

# TOWN OF FARRAGUT



## Utility Line Arboretum

Department of Community Development

November 2010

# **Utility Line Arboretum Outline**

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## Section 1: Introduction

### *a) Definition*

The Town of Farragut Utility Line Arboretum is primarily an effort to inform the public of the importance of selecting appropriate plant material where overhead utility lines are present.

In addition to the consideration of overhead utility lines, the selection of trees for this arboretum is also based on an effort to highlight the use and importance of incorporating native plant material into landscape projects. Consequently, this utility line arboretum provides the public with a place to observe and evaluate indigenous trees that may be used where overhead utility lines are present. This arboretum provides the observer with an opportunity to visualize different plant material in different conditions before they use them on their property or in their community.

### *b) Purpose and Need*

There are numerous reasons why a utility line arboretum is important and useful. Some of those reasons include the following:

- Since utility companies are actually required by law to keep their lines clear, these companies (and ultimately their customers) spend billions of dollars annually for line clearance trimming and tree and debris removal that essentially stems from the tree/utility line conflict. The local electric provider, Lenoir City Utilities Board (LCUB), spends easily more than \$500,000 yearly to trim along and under primary high voltage lines;
- Limbs may also get caught in or even pull wires down in a storm and create power outages;
- Clearing lines is a maintenance task that must be frequently repeated - usually every 3-5 years - and can lead to public relations problems for the utility company and/or local government. Utility line clearing can also be dangerous for those performing the work;
- Trees and overhead wires can harm each other either directly or indirectly. When a tree grows around a utility line it allows squirrels easy access to the wires which they may chew on. It also can create an electrical hazard for children climbing in trees;
- Electrical arcing can occur between tree parts and nearby high voltage conductors. This arcing creates serious hazards for people nearby, can lead to power outages, and/or can contribute to a fire;
- Trees that are trimmed for a utility line conflict often have shorter life spans resulting from the stress of trimming. In addition, new growth from trimmed portions of trees can be weak and actually make the tree more hazardous; and

- Trees that are trimmed for utility line clearing not only are less healthy (open cuts can invite infection) and potentially more hazardous (weaker new growth) but are also less aesthetically pleasing and compromise the appearance of the affected property and the larger community.

In summary, proper plant material selection can improve the appearance of the landscape, prevent safety hazards, improve electric service reliability, and reduce line clearance expenses for utility companies and their customers.

Some examples of tree/utility line conflicts that demonstrate the importance of proper tree selection are included below.



*c) Objectives*

Given the information provided above, some specific objectives related to the Town of Farragut Utility Line Arboretum include:

- Increasing the general public's awareness of tree/utility line conflicts;
- Developing a mentality that one must consider the size of plant material at maturity in relation to nearby overhead utilities;
- Assisting the local utility providers in efforts to inform the public of the importance of considering utility locations prior to plant selection and installation;
- Providing visual examples of what might be possible in terms of tree cover near utility lines and demonstrate that low-maturing trees that do not have to be trimmed will ultimately be healthier and far more attractive than larger trees that must be periodically trimmed and/or removed altogether;
- Identifying locally available utility-appropriate trees;
- Promoting native trees (many of which are underused) that would be utility-appropriate;
- Increasing market demand for utility appropriate trees that are native to this area;
- Increasing availability of utility appropriate native trees in the nursery trade;
- Demonstrating where different tree species would be appropriate for different conditions (e.g. light exposure, soil, moisture);
- Adding an additional element of interest to the Grigsby Chapel Greenway; and
- Enhancing the aesthetics of this section of the Grigsby Chapel Greenway.

