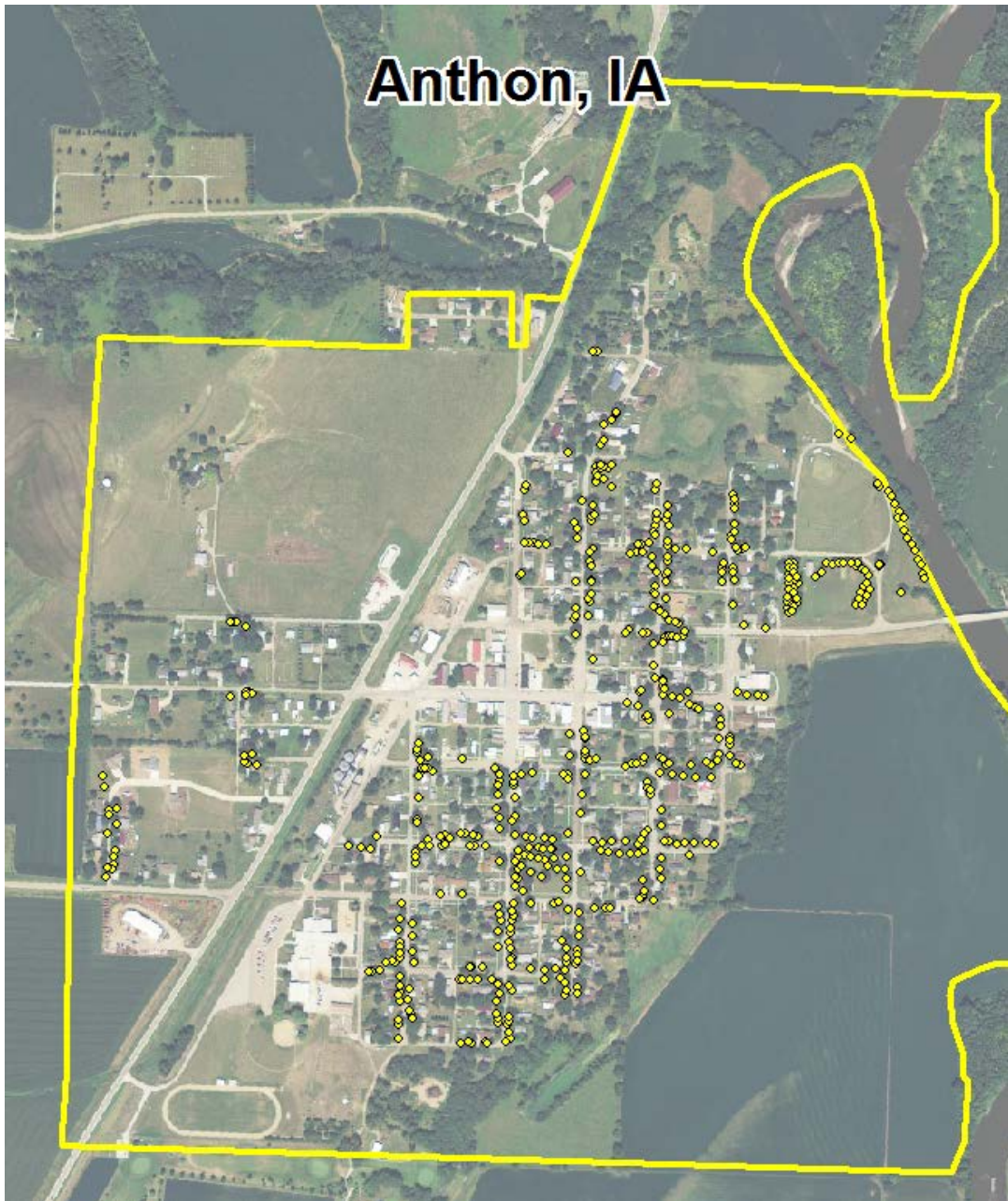


# Anthon, IA



2016 Urban Forest Management Plan  
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# Table of Contents

<b>Executive Summary</b> .....	<b>4</b>
Overview.....	4
Inventory and Results.....	4
Recommendations.....	4
<b>Introduction</b> .....	<b>5</b>
<b>Inventory</b> .....	<b>5</b>
<b>Inventory Results</b> .....	<b>6</b>
<i>Annual Benefits</i> .....	6
Annual Energy Benefits .....	6
Annual Stormwater Benefits .....	6
Annual Air Quality Benefits .....	6
Annual Carbon Benefits.....	6
Annual Aesthetics Benefits .....	6
Financial Summary of all Benefits.....	6
<i>Forest Structure</i> .....	7
Species Distribution .....	7
Age Class .....	7
Condition: Wood and Foliage .....	7
Management Needs.....	8
Canopy Cover .....	8
Land Use and Location .....	8
<b>Recommendations</b> .....	<b>8</b>
Risk Management .....	8
Pruning Cycle.....	9
Planting .....	9
Continual Monitoring.....	10
Six Year Maintenance Plan with No Additional Funding.....	10
<b>Emerald Ash Borer</b> .....	<b>11</b>
Ash Tree Removal .....	11
EAB Quarantines .....	11
Wood Disposal.....	12
Canopy Replacement .....	12
Postponed Work.....	12
Monitoring .....	12
Private Ash Trees.....	12
<b>Budget</b> .....	<b>13</b>
<b>Works Cited</b> .....	<b>14</b>
<b>Appendix A: i-Tree Data</b> .....	<b>15</b>
<b>Appendix B: ArcGIS Mapping</b> .....	<b>26</b>
<b>Appendix C: *CITY* Tree Ordinances</b> .....	<b>31</b>



# Executive Summary

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## Overview

This plan was developed to assist the City of Anthon with managing its urban forest, including budgeting and future planning. Trees can provide a multitude of benefits to the community, and sound management allows a community to best take advantage of these benefits. Management is especially important considering the serious threats posed by forest pests such as the emerald ash borer (EAB). EAB is an invasive insect imported from Eastern Asia on wood shipping crates that kills all species of ash trees (this does not include mountain ash). There is a strong possibility that 35% of Anthon's city owned trees (ash) will die once EAB becomes established in the community, unless preventative treatment is used. With proper planning and management, the costs of removing dead and dying trees can be extended over years, mitigating public safety issues.

## Inventory and Results

In 2015, a tree inventory was conducted using Global Positioning System (GPS) data collectors. The inventory was a complete inventory of street and park trees. Below are some key findings of the 537 trees inventoried.

- Anthon's trees provide \$112,755 of benefits annually, an average of \$210 a tree
- There are over 39 species of trees
- The top three genera are: Ash 35%, Maple 22%, and Hackberry 15%
- 3% of trees are in need of some type of management
- 3 trees are recommended for removal

## Recommendations

The core recommendations are detailed in the Recommendations Section. The Emerald Ash Borer Plan includes management recommendations as well. Below are some key recommendations.

- 8 of the 187 ash trees should be carefully examined, as they have one or more symptoms that could be related to an EAB infestation
- All trees should be pruned on a routine schedule- one third of the city every other year
- Plant a diverse mix of trees that do not include: ash, maple, cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut
- Check ash trees with a visual survey yearly
- With the current budget it could take 124 years to remove ash – Suggestion: request a budget increase to \$10,000 annually and apply for grants to plant replacement trees

## Introduction

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This plan was developed to assist Anthon with the management, budgeting and future planning of their urban forest. Across the state, forestry budgets continue to decrease with more and more of that money spent on tree removal. With the anticipated arrival of Emerald Ash Borer (EAB), an invasive pest that kills native ash trees, it is time to prepare for the increased costs of tree removal and replacement planting. With proper planning and management of the current canopy in Anthon, these costs can be extended over years and public safety issues from dead and dying ash trees mitigated.

Trees are an important component of Anthon's infrastructure and one of the greatest assets to the community. The benefits of trees are immense. Trees provide the community with improved air quality, stormwater runoff interception, energy conservation, lower traffic speeds, increased property values, reduced crime, improved mental health and create a desirable place to live, to name just a few benefits. It is essential that these benefits be maintained for the people of Anthon and future generations through good urban forestry management.

Good urban forestry management involves setting goals and developing management strategies to achieve these goals. An essential part of developing management strategies is a comprehensive public tree inventory. The inventory supplies information that will be used for maintenance, removal schedules, tree planting and budgeting. Basing actions on this information will help meet Anthon's urban forestry goals.

## Inventory

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In 2015, a tree inventory was conducted that included 100% of the city owned trees on both streets and parks. The tree data was collected using a handheld Global Positioning System (GPS) receiver. The data collector gives Geographic Information Systems (GIS) coordinates with an accuracy of 3 meters, which can be used in Arc GIS as an active GIS data layer. Because the inventory is a digital document the data can be updated with new information and become a working document.

The programming used to collect tree information on the data collectors was written to be compatible with a state-of-the-art software suite called i-Tree. i-Tree was developed by the USDA Forest Service to quantify the structure of community trees and the environmental services that trees provide. The i-Tree suite is a public domain which can be accessed for free.

To quantify the urban forest structure and benefits, specific data is collected for each tree. This data includes: location, land use, species, diameter at 4.5 ft, recommended maintenance, priority of that maintenance, leaf health, and wood condition. Additionally, signs and symptoms associated with EAB were noted for all ash trees. The signs and symptoms noted were canopy dieback, epicormic shoots, bark splitting, D-shaped borer exit holes, and wood pecker damage.

