Town of Garner

Planting Manual

Prepared by the
Planning Department

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There are many people instrumental in the making of this manual. The Planning Department wishes to thank Laura Brewer in the Engineering Department with the City of Charlotte, Joe Morris and Lynn Raker in the Planning Department with the City of Salisbury, Stuart Warren in the Horticulture Department at North Carolina State University, Bill Wilder with the North Carolina Association of Nurserymen, Ed Frederick in the Inspections Department with the City of Raleigh, Carl Matyac in the Master Gardener Program with the City of Raleigh, members of the Garner Planning and Appearance Commission, and the citizens of Garner, North Carolina.

Amanda H. Bosch, Project Manager
# TABLE OF CONTENTS

I. Introduction ............................................................................................................. 1

II. How to Use This Manual ...................................................................................... 1

III. Definitions ............................................................................................................ 3

IV. Requirements for Successful Groundcover, Shrub, and Tree Installation .......... 6
    A. Plant Material ................................................................................................. 6
    B. Soil Preparation ............................................................................................ 7
    C. Plant Installation ............................................................................................ 8
    D. Fertilizing Groundcover, Shrubs, and Trees ................................................. 11
    E. Watering Groundcover, Shrubs, and Trees ................................................... 12
    F. Herbicide Application for Groundcovers, Shrubs, and Trees ....................... 13
    G. Mulching Groundcovers, Shrubs, and Trees ................................................ 13
    H. Staking Trees ................................................................................................ 13
    J. Pruning Techniques ....................................................................................... 15
    K. Site Cleanup .................................................................................................. 15

V. Requirements for Successful Lawn Installation .................................................... 17
    A. Lawn Materials .............................................................................................. 17
    B. Turf Bed Preparation .................................................................................... 17

VI. Tree Preservation and Care During Construction ................................................ 19
    A. Tree Preservation .......................................................................................... 19
    B. Care During Construction ............................................................................. 20
    C. Site Cleanup .................................................................................................. 22

VII. Plant Categories: Large Trees, Ornamental Trees, and Shrubs ......................... 25

VIII. Landscape/Appearance Inspection Report ......................................................... 37

IX. Resource List ...................................................................................................... 39

# LIST OF ILLUSTRATIONS

Figure 1. Critical Root Zone/Drip Line ..................................................................... 2
Figure 2. Landscape Plants by Type ........................................................................... 5
Figure 3. Planting Details ....................................................................................... 9
Figure 4. Bed Edging Detail .................................................................................... 10
Figure 5. Groundcover Spacing ............................................................................. 10
Figure 6. Pruning Diagram .................................................................................... 14
Figure 7. Pruning Guidelines ................................................................................ 16
Figure 8. Tree Protection Fence Detail .................................................................... 18
Figure 9. Care of Trees During Construction .......................................................... 21
Figure 10. Plant Categories .................................................................................... 23
I. Introduction:

The guidelines included in this Manual apply to all new development, governed by the permitting process defined in Section 46 of the Town of Garner Land Use Ordinance, and change in use development defined in Section 152. Any property developed or substantially changed under a permit approved by the Town of Garner is subject to the planting guidelines of this Manual. **Existing residential, office, commercial, and industrial properties are not required to meet the standards described below.**

This Manual is a compilation of the latest accepted horticultural practices. It is meant as a reference to be used by landscape contractors, gardeners, and do-it-yourselfers to assure that installed landscapes thrive once planted. It contains definitions, text descriptions, and graphic examples. Sections within this manual provide information on: plant and lawn installations; tree protection and preservation, and care during construction; suggested species per plant category; the Planning Department’s Landscape/Appearance Inspection Report; and a resource list of supporting publications and organizations/contact persons.

Much of the information contained in this Manual may already be included in the Site Plan package approved by the Town of Garner. Where information is provided in this Manual and not addressed in the approved package or landscape contract, all those who install plants will use the standards in this Manual. **Where there are discrepancies, it is the responsibility of the installer to bring them to the attention of Planning Staff immediately.** The Urban Design Specialist in the Planning Department will determine the standard(s) to follow.

This Manual is the guide Staff uses to assess landscape installations. All those who install landscape plantings subject to Planning Department approval towards a Certificate of Occupancy or landscape compliance are expected to follow these guidelines in the absence of other specific information in the approved Site Plan package or landscape contract. **Failure to follow these guidelines can result in Planning Staff’s refusal to accept the work.**

II. How to Use This Manual:

This manual contains four elements designed to be used interchangeably. The core of the manual is the text description; the three other elements - definitions, figures/tables, and resource support - are tools to be used to better understand the text.

The definitions are provided at the beginning of the manual; the author suggests referring to these often so the user can get the most use out of this manual.

Much of the text is illustrated in accompanying figures. There are references in the text to those figures which help explain the text.

The tables included in Plant Categories provide the designer with lists of plant choices in each of the
Drip Line

Diameter Breast Height (DBH) Measured at 4' above grade

Caliper measured at 6' above grade

Critical Root Zone (CRZ)

NOTE: No cars or equipment allowed in the CRZ

PLAN VIEW

Figure 1: Critical Root Zone / Drip Line
three categories of plants: shade tree, ornamental tree, and shrub. The Landscape/Appearance
Inspection Report is included so that each installer is aware of those items most often cited as
violations.

The information in this manual is extracted from many persons and publications. At the beginning
of many sections or subsections the text refers to specific publication(s). The last section in the
manual, the Resource List, gives cost and availability information for publications, and contact
persons/phone numbers for organizations.

Any comments on the manual’s organization, layout, or content will be greatly appreciated.
Please direct questions/concerns to the Urban Design Specialist in the Planning Department,
Town of Garner at (919) 772-4688.

III. Definitions:

• **Annuals**: flowering plants, usually 6 to 18 inches tall, used to provide seasonal
color and interest. Root stock dies in winter, therefore annuals need replanting
each growing season. Often referred to as bedding plants.

• **Caliper**: standard trunk diameter measurement for nursery grown stock taken six
inches above the ground for trees up to and including four (4) inch caliper size,
and taken twelve inches above the ground for trunk diameters larger than four (4)
inches. *See Figure 1.*

• **Canopy**: the branched portion of a tree or forest. *See Figure 1.*

• **Central Leader**: primary or terminal shoot, i.e. the trunk of a tree. *See Figure 6.*

• **Critical Root Zone (CRZ)**: a circular region measured outward from a tree trunk
representing the area where roots must be maintained for the tree’s survival. This
CRZ is one foot radial distance for every inch of tree DBH, minimum of eight
feet. *See Figure 1.*

• **Cut**: the exposed wood area that remains after a branch has been removed.

• **DBH or Diameter at Breast Height**: tree trunk diameter for existing trees
measured in inches at a height of 4.5 feet above the ground. *See Figure 1.*

• **Deciduous**: those plants that annually lose their leaves.

• **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.
• **Drip Line**: a vertical line, extending from the outermost edge of the tree canopy or shrub branches, to the ground. *See Figure 1.*

• **Evergreen**: those plants that retain foliage throughout the year.

• **Groundcovers**: mature at 6 to 18 inches, usually evergreen, spreading growth form, used to control erosion and pedestrian traffic. *See Figure 2.*

• **Improper pruning**: *For deciduous trees*: the removal of the central leader, or the shortening of branch ends. Staff considers symmetrical pruning of the end branches of Crapemyrtles a particularly offensive violation. *For deciduous shrubs*: removal of more than a third of healthy growth. *For evergreen trees and shrubs*: removal of more than a third of growth. *For all trees and shrubs*: use of unsharp tools leaving uneven or broken cuts or wounds. *See Figure 7.*

• **Inch for inch Replacement**: replacing existing plants with an equal total caliper of new like plants. For example, if two existing 6” Willow Oaks are removed, they must be replaced with four new 3” caliper deciduous hardwoods, or five 2 1/2” deciduous hardwoods. The smallest replacement tree allowed is 2 1/2”; the smallest replacement shrub is 5 gallon at 3’ tall. All replacement stock must be specimen quality.

• **Lifting or Limbing up**: the removal of lower branches for under-clearance. *See Figure 7.*

• **Ornamental Grasses**: annual or perennial, seasonal growth to six (6) feet in height, used to provide landscape interest, perhaps for screening views, or for pedestrian control. Are typically low water users. *See Figure 2.*

• **Perennials**: flowering plants whose root stock survives the winter. Used to provide color/textural interest, and control pedestrian traffic, seldom used for screening.

• **Plan of Action**: a written/graphic document containing at least a Replacement Planting Plan, an estimated date of completion of the required plant installation, and an agreed-on date for the Urban Design Specialist to re-inspect the site.

• **Pruning**: the removal of dead or diseased, live but interfering, objectionable, and/or weak branches. *See Figure 6.*

• **Replacement Planting Plan**: a landscape plan showing types, numbers, sizes, and locations of plants to be planted as replacements for dead, improperly pruned, or diseased plant material. Such material is identified in writing by the Urban Design Specialist as needing replacement, and is included as an attachment to the Landscape/Appearance Inspection Report.
Figure 2: Landscape Plants by Type
• **Scars or Injuries**: natural or man-made lesions of the bark in which wood is exposed.

