

# Urban Forest Resource Analysis



Prepared for:  
**City Of Sparks Parks and Recreation**  
98 Richards Way  
Sparks, Nevada 89431



Prepared by:  
**Stantec Consulting Services, Inc.**  
6980 Sierra Center Parkway, Suite 100  
Reno, Nevada 89511

in conjunction with:  
**Dale Carlon Consulting, LLC**

## INTRODUCTION

In 2010 the City of Sparks obtained a grant from the Nevada Division of Forestry Urban Forestry Program to conduct public tree inventories, which was signed by Mayor Martini in February 2010. The purpose of the inventories was to develop data for the City to use in analyzing the tree canopy for a number of attributes including species, size, condition, maintenance needs, geographic location and benefit/cost.

The Phase 1 Tree Inventory started November 18, 2010 on Victorian Avenue to inventory all City-owned trees from Victorian Avenue north to Oddie Blvd., and from EL Rancho Blvd. east to McCarran Blvd. Included were all the trees in City parks, around City buildings, in medians, and in parkway strips in all the older sections of Sparks. The inventory was conducted by Dale Carlon using the i-Tree program. The caliper of tree is measured based on diameter at breast height or (DBH) and is approximately 4.5 feet above the ground. The assessment was completed August 3, 2011.

Later in 2011 the team of Stantec and Dale Carlon Consulting was awarded the Phase 2 Tree Inventory. This work involved an inventory of all remaining trees on City property to include the Truckee River bike path, all new parks, and all new medians. Phase 2 started November 9, 2011 and was completed December 6, 2012 also using the i-Tree program. The data collected in Phase 1 and Phase 2 was used to develop aerial maps that show every inventoried tree and also summarize attributes for the City of Sparks to use in their maintenance program.

Upon completion of the Phase 2 Inventory, Stantec and Dale Carlon Consulting developed this report and analysis of the current structure, function, and value of this tree resource using the inventory data in conjunction with i-Tree benefit/cost modeling software. Our report also contains the replacement values for the trees inventoried, which is calculated by taking the cost of installing a tree of the same species and multiplying by cost per caliper inch. This tree appraisal methodology is based on the Council Of Tree and Landscape Appraisers.



# Grant Breakdown

<b>Total Grant</b>	<b>\$80,000</b>
<b>Personnel/Labor</b>	
Total	\$0.00
<b>Travel</b>	
Total	\$0.00
<b>Operation/Supplies</b>	
Operating Supplies	
ISA Arborist Training	\$500
Palm Pilot	\$500
Nursery Plant	\$3,000
Total	\$4,000
<b>Contractual (Sub-contract)</b>	
Tree Inventory	\$40,000
ISA Arborist	\$8,500
Tree Trimming	\$27,500
Total	\$76,000
<b>Other (to include training)</b>	
Total	\$0.00
<b>Indirect Total (0.05%)</b>	
<b>Grant Total</b>	<b>\$80,000</b>
<b>Balance</b>	<b>\$0.00</b>

Urban Forest Resource Analysis

Utilizing funding from the grant, two Sparks employees were sent to arborist training, one has his certification and one is still working toward his certification. The city also purchased 25 large trees that were planted throughout our parks system. In addition, two Tree care companies, Tree Tenders and American Arborists, performed the removals and trimming of the critical concerns in Phase 1 of the inventory equating to \$27,000.00 worth of tree work done under contract.



## PHASE 1 INVENTORY

In addition to the data collected as described above, the first tree assessment inventory documented spaces that would be available for future tree planting. These sites are identified in the tree information section under species as available cut out plant space, or AVCUT. Also included under the 'maintenance required' tab are trees of critical concern, these trees were later managed in a request for proposal sent out to local tree trimming companies. A large percentage of the trees inventoried in this phase were large trees planted in the parkway strips in the older section of Sparks, many being planted in the early 1900s.

