Emerald Ash Borer/Urban Plan
Larchwood, IA

2015 Urban Forest Management Plan
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Executive Summary

Overview

This plan was developed to assist the City of Larchwood with managing its urban forest, including budgeting and future planning. Trees can provide a multitude of benefits to the community, and sound management allows Larchwood to 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 26% of Larchwood'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 482 trees inventoried.

- Larchwood's trees provide $98,416 of total benefits annually, an average of $204 a tree.
- There are over 34 species of trees.
- The top three genera are: Ash 27%, Maple 18%, and cottonwood 7%.
- 44% of trees are in need of some type of management.
- 20 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 20 trees needing removal, 4 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*.
- 46 of the 142 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 the 142 ash trees yearly for rapid decline and new symptoms.

Introduction

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

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

Inventory

In 2014, a tree inventory was conducted that included 100% of the city owned street trees and in 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 482 city trees was entered into the USDA Forest service program Street Tree Resource Analysis Tool for Urban forestry Management (STRATUM), part of the i-Tree suite. The following are results from the i-Tree STRATUM analysis.

Annual Benefits

Annual Energy Benefits

Trees conserve energy by shading buildings and blocking winds. Larchwood's trees reduce energy related costs by approximately $25,067 annually (Appendix A, Table 1). These savings are both in Electricity (121.1 MWh) and in Natural Gas (16,202.6 Therms).

Annual Stormwater Benefits

Larchwood's trees intercept about 1,433,400 gallons of rainfall or snow melt a year (Appendix A, Table 2). This interception provides $38,845 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 mater (ozone). In Larchwood, it is estimated that trees remove 1,515 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 $4,233 (Appendix A, Table 3).

Annual Carbon Benefits

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Larchwood, trees sequester about 280,199 lbs. of carbon a year with an associated value of $2,101 (Appendix A, Table 5). In addition, the trees store 5,371,649 lbs. of carbon, with a yearly benefit of $40,287 (Appendix A, Table 4).

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. Larchwood receives $28,179 in annual social benefits from trees (Appendix A, Table 6).

Financial Summary of all Benefits

According to the USDA Forest Service i-Tree STRATUM analysis, Larchwood's trees provide $98,416 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 482trees in Larchwood provide approximately $204 annually (Appendix A, Table 7).

Forest Structure

Species Distribution

Larchwood has over 34 different tree species along city streets and parks (Appendix A, Figure 1).
The distribution of trees by genera is as follows:

Ash	142	27%
Maple	107	22%
Spruce	65	14%
Cottonwood	30	6%
Pine	29	6%
Catalpa	28	6%
Linden	23	5%
Locust	14	3%
Apple	13	3%
Hackberry	12	3%
Elm	6	1%
Walnut	5	1%
Northern White cedar	2	<1%
Oak	2	<1%
Lilac	1	<1%
Holly	1	<1%
Buckthorn-weed	1	<1%
Mulberry	1	<1%
Small evergreen	1	<1%
Pear	1	<1%

Age Class

Most of Larchwood's trees (62%) are between 6 and 24 inches in diameter at 4.5 ft (Appendix A, Figure 2). With regard to age and size, it is preferred that the highest amounts of trees have smaller trunk diameters, so younger and smaller trees will replace natural mortality and to maintain canopy cover. Larchwood's size curve is in the middle diameters, indicating an 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 of of 83% of the trees is good and fair with only 17% of the foliage in poor health, dead or dying (Appendix B, Figure 3). Similarly, 86% of Larchwood's trees have wood in good to fair health (appendix A, Figure 4) while 14% have wood in poor health, dead or dying. This 14% are the 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	171	35%
Crown Raising	0	0%
Tree Staking	8	2%
Tree Removal	20	4%
Crown Reduction	13	3%
No work needed	270	56%

Canopy Cover

The total canopy of Larchwood is about 12 acres (Appendix A, Figure 5). According to the 2010 census, Larchwood occupies about 636 acres of land. The canopy cover is about 2%.

Land Use and Location

The majority of Larchwood'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	30%
Park/vacant/other	69%
Industrial/Large commercial	0%
Small commercial	0%
Multifamily residential	<1%

Location	
Planting strip	99%
Other maintained locations	34%
Median	<1%
Cutout (surrounded by pavement)	0%
Front yard	0%

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 24 inches should be removed. A few trees may have main trunks which fork between 2 feet and 8 feet above the ground. Any of these forked trees, with open splits exposing interior wood, 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

Larchwood has 20 'removal' trees that need removal without regard to the species (Appendix A, Table 8) and their locations are shown on Figure 5, Appendix B. These trees are shown as red circles with a black X on Figure 5 entitled 'Maintenance Tasks.' Larchwood is the first town not to have any 'critical concern' trees that needed some kind of immediate work. Next, move on the 35 young and mature trees needing immediate work as shown on Figurers 3 & 4, Appendix B.

Poor tree species

Of the 20 removal trees, 2 are ash trees. There are a total of 142 ash trees, and 46 of those have signs and symptoms that have been associated with EAB. In addition, there are 16 ash trees whose wood is 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 and fill in open spaces. It is recommended to plant 1.2 trees for every tree removed, since survival rates will not be 100%. 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 Larchwood.

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 (45%) (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: 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

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.

Emerald Ash Borer Plan

Ash Tree Removal

Tree removal can be prioritized with the 20 'removal' trees first as shown on Figure 5, Appendix B with the red circles and black X's within the circle. Then move on to the 35 trees needing 'immediate care' shown on Figure 4, Appendix B. This work is followed by the 90 or so dead, dying, and poor trees shown on Figure 3 in Appendix B. *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. Larchwood has the current added benefit of not finding any actual infestations of EAB. Chemical 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 is responsible for the decline and death of millions of ash trees. Ash in woodlands 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. 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. As updated, sample city tree code can be found in Appendix C covering public and private trees, past and present insect and disease problems, and sampling of trees for insect and disease problems. The new plantings will be a diverse mix and should not include ash, maple, cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut.

Postponed Work

While finances, staffing and equipment may be initially focused 'removal' trees, usual services may be delayed. Tree removal requests on genera other than ash should 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 "If it is determined with reasonable certainty that any such condition exists (trees or shrubs in the City reported or suspected to be infected with or damaged by any disease or insect or disease pests) on private property and that the 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 14 days of receipt of notice, the Council may cause the condition to be corrected and the cost assessed against the property."

Budget

Evidently, Larchwood's budget does not have a line item for tree care or maintenance. Instead, it handles tree care on a 'need' basis, such as, after the 2013 spring ice storms. Tree expenditures since 2008 are as follows:

4/21/2008	1385.00	Mungers	Raman Tree Service
9/02/2008	1350.00	Park	Raman Tree Service
10/06/2011	800.00	Park	Raman Tree Service
10/06/2011	2750.00	Cemetery	Raman Tree Service
8/15/2012	2500.00	Tree removal	Raman Tree Service
4/19/2013	23000.00	Ice Storm clean	Raman Tree Service
4/29/2013	2280.50	Ice Storm clean	Lyon Co. Secondary Roads
5/7/2013	28000.00	Ice Storm clean	Stensland Gravel Company
6/24/2013	450.00	Tree trimming	Scotts Restoration

Larch wood has 142 ash trees on public land. If EAB should enter the town, it is possible that all of these trees could die within 4 years. If the best ash trees were treated with systemic insecticides to postpone their eventual removal the yearly cost of tree removal could be lowered. At an estimated cost of removal per tree of $550, Larchwood's tree removal costs could rise to $78,000 to $80,000 (based on volume removal costs) just for public ash trees. These costs are in addition to removing the 20 'removal' trees shown on Figure 5, Appendix B. Plus, more costs for care of the 35 trees needing some 'immediate' care shown on Figure 4, Appendix B. Plus, another 90 trees in the 'dead, dying, and poor' category shown on Figure 3, Appendix B. If Larchwood can set aside additional funds each year for tree care and/or removal some of these future costs can be lowered.

Future Budget

Total $24,000 over 6 years ($4,000/year)

FY 2016 Budget

Removal: $3,000
Planting: $500
Watering & Maintenance: $500

FY 2017 Budget

Removal: $2,000 to 3,000
Planting: $500
Routine trimming: $1,000
Watering & Maintenance: $500

FY 2018 Budget

Removal: $2,000 to 3,000
Planting: $500
Routine trimming: $1,000
Watering & Maintenance: $500

FY 2019 Budget to 2021

Removal: $2,000 to 3,000
Planting: $500
Routine trimming: $1,000
Watering & Maintenance: $500

It will take an unknown number of years to remove all ash without a yearly budget.

