PLANNING AND FINANCING FUTURE URBAN FORESTS
- A Capital Asset Hybrid Proposal

Prepared by Kenneth A. Knight, AICP, Certified Arborist, Certified Urban Forester
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EXECUTIVE SUMMARY

The long term cost-benefits of urban forests justify their management as an essential element of urban infrastructure. However, because trees are not classified as capital assets in formal governmental accounting procedures, most jurisdictions do not provide adequate long-term financing for trees as they would other infrastructure such as roads, buildings, and other capital items. This paper suggests a long term financing program that mimics a capital improvement program, and thus provides an alternative tool for long term urban forest management. The tree capital hybrid program is composed of similar elements of a capital improvement program; including cost benefit analysis of trees using models such as I-Tree/STRATUM, long-term General Plans*, tree replacement and protection policies and ordinances, revolving funds, and most important, a vision of the urban forest of the future. The trees in a Capital Asset Hybrid program postulate trees functioning as capital assets without being officially labeled as such. Elected officials would have the same capability of revising long term urban forest plans as they do other capital plans and programs. The proposed process does put urban forests on an equal footing with other public capital facilities. (* The general plan describes a community's development goals and policies, and provides a basis for land use decisions by the planning commission and the city council or board of supervisors. The general plan establishes standards for population density, building intensity, land uses, transportation, and polices for protection of natural resources and public safety. It provides a basis for regulatory and budgetary actions, as well as the zoning and subdivision ordinances and a capital improvements program)

The City of Goleta Case Study involved an existing public street and park tree inventory of 9,855 trees with an additional 5,238 new trees to be added for a total projection of 15,093 trees at buildout. The Goleta urban forest is in a temperate, semi-arid climate with low energy efficiency opportunities, native trees with high negative air quality impacts, and high maintenance costs. The proposed future urban forest program has a cost benefit ratio of 1.18 which anticipates a net cost saving over 20 years of $156,013. A more aggressive tree planting program would likely provide even greater net benefits.
Key words – Urban forest, General Plan, STRATUM, I-Tree

INTRODUCTION

Many public urban forest managers spend their time managing the costs rather than the benefits of their urban forest. Staying within an allocated budget is a requirement for job security. However, the goal of a healthy and expanding urban forest is financially feasible with a benefits based approach as well. The benefits of urban street trees can be quantified and their values increase as they age. The benefits of urban trees are usually greater than the cost of managing them. Public trees can be managed similar to capital assets to maximize their long-term benefits. Maximizing the benefits of the urban forest requires long term commitments by local governments.

Changing the number and type of trees with an urban forest inventory is similar to steering the Titanic. By the time you know what is going to hurt you, it may be too late to change course. But everything we know right now points in the direction of global warming and the need for more large trees to provide ongoing environmental benefits and carbon sequestration

Most analysis of urban forests start with an inventory, factor in trends and make projections. This study starts with the desirable end state along with the projected results of current inventory, analyzes the future costs and benefits, and then calculates annual costs and benefits from the future to the present. Then proposed annual incremental program actions are developed to establish permanent ongoing financing that is required to achieve the desired end state.***

Trees generally have long lives, which is part of the definition of a capital asset. But unlike other types of capital assets, they appreciate in value over time instead of losing value (depreciating). In the language of accountants, trees are seen as a 'free good' that can't be depreciated.

Many urban foresters anticipated that implementation of Government accounting Standards Board Rule 34 (GASB 34) would assist in getting trees accounted for as capital assets. In summary, GASB 34 requires local governments to account for capital assets in their formal financial statements. Public agencies, like private industry, are now required to accurately account for their capital inventory in order to comply with generally accepted accounting standards.

Unfortunately the accountants who designed GASB 34 also refused to recognize trees as capital assets. They are considered to be 'free goods' that can't be converted to spendable cash. Thus most jurisdictions still do not list trees in their official financial statement. If they are listed in a financial statement, such as in Norfolk VA, the value of the inventory is defined according to accounting standards as the value of the tree when it is first planted. The total value of the Norfolk VA inventory in the financial statement is thus around $12,000, although other methods place the value in the millions.

The formal Financial Statement of a governmental jurisdiction is important because it is the document that bonding companies use to identify the financial capacity of a government to support long term bonds for capital improvement purposes. Among other considerations, usually the larger and more valuable a government's capital resources are, the greater the likelihood that the community can support long term financing to expand and improve capital facilities.

A tree is a long term public asset that must be managed to achieve maximum benefits and optimize its useful lifespan. Most capital improvement programs do not recognize trees as capital assets. Some jurisdictions list trees in their capital improvement programs with non-capital funding appropriated from General Funds and grants. This financing is generally secured with an annual vote to continue appropriations over the life of the capital program, assuming the elected officials who originally supported the budget proposals are still in office. There are no known capital programs with trees financed with permanent ongoing funding. This study proposes that with a little creative thinking, a tree can be treated similar to a capital asset in a capital improvement program if part of a formal legal and financial structure related to the community's General Plan.

Rather than attempting to argue that trees are a capital asset in accounting terms, this report proposes a process that copies capital budgeting programs when referring to trees. Thus trees may not be labeled as capital assets by accountants, but if we can create a financial process where trees are treated almost exactly as capital assets, then we have successfully created a capital hybrid.

A PROPOSED PROCESS

This study shows how a capital hybrid program can be implemented within the City of Goleta (which is still developing their initial urban forestry program), as well as in other jurisdictions across the country

As part of the proposed process, we suggest communities start with developing guidelines for establishing urban forest standards including those listed below:.

- Vision – Each resident should feel like they are living within a park
- Canopy coverage – Increase anywhere from current estimated 10% to 20%
- Air quality attainment level – improved air quality will help offset atmospheric impacts of industry and growth
- Stormwater management - recharge groundwater basins
- Energy efficiency - reduce/avoid increases in energy usage through shade of habitable structures
- Aesthetics, maintain high property values
- Longevity - plant a majority (60 %+) of new trees with a very long, useful lifespan
- Safety - reduce weak limbed trees to areas of low human contact, remove from streets
- Views - maintain view corridors, but establish that public trees are a view
- Sustainability – 90% of new trees to require minimal supplemental watering and ongoing care once established
- Native tree policy – use local genomes whenever possible, although climate suitable species okay as long as they do not present hybridization issues in environmentally sensitive habitat areas
- Partnerships - allocate resources to work with non-profit organizations

- Maintenance – meets American National Standards Institute (ANSI) standards

1. Urban Forest Vision Statement

The starting point for the urban forest of the future is the vision statement, regardless of the quality or even the existence of the current urban forest.