## Inventory Results

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The data collected for the 537 city trees was entered into the USDA Forest service program i-Tree STREETS, part of the i-Tree suite. The following are results from the i-Tree STREETS analysis.

### **Annual Benefits**

#### **Annual Energy Benefits**

Trees conserve energy by shading buildings and blocking winds. Anthon's trees reduce energy related costs by approximately \$30,221 annually (Appendix A, Table 1). These savings are both in Electricity (146 MWh) and in Natural Gas (19,531.6 Therms).

#### **Annual Stormwater Benefits**

Anthon's trees intercept about 1,586,602 gallons of rainfall or snow melt a year (Appendix A, Table 2). This interception provides \$42,997 of benefits to the city.

#### **Annual Air Quality Benefits**

Air quality is a persistent public health issue in Iowa. The urban forest improves air quality by removing pollutants, lowering air temperature, and reducing energy consumption, which in turn reduces emissions from power plants, and emitting volatile organic matter (ozone). In Anthon, it is estimated that trees remove 1,895 lbs of air pollution (ozone (O<sub>3</sub>), particulate matter less than 10 microns (PM<sub>10</sub>), carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), and sulfur dioxide (SO<sub>2</sub>)) per year with a net value of \$5,367 (Appendix A, Table 3).

#### **Annual Carbon Benefits**

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Anthon, trees sequester about 296,968 lbs of carbon a year with an associated value of \$2,227 (Appendix A, Table 4). In addition, the trees store 5,588,668 lbs of carbon, with a yearly benefit of \$41,915 (Appendix A, Table 5).

#### **Annual Aesthetics Benefits**

Social benefits of trees are hard to capture. The analysis does have a calculation for this area that includes: aesthetic value, property values, lowered rates of mental illness and crime, city livability and much more. Anthon receives \$31,943 in annual social benefits from trees (Appendix A, Table 6).

#### **Financial Summary of all Benefits**

According to the USDA Forest Service i-Tree STREETS analysis, Anthon's trees provide \$112,755 of benefits annually. Benefits of individual trees vary based on size, species, health and

location, but on average each of the 537 trees in Anthon provide approximately \$210 annually (Appendix A, Table 7).

## **Forest Structure**

### **Species Distribution**

Anthon has over 39 different tree species along city streets and parks (Appendix A, Figure 1). The distribution of trees by genera is as follows:

Ash	187	35%
Maple	120	22%
Hackberry	78	15%
Elm	31	6%
Honeylocust	20	4%
Apple (Crab)	15	3%
Oak	13	2%
Spruce	13	2%
Linden/Basswood	10	2%
Birch	10	2%
Walnut	9	2%
Kentucky Coffeetree	9	2%
Black Locust	6	1%
Cottonwood	5	1%
Ohio buckeye	3	1%
Chestnut	2	0%
Pine	1	<1%
Juniper	1	<1%
Mulberry	1	<1%
Pear	1	<1%
Willow	1	<1%
Other	1	<1%

### **Age Class**

Most of Anthon's trees (39%) are between 24 and 36 inches in diameter at 4.5 ft (Appendix A, Figure 2). For age, it is preferred that the highest amounts of trees are in the smallest size category (a downward slope) to prepare for natural mortality and to maintain canopy cover. Anthon's size curve is on the larger side, indicating an older than average stand.

### **Condition: Wood and Foliage**

Both wood condition and leaf condition are good indicators of the overall health of the urban forest. The foliage condition results for Anthon indicate that 96% of the trees are in good

health, with only 1% of the foliage in poor health, dead or dying (Appendix A, Figure 3 & Appendix B, Figure 3). Similarly, 70% of Anthon’s trees are in good health for wood condition (appendix A, Figure 4 & Appendix B, Figure 3). Wood condition that is in poor health, dead or dying is about 7% of the population. This 7% is an estimate of trees that need management follow up.

**Management Needs**

The following outlines the specific management needs of the street and park trees by number of trees and percent of canopy (Appendix B, Figure 3).

Crown Cleaning	7	1%
Tree Removal	3	1%
Tree Staking	1	<1%

**Canopy Cover**

The total canopy with both private and public trees is 17%, 78 acres. The canopy cover included in the Anthon inventory includes approximately 17 acres (Appendix A, Figure 4).

**Land Use and Location**

The majority of Anthon’s city and park trees are in planting strips in single family residential neighborhoods (Appendix A, Figure 6 & Appendix A, Figure7). The following describes the land use and locations for the street and park trees.

Land Use

Single family residential	77%
Park/vacant/other	22%
Multifamily residential	1%
Small commercial	<1%

Location

Planting strip	58%
Front yard	42%

**Recommendations**

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**Risk Management**

Hazardous trees can be a significant threat to both people and property. Trees that are dead or dying, or that have large issues such as trunk cracks longer than 18 inches should be removed. Broken branches and branches that interfere with motorist’s vision of pedestrians, vehicles, traffic signs and signals, etc should be removed.



### Hazardous trees

Anthon has 1 critical concern tree that need immediate removal. This tree can be seen on the Location of Trees with Recommended Maintenance map (Appendix B, Figure 4). After all of the critical concern trees are addressed, there should be follow up on the trees marked as needing maintenance. There are a total of 10 trees with these needs immediately. Please refer to the six year maintenance plan at the end of this section.

### Poor tree species

After the removal of the critical concern trees, ash trees in poor health should be assessed for removal (Appendix B, Figure 3 & Appendix B, Figure 4). Of the 3 removals, 2 are ash trees. There are a total of 187 ash trees, and 8 of those have signs and symptoms that have been associated with EAB. In addition, there are 20 trees that are in poor health. [\\*City ownership of the trees recommended for removal should be verified prior to any removal\\*](#)

### **Pruning Cycle**

Proper pruning can extend the life and good health of trees, as well as reduce public safety issues. In the Management Needs section of the Findings there are four main maintenance issues to be addressed: routine pruning, crown cleaning, crown raising, and crown reduction. Crown cleaning removes dead, diseased, and damaged limbs. Crown raising is the removal of lower branches that are 2 inches in diameter or larger in the case of providing clearance for pedestrians or vehicles. Crown reduction is removing individual limbs from structures or utility wires. It is recommended that all trees be pruned on a routine schedule every five to seven years. Please refer to the six year maintenance plan for further information.

### **Planting**

Most of the planting over the next 5 years will replace the trees that are removed. It is recommended to plant 1.2 trees for every tree removed, since survival rates will not be 100%. Please refer to the six year maintenance plan at the end of this section. It is not essential that the new trees be planted in the same location of the trees being removed. However, maintaining the same number of trees helps ensure continuation of the benefits of the existing forest in Anthon.

It is important to plant a diverse mix of species in the urban forest to maintain canopy health, since most insects and diseases target a genus (ash) or species (green ash) of trees. Current diversity recommendations advise that a genus (i.e. maple, oak) not make up more than 20% of the urban forest and a single species (i.e. silver maple, sugar maple, white oak, bur oak) not make up more than 10% of the total urban forest. Presently, the forest is heavily planted with maple (22%) (Appendix A, Figure 1). Maples should not be planted until this percentage can be lowered by at least 2%. Hackberry should not be planted until this percentage can be lowered by at least 5%. Also, ash trees have not been recommended since 2002, due to the threat of EAB. Other species to avoid because they are public nuisances include: cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut, as outlined in section 151.04 of the city ordinance (Appendix C). All trees planted must meet the restrictions in city ordinance 151.04 (Appendix C).

## **Continual Monitoring**

Due to the threat of EAB, it is important to continuously check the health of ash trees. It is recommended that ash trees be checked with a visual survey every year for tree decline and for the following signs and symptoms: canopy dieback, epicormic shoots, bark splitting, D-shaped borer exit holes, and wood pecker damage.

## **Six Year Maintenance Plan with No Additional Funding**

### **Year 1**

Removal: 1 critical concern tree and 2 immediate and 1 new critical concern trees or ash in poor health

\*Or saving for ash tree treatment and/or future ash removal

Planting and Replacement: 6 trees to be planted in open locations

Visual Survey for signs and symptoms of EAB

### **Year 2**

Removal: 3 trees - removal of any new critical concern trees or ash in poor health

\*Or saving for ash tree treatment and/or future ash removal

Planting and Replacement: 3 tree in open locations from year one removals

Routine trimming: Contract to trim 1/3 of the city trees

Visual Survey for signs and symptoms of EAB

### **Year 3**

Removal: 4 trees - removal of any new critical concern trees or ash in poor health

\*Or saving for ash tree treatment and/or future ash removal

Planting and Replacement: 6 trees to be planted in open locations and locations from previous removals

Visual Survey for signs and symptoms of EAB

### **Year 4**

Removal: 3 tree - removal of any new critical concern tree or an ash in poor health

\*Or saving for ash tree treatment and/or future ash removal

Planting and Replacement: 3 trees in open locations from previous removals

Routine trimming: Contract to trim 1/3 of the city trees

Visual Survey for signs and symptoms of EAB

### **Year 5**

Removal: 4 trees - removal of any new critical concern trees or ash in poor health

\*Or saving for ash tree treatment and/or future ash removal

Planting and Replacement: 6 trees to be planted in open locations and locations from previous removals

Visual Survey for signs and symptoms of EAB

### **Year 6**

Removal: 1 tree - removal of any new critical concern tree or an ash in poor health

\*Or saving for ash tree treatment and/or future ash removal

Planting and Replacement: 3 trees in open locations from previous removals

Routine trimming: Contract to trim 1/3 of the city trees

Visual Survey for signs and symptoms of EAB

\*Reduction of ash over 6 years: Approximately 20 ash trees removed (approximately 11% of ash). It will take approximately 54 years to remove all ash with the current budget. EAB could potentially kill all ash within 4 to 15 years of its arrival.

