Forestry Master Plan

City of Champaign

DEPARTMENT OF PUBLIC WORKS

Operations Division

AUGUST 2002

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1.0 INTRODUCTION

The residents of Champaign live in an urban forest. The trees that make up this forest provide shade, clean the air, reduce storm water runoff, provide wildlife habitat, increase property values, and provide a sense of well being, lending beauty and character to the community. Often taken for granted, these benefits will not continue without good planning and a strong, comprehensive urban forestry program.

2.0 PURPOSE

The Urban Forest Master Plan is designed to provide for a comprehensive plan to protect, develop, and maintain diversified and appropriate tree plantings on City right-of-ways. This master planning effort requires that the City establish standards for protecting, planting, pruning, and removing City-owned trees; develop systematic plans for meeting these standards; identify appropriate tree plantings based on factors such as location for planting, hardiness of species, etc.; and establish a means to achieve appropriate plantings.

3.0 BACKGROUND

3.1 Urban Forest Defined.

The Urban Forest is defined as all of the trees planted on City right-of-way, including City-owned parkways, City properties, and all City facilities.

3.2 Tree Population.

As of August 1, 2002, the current tree population is 18,429; however, the Urban Forest grows at a rate of at least one percent per year with the annexation of new subdivisions and other development in the City. The tree population by section is listed in Attachment A-1 and is accompanied by a City Section Index Map (Attachment A-2).

3.3 Tree Inventory Database.

The Forestry Section uses a computerized tree inventory that lists City trees by address, species, diameter, condition, and work history. This inventory was completed in 1994 and is continually updated as work is done on City trees. It is desirable that the inventory be maintained and ultimately included as a layer of the City's planned Geographic Information System (GIS) maps.

3.4 Species Composition.

Champaign's tree population is marked by some diversity in both composition and age. While Champaign's Urban Forest represents 149 species, the majority of the tree population is comprised of relatively few species. Only 18 species make up 86% of the population; some of those are unapproved species. Some species may not be approved for planting on City right-of-way because of lack of hardiness for this climate, susceptibility to storm damage, messy fruit, structural problems, insect and disease susceptibility, or other reasons. Currently, more than one-third of the City's Urban Forest is comprised of unapproved species. This number is expected to decrease as the City continues removals when warranted and plants other species. Further information is contained in Attachment B.

3.5 Age and Condition of Champaign's Urban Forest.

As indicated in Attachment C, 55% of the City's tree population would be considered young (less than one foot in diameter), just over 12% is considered to be mature (between two and three feet in diameter), or over mature (over three feet in diameter). Condition ratings are made on a 0-100% scale, based on criteria such as overall tree health, condition of tree structure, evidence of insect infestation, and similar measures. Trees rated at less than 70% are considered POOR; if rated between 70-79% are considered AVERAGE, and a rating above 80% is considered GOOD. Over two-thirds of the City's tree population falls into the GOOD category, with 26% AVERAGE, and only 5% are POOR. The condition ratings for the City's Urban Forest have improved as the City actively removes trees that are no longer thriving and plants approved species to replace trees that were removed. Appropriate pruning and other maintenance activities are critical to attaining GOOD condition ratings. Further information is in Attachment C.

4.0 MAINTENANCE

4.1 Forestry Section Maintenance.

The Forestry section provides proper care and maintenance of City trees by the following:

- Pruning City trees to improve tree health and allow the safe passage of pedestrians and vehicles, currently following a 7-year pruning cycle.
- Removing dead, declining, and undesirable trees from City right-of-ways.
- Planting trees on City right-of-ways per citizen request, as replacement for trees previously removed, or through the Share-the-Cost program.
- Identifying and treating diseased or insect-infested trees.
- Permitting tree maintenance and planting by individuals, developers, or contractors.
- Protecting trees from adjacent construction activities.
- Maintaining utility pruning and responding to citizen complaints.
- Conducting periodic public information workshops to inform citizens of tree-related care, needs and issues, and providing information on tree planting and the cost-share program.
- Providing public education through use of "University Avenue Tree Walk" brochure.

