



# Ramsey County Ash Tree Management Plan

A ten-year plan in response to the emerald ash borer infestation

1/8/2020



## Introduction

This plan includes a system wide inventory, rating, and plan for ash tree removal or replacement in response to the effects of emerald ash borer (EAB) within the Ramsey County Parks & Recreation department's jurisdiction. The potential liability, environmental and aesthetic impacts dead ash trees will have within the park system drives the need for this plan. Spatial extents of this plan include areas within Ramsey County Parks & Recreation department property, including, and adjacent to, parking lots, picnic areas, playgrounds, structures, golf courses, and other high traffic recreational areas. This plan does not include trees in natural undeveloped portions of park property, as there are countless ash trees in these areas making management cost prohibitive, however, ash trees can be removed during future natural resources restoration projects if suitable with the restoration plan.

This plan proposes to proactively remove or replace priority ash trees, starting on sites near closely EAB infested areas. This approach will allow for removal or establishment of replacement trees prior to infestation, preventing clear cutting of infested or dead trees within these highly used active areas. The remove and replace approach have been calculated to be more cost effective than ongoing treatment and it allows for phasing and consistent pricing on tree replacement. Further delay of this plan will inevitably result in spread of the infestation, increased costs of removal and replacement tree stock over time plus an increasing danger of hazardous trees.

## Background

Emerald ash borer (EAB) is an insect that attacks and kills ash trees. It is spread through short distance natural flight and infested firewood transported long distance. The adults are small, iridescent green beetles that live outside of trees during the summer months. The larvae are grub or worm-like and live underneath the bark of ash trees. Trees are killed by the tunneling of the larvae under the tree's bark. EAB was first discovered in the U.S.A, in 2002 near Detroit, Michigan. In May 2009, the first cases of EAB were found in Minnesota within the City of St. Paul. The City of St. Paul and its' surrounding suburbs began creating management plans shortly after. Many cities are now nearing ten years of planning and management. EAB has now locally infested most areas of Ramsey County. In 2010 the Ramsey County Parks & Recreation department began taking inventory of ash trees throughout golf courses and recreational areas of the park system. Between the years 2010 – 2012 around 350 ash trees, located in parks and golf courses, were treated with Emamectin benzoate (trade name TreeAge). This treatment was effective for up to four years. Treatment of ash trees ceased after this initiative because of the high costs of ongoing treatment.

## Ash tree management

The options for ash tree management include remove or replace, chemical treatment and biocontrol agents.



Many counties and municipalities are implementing the removal or replacement of ash trees. Once an ash tree becomes infested with EAB, it generally takes 3 to 5 years for the tree to die. By removing these trees before mortality occurs reduces the number of dead and potentially hazardous ash trees. Also, the removal of these trees becomes much more dangerous when they are dead. Removal and replacement are shown to be the longest term, most cost-effective measure. Replanting with varying tree species will also increase resilience to future pests and pathogens.

Chemical treatments include a wide variety of insecticides with the most common being Imidacloprid. Treatments include soil injection, trunk injection, bark spray and canopy spray. The most common treatments are soil injections and trunk injections. The cost of these injections depends on the diameter of the tree and can cost anywhere from \$40 to \$126 per tree. These treatments need to be re-applied every 2 to 4 years. These chemical treatments have little to no effect once a tree is infested with EAB. If there is not enough overlap in treatments a tree may unknowingly be infested and perish even after a treatment is applied. Treatment within Ramsey County Parks & Recreation department parkland ceased after EAB became so widespread that protection became too expensive.

Biocontrol, which is administered by the Minnesota Department of Agriculture within the State of Minnesota, includes three parasitoid wasp species. Two species attacks the larval stage of EAB under the ash bark. The other species kills EAB eggs that are in bark crevices. These wasps are small like gnats and do not harm humans. They were selected by the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) and Forest Service and tested extensively to ensure that they will not negatively impact other species or the environment. APHIS rears these biological control agents at a specialized facility in Brighton, MI and provides them to states with EAB infestations (<https://www.mda.state.mn.us/plants/pestmanagement/eab/eabbiocontrol>). The Minnesota Department of Agriculture, in conjunction with the Ramsey County Parks & Recreation department, coordinates the release and research plots of biocontrol agents within several locations at Battle Creek Regional Park for the past four years. Biocontrol research continues throughout 30 other infested sites throughout the state.