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Appendix A: i-Tree Data

Table 1: Annual Energy Benefits

Larchwood

Annual Energy Benefits of Public Trees

1/13/2015

Species	Total Electricity (MWh)	Electricity ($)	Total Natural Gas (Therms)	Natural Gas ($)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Green ash	33.7	2,560	4,497.5	4,408	6,967	(N/A)	26.4	27.8	49.77
Silver maple	25.5	1,937	3,342.0	3,275	5,212	(N/A)	13.2	20.8	74.46
Cottonwood	10.2	778	1,439.5	1,411	2,189	(N/A)	6.4	8.7	64.37
Norway maple	7.4	560	1,022.2	1,002	1,561	(N/A)	6.0	6.2	48.79
Catalpa	11.4	862	1,551.5	1,520	2,382	(N/A)	5.8	9.5	76.85
Norway spruce	3.4	259	427.0	418	677	(N/A)	4.5	2.7	28.21
Conifer Evergreen Large	3.1	232	377.6	370	602	(N/A)	4.2	2.4	27.37
Blue spruce	1.4	109	207.0	203	312	(N/A)	4.0	1.2	14.87
Austrian pine	2.3	172	285.7	280	452	(N/A)	3.4	1.8	25.11
American basswood	3.6	274	484.0	474	748	(N/A)	3.0	3.0	46.74
Honeylocust	4.1	311	540.2	529	841	(N/A)	3.0	3.4	52.54
Apple	0.8	62	132.3	130	192	(N/A)	2.8	0.8	12.80
Northern hackberry	1.4	105	194.2	190	296	(N/A)	2.6	1.2	21.11
Scotch pine	1.9	143	235.6	231	374	(N/A)	2.5	1.5	28.73
Littleleaf linden	1.0	75	145.0	142	217	(N/A)	1.7	0.9	24.09
Sugar maple	1.3	100	173.1	170	269	(N/A)	1.3	1.1	38.49
Black walnut	1.9	142	259.4	254	396	(N/A)	1.1	1.6	66.05
White ash	1.0	77	116.0	114	191	(N/A)	1.1	0.8	31.87
Amur maple	0.4	29	57.9	57	85	(N/A)	0.9	0.3	17.06
Boxelder	1.2	90	162.4	159	249	(N/A)	0.9	1.0	49.86
Spruce	0.4	32	57.8	57	89	(N/A)	0.9	0.4	17.80
Siberian elm	1.1	83	151.3	148	231	(N/A)	0.8	0.9	57.76
Northern white cedar	0.4	28	49.2	48	76	(N/A)	0.4	0.3	38.17
Red maple	0.3	22	35.3	35	57	(N/A)	0.4	0.2	28.40
Bur oak	0.4	27	51.8	51	78	(N/A)	0.4	0.3	38.98
American elm	0.6	47	80.4	79	126	(N/A)	0.4	0.5	63.12
Broadleaf Evergreen Small	0.0	1	3.1	3	4	(N/A)	0.4	0.0	2.12
Lilac	0.2	14	24.7	24	38	(N/A)	0.2	0.2	38.13
American holly	0.2	17	28.2	28	44	(N/A)	0.2	0.2	44.11
Buckthorn	0.2	14	24.7	24	38	(N/A)	0.2	0.2	38.13
Mulberry	0.2	14	24.7	24	38	(N/A)	0.2	0.2	38.13
Conifer Evergreen Small	0.0	0	0.7	1	1	(N/A)	0.2	0.0	0.93
Callery pear	0.0	3	6.2	6	9	(N/A)	0.2	0.0	8.99
Eastern white pine	0.1	10	14.6	14	24	(N/A)	0.2	0.1	24.14
Total	121.1	9,189	16,202.6	15,879	25,067	(N/A)	100.0	100.0	47.30

Table 2: Annual Stormwater Benefits

Larchwood

Annual Stormwater Benefits of Public Trees

1/13/2015

Species	Total rainfall interception (Gal)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Green ash	352,926	9,564	(N/A)	26.4	24.6	68.32
Silver maple	391,009	10,596	(N/A)	13.2	27.3	151.38
Cottonwood	114,288	3,097	(N/A)	6.4	8.0	91.09
Norway maple	58,535	1,586	(N/A)	6.0	4.1	49.57
Catalpa	152,755	4,140	(N/A)	5.8	10.7	133.54
Norway spruce	58,795	1,593	(N/A)	4.5	4.1	66.39
Conifer Evergreen Large	49,791	1,349	(N/A)	4.2	3.5	61.33
Blue spruce	16,815	456	(N/A)	4.0	1.2	21.70
Austrian pine	30,081	815	(N/A)	3.4	2.1	45.29
American basswood	32,520	881	(N/A)	3.0	2.3	55.08
Honeylocust	31,061	842	(N/A)	3.0	2.2	52.61
Apple	3,333	90	(N/A)	2.8	0.2	6.02
Northern hackberry	7,202	195	(N/A)	2.6	0.5	13.94
Scotch pine	33,287	902	(N/A)	2.5	2.3	69.39
Littleleaf linden	6,850	186	(N/A)	1.7	0.5	20.63
Sugar maple	10,414	282	(N/A)	1.3	0.7	40.32
Black walnut	21,376	579	(N/A)	1.1	1.5	96.55
White ash	6,378	173	(N/A)	1.1	0.4	28.81
Amur maple	1,333	36	(N/A)	0.9	0.1	7.22
Boxelder	13,036	353	(N/A)	0.9	0.9	70.65
Spruce	4,864	132	(N/A)	0.9	0.3	26.36
Siberian elm	10,837	294	(N/A)	0.8	0.8	73.42
Northern white cedar	9,209	250	(N/A)	0.4	0.6	124.79
Red maple	1,741	47	(N/A)	0.4	0.1	23.59
Bur oak	3,199	87	(N/A)	0.4	0.2	43.34
American elm	5,942	161	(N/A)	0.4	0.4	80.51
Broadleaf Evergreen Small	47	1	(N/A)	0.4	0.0	0.64
Lilac	667	18	(N/A)	0.2	0.0	18.06
American holly	2,052	56	(N/A)	0.2	0.1	55.60
Buckthorn	667	18	(N/A)	0.2	0.0	18.06
Mulberry	667	18	(N/A)	0.2	0.0	18.06
Conifer Evergreen Small	24	1	(N/A)	0.2	0.0	0.66
Callery pear	163	4	(N/A)	0.2	0.0	4.41
Eastern white pine	1,539	42	(N/A)	0.2	0.1	41.70
Citywide total	1,433,400	38,845	(N/A)	100.0	100.0	73.29

Table 3: Annual Air Quality Benefits

Larchwood

Annual Air Quality Benefits of Public Trees

1/13/2015

Species	Deposition (lb) O_3	NO_2	PM_{10}	SO_2	Total Depos. ($)	Avoided (lb) NO_2	PM_{10}	VOC	SO_2	Total Avoided ($)	BVOC Emissions (lb)	BVOC Emissions ($)	Total (lb)	Total ($)	Standard Error	% of Total Trees	Avg. $/tree
Green ash	43.3	6.9	20.9	1.9	231	160.0	23.4	22.3	152.9	999	0.0	0	431.6	1,230	(N/A)	26.4	8.79
Silver maple	72.0	12.2	34.9	3.2	387	120.2	17.6	16.8	115.4	752	-37.9	-142	354.5	997	(N/A)	13.2	14.24
Cottonwood	14.2	2.3	6.8	0.6	76	49.3	7.1	6.8	46.4	306	0.0	0	133.6	382	(N/A)	6.4	11.23
Norway maple	10.9	1.9	5.5	0.5	59	35.4	5.1	4.9	33.5	220	-2.6	-10	95.0	269	(N/A)	6.0	8.42
Catalpa	24.0	3.8	10.8	1.1	126	54.2	7.9	7.5	51.5	338	0.0	0	160.8	464	(N/A)	5.8	14.95
Norway spruce	6.8	1.3	5.6	0.8	45	15.9	2.3	2.2	15.4	100	-26.9	-101	23.5	44	(N/A)	4.5	1.82
Conifer Evergreen Large	5.7	1.1	4.7	0.7	38	14.2	2.1	2.0	13.8	89	-21.8	-82	22.6	45	(N/A)	4.2	2.06
Blue spruce	1.7	0.3	1.6	0.2	12	6.9	1.0	1.0	6.5	43	-5.5	-21	13.8	34	(N/A)	4.0	1.63
Austrian pine	4.0	0.8	3.3	0.5	26	10.6	1.6	1.5	10.3	66	-11.0	-41	21.4	51	(N/A)	3.4	2.86
American basswood	4.1	0.7	2.1	0.2	22	17.2	2.5	2.4	16.4	107	-3.6	-13	41.8	116	(N/A)	3.0	7.24
Honeylocust	5.5	0.9	2.6	0.2	29	19.4	2.8	2.7	18.6	121	-3.7	-14	49.0	136	(N/A)	3.0	8.53
Apple	0.8	0.1	0.4	0.0	5	4.1	0.6	0.6	3.7	25	0.0	0	10.4	30	(N/A)	2.8	1.98
Northern hackberry	0.5	0.1	0.4	0.0	3	6.7	1.0	0.9	6.3	41	0.0	0	15.9	45	(N/A)	2.6	3.19
Scotch pine	3.9	0.8	3.2	0.5	26	8.8	1.3	1.2	8.5	55	-15.9	-60	12.2	21	(N/A)	2.5	1.62
Littleleaf linden	0.8	0.1	0.5	0.0	4	4.8	0.7	0.7	4.5	30	-0.5	-2	11.6	32	(N/A)	1.7	3.61
Sugar maple	1.1	0.2	0.6	0.0	6	6.2	0.9	0.9	6.0	39	-0.9	-3	15.0	42	(N/A)	1.3	5.94
Black walnut	2.7	0.4	1.3	0.1	14	9.0	1.3	1.2	8.5	56	0.0	0	24.5	70	(N/A)	1.1	11.65
White ash	0.4	0.1	0.3	0.0	2	4.7	0.7	0.7	4.6	30	0.0	0	11.3	32	(N/A)	1.1	5.29
Amur maple	0.3	0.1	0.2	0.0	2	1.9	0.3	0.3	1.7	11	0.0	0	4.6	13	(N/A)	0.9	2.61
Boxelder	1.7	0.3	0.8	0.1	9	5.7	0.8	0.8	5.4	35	-0.7	-2	14.9	42	(N/A)	0.9	8.39
Spruce	0.5	0.1	0.5	0.1	3	2.0	0.3	0.3	1.9	13	-1.6	-6	4.1	10	(N/A)	0.9	2.01
Siberian elm	1.6	0.3	0.8	0.1	9	5.2	0.8	0.7	4.9	32	0.0	0	14.4	41	(N/A)	0.8	10.32
Northern white cedar	1.1	0.2	0.9	0.1	7	1.8	0.3	0.2	1.7	11	-5.7	-21	0.6	-3	(N/A)	0.4	-1.58
Red maple	0.3	0.1	0.2	0.0	2	1.4	0.2	0.2	1.3	9	-0.1	0	3.5	10	(N/A)	0.4	4.94
Bur oak	0.3	0.0	0.2	0.0	2	1.7	0.3	0.2	1.6	11	0.0	0	4.4	12	(N/A)	0.4	6.17
American elm	0.6	0.1	0.3	0.0	3	2.9	0.4	0.4	2.8	18	0.0	0	7.7	22	(N/A)	0.4	10.89
Broadleaf Evergreen Small	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.1	1	0.0	0	0.2	1	(N/A)	0.4	0.27
Lilac	0.2	0.0	0.1	0.0	1	0.9	0.1	0.1	0.8	5	0.0	0	2.3	7	(N/A)	0.2	6.56
American holly	0.7	0.1	0.5	0.1	4	1.0	0.1	0.1	1.0	6	0.0	0	3.7	11	(N/A)	0.2	10.84
Buckthorn	0.2	0.0	0.1	0.0	1	0.9	0.1	0.1	0.8	5	0.0	0	2.3	7	(N/A)	0.2	6.56
Mulberry	0.2	0.0	0.1	0.0	1	0.9	0.1	0.1	0.8	5	0.0	0	2.3	7	(N/A)	0.2	6.56
Conifer Evergreen Small	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	0.09
Callery pear	0.0	0.0	0.0	0.0	0	0.2	0.0	0.0	0.2	1	0.0	0	0.4	1	(N/A)	0.2	1.21
Eastern white 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

