

# City of Durham Street Tree Planting Procedure






## Intro

This document explains how the Urban Forestry team decides where to plant trees and what species of trees to plant.

Planting the “right tree in the right place” is a simple motto that is widely accepted by urban foresters around the world, but what does this really mean? And why is planting public trees important?

Trees provide many benefits to city residents. Planting trees is a cost effective way to shade our roads and sidewalks during hot summer days, filter our air and water of pollutants, reduce storm water runoff that contributes to flooding, provide wildlife benefits for birds and animals, and more. A dollar value estimate of the benefits of Durham’s street trees are shown below.

**Table 1. Street Tree Benefits in Durham**

Eco Benefits	
	<b>Total annual benefits</b> \$673,321 saved
TREE BENEFITS	
	<b>Energy conserved</b> 2,344,820 kwh/year saved \$131,102
	<b>Stormwater filtered</b> 45,512,022 gal/year saved \$450,569
	<b>Air quality improved</b> -5,648 lbs/year saved \$55,504
	<b>Carbon dioxide removed</b> 4,819,413 lbs/year saved \$36,145
	<b>Carbon dioxide stored to date</b> 35,906,722 lbs saved \$269,300

## Where does the city plant trees?

City foresters plant trees on city owned property. This includes medians, public parks, city owned grounds/ parking lots, and the Rights-of-Way along city maintained streets. Our tree planting efforts have mainly focused on planting street trees within the city owned Rights-of-Way. The reason for this is that street trees provide the most benefits to the public through increased shade and walkability, as well as air and water pollution reduction.

## What is the city owned Right-of-Way?

This is the area around a city maintained roadway, usually between the curb and sidewalk, that is dedicated for roads, utilities, drainage, curbs, gutters, and sidewalks. The length of the Right-of-Way varies greatly depending on where you are in the city. A good rule of thumb is to locate underground utilities maintained by the city, such as water meters, to estimate the Right-of-Way. While this is a good estimation, it is not always accurate and the length of Right-of-Way can vary greatly (see figure 2). To determine the length of Right-of-Way in your area you should contact the city.

**Fig 1.** Right of Way Representation, Source: City of Westwood, KS



**Fig 2.** Cross Street at Eva Street and North Elm Street in East Durham (Durham Go Maps). Note how the Right-of-Way varies greatly between the North side of Eva street vs the South side of Eva street. In this case street trees would not be planted on the North Side of the street because the Right-of-Way starts and ends at the curb.



***What species of trees are being planted and why?***

The city plants a wide variety of tree species every year. Native species are selected for locations that mimic our surrounding natural environment as these trees provide great value to our native wildlife. In more urban areas, such as in Downtown Durham, non-native species are sometimes used in order to withstand the tougher environmental conditions.

Each year we plant a wide variety of species in order to maintain a diverse urban forest. By having a diverse urban forest our trees are less likely to be negatively impacted by pests and disease. For instance, if a pest or disease does negatively impact one of our tree species we will still have many other species of trees that

will remain intact, thus maintaining our healthy tree canopy.

A good example of what can happen with little to no tree diversity in an urban forest can be seen through the history of the American Elm. Dutch Elm Disease came to the United States from the Netherlands in the 1930's and wiped out most American Elms throughout the country by the 1990s. The city's most impacted by this disease relied on the American Elm as their sole street tree. If these communities had relied on a mixture of trees in their landscape, then the loss of the Elms would not have been as impactful.

**Which planting site factors determine which tree species to plant?**

- 1) Length of the Right-of-Way
- 2) Presence of sidewalk
- 3) Presence of overhead utilities
- 4) Presence of underground utilities
- 5) Site distance factors
- 6) Site drainage
- 7) Soil volume
- 8) Soil PH
- 9) Tree planting spacing (closer together = taller stems of trees, further apart = broader canopy)

These are some of the factors we must consider when planting street trees. Tree planting is an iterative process to determine which species do the best under certain conditions in Durham.

The example below is a basic exercise to show how the site can determine the tree that is selected for planting.

**Example) A well-drained, planting location with 350 square-feet of planting space, with no overhead utilities could fit a large maturing tree, such as an oak. A planting location with less soil volume and overhead power lines present will need a smaller maturing species, such as an Eastern Redbud.**

For more information on proper species selection and tree planting procedures see the appendix below showing tables from the Durham Landscape Manual.

Note, The Public Works, Transportation, and Planning Departments are consulted before each planting season to ensure that new street trees do not cause conflicts with other projects.

**Appendix**

**Planting requirements for public trees according to the Durham Landscape Manual Plant Table Key.**

These tables come from Durham’s Landscape Manual and show a variety of factors to consider when planting trees. These tables guide how developers and urban foresters select species for planting in the Durham area.

