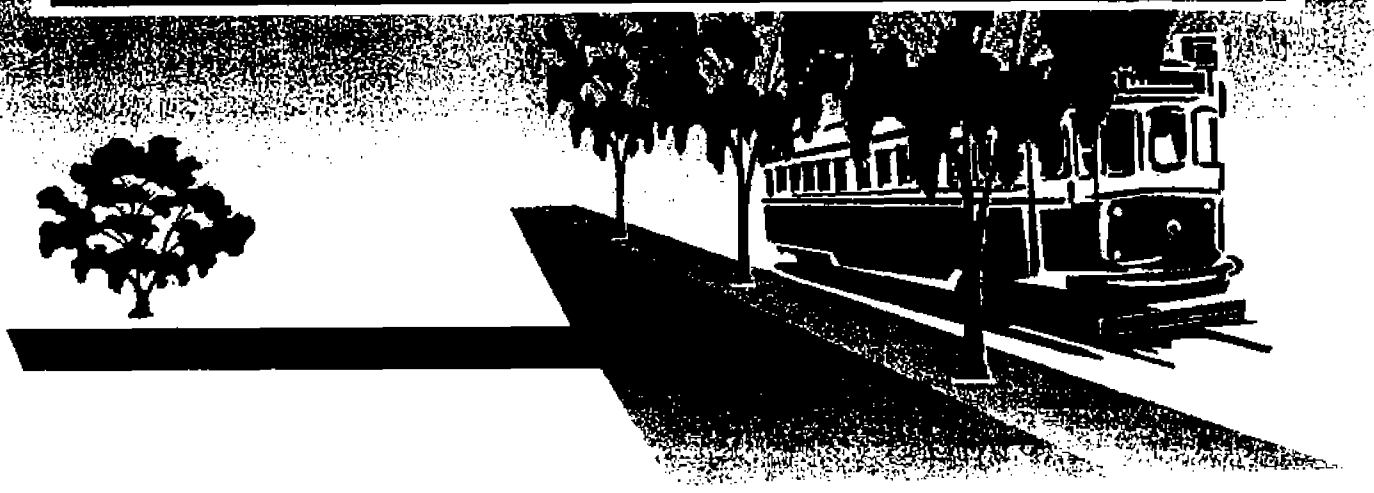
TREE INVENTORY AND TREE CARE NEEDS ASSESSMENT FOR CLARK PARK



Eric Goldstein
University City District
3940-42 Chestnut Street
Phila., PA 19104-3111

Prepared by:

A. William Graham Jr., ASCA
ISA Certified Arborist
Consultant & Educator

Morris Arboretum of the University of Pennsylvania

The official arboretum of the Commonwealth of Pennsylvania

9414 Meadowbrook Avenue (215) 247-5777 x 144
Philadelphia, Pennsylvania 19118 (215) 248-4439 - Fax

September 11, 2001

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INTRODUCTION

BACKGROUND

Clark Park is located in West Philadelphia and serves a residential neighborhood as playground/recreation and greenspace. Although the park is operated under the jurisdiction of the City of Philadelphia's Park and Recreation Department, it receives supplementary services from the University City District and the Friends of Clark Park. Recently, a Master Plan was completed that recommends park improvements that may directly impact trees and other vegetation within Clark Park. As a consequence, the University City District has asked the Arboricultural Consulting Team at the Morris Arboretum of the University of Pennsylvania to provide an independent and unbiased condition assessment for the park trees and to report our findings. This tree inventory and assessment will provide direction for both the park planners and the Clark Park community.

ASSIGNMENT

The purpose of this report is to document existing conditions and provide information supporting master planning and fund raising. This narrative report explains and records methodologies, techniques, data analysis, findings and recommendations. The narrative discusses findings and recommends effective tree care program strategies. The report's appendices include the tree inventory spreadsheets, suggested tree planting list, and other supporting information.

The scope of services for the Clark Park project are detailed in a proposal from the Morris Arboretum of the University of Pennsylvania titled "Clark Park: A Proposal for Tree Inventory and Assessment", dated June 07, 2001. The scope of services in proposal includes:

- a field inventory and assessment of trees and shrubs;
- meetings with representatives of Center City District;
- integration of the inventory and assessment information into an existing AutoCAD base map;
- recommend tree species for future plantings;
- estimate tree pruning and removal costs for the assessed trees. (This task was added and approved by Eric Goldstein as per a phone conversation with Jason Lubar on August 14, 2001.); and,
- a report outlining the findings and recommendations.

METHODOLOGY AND TECHNIQUES

Field Survey

All trees and large shrubs in Clark Park were inventories and assessed by A. William Graham, Jr., Arboricultural Consultant, and an assistant on July 12th, 24th, and 26th of 2001. The following describes the recorded information and methodology employed in the study.

Keying Inventory Information to the Tree Location: A unique inventory number was assigned for each inventoried and assessed tree. This information provides the connection between the recorded tree information and its physical location within Clark Park. The numbers were assigned in the order that trees were inventoried. The inventory numbers and tree locations were recorded in the field on a basemap dated February 28, 2001, Drawing No. 010222, titled "Topographic Plan of Clark Park for University City District City of Philadelphia", by Robert Petralia, Land Surveyor.

Data Gathering: The field data from both tree inventory and assessment was entered directly into a Microsoft Excel spreadsheet on a Sharp Model HC-4100 Mobilon Handheld PC. This facilitated sorting and manipulation of the inventory information.

ASSESSMENT CRITERIA

The recorded information falls in several major categories: 1) identification, 2) size, 3) maintenance and condition, 4) risk assessment, and 5) landscape usefulness. Spreadsheet headings are in parenthesis.

1. IDENTIFICATION INFORMATION

The identification information includes the inventory number (Inv #), tree location (Loc), the tree's common and scientific name, and if the tree is a memorial (Memorial). The Morris Consultants assigned location notations for individual areas bounded by walkways or other paving. In some cases, a small "orphan" section is included as part of a larger section. The ***Memorial*** heading lists the memorialized person's name.

2. SIZE INFORMATION

Size information includes tree trunk circumference (CBH) for up to five leaders, tree height (Tree Ht), and tree canopy spread (Tree Sprd).

3. MAINTENANCE AND CONDITION

Under the "Maintenance Action" part of the inventory form is both recommended maintenance and existing conditions. Life expectancy (Life Exp) for the tree is estimated in a range of years (0, <5, 5 to 15, and >15). Maintenance Score (Mt Sc) describes existing problematic conditions. Cabling information records the number of cable (C) *installations* recommended.

Pests including insects, diseases, and mites are noted when found and recognized by the arborist assessor. Further inspection and evaluation is necessary before deciding whether control is necessary. The *Comments* section of the inventory form contains comments related to other parts of the assessment and unusual conditions or notes.

4. RISK ASSESSMENT

Pruning and tree removals are major tree maintenance activities that relate to management of risks. General Pruning (G Pr) records *priority* and *amount* of pruning recommended, while Specific Pruning (Sp Pr) recommendations specific actions to be taken. Removals (Re) are categorized into *priorities a, b, c, Requires a Hazard Inspection (hi), and Consider Removal (cr).* The amount of pruning is expressed as a 1, 2, or 3 with 1 indicating the most.

5. LANDSCAPE USEFULNESS

Form (Fm) is used to describe general aesthetic functions of trees. *Blanks* indicate a generally useful tree, *Excellent* (e) indicates exceptional trees, while *Fair* (f) and *Poor* (p) indicate diminishing quality.

FINDINGS - TREE INVENTORY AND ASSESSMENT ANALYSIS

The field information recorded in the Excel Spreadsheet records inventory information, existing conditions, and recommendations for each individual tree. The spreadsheet records inventory information and condition, and makes recommendations about each individual tree. The spreadsheets are appended to this report.

Whereas the individual inventory and assessment information is necessary and useful, it does not look at overall trends and tree population observations. The spreadsheet information was analyzed by sorting and counting to look for these trends and are summarized below.

Item	*Number or measurement*	*% of total*
Number of Inventory Items	335	100.0 %
# of Trees	*306*	*91.3 %*
# of Shrubs	*23*	*7.0 %*
# stumps	*6*	*1.7 %*
The following figures are based on the 306 inventoried and assessed trees		
LARGEST, HIGHEST, GREATEST TREES		
Largest Tree Circumference (CBH)	12' (inv # 237)	
Greatest Tree Canopy Spread	96' (inv # 280)	
Tallest Tree	110' (inv # 299)	
CABLING		
Trees recommended for cabling (C)	3	1.0 %
REMOVALS		
Total Trees recommended for removal (Re)	17	5.6 %
High priority (a)	*10*	*3.3 %*
Intermediate priority (b)	*1*	*0.1 %*
Low Priority (c)	*6*	*2.0 %*
Trees to considered for removal (cr in Re column)	7	2.3 %
PRUNING		
Total Trees with Pruning needs (Pr G)	144	47.0 %
High priority (a1,2,3)	*52*	*17.0 %*
Intermediate priority (b1,2,3)	*50*	*16.3 %*
Low Priority (c1,2,3)	*42*	*13.7 %*

LIFE EXPECTANCY		
0 years	17	5.6 %
< 5 years	11	3.6 %
5 – 15 years	29	9.5 %
15 years	232	75.8 %
Further evaluation required (hi in Re Column)	17	5.6 %
SPECIES FACTS		
Number of tree families inventoried	17	
Number of tree genera inventoried	29	
Number of tree species inventoried	41	

Plant Classification Terminology

Plants are classified in units; the higher units are more general, the lower units being more specific. The units used in this report are: Family - Genus - Species – Taxa.

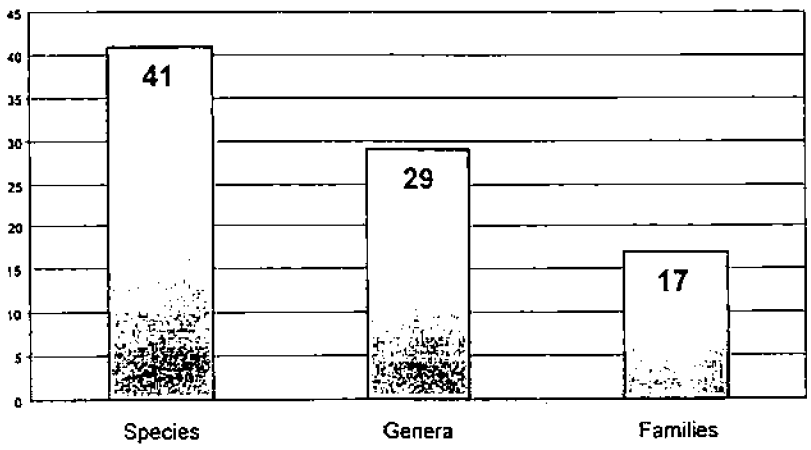
To explain the relationship of these units, a columnar English Oak, *Quercus robur 'Fastigiata'* will be used as an exemplar.

More general ↓ More specific

Family: Fagaceae (includes Oaks and Beeches) related groups of plants
Genus: Quercus (Oak) group of plants
Species: Quercus robur (English Oak) specific plant
Taxa: Quercus robur 'Fastigiata": very specific plant

Species Composition and Distribution

The 306 inventoried and assessed trees represent 41 different species of 29 genera in 17 families.