• **Shrubs, Large**: may be evergreen or deciduous, mature at 6 to 12 feet in height, and have branches to the ground. Used as accent, focus, or if evergreen, as screening material. *See Figure 2.*

• **Shrubs, Medium**: usually evergreen, mature at 3 to 6 feet in height, most often used to screen views seen by the traveling public. *See Figure 2.*

• **Shrubs, Low**: may be evergreen or deciduous, mature at 1 to 3 feet in height, the only shrub allowed inside sight triangles; low shrubs provide little or no screening, and are used to prevent erosion, control pedestrian traffic, and provide seasonal interest. *See Figure 2.*

• **Tree, Ornamental**: a small to medium tree, to a height of 15 to 35 feet at maturity, planted for aesthetic purposes such as colorful flower, interesting bark, or fall foliage. *See Figure 2.*

• **Tree, Shade**: a large tree growing to over 35 feet in height at maturity, usually deciduous, planted to provide a canopy of shade. *See Figure 2.*

• **Tree, Screening**: some medium and small evergreen trees, from 12 to 25 feet in height, which, because used to screen views, must keep branches to the ground. Examples are Leyland Cypress, pine, holly, or vertical junipers. *See Figure 2.*

### IV. Requirements for Successful Groundcover, Shrub, and Tree Installations:

#### A. Plant Material:

Protect all plants at all times. Protect plants from sun and/or drying winds. Plants that cannot be planted immediately upon delivery to the site must be kept in the shade or covered with burlap to prevent sun scorch. These plants need to be well watered. Plants which remain unplanted for longer than one day must be heeled in - i.e. covered with wet compost, soil, or other acceptable material - and their root ball kept moist by watering. No plant may remain unplanted on site longer than three (3) days.
To protect surrounding turf that may be damaged from being driven over and upon which soil may be temporarily piled, cover with a tarp or sheets of plywood. Provide tree protection fencing to protect any existing trees, shrubbery, and beds in this area. See Figure 8.

Supply all plants as specified in the Plant List as shown on the approved Site Plan. Determine from the plan the quantities of each species required. If a discrepancy exists between the number of plants specified in the Plant List and the graphic representation on the plan, the installer is to use the number graphically represented on the plan. Plants must be typical of their species and variety, have normal growth habit, have well-developed branching, be densely foliated, and have vigorous fibrous/feeder roots. Size of plants, spread of roots, and size of root ball must be in accordance with the American Standard for Nursery Stock (1996 or most current edition). Plants of each particular variety must be uniform in size, density, and configuration.

Container plants must have a root system dense enough to hold the soil intact when removed from the container. The root system, however, must not be root bound, or so dense in mass that it is excessively intertwined or has a circular growth pattern.

Balled and burlapped (B&B) plants must be nursery grown, and dug within three (3) days of transplanting. Nursery grown stock must have been transplanted or root pruned at least once in the past three (3) years. The burlap used to secure the ball must be untreated and biodegradable. There can be no more than one inch (1") of fill over the original roots. B&B plants must have firm balls of earth in which the plant has been growing, and of a diameter not less than specified in the American Standard for Nursery Stock, Table 5: Ball Sizes for Nursery Grown Trees.

All new trees must have straight trunks with an intact single central leader, unless a multi-stem tree is specified. Trees will not be accepted which have had their branches shortened, leaders cut, or have damaged leaders which require cutting. Unless otherwise specified, shade trees shall not have branches within six (6) feet of the top of the root ball.

B. Soil Preparation:

Create plant beds the size and location shown on the approved Site Plan. All groundcovers and container shrubs must be planted in a shrub bed; B&B material may be planted in individual planting holes. The planting bed or hole must be wide enough to accommodate all roots without crowding, and must contain nutrient rich soil. See NC Cooperative Extension Service bulletin Planting Techniques for Trees and Shrub for clarification of many of the following points. Also see Figures 3 and 4.

In order to readiness the beds for planting, prepare the soil by taking the following steps:

1. Remove all vegetation and topsoil from the top three (3") inches of the planting area for both planting beds and plant holes. Remove unwanted vegetation from the site; stockpile topsoil on site for future use or remove from the site if specifically stated in the approved Site Plan package.
2. Dig all shrub beds 2 to 3 times the width of the root mass and all tree planting holes 1 1/2 to 2 times the width of the root ball with a minimum nine (9) inches on each side of the mass or ball. See Figure 3

3. **Install** a sufficient quantity of planting mix to replace the removed topsoil, and to achieve positive drainage at a minimum of 1.5% slope.

   a. The replacement soil shall be the following **Planting Mix**: 10% - 30% sterile, well pulverized red clay; 30% - 50% silt; 30%- 45% coarse sand, 1.0 mm to 0.5 mm in diameter; minimum 5% organic material such as completely decomposed compost/humus. The acidity range of the Plant Mix shall be pH 5.5 to 7.0. The planting mix shall have the following nutrients at the specified percent base saturation: calcium at 55% to 80%, magnesium at 10% to 30%, potassium at 5% to 8%.

   b. If the quality of planting mix seems questionable to Planning Staff, Staff may require the results of a soil test for analysis. See Resource List for availability of Soil Sampling for Lawns and Gardens.

4. If no replacement planting mix is used, there is an **acceptable alternative soil preparation**. Thoroughly pulverize the soil, minus the sod, removed from the planting hole or plant bed. Amend with lime and fertilizer at the rates specified in Subsection D below. Mix with shredded bark mulch, leaf litter, or gypsum to create an adequate amount to backfill bed/hole.

5. **Till** all plant beds to a depth of 8". See Figure 3. Incorporate lime and fertilizer in the top 4" - 6" of the soil using a rototiller. See Subsection D for rates of application.

6. Dig a 4" V-cut trench at the perimeter of all plant beds and adjacent to concrete walks, curbs, and grassed areas. See Figure 4. Dig the trench to a consistent and uniform depth and width.

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### C. Plant Installation:

See NC Cooperative Extension Service bulletin *Planting Techniques for Trees and Shrubs* for clarification of the following points. See Figures 3 and 4.

1. **Soak** with water all container plants before removing them from their containers to keep the plant moist and healthy during the planting process.

2. Remove groundcover and shrubbery from their containers. If their root balls are pot bound, **scaryfy the ball** before installation.
Figure 3: Planting Details
Figure 4: Bed Edging

Figure 5: Groundcover Spacing

<table>
<thead>
<tr>
<th>d</th>
<th>a</th>
<th># of Plants</th>
<th>Area Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>3.45&quot;</td>
<td>10.39</td>
<td></td>
</tr>
<tr>
<td>6&quot;</td>
<td>5.20&quot;</td>
<td>4.52</td>
<td></td>
</tr>
<tr>
<td>8&quot;</td>
<td>6.93&quot;</td>
<td>2.56</td>
<td></td>
</tr>
<tr>
<td>10&quot;</td>
<td>8.66&quot;</td>
<td>1.66</td>
<td></td>
</tr>
<tr>
<td>12&quot;</td>
<td>10.39&quot;</td>
<td>1.15</td>
<td></td>
</tr>
<tr>
<td>15&quot;</td>
<td>12.99&quot;</td>
<td>7.39</td>
<td>per 1 SF</td>
</tr>
<tr>
<td>18&quot;</td>
<td>15.59&quot;</td>
<td>5.13</td>
<td></td>
</tr>
<tr>
<td>24&quot;</td>
<td>20.78&quot;</td>
<td>2.89</td>
<td>per 10 SF</td>
</tr>
<tr>
<td>30&quot;</td>
<td>25.98&quot;</td>
<td>1.85</td>
<td></td>
</tr>
<tr>
<td>36&quot;</td>
<td>31.18&quot;</td>
<td>1.28</td>
<td></td>
</tr>
<tr>
<td>4' 0&quot;</td>
<td>3.46'</td>
<td>7.22</td>
<td>per 100 SF</td>
</tr>
<tr>
<td>5' 0&quot;</td>
<td>4.33'</td>
<td>4.62</td>
<td></td>
</tr>
<tr>
<td>6' 0&quot;</td>
<td>5.20'</td>
<td>3.21</td>
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<tr>
<td>8' 0&quot;</td>
<td>6.93'</td>
<td>1.80</td>
<td></td>
</tr>
<tr>
<td>10' 0&quot;</td>
<td>8.66'</td>
<td>1.15</td>
<td></td>
</tr>
</tbody>
</table>

The illustration and table give planting information for shrub and ground cover massings. These calculations may also be used in figuring the arrangement of a staggered hedgerow.
3. Set plants **upright, plumb, and oriented to provide the best appearance** and relationship to the viewer.

4. **Set shrubs and trees 2" - 3" above finished grade.** Do not place backfill soil on top of the root ball, or up the stems or trunks of plant material.

5. Backfill around the root ball being careful not to pack tightly. **Form a 2" high collar of soil around the drip zone** of individual shrubs in all **unirrigated** planting beds.

