New Sharon, IA

2016 Urban Forest Management Plan
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Table of Contents

Executive Summary

Overview

This plan was developed to assist the City of New Sharon 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 12% of New Sharon'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 by Matt Brewer, Iowa DNR, 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 293 trees inventoried.

- New Sharon's trees provide $60,444 of benefits annually, an average of $206 a tree
- There are over 38 species of trees
- The top three genera are: Maple 46%, Ash 12%, and Oak 6%
- 19% of trees are in need of some type of management
- 18 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.

- Of the 18 trees needing removal, 11 trees are over 24 inches in diameter at 4.5 ft and must be addressed immediately *City ownership of the trees recommended for removal should be verified prior to any removal*
- 17 of the 35 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, any fruit-bearing tree, cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut
- Check ash trees with a visual survey yearly
- Budget impacts from ash removal – Suggestion: request a budget increase to at least $3,000-$6,000 annually and apply for grants to plant replacement trees

Introduction

This plan was developed to assist New Sharon 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 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 New Sharon, these costs can be extended over years and public safety issues from dead and dying ash trees mitigated.

Trees are an important component of New Sharon'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 New Sharon 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 New Sharon's urban forestry goals.

Inventory

In 2015, a tree inventory was conducted by Matt Brewer, Iowa DNR, 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

The data collected for the 293 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. New Sharon's trees reduce energy related costs by approximately $15,504 annually (Appendix A, Table 1). These savings are both in Electricity (73.3 MWh) and in Natural Gas (10,142.8 Therms).

Annual Stormwater Benefits

New Sharon's trees intercept about 861,039 gallons of rainfall or snow melt a year (Appendix A, Table 2). This interception provides $23,334 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 New Sharon, it is estimated that trees remove 949.2 lbs of air pollution (ozone (O_3), particulate matter less than 10 microns (PM10), carbon monoxide (CO), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2)) per year with a net value of $2,661 (Appendix A, Table 3).

Annual Carbon Benefits

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In New Sharon, trees sequester about 190,196 lbs of carbon a year with an associated value of $1,426 (Appendix A, Table 4). In addition, the trees store 3,409,869 lbs of carbon, with a yearly benefit of $25,574 (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. New Sharon receives $16,725 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, New Sharon's trees provide $60,444 of benefits annually. Benefits of individual trees vary based on size, species, health and

location, but on average each of the 293 trees in New Sharon provides approximately $206 annually (Appendix A, Table 7).

Forest Structure

Species Distribution

New Sharon has over 38 different tree species along city streets and parks (Appendix A, Figure 1).
The distribution of trees by genera is as follows:

Maple	135	46%
Ash	35	12%
Oak	18	6%
Hackberry	12	4%
Apple/Crabapple	11	4%
Pear	10	3%
Spruce	9	3%
Linden/Basswood	8	3%
Northern White Cedar	7	2%
Elm	7	2%
Eastern Redbud	6	2%
Eastern Red Cedar	6	2%
Cherry/Plum	6	2%
Pine	3	1%
Aspen/Cottonwood	3	1%
Hickory	2	1%
Honeylocust	2	1%
Black Walnut	2	1%
Mulberry	2	1%
Sycamore	2	1%
Black Locust	2	1%
Birch	1	<1%
Ginkgo	1	<1%
Willow	1	<1%
Other Small Deciduous	2	1%

Age Class

Over half of New Sharon's trees (54%) are between 18 and 36 inches in diameter at 4.5 ft (Appendix A, Figure 2). For age, it is preferred that a large number of trees are in the smallest size categories (a downward slope) to prepare for natural mortality and to maintain canopy cover. New Sharon will have an aging tree population as this 54% matures, and should consider

new plantings (currently only 11% are under 6 inches in diameter) to develop the next generation of trees.

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 New Sharon indicate that 77% of the trees are in good health, with 9% of the foliage in poor health, dead or dying (Appendix A, Figure 3 & Appendix B, Figure 3). Additionally, 33% of New Sharon'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 22% of the population. This 22% 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	31	11%
Tree Removal	18	6%
Tree Staking	5	2%

Canopy Cover

The total canopy with both private and public trees is 18% (105 acres). The canopy cover included in the New Sharon inventory includes approximately 9 acres (Appendix A, Figure 4).

Land Use and Location

The majority of New Sharon'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	81%
Park/vacant/other	17%
Small commercial	2%

Location	
Planting strip	56%
Front yard	44%

Recommendations

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

New Sharon has 6 critical concern trees, 3 of which need immediate removal and 3 that need immediate cleaning. These trees can be seen on the Location of Trees with Recommended Maintenance map (Appendix B, Figure 4). It is recommended to start with the large diameter critical concern trees first. All 6 trees are over 24 inches in diameter at 4.5 ft and should be addressed immediately. Please refer to the six year maintenance plan at the end of this section. 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 54 trees with these needs.

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 18 removals, 3 are ash trees. There are a total of 35 ash trees, and 17 of those have signs and symptoms that have been associated with EAB. In addition, there are 9 ash 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.

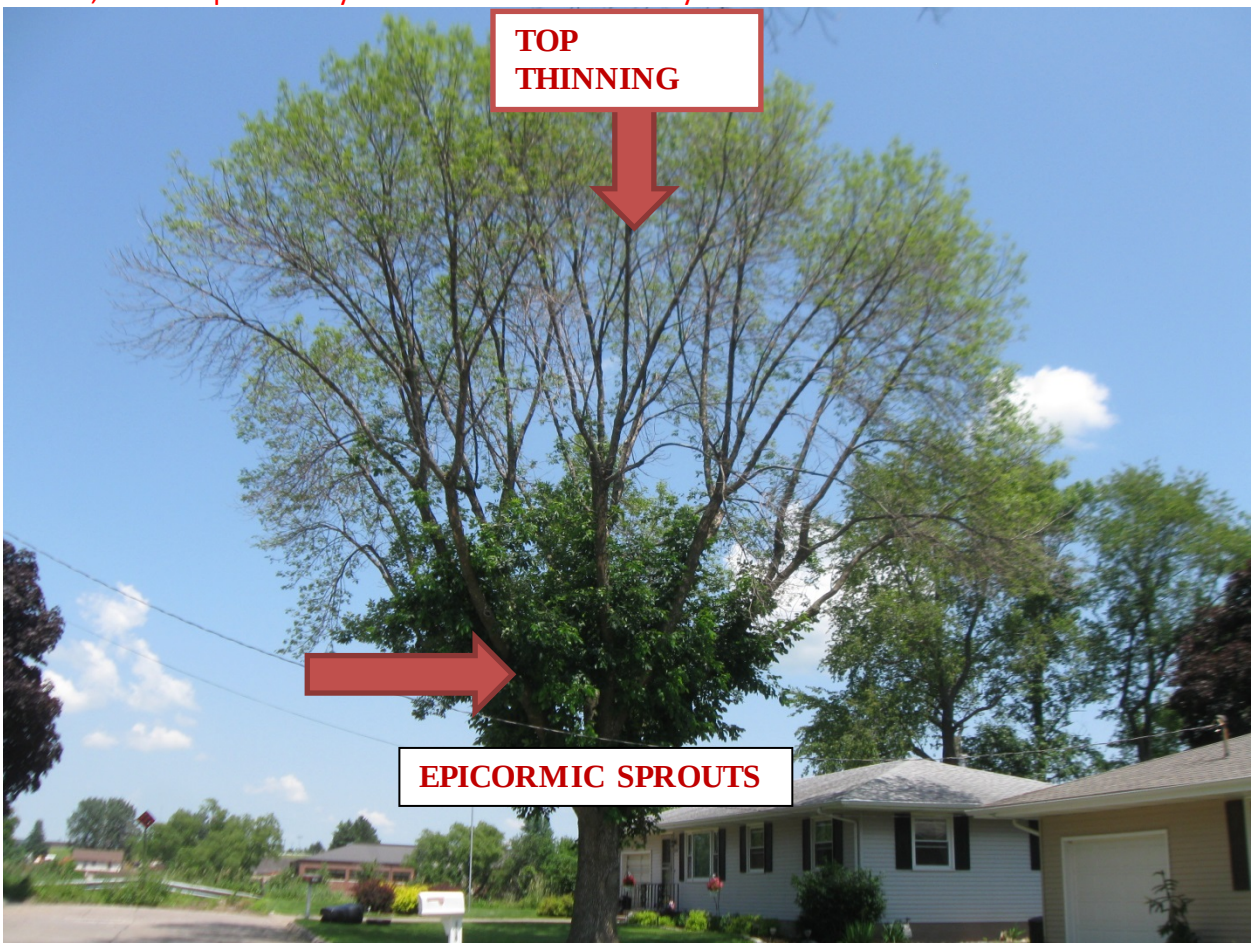
Planting

Most of the planting over the next 5 years will replace the trees that are removed. It is recommended to plant at least 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 or greater number of trees helps ensure continuation of the benefits of the existing forest in New Sharon.

