INTERAGENCY STUDY OF TREE MANAGEMENT PRACTICES

Office of Legislative Oversight
Report Number 2004-8

September 28, 2004

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EXECUTIVE SUMMARY

Trees maintained by the five County and bi-County agencies contribute to a countywide tree canopy that significantly improves the quality of life in Montgomery County. Numerous studies document that trees improve air quality, save energy, reduce stormwater runoff, improve water quality, reduce soil erosion along stream banks, and provide wildlife food and habitat.

This study describes how the five agencies acquire, install, maintain and remove trees on public lands and in public rights-of way. An incomplete cost estimate for these activities shows the agencies spent approximately $4 million for tree planting, pruning, and removals in FY 04, including $2.1 million for street trees, $1.6 million for park trees, and $247,000 for forest trees.

This study also looks at how the five agencies manage and coordinate their tree care activities. In particular, the Council asked OLO to examine centralization, contracting out, coordination, and the concept of Pope Farm supplying trees for the County Government's street tree programs.

Centralization. Efficient management of the agencies' tree care activities exists for park trees, and forest trees, either through a centralized organizational structure or a centralized process, such as the administration of the County's Forest Conservation Law. Efficient management of tree care activities exists for street trees in the Urban Districts. For street trees outside the Urban Districts, however, the County Government needs to clarify how a Memorandum of Understanding that assigned specific management responsibilities will work in practice.

Contracting Out. The five agencies use a mix of contract labor and in-house staff for tree care activities. The agencies use private contractors extensively to supply, install, and maintain landscape trees, forest trees, and street trees. The agencies use in-house staff primarily for core services, including emergency street tree services and most park tree services.

Coordination. Staff in the five agencies coordinate both formally and informally. Formal coordination occurs through the administration of the Forest Conservation Law and the mandatory referral process, as well as the activities of the Interagency Forest Conservation Team. Many examples of informal coordination exist as well.

Pope Farm. An initial analysis suggests it may be cost effective for Pope Farm to supply street trees for the Urban Districts or the Department of Housing and Community Affairs streetscape program. Pope Farm staff caution that it will take five or six years to launch this effort.

Other opportunities. Other opportunities exist to manage trees more efficiently, particularly for street trees outside the Urban Districts. Specifically, the County Government could update the inventory system for these trees and/or re-establish a routine pruning program. The County Government estimates it would cost $1 million to update the inventory, $1.5 million to address the current maintenance backlog, and $3.3 million annually to maintain a six-year pruning cycle.

To improve management of the agencies' tree care activities, OLO recommends the Council request a briefing on the County Government's street tree program; pursue a program for Pope Farm to supply trees for the Urban Districts, and request a study proposal for a plan to maximize the environmental benefits of the County's urban forest. OLO also recommends that the Council ask the Interagency Forest Conservation Team to manage an ongoing coordination effort.

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CHAPTER I. Introduction

A. AUTHORITY

Council Resolution Number 15-281, "Office of Legislative Oversight FY 2004 Work Program," adopted July 29, 2003.

B. PURPOSE AND SCOPE

This study presents research findings about tree care activities, the benefits of trees, and approaches to tree management practices. It also describes how the five County and bi-County agencies acquire, install, maintain, and remove trees, and how the agencies manage these activities. The five County and bi-County agencies are:

- The Maryland-National Capital Park and Planning Commission (M-NCPPC);
- Montgomery College (MC);
- Montgomery County Government (MCG);
- Montgomery County Public Schools (MCPS); and
- Washington Suburban Sanitary Commission (WSSC).

The County Council asked for this report to understand the agencies' activities and practices and to identify opportunities to improve the efficiency and effectiveness of these practices.

The scope of this study, i.e., the management of trees in public rights-of-way or on public lands maintained by the five agencies, addresses a very small portion of the Countywide tree cover. This study does not address trees on private property. It also does not address trees maintained by other public entities, such as trees along federally, state, or municipally maintained roads, trees in State or municipal parks, or trees maintained by special taxing districts.

C. ORGANIZATION OF THIS REPORT

This study begins with a presentation of research findings, followed by an examination of tree activities and management practices. This report is organized as follows:

Chapter II, Background, presents information about tree care activities, tree program management, and tree benefits.

Chapter III, Overview of Chapters IV, V and VI, presents an organizing structure for this study and discusses the issues of centralization, contracting out, and interagency coordination.

Chapters IV, V, and VI, address the agencies' practices for landscape trees, forest trees, and street trees, respectively.

Chapters VII and VIII, Findings and Recommendations, summarize this study's findings and recommendations.

Chapter IX, Agency Comments, incorporates formal written comments from the agencies.

The appendix includes a glossary of terms plus copies of relevant laws and regulations.

D. METHODOLOGY

OLO staff members Sue Richards, Ben Stutz, Karen Yoskowitz, and Craig Howard conducted this study. OLO interviewed agency staff and reviewed agency documents to understand the agencies' tree management practices. OLO collected information about other jurisdictions from web sites, journal articles, and other professional studies.

E. ACKNOWLEDGEMENTS

OLO received excellent cooperation from everyone involved in this study. In particular, OLO thanks Mike Hoyt, Al Roshdieh, Bruce Johnston, Tom Orr, Guy Turenne, Greg Leck, Jeffrey Riese, Gary Johnson, Dan Sheridan, Tom Shoemaker, Hamid Omidvar, Wayne Christiansen, and Debbie Yarrington from the Department of Public Works and Transportation (DPWT); Jim Caldwell, Cameron Wiegand, Laura Miller, Boyd Church, Lonnie Darr, Dan Harper, and Millie Souders from the Department of Environmental Protection (DEP); Robert Hubbard, Stan Wong, Joe Cheung, and Sarah Navid from the Department of Permitting Services (DPS); Tim Minerd, from the Department of Housing and Community Affairs (DHCA); Martha Lamborn from the Office of Management and Budget; Joann Robertson from the County Attorney's Office; and Terry Fleming from Risk Management.

OLO also thanks Charlie Loehr, Jeff Zyontz, George Halterman, Cathy Conlon, Carole Bergmann, Shelley Bontz, Mike Riley, Eugene Rose, Jack Seely, John D Boyd II, John Schlee, MaryAnn Brackna, Holly Thomas, Brian Murphy, Robert Kronenberg, and Wynn Witthans from the Maryland-National Capital Park and Planning Commission (M-NCPPC); Dick Hawes, James Song, Michael Shpur, Michael Allnutt, Janice Turpin, and Sean Gallagher from Montgomery County Public Schools (MCPS); Jim Benton and Terrance Valentine of the Washington Suburban Sanitary Commission (WSSC); Dave Capp and John McLean from Montgomery College; Jeff Burton of the Bethesda Urban Partnership; Joe Callaway of the Wheaton Urban District; and Geoff Durham of the Silver Spring Urban District.

OLO appreciates the assistance of Wayne Mowdy, Joe Verbier, and Greg Wallace from the Maryland State Highway Administration (SHA); Susan Nolde, and Rob Orndorff from the City of Rockville; Dave Paduda from Pepco; and, Jane Wilde from the Montgomery County Conservation Corps. OLO also thanks the President's Council of Silver Spring Civic Associations (Prezco) for inviting us to their meeting.

CHAPTER II. Background

This chapter presents background information about tree care activities, the types of trees in the urban environment, and the costs and benefits of tree care. The information is based on research studies and journal articles. This chapter is organized as follows:

Part A describes types and levels of tree care activities;
Part B explains the types and roles of trees in an urban environment; and
Part C discusses the benefits of trees and highlights research about these benefits.

A. Types and Levels of Tree Care Activities

The types and levels of tree care consist of tree conservation for naturally occurring trees and tree establishment, tree maintenance, and tree removal and replacement for planted trees. The definitions and best management practices for tree care that follow are adapted from *The Best Management Practices for Community Trees - Athens-Clarke County, GA.*

1. Tree Conservation

Tree conservation is the practice of retaining and preserving large and small stands of native trees and wooded areas. These areas can be protected through public easements, strategic park planning and acquisition, or forest conservation laws. Tree conservation activities help preserve a healthy amount of existing tree canopy that can generate immediate environmental benefits. Conserving trees through the development process helps to achieve a distribution of tree canopy regardless of the land use pattern. Some best management practices for tree conservation include:

- Integrating inventories and conservation plans into the development review process;
- Allowing land use plans that cluster development to conserve trees;
- Conserving contiguous forested areas across property boundaries to created large areas and interconnected networks for wildlife habitats;
- Maintaining natural forest conditions, leaving soils, leaf litter, and understory plants intact; and
- Providing permanent protection of conservation areas through granting conservation easements to land trusts, non-profits, or neighborhood associations.

2. Tree Establishment

Tree establishment refers to the set of activities associated with propagating, harvesting, planting, and caring for a tree through the first three years of its life. Typically, establishment begins with a planting plan that matches planting sites and appropriate species. Exhibit 1 identifies other best management practices associated with tree establishment.

EXHIBIT 1: SELECT BEST MANAGEMENT PRACTICES FOR TREE ESTABLISHMENT ACTIVITIES

Tree Selection

- Match tree growth requirements to on-site soil and environmental conditions.
- Select a tree of appropriate size at maturity for the site.
- Select native species, if available, or use proven non-native species for difficult situations.
- Select only good quality stock that meet minimum standards for root ball size and quality.
- Protect trees from damage during transport.

Site Selection

- Place trees where they have plenty of room to grow.
- Provide adequate amount of soil volume for growth and ensure there will be adequate clearance from utility lines, traffic, buildings, signs and street lights at maturity.
- Plant at least ten feet from underground utility line and plant only small maturing trees within ten feet of overhead utility line.

Site Preparation

- Break up compacted soils in area five to ten times the size of a new tree's root ball or container.
- Dig planting hole at least two to five times the width of the new tree's root ball or container.
- Dig the planting hole no deeper than the height of the new tree's root ball.
- Do not add soil amendments to the planting hole.

Tree Planting

- Move tree using only the root ball or container, not the trunk.
- Plant the root ball at or slightly above ground level.
- Backfill the planting hole with original soil.
- Water once when the planting hole is halfway full and again thoroughly when full.
- Do not stake the tree unless it cannot stand upright on its own; always remove stakes and guy wires after one year.

New Tree Maintenance

- Mulch with leaves, pine straw, or other organic materials to 3-4 inch depth in five-foot radius.
- Prune only dead, broken, crossed or rubbing branches; prune annually thereafter.
- Water one inch per week in the absence of adequate rainfall.
- Inspect newly planted trees regularly to evaluate condition and maintenance needs.
- Remove stakes and guy wires after one year.

Source: Head, Constance P. et al. Best Management Practices for Community Trees – Athens-Clarke County, GA. April 2001, Excerpts from Section 2.

3. Tree Maintenance

Tree maintenance refers to the routine care given to a tree throughout its life. The amount of maintenance a tree requires depends on the species, the environmental conditions, its age, and its health. Basic tree maintenance activities include pruning, mulching, fertilizing, irrigation, and pest management.

Pruning is the removal of branches and limbs to alter the tree's size, spread, health and form. Successful tree programs use regular inspections to determine pruning needs. The benefits of pruning include better tree form, health, and structural integrity; removal of decaying and diseased wood; and decreased risk of limb failure.

Mulching is the application of organic material over the tree's root system to improve soil moisture and enhance root and tree growth. The objective is to recreate conditions found in undisturbed, natural woodlands. The benefits of mulching are that it retains soil moisture, moderates soil temperature, suppresses weed growth, improves soil fertility and structure over time, and eliminates the need for mowing and weed trimming at the tree base.

Fertilizing is the application of nutrients to the soil to enhance growth. It should only be done to correct a deficiency identified through soil testing. The benefits of fertilization are healthier root systems, increased growth, larger trees at an earlier age, and a healthier tree that can better defend itself against pests.

Irrigation is the regular application of water to the root system to supplement rainfall. A tree may be irrigated using a hose, sprinkler, bucket, water tank, or installed irrigation system. The benefits of irrigation include better tree growth and survival, more economical tree establishment costs, and required visits which can also be used for inspection.

The maintenance a tree requires generally increases as the amount and impact of human activity increases. A tree in a reservoir, a conservation park, or a stream valley generally requires periodic inspections and a relatively low level of care compared to a tree along a suburban street, in a parking lot, or in a downtown area. Exhibit 2, on page 6, describes the characteristics and maintenance for trees in different types of urban areas. The information is adapted from a manual prepared for Athens Clarke County Georgia, *Best Management Practices for Community Trees*.

4. Tree Removal and Replacement

Tree removal and replacement activities consist of tree removal, stump grinding, and replacement planting. The goal of tree removal is to maintain public safety; the goal of tree replacement is to manage and maintain a tree canopy. A tree may be removed for many reasons. It may be an old tree at the end of its life span; it may be growing in the wrong place; or, it may be diseased and infested.

EXHIBIT 2: LAND USE SITE CHARACTERISTICS AND SELECT BEST MANAGEMENT PRACTICES

Site Characteristics	Tree Characteristics and Maintenance Needs	Select Best Management Practices
Forests preserves or large landscape Areas are open and wooded areas found in parks, golf courses, large institutions, office parks and rural lands.	Trees occur singularly, in small groups, or forest stands. They have abundant growing space. Most are native and naturally occurring. Most are not maintained or considered self-maintaining.	Conserve and plant in mixed groups and stands. Save groups wherever possible. Preserve riparian buffers. Conserve and plant trees of different ages. Plant primarily native trees. Manage areas with young trees to create valuable mature trees over time.
Road Frontage Areas exist along streets and roads. They include rights-of-way as well as front yards and commercial frontages.	The trees may have been planted or saved from pre-existing vegetation and may be in groups or not. They require a higher level of maintenance because of the type and amount of activity that occurs around them.	Plant trees only where there is adequate room both overhead and underground. Vary spacing to add interest and diversity. Maintain sight lines and provide clearance for large vehicles, pedestrians, and cyclists. Address impact of utility maintenance.
Parking Lots use trees to address sun, heat, glare, and air pollution.	Trees must have adequate soil volume, water and nutrients for healthy growth. Species should be selected to provide shade, be heat and pollution tolerant and effective at intercepting rainwater.	Select trees that can tolerate hot, dry microclimates and poor soil conditions. Select fast growing trees. Maintain sight lines. Provide curbs and wheelstops for protection. Consider pervious pavements and swales. Irrigate tree islands for new tree survival.
Plazas and Downtown Settings include small parks in commercial, institutional, and residential areas.	Trees are usually planted in a line or square in small tree wells. High activity levels, large amounts of pavement and air pollution, and inadequate, poor quality soil create challenging conditions.	Match species to growing space. Consider paving systems that increase moisture. Locate trees where compacted soils won't constrict size. Avoid species that attract wildlife. Budget for increased maintenance costs. Water new trees and prune regularly.
Buffers are linear areas that border roadways or property lines.	Trees may be conserved on-site or planted in groups or rows and spaced uniformly. They require little maintenance to be effective but there should be a commitment to replace dead or damaged trees planted in uniform rows.	Select low branching species. Plant a variety of species and sizes. Select for suitability to topography, soils, and vegetation. Conserve existing woodlands with understory for high quality buffers. Plant in staggered rows. Maintain minimum width of 10 feet for planted buffer or 25 feet for conserved buffer.
Riparian Zones are characterized by wetlands, alluvial soils, and steep slopes.	Trees in these areas have significant hydrological and ecological benefits. They are usually naturally occurring. If they are planted, they generally are self maintaining after they are established.	Conserve at least 70% tree canopy cover in riparian zones. Save existing woodlands. Plant trees in mixed groups and stands. Manage areas containing young trees to develop valuable mature tree stands. Avoid exotic species. Plant trees that can tolerate flooding in lowland areas.

Source: Head, Constance P. et al. *Best Management Practices for Community Trees* – Athens-Clarke County, GA. April 2001, Excerpts from Section 2.

The benefits of tree removal are that it: reduces the risk of failure or accident, reduces the risk of pest infestations and damage to other trees; creates space for new trees; and helps maintain a diverse, dynamic community forest.

Most tree programs recognize that trees take a long time to develop and are not easily replaced in terms of size or canopy spread. As a result, policies to remove trees are usually conservative. For example, in Redwood City, California, the policy states that trees are not removed unless they are dead, dying, structurally unsound, or if work is being done that will cause them to die.

Trees should be planted on a regular basis to replace trees that are removed and add new trees to the inventory. Systematically selecting and planting new and replacement trees help create a stable tree population with a diversity of ages, sizes, and species.

B. Tree Program Management

This section presents research about the components of a successful tree management program. The sources of the research are journal articles, literature reviews, research studies, manuals, and urban forest management plans.

1. Tree Ordinances

A tree ordinance is a local law that establishes the authority and standards to achieve a healthy urban forest and helps ensure a consistent approach to tree management. Different types of ordinances exist:

- A **street tree ordinance** covers the planting, maintenance, and removal of trees within public rights-of-way;
- A **tree protection ordinance** provides for the preservation of native or historic trees; and
- A **view ordinance** aims to resolve conflicts created by trees on private property.

An effective street tree ordinance contains clearly stated goals, designates specific responsibilities, establishes basic performance standards, provides for flexibility, and addresses enforcement. Ideally, a manager will develop and adopt an ordinance within the context of an overall comprehensive forest management strategy, with extensive community input and support.

2. Tree Inventories

A tree inventory is a database of tree resources that provides baseline information about the composition and distribution of the urban forest landscape. Typically, an inventory includes:

- Data on the total number of trees classified by species, condition, age, size, and location;
- Descriptions of problem situations such as sidewalk damage, disease and pest problems, hazardous trees; and
- Data on the amount of canopy cover by location.

A street tree inventory can also include information on the percent of live wood, the availability and quality of planting spaces, the presence of overhead wires, and the need for pruning. An inventory helps a manager identify current and potential problems, prepare budgets, and strategically plan for planting and maintenance requirements. It can also be used to estimate environmental benefits.

The costs to start an inventory can be significant; however, these costs can be managed by establishing the inventory incrementally over time, using sampling techniques to develop estimates, or training volunteers to collect data. Despite the start-up cost, over time, an inventory can substantially increase a jurisdiction's ability to respond to service requests and maintain regular trimming/pruning cycles.[1] A tree management consultant for Seattle estimates that updating and maintaining Seattle's old inventory and using the inventory to establish a scheduled maintenance routine could cut the per tree cost in half.[2]

3. Systematic Care Programs

A healthy tree requires a routine system of care that consists of periodic inspections as well as watering, mulching, pruning, and fertilizing. A routine system of care or a routine pruning program provides many benefits, which are listed in Exhibit 3.

EXHIBIT 3: BENEFITS OF ROUTINE PRUNING

- Improved cost-effectiveness by pruning trees when they are smaller and can be pruned at minimal cost.
- Lower municipal liability from potential tree related injuries or damages resulting from hazardous conditions.
- Fewer priority service requests.
- Improved overall condition of trees resulting in higher appraised dollar value.
- Increased property values due to improved condition and higher dollar values for tree populations.
- Lower cost per tree trimmed compared to pruning only for sign clearance and storm damage on an emergency basis.
- Reduced potential storm damage to trees and possibility of power outages caused by failure of weak or dead limbs.
- Improved tree appearance and enhanced aesthetic value to the County.
- Fewer tree mortalities through early identification and correction of disease and insect problems.
- Improved urban environment including maximum amounts of shade and cooling, noise and glare reduction, and pollution control.
- Improved public relations.

Source: ACRT, Inc. Urban Forestry Specialists. *Tree Inventory Report and Management Plan for Montgomery County MD.* November 1995, p. 28.

[1] Cabrera, Gabe. Legislative Analyst Report – Municipal Tree Programs Hearing (File No. 002106) A Survey of Municipal Tree Programs. December 14, 2000, with revisions January 2, 2001. http://sfgov.org/site/bdsupvrs_page.asp?id=5030.

[2] Cascadia Consulting Group. Seattle Urban Forest Assessment: Sustainability Matrix. 2001. Appendix I, Matrix Summary Detail, p. I-8.

In general, if care, especially pruning, is provided at regularly scheduled intervals, a tree will be healthier and require less expensive follow-up maintenance. For example, a recent cost benefit report found routine pruning reduced program costs by 300 percent.

Jurisdictions adopt different maintenance cycles for routine pruning. The research suggests the length of the cycle can range from four to ten years. Some examples of maintenance schedules include the following:

- Modesto, California provides maintenance on a four and a half-year cycle;
- New York City established a block-by-block routine maintenance program that provides service on a ten-year cycle;
- Los Angeles uses a grid operation to provide maintenance on a seven-year cycle; and
- Milwaukee schedules maintenance based on the size of the tree: trees less than 12 inches in diameter are pruned every three years; those greater than 12 inches are pruned every six years.[3]

4. Sustainable Budgets and Funding Sources

Historically, jurisdictions relied on general operating funds to pay for all aspects of public tree care programs, including skilled labor, appropriate equipment, and effective management. As municipal budgets declined, however, tree care activities did not compete well with other local government needs, such as public safety or education. To address the decline in funding, communities deferred maintenance, identified new funding sources, and/or supplemented operating funds with capital program funds.

- Some jurisdictions moved from a systematic pruning cycle to maintenance based on citizen requests. This approach addressed the lack of funds in the short term; however, over time, deferred maintenance results in increased per tree costs, increased costs for storm cleanup, and increased liability costs.

- Some communities identified other funding sources, such as grants, donations, special assessments, taxes, and dedicated sources of revenue to supplement general fund revenues. For example, San Francisco uses $1.8 million from the State Gas Tax and $500,000 from the Transportation Authority to fund its $2.3 million program. Claremont, CA uses revenues generated from a landscape and lighting district.[4]

- Some jurisdictions supplemented programs with money from their capital budget. New York City and Milwaukee both use bond money for new capital projects.[5]

[3] Cabrera, Gabe. Legislative Analyst Report – Municipal Tree Programs Hearing (File No. 002106) A Survey of Municipal Tree Programs. December 14, 2000, with revisions January 2, 2001. http://sfgov.org/site/bdsupvrs_page.asp?id=5030. pp. 2-8.
[4] Cabrera, 2001.
[5] Cabrera, 2001.

Table 1 shows some small jurisdictions that use capital project funding to pay for tree pruning and tree removal, in addition to tree planting/replacement. The funding for these activities ranges from $23,000 to $75,000.

TABLE 1: TYPES OF TREE CARE ACTIVITIES FUNDED WITH CAPITAL PROGRAMS

Jurisdiction	Department receiving CIP funds	Use of capital funds			
		Tree Planting/ Replacement	Tree Removal	Tree Pruning	Inventory & Management System
Brentwood, CA	Parks and Recreation	X	X		
Dana Point, CA	Public Works	X			
Evanston, IL	Parks	X	X		
Newton, MA	Parks and Recreation	X		X	X
Olympia, WA	Community Planning and Development	X			
Wheat Ridge, CO	Parks and Recreation	X	X	X	

Source: OLO and DEP, September 2004.

5. Tree Advisory Boards

A tree advisory board is a committee of citizens that advises elected officials on tree policies and motivates elected officials to support resources for urban forest management. The Tree Committee in Spokane, Washington, for example, plays a key role in evaluating needs, setting goals, and establishing policy for the community forestry program. Specifically, the Committee:

- Reviews city plans and policies related to arboriculture and horticulture;
- Recommends legislation regarding the urban forest;
- Develops a program for identifying and maintaining trees in the city that have significant historical, cultural, environmental or public significance;
- Provides information regarding the selection, planting and maintenance of trees on public and private property; and
- Coordinates the city's Arbor Day program, grants, and other similar programs.

One study of tree advisory boards in Northeastern Pennsylvania suggests that although a tree advisory board can improve the quality of an urban forestry program, it can be difficult to sustain over time. In addition to a lack of funding, a focus group of tree commissioners identified a lack of time and energy from volunteers to complete tasks, a lack of support from citizens and leaders, and a lack of assistance from staff, volunteers and arborists as other barriers to long term sustainability.

The research explains that cities without tree advisory committees tend to have strong working partnerships with private urban forestry organizations as well as support from citizen groups.

6. Management Plans and Studies

A management plan describes the practices and activities an agency uses to plant, maintain, and remove its trees, based on available resources, community needs and adopted program goals. A management plan articulates a shared vision for a city's trees, defines the procedures and steps to carry out the vision, and sets the framework for the use of other tools, such as the adoption of a tree ordinance.

The research suggests that jurisdictions recognize the need for management plans, however, they are not always positioned to implement them.

- A 1998 survey of staff in 25 large cities found 64 percent had management plans for public trees, and one city had a management plan that considered both public and private trees.[6]

- A 2000 survey of 56 program managers in northeastern Pennsylvania reported 90 percent of the respondents thought community tree plans were important, but only 29 percent of the programs had a tree plan.[7]

The scope and purpose of a management plan can vary widely, depending on a community's concerns and resources. Some plans address a specific concern or a specific tree type, such as hazardous trees or street trees. Other plans address the management and benefits of both public and private trees. Several types of management plans are described below.

- ***A tree risk management plan*** provides a systematic approach to identify trees with structural defects that may cause property damage or personal injury. According to *Urban Tree Risk Management: A Community Guide to Program Design and Implementation*, this type of plan lowers the frequency and severity of accidents, which, in turn, reduces damage and injury. It also results in fewer expenditures for claims and legal expenses; and reduces tree care activity costs because, in the long run, there are fewer tree removals annually. Ideally, a risk management plan will be fully integrated with a planting, tree maintenance, and emergency response program.[8]

[6] Clark, J.R., and N.P. Matheny. 1998. A model of urban forest sustainability: Application to cities in the United States. J. Aboric. 24(2):112-120. Cited in Elemendorf, William F., Vincent J. Cotrone, and Joseph T. Mullen. Trends in Urban Forestry Practices, Programs and Sustainability: Contrasting a Pennsylvania, U.S., Study. Journal of Arboriculture 29(4): July 2003. p. 240.

[7] Elemendorf, William F., Vincent J. Cotrone, and Joseph T. Mullen. Trends in Urban Forestry Practices, Programs and Sustainability: Contrasting a Pennsylvania, U.S., Study.. Journal of Arboriculture 29(4): July 2003. p. 241.

[8] USDA Forest Service, Northeastern Area. *Urban Tree Risk Management: A Community Guide to Program Design and Implementation.* 2003.

- ***An inventory and management plan*** analyzes the species and age diversity, condition, and management needs of a certain tree population based on a comprehensive inventory. For example, an inventory and management plan conducted for the Montgomery County Suburban District in the mid-nineties, created an inventory management system with 13 information fields. The study recommended a management plan that gave priority to the removal of hazardous trees, hazard pruning, and sign clearance problems, followed by systematic pruning and tree planting programs. The study also recommended that the County initiate an annual survey to identify trees that interfere with traffic control devices.[9]

- ***A forest management plan*** describes forest communities using species composition, age arrangement, size distribution, structure, density, canopy closure, and habitat characteristics such as dead and downed woody debris. It identifies management treatments that ensure long-term sustainability and diversity, as well as meet the landowner's objectives. The landowner's objectives may range from wanting to have a forest to wanting to harvest high quality timber products. The overriding objective of some plans is to ensure that the forest is managed in an ecologically sustainable manner. Some plans may include an inventory and description of distinct management areas. Examples of management objectives include increasing bio diversity, or an evaluation of the quality and quantity of habitat available for certain species.

- ***A green infrastructure management plan*** consists of an inventory or assessment of land cover to identify existing hubs[10] and corridors[11] for preservation and to target gaps for reforestation. The goal of a green infrastructure plan is to preserve the diversity and connectivity of natural ecosystems from urbanization and the negative effects of low density development. In Montgomery County, the Legacy Open Space Functional Master Plan and the associated capital program could provide a point of departure for a more comprehensive green infrastructure plan.[12]

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[9] An inventory analysis showed the County's tree population to be fairly well distributed with sufficient growing stock in young and middle age trees. It found 85 percent of the tree population was in fair or better condition and concluded the inventory was moderately diverse. The study estimated the County should replace 1,920 trees annually to keep the population constant, assuming a two percent annual mortality rate. The plan recommended maintaining safety in the urban forest by removing dead and dying trees, pruning trees to clear for traffic control, and pruning or removing hazardous trees and conducting routine pruning. The plan also proposed perpetuating the urban forest through new and replacement plantings.

[10] According to Maryland's Green Infrastructure Assessment, hubs are "unfragmented areas hundreds or thousands of acres in size, and are vital to maintaining the state's ecological health. They provide habitat for native plants and animals, protect water quality and soils, regulate climate, and perform other critical functions." Maryland's Green Infrastructure Assessment. May 2003. p. 2.

[11] Corridors are "linear remnants of natural land such as stream valleys and mountain ridges that allow animals, seeds, and pollen to move from one area to another. They also protect the health of streams and wetlands by maintaining adjacent vegetation. Preserving linkages between the remaining blocks of habitat will ensure the long-term survival and continued diversity of Maryland's plants, wildlife, and environment." Maryland's Green Infrastructure Assessment. May 2003. p .2.

[12] The State of Maryland has developed a Green Infrastructure Assessment tool and established the GreenPrint program, which earmarks funds specifically to protect land in the Green Infrastructure network. Based on an initial assessment, individual parcels are evaluated for their conservation or restoration value.

- ***A cost benefit management strategy*** compares tree care program costs with the avoided costs created by an urban forest's ability to naturally cool the air, sequester carbon dioxide, remove other air pollutants, and reduce stormwater runoff. This type of plan calculates these benefits for different species in the urban forest inventory and, based on this assessment, identifies those species that provide the greatest environmental benefits at the lowest program cost. The management recommendations balance actions to create a sustainable urban forest and actions to maximize environmental benefits. This approach can look narrowly at a street and/park tree inventory or more broadly at the public and private tree inventory in an urban area. (See Section C, beginning on page 15, for more details about these types of studies.)

- ***A comprehensive urban forest management plan*** addresses trees, small plants, and other vegetation on public and private property to manage the ecosystem of an urban area. For example, the Portland Urban Forestry Management Plan addresses "all the vegetation of the urban forest as a whole, placing more emphasis on trees since they provide the most benefits, are required the most often, and are regulated to a greater degree than other elements of the urban forest."[13]

  The Portland plan described the roles and responsibilities of the agencies and nonprofit organizations that manage programs and developed recommendations to move from "reactive, fragmented management to proactive, integrated and coordinated management."[14] The Portland plan recommended the establishment of a permanent Urban Forestry Policy group to coordinate policy, data gathering, maintenance, and education and outreach plans. It recommended development of criteria to prioritize planting areas; and, the establishment of stable funding and adequate resources to maintain, preserve, restore, and increase all aspects of the urban forest.

7. Organizational Structures

Traditionally, the public sector dispersed tree management responsibilities across several departments, including parks, forestry, public works, planning, and code enforcement.[15] More recently, some jurisdictions centralized these responsibilities in one department, usually a parks or public works department. The research offers the following information about these two models:

- The **centralized model** designates one person, such as an urban forester or arborist, to coordinate the management of all activities. This position should serve as clearinghouse for all activities that affect trees and must have the authority to approve, deny, or condition any activities in accordance with a jurisdiction's management plan, policies, and ordinances.

[13] Portland Parks & Recreation and the Urban Forestry Management Plan Technical Advisory Committee, Portland Urban Forestry Management Plan 2003 – Recommended Draft. November 2003, p. 1.
[14] Portland Parks & Recreation and the Urban Forestry Management Plan Technical Advisory Committee, Portland Urban Forestry Management Plan 2003 – Recommended Draft. November 2003, p 47.
[15] The administrative responsibilities usually include: directing tree care operations, including planting, maintenance and removal; preparing a budget; seeking funds and grants; evaluating and approving permits; conducting community outreach and education; enforcing ordinance provisions; developing and updating comprehensive management plans; and, establishing and tracking performance measures for program evaluation purposes.

- The **decentralized model** distributes responsibilities across different departments, such as the departments of public works, parks, planning, or environmental protection. In this case, a jurisdiction should establish a group to coordinate interagency issues and/or establish an overall coordinating framework to avoid creating duplication or overlapping responsibilities. Unless activities are coordinated, departments may unintentionally undermine each other's efforts to conserve tree resources.

Commenting on the model that centralizes authority, one study states that it is important to designate specific responsibilities and to ensure that the position has the authority to carry out the designated responsibilities. The authors caution that establishing the position of a community arborist or forester to coordinate duties across functions will not be effective if the person has the necessary technical expertise but lacks sufficient authority. To function effectively, an urban forester or tree manager must have the authority to modify existing practices and activities. [16]

A survey of programs in Claremont, Modesto, Los Angeles, New York City, Milwaukee, and Seattle, conducted in 2001 for the City of San Francisco Board of Supervisors, reports these cities have either a single agency responsible for managing both street trees and park trees, or working groups to coordinate inter-departmental efforts and reduce overlap. Specifically:

- The Public Works Department manages street and park trees in Modesto (75,600 street trees and 16,000 park trees), Milwaukee (200,000 street trees) and Claremont (23,000 trees);

- The Parks and Recreation Department, in coordination with five Borough Forestry Offices, manages street and park trees in New York City (500,000 street trees and 2 million park trees);

- The Public Works and Parks Departments share management responsibilities in San Francisco (30,000 street trees and 27,000 park trees) and Los Angeles (680,000 street trees and 800,000 park trees).[17]

A survey of six peer cities, conducted by the city of Seattle in 2000, reports that successful programs are consolidating most urban forestry work within one department. The study reports that while tree programs were originally established in public works departments, contemporary parks departments have public service and ecological missions that align more closely with the emerging objectives of urban forestry. The study suggests program consolidation offers opportunities to enhance planning, budgeting, and staffing, while developing a core program that has greater public visibility.[18]

[16] Guidelines for Developing and Evaluating Tree Ordinances. October 31, 2001. http://www.isa-arbor.com/tree-ord/ Part 1. Planning for an ordinance.
[17] Cabrera, Gabe. Legislative Analyst Report – Municipal Tree Programs Hearing (File No. 002106) A Survey of Municipal Tree Programs. December 14, 2000, with revisions January 2, 2001. http://sfgov.org/site/bdsupvrs_page.asp?id=5030. p.7.
[18] Cascadia Consulting Group, 2001.

8. Performance and Evaluation Measures

Urban forest researchers and practitioners have developed many different types of performance measures and policy frameworks that can be used to assess tree management programs on a local or regional level. Two of these tools are highlighted below.

- Cascadia Consulting Group studied the sustainability of Seattle's urban forest and developed a set of objectives and performance measures that assessed the vegetation resources, community framework, and management practices. See Appendix B for A Summary Matrix for an Assessment of Seattle's Urban Forest.

- The Sacramento Tree Foundation, a nonprofit organization in the Sacramento area, developed a Regional Urban Forest Framework to help public officials in a six-county area focus on maximizing the benefits of the urban forest. The framework creates a relationship between the amount of canopy coverage a jurisdiction wants to achieve and different management strategies. See Appendix C for a copy of the Regional Urban Forest Framework.

C. Research Findings About the Benefits and Costs of Tree Care Programs

Trees significantly improve the quality of life in an urban area because they provide many environmental, social, aesthetic, and economic benefits. Exhibit 4, on pages 17 and 18 at the end of this chapter, details these benefits.

Since 1999, the Center for Urban Forest Research (CUFR) has conducted a cost/benefit analysis of tree programs to develop program management strategies that maximize the environmental benefits of trees. Table 2, on page 16, summarizes the results of studies for cities of Davis, Modesto, and San Francisco, CA, and Fort Collins, CO. The data show different amounts of environmental benefits as well as different estimated values. These results reflect differences not only in city size and utility rates, but also in the size and characteristics of the tree inventories. Specifically:

- Davis' tree inventory consists of 31,066 publicly and privately maintained street trees;
- Fort Collins' inventory consists of 30,942 publicly maintained street trees and park trees;
- Modesto's inventory consists of 91,179 publicly maintained street and park trees; and
- San Francisco's tree population consists of 98,535 publicly and privately maintained street trees.

CUFR estimated the value of the environmental benefits using tree inventory data and utility rates. The estimates ranged from $2 million for the 31,066 street trees in Davis to $7.5 million for the 98,535 street trees in San Francisco. The average annual value ranged from $54 per tree to $77 per tree; however these calculations did not subtract out the costs of tree care activities. The net value is the value of the tree to the community minus the cost of care. If costs were subtracted from the estimated benefits, the net values ranged from 61 cents per tree in San Francisco to $52 per tree in Davis.

The analysis of street trees in the City of San Francisco that used this approach recommended planting proven long-lived species that maximize available growth space; planting in areas where stocking levels were lowest to distribute benefits more equitably; and improving pruning frequency to promote tree functionality and longevity.

TABLE 2: SUMMARY OF ENVIRONMENTAL AND COST BENEFIT ANALYSIS OF TREES BY JURISDICTION

Jurisdiction and Population[1]	Davis (60,308)	Fort Collins (118,652)	Modesto (188,856)	San Francisco (776,733)
Number of trees studied	31,066	30,942	91,179	98,535
Class of tree	Street trees	Street trees & park trees	Street trees & park trees	Street trees
Environmental Benefits				
Energy savings (Electricity and natural gas)	2,781 MWh of electricity and 2,619 MBtu[2] of natural gas	5,622 MWh	36,926 MWh	651 MWh of electricity and 1,646 MBtu of natural gas
Air quality improvement [3] (Pollutants removed from atmosphere)	36 metric tons	6 metric tons	150 metric tons	4 metric tons
Carbon dioxide reduction	3,722 metric tons	2,912 metric tons	15,000 metric tons	2,528 metric tons
Stormwater runoff reduction	17 million gallons	37 million gallons	77 billion gallons	98 million gallons
Value of Environmental Benefits				
Total Value	$2 million	$2 million	$5 million	$7 million
Value per Tree	$66	$70	$54	$77
Net Value per Tree (total benefits less costs)	$52	$38	$26	$0.61

Source: OLO and Benefit-Cost Analysis of Modesto's Municipal Urban Forest, Benefit-Cost Analysis of Fort Collins' Municipal Forest, A Practical Approach to Assessing Structure, Function, and Value of Street Tree Populations in Small Communities: City of Davis, City of San Francisco, Street Tree Resource Analysis.