<b>Requirements:</b>	
<p><b>Required Minimum Root Area (Trees):</b> Requires the surface area listed in the table, and two feet average depth of friable soil throughout planting area or equivalent volume in engineered root pathways, soil vaults, or Silva Cells™. (TM = DeepRoot Green Infrastructure, LLC)</p>	<p><b>1</b> = 150 square feet <b>2</b> = 250 square feet <b>3</b> = 350 square feet</p>

<b>Suggested Cultural Information (Continued):</b>	
<p><b>Suggested Sun Exposure:</b> Preferred amount of sun exposure for best performance of plants.</p>	<p><b>FS</b> = Full Sun (At least 6 full hours of direct sun each day) <b>PS</b> = Part Sun / Shade (3-6 hours of direct sun each day) <b>SH</b> = Shade (Less than 3 hours of direct sun each day, and filtered sunlight during the rest of the day)</p>
<p><b>Suggested pH Range:</b> Indicates adaptability over a range of soil pH and, especially, plants that perform best in a specific pH range.</p>	<p><b>Below 5.5</b> = Strongly Acidic <b>5.5 – 6.2</b> = Acidic (Sour) <b>6.2 – 6.8</b> = Neutral <b>6.8 – 7.4</b> = Basic (Sweet) <b>Above 7.4</b> = Strongly Basic</p>




### Suggested Cultural Information:

#### Suggested Established Plant Wet / Dry & Soil Tolerance:

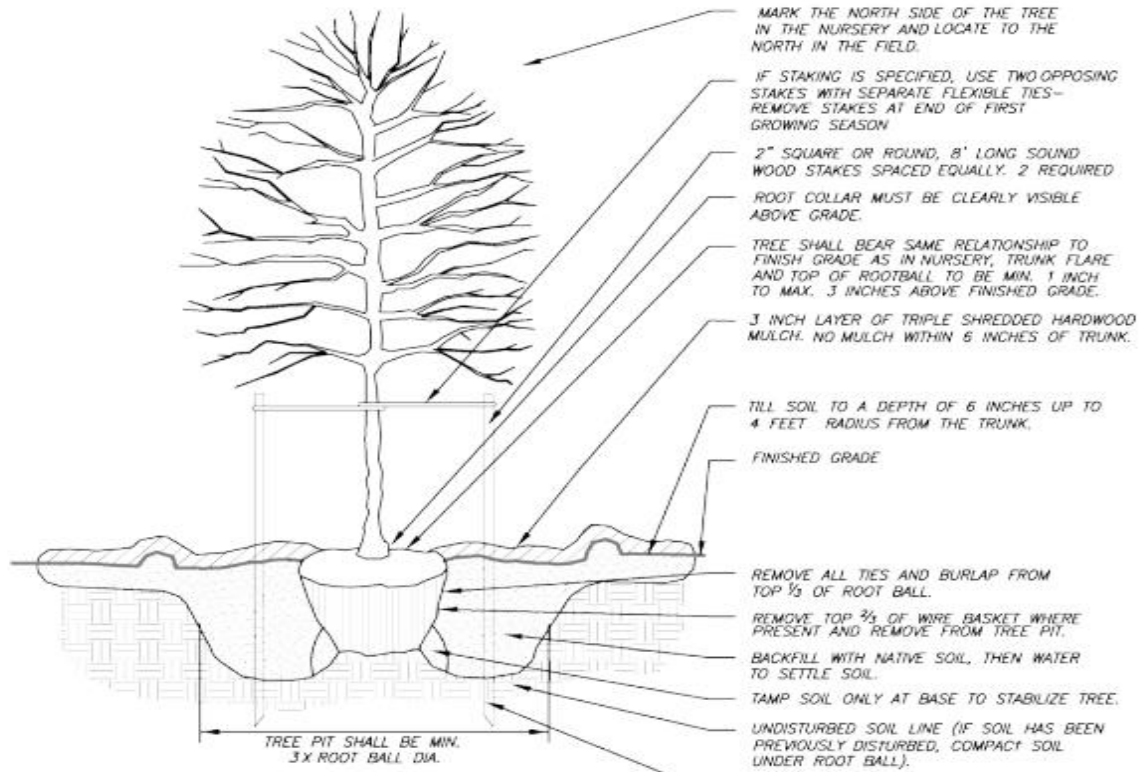
All new plantings require regular watering to establish.

Shrubs are generally established after one year.

Trees establish at an average rate of one year per caliper inch equivalent installed.

- 1 Performs best in moist, well-drained soil. Intolerant of drought and poor drainage often caused by flood conditions, compaction, and heavy clays.
- 2 Performs best in moist, moderately drained soils. Will not tolerate drought. Can withstand brief periods of poor drainage.
- 3 Performs best in very moist soils. Well-suited to poorly drained, compacted, and heavy clay soils.
- 4 Performs best in moderate moisture and well-drained sites. Can withstand brief dry periods. Intolerant of prolonged drought or flood conditions.
- 5 Performs best in moderate moisture. Intolerant of prolonged drought. Can tolerate brief periods of poor drainage.
- 6 Performs best in moderate moisture, but very adaptable to poorly-drained sites and flood conditions.
- 7  **Waterwise** species. Performs best in minimal moisture. Will tolerate prolonged drought. Requires well-drained soils. Not suited to heavy clays, compacted soils, or flood conditions.
- 8  **Waterwise** species. Can tolerate prolonged drought. Somewhat adaptable to poorly-drained sites, compacted soils, and heavy clays. Will not withstand prolonged flood conditions.
- 9  **Waterwise** species. Performs best in moist, poorly-drained soils. Adaptable to compacted soils, heavy clays, and flood conditions.

**Figure 1: Required Tree Planting Detail**



**NOTES:**

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

TREE PLANTING DETAIL  
NTS.

Courtesy of  
Coulter Jewell Thames P.A.