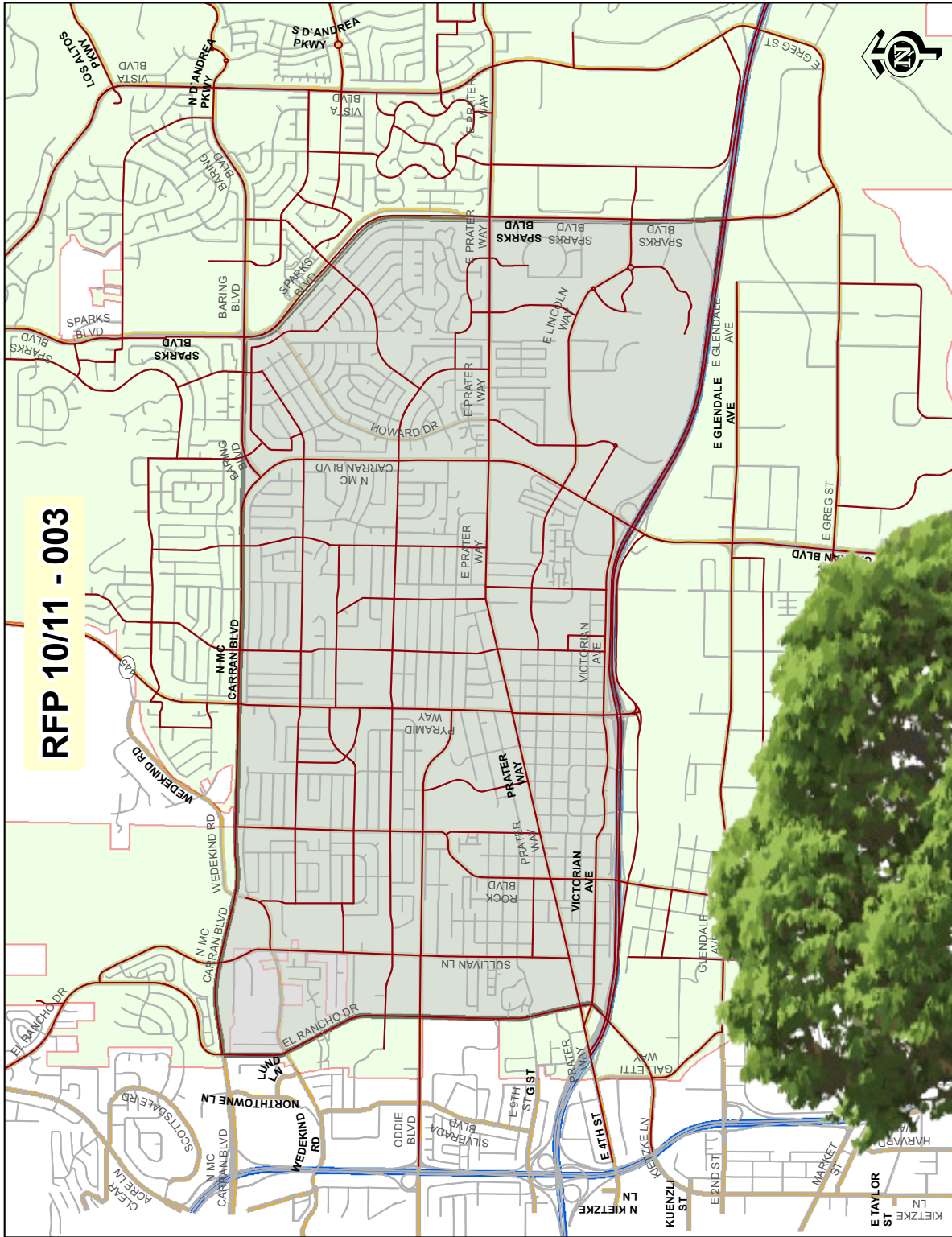
There were 2,161 trees inventoried in the first phase. Analysis of the species distribution shows a relatively balanced forest. Cottonwood and Siberian Elm comprised 25.4% while Oaks maintain 17.9%, Honey Locust 15.4%, Pear 14.1% with Plum, Apple, Pine, Ash and Locust fill the remaining 27.2%. The relative size distribution of the top 10 species shows that 24% of the London Planetrees are over 100 inches in diameter. Approximately 40% of the Pear trees in Sparks are between the sizes of 6 to 12 inches in diameter. About 20% of the Green Ash in Sparks are between 6 to 12 inches in diameter. Citywide totals show us that the majority of the trees in Sparks are 18% between the sizes of 12 inches to 18 inches in diameter, again demonstrating the relatively young age of the Sparks forest. *The annual benefits of the public trees in sparks inventoried in the first phase totals \$89,579:*

- Energy savings totaled \$26,798.
- Carbon dioxide sequestration totaled \$2,468.
- Air quality improvement totaled \$3,788.
- Stormwater sequestration totaled \$10,883.
- Aesthetic benefits totaled \$45,642.

