p> <ul style="list-style-type: none"> ▪ H 1'-1.25' x W 2'-3' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Low-growing, mounding groundcover

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION	
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers			
							Constructed	Riparian		
N	<i>Thuja occidentalis</i>	Eastern or American Arborvitae, White Cedar (medium cultivars)	Y					Y	<p>Same as previous; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 3'-15' ▪ Full Sun, Part Sun / Shade ▪ pH 6.2-7.0 ▪ Depending on cultivar, dense, full 	
N	<i>Thuja occidentalis</i>	Eastern or American Arborvitae, White Cedar (small cultivars)	Y					Y	<p>Not as vigorous in the South; some cultivars perform better than others</p> <ul style="list-style-type: none"> ▪ H 2.5'-5' x W 2.5'-5' ▪ Full Sun, Part Sun / Shade ▪ pH 6.2-7.0 ▪ Form Type Here 	
	<i>Thuja orientalis</i> (see <i>Platyclusus orientalis</i>)	Oriental Arborvitae								
W	<i>Viburnum</i> 'Pragense' (formerly <i>V. xpragense</i>) (<i>V. rhytidophyllum</i> x <i>V. utile</i>)	Prague Viburnum			Y			Y	Y	<p>Prefers deep, rich, moist, well-drained soil; tolerant of soil type and high pH; good specimen or screening plant; denser with pruning and more sun; flowers slightly fragrant; deer resistant; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 10'-12' x W 5'-7' ▪ Full Sun, Part Sun / Shade ▪ pH 6.2-7.4 ▪ Irregularly oval to rounded, upright

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
	<i>Viburnum davidii</i>	David Viburnum (species and cultivars)			Y			Y	<p>Prefers moist, well-drained soil; can be particular about siting; usually for collectors rather than widespread use; flowers not notably fragrant</p> <ul style="list-style-type: none"> ▪ H 3'-5' x W 3'-5' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Compact, dense, rounded
W	<i>Viburnum obovatum</i>	Walter Viburnum, Small Viburnum (small to medium cultivars)	Y		Y			Y	<p>Same as previous; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 6'-12' x W 6'-12' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Open, Wild, Irregular
W	<i>Viburnum obovatum</i>	Walter Viburnum (dwarf cultivars)	Y					Y	<p>Evergreen to 15° F; prefers moist, well-drained soil; tolerant of soil type and pH; grows in wet conditions in the wild, but has shown dry tolerance in cultivation; flowers not notably fragrant, but cultivars have showier flowers than the species</p> <ul style="list-style-type: none"> ▪ H 2'-6' x W 2'-8' ▪ Full Sun, Part Sun / Shade ▪ pH 6.2-7.4 ▪ Dwarf, flowering, lustrous, dark green leaved alternative to some <i>Ilex</i> species; 'St. Paul' has pendulous branches

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
	<i>Viburnum rhytidophyllum</i>	Leatherleaf Viburnum					Y	Y	<p>Prefers deep, rich, moist, well-drained soil and shade; tolerant of sun, deep shade, pH and soil types; leaves are evergreen to 10^o F, but stems to -15^o F and will grow back if stems not killed; protect from winter sun and wind; large, dark green, textured leaves; flowers slightly fragrant; good as a background plant; deer resistant; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 10'-15' x W 10'-15' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-6.6 ▪ Upright, loose and irregular, coarse
W	<i>Viburnum tinus</i>	Laurustinus (species and taller cultivars)	Y		Y		Y		<p>Culture same as previous; good specimen or screening plant; species is a tough, rapid-growing, that grows to 10 feet in 5 years and ultimately much larger; marginal in Zone 7; flowers not notably fragrant; deer resistant; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 6'-12' x W 6'-12' ▪ Full Sun, Part Sun / Shade ▪ pH 6.2-7.4 ▪ Dense, bushy, large shrub
W	<i>Viburnum tinus</i>	Laurustinus (smaller cultivars)	Y		Y		Y		<p>Prefers deep, rich, moist, well-drained soil, shade- tolerant of sun, pH and soil types; semi-evergreen; use as specimen or low hedge; not fragrant; deer resistant</p> <ul style="list-style-type: none"> ▪ H 4'-5' x W 4'-5' ▪ Full Sun, Part Sun / Shade ▪ pH 6.2-7.4 ▪ Dense, full, rounded

TABLE 2A: ALLOWED EVERGREEN SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Viburnum xburkwoodii</i> (<i>V. carlesii</i> x <i>V. utile</i>)	Burkwood Viburnum (hybrid and cultivars)	Y		Y			Y	<p>Prefers slightly moist, well-drained soil; tolerant of soil type, pH, pollution, heat, cold, and drought; very fast growing on good sites; flowers intensely fragrant; use with other plants in screens and borders because the somewhat open mass of stems can look unkempt; semi-evergreen in colder climates; susceptible to nematodes if drainage is poor; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 4'-7' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Medium to coarse texture, upright, multi-stemmed
W	<i>Viburnum xburkwoodii</i>	Conoy Viburnum	Y					Y	<p>Similar to previous, but shorter and more cold-tolerant; drought-tolerant; pest- and disease-free; flowers non-fragrant</p> <ul style="list-style-type: none"> ▪ H 4'-8' x W 6'-9' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Smaller, glossy, dark green leaves than <i>V. x burkwoodii</i>
	<i>Yucca filamentosa</i>	Adam's Needle Yucca	Y		Y			Y	<p>Sword-like leaves can be dangerous, this variety more Southern and coastal</p> <ul style="list-style-type: none"> ▪ H 1'-2.5' x W 1.5'-4' ▪ Full Sun, Part Sun / Shade ▪ pH 5.4-7.4 ▪ Coarse, stiff, upright sword-like foliage; flower stalks to 6-feet

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Abeliophyllum distichum</i>	White Forsythia	Y		Y		Y		<p>Prefers well-drained soils; adaptable to pH, cut down to ground periodically to rejuvenate</p> <ul style="list-style-type: none"> ▪ H 3'-5' x W 3'-4' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Dense, rounded, looks ragged with age
	<i>Acer palmatum</i> var. <i>dissectum</i>	Cutleaf Japanese Maple (this variety and cultivars)			Y				<p>Needs moist, well-drained soil rich in organic content; protect from winter sun and wind; fairly heat- and drought-tolerant once established (3-5 years); dappled shade best; needs sun for leaf colors; good as a specimen small tree or large shrub if allowed to be full to the ground; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 6'-8' x W 6'-8'+ ▪ Part Sun / Shade ▪ pH 5.5-8.6 ▪ Refined, rounded, mounding, spreading
N	<i>Aesculus pavia</i>	Red Buckeye	Y		Y	Y	Y	Y	<p>Attracts hummingbirds; susceptible to leaf blotch</p> <ul style="list-style-type: none"> ▪ H 12'-15' x W 12'-15' ▪ Full Sun, Part Sun / Shade ▪ pH 6.0-8.0 ▪ Compact, clump forming, rounded

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
N	<i>Aesculus parviflora</i>	Bottlebrush Buckeye			Y		Y	Y	<p>Prefers moist, well-drained soil rich in organic content; prefers acid pH, but adaptable; specimen plant, clumping or massing; suckering to form a colony; woodland understory shrub or small tree; white flowers June to July</p> <ul style="list-style-type: none"> ▪ H 8'-12' x W 8'-15' ▪ Part Sun / Shade, Shade ▪ pH 5.5-6.8 ▪ Upright, wide-spreading, multi-stemmed
N	<i>Aesculus sylvatica</i>	Painted Buckeye			Y		Y	Y	<p>Prefers moist, well-drained soil rich in organic content; prefers acid pH, but adaptable; specimen woodland large shrub or small tree</p> <ul style="list-style-type: none"> ▪ H 6'-15' x W 6'-10' ▪ Part Sun / Shade, Shade ▪ pH 5.5-6.8 ▪ Single or multi-stemmed, rounded outline, medium-coarse
N W	<i>Alnus serrulata</i>	Tag, Hazel, or Smooth Alder					Y	Y	<ul style="list-style-type: none"> ▪ Prefers moist soils with good drainage best; found along stream, pond, and lake edges; suckering, colonizing shrub or mass of small trees and can spread to exclude other species; is tolerant of dry and poor soil conditions H 6'-20' x W 10'-20' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Multi-stem, dense, rounded outline

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
N W	<i>Amelanchier canadensis</i>	Shadblow Serviceberry, Thicket Serviceberry			Y		Y	Y	<p>Prefers moist to wet soils with good organic content; grows in bogs, swamps and along the coast in the wild; pollution-tolerant; suckering to form a mass; juicy, blueberry-like fruit (attracts birds)</p> <ul style="list-style-type: none"> ▪ H 6'-15' x W 6'-15' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Upright, dense, multi-stemmed, rounded
N W	<i>Aronia arbutifolia</i> 'Brilliant' (‘Brilliantissima)	Red Chokeberry					Y	Y	<p>Prefers good drainage, but adaptable to many soil types, even poor soils, from wet to dry; tends to sucker, forming colonies; good for massing</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 3'-5' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Upright, dense, rounded top, open underneath
N W	<i>Aronia melanocarpa</i>	Black chokeberry					Y	Y	<p>Prefers good drainage, but will grow in low, wet areas or in dry sand; forms suckering colonies; hybridizes freely with <i>A. arbutifolia</i></p> <ul style="list-style-type: none"> ▪ H 3'-10' x W 3'-5' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Upright, rounded top, dense

