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INTRODUCTION

The City Council recognizes that trees play many vital roles. They include but not limited to improving water and air quality; reducing erosion and dust; reducing storm water runoff volume and velocity; protecting and enhancing the value of residential and commercial properties; as well as conserving energy. Tree also play an important role in promoting the City’s natural ecological, environmental and aesthetic qualities that attract new residents and business enterprises, aiding in noise, glare, and heat abatement, and providing wildlife habitat.

Therefore the City Council had adopted tree regulations which are designed to achieve the following objectives:

- Preserve existing mature, healthy trees and natural areas within the City of Denton including remnants of the Cross Timbers Forest and Bottomland Hardwood Forests. These standards provide incentives to retain existing trees and establish standards to address mitigation when removal is necessary.
- Promote the reasonable and responsible development of land within the City jurisdiction.
- Contribute to the long-term viability of existing trees by establishing protective measures during construction or land disturbing activities while balancing the rights of property owners with the interests of the community.
- Increase the overall tree canopy in the City’s jurisdiction.
- Establish regulations to prevent unauthorized removal of trees and minimize the indiscriminate clear-cutting of property.

The City of Denton has always placed a high priority on preserving trees and to demonstrate that, the city aspires to reach an overall goal of 30% tree canopy. To meet that goal with existing and replacement trees, a minimum percent of tree canopy cover will be required in developments located within:

<table>
<thead>
<tr>
<th>Zoning Districts</th>
<th>% Tree Canopy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neighborhood Residential:</td>
<td>50%</td>
</tr>
<tr>
<td>Downtown University Core:</td>
<td>30%</td>
</tr>
<tr>
<td>Community Mixed Use:</td>
<td>30%</td>
</tr>
<tr>
<td>Regional Mixed Use Districts:</td>
<td>30%</td>
</tr>
<tr>
<td>Employment Center:</td>
<td>30%</td>
</tr>
<tr>
<td>Industrial Center Districts:</td>
<td>15%</td>
</tr>
<tr>
<td>Rural</td>
<td>30%</td>
</tr>
</tbody>
</table>
This City of Denton Tree Protection Standards Manual is published separately from the Tree Code that is included in the Denton Development Code. The Tree Protection Standards Manual provides standards and specifications based on generally accepted practices and provide guidelines for survey, protection, planting, and pruning of trees. If there appears to be a conflict between the Tree Preservation Code e and the Tree Protection Manual, the Tree Preservation Ordinance will take precedence.
SECTION 1: TREE REMOVAL PERMIT

1.1 TREE REMOVAL PERMIT APPLICATION

A tree removal permit application must be submitted in accordance with the Tree Code, and shall include the following:

a. Name and contact information for the applicant;

b. Address and location of the platted lot or tract for which the tree removal permit is being submitted;

c. The approved tree protection plan, if any, for the platted lot or tract to be developed;

d. A tree inventory prepared in accordance with Section 2 of this manual.

e. A tree mitigation plan prepared in accordance with Section 4 of this manual.

f. A schematic and appropriately scaled site plan showing the layout of the lot or tract, including the proposed pad site and the location of each Protected Tree on the lot or tract in relation to the pad site;

g. Certification that each Protected Tree not to be removed has been tagged with an identification tag and flagged with survey tape;

h. A map or other graphic depiction designating the location of Protected Trees to be removed in relation to the building pad site;

i. A table summarizing the inventory of Protected Trees to be preserved and those to be removed;

j. Measures that will be taken to preserve Protected Trees that are not designated for removal

k. Payment of any fees proposed to mitigate Protected Tree removal.
Application contents for tree removal not associated with development.

Where the applicant seeks authorization to remove a Protected Tree in conjunction with activities not associated with development, the following information or documents shall be submitted:

1. Name and contact information for the applicant;

2. Address and location of the platted lot or tract for which the tree removal permit is being submitted;

3. Identification of each Protected Tree to be removed, described in the definitions.

4. The methods to be used to mitigate the removal of each Protected Trees, consistent with Section 4 of this manual; and

5. Payment of any fees proposed to mitigate Protected Tree removal.

1.2 APPROVE PROCEDURES

1. Completeness of application. The City Urban Forester shall review each application for a tree removal permit application for complete in accordance with the procedures in City Tree Code.

2. Criteria for approval. The City Urban Forester may approve, conditionally approve or deny an application for a tree removal permit in accordance with the criteria in Subsection 1 of the Tree Code. In the case of denial of a tree removal permit, the applicant may appeal the City Urban Forester’s decision in accordance with Subsection 35.3.11 of the Denton Development Code. The decision of the City Urban Forester shall based on the following criteria:

   a. The application is consistent with approved tree protection standards applicable to the lot or tract;

   b. Where required, the tree inventory correctly identifies each Protected Tree on the lot or tract;

   c. Where required, each Protected Tree inside the pad site has been appropriately tagged and;

   d. Each Protected Tree to be removed has been adequately mitigated in accordance with the requirements of Section 4 of this manual, and

   e. All proposed tree protection measures that are to be implemented during development meet the requirements of Section 3 of this manual.
3. Approval of a tree removal permit authorizes the applicant to remove Protected Trees from the site during the construction process or other activity in accordance with the permit. However, no Protected Tree shall be removed, until all of the following have occurred:

   a. All non-disturbance areas and Protected Trees not to be removed during development have been properly protected in accordance with measures set forth in Section 3 of this manual.

   b. All proposed mitigation fees have been paid in full.

4. **Plan verification and enforcement.** Approval of a tree removal permit authorizes the City Urban Forester to inspect the property during or after construction to ensure the requirements of the tree removal permit have been satisfied. If the City Urban Forester determines that Protected Trees not designated for removal have been removed, or that adequate measures are not being taken to preserve Protected Trees during development, he may seek enforcement of the plan, including measures to stop work on the development until additional mitigation has been made in accordance with Section 4 of this manual. The City Urban Forester shall verify that all obligations under the tree removal permit have been fully satisfied, and, in the event that some obligations have not been fulfilled, shall identify measures to bring the development into compliance with the approved tree removal permit.
SECTION 2: TREE SURVEY STANDARDS

2.1. INTRODUCTION
This section describes the preferred format of conducting tree surveys as well as the preferred methods of tree identification required in the field.

2.2. PROTECTED AND UNPROTECTED TREES
Trees of all species that are six inches (6”) or greater in dbh are considered protected, except for Unprotected Trees and those excepted in Subchapter 2 of the Tree Code. Trees less than six inches (6”) in dbh are not subject to tree protection. The trees selected for mitigation will be indicated on the tree survey and construction plans, and will be protected in the same manner as a protected tree. The City Urban Forester will approve the trees recommended for mitigation.

2.3. TYPES OF TREE SURVEYS
There are two types of tree surveys, partial and full. Elements required in a partial tree survey shall be described by the City Urban Forester.

2.4. TREE SURVEY CERTIFICATION
All tree surveys shall be certified and must be prepared by a qualified professional. Protected trees over six inches (6”) dbh must be surveyed and depicted on the survey and in the legend. If the survey is determined to be inaccurate, it will be rejected. Therefore the site plan or preliminary plat review process will be delayed until an accurate tree survey is submitted and approved.

2.5. INFORMATION TO BE GATHERED IN THE FIELD
The data required to be collected and illustrated in the site plan include tree locations, diameters, species, limits of construction, and certain tree graphics.

1. Location – Tree data submitted must be obtained from a ground survey. A number shall be assigned and a corresponding numbered tag placed on each tree surveyed and provided in the overall tree survey. Tree numbers will remain on the trees until the project has received its Certificate of Occupancy.

2. Diameter – Diameters of existing trees must be measured and recorded to the nearest inch.
Illustration 2-1: Measurement of trees

A. Straight trunk: Trees with fairly straight, upright trunks should be measured four and a half (4.5) feet above the ground (See illustration 2-1 A.)

B. Trunk on an angle or on a slope: The trunk is measured at right angles to the trunk four and half (4.5) feet along the center of the trunk axis, so the height is the average of the shortest and the longest sides of the trunk (see illustration 2-1 B).

c. Trunk branching lower than four and a half (4.5) feet from the ground: When branching begins less than four and a half (4.5) feet from the ground, measure the smallest circumference below the lowest branch. In
this example, an alternative would be to add the sum of the cross-sectional areas of the two (2) stems measured about twelve inches (12") above the crotch. Average the sum of these two (2) branch areas and the smallest cross-sectional area below the branches. This may give a better estimate of the tree size (see illustration 2-1 C).

d. **Multi-stemmed tree**: To determine the diameter of a multi-trunk tree, measure all the trunks; add the total diameter of the largest trunk to one-half (1/2) the diameter of each additional trunk (see illustration 2-1 D). A multi-trunked tree is differentiated from individual trees growing from a common root stock if there is a visible connection between the trunks above ground.
2.6. INFORMATION TO BE PROVIDED ON THE TREE SURVEY

1. *Trunk Location* – The trunk location must represent the center of the trunk at ground level in the field. If the tree leans substantially above that point, show the direction of the lean with an arrow. See the legend under the sample Tree Survey in Illustration 2-2B for an example (Tree #10).

Illustration 2-2A

2. *Critical Root Zone (CRZ)* - Trees are to be represented on the tree survey by a circle centered on the trunk location, with a radius equal in feet to the number of inches of the tree’s trunk diameter. For example, an oak tree with a trunk diameter measuring fifteen-inches (15”) would be represented to scale on the tree survey with a circle representing a fifteen-foot (15’) radius. Trees to be retained will be represented by a solid circle. Trees to be removed are to be represented by a dashed circle. See illustration 2-2A.

3. *Diameters and types of existing trees* – Tree diameters and types shall be shown on the survey through a legend. Tree numbers on the legend will be correlated with the appropriate tree circle drawn on the plan and the trees in the field. Special conditions such as “dead” must be noted.

4. *Tree numbers* – Tree numbers on the survey will correlate with tags assigned to trees in the field.