The replacement value for the trees inventoried in the first phase totals \$23,780,270.



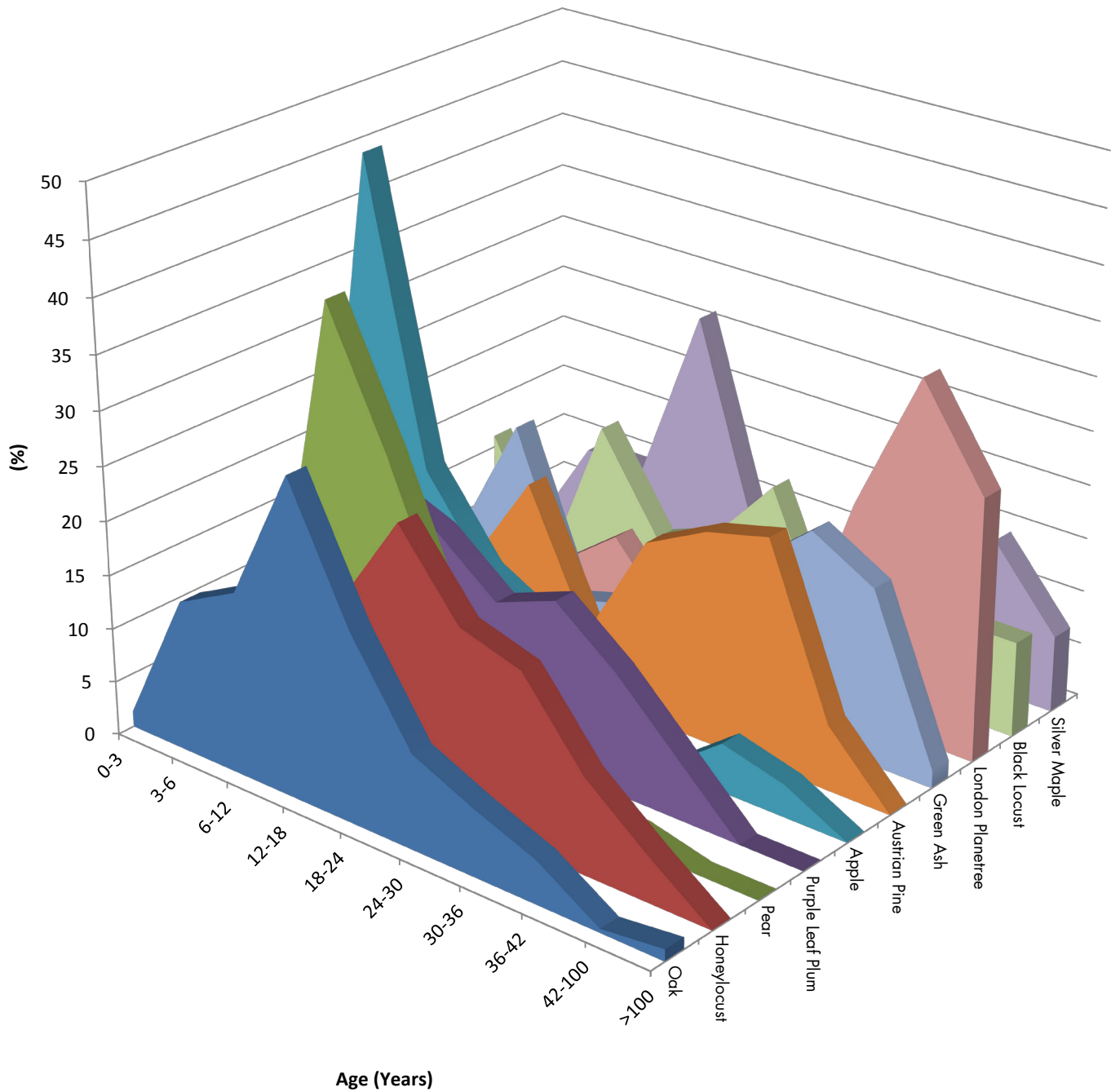
# PHASE 1 INVENTORY AREA



