

MASTER TREE PLAN 2016

State College Borough

AN URBAN FORESTRY STRATEGY FOR EFFECTIVE
MANAGEMENT IN A TREE CITY

STATE COLLEGE TREE COMMISSION
243 South Allen Street State College, Pennsylvania 16801

TREE COMMISSION

Nick Kerlin, Chair

Ken Tamminga, Vice Chair

William F. Elmendorf

Henry Gerhold

Bruce Rohrbach

Alan Sam, Borough Arborist

TREE CREW

Steve Shirey, Foreman

Eric Ekess, Dendrician

Ed Holmes, Public Services Manager

ACKNOWLEDGEMENTS

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DESIGN & EDITING

Alan Sam, Environmental Coordinator/Arborist

Debra Lang, Administrative Assistant

Clay Chiles, Environmental AmeriCorps Member

Kelly Doyle, Environmental AmeriCorps Member

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The State College Arts Fest, an annual event during summer, is enjoyed by many in the comfortable shade of the urban forest.

Executive Summary & Introduction



In accord with the Borough's Tree Ordinance, and in recognition of the long-term support of trees by residents and visitors, the Borough's urban forest is planted and maintained to ensure its health, safety, and the many benefits that trees and other plants provide to people and the places they live. This plan explains how and why.



The State College Municipal Building serves as the location for local government administration and public meeting space within the Borough.



TREE COMMISSION

What is the Tree Commission?

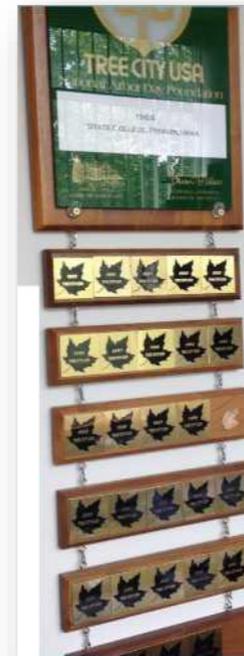
The Tree Commission consists of five members, at least two of whom are professionals in forestry, horticulture, plant pathology, entomology, landscape architecture, or related fields. Members are appointed by Borough Council to serve 3-year terms.

The Commission advises the Director of Public Works and the Borough Arborist on the planting, maintenance and removal of trees. Members are also responsible for preparing and maintaining a Master Plan for street trees and may solicit and accept contributions.

The Commission conducts public hearings when new trees are to be planted or removed. If adjoining property owners disagree with recommendations, they may appeal to Borough Council.

Tree Commission Mission Statement

The Tree Commission's mission is to support and promote the vitality, integrity, and extent of State College's Urban Forest. Acknowledging their major contribution to the livability of our city, the Tree Commission intends to augment the number and variety of our trees, protect their health and safety, and promote public understanding of the major role trees play in our community. State College's urban forest encompasses not only trees and plants in parks and along streets, but on private property as well. The Commission espouses a vigorous street tree program and urges community citizens to participate in the protection and enhancement of the private urban forest, as well as the public one. The urban forest benefits are maximized if both the public and private forest are well protected and maintained.



(Left) State College Borough has been a Tree City USA since 1984.
(Above) Tree City USA flag annually given to State College by the National Arbor Day Foundation for its efforts in urban forestry



TREE COMMISSION GOALS & OBJECTIVES

Goal #1

Provide diligent management and protection of all public trees in the Borough to promote the integrity, vitality, safety, and extent of the Borough's urban forest.

Objectives:

- Plant, remove, maintain, protect, and replace public trees in all parts of the Borough, consistent with sound urban forestry principles and according to best arboricultural management practices.
- Prune young trees one or more times within the first five years to improve branch structure and growth habit.
- Prune older trees as needed to maintain health and safety.
- Continue to oversee the tree resource in Borough parks to promote tree safety, health, and diversity, and to contribute to the purposes of both the parks and the larger urban forest context.
- Aggressively enforce violations of the Street Tree Ordinance and "Rules and Regulations for Arbor Work"

Goal #2

Engage in systematic, timely, and responsive planning of the Borough's urban forest in a way that embraces full community participation.

Objectives:

- Promote and engage public understanding, support, and ideas for the tree program.
- Provide regular and interactive opportunities for citizen involvement with the Commission to mutually consider trees along public roads and in our parks.
- Regularly review the Recommended Tree List and add or delete trees, if necessary.
- Adhere to sound, realistic, and sustainable concepts in managing the Borough's Urban Forest

Introduction



HISTORICAL PERSPECTIVE

At the end of the 19th century, farmland and pasture covered much of what is now the Borough of State College. Most of the remaining trees of the earlier forest stood on shallow soil or among rock outcrops. Recognizing the importance of its tree resource, the Borough, in a 1903 ordinance, gave complete jurisdiction over street tree planting, removal, and trimming to the “Street Committee” of the Town Council. By 1923, the Borough officially established a “Shade Tree Commission” composed of six residents not necessarily associated with the Council.

In 1926, the Shade Tree Commission adopted its first “Rules and Regulations” to manage the urban forest resource. Revised tree ordinances were adopted in 1976, 1989, and 2000. The Commission membership is designated as five members, at least two of whom shall be professionals in forestry, horticulture, plant pathology, entomology, landscape architecture, or related fields. Some Tree Commissions have been more active than others, and many individuals have donated considerable time and energy to create the urban forest enjoyed today. Past and present Tree Commission members and present full-time tree division personnel are listed in Appendix 7.

Originally, many fast-growing trees were planted along Borough streets, with slight regard to species traits or available growing space. Little maintenance was performed, other than the occasional removal of dead or hazardous trees. Trees most commonly planted were maples - primarily sugar maples along with many Norway, red, and silver maples. In 1975, a routine, comprehensive planting and maintenance program began, which incorporated tree removal, limbing-up, deadwooding, and corrective pruning.

In 1977, the first complete street tree inventory was prepared by the Borough Arborist and temporary staff, with assistance from Penn State University, and revealed that almost 60 percent of all trees were maples. The Tree Commission and others, concerned that a possible insect or disease infestation could wipe out a large number of maples, as Dutch elm disease has affected the American elm, began to diversify species composition of the street trees by replacing most maples, when they were removed, with other species.

Another street tree inventory, conducted in 1991, indicated an increase of about 700 trees, but at the same time showed a decrease in the percentage of maples to 40 percent of the total population. This percentage has continued to decline due to the limited numbers of maples being planted. The most recent inventory, conducted in 2012, revealed that maples now only make up approximately 23 percent of the urban street trees.

State College Borough’s budget for managing its shade trees has increased steadily over the past 54 years (Appendix 8). In this time period, the budget increased over three fold and has continued to increase at a steady pace since 1984. In the period from 1975 to 1982 many changes occurred, including the hiring of the Borough’s first arborist and dendricians, purchase of a bucket truck, and the completion of a comprehensive inventory.

Between 2010 and 2015, arborist duties were expanded to include development of the Borough’s sustainability programs. Budget responsibilities were transferred to the Public Services Manager, and dendricians were reduced from three positions (one Foreman) to two. Budget appropriations for 2015 were set at \$697,554, accounting for 2.9 percent of the total general budget or approximately \$16 per resident spent annually on tree and park maintenance.

Since 1984, the National Arbor Day Foundation has designated State College as a “Tree City, U.S.A.,” an honor that indicates a high level of commitment by the Borough’s citizens and elected officials to manage their urban forest resource. Communities that receive this designation must have a tree board or department, a tree ordinance, a comprehensive forestry program with an annual budget of at least \$2.00 per capita, and hold an Arbor Day observance and proclamation. Signs erected at entrances to the Borough indicate that State College is a “Tree City,” and a Tree City, U.S.A. flag is flown at Borough hall. The National Arbor Day Foundation has also presented State College Borough with a Tree City U.S.A. Growth Award for several years.

“If I knew I should die tomorrow, I would plant a tree today.”

-Stephen Girard

Introduction



State College Borough is now in the center of a larger quasi-governmental entity, the Centre Region Council of Governments, an area that includes the Borough and five surrounding townships. The Borough and Ferguson Township are currently the only Centre Region municipalities with a full-time arborist and staff. State College Borough provides assistance and advice on tree issues to the other member townships. The main part of the Pennsylvania State University campus, the predominant employer of the region and an important driving force of the local economy, lies partially within State College Borough. The University has an independent and active tree program. Penn State and the Borough have coordinated many activities in the past, especially those involving insect and disease problems. Other major components of the economy include tourism, light manufacturing, and high tech industries. The Borough has a vital downtown business district, large apartment complexes, office buildings, student housing, and both new and old residential neighborhoods. Except for the Borough's park system, little vacant land is left within the Borough and any future development will probably be through more intensive uses of existing areas.

Although the 2014 census data reported 42,100 people live within the Borough, 71 percent of the population is composed of students. About 13,000 persons are considered full-time residents. The Borough's population increased steadily between the end of World War II and 1990. Only during the 1970s was 10-year population growth less than 10 percent. Due partly to the lack of undeveloped land in the Borough, the population declined during the 1990s and limited growth is expected over the next 20 years. This is in contrast to the expected steady population growth of the Centre Region.

State College Borough occupies an area of 3,188 acres, slightly less than five square miles. There are over 55 miles of streets and roads in the Borough, excluding alleys. Most of these streets are tree-lined with a variety of species. Some older residential neighborhoods have large, mature trees that were planted when the homes were first built. Borough planting strips or sites vary from continuous strips of tree lawns 15 feet wide to 5-foot square tree pits in downtown sidewalks. Along some roadways space for planting is non-existent. Most, but not all, plantable areas have been planted.

Holmes-Foster Park, Sunset Park, Lederer Park, and some other area parks are remnants of farm woodlots left standing from the past, usually on shallow soil with some rock outcrops. These and surrounding forests are classified as oak-hickory type by the U.S. Forest Service. Dominant tree species are white, red, scarlet, and black oaks and some hickories. Other species such as yellow poplar, elm, blackgum, red and sugar maple, birch, black cherry, white ash, and black walnut are also associated with this forest type. Understory trees in association include flowering dogwood, sassafras, eastern redbud, hophornbeam, serviceberry, hawthorn and ironwood. More urban parks have been landscaped with both native and non-native plants. All the parks are an integral component of the Borough's Urban Forest.

An unbalanced species composition of the Borough's urban forest still exists today. As was the case 25 years ago, maples still make up a considerable portion of the street tree population. Efforts to reduce this monoculture by minimizing the number of maples planted and increasing diversity have already begun to pay off. The Borough has been able to minimize losses from some severe disease (i.e., oak wilt, verticillium wilt) and insect (i.e. gypsy moth, emerald ash borer, mimosa webworm) infestations. However, severe losses of elms and ashes have occurred recently.

State College is in the Nittany Valley, situated within the Ridge and Valley Province of Central Pennsylvania, and surrounded by rural agricultural and forested land. Nittany Valley, nearly 10 miles wide and 36 miles long, has an average elevation of about 1,000 feet above sea level. The valley floor is flat to slightly rolling and supports few surface streams. Spring Creek, fed by numerous, large springs, is the primary drainage system for the valley.

Most soils in the valley are derived from limestone parent material and range from shallow soils with rock outcrops to soils more than 7 feet deep. Soil series in State College include Hagerstown, Hublersburg, Opequon/Hagerstown complex, Opequon Rock outcrop, and Urban Land/Hagerstown complex.

Introduction



The most common soil along Borough rights-of-way, particularly in the Downtown, is created when original soil has been removed, covered, or mixed by earth-moving equipment. Much of the greenspace available for street tree planting throughout the Borough has been altered in some way and is simply classified as Urban Soil. It is difficult to list attributes of this mixed soil type because of problems caused by compaction, past construction debris, and alkaline conditions.

Central Pennsylvania has a humid continental climate. Winters are normally cold and dry, summers are warm and humid. Winter temperatures average 28°F but can dip below 0°F for extended periods of time. Summer temperatures average 70°F, but high temperatures may reach the upper 90s. The growing season is about five months long with the last major frost near April 27, and the first frost occurring around October 11. Average annual rainfall is 38.5 inches. Monthly average precipitation ranges from 2.54 (February) to 4.00 (June) inches and varies from year-to-year. Soil moisture is usually adequate for plants during the spring, but may be lacking sometimes in summer or autumn. Droughts occur periodically in the region during spring, summer, or fall. Severe droughts have occurred several times within the last 20 years. Plants hardy to USDA Hardiness Zone 5 can flourish in this area although some more southern tree species have been planted successfully in the area.



Winter street scape outside of the Municipal Building.

Introduction



NEIGHBORHOOD VIEW

Information about street trees is maintained through the Borough's computer system. The latest inventory of street trees within the Borough was completed in 2010 and has been kept up-to-date since that time through a proprietary inventory system that can be utilized with USDA software.

More recent improvements include the use of aerial photography and Geographic Information Systems (GIS). To facilitate management decisions, the Borough was divided into seven units (neighborhoods) based on forest and community characteristics. The management districts are College Heights, Greentree, Downtown, Northeast, Northwest, Southeast, and Southwest.

"A NATION THAT DESTROYS ITS SOILS DESTROYS ITSELF.
FORESTS ARE THE LUNGS OF OUR LAND, PURIFYING THE
AIR AND GIVING FRESH STRENGTH TO OUR PEOPLE."

-FRANKLIN D. ROOSEVELT

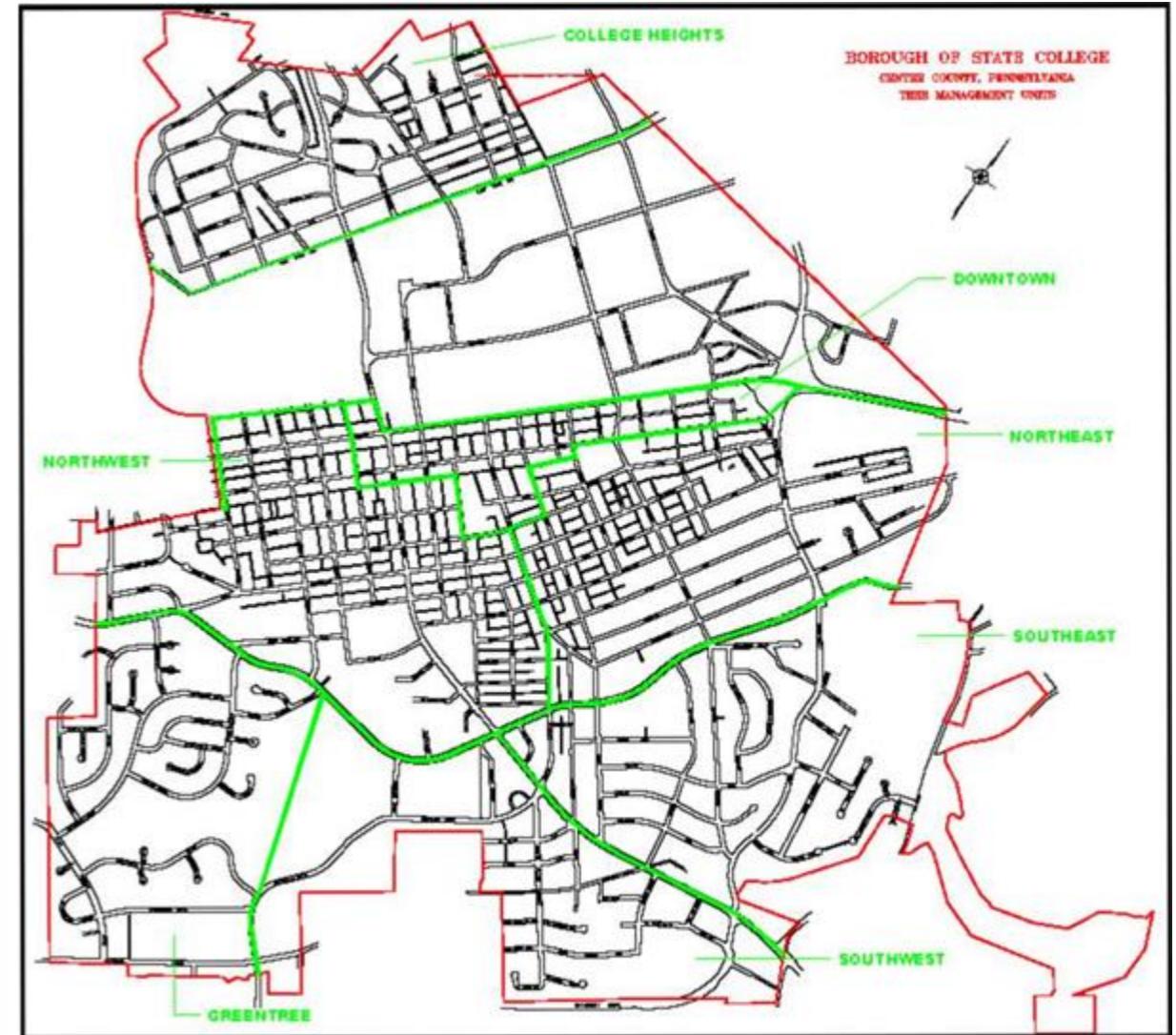


Figure 1. Management of Street Trees is broken down into seven neighborhoods.

Benefits of Our Urban Forest



Trees function as lungs for our communities.

TO NAME A FEW...



Aesthetics



Air Quality



Energy Savings



Property Value



Shade



Storm Water Management



Wildlife

Benefits of Our Urban Forest



AESTHETICS

One of the most important aspects of trees is their aesthetic qualities. Tree shapes, leaves, flowers and fruit all improve our surroundings in a way that is difficult to quantify. Tree flowers provide pleasant smells. Fall foliage is a major characteristic of why people choose certain trees to plant despite the fact that these brilliant colors only last a few short days or weeks. Properly placed trees can screen unwanted views, help mask urban noises and enhance desirable views or structures. Research has shown that hospital patients with rooms that had views of trees and landscaped grounds recovered faster from similar surgeries than those in rooms that didn't have scenic views. Urban vegetation can also result in proven health benefits such as reduced heart beats and lower blood pressure.



*I think that I shall never see
A poem lovely as a tree,
A tree whose hungry mouth is pressed
Against the earth's sweet flowing breast
A tree that looks at God all day,
And lifts her leafy arms to pray;
A tree that may in summer wear
A nest of robins in her hair;
Upon whose bosom snow has lain;
Who intimately lives with rain,
Poems are made by fools like me,
But only God can make a tree.*

~Joyce Kilmer

(Above) The poem describes the beauty of Trees.
(Left) The Borough's Service Building Sign is complemented by the placement of nearby trees.

Benefits of Our Urban Forest



AIR QUALITY

Trees have been referred to as nature's air purifier. Tree leaves are very efficient at collecting particulate matter suspended in the air such as dust, pollen and smoke, as indicated by research showing up to a 75% difference in airborne solids between the upwind and downwind side of tree canopies. Tree leaves absorb carbon dioxide, sulfur dioxide, carbon monoxide and other harmful gases while producing significant amounts of oxygen. An acre of trees can absorb and store enough carbon dioxide in a year to offset the pollutants produced by a car traveling 26,000 miles.

TREES...

help to clean the air, curb stormwater runoff, raise property values, sequester carbon, and reduce energy costs."

-ARBOR DAY FOUNDATION

Benefits of Our Urban Forest



ENERGY SAVINGS

Strategically placed shade trees conserve energy in nearby buildings. The shade they provide reduces how much heat the buildings absorb, keeping the inside cooler in warmer months. In colder months tree canopies reduce chilling winds that take away precious heat. This results in significant gains in home energy efficiency and costs.



Proper placement of trees can save energy.

Benefits of Our Urban Forest



PROPERTY VALUE

Using a tree's Leaf Surface Area (LSA), researchers have found that homes with more trees or LSA, will have higher property value. As trees grow in good health, their LSA increases, so does the value they add to adjacent properties. This is of course contingent on the species of tree and its potential size.

The reverse is also true. When mature trees are lost to catastrophic events, such as storms, insects, or disease, adjacent property values can be reduced as well.



Two blocks of the same Street in Detroit, Michigan, with trees (L) and without (R).

Source: <https://univercities.wordpress.com/>

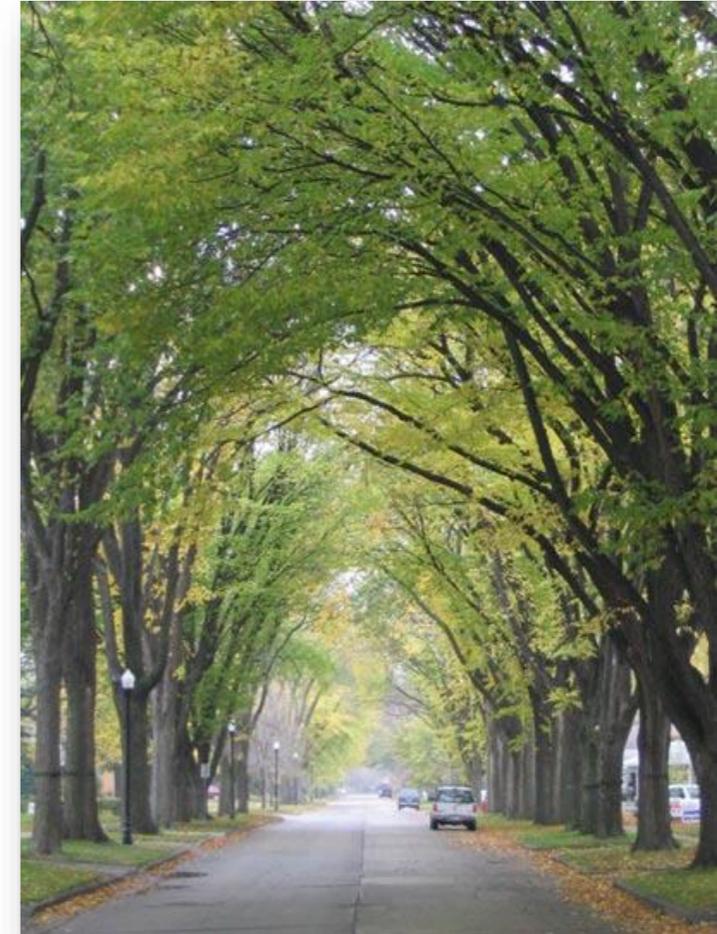
Benefits of Our Urban Forest



SHADE

The shade trees provide is important for many reasons. Typically, urban areas are warmer than the surrounding country side and it can be by as much as nine degrees. This is referred to as the heat island effect. Trees providing shade to roads, parking lots, buildings and other hard surfaces can help reduce this effect. In addition to reducing temperature by blocking the sun's direct rays, evapotranspiration from leaves can help cool the surrounding air. Heat pumps shaded by trees work more efficiently.

