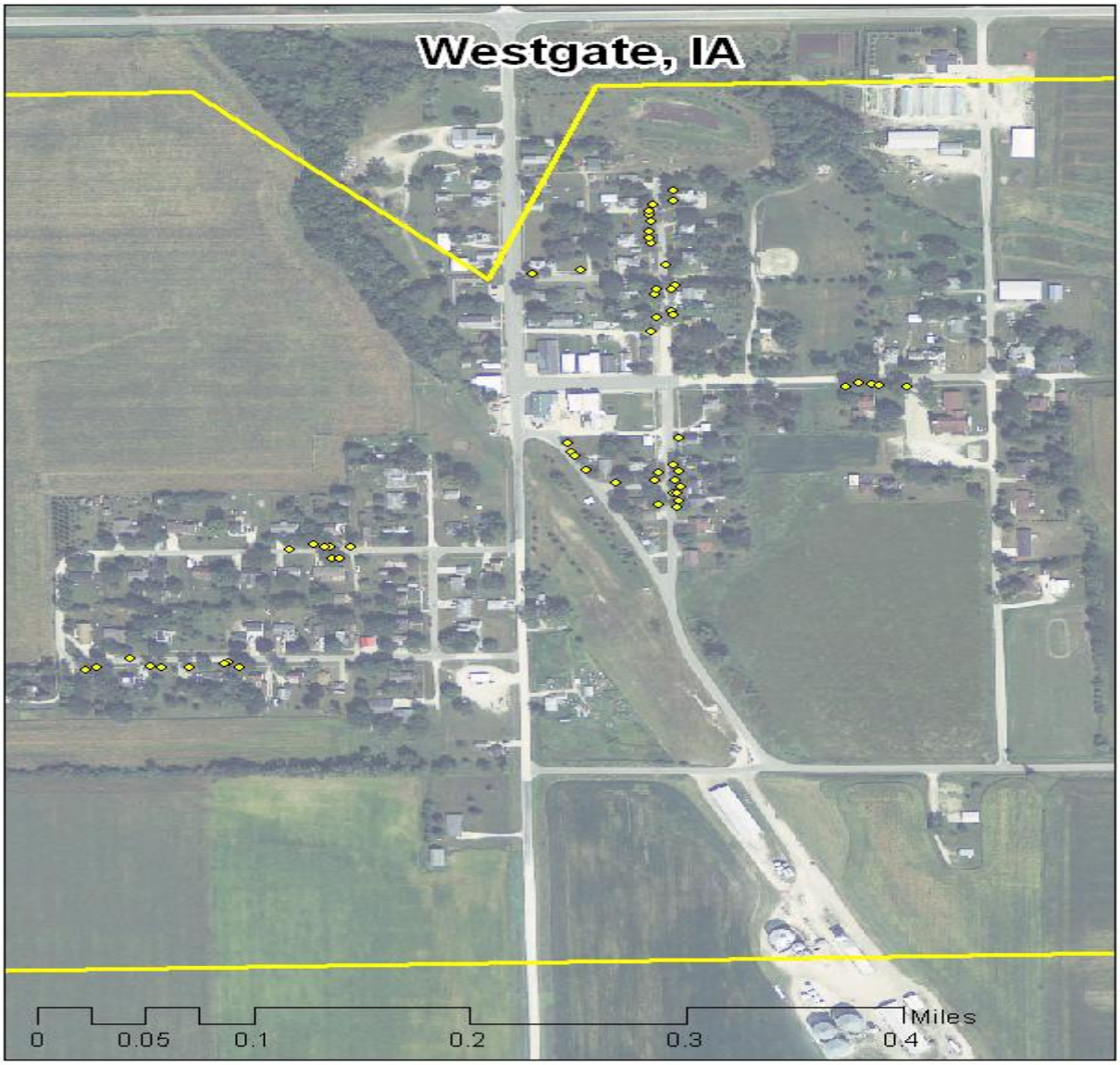
WESTGATE, IA



2011 Management Plan

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Executive Summary

Overview

This plan was developed to assist the City of Westgate 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 48% of Westgate's city owned trees (ash) will die once EAB becomes established in the community. 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 2010, 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 58 trees inventoried.

- Westgate's trees provide $16,649 of benefits annually, an average of $287 a tree
- There are over 11 species of trees
- The top three genus are: Ash 48%, Maple 32%, and Basswood (Linden) 5%
- 52% of trees are in need of some type of management
- 10 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 10 trees needing removal, 8 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*
- 2 of the 28 ash trees are in need of follow up because they are displaying signs and symptoms associated with EAB
- All trees should be pruned on a routine schedule
- Plant a diverse mix of trees that do not include: ash, maple, Autumn olive, black locust, black walnut, boxelder, Chinese elm, Siberian elm, cottonwood, poplar, tree of heaven or willow.
- Check ash trees with a visual survey yearly

Introduction

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

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

Inventory

In 2010, a tree inventory was conducted that included 100% of the city owned trees along the streets. 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 of 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 58 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. Westgate's trees reduce energy related costs by approximately $3,966 annually (Appendix A, Table 1). These savings are both in Electricity (19.2 MWh) and in Natural Gas (2,556.2 Therms).

Annual Stormwater Benefits

Westgate's trees intercept about 235,481 gallons of rainfall or snow melt a year (Appendix A, Table 2). This interception provides $6,382 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 Westgate, it is estimated that trees remove 259.1 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 $737 (Appendix A, Table 3).

Annual Carbon Benefits

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Westgate, trees sequester about 51,500 lbs of carbon a year with an associated value of $386 (Appendix A, Table 5). In addition, the trees store 771,668 lbs of carbon, with a yearly benefit of $5,788 (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. Westgate receives $4,964 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, Westgate's trees provide $16,649 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 58 trees in Westgate provide approximately $287 annually (Appendix A, Table 7).

Forest Structure

Species Distribution

Westgate has over 11 different tree species along city streets and parks (Appendix A, Figure 1). The distribution of trees by genus is as follows:

Species	# of Trees	% of Total
Ash	28	48.2
Maple	19	32.7
Basswood (Linden)	3	5.2
White cedar	3	5.2
Boxelder	2	3.4
Honeylocust	1	1.7
Black walnut	1	1.7
Other	1	1.7

Age Class

Most of Westgate's trees are between 24 and 30" in diameter (53%) and between 18 and 24 inches in diameter (17%) at 4.5 ft (Appendix A, Figure 2). For age, a Bell Curve is preferred and shows the highest amount of trees around 26 inches in diameter at 4.5 ft. Westgate's size curve is on the larger side, indicating an older than average stand. Only about 1% is 1" to 6" in diameter suggesting some new plantings will be needed in the near future to replace to older trees.