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Buddleia alternifolia</i>	Alternate Leaf Butterfly Bush	Y						<p>Needs well-drained soils, preferring loose, loamy soil; blooms on previous years' wood so prune right after flowering; large shrub or small tree; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 10'-20' x W 10'-20' ▪ Full Sun ▪ pH 5.5-7.4 ▪ Lax, somewhat weeping, full
W	<i>Buddleia davidii</i>	Butterfly Bush (species and cultivars)	Y						<p>Prefers moist, well-drained soil rich in organic content; but adaptable to pH and soil conditions; very tolerant of urban conditions; large, succulent, arching canes are tender in winter; cut to the ground to rejuvenate</p> <ul style="list-style-type: none"> ▪ H 5'-10' x W 4'-6' ▪ Full Sun ▪ pH 5.5-7.4 ▪ Arching, spreading, rounded
N W	<i>Callicarpa americana</i>	American Beautyberry					Y	Y	<p>Prefers good drainage, reliable moisture; denser and better fruit in full sun</p> <ul style="list-style-type: none"> ▪ H 3'-8' x W 3'-5' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Large leaves and a coarse texture, bright purple berries

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Callicarpa dichotoma</i>	Purple Beautyberry	Y		Y		Y	Y	<p>Prefers well-drained soils; adaptable to pH, ; cut down to ground periodically to rejuvenate</p> <ul style="list-style-type: none"> ▪ H 4'-6' x W 3'-5' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Fine textured, arching stems, dense
N W	<i>Calycanthus floridus</i>	Common Sweetshrub, Carolina Allspice, Strawberry Shrub	Y		Y		Y	Y	<p>Easy to grow in deep, moist loam; adaptable; performs best in sun; becomes straggly in shade</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 6'-12' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Dense, bushy, rounded
W	<i>Caryopteris x clandonensis</i>	Bluebeard, Blue Spirea, Blue Mist Shrub (species and cultivars)	Y						<p>Prefers loose, loamy, well-drained soils; adaptable to pH; too much moisture dooms the plant; treat as an herbaceous perennial, cutting back in the autumn</p> <ul style="list-style-type: none"> ▪ H 2'-3' x W 2'-3' ▪ Full Sun ▪ pH 5.5-6.8 ▪ Mounded, rounded, full
N W	<i>Castanea pumilla</i>	Allegheny Chinkapin			Y		Y		<p>Zones 5-9; grows in dry woodlands; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 4'-8' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Upright, twiggy

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
N W	<i>Ceanothus americanus</i>	New Jersey Tea, Redroot, Wild Snowball			Y		Y		<p>Found in sandy woods, dry prairies, mixed deciduous forests; very adaptable</p> <ul style="list-style-type: none"> ▪ H 3'-4' x W 3'-5' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Low, broad, compact with upright branches
N W	<i>Cephalanthus occidentalis</i>	Buttonbush			Y		Y	Y	<p>Prefers moist to wet soils, near or in water but withstands low-water conditions associated with droughts; forms thickets</p> <ul style="list-style-type: none"> ▪ H 3'-6'+ x W 3'-6' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Upright, coarse, gangly
W	<i>Cercis chinensis</i>	Chinese Redbud (low-growing cultivars)	Y		Y		Y	Y	<p>Prefers moist, deep, well-drained soil rich in organic content, but does well in almost all soil conditions, except permanently wet; large shrub or small tree; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 8'-15' x W 6'-10' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Multi-stemmed

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
	<i>Chimonanthus praecox</i>	Fragrant Wintersweet			Y		Y		<p>Needs good drainage; adaptable to many soil types and pH; cut back to within six inches of the ground to rejuvenate to restore form when older; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 10'-15' x W 8'-12' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4+ ▪ Multi-stemmed, fountain like, leggy with age
W	<i>Chionanthus retusus</i>	Chinese Fringetree	Y		Y		Y	Y	<p>Prefers well-drained soils; adaptable to pH and soil types; urban-tolerant, withstands heat and drought; large shrub or small tree; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 12'-25' x W 10'-15' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Multi-stemmed, upright, spreading branches
N W	<i>Chionanthus virginicus</i>	Fringe Tree	Y				Y	Y	<p>Prefers moist, deep, fertile, acid soils, but is very adaptable; more compact in full sun; found along stream banks and swamp edges, and as understory in woodlands; drought- and shade-tolerant</p> <ul style="list-style-type: none"> ▪ H 12'-20' x W 12'-20' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Large shrub or small tree, spreading, upright, medium coarse

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
N W	<i>Clethra alnifolia</i>	Clethra, Pepperbush, Summersweet	Y				Y	Y	<p>Prefers moist, well-drained soil rich in organic content; grows in wet places in the wild; but very adaptable; salt tolerant; easy to grow; forms suckering colonies; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 4'-8'+ x W 4'-6'+ ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Oval, rounded top, dense
W	<i>Cornus alba</i>	Tartarian Dogwood (species and cultivars)					Y	Y	<p>Survives much better in the North; suckers to form large colonies and can be invasive; good wet area plant if suckering is not a concern</p> <ul style="list-style-type: none"> ▪ H 4'-6' x W 4'-6' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.5 ▪ erect, arching, open, loose mass of twigs
N W	<i>Cornus amomum</i>	Silky Dogwood			Y		Y	Y	<p>Moist, part-shade environment, but very adaptable; native to low woods and along streams; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 6'-10' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Rounded, twiggy, multi-stemmed, upright, suckering

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
N W	<i>Cornus racemosa</i>	Gray Dogwood			Y		Y	Y	<p>Prefers moist, well-drained soil is best, but very adaptable; will grow in wet or dry soils, shade to sun; often found along streams; suckering; difficult to find in cultivation; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 10'-15' x W 10'-15' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Multi-stemmed, erect, medium texture
	<i>Corylopsis glabrescens</i>	Fragrant Winterhazel			Y		Y		<p>Needs well-drained, acidic, moist soil, high in organic content; keep well-watered, but no standing water; good drainage is a must; a large shrub or small tree; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 8'-15' x W 8'-15' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-6.5 ▪ Spreading, dense, flat topped, multi-stemmed with zigzag stems
	<i>Corylopsis spicata</i>	Spike Winterhazel (species and cultivars)			Y		Y		<p>Same as previous, but not usually used as a small tree</p> <ul style="list-style-type: none"> ▪ H 4'-6' x W 6'-12' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-6.5 ▪ Mass of crooked arching branches

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
N	<i>Corylus americana</i>	American Filbert			Y		Y	Y	<p>Prefers moist, well-drained, loamy soil; pH-adaptable; usually found as an understory of moist woodlands; Japanese beetles, caterpillars, scale, blight, other diseases are a problem; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 8'-10'+ x W 8'-10' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Multi-stemmed, rounded top, leggy below, medium-coarse
	<i>Corylus avellana</i>	European Filbert, Hazelnut (cultivars)	Y		Y		Y	Y	<p>Prefers well-drained, loamy soil; adaptable to pH,; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 12'-20' x W 10'-15' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Dense thicket of erect canes and shoots from roots
W	<i>Cotinus coggygria</i>	Smokebush (cultivars)	Y		Y		Y	Y	<p>Prefers well-drained soils and sunny exposure best; tolerant of pH, soil types, dry conditions, drought; leaf color fades with heat; a large shrub or small tree; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 10'-15' x W 10'-15' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Upright, spreading, loose, open, multi-stemmed

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Cotinus obovatus</i>	American Smoketree	Y		Y			Y	<p>Same as <i>C. coggygia</i>, above; many hybrids with other <i>Cotinus</i>; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 15'-25' x W 12'-15' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Large, multi-stemmed
N	<i>Dasiphora fruticosa</i> subsp. <i>floribunda</i> (formerly <i>Potentilla fruticosa</i>)	Shrubby Cinquefoil	Y	Y	Y				<p>Best in fertile, moist, well-drained soils, but is tolerant of poor, dry soils, and is very tolerant of high pH; does not perform very well in the south (high night-time temperatures)</p> <ul style="list-style-type: none"> ▪ H 1'-4' x W 2'-4'+ ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.9 ▪ Bushy, fine-textured
W	<i>Deutzia gracilis</i>	Slender Deutzia (cultivars and hybrids with other species)	Y		Y			Y	<p>Easy to grow in well-drained garden soil; adaptable to pH, urban conditions, drought-tolerant; rejuvenate by pruning back to 6-12 inches (sacrificing next season's flowers); looks unkempt in winter</p> <ul style="list-style-type: none"> ▪ H 2'-4' x W 2'-4' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Low, mounding with slender branches

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Deutzia scabra</i>	Fuzzy Deutzia	Y		Y		Y		<p>Easy to grow in well-drained garden soil; adaptable to pH, urban conditions, drought-tolerant; coarse and unkempt, but reliable flowering</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 4'-8' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Oval, round-topped with spreading slender branches
N W	<i>Dirca palustris</i>	Leatherwood			Y		Y	Y	<p>Prefers deep, organic soils; does best in moist to wet, shady areas; grows along streams in the wild</p> <ul style="list-style-type: none"> ▪ H 3'-6' x W 3'-6' ▪ Part Sun / Shade, Shade ▪ pH 5.5-6.8 ▪ Somewhat dense, irregular, spreading
	<i>Enkianthus campanulatus</i>	Red-Vein Enkianthus (species and cultivars)					Y	Y	<p>Prefers moist, acidic, well-drained soil rich in organic content; shallow rooting; needs consistent moisture (but not standing water) in hot weather; can be a large shrub or small tree; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 12'-15' x W 4'-8' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-6.5 ▪ Narrow, upright with layered branches, becoming rounded with age

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
N	<i>Euonymus americanus</i>	Strawberry Bush, 'Hearts-a-Burstin'			Y		Y		<p>Prefers well-drained soils; very pH- and soil-adaptable; suckering; red seeds are showy in autumn; understory shade plant</p> <ul style="list-style-type: none"> ▪ H 4'-6' x W 3'-4' ▪ Part Sun / Shade, Shade ▪ pH 5.5-7.4 ▪ Open, loose, Arching
W	<i>Exochorda racemosa</i>	Pearlbush			Y		Y		<p>Prefers well-drained, acidic, loamy soils; somewhat pH-adaptable; prune low to rejuvenate when becomes floppy and unkempt with age; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 10'-15' x W 10'-15' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.2 ▪ Upright slender branches, loose, irregular
W	<i>Forsythia x intermedia</i>	Forsythia (species and cultivars)	Y				Y		<p>Prefers good, loose soil, but very tolerant; needs full sun for best flowering; adaptable to pH, urban conditions, and air pollution; prune after flowering; suckering and spreading habit (suckers root where they touch the ground); location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 8'-10' x W 10'-12' some cultivars smaller ▪ Full Sun ▪ pH 5.5-7.4 ▪ Wild upright arching canes

