CITY COUNCIL STAFF REPORT

DATE: June 17, 2015 CONSENT CALENDAR

SUBJECT: CITY OF PALM SPRINGS TREE INVENTORY AND URBAN FOREST MANAGEMENT REPORT

FROM: David H. Ready, City Manager

BY: Office of the City Manager

SUMMARY

The City of Palm Springs received a grant from the Southern California Association of Government's (SCAG) Green Region Initiative to conduct a tree inventory, obtain urban forestry management software and complete an urban forestry management plan. The grant has provided the City with a full and complete "tree inventory" from which staff can appropriately manage on-going tree maintenance and replacement.

RECOMMENDATION:

Receive and file.

STAFF ANALYSIS:

In the last five years, the City of Palm Springs has initiated steps towards achieving recognition as a "Tree City USA" designation through the National Arbor Foundation. Some of the steps taken include hosting an annual Arbor Day event, education and outreach to schools regarding the importance of trees and community tree plantings. The Tree City USA program is a national program that provides the framework for community forestry management for cities and towns across America. Communities achieve Tree City USA status by meeting four core standards of sound urban forestry management, including: (1) maintaining a tree board or department, (2) having a community tree ordinance, (3) spending at least $2 per capita on urban forestry, and (4) officially celebrating Arbor Day. By conducting a tree inventory and creating a plan the City of Palm Springs is not only taking a another step towards this goal, but also will yield many positive financial savings, reduced maintenance cost and time and increased community and environmental health.

In recent years, the City has established strong partnerships with many local and national organizations including the Arbor Day Foundation, CAL Fire, Western Chapter

of the International Society of Arboriculture, Riverside County Master Gardener Program, Desert Healthcare Foundation and all local schools. Each year the City works with a local school to host an Arbor Day Celebration. Every child at the school receives a tree to take home and plant. In 2013, the City was awarded a grant through CAL Fire and the Britton Fund to host a nationally acclaimed program called Tree Circus. This program educates community members of all ages about the value and importance of trees. These valuable partnerships will continue and will help further the work and educational opportunities that result from a comprehensive Urban Forestry Management Plan.

Recently, the City's Office of Sustainability applied for and received grant award valued at $80,000 in services from SCAG. After receipt of the grant, SCAG awarded a contract to ArborPro, Inc., as a vendor to SCAG assigned to the City of Palm Springs to collect and analyze its public tree inventory. ArborPro employed an International Society of Arboriculture (ISA) Certified Arborist to collect tree attributes and to GPS locate the coordinates of every publicly owned and maintained tree in the City. ArborPro collected attributes such as species, diameter, condition, maintenance need, general observations, clearance requirements, hardscape damage, proximity to overhead power lines and grow space. ArborPro utilized handheld surveying equipment to determine the location of each tree (to sub-meter accuracy) and uploaded the data to a GIS (Geographic Information System) database. ArborPro provided the City with a license to ArborPro Tree Management software which allows the tree inventory data to be managed and updated.

Up until 2013, the City had never conducted a comprehensive inventory of publicly owned and maintained trees, and no management tool had ever been implemented to monitor and maintain these trees. This lack of data only allowed for reactive urban forest management, rather than management through a comprehensive, systematic approach. By preparing a tree inventory, the City has taken the critical first step to being able to proactively and efficiently manage its urban forest.

The final report, titled *City of Palm Springs Inventory of Public Trees (2014) | Urban Forest Management Report* is included as **Attachment 1**. The inventory has identified various characteristics of the City's urban forest (those publicly owned and maintained trees), consisting of 15,224 various trees, which include tree diameter (diameter at breast height [DBH]), tree height, and tree condition, as represented in the Tables on the following page.

DBH (in inches)	Tree Count
00-06	2,617
07-12	3,880
13-18	3,703
19-24	1,611
25-30	1,811
30+	428
Vacant Sites	1,174
Total	**15,224**

Tree Diameter (DBH)

Height	Tree Count
00-15	3574
15-30	5191
30-45	3172
45-60	1812
60+	301
Vacant Sites	1174
Total	**15,224**

Tree Height

Tree Condition	Tree Count
Excellent	271
Very Good	986
Good	6,118
Fair	4,516
Poor	2,030
Dead	103
Critical	11
Stump	15
Vacancy	1,174
Total	**15,224**

Tree Condition

The objective of the tree inventory and urban forestry management report is to summarize the findings from the tree inventory and to provide recommendations on how to appropriately manage the City's urban forest. The goal of the plan is to lay the foundation for long-term urban forestry programming.

ENVIRONMENTAL IMPACT:

Section 15061 (b)(3) of the California Environmental Quality Act ("CEQA") Guidelines exempts activities that are covered under the general rule that CEQA applies only to projects that have the potential to cause significant effects on the environment. Where it can be seen with certainty that there is no possibility the activity in question may have a significant effect upon the environment, the activity is not subject to CEQA. The requested action requests the City Council to receive and file the tree inventory and urban forest management report, which itself will not result in any new direct physical impacts to the environment. Therefore, the requested action is considered exempt from CEQA.

FISCAL IMPACT:

There is no direct local fiscal impact associated with the requested action.

SUBMITTED:

Submitted by:

Michele Mician,
Manager of Sustainability

Prepared by:

Marcus L. Fuller,
Assistant City Manager/City Engineer

Approved by:

David H. Ready, City Manager

Attachment:

City of Palm Springs Inventory of Public Trees (2014) | Urban Forest Management Report

ATTACHMENT 1

City of Palm Springs
Inventory of Public Trees
2014

Urban Forest Management Report

Prepared for
The City of Palm Springs, California

Prepared By
ArborPro, Inc.

Funded By
Southern California Association of Governments

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Part 1

Background

After receipt of a grant from Southern California Association of Governments, the City of Palm Springs awarded a contract to ArborPro, Inc. to collect and analyze tree inventory data. ArborPro, Inc. employed an International Society of Arboriculture (ISA) Certified Arborist to collect tree attributes and to GPS locate the coordinates of every publicly owned and maintained tree in the City. ArborPro Inc. collected attributes such as species, diameter, condition, maintenance need, general observations, clearance requirements, hardscape damage, proximity to overhead power lines and grow space. ArborPro, Inc. utilized handheld surveying equipment to determine the location of each tree (to sub-meter accuracy) and uploaded the data to a GIS (Geographic Information System) database. ArborPro, Inc. provided the City of Palm Springs with a license to ArborPro Tree Management software which allows the tree inventory data to be managed and updated.

Up until 2013, the City of Palm Springs had never conducted a comprehensive inventory of city trees and no management tool had ever been implemented to monitor and maintain these trees. This lack of data only allowed for reactive urban forest management, rather than management through a comprehensive, systematic approach. By preparing a tree inventory, the City of Palm Springs took the critical first step to being able to proactively and efficiently manage the urban forest.

The objective of this report is to summarize the findings from the tree inventory and to provide recommendations on how to appropriately manage the City's urban forest.

Part 2

Inventory Summary

ArborPro, Inc. collected a variety of attributes for each tree in the City, including its size, species and maintenance requirements. The purpose of this section is to summarize the data which was collected.