The Borough's zoning ordinance requires new developments to plant one shade tree for every 45 feet perimeter of parking. Parking your vehicle in a shaded parking space on hot, sunny days can actually improve gas mileage by reducing volatilization of gasoline in your gas tank.



Canopy trees overhanging roadways can significantly reduce radiant heat from the paved surface

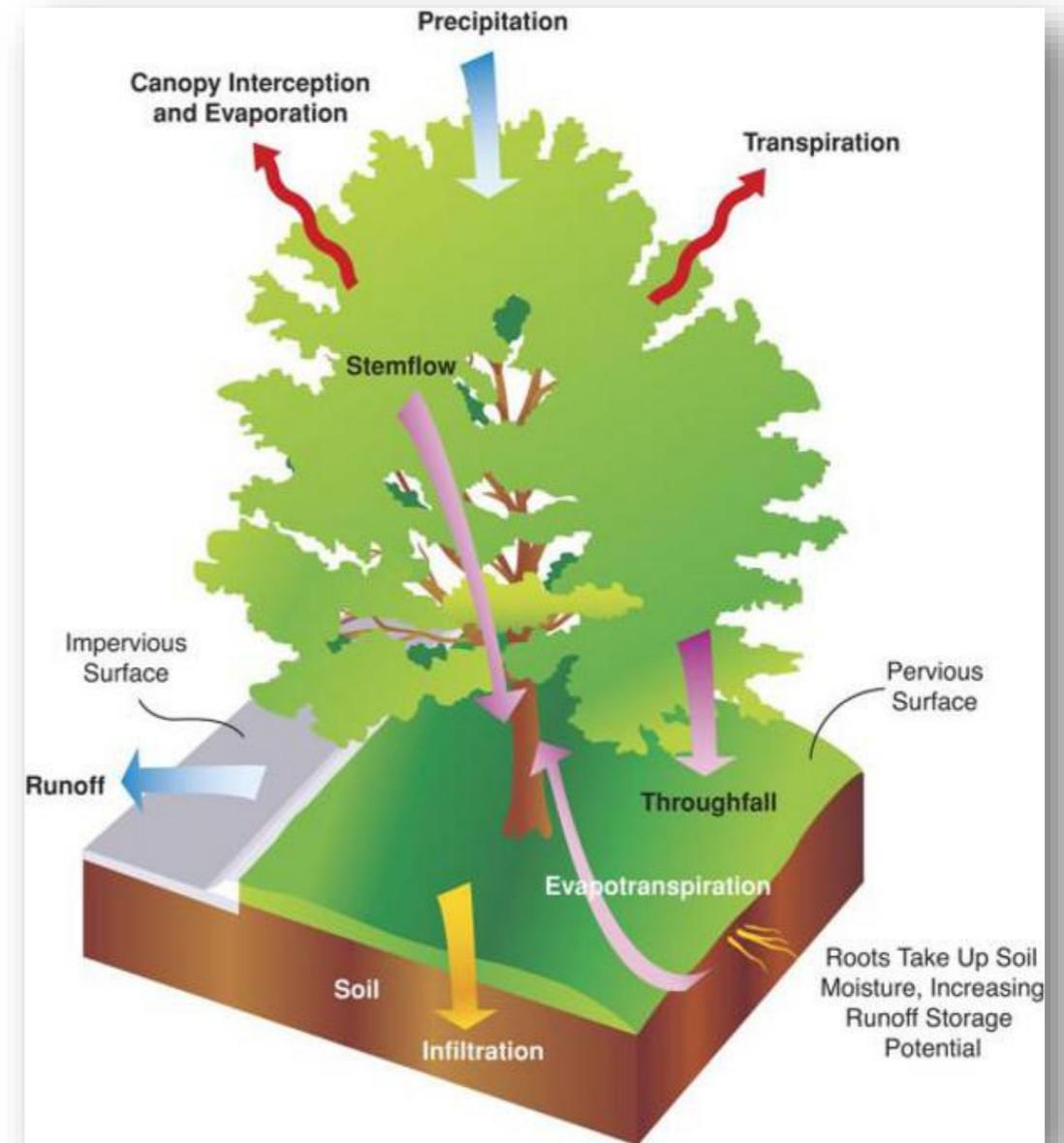
Benefits of Our Urban Forest



STORMWATER MANAGEMENT

Stormwater runoff can carry with it all sorts of pollutants (oil, gasoline, salts,) and litter into our watersheds, causing adverse effects on drinking water, aquatic life, and the health of the surrounding ecosystems. This non-point source pollution is even more prevalent in areas with an abundance of impervious surfaces that do not allow stormwater to be filtered by the substrate.

Trees in an urban environment contribute to stormwater management in several ways. First, their root systems are able to absorb runoff from the surrounding soil, acting as a mini-reservoir. This helps increase the infiltration rates and minimize the pollution going into sensitive aquifers. Even the small amount of soil surrounding urban trees provides a much needed permeable surface to absorb stormwater. Finally, the trees roots hold back sediment that could be eroded by rainfall.



Trees reduce stormwater runoff in a number of ways.

Benefits of Our Urban Forest



WILDLIFE

Trees are vitally important to the wellbeing of our wildlife community, especially in our urban areas. Most people recognize that trees are important to common animals like squirrels and birds. However, trees are also extremely important to a wide variety of insect life which in turn, supports the larger vertebrate animals. Oak trees for example, can support over 500 species of Lepidoptera and native trees tend to support a larger variety of insects than non-native trees do. Animals use trees for food, nesting and protection from predators.

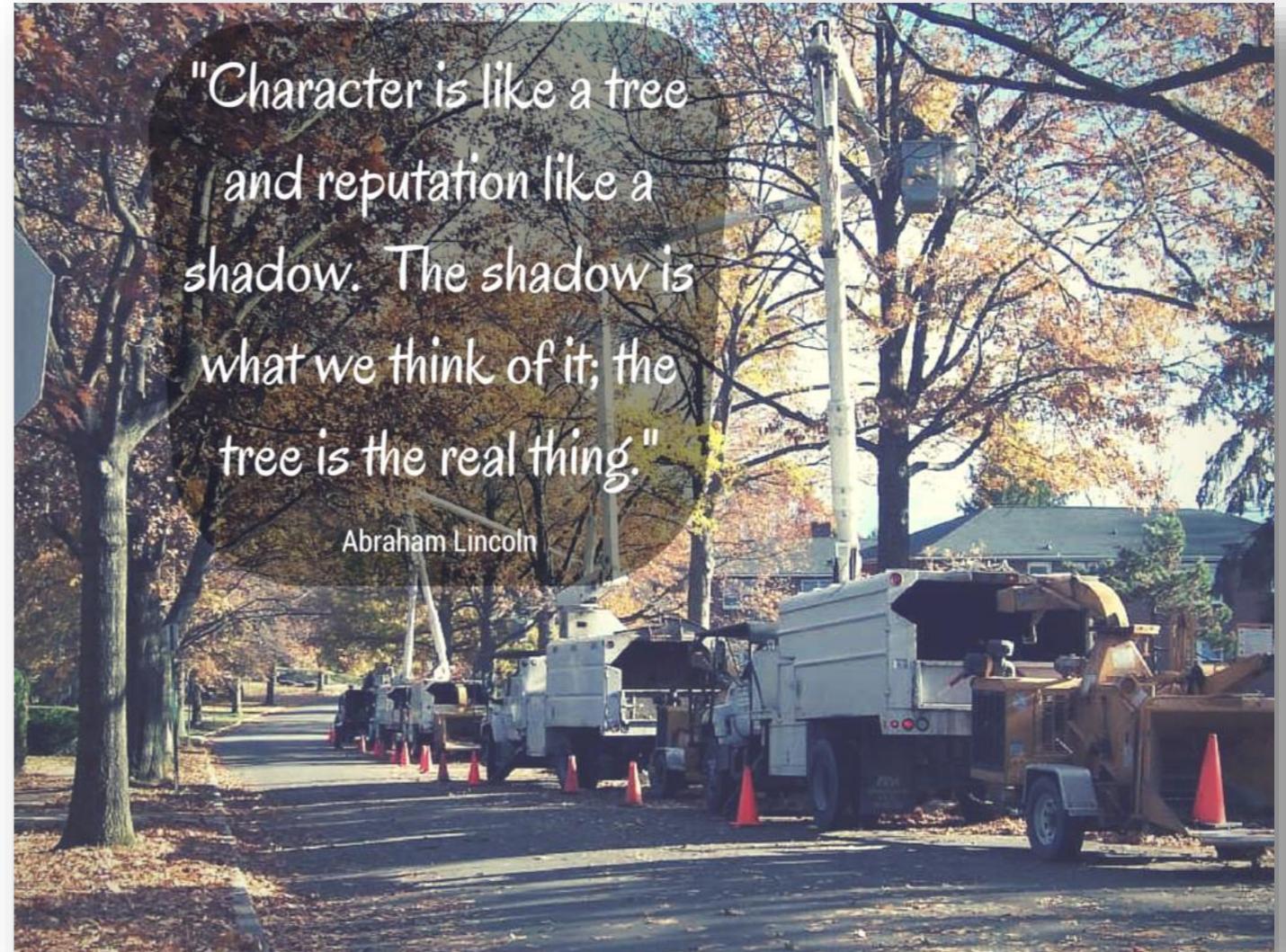


State College wildlife using the urban forest as a comfortable habitat

Management Policies



In recent years, State College Borough has planted approximately 150 street trees annually. As the pace of expansion in the Borough moderates, the number of new available tree plantings will decline, but the need to replace and maintain trees will continue, resulting in an uneven aged and diverse species composition important for maintaining the health, safety, and structure of the forest.





ADMINISTRATION

The Tree Division of the Public Works Department is responsible for the day-to-day implementation of the Borough's Urban Forestry Program. The Division consists of a working Foreman, Dendrician, and a Public Works Laborer who report to the Public Services Manager. Seasonal employees assist full-time employees.

- The Arborist is responsible for insuring urban trees receive proper care, developing work lists, and evaluating tree risks.
- Equipment used by the Division includes an aerial lift truck with chipper box, a t-tag dump truck, a pickup truck, and brush chipper. Other equipment, such as chainsaws, sprayers, and climbing gear are used by the Division.
- The Tree Commission functions as an appointed voluntary advisory board to the Arborist and Public Works Director. It makes recommendations concerning tree species, maintenance, and public education, and works actively with the Arborist in securing grants and contributions, conducting public hearings, and hearing property owner appeals.

TREE PLANTING

In recent years, State College Borough has planted approximately 150 street trees annually. As the pace of expansion in the Borough moderates, the number of new tree plantings will decrease, but the need to replace and maintain trees will continue, resulting in a balanced age distribution and diverse species composition important for maintaining the health and structure of the forest.

To initiate the tree planting process each year, the Borough Arborist prepares a list of proposed sites and species for the next planting year. The list includes locations where trees have been or will be removed (see Removals, page 26), where property owners have made specific requests, and other areas where there are open planting spaces. Using this list, Tree Commission members and the Arborist participate in two mid-summer drive-around tours to discuss and finalize planting recommendations. When the list is complete, owners whose properties are affected are notified of proposed tree removals and plantings and two public hearings are held, usually in the early fall. Objections to, or support for, the recommendations may be expressed at this meeting. The Commission and Arborist make every attempt to accommodate the wishes of the affected property owners while also taking into consideration the health and safety of the entire community forest. Since property owners are generally required to pay the cost of planting new trees (trees not designated as replacements for those recently removed), the property owner may decline to have the new tree not planted.

In selecting a tree for a particular site, careful consideration is given to trees nearby in the landscape, the size of the planting space, soil conditions, growth characteristics of the proposed tree, strength of the wood, troublesome fruit, disease and insect problems, and other factors. The following species are not recommended for street tree planting because of major problems associated with them: *Acer negundo*, boxelder maple; *Acer platanoides*, Norway maple; *Acer saccharinum*, silver maple; *Ailanthus altissima*, tree-of-heaven; most conifers; *Gingko biloba*, female gingko; and *Populus* species, hybrid poplars. The Borough is currently not planting ashes (*Fraxinus* spp.) because of concerns about the emerald ash borer. Restrictions on ash trees are listed in the Table of Recommended Street Trees (Appendix 11).

Management Policies



A goal of the Tree Commission is to improve the diversity of trees growing along Borough streets. Although monocultures may be perpetuated on individual streets or blocks, different species of trees with like characteristics can still provide the aesthetic appeal of single species plantings, if desired. When selecting trees for a specific site, architectural features of the neighborhood, scale of the area buildings, and existing trees are considered. Sizes, shapes, textures, and colors of trees should complement the surroundings. Trees that will grow large and spread are usually appropriate near large homes or office buildings. In areas with smaller homes and buildings, tree selection should reflect the building scale. Trees with an upright narrow form are available for use in confined spaces.

Over 1,500 trees, of 85 different varieties have been planted in the last ten years. Table 1 lists the top ten varieties and their percentage as compared to all new plantings. Compare this list with the top ten from the previous ten years. Half of the most popular trees planted ten years ago are not even considered any longer due to concerns for insect infestation, disease, or invasiveness.

Appendix 9 shows which trees were planted on individual streets over the last ten years. Of the 145 named streets identified in the Borough, trees have been planted on 122 or 84% of streets in the last ten years. One street in particular, South Allen Street, had 31 different varieties of trees planted along it. Several others have had at least 20 different varieties planted.

Street trees do not have to be planted in all available spaces. Private properties landscaped with a variety of trees and shrubs between the home and street may not need additional trees. Decisions on whether or not to plant in these situations are based on input from property owners and the Tree Commission.



(Left) Even though stump grinding is contracted out, Borough crews assist with clean up.
(Top) A utility contractor trims trees near power lines.

Management Policies



Table 1: Top Ten Tree Varieties Planted 2007-2016

RANKING	SPECIES/VARIETIES	TREES PLANTED	PERCENTAGE OF TOTAL
	Tulip Poplar	132	8.8%
2	Bloodgood London Planetree	96	6.4%
3	Red Oak	75	5.0%
4	Bur Oak	65	4.3%
5	Eastern Redbud	57	3.8%
6	Greenvase Zelkova	56	3.7%
7	Magnifica Hackberry	55	3.6%
8	Redmond American Linden	42	2.8%
9	Shumard Oak	42	2.8%
10	Skyline Honeylocust	39	2.6%
TOTAL		659	44%

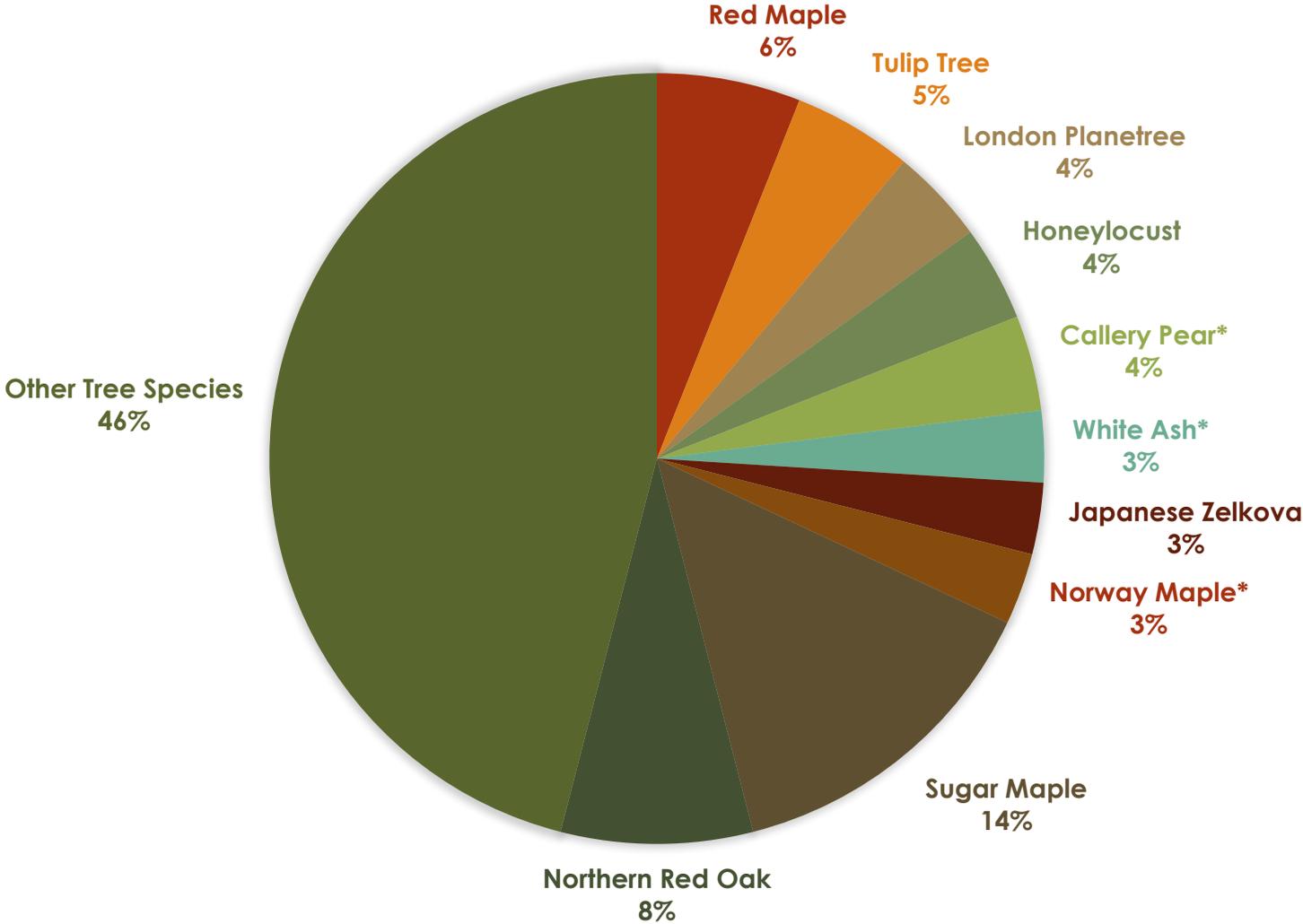
Table 2: Top Ten Tree Varieties Planted 1995-2006

RANKING	SPECIES/VARIETIES (Not all varieties designated)	TREES PLANTED	PERCENTAGE OF TOTAL
1	Green Ash	96	6.9%
2	Tulip Poplar	82	5.6%
3	Bloodgood London Planetree	75	5.4%
4	Red Oak	61	4.4%
5	White Ash	61	4.4%
6	Flowering Pear	60	4.3%
7	Hybrid Elm	48	3.4%
8	Turkish Filbert	46	3.3%
9	Sawtooth Oak	45	3.2%
10	Eastern Redbud	44	3.1%
TOTAL		618	44%



FIGURE 2. TREE SPECIES IN THE STATE COLLEGE URBAN CANOPY

*These historically planted species have been taken off the official tree list because of problems with invasiveness, disease, or insect susceptibility.





CARE OF NEWLY-PLANTED TREES

The Borough stakes and mulches all newly-planted trees. Six-foot hardwood stakes are used to secure such trees for approximately six months. Staking keeps the trees steady, allowing roots to become established, offers some protection from vandalism and other injuries, and advertises our tree planting program. All stakes are removed following the first growing season. Hardwood mulch, generated through the tree removal and pruning program, is placed around trees to conserve moisture in the root zone, protect the base of the tree from mechanical damage, and inhibit competing vegetation. At planting, two to four inches of mulch are placed in a circle two to three feet in diameter around, but not touching, the trunk. Adjacent homeowners are encouraged to continue this practice as the tree grows.

TREE MAINTENANCE

Efficient maintenance practices increase the benefits of trees, keep trees in good health, and ensure they are in a safe condition throughout their useful life span. Since maintenance costs, including associated labor cost, will constitute the largest part of the tree program budget, efficiency of operation is especially desirable.

PRUNING

Periodic pruning of every tree is essential to prevent interference of trees with people, vehicles, or other urban features; reduce storm damage; improve tree health and crown structure (branch scaffolding); and to remove hazardous branches or trunks. Some species and cultivars require much less pruning than others. This characteristic receives careful attention when planting decisions are made, as pruning entails major expenditures.

Periodic pruning at planned intervals in the life of the tree will achieve these goals at reasonable costs. Newly-planted trees should be pruned, or at least checked, in the first or second year, then again about the fifth year, and thereafter at about five-year intervals. Seasonal considerations affecting pruning schedules include availability of workers, presence of disease or insect vectors, favorable weather, and tendency of sap to drip from some species.

Several categories of workers may perform pruning tasks. Seasonal and full-time Borough employees, who do pruning, are well-trained in the proper standard techniques. Property owners are requested not to prune trees. They are to contact the Borough Arborist to request pruning or obtain a permit that will allow other qualified people to prune the trees. Private tree firms also may perform pruning tasks for the Borough through contracts or for emergency work.

Contractors employed by electric or other utilities are made fully aware of the Borough pruning standards, and periodically monitored; commercial arborists who perform contract work for the Borough are supervised similarly.

Standards for root pruning are enforced by the Arborist whenever construction projects impact Borough trees. A comprehensive guideline, "Rules and Regulations for Arbor Work" (Appendix 5) has been developed for the Borough and must be used by anyone doing work on Borough trees. In addition, a "Tree Permit" (Appendix 6) must be obtained from the Public Works office before any planting, removal, or pruning can be done on or near a Borough-owned tree by people not employed by the Borough.