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
N	<i>Fothergilla gardenia</i>	Dwarf Fothergilla (species and cultivars)			Y		Y	Y	<p>Native to Coastal Plain pine savannas and pocosins; best in acid soils, moisture, and excellent drainage; suckering; best flowers and fall color in full sun; an NC-DENR stormwater BMP plant</p> <ul style="list-style-type: none"> ▪ H 2'-4' x W 3'-4' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-6.2 ▪ rounded, dense, spreading and suckering colonies, slender stems
N	<i>Fothergilla major</i>	Large Fothergilla			Y		Y	Y	<p>Prefers rich, moist, well-drained, acid soil; needs cool moisture and some shade in the Piedmont; suckering colonie</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 6'-10' ▪ Part Sun / Shade, Shade ▪ pH 5.5-6.2 ▪ Variably rounded, multi-stem, dense with erect stems
	<i>Hamamelis mollis</i>	Chinese Witchhazel (species and cultivars)			Y		Y	Y	<p>Prefers moist, well-drained soil rich in organic content; leaves scorch in hot summers; large shrub or small tree; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 15' x W 15' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Spreading branches

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Hamamelis vernalis</i>	Vernal Witchhazel (species and cultivars)	Y		Y		Y	Y	<p>Prefers moist situations; found going in gravelly steam banks.; grows well in heavier, wet clays; pH-adaptable; will sucker and form colonies</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 6'-10'+ ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Dense, multi-stemmed, rounded
N	<i>Hamamelis virginiana</i>	Common Witchhazel (smaller cultivars)			Y		Y		<p>Prefers moist, well-drained soil; avoid extremely dry conditions; full sun to shade; a picturesque small tree or large shrub;</p> <ul style="list-style-type: none"> ▪ H 5'-15'x W 5'-15' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 5.5-7.5 ▪ Medium-coarse texture, large crooked branches, rounded overall
W	<i>Hamamelis x intermedia</i>	Witchhazel (cultivars)	Y				Y	Y	<p>Culture like other <i>Hamamelis</i>; generally, hybrids between <i>H. japonica</i> and <i>H. mollis</i>; LARGE shrub or small tree; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 15'-20' x W 15'-20' ▪ Full Sun, Part Sun / Shade ▪ pH 5.4-6.8 ▪ Multi-stemmed, rounded

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
	<i>Hydrangea anomala petolaris</i>	Climbing Hydrangea			Y				<p>Prefers moist, well-drained soil rich in organic content; best on eastern or northern exposure with regular moisture in hotter climates; able to cover tall trees and large structures</p> <ul style="list-style-type: none"> ▪ H 10'-80' x W 10'-40' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 5.5-7.4 ▪ Climbing vine
N	<i>Hydrangea arborescens</i> 'Annabelle', others	Smooth Hydrangea			Y		Y		<p>Best performance in rich, moist, well-drained soil; pH-adaptable; best in partial shade, but will take full sun, if moisture provided; can be big, unruly, and form suckering colonies; needs room</p> <ul style="list-style-type: none"> ▪ H 3'-5' x W 3'-5' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 5.5-7.5 ▪ Low growing, clumpy, rounded, coarse
	<i>Hydrangea macrophylla</i>	Bigleaf Hydrangea (species and cultivars, including mop-heads and lacecaps)	Y		Y				<p>Prefers moist, well-drained soil rich in organic content; partial shade or shade, and regular moisture in hotter climates; salt-tolerant, good urban-tolerance; best blue color in acidic (pH = 5.0-5.5) soils, best pink in more neutral (pH = 6.0-6.5) soils; flowers on previous season's growth, so prune after flowering</p> <ul style="list-style-type: none"> ▪ H 3'-6'+ x W 3'-6'+ ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 5.0-6.8 ▪ Course, rounded with many erect stems

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
	<i>Hydrangea paniculata</i>	Panicle Hydrangea (species and cultivars)	Y		Y				<p>Prefers moist, well-drained soil rich in organic content; good urban-tolerance; flowers on new wood, so can be pruned in winter or early spring; a tough plant; large shrub or small tree; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 4'-8' x W 4'-8'+ ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 5.5-6.8 ▪ Upright, course, low branched
	<i>Hydrangea quercifolia</i>	Oakleaf Hydrangea (species and cultivars)	Y		Y		Y		<p>Prefers moist, well-drained soil rich in organic content; mulch to keep roots moist; good urban-tolerance; native to limestone soils in lower South; "deer candy"; forming colonies via stolons; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 4'-8' x W 6'-12' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 5.5-7.4+ ▪ Upright, course, irregularly rounded
N W	<i>Ilex decidua</i>	Possomhaw (species and cultivars)					Y	Y	<p>A deciduous holly, lots of red berries; Larger than <i>I. verticillata</i>; also better-adapted to alkaline soils; <i>Ilex opaca</i> can serve as a male pollinator; large shrub or small tree; will sucker into masses;</p> <ul style="list-style-type: none"> ▪ H 15'-20' x W 18'-25' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Rounded, medium texture, many ascending stems

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION	
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers			
							Constructed	Riparian		
N W	<i>Ilex verticillata</i>	Common Winterberry, Black Alder (species and cultivars)						Y	Y	<ul style="list-style-type: none"> ▪ Prefers moist, well-drained soil rich in organic content; does well in light or heavy soils; native to swampy areas; chlorotic in high pH soils; best berry formation in full sun (and with both male and female plants); forms a dense colony of suckering stems H 4'-15' x W 4'-15'+ ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-6.5 ▪ Depends on cultivar, oval to rounded, dense and twiggy
W	<i>Kerria japonica</i>	Japanese Kerria	Y		Y			Y	Y	<p>Needs loamy, well-drained soil; adaptable to pH and soil conditions; better flowering with lower soil fertility; tends to sucker and spread (colonize) faster in looser soils; flowers face more quickly in full sun; becoming more open with age</p> <ul style="list-style-type: none"> ▪ H 5'-9' x W 5'-9' ▪ Part Sun / Shade, Shade ▪ pH 5.5-7.4 ▪ Distinctly upright, arching stems form dense rounded twiggy mass
W	<i>Kolkwitzia amabilis</i>	Beautybush	Y		Y			Y		<p>Prefers well-drained soils, but is adaptable to soils types and pH; cut to ground to rejuvenate (flowers on older wood, so will lose the season's flowers); leggy and more coarse with age</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 4'-8' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Upright, arching, vase-shaped

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
	<i>Laburnum x watereri</i>	Goldenchain Tree			Y			Y	<p>Prefers moist, well-drained soils; pH-tolerant, but no standing water; not very heat-tolerant and does not perform as well in the South; eastern or northern exposure best with shade in the hot part of the day; small tree or large shrub; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 12'-15' x W 9'-12' ▪ Part Sun / Shade ▪ pH 5.5-7.4 ▪ Upright, oval-rounded, loses lower branches
W	<i>Lagerstroemia indica</i> and <i>L. indica</i> x <i>L. fauriei</i>	Crapemyrtle (semi-dwarf)	Y					Y	<p>Same as previous; often multi-stemmed large shrub or small tree; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 6'-12' x W 6'-12' ▪ Full Sun ▪ pH 5.5-7.4 ▪ Full, rounded, dense flowering
W	<i>Lagerstroemia indica</i> and <i>L. indica</i> x <i>L. fauriei</i>	Dwarf Crapemyrtle (lowest-growing cultivars)	Y	Y				Y	<p>Prefers well-drained soils; very pH-and soil-adaptable; must be maintained at 30 inches in height to use in sight distance triangles</p> <ul style="list-style-type: none"> ▪ H 1'-3' x W 2'-6' ▪ Full Sun ▪ pH 5.5-7.4 ▪ Full, rounded, dense

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Lagerstroemia indica</i> and <i>L. indica</i> x <i>L. fauriei</i>	Dwarf Crapemyrtle (low growing cultivars)	Y	Y			Y		<p>Prefers well-drained soils; very pH-and soil-adaptable.</p> <ul style="list-style-type: none"> ▪ H 1'-5' x W 2'-6' ▪ Full Sun ▪ pH 5.5-7.4 ▪ Full, rounded, dense
W	<i>Lespedeza thunbergii</i>	Thunberg Lespedeza			Y		Y	Y	<p>Best in well-drained soil, but is soil-, pH-, and heat-tolerant; often dies back to ground in winter in Zone 7</p> <ul style="list-style-type: none"> ▪ H 3'-6' x W 3'-6' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Graceful, arching fountain
N	<i>Lindera benzoin</i>	Spice Bush			Y		Y	Y	<p>Moist, acid, well-drained soils; adaptable to drier soils, but best performance in moist conditions and half-shade; full and dense in full sun;</p> <ul style="list-style-type: none"> ▪ H 6'-12' x W 6'-12' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Rounded outline, medium, looser in shade

