



Tree Inventory Summary Report

City of East Grand Rapids, Michigan

May 2016

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Acknowledgments

The City of East Grand Rapids' vision to promote and preserve the urban forest and improve the management of public trees was a fundamental inspiration for this project. This vision will ensure canopy continuity, which will reduce stormwater runoff and improve air quality, public health, and aesthetic values.

The City of East Grand Rapids is thankful for the grant funding it received from the United States Department of Agriculture Forest Service State and Private Forestry program, as well as the Michigan Department of Natural Resources Urban and Community Forestry program.

Notice of Disclaimer: Inventory data provided by Davey Resource Group, a division of The Davey Tree Expert Company, are based on visual recording at the time of inspection. Visual records do not include individual testing or analysis, nor do they include aerial or subterranean inspection. Davey Resource Group is not responsible for the discovery or identification of hidden or otherwise non-observable hazards. Records may not remain accurate after inspection due to the variable deterioration of inventoried material. Davey Resource Group provides no warranty with respect to the fitness of the urban forest for any use or purpose whatsoever. Clients may choose to accept or disregard Davey Resource Group's recommendations, or to seek additional advice. Important: know and understand that visual inspection is confined to the designated subject tree(s) and that the inspections for this project are performed in the interest of facts of the tree(s) without prejudice to or for any other service or any interested party.

Executive Summary

The City of East Grand Rapids commissioned an inventory and assessment of trees and stumps located within public street rights-of-way (ROW). Understanding an urban forest's structure, function, and value can promote management decisions that will improve public health and environmental quality. Davey Resource Group collected and analyzed the inventory data to understand species composition and tree condition and to generate maintenance recommendations. Tree values and benefits have been quantified using the i-Tree Streets benefits model (developed by the United States Department of Agriculture Forest Service in partnership with The Davey Tree Expert Company). In addition to providing the inventory results, this report will discuss the health and benefits of the inventoried street tree population throughout the City of East Grand Rapids.

Key Findings

- The replacement value of the inventoried tree population is approximately \$7.4 million.
- A total of 7,113 sites were inventoried, including 7,082 trees and 31 stumps.
- The most common species are: *Acer platanoides* (Norway maple), 36%; *A. saccharum* (sugar maple), 13%; *A. rubrum* (red maple), 9%; *Gleditsia triacanthos inermis* (thornless honeylocust), 5%; and *Tilia cordata* (littelleaf linden), 5%.
- The plurality (44%) of the urban forest is in the established, 9–17 inches diameter at breast height (DBH) class.
- The overall condition of the tree population is Good.
- Risk Ratings include: 6,282 Low Risk trees, 731 Moderate Risk trees, 68 High Risk trees, and 1 Extreme Risk tree.
- Primary Maintenance recommendations include: 1,312 Tree Cleans, 950 Young Tree Trains, 4,511 Routine Prunes, 309 Removals, and 31 Stump Removals.
- East Grand Rapids' street tree population provides approximately \$883,776 in the following annual benefits:
 - *Aesthetic and Other Tangible Benefits*: valued at \$276,361 per year.
 - *Air Quality*: 15,245.3 pounds of pollutants removed valued at \$42,858 per year.
 - *Net Total Carbon Sequestered and Avoided*: 4,410,593 pounds valued at \$33,079 per year.
 - *Energy*: 1,251.2 megawatt-hours (MWh) and 169,572.8 therms valued at \$261,150 per year.
 - *Stormwater*: 9,975,209 gallons valued at \$270,328 per year.

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Section 1: Tree Inventory Assessment

Project Area

In April 2016, Davey Resource Group arborists assessed and inventoried trees and stumps along the public street rights-of-way (ROW) of East Grand Rapids in the City of East Grand Rapids. See Appendix A for an overview of the site location methodology used in the inventory and assessment.

Species Diversity

Throughout East Grand Rapids' ROW, 7,113 sites were inventoried, including 7,082 trees and 31 stumps. Figure 1 shows the composition of the most populous species compared to all inventoried species. The composition of a tree population should follow the 10-20-30 Rule for species diversity: a single species should represent no more than 10% of the urban forest, a single genus no more than 20%, and a single family no more than 30%.

Of the species found within the ROW in East Grand Rapids, *Acer platanoides* (Norway maple) and *A. saccharum* (sugar maple) are the only species that exceed the 10% threshold (comprising 36% and 13% of the inventoried population, respectively). *A. rubrum* (red maple) falls just below the threshold, comprising 9% of the total inventoried population.

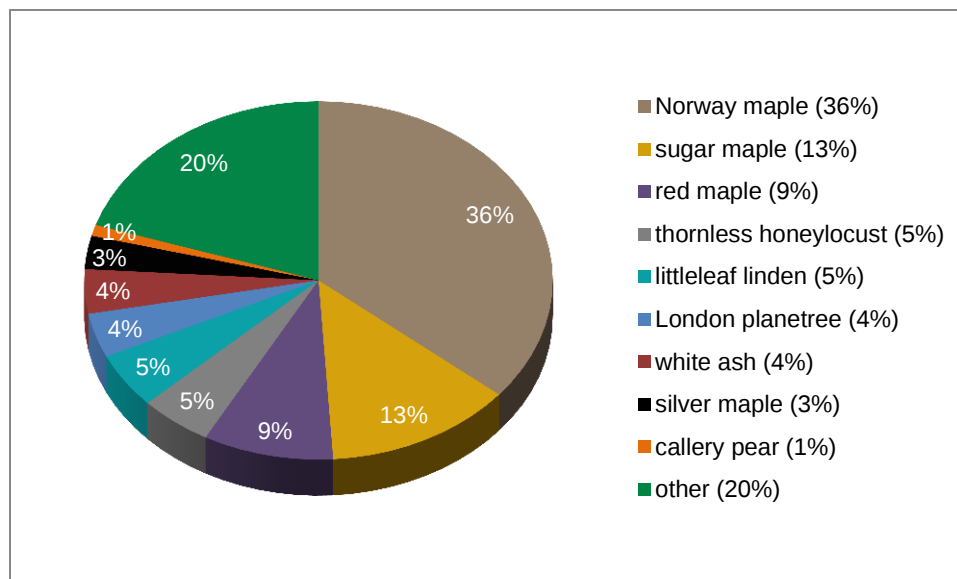


Figure 1. Tree species composition in East Grand Rapids, Michigan.

Figure 2 compares the percentages of the most common genera identified during the inventory to the 20% Rule. *Acer* (maple) exceeds the recommended 20% threshold for a single genus in a population. Maple comprises 63% of the street tree population.

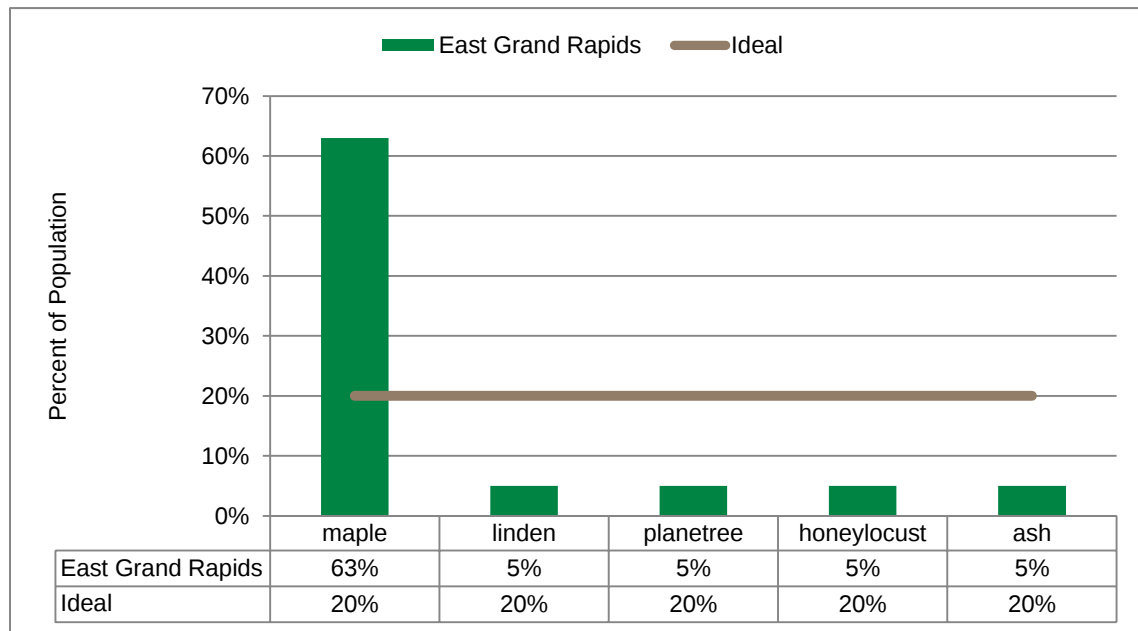


Figure 2. Top five genera in East Grand Rapids, Michigan in relation to the 20% Rule.

Diameter Size Class Distribution

Analyzing the diameter size class distribution (measured as diameter at breast height [DBH]) provides an estimate of the relative age of a tree population and lends insight into maintenance practices and needs.

The inventoried trees were categorized into the following diameter size classes: young trees (0–8 inches DBH); established trees (9–17 inches DBH); maturing trees (18–24 inches DBH); and mature trees (greater than 24 inches DBH). These categories were chosen so that the population could be analyzed following Richards’ ideal distribution (1983). Richards proposed an ideal diameter size class distribution for street trees based on observations of well-adapted trees in Syracuse, New York. Richards’ ideal distribution suggests that the largest fraction of trees (approximately 40% of the population) should be young (less than 8 inches DBH), while a smaller fraction (approximately 10%) should fall in the large-diameter size class (greater than 24 inches DBH). A tree population with an ideal distribution would have an abundance of newly planted and young trees, and lower numbers of established, maturing, and mature trees.

Figure 3 compares East Grand Rapids' inventoried street tree diameter size class distribution to the ideal proposed by Richards (1983). East Grand Rapids' distribution is skewed; young trees fall short of the ideal by roughly 9%, and established trees exceed the ideal by 14%. As the urban forest in East Grand Rapids ages, this ideal will begin to balance out. Continued tree planting, care, and maintenance of the young and established tree population will help achieve a more sustainable size distribution of street trees in East Grand Rapids.

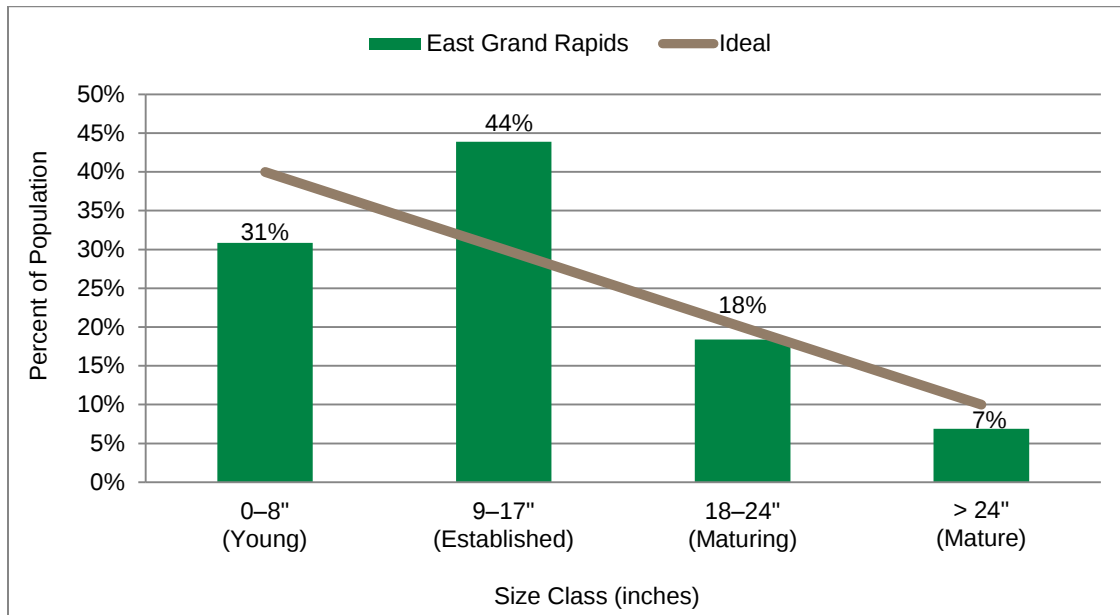


Figure 3. Age class distribution compared to Richards' (1983) ideal.

Condition

Several factors were considered for the condition of each tree, including: root characteristics, branch structure, trunk, canopy, foliage condition, and the presence of pests. The condition of each inventoried tree was rated Excellent, Very Good, Good, Fair, Poor, Critical, or Dead.

Most of the inventoried ROW trees were recorded to be in Good condition, 51% (Figure 4). Based on these data, the general health of the inventoried tree population is rated Good.

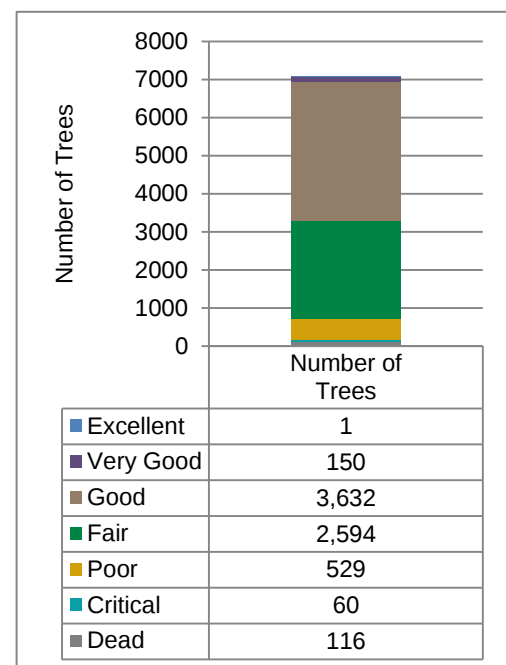


Figure 4. Overall condition of the inventoried population.

Figure 5 illustrates the general condition of the urban forest in relation to the relative age classes. The majority of young, established, maturing, and mature trees were rated to be in Good to Excellent condition. With proactive care and an established maintenance schedule, the city can improve the long-term health of its urban forest.

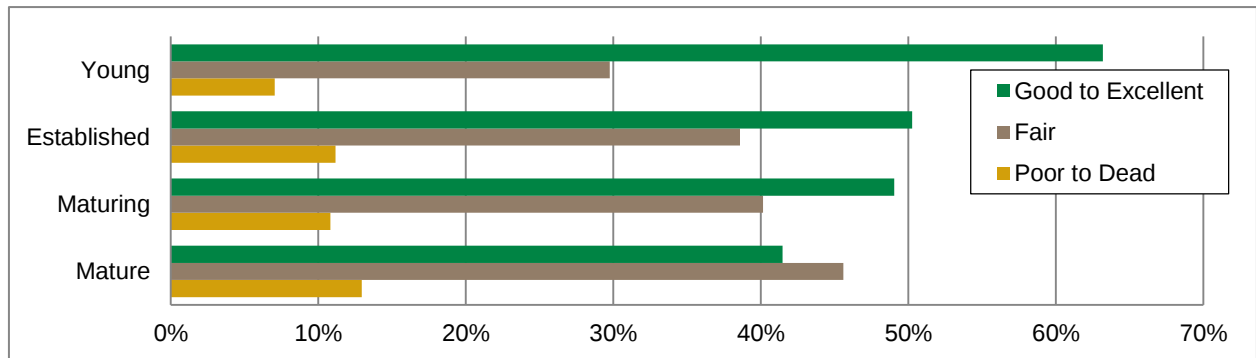


Figure 5. Tree condition by age class.

Primary Maintenance and Risk

Primary maintenance refers to the task identified for a tree or site: Tree and Stump Removal, Tree Clean, Routine Prune, or Young Tree Train. Risk is a graduated scale that measures potential tree-related hazardous conditions. A tree is considered hazardous when its potential risks exceed an acceptable level.

Davey Resource Group based the maintenance recommendations and risk values (Figure 6) on the evaluation of species, diameter class, condition, impact of hazard, and defects found in each individual tree. Identifying and ranking the maintenance needs of a tree population enable tree work to be assigned priority based on observed defects. Once prioritized, tree work can be systematically addressed to eliminate the greatest risk and liability first (Stamen 2011).

Based on the inventoried population in East Grand Rapids, the following maintenance recommendations should be implemented: 309 Removals, 1,312 Tree Cleans, 4,511 Routine Prunes, and 950 Young Tree Trains. Figure 6 illustrates the risk values associated with each maintenance need.

