Summary

The Town of Oakland has an abundance of beautiful, large oak trees. The majority of the trees on public right-of-way are Southern live oaks (*Quercus virginiana*) 52,2% and laurel oaks (*Quercus laurifolia*) are the next most prevalent species at 38.1%. A significant number of trees, especially laurel oaks, which have a shorter life span and weaker wood than live oaks, have poor structure and require mitigation to reduce the risk of failure. Other trees require regular but light maintenance pruning to help develop a stronger structure over a period of years. Another significant problem observed is the sub-standard quality of pruning that has been done to the trees by privately operated tree services. Such pruning procedures often exacerbate the structural problems rather than improve them. It is recommended that pruning standards be incorporated into an ordinance to require compliance with accepted national standards. This inventory and assessment is designed to help the town budget a regular maintenance program that is proactive based upon the most significant problems observed.

Introduction

Background

I was asked by town manager, Maureen Rischitelli, to do a tree inventory and assessment of street trees on public right-of-ways in the Town of Oakland, Florida. The inventory and assessment was designed to count the trees and assess the condition of the trees. When maintenance or care was needed, I made recommendations.

Assignment

My assignment was to:

1. Assess the current condition of the street trees on public right-of-way that are 10 inches in diameter or larger
2. Recommend a appropriate course of action for remediation of tree problems including removal of dead or structurally defective trees that could not, in my opinion, be mitigated to a reasonable level of risk.
3. Provide a score or rating for most trees so the town could mitigate the most serious problem trees first and deal with the more moderate problems as budget and time permitted.

Limits of the Assignment

I visually inspected each tree for the inventory and assessment. Arborists cannot detect every condition that could possibly lead to the structural failure of a tree. Trees are living organisms that fail in ways we do not fully understand. Conditions are often hidden

within trees, below ground or not clearly visible from the vantage point on the ground. Arborists cannot guarantee that a tree will be healthy, safe or adequately protected under all circumstances or for a specified period of time. Likewise, remedial, protective and mitigating treatments and recommendations cannot be guaranteed.

Because of assignment limitations, I did not perform any excavation to examine **root flare** or root structure with a diagnostic tool such as an **Air Spade** and I did not use other diagnostic equipment such as a **Resistograph** to determine the extent of internal decay. Root flare examination would be helpful in determining root decay and basal trunk decay on trees with fill soil over the flare or construction damage near the base of the trunk. Decay analysis is helpful is evaluating the structural condition and risk level of trees. These services are recommended on several trees in the assessment and these services can be performed, if requested, under a separate contract.

Sometimes it was not clear where the private property lines met the public right-of-way. I may have inadvertently included a few private trees in the assessment and possibly omitted a few public street trees too. In a few cases there was too much undergrowth near the base of the tree or too many vines on the tree trunk to allow for suitable assessment.

I estimated tree diameters (**DBH**) in most cases except for very large specimen trees. Whenever possible, I tried to measure these large trees, which I consider a very important town asset.

I did not survey Palm trees. Trees in public parks were not assessed as I understand these trees were surveyed within the last few years.

Purpose and Use of the Report

The purpose of this report, inventory and assessment is to provide information on the species, size and condition of the street trees in the Town of Oakland, which in turn will help provide a basis for long and short-term maintenance work and budgeting.

Assumptions

Field examinations of the Oakland street trees were made on October 11, 12, 13, 23 and Nov. 2, 2006. My observations and conclusions are as of those dates.

Observations

Methods

Street maps were provided. I identified each tree, which measured 10 inches or more in diameter, with a numbered black nylon tag secured to the tree with a 3-inch stainless steel

nail. Each nail was driven only partially into the tree to allow room for tree growth in diameter, which will push the tag outward along the nail to the nail head. Generally, I attached the tags to the tree at a height of about 7 to 8 feet out of reach of the curious and facing away from the street or on the least-conspicuous side of the tree, whenever possible. I noted the location of the tag on each tree by compass direction such as N for north side of the tree, SE for southeast side of the tree and so on.

Notes were taken on a hand-held Palm Pilot using SmartList software which I adapted specifically for the information that was determined to be most appropriate for the Town of Oakland.