\*\* To remove all ash trees within 6 years, the budget would need to be increased to \$131,000 a year. If the budget were increased to \$10,000 a year all ash could be removed in 13 years.

## Emerald Ash Borer Plan

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### Ash Tree Removal

Tree removal will be prioritized with dead, dying, hazardous trees to be removed first (Appendix B, Figure 4). Next will be all ash in poor condition and displaying signs and symptoms of EAB (Appendix B, Figure 2 & Appendix B, Figure 3). *\*City ownership of the tree recommended for removal should be verified prior to any removal\**

### Treatment of Ash Trees

Chemical treatment can be effective tool for communities to spread removal costs out over several years while allowing trees to continue to provide benefits. However, treatment is not recommended if EAB is more than 15 miles away from the community. For more information on the cost of treatment strategies visit <http://extension.entm.purdue.edu/treecomputer/>

### EAB Quarantines

EAB is an extremely destructive plant pest and it is responsible for the death and decline of millions of ash trees. Ash in both forested and urban settings constitute a significant portion of the canopy cover in the United States. Current tools to detect, control, suppress and eradicate this pest are not as robust as the USDA would desire. In order to stay ahead of this hard to detect beetle, the USDA is attempting to contain the beetle before it spreads beyond its known positions by regulating articles.

A regulated article under the USDA's quarantine includes any of the following items:

- emerald ash borer
- firewood of all hardwood species (for example ash, oak, maple and hickory)
- nursery stock and green lumber of ash
- any other ash material, whether living, dead, cut or fallen, including logs, stumps, roots, branches, as well as composted and not composted chips of the genus ash (Mountain ash is not included)

In addition, any other article, product or means of conveyance not listed above may be designated as a regulated article if a USDA inspector determines that it presents a risk of spreading EAB once a quarantine is in effect for your county.

## **Wood Disposal**

A very important aspect of planning is determining how wood infested with EAB will be handled, keeping in mind that quarantines will restrict its movement. Consider who will cut and haul the dead and dying trees? Is there an accessible, secured site big enough to store and sort the hundreds of trees and the associated brush and chips? How will wood be disposed of or utilized? Do you have equipment capable of handling the amount and size of ash trees your tree inventory has identified? Once your county is under quarantine for EAB, contact USDA-APHIS-PPQ at 515-251-4083 or visit the website [http://www.aphis.usda.gov/plant\\_health/plant\\_pest\\_info/emerald\\_ash\\_b/regulatory.shtml](http://www.aphis.usda.gov/plant_health/plant_pest_info/emerald_ash_b/regulatory.shtml). Wood waste can be disposed of as you normally would if your county is not part of a quarantine.

## **Canopy Replacement**

As budget permits, all removed trees will be replaced. All trees will meet the restrictions in city ordinance 151.04 (Appendix C). The new plantings will be a diverse mix and will not include ash, maple, cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut.

## **Postponed Work**

While finances, staffing and equipment are focused on the management of ash, usual services may be delayed. Tree removal requests on genera other than ash will be prioritized by hazardous or emergency situations only.

## **Monitoring**

It is recommended that ash trees be checked with a visual survey every year for tree death and for the following signs and symptoms: canopy dieback, epicormic shoots, bark splitting, D-shaped borer exit holes, and wood pecker damage.

## **Private Ash Trees**

It is strongly recommended that private property owners start removing ash trees on their property upon arrival of EAB. City Code 151.11 states "If it is determined with reasonable certainty that any such condition exists on private property and that the danger to other trees within the city is imminent, the Council shall immediately notify by certified mail the owner, occupant or person in charge of such property to correct such condition by treatment or removal within fourteen (14) days of said notification. If such owner, occupant or person in charge of said property fails to comply within 14 days of receipt of notice, the Council may cause the condition to be corrected and the cost assessed against the property."

# Budget

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## Current Budget

Total \$21,000 over 6 years (\$3,500/year)

### **FY 2016 Budget**

Removal: \$2,800

\*Or saving for ash tree treatment and/or future ash removal

Planting: \$600

Watering & Maintenance: \$100

### **FY 2017 Budget**

Removal: \$2,100

\*Or saving for ash tree treatment and/or future ash removal

Planting: \$300

Routine trimming: \$1000

Watering & Maintenance: \$100

### **FY 2018 Budget**

Removal: \$2,800

\*Or saving for ash tree treatment and/or future ash removal

Planting: \$600

Watering & Maintenance: \$100

### **FY 2019 Budget**

Removal: \$2,100

\*Or saving for ash tree treatment and/or future ash removal

Planting: \$300

Routine trimming: \$1000

Watering & Maintenance: \$100

### **FY 2020 Budget**

Removal: \$2,800

\*Or saving for ash tree treatment and/or future ash removal

Planting: \$600

Watering & Maintenance: \$100

### **FY 2021 Budget**

Removal: \$2,100

\*Or saving for ash tree treatment and/or future ash removal

Planting: \$300

Routine trimming: \$1000

Watering & Maintenance: \$100

\*Reduction of ash over 6 years: approximately 20 ash trees removed (approximately 11% of ash). **It will take approximately 54 years to remove all ash with the current budget.**

## Purposed Budget Increase

EAB could potentially kill all ash trees in Anthon within 4 years of its arrival. To remove all ash trees within 6 years the budget would need to be increased to \$21,800 a year. If the budget

were increased to \$10,000 a year all ash could be removed within 13 years. Additionally, it is recommended that Anthon apply for grants to fund replacement trees. Utility Company grants are usually between \$500 and \$10,000 for community-based, tree-planting projects that include parks, gateways, cemeteries, nature trails, libraries, nursing homes, and schools.

Another option being considered by many communities is treating a number of selected trees, either to maintain those trees in the landscape or to delay their removal – to spread out the costs and number of trees needing removed all at once. Trunk injection is administered every two years for the life of the tree. If treatment is discontinued, the tree dies. For instance, in this treatment scenario, the average ash diameter is 20 inches and at \$15 per inch, about 4 trees could be treated per year (every other year treatment). This would be 8 trees selected for treatment, and Anthon would still need to find \$125,300 for removal. Alternatively, if there are 15 treatable trees, it would cost approximately \$2,250 a year for treatment and leave \$120,400 for removal. These are alternatives to straight removal of ash trees. However, whether or not the treatment option is selected, there will be an increased cost of dealing with ash trees if EAB is found in Anthon. It is suggested to consider increasing the budget to plan for this.

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# Appendix A: i-Tree Data

Table 1: Annual Energy Benefits

Anthon

## Annual Energy Benefits of Public Trees

12/22/2015

Species	Total Electricity (MWh)	Electricity (\$)	Total Natural Gas (Therms)	Natural Gas (\$)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Green ash	45.5	3,453	5,939.0	5,820	9,273	(N/A)	33.5	30.7	51.52
Northern hackberry	28.7	2,182	4,030.8	3,950	6,132	(N/A)	14.5	20.3	78.62
Silver maple	23.7	1,801	3,072.6	3,011	4,813	(N/A)	12.8	15.9	69.75
Sugar maple	5.8	439	743.3	728	1,167	(N/A)	4.3	3.9	50.76
Siberian elm	8.5	649	1,144.6	1,122	1,771	(N/A)	4.3	5.9	76.98
Honeylocust	7.3	552	943.1	924	1,476	(N/A)	3.7	4.9	73.80
Norway maple	4.1	310	547.8	537	847	(N/A)	3.2	2.8	49.81
Apple	2.0	150	314.6	308	458	(N/A)	2.8	1.5	30.56
Northern red oak	2.1	159	293.5	288	447	(N/A)	1.9	1.5	44.71
River birch	0.0	3	7.9	8	11	(N/A)	1.9	0.0	1.10
American basswood	1.5	111	217.4	213	324	(N/A)	1.7	1.1	35.96
Black walnut	2.8	210	380.1	372	582	(N/A)	1.7	1.9	64.71
Kentucky coffeetree	3.1	233	422.2	414	647	(N/A)	1.7	2.1	71.86
Blue spruce	0.5	38	65.5	64	102	(N/A)	1.1	0.3	17.04
American elm	1.0	79	132.9	130	210	(N/A)	1.1	0.7	34.95
Black locust	1.9	146	284.5	279	425	(N/A)	1.1	1.4	70.84
Maple	0.3	20	40.5	40	60	(N/A)	1.1	0.2	10.02
Red maple	0.9	66	119.5	117	183	(N/A)	0.9	0.6	36.67
White ash	0.4	28	53.3	52	80	(N/A)	0.7	0.3	20.10
Spruce	0.2	18	33.6	33	51	(N/A)	0.6	0.2	17.10
Pin oak	1.0	77	130.6	128	205	(N/A)	0.6	0.7	68.31
Austrian pine	0.4	30	49.9	49	79	(N/A)	0.6	0.3	26.22
Ash	0.7	50	93.8	92	142	(N/A)	0.6	0.5	47.36
Ohio buckeye	0.1	11	23.8	23	35	(N/A)	0.6	0.1	11.52
Elm	0.8	63	112.7	110	173	(N/A)	0.4	0.6	86.52
Eastern cottonwood	0.5	36	54.0	53	88	(N/A)	0.4	0.3	44.23
Black poplar	0.7	51	86.0	84	135	(N/A)	0.4	0.4	67.63
Eastern red cedar	0.1	8	16.4	16	25	(N/A)	0.2	0.1	24.57
Mulberry	0.0	2	3.8	4	5	(N/A)	0.2	0.0	5.40
Boxelder	0.2	17	30.8	30	47	(N/A)	0.2	0.2	46.76
Pear	0.1	6	12.8	13	18	(N/A)	0.2	0.1	18.19
American chestnut	0.0	0	0.5	0	1	(N/A)	0.2	0.0	0.66
Littleleaf linden	0.2	15	23.9	23	39	(N/A)	0.2	0.1	38.70
Broadleaf Evergreen Medium	0.4	28	46.9	46	74	(N/A)	0.2	0.2	73.91
Norway spruce	0.1	10	14.6	14	24	(N/A)	0.2	0.1	24.14
Scotch pine	0.1	10	14.6	14	24	(N/A)	0.2	0.1	24.14
Willow	0.2	18	29.5	29	47	(N/A)	0.2	0.2	46.78
Quaking aspen	0.0	0	0.5	0	1	(N/A)	0.2	0.0	0.66
<b>Total</b>	<b>146.0</b>	<b>11,080</b>	<b>19,531.6</b>	<b>19,141</b>	<b>30,221</b>	<b>(N/A)</b>	<b>100.0</b>	<b>100.0</b>	<b>56.28</b>