Species	Deposition (lb) O_3	NO_2	PM_{10}	SO_2	Total Depos. ($)	Avoided (lb) NO_2	PM_{10}	VOC	SO_2	Total Avoided ($)	BVOC Emissions (lb)	BVOC Emissions ($)	Total (lb)	Total ($)	Standard Error	% of Total Trees	Avg. $/tree
Citywide total	210.4	35.5	110.3	11.3	1,158	574.3	83.9	80.0	548.5	3,586	-139.0	-521	1,515.1	4,223	(N/A)	100.0	7.97

Table 4: Annual Carbon Stored

Larchwood

Stored CO2 Benefits of Public Trees

1/13/2015

Species	Total Stored CO2 (lbs)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Green ash	1,437,021	10,778	(N/A)	26.4	26.8	76.98
Silver maple	1,741,881	13,064	(N/A)	13.2	32.4	186.63
Cottonwood	461,255	3,459	(N/A)	6.4	8.6	101.75
Norway maple	179,666	1,347	(N/A)	6.0	3.3	42.11
Catalpa	807,386	6,055	(N/A)	5.8	15.0	195.34
Norway spruce	64,623	485	(N/A)	4.5	1.2	20.19
Conifer Evergreen La	51,618	387	(N/A)	4.2	1.0	17.60
Blue spruce	8,690	65	(N/A)	4.0	0.2	3.10
Austrian pine	25,466	191	(N/A)	3.4	0.5	10.61
American basswood	151,511	1,136	(N/A)	3.0	2.8	71.02
Honeylocust	67,813	509	(N/A)	3.0	1.3	31.79
Apple	14,520	109	(N/A)	2.8	0.3	7.26
Northern hackberry	6,903	52	(N/A)	2.6	0.1	3.70
Scotch pine	38,716	290	(N/A)	2.5	0.7	22.34
Littleleaf linden	18,985	142	(N/A)	1.7	0.4	15.82
Sugar maple	31,521	236	(N/A)	1.3	0.6	33.77
Black walnut	85,391	640	(N/A)	1.1	1.6	106.74
White ash	13,270	100	(N/A)	1.1	0.2	16.59
Amur maple	5,209	39	(N/A)	0.9	0.1	7.81
Boxelder	56,601	425	(N/A)	0.9	1.1	84.90
Spruce	3,111	23	(N/A)	0.9	0.1	4.67
Siberian elm	39,623	297	(N/A)	0.8	0.7	74.29
Northern white cedar	14,981	112	(N/A)	0.4	0.3	56.18
Red maple	3,843	29	(N/A)	0.4	0.1	14.41
Bur oak	9,492	71	(N/A)	0.4	0.2	35.60
American elm	15,282	115	(N/A)	0.4	0.3	57.31
Broadleaf Evergreen S	28	0	(N/A)	0.4	0.0	0.10
Lilac	3,037	23	(N/A)	0.2	0.1	22.78
American holly	6,743	51	(N/A)	0.2	0.1	50.57
Buckthorn	3,037	23	(N/A)	0.2	0.1	22.78
Mulberry	3,037	23	(N/A)	0.2	0.1	22.78
Conifer Evergreen Sn	3	0	(N/A)	0.2	0.0	0.02
Callery pear	218	2	(N/A)	0.2	0.0	1.64
Eastern white pine	1,170	9	(N/A)	0.2	0.0	8.78
Citywide total	5,371,649	40,287	(N/A)	100.0	100.0	76.01

Table 5: Annual Carbon Sequestered

Larchwood

Annual CO Benefits of Public Trees

1/13/2015

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	75,158	564	-6,898	-349	-3	0	0	67,911	509	(N/A)	26.4	24.2	3.64
Silver maple	117,704	883	-8,361	-293	-2	0	0	109,049	818	(N/A)	13.2	38.9	11.68
Cottonwood	24,816	186	-2,214	-108	-1	0	0	22,494	169	(N/A)	6.4	8.0	4.96
Norway maple	12,020	90	-863	-70	-1	0	0	11,087	83	(N/A)	6.0	4.0	2.60
Catalpa	23,812	179	-3,875	-126	-1	0	0	19,811	149	(N/A)	5.8	7.1	4.79
Norway spruce	3,588	27	-310	-59	0	0	0	3,219	24	(N/A)	4.5	1.1	1.01
Conifer Evergreen Large	3,329	25	-248	-51	0	0	0	3,030	23	(N/A)	4.2	1.1	1.03
Blue spruce	912	7	-42	-25	0	0	0	845	6	(N/A)	4.0	0.3	0.30
Austrian pine	1,806	14	-122	-37	0	0	0	1,646	12	(N/A)	3.4	0.6	0.69
American basswood	9,404	71	-727	-39	0	0	0	8,638	65	(N/A)	3.0	3.1	4.05
Honeylocust	8,333	62	-326	-33	0	0	0	7,975	60	(N/A)	3.0	2.8	3.74
Apple	1,455	11	-70	-13	0	0	0	1,372	10	(N/A)	2.8	0.5	0.69
Northern hackberry	979	7	-34	-13	0	0	0	933	7	(N/A)	2.6	0.3	0.50
Scotch pine	1,886	14	-186	-33	0	0	0	1,667	13	(N/A)	2.5	0.6	0.96
Littleleaf linden	2,866	21	-91	-13	0	0	0	2,762	21	(N/A)	1.7	1.0	2.30
Sugar maple	2,318	17	-153	-13	0	0	0	2,152	16	(N/A)	1.3	0.8	2.31
Black walnut	4,635	35	-410	-20	0	0	0	4,206	32	(N/A)	1.1	1.5	5.26
White ash	1,910	14	-64	-9	0	0	0	1,837	14	(N/A)	1.1	0.7	2.30
Amur maple	571	4	-25	-5	0	0	0	541	4	(N/A)	0.9	0.2	0.81
Boxelder	4,300	32	-272	-15	0	0	0	4,013	30	(N/A)	0.9	1.4	6.02
Spruce	389	3	-15	-7	0	0	0	367	3	(N/A)	0.9	0.1	0.55
Siberian elm	2,082	16	-190	-12	0	0	0	1,880	14	(N/A)	0.8	0.7	3.53
Northern white cedar	0	0	-72	-10	0	0	0	-82	-1	(N/A)	0.4	0.0	-0.31
Red maple	522	4	-18	-3	0	0	0	501	4	(N/A)	0.4	0.2	1.88
Bur oak	868	7	-46	-4	0	0	0	819	6	(N/A)	0.4	0.3	3.07
American elm	676	5	-73	-5	0	0	0	597	4	(N/A)	0.4	0.2	2.24
Broadleaf Evergreen Small	9	0	0	0	0	0	0	8	0	(N/A)	0.4	0.0	0.03
Lilac	268	2	-15	-2	0	0	0	251	2	(N/A)	0.2	0.1	1.88
American holly	0	0	-32	-2	0	0	0	-34	0	(N/A)	0.2	0.0	-0.26
Buckthorn	268	2	-15	-2	0	0	0	251	2	(N/A)	0.2	0.1	1.88
Mulberry	268	2	-15	-2	0	0	0	251	2	(N/A)	0.2	0.1	1.88
Conifer Evergreen Small	1	0	0	0	0	0	0	0	0	(N/A)	0.2	0.0	0.00

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
Callery pear	96	1	-2	-1	0	0	0	93	1	(N/A)	0.2	0.0	0.70
Eastern white pine	116	1	-6	-2	0	0	0	108	1	(N/A)	0.2	0.0	0.81
Citywide total	307,365	2,305	-25,788	-1,378	-10	0	0	280,199	2,101	(N/A)	100.0	100.0	3.97