WATERING

Watering is necessary only when droughts occur during April to October, or as a part of the planting program. The onset of drought conditions cannot be predicted beforehand, so equipment for watering must be kept in readiness. Workers will need to be diverted from other tasks when watering becomes necessary.

Priorities for watering are related to the degree of risk that deprived trees may be injured or die. In descending order of risk are 1) bare root trees, 2) trees in containers, 3) all trees planted during the current spring or the previous fall, 4) drought-sensitive trees planted one to two years previously, and 5) older trees in sidewalk cuts. Newly-planted trees are especially vulnerable because their root systems have been greatly reduced through transplanting. Adjacent property owners are encouraged to water newly planted trees. They should contact the Borough Arborist for recommended amounts or frequency of watering. Trees in planting containers and large trees in sidewalk cuts should have installation systems specially designed for watering so adequate volumes can be applied rapidly. Some trees will require watering during hotter, drier periods in most growing seasons. Timing can be optimized by monitoring soil moisture or transpiration, but under most circumstances the good judgment of the Arborist will suffice.



FERTILIZING

Fertilizing is normally not required if appropriate soils are present or provided when trees are planted. Fertilizing is considered only when deficiency symptoms or other signs of poor health jeopardize survival or normal growth of trees that are especially important to the landscape. In such cases the prescription for fertilizer treatments should be based on soil tests, research results, or other reliable information.

CONTROL OF DISEASES AND INSECTS

Damage by most diseases and insects can be kept at tolerable levels by preventive measures including proper tree species, proper planting and pruning, and maintaining vigor by watering and fertilizing. Birds and parasites are important control agents and impacts of pesticides on them is considered before use.

Chemical or biological pesticides are applied only when the threat of severe damage is imminent. Examples of imminent threat include severe insect infestation, prolific gypsy moth egg masses, or predictable annual exposure to Dutch elm disease or oak wilt. Treatments are designed according to the best available scientific information, with provision for safety and advance notice to residents who may be concerned. Property owners must not apply any type of chemical or biological control materials to Borough trees but should notify the Borough Arborist of suspected problems.



(Above) Declining Ash Tree from Emerald Ash Borer Damage
(Right) Sidewalk accommodations to minimize damage to tree

TREE/SITE CONSIDERATIONS

Expansion of the roots of healthy street trees sometimes conflicts with flat and uniform sidewalks. State College Borough has a rigorous sidewalk inspection program, in which residents incur costs for repairs to their sidewalks. When homeowners or contractors attempt to repair sidewalks, trees can be seriously injured or made unsafe. The Borough Arborist and Engineer are consulted to assist with the best possible solutions to these situations.

In accordance with specifications of the Borough Engineering Department, certain sidewalk accommodations can be made that enable proper repair of sidewalks while minimizing damage to trees and their roots. Some solutions include constricting the sidewalk around a tree, curving the walk onto private property, installing root barriers, or a combination of these measures. Root barriers, installed between the sidewalk and tree, are intended to force roots deeper under sidewalks and prevent damage to trees and sidewalks.



Tree/sidewalk conflicts can best be avoided by planting the right tree in the right place. Width of the planting space is considered prior to tree selection, so that a tree will not outgrow its growing space. Adhering to the Borough's Recommended Tree list (Appendix 11) is likely to minimize future problems.

Management Policies



Example of metal curbing used to protect tree roots.

Concrete curbs create a barrier to tree roots. In several areas of the Borough, metal curbing has been installed around the roots of large trees. Unlike standard concrete curbing, metal curbing requires little excavation and can be curved around large roots while not interfering with stormwater runoff in the gutter. Metal curbing can be installed to preserve existing trees and later replaced with a concrete curb after the tree has been removed for other reasons. If valuable trees are in jeopardy, this procedure is considered during road construction or widening projects.

The Tree Commission has certain authority over for tree lawns or grass areas between the sidewalk and the street curb (Ordinance 802, Appendix 4). No impervious material may be placed within this area without Tree Commission or Arborist approval. Any excavation within the root zone of Borough-owned trees must be approved by the Borough Arborist and a Tree Permit must be obtained.

In recent years, this ordinance has been used to regulate vegetable and flower gardens between the curb and sidewalk. Installation of these types of gardens is permitted but certain regulations must be followed. All gardens placed in the public right-of-way must be approved by the Borough Arborist and entered into the Public Garden Registry.



Typical 5 x 5 tree planting pit covered by a cast iron tree grate in Downtown State College.

In some areas, particularly downtown, no tree lawns exist for the placement of street trees. "Tree pits" have been installed where adequate room exists. The most common pit is a 5-foot square area in the sidewalk opened for tree planting. These pits have been overlaid in the past with a loose arrangement of bricks to permit pedestrian traffic, while providing open space for tree growth. Some air and water reach the rooting zone, but the covers require considerable maintenance. Recently the bricks have been replaced with cast iron tree grates. These grates require less maintenance and allow for the attachment of metal tree guards to protect newly-planted trees. Other alternatives such as "rubber" tree grates produced from shredded tires may be used on a trial basis. Wherever possible, larger planting areas or different planting techniques (e.g., structural soil) should be used.



TREE REMOVALS

Just over one percent of the Borough's 8,000 park and street trees are removed and replaced annually. Removal is practiced primarily because of disease or insect infestation, injury, or because trees may present a risk to the public or to adjacent trees. Trees may also be removed for infrastructure improvements or property owner request. Property owner requests to remove trees are considered on a case-by-case basis by the Tree Commission.

If granted, the owner will generally be required to pay the determined value of the Borough's tree or trees. The Tree Commission has generally been responsive to landowner requests when significant safety issues have been involved in cases of particularly obnoxious fruit problems such as female ginkgos and walnuts, or when the health of the tree is obviously declining. On the other hand, the Tree Commission has been less sympathetic to requests involving aesthetics, sidewalk problems, difficulty growing grass, or minor fruiting problems such as maples producing large quantities of seed. Depending on the circumstances, property owners who request that a tree be removed may be required to reimburse the Borough for the value of the tree.

It is the responsibility of the Arborist or the Public Works Director to supervise removal of seriously damaged, diseased, disfigured trees, or those that may constitute a risk to the public within the Borough right-of-way. An attempt is made to remove deteriorating trees and replace them with new trees as unobtrusively as possible. This involves planned, gradual removals and replacements over time. In a process similar to that for tree planting, the Borough Arborist inspects all trees each year and compiles a list of trees to be considered for removal. Candidates for removal are chosen by visually inspecting trees for decline or structural defects, requests by the public, or through internal decay detection procedures. Members of the Tree Commission and the Arborist participate in drive-around tours in mid summer to assess the trees on this list.

Written notice of planned removal of trees on rights-of-way abutting private property is given to the owner of the property adjacent to the tree to be removed. Trees are clearly marked as candidates for removal and interested parties are invited to attend a public hearing on the proposed removals. Notice of planned removals also is provided to the Borough Council and the Mayor as directed in Ordinance 1618 (Appendix 1). The Borough publishes time and place of the planned meeting and a news release is provided to call attention to the hearings.

Residents are encouraged to express their concerns or support for the proposed removals at the public hearing. Evidence and opinions presented at the public hearing are taken into consideration as the Tree Commission makes a final decision on what trees to recommend for removal. Property owners may appeal decisions to remove or not to remove trees to the Director, Council, and Mayor.

Unless a tree is an immediate hazard, removal usually is planned for the winter months when trees are dormant and workloads are lighter for the tree crew. Trees that are judged to be immediate hazards by the Borough Arborist are removed as quickly as is necessary to alleviate the hazard, without any action required by the Tree Commission. Policies dealing with the removal of potentially hazardous trees and immediately hazardous trees on private property have been clearly addressed under Borough Ordinance 1618 (Appendix 1).





CHALLENGES WE FACE

INVASIVES

One of the more critical issues facing urban landscapes today is the pervasiveness of invasive plant species. Parks and private landscapes are being overrun by numerous exotic and invasive plants. The list includes not only shrub and herbaceous plants such as Japanese honeysuckle, privet, multiflora rose, garlic mustard and crown vetch but also tree species like Norway maple, flowering pear and ailanthus. Invasives can negatively affect landscapes by excluding or outcompeting native species, alter native animal and insect populations, and create impenetrable monocultures. For this reason, the Borough's Recommended Tree List may include well adapted non-native trees but not invasive ones. Combating these invasives can be done by mechanical or chemical means. Both alternatives are costly and time consuming.

CLIMATE CHANGE

With a predicted rise in average temperatures and severe weather increasing, Arborists everywhere have needed to alter their programs to anticipate for more droughts and wet seasons, more severe storms, new insect and disease infestations, and tree ranges moving north affecting recommended tree lists. Larger budgets must be allotted to adjust for these unknown factors.

LANDSCAPING DAMAGE

Trees can be adversely affected by a number of common landscaping practices. A common mistake homeowners and landscaping contractors make is to use too much mulch piled against trunks. Excessive mulch can cause the protective bark and stabilizing roots of a tree to rot. Often, the roots will grow into the mulch, girdling the tree. This can potentially kill the tree. Mulch should be kept away from the base of the trunk and be no deeper than three inches.

The base of trees can also be damaged by mechanical weed control devices. People often mistakenly expect trees to be much harder than the weeds they are trying to cut. However, if proper precaution is not used, significant damage can be sustained by the tree. The tree's base opens it up to infections, leading to impaired function of the tree and eventual death.

Salt damage from winter maintenance also negatively affects street trees. Anti-icing products typically used on sidewalks can damage or kill adjacent landscape plants and recently planted trees. Anti-icing products should be used sparingly around trees and snow should never be dumped at the base of trees. Road salt has been a fact of life for many years and actually limits the type of trees that can be planted in some locations, particularly on slopes where there is a tendency to use more salt. Finally, improper pruning can also impair the tree's health and growth. The National Arbor Day Foundation provides Keys to Good Tree Pruning on its website (<http://www.arborday.org/trees/tips/keys-to-pruning.cgm>). Before making any cuts to a tree's branches, understanding the principles of pruning is essential. For this reason, the pruning of Borough trees is only to be undertaken by authorized personnel unless a pruning permit is obtained. Property owners can be fined for any damage done to street trees by improperly pruning them.

VANDALISM

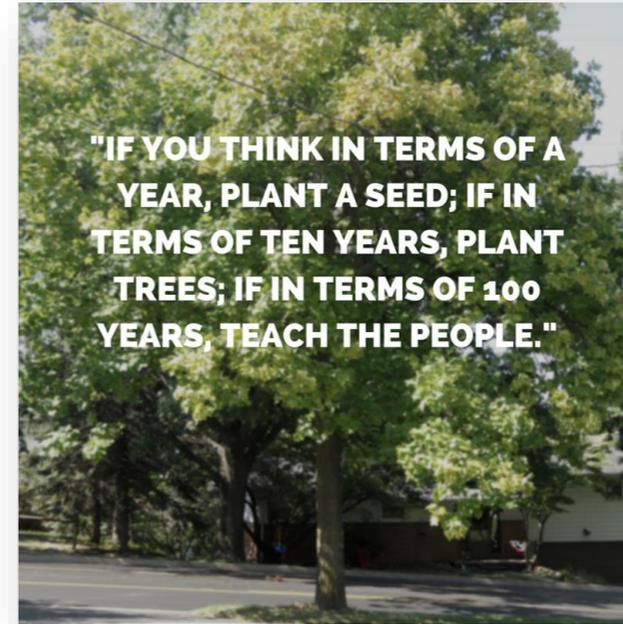
Unfortunately, whether trees are young or old, they can be damaged or killed by human misconduct. Young trees are more susceptible to death by vandalism but sometimes more established ones are targeted as well. Citizens are encouraged to report any suspected vandalism. According to the Borough's Shade Tree Ordinance, anyone found guilty of vandalizing Borough trees, including adjacent homeowners, can be fined up to \$600 plus the lost value of the tree.

Public Outreach



(Above) Arbor Day tree planting held with residents of Foxdale Retirement Village.

(Right) Arbor Day tree planting held with residents of Corl Street Elementary School.



Public Outreach



ENGAGEMENT

There are a number of ways residents of State College can be involved with their urban forest. From self-guided tours to participating in Tree Commission meetings, people can celebrate our trees and contribute to important decisions. Citizens are encouraged to stay engaged with the process of caring for these valuable resources.

TREE WALK & TREE RIDE

The Tree Walk and Tree Ride are self-guided tours that highlight the biodiversity of our street trees and explain some of our sustainability projects. The Tree Walk focuses on species near downtown while the Tree Ride appropriately follows a popular bicycle route. Both are available on the Borough's website and as printed pamphlets at the Public Works Department office in the Municipal Building.

VOLUNTEER EVENTS

Often the Borough will coordinate with local non-profits and volunteers to plant trees or flower beds, remove invasive species, and maintain public parks and trails. These volunteer efforts are invaluable to the quality of our natural community. Please feel free to reach out to us with volunteering ideas. These activities benefit our local environment and are a key component to State College's thriving civic engagement.

PUBLIC COMMENT PERIODS

Another way to stay engaged, that does not involve getting your hands dirty, is attending Tree Commission meetings. All Commission meetings are open to the public and include a public comment period in which you can express your ideas or concerns about trees. Agendas are made available on the Borough's website prior to all meetings and minutes are published afterwards.



(Above) Is the Borough's Tree Walk Brochure

(Above Right) Arbor Day at Corl Street Elementary School

(Right) Volunteer maintenance of Westerly Parkway Wetland Education Center





Glossary of Selected Terms

Arbor Day	An unofficial holiday held in the United States and some other countries to celebrate the planting of trees. Normally held on the last Friday of April in Pennsylvania
B & B trees	Generally saplings or small trees harvested from a nursery with roots and surrounding soil formed in small ball wrapped in burlap.
Bareroot Trees	Generally saplings or small trees harvested from the nursery with roots intact but without the surroundings soil medium.
Branch Structure (Scaffolding)	The spatial arrangement of branches on the main bole of a tree.
Caliper	The trunk diameter of a tree measured six inches above the ground line.
Callus Tissue	The rapidly growing tissue that forms around an injured or pruned plant surface.
Certified Arborist Program	A program regulated by the International Society of Arboriculture that certifies Arborist through testing, training and authenticity of experience.
Container Grown Trees	Generally saplings or small trees grown and shipped in some type of pot filled with a soil medium.
Corrective Pruning	Pruning to eliminate or reduce future problems with a tree or improve branch structure.
* Culkivar	A variety of plants (tree) created or selected for selected benefits and maintained through cultivation.
Deadwooding	Removal/pruning of dead, dying or decayed limbs from a tree.
Dendricians	Non-management tree workers in State College Borough.
* Ecosystem	“A biological community together with its environment, functional as a unit.”
Evapotranspiration	Total moisture lost by living organisms through evaporation of the surface tissue and through the process of transpiration.
* Geographic Information System (GIS)	“A computer application system used to store, view and analyze geographical information, especially maps.”
Immediate Hazard	Trees (public or private) which in the opinion of the Borough Arborist or Director, constitutes a hazard to the public. Requires removal or remedial action within two weeks from notification.
Potential Hazard	Trees (Private or public) which in the opinion of the Borough Arborist or Director are seriously damaged, diseased, disfigured or constitute a hazard to the public or property but do not necessitate immediate action.

Impervious	Solid surfaces such as concrete or pavement that are impossible or nearly impossible for moisture to penetrate.
International Society of Arboriculture	An independent Professional organization representing municipal arborist, consultants, academia, and others working in the urban and community tree industry.
Invasive Trees	Trees, usually non-native, that have a tendency to spread through seed, roots or tissue into unwanted or natural areas at the expense of native plants
Limbing-Up	The removal of the lower limbs on a tree that may interfere with pedestrians or vehicles. In the Borough trees are limbed-up 14 feet over the roadway and 7 feet over sidewalks.
* Microclimate	“The climate of a small specific place within an area.”
Monocultures	Exclusive planting of one species or variety of trees on a block, street or area. Generally considered high risk for disease or insect infestation.
National Arbor Day Foundation	The Arbor Day Foundation is a 501 non-profit conservation and education organization founded in Nebraska in 1972 by John Rosenow. It is the largest membership organization dedicated to tree planting. (Wikipedia)
Native Trees	A tree occurring within its pre-European settlement range
Non-Point Source Pollution	Nonpoint source pollution generally results from land runoff, precipitation, atmospheric deposition, drainage, seepage or hydrologic modification. Nonpoint source (NPS) pollution, unlike pollution from industrial and sewage treatment plants, comes from many diffuse sources. (EPA)
Structural Soil	An engineered planting medium composed of specified portions of loamy soil, angular stone and Hydrogel, which can be compacted to accommodate a paved surface, but that, retains open pore space for root growth.
Tree City USA	An Arbor Day Foundation sponsored program in cooperation with the US Forest Service, Urban & Community Forestry Council and National Association of State Foresters. It is a nationwide movement that provides the framework necessary for communities to manage and expand their public trees.
Understory Trees	Trees, which in woodland settings, survive and flourish in shade to partial shade. Generally ornamental, smaller growing trees.
Urban Forest	Trees, shrubs and other plants growing in and around populated areas when considered as a unit.
Urban Forestry	The management of forest and trees (planting, trimming, removal, etc.) where people live.
Vandalism	“Willful or malicious destruction of public or private property.” In this context referring to damage to street or park trees.

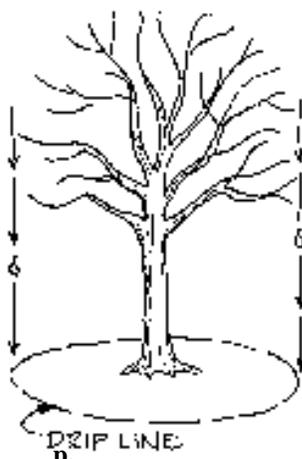
* The American Heritage College Dictionary. 4th edition. 2002. Boston/New York: Houghton Mifflin Company.

Appendix 1. State College Borough Shade Tree Ordinance 1618

PART A: TREES

Section 101. Definitions. For the purpose of this ordinance, the following terms shall have the following meanings:

- a. **Arborist** shall mean the Arborist/Horticulturist of this Borough of State College, supervised by the Director of Public Works.
- b. **Borough.** The Borough of State College.
- c. **Commission.** The Tree Commission of the Borough.
- d. **Council.** The Council of the Borough.
- e. **Department.** The Department of Public Works of the Borough.
- f. **Director.** The Director of the Department of Public Works or his/her designee.
- g. **Manager.** The Manager of the Borough or his/her designee.
- h. **Notice.** Notice shall mean either publication in a newspaper of general circulation once a week for two consecutive weeks or written notification sent by first class mail to property owners immediately affected, or notification posted on the affected tree. Notice of public hearings shall be published and sent to affected property owners within 30 calendar days of the hearing date.
- i. **Person.** Any individual, firm, partnership, association, corporation, company or organization of any kind and includes the plural of each.
- j. **Public Area.** Any public right-of-way, park, easement or other area under the control of the Borough.
- k. **New Tree.** Any tree planted by the Borough in a public right-of-way, except a replacement tree.
- l. **Replacement Tree.** A tree planted in a location formerly occupied by another tree.
- m. **Work Days.** Monday through Friday, excluding legal holidays when Borough offices are closed.
- n. **Tree Protection Zone.** The 3-dimensional area within the drip line, including from the crown to the root system of each public tree.
- q. **Tree Drip Line.** A line derived by the horizontal line extending along a radius from the trunk of a tree to the outermost tips of branches.



r. **Public Tree.** Any tree located in a public right-of-way, park, easement, or other area under the control of the Borough.

(Ordinance 1254, September 25, 1989, Section 101, as amended by Ordinance 1618, April 3, 2000, Section 101.)

Section 102. Tree Commission.

a. **Creation and Membership.** A Tree Commission is hereby created which shall consist of 5 members, all of whom shall be residents of the Borough. At least 2 of the members shall be professionals in forestry, horticulture, plant pathology, entomology, landscape architecture or related fields.

Members of the Commission shall be appointed by Council for staggered terms of 3 years. The first member shall be appointed to serve 1 year. The second and third members appointed shall serve 2 years, and the fourth and fifth members appointed shall serve 3 years. Thereafter, each member appointed shall serve 3 years.

The members of the Commission shall serve without pay but they may be reimbursed for actual authorized expenses within the funds budgeted for such activities by Council.

A vacancy on the Commission, which occurs for reasons other than the expiration of a term, shall be filled by Council for the unexpired portion of the term.

b. **Organization, Records and Meetings.** Members of the Commission shall elect a Chairman, Vice-Chairman, and such other officers as they may determine necessary. All officers shall be eligible for reelection.

The Commission shall keep a written record of its meetings in accordance with law. The Commission shall provide Council with minutes and annual or other reports of its activities, as may be requested or required.

For the purpose of taking action, a quorum of 3 members must be present.

c. **Responsibilities.** The Commission shall have the following responsibilities:

(1) The Commission shall advise the Director and the Arborist on the planting, maintenance and removal of trees. Such advice may include:

- (a) Recommendations of tree species for public areas;
- (b) Recommendations for controlling diseases and pests damaging trees;
- (c) Recommendations for tree maintenance;
- (d) Recommendations for a public education/information program concerning the importance and care of trees; and
- (e) Recommendations on Departmental rules and regulations regarding tree planting, maintenance and removals.

(2) The Commission, through the Department, shall prepare for Council's approval a Plan for street trees in the Borough. The plan should include a list of existing trees (including species and location). The Plan should also include suggested policies for the planting of trees (including suitable species for various environments and spacing of trees). The Plan may also identify locations for new plantings, desirable specie changes, etc.

In developing the plan, the Commission should consult with the Director and Arborist and may consult with other Borough Authorities, Boards and Commissions. The Plan should recognize the benefits of a public tree program and the need to control expenses (both in the short- and long-term) of planting, maintenance, removals, clean-up and all other costs associated with a tree program. The

Commission shall review the Plan annually and/or at other times, at the request of the Director.