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
	<i>Lindera obtusifolium</i>	Japanese Spicebush			Y		Y	Y	<p>Moist, acidic, well-drained soils; adaptable to drier soils, but best performance in moist conditions and half-shade; multi-stemmed shrub or small tree; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 8'-10'+ x W 8'-10'+ ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Rounded, dense
	<i>Magnolia</i> 'Jane' (<i>M. liliiflora</i> 'Nigra' x <i>M. stellata</i> 'Rosea'),	'Little Girl' Hybrid Magnolia (cultivars)	Y				Y		<p>Prefers well-drained soils; foliage tends to be mildew-susceptible and look tattered toward end of summer; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 10'-15' x W 8'-12' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Upright, broadly rounded
	<i>Magnolia stellata</i>	Star Magnolia (species and cultivars)	Y				Y		<p>Prefers well-drained soil rich in organic content; avoid southern exposures (like other deciduous magnolias) to protect from early flowers being damaged by cold; pollution-tolerant; does well in heat; a large shrub or small tree; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 15'-20' x W 10'-15' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Dense, oval to rounded

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
N W	<i>Magnolia virginiana</i>	Sweetbay Magnolia (smaller cultivars)					Y	Y	<p>Prefers moist, acidic, soils; grows in moist to wet areas in swamps and along streams; evergreen in mild winters, primarily semi-evergreen to deciduous, large shrub or small tree; species grows to 60 feet tall;</p> <ul style="list-style-type: none"> ▪ H 12'-30' x W 8'-15' ▪ Part Sun / Shade, Shade ▪ pH 5.5-6.8 ▪ Upright, small multi-stem tree
	<i>Magnolia x loebneri</i>	Hybrid Star Magnolia, Loebner Magnolia (cultivars)	Y				Y		<p>Prefers well-drained soils; little mildew effect on leaves; large shrub or small tree; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 12'-25' x W 15'-30' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Upright, broadly rounded
	<i>Magnolia x soulangeana</i>	Saucer Magnolia (species and cultivars)	Y				Y		<p>Prefers deep, well-drained soils rich in organic content; not as cold-hardy as other deciduous magnolias; best in east, northeast exposures (protects flowers best); pollution-tolerant; a large shrub or low-branched, multi-stemmed small tree; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 18'-25' x W 15'-20' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Upright, pyramidal to rounded

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Philadelphus coronarius</i>	Sweet Mockorange (species and cultivars)	Y				Y		<p>Prefers moist, well-drained soil rich in organic content, but generally tolerant of soil conditions; vigorous and easy to grow; many cultivars with other <i>Philadelphus</i> species; leggy and straggly with age; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 10'-12' x W 10'-12' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Large, rounded with stiff upright branches
N W	<i>Physocarpus opulifolius</i>	Common Eastern Ninebark (species and cultivars)			Y		Y	Y	<p>Very adaptable to wet or dry, sun or shade, acidic or basic soils; grows in rocky banks along streams; cultivars have red or yellow new and fall foliage; ragged in winter;</p> <ul style="list-style-type: none"> ▪ H 5'-10' x W 6'-10' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Upright, spreading with stiffly-recurved branches
	<i>Potentilla fruticosa</i> (see <i>Dasiphora fruticosa</i> .)	Shrubby Cinquefoil							
W	<i>Punica granatum</i>	Pomegranate	Y						<p>Does better further south; best in fertile, moist, well-drained soils, but with good drainage is very adaptable to soil type, and pH; large shrub or small tree; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 12'-20' x W 10'-15' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Upright, oval to rounded

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION	
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers			
							Constructed	Riparian		
N W	<i>Rhamnus caroliniana</i>	Carolina Buckthorn, Indian Cherry	Y		Y			Y		<p>Prefers limestone, high pH soils, but is very adaptable; withstands urban environments, difficult conditions, and waste areas; birds spread seeds; large shrub or small tree; related, naturalized, foreign species <i>R. cathartica</i> and <i>R. frangula</i> ('Tallhedge') are invasive in the East</p> <ul style="list-style-type: none"> ▪ H 10'-15' x W 6'-10' ▪ Full Sun, Part Sun / Shade ▪ pH 6.2-7.4+ ▪ Upright, oval to rounded, dense, twiggy
N	<i>Rhododendron arborescens</i>	Sweet Azalea			Y			Y	Y	<p>Prefers light, well-drained, acid, constantly-moist soils; high shade best; native to banks of mountain streams</p> <ul style="list-style-type: none"> ▪ H 8'-15' x W 6'-10' ▪ Part Sun / Shade, Shade ▪ pH 4.5-6.2 ▪ Erect, open, fine-textured
N	<i>Rhododendron atlanticum</i>	Coast Azalea			Y			Y	Y	<p>Light, well-drained (sandy), acid, moist soils, high shade; native to open pine woods, especially along streams, in the Coastal Plain; suckering</p> <ul style="list-style-type: none"> ▪ H 3'-6' x W 3'-6' ▪ Part Sun / Shade, Shade ▪ pH 4.5-6.8 ▪ Round, refined

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
N	<i>Rhododendron austrinum</i>	Florida Azalea			Y		Y	Y	<p>Prefers moist, well-drained soil and high shade; somewhat pH- and soil-condition-tolerant;</p> <ul style="list-style-type: none"> ▪ H 8'-10' x W 5'-8' ▪ Part Sun / Shade, Shade ▪ pH 5.4-6.8 ▪ Loose, open, rounded, multi-stem
N	<i>Rhododendron calendulaceum</i>	Flame Azalea			Y		Y	Y	<p>Refers light, well-drained, constantly-moist, acid soils; native to southern Appalachian Mountains; does not tolerate heat as well as other Azaleas</p> <ul style="list-style-type: none"> ▪ H 4'-8' x W 4'-8' ▪ Part Sun / Shade, Shade ▪ pH 5.4-6.2 ▪ Loose, open, upright
N	<i>Rhododendron canescens</i>	Sweet-Piedmont Azalea (aka Florida Pinxter Azalea)			Y		Y	Y	<p>Prefers well-drained, moist acid soils; tolerates shade better than other deciduous azaleas; native along slopes and stream banks in high shade; stoloniferous, suckering to form colonies</p> <ul style="list-style-type: none"> ▪ H 10'-15' x W 6'-8' ▪ Part Sun / Shade, Shade ▪ pH 5.5-6.5 ▪ Tall, loose, open

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
N	<i>Rhododendron periclymenoids</i>	Pinxterbloom Azalea			Y		Y	Y	<p>Prefers well-drained, acid soils, with regular moisture; has adapted to dry, sandy, and rocky soils of the Appalachian Mountains; spreads by stolons</p> <ul style="list-style-type: none"> ▪ H 2'-10' x W 4'-8' ▪ Part Sun / Shade, Shade ▪ pH 4.5- 6.2 ▪ Low, much-branched, stoloniferous
N	<i>Rhododendron prinophyllum</i>	Roseshell Azalea			Y		Y	Y	<p>Prefers well-drained, moist soils; more tolerant of high-pH soils than other azaleas</p> <ul style="list-style-type: none"> ▪ H 4'-8' x W 4'-8' ▪ Part Sun / Shade, Shade ▪ pH 5.5-6.5 ▪ Dense with spreading, horizontal nature
	<i>Rhododendron prunifolium</i>	Plumleaf Azalea			Y		Y	Y	<p>Prefers well-drained, moist, acid soils; native to shady stream banks; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 8'-12' x W 4'-8' ▪ Part Sun / Shade, Shade ▪ pH 4.5-6.8 ▪ loose, open, graceful

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION	
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers			
							Constructed	Riparian		
	<i>Rhododendron serrulatum</i>	Sweet Azalea			Y			Y	Y	Needs constantly moist, well-drained, acid soils; native to swampy woods; location of use is predicated on the mature or maintained height of the plant or cultivar <ul style="list-style-type: none"> ▪ H 6'-12' x W 6'-12' ▪ Part Sun / Shade, Shade ▪ pH 4.5-6.8 ▪ Rounded outline, loose and open
N	<i>Rhododendron vaseyi</i>	Pinkshell Azalea			Y			Y	Y	Prefers well-drained, rocky, constantly-moist, acid soils; native to the Blue Ridge Mountains; not as heat-tolerant as other azaleas; location of use is predicated on the mature or maintained height of the plant or cultivar <ul style="list-style-type: none"> ▪ H 5'-10' x W 4'-8' ▪ Part Sun / Shade, Shade ▪ pH 4.5-6.2 ▪ Upright, loose, irregular
N	<i>Rhododendron viscosum</i>	Swamp Azalea			Y			Y	Y	Prefers acid, moist soils; native to swamps; tolerates wetter conditions, but still does best with good drainage <ul style="list-style-type: none"> ▪ H 3'-8' x W 3'-8' ▪ Part Sun / Shade, Shade ▪ pH 4.5-6.2 ▪ Loose, open, spreading

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Rhodotypos scandens</i>	Black Jetbead	Y		Y		Y		<p>Tolerant of a wide range of conditions, including soil type, pH, pollution and shade; good plant for dry shade; good parking lot tolerance; sometimes scraggly</p> <ul style="list-style-type: none"> ▪ H 3'-6' x W 4'-9' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 5.5-7.4 ▪ Mounded with arching branches
N W	<i>Rhus aromatica</i>	Fragrant Sumac	Y	Y	Y		Y	Y	<p>Prefers well-drained, acid soils, but pH-tolerant; drought-tolerant; has not performed well in wet, heavy soils; good for bank stabilization, rooting where stems touch ground, and forming colonies; should only be planted where this tendency can be contained or is desirable; should not be used as specimen, foundation, or container planting</p> <ul style="list-style-type: none"> ▪ H 2'-3' x W 4'-8' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Low, dense, wide-spreading

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
N W	<i>Rhus copallina</i> (<i>Rhus copallinum</i>)	Flameleaf or Shining Sumac	Y				Y	Y	<p>Prefers well-drained soils; drought-resistant and pH-tolerant; use only in dry, rocky areas, on banks, waste places; aggressively spreading and suckering when established, forming large colonies; should only be planted where this tendency can be contained or is desirable; should not be used as specimen, foundation, or container planting</p> <ul style="list-style-type: none"> ▪ H 15'-25' x W 15'-25' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Compact and dense when young, spreading and more open with age
N W	<i>Rhus glabra</i>	Smooth Sumac	Y				Y	Y	<p>Similar to previous sumac; can grow very large</p> <ul style="list-style-type: none"> ▪ H 10'-15' x W 10'-15' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Multi-stem, erect colony
N W	<i>Rosa carolina</i>	Pasture Rose, Carolina Rose			Y		Y	Y	<p>Prefers slightly acid soils amended with organic matter; native to low and wet ground beside swamps and streams; suckering to form dense thickets</p> <ul style="list-style-type: none"> ▪ H 3'-6' x W 6'-15' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Erect, arching branches