4.1.1 Tree Pruning.

Tree pruning is the most important of the maintenance activities. In 1991, pruning began on a section-by-section basis (the City was divided into sections with each comprising a one square mile area). This cycle was completed 7.25 years later in 1998. An average of 2,385 trees are pruned each year. Systematic pruning is the main focus of maintenance efforts, yet it is also necessary to respond to citizen requests for tree care outside of sections scheduled for maintenance. Citizen requests for tree care average 576 per year. Requests for service are typically completed within four to six weeks. Exceptions to this rule are requests within the currently scheduled cycle or adjacent sections. In these cases, citizens are informed of the ongoing maintenance in their area and are given a tentative date for completion of service. Numbers for pruning and service requests from 1991-2001 are listed in Attachment D. A line graph chart of service requests from 1993 to 2001 for all sections is given in Attachment E.

4.1.2 Removals.

The City averages 288 removals per year. Most removals are done in-house; however, an average of 104 removals are contracted out each year. City crews will typically remove smaller trees, while larger trees (excepting hazardous trees) are contracted out. Numbers of removals from 1991-2001 are listed in Attachment D.

4.1.3 Planting

City crews plant an average of 270 trees per year. The current goal is to meet or exceed the number of trees removed each year. Presently, the City achieves this goal because of trees that are planted as part of new development. However, it would be more desirable for the City to plant at least the same number of trees that are removed each year and have the benefit of growth from trees planted in new subdivisions. Plantings can occur by any of the following methods:

- Planting by the City using in-house staff;
- Planting through contract under Forestry Section administration;
- Planting by citizens, contractors, or others through a permit process.
- Additional growth in the Urban Forest is accomplished by developer plantings as part of subdivision development.

Participants in the Share-the-Cost program contribute $75 toward the tree cost, with the City picking up any remaining costs for the trees and all labor costs for planting. All subsequent replacement costs for these trees are borne by the City. Trees not originally planted by the City will be replaced at City costs if 1) the trees are greater than 8" in diameter, and 2) if the trees meet current spacing requirements.

5.0 TECHNICAL ISSUES

5.1 Species Composition.

How is a preferred species distribution achieved? Stability requires diversity, and it is recommended that an urban tree population consist of no more than 10% of the same species, 20% of the same genus, or 30% of the same family. The biggest problem is the high percentage of maples (over 35%). While it is still appropriate to plant maples in some sections, the high concentration of a single genus or species is unwise, as evidenced by the loss of American elm to Dutch elm disease. The Forestry Section is emphasizing other species, although homeowners and developers often work against the City's efforts by planting unapproved species, or too many of a specific species, such as maple. The permitting of all tree planting on City right-of-way and review by the Forestry Section as outlined in the Vegetation Ordinance and new subdivision regulations will mitigate these problems.

5.2 Age/Size Distribution.

The size distribution is encouraging in the fact that there is a good number of medium-age species, though a higher number of mature trees would be desirable. Because of past neglect, there is need to continue to remove many mature trees each year. The majority of these trees are poor species that should never have been planted. The abundance of young trees (55%) presents a good opportunity in the fact that with proper care, these trees can develop into sound mature trees with longer life expectancies than trees that never received regular maintenance.

5.3 Condition Class.

Condition class represents the relative health of City trees and is summarized in Attachment B. The condition class percentages are encouraging and reflect the result of ongoing maintenance. The number of trees in poor condition is small and should continue to drop as maintenance efforts continue.

5.4 Removals.

The current average of 288 removals per year is at an acceptable level. "Normal" removal levels, assuming a 60-year life span with even age distribution and a current tree population of 18,429 trees would be 307 trees per year. The average number of removals should drop as proper maintenance and proper species selection continues. In past years, an above average number of trees have been removed because of prior periods of neglect, poor tree selection, and poor planting techniques. The Forestry Section is currently able to respond to removals in a timely fashion. This is done through a combination of in-house (typically smaller or "urgent") removals and contracted removals. Last year, the section utilized $35,525 from the Capital Improvement Fund to remove 80 trees (an average cost of $444 per tree).