(3) The Commission may, with the approval of Council, solicit and accept grants and contributions on behalf of the Borough. All funds obtained by the Commission shall be expended for the specific purpose(s) or under the stipulations set by the contributor or the Commission with specific approval of Council.

(4) The Commission shall conduct all Public Hearings required by this Chapter. After hearing testimony, the Commission may make recommendations to the Director concerning the subject of the Hearing.

(5) In accord with Section 103.d of this ordinance, the Commission shall hear appeals by property owners of notifications by the Director to eliminate immediate hazards on private property.

(6) The Commission may, at the request of the Arborist, review land development plans to determine the impact of such plans on public trees and to make recommendations on steps needed to mitigate said impacts.

(Ordinance 1254, September 25, 1989, Section 102, as amended by Ordinance 1618, April 3, 2000, Section 102.)

Section 103. Authorized Activity. The Department is hereby authorized, but is not limited to, to perform the following activities in regard to trees:

a. Adopt Policies Rules and Regulations. Policies, rules and regulations may be adopted to control tree trimming, cabling, spraying, root cutting, and other work on trees by contractors, abutting property owners, and/or others.

b. Select and Plant New Trees in Public Areas. If a plan has been approved by Council in accord with Section 102.c, selection and planting of new trees should generally be in accord with that Plan. Prior to the planting of any new tree in the right-of-way, a Public Hearing shall be held to hear comments from property owners who will be assessed. Notice of the Hearing shall include the address, location, and species of trees to be planted.

c. Potentially Hazardous Trees on Private Property. Trees on private property, which, in the opinion of the Arborist or Director, are sufficiently damaged, diseased or in such condition as to contribute a potential hazard to the public or to other trees on public property, may be ordered removed, partially removed, or treated. Property owners so ordered shall have 10 days following receipt of the order to appeal, through the Director, to the Tree Commission. The Tree Commission shall hear the appeal and make a determination within 10 days of the receipt of the appeal. Decisions of the Commission shall be appealable as provided by law. Appeals to the Tree Commission shall be recorded and decisions shall be written and shall include findings of fact. Following a determination by the Commission that said tree should be removed, partially removed or treated, the property owner shall comply within 5 days. If the property owner shall fail or refuse to remove or treat said tree, the property owner shall be subject to the penalty specified in Section 108.b. In addition, the Director is authorized to remove said hazardous tree or portions thereof. All costs for such work shall be assessed and, if not paid, shall be a lien against the property in accord with Section 104.

d. Immediate Hazards on Private Property. When, in the opinion of the Arborist or the Director, a tree or portion(s) of a tree on private property which is infected with Dutch Elm Disease or otherwise constitutes an immediate hazard to the public or other trees on public or private property, the property owner shall immediately be notified of the hazard and requested to eliminate it. If the hazard is not eliminated, the matter shall be considered by the Commission at a public meeting. In the absence of a quorum of the Commission, the matter shall be considered at the next

meeting of Borough Council. Upon determination that the tree is an immediate threat or hazard, the Director is authorized to remove or order the removal of the tree or portion of the tree after 5 days' notice to the property owner. All costs for such work shall be assessed and, if not paid, shall be a lien against the property in accord with Section 104.

e. Potentially Hazardous Trees in Public Areas. Trees in public areas, which, in the opinion of the Arborist or the Director, are seriously damaged, diseased, disfigured or constitute a hazard to the public or to trees on private property, may be removed or pruned by the Director. Prior to tree removals from public rights-of-ways, notice shall be provided to the property owner(s) immediately adjacent to the tree(s) to be removed. Notice shall also be provided to the Council and the Mayor. The property owner may appeal the removal to the Director, Council and the Mayor. If not satisfied with the Director's decision, the property owner may appeal to the Manager. At any time prior to a decision by the Manager, the property owner, the Director or the Manager may request an advisory opinion by the Commission.

f. Immediate Hazards in Public Areas. When, in the opinion of the Arborist or the Director, a tree or portion(s) of a tree in public areas constitutes an immediate hazard to persons or property, the Arborist or Director shall remove the hazard without notice or appeal.

g. Trees/Maintenance Operations. Maintain all trees; administrative budget involving tree maintenance; reporting on tree maintenance activities.

h. Review of Land Development Plans.

(1) Concept Plan. The Planning Department shall forward 1 copy of any concept (preliminary) plan submitted for review to the Planning Department to the Arborist, or his or her designee, for a review of the proposed land development's affect on any public tree(s). Within 15 working days of the receipt of a concept plan from the Planning Department, the Arborist, or his or her designee, shall provide the Planning Department with written comments on the affect of said land development on any public tree(s).

(2) Final Plan. The Planning Department shall forward 1 copy of any development plan submitted for review and approval to the Planning Department to the Arborist, or his or her designee, for a review of the proposed land development's affect on any public tree(s). Within 15 working days of the receipt of a development plan from the planning department, the Arborist shall provide the planning department with written comments on the affect of said land development on any public tree(s).

i. Review of Zoning Permit Applications. All applications for driveway permits and zoning permits for demolition, construction or expansion of any 1- or 2-family dwelling shall be referred to the Arborist, or his/her designee, for review as provided for hereunder.

Within 2 working days of the receipt of the driveway or zoning permit application from the Zoning Officer, the Arborist shall determine the need for and location of the tree protection zone fencing around all public trees located on or adjacent to the site.

Where determined necessary by the Arborist or his/her designee, the property owner shall install or cause to be installed a staked construction fence at least 4 feet high, or alternative as approved by the Arborist, around all portions of the tree protection zone located on public property, excluding any portions occupied by sidewalks, street cart way, curbs/gutters or a driveway.

No activity is permitted within the tree protection zone without a permit issued in accordance with Section 106 of this ordinance. Any activity occurring within a tree

protection zone in violation of this ordinance shall be addressed as provided for in Sections 107 and 108 of this ordinance.

(Ordinance 1254, September 25, 1989, Section 103, as amended by Ordinance 1618, April 3, 2000, Section 103.)

Section 104. Payments, Assessments, Liens. The cost of planting new trees and planting in the public areas, together with the cost of necessary guards, curbing, grates, sidewalks, or grading, shall be paid by the owner of the abutting property. Replacement trees shall be planted at no cost to the owner. All costs of tree removal, partial removal, or treatment ordered by the Arborist, Director, or Commission, for trees on private property shall be paid by the owner of the property on which such trees are located. Owners shall have an opportunity to make written objections to proposed assessments, which objections shall be considered by the Council prior to approval. All costs incurred in repairing or replacing trees, as provided in Section 108, shall be assessed.

The amount each property owner is to pay shall be determined and certified by the Director to the Manager and approved by Council. Thereafter, the Finance Director of the Borough shall cause 30 days' written notice to be given to each person against whose property an assessment has been made. The notice shall state the nature and amount of the assessment and the time and place for payment thereof.

The amount assessed against the real estate shall be a municipal claim from the time of approval by the Council and, if not paid within the time specified in the notice, may be filed and collected by the Borough Solicitor in the same manner as municipal claims are, by law, recoverable.

(Ordinance 1254, September 25, 1989, Section 104, as amended by Ordinance 1618, April 3, 2000, Section 104.)

Section 105. Easements. The Borough is authorized to accept easements from property owners to plant and maintain trees on private property within 12 feet of the boundary of a public area. Such easements shall be in writing, executed, and acknowledged by such property owners, and shall be recorded in the office of the Centre County Recorder of Deeds. (Ordinance 1254, September 25, 1989, Section 105, as amended by Ordinance 1618, April 3, 2000, Section 105.)

Section 106. Permits. The Department is authorized to issue permits for certain work on Borough trees by persons not Borough employees. Permits shall be required for the following acts:

- a. Planting, treating, pruning, removing, or otherwise disturbing any tree located in public areas or within any tree protection zone;
- b. Trimming, pruning, or removing any tree or portions thereof, including limbs and roots, if such tree or portions thereof may reasonably be expected to fall in public areas and cause damage to persons or property, or interfere with pedestrian or vehicle traffic using the public rights-of-way or public easements;
- c. Placing in public areas or within any tree protection zone, either above or below ground level, a container for trees, shrubs or other plants;
- d. Transplanting any tree located in public areas or within any tree protection zone;
- e. Attaching any rope, wire, nail, sign, poster, or similar man-made object to any tree located in public areas;
- f. Damaging or cutting roots by tunneling, trenching, or digging in public areas or within any tree protection zone for the purpose of sidewalk, curb, pipe, conduit, electric wire, etc., installation and repair.

- g. Storage of construction materials within the tree protection zone;
- h. Soil compaction within the tree protection zone; or
- i. Construction of a cur cut and/or driveway within the tree protection zone.

Permits shall be in writing and shall specify the work permitted and the time period, not exceeding 1 year. All work shall be performed in accord with the Department's *ARules and Regulations for Arbor Work*. Such permits may be revoked by the Director if the terms and conditions of the permit or the *ARules and Regulations for Arbor Work* are violated. Revocations may be appealed, in writing, to the Manager within 5 workdays of that notice of revocation.

Nothing in this Section shall be construed to exempt abutting property owners, public utility companies, or other agents from any of the requirements of this Chapter.

(Ordinance 1254, September 25, 1989, Section 106, as amended by Ordinance 1618, April 3, 2000, Section 106.)

Section 107. Violations. It shall be unlawful for any person to carry out any of the following activities without a valid permit issued by the Department under the provisions of Section 106 of this Chapter:

- a. Cut, break, prune limbs or trunks, climb with spikes, disturb or prune the roots of, store construction materials or compact soil, or otherwise injure or destroy trees in any public area or to authorize such actions. It shall not be considered a violation to trim limbs or roots or perform other activities with a valid permit from the Department specific to the tree(s) involved in accord with Section 106 of this Chapter.
- b. Cause or authorize a wire or other conductor charged with electricity to come into contact with any tree in any public area or within any tree protection zone in a manner that may injure or kill it without a written permit from the Department, specific to the tree(s) involved.
- c. Cause or authorize in any public area or within any tree protection zone, any oil, gasoline, herbicide, paint, brine, hot water, steam or other gas, liquid or solid substances deleterious to the tree to contact any tree or to enter the soil about the base or root system of a tree in any manner that may injure or kill it.
- d. Interfere, cause or authorize an interference with the Borough or any of its agents or employees while they are engaged in planting, inspecting, maintaining or removing trees.
- e. Supervise or authorize construction, alterations, repairs or demolition activities in the vicinity of any tree in any public area or within any tree protection zone without first placing sufficient guards or protectors as shall prevent injury or destruction of said tree arising out of such activities. The placement of guards or protectors shall be in accord with Department rules and regulations or with written authorization of the Arborist or the Director.
- f. Place or maintain upon the ground any asphalt, cement, stone or other material or substances in such manner as may obstruct or further obstruct free access of air and water to the roots of any tree in any public area or within any tree protection zone.
- g. Fasten any rope, wire, electric attachment, sign or other devices to any tree in any public area or to any guard about such tree without written permit from the Department specific to the tree(s) involved.

- h. Plant, prune, fertilize, or apply fungicides, insecticides or other chemical substances to any tree in any public area or within any tree protection zone without a written permit from the Department specific to the tree(s) involved.
- i. Remove or tamper with any object or device set for the protection or treatment of any tree in any public area or within any tree protection zone without a written permit from the Department specific to the tree(s) involved.
- j. Pile any building material or make any mortar or cement within 6 feet of any tree in any public area or within any tree protection zone.
- k. Hitch or fasten any animal, bicycle or vehicle to any tree in any public area.
- l. Construct site access, whether permanent or temporary, within any tree protection zone.
- m. Construct a curb cut and/or driveway within any tree protection zone.

(Ordinance 1254, September 25, 1989, Section 107, as amended by Ordinance 1618, April 3, 2000, Section 107.)

Section 108. Penalties. Any person violating the provisions of this Chapter shall, upon conviction before a District Justice of appropriate jurisdiction, be liable to pay costs of prosecution and a fine as follows:

- a. For willfully injuring or killing a living tree in any public area or within any tree protection zone by cutting, debarking, breaking, by the use of herbicides, use of a vehicle, or in any other manner wherein it is determined by the District Justice that such damage or destruction was intentionally inflicted, a fine of not less than \$100.00 nor more than \$600.00 plus the cost of repairing or replacing each damaged tree shall be levied. The value of the tree or trees removed shall be determined by a certified arborist using a valuation method approved by the International Society of Arboriculture. If the person found guilty of violating this Section is an abutting property owner, the cost of repair or replacing the damaged tree shall be assessed against the property in accord with Section 104 of this Chapter.
- b. For failure of a property owner to remove, partially remove or treat a tree on private property, as ordered in accord with this ordinance, the guilty person shall be fined not more than \$100.00 per day. Each day the property owner remains in violation shall constitute a separate offense.
- c. For all other violations, where it is determined by the District Justice that such damage or destruction was not intentionally willfully inflicted, a fine of not less than \$25.00 nor more than \$100.00 plus the cost of repairing or replacing the damaged tree shall be levied. The value of the tree or trees removed shall be determined by a certified arborist using a valuation method approved by the International Society of Arboriculture. If the person found guilty of violating this Section is an abutting property owner, the cost of repair or replacing the damaged tree shall be assessed against the property in accord with Section 104 of this Chapter.

In default of the payment of such fine and costs, such person shall be committed to the County Jail for a period not to exceed 10 days for each violation or a maximum of 30 days.

(Ordinance 1254, September 25, 1989, Section 108,¹⁰ as amended by Ordinance 1618, April 3, 2000, Section 108.)

**Appendix 2. State College Borough Shade Tree Ordinance Amendment
1696**

ORDINANCE 1696

AMENDING THE TREE ORDINANCE OF THE BOROUGH OF
STATE COLLEGE TO CLARIFY DAMAGE.

Be it ENACTED AND ORDAINED by the Council of the Borough of State College, and it is hereby Enacted and Ordained by authority of same, as follows:

SECTION 1. Amend the Codification of Ordinances, Chapter XVIII, Section 108.a, and Ordinance 1618 to read as follows:

For willfully injuring or killing a living tree in any public area or within any tree protection zone by cutting, debarking, breaking, by the use of herbicides, use of a vehicle, or in any other manner where in it is determined by the District Justice that such damage or destruction was intentionally inflicted, a fine of not less than \$100.00 nor more than \$600.00 plus the cost of prosecution and value of the destroyed or damaged tree and/or cost of repair shall be levied. The value of the tree or trees removed shall be determined by the Borough Arborist or other certified arborist selected by the Borough using a valuation method approved by the International Society of Arboriculture. If the person found guilty of violating this Section is an abutting property owner, the cost of repair or replacing the damaged tree shall be assessed against the property in accord with Section 104 of this Chapter.

ENACTED AND ORDAINED this 4th day of February 2002.

BOROUGH OF STATE COLLEGE

By: S/Richard L. McCarl, President of Council

Attest: S/Barbara J. Natalie, Assistant Borough Secretary

EXAMINED AND APPROVED as an Ordinance this 7th day of February 2002.

S/Bill Welch, Mayor

Copied from the original ordinance this 12th day of February 2002

Barbara J. Natalie
Assistant Borough Secretary

Appendix 3. State College Borough Zoning Ordinance Amendment 1619

ORDINANCE 1619

AMENDING THE STATE COLLEGE ZONING ORDINANCE (CHAPTER XIX OF THE CODIFICATION OF ORDINANCES) TO REVISE THE REVIEW PROCESS AND PLAN CONTENT FOR LAND DEVELOPMENT PLANS AND FOR ZONING, DEMOLITION, AND DRIVEWAY PERMIT APPLICATIONS.

It is hereby ENACTED AND ORDAINED by the Council of the Borough of State College, and it is Enacted and Ordained by authority of same, that Chapter XIX of the Codification of Ordinances is hereby amended as follows:

Section 1. Purpose. It is the purpose of this amendment to:

Establish a process and standards for the protection of public trees during:
land development;
the demolition, construction or expansion of any 1- or 2-family dwelling; or
the construction or expansion of any driveway; and

Establish a process and standards for the replacement of public trees that are:

damaged to such an extent during and as result of land development or the demolition, construction or expansion of any 1- or 2-family dwelling or the construction or expansion of any driveway that they are not recoverable or

are removed during and as a result of land development.

Section 2. Amending the Codification of Ordinances, Chapter XIX, Section 304.a, Zoning Permit, by inserting the following sentence immediately before the last sentence in this Section:

No zoning permit for a land development plan shall be issued until all signature blocks on the final plan have been signed by the appropriate official. Signatures may be withheld only if the proposed land development plan does not comply with this and other applicable Chapters of the Codification of Ordinances.

Section 3. Amend the Codification of Ordinances, Chapter XIX, Section 305, Development Plan, Subsection (6)a, Submission and Content of Development Plan, by adding subsection (32) to read as follows:

(32) the location of the trunk, trunk diameter at a point 4.5 feet above the ground, species, and drip line of all public trees located on any public areas adjacent to the development site and any other sites that will be used for storage of construction materials, access to the site, or any other function related to the land development.

Section 4. Amend the Codification of Ordinances, Chapter XIX, Section 305, Development Plan, Subsection (6)a, Submission and Content of Development Plan, by adding subsection (33) to read as follows:

(33) a tree protection zone for each public tree, which shall be the area extending to the drip line of each public tree.

Section 5. Amend the Codification of Ordinances, Chapter XIX, Section 305, Development Plan, Subsection (6)a, Submission and Content of Development Plan, by adding subsection (34) to read as follows:

(34) a tree protection report prepared by a certified arborist that assesses the health of each affected public tree identified in Section 32, that assesses the

amount of canopy and/or root pruning that will result from the proposed land development on each affected public tree and that indicates the steps proposed to be taken by the applicant to mitigate all impacts for any public tree exposed to pruning (of either the root system or limbs) within the tree protection zone, storage of construction materials within the tree protection zone, soil compaction within the tree protection zone during construction whether by equipment or for any other reason, or site access, whether permanent or temporary, within the tree protection zone.

Section 6. Amend the Codification of Ordinances, Chapter XIX, Section 305, Development Plan, Subsection (6)a. Submission and Content of Development Plan, by adding subsection (36) to read as follows:

(36) an approval signature block for the Borough Arborist or his or her designee.

Section 7. Amend the Codification of Ordinances, Chapter XIX, Section 305, Development Plan, Subsection b(1), Preliminary Review, by modifying the first sentence of the first paragraph to read as follows:

Preliminary Review. Except as provided for in subsection b(1) below, at least 30 days prior to the application of a development plan for final review, as required herein, the applicant shall submit to the State College Planning Department 5 copies of a concept (preliminary) plan for review.

Section 8. Amend the Codification of Ordinances, Chapter XIX, Section 305, Development Plan, Subsection b(1), Preliminary Review, by modifying the second paragraph to read as follows:

The Planning Department shall forward 1 copy of the concept (preliminary) plan to the State College Design Review Board (DRB) for review and comment at the Board's next regularly scheduled meeting. The Planning Department shall forward 1 copy of the concept (preliminary) plan to the Borough Arborist, or his or her designee, for a review of the proposed land development's effect on any public tree(s). The Borough Arborist, or his/her designee, shall report his/her findings to the Planning Department on the effect of the plan on any public trees within 15 working days of the receipt of said plan. The Planning Department shall forward 1 copy of any concept plan affecting a property located in a National Register Historic District or listed in the Historic Resources of the Centre Region prepared in 1982 by the Centre Regional Planning Commission, to the State College Historic Resources Commission for review and comment at the Historic Resources Commission's next regularly scheduled meeting. The Historic Resources Commission shall advise the DRB at the next regularly scheduled meeting of the DRB of the historic and architectural significance of the property affected and of the effect of the proposed land development on this historic and architectural significance. The content of such concept plan shall conform substantially to the criteria specified in Sections 305.a(1) through (7), (11), (15), (20), (22), (32), (33) and (34). Within 30 days following the DRB's review of the concept plan, the Planning Department shall forward to the applicant a written summary of the DRB's comments, and indicate whether the general concept of the plan meets the planning criteria and objectives of these regulations. Following approval, the applicant may proceed to a final review.

Section 9. Amend the Codification of Ordinances, Chapter XIX, Section 305, Development Plan, Subsection b(2)(b), to read as follows: (b) 7 copies of the development plan; and

Section 10. Amend the Codification of Ordinances, Chapter XIX, Section 305, Development Plan, Subsection b(2), Final Review, paragraph 3, to read as follows:

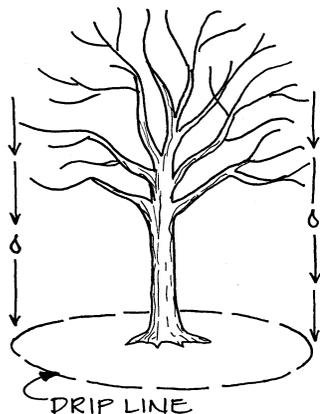
The Planning Department shall forward 1 copy of the development plan, as required in this Part, to the State College Design Review Board (DRB) for review and recommendation at the Board's next regularly-scheduled meeting and 1 copy to the State College Planning Commission for review and recommendation at the Commission's next regularly-scheduled meeting. The applicant shall be available to review any development plan(s) submitted in conjunction with an application for development at any action meeting of the Design Review Board or Planning Commission at which said development plan(s) will be reviewed.

The Planning Department shall forward 1 copy of the development plan to the Borough Arborist, or his or her designee, for a review of proposed land development's effect on any public tree(s). The Borough Arborist, or his/her designee, shall report his/her findings to the Planning Department on the effect of the plan on any public trees within 15 working days of the receipt of said plan.

The Planning Department shall forward 1 copy of any final plan affecting a property located in a National Register Historic District or listed in the Historic Resources of the Centre Region prepared in 1982 by the Centre Regional Planning Commission, that was not previously reviewed under Section 305.b(1) of this Chapter to the State College Historic Resources Commission for review and comment at the Historic Resources Commission's next regularly-scheduled meeting. The Historic Resources Commission shall advise the DRB at the DRB's next regularly scheduled meeting of the historic and architectural significance of the property affected and of the effect of the proposed land development on this historic and architectural significance.