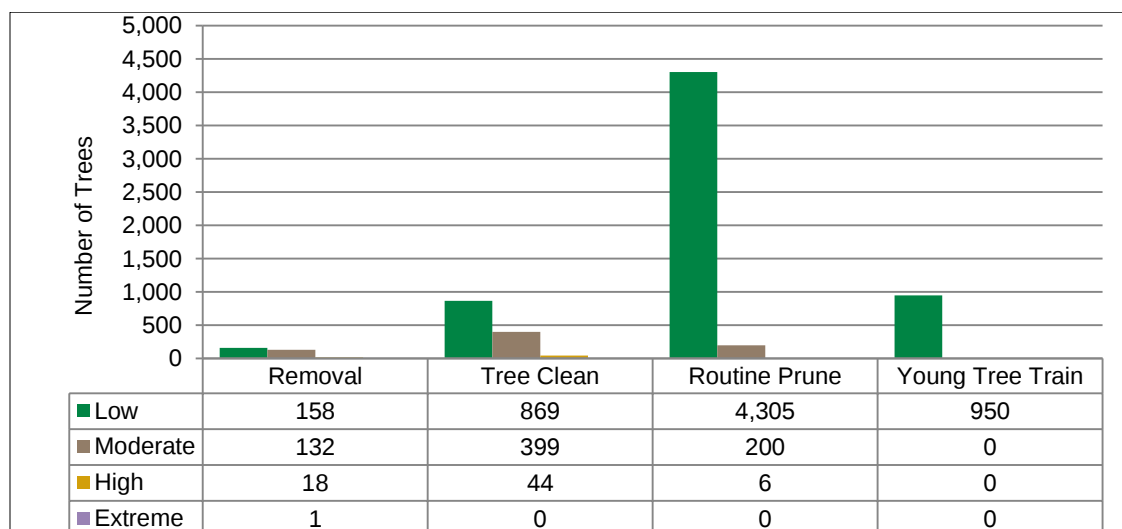


Figure 6. Maintenance needs by risk rating.

Section 2: i-Tree Streets Benefits

The i-Tree Streets application was used to assess the inventoried trees. This management and analysis tool uses tree inventory data to quantify the dollar value of annual environmental and aesthetic benefits provided by trees, including energy conservation, air quality improvement, carbon dioxide (CO₂) reduction, stormwater control, and increases in property value. The tool estimates the costs and benefits of a street tree population and creates annual benefit reports that reflect the value street trees provide to a community.

The inventoried urban forest of East Grand Rapids provides an annual benefit of approximately \$883,776 in energy savings, overall air quality improvement, carbon dioxide removal, stormwater reduction, and aesthetic and other tangible benefits. More detailed information about annual benefit analysis reports and maintenance reports can be found in Appendix B.

Table 1 provides a breakdown of the annual benefits provided to the City of East Grand Rapids.

Table 1. Annual Benefits Provided by Inventoried Tree Population

Benefits	Total (\$)	Percent of Total
Aesthetics/Other	\$276,361	31%
Air Quality	\$42,858	5%
Carbon Dioxide	\$33,079	4%
Energy	\$261,150	29%
Stormwater	\$270,328	31%
ROW Trees Total	\$883,776	100%

Aesthetic/Other Benefits

The total annual benefit associated with property value increases and other tangible and intangible services trees provide is \$276,361. Each tree in East Grand Rapids provides an average of \$39.02 in annual benefits.

Table 2. Annual Aesthetic and Other Tangible Benefits
Provided by Inventoried Tree Population

Total (\$)	Avg. \$/Tree
\$276,361	\$39.02

Air Quality Improvements

The inventoried tree population annually removes 2,511 pounds of air pollutants (including ozone, nitrogen dioxide, sulfur dioxide, and particulate matter) through deposition. The street tree population provides a total annual benefit of \$42,858 in overall air quality improvements. Each tree in East Grand Rapids provides an average of \$6.05 in annual benefits.

Table 3. Annual Air Quality Benefits
Provided by Inventoried Tree Population

Net Total Avoided/Deposition (lbs.)	Total (\$)	Avg. \$/Tree
15,245	\$42,858	\$6.05

Carbon Dioxide Removal

Trees store some of the CO₂ they absorb, thereby preventing it from reaching the upper atmosphere where it can react with other compounds and form harmful gases like ozone. Such gases adversely affect air quality.

The i-Tree Street analysis found that the inventoried street trees in East Grand Rapids have stored 30,075,199 pounds of carbon (measured in CO₂ equivalents). This amount reflects the total carbon these trees have amassed during their lifetime. Through sequestration and avoidance, 4,410,593 pounds of CO₂ are removed on an annual basis. The inventoried trees provide an annual carbon benefit of \$33,079, with a per-tree average of \$4.67.

Table 4. Annual Carbon Dioxide Benefits
Provided by Inventoried Tree Population

Net Total CO ₂ Sequestered/Avoided - Released (lbs.)	Total (\$)	Avg. \$/Tree
4,410,593	\$33,079	\$4.67

Energy Use

Public trees conserve energy by shading structures and surfaces, reducing electricity use for air conditioning in the summer, and diverting wind in the winter to reduce natural gas use. Based on the inventoried trees, the annual electric and natural gas savings are equivalent to 1,251.2 MWh of electricity and 169,572.8 therms of natural gas. When converted into monetary values using default economic data, this accounts for an annual savings of \$261,150 in energy consumption. Large leafy canopies provide greater reductions in energy use by providing shade and natural wind barriers. In contrast, smaller trees tend to result in slighter reductions in energy usage.

Table 5. Annual Energy Savings
Provided by Inventoried Tree Population

Total Electricity (MWh)	Electricity (\$)	Total Natural Gas (Therms)	Natural Gas (\$)	Total (\$)	Avg. \$/Tree
1,251.2	\$94,968	169,572.8	\$166,181	\$261,150	\$36.88

Stormwater Interception and Mitigation

Trees intercept rainfall, which reduces costs to manage stormwater runoff. East Grand Rapids' inventoried trees intercept 9,975,209 gallons of rainfall annually. The estimated average savings for the City of East Grand Rapids in stormwater management is approximately \$270,328 per year. On average, each tree in East Grand Rapids provides an annual stormwater benefit of \$38.17.

Table 6. Annual Stormwater Benefits
Provided by Inventoried Tree Population

Total Rainfall Interception (gal.)	Total (\$)	Avg. \$/Tree
9,975,209	\$270,328	\$38.17

Conclusion and Recommendations

Managing trees in urban areas can be complicated. Navigating the recommendations of experts, the needs of residents, the pressures of local economics and politics, concerns for public safety and liability, physical components of trees, forces of nature and severe weather events, and the expectation that these issues are resolved all at once is a considerable challenge.

The City of East Grand Rapids must carefully consider these challenges to fully understand the needs of maintaining an urban forest. By completing a tree inventory, the city has shown interest in preserving the urban forest, but also maintaining it for future generations. If the city successfully implements established planting and maintenance programs that include Tree and Stump Removal, Young Tree Training, Routine Pruning, Tree Cleaning, and public outreach, the health and safety of East Grand Rapids' trees and residents will be maintained for years to come.

East Grand Rapids' urban forest is in Good condition and provides \$883,776 in annual benefits. With continued dedication to its street tree resource, the city can improve the condition and diversity of its trees and increase the annual benefits they provide.

Key Recommendations

- Prioritize tree maintenance activities based on risk assessments.
- Continue planting trees to ensure a population of young, growing trees to replace the stock of declining, mature maples.
- Limit planting of maples to balance population diversity.

Glossary

Aesthetic/Other Report: The i-Tree Streets Aesthetic/Other Report presents the tangible and intangible benefits of trees, as reflected by monetary increases in property values.

Air Quality Report: The i-Tree Streets Air Quality Report quantifies the air pollutants (ozone [O₃], nitrogen dioxide [NO₂], sulfur dioxide [SO₂], coarse particulate matter less than 10 micrometers in diameter [PM₁₀]) deposited on tree surfaces, and reduced emissions from power plants (NO₂, PM₁₀, Volatile Oxygen Compounds [VOCs], SO₂) due to reduced electricity use measured in pounds (lbs.). Also reported are the potential negative effects of trees on air quality due to Biogenic Volatile Organic Compounds (BVOC) emissions.

arboriculture: The art, science, technology, and business of commercial, public, and utility tree care.

canopy: Branches and foliage that make up a tree's crown.

Carbon Dioxide Report: The i-Tree Streets Carbon Dioxide Report presents annual reductions in atmospheric CO₂ due to sequestration by trees and reduced emissions from power plants due to reduced energy use in pounds. The model accounts for CO₂ released as trees die and decompose and CO₂ released during the care and maintenance of trees.

community forest: see **urban forest**.

condition (data field): The general health assigned to each inventoried tree according to the following categories adapted from the International Society of Arboriculture's rating system: Excellent (100%), Very Good (90%), Good (80%), Fair (60%), Poor, (40%), Critical (20%), Dead (0%).

diameter at breast height (DBH): See **tree size**.

diameter: See **tree size**.

Energy Report: The i-Tree Streets Energy Report presents the contribution of the urban forest towards conserving energy in terms of reduced natural gas use in winter measured in therms [th] and reduced electricity use for air conditioning in summer measured in megawatt-hours (MWh).

Extreme Risk tree: The Extreme Risk category applies in situations where tree failure is imminent and there is a high likelihood of impacting the target, and the consequences of the failure are "severe." In some cases, this may mean immediate restriction of access to the target zone area to avoid injury to people.

genus: A taxonomic category ranking below a family and above a species and generally consisting of a group of species exhibiting similar characteristics. In taxonomic nomenclature, the genus name is either used as a standalone term or is followed by a Latin adjective or epithet to form the name of a species.

High Risk tree: The High Risk category applies when consequences are "significant" and likelihood is "very likely" or "likely," or consequences are "severe" and likelihood is "likely." In a population of trees, the priority of High Risk trees is second only to Extreme Risk trees.

inventory: See **tree inventory**.

i-Tree Streets: i-Tree Streets is a street tree management and analysis tool that uses tree inventory data to quantify the dollar value of annual environmental and aesthetic benefits: energy conservation, air quality improvement, CO₂ reduction, stormwater control, and property value increases.

i-Tree Tools: State-of-the-art, peer-reviewed software suite from the USDA Forest Service that provides urban forestry analysis and benefits assessment tools. The i-Tree Tools software helps communities of all sizes to strengthen their urban forest management and advocacy efforts by quantifying the structure of community trees and the environmental services that trees provide.

Low Risk tree: The Low Risk category applies when consequences are “negligible” and likelihood is “unlikely”; or consequences are “minor” and likelihood is “somewhat likely.” Some trees with this level of risk may benefit from mitigation or maintenance measures, but immediate action is not usually required.

Moderate Risk tree: The Moderate Risk category applies when consequences are “minor” and likelihood is “very likely” or “likely”; or likelihood is “somewhat likely” and consequences are “significant” or “severe.” In populations of trees, Moderate Risk trees represent a lower priority than High or Extreme Risk trees.

monoculture: A population dominated by one single species or very few species.

Net Annual Benefits: Specific data field for i-Tree Streets. Citywide benefits and costs are calculated according to category and summed. Net benefits are calculated as benefits minus costs.

Nitrogen Dioxide (NO₂): Nitrogen dioxide is a compound typically created during the combustion processes and is a major contributor to smog formation and acid deposition.

Ozone (O₃): A strong-smelling, pale blue, reactive toxic chemical gas with molecules of three oxygen atoms. This gas is a product of the photochemical process involving the sun’s energy. Ozone exists at the Earth’s surface and in the upper layer of the atmosphere. Ozone at the Earth’s surface is a major component of smog and can cause significant health issues.

Particulate Matter (PM₁₀): A major class of air pollutants consisting of tiny solid or liquid particles of soot, dust, smoke, fumes, and mists.

Primary Maintenance Need (data field): The type of tree work needed to reduce immediate risk.

pruning: The selective removal of plant parts to meet specific goals and objectives.

Removal (Primary Maintenance Need): Trees designated for removal have defects that cannot be cost-effectively or practically treated. The majority of the trees in this category have a large percentage of dead crown. All trees with safety risks that could be seen as potential threats to persons or property and seen as potential liabilities to the client would be in this category. This category includes large dead and dying trees that are high-liability risks as well as those that pose minimal liability to persons or property (such as trees in poor locations or undesirable species).

Routine Prune (Primary Maintenance Need): Trees in this category have characteristics that could become risks if not corrected. Dead, diseased, dying, or otherwise poorly structured limbs are generally less than 2 inches in diameter. These trees should be pruned within the community’s regularly pruning cycle.

right-of-way (ROW): See **street right-of-way**.

risk: Combination of the probability of an event occurring, along with its consequence.

risk assessment (data fields): Level 2 qualitative risk assessment will be performed based on the ANSI A300 (Part 9) and the companion publication *Best Management Practices: Tree Risk Assessment*, published by the International Society of Arboriculture (2011). Trees can have multiple failure modes with various risk ratings. One risk rating per tree will be assigned during the inventory. The failure mode having the greatest risk will serve as the overall tree risk rating.

risk rating: The overall risk rating of the tree determined by combining the likelihood of tree failure impacting a target and the consequence of failure.

species: Fundamental category of taxonomic classification, ranking below a genus or subgenus, and consisting of related organisms capable of interbreeding.

stem: A woody structure bearing buds and foliage, and giving rise to other stems.

stems (data field): Identifies the number of stems or trunks splitting less than 1 foot above ground level.

Stored Carbon Report: The i-Tree Streets Stored Carbon Report tallies all of the Carbon (C) stored in the urban forest over the life of the trees as a result of sequestration measured in pounds as the CO₂ equivalent.

Stormwater Report: A report generated by i-Tree Streets that presents the reductions in annual stormwater runoff due to rainfall interception by trees, as measured in gallons (gals.).

street name (data field): The name of a street right-of-way or road identified using posted signage or parcel information.

street right-of-way (ROW): A strip of land generally owned by a public entity over which facilities, such as highways, railroads, or power lines, are built.

street tree: A street tree is defined as a tree within the right-of-way.

structural defect: A feature, condition, or deformity of a tree or tree part that indicates weak structure and contributes to the likelihood of failure.

Stump Removal (Primary Maintenance Need): This category indicates a stump that should be removed. This includes any stump over 2 inches from ground level in the public rights-of-way or park.

Sulfur Dioxide (SO₂): A strong-smelling, colorless gas that is formed by the combustion of fossil fuels. Sulfur dioxide contributes to the problem of acid rain.

Summary Report: The i-Tree Streets Summary report presents the annual totals of energy, stormwater, air quality, carbon dioxide, and aesthetic/other benefits. Values are represented in dollars per tree or total dollars.

tree: A tree is defined as a perennial woody plant that may grow more than 20 feet tall. A tree generally has one main stem, although many species may grow as multi-stemmed forms.

tree benefit: An economic, environmental, or social improvement that benefits the community and results mainly from the presence of a tree. A benefit contains real or intrinsic value.

Tree Clean (Primary Maintenance Need): These trees require selective removal of dead, diseased, dying, and/or broken wood, greater than 2 inches in diameter to minimize potential risk. Priority of work should be dependent upon the risk associated with the individual trees.

tree inventory: Comprehensive database containing information or records about individual trees typically collected by an arborist.

tree size (data field): A tree's diameter measured to the nearest inch in 1-inch size classes at 4.5 feet above ground, also known as diameter at breast height (DBH) or diameter.

urban forest: All of the trees within a municipality or a community. This can include the trees along streets or rights-of-way, in parks and greenspaces, in forests, and on private property.

Volatile Organic Compounds (VOCs): Hydrocarbon compounds that exist in the ambient air and are by-products of energy used to heat and cool buildings. Volatile organic compounds contribute to the formation of smog and/or are toxic. Examples of VOCs are gasoline, alcohol, and solvents used in paints.

Young Tree Train (Primary Maintenance Need): These are young trees that must be pruned to correct or eliminate weak, interfering, or objectionable branches in order to minimize future maintenance requirements. Generally, these trees may be up to 20 feet in height and can be worked with a pole pruner by a person standing on the ground.

References

- American National Standards Institute. 2011. *ANSI A300 (Part 9)–2011, American National Standard for Tree Care Operations—Tree, Shrub, and Other Woody Plant Management Standard Practices (Tree Risk Assessment a. Tree Structure Assessment)*. Londonderry: Tree Care Industry Association, Inc.
- Richards, N.A. 1983. “Diversity and Stability in a Street Tree Population.” *Urban Ecology* 7(2):159–171.
- Stamen, R.S. “Understanding and Preventing Arboriculture Lawsuits.” Presented at the Georgia Urban Forest Council Annual Meeting, Madison, Georgia, November 2–3, 2011.

Appendix A

Site Location Methods

Equipment and Base Maps

Inventory arborists use CF-19 Panasonic Toughbook® unit(s) and Trimble® GPS Pathfinder® ProXH™ receiver(s).

Base map layers were loaded onto these unit(s) to help locate sites during the inventory. Table 1 lists the base map layers utilized along with source and format information for each layer.