6. Take extra care to adequately backfill B&B plants. Backfill and compact the bottom third (1/3) of the root ball. **Cut away the ball ties, the top two thirds (2/3) of the wire basket, and the exposed burlap.** Do not remove the burlap from under the root ball. Backfill one half (1/2) the remaining hole with the specified planting mix, and water thoroughly. Backfill the rest of the hole with the specified planting mix, firm down to eliminate air packets but do **not pack tightly.** Build a **collar of soil 4" in height around the edge of the root ball** to form a basin for holding water. Form the bottom of the basin at surrounding finish grade.

7. Dig a **4" V-cut trench** at the perimeter of all plant beds and adjacent to concrete walks, curbs, and grassed areas. Dig the trench to a consistent and uniform depth and width.

8. Mulch with 2" - 3" clean bark mulch.

9. Water all plants immediately after planting. **See Subsection F for more on watering.**

**D. Fertilizing and Liming Groundcovers, Shrubs, and Trees:**

See NC Cooperative Extension Service bulletin **Fertilizer Recommendations and Techniques to Maintain Landscapes and Protect Water Quality** for clarification of the following points.

1. **Incorporate lime and fertilizer uniformly in the top 6" - 8" of the soil using a rototiller.**

2. As a source of lime use ground **(dolomitic)** limestone containing less than 85% total carbonates. In the absence of a soil test apply lime at a rate of 75 pounds per 1,000 square feet.

3. Use a fertilizer having **50% water insoluble nitrogen,** and a maximum 5% chlorine content.
4. The fertilizer analysis for **Groundcovers and Shrubs** shall be either 12-6-6 or 14-7-7 and shall be applied at a rate of 2 pounds per 100 square feet.

5. **For trees**, apply fertilizer at a rate of 0.16 lb to 0.20 lb nitrogen per inch caliper of tree. Use a Urea Formaldehyde or similar **slow release fertilizer** source. Two possible fertilizer analyses are either 1 cup 31-7-7 analysis fertilizer or 2 cups 12-6-6 analysis fertilizer per inch caliper.

   **Use the following fertilizer amounts for trees for each fertilizer analysis:**
   
   - For a 1 ½" caliper tree: 1 ½ cups 31-7-7 or 3 cups 12-6-6
   - For a 2" caliper tree: 2 cups 31-7-7 or 4 cups 12-6-6
   - For a 2 ½" caliper tree: 2 ½ cups 31-7-7 or 5 cups 12-6-6
   - For a 3" caliper tree: 3 cups 31-7-7 or 6 cups 12-6-6
   - For a 3 ½" caliper tree: 3 ½" cups 31-7-7 or 7 cups 12-6-6
   - For a 4" caliper tree: 4 cups 31-7-7 or 8 cups 12-6-6
   - For a 5" caliper tree: 5 cups 31-7-7 or 10 cups 12-6-6
   - For a 6" caliper tree: 6 cups 31-7-7 or 12 cups 12-6-6

6. In addition to the nitrogen, apply **phosphorous** at a rate of 0.05 lb per inch caliper, and **potassium** at a rate of 0.05 lb per inch caliper. These rates are reflected in the fertilizer choices and rates listed in #5 above.

7. **Apply granulated fertilizer as a top dressing within the drip line** of each individual plant. Immediately remove any fertilizer that comes in contact with the stem, trunk or foliage of a plant. Work the fertilizer into the **top two (2) inches of the soil**.

8. Apply fertilizer and work into the soil **before installing mulch**.

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**E. Watering Groundcovers, Shrubs, and Trees:**

See NC Cooperative Extension Service bulletin **Wise Water Use in Landscaping** for clarification of the following points.

1. Be sure water used is **free from oil, acids, alkalis, salts or any other substance that is toxic or harmful to vegetation**.

2. Water container plants thoroughly **before removing from their containers** to keep the plant 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**. Water only by open-end hose at **very low pressure** to avoid erosion of soil, breaking the soil collars surrounding each plant, and/or injury to roots. Make sure plants are **vertical** and the top of the **root ball is not below existing grade** once they are watered and fully settled.
F. Herbicide Application for Groundcovers, Shrubs, and Trees:

1. **Before mulching** trees and shrubs apply a pre-emergent herbicide to the planting beds and tree wells.

2. Use the herbicide *Dacthal 75 WP*, or equivalent, applied to the surface at a rate of 10 pounds per acre or 1 pound per 5000 square feet.

3. Apply a second application at the same rate **one month after mulching**.

G. Mulching Groundcovers, Shrubs, and Trees:

1. Before mulching **apply a pre-emergent herbicide** as specified above. See Subsection F above.

2. Use shredded bark or pine straw as a mulch. The mulch cannot contain any **trash or pine cones**.

3. Apply mulch in a 2"- 3" layer within two (2) days of planting. Cover the entire groundcover/shrub bed or tree well with mulch.

4. Apply a second **application of herbicide** as specified above. See Subsection F.

H. Staking Trees:

See NC Cooperative Extension Service bulletin *Planting Techniques for Trees and Shrubs* for clarification of the following points. *See Figure 3.*

1. Trees less than 2" caliper and shrubs less than eight feet in height need not be staked.

2. Stake all trees 2" - 3" caliper using three (3) 1" x 2" x 18" minimum size wood stakes per tree. Use strapping or rope fed through a **rubber hose** at the trunk to prevent damage to the bark.

3. Stake all trees greater than 3" caliper using a minimum of 3 "Duck Bill" anchors or approved equal. Drive **anchors into undisturbed soil**. Use strapping or rope fed through a **rubber hose** at the trunk to prevent damage to the bark.

4. All staking must be removed no more than six (6) months after planting. No trees may be planted unless a provision is made in the landscape contract to remove stakes at the end of six (6) months.
Figure 6: Pruning Diagram
J. Pruning Techniques:

Refer to Figures 6 and 7 for further clarification of the points discussed below.

1. Use only clean, **sharp tools**.

2. When pruning large branches remove in three stages so the trunk is not torn. First **cut up from the bottom** of the branch several inches away from the trunk, then **cut down from the top** of the branch so the cuts meet. The third cut is close to the trunk but **outside the branch collar**.

3. Remove **basal sprouts** from the root crown or lower trunk. These sprouts sap needed growth energy from the tree, look messy, and create an area where trash often collects.

4. Remove **water sprouts**, those vertical sprouts which grow up through the middle of the tree or shrub.

5. Remove **crossing branches** which rub against other branches. The rubbing weakens the growth of both branches.

6. Remove any branches that were not taken back close to the trunk at the branch collar, or **temporary branches**.

7. Remove branches which grow at a **sharp angle to the trunk**. The sharp angle is a weak angle of attachment and can cause a weakened plant if it splits from the trunk, or can cause rot by giving water a place to collect.

8. Remove **parallel branches**, those branches which attach to the trunk one above the other within inches up the trunk.

9. Remove all branches **up to six (6) feet** above the ground.

10. Remove any branch **competing with the central leader**. 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.

K. Site Cleanup:

1. **Clean the work site at the end of each work day of all debris, containers, ball ties, wire baskets, rubbish, etc.** Do not leave debris or rubbish on the site overnight.
BEFORE PRUNING

Multi-Stem Tree (Overgrown)

CORRECT PRUNING

Prune to Maintain Tree Form

INCORRECT PRUNING

Do NOT Round-Over (Promotes Sprouts)

Single Stem Tree with Dense Crown, Dead Limbs or Low Branches

Prune Back to Trunk or to Next Largest Limb

Do NOT Top or Stub Cut

Shrub (Poor Shape and Overgrown)

Remove Oldest Branches to Reshape. Prune Narrower on Top, Wider on Bottom.

Do NOT Round-Over (Kills lower Branches, Promotes Sprouts)

Figure 7: Pruning Guidelines

16
2. At the end of each work day thoroughly clean all paved areas by sweeping and/or washing so as to return the pavement to its original condition.

V. Requirements for Successful Lawn Installation:

This section is compiled from information taken from two NC Cooperative Extension Service bulletins: Carolina Lawns, and Lawn Maintenance Calendar. Refer to these publications for clarification of the points contained in each subsection.

A. Lawn Materials:

1. Supply all species or varieties, materials, products, and sizes specified in the Approved Site Plan.

2. Use a grass seed containing 97% minimum purity and 85% minimum germination, as certified by the North Carolina Co-op Improvement Association, and free of noxious weed seeds.

3. Use ground (dolomitic) limestone containing not less than 85% total carbonates as a source of lime. In the absence of a soil test apply lime at a rate of 75 lbs per 1,000 square feet.

4. Use a commercial fertilizer which has a minimum 50% slow release nitrogen, and a uniform composition.

5. Mulch the lawn with clean threshed wheat or oat straw from the latest harvest crop. This straw must be free of noxious weed seeds and foreign materials.

6. Use water free from oils, acids, alkalis, salts or any other substance toxic or harmful to vegetation.

B. Turf Bed Preparation:

1. Prepare the soil and apply lime and fertilizer as specified in Section IV, Subsections B and D.

2. After proper soil preparation and fertilization, apply a pre-emergent herbicide and
Figure 8: Tree Protection Fence Detail
fertilizer combination (Ronstar + 7-3-22 or approved equivalent); broadcast it at an application rate of 175 lbs per acre just before applying seed or planting sprigs or sod.