I noted both empirical data as well as subjective data on each tree. The empirical data included:

- tree tag number
- tree species
- tree (estimated) diameter
- house number if a house was adjacent to the street tree
- street where the tree was located
- nearest cross street
- the side of the street where tree was located (north, east, etc.)
- tag location on the tree trunk (N, NE, NW, W, E, S, SE, SW)

The subjective data included my observations included:

- concerns over observed defects (labeled Concern1, Concern2 and Concern3)
- work recommended to mitigate the observed defects (labeled Work1, Work2 and Work3)
- urgency (only if tree work was required very soon due to high risk)
- observations which elaborated on the concerns, work recommended or other factors regarding the tree

Finally, I rated each tree according to a rating system utilized by Dr. James Clark and Dr. Nelda Matheny.[1] The Clark-Matheny rating system applies a score for three tree characteristics (items 1 through 3 below):

1. probability of failure of the tree or part of the tree
2. size of the tree part that may fail
3. the target (person or property) that could be injured or damaged if the tree failed
4. the tree species

Based upon my experience and in consideration of other risk rating systems, I have added a forth category – tree species (item 4 above). Different tree species vary in their strength, wind resistance, tolerance of construction damage (fill soil, cutting roots, soil compaction), life span and susceptibility to decay or other pests. In my opinion, tree

species will affect how trees respond to urban landscape situations and should be considered as part of the tree risk assessment.

Trees were rated in each category on a scale of 1, 2 or 3. The higher score means a higher risk for that category. The highest risk tree could attain a hazard rating of 12. The lowest risk tree could have a hazard rating of 4. Trees receiving a score in the mid-range, 7 to 9, may or may not require maintenance depending on budget considerations and available resources.

According to Clark and Matheny, "Thus hazard ratings cannot strictly define a numerical line for action between either removal and retention or treatment and no treatment. This must be an administrative decision, one made by owner and manager. In municipal situations, where an agency might manage a very large number of trees, there may be practical limits to the amount of work that can be undertaken and only the most severe and significant hazards may be addressed. Some level of risk will always be present when people live among trees. The decision of how much risk is tolerable remains with the owner and manager."

The Site

The Town of Oakland is located west of Orlando on the south edge of Lake Apopka near the east side of the central ridge. Soils appear to be well drained. Information on water tables and soil type was not available and not part of the assignment.

The Trees

Oak trees are the predominant trees in the Town of Oakland with 90% of the street trees being either Southern live oak or laurel oak. The breakdown of the trees in the survey is:

1. Southern live oak (*Quercus virginiana*) 52.2%
2. laurel oak (*Quercus laurifolia*) 38.1%
3. raintree (*Koelreuteria spp*.) 2.2%
4. camphor (*Cinnamomum camphora*) 1.4%
5. hackberry (*Celtis laevigata*) 1.1%
6. black cherry (*Prunus serotina*) 0.8%
7. magnolia (*Magnolia grandiflora*) 0.8%
8. Chinaberry (*Melia azedarach*) 0.8%
9. black tupelo (*Nyssa sylvatica*) 0.6%
10. red cedar (*Juniperus silicola*) 0.6%
11. Chinese tallow (*Sapium sebiferum*) 0.6%
12. miscellaneous trees 0.9%
    cherry-laurel (*Prunus caroliniana*), sweetgum (*Liguidambar styraciflua*) and Norfolk Island pine (*Auracaria heterophylla*)

During the survey, I encountered 23 very special trees, all Southern live oaks, that I believe should receive special status possibly as **Specimen Trees**. These trees have special characteristics in addition to their size. Their structure and health are generally good with the exception of tree #7898, which has been severely pruned and has considerable decay requiring additional testing. The smallest tree of this special group is 40 inches DBH while the largest is tree #7898. which is a mammoth 94 inches DBH. The average diameter of this group of trees is 52.2 inches DBH.

Structural Problems Regarding problems (concerns) I observed, structural problems occurred most frequently. Many trees (47.2%) had some form of structural problem called **codominant leaders**. I described extreme forms of codominant leaders as "trees with weak structure." There were 13.8% of the trees with very weak structure, which usually required heavy **reduction pruning** or removal.