Number of Trees

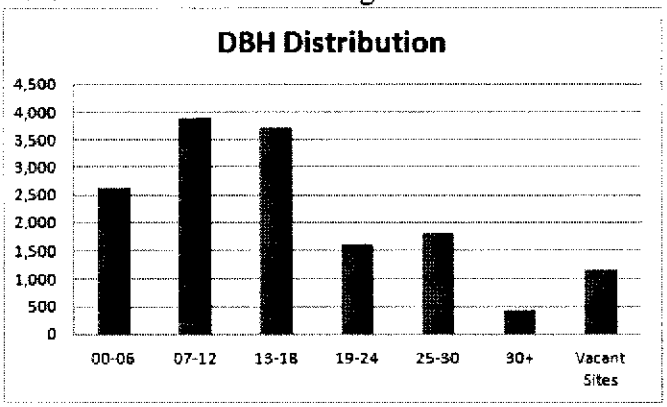
During the data collection process, ArborPro, Inc. created 15,224 records, which includes 13,830 trees, 220 stumps and 1,174 vacant planting sites.

Size Characteristics

The general size of a tree provides insight into the age and value of the tree. There are two industry wide recognized size characteristics: height and diameter at breast height. While height is self explanatory, diameter at breast height (DBH) is determined by the diameter of the tree at 4.5' above grade. Both the Height and DBH are collected in ranges due to the dynamic growth rate of trees.

The chart below summarizes the DBH distribution among the trees collected:

DBH (In Inches)	Tree Count
00-06	2,617
07-12	3,880
13-18	3,703
19-24	1,611
25-30	1,811
30+	428
Vacant Sites	1,174
Total	**15,224**



The chart below summarizes the height distribution among the trees collected:

Height	Tree Count
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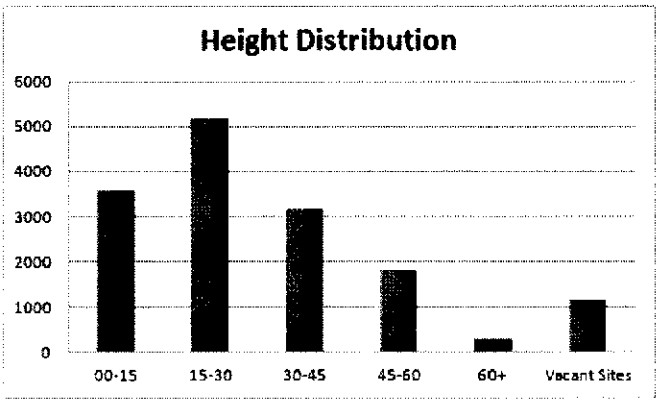

The charts above indicate that the City of Palm Springs has a relatively young urban forest. With regards to the Diameter at Breast Height (trunk diameter) 45% of the trees surveyed are 12 inches or smaller. As the urban forest becomes more mature, the young trees will become larger and the distribution of DBH and height will shift to the right.

In general, large mature trees provide significantly greater aesthetic and environmental benefits than young small trees. Proper maintenance and management of the urban forest will allow the young trees to grow larger and deliver the increased benefits to the City.

Tree Condition

A condition assessment was conducted for every tree that was cataloged as part of the tree inventory. The condition assessment was based on criteria established by the ISA. Each tree was assigned a rating (excellent, very good, good, fair, poor, dead and critical). A description of the rating categories are below:

Excellent – The tree is near perfect condition, this determination is generally used for trees with no defects and young trees that have been properly maintained.

Very Good – The tree is in very good condition with very minor defects that could be corrected by pruning. These trees generally "stand out" with respect to the aesthetic value they add to the Urban Forest.

Good – The tree has no major structural problems; no significant damage from diseases or pests; no significant mechanical damage; a full, balanced crown, and normal twig condition and vigor for its species.

Fair – The tree may exhibit the following characteristics: minor structural problems and/or mechanical damage; significant damage from non-fatal or disfiguring diseases; minor crown imbalance or thin crown; minor structural imbalance; or stunted growth compared to adjacent trees.

Poor – The tree appears healthy, but may have structural defects. This classification also includes healthy trees that have unbalanced structures or have been topped. Trees in this category may also have severe mechanical damage, decay, severe crown dieback or poor vigor/failure to thrive.

Dead – Trees in advanced states of decline are not included. This category refers only to dead trees.

Critical – The tree is in a physical state that requires immediate attention. Generally these trees are recommended for a Priority One Removal.

The charts below summarize the distribution of tree conditions.

Tree Condition	Tree Count
Excellent	271
Very Good	986
Good	6,118
Fair	4,516
Poor	2,030
Dead	103
Critical	11
Stump	15
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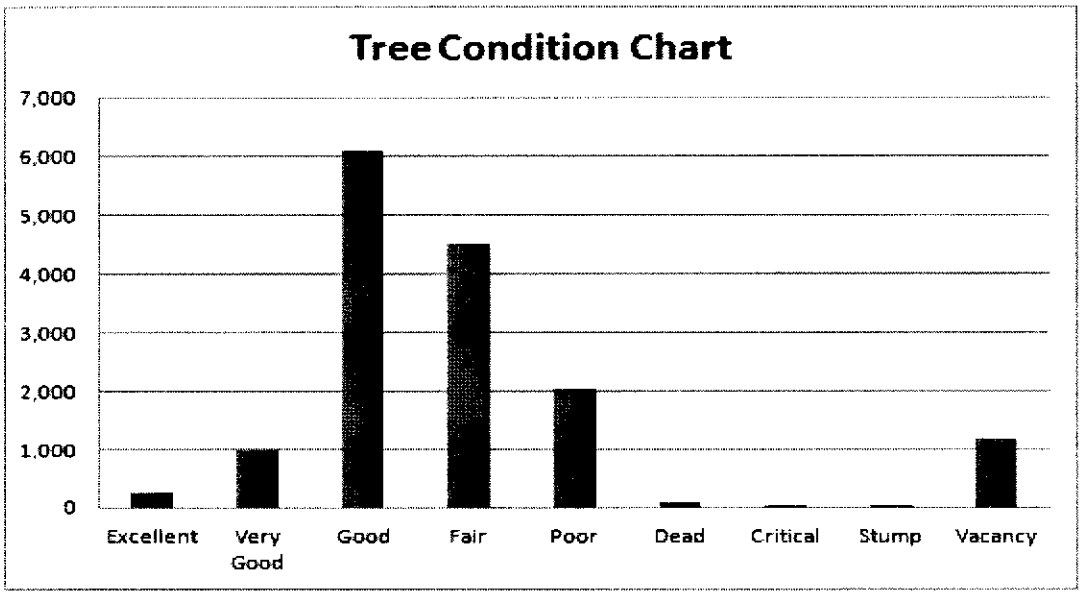


About 86% of trees surveyed, were given a rating of "fair" or better, which is indicative of a fairly healthy urban forest. The vast majority of trees surveyed fell within the "good" or "fair" condition categories. Moving forward, it is important to perform proper maintenance of the urban forest to maintain or improve this overall condition level.