2. General Plan Urban Forest Policies

The functions of the future urban forest should be addressed, including canopy coverage (shade), desired benefits to air quality, stormwater management, energy efficiency, aesthetics, longevity, safety, views and sustainability in relation to allocated resources for planting, maintenance, and renewal. These policies will help identify the desired number of trees, types of species, and age composition of the future urban forest 25 years from now at the potential buildout of a community's General Land Use Plan. Suggested Urban Forest polices to be adopted by ordinance and related to City's Urban Forest Management Plan include:

- Equal treatment policy-trees receive equal treatment in relation to other public infrastructure
- Healthy Public Tree Protection Policy-healthy public trees will continue to be maintained. Exceptions include entire tree presenting a high safety risk, and non city recognized trees, i.e. not appearing on the city's inventory
- Tree Replacement policy – i.e. a new tree is planted to replace each tree lost.
- Mortality Rates – anticipated street tree life by species, new tree mortality rates
- Maximum environmental Benefit Policy- tree species preferred that provide greatest leaf space, i.e. crown spread and density
- Cost-Benefit Planting goals – long term benefits of tree exceeds long term costs.
- Standard Tree Protection Ordinances-see TREEORD, current State Government Codes, utility codes
- Tree renewal. – tree replacement policy

A critical element in preparing for a future urban forest is an equal treatment policy that requires public urban trees to be given equal consideration in regard of other urban infrastructure such as roads, viewsheds, and lighting. Equal treatment is appropriate as public trees are not only compatible with other elements of urban infrastructure; they also compliment and provide beneficial services when maintained over time. For example, research studies have shown that canopy-covered streets help prolong the surface life of asphalt streets by slowing the rate of surface oil evaporation.

Equal consideration does not mean preferential treatment, it simply means that the benefits and costs of urban trees be considered in the design and implementation of public infrastructure. For example, in designing a road, the typical section should include adequate cubic volume for tree roots to grow

underneath paved surfaces without compromising the pavement at a future date, rather than simply cutting a hole in a concrete sidewalk and inserting a tree that may be removed well before its time due to pavement issues. Adoption of an equal treatment policy will also assist public staff not connected with trees to look for tree siting opportunities.

A second policy necessary for the long term stewardship of urban forest is the protection of healthy public trees. Members of the public are continually clamoring for removal of public trees for a myriad of reasons ranging from annoyance with litter, blocking views, preference for a different tree, etc. A statement in the General Plan that a tree (or at least a public tree) is considered part of a view would assist in resolving many viewshed issues.

A third policy necessary for sustaining the urban forest is a tree replacement policy. Simply stated, for every tree that dies, a new one will be planted within one year. This policy does not deal with equals, i.e. replacing a one hundred year old oak with a 15 gallon new tree. It simply recognizes that trees are living plants that will eventually die. Replacement should take place quickly to sustain the current population and to make progress towards increasing overall tree populations. Tree mortality is defined as any cause for the death of the tree, including lack of or too much water during establishment phase, disease, insect and animal damage, vandalism, accidents, among others. Based on experience of species and planting procedures, tree mortality rates can be estimated and replacements planned.

Tree Replacement Policy--A policy statement by the local governing body that

-dedicates funds for replacement costs
-defines eligible replacement costs
-establishes a structure for the accumulation of resources dedicated to replacement costs
-recovers full tree value remuneration for all trees lost due to accidents or vandalism.

Also part of tree planting vision is to plant for species that result in the highest net benefits, which in many cases is similar to maximum environmental impact. While a rich diversity of trees adds vitality and interest to a community, scientific observations show that large trees which maximize leaf space can promote the most positive impact on the environment. The benefit from these trees can be quantified, so that tree species with the highest net cost benefit ratio should be planted. Tree species lists that promote large broad leafed trees are essential for maximum environmental benefit. A corollary to a decision to plant for highest benefits is that if a decision is made to plant a species with a lower net benefit/cost ratio, then the funds have to be allocated to support it.

A maximum healthy benefit tree selection process also indicates that palms should not be planted as part of an urban forest strategy. Palms are technically not woody trees, but actually belong to the grass family. Palms do not provide the environmental benefit of woody trees and do not rate high on cost benefit charts. While existing palms would not be influenced by this policy, nor

would palms planted on private property, this policy would promote broad leaved trees which can provide a much better investment of public resources.

A new issue developing is coordinating the energy conservation potential of trees with the potential shade cast upon solar panels. Current California law ruled in favor of limiting tree growth near solar panels, but such restrictions do not account for passive reduced air-conditioning energy costs from the shade of trees

A sustainability policy recognizes the impact of global warming and reduced available water sources. This policy would require using native and/or climate suitable species in public areas that do not normally require additional watering and maintenance in order to survive after several years of establishment.

A diversity policy recognizes that a healthy urban forest is a diverse forest. A desired percentage estimate of trees is possible by different categories including age, species, planting procedures, and location.

A community's answer to these policy issues helps determine general planting locations and total planting goals.

3. Urban Forest implementing ordinances

A comprehensive set of ordinances helps to protect current public trees from destruction, and provides a form for changing public inventories over time to reflect advances in arboriculture. The urban forest polices in the General Plan must be adopted in ordinance form in order to be implemented. This process includes ordinances implementing urban forest polices, list of allowed street and public trees, annual operating budgets and long term capital improvement programs.

Managing the ongoing costs of tree care is normally incorporated in the operating budget of most governmental agencies, even though the long term costs of tree care can be projected decades into the future. The proposed method of financing is a process that mimics the capital improvement process. Since the costs and benefits can be defined and net present values assigned, the proposed capital hybrid process can provide long term financing methods for achieving desired future urban forests.

Since many City department functions benefit from the presence of trees, they should also be providing resources to support long-term tree care. Bailey Hudson proposed the concept of trees as a biogenic utility, which also provides a framework for identifying how departments can support the long term benefits of trees.

4. Costs and Benefits of Existing and Projected Public Urban Forest Inventory Using STRATUM and I-Tree

Once the long term goals are developed, then the current urban forest inventory is analyzed. STRATUM (Street Tree Resource Analysis tool for Urban Forest Managers) is a tool to get a snapshot of the future value of the present urban forest. The I-Tree package also includes the use of U-Fore tools for analyzing park forests.

The inventory total should include street and preferably also, park trees that are actively managed by the city. Because the park tree inventory process was not well developed at the time this research was conducted, we modified the STRATUM process and took half of the benefits of the STRATUM model when applied to park trees. This process recognizes that park trees will not provide energy efficiency savings adjacent to residences, and also may not have as significant impact on home values when in a park setting.

STRATUM and I-Tree tools provide the scientific analysis of projected urban forest costs and benefits. In the case of the City of Goleta, the expected cost benefit ratio of 1.18 is a positive impetus to adding additional trees to the City's inventory.

5. Urban Forest Financial Implementing Tools and funding sources

Using the previously discussed urban forest management plan, the City now has a framework for implementing the urban forest of the future. Urban forestry programs can be inserted into the City's annual Budget and long term capital budget process using the Public Tree Asset Management Revolving Fund. While the policy could be adopted in conjunction with other policies in the management Plan, the actual implementation of the policy should wait for the results of the STRATUM /I-Tree analysis.