Condition: Wood and Foliage

Both wood condition and leaf condition are good indicators of the overall health of the urban forest. The foliage that was present on trees appeared quite healthy (Appendix A, Figure 3 & Appendix B, Figure 3). Similarly, 50% of Westgate'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 17% of the population. These trees are in need of 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	12	20%
Tree Removal	10	17%
Crown raising	7	12%

Canopy Cover

The canopy cover of Westgate is approximately 2 acres (Appendix A, Figure 4).

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

Westgate has 8 trees over 24 inches in diameter at 4.5 ft that should be addressed immediately for removal. After those trees are addressed, there are 2 trees under 24 inches that should be addressed for removal. After the removals, other trees in town are in need of various work to eliminate possible hazards (Appendix B, Figure 3 & Appendix B, Figure 4).

Ash trees

After the hazardous tree work is complete, ash trees in poor health should be assessed for removal. Of the 10 removals recommended, 5 of these are ash trees. There are a total of 28 ash trees, and 2 of those have epicormic sprouting that has been associated with EAB. *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 6 years will replace the trees that are removed. It is recommended to plant 1.2 trees for every tree removed, since survival rates will not be 100%. Please refer to the six year maintenance plan at the end of this section. It is not essential that the new trees be planted in the same location of the trees being removed. However, maintaining the same number of trees helps ensure continuation of the benefits of the existing forest in Westgate.

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 (32%) (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: Autumn olive, black locust, black walnut, boxelder, Chinese elm, Siberian elm, cottonwood, poplar, tree of heaven, or willow.

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 death 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 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*

EAB Quarantines

EAB is an extremely destructive plant pest and it is responsible for the death and decline of over 25 million ash trees. Ash in both forested and urban settings constitute a significant portion of the canopy cover in the United States. Current tools to detect, control, suppress and eradicate this pest are not as robust as the USDA would desire. In order to stay ahead of this hard to detect beetle, the USDA is attempting to contain the beetle before it spreads beyond its known positions by regulating articles.

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

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

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

Wood Disposal

A very important aspect of planning is determining how wood infested with EAB will be handled, keeping in mind that quarantines will restrict its movement. Consider who will cut and haul the dead and dying trees? Is there an accessible, secured site big enough to store and sort the hundreds of trees and the associated brush and chips? How will wood be disposed of or utilized? Do you have equipment capable of handling the amount and size of ash trees your tree inventory has identified? Once your county is under quarantine for EAB, contact USDA-APHIS-PPQ at 515-251-4083 or visit the website http://www.aphis.usda.gov/plant_health/plant_pest_info/emerald_ash_b/regulatory.shtml. 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 ash trees will be replaced. All trees will meet the restrictions in the city ordinance. The new plantings will be a diverse mix and will not include ash, maple, Autumn olive, black locust, black walnut, boxelder, Chinese elm, Siberian elm, cottonwood, poplar, tree of heaven, or willow.

Postponed Work

While finances, staffing and equipment are focused on the management of ash, usual services may be delayed. Tree removal requests on genus 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 as trees are infested with Emerald Ash Borer. Trees that are on private property are part of Westgate's urban forest. Private property owners should be given direction to the proper species to plant, spacing, and location.

Six Year Work Plan and Estimated Costs

Year 1:

Remove 5 hazard trees	$2500
Plant 5 trees in open locations	$500
Visual survey of signs and symptoms of Emerald Ash Borer	

Year 2:

Remove 5 hazard trees	$2500
Plant 5 trees in open locations	$500
Maintenance of newly planted trees in city	
Visual survey of signs and symptoms of Emerald Ash Borer	

Year 3:

Appendix B, Figure 3 & Appendix B, Figure 4 tree work	$????
Remove 1 ash tree	$500
Plant 1 tree in open locations $100	
Maintenance of newly planted trees in city	
Prune 1/4 of city trees	
Visual survey of signs and symptoms of Emerald Ash Borer	

Year 4:

Remove 1 ash tree	$500
Plant 1 tree in open locations	$100
Maintenance of newly planted trees in city	
Prune 1/4 of city trees	
Visual survey of signs and symptoms of Emerald Ash Borer	

Year 5:

Maintenance of newly planted trees in city
Prune 1/4 of city trees
Visual survey of signs and symptoms of Emerald Ash Borer

Year 6:

Maintenance of newly planted trees in city
Prune 1/4 of city trees
Visual survey of signs and symptoms of Emerald Ash Borer

** The ash removed in this six year plan is 25% of the total ash in Westgate.

Funding

Westgate can 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.

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Appendix A: i-Tree Data

Table 1: Annual Energy Benefits

Annual Energy Benefits of Public Trees by Species

12/12/2010

Species	Total Electricity (MWh)	Electricity ($)	Total Natural Gas (Therms)	Natural Gas ($)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
White ash	9.2	701	1,187.2	1,163	1,864	(N/A)	37.9	47.0	84.73
Sugar maple	2.8	209	382.8	375	584	(N/A)	15.5	14.7	64.88
Green ash	1.6	122	230.5	226	348	(N/A)	10.3	8.8	58.00
Norway maple	1.4	104	193.4	190	294	(N/A)	8.6	7.4	58.78
Silver maple	1.7	128	217.0	213	341	(N/A)	8.6	8.6	68.15
Northern white cedar	0.4	34	53.9	53	86	(N/A)	5.2	2.2	28.82
Basswood	1.2	88	159.5	156	244	(N/A)	5.2	6.2	81.32
Boxelder	0.4	30	47.8	47	77	(N/A)	3.5	2.0	38.63
Honeylocust	0.3	23	42.3	41	65	(N/A)	1.7	1.6	64.79
Black walnut	0.3	20	38.1	37	57	(N/A)	1.7	1.5	57.32
Lilac	0.0	2	3.8	4	5	(N/A)	1.7	0.1	5.40
Other street trees	0.0	0	0.0	0	0	(N/A)	0.0	0.0	0.00
Citywide total	19.2	1,461	2,556.2	2,505	3,966	(N/A)	100.0	100.0	68.38

Table 2: Annual Stormwater Benefits

Annual Stormwater Benefits of Public Trees by Species

12/12/2010

Species	Total rainfall interception (Gal)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
White ash	118,106	3,201	(N/A)	37.9	50.2	145.50
Sugar maple	31,501	854	(N/A)	15.5	13.4	94.86
Green ash	17,617	477	(N/A)	10.3	7.5	79.58
Norway maple	12,825	348	(N/A)	8.6	5.5	69.52
Silver maple	22,603	613	(N/A)	8.6	9.6	122.52
Northern white cedar	7,681	208	(N/A)	5.2	3.3	69.39
Basswood	16,671	452	(N/A)	5.2	7.1	150.61
Boxelder	2,912	79	(N/A)	3.5	1.2	39.46
Honeylocust	2,905	79	(N/A)	1.7	1.2	78.73
Black walnut	2,591	70	(N/A)	1.7	1.1	70.21
Lilac	69	2	(N/A)	1.7	0.0	1.86
Other street trees	0	0	(N/A)	0.0	0.0	0.00
Citywide total	235,481	6,382	(N/A)	100.0	100.0	110.03

