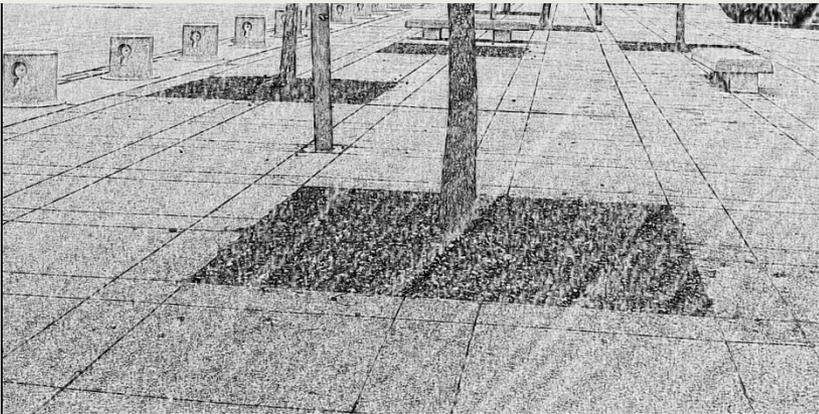




Article X Landscape Regulations



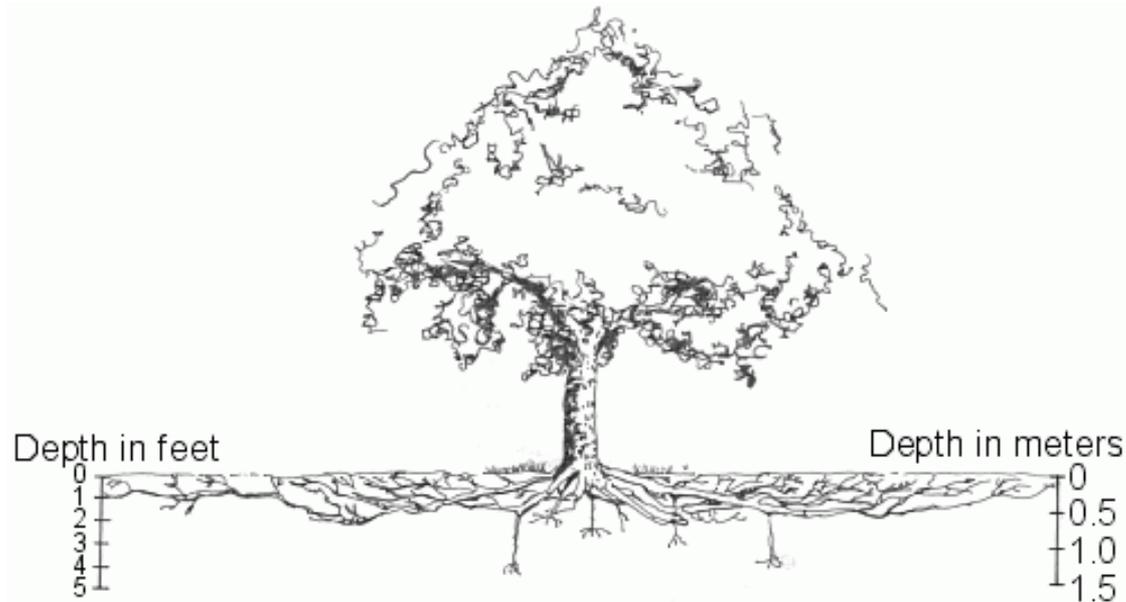
Tree Biology, Health, and Environment



Zoning Ordinance Committee - April 16, 2015

TREES

General Biology



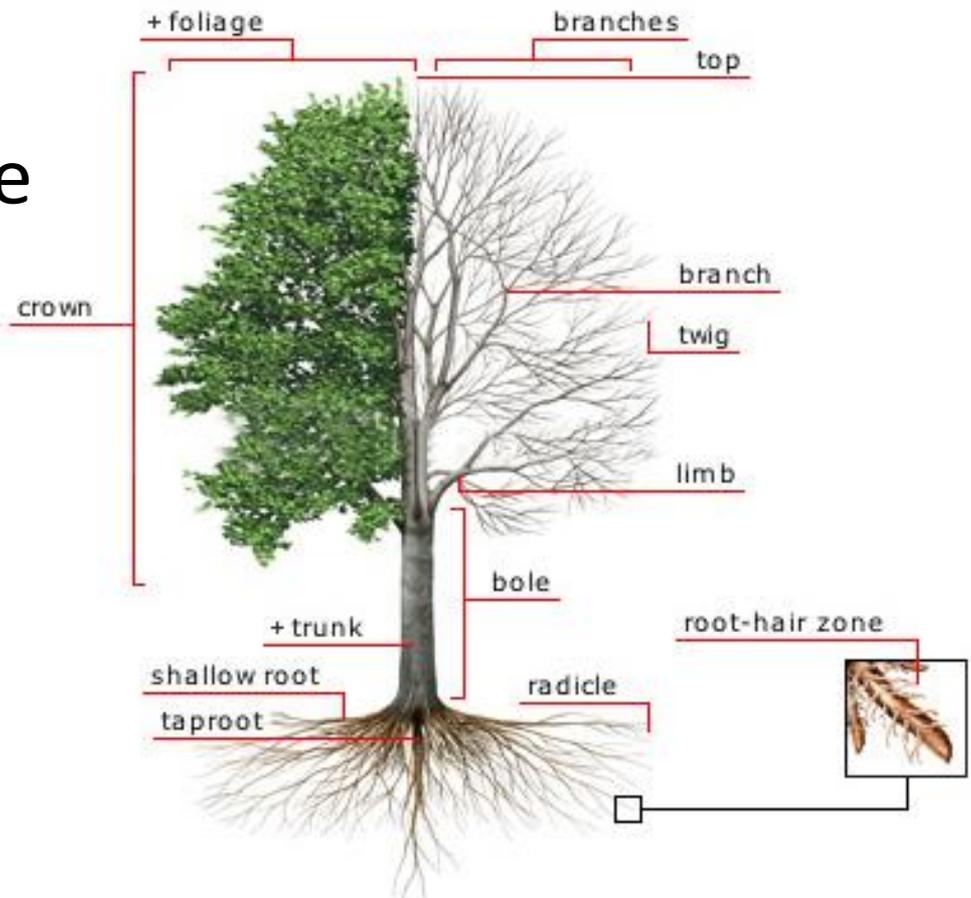
Tree: 'A woody plant that grows to 15 feet in height or more, usually with a single trunk, growing to more than 3 inches in diameter, and possessing an upright arrangement of branches and leaves.'

- Athens-Clark County Best Management Practices

TREES

Crown

- Crown – woody and leafy component of the tree. It has large limbs that support smaller branches, twigs, leaves and buds.



