ROSEVILLE

REQUEST FOR COUNCIL DISCUSSION

Agenda Date: 11/17/2014
Agenda Item: 14.c

Department Approval

City Manager Approval

Item Description: Request by Community Development Department Staff to Discuss Potential Amendments to §1011.04 (Tree Preservation) of the City Code

BACKGROUND

On July 7, 2014 the City Council discussed current tree preservation requirements and suggested that staff consider amendments that might better preserve existing trees, simplify identification of valuable trees, adjust the calculation for tree replacement requirements, and ensure better coordination among various parts of the City Code that deal with planting, maintaining, and removing trees. Staff has taken the City Council's comments to the Planning Commission and received additional input that is also included in the concepts below.

As staff has worked through the comments, concerns, and staff's own analysis, it is apparent that there are many ways that the regulations could be modified and further direction from the City Council would be useful. The text below is a summary of the staff's current thinking regarding how regulation of tree removal could be refined. For ease of discussion, staff has attempted to group the comments and changes around some key sections:

SECTION TITLE AND PURPOSE STATEMENT

- **Change title to "Tree Preservation *and Replacement* in All Districts" to better convey that Roseville is not strictly prohibiting removal of trees, but is attempting to balance removal with replacement.**

  Staff believes this title change is important in discussing the issue with the public. In recent developments, some of the comments that have been made by residents seem to indicate that there is a belief that the regulation is intended to protect virtually all of the trees due to the title of the section.

- **Add text to clarify that this Section is intended to regulate removal of trees as a consequence of development and construction activity and does not regulate the cutting or removal of existing trees done as regular design and maintenance of private property unless such maintenance is performed in preparation for anticipated development.**

  There was a lot of discussion at the Planning Commission about where the line should be regarding what constitutes a development activity that should be subject to tree replacement. The Commission noted the underlying tension that occurs with regulating tree replacement on single family lots since the section includes an exemption allowing any owner of LDR-zoned properties to remove all of their trees on their lot without penalty, but they have to provide tree replacement if, for instance, they are building a house addition or even a deck.

- **Clarify the relationship between the tree preservation regulations and the required landscaping requirements in order to encourage tree preservation.**

  The code currently views the tree preservation and landscaping sections to be largely independent of each other. If a developer preserves trees, they are still required to put in additional trees to meet the landscaping requirement. For instance, the landscaping requirements require 1 canopy or evergreen tree per unit in a multi-family dwelling. If the developer makes an effort to preserve existing trees, they may have a difficult time getting the site to absorb both the tree preservation requirements and the landscaping requirements.

  One way cities can incentivize additional tree preservation is by allowing all trees that are saved to generate a credit towards the trees required in the landscaping requirements. If the developer chooses to remove the trees and replace them, there would be no credit generated and they would have to satisfy both the tree replacement and landscaping requirements as is currently required.

  Currently, the code allows replacement trees to be utilized for satisfying screening and landscaping requirements, but not preserved trees which could create the opposite incentive (rewarding developers for removing trees with additional flexibility).

TREE PRESERVATION PLAN

- **Specify that tree preservation plans (TPP) are to be prepared by certain qualified individuals.**

- **Clarify the responsibilities of the City Forester in the building and development approval process in order to solicit her/his assessment of the accuracy and adequacy of the plan, possible approval (if approved administratively), or recommendation for Council action.**

  One area of roles and responsibilities clarification is to eliminate the species list in the zoning code and consolidate with the City Forester's others species lists to create uniform species standards. The City Forester's species list includes input from other agencies, such as the DNR.

- **Clarify significant trees, particularly between coniferous and deciduous trees.**

  The current differentiation between coniferous and deciduous trees adds unnecessary complexity in calculating replacements because conifers are calculated based on the tree height while deciduous trees are considered to be significant at a diameter at breast height (DBH) of at least 6 inches. This creates an unintended consequence that conifers have to be replaced with conifers and deciduous trees have to be replaced with deciduous trees since they operate off of different scales.