Funding sources can include General Fund allocations in recognition of defined benefits, grants from through Federal, State and non-profit agencies, special revenue funds from departments accruing benefits from urban forests including Roads, Stormwater Management, and Energy Conservation. The Greenhouse Gas Reporting Protocol recently developed by the Center for Urban Forest Research provides criteria to quantify and report actual changes in carbon stocks and greenhouse gas emission reductions resulting from urban forest project activity. The value of carbon credits is likely to become increasingly important as new regulations on greenhouse gas emissions are instituted.

Model Public Tree Asset/Management Policy

The following is a model policy for use in implementing a capital hybrid program for public trees;

The City/County of _____ desires to maximize the beneficial values of its publicly managed urban forest. The elected body has determined it necessary to adopt this tree asset management policy to create a financing structure that insures the timely planting, maintenance, and replacement of its urban forest assets. This policy is created to mimic the procedures for depreciation of capital assets, and in effect pick up where traditional government accounting ends.

1. Objectives – This Public Tree Infrastructure Management policy is designed to:
    a. Create a permanent financing program including a plan which shall be updated annually during the budget process. The management

policy estimates and cash flow projections in the plan cash and resource needs.

b. Moderate annual appropriations for tree costs by taking a long-term view of both the quantifiable benefits provided by trees and their management costs.
c. Carefully plan for new tree management financing costs by requiring a long-term emphasis on costs and benefits because tree asset cost fluctuate from year to year. The long-term emphasis is desirable because tree management costs, if funded exclusively through current revenues, would cause dramatic annual financing changes without recognizing benefits.
d. Avoid assessing a property owner twice for the same improvement. Public trees installation costs in conjunction with adjacent developments are required only once. The City as a whole is primarily responsible for the ongoing management of public trees unless there has been a separate requirement for ongoing maintenance as a condition of development.

2. Public Tree Assets (General Assets)
   a. Public trees include the following:
      - Public - Any public right of way, City Owned property, easement, or dedicated land, or private property with specifically designated public functions per adopted City ordinance,
      - Trees - Any woody plant with a mature height for its species of at least 25 feet as defined in the current edition of Sunset Western Garden Book.
   b. Costs and benefits associated with the planting, maintenance, removal and renewal of public tree assets shall be accounted for in a revolving Public Tree Asset Management Revolving Fund (PTAMRF). This fund accumulates resources and tracks benefits dedicated for eligible public tree asset management activities. Annual appropriations are made in the operating budget due to accounting guidelines, even though these trees have the attributes of capital assets
3. Public Tree Asset Management Revolving Fund (PTAMRF)
   This fund is created to collect revenue dedicated to the management of public tree assets. The fund provides a permanent program to manage and finance the replacement of public tree assets identified in the Urban Forest Management Plan. The following requirements are established for the PTAMRF:
   a. Eligible costs include all costs with planting, maintaining, removing and replacing public trees. Sources of revenue include allocations from other funds with public tree responsibilities (ex. Road Fund, Utilities Fund, Service Areas), special assessments, investment interest, grants, donations and any additional monies the City may dedicate to public tree asset management in the future.

b. Minimum fund balances are not required for the PTAMRF. Because of year to year variable costs, no minimum fund balance is specified. However, a deficit shall not be allowed.
c. Use of bonding. The PTAMRF shall have no direct outstanding debt. It is the intent of the City to finance most public tree asset management costs through the use of current resources. However, on occasion the City may finance certain public tree asset management costs through the use of bonds, certificates of participation, equipment certificates, capital leases or some other financing mechanism. In these instances transfers may be made from the PTAMRF to a debt service fund for the a portion of public tree asset management costs provided that:
    - The PTAMRF is shown as a source of funding when the debt issue is authorized, and/or
    - The transfer is approved by the City Council in the annual budget document or through separate authorization.
d. Requirements which apply to the PTAMRF include:
    - Expenditures shall be limited to eligible public tree asset management costs as described for the fund.
    - Cost/Benefit projections shall be prepared for a minimum of 25 years.
    - Investment interest earned within each fund shall remain in the fund.
    - Interfund loans are subject to city Council approval and must be repaid with interest at the average rate of return on the City's investment portfolio. The Finance Director will determine the annual interest rate to be charged on inter fund loans.
    - Expenditures for purposes outside of the eligible costs for pubic tree assets are allowed only under one of the following two procedures:
    - The City Council declares a financial emergency by at least a four fifths vote, or
    - The City council conducts a public hearing to declare its intent and to invite public input. Notice must be provided to the public and to each newspaper of general circulation throughout the City at least 30 days prior to the hearing. The notice shall include the amount and intended purpose of the proposed expenditure.

CONCLUSION

A Capital hybrid program can be integrated into any community's planning and financing process. Policy makers rely upon scientifically based, replicable procedures that they can trust. Long term tree benefits require long term protection and equal treatment of trees as infrastructure. The I-Tree models are worthy tools-not perfect, but the best we have today The process described in

this study works best in locations where there are a large number of trees to plant in the future in comparison to a small current tree population.

However, depending upon the projected mortality rate of the existing tree population, this process could work just as well in jurisdictions that are replacing or supplementing an aging public urban forest, or one that is undergoing significant change due to redevelopment.

The data indicates that a long-term tree planting program will provide positive environmental benefits even in a temperate climate with low energy efficiency potential. These benefits will increase with the increased use of air conditioning, which is likely to occur as the mostly affluent population ages, and the effects of warmer climate changes become more pronounced.

The data also suggests that the benefits of a large volume tree planting program could be improved through an aggressive tree protection program. A key element of an effective tree protection program includes identifying trees as an equal partner in the City infrastructure.

Case Study – City of Goleta, California

1. Urban Forest Vision - City of Goleta –The City doesn't have one, but the non-profit urban forestry organization Goleta Valley Beautiful (whose jurisdiction includes the City of Goleta) vision is for the Citizens of Goleta to feel as though they live within a park-like setting.

2. General Plan Urban Forest Policies - City of Goleta

The City's Urban Forestry policies included in the City's General Plan are included as Attachment 1. Based on the General Plan policies, the City is embarking on the development of an Urban Forest Management Plan beginning in 2008, as identified in Attachment 2.

The City of Goleta's administrative urban forest policies state that the life of a street tree in Goleta is 40 years, although the policy is based more on identifying street sidewalk conflicts than with the actual health and vigor of a tree.

The mortality rate for new trees is based on the experience of Goleta Valley Beautiful new tree planting efforts within the Goleta Valley over the years 2000-2005. The average new tree mortality rate is 3% of trees planted dying within the first year, and 1% dying each year thereafter.

An issue currently being considered is planting public trees on adjacent private property where sufficient right of way does not exist to accommodate a large public tree

3. Urban Forest Implementing Ordinances - City of Goleta

The City of Goleta has adopted tree protection ordinances for street trees and parks that were originally County policies in existence prior to the City forming in February of 2002. These ordinances are enforced by the Parks and Open Space Manager, who is also a Certified Arborist. The ordinances meet the minimum qualifications for the City to be recognized as a Tree City USA. Goleta received its first Tree City Award for 2007.

