# Public Tree Inventory

## Lafayette, Indiana—Phase 4

Street trees in Lafayette mitigate stormwater, conserve energy, improve air quality, sequester carbon dioxide, and increase property values. When properly maintained, trees return environmental and economic benefits far in excess of the time and money invested in their planting, pruning, protection, and removal.

Lafayette, Indiana is a thriving city located in northwest Indiana. The City has created an attractive community and a great place to live, work, and play. The health of Lafayette's citizens is, as with many communities, dependent upon the municipal government's ability to provide efficient services, safe public spaces, and properly maintained infrastructure. Trees are an integral component of the City's infrastructure and urban environment.

When properly maintained, trees return environmental and economic benefits to a community far in excess of the time and money invested in their planting, pruning, protection, and removal. Environmentally trees provide shade and act as windbreaks helping to decrease residential energy consumption. They are mini-reservoirs, helping to slow and reduce the amount of stormwater runoff that reaches storm drains, rivers, and lakes. They help reduce noise levels, cleanse atmospheric pollutants, produce oxygen, and absorb carbon dioxide. Trees stabilize soil and provide a habitat for wildlife. Trees also provide significant economic benefits, including increased property values as reflected in real estate sales and more attractive settings in which to locate commercial businesses. A tree's shade and beauty contributes to the community's quality of life and softens the often-hard appearance of urban landscapes and streetscapes.

Lafayette's city forester has continued to play an instrumental role in advocating the benefits of a complete tree inventory to better manage the City's tree population. As of August 2013, the City of Lafayette has completed its fourth and final phase of a tree inventory along city streets. This fourth inventory phase was partially funded by an Indiana Department of Natural Resources, Division of Forestry, Community and Urban Forestry grant.

*A successful urban forestry program requires a combination of organized leadership, comprehensive information about the tree population, dedicated personnel, and effective public relations.*

The purpose of the inventory is to identify and locate publically managed trees and assess their current condition, size, and maintenance needs. Davey Resource Group performed the inventory using geographic information systems-based collection methods. The tree data gathered was cataloged into Davey Resource Group's TreeKeeper® management software. The City utilizes this software to keep the inventory information accurate as existing trees are maintained and new trees are planted. Ultimately, a complete public tree inventory will establish an efficient and effective means by which the City of Lafayette can plan, budget, and proactively manage their green infrastructure. By completing Phase Four of its public tree inventory, the City of Lafayette has shown a strong commitment to building a more successful urban forestry program.

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***Public Tree Inventory—Phase 4***

Tree data from Lafayette's fourth phase public tree inventory were collected and analyzed. The following is a statistical summary of the tree population in terms of genus and species composition, general condition, health of the urban forest, and maintenance recommendations:

- A total of 5,312 sites were inventoried during the fourth phase consisting of 2,351 trees, 2,876 vacant planting sites, and 85 stumps.
- There were 84 species representing 46 genera.
- The genus *Acer* (maple) comprised 22% of the tree population followed by *Picea* (spruce) 8%; *Gleditsia* (locust) 8%; *Malus* (apple) 7%; *Fraxinus* (ash) 7%; *Pyrus* (pear) 6%; *Quercus* (oak) 6%; *Populus* (poplar) 4%; *Liquidambar* (sweetgum) 3%; and *Tilia* (linden) 3%.
- There were 21 trees (1%) assessed to be in Very Good condition; 1,229 (52%) in Good condition; 846 (36%) in Fair condition; 206 (9%) in Poor condition; and 26 (1%) in Critical condition. There were 23 (1%) Dead trees.
- Ash trees inventoried totaled 162. Of those, 18 showed signs of emerald ash borer (*Agrilus planipennis*) and 19 showed possible symptoms of this invasive pest.
- The number and type of maintenance tasks recommended is 2,876 (54%) plantings; 1,417 (27%) large tree cleans; 642 (12%) young tree training; 222 (4%) small tree cleans; 85 (2%) stump removals; and 70 (1%) tree removals.

***Public Tree Inventory—Phases 1–4***

Information from Lafayette's Phase 1, Phase 2, Phase 3, and Phase 4 inventories was combined and analyzed to provide the following summary of the City's public tree population:

- Lafayette's potential tree population totals 20,900 sites. There were 10,885 trees, 9,171 vacant planting sites, and 844 stumps.
- There were 4,934 small, 1,304 medium, and 2,933 large vacant sites available for planting.
- The top five inventoried species were *Acer saccharinum* (silver maple) 12%; *A. rubrum* (red maple) 8%; *A. saccharum* (sugar maple) 7%; *Pyrus calleryana* (Callery pear) 6%; and *Malus* (apple) 5%. These species comprise 38% of the population.
- Small-sized trees (6 inches and less in diameter at breast height [DBH]) represent 30% of the inventoried tree population; medium-sized trees, (7–24 inches DBH) a dominant 58%; and large-sized trees (25 inches and greater DBH) 12% of the inventoried tree population.
- Maintenance recommendations indicate that of the tree population, 71% were mature trees needing corrective or structural pruning, 21% were young trees needing training pruning, and 8% need removal.

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## Lafayette, Indiana—Phase 4

***Lafayette's i-Tree Streets Annual Benefit Analysis***

Trees provide abundant environmental and economic benefits. In order to identify the dollar value provided and returned to the community, the City's street tree inventory information from Phases 1–4 were formatted for use in the i-Tree Streets (Version 5.0.8) benefit assessment tool. i-Tree Streets is a free software application released by the U.S. Forest Service used to analyze an inventoried tree population's structure and environmental and economic functional benefits and values. Quantified functional benefits include energy conservation, air quality improvement, stormwater interception, carbon dioxide removal, and property value increases.

Lafayette's entire inventoried population (10,885 trees) provides the community the following annual benefits:

- Reduction of energy and natural gas use from shading and climate effects equal 1,600 megawatt-hours and 218,009 therms, respectively, and is valued at $349,664 per year, for an average of $38.13 per tree.
- Net air quality improvement from the removal and avoidance of 9.7 tons of air pollutants is valued at $54,575 per year, for an average of $5.95 per tree.
- Interception of 14.4 million gallons of stormwater is valued at $389,275 per year, for an average benefit of $42.45 per tree.
- Reduction of atmospheric carbon dioxide by a net of 1,706 tons per year is valued at $25,596, for an average of $2.35 per tree.
- Increased property values, aesthetics, and other less tangible improvements is valued at $162,786 per year, for an average of $14.96 per tree.
- The total annual benefit received from the City's inventoried public trees is $981,896, for an average of $90.21 per tree.
- The net annual benefit returned from the City's inventoried public trees is $555,783, for an average of $51.06 per tree. Net benefit is total benefit minus costs for management of street trees.
- For every $1 the City spends on managing public trees, the return benefit is $2.30.