Table 1. Base Map Layers Utilized for Inventory

Imagery/Data Source	Date	Projection
Kent County, Michigan	2014 -2015	NAD 83 State Plane, Michigan South, Feet
USGS 1 m Imagery	2015	

Street ROW Site Locations

Individual street ROW were located using a methodology developed by Davey Resource Group that identifies sites by *address number*, *street name*, *side*, and *On Street*. This methodology allows for consistent assignment of location.

Address Number and Street Name

The *address number* was recorded based on visual observation by the arborist at the time of the inventory (the address number posted on a building at the inventoried site). Where there was no posted address number on a building or where the site was located by a vacant lot with no GIS parcel addressing data available, the address number assigned was matched as closely as possible to opposite or adjacent addresses by the arborist and an “X” was added to the number in the database to indicate that it was assigned (for example, “37X Choice Avenue”).

Sites in medians or islands were assigned an address number using the address on the right side of the street in the direction of collection closest to the site. Each segment was numbered with an assigned address that was interpolated from addresses facing that median/island. If there were multiple median/islands between cross streets, each segment was given its own assigned address.

The *street name* assigned to a site was determined by street ROW parcel information and posted street name signage.

Side Value

Each site was assigned a *side value*. Side values include: *front*, *side*, *median* (includes islands), or *rear* based on the site’s location in relation to the lot’s street frontage (Figure 1). The *front side* is the side that faces the address street. *Side* is the name of the street adjacent to the front of the house on either side. *Median* indicates a median or island. The *rear* is the side of the lot opposite of the front.

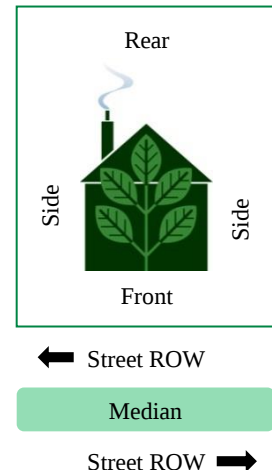


Figure 1. Side values for street ROW sites.

Block Side

Block side information for a site includes the *on street* and *street*.

- The *on street* is the street on which the site is physically located. The *on street* may not match the address street. A site may be physically located on a street that is different from its street address, for example, a site located on a side street.
- The *street* is the street that the property is actually addressed to. Regardless of the *on street*, the property will always have a *street* that matches its address.

Replacement Value

The methodology used to appraise the landscape value derives from the i-Tree Streets *Replacement Value of Public Trees* report (Appendix B)

Appendix B
Tree Inventory Analysis Reports

East Grand Rapids

Annual Aesthetic/Other Benefits of Public Trees

5/9/2016

Species	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
maple, Norway	83,487	(N/A)	35.8	30.2	32.93
maple, sugar	40,102	(N/A)	13.4	14.5	42.12
maple, red	15,263	(N/A)	8.7	5.5	24.66
honeylocust, thornless	33,807	(N/A)	5.0	12.2	94.70
linden, littleleaf	15,338	(N/A)	5.0	5.5	43.33
planetree, London	17,280	(N/A)	4.2	6.3	57.60
ash, white	14,223	(N/A)	4.0	5.1	50.61
maple, silver	21,871	(N/A)	3.4	7.9	90.01
pear, callery	1,410	(N/A)	1.4	0.5	14.24
arborvitae spp.	1,028	(N/A)	1.2	0.4	12.53
oak, pin	3,933	(N/A)	1.1	1.4	52.44
oak, northern red	1,205	(N/A)	1.0	0.4	16.97
maple, freeman	2,003	(N/A)	0.9	0.7	31.79
sycamore, American	3,618	(N/A)	0.8	1.3	60.30
ash, green	1,998	(N/A)	0.8	0.7	35.67
oak, white	2,857	(N/A)	0.7	1.0	53.91
elm, hybrid	331	(N/A)	0.7	0.1	6.75
hickory, shagbark	2,334	(N/A)	0.7	0.8	48.63
maple, hedge	769	(N/A)	0.6	0.3	16.71
ginkgo	101	(N/A)	0.6	0.0	2.29
apple	173	(N/A)	0.6	0.1	4.23
elm, Siberian	1,548	(N/A)	0.6	0.6	39.70
elm, American	1,409	(N/A)	0.5	0.5	38.09
redbud, eastern	52	(N/A)	0.5	0.0	1.54
pine, eastern white	403	(N/A)	0.4	0.1	14.39
basswood, American	791	(N/A)	0.4	0.3	28.26
serviceberry spp.	9	(N/A)	0.4	0.0	0.33
horsechestnut	345	(N/A)	0.4	0.1	13.27
Buckthorn, European	71	(N/A)	0.4	0.0	2.75
plum	102	(N/A)	0.3	0.0	4.23
birch, river	504	(N/A)	0.3	0.2	21.01
spruce, Norway	599	(N/A)	0.3	0.2	26.06
walnut, black	1,104	(N/A)	0.3	0.4	50.18
tulip tree	459	(N/A)	0.3	0.2	22.94
hawthorn species	40	(N/A)	0.3	0.0	1.99
zelkova, Japanese	477	(N/A)	0.3	0.2	25.10
locust, black	532	(N/A)	0.3	0.2	29.56
spruce, blue	310	(N/A)	0.2	0.1	18.21
lilac, Japanese tree	38	(N/A)	0.2	0.0	2.21
cottonwood, eastern	854	(N/A)	0.2	0.3	61.02
sweetgum	397	(N/A)	0.2	0.1	30.54
oak, white swamp	366	(N/A)	0.2	0.1	30.49
spruce, Serbian	134	(N/A)	0.2	0.0	12.19
unknown tree	241	(N/A)	0.1	0.1	24.11
dogwood, flowering	7	(N/A)	0.1	0.0	0.67
hornbeam, American	143	(N/A)	0.1	0.1	17.89
cedar, northern white	65	(N/A)	0.1	0.0	8.18
dogwood, kousa	0	(N/A)	0.1	0.0	0.03
mulberry, white	42	(N/A)	0.1	0.0	6.92
hackberry, northern	98	(N/A)	0.1	0.0	16.39
spruce, white	42	(N/A)	0.1	0.0	8.34
magnolia, saucer	19	(N/A)	0.1	0.0	3.80

Annual Aesthetic/Other Benefits of Public Trees

5/9/2016

Species	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
boxelder	140 (N/A)		0.1	0.1	27.95
maple, paperbark	8 (N/A)		0.1	0.0	1.65
hickory, pignut	301 (N/A)		0.1	0.1	60.27
fir, douglas	34 (N/A)		0.1	0.0	8.44
hickory, bitternut	186 (N/A)		0.1	0.1	46.46
beech, European	15 (N/A)		0.1	0.0	3.69
cedar, eastern red	44 (N/A)		0.1	0.0	10.89
birch, paper	149 (N/A)		0.1	0.1	37.21
oak, bur	219 (N/A)		0.1	0.1	54.86
smoketree, American	0 (N/A)		0.1	0.0	0.03
catalpa, northern	191 (N/A)		0.0	0.1	63.51
hophornbeam, eastern	22 (N/A)		0.0	0.0	7.31
tree of heaven	126 (N/A)		0.0	0.0	42.06
cherry, black	73 (N/A)		0.0	0.0	24.36
maple, Japanese	6 (N/A)		0.0	0.0	2.16
linden, silver	52 (N/A)		0.0	0.0	17.42
willow, black	4 (N/A)		0.0	0.0	1.91
sumac, staghorn	0 (N/A)		0.0	0.0	0.03
maple, amur	8 (N/A)		0.0	0.0	4.23
pine, Austrian	45 (N/A)		0.0	0.0	22.60
elm, Chinese	57 (N/A)		0.0	0.0	28.56
willow, pussy	18 (N/A)		0.0	0.0	8.77
fir, balsam	22 (N/A)		0.0	0.0	11.13
oak, English	16 (N/A)		0.0	0.0	16.24
buckeye, Ohio	13 (N/A)		0.0	0.0	12.89
elm, slippery	54 (N/A)		0.0	0.0	53.50
aspen, bigtooth	13 (N/A)		0.0	0.0	13.08
bamboo, spp.	0 (N/A)		0.0	0.0	0.03
yellowwood	13 (N/A)		0.0	0.0	12.89
pine, scotch	32 (N/A)		0.0	0.0	32.32
fir, white	15 (N/A)		0.0	0.0	15.42
osage-orange	13 (N/A)		0.0	0.0	12.89
goldenraintree	6 (N/A)		0.0	0.0	6.40
willow, corkscrew	6 (N/A)		0.0	0.0	6.40
larch, American	31 (N/A)		0.0	0.0	31.49
katsuratree	31 (N/A)		0.0	0.0	31.20
Whitebeam	13 (N/A)		0.0	0.0	12.89
pine, Japanese red	7 (N/A)		0.0	0.0	6.83
pear, common	43 (N/A)		0.0	0.0	43.05
Citywide total	276,361 (N/A)		100.0	100.0	39.02

East Grand Rapids

Annual Air Quality Benefits of Public Trees

5/9/2016

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								
maple, Norway	572.9	98.8	298.0	25.4	3,142	2,262.1	328.3	312.8	2,133.8	14,057	-144.8	-543	5,887.3	16,656	(N/A)	35.8	6.57
maple, sugar	161.0	27.4	90.9	7.2	902	953.6	140.0	133.8	920.4	5,980	-135.1	-507	2,299.1	6,376	(N/A)	13.4	6.70
maple, red	80.2	13.7	40.5	3.6	436	308.0	44.8	42.7	292.0	1,918	-29.3	-110	796.1	2,244	(N/A)	8.7	3.62
honeylocust, thornless	91.4	15.1	44.7	4.2	491	377.4	55.3	52.9	363.4	2,365	-61.0	-229	943.4	2,627	(N/A)	5.0	7.36
linden, littleleaf	41.9	7.2	23.0	1.9	233	230.3	33.7	32.1	220.2	1,439	-22.9	-86	567.3	1,586	(N/A)	5.0	4.48
planetree, London	97.6	15.6	48.3	4.4	524	402.1	58.4	55.7	380.1	2,500	0.0	0	1,062.1	3,025	(N/A)	4.2	10.08
ash, white	30.6	4.9	17.6	1.4	171	230.3	34.1	32.6	225.8	1,454	0.0	0	577.3	1,625	(N/A)	4.0	5.78
maple, silver	145.0	24.6	72.9	6.4	787	337.6	49.4	47.2	324.1	2,113	-77.4	-290	929.9	2,609	(N/A)	3.4	10.74
pear, callery	2.9	0.5	1.9	0.1	17	26.1	3.7	3.6	24.0	161	-0.9	-4	61.9	174	(N/A)	1.4	1.76
arborvitae spp.	2.4	0.5	2.5	0.3	18	13.5	1.9	1.8	12.3	83	-8.7	-33	26.5	68	(N/A)	1.2	0.82
oak, pin	15.1	2.7	8.6	0.7	85	71.6	10.5	10.0	68.8	448	-30.7	-115	157.3	418	(N/A)	1.1	5.58
oak, northern red	27.8	4.8	13.6	1.2	150	67.9	9.9	9.4	64.6	424	-39.6	-148	159.7	425	(N/A)	1.0	5.99
maple, freeman	6.4	1.1	3.5	0.3	35	36.4	5.3	5.0	34.4	226	-2.7	-10	89.6	252	(N/A)	0.9	3.99
sycamore, American	24.7	3.9	11.9	1.1	132	87.0	12.6	12.0	82.1	541	0.0	0	235.3	672	(N/A)	0.8	11.20
ash, green	4.2	0.7	2.6	0.2	24	39.2	5.7	5.5	37.5	245	0.0	0	95.6	269	(N/A)	0.8	4.81
oak, white	34.1	5.5	15.5	1.5	179	83.2	12.1	11.5	79.0	518	0.0	0	242.5	698	(N/A)	0.7	13.16
elm, hybrid	0.3	0.1	0.3	0.0	2	5.8	0.9	0.8	5.7	37	0.0	0	13.8	39	(N/A)	0.7	0.79
hickory, shagbark	8.6	1.4	4.6	0.4	47	52.9	7.8	7.4	51.1	332	0.0	0	134.2	379	(N/A)	0.7	7.90
maple, hedge	1.1	0.2	0.8	0.0	7	13.6	1.9	1.8	12.4	83	-0.4	-2	31.6	89	(N/A)	0.6	1.93
ginkgo	0.8	0.1	0.4	0.0	5	4.5	0.7	0.6	4.2	28	-0.3	-1	11.1	31	(N/A)	0.6	0.71
apple	1.3	0.2	0.7	0.1	7	10.0	1.4	1.4	9.1	61	0.0	0	24.2	69	(N/A)	0.6	1.68
elm, Siberian	17.5	3.0	8.7	0.8	94	52.3	7.6	7.3	49.8	326	0.0	0	146.9	421	(N/A)	0.6	10.78
elm, American	14.1	2.4	7.0	0.6	76	38.7	5.7	5.4	37.2	242	0.0	0	111.0	318	(N/A)	0.5	8.60
redbud, eastern	0.2	0.0	0.1	0.0	1	3.1	0.4	0.4	2.8	19	0.0	0	7.1	20	(N/A)	0.5	0.59
pine, eastern white	1.6	0.3	1.5	0.2	11	6.5	0.9	0.9	6.1	40	-6.3	-23	11.8	28	(N/A)	0.4	1.00
basswood, American	3.4	0.6	1.9	0.2	19	22.4	3.3	3.1	21.3	140	-3.3	-12	52.8	146	(N/A)	0.4	5.23
serviceberry spp.	0.0	0.0	0.0	0.0	0	0.9	0.1	0.1	0.8	5	0.0	0	1.9	5	(N/A)	0.4	0.20
horsechestnut	0.3	0.1	0.2	0.0	2	3.8	0.5	0.5	3.6	23	0.0	0	9.0	25	(N/A)	0.4	0.97
Buckthorn, European	0.3	0.1	0.2	0.0	2	4.1	0.6	0.6	3.7	25	0.0	0	9.6	27	(N/A)	0.4	1.04
plum	0.9	0.2	0.5	0.0	5	5.9	0.8	0.8	5.4	36	0.0	0	14.6	41	(N/A)	0.3	1.72
birch, river	1.3	0.2	0.8	0.1	8	10.5	1.5	1.4	9.7	65	-0.4	-2	25.2	71	(N/A)	0.3	2.95
spruce, Norway	4.0	0.8	3.4	0.5	27	11.3	1.7	1.6	11.0	71	-15.6	-59	18.7	39	(N/A)	0.3	1.71
walnut, black	6.3	1.0	3.1	0.3	34	25.7	3.7	3.6	24.5	160	0.0	0	68.2	194	(N/A)	0.3	8.82
tulip tree	0.4	0.1	0.3	0.0	2	6.9	1.0	1.0	6.6	43	0.0	0	16.3	46	(N/A)	0.3	2.29