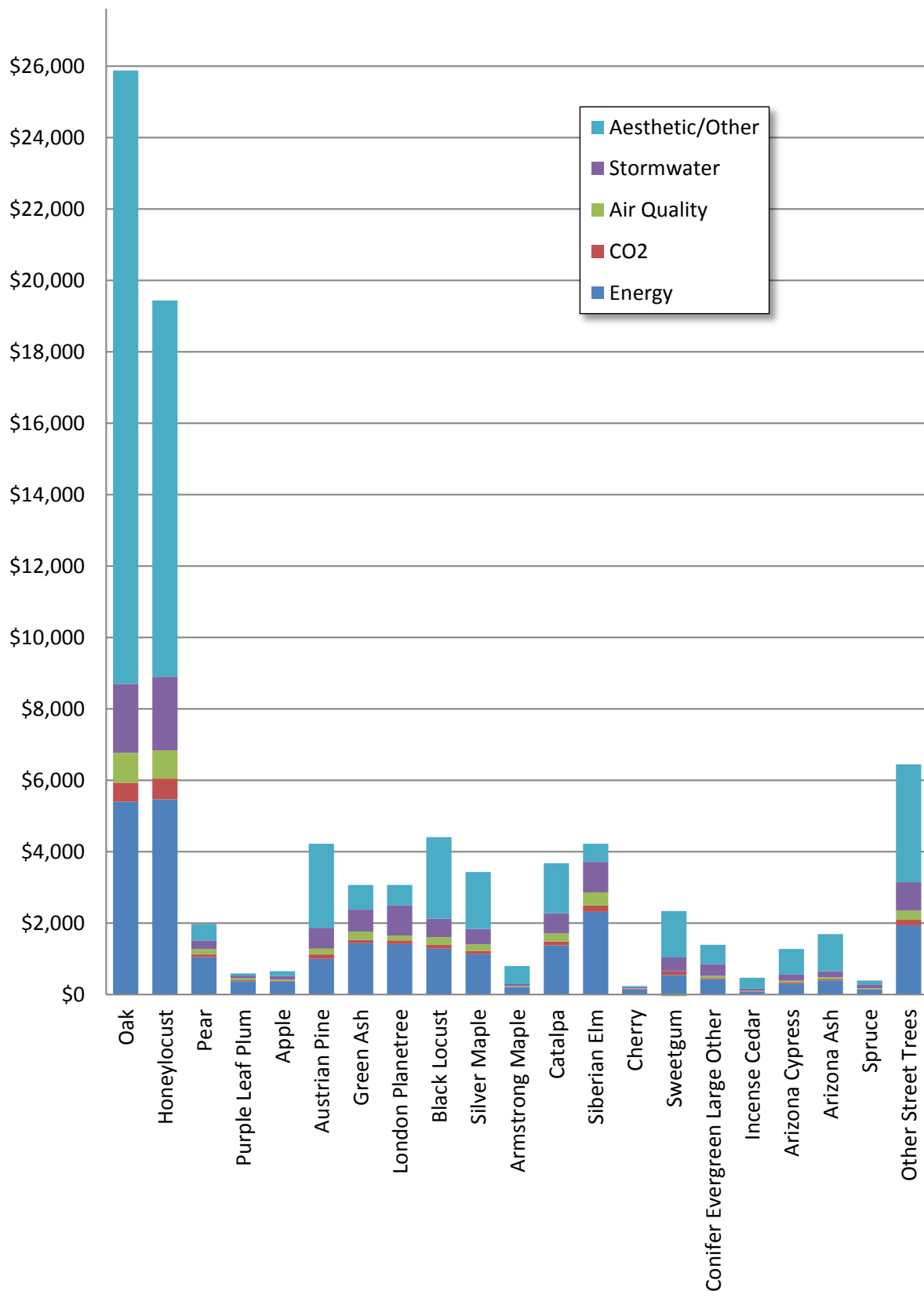
Urban Forest Resource Analysis



PHASE 1 INVENTORY:  
Relative Age Distribution of Top 10 Public Tree Species (%)