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Rosa</i> hybrids	Rose (low-growing, lower maintenance cultivars)	Y	Y					<p>Prefers moist, well-drained, slightly acidic soil rich in organic content; tolerant of salt and urban conditions; good disease-resistance; however, Meidiland™ series, especially, and some others should be monitored for black spot and mildew</p> <ul style="list-style-type: none"> ▪ H 2'-4' x W 2'-6' ▪ Full Sun ▪ pH 5.5-6.8 ▪ Spreading, groundcover, dense
W	<i>Rosa</i> hybrids	Rose (medium-height, lower maintenance cultivars)	Y				Y		<p>Same as previous</p> <ul style="list-style-type: none"> ▪ H 3'-5' x W 3'-6' ▪ Full Sun ▪ pH 5.5-6.8 ▪ Spreading, rounded, tall groundcover
W	<i>Rosa rugosa</i>	Rugosa Rose (species and cultivars)	Y				Y		<p>Prefers well-drained, slightly acid soil, supplemented with organic matter; salt-tolerant, urban conditions, will grow in sand; watch location due to thorns; suckers and forms colonies</p> <ul style="list-style-type: none"> ▪ H 4'-6' x W 4'-6' ▪ Full Sun ▪ pH 5.5-6.8 ▪ Thorny, stout, upright stems with rounded habit
N W	<i>Rosa virginiana</i>	Virginia Rose			Y		Y	Y	<p>Prefers well-drained, slightly acid soils amended with organic matter; will grow in sand; suckering to form dense thickets</p> <ul style="list-style-type: none"> ▪ H 4'-6' x W 6'-8' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Erect, arching branches

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION	
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers			
							Constructed	Riparian		
N W	<i>Sambucus canadensis</i>	Common Elderberry			Y			Y	Y	<p>Does best in moist conditions, but tolerates dry soil, and is pH-adaptable; suckers profusely, making large colonies once established; use in wet areas, along roadsides, to naturalize; attracts birds</p> <ul style="list-style-type: none"> ▪ H 5'-20' x W 5'-15' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Spreading, erect, multi-stemmed, with flat to rounded top
W	<i>Spiraea cantoniensis</i>	Double Reeves Spirea (cultivars)	Y		Y			Y		<p>Best in fertile, well-drained soil, but very tolerant of soil and pH conditions (except wet soils); good heat- and pollution-tolerance</p> <ul style="list-style-type: none"> ▪ H 4'-6' x W 4'-6' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Graceful, arching, dense, rounded
W	<i>Spiraea nipponica</i> 'Snowmound'	Snowmound Nippon Spirea	Y		Y					<p>Same as <i>S. cantoniensis</i></p> <ul style="list-style-type: none"> ▪ H 3'-6' x W 4'-8' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Dense, arching, rounded
W	<i>Spiraea thunbergii</i>	Thunberg Spirea	Y		Y					<p>Same as <i>S. cantoniensis</i></p> <ul style="list-style-type: none"> ▪ H 3'-5' x W 3'-5' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Bushy, spreading, arching

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
W	<i>Spiraea xbumalda</i> and <i>S. japonica</i> hybrids	Bumald and Japanese Spirea Hybrids (medium-height cultivars)	Y		Y				<p>Same as previous</p> <ul style="list-style-type: none"> ▪ H 2'-5' x W 2'-5' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Dense, finely textured, rounded, mounding
W	<i>Spiraea xbumalda</i> and <i>S. japonica</i> hybrids	Bumald and Japanese Spirea Hybrids (lowest-growing cultivars)	Y	Y	Y				<p>Best in fertile, well-drained soil, but very tolerant of soil and pH conditions (except wet soils); generally good heat- and pollution-tolerance; only those less than 30 inches tall at maturity can be planted within sight distance triangles; species not allowed due to invasive tendencies</p> <ul style="list-style-type: none"> ▪ H 2'-2.5' x W 2'-5' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Dense, finely textured, rounded, mounding
W	<i>Spiraea xvanhouttei</i> (<i>S. trilobata</i> x <i>S. cantoniensis</i>)	Vanhoutte Spirea (hybrid and cultivars)	Y		Y		Y		<p>Culture same as <i>S. x bumalda</i>, above; Newer cultivars have better form and disease resistance than original.</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 10'-12' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-7.4 ▪ Vase / fountain like habit with rounded top

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
N	<i>Stewartia malacodendron</i>	Silky Stewartia			Y		Y	Y	<p>Prefers moist, well-drained soil rich in organic content; best with afternoon shade; native understory in broadleaf woods, ravines, and steep slopes near streams; root rot is a problem, so plant high and mulch; large shrub or small tree.</p> <ul style="list-style-type: none"> ▪ H 10'-15' x W 10'-15' ▪ Part Sun / Shade, Shade ▪ pH 4.5-6.5 ▪ Upright, spreading branches
N W	<i>Stewartia ovata</i>	Mountain Stewartia			Y		Y	Y	<p>Similar to silky Stewartia, except somewhat bushier, fewer problems with root rot.</p> <ul style="list-style-type: none"> ▪ H 10'-15' x W 10'-15' ▪ Part Sun / Shade, Shade ▪ pH 4.5-6.5 ▪ Bushy, upright, spreading
N	<i>Styrax americanus</i>	American Snowbell			Y		Y	Y	<p>Prefers moist, loose, well-drained, cool, acid soil, mulch; native to lowlands bordering streams</p> <ul style="list-style-type: none"> ▪ H 6'-12' x W 4'-8' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 4.5-6.5 ▪ Fine textured to wispy, rounded

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
N	<i>Styrax grandifolius</i>	Bigleaf Snowbell			Y		Y	Y	<p>Prefers loose, well-drained, acid soils; mulch needed; understory native in upland deciduous or mixed woods in well-drained or dry soils; shrub to small tree</p> <ul style="list-style-type: none"> ▪ H 8'-15' x W 6'-12' ▪ Part Sun / Shade, Shade ▪ pH 4.5-6.5 ▪ Open, small tree
N W	<i>Vaccinium arboreum</i>	Farkleberry, Sparkleberry			Y		Y	Y	<p>Prefers acidic, well-drained soils; native to understory in dry, deciduous woodlands; fruit is inedible; noted heat- and drought-tolerance; ranges from a low shrub to a multi-stemmed tree</p> <ul style="list-style-type: none"> ▪ H 4'-15' x W 4'-12' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-5.5 ▪ Upright, open shrub
N	<i>Vaccinium ashei</i>	Rabbiteye Blueberry (species and cultivars)	Y		Y		Y	Y	<p>Prefers moist, well-drained, ACIDIC soils with lots of organic matter; willrow in sand, if acidic, moist and mulched; mulch to keep the shallow, fibrous rootsystem moist and protected; use raised beds in urban situations; good blueberryfor Durham; fruits a little later than Southern Highbush varieties</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 6'-10' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-5.5 ▪ Upright, dense, spreading, shrub

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
N	<i>Vaccinium corymbosum</i>	Highbush Blueberry (Southern Highbush cultivars)	Y		Y		Y	Y	<p>Same cultural notes as <i>V. ashei</i>, above; Southern Highbush cultivars perform better in Durham than others; mulch well to protect shallow, fibrous root system.</p> <ul style="list-style-type: none"> ▪ H 6'-12' x W 6'-12' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-5.5 ▪ Upright, dense, spreading shrub
N W	<i>Vaccinium elliotii</i>	Elliott Blueberry			Y		Y	Y	<p>Found in acidic soils in well-drained and wet habitats as an understory along stream banks, wet thickets, and bottomland woodlands; noted tolerance of heat, drought, and wet conditions</p> <ul style="list-style-type: none"> ▪ H 6'-12' x W 6'-12' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-5.5 ▪ Slender, upright, arching, multibranched
N W	<i>Vaccinium pallidum</i>	Hillside Blueberry	Y	Y	Y		Y	Y	<p>Found in dry, acid soils, under oaks, pine, in wet, maple low-lands, and in pine barrens and savannas; common on roadsides and in old fields; tolerant of soil conditions and drought; forms colonies; mulch shallow root system.</p> <ul style="list-style-type: none"> ▪ H 1'-2' x W 1'-2' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-5.5 ▪ Low, spreading

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
N W	<i>Vaccinium stamineum</i>	Deerberry			Y		Y	Y	<p>Zones 5-9; prefers well-drained, acid soils; size is dependent on soil quality and moisture; tolerant of drier, sandy soils (shorter in this habitat), and wetter, richer, heavier soils (taller here).</p> <ul style="list-style-type: none"> ▪ H 3'-15' x W 3'-12' ▪ Part Sun / Shade, Shade ▪ pH 4.5-5.5 ▪ Variable, multi-stem, fine textured
N W	<i>Viburnum acerifolium</i>	Mapleleaf Viburnum			Y		Y	Y	<p>Prefers well-drained, slightly acid (but is pH-tolerant), slightly moist soils; tolerant of deep shade and drought; best for naturalizing; native to understory of dry, upland forests; suckers to form colonies; flowers not notably fragrant</p> <ul style="list-style-type: none"> ▪ H 4'-6' x W 4'-6' ▪ Part Sun / Shade, Shade ▪ pH 5.5-6.8 ▪ Upright, loose, open
N W	<i>Viburnum bracteatum</i>	Bracted Viburnum	Y		Y		Y	Y	<p>Prefers well-drained, moist soils; good pH-, drought-, wet-, urban-, and salt-tolerance; leaves hold up better in heat than <i>V. dentatum</i>; will sucker and form colonies; 'Emerald Lustre' is a rare, beautiful, cultivar that can grow to 15 feet tall and wide in Zones 6-8; flowers are malodorous</p> <ul style="list-style-type: none"> ▪ H 6'-12' x W 6'-8' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 5.5-6.8 ▪ Similar to <i>V. dentatum</i>