Species Distribution

The City of Palm Springs does not have the most diverse Urban Forest. Of the 13,803 trees that were surveyed, 40% of the trees are Washingtonia Palm species, Mexican and California Fan Palms. The palm trees are iconic to the City of Palm Springs and provide many aesthetic benefits, however, they do not provide as many environmental benefits as other trees would provide for the City. As part of our long term management strategy we are recommending the introduction of additional evergreen and deciduous species to be planted city wide.

In general, a diverse palette of trees helps guard against catastrophic loss to insects and diseases or environmental stresses.

Below is a species frequency report that provides a total tree count by species.

Botanical Name	Common Name	Tree Count
Mexican Fan Palm	Washingtonia robusta	3,162
California Fan Palm	Washingtonia filifera	2,405
Thornless Chilean Mesquite	Prosopis alba 'Colorado'	718
African Sumac	Rhus lancea	657
Olive	Olea europaea	624
Mediterranean Fan Palm	Chamaerops humilis	471
Filibusta Palm	Washingtonia filifera X robusta	428
Desert Willow	Chilopsis linearis	385
Athel Tree	Tamarix aphylla	348
Blue Palo Verde	Parkinsonia florida	322
Carob	Ceratonia siliqua	251
Small's Acacia	Acacia smallii	228
Bottle Tree	Brachychiton populneus	224
Tipu	Tipuana tipu	196
Aleppo Pine	Pinus halepensis	187
Desert Museum Palo Verde	Parkinsonia x 'Desert Museum'	177
Red Gum	Eucalyptus camaldulensis	160
Jacaranda	Jacaranda mimosifolia	156
Jerusalem Thorn	Parkinsonia aculeata	148
Date Palm	Phoenix dactylifera	141
Yellow Oleander	Thevetia peruviana	140
Chinese Elm	Ulmus parvifolia	130
Red Ironbark	Eucalyptus sideroxylon	109
Desert Gum	Eucalyptus rudis	83
Argentine Mesquite	Prosopis alba	81
Cajeput Tree	Melaleuca quinquenervia	81
Indian Laurel Fig	Ficus microcarpa 'Nitida'	77
Cascalote	Caesalpinia cacalaco	75
Brazilian Pepper	Schinus terebinthifolius	70
London Plane Tree	Platanus x acerifolia	65
Heritage Southern Live Oak	Quercus virginiana 'Heritage'	64
Mulga	Acacia aneura	60
Evergreen Pear	Pyrus kawakamii	59
Velvet Mesquite	Prosopis velutina	49
Willow Acacia	Acacia salicina	48
Afghan Pine	Pinus brutia var. eldarica	46
Fern-of-the-Desert	Lysiloma microphylla var. thornberi	46
Queen Palm	Syagrus romanzoffianum	45
Sonora Emerald Palo Verde	Parkinsonia x 'Sonora Emerald'	44
California Pepper	Schinus molle	43

Palo Brea	Parkinsonia praecox	43
Weeping Bottlebrush	Callistemon viminalis	43
Shamel Ash	Fraxinus uhdei	42
Silk Oak	Grevillea robusta	41
Littleleaf Cordia	Cordia parvifolia	37
Ocotillo	Fouquieria splendens	35
Crape Myrtle (including hybrids)	Lagerstroemia indica (and hybrids)	33
Pigmy Date Palm	Phoenix roebelenii	33
Mexican Blue Palm	Brahea armata	32
Foothill Palo Verde	Parkinsonia microphyllum	31
Chitalpa	Chitalpa tashkentensis	30
Shoestring Acacia	Acacia stenophylla	30
Green Gem Indian Laurel Fig	Ficus microcarpa 'Green Gem'	27
Ponytail Palm	Beaucarnea recurvata	27
Italian Stone Pine	Pinus pinea	26
Canary Island Pine	Pinus canariensis	25
Pindo Palm	Butia capitata	24
California Sycamore	Platanus racemosa	23
Grapefruit	Citrus X paradisi	23
Desert Ironwood	Olneya tesota	22
Coolibah	Eucalyptus microtheca	21
Palo Blanco	Acacia willardiana	19
Chilean Mesquite	Prosopis chilensis	18
Desert Smoke Tree	Dalea spinosa	18
Escarpment Live Oak	Quercus fusiformis	18
Leadball Tree	Leucaena leucocephala	17
Thornless Honey Locust	Gleditsia triacanthos f. inermis	16
Lemon Bottlebrush	Callistemon citrinus	15
Silver Dollar Gum	Eucalyptus polyanthemos	15
Stump with no planting plan	Stump with no planting plan	15
Weeping Fig	Ficus benjamina	15
Jumping Cholla	Cylindropuntia fulgida	14
Mexican Caesalpinia	Caesalpinia mexicana	13
Yellow Elder	Tecoma stans	13
Saguaro	Carnegiea gigantea	12
Tree Spurge	Euphorbia ingens	12
White Ironbark	Eucalyptus leucoxylon	12
White Mulberry	Morus alba	12
Carrotwood	Cupaniopsis anacardioides	11
Pencil Tree	Euphorbia tirucalli	11
Spotted Gum	Corymbia maculata	10
Carolina Laurel Cherry	Prunus caroliniana	9
Lemon	Citrus limon	9

Madagascar Palm	Pachypodium lamerei	9
Arizona Ash	Fraxinus velutina	8
Cuban Laurel	Ficus microcarpa	8
Italian Cypress	Cupressus sempervirens	8
Camphor	Cinnamomum camphora	7
Calabrian Pine	Pinus brutia	6
Honey Mesquite	Prosopis glandulosa	6
Lemon-Scented Gum	Corymbia citriodora	6
Ornamental Pear	Pyrus calleryana	6
Rustyleaf Fig	Ficus rubiginosa	6
Tangerine	Citrus reticulata	6
Apple Cactus	Cereus peruvianus	5
Redspire Pear	Pyrus calleryana 'Redspire'	5
Southern Live Oak	Quercus virginiana	5
Spanish Bayonet	Yucca aloifolia	5
Texas Ebony	Ebenopsis ebano	5
Bird of Paradise Bush	Caesalpinia gilliesii	4
Eucalyptus Species	Eucalyptus species	4
Ficus Species	Ficus species	4
Floss Silk Tree	Ceiba speciosa	4
Fremont Cottonwood	Populus fremontii	4
Mexican Grass Tree	Dasylirion longissimum	4
Orange	Citrus sinensis	4
Purple Orchid Tree	Bauhinia variegata	4
Canary Island Date Palm	Phoenix canariensis	3
Drake Chinese Elm	Ulmus parvifolia 'Drake'	3
Dwarf Olive	Olea europaea 'Skylark'	3
Edible Fig	Ficus carica	3
Formosa Flamegold	Koelreuteria elegans subsp. formosana	3
Ghost Gum	Corymbia papuana	3
Hong Kong Orchid Tree	Bauhinia x blakeana	3
Lime	Citrus aurantifolia	3
Nichol's Willow-Leafed Peppermint	Eucalyptus nicholii	3
Oriental Arborvitae	Platycladus orientalis	3
Other Tree	Other Tree	3
Peruvian Pepper	Schinus polygamus	3
Shiny Xylosma	Xylosma congestum	3
White-thorn Acacia	Acacia constricta	3
Yucca Species	Yucca species	3
Black Ironwood	Krugiodendron ferreum	2
Chaste Tree	Vitex agnus-castus	2
Fern Pine	Afrocarpus gracilior	2