Table 3: Annual Air Quality Benefits

Annual Air Quality Benefits of Public Trees by Species

12/12/2010

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
White ash	21.6	3.5	9.7	1.0	113	43.3	6.4	6.1	41.8	272	0.0	0	133.3	385	(N/A)	37.9	17.49
Sugar maple	4.1	0.7	2.1	0.2	22	13.2	1.9	1.8	12.5	82	-3.2	-12	33.2	92	(N/A)	15.5	10.24
Green ash	2.0	0.3	1.0	0.1	11	7.8	1.1	1.1	7.3	48	0.0	0	20.7	59	(N/A)	10.3	9.85
Norway maple	2.7	0.5	1.3	0.1	14	6.6	1.0	0.9	6.2	41	-0.6	-2	18.7	53	(N/A)	8.6	10.63
Silver maple	3.7	0.6	1.8	0.2	20	7.9	1.2	1.1	7.6	50	-1.9	-7	22.3	63	(N/A)	8.6	12.54
Northern white cedar	0.9	0.2	0.7	0.1	6	2.1	0.3	0.3	2.0	13	-4.0	-15	2.6	4	(N/A)	5.2	1.35
Basswood	2.4	0.4	1.1	0.1	13	5.5	0.8	0.8	5.2	34	0.0	0	16.4	47	(N/A)	5.2	15.74
Boxelder	0.3	0.0	0.2	0.0	2	1.8	0.3	0.3	1.8	12	-0.1	-1	4.6	13	(N/A)	3.4	6.37
Honeylocust	0.5	0.1	0.3	0.0	3	1.5	0.2	0.2	1.4	9	-0.4	-1	3.8	11	(N/A)	1.7	10.61
Black walnut	0.3	0.0	0.1	0.0	1	1.3	0.2	0.2	1.2	8	0.0	0	3.3	9	(N/A)	1.7	9.34
Lilac	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.1	1	0.0	0	0.3	1	(N/A)	1.7	0.71
Other street trees	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)	0.0	0.00
Citywide total	38.6	6.3	18.3	1.8	206	91.1	13.3	12.7	87.1	569	-10.2	-38	259.1	737	(N/A)	100.0	12.70

Table 4: Annual Carbon Stored

Stored CO2 Benefits of Public Trees by Species

12/12/2010

Species	Total Stored CO2 (lbs)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
White ash	355,567	2,667	(N/A)	37.9	46.1	121.22
Sugar maple	115,852	869	(N/A)	15.5	15.0	96.54
Green ash	65,268	490	(N/A)	10.3	8.5	81.59
Norway maple	43,754	328	(N/A)	8.6	5.7	65.63
Silver maple	77,796	583	(N/A)	8.6	10.1	116.69
Northern white	9,831	74	(N/A)	5.2	1.3	24.58
Basswood	80,974	607	(N/A)	5.2	10.5	202.44
Boxelder	7,248	54	(N/A)	3.5	0.9	27.18
Honeylocust	6,743	51	(N/A)	1.7	0.9	50.57
Black walnut	8,458	63	(N/A)	1.7	1.1	63.43
Lilac	178	1	(N/A)	1.7	0.0	1.33
Other street trees	0	0	(N/A)	0.0	0.0	0.00
Citywide total	771,668	5,788	(N/A)	100.0	100.0	99.78

Table 5: Annual Carbon Sequestered

Annual CO_2 Benefits of Public Trees by Species

12/12/2010

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
White ash	27,423	206	-1,707	-4	-13	15,483	116	41,195	309	(N/A)	37.9	51.5	14.04
Sugar maple	6,348	48	-556	-2	-4	4,615	35	10,405	78	(N/A)	15.5	13.0	8.67
Green ash	4,099	31	-313	-1	-2	2,698	20	6,483	49	(N/A)	10.3	8.1	8.10
Norway maple	1,612	12	-210	-1	-2	2,307	17	3,708	28	(N/A)	8.6	4.6	5.56
Silver maple	6,332	47	-373	-1	-3	2,832	21	8,789	66	(N/A)	8.6	11.0	13.18
Northern white cedar	487	4	-47	-1	0	744	6	1,183	9	(N/A)	5.2	1.5	2.96
Basswood	2,729	20	-389	-1	-3	1,937	15	4,276	32	(N/A)	5.2	5.3	10.69
Boxelder	837	6	-35	0	0	673	5	1,474	11	(N/A)	3.5	1.8	5.53
Honeylocust	936	7	-32	0	0	515	4	1,419	11	(N/A)	1.7	1.8	10.64
Black walnut	660	5	-41	0	0	441	3	1,060	8	(N/A)	1.7	1.3	7.95
Lilac	38	0	-1	0	0	37	0	74	1	(N/A)	1.7	0.1	0.56
Other street trees	0	0	0	0	0	0	0	0	0	(N/A)	0.0	0.0	0.00
Citywide total	51,500	386	-3,704	-11	-28	32,281	242	80,066	600	(N/A)	100.0	100.0	10.35

Table 6: Annual Social and Aesthetic Benefits

Annual Aesthetic/Other Benefits of Public Trees by Species

12/12/2010

Species	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
White ash	2,695	(N/A)	37.9	54.3	122.50
Sugar maple	652	(N/A)	15.5	13.1	72.46
Green ash	341	(N/A)	10.3	6.9	56.78
Norway maple	153	(N/A)	8.6	3.1	30.57
Silver maple	509	(N/A)	8.6	10.3	101.86
Northern white cedar	91	(N/A)	5.2	1.8	30.30
Basswood	191	(N/A)	5.2	3.8	63.51
Boxelder	79	(N/A)	3.5	1.6	39.36
Honeylocust	195	(N/A)	1.7	3.9	194.60
Black walnut	58	(N/A)	1.7	1.2	57.69
Lilac	2	(N/A)	1.7	0.0	2.06
Other street trees	0	(±NaN)	0.0	0.0	0.00
Citywide total	4,964	(N/A)	100.0	100.0	85.59