Table 6: Annual Social and Aesthetic Benefits

Larchwood

Annual Aesthetic/Other Benefits of Public Trees

1/13/2015

Species	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Green ash	6,604	(N/A)	26.4	23.4	47.17
Silver maple	8,641	(N/A)	13.2	30.7	123.44
Cottonwood	2,016	(N/A)	6.4	7.2	59.29
Norway maple	1,175	(N/A)	6.0	4.2	36.73
Catalpa	1,741	(N/A)	5.8	6.2	56.17
Norway spruce	900	(N/A)	4.5	3.2	37.48
Conifer Evergreen Large	838	(N/A)	4.2	3.0	38.08
Blue spruce	411	(N/A)	4.0	1.5	19.56
Austrian pine	429	(N/A)	3.4	1.5	23.83
American basswood	707	(N/A)	3.0	2.5	44.18
Honeylocust	1,715	(N/A)	3.0	6.1	107.20
Apple	82	(N/A)	2.8	0.3	5.49
Northern hackberry	256	(N/A)	2.6	0.9	18.29
Scotch pine	456	(N/A)	2.5	1.6	35.04
Littleleaf linden	355	(N/A)	1.7	1.3	39.44
Sugar maple	269	(N/A)	1.3	1.0	38.49
Black walnut	367	(N/A)	1.1	1.3	61.15
White ash	271	(N/A)	1.1	1.0	45.14
Amur maple	32	(N/A)	0.9	0.1	6.48
Boxelder	287	(N/A)	0.9	1.0	57.31
Spruce	111	(N/A)	0.9	0.4	22.18
Siberian elm	159	(N/A)	0.8	0.6	39.67
Northern white cedar	0	(N/A)	0.4	0.0	0.00
Red maple	73	(N/A)	0.4	0.3	36.59
Bur oak	86	(N/A)	0.4	0.3	43.12
American elm	101	(N/A)	0.4	0.4	50.58
Broadleaf Evergreen Small	1	(N/A)	0.4	0.0	0.50
Lilac	15	(N/A)	0.2	0.1	15.48
American holly	0	(N/A)	0.2	0.0	0.00
Buckthorn	15	(N/A)	0.2	0.1	15.48
Mulberry	15	(N/A)	0.2	0.1	15.48
Conifer Evergreen Small	4	(N/A)	0.2	0.0	4.27
Callery pear	13	(N/A)	0.2	0.0	12.89
Eastern white pine	32	(N/A)	0.2	0.1	32.32
Citywide total	28,179	(N/A)	100.0	100.0	53.17

Table 7: Summary of Benefits in Dollars

Larchwood

Total Annual Benefits of Public Trees by Species ($)

1/13/2015

Species	Energy	CO_2	Air Quality	Stormwater	Aesthetic/Other	Total ($)	Standard Error	% of Total $
Green ash	6,967	509	1,230	9,564	6,604	24,875	(N/A)	25.3
Silver maple	5,212	818	997	10,596	8,641	26,264	(N/A)	26.7
Cottonwood	2,189	169	382	3,097	2,016	7,852	(N/A)	8.0
Norway maple	1,561	83	269	1,586	1,175	4,676	(N/A)	4.8
Catalpa	2,382	149	464	4,140	1,741	8,876	(N/A)	9.0
Norway spruce	677	24	44	1,593	900	3,238	(N/A)	3.3
Conifer Evergreen Large	602	23	45	1,349	838	2,857	(N/A)	2.9
Blue spruce	312	6	34	456	411	1,219	(N/A)	1.2
Austrian pine	452	12	51	815	429	1,760	(N/A)	1.8
American basswood	748	65	116	881	707	2,517	(N/A)	2.6
Honeylocust	841	60	136	842	1,715	3,594	(N/A)	3.7
Apple	192	10	30	90	82	405	(N/A)	0.4
Northern hackberry	296	7	45	195	256	798	(N/A)	0.8
Scotch pine	374	13	21	902	456	1,765	(N/A)	1.8
Littleleaf linden	217	21	32	186	355	811	(N/A)	0.8
Sugar maple	269	16	42	282	269	879	(N/A)	0.9
Black walnut	396	32	70	579	367	1,444	(N/A)	1.5
White ash	191	14	32	173	271	680	(N/A)	0.7
Amur maple	85	4	13	36	32	171	(N/A)	0.2
Boxelder	249	30	42	353	287	961	(N/A)	1.0
Spruce	89	3	10	132	111	345	(N/A)	0.4
Siberian elm	231	14	41	294	159	739	(N/A)	0.8
Northern white cedar	76	-1	-3	250	0	322	(N/A)	0.3
Red maple	57	4	10	47	73	191	(N/A)	0.2
Bur oak	78	6	12	87	86	269	(N/A)	0.3
American elm	126	4	22	161	101	415	(N/A)	0.4
Broadleaf Evergreen Sm	4	0	1	1	1	7	(N/A)	0.0
Lilac	38	2	7	18	15	80	(N/A)	0.1
American holly	44	0	11	56	0	110	(N/A)	0.1
Buckthorn	38	2	7	18	15	80	(N/A)	0.1
Mulberry	38	2	7	18	15	80	(N/A)	0.1
Conifer Evergreen Smal	1	0	0	1	4	6	(N/A)	0.0
Callery pear	9	1	1	4	13	28	(N/A)	0.0
Eastern white pine	24	1	3	42	32	102	(N/A)	0.1
Citywide Total	25,067	2,101	4,223	38,845	28,179	98,416	(N/A)	100.0

Table 8: Priority Task Summary for Public Trees

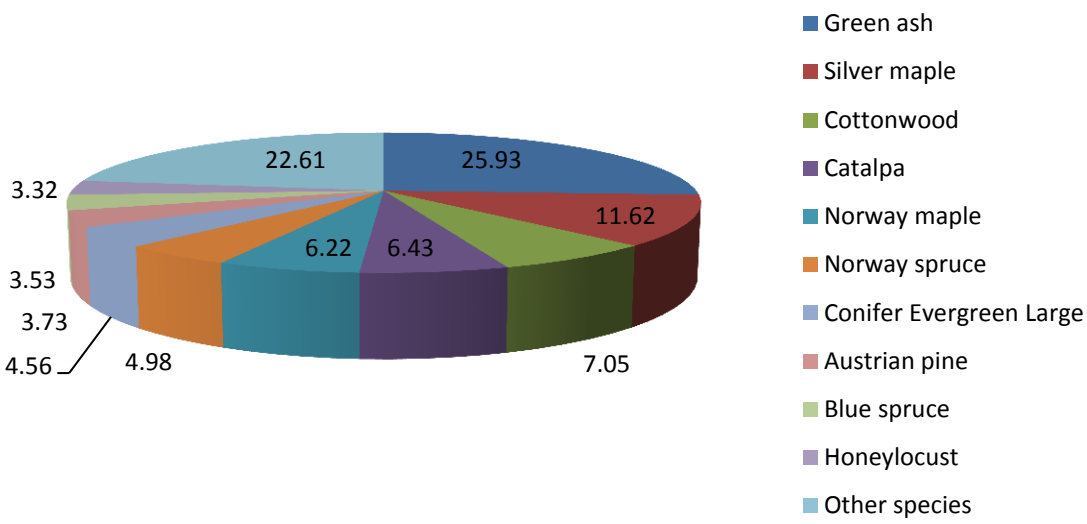
Larchwood											
	Priority Task Summary for Public Trees										
	DBH Class(DBH-means Diameter at Chest/Breast Height)										
Maintenance Type	0 to 3 inches	3 to 6 inches	6 to 12 inches	12 to 18 inches	18 to 24 inches	24 to 30 inches	30 to 36 inches	36 to 42 inches	> 42 inches	Total number	% of Total Population
No work	11	22	62	89	38	22	12	5	9	270	56.02
Stake or Train	0	4	2	1	0	1	0	0	0	8	1.66
Clean Crown	0	0	6	43	44	30	21	17	10	171	35.48
Raise Crown	0	0	0	0	0	0	0	0	0	0	0
Reduce Crown	0	0	0	1	3	5	2	2	0	13	2.7
Remove Tree	1	1	1	4	9	1	2	1	0	20	4.15
Treat Pests/ or Diseases	0	0	0	0	0	0	0	0	0	0	0
City Wide Total	12	27	71	138	94	59	37	25	19	482	100

Table 9: Recommended Maintenance for Public Trees

Larchwood											
	Recommended Maintenance for Public Trees										
	DBH Class in inches (DBH-Diameter at Chest/Breast Height)										
Maintenance Type	0 to 3 inches	3 to 6 inches	6 to 12 inches	12 to 18 inches	18 to 24 inches	24 to 30 inches	30 to 36 inches	36 to 42 inches	>42 inches	Total number	% of total Population
No Work	0	0	0	0	0	0	0	0	0	0	0
Young Tree (routine)	8	24	58	29	0	0	0	0	0	119	24.69
Young Tree (immediate)	1	2	2	3	0	0	0	0	0	8	1.66
Mature Tree (routine)	3	1	10	97	86	54	36	23	18	328	68.05
Mature Tree (immediate)	0	0	1	9	8	5	1	2	1	27	5.6
Critical Concern (public safety)	0	0	0	0	0	0	0	0	0	0	0
City wide total	12	27	71	138	94	59	37	25	19	482	100