## Section 2: Methodology

### *a) Tree Height Zones*

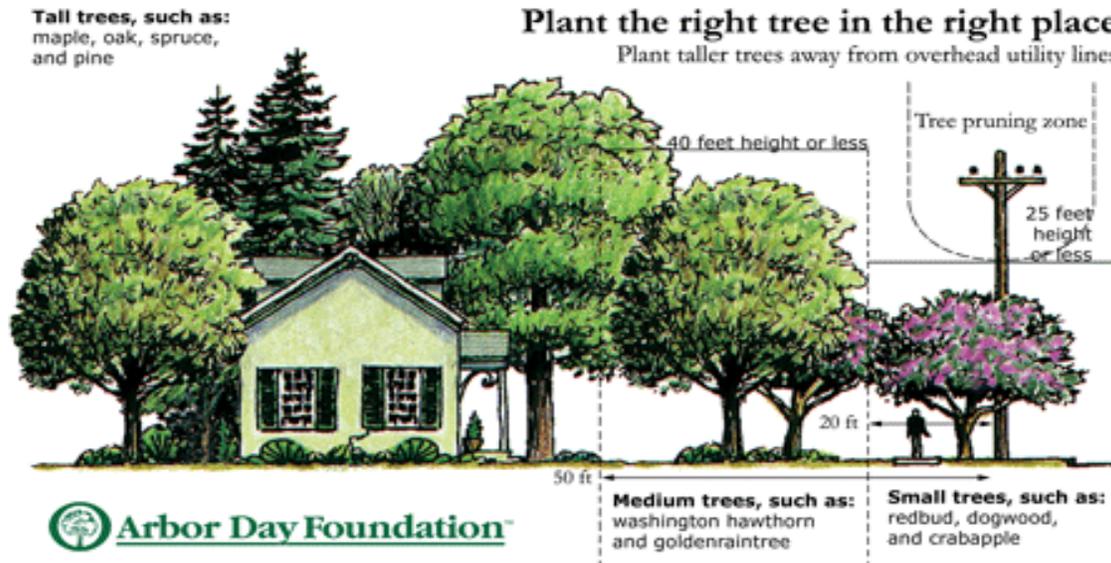
The process of developing a utility line arboretum involves a number of considerations. Initially, physical parameters for tree height in relation to overhead utility lines must be established.

In general, there are three commonly recognized height zones that are applied to plant material (namely trees) and overhead utility lines. The low height zone is the area beneath power lines and up to 20 feet to either side of the pole. This is the area where tree/utility line conflicts are most often seen and where proper plant material selection is critical. Plant material here should have a typical maximum height at maturity of no more than 25 feet. Some good native choices for low height zone material and which are included in this arboretum would be witch hazel, serviceberry, sweetbay magnolia, white fringe tree, blackhaw viburnum, and red buckeye.

The medium height zone begins adjacent to the low zone and extends to 50 feet from the power line pole. In this area plant material selection is also very important and any trees selected should be from a species that does not exceed a height of 40 feet at maturity. Some good native choices for the medium height zone area and which are also included in this arboretum would be eastern redbud, winter king hawthorn (a cultivar of green hawthorn), American hornbeam, and flowering dogwood. Depending on the context, some of these tree species may also be used in the low height zone but this should first be discussed with the local utility provider.

The tall height zone begins from the medium zone and generally tree selection in this zone is unrestricted in terms of overhead utility lines. The Town of Farragut Utility Line Arboretum will only address the low and medium height zones since these are the areas of greatest potential conflict between trees and overhead utility lines.

**NOTE:** The diagram below from the Arbor Day Foundation (which is used because it is referenced on the local electric utility provider’s web site) demonstrates the height zones relevant to overhead utility lines. The tree species referenced in this diagram are not necessarily recommended nor are they necessarily representative of the tree species used for the height zones specified in this arboretum. The material shown on this diagram is included because it is commonly recognized and demonstrates the different height categories that are applicable in this context.



### *b) Site Selection*

Using the tree height zones to define the physical limits, the next consideration in terms of the development of the arboretum was site selection. The key characteristics for the desired site included the following:

- Presence of recently upgraded overhead utility lines in an area that is publicly owned and where nearby residents have been impacted by the tree/overhead utility line conflict;
- Part of a well known and heavily used walking path greenway system where the arboretum will be highly visible to the general public;
- Convenient access for planting, maintenance, and viewing;
- An area that is already developed and where the arboretum will not likely be affected by future development;
- A section of walking path that is continuous, uninterrupted, and relatively compact;
- A publicly owned area that is wide enough to address the medium height zone as well as the low height zone; and

- An area that features some variety in terms of light exposure, soil conditions, and drainage.

The area that was determined to satisfy the above criteria to the greatest extent possible is along a section of the Grigsby Chapel Greenway (an asphalt walking path north of Grigsby Chapel Road) approximately  $\frac{3}{4}$  of a mile from the main trailhead at the Park and Ride lot off N. Campbell Station Road (**Exhibits A & B**).

Though it would be preferable for the arboretum to be closer to the Grigsby Chapel Greenway trailhead there were no such areas where the criteria listed above could be satisfied to the extent demonstrated in the section that was ultimately selected.