3. In the absence of a soil test for all grasses except centipedegrass, apply 75 lbs of ground limestone per 1,000 square feet. Incorporate lime and fertilizer in the top 6” - 8” of the soil using a rototiller.

4. Use a rake to create a smooth and level bed free of hollows and depressions, and with soil particles no larger than marble size. (Pea gravel size is even better).

5. Water to settle the soil, and rake again to break the crusty surface before seeding.

VI. Tree Preservation and Care During Construction:

A. Tree Preservation:

Refer to Figures 1 and 8 for further clarification of the following points.

1. Mark the “Tree Save Area” with Tree Protection Fencing. See Figure 8.

2. The size of the “Tree Save Area” is either a radius based on the trunk diameter or the area within the drip line, whichever is largest. If using the tree’s trunk diameter to determine the Tree Save Area enclose at least one (1) foot of ground measured from the trunk of the tree for every one (1) inch of trunk diameter. For example, if the diameter of an existing tree is eight (8) inches, the radius, measured from the trunk of the tree, of the Tree Save Area must be eight (8) feet; the diameter of the Tree Save Area is therefore sixteen (16) feet. However, the branches of an eight inch diameter tree could easily spread beyond eight feet from the trunk. If so, the Tree Save Area must extend at least as far as the branches forming the drip line. See Figure 1.

3. If installing tree protection fencing for trees along a wood’s edge, locate the fence at the drip line of the outermost trees.

4. Install Tree Protection Fencing before doing any grading or land disturbing activity.
5. Call the Planning Department (772-4688) to request that the Urban Design Specialist visit the site to give approval of the placement of the fencing before doing any other site work.

6. Do not disturb the Critical Root Zone (CRZ) of any tree(s) in an area designated “Tree Save Area.” In other words do not clear, grub, trench, remove soil, backfill, drive or park vehicles, equipment or materials, dump trash, oil, paint or any material harmful to the health and growth of the tree within the area marked by the drip line of any tree.

7. If authorized to clear within the CRZ, cut any trees or shrubs flush with grade or grind the stumps to a minimum twelve (12) inches below surrounding grade. Backfill any holes with clean, dry soil the same day. Moisten the soil. Seed or mulch the remaining area depending on which landscape treatments are stipulated on the plans.

8. The Urban Design Specialist may allow a Temporary Access (for 30 days only) across the “Tree Save Area.” Get permission in writing from the Urban Design Specialist and keep a copy on the construction site at all times. Mulch the access across the Tree Save Area with a minimum 6” layer of large wood chips. No material storage, however, is allowed in the access area even on a temporary basis.

9. Some trees being saved may require root pruning. See Subsection B 1 below for specific guidelines on root pruning. See Figure 9.

10. Those trees requiring more than a third of their roots pruned/removed are unlikely to survive. Remove these trees. See Figure 9.

B. Care During Construction:

Refer to Figure 9 for further clarification of the points discussed below.

1. Root pruning may be done on existing trees located near proposed construction using the following guidelines:

   a) Cut roots no more than 6” back from new construction; cut to a depth of two (2) feet only.

   b) Backfill with clean, dry soil within hours of root pruning. Moisten soil the same day.

   c) Keep all tools sharp to ensure roots are not broken or torn.
How do you decide which trees to preserve? Existing trees can add character, beauty, and dollar value to a development. Some trees, however, are less likely to survive the construction process than others. A healthy tree standing alone prior to construction or a group of existing trees with sufficient root zone protection is the best choice for long-term survival following construction. Those trees with no more than one-third of their root zone disturbed by construction are likely to survive; those trees with greater than one-third of their root zone disturbed are not likely to survive and should be removed. Any trees with pre-existing pest or disease problems will probably decline rapidly due to the stress of construction and should be removed.

Figure 9: Care of Trees During Construction
2. Any clearing done in the CRZ may only be done if specified on the approved Site Plan or with written permission from the Urban Design Specialist, and cannot disturb the roots. Cut any trees or shrubs flush with grade or use a stump grinder.

3. Do not use climbing irons, spurs or spikes on trees when pruning them.

C. Site Clean Up:

1. Remove all debris from the work site each day before the work crew leaves the site. Do not leave debris or rubbish on the site overnight.

2. At the end of each work day thoroughly clean all areas, including paved areas, by raking or sweeping so as to return the site to its original condition.
REASONS FOR INCLUDING LARGE TREES IN THE LANDSCAPE.

**LARGE TREES:**
- Create green spaces in the community.
- Establish a unifying element in a streetscape or corridor planting.
- Soften architectural elements.
- Provide taller buffers between incompatible land uses.
- Mitigate urban microclimates by providing shade and windbreaks and by filtering sound and pollution.
- Reduce soil erosion and excess storm water run-off.
- Contribute a living legacy to the community.