Section 11. Amend the Codification of Ordinances, Chapter XIX, Section 201, Definitions, by adding the following definitions:

Tree Drip Line. A line derived by the horizontal line extending along a radius from the trunk of a tree to the outermost tips of branches.



Tree Protection Zone. The 3-dimensional area within the drip line including from the crown to the root system of each public tree.

Public Tree. Any tree located in a public right-of-way, park, easement or other area under the control of the Borough.

Section 12. Amend the Codification of Ordinances, Chapter XIX, Section 304.a, Permits, by inserting the following sentence prior to the last sentence of this Section:

All applications for driveway permits and for zoning permits for demolition, construction or expansion of any 1- or 2-family dwelling shall include the location of all public trees in the tree lawn (that area located parallel to the street and between the sidewalk and curb face) in front of the affected property. A copy of all such applications shall be referred to the Borough Arborist or his/her designee for review and action, including but not limited to issuance of permits and enforcement of penalties, as provided for in the Tree Ordinance, Chapter XVIII of the Codification of Ordinances.

ENACTED AND ORDAINED this 20th day of March, 2000.

BOROUGH OF STATE COLLEGE

By:

S/Janet K. Knauer, President of Council

Attest:

S/Barbara J. Natalie, Assistant Borough Secretary

EXAMINED AND APPROVED as an Ordinance this 3rd day of April, 2000.

S/Bill Welch, Mayor

Copied from the original ordinance this 12th day of April, 2000:

Barbara J. Natalie
Assistant Borough Secretary

Appendix 4. State College Borough Planting Strip Paving Ordinance 802.

PART H Planting Strips Along Sidewalks

Section 801. Short Title. This Ordinance shall be known as the Planting Strip Paving Ordinance. (Ordinance 802, June 6, 1972, Section 1.)

Section 802. Definitions. The following definitions shall apply to the provisions of this ordinance:

Curb Line. The inside edge of the curb on the street cartway, if installed, and, if not, then the edge of the cartway of the street adjoining the premises.

Pavement. Any material, which is essentially impermeable by water, fertilizer and the like, including bituminous paving, concrete paving, impermeable plastic and the like.

Person. Any person, corporation, partnership, persons who or which may be the owner of real estate in the Borough of State College.

Place or Maintain. To lay or permit to be laid or permit to remain, pavement in the planting strip.

Planting Strip. The space between the sidewalk and curb line on any street or roadway of the Borough of State College.

Sidewalk. The sidewalk adjoining any such premises, if installed and, if not, then the line of the street or alley right-of-way adjoining the premises.

(Ordinance 802, June 6, 1972, Section 2.)

Section 803. Tree Commission=s Permission Required to Place or Maintain Pavement in Planting Strip. No person shall place or maintain any pavement in the planting strip unless the Tree Commission of the Borough grants written approval to do so, which written approval shall certify to the Council of the Borough that such pavement will not endanger the health of any tree located in the planting strip. (Ordinance 802, June 6, 1972, Section 3.)

Section 804. Authority to Order Removal of Pavement. If the (Tree) Commission deems the health of existing trees to be endangered by the location of pavement in any planting strip, the (Tree) Commission may order removal of such paving as it may deem necessary to protect the health of said trees. Such order shall be in writing and directed to the owner of the premises and either mailed to said owner by certified mail or posted on the premises. Within 30 days after service on such owner, the owner shall cause to be removed the pavement as designated by the (Tree) Commission. (Ordinance 802, June 6, 1972, Section 4.)

Section 805. Conditions for Material Other Than Pavement in Grass Strips. In the planting strips where pavement is prohibited under the terms of this ordinance, placing or maintaining materials other than grass, such as other vegetation, crushed stone, unmortared brick and paving blocks, shall be permitted if the (Tree) Commission, after a request for such placement, certifies, in writing, that placement of such material will not endanger the health of trees located in such planting strip, and approved such placement. (Ordinance 802, June 6, 1972, Section 5.)

Section 806. Penalty for Violation. Any person violating the terms of this Ordinance shall, upon conviction, pay a fine not exceeding \$100.00 plus costs, and each day that a violation continues may be deemed a separate violation. (Ordinance 802, June 6, 1972, Section 6.)⁸⁰

Appendix 5. Rules and Regulations for Arbor Work

BOROUGH OF STATE COLLEGE PUBLIC WORKS DEPARTMENT RULES AND REGULATIONS FOR ARBOR WORK

I. GENERAL REQUIREMENTS

- A. Scope of Requirement. No person may perform any of the following acts without first obtaining a permit from the Department. Nothing in this section shall be construed to exempt any person from the requirements of obtaining any additional permits or license as are required by law:
1. Plant, treat(chemically or biologically), prune, remove, or otherwise disturb any tree located on Borough-owned property, public rights-of-way, or within Tree Protection Zone (See Figure 1) except that this provision shall not be construed to prohibit owners of property adjacent to Borough-owned property, public rights-of-way, or Tree Protection Zone from watering or fertilizing without a permit any tree, shrub, or other plants located on such Borough-owned property, public rights-of-way, or Tree Protection Zone;
 2. Trim, prune, or remove any tree, public or private, or portions thereof if such tree or portions thereof may reasonably be expected to fall on Borough-owned property or public rights-of-way;
 3. Place on Borough-owned property, public rights-of-way, or Tree Protection Zone, either above or below ground level, a container for a tree;
 4. Attach any rope, wire, sign, poster, or any other man-made object to any tree located on Borough-owned property or public rights-of-way;
 5. Damage or cut roots larger than 2 inches in diameter by tunneling, trenching or digging on Borough-owned property, public rights-of-way, or within the Tree Protection Zone for the purpose of sidewalk, curb, pipe, conduit, electric wire, etc. installation and repair.
- B. Issuance. Permits for the above items may be issued if the following requirements are met:
1. An application for a tree permit has been signed by the applicant and submitted to the Director of Public Works or his/her designee indicating general details such as location, number, size and species of trees that will be affected by such acts, setting forth the purpose of such acts and the methods to be used, and presenting any additional information that the Director of Public Works may find reasonably necessary;
 2. The applicant agrees to perform the work for which the tree permit is sought in accordance with the provisions of these **Rules and Regulations**;
 3. All work pertaining to the treatment of trees for insect, disease, or other pests shall be completed by a person(s) with a current Pesticide Application License and proof of license shall accompany the Borough permit application;
 4. If the work for which a tree permit is issued entails the felling of any tree or part thereof, located on private property, which, as a result of such felling reasonably may be expected to fall upon Borough-owned property or public rights-of-way, and if such felling is done by one other than the owner of the property on which such felling is done, then the applicant shall agree to indemnify and to hold the Borough of State College harmless for all damages resulting from work conducted pursuant to the permit and shall deposit with the Borough a Comprehensive General Liability Insurance Policy or Certificate with a minimum combined single limit of \$500,000,

which policy shall cover the Borough of State College as an additional insured.

- C. Exception. Nothing in this section shall be construed to exempt abutting property owners, municipal authorities, or public utility companies or their agents from any of the requirements of these **Rules and Regulations**. Only the State College Borough Director of Public Works, his/her designee, an agent of the Director, or a contractor hired by the State College Borough Department of Public Works may perform work on Borough owned trees without obtaining a permit.

RULES AND REGULATIONS FOR ARBOR WORK

Part II. PRUNING AND REMOVAL SPECIFICATIONS

A. SPECIFIC REQUIREMENTS PERTAINING TO THE PRUNING OF TREES

1. No tree shall be cut back in such a manner that its health or present or future safety will be impaired. An exception to this may occur in tree removal or emergency relief of an immediate hazard to person or property. Any such emergency procedures must be reported within one (1) day following the emergency to the Director of Public Works or his/her designee, along with plans for completion or follow-up work submitted for approval.
2. Authority to prune street trees does not include the cutting back of sound, healthy tree branches outside the stated purpose of the tree permit issued.
3. It shall not be permitted as a normal practice for any person or firm to top any street tree, park tree, or other tree on public property (except as outlined in section C.4). Topping is the severe reduction of upper branches of a tree without consideration for its normal growth habit or natural form.
4. All dangerous deadwood and all broken limbs or other defective tree parts which constitute a hazard to the health of the tree, to public safety, or to property shall be removed.
5. Tree branches shall be removed and controlled in such a manner as not to cause damage to other parts of the tree or to other plants, people or property.
6. All tools used on a tree known to contain an infectious tree disease shall be properly disinfected immediately after completing work in such a tree and prior to being used on any other tree.
7. All cutting tools and saws used in tree pruning shall be kept adequately sharpened to assure clean cuts without jagged edges.
8. When tree pruning all cuts are to be made to a side branch (lateral), at least 1/3 of the diameter of the branch being cut where feasible.
9. Whenever removing branches too large to hold securely in one hand during the cutting operation, such branches shall be cut off several inches beyond the intended final cut. Final cuts shall then be made in a manner to prevent any unnecessary tearing of the bark and wood (See Figure 2).
0. All final pruning cuts shall be made sufficiently close to the trunk or parent limb, without cutting into the branch collar or leaving a protruding stub, so that closure can readily start under normal conditions. Clean cuts shall be made in all cases (See Figure 2).

B. STANDARDS OF WORKMANSHIP FOR PRUNING AND REMOVAL

1. The use of climbing spurs or spikes shall be permitted only in the process of removing a tree.

2. Public trees or poles in the public right-of-way shall not be used as an anchor for any mechanical device or any process for any reason.
3. Under no circumstances, when in the process of removing a tree or any part of a tree, shall the work site be left unattended unless the tree and its branches are in a safe condition.
4. Unless the tree work area is totally barricaded or otherwise kept safe while pruning or removing trees, at least one responsible worker shall serve to coordinate safe operations on the ground at all times when work operations are in progress.
5. Under no condition shall it be considered proper to leave any severed or partially cut branches in the upper portion of any tree being worked on after the tree workers leave the scene of the operation.
6. Whenever large tree sections are being cut which may endanger person or property, such materials shall be secured by ropes and lowered safely in a controlled manner.
7. Cleanup of branches, logs or any other debris resulting from any tree pruning or removal shall be promptly and properly accomplished. The work area shall be kept safe at all times during the cleanup operation. Under no condition shall the accumulation of brush, branches, logs or other debris be allowed upon a public property in such a manner as to result in a public hazard.
8. All removal of public trees shall be done in a manner so that the remaining stumps will be left as close to ground level as possible. If stump removal is required, they shall be ground at least 8 inches below ground level or removed intact.
9. Excavations resulting from tree or shrub removal must be properly filled in to conform to the surrounding ground level with a clean earth fill lightly compacted and free of debris. Surface material shall be restored to match adjacent material.

C. AUTHORIZED TYPES OF TREE PRUNING

Authorized types of tree pruning follow the National Arborist Association's **Pruning Standards for Shade Trees** and are summarized below:

1. **Crown Cleaning**
Crown Cleaning shall consist of the removal of dead, dying, diseased, crowded, weakly attached and low-vigor branches from the crown of the tree.
2. **Crown Thinning**
Crown thinning shall consist of the selective removal of 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 trees= natural shape.
3. **Crown Raising**
Crown raising removes the lower branches from a tree in order to provide clearance for buildings, vehicles, pedestrians and vistas.
4. **Crown Reduction**
Crown reduction reduces the size of a tree, often for clearance for utility lines (See Figure 3). 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 one-third the diameter of the cut stem).

RULES AND REGULATIONS FOR ARBOR WORK

Part III. CHEMICAL APPLICATION SPECIFICATIONS

The following specifications pertain to the spray application, soil application, or injection of fertilizers, pesticides, or growth inhibitors to the above ground portions of trees or roots.

A. General Specifications

1. Applicators applying chemical pesticides to public trees shall adhere to all federal and state laws and regulations pertaining to pesticides and their application.
2. The pesticide applicator shall know and understand the capacities and safety precautions of those materials used by either himself or his employees and be aware of those recommendations stipulated by the manufacturer.
3. Ineffectual control; damage, injury or death to plants; or adverse effects on animals or persons; resulting from the use of materials beyond the limitation of the manufacturer's guarantee shall be considered the responsibility of the licensed operator and his employer.
4. Spray equipment shall be kept clean and in good working order. The Borough Arborist may inspect same at any time and take samples of spray materials being applied.
5. It shall not be permitted to perform chemical application with dirty or contaminated tanks or equipment.
6. Operators shall properly dispose of excess chemicals, including rinse water, in accordance with federal and state laws and regulations. Unsanitary or unsafe methods of washing out or draining tanks and equipment into public sewers and gutters is prohibited.
7. No spray application shall be carried out when there is sufficient wind to make pesticide control ineffectual or create an overspray hazard to persons, plants or property.
8. No spraying of pesticides shall be done when air temperature is less than 40° Fahrenheit.
9. All spray machines other than hand pump sprayers must have agitators capable of maintaining a uniform spray solution at all times when spray application is in progress.

10. Adequate precautions shall be taken in all phases of chemical preparation and application in order to minimize the chances of toxicity or phytotoxicity to non-target species.

B. Specific Requirements Pertaining to Tree Injections

1. Authorization by the Borough Arborist must be given prior to any injection of chemicals into Borough-owned trees.
2. Injection hole size, spacing and timing of application will be according to product label and tree species.
3. Injection holes should not be placed near wounds in the tree trunk, such as knots, frost cracks, cankers, decay, etc.
4. Holes shall be drilled as low on the trunk as feasible.
5. Avoid vertical alignment of holes from previous treatments.
6. Remove external fixtures as soon after treatment as the manufacturer and legal requirements allow.
7. If growth regulators are used, each stem of a multi-stemmed tree should be treated as a separate tree and any tree showing visible signs of decline or decay should not be injected unless permitted by the Borough Arborist.
8. A record of trees injected shall be kept and turned in to the Borough Arborist upon the completion of work. The record shall include the date, time of day and location that the tree or trees were injected, the operator, chemicals used, size and species of tree, amount of chemical used and any other pertinent information.

RULES AND REGULATIONS FOR ARBOR WORK

IV. PLANTING SPECIFICATIONS

A. PLANT MATERIAL

1. Plant material shall conform to the latest version of the American Standard for Nursery stock (ANSI Z60.1). Plant material shall be of standard quality or better, true to name and type of their species or variety.
2. Plants shall have normal, well developed branches and root systems. They shall be healthy, vigorous plants free from defects, decay, sunscald injuries, abrasions of the bark, insect pests and all forms of infestations or objectionable disfigurements.
3. Balled and burlapped plants shall have solid balls of adequate size, the balls securely wrapped with burlap or canvas, tightly bound with rope or twine. Plastic twine or wrapping material is not permitted.
4. The minimum sizes of plants, straightness of trunk, clearance of lower branches and geographic location of the nursery tree origin and propagation method shall be specified by the Borough Arborist.
5. The Director of Public Works or his/her designee shall be notified and have the right to inspect any trees or shrubs before they are planted.
6. All street trees shall be of a species and variety from the recommended tree list, unless otherwise authorized by the Borough Arborist.

B. PLANTING METHODS AND TECHNIQUES

1. No plant pit shall be dug or approved until all underground electric or telephone lines, gas lines, water lines or any other improvement locations are checked in accordance with Act 187 of 1996 of the Commonwealth of Pennsylvania.
2. Trees may not be planted less than 50 feet from a public road intersection or 20 feet from a fire hydrant or 10 feet from a driveway or pole supporting a street light. Actual tree locations shall be approved by the Director of Public Works.
3. Every pit should be two to three times wider and at least the depth of the soil ball or the full extent of the root system of bare root trees (See Figure 4). In the process of digging the pit, avoid "glazing" the sides of the hole.

4. For all balled and burlapped, bare root and container plantings, the backfill should be of desirable structure, texture and pH to support vigorous plant growth. The Borough Arborist will decide if the existing soil at each location is adequate to use in the backfill or if soil will have to be brought in. The backfill shall be added and tamped firmly but not excessively around the ball or root system at 12 inch increments until full.
5. Each plant should be centered and vertically aligned in the pit and set at the depth at which it was growing at the nursery or higher depending on conditions.
6. For all balled and burlapped stock, once it has been properly positioned in the pit, the burlap and twine shall be removed from around the trunk of the tree and removed or tucked down in the planting hole. Plastic burlap or other synthetic materials shall be completely removed from the pit. Tree baskets may remain on the root ball but the top ring of all wire baskets should be removed.
7. A watering berm shall be constructed around every new tree or shrub when possible (See Figure 4). The soil in the planting hole shall be thoroughly soaked with water after planting.
8. All tree and shrub plantings shall be mulched with 2 to 4 inches of wood chips, coarse fibrous bark or other surface treatment as specified by the Borough Arborist and placed in a circle 2 to 3 feet in diameter but not touching the trunk.
9. Every evergreen tree in excess of 6 feet in height and any tree loose in the ball or ground shall be guyed securely. The method shall be approved by the Borough Arborist (See Figure 4).
10. For every plant moved with a tree spade, all space between the ball and surrounding soil shall be filled. Trees shall be staked or guyed and mulched immediately after transplanting.
11. When planting a tree that will be surrounded by an impervious surface, there shall be a minimum of 40 square feet of porous surface around the tree. A lesser area may be provided if approved by the Borough Arborist. All newly formed impervious areas must be approved, in writing, by the Borough Arborist to conform with Section 803 of the Codification.

C. PLANTING STANDARDS OF WORKMANSHIP

1. Plant material shall be handled in a manner so as to cause the least amount of damage during the planting process. The trunk shall be protected against mechanical impact during handling and transport.
2. Balled and burlapped and container plants shall always be handled by the soil ball. Under no circumstances may they be dragged, lifted or pulled by the trunk or foliage parts in a manner that will loosen the roots in the ball.
4. In transporting plants to the job site, they shall be handled, secured or covered so as to prevent any damage from wind or vibration. Plants shall never be thrown, dropped, or bounced off a truck or loader to the ground.
5. Plant material shall be planted the day it is taken to the planting site or it shall be watered and placed in a shady area to prevent dehydration.
6. Bare root plants shall have their roots covered either with a moist tarp or mulch while they are being transported to and being held at the planting site.
7. Trees and shrubs shall not be dug, balled and burlapped or moved with a tree spade during the active growth period unless the ball is large enough to insure survival and the foliage is treated with an anti-desiccant.
8. All twine or rope and plant labels secured around the trunk and branches shall be removed after planting is completed.
9. Cleanup of soil, branches or other debris resulting from any tree or shrub planting shall be promptly accomplished. The work area shall be kept safe at all times until the cleanup operation is completed. Under no condition shall the accumulation of soil, branches or other debris be allowed upon public property in such a manner as to result in a public hazard or be unsightly.
10. Excavated plant pits that will be left open when work is not in progress or pose hazards to pedestrians or vehicles shall be adequately barricaded with qualified warning devices.

RULES AND REGULATIONS FOR ARBOR WORK

V. PROTECTION AND PRESERVATION SPECIFICATIONS

The following specifications are intended to prevent unnecessary damage and destruction to trees.

A. GENERAL SPECIFICATIONS

1. Authorization must be given by the Director of Public Works or his/her designee before any of the following is performed:
 - a. Attach or install any metal materials, signs, cables, wires or other things foreign to the natural structure of a Borough owned tree.
 - b. Any excavation within a tree's protection zone (See Figure 1).
 - c. Treatment of the soil within the tree protection zone with a soil sterilant.
2. All land development plans or landscape plans shall show all existing trees. Trees proposed to be saved and removed shall be indicated. Every possible effort shall be made to preserve desirable trees. All public trees adjacent to said projects shall also be shown on the plans along with the required Tree Protection Zone.
3. Existing trees on public property not to be removed shall be marked with prominent identification. The property owner shall install, or cause to be installed, a staked construction fence at least 4 feet high or alternative as approved by the Borough Arborist around all portions of the tree protection zone located on both public and private property, excluding any portions occupied by sidewalks, street cartway, curb gutters or driveways. Any trespass of this protective zone by personnel, equipment, or materials shall be considered a violation of the Borough's tree ordinance.
4. Equipment access routes shall be established through a conditional use permit or as approved by the Borough Arborist. Heavy equipment shall not be allowed to travel within a Tree Protection Zone unless geotextile landscape fabric and wood chips maintained at least 5" deep are used to avoid compaction of the soil and damage to the tree's roots and is approved by the Borough Arborist.
5. Curb cuts shall not be closer than 5 feet from the trunk of a tree. No paving or asphaltting shall be installed closer than 2-1/2 feet from a tree trunk.

6. New sidewalks, paving or asphaltting must allow space for tree roots that is permeable to air and water. The following should be used as a guideline. For trees up to 4 inches in trunk caliper, 25 square feet of porous area is needed. For each additional 2 inches of tree caliper, 10 more square feet are needed.
7. Grade changes within the tree protection zone of a tree saved shall be avoided whenever possible. If grade changes are absolutely necessary within the tree protection zone of a tree, protective devices shall be used as approved by the Borough Arborist.
8. Avoid cutting surface roots whenever possible. Sidewalks and paving levels shall be detoured sufficiently to avoid such cutting.
9. If trees are in full leaf during the construction phase, it may be necessary to supply supplemental irrigation. The Borough Arborist shall notify the permittee when irrigation is required.

B. SPECIFIC REQUIREMENTS PERTAINING TO THE PROTECTION OF TREES

1. A permittee shall take all necessary measures to protect roadside trees from damage during excavation and associated activities. Any damage sustained by a tree, such as broken limbs or roots or scarred trunks resulting from construction and/or installing underground facilities shall be reported immediately to the Borough Arborist or treated according to the tree care standards specified in these Regulations. All measures taken to protect or treat Borough trees under this section shall be done under the supervision of the Borough.
2. When an underground project encounters the roots of a Borough-owned tree, the permittee shall tunnel or bore under the tree or otherwise modify the project to protect the tree's root system. No digging shall take place within the tree's protection zone or as specified by the Borough Arborist. A tunnel or some other method of modification of the project under or around the tree shall be used when needed to protect the health and survivability of the tree.
3. There shall remain at least 24 inches of undisturbed earth over the tunnel, bore or other type of installation.
4. When in the process of excavating within the tree protection zone of a Borough-owned tree, roots larger 2 inches are encountered, the Borough Arborist shall be contacted. All roots shall be cleanly pruned on the tree side of the excavation. Backfilling shall be done as soon as possible to prevent the drying out of exposed roots.