### *c) Plant Selection*

Using the tree height zones in relation to the site selected, the next task was to lay out a general planting scheme to determine roughly the number of plant units that would be used at this time. A Tennessee One Call was performed and the individual planting sites were reviewed by LCUB and nearby property owners. Soil samples were also taken to help guide the staff in the species selection.

The ultimate objectives in terms of species selection and placement were as follows:

- Use native plant material that is generally tolerant of urban conditions;
- Use plant material that is generally low maintenance in terms of disease, pests, and branch, leaf, and fruit litter;
- Use plant material that has notable visual appeal;
- Plant several different species for visual interest and to limit pest (insect and disease) and physiological (weather, chemical, etc.) problems that can easily kill off plantings of a single species or cultivar;
- Provide plant material that would be appropriate for different site conditions (e.g. wet areas, full sun areas, poorly drained soils, shady areas, etc.). This would demonstrate a variety of plant material options that the viewer could apply to their own landscape projects;
- Due to lack of irrigation in the planting area, choose material of a size that should transplant well and plant the material in the late fall;
- Ideally, try to obtain plant material that is locally available and from local nurseries so that the material is already acclimated to the area;
- The spacing of plant material would generally be 15-25 feet apart and would be no closer to the walking path than 5 feet; and
- Ensure that the placement of plant material would leave enough space for maintenance vehicles to get through when the plant material matures.

### Section 3: Plant Material Profiles

a) *Witch-Hazel* (*Hamamelis virginiana*)

General Characteristics

Height at maturity:	20 to 25 feet
Spread at maturity:	15 to 20 feet
Growth rate:	Slow
Flower:	Yellow and fragrant but, compared to some flowering trees, rather inconspicuous
Fruit:	Small, round, persistent fruit that is not particularly attractive to wildlife. No significant litter problem

Preferred Conditions

Light/exposure:	Tolerant of a variety of conditions
Soil:	Prefers moist acidic soils but is generally tolerant of a variety of soils as long as they are well-drained
Moisture:	Moderately drought tolerant

Advantages

Unique and irregular looking. Attractive foliage in all growing seasons with a nice yellowish-orange color in the fall and early winter. One of the last plants to produce flowers in the season. Good plant for late season interest and naturalizing. Usually no significant pests or diseases.

Disadvantages

May be hard to find in local nurseries. Slow growing.



b) **Serviceberry** (*Amelanchier x grandiflora* 'Autumn Brilliance') – a hybrid apple serviceberry cultivar

General Characteristics

Height at maturity:	15 to 25 feet
Spread at maturity:	15 to 25 feet
Growth rate:	Slow to Moderate
Flower:	Very showy white flower in spring. An excellent substitute for dogwood
Fruit:	Small, round, persistent fruit that attracts birds and is suitable for human consumption. No significant litter problem

Preferred Conditions

Light/exposure:	Tolerant of a variety of conditions
Soil:	Prefers moist acidic soils but is generally tolerant of a variety of soils as long as they are well-drained
Moisture:	Moderately drought tolerant

Advantages

Showy flowers in the spring and orange/red foliage in the fall. Tolerant of urban conditions. Attracts birds. Good plant for naturalizing with dark or shaded backdrops. May also be used along streams and other water bodies. Usually no significant pests or diseases (in this cultivar). Moderate life span in relation to other flowering trees.

Disadvantages

Somewhat slow growing. Can be susceptible to certain pests and diseases, though this is less likely with the Autumn Brilliance cultivar. Root suckers can be a problem, which, if not removed, could result in a shrubby appearance.



c) *Sweet Bay Magnolia* (*Magnolia virginiana*)

General Characteristics

Height at maturity:	10 to 20 feet
Spread at maturity:	10 to 20 feet
Growth rate:	Moderate to fast
Flower:	Very showy white flower in summer
Fruit:	Pinkish-red seeded fruit in late summer. Seed attracts birds and some small mammals. No significant litter problem

Preferred Conditions

Light/exposure:	Tolerant of a variety of conditions
Soil:	Prefers moist acidic soils but is generally tolerant of a variety of soils as long as they are fairly well-drained
Moisture:	Fairly drought tolerant and can take some periodic flooding

Advantages

A good, typically evergreen tree that is tolerant of urban conditions and can tolerate some flooding and drought. Showy flowers in the spring and orange/red seed fruit in the late summer. Few concerns with pests or diseases. Moderate life span.