<table>
<thead>
<tr>
<th>LARGE TREES</th>
<th>TYPE TREE</th>
<th>SIZE AT MATURITY</th>
<th>GROWTH RATE</th>
<th>SITE CONDITIONS</th>
<th>BENEFITS</th>
<th>POSSIBLE PROBLEMS</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acer rubrum RED MAPLE</td>
<td>deciduous shade</td>
<td>40-60' 30-50'</td>
<td>fast</td>
<td>adaptable</td>
<td>spring flowers, fall color</td>
<td>leaf hoppers, borers</td>
<td>Many cultivars with brilliant fall color. Does not tolerate heavy pollution. Shade tolerant.</td>
</tr>
<tr>
<td>Acer saccharum SUGAR MAPLE</td>
<td>deciduous shade</td>
<td>60-75' 40-60'</td>
<td>moderate</td>
<td>well-drained slightly moist</td>
<td>fall color</td>
<td>leaf scorch</td>
<td>Beautiful fall color. Resents heat. Shade tolerant. Cultivars: “Green Mountain,” “Legacy”</td>
</tr>
<tr>
<td>Betula nigra RIVER BIRCH</td>
<td>deciduous</td>
<td>40-70' 40-60'</td>
<td>fast</td>
<td>moist preferred, but adaptable</td>
<td>handsome form and bark</td>
<td>leaf spot</td>
<td>Multi- or single-stem. Handsome bark. ‘Heritage’ excellent selection</td>
</tr>
<tr>
<td>Carpinus carolina HORNBEAM, IRONWOOD</td>
<td>deciduous shade</td>
<td>20-50' 30-50'</td>
<td>slow to moderate</td>
<td>rich, moist, slightly acid; adaptable</td>
<td>fall color, smooth bark</td>
<td>canker, leaf spot</td>
<td>Very adaptable smaller shade tree. Unique smooth sinewy trunk. Shade tolerant.</td>
</tr>
<tr>
<td>Cedrus deodara DEODAR CEDAR</td>
<td>evergreen</td>
<td>40-70' 50-90'</td>
<td>moderate</td>
<td>well-drained, somewhat dry</td>
<td>foliage texture and color</td>
<td>cold damage, top dieback</td>
<td>Excellent, graceful specimen with soft blue-green color.</td>
</tr>
<tr>
<td>Celtis laevigata SOUTHERN HACKBERRY</td>
<td>deciduous shade</td>
<td>60-80' 60-80'</td>
<td>moderate to fast</td>
<td>prefers rich, moist, but tolerates dry or heavy; sun</td>
<td>sweet orange-red to blue-black fruit, adaptability</td>
<td>nipple-gall, leaf spots</td>
<td>Fruit is very sweet and juicy and relished by birds, excellent street tree because of tolerance to heavy soils and city pollution</td>
</tr>
<tr>
<td>Cladrastis kentukea YELLOWWOOD</td>
<td>deciduous shade</td>
<td>30-50' 40-55'</td>
<td>moderate</td>
<td>well-drained; full sun</td>
<td>fragrant spring flowers, bright foliage</td>
<td>very few</td>
<td>Beautiful fragrant flowers on older trees. Slow to develop strong form. Underused.</td>
</tr>
<tr>
<td>Cryptomeria japonica JAPANESE CEDAR</td>
<td>evergreen</td>
<td>50-60' 20-30'</td>
<td>moderate</td>
<td>rich, moist, acid; full sun</td>
<td>soft texture, beautiful bark</td>
<td>leaf blight, branch dieback</td>
<td>Graceful stately specimen. Excellent screen.</td>
</tr>
<tr>
<td>LARGE TREES</td>
<td>TYPE TREE</td>
<td>SIZE AT MATURITY</td>
<td>GROWTH RATE</td>
<td>SITE CONDITIONS</td>
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<tr>
<td><em>Fagus grandiflora</em> AMERICAN BEECH</td>
<td>deciduous shade</td>
<td>50-70' 50-70'</td>
<td>slow</td>
<td>moist, well-drained, acid</td>
<td>handsome form, bark, fall foliage</td>
<td>none serious, surface roots</td>
<td>Beautiful and grand native for large areas. Shallow roots inhibit grass.</td>
</tr>
<tr>
<td><em>Fraxinus pennsylvanica</em> GREEN ASH</td>
<td>deciduous shade</td>
<td>50-60' 25-35'</td>
<td>fast</td>
<td>very adaptable, full sun</td>
<td>adaptability</td>
<td>borers, scale</td>
<td>Plant cultivars to prevent reseeding. Easily transplanted; variable growth habit.</td>
</tr>
<tr>
<td><em>Gleditsia triacanthos var. inermis THORNLESS HONEYLOCUST</em></td>
<td>deciduous shade</td>
<td>30-70' 30-50'</td>
<td>fast</td>
<td>moist to dry, even drought tolerant, adaptable, full sun</td>
<td>filtered shade, salt tolerant</td>
<td>leaf spot, borer, prone to webworm</td>
<td>Elegant filtered shade, overused. Could face serious disease problems as monoculture planting. Cultivars.</td>
</tr>
<tr>
<td><em>Liquidambar styraciflua var. rotundifolia SWEETGUM</em></td>
<td>deciduous shade</td>
<td>60-75' 40-50'</td>
<td>moderate</td>
<td>adaptable, needs large root zone</td>
<td>rich fall color; fruitless</td>
<td>numerous pests when under stress</td>
<td>Fruitless variety, but reversion possible. Rich fall color.</td>
</tr>
<tr>
<td><em>Liriodendron tulipifera</em> TULIP POPLAR</td>
<td>deciduous shade</td>
<td>70-90' 35-50'</td>
<td>fast</td>
<td>moist, well-drained loamy, full sun</td>
<td>beautiful spring flowers, fall foliage</td>
<td>numerous when poorly sited</td>
<td>Majestic tree only for large sites. Needs well-drained, loamy soil to stay healthy.</td>
</tr>
<tr>
<td><em>Magnolia grandiflora</em> SOUTHERN MAGNOLIA</td>
<td>evergreen</td>
<td>60-80' 30-50'</td>
<td>moderate</td>
<td>rich, well-drained shade tolerant</td>
<td>beautiful fragrant flowers, handsomely thick leaves</td>
<td>messy leaves, surface roots</td>
<td>Formal specimen, as screen or hedge. Use cultivars: 'Little Gem,' 'Margaret Davis,' etc if seeking narrow or smaller specimens.</td>
</tr>
<tr>
<td><em>Metasequoia glyptostroboides DAWN REDWOOD</em></td>
<td>deciduous</td>
<td>70-100' 25-45'</td>
<td>fast</td>
<td>moist, well-drained upland; slightly acid</td>
<td>bright green, fine-textured leaves</td>
<td>none serious, Japanese beetle</td>
<td>Tall but somewhat narrow; lovely ornamental well suited to parks, golf courses, large areas; effective in groups or lining driveways or streets.</td>
</tr>
<tr>
<td><em>Nyssa sylvatica</em> BLACK GUM</td>
<td>deciduous</td>
<td>30-50' 20-30'</td>
<td>moderate</td>
<td>moist, well-drained acid</td>
<td>striking fall color</td>
<td>none serious</td>
<td>Beautiful native tree but hard to find in nurseries. Striking early fall color.</td>
</tr>
<tr>
<td><em>Pinus taeda</em> LOBLOLLY PINE</td>
<td>evergreen</td>
<td>40-60' 20-30'</td>
<td>fast</td>
<td>adaptable to poorly drained, acid soil</td>
<td>good fast screen, adaptability</td>
<td>pine beetles</td>
<td>Fast screen when young; higher canopy with age. Beetles not frequent in landscape setting.</td>
</tr>
<tr>
<td>LARGE TREES</td>
<td>TYPE TREE</td>
<td>SIZE AT MATURITY</td>
<td>GROWTH RATE</td>
<td>SITE CONDITIONS</td>
<td>BENEFITS</td>
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</tbody>
</table>
| *Platanus x acerifolia*  
LONDON PLANETREE | deciduous shade | 70-100' 65-80' | moderate | prefers rich, moist well-drained, but adaptable | withstands heavy pruning, easily transplanted; good choice for open areas | canker stain fungus, lacebark borer | Excellent for large areas; restrict use as street tree as it grows too large. Good uniformity of habit. |
| *Quercus alba*  
WHITE OAK | deciduous shade | 50-80' 60-90' | slow | deep, moist, well-drained, acid | stately habit, fall color | numerous, but tree is survivor | Probably most majestic of trees. Slow growth, transplant problems restricts use but worthy choice where room and time. |
| *Quercus cocinea*  
SCARLET OAK | deciduous shade | 70-75' 40-50' | moderate | adaptable | excellent glossy foliage, fall color | none serious; not as drought tolerant; not good street tree choice | Excellent foliage, attractive form makes this oak increasingly popular. |
| *Quercus palustris*  
PIN OAK | deciduous shade | 60-70' 25-40' | fast | tolerant of wet roots, prefers rich moist well-drained | transplants easily, readily available, tolerant of city conditions | iron chlorosis | Strongly oval-pyramidal habit makes good street tree. Fall coloration is variable. |
| *Quercus phellos*  
WILLOW OAK | deciduous shade | 40-60' 30-60' | moderate | adaptable | good form, fine texture | none serious | Highly adaptable and obtainable oak. Perhaps overused. |
| *Quercus rubra*  
RED OAK | Deciduous shade | 60-75' 40-60' | fast | sandy loam, well-drained, acid | withstands city pollution, transplants easily | chlorosis in high pH soils | Excellent street tree in proper culture. Russet red to bright red fall color. |
| *Quercus shumardii*  
SHUMARD OAK | deciduous shade | 40-60' 40-60' | moderate | adaptable | reliable, fall color | none serious; retains brown leaves thru winter | Reliable and adaptable. Becoming more available in the trade. |
| *Sophora japonica*  
PAGODA TREE | deciduous shade | 50-75' 50-75' | fast | loamy, well-drained | fragrant showy flowers | canker, cold damage in youth | Some disease and hardiness problems when young. Otherwise good urban tree. |
| *Taxodium distichum*  
BALD CYPRESS | deciduous | 50-70' 20-30' | moderate | adaptable, full sun | fine texture, attractive bark | twig blight, cypress moth, mildew | Stately tree with finer texture than most. Looks at home near water but adaptable to city conditions. |
| *Tsuga canadensis*  
CANADIAN HEMLOCK | evergreen | 40-70' 25-35' | moderate | moist, well-drained acid, sun or shade | fine texture; hedge, screen, groupings | numerous if not properly located | Excellent for naturalizing, screening, or large hedge. Reliable if given cultural care and not allowed to dry. |
<table>
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<tr>
<th>LARGE TREES</th>
<th>TYPE TREE</th>
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<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ulmus parviflora</td>
<td>deciduous shade</td>
<td>40-50' x 40-50'</td>
<td>moderate</td>
<td>adaptable</td>
<td>medium to fine texture, beautiful mottled bark</td>
<td>none serious</td>
<td>Tough and durable for urban sites. Easily transplanted and grown. Medium to fine texture.</td>
</tr>
<tr>
<td>LACEBARK ELM</td>
<td>Deciduous shade</td>
<td>50-80' x 50-80'</td>
<td>moderate</td>
<td>moist, well-drained, sun</td>
<td>fine foliage, fall color, vase shape</td>
<td>none serious</td>
<td>Handsome tree with good foliage and vase shape. Good cultivar: 'Village Green.'</td>
</tr>
</tbody>
</table>
REASONS FOR INCLUDING ORNAMENTAL TREES IN THE LANDSCAPE.

**ORNAMENTAL TREES:**

- Provide an understory to the large trees which form the canopy.
- Create a screen or buffer for less desirable visual elements.
- Define or accent a focal space such as an entry area to a building, park, or plaza.
- Add dynamic visual interest to the environment, such as attractive bark, flowers, fragrance, and sculptural form.
- Mitigate urban microclimates by providing shade and windbreaks, and by filtering sound and pollution.
- Reduce soil erosion and excess storm water run-off.