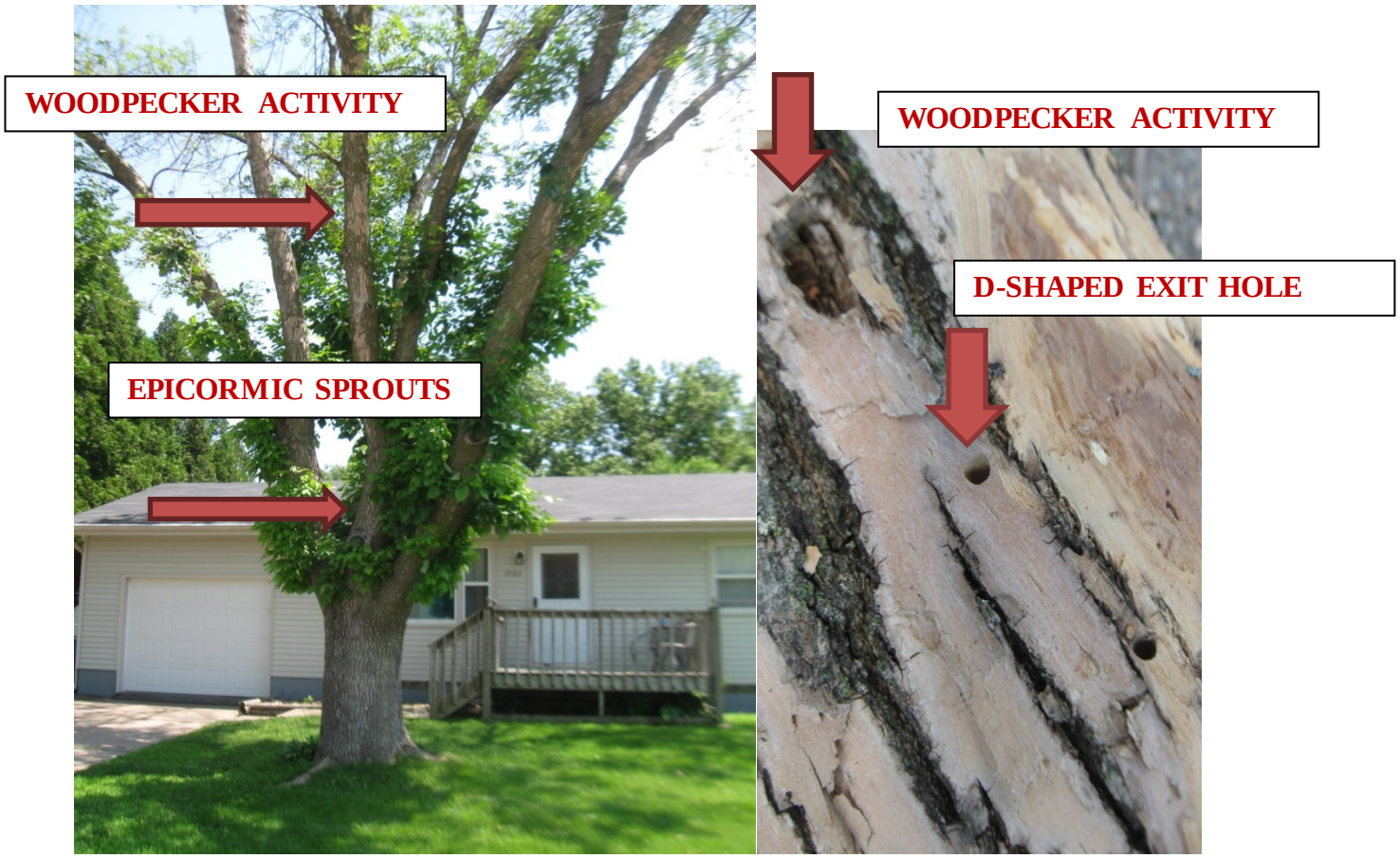
It is important to plant a diverse mix of species in the urban forest to maintain canopy health, since most insects and diseases target a genus (ash) or species (green ash) of trees. Current diversity recommendations advise that a genus (i.e. maple, oak) not make up more than 10% of the urban forest and a single species (i.e. silver maple, sugar maple, white oak, bur oak) not make up more than 5-10% of the total urban forest. Presently, the forest is heavily planted with maple (46%) (Appendix A, Figure 1). Maples should not be planted until this percentage can be lowered. 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: any fruit-bearing tree or any tree of the kinds commonly known as cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut, as outlined in section 151.02 of the city ordinance (Appendix C). All trees planted must meet the restrictions in city ordinance 151.02 (Appendix C).

Continual Monitoring For EAB

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 (See examples below). Once EAB arrives in New Sharon, it could potentially kill all ash within 4 to 10 years of its arrival.



EAB infested tree in Muscatine with top thinning and many new green epicormic sprouts



EAB infested tree in Muscatine with sprouting, wood pecker activity, and D-shaped exit holes

Emerald Ash Borer Plan

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 an 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.

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? The entire state of Iowa is under quarantine, so regulated articles may not be moved into non-quarantined states. For more information, please visit http://www.emeraldashborer.info/.

Canopy Replacement

As budget permits, all removed trees will be replaced. All trees will meet the restrictions in city ordinance 151.02 (Appendix C). The new plantings will be a diverse mix and will not include ash, maple, any fruit-bearing tree, 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 151.06 states "Private Property. If it is determined with reasonable certainty that any such condition exists on private property and that danger to other trees or to adjoining property or passing motorists or pedestrians is imminent, the Council shall 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 corrected and the cost assessed against the property.".

Six Year Maintenance Plan and Cost Estimates

Year 1 (FY 2016)

Remove 3 critical concern trees that need immediate attention	$2,700
Maintain 3 critical concern trees that need immediate attention (cleaning)	$900
Remove 6 trees (marked for removal)	$5,400
Plant and Maintain 11 trees in open locations (pursue grants)	$1,100
Ash tree treatment (if elected), 14 trees in good condition, average 18–24"	avg. $315/tree
-$15 per inch, treated every two years, see note	
*Or saving for future ash removal	
Visual Survey for signs and symptoms of EAB	

Year 2 (FY 2017)

Remove 9 trees (marked for removal)	$8,100
Plant and Maintain 11 trees in open locations (pursue grants)	$1,100
Ash tree treatment (if elected) or saving for future ash removal	
Routine trimming: Contract to trim 1/3 of the city trees (~$300 per tree)	
Visual Survey for signs and symptoms of EAB	

Year 3 (FY 2018)

Remove any new critical concern trees and ash in poor health	$900/tree
Plant and Maintain 20 trees in open locations (pursue grants)	$2,000
Ash tree treatment (if elected) or saving for future ash removal	
Visual Survey for signs and symptoms of EAB	

Year 4 (FY 2019)

Remove any new critical concern trees and ash in poor health	$900/tree
Plant and Maintain 20 trees in open locations (pursue grants)	$2,000
Ash tree treatment (if elected) or saving for future ash removal	
Routine trimming: Contract to trim 1/3 of the city trees (~$300 per tree)	
Visual Survey for signs and symptoms of EAB	

Year 5 (FY 2020)

Remove any new critical concern trees and ash in poor health	$900/tree
Plant and Maintain 20 trees in open locations (pursue grants)	$2,000
Ash tree treatment (if elected) or saving for future ash removal	
Visual Survey for signs and symptoms of EAB	

Year 6 (FY 2021)

Remove any new critical concern trees and ash in poor health	$900/tree
Plant and Maintain 20 trees in open locations (pursue grants)	$2,000
Ash tree treatment (if elected) or saving for future ash removal	
Routine trimming: Contract to trim 1/3 of the city trees (~$300 per tree)	
Visual Survey for signs and symptoms of EAB	

*****Reduction of ash in poor health will reduce exposure to Emerald Ash Borer over time. EAB could potentially kill all ash within 4-15 years of its arrival.
******Assuming a cost of $900 per tree for removal, the budget would need to be increased to $5,250 a year to remove all ash trees within 6 years.
*******Suggest a future (post ash removal and replacement) budget of at least $2 per capita (population 1,293). Currently, this amount would cover about 50% of what would be needed to remove EAB infested trees over a six year period. Suggest setting aside additional funds to prepare for the expected arrival of EAB. Planting would be at least partially dependent on receiving grant funds annually.

Proposed Budget Increase

EAB could potentially kill all ash trees in New Sharon within 4-15 years of its arrival. To remove all ash trees within 6 years the budget would need to be increased to $5,250 a year. If the budget were increased to $2,450 a year all ash could be removed within 13 years. Additionally, it is recommended that New Sharon 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 an example, if the average ash diameter is 20 inches and treatment costs $15 per inch, then treating 10 trees would cost about $3,000 (every other year treatment). This would be 10 trees selected for treatment, and New Sharon would still need to find $900 per tree for removal. Alternatively, if there are 15 treatable trees, it would cost approximately $4,500 every two years for treatment and leave five less trees for removal (for at least two more years). 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 New Sharon. 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

