# *Street Tree Inventory Report and Recommendations*

# City of Pflugerville, TX

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PFLUGERVILLE
TEXAS

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TEXAS FOREST SERVICE
The Texas A&M University System

# Contents



# Credits

*The Texas Sample Community Tree Inventory (TXSCTI) system and report was developed by the Texas Forest Service. It is adapted from the Street Tree Management Tool for Urban Forest Managers (STRATUM) computer model developed by researchers at the Center for Urban Forest Research, a research unit of the USDA Forest Service's Pacific Southwest Research Station. The statistical equations used to compute Standard Error values and percentages were specifically drawn from the STRATUM model, as published in the user's manual. For more information about STRATUM or the other i-Tree tools, go to www.itreetools.org.*

*Recommendations provided are the judgment of the Texas Forest Service forester(s) listed below, based on the data collected in cooperation with community staff or volunteers. Questions or comments should be directed to:*


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# Executive Summary

In May 2007, Texas Forest Service and city of Pflugerville foresters conducted a sample tree inventory of 161 randomly selected street segments, covering 15.3 miles (roughly 11%) of the total street miles maintained by the city.

Results include:

* Pflugerville has approximately 3,128 public trees that occupy 45% of the sites available for street and median trees.
* The population is dominated by sugarberry (19%), live oak (18%), cedar elm (17%), crapemyrtle (14%), and Arizona ash (13%).
* Most trees are small, with 69% of trees in the 0-6" diameter range and only 2% of trees larger than 18" diameter.
* Three-fifths of street trees are in good condition and 53% require only routine care.
* An estimated 1,000 public trees and 2,000 private trees have limbs that encroach into clear zones above streets and sidewalks.
* Street trees in Pflugerville are valued at more than $2 million.

Recommendations include:

* Begin a program of pruning to train and shape young trees.
* Favor shade trees other than live oak in street tree planting projects.
* Locate and remove the estimated 17 trees that pose risk to persons or property.
* Develop an annual work plan for tree maintenance and planting.
* Conduct an annual Arbor Day celebration and involve local groups.

# *City Description*

Pflugerville, Texas, is located approximately 12 miles northeast of downtown Austin, between Interstate 35 and the new state highway 130 toll road. Incorporated in 1965, the city is now one of the fastest growing in the nation. U.S. Census figures show a population increase from 4,444 residents in 1990 to 16,335 in 2000, and city leaders estimate the 2008 population at more than 30,000. This growth mirrors the trend of other communities in the Austin-Round Rock metropolitan area.

Pflugerville is a convenient commuting distance from major employers in Austin and Round Rock, and has regionally affordable housing, both of which have spurred the city's growth. Outdoor recreation opportunities and community appearance and character are important issues to citizens.

# Current Tree Management

Pflugerville is located in the Blackland Prairie ecoregion. At the beginning of the last century, native tallgrass prairies were converted to farms and rangeland with narrow ribbons of creek bottom forest made up of oaks, elms, and pecans. Former fencerows now make up a significant portion of the current tree population within city limits.

City leaders see tree planting as a high priority as the community grows into surrounding farmland. Several community groups are active in volunteering for tree planting and tree maintenance activities. Keep Pflugerville Beautiful in particular has committed to a partnership with the Parks and Recreation department to support forestry activities. The city also receives donations of trees through Austin-based TreeFolks and the Lower Colorado River Authority (LCRA) to augment its tree planting effort.

The city forester works in the Parks and Recreation department, but coordinates with other city departments to complete Pflugerville's tree maintenance activities. The Parks department is responsible for tree care in city parks and greenbelts; the Street department manages trees in city street rights-of-way; a brush chipping program was recently delegated to the Wastewater department. However, none of the departments has a line item budget for tree care. Oncor Electric Delivery is the utility company responsible for trimming trees near overhead power lines.

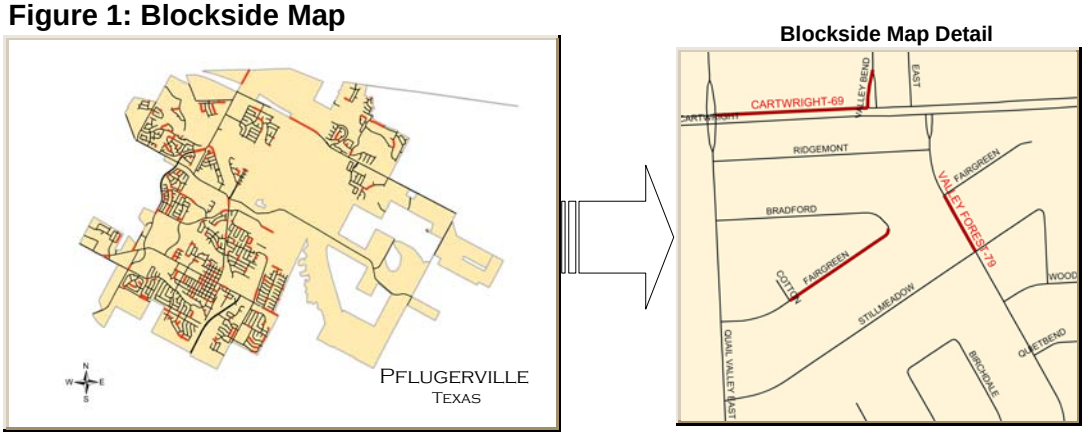
The city forester is also responsible for development plan review for the Planning department to insure new commercial development complies with the city's tree protection and mitigation ordinance. This ordinance defines protected trees, includes an inch-for-inch replacement clause, and an approved species list. Code enforcement officers are responsible for enforcing tree ordinance violations.

Pflugerville passed an ordinance governing the care of trees on public property in 2007, which also created a public tree care advisory board. The board is working with the city forester to create a management plan for the care of trees in public places, as well as examining the landscaping code to suggest changes to City Council that will improve the quality and quantity of trees planted on commercial development sites.