5. Installations of curbs and sidewalks shall be completed in a manner least damaging to trees and tree roots. Clean cuts shall be made in every case.
 - a. Sidewalks - roots less than 2 inches in diameter of Borough trees may be cleanly pruned on the tree side without obtaining a permit. A permit is required to prune roots larger than 2 inches in diameter. Sidewalk cutouts are permitted to clear trees or large roots while maintaining a minimum 4 foot wide sidewalk or less if permission is granted by the Borough Engineer.
 - b. Curbs - damage to Borough trees or roots over 2 inches in diameter shall be avoided when installing curbs. Removal of larger roots must be as directed by the Borough Arborist. Encroachment upon the tree lawn while excavating cannot exceed 6 inches, unless done under the supervision of the Borough Arborist. Replacement of concrete curbing with metal curbing to clear trees or large roots is an option if permission is granted by the Borough Engineer.

C. Reserved for Future

Figure 1. Tree Protection Zone

Appendix 6. Tree Permit

MUNICIPAL TREE AND RIGHT-OF-WAY WORK PERMIT

Borough of State College, PA
OFFICE OF THE ARBORIST

Issued and agreed to in accordance with Borough Ordinance 1618 as amended:

DATE: _____ Permit expires on or before _____

_____ is hereby granted permission to:

perform the following work on municipal trees:

- | | | | |
|-------|---------------------------|--------------------------|------|
| | PLANT
REMOVE | PRUNE
APPLY PESTICIDE | |
| PRUNE | FERTILIZE
pesticide) | INJECT (fertilizer or | ROOT |
| | INJECT (growth regulator) | | |
| | OTHER _____ | | |

fell trees or parts of trees onto or across Borough rights-of-way

Address or Location: _____

Tree(s) Affected (species, size and number): _____

Detailed Description of Work or Reason for Request: _____

The holder of this permit agrees to perform all work in accordance with all specifications, rules and standards as set forth in the RULES AND REGULATIONS FOR ARBOR WORK and only for work as stated above.

Permittee Signature _____
Borough Arborist _____

Appendix 7. State College Borough Tree Commission and Staff

STATE COLLEGE BOROUGH TREE COMMISSION AND STAFF 1966-Present

2016
Nick Kerlin
Ken Tamminga
Henry Gerhold
Bruce Rohrback
William Elmendorf

2015
*Nick Kerlin
*Ken Tamminga
Henry Gerhold
Bruce Rohrback
William Elmendorf

2014
*William Elmendorf
*Janet Ferguson
Ken Tamminga
Henry Gerhold
Bruce Rohrback
Nick Kerlin (Rep. Ferguson)

2013
Bruce Rohrback
*Ken Tamminga
Henry Gerhold
Cassandra (Burke) Godby
*William Elmendorf

2012
*William Elmendorf
*Ken Tamminga
Bruce Rohrback
Henry Gerhold
Cassandra Burke

2011
*Ken Tamminga
Henry Gerhold
L.J.Bright
Cassandra Burke
*William Elmendorf
Bruce Rohrback (Rep. Bright)

2010
*Marc McDill
*Henry Gerhold
Ken Tamminga
Cassandra Burke
William Elmendorf

2009
*Marc McDill
*Ken Tamminga
Cassandra Burke
William Elmendorf
Alfred Traverse
Henry Gerhold (Replaced Traverse)

2008
*Marc McDill
*Ken Tamminga
Cassandra Burke
Alfred Traverse
William Elmendorf

2007
*Marc McDill
*Ken Tamminga
Alfred Traverse
Cassandra Burke
William Elmendorf

2006
Nicholas Bolgiano
*Marc McDill
*William Elmendorf
Ken Tamminga
Cassandra Burke

2005
Kelleann Foster
David Brown
*Nicholas Bolgiano
*Marc Mc Dill
*William Elmendorf

2004
Kelleann Foster
David Brown
Nicholas Bolgiano
*Marc Mc Dill
*William Elmendorf

2003
Kelleann Foster
David Brown
Nicholas Bolgiano
*Marc Mc Dill
*William Elmendorf

2002
*L. J. Bright
Kellerann Foster
*David Brown
Nicholas Bolgiano
*Marc Mc Dill

2001
*William Elmendorf
*L. J. Bright
Kelleann Foster
David Brown
Nicholas Bolgiano

2000
*William Elmendorf
*Gary Moorman
L. J. Bright
Kelleann Foster
David Brown

1999
*William Elmendorf
*Gary Moorman
L. J. Bright
Kelleann Foster
Carolyn Rudd

1995
* Henry Gerhold
Larry Kuhns
Rae Chambers
L. J. Bright
* Eugene Lindstrom

1994
* Dana Boyd
* Eugene Lindstrom
Henry Gerhold
Larry Kuhns
Rae Chambers

1993
* Larry Kuhns
Henry Gerhold
* Rae Chambers
Dana Boyd
Eugene Lindstrom

1992

* Dan Roysse
Henry Gerhold
Larry Kuhns
Rae Chambers
Dana Boyd

1991

* Henry Gerhold
Dana Boyd
Rae Chambers
Larry Kuhns
Daniel Roysse

1990

* Larry Kuhns
Henry Gerhold
Huey Jones
Daniel Roysse
Mary Snavelly-10/89-10/90
Dana Boyd-11/90-12/93

1989

* Marion Deppen
* Paul Wuest-1/81-9/89
Huey Jones
Edgar Palpant-1/81-5/89
Henry Gerhold-6/89-12/92
Daniel Wallace-1/88-9/89
Mary Snavelly-10/89-12/90
Larry Kuhns -10/89-12/91

1988

* Edgar Palpant
* Paul Wuest
Marion Deppen
Huey Jones
Daniel Wallace

1987

* Edgar Palpant
* Paul Wuest
Marion Deppen
Huey Jones
Bruce Rohrbach

1986

* Edgar Palpant
Huey Jones
Bruce Rohrbach
Richard Schein
Paul Wuest

1985

* Edgar Palpant
Huey Jones
Bruce Rohrbach
Richard Schein
Paul Wuest

1984

* Edgar Palpant
Kathleen Donohue
Norma Lee Gruver
Richard Schein
Paul Wuest

1983

* Edgar Palpant
Kathleen Donohue
Norma Lee Gruver
* Mary Jane Hovanec
Paul Wuest

1982

* Edgar Palpant
* Mary Hovanec
Kathleen Donohue
Norma Gruver
Paul Wuest

1981

* Larry Kuhns
Alexander Black
Mary Hovanec
Marjorie Johnstone-79-5/81
Paul Wuest-81-83
Edgar Palpant

1980

* Larry Kuhns
* Daniel Jones
Alexander Black
Marjorie Johnstone
Richard Schein

1979

* Richard Schein
Alexander Black
Daniel Jones
Larry Kuhns
Marjorie Johnstone

1978

* Richard Schein
* Henry Gerhold
William Johnstone
Daniel Jones
Edgar Ulrich

1977

* Chiko Haramaki
Henry Gerhold
William Johnstone
Richard Schein
Edgar Ulrich

1976

* Chiko Haramaki
* William Johnstone
Richard Schein
Edgar Ulrich
Henry Gerhold

1975**

* Chiko Haramaki
Richard Schein
William Johnstone
Walter Simonds
Henry Gerhold

1974

* Walter Simonds
William Merrill
Chiko Haramaki

1973

* Walter Simonds
William Merrill
Chiko Haramaki

1972

* Walter Simonds
William Merrill
Chiko Haramaki

1971

* Walter Simonds
William Merrill
Peter Pfahl

1970

* Walter Simonds
William Merrill
Chiko Haramaki

1969

* Walter Simonds
William Merrill
Chiko Haramaki

1968

* Walter Simonds
Charles Fergus
A. O. Rasmussen

1967

* Walter Simonds
Charles Fergus
Robert Duquet

1966

* Walter Simonds
Robert Duquet
Charles Fergus

* Chairperson and Vice-Chair

** The number of Tree Commission members was increased from three to five with passage of the 1976 Tree Ordinance

**State College Borough
Shade Tree Personnel**

Arborists

Alan W. Sam 1989 to present
James Evans 1975-1988

Dendricians

(Foreman) Steve Shirey 1994 to present
Eric Ekess 2015 to present

W.

Borough Manager

Carl B. Fairbanks – 1969 – 1986
Peter Marshall 1986 – 2003
Thomas J. Fountaine – 2003 – Present

Public Works Director

Donald R. Dorneman – 1956 – 1986
Lee L. Lowry – 1986 – 1998
Mark A. Whitfield – 1998 - Present

Appendix 8. State College Borough Shade Tree Budget 1964 - Present

STATE COLLEGE BOROUGH SHADE TREE BUDGET 1964 to Present

	1999 - \$352,509	1981 - \$90,840
2016 - \$632,869	² 1998 - \$340,380	1980 - \$77,875
2015 - \$697,554	1997 - \$283,710	1979 - \$83,925
2014 - \$610,052	1996 - \$263,360	1978 - \$49,680
2013 - \$485,732	1995 - \$256,950	1977 - \$41,890
2012 - \$480,015	³ 1994 - \$243,835	1976 - \$38,0501
2011 - \$417,178	1993 - \$212,076	⁵ 1975 - \$28,770
2010 - \$458,818	1992 - \$208,942	1974 - \$28,000
2009 - \$453,692	1991 - \$193,435	⁶ 1973 - \$28,400
2008 - \$458,765	1990 - \$185,101	1972 - \$24,000
2007 - \$467,056	1989 - \$161,075	1971 - \$24,000
2006 - \$439,327	1988 - \$144,944	1970 - \$18,000
2005 - \$399,360	1987 - \$130,880	1969 - \$17,300
2004 - 404,850	⁴ 1986 - \$200,000	1968 - \$11,200
2003 - 400,270	1985 - \$114,820	1967 - \$9,263
2002 - \$407,030	1984 - \$102,060	1966 - \$9,850
2001 - \$416,815	1983 - \$105,865	1965 - \$7,740
¹ 2000 - \$363,745	1982 - \$102,060	1964 - \$8,314

¹ Parks Maintenance incorporated into Shade Tree Budget

² Began budgeting \$50,000 a year for contract pruning

³ Hired third full-time dendrician

⁴ \$50,000 for Special Tree Pruning Project

⁵ State College Borough hired its first full-time arborist and dendrician

⁶ Trees planted along Beaver Avenue

⁷ Money budgeted for planting along College Avenue

Appendix 9. Street Trees Planted in State College, 2007-2016

Adams Avenue:	European Hornbeam, Tulip Poplar, Greenvase Zelkova, Fruitless Coffeetree, Regent Japanese Pagoda Tree, Hybrid Maple, Forest Pansy Redbud, Hackberry
Aikens Place:	
North Allen Street:	Red Oak, Redbud, American Basswood, Bur Oak, Cucumber Magnolia, Okame Cherry, Tulip Poplar, Green Vase Zelkova, Swamp White Oak, Magnifica Hackberry, Princeton Sentry Ginkgo
South Allen Street:	Stellar Pink Hybrid Dogwood, Fruitless Coffeetree, Celebration Hybrid Maple, Princeton Sentry Ginko, Zelkova, Bur Oak, Queen Elizabeth Hedge Maple, Glenlevin Littleleaf Linden, Redbud, Skyline Honeylocust, Golden Raintree, Valley Forge American Elm, Tulip Poplar, Hardy Rubbertree, Red Maple, London Planetree, Ruby Red Horsechestnut, Shumard Oak, Kousa Dogwood, Merrill Magnolia, Kwanson Cherry, Magnifica Hackberry, Sawtooth Oak, Autumn Gold Ginkgo, Autumn Blaze Hybrid Maple, Red Oak, Shademaster Honeylocust, Redmond American Linden, Bur Oak, Celestial Dogwood, Ivory Silk Tree Lilac
Amelia Avenue:	Autumn Gold Ginkgo, Forest Pansy Redbud, Regent Japanese Tree Lilac
Arbor Way:	Ivory Silk Tree Lilac, Golden Raintree, Tulip Poplar
No. Ashwicken Ct.:	Regent Tree Lilac
So. Ashwicken Ct.:	
North Atherton St.:	
South Atherton St.:	Princeton Sentry Ginkgo, Shumard Oak, Skyline Honeylocust, Bloodgood London Planetree, American Hornbeam, Heritage River Birch, Forest Pansy Redbud, Ivory Silk Tree Lilac, Macho Cooktree, Tulip Poplar
Barley Way:	Bald Cypress, Bloodgood London Plantree, Stellar Pink Dogwood
North Barnard St.:	Redmond American Linden, Skyline Honeylocust, Winter King Hawthorn, Happidaze Sweetgum
South Barnard St.:	American Hophornbeam, Frontier Elm, Greenspire Littleleaf Linden, Coffeetree, Bur Oak, Redmond American Linden, Magnifica Hackberry, Catalpa, Liberty London Planetree, Upright Sargent Cherry, Tulip Poplar, Kwansan Cherry
Bayberry Drive:	Celebration Hybrid Maple, Tulip Poplar, Princeton Sentry Ginkgo, Cucumber Magnolia
Bayfield Court:	Swamp White Oak, Spring Snow Crabapple
East Beaver Avenue:	Skyline Honeylocust, Shademaster Honeylocust, Ginkgo, Hardy Rubbertree, Bloodgood London Planetree, Autumn Blaze Hybrid Maple
West Beaver Avenue:	Bloodgood London Planetree, Tree Lilac, Celebration Hydrid Maple, Purple Robe Black Locust, Magnifica Hackberry, Sargent Cherry, Skyline Honeylocust, Hardy Rubbertree, Shademaster Honeylocust, Autumn Gold Ginkgo, Greenvase Zelkova, Golden Raintree, Greenspire Littleleaf Linden, Fruitless Coffeetree, Prairie Pride Hackberry, Princeton Sentry Ginkgo
Bellaire Avenue:	Tulip Poplar, Swamp White Oak, Constellation Dogwood, Bur Oak, Autumn Blaze Hybrid Maple, Hybrid Dogwood, Skyline Honeylocust
Blue Course Drive:	Bald Cypress, Dawn Redwood
Bradley Avenue:	Red Oak, Fruitless Coffeetree
Branch Road:	
North Buckhout St.:	
South Buckhout St.:	Ruby Red Horsechestnut
North Burrowes St.:	Greenspire Zelkova, Tulip Poplar, Autumn Blaze Hybrid Maple, Liberty London Planetree, Bur Oak
South Burrowes St.:	Redmond American Linden, Shingle Oak, Shademaster Honey Locust, Japanese Katsura, Ivory Silk Tree Lilac, Tulip Poplar, Bloodgood London Plantree, Shellbark Hickory, American Basswood, Shumard Oak, Eastern Redbud, Cumulus Serviceberry, Hardy Rubbertree, Skyline Honeylocust, Zelkova
Center Lane:	Tulip Poplar, Hedge Maple
Clarence Avenue:	Redmond American Linden
East College Ave.:	Valley Forge American Elm, Autumn Gold Ginkgo, Autumn Blaze Hybrid Maple, Greenvase Zelkova, Liberty London Planetree, Princeton Sentry Ginkgo, Shademaster Honeylocust, Skyline Honeylocust, Bloodgood London Planetree, Lakeview Ginkgo, Hardy Rubbertree, Autumn Blaze

Hybrid Maple

West College Ave.:	Skyline Honeylocust, Catalpa, Shademaster Honeylocust, Coffeetree, Bloodgood London Planetree, Autumn Gold Ginkgo, Exclamation London Planetree, Greenspire Littleleaf Linden, Magnifica Hackberry, Princeton Sentry Ginkgo, Greenvase Zelkova
Corl Street:	Eastern Redbud, Shumard Oak, Prairiepride Hackberry, Magnifica Hackberry
Crabapple Court:	
Crabapple Drive:	Bald Cypress, Sterling Silver Linden, Tulip Poplar, Bur Oak
	Crestmont Road: Kwansan Cherry
East Doris Avenue:	Frontier Elm, Greenvase Zelkova, Purple Robe Black Locust, Skyline Honeylocust, River Birch
West Doris Avenue:	
Dorum Avenue:	Tulip Poplar, Constellation Dogwood, Red Oak, Happidaze Sweetgum
Easterly Parkway:	Yellowwood, Tulip Poplar, Shumard Oak, Swamp White Oak, Red Oak, Honeylocust
	Edgewood Circle:
Ellen Avenue:	Celebration Hybrid Maple, Greenvase Zelkova
E. Fairmount Ave:	Greenvase Zelkova, Shubert Cherry, Bloodgood London Planetree, Catalpa, Ruby Red Horsechestnut
W. Fairmount Ave.:	Valley Forge American Elm, Redmond American Linden, Coffeetree, Halka Zelkova, Magnifica Hackberry, Fruitless Sweetgum, Tulip Poplar, Bur Oak, Constellation Dogwood, Autumn Gold Ginkgo, Red oak, American Linden, Bloodgood London Planetree, Hickory, Greenvase Zelkova, Lakeview Ginkgo, Greenspire Littleleaf Linden, Swamp White Oak, Fruitless Coffeetree, Skyline Honeylocust
Fairway Road:	Shuman Oak, Kwansan Cherry, Skyline Honeylocust
East Foster Avenue:	Greenvase Zelkova, Bloodgood London Planetree, Shingle Oak, Sawtooth Oak, Dawn Redwood, Tulip Poplar, Magnifica Hackberry, Greenlevin Littleleaf Linden, Japanese Pagoda Tree, Halka Zelkova, Shumard Oak
West Foster Avenue:	Bloodgood London Planetree, Valley Forge American Elm, Purple Robe Blacklocust, Tulip Poplar, Shumard Oak, Constellation Dogwood, Shademaster Honeylocust
Franklin Road:	
South Fraser St.:	Tulip Poplar, Greenvase Zelkova, Constellation Dogwood, Celebration Hybrid Maple, Skyline Honeylocust, Cornelian Cherry Dogwood
Fraternity Row:	
Fry Drive:	Katsura Tree, Shubert Cherry, Cucumber Magnolia, Tulip Poplar
South Garner St.:	Ruby Red Horsechestnut, Red Oak, Bur Oak, Tulip Poplar, European Hornbeam, Kwansan Cherry, Autumn Blaze Hybrid Maple, Autumn Brilliance Serviceberry, Hackberry, American Basswood, Columnar Sargent Cherry, Princeton Sentry Ginkgo, Umbrella Magnolia, Redmond Linden, Shademaster Honeylocust
North Gill St.:	Skyline Honeylocust, Tulip Poplar, Queen Elizabeth Hedge Maple, Bloodgood London Planetree
South Gill St.:	Autumn Gold Ginkgo, Eastern Redbud, Swamp White Oak, Redmond Linden, Tulip Poplar, Hackberry, Heritage River Birch, Fruitless Coffeetree, Princeton Sentry Ginkgo, American Basswood, Kwansan Cherry, Catalpa
Glenn Circle:	Stellar Pink Dogwood
Glenn Road:	Fruitless Coffeetree, Blackgum, Hardy Rubbertree, Glenlevin Linden, Pacific Sunset Hybrid Maple, Eastern Redbud, Happidaze Sweetgum, Autumn Blaze Hybrid Maple, Fruitless Sweetgum, Redmond American Linden, Swamp White Oak
Grace Street:	Tulip Poplar, American Basswood, Sterling Silver Linden
Greenfield Circle:	Katsura, Sassafras, Shumard Oak
Hadden Court:	
East Hamilton Ave.:	Tulip Poplar, Sassafras, Bur Oak, Ruby Red Horsechestnut, Macho Amur Corktree, Witch Hazel, Ivory Silktree Lilac, Bald Cypress, Yellowwood, Chestnut Oak, Bloodgood London Planetree, Eastern Redbud, Red Oak, Ginkgo, Hedge Maple