Annual Energy Benefits of Public Trees

12/3/2015

Species	Total Electricity (MWh)	Electricity ($)	Total Natural Gas (Therms)	Natural Gas ($)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Norway maple	10.1	765	1,462.2	1,433	2,198	(N/A)	13.7	14.2	54.96
Silver maple	13.1	993	1,743.1	1,708	2,701	(N/A)	13.7	17.4	67.53
Sugar maple	12.4	938	1,672.6	1,639	2,577	(N/A)	13.0	16.6	67.81
Green ash	10.4	790	1,443.0	1,414	2,204	(N/A)	11.6	14.2	64.83
Pin oak	4.7	358	630.8	618	976	(N/A)	4.8	6.3	69.71
Northern hackberry	4.6	349	660.4	647	997	(N/A)	4.1	6.4	83.05
Apple	0.7	50	114.0	112	162	(N/A)	3.8	1.0	14.70
Pear	0.5	38	79.1	78	115	(N/A)	3.4	0.7	11.52
Maple	0.8	57	96.8	95	152	(N/A)	3.1	1.0	16.91
Red maple	2.0	152	274.7	269	421	(N/A)	2.7	2.7	52.61
Northern white cedar	0.1	6	13.5	13	19	(N/A)	2.4	0.1	2.73
Eastern red cedar	0.6	46	90.1	88	134	(N/A)	2.0	0.9	22.39
Eastern redbud	0.8	61	124.0	121	183	(N/A)	2.0	1.2	30.47
Siberian elm	1.3	95	162.9	160	255	(N/A)	1.7	1.6	50.95
Plum	0.4	34	63.4	62	96	(N/A)	1.7	0.6	19.24
Northern red oak	0.8	63	117.6	115	178	(N/A)	1.4	1.1	44.46
Basswood	1.1	86	156.1	153	239	(N/A)	1.0	1.5	79.79
Eastern cottonwood	0.9	65	107.7	106	170	(N/A)	1.0	1.1	56.82
Blue spruce	0.1	7	16.2	16	23	(N/A)	1.0	0.2	7.80
Norway spruce	0.5	38	63.8	63	100	(N/A)	1.0	0.6	33.49
American basswood	0.9	69	134.2	132	200	(N/A)	1.0	1.3	66.72
Spruce	0.2	18	33.6	33	51	(N/A)	1.0	0.3	17.10
Black locust	0.1	11	23.0	23	33	(N/A)	0.7	0.2	16.73
Mulberry	0.2	16	28.5	28	44	(N/A)	0.7	0.3	21.77
American sycamore	0.7	50	93.7	92	142	(N/A)	0.7	0.9	70.91
Austrian pine	0.3	21	39.0	38	59	(N/A)	0.7	0.4	29.65
Elm	0.8	62	110.0	108	170	(N/A)	0.7	1.1	84.77
Broadleaf Deciduous Small	0.2	15	32.2	32	47	(N/A)	0.7	0.3	23.50
Littleleaf linden	0.5	37	65.8	65	101	(N/A)	0.7	0.7	50.69
Hickory	0.7	49	91.8	90	139	(N/A)	0.7	0.9	69.67
Honeylocust	0.7	56	94.8	93	149	(N/A)	0.7	1.0	74.28
Black walnut	0.7	49	91.8	90	139	(N/A)	0.7	0.9	69.67
White ash	0.5	40	62.1	61	101	(N/A)	0.3	0.7	100.98
River birch	0.3	24	47.4	46	71	(N/A)	0.3	0.5	70.84
Black cherry	0.2	15	31.6	31	46	(N/A)	0.3	0.3	46.14
Willow	0.2	18	29.5	29	47	(N/A)	0.3	0.3	46.78
Eastern white pine	0.1	4	9.5	9	14	(N/A)	0.3	0.1	13.58
Ginkgo	0.2	18	32.0	31	49	(N/A)	0.3	0.3	49.28
Total	73.3	5,564	10,142.8	9,940	15,504	(N/A)	100.0	100.0	52.92

Table 2: Annual Stormwater Benefits

Annual Stormwater Benefits of Public Trees

12/3/2015

Species	Total rainfall interception (Gal)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Norway maple	97,679	2,647	(N/A)	13.7	11.3	66.18
Silver maple	194,261	5,264	(N/A)	13.7	22.6	131.61
Sugar maple	159,013	4,309	(N/A)	13.0	18.5	113.40
Green ash	118,359	3,208	(N/A)	11.6	13.7	94.34
Pin oak	55,018	1,491	(N/A)	4.8	6.4	106.50
Northern hackberry	48,170	1,305	(N/A)	4.1	5.6	108.78
Apple	2,322	63	(N/A)	3.8	0.3	5.72
Pear	1,762	48	(N/A)	3.4	0.2	4.77
Maple	4,517	122	(N/A)	3.1	0.5	13.60
Red maple	18,943	513	(N/A)	2.7	2.2	64.17
Northern white cedar	888	24	(N/A)	2.4	0.1	3.44
Eastern red cedar	8,832	239	(N/A)	2.0	1.0	39.89
Eastern redbud	4,265	116	(N/A)	2.0	0.5	19.26
Siberian elm	13,322	361	(N/A)	1.7	1.5	72.20
Plum	1,612	44	(N/A)	1.7	0.2	8.74
Northern red oak	8,628	234	(N/A)	1.4	1.0	58.46
Basswood	17,069	463	(N/A)	1.0	2.0	154.19
Eastern cottonwood	8,422	228	(N/A)	1.0	1.0	76.08
Blue spruce	1,050	28	(N/A)	1.0	0.1	9.49
Norway spruce	10,748	291	(N/A)	1.0	1.2	97.09
American basswood	9,854	267	(N/A)	1.0	1.1	89.02
Spruce	2,730	74	(N/A)	1.0	0.3	24.66
Black locust	749	20	(N/A)	0.7	0.1	10.14
Mulberry	735	20	(N/A)	0.7	0.1	9.96
American sycamore	7,886	214	(N/A)	0.7	0.9	106.85
Austrian pine	4,625	125	(N/A)	0.7	0.5	62.66
Elm	11,182	303	(N/A)	0.7	1.3	151.51
Broadleaf Deciduous Small	1,181	32	(N/A)	0.7	0.1	16.01
Littleleaf linden	5,003	136	(N/A)	0.7	0.6	67.80
Hickory	8,081	219	(N/A)	0.7	0.9	109.50
Honeylocust	9,370	254	(N/A)	0.7	1.1	126.96
Black walnut	8,081	219	(N/A)	0.7	0.9	109.50
White ash	7,883	214	(N/A)	0.3	0.9	213.62
River birch	3,764	102	(N/A)	0.3	0.4	102.01
Black cherry	1,174	32	(N/A)	0.3	0.1	31.82
Willow	1,409	38	(N/A)	0.3	0.2	38.19
Eastern white pine	596	16	(N/A)	0.3	0.1	16.14
Ginkgo	1,857	50	(N/A)	0.3	0.2	50.33
Citywide total	861,039	23,334	(N/A)	100.0	100.0	79.64

Table 3: Annual Air Quality Benefits

Annual Air Quality Benefits of Public Trees

12/3/2015

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_3	NO_2	PM_{10}	SO_2		NO_2	PM_{10}	VOC	SO_2							
Norway maple	20.3	3.5	9.9	0.9	110	49.0	7.1	6.7	45.7	303	-4.7	-18	138.5	395 (N/A)	13.7	9.88
Silver maple	35.1	5.9	17.1	1.6	189	61.9	9.0	8.6	59.2	387	-18.7	-70	179.7	505 (N/A)	13.7	12.63
Sugar maple	22.8	3.9	11.0	1.0	123	58.7	8.6	8.2	55.9	366	-17.7	-66	152.5	423 (N/A)	13.0	11.12
Green ash	15.1	2.4	7.2	0.7	80	49.9	7.2	6.9	47.2	310	0.0	0	136.6	390 (N/A)	11.6	11.49
Pin oak	10.0	1.8	5.1	0.5	55	22.4	3.3	3.1	21.3	140	-18.5	-69	48.9	125 (N/A)	4.8	8.92
Northern hackberry	7.8	1.4	3.9	0.4	43	22.3	3.2	3.1	20.9	138	0.0	0	62.9	181 (N/A)	4.1	15.05
Apple	0.4	0.1	0.2	0.0	2	3.4	0.5	0.4	3.0	20	0.0	0	7.9	22 (N/A)	3.8	2.05
Pear	0.4	0.1	0.2	0.0	2	2.5	0.4	0.3	2.3	15	0.0	0	6.1	17 (N/A)	3.4	1.73
Maple	0.8	0.1	0.4	0.0	4	3.5	0.5	0.5	3.4	22	-0.3	-1	9.1	25 (N/A)	3.1	2.83
Red maple	4.8	0.8	2.2	0.2	26	9.5	1.4	1.3	9.1	59	-1.6	-6	27.8	79 (N/A)	2.7	9.89
Northern white cedar	0.1	0.0	0.1	0.0	0	0.4	0.1	0.1	0.4	2	-0.3	-1	0.7	2 (N/A)	2.4	0.25
Eastern red cedar	1.8	0.4	1.4	0.2	12	2.9	0.4	0.4	2.7	18	-4.9	-18	5.4	12 (N/A)	2.0	1.92
Eastern redbud	1.5	0.2	0.7	0.1	8	4.0	0.6	0.5	3.7	24	0.0	0	11.3	32 (N/A)	2.0	5.40
Siberian elm	2.3	0.4	1.1	0.1	13	5.9	0.9	0.8	5.7	37	0.0	0	17.2	50 (N/A)	1.7	9.91
Plum	0.5	0.1	0.2	0.0	2	2.2	0.3	0.3	2.0	13	0.0	0	5.6	16 (N/A)	1.7	3.17
Northern red oak	1.8	0.3	0.9	0.1	10	4.0	0.6	0.5	3.7	25	-2.6	-10	9.3	25 (N/A)	1.4	6.17
Basswood	2.6	0.4	1.2	0.1	14	5.4	0.8	0.8	5.2	34	0.0	0	16.4	47 (N/A)	1.0	15.80
Eastern cottonwood	1.0	0.2	0.5	0.0	5	4.0	0.6	0.6	3.9	25	0.0	0	10.7	31 (N/A)	1.0	10.18
Blue spruce	0.1	0.0	0.1	0.0	1	0.5	0.1	0.1	0.4	3	-0.3	-1	1.0	2 (N/A)	1.0	0.82
Norway spruce	1.3	0.3	1.0	0.2	9	2.3	0.3	0.3	2.3	15	-6.3	-24	1.8	0 (N/A)	1.0	-0.11
American basswood	1.3	0.2	0.6	0.1	7	4.4	0.6	0.6	4.1	27	-1.1	-4	10.8	30 (N/A)	1.0	10.02
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)	1.0	1.92
Black locust	0.1	0.0	0.0	0.0	0	0.7	0.1	0.1	0.7	4	0.0	0	1.7	5 (N/A)	0.7	2.34
Mulberry	0.2	0.0	0.1	0.0	1	1.0	0.1	0.1	0.9	6	0.0	0	2.6	7 (N/A)	0.7	3.63
American sycamore	1.0	0.2	0.5	0.0	5	3.2	0.5	0.4	3.0	20	0.0	0	8.7	25 (N/A)	0.7	12.48
Austrian pine	0.7	0.1	0.6	0.1	5	1.3	0.2	0.2	1.3	8	-1.8	-7	2.7	6 (N/A)	0.7	3.10
Elm	2.1	0.3	0.9	0.1	11	3.9	0.6	0.5	3.7	24	0.0	0	12.1	35 (N/A)	0.7	17.51
Broadleaf Deciduous Small	0.4	0.1	0.2	0.0	2	1.0	0.1	0.1	0.9	6	0.0	0	2.9	8 (N/A)	0.7	4.23
Littleleaf linden	0.9	0.2	0.4	0.0	5	2.3	0.3	0.3	2.2	14	-0.4	-2	6.3	18 (N/A)	0.7	8.82
Hickory	1.1	0.2	0.5	0.0	6	3.1	0.5	0.4	2.9	19	0.0	0	8.7	25 (N/A)	0.7	12.53
Honeylocust	1.9	0.3	0.8	0.1	10	3.4	0.5	0.5	3.3	22	-1.5	-6	9.3	26 (N/A)	0.7	12.87
Black walnut	1.1	0.2	0.5	0.0	6	3.1	0.5	0.4	2.9	19	0.0	0	8.7	25 (N/A)	0.7	12.53
White ash	1.9	0.3	0.8	0.1	10	2.4	0.4	0.3	2.4	15	0.0	0	8.7	25 (N/A)	0.3	25.38
River birch	0.9	0.1	0.4	0.0	5	1.6	0.2	0.2	1.5	10	-0.2	-1	4.7	14 (N/A)	0.3	13.58
Black cherry	0.4	0.1	0.2	0.0	2	1.0	0.1	0.1	0.9	6	0.0	0	2.9	8 (N/A)	0.3	8.35
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)	0.3	7.92
Eastern white pine	0.1	0.0	0.1	0.0	0	0.3	0.0	0.0	0.3	2	-0.2	-1	0.6	1 (N/A)	0.3	1.48
Ginkgo	0.5	0.1	0.3	0.0	3	1.1	0.2	0.2	1.1	7	-0.2	-1	3.3	9 (N/A)	0.3	9.29
Citywide total	145.5	24.7	71.8	6.8	786	350.8	51.0	48.6	332.1	2,183	-82.2	-308	949.2	2,661 (N/A)	100.0	9.08