### Recommended course of action

Given the proximity of known infestations and the ongoing climbing costs of treatments the viable option for the Ramsey County Parks & Recreation department is to implement the removal or replacement of ash trees within the system in an order of proximity to known infestations. Golf courses and active use park areas will be managed separately through the implementation process.

To plan for removal or replacement the Ramsey County Parks & Recreation department took an inventory of ash trees, which was completed in May 2019, see locations and inventory dates in [Appendix A](#). A spatial database of this inventory was created, and ash trees were prioritized in three categories:

1. Priority 1: removal and replacement of high priority trees
2. Priority 2: removal and replacement of medium priority trees following priority 1 trees
3. Priority 3: removal with no replacement of low priority trees

The number of trees and associated prioritization is shown in the table below and map of ash tree locations and known infestations can be found in [Appendix B](#).

Number and prioritization of ash trees		
	Active use park areas	Golf courses
Priority 1	473	156
Priority 2	165	232
Priority 3	153	170

### Overall Cost

The removal or replacement of trees will be based on available funds and is expected to be completed over an ten-year period at a **total projected cost of \$733,688**. At this time, existing funding for ash tree removal or replacement includes \$6,870.23 for active use park areas and \$47,500 for golf courses. The source for these funds can be found in [Appendix C](#). The remaining funds required will need to be requested in a lump sum of \$679,318 or requested at the per year cost of implementation efforts shown in the table below.

	Yearly cost for active use park areas	Yearly cost of golf courses	Total yearly cost (park active use areas + golf courses)	Current available funds ( <a href="#">appendix C</a> )
year one	\$50,747	\$2,500	\$53,247	\$54,370
year two	\$58,747	\$63,266	\$122,013	
year three	\$66,747	\$45,994	\$112,741	
year four	\$66,747	\$33,580	\$100,327	
year five	\$66,747	\$0	\$66,747	
year six	\$66,747	\$0	\$66,747	
Year seven	\$66,747	\$0	\$66,747	
Year eight	\$66,747	\$0	\$66,747	
Year nine	\$16,000	\$0	\$16,000	
Year ten	\$8,000	\$0	\$8,000	
	Total active use park areas cost	Total golf course area cost	Total cost	<b>Total cost of EAB plan</b>
	\$533,978	\$145,340	\$679,318	<b>\$733,688</b>



Funding requests will be divided between regional and county funding requests based on the designation of the park or facility. 53% of the costs are borne on trees within regional parks leaving 47% of the costs for the county to fund. A table of tree numbers and DBH by park and regional versus county designation can be found in [appendix D](#). A break down per year and total funding request is in the table below.

Plan year	Yearly plan cost	Regional funding request	County funding request
Year one	\$53,247	\$28,221	\$25,026
Year two	\$122,013	\$64,667	\$57,346
Year three	\$112,741	\$59,753	\$52,988
Year four	\$100,327	\$53,173	\$47,154
Year five	\$66,747	\$35,376	\$31,371
Year six	\$66,747	\$35,376	\$31,371
Year seven	\$66,747	\$35,376	\$31,371
Year eight	\$66,747	\$35,376	\$31,371
Year nine	\$16,000	\$8,480	\$7,520
Year ten	\$8,000	\$4,240	\$3,760
	<b>Total EAB plan costs</b>	<b>Total EAB plan regional funding request</b>	<b>Total EAB plan county funding request</b>
	<b>\$679,318</b>	<b>\$360,039</b>	<b>\$319,279</b>

The cost for removal and the grinding of stumps was determined using the Public Works-Environmental Division county tree contractor’s current removal price of \$11.50 per diameter at breast height inch. The county tree contractor will be used for the removal process on parks and golf courses in coordination with the county forester. A contractor, to be determined, will be hired for providing tree stock, planting and three years of maintenance on active use park areas at a projected cost of \$650 per tree. Projected costs are \$250 per tree, \$100 per tree for planting, and \$300 for three years of maintenance per tree. Golf course personnel will plant and maintain replacement trees on golf courses, so the cost will only be for the nursery tree stock at a projected rate of \$250 per tree.