TREES

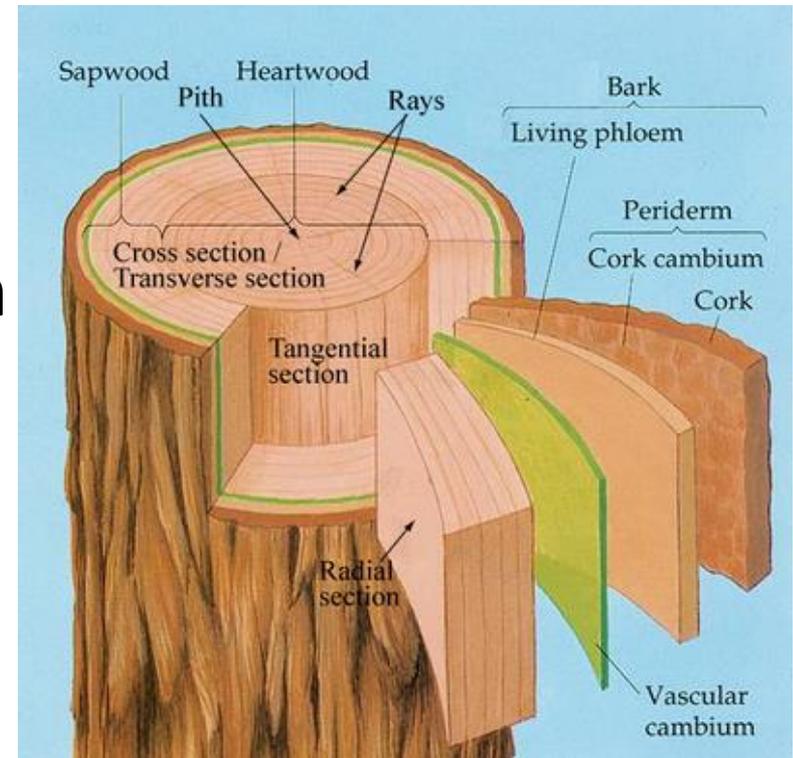
Trunk

- Trunk – Main woody stem of the tree that supports the crown. Most have one stem while some will have multiple stems.
- Food is stored and water is transported in the trunk.
- Tree size is typically measured as ‘dbh’, or diameter at breast height (4.5’).

TREES

Trunk – Cambium Layer

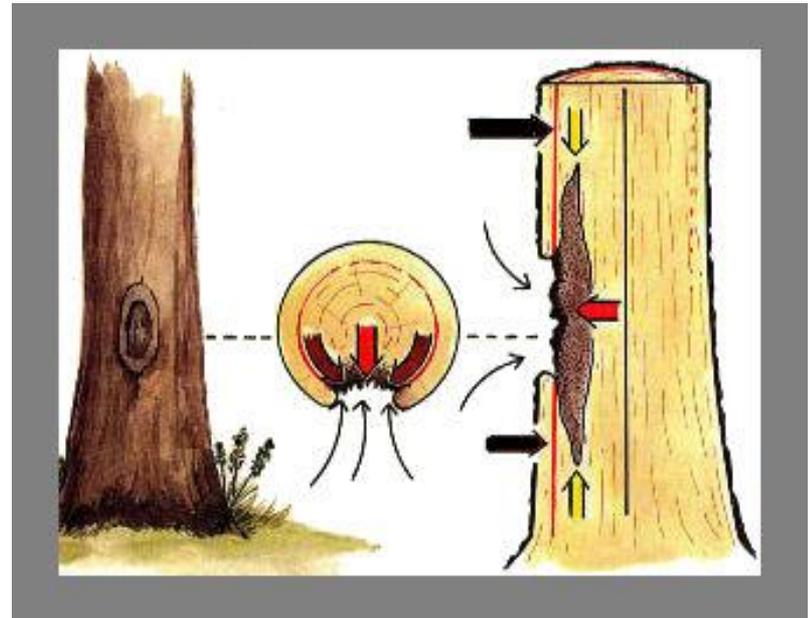
- Cambium layer in the trunk is beneath the outer bark.
- The location where growth in the trunk and root diameter take place. Xylem (wood) is located on the inside and the inner bark (Phloem) is produced outside.
- Food transport system.



TREES

Damage

- Trees can only 'seal', or compartmentalize, wounds.
- Trees most affected by injury or stresses –
 - Store little energy.
 - Fast growing.
 - Poor soil volume.
 - Affected by weather.
 - Repeatedly wounded.
 - Critical point in life stage.



TREES

Roots

- Roots – The underground structures that anchor the tree and absorb water, oxygen and nutrients for growth.
- Woody or fibrous and 85% of tree roots are located in the top 18 inches of soil.

TREES

Roots

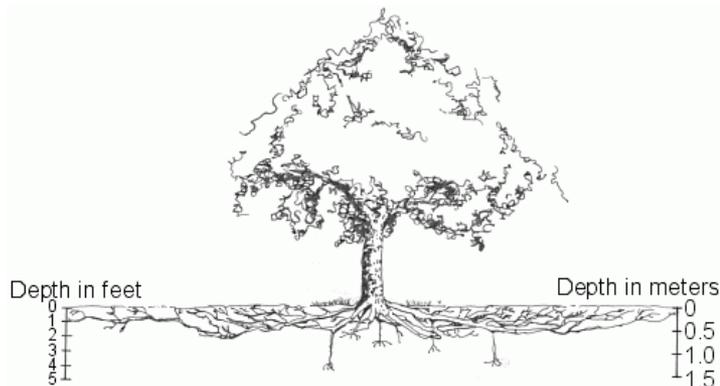
Anchorage roots are large, thick and woody, and usually number from 4 to 11 large woody roots.