Table 2: Annual Stormwater Benefits

**Anthon**

**Annual Stormwater Benefits of Public Trees**

12/22/2015

Species	Total rainfall interception (Gal)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Green ash	437,656	11,860	(N/A)	33.5	27.6	65.89
Northern hackberry	286,817	7,773	(N/A)	14.5	18.1	99.65
Silver maple	353,596	9,582	(N/A)	12.8	22.3	138.88
Sugar maple	57,006	1,545	(N/A)	4.3	3.6	67.17
Siberian elm	95,555	2,590	(N/A)	4.3	6.0	112.59
Honeylocust	91,916	2,491	(N/A)	3.7	5.8	124.55
Norway maple	31,729	860	(N/A)	3.2	2.0	50.58
Apple	10,283	279	(N/A)	2.8	0.6	18.58
Northern red oak	22,953	622	(N/A)	1.9	1.4	62.20
River birch	122	3	(N/A)	1.9	0.0	0.33
American basswood	15,304	415	(N/A)	1.7	1.0	46.08
Black walnut	30,727	833	(N/A)	1.7	1.9	92.52
Kentucky coffeetree	39,992	1,084	(N/A)	1.7	2.5	120.42
Blue spruce	5,901	160	(N/A)	1.1	0.4	26.65
American elm	9,115	247	(N/A)	1.1	0.6	41.17
Black locust	22,586	612	(N/A)	1.1	1.4	102.01
Maple	1,423	39	(N/A)	1.1	0.1	6.43
Red maple	6,347	172	(N/A)	0.9	0.4	34.40
White ash	2,455	67	(N/A)	0.7	0.2	16.63
Spruce	2,730	74	(N/A)	0.6	0.2	24.66
Pin oak	11,381	308	(N/A)	0.6	0.7	102.80
Austrian pine	5,401	146	(N/A)	0.6	0.3	48.79
Ash	5,759	156	(N/A)	0.6	0.4	52.03
Ohio buckeye	761	21	(N/A)	0.6	0.0	6.87
Elm	12,729	345	(N/A)	0.4	0.8	172.48
Eastern cottonwood	2,931	79	(N/A)	0.4	0.2	39.72
Black poplar	8,704	236	(N/A)	0.4	0.5	117.95
Eastern red cedar	1,635	44	(N/A)	0.2	0.1	44.30
Mulberry	69	2	(N/A)	0.2	0.0	1.86
Boxelder	2,233	61	(N/A)	0.2	0.1	60.52
Pear	264	7	(N/A)	0.2	0.0	7.17
American chestnut	18	0	(N/A)	0.2	0.0	0.48
Littleleaf linden	1,260	34	(N/A)	0.2	0.1	34.14
Broadleaf Evergreen Medium	4,740	128	(N/A)	0.2	0.3	128.45
Norway spruce	1,539	42	(N/A)	0.2	0.1	41.70
Scotch pine	1,539	42	(N/A)	0.2	0.1	41.70
Willow	1,409	38	(N/A)	0.2	0.1	38.19
Quaking aspen	18	0	(N/A)	0.2	0.0	0.48
Citywide total	1,586,602	42,997	(N/A)	100.0	100.0	80.07



**Table 3: Annual Air Quality Benefits**

Anthon

**Annual Air Quality Benefits of Public Trees**

12/22/2015

Species	Deposition (lb)				Total Depos. (\$)	Avoided (lb)				Total Avoided (\$)	BVOC Emissions (lb)	BVOC Emissions (\$)	Total (lb)	Total (\$)	Standard Error	% of Total Trees	Avg. \$/tree
	O <sub>3</sub>	NO <sub>2</sub>	PM <sub>10</sub>	SO <sub>2</sub>		NO <sub>2</sub>	PM <sub>10</sub>	VOC	SO <sub>2</sub>								
Green ash	50.1	8.0	24.8	2.2	269	214.7	31.4	30.0	206.2	1,344	0.0	0	567.4	1,613 (N/A)		33.5	8.96
Northern hackberry	46.0	8.0	23.2	2.1	250	138.3	20.1	19.1	130.4	859	0.0	0	387.0	1,109 (N/A)		14.5	14.22
Silver maple	61.3	10.4	30.0	2.7	330	111.4	16.3	15.6	107.3	698	-30.9	-116	324.2	912 (N/A)		12.8	13.22
Sugar maple	7.3	1.2	3.7	0.3	40	27.2	4.0	3.8	26.2	170	-5.8	-22	67.9	188 (N/A)		4.3	8.18
Siberian elm	16.9	2.9	8.1	0.7	91	40.6	5.9	5.7	38.7	253	0.0	0	119.4	344 (N/A)		4.3	14.95
Honeylocust	18.4	3.0	8.3	0.8	97	34.2	5.0	4.8	32.9	214	-14.8	-56	92.6	255 (N/A)		3.7	12.76
Norway maple	6.0	1.0	3.0	0.3	32	19.4	2.8	2.7	18.5	121	-1.4	-5	52.3	148 (N/A)		3.2	8.73
Apple	3.5	0.6	1.6	0.2	18	9.8	1.4	1.3	9.0	60	0.0	0	27.3	79 (N/A)		2.8	5.24
Northern red oak	5.0	0.9	2.4	0.2	27	10.1	1.5	1.4	9.5	63	-7.2	-27	23.7	62 (N/A)		1.9	6.24
River birch	0.0	0.0	0.0	0.0	0	0.2	0.0	0.0	0.2	1	0.0	0	0.5	1 (N/A)		1.9	0.14
American basswood	1.9	0.3	1.0	0.1	11	7.1	1.0	1.0	6.6	44	-1.7	-6	17.4	48 (N/A)		1.7	5.35
Black walnut	3.8	0.6	1.8	0.2	20	13.2	1.9	1.8	12.5	82	0.0	0	35.8	102 (N/A)		1.7	11.36
Kentucky coffeetree	5.5	0.9	2.5	0.2	29	14.7	2.1	2.0	13.9	91	0.0	0	42.0	121 (N/A)		1.7	13.39
Blue spruce	0.7	0.1	0.6	0.1	5	2.4	0.3	0.3	2.3	15	-2.0	-8	4.8	12 (N/A)		1.1	1.95
American elm	3.1	0.5	1.5	0.1	17	4.9	0.7	0.7	4.7	31	0.0	0	16.3	48 (N/A)		1.1	7.92
Black locust	5.2	0.9	2.5	0.2	28	9.4	1.4	1.3	8.7	58	-1.2	-4	28.4	81 (N/A)		1.1	13.58
Maple	0.2	0.0	0.1	0.0	1	1.3	0.2	0.2	1.2	8	-0.1	0	3.1	9 (N/A)		1.1	1.46
Red maple	1.3	0.2	0.6	0.1	7	4.2	0.6	0.6	4.0	26	-0.5	-2	11.1	31 (N/A)		0.9	6.24
White ash	0.1	0.0	0.1	0.0	1	1.8	0.3	0.2	1.7	11	0.0	0	4.1	12 (N/A)		0.7	2.91
Spruce	0.3	0.1	0.3	0.0	2	1.2	0.2	0.2	1.1	7	-0.9	-3	2.3	6 (N/A)		0.6	1.92
Pin oak	2.1	0.4	1.1	0.1	11	4.8	0.7	0.7	4.6	30	-3.9	-14	10.5	27 (N/A)		0.6	8.92
Austrian pine	0.7	0.1	0.6	0.1	5	1.8	0.3	0.3	1.8	12	-2.0	-7	3.7	9 (N/A)		0.6	2.96
Ash	1.1	0.2	0.6	0.1	6	3.2	0.5	0.4	3.0	20	-0.3	-1	8.8	25 (N/A)		0.6	8.32
Ohio buckeye	0.1	0.0	0.0	0.0	0	0.7	0.1	0.1	0.7	5	0.0	0	1.7	5 (N/A)		0.6	1.61
Elm	2.0	0.3	0.9	0.1	10	3.9	0.6	0.5	3.7	25	0.0	0	12.0	35 (N/A)		0.4	17.37
Eastern cottonwood	0.2	0.0	0.1	0.0	1	2.1	0.3	0.3	2.1	14	0.0	0	5.3	15 (N/A)		0.4	7.42
Black poplar	1.3	0.2	0.6	0.1	7	3.2	0.5	0.4	3.0	20	0.0	0	9.2	26 (N/A)		0.4	13.23
Eastern red cedar	0.3	0.1	0.3	0.0	2	0.5	0.1	0.1	0.5	3	-0.9	-3	1.0	2 (N/A)		0.2	2.19
Mulberry	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.1	1	0.0	0	0.3	1 (N/A)		0.2	0.71
Boxelder	0.3	0.0	0.1	0.0	1	1.0	0.2	0.1	1.0	7	-0.1	0	2.7	8 (N/A)		0.2	7.54
Pear	0.0	0.0	0.0	0.0	0	0.4	0.1	0.1	0.3	2	0.0	0	0.9	3 (N/A)		0.2	2.55
American chestnut	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0	0.0	0	0.0	0 (N/A)		0.2	0.08
Littleleaf linden	0.2	0.0	0.1	0.0	1	0.9	0.1	0.1	0.9	6	-0.1	0	2.3	6 (N/A)		0.2	6.42
Broadleaf Evergreen Medium	0.7	0.1	0.7	0.1	5	1.7	0.3	0.2	1.6	11	-1.3	-5	4.1	11 (N/A)		0.2	10.71
Norway spruce	0.2	0.0	0.1	0.0	1	0.6	0.1	0.1	0.6	4	-0.5	-2	1.2	3 (N/A)		0.2	2.82
Scotch pine	0.2	0.0	0.1	0.0	1	0.6	0.1	0.1	0.6	4	-0.5	-2	1.2	3 (N/A)		0.2	2.82
Willow	0.2	0.0	0.1	0.0	1	1.1	0.2	0.2	1.1	7	-0.1	0	2.8	8 (N/A)		0.2	7.92
Quaking aspen	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0	0.0	0	0.0	0 (N/A)		0.2	0.08
Citywide total	245.9	41.3	121.4	11.2	1,327	692.7	101.2	96.5	661.4	4,325	-76.2	-286	1,895.4	5,367 (N/A)		100.0	9.99