# Inventory Methods

The Texas Sample Community Tree Inventory (TXSCTI) system is designed to provide city staff and community leaders with basic information about the street tree resource. Texas Forest Service (TFS) foresters identify and survey a 5-15% sample of street segments, or "blocksides" (see Figure 1 below), and collect data on the individual trees they find there. This sample is not a substitute for a complete inventory of street trees, but instead is designed to make basic short- and long-term recommendations for managing this important community asset.

**Figure 1: Blockside Map**




Field data collection is limited to relatively few measurements in order to speed up the process (see Appendix A for data collection form and definitions). Trees located within the public right-of-way (ROW) on both sides of a chosen blockside segment, or within a center median, are evaluated for species, trunk diameter, general condition, maintenance needs, and safety clearance. Private trees outside the ROW are evaluated solely for safety clearance. Blockside segments are also surveyed for available planting spaces, both within the ROW or median and within 30' of the roadway on private property. All estimates provided in this report represent public ROW and median trees combined, unless specifically identified otherwise.

The sampled trees provide the basis for statistical estimates for the entire street tree population. In general, sample sizes that produce a Standard Error (SE) value of 20% or less of the total tree estimate are considered sufficient for making basic judgments about the state of the street tree resource. Streets with center medians are included in the survey, with the length of these street segments increased as if the median were divided between the two sides of the street. Table 1 details the sampling results for this survey.

**Table 1: Street Tree Sampling Results**

| | | |
|---|---|---|
| Total Miles (# blocksides): | | 129.72 (1485) |
| Miles Sampled (# blocksides): | | 15.30 (161) |
| Sample Size: | | 11.8% (10.8%) |
| Estimated Total Public Trees: | | 3,128 |
| Standard Error (SE): | +/- | 546 |
| Standard Error Percent: | | 17.5% |

The report findings are divided into three sections: Street Tree Structure, Street Tree Care, and Street Tree Values. The TFS forester has provided professional insight into the data results, followed by a set of recommendations based on an understanding of the city's current program and the state of the street tree resource.

# *Street Tree Structure*

The pattern of trees found in a community can be referred to as its structure. This includes the different tree species and their sizes, as well as the overall number of trees and how they fill the available space along city streets – what urban foresters call stocking. These key measures will guide the recommendations at the end of the report.

## Stocking

In any city there are a certain number of miles of streets to maintain. A model residential street has trees planted along both sides of the right-of-way (ROW), often between the curb and sidewalk. Larger collector streets and boulevards may also have medians that are wide enough to support street trees. If all planting spaces are filled with trees of the largest size possible for the available growing space (termed "full stocking"), a typical U.S. city will have about 105 ROW trees per mile. This benchmark is equivalent to one tree every 50 feet, but takes into account visibility triangles at corners and lost planting spaces due to intersections, driveways, and other public infrastructure. Median spaces provide additional planting opportunities above that number, as do spaces on adjacent private property that can shade public sidewalks and ROWs. The estimates here did not take into account underground utility conflicts that would lower the potential number of planting sites.

Table 2 shows the current estimate of street trees in the community, as well as planting site criteria and opportunities, as found in the sample inventory.

**Table 2: Street Tree Stocking**

| | |
|---|---|
| Estimated No. ROW Trees: | 2,502 |
| Estimated No. Median Trees: + | 626 |
| Estimated Total No. Street Trees: | 3,128 |
| Total Street Miles: | 129.72 |
| Estimated Stocking (trees/mile): | 24.11 |
| % Stocking: | 23% |
| Median/ROW Planting Spaces: | 3,798 |
| Private Yard Planting Spaces: + | 2,077 |
| Total Planting Opportunities: | 5,875 |

***Planting Site Criteria***

***Tree Size:*** Medium or large tree to be planted, if room; only small trees planted under powerlines.

***Location:*** Within public ROW and/or within 30' of ROW edge in private front yard. Tree lawn minimum 4' width.

***Distances:*** Overhead - 15'
Hydrant, utility pole, street light - 10'
Street intersection - 25'
Driveway - 5'
Other trees - 20-50'

### *Key findings:*

Pflugerville has an estimated street tree stocking level of 23%, which leaves ample opportunities for increasing street tree cover. To reach full stocking, the city would need to plant new trees in all of the estimated 3,800 planting spaces along medians and ROWs.

In addition, private homeowners have space in their front yards to plant another 2,000 trees within 30 feet of the curb. Since these owners provide tree maintenance, either individually or through their homeowner associations, Pflugerville can realize the added benefits of trees over streets and sidewalks without the associated increase in management costs.

However, even after filling all the planting sites on ROW's and medians, the city's stocking level would only rise to 53 trees/mile, or 51% – well below the standard of 105 trees/mile. This may be the result of streetscape standards that do not create sufficient room for new trees. Planting strips or "tree lawns" between the curb and sidewalk less than four feet wide effectively prevent the planting of shade trees along new streets, thus limiting the number of open planting sites in our survey. Utility easements may also occupy the spaces normally reserved for street trees.

# Species

As a rule, urban foresters recommend having no more than 10% of the street tree population made up of any single species, and no more than 20% made up of any one tree genus (i.e. the oaks or elms). This can prevent the catastrophic loss of trees due to an outbreak of insects or disease, like the story of Dutch Elm disease in the Eastern U.S. or current outbreaks of Emerald Ash Borer in the Upper Midwest. Species diversity is one sign of a healthy tree resource.

Figures 2 and 3 show the most common species and genera, respectively, found in the sample inventory. The top ten species or genera are shown (could be more if categories tie for tenth place), plus a category combining the remaining species or genera. A complete list of species encountered during the inventory is listed in Appendix B.