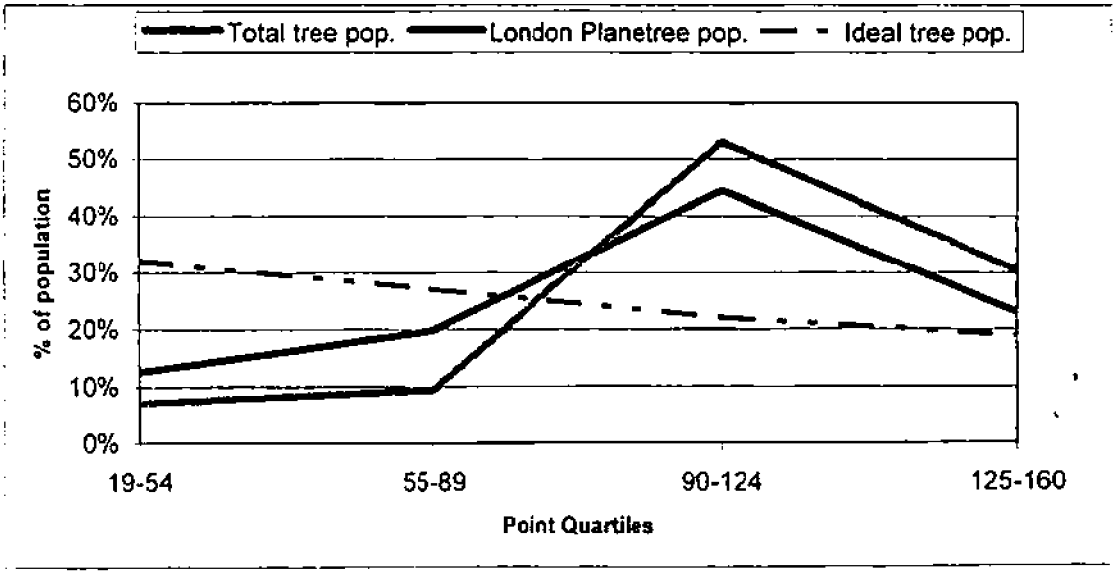
Graph 1: Number of tree species, genera, and families at Clark Park

The Morris Consultants use a 10-20-30 plant composition rule as a general guideline for plant diversity in parks or other landscapes. This rule is often recommended in the management of large landscapes or city tree populations because of lessons learned from the Dutch Elm Disease epidemic. The rule's premise is that a tree population should NOT consist of more than 10 percent of any one species, 20 percent of any one genus, or 30 percent of any one family. Using the tree population at Clark Park, the plant composition rule would prescribe that no more than about 30 trees be of the same species, 61 trees be of the same genera, or 92 trees be of the same family.

London Plane trees represent nearly 168 trees representing 55 percent of the trees in Clark Park. This points to a need to reduce the London Plane population in the future and increase the diversity of other kinds of trees. This should be undertaken by an attrition process; when trees die or do not fulfill their landscape function, they should be replaced. With this exception, other plant species populations are in an acceptable range. A suggested plant palette for Clark Park is included in the appendix.

Size Distribution

For comparison purposes, foresters and others use a point system to express the multi-dimensional nature of trees. One point is awarded for each inch of trunk circumference, each foot in height, and each four feet of branch spread. This method was use to compare trees sizes in Clark Park. Note that size is loosely correlated with tree age. For purposes of this following chart and analysis, we removed the small growing tree species such as hawthorn, dogwood, and hardy rubber trees. The following chart illustrates the size of trees in Clark Park by dividing the point spread into quarters or quartiles. One line indicates the size of all the trees in the park and the other line indicates the size of just the London Planetrees.



Graph 2: Point distribution by quartile

As can be seen from Graph 2, trees in Clark Park are decidedly shifted towards the older larger tree population. Because of the Clark Park's aging tree population, continual emphasis should be placed on planting new trees to create a mixed-age landscape. Attainment of a mixed age tree population provides the most stable and sustainable landscapes.

Tree Removals

Although it is not the management objective to unnecessarily remove trees, it is often necessary to protect public safety. In addition, removals provide opportunities for replacement plantings. Planting new trees, especially as replacements should be an on-going landscape maintenance policy.

Although it is not the management objective to unnecessarily remove trees, it is often necessary to protect public safety.

Of the 306 trees that were inventoried and assessed, 17 trees or about 5.5% are recommended for removal for various reasons. This total is composed of 8 high-priority, 2 medium-priority, and 7 low-priority removals. All removals have a "0" life expectancy. Six (6) trees of these seventeen (17) trees are dead or in serious decline; seven (7) are in poor health and will continue to decline causing potentially hazardous conditions in the near future. Another two (2) are considered hazardous because of defects such as cavities and cracks, and two (2) are potentially hazardous because their structural roots were cut. In addition, seven (7) trees should be considered for removal. These trees are in poor condition, or may not fulfill their landscape role. Seventeen (17) trees should have further inspection and evaluation to determine the future course of action. The trees marked for removal are scattered throughout the park.

Inv #	Common Name	Loc	Life Exp	Re	Comments
251	London Planetree	X	0	a	1/2 of tr circ dead
255	Paper Mulberry	X	0	c	cluster of volunteer trees
256	Paper Mulberry	X	0	c	cluster of volunteer trees
258	Paper Mulberry	X	0	c	cluster of volunteer trees
257	Paper Mulberry	X	0	c	cluster of volunteer trees
254	Crabapple or Apple	X	0	c	crowded
234	London Planetree	X	0	a	dead
239	London Planetree	X	0	a	dead
190	London Planetree	S	0	a	dead
68	Stewardia	g	0	c	dead
216	Norway Maple	W	0	a	dead top, declining
324	Red Elm	JJ	0	b	growing through & against fence
176	London Planetree	S	0	a	significant structural roots cut for sidewalk
175	Red Oak	S	0	a	significant structural roots cut for sidewalk
162	Sweetgum	R	0	a	split crotch, haz
150	London Planetree	R	0	a	vertical cr & cavity, haz
88	Catalpa	i	0	a	

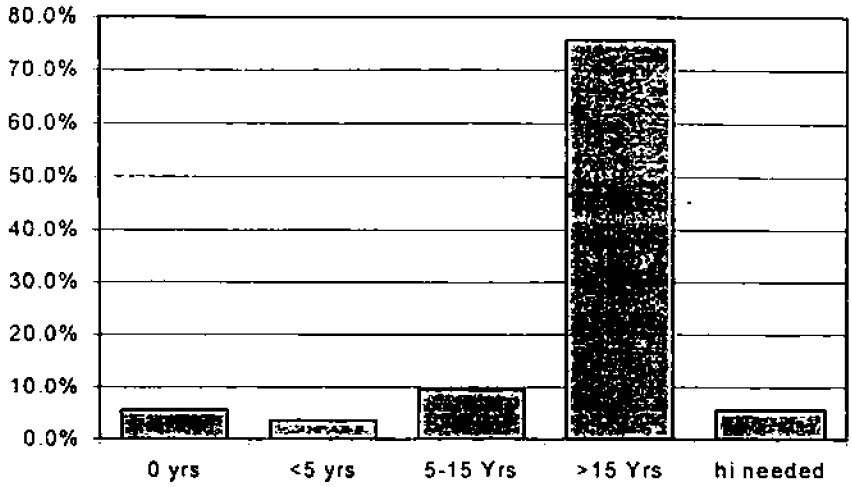
Table 1: Inventory of trees with zero life expectancy

Tree Pruning

About 47% of the total trees surveyed have some pruning requirements. This 47% is composed of about 36% high-priority, 35% intermediate-priority, and 29% low-priority pruning needs. The specific recommendations of each tree can be found under the Specific Pruning column of the Tree Inventory and Assessment spreadsheet. Individual observations are included in the Appendices.

Tree Life Expectancy

Tree life expectancy is an estimation of how long the individual tree will survive given its specific set of circumstances and "normal" environmental conditions. Tree health, damage, location, and many other factors influence the life expectancy classification. There are four categories of life expectancy: less than five years; five to fifteen years; greater than fifteen years; and dead or nearly so. Within Clark Park, 5.6% (17) trees surveyed are dead or nearly so, 3.6% (11) trees are in the less than 5 years category, 9.5% (29) trees are in the five to fifteen year category, and over 75% (232) are in the greater than 15 year life expectancy category. Over 85% of the trees (261) have a 5-year or greater life expectancy. There are six stumps that were inventoried that were not included with the above numbers and percentages.



Graph 3: Life expectancy of Clark Park trees

Tree life expectancy serves as a guide to gage the long-term tree management in Clark Park. Long-term management should anticipate removal and replacement of trees. The distribution of tree life expectancy ratings are evenly distributed throughout the Park with the exception of street trees. The street trees have, on average, a lower average life expectancy.

Life Expectancy	*street trees (64)*	*%*	*non-street trees (242)*	*%*
0 years	5	8%	12	5%
<5 yrs.	5	8%	6	2%
5-15 yrs.	11	17%	18	7%
>15 yrs.	33	52%	199	82%

Table 2: Life expectancy for street trees vs. non-street trees
(% do not add up to 100 because trees needing further inspections are excluded)

Cabling

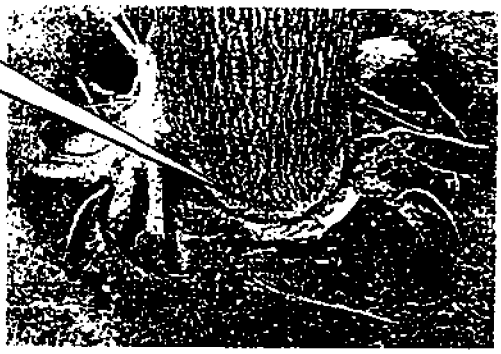
According to the *American National Standards Institute's ANSI A300 (Part 3) – 2000 for Tree Care Operations – Tree, Shrub, and Other Woody Plant Maintenance – Standard practices (Support Systems a. Cabling, Bracing and Guying),* Cabling is

> *"...the installation of a steel wire rope, steel strand, or synthetic fiber system within a tree between limbs or leaders to limit movement and provide supplemental support."*

At Clark Park, cables should be used to protect landscape trees from damage and to reduce visitor risk from trees. Three trees are identified that would benefit from one or more cables.

Cabling should only be designed and installed by an experienced arborist using the ANSI A300 standards.

Girdling Roots



By definition, a tree is girdled when something is wrapped tightly around the trunk, restricting the flow of water and nutrients. Often roots from the same or neighboring trees become girdling by wrapping around a tree root or trunk. Girdling roots often result from poor nursery production practices. Therefore, careful nursery selection is necessary to avoid future girdling root problems. Timely amputation of the restricting root may be useful, if the offending root has not grown too large. At Clark Park, 3 trees have girdling roots and would benefit from having the girdling roots cut and removed. Since the offending roots are usually hidden below ground, there may be additional undetected girding roots on other trees in Clark Park.

BUDGET ESTIMATES

Developing realistic maintenance budgets for tree maintenance and replacement is essential for managing mature landscapes. However, obtaining price estimates can sometimes be problematic, especially when funds must be raised before contracting the work. Tree care contractors are often reluctant to invest large amounts of time to price work that may not be funded.

Pricing or estimating tree maintenance and tree removals involves many variables such as arborist crew's skills and production rates, and tree size, condition, position, and circumstance. The only true price is that provided by a qualified contractor who is willing to perform the work. Their estimates are based on pricing each tree separately.

For purposes of the Clark Park estimates, the Morris Consulting Team used two estimating models, one developed on another Morris Arboretum project and the other based on a time study in Toledo, Ohio. These estimating tools predict the labor time requirements. The regional labor costs can be then applied to estimate the maintenance costs.

The Toledo Study found that time requirements varied during the extremes of the seasons. Therefore, the cost estimates in this report are expressed as a range using the seasonal variations. For the purposes of this report, a crew consisting of a crewleader, climber, and maintenance worker are assumed for tree pruning and removal. A two-person crew is assumed for stump grinding. For hazard inspections, a consultant and assistant are assumed. The low cost for a three-man crew is $920/day and the high cost is $1200/day. This cost is based on the prevailing

wage rate plus the company's overhead. The differences between low and high costs is due to the different overhead multipliers and labor costs of different companies.

METHODOLOGY – PRUNING:

Developing an Estimating Tool: For the Clark Park project, the Morris Arboretum consulting team employed an estimating technique we developed to predict ballpark pruning costs for other client projects. The tree size and pruning amount gathered during the tree assessment are used to *estimate* time requirements and costs. Our estimates closely agree with published time study techniques for tree care in Toledo, Ohio (Tree Maintenance Performance Standards, *Journal of Arboriculture* 18(6): Nov 1992, O'Brien et al). This study was based on a database of 6272 municipal work records collected over a 31-month period. The Toledo time study used one-dimensional (tree diameter) figures for estimating.

Developing a Size Model for Estimating Pruning Costs: Our estimating methodology also considers the tree size as the major factor to determine the time required for pruning or removing a tree and grinding its stump. Trunk circumference, height, or canopy spread are all one-dimensional measurements or expressions of tree size. For estimating purposes, one-dimensional measurements may be unsatisfactory. The Morris consultants use a multi-dimensional point system used by foresters to compare and determine the champion size trees. One point is awarded for each inch of trunk circumference, each foot in height, and each four-foot of branch spread. The total points were calculated for each tree in the inventory spreadsheet. A single stem circumference for multiple-stemmed trees was calculated by adding together the cross sectional areas of each stem and then mathematically converting it into an equivalent circumference.

Size Ranges Established: The Morris Consultants methodology established four size ranges based on points. This allowed the number of trees within each of the point size ranges to be determined and counted for the "A" and "B" pruning priorities and amounts.