5. *Tree survey table* – A table must be included listing all surveyed trees six inches (6”) and greater by number, species, sizes, removal status, health conditions, and credit trees. It must also include a legend indicating the protection status of the tree. Additionally, it must include calculations of the number of inches of trees to be protected, inches to be removed without mitigation, number of inches equal to or greater than six inches (6”), number of inches subject to mitigation, and number of inches credited. See illustration 2-2B, *Elements of a Tree Survey*, for reference.

6. *Species* – The name of the species, such as Post Oak, Live Oak, or Pecan should be accurately depicted on the survey. Tree types may be listed by common names or Latin names. Indicating a tree name as “unknown” on a tree survey is not acceptable and will cause the survey to be rejected.
### TREE SURVEY TABLE

<table>
<thead>
<tr>
<th>Tree #</th>
<th>Size (dbh)</th>
<th>Species</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9&quot;</td>
<td>Post Oak</td>
<td>Protected - Preserved</td>
</tr>
<tr>
<td>2</td>
<td>8&quot;</td>
<td>Cedar Elm</td>
<td>Protected - Removed</td>
</tr>
<tr>
<td>3</td>
<td>16&quot;</td>
<td>Post Oak</td>
<td>Protected - Preserved</td>
</tr>
<tr>
<td>4</td>
<td>28&quot;</td>
<td>Post Oak</td>
<td>Heritage - Preserved</td>
</tr>
<tr>
<td>5</td>
<td>10&quot;</td>
<td>Post Oak</td>
<td>Protected - Removed</td>
</tr>
<tr>
<td>6</td>
<td>22&quot;</td>
<td>Post Oak</td>
<td>Heritage - Removed</td>
</tr>
<tr>
<td>7</td>
<td>36&quot;</td>
<td>Pecan</td>
<td>Heritage - Removed</td>
</tr>
<tr>
<td>8</td>
<td>6&quot;</td>
<td>Cedar Elm</td>
<td>Protected - Preserved</td>
</tr>
<tr>
<td>9</td>
<td>22&quot;</td>
<td>Post Oak</td>
<td>Protected - Removed</td>
</tr>
<tr>
<td>10</td>
<td>14&quot;</td>
<td>Pecan</td>
<td>Heritage - Preserved</td>
</tr>
<tr>
<td>11</td>
<td>6&quot;</td>
<td>Hackberry</td>
<td>Unprotected</td>
</tr>
<tr>
<td>12</td>
<td>8&quot;</td>
<td>Hackberry</td>
<td>Unprotected</td>
</tr>
<tr>
<td>13</td>
<td>6&quot;</td>
<td>Hackberry</td>
<td>Unprotected</td>
</tr>
</tbody>
</table>

Total inches Protected Trees on site: 63
Total inches Heritage Trees on site: 108

### Protected Trees
- Total inches removed outside of Building Pad: 17
- Total inches removed inside of Building Pad: 10
- Replacement Inches outside Building Pad ( @ 1:1 ratio): 17
- Replacement inches inside Building Pad ( @ 1:0.5 ratio): 5

### Heritage Trees
- Total inches of Heritage Trees removed outside the Building Pad: 58
- Total inches of Heritage Trees removed inside the Building Pad: 22
- Replacement Inches outside the Building Pad(@ 1:2 ratio): 116
- Replacement Inches inside the Building Pad(@ 1: ratio): 22
- Total inches subject to replacement: 160

### Credits
- Total inches of Protected Trees credited : 36 (@ 1:1 ratio): 36
- Total inches of Heritage Trees credited: 28 (@ 1:2 ratio): 56
- Total inches subject to credit: 92

### Replacement Inches Calculation
- Protected Trees (17) + Heritage Trees (160) =177 in.
- Replacement In. (177) - Credited In. (92) = 85 in.
- Total inches to be replaced: 85
2.7. ADDITIONAL INFORMATION

There are other types of information related to tree structure and condition which may affect site plan design that may be requested by the City Urban Forester. When required, this information must be illustrated as a written note on the survey and include the tree number and a description of any of the following:

1. **Crown Configuration** – If a tree has a crown that is skewed in one direction, this information should be noted. This information is vital to accurately assess design impacts on such trees.

2. **Crown Clearance** – This information is often critical in determining whether a given structure or vehicular use area can practically placed within the drip line of a tree. If this information is recorded, the surveyor should consider the vertical distance to any major branches.

3. **Condition** – This is one of the principle factors in determining whether a tree should or should not be preserved. Surveyors should not speculate about the condition of all trees unless they have the necessary credentials; however, if a tree is obviously in poor condition, it should be noted to prevent unnecessary expense in trying to design around it.

4. **Spot Elevation** - Taking an elevation reading near the trunks of some trees will provide valuable information for project designers. Since grade changes are the most destructive impacts on trees, it is important to collect and record the most accurate information possible. If there is more than a six-inch (6”) change, existing and proposed grade elevation must be reflected on the tree survey.
SECTION 3: TREE PROTECTION STANDARDS

3.1. INTRODUCTION
The tree protection standards in this section are provided to ensure the implementation of appropriate practices in the field. This is aimed to eliminate undesirable consequences that may result from uninformed or careless acts while preserving both trees and property values. Construction projects are required to implement the protective practices described in this section.

Typical negative impacts that may occur during construction include:

- Injury to roots, trunk or branches;
- Compaction of soil, which degrades the functioning roots and inhibits the development of new ones and restricts drainage, which desiccates roots and enables water mold fungi to develop;
- Changes in existing grade which can cut or suffocate roots;
- Alteration of the water table – either raising or lowering;
- Microclimate change, exposing sheltered trees to sun or wind; and
- Sterile soil conditions, associated with stripping off topsoil.

3.2. CRITICAL ROOT ZONE (CRZ)
Each tree to be retained shall have a designated critical root zone (CRZ) identifying the area sufficiently large enough to protect the tree and roots from disturbance. The CRZ is defined as a radius equal in feet to the number of inches of the tree’s trunk diameter. The CRZ shall be shown on all tree surveys, tree replacement plans, and construction plans. Improvements or activities such as paving, utility and irrigation trenching and other activities shall occur outside the CRZ, unless authorized by the City Urban Forester. Unless otherwise specified, the protective fencing shall define the CRZ.
Illustration 3-1: Root zone vs. Critical root zone (CRZ)
Activities prohibited within the CRZ include:

- Storage or parking vehicles, building materials, refuse, excavated spoils or dumping of poisonous or hazardous materials on or around tree and roots. Poisonous or hazardous materials include, but are not limited to, paint, petroleum products, concrete or stucco mix, dirty water or any other material which may be harmful to tree health;
- The use of tree trunks as a winch support, anchorage, temporary power pole, sign posts or other similar function;
- Cutting of tree roots by utility trenching, foundation digging, placement of curbs and trenches and other miscellaneous excavation without prior approval of the City Urban Forester;
- Soil disturbance or grade change;
- Impervious paving;
- Vehicular traffic; and
- Drainage changes

Activities permitted or required within the CRZ include:

- **Mulching.** During construction, mulch may be spread within the CRZ. The mulch may be removed if improvements or other landscaping is required. Where there are areas of unprotected root zones in the CRZ, those areas shall be covered with four inches (4") of organic mulch to minimize soil compaction. See Section 4.7.6 of this Manual for a more thorough discussion on mulching.

- **Irrigation, aeration, fertilizing** or other beneficial practices that have been specifically approved for use within the CRZ and as defined by the City Urban Forester. If a tree is adjacent to or in the immediate proximity to a grade requiring erosion control, approved erosion control or silt barriers shall be installed outside the CRZ to prevent siltation and/or erosion within the CRZ.

**3.3. TREE PROTECTION AND PRESERVATION PLAN & PRE-CONSTRUCTION REQUIREMENTS**

Prior to the start of any development project, the property owner shall prepare and submit a Tree Protection Plan for all protected trees for review and approval. The Tree Protection Plan must consist of three elements: (1) illustrations showing options in tree fencing and protection (see illustrations in this section related to fencing and protection); (2) notes as listed in section 3.3.2 of this Manual; and (3) tree protection symbols on the tree protection plan as discussed in section 3.3.1 and illustrated in illustration 3-2 of this Manual.
3.3.1. Site Plan Reflecting Critical Root Zones

In addition to the requirements described in the Tree Survey Standards, the CRZ to be enclosed with the specified tree fencing will be indicated on the Tree Replacement Plan and all construction plans as a bold line with x’s evenly spread along the line (see illustration 3-2).

3.3.2. Tree Protection Notes

The Construction Plan and Site Plan must be shown on plans accompanied by the tree protection details as illustrated:

1. All trees shown on this plan to be retained shall be protected during construction with fencing;
2. Tree protection fences shall be erected according to city standards for tree protection, including types of fencing and signage;
3. Tree protection fences shall be installed prior to the commencement of any site preparation work (clearing, grubbing, or grading) and shall be maintained throughout all phases of the construction project;
4. Erosion and sedimentation control barriers shall be installed or maintained in a manner which does not result in soil build-up within tree driplines or root damage;
5. Fences shall completely surround the tree or clusters of trees located at the outermost limits of the tree branches (dripline) or CRZ, whichever is greater; and shall be maintained throughout the construction project in order to prevent the following:
   a. Soil compaction in root zone area resulting from vehicular traffic or storage of equipment or material;
   b. Root zone disturbances due to grade changes (greater than 3 inches cut or fill) or trenching not reviewed and authorized by the City Urban Forester;
   c. Wounds to exposed roots, trunk, or limbs by mechanical equipment; and,
   d. Other activities detrimental to trees such as chemical storage, concrete truck cleaning, fires, and anchoring to tree trunk.
6. Exceptions to installing tree fences at the tree driplines or CRZ, whichever is greater, may be permitted in the following cases:
   a. Where there is to be an approved grade change, impermeable paving surface, or tree well;
   b. Where trees are close to proposed buildings, erect the fence no closer than eight feet (8’) to the building;
7. Where any of the above exceptions result in a fence that is closer than five feet (5’) to a tree trunk, the trunk shall be protected with strapped-on planking to a height of eight feet (8’) – or to the limits of lower branching – in addition to the reduced fencing provided;