Another structural problem, **multiple trunks**, are trunks that are clustered together in groups of two, three or more. Trees growing this close together can become unstable as they grow taller because the roots cannot grow outward in all directions to anchor each tree. The roots on the side adjacent to the next tree cannot grow in that direction. Consequently, over time some of the trees in a cluster may fall over in wind storms because of lack of horizontal supporting roots.

Dead Branches The next most serious problem observed was dead branches in the canopy. There were two categories of trees with dead branches – trees having dead branches that comprised less than 10% of the canopy (14.4%) and trees having dead branches that comprised more than 10% of the canopy were 11.0%.

Decay Another concern was tree decay. Trees with apparent signs of decay such as cavities and cankers were categorized as follows:

- small amount of decay visible 2.2%
- moderate amount of decay visible 8.6%
- extensive amount of decay 9.7%

The percentage number above is the percent of total trees that have visible decay.

Poor Pruning Work Another serious problem was the quality of pruning work done previously by tree services. Fifteen percent of the trees had pruning done that was not up to current national pruning standards.[2] Of the 15% with poor pruning, 7.5% had been **over-lifted** (Figures 2, 3 and 4) and 7.5% had **heading (stub) cuts** Figure (1).

Trees and Power Lines Trees near power lines were another problem. I observed 5.0% of the trees, which were usually higher quality Southern live oaks, were very close to

power lines and needed special care to avoid possible pruning damage by line clearing crews.

Risk Assessment Regarding the risk assessment, 16 live oaks had a score equal to 9 or greater which means they needed attention. There were 58 laurel oaks that had a hazard score in the same range of 9 through 12. At the other end of the risk assessment, 136 live oaks had a score in the low risk range of 4 to 6 while only 45 laurel oaks were in that lower risk range. The number of live oaks and laurel oaks in the mid-range risk level of 7 to 8 were about the same – 36 live oaks to 39 laurel oaks.

Tree Removals My assessment called for the removal of 21 trees. Of these trees eight were laurel oaks and four were live oaks. The others were Chinaberry, Chinese tallow, black tupelo, camphor and black cherry. This number of recommended removals may increase once additional trees are tested with a Resistograph.and other techniques.

Additional Testing Twenty four trees were selected for additional testing which is not included in this Tree Inventory and Assessment. These trees had signs of significant decay that could not be readily evaluated without more time and special testing equipment such as the Resistograph.

Improper Planting Some of the young trees that I surveyed had poor planting procedures that may likely shorten the life of the trees (Figure 4). Because I did not survey trees under 10 inches DBH, there may be many more with installation (planting) problems that can retard growth and could cause early death.

And finaly, 7.7% of the trees surveyed has no apparent problems.

Testing and Analysis

No special analysis or diagnostic techniques were used.

Discussion

The Town of Oakland has a large concentration of very large and impressive live oaks, which are generally a vital asset to the community. Large trees can have a positive economic impact as well as a positive environmental and psychological affects on a community. One giant tree (tree #7898) has a diameter of 94 inches only 4 inches less than the famous Fairchild Oak on

Figure 1 Tree # 7898 is huge with a 94 inch diameter. Unfortunatley the tree has decay and was severely "topped, " a pruning practice is very detrimental for trees. Restricted root space

the Flagler County-Volusia County line on the east coast of Florida. Unfortunately, this tree has been **topped** (improperly pruned) and impacted severely by street construction which has restricted the available root space and quite likely damaged existing roots. There is also a large number of laurel oaks over 40-inches DBH in hazardous condition. Some of the laurel oaks can be mitigated through heavy reduction pruning.