Determining a "Bread Basket" Value of Pruning Services: Each tree has varying pruning requirements that influence the time required for a skilled tree climber using a rope and saddle. A "bread basket" approach is borrowed from methods used to determine the cost of living. In the cost of living model, a sample or "bread basket" having similar or identical items is priced periodically. The items in the "tree bread basket" are species, size, and pruning amount. The time requirements were separately determined for each of these variables.

Estimated Pruning Costs: Once the sample tree "bread basket" time requirements were determined, an estimate for pruning the whole tree population could be calculated by multiplying the average time requirement and the tree number per "bread basket" category. Set-up and clean-up times were considered by use of an addition multiplier. Costs estimates were determined using a $60/hour/climber national average.

PRUNING COSTS: Using the data from the Toledo Study (Tree Maintenance Performance Standards), the cost for pruning the fifty-two, "A" priority trees is estimated to be between $5763 - $7518; the fifty, "B" priority trees is between $5384 and $7022; and, the forty-two, "c" priority trees is between $4269 and $5568. Therefore, the total cost for pruning will cost **approximately $3600.**

METHODOLOGY – CABLING:

Determining Estimated Cabling Costs: Cabling costs were estimated with consideration of size of tree and required number of cables. This estimate recognizes preparation time regardless independent of the number of installed cables. Cable anchor hardware costs are fixed since two hardware sets are used on every cable installation. Cable length is variable, but the cable cost per foot is negligible. For estimating purposes, we used assumed a fixed "average" cable length.

CABLING COSTS: Three trees were identified that would benefit from receiving 6 cables. The cost estimate for cabling will cost **approximately $3600.**

METHODOLOGY – DETAILED STRUCTURAL EVALUATION:

During the inventory and assessment phase, seventeen trees were discovered that require further inspection to determine their structural soundness. Visual signs or symptoms of structural problems were noted on these trees. Symptoms include cavities, wounds, cracks, fungus fruiting structures (such as mushrooms), and other abnormalities. Time required to inspect and measure these defects is highly variable many defects occur at various heights above the ground necessitating access by rope and saddle climbing. Some measurements may require the use of instruments such as the Resistograph that measures and graphs the resistance of a $1/8^{th}$-inch diameter brad point bit as it drills into the wood. This instrument allows precise measurements of cavities by graphing the sudden drop in resistance as it enters decayed wood or trunk hollows.

HAZARD INSPECTION COSTS: Because of this variability, an actual price quote must be based on a separate price estimate for each tree on the hazard inspection list. The Morris Arboretum's Arboricultural Consulting Team would be happy to quote a firm price for this additional work that was not included in the initial scope of work. ***For estimating purposes only***, we estimate these hazard inspections will cost **approximately $3600.**

METHODOLOGY – TREE AND STUMP REMOVAL:

Estimating Removal and Stump Grinding Costs: Tree removal costs are based on the published data in Tree Maintenance Performance Standards, *Journal of Arboriculture* 18(6): Nov 1992, O'Brien et al. The price includes the cost for stump grinding. The tree removal estimation formula considers size, tree condition, site access, overhead wires, and work season. It assumes that all stumps are chainsaw cut at ground level. **Note:** *The list of tree removals do NOT include those marked as "consider removal" (cr) or "need further inspection". Decisions about trees in these categories will increase in the final cost estimates.*

REMOVAL COSTS: Using the estimating formulas, the cost to remove seventeen (17) trees with "0" life expectancy is between **$5025 and $6575.** In addition to the tree removal cost, the cost to remove their stumps is about 55 hours at 90 per hour or **$4950.** Six (6) additional stumps only were identified in the inventory. Assuming that the stumps are flush cut with the ground before work starts, the time estimate for this work is 30.5 hours at $90 per hour or $2745. **The total cost of removing 23 stumps is $7695.**

DISCUSSION – ESTABLISHING A TREE MANAGEMENT PLAN

Trees are an important natural resource for any urban area. They are the major vegetative component of park landscapes. In addition to their beauty, trees enhance visual aesthetics, provide a sense-of-place, and improve energy conservation. Because of their aesthetic and functional contributions, a tree care management plan is essential to create a sustainable landscape and to provide for public safety. A tree care management plan is essential to maintain and improve the Clark Park landscape by establishing tree maintenance guidelines, priorities, and budgets. Components of the tree management plan are 1) establishing goals, 2) planning for maintenance and renewal, 3) conducting an inventory and assessment (needs assessment), 4) estimating deferred and maintenance budgets, 5) fund raising, and 6) setting priorities.

Goals of a Tree Maintenance Program: A goal of the management plan is to *create sustainable landscape* as directed by the Master Plan. Landscape stability is best attained by *managing towards a mixed-age tree population of diverse kinds*. Trees must be planted routinely, especially to replace tree removals. Tree planting should be an annual event, not just a culmination of a renewal or revitalization program.

Planning for Maintenance and Renewal: Planning is required as a starting place for a landscape management plan. The recent master planning process should provide the direction for accomplishing the goals and objectives defined by the Clark Park community.

Tree Inventory and Assessment: A **needs assessment** is the starting point for developing a tree management plan. The inventory and assessment conducted in this study identifies maintenance task for the trees.

Estimating and Budgeting: Following the needs assessment, cost estimates are required to begin the budgeting and fund raising process. Implementation should follow the plan, but the plan must be flexible to consider annual changes in the condition of trees. The Clark Park tree management budget should consist of both deferred and on-going maintenance costs.

Task:	Budget Estimate:
Removing 23 Stumps	$ 7,695
Further Inspection/Hazard Inspection	$ 3,600
Cabling	$ 1,420
Pruning (all categories) - average	$ 16,175
Remove 17 trees - average	$ 5,800
Total:	**$ 34,690**

Figure 1: Deferred Tree Maintenance Budget Estimate (Average)

Task:	Budget Estimate:
Removals	$ 1,570
Stump Grinding	$ 582
Replanting	$ 1,760
Pruning	$ 13,265
Total:	**$ 17,177**

Figure 2: Estimated Annual Budget for Tree Care

Annual Budget COSTS based on
Pruning = $13, 265/yr, four year cycle based on present population, no shrubs, no wires in trees, street trees included
Removals = $1570. /yr. based on <5 yr. life expectancy category plus 5-15 yr. "consider removals" (16 trees total)
Stump grinding = 582. /yr. based on grinding above (flush cut to ground)
Replanting = $1760. /yr. based on removal #'s @ $550. /tree installed

These estimates do not include trees that may be added in the master plan. All work billed at $60/person hour and performed by outside contractor.

Setting Priorities: Tree care priorities should be ranked by: first, public safety; second, tree health (of important trees); and third, aesthetics. As a tree maintenance program is begun, expect most of the financial resources to be committed to remedy safety related problems. This is because routine work usually has been deferred. Over a period of years, budget dollars can be shifted from safety concerns to tree health issues and aesthetic considerations as the deferred work is accomplished. Since health and aesthetic maintenance is more appealing for donations,

consider using annual budgets for tree removal and fund raise for planting replacements and to maintain existing trees.

AUTOCAD MAP

Computer-based and other informational systems are essential to natural resource management. Informational systems are record keeping and referencing systems that organize information in ways that make it easily accessible when required. An informational system may include components such as spreadsheets, databases, AutoCAD or other maps, and tree and/or plant interpretive labeling/tagging. Together these systems maintain information specific to each tree.

Part of the computer-based informational system for Clark Park is an AutoCAD 2000-based map. The Morris Consultants used this map; supplied by Simone Jaffe Collins, Landscape Architects, to indicate tree location, inventory number, canopy spread, and life expectancy. A CD-ROM containing the updated map was submitted with this report. The Morris consultants used existing tree locations and other site features on the supplied CAD map to place tree icons if they were missing. Professional licensed surveyors, if required, should map exact tree locations.

AutoCAD Mapping Services Methodology

Four distinct icons were created by the Morris Consultants to distinguish deciduous trees, evergreen trees, shrubs, and stumps. Life expectancy categories are expressed as different colors of trees with Red indicating dead or nearly so, Orange indicating less than 5 years, Yellow indicating 5 to 15 years, and Green indicating greater than 15 years. Inventory numbers and section names (assigned and named by the Morris Consultants) were added to the CAD map.

Explanation of the Clark Park AutoCAD Map

Four plant canopy outlines represent evergreen tree, deciduous tree, shrub, or stump. Each icon has an associated layer except stumps that are part of the deciduous tree layer. Each plant has an associated life expectancy layer that contains the life expectancy hatching for each plant canopy outline. Each individual icon, regardless of layer, is scaled to the drawing.

The Morris Arboretum Arboricultural and Natural Resource Consultants have produced all layers whose name starts with "**ma-**". The shrubs, deciduous trees (includes stumps), and evergreen trees are resident on named layers with the prefix of "**ma-**"+ *type of plant*. All plant life expectancy layers are prefixed by "**ma-LIFEEXP**"+ *type of plant*.

Layer Use

Layering allows the user to turn on or off any combination of plant type and life expectancy associated with the plant type. To turn off **all** the icons and their life expectancies that are showing on the display, FREEZE the "**ma-TREE CANOPY**" layer. You will need to REGEN the drawing to view the plants.

BLOCKS

All icons have been inserted as named blocks. The name of the block = *plant type + life expectancy category*. Each named block is composed of two layers; the plant canopy outline from the ma-plant type layer, and the life expectancy hatching from its associated layer. All blocks are inserted onto the "ma-TREE CANOPY" layer. The life expectancy hatching was done with numbered colors.

LAYER DEFINITIONS:

PLANT CANOPY LAYERS

- ma-SHRUB: scaled shrub canopy outline, the minimum shrub size is 15 feet.
- ma-EVERGRN: scaled evergreen tree canopy outline.
- ma-DECID: scaled deciduous tree canopy outline plus stumps.

LIFE EXPECTANCY LAYERS

- ma-LIFEEXP-SHRUB: Life expectancy hatching for shrubs;
- ma-LIFEEXP-EVERG: Life expectancy hatching for evergreen trees;
- ma-LIFEEXP-DECID: Life expectancy hatching for deciduous trees and stumps.

OTHER LAYERS

- ma-INSTRUCTIONS: contain instructions and Legend showing plant icon and life expectancy hatching
- ma-TREE-BLOCK: contains Blocks representing every inventoried item
- ma-INV-NUM: contains plant inventory number and common name.
- ma-SECTION: is the section number assigned by the Morris Consultants