Appendix A. Graphs

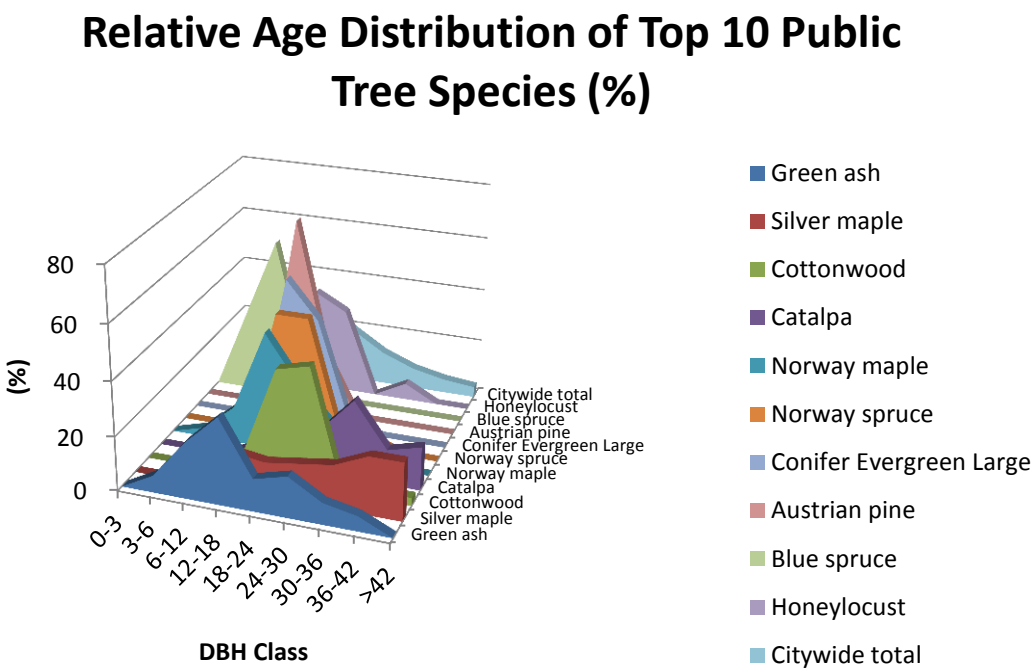
Figure 1: Species Distribution



Larchwood
Species Distribution of Public Trees (%)
1/13/2015

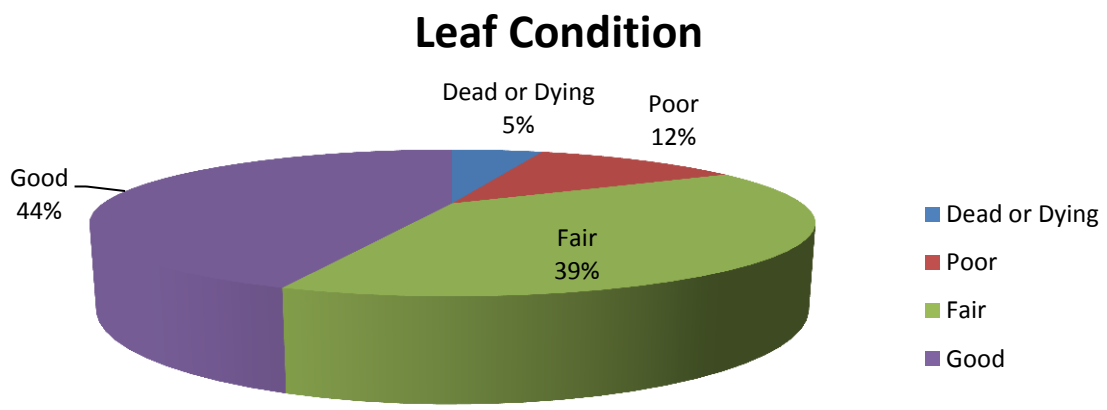
Species	Percent
Green ash	25.93
Silver maple	11.62
Cottonwood	7.05
Catalpa	6.43
Norway maple	6.22
Norway spruce	4.98
Conifer Evergreen Large	4.56
Austrian pine	3.73
Blue spruce	3.53
Honeylocust	3.32
Other species	22.61
Total	100.00

Figure 2: Relative Age Class



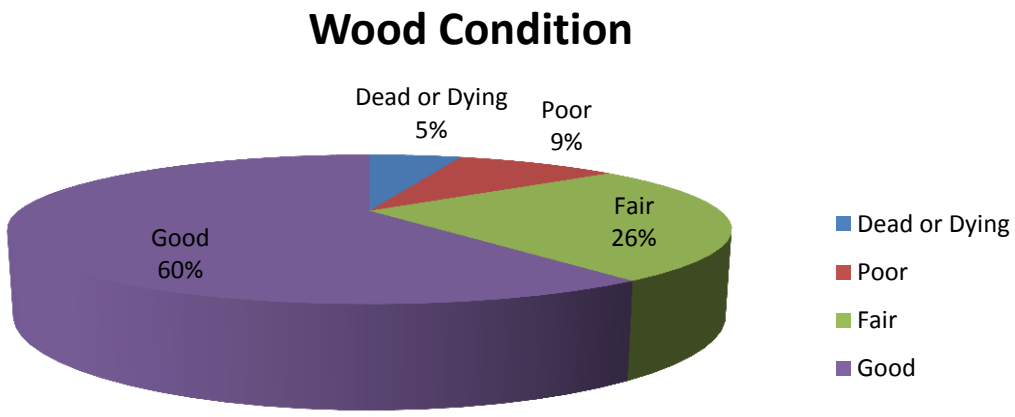
Larchwood									
Relative Age Distribution of Top 10 Public Tree Species (%)									
1/13/2015									
	DBH class (in)								
Species	0-3	3-6	6-12	12-18	18-24	24-30	30-36	36-42	>42
Green ash	0.00	6.40	20.80	32.00	12.00	15.20	8.00	5.60	0.00
Silver maple	0.00	0.00	0.00	14.29	12.50	14.29	16.07	21.43	21.43
Cottonwood	0.00	0.00	0.00	8.82	41.18	44.12	0.00	2.94	2.94
Catalpa	0.00	0.00	0.00	6.45	19.35	16.13	29.03	12.90	16.13
Norway maple	0.00	3.33	13.33	43.33	26.67	13.33	0.00	0.00	0.00
Norway spruce	0.00	0.00	0.00	45.83	45.83	4.17	4.17	0.00	0.00
Conifer Evergreen Large	0.00	0.00	0.00	54.55	40.91	4.55	0.00	0.00	0.00
Austrian pine	0.00	0.00	5.56	72.22	22.22	0.00	0.00	0.00	0.00
Blue spruce	0.00	29.41	58.82	11.76	0.00	0.00	0.00	0.00	0.00
Honeylocust	0.00	0.00	25.00	37.50	31.25	0.00	6.25	0.00	0.00
Citywide total	2.49	5.60	14.73	28.63	19.50	12.24	7.68	5.19	3.94

Figure 3: Foliage Condition



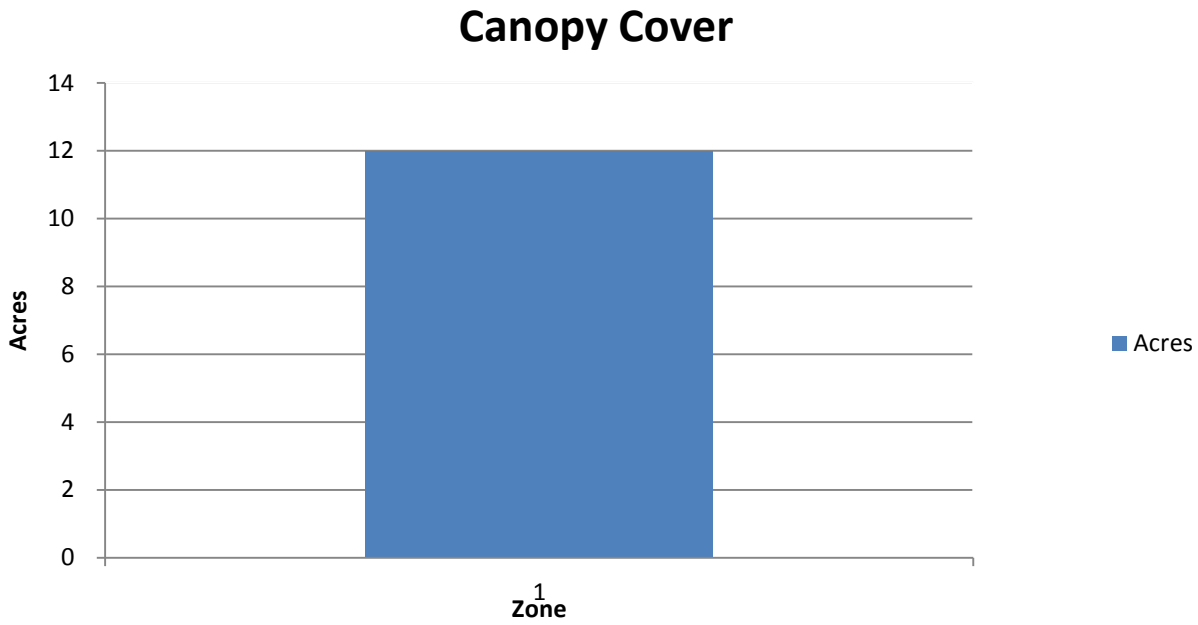
Larchwood				
Condition (Foliage) of Public Trees by Species (%)				
1/13/2015				
Species Name	Dead or Dying	Poor	Fair	Good
Green ash	6.40	16.00	46.40	31.20
Silver maple	0.00	10.71	48.21	41.07
Cottonwood	15.15	9.09	21.21	54.55
Catalpa	3.23	19.35	58.06	19.35
Norway maple	0.00	3.33	13.33	83.33
Norway spruce	0.00	4.17	45.83	50.00
Conifer Evergreen Large	0.00	36.36	59.09	4.55
Blue spruce	0.00	0.00	17.65	82.35
Honeylocust	6.25	6.25	37.50	50.00
Austrian pine	43.75	25.00	25.00	6.25
Apple	0.00	6.67	6.67	86.67
Northern hackberry	0.00	0.00	28.57	71.43
American basswood	7.14	0.00	0.00	92.86
Scotch pine	0.00	15.38	84.62	0.00
Littleleaf linden	0.00	0.00	0.00	100.00
Sugar maple	0.00	0.00	16.67	83.33
White ash	0.00	0.00	33.33	66.67
Amur maple	0.00	0.00	80.00	20.00
Boxelder	0.00	60.00	40.00	0.00
Black walnut	0.00	0.00	40.00	60.00
Citywide total	5.22	11.90	38.83	44.05