**Figure 2: "Top Ten" Species**

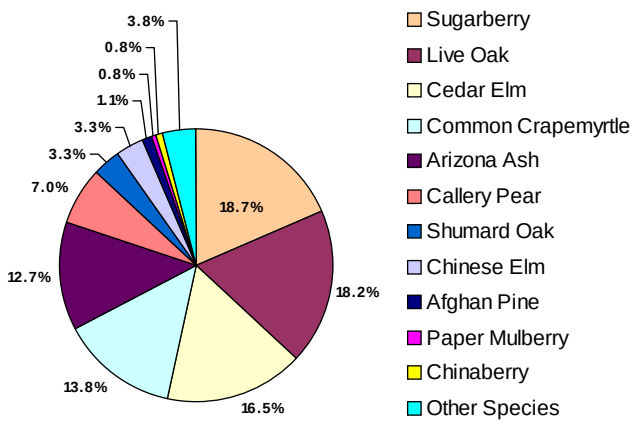
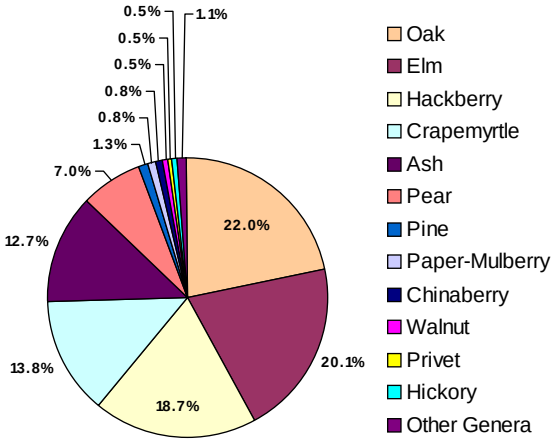



**Figure 3: "Top Ten" Genera**




## *Key findings:*

The population of street trees in Pflugerville is dominated by five species: sugarberry (19%), live oak (18%), cedar elm (17%), crapemyrtle (14%), and Arizona ash (13%) combine to account for 80% of ROW and median trees. Since the city has been built into what was agricultural land, only sugarberry and cedar elm represent existing vegetation into which the city streets have been constructed. The others represent plantings installed as new streets and subdivisions have been built.

The remaining 20% of trees is more diverse, with 16 additional species encountered during our survey. Some of these, however, are invasive exotic species such as Chinaberry, paper-mulberry, and privet which can become problems for tree managers.

Another challenge in Pflugerville will be to increase diversity with species proven to perform well in the native Blackland soils of the area. Adding bur oak, Shumard oak, sycamore, western soapberry, and baldcypress will improve diversity as older sugarberry and Arizona ash trees decline and are removed. Accent trees like Mexican plum, Eve's-necklace, and Texas redbud can provide seasonal interest and color beyond crapemyrtles.

Though outside the recommended proportion of the street tree population, it may not be wise to completely avoid planting live oaks. This species is well adapted to the climate and performs well in difficult urban settings. As a rule, though, it would be good to begin to favor other medium and large-statured species when designing street tree planting projects, especially those resistant to oak wilt.

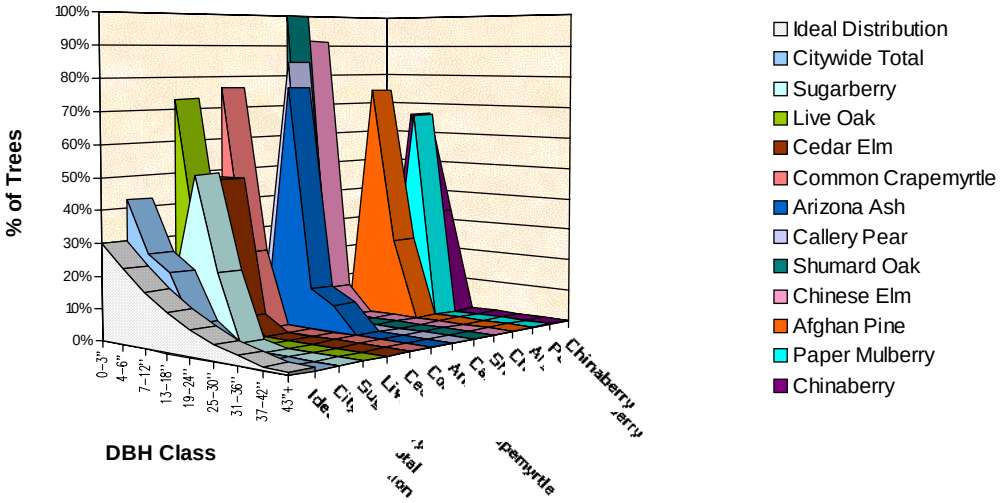
# Size

Tree diameter is measured at a point on the trunk located 4.5 feet off the ground, also called diameter at breast height (DBH). This sample inventory assigned each tree to one of nine size classes, as detailed in Appendix B (palms are assigned to a class by feet of clear trunk height). The ten most prevalent species are displayed as a graph in Figure 4 (below).

The distribution of street trees by size mirrors its age structure, since older trees are usually larger than young trees. Species composition can also influence the size class distribution, since small-statured species will never grow into the larger classes. Taking into account mortality rates that are higher for trees when they are young, a balanced size distribution for a species will have more trees in the smaller size classes and fewer in the large size classes. For example, the City of Davis, CA set an overall goal of having 40% young trees (<6" DBH), 30% maturing (6-12" DBH), 20% mature (13-24" DBH), and 10% old trees (>24" DBH).

This survey considers medium (25-50' tall) and large (>50' tall) species mature when they reach 13-24" DBH. A reasonable target distribution would then be: 30% young trees (0-3" DBH), 40% maturing (4-12" DBH), 20% mature (13-24" DBH), and 10% old (>24" DBH).

**Figure 4: DBH Distribution of Top Ten Species, in Order of Abundance**




## *Key findings:*

The citywide size distribution of street trees reflects the rapid development of Pflugerville in recent years, with 69% of all trees in the 0-6" DBH range and only 2% of trees larger than 18" DBH (Figure 4). This distribution also reflects some of the species choices for streetscapes, since small-statured species like crapemyrtle and callery pear rarely grow into a larger class.