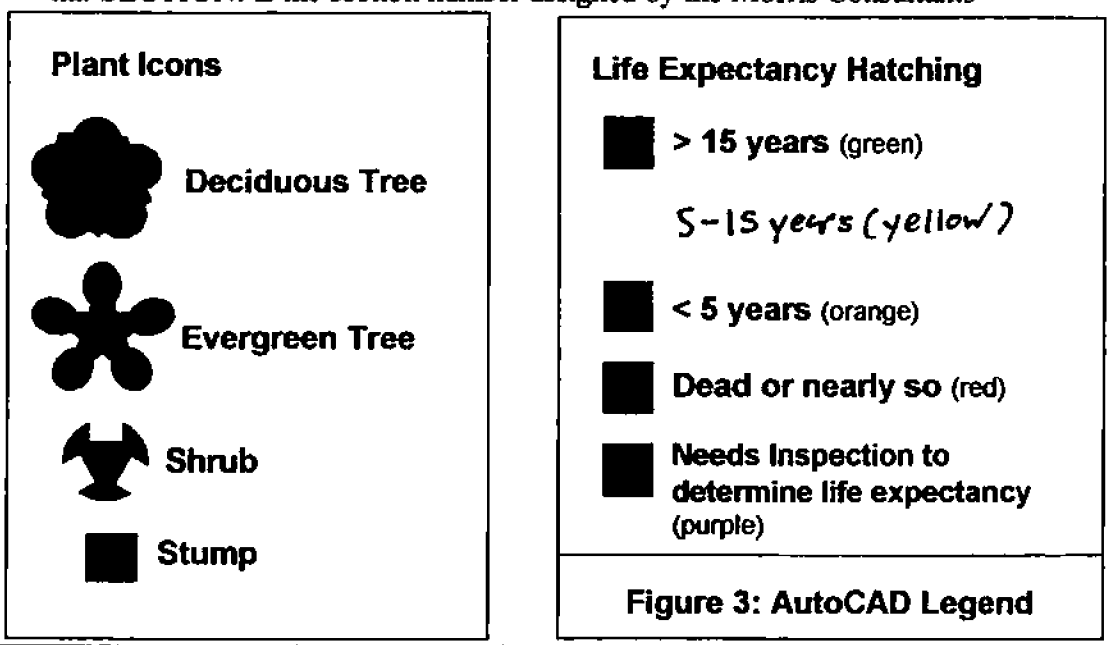


Figure 3: AutoCAD Legend

RECOMMENDATIONS

1. Safety Issues should be addressed first. "A" priority removals and pruning should be addressed as soon as possible. If removing or pruning hazard trees can not be accomplished immediately, action should be taken to restrict access in the vicinity of the tree hazard. "C" priority pruning is optional.
2. Trees marked "*hi*" under the ***Removal*** spreadsheet heading should be assessed by a certified arborist to ascertain life expectancy. Without this detailed analysis, consider that these trees may be hazardous.
3. Cabling and bracing recommendations are both for safety and protection of notable trees. Trees in frequently used areas such as on roads, paths, etc. should be cabled first.
4. The current tree assessment is relevant for a one-year or less. Trees should be periodically monitored by qualified tree care professionals to determine maintenance requirements. Be vigilant for the development of mushrooms, shelf fungi, dead branches, cracks, cavities, and detached hanging branches throughout the year and especially after storms.
5. When planting new trees, choose from a diverse palette of plants species.
6. The inventory information provides a powerful record keeping system useful for managing the Clark Park landscape. This consists of the Excel Spreadsheet and the AutoCAD map. Both should be maintained to remain an effective tool.
7. Some replanting or replacement planting should be done every year to maintain a mixed age tree population.
8. Invasive/exotic (I/E) trees, such as Norway Maple *(Acer platinoides),* should NOT be planted and should be systematically removed.
9. Care must be given when selecting and planting nursery trees. Nursery trees frequently will have root, stem, and/or pruning-related problems. Learn how to properly select nursery trees and properly plant them to avoid future problems. Revise tree-planting specifications to eliminate trunk wrap, over-use of tree stakes, and use of wire and hose guying. Use strap-type attachments around trunks, when staking is necessary. Increase the size of the planting holes and mulched area to 2 to 3 times the root ball diameter.
10. Important trees may benefit by additional watering during drought and mulching to reduce competition and improve soil conditions.
11. Appropriate actions should be taken to protect new trees. New trees should be monitored for vandalism.
12. Existing stumps should be ground down. When trees are removed, they should be cut as close as possible to the ground to facilitate stump grinding.
13. Trees must be carefully protected during construction or other soil/root disturbances. Avoid driving cars and other heavy vehicles on any soil within the park.

ASSUMPTIONS AND LIMITING CONDITIONS

1. During the inspections and evaluations, only above ground parts were observed. Decayed roots are difficult to detect and evaluate and were not part of this scope of work.
2. Visual inspection was limited to what could be seen readily from the ground.
3. Do not assume that the inspector looked at trees other than those covered in this report.
4. The information in the inventory represents conditions at the time of the inspection. Tree conditions can degrade or change due to progressive decay, storm, and/or mechanical injury.
5. Even healthy sound trees constitute some risk. Most trees, especially older trees, have defects. Not all trees with defects should be considered unreasonable risks. The tree inspections and assessments are designed to identify those trees that have warning signs of structural weakness.
6. There may be inventoried trees with hidden defects that may not be detected.
7. Price estimates provided for tree pruning, removals, stump grinding and hazard assessment are based upon documented studies; however, the only true price is that provided by a qualified contractor who is willing to perform the work.

CERTIFICATION

I certify that I am a member in good standing of the American Society of Consulting Arborist (ASCA) and an International Society of Arboriculture (ISA) Certified Arborist. I further certify that I represent the Morris Arboretum of the University of Pennsylvania and that this is my work product based on my professional judgment and current industry standards and understanding.

Andrew William Graham, Jr. Date: September 12, 2001

Arboricultural Consultant and Educator

Suggested Tree List for Clark Park

category	Scientific Name	Common Name	% of trees (306 as of 7/26/01)
STREET TREES			
LARGE TREES > 45 FT			
	Acer rubrum	Red Maple	0.3%
	Betula nigra	River Birch	
	Celtis laevigata	Sugar Hackberry	
	Celtis occidentalis	Common Hackberry	
	Fraxinus pennsylvanica	Green Ash	
	Ginkgo biloba	Maidenhair-tree or Ginkgo	0.7%
	Gleditsia triacanthos var. inermis	Thornless Honeylocust	2.9%
	Gymnocladus dioica	Kentucky Coffee-tree	0.7%
	Liquidambar styraciflua	American Sweetgum	1.0%
	Metasequoia glyptostroboides	Dawn Redwood	
	Nyssa sylvatica	Black Tupelo	0.3%
	Platanus x acerifolia	London Plane Tree	54.9%
	Quercus acutissima	Sawtooth Oak	
	Quercus bicolor	Swamp White Oak	
	Quercus coccinea	Scarlet Oak	0.3%
	Quercus imbricaria	Shingle Oak	
	Quercus macrocarpa	Bur Oak	
	Quercus palustris	Pin Oak	2.0%
	Quercus phellos	Willow Oak	
	Quercus prinus	Chestnut Oak	
	Quercus robur	English Oak	
	Quercus rubra	Red Oak	2.6%
	Quercus shumardii	Shumard Oak	
	Quercus velutina	Black Oak	0.7%
	Sophora japonica	Japanese Pagoda-Tree	
	Taxodium distichum	Common Baldcypress	
	Tilia tomentosa	Silver Linden	
	Ulmus parvifolia	Chinese Elm	
	Zelkova serrata	Japanese Zelkova	0.7%
MEDIUM TREES 30 - 45 FT			
	Acer truncatum	Purpleblow Maple	
	Betula schmidtii	Schmidt's Birch	
	Carpinus betulus	European Hornbeam	
	Chamaecyparis pisifera	Sawara Falsecypress	
	Chamaecyparis spp.	Falsecypress species	
	Cornus kousa var. chinensis	Chinese Kousa Dogwood	2.0%
	Corylus colurna	Tree Filbert	
	Eucommia ulmoides	Chinese Rubber Tree	0.7%
	Halesia carolina	Carolina Silverbell	
	Ilex opaca	American Holly	
	Juniperus virginiana	Eastern Red Cedar	
	Koelreuteria paniculata	Panicled Golden-rain-tree	
	Maackia amurensis	Amur Maackia	
	Maclura pomifera var. inermis	Thornless Osage Orange	

Suggested Tree List
for Clark Park

category	Scientific Name	Common Name	% of trees (306 as of 7/26/01)
	Parrotia persica	Persian Perrotia	
	Phellodendron amurense	Amur Cork-tree	
	Pinus bungeana	Lacebark Pine	
	Pistacia chinensis	Chinese Pistache	
	Prunus sargentii	Sargent Cherry	
	Pyrus calleryana cvs.	Callery Pear cultivars	0.7%
	Sorbus alnifolia	Korean Mountain Ash	
	SMALL TREES UP TO 30 FT.		
	Acer buergerianum	Trident Maple	
	Acer campestre	Hedge Maple	
	Acer ginnala	Amur Maple	
	Acer tataricum	Tatarian Maple	
	Alnus japonica	Japanese Alder	
	Amelanchier x grandiflora	Apple Serviceberry	
	Carpinus caroliniana	American Hornbeam	
	Carpinus coreana	Korean Hornbeam	
	Carpinus laxiflora	Looseflower Hornbeam	
	Cornus kousa	Kousa Dogwood	2.0%
	Cornus mas	Cornelian Cherry Dogwood	
	Cornus officinalis	Japanese Cornel Dogwood	
	Cotinus obovatus	American Smoke-tree	
	Crataegus crus-galli var. inermis	Thornless Cockspur Hawthorn	
	Crataegus marshallii	Marshalls Hawthorn	
	Crataegus nitida	Glossy Hawthorn	
	Crataegus phaenopyrum	Washington Hawthorn	0.7%
	Crataegus viridis 'Winter King'	Winter King Green Hawthorn	
	Crataegus x lavallei	Lavalle Hawthorn	
	Magnolia virginiana	Sweetbay Magnolia	
	Malus spp.	Crabapple species	2.3%
	Prunus serrulata	Oriental Cherry	
	Prunus spp.	Cherry species	2.6%
	Ptelea trifoliata	Common Hop-tree	
	Styrax japonica	Japanese Snowbell	
	Syringa amurensis japonica 'Ivory Silk'	Tree Lilac	
	Syringa reticulata	Japanese Tree Lilac	1.0%

NOT RECOMMENDED FOR STREET TREES

Acer negundo	Boxelder (Brittle Wood and Boxelder Bugs)	
Acer platanoides	Norway Maple (Overused and Invasive)	
Acer saccharinum	Silver Maple (Weak Wooded)	0.3%
Ailanthus altissima	Tree of Heaven (Brittle Wood and Invasive)	
Betula papyrifera	Paper Birch (Borers)	
Betula pendula	European White Birch (Borers)	
Betula populifolia	Grey Birch (Borers)	
Castanea dentata	American Chestnut (Chestnut Blight Disease)	
Juglans cinerea	Butternut (Canker Disease)	
Juglans nigra	Black Walnut (Fruit, Allelopathy)	
Morus alba and Morus rubra	White and Red Mulberry (Fruit)	0.7%

Suggested Tree List for Clark Park

category	Scientific Name	Common Name	% of trees (306 as of 7/26/01)
	Pinus nigra	Austrian Pine (Pine Wilt Disease, Diplodia Tip Blight, and Overused)	
	Populus deltoides	Eastern Cottonwood (Brittle Wood and Cottony Seed)	
	Populus nigra	Lombardy Black Popular (Canker Disease)	
	Prunus avium	Sweet Cherry (Borers)	
	Prunus padus	European Bird Cherry (Borers and Black Knot Disease)	
	Prunus pensylvanica	Pin Cherry (Borers)	
	Prunus serotina	Black Cherry (Borers and Black Knot Disease)	
	Pinus sylvestris	Scotch Pine (Pine Wilt Disease, Diplodia Tip Blight, and Overused)	
	Prunus virginiana	Common Choke Cherry (Black Knot Disease)	
	Rhamnus spp.	Buckthorn species (Extremely Aggressive)	
	Robinia pseudoacacia	Black Locust (Borers)	
	Sorbus americana	American Mountain Ash-(Borers and Fireblight Disease)	
	Sorbus aucuparia	European Mountain Ash (Borers and Fireblight Disease)	
	Ulmus americana	American Elm (Dutch Elm Disease)	
	Ulmus pumila	Siberian Elm (Brittle Wood and Elm Leaf Beetle)	
	Ulmus rubra	Red Elm (Dutch Elm Disease)	
	Ulmus thomasii	Rock Elm (Dutch Elm Disease)	

PARK TREES

LARGE TREES > 45 FT.		
Abies cephalonica	Greek Fir	
Abies concolor	White Fir	
Abies nordmanniana	Normann Fir	
Acer rubrum	Red Maple	0.3%
Acer saccharum	Sugar Maple	3.6%
Aesculus flava (octandra)	Yellow Buckeye	
Betula nigra	River Birch	
Carya ovata	Shagbark Hickory	
Celtis occidentalis	Common Hackberry	
Cercidiphyllum japonicum	Katsura-tree	
Chamaecyparis nootkatensis	Nootka Falsecypress	
Chamaecyparis obtusa	Hinoki Falsecypress	
Fagus grandifolia	American Beech	
Fagus sylvatica	European Beech	0.3%
Fraxinus americana	White Ash	
Gymnocladus dioca	Kentucky Coffee-tree	0.7%
Liquidambar styraciflua	American Sweetgum	1.0%
Liriodendron tulipifera	Tulip-tree	0.7%
Metasequoia glyptostrobcides	Dawn Redwood	
Nyssa sylvatica	Black Tupelo	0.3%
Picea abies	Norway Spruce	
Picea omorika	Serbian Spruce	
Picea orientalis	Oriental Spruce	
Pinus strobus	Eastern White Pine	0.3%
Pinus wallichiana	Himalayan Pine	
Prunus sargentii	Sargent Cherry	
Quercus acutissima	Sawtooth Oak	