Giant Bird of Paradise	Strelitzia nicolai	2
Indian Rosewood	Dalbergia sissoo	2
Mango	Mangifera indica	2
Manna Gum	Eucalyptus viminalis	2
Plumeria	Plumeria rubra	2
Prickly Pear Cactus	Opuntia ficus-indica	2
Private Tree	Private Tree	2
Purple Hopseed	Dodonaea viscosa 'Purpurea'	2
Purple-Leafed Plum	Prunus cerasifera	2
River She-Oak	Casuarina cunninghamiana	2
Sago Palm	Cycas revoluta	2
Senegal Date Palm	Phoenix reclinata	2
Siberian Elm	Ulmus pumila	2
Snailseed	Cocculus laurifolius	2
Stone Fruit Species	Prunus species	2
Tangelo	Citrus X 'Tangelo'	2
Texas Mountain Laurel	Sophora secundiflora	2
Tree of Heaven	Ailanthus altissima	2
Yate	Eucalyptus cornuta	2
Arizona Cypress	Cupressus arizonica	1
Arizona Sycamore	Platanus wrightii	1
Avocado	Persea americana	1
Chinaberry	Melia azedarach	1
Chinese Sweet Gum	Liquidambar formosana	1
Clustered Fishtail Palm	Caryota mitis	1
Edible Loquat	Eriobotrya japonica	1
Fan-Tex Ash	Fraxinus velutina 'Rio Grande'	1
Flooded Gum	Eucalyptus grandis	1
Japanese Black Pine	Pinus thunbergiana	1
Mimosa; Silk Tree	Albizia julibrissin	1
Peach	Prunus persica	1
Peach-Leafed Willow	Salix amygdaloides	1
Pumelo	Citrus maxima	1
Purple Robe Locust	Robinia x ambigua 'Purple Robe'	1
Red Bauhinia	Bauhinia punctata	1
Sky Flower	Duranta repens	1
Southern Magnolia	Magnolia grandiflora	1
Yew Pine	Podocarpus macrophyllus	1

Part 3

Economic Benefits Analysis

Often, municipalities only consider the cost of maintaining the urban forest, and ignore the benefits that trees provide. Trees provide significant community benefits. It is important to quantify those benefits to highlight the fact that trees are a good investment for the community.

ArborPro, Inc. performed an economic benefits analysis of the tree inventory data utilizing the i-Tree software suite distributed by the USDA Forest Service. The i-Tree suite is comprised of urban and community forestry analysis and benefits assessment tools. The i-Tree tools are intended to help communities to strengthen their urban forest management and advocacy efforts by quantifying the environmental services that trees provide and the structure of the urban forest. All of the attributes collected during the tree inventory were entered into the i-Tree software to quantify their value.

Stormwater Runoff and Improved Water Quality

Trees reduce peak stormwater runoff and associated pollutants entering local water bodies. Trees reduce stormwater volumes by intercepting a portion of rainfall, which evaporates and never reaches the ground. Tree roots also increase rainfall infiltration and storage in the soil. And tree canopies reduce soil erosion by diminishing the impact of raindrops on barren surfaces.

Public trees in Palm Springs intercept 6,882,183 gallons of water annually for a savings of $33,304.

Reduction of Atmospheric Carbon Dioxide

Trees reduce atmospheric carbon by capturing and storing CO2 as they grow. By reducing demand for heating and cooling, trees indirectly reduce CO2 by avoiding emissions associated with energy production.

Public trees in Palm Springs capture 620,065 pounds of atmospheric CO2 per year. Annual savings including indirect costs are $4,650. Street trees also store approximately 14,414,657 pounds of atmospheric CO2 for a total savings of $108,110.

Air Quality Improvements

Trees improve air quality by trapping particulates, absorbing gaseous pollutants, and releasing oxygen. By cooling urban heat islands and shading parked cars, trees indirectly reduce ozone levels. The Environmental Protection Agency recognizes tree planting as an ozone reduction measure in state implementation plans.

Public trees in Palm Springs remove particulate matter, ozone, sulfur dioxide and nitrogen oxides. The annual savings from air quality improvements including indirect cost is $ 37,208.

Energy Savings

Trees reduce the demand for energy to heat and cool buildings by providing shade, lowering summertime temperatures, and reducing windspeeds. Secondary benefits are reduced water consumption and pollutants emissions.

Public trees in Palm Springs save approximately 406.3 MWH of electricity and 7,226.6 Therms of natural gas annually for a savings of $63,186.

Improved Property Values

Trees are the single strongest positive influence on scenic quality in most communities. They increase the attractiveness of retail business areas. Studies have found that shoppers are willing to pay more for goods and services in a well-landscaped business district and people will pay more for properties with many trees. Trees foster safer and more sociable neighborhoods. Views of trees ease mental fatigue and stress, help concentration, reduce sickness, and provide settings for recreation and relaxation. Trees also help reduce noise, provide a refuge for wildlife, and help connect residents with their natural environment.

Public trees in Palm Springs increase property values annually by $307,572.

The full i-Tree reports are provided in Exhibit C.

The i-Tree reports indicate that larger trees provide significantly greater environmental and economic benefits to the community than smaller trees. For example, the average annual benefits for individual African Sumac Trees were calculated to be $47.53, whereas the average annual benefits for individual Mexican Fan Pals was calculated to be $12.80. As the City's urban forest continues to grow, it is expected that the difference in average annual benefits will grow by a large margin.

Part 4

Tree Maintenance Recommendations

The Certified Arborist that conducted the tree inventory provided a maintenance recommendation for each tree or tree site. All recommendations and tree assessments were provided utilizing a ground level observation of the tree. There can be unforeseen damage internally or in the branch structure, not identified by the data collector, that could cause limb or tree failure. The maintenance categories are defined below:

Priority One Prune – Trees which require pruning to remove deadwood and/or broken branches that pose an immediate safety risk that could result in personal injury or property damage. Trees have limbs that are more than 3 inches in diameter and pose an immediate safety risk. The trees that have been recommended for a priority 1 prune should be inspected by staff. These trees are in need of corrective maintenance.

Priority Two Prune – Trees having problems and conditions which may affect future safety, health or structure of the tree. This includes primarily large trees (over 20 feet in height) with minor amounts of deadwood and correctable structural problems.

Routine Prune (Small or Large) – This includes pruning of trees with minor amounts of deadwood that pose little or no threat of personal injury or property damage and trees with correctable structural problems. Trees with growth patterns that will eventually obstruct or interfere with pedestrian or vehicular traffic, traffic control devices, lines of sight, or overhead utility lines are also included in this category. These trees are in satisfactory condition and can be pruned on a regular cycle.