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
	<i>Viburnum carlesii</i>	Koreanspice Viburnum (species and cultivars)	Y		Y				<p>Prefers well-drained, slightly acid soils with even moisture; adaptable to high pH; recommend buying own-root plants instead of plants grafted onto <i>V. lantana</i> understock, which will take over the entire plant; fragrant blooms</p> <ul style="list-style-type: none"> ▪ H 4'-5' x W 4'-8' ▪ Full Sun, Part Sun / Shade ▪ pH 6.3-6.8 ▪ Rounded, dense with upright spreading branches
N W	<i>Viburnum dentatum</i>	Arrowwood Viburnum (species and cultivars)	Y		Y		Y	Y	<p>Prefers well-drained, moist soils; pH-tolerant; will grow in dry woodlands to stream and pond edges; good wet- and dry-tolerance; adaptable to heavy soils salt-tolerant; ultimate size depends on local habitat; will sucker and form colonies; flowers either somewhat malodorous or non-scented</p> <ul style="list-style-type: none"> ▪ H 6'-15' x W 6'-15' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Dense, spreading, with many finely arching stems
N W	<i>Viburnum lentago</i>	Nannyberry Viburnum, Sheepberry	Y		Y		Y	Y	<p>Easy to grow; pH-adaptable; tolerant of wet or dry and most soil conditions (well-drained is still best); large shrub or small tree; good for naturalizing; often suckers, producing large thickets; flowers not notably fragrant</p> <ul style="list-style-type: none"> ▪ H 15'-18' x W 10'-15' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 5.5-7.5 ▪ Open, fine textured, arching branches

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
	<i>Viburnum macrocephalum</i>	Chinese Snowball Viburnum	Y		Y				<p>Semi-evergreen in the South; prefers well-drained, moist, slightly acid soils; needs even moisture; adaptable to high pH; flowers non-fragrant; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 6'-10' ▪ Full Sun, Part Sun / Shade ▪ pH 6.3-6.8 ▪ Open, loose, upright, rounded
N W	<i>Viburnum nudum</i>	Smooth Witherod, Possum-Haw Viburnum (species and cultivars)	Y		Y		Y	Y	<p>Prefers well-drained, slightly acid (although pH-tolerant), slightly moist soils; drought- and flood-tolerant; good for naturalizing and can be grown in floodplains in both sun and shade; an erect, large shrub, or more rarely, a small tree; flowers not notably fragrant</p> <ul style="list-style-type: none"> ▪ H 6'-14' x W 6'-10' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Fairly dense, compact, rounded, with spreading, arching stem
	<i>Viburnum opulus</i>	European Cranberrybush Viburnum (species and cultivars)	Y		Y				<p>Prefers well-drained, moist, slightly acid soils; needs even moisture; adaptable to high pH; found in swamps and bog in its native habitat; easy to grow; flowers slightly malodorous, but not generally noticeable; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 8'-12' x W 10'-15' ▪ Full Sun, Part Sun / Shade ▪ pH 6.3-6.8 ▪ Upright, multi-stemmed, spreading

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
	<i>Viburnum plicatum</i> f. <i>tomentosum</i>	Doublefile Viburnum	Y		Y				<p>Prefers well-drained, moist, slightly acid soils; needs even moisture; will not tolerate wet, poorly drained, clay soils; needs mulch and regular (but well-drained) moisture in the South; large shrub or small tree; flowers non-fragrant; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 8'-12 x W 10'-15' ▪ Full Sun, Part Sun / Shade ▪ pH 6.3-6.8 ▪ Multi-stemmed, spreading
N W	<i>Viburnum prunifolium</i>	Black Haw, Blackhaw Viburnum (species and cultivars)	Y		Y		Y	Y	<p>Prefers well-drained soil to thrive, but very adaptable to pH, wet or dry conditions, clay, pollution, sun or shade; pest- and disease-free; multi-stemmed small tree or shrub growing to 30 x 20 in 20 years (larger with more time); flowers attractive, but not notably fragrant; edible fruit (better after frost)</p> <ul style="list-style-type: none"> ▪ H 12'-30' x W 12'-20' ▪ Full Sun, Part Sun / Shade ▪ pH 5.5-6.8 ▪ Stiff, upright branches, rounded top
N W	<i>Viburnum rufidulum</i> '	Rusty Blackhaw Viburnum, Southern Blackhaw	Y		Y		Y	Y	<ul style="list-style-type: none"> ▪ Prefers well-drained soil to thrive, but very adaptable to pH, wet or dry conditions, soil types, pollution, sun or shade; very drought-tolerant and very heavy clay-tolerant; more dense in full sun; a small tree or large shrub; cultivars listed are shorter than ultimate sizes shown for species; flowers have slight to no fragrance H 15'-35' x W 10'-25' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 5.5-6.8 ▪ Irregular, open, spreading

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
	<i>Viburnum xcarlcephalum</i> (<i>V. carlesii</i> x <i>V. macrocephalum</i> var. <i>keteleeri</i>),	Fragrant or Carlcephalum Viburnum (this hybrid and cultivars)	Y		Y				<p>Prefers deep, fertile, well-drained, moist, slightly acid soils; needs even moisture; it forms a fast-growing, large shrub; adaptable to high pH; popular garden Viburnum; fragrant blooms; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 6'-10' x W 6'-10' ▪ Full Sun, Part Sun / Shade ▪ pH 6.3-6.8 ▪ Open, loose, upright, rounded
W	<i>Vitex agnus-castus</i>	Lilac Chastetree	Y		Y		Y		<p>Prefers loose, well-drained soil, and hot weather; will sucker and water-sprout from stem and trunk, especially when pruned, making it look unkempt; grows in sand in the Coastal Plain; salt-tolerant; large shrub or small tree; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 15'-20' x W 15'-20' ▪ Full Sun, Part Sun / Shade ▪ pH 5.8-6.8 ▪ Loose, airy, multi-stemmed
W	<i>Vitex negundo</i>	Chinese Chastetree	Y		Y		Y		<p>Prefers loose, well-drained soil, full sun, and hot weather; large shrub or small tree; more cold-tolerant than <i>V. agnus-castus</i>; location of use is predicated on the mature or maintained height of the plant or cultivar</p> <ul style="list-style-type: none"> ▪ H 10'-15' x W 10'-15' ▪ Full Sun, Part Sun / Shade ▪ pH 5.8-6.8 ▪ Loose, airy, multi-stemmed

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
	<i>Weigela florida</i>	Weigela (species and taller cultivars)	Y		Y			Y	<p>Same as previous</p> <ul style="list-style-type: none"> ▪ H 6'-9' x W 6'-12' ▪ Full Sun ▪ pH 5.8-6.8 ▪ Spreading, dense
	<i>Weigela florida</i>	Dwarf Weigela (very low cultivars)	Y	Y	Y				<p>Prefers loose, well-drained soil; very adaptable to soil conditions; heat- and pollution-tolerant; will succumb to extended drought</p> <ul style="list-style-type: none"> ▪ H 2'-3' x W 3'-5' ▪ Full Sun ▪ pH 5.8-6.8 ▪ Spreading, dense
	<i>Weigela florida</i>	Weigela (low to medium height cultivars)	Y		Y			Y	<p>Same as previous</p> <ul style="list-style-type: none"> ▪ H 4'-5' x W 4'-5' ▪ Full Sun ▪ pH 5.8-6.8 ▪ Spreading, dense
N W	<i>Xanthorhiza simplicissima</i>	Yellowroot	Y	Y	Y				<p>Prefers moist to wet conditions, and acidic soils but will grow in dry conditions (will not spread as fast); common along streams in southern Appalachians; suckers freely forming a thicket</p> <ul style="list-style-type: none"> ▪ H 1'-3' x W 2'-5' ▪ Full Sun, Part Sun / Shade, Shade ▪ pH 5.5-6.2 ▪ Flat-topped groundcover, celery-like leaves

TABLE 2B: ALLOWED DECIDUOUS SHRUBS

ALLOWED SHRUBS Native = N Water-Wise = W			APPROVED LOCATION OF USE CATEGORIES Allowed = Y						CULTURAL INFORMATION
Plant Type	Scientific Name	Common Name	Vehicle Use Area	Site Distance Triangle	Under Tree Coverage	Solid Hedge	Buffers		
							Constructed	Riparian	
N	<i>Zenobia pulverulenta</i>	Dusty Zenobia			Y			Y	<p>Semi-evergreen to deciduous; prefers moist, well-drained, acidic soils; requires even moisture levels; good native plant for wet areas</p> <ul style="list-style-type: none"> ▪ H 2'-6 x W 3'-5' ▪ Full Sun, Part Sun / Shade ▪ pH 4.5-6.2 ▪ Upright, graceful, arching

TABLE 3: TREES NOT ALLOWED FOR ORDINANCE-REQUIRED PLANTING CREDIT

(Exceptions are Noted within the Allowed Plant Tables)