PHASE 1 INVENTORY:  
Total Annual Benefits of Public Trees by Species



## PHASE 2 INVENTORY

The Phase 2 Inventory totaled 5,620 trees. The majority of the trees in this inventory were considerably younger than Phase 1 as they were planted in recently constructed parks and medians throughout the City. The largest percentage of trees identified by the species distribution chart is the Austrian pine at 19%. Since these trees are susceptible to pine pitch moth and borers, City park planners should consider planting other species of pine like Western White Pine to avoid future infestation. The annual benefits of the trees inventoried in Phase 2 totals \$308,126:

- Energy savings totaled \$120,181.
- Carbon dioxide sequestration totaled \$1,926.
- Air quality improvement totaled \$2,344.
- Stormwater sequestration totaled \$51,486.
- Aesthetic benefits totaled \$132,189.

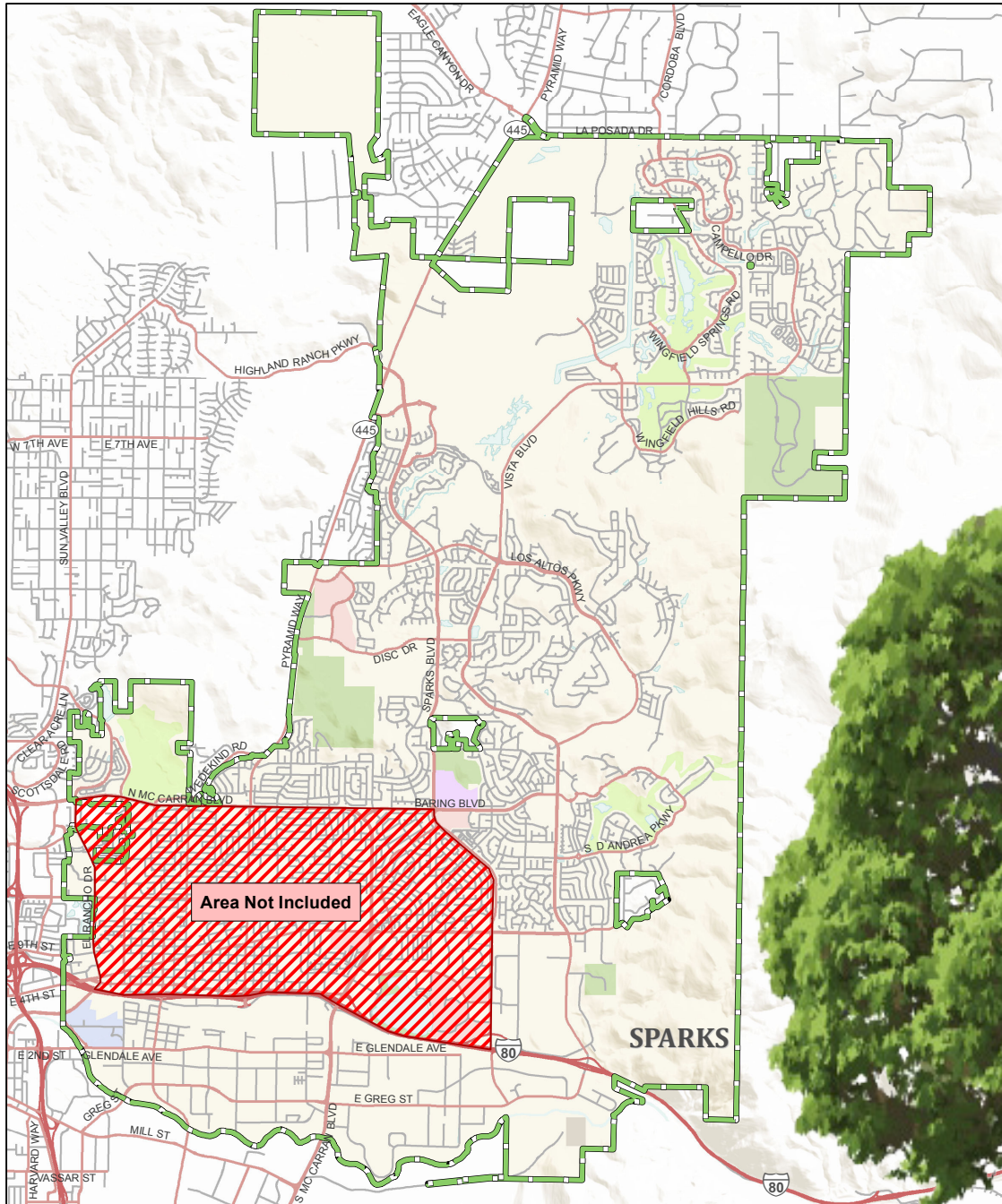
The replacement value for the trees inventoried in the second phase totals \$49,742,876.