Priority One Removal – Trees that are dead or have one or more defects that cannot be cost-effectively or practically remedied. Such defects include extensive trunk decay and severely decayed or weakened v-type crotches. These trees should be surveyed by staff and scheduled for removal and replacement if appropriate. This category includes trees that reflect dangerous conditions combined with significant targets such as proximity to high volume sidewalks or play areas.

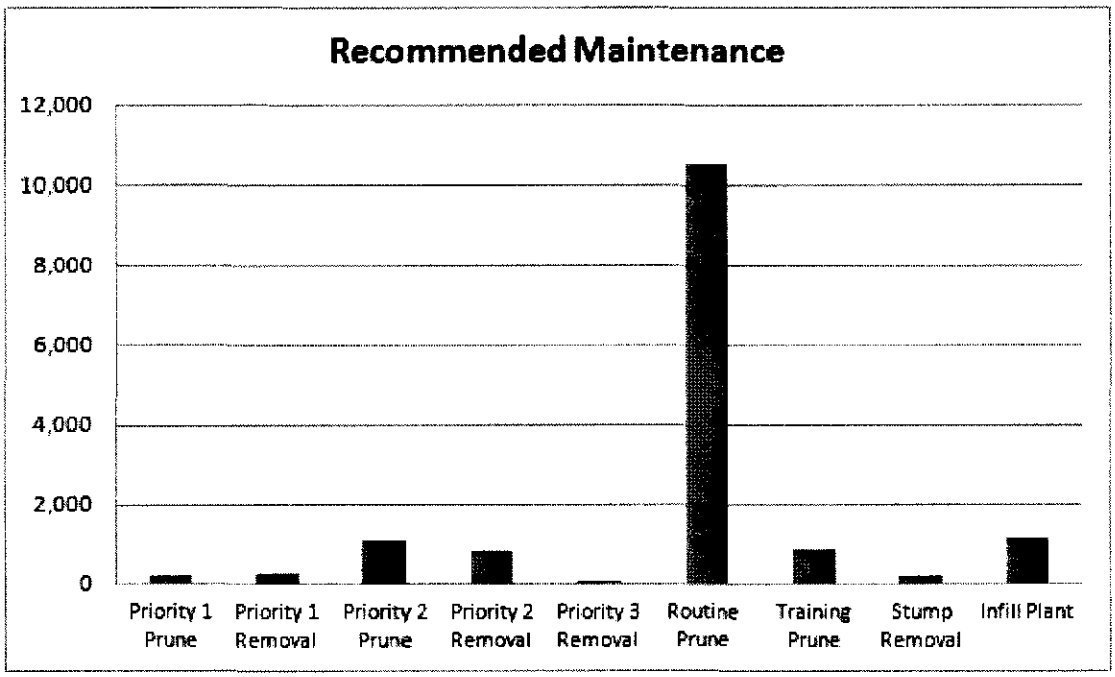
Priority Two Removal - Trees that are structurally compromised but may be expected to be removed in 2 to 5 years. These trees should be scheduled for removal over a reasonable time period based on available funds. The removal process should be followed by a replanting program.

Plant Tree – This recommendation has been provided for vacant planting sites throughout the city. Based on criteria approved by the City of Palm Springs our data collector has identified sites throughout the city to plant trees. In association

with the Planting Plan we have also identified the appropriate specie to plant in each site.

Training Prune – The most important time to prune a tree is within the first five years following planting. By properly pruning a young tree the city will save future maintenance costs that result from poor branch structure, dual leaders, etc. The small investment on a young tree will save thousands in the long run.

The charts below summarize the distribution of recommended maintenance needs:



Recommended Maintenance	Tree Count
Priority 1 Prune	199
Priority 1 Removal	247
Priority 2 Prune	1,133
Priority 2 Removal	844
Priority 3 Removal	4
Routine Prune (Large and Small)	10,549
Training Prune	854
Stump Removal	220
Infill Plant	1,174
Total	**15,224**

Hazard Eradication

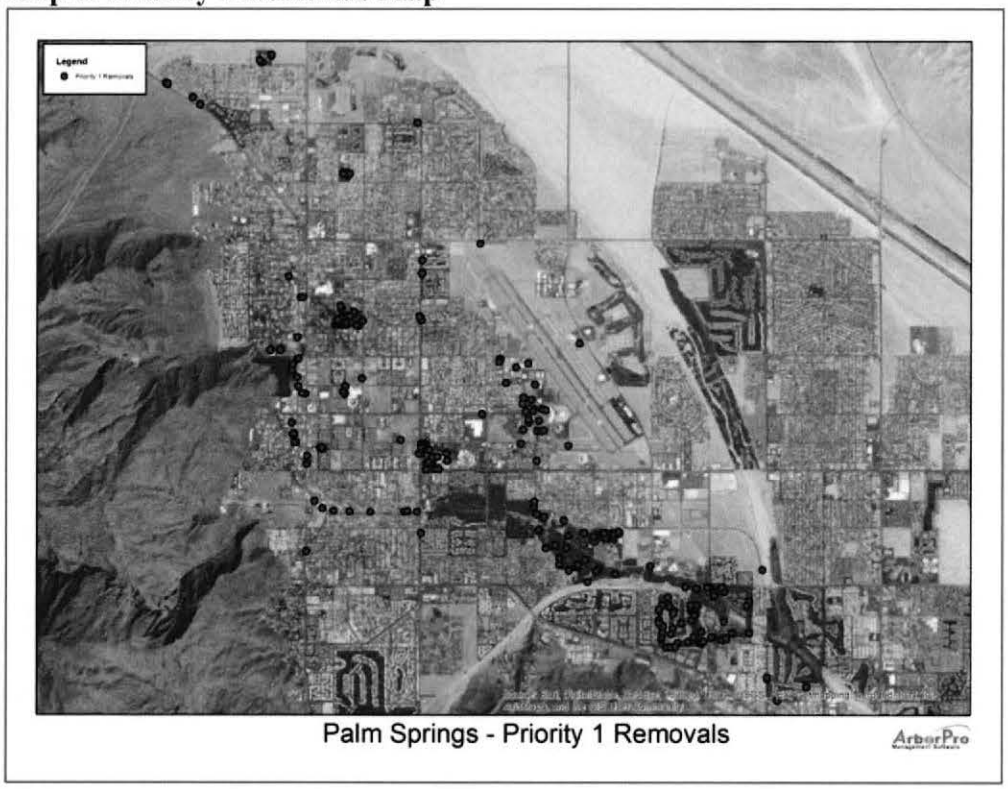
The trees that pose the most immediate threat to the City of Palm Springs are categorized as Category 1 Removals. The first phase of properly managing the City's tree inventory is to remove the trees in the Priority 1 Removal category. Utilizing the ArborPro software provided, city staff can produce a work order and map to generate an RFP and to create a work order to remove all Category 1 Removal trees. It is recommended that the City remove these trees as soon as possible to reduce liability. If the city is not able to fund the removal of all of the hazardous trees in one year, the city may consider a multi-year removal/replacement program, not to exceed three years. In a multi-year plan, the City should remove the most hazardous trees in year one and work their way through the list. ArborPro, Inc. strongly suggests that the program does not exceed a three year term. Removing all trees at one time, under one contract would provide the City with some cost savings.