Table 7: Summary of Benefits in Dollars

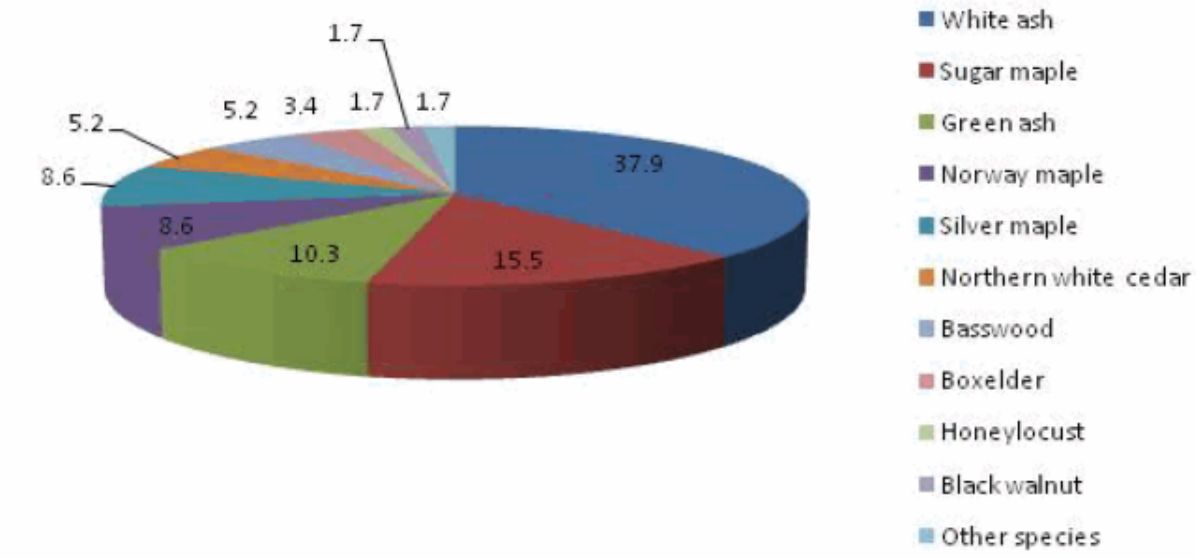
Total Annual Benefits of Public Trees by Species ($)

12/12/20

Species	Energy	CO_2	Air Quality	Stormwater	Aesthetic/Other	Total ($)	Standard Error	% of Total $
White ash	1,864	309	385	3,201	2,695	8,454	(±0)	50.8
Sugar maple	584	78	92	854	652	2,260	(±0)	13.6
Green ash	348	49	59	477	341	1,274	(±0)	7.7
Norway maple	294	28	53	348	153	875	(±0)	5.3
Silver maple	341	66	63	613	509	1,591	(±0)	9.6
Northern white cedar	86	9	4	208	91	398	(±0)	2.4
Basswood	244	32	47	452	191	966	(±0)	5.8
Boxelder	77	11	13	79	79	259	(±0)	1.6
Honeylocust	65	11	11	79	195	359	(±0)	2.2
Black walnut	57	8	9	70	58	203	(±0)	1.2
Lilac	5	1	1	2	2	11	(±0)	0.1
Other street trees	0	0	0	0	0	0	(±0)	0.0
Citywide Total	3,966	600	737	6,382	4,964	16,649	(±0)	100.0

Species Distribution of Public Trees (%)

12/12/2010

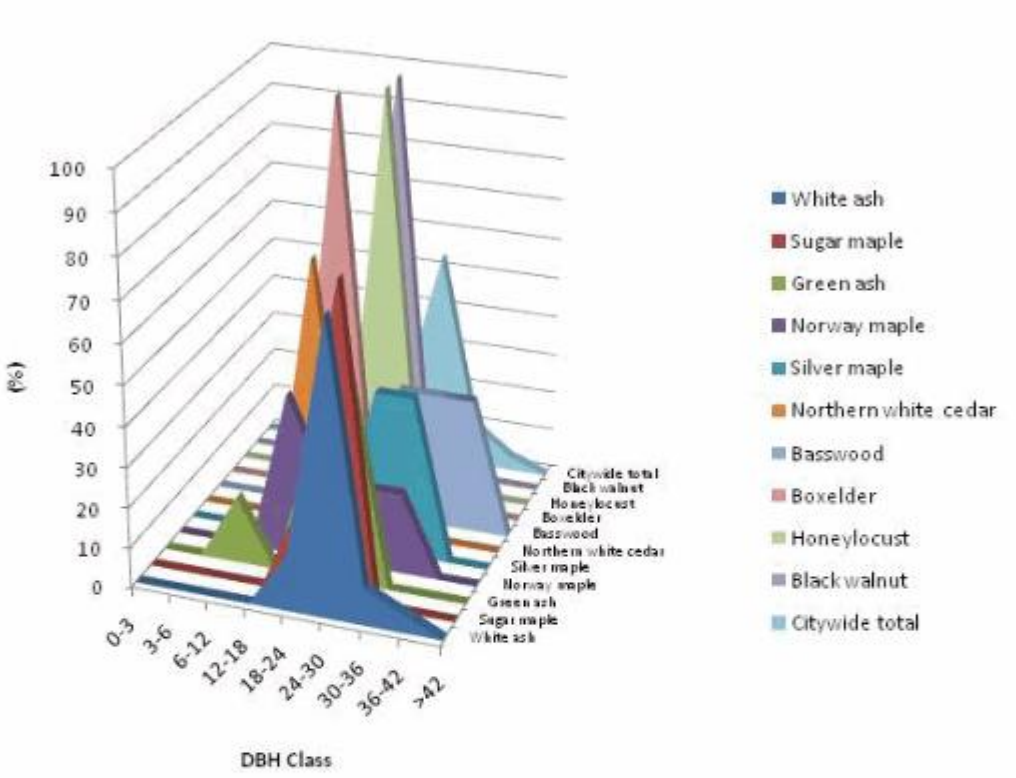


Species	Percent
White ash	37.9
Sugar maple	15.5
Green ash	10.3
Norway maple	8.6
Silver maple	8.6
Northern white cedar	5.2
Basswood	5.2
Boxelder	3.4
Honeylocust	1.7
Black walnut	1.7
Other species	1.7
Total	100.0

Figure 1: Species Distribution

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

12/12/2010



	DBH class (in)								
Species	0-3	3-6	6-12	12-18	18-24	24-30	30-36	36-42	>42
White ash	0.0	0.0	0.0	0.0	13.6	72.7	9.1	4.5	0.0
Sugar maple	0.0	0.0	0.0	0.0	22.2	77.8	0.0	0.0	0.0
Green ash	0.0	0.0	16.7	0.0	33.3	50.0	0.0	0.0	0.0
Norway maple	0.0	0.0	0.0	40.0	20.0	20.0	20.0	0.0	0.0
Silver maple	0.0	0.0	0.0	20.0	0.0	40.0	40.0	0.0	0.0
Northern white cedar	0.0	0.0	0.0	66.7	0.0	33.3	0.0	0.0	0.0
Basswood	0.0	0.0	0.0	0.0	0.0	33.3	33.3	33.3	0.0
Boxelder	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0
Honeylocust	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
Black walnut	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
Citywide total	0.0	1.7	1.7	12.1	17.2	53.4	10.3	3.4	0.0