Table 4: Annual Carbon Stored

Stored CO2 Benefits of Public Trees

12/3/2015

Species	Total Stored CO2 (lbs)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Norway maple	335,433	2,516	(N/A)	13.7	9.8	62.89
Silver maple	848,765	6,366	(N/A)	13.7	24.9	159.14
Sugar maple	663,765	4,978	(N/A)	13.0	19.5	131.01
Green ash	490,716	3,680	(N/A)	11.6	14.4	108.25
Pin oak	267,022	2,003	(N/A)	4.8	7.8	143.05
Northern hackberry	119,148	894	(N/A)	4.1	3.5	74.47
Apple	7,797	58	(N/A)	3.8	0.2	5.32
Pear	6,738	51	(N/A)	3.4	0.2	5.05
Maple	9,534	72	(N/A)	3.1	0.3	7.94
Red maple	51,514	386	(N/A)	2.7	1.5	48.29
Northern white cedar	272	2	(N/A)	2.4	0.0	0.29
Eastern red cedar	5,787	43	(N/A)	2.0	0.2	7.23
Eastern redbud	23,457	176	(N/A)	2.0	0.7	29.32
Siberian elm	58,362	438	(N/A)	1.7	1.7	87.54
Plum	7,010	53	(N/A)	1.7	0.2	10.51
Northern red oak	39,721	298	(N/A)	1.4	1.2	74.48
Basswood	86,975	652	(N/A)	1.0	2.6	217.44
Eastern cottonwood	33,287	250	(N/A)	1.0	1.0	83.22
Blue spruce	329	2	(N/A)	1.0	0.0	0.82
Norway spruce	16,151	121	(N/A)	1.0	0.5	40.38
American basswood	45,717	343	(N/A)	1.0	1.3	114.29
Spruce	1,684	13	(N/A)	1.0	0.0	4.21
Black locust	1,319	10	(N/A)	0.7	0.0	4.95
Mulberry	3,215	24	(N/A)	0.7	0.1	12.06
American sycamore	31,546	237	(N/A)	0.7	0.9	118.30
Austrian pine	5,322	40	(N/A)	0.7	0.2	19.96
Elm	71,755	538	(N/A)	0.7	2.1	269.08
Broadleaf Deciduous	6,756	51	(N/A)	0.7	0.2	25.34
Littleleaf linden	18,834	141	(N/A)	0.7	0.6	70.63
Hickory	34,401	258	(N/A)	0.7	1.0	129.00
Honeylocust	24,490	184	(N/A)	0.7	0.7	91.84
Black walnut	34,401	258	(N/A)	0.7	1.0	129.00
White ash	25,943	195	(N/A)	0.3	0.8	194.57
River birch	14,280	107	(N/A)	0.3	0.4	107.10
Black cherry	6,743	51	(N/A)	0.3	0.2	50.57
Willow	3,624	27	(N/A)	0.3	0.1	27.18
Eastern white pine	257	2	(N/A)	0.3	0.0	1.93
Ginkgo	7,800	59	(N/A)	0.3	0.2	58.50
Citywide total	3,409,869	25,574	(N/A)	100.0	100.0	87.28

Table 5: Annual Carbon Sequestered

Annual CO Benefits of Public Trees

12/3/2015

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 $	Av $/t
Norway maple	13,414	101	-1,611	-107	-13	16,912	127	28,607	215 (N/A)	13.7	9.7	5.
Silver maple	58,867	442	-4,074	-150	-32	21,941	165	76,584	574 (N/A)	13.7	25.9	14.
Sugar maple	30,940	232	-3,186	-139	-25	20,722	155	48,337	363 (N/A)	13.0	16.3	9.
Green ash	25,081	188	-2,355	-109	-18	17,462	131	40,078	301 (N/A)	11.6	13.5	8.
Pin oak	23,591	177	-1,282	-51	-10	7,906	59	30,164	226 (N/A)	4.8	10.2	16.
Northern hackberry	6,238	47	-572	-44	-5	7,720	58	13,342	100 (N/A)	4.1	4.5	8.
Apple	1,025	8	-37	-11	0	1,105	8	2,081	16 (N/A)	3.8	0.7	1.
Pear	767	6	-33	-8	0	833	6	1,560	12 (N/A)	3.4	0.5	1.
Maple	1,311	10	-46	-7	0	1,267	10	2,525	19 (N/A)	3.1	0.9	2.
Red maple	1,445	11	-247	-19	-2	3,353	25	4,532	34 (N/A)	2.7	1.5	4.
Northern white cedar	74	1	-1	-2	0	131	1	201	2 (N/A)	2.4	0.1	0.
Eastern red cedar	83	1	-28	-11	0	1,016	8	1,060	8 (N/A)	2.0	0.4	1.
Eastern redbud	1,750	13	-113	-11	-1	1,356	10	2,982	22 (N/A)	2.0	1.0	3.
Siberian elm	2,259	17	-280	-14	-2	2,103	16	4,069	31 (N/A)	1.7	1.4	6.
Plum	667	5	-34	-5	0	752	6	1,380	10 (N/A)	1.7	0.5	2.
Northern red oak	529	4	-191	-11	-2	1,384	10	1,712	13 (N/A)	1.4	0.6	3.
Basswood	2,484	19	-417	-13	-3	1,910	14	3,964	30 (N/A)	1.0	1.3	9.
Eastern cottonwood	1,850	14	-160	-8	-1	1,436	11	3,118	23 (N/A)	1.0	1.1	7.
Blue spruce	52	0	-2	-2	0	165	1	214	2 (N/A)	1.0	0.1	0.
Norway spruce	116	1	-78	-12	-1	838	6	864	6 (N/A)	1.0	0.3	2.
American basswood	2,774	21	-219	-11	-2	1,516	11	4,060	30 (N/A)	1.0	1.4	10.
Spruce	221	2	-8	-4	0	405	3	614	5 (N/A)	1.0	0.2	1.
Black locust	320	2	-7	-2	0	240	2	551	4 (N/A)	0.7	0.2	2.
Mulberry	306	2	-15	-3	0	346	3	633	5 (N/A)	0.7	0.2	2.
American sycamore	1,714	13	-151	-7	-1	1,105	8	2,660	20 (N/A)	0.7	0.9	9.
Austrian pine	294	2	-26	-5	0	465	3	728	5 (N/A)	0.7	0.2	2.
Elm	1,336	10	-344	-9	-3	1,365	10	2,347	18 (N/A)	0.7	0.8	8.
Broadleaf Deciduous Smal	487	4	-32	-3	0	340	3	792	6 (N/A)	0.7	0.3	2.
Littleleaf linden	1,632	12	-90	-5	-1	815	6	2,351	18 (N/A)	0.7	0.8	8.
Hickory	1,619	12	-165	-7	-1	1,091	8	2,539	19 (N/A)	0.7	0.9	9.
Honeylocust	2,972	22	-118	-5	-1	1,230	9	4,078	31 (N/A)	0.7	1.4	15.
Black walnut	1,619	12	-165	-7	-1	1,091	8	2,539	19 (N/A)	0.7	0.9	9.
White ash	1,922	14	-125	-4	-1	886	7	2,680	20 (N/A)	0.3	0.9	20.
River birch	0	0	-69	-4	-1	539	4	466	3 (N/A)	0.3	0.2	3.
Black cherry	0	0	-32	-4	0	335	3	299	2 (N/A)	0.3	0.1	2.
Willow	386	3	-17	-2	0	395	3	762	6 (N/A)	0.3	0.3	5.
Eastern white pine	53	0	-1	-1	0	94	1	145	1 (N/A)	0.3	0.0	1.
Ginkgo	0	0	-37	-4	0	396	3	355	3 (N/A)	0.3	0.1	2.
Citywide total	190,196	1,426	-16,370	-823	-129	122,966	922	295,969	2,220 (N/A)	100.0	100.0	7.