TREES

Roots

- Roots grow out from the trunk for a distance of at least 2-3 times the radius of the tree's crown, or at least 2 times the height of the tree.
- Small fibrous roots from woody roots grow into the top layers of soil and the leaf litter.
- Small fibrous roots are supported by beneficial fungi (mycorrhizae) on the fibrous roots that combine with root hairs. These increase the surface area of the roots that absorb water and nutrients.



Root growth depth in 1 year. – U. of Florida

TREES

Site Growth Conditions

- Trees require certain conditions to achieve their genetic potential for size, age, and form characteristics of the species.
- Under less supportive conditions:
 - Trees grow slower
 - Trees are smaller at maturity
 - Trees have more deadwood
 - Trees are more stressed and more vulnerable to attacks by insects and diseases.



TREES

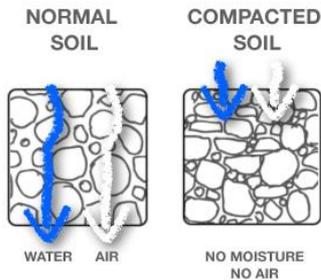
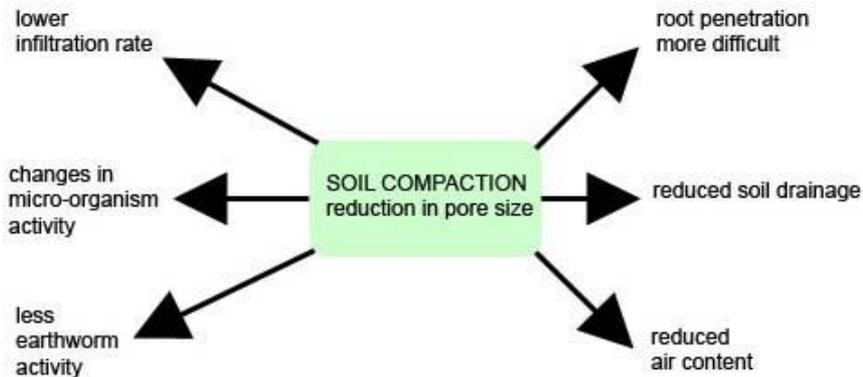
Soil Health Conditions Vital To New Tree Plantings

- **Soil Volume**
- Soil Depth
- Soil Specification
- Texture
- Stones (# and size)
- Debris content (clean)
- Contaminants
- Soil clod size
- Organic matter content
- **Density** of soil
- **Drainage** ability of soil
- **Soil pH**
- Nutrients
- Soluble salt
- **Water**

E Thomas Smiley, Soil for Urban Tree Planting

TREES

Soil Conditions Vital To New Tree Plantings



TREES

Soil Conditions Vital To New Tree Plantings

There are two components to soil space:

1) the **total soil volume** needed to sustain a tree for a reasonable period of time, and

2) the **open soil area** needed immediately surrounding the trunk to accommodate trunk flare growth. Open soil space is soil that is not covered by a solid hard surface such as a sidewalk, pavement, or a building.

A typical design specification can call for a volume of 200 cubic feet of soil for trees, whereas 2,000 to 3,000 cubic feet would be an ideal amount.

- E.F. Gilman

TREES

Planting the right tree in the right place.

How Far You Should Plant from Utility Lines*

- Plant large canopy trees (40 feet and taller) at least 50 feet from power lines.
- Plant medium size trees (less than 40 feet tall) at least 20 feet from power lines.
- Plant only small trees (20 feet and smaller) near power lines, and within 8 feet of power poles.

* These are general guidelines. Check with your local utility for specific planting distances for your area.