The distributions for individual species offer additional insight (see Appendix B for detail). In particular, sugarberry represents a tree species present when roads were built into the native landscape. These trees survived the construction and are now some of the larger trees found in our survey. But damage to trunk or roots during construction can start the decay process that leads to structural failure many years later. Sugarberries in the larger size classes should be inspected regularly for structural soundness as part of the overall management program. Also, many of the Arizona ash trees planted as a fast-growing shade tree may begin to suffer breakage during storm events and will need to be replaced with longer-lived species.

# *Street Tree Care*

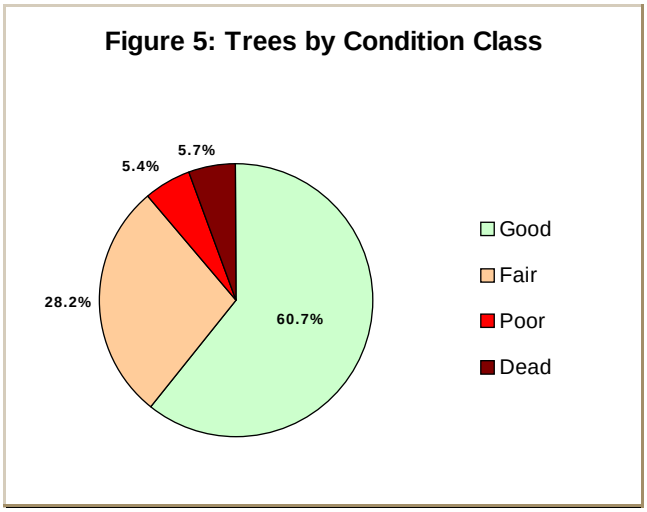
The care and maintenance practices – or lack thereof – that cities perform on their street trees will determine the condition of the resource as well as its future needs. This sample inventory evaluated trees for their overall condition, maintenance needs, and safety clearance.

## Condition

Sampled trees were briefly observed and assigned to one of four condition classes: good, fair, poor, or dead (see Appendix A for condition class descriptions). This evaluation was designed to capture an overall assessment of the tree, including its health and structural soundness, but did not rate each portion of the tree such as leaves, twigs, branches, trunk, and roots.

Figure 5 shows the distribution of street trees by condition class, as found in the sample inventory.

**Figure 5: Trees by Condition Class**




### *Key findings:*

The majority of street trees in Pflugerville are well cared for, with three-fifths (60%) in good condition. If proper maintenance continues, these trees can remain in good health and produce increasing economic and environmental benefits to the community for years to come.

But 28% of street trees are only in fair condition. These are trees that can usually be restored to full health with appropriate treatment, but much depends on the reason for the classification. Trees in this category may be larger specimens that survived the original road construction and have the scars to prove it. Injuries to the trunk, branches, or root systems would be reasons to rate a tree as fair instead of good. Or, these trees could be new plantings that have not received proper care or sufficient water.

A relatively small number of trees rated poor (5%) in the survey. Some of these trees could move up one level to the fair classification if timely maintenance is conducted. Without maintenance, they will likely continue to decline and will need to be removed at some point. Removal costs are almost always higher than maintenance costs.

A surprising number of dead trees (6%) were discovered in the sample. All dead trees should be located and removed. Many will be new plantings under replacement contracts with landscapers.

# Maintenance

Tree maintenance is the primary responsibility of the street tree manager. A prudent maintenance program will remove or repair trees that pose risk to the public, as well as improve tree health and reduce future maintenance costs. This sample inventory evaluated ROW and median trees and assigned each to a maintenance category, as shown in Table 3 (below).

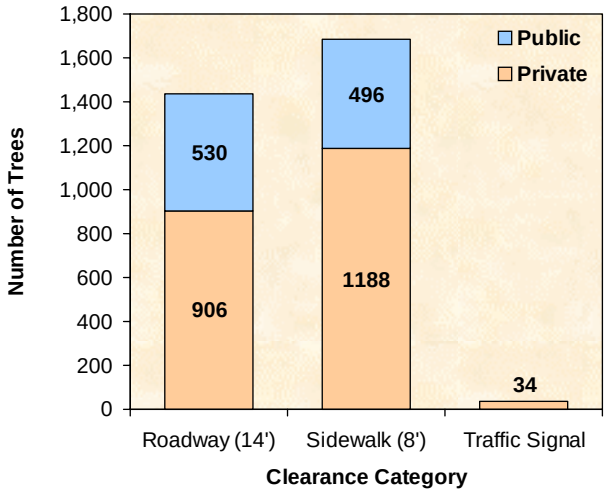
**Table 3: Maintenance Needs**

| Treatment | Description | Estimate | Percent |
|---|---|---|---|
| Prune-Immediate | Dangerous broken branches and/or large deadwood. Presents safety risk to persons or property. Pruning should be accomplished as soon as resources are available. | 0 | 0.0% |
| Prune-High Priority | Broken branches or deadwood, but no apparent immediate safety risk to persons or property. Prune as soon as resources are available. | 0 | 0.0% |
| Prune-Routine | Routine, ongoing pruning should be scheduled on a cycle of five to seven years to remove dead, dying, or diseased branches. | 1,661 | 53.1% |
| Prune-Training | Recent plantings require pruning of root and trunk suckers; dead, crossing, diseased, or weak branches; and to develop a strong central leader and scaffold limbs. | 1,255 | 40.1% |
| Remove-Immediate | Trees should be removed ASAP because their condition and proximity to active-use areas pose an apparent risk to persons or property. | 17 | 0.5% |
| Remove | Low priority removals should be scheduled when resources are available and after high-priority removals. Trees are generally located away from facilities and areas of use. | 195 | 6.2% |

# Clearance

One important aspect of a tree maintenance program is to create safe clearance for the public and emergency vehicles over streets and sidewalks, and for visibility of traffic signs and signals. In these situations, even though a tree may be located on the adjacent private property, it is the city's responsibility to insure that the required pruning is performed – either by the owner or the city. Figure 6 shows the estimated number of trees that require pruning to meet the appropriate distance standard.