Disadvantages

Can be susceptible to verticillium wilt. Has no particular winter interest. Can have transplanting issues.



d) **White Fringe Tree** (*Chionanthus virginicus*)

General Characteristics

Height at maturity:	12 to 20 feet
Spread at maturity:	10 to 20 feet
Growth rate:	Slow
Flower:	Very showy white flowers in mid-late spring
Fruit:	Dark blue unique looking fruit typically in September. No significant litter problem.

Preferred Conditions

Light/exposure:	Grows well in full sun to moderate shade
Soil:	Prefers moist well drained soils but is generally tolerant of a variety of soils
Moisture:	Fairly drought tolerant

Advantages

Very showy white flowers. Unique looking fruit. Tolerant of urban conditions. Good for naturalizing with a wooded area. Excellent in groups or borders. Few concerns with pests or diseases.

Disadvantages

Slow growing and relatively short life span. Need to mix male and female to maximize flower (male) and fruit (female) value. Can be a little difficult to transplant. Does not tolerate being wet for long periods and the bark is sensitive to mechanical damage (e.g. weed trimmers).



e) **Blackhaw Viburnum** (*Viburnum prunifolium*)

General Characteristics

Height at maturity:	12 to 15 feet
Spread at maturity:	8 to 10 feet
Growth rate:	Medium
Flower:	Very showy white flowers in mid-late spring
Fruit:	Showy bluish/black fruit is edible and attracts birds. No significant litter problem

Preferred Conditions

Light/exposure:	Grows well in a variety of light conditions
Soil:	Tolerant of a wide range of soils
Moisture:	Drought tolerant

Advantages

Very showy white flowers. Unique looking fruit and bark. Tolerant of urban conditions. Very attractive to birds and wildlife and great for naturalizing with nearby canopy trees. Few concerns with pests or diseases.

Disadvantages

May be difficult to find but should be used much more frequently in urban environments. Can develop an unkempt appearance with age. Sometimes suckers from nearby roots at its base. Does not tolerate salt.



f) **Red Buckeye** (*Aesculus pavia*)

General Characteristics

Height at maturity:	10 to 20 feet
Spread at maturity:	10 to 20 feet
Growth rate:	Medium
Flower:	Very showy red flowers in mid-late spring that attracts birds and particularly hummingbirds
Fruit:	Smooth light brown fruit in the late summer and early fall. No significant litter problem

Preferred Conditions

Light/exposure:	Grows well in full sun or part shade
Soil:	Likes moist, well-drained soil
Moisture:	Not drought tolerant

Advantages

Very showy red flowers and often starts blooming at an early age. Makes a good specimen plant. Has a long life span compared to most other small flowering trees. Few concerns with pests or diseases.

Disadvantages

May be difficult to find. Has low tolerance to drought.



**g) Eastern Redbud (*Cercis canadensis*)**

General Characteristics

Height at maturity:	20 to 30 feet
Spread at maturity:	15 to 25 feet
Growth rate:	Moderate to fast
Flower:	Very showy pinkish/purple flowers in spring
Fruit:	1-3 inch pods with only modest value to wildlife and no significant litter problem

Preferred Conditions

Light/exposure:	Can grow in a variety of light conditions from part shade to full sun
Soil:	Tolerant of a variety of soils but prefers a rich moist soil that is well-drained. Tolerant of soil pH values from 4.5-7.5. Cannot tolerate standing water
Moisture:	Though faster growing in more moist conditions, redbud is fairly drought tolerant

Advantages

Readily available, excellent spring color (one of the most showy and graceful trees), generally hardy and tolerant of urban conditions, seeds provide food for birds and are not very messy.

Disadvantages

Must carefully select trees to be planted and prune to lessen weak low forking branch development, not particularly long-lived (20-30 years), and can be disease and insect prone.



***h) Winter King Hawthorn (Crataegus viridis)*** – a cultivar of green hawthorn

General Characteristics

Height at maturity:	20 to 30 feet
Spread at maturity:	20 to 30 feet
Growth rate:	Moderate
Flower:	Very showy white flowers in spring
Fruit:	Small and very showy round red fruit that is prominent in winter. Fruit is eaten by birds and has no significant litter issues

Preferred Conditions

Light/exposure:	Prefers full sun
Soil:	Tolerant of a variety of soils, provided they are well drained
Moisture:	Generally drought tolerant

Advantages

Generally available. Attractive white blooms in spring and very showy red berry looking fruit in winter. The bark is also very unique looking as the tree matures. Tolerant of urban conditions and is usually not affected by pests or diseases.