West Hamilton Ave.:	Cumucus Serviceberry, Fruitless Coffeetree, Dawn Redwood, Bald Cypress, Bur Oak, Shademaster Honeylocust, Constellation Dogwood
Hartswick Avenue:	Frontier Elm, Golden Raintree, Tulip Poplar, Coffeetree, Magnifica Hackberry, Redmond Linden, Halka Zelkova, Sterling Silver Linden, Greenvase Zelkova, Hybrid Dogwood, Glenlevin Littleleaf Linden, Willow Oak
Hedgerow Drive:	Purple Robe Blacklocust, Tulip Poplar, Shingle Oak
Hiester Street:	Bloodgood London Planetree, Skyline Honeylocust, Shademaster Honeylocust
Hetzel Street:	London Planetree, Redmond American Linden
High Street:	Upright European Hornbeam, Queen Elizabeth Hedgemaple, Crabapple
Highland Avenue:	Greenspire Littleleaf Linden, Skyline Honeylocust, Spring Snow Crabapple
Highlandon Court:	Japanese Pagoda Tree, Red Oak, Swamp White Oak
Hillcrest Avenue:	Sterling Silver Linden, Red Oak, Tulip Poplar, Coffeetree, Redmond American Linden, Heritage Riverbirch, Cucumber Magnolia, Japanese Katsua, Greenvase Zelkova, Lakeview Ginkgo, Princeton Sentry Ginkgo, Bald Cypress, October Glory Red Maple, Catalpa, Fruitless Sweetgum, Skyline Honeylocust, Fruitless Coffeetree, Liberty London Planetree, Eastern Redbud, Blackgum
Holmes Street:	Golden Raintree, Sawtooth Oak, Eastern Redbud, Canada Red Cherry, Prariepride Hackberry, Red Oak, Stellar Pink Dogwood, Paperbark Maple, Autumn Blaze Hybrid Maple.
Homan Avenue:	Fruitless Sweetgum, Sargent Cherry, Katsura, Magnolia
Inverary Place:	Forest Pansy Redbud, Kousa Dogwood, Autumn Blaze Hybrid Maple, Hybrid Dogwood, Japanese Red Maple, Stella Pink Dogwood, Upright Cherry
East Irvin Avenue:	Witch Hazel, Tulip Poplar, Fruitless Sweetgum, Glenlevin Littleleaf Linden, Redmond American Linden, Autumn Blaze Hybrid Maple, Bur Oak, Eastern Redbud, Red Oak, Sawtooth Oak
West Irvin Avenue:	Coffeetree, Heritage River Birch, Japanese Katsura, Skyline Honeylocust, Hardy Rubbertree, Autumn Blaze Hybrid Maple, Fruitless Coffeetree
Jackson Street:	Red Oak, Beech
Keller Street:	Bloodgood London Planetree, Purple Robe Black Locust, Greenvase Zelkova
Kemmerer Road:	
Legion Lane:	
Lillian Circle:	Sterling Silver Linden
Locust Lane:	Bur Oak, Skyline Honeylocust, Swamp White Oak
Logan Avenue:	Greenvase Zelkova
Lytle Avenue:	Yellowwood, Bloodgood London Planetree, Constellation Dogwood
Martin Terrace:	
East Marylyn Avenue:	Red Oak
West Marylyn Avenue:	Prairiefire Crabapple, Sugar Tyme Crabapple, Bloodgood London Planetree, Liberty London Planetree
McAllister Street:	
McCormick Avenue:	Magnifica Hackberry, Cucumber Magnolia, Sterling Silver Linden, Regent Japanese Pagoda Tree, Shingle Oak, Redmond Linden, Redbud, Constellation Dogwood, Purple Robe Black Locust, Hardy Rubbertree, Sawtooth Oak, Red Oak, Catalpa, Glenlevin Littleleaf Linden, American Linden, Autumn Gold Ginkgo, Greenspire Littleleaf Linden, Fruitless Sweetgum, Bur Oak, Princeton Sentry Ginkgo, Shagbark Hickory
McKee Street:	Homestead Hybrid Elm, Upright Sargent Cherry, Red Oak, Tulip Poplar, Swamp White Oak, Bur Oak, Hybrid Dogwood, Hackberry, Cherry
Metz Avenue:	Kentucky Coffeetree
East Mitchell Ave.:	Autumn Blaze Hybrid Maple, Tulip Poplar, Dawn Redwood, Redmond American Linden, Valley Forge American Elm, Hickory, Red Oak, Sterling Silver Linden, American Hornbeam
West Mitchell Ave.:	Tulip Poplar, Fruitless Coffeetree
Nimitz Avenue:	Umbrella Magnolia, Silver Linden, Eastern Redbud, Greenspire Littleleaf Linden, Bur Oak, Autumn

	Gold Ginkgo, Red Sunset Red Maple, Swamp White Oak, Tulip Poplar, Fruitless Coffeetree, Redmond American Linden, Golden Raintree, Constellation Dogwood, October Glory Redmaple
East Nittany Ave.:	Catalpa, Shademaster Honeylocust, Tulip Poplar, Red Sunset Red Maple, Regent Japanese Pagoda Tree
West Nittany Ave.:	Bloodgood London Planetree, Tulip Poplar, Shingle Oak, Shademaster Honeylocust, Redmond American Linden, Hardy Rubbertree, Ruby Red Horsechestnut, Catalpa, Forest Pansy Redbud, Shellbark Hickory, Shumard Oak, Swamp White Oak, Liberty London Planetree, Hybrid Elm
Norma Street:	Dawn Redwood, Sugar Tyme, Crabapple, Regent Japanese Pagoda Tree, Silver Linden
O' Bryan Lane:	Bur Oak, Shingle Oak, Tulip Poplar, Cucumber Magnolia, Bloodgood London Planetree
Old Boalsburg Rd.:	Sawtooth Oak, Autumn Gold Ginkgo, American Basswood, Tulip Poplar, Lakeview Ginkgo, Red Oak, Redmond American Linden, Skymaster English Oak, Glenlevin Littleleaf Linden, Serviceberry Shumard Oak, Scarlet Sentinel Hybrid Maple, Greenspire Littleleaf Linden, Cucumber Magnolia
Oneida Street:	Redmond American Linden, Greenspire Littleleaf Linden, Hardy Rubbertree, Eastern Redbud, Magnifica Hackberry, Regent Japanese Pagoda Tree, Cornelian Cherry Dogwood, Golden Raintree
Osmond Street:	Japanese Pagoda Tree, October Glory Red Maple, Redbud, Eastern Redbud, Purple Robe Black Locust
East Park Avenue:	Magnifica Hackberry Catalpa
West Park Avenue:	Autumn Gold Ginkgo, Tulip Poplar, Greenspire Littleleaf Linden, Redmond American Linden Cherry
No. Patterson St.:	Constellation Dogwood, Red Oak, Greenspire Littleleaf Linden, Glenleven Littleleaf Linden
So. Patterson St.:	Constellation Dogwood, Greenvase Zelkova, Bald Cypress, Red Oak, Robin Hill Serviceberry
Penfield Road:	Spring Snow Crabapple, Regent Tree Lilac, Prairiefire Crabapple, Okame Cherry, Sugar Tyme Crabapple,
Plaza Drive:	Bloodgood London Planetree
East Prospect Ave:	Hardy Rubbertree, Sawtooth Oak, Autumn Blaze Hybrid Maple, Prairiepride Hackberry, Sargent Cherry, American Basswood, Magnifica Hackberry, Regent Japanese Pagoda Tree, Legacy Sugar Maple, Purple Robe Black Locust, Shumard Oak, Shademaster Honeylocust, Coffeetree, Yellowwood Tulip Poplar, Queen Elizabeth Hedge Maple, Red Oak, Bloodgood London Planetree, Bur Oak, Greenvase Zelocova, Ultra Hackberry
West Prospect Ave.:	Hardy Rubbertree, Purple Robe Black Locust, Yellowwood, Eastern Redbud, Red Oak, Bur Oak, Constellation Dogwood, Sawtooth Oak, Celebration Hybrid Maple, Magnifica Hackberry, Swamp White Oak, Upright European Hornbeam, Shumard Oak
South Pugh Street:	Kwansan Cherry
Ridge Avenue:	Magnifica Hackberry, Bur Oak, Redbud, Greenvase Zelkova, Bloodgood London Planetree, Catalpa, Red Oak, Shumard Oak, Tulip Poplar, Redmond American Linden, Sargent Cherry, Dogwood, Halka Zelkova, Coffeetree, Autumn Blaze Hybrid Maple, Shademaster Honeylocust, Cucumber Magnolia
Robin Road:	Eastern Redbud
Rosa Lane:	
Royal Circle/Road:	Sugar Tyme Crabapple, Fruitless Sweetgum
Sandpiper Drive:	Red Sunset Red Maple, Constellation Dogwood, Autumn Blaze Hybrid Maple, Hedge Maple, Ivory Silk Tree Lilac, Kousa Dogwood
Sawgrass Circle:	
Saxton Drive:	Constellation Dogwood, Shumard Oak, Kouse Dogwood, Green Mountain Sugar Maple, Eastern Redbud, Red Sunset Red Maple, Princeton Sentry Ginkgo, Red Oak, Catalpa, Celebration Hybrid Maple, Tulip Poplar, Cucumber Magnolia, Dawn Redwood, Fairmount Ginkgo
Science Street:	Red Oak, Sargent Cherry, Pink Flame Cherry
Smithfield Circle:	Happidaze Sweetgum
Smithfield Street:	Tulip Poplar
Southgate Drive:	Bloodgood London Planetree, Magnifica Hackberry, Hardy Rubbertree, Tulip Poplar, Celebration Hybrid Maple, Fruitless Coffeetree, Swamp White Oak, Bur Oak

East South Hills Ave.:	
West South Hills Ave.:	Yellowwood, Tulip Poplar, Bloodgood London Planetree
Sowers Street:	
North Sparks Street:	
South Sparks Street:	Greenspire Littleleaf Linden, Trident Maple, Eastern Redbud, Constellation Dogwood, Redmond American Linden, Regent Japanese Tree Lilac, Cornellian Cherry Dogwood, Purple Robe Black Locust, Shademaster Honeylocust, Queen Elizabeth Hedgemaple, Cherry, Ruby Red Horsechestnut, Sterling Silver Linden
Stony Lane:	Cumulus Serviceberry
Storch Road:	Swamp White Oak, Autumn Blaze Hybrid Maple
Stratford Court:	Dawn Redwood, Greenvase Zelkova
Stratford Drive:	Sterling Silver Linden, Yellowwood, Bur Oak, Magnifica Hackberry, Tulip Poplar, Hardy Rubbertree, Shubert Cherry, Red Oak, Dawn Redwood, Stella Pink Dogwood, Fruitless Coffeetree, Sawtooth Oak, Bloodgood London Planetree
Sunrise Terrace:	
Sunset Road:	Red Oak
Taylor Street:	Bur Oak, Hardy Rubbertree, Kwanson Cherry, Hackberry
Thistlewood Way:	
Thomas Street:	Cucumber Magnolia, Red Oak, Shingle Oak, Tulip Poplar
University Drive:	Bloodgood London Planetree, Yellowwood, Bur Oak, Eastern Redbud, Tulip Poplar, Queen Elizabeth Hedge Maple, Autumn Gold Ginkgo, Shumard Oak
Walnut Spring Lane:	Hardy Rubbertree, Red Sunset Red Maple, Autumn Blaze Hybrid Maple
Walnut Street:	Shademaster Honeylocust, Dawn Redwood, Fruitless Coffeetree, Skyline Honeylocust, Bloodgood London Placetree, Greenvase Zelkova
Waring Avenue:	Coffeetree, Cucumber Magnolia, Magnifica Hackberry, Sawtooth Oak, Tulip Poplar, Serling Silver Linden, Regent Japanese Pagoda Tree, Redbud, Fruitless Coffeetree, Skyline Honeylocust, Greenvase Zelkova, Katsura, Shademaster Honeylocust, Redmond American Linden
Waupelani Drive:	Swamp White Oak, English Oak, Ivory Silk Tree Lilac, Red Oak, Prairiefire Crabapple, Shingle Oak, Bur Oak, Sargent Cherry, Purple Robe Black Locust, Willow Oak, Coffeetree, Red Oak, Redmond American Linden, Sawtooth Oak, Magnifica Hackberry
Waypoint Circle:	
Webster Drive:	Japanese Pagoda Tree, Forest Pansy Redbud, Eastern Redbud, Okame Cherry, Tulip Poplar, Bloodgood London Planetree, Paperback Maple, Swamp White Oak
Westerly Parkway:	Homestead Elm, Sawtooth Oak, Red Oak, Celebration Hybrid Maple, Swamp White Oak, Tulip Poplar, Catalpa, Bur Oak, Fruitless Sweetgum, Bald Cypress
Westview Avenue:	Celebration Hybrid Maple, Kwasan Cherry, Tulip Poplar, Sargent Cherry
Wheatfield Drive:	Swamp White Oak, Sterling Silver Linden, Tulip Poplar, Sawtooth Oak, Glenlevin Littleleaf Linden,
Whitehall Road:	Stellar Pink Dogwood, Yellowwood, Sugar Tyme Crabapple, Prairiefire Crabapple, Upright European Hornbeam
Willard Circle/Street:	American Hornbeam, Bohall Red Maple, Bur Oak, Bloodgood London Planetree, Redmond American Linden
William Street:	Redbud, Hardy Rubbertree, Autumn Gold Ginkgo, Swamp White Oak, Sassafras, Katsura, Yellowwood, Japanese Tree Lilac, Magnifica Hackberry, Forest Pansy Redbud, Purple Robe Black Locust, Cucumber Magnolia, Redmond American Linden, Golden Raintree
Windsor Court:	
Wintergreen Circle:	Prairiepride Hackberry
Woodland Drive:	

Appendix 10. Tree Planting 2007-2016

Tree Planting 2007-2016

Year Tree Planted	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Celebration Hybrid Maple	1	0	4	0	0	3	4	4	4	0	20
Autumn Blaze Hybrid Maple	0	2	1	1	6	6	0	7	4	0	27
Bowhall Red Maple	0	3	0	0	0	0	0	0	0	0	3
Green Mtn. Sugar Maple	4	0	0	0	1	0	1	0	0	0	6
Paperbark Maple	0	0	0	0	0	0	0	3	0	0	3
Pacific Sunset Red Maple	0	0	1	0	0	0	0	0	0	0	1
Legacy Sugar Maple	0	0	2	0	0	0	0	0	0	0	2
Trident Maple	2	0	0	0	0	0	1	0	0	0	3
Queen Elizabeth Hedge Maple	0	1	0	0	0	2	0	0	4	2	9
October Glory Red Maple	5	0	0	0	1	0	0	1	0	0	7
Deborah Norway Maple	4	0	0	0	0	0	0	0	0	0	4
Red Sunset Red Maple	0	0	2	0	6	0	0	0	0	0	8
Ruby Red Horsechestnut	2	1	1	0	2	0	3	1	2	0	12
Heritage River Birch	0	1	0	0	0	1	0	1	0	1	4
Catalpa	0	0	0	0	2	1	4	2	4	5	18
Eastern Redbud	0	8	2	9	10	6	7	4	2	9	57
Forest Pansy Redbud	0	1	1	2	0	0	0	0	0	1	5
American/European Hornbeams	2	1	0	0	2	1	0	1	1	2	10
Magnifica Hackberry	2	5	6	4	7	5	1	4	11	10	55
Pacific Pride Hackberry	0	0	1	2	0	0	5	0	0	0	8
Katsura	2	0	3	2	1	2	3	1	0	1	15
Yellowwood	3	2	6	0	0	1	1	1	9	1	24

Tree Planting 2007-2016

Year Tree Planted	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Hickory (Mockernut & others)	0	1	0	1	1	0	1	0	0	0	4
Stellar Pink Dogwood	0	0	0	0	0	0	0	4	0	0	4
Constellation Dogwood	3	8	2	0	2	2	4	2	0	6	29
Kousa Dogwood	1	1	0	1	5	1	0	0	1	0	10
Cornelian Cherry Dogwood	0	0	1	3	0	0	1	2	10	0	17
Ohio Pioneer Hawthorn	1	0	0	0	2	0	0	0	0	0	3
Hardy Rubbertree	7	2	6	5	1	2	4	2	1	2	32
Serviceberry (Autumn Brilliance, Cumulas & Robin Hill)	0	0	0	3	1	0	1	0	2	2	9
American Beech	0	0	0	0	0	0	0	0	0	1	1
Summit Green Ash	4	0	0	0	0	0	0	0	0	0	4
Autumn Gold Ginkgo	0	7	11	0	5	5	0	0	3	4	35
Lakeview Ginkgo	0	0	0	5	0	5	6	0	0	0	16
Princeton Sentry Ginkgo	0	0	0	0	2	0	0	5	4	0	11
Skyline Honeylocust	0	5	6	4	5	4	9	3	3	0	39
Shademaster Honeylocust	7	3	1	0	0	4	4	3	2	4	28
Coffeetree	5	6	1	4	0	0	0	0	0	0	16
Fruitless Coffeetree	0	0	0	0	6	5	5	7	2	2	27
Golden Raintree	2	0	1	0	0	0	0	1	2	0	6
Fruitless Sweetgum	2	2	1	0	3	0	4	1	3	1	17
Tulip Poplar	6	15	17	14	17	11	17	8	17	10	132
Spring Snow Crabapple	0	0	0	0	0	2	0	0	0	0	2
Sugar Tyme Crabapple	1	0	0	0	2	1	0	0	4	5	13
Prariefire Crabapple	1	0	0	0	0	0	1	0	3	0	5

Tree Planting 2007-2016

Year Tree Planted	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Cucumber Magnolia	1	0	3	3	2	2	0	3	5	5	24
Witch Hazel	1	0	0	0	0	0	0	0	0	0	1
Blackgum	0	0	0	0	0	0	0	0	2	0	2
Dawn Redwood	3	2	0	2	1	2	3	1	0	1	15
American Hophornbeam	1	0	0	0	0	0	0	0	0	0	1
Bloodgood london Planetree	12	6	17	4	13	20	15	6	3	0	96
Macho Amur Cork Tree	0	1	0	0	0	0	0	1	0	0	2
Merril Magnolia	0	1	0	0	0	0	0	0	0	1	2
Red Oak	15	3	2	5	9	6	16	10	4	5	75
Bur Oak	11	4	5	2	4	12	10	6	7	4	65
Sawtooth Oak	4	6	0	1	1	3	2	3	0	0	20
Pin Oak	0	0	0	1	0	0	0	0	0	0	1
Swamp White Oak	2	4	0	0	5	5	2	2	3	1	24
Shingle Oak	2	1	1	1	1	3	0	0	0	0	9
English Oak	0	0	0	0	1	0	1	0	1	0	3
Chestnut Oak	4	0	0	1	0	0	0	0	1	0	6
Scarlet Oak	4	0	0	1	0	0	0	0	0	0	5
Shumard Oak	2	2	3	7	6	1	8	4	6	3	42
Laurel Oak	0	0	0	0	0	0	0	0	1	0	1
Willow Oak	1	2	0	0	0	0	0	0	0	0	3
Okame Cherry	0	1	2	0	1	0	1	0	0	0	5
Kwansan Cherry	0	12	0	1	1	4	1	0	0	0	19
Sargent Cherry	7	1	2	1	1	1	2	1	2	6	24
Shubert Cherry	0	1	1	1	2	0	0	0	0	0	5

Tree Planting 2007-2016

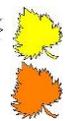
Year Tree Planted	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Purple Robe Black Locust	7	3	1	5	1	0	1	0	1	0	19
Willow	0	1	0	0	0	0	0	0	0	1	2
Sassafras	1	0	1	1	1	2	0	0	1	0	7
Tree Lilac (Regent, Ivory Silk)	5	0	3	3	2	2	1	2	4	5	27
Sterling Silver Linden	3	0	4	0	3	3	3	0	2	2	20
Glenlevin Attleleaf Linden	3	1	3	1	0	0	0	0	4	3	15
Greenspire Littleleaf Linden	10	4	1	0	3	1	3	3	0	0	25
Redmond American Linden	5	6	2	1	2	3	6	7	8	2	42
American Linden	0	0	2	2	4	3	0	0	0	8	19
Japanese Pagoda Tree	1	3	7	2	2	1	2	1	0	0	19
Bald Cypress	3	0	0	3	3	0	6	0	2	0	17
Frontier Elm	2	0	0	0	0	0	0	0	0	0	2
Valley Forge American Elm	5	0	0	0	0	0	0	0	0	0	5
Homestead Hybrid Elm	2	0	0	0	0	0	0	0	0	3	5
Greenvase Zelkova	2	5	4	3	6	3	12	8	9	4	56
Halka Zelkova	0	6	4	1	1	2	0	0	0	0	14
Total	186	151	145	113	166	149	182	126	164	123	1505

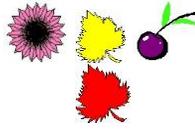
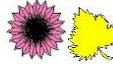
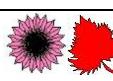
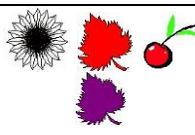
Appendix 11. Tree species and varieties recommended for use as street trees in State College

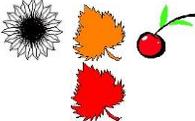
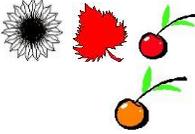
Key to symbols used:

<u>Growth Habit</u>		<u>Site Tolerance</u>		<u>Seasonal Interest</u>	
	Columnar		Requires full sun		Fruit color/showy
	Vase Shaped		Prefers shade		Flower color/showy
	Conical		Poor, dry soil		Fall foliage/showy
	Rounded		Moist soil		
	Spreading		Urban stresses		
			Salt		

A. SMALL TREES. Mature ht. less than 30ft. Minimum tree lawn 2ft; may be planted under wires.

Species	Growth Habit	Site Tolerance	Seasonal Interest	Caution/Comments
<i>Acer buergeranum</i> Trident Maple *(TF) Small growing, 3 lobed leaf maple with few pests. May be damaged in ice storms.		  		Slow growing and availability may be limited.
<i>A. ginnala</i> Amur Maple (TF) Small growing, 3 lobed leaf maple, often multi-stemmed with abundant fruit set which may be colorful. Does not tolerate alkaline soil.		 or  	 	Slow growth. Susceptible to verticillium wilt. Fruit may cause litter problem. Has shown invasive tendencies in some parts of Northeastern U.S.
<i>A. tataricum</i> Tatarian Maple (TF) Small growing maple with greenish white paniced flowers and noticeable green to red fruit (samaras). Tolerates alkaline soil.		 or   	 	Slow growing and availability may be limited. Susceptible to verticillium wilt.
<i>Amelanchier laevis</i> 'Cumulus' Cumulus Serviceberry Early white flowering tree with persistent edible fruit. Light colored bark with dark vertical striations provides interest throughout the year. Grows poorly in full sun.		 	  	Leaf diseases & fireblight may be problem. Sensitive to drought and salt. Plant only as understory tree.
<i>A.x.grandiflora</i> 'Autumn Brilliance' Autumn Brilliance Serviceberry Good growth habit with vibrant orange to red foliage in the fall. Grows poorly in full sun.		 	  	Leaf diseases & fireblight may be problem. Sensitive to drought and salt. Plant only as understory tree.