The list of Category 1 removals is below:

City Zone	Property Name or Street	Tree Count
Airport	Kirk Douglas Way	1
Airport	Palm Springs Airport	8
Airport	Vista Chino E	1
Facilities	Boys & Girls Club	1
Facilities	City Hall	4
Facilities	City Yard	4
Facilities	Convention Center Parking Lot	1
Facilities	Jackie Lee Houston Plaza	3
Facilities	Mizell Senior Center	1
Facilities	Palm Springs Air Museum	1
Facilities	Palm Springs Public Library	11
Facilities	Plaza Raquet Club	1
Facilities	Police Department	5
Facilities	Sunrise Plaza	1
Parks	Baristo Park	3
Parks	Civic Drive LMD	1
Parks	Civic Drive N LMD	1
Parks	Demuth Park	18
Parks	Desert Healthcare (Wellness) Park	2
Parks	Desert Highland Park	4
Parks	Dog Park	2
Parks	Ruth Hardy Park	21
Parks	Sunrise Park	8
Parks	Tahquitz Creek Channel	7
Parks	Victoria Park	3
Streets	Arenas Road W	1

Streets	Baristo Road E	1
Streets	Baristo Road W	3
Streets	Belardo Road N	2
Streets	Chino Drive W	2
Streets	Dinah Shore Drive	1
Streets	El Cielo Road	4
Streets	Indian Canyon Drive N	1
Streets	Indian Canyon Drive S	2
Streets	Palm Canyon Drive N	11
Streets	Palm Canyon Drive S	4
Streets	Pso Azulejo	4
Streets	Riverside Drive N	1
Streets	San Rafael Drive E	1
Streets	Sunrise Way N	6
Streets	Sunrise Way S	2
Streets	Tachevah Drive E	2
Streets	Tahquitz Canyon Way E	1
Streets	Via Las Palmas N	1
Taquitz Creek Golf Resort	Resort Course	21
Taquitz Creek Golf Resort	Taquitz Creek Golf Resort	7
Taquitz Creek Golf Resort	The Legends Course	56

Map of Priority 1 Removals Map



Priority 1 Removals Species Frequency

It is important when analyzing the tree inventory data to determine which species are causing issues within the Urban Forest. Below is a frequency report by species of the Priority 1 Tree Removals.

Botanical Name	Common Name	Tree Count
Olea europaea	Olive	34
Pinus halepensis	Aleppo Pine	29
Washingtonia robusta	Mexican Fan Palm	27
Ceratonia siliqua	Carob	26
Prosopis alba 'Colorado'	Thornless Chilean Mesquite	23
Schinus molle	California Pepper	16
Chilopsis linearis	Desert Willow	10
Eucalyptus rudis	Desert Gum	9
Rhus lancea	African Sumac	9
Acacia smallii	Small's Acacia	7
Fraxinus uhdei	Shamel Ash	6
Jacaranda mimosifolia	Jacaranda	6
Eucalyptus camaldulensis	Red Gum	5
Parkinsonia florida	Blue Palo Verde	5
Ulmus parvifolia	Chinese Elm	5
Phoenix dactylifera	Date Palm	3
Prosopis alba	Argentine Mesquite	3
Washingtonia filifera	California Fan Palm	3
Brachychiton populneus	Bottle Tree	2
Ficus species	Ficus Species	2
Parkinsonia aculeata	Jerusalem Thorn	2
Pinus brutia var. eldarica	Afghan Pine	2
Schinus terebinthifolius	Brazilian Pepper	2
Tipuana tipu	Tipu	2
Eucalyptus sideroxylon	Red Ironbark	1
Ficus microcarpa 'Green Gem'	Green Gem Indian Laurel Fig	1
Fraxinus velutina	Arizona Ash	1
Grevillea robusta	Silk Oak	1
Pinus pinea	Italian Stone Pine	1
Platanus racemosa	California Sycamore	1
Populus fremontii	Fremont Cottonwood	1
Prosopis velutina	Velvet Mesquite	1
Thevetia peruviana	Yellow Oleander	1

Tree Pruning Program

Pruning is the most common tree maintenance procedure. Although forest trees grow quite well with only nature's pruning, landscape trees require a higher level of care to maintain their safety and aesthetics. Pruning should be done with an understanding of how the tree responds to each cut. Improper pruning can cause damage that will last for the life of the tree, or worse, shorten the tree's life.

Because each cut has the potential to change the growth of the tree, no branch should be removed without a reason. Common reasons for pruning are to remove dead branches, to remove crowded or rubbing limbs, and to eliminate hazards. Trees may also be pruned to increase light and air penetration to the inside of the tree's crown or to the landscape below. In most cases, mature trees are pruned as a corrective or preventive measure.

Routine thinning does not necessarily improve the health of a tree. Trees produce a dense crown of leaves to manufacture the sugar used as energy for growth and development. Removal of foliage through pruning can reduce growth and stored energy reserves. Heavy pruning can be a significant health stress for the tree.

Yet if people and trees are to coexist in an urban or suburban environment, then we sometimes have to modify the trees. City environments do not mimic natural forest conditions. Safety is a major concern. Also, we want trees to complement other landscape plantings and lawns. Proper pruning, with an understanding of tree biology, can maintain good tree health and structure while enhancing the aesthetic and economic values of our landscapes.

ArborPro, Inc. recommends that the City of Palm Springs deploy a routine tree trimming program based on a pre-determined grid system. Based on volume and efficiencies of maintaining the trees on a block by block basis the City will receive a fair price for the maintenance and be able to properly and efficiently manage the Urban Forest. Prior to the implementation of the routine tree trimming program we suggest that the City address the trees that have been recommended as Priority 1 Prunes. We have identified only 199 trees that fall into this category but they should be addressed in the near future. Based on recent local bid results we predict the cost for this maintenance will not exceed $30,000.

Palm Springs - Priority 1 Pruning

ArborPro Software

To maintain the integrity of the tree inventory, it is important that data be properly maintained and updated. When a tree is pruned, removed or planted, the information should be updated in the ArborPro tree management program. When preparing a contract for a tree management services, the City should include a provision requiring the company to update the ArborPro database.

Part 5
Tree Planting Recommendations

To have a healthy and functional urban forest, it is important to have the right trees planted in the right place. For example, it would not be appropriate to plant a tall growing redwood tree directly underneath utility lines. ArborPro, Inc. has developed a recommended planting palette to provide city staff with a guide to aid in the proper selection of a species that is appropriate to a particular planting site and its physical characteristics.

Recommended Species Characteristics

Not all existing species within the city meet the criteria for where they are located. Parkway size is commonly far too narrow and utility lines are a common conflict with tree canopy. One of the goals of this document is to offer a framework to city staff for selecting the correct tree for the site condition. In selecting a replacement species these conditions were evaluated as well as spread and canopy coverage, leaf and fruit litter.