Scientific Name, Common Name	Location Not Allowed for Credit	Native or Exotic	Reasons for Concern
<i>Acer x freemanii</i> , Freeman maple	All uses	Exotic	Hybrid with Silver Maple
<i>Acer rubrum</i> , 'Armstrong', Armstrong columnar red maple	All uses	Native	Weak-wooded and prone to storm damage
<i>Acer saccharinum</i> , Silver maple	All uses	Exotic	Weak-wooded and prone to storm damage, very vigorous roots and disease-prone
<i>Cornus florida</i> , Dogwood	Street trees and parking lots	Native	Generally does not do well in full sun or hot areas; should be planted at the edge of a canopy of trees or the north side of a building that provides shade; subject to <i>Anthracnose</i>
<i>Crataegus</i> spp., Hawthorns	All uses	Exotic	Many insect and disease problems; generally do not fare well in the South
<i>Fraxinus americana</i> , White ash	All uses	Native	Many disease and insect problems
<i>Fraxinus Pennsylvanica</i> , Green ash	All uses	Native	Many disease and insect problems
<i>Juglans nigra</i> , Black Walnut	For all new plantings; existing, protected trees allowed in appropriate locations	Native	Although a handsome tree, does not allow anything else to grow under or around it (allelopathic)
<i>Liquidambar styraciflua</i> , Sweetgum (species)	Street trees and parking lots	Native	Not a specimen tree; fruit is generally a nuisance around buildings and over streets and parking lots
<i>Malus</i> spp., Apples and Crabapples, (some cultivars better-see Tables of Allowed Trees, above)	All uses	Exotic	Many insect and disease problems; excessive suckering is unattractive; fruit may be a nuisance around buildings and over streets and parking lots
<i>Morus</i> spp. (Mulberries)	All uses	Exotic	Excessive suckering is unattractive; fruit may be a nuisance in parking lots, streets and around buildings; <i>Morus papyrifera</i> and <i>M. alba</i> have invasive tendencies
<i>Pyrus</i> spp. (Pears)	All uses	Exotic	Weak-wooded and sharp branch angles contribute to storm damage and broken trees; short-lived; (<i>Pyrus calleryana</i> 'Bradfordii' and similar trees are an example); <i>P. calleryana</i> has invasive tendencies
<i>Pinus echinata</i> , Shortleaf pine	Street trees and parking lots	Native	Shallow-rooted; prone to wind throw, storm damage and Southern Pine Beetle
<i>Pinus palustris</i> , Longleaf pine	Street trees, parking lots, and any use in clay soils	Exotic	Native to NC Coastal Plain, but not Piedmont; requires very sandy soil to grow
<i>Pinus strobus</i> , Eastern white pine	All uses	Exotic	Native to NC Mountains but not Piedmont; frequently dies suddenly in "hot spells" when 15-20 years old
<i>Platanus occidentalis</i> , Sycamore	All uses, except in buffers	Native	Litter a nuisance around buildings, streets and parking lots; sycamore leaf scorch and anthracnose are becoming significant problems which are difficult to impossible to treat

TABLE 3: TREES NOT ALLOWED FOR ORDINANCE-REQUIRED PLANTING CREDIT

(Exceptions are Noted within the Allowed Plant Tables)

Scientific Name, Common Name	Location Not Allowed for Credit	Native or Exotic	Reasons for Concern
<i>Prunus spp.</i> , Cherries and plums	All uses	Exotic	Short-lived; seems to be too hot for them here; many insect and disease problems; see recommended list for exceptions
<i>Quercus nigra</i> , Water oak	Street trees and parking lots	Native	Problems with untreatable decay
<i>Quercus palustris</i> , Pin or Swamp oak	Parking lots or street trees	Exotic	Iron chlorosis and bacterial scorch are common and difficult to treat; persistent branches (may be limbed up) and leaves
<i>Quercus virginiana</i> , Live oak	All uses	Exotic	Native to NC Coastal Plain, but not Piedmont; too cold at times in winter to do well here
<i>Betula nigra</i> , River Birch	All uses	Native	Not as heat and drought tolerant as cultivars
<i>Tilia cordata</i> cultivars (e.g. 'Greenspire'), Greenspire linden	All uses	Exotic	Littleleaf linden cultivars are not hardy here and develop problems with <i>Botryosphaeria</i> canker, which cannot be treated; <i>Tilia cordata</i> (species) is a better choice
<i>Tsuga canadensis</i> , Eastern hemlock	All uses	Exotic	Too hot for them here
<i>Ulmus spp.</i> , Siberian Elm and unimproved (seed-derived) American elm.	All uses	Exotic	Many disease and insect problems, including Dutch Elm Disease; some of the new <i>Ulmus x</i> – named cultivars, and <i>Ulmus parvifolia</i> are exceptions

Notes: From City of Durham, General Services Department, Urban Forestry Division, and from "Invasive exotic plants to avoid in the southeastern United States", compiled for the North Carolina Botanical Garden by Allison Schwartz and Johnny Randall, Spring, 1999.

TABLE 4: OTHER PLANTS NOT ALLOWED FOR ORDINANCE-REQUIRED PLANTING CREDIT

Scientific name	Common Name	Reasons for Concern
<i>Ajuga reptans</i>	Bugleweed, common bugle	Invasive tendencies
<i>Alliaria officianalis</i> ; <i>A. petiolata</i>	Garlic mustard	Invasive tendencies
<i>Allium vineale</i>	Wild garlic, field or crow garlic	Invasive tendencies
<i>Alnus serrulata</i>	Common alder	May colonize moist areas to the detriment of other plants
<i>Ampelopsis heterophylla</i>	Amur peppervine, porcelain-berry	Invasive tendencies; (see <i>A. brevipedunculata</i> on prohibited list)
<i>Artemisia vulgaris</i>	Common wormwood, mugwort	Invasive tendencies
<i>Buxus microphylla</i> 'Compacta'	Littleleaf boxwood	Many diseases
<i>Buxus sempervirens</i> 'Arborescens'	Tree boxwood	Too hot here for this plant
<i>Calluna vulgaris</i>	Scotch Heather	Size does not meet ordinance requirements
<i>Carduus vulgaris</i> (see <i>Cirsium vulgare</i>)		Invasive tendencies
<i>Carex kobomugi</i>	Japanese or Asiatic sand sedge	Invasive tendencies
<i>Ceanothus americanus</i>	New Jersey Tea	Does not do well in humid conditions or in heavy soils; difficult to transplant
<i>Chaenomeles japonica</i>	Japanese flowering quince	Unkempt, thorny; leaf spots and abundant spring and early summer rainfall result in premature defoliation
<i>Centaurea biebersteinii</i>	Spotted knapweed	Invasive tendencies
<i>Commelina communis</i>	Common dayflower	Invasive tendencies
<i>Comptonia peregrina</i>	Sweet fern	Too hot here
<i>Cornus sericea</i> ; <i>C. stolonifera</i> and 'Flaviramea'	Redosier dogwood, yellow-twig dogwood	Freely spreading by underground stems, many diseases; considered potentially invasive
<i>Coronilla varia</i>	Crown vetch	Invasive tendencies
<i>Cytisus scoparius</i>	Scotch broom	Short-lived; many diseases
<i>Diervilla sessilifolia</i>	Southern bush-honeysuckle	Native honeysuckle that suckers to form colonies and may take over
<i>Dipsacus fullonum</i> ; <i>D. fullonum sylvestris</i> ; <i>D. laciniatus</i> ; <i>D. sylvestris</i>	Fuller's teasel; common or wild teasel; cutleaf teasel	Invasive tendencies
<i>Egeria densa</i>	Brazilian waterweed, elodea	Invasive tendencies
<i>Elodea densa</i> (see <i>Egeria densa</i>)		Invasive tendencies
<i>Festuca arundinacea</i> ; <i>F. elatior</i> ; <i>Lolium arundinacea</i>	Tall fescue, meadow fescue, Kentucky 31™ fescue	Invasive tendencies, especially in wet (riparian) growing conditions
<i>Foeniculum vulgare</i>	Sweet fennel	Invasive tendencies
<i>Glechoma hederacea</i>	Groundivy	Invasive tendencies
<i>Lapsana communis</i>	Common nipplewort	Invasive tendencies
<i>Ludwigia uruguayensis</i>	Primrosewillow or hairy water-primrose	Invasive tendencies

TABLE 4: OTHER PLANTS NOT ALLOWED FOR ORDINANCE-REQUIRED PLANTING CREDIT

Scientific name	Common Name	Reasons for Concern
<i>Lyonia ligustrina</i> ; <i>L. lucida</i>	Northern maleberry; shining fetterbush	Arching suckers; weak growth; leaf spot; intolerant of stress
<i>Lysimachia nummularia</i>	Moneywort or creeping Jenny	Invasive tendencies
<i>Picea omorika</i> and dwarf cultivars	Serbian spruce	Prefers deep, rich, moist, well drained soils; more heat-tolerant than most spruces, but subject to borers, aphids and budworms
<i>Pittosporum tobira</i>	Japanese pittosporum	Too cold here (Zone 8b best)
<i>Podocarpus macrophyllus</i> var. <i>maki</i>	Shrubby podocarpus	Marginally hardy herex
<i>Polygonum cespitosum</i> ; <i>P. cuspidatum</i> ; <i>P. perfoliatum</i> ; <i>P. sachalinense</i>	Bunchy knotweed or oriental ladythumb; Japanese knotweed; Mile-aminute; giant knotweed	Invasive tendencies
<i>Poncirus trifoliata</i>	Hardy Orange	Thorny and invasive
<i>Potamogeton crispus</i>	Curly pondweed	Invasive tendencies
<i>Prunus glandulosa</i>	Flowering almond	Prunus species not recommended due to diseases; weak, straggly
<i>Raphanus raphanistrum</i>	Wild radish or jointed charlock	Invasive tendencies
<i>Rhus typhina</i>	Staghorn sumac	Suckering to form colonies; should not be used widely
<i>Rorippa nasturtium-aquaticum</i>	Watercress	Invasive tendencies
<i>Rumex acetosella</i>	Red sorrel or common sheep sorrel	Invasive tendencies
<i>Ruscus aculeatus</i>	Butcher's broom	Not hardy in Durham
<i>Sabal minor</i>	Dwarf palmetto	Not hardy in Durham
<i>Spiraea prunifolia</i>	Bridalwreath spirea	Straggly, open, coarse, with foliage on upper 50percent of the plant
<i>Stellaria media</i>	Common chickweed	Invasive tendencies
<i>Syringa oblata</i> var. <i>dilatata</i> ; <i>S. vulgaris</i>	Korean lilac, common lilac	Too hot here for them
<i>Syringa pekinensis</i>	Peking lilac	Many diseases
<i>Torilis arvensis</i>	Hedge-parsley	Invasive tendencies
<i>Trapa natans</i>	Water chestnut	Invasive tendencies
<i>Tribulus terrestris</i>	Puncturevine	Invasive tendencies
<i>Tussilago farfara</i>	Coltsfoot	Invasive tendencies
<i>Verbascum thapsus</i>	Common mullein	Invasive tendencies
<i>Veronica hederifolia</i>	Speedwell, ivyleaf	Invasive tendencies
<i>Viburnum dilitatum</i>	Arrowwood, linden	Invasive tendencies

Note: Invasive plants taken from "Invasive exotic plants to avoid in the southeastern United States," compiled for the North Carolina Botanical Garden by Allison Schwartz and Johnny Randall, Spring, 1999.