**Figure 6: Safety Clearance**




## *Key findings:*

Because Pflugerville has many small trees, training pruning is required for more than 1,200 trees (40%). This type of pruning shapes and directs the growth of young trees, helps reduce future maintenance costs, and allows each tree to reach its potential. Training is the single best maintenance investment a city can make.

An estimated 17 street trees in the city need to be removed immediately; these trees were reported to city officials as soon as they were discovered and may have already been removed. Another 195 trees require removal and replacement over the next year. We discovered no trees in our sample that required priority pruning.

Safety clearance over sidewalks (8') and streets (14') is one area of concern. While our estimates show very few trees (34) obstruct street signs or signals, an estimated 1,000 public trees and 2,000 private trees have limbs that encroach into these safety zones above streets and sidewalks. Safety clearance work provides an excellent reason to develop a routine maintenance schedule for all street trees.

# *Street Tree Values*

Developing a management program for street trees undoubtedly carries the burden of cost. But public trees also deliver valuable returns to a community, and in recent years many of these values have been quantified. These include the value of air and water pollution reductions, stormwater and energy savings, carbon sequestration, and even deferred medical costs. The aesthetic benefits of street trees are often harder to quantify – but just as important if you ask most citizens. Current research aims to quantify the health benefits to pedestrians from direct solar shading, the economic benefits from increased shopping activity in business districts, and reduced street repair costs. In fact, public trees are the only portion of a city's infrastructure that can increase in value over time because healthy trees grow each year and increase the benefits they provide. Investing in a tree maintenance program can actually deliver a positive return to a city, when the full benefits of trees are considered.

## Tree Replacement Value

The accepted method for quantifying the value of trees was developed by the Council of Tree and Landscape Appraisers, published as the "Guide for Plant Appraisal–9th Edition (2000)." This method combines tree ratings in four categories (species, condition, size, and location) to calculate the cost of replacing a given tree in the event it is damaged or destroyed. The location rating is an average of three factors: site, contribution, and placement. This sample inventory used a conservative location rating of 70%, recorded DBH class values and condition ratings, and published species ratings and regional replacement costs ("Texas Supplement and Species Approximation, 2003") to arrive at the estimated street tree value shown in Table 4. A complete list of replacement values, by species, is shown in Appendix C.

**Table 4: Tree Replacement Values**

| | |
|---|---|
| Estimated No. Trees: | 3,128 |
| Estimated Total Value: | $2,355,363 |
| Average Tree Value: | $753 ea. |

### *Key findings:*

Street trees in Pflugerville have a landscape value totalling more than $2 million, for an average of about $750 each. Considering the number of small trees that will continue to grow over time, city leaders can expect increasing value from street trees for many years.

Appendix C illustrates the value of large trees. Even a tree with a low species rating like pecan has a high average value of $5,150 each because the average DBH is 18 inches. Conversely, crapemyrtles represent 14% of the population, but because the average size is so small (2.8" DBH), they represent only 3% of total value (just $165/tree). Unfortunately, this species simply won't grow much beyond this average DBH, meaning its value contribution won't increase much either.

The real surprise in terms of value, though, is the fact that Arizona ash (35%) and sugarberry (34%) are the two most valuable species in Pflugerville. These two species represent 31% of all trees, but account for over two-thirds (69%) of the total tree value – even though their species ratings are not particularly high. This points to the fact that most of the ash and sugarberry trees are mature or will be soon, meaning their value is peaking. Recognizing this fact and making plans for removing and replacing these trees as they decline will be an important part of a long-range management plan for street trees.

# *Recommendations*

The purpose of this report is to provide city leaders with a snapshot of the current structure, maintenance needs, and replacement value of the street tree population. Below are the short- and long-term recommendations from the Texas Forest Service that the city can use to craft a plan for managing street trees into the future.

## Short-Term (1-3 years)

### *Planting: develop a strategy to plant new trees annually*

With as many as 3,800 public tree planting sites, a formal streetscape program should be implemented and budgeted to plant trees in appropriate locations along streets and medians. Even a small program will insure that some new trees are added each year to replace trees that die and must be removed. A second option would be to focus on the 2,000 planting sites on private property, within 30' of the curb. This sort of NeighborWoods program could bring together civic groups, HOAs, and businesses to distribute trees to citizens to plant in their front yards.

Whether grown in-house or purchased from commercial nurseries, other species to consider planting along streets include bur oak, Shumard oak, chinkapin oak, Mexican white oak, baldcypress, Mexican sycamore, Eve's-necklace, Texas redbud, and Mexican plum. At this time, we recommend limiting the planting of live oaks on streets and medians to minimize the risk of oak wilt.

### *Maintenance: lower the risk to the public from trees*

In beginning to manage the risk from street trees, the first priority should be to locate and remove the estimated 17 trees that pose risk to persons or property. This is a relatively small number, so it may be more effective to first educate other city departments (public works, fire, police) how to identify and report a risky tree.

From our survey, about one-third of all public trees require pruning for safety clearance over streets and sidewalks, so the second priority should be to develop a systematic pruning cycle to visit each neighborhood on a 5-7 year cycle. Based on our estimates, tree managers would need to visit between 150 and 200 trees per year to conduct routine safety pruning on existing trees larger than 6" DBH. This systematic approach will keep these trees healthy and allow city staff to notify the owners of the estimated 2,000 trees on private property that also have clearance problems. Consider using a contract workforce for this maintenance program.

The resources of city staff can best be used by concentrating on training pruning of young trees (less than 6" DBH). An estimated 1,250 trees require this maintenance investment, which will prevent poor branching and will greatly reduce future maintenance costs. Young tree training pruning requires few specialized tools and is easily taught to staff members. Other basic maintenance practices such as watering, mulching, and fertilizing can also improve young tree health and survival.

All tree work should conform to the latest ANSI A-300 (Standard Practices for Tree, Shrub and Woody Plant Maintenance), ANSI Z-133 (Safety Standards), and the latest Tree Pruning Guidelines from the International Society of Arboriculture (ISA) or Tree Care Industry Association (TCIA), and should be directed by ISA Certified Arborists.