East Grand Rapids

Annual Air Quality Benefits of Public Trees

5/9/2016

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								
hawthorn species	0.1	0.0	0.1	0.0	1	2.3	0.3	0.3	2.1	14	0.0	0	5.3	15 (N/A)	0.3	0.74	
zelkova, Japanese	0.4	0.1	0.3	0.0	3	7.4	1.1	1.0	7.0	46	0.0	0	17.3	49 (N/A)	0.3	2.56	
locust, black	8.8	1.5	4.3	0.4	48	21.7	3.1	3.0	20.4	135	-2.1	-8	61.2	174 (N/A)	0.3	9.69	
spruce, blue	2.6	0.5	2.2	0.3	17	6.8	1.0	0.9	6.4	42	-7.0	-26	13.7	33 (N/A)	0.2	1.95	
lilac, Japanese tree	0.1	0.0	0.1	0.0	1	2.2	0.3	0.3	1.9	13	0.0	0	4.9	14 (N/A)	0.2	0.82	
cottonwood, eastern	9.2	1.5	4.2	0.4	48	23.6	3.4	3.3	22.2	146	0.0	0	67.8	195 (N/A)	0.2	13.92	
sweetgum	0.7	0.1	0.5	0.0	4	7.3	1.1	1.0	7.0	46	0.0	0	17.8	50 (N/A)	0.2	3.85	
oak, white swamp	6.0	1.0	2.9	0.3	32	14.7	2.1	2.0	13.7	91	-1.4	-5	41.3	118 (N/A)	0.2	9.81	
spruce, Serbian	0.3	0.1	0.3	0.0	2	1.7	0.2	0.2	1.5	10	-1.1	-4	3.4	9 (N/A)	0.2	0.78	
unknown tree	0.8	0.1	0.5	0.0	4	5.4	0.8	0.7	5.0	33	-0.2	-1	13.1	37 (N/A)	0.1	3.69	
dogwood, flowering	0.0	0.0	0.0	0.0	0	0.5	0.1	0.1	0.5	3	0.0	0	1.2	4 (N/A)	0.1	0.35	
hornbeam, American	0.2	0.0	0.2	0.0	1	2.5	0.4	0.3	2.3	16	-0.1	0	5.9	16 (N/A)	0.1	2.06	
cedar, northern white	0.1	0.0	0.1	0.0	1	0.7	0.1	0.1	0.6	4	-0.4	-2	1.3	3 (N/A)	0.1	0.41	
dogwood, kousa	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)	0.1	0.11	
mulberry, white	0.5	0.1	0.2	0.0	3	2.4	0.3	0.3	2.2	15	0.0	0	6.0	17 (N/A)	0.1	2.86	
hackberry, northern	0.1	0.0	0.1	0.0	1	2.2	0.3	0.3	2.0	14	0.0	0	5.1	14 (N/A)	0.1	2.38	
spruce, white	0.1	0.0	0.1	0.0	1	0.6	0.1	0.1	0.6	4	-0.4	-1	1.2	3 (N/A)	0.1	0.64	
magnolia, saucer	0.1	0.0	0.1	0.0	1	1.1	0.2	0.1	1.0	7	0.0	0	2.6	7 (N/A)	0.1	1.44	
boxelder	0.3	0.0	0.2	0.0	2	2.6	0.4	0.4	2.5	16	-0.2	-1	6.3	18 (N/A)	0.1	3.50	
maple, paperbark	0.0	0.0	0.0	0.0	0	0.5	0.1	0.1	0.4	3	0.0	0	1.0	3 (N/A)	0.1	0.59	
hickory, pignut	2.2	0.3	1.0	0.1	11	7.4	1.1	1.0	7.0	46	0.0	0	20.1	57 (N/A)	0.1	11.49	
fir, douglas	0.1	0.0	0.1	0.0	0	0.4	0.1	0.1	0.4	3	-0.3	-1	0.8	2 (N/A)	0.1	0.53	
hickory, bittersnut	0.7	0.1	0.4	0.0	4	4.2	0.6	0.6	4.0	26	0.0	0	10.7	30 (N/A)	0.1	7.58	
beech, European	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)	0.1	0.14	
cedar, eastern red	0.4	0.1	0.3	0.1	3	0.8	0.1	0.1	0.8	5	-1.3	-5	1.4	3 (N/A)	0.1	0.74	
birch, paper	0.3	0.0	0.2	0.0	2	3.1	0.5	0.4	3.0	19	0.0	0	7.4	21 (N/A)	0.1	5.21	
oak, bur	3.4	0.5	1.5	0.2	18	7.3	1.1	1.0	6.9	45	0.0	0	21.9	63 (N/A)	0.1	15.83	
smoketree, American	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.1	0	0.0	0	0.2	0 (N/A)	0.1	0.11	
catalpa, northern	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)	0.0	15.74	
hophornbeam, eastern	0.3	0.0	0.1	0.0	1	1.3	0.2	0.2	1.2	8	0.0	0	3.2	9 (N/A)	0.0	3.07	
tree of heaven	0.6	0.1	0.3	0.0	3	2.8	0.4	0.4	2.7	18	0.0	0	7.3	21 (N/A)	0.0	6.92	
cherry, black	1.1	0.2	0.5	0.0	6	2.9	0.4	0.4	2.6	18	0.0	0	8.1	23 (N/A)	0.0	7.75	
maple, Japanese	0.0	0.0	0.0	0.0	0	0.4	0.1	0.1	0.4	3	0.0	0	1.0	3 (N/A)	0.0	0.92	
linden, silver	0.0	0.0	0.0	0.0	0	0.6	0.1	0.1	0.6	4	0.0	0	1.5	4 (N/A)	0.0	1.38	

East Grand Rapids

Annual Air Quality Benefits of Public Trees

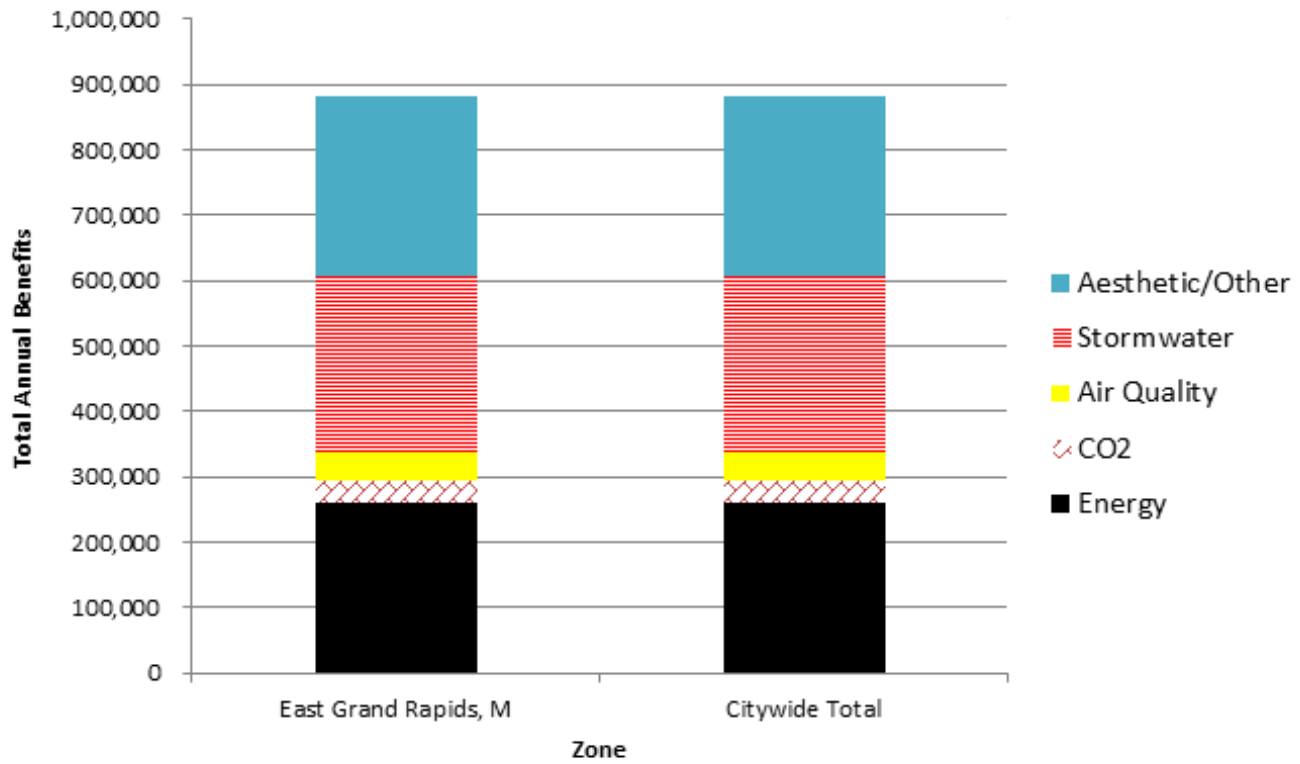
5/9/2016

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								
willow, black	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	0.03	
sumac, staghorn	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0	0.0	0	0.1	0 (N/A)	0.0	0.11	
maple, amur	0.0	0.0	0.0	0.0	0	0.5	0.1	0.1	0.4	3	0.0	0	1.1	3 (N/A)	0.0	1.63	
pine, Austrian	0.5	0.1	0.4	0.1	4	1.2	0.2	0.2	1.2	8	-1.4	-5	2.5	6 (N/A)	0.0	2.99	
elm, Chinese	0.0	0.0	0.0	0.0	0	0.9	0.1	0.1	0.9	6	0.0	0	2.1	6 (N/A)	0.0	2.99	
willow, pussy	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)	0.0	3.63	
fir, balsam	0.1	0.0	0.1	0.0	0	0.4	0.1	0.1	0.4	2	-0.2	-1	0.8	2 (N/A)	0.0	1.02	
oak, English	0.1	0.0	0.0	0.0	0	0.5	0.1	0.1	0.4	3	-0.1	0	1.1	3 (N/A)	0.0	2.89	
buckeye, Ohio	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)	0.0	1.21	
elm, slippery	1.2	0.2	0.6	0.1	6	2.1	0.3	0.3	2.0	13	0.0	0	6.8	20 (N/A)	0.0	19.64	
aspen, bigtooth	0.0	0.0	0.0	0.0	0	0.4	0.1	0.1	0.4	3	0.0	0	1.0	3 (N/A)	0.0	2.71	
bamboo, spp.	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	0.11	
yellowwood	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)	0.0	1.21	
pine, scotch	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)	0.0	2.82	
fir, white	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)	0.0	1.48	
osage-orange	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)	0.0	1.21	
goldenraintree	0.0	0.0	0.0	0.0	0	0.4	0.1	0.1	0.3	2	0.0	0	0.9	3 (N/A)	0.0	2.55	
willow, corkscrew	0.0	0.0	0.0	0.0	0	0.4	0.1	0.1	0.3	2	0.0	0	0.9	3 (N/A)	0.0	2.55	
larch, American	0.1	0.0	0.0	0.0	0	0.7	0.1	0.1	0.6	4	0.0	0	1.5	4 (N/A)	0.0	4.28	
katsuratree	0.0	0.0	0.0	0.0	0	0.4	0.1	0.1	0.4	2	0.0	0	0.9	3 (N/A)	0.0	2.55	
Whitebeam	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)	0.0	1.21	
pine, Japanese red	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.1	1	-0.1	0	0.2	1 (N/A)	0.0	0.56	
pear, common	0.5	0.1	0.2	0.0	3	1.3	0.2	0.2	1.2	8	-0.1	0	3.6	10 (N/A)	0.0	10.16	
Citywide total	1,445.8	245.1	754.7	65.3	7,926	5,960.3	869.0	828.8	5,672.9	37,169	-596.6	-2,237	15,245.3	42,858 (N/A)	100.0	6.05	

East Grand Rapids

Total Annual Benefits of Public Trees by Zone (\$)

5/6/2016



Zone	Energy	CO ₂	Air Quality	Stormwater	Aesthetic/Other	Total (\$)	Standard Error	% of Total \$
East Grand Rapids, M	261,150	33,079	42,858	270,328	276,361	883,776	(N/A)	100.0
Citywide total	261,150	33,079	42,858	270,328	276,361	883,776	(N/A)	100.0

East Grand Rapids

Annual CO₂ Benefits of Public Trees

5/9/2016

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
maple, Norway	818,162	6,136	-45,919	-4,527	-378	788,657	5,915	1,556,373	11,673(N/A)	35.8	35.3	4.60
maple, sugar	340,009	2,550	-22,024	-1,951	-180	340,736	2,556	656,771	4,926(N/A)	13.4	14.9	5.17
maple, red	100,208	752	-4,581	-668	-39	108,124	811	203,082	1,523(N/A)	8.7	4.6	2.46
honeylocust, thornless	158,729	1,190	-5,449	-620	-46	134,555	1,009	287,215	2,154(N/A)	5.0	6.5	6.03
linden, littleleaf	133,935	1,005	-4,625	-555	-39	81,366	610	210,121	1,576(N/A)	5.0	4.8	4.45
planetree, London	204,667	1,535	-15,047	-858	-119	140,649	1,055	329,410	2,471(N/A)	4.2	7.5	8.24
ash, white	103,267	774	-3,941	-445	-33	83,614	627	182,494	1,369(N/A)	4.0	4.1	4.87
maple, silver	263,633	1,977	-15,116	-749	-119	120,140	901	367,908	2,759(N/A)	3.4	8.3	11.36
pear, callery	11,209	84	-303	-67	-3	8,872	67	19,711	148(N/A)	1.4	0.4	1.49
arborvitae spp.	1,473	11	-49	-53	-1	4,544	34	5,915	44(N/A)	1.2	0.1	0.54
oak, pin	41,633	312	-1,804	-145	-15	25,474	191	65,158	489(N/A)	1.1	1.5	6.52
oak, northern red	15,070	113	-2,823	-178	-23	23,915	179	35,984	270(N/A)	1.0	0.8	3.80
maple, freeman	12,033	90	-399	-75	-4	12,723	95	24,282	182(N/A)	0.9	0.6	2.89
sycamore, American	44,835	336	-3,821	-190	-30	30,371	228	71,196	534(N/A)	0.8	1.6	8.90
ash, green	17,787	133	-700	-85	-6	13,896	104	30,897	232(N/A)	0.8	0.7	4.14
oak, white	37,646	282	-5,485	-192	-43	29,227	219	61,195	459(N/A)	0.7	1.4	8.66
elm, hybrid	2,544	19	-104	-31	-1	2,116	16	4,525	34(N/A)	0.7	0.1	0.69
hickory, shagbark	24,570	184	-1,348	-106	-11	18,895	142	42,010	315(N/A)	0.7	1.0	6.56
maple, hedge	6,129	46	-132	-35	-1	4,574	34	10,536	79(N/A)	0.6	0.2	1.72
ginkgo	894	7	-59	-22	-1	1,570	12	2,384	18(N/A)	0.6	0.1	0.41
apple	3,132	23	-121	-34	-1	3,367	25	6,344	48(N/A)	0.6	0.1	1.16
elm, Siberian	20,574	154	-2,046	-117	-16	18,451	138	36,862	276(N/A)	0.6	0.8	7.09
elm, American	9,814	74	-1,453	-83	-12	13,785	103	22,063	165(N/A)	0.5	0.5	4.47
redbud, eastern	1,061	8	-26	-16	0	1,028	8	2,047	15(N/A)	0.5	0.0	0.45
pine, eastern white	1,305	10	-60	-27	-1	2,249	17	3,468	26(N/A)	0.4	0.1	0.93
basswood, American	9,317	70	-603	-51	-5	7,859	59	16,521	124(N/A)	0.4	0.4	4.43
serviceberry spp.	351	3	-6	-7	0	278	2	617	5(N/A)	0.4	0.0	0.17
horsechestnut	1,933	14	-59	-14	-1	1,325	10	3,185	24(N/A)	0.4	0.1	0.92
Buckthorn, European	1,325	10	-40	-17	0	1,362	10	2,630	20(N/A)	0.4	0.1	0.76
plum	1,850	14	-77	-19	-1	2,007	15	3,761	28(N/A)	0.3	0.1	1.18
birch, river	4,307	32	-123	-23	-1	3,593	27	7,753	58(N/A)	0.3	0.2	2.42

Annual CO₂ Benefits of Public Trees

5/9/2016

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
spruce, Norway	2,469	19	-175	-41	-2	4,090	31	6,343	48(N/A)		0.3	0.1	2.07
walnut, black	12,567	94	-983	-55	-8	9,063	68	20,591	154(N/A)		0.3	0.5	7.02
tulip tree	3,192	24	-78	-19	-1	2,440	18	5,536	42(N/A)		0.3	0.1	2.08
hawthorn species	764	6	-20	-11	0	760	6	1,493	11(N/A)		0.3	0.0	0.56
zelkova, Japanese	3,396	25	-83	-20	-1	2,590	19	5,884	44(N/A)		0.3	0.1	2.32
locust, black	5,549	42	-703	-47	-6	7,535	57	12,334	93(N/A)		0.3	0.3	5.14
spruce, blue	1,161	9	-87	-26	-1	2,371	18	3,419	26(N/A)		0.2	0.1	1.51
lilac, Japanese tree	709	5	-19	-10	0	711	5	1,391	10(N/A)		0.2	0.0	0.61
cottonwood, eastern	11,493	86	-1,456	-54	-11	8,233	62	18,216	137(N/A)		0.2	0.4	9.76
sweetgum	3,336	25	-122	-17	-1	2,608	20	5,806	44(N/A)		0.2	0.1	3.35
oak, white swamp	3,840	29	-472	-33	-4	5,056	38	8,391	63(N/A)		0.2	0.2	5.24
spruce, Serbian	187	1	-6	-7	0	574	4	748	6(N/A)		0.2	0.0	0.51
unknown tree	2,126	16	-67	-11	-1	1,860	14	3,908	29(N/A)		0.1	0.1	2.93
dogwood, flowering	192	1	-5	-3	0	175	1	358	3(N/A)		0.1	0.0	0.27
hornbeam, American	1,150	9	-25	-6	0	850	6	1,969	15(N/A)		0.1	0.0	1.85
cedar, northern white	126	1	-3	-4	0	225	2	346	3(N/A)		0.1	0.0	0.32
dogwood, kousa	52	0	-1	-1	0	34	0	84	1(N/A)		0.1	0.0	0.10
mulberry, white	734	6	-35	-6	0	821	6	1,513	11(N/A)		0.1	0.0	1.89
hackberry, northern	288	2	-7	-5	0	745	6	1,021	8(N/A)		0.1	0.0	1.28
spruce, white	110	1	-2	-3	0	214	2	319	2(N/A)		0.1	0.0	0.48
magnolia, saucer	342	3	-11	-4	0	360	3	686	5(N/A)		0.1	0.0	1.03
boxelder	1,017	8	-35	-6	0	931	7	1,908	14(N/A)		0.1	0.0	2.86
maple, paperbark	160	1	-4	-3	0	154	1	309	2(N/A)		0.1	0.0	0.46
hickory, pignut	3,778	28	-334	-16	-3	2,589	19	6,017	45(N/A)		0.1	0.1	9.03
fir, douglas	78	1	-1	-2	0	144	1	218	2(N/A)		0.1	0.0	0.41
hickory, bitternut	1,956	15	-116	-9	-1	1,497	11	3,329	25(N/A)		0.1	0.1	6.24
beech, European	14	0	0	-1	0	30	0	43	0(N/A)		0.1	0.0	0.08
cedar, eastern red	84	1	-7	-4	0	281	2	355	3(N/A)		0.1	0.0	0.67
birch, paper	1,308	10	-45	-6	0	1,103	8	2,360	18(N/A)		0.1	0.1	4.43
oak, bur	3,058	23	-558	-17	-4	2,554	19	5,037	38(N/A)		0.1	0.1	9.44
smoketree, American	35	0	0	-1	0	22	0	56	0(N/A)		0.1	0.0	0.10
catalpa, northern	2,729	20	-389	-13	-3	1,937	15	4,264	32(N/A)		0.0	0.1	10.66
hophornbeam, eastern	390	3	-19	-3	0	438	3	806	6(N/A)		0.0	0.0	2.02
tree of heaven	1,376	10	-94	-6	-1	994	7	2,270	17(N/A)		0.0	0.1	5.67