8. Where any of the above exception results in areas of unprotected root zones under the dripline or CRZ, whichever is greater, those areas shall be covered with 4 inches of organic mulch to minimize soil compaction;

9. All grading within protected root zone areas shall be done by hand or with small equipment to minimize root damage. Prior to grading, relocate protective fencing to 2 feet behind the grade change area;

10. Roots exposed by construction activity shall be pruned flush with the soil. Backfill root areas with good quality light top soil within 24 hours. If exposed root areas are not backfilled within 24 hours, cover them with organic material in a manner which reduces soil temperature and minimized water loss due to evaporation;

11. Prior to excavation or grade cutting within tree driplines, a clean cut shall be made between the disturbed and undisturbed root zones with a trenching machine or similar equipment to minimize damage to remaining roots;

12. All trees impacted by construction activities will be watered deeply once a week during periods of hot, dry weather. Tree crowns are to be sprayed with water periodically to reduce dust accumulation on leaves;

13. When installing concrete adjacent to the root zone of the tree use a plastic vapor barrier behind the concrete to prohibit leaching of lime into the root zone;

14. Installation of landscape irrigation within the CRZ of protected trees shall be installed by hand digging with no root over 1” in diameter being cut;

15. No landscape topsoil dressing greater than three inches (3”) shall be permitted within the dripline or CRZ, whichever is greater, of trees. No topsoil or mulch is permitted on root flares of any tree;

16. Pruning to provide clearance for structures, vehicular traffic, and construction equipment shall take place before construction begins. All pruning must be done according to standards as outlined in American National Standard for Tree Care Operation – Tree Shrub and Other Woody Plant Maintenance – Standard Practice (ANSI R300-1995);

17. The City Urban Forester has the authority to require additional tree protection before or during construction; and,

18. Trees approved for removal shall be removed in a manner which does not impact trees to be preserved. See Section 3.4.3 of this manual for appropriate removal methods.

19. Deviations from the above may be considered violations if there is substantial noncompliance or if a tree sustains damage as a result.
3.3.3. Pre-Construction Meeting

The demolition, grading and underground contractors, construction superintendent and other pertinent personnel are required to meet with the City Urban Forester prior to beginning work to review procedures, tree protection measures and to establish haul routes, staging areas, contacts, watering, etc.

Pre-Clearing Conference

After final plat approval, including amended plats, replats or site plans, but prior to any clearing or grading, a tree protection management conference shall take place to review procedures for protection and management of all tree protection elements.

Field Inspections:

Prior to the approval of removal of any trees, the applicant shall mark all trees to be preserved and notify the City Urban Forester of the markings. The City Urban Forester shall inspect and verify the marking not to exceed a two week period.

Prior to the commencement of grading, all tree markings, protective fencing as described within this manual, must be installed by the developer and must be inspected by the City Urban Forester.

A stop-work order may be issued by the City Urban Forester if the tree preservation requirements are not being met. Efforts will be made to allow compliance before the project is shut down.

3.3.4. Verification of Tree Protection

A qualified professional shall verify, in writing, that all preconstruction conditions have been met (tree fencing, pruning, etc.) and are in place. Written verification must be submitted to and approved by the City Urban Forester before demolition or grading begins.
3.3.5. Tree Fencing for Protected Trees

Fenced enclosures shall be installed at the CRZ or the dripline, whichever is greater, to achieve three primary goals:

1. To keep the foliage crowns and branching structure clear from contact by equipment, materials and activities;
2. To preserve roots and soil conditions in an intact and non-compacted state; and,
3. To identify the Critical Root Zone (CRZ) in which no soil disturbance is permitted and activities are restricted, unless otherwise approved.
Illustration 3-3: Examples of tree protection fencing surrounding the Critical Root Zone
Exceptions to fencing along the Critical Root Zone:
1. Where aeration paving is to be installed, erect the fence at the outer limits of the aeration area.

2. Where trees are close to proposed buildings, erect the fence no closer than eight (8) feet to the building.

3. Where there are severe space constraints due to tract size, or other special requirements, contact the City Urban Forester.

**Size and type of fence:**

**Chain Link:**

Chain link fences around protected trees shall be a minimum of five (5) feet high. Fences are to be mounted on two-inch (2") diameter galvanized iron posts, driven into the ground to a depth of at least 1 foot at no more than ten-foot (10’) spacing. This detail shall appear on grading, demolition and improvement plans.

**Plastic:**

Plastic fence will consist of four-foot (4’) high plastic mesh fence supported by six-foot (6’) high iron T-bar posts driven two feet (2’) into ground on no more than ten-foot (10’) on center. Fence is attached to posts with sixteen (16) gauge wire ties spaced on twenty four-inch (24") on center.

**Area to be fenced**

1. **Type I Tree Protection**

Tree fences shall enclose the entire area under the dripline or CRZ, whichever is larger, of the tree(s) to be saved throughout the life of the project, or until final improvement work within the area is required, typically near the end of the project.

**Parking Areas:** If the fencing must be located on paving or sidewalk that will not be demolished, the posts may be supported by an appropriate grade level concrete base.

2. **Type II Tree Protection**

When trees that are situated within a narrow planting strip, only the planting strip shall be enclosed with the required chain link or wood protective fencing in order to keep the sidewalk and street open for public use. When trees are situated near buildings, partial fencing may be necessary.
3. Type III Tree Protection

Trees situated in a small tree well or sidewalk planter pit, or when construction will come within five (5) feet of a trunk, the trunk shall be protected with strapped-on planking to a height of eight (8) feet or to the limits of lower branches. During installation of the wood slats, caution shall be used to avoid damaging any bark or branches. Major scaffold limbs may also need protection as directed by the City Urban Forester.

Illustration 3-4: Example of trunk protection – done when CRZ is less than an 8 foot diameter, upon approval by the Urban Forester.
Duration

Tree fencing shall be erected before demolition, grading, or construction begins and remain in place until the certificate of occupancy has been granted. Removal of the fence during construction must be approved by the City Urban Forester. **Fence removal without the approval of the Urban Forester will result in a stop work order.**

‘Warning’ sign

A warning sign shall be posted on each section of fence or every one hundred (100’) feet of fence and state in both English and Spanish the following: ‘TREE PROTECTION ZONE – NO ACCESS BY ORDER OF THE CITY OF DENTON’S URBAN FORESTER’. Durable signs are recommended with a minimum size of 8”x11”.

3.4. TREE PRUNING, TREE SURGERY, AND REMOVAL PRIOR TO CONSTRUCTION

3.4.1. Pruning

Prior to construction, various trees may require that branches be pruned clear from structures, activities, building encroachment or may need to be strengthened by means of mechanical support or surgery per approval of the City Urban Forester. The most compelling reason to prune is to develop a strong, safe framework and tree structure. Cosmetic pruning is left to the discretion of the owner. Consult a qualified professional for best practices if cosmetic pruning is desired.

Heavy pruning just after the spring growth flush should be avoided. This is when trees have just expanded a great deal of energy to produce foliage and early shoot growth. Removal of a large percentage of foliage at this time can stress the tree.

1. **All trees except oak (Recommended):**

   Most routine pruning to remove weak, diseased, or dead limbs can be accomplished at any time during the year with little effect on the tree. As a rule, growth is maximized and wound closure is fastest if pruning takes place between November and March.

2. **Pruning limitations:**

   a. **Minimum Pruning** – If the project urban forester or landscape architect recommends that trees be pruned, and the type of pruning is left unspecified, the standard pruning shall consist of ‘crown cleaning’ as described below. Trees shall be pruned to reduce hazards and develop a strong, safe framework.
b. **Maximum Pruning** – Maximum pruning should only occur in the rarest situation and be approved by the City Urban Forester. No more than one fourth (25%) of the functioning leaf and stem area may be removed within one calendar year of any protected tree. It must be recognized that trees are individual in form and structure, and that pruning needs may not always fit strict rules. A qualified professional shall assume all responsibility for special practices that vary from the standards outlined in this manual.

3. **Tree Workers** – Pruning shall not be attempted by construction or contractor personnel, but shall be performed by a qualified professional.

4. **Types of Pruning** – *(See Illustration 2-5)*

   a. **Cleaning:** The removal of dead, dying, diseased, crowded, weakly attached, and low-vigor branches from the crown of a tree.

   b. **Thinning:** The removal of selective branches to increase light penetration and air movement through the crown. Thinning opens the foliage of a tree, reduces weight on heavy limbs, and helps retain the tree’s natural shape.

   c. **Raising:** Removes the lower branches from a tree in order to provide clearance for building, vehicles, pedestrians, and vistas.

   d. **Reduction:** Reducing the height or spread of a tree is best accomplished by pruning back the leaders and branch terminals to lateral branches that are large enough to assume the terminal roles (at least 1/3 the diameter of the cut stem). Compared to topping, this helps maintain the form and structural integrity of the tree.
5. **Making Proper Pruning Cuts**

- Tree topping is prohibited and may result in tree replacement.
- Stub cuts are prohibited.
- Cuts will be made just beyond the outer edge of the collar of live wood. See illustration 3-6 for an example.
- To reduce potential of oak wilt infestation, all pruning cuts on oak trees during the months of April, May or June shall be covered with a thin coat of water-based black paint.
- If a large limb is to be removed, its weight should first be reduced. This is done by making an undercut about 12-18 inches from the limb’s point of attachment. A second cut is made from the top, directly above or a few inches further out on the limb. This removes the limb leaving the 12-18 inch stub. The stub is removed by cutting back to the branch collar. This technique reduces the possibility of tearing the bark.

**Illustration 3-5: Types of crown pruning**
3.4.2. Tree Surgery

If it is necessary to promote health and prolong useful life or the structural characteristics, trees shall be provided the appropriate treatments (e.g. cavity screening, bark tracing, wound treat, cables, rods or pole supports).