6.0 PREVIOUS ISSUES AND COUNCIL DIRECTION

6.1 Adequacy of the Urban Forest in Existing Neighborhoods.

Are the numbers of trees planted on the City right-of-way adequate? In general, most City streets have adequate tree cover from both a combination of private and public trees. Often, there are small gaps in neighborhoods, although many of these are a result of homeowner preference. To infill these spaces as requests arise is possible with existing funds.

There are some areas, however, with large gaps and whole streets totally devoid of tree plantings. The area bordered by First Street to Wright Street and Bradley Avenue to University Avenue has large gaps and is in need of approximately 200 trees. The Mattis Commercial Park and the commercial area south of Town Center Boulevard also have large gaps and are in need of approximately 100 trees. Planting 300 trees would cost approximately $60,000 in-house or $75,000 through contracted labor.

6.1.1 Tree Cost-Share Policy.

The City's Tree Cost-Share Policy covers who pays for Urban Forest plantings based on street classification and whether the planting is infill or new development. All tree replacement costs are 100% City expense, and the City determines whether and when the replacement planting will be accomplished. (The exception being trees less than 8" in diameter not originally planted by the City.) For all new development, planting is mandatory, and 100% developer paid for all street classifications, including arterials. Infill plantings on local and collector streets are shared 50/50 with private property owners as described in the Share-the-Cost program previously in this report. All arterial street plantings are funded fully by the City, at City option. Under the Cost-Share Policy, the City bears all costs for replacement and maintenance of the Urban Forest.

6.1.2 Precedent for City-Funded Large-Scale Plantings.

Based on the Neighborhood Wellness Plan, the City has historically funded 100% of the cost of large-scale tree plantings in Preservation and Restoration neighborhoods as defined in the Neighborhood Wellness Plan. The most recent example of this planting level occurred in 1999 on State and Randolph streets in the Sesquicentennial neighborhood, and was funded through the Forestry budget. If this practice continues, the City could pay for large-scale plantings in the MLK Subdivision/Douglass Park area, and along Mattis Avenue adjacent to Mattis Commercial Park. However, Town Center Boulevard and the interior of Mattis Commercial Park would have to be planted at developer expense, or by adjacent property owners through the Cost-Share Program.

6.1.3 Evaluation.

The issue of how to pay for street tree planting was presented to City Council in August 2000. Retaining the current cost-share policy can provide a means to encourage neighborhoods to do some infill plantings that can be accomplished with existing resources. Sharing the cost of tree planting gives the property owner a sense of "ownership" that is likely to result in follow-up care (e.g. watering) that is important for survival in the first few

years following planting. The drawback is that some citizens will not pay to plant trees, resulting in gaps in the parkway.

6.1.4 Council Direction.

City Council polled to retain the current cost-share program. Cost-share planting remains an important part of planting each year, and there is sufficient flexibility in the current policy to allow staff to fund full planting costs when needed in infill or existing neighborhoods. Plantings are done at the request of neighborhoods and usually results in better cooperation of neighborhood residents to help maintain and water new trees as they are getting established.

6.2 Contracting Verses In-House Costs

6.2.1 Primary Activities.

The maintenance tasks that form the core of the Forestry Section activities are tree pruning, removals, and planting. The following lists comparisons between in-house costs (including salary and benefits, vehicle amortization, maintenance and fuel costs) and contractual costs.

Maintenance Activity	Maintenance Activity Cost Per Tree	
	In-House	Contractual
Pruning	$ 70	$105
Planting	200	250
Small Tree Removal (15" diameter)	160	300
Large Tree Removal (27" diameter)	750	750
Winter Large Volume/ Large Tree Removal	750	450

6.2.2 Cost Comparison.

For most categories, the cost in-house is cheaper than contracted costs. The exception is large volume/large tree removals in the winter season. Because of lower demand, efficiencies of scale and equipment suited to the job, these removals are cheaper when contracted.

6.2.3 Additional Activities.

If contracted tree costs were applied to all pruning, removals, and planting that the Forestry Section does, 95 to 100% of the current budget would be used to pay for these activities. If contracted costs were applied to any additional work such as storm cleanup, inlet cleaning, landscape maintenance, and snow and ice removal, these costs would be above current budget levels for the Forestry Section.