Table 6: Annual Social and Aesthetic Benefits

Annual Aesthetic/Other Benefits of Public Trees

12/3/2015

Species	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Norway maple	1,264	(N/A)	13.7	7.6	31.59
Silver maple	4,439	(N/A)	13.7	26.5	110.98
Sugar maple	3,081	(N/A)	13.0	18.4	81.09
Green ash	2,006	(N/A)	11.6	12.0	59.00
Pin oak	1,783	(N/A)	4.8	10.7	127.38
Northern hackberry	779	(N/A)	4.1	4.7	64.91
Apple	57	(N/A)	3.8	0.3	5.22
Pear	41	(N/A)	3.4	0.2	4.13
Maple	192	(N/A)	3.1	1.1	21.29
Red maple	182	(N/A)	2.7	1.1	22.78
Northern white cedar	50	(N/A)	2.4	0.3	7.14
Eastern red cedar	35	(N/A)	2.0	0.2	5.84
Eastern redbud	104	(N/A)	2.0	0.6	17.33
Siberian elm	176	(N/A)	1.7	1.1	35.23
Plum	37	(N/A)	1.7	0.2	7.49
Northern red oak	44	(N/A)	1.4	0.3	10.93
Basswood	174	(N/A)	1.0	1.0	58.12
Eastern cottonwood	158	(N/A)	1.0	0.9	52.77
Blue spruce	38	(N/A)	1.0	0.2	12.81
Norway spruce	32	(N/A)	1.0	0.2	10.77
American basswood	209	(N/A)	1.0	1.3	69.73
Spruce	63	(N/A)	1.0	0.4	21.05
Black locust	39	(N/A)	0.7	0.2	19.55
Mulberry	18	(N/A)	0.7	0.1	8.77
American sycamore	131	(N/A)	0.7	0.8	65.59
Austrian pine	40	(N/A)	0.7	0.2	19.97
Elm	94	(N/A)	0.7	0.6	47.08
Broadleaf Deciduous Small	29	(N/A)	0.7	0.2	14.42
Littleleaf linden	161	(N/A)	0.7	1.0	80.56
Hickory	124	(N/A)	0.7	0.7	62.14
Honeylocust	778	(N/A)	0.7	4.7	388.90
Black walnut	124	(N/A)	0.7	0.7	62.14
White ash	185	(N/A)	0.3	1.1	184.59
River birch	0	(N/A)	0.3	0.0	0.00
Black cherry	0	(N/A)	0.3	0.0	0.00
Willow	39	(N/A)	0.3	0.2	39.16
Eastern white pine	15	(N/A)	0.3	0.1	15.42
Ginkgo	0	(N/A)	0.3	0.0	0.00
Citywide total	16,725	(N/A)	100.0	100.0	57.08

Table 7: Summary of Benefits in Dollars

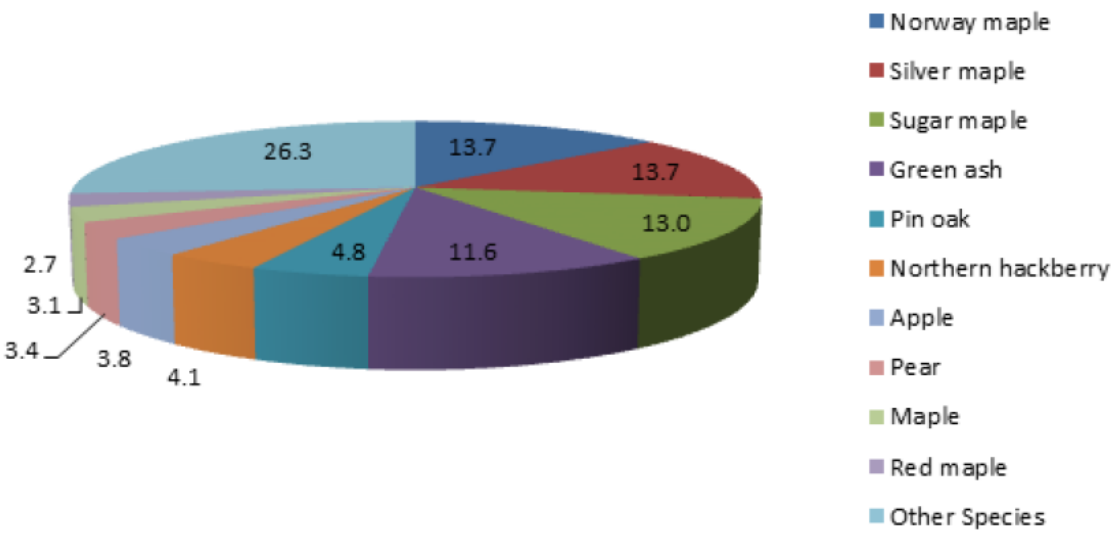
Total Annual Benefits of Public Trees by Species ($)

12/3/2015

Species	Energy	CO_2	Air Quality	Stormwater	Aesthetic/Other	Total ($)	Standard Error	% of Total $
Norway maple	2,198	215	395	2,647	1,264	6,719	(N/A)	11.1
Silver maple	2,701	574	505	5,264	4,439	13,484	(N/A)	22.3
Sugar maple	2,577	363	423	4,309	3,081	10,753	(N/A)	17.8
Green ash	2,204	301	390	3,208	2,006	8,109	(N/A)	13.4
Pin oak	976	226	125	1,491	1,783	4,601	(N/A)	7.6
Northern hackberry	997	100	181	1,305	779	3,362	(N/A)	5.6
Apple	162	16	22	63	57	320	(N/A)	0.5
Pear	115	12	17	48	41	233	(N/A)	0.4
Maple	152	19	25	122	192	511	(N/A)	0.8
Red maple	421	34	79	513	182	1,230	(N/A)	2.0
Northern white cedar	19	2	2	24	50	96	(N/A)	0.2
Eastern red cedar	134	8	12	239	35	428	(N/A)	0.7
Eastern redbud	183	22	32	116	104	457	(N/A)	0.8
Siberian elm	255	31	50	361	176	872	(N/A)	1.4
Plum	96	10	16	44	37	204	(N/A)	0.3
Northern red oak	178	13	25	234	44	493	(N/A)	0.8
Basswood	239	30	47	463	174	953	(N/A)	1.6
Eastern cottonwood	170	23	31	228	158	611	(N/A)	1.0
Blue spruce	23	2	2	28	38	94	(N/A)	0.2
Norway spruce	100	6	0	291	32	430	(N/A)	0.7
American basswood	200	30	30	267	209	737	(N/A)	1.2
Spruce	51	5	6	74	63	199	(N/A)	0.3
Black locust	33	4	5	20	39	102	(N/A)	0.2
Mulberry	44	5	7	20	18	93	(N/A)	0.2
American sycamore	142	20	25	214	131	532	(N/A)	0.9
Austrian pine	59	5	6	125	40	236	(N/A)	0.4
Elm	170	18	35	303	94	619	(N/A)	1.0
Broadleaf Deciduous Sn	47	6	8	32	29	122	(N/A)	0.2
Littleleaf linden	101	18	18	136	161	433	(N/A)	0.7
Hickory	139	19	25	219	124	527	(N/A)	0.9
Honeylocust	149	31	26	254	778	1,237	(N/A)	2.0
Black walnut	139	19	25	219	124	527	(N/A)	0.9
White ash	101	20	25	214	185	545	(N/A)	0.9
River birch	71	3	14	102	0	190	(N/A)	0.3
Black cherry	46	2	8	32	0	89	(N/A)	0.1
Willow	47	6	8	38	39	138	(N/A)	0.2
Eastern white pine	14	1	1	16	15	48	(N/A)	0.1
Ginkgo	49	3	9	50	0	112	(N/A)	0.2
Citywide Total	15,504	2,220	2,661	23,334	16,725	60,444	(N/A)	100.0

Species Distribution of Public Trees

12/3/2015

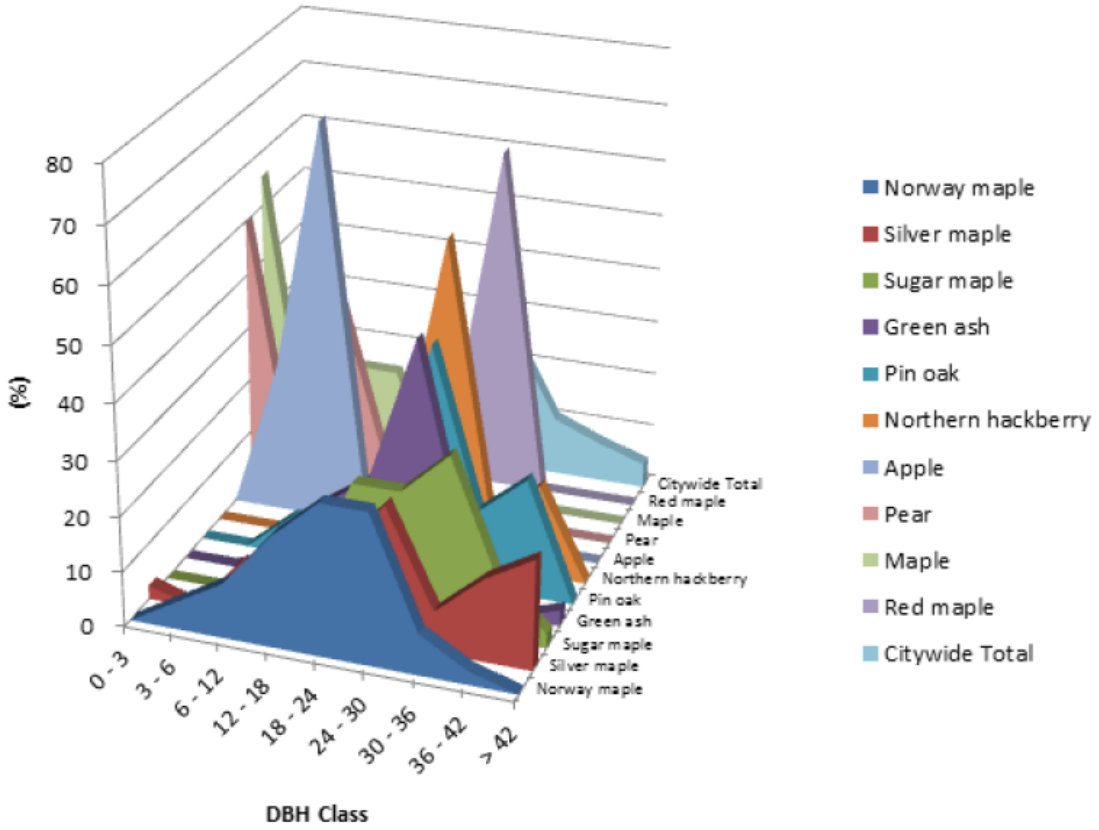


Species	Percent
Norway maple	13.7
Silver maple	13.7
Sugar maple	13.0
Green ash	11.6
Pin oak	4.8
Northern hackberry	4.1
Apple	3.8
Pear	3.4
Maple	3.1
Red maple	2.7
Other Species	26.3
Total	100.0