Table 4: Annual Carbon Stored

Anthon

**Stored CO2 Benefits of Public Trees**

12/22/2015

Species	Total Stored CO2 (lbs)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Green ash	1,649,493	12,371	(N/A)	33.5	29.5	68.73
Northern hackberry	697,493	5,231	(N/A)	14.5	12.5	67.07
Silver maple	1,351,204	10,134	(N/A)	12.8	24.2	146.87
Sugar maple	207,945	1,560	(N/A)	4.3	3.7	67.81
Siberian elm	406,319	3,047	(N/A)	4.3	7.3	132.50
Honeylocust	239,395	1,795	(N/A)	3.7	4.3	89.77
Norway maple	99,188	744	(N/A)	3.2	1.8	43.76
Apple	54,967	412	(N/A)	2.8	1.0	27.48
Northern red oak	111,305	835	(N/A)	1.9	2.0	83.48
River birch	168	1	(N/A)	1.9	0.0	0.13
American basswood	69,224	519	(N/A)	1.7	1.2	57.69
Black walnut	120,608	905	(N/A)	1.7	2.2	100.51
Kentucky coffeetree	182,536	1,369	(N/A)	1.7	3.3	152.11
Blue spruce	3,725	28	(N/A)	1.1	0.1	4.66
American elm	61,048	458	(N/A)	1.1	1.1	76.31
Black locust	85,681	643	(N/A)	1.1	1.5	107.10
Maple	2,470	19	(N/A)	1.1	0.0	3.09
Red maple	14,871	112	(N/A)	0.9	0.3	22.31
White ash	4,138	31	(N/A)	0.7	0.1	7.76
Spruce	1,684	13	(N/A)	0.6	0.0	4.21
Pin oak	56,450	423	(N/A)	0.6	1.0	141.12
Austrian pine	4,898	37	(N/A)	0.6	0.1	12.24
Ash	19,005	143	(N/A)	0.6	0.3	47.51
Ohio buckeye	1,336	10	(N/A)	0.6	0.0	3.34
Elm	65,202	489	(N/A)	0.4	1.2	244.51
Eastern cottonwood	7,344	55	(N/A)	0.4	0.1	27.54
Black poplar	42,930	322	(N/A)	0.4	0.8	160.99
Eastern red cedar	1,102	8	(N/A)	0.2	0.0	8.27
Mulberry	178	1	(N/A)	0.2	0.0	1.33
Boxelder	7,945	60	(N/A)	0.2	0.1	59.59
Pear	908	7	(N/A)	0.2	0.0	6.81
American chestnut	12	0	(N/A)	0.2	0.0	0.09
Littleleaf linden	3,595	27	(N/A)	0.2	0.1	26.96
Broadleaf Evergreen l	8,324	62	(N/A)	0.2	0.1	62.43
Norway spruce	1,170	9	(N/A)	0.2	0.0	8.78
Scotch pine	1,170	9	(N/A)	0.2	0.0	8.78
Willow	3,624	27	(N/A)	0.2	0.1	27.18
Quaking aspen	12	0	(N/A)	0.2	0.0	0.09
Citywide total	5,588,668	41,915	(N/A)	100.0	100.0	78.05

Table 5: Annual Carbon Sequestered

Anthon

**Annual CO Benefits of Public Trees**

12/22/2015

Species	Sequestered (lb)	Sequestered (\$)	Decomposition Release (lb)	Maintenance Release (lb)	Total Released (\$)	Avoided (lb)	Avoided (\$)	Net Total (lb)	Total Standard (\$ Error)	% of Total Trees	% of Total \$	Avg. \$/tree
Green ash	100,461	753	-7,918	-449	-3	0	0	92,094	691 (N/A)	33.5	31.0	3.84
Northern hackberry	36,976	277	-3,348	-270	-2	0	0	33,358	250 (N/A)	14.5	11.2	3.21
Silver maple	99,191	744	-6,487	-261	-2	0	0	92,443	693 (N/A)	12.8	31.1	10.05
Sugar maple	11,661	87	-998	-59	0	0	0	10,604	80 (N/A)	4.3	3.6	3.46
Siberian elm	16,760	126	-1,950	-92	-1	0	0	14,718	110 (N/A)	4.3	5.0	4.80
Honeylocust	15,794	118	-1,149	-55	0	0	0	14,591	109 (N/A)	3.7	4.9	5.47
Norway maple	4,693	35	-476	-41	0	0	0	4,176	31 (N/A)	3.2	1.4	1.84
Apple	1,362	10	-264	-32	0	0	0	1,066	8 (N/A)	2.8	0.4	0.53
Northern red oak	2,283	17	-534	-28	0	0	0	1,721	13 (N/A)	1.9	0.6	1.29
River birch	54	0	-1	-2	0	0	0	51	0 (N/A)	1.9	0.0	0.04
American basswood	4,309	32	-332	-18	0	0	0	3,959	30 (N/A)	1.7	1.3	3.30
Black walnut	6,794	51	-579	-28	0	0	0	6,187	46 (N/A)	1.7	2.1	5.16
Kentucky coffeetree	7,222	54	-876	-33	0	0	0	6,313	47 (N/A)	1.7	2.1	5.26
Blue spruce	335	3	-18	-8	0	0	0	309	2 (N/A)	1.1	0.1	0.39
American elm	1,320	10	-293	-11	0	0	0	1,016	8 (N/A)	1.1	0.3	1.27
Black locust	1,110	8	-411	-23	0	0	0	675	5 (N/A)	1.1	0.2	0.84
Maple	378	3	-12	-4	0	0	0	362	3 (N/A)	1.1	0.1	0.45
Red maple	979	7	-71	-8	0	0	0	899	7 (N/A)	0.9	0.3	1.35
White ash	728	5	-20	-5	0	0	0	704	5 (N/A)	0.7	0.2	1.32
Spruce	221	2	-8	-4	0	0	0	208	2 (N/A)	0.6	0.1	0.52
Pin oak	4,876	37	-271	-11	0	0	0	4,595	34 (N/A)	0.6	1.5	11.49
Austrian pine	328	2	-24	-7	0	0	0	298	2 (N/A)	0.6	0.1	0.75
Ash	610	5	-91	-7	0	0	0	511	4 (N/A)	0.6	0.2	1.28
Ohio buckeye	325	2	-7	-2	0	0	0	316	2 (N/A)	0.6	0.1	0.79
Elm	1,872	14	-313	-9	0	0	0	1,549	12 (N/A)	0.4	0.5	5.81
Eastern cottonwood	891	7	-35	-4	0	0	0	852	6 (N/A)	0.4	0.3	3.19
Black poplar	1,357	10	-206	-7	0	0	0	1,144	9 (N/A)	0.4	0.4	4.29
Eastern red cedar	0	0	-5	-2	0	0	0	-7	0 (N/A)	0.2	0.0	-0.05
Mulberry	38	0	-1	-1	0	0	0	37	0 (N/A)	0.2	0.0	0.27
Boxelder	694	5	-38	-3	0	0	0	654	5 (N/A)	0.2	0.2	4.90
Pear	114	1	-4	-1	0	0	0	108	1 (N/A)	0.2	0.0	0.81
American chestnut	3	0	0	0	0	0	0	2	0 (N/A)	0.2	0.0	0.02
Littleleaf linden	514	4	-17	-2	0	0	0	495	4 (N/A)	0.2	0.2	3.71
Broadleaf Evergreen Medi	420	3	-40	-4	0	0	0	376	3 (N/A)	0.2	0.1	2.82
Norway spruce	116	1	-6	-2	0	0	0	108	1 (N/A)	0.2	0.0	0.81
Scotch pine	116	1	-6	-2	0	0	0	108	1 (N/A)	0.2	0.0	0.81
Willow	386	3	-17	-2	0	0	0	367	3 (N/A)	0.2	0.1	2.75
Quaking aspen	3	0	0	0	0	0	0	2	0 (N/A)	0.2	0.0	0.02
Citywide total	325,293	2,440	-26,829	-1,496	-11	0	0	296,968	2,227 (N/A)	100.0	100.0	4.15