<p>A.x.g. 'Princess Diana' Princess Diana Serviceberry Variety similar to above but with bright red foliage in the fall.</p>		 		<p>Leaf diseases & fireblight may be problem. Sensitive to drought and salt. Plant only as understory tree.</p>
<p>A.x.g 'Robin Hill' Robin Hill Serviceberry Better tree form than other varieties.</p>	 to 	 		<p>Leaf disease & fireblight may be problem. Sensitive to drought, salt & air pollution. Plant only as understory tree.</p>
<p>Cercis canadensis Eastern Redbud Colorful native tree that can be used as street tree and in woodland settings. Nitrogen fixating plant.</p>		 or  		<p>Affected by canker and verticillium wilt.</p>
<p>C.c. var alba White Flowering Redbud Similar to above but with white flowers.</p>		 or  		<p>Affected by canker and verticillium wilt.</p>
<p>C.c. 'Forest pansy' Forest Pansy Redbud A red leaved variety of Eastern Redbud.</p>		 or  		<p>Same as species. Cold hardness may be a problem.</p>
<p>Cornus kousa Kousa Dogwood A slow growing ornamental prized for its layered white blossoms. Edible fruit.</p>	 to 	 		<p>Fall planting hazard. Exfoliating bark provides summer interest.</p>
<p>Cornus kousa x C. florida 'Rutcan' Constellation Dogwood Cross between our native Flowering Dogwood & Chinese Dogwood. Flowers after Flowering Dogwood & before Kousa Dogwood.</p>		  or 		<p>No fruit litter problems like other dogwoods. Resistant to anthracnose & dogwood borer.</p>
<p>Cornus mas Cornelian Cherry Dogwood One of the first trees to bloom in spring with small yellow flowers.</p>		 or 		<p>Flaky bark provides year round interest. Basically pest free, suckers may be a problem. Fall planting hazard</p>

<p><i>Crataegus crus-galli</i> var <i>inermis</i> (TF) Thornless Cockspur Hawthorn Thornless native tree with attractive flowers.</p>		  U		Flowers may give off unpleasant odor. Prone to cedar apple rust. Fall planting hazard.
<p><i>C. phaenopyrum</i> Washington Hawthorn (TF) An attractive small tree to plant in difficult locations.</p>		  U		Thorns may be a problem. Fall planting hazard.
<p><i>C. punctata</i> ‘Ohio Pioneer’ Ohio Pioneer Hawthorn (TF) Good tree for difficult sites.</p>		  or  U		Resistant to fireblight. Fruit may cause litter problem. Fall planting hazard.
<p><i>C. viridis</i> ‘Winter King’ Winter King Hawthorn (TF) Tree selected from native plant.</p>		 U		Bark provides year round interest. Suckering may be a problem. Fall planting hazard.
<p><i>Magnolia stellata</i> Star Magnolia (TF) May be used as street tree in sheltered location. Slow growing.</p>				Susceptible to verticillium wilt & magnolia scale. Slow growing. Fall planting hazard.
<p><i>M. galaxy</i> Galaxy Magnolia (TF) Rapidly growing hybrid.</p>				Flowers may cause litter problem. Susceptible to verticillium wilt & scale insects. Fall planting hazard.
<p><i>M. x loebneri</i> ‘Merrill’ Merrill Magnolia (TF)</p>		 S		Fragrant flowers. Susceptible to verticillium wilt. Fall planting hazard.
<p><i>Malus</i> ‘Prairiefire’ Prairiefire Crabapple (TF) Attractive small tree with reddish green summer foliage & reddish brown bark.</p>				Suckers may cause problem but no serious limitations.
<p><i>M.</i> ‘Sugar Tyme’ Sugar Tyme Crabapple (TF) Good street tree with upright branching when young.</p>		  or 		Suckers may cause problems. Good disease resistance
<p><i>Prunus</i> ‘Okame’ Okame Cherry Branching more delicate and upright than other cherries.</p>				Fall planting hazard.

<p><i>P. virginiana</i> ‘Shubert’ Shubert Chokecherry or Canada Red Cherry Colorful red or maroon foliage during growing season.</p>				<p>Suckers may cause problems. Young trees produce long, weak branches that may need pruned.</p>
<p><i>Syringa reticulata</i> ‘Ivory Silk’ Ivory Silk Tree Lilac Good street tree for small spaces with attractive reddish brown bark.</p>				<p>Susceptible to powdery mildew & lilac borer.</p>
<p><i>S. r.</i> ‘Regent’ Regent Tree Lilac More vigorous than Ivory Silk.</p>				<p>Susceptible to powdery mildew & lilac borer.</p>

*(TF) – Indicates that the tree form should be specified when ordering

Key to symbols used:

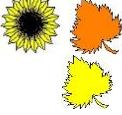
<u>Growth Habit</u>		<u>Site Tolerance</u>		<u>Seasonal Interest</u>	
	Columnar		Requires full sun		Fruit color/showy
	Vase Shaped		Prefers shade		Flower color/showy
	Conical		Poor, dry soil		Fall foliage/showy
	Rounded		Moist soil		
	Spreading	U	Urban stresses		
		S	Salt		

B. MEDIUM TREES. Mature ht. 30 to 50 ft. Minimum tree lawn 3ft; most may be planted under wires.

<u>Species</u>	<u>Growth Habit</u>	<u>Site Tolerance</u>	<u>Seasonal Interest</u>	<u>Caution/Comments</u>
<i>Acer campestre</i> Hedge Maple Slow growing tree with typical maple form that can be planted under power lines.		 or   U		Susceptible to verticillium wilt. Closely spaced trees can produce dense shade.
<i>A. c.</i> 'Queen Elizabeth' Queen Elizabeth Hedge Maple More upright than species.		 or   U		This variety is more susceptible to frost cracks. Also susceptible to verticillium wilt.
<i>A. saccharum</i> 'Goldspire' Goldspire Sugar Maple Narrow compact tree with dark summer foliage.				Sensitive to salt. Very susceptible to verticillium wilt. Not tolerant of urban stresses
<i>A. truncatum x A. platanoides</i> 'Warrenred' Pacific Sunset Hybrid Maple		 or  U 		Availability may be problem.
<i>Aesculus x carnea</i> 'Briotii' Ruby Red Horsechestnut Medium growing tree with very showy flowers.		U 		Less sensitive to heat & drought than other horsechestnuts. Availability may be problem. 20' to 30' height.
<i>Aesculus x carnea</i> 'Fort McNair' Ruby Red Horsechestnut Medium growing tree with very showy flowers.		U 		Less sensitive to heat & drought than other horsechestnuts. Availability may be problem. Reddish pink flowers. 30' to 40' height
<i>Betula nigra</i> 'Heritage' Heritage River Birch (TF) Good tree for tough sites.		 or 	Salmon colored flaky bark	Somewhat resistant to bronze birch borer. pH sensitive. Requires pruning to maintain clearance. Fall planting hazard.

Carpinus betulus European Hornbeam (TF)	 to 	 or  U		Fall planting hazard.
C. b. 'Fastigiata' Upright European Hornbeam (TF) Very formal looking tree. Usually low branched.		 or  U		Fall planting hazard. Best if used in wide tree lawns or park like settings. Requires little pruning.
C. caroliniana American Hornbeam (TF) Also called muscle wood because of its smooth fluted bark.	 to 		  	Grows well in small places. Sensitive to drought and soil compaction. Fall planting hazard.
Cladrastis lutea American Yellowwood (TF) Usually a low branched tree with fragrant flowers.		 U	 	Sensitive to drought and compaction. Susceptible to verticillium wilt. Poor branching habit, scale insects may be a problem.
Eucommia ulmoides Hardy Rubber Tree Medium size tree with attractive summer foliage.		 U		No serious disease or pest known. Produces latex. Availability may be limited.
Koelreuteria paniculata Golden Raintree Fragrant flowers and bladder-like fruit make this a good ornamental for residential areas.		U S	  	No serious disease or pest known except verticillium wilt. Fall planting hazard.
Ostrya virginiana American Hophornbeam (TF) Native tree with scaly bark.	 to 	 or 	 	Sensitive to salt and urban conditions. Availability may be a problem.

Phellodendron amurense Amur Corktree				
P.a. 'Macho' Macho Amur Corktree More upright than species.	 to 	 or  U		Fall planting hazard. Male variety of species that dose not produce fruit. Has spreading root system
Prunus sargentii Sargent Cherry (TF) Reddish brown bark with obvious white lenticels.		 U	 	Hardy flowering tree but short lived. Fall planting hazard.
P.s. 'Columnar' Columnar Sargent Cherry		 U	 	Same as species
P. serrulata 'Kwanzan' Kwanzan Cherry (TF) Flowering ornamental famous for the cherry blossom display in Washington, DC.		 S		Sensitive to pollution and several insects. Fall planting hazard.

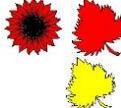
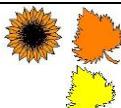
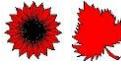
<p><i>Robinia pseudoacacia</i> ‘Purple Robe’ Purple Robe Black Locust A good ornamental for difficult areas with fragrant flowers.</p>		 S U		Availability may be problem. Susceptible to borers. May produce sucker sprouts.
<p><i>Sassafras albidum</i> Sassafras Native tree with fragrant leaves and bark.</p>	 to 	 or 		Few pest problems. Availability may be problem. pH sensitive.

*(TF) – Indicates that tree form should be specified when ordering.

Key to symbols used:

<u>Growth Habit</u>		<u>Site Tolerance</u>		<u>Seasonal Interest</u>	
	Columnar	 Requires full sun			Fruit color/showy
	Vase Shaped	 Prefers shade			Flower color/showy
	Conical	 Poor, dry soil	 Moist soil		Fall foliage/showy
	Rounded	U Urban stresses			
	Spreading	S Salt			

C. LARGE TREES Mature ht. over 50ft. Minimum tree lawn 5ft; do not plant under wires.

Species	Growth Habit	Site Tolerance	Seasonal Interest	Caution/Comments
<i>Acer rubrum</i> 'Autumn Flame' Autumn Flame Red Maple Good tree for structure and fall color if planted on appropriate sites.		 or 		May be susceptible to verticillium wilt. pH sensitive. Fall planting hazard. Shallow root system.
<i>A.r.</i> 'Bowhall' Bowhall Red Maple Good tree for limited space conditions.		 or 		May be susceptible to verticillium wilt. pH sensitive. Fall planting hazard. Shallow root system.
<i>A. r.</i> 'October Glory' October Glory Red Maple One of the best Red Maple cultivars for fall color. Popular homeowner tree.		 or 		May be susceptible to verticillium wilt. pH sensitive. Fall planting hazard. Shallow root system.
<i>A.r.</i> 'Red Sunset' Red Sunset Red Maple Even more brilliant fall color than October Glory.		 or 		Same as above plus susceptible to wind driven road salt.
<i>A. saccharum</i> Sugar Maple Native tree that has been over-planted as a street tree.		 or  		Sensitive to road salt and very susceptible to verticillium wilt. Does not do well on difficult sites.
<i>A.s.</i> 'Bonfire' Bonfire Sugar Maple Broad crown with good fall color.				Sensitive to road salt and verticillium wilt. Does not do well on difficult sites.
<i>A.s.</i> 'Green Mountain' Green Mountain Sugar Maple' More upright than species.				Sensitive to road salt and verticillium wilt. Does not do well on difficult sites.
<i>A.s.</i> 'Legacy' Legacy Sugar Maple Rapid growing cultivar with dark green summer foliage.				Availability may be a problem. May require regular pruning to maintain clearance. Fall planting hazard. Not affected by

				limestone soils.
<p><i>A. x freemani</i> ‘Autumn Blaze’ Autumn Blaze Hybrid Maple A cross between Red & Silver Maples with branching structure & color of Red Maple but rapid growth and adaptability of Silver Maple.</p>		 or   or  		Shallow root system.
<p><i>A. x freemani</i> ‘Celebration’ Celebration Hybrid Maple A cross between Red and Silver Maple with branching structure & color of Red Maple but rapid growth and adaptability of Silver Maple.</p>		 or   or  		Not affected by limestone soils. Susceptible to verticillium wilt. Fall planting hazard.
<p><i>A. x freemani</i> ‘Scarlet Sentinel’ Scarlet Sentinel Hybrid maple A cross between Red and Silver Maple with branching structure & color of Red Maple but rapid growth and adaptability of Silver Maple.</p>	 to 	 or   or  		Shallow root system. Susceptible to verticillium wilt. Fall planting hazard.

<i>Carya cordiformis</i> Bitternut Hickory				Native tree but availability may be a problem.
<i>Carya illinoensis</i> Hardy Pecan				Midwest native but availability may be a problem.
<i>Catalpa speciosa</i> Catalpa		 		Native. Produces bean-like fruit
<i>Celtis occidentalis</i> 'Prairie Pride' Prairie Pride Hackberry Rapid growing tree good for difficult sites.		 or  U S		Availability may be a problem. May require regular pruning to maintain clearance. Fall planting hazard. Not affected by limestone soils.
<i>C. laevigata</i> x o. 'Magnifica' Magnifica Hackberry Rapid growing tree good for difficult sites.		 or  U S		Availability may be a problem. May require regular pruning to maintain clearance. Fall planting hazard. Not affected by limestone soils.
<i>Cercidiphyllum japonicum</i> (TF) Katsura Tree Scaly bark & red buds add interest year round.		 		Sometimes difficult to establish after transplanting, but grows rapidly. Drought sensitive.
<i>Ginkgo biloba</i> 'Autumn Gold' Autumn Gold Ginkgo Good urban tree.		U S		Availability may be a problem. Few insect or disease problems. May produce undesirable fruit as it matures.
<i>G.b</i> 'Lakeview' Lakeview Ginkgo Narrow form ideal for sites with limited space.		U S		Availability may be a problem. Few insect or disease problems. May produce undesirable fruit as it matures.
<i>G.b.</i> 'Princeton Sentry' Princeton Sentry Ginkgo Narrow form ideal for sites with limited space.		U S		Availability may be a problem. Few insect or disease problems. May produce undesirable fruit as it matures.
<i>Gleditsia triacanthos</i> 'Imperial' Imperial Honeylocust Lower growing form of Honeylocust.		  U S		Susceptible to webworm, borers and plant bugs. Usually fruitless.
<i>G. t.</i> 'Ruby Lace' Ruby Lace Honeylocust Red summer foliage.		U S		Poor form and increased susceptibility to insects and diseases. Use sparingly.
<i>G.t.</i> 'ShadeMaster' Shademaster Honeylocust	 to 	  U S		Susceptible to webworm, borers and plant bugs. Reduced fruiting.
<i>G. t.</i> 'Skyline' Skyline Honeylocust Has a strong central leader and is more compact than other cultivars.		 		Reduced fruiting. Less susceptible to plant bugs & leaf hoppers than other cultivars.

		U S		
<i>Gymnocladus dioicus</i> Kentucky Coffeetree Good urban tree requiring little care after establishment.		 U S		Pod fruit may be nuisance on female trees. Few disease or insect problems. Slow to establish.
<i>Gymnocladus dioicus</i> 'Espresso' Fruitless Kentucky Coffeetree Good urban tree requiring little care after establishment.		 U S		Few disease or insect problems. Slow to establish. Fruitless
<i>Liquidambar styraciflua</i> Sweetgum Beautiful, symmetrical plant when young, more spreading as it ages.	 to 		 	Fall planting hazard. Spiked, round fruit may cause litter problem. Ice and snow damage common. Chlorosis on high pH soils.
<i>L.s. 'Rotundiloba'</i> Rotundiloba Sweetgum Fruitless variety of species.				Crown narrower than species. Fruitless Fall planting hazard. Availability may be a problem.
<i>Liriodendron tulipifera</i> Tuliptree or Yellow-poplar Referred to as 'Redwood of the East' because of the large size it can obtain.			 	Fast growing tree. Fall planting hazard.
<i>Magnolia acuminata</i> Cucumber tree Good street tree for large spaces.		 or 		Tolerates limestone soils. Availability may be limited. Susceptible to verticillium wilt.
<i>Metasequoia glyptostroboides</i> Dawn Redwood Unusual shape and form for street tree.		 U		Poor growth on alkaline soils. Availability may be problem. Low branched tree that requires early pruning if used as street tree.
<i>Nyssa sylvatica</i> Blackgum One of the best trees for fall foliage		 or  S	 	Difficult to transplant. Descending branches necessitates pruning for clearance, even on older trees. Affected by limestone soils.
<i>Platanus acerifolia</i> 'Bloodgood' Bloodgood London Planetree Mottled bark attractive on older trees.		 or  U S		Requires wide tree lawn. Tendency to form frost cracks but does better if planted in spring. Fruit & bark may cause litter problem. Anthracnose can become serious problem.
<i>Quercus acutissima</i> Sawtooth Oak Good oak for narrower tree lawns.	 to 	 or  U	Attractive summer foliage	Fruit may cause litter problem. pH sensitive. Fall planting hazard.

<p><i>Q. alba</i> White Oak Large growing tree more suited to parks than tree lawns.</p>				Slow growing tree. Difficult to transplant normal size trees. Does poorly on compacted soils. Fall planting hazard.
<p><i>Q. bicolor</i> Swamp White Oak Good street tree as replacement for White Oak.</p>		U S		Fruit may cause litter problem. pH sensitive. Transplants better than white oak. Fall planting hazard.
<p><i>Q. imbricaria</i> Shingle Oak</p>	 to 	 U		Dead leaves on younger trees don't drop until spring. Fall planting hazard.
<p><i>Q. macrocarpa</i> Bur Oak Large growing tree suitable for parks and wide tree lawns.</p>		 or U	Small branches have corky, winged ridges	Slow to recover from transplanting. Tolerates alkaline soil. Fall planting hazard.
<p><i>Q. rubra</i> Red Oak Good native tree if adequate growing space.</p>		 U S		Fall planting hazard. Fruit may be a litter problem. pH sensitive. Fall/winter pruning recommended where oak wilt present.
<p><i>Q. Shumardii</i> Shumard Oak Similar in leaf shape and other characteristics to Red Oak.</p>	 to 	 U S		Fruit may be litter problem. Fall planting hazard. Does better on alkaline soils than Red Oak.
<p><i>Sophora japonica</i> Japanese Pagoda Tree Good medium to large growing tree with unusual green colored bark on younger branches.</p>		 U S	 	Flowers and fruit may cause litter problem. Avoid planting on slopes. Twig blight may be a problem but doesn't affect tree health.
<p><i>S.j. 'Regent'</i> Regent Pagoda Tree Similar to species but smaller mature size.</p>		 U S	 	Flowers and fruit may cause litter problem. Avoid planting on slopes. Twig blight may be a problem but does not affect tree health.
<p><i>Taxodium distichum</i> Bald Cypress Similar in shape to dawn redwood but more sensitive to high pH.</p>	 to  to 	 or U		Requires early pruning if used as streettree. Availability may be a problem.
<p><i>Tilia americana</i> American Linden Large native tree suited to large tree lawns and parks.</p>	 to 	 or U	 Fragrant	Susceptible to verticillium wilt & Japanese beetles. Flowers attractive to bees. Sprouts may be a problem.
<p><i>T. a. 'Redmond'</i> Redmond American Linden Fast growing tree with more uniform shape than species.</p>	 to 	 or S	 Fragrant	Susceptible to verticillium wilt & Japanese beetle. Flowers attractive to bees. Sprouts may be a problem.
<p><i>T. cordata</i> Littleleaf Linden Popular downtown tree because of shape and adaptability.</p>	 to 	 or U	  Fragrant	Adaptable to pH & compaction but sensitive to drought and salt. Aphid honeydew and associated sooty mold may

				be a problem.
<i>T. c.</i> ‘Glenlevin’ Glenlevin Littleleaf Linden Crown shape more closely resembles species than Greenspire Linden.		 or  U	 Fragrant	Adaptable to pH & compaction but sensitive to drought and salt. Aphid honeydew and associated sooty mold may be a problem.
<i>T. c.</i> ‘Greenspire’ Greenspire Littleleaf Linden Uniform crown shape.		 or  U	 Fragrant	Adaptable to pH & compaction but sensitive to drought and salt. Aphid honeydew and associated sooty mold may be a problem.
<i>T. tomentosa</i> Silver Linden Uniform shaped tree with dark green leaves & silvery underside.	 to 	 or  U	 Fragrant	Tolerates heat and drought. Aphid exudation and defoliation may be problem. Basal sprouts may require pruning.
<i>T. t.</i> ‘Sterling’ Sterling Silver Linden	 to 	 U	  Fragrant	Similar to species but more resistant to Japanese beetle feeding. Fall planting hazard.
<i>Ulmus americana</i> ‘Liberty’ Liberty American Elm		 or  U S		Availability may be limited. Possible resistance to Dutch Elm disease but not elm yellows. Susceptible to verticillium wilt.
<i>Ulmus americana</i> ‘Valley Forge’ Valley Forge American Elm		 or  U S		Availability may be limited. Possible resistance to Dutch Elm disease but not elm yellows. Susceptible to verticillium wilt.
<i>Ulmus parvifolia</i> Lacebark Elm Tough tree with attractive mottled bark.	 to 	 or  U	 	Highly resistant to Dutch elm disease but not elm yellows.
<i>U. p.</i> ‘Dynasty’ Dynasty Lacebark Elm Mature shape supposedly resembles American Elm.		 or  U	 	May be difficult to establish. Upright crown. Highly resistant to Dutch elm disease but not elm yellows.
<i>U. p.</i> ‘Ohio’ Ohio Lacebark Elm Same shape as American Elm but smaller mature size.		 U	 	pH adaptable. Resistant to Dutch elm disease.
<i>U.</i> ‘Frontier’ Frontier Hybrid Elm Fast growing elm showing good fall color.	 to 	 U		Stem canker can kill individual branches. Resistant to Dutch elm disease but not elm yellows.

<p>U. 'Pioneer' Pioneer Elm</p>		 or   		<p>Availability may be problem. High resistance to Dutch elm disease but not elm yellows.</p>
<p>Zelkova serrata 'Green Vase' Green Vase Zelkova Fast growing substitute for American Elm.</p>		 or   		<p>Fall planting hazard. Resistant to Dutch elm disease.</p>
<p>Z. s. 'Halka' Halka Zelkova Large fast growing tree similar in shape to American Elm.</p>		 or   		<p>Fall planting hazard. Highly resistant to Dutch elm disease. Availability may be a problem.</p>