Figure 1: Species Distribution

Relative Age Distribution of Top 10 Public Tree Species for All Zones (%)

12/3/2015



	DBH class (in)								
Species	0-3	3-6	6-12	12-18	18-24	24-30	30-36	36-42	> 42
Norway maple	0.00	5.00	10.00	20.00	27.50	27.50	7.50	2.50	0.00
Silver maple	2.50	0.00	10.00	5.00	15.00	25.00	7.50	15.00	20.00
Sugar maple	0.00	0.00	2.63	5.26	23.68	23.68	31.58	10.53	2.63
Green ash	0.00	0.00	2.94	14.71	20.59	47.06	11.76	0.00	2.94
Pin oak	0.00	0.00	7.14	7.14	7.14	42.86	14.29	21.43	0.00
Northern hackberry	0.00	0.00	0.00	0.00	16.67	58.33	8.33	16.67	0.00
Apple	0.00	27.27	72.73	0.00	0.00	0.00	0.00	0.00	0.00
Pear	50.00	0.00	40.00	10.00	0.00	0.00	0.00	0.00	0.00
Maple	55.56	0.00	22.22	22.22	0.00	0.00	0.00	0.00	0.00
Red maple	0.00	12.50	0.00	12.50	12.50	62.50	0.00	0.00	0.00
Citywide Total	7.51	3.41	12.29	11.60	17.06	25.94	10.58	7.17	4.44

Figure 2: Relative Age Class

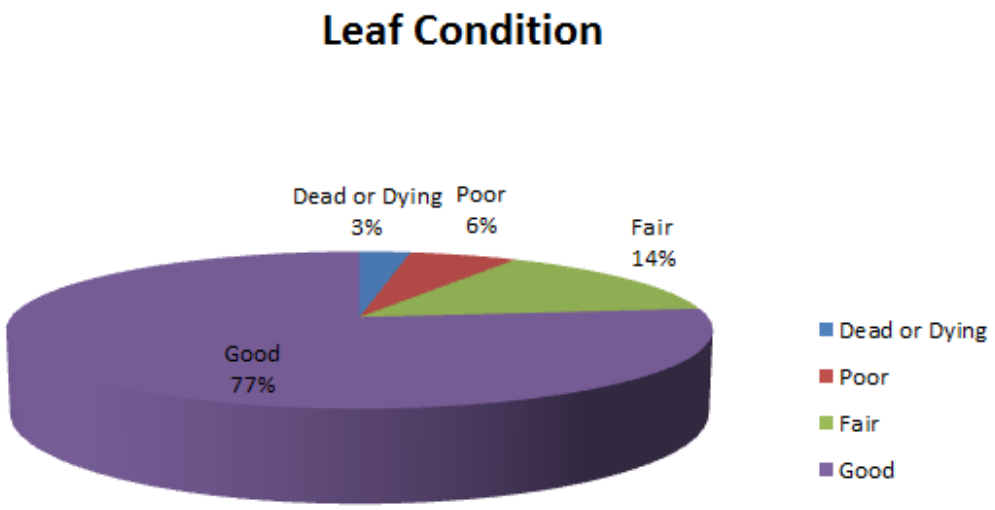


Figure 3: Foliage Condition

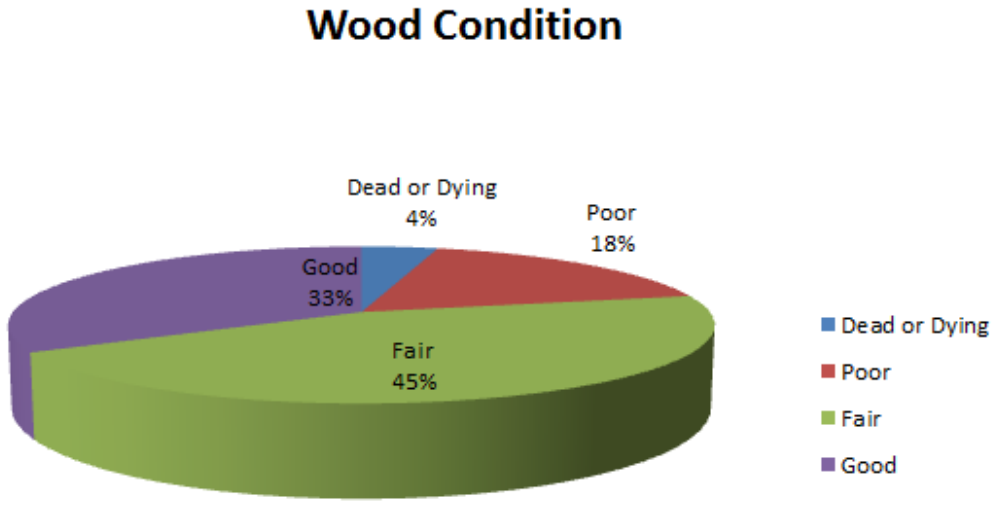
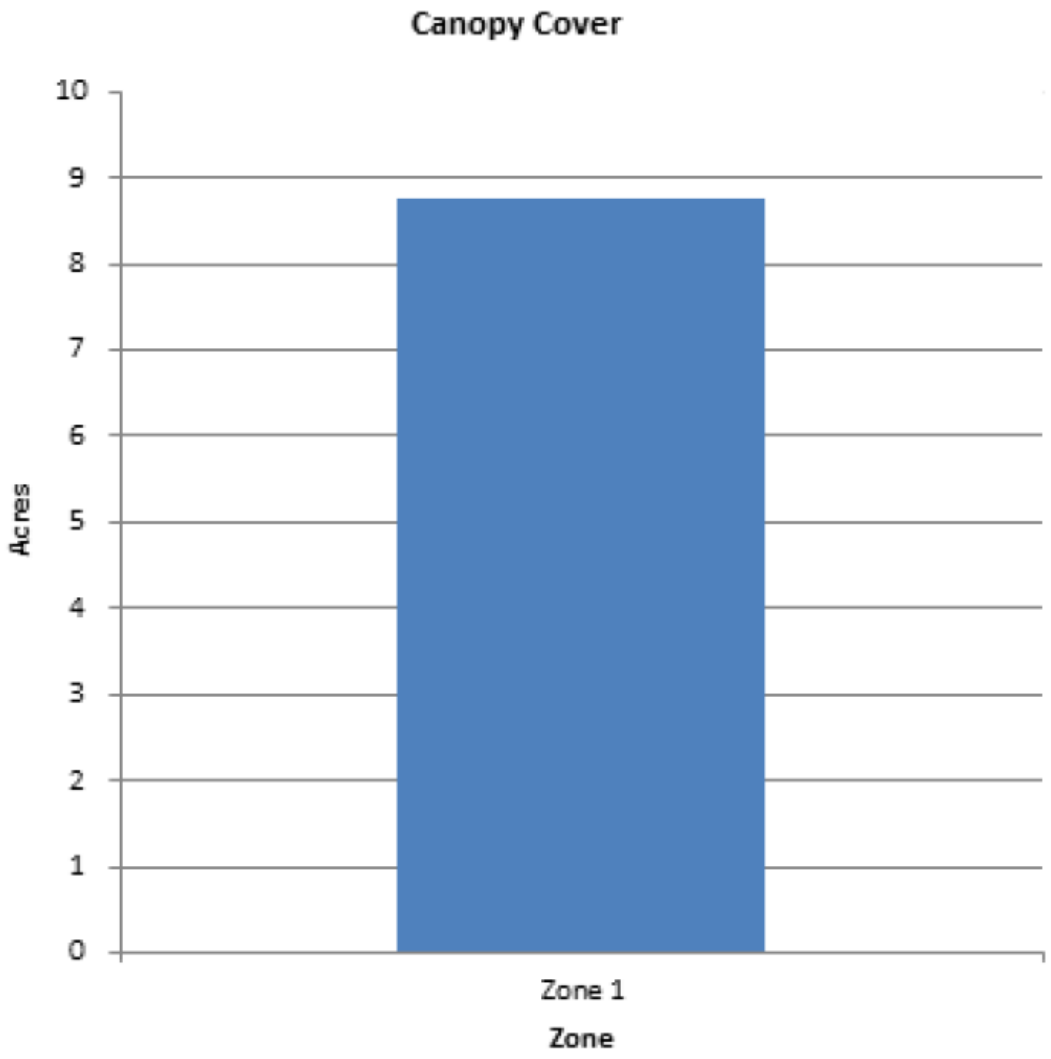