The predominant tree in the Town of Oakland is the Southern live oak, a native tree, which is considered to be one of the premier tree species in the Southeast. According to Dr. Ed Gilman, Environmental Horticulture Professor at the University of Florida and one of the country's leading arboriculture researchers, "A large, sprawling, picturesque tree, usually graced with Spanish moss and strongly reminiscent of the Old South, live oak is one of the broadest-spreading of the oaks, providing large areas of deep, inviting shade. And amazingly durable American native, it can measure it lifetime in centuries if properly located and care for in the landscape."[3] He goes on to say live oaks have a reputation for being a tough tree and have very good wind resistance.[4]

Regarding the laurel oaks, Dr. Gilman says, "Laurel oaks decay and roots rot as these trees reach about 40 years old." The laurel also oak has generally not performed well in recent hurricanes and presents a significant risk under storm conditions. Dr. Mary Duryea a University of Florida Forestry researcher and Associate Dean of Research describes the laurel oak as being part of a group of trees having "the lowest wind resistance" of trees observed in the hurricanes that hit Florida in the last 10 years. Pamela Crawford, a landscape architect who studied storm damage in the fall of 2004, wrote in her book ***Stormscaping: Landscaping to Minimize Wind Damage in Florida***, "We had more reports of laurel oaks down than any other tree in central and north Florida. If you have one of these within falling distance of your house, remove it, especially if it is an older tree. Laurel oaks are weaker and shorter lived than live oaks and the four storms of 2004 proved that the older ones were particularly dangerous."[5]

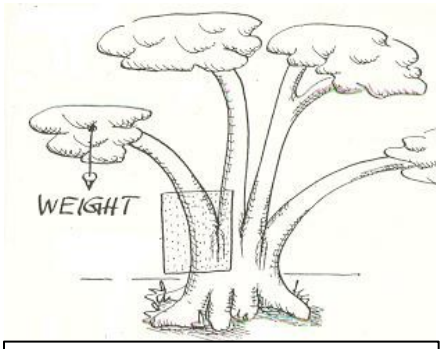

Figure 2 Note the narrow crotch attachment which is weak and a prime failure point. Combine the weak crotch with lions-tailed (over-lifted) structure and you have a tree with high risk. Drawing from *The Body Language of Trees: A handbook for failure analysis* by Claus Mattcheck and Helge Breloer.

I am not suggesting that all laurel oaks must be removed. But I am suggesting that laurel oaks are generally an inferior tree species that can be a problem. And for the reasons mentions above, older, larger laurel oaks should receive special care including regular inspection if they are going to be retained in moderate and high traffic areas.

Many of the 171 trees that I noted as having codominant structure are relatively young trees that could be put on a "light" **reduction pruning** program to gradually improve

their structure over a period of years. This practice is a low-cost, proactive method of avoiding the expensive and dangerous structural problems in the future. That way when the tree reaches a mature size, it is improved structurally and inexpensively. Fixing a large, mature tree with large codominant leaders can be costly. Not fixing a large, mature tree with large codominant leaders can be dangerous.

I found three trees that I labeled as a severe hazard that needed "urgent attention." I found 24 trees that had a serious problem that should be addressed "As soon as possible."

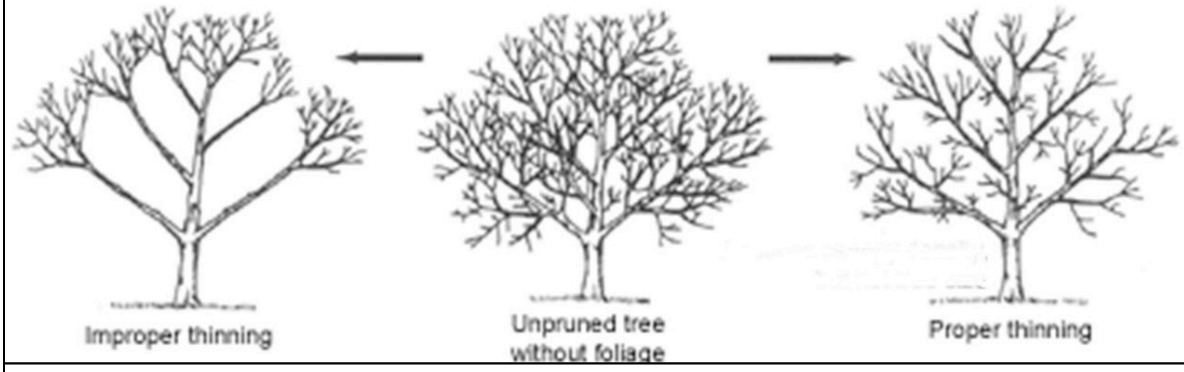

Figure 3 Proper thinning of a tree leaves small branches in the interior structure of the tree (right drawing). Improper thinning known as "lions-tailing," shown in the left drawing leaves all the foliage and small branches at the end of large branches making them structurally unstable and prone to failure. Drawings from *An Illustrated Guide to Pruning* by Dr. Ed Gilman