Figure 4: Wood Condition



Larchwood				
Condition (Woody) of Public Trees by Species (%)				
1/13/2015				
Species Name	Dead or Dying	Poor	Fair	Good
Green ash	3.20	12.00	40.00	44.80
Silver maple	1.79	12.50	39.29	46.43
Cottonwood	15.15	6.06	15.15	63.64
Catalpa	12.90	25.81	32.26	29.03
Norway maple	3.45	3.45	20.69	72.41
Norway spruce	0.00	0.00	4.17	95.83
Conifer Evergreen Large	0.00	4.55	4.55	90.91
Blue spruce	0.00	0.00	11.76	88.24
Honeylocust	6.25	0.00	12.50	81.25
Austrian pine	31.25	0.00	0.00	68.75
Apple	0.00	6.67	26.67	66.67
Northern hackberry	0.00	0.00	21.43	78.57
American basswood	0.00	21.43	14.29	64.29
Scotch pine	0.00	7.69	0.00	92.31
Littleleaf linden	0.00	0.00	0.00	100.00
Sugar maple	0.00	16.67	16.67	66.67
White ash	0.00	16.67	50.00	33.33
Amur maple	0.00	0.00	60.00	40.00
Boxelder	20.00	60.00	20.00	0.00
Black walnut	0.00	0.00	20.00	80.00
Citywide total	5.23	9.21	25.31	60.25

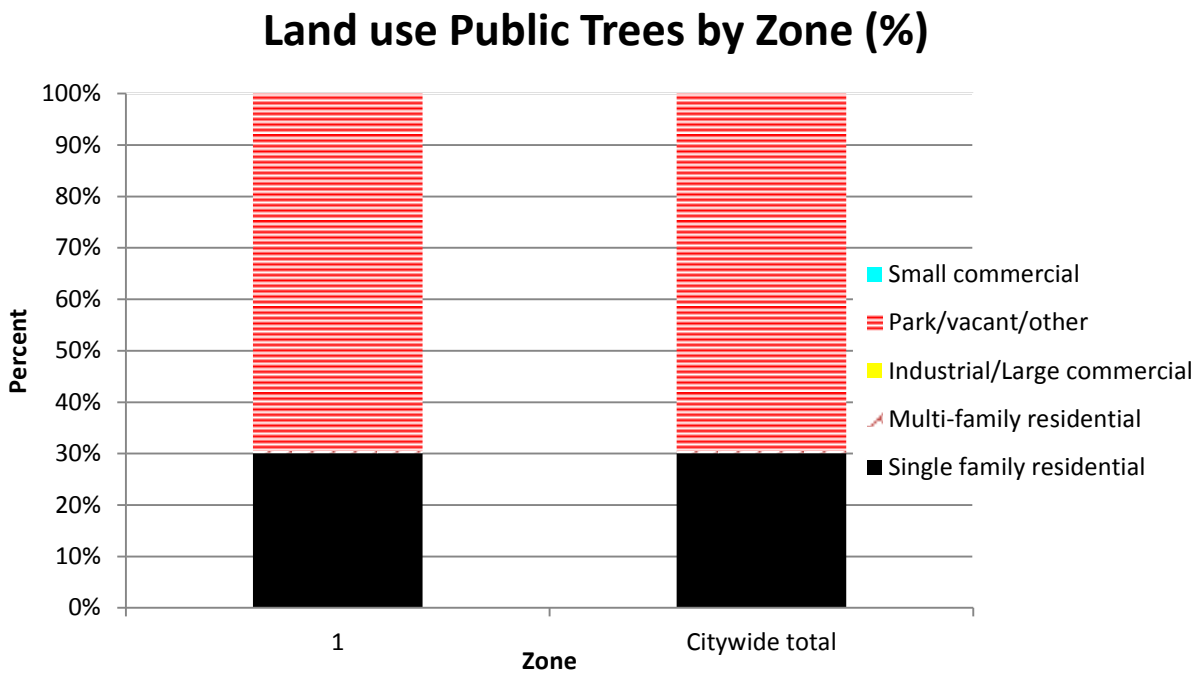
Figure 5: Canopy Cover in Acres



Larchwood
Canopy Cover of Public Trees (Acres)
1/13/2015

	Total Land Area	Total Canopy Cover	Canopy Cover as % of Total Land Area
Citywide total	636.00	11.97	0.02

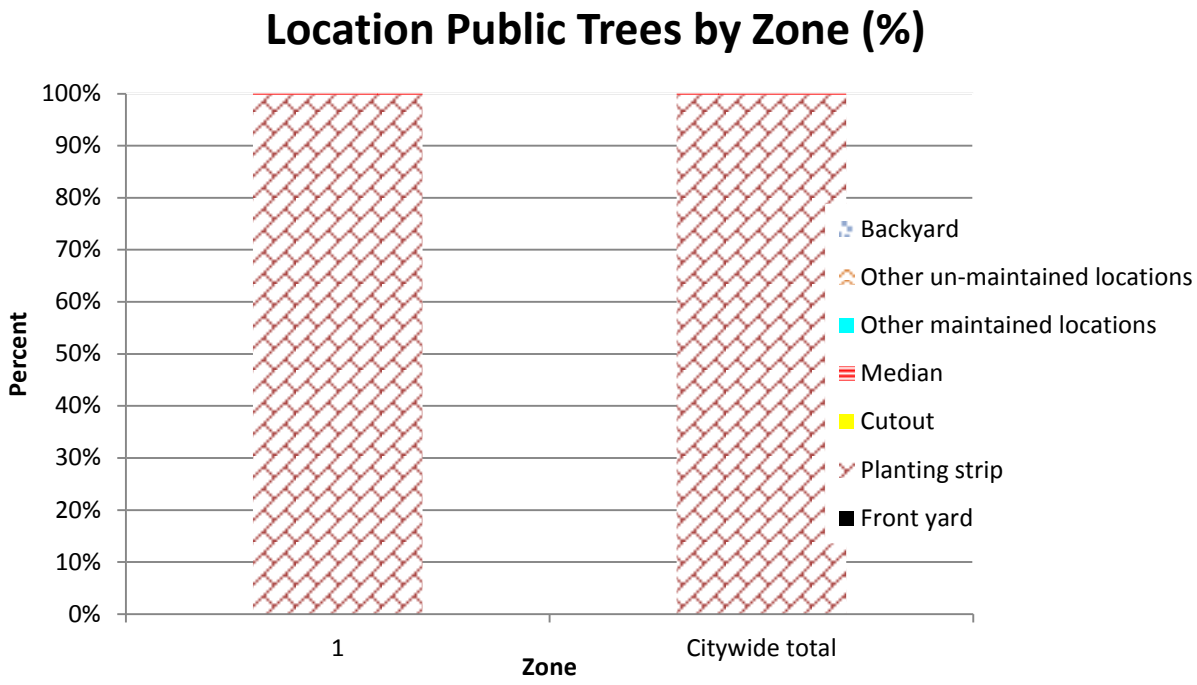
Figure 6: Land Use of city/park trees



Larchwood
Land use Public Trees by Zone (%)
1/13/2015

Zone	Single family residential	Multi-family residential	Industrial/Large commercial	Park/vacant/other	Small commercial
1	30.08	0.41	0.00	69.50	0.00
Citywide total	30.08	0.41	0.00	69.50	0.00

Figure 7: Location of city/park trees



Larchwood
Location Public Trees by Zone (%)
1/13/2015

Zone	Front yard	Planting strip	Cutout	Median	Other maintained locations	Other un-maintained locations	Backyard
1	0.00	99.79	0.00	0.21	0.00	0.00	0.00
Citywide total	0.00	99.79	0.00	0.21	0.00	0.00	0.00