Figure 2: Relative Age Class

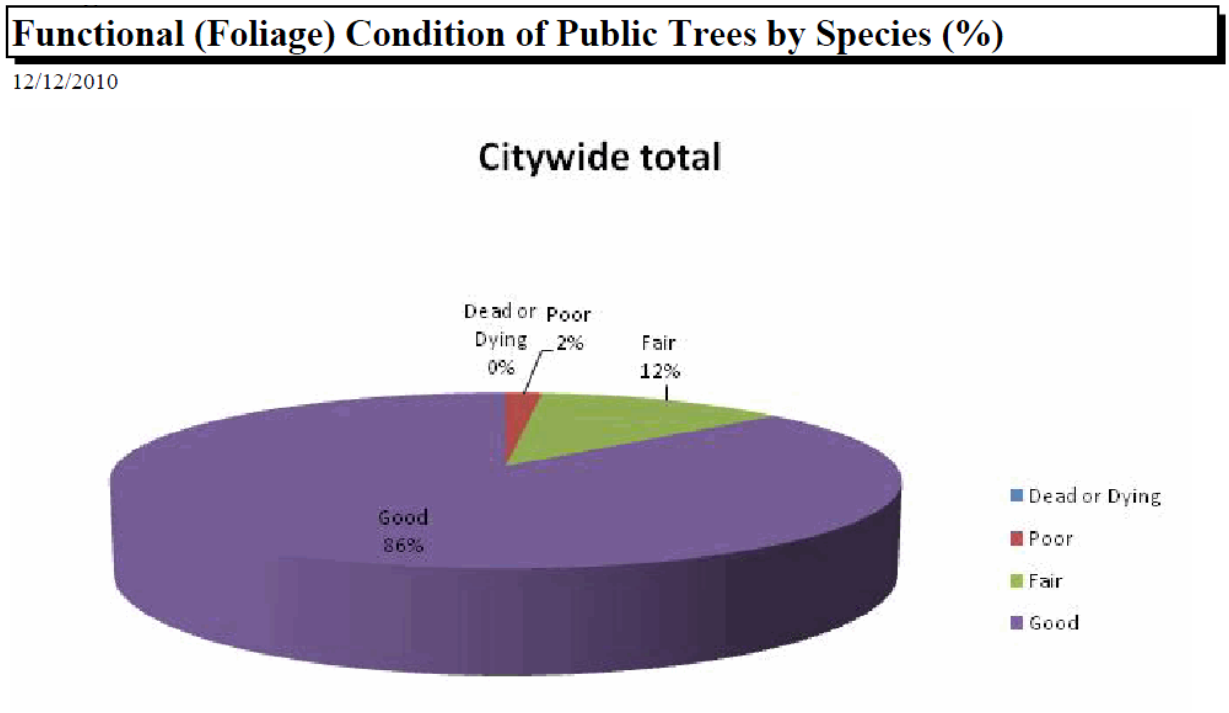


Figure 3: Foliage Condition

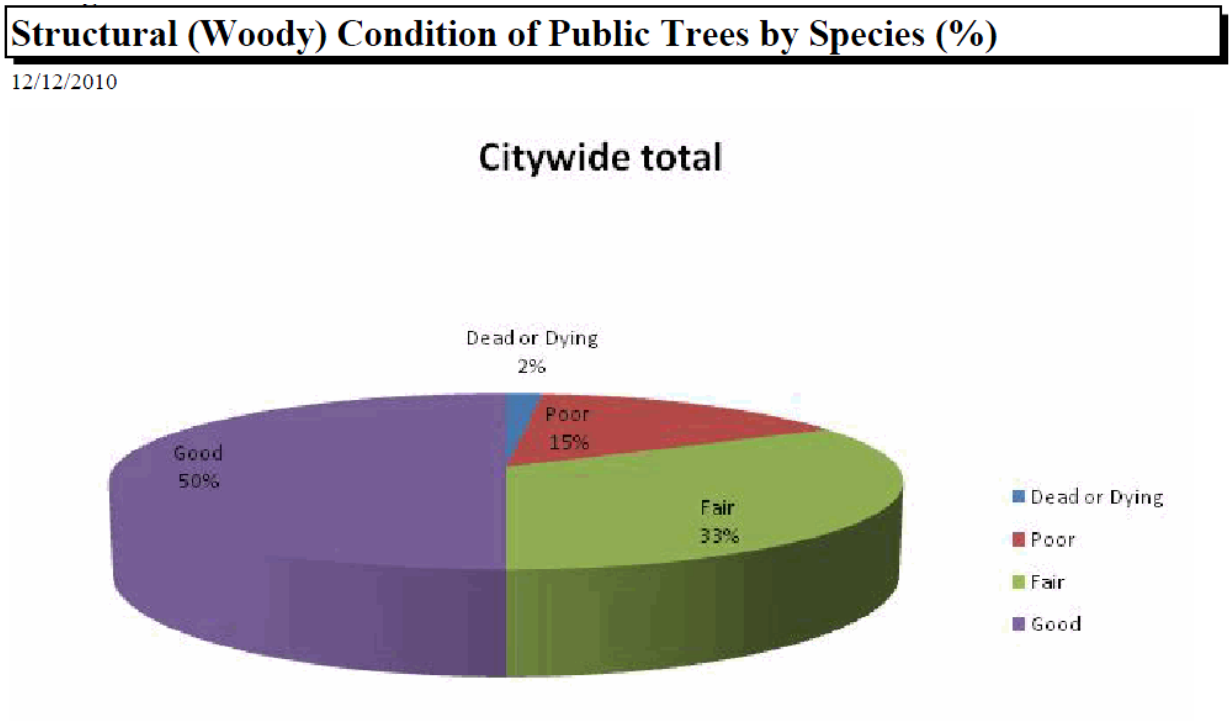
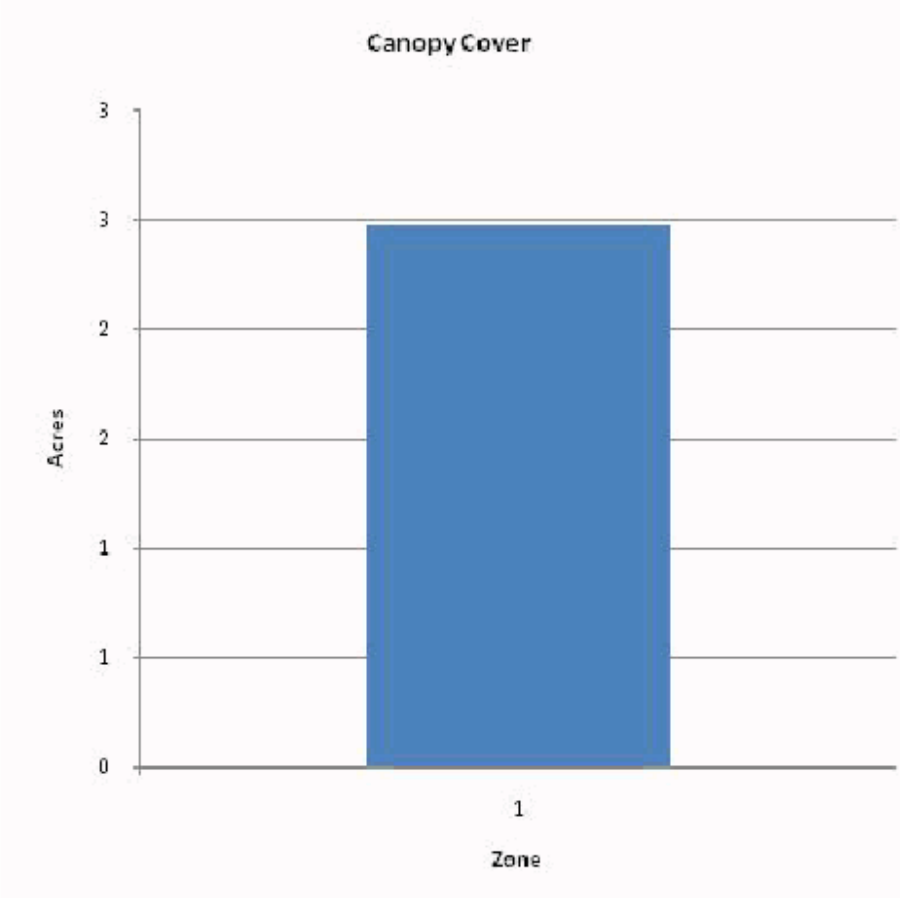