Park active use areas implementation and detailed cost

Removal within park active use areas will be initiated based on priority as identified in the survey plus proximity to EAB infestations. Trees identified as priority one will be removed first. Priority one site removal and replacements will be prioritized based on proximity to

existing infestations, current tree health, and danger to the public or infrastructure. Staff will also prioritize based on local knowledge and risks.

Trees will be cut, removed per [MDA guidelines](#), and stumps ground under a contract with the Public Works-Environmental Division or other contract. **This contract will go out for bid in 2021 meaning the cost per inch of diameter at breast height (DBH) removal will likely increase. Future increases are possible during the lifetime of this plan. Expediting any aspect of this plan will result in cost savings.** Removal of trees identified on park land or arena properties will occur as follows

1. Remove all priority one sites in Year one using a combination of existing funding
  - a. In order of priority sites are: Battle Creek, Biff Adams Arena, Ken Yackel Arena, Pleasant Arena, Parks Administration Building, Keller Park, Lake McCarrons Park, Beaver Lake Park, White Bear Lake Arena, Spoon Keller Launch, Gervais Lake Park, Tony Schmidt park, Lake Josephine Park, Island Lake Park, Owasso Park, Long Lake Park, Otter Boat Landing, Bald Eagle Boat Launch, Snail Lake Park, Turtle Lake Park, and White Bear Boat Launch
2. Remove all priority two sites in year two with requested funds
  - a. Battle Creek, Ken Yackel Arena, Parks Administration Building, Keller Park, Lake McCarrons Park, Beaver Lake Park, White Bear Lake Arena, Tony Schmidt park, Island Lake Park, Owasso Park, Long Lake Park, Bald Eagle Boat Launch, Snail Lake Park, Turtle Lake Park, Marsden Archery Range, and White Bear Boat Launch
3. Remove all priority three sites in year 3 with requested funds
  - a. Battle Creek, Ken Yackel Arena, Shoreview Arena, Vadnais Sports Arena, Parks Administration Building, Keller Park, Spoon Boat Launch, Lake Gervais County Park, Lake McCarrons Park, Beaver Lake Park, White Bear Lake Arena, Tony Schmidt park, Island Lake Park, Lake Josephine County Park, Long Lake Park, Bald Eagle Boat Launch, Snail Lake Park, Turtle Lake Park, and Marsden Archery Range

Tree removal cost	Total tree DBH in system (inches)	Total cost of Removal
\$11.50/inch of DBH	9,751 inches (estimated)	\$117,978
year one	96	\$14,747.25
year two	96	\$14,747.25
year three	96	\$14,747.25
year four	96	\$14,747.25
year five	96	\$14,747.25
year six	96	\$14,747.25
year seven	96	\$14,747.25



year eight	96	\$14,747.25
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Replacement trees will be replanted for priority one and two trees as funding is available for hire of a contractor. Priority three are generally on wood line edges and can be removed to allow for natural regrowth. Replacement tree locations may not necessarily be in the removed tree spot. Location is dependent on the best use of the tree, tree species, and will be directed by the planning division. Replacement will follow a longer time scale in order to evaluate the needs of the replacement location and ensure proper establishment of trees. Individual site planting plans will be created by the planning department as progress continues. These plans will be amended to this document. Tree species will be chosen from the list in [Appendix E](#) developed under consultation across county divisions with input from city ordinances ([Appendix F](#)). The department retains the right to add or deduct trees as it sees fit. Currently, there are no tree replacement ordinances required for removal of ash trees effected by EAB in Ramsey County. The Minnesota Department of Natural Resources does have guidelines that replacement trees no single tree family to make up more than 20% of total trees, 10% of one genera, or 5% of one species be planted in Ramsey County to protect from disease or climate change affecting a large number of landscape trees. While the department will aim for this diversity, it will procure as it sees fit given price and availability constraints. A combination of contractor and/or staff time will be used to complete the plantings. Trees will be broken into an equal amount of plantings over the next eight years.