**Table 6: Annual Social and Aesthetic Benefits**

## Anthon

### Annual Aesthetic/Other Benefits of Public Trees

12/22/2015

Species	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Green ash	8,958	(N/A)	33.5	28.0	49.77
Northern hackberry	4,781	(N/A)	14.5	15.0	61.30
Silver maple	7,657	(N/A)	12.8	24.0	110.97
Sugar maple	1,247	(N/A)	4.3	3.9	54.20
Siberian elm	1,107	(N/A)	4.3	3.5	48.14
Honeylocust	4,084	(N/A)	3.7	12.8	204.18
Norway maple	483	(N/A)	3.2	1.5	28.42
Apple	78	(N/A)	2.8	0.2	5.23
Northern red oak	161	(N/A)	1.9	0.5	16.11
River birch	27	(N/A)	1.9	0.1	2.74
American basswood	334	(N/A)	1.7	1.0	37.06
Black walnut	544	(N/A)	1.7	1.7	60.44
Kentucky coffeetree	542	(N/A)	1.7	1.7	60.25
Blue spruce	121	(N/A)	1.1	0.4	20.23
American elm	169	(N/A)	1.1	0.5	28.14
Black locust	94	(N/A)	1.1	0.3	15.73
Maple	67	(N/A)	1.1	0.2	11.18
Red maple	155	(N/A)	0.9	0.5	31.08
White ash	134	(N/A)	0.7	0.4	33.42
Spruce	63	(N/A)	0.6	0.2	21.05
Pin oak	370	(N/A)	0.6	1.2	123.22
Austrian pine	70	(N/A)	0.6	0.2	23.48
Ash	65	(N/A)	0.6	0.2	21.79
Ohio buckeye	42	(N/A)	0.6	0.1	13.95
Elm	125	(N/A)	0.4	0.4	62.47
Eastern cottonwood	92	(N/A)	0.4	0.3	45.86
Black poplar	104	(N/A)	0.4	0.3	52.10
Eastern red cedar	0	(N/A)	0.2	0.0	0.00
Mulberry	2	(N/A)	0.2	0.0	2.06
Boxelder	52	(N/A)	0.2	0.2	51.63
Pear	6	(N/A)	0.2	0.0	6.40
American chestnut	5	(N/A)	0.2	0.0	5.26
Littleleaf linden	55	(N/A)	0.2	0.2	55.09
Broadleaf Evergreen Medium	38	(N/A)	0.2	0.1	38.47
Norway spruce	32	(N/A)	0.2	0.1	32.32
Scotch pine	32	(N/A)	0.2	0.1	32.32
Willow	39	(N/A)	0.2	0.1	39.16
Quaking aspen	5	(N/A)	0.2	0.0	5.26
<b>Citywide total</b>	<b>31,943</b>	<b>(N/A)</b>	<b>100.0</b>	<b>100.0</b>	<b>59.48</b>

Table 7: Summary of Benefits in Dollars

**Anthon**

**Total Annual Benefits of Public Trees by Species (\$)**

12/22/2011

Species	Energy	CO <sub>2</sub>	Air Quality	Stormwater	Aesthetic/Other	Total (\$)	Standard Error	% of Total \$
Green ash	9,273	691	1,613	11,860	8,958	32,395	(N/A)	28.7
Northern hackberry	6,132	250	1,109	7,773	4,781	20,046	(N/A)	17.8
Silver maple	4,813	693	912	9,582	7,657	23,657	(N/A)	21.0
Sugar maple	1,167	80	188	1,545	1,247	4,227	(N/A)	3.7
Siberian elm	1,771	110	344	2,590	1,107	5,921	(N/A)	5.3
Honeylocust	1,476	109	255	2,491	4,084	8,415	(N/A)	7.5
Norway maple	847	31	148	860	483	2,370	(N/A)	2.1
Apple	458	8	79	279	78	902	(N/A)	0.8
Northern red oak	447	13	62	622	161	1,306	(N/A)	1.2
River birch	11	0	1	3	27	43	(N/A)	0.0
American basswood	324	30	48	415	334	1,150	(N/A)	1.0
Black walnut	582	46	102	833	544	2,108	(N/A)	1.9
Kentucky coffeetree	647	47	121	1,084	542	2,441	(N/A)	2.2
Blue spruce	102	2	12	160	121	398	(N/A)	0.4
American elm	210	8	48	247	169	681	(N/A)	0.6
Black locust	425	5	81	612	94	1,218	(N/A)	1.1
Maple	60	3	9	39	67	177	(N/A)	0.2
Red maple	183	7	31	172	155	549	(N/A)	0.5
White ash	80	5	12	67	134	298	(N/A)	0.3
Spruce	51	2	6	74	63	196	(N/A)	0.2
Pin oak	205	34	27	308	370	944	(N/A)	0.8
Austrian pine	79	2	9	146	70	307	(N/A)	0.3
Ash	142	4	25	156	65	392	(N/A)	0.3
Ohio buckeye	35	2	5	21	42	104	(N/A)	0.1
Elm	173	12	35	345	125	689	(N/A)	0.6
Eastern cottonwood	88	6	15	79	92	281	(N/A)	0.2
Black poplar	135	9	26	236	104	510	(N/A)	0.5
Eastern red cedar	25	0	2	44	0	71	(N/A)	0.1
Mulberry	5	0	1	2	2	10	(N/A)	0.0
Boxelder	47	5	8	61	52	171	(N/A)	0.2
Pear	18	1	3	7	6	35	(N/A)	0.0
American chestnut	1	0	0	0	5	7	(N/A)	0.0
Littleleaf linden	39	4	6	34	55	138	(N/A)	0.1
Broadleaf Evergreen Me	74	3	11	128	38	254	(N/A)	0.2
Norway spruce	24	1	3	42	32	102	(N/A)	0.1
Scotch pine	24	1	3	42	32	102	(N/A)	0.1
Willow	47	3	8	38	39	135	(N/A)	0.1
Quaking aspen	1	0	0	0	5	7	(N/A)	0.0
Citywide Total	30,221	2,227	5,367	42,997	31,943	112,755	(N/A)	100.0