Figure 4: Wood Condition

Canopy Cover of Public Trees (Acres)

12/12/2010



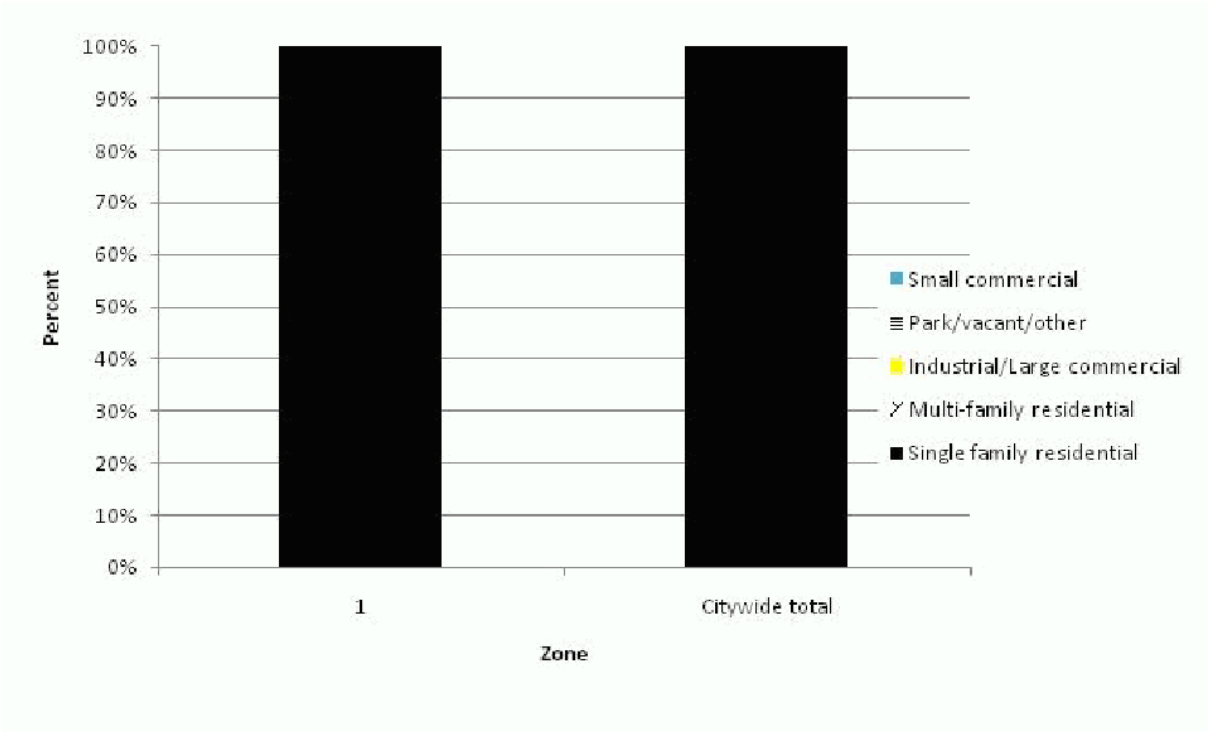
Zone	Acres	% of Total Canopy Cover
1	2	100.0
Citywide total	2	100.0

	Total Land Area	Total Street and Sidewalk Area	Total Canopy Cover	Canopy Cover as % of Total Land Area	Canopy Cover as % of Total Streets and Sidewalks
Citywide	0	0	2		

Figure 5: Canopy Cover in Acres

Land Use of Public Trees by Zone (%)