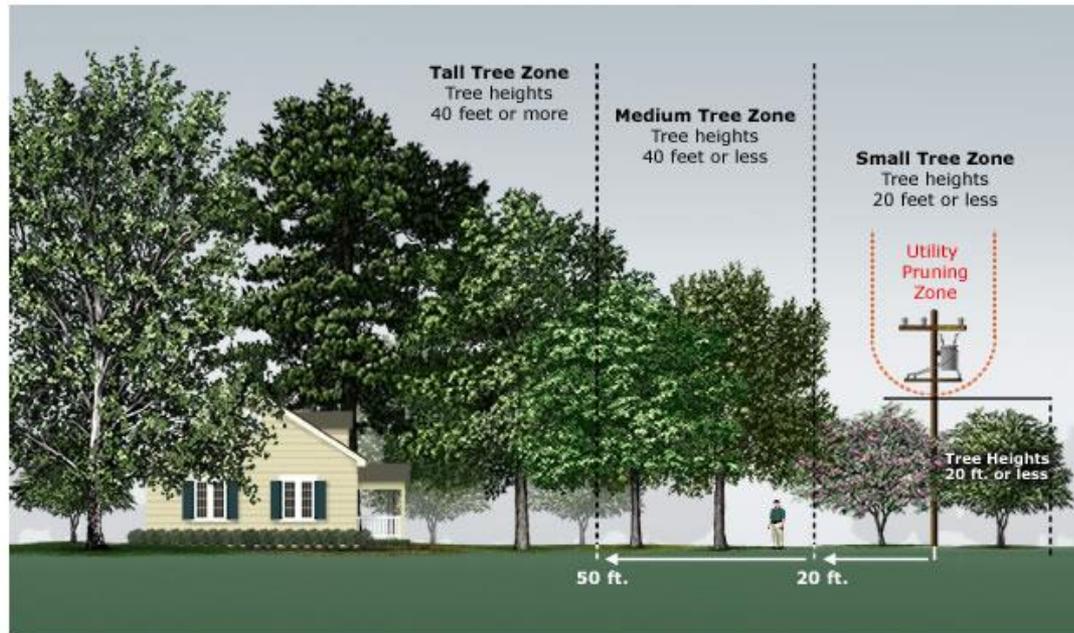


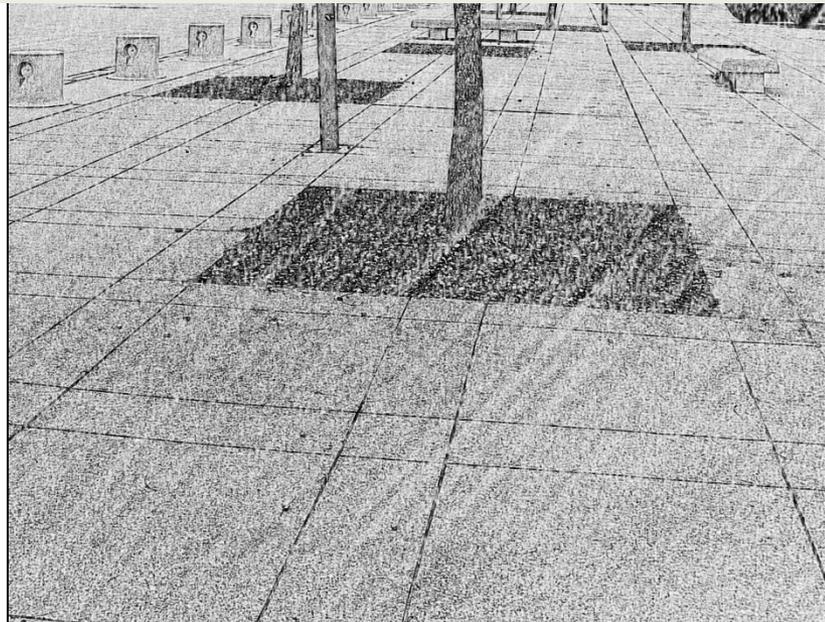
Illustration Copyright © Robert O'Brien



Article X Landscape Regulations



Trees in Landscape Applications



Landscape Trees In Article X

- Do the current regulations fully address the purposes of Article X?
- Categories of trees
- Measuring standards
- Applications of trees for each land use
- Planting conditions

Discussion

- Staff recognizes portions of the ordinance need clarification of language and new definitions
- Consider amendments to definitions and terminology for clarity with landscaping industry by following national standards
- Provide proper planting conditions for nursery stock trees that favor achieving full mature potential.