# Short-Term Recommendations, cont'd

## *Policy: review ordinances, standards, and training*

Review local tree ordinances to clarify the role of city departments in caring for street trees. A public tree care ordinance is one of the four required standards for becoming a Tree City USA. The ordinance can also set standards for locating new plantings and can define the role for individuals, groups, and businesses in planting trees in the public ROW.

Develop a system for tree maintenance and planting and keep track of your progress. Such annual accomplishment reports can also be used to qualify for Tree City USA. A complete management plan covering the next three to five years would help guide work into the future and help set budget levels to accomplish your goals.

Conduct a basic tree care workshop to train city personnel from all applicable departments on proper tree maintenance practices. The Texas Forest Service regional forester can help schedule training classes, workshops, and other educational opportunities.

## *Community Support: get the public involved*

Use the newly created Tree Board to build support for your tree management program and help set priorities for tree planting and care throughout the city. Conduct an annual Arbor Day celebration, and involve the board to help plan the event. Arbor Day can also bring together other community organizations such as the local Garden Club or Keep Pflugerville Beautiful. These organizations can be great partners that support and advocate for tree issues in the community, and can help you gain Tree City USA status. This award program of the National Arbor Day Foundation and the State Foresters recognizes communities that invest in and manage public trees. Your Texas Forest Service forester can support a recognition ceremony at city council meetings or on Arbor Day.

Look to the private sector for additional support. Through your non-profit partners, many local businesses are often willing to donate towards activities that have such a strong public benefit as planting and caring for trees. In this era of increasing awareness on issues like global climate change, many companies are looking for opportunities to invest in local communities.

# Long-Term Recommendations

Develop a Street Tree Master Plan to guide annual work plans and provide long-range budget forecasting. This can be an important tool in communicating with city leaders on the need for an ongoing maintenance budget. This plan will identify street tree priorities, goals and objectives and can help integrate street trees as part of the public infrastructure. To fund the plan, create a "green infrastructure" provision for capital improvement projects to create a dedicated income stream for planting new trees on all city construction projects.

Conduct a 100% inventory of street trees, which will allow for more efficient management and maintenance of the community's urban forest. Such an inventory can then be used to conduct a more thorough analysis of the city's trees, through models like the U.S. Forest Service's STRATUM or UFORE, or American Forests' CityGreen. These tools can calculate the ecosystem benefit of trees from processes such as pollution mitigation, stormwater runoff prevention, energy savings and other values that trees provide to a community.

## Appendix A–Part 1: Sample Blockside Data Sheet

**Blockside #:**_____ **ROW Width (ft.):** _____ **Date:** _____ **Crew:** _____

**Street:** _____ **From:** _____ **To:** _____

| Tree # | Median/ Private Tree? | Species/ Code | DBH Class | | | | | | | | | Condition Class/Rating | | | | Maintenance | | | | | | Clearance Issues | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | Prune | | | | Remove | | | | | |
| | | | 0-3 | 4-6 | 7-12 | 13-18 | 19-24 | 25-30 | 31-36 | 37-42 | 43+ | G | F | P | D | PI* | PH | PR | PT | RI* | R | TS* | R | S | N/A |
| 1 | M PVT | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | G | F | P | D | PI* | PH | PR | PT | RI* | R | TS* | R | S | NA |
| 2 | M PVT | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | G | F | P | D | PI* | PH | PR | PT | RI* | R | TS* | R | S | NA |
| 3 | M PVT | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | G | F | P | D | PI* | PH | PR | PT | RI* | R | TS* | R | S | NA |
| 4 | M PVT | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | G | F | P | D | PI* | PH | PR | PT | RI* | R | TS* | R | S | NA |
| 5 | M PVT | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | G | F | P | D | PI* | PH | PR | PT | RI* | R | TS* | R | S | NA |
| 6 | M PVT | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | G | F | P | D | PI* | PH | PR | PT | RI* | R | TS* | R | S | NA |
| 7 | M PVT | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | G | F | P | D | PI* | PH | PR | PT | RI* | R | TS* | R | S | NA |
| 8 | M PVT | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | G | F | P | D | PI* | PH | PR | PT | RI* | R | TS* | R | S | NA |
| 9 | M PVT | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | G | F | P | D | PI* | PH | PR | PT | RI* | R | TS* | R | S | NA |
| 10 | M PVT | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | G | F | P | D | PI* | PH | PR | PT | RI* | R | TS* | R | S | NA |
| 11 | M PVT | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | G | F | P | D | PI* | PH | PR | PT | RI* | R | TS* | R | S | NA |
| 12 | M PVT | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | G | F | P | D | PI* | PH | PR | PT | RI* | R | TS* | R | S | NA |
| 13 | M PVT | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | G | F | P | D | PI* | PH | PR | PT | RI* | R | TS* | R | S | NA |
| 14 | M PVT | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | G | F | P | D | PI* | PH | PR | PT | RI* | R | TS* | R | S | NA |
| 15 | M PVT | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | G | F | P | D | PI* | PH | PR | PT | RI* | R | TS* | R | S | NA |
| 16 | M PVT | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | G | F | P | D | PI* | PH | PR | PT | RI* | R | TS* | R | S | NA |
| 17 | M PVT | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | G | F | P | D | PI* | PH | PR | PT | RI* | R | TS* | R | S | NA |
| 18 | M PVT | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | G | F | P | D | PI* | PH | PR | PT | RI* | R | TS* | R | S | NA |
| 19 | M PVT | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | G | F | P | D | PI* | PH | PR | PT | RI* | R | TS* | R | S | NA |
| 20 | M PVT | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | G | F | P | D | PI* | PH | PR | PT | RI* | R | TS* | R | S | NA |
| 21 | M PVT | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | G | F | P | D | PI* | PH | PR | PT | RI* | R | TS* | R | S | NA |
| 22 | M PVT | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | G | F | P | D | PI* | PH | PR | PT | RI* | R | TS* | R | S | NA |
| 23 | M PVT | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | G | F | P | D | PI* | PH | PR | PT | RI* | R | TS* | R | S | NA |
| 24 | M PVT | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | G | F | P | D | PI* | PH | PR | PT | RI* | R | TS* | R | S | NA |
| 25 | M PVT | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | G | F | P | D | PI* | PH | PR | PT | RI* | R | TS* | R | S | NA |

***Special Notes***

**Address/Intersection**

***Number of Planting Sites per Block:***

**In Public Median or ROW:** _____

**Private Yards (<30' from ROW):** _____

Blockside Sheet _____1_____ of _____

## Appendix A–Part 2: Data Sheet Definitions

Tree Inventory Information: TXSCTI

**Blockside Number:** Blockside = street name from street name to street name. 5% random sample has been mapped with ROW width and Blockside numbers assigned before the survey begins.