Unfortunately, when pruning work was done, much of it was sub-standard and caused large pruning cuts or stubbed branches prone to decay or over-lifting and lions-tailing which creates a more hazardous tree. According to Dr. Gilman, "Improper thinning removes only interior branches and results in 'lions-tailing.' This is extremely damaging to trees and eliminates other pruning options later, such as reduction, because all interior branches are removed."[6] The book, ***An Illustrated Guide to Pruning***, written by Dr. Gilman is one of the top pruning reference guides for professional arborists. Dr. Gilman goes on to say, "Over-thinning stresses the tree by reducing energy reserves (starch) and can initiate unwanted water sprouts on interior branches, creating an atypical look. Over-thinning reduces photosynthesis and enhances the likelihood of sunscald, cracks and death. Over-thinning also forces the thinned branches to over-elongate and changes the center of gravity creating substantially weakened branches, which may break easily in storms or under their own weight. Roots can also be impacted by

Figure 4 The large laurel oak, although off the public right-of-way, is a good example of an over-lifted tree with poor structure. The tree has weak narrow crotches that can split and is top heavy with most of the foliage and branch weight at the top of the tree. Large laurel oaks are also weak wooded and prone to failure in windstorms and at times without any apparent cause.

over-thinning. If a tree sprouts vigorously after pruning, it was probably over-pruned. Few live branches should be removed from mature trees. Certainly, no more than 15 percent of live foliage should be removed at one time."

Dr. Gilman lists the following negative effects caused by lions-tailing:[7]

- Severely reduces stored energy reserves
- Reduces valuable photosynthetic surface area
- Changes wind loading patterns and makes the tree top heavy
- Increases damage from storms
- Increases number of entry points for pests
- Spoils tree architecture and appearance
- Causes branches to overelongate and droop
- Can kill the tree
- Can initiate cracks and decay

The ANSI A300 pruning standards state, “Thinning should result in an even distribution of branches on individual limbs and throughout the crown.” The ANSI standards also state, “Not more than 25 percent of the crown should be removed within an annual growing season.”[8] This type of pruning, in my opinion, represents severe over-pruning by both Dr. Gilman’s standards and ANSI A300 standards.

The diversity of tree species in the Town of Oakland is limited. Although the live oak is one of the best trees in the Southeast for strength, longevity and pest resistance, it would still be beneficial to gradually increase the diversity of tree species in the town. Northerners recall their elm-lined streets being devastated by Dutch Elm Disease in the 1950’s and 1960’s. Many small towns in the north were left virtually tree-less after the disease came through and killed the elm trees. We have no imminent threat of a disease of live oaks, but it could occur. Species diversification would be helpful in limiting the impact of such a pest problem, if one occurred.

Figure 5 This nylon rope, which I found at the base of several smaller trees that have been planted within the last several years, can eventually girdle the trunk causing the tree to lose vigor and even die. If the planting crew left the nylon ropes in place, it is likely other undesirable materials that can be harmful to the tree have also been left on the rootball.

Check the younger transplants for rootball problems such as wire cages, nylon rope and straps left in place. Installers of the small trees have taken shortcuts that can negatively affect the vigor and longevity of the trees. The nylon ropes can **girdle** the trunks as the trees grow (Figure 5). I suspect if the nylon ropes have been left in place, the wire baskets, the nylon straps and possibly synthetic burlap that will not degrade may also be surrounding and limiting the root growth of each tree.

My observation on good trees near power lines was: “Care should be taken to properly prune this tree for structure and power line clearance before utility crews hack it.” The town should be proactive in its tree work around special trees and power lines. Otherwise, trees may be

damaged by work crews who have insufficient understanding of current pruning standards.