Tree Planting Palette

In association with city staff and utilizing guidelines from the suggested from the Recommended Street Tree Book, ArborPro, Inc. has created a tree planting palette for the City of Palm Springs. ArborPro, Inc. suggests that this list remain dynamic. The benefits of alternate species and cultivars are discovered every year.

Botanical Name	Common Name	Parkway Size (in feet)	Plant Under Utilities
Acacia aneura	Mulga	4	No
Acacia constricta	White-thorn Acacia	4	No
Acacia salicina	Willow Acacia	4	No
Acacia smallii	Small's Acacia	4	No
Acacia stenophylla	Shoestring Acacia	4	No
Acacia willardiana	Palo Blanco	4	No
Afrocarpus gracilior	Fern Pine	5	No
Brachychiton populneus	Bottle Tree	4	No
Brahea armata	Mexican Blue Palm	3	No
Butia capitata	Pindo Palm	3	Yes
Caesalpinia cacalaco	Cascalote	4	Yes
Caesalpinia mexicana	Mexican Caesalpinia	4	Yes
Callistemon citrinus	Lemon Bottlebrush	4	No
Callistemon viminalis	Weeping Bottlebrush	4	No

Casuarina cunninghamiana	River She-Oak	7	No
Chilopsis linearis	Desert Willow	4	Yes
Chitalpa tashkentensis	Chitalpa	4	No
Corymbia citriodora	Lemon-Scented Gum	7	No
Corymbia maculata	Spotted Gum	7	No
Corymbia papuana	Ghost Gum	7	No
Cupaniopsis anacardioides	Carrotwood	5	Yes
Dalea spinosa	Desert Smoke Tree	4	Yes
Ebenopsis ebano	Texas Ebony		
Eucalyptus cornuta	Yate	5	No
Eucalyptus grandis	Flooded Gum	7	No
Eucalyptus leucoxylon	White Ironbark	5	No
Eucalyptus microtheca	Coolibah	5	No
Eucalyptus nicholii	Nichol's Willow-Leafed Peppermint	5	No
Eucalyptus polyanthemos	Silver Dollar Gum	5	No
Eucalyptus rudis	Desert Gum	5	No
Eucalyptus viminalis	Manna Gum	5	No
Ficus microcarpa 'Green Gem'	Green Gem Indian Laurel Fig	6	No
Fraxinus velutina	Arizona Ash	5	No
Fraxinus velutina 'Rio Grande'	Fan-Tex Ash	5	No
Koelreuteria elegans subsp. formosana	Formosa Flamegold	5	No
Koelreuteria bipinnata	Chinese Flame Tree	3	Yes
Lagerstroemia indica (and hybrids)	Crape Myrtle (including hybrids)	3	Yes
Lysiloma microphylla var. thornberi	Fern-of-the-Desert	3	Yes
Melaleuca quinquenervia	Cajeput Tree	5	Yes
Olea europaea 'Swan Hill'	Fruitless Olive	7	Yes
Olea europaea 'Skylark'	Dwarf Olive	7	Yes
Olneya tesota	Desert Ironwood	4	No
Parkinsonia aculeata	Jerusalem Thorn	5	No
Parkinsonia florida	Blue Palo Verde	5	No
Parkinsonia microphyllum	Foothill Palo Verde	5	No
Parkinsonia praecox	Palo Brea	5	No
Parkinsonia x 'Desert Museum'	Desert Museum Palo Verde	5	No
Parkinsonia x 'Sonora Emerald'	Sonora Emerald Palo Verde	5	No
Phoenix canariensis	Canary Island Date Palm	6	No
Phoenix dactylifera	Date Palm	4	No
Pinus eldarica	Afgan Pine	5	No
Pinus halepensis	Aleppo Pine	5	No

Pistacia chinensis	Chinese Pistache	5	Yes
Prosopis alba	Argentine Mesquite	4	No
Prosopis alba 'Colorado'	Thornless Chilean Mesquite	4	No
Prosopis chilensis	Chilean Mesquite	4	No
Prosopis glandulosa	Honey Mesquite	4	No
Prosopis velutina	Velvet Mesquite	4	No
Prunus caroliniana	Carolina Laurel Cherry	4	Yes
Pyrus calleryana 'Redspire'	Redspire Pear	5	No
Quercus fusiformis	Escarpment Live Oak	6	No
Quercus virginiana	Southern Live Oak	6	No
Quercus virginiana 'Heritage'	Heritage Southern Live Oak	6	No
Rhus lancea	African Sumac	4	Yes
Tipuana tipu	Tipu	5	Yes
Ulmus parvifolia	Chinese Elm	5	No
Ulmus parvifolia 'Drake'	Drake Chinese Elm	5	No
Ulmus pumila	Siberian Elm	5	No
Washingtonia filifera	California Fan Palm	4	No
Washingtonia filifera X robusta	Filibusta Palm	3	No
Washingtonia robusta	Mexican Fan Palm	3	No

The list above is organized by the size of parkway planting area. All of the above trees have been deemed to be appropriate in an urban planting situation, but offer unique characteristics. Some trees have showy flowers and others attract insects or wildlife. Some are evergreen, some are deciduous. Some trees provide edible fruit. All of a tree's characteristics should be taken into account during a tree planting situation, not just the amount of growing space.

Replacement Program

Utilizing the recommended planting palette, the city should continually replace trees that have been removed or have failed with new plantings in order to minimize the impact on the urban forest. ArborPro, Inc. recommends utilizing 24" box trees or larger for replacement plantings.

In fill Planting

The tree inventory identified 1,174 vacant sites which are potentially suitable for tree planting. We recommend that the city take a proactive approach to plant trees at these locations.

The City should always keep in mind that a major wind storm event, pest or disease can wipe out a large portion of the City's canopy at any time. Therefore, the city should

constantly fill vacant sites in anticipation of potential future canopy loss. It can take decades to replace the canopy of a mature tree. If trees are continually planted, the impact from a catastrophic loss of trees is diminished. ArborPro, Inc. recommends utilizing 24" box trees or larger for new plantings, but in special situations or with budget limitations, a 15 gallon planting or planting by seed may also be acceptable.

Community Outreach

Customer service is important to all companies and cities. ArborPro, Inc. recommends that a mailer or door hanger be distributed to properties located near a site where a tree is planned to be removed, pruned or planted. This step will take minimal effort and expense and almost always results in more satisfied customers (residents).

Young Tree Maintenance Program

Young trees require special maintenance. New tree plantings must be done in conjunction with a funded young tree maintenance program.

The most important maintenance performed on any tree takes place in the first 2-5 years. Trimming a young tree provides exponential benefits. Proper pruning of a young tree, utilizing International Society of Arboriculture standards, will promote a healthy growth and form. Many pruning activities performed by crews, on mature trees, is the result of neglect of young trees or poor past pruning techniques. With a little effort in the first 2-5 years a properly pruned tree will not require very much attention in the future. Young tree maintenance is a very inexpensive activity and will save the city thousands of dollars in future maintenance and potential liability.