**Tree #:** Tree number is just to help you keep track of where you are since this is a sample inventory. Start at a block end. The survey is taken by walking or driving up one side of the block and down the other. All trees are counted in ROW and medians (if applicable) for residences, businesses, parks and other maintained areas. Only survey trees over 6 inches in fencerows or wild areas. If you have more than 25 trees, use a sheet with blank tree number column and fill in 26, 27, 28… and fill in "Blockside Sheet ____ of ___" at bottom of survey sheet.

**Median Tree:** Circle 'M' if tree is in a center median strip. Mark map to indicate the total length of the median on the blockside.
**Private Tree:** Circle 'PVT' if tree is on private property **and** has 'Clearance Issues' - don't record Species, DBH Class, Condition Rating or Maintenance for this tree.

**Species Code:** From list. Write name in if not on list.

**DBH Class:** Measure or estimate DBH and assign to one of the following classes: 1 (0-3), 2 (4-6), 3 (7-12), 4 (13-18), 5 (19-24), 6 (25-30), 7 (31-36), 8 (37-42), 9 (43+). If forked, take diameter at narrowest point below fork. If multi-stemmed (i.e. crape myrtles), average the diameters of stems over 1" at DBH. For palm species, assign to class based on feet of clear trunk height (from ground to base of live crown).

**Condition Class:** Condition addresses the current state of the tree's health, structural soundness, shape, and growth rate. Rate the overall health and condition of a tree by analyzing root characteristics, trunk and branch structure, canopy, twigs, buds, foliage, and any presence of disease and pest pathogens. Classify and record the condition of each tree in one of the following categories adapted from the rating system established by the International Society of Arboriculture:
**Good:** Trees in this class are judged to be desirable and with regular maintenance can retain this classification. They have few signs of physical damage, decay, disease or insect damage, or deadwood in the crown, limbs or trunk, although they may be interfering with utility lines or are planted in an overcrowded location.
**Fair:** Trees in this category have visible signs of stress, including one or more of the following: thinning canopy or small leaves; premature fall coloration; limited insect or disease infestation; structural faults or poor form; mechanical stem damage, including evidence of past 'topping'; deadwood >2" in the crown, limbs or trunk.
**Poor:** Trees in this group are in a general state of decline, exhibiting major disease or insect damage, physical defects, over 50% of the crown has deadwood or other serious defects, or bark may be beginning to peel. Priority pruning is likely required (i.e., large dead wood is present that could cause significant harm or damage).
**Dead:** Trees in this category are either already dead or in such very poor condition that removal is warranted. These trees have over 90% dead branches and have completely succumbed to insects, pathogens, or nutritional deficiencies. Little or no live foliage is visible during the growing season.

**Maintenance:**
**PI*: Prune Immediate Priority.** Requires immediate pruning – record under special notes at bottom of page. Trees in the immediate pruning category present possible safety risks to persons or property. Trees in this category are characterized by broken branches and large deadwood. Pruning should be accomplished as soon as resources are available.
**PH: Prune High Priority.** Trees requiring high priority pruning should be attended to as quickly as scheduling will allow. These trees, like the immediate priority pruning category, have broken branches and areas of deadwood. The dead areas, however, do not present an apparent immediate safety risk to persons or property.
**PR: Prune Routine Priority.** All other trees except young and recent plantings fall into the routine pruning category. They require removal of dead, dying, diseased, or obviously weak and heavy branches and deadwood. Routine, ongoing pruning should be scheduled and programmed to ensure all tree pruning is accomplished on a minimum cycle of five to seven years. It is important to remember that low priority problems can become high priority if they are not maintained for an extended period of time.
**PT: Prune Train.** The final maintenance category is training pruning. Trees in this category are generally young, recent plantings. Minimum maintenance includes trimming root and trunk suckers, deadwood, crossing, diseased, or weak branches, and staking improvement or removal. Trees in this category need to be scheduled for maintenance and not neglected. Generally, young trees should be pruned to reflect their species' natural growth pattern or to a single leader or a strong central leader to promote the development of strong scaffold limbs.
**RI*: Removal Immediate Priority.** Record under special notes at bottom of page. Trees categorized as high priority removals should be removed as soon as possible based on their lower condition class and proximity to active use areas or structures.
**R: Removal-low priority.** Low priority removals should be scheduled and accomplished when resources are available after high priority removals have been accomplished. These trees are generally located away from population areas and facilities.

**Clearance Issues:** Note if it is a private tree by circling PVT.
***TS: Traffic Signal.** Record under special notes at bottom of page. Circle if tree is blocking traffic control device such as a sign or light.
**R: Road Clearance.** Limb(s) is less than 14' over the curb or roadway.
**S: Sidewalk Clearance.** Limb(s) is less than 8' over a sidewalk (or other hardscapes for parks and public facilities besides streets).
**N/A: No Clearance Issues.**

**Planting Sites:** Medium or large trees to be planted if room. Under power lines, only small trees to be planted. Minimum 4-foot tree lawn needed to plant a tree. Record the number of planting spaces in Public ROW or Median. Also record number of planting spaces in Private Front Yards within 30' of ROW edge.
**Distances From:**
Utilities – overhead (15'); Hydrants, utility poles, and light posts (10'); Intersections (measured from corner) (25'); Driveways (5'); Other trees: 20-50'