Annual CO₂ Benefits of Public Trees

5/9/2016

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
cherry, black	1,225	9	-79	-7	-1	978	7	2,116	16(N/A)		0.0	0.0	5.29
maple, Japanese	131	1	-5	-2	0	135	1	260	2(N/A)		0.0	0.0	0.65
linden, silver	343	3	-8	-2	0	221	2	553	4(N/A)		0.0	0.0	1.38
willow, black	15	0	0	0	0	4	0	18	0(N/A)		0.0	0.0	0.07
sumac, staghorn	17	0	0	0	0	11	0	28	0(N/A)		0.0	0.0	0.10
maple, amur	152	1	-5	-2	0	161	1	306	2(N/A)		0.0	0.0	1.15
pine, Austrian	238	2	-18	-5	0	445	3	660	5(N/A)		0.0	0.0	2.48
elm, Chinese	418	3	-10	-2	0	318	2	723	5(N/A)		0.0	0.0	2.71
willow, pussy	306	2	-15	-3	0	346	3	633	5(N/A)		0.0	0.0	2.37
fir, balsam	71	1	-1	-2	0	132	1	200	1(N/A)		0.0	0.0	0.75
oak, English	147	1	-5	-1	0	160	1	301	2(N/A)		0.0	0.0	2.26
buckeye, Ohio	96	1	-2	-1	0	65	0	158	1(N/A)		0.0	0.0	1.18
elm, slippery	911	7	-141	-5	-1	749	6	1,514	11(N/A)		0.0	0.0	11.36
aspen, bigtooth	120	1	-5	-1	0	148	1	262	2(N/A)		0.0	0.0	1.96
bamboo, spp.	9	0	0	0	0	6	0	14	0(N/A)		0.0	0.0	0.10
yellowwood	96	1	-2	-1	0	65	0	158	1(N/A)		0.0	0.0	1.18
pine, scotch	116	1	-6	-2	0	216	2	324	2(N/A)		0.0	0.0	2.43
fir, white	53	0	-1	-1	0	94	1	145	1(N/A)		0.0	0.0	1.08
osage-orange	96	1	-2	-1	0	65	0	158	1(N/A)		0.0	0.0	1.18
goldenraintree	114	1	-4	-1	0	124	1	232	2(N/A)		0.0	0.0	1.74
willow, corkscrew	114	1	-4	-1	0	124	1	232	2(N/A)		0.0	0.0	1.74
larch, American	201	2	-4	-1	0	223	2	419	3(N/A)		0.0	0.0	3.14
katsuratree	223	2	-5	-1	0	134	1	351	3(N/A)		0.0	0.0	2.63
Whitebeam	96	1	-2	-1	0	65	0	158	1(N/A)		0.0	0.0	1.18
pine, Japanese red	18	0	0	-1	0	38	0	55	0(N/A)		0.0	0.0	0.41
pear, common	470	4	-38	-3	0	440	3	869	7(N/A)		0.0	0.0	6.52
Citywide total	2,468,962	18,517	-144,671	-12,476	-1,179	2,098,777	15,741	4,410,593	33,079(N/A)		100.0	100.0	4.67

East Grand Rapids

Annual Energy Benefits of Public Trees

5/9/2016

Species	Total Electricity (MWh)	Electricity (\$)	Total Natural Gas (Therms)	Natural Gas (\$)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
maple, Norway	470.2	35,686	65,786.7	64,471	100,157	(N/A)	35.8	38.4	39.51
maple, sugar	203.1	15,418	26,091.0	25,569	40,987	(N/A)	13.4	15.7	43.05
maple, red	64.5	4,893	8,919.9	8,742	13,634	(N/A)	8.7	5.2	22.03
honeylocust, thornless	80.2	6,089	10,407.5	10,199	16,288	(N/A)	5.0	6.2	45.62
linden, littleleaf	48.5	3,682	6,434.5	6,306	9,988	(N/A)	5.0	3.8	28.21
planetree, London	83.9	6,364	11,667.4	11,434	17,798	(N/A)	4.2	6.8	59.33
ash, white	49.8	3,783	5,987.7	5,868	9,651	(N/A)	4.0	3.7	34.35
maple, silver	71.6	5,436	9,415.2	9,227	14,663	(N/A)	3.4	5.6	60.34
pear, callery	5.3	401	817.4	801	1,202	(N/A)	1.4	0.5	12.15
arborvitae spp.	2.7	206	437.2	428	634	(N/A)	1.2	0.2	7.73
oak, pin	15.2	1,153	1,984.8	1,945	3,098	(N/A)	1.1	1.2	41.30
oak, northern red	14.3	1,082	1,948.7	1,910	2,992	(N/A)	1.0	1.1	42.14
maple, freeman	7.6	576	1,065.0	1,044	1,619	(N/A)	0.9	0.6	25.70
sycamore, American	18.1	1,374	2,540.7	2,490	3,864	(N/A)	0.8	1.5	64.40
ash, green	8.3	629	1,095.0	1,073	1,702	(N/A)	0.8	0.7	30.39
oak, white	17.4	1,322	2,388.9	2,341	3,664	(N/A)	0.7	1.4	69.12
elm, hybrid	1.3	96	150.7	148	243	(N/A)	0.7	0.1	4.97
hickory, shagbark	11.3	855	1,446.4	1,417	2,272	(N/A)	0.7	0.9	47.34
maple, hedge	2.7	207	439.0	430	637	(N/A)	0.6	0.2	13.85
ginkgo	0.9	71	129.8	127	198	(N/A)	0.6	0.1	4.51
apple	2.0	152	325.7	319	472	(N/A)	0.6	0.2	11.50
elm, Siberian	11.0	835	1,482.0	1,452	2,287	(N/A)	0.6	0.9	58.65
elm, American	8.2	624	1,059.8	1,039	1,662	(N/A)	0.5	0.6	44.93
redbud, eastern	0.6	47	105.9	104	150	(N/A)	0.5	0.1	4.42
pine, eastern white	1.3	102	196.8	193	295	(N/A)	0.4	0.1	10.52
basswood, American	4.7	356	644.8	632	988	(N/A)	0.4	0.4	35.27
serviceberry spp.	0.2	13	29.6	29	42	(N/A)	0.4	0.0	1.54
horsechestnut	0.8	60	108.2	106	166	(N/A)	0.4	0.1	6.38
Buckthorn, European	0.8	62	140.2	137	199	(N/A)	0.4	0.1	7.66
plum	1.2	91	185.7	182	273	(N/A)	0.3	0.1	11.37
birch, river	2.1	163	319.6	313	476	(N/A)	0.3	0.2	19.82
spruce, Norway	2.4	185	303.1	297	482	(N/A)	0.3	0.2	20.96
walnut, black	5.4	410	729.6	715	1,125	(N/A)	0.3	0.4	51.14
tulip tree	1.5	110	201.1	197	307	(N/A)	0.3	0.1	15.37
hawthorn species	0.5	34	78.1	77	111	(N/A)	0.3	0.0	5.55
zelkova, Japanese	1.5	117	213.9	210	327	(N/A)	0.3	0.1	17.20
locust, black	4.5	341	635.7	623	964	(N/A)	0.3	0.4	53.55
spruce, blue	1.4	107	200.7	197	304	(N/A)	0.2	0.1	17.88
lilac, Japanese tree	0.4	32	73.1	72	104	(N/A)	0.2	0.0	6.11
cottonwood, eastern	4.9	373	685.4	672	1,044	(N/A)	0.2	0.4	74.59
sweetgum	1.6	118	202.5	198	316	(N/A)	0.2	0.1	24.34
oak, white swamp	3.0	229	440.6	432	661	(N/A)	0.2	0.3	55.05
spruce, Serbian	0.3	26	56.5	55	81	(N/A)	0.2	0.0	7.39
unknown tree	1.1	84	161.7	158	243	(N/A)	0.1	0.1	24.26
dogwood, flowering	0.1	8	18.5	18	26	(N/A)	0.1	0.0	2.60
hornbeam, American	0.5	38	81.5	80	118	(N/A)	0.1	0.0	14.79
cedar, northern white	0.1	10	23.0	23	33	(N/A)	0.1	0.0	4.09
dogwood, kousa	0.0	2	3.7	4	5	(N/A)	0.1	0.0	0.87
mulberry, white	0.5	37	70.4	69	106	(N/A)	0.1	0.0	17.69
hackberry, northern	0.4	34	71.7	70	104	(N/A)	0.1	0.0	17.33
spruce, white	0.1	10	22.1	22	31	(N/A)	0.1	0.0	6.26
magnolia, saucer	0.2	16	37.1	36	53	(N/A)	0.1	0.0	10.52
boxelder	0.6	42	74.6	73	115	(N/A)	0.1	0.0	23.05
maple, paperbark	0.1	7	15.8	15	22	(N/A)	0.1	0.0	4.50
hickory, pignut	1.5	117	212.5	208	325	(N/A)	0.1	0.1	65.08
fir, douglas	0.1	7	14.8	15	21	(N/A)	0.1	0.0	5.26
hickory, bitternut	0.9	68	114.6	112	180	(N/A)	0.1	0.1	45.00
beech, European	0.0	1	3.2	3	5	(N/A)	0.1	0.0	1.14
cedar, eastern red	0.2	13	25.7	25	38	(N/A)	0.1	0.0	9.48
birch, paper	0.7	50	81.4	80	130	(N/A)	0.1	0.0	32.43
oak, bur	1.5	116	208.6	204	320	(N/A)	0.1	0.1	80.00

Annual Energy Benefits of Public Trees

5/9/2016

Species	Total Electricity (MWh)	Electricity (\$)	Total Natural Gas (Therms)	Natural Gas (\$)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
smoketree, American	0.0	1	2.5	2	3 (N/A)		0.1	0.0	0.87
catalpa, northern	1.2	88	159.5	156	244 (N/A)		0.0	0.1	81.32
hophornbeam, eastern	0.3	20	38.1	37	57 (N/A)		0.0	0.0	19.06
tree of heaven	0.6	45	77.5	76	121 (N/A)		0.0	0.0	40.32
cherry, black	0.6	44	87.9	86	130 (N/A)		0.0	0.0	43.47
maple, Japanese	0.1	6	14.1	14	20 (N/A)		0.0	0.0	6.64
linden, silver	0.1	10	20.3	20	30 (N/A)		0.0	0.0	9.96
willow, black	0.0	0	0.3	0	0 (N/A)		0.0	0.0	0.23
sumac, staghorn	0.0	1	1.2	1	2 (N/A)		0.0	0.0	0.87
maple, amur	0.1	7	16.6	16	24 (N/A)		0.0	0.0	11.80
pine, Austrian	0.3	20	34.7	34	54 (N/A)		0.0	0.0	27.08
elm, Chinese	0.2	14	27.5	27	41 (N/A)		0.0	0.0	20.64
willow, pussy	0.2	16	28.5	28	44 (N/A)		0.0	0.0	21.77
fir, balsam	0.1	6	13.5	13	19 (N/A)		0.0	0.0	9.59
oak, English	0.1	7	14.2	14	21 (N/A)		0.0	0.0	21.11
buckeye, Ohio	0.0	3	6.2	6	9 (N/A)		0.0	0.0	8.99
elm, slippery	0.4	34	58.3	57	91 (N/A)		0.0	0.0	91.06
aspen, bigtooth	0.1	7	13.8	14	20 (N/A)		0.0	0.0	20.27
bamboo, spp.	0.0	0	0.6	1	1 (N/A)		0.0	0.0	0.87
yellowwood	0.0	3	6.2	6	9 (N/A)		0.0	0.0	8.99
pine, scotch	0.1	10	14.6	14	24 (N/A)		0.0	0.0	24.14
fir, white	0.1	4	9.5	9	14 (N/A)		0.0	0.0	13.58
osage-orange	0.0	3	6.2	6	9 (N/A)		0.0	0.0	8.99
goldenraintree	0.1	6	12.8	13	18 (N/A)		0.0	0.0	18.19
willow, corkscrew	0.1	6	12.8	13	18 (N/A)		0.0	0.0	18.19
larch, American	0.1	10	20.2	20	30 (N/A)		0.0	0.0	29.94
katsuratree	0.1	6	12.5	12	18 (N/A)		0.0	0.0	18.25
Whitebeam	0.0	3	6.2	6	9 (N/A)		0.0	0.0	8.99
pine, Japanese red	0.0	2	4.0	4	6 (N/A)		0.0	0.0	5.61
pear, common	0.3	20	39.6	39	59 (N/A)		0.0	0.0	58.69
Total	1,251.2	94,968	169,572.8	166,181	261,150 (N/A)		100.0	100.0	36.88

East Grand Rapids

Annual Stormwater Benefits of Public Trees

5/9/2016

Species	Total rainfall interception (Gal)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
maple, Norway	3,380,527	91,612	(N/A)	35.8	33.9	36.14
maple, sugar	1,526,938	41,380	(N/A)	13.4	15.3	43.47
maple, red	427,188	11,577	(N/A)	8.7	4.3	18.70
honeylocust, thornless	541,397	14,672	(N/A)	5.0	5.4	41.10
linden, littleleaf	330,486	8,956	(N/A)	5.0	3.3	25.30
planetree, London	864,903	23,439	(N/A)	4.2	8.7	78.13
ash, white	361,164	9,788	(N/A)	4.0	3.6	34.83
maple, silver	921,123	24,962	(N/A)	3.4	9.2	102.73
pear, callery	28,357	768	(N/A)	1.4	0.3	7.76
arborvitae spp.	29,031	787	(N/A)	1.2	0.3	9.59
oak, pin	113,464	3,075	(N/A)	1.1	1.1	41.00
oak, northern red	134,285	3,639	(N/A)	1.0	1.3	51.26
maple, freeman	43,680	1,184	(N/A)	0.9	0.4	18.79
sycamore, American	203,588	5,517	(N/A)	0.8	2.0	91.95
ash, green	58,887	1,596	(N/A)	0.8	0.6	28.50
oak, white	226,319	6,133	(N/A)	0.7	2.3	115.72
elm, hybrid	7,945	215	(N/A)	0.7	0.1	4.39
hickory, shagbark	91,316	2,475	(N/A)	0.7	0.9	51.56
maple, hedge	13,927	377	(N/A)	0.6	0.1	8.20
ginkgo	4,727	128	(N/A)	0.6	0.0	2.91
apple	6,983	189	(N/A)	0.6	0.1	4.62
elm, Siberian	110,634	2,998	(N/A)	0.6	1.1	76.88
elm, American	66,196	1,794	(N/A)	0.5	0.7	48.48
redbud, eastern	1,930	52	(N/A)	0.5	0.0	1.54
pine, eastern white	17,307	469	(N/A)	0.4	0.2	16.75
basswood, American	33,969	921	(N/A)	0.4	0.3	32.88
serviceberry spp.	446	12	(N/A)	0.4	0.0	0.45
horsechestnut	5,780	157	(N/A)	0.4	0.1	6.02
Buckthorn, European	2,715	74	(N/A)	0.4	0.0	2.83
plum	4,188	113	(N/A)	0.3	0.0	4.73
birch, river	11,848	321	(N/A)	0.3	0.1	13.38
spruce, Norway	35,866	972	(N/A)	0.3	0.4	42.26
walnut, black	54,634	1,481	(N/A)	0.3	0.5	67.30
tulip tree	9,218	250	(N/A)	0.3	0.1	12.49
hawthorn species	1,459	40	(N/A)	0.3	0.0	1.98
zelkova, Japanese	9,790	265	(N/A)	0.3	0.1	13.96
locust, black	42,383	1,149	(N/A)	0.3	0.4	63.81
spruce, blue	19,616	532	(N/A)	0.2	0.2	31.27
lilac, Japanese tree	1,375	37	(N/A)	0.2	0.0	2.19
cottonwood, eastern	63,927	1,732	(N/A)	0.2	0.6	123.74
sweetgum	10,713	290	(N/A)	0.2	0.1	22.33
oak, white swamp	28,965	785	(N/A)	0.2	0.3	65.41
spruce, Serbian	3,725	101	(N/A)	0.2	0.0	9.18
unknown tree	6,358	172	(N/A)	0.1	0.1	17.23
dogwood, flowering	332	9	(N/A)	0.1	0.0	0.90
hornbeam, American	2,571	70	(N/A)	0.1	0.0	8.71
cedar, northern white	1,483	40	(N/A)	0.1	0.0	5.03
dogwood, kousa	45	1	(N/A)	0.1	0.0	0.20