Average tree cost installed per tree	Total trees (priority 1 & 2 only)	Total cost of replacement
\$350	640	\$224,000
year one	80	\$28,000
year two	80	\$28,000
year three	80	\$28,000
year four	80	\$28,000
year five	80	\$28,000
year six	80	\$28,000
year seven	80	\$28,000
year eight	80	\$28,000

In order to protect the investment of new trees, three years of maintenance is required. Maintenance will include but not limited to watering, amending soil, providing support, animal/pest protection, and replacing trees that do not survive. A combination of contractor and/or staff time will be used to complete the maintenance.



Est. tree maintenance cost/year for 3 years	Total trees	Total cost of maintenance
Est. \$100/tree/year	640 (priority 1 & 2 only)	\$192,000
year one	80	\$8,000
year two	160	\$16,000
year three	240	\$24,000
year four	240	\$24,000
year five	240	\$24,000
year six	240	\$24,000
year seven	240	\$24,000
year eight	240	\$24,000
year nine	160	\$16,000
year ten	80	\$8,000

The table below shows the total costs associated with removal, replacement and maintenance for the active use park areas.

Plan year	Yearly cost for active use park areas
year one	\$50,747.25
year two	\$58,747.25
year three	\$66,747.25
year four	\$66,747.25
year five	\$66,747.25
year six	\$66,747.25
Year seven	\$66,747.25
Year eight	\$66,747.25
Year nine	\$16,000
Year ten	\$8,000
	Total active use park areas cost over ten years
	\$533,978.00





Golf course implementation and detailed cost

Golf courses include Goodrich, Keller, and Manitou Ridge golf courses. The Ponds at Battle Creek has no ash trees within its boundaries. Island lake golf course is under a contract agreement and will not be included at this time. Removal at the golf courses will be prioritized based on golf personnel’s local knowledge of significant trees within the course layout and hazardous trees. Trees will be cut, removed per [MDA guidelines](#), and stumps ground under a contract with the Public Works-Environmental Division or other contract removal of trees.

1. Remove 162 trees at Keller year one using a combination of existing funding
2. Remove 184 trees at Keller, 58 at Goodrich, & 33 at Manitou in year two with requested funds
3. Remove 58 trees at Goodrich and 33 at Manitou in year three with requested funds
4. Remove 30 at Manitou in year four with requested funds

Tree removal cost	Total tree DBH in system	Total cost of Removal
\$11.50/inch of DBH	8,333 inches (estimated)	\$48,340
year one	162	\$0 (existing funding)
year two	275	\$26,766
year three	91	\$16,744
year four	30	\$4,830

Trees will be replanted by golf course personnel as funding is made available for nursery stock. Some replacement has already taken place at Goodrich Golf Course. Replacement tree locations may not necessarily be in the removed tree spot. Location is dependent on the best use of the tree, tree species, and will be directed by the golf course supervisor. Replacement will follow a longer time scale in order to evaluate the needs of the replacement location and ensure proper establishment of trees. Tree species will be chosen from the list below developed under consultation across divisions. The goal will be for no single species to make up more than 25% of total trees replaced to protect the course from disease or climate change affecting a large number of landscape trees. A combination of contractor and/or staff time will be used to complete the plantings.

1. Replace 10 trees at Keller in year one using a combination of existing funding
2. Replace the remaining priority 1 sites in year two with requested funds
3. Replace one-half of priority 2 sites in year three and four with requested funds



Average tree cost	Total trees	Total cost
\$250 (installed)	388	\$97,000
year one	10	\$2,500
year two	146	\$36,500
year three	117	\$29,250
year four	115	\$28,750

In order to protect the investment of new trees, three years of maintenance is required. Maintenance will include but not limited to watering, amending soil, providing support, animal/pest protection, and replacing trees that do not survive. Golf course personnel will complete tree maintenance, therefore no cost is budgeted for tree maintenance activities on golf courses.

The table below shows the total costs associated with removal and replacement for the golf courses.