Figure 4: Wood Condition

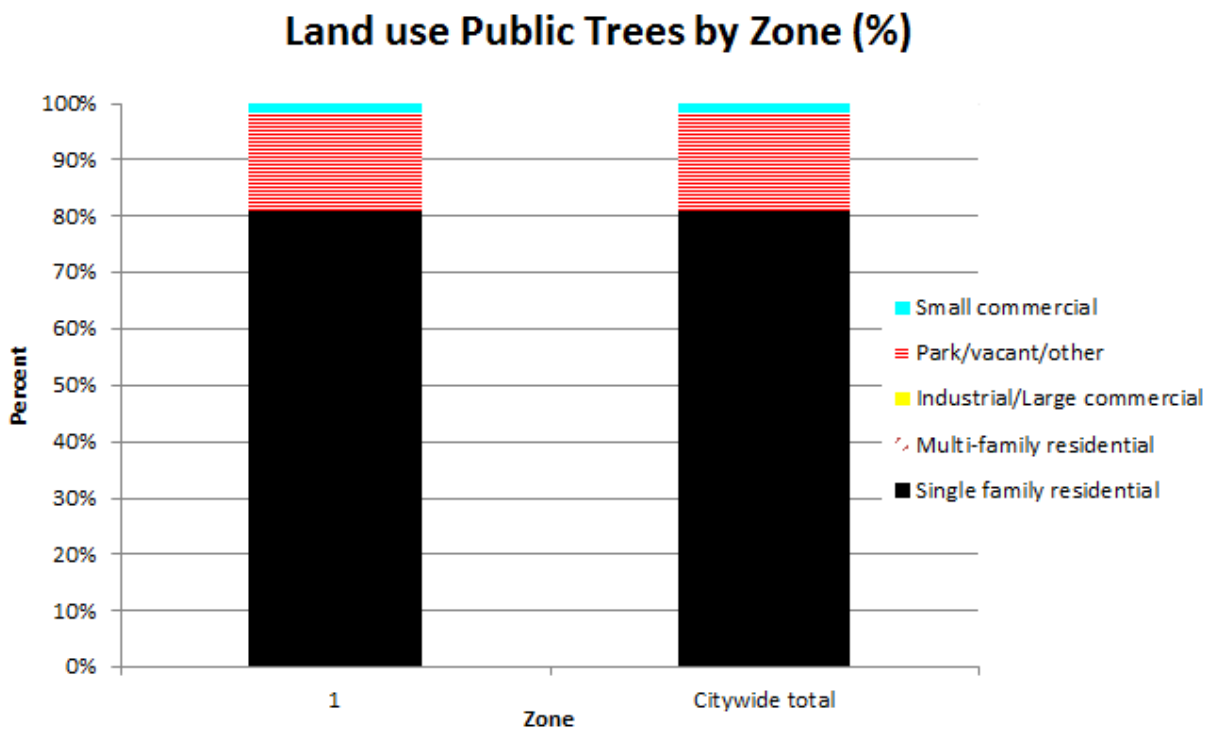
Canopy Cover of Public Trees (Acres)

12/3/2015



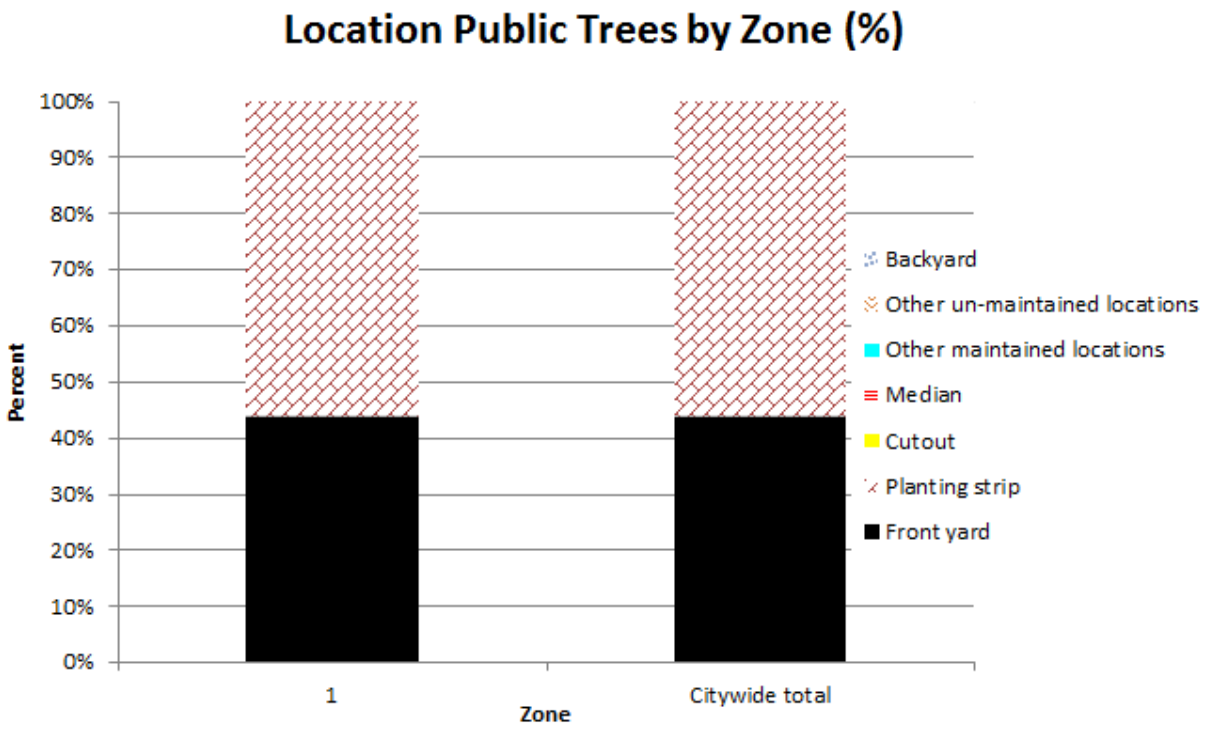
Zone	Acres	% of Total Canopy Cover
Zone 1	9	100.0
Citywide total	9	100.0

Figure 5: Canopy Cover in Acres



Zone	Single family residential	Multi-family residential	Industrial/Large commercial	Park/vacant /other	Small commercial
1	80.89	0.00	0.00	17.41	1.71
Citywide total	80.89	0.00	0.00	17.41	1.71

Figure 6: Land Use of city/park trees



Zone	Front yard	Planting strip	Cutout	Median	Other maintained locations	Other un-maintained locations	Backyard
1	43.69	56.31	0.00	0.00	0.00	0.00	0.00
Citywide total	43.69	56.31	0.00	0.00	0.00	0.00	0.00