Annual Stormwater Benefits of Public Trees

5/9/2016

Species	Total rainfall interception (Gal)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
mulberry, white	1,742	47	(N/A)	0.1	0.0	7.87
hackberry, northern	2,233	61	(N/A)	0.1	0.0	10.09
spruce, white	1,283	35	(N/A)	0.1	0.0	6.95
magnolia, saucer	735	20	(N/A)	0.1	0.0	3.98
boxelder	3,892	105	(N/A)	0.1	0.0	21.10
maple, paperbark	282	8	(N/A)	0.1	0.0	1.53
hickory, pignut	17,433	472	(N/A)	0.1	0.2	94.49
fir, douglas	906	25	(N/A)	0.1	0.0	6.14
hickory, bitternut	7,482	203	(N/A)	0.1	0.1	50.69
beech, European	72	2	(N/A)	0.1	0.0	0.49
cedar, eastern red	2,343	63	(N/A)	0.1	0.0	15.87
birch, paper	4,147	112	(N/A)	0.1	0.0	28.09
oak, bur	20,811	564	(N/A)	0.1	0.2	140.99
smoketree, American	30	1	(N/A)	0.1	0.0	0.20
catalpa, northern	16,672	452	(N/A)	0.0	0.2	150.61
hophornbeam, eastern	938	25	(N/A)	0.0	0.0	8.48
tree of heaven	5,580	151	(N/A)	0.0	0.1	50.41
cherry, black	3,015	82	(N/A)	0.0	0.0	27.23
maple, Japanese	279	8	(N/A)	0.0	0.0	2.52
linden, silver	648	18	(N/A)	0.0	0.0	5.85
willow, black	7	0	(N/A)	0.0	0.0	0.09
sumac, staghorn	15	0	(N/A)	0.0	0.0	0.20
maple, amur	333	9	(N/A)	0.0	0.0	4.51
pine, Austrian	3,857	105	(N/A)	0.0	0.0	52.26
elm, Chinese	1,216	33	(N/A)	0.0	0.0	16.47
willow, pussy	735	20	(N/A)	0.0	0.0	9.96
fir, balsam	808	22	(N/A)	0.0	0.0	10.95
oak, English	529	14	(N/A)	0.0	0.0	14.33
buckeye, Ohio	163	4	(N/A)	0.0	0.0	4.41
elm, slippery	5,904	160	(N/A)	0.0	0.1	159.99
aspen, bigtooth	474	13	(N/A)	0.0	0.0	12.83
bamboo, spp.	7	0	(N/A)	0.0	0.0	0.20
yellowwood	163	4	(N/A)	0.0	0.0	4.41
pine, scotch	1,539	42	(N/A)	0.0	0.0	41.70
fir, white	596	16	(N/A)	0.0	0.0	16.14
osage-orange	163	4	(N/A)	0.0	0.0	4.41
goldenraintree	264	7	(N/A)	0.0	0.0	7.17
willow, corkscrew	264	7	(N/A)	0.0	0.0	7.17
larch, American	627	17	(N/A)	0.0	0.0	17.00
katsuratree	461	12	(N/A)	0.0	0.0	12.48
Whitebeam	163	4	(N/A)	0.0	0.0	4.41
pine, Japanese red	213	6	(N/A)	0.0	0.0	5.77
pear, common	2,479	67	(N/A)	0.0	0.0	67.19
Citywide total	9,975,209	270,328	(N/A)	100.0	100.0	38.17



East Grand Rapids, MI

Quantity Report: Botanical

<i>Botanical</i>	<i>Total</i>	<i>Percentage of Entire Population</i>
Acer platanoides	2535	35.79%
Acer saccharum	952	13.44%
Acer rubrum	619	8.74%
Gleditsia triacanthos inermis	357	5.04%
Tilia cordata	354	5.00%
Platanus x acerifolia	300	4.24%
Fraxinus americana	281	3.97%
Acer saccharinum	243	3.43%
Pyrus calleryana	99	1.40%
Thuja spp.	82	1.16%
Quercus palustris	75	1.06%
Quercus rubra	71	1.00%
Acer x freemanii	63	0.89%
Platanus occidentalis	60	0.85%
Fraxinus pennsylvanica	56	0.79%
Quercus alba	53	0.75%
Ulmus x	49	0.69%
Carya ovata	48	0.68%
Acer campestre	46	0.65%
Ginkgo biloba	44	0.62%
Malus spp.	41	0.58%
Ulmus pumila	39	0.55%
Ulmus americana	37	0.52%
Cercis canadensis	34	0.48%
Tilia americana	28	0.40%
Pinus strobus	28	0.40%
Amelanchier spp.	27	0.38%
Rhamnus cathartica	26	0.37%
Aesculus hippocastanum	26	0.37%
Prunus spp.	24	0.34%
Betula nigra	24	0.34%
Picea abies	23	0.32%
Juglans nigra	22	0.31%
Liriodendron tulipifera	20	0.28%
Crataegus spp.	20	0.28%

<i>Botanical</i>	<i>Total</i>	<i>Percentage of Entire Population</i>
Zelkova serrata	19	0.27%
Robinia pseudoacacia	18	0.25%
Syringa reticulata	17	0.24%
Picea pungens	17	0.24%
Populus deltoides	14	0.20%
Liquidambar styraciflua	13	0.18%
Quercus bicolor	12	0.17%
Picea omorika	11	0.16%
unknown tree	10	0.14%
Cornus florida	10	0.14%
Tsuga canadensis	8	0.11%
Carpinus caroliniana	8	0.11%
Morus alba	6	0.08%
Cornus kousa	6	0.08%
Celtis occidentalis	6	0.08%
Picea glauca	5	0.07%
Magnolia x soulangiana	5	0.07%
Carya glabra	5	0.07%
Acer negundo	5	0.07%
Acer griseum	5	0.07%
Quercus macrocarpa	4	0.06%
Pseudotsuga menziesii	4	0.06%
Juniperus virginiana	4	0.06%
Fagus sylvatica	4	0.06%
Cotinus coggygria	4	0.06%
Carya cordiformis	4	0.06%
Betula papyrifera	4	0.06%
Tilia tomentosa	3	0.04%
Prunus serotina	3	0.04%
Ostrya virginiana	3	0.04%
Catalpa speciosa	3	0.04%
Ailanthus altissima	3	0.04%
Acer palmatum	3	0.04%
Ulmus parvifolia	2	0.03%
Salix nigra	2	0.03%
Salix discolor	2	0.03%
Rhus typhina	2	0.03%
Pinus nigra	2	0.03%

<i>Botanical</i>	<i>Total</i>	<i>Percentage of Entire Population</i>
Acer tataricum ginnala	2	0.03%
Abies balsamea	2	0.03%
Ulmus rubra	1	0.01%
Sorbus aria	1	0.01%
Salix matsudana	1	0.01%
Quercus robur	1	0.01%
Pyrus communis	1	0.01%
Populus grandidentata	1	0.01%
Pinus sylvestris	1	0.01%
Pinus densiflora	1	0.01%
Maclura pomifera	1	0.01%
Larix laricina	1	0.01%
Koelreuteria paniculata	1	0.01%
Cladrastis kentukea	1	0.01%
Cercidiphyllum japonicum	1	0.01%
Bamboo spp.	1	0.01%
Aesculus glabra	1	0.01%
Abies concolor	1	0.01%
Grand Total	7082	100%

Botanical Count: 91



East Grand Rapids, MI
Quantity Report: Common

<i>Common</i>	<i>Total</i>	<i>Percentage of Entire Population</i>
maple, Norway	2535	35.79%
maple, sugar	952	13.44%
maple, red	619	8.74%
honeylocust, thornless	357	5.04%
linden, littleleaf	354	5.00%
planetree, London	300	4.24%
ash, white	281	3.97%
maple, silver	243	3.43%
pear, Callery	99	1.40%
arborvitae spp.	82	1.16%
oak, pin	75	1.06%
oak, northern red	71	1.00%
maple, Freeman	63	0.89%
sycamore, American	60	0.85%
ash, green	56	0.79%
oak, white	53	0.75%
elm, hybrid	49	0.69%
hickory, shagbark	48	0.68%
maple, hedge	46	0.65%
ginkgo	44	0.62%
crabapple, flowering	41	0.58%
elm, Siberian	39	0.55%
elm, American	37	0.52%
redbud, eastern	34	0.48%
pine, eastern white	28	0.40%
linden, American	28	0.40%
serviceberry, spp.	27	0.38%
horsechestnut	26	0.37%
buckthorn, common	26	0.37%
cherry/plum, spp.	24	0.34%
birch, river	24	0.34%
spruce, Norway	23	0.32%
walnut, black	22	0.31%
tuliptree	20	0.28%
hawthorn, spp.	20	0.28%

<i>Common</i>	<i>Total</i>	<i>Percentage of Entire Population</i>
zelkova, Japanese	19	0.27%
locust, black	18	0.25%
spruce, Colorado	17	0.24%
lilac, Japanese tree	17	0.24%
cottonwood, eastern	14	0.20%
sweetgum, American	13	0.18%
oak, swamp white	12	0.17%
spruce, Serbian	11	0.16%
unknown tree	10	0.14%
dogwood, flowering	10	0.14%
hornbeam, American	8	0.11%
hemlock, eastern	8	0.11%
mulberry, white	6	0.08%
hackberry, common	6	0.08%
dogwood, Kousa	6	0.08%
spruce, white	5	0.07%
maple, paperbark	5	0.07%
magnolia, saucer	5	0.07%
hickory, pignut	5	0.07%
boxelder	5	0.07%
smoketree, American	4	0.06%
redcedar, eastern	4	0.06%
oak, bur	4	0.06%
hickory, bitternut	4	0.06%
douglas-fir	4	0.06%
birch, paper	4	0.06%
beech, European	4	0.06%
tree of heaven	3	0.04%
maple, Japanese	3	0.04%
linden, silver	3	0.04%
hophornbeam, American	3	0.04%
cherry, black	3	0.04%
catalpa, northern	3	0.04%
willow, pussy	2	0.03%
willow, black	2	0.03%
sumac, staghorn	2	0.03%
pine, Austrian	2	0.03%
maple, Amur	2	0.03%

<i>Common</i>	<i>Total</i>	<i>Percentage of Entire Population</i>
fir, balsam	2	0.03%
elm, Chinese	2	0.03%
yellowwood	1	0.01%
willow, corkscrew	1	0.01%
Whitebeam	1	0.01%
pine, Scotch	1	0.01%
pine, Japanese red	1	0.01%
pear, common	1	0.01%
osage-orange	1	0.01%
oak, English	1	0.01%
larch, American	1	0.01%
katsuratree	1	0.01%
goldenraintree	1	0.01%
fir, white	1	0.01%
elm, slippery	1	0.01%
buckeye, Ohio	1	0.01%
bamboo, spp.	1	0.01%
aspen, bigtooth	1	0.01%
<i>Grand Total</i>	7082	100%

Common Count: 91



East Grand Rapids, MI
Condition/Age Class Frequency Matrix

<i>Condition</i>	<i>0 - 8</i>	<i>18 - 24</i>	<i>9 - 17</i>	<i>25+</i>	<i>TOTAL</i>
Critical	20	6	33	1	60
Dead	58	6	48	4	116
Excellent	1				1
Fair	650	523	1199	222	2594
Good	1303	624	1510	195	3632
Poor	76	129	266	58	529
Very Good	76	15	52	7	150
Grand Total	2184	1303	3108	487	7082



East Grand Rapids, MI
Quantity Report: Condition

<i>Condition</i>	<i>Total</i>	<i>Percentage of Entire Population</i>
Good	3632	51.28%
Fair	2594	36.63%
Poor	529	7.47%
Very Good	150	2.12%
Dead	116	1.64%
Critical	60	0.85%
Excellent	1	0.01%
Grand Total	7082	100%

Condition Count: 7



East Grand Rapids, MI

Quantity Report: Genus

<i>Genus</i>	<i>Total</i>	<i>Percentage of Entire Population</i>
Acer	4473	63.16%
Tilia	385	5.44%
Platanus	360	5.08%
Gleditsia	357	5.04%
Fraxinus	337	4.76%
Quercus	216	3.05%
Ulmus	128	1.81%
Pyrus	100	1.41%
Thuja	82	1.16%
Carya	57	0.80%
Picea	56	0.79%
Ginkgo	44	0.62%
Malus	41	0.58%
Cercis	34	0.48%
Pinus	32	0.45%
Betula	28	0.40%
Prunus	27	0.38%
Amelanchier	27	0.38%
Aesculus	27	0.38%
Rhamnus	26	0.37%
Juglans	22	0.31%
Liriodendron	20	0.28%
Crataegus	20	0.28%
Zelkova	19	0.27%
Robinia	18	0.25%
Syringa	17	0.24%
Cornus	16	0.23%
Populus	15	0.21%
Liquidambar	13	0.18%
unknown	10	0.14%
Tsuga	8	0.11%
Carpinus	8	0.11%
Morus	6	0.08%
Celtis	6	0.08%
Salix	5	0.07%

<i>Genus</i>	<i>Total</i>	<i>Percentage of Entire Population</i>
Magnolia	5	0.07%
Pseudotsuga	4	0.06%
Juniperus	4	0.06%
Fagus	4	0.06%
Cotinus	4	0.06%
Ostrya	3	0.04%
Catalpa	3	0.04%
Ailanthus	3	0.04%
Abies	3	0.04%
Rhus	2	0.03%
Sorbus	1	0.01%
Maclura	1	0.01%
Larix	1	0.01%
Koelreuteria	1	0.01%
Cladrastis	1	0.01%
Cercidiphyllum	1	0.01%
Bamboo	1	0.01%
Grand Total	7082	100%

Genus Count: 52



East Grand Rapids, MI

Maintenance Need/DBH Class Matrix Report

<i>Maintenance Need</i>	<i>N/A</i>	<i>1 - 3</i>	<i>4 - 6</i>	<i>7 - 12</i>	<i>13 - 18</i>	<i>19 - 24</i>	<i>25 - 30</i>	<i>31 - 36</i>	<i>37 - 42</i>	<i>43 +</i>	<i>TOTAL</i>
Removal		14	37	122	98	26	5	7			309
Routine Prune		149	415	1719	1493	544	153	24	11	3	4511
Stump Removal			3	7	7	9	1	3		1	31
Tree Clean		1	6	146	465	410	174	72	28	10	1312
Young Tree Train		522	415	13							950
Grand Total		686	876	2007	2063	989	333	106	39	14	7113