TABLE 5: PLANTS PROHIBITED FOR ANY USE

Scientific name	Common Name
<i>Acer campestre</i>	Hedge maple and cultivars
<i>Acer ginnala</i>	Amur Maple
<i>Acer platanoides</i>	Norway maple
<i>Ailanthus altissima</i>	Tree of Heaven
<i>Akebia quinata</i>	Chocolate vine, fiveleaf akebia
<i>Albizia julibrissin</i>	Mimosa
<i>Allaria petiole</i>	Garlic mustard
<i>Arrhenatherum elatius</i>	Alligatorweed
<i>Artemisia vulgaris</i>	Common wormwood, mugwort
<i>Arum italicum</i>	Italian lords and ladies
<i>Arundo donax</i>	Giant reed
<i>Ampelopsis brevipedunculata</i>	Porcelain-berry, Amur peppervine
<i>Berberis bealei</i> (formerly <i>Mahonia bealei</i>)	Leatherleaf mahonia; Oregon grape
<i>Berberis thunbergii</i> and cultivars	Japanese barberry
<i>Broussonetia papyrifera</i>	Paper mulberry
<i>Callicarpa japonica</i>	Japanese Beautyberry
<i>Cardiospermum halicacabum</i>	Balloon vine, Love in a Puff
<i>Carpinus betulus</i>	European Hornbeam
<i>Celastrus orbiculatus</i>	Oriental bittersweet
<i>Chrysanthemum leucanthemum</i>	Oxeye daisy
<i>Cinnamomum camphora</i>	Camphortree
<i>Clematis terniflora</i>	Leatherleaf clematis, sweet autumn virgin's bower
<i>Cotoneaster apiculatus</i>	Cranberry cotoneaster
<i>Dioscorea bulbifera</i> ; <i>D. oppositifolia</i> (formerly <i>D. batatas</i>); <i>D. alata</i>	Climbing yam, air potatoes, Chinese yam, water yam
<i>Elaeagnus angustifolia</i> ; <i>E. pungens</i> ; <i>E. umbellata</i>	Russian, autumn and thorny olive
<i>Elaeagnus xebbingei</i> (<i>E. macrophylla</i> x <i>E. pungens</i>)	Elaeagnus, Ebbing's Silverberry
<i>Eleutherococcus pentaphyllus</i>	Ginseng shrub, five-leaf aralia
<i>Eragrostis curvula</i>	Weeping lovegrass
<i>Euonymus alata</i>	Burning bush, winged euonymus, wahoo
<i>Euonymus fortunei</i>	Winter creeper, climbing euonymus, gaiety
<i>Euphorbia esula</i>	Leafy spurge, wolf's milk
<i>Hedera helix</i>	English ivy
<i>Hesperis matronalis</i>	Dames rocket
<i>Hibiscus syriacus</i>	Rose of Sharon, Althea
<i>Hydrilla verticillata</i>	Waterthyme
<i>Ilex cornuta</i>	Chinese holly

TABLE 5: PLANTS PROHIBITED FOR ANY USE

Scientific name	Common Name
<i>Imperata cylindrical</i> ; <i>I. arundinaceae</i>	Cogongrass
<i>Ipomoea coccinea</i> ; <i>I. hederacea</i> ; <i>I. purpurea</i>	Red or redstar, ivyleaf and common or tall morning glory
<i>Iris pseudacorus</i>	Yellow flag or pale yellow iris
<i>Lespedeza bicolor</i> ; <i>L. cuneata</i> (see <i>Sericea lespedeza</i>)	Shrubby lespedeza, bicolor lespedeza, shrub bushclover, bicolor, Chinese lespedeza
<i>Lespedeza thunbergii</i>	Thunberg Lespedeza
<i>Ligustrum japonicum</i> ; <i>L. lucidum</i> ; <i>L. sinense</i> ; (<i>L. villosum</i>); <i>L. vulgare</i>	Common, Japanese, Glossy, European and Chinese privet
<i>Ligustrum obtusifolium</i>	Border or blunt-leaved privet
<i>Liriope</i> (all species)	Lillyturf; Monkey grass
<i>Lonicera maackii</i> ; <i>L. morrowii</i> ; <i>L. tatarica</i> ; <i>L. fragrantissima</i> ; <i>L. xbella</i> (hybrid <i>Morrows</i> and <i>Tatarian</i>)	Bush honeysuckles (Amur, Morrow's, Tatarian, Sweetbreath-of-spring, Bell's)
<i>Lonicera japonica</i>	Japanese honeysuckle
<i>Lonicera standishii</i>	Standish's honeysuckle
<i>Lotus corniculatus</i>	Birdsfoot deervetch or birdsfoot trefoil
<i>Lygodium japonicum</i>	Japanese climbing fern
<i>Lytrum salicaria</i> ; <i>L. virgatum</i>	Purple loosestrife; European wand loosestrife
<i>Melia azedarach</i>	Chinaberry
<i>Melilotus alba</i>	White sweet clover
<i>Microstegium vimineum</i>	Japanese stilt grass --wind/water dispersed
<i>Miscanthus sinensis</i>	Chinese silvergrass
<i>Mosla dianthera</i>	Miniature beefsteak
<i>Murdannia keisak</i>	Asian spiderwort or aneilima
<i>Myriophyllum aquaticum</i> ; <i>M. spicatum</i>	Parrotfeather watermilfoil; European or spike watermilfoi
<i>Nandina domestica</i> species and cultivars with berries: 'Harbor Belle', 'Harbour Dwarf', 'Monum', 'Wood's Dwarf'	Sacred bamboo, nandina
<i>Panicum repens</i>	Torpedo grass
<i>Paspalum urvillei</i>	Vasey's grass
<i>Pastinaca sativa</i>	Wild parsnip
<i>Paulownia tomentosa</i>	Princess tree
<i>Perilla frutescens</i>	Beefsteak plant
<i>Phalaris arundinacea</i>	Reed canarygrass
<i>Phragmites australis</i>	Common reed
<i>Phyllostachys aurea</i> ; <i>P. spp.</i> ; and <i>Bambusa spp.</i>	Golden bamboo and other invasive bamboos
<i>Poncirus trifoliata</i>	Trifoliolate orange
<i>Populus alba</i> ,	White poplar, Silver-leaf poplar
<i>Populus balsamifera ssp.</i> ; <i>balsamifera</i> ,	Balsam poplar or Balm of Gilead
<i>Pseudosasa japonica</i>	Arrow bamboo
<i>Pueraria montana var. lobata</i> ; <i>P. lobata</i>	Kudzu

TABLE 5: PLANTS PROHIBITED FOR ANY USE

Scientific name	Common Name
<i>Pyracantha</i> spp	Scarlet firethorn, Formosa firehorn
<i>Quercus acutissima</i>	Sawtooth oak
<i>Ranunculus ficaria</i>	Lesser celadine or fig buttercup
<i>Rhamnus alnus</i> ; <i>R. cathartica</i> ; <i>R. frangula</i>	Glossy buckthorn; common buckthorn
<i>Robinia pseudoacacia</i>	Black locust
<i>Nasturtium officinale</i>	Watercress
<i>Rosa multiflora</i> ; <i>R. bracteata</i> ; <i>R. laevigata</i>	Multiflora, McCartney and Cherokee roses
<i>Rubus phoenicolasius</i>	Wineberry or wine raspberry
<i>Senna obtusifolia</i>	Coffeeweed or sicklepod
<i>Sericea lespedeza</i> (see <i>Lespedeza bicolor</i> and <i>L. cuneata</i>)	
<i>Setaria faberi</i> ; <i>S. pumila</i> ; <i>S. viridis</i>	Japanese bristlegrass or giant foxtail; yellow bristlegrass or smooth millet; green bristlegrass or green millet
<i>Solanum viarum</i>	Tropical soda apple
<i>Sorghum halepense</i>	Bridalwreath spireaBerberis thunbergii (
<i>Spiraea japonica</i>	Bridalwreath spirea
<i>Tamarix ramosissima</i>	Saltcedar
<i>Triadica sebifera</i> (<i>Sapium sebiferum</i>)	Tallowtree, Popcorn tree
<i>Viburnum dilatatum</i>	Linden viburnum
<i>Vinca minor</i> ; <i>V. major</i>	Periwinkles
<i>Wisteria floribunda</i> ; <i>W. sinensis</i>	Japanese and Chinese wisteria

Notes: From "Invasive exotic plants to avoid in the southeastern United States," compiled for the North Carolina Botanical Garden by Allison Schwartz and Johnny Randall, Spring, 1999; and James H. Miller, Nonnative Invasive Plants of Southern Forests, United States Department of Agriculture, Forest Service, Southern Research Station, General Technical Report SRS-62, Revised December, 2004. Updated August 5, 2005.