6.2.4 Evaluation.

Council evaluated alternatives for performing tree maintenance work in August 2000. Alternatives considered included contracting out all pruning, planting, and removals of City

trees; performing all these services in-house; or using a combination of in-house and contract forces to provide these services.

6.2.5 Council Direction.

City Council concurred in Staff's recommendation of using a combination of in-house and contracted resources. This is a continuation of the current practice that appears to provide the greatest flexibility and cost savings. The City's Forestry Crew is comprised of certified arborists and is typically responsible for maintenance activities such as pruning, planting, and removals, while some removals are contracted out.

6.3 Pruning Cycle.

6.3.1 Background.

Along with proper tree selection and planting, this maintenance activity is vitally important in maintaining a healthy, long-lived tree population. If trees are not pruned regularly, major problems will result. A branch in the right place is a growing asset, but if in the wrong place, it is an ever-increasing hazard. Tree pruning keeps trees healthy by lessening structural problems that often lead to failure. Regular pruning will extend the life of trees, thereby saving money through reducing removal and replacement costs. Pruning is also important in reducing conflicts between pedestrian and vehicular traffic. For trees along the street, it is important to allow for good visibility and clearance to promote a safe flow of traffic.

6.3.2 Industry Standards.

Industry standards recommend that trees (with the exception of very young trees) should be pruned every 5 years. Pruning on a longer rotation results in decreased tree valuation and condition as well as increased problems with traffic clearance and visibility. The City's current pruning cycle is at 7 years, with an average of 2,532 trees pruned yearly. (This number represents whole tree pruning through section pruning or service requests and does not reflect storm damage pruning or training pruning. Training pruning is performed on young trees every 3 years.) Given the current tree level, the yearly average would have to increase by 1,153 per year, or 45% above the current workload, to reach a 5-year cycle.

6.3.3 Evaluation.

The options of maintaining the current pruning cycle or increasing the pruning cycle was presented to Council. The current pruning cycle cannot be maintained without additional resources (the cycle will move incrementally over time) due to the annexation of new areas to the City and many landscape improvements that have accompanied major improvements without adequate maintenance funds. To increase the pruning cycle to meet industry standards would require an immediate addition of personnel or contracted labor.

6.3.4 Council Direction.

Staff did not request a change in current funding or staffing, but will continue to review the program effectiveness annually with the City Manager as part of the annual budget preparation.

6.4 Effect of Growth on the Urban Forest

6.4.1 Background.

New development poses problems in many ways. Increased planting levels brought on by development will put a greater strain on the current maintenance cycle, which is already below industry standards. New developments, simply because of their distance from the Public Works building, require greater travel time. Growing conditions in new subdivisions are poor with soils typically compacted and poorly drained. Plantings require more attention and mortality rates are higher in these developments. Developers who plant in these new neighborhoods create problems if they plant before construction. The end result is trees poorly placed in relation to sidewalks and driveways and damage to trees and the growing site during development. Planting trees on City right-of-ways requires a permit, and the Forestry Section is currently working with developers to install trees after construction. Prior to planting, developers must submit plans to identify location, species and size of trees to be planted. The Forestry Supervisor reviews and approves all plans prior to plantings to ensure that appropriate species and conditions are established.

6.4.2 Pilot Program for New Developments.

The Forestry Section recently attempted to address subdivision planting through the Share-the-Cost tree-planting program. City staff met with the development community at the City's Developer's Forum and proposed using the Share-the-Cost program in order to have better control over the quality and types of trees planted in new subdivisions. However, because the budget for the Share-the-Cost program was so limited, the City was unable to satisfy the demand for all subdivisions. The additional plantings also put pressure on the Forestry Section allowing for less time to deal with other section activities.

6.4.3 Subdivision Regulations.

A "Manual of Practice" was recently published as part of the update of the Subdivision Regulations. The manual requires developers to plant at a minimum of one tree per lot and one every 60 feet of lot frontage. Developers may plant through a permit or the City will contract this planting at full cost to the developer. This oversight will enhance the quality and location of plantings in these new developments.

6.4.4 Evaluation.

The alternatives of allowing developers to participate in the Share-the-Cost tree planting program or requiring the developers to bear the full cost for planting with Forestry Section oversight was discussed.