Also, the spreading canopy growth of live oaks causes branches to hang above the streets. On numerous occasions during my surveying work in the town, I heard delivery trucks scrape across branches and foliage hanging over the street. Sooner or later the truck will break or rip the branch causing a wound that does not callous over well. It is better to raise the canopy just enough for delivery truck clearance with proper pruning cuts and lifting procedures rather than letting the trucks crudely prune the overhanging branches by bumping into them.

Conclusions

The Town of Oakland has many beautiful trees. Many require some degree of maintenance. There are also a number of trees that are, in my opinion, an unreasonable risk for residents and property. All trees create some level of risk. The goal is to create a maintenance program that addresses structural and health problems that we know are more likely to cause a tree to fail. We cannot see and anticipate all structural and health problems. Pruning standards should be established to help insure that all tree work on public right-of-ways is done according to nationally accepted standards.

Recommendations

Based upon my assessment of the street trees in the Town of Oakland, these are my recommendations:

Incorporate Pruning Standards To both maintain the extraordinary tree canopy that exists in the Town of Oakland and to sustain this canopy for years to come, it is important to incorporate nationally accepted tree industry pruning standards that have been developed with input from arboriculture university researchers and practicing arborists. These are the ANSI A300 Pruning Standards. An ordinance mandating that all pruning in the town follow these standards will help stop the poor pruning practices that I observed. These poor pruning practices damage tree health and exacerbate tree structure problems. The ANSI A300 standard is available through on-line arboriculture bookstores such as the International Society of Arboriculture website book store at https://secure.isa-arbor.com/store/. Following the standards and making penalties for not following the standards should help eliminate the problems with over-lifting and lions-tailing.

Prune Young Trees Part of the maintenance program should include “light” structural pruning of younger trees to reduce the likelihood of structural problems as these tree mature.

Treat Different Species Differently Live oaks and laurel oaks are not trees of equal quality, longevity or strength. Residents who wish to remove a large laurel oak over 30 inches DBH and/or with significant structural problems should not have to meet the same strict criteria for removal as a resident who wants to remove a live oak.

Give Special Status to Your Best Trees If you do not have one, create a Specimen Tree designation in your tree ordinance which will provide for greater protection for the numerous large trees in Town. Construction activities around these specimen trees should allow for greater root protection. Street and sidewalk repair should be done with greater care to accommodate rather than cut specimen tree roots.

Consider Species Diversification Over 90% of your street trees are oak trees. Consider adding some new tree species to the street tree population. Lists of appropriate replacement species for the area are available from the Orange County or Lake County Cooperative Extension Service offices.

Incorporate Planting Standards for New Trees I observed some young trees on the north end of Tubb St. that had been improperly planted. Consider incorporating planting standards into your tree ordinance. The best planting standards available, in my opinion, were developed by Dr. Ed Gilman of the University of Florida and The Urban Florida Urban Forestry Council with special attention to part 3 Materials and part 4 Execution.[9]

Resistograph Decay Analysis Some trees did not receive a risk rating because more inspection was required. The Resistograph is the best tool for helping to determine the amount and location of internal decay inside the lower trunk of a tree.

Root Flare Excavation Several trees had fill soil or construction damage to the lower trunk. Using an Air Spade to remove the soil and examine the critical root flare is recommended on these trees. Root flare examination can be used to clear soil away from the root crown on the younger trees planted along the west side of the north end of Tubb St. The nylon ropes that were found and the strapping and the upper portions of the wire baskets can be removed, if they exist.

Mulch Apply organic mulch such as chipped tree debris and yard waste directly over the soil around your specimen trees. Mulch helps improve the organic matter content of the soil, reduce compaction and protect the soil from further compaction. Mulch also helps conserve soil moisture and buffers the soil from temperature extremes.

ISA Certified Arborists Consider using only International Society of Arboriculture Certified Arborists for contracting town tree work and require that the Certified Arborist be on site during the entire pruning operation. Even then make sure the Certified Arborist fully understands and follows the ANSI A300 Pruning Standards. To find a Certified

Arborist in your area, go the website: http://www.isa-arbor.com/findArborist/findarborist.aspx

Irrigation Trees can become stressed during extended droughts. The Town should have a plant to irrigate the specimen live oak trees once every month or so during extended droughts like the 11-month drought we are currently experiencing in central and north Florida.