# PHASE 2 INVENTORY AREA

RFP 10/11 - 003



Urban Forest Resource Analysis



DATE: MARCH 2011

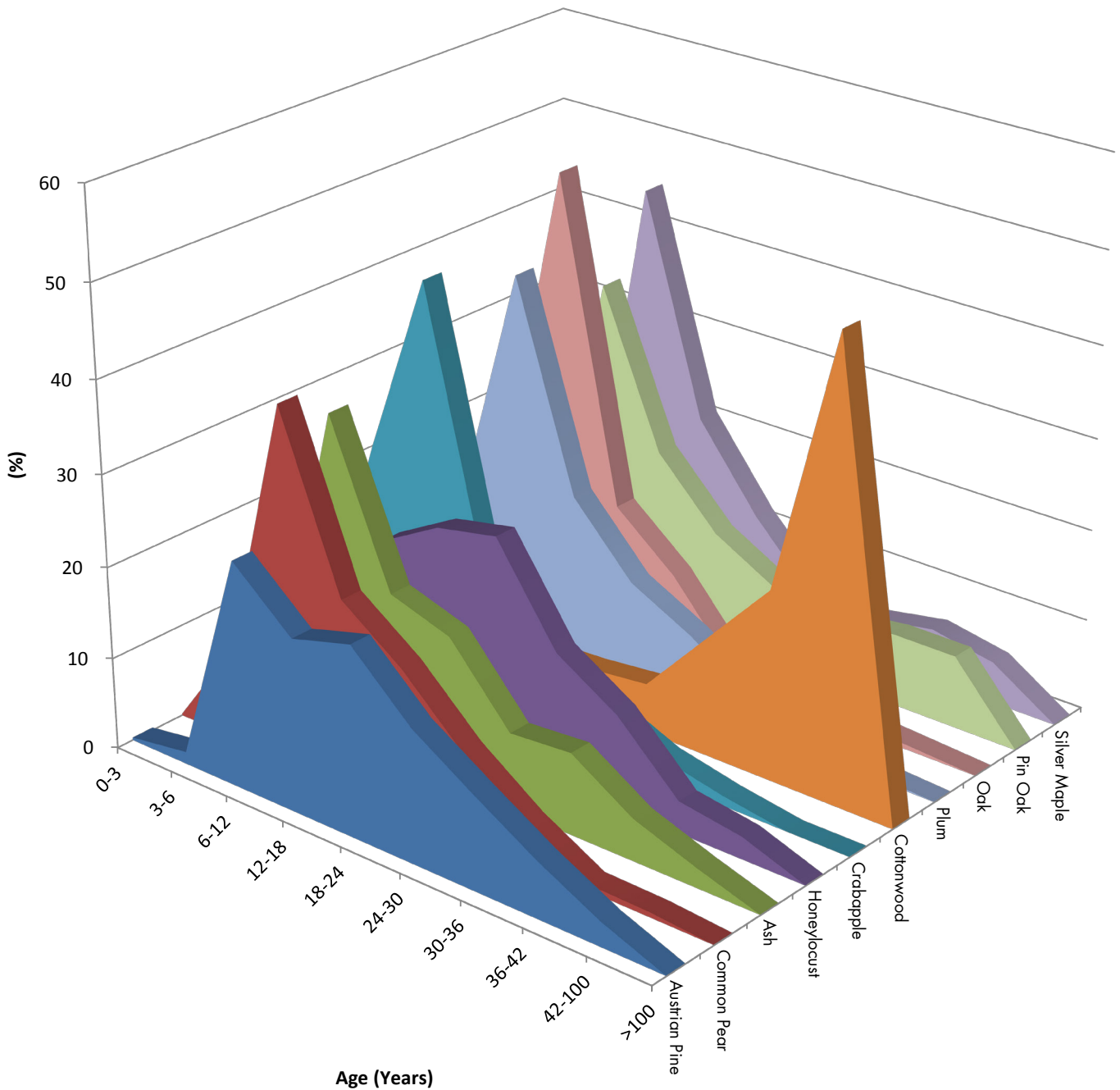
**NORTH**

NOTE: The scale and configuration of all information shown hereon are approximate only and are NOT intended as a guide for design or survey work. Reproduction is NOT permitted without prior written permission from the City of Sparks Geospatial Technologies Office.