6.4.5 Council Direction.

The Council supported Staff's recommendation that requires developers to bear the full cost of planting trees in new developments. This was reflected in the conditions required in the "Manual of Practice" (Attachment F).

6.5 Forestry Section Enforcement and Authority.

6.5.1 Background.

The authority for the work done by the Forestry Section is supported by an ordinance regulating trees and vegetation on public property. This ordinance states that all trees within the public right-of-way are property of the City. The authority of the Forestry Section to maintain these trees is established and adjacent property owners are forbidden to maintain these trees except to prevent imminent injury or damage to persons or property. Tree maintenance by homeowners or tree services is allowed through a permit system. This ordinance is supported by amendments that set standards for proper planting and pruning.

6.5.2 Proposed Ordinance Changes.

Changes to the Vegetation Ordinance were proposed in the August 2000 Study Session. These changes would tighten standards for protection of City trees. The amount of new construction in areas where there are established mature trees (particularly in the Campus area) poses problems for these trees. Vegetation Ordinance changes would require fencing of sensitive areas prior to construction and would restrict the areas where equipment and vehicles would be stored or driven. In addition, the ability to issue punitive fines was proposed.

6.5.3 Evaluation.

The alternatives presented to Council were to change the current Vegetation Ordinance or leave the Vegetation Ordinance unchanged. Staff noted that changing the Ordinance would add to construction costs, but the City would benefit by protecting City trees and benefit from cost savings associated with repair and loss of trees.

6.5.4 Council Direction.

City Council supported the proposal to change the Vegetation Ordinance to increase authority to enforce standards relative to tree protection. This Vegetation Ordinance change was approved in August 2001.

APPENDICES

A. Abbreviated Site Summary and City Section Index Map

B. Species Diversity Percentages

C. Age and Condition Chart

D. Forestry Section Maintenance Breakdown

E. Service Request Summary

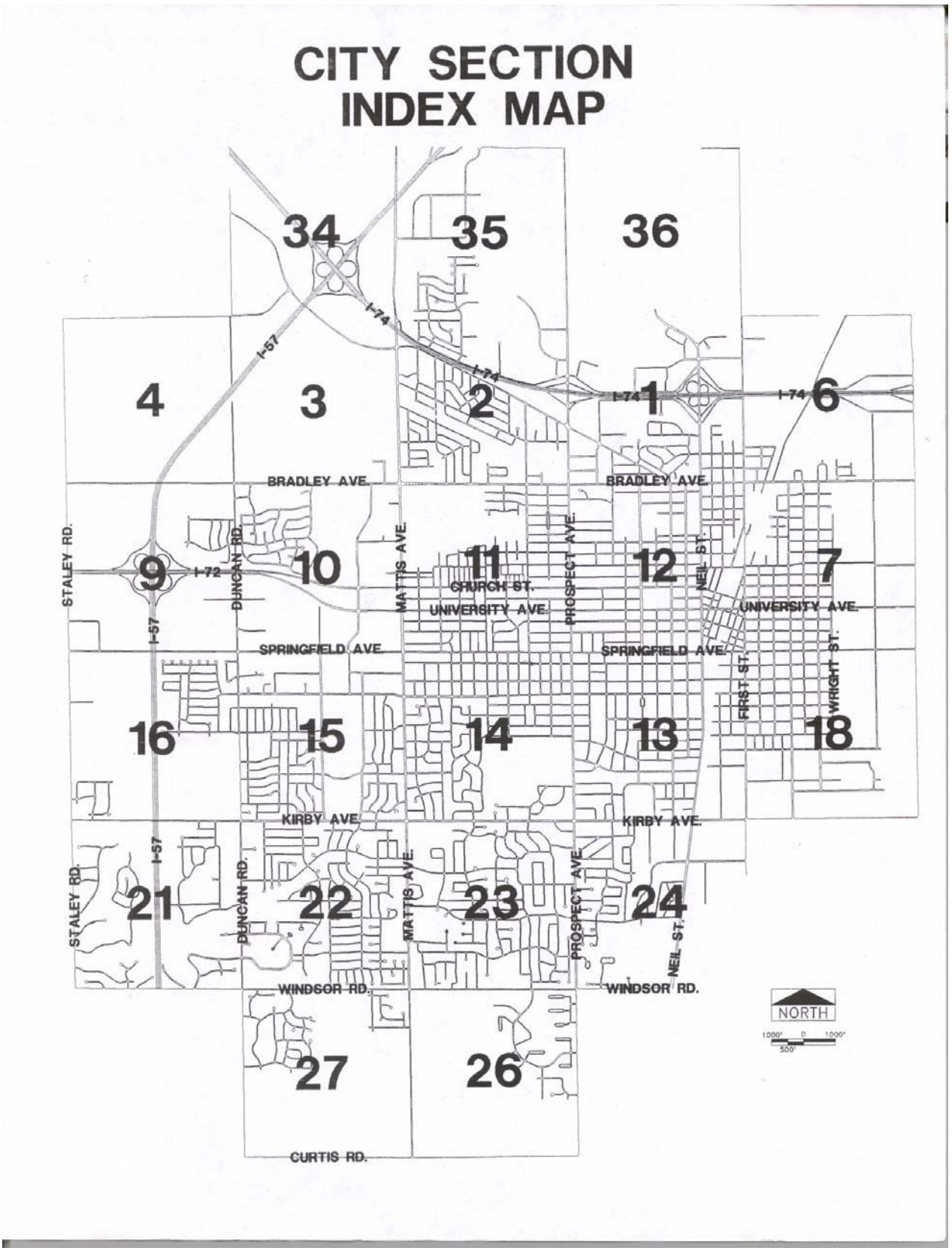
F. Manual of Practice: Right-of-Way Tree Standards