East Grand Rapids, MI
Quantity Report: Maintenance Need

<i>Maintenance Need</i>	<i>Total</i>	<i>Percentage of Entire Population</i>
Routine Prune	4511	63.42%
Tree Clean	1312	18.45%
Young Tree Train	950	13.36%
Removal	309	4.34%
Stump Removal	31	0.44%
<i>Grand Total</i>	7113	100%

tenance Need Count: 5

East Grand Rapids

Replacement Value of Public Trees

5/9/2016

Species	DBH Class (in)									Total	Standard Error	% of Total
	0-3	3-6	6-12	12-18	18-24	24-30	30-36	36-42	> 42			
maple, Norway	20,034	67,375	384,481	960,867	830,775	185,609	20,321	4,123	0	2,473,586 (±0)		33.34
maple, sugar	3,313	9,490	99,882	511,189	526,439	138,131	23,522	0	0	1,311,967 (±0)		17.68
planetree, London	0	0	3,368	51,061	231,954	202,961	57,344	4,991	0	551,680 (±0)		7.44
maple, silver	1,284	2,386	5,880	28,600	85,682	135,563	125,685	73,338	13,298	471,717 (±0)		6.36
maple, red	19,572	73,200	139,234	73,866	42,425	57,684	17,660	11,527	0	435,168 (±0)		5.86
linden, littleleaf	858	15,961	81,419	172,512	61,037	6,219	0	0	0	338,006 (±0)		4.56
honeylocust, thornless	1,585	7,910	53,795	151,292	61,868	41,136	17,835	2,055	0	337,477 (±0)		4.55
oak, white	0	1,332	831	4,027	20,118	41,325	47,382	47,918	46,882	209,815 (±0)		2.83
oak, northern red	0	308	9,068	21,441	21,475	30,389	36,263	25,579	25,139	169,662 (±0)		2.29
ash, white	776	3,553	43,520	63,106	18,756	2,614	6,070	0	0	138,394 (±0)		1.87
oak, pin	350	4,194	10,717	30,672	37,863	20,891	0	4,770	0	109,456 (±0)		1.48
sycamore, American	0	0	0	5,612	31,865	48,179	13,546	8,514	0	107,717 (±0)		1.45
elm, Siberian	0	0	3,532	3,965	4,242	21,449	15,126	14,093	0	62,406 (±0)		0.84
elm, American	205	963	5,069	2,699	2,640	6,154	4,109	21,404	10,149	53,391 (±0)		0.72
hickory, shagbark	0	0	3,009	22,694	15,002	12,325	0	0	0	53,029 (±0)		0.71
maple, freeman	317	2,280	30,423	9,125	0	0	0	0	0	42,145 (±0)		0.57
walnut, black	0	0	2,831	4,877	8,895	6,219	16,138	0	0	38,960 (±0)		0.53
pear, callery	7,056	14,329	10,722	3,377	1,443	0	0	0	0	36,927 (±0)		0.50
cottonwood, eastern	0	0	0	0	3,960	11,112	11,602	3,777	5,949	36,399 (±0)		0.49
basswood, American	317	799	5,303	10,226	4,927	6,219	3,654	0	0	31,445 (±0)		0.42
oak, white swamp	0	0	1,179	2,974	8,770	6,950	4,964	6,501	0	31,338 (±0)		0.42
apple	2,025	7,207	9,414	3,983	0	0	0	0	0	22,629 (±0)		0.30
arborvitae spp.	6,216	6,277	8,045	1,151	0	0	0	0	0	21,689 (±0)		0.29
ginkgo	8,211	5,640	2,354	1,592	0	3,119	0	0	0	20,916 (±0)		0.28
locust, black	0	247	506	4,446	1,648	9,995	3,987	0	0	20,828 (±0)		0.28
spruce, Norway	0	1,504	834	9,764	3,345	5,066	0	0	0	20,513 (±0)		0.28
maple, hedge	1,419	8,607	10,203	0	0	0	0	0	0	20,228 (±0)		0.27
elm, hybrid	497	15,343	1,149	0	1,870	0	0	0	0	18,859 (±0)		0.25
oak, bur	0	0	0	0	2,086	0	5,487	0	6,854	14,426 (±0)		0.19
redbud, eastern	4,251	7,567	679	0	0	0	0	0	0	12,497 (±0)		0.17
ash, green	121	208	3,630	4,331	3,725	0	0	0	0	12,014 (±0)		0.16
birch, river	873	1,863	6,319	2,956	0	0	0	0	0	12,012 (±0)		0.16
pine, eastern white	1,081	2,886	2,874	1,370	3,084	0	0	0	0	11,294 (±0)		0.15
spruce, blue	464	592	2,243	2,014	4,141	1,506	0	0	0	10,961 (±0)		0.15
hickory, pignut	0	0	0	1,037	1,759	4,642	2,709	0	0	10,147 (±0)		0.14

Species	DBH Class (in)									Total	Standard Error	% of Total
	0-3	3-6	6-12	12-18	18-24	24-30	30-36	36-42	> 42			
serviceberry spp.	7,813	1,513	0	0	0	0	0	0	0	9,326 (±0)		0.13
horsechestnut	2,670	4,319	392	0	1,759	0	0	0	0	9,139 (±0)		0.12
tulip tree	586	2,014	5,701	732	0	0	0	0	0	9,033 (±0)		0.12
sweetgum	0	1,412	2,649	2,806	1,759	0	0	0	0	8,626 (±0)		0.12
Buckthorn, European	1,084	4,412	3,109	0	0	0	0	0	0	8,605 (±0)		0.12
zelkova, Japanese	0	1,910	5,069	732	0	0	0	0	0	7,711 (±0)		0.10
lilac, Japanese tree	1,036	5,047	1,519	0	0	0	0	0	0	7,601 (±0)		0.10
catalpa, northern	0	0	0	0	0	2,051	1,692	3,777	0	7,520 (±0)		0.10
hawthorn species	1,534	4,771	1,036	0	0	0	0	0	0	7,341 (±0)		0.10
plum	1,638	1,899	2,503	1,144	0	0	0	0	0	7,184 (±0)		0.10
hickory, bitternut	0	0	392	1,769	0	2,721	0	0	0	4,883 (±0)		0.07
hornbeam, American	0	1,961	1,707	0	0	0	0	0	0	3,668 (±0)		0.05
spruce, Serbian	1,161	477	1,676	0	0	0	0	0	0	3,314 (±0)		0.04
mulberry, white	143	616	518	2,034	0	0	0	0	0	3,311 (±0)		0.04
tree of heaven	0	249	0	1,037	0	1,921	0	0	0	3,207 (±0)		0.04
hackberry, northern	317	564	2,033	0	0	0	0	0	0	2,915 (±0)		0.04
dogwood, flowering	2,107	0	734	0	0	0	0	0	0	2,841 (±0)		0.04
magnolia, saucer	0	1,308	1,511	0	0	0	0	0	0	2,819 (±0)		0.04
cherry, black	0	0	0	404	2,326	0	0	0	0	2,730 (±0)		0.04
hophornbeam, eastern	245	0	518	1,441	0	0	0	0	0	2,204 (±0)		0.03
boxelder	0	251	1,048	771	0	0	0	0	0	2,070 (±0)		0.03
elm, slippery	0	0	0	0	0	0	0	2,055	0	2,055 (±0)		0.03
cedar, northern white	1,116	0	900	0	0	0	0	0	0	2,016 (±0)		0.03
birch, paper	0	0	927	1,072	0	0	0	0	0	1,999 (±0)		0.03
maple, paperbark	348	1,488	0	0	0	0	0	0	0	1,835 (±0)		0.02
pine, Austrian	0	0	0	815	974	0	0	0	0	1,790 (±0)		0.02
dogwood, kousa	1,779	0	0	0	0	0	0	0	0	1,779 (±0)		0.02
cedar, eastern red	438	0	438	839	0	0	0	0	0	1,715 (±0)		0.02
pear, common	0	0	0	0	1,443	0	0	0	0	1,443 (±0)		0.02
linden, silver	0	682	678	0	0	0	0	0	0	1,360 (±0)		0.02
willow, pussy	0	308	0	1,017	0	0	0	0	0	1,325 (±0)		0.02
beech, European	1,269	0	0	0	0	0	0	0	0	1,269 (±0)		0.02
spruce, white	230	617	328	0	0	0	0	0	0	1,175 (±0)		0.02
elm, Chinese	0	0	1,112	0	0	0	0	0	0	1,112 (±0)		0.01
smoketree, American	1,084	0	0	0	0	0	0	0	0	1,084 (±0)		0.01
fir, douglas	459	284	328	0	0	0	0	0	0	1,071 (±0)		0.01
maple, Japanese	549	0	445	0	0	0	0	0	0	994 (±0)		0.01
pine, scotch	0	0	0	815	0	0	0	0	0	815 (±0)		0.01
unknown tree	76	0	445	281	0	0	0	0	0	802 (±0)		0.01
fir, balsam	0	284	465	0	0	0	0	0	0	749 (±0)		0.01

Species	DBH Class (in)									Total	Standard Error	% of Total
	0-3	3-6	6-12	12-18	18-24	24-30	30-36	36-42	> 42			
goldenraintree	0	0	734	0	0	0	0	0	0	734 (±0)		0.01
katsuratree	0	0	718	0	0	0	0	0	0	718 (±0)		0.01
sumac, staghorn	593	0	0	0	0	0	0	0	0	593 (±0)		0.01
maple, amur	0	282	279	0	0	0	0	0	0	561 (±0)		0.01
larch, American	0	0	556	0	0	0	0	0	0	556 (±0)		0.01
willow, corkscrew	0	0	518	0	0	0	0	0	0	518 (±0)		0.01
oak, English	0	0	518	0	0	0	0	0	0	518 (±0)		0.01
aspen, bigtooth	0	0	478	0	0	0	0	0	0	478 (±0)		0.01
fir, white	0	0	465	0	0	0	0	0	0	465 (±0)		0.01
buckeye, Ohio	0	440	0	0	0	0	0	0	0	440 (±0)		0.01
willow, black	411	0	0	0	0	0	0	0	0	411 (±0)		0.01
yellowwood	0	392	0	0	0	0	0	0	0	392 (±0)		0.01
Whitebeam	0	392	0	0	0	0	0	0	0	392 (±0)		0.01
bamboo, spp.	348	0	0	0	0	0	0	0	0	348 (±0)		0.00
pine, Japanese red	0	284	0	0	0	0	0	0	0	284 (±0)		0.00
osage-orange	0	277	0	0	0	0	0	0	0	277 (±0)		0.00
Citywide Total	109,860	300,471	984,963	2,184,540	2,050,053	1,012,149	435,094	234,422	108,271	7,419,824 (±0)		100.00

East Grand Rapids

Stored CO2 Benefits of Public Trees

5/9/2016

Species	Total Stored CO2 (lbs)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
maple, Norway	9,537,769	71,533	(N/A)	35.8	31.7	28.22
maple, sugar	4,584,428	34,383	(N/A)	13.4	15.2	36.12
maple, red	953,582	7,152	(N/A)	8.7	3.2	11.55
honeylocust, thornl	1,132,352	8,493	(N/A)	5.0	3.8	23.79
linden, littleleaf	958,377	7,188	(N/A)	5.0	3.2	20.30
planetree, London	3,134,890	23,512	(N/A)	4.2	10.4	78.37
ash, white	818,970	6,142	(N/A)	4.0	2.7	21.86
maple, silver	3,148,089	23,611	(N/A)	3.4	10.5	97.16
pear, callery	56,539	424	(N/A)	1.4	0.2	4.28
arborvitae spp.	10,239	77	(N/A)	1.2	0.0	0.94
oak, pin	375,878	2,819	(N/A)	1.1	1.2	37.59
oak, northern red	588,112	4,411	(N/A)	1.0	2.0	62.12
maple, freeman	83,153	624	(N/A)	0.9	0.3	9.90
sycamore, American	796,022	5,970	(N/A)	0.8	2.6	99.50
ash, green	145,886	1,094	(N/A)	0.8	0.5	19.54
oak, white	1,142,776	8,571	(N/A)	0.7	3.8	161.71
elm, hybrid	16,409	123	(N/A)	0.7	0.1	2.51
hickory, shagbark	280,888	2,107	(N/A)	0.7	0.9	43.89
maple, hedge	24,039	180	(N/A)	0.6	0.1	3.92
ginkgo	12,133	91	(N/A)	0.6	0.0	2.07
apple	25,105	188	(N/A)	0.6	0.1	4.59
elm, Siberian	426,304	3,197	(N/A)	0.6	1.4	81.98
elm, American	302,278	2,267	(N/A)	0.5	1.0	61.27
redbud, eastern	5,373	40	(N/A)	0.5	0.0	1.19
pine, eastern white	12,425	93	(N/A)	0.4	0.0	3.33
basswood, America	125,641	942	(N/A)	0.4	0.4	33.65
serviceberry spp.	1,028	8	(N/A)	0.4	0.0	0.29
horsechestnut	12,210	92	(N/A)	0.4	0.0	3.52
Buckthorn, Europe	8,347	63	(N/A)	0.4	0.0	2.41
plum	16,078	121	(N/A)	0.3	0.1	5.02
birch, river	24,560	184	(N/A)	0.3	0.1	7.67
spruce, Norway	36,413	273	(N/A)	0.3	0.1	11.87
walnut, black	204,810	1,536	(N/A)	0.3	0.7	69.82
tulip tree	16,189	121	(N/A)	0.3	0.1	6.07
hawthorn species	4,196	31	(N/A)	0.3	0.0	1.57
zelkova, Japanese	17,199	129	(N/A)	0.3	0.1	6.79
locust, black	146,351	1,098	(N/A)	0.3	0.5	60.98
spruce, blue	18,027	135	(N/A)	0.2	0.1	7.95
lilac, Japanese tree	3,991	30	(N/A)	0.2	0.0	1.76
cottonwood, eastern	303,250	2,274	(N/A)	0.2	1.0	162.46
sweetgum	25,388	190	(N/A)	0.2	0.1	14.65
oak, white swamp	98,351	738	(N/A)	0.2	0.3	61.47
spruce, Serbian	1,234	9	(N/A)	0.2	0.0	0.84
unknown tree	13,886	104	(N/A)	0.1	0.0	10.41
dogwood, flowering	1,032	8	(N/A)	0.1	0.0	0.77
hornbeam, America	4,394	33	(N/A)	0.1	0.0	4.12
cedar, northern whi	528	4	(N/A)	0.1	0.0	0.50
dogwood, kousa	83	1	(N/A)	0.1	0.0	0.10
mulberry, white	7,352	55	(N/A)	0.1	0.0	9.19
hackberry, northern	1,420	11	(N/A)	0.1	0.0	1.77
spruce, white	374	3	(N/A)	0.1	0.0	0.56
magnolia, saucer	2,349	18	(N/A)	0.1	0.0	3.52
boxelder	7,145	54	(N/A)	0.1	0.0	10.72
maple, paperbark	725	5	(N/A)	0.1	0.0	1.09
hickory, pignut	69,618	522	(N/A)	0.1	0.2	104.43
fir, douglas	300	2	(N/A)	0.1	0.0	0.56
hickory, bitternut	24,151	181	(N/A)	0.1	0.1	45.28
beech, European	19	0	(N/A)	0.1	0.0	0.04
cedar, eastern red	1,384	10	(N/A)	0.1	0.0	2.60
birch, paper	9,413	71	(N/A)	0.1	0.0	17.65

The value of stored carbon dioxide is calculated as the total amount of carbon dioxide sequestered annually over the life of each tree, summed for the population. This value should not be added to the Replacement Value or double-counting of the carbon dioxide storage benefit will occur.

Stored CO2 Benefits of Public Trees

5/9/2016

Species	Total Stored CO2 (lbs)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
oak, bur	116,326	872	(N/A)	0.1	0.4	218.11
smoketree, American	55	0	(N/A)	0.1	0.0	0.10
catalpa, northern	80,974	607	(N/A)	0.0	0.3	202.44
hophornbeam, eastern	3,959	30	(N/A)	0.0	0.0	9.90
tree of heaven	19,630	147	(N/A)	0.0	0.1	49.08
cherry, black	16,523	124	(N/A)	0.0	0.1	41.31
maple, Japanese	935	7	(N/A)	0.0	0.0	2.34
linden, silver	1,398	10	(N/A)	0.0	0.0	3.49
willow, black	28	0	(N/A)	0.0	0.0	0.10
sumac, staghorn	28	0	(N/A)	0.0	0.0	0.10
maple, amur	1,086	8	(N/A)	0.0	0.0	4.07
pine, Austrian	3,779	28	(N/A)	0.0	0.0	14.17
elm, Chinese	2,069	16	(N/A)	0.0	0.0	7.76
willow, pussy	3,215	24	(N/A)	0.0	0.0	12.06
fir, balsam	295	2	(N/A)	0.0	0.0	1.11
oak, English	1,025	8	(N/A)	0.0	0.0	7.68
buckeye, Ohio	218	2	(N/A)	0.0	0.0	1.64
elm, slippery	29,353	220	(N/A)	0.0	0.1	220.15
aspen, bigtooth	1,025	8	(N/A)	0.0	0.0	7.68
bamboo, spp.	14	0	(N/A)	0.0	0.0	0.10
yellowwood	218	2	(N/A)	0.0	0.0	1.64
pine, scotch	1,170	9	(N/A)	0.0	0.0	8.78
fir, white	257	2	(N/A)	0.0	0.0	1.93
osage-orange	218	2	(N/A)	0.0	0.0	1.64
goldenrain tree	908	7	(N/A)	0.0	0.0	6.81
willow, corkscrew	908	7	(N/A)	0.0	0.0	6.81
larch, American	908	7	(N/A)	0.0	0.0	6.81
katsuratree	1,025	8	(N/A)	0.0	0.0	7.68
Whitebeam	218	2	(N/A)	0.0	0.0	1.64
pine, Japanese red	38	0	(N/A)	0.0	0.0	0.29
pear, common	7,945	60	(N/A)	0.0	0.0	59.59
Citywide total	30,075,199	225,564	(N/A)	100.0	100.0	31.85

The value of stored carbon dioxide is calculated as the total amount of carbon dioxide sequestered annually over the life of each tree, summed for the population. This value should not be added to the Replacement Value or double-counting of the carbon dioxide storage benefit will occur.