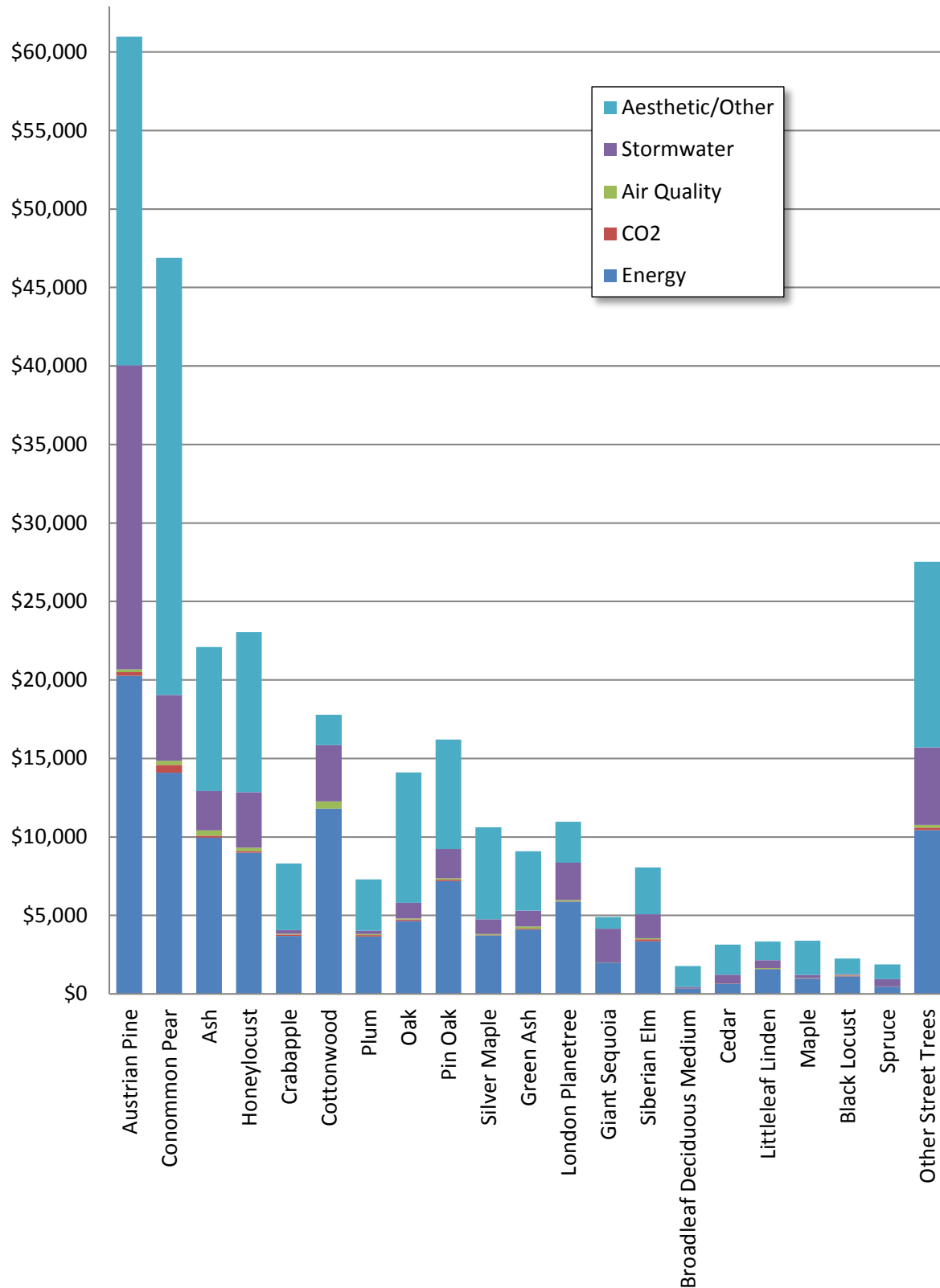
City of Sparks  
GT Office

FILE: G:\Adam\MXDs\RFP 10-11 - 003.mxd

PHASE 2 INVENTORY:  
Relative Age Distribution of Top 10 Public Tree Species (%)