The City's street tree list is included as attachment 3. The City does not have a recommended tree list for parks or for other public areas of the City. The current City of Goleta allowed tree species is based on the typical design of the roads, which includes a 4' parkway planting strip between the sidewalk and the curb on most residential, and collector streets. Most arterials do not have a planting strip, favoring instead 4 x 4 tree cutouts, or a planting strip between the sidewalk and adjacent private property where, in new developments, the responsibility for maintenance lies with private homeowner's associations. The list reflects the typical downsizing of trees from large to small (20'-30') species that will be more maintenance free, i.e. smaller leaves, lower height, minimal flowers/fruit, stronger branch structure, and minimal surface roots to disrupt sidewalks. The City also requires 10' linear root shields on both sides of 3 foot parkways.

The Comprehensive Annual Financial Report for the City of Goleta does not make any mention of trees as capital assets or specifically relating them as part of the $208,626,597 value of infrastructure in the City as of 6/30/07. These

actions are consistent with the Governmental Accounting Standards Board, which gave Goleta high marks in financial reporting. If trees were accounted for as infrastructure, they would likely be classified as a Non-Major Special Revenue Fund, although the value of the tree would not be the revenue source but rather the cash contributions (ex. grant revenues, general fund cash contributions) generated in lieu of a value derived directly from the trees. Although trees aren't listed in the depreciation of capital assets, City Departmental policy is to consider the life of a street tree at 40 years, the same as that identified for pavement and hardscape, but less than the 50 year lifespan attributed to sidewalks, curb and gutters.

The Annual Operating Budget also does not account separately for trees. Street tree costs are absorbed under street maintenance contracts for hardscape repair and median maintenance, while park tree costs are part of contractual service contracts for emergency maintenance.

4. Costs and Benefits of Existing and Projected Public Urban Forest Inventory Using STRATUM and I-Tree- City of Goleta

The following data was used to develop the STRATUM model costs and benefits;

4a. Current Street and Park Tree inventory - City of Goleta

For fiscal year 2005-06, Goleta had a 100% Street Tree Inventory of 6,727 trees

A Managed Park Tree Inventory was conducted by Goleta Valley Beautiful in 2006 prior to the completed development of the I-Tree survey tools. The 3,128 trees surveyed included only the portions of park tree inventory that would be actively managed by City staff for planting, maintenance, and renewal. Unmanaged park trees are those that are not actively used by the public, i.e. inaccessible forest areas along creeks, steep hillsides. Unmanaged areas generally do not receive tree staff attention except in emergency situations or citizen complaints.

Total managed street and park trees for the City of Goleta is 9,855.

4b. Available Vacant Street and Park Planting Sites - City of Goleta

2,334 available vacant street tree sites were identified by criteria that allocates trees according to planting philosophies that minimize the cost of maintenance rather than promote canopy, i.e. trees no closer than 30 feet, ten feet away from water meters, street lights, private trees, driveways, and allowing for visibility triangles at each intersection.

618 available vacant park tree planting sites were identified along the peripheries of the City's parks. Those sites provide a conservative estimate of potential new tree locations to avoid conflict with open turf areas. The City has a moratorium on planting trees in City parks and open spaces until all they are redesigned to meet Americans with Disabilities Act (ADA) accessibility requirements

4c. Projected Total Additional Trees generated by new development at buildout by land use type - City of Goleta

A total of 2,624 additional public trees are projected from new development based on the adopted 2006 General Plan. The currently vacant land uses are projected to be developed at buildout in 25 years. For all existing and proposed types of land use, we calculated the average number of public trees per acre. We then took the total acreage by proposed land use and multiplied it by the average public tree per acre rate to identify the total number of trees to be planted. The total trees generated by new development were then allocated to individual tree types depending on the overall tree diversity goals for the City of Goleta. See Attachment 5 for the projection procedures.

4d. Total Tree species distribution by 6 STRATUM categories - City of Goleta

The 15,093 total number of projected trees includes 9,398 existing street and park trees, plus 5,238 new street, park and new development trees. The optimum urban forest species distribution is applied based on adopted street tree species identified in attachment 3 and planting rates identified in attachment 6. However the process for calculating impacts using existing inventories and integrating proposed new species and numbers of trees requires extensive calculations that are too complex to be useful for normal use. STRATUM is designed to use existing real inventory data to make projections of future costs and benefits. Therefore instead of projecting mortality rates and growth characteristics for each individual tree, we consolidated the species of existing and projected trees using the 9 species description categories for the Berkeley area as researched by STRATUM developers – see Attachment 4. The Berkeley area was chosen instead of Santa Monica due to the propensity of the latter area to heavily prune their trees, which is not the case in the Goleta area.

Assuming the maximum tree environmental benefit policy is adopted, projected new palm plantings in the three palm categories in the Goleta area are assumed to be zero. Thus there are six general species categories by which tree species are selected. The inventory data on existing and projected new trees is used by STRATUM to calculate leaf area and foliar biomass, and regression models predict growth of the trees over time, along with projected costs and benefits.

4e. City of Goleta - Total trees and categories by year for 25 year planning period

The total trees to be planted were distributed over the twenty five year study period according to tree planting assumptions specific to the City of Goleta. The City of Goleta is a relatively new City formed in 2002. The City has contract tree care assistance with limited new tree plantings, primarily replacements of existing trees that have been removed due to public projects and owner request. The City primarily relies on new plantings from a non-profit organization that has the capacity to plant 500 trees annually. Thus the tree plantings were frontloaded, i.e. scheduled at a mixture of street and park plantings totaling 500

per year until the maximum amount was reached. The new development trees were added in five year increments over the twenty five year General Plan projected buildout. Also factored in are mortality rates for existing and new trees, resulting in additional tree planting efforts within one year of the death of any tree in the inventory.

4f. City of Goleta STRATUM Benefit and cost assumptions

The total number of trees, species and characteristics were then entered into STRATUM for each of the projected 25 years of the General Plan to develop the total cost benefit for the trees during each year. Since STRATUM is producing a snap shot of the projected future benefits and costs, a comparison of the differences between years should produce an estimate of changes in the urban forest. See Attachment 7 for cost assumptions used in the STRATUM projections and Attachment 8 for benefit assumptions used in the STRATUM projections. The results of the STRATUM runs for each year are summarized in Attachment 9.

The original expectation of this author was that, with a new tree planting program with greater numbers of trees planted in future years than in the past, significant environment benefits were expected to accrue. However, many of these benefits accrue as the tree matures. There is a continued need for replacement of existing and new trees due to the projected new tree mortality rates, and the 40 year defined lifespan of existing street trees which makes up a greater proportion of Goleta's public trees. The projected mortality rate for both existing and new trees tends to leave the forest in a younger status, which delays the full environmental benefits. Further, as older large existing street trees die, they are replaced with smaller new tree species that do not disrupt sidewalks and are easier to maintain. The resulting decrease in size in street trees could be partially offset by planting large trees in park settings. An additional detrimental impact on benefits in the Goleta area is that most native trees suitable for planting in this region are also high BVOC emitters, which has a negative impact on air quality. Nevertheless, the value of planting sustainable native trees is paramount, and the negative impacts on air quality will be offset in part by other positive benefits of the trees.