Appendix A

Tree Location List

Appendix B

Tree Inventory and Assessment

Appendix C

ISA Pamphlets

Appendix D

Definitions

Air Spade – equipment used to excavate soil from roots using high velocity air expelled through a special nozzle. The air moves soil but generally does not harm roots or other solid obstacles. The Air Spade is generally a non-invasive diagnostic tool for examining roots, tree crowns and root flares.

Bracing – Installation of steel rods or bolts through the stems or limbs, to reduce twisting or splitting of the wood.

Cabling – Installation of steel cables, attached to lag screws or bolts placed in tree limbs, to provide additional support or to limit movement and stress of limbs.

Canker – An area of dead bark caused by certain fungal infections.

Canopy – The live, foliage-bearing part of a tree.

Cavity – An open and exposed area of wood, where the bark is missing and internal wood has been decayed and dissolved.

Codominant Leaders – a tree with multiple trunks often beginning as a single leader and dividing into two or more leaders of similar size higher up on the trunk. Codominant leaders are considered a structural defect because they can be prone to failure (splitting)

Compartmentalization – the ability of a tree to isolate (wall off) damage and decay and continue to grow around the damaged area. Trees that are good compartmentalizers are better able to withstand damage from injuries such as pruning cuts, gashes, lightning strikes, etc.

Condition – an evaluation of a tree's structure and health

Conk – A woody or perennial reproductive organ of certain fungi, usually found on trunks, branches or stumps.

Crown – The upper portions of a tree or shrub, including the main limbs, branches, and twigs.

Decline – Progressive reduction of health or vigor of a plant.

DBH – diameter at breast height, a measurement of a tree's diameter usually measured approximately four and one half feet above the ground

Dieback – Progressive death of buds, twigs and branch tissues, on individual limbs, or throughout the canopy.

Dripline – the outer edge of a tree canopy

Epicormic sprouts – Excessive sprouting. Short twigs and small leaves growing along the upper surface of one or more main branches. The presence of epicormic sprouts are an indication of poor tree health, over-pruning, a weakened tree.

Girdle – the process of strangling or cutting off the transport vessels in a tree trunk, branch or root. Girdling can be caused by foreign objects such as nylon rope left on the rootball during transplanting or growth abnormalities such as circling roots often caused by containerized nursery stock being pot-bound. Sometimes girdling of a tree roots or stem is due to naturally occurring causes.

Heading cut – pruning procedure that leaves a stub which is an entry point for decay. This practice is extremely injurious to trees, and promotes decay in the canopy. See topping.

Leader – A main stem or branch of a tree that is (usually) codominant with other main stems.

Limb – A large lateral branch growing from the main trunk or from another larger branch.

Lions-tailing – the removal of an excessive number of inner lateral branches from parent branches. Lion tailing is not an acceptable pruning practice according to ANSI A300 (part 1) Pruning Standards.[10]

Multiple trunks – when trees grow in a cluster of two, three or more, they can become unstable as they grow taller because root growth is limited by adjacent trees and their roots.

Over-lifted or Over-lifting – The improper pruning practice of removing lower and interior branches leaving most of the remaining branches and foliage at the upper ends of limbs. Also can be another term for lions tailing**.**

Prune or Pruning – Selective removal of woody plant parts of any size, using saws, pruners, clippers, or other pruning tools.

Reduction Pruning – A recommended pruning method that reduces (subordinates) codominant leaders and large side branches by reducing their size from the outside in. Reduction pruning is often the preferred method of taking weight off the ends of branches versus the commonly utilized but undesirable method known as “lions tailing” which removes interior branches and keeps only the branches out at the end creating instability and increasing risk of branch or trunk failure.

Resistograph – a diagnostic tool that utilizes a 1/8-inch diameter drill bit to measure decay inside a tree trunk or branch by measuring and graphing the resistance of the drill bit as it moves through the wood.

Root Flare – the area at the base of the tree trunk that becomes wider (flares out) where roots grow horizontally in the soil. The individual root flares are where the roots are connected to the base of the tree trunk.

Root Plate – a circular area with an outer boundary that is usually considered to be a distance from the tree trunk that is three times the diameter of the tree.