Attachment A-1

ABBREVIATED SITE SUMMARY

AREA	TREES	PERCENT
1	416	2.2573
2	1,024	5.5565
4	218	1.1829
6	82	.445
7	904	4.9053
9	246	1.3349
10	441	2.393
11	1,959	10.63
12	2,045	11.0966
13	1,862	10.1036
14	1,673	9.0781
15	758	4.1131
16	562	3.0495
18	611	3.3154
22	2,171	11.7803
23	1,594	8.6494
24	599	3.2503
25	1	.0054
26	425	2.3061
27	277	1.5031
28	320	1.7364
35	241	1.3077
Record Count: 22	**Totals: 18,429**	

Attachment A-2



Attachment B

1	Red Maple	11.3%
2	Sugar Maple	9.9%
3	***Silver Maple***	9.9%
4	Red Oak	7.1%
5	***Green Ash***	5.4%
6	Linden	5.3%
7	White Ash	4.5%
8	***Norway Maple***	4.4%
9	***Honeylocust***	4.2%
10	Swamp White Oak	3.9%
11	***Sweetgum***	3.9%
12	Crabapple	3.3%
13	***Sycamore***	3.1%
14	***Pin Oak***	2.4%
15	Tuliptree	2.1%
16	***Pear***	2.1%
17	Bur Oak	1.5%
18	Hackberry	1.4%
	Total:	**85.7%**