Article X Trees

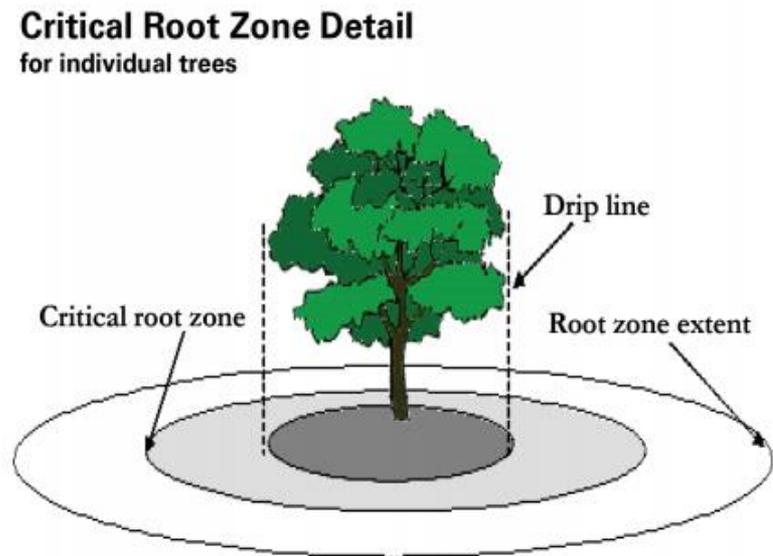
Categories

- Canopy tree - means a species of tree that normally bears crown foliage no lower than six feet above ground level upon maturity.
- 'Non-canopy tree' – no definition (10.125(b)(7))
- Evergreen tree - means a tree ... of a species that normally retains its leaves throughout the year.
- Large tree - means a tree of a species that normally reaches a height of 30 feet or more upon maturity.
- Small tree - means a tree of a species that normally reaches a height of less than 30 feet upon maturity.

Article X Trees

Definitions – Tree Sizes

- Critical Root Zone (CRZ) = 1' per 1" of diameter of tree measured from the tree trunk or stem.
- Dripline - a vertical line that runs from the outermost portion of the crown of a tree to the ground.



Colorado St. U. Extension

Article X Trees

Measuring Standards

Caliper

(A) for a single-stem tree, the diameter of the trunk measured **12 inches** above the ground for a tree having a diameter up to and including eight inches, and measured at four and one-half feet above the ground for a tree having a diameter of more than eight inches.

(B) for multi-stem trees, the diameter of the trunk measured at the narrowest point below branching when branching occurs higher than 12 inches above the ground. When branching occurs at or lower than 12 inches above the ground, caliper means the diameter of the largest stem plus the average diameter of the remaining stems, measured at four and one-half feet above the ground.

Article X Trees

American Standard For Nursery Stock (ANSI Z60.1 – 2014)

“...caliper measurement shall be taken **six inches** above the ground level for field grown stock and from the soil line for container grown stock, which should be at or near the top of the root flare, and six inches above the root flare for bare root plants, up to and including the four-inch caliper size interval (i.e., from four inches up to, but not including, 4½ inches). If the caliper measured at six inches is four and one-half inches or more, the caliper shall be measured at 12 inches above the ground level, soil line, or root flare, as appropriate.”

Article X Trees

American Standard For Nursery Stock (ANSI Z60.1 – 2014)

Staff recommends:

Caliper – Consider ASNS calculation methods

Nursery Stock – Plants grown in or obtained from a nursery.

Two standards for measure:

- Caliper (nursery stock)
- DBH “diameter at breast height”
(‘established trees’ in measurement for surveys.)