Suggested Tree List for Clark Park

category	Scientific Name	Common Name	% of trees (306 as of 7/26/01)
	Quercus alba	White Oak	1.0%
	Quercus bicolor	Swamp White Oak	
	Quercus coccinea	Scarlet Oak	0.3%
	Quercus imbricaria	Shingle Oak	
	Quercus macrocarpa	Bur Oak	
	Quercus phellos	Willow Oak	
	Quercus robur	English Oak	
	Quercus rubra	Red Oak	2.6%
	Taxodium ascendens var. nutans	Pondcypress	
	Taxodium distichum	Common Baldcypress	
	Tilia americana	American Linden	1.0%
	Tilia tomentosa	Silver Linden	
	Ulmus parvifolia	Chinese Elm	
	MEDIUM TREES 30 - 45 FT.		
	Acer buergerianum	Trident Maple	
	Aesculus x carnea	Red Horse Chestnut	
	Amelanchier laevis	Allegheny Serviceberry	
	Betula lenta	Sweet Birch	
	Betula maximowicziana	Monarch Birch	
	Betula platyphylla var. japonica	Asian White Birch	
	Carpinus betulus	European Hornbeam	
	Carpinus laxiflora	Looseflower Hornbeam	
	Cladrastis kentukea	American Yellowwood	0.7%
	Corylus colurna	Tree Filbert	
	Halesia carolina	Carolina Silverbell	
	Hovenia dulcis	Japanese Raisin-tree	
	Ilex opaca	American Holly	
	Koelreuteria paniculata	Panicled Golden-rain-tree	
	Magnolia denudata	Yulan Magnolia	
	Magnolia 'Galaxy'	Galaxy Magnolia	
	Magnolia grandiflora cvs.	Southern Magnolia cultivars	
	Magnolia kobus	Kobus Magnolia	
	Magnolia x loebneria 'Merrill'	Merrill Loebner Magnolia	
	Magnolia x soulangiana 'alexandrina'	Alexander Saucer Magnolia	
	Ostrya virginiana	American Hop Hornbeam	
	Oxydendrum arboreum	Sourwood	
	Parrotia persica	Persian Perrotia	
	Pinus bungeana	Lacebark Pine	
	Pinus bungeana	Lacebark Pine	
	Pinus cembra	Swiss Stone Pine	
	Pinus densiflora	Japanese Red Pine	
	Pinus flexilis	Limber Pine	
	Pinus rigida	Pitch Pine	
	Pinus thunbergii	Japanese Black Pine	
	Pistacia chinensis	Chinese Pistache	
	Prunus subhirtella	Higan Cherry	
	Prunus x yedoensis	Yoshino Cherry	
	Thuja occidentalis	Eastern Arborvitae	

Suggested Tree List for Clark Park

category	Scientific Name	Common Name	% of trees (306 as of 7/26/01)
	SMALL TREES UP TO 30 FT.		
	Acer campestre	Hedge Maple	
	Acer ginnala	Amur Maple	
	Acer griseum	Paperbark Maple	
	Acer triflorum	Three Flower Maple	
	Alnus japonica	Japanese Alder	
	Amelanchier arborea	Downy Serviceberry	
	Amelanchier spp.	Serviceberry species	
	Betula pendula	European White Birch	
	Carpinus caroliniana	American Hornbeam	
	Cercis canadensis	Eastern Redbud	
	Chamaecyparis obtusa	Hinoki Falsecypress	
	Chionanthus retusus	Chinese Fringetree	
	Clethra barbinervis	Japanese Clethra	
	Cornus alternifolia	Pagoda Dogwood	
	Cornus controversa	Giant Dogwood	
	Cornus florida	Flowering Dogwood	2.0%
	Cornus kousa	Kousa Dogwood	2.0%
	Cornus mas	Cornelian Cherry Dogwood	
	Crataegus phaenopyrum	Washington Hawthorn	0.7%
	Crataegus x lavallei	Lavalle Hawthorn	
	Franklinia alatamaha	Franklinia	
	Hamamelis mollis	Chinese Witchhazel	
	Juniperus rigida	Needle Juniper	
	Magnolia stellata	Star Magnolia	
	Malus cvs.	Apple cultivars	
	Prunus 'Okame'	Okame Cherry	
	Prunus serrulata	Oriental Cherry	
	Sciadopitys verticillata	Umbrella Pine	
	Stewartia koreana	Korean Stewartia	
	Stewartia monodelpha	Tall Stewartia	
	Stewartia pseudocamellia	Japanese Stewartia	
	Styrax japonica	Japanese Snowbell	
	Styrax obassia	Fragrant Snowbell	
	Symplocos paniculata	Sapphireberry Sweetleaf	
	Syringa reticulata	Japanese Tree Lilac	:.0%

TREES NOT RECOMMENDED FOR PLANTING BECAUSE OF THEIR INVASIVE CHARACTERISTICS

	Acer palmatum	Japanese Maple	
	Acer platanoides	Norway Maple	5.9%
	Acer pseudoplatanus	Sycamore Maple	
	Alnus glutinosa	Black Alder	
	Aralia elata	Devil's Walking Stick	
	Ailanthus altissima	Tree-of-Heaven	
	Broussonettia papyrifera	Paper mulberry	
	Evodia daniellii	Korean Evodia	
	Lonicera maackii	Amur honeysuckle	

Suggested Tree List for Clark Park

category	Scientific Name	Common Name	% of trees (306 as of 7/26/01)
	Morus alba	White mulberry	0.7%
	Paulownia tomentosa	Empress tree	
	Phellodendron amurense	Amur Cork tree	
	Populus alba	White Poplar	
	Styrax japonica	Japanese Snowbell	
	Ulmus pumila	Siberian Elm	
TREE PITS AND RESTRICTED ROOT SPACES			
	Acer campestre	Hedge Maple	
	Acer ginnala	Amur Maple	
	Acer tataricum	Tartarian Maple	
	Celtis occidentalis	Common Hackberry	
	Cornus florida	Flowering Dogwood	2.0%
	Cornus kousa	Kousa Dogwood	2.0%
	Cornus mas	Cornelian Cherry Dogwood	
	Crataegus crus-galli	Cockspur Hawthorn	
	Crataegus phaenopyrum	Washington Hawthorn	0.7%
	Crataegus viridis 'Winter King'	Winter King Green hawthorn	
	Ginkgo biloba	Ginkgo	0.7%
	Gleditsia triacanthos var. inermis	Thornless Honeylocust	2.9%
	Koelreuteria paniculata	Panicled Golden-rain-tree	
	Malus cvs.	Apple cultivars	
	Ostrya virginiana	American Hop Hornbeam	
	Platanus x acerifolia	London Plane Tree	54.9%
	Syringa reticulata	Japanese Tree Lilac	1.0%
	Ulmus parvifolia	Chinese Elm	
SALT TOLERANCE			
	Acer ginnala	Amur Maple	
	Acer negundo	Box Elder Maple	
	Amelanchier spp.	Serviceberry species	
	Betula lenta	Sweet Birch	
	Celtis spp.	Hackberry species	
	Cornus mas	Cornelian Cherry Dogwood	
	Crataegus spp.	Hawthorne species	0.3%
	Fraxinus americana	Ash species	
	Fraxinus pennsylvanica	Green Ash	
	Ginkgo biloba	Ginkgo	0.7%
	Gleditsia triacanthos var. inermis	Thornless honeylocust	2.9%
	Gymnocladus dioica	Kentucky Coffee-tree	0.7%
	Ilex spp.	Holly species	0.7%
	Juniperus virginiana	Eastern Red Cedar	
	Koelreuteria paniculata	Panicled Golden-Rain-Tree	
	Liquidambar styraciflua	American Sweetgum	1.0%
	Magnolia virginiana	Sweetbay Magnolia	
	Malus spp.	Apple species	2.3%
	Metasequoia glyptostroboides	Dawn Redwood	
	Nyssa sylvatica	Black Tupelo	0.3%
	Phellodendron amurense	Amur Cork-tree	

Suggested Tree List for Clark Park

category	Scientific Name	Common Name	% of trees (306 as of 7/26/01)
	Pinus densiflora	Japanese Red Pine	
	Pinus thunbergii	Japanese Black Pine	
	Platanus x acerifolia	London Plane Tree	54.9%
	Prunus serotina	Black Cherry	
	Pyrus calleryana	Callery Pear	0.7%
	Quercus robur	English Oak	
	Quercus rubra	Red Oak	2.6%
	Sophora japonica	Japanese Pagoda-Tree	
	Syringa reticulata	Japanese Tree Lilac	1.0%
	Taxodium distichum	Common Baldcypress	
	Ulmus parvifolia	Chinese Elm	
	Zelkova serrata	Japanese Zelkova	0.7%

NOTE: Because of genetic diversity, individuals of a species may vary in salt tolerance

DRY SITES

	Acer campestre	Hedge Maple	
	Acer ginnala	Amur Maple	
	Acer negundo	Box Elder Maple	
	Acer tataricum	Tartarian Maple	
	Celtis spp.	Hackberry species	
	Corylus colurna	Tree Filbert	
	Crataegus spp.	Hawthorne species	0.3%
	Eucommia ulmoides	Chinese Rubber Tree	0.7%
	Ginkgo biloba	Ginkgo	0.7%
	Gleditsia triacanthos var. inermis	Thornless Honeylocust	2.9%
	Gymnocladus dioca	Kentucky Coffee-tree	0.7%
	Juniperus virginiana	Eastern Red Cedar	
	Koelreuteria paniculata	Panicled Golden-rain-tree	
	Maackia amurensis	Amur Maackia	
	Malus cvs.	Apple cultivars	
	Ostrya virginiana	American Hop Hornbeam	
	Pinus rigida	Pitch Pine	
	Pinus thunbergii	Japanese Black Pine	
	Prunus spp.	Cherry species	2.6%
	Quercus macrocarpa	Bur Oak	
	Quercus muehlenbergii	Chinkapin Oak	
	Quercus prinus	Chestnut Oak	
	Quercus robur	English Oak	
	Sophora japonica	Japanese Pagoda-Tree	
	Syringa reticulata	Japanese Tree Lilac	1.0%

WET SITES

	Acer rubrum	Red Maple	0.3%
	Alnus spp.	Alder species	
	Betula nigra	River Birch	
	Chionanthus spp.	Fringetree species	
	Fraxinus spp.	Ash species	
	Gleditsia triacanthos var. inermis	Thornless Honeylocust	2.9%

Suggested Tree List for Clark Park

category	Scientific Name	Common Name	% of trees (306 as of 7/26/01)
	Ilex opaca	American Holly	
	Liquidambar styraciflua	American Sweetgum	1.0%
	Magnolia virginiana	Sweetbay Magnolia	
	Metasequoia glyptostroboides	Dawn Redwood	
	Nyssa sylvatica	Black Tupelo	0.3%
	Platanus x acerifolia	London Plane Tree	54.9%
	Quercus bicolor	Swamp White Oak	
	Quercus nigra	Water Oak	
	Quercus palustris	Pin Oak	2.0%
	Quercus phellos	Willow Oak	
	Quercus rubra	Red Oak	2.6%
	Taxodium distichum	Common Baldcypress	
	Thuja spp.	Arborvitae species	
	Ulmus parvifolia	Chinese Elm	
	Zelkova serrata	Japanese Zelkova	0.7%

COMPACTED SOIL TOLERANCE

Celtis occidentalis	Common Hackberry	
Crataegus spp.	Hawthorn species	0.3%
Eucommia ulmoides	Chinese Ruber Tree	0.7%
Fraxinus pennsylvanica	Green Ash	
Ginkgo biloba	Ginkgo	0.7%
Gleditsia triacanthos var. inermis	Thornless Honeylocust	2.9%
Platanus x acerifolia	London Plane Tree	54.9%
Quercus rubra	Red Oak	2.6%
Quercus shumardii	Shumard Oak	
Taxodium distichum	Common Baldcypress	
Tilia cordata	Littleleaf Linden	0.7%
Ulmus parvifolia	Chinese Elm	
Zelkova serrata	Japanese Zelcova	0.7%

STRESS TOLERANT TO SOIL COMPACTION AND OXYGEN DEFICIENCY

HIGHLY TOLERANT		
Crataegus phaenopyrum	Washington Hawthorn	0.7%
Fraxinus americana	White Ash	
Ginkgo biloba	Ginkgo	0.7%
Malus spp.	Apple species	2.3%
Platanus x acerifolia	London Plane Tree	54.9%
Pyrus calleryana	Callery Pear	0.7%
Sophora japonica	Japanese Pagoda-Tree	

MODERATELY TOERANT		
Acer campestre	Hedge Maple	
Acer rubrum	Red Maple	0.3%
Celtis occidentalis	Common Hackberry	
Crataegus lavallei	Lavalle Hawthorn	
Liquidambar styraciflua	American Sweetgum	1.0%

Suggested Tree List for Clark Park

category	Scientific Name	Common Name	% of trees (306 as of 7/26/01)
	Quercus spp.	Oak species	
	Tilia cordata	Little-leaf Linden	0.7%