The future Goleta urban forest will be more economical to maintain than the forest of today. The use of lower maintenance cultivars (ex. Rotundiloba versus traditional Liquidambar species), smaller trees as identified in the official tree species list, and appropriate placement of tree species at a site as well as a regular maintenance program will result in a forest with more trees than today that is less costly to maintain.

5. Urban Forest Financial Implementing Tools - City of Goleta

The process of applying the STRATUM-derived cost benefit data into a City's annual and long term budgeting process would proceed as follows;

a. <u>Annual Budget</u>

During the preparation of the annual budget, City Urban Forestry staff begins with the first year of the projected cost benefit results to

identify projected costs based on the assumptions in the model. In the case of the City of Goleta, the total first year costs for both street and park trees is $351,322.

b. Transfers from/to the Public Tree Asset Management Revolving Fund (PTAMRF)

The Public Tree Asset Management Revolving Fund functions both as a Capital Infrastructure Reserve Fund (A revolving fund to replace the depreciation of capital assets) and a Tree Infrastructure Reserve Fund (A revolving fund to provide separate non-capital accounting for long term, non-depreciable tree care costs including planting, maintenance and replacement. This fund provides a financing structure that traditional government accounting does not address.)

The governing body allocates total expenses in this fund. Separate accounting may be necessary within the PTAMRF to identify expenditures requiring separate accounting, such as State Road funds and Bond Proceeds.

The first year benefits of $643,574 identified in the model can be met through allocations from separate funds (Road Fund, Bond Proceeds), General Fund contributions, grant proceeds, donations, etc. The total first year minimum revenue allocations must equal the total first year costs of $351,322 in order to insure a balanced budget. The governing body may allocate additional revenues to this fund in the first year up to the $643,574 identified benefits in the model in consideration of long term commitments to fully funding this asset.

In subsequent years, this process will continue as identified in the model projections unless modified by new information discussed in c, d, and e. below

c. Project impact analysis for individual new developments

Each new development project will include an analysis of its urban forest impact as part of the land use approval process. Part of the review is to determine if the projected impacts are different from the projected impacts in the model. If they are different, the results will be included in the Annual Project Impact Update to be included in the subsequent year's budget.

d. Annual project impact update

At the beginning of each year's budget process, staff will assess the cumulative impact of new development on the recommended actions in the model, and adjust budget recommendations accordingly in order to continue to reach the goals set in the General Plan.

e. 5 year Urban Forest Management Plan review

At the end of each five year period, the model will be rerun to update the impacts of new development information. The model can be rerun earlier if significant development activity occurs.

City of Goleta Case Study -Conclusion

In the case study, a very conservative approach was taken to show how even a minimal increase in the urban forest can produce a positive cost benefit.

In the case of the City of Goleta, the City recognizes street trees as having an estimated maximum life of 40 years. The defined life of the average street tree is not based on a scientific study of healthy Goleta street trees. The lifespan definition does recognize that most Goleta street trees were planted 40 to 50 years ago during construction booms of the 1950's and 60's. The defined street tree life of 40 years makes the trees candidates for removal today.

The City of Goleta has an aggressive street and sidewalk reconstruction program that attempts healthy street tree protection when feasible, i.e. when new replacement curb/sidewalk can be 'bowed' up to a foot to accommodate existing tree trunks that are as large or larger then their 3.5' to 4' wide parkways. When this accommodation is not feasible, the tree is a candidate for removal. A street tree is not considered equal in terms of infrastructure, so additional tree protection measures are not routinely researched, such as flexible sidewalks, expansion of tree foot prints that may require removal of a parking space, or sidewalk realignments requiring easements on adjacent property, and the use of structural soil in commercial areas. A tree protection policy that equates trees with other city infrastructure would require consideration of the costs and benefits of retaining trees as part of reconstruction projects and thus likely lead to the retention of older street trees.

The low level of park tree maintenance in comparison to street trees and the lack of an administratively defined lifespan may at first seem to allow retention of older trees. However the lack of systematic maintenance usually means that older trees require major maintenance when they do get serviced, which is not recommended for the long term health of the tree.

Even a small increase in the overall number of trees will require not only a strong initial planting effort, but also a strong maintenance follow-up to overcome urban mortality rates and to insure that desired total trees are reached and sustained in a managed population.

Policy CE 14: Preservation and Enhancement of Urban Forest [GP]
Objective: *To protect, preserve, and enhance Goleta's urban forest for its aesthetic, visual, and environmental benefits to the community.*
CE 14.1 Definition of Urban Forest. [GP] *Goleta's urban forest consists of all public and private trees, which include the street tree system, trees on parks and other public lands, trees on private properties throughout the city, and others. Goleta General Plan/Coastal Land Use Plan 4.0 Conservation Element September 2006 4-34*
CE 14.2 Public Urban Forest Management. [GP] *Urban forests are recognized as a resource created and sustained for people. The urban forest is different from wildland forests in that it requires a higher level of management. The City considers the urban forest a valuable resource. As of 2005, it was estimated that the total number of trees situated within city street rights-of-way was about 7,500. The public portion of the urban forest shall be protected, preserved, and enhanced to: a. Provide an appropriate shade canopy for each of the various types of land uses so that the average total canopy will increase over time. b. Provide for a tree population of mixed ages, diverse species, and appropriate mix of tree types (evergreen and deciduous; native and nonnative in non-ESHA areas) in order to support a diverse forest ecosystem able to adapt to changing environmental pressures such as disease, pest infestation, and climate change. c. Maximize availability of planting spaces. d. Survive within the limitations of the existing resources with minimal maintenance once establishment occurs. e. Recognize that the maximum environmental benefit, such as those related to air quality, storm water runoff, and shade, occurs as trees reach maturity.*
CE 14.3 Tree Species List. [GP] *The City shall prepare and maintain an official public tree species list and apply it, as appropriate, to streets, parks, and other public areas.*
CE 14.4 Conservation of Trees on Public Property. [GP] *Trees on City property, including street rights-of-way, are valuable resources that will not generally be added to, removed, or substantially altered without City authorization.*
CE 14. 5 Public Urban Forest Master Plan. [GP] *The City may develop and maintain an Urban Forest Master Plan that describes and maps the resource, provides a vision statement, establishes measurable urban forest management goals and performance standards, presents a timeline for managing the Goleta urban forest, and includes any additional information that the City determines is appropriate.*
CE 14. 6 Public Information. [GP] *The City will create and maintain a public information program to educate property owners on the benefits of and responsibilities for the care of Goleta's urban forest.*
CE 14. 7 Ordinance Standards. [GP] *The City will consider an ordinance to strengthen standards for trees in streets, medians, parkways, parks, or open space; heritage and native trees where they occur in an urban setting; parking lot shade; tree replacement; heat island mitigation; and anti-topping. The ordinance may establish an advisory committee and define its roles and responsibilities. The Urban Forest Ordinance shall be designed with the intention to meet the requirements to obtain Tree City USA status.*