  Choosing the right minimum level of DBH is generally a determination based on the City Council's assessment of the acceptability of the length of time it would take for a replacement tree to grow to the same size as the tree removed. Different species have different growth rates, but in general, the 6" standard used in the regulations now corresponds to a 10 – 20 year old tree (see Attachment B).

TREE SURVEY AND INVENTORY

- **Survey location of all minimum DBH trees, without distinguishing by species or type.**

  Currently, the tree preservation plans only show the significant trees which have already screened out the "undesirable" species and the trees that are diseased. This can cause confusion with the public when looking at a tree survey because they may know there is a large tree on the lot in a certain location but it does not show up as existing on the tree survey (perhaps due to disease). By showing all trees over the minimum diameter with key notations regarding why they were viewed to be non-significant (i.e. a different symbol for diseased, undesirable species), it will be easier for the approval bodies and the public to understand what change is actually being proposed and why.

- **Preserve the option for a simplified tree survey and inventory where trees do not currently exist on a site or where existing trees will not be cut, cleared, or graded for the proposed development.**

TREE REMOVAL CALCULATION

- **Count trees in public easements/rights-of-way instead of exempting them.**

  Currently, trees may be destroyed without replacement in easements, rights of way, for utilities and in storm water ponding areas. Although trees in these areas will need to be removed for infrastructure installation, by exempting them from tree replacement, the regulations treat them differently than other development activities.

  This current practice can create issues on large lot, infill redevelopment sites where the owner of a large lot often clusters trees along the edge of the large lot for privacy but then leaves the interior with fewer trees so they can enjoy their yard.

  This is partially what occurred on the development along Owasso Blvd. earlier this year where some in the neighborhood found the tree removal to be too severe. The existing tree cover was concentrated more on the edges of the property and there wasn't a lot of tree cover on the interior of the lots that had remained out of view of passersby. Once that exterior tree cover was removed, the sparse tree cover on the interior was exposed.

  By including these lot exterior trees in the calculation for replacement, neighborhoods that have become used to the privacy of an existing tree border in easement areas will receive more relief in terms of additional tree replacement.

- **Reconsideration of the 35%/15% exemption.**

  The current standards allow the removal of 35% of the significant trees and 15% of the Heritage trees without replacement. The text of the section indicates that the purpose of the removals should be for the installation of utilities, building pads and driveways. In the past, the Planning staff has interpreted this to be a straight percentage exemption rather than tying the requirement to demonstrating that the trees are being removed from the applicable areas due to the difficulties in determining how strictly this should be interpreted (i.e. only within the physical building footprint vs. trees impacted due to the grading to support the building footprint, etc.).

The current exemption, as it is being administered, does not recognize any sense of need. A lot that has a solid acre of forest and can't possibly develop without tree removal is treated the same as a lot that may have only 2 or 3 trees per acre.

Staff has not yet come to a recommendation on this requirement, in part, because its impact will be greatly affected by whether some of the other changes to the calculations are implemented.

- **Exempt problem invasive species from calculation and require their removal.**

  One threat to the urban forest is the competition with certain invasive species. The existing regulations are generally silent on this issue. This amendment process could strengthen the battle against the species that are a problem by having them identified and removed as part of the development process.

- **Exempt diseased or disease-prone trees from calculation (and perhaps require removal) if the City Forester determines that removal of such trees would help to prevent the spread of disease.**

  Currently, the code only considers the health of trees when they reach Heritage size. As with invasive species, if the City Forester finds some of the existing trees to be a threat to the urban forest due to disease concerns, this would encourage (and potentially require) that they be removed.

- **Removal of trees determined by the City Forester to be "undesirable" (e.g., cottonwoods, box elders, etc.) is calculated at ½ DBH to acknowledge that such trees have some nuisance qualities despite their positive attributes.**

  Currently, the "undesirable" trees do not generate a need to replace if they are removed. However, to the casual observer and neighborhood, a grove of cottonwoods, for instance, can still provide privacy, shade and other positive attributes that make it difficult to see removed without any attempt to mitigate the loss. By choosing to replace trees in this situation at a rate that is half of the normal tree replacement ratio, the goal would be to provide some mitigation for tree loss, but acknowledge that there may be some long term benefits to reducing the numbers of trees that fall into this category within the city.