TREES THAT COULD BE PLANTED MORE OFTEN

Acer miyabei	Miyabe Maple	
Acer nigrum	Black Maple	
Acer truncatum	Purpleblow Maple	
Aesculus flava	Yellow Buckeye	
Carya spp.	Hickory species	
Cladrastis kentukea	American Yellowwood	0.7%
Corylus colurna	Tree Filbert	
Fagus sylvatica	European Beech	0.3%
Fraxinus quadrangulata	Blue Ash	
Gymnocladus dioca	Kentucky Coffee-Tree	0.7%
Liquidambar styraciflua	American Sweetgum	1.0%
Liriodendron tulipifera	Tulip Tree	0.7%
Maackia amurensis	Amur Maackia	
Magnolia acuminata	Cucumber Magnolia	
Quercus alba	White Oak	1.0%
Quercus bicolor	Swamp White Oak	
Quercus macrocarpa	Bur Oak	
Quercus muehlenbergii	Chinkapin Oak	
Quercus prinus	Chestnut Oak	
Sophora japonica	Japanese Pagoda-Tree	
Syringa reticulata	Japanese Tree Lilac	1.0%
Ulmus parviflora	Chinese Elm	

TREES FOR CONTAINERS

Acer campestre	Hedge Maple	
Acer ginnala	Amur Maple	
Acer tataricum	Tartarian Maple	
Amelanchier spp.	Shadblow Serviceberry	
Cornus mas	Cornelian Cherry Dogwood	
Crataegus phaenopyrum	Washington Hawthorn	0.7%
Crataegus viridis 'Winter King'	Winter King Green Hawthorn	
Magnolia stellata	Star Magnolia	
Malus sargentii	Sargent Apple	
Prunus 'Accolade'	Sargent Cherry 'Accolade'	
Syringa reticulata	Japanese Tree Lilac	1.0%

Tree Inventory and Assessment for Clark Park

Inv #	Scientific Name	Common Name	Loc	#1 CBH	#2 CBH	#3 CBH	#4 CBH	#5 CBH	Tree Ht	Tree Sprd	Life Exp	Re	G Pr	Sp Pr	Gd Rt	C	Mt Sc	Fm	Memorial	Pests	Comments
1	Platanus x acerifolia	London Planetree	a	74					60	50	5-15							f			over growing curb
2	Platanus x acerifolia	London Planetree	a	8					13	14	>15		a3	cl,cp						sycamore plant bug	
3	Pyrus calleryiana Bradford	Bradford Callery Pear	a	30	15				38	38	5-15					3			Peter Lakey		torn br at 5 ft
4	Platanus x acerifolia	London Planetree	a	10					18	18	>15		b2	cp						sycamore plant bug	
5	Platanus x acerifolia	London Planetree	a	10					17	15	>15		a2	cl,cp						sycamore plant bug	
6	Platanus x acerifolia	London Planetree	a	9					17	16	>15		b2	cp						sycamore plant bug	j-root
7	Platanus x acerifolia	London Planetree	a	61					55	50	?	hi								sycamore plant bug	basal wound/decay on street side
8	Platanus x acerifolia	London Planetree	a	7					14	12	>15		c2	cp						sycamore plant bug	
9	Gleditsia triacanthos inermis	Thornless Honeylocust	a	12					18	22	5-15		b1	LL				f			severely shaded, prune sycamore
10	Gleditsia triacanthos inermis	Thornless Honeylocust	a	12					16	26	5-15						dp				severely shaded, prune sycamore
11	Platanus x acerifolia	London Planetree	a	7					17	13	>15		a2	cl,cp			dp			sycamore plant bug	
12	Platanus x acerifolia	London Planetree	a	85					62	64	<5	cr								canker stain	most of bark dead at base
13	Forsythia sp	Forsythia	b						8	15	>15									sheared	measured at 12"
14	Cornus kousa	Kousa Dogwood	b	7	7	6			8	15	>15							e			
15	Acer platinoides	Norway Maple	b	72					60	42	<5		a2	d			mr			verticillium?	declining, small leaves at top
16	Platanus x acerifolia	London Planetree	b	68					75	50	>15									Chlorotic lvs	
17	Acer saccharum	Sugar Maple	b	21					36	30	>15		a2	cl							clear brs from coffee tree
18	Platanus x acerifolia	London Planetree	b	67					66	60	>15										basal decay
19	Cladrastus kentuckea	American Yellowwood	b	71					40	45	?	hi								fungal conk	hollow tr
20	Platanus x acerifolia (stump)	London Planetree	b	65	59				4	0	0	c									stump
21	Gymnocladus dioicus	Kentucky Coffeetree	c	65					70	60	>15		b2	d,cp							lean
22	Gymnocladus dioicus	Kentucky Coffeetree	c	87					80	76	>15		a2	d				e			
23	Forsythia sp	Forsythia	c	*					*	*	>15										shaded
24	Forsythia sp	Forsythia	c	*					*	*	>15										shaded
25	Platanus x acerifolia	London Planetree	c	89					80	62	>15							e			
26	Acer platinoides	Norway Maple	c	72					65	41	>15		a3	d							
27	Platanus x acerifolia	London Planetree	c	82					78	52	>15		c3	s			s				
28	Platanus x acerifolia	London Planetree	c	51					65	34	>15		c3	d							
29	Platanus x acerifolia	London Planetree	c	77					70	44	>15		a2	cp							
30	Platanus x acerifolia	London Planetree	c	83					72	48	>15										
31	Platanus x acerifolia	London Planetree	c	82					74	45	?	hi								fungus conk on root	hollow lower tr
32	Platanus x acerifolia	London Planetree	d	85					74	51	>15		a3	h,cp				e			
33	Acer platinoides	Norway Maple	d	69					67	46	5-15										
34	Acer platinoides	Norway Maple	d	67					50	53	>15		b2	d							
35	Eucommia ulmoides	Hardy Rubber Tree	d	8	2				7	16	>15		c3	s							
36	Forsythia sp	Forsythia	d	*					*	*	>15										sheared
37	Eucommia ulmoides	Hardy Rubber Tree	d	6	6	6	6	2	11	15	>15										
38	Cornus florida	Flowering Dogwood	d	15					17	14	5-15		c2	d							
39	Forsythia sp	Forsythia	d						*	*	>15										sheared
40	Gleditsia triacanthos inermis	Thornless Honeylocust	d	70					65	55	5-15	cr	a1	2 cr lb,d							hazard
41	Acer platinoides	Norway Maple	d	73					46	62	>15		c3	h			mr				
42	Gleditsia triacanthos inermis	Thornless Honeylocust	d	49					45	43	>15		b1	d							
43	Gleditsia triacanthos inermis	Thornless Honeylocust	e	49					40	50	>15		b1	s,d			s				
44	Platanus x acerifolia	London Planetree	e	73					42	44	>15										
45	Gleditsia triacanthos inermis	Thornless Honeylocust	e	49					45	56	>15		b1	d,cp							
46	Platanus x acerifolia	London Planetree	e	94					68	65	>15		b2	cp							
47	Pyrus calleryiana Bradford	Bradford Callery Pear	f	48					38	43	5-15		a2	cp							poor br structure
48	Platanus x acerifolia (stump)	London Planetree	g	83					2	0	0	c									stump
49	Magnolia x soulangiana	Saucer Magnolia	g	15	16	12			17	19	>15		c3	s			s				
50	Cornus kousa	Kousa Dogwood	g	4	2	4	4	5	10	15	>15										
51	Syringa reticulata	Japanese Tree Lilac	g	6	4	5	2	2	15	12	>15										
52	Syringa reticulata	Japanese Tree Lilac	g	6	4	7	5	5	16	15	>15										
53	Syringa reticulata	Japanese Tree Lilac	g	2	2	4	2	1	15	14	>15										

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54	Cornus kousa	Kousa Dogwood	g	4	5	2	4	2	10	12	>15										
55	Prunus sp	Cherry	g	20					14	24	>15										
56	Cornus kousa	Kousa Dogwood	g	4	2	3	3	4	10	12	>15										
57	Platanus x acerifolia	London Planetree	g	112					80	66	>15		b1	v,s			s				
58	Platanus x acerifolia	London Planetree	g	108					80	75	>15		c3	d,h							
59	Acer platinoides	Norway Maple	g	89					62	57	>15		c2	d							
60	Platanus x acerifolia (stump)	London Planetree	g	60					4	*	0	c									stump
61	Platanus x acerifolia	London Planetree	g	80					77	52	>15										
62	Platanus x acerifolia	London Planetree	g	101					80	53	?	hl	b2	d							hollow at base
63	Pinus strobus	White Pine	g	35					37	28	>15									pine bark aphid	
64	Acer saccharinum	Silver Maple	g	43					60	32	>15		c3	sk							
65	Quercus coccinea	Scarlet Oak	g	51					55	44	>15		b1	d,t							
66	Platanus x acerifolia	London Planetree	g	88					85	62	>15										
67	Fraxinus excelsior	European Ash	g	18					35	19	5-15	cr	b2	h,cr lb				f			vertical lr crack, lean
68	Stewardia sp	Stewardia	g	7					9	4	0	c									dead
69	Fraxinus excelsior	European Ash	g	18					35	17	>15		a1	cd							
70	Tilia americana	American Linden	h	53					43	43	5-15		a1	LL,cp							
71	Cornus florida	Flowering Dogwood	h	11					17	18	>15										
72	Platanus x acerifolia	London Planetree	h	106					80	51	>15		b2	d,s							
73	Platanus x acerifolia	London Planetree	h	91					75	40	>15										frost crack
74	Platanus x acerifolia	London Planetree	h	88					80	35	>15		a3	haz b							re lb over sidewalk/dead bark on top
75	Platanus x acerifolia	London Planetree	h	90					75	36	>15		b2	v							
76	Platanus x acerifolia	London Planetree	h	98					80	55	>15		b3	h							
77	Platanus x acerifolia	London Planetree	h	84					75	37	>15										frost crack
78	Platanus x acerifolia	London Planetree	h	101					80	57	>15		b1	shorten LL							
79	Platanus x acerifolia	London Planetree	h	107					82	61	>15		b3	d,h							
80	Taxus cuspidata	Japanese Yew	h	*					*	*	>15										
81	Taxus cuspidata	Japanese Yew	h	*					*	*	>15										
82	Platanus x acerifolia	London Planetree	h	91					70	51	<5		a3	d						canker stain?	
83	Ulmus americana	American Elm	h	40					35	45	>15										
84	Platanus x acerifolia	London Planetree	h	88					80	45	5-15		a3	d,h							
85	Platanus x acerifolia	London Planetree	h	92					80	68	>15										
86	Platanus x acerifolia	London Planetree	h	90					72	54	>15		a2	haz d,v							re synthetic rope
87	Platanus x acerifolia	London Planetree	i	98					70	43	>15		c3	v							
88	Catalpa bignonoides	Catalpa	i	83					68	33	0	a									
89	Amelanchier sp	Shadblow Serviceberry	i	17	10				19	22	5-15										basal wound
90	Amelanchier sp	Shadblow Serviceberry	i	9	7	11	8		18	22	>15										
91	Amelanchier sp	Shadblow Serviceberry	i	9					15	15	5-15										basal wound
92	Platanus x acerifolia	London Planetree	i	95					80	56	>15		a2	d,h							
93	Platanus x acerifolia	London Planetree	i	91					83	58	>15		a3	d							
94	Cornus kousa	Kousa Dogwood	i	7	8	9			14	24	>15										
95	Cornus kousa	Kousa Dogwood	i	12	16				14	27	>15										
96	Cornus florida	Flowering Dogwood	i	15	10				24	25	>15		b3	cp							
97	Platanus x acerifolia	London Planetree	i	85					82	45	>15										
98	Platanus x acerifolia	London Planetree	i	87					52	58	>15		b3	h							lr overgrowing sign
99	Platanus x acerifolia	London Planetree	j	94					80	63	>15										
100	Acer platinoides	Norway Maple	j	52					49	48	>15						mr				
101	Platanus x acerifolia	London Planetree	j	82					75	45	>15										
102	Acer platinoides	Norway Maple	j	60					70	51	>15						mr				basal cavity
103	Platanus x acerifolia	London Planetree	j	83					100	49	>15										
104	Platanus x acerifolia	London Planetree	j	91					80	68	>15		c3	s							
105	Platanus x acerifolia	London Planetree	k	93					65	52	>15										
106	Acer saccharum	Sugar Maple	k	53					50	50	>15		b1	xbr,h							soil compaction