Appendix B: ArcGIS Mapping

Figure 1: Location of Ash Trees

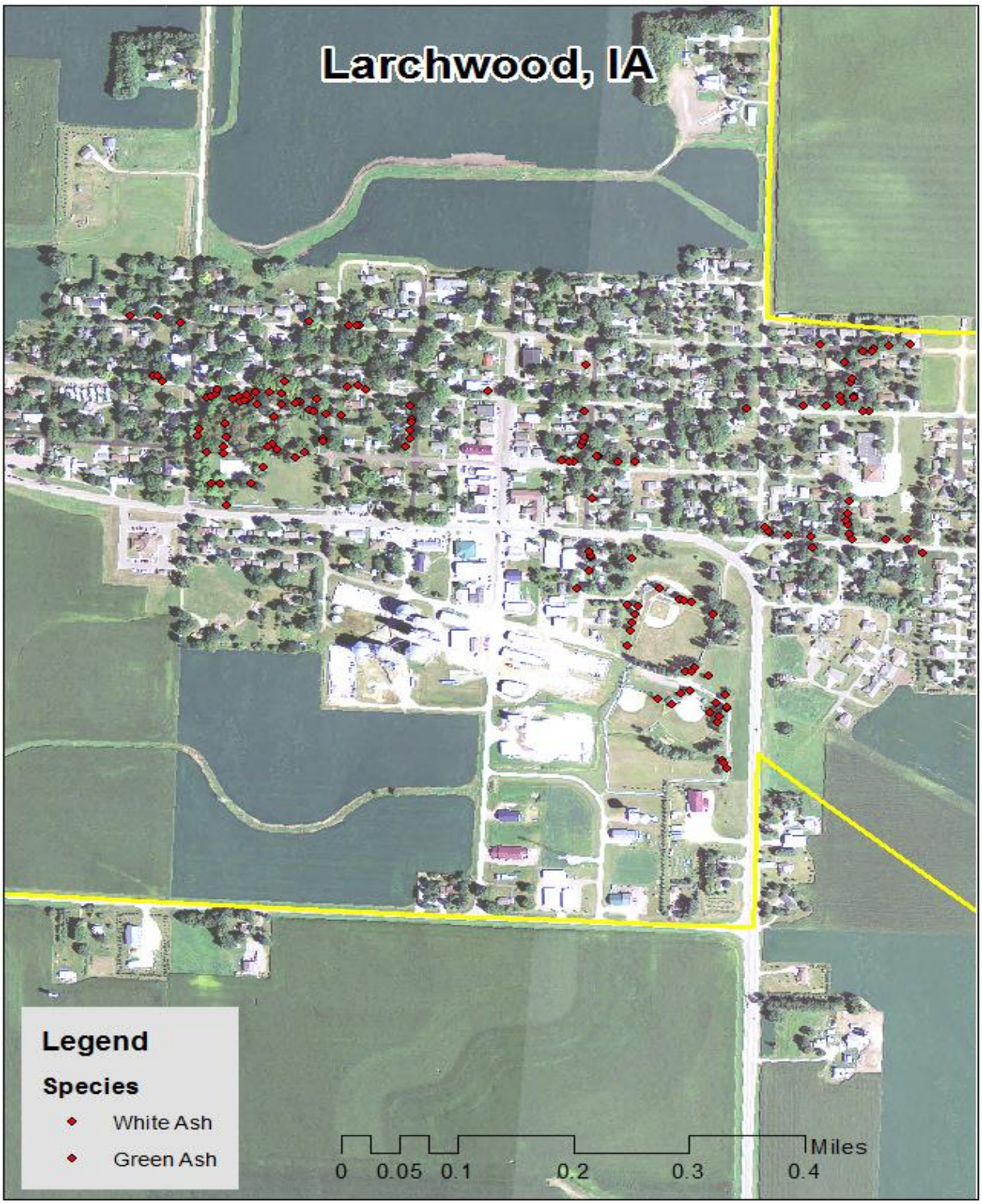


Figure 2: Location of EAB symptoms

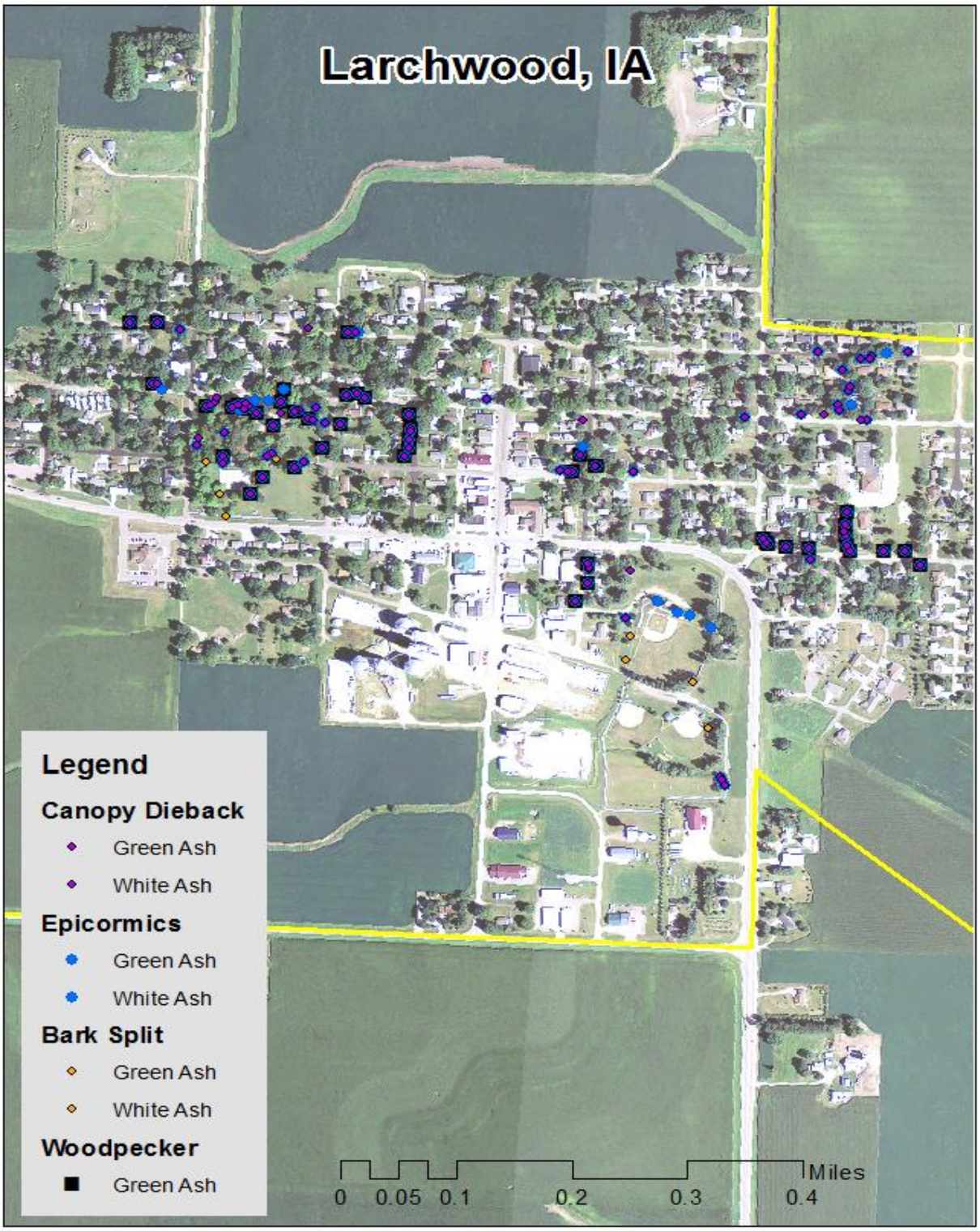


Figure 3: Location of Poor Condition Trees

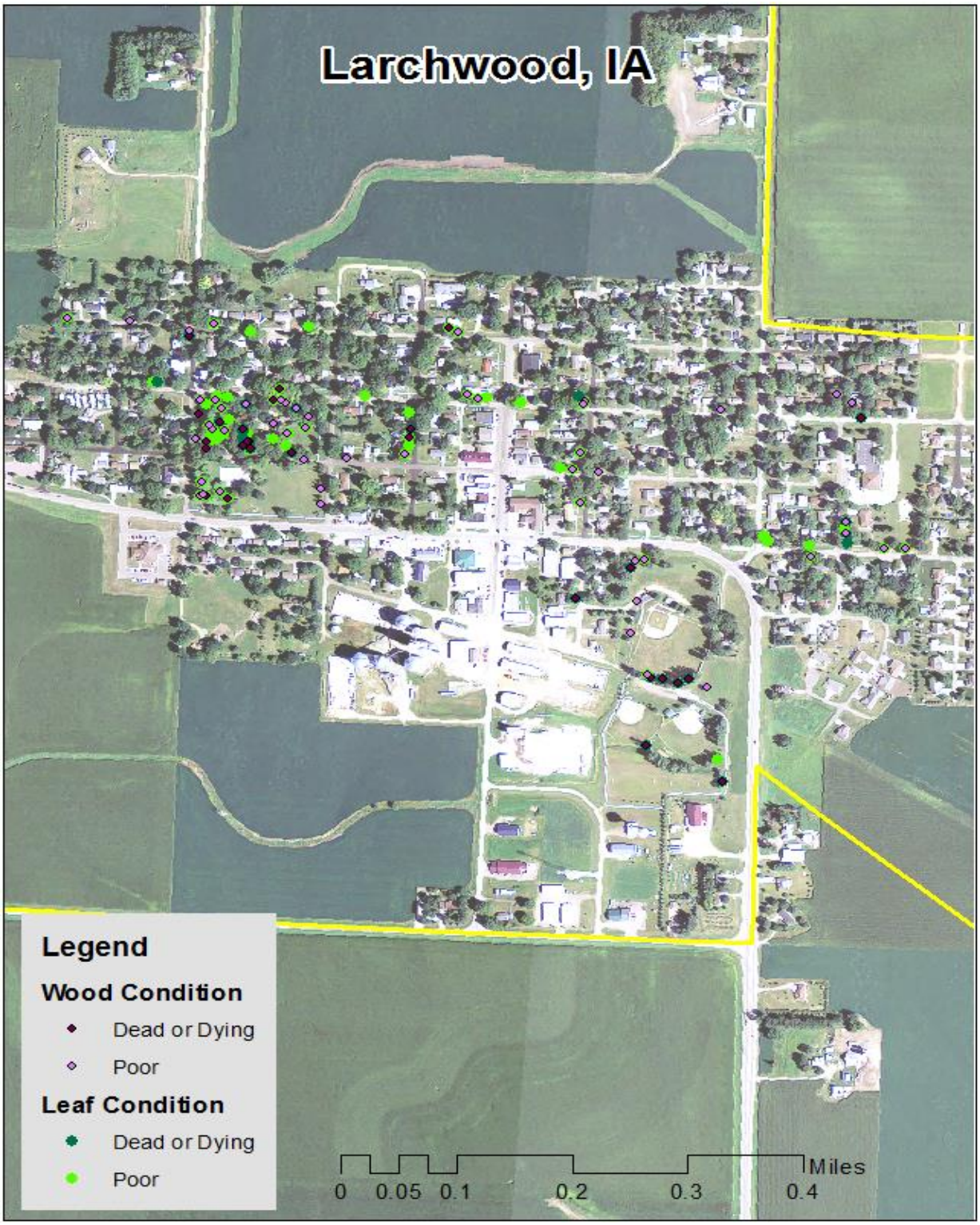


Figure 4: Location of Trees with Recommended Maintenance

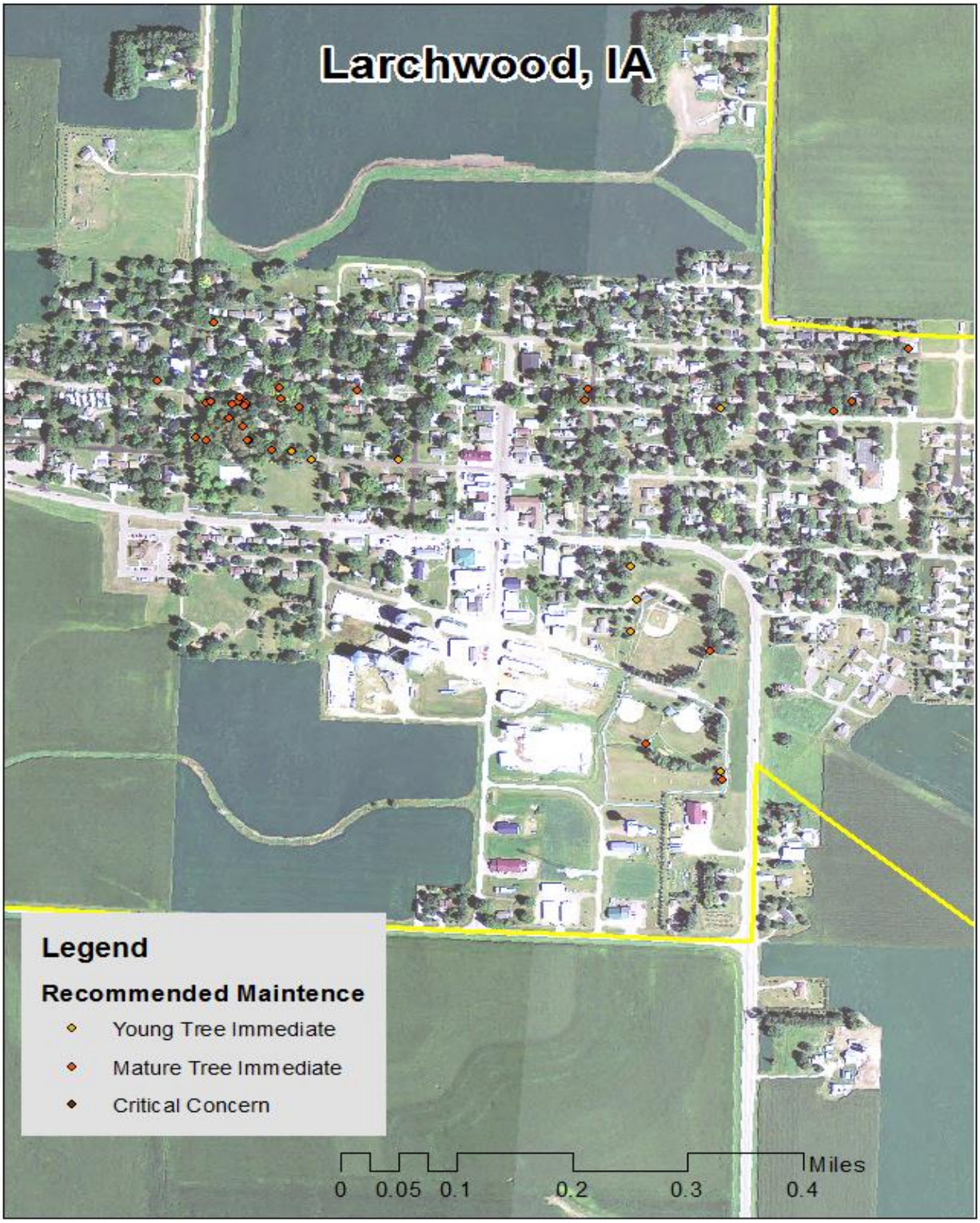
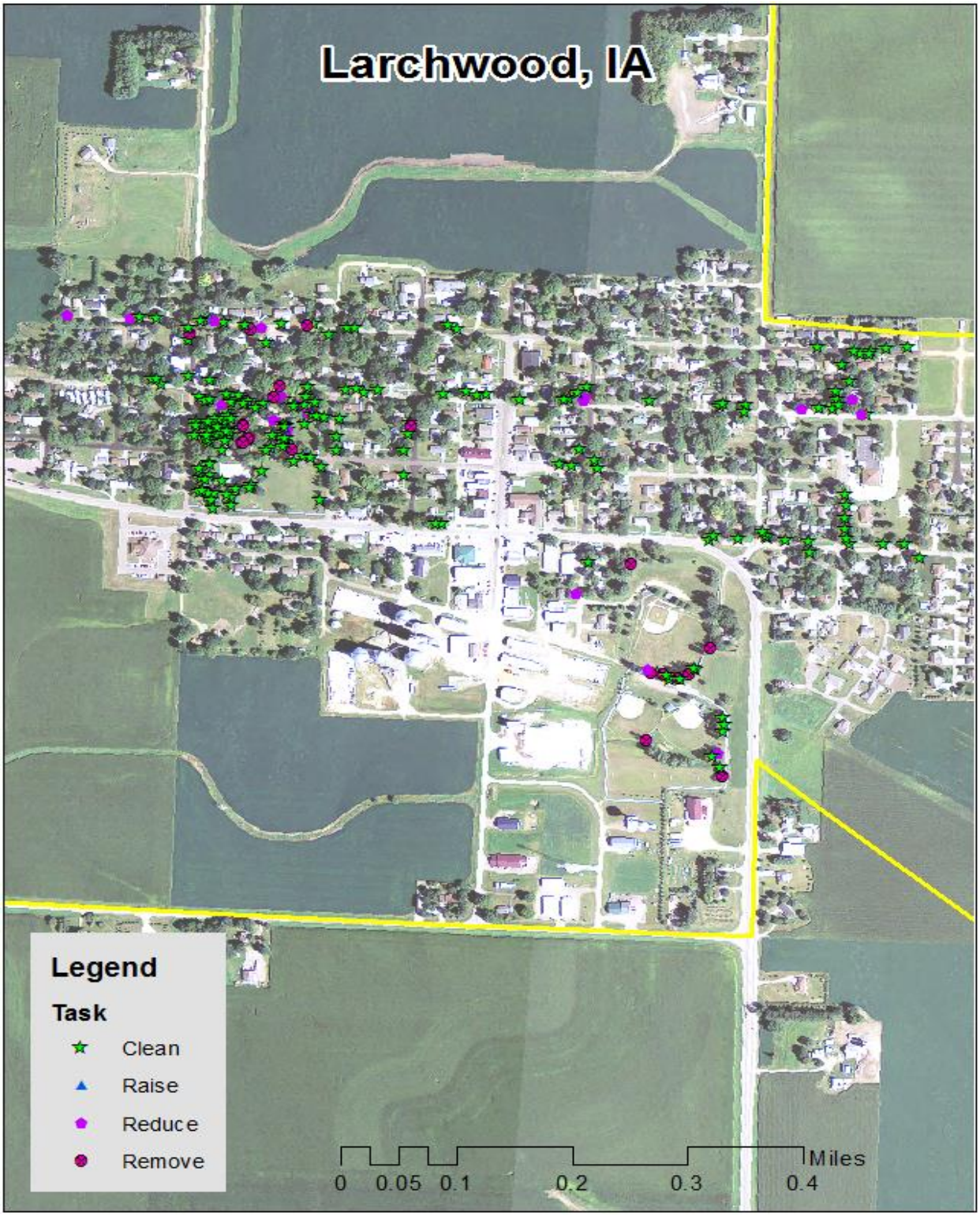


Figure 5: Maintenance Tasks ***City ownership of the trees recommended for removal should be verified prior to any removal***



Appendix C: Larchwood Tree Ordinances

CHAPTER 151
TREES AND GRASS

151.01 DEFINITION. For use in this chapter, “boulevard” 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 boulevard or street except in accordance with the following:
1. Alignment. All tress planted in any street shall be planted in the boulevard 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 boulevard 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 eighteen (18) feet above the surface of a street, twenty (20) feet above the surface of a primary highway, 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 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. 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 the 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 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])

151.07 CUTTING OR MOWING OF GRASS.
1. Duty to Cut and Mow Lawns and Lots. The owner of any property shall cut and mow all lawns and lots so that such growth shall be less than four (4) inches at all times.
2. Cutting and Mowing by City. If a property owner refuses or fails to cut and mow lawns and lots within forty-eight (48) hours after being delivered a notice from the City to perform such action, the Council may require said work to be done and the cost and expenses thereof shall be assessed to the property owner after due notice is given. The amount of such assessment shall be certified to the County Auditor as provided by law and the same shall be collected with and in the same manner as general property taxes.

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If you need accommodations because of disability to access the services of this Agency, please contact the Director at 515-281-5918.