<table>
<thead>
<tr>
<th>ORNAMENTAL TREES</th>
<th>TREE TYPE</th>
<th>SIZE AT MATURITY</th>
<th>GROWTH RATE</th>
<th>SITE CONDITIONS</th>
<th>BENEFITS</th>
<th>POSSIBLE PROBLEMS</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Acer grimmia</em></td>
<td>deciduous</td>
<td>15-20'</td>
<td>moderate</td>
<td>adaptable, sun or light shade</td>
<td>fragrant flowers, fall color, early leaves</td>
<td>relatively few</td>
<td>Very hardy. Use as specimen, in groups, or in containers; tends towards multi-stem.</td>
</tr>
<tr>
<td><em>Acer palmatum</em></td>
<td>deciduous</td>
<td>15-25'</td>
<td>sow to moderate</td>
<td>moist, well-drained; sun/shade</td>
<td>excellent foliage, fall color, bark</td>
<td>few, leaf scorch</td>
<td>Beautiful specimen or accent. Many named varieties with red to green leaf color and varying leaf shape.</td>
</tr>
<tr>
<td><em>Amelanchier arborea</em></td>
<td>deciduous</td>
<td>15-25'</td>
<td>moderate</td>
<td>moist, well-drained; sun/shade</td>
<td>spring flowers, fall color, fruit, bark, wildlife</td>
<td>numerous rust, leaf blight, fire blight, mildews</td>
<td>Excellent for naturalizing; edible fruit, attracts wildlife. Interesting winter habit.</td>
</tr>
<tr>
<td><em>Cercis canadensis</em></td>
<td>deciduous</td>
<td>20-30'</td>
<td>moderate</td>
<td>adaptable if not wet; sun/part shade</td>
<td>spring flowers, fall color, fruit</td>
<td>canker, leaf spot, Verticillium wilt</td>
<td>Handsome native tree used for naturalizing, as specimen, or in groups. New varieties offer new leaf and flower colors. Interesting form.</td>
</tr>
<tr>
<td><em>Cornus florida</em></td>
<td>deciduous</td>
<td>20-30'</td>
<td>moderate</td>
<td>well-drained, acid, organic, moist</td>
<td>spring &quot;flowers&quot; white or pink, fall color, fruit, form</td>
<td>borer, fungus, leaf spot</td>
<td>Despite problems, worth growing in proper cultural conditions. One of most ornamental of all natives. Cultivar: 'Cloud 9,' 'Galaxy'</td>
</tr>
<tr>
<td><em>Cornus kousa</em></td>
<td>deciduous</td>
<td>20-30'</td>
<td>slow to moderate</td>
<td>well-drained, acid, sandy, organic</td>
<td>late spring &quot;flowers,&quot; bark, fall color, fruit, form</td>
<td>borer, none serious</td>
<td>Handsome as specimen, softens harsh structures, beautiful in flower, fall color, and winter habit.</td>
</tr>
<tr>
<td>ORNAMENTAL TREES</td>
<td>TYPE TREE</td>
<td>SIZE AT MATURITY</td>
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</tr>
<tr>
<td>Crataegus phaenopyrum WASHINGTON HAWTHORN</td>
<td>deciduous</td>
<td>25-30' 20-25'</td>
<td>moderate</td>
<td>well-drained; full sun</td>
<td>spring flowers, showy fall fruit</td>
<td>numerous: fireblight, leaf spot, mildew, rust. 1-3' thorns</td>
<td>Fruit display makes excellent specimen or in groups. C. vinifolia 'Winter King' less rust-prone. Poor choice in areas where small children tend to play due to thorns.</td>
</tr>
<tr>
<td>Halesia carolina CAROLINA SILVERBELL</td>
<td>deciduous</td>
<td>30-40' 20-35'</td>
<td>moderate</td>
<td>well-drained, organic, moist, acid; sun/shade</td>
<td>spring flowers, fall fruit</td>
<td>very pest resistant</td>
<td>Subtly beautiful native, for shrub and woodland borders.</td>
</tr>
<tr>
<td>Ilex opaca AMERICAN HOLLY</td>
<td>evergreen</td>
<td>20-40' 18-40'</td>
<td>slow</td>
<td>well-drained, moist, acid; sun</td>
<td>evergreen leaves, red berries</td>
<td>numerous: leaf miner, scale, bud moth, blight</td>
<td>Picturesque specimen. Many superior cultivars: 'Greenleaf,' 'Howard.'</td>
</tr>
<tr>
<td>Ilex x cultivars HOLLY (large types)</td>
<td>evergreen</td>
<td>15-25' 15-25'</td>
<td>moderate to fast</td>
<td>well-drained, moist, acid; sun</td>
<td>glossy dark leaves, fall berries</td>
<td>none serious</td>
<td>Many large enough to be used as trees, screening. Popular: ‘Nellie R. Stevens,’ ‘Fosteri,’ ‘Mary Nell,’ ‘Emily Brunner.’</td>
</tr>
<tr>
<td>Koelreuteria paniculata GOLDENRAINTREE</td>
<td>deciduous</td>
<td>30-40' 30-40'</td>
<td>moderate to fast</td>
<td>adaptable; full sun</td>
<td>spring leaves, summer flowers</td>
<td>none very serious</td>
<td>Lawn or patio tree unique for showy yellow summer flowers</td>
</tr>
<tr>
<td>Lagerstroemia indica (x fauriei) CRAPEMYRTLE</td>
<td>deciduous</td>
<td>18' 20-25'</td>
<td>fast</td>
<td>well-drained, warm; full sun</td>
<td>bark, form, showy summer flowers</td>
<td>powdery mildew, black spot, sooty mold</td>
<td>Excellent National Arboretum cultivars for flower, bark, fall color, and mildew/pest resistance.</td>
</tr>
<tr>
<td>Magnolia x loebneri LOEBNER MAGNOLIA</td>
<td>deciduous</td>
<td>20-30' 24-35'</td>
<td>moderate</td>
<td>well-drained, acid, moist, organic; sun</td>
<td>fragrant spring bloom, form</td>
<td>numerous possible but seldom</td>
<td>Spectacular early flowers susceptible to freeze but worth the risk overall.</td>
</tr>
<tr>
<td>Magnolia x soulangiana SAUCER MAGNOLIA</td>
<td>deciduous</td>
<td>20-30' 15-25'</td>
<td>moderate</td>
<td>well-drained, acid, moist, organic; sun</td>
<td>fragrant spring bloom, form</td>
<td>numerous possible but seldom</td>
<td>Spectacular early flowers susceptible to freeze but worth the risk overall.</td>
</tr>
<tr>
<td>Magnolia virginiana SWEETBAY MAGNOLIA</td>
<td>semi-evergreen</td>
<td>20-30' 25-35'</td>
<td>moderate</td>
<td>adaptable, tolerates wet; shade</td>
<td>fragrant summer bloom, fall fruit</td>
<td>none serious</td>
<td>Versatile tree with nice foliage, fragrant flowers, often multi-stem. Underused.</td>
</tr>
<tr>
<td>Malus hybrid FLOWERING CRABAPPLE</td>
<td>deciduous</td>
<td>15-25' 15-25'</td>
<td>adaptable but prefers heavy loam</td>
<td>well-drained, moist, acid; sun</td>
<td>showy spring bloom, fall fruit</td>
<td>numerous - use only resistant varieties</td>
<td>Many varieties available with different habits; bloom, leaf and fruit color. Select only disease resistant varieties.</td>
</tr>
<tr>
<td>ORNAMENTAL TREES</td>
<td>TYPE TREE</td>
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<tr>
<td>Oxydendrum arboreum</td>
<td>deciduous</td>
<td>25-30' 20-25'</td>
<td>slow</td>
<td>moist well-drained to dry soils; full sun to part shade</td>
<td>long white drooping blossoms in mid summer</td>
<td>leaf spot, twig blight not serious</td>
<td>Striking pendulous profuse white blooms, specimen second only to Dogwood. Pyramidal tree with rounded top and drooping branches; lovely outline.</td>
</tr>
<tr>
<td>SOURWOOD</td>
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<tr>
<td>Parrotia persica</td>
<td>deciduous</td>
<td>20-40' 15-30'</td>
<td>moderate</td>
<td>well-drained; sun or light shade</td>
<td>spring flowers, exfoliating bark</td>
<td>only Japanese beetle</td>
<td>Exceptional specimen, accent, small lawn or street tree. Underused.</td>
</tr>
<tr>
<td>PERSIAN PARROTIA</td>
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<tr>
<td>Pistacia chinensis</td>
<td>deciduous</td>
<td>30-35' 25-35'</td>
<td>moderate</td>
<td>adaptable; full sun</td>
<td>fall color, bark</td>
<td>none</td>
<td>Highly adaptable lawn, park, street tree with outstanding fall color. Underused.</td>
</tr>
<tr>
<td>CHINESE PISTACHE</td>
<td></td>
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<tr>
<td>Prunus species</td>
<td>deciduous</td>
<td>15-35' 15-30'</td>
<td>moderate</td>
<td>well-drained, moist, sun</td>
<td>spring flowers, some weeping</td>
<td>numerous if poor conditions</td>
<td>Popular despite problems. Often used: Prunus mume, P. x yedoensis 'Okame,' P. subhirtella pendula.</td>
</tr>
<tr>
<td>FLOWERING CHERRY</td>
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<tr>
<td>Sassafras albidum</td>
<td>deciduous</td>
<td>30-60' 25-40'</td>
<td>moderate</td>
<td>well-drained, moist, acid; sunlight shade</td>
<td>spring flowers, fall colors</td>
<td>numerous possible but seldom noticed</td>
<td>Overlooked native, excellent for naturalizing, road sides, spectacular fall color. Tea made from bark of roots.</td>
</tr>
<tr>
<td>SASSAFRAS</td>
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<tr>
<td>Stewartia pseudocamellia</td>
<td>deciduous</td>
<td>20-40' 15-30'</td>
<td>moderate</td>
<td>well-drained, moist, organic</td>
<td>summer flowers, bark, tree form</td>
<td>none serious</td>
<td>Magnificent specimen with Camellia-like flowers, stunning fall color, and beautiful bark.</td>
</tr>
<tr>
<td>JAPANESE STEWARTIA</td>
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<tr>
<td>Styx japonica</td>
<td>deciduous</td>
<td>20-30' 20-30'</td>
<td>moderate</td>
<td>well-drained, moist, organic</td>
<td>late spring flowers, fruit, form</td>
<td>mostly pest free, borers</td>
<td>Lovely graceful tree all seasons, cultivars available. Underused.</td>
</tr>
<tr>
<td>JAPANESE SNOWBELL</td>
<td></td>
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</tr>
<tr>
<td>Thuja occidentalis</td>
<td>evergreen</td>
<td>15-25' 5-10'</td>
<td>slow to moderate</td>
<td>well-drained, moist soil and air, sun</td>
<td>fine texture, foliage</td>
<td>bagworm, heart rot, red spider mite</td>
<td>Useful as specimen, accent, hedge, screen. Narrow pyramidal form. Very cold hardy.</td>
</tr>
<tr>
<td>'Emerald' 'EMERALD'</td>
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<tr>
<td>ARBORVITAE</td>
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</table>

31
**REASONS FOR INCLUDING SHRUBS IN THE LANDSCAPE:**

**SHRUBS:**
- Soften edges between architectural walls, fences, and other vertical elements and the ground plane.
- Define spaces, and direct pedestrian traffic.
- Help establish pedestrian scale.
- Provide eye level screening for less attractive site elements.
- Reduce soil erosion and excess storm water run-off.
- Add texture, color, and variety to the built environment.