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107	Platanus x acerifolia	London Planetree	k	111					85	80	>15		b3	s							
108	Platanus x acerifolia	London Planetree	k	106					80	61	>15										
109	Platanus x acerifolia	London Planetree	k	84					85	59	>15										
110	Platanus x acerifolia	London Planetree	k	40					65	38	5-15		b2	d							early decline
111	Platanus x acerifolia	London Planetree	k	100					85	66	>15		c3	s							
112	Euonymus alatus	Winged Euonymus	k	*					*	*	>15										
113	Pieris japonica	Japanese Pieris	k	*					*	*	>15										
114	Cornus florida	Flowering Dogwood	k	9	6	7			13	23	>15		c3	h							
115	Platanus x acerifolia	London Planetree	k	91					70	70	>15		b3	d							
116	Acer platinoides	Norway Maple	L	93					56	65	>15		c3	d							
117	Amelanchier sp	Shadblow Serviceberry	L	13	12	10	17		15	25	>15		c2	d							
118	Amelanchier sp	Shadblow Serviceberry	L	14	24				21	28	>15		c3	d							recent tr wound on smaller lead
119	Platanus x acerifolia	London Planetree	M	68					60	46	5-15		b3	d						mildew	chlorotic foliage
120	Platanus x acerifolia	London Planetree	M	85					65	63	>15		c2	d,h							
121	Prunus sp	Cherry	M	14					14	18	>15		b3	cp			dp				
122	Quercus palustris	Pin Oak	M	72					63	43	>15		b3	d							
123	Prunus sp	Cherry	N	19					18	24	>15						dp				
124	Crataegus phaenopyrum	Washington Hawthorn	N	12	24				22	27	>15		a2	cp						Quince Rust on Fruit	
125	Crataegus phaenopyrum	Washington Hawthorn	N	18	18				22	30	>15									Quince Rust on Fruit	
126	Crataegus laevigata	English Hawthorn	N	19					24	18	>15		b1	cp,xbr			dp				
127	Acer saccharum	Sugar Maple	N	65					60	50	>15		a2	h,d							soil compaction
128	Platanus x acerifolia	London Planetree	N	61					62	40	>15										lean
129	Acer platinoides	Norway Maple	N	58					63	44	>15										lean
130	Platanus x acerifolia	London Planetree	N	71					67	50	>15										
131	Platanus x acerifolia	London Planetree	N	61					80	33	>15										br cavity at 9 ft
132	Cladrastus kentuckea	American Yellowwood	N	72					65	56	>15		b2	d							
133	Platanus x acerifolia	London Planetree	N	74					68	60	>15		c3	cp							
134	Zelkova serrata	Zelkova	N	25					26	37	>15		c3	s			s,dp				
135	Platanus x acerifolia	London Planetree	o	92					84	64	>15		a3	d							
136	Acer platinoides	Norway Maple	o	51					72	38	>15		c2	d							
137	Acer platinoides	Norway Maple	o	64					70	44	>15		a2	d,s							
138	Platanus x acerifolia	London Planetree	o	83					70	68	>15		a2	d,s							
139	Platanus x acerifolia (stump)	London Planetree	P	135					1	0	0	c									stump
140	Platanus x acerifolia	London Planetree	Q	65					36	52	5-15	cr	b2	d				f			pruned for overhead wires
141	Platanus x acerifolia	London Planetree	Q	72					31	34	5-15	cr						f			pruned for overhead wires
142	Platanus x acerifolia	London Planetree	Q	79					42	40	?	hi						f			pruned for overhead wires,haz? pr cuts
143	Prunus sp	Cherry	Q	39					22	30	5-15		b2	cp							overhead wires
144	Platanus x acerifolia	London Planetree	Q	69					39	37	?	hi	b2	cp,ow				f			pruned for overhead wires
145	Platanus x acerifolia	London Planetree	Q	64					35	44	>15		a1	cp,ow							pruned for overhead wires
146	Platanus x acerifolia	London Planetree	Q	64					40	35	?	hi	a2	cp,ow							pruned for overhead wires
147	Platanus x acerifolia	London Planetree	Q	54					33	32	?	hi	a1	cp,ow							pruned for overhead wires, basal cavity
148	Platanus x acerifolia	London Planetree	R	62					40	25	?	hi									basal cavity, cavity at 11 ft
149	Platanus x acerifolia	London Planetree	R	78					38	47	5-15										
150	Platanus x acerifolia	London Planetree	R	70					60	37	0	a									vertical cr & cavity, haz
151	Platanus x acerifolia	London Planetree	R	68					60	27	5-15						c			fungus conk at 14 ft	
152	Platanus x acerifolia	London Planetree	R	78					57	35	<5									canker stain?	
153	Acer rubrum	Red maple	R	33					30	33	>15										
154	Platanus x acerifolia	London Planetree	R	90					47	30	?	hi									basal canker
155	Platanus x acerifolia	London Planetree	R	109					72	48	>15										
156	Platanus x acerifolia	London Planetree	R	17					20	35	>15										
157	Liquidambar styraciflua	Sweetgum	R	52					55	34	>15										
158	Liquidambar styraciflua	Sweetgum	R	41					50	21	>15										
159	Platanus x acerifolia	London Planetree	R	116					74	52	<5									canker stain	

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160	Platanus x acerifolia	London Planetree	R	96					75	45	>15										
161	Quercus rubra	Red Oak	R	46					40	36	>15										
162	Liquidambar styraciflua	Sweetgum	R	48					38	28	0	a									split crotch, haz
163	Platanus x acerifolia	London Planetree	R	109					70	55	>15										
164	Platanus x acerifolia	London Planetree	R	84					69	54	>15										basal cavity
165	Platanus x acerifolia	London Planetree	R	82					70	46	>15										
166	Platanus x acerifolia	London Planetree	R	92					70	79	>15										
167	Platanus x acerifolia	London Planetree	R	98					70	72	>15										
168	Tsuga canadensis	Canadian Hemlock	R	8					4	7	5-15		c2	d							in round planter
169	Platanus x acerifolia	London Planetree	S	100					70	58	>15										
170	Platanus x acerifolia	London Planetree	S	102					70	61	>15										
171	Platanus x acerifolia	London Planetree	S	109					72	56	<5										basal canker
172	Platanus x acerifolia	London Planetree	S	102					73	59	?	hi									basal wound, root cut for new sidewalk
173	Platanus x acerifolia	London Planetree	S	102					73	56	>15										
174	Platanus x acerifolia	London Planetree	S	116					74	76	>15										
175	Quercus rubra	Red Oak	S	42					55	37	0	b									significant structural roots cut for sidewalk
176	Platanus x acerifolia	London Planetree	S	117					69	70	0	c									significant structural roots cut for sidewalk
177	Platanus x acerifolia	London Planetree	S	115					73	58	>15										
178	Platanus x acerifolia	London Planetree	S	89					72	44	>15										
179	Platanus x acerifolia	London Planetree	S	93					74	41	>15										
180	Platanus x acerifolia	London Planetree	S	100					70	54	>15										
181	Malus sp	Crabapple or Apple	S	11					10	14	5-15	cr	b2	cp			dp				shaded
182	Malus sp	Crabapple or Apple	S	15					15	17	>15		a2	cp			dp				
183	Platanus x acerifolia	London Planetree	S	83					68	55	<5		a3	d							basal canker
184	Platanus x acerifolia	London Planetree	S	88					70	66	>15										
185	Platanus x acerifolia	London Planetree	S	81					70	51	?	hi									basal canker
186	Platanus x acerifolia	London Planetree	S	97					74	42	>15										
187	Platanus x acerifolia	London Planetree	S	109					77	50	?	hi									very large basal cavity
188	Platanus x acerifolia	London Planetree	S	9					15	12	>15						dp				
189	Acer platinoides	Norway Maple	S	42					35	44	>15										
190	Platanus x acerifolia	London Planetree	S	88					68	52	0	a									dead
191	Platanus x acerifolia	London Planetree	S	10					12	14	>15		a2	cp,cl			dp				
192	Acer saccharum	Sugar Maple	T	68					58	61	>15		a2	d,h							
193	Platanus x acerifolia (stump)	London Planetree	T	60					6	0	0	c									tipped stump
194	Platanus x acerifolia	London Planetree	T	100					70	72	?	hi									basal cavity
195	Platanus x acerifolia	London Planetree	T	70					70	56	>15										
196	Malus sp	Crabapple or Apple	T	10	12				17	21	>15										shaded
197	Malus sp	Crabapple or Apple	T	12					15	19	>15		c1	sk							shaded
198	Malus sp	Crabapple or Apple	T	17					19	21	5-15		c1	sk			dp				shaded, tr scar at 4 ft
199	Gleditsia triacanthos inermis	Thornless Honeylocust	T	17					26	25	>15		c2	d							
200	Platanus x acerifolia	London Planetree	T	116					100	93	>15							*			
201	Platanus x acerifolia	London Planetree	T	73					68	54	5-15		b3	d						canker stain?	lean
202	Platanus x acerifolia	London Planetree	T	82					70	49	>15										embedded sign
203	Quercus rubra	Red Oak	U	47					51	43	>15		c3	d							
204	Platanus x acerifolia	London Planetree	U	95					78	59	>15		b3	h							
205	Quercus palustris	Pin Oak	U	59					60	54	>15		c2	d,cp							top leaning for light compacted soil
206	Platanus x acerifolia	London Planetree	V	131					80	75	>15										
207	Quercus palustris	Pin Oak	V	66					82	44	>15		c2	cp							
208	Quercus rubra	Red Oak	V	71					80	47	>15		b3	d							
209	Platanus x acerifolia	London Planetree	V	114					80	72	>15										
210	Ginkgo biloba	Ginkgo or Maidenhair	V	68					80	19	>15					1					re nails in lower tr,basal wound
211	Platanus x acerifolia	London Planetree	V	94					80	68	>15		c3	s							
212	Platanus x acerifolia	London Planetree	V	87					75	49	>15										

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Tree Inventory and Assessment for Clark Park