Between 2008 and 2010, the City will develop the following elements of an Urban Forest Management Plan over a 3 year period under a contract with the local Urban Forestry Non-Profit Goleta Valley Beautiful;

Year 1

- Conduct an urban forest value assessment
- Develop urban forest stakeholder working group to guide Management Plan process
- Defining why the City's urban forest is needed, including heat island impacts, canopy loss and biological impacts.
- Establish the guiding principles upon which the Management Plan is based, including percentage of canopy coverage, and diversity of ages, species and tree types
- Establish the City's Vision of their future urban forest, and incorporate this vision in the City's General Plan.
- Calculating the benefits and costs to the City of the proposed addition of trees to the City

Year 2

- Develop a public information and public outreach program
- Identify available planting spaces and procedures for maximizing their availability
- Develop public, private, and nonprofit partnerships to provide support for widespread volunteer care for public and private trees.
- Beginning in year two with completion by year 3 – Begin the process to revise/rewrite existing street and park tree protection ordinances, policies and enforcement procedures to implement the management program. This includes street, median and parking lot planting and design guidelines, shade cover objectives of various land uses, tree replacement and mitigation policies, healthy tree protection and preservation ordinance compliance program, urban heat island mitigation policy, green infrastructure principles, smart growth and green planning policies, mature tree care program, young tree care program, tree purchasing and planting specifications, 5 year planting plans for the next 20 years, tree hazard management program, pest and disease management program

Year 3

- Improving the current tree inventory. GVB would train and employ volunteers in the use of I-Tree Inventory software to prepare a digital record of tree attributes, location, maintenance needs, and potential future planting sites.
- Developing a financing program and resources for sustaining an ongoing urban forestry program.

Attachment 3 City of Goleta Allowed Street Tree Species approved 11/15/05.

This list was used as the basis for making future projections of Goleta trees since a parks list has not yet been developed. Minimizing future concrete repair costs are a high priority, thus parkway widths determine how many species are used.

Genus	***species***	**common name**	Pkwy Width	Root Barrier
Chionanthus	retusus	Chinese Fringe	3	no
Lagerstoemia	indica	Crape Myrtle	3	no
Callistemon	citrinus	Lemon Bottlebrush	3	no
Magnolia	grandiflora 'Little Gem'	Little Gem Magnolia	3	yes
Podacarpus	henkelii	Long-Leafed Yellow Wood	3	yes
Prunus	cerasifera	Purple-leafed Plum	3	no
Rhaphiolepis	Majestic Beauty"	Rhaphiolepis	3	no
Tristina	laurina	Swamp Myrtle or Watergum	3	no
Arbutus	marina	Arbutus 'Marina'	4	yes
Geijera	parviflora	Australian Willow	4	yes
Lophostemon	conferta	Brisbane Box	4	yes
Eriobotrya	deflexa	Bronze Loquat	4	no
Koelreuteria	bipinnata	Chinese Flame Tree	4	yes
Ginkgo	biloba	Chinese Maidenhair Tree	4	yes
Pistachia	chenensis	Chinese Pistache	4	yes
Stenocarpus	sinuatus	Firewheel	4	yes
Cassia	leptophylia	Gold Medallion	4	no
Bauhinia	blakeana	Hong Kong Orchid	4	no
Calocedrus	decurrens	Incense Cedar	4	yes
Metrosideros	excelsus	New Zealand Christmas Tree	4	yes
Pyrus	calleryana'Aristocrat'	Ornamental Pear	4	yes
Agonis	flexuosa	Peppermint Tree	4	Yes
Tababuia	ipe or impetiginosa	Pink Trumpet Tree	4	no
Acacia	stenophyllia	Shoestring acacia	4	no
Albizzia	julibrissin	Silk Tree Mimosa	4	yes
Hymenosporum	flavum	Sweetshade	4	yes
Callistemon	viminalis	Weeping Bottlebrush	4	yes
Lynonothamnus	asplenifolius	Catalina Ironwood	4	yes
Umbellularia	californica	California Bay Laurel	5	yes
Calodendrum	capense	Cape Chestnut	5	yes
Quercus	suber	Cork Oak	5	yes
Brachychiton	acerifolius	Flame Bottle Tree	5	yes
Jacaranda	mimosifolia	Jacaranda	5	yes
Melaleuca	quinquinervia	Paperbark	5	yes
Lauris	nobilis 'saratoga'	Sweetbay/Grecian Laurel	5	yes
Quercus	tomentella	Island Oak	5	yes
Quercus	virginiana	Southern Live Oak	5	yes
Cinnamomum	camphora	Camphor	6	yes
Pinus	canariensis	Canary Island Pine	6	yes
Citrus	sinensis	Citrus 'Lemon or orange'	6	no
Quercus -	agrifolia	Coast Live Oak	6	no
Podocarpus	gracilior	Fern Podacarpus	6	yes
Olea	europea 'Swan Hill'	Fruitless Olive	6	yes
Koelreuteria	paniculata	Goldenrain tree	6	yes
Pinus	pinea	Italian Stone Pine	6	yes
Magnolia	grandiflora	Southern Magnolia	6	yes
Platanus	racemosa	California Sycamore	6	yes

Attachment 4 – Tree Species Categories used for STRATUM Analysis

The growth rate of specific types of tree species is based on research by the Center for Urban Forest Research. The Berkeley area data was cho as being most representative of the growth rates in the Goleta area. Trees in each category were measured till their normal death or until they reached 45" DBH.
The chart below lists how many years of tree growth are projected in each DBH range before the tree moves to the next DBH range.
For example, the Platanus x acerifolia normally takes 4 years to grow to a DBH of at least 1", which is the minimum DBH assumed for newly planted trees in Goleta. Once it is planted at the age of 4, it will take another 8 years for a total of 12 years to move from the 0-6 DBH range and into the 7-12" DBH range, where it will take another 11 years of growth (the tree now being 23 years old) before moving into the 13-18" DBH range, and so on till the tree's projected death at age 113 (some rounding involved).