- **Removal of trees in solar access easements is calculated at ½ DBH to reduce a disincentive to providing the potential for solar energy production, which is generally encouraged by the Comprehensive Plan.**

  As the price of solar installations is dropping rapidly, staff is beginning to see a significant uptick in desire to create zero impact homes and other solar installations. This has the potential to put two policy goals (tree preservation and sustainable energy generation) in conflict with each other in certain circumstances. This proposal would attempt to balance the loss of trees for solar installations with the benefits of promoting solar installation.

- **Offer an additional incentive to preserve Heritage trees.**

  Currently, developers are penalized for removal of Heritage trees by causing them to be replaced at twice the replacement ratio of non-Heritage trees. In addition, staff is proposing that if a developer manages to save a Heritage tree, the DBH of that Heritage

tree could be subtracted from the amount needed to be replaced on the site at a 1:1 ratio, not the 2:1 penalty ratio.

- **The definition of Heritage trees is reduced to any tree which equals or exceeds 20-inch DBH (deciduous or coniferous).**

  Because of the pre-development land use in Roseville, there are not significant stands of "old growth" forests to protect like there might be in other communities. A noticeably large tree in most neighborhoods is likely not 100 years in age and more likely to be in the 50 – 70 year age. Developments rarely are submitted with trees that fall into the current Heritage tree definition of 24+ inches (coniferous) to 27+ inches (deciduous). This proposal would recalibrate the definition of Heritage tree to be a size that corresponds with the local conditions.

TREE PROTECTION PLAN

- **Preserve the requirements to show topographical information, areas of site disturbance, areas of tree protection, and details of tree protection BMP.**

  The tree protection plan would be an additional drawing that takes the trees that are indicated to preserve in the tree survey drawing and identify the measures to be taken to protect those trees so that they can be clearly demonstrated in the construction and approval process.

TREE REPLACEMENT PLAN

- **The tree replacement plan would be a third drawing that shows not only the protected trees from the tree survey but the location of what is planned for the tree replacement including species, quantities and caliper inches.**

  With the current system, approval bodies and the public only see the trees to be removed but there is not a corresponding visual to indicate what will be added during the development process. This incomplete information can lead to misunderstanding in the public regarding what the long term situation will be with trees on the site.

  Requiring the tree replacement plan will also allow the Planning Commission and City Council to have the information to respond to particular concerns raised in the approval process with actions such as requiring greater concentrations of trees or particular types of trees (coniferous or deciduous) in sensitive locations where more or less visibility might be desired.

- **Submit a form tabulating the tree replacement calculations.**

  This form would be created by the Community Development Department to illustrate the tree replacement calculations so that it is easily understandable for applicants, approval bodies and the public.

- **City Council approval**

  TPPs related to major subdivisions, conditional uses, interim uses, and rezonings in which a final development plan is known, shall be approved by City Council. The text would be strengthened to clarify that the City Council has the authority to require reasonable adjustments to site plans for the purpose of tree preservation.

TPP related to permitted activities (e.g., building permit or grading permit) shall be approved by City Council when more than 50% of existing trees (if this percentage represents not less than 10 trees) would be removed and/or when more than one Heritage tree would be removed.

OTHER

- **Reference the shoreland ordinance.**

  Since the City Code is online and residents may look up the requirements without seeking guidance from staff, they could mistakenly assume that they can cut down all of their trees on any LDR zoned lot. Although that is true in the vast majority of lots in the City, shoreland lots do have an additional layer of control that can limit a property owner's ability to remove trees and vegetation.

- **Additional construction penalty**

  In order to protect trees during the construction process and get contractors to take tree protection seriously, trees identified for preservation that die as a consequence of the development activity should be replaced at twice the required replacement value.