3.4.3. Tree Removal Adjacent to Protected Trees

When trees are removed and adjacent trees must be protected (as shown on the approved site plans), then the following tree removal practices apply:

a. **Tree Removal** – Removal of trees that extend into the branches or roots of protected trees shall not be attempted by demolition or construction personnel, grading or other heavy equipment. A qualified professional shall remove the tree carefully in a manner that causes no damage above or below ground to trees that remain.

b. **Stump Removal** – Before performing stump extraction, the developer shall first consider whether or not roots may be entangled with trees that are to remain. If so, these stumps shall have their roots severed before extracting the stump. Removal shall include the grinding of stump and roots to a minimum depth of 12-inches.
3.5. ACTIVITIES DURING CONSTRUCTION & DEMOLITION NEAR TREES

Any soil disturbance within the CRZ is prohibited unless approved by the City Urban Forester. If soil disturbance has been specifically conditioned for project approval, then the following mitigation is required:

3.5.1. Soil compaction

If compaction of the soil occurs, it shall be mitigated as outlined in Section 3.5.5.

3.5.2. Grading limitations within the Critical Root Zone

- Grade changes within the CRZ are not normally permitted.
- If grading within the CRZ is approved, grading shall be done by hand or with small equipment to minimize root damage.
- Grade changes outside the CRZ shall not significantly alter drainage to the tree.
- Grade changes under specifically approved circumstances shall not allow more than three (3) inches of fill soil added or allow more than three (3) inches of existing soil to be removed from natural grade unless mitigated.
- Grade fills over three (3) inches or impervious overlay shall incorporate an approved permanent aeration system, or other approved mitigation.
- Grade cuts exceeding three (3) inches shall incorporate retaining walls or an appropriate transition equivalent.
Illustration 3-7: Options in tree preservation due to grade change

- **Permanent Protective Wall at Cut**
  - Mortared Rock Wall @ 1:1
  - Fill
  - Original Ground

- **Open Tree Well at Fill**
  - Mortared Rock Wall @ 1:1
  - Fill
  - Original Ground

- **Tree Well with Raised Grade**
  - Drain Tiles
  - Vertical Tiles
  - Well
  - Loose Stone
  - Original Ground
Illustration 3-8: Changing grade around tree trunk by grading or fill. Trees which have too high or a grade during or after construction will lack the root flare.

Illustration 3-9: Using retaining walls when natural grade must be raised or lowered.
3.5.3. **Trenching, excavation and equipment use**

Normally, trenching is allowed outside of the CRZ. Trenching, excavation or boring activity within the CRZ is restricted to the following activities, conditions and requirements if approved by the City Urban Forester. Mitigating measures shall include prior notification to and direct supervision by the qualified professional.

   **a. Notification.** Contractor shall notify the City Urban Forester a minimum of 24 hours in advance of any activity in the CRZ.

   **b. Root Severance.** Roots that are encountered shall be pruned flush with the soil. Backfill root areas with good quality top soil within the same day. If exposed root areas are not backfilled within the same day, cover them with organic material in a manner which reduces soil temperatures and minimizes water loss due to evaporation.

   **c. Excavation.** Any approved excavation, demolition or extraction of material shall be performed with equipment sitting outside the CRZ. Methods permitted are by hand digging, hydraulic air excavation technology. If excavation or trenching for drainage, utilities, irrigation lines, etc., it is the duty of the contractor to tunnel under any roots 1-inches in diameter and greater.

   Prior to excavation for foundation/footings/walls, grading or trenching within the CRZ, roots shall first be severed cleanly one (1) foot outside the CRZ and to the depth of the future excavation. The trench must then be hand dug and roots pruned with a saw, narrow trencher with sharp blades or other approved root pruning equipment.

   **d. Heavy Equipment.** Use of backhoes, steel tread tractors or any heavy vehicles within the CRZ, plans shall specify a design or special foundation, footing, walls, concrete slab or pavement designs subject to the City Urban Forester approval. Discontinuous foundations such as concrete pier and structural grade beam must maintain natural grade (not to exceed a 3-inch cut), to minimize root loss and allow the tree to use the existing soil. Basement excavations shall be designed outside the CRZ of all protected trees and shall not be harmful to other mature or neighboring property trees.
Illustration 3-10: Trenching and boring options illustrated.

3.5.4. Tunneling and directional drilling

If tunneling or pipe installation has been approved within the CRZ, the trench shall be either cut by hand, air-spade, hydraulic vac-on excavation, or by mechanically boring the tunnel under the roots with a horizontal directional drill and hydraulic or pneumatic air excavation technology. In all cases, install the utility pipe immediately, backfill with soil and soak with water within the same day. Installation of private utility improvements shall be tunnel bored beneath the tree and roots per Trenching Tunneling and Distance Table in Illustration 3-11. Emergency utility repairs shall be exempt from the above restriction zones within the CRZ. The City Urban Forester shall be contacted after any such repairs that may result in significant tree damage or removal.
3.5.5. Construction impact mitigation

A mitigation program is required if the approved development will cause drought stress, dust accumulation, or soil compaction to trees that are to be saved. To help reduce impact injury, one or more of the following mitigation measures shall be implemented and supervised by the project arborist or landscape architect as follows:

1. **Irrigation program** – Irrigate or water weekly or as scheduled by the City Urban Forester with 10-gallons of water per diameter inch within the CRZ. Duration shall be until project completion or when seasonal rainfall begins.

2. **Dust control program** – During periods of extended drought, wind or grading, spray wash trunk, limbs and foliage to remove accumulated construction dust.

3. **Soil compaction damage** – Compaction of the soil is the largest killer of trees on construction sites due to suffocation of roots and ensuing decline of tree health. If compaction occurs to the upper 12-inches of soil within the CRZ by any means, then one or more of the following mitigation measures shall be implemented.
a. **Type I Mitigation.** When an approved paving, hardscape, or other compromising material encroaches within the CRZ, an aeration system shall be designed by the project urban forester and landscape architect and used within this area (subject to approval by the City Urban Forester).

b. **Type II Mitigation.** When inadvertent compaction of the soil has occurred within the CRZ, the soil shall be loosened by one or more of the following methods to promote favorable root conditions: vertical mulching, soil fracturing, core-venting, radial trenching or other method approved by the City Urban Forester.

**3.6. DAMAGE TO TREES**

**3.6.1. Reporting**

Any damage or injury to trees shall be reported the same day to the City Urban Forester so that mitigation can take place. All injury to branches, trunk or roots over 1-inch in diameter shall be reported. In the event of injury, the following mitigation and damage control measures shall apply:

1. **Root injury:** If trenches are cut and tree roots 1-inch or larger are damaged they must be cleanly cut back to a sound wood lateral root. The end of the root shall be sawed off with a clean cut. All exposed root areas within the CRZ shall be backfilled or covered the same day. Exposed roots may be kept from drying out by temporarily covering the roots and draping layered burlap or carpeting over the upper 2-feet of trench walls.

2. **Bark or trunk wounding:** Current bark tracing and treatment methods shall be performed by a qualified professional within 24 hours.

3. **Scaffold branch or leaf canopy injury:** Remove broken or torn branches back to an appropriate branch capable of resuming terminal growth within five days. If leaves are heat scorched from equipment exhaust pipes, consult a qualified professional the same day.

**3.6.2. Penalty for damage to protected trees**

In the event that protected trees or their roots have been damaged, replacement may be required if the City Urban Forester deems that the trees need to be replaced. Damaged trees will be replaced according to subsection 3 of the Tree Code.
3.7. PAVEMENT AND HARDSCAPE CONFLICTS WITH TREE ROOTS

Conflicts may occur when tree roots grow adjacent to paving, foundations, sidewalks or curbs (hardscape). Improper extraction of these elements can cause severe injury to the roots and instability or even death of the trees. The following alternatives must first be considered before root pruning within the CRZ of a protected tree.

3.7.1. Removal and replacement of pavement or sidewalk

1. Removal of existing pavement over tree roots shall include the following precautions: Break hardscape into manageable pieces with a jackhammer or pick and hand load the pieces onto a loader. The loader must remain on undisturbed pavement or off exposed roots. Do not remove base rock that has been exploited by established absorbing roots. Apply untreated wood chips over the exposed area within one hour, then wet the chips and base rock and keep moist until overlay surface is applied.

2. Replacement of pavement or sidewalk: An alternative to the severance of roots greater than 1” – inch in diameter should be considered before cutting roots. If an alternative is not feasible, remove the sidewalk and grind roots only as approved by the City Urban Forester. Use wire mesh reinforcement if within 10-feet of the trunk of a protected tree.

3.7.2. Alternative methods to prevent root cutting (Recommended)

The following remedies should be considered before cutting tree roots that may result in tree instability or decline:

1. Grinding a raised sidewalk edge
2. Ramping the walking surface over the roots or lifted slab with pliable paving.
3. Routing the sidewalk around the tree roots.
4. Inflexible paving or rubberized sections.
5. On private property, new sidewalk or driveway design should offer alternatives to conventional pavement and sidewalk materials. Substitute permeable materials for typical asphalt or concrete overlay, sub-base or footings to consider are: permeable paving materials, interlocking pavers, flexible paving, and wooden walkways, porches elevated on posts and brick or flagstone walkways on sand foundations.

3.7.3. Avoiding conflict (Recommended)

Conflicts and associated costs can be avoided or reduced by the following planting practices:

- Plant deep rooted trees that are proven to be non-invasive.
- Over soil that shrinks and swells, install a sidewalk with higher strength that has wire mesh and/or expansion slip joint dowel reinforcement.
- Follow soil loosening planting techniques to promote deep rooting.
- Install root barrier only along the hardscape area of the tree (but allow roots to use open lawn or planter strip areas).