Inv #	Scientific Name	Common Name	Loc	#1 CBH	#2 CBH	#3 CBH	#4 CBH	#5 CBH	Tree Ht	Tree Sprd	Life Exp	Re	G Pr	Sp Pr	Gd Rt	C	Mt Sc	Fm	Memorial	Pests	Comments
213	Tilia americana	American Linden	V	47					40	33	?	hl									vertical bark defect at 12 ft
214	Quercus velutina	Black Oak	V	24					29	27	5-15		b1	d							basal bark wound, decline
215	Acer saccharum	Sugar Maple	V	52					58	45	<5		a1	haz d						hypoxolon canker	
216	Acer platinoides	Norway Maple	W	53					42	36	0	a	a1	haz d				p			dead top, declining
217	Platanus x acerifolia	London Planetree	W	94					75	59	<5									basal canker	
218	Platanus x acerifolia	London Planetree	W	101					80	79	>15		c3	s							
219	Platanus x acerifolia	London Planetree	W	119					80	82	>15		a3	haz d							
220	Platanus x acerifolia	London Planetree	W	87					82	43	>15										
221	Cornus florida	Flowering Dogwood	W	8	13				11	21	>15		c3	d							
222	Platanus x acerifolia	London Planetree	W	97					80	58	>15		a3	haz h							
223	Acer saccharum	Sugar Maple	W	85					68	57	>15		b2	d,cp			c,mr				
224	Tilia cordata	Littleleaf Linden	W	43					50	31	>15		c2	d							
225	Platanus x acerifolia	London Planetree	X	115					78	83	>15										
226	Acer platinoides	Norway Maple	X	77					39	53	5-15		a1	d,s							declining
227	Prunus serotina	Black Cherry	X	20	25				31	30	>15										
228	Malus sp	Crabapple or Apple	X	11	13	14			11	20	>15										
229	Platanus x acerifolia (stump)	London Planetree	X	150					1	0	0	c									stump
230	Platanus x acerifolia	London Planetree	X	106					75	43	>15		b3	d							
231	Quercus alba	White Oak	X	110					75	64	>15		c2	d,cp							
232	Platanus x acerifolia	London Planetree	X	96					73	48	<5	cr								canker stain	almost dead
233	Liriodendron tulipifera	Tulip Tree	X	137					90	60	?	hl	c3	d							hollow basal opening
234	Platanus x acerifolia	London Planetree	X	92					48	64	0	a									dead
235	Platanus x acerifolia	London Planetree	X	101					75	60	>15										
236	Acer saccharum	Sugar Maple	X	72					46	43	>15		c3	d	re			e			compacted soil
237	Quercus velutina	Black Oak	X	144					72	74	?	hl									hollow tr, vertical cracks
238	Quercus alba	White Oak	X	114					70	87	>15										lean
239	Platanus x acerifolia	London Planetree	X	127					62	8	0	a									dead
240	Quercus palustris	Pin Oak	X	119					92	56	>15		a2	cp,d							
241	Platanus x acerifolia	London Planetree	X	131					90	78	>15		a3	d				e			
242	Fagus sylvatica	European Beech	X	35					32	30	>15		c3	s	re						re metal guard
243	Platanus x acerifolia	London Planetree	X	111					85	64	>15										
244	Platanus x acerifolia	London Planetree	X	94					82	66	>15										
245	Tilia americana	American Linden	X	111					86	67	>15					2					
246	Platanus x acerifolia	London Planetree	X	136					90	93	>15							e			compacted soil
247	Platanus x acerifolia	London Planetree	X	88					70	46	<5		a3	haz d							chlorotic leaves, declining
248	Acer saccharum	Sugar Maple	X	56					47	34	>15										
249	Platanus x acerifolia	London Planetree	X	114					88	68	>15										
250	Platanus x acerifolia	London Planetree	X	121					90	74	>15										small root flare wound
251	Platanus x acerifolia	London Planetree	X	123					86	67	0	a								canker stain	1/2 of tr circ dead
252	Quercus palustris	Pin Oak	X	34					36	30	>15		c2	cp							
253	Brusonettia paperifera	Paper Mulberry	X	20	17	12	19		24	28	>15		a1	re 2nd lead							
254	Morus alba	Crabapple or Apple	X	8					18	17	0	c									crowded
255	Brusonettia paperifera	Paper Mulberry	X	13					18	21	0	c									cluster of volunteer trees
256	Brusonettia paperifera	Paper Mulberry	X	16					21	31	0	c									cluster of volunteer trees
257	Brusonettia paperifera	Paper Mulberry	X	23					26	21	0	c									cluster of volunteer trees
258	Brusonettia paperifera	Paper Mulberry	X	22	19				21	28	0	c									cluster of volunteer trees
259	Morus alba	Crabapple or Apple	X	11	20	11	16	12	25	21	>15		a1	t trs							cluster of volunteer trees
260	Platanus x acerifolia	London Planetree	X	121					92	78	>15		b3	d							
261	Amelanchier sp	Shadblow Serviceberry	Y	12	12	12	12	12	19	25	>15										re damaged leaded
262	Amelanchier sp	Shadblow Serviceberry	Y	12	13	14	10	8	23	18	>15										
263	Amelanchier sp	Shadblow Serviceberry	Y	10	6				20	15	>15										
264	Amelanchier sp	Shadblow Serviceberry	Y	2	2	2	2	2	9	9	>15										
265	Pinus resinosa	Red Pine	Y	25					29	19	5-15		a1	cd							poor structure

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Tree Inventory and Assessment for Clark Park

Inv #	Scientific Name	Common Name	Loc	#1 CBH	#2 CBH	#3 CBH	#4 CBH	#5 CBH	Tree Ht	Tree Sprd	Life Exp	Re	G Pr	Sp Pr	Gd Rt	C	Mt Sc	Fm	Memorial	Pests	Comments
266	Acer platinoides	Norway Maple	Y	78					60	47	>15										
267	Platanus x acerifolia	London Planetree	Y	98					80	74	>15		c3	d							
268	Amelanchier sp	Shadblow Serviceberry	Y	6	4	3			16	13	>15						dp				
269	Quercus alba	White Oak	Y	104					82	52	>15										
270	Platanus x acerifolia	London Planetree	Y	86					75	62	>15										
271	Zelkova serrata	Zelkova	Y	21					26	23	>15		c3	cp			dp				tr wound at 2 ft
272	Malus sp	Crabapple or Apple	Z	24					19	34	>15						dp				re metal cage
273	Pyrus calleryana	Callery Pear	Z	33					28	33	>15		b2	cp							
274	Liriodendron tulipifera	Tulip Tree	Z	75					38	32	>15		b1	cp,d,h							poor structure
275	Platanus x acerifolia	London Planetree	Z	73					62	44	>15		b2	s,h							
276	Acer saccharum	Sugar Maple	Z	81					70	56	>15		a2	cp							soil compaction
277	Nyssa sylvatica	Black Gum	AA	78					65	44	>15										
278	Quercus rubra	Red Oak	BB	52					45	43	>15										
279	Platanus x acerifolia	London Planetree	BB	67					45	43	>15		b2	d							
280	Platanus x acerifolia	London Planetree	CC	129					82	96	>15		a3	haz d							
281	Acer saccharum	Sugar Maple	CC	80					64	63	>15		c2	s,d,h							
282	Acer platinoides	Norway Maple	DD	94					52	59	5-15		a1	haz d							
283	Platanus x acerifolia	London Planetree	DD	109					80	82	>15		a3	cp,d							
284	Prunus sp	Cherry	EE	9					11	7	5-15		a3	cl			dp	f			basal wound and at 2 ft
285	Prunus sp	Cherry	EE	13					12	19	>15										
286	Platanus x acerifolia	London Planetree	EE	18					25	28	>15		b2	cp			dp				
287	Prunus sp	Cherry	EE	6					10	5	>15						dp				
288	Prunus sp	Cherry	EE	5	6	5			12	10	>15						dp				
289	Gleditsia triacanthos inermis	Thornless Honeylocust	EE	39					35	48	>15		b2	d,ws,xbr							
290	Gleditsia triacanthos inermis	Thornless Honeylocust	EE	52					35	49	>15		a1	cp,d							
291	Quercus rubra	Red Oak	EE	42					44	45	>15		c3	h							
292	Platanus x acerifolia	London Planetree	EE	59					82	84	>15										
293	Platanus x acerifolia	London Planetree	FF	102					80	61	>15										
294	Platanus x acerifolia	London Planetree	FF	101					80	56	>15										
295	Platanus x acerifolia	London Planetree	FF	97					80	58	>15										
296	Platanus x acerifolia	London Planetree	FF	102					80	47	>15										
297	Platanus x acerifolia	London Planetree	FF	96					75	68	>15										
298	Platanus x acerifolia	London Planetree	FF	100					80	55	>15										
299	Quercus palustris	Pin Oak	FF	82					110	47	>15										
300	Pyrus calleryana	Callery Pear	FF	21					28	21	5-15						dp				
301	Platanus x acerifolia	London Planetree	FF	100					77	50	>15										
302	Platanus x acerifolia	London Planetree	FF	98					80	49	>15										re tacks
303	Platanus x acerifolia	London Planetree	FF	88					85	43	>15										graffetti
304	Platanus x acerifolia	London Planetree	FF	94					85	73	>15						c				re staples
305	Platanus x acerifolia	London Planetree	FF	94					83	83	>15										
306	Platanus x acerifolia	London Planetree	GG	111					80	76	>15										basal cavity
307	Platanus x acerifolia	London Planetree	GG	63					80	35	>15		b3	d							
308	Platanus x acerifolia	London Planetree	GG	106					75	57	>15										
309	Quercus rubra	Red Oak	GG	12					22	18	>15		a2	cl			dp				
310	Quercus rubra	Red Oak	GG	43					38	39	>15		a2	cl							
311	Platanus x acerifolia	London Planetree	HH	89					75	68	>15										
312	Taxus cuspidata	Japanese Yew	HH	*					3	*	>15										sheared
313	Taxus cuspidata	Japanese Yew	HH	*					3	*	>15										sheared
314	Taxus cuspidata	Japanese Yew	HH	*					3	*	>15										sheared
315	Taxus cuspidata	Japanese Yew	HH	*					5	*	>15										sheared
316	Platanus x acerifolia	London Planetree	HH	111					75	63	>15										
317	Cornus florida	Flowering Dogwood	HH	17					21	22	>15		c3	d			dp				
318	Platanus x acerifolia	London Planetree	HH	8					60	52	>15									mildew	

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Inv #	Scientific Name	Common Name	Loc	#1 CBH	#2 CBH	#3 CBH	#4 CBH	#5 CBH	Tree Ht	Tree Sprd	Life Exp	Re	G Pr	Sp Pr	Gd Rt	C	Mt Sc	Fm	Memorial	Pests	Comments
319	Platanus x acerifolia	London Planetree	ii	100					78	50	>15										
320	Platanus x acerifolia	London Planetree	ii	123					95	81	>15		a3	cp,h							
321	Acer platinoides	Norway Maple	ii	38					31	39	>15		b2	cp,d			dp				
322	Platanus x acerifolia	London Planetree	JJ	101					80	63	>15		b2	cp							basal cavity
323	Platanus x acerifolia	London Planetree	JJ	119					76	84	>15		c3	s							enlarge paving opening
324	Ulmus rubra	Red Elm	JJ	29	27	13			34	43	0	b									growing through & against fence
325	Ginkgo biloba	Ginkgo or Maidenhair	KK	73					55	52	>15		b3	h							
326	Acer saccharum	Sugar Maple	KK	32					56	55	>15		a3	cr,lb,cp	re						
327	Pyrus calleryana	Callery Pear	KK	20					26	17	5-15										multiple scars on tr
328	Platanus x acerifolia	London Planetree	KK	15					25	21	>15										
329	Platanus x acerifolia	London Planetree	KK	106					80	80	>15										
330	Platanus x acerifolia	London Planetree	KK	83					80	64	>15										basal cavity
331	Platanus x acerifolia	London Planetree	LL	96					80	55	>15										basal cavity
332	Tilia cordata	Littleleaf Linden	LL	70					48	46	>15										basal scar
333	Platanus x acerifolia	London Planetree	LL	80					82	46	>15										basal cavity
334	Platanus x acerifolia	London Planetree	LL	112					78	66	>15										
335	Platanus x acerifolia	London Planetree	LL	80					42	64	>15		c2	cp							

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Key Abbreviations For The Clark Park Tree Inventory Spreadsheets

Headings	Explanation and column codes:
# Inv =	**inventory number** assigned by Morris Arboretum
Scientific Name =	**botanical name** of the tree
Common Name =	**common name** of the tree
Loc =	**Area Locations** assigned by Morris Arboretum (delineated by paths)
Cbh =	**circumference breast height** in inches (4.5 feet standard measurement from the ground) multiple entries indicate the number of trunks or stems
Ht Tree =	**Tree Height** (in feet)
Sprd =	**Tree canopy spread,** i.e. - the diameter in feet of the branch spread
Life Exp =	**Life expectancy** in one of four ranges (0,<5, 5-15, >15 [rem = removed])
Re =	recommended for **removal** (Priority a, b, or c; cr = consider removal; hi = hazard inspection recommended)
G Pr =	**Pruning recommendations** - General (Priority A, B, or C; Amount 1, 2, or 3. Note #1 = greatest amount of pruning required)

Sp Pr =	**Pruning – Specific** (blank = no recommendation)
	cd = remove codominant limb;
	cl = correct leader;
	cp = clearance pruning;
	cr lb = removed cracked limb;
	d = deadwood pruning;
	h = hanging detached branch;
	haz b = hazardous branch;
	haz d = hazardous deadwood;
	haz h= hazardous hanging detached branch;
	LL = remove long limb or leader;
	ow = overhead wires;
	s = remove stub;
	sk = prune suckers;
	t = thin branch density;
	t trs = thin # of trunks present;
	v = remove vines;
	ws = water sprouts;
	xbr = remove crossing limb or branch.

Gd Rt =	**Girdling Root** (re = remove girdling root or roots; x = existing girdling root exists but is too late to remove it)

Key Abbreviations For The Clark Park Tree Inventory Spreadsheets

Headings	Explanation and column codes:
C =	**Cabling and Bracing** to reinforce weaknesses (# indicates the number of cables required; x# = the number of existing cables in the tree; u# indicates the number of cables requiring upgrading)

Mt Sc =	**Maintenance Score**
	c = pruning cut made too close;
	dp = tree is planted too deep;
	mr = mower root damage;
	s =stubs present;

Fm =	**Tree form** (Blank = acceptable; E = excellent form; F = fair; or P = poor)
Memorial =	**Memorial Tree** (information found on any identification plaque)
Pests =	**Tree diseases or insects,** as listed;

Comments =	**Comments** and specific directions applying to other columns or miscellaneous notes. If abbreviation not noted, please see Mt Sc or G Pr notes for explanation.
	br = branch;
	cd = codominant limb;
	cr = crack running longitudinally;
	haz = hazard;
	lb = limb;
	lmcav = limb cavity present;
	ml = monitor lean;
	re = remove;
	row = indicated a row or hedge;
	st = indicates that staples should be removed;
	tr = trunk.