East Grand Rapids

Annual Benefits of Public Trees by Species (\$/tree)

5/9/2016

Species	Energy	CO ₂	Air Quality	Stormwater	Aesthetic/Other	Total (\$) Standard Error
maple, Norway	39.51	4.60	6.57	36.14	32.93	119.76 (N/A)
maple, sugar	43.05	5.17	6.70	43.47	42.12	140.51 (N/A)
maple, red	22.03	2.46	3.62	18.70	24.66	71.47 (N/A)
honeylocust, thornle	45.62	6.03	7.36	41.10	94.70	194.81 (N/A)
linden, littleleaf	28.21	4.45	4.48	25.30	43.33	105.77 (N/A)
planetree, London	59.33	8.24	10.08	78.13	57.60	213.38 (N/A)
ash, white	34.35	4.87	5.78	34.83	50.61	130.45 (N/A)
maple, silver	60.34	11.36	10.74	102.73	90.01	275.17 (N/A)
pear, callery	12.15	1.49	1.76	7.76	14.24	37.40 (N/A)
arborvitae spp.	7.73	0.54	0.82	9.59	12.53	31.22 (N/A)
oak, pin	41.30	6.52	5.58	41.00	52.44	146.83 (N/A)
oak, northern red	42.14	3.80	5.99	51.26	16.97	120.15 (N/A)
maple, freeman	25.70	2.89	3.99	18.79	31.79	83.17 (N/A)
sycamore, American	64.40	8.90	11.20	91.95	60.30	236.76 (N/A)
ash, green	30.39	4.14	4.81	28.50	35.67	103.51 (N/A)
oak, white	69.12	8.66	13.16	115.72	53.91	260.58 (N/A)
elm, hybrid	4.97	0.69	0.79	4.39	6.75	17.59 (N/A)
hickory, shagbark	47.34	6.56	7.90	51.56	48.63	161.99 (N/A)
maple, hedge	13.85	1.72	1.93	8.20	16.71	42.41 (N/A)
ginkgo	4.51	0.41	0.71	2.91	2.29	10.82 (N/A)
apple	11.50	1.16	1.68	4.62	4.23	23.18 (N/A)
elm, Siberian	58.65	7.09	10.78	76.88	39.70	193.10 (N/A)
elm, American	44.93	4.47	8.60	48.48	38.09	144.58 (N/A)
redbud, eastern	4.42	0.45	0.59	1.54	1.54	8.54 (N/A)
pine, eastern white	10.52	0.93	1.00	16.75	14.39	43.60 (N/A)
basswood, American	35.27	4.43	5.23	32.88	28.26	106.06 (N/A)
serviceberry spp.	1.54	0.17	0.20	0.45	0.33	2.69 (N/A)
horsechestnut	6.38	0.92	0.97	6.02	13.27	27.58 (N/A)
Buckthorn, European	7.66	0.76	1.04	2.83	2.75	15.04 (N/A)
plum	11.37	1.18	1.72	4.73	4.23	23.23 (N/A)
birch, river	19.82	2.42	2.95	13.38	21.01	59.59 (N/A)
spruce, Norway	20.96	2.07	1.71	42.26	26.06	93.06 (N/A)
walnut, black	51.14	7.02	8.82	67.30	50.18	184.45 (N/A)
tulip tree	15.37	2.08	2.29	12.49	22.94	55.17 (N/A)
hawthorn species	5.55	0.56	0.74	1.98	1.99	10.81 (N/A)
zelkova, Japanese	17.20	2.32	2.56	13.96	25.10	61.14 (N/A)
locust, black	53.55	5.14	9.69	63.81	29.56	161.76 (N/A)
spruce, blue	17.88	1.51	1.95	31.27	18.21	70.82 (N/A)
lilac, Japanese tree	6.11	0.61	0.82	2.19	2.21	11.94 (N/A)
cottonwood, eastern	74.59	9.76	13.92	123.74	61.02	283.03 (N/A)
sweetgum	24.34	3.35	3.85	22.33	30.54	84.41 (N/A)
oak, white swamp	55.05	5.24	9.81	65.41	30.49	166.01 (N/A)
spruce, Serbian	7.39	0.51	0.78	9.18	12.19	30.05 (N/A)
unknown tree	24.26	2.93	3.69	17.23	24.11	72.22 (N/A)
dogwood, flowering	2.60	0.27	0.35	0.90	0.67	4.79 (N/A)
hornbeam, American	14.79	1.85	2.06	8.71	17.89	45.29 (N/A)
cedar, northern white	4.09	0.32	0.41	5.03	8.18	18.02 (N/A)
dogwood, kousa	0.87	0.10	0.11	0.20	0.03	1.31 (N/A)
mulberry, white	17.69	1.89	2.86	7.87	6.92	37.23 (N/A)
hackberry, northern	17.33	1.28	2.38	10.09	16.39	47.47 (N/A)
spruce, white	6.26	0.48	0.64	6.95	8.34	22.67 (N/A)
magnolia, saucer	10.52	1.03	1.44	3.98	3.80	20.77 (N/A)
boxelder	23.05	2.86	3.50	21.10	27.95	78.47 (N/A)
maple, paperbark	4.50	0.46	0.59	1.53	1.65	8.73 (N/A)
hickory, pignut	65.08	9.03	11.49	94.49	60.27	240.34 (N/A)
fir, douglas	5.26	0.41	0.53	6.14	8.44	20.78 (N/A)
hickory, bittersweet	45.00	6.24	7.58	50.69	46.46	155.97 (N/A)

Annual Benefits of Public Trees by Species (\$/tree)

5/9/2016

Species	Energy	CO ₂	Air Quality	Stormwater	Aesthetic/Other	Total (\$) Standard Error
beech, European	1.14	0.08	0.14	0.49	3.69	5.54 (N/A)
cedar, eastern red	9.48	0.67	0.74	15.87	10.89	37.65 (N/A)
birch, paper	32.43	4.43	5.21	28.09	37.21	107.37 (N/A)
oak, bur	80.00	9.44	15.83	140.99	54.86	301.13 (N/A)
smoketree, American	0.87	0.10	0.11	0.20	0.03	1.31 (N/A)
catalpa, northern	81.32	10.66	15.74	150.61	63.51	321.84 (N/A)
hophornbeam, eastern	19.06	2.02	3.07	8.48	7.31	39.93 (N/A)
tree of heaven	40.32	5.67	6.92	50.41	42.06	145.38 (N/A)
cherry, black	43.47	5.29	7.75	27.23	24.36	108.10 (N/A)
maple, Japanese	6.64	0.65	0.92	2.52	2.16	12.89 (N/A)
linden, silver	9.96	1.38	1.38	5.85	17.42	36.00 (N/A)
willow, black	0.23	0.07	0.03	0.09	1.91	2.33 (N/A)
sumac, staghorn	0.87	0.10	0.11	0.20	0.03	1.31 (N/A)
maple, amur	11.80	1.15	1.63	4.51	4.23	23.32 (N/A)
pine, Austrian	27.08	2.48	2.99	52.26	22.60	107.41 (N/A)
elm, Chinese	20.64	2.71	2.99	16.47	28.56	71.37 (N/A)
willow, pussy	21.77	2.37	3.63	9.96	8.77	46.51 (N/A)
fir, balsam	9.59	0.75	1.02	10.95	11.13	33.44 (N/A)
oak, English	21.11	2.26	2.89	14.33	16.24	56.83 (N/A)
buckeye, Ohio	8.99	1.18	1.21	4.41	12.89	28.68 (N/A)
elm, slippery	91.06	11.36	19.64	159.99	53.50	335.55 (N/A)
aspen, bigtooth	20.27	1.96	2.71	12.83	13.08	50.85 (N/A)
bamboo, spp.	0.87	0.10	0.11	0.20	0.03	1.31 (N/A)
yellowwood	8.99	1.18	1.21	4.41	12.89	28.68 (N/A)
pine, scotch	24.14	2.43	2.82	41.70	32.32	103.40 (N/A)
fir, white	13.58	1.08	1.48	16.14	15.42	47.70 (N/A)
osage-orange	8.99	1.18	1.21	4.41	12.89	28.68 (N/A)
goldenrain tree	18.19	1.74	2.55	7.17	6.40	36.05 (N/A)
willow, corkscrew	18.19	1.74	2.55	7.17	6.40	36.05 (N/A)
larch, American	29.94	3.14	4.28	17.00	31.49	85.86 (N/A)
katsuratree	18.25	2.63	2.55	12.48	31.20	67.11 (N/A)
Whitebeam	8.99	1.18	1.21	4.41	12.89	28.68 (N/A)
pine, Japanese red	5.61	0.41	0.56	5.77	6.83	19.18 (N/A)
pear, common	58.69	6.52	10.16	67.19	43.05	185.60 (N/A)
Citywide Total	36.88	4.67	6.05	38.17	39.02	124.79 (N/A)

East Grand Rapids

Annual Benefits of Public Trees by Species (\$/tree)

5/9/2016

Species	Energy	CO ₂	Air Quality	Stormwater	Aesthetic/Other	Total (\$) Standard Error
maple, Norway	39.51	4.60	6.57	36.14	32.93	119.76 (N/A)
maple, sugar	43.05	5.17	6.70	43.47	42.12	140.51 (N/A)
maple, red	22.03	2.46	3.62	18.70	24.66	71.47 (N/A)
honeylocust, thornle	45.62	6.03	7.36	41.10	94.70	194.81 (N/A)
linden, littleleaf	28.21	4.45	4.48	25.30	43.33	105.77 (N/A)
planetree, London	59.33	8.24	10.08	78.13	57.60	213.38 (N/A)
ash, white	34.35	4.87	5.78	34.83	50.61	130.45 (N/A)
maple, silver	60.34	11.36	10.74	102.73	90.01	275.17 (N/A)
pear, callery	12.15	1.49	1.76	7.76	14.24	37.40 (N/A)
arborvitae spp.	7.73	0.54	0.82	9.59	12.53	31.22 (N/A)
oak, pin	41.30	6.52	5.58	41.00	52.44	146.83 (N/A)
oak, northern red	42.14	3.80	5.99	51.26	16.97	120.15 (N/A)
maple, freeman	25.70	2.89	3.99	18.79	31.79	83.17 (N/A)
sycamore, American	64.40	8.90	11.20	91.95	60.30	236.76 (N/A)
ash, green	30.39	4.14	4.81	28.50	35.67	103.51 (N/A)
oak, white	69.12	8.66	13.16	115.72	53.91	260.58 (N/A)
elm, hybrid	4.97	0.69	0.79	4.39	6.75	17.59 (N/A)
hickory, shagbark	47.34	6.56	7.90	51.56	48.63	161.99 (N/A)
maple, hedge	13.85	1.72	1.93	8.20	16.71	42.41 (N/A)
ginkgo	4.51	0.41	0.71	2.91	2.29	10.82 (N/A)
apple	11.50	1.16	1.68	4.62	4.23	23.18 (N/A)
elm, Siberian	58.65	7.09	10.78	76.88	39.70	193.10 (N/A)
elm, American	44.93	4.47	8.60	48.48	38.09	144.58 (N/A)
redbud, eastern	4.42	0.45	0.59	1.54	1.54	8.54 (N/A)
pine, eastern white	10.52	0.93	1.00	16.75	14.39	43.60 (N/A)
basswood, American	35.27	4.43	5.23	32.88	28.26	106.06 (N/A)
serviceberry spp.	1.54	0.17	0.20	0.45	0.33	2.69 (N/A)
horsechestnut	6.38	0.92	0.97	6.02	13.27	27.58 (N/A)
Buckthorn, European	7.66	0.76	1.04	2.83	2.75	15.04 (N/A)
plum	11.37	1.18	1.72	4.73	4.23	23.23 (N/A)
birch, river	19.82	2.42	2.95	13.38	21.01	59.59 (N/A)
spruce, Norway	20.96	2.07	1.71	42.26	26.06	93.06 (N/A)
walnut, black	51.14	7.02	8.82	67.30	50.18	184.45 (N/A)
tulip tree	15.37	2.08	2.29	12.49	22.94	55.17 (N/A)
hawthorn species	5.55	0.56	0.74	1.98	1.99	10.81 (N/A)
zelkova, Japanese	17.20	2.32	2.56	13.96	25.10	61.14 (N/A)
locust, black	53.55	5.14	9.69	63.81	29.56	161.76 (N/A)
spruce, blue	17.88	1.51	1.95	31.27	18.21	70.82 (N/A)
lilac, Japanese tree	6.11	0.61	0.82	2.19	2.21	11.94 (N/A)
cottonwood, eastern	74.59	9.76	13.92	123.74	61.02	283.03 (N/A)
sweetgum	24.34	3.35	3.85	22.33	30.54	84.41 (N/A)
oak, white swamp	55.05	5.24	9.81	65.41	30.49	166.01 (N/A)
spruce, Serbian	7.39	0.51	0.78	9.18	12.19	30.05 (N/A)
unknown tree	24.26	2.93	3.69	17.23	24.11	72.22 (N/A)
dogwood, flowering	2.60	0.27	0.35	0.90	0.67	4.79 (N/A)
hornbeam, American	14.79	1.85	2.06	8.71	17.89	45.29 (N/A)
cedar, northern white	4.09	0.32	0.41	5.03	8.18	18.02 (N/A)
dogwood, kousa	0.87	0.10	0.11	0.20	0.03	1.31 (N/A)
mulberry, white	17.69	1.89	2.86	7.87	6.92	37.23 (N/A)
hackberry, northern	17.33	1.28	2.38	10.09	16.39	47.47 (N/A)
spruce, white	6.26	0.48	0.64	6.95	8.34	22.67 (N/A)
magnolia, saucer	10.52	1.03	1.44	3.98	3.80	20.77 (N/A)
boxelder	23.05	2.86	3.50	21.10	27.95	78.47 (N/A)
maple, paperbark	4.50	0.46	0.59	1.53	1.65	8.73 (N/A)
hickory, pignut	65.08	9.03	11.49	94.49	60.27	240.34 (N/A)
fir, douglas	5.26	0.41	0.53	6.14	8.44	20.78 (N/A)
hickory, bittersweet	45.00	6.24	7.58	50.69	46.46	155.97 (N/A)

Annual Benefits of Public Trees by Species (\$/tree)

5/9/2016

Species	Energy	CO ₂	Air Quality	Stormwater	Aesthetic/Other	Total (\$) Standard Error
beech, European	1.14	0.08	0.14	0.49	3.69	5.54 (N/A)
cedar, eastern red	9.48	0.67	0.74	15.87	10.89	37.65 (N/A)
birch, paper	32.43	4.43	5.21	28.09	37.21	107.37 (N/A)
oak, bur	80.00	9.44	15.83	140.99	54.86	301.13 (N/A)
smoketree, American	0.87	0.10	0.11	0.20	0.03	1.31 (N/A)
catalpa, northern	81.32	10.66	15.74	150.61	63.51	321.84 (N/A)
hophornbeam, eastern	19.06	2.02	3.07	8.48	7.31	39.93 (N/A)
tree of heaven	40.32	5.67	6.92	50.41	42.06	145.38 (N/A)
cherry, black	43.47	5.29	7.75	27.23	24.36	108.10 (N/A)
maple, Japanese	6.64	0.65	0.92	2.52	2.16	12.89 (N/A)
linden, silver	9.96	1.38	1.38	5.85	17.42	36.00 (N/A)
willow, black	0.23	0.07	0.03	0.09	1.91	2.33 (N/A)
sumac, staghorn	0.87	0.10	0.11	0.20	0.03	1.31 (N/A)
maple, amur	11.80	1.15	1.63	4.51	4.23	23.32 (N/A)
pine, Austrian	27.08	2.48	2.99	52.26	22.60	107.41 (N/A)
elm, Chinese	20.64	2.71	2.99	16.47	28.56	71.37 (N/A)
willow, pussy	21.77	2.37	3.63	9.96	8.77	46.51 (N/A)
fir, balsam	9.59	0.75	1.02	10.95	11.13	33.44 (N/A)
oak, English	21.11	2.26	2.89	14.33	16.24	56.83 (N/A)
buckeye, Ohio	8.99	1.18	1.21	4.41	12.89	28.68 (N/A)
elm, slippery	91.06	11.36	19.64	159.99	53.50	335.55 (N/A)
aspen, bigtooth	20.27	1.96	2.71	12.83	13.08	50.85 (N/A)
bamboo, spp.	0.87	0.10	0.11	0.20	0.03	1.31 (N/A)
yellowwood	8.99	1.18	1.21	4.41	12.89	28.68 (N/A)
pine, scotch	24.14	2.43	2.82	41.70	32.32	103.40 (N/A)
fir, white	13.58	1.08	1.48	16.14	15.42	47.70 (N/A)
osage-orange	8.99	1.18	1.21	4.41	12.89	28.68 (N/A)
goldenrain tree	18.19	1.74	2.55	7.17	6.40	36.05 (N/A)
willow, corkscrew	18.19	1.74	2.55	7.17	6.40	36.05 (N/A)
larch, American	29.94	3.14	4.28	17.00	31.49	85.86 (N/A)
katsuratree	18.25	2.63	2.55	12.48	31.20	67.11 (N/A)
Whitebeam	8.99	1.18	1.21	4.41	12.89	28.68 (N/A)
pine, Japanese red	5.61	0.41	0.56	5.77	6.83	19.18 (N/A)
pear, common	58.69	6.52	10.16	67.19	43.05	185.60 (N/A)
Citywide Total	36.88	4.67	6.05	38.17	39.02	124.79 (N/A)