PHASE 2 INVENTORY:  
Total Annual Benefits of Public Trees by Species (\$)



## SUMMARY

The combined number of trees, annual benefits and replacement value for phase 1 and phase 2 are as follows:

- Total number of trees: 7,781
- Total annual benefits: \$397,705
- Total replacement value: \$73,523,146

The urban forest in the City of Sparks plays an important role in the community's quality of life. Research has shown that healthy urban trees improve local environments and reduce the ill effects of urbanization in a number of ways. Not only do trees improve air quality by manufacturing oxygen, they also act as filters reducing particulate matter. The shade urban trees produce reduces energy consumption by shading structures and reducing the overall rise in temperature created through urban heat island effects. Urban trees can also reduce the amount of maintenance required on City streets by providing shade and lowering pavement temperatures. Trees sequester stormwater runoff, easing the burden on water treatment facilities and reducing the amount of particulate flowing into waterways including the Truckee River. Trees have been proven to increase the value of local real estate by 7 to 10% as well as promoting shopping, retail sales and tourism.

Trees support a more livable community, fostering physiological health and providing residents with a greater sense of place. Community trees, both public and private, soften the urban hardscape by providing a green sanctuary and making Sparks a more enjoyable place to live, work, and play. The City's 7,781 public trees play a prominent role in the urban forest benefits afforded to the community, and the citizens rely on the City of Sparks to protect and maintain this vital resource.

The data collected in Phase 1 and Phase 2 has been converted to aerial maps that show every inventoried tree and its description. These maps, in conjunction with the provided software, will enable Sparks maintenance staff to better manage this critical resource. By utilizing the information gleaned from the inventory, maintenance crews will be able to prioritize and document work required. New planting sites and the correct species for that site can be identified through the reports as well.



## BENEFITS TO COSTS

Most importantly, the i-Tree program has the ability to calculate in real dollars and cents the monetary value of the Sparks urban forest. This provides the maintenance staff with the tools they need to justify dollars to maintain the City's investment in the urban forest.

We used the i-Tree program to conduct benefit to cost and other economic evaluations of the trees inventoried using annual management budget and expenditure data for the urban forestry program. The following year 2013 data was obtained from the City of Sparks:

- Population in January 2013 was 92,302
- Total municipal budget was \$55 million
- Total land area square miles was 35.81
- The average width of the City's sidewalks is 4 feet
- There are 308 linear miles of streets averaging 38 feet wide

In 2012 the City had the following annual management costs for the Urban Forestry program which includes trees in Phase 1 and 2:

- Annual planting budget of \$12,064
- Annual pruning cost \$31,276
- Annual tree removal cost was \$43,200
- Pest and disease control cost \$1,500
- Irrigation cost \$5,600
- The average price for repair of infrastructure damage was \$3,504
- Other annual expenditures amounted \$2,500

This brings the total annual management expenditures for public trees in 2012 to \$99,644, which calculates to \$38.27 per tree and \$1.08 per citizen.



The two largest expenditures noted in the Urban Forestry Program annual management costs were contract pruning for \$31,276 and removal for \$43,200 totaling \$74,476.

Purchasing and planting replacement trees totaled \$12,064.

The \$99,644 was spent in 2012 to maintain the trees in both Phase 1 and 2 Inventories. The cost benefit analysis as calculated by i-Tree for the both inventories is as follows:

**PHASES 1 & 2 COMBINED**

Total trees: 7,781

Total population: 92,302

**Benefits:**

Total benefits: \$397,706

Per tree benefits: \$51.11

Per capita benefits: \$4.31

**Maintenance Costs:**

Total costs: \$112,158

Total per tree costs: \$14.41

Total per capita costs: \$1.21

**Net Benefits:**

Total net benefits: \$285,548

Per tree net benefits: \$36.70

Per capita net benefits: \$3.09

**Total Benefit to Cost Ratio: \$3.56**



**For every dollar the City of Sparks invests in the trees inventoried, it receives \$3.56 worth of benefit.**