- **Off-site tree fund**

  Development of some especially wooded lots may create situations in which required new/replacement trees cannot reasonably be accommodated on the site. The Planning Commission came up with an idea that in such cases, the developer could contribute an amount of money comparable to the value of the trees not installed to a fund for planting and maintaining trees and other landscaping in public spaces around the city.

- **Preservation of trees that are planted as part of landscaping plans**

  It may be desirable to augment the City's landscaping requirements to ensure that multi-family residential, commercial, and industrial properties replace trees that die or are otherwise removed to preserve the intended shading/ screening qualities.

REQUESTED DISCUSSION

This memo is an update of staff's progress on revising the tree preservation regulations.

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Exhibits: A: Planning Commission minutes B: Morton Arboretum age estimation table

Tree Preservation: Discussion regarding amendment to Section 1011.04 Tree Preservation

As detailed in the staff report dated August 6, 2014, City Planner Paschke noted that this discussion was intended to review the current tree preservation requirements as adopted in 2010 under the City's revised Zoning Ordinance, following practical application, and the direction of the City Council to review current elements and aspects needing potential amendment. Mr. Paschke advised that staff was again seeking guidance and feedback, based on past debate and concerns about various nuances, as outlined in the most recent City Council discussions of July 7, 2014 (Attachment B), and outlined in lines 41 – 51 of the staff report.

Mr. Paschke noted that the City's Park & Recreation Board also served as the City's Tree Board; and asked the Planning Commission's preference to work in conjunction with, or separately at first to address the City Council's charge to put more enforcement and specificity into the current ordinance upon revision, with the goal to incentivize preservation.

Mr. Bilotta again used the proposed Mueller Subdivision as an example of how a neighborhood got used to a lot of trees, and then upon redevelopment, it was hard on the neighborhood to make that transition. As with the Mueller property, Mr. Bilotta noted that many of the existing trees were of the Boxelder species, and the City currently, from a technical forestry perspective, gave not credit for Boxelders or Cottonwoods, with the attempt to eventually get rid of those types of species and replace them with other species.

Mr. Bilotta clarified that the City's current ordinance was all about replacement and not mandating things remaining in place (e.g. heritage trees), and had no ability to protect or preserve any trees valued by the community. Mr. Bilotta noted that another issue that came up a lot was what controls the Planning Commission and City Council had in guiding development in currently ungraded areas that may not be amenable for a developer to address, with the City's hands currently tied. Also, Mr. Bilotta noted another consideration was if and when the City went too far in the other direction, advising that in some cities a resident had to get a permit to cut down any tree on private property. While the City Council wasn't ready to go there, Mr. Bilotta suggested a general tweaking of the current ordinance and structural changes to tie them in with City Code and Parks & Recreation Department considerations was preferable.

While there may be some obvious areas for improvement, not being a Forester or Arborist, Chair Gisselquist opined that in order to make the best recommendations, there should be some technical expertise behind the recommendations, whether from the parks group as to what constitutes a problem tree species while also recognizing that any tree coming down constitutes some visual element and should be replaced.

Member Cunningham reviewed some comments she'd heard from residents prior to this meeting, including specific trees needing to be preserved; more attention paid to species; the replacement ratio of trees not being sufficient; and how to address different scenarios for preservation, replacement, and how to balance that aesthetic need without making it difficult for a property owner to achieve physically and/or financially.

Mr. Bilotta referenced Councilmember Etten's comments at the City Council meeting, suggesting that rather than the City having its own list of trees, since neither they or staff were foresters, that the City Code reference the DNR list of trees and period revisions to that list as times change.

Member Boguszewski suggested that a forester or arborist review the ordinance to make sure root depth needed for a species to survive, not just root/fence lines, and other considerations are addressed. If and when the Planning Commission met jointly with the Parks & Recreation Commission (Park Board), Member Boguszewski asked that a qualified forester also attend that meeting to provide feedback and their expertise. As an example, Member Boguszewski stated that he wasn't convinced the list should be confined to passive DNR references, but also include some of the many arboretums in the State of MN for their input and to provide their expertise.