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## Appendix B: List of Species Sampled and the Distribution of Each by DBH Class

| Common Name (Scientific Name) | Distribution by DBH Class | | | | | | | | | Tree Count | Percent of Total | Running % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0-3 | 4-6 | 7-12 | 13-18 | 19-24 | 25-30 | 31-36 | 37-42 | 43+ | | | |
| Sugarberry (Celtis laevigata) | 10% | 16% | 51% | 22% | 1% | | | | | 69 | 18.7% | 18.7% |
| Live Oak (Quercus virginiana) | 73% | 25% | 1% | | | | | | | 67 | 18.2% | 36.9% |
| Cedar Elm (Ulmus crassifolia) | 48% | 48% | 5% | | | | | | | 61 | 16.5% | 53.4% |
| Common Crapemyrtle (Lagerstroemia indica) | 76% | 24% | | | | | | | | 51 | 13.8% | 67.2% |
| Arizona Ash (Fraxinus velutina) | | 2% | 77% | 13% | 9% | | | | | 47 | 12.7% | 79.9% |
| Callery Pear (Pyrus calleryana) | 15% | 85% | | | | | | | | 26 | 7.0% | 87.0% |
| Shumard Oak (Quercus shumardii) | 100% | | | | | | | | | 12 | 3.3% | 90.2% |
| Chinese Elm (Ulmus parvifolia) | 92% | 8% | | | | | | | | 12 | 3.3% | 93.5% |
| Afghan Pine (Pinus eldarica) | | | 75% | 25% | | | | | | 4 | 1.1% | 94.6% |
| Paper Mulberry (Broussonetia papyrifera) | | 33% | | 67% | | | | | | 3 | 0.8% | 95.4% |
| Chinaberry (Melia azedarach) | | | 67% | 33% | | | | | | 3 | 0.8% | 96.2% |
| Pecan (Carya illinoinensis) | | | | 50% | 50% | | | | | 2 | 0.5% | 96.7% |
| Little Walnut (Juglans microcarpa) | | 100% | | | | | | | | 2 | 0.5% | 97.3% |
| Privet (Ligustrum species) | 50% | 50% | | | | | | | | 2 | 0.5% | 97.8% |
| Bur Oak (Quercus macrocarpa) | 100% | | | | | | | | | 2 | 0.5% | 98.4% |
| Hawthorn (Crataegus species) | 100% | | | | | | | | | 1 | 0.3% | 98.6% |
| Tuliptree (Liriodendron tulipifera) | 100% | | | | | | | | | 1 | 0.3% | 98.9% |
| Japanese Black Pine (Pinus thunbergii) | | 100% | | | | | | | | 1 | 0.3% | 99.2% |
| Black Willow (Salix nigra) | | | | 100% | | | | | | 1 | 0.3% | 99.5% |
| Gum Bully (Sideroxylon lanuginosum) | 100% | | | | | | | | | 1 | 0.3% | 99.7% |
| American Elm (Ulmus americana) | | | | | 100% | | | | | 1 | 0.3% | 100.0% |

**Total Number of Public Trees Sampled: 369**

**Total Number of Species Sampled: 21**

## Appendix C: Tree Replacement Values, by Species

*Values are calculated for each tree in the sample using its recorded condition class rating, an average DBH for its assigned class, an average location rating of 70%, and the Austin/Central Texas 'Basic Price' ($62 per square-inch) for a 3-inch caliper specimen, installed and guaranteed for one year. Values for palm species are calculated using an average height in 'brown trunk feet' (BTF) and a Basic Price for that species. Species ratings for species marked with # were determined by the regional forester.

| Tree Species | Species Rating # | Average DBH/BTF | Estimated No. Trees | Average Tree Value* | Total Value | Percent |
|---|---|---|---|---|---|---|
| Arizona Ash | 71% | 11.4" | 398 | $2,059.06 | $820,334 | 34.8% |
| Sugarberry | 65% | 10" | 585 | $1,358.59 | $794,620 | 33.7% |
| Cedar Elm | 78% | 4.1" | 517 | $339.95 | $175,779 | 7.5% |
| Live Oak | 100% | 3" | 568 | $195.08 | $110,794 | 4.7% |
| Pecan | 68% | 18.2" | 17 | $5,152.62 | $87,354 | 3.7% |
| Callery Pear | 60% | 4.6" | 220 | $351.42 | $77,450 | 3.3% |
| American Elm | 73% | 21" | 8 | $8,778.72 | $74,414 | 3.2% |
| Common Crapemyrtle | 80% | 2.8" | 432 | $164.89 | $71,285 | 3.0% |
| Chinaberry | 53% | 11.4" | 25 | $1,593.40 | $40,520 | 1.7% |
| Afghan Pine | 45% | 10.8" | 34 | $1,076.79 | $36,510 | 1.6% |
| Paper Mulberry | 45% | 12.6" | 25 | $971.46 | $24,704 | 1.0% |
| Black Willow | 53% | 15" | 8 | $1,625.92 | $13,782 | 0.6% |
| Chinese Elm | 73% | 2" | 102 | $82.53 | $8,395 | 0.4% |
| # Little Walnut | 70% | 5" | 17 | $477.21 | $8,090 | 0.3% |
| Shumard Oak | 80% | 1.5" | 102 | $48.06 | $4,888 | 0.2% |
| Japanese Black Pine | 60% | 5" | 8 | $306.78 | $2,600 | 0.1% |
| # Privet | 30% | 3.7" | 17 | $109.16 | $1,851 | 0.1% |
| Bur Oak | 86% | 1.5" | 17 | $52.77 | $895 | 0.0% |
| # Hawthorn | 80% | 1.5" | 8 | $49.08 | $416 | 0.0% |
| Gum Bully | 78% | 1.5" | 8 | $47.86 | $406 | 0.0% |
| Tuliptree | 53% | 1.5" | 8 | $32.52 | $276 | 0.0% |
| | | **Estimated Totals:** | **3,124** | **Avg: $754 ea** | **$2,355,363** | |