3.7.4. Alternative base course materials (Recommended)
When designing hardscape areas near trees, the project architect or engineer should consider the use of recommended base course material such as an engineered structural soil mix. Structural soil mix will allow a long term cost effective tree and infrastructure compatibility that is particularly suited for the following types of development project: repair or replacement of sidewalk greater than 40-feet in length; subdivisions with new street tree plantings; planting areas that are designed over structures or parking garages; confined parking lot median and islands or other specialized conditions as warranted.
SECTION 4: TREE REMOVAL, REPLACEMENT, PLANTING, AND MAINTENANCE STANDARDS

4.1. INTRODUCTION

A protected tree may not be removed without City review and approval, except in certain emergencies. The purpose of City review is to verify that the removal is allowed under the Ordinance, and to prevent unnecessary tree removal. This section discusses conditions for tree removal, replacement or protected trees, planting and pruning of replacement trees, and maintenance.

4.2. TREE REMOVAL

4.2.1. Allowable removal

Tree removal is approved as part of the subdivision and site plan process, or in the case of individual trees, through the tree removal permit process. A tree removal permit must be granted, or a site or subdivision plan with a tree survey and replacement plan approved, before removing a protected tree regardless of the condition of the tree.

4.2.2. Protected Tree Removal Permit Application

Tree removal applications are available at the City of Denton Planning and Development Department.

4.3. TREE REPLACEMENT PLAN

It is important to note that tree replacements during the site plan process will be addressed in both the Tree Preservation Ordinance and the Landscape Ordinance. Whichever ordinance requires the greatest number of tree replacement inches will be followed in terms of the number of inches to be replaced. The tree requirements of both ordinances will not be added up. Refer to graph 35.13. in the Ordinance for the required Tree Canopy Percentage based on zoning district.

In selecting trees to be replaced, the types of trees removed will be replaced with the same or similar species. Each replacement tree shall be a minimum caliper size of two inches measured at six inches above natural grade and a height of five feet at the time of planting. Illustration 4-1 shows the type of information required on a tree replacement plan.

The Tree Replacement Plan will include four elements: (1) a table including the common or Latin name; tree size in caliper inches, and height; tree symbols; quantity; and if the tree is considered large, medium, or small; (2) a tree planting plan (may be combined with the Landscape Plan); (3) proper tree planting details including planting hole, tree planting, staking, and mulching; and, (4) notes on proper tree planting as...
described in section 4.7 of this Manual. Illustration 4-1 shows the type of information required on a tree replacement plan.

**Illustration 4-1: Tree replacement plan**

<table>
<thead>
<tr>
<th>Symbol</th>
<th># of Trees</th>
<th>Species</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>○</td>
<td>1</td>
<td>Pecan <em>Caraya illinoiensis</em></td>
<td>2” Caliper</td>
</tr>
<tr>
<td>◆</td>
<td>1</td>
<td>Live Oak <em>Quercus virginiana</em></td>
<td>2” Caliper</td>
</tr>
</tbody>
</table>

**EXAMPLE**
- Required Replacement: 4 inches
- Total provided replacement:
- 2 trees (2” caliper) = 4 inches
- Designate replacements trees with (R)
4.4. TREE PLANTING REQUIREMENTS

4.4.1. Species

The replacement trees shall be the same or similar species unless the Urban Forester determines that another species would be more suitable for the location or if there is a need to promote diversity of species. Factors to be considered include the long term health of the tree in the location and its compatibility with adjacent uses as well as design considerations. No more than 30 percent (30%) of the total number of trees planted may be of one species. Exceptions must be approved by the City Urban Forester.

The above restrictions are designed to avoid creating monocultures, or areas of plantings made up of only one species of trees. Monocultures are undesirable because if a certain species is prone to a particular disease or is more susceptible to storm damage or temperature extremes, then it is likely the entire stand could die or be destroyed by a single disease or weather event. Creating planting areas of several species creates a more diverse, and therefore more resistant, urban forest.

With the exceptions noted above, other species shall be chosen from the City of Denton’s approved tree list provided in Appendix B of this Manual.

4.4.2. Planting distances/spacing requirements:

a. Minimum distance between newly planted trees
   - Large sized trees: 40 ft;
   - Medium sized trees: 30 ft; and,
   - Small sized trees: 20 ft
b. Minimum distance from any water meter boxes, and fire hydrant: 10 feet
c. Planting strips should be a minimum of 10 ft wide.
d. Minimum distance from buildings and similar structures:
   - Large size tree: 30 ft;
   - Medium size tree: 20 ft; and,
   - Small size tree: 10 ft
e. Minimum distance from stop or yield signs: 20 feet or by Code, whichever is greater.
f. Distance from directional traffic sign: 10 feet or by Code, whichever is greater.
g. Distance from street lights: 25 feet, or by Code, whichever is greater.
Tree selection shall be taken into consideration, ordinance requirements for height clearances as defined in the Code. As they grow, trees will need to be pruned to provide pedestrian clearance of at least 8 feet over sidewalks, and vehicular clearance of 13.6 feet over streets.

4.5. TREE STOCK AND MATERIALS

4.5.1. Quality
It is the contractor's responsibility to supply tree stock that meets ANSI 760.1-1996 and any other standards addressed in this Manual.

- All trees installed within the City of Denton shall conform to the American Standard for Nursery Stock.
- Trees shall be sound, healthy, vigorous, and free of plant disease and insect pests or their damage.
- Container grown trees shall be grown for at least 8-months in containers in which delivered and shall not be root bound or have girdling roots. The root ball will be moist and the roots will be contained within the container.
- Trees shall not have been topped or headed.
- The tree will have healthy leaves if it is the time of year for trees to have leaves.
- There will be no weeds growing out of the container.
- If the tree is multi-stemmed, the stems will not be squeezing against each other or the trunk of the tree.
- Trees with broken tops, branches, injured trunks, poor structure, low branching, poor vigor, and apparent poor quality shall be rejected and the City Urban Forester has the right to reject them if they do not meet the quality standards.

4.5.2. Container grown/ball and burlapped trees
Trees can be effectively planted that are container grown or balled and burlapped (B & B). The advantage to planting container grown trees is that they can be planted year round, provided there is good follow up care. B & B trees require planting during the dormant season (November to April).

Recommendations: Regardless, due to the advantages of container trees, it is recommended that container grown trees be used during all times of the year.

4.5.3. Miscellaneous materials
The following materials shall be used unless otherwise specified:

- **Tree stakes.** Metal T-posts shall be used.
• **Tree Ties.** Tree ties may include one of two types. The first is a 10 gauge wire, cushioned with a rubber hose around the trunk. The wire should not touch the trunk. The second is a plastic chain lock, also called twist brace.

• **Mulch.** All newly planted trees should be mulched with 2-4 inches of organic mulch. Mulch should never be placed against the trunk of a tree. There should be a space of 1-2 inches between the trunk and mulch. Mulch should cover the entire tree planting hole. No volcano mulching is allowed.

• **Tee guards.** For trees in turf areas requiring regular mowing and/or weed eating, the tree trunk shall be protected with TreeGuard or equivalent.

• **Tree gates.** Where sidewalk width is less than 8-feet and new trees will be installed in a tree well, metal tree grates may be used and approved by the City Urban Forester. Minimum size grates shall be 4” x 4” unless specified otherwise. All tree grates shall be mounted in frames; frames inset into a concrete foundation within the sidewalk or surface material, and shall be flush with the surrounding surface.

### 4.6. PLANTING SITE PREPARATION

#### 4.6.1. Soil preparation and conditioning

All debris, wood chips, pavement, concrete and rocks over 2-inches in diameter shall be removed from the planting pit to a minimum of 24-inch depth, unless specified otherwise.

#### 4.6.2. Planter pit preparation

1. **Trees in a confined planter pit or sidewalk area:** The planting hole shall be excavated to a minimum of 30-inches deep. The excavated area should be multiplied by the width of the exposed area. Scarify the sides of the pit and soil beneath the rootball shall be compacted to prevent settling..

2. Trees in all other areas
   a. Mark out a planting area 2 to 5 times wider than the rootball diameter (the wider the better). Loosen this area to about an 8” depth. This will enable your tree to extend a dense mat of tiny roots well out into the soil in the first one to ten weeks in the ground.
   b. Remove all soil from on top of the root flare before planting so the root flare is visible. The top of the root ball should be several inches above surrounding soil or approximately 10% of the root ball is above the landscape grade. This prevents roots from being planted to deep (root flare remains above ground) and aids in establishment, even if the root ball should settle. The handle of a shovel can be used to gauge appropriate planting height.
4.6.3. Drainage

Adequate drainage must be provided to the surrounding soil for the planting of new trees. If the trees are to be planted in impermeable or infertile soil and water infiltration rates are less than two (2) inches an hour, then one of the following drainage systems or other approved measures must be implemented:

- French drain, a minimum of three feet in depth
- Drain tiles or lines beneath the trees
- Auger six drain holes at the bottom perimeter of the planting pit, at a minimum of four (4) inches in diameter, twenty-four (24) inches deep and filled with medium sand or fine gravel

4.6.4. Aeration tubes for trees

Trees planted in sidewalk planter pits, planting strip, parking islands, or medians shall use 4-inch diameter perforated aeration piping (rigid or flexible), circling the bottom of the planter connected to a ‘T’ fitting to two riser tubes with grated caps with filter fabric. This detail shall be shown on the approved landscape plans.

4.7. PLANTING THE TREE

After the hole has been prepared as described in Section 4.6 above, the tree is ready to be planted.

4.7.1. Container grown tree

Pull the container away from the root ball. Do not pull the tree out by its trunk. Container grown trees often have circling or girdling roots running along the edge of the rootball. If they exist in this area, cut them and spread them apart. Place the root ball in the center of the hole and adjust the tree so it is straight and at the proper level. Make any adjustments prior to filling the hole with dirt.

4.7.2. Ball and burlapped tree

Rest the root ball in the center of the hole, and reshape the hole so the tree will be straight and at the proper level. After adjusting the tree, pull the burlap and any other material away from the sides and top of the root ball. Do not remove the burlap from the bottom. If you adjust or lift the tree after the burlap has been removed you run the risk of damaging the root system.
4.7.3. Backfill soil, amended soil

Backfill with the original soil unless the original soil has been removed or the soil is poor. If soil must be amended, consult with a qualified professional in identifying the most appropriate soil mix.