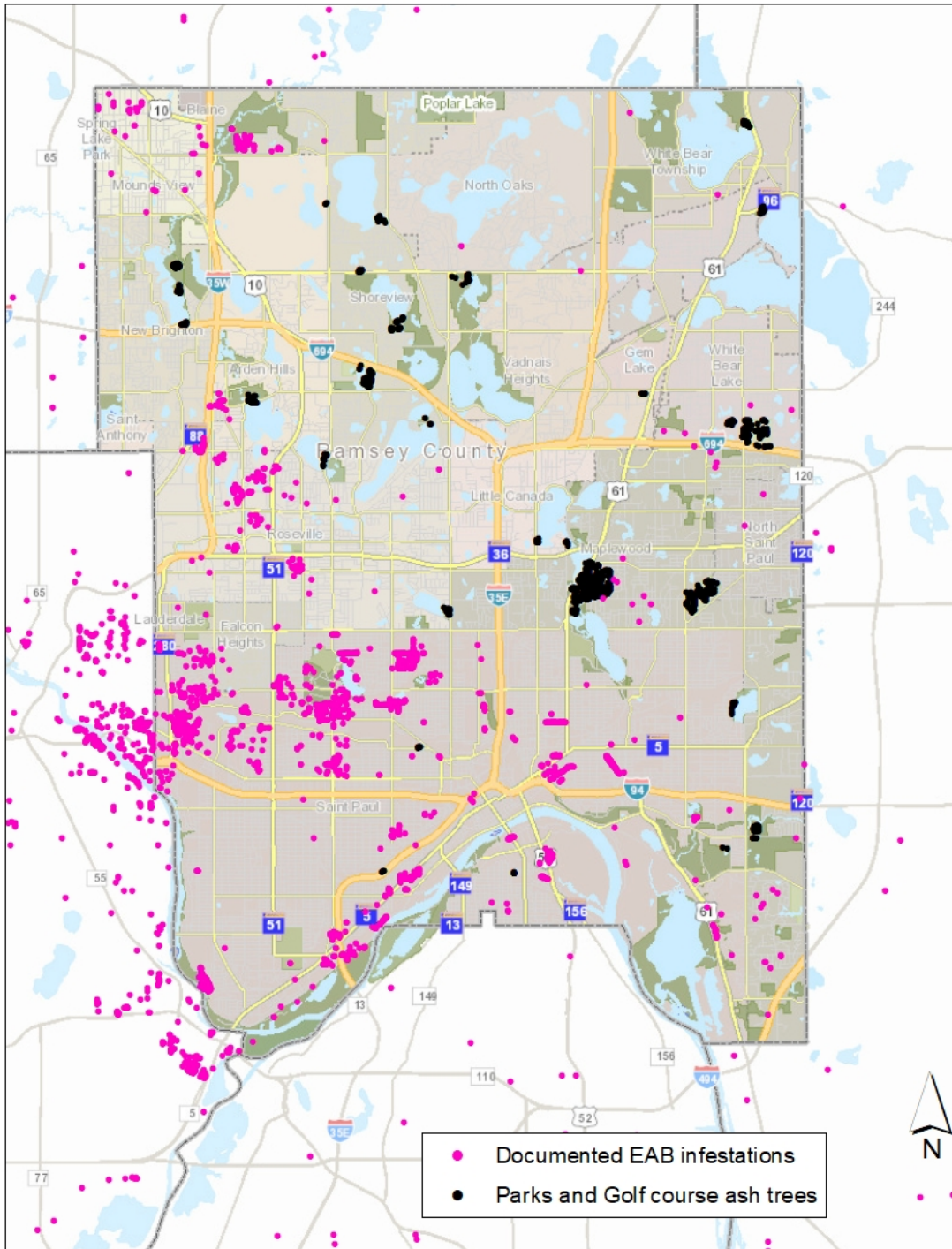
Year	Total Budget Required
year one	\$2,500
year two	\$63,266
year three	\$45,994
year four	\$33,580
Golf Course current estimated cost Total	\$145,340