Unapproved Species 35.4%

Attachment C

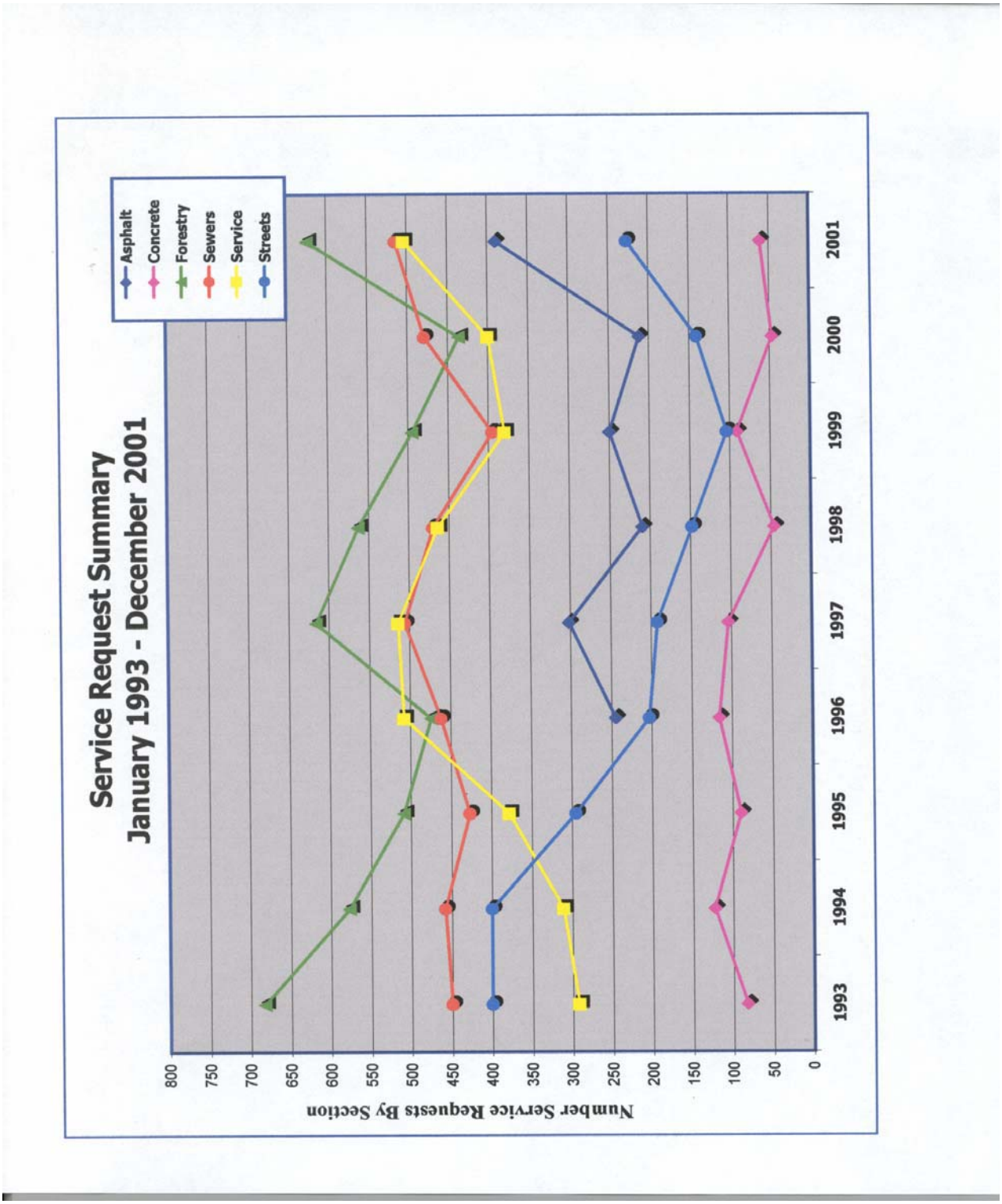
Age	Percentage
Young (1-12" diameter)	54.5
Medium (13-24" diameter)	33.3
Mature (25-36" diameter)	11.3
Over Mature (37" diameter)	.9
Condition class is rated on a 0-100% scale. Condition classes are as follows:	
Poor (0-69%)	4.8
Average (70-79%	25.8
Good (80-100%)	69.4

Attachment D

FORESTRY SECTION MAINTENANCE

Year	Pruning	No. of Removals	No. of Trees Planted	No. of Service Requests Completed
1991	3,372	232	300	600
1992	2,928	336	172	759
1993	2,124	422	177	683
1994	2,193	365	367	577
1995	2,200	239	269	509
1996	2,103	235	250	474
1997	3,048	257	256	616
1998	2,449	278	288	563
1999	2,582	296	363	495
2000	2,471	290	288	436
2001	2,385	232	250	624
Average:	**2,532**	**288 (184 in-house) (104 contracted)**	**270**	**576**

Exhibit E


Service Request Summary
January 1993 - December 2001
Asphalt
Concrete
Forestry
Sewers
Service
Streets
Number Service Requests By Section
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
1993
1994
1995
1996
1997
1998
1999
2000
2001