1. Population based on 2000 U.S. Census Bureau data.
2. One million British Thermal Units.
3. Includes O_3 (Ozone), PM_{10} (Particulate matter), VOCs (Volatile Organic Compound), and NO_2 (Nitrates).

EXHIBIT 4: BENEFITS OF TREES

Trees improve air quality. Trees improve air quality because they release oxygen into the air through photosynthesis, absorb and store carbon dioxide, remove harmful gases and particulates, and provide shade to reduce the vehicle emissions of parked cars. A large, healthy tree can produce enough oxygen each day for 18 people.

Through normal metabolism, a tree can help reduce the planet's carbon dioxide load. For example, one mature urban tree can absorb CO^2 at a rate of 13 pounds/tree/year.[19] A tree absorbs nitrogen oxides, carbon monoxide, chlorine and fluorine halogens, sulfur dioxide, ammonia, and ozone.[20]

A tree also filters particulate matter (less than ten microns) such as dust, ash, and smoke from the air.[21] One large urban tree can absorb ten pounds of air pollutants, including four pounds of ozone and three pounds of particulates.[22] A tree that shades a parking lot reduces the amount of volatile organic compounds (VOCs) released from a parked car.

Trees save energy. Urban trees can modify climate and conserve building energy use through shading, evapotranspiration, and wind speed reduction. Trees shade homes, offices, streets, parking lots, and other surrounding pavement. In summer, a well placed tree can intercept up to 90% of the solar energy, reducing the need for air conditioning.[23] A large front yard tree can reduce a typical residential building's annual air conditioning costs by 9 percent.[24]

Evapotranspiration converts liquid water in plants to vapor, thereby cooling the air. The 200,000 leaves on a healthy 100-foot tree can take 11,000 gallons of water from the soil and breathe it into the air in one growing season. The cooling effect of this process is equivalent to air conditioning 12 rooms. Wind speed reduction reduces the infiltration of outside air into interior spaces.[25] In winter, a properly placed evergreen tree can reduce wind velocity that pulls heat out of buildings, lowering heating costs by 10 to 20 percent.[26]

Trees reduce stormwater runoff. Trees decrease the overland flow of water and non-point pollution created from a heavy rainfall because a tree intercepts rainfall and releases it slowly. A mature urban tree can intercept 760 gallons of rainfall in its crown.[27] Tree roots actively remove water from soil. Studies show that infiltration rates of treed areas are ten to 15 times higher than those of grass turf areas.

[19] The Tree Report. Tree Ordinance Drafting Group. Montgomery County, Maryland. April 1990.
[20] Montgomery County's Air Quality Strategy (Strategy #7), 2003.
[21] The Value of Urban Trees. www.dnr.state.md.us/forests/healthreport/urban.html
[22] Center or Urban Forest Research. Pacific Southwest Research Station. USDA Forest Service, Davis, California. Fact Sheet #1: Benefits of the Urban Forest.
[23] Portland Urban Forestry Management Plan 2003.
[24] Center or Urban Forest Research. Pacific Southwest Research Station. USDA Forest Service, Davis, California. Fact Sheet #1: Benefits of the Urban Forest.
[25] Center for Urban Forest Research. Pacific Southwest Research Station. Chapter IV. Benefits Produced by the Fort Collin's Urban Forest.
[26] Portland Urban Forestry Management Plan 2003.
[27] Center or Urban Forest Research. Pacific Southwest Research Station. USDA Forest Service, Davis, California. Fact Sheet #1: Benefits of the Urban Forest.

EXHIBIT 4: BENEFITS OF TREES (CONTINUED)

Trees improve water quality and reduce soil erosion. Rapidly moving stormwater can wash soil sediment into nearby rivers, creeks, and water ways, increasing water turbidity; a major source of water pollution. Tree roots hold the soil, reduce erosion, and decrease the amount of sediment that enters our creeks, streams, rivers, and lakes.

Riparian, or streamside forests, are important to the environment. Streamside forests control fluctuations in water temperature and maintain light levels, which control the type and amount of algae in a stream. Without a streamside forest, stream channels become unnaturally wide as stream banks erode. If there is fundamental change, habitat loss results.

Trees provide wildlife food and habitat. Trees provide food and habitat for many species of birds, mammals, fish, insects, and amphibians. Seeds, fruits, and nesting sites from trees sustain a wide variety of birds and other animals that depend upon these sources for survival. Litterfall contributes food energy to stream inhabitants and trees keep water at a comfortable temperature for aquatic animals.[28]

Trees provide visual screens and sound barriers, which can be used to screen dissimilar land uses while making the overall land use pattern more efficient. Barriers of trees in conjunction with walls and landforms can reduce highway noise by 6 to 15 decibels.[29] A dense grove of trees about 50 feet wide reduces apparent loudness of noise by as much as 50 percent.[30]

The presence of trees can increase real estate values and sales. Several studies show that trees planted in public spaces and rights-of-way can contribute an additional 5 to 7 percent value of a property, compared to properties in urban areas without trees. In a study conducted by the University of Washington, researchers found that consumers are willing to pay 12 percent more for goods purchased in well landscaped districts.[31]

Trees provide a setting for both passive and active recreation activities. Trees provide color, variety, texture, shape, and sound that are pleasing in all seasons of the year.[32] Studies show that exposure to nature and the urban forest reduces stress.[33] Most people enjoy the natural beauty and serenity of trees and many cultures associate trees with strength and wisdom.

Source: OLO, September 2004.

[28] Portland Urban Forestry Management Plan. 2003.
[29] Portland Urban Forestry Management Plan. 2003.
[30] The Value of Urban Trees. www.dnr.state.md.us/forests/healthreport/urban.html
[31] Portland Urban Forestry Management Plan. 2003.
[32] Portland Urban Forestry Management Plan. 2003.
[33] Portland Urban Forestry Management Plan. 2003.

CHAPTER III. Overview of Chapters IV, V and VI

The next three chapters of this report address how the five County and bi-County agencies care for and manage trees on publicly owned land and in public rights-of-way.

> **Part A** establishes an organizing structure for the review of the agencies' tree care activities; and
> **Part B** addresses the issues of centralization, contracting out, and interagency coordination.

A. Review of the Agencies' Tree Care Activities

To facilitate the comparison of similar programs across the agencies and the identification of opportunities for improved coordination, this report examines the agencies' practices within three groups: landscape trees, forest trees, and street trees.

- **Chapter IV** examines the agencies' activities and practices for **landscape trees**. For the purpose of this study, **a landscape tree** is a tree which grows naturally or is planted adjacent to a school, or community center or other public facility, on a college campus; or in a local or regional park. (For the purposes of presenting cost data, landscape trees in parks are identified as park trees.) Each of the five agencies, i.e., M-NCPPC, Montgomery College, County Government, MCPS, and WSSC, plants, maintains, and removes landscape trees.

- **Chapter V** examines the agencies' activities and practices for **forest trees**. For the purpose of this study, a **forest tree** is a tree which is part of a stand of trees that may occur naturally or be deliberately planted in a natural reserve, a county park, or on a public building site. Each of the five agencies, i.e., M-NCPPC, Montgomery College, County Government, MCPS, and WSSC, plants forest trees.

- **Chapter VI** examines the agencies' activities and practices for **street trees**. For the purpose of this study, a **street tree** is a tree that is planted along a public right of way in an urban, suburban, or rural area. Two of the five agencies, County Government and WSSC, plant and remove street trees. Three agencies, M-NCPPC, the College and MCPS, do not provide tree care activities for street trees.[1]

The first part of each chapter provides a detailed description of the agencies' tree care activities, and presents available cost data for staff who manage or are directly engaged in tree planting, maintenance and removal activities. The data, summarized in Table 3 on the next page, show the five County and bi-County agencies collectively spent approximately $4 million for tree planting, pruning, and removals in FY 04. The data represent an incomplete estimate of tree care activity costs. Specifically:

[1] M-NCPPC maintains three roads in the County as park roads: Beach Drive, Sligo Creek Parkway, and Little Falls Parkway. Staff in the Division of Natural Resources estimate there are approximately 30 trees in the medians of these roads, which the Arboriculture Section maintains as part of its broader maintenance responsibilities. For the purposes of this study, these trees are defined as park trees, not street trees.

- The total does not include an estimate for landscape tree activities in the College, County Government, MCPS, and WSSC because the design and planting costs are generally embedded in individual capital projects. The agencies generally do not break out tree maintenance costs, which are an incidental portion of a much larger budget for building maintenance activities.

- The estimate for park tree activities reflects M-NCPPC's estimated costs for the Pope Farm nursery, the Horticulture Section, and the Arboriculture Section in the Natural Resources Division plus an estimate of landscape crew costs in the Northern and Southern regions. It does not include landscape contract costs, which are generally a small portion of the total capital project cost for a new park.

TABLE 3: FY 04 ACTIVITY COST DATA BY TREE SETTING

Tree Settings	Activity Cost ($ in 000s)	Percent of Available Cost
Landscape tree activities	Not available	0%
Park tree activities[2]	$1,600	40%
Forest tree activities	$247	6%
Street tree activities	$2,132	54%
TOTAL	**$3,979**	**100%**

Source: OLO, September 2004

B. REVIEW OF THE AGENCIES' MANAGEMENT PRACTICES

As part of this study, the Council also asked OLO to identify opportunities to improve the efficiency and effectiveness of the agencies' tree management practices, with a particular focus on centralization, contracting out, and interagency coordination. OLO's observations about each of these issues, based on the review of the agencies' practices in Chapters IV, V, and VI, are summarized below.

1. Could activities common to more than one agency be managed more efficiently through a centralized process?

OLO's review of the agencies' tree care activities shows the centralization that exists among the agencies' tree care activities depends on many factors, including the tree

[2]The phrase "park tree activities" reflects all of the costs associated with the care of trees in parks, whether they are in a landscape area, along a trail, or in the forested area of a park.

setting, i.e., landscape, forest or street trees, the purpose of the activity, and the mission of the agency. For example:

- At least 12 different groups participate in tree care activities for landscape trees in the College, County Government, MCPS and WSSC. These activities are part of capital project development and building maintenance services. In each agency, the capital project section is responsible for landscape design and installation and a separate maintenance division is responsible for maintenance and removals. It would be difficult to centralize these activities across the agencies, in part, because the timing of the design activities depends on each individual project.

- At M-NCPPC, the responsibility for growing, harvesting, planting, major pruning, and the removal of landscape trees and other trees in the parks is centralized in the Division of Natural Resources in the Parks Department. In addition, the landscape crews stationed at the Northern and Southern regions supplement these activities with planting and routine pruning.

- Tree care activities for forest trees are shared among several groups in M-NCPPC, the College, the County Government, MCPS and WSSC. Generally, the activities to comply with the County's Forest Conservation Law (FCL) are decentralized; however, the administration of the FCL provides an opportunity to coordinate these activities. For example, as a result of an agreement among M-NCPPC, WSSC, and the County Government, the County Government is reforesting portions of WSSC's land along the Triadelphia Reservoir, establishing a tree bank so that future County roadway projects will be able to comply with the FCL's requirements.

- Tree care activities for street trees are largely centralized in MCG, although WSSC also removes and replaces street trees that interfere with water and sewer repair projects.

- Within County Government, most planting, maintenance, and removal activities are organized geographically. The Regional Service Centers are responsible for tree care activities in their respective urban districts.

- Outside of the urban districts, DPWT and DEP share management responsibilities for street tree planting, maintenance and removals. In April 2004, the Directors of DEP and DPWT signed a memorandum of understanding (MOU) to formally address several street tree program responsibilities. The MOU transferred additional management responsibilities for the street tree program from DPWT to DEP in principle; however, it did not address how the program would work in practice. Since the MOU was signed, citizens and others have asked many specific questions about planting, maintenance, and removal activities to understand what new procedures the County Government has put in place to coordinate delivery of these activities.

In sum, efficient management of the agencies' tree care activities for landscape trees, park trees, and forest trees exists, either through a centralized organizational structure or a centralized process. Efficient management of tree care activities for street trees in the urban districts exists through each of the Regional Services Center. The Directors of DEP and DPWT signed a memorandum of understanding to establish a centralized process to manage tree care activities for street trees outside of the urban districts; however, the County Government needs to clarify how these responsibilities will work in practice.

2. What are the advantages and disadvantages of using in-house staff versus contracting out each tree care activity?

The five County and bi-County agencies use a combination of contract and in-house personnel for tree care activities. According to the research literature, there are advantages and disadvantages to both approaches.

- The advantages of using contractors include cost savings and flexibility; however, these advantages can be off-set by a lack of sustainable practices. The research also states that smaller organizations benefit from contract labor because they are not well positioned to add personnel to the payroll. The disadvantages of contract labor are the loss of control, the varying quality among private contractors, and the need for effective contract oversight.

- The advantages of using in-house personnel are their availability and responsiveness, plus the opportunity to provide better supervision and better training. Over time, effective supervision and training can lead to higher quality service. The main disadvantage of in-house personnel is higher costs compared to contract labor.

The people OLO interviewed in the five County and bi-County agencies acknowledged that contracting out helps the County save money, however, many people emphasized the importance of ongoing oversight to ensure a contractor meets the terms specified in the contract.

Exhibit 5, on the following page, compares the contract oversight practices among the departments and agencies that plant new or replacement street trees. Except for BUP, all of the entities that plant street trees contract with a nursery or landscape company to provide, plant, and care for the trees. BUP staff report they are able to provide adequate oversight because they choose and plant trees with in-house staff. DEP always inspects materials at the contractor's yard following delivery and inspects all trees following planting and at the end of the guarantee period. DEP reports its inspection practices have resulted in fewer substandard plantings by contractors. In FY 05, the Council approved funding for DEP to hire staff to provide additional contract oversight.

EXHIBIT 5: OVERSIGHT PRACTICES FOR STREET TREE PLANTING CONTRACTS

Oversight Practices	DEP	DHCA	BUP	Wheaton/Silver Spring Urban Districts	WSSC
Select and tag product at nursery	No	Optional	Yes	Yes	Optional
Inspect product upon arrival	Yes	Yes	Yes	Yes	Optional
Certified Arborist required on-site during planting	No	No	Yes	Yes	No
Inspect Planting within warranty period	Yes	Yes	Yes	Yes	Yes

Source: OLO and DPWT, WSSC, BUP, and Wheaton and Silver Spring Urban Districts, September 2004.

OLO's review of five agencies' practices found extensive use of contractors for landscape trees, forest trees, and street trees, but not for park trees. Staff in the five County and bi-County agencies stressed the importance of retaining in-house personnel for the delivery of core services. OLO's review of the agencies' tree care activities identified the following uses of in-house personnel:

- The Bethesda Urban Partnership uses in-house personnel for most its tree care activities;
- County Government uses in-house personnel for emergency street tree services;
- M-NCPPC uses in-house personnel for most of its tree care activities in the parks and a combination of in-house and volunteer personnel for its forest tree activities;
- In-house building or facility services staff at four agencies, County Government, the College, MCPS, and WSSC, provide minor tree pruning for landscape trees.

3. What interagency coordination currently exists with respect to the agencies' tree care activities and what additional opportunities exist for coordination?

The dispersed nature and multiple purposes of the tree care activities throughout the five County and bi-County agencies suggest the need for ongoing coordination. Staff who provide tree care activities coordinate both formally and informally.

Formal coordination. Formal coordination of tree care activities takes place through the administration of the Forest Conservation Law and the Planning Board's mandatory referral process. Formal coordination also occurs through the Interagency Forest Conservation Team. Specifically,

- The M-NCPPC Environmental Planning staff coordinate with all public agencies to meet the requirements of the Forest Conservation Law for the preservation, reforestation, and afforestation of trees.

- MCPS, DPWT, DHCA, DEP all formally coordinate capital project plans with the Planning staff which reviews all capital projects as part of the Planning Board's mandatory referral process.

- Staff in the Silver Spring and Wheaton Urban Districts coordinate with the Maryland State Highway Administration (SHA) to maintain some trees along State roads. The Urban Districts developed a Memorandum of Understanding with SHA to assume responsibility for pruning trees along certain State roads while the State maintains responsibility for plantings and removals.

- The Interagency Forest Conservation team, an interagency staff working group that DEP established at the request of the County Council, serves as a formal coordinating structure for staff from the County Government, M-NCPPC, WSSC, and MCPS. The IFC team, which began meeting in March 2002, discusses and recommends solutions to forest and tree conservation issues in the County. DEP's Forest Conservation Coordinator chairs the IFC Team. In July 2004, the IFC Team issued a Forest Preservation Strategy Update and briefed the County Council's Transportation and Environment Committee on its accomplishments. The IFC Team's priority issues for FY 05 are the overabundance of deer, non-native invasive plants, tree loss on small lots, and lack of funds for street tree maintenance.

Informal coordination. OLO's review of the agencies' tree care activities identified a multitude of informal coordinating practices. Some examples include the following:

- The Bethesda Urban Partnership coordinates tree plantings with developers and Planning staff to ensure that the developers' plantings are consistent with the requirements in the master plan and the streetscape plan.

- Staff in the Silver Spring and Wheaton urban districts receive informal opportunities from Planning staff to review the details of development plans that will occur in their districts. Staff from both districts appreciate those opportunities and would like to see a more formal review function to ensure coordination in the future.

- The Department of Housing and Community Affairs (DHCA) coordinates with staff in the Silver Spring and Wheaton Urban Districts regarding streetscape projects in the urban districts. Staff work out agreements to address the types of species that will be planted and how the trees will be maintained. DHCA also coordinates informally with DPWT to be sure the selected tree species comply with the County's official street tree list.

- Staff in DPWT's Traffic Engineering and Operations Section co-chair a pre-development review meeting with staff in the Department of Permitting Services (DPS); both DPWT and DEP staff participate in the Development Review Committee. M-NCPPC's Development Review staff work with the staff in DPWT, DPS and developers to resolve issues when there are conflicts between the master plan guidelines and the standards in County law.

- MCPS staff worked with M-NCPPC's urban designers to develop a booklet of landscaping guidelines for school sites to address design conflicts between the agencies.

- DEP's reforestation plantings in stream valley parks are carried out with the full cooperation and support of M-NCPPC staff. M-NCPPC staff also approve landscaping plans for all projects within the stream valley park system.

- Environmental Planning staff in M-NCPPC's Countywide Planning Division work with the Parks Department to identify forest resource areas for park acquisition.

- The Forest Ecologist who administers the M-NCPPC reforestation program works with staff at Pope Farm to grow seedlings and with staff in the Parks Department to plant trees.

Opportunities for improved coordination. OLO's review of the five agencies' tree care activities also identified opportunities for improved coordination. Some of these include the following:

- Convene staff from the five County and bi-County agencies to develop a uniform list of tree species and to convene periodic follow-up meetings to discuss issues associated with different species and to update the list of approved tree species.

- Convene staff from the five agencies to compare and discuss specifications associated with different tree management contracts and to discuss effective oversight practices.

- Create subcommittees for the IFC Team so that the issues discussed could be relevant to more people.

- Establish procedures for staff to inform DPWT when new street trees are planted that require ongoing maintenance.

- Put a system in place to track maintenance and liability agreements and to establish a process to share these agreements with DPWT.

4. Would it be feasible and/or cost effective for the Pope Farm to grow trees for the County Government's street tree programs?

As part of this study, the Council and the IFC Team asked OLO to study the feasibility of the County Government entities using trees from Pope Farm. OLO worked with staff at Pope Farm to develop cost estimates for this analysis. Table 4 summarizes options and estimates for the Urban Districts and DEP/DPWT and Appendix D provides more detailed cost information. The unit prices for trees for the Urban Districts would be cash and carry; the prices do not include planting or aftercare. The DEP/DPWT options include one cash and carry option and two options that include planting and aftercare. All three DEP/DPWT options would require additional start-up costs for Pope Farm. Pope Farm staff caution that pursuing any of these options would require a five to six-year start-up period.

TABLE 4: OPTIONS AND PRELIMINARY COST ESTIMATES FOR POPE FARM TO SUPPLY STREET TREES TO COUNTY GOVERNMENT

Entity	Tree caliper	Unit price	Does price include planting and aftercare?	Are there additional Pope Farm start up costs?
Urban Districts	1.5 to 2 inches	$120/tree	No	No
Urban Districts	2 to 2.5 inches	$170/tree	No	No
Urban Districts	2.5 to 3 inches	$225/tree	No	No
DEP/DPWT	1.5 to 1.75 inches	$118/tree	No	$605,000
DEP/DPWT	1.5 to 1.75 inches	$235/tree	Planting and one year aftercare	$1,025,000
DEP/DPWT	1.5 to 1.75 inches	$338/tree	Planting and two years aftercare	$1,445,000

Source: OLO, September 2004.

CHAPTER IV. Landscape Tree Care Activities

For the purpose of this study, a landscape tree is a tree which grows naturally or is planted adjacent to a school, or community center or other public facility, on a college campus; or in a local or regional park. In Montgomery County, schools, libraries, government buildings, community centers, college campuses, and parks all have landscape trees. No estimate exists of the total number of landscape trees on public land. All five agencies manage tree care activities associated with these landscape trees.

This chapter presents the legal requirements for landscape trees and describes the agencies' tree care activities and practices. This chapter is organized as follows:

> **Part A** presents the governance structure for landscape trees;
> **Part B** describes the agencies' planting, maintenance and removal activities and reports available cost data for these activities; and
> **Part C** provides comparative data and inventory management information.

A. Requirements for Landscape Trees in County Law

The County Zoning Ordinance, (Montgomery County Code, Chapter 59) establishes the requirements for planting landscape trees. Some sections of the Ordinance establish requirements for planting trees in parking lots to provide shade; other sections require the planting of landscape trees along the perimeter of a site. For example:

- Section 59-C-18.23 establishes development standards for a rural village center overlay zone. Trees must be planted and maintained throughout a parking facility to assure that at least 30 percent of the area is shaded. Shading must be calculated using the area of the tree crown at 15 years after the parking facility is built.

- Section 59-E-2.7-2.71 requires parking facilities located adjacent to a street right-of-way to provide a landscaping strip at least ten feet in width that must be planted with either shade or ornamental trees. A minimum of one tree for every 40 feet of lot frontage must be provided as well as an evergreen hedge, a wall, fence, or other methods to reduce the visual impact of the parking facility.

- Section 59-E-2.72 requires a perimeter landscape strip four feet in width where a parking area adjoins a residential zone. The strip must contain at least one shade tree for every 40 feet of lot perimeter and, if space permits, incorporate landscaped berms.

- Section 59-E-2.73 requires a minimum of five percent of the internal area of a surface parking facility be landscaped with shade trees. The shade trees should be distributed to increase shade and where possible, existing trees should be saved for this purpose. The minimum internal landscaping requirements may be reduced by the director/planning board for properties located in a central business district.

- Section 59-E-2.74 states planting areas shall be provided with shade trees and be wide enough to protect the trees from a vehicle's swinging doors and bumper overhang. Planting islands parallel to the sides of parking spaces must be a minimum of 8.5 feet wide.

- Section 59-E-2.75 states deciduous shade trees with ground cover or low shrubs shall be the primary landscape material for parking areas and that tall shrubs or low branching trees which restrict visibility should be avoided.

These requirements apply to public agencies, which must forward landscape plans for public buildings to M-NCPPC's Planning Department and the Planning Board for review as part of the mandatory referral process.

B. The Agencies' Landscape Tree Care Activities – Planting, Maintenance and Removals

Two general sets of tree care activities for landscape trees exist among the five agencies.

- Four agencies use contractors to provide most tree care activities for landscape trees. Private contractors provide landscape services at MCPS schools and at buildings and facilities for Montgomery College, WSSC, and Montgomery County Government. A landscape contractor typically prepares a landscaping plan, and supplies and installs the trees. The trees carry a one-year warranty. The four agencies provide only minor maintenance, if any, with in-house maintenance staff. The agencies contract out any significant maintenance or removals.

- One agency, M-NCPPC, primarily uses in-house staff to supply, install, maintain and remove landscape trees in County parks. M-NCPPC retains contractors occasionally for landscaping in some parks. Trees in County parks receive comprehensive aftercare for two years and all necessary maintenance (small and large scale) is conducted by in-house Park staff.

1. Tree Planting and Establishment Activities

All five agencies plant landscape trees. Four of the agencies, the County Government, MCPS, WSSC, and the College, use contractors for design, planting and removal. M-NCPPC primarily uses in-house staff for these activities. The number, species and locations of the trees planted are established by the Zoning Ordinance and a landscape plan for the site.

a. Maryland National Capital Park and Planning Commission (M-NCPPC)

Staff in the Horticultural Section of the Division of Natural Resources manage the operation of Pope Farm which grows trees for installation in parks across the County. In FY 04, the Pope Farm produced 1,414 balled and burlapped trees and 366 containerized

trees. Of these, 1,048 balled and burlapped trees were planted in parks as "landscape"[1] trees. In addition to trees planted at Pope Farm, landscape contractors provide approximately 10 percent of the trees in the parks. Park staff do not track these costs as a separate item; however, they estimate landscaping to be approximately ten percent of the total cost for each park development project.

Staff in the Division of Natural Resources convene an annual Plant Selection Committee to determine the best species to grow and plant in County parks. Park managers can browse and select trees from the Pope Farm inventory through an online intranet system. Trees planted at Pope Farm are primarily native species and only those trees with two-inch caliper or greater are harvested for planting.

b. Montgomery College (MC)

The College installs both new and replacement landscape trees. Contractors install most of these plantings; however, occasionally, in-house maintenance staff plant donated trees. Ideally, the College likes to plant 2.5-3 inch caliper trees; however, the size depends on the available funding.

c. Montgomery County Government (MCG)

County Government plants landscape trees when building new community facilities or other public buildings. The Division of Capital Development in the Department of Public Works and Transportation manages the design and construction of these facilities.

Staff in this division work with architects and landscape contractors, who are hired as part of each project to determine the number, type, species, and size of the trees to be planted. The characteristics (i.e., number, type, and size of trees) and costs for each project vary substantially depending on the building's use, surroundings, and orientation.

Staff in DPWT's Division of Operations review the landscape plans as part of their responsibility for ongoing maintenance; Planning staff at M-NCPPC review the landscape plans as part of the mandatory referral process.

d. Montgomery County Public Schools (MCPS)

MCPS plants landscape trees when building or renovating a school. Landscape architects, hired as part of the design team, develop landscaping plans for MCPS capital projects. A contractor must hire a professional nursery to furnish and install certified plants, following the best practices of the industry. Planning staff at M-NCPPC review landscape plans as part of the mandatory referral process. The capital program budget funds the landscape designers' fees and contract costs. MCPS staff note that landscaping costs comprise a very small portion of the overall cost of a school, typically $200,000 out of a $15 million project.

[1] Landscape trees are predominantly planted in playgrounds, near buildings, and in grassy areas of parks.

MCPS staff report that they worked with urban designers in the Planning Department to develop a booklet of landscaping guidelines for school sites to address design conflicts between the agencies. The MCPS Facilities Guide contains a Landscaping Design Guide that recommends guidelines for tree planting at MCPS facilities. The guidelines require a one-year guarantee and maintenance period (including weeding, pruning, mulching, watering, and adjusting guy wires and stakes), and identify trees recommended for planting, and trees not recommended for planting. (See Appendix E for a copy of these guidelines.)

MCPS developed its recommended tree list in line with the preference for native species by staff at M-NCPPC and the City of Rockville. MCPS' own experience has been that hardy trees with high survivability rates (which may or may not be native species) work best at MCPS facilities. MCPS' non-recommended tree list consists of non-native species and/or trees that have proven to be problematic at school facilities in the past.

MCPS purchases trees on a project by project basis from private landscapers. Since each new school or modernization project is on its own schedule, MCPS generally does not purchase in bulk.

e. Washington Suburban Sanitary Commission (WSSC)

WSSC uses private contractors for most of its tree planting activities. WSSC reports tree planting is very minimal at its buildings in Montgomery County, which include one water treatment plant and three wastewater treatment plants.

2. Landscape Tree Maintenance and Removal Activities

The five agencies rely on both in-house staff and contractors for tree maintenance and removal activities. Four agencies, MC, MCG, MCPS, and WSSC, use contractors for major maintenance and removals, relying on in-house staff for occasional minor maintenance. M-NCPPC uses in-house staff for all maintenance and removal activities.

a. Maryland National Capital Park and Planning Commission (M-NCPPC)

Staff in the Arboriculture and Horticulture Sections of the Natural Resources Division and landscape crews that operate out of the Northern and Southern regions share the planting, maintenance, and removal of landscaped trees in County parks. M-NCPPC staff maintain every tree planted in a County park. Throughout its life, a tree planted in a County park may receive maintenance services from three different programs. Specifically,

- The Horticulture Section provides two years of aftercare for every planted landscape tree. If Pope Farm grows and installs a tree, the Horticulture Section provides aftercare services as soon as the tree is planted. If a private landscape contractor installs a tree, the Horticulture Section begins aftercare after the one-year warranty period for the tree expires.

- Following the two-year aftercare program, the landscape crews in the Northern and Southern regions provide basic services, which include pruning of lower branches and mulching.

- The Arboriculture Section in the Division of Natural Resources inspects trees which impact park facilities on a four-year cycle, and also inspects trees in response to citizen calls. In each case, the Arboriculture Section provides emergency service, if warranted.

Table 5 summarizes the maintenance and care a tree in a park receives over its lifetime. M-NCPPC reports that trees from Pope Farm that receive the two-year aftercare program have a 98 percent survival rate.

TABLE 5: M-NCPPC TREE MAINTENANCE PROGRAMS

Maintenance Program	Time Period	Provider	Description of Activities
Two-Year Aftercare	0 to 2 years	Natural Resources Division – Horticulture Section	• Provides regular watering, mulching, pruning and necessary Integrated Pest Management (IPM) and stake removal.
Tree Maintenance and Inspection	2 years and beyond	Natural Resources Division – Arboriculture Section	• Provides emergency tree care in response to approximately 800-1000 citizen calls per year regarding park trees in close proximity to houses.[2] • Conducts routine inspections of park trees which impact park facilities every four years.[3]
Regional Tree Care[4]	2 years and beyond	Southern and Northern Regional Parks - Landscape Crews	• Provides basic services (pruning of lower branches, watering, and mulching) to trees in their area.

Source: OLO and M-NCPPC Natural Resources Division, September 2004.

Table 6 shows M-NCPPC's estimated costs for these activities from FY 02 through FY 04. The estimate assumes 60 percent of the costs associated with Pope Farm, 36 percent of the costs associated with the Horticulture Section, 100 percent of the costs associated

[2] The Arboriculture Section is also responsible for 24-hour emergency response, log jam removal from streams, expert planning design, technical support to install, renovate, and maintain park arboricultural resources, and review of all park development plans for compliance with best management practices in arboriculture.

[3] Specified in the M-NCPPC Arboriculture Department Maintenance Frequency Targets

[4] Other regional park staff receive training on how to inspect park trails and forests for trees that need removal and pruning and identify diseased trees.

with the Arboriculture Section, and minimal costs associated with the landscape crews in each region. It does not include the costs for trees provided and planted by landscape contractors.

TABLE 6: TREE MANAGEMENT EXPENDITURES M-NCPPC– FY 02 TO FY 04 ($ IN 000S)

	FY 02 Actual	FY 03 Actual	FY 04 Budget
Natural Resources Division			
Pope Farm Tree Expenditures (60% of Activities used for Tree Growth, Management, and Supplies)	$227	$238	$273
Horticulture Section (36% of Section used for Tree Aftercare Program and other tree related activities)	$159	$154	$193
Arboriculture Section (100% for tree maintenance)	$704	$964	$803
Southern and Northern Regional Parks			
Landscape Crews Expenditures • Southern • Northern	 $217 $81	 $219 $85	 $239 $92
Capital Projects			
Landscaping as part of new M-NCPPC Facilities and Parks	Embedded	Embedded	Embedded
Estimated Expenditures for M-NCPPC Tree Management	**$1,388**	**$1,660**	**$1,600**

Source: OLO and M-NCPPC, September 2004.

b. Montgomery College (MC)

The College's landscape contracts carry a one-year warranty. After this warranty expires, the College prunes and maintains landscape trees primarily for safety purposes. The College has in-house maintenance staff at each campus that conducts routine maintenance on new and existing trees. This includes pruning of lower branches, watering, and mulching.

The College contracts out all significant maintenance work including major tree pruning, tree and stump removals, and tree replacement.[5] Usually, the College procures maintenance services for one campus at a time; however, if all three campuses require

[5] On the Rockville and Takoma Park campuses, the College must follow the procedures in each City's tree ordinance to remove a tree.

similar services at the same time, such as weeding or integrated pest management (IPM), the College uses a joint contract for all three campuses. The cost depends on the number of trees that are pruned, removed, and replaced. The operating budget funds maintenance services for landscape trees.

c. Montgomery County Government (MCG)

The County Government's landscape contracts carry a one-year replacement warranty, which requires a contractor to replace any dead plants or trees one year after the County Government accepts the installation. Generally, County Government staff do not provide any ongoing aftercare or routine maintenance after the one-year warranty period expires. County Government staff retain a contractor to perform major pruning, tree removals, or any work that requires equipment. The operating budget funds maintenance services for landscape trees.

d. Montgomery County Public Schools (MCPS)

MCPS' contracts require a contractor to provide a one-year warranty and guarantee a 100 percent survival rate for all plantings, including landscape trees. The contract requires a contractor to fertilize, water, and de-stake plants, as needed, during the first year. At the end of the one-year warranty period, the contractor must replace all dead plants.

After the warranty period expires, MCPS has a three-tiered system for tree maintenance, which it provides as needed. In general, MCPS gears its pruning activities toward removing safety risks.

- Building Services Workers based at each school, managed by the Division of Plant Operations, are responsible for routine, small-scale pruning. The Building Services Workers also conduct an annual clean up at the beginning of each school year that can include minor tree trimming.

- The Division of Maintenance operates three depots across the County that take care of more hazardous tree issues at the request of the school.

- When necessary, the Division of Maintenance can contract out major tree pruning plus all tree and stump removals. MCPS only removes trees for health and safety reasons. MCPS spent $38,200 in FY 02 and $32,600 in FY 03. In FY 04 MCPS expects to spend $60,000. The change from previous years reflects an increase in tree removals and major pruning as a result of the Hurricane Isabel.

e. Washington Suburban Sanitary Commission (WSSC)

The buildings facility manager and maintenance staff are responsible for the basic maintenance needs of landscape trees at WSSC facilities.

3. Agencies' Tree Care Practices and Available Activity Costs

Table 7, on page 35, summarizes information about the source of funds and source of labor for specific tree activities for each of the five agencies. The information shows that each of the agencies usually funds tree planting as part of a capital project and pays for routine maintenance and removals out of the operating budget. The information also shows that the agencies use a mix of in-house and contract staff to provide these services.

C. Agencies' Inventory Management Practices

Since most of the agencies' plant landscape trees as part of capital projects and provide only routine maintenance, staff generally do not maintain inventory information; such as how many trees there are, how many trees are planted either as part of a project or annually, or the activity costs associated with maintaining these trees.

The exception to this is M-NCPPC. Until recently, staff in the Horticulture Section of the Division of Natural Resources used an outdated system to identify and locate trees in the two-year aftercare program in order to set up watering routes. In July 2004, the Parks Department introduced a new automated Smart Parks system. After this system is fully operational, staff in the Division of Natural Resources anticipate they will be able to use it for state-of–the-art inventory management activities.

TABLE 7: COMPARATIVE AGENCY DATA FOR LANDSCAPE TREE ACTIVITIES

Agency	Tree Activity	Source of Funds	Source of Labor	What it pays for (with cost estimates as available)
MC	Planting	CIP Facilities	Contractor	Tree acquisition, installation, and one-year replacement warranty for landscaping around new MC facilities.
	Routine Maintenance	Operating Budget	In-house	Routine maintenance by on-site grounds personnel.
	Major Maintenance and Removal	Operating Budget	Contractor	Major tree pruning, tree removal, and stump grinding when needed.
MCG	Planting	CIP Facilities	Contractor	Tree acquisition, installation, and one-year replacement warranty for landscaping around new MCG facilities.
	Major Maintenance and Removal	Operating Budget	Contractor	Major tree pruning, tree removal, and stump grinding when needed.
MCPS	Planting	CIP Facilities	Contractor	Tree acquisition, installation, and one-year replacement warranty for landscaping around new MCPS facilities. (2% of $15 million project.)
	Routine Maintenance	Operating Budget	In-house	Routine maintenance by on-site building service workers and maintenance workers at regional depots
	Major Maintenance and Removal	Operating Budget	Contractor	Major tree pruning, tree removal, and stump grinding when needed. ($60,000 in FY 04)
M-NCPPC	Planting	Operating budget	In-house	Growing and harvesting trees at Pope Farm and planting trees in County parks ($273,000 in FY 04 for Pope Farm costs)
		CIP Facilities	Contractor	Tree acquisition, installation, and one-year replacement warranty for landscaping around new M-NCPPC facilities and parks. (Estimated at 1% of $10 to $15 million project.)
	Aftercare and Routine Maintenance	Operating budget	In-house	Two-year aftercare program for Pope Farm trees and private contractor trees ($193,000 in FY 04) plus mulching and minor pruning of low branches by landscape crews. ($331,000 in FY 04)
	Emergency Maintenance and Removals	Operating budget	In-house	Inspections, major tree pruning, tree removal, and stump grinding from the Arboriculture Section in the Division of Natural Resources ($803,000 in FY 04)
WSSC	Planting	CIP Facilities	Contractor	Tree acquisition, installation, and one-year replacement warranty for landscaping around new WSSC facilities.
	Routine Maintenance	Operating Budget	In-house	Routine maintenance by on-site building service workers.