<table>
<thead>
<tr>
<th>SHRUBS</th>
<th>TREE TYPE</th>
<th>AT MATURITY</th>
<th>GROWTH RATE</th>
<th>SITE CONDITIONS</th>
<th>BENEFITS</th>
<th>POSSIBLE PROBLEMS</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Abelia grandiflora</em></td>
<td>evergreen</td>
<td>3-6'</td>
<td>moderate</td>
<td>flowers June to frost</td>
<td>none serious</td>
<td>For mass or hedge; 'Sherwood more dense and compact; x' Edward Goucher' darker pink flowers.</td>
<td></td>
</tr>
<tr>
<td>GLOSSY ABELIA</td>
<td>small to medium</td>
<td>3-6'</td>
<td>to fast</td>
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<tr>
<td><em>Aronia arbutifolia</em></td>
<td>deciduous</td>
<td>6-10'</td>
<td>moderate</td>
<td>spring flowers, fall</td>
<td>none serious: leaf spots</td>
<td>Border, massing, groups, naturalizing brilliant fruit. Superior cultivar: 'Brillantissima.'</td>
<td></td>
</tr>
<tr>
<td>RED CHOKEBERRY</td>
<td>medium</td>
<td>6-6'</td>
<td>to fast</td>
<td>color, red &quot;berries&quot;</td>
<td>powdery mildew</td>
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<tr>
<td><em>Berberis julianae</em></td>
<td>evergreen</td>
<td>6-10'</td>
<td>moderate</td>
<td>yellow spring flowers,</td>
<td>thorns</td>
<td>Impenetrable hedge, improper pruning can ruin form. Cultivars: 'niana' and 'Glory' are good but hard to find.</td>
<td></td>
</tr>
<tr>
<td>WINTERGREEN BARBERRY</td>
<td>medium</td>
<td>6-10'</td>
<td>to wide</td>
<td>fall color, fruit</td>
<td></td>
<td></td>
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<tr>
<td><em>Berberis thunbergii</em></td>
<td>deciduous</td>
<td>3-6'</td>
<td>moderate</td>
<td>leaf colors, winter</td>
<td>numerous possible, but</td>
<td>Many cultivars: 'Crimson Pygmy' and 'Rose Glow' have burgundy foliage; 'aurera' bright yellow-green.</td>
<td></td>
</tr>
<tr>
<td>JAPANESE BARBERRY</td>
<td>small to medium</td>
<td>4-7'</td>
<td>to soils</td>
<td>fruit</td>
<td>none prevalent</td>
<td></td>
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<tr>
<td><em>Buddleia davidii</em></td>
<td>deciduous</td>
<td>5-15'</td>
<td>fast</td>
<td>foliage color, profuse</td>
<td>none serious</td>
<td>Many cultivars of varied sizes, foliage, bloom color: 'Black Knight,' 'Dobonnet,' 'Nanho,' 'Petite Plum,' etc. Best used in groupings. Cut back to the growth late fall/winter.</td>
<td></td>
</tr>
<tr>
<td>BUTTERFLY BUSH</td>
<td>medium to large</td>
<td>8-12'</td>
<td>adaptable,</td>
<td>summer blooms</td>
<td></td>
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<tr>
<td><em>Callicarpa dichotoma</em></td>
<td>deciduous</td>
<td>3-5'</td>
<td>moderate</td>
<td>graceful form, spectacular</td>
<td>none serious</td>
<td>Used in mass, few can compete with effect of this shrub in fruit. Purple and white fruting types.</td>
<td></td>
</tr>
<tr>
<td>PURPLE BEAUTYBERRY</td>
<td>small to medium</td>
<td>4-6'</td>
<td>well-drawn;</td>
<td>fall berries</td>
<td></td>
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<td></td>
<td></td>
<td>sun/part shade</td>
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<tr>
<td>SHRUBS</td>
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<tr>
<td>Camellia japonica, C. sasanqua CAMELLIA</td>
<td>evergreen medium to large</td>
<td>10-15' 6-10' 6-10' 5-8'</td>
<td>slow to moderate</td>
<td>moist, well-drained, organic; part shade</td>
<td>handsome foliage, fall, winter or spring bloom</td>
<td>numerous possible in improper soils</td>
<td>Many cultivars: select for cold hardiness, bloom time and color. Use for accent, screening, espalier.</td>
</tr>
<tr>
<td>Chamaecyparis pisifera cultivar JAPANESE FALSECYPRESS</td>
<td>evergreen medium to large</td>
<td>4-15' 4-13' size varies with cultivar</td>
<td>moderate</td>
<td>moist, well-drained, humid; sun</td>
<td>fine texture, foliage color in cultivars</td>
<td>leaf scorch, none serious</td>
<td>Accent or specimen. Cultivars with gold or bluish leaf: ‘Filifera,’ ‘Filifera Aurea,’ ‘Gold Mop,’ ‘Boulevard.’</td>
</tr>
<tr>
<td>Chionanthus virginicus FRINGETREE</td>
<td>deciduous medium to large</td>
<td>12-20' 12-20'</td>
<td>slow</td>
<td>deep, moist, fertile, acid soils; sun to part shade</td>
<td>outstanding fringe-like white flower; pollution tolerant</td>
<td>none serious</td>
<td>Outline is spreading and rounded, fine textured in flower May to June. One of more handsome native plants in flower.</td>
</tr>
<tr>
<td>Clethra alnifolia SUMMERSWEET CLETHRA</td>
<td>deciduous medium</td>
<td>3-8' 4-6'</td>
<td>moderate</td>
<td>acid, organic, tolerates wet; sun/shade</td>
<td>summer blooms very fragrant, fall color</td>
<td>none serious</td>
<td>Underused plant for massing, naturalizing. Extremely fragrant bloom. Tolerates wet, shady sites.</td>
</tr>
<tr>
<td>Cotinus coggygria SMOKETREE</td>
<td>deciduous medium to large</td>
<td>10-15' 10-15'</td>
<td>moderate</td>
<td>readily transplanted, adaptable to wide range soils; most showy in full sun</td>
<td>hairs of flowers very showy June through August; purple-leaf varieties.</td>
<td>None serious</td>
<td>Good in shrub border, grouping, massing, better than as specimen. Purple cultivars have striking maroon to purplish red foliage.</td>
</tr>
<tr>
<td>Cotoneaster dammeri BEARBERRY COTONEASTER</td>
<td>semi-evergreen to evergreen</td>
<td>1-1 1/2' x 6+</td>
<td>fast</td>
<td>adaptable but prefers well-drained soils</td>
<td>easiest cotoneaster to grow, roots where branches touch the ground</td>
<td>aphids, occasionally fireblight</td>
<td>Excellent on banks as display and erosion control, facing shrubs, foundation, and possible espalier</td>
</tr>
<tr>
<td>Euonymus alatus WINGED EUONYMUS</td>
<td>deciduous large to medium</td>
<td>15-20' 15-23' 5-10' (compact form)</td>
<td>moderate</td>
<td>adaptable, but not too wet; sun/shade</td>
<td>form, fall color, fruit, winter stems</td>
<td>none serious</td>
<td>Excellent as specimen, massing screening. Brilliant fall color. Most popular: 'Compactus.'</td>
</tr>
<tr>
<td>SHRUBS</td>
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</table>
| *Forsythia x intermedia*  
FORSYTHIA | deciduous  
medium to large | 8-12'  
10-12' | fast | adaptable; sun to part shade | early spring flowers | several but not particularly serious | Shrub border, massing, groups, bank plantings. Needs plenty of space to limit pruning. |
| *Hamamelis x intermedia*  
WITCH H HAZEL HYBRID | deciduous  
large | 10-20'  
10-15' | moderate | moist, well-drained; sun/shade | fragrant winter blooms, fall color | none serious | Specimen, groups, shrub border, naturalizing. Underused native shrub with winter interest. Many cultivars. |
| *Hydrangea*  
species HYDRANGEA | deciduous  
medium to large | 4-15'  
4-15' | fast | moist, well-drained, salt tolerant | large summer blooms, fall color, 'Oak Leaf' | several possible, none prevalent | Accent groups. All species show in flower; color varies. 'Oak Leaf' also has good fall color and winter form. |
| *Ilex crenata*  
cultivars  
JAPANESE HOLLY | evergreen  
small, medium, large | 4-12'  
4-12' | moderate | moist, well-drained, no drought; sun | evergreen leaf, texture | spider mites, black knot, nematodes | Workhorse plants for foundation, hedge, mass; most serviceable 'Hellen,' 'Compacta,' 'Steeds.' |
| *Ilex cornuta*  
cultivars  
CHINESE HOLLY | evergreen  
small, medium, large | 3-15'  
4-15' | moderate | adaptable, drought tolerant; sun | broad glossy leaf, berries on some cultivars | scale, numerous possible, varies with cultivar | Accent, foundation, screen, hedge. Many cultivars widely used: ‘Burford,’ ‘Carissa,’ ‘Rotunda.’ |
| *Ilex glabra*  
INKBERRY HOLLY | evergreen  
medium | 5-10'  
5-11' | moderate | moist; acid; sun/shade | lustrous leaves, adaptability | none serious | Accent, foundation, screen, hedge, mass. Select named cultivars for size and form: ‘Nordic,’ ‘Shannon.’ |
| *Ilex vomitoria*  
YAUPON HOLLY | evergreen  
small, medium, large | 3-20'  
5-15' | moderate | adaptable to wet or dry, salt tolerant | great adaptability, varied forms, bark | none serious | Accent, foundation, screen, hedge, mass. Some small trees. Some dwarf and compact: ‘Shillings.’ Some weeping. |
| *Ilex verticillata*  
WINTERBERRY | deciduous  
medium | 6-10'  
6-12' | slow to moderate | adaptable, tolerates wet; sun to part shade | red fall to winter fruit | none serious | Mass, border, bank plantings, water’s edge or wet soils. Needs male to set fruit. Spectacular in winter. |
| *Illicium parviflorum*  
ANISE-TREE | evergreen large | 8-15'  
10-15' | moderate | adaptable wet to dry; sun to shade | Handsome olive-green foliage | none serious | Large foliage mass or screen. Prune for specimen small tree. Foliage offers nice color contrast to dark greens. |
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td><strong>Itea virginica</strong></td>
<td>deciduous</td>
<td>3-7'</td>
<td>moderate</td>
<td>adaptable, prefers moist; sun to shade</td>
<td>fragrant May blooms, white drooping plumes, good foliage</td>
<td>none serious</td>
<td>Massing, banks, naturalizing. Highly adaptable native. Spreads by runner. ‘Henry’s Garnet’ good for brilliant fall color.</td>
</tr>
<tr>
<td><strong>Juniperus cultivars</strong></td>
<td>evergreen</td>
<td>1-20’+</td>
<td>moderate</td>
<td>tolerant of poor soils, no wet soils</td>
<td>needle-like foliage, fine texture</td>
<td>twig blight, rust, wilt, bagworm, miles</td>
<td>Groundcover, foundation, bank, hedge, screen, specimen. Sizes, shapes, colors vary with cultivar.</td>
</tr>
<tr>
<td><strong>Juniperus</strong></td>
<td>small, medium,</td>
<td>1-10’+</td>
<td>moderate</td>
<td>tolerant of poor soils, no wet soils</td>
<td>needle-like foliage, fine texture</td>
<td>twig blight, rust, wilt, bagworm, miles</td>
<td>Groundcover, foundation, bank, hedge, screen, specimen. Sizes, shapes, colors vary with cultivar.</td>
</tr>
<tr>
<td><strong>Ligustrum japonicum</strong></td>
<td>large</td>
<td>8-15’</td>
<td>fast</td>
<td>adaptable, salt tolerant, no wet soils; sun to shade</td>
<td>lustrous dark green leaves</td>
<td>none serious</td>
<td>Foundation, screen, hedge, topiary, can be pruned into small tree. Cultivars.</td>
</tr>
<tr>
<td><strong>Myrica cerifera</strong></td>
<td>evergreen</td>
<td>10-20’</td>
<td>fast</td>
<td>adaptable, salt tolerant, sun to shade</td>
<td>adaptability, fragrant stems and leaves</td>
<td>anthracnose, none serious</td>
<td>Versatile as screen, mass, hedge, small tree specimen. Ice may break limbs, but shrub recovers quickly.</td>
</tr>
<tr>
<td><strong>Nandina domestica</strong></td>
<td>evergreen</td>
<td>2-8’</td>
<td>moderate</td>
<td>adaptable; sun to shade</td>
<td>spectacular fruit, winter color</td>
<td>none serious</td>
<td>Species effective in groups, as hedge. Cultivars mostly dwarf types with varied leaf color: ‘Harbor Dwarf’ best.</td>
</tr>
<tr>
<td><strong>Osmanthus x fortunei</strong></td>
<td>evergreen</td>
<td>15-20’</td>
<td>slow to moderate</td>
<td>moist, well-drained; sun to shade</td>
<td>fragrant flowers in fall, handsome foliage</td>
<td>none serious</td>
<td>Border, screen, hedge, formal specimen. Fail fragrance.</td>
</tr>
</tbody>
</table>