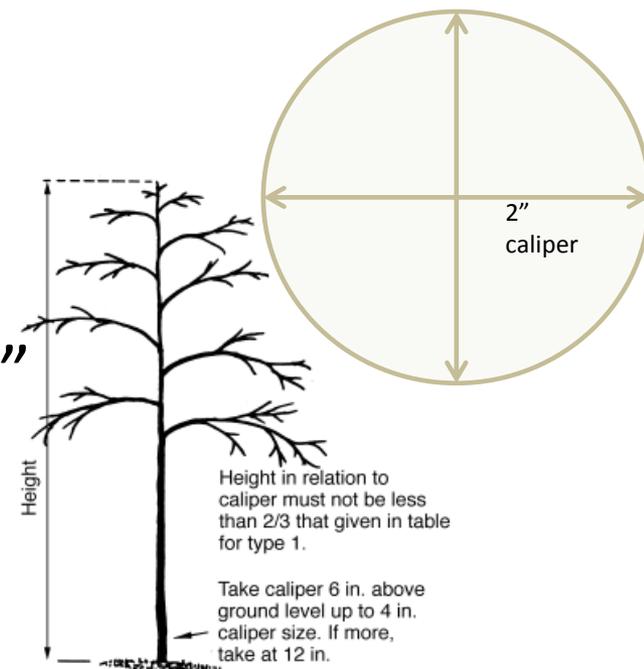


FIGURE 9 – Measurement – Type 2 shade trees

Article X Trees

General uses – Street Trees – 10.125(b)

- (4) **Street trees. A large tree must be provided for each 50 feet of frontage, with a minimum of two trees being provided. These trees must be located within 30 feet of the projected street curb.** The trees may be located in the public right-of-way provided that all private licensing requirements of the city code and charter are met. For purposes of this paragraph, "projected street curb" means the future location of the street curb consistent with the city thoroughfare plan as determined by the director of public works and transportation.

Article X Trees

Street Trees – Topics for discussion

- Utility conflicts – underground/overhead utilities
- Street tree density – number and size of trees
- Distance from the curb – what is a street tree?
- Resolving green infrastructure/grey infrastructure conflicts
- Maturing street trees and their relation to commercial view corridors in changing landscapes
- Adaptable changes in a comprehensive concept
- Achieve best standards for available healthy soils

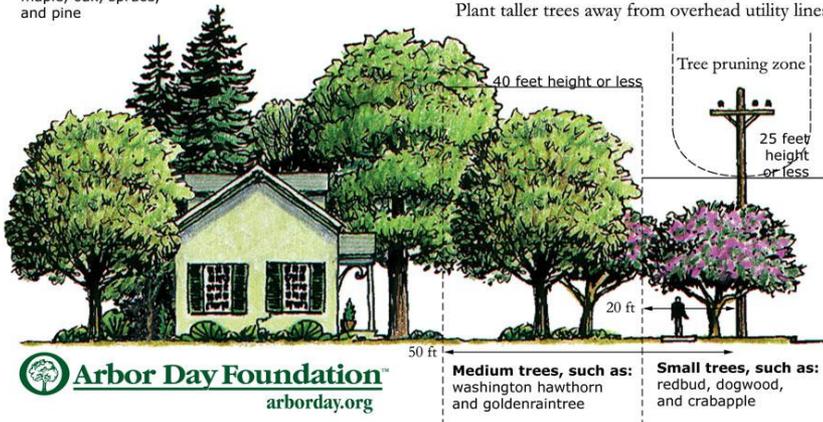
Article X Trees

Street Trees – Topics for discussion

Tall trees, such as:
maple, oak, spruce,
and pine

Plant the right tree in the right place

Plant taller trees away from overhead utility lines



Utility Conflict – Street Definition – Soil Requirements



Article X Trees

Soil Requirements – 10.104

- (a) **Planting areas in general** must have the following soil depths and dimensions:
 - (1) For each large shrub or small tree installation, a minimum of 24 inches of soil depth and 16 square feet of surface area (total of 32 cubic feet).
 - (2) For each large tree installation, a minimum of 36 inches of soil depth and 25 square feet of surface area (total of 75 cubic feet).
- (b) **Planting areas located above underground buildings or structures** must have the following soil depths and dimensions:
 - (1) For each large shrub or small tree installation, a minimum of 30 inches of soil depth and 25 square feet of surface area (total of 62.5 cubic feet).
 - (2) For each large tree installation, a minimum of 40 inches of soil depth and 36 square feet of surface area (total of 120 cubic feet).
- (c) The building official may waive the minimum planting area requirements if a landscape architect certifies that the proposed alternative soil depths and dimensions are sufficient to support the healthy and vigorous growth of the plant materials affected.