Source: OLO, September 2004

CHAPTER V. Forest Tree Activities

For the purpose of this study, a forest tree is a tree which is part of a stand of trees that may occur naturally or be deliberately planted in a natural reserve, a county park, or on a public building site. In Montgomery County there are approximately 25,000 acres of forested public lands maintained by County and bi-County agencies. This includes:

- 23,000 acres of undeveloped parkland, including stream valley parks managed by the Parks Department as part of the 32,000 acre park system; and,
- 2,000 acres of open and forested land managed by WSSC as a natural resource area.

This chapter begins with an explanation of State and County laws for forest conservation, followed by a review of the agencies' activities and management practices; it is organized as follows:

Part A presents an overview of forest conservation laws;
Part B describes the agencies' forest tree planting activities;
Part C discusses the agencies' forest tree maintenance activities;
Part D summarizes available cost activity data; and
Part E summarizes inventory and management practices.

A. State and County Forest Conservation Laws

Two State laws and one County law establish the legal framework for forest conservation in Montgomery County. The Maryland Reforestation law requires the State to reforest public land in order to mitigate the impact of road construction projects. The Maryland Forest Conservation Act and the County Forest Conservation Law establish procedures to identify and conserve existing forests on property proposed for development. The laws also establish procedures to plant forest trees on-site and/or off-site.

1. The Maryland Reforestation Law

Passed in 1989, this law requires the State Highway Administration to replace trees that are removed as part of a road construction project that uses State funds. The law requires a replacement forest to be replanted on public land within a year after the highway project is complete. The first priority is to replace the forest on an acre per acre basis (1:1 ratio), in the same watershed or county as the construction project. If this is not feasible, SHA must deposit funds into the Reforestation Fund at a rate of $4,356 for every acre cleared.

The Maryland Department of Natural Resources (DNR) uses funds in the Reforestation Fund to plant trees at school sites, in parks, or on other public lands. According to the DNR website, since the law was enacted in 1989, approximately 2,130 acres of forest land have been cleared and DNR has planted 2,400 acres. (See Appendix F for a copy of the State law and information about projects in Montgomery County.)

2. The Maryland Forest Conservation Act

Passed in 1991, the Forest Conservation Act is intended to minimize the loss of forest land during development and ensure that areas for forest retention and forest planting are identified and protected prior to development. The Act protects forested sensitive areas, such as non-tidal wetlands, floodplains, streams, steep slopes and critical habitats, identified during a comprehensive land use planning process.

The law incorporates an assessment of forest trees into the land development process in order to minimize the loss of these resources. Any person who applies to develop a tract of 40,000 square feet or more must submit a forest stand delineation[1] and a forest conservation plan,[2] prepared by a qualified professional, such as a licensed forester or landscape architect. The Forest Service in DNR administers the law, which is implemented at the local level.[3]

3. The Montgomery County Forest Conservation Law (FCL) - Chapter 22A

Chapter 22A of the Montgomery County Code establishes the County's Forest Conservation Law (FCL) to implement the State's Forest Conservation Act. The law establishes procedures to save, maintain, and plant forest trees during and after construction or other "land disturbing activities." Staff in the Countywide Planning Division in the Montgomery County Park and Planning Department administer the Forest Conservation Law (FCL) in Montgomery County.

As required in State law, the FCL applies to anyone developing a tract of land 40,000 square feet or larger. This threshold requirement includes capital projects to construct new roads, schools, or other community buildings, such as libraries, police stations or college facilities. Under the law, a public agency or developer must complete an inventory to identify existing forest resources and prepare a plan to retain forest trees on-site or plant forest trees on-site or off-site.

- ***A Forest Stand Delineation Plan*** describes the existing forest and vegetation resources. It is used during the preliminary review process to find the most suitable and practical areas for tree and forest conservation.

[1] A forest stand delineation identifies the existing forest cover and environmental features on the proposed site.

[2] A forest conservation plan indicates the limits of disturbance for the proposed project and shows how forested and sensitive areas will be protected during and after development.

[3] At the state level, between January 1993 and June 1997, DNR reports that 36,397 acres of forest were reviewed for development and, absent the Act, a majority of that forest would have been lost. Instead, 22,508 acres were retained; 4,313 acres were planted and 12,210 acres were cleared. Maryland Department of Natural Resources, Forest Service. The Maryland Forest Conservation Act: the law that conserves forest during development – A Five Year Review Summary. July 2000.

- ***A Forest Conservation Plan*** establishes the conservation, maintenance, and afforestation,[4] or reforestation[5] requirements that must be followed when the site is developed. The primary objective of the plan is to retain existing forest and trees and avoid reforestation. The plan must address:

  - The extent and characteristics of the trees and forested area to be retained or planted;
  - Proposed locations for on-site and off-site reforestation, scheduling and protective measures;
  - A binding maintenance agreement for planted areas effective for at least two years;
  - A binding agreement to protect forest conservation areas; and
  - Other information specified in the regulations or the technical manual.

The FCL also establishes priorities that determine where afforestation or reforestation will take place. The law gives priority to the retention of existing trees on-site as the preferred method of forest conservation, and to planting new forest on-site when forest must be cleared. Priority areas for on-site and off-site afforestation and reforestation are stream buffer areas, connections between and additions to forested areas, critical habitat areas, topographically unstable areas, and road buffers. Priority for off-site afforestation and reforestation planting is in the watershed where the project is located. In addition,

- Any off-site afforestation or reforestation in existing population centers may include the use of street trees which meet landscape or streetscape goals identified in an applicable master plan; and

- Permanent preservation of priority forests may be substituted for reforestation and afforestation at a rate of two acres of forest preservation for each acre of planting required.

To meet the reforestation or afforestation requirements, a developer or public agency must install a certain number trees or shrubs of a certain size, maintain them for a minimum of two years, and commit to a survival rate that corresponds to the size and number of trees planted. (Seedlings are only permitted on a case by case basis as part of a planting plan which includes larger planting stock.)

Table 8 summarizes the FCL's stocking rates and survival requirements. M-NCPPC staff inspect the plantings at the end of the maintenance period. If too many trees have died, a developer or public agency must replace the trees to achieve the survival rate.

[4] According to the Forest Conservation regulations issued by the Planning Board, afforestation is "the creation, on a tract that is not presently in forest cover, of a biological community dominated by trees and other woody plants (including plant communities, the understory, and forest floor), which is at least 10,000 square feet in area and 50 feet wide, and containing at least 100 trees per acre, with at least 50 of those trees having the potential of growing to a two-inch or greater diameter at 4.5 feet above the ground within seven years. In some instances, afforestation includes the creation of tree cover by landscaping areas under an approved landscape plan."

[5] According to the Tree Manual, reforestation is the creation of a biological community dominated by trees and other woody vegetation (forest cover).

TABLE 8: STOCKING RATES AND SURVIVAL REQUIREMENTS FOR THE COUNTY'S FOREST CONSERVATION LAW

TREE OR SHRUB SIZE	NUMBER OF TREES PER ACRE	APPROX. SPACING (FEET ON CENTER)	SURVIVAL REQUIREMENT AT END OF SECOND GROWING SEASON
Whips 3-4 feet	350	10 to 12	75% or 260/acre
¾-1 inch caliper	200	12 to 15	75% or 150/acre
1.5-2 inch caliper	100	15 to 20	100% or 100/acre
Shrubs 18-24 inches	33	Evenly distributed over planting area	75% or 25/acre

Source: M-NCPPC Forest Conservation Regulation, Section 108.E.(3)(c).

4. Agencies' Compliance with the County's Forest Conservation Law (FCL)

Several options exist to comply with the Forest Conservation Law, such as conserving an existing forest on-site, planting additional trees on-site, planting trees off-site, purchasing credits from a private reforestation bank, or establishing a reforestation bank. Since the County's Forest Conservation Law was enacted, the five County and bi-County agencies have used several methods to meet the law's requirements.

Maryland National Capital Park and Planning Commission (M-NCPPC). Because most park sites have existing forests or because forested areas are available in developing parks, M-NCPPC rarely has to reforest, either on-site or off-site. When M-NCPPC does reforest, it usually plants forest trees along stream valleys.

Montgomery County Government (MCG). County Government generally complies with the FCL requirements for new County facilities through on-site reforestation. For example, half of the site for the new Germantown Library will be developed as a park to meet the FCL's requirements. DPWT established a reforestation bank, which is open land designated for the planting of forest trees, on land adjacent to the Triadelphia Reservoir. (See page 41 for more details on the reforestation bank.)

Montgomery County Public Schools (MCPS). MCPS accepts slightly smaller sites for dedication for new school construction if a developer includes the reforestation requirements for the school site in the forest conservation plan for the entire subdivision. For new schools, which are not constructed on land included in private developer forest conservation plans, MCPS either plants trees on-site, plants trees at another MCPS site, or purchases credits from a private reforestation bank. Since existing school sites rarely have forest stands, which are cleared as part of the renovation project, most school renovation projects are exempt from forest conservation plans.

Montgomery College. Montgomery College plants forest trees on-site to comply with the FCL. It has also planted street trees on Georgia Avenue and Fenton Street. The College reports that, due to the developed nature of each campus, the College has not had to remove any extensive wooded areas to construct new buildings during the last 15 years.

Washington Suburban Sanitary Commission (WSSC) WSSC holds a developer responsible for construction of the water and sewer extensions that serve his/her development, including the reforestation requirements associated with these extensions.

B. Forest Tree Planting Activities

Each of the five County and bi-County agencies plants forest trees. All five of the County and bi-County agencies plant trees to comply with the FCL; three of the agencies, i.e. M-NCPPC, County Government, and WSSC, plant forest trees as part of other reforestation programs to address the over-abundance of white-tailed deer as well as the impact of non-native invasive plants.[6]

1. Maryland National Capital Park and Planning Commission (M-NCPPC)

The Parks Department plants forest trees to meet the requirements of the FCL. In addition, the Natural Resources Management Section in the Division of Natural Resources plants forest trees as part of a capital project to reforest stream valley parks.

M-NCPPC Plantings to comply with the Forest Conservation Law (FCL). Most park development projects are able to comply with the FCL because park sites are usually forested. Some projects require reforestation and afforestation planting by contractors, which average about one acre of planting annually. In a few instances, for example, where a capital project experienced cost overruns, the Parks Department is responsible for reforestation. Staff in the Natural Resources Division plant these trees as time permits. When the Parks Department must plant trees to comply with the FCL, the reforestation takes place on-site, generally in an environmentally sensitive area such as a stream buffer.

M-NCPPC plantings in Stream Valley Parks. The Forest Ecologist in the Natural Resources Management Section manages a reforestation planting program to fill in riparian buffers and conserve natural forest areas in the park system. The Forest Ecologist targets stream valleys and existing forest stands for reforestation. She routinely coordinates with Park managers to identify potential reforestation sites.

When this program began in 1994, the Forest Ecologist purchased trees from a private nursery in Maryland. At the time, it was difficult to obtain native species in small sizes because the FCL was recently enacted and there was not yet enough demand. In 1996, the Forest Ecologist arranged for Pope Farm to grow seedlings, which she purchased from native nurseries on the East Coast with a grant from the American Tree Trust. The first year, Pope Farm grew approximately 1,000 containerized trees.

Over time, Pope Farm increased the number of plants to approximately 2,000 containerized trees annually; however, many of these trees were lost due to deer. In FY 03, in an effort to increase the survival rate, the Forest Ecologist decided to plant fewer

[6] According to the Forest Preservation Strategy Update, the over-abundance of white-tailed deer and non-native invasive plants pose a serious threat to the future of the County's forest. Browsing by deer is reducing the number, height, and species diversity of tree seedlings on County park land and eliminating new young trees, which are needed to replace mature trees. Non-native invasive plants are plants that grow and spread rapidly and are readily established over large areas. M-NCPPC recognizes non-native plants as the second most important threat to biodiversity nationwide.

trees that were larger in size. That year, Pope Farm provided 1,726 containerized trees and 45 balled and burlapped trees. In FY 04, volunteers planted approximately 766 containerized trees from Pope Farm, and park staff planted 320 larger balled and burlapped trees.

2. Montgomery County Government (MCG)

In Montgomery County Government, DPWT's Division of Capital Development plants forest trees to meet FCL requirements and DEP's Watershed Management Section plants forest trees as part of its stream restoration projects.

DPWT Plantings. In 2001, DPWT signed an agreement with WSSC and M-NCPPC to plant forest trees on a 56-acre parcel of land, owned by WSSC adjacent to the reservoir. DPWT intends to use this land as a reforestation bank so that future road projects can meet the requirements of the County's FCL. Under the agreement, DPWT must plant 200 one-inch caliper trees per acre, with a minimum of five species, and achieve a 75 percent survival rate after three years.

DPWT signed a separate contract with the Montgomery County Conservation Corps to reforest six to eight acres per year. Under this contract, DPWT paid the Conservation Corps $105,000 in 2003 to plant approximately 1,400 trees on 6.9 acres at the Triadelphia Reservoir.

DEP Plantings to Restore Stream Valleys. Staff in the Watershed Management Section of the Department of Environmental Protection monitor the water quality in the County's streams and implement capital projects to restore streams and improve water quality. The stream restoration projects generally include plantings to provide a tree canopy that, over time, provides shade and maintains the water temperature to improve water quality.

Table 9 shows the number and types of forest trees for recent projects. DEP and M-NCPPC developed a list of tree and shrub species for the restoration projects on parkland and DEP reports that it uses the same species for all restoration projects. Because the success rate for cuttings can vary widely depending on site conditions, weather, pests, and the quality of contractor installation, DEP reports that it uses a large number of cuttings to establish a forest.

TABLE 9: TREES PLANTED DURING WATERSHED RESTORATION PROJECTS

Project Status	Cuttings	Containerized Trees	Balled and Burlapped	Total Plantings
Completed (FY 00-04)	18,193	689	191	19,073
Under Construction	13,471	5,158	512	19,141
Design	17,140	3,419	32	20,591
Total	**48,804**	**9,266**	**735**	**58,805**

Source: OLO and DEP, September 2004.

3. Montgomery County Public Schools (MCPS)

MCPS plants forest trees both on-site and off-site to so that school construction projects comply with FCL requirements.

MCPS On-Site Plantings. The FCL requires reforestation to occur on-site if possible; however, forest conservation competes for limited site space with several important program requirements, such as building size, athletic fields, parking, bus loops and vehicular access, and on-site stormwater management facilities. The MCPS practice is to provide as much on-site reforestation as possible without compromising the school's function. The size and amount of on-site planting varies with each project. Between 1993 and 2003, MCPS conserved or reforested 16.5 acres on-site.

MCPS Off-Site Plantings. Unless the existing site contains significant wooded slopes that are not developable, reforestation requirements usually cannot be fully achieved on-site. Between 1994 and 1999, MCPS reforested almost 30 acres off-site, including 23.25 acres generated by the construction of Blair High School.

To meets its FCL requirements at off-site locations, in FY 02 MCPS purchased credits from a private reforestation bank, which negotiated two approved forest mitigation plans with M-NCPPC. The plans, which specify the type and number of plantings per acre, are filed as conservation easements in the Montgomery County land records. In FY 02, MCPS paid $227,311 to purchase credits for two approved plans. One plan preserves and reforests 40 acres on Mason Island, located in the Potomac River near White's Ferry. The other plan reforests 149 acres at Bachelor's Purchase. These credits satisfied MCPS's FCL requirements for Blair High School and two other projects.

4. Washington Suburban Sanitary Commission (WSSC)

WSSC plants forest trees as part of its management responsibilities at the reservoir. WSSC manages 2,000 acres of open and forested land which surround the Brighton Dam and Rocky Gorge Reservoirs. In FY 04, WSSC planted approximately 300 shrubs and trees to reforest its reservoir property.

5. Montgomery College (MC)

Montgomery College planted forest trees on the Germantown campus to comply with the FCL. As part of the High Technology and Science Center project, the College planted trees in order to improve the appearance of the campus, to develop a new campus quad, and to landscape an existing stormwater management pond that was enlarged as part of the overall project.

C. Forest Tree Maintenance Activities

The five County and bi-County agencies provide different types and levels of maintenance for the forest trees they plant and/or manage. Maintenance activities for trees planted to comply with the FCL are established in law. The law mandates a minimum two-year maintenance period, plus watering, feeding, and replanting of the areas to be afforested or reforested. Agency staff establish maintenance levels for trees planted as part of other agency programs.

1. Maryland National Capital Park and Planning Commission (M-NCPPC)

The large balled and burlapped trees that the Park staff plant receive two years of aftercare from Park staff in the Horticulture Department of the Natural Resources Division. The aftercare includes watering, de-staking, mulching, and weeding.

Staff in the Natural Resources Division and volunteers maintain the containerized tree reforestation sites. Maintenance activities include replacing and repairing deer predation cages and tubex and removing non-native invasive plants. Between 150 and 200 volunteers participate in the reforestation volunteer program each year.

In addition to these activities, the Forest Ecologist runs the Weed Warrior program, which has 280 active volunteers. Weed Warriors remove non-native invasive plants from the forest. The Forest Ecologist reports these efforts provide tremendous maintenance support for park reforestation activities.

2. Montgomery County Government (MCG)

The forest trees that DPWT plants at the reservoir and the trees that DEP plants as part of its stream valley restoration projects both receive follow-up maintenance.

DPWT Plantings in the WSSC Reservoir. As part of its agreement with M-NCPPC and WSSC to reforest 56 acres of the WSSC reservoir, the County contracts with the Conservation Corps to provide three years of maintenance services. These services include monthly watering from mid-June to mid-September, weeding, mowing, and mulching as needed. The Corps also agrees to replace trees to achieve a 75 percent survival rate after three years.

DEP Stream Valley Plantings. DEP requires contractors to guarantee 100 percent of their plant material for one year. Maintenance during the warranty period includes pruning to remove dead or damaged branches, weeding, insect and disease control, watering during the growing season, and deer protection.

3. Montgomery County Public Schools (MCPS)

MCPS On-Site Plantings. MCPS provides a two-year maintenance period for forest trees, in accordance with the FCL

MCPS Off-Site Plantings. Under MCPS's approved forest conservation plans for Mason Island and Bachelor's Purchase, M-NCPPC requires a two-year maintenance period for plantings as well as bonding of the planted area. The MCPS contractor is responsible for providing these maintenance services.

4. Washington Suburban Sanitary Commission (WSSC)

Since WSSC manages the area as natural forestland, there is no maintenance performed on trees outside of emergency or hazardous situations.

5. Montgomery College

Montgomery College provides a two-year maintenance period for forest trees, in accordance with the FCL. For example, the approved Forest Conservation Plan for the High Technology and Science Center requires watering, feeding, and replanting for a two-year period. Montgomery College required a two-year plant warranty from the contractor and the contractor provided periodic maintenance throughout this period.

D. FY 04 Estimates for Forest Tree Activities and Programs

Table 10 presents activity cost data for forest trees for MCG, MCPS, M-NCPPC, and WSSC. The data show estimated expenditures for FY 04 were $249,300. This total includes:

- $7,300 for WSSC to acquire and plant trees as part of its reforestation program;
- $41,000 in acquisition costs for the M-NCPPC's reforestation program
- $65,300 for the trees in DEP's stream restoration projects;
- $123,000 for DPWT's contract costs to reforest a parcel in the WSSC reservoir.

This total excludes activity costs associated with M-NCPPC's existing trees, which include many forest trees. As reported in Chapter IV, M-NCPPC's total FY 04 activity cost for all park trees was $1.6 million.

TABLE 10: AGENCIES' FOREST TREE ACTIVITY PROGRAM DATA AND AVAILABLE FY 04 ESTIMATES

Agency	Dept.	Tree Activity	Source of Funds	Source of labor	What it pays for	Estimates
MC	Cap Plng	Planting and maintenance	CIP	Contractor	Tree acquisition, installation and two-year maintenance to comply with Forest Conservation Law.	No FY 04 costs[7]
MCG	DEP	Planting and maintenance	CIP Stream Restoration	Contractor	Tree acquisition, installation and one year warranty for stream restoration projects	$65,300[8]
	DPWT	Planting and Maintenance	CIP Forest Reforestation	Contractor (Conservation Corp)	Tree acquisition, installation, and three-year maintenance to reforest 6.9 acres of WSSC land and create a reforestation bank so that future County road projects can comply with Forest Conservation Law.	$123,000[9]
MCPS	Fac. Mgmt.	Planting and Forest Conservation	CIP	Contractor	Tree installation, forest conservation, 2-year maintenance per M-NCPPC approved plan.	No FY 04 costs[10]
M-NCPPC	Parks	Growing and Planting	CIP Stream Restoration	In-House and Volunteer	Acquisition and planting of 366 containerized trees and 320 landscape trees from Pope Farm.	$41,000[11]
	Parks	Planting and Maintenance	CIP	Contractor	Reforestation and afforestation planting averages 1 acre of planting per year.	$10,000
WSSC		Planting	Operating Budget	In-House and TreeMendous Volunteer Program	Acquisition and planting for reforestation as part of WSSC forest management responsibilities.	$7,300[12]
					Activity Based Costs FY 04	**$246,600**

Source: OLO, September 2004.

[7] Montgomery College did not generate any Forest Conservation requirements in FY 04.
[8] Average contract cost based on trees planted or to be planted at nine stream restoration projects. Cost includes plant material and installation and is based upon an average restoration project size of 0.9 miles. Per tree cost estimates for containerized trees range from $14.70 for 1-2 gal. to $47 for 3 gal. and for larger trees from $75 for 1 to 1.5 inch caliper tree to $250 for 2 to 2.5 inch caliper tree.
[9] Estimate represents FY04 contract cost for Conservation Corps to plant and maintain trees for three years.
[10] MCPS did not generate any Forest Conservation requirements in FY 04. MCPS paid $227,311 in FY 02 to purchase credits from a private reforestation bank and satisfy FCL compliance for Blair High School and two other projects.
[11] Estimate for FY 04 assumes 320 B&B trees at $120 each plus 366 containerized trees at $7 each. Estimate does not include two years of aftercare costs for B&B trees.
[12] Estimate assumes $1,900 in acquisition costs for 100 trees plus $5,400 in staff management costs.

E. Inventory and Management Practices for Forest Trees

Management practices for forest trees take place through the master plan process, the activities of DEP's Forest Conservation Coordinator, and the Interagency Forest Conservation Team.

1. Forest Inventories, Protection Areas and Reforestation Targets

The Forest Ecologist in the Natural Resources Management Unit, Natural Resources Division prepares forest stand delineations for park resource management plans, trail plans, and conservation plans.

In addition, staff in the Countywide Planning Division in the Park and Planning Department and staff in the Natural Resource Management Unit, Natural Resources Division, prepare inventories of existing forest resources for a specific master plan area as part of the master plan amendment process. As part of this process, which began eight years ago, staff also prioritize existing forests for protection and identify areas to target for reforestation. The inventory and analysis is also used to guide park planning and development during the master plan process and the administration of the Forest Conservation Act as part of the subdivision review process.

2. Forest Conservation Coordinator and Interagency Forest Conservation Team

Chapter 22A, Article V of the Montgomery County Code, Forest Conservation Law establishes the position and defines the duties of the County Arborist.[13] The Forest Conservation Coordinator in the Department of Environmental Protection fulfills these duties. Under the law, the Coordinator is responsible, in part, for:

- Developing a comprehensive County conservation and management strategy, including programs to promote afforestation and reforestation in the County;
- Advising the County Executive and County Council on the effectiveness of County programs for controlling tree pests and diseases; and
- Providing liaison with citizens and businesses on forest and tree conservation issues and developing appropriate mechanisms for public input on conservation strategies.

According to DEP, in addition to the duties outlined in Chapter 22A, the Coordinator was hired to coordinate and address action items in the Forest Preservation Strategy, which is described in Section 4, beginning on the next page. According to the Forest Preservation Strategy, the Forest Conservation Coordinator is charged with coordinating and

[13] The position of County Arborist exists in the Department of Public Works and Transportation and reports to the Tree Maintenance Program Manager. The position in the Department of Environmental Protection was given the name Forest Conservation Coordinator so it would not conflict with the County Arborist position.

advocating forest and tree programs and coordinating interagency, educational, public outreach, and planning initiatives to promote forest and tree preservation programs. (DEP suggests approximately 20 to 30 percent of the Coordinator's time should be dedicated to urban tree programs.)

3. Interagency Forest Conservation Team

The Forest Conservation Coordinator chairs the Interagency Forest Conservation (IFC) Team, a staff working group that DEP established at the request of the County Council to coordinate tree management activities across the five County and bi-County agencies. The objective of the IFC Team is to discuss and recommend solutions to forest and tree conservation issues in the County and implement the Forest Preservation Strategy.

4. The Countywide Forest Preservation Strategy and Update

In 2000, the County Executive established the Forest Preservation Task to prepare a Countywide Forest Preservation Strategy. The Strategy identified actions to restore and protect both natural forest ecosystems and street trees in Montgomery County. Publication of the Forest Preservation Strategy provided the impetus for the County Executive to hire the Forest Conservation Coordinator and increase funding for street tree plantings in DEP.

In July 2004, the IFC Team issued a Forest Preservation Strategy Update, and DEP's Forest Conservation Coordinator briefed the County Council's Transportation and Environment Committee on its accomplishments since the original Strategy was issued in July 2000. The IFC Team plans to address the following priority issues for FY 05:

- The overabundance of deer;
- Non-native invasive plants;
- Tree loss on small lots; and
- Lack of funds for street tree maintenance.

CHAPTER VI. Street Tree Activities

For the purpose of this study, a street tree is a tree that is planted along a public right-of-way in an urban, suburban, or rural area. In Montgomery County, there are an estimated 283,300 street trees and 45,000 planting sites in publicly maintained rights-of-way in the unincorporated areas of the County. This estimate includes:

- 2,300 trees in downtown Bethesda, Silver Spring and Wheaton;
- 211,000 trees in the unincorporated area of the County outside of the Urban Districts, excluding trees in the Agricultural Reserve;
- 20,000 trees planted by developers and the County Government in the unincorporated area outside of the Urban Districts since 1999; and
- 50,000 trees in the Agricultural Reserve.

The research suggests the components of a successful street tree program include a systematic approach to planting, pruning, and removal; ongoing contract oversight practices; sustainable funding; a comprehensive inventory management system; and an administrative structure that can coordinate and manage cross-cutting issues.

This chapter reviews the street tree activities of County Government and WSSC.[1] This chapter is organized as follows:

Part A describes the requirements for street trees in State and County law;
Part B presents programs to plant new and replacement trees;
Part C discusses tree maintenance activities;
Part D reviews tree removal activities;
Part E looks at inventory management; and
Part F reviews comparative program data.

A. Street Tree Requirements in State and County Law

The tree care activities of County Government and WSSC take place within a governance structure of State and County law. This section briefly describes the key laws.

1. The Maryland Roadside Tree Law

The Maryland Roadside Tree law[2] places trees in the public right-of-way under the jurisdiction of the Maryland Department of Natural Resources and establishes pruning and care requirements for planted and naturally occurring roadside trees. The law applies to rights-of-way throughout the State, whether the State, a county, or a municipality maintains the trees in the public right of way.

[1] M-NCPPC maintains three roads in the County as park roads: Beach Drive, Sligo Creek Parkway, and Little Falls Parkway. Staff in the Division of Natural Resources estimate there are approximately 30 trees in the medians of these roads, which the Arboriculture Section maintains as part of its broader maintenance responsibilities. For the purposes of this study, these trees are defined as park trees, not street trees.
[2] Title 5, Subtitle 4, Part I, Section 401-411

Passed in 1914, the law requires anyone who wishes to perform tree care involving roadside trees to obtain a permit from DNR.[3] Persons who obtain permits must comply with specific standards for tree pruning and care.[4] Persons must also replace any tree that is removed with a species from the State's recommended tree list. (See Appendix G for a copy of the regulations.)[5]

Table 11 presents the number of street trees County Government departments and WSSC planted and removed in FY 04. The data show that if the plantings for the County departments are combined, the County Government planted 1,015 more trees than it removed. Specifically, in FY 04, Montgomery County departments planted 2,182 trees and removed 1,167 trees. Individually, DEP, DHCA and the Urban Districts[6] each planted more trees than they removed; whereas DPWT removed 122 more trees than it planted. WSSC planted one replacement tree for every tree it removed.

TABLE 11: STREET TREES REMOVED AND PLANTED, FY 04

County Government Departments and WSSC	Estimate of Trees Removed in FY 04	Estimate of New and Replacement Trees Planted in FY 04	Estimated Net New Trees
DEP	0	1,522[7]	951
DHCA	0	70	70
DPWT	1,093	400[8]	(122)
Urban Districts	74	190	116
Subtotal for County Government Depts.	**1,167**	**2,182**	**1,015**
WSSC	120	120	0
Estimated Total	**1,287**	**2,302**	**1,015**

Source: OLO, DEP, DPWT, BUP, Silver Spring and Wheaton Urban Districts and WSSC, September 2004.

[3] The law defines "tree care" as "the removal, planting or maintenance, application of a pesticide, or any treatment that affects the health or growth of a roadside tree."

[4] The law establishes standards for general pruning, clearance from overhead facilities, ground disturbance and protection of roots to protect tree health, ensure public safety, and promote aesthetics. The standards require cutting back branches that are removed to a live branch that is at least 1/3 the size of the branch that is removed; making cuts close to the trunk without cutting into the branch collar or leaving a protruding stub; using nontoxic materials to paint cuts, if required; and removing dangerous deadwood and broken limbs located in the work area. The standards prohibit the use of climbing hooks or spurs, except when authorized by the Forest Service and also prohibit the wrapping or winding of cable, wires, and other attachments that would bruise or injure a tree.

[5] Title 5, Subtitle 4, Part IV, Section 424-430

[6] An urban district is a legally designated geographic area created as a special taxing district to maintain and enhance communities with diverse commercial, institutional, and residential development. The goal is to maintain an urban district as a prosperous, livable urban center. Sources for the operation of an urban district in Montgomery County include an urban district tax, a parking fee surcharge, and optional method development. Montgomery County has three urban districts: Bethesda, Silver Spring, and Wheaton.

[7] Includes 571 replacement trees planted for DPWT.

[8] Estimate of trees planted to landscape new County roads.

2. County Laws

Two County laws primarily govern street trees: the Road Code and the Subdivision Ordinance. The Department of Public Works and Transportation (DPWT) and the Department of Permitting Services (DPS) jointly administer the Road Code. The Planning Board administers the Subdivision Ordinance (Chapter 50).

In addition to the two laws, other governing documents that may address street trees include approved County land use plans, Executive regulations, and departmental Memorandums of Understanding (MOUs).

Chapter 49. The Montgomery County Road Code establishes shared authority for the management of the public right-of-way among four different entities. Specifically, the Road Code:

- Gives DPWT the authority to establish standards for road construction, including street trees, and requires street trees on public roads to comply with these design standards.[9] DPWT standards identify the species that are acceptable for planting in public rights-of-way as well as spacing requirements. (See Appendix H for a copy of these standards.)

- States that the Director of DPWT and the Planning Board should coordinate the location and species of street tree plantings. The law recognizes this coordination is needed to promote compatibility of the plantings with road function and safety, signage, maintenance, appropriate noise and visual buffering, utilities, other public or private improvement, and aesthetic consideration related to streetscape design.[10]

- Authorizes the Department of Permitting Services to administer the permitting process for construction of a road or sidewalk in the public right of way.[11] The law requires an applicant to post a bond, authorizes DPS to require alternate standards if it finds the standards are not feasible or practical, and establishes the conditions that must be met for the County to accept a road for maintenance.[12]

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[9] Section 49-35(j)(1)
[10] Section 49-35(j) (2)
[11] Sections 49-38 through 49-41
[12] Section 49-41 states the County Executive may prescribe the terms and conditions upon which any street, alley, road or thoroughfare which has been acquired by the county or dedicated to public use may be accepted, and he may authorize the acceptance of all streets, roads or thoroughfares upon such terms and conditions; provided, that such streets, alleys, roads or thoroughfares conform to the standards and specifications of the County Road Construction Code in force at the time of acceptance. The County Council may provide by law for the acceptance of streets, alleys, roads or thoroughfares by the County Executive which do not conform to the standards and specifications of such County Road Construction Code; provided, that such law shall establish standards and conditions for acceptance to protect the public interest. Upon the acceptance of any street, alley, road or thoroughfare, it shall become a part of the County road system and shall thereafter be maintained by the county at its expense.

- Authorizes DPS to waive certain requirements[13] for a road constructed by the County or a developer in certain circumstances, for example, to protect a specimen tree or a significant stand of mature trees.[14] Under the law, DPS must give the Planning Board and DEP an opportunity to comment before it issues a waiver.

Chapter 50. The Subdivision Ordinance governs the subdivision of land within the Maryland-Washington Regional District, as defined in Article 28 of the Maryland Code. The law assigns administration of the subdivision process to the Planning Board. The Subdivision Ordinance:

- Requires that a developer construct the elements in the public right-of-way,[15] including street trees, to comply with the specifications established by DPWT in the Road Code.[16] Each new subdivision must be constructed by the subdivider or developer under the specifications of the Road Code or the requirements of a municipality, whichever is applicable.

- States that the Planning Board must consider the applicable master plan or sector plan, in determining the acceptability of a preliminary plan of subdivision. A preliminary plan must substantially conform to the applicable master plan or sector plan, including maps and text.[17]

Approved land use plans. Master and sector plans for the County's Central Business Districts (CBDs) and other urban centers prepared by the Planning Board and adopted by the District Council contain a streetscape plan which recommends street tree species and locations on a block by block basis. The Planning Board also adopts streetscape design standards to add more specific detail to the recommendations found in a master or sector plan. Currently, the Board has proposed or adopted streetscape design standards for the Silver Spring CBD, the Bethesda CBD, the Germantown Town Center, and the Clarksburg Town Center. Also, the Montgomery County Department of Housing and Community Affairs prepared streetscape design standards for the Wheaton CBD.

County Government Memorandum of Understanding (MOU). Currently, staff in DPWT's Highway Services Administration, Division of Operations and staff in DEP's Watershed Management Section jointly manage the County's street tree program for trees outside of the urban districts. Together DPWT and DEP staff are responsible for maintaining the list of tree species that can be planted in public rights-of-way; managing the County contracts for planting, pruning, and tree removal; processing and inspecting citizen requests for pruning services; and maintaining the street tree inventory. These services are paid for out of the General Fund.

[13] for rights-of-way widths, curbs and gutters, paving widths, or street trees
[14] Section 49-43
[15] roads, streets, alleys, sidewalks and crosswalks with appurtenant drainage , street trees, and other integral facilities
[16] Section 50-24
[17] Section 50-35

DPWT and DEP have jointly managed tree planting, maintenance, and removal activities since FY 03, when the County Government transferred the responsibility for managing the planting contract for street trees from DPWT's Tree Maintenance Program Manager to DEP's Forest Conservation Coordinator in order to increase the number of street tree plantings.[18] DEP and DPWT staff shared responsibilities informally through April 2004 when the Directors of DEP and DPWT signed a memorandum of understanding (MOU) to formally address the program. Exhibit 6 summarizes DEP's and DPWT's responsibilities. See Appendix I for a copy of the MOU.

The MOU transfers policy and additional management responsibilities for the street tree program to DEP in principle; however, it does not address how the program will work in practice. Since the MOU was signed, several questions have surfaced about the procedures DEP and DPWT have in place to deliver of specific activities. Citizens and others are asking these questions in an effort to understand how DEP and DPWT intend to coordinate their planting, maintenance, and removal responsibilities. Some of these questions include the following:

1. Will DPWT continue to receive citizen calls for service or will DEP establish a separate telephone line for citizen calls?

2. How does a citizen know whether to call DEP or DPWT with a specific question about a street tree? Will a citizen have to call DPWT to have a tree removed and then call DEP to have a tree replaced?

3. Under DEP's new tree planting policy, can a citizen who has a tree removed still receive a replacement tree?

4. What programs or procedures are in place for a civic association that wants to provide volunteer labor to plant trees?

Although DPWT and DEP staff met throughout the course of OLO's study to discuss implementation of the MOU, these issues still need to be addressed.

[18] In FY 02, contract administration and funding resided with DEP and DPWT assisted by selecting all of the new and replacement planting sites and conducting follow-up inspections. In FY 03, DPWT assisted DEP by selecting 620 sites and conducted follow-up inspections in the fall and spring. In FY 04, DPWT selected 571 sites and inspected 265 of those.