Root Tracing – a non-invasive technique utilizing an Air Spade to locate and follow tree roots. This procedure allows an arborist to precisely determine the location of large roots in relation to planned buildings or other infrastructure.

Specimen Trees – trees of above average size, age and/or other characteristics such as historical value or location which can be designated by ordinance to have special protection and care.

Survival – tree survival does not mean the tree will remain alive until the end of construction or even for another five years. Tree survival means adequate precautions have been taken during construction so the tree will continue to live vigorously for at least its average life span in this area of Florida

Target – Any person or object within reach of a falling tree or part of a tree, that may be injured or damaged.

Topping – The practice of cutting large limbs back severely, without regard to form or habit of the tree. Cuts are usually made between lateral branch nodes. This practice is extremely injurious to trees, and promotes decay in the canopy.

Water sprouts – epicormic sprouts (see above) that form on a branch that is usually over-pruned

Certification of Performance

I, Chuck Lippi, certify that:

- I have personally inspected the trees referred to in this report and have stated my findings accurately.
- I have no current or prospective interest in the trees or the property that is the subject of this report and have no personal interest or bias with respect to the party or parties involved.
- The analysis, opinions and conclusions stated herein are my own and are based on current scientific procedures and facts.
- My compensation is not contingent upon the reporting of a predetermined conclusion that favors the cause of one party or any other party nor upon the results of the assessment, the attainment of stipulated results or the occurrence of any subsequent events.
- Arborists are tree specialists who use their education, knowledge, training and experience to examine trees, recommend measures to enhance the beauty and health of trees, and attempt to reduce the risk of living near trees. Clients may choose to accept or disregard the recommendations of the arborists, or to seek additional advice.
- Arborists cannot detect every condition that could possibly lead to the structural failure of a tree. Trees are living organisms that fail in ways we do not fully understand. Conditions are often hidden within trees, below ground or are not visible from the vantage point of standing on the ground. Arborists cannot guarantee that a tree will be healthy, safe or adequately protected under all circumstances or for a specified period of time. Likewise, remedial, protective and mitigating treatments and recommendations cannot be guaranteed.

I further certify that I am a member in good standing of the American Society of Consulting Arborists (ASCA), the International Society of Arboriculture (ISA) and the Florida Urban Forestry Council and am an ISA Board Certified Master Arborist FL-0501B and an ASCA Registered Consulting Arborist #443.

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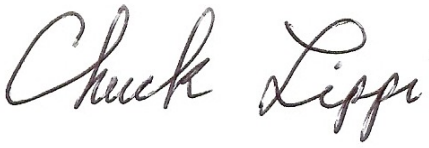
Signed:  Date: November 9, 2006

References

[1] Dr. James R. Clark and Dr. Nelda P. Matheny, ***A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas***, 2nd edition, International Society of Arboriculture, 1994, pp. 37 – 57.

[2] ANSI A300 (Part I)-2001 Pruning, American National Standard for Tree Care Operations Tree, Shrub and Other Woody Plant Maintenance, Standard Practices (Pruning)

[3] Dr. Ed Gilman, ***Trees for Urban and Suburban Landscape***, Delmar Publisher, New York, 1996, p. 497.

[4] *Ibid.,* 497.

[5] Pamela Crawford, ***Stormscaping: Landscaping to Minimize Wind Damage in Florid,*** Color Garden Publishing, 2005, p. 41

[6] Dr. Ed Gilman, ***An Illustrated Guide to Pruning,*** 2nd edition, Delmar Thomson Learning, 2002, p. 211.

[7] *Ibid*, p. 212.

[8] ANSI A300 (Part I)-2001 Pruning, American National Standard for Tree Care Operations Tree, Shrub and Other Woody Plant Maintenance, Standard Practices (Pruning), p. 6.

[9] *Typical Tree Bid Specifications for Florida* Developed by the Florida Urban Forestry Council and Dr. Edward F. Gilman, University of Florida, Gainesville, Updated June 1999. http://www.floridaisa.org/typicalspecs.html#General

[10] ANSI A300 (Part I)-2001 Pruning, American National Standard for Tree Care Operations Tree, Shrub and Other Woody Plant Maintenance, Standard Practices (Pruning), pp. 2-3.