Figure 7: Location of city/park trees

Appendix B: ArcGIS Mapping

Figure 1: Location of Ash Trees

Figure 2: Location of EAB symptoms

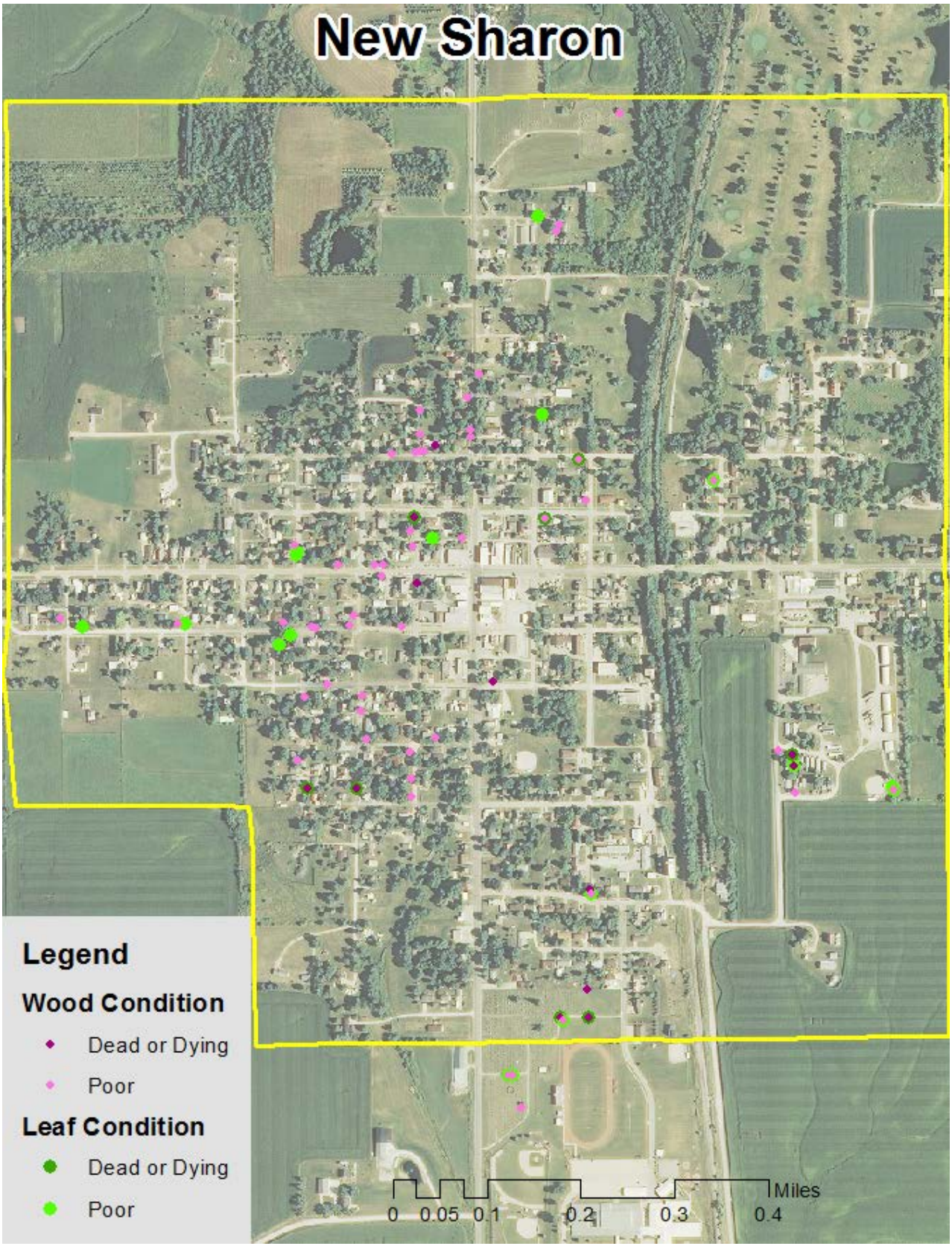


Figure 3: Location of Poor Condition Trees

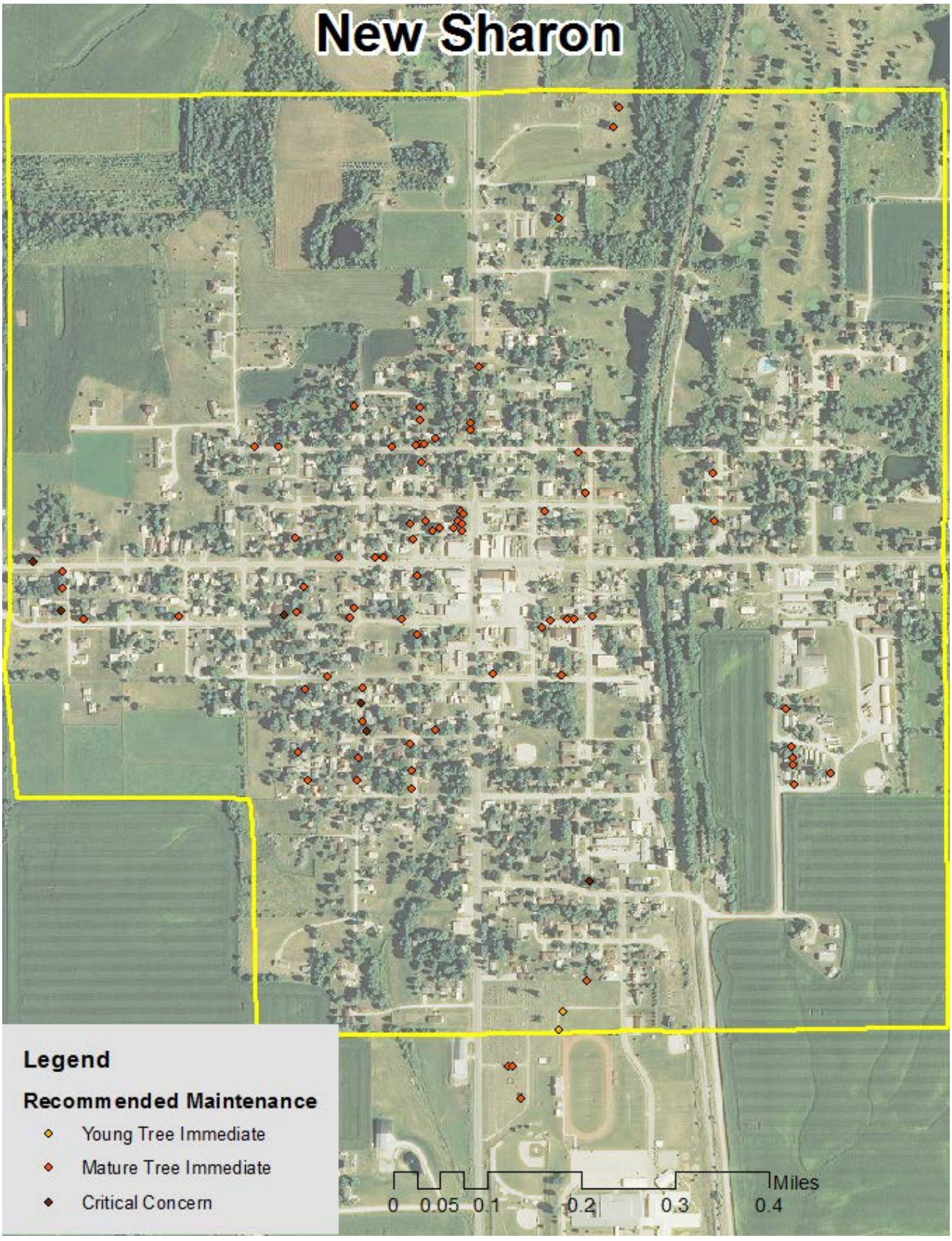


Figure 4: Location of Trees with Recommended Maintenance

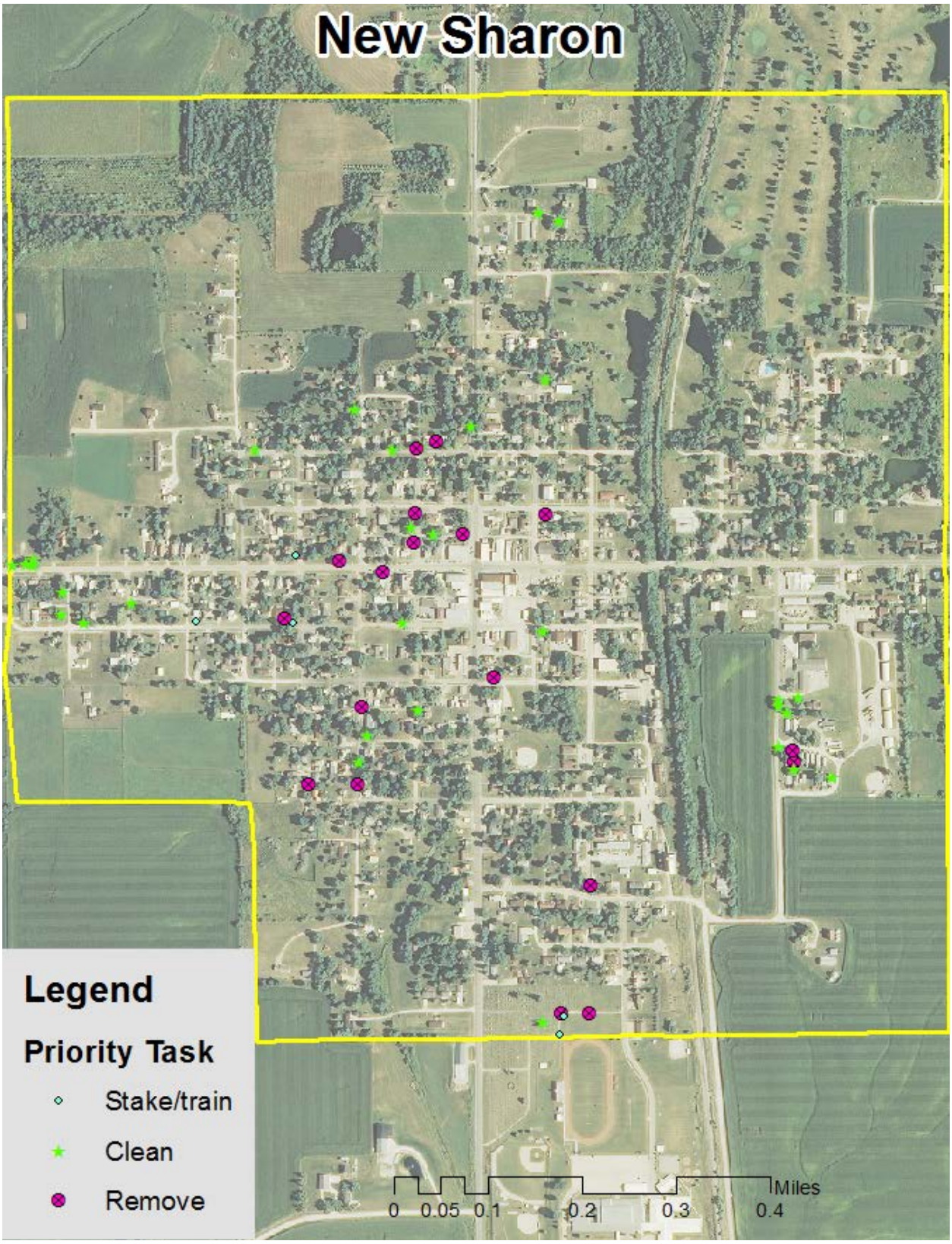


Figure 5: Maintenance Tasks ***City ownership of the trees recommended for removal should be verified prior to any removal***

Appendix C: New Sharon Tree Ordinances

CHAPTER 135

STREET USE AND MAINTENANCE

135.10 MAINTENANCE OF PARKING OR TERRACE. It shall be the responsibility of the abutting property owner to maintain all property outside the lot and property lines and inside the curb lines upon the public streets, except that the abutting property owner shall not be required to remove diseased trees or dead wood on the publicly owned property or right-of-way. Maintenance includes timely mowing, trimming trees and shrubs and picking up litter.

(Code of Iowa, Sec. 364.12[2c])

135.11 FAILURE TO MAINTAIN PARKING OR TERRACE. If the abutting property owner does not perform an action required under the above section within a reasonable time, the City may perform the required action and assess the cost against the abutting property for collection in the same manner as a property tax.

(Code of Iowa, Sec. 364.12[2e])

Continued on next page.

CHAPTER 151

TREES

151.01 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.

151.02 PLANTING RESTRICTIONS. No tree shall be planted in any parking or street without first obtaining approval from the Council and 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. 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 (20) feet from street intersections (property lines extended) and ten (10) feet from driveways. 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 plant in any street any fruit-bearing tree or any tree of the kinds commonly known as cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut.

151.03 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. If the abutting property owner fails to trim the trees, the City may serve notice on the abutting property owner requiring that such action be taken within five (5) days. If such action is not taken within that time, the City may perform the required action and assess the costs against the abutting property for collection in the same manner as a property tax.

(Code of Iowa, Sec. 364.12[2c, d & e])

151.04 TRIMMING TREES TO BE SUPERVISED. Except as allowed in Section 151.03, it is unlawful for any person to trim or cut any tree in a street or public place unless the work is done under the supervision of the City.

151.05 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.

151.06 INSPECTION AND REMOVAL. The Council shall inspect or cause to be inspected any trees or shrubs in the City reported or suspected to be dead, diseased or damaged, and such trees and shrubs shall be subject to the following:

1. 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, the Council may cause such condition to be corrected by treatment or removal. 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. Private Property. If it is determined with reasonable certainty that any such condition exists on private property and that danger to other trees or to adjoining property or passing motorists or pedestrians is imminent, the Council shall 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 corrected and the cost assessed against the property.

(Code of Iowa, Sec. 364.12[3b & h])