New plantings typically require several years of regular watering for the tree to properly establish. Irrigation systems or a program for hand watering should be established for the first several years after a tree is planted. ArborPro Inc. recommends recruiting nearby residents to assist with the watering needs of a new tree. Residents are often very willing to help water because new trees ultimately improve the appearance of their property and their streetscape.

Tree Planting Funding Sources

Grant opportunities arise periodically that will fund tree planting activities. Over the past several years, CAL FIRE grants have funded numerous planting efforts. Palm Springs should submit a grant application to plant trees on the vacant planting sites identified in the tree inventory. Having specific locations identified is a desirable characteristic in a tree planting grant application.

The City may also be able to fund new tree plantings by simply working with local community groups. Many organizations will donate time and money to support local tree planting efforts. The City should approach local non-profit organizations and neighborhood groups with a plan for small community based tree planting events.

ArborPro Software

To maintain the integrity of the tree inventory, it is important that data be properly maintained and updated. When a tree is pruned, removed or planted, the information should be updated in the ArborPro tree management program. When preparing a contract for a tree management services, the City should include a provision requiring the company to update the ArborPro database.

Part 6
Construction Management

Capital projects or private developments often conflict with existing mature trees. Proper management and protection of existing trees is important when conducted in conjunction with a development project.

ArborPro, Inc. recommends that a Certified Arborist be consulted when any grading, paving or other construction work is to be conducted within the canopy of an existing mature tree. Some species will be incompatible with a construction project. A Certified Arborist can determine whether it is appropriate to preserve the tree and if so, can provide recommendations for adequately protecting it during construction. Consultation should be done during the design phase, if possible.

Appendices

A. Summary of Recommendations
B. I-Tree Reports

Appendix A

Summary of Recommendations

Tree Maintenance Recommendations

1) Address Priority 1 Tree Removals during the first year, if financially feasible. If not financially feasible, prepare a multi-year removal strategy that does not exceed three years.

2) Address Priority 1 Prunes during the first year.

3) Deploy a routine tree trimming program based on a pre-determined grid system.

4) Perform routine tree pruning on a four year cycle.

5) When preparing a contract for tree management services, include a provision requiring the tree company to update the ArborPro software database.

Tree Planting Recommendations

1) When selecting a tree to plant, refer to the recommended planting palette. Review all features of the tree to select the right species for the right place.

2) Utilize the recommended planting palette to continually replace trees that have been removed or have failed.

3) Plant trees utilizing 24" box trees or larger, when feasible.

4) Distribute a mailer or door hanger to properties nearby the site of a planned tree removal, pruning or planting.

5) Integrate a young tree maintenance program into all new planting projects.

6) Perform young pruning during the first 2-5 years after planting.

7) Install irrigation systems or implement a hand watering program for the first three years after a tree is planted.

8) Contact nearby residents to ask for assistance with watering new trees.

9) Apply for grants that will pay for tree planting on the vacant sites identified in the tree inventory.

10) Contact local non-profit organizations and neighborhood groups to collaborate on small community based tree planting events.

11) When preparing a contract for tree management services, include a provision requiring the tree company to update the ArborPro software database.

12) Update the planting palette periodically with the best performing species and cultivars.

Construction Management

1) Consult with a Certified Arborist whenever a construction project will require paving or grading within the canopy of an existing mature tree. Consultation is recommended to take place during the design phase, when feasible.

Appendix B
I-Tree Reports

Stored CO2 Benefits of Public Trees by Zone

Zone	Total stored CO2 (lbs)	Total ($)	Standard Error	% of Total Tree Numbers	% of Total $	Avg. $/tree
Streets	3,877,849.02	29,083.87	(N/A)	38.03	26.90	5.54
Parks	3,879,272.61	29,094.54	(N/A)	18.13	26.91	11.62
Facilities	2,640,618.44	19,804.64	(N/A)	17.06	15.38	7.06
Airport	946,822.42	7,101.17	(N/A)	8.90	6.57	5.78
Taquitz Creek Golf R	3,070,094.46	23,025.71	(N/A)	14.75	21.30	11.30
Citywide total	14,414,656.95	108,109.93	(N/A)	100.00	100.00	7.83

Annual Stormwater Benefits of Public Trees by Zone

Zone	Total rainfall interception(Gal)	Total ($)	Standard Error	% of Total Tree Numbers	% of Total $	Avg. $/tree
Streets	1,518,487.80	7,288.74	(N/A)	38.03	22.06	1.39
Parks	2,053,895.21	9,858.70	(N/A)	18.13	29.84	3.94
Facilities	1,367,982.16	6,566.30	(N/A)	17.06	16.70	2.34
Airport	460,556.23	2,210.67	(N/A)	8.90	6.69	1.80
Taquitz Creek Golf R	1,481,261.81	7,110.06	(N/A)	14.75	21.52	3.49
Citywide total	6,882,183.21	33,034.48	(N/A)	100.00	100.00	2.39

Annual CO2 Benefits of Public Trees by Zone

Zone	Sequestered (lb)	Sequestered ($)	Decomposition Release(lb)	Maintenance Release (lb)	Total Release ($)	Avoided (lb)	Avoided ($)	Net Total (lb)	Total ($)	% of Total Tree Numbers	% of Total $	Avg. $/tree
Streets	162,508.67	1,218.82	- 31,022.79	- 4,428.72	- 33.22	315,303.02	2,364.77	442,360.17	3,317.70	38.03	26.97	0.63
Parks	176,612.02	1,324.59	- 31,034.18	- 2,577.20	- 19.33	302,961.08	2,272.21	445,961.71	3,344.71	18.13	27.19	1.34
Facilities	122,702.56	920.28	- 17,736.58	- 2,071.78	- 15.54	180,341.57	1,352.56	266,563.77	1,999.23	17.06	16.25	0.85
Airport	48,049.04	360.37	- 7,574.58	- 960.16	- 7.20	95,517.25	716.38	135,031.55	1,012.74	8.90	8.23	0.82
Taquitz Creek Golf R	110,192.41	826.44	- 24,560.76	- 2,018.16	- 15.14	220,558.48	1,654.19	304,171.98	2,281.29	14.75	18.54	1.12
Citywide Total	620,065.40	4,650.49	- 115,317.26	- 12,473.59	- 93.55	1,147,973.69	8,609.80	1,640,248.24	12,301.86	100.00	100.00	0.89

Annual Aesthetic/Other Benefit of Public Trees by Zone					
Zone	Total ($)	Standard Error	% of Total Tree Numbers	% of Total ($)	Avg $/tree
Streets	80,186.13	(N/A)	38.03	26.07	15.26
Parks	89,476.13	(N/A)	18.13	29.09	35.73
Facilities	61,308.79	(N/A)	17.06	17.13	22.36
Airport	24,197.70	(N/A)	8.90	7.87	19.69
Taquitz Creek Golf R	52,403.60	(N/A)	14.75	17.04	25.73
Citywide Total	307,572.35	(N/A)	100.00	100.00	22.27