EXHIBIT 6: DEP AND DPWT RESPONSIBILITIES IN MEMORANDUM OF UNDERSTANDING

DEP's Responsibilities

- Sets overall policy for Montgomery County's Street Tree Program, including cycles and priorities for both planting and maintenance (pruning, removals, and stumps);
- Budgets and manages contracts for new plantings (except where part of a road project);
- Provides inspections for the Street Tree Program in coordination with DPWT;
- Serves as the point of contact for all replacement tree requests;
- Approves all new and replacement plantings;
- Develops and maintains an approved street tree list for all new and replacement tree plantings including those associated with road construction and mitigation in coordination with DPWT and MNCPPC;
- Manages planting site selections for targeted neighborhood street plantings to reach canopy goals in coordination with DPWT; and
- Develops and maintains a comprehensive street tree inventory for joint agency use.

DPWT's Responsibilities

- Manages operation of the street tree maintenance program including regular and hazardous trimming, tree and stump removals, and related emergency services;
- Serves as point of contact for all tree maintenance requests;
- Refers all request for new or replacement tree plantings to DEP;
- Provides inspections for the Street Tree Program in coordination with DEP;
- Coordinates tree site and species selections for all road projects involving tree plantings;
- Oversees planting and inspection of new street tree plantings in association with road construction using DPWT tree guidelines.

Source: OLO, September 2004.

B. PROGRAMS TO PLANT NEW AND REPLACEMENT STREET TREES

In any given year, several Montgomery County Government departments and private developers plant new street trees. Some of these trees are planted as part of programs with broader purposes; others are planted to meet County regulatory requirements.

1. Montgomery County Government Programs to Plant New Trees

The County Government entities that plant new trees include: the Department of Housing and Community Affairs, the Department of Public Works and Transportation, the Department of Environmental Protection, the Bethesda Urban Partnership, and the Silver Spring and Wheaton Urban Districts.

Environmental Protection (DEP). DEP's Watershed Management Division states that it plants street trees to increase canopy coverage, reduce stormwater runoff, lower the temperatures of runoff water, improve air quality, reduce energy needs, remove dust particles, reduce noise, enhance restoration projects, provide habitat and improve water quality. These goals are well supported y the Forest Preservation Strategy, the Countywide Stream Protection Strategy, and the Air Quality Protection Strategy.

In FY 03, management of the street tree planting contract was transferred from DPWT to DEP in an effort to increase the number of new street tree plantings.[19] DEP planted 757 new trees in FY 03 and 951 new trees in FY 04, in addition to planting replacement trees on DPWT's behalf. DEP expects to purchase approximately 1,500 trees in FY 05.

Besides increasing the number of plantings, DEP staff established an informal policy for identifying new street tree planting sites based on water quality, air quality, and tree canopy coverage data. The DEP Forest Conservation Coordinator manages this process. She identifies an initial list of priority watersheds based on ratings from watershed assessments, ongoing and planned stream restoration projects, and other indicators of the water quality for a watershed and its sub-watershed.[20] Her initial review identifies both poor and good water quality watersheds because DEP wants to use new tree plantings both to preserve good water quality and to improve poor water quality.

After the initial list of priority watersheds is developed, the Forest Conservation Coordinator examines the County's tree canopy coverage to select three or four watersheds. Finally, she evaluates streets for existing canopy coverage, amount of growing space, interfering utilities and infrastructure, and the amount of impervious surfaces to select specific sites. She also takes into account the willingness of neighborhoods to support the plantings. She selects the species to plant by examining the space available for root growth, the existence of sidewalks, potential interference with utilities, and the species of existing trees in the area.

[19] As a result of the Forest Preservation Strategy, the County Government undertook an initiative to plant 1,000 more trees than the number of trees removed, which was estimated at 900 trees annually.
[20] DEP reports that in some cases the water quality of the sub-watershed may differ from that of the watershed as a whole.

Overall, DEP attempts to place about 30 percent of plantings in poor water quality watersheds, 20 percent in high water quality watersheds, 10 percent in areas immediately surrounding stream restoration projects, and 10 percent scattered throughout the County. DEP sets aside the remaining 30 percent for DPWT replacement plantings.

Housing and Community Affairs (DHCA). DHCA's Commercial Revitalization Streetscape Program plants street trees as one element of its streetscape program. Staff in the Commercial Revitalization Section, Community Development Division, Department of Housing and Community Affairs design and implement streetscape programs to promote commercial revitalization in targeted, older retail centers throughout the County, including the Silver Spring and Wheaton central business districts.

Streetscape projects typically include street trees as a core element, in addition to curbs, gutters, customized sidewalk paving, custom street lights, street hardware such as bus shelters, and road side signage. DHCA works with staff in the Silver Spring and Wheaton Urban Districts to reach agreement on the details of DHCA streetscape projects within an Urban District. This coordination includes agreeing on the types of species to plant and who will be responsible for future maintenance. The trees DHCA plants in the Urban Districts receive follow-up inspections and maintenance from the Urban District; however, trees planted outside the Urban District generally do not.

Over the past five years, DHCA's streetscaping, including tree planting, has been installed along Antique Row in Kensington, and in the Fenton Street Village and South Silver Spring areas of the Silver Spring CBD. DHCA planted several hundred trees in these areas and estimates that, in the last five years, it streetscaped approximately 20 city blocks with trees and other items.

Trees planted in the sidewalk in highly urbanized areas require special planting techniques to ensure their survival, including tree pits with amended soil and sub-surface drainage. On average, this type of installation costs approximately $400 per tree.

Each streetscaping capital project funds the overall project costs, including staff, consultants, and construction. Tree planting, as part of an overall streetscape project, averages less than five percent of the total cost of the project.

Public Works and Transportation (DPWT). DPWT's street tree plantings for new County roads meet the design requirements found in County law and in the approved land use master plans. Staff in the Division of Capital Development (DCD) in DPWT manage the design and construction of new County roads, including the landscape element. DCD hires a private contractor to design a landscape plan for trees and plantings along a new roadway. The contractor selects the tree species from the County's street tree list.

The capital project funds the staff and installation. The amount of money for landscaping varies with the size of the project. Similar to the DHCA tree plantings outside the Urban Districts, no funding exists to maintain street trees along new roadways on an ongoing basis.

Staff in DCD review the proposed landscape plan with local citizen groups, staff in the Highway Services Division of Operations in DPWT, and staff at the Montgomery County Planning Department through the mandatory referral process.

Typically, citizen advisory groups press for more landscaping; however, the Division of Operations in DPWT, which is responsible for future maintenance, routinely advises limiting the amount of plant materials because there is no money for ongoing maintenance. Recently, DCD included funding for two or three years of landscape maintenance in a few capital projects; however, after these funds were spent, staff in Highway Services removed the landscaping.

Staff coordinate with the State or a developer to ensure consistent landscaping treatment. When a road project includes State funds, staff coordinate with the State to ensure continuity of the landscaping. For example, for the Montrose Parkway project, the State will landscape the interchange and the County will landscape the roadway. DCD also coordinates landscaping with a developer who builds a road that abuts a County road. Along Father Hurley Boulevard, for example, the County installed two-inch caliper trees and the developer installed four inch caliper trees of the same species to give the townhouse and commercial area a more mature look.

Wheaton and Silver Spring Urban Districts. The Wheaton and Silver Spring Urban Districts plant new street trees to fill in planting spaces and landscape downtown areas. Both districts rely primarily on contract staff to plant new street trees. The Silver Spring master plan or Wheaton streetscape plan define the tree species. Staff in both districts prefer to plant street trees with 3 to 3.5 inch calipers.

2. New Street Tree Plantings by Private Developers

Chapters 49 and 50 of the Montgomery Code require a developer who constructs a road as part of a subdivision development to plant street trees in accordance with standards established by DPWT and guidelines in the approved land use master plan. Typically, trees must have a minimum caliper of three inches and be spaced 30 to 50 feet apart.

Neither Montgomery County Government nor the Planning Department maintain records of the number of street trees planted by developers as part of the subdivision process; however, OLO estimates that developers plant approximately 3,600 trees per year.[21]

3. Total New Tree Plantings

Table 12 shows the estimated number of street trees planted in FY 04. The data show the developers planted 3,600 street trees, or approximately 70 percent of the total and County agencies and departments planted 1,540 street trees.

[21] DPWT staff report that the County accepts approximately 20 miles of new roads for maintenance each year, including 18 miles of subdivision roads. If trees are spaced 50 feet on center, one mile of subdivision road will have approximately 200 trees and 18 miles will have approximately 3,600 trees.

TABLE 12: ESTIMATES OF NEW TREES PLANTED IN FY 04

Agency/Department	Estimate of New Trees Planted in FY 04	Percent of New Plantings
Developers	3,600	70%
DHCA	70	1%
DPWT Roadway Projects	400	8%
DEP	951[22]	19%
Wheaton and Silver Spring Urban Districts	116	2%
TOTAL	**5,137**	**100%**

Source: OLO, September 2004.

4. Programs to Plant Replacement Street Trees

The responsibility for planting replacement street trees depends on where a tree is located, i.e., inside or outside of an Urban District, or whether a tree is removed as part of a water or sewer repair project. Each Urban District manages the removal and replacement of trees within its respective boundaries. Outside of the Urban District, the Division of Highway Operations in DPWT and DEP share responsibility for planting replacement trees. In compliance with State law, WSSC also replaces trees that the agency removes during a water or sewer project.

Replacement Plantings in the Urban Districts. The Bethesda Urban Partnership (BUP) plants replacement trees; in FY 04, BUP planted 53 replacement trees. BUP uses its own street tree list to select the species for planting, and coordinates with Planning Department staff to remain consistent with the Bethesda Streetscape Plan. BUP takes into account factors such as utility lines, street lights, and surrounding trees when determining which species to plant. BUP contracts out tree installation and each tree comes with a one-year warranty.

Staff in the Silver Spring Urban District estimate they replace an average of 14 trees each year, based on an average of trees replaced over the past five years; staff in Wheaton estimate they replace an average of seven trees a year.

DPWT/DEP Replacement Plantings. Since FY 02, DPWT and DEP staff share the responsibility for replacement tree plantings in the unincorporated area of the County outside the Urban Districts. DEP administers the street tree planting contract and associated funds. DPWT receives citizen requests and assists with site selection and inspection. DPWT estimates about three-fifths of citizens call to request a replacement.

[22] In FY 04, DEP's new street tree plantings is lower than average because DEP had to accommodate an increase in requests for replacement plantings as a result of the hurricane.

Under the shared management structure, when a tree is removed, DPWT staff leave a notice asking a citizen to call DPWT if he/she wanted a replacement tree. After the tree removal and stump grinding operations are complete, DPWT notifies DEP, which manages the planting contract. Since FY 02, DEP has set aside a portion of its plantings for replacement trees. DEP planted 945 replacement trees in FY 03 and 571 in FY 04.

Table 13 presents data that shows DEP and DPWT street tree plantings by watershed. The data reflect three seasons of plantings from the fall of FY 03 through the fall of FY 04. The data show approximately three-fourths of the plantings were in watersheds with fair or good quality and one-fourth were in watersheds with poor water quality. DEP plantings were concentrated in watersheds with ongoing or completed stream restoration projects to enhance the success of those projects, as well as in watersheds with poor water quality. DEP also notes that the quality of the sub-watershed may differ from the rating for the overall watershed. DEP plantings were clustered in six watersheds whereas DPWT plantings were distributed among 15 different watersheds.

TABLE 13: DEP AND DPWT STREET TREES PLANTED BY WATERSHED – FALL FY 03 THROUGH FALL FY 04

County Watersheds	Canopy Coverage	Water Quality	DEP New Plantings	DPWT Replacement Plantings
Little Falls Branch	30%	Poor		108
Sligo Creek	26%	Poor	415	95
Middle Great Seneca	36%	Fair	77	70
Little Paint Branch	31%	Fair		23
Northwest Branch	42%	Fair	103	108
Muddy Branch	43%	Fair		18
Watts Branch	37%*	Fair		42
Rock Run	48%*	Fair		10
Lower Rock Creek	25%	Fair	796	257
Upper Rock Creek	40%	Fair	247	42
Cabin John	27%*	Fair	68	92
Lower Patuxent River	61%	Fair		
Hawlings River	39%	Good		12
Broad Run	44%	Good		
Paint Branch	43%	Good		12
Upper Patuxent River	44%	Good		
Bennett Creek	43%	Good		
Little Monocacy	40%	Good		
Upper Great Seneca	36%*	Good		17
Lower Great Seneca	49%	Good		17
Little Seneca	41%	Good		
Dry Seneca	32%	Good		
TOTALS			**1,706**	**923**

*Due to cloud cover, canopy coverage is underestimated. Source: OLO and DEP, September 2004.

WSSC Replacement Plantings. Washington Suburban Sanitary Commission (WSSC) staff maintain and construct water and sewer infrastructure located in public rights-of-way. As part of these responsibilities, if WSSC removes a tree as part of a project, WSSC plants a replacement tree.

WSSC chooses the species of the replacement tree from the tree list maintained by the Maryland Department of Natural Resources (DNR) and usually plants native species; the trees range in size from 1.5 inch to 2-inch caliper.[23] If an owner does not want a tree replanted, WSSC will defer to the owner's wishes. Since State law requires WSSC to plant a tree for every tree removed, however, WSSC will work with the local government tree managers to identify another location for a replacement tree. WSSC uses a commercial landscaping contractor for its tree replanting.

Table 14 displays the estimated number of replacement trees planted by County Government departments and WSSC in FY 04. The data show DPWT/DEP planted three-fourths of the replacement trees; WSSC planted 16 percent; and the three Urban Districts combined planted the remaining 10 percent.

TABLE 14: ESTIMATED NUMBER OF REPLACEMENT TREES PLANTED BY COUNTY AGENCIES IN FY 04

Agency/Department	Number of Replacement Trees Planted in FY 04	Percent of Total Replacement Plantings
Bethesda Urban Partnership	53	7%
Wheaton & Silver Spring Urban Districts	21	3%
DPWT/DEP	571[24]	74%
WSSC	120	16%
FY 04 Estimated Total	**765**	**100%**

Source: OLO and DPWT, WSSC, BUP, and Wheaton and Silver Spring Urban Districts, September 2004.

C. STREET TREE MAINTENANCE ACTIVITIES

Trees in the unincorporated areas of Montgomery County receive different types and levels of maintenance services based on where they are located and what type of maintenance arrangement has been put in place. DPWT and the Urban Districts share responsibility for the majority of tree maintenance services. In addition to these public agency efforts, some private entities provide maintenance services.

[23] WSSC's contract specifies a minimum of one-inch caliper. Staff report that trees planted in the right of way, with a caliper of 2.5 inches or more do not adapt as well.

[24] The number of replacement plantings for FY 04 is higher than average due to an increase in requests as a result of the hurricane.

1. The Bethesda Urban District

The Bethesda Urban District contracts with the Bethesda Urban Partnership (BUP) to provide promotional and maintenance services. BUP maintains 1,200 street trees within the Bethesda Urban District. BUP's Director of Landscape and Maintenance Services (a certified arborist) and six full-time landscapers provide the majority of tree maintenance services. Each year, all 1,200 trees receive monitoring and inspection; maintenance pruning; clearance and/or emergency pruning, as needed; fertilization based on soil samples, as needed; edging and mulching in the spring and fall; pest or health management, as needed; and watering, as needed.

2. The Silver Spring and Wheaton Urban Districts

The Silver Spring and Wheaton Urban Districts contract jointly for landscape services, including tree maintenance. The contractor is responsible for maintaining approximately 1,100 street trees within the two Urban Districts (280 in Wheaton and 825 in Silver Spring). Annual maintenance services include: monitoring and inspection, ornamental pruning, edging and mulching in the spring and fall; leaf removal; clearance and/or emergency pruning; and pest or health management.

The operation managers in both districts report that previous tree maintenance contracts included annual pruning for all trees but now pruning is conducted based on complaints or annual inspections carried out by the contract arborist or in-house staff. The contractor provides approximately 75 percent of the tree maintenance services in the districts; district staff provide the remaining 25 percent.

Silver Spring and Wheaton also coordinate with the State of Maryland Highway Administration to maintain some trees along State roads. Under a Memorandum of Understanding (MOU) the Urban Districts signed with the State, the Districts are responsible for pruning trees along Georgia Avenue and the State is responsible for plantings and removals.

3. DPWT Pruning Outside of the Urban Districts

Outside of the Urban District, DPWT removes deadwood, diseased branches, and structural defects that pose a threat to public safety. DPWT provides tree pruning services in response to citizen requests. A request to trim a tree generates an inspection order. DPWT usually schedules the inspection for the next time a DPWT Arborist is in the area, unless the request is an emergency.

After the inspection, DPWT prioritizes its work based on the severity of the need. DPWT gives the highest priority to trees deemed to have the greatest potential impact on public safety. Currently,

- DPWT completes high priority emergency pruning within ten days;
- DPWT completes medium priority emergency pruning within nine months; and
- DPWT completes low priority emergency pruning in nine months or more.

DPWT assigns high priority emergency pruning to its in-house staff and generally contracts out medium and low priority emergency pruning.

Routine pruning consists of horticultural pruning to correct structural problems or growth patterns that would eventually obstruct traffic or interfere with utility wires or buildings. *DPWT has not provided routine pruning since the dissolution of the Suburban Taxing District in 1996.* DPWT does not take requests for routine pruning and it *does not* prune trees on a regularly scheduled basis to provide clearance for vehicles and pedestrians over roads and sidewalks or to eliminate the obstruction of traffic signals, stop signs, and other traffic control devices. It is the responsibility of utility companies to prune trees interfering with electrical lines.

DPWT states that, if funding were available, it would establish a five to seven-year cycle for routine pruning because it is more cost effective to prune a young tree. Older trees tend to be more expensive to prune, especially if they have never been pruned before. Assuming a current inventory of approximately 231,000 trees, DPWT reports that it would have to prune approximately 38,500 trees annually to achieve a six-year pruning cycle. DPWT estimates that it would cost approximately $3.3 million to maintain a six-year pruning cycle, plus an additional $1.5 million to eliminate the current maintenance backlog.[25]

4. Private Maintenance Activities

Other entities that provide tree pruning services include Pepco[26], some private developers, and some homeowner's associations.

Pepco Maintenance. Pepco prunes trees growing under and around power lines for electrical clearance only. Pepco prunes an area that covers a 20-foot radius around a power line in any direction. Pepco fields 20 contract crews that work continuously to trim every tree in the County every two years. Pepco reports that the company coordinates with DPWT staff to address tree maintenance issues.

Developer Maintenance and Liability Agreements. DPS and DPWT staff report that through the development review process, the County has signed maintenance and liability (M&L) agreements with private developers to maintain streetscape that exceeds the standards set in the County Code. The agreements typically state that the developer is responsible for all maintenance and that if the developer fails to maintain the streetscape, the County has the right to remove it. DPS reports that with the exception of an agreement signed for the Clarksburg Town Center, most of these agreements do not require a developer to maintain the street trees. Currently, neither DPS nor DPWT maintains copies of these agreements; however, DPS indicates the department will start to do this.

[25] This estimate, which assumes a maintenance cost of $87 per tree, would increase annually to accommodate new trees planted by developers and County agencies outside of the urban districts.
[26] In addition to Pepco, Allegheny Power, Baltimore Gas and Electric, ATT, and cable companies also trim trees in Montgomery County.

Homeowner Association and Private Property Owner Maintenance. DPWT staff report that some homeowner's associations informally maintain street trees in the public right-of-way.

D. Street Tree and Stump Removals

Staff in the Urban Districts, the DPWT Division of Operations, and WSSC each are responsible for tree removals.

1. Urban District Removals

Staff in the Silver Spring and Wheaton Urban Districts and in the Bethesda Urban Partnership manage tree removals for their respective central business district (CBD).

- BUP removes dead, diseased, or dying trees on an "as needed" basis. The annual inspection of each tree within the district often identifies trees that require removal. BUP contracts out tree and stump removals for trees greater than eight inches in diameter.

- In the Wheaton and Silver Spring Urban Districts, staff contract out their tree removal work. Tree removals in the Silver Spring and Wheaton Urban Districts average approximately 21 per year. Staff report that generally they plant replacement trees within the same or the next growing season.

2. DPWT Tree and Stump Removals

Staff in the Highway Services - Field, Division of Operations in DPWT provide tree removal and stump removal services. These services are part of the Roadway Maintenance Program, which maintains and repairs roads and other roadway elements, such as street trees, in the public right-of-way.

DPWT removes dead trees in the right-of-way. DPWT also removes trees that have a structural defect, or are in declining health. DPWT delivers services in response to citizen requests. A citizen begins the tree removal process by calling to request a removal. DPWT inspects requests within one or two days to determine if the tree should be removed. If the tree is alive, the State must issue a removal permit.

DPWT prioritizes tree removals based on the potential public safety hazard, giving highest priority to trees that are in immediate danger of falling and lower priority to those that are unlikely to fall or otherwise cause problems prior to removal, even if they are dead. The current backlog for tree removal is approximately 12 months, or 350 trees. In FY 04, when the backlog approached 24 months, DPWT re-allocated $200,000 from emergency tree pruning to reduce the backlog.

DPWT conducts stump removal for all of the trees it removes. Stump removal consists of the mechanical grinding of the stump and exposed roots radiating from the stump out

to where the roots first enter the ground. The stump and roots are ground to a depth of 6 inches below the surrounding ground level. The type and amount of grinding differs depending on whether or not a new tree will be re-planted in the same spot.

DPWT gives priority to stumps that must be removed before a replacement tree can be planted; otherwise, it places stumps on a removal list as trees are removed. DPWT contracts out all stump removals in the County. The current stump removal backlog is approximately 24 to 30 months. DPWT staff report that when the backlog exceeds 24 months, often homeowners hire private contractors to remove them or smaller stumps decompose naturally.

3. WSSC Street Tree Removals

As part of its responsibility to maintain and construct water and sewer infrastructure located in public rights-of-way, WSSC removes trees when a project to maintain a water line or sewer pipe requires it. WSSC staff work under a "Public Agency Tree Maintenance Permit" from the Maryland Department of Natural Resources (DNR). This permit allows WSSC staff to remove dead or live trees and trim overhead branches for machine clearance. WSSC contracts out the removal, replanting, and maintenance of its roadside trees to a private landscape company.

E. Street Tree Inventory Practices

Five County Government departments, including DPWT, DEP, and the three Urban Districts, maintain an inventory; however, no comprehensive Countywide inventory exists and the DPWT inventory is outdated and incomplete.

- The DEP inventory is a GIS based system with records for the street trees planted by DEP and the DPWT street tree program since FY 02.

- BUP maintains a GIS inventory of all the street trees in the Bethesda Urban District. Each year, BUP updates the inventory as they perform maintenance on the trees. The initial inventory took approximately 1,200 hours to complete over 6 months.

- Silver Spring and Wheaton maintain hand written inventories that are updated at the end of each growing season. Staff indicate they would like to convert their streetscape inventories (including trees) into a GIS-format in the future.

- The DPWT inventory consists of three separate data sets. The first is an inventory of the Suburban District, completed in 1994, which identified 96,000 trees and 45,000 planting sites. The second data set is an inventory of area outside the Suburban District, conducted in 1997-1999, which identified 115,000 trees. The third set of data is from a ride-along statistical inventory of trees in the Agricultural Reserve, which produced an estimate of 50,000 trees.

DPWT has not had the resources to maintain or update this inventory. As a result, it does not reflect any trees planted or replaced since 1999. DPWT staff estimate it would cost approximately $3.75 per tree, or between $800,000 and $1 million, for a new GIS inventory. DEP reports that DEP and DPWT are exploring the implementation and testing of a new inventory system.

F. Summary of Budget and Comparative Data

This section presents budget and comparative data for the County's street tree programs. It examines the use of contractors and contract specifications, levels of maintenance, removal and replacement data, budgets and pruning cycles, and tree liability claims. It also summarizes costs by type of street tree activity.

1. Montgomery County Government Budget Overview

The County Government budget for street tree activities includes funds in DEP, DPWT, and each of the Regional Service Centers.

Department of Environmental Protection (DEP). The general fund provides money for DEP street tree management activities as separate line-items within the Watershed Management Program budget. Table 15 summarizes the DEP budget, which funds the Forest Conservation Coordinator position, the planting contract, and gypsy moth control. In FY 04, DEP estimates the Forest Conservation Coordinator spent approximately .85 workyears on urban street trees; the value of this time was approximately $63,750.[27]

In the FY 05 budget, the Council approved the County Executive's recommendation to reduce the Forest Conservation Coordinator's position to part-time. The Council approved an additional 0.5 workyears, a net increase of 0.3 WY's, to provide assistance with planning and selecting planting sites, tracking plantings through GIS databases, contract oversight, and fostering stewardship in communities where plantings occur.

Table 15: DEP Street Tree Expenditures – FY 03 to FY 05
(in $ 000s)

	FY 03 Actual	FY 04 Actual	FY 05 Budget
Operating Personnel	$0	$64[28]	$75
Tree Planting	$190	$190	$190
Gypsy Moth Control	$0	$30	$30
Total	**$190**	**$284**	**$295**

[27] DEP states that since the Forest Conservation Coordinator was hired to coordinate and address action items in the Forest Preservation Strategy and fulfill the duties in Chapter 22A, DEP estimates approximately 20 to 30 percent of the workyear associated with this position should be dedicated to urban tree programs.

[28] In FY 04, DEP estimates the Forest Conservation Coordinator spent approximately .85 workyears to complete assignments and tasks associated with urban street trees and the value of this time was approximately $63,750.

Department of Public Works and Transportation (DPWT). The general fund pays for DPWT's street tree maintenance activities as a separate program within the DPWT budget. The Council approved $2.4 million for tree maintenance in FY 05. This total includes approximately $1 million for contract work and approximately $1 million for 15.5 workyears, including one Program Manager, 1.5 Arborists, one Contract Inspector, two Workforce Leaders, and ten Tree Climber positions. DPWT staff report that it is common to carry two to four tree climber vacancies throughout an average year. Table 16 illustrates DPWT's budget for tree maintenance over the past five years.

TABLE 16: DPWT STREET TREE MAINTENANCE FUNDING – FY 01 TO FY 05 (in $ 000s)

Category	DPWT Expenditures				
	FY 01 Actual	**FY 02 Actual**	**FY 03 Actual**	**FY 04 Estimated**	**FY 05 Approved**
Personnel					
Adm. Tree Pruning and Tree Removal	$781	$986	$847	$1,145	$1,019
Contractors					
Tree Pruning	$435	$395	$229	$432	$952
Tree Removal	$0	$38	$41	$220	$0
Tree Planting	$40	$40	--	--	--
Stump Removal	$75	$102	$34	$75	$75
Operating Expenses	$212	$233	$268	$258	$349
Total	**$1,543**	**$1,794**	**$1,419**	**$2,130**	**$2,395**

Source: OLO and DPWT, September 2004.

DPWT staff report that tree maintenance expenditures have not met budgeted levels in recent years due to budget savings plan requirements and/or transfer of funds for other one-time maintenance needs, such as pothole repair. Table 17 compares approved funds to actual expenditures from FY 01 to FY 03.

TABLE 17: DPWT APPROVED VS. EXPENDED TREE MAINTENANCE FUNDS - FY 01 TO 03 ($ 000S)

	FY 01	**FY 02**	**FY 03**
Approved Budget	$1,658	$1,998	$2,028
Actual Expenditures	$1,543	$1,794	$1,419
Difference	**($116)**	**($203)**	**($609)**

Source: OLO and DPWT, September 2004.

The Urban Districts. The County spends approximately $100,000 per year on tree management in the three County Urban Districts. In addition staff in the districts estimate they spend anywhere from two to two and one-half percent of their time working on tree related activities as part of their job duties. Table 18 summarizes the operating and personnel expenditures by urban district from FY 01 to FY 05.

TABLE 18: URBAN DISTRICT TREE MAINTENANCE EXPENDITURES – FY 01 TO FY 05 (in $ 000s)

Tree Maintenance	FY 01 Actual	FY 02 Actual	FY 03 Actual	FY 04 Estimated	FY 05 Approved
Bethesda Urban District[29]					
Operating Expenditures (including contracts)	$45	$37	$40	$41	$35
Personnel Expenditures[30]	25%	25%	25%	25%	25%
Silver Spring Urban District					
Operating Expenditures[31] (including contracts)	$40	$44	$47	$51	$35
Personnel Expenditures[30]	2%	2%	2%	2%	2%
Wheaton Urban District					
Operating Expenditures (including contracts)	$20	$20	$20	$21	$21
Personnel Expenditures[30]	0%	2%	2%	3.5%	3.5%
Total Operating Expenses	**$105**	**$101**	**$107**	**$113**	**$91**

Source: OLO and Wheaton and Silver Spring Urban Districts, September 2004.

2. Contract versus in-house labor

MCG entities use a combination of contract and in-house personnel for tree care activities. The advantages of contract services include cost savings and flexibility; however, these savings can be off-set by a lack of sustainable practices, such as systematic or routine pruning. The research also states that smaller organizations benefit from contract labor because they are often not well positioned to add personnel to the payroll. The drawbacks of contract labor are the loss of control, having to address the varying quality among private contractors, and the need for effective contract oversight.

[29] Personnel Expenditures in the Bethesda Urban District are approximately $37,000 per year based on the following analysis. 6WY's @ $24,600 per year including benefits = $148,000. 25% of $148,000 is $37,000.

[30] Percent of District Maintenance/Operation Staff Time spent on Tree Management.

[31] In addition to the funds allocated specifically for "tree maintenance" services, the SSUD regularly utilizes a percent of "streetscape maintenance" funds for these services as well.

The advantages of in-house personnel are the ability to provide better supervision and better training, which over time, leads to higher quality services. As one person stated, with in-house personnel you get the product you want, not what someone else thinks you want. There was a general consensus among the people OLO interviewed that, although it is important to save money where possible because the County can no longer afford in-house personnel, it makes sense to retain in-house personnel for core services.

Table 19 shows the breakdown of MCG expenditures between in-house and contract labor for DPWT, DEP, and the Urban Districts. The data show, on average, 59 percent of all MCG expenditures are for contracts and 41 percent for in-house staff.

TABLE 19: IN-HOUSE AND CONTRACT STREET TREE EXPENDITURES FOR FY 04 ($000'S)

Department	In-house	Contract	Total	Percent In-house	Percent Contract
DEP	$75	$190	$265	28%	72%
DPWT	$697	$897	$1,594	44%	56%
Urban Districts	$78	$112	$190	41%	59%
Total	**$850**	**$1,199**	**$2,049**	**41%**	**59%**

Source: OLO and DEP, DPWT, BUP, and Wheaton and Silver Spring Urban Districts, September 2004.

3. Tree Planting Specifications, Services, and Costs

Contract terms and prices for tree acquisition and installation vary depending on the size of the tree, whether the tree will be picked up or delivered and planted, and the amount of follow-up care provided. Contracts with lower per tree costs typically provide smaller trees, e.g. 1.5 inch to 1.75 inch calipers, and a shorter replacement warranty. Under this type of agreement, contractors do not provide aftercare in the first year, but will replace trees that die. Contracts with higher per tree costs require larger trees and a longer guarantee period which in turn requires contractors to perform a level of aftercare.

All of the agencies listed in Table 20 use contractors to plant their street trees. Specifications for the size, type[32], and standards for spacing and maintenance depend on the terms of the contract. The data show that DHCA, BUP, and the Silver Spring and Wheaton Urban Districts generally pay higher prices to plant larger trees compared to the trees DEP, DPWT, and WSSC plant along suburban roadways. DEP staff have discussed extending the warranty period from one to two years when their contract is re-bid because many of the trees are dying in the second year. They have also discussed requiring additional mulching, corrective pruning, and weeding along with the extension of the guarantee.

[32] In general agencies prefer to obtain native or locally grown trees, although some native trees may be shipped in from the West coast.

TABLE 20: SUMMARY OF STREET TREE CONTRACT SPECIFICATIONS

	DEP/ DPWT	DHCA	BUP	Wheaton/Silver Spring Urban Districts	WSSC
Caliper	1.5 to 1.75 inches	3 to 3.5 inches	2.5 to 3 inches	2.5 to 3.5 inches	1.5 to 2 inches
Average Cost per Tree	$125	$400	$200	$290	$100
Cost includes planting	Yes	Yes	No	Yes	Yes
Cost includes aftercare	No	No	No	No	No
Replacement Warranty	1 year	1 year	1 year	1 year	1 year

Source: OLO and DEP, DPWT, WSSC, BUP, and Wheaton and Silver Spring Urban Districts, September 2004.

4. Maintenance Services

Table 21, compares the types and levels of tree care activities for street trees in the Bethesda, Wheaton, and Silver Spring CBDs, maintained by Urban District staff, and street trees outside of the Urban Districts, maintained by DPWT. The comparison shows trees in the Urban District receive comprehensive services each year whereas the trees outside the Urban District receive services on request.

TABLE 21: DPWT, BUP, SILVER SPRING AND WHEATON URBAN DISTRICTS TREE MAINTENANCE SERVICES

Type of Service	DPWT	BUP	Wheaton/Silver Spring Urban Districts
Number of trees	231,000	1,200	1,100
Monitoring and Inspection	No	Annually	Annually
Maintenance Pruning	No	Annually	Annually based on inspection
Clearance/Emergency Pruning	Yes	Annually based on inspection	Annually based on inspection
Leaf Removal	Yes	Annually	Annually
Fertilizing	No	Annually based on inspection	NA
Edging and mulching	No	Spring and fall	Spring and fall
Pest management	No	As needed	As needed
Watering	No	As needed	As needed
Tree Base Cleaning	No	Annually	As needed

Source: OLO and DPWT, WSSC, BUP, and Wheaton and Silver Spring Urban Districts, September 2004.

5. Removals and Replacement Measures

Table 22 displays tree removal data for DPWT, WSSC, and each of the Urban Districts. The data shows DPWT averages 1,060 tree removals annually, compared to an average of 22 for Wheaton/Silver Spring, 50 for BUP, and 120 for WSSC.

TABLE 22: COMPARISON OF STREET TREE REMOVAL AND REPLACEMENT MEASURES

	DPWT	WSSC	BUP	Wheaton/Silver Spring Urban Districts
Type of Street Tree	Suburban	Suburban	Urban	Urban
Average Number of Tree Removals per Year (FY 01-04)	1,060[33]	120	50	22
Backlog of Tree Removal Work Orders (Quantity and Time)	1 year	Not applicable	None	None
Backlog of Stump Removal Work Orders (Time)	2.5 years	Not applicable	None	None
Maximum Elapsed Time between Tree Removal and Replacement	3.5 Years	1 year	6 months[34]	6 months[34]

Source: OLO and DPWT, WSSC, BUP, and Wheaton and Silver Spring Urban Districts, September 2004.

6. Trends in Tree Liability Claims

The Office of the County Attorney and the Department of Finance, Risk Management Division, are responsible for defending the County against liability claims. A claim generally seeks damages for property damage or bodily injury caused by a tree. To prove negligence, a claimant must prove both that the agency received notice of a potentially dangerous tree and that the agency failed to respond. The County processes liability claims for the County Government, the City of Rockville, and Maryland National Capital Park and Planning Commission.

Since FY 01, the County processed 511 liability claims related to damage caused by trees. There were 328 claims for County Government, 93 for M-NCPPC, and 90 for Rockville. Of the 511 claims, the County paid damages on 134. There is a steady increase in the number of claims and the number of claims paid since FY 01. Table 23 summarizes this data.

[33] Average does not include 600 additional trees removed in FY 04 due to Hurricane Isabel.
[34] Six months is necessary only when a tree that needs to be replaced falls between two planting seasons.

TABLE 23: FY 01 TO FY 04 TREE LIABILITY CLAIMS

	FY 01	FY 02	FY 03	FY 04
County Government				
Number of Claims	31	65	99	133
Number of Claims Paid	11	21	27	46
Total Amount Paid	$21,939	$21,879	$150,695*	$76,021*
Avg. Paid per Claim	$1,994	$1,042	$5,581	$1,653
M-NCPPC				
Number of Claims	17	20	25	31
Number of Claims Paid	3	5	4	6
Total Amount Paid	$161,513**	$4,072	$7,858*	$10,956*
Avg. Paid per Claim	$53,838**	$814	$1,965	$1,826
City of Rockville				
Number of Claims	8	15	18	49
Number of Claims Paid	2	3	1	5
Total Amount Paid	$1,479	$24,448	$635	$11,893*
Avg. Paid per Claim	$740	$8,149	$635	$2,379

*Includes funds held in reserve while claims are awaiting final negotiations and/or judgments. The amount kept in reserve is an estimate of the potential amount to be paid, and these values could increase or decrease.
**These values are substantially impacted by one large award of $160,444.
Source: Department of Finance, Division of Risk Management.

7. Street Tree Activity Costs for MCG and WSSC

Table 24, on the next page, summarizes the activity based costs for street trees in MCG and WSSC. The FY 04 estimated costs total $2.1 million, including slightly more than $2 million for County Government and $94,000 for WSSC.