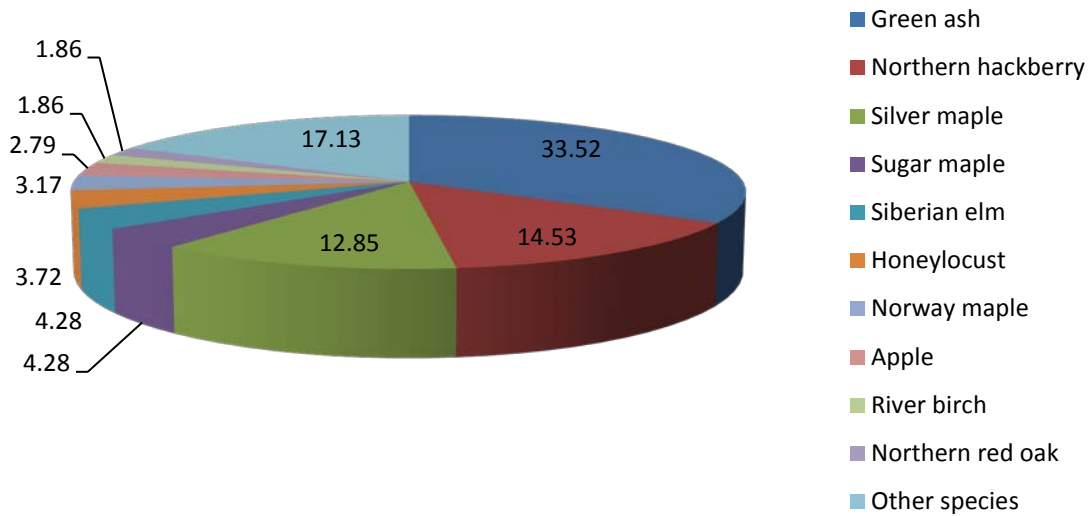


Figure 1: Species Distribution

## Relative Age Distribution of Top 10 Public Tree Species (%)

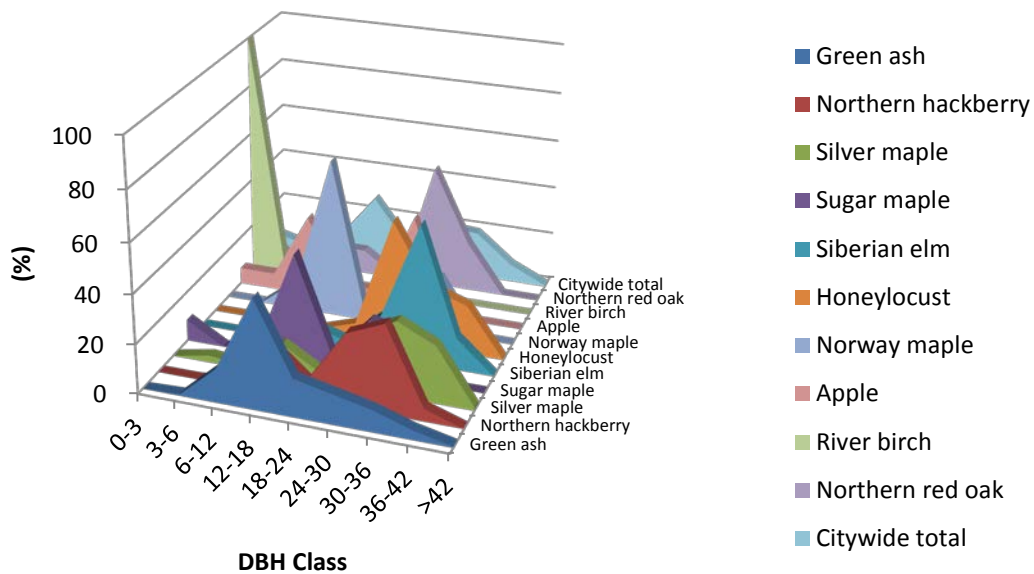


Figure 2: Relative Age Class

# Leaf Condition

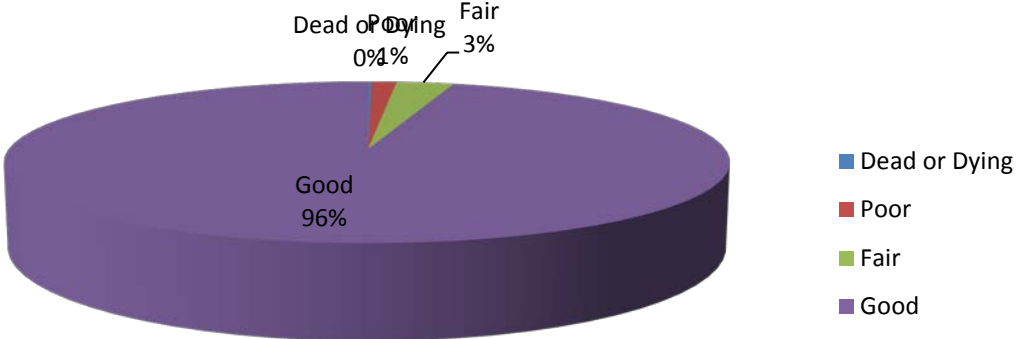


Figure 3: Foliage Condition

# Wood Condition

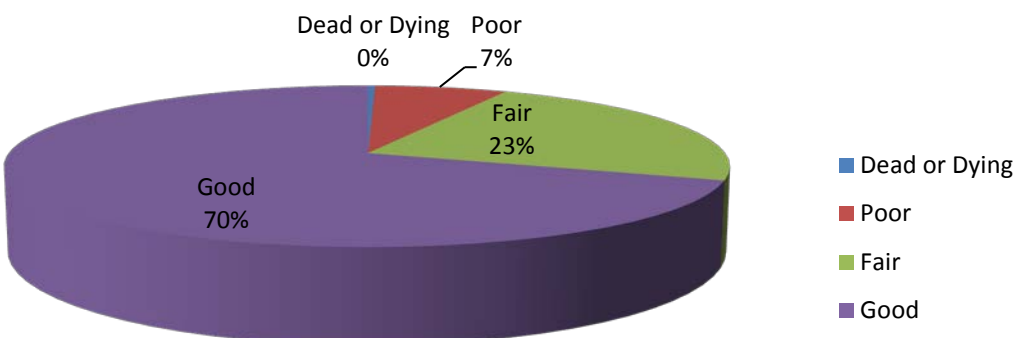


Figure 4: Wood Condition

# Canopy Cover

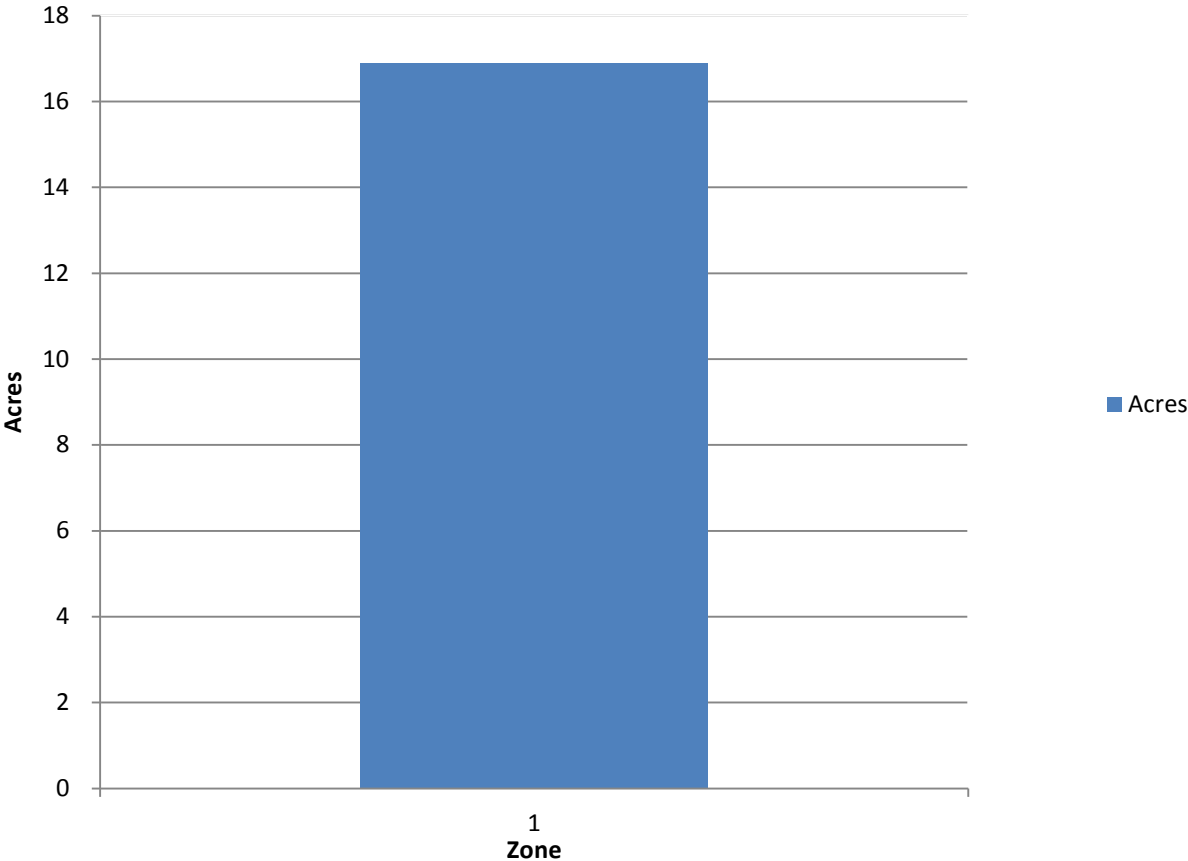


Figure 5: Canopy Cover in Acres



## Land use Public Trees by Zone (%)

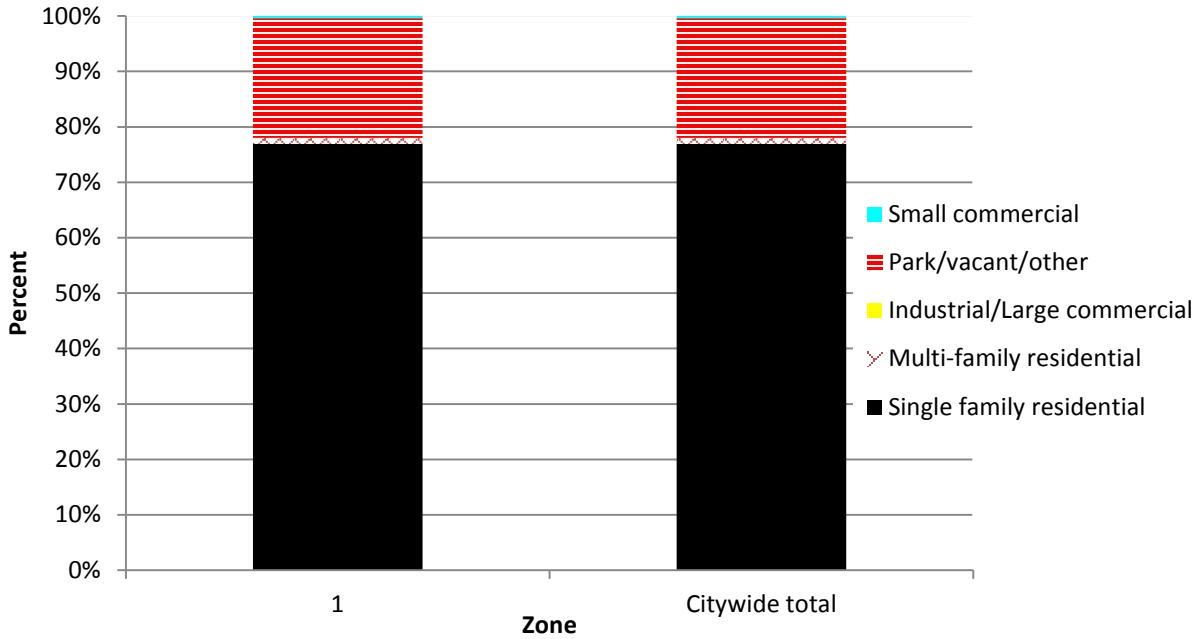


Figure 6: Land Use of city/park trees

## Location Public Trees by Zone (%)

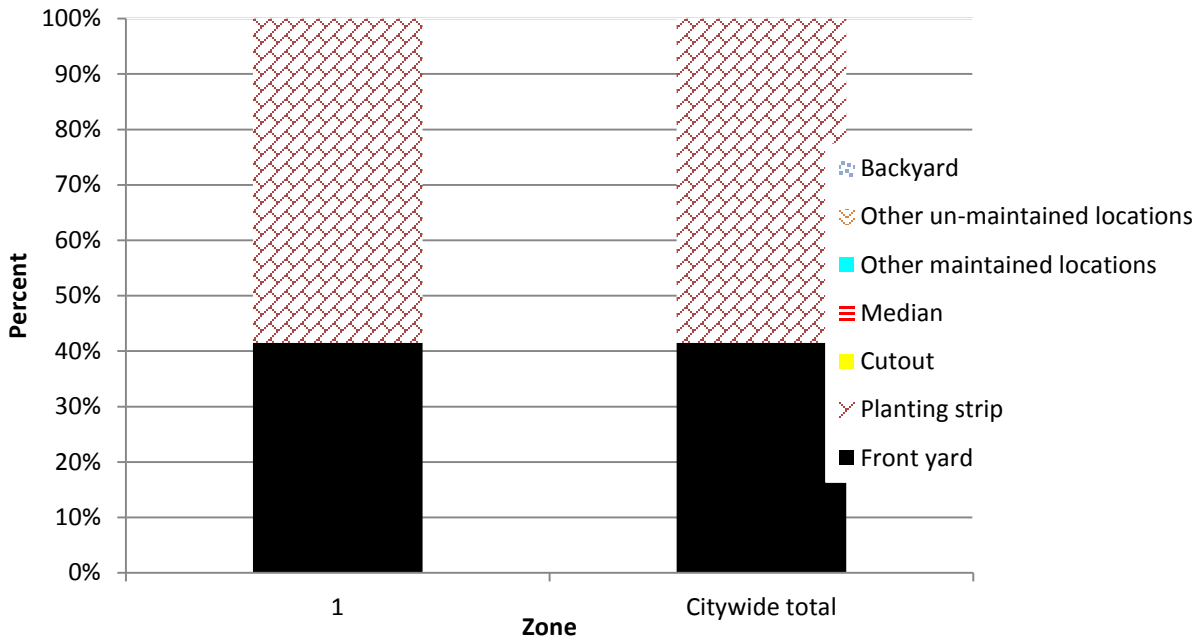


Figure 7: Location of city/park trees

Appendix B: ArcGIS Mapping



Figure 1: Location of Ash Trees





Figure 2: Location of EAB symptoms





Figure 3: Location of Poor Condition Trees





Figure 4: Location of Trees with Recommended Maintenance





**Figure 5: Maintenance Tasks** \*City ownership of the trees recommended for removal should be verified prior to any removal\*

CHAPTER 151

TREES

151.01 Purpose	151.07 Enforcement Period
151.02 Definition	151.08 Removal of Trees
151.03 Trees in Parking	151.09 Removal of Stumps
151.04 Planting Restrictions	151.10 Disease Control
151.05 Vision	151.11 Inspection and Removal
151.06 Duty to Trim Trees	151.12 Rate

**151.01 PURPOSE.** The purpose of this chapter is to beautify and preserve the appearance of the City by regulating and providing for the planting, care and removal of trees.

**151.02 DEFINITION.** For use in this chapter, "parking" means that part of the street, avenue or highway in the City not covered by sidewalk and lying between the lot line and the curb line; or, on unpaved streets, that part of the street, avenue or highway lying between the lot line and that portion of the street usually traveled by vehicular traffic.

**151.03 TREES IN PARKING.** The owners of all lots or parcels of land are hereby granted the right and privilege of planting and maintaining trees on the parking in front of and beside their property, except as hereinafter provided, and upon the express condition that the right is reserved to the City at any time to use the same for street or sidewalk purposes and to remove all trees therefrom, or other things growing thereon, and providing further that all trees shall be planted and maintained in accordance with the requirements of this chapter.

**151.04 PLANTING RESTRICTIONS.** No tree shall be planted in any parking or street except in accordance with the following:

1. Alignment. All trees planted in any street shall be planted in the parking midway between the outer line of the sidewalk and the curb. In the event a curb line is not established, trees shall be planted on a line ten (10) feet from the property line.
2. Spacing. Except as hereafter set forth, trees shall not be planted on any parking which is less than nine (9) feet in width, or contains less than eighty-one (81) square feet of exposed soil surface per tree. Trees shall not be planted closer than twenty-five (25) feet to street intersections (property lines extended) and ten (10) feet to a driveway, alley or fire hydrant. Trees shall be planted not less than thirty (30) feet apart. If it is at all possible, trees should be planted inside the property lines and not between the sidewalk and the curb.



3. **Prohibited Trees.** No person shall hereafter plant in any parking any fruit-bearing tree or any tree of the kinds commonly known as cottonwood, poplar, box elder, Chinese elm, evergreen, soft maple, black walnut or willow.

4. **Utilities.** No tree may be planted in the parking under or within ten (10) lateral feet of any overhead utility wire or over or within five (5) lateral feet of any underground water line, sewer line, transmission line or other utility.