While yet to set a 2015 budget, Mr. Bilotta noted that the City Council had before them a proposal to increase the current City forester form part- to full-time to assist in such efforts.

If the staff time was increased, Member Boguszewski opined that he would like to see the requirements of doing to tied to the skills and expertise for whoever held that job, allowing more time for the existing staff person in that role. Member Boguszewski agreed with the comments of Member Cunningham, that if the City valued trees at all, the current way the ordinance was structured for replacement percentages was insufficient and needed to increase while still allowing for flexibility based on age of existing trees or based on their maturity levels.

Mr. Paschke stated that he was not opposed to increasing that ratio or number, but clarified that there was no instance where a developer could clear cut a site and not install replacement trees, even for new projects in order to meet landscape requirements for trees and shrubs. Using the Josephine Heights development as an example, Mr. Paschke noted that they received credit for preserved trees, many heritage trees; however, in some commercial areas, it was more difficult to achieve that; or other developments with existing landscaping that couldn't fit additional trees in based on design standards.

Member Boguszewski opined that this wasn't only about individual sites or micro locations, but had a biosphere affect and benefit for the entire community. Member Boguszewski questioned if there was any way to accomplish those instances when there wasn't room on an individual site, but reforestation or replacement could be accomplished in other areas of the community (e.g. Central Park).

Mr. Paschke agreed that staff could look into options to plant trees off-site, or in certain developments to plant on adjacent properties, opining that there may be a number of opportunities to review.

As an example Member Boguszewski suggested a line of shade trees along County Road B-2.

Member Stellmach stated that his concern was that right now it seemed like you could clear cut a lot as long as you replaced some trees.

Mr. Bilotta agreed with that perception; however, he noted that it generally meant replacing one tree with multiple trees, but there came a point where you couldn't plant any more.

Member Stellmach opined that, if you were replacing on other sites, it was not a true replacement (e.g. young trees versus heritage trees); and habitat and absorption were other considerations. Member Stellmach further opined that there needed to be a way to incentivize retaining older trees on a lot and not cutting them down in the first place. Member Stellmach suggested a tradeoff in higher density or different setbacks for keeping older trees.

While they provide great aesthetics, Chair Gisselquist noted the burden in trying to build around heritage or older trees in an attempt to preserve them.

In his initial read of the materials, Member Daire opined that it was written in such a way to include private properties across the City, not just those being proposed for redevelopment, and questioned if that was the intent and purpose that any tree preservation plan needed to be submitted and approved. If this was the case, using a recent porch remodel at his residence as an example, Member Daire opined that he found this scary, as well as noting that the City didn't have sufficient personnel to deal with such an overreaching purpose. Member Daire questioned the viability of passing on the cost of a tree preservation plan to private property owners. If he was reading the existing ordinance correctly, Member Daire opined that this created a huge burden for private property owners.

Mr. Bilotta advised that, as with reliance on engineers and surveyors for grade specifications, the City also had to depend on a professional developer to make a determination on sick trees or other considerations as part of the tree preservation plan presented as part of the requirement.

Mr. Paschke clarified that a private citizen in Roseville could not get a building permit until they identified trees – whether through a formal or informal tree preservation plan – and specific to the impacted area only, not the entire site. Mr. Paschke noted that if there was no impact to existing trees, a property owner still had to fence around those trees, if applicable and within the impact area, to ensure there was no root damage as the project proceeded.

Member Daire further opined that this gave the City the right to tell a private property owner what to do with tree coverage on their property, which he also found problematic and overreaching; further opining that the City didn't have any right to come into his property to tell him what he could or could not do unless the City owned the trees.

Chair Gisselquist noted that in some instances, such as easements for power lines, people other than the City could access private property.

Member Daire recognized this as an incentive to have consistently dependent utility service available; but could find no benefit in his having to submit a tree preservation plan to qualify for a building permit for a porch addition. While being a verbal processor, Member Daire reiterated that this frightened him, causing a need for his only recourse to be an appeal to the City to allow trucks to come onto his lot with building materials to accomplish his porch remodel.