TABLE 24: COMPARATIVE AGENCY DATA FOR STREET TREE ACTIVITIES FY 04

Agency	Dept.	Tree Activity	Source of Funds	In house or contractor	What it pays for	Estimated Amount
MCG	BUP	Planting, Maintenance, Removal	Operating Budget	In-house	Tree acquisition, installation, and maintenance provided by 25% of time of six person maintenance crew	$78,000
	BUP	Major Removals	Operating Budget	Contractor	Removals for trees with caliper eight inches or more	See above.
	DEP	Planting	Operating Budget	Contractor	Tree acquisition, installation, and one year replacement warranty for new street tree plantings to improve water quality and replacement street tree plantings for citizens	$190,000
	DEP	Contract Management and Oversight	Operating Budget	In-house	Estimated value of Forest Conservation Coordinator[35]	$64,000
	DHCA	Planting	CIP Streetscape	Contractor	Tree acquisition, installation, and one-year replacement warranty for trees that are part of streetscape projects to revitalize commercial areas	Embedded
	DPWT	Planting	CIP	Contractor	Tree acquisition, installation and one year warranty for trees that are part of County road projects	Embedded
	DPWT	Planting	CIP Bethesda Streetscape	Contractor	Tree acquisition, installation, and one-year warranty for 18 street trees in Bethesda CBD	None[36]
	DPWT	Contract Management, Inspections, and Maintenance	Operating Budget	In-house	10.2 WYS at DPWT to manage street tree program, conduct inspections, prioritize requests from citizens for tree maintenance, and take care of emergency tree maintenance and removals	$697,000[37]
	DPWT	Removals	Operating Budget	Contractor	Emergency tree removals	$221,000[37]
	DPWT	Pruning	Operating Budget	Contractor	Emergency tree pruning	$444,000[37]
	DPWT	Stump Removal	Operating Budget	Contractor	Stump removals	$84,000[37]
	DPWT	Contract Operating Expenses	Operating Budget	Contractor	Other operating expenses, including non-professional services, motor pool, phone, and tree maintenance supply costs	$148,000[37]
	SS/Wheaton Urban Dist.	Maintenance	Operating Budget	Contractor	Mowing, edging, weeding, seasonal tree trimming, IPM, leaf removal and other maintenance	$112,000
WSSC		Contract Oversight	CIP	In-house	One manager, One supervisor, and a six person crew to inspect projects, provide contract management	$14,000
		Planting	CIP	Contractor	Tree acquisition, installation, and maintenance with one year replacement warranty	$80,000
					Activity Based Cost FY 04	**$2,132,000**

[35] Estimate assumes .85 WYs for FY 04. FY 05 budget has .75 WY (Coordinator) and .5 WY (Contract oversight) for $75,000.
[36] Project not scheduled to begin until 2006. Estimated cost for 18 trees assumes $500 per tree, total $9,000.
[37] Actual FY 04 dollars spent or encumbered as of July 30, 2004.

CHAPTER VII. Findings

This study presents research findings about tree care activities, the benefits of trees, and approaches to tree management practices. It also describes how the five County and bi-County agencies acquire, install, maintain, and remove trees located on public land or along public rights-of-way maintained by the County. The County Council asked for this report to understand the agencies' activities and practices and to identify opportunities to improve the efficiency and effectiveness of the agencies' tree care programs. This chapter is organized as follows:

Part A presents research findings about tree care programs;
Part B presents findings about the agencies' tree care activities;
Part C presents findings about centralization, contracting out, and interagency coordination; and
Part D presents findings about inventory management and systematic care programs.

A. RESEARCH FINDINGS ABOUT TREE CARE PROGRAMS

Finding #1: The major types of tree care activities consist of tree establishment, tree maintenance, tree removal and replacement, and tree conservation.

The phrase "tree care activities" refers to a set of practices to preserve and sustain an urban forest over time. These practices include:

- ***Tree conservation***, which relies on inventories and land use plans to retain native trees and wooded areas;
- ***Tree establishment***, which consists of propagating, harvesting, planting and caring for a tree through its first three years of life;
- ***Tree maintenance***, which includes the routine pruning, mulching, fertilizing and irrigation a tree needs throughout its life; and
- ***Tree removal and replacement,*** which consists of tree removal, stump grinding, and subsequent replacement plantings.

Finding #2: In an urban area, trees exist in many different settings and require different kinds and levels of care. Generally, a tree requires more care as the amount of human activity near it increases.

In an urban area, trees grow in forests, along stream valleys, in downtown plazas, in parking lots, in residential neighborhoods, or in office parks. The care of a tree depends, in part, on its setting. Generally, a tree requires more care as the amount of human activity near it increases. For example, a tree near a reservoir, in a conservation park, or in a stream valley generally requires periodic inspections and a relatively low level of care. In contrast, a tree along a suburban street, in a parking lot, or in a downtown area requires more extensive soil treatments, more frequent inspections, and a higher level of maintenance.

Finding #3: Jurisdictions across the country use a combination of ordinances, inventories, systematic care programs, advisory boards, and management plans to administer urban forest programs.

- ***A tree ordinance*** establishes the authority to achieve a healthy urban forest and ensure a consistent approach to tree management. Different types of tree ordinances exist: a street tree ordinance regulates the planting, maintenance, and removal of trees in the public right-of-way; a tree protection ordinance preserves trees on private property; and, a view ordinance resolves conflicts about trees on private property.

- ***A tree inventory*** provides baseline information about the composition and distribution of the urban forest landscape. The costs to start an inventory can be significant; however, these costs can be managed by establishing the inventory incrementally over time, using sampling techniques to develop estimates, or training volunteers to collect data.

- ***A systematic care program*** consists of periodic inspections and routine care, such as watering, mulching, pruning, and fertilizing, provided at regularly scheduled intervals. Over time, a routine pruning program can produce healthier trees which require less expensive follow-up maintenance.

- ***A tree advisory board*** is a committee of citizens that advises elected officials on tree policies and motivates elected officials to support resources for urban forest management. A tree committee can play a key role in establishing policy for a community forestry program; however, it may be difficult to sustain over time.

- ***A management plan*** describes the practices and activities an agency uses to plant, maintain, and remove its trees and makes recommendations to direct the use of scarce resources in order to create a sustainable urban forest.

Finding #4: Since the mid-nineties, jurisdictions around the country have used different strategies to address a decline in general fund support for tree care activities. Some jurisdictions deferred routine maintenance; some identified other funding sources; and, others supplemented programs with capital budget funding.

Historically, jurisdictions relied on general operating funds to pay for all aspects of public tree care programs; however, as budgets tightened in the nineties, tree care did not compete with more pressing needs, such as public safety or education. Jurisdictions used different strategies to respond to this problem:

- Some jurisdictions replaced systematic pruning with maintenance based on requests. This approach addressed the funding shortfall in the short term; however, over time, deferred maintenance increases pruning costs, storm cleanup costs; and liability costs.

- Some communities identified other funding sources, such as grants, donations, special assessments, taxes, and dedicated sources of revenue, to supplement general fund revenues. San Francisco and Modesto, California use State Gas tax revenues; Claremont, California established a landscape and lighting district.

- Some jurisdictions supplemented programs with money from their capital budget. New York City and Milwaukee use bond money for new capital projects to plant trees. Some small jurisdictions use their capital program to pay for tree replacement and tree removal, in addition to tree planting.

Finding #5: There are many different approaches to managing the urban forest. The approach a community chooses will depend on how it defines its urban forest, the concerns it faces, and the resources it can commit.

The research suggests that the scope and purpose of a management plan varies widely, depending on the definition of an urban forest that a community uses, the resources a community has, and the concerns it faces. Some management plans address a specific concern, such as hazardous trees, or a specific urban forest component such as street trees. Other plans address the management and benefits of both public and private trees. Below are some examples of the different types of management plans.

- ***A tree risk management*** plan provides a community with a systematic approach to identify trees with structural defects that may cause property damage or personal injury.

- ***An inventory and management plan*** analyzes the species and age diversity, condition, and management needs of a certain tree population based on a comprehensive inventory and makes recommendations about the tree care activities needed to sustain the urban forest over time.

- ***A forest management plan*** reports on the characteristics of a forest that affect habitat quality, such as tree density, canopy height, and number of dead trees. It also identifies strategies for forest management.

- ***A green infrastructure management plan*** consists of an inventory or assessment of land cover to identify existing hubs[1] and corridors[2] for preservation and to target gaps for reforestation. The goal of a green infrastructure plan is to preserve the diversity and connectivity of natural ecosystems from urbanization and the

[1] According to Maryland's Green Infrastructure Assessment, hubs are "unfragmented areas hundreds or thousands of acres in size, and are vital to maintaining the state's ecological health. They provide habitat for native plants and animals, protect water quality and soils, regulate climate, and perform other critical functions." Maryland's Green Infrastructure Assessment. May 2003. p.2.

[2] Corridors are "linear remnants of natural land such as stream valleys and mountain ridges that allow animals, seeds, and pollen to move from one area to another. They also protect the health of streams and wetlands by maintaining adjacent vegetation. Preserving linkages between the remaining blocks of habitat will ensure the long-term survival and continued diversity of Maryland's plants, wildlife, and environment." Maryland's Green Infrastructure Assessment. May 2003. p.2.

negative effects of low density development. In Montgomery County, the Legacy Open Space Functional Master Plan and the associated capital program could provide a point of departure for a more comprehensive green infrastructure plan.

- ***A cost benefit management strategy*** compares tree care program costs with the avoided costs that an urban forest provides.[3] This approach calculates the benefits for different species in the urban forest inventory to identify those species that would provide the greatest environmental benefits at the lowest program cost. The recommendations balance actions needed to create a sustainable urban forest with recommendations to maximize environmental benefits.

- ***A comprehensive urban forest management plan*** provides direction for the trees, small plants, and other vegetation on public and private property. The Portland Urban Forestry Management Plan describes the roles and responsibilities of the agencies and nonprofit organizations that manage urban forest programs and develops recommendations designed to move from "reactive, fragmented management to proactive, integrated and coordinated management."[4] The Portland plan recommends establishing a permanent Urban Forestry Policy group to coordinate policy; coordinating data gathering and mapping projects to interpret canopy cover information; coordinating maintenance and stewardship programs; and developing criteria to prioritize planting areas.

Finding #6: Trees significantly improve the quality of life, particularly in an urban area. Numerous studies document the benefits of trees; more recent studies that quantify specific environmental benefits identified cost savings that total millions of dollars.

Trees significantly improve the quality of life, particularly in an urban area. Numerous research studies document that trees improve air quality, save energy, reduce stormwater runoff, improve water quality, reduce soil erosion along stream banks, provide wildlife food and habitat, provide visual screens and sound barriers, create settings for recreational activities, and increase real estate values. Recent studies quantifying the environmental benefits attributable to an urban forest have identified cost savings that total millions of dollars.

[3] Avoided costs are the savings due to a forest's ability to naturally cool the air, sequester carbon dioxide, remove other air pollutants, and reduce stormwater runoff.

[4] Portland Parks & Recreation and the Urban Forestry Management Plan Technical Advisory Committee, Portland Urban Forestry Management Plan 2003 – Recommended Draft. November 2003, p 47.

B. FINDINGS ABOUT THE AGENCIES' TREE CARE ACTIVITIES

Finding #7: The five County and bi-County agencies manage trees in three types of settings: landscape trees, forest trees, and street trees.

To compare programs with similar tree care requirements across the agencies, this study establishes three broad categories of tree types, i.e., landscape trees, forest trees, and street trees, For the purposes of this study:

- **A landscape tree** is a tree which grows naturally or is planted adjacent to a school, or community center or other public facility, on a college campus; or in a local or regional park.

- **A forest tree** is a tree which is part of a stand of trees that may occur naturally or be deliberately planted in a natural reserve, a county park, or on a public building site.

- **A street tree** is a tree that is planted along a public right-of-way in an urban, suburban, or rural area.

Finding #8: All five agencies are responsible for the acquisition, planting, maintenance, and removal of landscape trees. Four of the agencies – Montgomery College, the County Government, MCPS and WSSC – rely primarily on private contractors to plant, maintain, and remove trees.

In Montgomery County, schools, libraries, government buildings, community centers, college campuses, and parks all have landscape trees. County Government, Montgomery College, MCPS, and WSSC follow similar practices to care for these trees:

- All four agencies hire landscape contractors to prepare and install landscape plans as part of a capital project. Planning Department staff at M-NCPPC review the contractors' landscape plans as part of the mandatory referral process.

- The trees carry a one-year replacement warranty. After the warranty expires, the trees receive a minimal level of pruning from the agencies' in-house maintenance staff.

- Each agency contracts with a private firm for emergency maintenance and removals, which are done primarily for safety purposes.

Finding #9: M-NCPPPC grows, plants, maintains, and removes trees to landscape local parks. M-NCPPC primarily uses in-house staff to manage all of these activities.

In FY 04, staff at the M-NCPPC Pope Farm nursery harvested and planted 1,048 trees to landscape local parks.

- Trees planted by staff in the Horticulture Section of the Division of Natural Resources, receive a two-year aftercare program, which includes watering, de-staking, mulching, and weeding.

- After this two-year period expires, these trees receive routine maintenance from the landscape crews in the Northern and Southern regions.

- In addition, staff in the Arboriculture Section inspect trees that impact park facilities on a four-year cycle. The Arboriculture Section also provides emergency tree care services for all other park trees in response to citizen requests. Staff respond to 800 to 1,000 calls annually.

Finding #10: Public agencies, including the five County and bi-County agencies, must comply with the Maryland Forest Conservation Act and/or the County's Forest Conservation Law, when they build or renovate roads, schools, or other community buildings or develop a park.

In the early 1990s, the State enacted the Maryland Forest Conservation Act and Montgomery County adopted the Forest Conservation Law to implement the State Act. These laws establish procedures to identify and conserve existing forests on property that is undergoing development, and to reforest and afforest additional acres on-site and off-site. The law applies to anyone developing a tract of land 40,000 square feet or larger, including public agencies that are constructing or renovating a road, a school, a community building, or a park.

Under the law, a public agency must complete an inventory to identify existing forest resources and prepare a plan to retain forest trees on-site or plant forest trees on-site or off-site. The law gives priority to the retention of existing trees on-site. It also establishes stream buffers, connections between forested areas, and critical habitat areas as priority areas for reforestation. To meet reforestation requirements, a public agency must install a certain number of trees, maintain them for a minimum of two years, and commit to a survival rate that corresponds to the size and number of trees planted.

Finding #11: All five agencies, Montgomery College, County Government, MCPS, M-NCPPC, and WSSC, manage forest tree activities to comply with the County's Forest Conservation Law.

Several options exist to comply with the Forest Conservation Law, such as conserving an existing forest on-site, planting additional trees on-site, planting trees off-site, purchasing credits from a private reforestation bank, or establishing a reforestation bank. Since the County's Forest Conservation Law was enacted, the five County and bi-County agencies have used several methods to meet the law's requirements.

- Maryland National Capital Park and Planning Commission (M-NCPPC). Because most park sites have existing forests or because forested areas are available in developing parks, M-NCPPC rarely has to reforest, either on-site or off-site. When the Parks Department must plant trees to comply with the FCL, the reforestation takes place on-site, generally in an environmentally sensitive area such as a stream buffer.

- Montgomery County Government (MCG). The County Government generally complies with the FCL requirements for new County facilities through on-site reforestation. The County Government has also established a reforestation bank on WSSC owned land, that will provide credits for future roadway projects.

- Montgomery County Public Schools (MCPS). MCPS accepts slightly smaller sites for dedication for new school construction if a developer includes the reforestation requirements for the school site in the forest conservation plan for the entire subdivision. For new schools, which are not constructed on land included in private developer forest conservation plans, MCPS either plants trees on-site, plants trees at another MCPS site, or purchases credits from a private reforestation bank.

- Montgomery College. Montgomery College generally plants forest trees on-site to comply with the FCL. It has also planted street trees on Georgia Avenue and Fenton Street.

- Washington Suburban Sanitary Commission (WSSC). WSSC holds a developer responsible for construction of the water and sewer extensions that serve his/her development, including the reforestation requirements associated with these extensions.

Finding #12: In addition to activities to comply with the County's Forest Conservation Law, three agencies, County Government, M-NCPPC, and WSSC, plant forest trees as part of environmental programs.

Both County Government and M-NCPPC administer programs to reforest stream valleys. The Forest Ecologist in M-NCPPC's Natural Resources Management Section of the Division of Natural Resources manages a reforestation planting program to fill in riparian buffers and conserve natural forest areas in the park system. The Watershed

Management Section in the Department of Environmental Protection implements capital projects to restore streams and improve water quality.

- For the M-NCPPC reforestation program, staff acquire trees from Pope Farm and rely on volunteers and Park staff to plant the trees. The tree stock consists of containerized trees and balled and burlapped trees. After the trees are planted, the balled and burlapped trees receive two years of aftercare from Horticulture staff in the Division of Natural Resources, which includes watering, de-staking, mulching, and weeding. Staff in the Natural Resources Division and volunteers maintain the containerized tree reforestation sites. Maintenance activities include replacing and repairing deer predation cages and tubex and removing non-native invasive plants.

- For the DEP reforestation program, staff use a private contractor to supply and plant the trees. The tree stock consists of cuttings, containerized trees, and balled and burlapped trees. DEP requires contractors to guarantee their trees for one year and to provide maintenance services during the warranty period that include pruning, removing dead or damaged branches, weeding, insect and disease control, watering during the growing season, and deer protection. Because the success rate for cuttings can vary widely depending on site conditions, weather, pests, and the quality of contractor installation, DEP reports that it uses a large number of cuttings to establish a forest.

- WSSC plants forest trees as part of its management of land around the Triadelphia Reservoir in Sunshine, Maryland. WSSC uses volunteers to plant forest trees on vacant land next to the reservoir.

Finding #13: Two of the five agencies, MCG and WSSC, administer programs to care for an estimated 231,000 street trees in the unincorporated areas of the County. The County Government organizes most of its activities geographically and WSSC delivers its services throughout the bi-County district.

There are an estimated 231,000 street trees in the unincorporated areas of the County, including 1,200 in Bethesda, 825 in Silver Spring, and 280 in Wheaton. Tree care activities for street trees are largely centralized in County Government, although WSSC also removes and replaces street trees that interfere with water and sewer repair projects.

County Government organizes its tree care activities geographically. Five entities, DPWT, DEP, and three Urban Districts,[5] are responsible for planting, maintaining, and removing trees in the unincorporated areas of the County.

[5] An urban district is a legally designated geographic area created as a special taxing district to maintain and enhance communities with diverse commercial, institutional, and residential development. The goal is to maintain an urban district as a prosperous, livable urban center. Sources for the operation of an urban district in Montgomery County include an urban district tax, a parking fee surcharge, and optional method development. Montgomery County has three urban districts: Bethesda, Silver Spring, and Wheaton.

- In the downtown business districts, the Silver Spring, Wheaton, and Bethesda Regional Service Centers are responsible for tree care activities within their respective districts. The Bethesda Urban Partnership, a non-profit organization charged with maintenance activities in the Bethesda Urban District, manages planting, pruning, and removals in Bethesda. In Silver Spring and Wheaton, the Urban Districts jointly contract out most of their tree care activities.

- In the unincorporated areas of the County outside of the Urban Districts, the Maintenance Division of DPWT and the Watershed Management Division in DEP share management responsibility for the 231,000 street trees in public rights-of-way.[6] DEP is responsible for street tree plantings and DPWT assists with site selections, resident contacts, and inspections. DPWT is responsible for emergency pruning, removals, and stump grinding.

In addition to these activities, WSSC manages a program that removes and replaces street trees. The Environmental Team at WSSC provides tree inspection, pruning, removal and replanting services for trees that interfere with capital projects to repair the water and sewer infrastructure. The team, which consists of one supervisor and six staff, removes and plants approximately 120 trees annually.

Finding #14: Street tree planting activities in Montgomery County Government are highly decentralized among several departments and private developers. In FY 04, developers and public agencies planted approximately 5,100 new street trees.

In any given year, several Montgomery County Government departments and private developers plant new street trees. In FY 04, developers and public agencies planted approximately 5,100 new street trees. This total includes 3,600 planted by developers and 1,500 planted by County Government departments.

The public entities that plant new trees are the Department of Environmental Protection, the Department of Housing and Community Affairs, the Department of Public Works and Transportation, and the Silver Spring and Wheaton Urban Districts.

- DEP's Watershed Management Division plants street trees to improve water quality. DEP reports it planted 757 new trees in FY 03 and 951 in FY 04.

- DHCA's Commercial Revitalization Streetscape Program plants street trees as one element of its streetscape program. DHCA reports it has planted several hundred trees in these areas and estimates that, in the last five years, approximately twenty city blocks have been streetscaped with trees and other items.

[6] This estimate excludes 50,000 trees in the Agricultural Reserve.

- DPWT's Division of Capital Development plants street trees as part of new County roadway projects. The landscape designs meet the requirements in County law and in the approved land use master plans. DPWT plants approximately 400 new trees annually.

- The Wheaton and Silver Spring Urban Districts plant new street trees to fill in planting spaces and green the downtown areas. Both districts rely primarily on contract staff to plant new street trees. The species are defined either in the Silver Spring master plan or in the Wheaton streetscape plan.

Chapters 49 and 50 of the Montgomery Code require developers who construct roads as part of a subdivision development to plant street trees in accordance with standards established by DPWT and in approved land use master plans. Assuming 18 miles of new subdivision roads and trees placed 50 feet on center, OLO estimates developers planted 3,600 trees, or approximately 70 percent of all new plantings.

Finding #15: A comparison of tree acquisition practices shows that DHCA, BUP and the Silver Spring and Wheaton Urban Districts generally pay higher prices to plant larger trees compared to DEP, DPWT, and WSSC.

Contract terms and prices for tree acquisition and installation vary depending on the size of the tree, whether the tree will be picked up or delivered and planted, and the amount of follow-up care provided. A contract with a lower per tree cost typically provides a smaller tree, e.g. 1.5 inch to 1.75 inch caliper, and a shorter replacement warranty. Under this type of agreement, a contractor does not provide aftercare in the first year, but will replace any trees that die during that period. A contract with a higher per tree cost typically provides a larger tree and a longer guarantee period, which means a contractor may provide some aftercare.

The table below compares some of the contract specifications for the entities that plant street trees in the County. The data show a range in costs and tree sizes. In general, DHCA, BUP, and the Silver Spring and Wheaton Urban Districts pay higher prices to plant larger trees compared to the trees DEP, DPWT and WSSC plant along suburban roadways.

SUMMARY OF STREET TREE CONTRACT SPECIFICATIONS

Item	DEP	DHCA	BUP	Wheaton/ Silver Spring Urban Districts	WSSC
Caliper	1.5 to 1.75 inches	3 to 3.5 inches	2.5 to 3 inches	2.5 to 3.5 inches	1.5 to 2 inches
Average Cost per Tree	$125	$400	$200	$290	$100
Cost includes planting	Yes	Yes	No	Yes	Yes
Cost includes aftercare	No	No	No	No	No
Replacement Warranty	One year	One year	One year	One year	One year

Source: OLO, September 2004.

Finding #16: A comparison of street tree removal and replacement practices among DPWT, WSSC, and the three Urban Districts shows the Urban Districts and WSSC generally replace trees within the same growing season whereas DPWT takes two years to replace a tree.

DPWT, WSSC, and the three Urban Districts remove and replace trees for the unincorporated areas of the County. A review of data for the past five years shows the Urban Districts replaced between 22 and 50 trees a year, compared to 120 for WSSC. DPWT replaced 945 trees in FY 03 and 571 in FY 04.

DPWT. Outside of the Urban Districts, the DPWT's Division of Operations, Field Services manages the tree removal and stump grinding process, and DPWT and DEP share responsibility for planting replacement trees. DPWT removes trees in the right-of-way due to the death of a tree, a structural defect, or declining health. A citizen begins the tree removal process by calling to request a removal. DPWT inspects removal requests within one or two days.

DPWT prioritizes tree removals based on the potential public safety hazard, giving highest priority to trees that are in immediate danger of falling. The current backlog for tree removal is approximately 12 months, or 350 trees. In FY 04, when the backlog approached 24 months, DPWT re-allocated $200,000 from emergency tree pruning funds to reduce the backlog.

DPWT conducts stump removal for all of the trees it removes. DPWT gives priority to stumps that must be removed before a replacement tree can be planted; otherwise, it places stumps on a removal list. The current stump removal backlog is approximately 24 to 30 months. DPWT staff report that when the backlog exceeds 24 months, often homeowners hire private contractors to remove them or smaller stumps decompose naturally.

After DPWT completes its tree removal and stump grinding operations, staff notify DEP, which sets aside a portion of its plantings for replacement trees. DPWT estimates about 60 percent of the citizens request a replacement when a tree is removed. Staff report DPWT replaced 945 trees in FY 03 and 571 in FY 04.

Urban Districts. In Bethesda, Silver Spring, and Wheaton, each of the Urban Districts manages the removal and replacement of trees. Staff in Silver Spring and Wheaton contract out all removal work and BUP contracts out all large removals. Staff report they often identify trees that need to be removed as part of the annual inspection process. Tree removals in the Silver Spring and Wheaton Urban Districts average approximately 21 per year. Staff report that generally they plant replacement trees within or by the next growing season.

WSSC. WSSC also replaces the trees it removes during a water or sewer project in compliance with state law. If an owner does not want a tree replanted, WSSC will defer to the property owner's wishes. Since State law requires WSSC to plant a tree for every tree removed, WSSC will look for a jurisdiction that is willing to plant a tree in another location if a property owner does not want a replacement tree.

Finding #17: State law requires any agency that removes a tree in the public right-of-way to replace it with a species from the State's recommended tree list. In FY 04, the County Government departments collectively planted 1,015 more trees than they removed. WSSC planted one replacement tree for every tree it removed.

The Maryland Roadside Tree law, passed in 1914, requires anyone who removes a tree in the public right-of-way to obtain a permit from the Department of Natural Resources and to replace any tree that is removed with a species from the State's recommended tree list.

OLO collected data for each of the County agencies and departments that plant street trees to compare the number of removals and plantings. The data show that if the plantings for the County departments are combined, the County Government planted 1,015 more trees than it removed. Specifically, in FY 04, Montgomery County departments planted 2,182 trees and removed 1,167 trees. Individually, DEP, DHCA and the Urban Districts each planted more trees than they removed; whereas DPWT removed 122 more trees than it planted. WSSC planted one replacement tree for every tree it removed.

Finding #18: A review of liability claim data shows that, since FY 01, the County processed 511 liability claims related to damage caused by trees and paid damages on 134. There is a steady increase in the number of claims and the number of claims paid since FY 01.

The Office of the County Attorney and the Department of Finance, Risk Management Division, are responsible for defending the County against liability claims. A claim generally seeks damages for property damage or bodily injury caused by a tree. To prove negligence, a claimant must prove both that the agency received notice of a potentially dangerous tree and that the agency failed to respond.

The County processes liability claims for the County Government, the City of Rockville, and Maryland National Capital Park and Planning Commission. Of the 511 claims processed since FY 01, the County paid damages on 134 and there has been a steady increase in the number of claims and the number of claims paid.

Finding #19: An incomplete cost estimate for tree care activities shows the five County and bi-County agencies collectively spent approximately $4 million for tree planting, pruning, and removals in FY 04.

The table below displays cost activity data for staff directly engaged in tree planting, maintenance and removal in the five agencies. The data show over half of the tree care costs in FY 04 were for street trees, 40 percent were for park trees, and 6 percent were for forest trees.

FY 04 ACTIVITY COST DATA BY TREE SETTING

Tree Settings	Activity Cost ($ in 000s)	Percent of Available Cost
Landscape tree activities	Not available	0%
Park tree activities[7]	$1,600	40%
Forest tree activities	$247	6%
Street tree activities	$2,132	54%
TOTAL	**$3,979**	**100%**

Source: OLO, September 2004

[7]The phrase "park tree activities" reflects all of the costs associated with the care of trees in parks, whether they are in a landscape area, along a trail, or in the forested area of a park.

The data represent an incomplete estimate of tree care activity costs. Specifically:

- The estimate for park tree activities reflects M-NCPPC's estimated costs for the Pope Farm nursery, the Horticulture Section, and the Arboriculture Section in the Natural Resources Division plus an estimate of landscape crew costs in the Northern and Southern regions. It does not include landscape contract costs, which are generally a small portion of the total capital project cost for a new park.

- The total does not include an estimate for landscape tree activities in Montgomery College, County Government, MCPS, and WSSC because the design and planting costs are generally embedded in individual capital projects and the agencies generally do not break out tree maintenance costs, which are an incidental portion of a much larger budget for building maintenance activities.

C. FINDINGS ABOUT CENTRALIZATION, CONTRACT LABOR AND INTERAGENCY COORDINATON

Finding #20: The research identifies two generic models to structure the administration and coordination of tree care activities and programs: a centralized model and a decentralized model. Results are mixed on which approach is more prevalent or more effective.

Traditionally, the public sector relied on several departments to administer tree programs. More recently, to improve coordination, jurisdictions are establishing either:

- A ***centralized model*** that designates one person to coordinate the management of all activities; or
- A ***decentralized model*** that distributes responsibilities across different departments, with a group to coordinate interagency issues.

A survey of programs in Claremont, Modesto, Los Angeles, New York City, Milwaukee, and Seattle found either a single agency was responsible for managing both street trees and park trees, or working groups existed to coordinate efforts and reduce overlap. Alternatively, a survey of peer cities for Seattle reported successful programs were consolidating programs in one department. This study suggested program consolidation offered opportunities to enhance planning, budgeting and staffing, while developing a core program with greater public visibility.

Finding #21: There are many tree care activities that are common to the five agencies. These activities are distributed among several different groups across the agencies, often embedded in programs that serve many different purposes.

This study identified several different staff groups across the five agencies that are directly engaged in growing, acquiring, planting, maintaining, or removing trees. The degree of centralization that exists among these activities depends on many factors, including the tree setting, i.e., landscape, forest or street trees, the purpose of the activity, and the mission of the agency. For example:

- At least 12 different groups participate in tree care activities for landscape trees in the College, County Government, MCPS and WSSC. It would be difficult to centralize these activities across the agencies, in part, because the timing of the design activities depends on each individual project.

- At M-NCPPC, the responsibility for growing, harvesting, planting, major pruning, and the removal of landscape trees and other trees in the parks is centralized in the Division of Natural Resources in the Parks Department. In addition, the landscape crews stationed at the Northern and Southern regions supplement these activities with planting and routine pruning.

- Tree care activities for forest trees are shared among several groups in M-NCPPC, Montgomery College, the County Government, MCPS and WSSC. Generally, the activities to comply with the County's Forest Conservation Law (FCL) are decentralized but coordinated through the administration of the law. As a result of an agreement among WSSC, M-NCPPC, and the County Government, the County Government is reforesting portions of WSSC's land along the Triadelphia Reservoir.

- Tree care activities for street trees are largely centralized in County Government, although WSSC also removes and replaces street trees that interfere with water and sewer repair projects. Within County Government, most planting, maintenance, and removal activities are organized geographically. DEP and DPWT share management responsibilities for tree care activities in the unincorporated areas of the County. Staff in each of the Regional Services Centers manage tree care activities for the Bethesda, Silver Spring, and Wheaton Urban Districts.

Finding # 22: A memorandum of understanding (MOU) signed by the Directors of DEP and DPWT transfers several management responsibilities for the street tree program from DPWT to DEP; however, it does not address how the program will work in practice. Several issues still need to be addressed.

In April 2004, the Directors of DEP and DPWT signed a memorandum of understanding (MOU) to formally address several street tree program responsibilities. The MOU transfers policy and additional management responsibilities for the street tree program to DEP in principle; however, it does not address how the program will work in practice.

Since the MOU was signed, several questions have surfaced about the procedures DEP and DPWT have in place to deliver specific activities. Citizens and others are asking these questions to understand how DEP and DPWT intend to coordinate their planting, maintenance, and removal responsibilities. Some of these questions include the following:

1. Will DPWT continue to receive citizen calls for service or will DEP establish a separate telephone line for citizen calls?

2. How does a citizen know whether to call DEP or DPWT with a specific question about a street tree? Will a citizen have to call DPWT to have a tree removed and then call DEP to have a tree replaced?

3. Under DEP's new tree planting policy, can a citizen who has a tree removed still receive a replacement tree?

4. What programs or procedures are in place for a civic association that wants to provide volunteer labor to plant trees?

Finding #23: All of the agencies use a combination of in-house and contract labor for tree care activities.

The five agencies use a combination of contract and in-house personnel for tree care activities across all tree types. According to the research, the advantages of contract labor are cost savings and flexibility. The advantages of in-house personnel are their availability and responsiveness as well as the ability to provide better supervision and better training.

OLO's review of five agencies' practices found extensive use of contractors for landscape trees, forest trees, and street trees, but not for park trees. Staff in the five County and bi-County agencies stressed the importance of retaining in-house personnel for the delivery of core services. OLO's review of the agencies' tree care activities identified the following uses of in-house personnel:

- The Bethesda Urban Partnership uses in-house personnel for most its tree care activities;

- County Government uses in-house personnel for emergency street tree services;

- M-NCPPC uses in-house personnel for most of its tree care activities in the parks and a combination of in-house and volunteer personnel for its forest tree activities; and

- In-house building or facility services staff at four agencies, County Government, the College, MCPS, and WSSC, provide minor tree pruning for landscape trees.

Finding 24: Staff in the five County and bi-County agencies who provide tree care activities coordinate both formally and informally. Formal coordination occurs through the administration of the Forest Conservation Law, the mandatory referral process, and the activities of the Interagency Forest Conservation Team. Many examples of informal coordination exist as well.

The dispersed nature and multiple purposes of the tree care activities throughout the five County and bi-County agencies suggest the need for ongoing coordination. Staff in the five agencies who provide tree care activities coordinate both formally and informally.

- Formal coordination of tree care activities occurs through the administration of the Forest Conservation Law and the mandatory referral process. The M-NCPPC Environmental Planning staff coordinate with the County Government, Montgomery College and MCPS to meet the requirements of the Forest Conservation Law. MCPS and the County Government also coordinate with the Planning staff, which reviews all capital projects as part of the Planning Board's mandatory referral process.

- Formal coordination of tree care activities occurs through the Interagency Forest Conservation Team, an interagency staff working group that DEP established at the request of the County Council. In July 2004, the IFC Team issued a Forest Preservation Strategy Update and briefed the County Council's Transportation and Environment Committee on its accomplishments. The IFC Team's priority issues for FY 05 are the overabundance of deer, non-native invasive plants, tree loss on small lots, and lack of funds for street tree maintenance.

- Many examples of informal coordination exist among staff who provide tree care activities. MCPS staff worked with M-NCPPC's urban designers in the Planning Department to develop a booklet of landscaping guidelines for school sites to address design conflicts between the agencies. The M-NCPPC Forest Ecologist who administers a reforestation program worked with staff at Pope Farm to grow seedlings and with staff in the Parks Department to plant trees.

Finding #25: Opportunities exist to improve interagency coordination.

OLO's review of the five agencies' tree care activities also identified opportunities for improved coordination. Some suggestions included:

- Convening a group to discuss and update the tree species list;
- Convening a group to compare and discuss specifications associated with different tree management contracts and discuss effective oversight practices; and
- Considering the creation of sub-committees for the IFC team.

Finding 26: An initial cost analysis suggests it may be cost effective for the Pope Farm to supply street trees for the Urban Districts and/or DHCA's streetscape program.

As part of this study, OLO worked with M-NCPPC staff at the Pope Farm to study the feasibility of County Government purchasing trees from Pope Farm. The table below summarizes some price options for the Urban Districts and DEP/DPWT. This preliminary analysis suggests that Pope Farm's prices might be competitive for the Urban District programs. Pope Farm staff caution that pursuing any of these options would require a five or six-year start-up period.

OPTIONS AND PRELIMINARY COST ESTIMATES FOR POPE FARM TO SUPPLY STREET TREES COUNTY GOVERNMENT

Potential Client	Tree caliper requirements	Unit Price	Does price include planting and aftercare?	Are there additional Pope Farm start up costs?
Urban Districts	1.5 to 2 inches	$120/tree	No	No
Urban Districts	2 to 2.5 inches	$170/tree	No	No
Urban Districts	2.5 to 3 inches	$225/tree	No	No
DEP/DPWT	1.5 to 1.75 inches	$118/tree	No	$605,000
DEP/DPWT	1.5to 1.75 inches	$235/tree	One-year	$1,025,000
DEP/DPWT	1.5 to 1.75 inches	$338/tree	Two years	$1,445,000

Source: OLO, September 2004.

D. FINDINGS ABOUT THE AGENCIES' TREE INVENTORIES AND SYSTEMATIC CARE PROGRAMS

Finding #27: Research about tree care programs suggests jurisdictions with successful tree programs improve program efficiency by using tree inventories and systematic care programs.

According to the research, both a tree inventory and a systematic pruning program can lead to lower program costs. An effective inventory increases a jurisdiction's ability to respond to service requests and maintain regular trimming/pruning cycles. A tree management consultant for the City of Seattle estimates that updating and maintaining Seattle's old inventory and using the inventory to establish a scheduled maintenance routine could cut their per tree cost in half.[8] According to a study conducted for Montgomery County's Suburban District in the mid-eighties, routine pruning can lower overall program costs because it can reduce pruning costs, storm cleanup costs, liability costs, and the number of higher cost priority service requests.

Finding #28: M-NCPPC manages tree care activities for park trees using a blend of routine care and service in response to citizen requests. In July 2004, M-NCPPC introduced the automated Smart Parks system, which staff expects to use for state-of-the-art inventory management in the future.

Staff in the Horticulture and Arboriculture Sections of the Division of Natural Resources provide tree care activities for park trees, using a blend of routine care and service in response to citizen requests.

- Trees planted by staff in the Horticulture Section of the Division of Natural Resources, receive a two-year aftercare program, which includes watering, de-staking, mulching, and weeding.

- In addition, the Arboriculture Section in the Division of Natural Resources inspects trees which impact park facilities on a four-year cycle and provides service if warranted.