**151.05 VISION.** No tree shall be maintained upon the parking in such a manner as to interfere with the clear vision of drivers of vehicles, nor within twenty-five (25) feet of any intersection, and any trees existing contrary to the provisions hereof may be removed by the Public Works Superintendent without compensation to the abutting property owners.

**151.06 DUTY TO TRIM TREES.** The owner or agent of the abutting property shall keep the trees on or overhanging the street trimmed so that all branches will be at least fifteen (15) feet above the surface of the street and eight (8) feet above the sidewalks, and do not interfere with or obscure utility wires or street lights.

**151.07 ENFORCEMENT PERIOD.** If the abutting property owner fails to trim or maintain the trees as required in this chapter, the City may serve notice on the abutting property owner. The notice shall be by certified mail and allow five (5) days after mailing said notice as a period of time to eliminate the violations. Return receipt with signature is not required for this notice. If the owner fails to act within the prescribed 5-day time period, the City may perform or cause to be performed the required action and assess the costs against the property for collection in the same manner as a property tax.

**151.08 REMOVAL OF TREES.** The Public Works Superintendent shall remove or cause or order to be removed any tree on the parking which by reason of its nature is injurious to sewers, electric power lines, gas lines, water lines or other public improvements. The Public Works Superintendent shall additionally remove any trees on the parking, not on private property, which are dead or have become diseased, or which constitute a danger to the public, or which may otherwise be declared a nuisance.

**151.09 REMOVAL OF STUMPS.** It shall be the duty of the owner or agent of the abutting or adjacent property to remove any tree stumps in the parking so that the stump does not project above the surface of the ground.



**151.10 DISEASE CONTROL.** Any dead, diseased or damaged tree or shrub which may harbor serious insect or disease pests or disease injurious to other trees is hereby declared to be a nuisance.

**151.11 INSPECTION AND REMOVAL.** The Council shall inspect or cause to be inspected any trees or shrubs in the City reported or suspected to be infected with or damaged by any disease or insect or disease pests, and such trees and shrubs shall be subject to removal as follows:

1. Removal from City Property. If it is determined that any such condition exists on any public property, including the strip between the curb and the lot line of private property, and that danger to other trees within the City is imminent, the Council shall immediately cause such condition to be corrected by treatment or removal so as to destroy or prevent as fully as possible the spread of the disease or the insect or disease pests. The Council may also order the removal of any trees on the streets of the City which interfere with the making of improvements or with travel thereon.

2. Removal from Private Property. If it is determined with reasonable certainty that any such condition exists on private property and that danger to other trees within the City is imminent, the Council shall immediately notify by certified mail the owner, occupant or person in charge of such property to correct such condition by treatment or removal within fourteen (14) days of said notification. If such owner, occupant or person in charge of said property fails to comply within fourteen (14) days of receipt of notice, the Council may cause the condition to be removed and the cost assessed against the property.

**151.12 RATE.** The rate at which a property owner shall be assessed for the City's performance of the required action under this chapter shall be fifty dollars (\$50.00) per hour, with a minimum charge of fifty dollars (\$50.00).

**The State of Iowa is an Equal Opportunity Employer and provider of ADA services.**

Federal law prohibits employment discrimination on the basis of race, color, age, religion, national origin, sex or disability. State law prohibits employment discrimination on the basis of race, color, creed, age, sex, sexual orientation, gender identity, national origin, religion, pregnancy, or disability. State law also prohibits public accommodation (such as access to services or physical facilities) discrimination on the basis of race, color, creed, religion, sex, sexual orientation, gender identity, religion, national origin, or disability. If you believe you have been discriminated against in any program, activity or facility as described above, or if you desire further information, please contact the Iowa Civil Rights Commission, 1-800-457-4416, or write to the Iowa Department of Natural Resources, Wallace State Office Bldg., 502 E. 9<sup>th</sup> St., Des Moines, IA 50319.

If you need accommodations because of disability to access the services of this Agency, please contact the Director at 515-725-8200.