Mr. Bilotta clarified that, as far as the rights of the City, the interpretation depended on the type of development activity: whether a building addition or a developer building houses. Mr. Bilotta noted that all of those trees on a private developer's lot were also private trees on that private property, but the City has indicated through its zoning ordinance and tree preservation regulations, that they have an interest in maintaining private trees. That said, Mr. Bilotta noted that there was obviously some flexibility built in to address issues on a case by case basis and based on the most advantageous means to ensure trees are protected and/or preserved.

Mr. Paschke noted that a property owner was allowed to remove 35% of the tree coverage on their private property without penalty, per current code, and using Member Daire's remodel as an example, a simplified plan could address what trees may potentially be impacted by construction of that particular project. In some cased, Mr. Paschke noted that a more involved survey of trees may be required by the inspection department, but as part of the City's tree preservation ordinance and process, a plan was approved.

Member Daire opined that his problem was in assuming that the trees were not his even though on his private property.

Mr. Paschke advised that code stated that the City's intent was to protect as many trees within the community as possible, or when unable to do so, to make allowances for their replacement of varying degrees.

Mr. Bilotta noted that the issue was not whether or not the City owned the trees, and as a private citizen you had the right to do what you wanted, but when triggering an expansion mode, you moved from homeowner to developer status.

Chair Gisselquist noted that this became the whole premise of the zoning code, and in the example of a garage, while the City didn't own the garage, the homeowner put on the developer that in their role of impacting the community; and questioned at what point the rules and regulations became applicable.

Given another scenario, Member Daire questioned if he wanted to clear 45% of the trees on his property, but didn't apply for a building permit, he couldn't do so.

Mr. Paschke advised that if the property owner was not doing any development, at this time there was no ordinance on the books in any zone to prevent a property owner from doing so, but similar to any other code requirement, once you seek the City's approval, through an administrative or other process, it triggered certain requirements.

Mr. Bilotta noted that, unfortunately, this was a sticky loophole that most codes fell into.

Back to the alternative proposal for planting trees elsewhere, Member Murphy stated that he found that intriguing. As an example, Member Murphy noted some Buckthorn removal projects in some parts of the City that had left vacant areas, and questioned if a creative approach along that line for off-site planting to meet ratios or criteria, may benefit those other areas and enable trees to be planted which would further address Member Boguszewski's biomass theory. Member Murphy opined that, increasing habit and replanting in public areas would be a neat option to explore.

Specific to Member Daire's comments, Member Boguszewski added his voice to those concerns; and spoke in support of being cautious against over-reaching with this type of ordinance. While recognizing public utilities versus private ownership and their underlying values, Member Boguszewski opined that, as this ordinance was further refined, there needed to be guards against increasing encroachment of government upon personal liberties; and safeguards or options were needed to address those concerns expressed by Member Daire.

Along those same lines, Member Murphy referenced the last paragraph of Attachment A (Item J entitled "Entry on Private Property and Interference with Inspection"), and suggested the need for caution in limiting enforcement action only on the subject parcel, not adjacent properties. Member Murphy suggested further clarification on that point.

Mr. Bilotta noted that the intent was that this was addressing developed properties; however, he recognized Member Murphy's concerns.

In conclusion, Mr. Bilotta noted that the intent of the City Council was not to radically change requirements or get into private sector home issues, but specifically to:

1) Determine whether to define trees by a recognized standard versus a list developed by the City that periodically became outdated; and
2) Recognize there was still some inherent value to trees considered to be a bad species; and
3) How to beef up controls if you want to retain a tree or have one that can't be relocated.

Mr. Paschke suggested caution in addressing the whole notion of or potentially increasing replacement formulas.

Mr. Bilotta suggested, if consideration was given for credit for bad tree species that needed to be addressed before considering the formula, as there may be more trees showing up.

Member Boguszewski noted past incentives during Arbor Day activities for tree planting; with some now located on private property having increased their tree count of their own free will, but now subject to penalty for what they originally did as a good deed. Member Boguszewski questioned if there was a provisional credit or a certain time when a tree survey was submitted.