4.7.4. Filling the hole

Fill until the hole is half full. Flood the hole with a slow hose or tamp gently with your foot to firm the soil. Repeat until the hole is full. Do not press too firmly-only firm enough to hold the tree upright. Backfilling with soil and water or gently tamping will remove large air pockets.

4.7.5. Constructing a berm

A berm should be construction from soil or mulch to hold water ONLY IF the tree will be watered with a hose or other high volume device. If irrigation will be from a low volume system or if little no irrigation will be applied, do not bother with the berm. No more water will reach the root ball under these circumstances if a berm is present. The
potential downsides of the berm include cutting off rainwater and oxygen when personnel later push the berm over the rootball.

4.7.6. **Mulching**

Cover the entire loosened area of soil with 2 to 3 inches of mulch composed of shredded wood or bark in the entire planting area. Mulch will be placed one to two inches away from the trunk of the tree.

4.7.7. **Staking or guying**

Stake trees only if necessary, and remove staking as soon as is possible. Staking or guying is to prevent movement of the lower trunk and root system. Movement of the top is desirable and will strengthen the tree. The stakes will be installed 12-18 inches in undisturbed soil outside of the planting hole. Depending on height and size of the tree, stakes shall be six, eight, or ten feet tall. Trees shall be staked with 3 metal T-posts. Metal stakes will not rub against tree trunks. Tree ties will be located near the lowest main branch on the tree. Check a staked or guyed tree monthly during the growing season and after storms or strong wind. Use wide strips attached loosely around the trunk. Do not stake a tree any longer than necessary. One or two growing seasons is all that is needed. Illustration 3-2 and 3-3 show the proper staking and guying techniques. In Illustration 3-3 A, trees 3-4 inches in diameter are supported by three stakes. Branches should not rub against the stakes. For trees over four (4) inches, guy wires should be used, with a minimum of three guys. Cable or wire is attached to the tree by running wires through a piece of hose or by using lag hooks on large trees. The guys should be secured to arrowhead-shaped land anchors (C), wooden stakes (D), or deadmen buried in the soil (E).
4.8. PRUNING NEWLY PLANTED TREES

Young trees are pruned to allow for proper growth through the years. If the tree is of high quality, it should need little pruning. This is no longer a common practice to automatically trim a certain percentage of limbs from a newly planted tree. The tree needs as much foliage as can be available to assure rapid growth and solid leaf structure. This includes refraining from "limbing up" and topping.

4.8.1. Prohibitions

- Topping trees – tree replacement may be required if this is done
- Limbing up trees (the practice of cutting the lowest branches to a desired height)

4.8.2. Pruning guidelines (Recommended)

- **Scaffolding/Permanent branches.** Identify the scaffolding/permanent branches. The lowest permanent branch should have a diameter of one-half or less of the trunk diameter where the branch attaches to the trunk. The vertical spacing of
permanent scaffold branches should equal a distance equal to 3% of the tree’s eventual height. Thus, a tree that will be 50 feet tall should have permanent scaffold branches spaced about 18 inches apart along the trunk. Avoid allowing two scaffold branches to arise one above the other on the same side of the tree. Maintain radial balance with branches growing outward in each direction.

4.8.3. Limb removal (Recommended)

The following may be removed.

a. **Torn, damaged, dead branches**: Remove the branch just outside of the branch collar. See Illustration 3-6.

b. Double Leaders: Maintain a dominant trunk for at least six to eight feet without a major fork. When the trunk divides into two or more relatively equal stems, favor one strong stem and remove the others. Cut one stem back to a lateral branch.

c. **Rubbing Branches**: Eliminate branches that are rubbing or will soon rub against another branch.

d. **Crowding**: Give each branch room to grow with minimal competition for sunlight. When possible, have major lateral branches evenly spaced eight to ten inches apart along the trunk. If the tree by its nature would lose too much foliage in the process of eliminating crowding, maintain at least half the foliage on branches in the lower 2/3 of the tree.

e. **Narrow Branch Angles/Included Bark**: Remove one branch if the angle is 40% or narrower or if it appears that the bark from the branch is becoming pinched between the branch and the trunk.

f. **Sprouts and Suckers**: Remove sprouts and suckers.

g. **Temporary Branches**: Leave temporary branches that are not competing with permanent, scaffolding branches.

4.9. TRANSPLANTING TREES

Transplanting large trees is difficult, expensive, and requires expertise and equipment. Preapproval from the City Urban Forester and periodic inspections will be required for
the transplanting of a protected tree. Such trees will be under warrantee as if it is a new tree, and will need to follow replacement requirements should the tree die or severely decline. When transplanting protected trees from existing landscapes it is important to select healthy, vigorous trees, dig an appropriate size root ball, select a site that is consistent with the tree’s cultural needs, provide a saucer shaped planting hole approximately three times the root ball width, and then protect the root ball, trunk, and crown during lifting, transportation, and storage. The most important and hardest part in tree transplanting is creating and implementing a multi-year aftercare program, providing adequate moisture to the root ball.

When a tree is dug for transplanting, as much as 90% of its root system is left behind, severed in the process of digging for transplanting. The tree has a hard time relying on 5-10 percent of its root system doing the work of the 90 percent that was lost. Until it is well established, the root system will have difficulty supplying enough water to the leaves. This stress impacts vigor of the tree and also exposes the tree to the risk of being vulnerable to pests and diseases, as well as less able to adapt to or withstand drought, extreme cold, and drying winds.

Considering the size of the protected trees being transplanted, a professional arborist is required to assist in the process. The following issues should assist in providing a successful transplanting.

- **Site** – Before transplanting make sure the tree is a good match for the new site.
- **Timing** – Recommended timing for transplanting trees is during the dormant season, when the tree is not trying to support its leafy crown.
- **Health of tree** – Select a tree that is in good health and shape and has no major defects in its trunk branch structure.
- **Success rate** – Different species have different success rates in transplanting. Consult with your urban forester on the success rate of the tree you want to transplant.
- **Tree size** – Most commonly transplanted trees range in size from 4-12 diameter inches.

**Transplanting process**

**Digging up the tree** – Dig up a wide root ball with appropriate depth and wrap burlap material with wire and twine to save as much of root ball as you can intact. A rule of thumb for trees over six inches in diameter is that a root ball = 10 inches in diameter for every tree trunk diameter measured at 4 ½ feet above the ground (See Section 2 of this manual for instruction for measuring the tree diameter in unusual situations). In other words, a 10 inch tree should have a 100 inch diameter. Likewise, the ball depth should be about 60% of the ball diameter. The same 10 inch tree should have a 60 inch depth.
While smaller trees can be transplanted using a tree spade or other specialty equipment/techniques, larger trees will require mechanical digging equipment and appropriate hoists and heavy equipment for moving the tree.

*Transporting the tree* – During transportation the tree crown should always be covered with tarp to protect the tree from drying out and windburn.

*After transplanting* – Keep the root ball moist at all time.
- Anticipate watering three times a week, or every day in hot weather.
- Continued watering will be required for several years.

**Do not prune newly transplanted trees to reduce crown and compensate for root loss. That will only further weaken the tree.**

Mulch the transplanted tree with 2-4 inches of organic mulch to cover root ball. The process of regenerating a normal root system will take several years, especially for large trees. Immediately after transplanting, the tree will be susceptible to extreme stress. Moisture is a critical factor in new root growth. Compacted soils and soil temperature also impact the growth of roots. (A bridged from “Transplanting Trees”, by Patrice Peitier and Gary W. Watson. *Arbor Age*, January-March 2000.)

### 4.10. MAINTENANCE

All newly planted trees shall be maintained by the owner. Maintenance practices shall consist of all regular and normal maintenance of trees, including but not limited to irrigation, pruning, and disease control. Plant material that exhibits severe levels of insect or pest infestation, disease and/or damage, shall be approximately treated, and all dead trees shall be removed and replaced with living trees where required according to the city approved Tree Replacement Plan for the site.