Appendix A: Areas Surveyed

Facility	Date Surveyed
Rice Creek North Regional Trail	12/18/2018
Long Lake Regional Park	9/16/2018
Vadnais-Snail Lakes Regional Park - Snail Lake	Snail 11/05/2018 Vadnais-12/18/2018
Tony Schmidt Regional Park	9/4/2018
Keller Regional Park	12/19/2018
Island Lake County Park	11/29/2018
Lake Owasso County Park	11/29/2018
Turtle Lake County Park	12/18/2018
White Bear Lake County Park	12/5/2018
Lake Josephine County Park	11/29/2018
Lake Gervais County Park	12/19/2018
Lake McCarrons County Park	12/6/2018
Beaver Lake County Park	12/6/2018
Bald Eagle - Otter Lakes Regional Park	BE launch 8/2/2018; Otter 12/12/2018
Battle Creek Regional Park	1/4/19
<b> </b>	
Biff Adams Ice Arena	3/16/2019
Oscar Johnson Ice Arena	3/16/2019-None
Pleasant Ice Arena	3/16/2019
Shoreview Ice Arena	3/16/2019
Ken Yackel-West Side Ice Arena	2/10/2019
Fairgrounds/Parks & Rec Building	1/20/2019
Goodrich Golf Dome/Aldrich Ice Arena	1/20/2019-with Admin building
Marsden Archery Range	1/20/2019
White Bear County Arena	3/16/2019
Harding	Trees being removed soon
Ramsey County Parks & Rec Horseshoe Court	1/20/2019-included in Admin building
Vadnais Sports Center	3/16/2019
<b> </b>	
The Ponds at Battle Creek	None
Keller Golf Course	2/1/2019
Island Lake Golf & Training Center	Not participating
Manitou Ridge Golf Course	2/14/2019
Goodrich Golf Course	12/12/19-No DBH

Appendix B. Documented EAB infestations and park/golf course ash tree locations





Appendix C: Current Parks and Golf Courses Funding Sources

<b>Parks Funding Sources</b>	<b>Available Amount</b>
Parks Diseased Tree Replacement (Fund 12707 431804)	\$5,571.00
Parks Maint. Lexus Hybrid Prog. (Fund 12707 431408)	\$1,299.23
<b>Totals Funding</b>	<b>\$6,870.23</b>

<b>Golf Course Funding Sources</b>	<b>Available Amount</b>
Keller Golf Course Operational Budget (2019)	\$22,500
CCAMP (2020)-for Keller	\$25,000
<b>Totals Funding</b>	<b>\$47,500</b>



Appendix D: Regional versus county funding source needs

Facility	Total Trees	Total DBH
<b><u>Regional funding</u></b>		
Rice Creek North Regional Trail	0	0
Long Lake Regional Park	146	1780
Vadnais-Snail Lakes Regional Park	45	478
Tony Schmidt Regional Park	31	404
Keller Regional Park	62	892
Bald Eagle - Otter Lakes Regional Park	28	442
Battle Creek Regional Park	85	988
<b><u>County funding</u></b>		
Island Lake County Park	80	1040
Lake Owasso County Park	3	64
Turtle Lake County Park	33	454
White Bear Lake County Park	26	368
Lake Josephine County Park	18	214
Lake Gervais County Park	9	138
Lake McCarrons County Park	24	326
Beaver Lake County Park	13	244
Biff Adams Ice Arena	6	158
Oscar Johnson Ice Arena	0	0
Pleasant Ice Arena	3	58
Shoreview Ice Arena	8	90
Ken Yackel-West Side Ice Arena	8	190
Fairgrounds/Parks & Rec Building	55	848
Marsden Archery Range	19	202
White Bear County Arena	17	328
Harding	0	0
Vadnais Sports Center	5	45
The Ponds at Battle Creek	0	0
Keller Golf Course	346	4894
Island Lake Golf & Training Center	N/A	N/A
Manitou Ridge Golf Course	N/A	N/A
Goodrich Golf Course	115	2416