- The Arboriculture Section in the Division of Natural Resources also inspects trees in response to citizen calls. On average, staff respond to approximately 800 to 1000 citizen calls per year regarding park trees in close proximity to houses

Historically, the Horticulture Section in M-NCPPC's Division of Natural Resources, maintains information about the location and services for trees in the two-year aftercare program using paper records. In July 2004, the Parks Department introduced a new automated Smart Parks system. After this system is fully operational, staff in the Division of Natural Resources anticipate they will be able to use it for state-of–the-art inventory management activities.

[8] Cascadia Consulting Group. Seattle Urban Forest Assessment: Sustainability Matrix. 2001. Appendix I, Matrix Summary Detail, p. I-8.

Finding #29: Updating the inventory of street trees outside the urban districts could create an opportunity to manage the County Government's street tree program for trees outside of the urban districts more efficiently. DPWT staff estimate it would cost approximately $3.75 per tree, or up to $1 million, for a new GIS inventory. DEP and DPWT are exploring the implementation and testing of a new inventory system.

In the County Government, DPWT, DEP, and the three Urban Districts maintain street tree inventories:

- The DEP inventory is a GIS-based system with records for the street trees planted by DEP and the DPWT street tree program since FY 02.

- BUP maintains a GIS inventory of all the street trees in the Bethesda Urban District, which it updates annually.

- Silver Spring and Wheaton maintain hand written inventories that are updated at the end of each growing season. Staff indicate they would like to convert their streetscape inventories (including trees) into a GIS-format in the future.

- The DPWT inventory consists of three separate data sets: an inventory of the Suburban District, completed in 1994; an inventory of area outside the Suburban District, conducted in 1997-1999; and, a ride-along statistical inventory of trees in the Agricultural Reserve.

DPWT updates the inventory when it provides emergency service; however, DPWT has not had the resources to maintain or update this inventory to reflect the majority of new or replacement plantings since 1999. As a result, the DPWT inventory is outdated and incomplete. DPWT staff estimate it would cost approximately $3.75 per tree, or between $800,000 and $1 million, for a new GIS inventory. DEP reports that DEP and DPWT are exploring the implementation and testing of a new inventory system.

Finding #30: An opportunity exists to manage the street tree program for street trees outside the Urban Districts by re-establishing a routine pruning program. DPWT estimates it would cost approximately $3.3 million annually to prune 38,500 trees per year and maintain a six-year pruning cycle, plus an additional $1.5 million to eliminate the current maintenance backlog.

Under the County Government's street tree program, trees within each Urban District receive a systematic care program whereas trees outside the Urban Districts do not. In each of the Urban Districts, trees receive a systematic care program that consists of an annual inspection plus pruning, edging, and mulching in the spring and fall, and pest management.

For street trees outside of the Urban Districts, DPWT's provides high, medium, and low priority emergency pruning services only. ***DPWT does not provide routine tree pruning, and has not since the dissolution of the Suburban Taxing District in 1996.*** According to the research, deferring routine pruning of trees when they are young results in higher pruning costs later.

DPWT staff state that, if funding were available, the Department's goal would be to establish five to seven-year cycle for routine pruning. Staff report that it is more cost effective to prune a tree at a younger age and that older trees tend to be more expensive to prune, especially if they have never been pruned before. Assuming an inventory of 231,000 trees, DPWT staff report that it would have to prune approximately 38,500 trees per year to achieve a six-year pruning cycle. DPWT estimates that it would cost approximately $1.5 million to eliminate the current maintenance backlog and $3.3 million annually to maintain a six-year cycle.

CHAPTER VIII. Recommendations

Trees on public lands and in public rights-of-way contribute to Countywide tree canopy coverage that provides significant benefits. OLO's study of tree care activities throughout the five County and bi-County agencies found an extensive, decentralized network of activities and programs. OLO recommends that the Council pursue the following priority tasks to address some of the issues this study identified.

RECOMMENDATION #1. The Council should ask the Chief Administrative Officer to provide a management briefing on the County Government's street tree program.

In April 2004, the Directors of the Department of Environmental Protection (DEP) and the Department of Public Works and Transportation (DPWT) signed a Memorandum of Understanding (MOU) that addresses management responsibilities for the street tree program. Throughout OLO's study, many questions were raised about the status and implementation of this agreement. OLO recommends that the Council ask the Chief Administrative Officer (CAO) for a briefing on the street tree program and ask the CAO to address the following questions.

1. What is the status of the April 2004 MOU signed by the Directors of DEP and DPWT? What plans have been put in place to implement this MOU and when are these plans scheduled to take effect?

2. How does DPWT intend to use the additional funds the Council appropriated for the street tree program in the FY 05 budget?

3. Please provide information, a schedule, and a cost estimate for the plans that are underway to automate and update DPWT's street tree inventory system.

4. In the short term, what actions has the County Government taken to manage the risks associated with the County's on-going practice of deferred maintenance? Has DPWT put in place any measures or practices to identify and address public safety hazards that are not captured through a complaint-based maintenance system?

5. How much would it cost to develop and implement a risk management plan that, at a minimum, conducts an inventory every ten years to identify and address trees with structural defects and trees that interfere with traffic control devices?

6. In the long term, what alternative funding sources or strategies is the County Government pursuing so that some level of routine pruning can be reinstated?

RECOMMENDATION #2. The Council should request that the Director of Park and Planning and the Chief Administrative Officer study the feasibility of Pope Farm supplying street trees for the Urban Districts and submit a proposal for a pilot program as part of the FY 06 budget.

As part of this study, OLO worked with staff at Pope Farm to investigate the feasibility of the County Government purchasing trees from Pope Farm. An initial cost analysis suggests that Pope Farm's prices could be competitive for one or more of the Urban District programs. OLO recommends that the Council ask the Director of Park and Planning and the Chief Administrative Officer to pursue the possibility of Pope Farm supplying street trees for one or more of the Urban Districts and submit a proposal for a pilot program as part of the FY 06 budget.

RECOMMENDATION #3. The Council should ask the Interagency Forest Conservation (IFC) Team to manage an on-going effort for staff from the five agencies to coordinate landscape tree, forest tree, and street tree program activities. The IFC Team should report on the results of this effort when it updates the Council on its priority issues next year.

The Interagency Forest Conservation (IFC) Team is a staff working group established by DEP to coordinate tree management activities across the five County and bi-County agencies. The objective of the IFC Team is to discuss and recommend solutions to forest and tree conservation issues in the County.

During the course of this study, OLO heard numerous suggestions from staff in the five County and bi-County agencies to improve coordination of tree care activities within a specific program area. For example, several staff suggested it would be useful to have a forum for updating street tree lists periodically, for sharing information about contract bids and specifications, and for discussing effective contract management and oversight practices. Given citizen interest in the street tree program outside the urban district, it may also be useful to share information about working with citizens and volunteers.

OLO recommends that the Council ask the Interagency Forest Conservation Team to manage an on-going effort for staff from the five agencies to coordinate tree care activities within specific program areas, i.e., landscape trees, forest trees, and street trees. The IFC Team should report on the results of this effort when it updates the Council on the status of its priority issues next summer.

RECOMMENDATION #4. The Council should ask the Chief Administrative Officer and the Director of Park and Planning to develop a study proposal to produce a management plan for the County's urban forest. The purpose of the management plan would be to identify recommendations to maximize the environmental benefits of the County's urban forest, while managing program costs.

According to the research, a management plan for an urban forest plays an important role in articulating a shared vision for a local jurisdiction's trees. The scope and purpose of a management plan can vary widely, depending on the definition of an urban forest that a community uses, the resources a community has, and the concerns it faces. OLO's review of the research identified many different types of management plans: some addressed narrowly defined risk management issues; others examined forest management issues, or proposed plans for trees on public and private property.

OLO found the research conducted by the Center for Urban Forest Research that quantifies the environmental benefits of an urban forest particularly relevant given the County's concerns about air quality and Montgomery County's designation as a non-attainment area. These studies not only estimate the environmental benefits of an urban forest, based on an inventory analysis, but also propose recommendations that balance actions needed to create a sustainable forest with recommendations to maximize environmental benefits. For example, an analysis conducted for the City of San Francisco recommended:

- Focusing on new plantings with proven long-lived species that maximize available growth space;
- Planting in areas where stocking levels are lowest to provide more equitable distribution of benefits; and
- Improving pruning frequency to promote tree functionality and longevity.

OLO recommends that the Council ask the Chief Administrative Officer and the Director of Park and Planning to develop a proposal for a study of Montgomery County modeled on these research studies. Given DEP's experience in developing other environmental strategies, OLO suggests that the Director of Environmental Protection take the lead for the County Government, working closely with the Director of Park and Planning and the Director of Public Works and Transportation.

The purpose of this effort would be to produce a management plan for tree maintenance and planting that would maximize the environmental benefits of the County's urban forest. The proposal should address the definition of the urban forest, i.e., whether the scope of the study includes public and private trees or only public trees. The study proposal should also include a staff plan, a cost estimate, and a proposed schedule.

CHAPTER IX. Agency Comments

The Office of Legislative Oversight circulated a final draft of this report in August 2004 to the five County and bi-County agencies. This final report incorporates formal, written comments from:

- The Maryland-National Capital Park and Planning Commission;
- The County Government; and
- The Washington Suburban Sanitary Commission.

These comments are included in their entirety, beginning on the following page. OLO did not receive formal written comments from Montgomery College and Montgomery Public Schools.

This final report also incorporates technical corrections provided by staff in the five County and bi-County agencies. OLO greatly appreciates the time staff invested to review and comment on the draft report and looks forward to discussing the issues raised in this study.

M-NCPPC

MONTGOMERY COUNTY DEPARTMENT OF PARK AND PLANNING

THE MARYLAND-NATIONAL CAPITAL
PARK AND PLANNING COMMISSION

8787 Georgia Avenue
Silver Spring, Maryland 20910-3760
301-495-4500, www.mncppc.org

September 20, 2004

Sue Richards, Program Evaluator
Office of Legislative Oversight
Stella B. Werner Council Office Building
100 Maryland Avenue, Room 509
Rockville, Maryland 20850

Dear Ms. Richards:

Thank you for the opportunity to review the Draft OLO Report 2004-8: An Interagency Study of Tree Management Practices. I know my staff have worked closely with you in the preparation of this report and have offered technical comments on the draft. We cannot provide an official agency position until the report is formally released and can be reviewed by the Planning Board. At the staff level, however, we believe your recommendations have merit and look forward to working on them if the Planning Board and Council so desire.

The one change we would suggest concerns Recommendation #4. Given our regulatory responsibilities for private sector trees, and the many trees located in urban area parks, we believe that Park and Planning should partner with Department of Environmental Protection in any studies related to the County's urban forest.

Please give me a call if you have any questions.

Sincerely,

Charles R. Loehr, Director

cc: Shelly Bontz
Catherine Conlon

OFFICES OF THE COUNTY EXECUTIVE

Douglas M. Duncan
County Executive

Bruce Romer
Chief Administrative Officer

MEMORANDUM

September 13, 2004

To: Karen Orlansky, Director
Office of Legislative Oversight

From: Bruce Romer
Chief Administrative Officer

Subject: Office of Legislative Oversight Draft Report 2004-8: An Interagency Study of Tree Management Practices

Thank you for the opportunity to comment on the subject draft OLO report. The report is an outstanding reference document that captures the changing perceptions about the value of trees as community infrastructure and the wide range of approaches used to administer and fund tree planting and maintenance programs across the country. I have reviewed the report and in addition to the technical comments provided by Executive Branch staff I offer the following comments on the report's findings and recommendations.

In general, we concur with the findings and recommendations in the draft report. In particular we concur that the Department of Environmental Protection should develop a proposal for a management plan to develop a long range strategy to maximize the benefits of the County's urban forest. However, regarding Finding #15 and Recommendation #2, we believe additional analysis is warranted to determine whether it is more cost effective for the Urban Districts or all County agencies to obtain street trees from the Pope Farm nursery. Before making this determination the relative costs of tree acquisition and planting need to be clarified.

We appreciate the opportunity to comment on this draft report. We look forward to participating with the Council in its review of this report.

BR:jfb

WASHINGTON SUBURBAN SANITARY COMMISSION

14501 Sweitzer Lane • Laurel, Maryland 20707-5902

August 19, 2004

Ms. Sue Richards
Office of Legislative Oversight
Montgomery County Government
Council Office Building
100 Maryland Avenue, Room 509
Rockville, Maryland 20850

Dear Ms. Richards:

We are pleased to have the opportunity to review and comment on the Office of Legislative Oversight Report 2004-8: An Interagency Study of Tree Management Practices. We applaud and fully support your efforts to identify opportunities for coordination among the Washington Suburban Sanitary Commission (WSSC) and other county and Bi-county agencies to improve the efficiency and effectiveness of tree management practices in Montgomery County.

For many years we have been involved with tree care and planting on our Patuxent reservoir properties, our various plant facilities in Montgomery County, and tree replacement projects following water and sewer construction activities on the Maryland National Capital Park and Planning Commission parklands and along public roads. Opportunities to coordinate and streamline tree management practices among the various agencies should prove beneficial for us all.

We have forwarded to you via email a copy of the draft report edited with additional information relating to WSSC tree management activities. I hope this information helps you in preparation of your final report. If you have any questions or need additional information you may contact Terrance Valentine, Unit Coordinator for Environmental Assessment and Enforcement at 301/206-8072 or James Benton, our Watershed Manager, on 301/206-8074.

We look forward to working with you to create a tree management plan that effectively serves the residents of Montgomery County.

Sincerely,

Richard R. Shagogue
Chief Engineer
Engineering and Construction Team

AN INTERAGENCY STUDY OF TREE MANAGEMENT PRACTICES

OLO REPORT 2004-8

APPENDIX

GLOSSARY

Afforestation – The creation on a tract that is not presently in forest cover, of a biological community dominated by trees and other woody plants, at a density of at least 100 trees per acre with at least 50 of the trees having the capability of growing to a diameter, at 4.5 feet above the ground, of 2 inches or more within 7 years.

Agricultural reserve – A protected area of agricultural land in the County as designated by the County Council for the primary use of agriculture. There are restrictions on the amount and types of development that can occur within the reserve.

Arboriculturist - Arboriculture is the art, science, technology, and business of tree care. Arboriculture is practiced by arborists. Arborists are trained to promote tree health, discern tree problems, and take measures to correct them.

Balled and burlapped – A term used to describe trees grown in the field which are then dug with a ball of dirt containing the roots. The ball of earth is then wrapped in burlap to keep the ball together until it is planted. The ball once dug and wrapped can also be placed in a wire cage for additional support for transport purposes. This differentiates between a tree grown naturally in a field and then dug for sale from trees grown in containers.

Bethesda Urban Partnership (BUP) – BUP is an urban district corporation established by the Council in 1993. BUP serves as the management entity for the Bethesda Urban District, providing services to downtown Bethesda, such as maintenance and landscaping.

Caliper - The diameter of the trunk of the tree as measured 6 inches above where the stem and roots meet. A tree is measured this way until it reaches 6-inch caliper; at that point, it is measured at 4.5 feet above the ground or at breast height and referred to as "dbh" (diameter breast height).

Evapotranspiration - The conversion of water into vapor that is released into the atmosphere through the combined processes of evaporation from the soil and transpiration from the foliage or other parts of a living plant.

Forest - Chapter 22A of the Montgomery County Code defines a forest as a biological community dominated by trees and other woody plants (including plant communities, the understory, and forest floor) covering a land area which is 10,000 square feet or greater and at least 50 feet wide. The law states a forest includes areas that have at least 100 live trees per acre with at least 50% of those trees having a two-inch or greater diameter at 4.5 feet above the ground as well as forest areas that have been cut but not cleared. Minor portions of a forest stand which otherwise meet the definition in the County Code may be less than 50 feet wide if they exhibit the same character and composition as the overall stand.

Guy wire – Typically, a wire (or other similar material) affixed on one end around the trunk of the tree at some elevated point above the ground and affixed to a stake on the other end. The wires restrict the movement of the trunk and root ball of newly planted trees until new roots grow and anchor the tree.

Reforestation – The creation of a biological community dominated by trees and other woody plants containing at least 100 trees per acre with at least 50 of those trees having the potential of attaining a 2-inch or greater diameter measured at 4.5 feet above the ground, within 7 years. Reforestation includes landscaping of areas under an approved landscaping plant that establishes a forest that is at least 35 feet wide and covering 2,500 square feet of an area.

Reforestation bank – An area of reforestation, afforestation, or existing forests that have been preserved, where land developers purchase credits to meet mitigation requirements for forests and trees that are cleared for land development. Developers pay fees to the landowner and receive credit for acreage needed for mitigation requirements when these requirements cannot be met on site or near the site. In general, the fees cover the costs of establishment of the bank, the maintenance, the land, etc.

Stocking level - A loose term for the amount of anything on a given area, particularly in relation to what is optimum. In a forest (including urban forests), a more or less subjective indication of the number of trees as compared to the desirable number for best results. For example, 100 trees per acre.

Tree pits - A term that refers to the immediate area a landscape tree is planted within; sometimes it refers to just the hole and at other times refers to the larger open area in a sidewalk where a tree is planted.

SUMMARY MATRIX FOR AN ASSESSMENT OF SEATTLE'S URBAN FOREST

	Criteria/Objective	Current Measures/Comments
VEGETATION RESOURCES	**Canopy Coverage** - Establish climate appropriate coverage	• Street tree counts • % canopy overall • % canopy in residential areas • # of vacant planting sites • Average distance between residential street trees
	Age/size distribution - Provide and maintain uneven age distribution	• Distribution and percents by size and age
	Species mix and diversity - Ensure species mix and diversity	• # of species and distribution of street trees • # of species and distribution of public land trees • # of species and distribution in business district
	Native vegetation - Preserve and manage regional biodiversity; maintain biological integrity of remnant forests; maintain wildlife corridors	• # of acres of woodland canopy • # of acres of riparian forests • # of acres of upland forests
COMMUNITY FRAMEWORK	**Awareness of/Commitment to UF Vision** - Foster public/private understanding of tree benefits	• Does an urban forest vision exist? • What is the asset value of a jurisdiction's trees?
	Public Agency Cooperation - Ensure all city departments operate with common goals and objectives	• Is there a clear chain of command regarding trees? • Is there joint budgeting for common program goals? • Define leadership for UF. Set common objectives and delegate appropriate staffing and budget to ensure efficient and cost effective management
	Policy Input and Development - Provide opportunities for citizens, government and business to contribute to UF policy and programs	• Is there an urban forest board or advisory council to provide leadership?
	Regional Cooperation - Promote cooperation among neighboring communities and regional groups	• How many regional groups? How much corporate involvement? How much State support? How much federal, state and regional funding?
	Partners and Supporters - Build support with major landholders, nongovernmental organizations (NGOs), corporations and green industry	• How many NGOs are there and what level of involvement do they have with the urban forest? • What level of business involvement is there? • What type of green industry involvement is there?
	Neighborhood Involvement - Insure urban forest issues and improvements speak to neighborhood interests	• Use neighborhood grants for assessment of neighborhood needs. • Cities use neighborhood based tree grants

SUMMARY MATRIX FOR AN ASSESSMENT OF SEATTLE'S URBAN FOREST (CONTINUED)

	Criteria/Objective	Current Measures/Comments
COMMUNITY FRAMEWORK (cont.)	**Citizen Individual Involvement** - Provide opportunities for individual and household actions	• Is there a tree steward program? • What is level of outreach to individuals? • What is level of volunteer coordinator involvement?
	Citywide Management Plan - Need strategic vision and resources to develop urban forest management plan, review process and update.	• Does a citywide management plan exist?
	Urban Forest Policy - Conserve, restore, enhance resources; Develop guidelines and standards; Ensure safety	• Integrate tree conservation in growth management. • Develop tools to increase tree cover in new development. Enforce existing ordinances
RESOURCE MANAGEMENT	**Urban Forest Practices** -Protect existing trees; Promote good species and site selection; Provide standards for tree care	• What public outreach exists regarding tree care? • Is invasive species control adequate? • What is the pruning cycle? • Is support for maintenance adequate? • What is data for # of trees planted versus # of trees removed?
	Funding - Develop and maintain adequate funding	• What is cost/capita and what are overall program costs? • Are budgets coordinated? • Can funding categories be matched up? • How easy is it to track expenditures by category?
	Staffing - Employ/train adequate staff to implement management plan	• Staffing increases require greater coordination. • Systematic deployment may increase efficiency. • Staff numbers for peer cities range from 9 to 200.
	Assessment Tools	• Is there a complete, up to date inventory? • Is there a maintenance database? • Is there a separate inventory for public and private trees?
	Regulations and Incentives - Establish a cohesive system	• What ordinances and regulations exist and how are they enforced? • Are there tree protection standards?

REGIONAL URBAN FOREST FRAMEWORK

	Growth Ring 1	Growth Ring 2	Growth Ring 3	Growth Ring 4
Shade Coverage	10%	15%	25%	35%
Public Tree Management	• Public trees maintained on emergency basis	• Tree maintenance on a 12-20 year cycle • Public trees inspection interval of ten+ years • Hazard Tree Abatement Program • Training and Staff Development 3% of tree budget • 25% tree staff hold professional certification	• Tree maintenance on a six-12 year cycle • Public trees inspection interval of five-ten years • Pest and Disease management program • Tree Inventory and database completed • Inter-departmental cooperation and integration of urban forest efforts • Training and Staff Development 1% of tree budget • 50% tree staff hold professional certification	• Tree maintenance on a four-six year cycle • Public trees inspection interval of three-five years • Adopt Best Management Practices for urban forest health • Consolidation of urban forest efforts within a single department • Training and Staff Development 5% of tree budget • 100% tree staff hold professional certification
Legislative Policies and Measures	• Front Yard Tree Ordinance • Street, Median, and Parkway planting guidelines	• Heritage and Native Tree protection ordinances • Parking lot shade ordinance • Solar Access guidelines • Tree Replacement Ordinance	• Urban forest goals included in General Plan • Heat island mitigation ordinance • Green Infrastructure Principles applied • Anti-Topping Ordinance	• Individualized Forest Master Plan • Monitoring and Enforcement program • Interdepartmental urban forest coordination
Community Involvement	• Budget funds each year on community tree efforts	• Form local tree group • Create education and training opportunities for volunteers • Make annual distribution of tree information to citizenry	• Track and recognize contribution of volunteer hours, resources and services to municipal tree goals • Invent in organizational capacity of local tree group	• Annual recognition of community's Tree Heroes and Champions • Establish designated tree advisory committee/council • Annual MOU signed with local tree group
Tree Planting and Maintenance	• Plants at ½ replacement rate • Require three year watering and care commitment for new trees	• Mulch and corrective prune newly planted trees annually • Young tree pruning program in place • Young tree watering program in place • Plant at full replacement rate • Adopt preferred tree list based upon preferred tree characteristics list	• Adopt planting plant to reach canopy goals in 30 years • Adopt tree selection and location guidelines to promote energy savings, water quality, air quality, human health, and habitat • Establish semi-annual monitoring plan for newly planted trees • Tree mulch program in place	• Adopts planting plan to reach canopy goals within 20 years
Framework Progress Evaluation	• Spends $1 per resident per year on public tree maintenance, planting, and education	• Awarded "Tree City, USA" designation • Spends $2.50 per resident per year on public tree maintenance, planting, and education	• Spends $7.50 per resident per year on public tree maintenance, planting, and education • Produces State of the Trees report every five years • Produces Management Information and Benchmark report on five year intervals	• Spends $10 per resident per year on public tree maintenance, planting, and education • Produces Management Information and benchmark report bi annually • Awarded "Excel Tree City, USA" designation

Source: Sacramento Tree Foundation, http://www.sactree.com/ruff/ufrf96/page8.html

TO: Sue Richards
Office of Legislative Oversight

August 6, 2004

FROM: Charles R. Loehr, Director

SUBJECT: Pope Farm – Street Tree Proposal

This memorandum is in response to your proposal that the Pope Farm grow and provide street trees to the Department of Public Works and Transportation. Staff believes that there is merit in pursuing this proposal with the understanding that the following conditions would apply. In addition, it is important to understand that the start-up for this project will take place five years before the first street tree can be delivered and funding must occur in the following sequence:

Year 1 – Preparation phase which would consist of consolidation and making room for 1700 trees. Cost - $85,000.00.

Year 2 – Planting first crop of 1700 seedlings. Cost - $155,000.00.

Year 3 - Grow crop 1 and plant crop 2 of 1700 seedlings. Cost - $165,000.00.

Year 4 – Grow crops 1 and 2 and plant crop 3 of 1700 seedlings. Cost - $200,000.00.

Year 5 – Harvest crop 1, grow crops 2 and 3 and plant crop 4 of 1700 seedlings. Cost - $200,000.00.

The fifth year cycle will repeat itself with each succeeding year. The costs will increase because of cost increases for materials, equipment and labor. I want to emphasize that these costs are based on Option A which was provided to you earlier. Options B and C would be more costly.

Following are the conditions that we believe must be met in order for this program to be successful:

1. The funding source must be secure.
2. This program must be independent of other similar, existing programs.
3. Expenditures to be outside the Department of Park and Planning's SAG.
4. Funds – revenues must be eligible to be placed in a special revenue account, or a revolving account, not subject to fiscal year limitations.
5. New positions will be needed to operate this program.
6. Funding must be obtained for fencing an additional parcel of land (9 acres) as an overflow area. This will allow for any expansion needed and will allow the

Park System to plant annual crops in this area. The fencing is necessary as a deer exclusion area.

If you have any questions concerning this proposal, please do not hesitate to call me.

Cc: Straw
Falcone
Zyontz

OLO Cost Analysis for Pope Farm: Planting Options

OPTION A - CASH AND CARRY OPTION - Pope Farm would plant 1700 trees for County street tree program. Trees would be 1.75" caliper. Trees would be freshly dug and picked up at the nursery by County staff. There would be no replacement warranty for these trees.

NOTES: Work Plan/Schedule (Labor assumptions)

Year 1 - Preparation phase. Hire 1 worker to consolidate nursery and make room for 1700 trees on site.
Year 2 - Planting - Hire 2 additional workers to plant first crop of 1700 seedlings.
Year 3 - Grow crop 1 and plant crop 2.
Year 4 - Grow crops 1& 2 and plant crop 3. Hire 1 additional worker.
Year 5 - Harvest crop 1, grow crops 2&3 and plant 4

Seedling Planted		2000	2000	2000	2000	2000	2000
Total Onsite Seedling Inventory		2000	4000	6000	6000	6000	6000
Supplies	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**
1700 Seedlings @ $10 /tree		$20,000	$20,000	$20,000	$20,000	$20,000	$20,000
Stakes variable costs (e.g. water, IPM, etc)		$10,000	$20,000	$30,000	$30,000	$30,000	$30,000
Sub total		**$30,000**	**$40,000**	**$50,000**	**$50,000**	**$50,000**	**$50,000**
Labor - Nursery	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**
1 WY	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
1 WY		$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
1 Seas WY		$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
1 Seas WY				$25,000	$25,000	$25,000	$25,000
Sub total	**$50,000**	**$125,000**	**$125,000**	**$150,000**	**$150,000**	**$150,000**	**$150,000**
Sub total Supplies and Nursery	$50,000	$155,000	$165,000	$200,000	$200,000	$200,000	$200,000
Labor - Aftercare	NA	NA	NA	NA	NA	NA	NA
Equipment	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**
Spade	$35,000						
Sub total equipment	**$35,000**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
TOTAL COSTS	**$85,000**	**$155,000**	**$165,000**	**$200,000**	**$200,000**	**$200,000**	**$200,000**
Startup costs (Total Costs for Years 1-4)				**$605,000**			
Tree Production Schedule					1700	1700	1700
Cost per tree beginning in year 5					$118	$118	$118

Summary Results for Option A - Pope Farm could supply trees for the County's street tree program with a start up investment cost of $605,000. Beginning in year 5, the ongoing cost would be $200,000 per year or $118 per tree.

OLO Cost Analysis for Pope Farm: Planting Options

OPTION B - FULL SERVICE WITH 1 YR AFTERCARE - Pope Farm would plant 1700 trees for County street tree program. Trees would be 1.5 to 1.75" caliper. Trees would be freshly dug and planted and provided 1 year of aftercare. The trees would carry a 1 year replacement warranty.

NOTES: Work Plan/Schedule (Labor assumptions)

Year 1 - Preparation phase. Hire 1 worker to consolidate nursery and make room for 1700 trees on site.
Year 2 - Planting - Hire 2 additional workers to plant first crop of 1700 seedlings.
Year 3 - Staff to grow crop 1 and plant crop 2. Also includes equipment used to run 3 water rigs
Year 4 - Staff to grow crops 1& 2 and plant crop 3.
Year 5 - Harvest crop 1, grow crops 2&3 and plant 4 plus install 1700 trees and provide 1st year of aftercare-hire 5 additional workers.

Seedling Planted		2000	2000	2000	2000	2000	2000
Total Onsite Seedling Inventory		2000	4000	6000	6000	6000	6000
Supplies	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**
1700 Seedlings @ $10 /tree		$20,000	$20,000	$20,000	$20,000	$20,000	$20,000
Stakes variable costs (e.g. water, IPM, etc)		$10,000	$20,000	$30,000	$30,000	$30,000	$30,000
Sub total		**$30,000**	**$40,000**	**$50,000**	**$50,000**	**$50,000**	**$50,000**
Labor - Nursery	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**
1 WY	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
1 WY		$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
1 Seas WY		$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
1 Seas WY				$25,000	$25,000	$25,000	$25,000
Sub total-Nursery	**$50,000**	**$125,000**	**$125,000**	**$150,000**	**$150,000**	**$150,000**	**$150,000**
Labor Aftercare & Installation	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**
1 WY					$50,000	$50,000	$50,000
1 WY					$50,000	$50,000	$50,000
1 WY					$50,000	$50,000	$50,000
1 Seas WY					$25,000	$25,000	$25,000
1 Seas WY					$25,000	$25,000	$25,000
Subtotal - Aftercare Labor		**$0**	**$0**	**$0**	**$200,000**	**$200,000**	**$200,000**
Equipment	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**
Spade	$35,000						
Water Truck			$150,000				
Dump Bed Truck			$135,000				
Trailer			$30,000				
Compact Backhoe			$105,000				
Subtotal - Aftercare Equipment	**$35,000**		**$420,000**				
TOTAL COSTS	**$85,000**	**$155,000**	**$585,000**	**$200,000**	**$400,000**	**$400,000**	**$400,000**
Startup costs (Total Costs for Years 1-4)				**$1,025,000**			
Tree Production Schedule					1700	1700	1700
Cost per tree beginning in year 5					$235	$235	$235

Summary Results for Option B - Pope Farm could supply trees for the County's street tree program with a start up investment cost of $1,025,000. Beginning in year 5, the ongoing cost would be $400,000 per year or $235 per tree.

OLO Cost Analysis for Pope Farm: Planting Options

OPTION C - FULL SERVICE WITH 2 YR AFTERCARE - Pope Farm would plant 1700 trees for County street tree program. Trees would be 1.5 to 1.75" caliper. Trees would be freshly dug and planted and provided 2 years of aftercare. The trees would carry a 2 year replacement warranty.

NOTES: Work Plan/Schedule (Labor assumptions)

Year 1 - Preparation phase. Hire 1 worker to consolidate nursery and make room for 1700 trees on site.

Year 2 - Planting - Hire 2 additional workers to plant first crop of 1700 seedlings.

Year 3 - Grow crop 1 and plant crop 2. Also includes equipment used to run 3 water rigs.

Year 4 - Grow crops 1& 2 and plant crop 3.

Year 5 - Harvest crop 1, grow crops 2&3 and plant 4 plus X horticulture staff to provide planting and aftercare for 1700 Aftercare program-5 staff to operate 6 water rigs. Labor represents the cost for FT wokers for 1/2 the year(May-October) and other 1/2 the year for filed renovation work.

Year 6-Provide 2nd year of watering. Hire 5 workers for 4 workyears.

Seedling Planted		2000	2000	2000	2000	2000	2000
Total Onsite Seedling Inventory		2000	4000	6000	6000	6000	6000
Supplies	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**
1700 Seedlings @ $10 /tree		$20,000	$20,000	$20,000	$20,000	$20,000	$20,000
Stakes variable costs (e.g. water, IPM, etc)		$10,000	$20,000	$30,000	$30,000	$30,000	$30,000
Sub total		**$30,000**	**$40,000**	**$50,000**	**$50,000**	**$50,000**	**$50,000**
Labor - Nursery	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**
1 WY	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
1 WY		$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
1 Seas WY		$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
1 Seas WY				$25,000	$25,000	$25,000	$25,000
Sub total-Nursery	**$50,000**	**$125,000**	**$125,000**	**$150,000**	**$150,000**	**$150,000**	**$150,000**
Labor Aftercare & Installation	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**
1 WY					$50,000	$100,000	$100,000
1 WY					$50,000	$100,000	$100,000
1 WY					$50,000	$100,000	$100,000
1 Seas WY					$25,000	$37,500	$37,500
1 Seas WY					$25,000	$37,500	$37,500
Subtotal - Aftercare Labor		**$0**	**$0**	**$0**	**$200,000**	**$375,000**	**$375,000**
Equipment	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**
Spade	$35,000						
Water Truck			$300,000				
Dump Bed Truck			$270,000				
Trailer			$60,000				
Compact Backhoe			$210,000				
Subtotal-Eqpmt	**$35,000**		**$840,000**				
TOTAL COSTS	**$85,000**	**$155,000**	**$1,005,000**	**$200,000**	**$400,000**	**$575,000**	**$575,000**
Startup costs (Total Costs for Years 1-4)				**$1,445,000**			
Tree Production Schedule					1700	1700	1700
Cost per tree beginning in year 5					$235	$338	$338

Summary Results for Option C - Pope Farm could supply trees for the County's street tree program with a start up investment cost of $1,445,000. Beginning in year 5, the cost would be $400,000 or $235 per tree, increasing to $575,000 per year or $338 per tree with 2 year aftercare.

SECTION 02900 - LANDSCAPING

PART 1 - GENERAL

1.1 Scope:

A. Furnish all labor, material, tools, equipment and services necessary for landscaping the site as indicated on the drawings and/or specifications. Include but not limited to the following:

1. Plants and Trees

2. Soil preparation, planting, pruning, staking fertilizing, irrigating, weed control and mulching of all plants and trees.

3. Protection, maintenance, guarantee and required replacements of plantings.

4. Ground cover on banks steeper than 3:1 or where otherwise scheduled.

1.2 Related Sections:

A. Seedings and Sodding 02490

B. Excavating, Filling and Grading 02200

1.3 Quality Assurance:

A. Conform to applicable horticulture standards to include standardized plant names by the American Joint Committee on Horticulture Nomenclature and American Standard for Nursery Stock.

B. Landscaping contractor shall have been in related work for a minimum of 5 years and familiar with the Tree Report, dated April 1990 as prepared by Tree Ordinance Drafting Group.

C. Plants may be subject to inspection and approval by the Project Architect and/or Owner, at the place of growth for conformity to specification requirements as to quality, size, and variety. All trees shall be sealed.

D. State or Federal nursery inspection certificates shall be furnished to the Project Architect upon request.

E. All plant materials will be inspected upon delivery to the site and before final acceptance and at the end of the guarantee/maintenance period. Unacceptable plants shall be removed from the site and replaced by the Contractor at no cost to the Owner.

F. Plant materials, represented by each shipment, invoice or stock order shall be declared and certified free from disease of any kind. All applicable Federal and State Inspection Certificates which are required shall accompany each shipment, invoice or order of stock. It shall be the responsibility of the Contractor to comply with all applicable Federal and State Plant pest Regulations in the fulfillment of this contract.

1.4 Reviewing and or Approving Agencies:

(Prior to bidding by Project Architect and or MCPS)

A. See paragraph 1.2 of Section 02000.

B. Submit to Maryland National Capital Park and Planning the final landscape plan for their review. Landscape suggestions at the Mandatory Referral Hearing are to be evaluated and included if feasible.

1.5 Submittals:

A. Letter from the Landscape Contractor through the General Contractor certifying their understanding and intent to provide certificate of laboratory soil tests, plant health certificate and compliance with state and federal marking requirements.

B. Complete list and quality of plants to be used, including specifications for all plant materials fertilizers, soil preparation and source of supplies.

1.6 Planting Seasons and Acceptance Date:

A. Elementary, Middle, and High Schools Opening in September

1. Deciduous trees and shrubs and ~~plans~~ plants

a. March 1 - May 15 (Beyond 50' from building)

b. July 15- August 15 (Within 50' of building)

c. September 1 (±) Acceptance and beginning of one year guarantee and maintenance.

2. Evergreen trees and shrubs

a. March 15 - May 15 (Beyond 50' from building)

b. Same as 1b above.

c. Same as 1c above.

B. All Schools Opening Other Than September:

1. Deciduous trees and shrubs and plants

a. March 1 - May 15 or October 1 - December 2

(1) (Planting to be in the period preceding opening date)

2. Evergreen trees, shrubs and plants

a. March 15 - May 15 or September 1 to November 15 (Planting to be in the period preceding the opening date)

3. One year guarantee and maintenance period to commence when work is accepted which would be approximately the date the school is occupied.

4. Adjustments to the planting periods may be considered if approved by the architect for particular areas around the building.

1.7 Responsibility and Coordination:

A. Landscape contractor through the general contractor shall be responsible for replacing, repairing and restoring damaged work caused by other trades in conjunction with the project.

B. Avoid planting pine needle producing species in location of A/C chillers and tennis courts. (12)

C. Avoid pollen producing plants near outside air intakes.

D. Coordinate planting locations to assure there is no conflict or damage to paving, site utilities and any other site property.