Failure to replace dead or diseased trees within thirty (30) days of written notification by the City shall constitute a violation of the Ordinance.
APPENDIX A: TREE LIST
<table>
<thead>
<tr>
<th>Mature Size Canopy</th>
<th>Common Name</th>
<th>Botanical Name</th>
<th>Native</th>
<th>Drought Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CANOPY TREES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large (1,256 sq. ft.)</td>
<td>Texas Ash</td>
<td><em>Fraxinus texensis</em></td>
<td>Yes</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td>Chinese Pistache</td>
<td><em>Pistacia chinensis</em></td>
<td>No</td>
<td>Yes</td>
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<tr>
<td></td>
<td>Bur Oak</td>
<td><em>Quercus macrocarpa</em></td>
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<td>Yes</td>
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<tr>
<td></td>
<td>Chinkapin Oak</td>
<td><em>Quercus muhlenbergii</em></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Shumard Oak</td>
<td><em>Quercus shumardii</em></td>
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<td>Yes</td>
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<tr>
<td></td>
<td>Durand Oak</td>
<td><em>Quercus sinuate</em></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Post Oak</td>
<td><em>Quercus stellata</em></td>
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<td>Yes</td>
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<td></td>
<td>Live Oak</td>
<td><em>Quercus virginiana</em></td>
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<td>Yes</td>
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<tr>
<td></td>
<td>Bald Cypress</td>
<td><em>Taxodium distichum</em></td>
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<tr>
<td></td>
<td>Lacebark Elm</td>
<td><em>U. parvifolia sempervirens</em></td>
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<tr>
<td>Medium (707 sq. ft.)</td>
<td>Caddo Maple</td>
<td><em>Acer barbatum</em></td>
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<tr>
<td></td>
<td>Bigtooth Maple</td>
<td><em>Acer grandidentatum</em></td>
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<tr>
<td></td>
<td>Red Maple</td>
<td><em>Acer rubrum</em></td>
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<td>Trident Maple</td>
<td><em>Acer buergerianum</em></td>
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<tr>
<td></td>
<td>Chitalpa</td>
<td><em>Chilopsis x catalpa</em></td>
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<td>Yes</td>
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<tr>
<td></td>
<td>Ginkgo</td>
<td><em>Gingko biloba</em></td>
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<tr>
<td></td>
<td>Sweetgum</td>
<td><em>Liquidambar styrdciflua</em></td>
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<td>Austrian Pine</td>
<td><em>Pinus nigra</em></td>
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<td></td>
<td>Western Soapberry</td>
<td><em>Sapindus drummonddi</em></td>
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<td>Blackjack Oak</td>
<td><em>Quercus marilandica</em></td>
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<td></td>
<td>Texas Red Oak</td>
<td><em>Quercus texana</em></td>
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<td><strong>ORNAMENTAL TREES</strong></td>
<td>Mexican Redbud</td>
<td><em>Cercis mexicana</em></td>
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<td>Texas Redbud</td>
<td><em>Cercis texensis</em></td>
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<td>Desert Willow</td>
<td><em>Chilopsis linearis</em></td>
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<td></td>
<td>Mountain Cedar</td>
<td><em>Juniperus ashei</em></td>
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<td>Eastern Red Cedar</td>
<td><em>Juniperus virginiana</em></td>
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<tr>
<td></td>
<td>Goldenrain Tree</td>
<td><em>Koelreuteria paniculata</em></td>
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<td>Moderate</td>
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<tr>
<td>Large (314 sq. ft.)</td>
<td>Afghan Pine</td>
<td><em>Pinus eldarica</em></td>
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<tr>
<td></td>
<td>Lobolly Pine</td>
<td><em>Pinus Taeda</em></td>
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<tr>
<td></td>
<td>Japanese Black Pine</td>
<td><em>Pinus thunbergiana</em></td>
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<tr>
<td></td>
<td>Japanese Black Pine</td>
<td><em>Pinus thunbergii</em></td>
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<tr>
<td></td>
<td>Mexican Plum</td>
<td><em>Prunus mexicana</em></td>
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<td></td>
<td>Aristocrat Pear</td>
<td><em>Pyrus calleryana</em></td>
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<td>Lacey Oak</td>
<td><em>Quercus glaucoide</em></td>
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<td>Eve’s Necklace</td>
<td><em>Sophora affinis</em></td>
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<td>Rusty Blackhaw</td>
<td><em>Viburnum rufidulum</em></td>
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<tr>
<td>Medium</td>
<td>Purple Plum</td>
<td>Prunus cerasifera</td>
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<tr>
<td>(117 sq. ft.)</td>
<td>Escarpment Live Oak</td>
<td>Quercus fusiformis</td>
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<td>Prairie Flameleaf Sumac</td>
<td>Rhus copallina</td>
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<td>Birds of Paradise</td>
<td>Caesalpinia gilliesii</td>
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<td></td>
<td>Washington Hawthorn</td>
<td>Crataegus phaenopyrum</td>
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<td>Texas Persimmon</td>
<td>Diospyros texana</td>
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<td></td>
<td>Possumhaw Holly</td>
<td>Ilex deciduas</td>
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<td>Savannah Holly</td>
<td>Ilex opaca</td>
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<td></td>
<td>Yaupon Holly</td>
<td>Ilex vomitoria</td>
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<td>Yes</td>
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<td></td>
<td>Nellie R. Stevens</td>
<td>Ilex 'NRS'</td>
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<td>Small</td>
<td>Foster Holly</td>
<td>Ilex x attenuata</td>
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<td>(79 sq. ft.)</td>
<td>Foster Holly</td>
<td>Ilex x. attenuata 'Fosteri'</td>
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<td>Nellie R. Stevens Holly</td>
<td>Ilex x. 'Nellie R. Stevens'</td>
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<td>Juniper, Blue Point</td>
<td>Juniperus chinensis 'Blue Point'</td>
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<td>Juniper, Wichita Blue</td>
<td>Juniperus scopulorum 'Wichita'</td>
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<td></td>
<td>Crape myrtle</td>
<td>Lagerstroemia</td>
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<td>Yes</td>
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<td></td>
<td>Little Gem Magnolia</td>
<td>Magnolia grandiflora &quot;Little Gem&quot;</td>
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<td></td>
<td>Saucer magnolia</td>
<td>Magnolia soulangiana</td>
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<td>Wax myrtle</td>
<td>Myrica cerifera</td>
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<td></td>
<td>Pomegranate</td>
<td>Punica granatum</td>
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<td>Vitex</td>
<td>Vitex agnus-castus</td>
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<td>Dwarf Glossy Abelia</td>
<td>Abelia x grandiflora</td>
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<td>Glossy Abelia</td>
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<td>Japanese Aucuba</td>
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<td>Purpleleaf Japanese Barberry</td>
<td>Berberis thunbergii &quot;atropurpurea&quot;</td>
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<td>Berberis thunbergii ‘Crimson’</td>
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<td>Flowering Quince</td>
<td>Chaenomeles japonica</td>
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<td>Euonymus alata 'Compacta'</td>
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<td>Forsythia</td>
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<td>Rose of Sharon (Althea)</td>
<td>Hibiscus syriacus</td>
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<td>Oakleaf Hydrangea</td>
<td>Hydrangea quercifolia</td>
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<td>Hypericum</td>
<td>Hypericum patulum</td>
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<td>Burford Holly</td>
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<td>Dwarf Burford Holly</td>
<td>Ilex cornuta Burfordii 'Pygmy'</td>
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<td>Dwarf Yaupon Holly</td>
<td>Ilex vomitoria 'Nana'</td>
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<td></td>
<td>Italian Jasmine</td>
<td>Jasmine nudiflorum</td>
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<tr>
<td></td>
<td>Dwarf Crepe Myrtle</td>
<td>Lagerstroemia indica</td>
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<td>Plant Type</td>
<td>Scientific Name</td>
<td>Dwarf?</td>
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<tr>
<td>Miniature Crepe Myrtle</td>
<td>Lagerstroemia indica</td>
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<td>Semi-dwarf Crepe Myrtle</td>
<td>Lagerstroemia indica</td>
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<td>Winter/Bush Honeysuckle</td>
<td>Lonicera fragrantissima</td>
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<td>Leatherleaf mahonia</td>
<td>Mahonia bealei</td>
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<td>Standard Nandina</td>
<td>Nandina domestica</td>
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<td>Compact Nandina</td>
<td>Nandina domestica 'Compacta'</td>
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<td>Harbor Dwarf Nandina</td>
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<td>Chinese photinia</td>
<td>Photinia serrulata</td>
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<td>Dwarf Pomegranate</td>
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<td>Indian Hawthorne</td>
<td>Rhapiolepsis indica</td>
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<td>Aromatic Sumac</td>
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<td>Bridal Wreath Spiraea</td>
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<td>Dwarf Spirea (Anthony Waterer, Goldflame, Little Princess)</td>
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<td>Cleyera</td>
<td>Ternstroemia gymnanthera</td>
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**GRASSES**

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<th>Scientific Name</th>
<th>Dwarf?</th>
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<tr>
<td>Feather Reed grass, Karl</td>
<td>Calamagrostis acutiflora 'Karl foerster grass'</td>
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<td>Dwarf Pampas Grass</td>
<td>Cortaderia selloana pumila</td>
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<td>Ravenna Grass</td>
<td>Erianthus ravennae</td>
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<td>Dwarf Maiden Grass</td>
<td>Miscanthus sinensis 'Adagio'</td>
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<td>Maiden Grass</td>
<td>Miscanthus sinensis 'Gracillimus'</td>
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<td>Morning Light Maiden Grass</td>
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<td>Variegated Japanese Silver Grass</td>
<td>Miscanthus sinensis 'Variegatus'</td>
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<td>Zebra Grass</td>
<td>Miscanthus sinensis 'Zebrinus'</td>
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<td>Mondo Grass/Monkey grass</td>
<td>Ophiopogon japonicus</td>
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<td>Hameln’s Fountain Grass</td>
<td>Pennisetum a. 'Hameln'</td>
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<td>Black Fountain Grass</td>
<td>Pennisetum a. 'Moudry'</td>
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<td>YES</td>
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<tr>
<td>Standard Fountain Grass</td>
<td>Pennisetum alopecuroides</td>
<td>No</td>
<td>YES</td>
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**FORBS (WILDFLOWERS)**