> Mr. Lloyd noted that such a situation existed today, with a private property owner allowed to remove up to 35% of their trees without any issue.

Mr. Bilotta noted, as an example, a shopping center in another state, which brought in 20,000 small trees five years prior to development, and in that instance, a PUD was negotiated to vary that section of zoning to provide credit for the future development.

Estimated[1] Age of Urban Trees by Species and Diameter (DBH)

	Tree diameter (DBH) in inches									
Species	5"	10"	15"	20"	25"	30"	35"	40"	45"	50"
	Estimated tree age in years									
American elm (4)		27	38	48	58	67	77	86	95	104
Siberian elm (4)		24	32	39	46	53	59	65		
Hackberry (7)		14	29	50	77	109				
Honeylocust (4)		29	41	52	63	73	84	94		
Pear (3)	6	15	24	34						
Green ash (4)		27	45	63	83	104	126	148	171	194
White ash (3)	6	14	21	28	35					
Silver maple (7)		9	18	31	46	65	86	110	136	
Boxelder maple (4)		23	36	50	64	78				
Sugar maple (4)		33	51	70	88	107				
Red maple (6)	13	23	34							
Black maple (7)		20	39	64	94	127				
Norway maple (4)		28	40	52	63					
London plane (3)	7	16	25	33						
White oak (3)	11	24	36							
Swamp white oak (3)	9	20	31							
Red oak (4)		55	75	94	112	130	146	162		
Bur oak (4)				134	140	144	148	152		
Pin oak (4)		28	38	46						
Lindens (6)	12	21	31	41	53					
Basswood (7)		16	31	51	76	104				
Ginkgo (3)	12	24	35							
Black walnut (6)	14	26	41							
Kentucky coffeetree (3)	9	23	36							
Catalpa (3)	6	13	21	28	36					
Baldcypress (3)	7	18	29							
Poplar (10)	15	28	41	52	61	69	77	84		
White pine (6)	15	26	38							
Scotch pine (4)		52	68	82	95	107	119			
White spruce (6)	21	39	61							
Blue spruce (6)	17	30	45							

[1] Estimates are approximate given the significant variation in the growth rates of individual urban trees.
(#) = source of information for the species. See accompanying page of citations.

The Morton Arboretum

Attachment B

Citations for the Table "Estimate age of urban trees by special and diameter (DBH)."

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3. Dwyer, John F. 2010. Unpublished data on the growth of planted street trees in selected suburbs of Chicago. The Morton Arboretum, Lisle IL.

4. Dwyer, John F. 2009. How old is that tree? ***Illinois Trees***: The quarterly publication of the Illinois Arborist Association. Vol. 24, Issue 6, Fall 2009 p. 13.

5. Fleming, Lynn E. 1988. Growth estimates of street trees in central New Jersey. Unpublished MS Thesis, Rutgers University, New Brunswick, NJ.

6. Frelich, Lee E. 1992. Predicting dimensional relationships for Twin Cities shade trees. Unpublished paper. Department of Forest Resources, University of Minnesota –Twin Cities, St. Paul MN.

7. Iakovoglou, Valasia. 2001. Trees examined along a rural-urban gradient and by local land use in the Midwestern US: An investigation of factors related to tree growth. Unpublished MS Thesis. Iowa State University, Ames Iowa.

8. Iakovoglou, Valasia; Thompson, Janette; Burras, Lee and Rebecca Kipper. 2003. Factors related to tree growth across urban-rural gradients in the Midwest, USA. ***Urban Ecosystems*** 5: 71-85.

9. Iakovoglou, Valasia; Thompson, Janette and Lee Burras. 2002. Characteristics of trees according to community population level and land us in the U.S. Midwest. ***Journal of Arboriculture*** 28, 59-69.

10. Nowak, David J. 1994. ***Atmospheric carbon dioxide reduction by Chicago's urban forest.*** pp. 83-94 In: Chicago's urban forest ecosystem: Results of the Chicago Urban Forest Climate Project. GTR NE-186. Radnor PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 201 p.

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