			1" DBH at yr below	**Years** 0-6 DBH	**that** 7-12 DBH	**tree** 13-18 DBH	**remains** 19-24 DBH	**within** 25-30 DBH	
Broadleaf Deciduous Large Other	BDL	Platanus x acerifolia	4 yrs	12	11	12	14	17	
Broadleaf Deciduous Medium Other	BDM	Liquidambar styraciflua	3 yrs	12	11	14	17	22	
Broadleaf Deciduous Small Other	BDS	Prunus cerasifera	2 yrs	19	15	14	12		
Broadleaf Evergreen Large Other	BEL	Quercus agrifolia	2 yrs	11	10	10	10	11	
Broadleaf Evergreen Medium Other	BEM	Cinnamomum camphora	1 yr	23	19	17	16	14	
Broadleaf Evergreen Small Other	BES	Pyrus kawakamii	1 yr	11	12	11	10	6	
Conifer Evergreen Large Other	CEL	Pinus radiata	2 yrs	10	9	9	9	11	
Conifer Evergreen Medium Other	CEM	Pinus brutia	3 yrs	6	6	7	15		
Conifer Evergreen Small Other	CES	Pinus contorta	5 yrs	13	17	16			
Palm Evergreen Large Other	PEL	Phoenix canariensis	1 yr	15	15	15	15	15	
Palm Evergreen Medium Other	PEM	Phoenix dctylifera	1 yr	6	11	16	20	24	
Palm Evergreen Small Other	PES	Washingtonia robusta	1 yr	15	15	15	15	15	

Attachment 5 –Projecting number of trees in new development-City of Goleta

The acreage per proposed land use is multiplied by the average number of public trees for current land uses, and assigned to species categories according to the city's desired diversity of tree species at buildout.
BES/M/L – Broadleaf Evergreen Small/Medium/Large
BDS/M/L – Broadleaf Deciduous Small/Medium /Large
CES/M/L – Conifer Evergreen Small/Medium/Large

Proposed Use	Total Acres for Proposed Use	Avg	Trees	BES	BEM	BEL	BDS	BDM	BDL	CES	CEM	CEL
Business Park	**22.053**	10	168		68	100						
General Commercial	**11.680**	5	11		2	9						
General Industry	**5.978**	5	6									6
Highway-related	**1.812**	5	6			6						
Mod. Density Multi-Family	**122.775**	10	4				1	1	2			
Neighborhood	**9.369**	5	18				2	4	12			
Office and Institutional	**9.425**	10	5				1	1	3			
Old Town	**3.789**	5	11				1	3	7			
Open Space / Passive Rec.	**6.525**	10	3					1	2			
Planned	**24.564**	10	2					1	1			
Public / Quasi Public	**6.590**	10	1						1			
Recreation	**3.370**	10	34				5	10	19			
Services	**44.146**	5	133				10	30	93			
Single-Family	**21.165**	10	2					1	1			
Visitor serving	**13.372**	5	6				2	2	2			
TOTAL ACREAGE IN VACANT LAND SITES	**307.439**		**2624**	**0**	**106**	**182**	**378**	**731**	**1198**	**0**	**0**	**29**

Attachment 6 Proposed Tree Planting Rate –City of Goleta

The planting rate assumes a maximum 500 trees a year added to the park and street tree inventory beginning at year 1 until all projected available planting locations are filled The 500 trees are distributed between street tree and park trees for the first four years. An additional 500 trees a year are added from new development in years 5, 10, 15, 20, and 634 in year 25. These figures do not include new trees planted each year to replace trees previously in the inventory that were lost.

Year	Park Trees	Street Trees	Total
1	3329	6928	10257
2	3520	7198	10718
3	3718	7469	11187
4	3714	7922	11636
5	3717	8900	12617
6	3711	9280	12991
7	3715	9280	12995
8	3715	9283	12998
9	3712	9280	12992
10	3713	9808	13521
11	3714	9805	13519
12	3714	9805	13519
13	3712	9801	13513
14	3712	9807	13519
15	3715	10329	14044
16	3717	10330	14047
17	3717	10325	14042
18	3715	10327	14042
19	3715	10331	14046
20	3717	10853	14570
21	3714	10851	14565
22	3716	10857	14573
23	3718	10850	14568
24	3716	10855	14571
25	3716	11377	15093

Attachment 7 – Cost Assumptions in STRATUM model – City of Goleta

1. Pruning - Leave the total base year cost of $104,836 unless there is a change in the level of service, i.e. no inflation increase
2. Program Admin - Add young tree Maintenance coordinator in year 3 $50,000 annually + $50,0001-time expenses
3. Program Admin - Add increased level of service from a half time to a full time arborist in year 5 = $50,000 annually
4. Pruning - Add $30 per tree pruning at 7th year after planting (double current 2007 amount)
5. Pruning -Increase pruning cost by $30 additional per tree in 12th year after planting
6. Pruning - Increase pruning cost by $30 additional per tree in 17th year after planting
7. Pruning - increase pruning cost by $30 additional per tree in 22nd year after planting
8. Planting - Increase one time root shield installation costs of $50 per street tree($25 shields, $10 equipment rental, $15 labor)
   Ex- year 2 - 270 new trees added X $50 = $13,500
9. All installation and 2 year establishment costs for 2634 development trees paid by developers after which city assumes maintenance
10. One time backlog of park tree maintenance costs paid for by Prop 40 funds
11. Costs for new tree installation and 2 year establishment paid for through grants and nonprofit coordination.

For items one through seven, cost were assumed to be split 25% for parks and 75% for street trees. Item eight is 100% street cost

Attachment 8 – Benefit Assumptions in STRATUM model – City of Goleta

Benefit Assumptions

1. All trees planted are 15 gallon with 1" DBH when planted
   Example - For CICA, that would be the third year of growth
2. Trees increase in growth rate according to the Berkeley growth rate analysis
3. City begins planting 500 trees a year in 2008/2009 fiscal year, 250 street trees, 250 park trees
4. New development tree planting assumptions - year 5 - 500, year 10 - 500, year 15 - 500, year 20 - 500, year 25 - 634, all initial costs paid by developers
5. Mortality rate of existing trees - Assume most trees planted in 1960 and calculate morbidity based on a 1% of the total species dying each year, i.e. about 50
   A percentage of a tree whether it dies or is replanted should be converted to one tree, ex.01 tree= 1 tree
6. Mortality rate of future trees based on Journal report-Significance of Young Urban Tree Mortality on SIP Planning
   a. first four years establishment mortality rate High 9% (year 1 3%, year 2 2%, year 3 2%, year 4 2%
   b. Post establishment rate average 1% loss per year
   c. Cumulative 25 year survival rate low-average 70%
   d. General mortality assumptions; temperate climate, trained volunteers, monitoring of planting, high quality tree stock, low stress planting sites, post planting care, community involvement
   e. A percentage of a tree whether it dies or was replanted should be converted to one tree, ex.01 tree= 1 tree
7. In addition to new trees, all trees that die will be replaced the following year on a one to one basis
8. Six DBH ranges 0-6"(6"), 6-12(7-12), 12-18(13-18), 18-24(19-24), 24-30(25-30), 30+(31+)
9. Assumes first year of cost-benefit stream will be 2008-2009, beginning July 1, 2008.
   Trees planted in that year will assume full benefit for entire year.
10. Stratum undercounts benefits when new trees are added to the model because the trees are planted at a later age (with more DBH) that the growth rate assumptions in the model.

Attachment 9 -STRATUM 25 yr. benefit and cost results by year and total – (not discounted)

While we expected the benefit/cost ratio to increase rather than decrease over time, the new tree species are significantly smaller at maturity than previous species, producing less environmental benefits. The 1% projected mortality rate also continually places a number of new trees into the system, which have lower environmental benefits than mature trees.