<table>
<thead>
<tr>
<th>Forb</th>
<th>Scientific Name</th>
<th>Dwarf?</th>
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<tr>
<td>Yarrow</td>
<td>Achillea spp.</td>
<td>No</td>
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<tr>
<td>Cast Iron Plant</td>
<td>Aspidistra elatior</td>
<td>No</td>
<td>YES</td>
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<tr>
<td>Fern, Japanese Painted</td>
<td>Athyrium nipponicum</td>
<td>No</td>
<td>YES</td>
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<tr>
<td>Butterfly Bush</td>
<td>Buddleia davidii</td>
<td>No</td>
<td>YES</td>
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<tr>
<td>Canna Lily</td>
<td>Canna spp.</td>
<td>No</td>
<td>YES</td>
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<tr>
<td>Hardy Plumbago</td>
<td>Ceratostigma plumbaginoides</td>
<td>No</td>
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<tr>
<td>Hardy Plumbago</td>
<td>Ceratostigma plumbaginoides</td>
<td>No</td>
<td>YES</td>
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<tr>
<td>Coreopsis, Dwarf</td>
<td>Coreopsis grandiflora</td>
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<td>YES</td>
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<tr>
<td>Coreopsis, Threadleaf</td>
<td>Coreopsis verticillata</td>
<td>No</td>
<td>YES</td>
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<tr>
<td>Fern, Holly</td>
<td>Cyrtomium falcatum</td>
<td>No</td>
<td>YES</td>
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<tr>
<td>Clara Curtis Daisy</td>
<td>Dendranthema zawadskii 'Clara</td>
<td>No</td>
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<td>Plant Name</td>
<td>Scientific Name</td>
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<td>Presence</td>
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<tr>
<td>Blanket Flower</td>
<td>Gaillardia x. grandiflora</td>
<td>No</td>
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<tr>
<td>Ground ivy</td>
<td>Glechoma hederacea</td>
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<tr>
<td>Daylily</td>
<td>Hemerocallis spp.</td>
<td>No</td>
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<tr>
<td>Coral Bells</td>
<td>Heuchera spp.</td>
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<td>Hibiscus, Rose Mallow</td>
<td>Hibiscus moscheutos</td>
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<td>Hosta</td>
<td>Hosta spp.</td>
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<td>Candy Tuft</td>
<td>Iberis sempervirens</td>
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<td>Iris, Louisiana</td>
<td>Iris fulva x. giganticaerulea x. foliosa</td>
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<td>Iris, Bearded</td>
<td>Iris xiphioides</td>
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<td>Red Hot Poker</td>
<td>Kniphofia uvaria</td>
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<td>Texas Lantana</td>
<td>Lantana horrida</td>
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<td>Oxyeye Daisy</td>
<td>Leucanthemum vulgare</td>
<td>No</td>
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<td>Liriope or Lily turf</td>
<td>Liriope muscari</td>
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<td>Wood Sorrell</td>
<td>Oxalis spp.</td>
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<td>Candy Lily</td>
<td>Pardancanda norisii</td>
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<td>Penstemon, Husker Red</td>
<td>Penstemon digitalis 'Husker Red'</td>
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<td>Sage, Russian</td>
<td>Perovskia atriplicifolia</td>
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<td>Phlox, Summer</td>
<td>Phlox paniculata</td>
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<td>Thrift</td>
<td>Phlox subulata</td>
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<td>Mexican Oregano</td>
<td>Poliminthia longiflora</td>
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<td>Fern, Tassel</td>
<td>Polystichum polyblepharum</td>
<td>No</td>
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<tr>
<td>Rosemary</td>
<td>Rosmarinus officinalis</td>
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<td>Black Eyed Susan</td>
<td>Rudbeckia fulgida 'Goldstrum'</td>
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<td>Sage, Mealy</td>
<td>Salvia farinacea</td>
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<td>Sage, Mexican Bush</td>
<td>Salvia leucantha</td>
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<td>Sage, Blue Queen</td>
<td>Salvia nemorosa 'Blue Queen'</td>
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<tr>
<td>Sage, Indigo Spires</td>
<td>Salvia x. 'Indigo Spires'</td>
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<td>Santolina</td>
<td>Santolina spp.</td>
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<td>Strawberry Geranium</td>
<td>Saxifraga stolonifera</td>
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<td>Sedum, Gold</td>
<td>Sedum floriferum</td>
<td>'Weihenstephaner Gold'</td>
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<td>Sedum, Brilliant</td>
<td>Sedum spectabile 'Brilliant'</td>
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<td>Sedum, Dragons Blood</td>
<td>Sedum spurium 'Schorbuser Blut'</td>
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<td>Sedum, Tricolor</td>
<td>Sedum spurium 'Tricolor'</td>
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<td>Sedum, Vera Jameson</td>
<td>Sedum telephium 'Vera Jameson'</td>
<td>No</td>
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<tr>
<td>Sedum, Autumn Joy</td>
<td>Sedum x. 'Herbstfreude'</td>
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<td>Sedum, Mohrchen</td>
<td>Sedum x. 'Mohrchen'</td>
<td>No</td>
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<tr>
<td>Sedum, Ruby Glow</td>
<td>Sedum, x. 'Robustium'</td>
<td>No</td>
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<tr>
<td>Purple Heart</td>
<td>Setcreasea pallida</td>
<td>No</td>
<td>Yes</td>
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<td>Goldenrod, Dwarf</td>
<td>Solidago spp.</td>
<td>No</td>
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<tr>
<td>Plant Name</td>
<td>Scientific Name</td>
<td>Approved?</td>
<td></td>
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<tr>
<td>----------------------------</td>
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<tr>
<td>Lambs Ears</td>
<td><em>Stachys byzantina</em></td>
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<tr>
<td>Mexican Mint Marigold</td>
<td><em>Tagetes lucida</em></td>
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<tr>
<td>Germander, Upright</td>
<td><em>Teucrium chamaedrys</em></td>
<td>Yes</td>
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<tr>
<td>Society Garlic</td>
<td><em>Tulbaghia violacea</em></td>
<td>Yes</td>
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<tr>
<td>Verbena</td>
<td><em>Verbena x. hybrida</em></td>
<td>Yes</td>
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<tr>
<td>Speedwell</td>
<td><em>Veronica spp.</em></td>
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<tr>
<td>Violet, Sweet</td>
<td><em>Viola odorata</em></td>
<td>Yes</td>
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<tr>
<td>Rain Lily</td>
<td><em>Zephyranthes spp.</em></td>
<td>Yes</td>
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<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Scientific Name</th>
<th>Approved?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpleleaf Euonymus</td>
<td><em>Euonymus fortunei</em> &quot;Colotara&quot;</td>
<td>No  Yes</td>
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<tr>
<td>N/A</td>
<td>0</td>
<td>1</td>
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<tr>
<td>Boston Ivy</td>
<td><em>Parthenocissus tricuspidata</em></td>
<td>No  Yes</td>
</tr>
<tr>
<td>Asiatic Jasmine</td>
<td><em>Trachelospermum asiaticum</em></td>
<td>No  Yes</td>
</tr>
</tbody>
</table>

These tree list are a guide and not meant to be exclusive. Any other native or well adapted tree may be used with approval from the Landscape Administrator.
APPENDIX B: DEFINITIONS

BUILDING PAD – The actual footprint area of a building and an area not to exceed six feet around the actual foundation necessary for construction and grade transitions.

CALIPER – Caliper (trunk thickness or diameter) of all trees shall be measured at a point on the trunk six inches above natural grade up to four inch caliper. On size four inch caliper and larger, the measurement shall be at a point twelve inches above natural grade.

CRITICALLY ALTER – Uprooting or severing the main trunk of a tree, or any act which causes or may reasonably be expected to cause a tree to die. This includes, but is not limited to damage inflicted upon the root system of a tree by machinery, storage of materials, or the compaction of soil above the root system of a tree; a change in the natural grade above the root system of a tree; an application of herbicidal chemical(s) or the misapplication of beneficial chemical(s); excessive pruning; placement of impervious pavement over the root system of a tree; or trenching or boring within the critical root zone.
**CRITICAL ROOT ZONE (CRZ)** – The area of undisturbed natural soil around a tree defined by a concentric circle with a radius equal to the distance from the trunk to the outermost portion of the Drip Line but not less than a one foot radius for each one inch of DBH.

**DIAMETER AT BREAST HEIGHT (DBH)** – The diameter of a tree trunk, or, in the case of a multi-trunk tree, the total of the diameter of the largest trunk and one half (½) of the diameter of each additional trunk, measured at a height of 4 ½ feet above the ground.

**DRIP LINE** – A vertical line running through the outermost portion of the canopy of a tree and extending to the ground; or, if a tree is damaged or deformed, a circular area with a radius equal to two feet per caliper inch.
HERITAGE TREE – A Protected Tree having an eighteen inch DBH or greater.

LIMITED PURPOSE TREE REMOVAL PERMIT – A type of Tree Removal Permit issued for limited tree removal where full permit processing is deemed excessive by the City Urban Forester.

NATURAL GRADE – The existing grade or elevation of the ground surface that exists in its unaltered state.

PROTECTED TREE – Any tree that is not an Unprotected Tree that meets the following criteria:

1. Six inch trunk diameter or larger measured four and one-half feet above Natural Grade.

2. Six inch total diameter for multi-trunk trees, calculated by summing the largest trunk and half the diameter of all other trunks as measured four and one-half feet above Natural Grade.

PUBLIC PROPERTY – Property in which title is held in the name of a governmental entity, including but not limited to the City, County, State or Federal entity(e.g. the Denton Independent School District and the U.S. Army Corps of Engineers).

QUALIFIED PROFESSIONAL:

1. A person with a minimum of Bachelor of Science Degree in any of the following disciplines:
   a. Forestry
   b. Horticulture
   c. Botany and or Plant/Soil Science.

2. An Arborist or Urban Forester that has been certified by the International Society of Arboriculture.

3. A Texas Certified Nursery Professional or Landscape Architect licensed in the State of Texas.

REPLACEMENT TREE – A tree listed in the Site Design Criteria Manual or as otherwise approved by the Urban Forester with a minimum caliper size of two inches measured at six inches above Natural Grade and is a minimum of five feet in height at the time of planting.

TREE REPLACEMENT PLAN – A plan submitted to the City in accordance with the Tree Protection Standards Manual. The Plan shall provide the method of replacement for the proposed Protected Trees to be removed, and shall indentify
the location, size, and species of all trees proposed as replacements for the Protected Trees being removed. The Plan shall also list all fees that are proposed in lieu of replacement trees.

**TREE PROTECTION STANDARDS MANUAL** – Standards and specifications for sound arboricultural practices, techniques and procedures which shall serve as guidelines for trees regulated by this Ordinance, including but not limited to tree selection, pruning, alteration, treatment, protection, and removal.

**TREE SURVEY** – A survey of all protected trees indicating size, type and location of trees, completed by a professional land surveyor, civil engineer, landscape architect, or arborist. Detailed requirements regarding the content of the Tree Survey are listed in the Site Design Criteria Manual.

**UNPROTECTED TREE** – Hackberry, Mesquite, Bois d' Arc, Cottonwood and Honey Locust trees are considered to be Unprotected Trees. Unprotected Trees do not require preservation, protection measures or replacement. Unprotected Trees shall not be used as Replacement Trees to comply with mitigation requirements.

**CITY URBAN FORESTER** – The City of Denton’s administrator of the Tree Preservation and Mitigation Ordinance, or that person’s designated representative.
APPENDIX C: BIBLIOGRAPHY

Sources Cited


Additional Resources