Disadvantages

Though more tolerant than other hawthorns, this species is somewhat susceptible to cedar-hawthorn rust and can have some problems with aphids, borers, caterpillars, and leaf miners. Can have some thorns but far less prominent than other hawthorns.



i) **American Hornbeam** (*Carpinus caroliniana*)

General Characteristics

Height at maturity:	20 to 30 feet
Spread at maturity:	20 to 30 feet
Growth rate:	Slow
Flower:	Inconspicuous
Fruit:	Small brown colored fruit that attracts birds, squirrels, and other mammals. Fruit is inconspicuous and has no significant litter issues

Preferred Conditions

Light/exposure:	Prefers some shade
Soil:	Prefers moist but fairly well drained soil
Moisture:	Only moderately drought tolerant but can take periodic flooding

Advantages

Nice fall color. Very strong wood with unique looking bark. A good choice for shady wet sites. Fruit attracts wildlife. Has no significant pest and/or disease problems.

Disadvantages

Short lived and slow growing. Not particularly showy in terms of flowers. Could be difficult to find at local nurseries and can be difficult to transplant.



j) *Flowering Dogwood* (*Cornus florida*)

General Characteristics

Height at maturity:	20 to 30 feet
Spread at maturity:	20 to 30 feet
Growth rate:	Medium
Flower:	Very showy flowers in spring. The species color is white though the bracts (modified leaf) may be pink or red depending on the cultivar
Fruit:	Small, showy red fruit that attracts birds. Fruit has no significant litter problem

Preferred Conditions

Light/exposure:	Typically prefers part shade. Irrigation is strongly recommended if planted in full sun
Soil:	Prefers a deep, rich, well-drained soil
Moisture:	Intolerant of extended drought

Advantages

Readily available in a variety of cultivars. Very showy flowers in the spring. Nice leaf color in the fall. Strong wood resistant to breakage. Good tree for naturalizing with larger canopy trees. The fruit is well-liked by songbirds and is visually interesting.

Disadvantages

Relatively short lived. Subject to a number of pests (aphids, borers, leaf miners, and others) and diseases (most notably anthracnose). When planting dogwoods, cultivars that are resistant to anthracnose should be chosen. Proper planting environment is also critical with dogwoods.



## Section 4: Post Tree Installation, Identification Measures, and Maintenance

### *a) Post Tree Installation and Identification Measures*

Once the trees noted in Section 3 have been satisfactorily installed and inspected, the trees will be monitored for a minimum of one year to ensure that they adjust properly to their new planting environment. A small information kiosk (that will not block access for service vehicles) will then be installed. The material for the kiosk will likely be made from sandblasted fiberglass or some similar material that is attractive, strong, lightweight, corrosion resistant, and will not warp, shrink, rot or swell. The kiosk will include, at a minimum, the following:

- A title and appropriate Town of Farragut identification;
- An overview of the purpose and need of a utility line arboretum;
- A map with a scale, north arrow, and legend that notes the location of the trees, the species that have been selected, and some interesting information about each species; and
- An indication of where more information related to this arboretum and/or the subject matter in general could be obtained.

When the kiosk is installed, small tree mounted identification labels that will not cause damage to the trees (they will have a screw and spring that adjusts to the tree's growth) will be added to the tree groups that are part of the arboretum. These labels will be visible to the public and include the common and botanical name for each tree. The botanical name will be in italic with the Genus or the first word having a capital letter and the last word having a lower case letter. Where cultivars are used, a single quotation mark with the first letter being capitalized will be used. An example would be *Cornus florida* 'Appalachian Spring' (Anthracnose resistant cultivar of the dogwood species).

Tree mounted labels were selected because of the proximity to a heavily used greenway and the desire to avoid any protruding hazards in this area and to lessen the likelihood of the labels being vandalized or stolen.

### *b) Maintenance*

Basic maintenance of the arboretum will be conducted by the Town of Farragut. However, should any of the trees need special attention to address a health related issue an appropriate tree professional will be contacted for recommendations and/or treatments.