E. Landscape plan shall be approved by MCPS's Department of Security and Safety & Environmental Health to assure site lines are not obscured, and ultimate growth anticipated will not create security and safety problems.

F. Bushes should be kept less than 4'-0" in height . Screening to be carefully planned so as to avoid site line obstructions. Only thornless plants should be used.

1.8 Acceptance:

A. On or about the time the building is accepted by MCPS for occupancy, the architect will consider acceptance of the landscaping work. Date the owner accepts this work is the date the one year guarantee and maintenance period commences.

1.9 Guarantee/Maintenance:

A. All plants and trees shall be guaranteed and maintained from the time they are planted until the end of the one (1) year guarantee and maintenance period.

B. Any material that is 25% dead or more shall be considered dead and must be replaced at no additional expense to Owner. A tree shall be considered dead when the main leader has died back, or there is 25% of the crown dead.

C. The Contractor (G.C.) shall arrange a site inspection meeting with the Architect, Contractor, Landscape Contractor, and the Owner on or about June 15 for a September to September guarantee/maintenance period to identify unacceptable plantings or conditions. Should the Contractor be unable or fail to schedule an appropriate meeting by this time, the guarantee/maintenance period shall be automatically extended until such time as the meeting takes place and the Contractor shall be fully responsible for replacing unacceptable plantings as if they occurred during the original guarantee period.

D. All dead or unhealthy plants shall be removed by the contractor from the project within ten (10) days of written notification at any time during the life of the contract and if this occurs during the planting season these plants shall be replaced at once; if between planting seasons, they shall be replaced during the next proper planting season. If replacement plants die during the contract, they shall be replaced according to the schedule on the Planting Plan. All replacement plants shall be guaranteed for a minimum period one (1) year beyond the time of replacement, even thought it extends beyond the one year guarantee/maintenance period.

1.10 Maintenance Requirements

A. Care for all plantings, weeding, pruning, mulching, watering, and adjusting guy wires and stakes for one (1) year after acceptance.

1.11 Material Delivery and Handling Care:

A. Deliver planting material within 24 hours of planting. Protect from drying winds while in transit.

B. Handle and store materials to prevent damage and deterioration. Broken and/or damaged products or materials shall not be used and must be removed from the site by the Contractor.

C. The balls of all plants, if not immediately planted after delivery and inspection shall be adequately protected by covering until removed for planting, in a manner appropriate to prevailing conditions and

in accordance with accepted horticultural practices. The contractor shall, in loading, unloading or handling of plants, exercise utmost care to prevent injuries to the branches or roots of the plants. The solidity of the balls of all plants shall be carefully preserved. Handling of the plant by parts other than the ball shall be cause for rejection of such plant.

D. Special precautions shall be taken to avoid any unnecessary injury to, or removal of fibrous roots. Each species or variety shall be handled and packed in the approved manner for that plant, with proper regard to the soil and climatic conditions and the time that will be consumed to transit or delivery. All precautions that are customary in good trade practice shall be taken to insure the arrival of the plants at their destination in a good condition for successful growth.

E. All plants which are required to be balled and burlapped previous to shipment are designated BB in the itemized list of plant materials. Balled and burlapped plants shall be lifted so as to retain as many fibrous roots as possible. The burlap shall be firmly held in place by careful wrapping with stout natural fiber rope.

F. Plant materials marked BB in the itemized list shall be balled and burlapped and then platformed. Balled and burlapped plants shall be securely tied with stout rope to sturdy platforms equal in size to the outer diameter of the ball. Ball diameters shall be as specified in the standards of the American Association of Nurserymen and are the minimum which will be accepted and apply to nursery grown plants only. Depth of balls shall be sufficient to comply with standard.

PART 2 - PRODUCTS

2.1 Materials:

A. All nursery stock shall be in accordance with "American Standard for Nursery Stock" No. Z60-1-1986, by American Association of Nurserymen, Inc., and no substitutions will be permitted without written approval of the Architect and/or Owner.

B. Plant material must be selected from nurseries that have been inspected by State and Federal agencies. Collected material may not be used. Nomenclature will be in accordance with Hortus III.

C. Plants shall be sound, healthy, vigorous, free from plant diseases, insect pests, or their eggs and shall have healthy normal top and root systems. Plants shall be nursery grown stock, freshly dug. No heeled-in, cold storage or collected stock will be accepted. Plants shall have been grown in the same climatic conditions, or from colder zones than the location of this project for at least two (2) years prior to award of contract. Plants cut back from larger grades to meet requirements of this specification shall not be acceptable.

D. Plants shall not be top pruned in any way prior to delivery.

E. All plants shall have been transplanted or root pruned at least once in the past three (3) years.

F. Caliper of tress shall be measured six inches (6") up from root ball on tress up to 4" caliper. Unless otherwise noted, trees will have straight trunks with the single leader well-branched, intact, undamaged, and uncut. All old abrasions and cuts must be completely calloused over.

G. Plants will be in accordance with the current American Association of Nurserymen's standards and conform in general to representative species in terms of size and growth and habit. See plant lit for sizes and comments.

H. Balled and Burlapped:

1. Balled and burlapped plants shall be dug with firm natural balls of earth.

2. Ball sizes shall be in accordance with A.A.N. specifications.

I. Container grown stock shall have been grown in a container long enough for the root system to have developed sufficiently to hold its soil together. All plant material shall be nursery grown unless otherwise specified. Pruning shall be done before planting or during the planting operation. See pruning detail and explanation in back of specifications. All plant material in transit shall be covered with a burlap or similar cover to keep from drying out. Anti-desiccants shall be applied on all material dug while in foliage. Plants in wire baskets and/or nylon burlap are not acceptable.

J. Mulch:

1. Material shall be either composed hardwood bark, pine bark, or approved equal. Material shall be mulching grade, uniform in size and free of foreign matter. Freshly cut wood chips shall not be used.

K. Organic Matter:

1. Organic matter used in back fill mix shall be peat, composed bark, leaf mold or other material approved by MCPS.

L. Peat Moss

1. Type 1 - sphagnum peat moss is finely divided with PH of 4.0 - 5.0.

2.2 Recommended Plant Lists:

A. Shade Trees (Locate > 20' from building):

BOTANIC NAME	COMMON NAME	Comments
Acer platanoides "Columnare"	Columnar Norway Maple	
Acer platanoides "Summershade"	Summershade Norway Maple	
Acer rubrum cultivars	Red maple	
Fraxinus pensylvanica ("Marshall Seedless")	Marshall's Seedless Green Ash	Borers a problem
Liquidombar styraciflus	Sweetgum	Fruit can be a concern.
Platanus acerifolia "Bloodgood"	Bloodgood London Planetree	
Quercus acutissima	Sawtooth Oak	
Quercus coccinea	Scarlet Oak	
Quercus falcata	Southern Red Oak	
Quercus palustris	Pin Oak	Cultivars without dropping branches recommended .
Quercus phellos	Willow Oak	
Quercus rubra (borealis)	Red Oak	
Quercus velutina	Black Oak	
Tilia americana	American Linden	
Tilia cordata "Greenspire"	Greenspire Littleleaf Linden	Excellent street tree despite occasional graft incompatibility.
Tilia euchlora	Crimean Linden	
Tilia tomentosa	Silver Linden	

B. Minor Shade Trees:

BOTANIC NAME	COMMON NAME	Comments
Acer buergerianum	Trident Maple	
Acer campestre	Hedge Maple	
Acer ginnala	Amur Maple	
Betula nigra	River Birch	
Carpinus betulus "Fastigiata"	European Hornbeam	
Koelreuteria paniculata	Golden Rain Tree	
Ostrya virginiana	Ironwoood	Prefers better planting sites.

Philodendron amurense	Amur Cork Tree
Prunus sargentil	Sargeant Cherry

C. Ornamental Trees:

BOTANIC NAME	COMMON NAME	Comments
Acer palmatum cultivars	Japanese Maple	
Amelanchier canadensis	Serviceberry	
Carpinus caroliniana	American Hornbeam	
Cercis canadensis	Redbud	
Cornus florida cultivars	Dogwood	
Cornus kousa	Kousa Dogwood	
Crataegus phaenopyrum	Washington Hawthorne	Thornless varieties are available.
Crataegus viridis "Winter King"	Winter King 'Green Hawthorne"	
Elaeagnus angustifolia	Russianolive	
Lagerstroemia indica	Crape Myrtle	
Magnolia spp.	Magnolia	
Malus spp. (improved varieties)	Crabapple	
Prunus spp.	Flowering Cherry and Plum	
Pyrus calleryana "Aristocrat"	Aristocrat Pear	
Pyrus calleryana "Redspire"	Redspire Pear	
Pyrus calleryana "Whitehouse"	Whitehouse Pear	
Prunus Cerasifera (Atropurpura)	Purple Plumb	

D. Evergreen Trees:

BOTANIC NAME	COMMON NAME	Comments
Cedrus atlantica glauca	Atlas Blue Cedar	
Cupressocyparis leylandi	Leyland Cypress	
Ilex opaca cultivars	American Holly	
Picea spp.	Omoriko Spruce	
Pinus spp.	Black & White Pine	
Pseudotsuga menziesili	Douglas Fir	
Thuja spp.	Arborvitae	
Tsuga canadensis	Canadian Hemlock	

E. Shrubs (All shrubs located >2'-6" from building):

BOTANIC NAME	COMMON NAME	Comments
Abelia grandiflora	Glossy Abelia	
Azalea spp.	Azalea (in variety)	In protected areas only
Berberis spp.	Barberry (in variety)	
Clethra alnifolia	Summersweet	
Cornus alba cultivars	Siberian Dogwood	
Cornus stolonifera	Red-Osier Dogwood	
Cotoneaster spp.	Cotoneaster (in variety)	
Euonymus spp.	Euonymus (in variety)	Should not be used by entrances
Forsythia spp.	Forsythia (in variety)	
Ilex cornuta rotunda	Dwarf Chinese Holly	
Ilex cornuta helleri	Dwarf Japanese Holly	
Ilex spp. (excl. above)	Holly (in variety)	
Jasminum nudiflorum	Spreading or Dwarf Junipers	
(conferta, horizontalis, var.)	(in variety)	
Juniperus spp. (excl. above)	Junipers (in variety)	
Ligustrum spp.	Privet (in variety)	
Mahonia bealei	Leatherleaf Mahonia	
Myrica cerifera	Southern Bayberry	
Myrica pensylvanica	Northern Bayberry	
Osmanthus spp.	Osmanthus (in variety)	
Prunus laurocerasus schipkaensis	Cherry Laurel	

Rhododendron spp.	Rhododendron	Protected areas only
Spiraea spp.	Spirea (in variety)	
Taxus spp.	Yew (in variety)	
Viburnum spp.	Viburnum (in variety)	
Phetinia Fraseria	Red Tip Phetinia	
Euonymus Alutus (Compacta)	Burning Bush	

2.3 Not Recommended for General Use:

A. Trees (by common name)

Boxelder	Autumn Purple White Ash
Standard Norway Maple	Blue Ash
Sycamore Maple	Male Ginlego
Silver Maple	Kentucky Coffee Tree
Tree of Heaven	Dawn Redwood
Mimosa, Silk Tree	Black Gum
Paper Birch	Japanese Pagoda Tree
European White Birch	Baldeypress
Female Ginkgo	Groenveldt Elm
Thorny Honeylocust	Chinese Elm
Osage Orange	Katsura Tree
Mulberry	Yellowood
Popular	Hardy Rubber Tree
White Oak	Mongolian Linden
Mountain Ash	Fringetree
Black Walnut	Goldenchain Tree
Black Cherry	Sourwood
American Elm	Japanese Snowbell
Siberian Elm	English Holly
American Beech	
European Beech	

B. Shrubs (by Common name)

Mountain Laurel
Leucothoe
Fragrant Honeysuckle
Oregon Grape Holly
Japanese Andromeda
Firethorn (Pyracantha)
Lilac
Weigela

PART 3 - EXECUTION

3.1 Planting Procedures:

A. Planting shall be done in accordance with the "Landscape Specification Guideline" as published in 1986 by the Landscape Contractor Association for MD-DC-VA., 9053 Shady Grove Court, Gaithersburg, Md 20877 and "Tree and Shrub Transplanting Manual" by the International Society of Arboriculture - 1091.

B. Procedures for Planting Trees:

1. Preparing Tree Pit - Walls of tree pit shall be dug so that they are vertical and scarified. The tree pit must be a minimum of 24" larger on every side than the ball of the tree. The tree pit shall be deep enough to allow 1/8 of the ball to be above the existing grade. Any loose soil at the bottom of the pit shall be tamped by hand or with the bucket of the backhoe. Where hard pan material is encountered in pit, break through it to allow proper drainage, or use 10-12 auger hole in bottom of pit, 2-3 feet deep, backfilled with washed gravel.

2. Placing Tree in Pit - Place the tree in the pit either by lifting and carrying the tree by its ball (never lift by branches or trunk) and then lowering it into the pit. Set the tree straight and in the center of the pit with most desirable side of the tree facing toward the prominent view (sidewalk, building, street, etc.).

3. Backfilling Tree Pit - Backfill tree pit with a soil on-site. Make sure plant remains straight during backfilling procedure. Backfill sides of tree pit halfway with soil and tamp as pit is being filled. Cut rope on ball of tree and pull burlap back to the edge of the tree ball. Remove all plastic wraps and twine. Finish backfilling sides of tree pit and tamp firmly. Never cover top of tree ball with soil. Form a saucer above existing grade and around the outer rim of the tree pit. Mulch top of root ball and saucer within 48 hours to a minimum depth of 2" and to a depth not to exceed 3". Water thoroughly on the interior of the tree saucer until it is filled, even if it is raining. A second watering may be necessary to insure saturation of the root ball. Top of ball should be planted 1/8th of the ball diameter above grade.

4. Prune out any dead or broken branches. In extremely hot weather, reduce foliage surface by pruning or stripping. Remove all tags, labels, seals, etc. from the trees after final inspection.

C. Procedures for Planting Shrubs:

1. Planting a Shrub Mass - Place the plant in the pit by lifting and carrying it by the root ball. Set the plant straight and in the center of the pit with the most desirable side facing toward the prominent view. Set perpendicular to grade. Use a soil mixture as stated in the specifications. Make sure the plant remains straight during backfilling procedure. Cut the rope on the ball of the shrub and pull the burlap back to the edge of the plant ball. All plastic wraps and twine shall be removed. Containers are to be removed from the containerized materials. Finish backfilling the sides of the shrub pit and tamp firmly. Form a saucer above the existing grade and around the planting pit. Edge and rake the entire planting bed. Mulch the entire planting bed per enclosed detail a minimum of 2" depth, not to exceed 3" of depth. Water thoroughly on the interior of the shrub saucer until it is filled, even if it is raining. Prune out any dead or broken branches. Remove all tags, labels, seals, etc., from the plant after final inspection.

D. Drainage:

1. No plants shall be planted in situations with obvious poor drainage. Such situations shall be brought to the attention of the Project Architect and/or Owner and shall be resolved before planting commences. If not brought to the attention of the Architect/Owner and it is determined later that the plants must be moved, they shall be relocated at no cost to the Owner.

3.2 Clean Up and Restoration:

A. During the course of planting, excess and waste materials shall be removed daily. Lawn areas shall be kept clear and all reasonable precautions taken to avoid damage to existing streams, structures, plants, and grass. When planting in an area has been completed, the area shall be thoroughly cleaned up. Existing grass areas which have been injured by the work shall be regarded, seeded and the entire area, when completed, shall be neat and clean. Cleanup restoration shall be incidental to the contract. Costs for same shall be included in the various bid proposal items.

END OF SECTION
02900

Reforestation for State Highway Projects in Montgomery County from FY 1998-FY 2004

Route	Project	Sub Watershed	Acres Cleared	Status of Reforestation*	Total Mitigation Needed	Total Acres Planted	Additional Acres Planted	Remaining Acres to be Planted	Construction Completion Date
US 29	US 29 & MD 193	Seneca Creek	4.64	Complete	4.64	7.0	2.36	-	11/1997
I-495	I-495; Fernwood to MD 187	Western Branch (PG County)	4.79	Complete	4.79	5.06	0.27	-	2/1998
I-495	I-495 & I-270 Spur South	Cabin John Creek	6.0	Complete	6.0	6.03	0.03	-	8/1998
I-495	I-495 & I-270 Spur North	Cabin John Creek	2.0	Complete	2.0	2.12	0.12	-	8/1998
MD 355	MD 355; from MD-124 to Middlebrook	Seneca Creek / Potomac River M.C. Area / Rock Creek	11.6	Complete	11.6	11.6	-	-	10/1998
MD 28	MD-28 Bridge over Seneca Creek	Patuxent River Upper / Little Patuxent River	5.08	Complete	5.08	5.07	-	-	9/2000
I-270	I-270 at MD 124 Interchange	Cabin John Creek / Potomac River M.C. Area	2.8	Complete	2.8	3.0	0.2	-	10/2000
US 29	US-29 from South of Greencastle to North of Dustin		29.0	Not completed	29.0	N/A	-	29.0	3/2004
US 29	Briggs Chaney Rd-interchange improvements		5.1	Not completed	5.1	N/A	-	5.1	7/2005
MD 124	Mid County Highway to Warfield Rd		2.3	Not completed	2.3	N/A	-	2.3	5/2006
Total			73		73	39	2	36	

*If reforestation is not complete, it will take place within 1 year or within two growing seasons of the construction completion date.

State of Maryland

(17a)

Reforestation Law
Department of Natural Resources, Title 5

Reforestation

§ 5-103. REFORESTATION

(a) **DEFINITIONS:** In this section the following words have the meanings indicated.

(1) "Construction activity" means construction of a highway by a constructing agency.

(2) "Constructing agency" means:
(i) A unit of State or local government; or
(ii) Any other person who uses State funding and performs any construction activity with the State funding.

(3) "Forest" means:
(i) a biological community dominated by trees or other woody plants covering a land area of 1 acre or more, or
(ii) an area that has been cut but not cleared of trees or other woody plants.

(4) "Forest mitigation banking" means the intentional restoration or creation of forests undertaken expressly for the purpose of providing credits for reforestation requirements with enhanced environmental benefits from future activities.

(5) "Watershed" means all lands lying within an area described as a subbasin in water quality regulations adopted by the Department of the Environment.

(b) **GOVERNMENTTO MINIMIZE CUTTING OR CLEARING** - To accomplish a construction activity involving land clearing, a unit of State or local government or any other person using State funding for the construction project:

(1) May cut or clear only the minimum number of trees and other woody plants that are necessary and consistent with sound design practices; and

(2) Shall make every reasonable effort to minimize the cutting or clearing of trees and other woody plants.

(c) **WHEN REQUIRED-**

(1) If the total area of forest cut or cleared in connection with a construction activity by a unit of State or local government or any other person using State funding for the construction project equals 1 acre or more, the constructing agency shall locate an equivalent area of State-owned or other publicly owned land to be reforested by the Department at a rate of 10 cents per square foot of the area of required planting.

(2) (i) Except as provided in subparagraph (ii) or (iii) of this paragraph, the reforestation projects shall be established on any public land within the county and watershed in which construction activity by a unit of State or local government has caused a loss of trees where the public entity that owns the land agrees to that use of the land.

(ii) If the reforestation project cannot be reasonably accomplished in the county and watershed in which the construction activity is located, then the reforestation shall occur in the county or watershed in the State in which the construction activity is located, or shall be accomplished by use of credits in a forest mitigation bank in the county and watershed in which the construction activity is located.

(iii) If the reforestation project cannot be reasonably accomplished in the county or watershed in which the construction activity is located, or by use of credits in the county and watershed in which the construction activity is located, then reforestation may occur by the use of credits in a forest mitigation bank in the county or watershed in which the construction activity is located.

(3) The constructing agency shall reimburse the Department for the reforestation activities at an appropriate rate of 10 cents per square foot of the area of required planting.

(4) Any land for a reforestation project shall be:
(i)If possible, on the site or in the project right-of-way being used for the construction activity;
(ii) If sufficient area is not available at the site or within the project right-of-way, on State-owned or other publicly owned land in the county and watershed in which the construction activity is located;
(iii) If the reforestation project cannot be reasonably accomplished in the county and watershed in which the construction activity is located, on State-owned or other publicly owned land in the county or watershed in the State in which the construction activity is located; or
(iv) If the reforestation project cannot be reasonably accomplished on State-owned or other publicly owned land in the county or watershed in the State in which the construction activity is located, accomplished through use of forest mitigation bank credits in the watershed in which the construction activity is located.

(d) **REFORESTATION FUND**

(1) If the constructing agency is unable to locate a sufficient amount of State or other publicly owned land or available forest mitigation bank credits to comply with the requirements of subsection (c) of this section, the constructing agency shall contribute money, at the rate of 10 cents per square foot of the area of required planting, to a special fund to be maintained in the Department and to be known as the Reforestation Fund.

(2) There is a Reforestation Fund in the Department.

(e) **MANAGEMENT OF FUND**

(1) Money deposited in the Reforestation Fund:
(i) Shall remain in the Fund until appropriated and spent; and
(ii) May not revert to the General Fund.

(2)
(i)1. Except as provided in item 2 of this subparagraph, the Department shall use the Reforestation Fund solely to plant trees on State or other publicly owned lands located in the county and watershed in which construction projects giving rise to Fund contributions are located.

2. If reforestation cannot be reasonably accomplished in the county and watershed in whicthe construction activity is located, then the Department may use the Reforestation Fund to plant trees on State or other publicly owned lands located in the county or in the watershed in the State in which the construction activity is located, or to purchase credits in, establish, or maintain a forest mitigation bank in the county or watershed in which the construction activity is located in accordance with regulations of the Department. The Reforestation Fund may not

be used to finance administrative activities associated with a mitigation bank and any credits created by the Reforestation Fund may not be sold to compensate for additional forest impacts.

(ii) 1. The Department shall accomplish the reforestation for which money is deposited in the Reforestation Fund within 1 year or 2 growing seasons after project completion, as appropriate, after receipt of the money.

2. Money deposited in the Reforestation Fund under subsection (d) of this section shall remain in the Fund for a period of 1 year or 2 growing seasons, and at the end of that time period, any portion that is not used to meet the reforestation requirements shall be returned to the constructing agency.

(f) **CONSULTATION WITH THE DEPARTMENT**

(1) Any unit of State or local government that engages in construction activities involving land clearing on forest lands shall consult with the Department to assure compliance with this section:

(i) Before cutting in or clearing a forest; and

(ii) Before locating a reforestation area in accordance with this section.

(2) The provisions of this subsection shall also apply to any construction activity by any other person who uses State funding for that activity.

(g) **EXCEPTION**

The provisions of this section do not apply to any agricultural practice implemented under a soil and water conservation plan.

(h) **ANNUAL REPORT**

On or before July 1 of each year, the Department or local authority shall submit to the Senate Economic and Environmental Affairs Committee and the House Environmental Matters Committee a report on:

(1) The number and location of each construction activity subject to the requirements of this section;

(2) The amount and location of acres cleared, conserved, and planted in connection with the activity; and

(3) The amount of reforestation fees collected and expended.

(i) Forest mitigation banking.- Forest mitigation banking under this section shall be conducted in accordance with standards adopted under Subtitle 16 of this title.

[1987, ch. 610; 1989, chs. 769, 819; 1991, ch. 255, § 2; 1997, ch. 559, §§ 1, 2.]

Annotations

Effect of amendments. Section 1, ch. 559, Acts 1997, effective Oct. 1, 1997, redesignated former (a) (5) to be present (a) (6). Section 2 of ch. 559, inserted present (a) (5); inserted "or (iii)" following "(ii)" in (c) (2) (i); added "or shall be accomplished by use of credits in a forest mitigation bank in the county and watershed in which the construction activity is located" to the end of (c) (2) (ii); added (c) (2) (iii); added (c) (4) (iv); inserted "or available forest mitigation bank credits" in (d) (1); in (e) (2) (i) 2, added the language beginning "or to purchase credits in" to the end of the first sentence and added the second sentence; and added (i).

Editor's note. Section 2, ch. 610, Acts 1987, effective July 1, 1987, provides that "this act applies to all construction activity involving land clearing by any unit of State government for which bids are let after January 1, 1988."

Subtitle 4. Trees and forest Nurseries

Part I. Roadside Trees

§ 5-401. Definition.

In this subtitle, roadside tree means any tree or shrub growing within the right-of-way of any public road. (An. Code 1957, art. 66C, § 359; 1973, 1st Sp. Sess., ch. 4, § 1.)

§ 5-402. Powers of Department generally; establishment of State forest nurseries.

The Department may plant trees along the roadsides, make rules and regulations governing the planting, care for and protect any roadside tree, and establish one or more State forest nurseries for the propagation of trees for any roadside planting. (An. Code 1957, art. 66C, § 358; 1973, 1st Sp. Sess., ch. 4, § 1.)

Purpose. -- It is the evident purpose of this part to promote the interests of public travel, and to develop and conserve the value of public property, by establishing a system of roadside tree planting and protection for the highways of the State. C & P Tel. Co. v. Goldsborough, 125 Md. 666, 94 A. 322 (1915).

§ 5-403. Plans for planting or care of trees.

(a) *Application.*—If the governing body or the road supervisors of any county of the State, the Department of Transportation, the council of any municipality, or any organization or person applies to the Department to plant, care, or protect any roadside tree, the Department shall evaluate the application and inform the applicant concerning the advisability of the requested planting, care, or protection. If, in the judgment of the Department, the requested planting, care, or protection is advisable, the Department shall prepare and submit to the applicant a plan for the same, including an estimate of the cost.
(b) *Approval and implementation of plan.*—Any plan to plant, care, or protect roadside trees may not become operative until the applicant approves the plan and has guaranteed to the Department the cost of the work. When the applicant approves a plan the Department has prepared, and the applicant has guaranteed payment of the cost in a manner satisfactory to the Department, the Department shall perform, or cause to be performed, the specified planting, care, or protection of roadside trees.
(c) Payment of unexpended balances.—The Department, without being requested as provided in subsection (a) or guaranteed as provided in subsection (b), may plant, care for, and protect roadside trees and pay for the work out of any unexpended balance of the amount appropriated for the purposes of this subtitle. However, no tree may be planted under the provisions of this section without the consent and approval of the owner of the land on which planted. (An. Code 197, art. 66C, §§ 360-362; 1973, 1st Sp. Sess., ch. 4, § 1.)

§ 5-404. Authority of forest wardens, etc., to arrest without warrant.

Forest wardens and other persons having police powers in the State, in addition to their regular duties, shall enforce the law for the care and protection of roadside trees. In the enforcement of these laws, they possess the same powers as a peace officer to arrest with a warrant. (An. Code 1957, art. 66C, § 363; 1973, 1st Sp. Sess., ch. 4, § 1.)

§ 5-405. Payment by Department to forest warden for making required examinations, planting and care of trees, etc.; reimbursement of Department by applicant for payments.

For his services in making examinations, as provided in § 5-403 (a), the Department shall pay the forest warden upon presentation and approval of his accounts with vouchers, for services in planting roadside trees, trimming, spraying, or otherwise caring for existing roadside trees, as provided in § 5-403 (b). The applicant who guarantees the cost of work shall reimburse the Department for the services of the forest warden and his helpers upon presentation of the forest warden's accounts with vouchers, and upon the approval of the Department. The applicant shall pay for the forest warden's services in examining conditions serving as a basis for permits applied for under § 5-406, for issuing permits, and for supervising work authorized by the permits. The Department shall determine the rate to be paid under this section. (An. Code 1957, art. 66C, § 364; 1973, 1st Sp. Sess., ch. 4, § 1.)

Delegation of duty of fixing fees not unconstitutional.—There is no constitutional prohibition against delegating to a public board or commission, serving as a governmental agency, the duty of fixing the fees to be charged for a public service. C & P Tel. Co. v. Goldsborough, 125 Md. 666, 94 A. 322 (1915).

§ 5-406. Permit to cut down or trim trees; prohibited conduct without permit.

(a) *Application for permit required; exception.*—Any person who desires to cut down or trim any roadside tree shall apply to the Department for a permit, except that: (1) if a tree is uprooted or its branches broken so as to contact telephone, telegraph, electric power, or other wires carrying electric current, or if the tree or its branches endanger persons or property, the tree or its branches may be removed without first obtaining a permit from the Department; and (2) a tree standing within the right-of-way of a public road which has not been surfaced with either stone, shell, gravel, concrete, brick, asphalt, or other improved surface maybe cut down and removed by the abutting landowner for his own use without first obtaining a permit.

(b) Prohibited conduct.—A person may not cut down, trim, mutilate, or in any manner injure any roadside tree, except as authorized by this section, without a permit from the Department. (An. Code 1957, art. 66C, § 365; 1973, 1st Sp. Sess., ch. 4, § 1.)

Permit requirement is provided as regulation.—The requirement of a permit from the Department for the trimming or removal of roadside trees, so far as it affects proprietary rights, is clearly provided as a regulation merely, and not as a possible prohibition, of their exercise. C & P Tel. Co. v Goldsborough, 125 MD. 666, 94 A. (1915)

And does not mean that permit can be denied one having property right in trees. — The provision requiring a permit from the Department for trimming or removal of roadside trees on public highways was designed to prevent interference with trees n the public highways, by persons acting without interest, but vested ownership is to be respected, and the law is not to be construed as meaning that a permit can be denied to one having a valid right of property in such trees. C & P Tel. Co. v Goldsborough, 125 MD, 666, 94A. 322 (1915).

§ 5-408. Use of trees for planting on State forest reserve.

Any trees grown in State nurseries, not required for roadside planting, may be used for planting on the State forest reserve or furnished to any landowner of the State at not more than the cost of production. The trees shall be planted for conservation purposes according to plans approved by the Secretary under rules and regulations promulgated by the Department. (An. Code 1957, art. 66C, § 367; 1973, 1st Sp. Sess., ch. 4, § 1.)

ROADSIDE TREE CARE REGULATIONS

Title 08
DEPARTMENT OF NATURAL RESOURCES
Subtitle 07 FOREST AND PARKS

Chapter 02 Roadside Tree Care

.01 Purpose

.02 Definitions
-What a roadside tree is
-What a pesticide is
- Who is a roadside tree care expert

.03 Permit Required
- When a roadside tree permit is required
- What activities are exempt from the regulations

.04 Types of Roadside Tree Care Permits
- Permits for a specific tree or group of trees
- Permits for comprehensive and continuing programs

.05 Issuance of Roadside Tree Care Permits
- Who may request a permit
- How a permit is issued
- What information is required in a permit
- When can a permit be issued

.06 Fees
- Fees for comprehensive and continuing programs
- Fees for a specific tree or group of trees

.07 Roadside Tree Care Standards
- General Requirements
-Tree Clearance for Overhead Facilities
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.08 Use of Pesticides
-Use of pesticides on roadside trees

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-Use of the recommended tree list

-Conforming to the American Standard for Nursery Stock

- Use of a roadside tree planting plan

ROADSIDE TREE CARE REGULATIONS

.01 Purpose

The purpose of these regulations is to implement Natural Resources Article, §§5-401 -- 5-406, Annotated Code of Maryland, to ensure the proper care of roadside trees in the interest of promoting and maintaining healthy trees and safe unobstructed, and aesthetically pleasing public roads and rights-of-way.

.02 Definitions

A. In this chapter, the following terms have the meanings indicated.

B. Terms Defined.

(1) "Director" means Director of the Maryland Forest Service.

(2) "Dripline" is a line extending from the outer reaches of a tree crown vertically to the ground.

(3) "Forest Service" means the Maryland Forest Service.

(4) "Licensed Tree Expert" means a person licensed under Natural Resources Article, §§5-415 et seq.

(5) "Person" includes the State, a county, municipal corporation, or other political subdivision of the State, or their units, or an individual, receiva, trustee, guardian, executor, administrator, fiduciary, or representative of any kind, or a partnership, firm, association, public or private corporation, or other entity.

(6) "Pesticide" means a:

(a) Chemical or biological preparation used to kill, inhibit, or regulate growth on targeted plants, their spores or seed, including:

(I) Herbicides,

(ii) Insecticides,

(iii) Tree growth regulators, and

(iv) Fungicides,

(b) Substance or mixture of substances intended for:

(I) Preventing, destroying, repelling, or mitigating pest,

(ii) Use as a plant regulator, defoliant, or desiccant, or

(iii) Use as a spray adjuvant such as a wetting agent or adhesive.

(7) "Public road" means a road the title to which, or the easement for the use of which, is vested in a public body or governmental agency.

(8) "Recommended tree list" means a list of trees approved by the Forest Service and

those recommended by the Forest Service that are suitable for planting on specific sites and for specific conditions within the right-of-way of public roads.

(9) "Right-of-way of a public road" means that land the title to which, or an easement for which, is held by the State, county, or a municipality for use as a public road.

(10) Roadside tree" or "tree" means a plant that has a woody stem or trunk that grows all, or in part, within the right-of-way of a public road.

ROADSIDE TREE CARE REGULATIONS

.02 Definitions
(continued)

(11) "Roadside tree care expert" means an individual representing a governmental agency who:

(a) Is designated to supervise that government's roadside tree planting and maintenance operations;

(b) Has passed the Forest Service's examination for licensed tree experts; and

(c) Has been approved by the Forest Service as qualified to supervise that government's tree care program.

(12) "Tree care" means:

(a) Removal of a roadside tree;

(b) Planting or maintenance, or both, of a roadside tree;

(c) Application of pesticide to a roadside tree; or

(d) Treatment that may affect the health or growth of a roadside tree.

(13) "Tree care crew" means a unit from a public or private entity whose purpose is to maintain roadside trees as defined in §B(10) of this regulation, characterized by a service truck and supervised by a licensed tree expert.

(14) "Tree care standards" means tree care approved by the Forest Service and in accordance with the roadside tree care standards set forth in Regulations .07--.09 of this chapter.

.03 Permits Required

A. A person may cut down or prune a roadside tree without a permit if the tree:

(1) Is uprooted or its branches broken to contact telephone, telegraph, electric power, or other wires carrying electricity, or if the tree or its branches are an immediate danger to person or property; or

(2) Stands within the right-of-way of a public road which has not been surfaced with either stone, shell, gravel, concrete, brick, asphalt, or other improved surface material, and only if the tree is cut down and removed by, or at the request of, the abutting landowner for the landowner's own use.

B. Except as provided in §A of this regulation, a person shall obtain a permit to perform tree care to a roadside tree.

C. A person providing tree care under §A(I) of this regulation shall inform the Forest Service, by calling or writing within 1 week of the action taken, of the place or general area where that action was taken, and provide a proposed plan to upgrade the work, if necessary, to tree care standards. The Forest Service shall approve, modify, or reject a proposed plan within 2 weeks after an examination of the work.

ROADSIDE TREE CARE REGULATIONS

.04 Types of Roadside Tree Care Permits.

A. Roadside tree care permits are of two types:

(1) Permits issued for a specific tree or group of trees for specific tree care operations for a term not exceeding 1 year from the date of issuance; and

(2) Permits issued for comprehensive and continuing programs of general tree care such as those administered by State agencies, counties, municipalities, corporations, and public utilities.

B. Permits issued under §A(2) of this regulation are issued only for specified types of tree care, based upon the skills of those supervising the program.

C. For tree care not authorized in a permit issued under §A(2) of this regulation, a permittee shall obtain a separate tree care permit.

D. Permits are issued for a calendar year, and may be renewed upon application.

.05 Issuance of Roadside Tree Care Permits.

A. A request for a roadside tree care permit:

(1) May be made by:

(a) A person owning title to the land on which the tree or trees are located,

(b) A governmental entity possessing an easement for the public road right-of-way in which the tree or trees are located,

(c) A person responsible for providing tree care to the tree or trees,

(d) A person whose property abuts the right-of-way at the point at which the tree or trees are located,

(e) A public utility, or

(f) An authorized agent of one of the entities in §A(l)(a)-(e) of this regulation; and

(2) Shall be made by an applicant to the appropriate office of the Forest Service.

B. Following a request for a permit, a representative of the Forest Service shall meet with the applicant and conduct an on-site examination of the proposed tree care.

C. For permits authorizing continued tree care programs under Regulation .04A(2) of this chapter, an examination is necessary only as specified in the permit. An examination is not required for the renewal of the permit.

.O5 Issuance of Roadside Tree Care Permits (continued)

D. The Forest Service may issue a permit for tree care if the applicant shows that the proposed tree care will meet one of the following conditions:

(1) Eliminate a hazard to property, public safety, or health;

(2) Improve or prevent a deteriorated tree condition; or

(3) Improve the general aesthetic appearance of the right-of-way.

E. Unless exempted by the Forest Service, if a tree is removed it shall be followed by replanting of a species on the recommended tree list that is suitable to the location.

F. Roadside tree care permits shall specify:

(1) The name and address of the permittee;

(2) The area where the tree care will occur;

(3) The particular tree or trees involved;

(4) The type of tree care permitted;

(5) The term of the permit;

(6) Whether supervision of the tree care is required; and

(7) Limitations or conditions on the tree care or planting considered advisable by the Forest Service.

G; Except for a tree care permit issued to a government agency for which tree care is provided under the supervision of a roadside tree care expert, the Forest Service shall provide supervision of a tree care permit.

H. If the Forest Service denies a permit, the Forest Service shall notify the applicant of the reasons for denial within l0 days of receipt of the application for the permit.

I. The Forest Service may:

(1) Modify the terms and conditions of a permit in accordance with provisions and objectives of the roadside tree care laws and regulations; or

(2) Suspend or cancel a permit for a violation of a:

(a) Condition of the permit, or

(b) Provision of Natural Resources Article, §5-401 et seq., Annotated Code of Maryland or implementing regulation.