Appendix E: Replacement tree species

<b>Common Name</b>	<b>Family</b>	<b>Genus</b>	<b>Species</b>
Beech	Fagaceae	<i>Carpinus</i>	<i>caroliniana</i>
Catalpa	Bignoniaceae	<i>Catalpa</i>	<i>speciosa</i>
Buckeye	Sapindaceae	<i>Aesculus</i>	<i>glabra</i>
Oak-Swamp White or Red	Fagaceae	<i>Quercus</i>	<i>bicolor</i> or <i>Q. Rubra</i>
Maple Red and Sugar	Sapindaceae	<i>Acer</i>	<i>rubrum</i> or <i>A. Saccharinum</i> (cultivar TBD)
Elm	Ulmaceae	<i>Ulmus</i>	<i>americana</i> x <i>St. Croix</i>
Hackberry	Cannabaceae	<i>Celtis</i>	<i>occidentalis</i>
Evergreen-TBD	Pinaceae		
Kentucky Coffeetree	Fabaceae	<i>Gymnocladus</i>	<i>dioicus</i> x <i>Espresso</i> male cultivar
River Birch	Betulaceae	<i>Betula</i>	<i>nigra</i>
Honeylocust	Fabaceae	<i>gleditsia</i>	<i>triacanthos</i> (var. <i>intermiss</i> )
*American Sweetgum	Altingiaceae	<i>Liquidambar</i>	<i>styraciflua</i>
*Shagbark hickory	Juglandaceae	<i>Carya</i>	<i>ovata</i>
*American Beech	Fagaceae	<i>Fagus</i>	<i>grandifolia</i>
*Sycamore	Platanaceae	<i>Platanus</i>	<i>occidentalis</i>
*Yellowwood	Fabaceae	<i>Cladrastis</i>	<i>kentukea</i>

\*denotes trees of higher numbered planting zones to address climate change adaptation



Appendix F: Correspondence in regards to city tree ordinances

<b>City</b>	<b>Ordinance Reference</b>
Maplewood	<a href="https://library.municode.com/mn/maplewood/codes/code_of_ordinances?nodeId=COOR_CH18EN_ARTVENNARE_DIV3TR">https://library.municode.com/mn/maplewood/codes/code_of_ordinances?nodeId=COOR_CH18EN_ARTVENNARE_DIV3TR</a> and <a href="https://maplewoodmn.gov/DocumentCenter/View/15925">https://maplewoodmn.gov/DocumentCenter/View/15925</a> exempt when: Tree removal related to public improvement projects to existing roadways, sewers, parks, and utility/infrastructure work or repair.
St. Paul	None-please let Strehlow, Adam (CI-StPaul) <a href="mailto:adam.strehlow@ci.stpaul.mn.us">adam.strehlow@ci.stpaul.mn.us</a> know when removal is taking place.Appendix
White Bear Township	None-per Dale Reed  <small>RE_ Ash tree removal.msg</small>
Shoreview	<a href="https://www.shoreviewmn.gov/home/showdocument?id=16">https://www.shoreviewmn.gov/home/showdocument?id=16</a>
New Brighton	None- Contact Jim Veiman <a href="mailto:Jim.Veiman@newbrightonmn.gov">Jim.Veiman@newbrightonmn.gov</a> before  New Brighton Shade Tree Disease cutting
Roseville	<a href="https://www.cityofroseville.com/DocumentCenter/View/23983/EAB-Fact-Sheet">https://www.cityofroseville.com/DocumentCenter/View/23983/EAB-Fact-Sheet</a> None-Just let Ryan Johnson know and remember construction hours  <small>RE_ Ash Tree Removal.msg</small>
Vadnais Heights	None per Katie Everett  <small>RE_ Ash tree removal.msg</small>
City of White Bear Lake	None- <a href="https://www.whitebearlake.org/sites/default/files/fileattachments/administration/page/1721/chapter_706.pdf">https://www.whitebearlake.org/sites/default/files/fileattachments/administration/page/1721/chapter_706.pdf</a>  <small>RE_ Ash Tree Removal.msg</small>
Little Canada	<a href="http://www.littlecanadamn.org/DocumentCenter/View/313/1701-Dutch-Elm-Disease-PDF?bidId=">http://www.littlecanadamn.org/DocumentCenter/View/313/1701-Dutch-Elm-Disease-PDF?bidId=</a>
Arden Hills	<a href="https://www.cityofardenhills.org/DocumentCenter/View/306/Tree-Preservation-Ordinance-Information?bidId=">https://www.cityofardenhills.org/DocumentCenter/View/306/Tree-Preservation-Ordinance-Information?bidId=</a> and <a href="http://library.amlegal.com/nxt/gateway.dll/Minnesota/ardenhills_mn/ardenhillsmncodeofordinances?f=templates\$fn=default.htm\$3.0\$vid=amlegal:ardenhills_mn">http://library.amlegal.com/nxt/gateway.dll/Minnesota/ardenhills_mn/ardenhillsmncodeofordinances?f=templates\$fn=default.htm\$3.0\$vid=amlegal:ardenhills_mn</a>