35
Town of Garner
PLANNING DEPARTMENT
Landscape/Appearance Inspection Report

Site Name/Address: ____________________________
Contact Person: ____________________________ Ph # ____________ Fx # ____________
Inspected by: ____________________________ Date: ____________ Report/Letter Sent On: ____________

CONDITIONS OBSERVED/CORRECTIVE ACTION REQUIRED:

Landscaping:
☐ Install wheel stops a minimum of 2.5' from edge of plant bed or sidewalks less than 5' wide.
☐ Did not follow acceptable plant bed preparation.
☐ Did not follow acceptable planting standards.
☐ Did not follow acceptable pruning standards.
☐ Replace trees/shrubs/groundcovers which are dead or have been removed.
☐ Trees/shrubs at installation do not meet ANSI standards for nursery stock.
☐ Planting does not comply with approved Site Plan. Date of approved Site Plan: ____________
☐ Trees/shrubs planted too close to power line980/utilities.
☐ Remove stakes/guy wires/rubber hose/tree wrap.
☐ Soil well must be min. 3" above grade and placed beyond outer edge of footwall.
☐ Dumpster/HVAC units inadequately screened from view from public right-of-way.

Parking/Pavement:
☐ Sidewalks not as shown on the approved Site Plan. Date of approved Site Plan: ____________
☐ Not enough parking spaces/stop signs; no handicapped accessible spaces/ramps.
☐ Not paved as shown on the approved Site Plan. Date of approved Site Plan: ____________

Signage:
☐ Does not comply with approved Sign Permit/Master Sign Plan. Date of SP/MSP: ____________
☐ Landscape bed for the monument sign is not installed.

Lighting/Elevations:
☐ Does not comply with approved Site Plan. Date of approved Site Plan: ____________

Other: ____________________________

ACTION TAKEN BY PLANNING STAFF:
☐ Site (not) approved for CO. Initials: ____________ Date: ____________
☐ Site approved for Conditional CO. Initials: ____________ Date: ____________
☐ 1-Yr Inspection Date: ____________ Pass: ____________ Fail: ____________

Conditions must be corrected immediately. Call ______ at 772-4688 upon receipt of this notice to establish a submittal date for a Plan of Action. Violation proceedings will be initiated if no Plan of Action is submitted or response to this report received by ______/____/____.
☐ Plan of Action Received On: ____________ Acceptable: ____________________________
IX. RESOURCE LIST:

Publications, cost, and where to get them:

American Standard for Nursery Stock. $15.00, plus $2.50 postage and handling. North Carolina Association of Nurserymen, 7419 East US 64 Highway, Knightdale, NC (919) 266-3322

Carolina Lawns. FREE. NC Cooperative Extension Service, 1911 Building, NCSU campus. (919) 515-2811.


Lawn Maintenance Calendar (for Fescue, Bermuda grass, Centipedegrass, etc.). FREE. NC Cooperative Extension Service, 1911 Building, NCSU campus. (919) 515-2811.

Planting Techniques for Trees and Shrubs. FREE. NC Cooperative Extension Service, 1911 Building, NCSU campus. (919) 515-2811.

Soil Sampling for Lawns & Gardens. FREE. NCDA Agronomic Division, Soil Testing Section, 4300 Reedy Creek Road, Raleigh NC (919) 733-2655.

Understanding the Soil Report. FREE. NCDA Agronomic Division, Soil Testing Section, 4300 Reedy Creek Road, Raleigh NC (919) 733-2655.


Organizations, Contact Persons, Title, and Phone Number:

Agricultural Resources Center (ARC). Erick Umstead, Research Director. (919) 839-0159. An excellent resource for questions/concerns about the proper use of pesticides.

Horticulture Extension Service at NCSU. Kim Powell, Extension Agent. (919) 515-1197. An excellent resource for all questions/concerns to do with horticulture.

NC Landscape Contractors Association Inc. Bill Wilder, President. (919) 266-1777. An excellent resource for information on state certification as a Landscape Contractor, and for study guides for the certification exam.


Soils Extension Service at NCSU. (919) 515-3285. An excellent resource for questions/concerns about turf management.