Year/Category	Number	Cost	Benefit	Net Benefit	Benefit-cost ratio
1/Street Trees	6,928	$ 263,492	$ 476,839	$ 213,347	1.81
Park Trees	3,329	$ 87,830	$ 166,735	$ 78,905	1.90
Total Trees	10,257	$ 351,322	$ 643,574	$ 292,252	1.83
2/Street Trees	7,198	$ 263,492	$ 476,839	$ 213,347	1.81
Park Trees	3,520	$ 87,830	$ 166,735	$ 78,905	1.90
Total Trees	10,718	$ 351,322	$ 643,574	$ 292,252	1.83
3/Street Trees	7,469	$ 286,992	$ 494,589	$ 207,597	1.72
Park Trees	3,718	$ 87,830	$ 171,684	$ 83,854	1.95
Total Trees	11,187	$ 374,822	$ 666,273	$ 291,451	1.78
4/Street Trees	7,922	$ 352,042	$ 512,234	$ 160,192	1.46
Park Trees	3,714	$ 112,830	$ 176,844	$ 64,014	1.57
Total Trees	11,636	$ 464,872	$ 689,078	$ 224,206	1.48
5/Street Trees	8,900	$ 323,642	$ 537,347	$ 213,705	1.66
Park Trees	3,717	$ 100,330	$ 175,673	$ 75,343	1.75
Total Trees	12,617	$ 423,972	$ 713,020	$ 289,048	1.68
6/Street Trees	9,280	$ 387,392	$ 589,569	$ 202,177	1.52
Park Trees	3,716	$ 112,830	$ 174,692	$ 61,862	1.55
Total Trees	12,996	$ 500,222	$ 764,261	$ 264,039	1.53
7/Street Trees	9,280	$ 387,392	$ 589,569	$ 202,177	1.52
Park Trees	3,716	$ 112,830	$ 174,692	$ 61,862	1.55
Total Trees	12,996	$ 500,222	$ 764,261	$ 264,039	1.53
8/Street Trees	9,283	$ 345,698	$ 614,959	$ 269,261	1.78
Park Trees	3,715	$ 112,830	$ 173,298	$ 60,468	1.54
Total Trees	12,998	$ 458,528	$ 788,257	$ 329,729	1.72
9/Street Trees	9,280	$ 409,052	$ 619,891	$ 210,839	1.52
Park Trees	3,712	$ 124,410	$ 172,303	$ 47,893	1.38
Total Trees	12,992	$ 533,462	$ 792,194	$ 258,732	1.49
10/Street Trees	9,808	$ 409,292	$ 624,647	$ 215,355	1.53
Park Trees	3,713	$ 120,540	$ 171,936	$ 51,396	1.43
Total Trees	13,521	$ 529,832	$ 796,583	$ 266,751	1.50
11/Street Trees	9,805	$ 409,052	$ 631,137	$ 222,085	1.54

Park Trees	3,714	$ 124,320	$ 173,834	$ 49,514	1.40
Total Trees	13,519	$ 533,372	$ 804,971	$ 271,599	1.51
12/Street Trees	9,805	$ 409,052	$ 631,137	$ 222,085	1.54
Park Trees	3,714	$ 124,320	$ 173,834	$ 49,514	1.40
Total Trees	13,519	$ 533,372	$ 804,971	$ 271,599	1.51
13/Street Trees	9,801	$ 451,292	$ 666,609	$ 215,317	1.48
Park Trees	3,712	$ 124,350	$ 177,210	$ 52,860	1.43
Total Trees	13,513	$ 575,642	$ 843,819	$ 268,177	1.47
14/Street Trees	9,807	$ 424,802	$ 675,743	$ 250,941	1.59
Park Trees	3,712	$ 90,630	$ 180,599	$ 89,969	1.99
Total Trees	13,519	$ 515,432	$ 856,342	$ 340,910	1.66
15/Street Trees	10,329	$ 511,112	$ 686,978	$ 175,866	1.34
Park Trees	3,715	$ 135,930	$ 181,826	$ 45,896	1.34
Total Trees	14,044	$ 647,042	$ 868,804	$ 221,762	1.34
16/Street Trees	10,330	$ 510,872	$ 713,087	$ 202,215	1.40
Park Trees	3,717	$ 135,810	$ 181,870	$ 46,060	1.34
Total Trees	14,047	$ 646,682	$ 894,957	$ 248,275	1.38
17/Street Trees	10,325	$ 510,872	$ 713,087	$ 202,215	1.40
Park Trees	3,717	$ 135,810	$ 181,870	$ 46,060	1.34
Total Trees	14,042	$ 646,682	$ 894,957	$ 248,275	1.38
18/Street Trees	10,327	$ 511,532	$ 730,763	$ 219,231	1.43
Park Trees	3,715	$ 135,810	$ 181,747	$ 45,937	1.34
Total Trees	14,042	$ 647,342	$ 912,510	$ 265,168	1.41
19/Street Trees	10,331	$ 568,652	$ 766,473	$ 197,821	1.35
Park Trees	3,715	$ 135,990	$ 181,779	$ 45,789	1.34
Total Trees	14,046	$ 704,642	$ 948,252	$ 243,610	1.35
20/Street Trees	10,853	$ 542,662	$ 771,110	$ 228,448	1.42
Park Trees	3,717	$ 136,110	$ 181,753	$ 45,643	1.34
Total Trees	14,570	$ 678,772	$ 952,863	$ 274,091	1.40
21/Street Trees	10,851	$ 644,222	$ 776,881	$ 132,659	1.21
Park Trees	3,714	$ 147,750	$ 181,816	$ 34,066	1.23
Total Trees	14,565	$ 791,972	$ 958,697	$ 166,725	1.21

22/Street Trees	10,857	$ 644,222	$ 776,881	$ 132,659	1.21
Park Trees	3,716	$ 147,750	$ 181,816	$ 34,066	1.23
Total Trees	14,573	$ 791,972	$ 958,697	$ 166,725	1.21
23/Street Trees	10,850	$ 644,322	$ 797,362	$ 153,040	1.24
Park Trees	3,718	$ 147,570	$ 181,816	$ 34,246	1.23
Total Trees	14,568	$ 791,892	$ 979,178	$ 187,286	1.24
24/Street Trees	10,855	$ 644,962	$ 806,435	$ 161,473	1.25
Park Trees	3,716	$ 147,570	$ 181,784	$ 34,214	1.23
Total Trees	14,571	$ 792,532	$ 988,219	$ 195,687	1.25
25/Street Trees	11,377	$ 717,842	$ 839,099	$ 121,257	1.17
Park Trees	3,716	$ 147,750	$ 182,546	$ 34,796	1.24
Total Trees	15,093	$ 865,592	$ 1,021,645	$ 156,053	1.18
			Total 25 years	$ 6,298,433	
			Avg. annual	$ 251,937	

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