12/12/2010

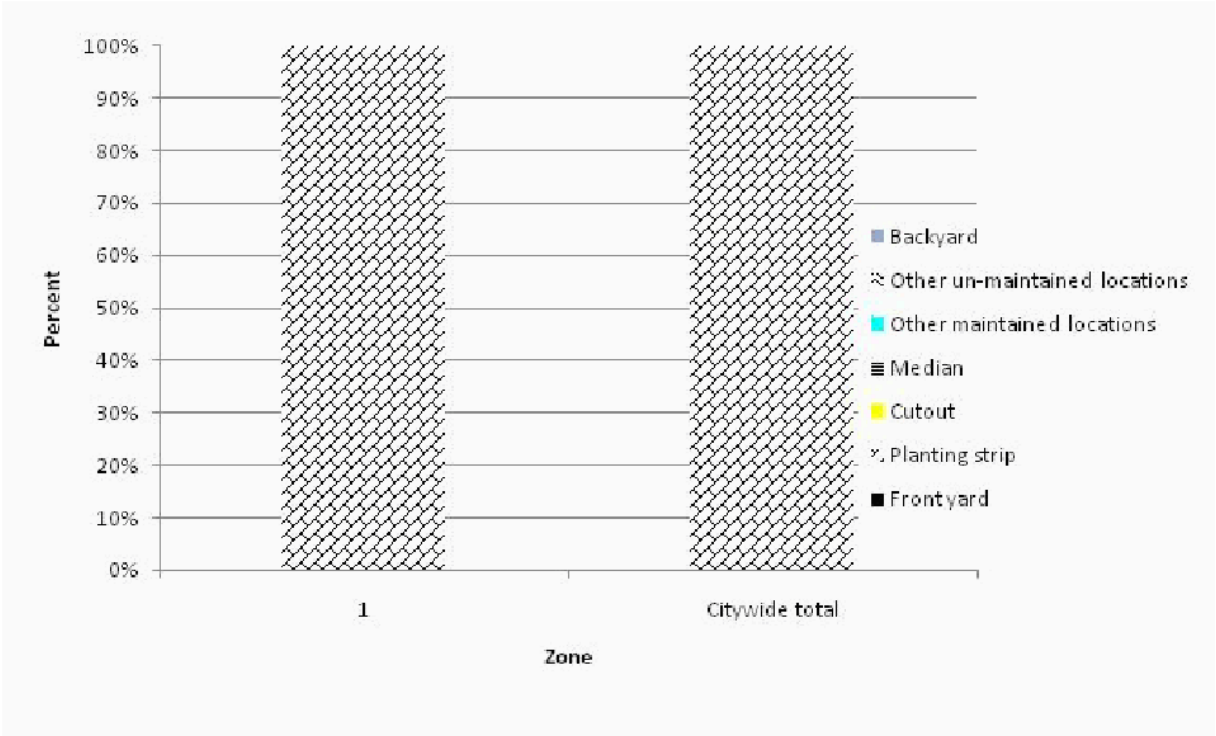


Zone	Single family residential	Multi-family residential	Industrial/ Large commercial	Park/vacant/ other	Small commercial
1	100.0	0.0	0.0	0.0	0.0
Citywide total	100.0	0.0	0.0	0.0	0.0

Figure 6: Land Use of city/park trees

Location of Public Trees by Zone (%)

12/12/2010



Zone	Front yard	Planting strip	Cutout	Median	Other maintained locations	Other un-maintained locations	Backyard
1	0.0	100.0	0.0	0.0	0.0	0.0	0.0
Citywide total	0.0	100.0	0.0	0.0	0.0	0.0	0.0