J. Request for Hearing

(1) A person whose request for a roadside tree care permit is denied or whose roadside tree care permit is suspended or revoked, has the right to be heard regarding the denial or suspension or revocation of the permit, after submitting a request in writing not later than 10 days after the date on which the denial or suspension or revocation notice is served.

(2) The Director shall schedule a hearing within 10 days from receipt of a request and render a decision within 10 days from the date of the hearing.

.06 Fees.

A. Fees for roadside tree care permits are calculated according to the following schedule:

(1) If Forest Service supervision of the proposed tree care is required for a permit under Regulation .04A(2), the fee for that supervision, including permit examination, is: (a) $2,500 per year per tree care crew, or (b) $250 per month per tree care crew.

(2) The fee for the on-site examination before the issuance of a tree care permit under Regulation .04A(1) is $25;

(3) No fee is required for a tree care permit issued to an applicant that is a government agency.

B. If a permit request is denied, a fee is not required.

C. Billing for tree care crews is made either annually or quarterly, at the option of the tree care crew.

.07 Roadside Tree Care Standards.

A. General Requirements. Unless the Forest Service grants an exception, treatment of roadside trees authorized by permit shall be performed according to the following standards:

(1) Branches to be removed shall be cut back to a live lateral branch at least 1/3 the diameter of the severed branch;

(2) Cuts shall be made sufficiently close to the trunk or parent limb without cutting into the branch collar or leaving a protruding stub;

(3) Proper pruning techniques shall be followed at all times;

(4) Except when directed by the Forest Service, pruning cuts shall be left unpainted for aesthetic reasons;

(5) If the painting of cuts is required, only materials nontoxic to the cambial layer shall be used;

(6) Dangerous deadwood and broken limbs which are located within the scope of the work as defined in the permit shall be removed;

(7) Except when authorized by the Forest Service or when the tree is being removed, climbing hooks or spurs are prohibited;

(8) Chips resulting from roadside tree care may:

(a) Be broadcast on a right-of-way except in ditches, waterways, turf, and surfaced areas, and

(b) Not exceed 6 inches in depth on the right-of-way;

(9) The wrapping or winding of cable, wires, and other attachments around a tree, or fastening attachments to a tree to bruise or injure a tree or cavity work performed on a tree, is prohibited; and

(10) When trees are removed, replacement of those trees according to a plan may be required by the Forest Service.

B. Tree Clearance for Overhead Facilities.

(1) In addition to the requirements of §A of this regulation, a person who trims a tree to provide clearance for utility wires, cables, or other facilities shall:

(a) Allow sufficient clearance for 2 years growth normally expected after trimming, unless otherwise directed by the Forest Service;

(b) Take into account the health of the tree; and

(c) Make proper cuts that direct growth away from overhead wires and facilities in compliance with safety standards and government regulations.

(2) If a trimmed tree dies within 1 year or is in poor condition of growth as a result of that trimming, the permittee shall, if required by the Forest Service, remove the tree and plant replacement trees.

(3) Replacement trees shall be:

(a) Furnished by the permittee;

(b) In good condition;

(c) Of a recommended size and species, and

(d) Properly planted at locations to be determined by the Forest Service.

C. Ground Disturbance Requirements.

(1) The requirements set forth in this section:

(a) Are intended to protect roadside trees during construction, installation, and maintenance of a structure requiring excavation;

(b) Apply to underground utilities such as:

(I) Sewers,

(ii) Water and gas pipes,

(iii) Storm drains,

(iv) Electric, telephone, and television cables or conduits,

(v) Sidewalks,

(vi) Driveways, or

(vii) Roadways or similar structures.

(2) A permittee shall take all necessary measures to protect roadside trees from damage during construction and associated activities.

(3) Damage sustained by a tree, such as broken limbs, roots, or scarred trunks, including compaction damage, shall be repaired by the permittee.

(4) The Forest Service shall supervise the measures taken to protect and repair roadside trees under this section.

ROADSIDE TREE CARE REGULATIONS

.07 Roadside Tree Care Standards
(continued)

D. Protection of Tree Roots.

(1) When an underground project subject to §C of this regulation encounters the roots of a roadside tree, a permittee, in accordance with the guidelines in §D(2)-(15) of this regulation or other criteria approved by the Forest Service, shall tunnel or bore under the tree continued or modify the project to protect the tree's root system.

(2) For trees under 6 inches in diameter as measured 4 ½ feet above average ground level, all machine digging shall stop at the dripline of the tree, or where specified by the Forest Service.

(3) For trees over 6 inches in diameter as measured 4 ½ feet above average ground level, all machine digging shall stop when roots of 1 inch or more in diameter are encountered or, where specified by the Forest Service.

(4) Roots 1 inch or more in diameter may not be cut without approval of the Forest Service.

(5) A tunnel or other method of modification of the project under or around the tree shall be used if considered necessary by the Forest Service.

(6) The procedure noted in §D(5) of this regulation also shall be used to approach the tree from the opposite side.

(7) At least 24 inches of undisturbed earth shall remain over the tunnel or bore, or above other type of installation.

(8) For operations using shallow trenching techniques up to 12 inches deep, care shall be taken to minimize root damage and protect the trunk of the tree.

(9) Roots 1 inch or larger, damaged during construction, shall be sawed off close to the tree side of the ditch. Clean cuts shall be made at all times.

(10) Installations affecting roadside trees shall be completed in as short a time as possible to prevent the drying out of exposed roots.

(11) If considered necessary, the exposed root area within the ditch shall be watered and fertilized as directed by the Forest Service.

(12) Tunnels shall be refilled and the soil tamped tightly to original firmness.

(13) Trenches shall be filled to achieve and maintain original grade.

(14) Excess soil shall be removed from the site or disposed of as directed by the Forest Service.

(15) Unless otherwise directed by the Forest Service, the ground shall be fertilized and reseeded, cover shall be restored, and other procedures shall be followed as necessary to prevent erosion around trees.

ROADSIDE TREE CARE REGULATIONS

.07 Roadside Tree Care Standards (continued)

E. Violations of Roadside Tree Standards.

(1) The Forest Service may require a person who fails to comply with §§C or D of this regulation to:

(a) Remove and replace a tree which dies within 1 year after the treatment activity is completed;

(b) Document for 3 years the condition of the tree which shows decline within 1 year after the treatment activity is completed; and

(c) Remove and replace a tree which dies after 3 years following the completion of the treatment activity, if the tree has been the subject of the documentation in §E(l)(b) of this regulation.

(2) The value of a tree to be replaced is determined as of the date of the violation.

.08 Use of Pesticides.

use or application of a pesticide to a tree on a public road right-of-way in the State is
s follows:

(1) Any person applying a pesticide to a roadside tree shall have acquired
and licensure required by the Maryland Department of Agriculture and shall adhere to
provided in COMAR 15.05.01;

(2) Any person applying a pesticide shall apply only those pesticides registered for
he U.S. Environmental Protection Agency, and the Maryland Department of
and shall follow the manufacturer's label directions for proper use;

(3) Before the time of pesticide application, the Forest Service shall be notified by
of the approximate time and place of application;

(4) Except when authorized by the Forest Service, a tree may not be treated with
nless it is 6 feet or less in height.

(5) Dead plant material resulting from the application of an herbicide shall be
necessary for aesthetic or safety reasons, or both;

(6) Every reasonable precaution shall be taken to:

(a) Avoid the use of herbicides on vegetation which contributes to soil
rticularly at highway cuts and fills and other areas with steep slopes, and

(b) Prevent the pollution of streams and damage to adjoining properties.

ROADSIDE TREE CARE REGULATIONS

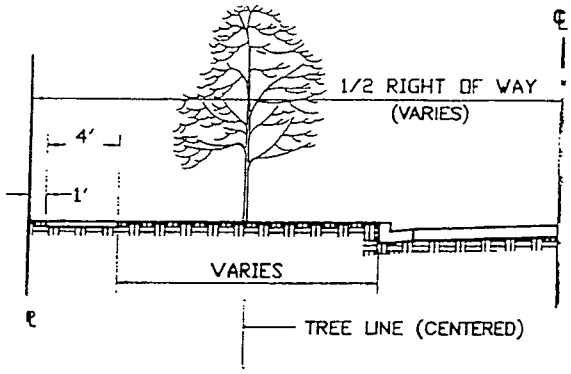
.09 Roadside Tree Planting.

A. Trees to be planted on a public road right-of-way are subject to the conditions in §§B and C of this regulation, in addition to conditions imposed by local ordinances.

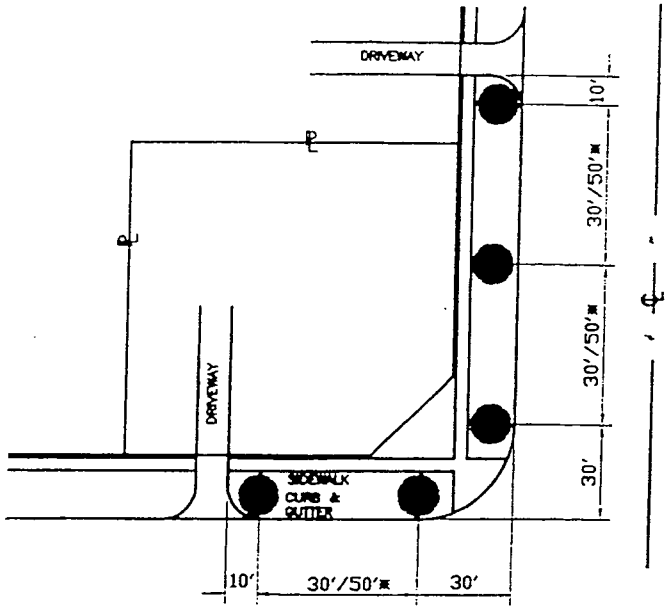
B. Trees shall be of a species and variety from the recommended tree list, and shall conform to the American Standard for Nursery Stock, Approved 1990, by the American National Standards Institute, Inc., which is incorporated by reference.

C. Roadside tree planting shall comply with a planting plan, approved by the Forest Service, which may include:

(1) Stump removal;
(2) Size and type of planting stock;
(3) Planting specifications;
(4) Spacing;
(5) Species;
(6) Proximity to overhead wires;
(7) Care and maintenance; and
(8) Other site considerations.



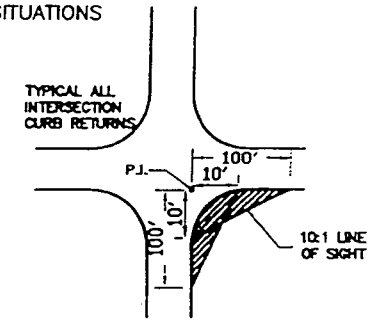
PROFILE VIEW
NO SCALE



PLAN VIEW
NO SCALE

NOTES

1. THE DIMENSIONS SHOWN HERE ARE TYPICAL AND MAY BE MODIFIED IN SPECIFIC SITUATIONS BY THE DEPARTMENT OF TRANSPORTATION.
2. TREES ARE TO BE LOCATED WITH THE FOLLOWING MINIMUM CLEARANCES:
   a. 5' FROM WATER MAIN
   b. 5' FROM GAS BOX
   c. 5' FROM INLET OR MH
   d. 10' FROM FIRE HYDRANT
   e. 15' FROM STREET LIGHT
3. MINOR TREE SPACING 30' (±5')O.C. MIN.
4. MAJOR TREE SPACING 50' (±5')O.C. MIN.
5. SHADE TREES TO BE 1 1/2" MINIMUM CALIPER 10' MINIMUM HEIGHT.
6. FLOWERING TREES TO BE 3/4" MINIMUM CALIPER 6' MINIMUM HEIGHT.
7. SPECIES TO BE AS APPROVED BY THE MONTGOMERY COUNTY DEPARTMENT OF TRANSPORTATION.
8. SEE STANDARD NO. MC-702.01 FOR PLANTING DETAILS.
9. NO TREE IS PERMITTED IF GREENSPACE IS LESS THAN 6'.
10. NO TREE IS PERMITTED WITHIN LIMIT OF SIGHT.



APPROVED JAN 5/96
DATE

DIRECTOR, DEPT. OF TRANS.

CHIEF, DIV. OF ENG. SERVICES

REVISED

MONTGOMERY COUNTY
DEPARTMENT OF TRANSPORTATION

TREE LOCATIONS
CLOSED SECTION ROADS

STANDARD NO. MC-700.01

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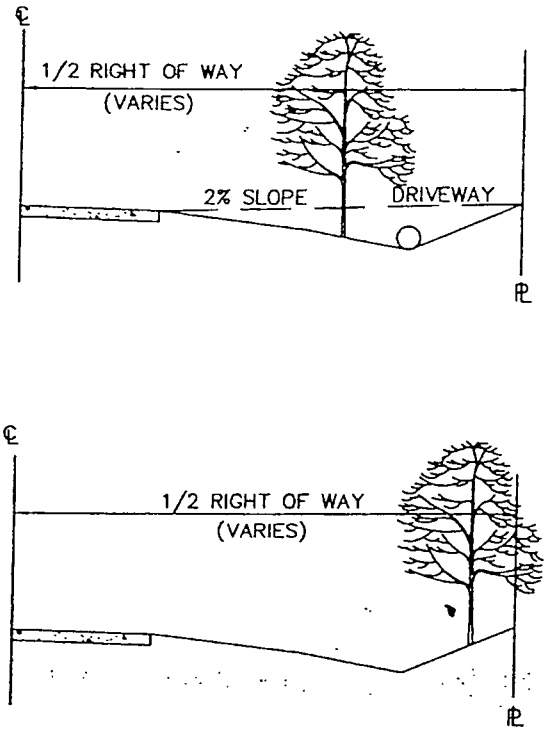

PROFILE VIEW

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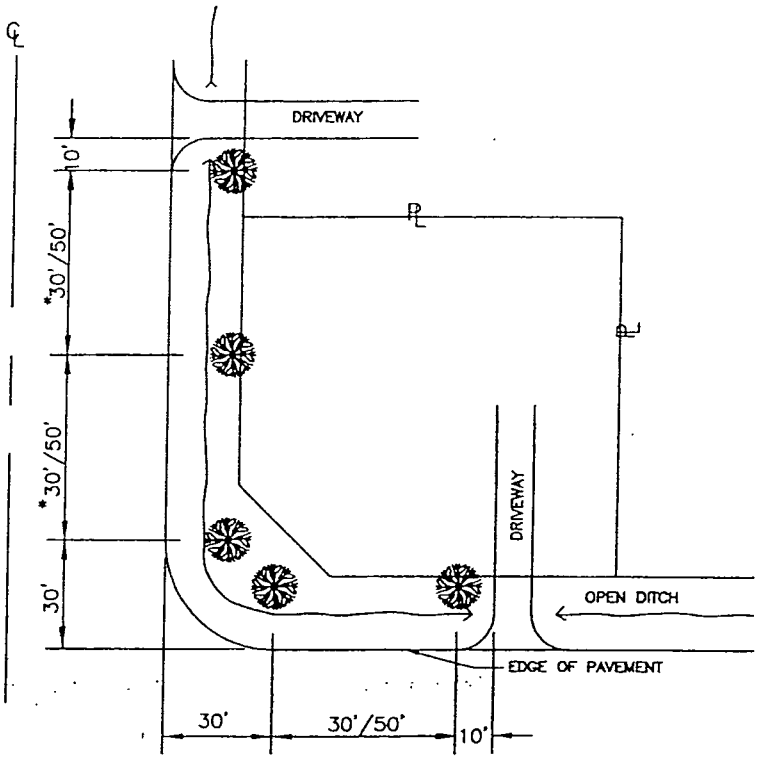


PLAN VIEW

NO SCALE

NOTES

1. THE DIMENSIONS SHOWN HERE ARE TYPICAL AND MAY BE MODIFIED IN SPECIFIC STUATIONS BY THE DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION.
2. TREES ARE TO BE LOCATED WITH THE FOLLOWING MINIMUM CLEARANCES:
   a. 5' FROM WATER MAIN
   b. 5' FROM GAS BOX
   c. 5' FROM INLET OR MH
   d. 10' FROM FIRE HYDRANT
   e. 15' FROM STREET LIGHT

*3. MINOR TREE SPACING 30' (±5') O.C. MIN.

*4. MAJOR TREE SPACING 50' (±5') O.C. MIN.
TREES TO BE PLATED UNDER STANDARD NO. MC-703.02 ARE TO BE SPACED 50' (+5') O.C.

5. SHADE TREES TO BE 1 1/2 " MINIMUM CALIPER 10' MINIMUM HEIGHT.
6. FLOWERING TREES TO BE 1 1/2" MINIMUM CALIPER 6' MINIMUM HEIGHT.
7. SPECIES TO BE AS APPROVED BY THE DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION.
8. SEE STANDARD NO. MC-702.01 FOR PLANTING DETAILS.
9. NO TREE IS PERMITTED IF GREENSPACE IS LESS THAN 6'.
10. NO TREE IS PERMITTED WITHIN LIMIT OF SIGHT.
11. TREE PLANTINGS (IN THE PROFILE VIEW) ARE TO BE LOCATED IN ACCORDANCE WITH THE APPROPRIATE OPEN SECTION ROADWAY STANDARD.

APPROVED 11 July 2000
DATE

DIRECTOR, DPWT

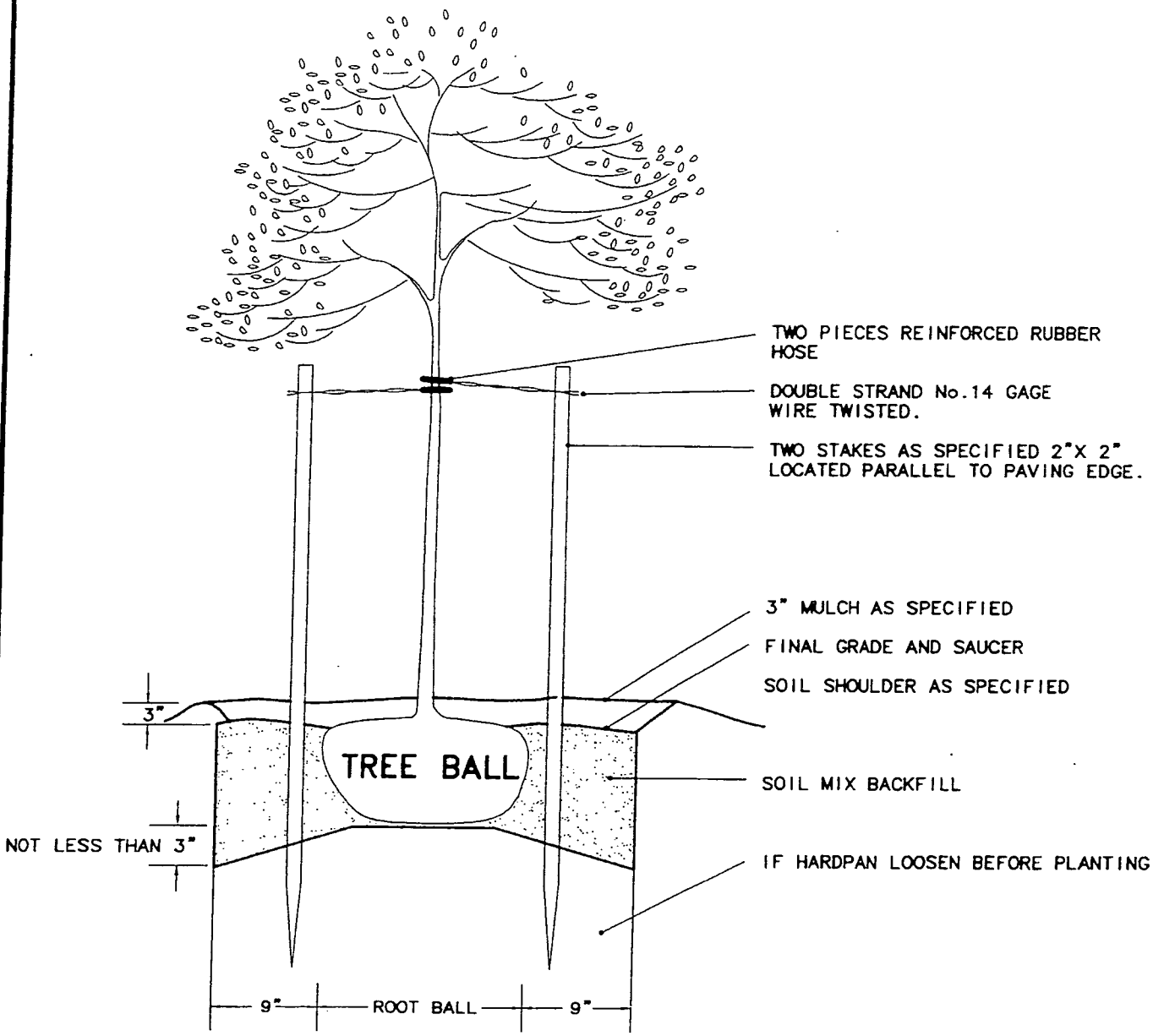
CHIEF, DIV. OF ENG. SERVICES

REVISED

MONTGOMERY COUNTY DEPARTMENT
OF PUBLIC WORKS AND TRANSPORTATION

TREE LOCATIONS
OPEN SECTION ROADS

STANDARD NO. MC-701.01



APPROVED JAN 5/96
DATE

DIRECTOR, DEPT. OF TRANS.

CHIEF, DIV. OF ENG. SERVICES

REVISED

MONTGOMERY COUNTY
DEPARTMENT OF TRANSPORTATION

TREE PLANTING DETAIL

STANDARD NO. MC-702.01

39

P:\DOTSTD\MC70201 9-29-95 7:50:16 am EST

Current Tree List Used By DPWT 6/03

PROPOSED APPROVED STREET TREES

Major Trees

	Scientific Name	Common Name	Height	Width
1.	Acer rubrum 'Armstrong'	Armstrong Red Maple	50'-60'	20'-25'
2.	Acer saccharum 'GreenMountain'	Green Mountain Sugar Maple	50'-75'	40'-60'
3.	Betula nigra "Heritage"	Heritage River Birch (single stem)	40'-50'	40'-50'
4.	Carpinus betulus	European Hornbeam	40'-60'	30'-40'
5.	Carpinus betulus 'Fastigiata	Fastigate European Hornbeam	35'-40'	20'-30'
6.	Celtis occidentalis 'Prairie Pride'	"Prairie Pride" Hackberry	40'-50'	40'-50'
7.	Cladasris lutea*	Yellowwood	30'-50'	40'-50'
8.	Fagus sylvatica	European Beech	50'-75'	40'-60'
9.	Fraxinus pennsylvanica 'Marshall'	'Marshall Seedless Ash	45'-55'	35'-45'
10.	Ginko biloba	Ginko (male grafted only)	50'-80'	40'-80'
11.	Gleditsia tricanthos 'inermis'	Thornless Honeylocust	50'-70'	35'-50'
12.	Liqudambar styrciflua 'Rotundiloba"	Sweetgum (fruitless)	65'-75'	40'-50'
13.	Nyssa sylvatica	Blackgum	40'-70'	35'-45'
14.	Platanus x acerifolia "Bloodgood"	Bloodgood London Planetree	70'-80'	55'-65'
15.	Quercus bicolor	Swamp White Oak	60'-80'	50'-80'
16.	Quercus rubra	Northern Red Oak	60'-80'	45'-60'
17.	Quercus phellos	Willow Oak	60'-75'	40'-60'
18.	Sophora japonica "Regent"*	Regent Scholartree	40'-70'	30'-40'
19.	Tilia cordata 'Greenspire"	Greenspire Littleleaf Linden	50'70'	35'-50'
20.	Tilia tomentosa	Silver Linden	50'-60'	50'-60'
21.	Ulmus parvifolia	Lacebark Elm	40'-45'	45'-50'
22.	Zelkova serrata 'Village Green"	Village Green Zelkova	50'-60'	50'-60'

Minor Trees

1.	Acer campestre	Hedge Maple	30'-35'	30'-35'
2.	Acer ginnala	Amur Maple	15'-20'	15'-25'
3.	Acer griseum	Paperbark Maple	20'-30'	15'-25'
4.	Amelanchier laevis*	Allegheny Serviceberry	30'-40'	15'-20'
5.	Carpinus caroliniana	American Hornbeam	20'-40'	20'-30'
6.	Cercis canadensis* 'Texas White"	Redbud Texas White	20'-30'	15'-30'
7.	Cercis Canadensis*	Eastern Redbud	20'-30'	15'-30'
8.	Chinoanthus virginicus*	Fringetree (tree form)	12'-20'	12'-20'
9.	Cornus florida*	White Flowering Dogwood	20'-30'	20'-30'
10.	Cornus florida 'rubra'*	Pink Flowering Dogwood	20'-30'	20'-30'
11.	Cornus kousa*	Kousa Dogwood	15'-20'	15'-20'
12.	Crataegus crusgalli 'inermis"*	Thornless Cockspur Hawthorn	20'-30'	20'-35'
13.	Craetaegus virdis 'Winter King'*	Winter King Green Hawthorn	25'-30'	20'-35'
14.	Koelruteria paniculata*	Goldenraintree	30'-40'	30'-40'
15.	Malus x 'Robinson'*	Robinson Flowering Crabapple	20'-25'	15'-20'
16.	Malus x 'Callaway'*	Callaway Flowering Crabapple	15'-25'	15'-20'
17.	Prunus x incamp 'Okame'*	Okame Cherry	15'-25'	15'-20'
18.	Prunus yedoensis*	Yeoshino Cherry	35-'40'	35'-45'
19.	Pyrus calleryana 'Aristocrat'*	Aristocrat Pear	35'-45'	25'-35'
20.	Pyrus calleryana 'Redspire'	Redspire Pear	35'-45'	20'-25'
21.	Quercus myrsinifolia	Chinese Evergreen Oak	30'-35'	30'-35'
22.	Stewartia pseudocamellia*	Japanese Stewartia	30'-40'	20'-30'
23.	Stytax japonica*	Japanese Snowbell	20'-30'	15'-25'
24.	Syringia reticulate*	Japanese Treelilac	20'-25'	15'-20'
25.	Viburnam prunifolium	Blackhaw Viburnam (tree form)	15'-20'	8'-12'

* denotes a flowering tree

MAJOR TREES:

Acceptable major trees shall be 8' to 10' tall and have a minimum caliper of 1 1/2" measured 6" above ground level. They shall be branched at a point approximately 60% of the total height of the tree above ground. Larger size trees are acceptable but must conform to American Standards for nursery stock.

Acer saccharum (Sugar Maple)
Carpinus betulus (European Hornbeam)
Cladrastis lutea (Yellowwood)
Fagus sylvatica (European Beech)
Ginkgo biloba (Male Grafted Ginkgo)
Fraximus Pennsylvanica Marshall (Marshall Seedless Ash)
Gleditsia triacanthos inermis (Thornless Honeylocust)
Quercus alba (White Oak)
Quercus borealis (Red Oak)
Quercus phellos (Willow Oak)
Tilia cordata (Little Leaf Linden)
Tilia tomentosa (Silver Linden)
Zelkova serrata (Village Green Zelkova)

MINOR TREES:

Acceptable major trees shall be a minimum of 6' tall and have a minimum caliper of 3/4" measured 6" above ground level. They shall be branched at a point approximately 60% of the total height of the tree above ground. Larger size trees are acceptable but must conform to American Standards for nursery stock.

Acer campestre (Hedge Maple)
Acer ginnala (Amur Maple)
Carpinus caroliniana (American Hornbeam)
Cercis canadensis (Redbud)
Cornus florida (White Flowering Dogwood)
Cornus florida rubra (Red Flowering Dogwood)
Cornus kousa (Kousa Dogwood)
Crataegus phaenopyrum (Washington Hawthorn)
Crataegus mouis (Downey Hawthorn)
Koelreuteria paniculata (Golden Rain—tree)
Ostrya virginiana (Ironwood)
Prunus serrulata 'Kwanzan' (Kwanzan Double PinkFlowering Cherry)
Prunus yodensis (Yoshino Cherry—White)
Pyrus calleryana (Callery Pear—Aristocrat Pear)
Pyrus calleryana (Callery Pear—Redspire Pear)
Sophora japonica (Chinese Scholartree)

OTHER SPECIES:

Considered by request.

APPROVED JAN 5/96
DATE
DIRECTOR, DEPT. OF TRANS.
CHIEF, DIV. OF ENG. SERVICES

REVISED

MONTGOMERY COUNTY
DEPARTMENT OF TRANSPORTATION

APPROVED
TREE VARIETY LIST

STANDARD NO. MC-703.01

P:\DOTSTD\MC70301 9-29-95 7:52:27 am EST

THESE TREE SPECIES ARE INTENDED FOR USE WITH THOSE OPEN SECTION ROADWAY STANDARDS WITH SIDEWALKS (AND BIKEPATHS, AS APPROPRIATE). THE NUMBERS OF THOSE SPECIFIC STANDARDS ARE MC-210.05, MC-211.03, MC-212.04, MC-212.05, MC-213.04, AND MC-217.04.

APPROVED TREE SPECIES LIST

Acceptable trees shall have a minimum caliper of 11/2" measured six inches (6") above ground level. They shall be branched a minimum of five feet above ground. Larger size trees are acceptable but must conform to American Standards for Nursery Stock. Trees designated for a specific roadway section may be planted in another roadway section provided a root barrier is installed as needed to protect sidwalks and paths.

TERTIARY ROADWAY

Koelreuteria paniculata	(Golden Rain Tree)
Pyrus calleryana "Aristocrat"	(Aristocrat Pear)
Pyrus calleryana "Redspire"	(Redspire Pear)
Sophora japonica	(Scholartree)
Ginkgo biloba	(Ginkgo – male)
Quercus coccinea	(Scarlet Oak)
Quercus prinus	(Chestnut Oak)
Tilia tomentosa	(Silver Linden)
Tilia cordata	(Little Leaf Linden)

SECONDARY ROADWAY

Koelreuteria paniculata	(Golden Rain Tree)
Pyrus calleryana "Aristocrat"	(Aristocrat Pear)
Pyrus calleryana "Redspire"	(Redspire Pear)
Sophora japonica	(Scholartree)
Tilia tomentosa	(Silver Linden)
Ginkgo biloba	(Ginkgo – male)
Nyssa sylvatica	(Blackgum)
Quercus prinus	(Chestnut Oak)
Quercus coccinea	(Scarlet Oak)
Tilia cordata	(Little Leaf Linden)

PRIMARY ROADWAY

Acer nigrum	(Black Maple)
Acer saccharum	(Sugar Maple)
Fraxinus pennsylvanica	(Green Ash)
Koelreuteria paniculata	(Golden Rain Tree)
Pyrus calleryana "Redspire"	(Redspire Pear)
Quercus coccinea	(Scarlet Oak)
Quercus rubra	(Northern Red Oak)
Pyrus calleryana "Aristocrat"	(Aristocrat Pear)
Sophora japonica	(Scholartree)
Ulmus hybrids	(Hybrid Elms)
Celtis occidentalis	(Hackberry)
Ginkgo biloba	(Ginkgo – male)
Nyssa sylvatica	(Blackgum)
Platanus x acerifolia	(London Planetree)
Quercus acutissima	(Saw Toothed Oak)
Quercus prinus	(Chestnut Oak)
Quercus shumardii	(Shumard Oak)
Tilia tomentosa	(Silver Linden)
Tilia cordata	(Little Leaf Linden)
Zelkova serrata	(Japanese Zelkova)

ARTERIAL ROADWAY

Gleditsia triacanthos var. inermis	(Thornless Honeylocust)
Quercus phellos	(Willow Oak)
Quercus rubra	(Northern Red Oak)
Tilia tomentosa	(Silver Linden)
Ginkgo biloba	(Ginkgo – male)
Quercus coccinea	(Scarlet Oak)
Quercus prinus	(Chestnut Oak)
Tilia cordata	(Little Leaf Linden)

APPROVED 11 July 2000
DATE

DIRECTOR, DPWT

CHIEF, DIV. OF ENG. SERVICES

REVISED

MONTGOMERY COUNTY DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION

APPROVED
TREE SPECIES LIST

STANDARD NO. MC-703.02

Allowable Greenspace Plantings

1. Plants installed on the County right-of-way cannot block vehicle operator sight distances along roadways or impede the use of public sidewalks.

2. Plantings must not cause erosion of the soil on the right-of-way. All exposed soil must be protected from erosion by mulch, erosion control fabric or other such means.

3. All resident or community installed plantings under this standard are the maintenance responsibility of the resident or community.

4. Weeds as defined in Chapter 58 of the County code, noxious or otherwise, are not permitted.

5. Invasive plants are not permitted. Invasives are plants which by their growth habits or origin:
   - are aggressive in their growth requiring repeated containment efforts through the growing season; examples include but are not limited to; English ivy, kudzu, porcelain berry, purple loosestrife, ailanthus
   - have no native or natural control mechanism,
   - suppress the growth of other plants, especially natives, by chemical, aggressive growth, shading, or other means,
   - spread rapidly,
   - are listed by the U. S. Department of Agriculture as invasive.

6. Acceptable plants may be ornamental grasses, flowers, herbaceous perennials or woody plants which at maturity will not exceed a height of 18" without the need for pruning.

7. No vegetable plantings are permitted.

8. Under Maryland State law, plantings allowed under these guidelines can not be located within 15' of fire hydrants, for other items appearing in the right-of-way such as; utility meters, sewer clean outs, etc., a minimum of 3' is to be kept free of plantings.

9. The planting design must provide for access across the right-of-way from the edge of pavement to the sidewalk where sidewalks are present. Access paths must be at least 36" wide and should occur at least every 25' and can be by flagstone, brick, mulched path or other suitable means.

10. On closed section roads, plant material should not be located so as to impede people from opening doors of vehicles parked at the edge of pavement or curb line.

11. Plantings must not impede drainage flows on open section roads. Plantings are allowed only on the house side of the drainage swale and a minimum 2' wide zone along the drainage path at the bottom of drainage swales must be kept clear of all plant material.

12. Any plant material installed on the County right-of-way by residents will not be replaced by the Department of Public Works and Transportation if damaged as a result of County maintenance activities. To minimize the potential for damage resulting from maintenance activities plantings should not be located within 1' of the edge of pavement on open section roads, the back edge of curb on closed section roads, or the sidewalk if present.

13. All parts of plants located on the right-of-way (other than trees) must be kept within the confines of the planting area.

14. Plantings must allow for natural drainage of surface water flows across the right-of-way and must not cause ponding of water on either the public sidewalk or adjacent properties.

15. The County assumes no liability for any adverse consequences resulting from privately installed plantings located on the public right-of-way.

APPROVED 7/29/03 DATE DIRECTOR, DEPT. OF PUBLIC WORKS & TRANSPORTATION CHIEF, DIV. OF ENG. SERVICES	REVISED	MONTGOMERY COUNTY DEPARTMENT OF PUBLIC WORKS & TRANSPORTATION ALLOWABLE GREENSPACE PLANTINGS STANDARD NO. MC-704.01

04-21-04 P02:19 IN

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION

Douglas M. Duncan
County Executive

Albert J. Genetti, Jr., P.E.
Director

MEMORANDUM

April 20, 2004

TO: James Caldwell, Director
Department of Environmental Protection

FROM: Albert J. Genetti, Jr., Director
Department of Public Works and Transportation

SUBJECT: Montgomery County Street Tree Program Memorandum of Understanding

Per our conversation today, April 20, 2004, the changes we discussed and agreed to have been incorporated into the attached Memorandum of Understanding (MOU) between the Department of Public Works and Transportation and the Department of Environmental Protection.

Please review the MOU for completeness and accuracy and, if no further changes are necessary, sign and return to me, retaining a copy for your Department. Upon receipt, I'll make the necessary distribution to OMB and the appropriate DPWT Divisions.

Office of the Director
101 Monroe Street, 10th Floor • Rockville, Maryland 20850-2540 • 240/777-7170, TTY 240/777-7180, FAX 240/777-7178

April 22, 2004

SUBJECT: Agreement between the Department of Environmental Protection and Department of Public Works and Transportation – Montgomery County Street Tree Program

I. **DEP Responsibilities:**

a. Set overall policy for Montgomery County's Street Tree Program including cycles, and priorities for both planting and maintenance (pruning, removals and stumps).

b. Budget and manage contracts for new plantings (except where part of a road project)

c. In coordination with DPWT, provide inspections for the Street Tree Program.

d. Serve as the point of contact for all replacement tree requests.

e. Approve all new and replacement plantings.

f. In coordination with DPWT and MNCPPC develop and maintain an approved street tree list for all new and replacement tree plantings including those associated with road construction and mitigation.

g. In coordination with DPWT manage planting site selections for targeted neighborhood street plantings to reach canopy goals.

h. Develop and maintain a comprehensive street tree inventory for joint agency use.

II. **DPWT Responsibilities:**

a. Manage operations of the street tree maintenance program including regular and hazardous trimming, tree and stump removals, and related emergency services.

b. Serve as point of contact for all tree maintenance requests.

c. Refer all requests for new or replacement tree plantings to DEP.

d. In coordination with DEP, provide inspections for the Street Tree Program.

e. Coordinate tree site and specie selections for all road projects involving tree plantings.

f. Oversee planting and inspection of new street tree plantings associated with road construction using DEP tree guidelines.

Albert Genetti, Director
Department of Public Works
and Transportation

James Caldwell, Director
Department of Environmental
Protection

Michael Hoyt, Deputy Director
Department of Public Works
and Transportation