Figure 7: Location of city/park trees

Appendix B: ArcGIS Mapping

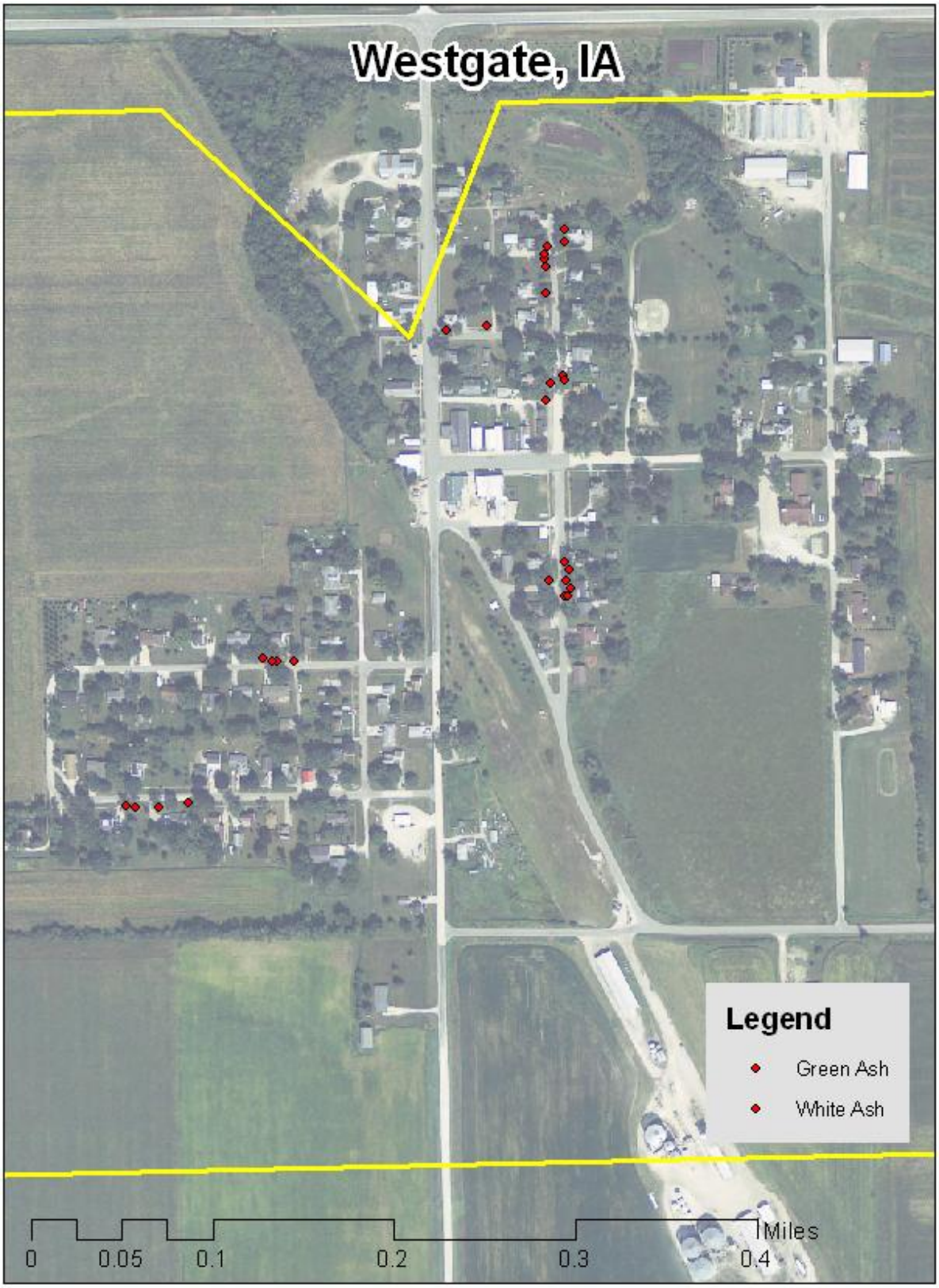


Figure 1: Location of Ash Trees

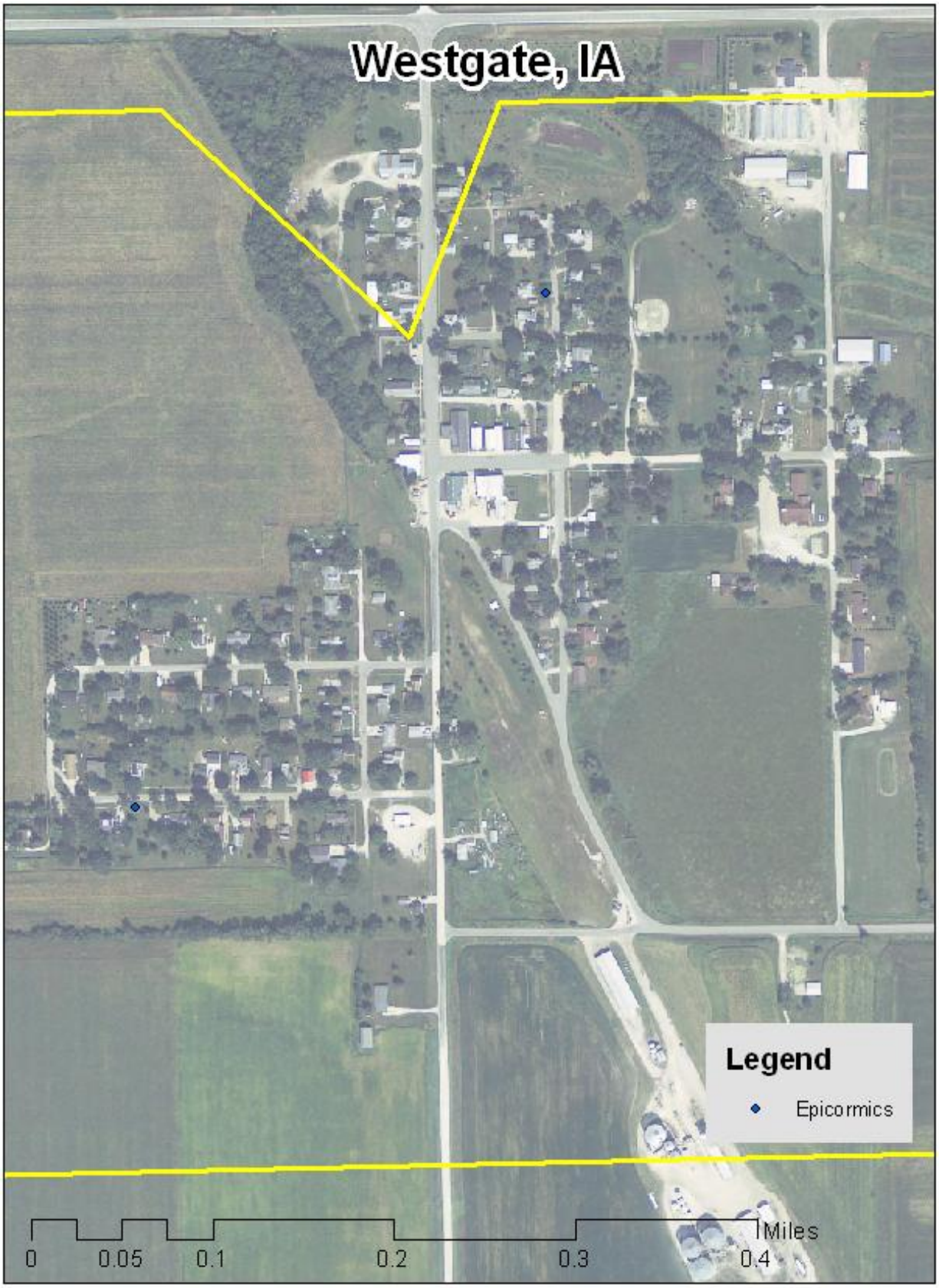


Figure 2: Location of EAB symptoms

Figure 3: Location of Poor Condition Trees

Figure 4: Location of Trees with Recommended Maintenance

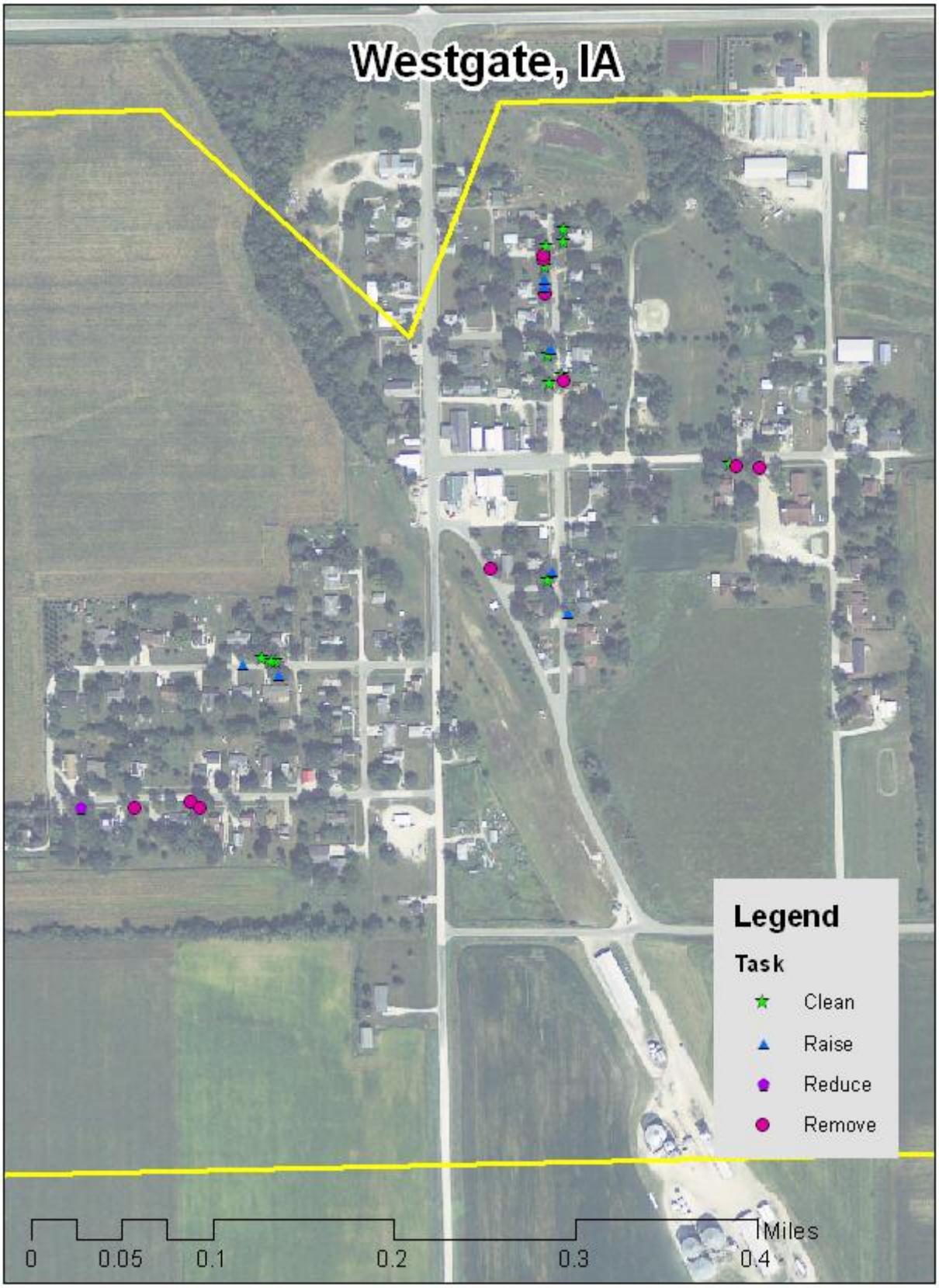


Figure 5: Maintenance Tasks *City ownership of the trees recommended for removal should be verified prior to any removal*

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