

## 2012 Condition Report information Request

### Boulevards

#### Instructions:

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Kathy Brengosz  
286-3926

1) What is the size of the boulevard system in miles and acres (or other area measure) 121.8 miles (265 acres)

2) Other landscaped sites

- Number 136
- Area 211 acres
- Type (eg. greenspaces, plazas, other public spaces) Greenspace, tot lots, city owned properties

3) Describe Forestry's responsibility relating to boulevards (eg. design, maintenance etc.) The Forestry section is responsible for design, construction and maintenance of 121 miles of landscaped boulevards

4) What are the typical components of the boulevard system? Signature landscape beds comprised of ornamental trees, perennials, annuals, and hardscape elements, shade trees, turf and an extensive automated irrigation system

5) How many of each boulevard component is in the city's Inventory? 276 signature beds with automated drip irrigation occupying approximately 36 acres, approximately 230 acres of turf, approximately 10,000 shade trees and approximately 120 miles of irrigation infrastructure.

6) What is the amount of boulevards (miles and area) installed each year for the last 10 years? (The 1987 report had chart showing the distribution of boulevard construction going back to 1937. If the raw data is readily available I'd like to be able to reproduce that chart for the new report.) Unknown. Forestry installed 276 new signature beds since 2009. The miles and area of boulevard maintained is not believed to have grown substantially since 1987

7) How often is an inventory performed? Tree and signature bed inventory is current and updated as work is completed

8) Describe the record keeping process for master plans and field plans Signature bed designs are archived (some CAD, mostly hand drawn) once designed and installed, location and size of signature beds by boulevard street segment are maintained in an Excel database. As built drawings of irrigation systems are archived. Boulevard tree inventory is spatially maintained in a GIS based software application.

9) Summarize / describe the process used to determine the condition of the boulevards listing any specific criteria that are used. The boulevard system just went through a complete renovation (sustainable boulevards) project that eliminated 1,800 low impact flower and shrub beds, added 276 new signature beds and approximately 2,800 new trees, and installed water conserving drip irrigation systems at each bed location. Irrigation infrastructure in connector boulevard segments is updated (mainly new deep water service taps) in conjunction with the paving schedule or based on the age and condition of the deep tap. Approximately 100 deep taps are updated annually.

10) Is there an existing backlog of boulevard projects? The installation of 13 signature beds is delayed pending completion of major street construction projects.

11) Does the boulevard irrigation system meet current State and City plumbing codes? If no, is Forestry required to bring it into compliance? Yes. All work is completed by a licensed master plumber. Updated deep taps conform to plumbing codes in existence at the time of installation.

12) What are the major funding sources for boulevard projects? Capital Improvement Budget

13) Describe any trends in funding. Historically funding for irrigation updates have followed the paving schedule, but funding requests in 2013 include deep tap replacement based on age and condition. Funding for boulevard maintenance (labor) has trended downward for many years as the number of authorized positions and funding for seasonal laborers have decreased. Sustainable Boulevards was funded at 1.6 million over a 3 year period, resulting in \$180,000 annual savings in seasonal laborer. In the 1980's Forestry hired as many as 120 seasonal laborers for boulevard and grounds maintenance tasks. In 2012, the budget supports the hire of 13 Urban Forestry Laborers.

14) What is the estimated useful life of each component of the boulevard system? Trees: 50 years, Irrigation infrastructure: 30-50 years, signature beds: 30-50 years, perennials/shrubs: 15-25 years

15) What factors affect the condition of the components of the boulevard system? Funding for maintenance programs, maintenance frequencies, irrigation and plant replacement cycles, road salt damage, road construction and redesign, vehicle accidents, vandalism

16) Are there specific technologies which affect (or could affect) the useful life of boulevard components? Integrating automated technologies such as timer controlled drop irrigation systems, use of chemical weed control, and maximum mechanization of maintenance tasks to reduce labor costs are key to a sustainable boulevard system.

17) What is the current value of the boulevards? Unknown

18) Describe any preventative maintenance programs including:

- Type of work: Cycle tree pruning, pest and disease monitoring and treatment, irrigation upgrades, bed maintenance, weed control
- Schedule: Trees: 6 year cycle, irrigation: in conjunction with paving cycle, plant and bed maintenance: annual or as needed
- Criteria used to determine when maintenance is necessary: Condition of plants, turf, and irrigation systems
- Cost Savings; Sustainable Boulevards resulted in \$180,000 annual savings in labor and automated drip irrigation system installed at signature bed locations has saved an additional \$20,000 annually in water usage.

19) Describe the purpose and function of the boulevard system. Streetscape and neighborhood beautification and civic pride, storm water reduction, traffic calming, increased pavement life (via shading), provide livable communities, and ecosystem service benefits such as improved air quality, carbon sequestration and storage, energy savings, etc.

20) Describe any relevant policies (city or departmental) that affect the boulevard system. The bed only irrigation policy that does not fund the restoration of surface irrigation (piping, spray heads) destroyed when non signature bed boulevards segments are repaved prevents the Forestry Section from watering newly placed sod or seed following construction, resulting in poor restorative turf establishment, and eliminates the capability to water turf and newly planted trees during periods of drought. The inability to water turf increases weed growth, reduces the quality and appearance of the boulevard system and increases transplant loss of newly planted trees.

21) What are the key challenges Forestry faces in relation to maintenance of the boulevards. Sustaining a visually attractive and functional landscape boulevard system with a shrinking workforce and irrigation infrastructure.

22) Describe projects, departmental highlights or any other information that you would like included in the condition report. Sustainable Boulevards Summary – See Below

### **SUSTAINABLE BOULEVARDS SUMMARY**

The City of Milwaukee has 120 miles of irrigated and landscaped boulevards that represent a long-term investment in public infrastructure that is rare in major American cities. Many cities have landscaped boulevards in their downtown areas; however few are as extensive and well developed as Milwaukee's. Milwaukee's proud heritage of landscaped boulevards dates back to the 1920s and expanded as the city grew in the 1950s and 1960s.

Forestry designed the system based on a customer service philosophy responsive to residents and adjacent property owners. The result was a visually striking boulevard system that is popular with the community. At the height of its glory, Milwaukee's boulevards resembled a roadside botanical garden boasting 475 acres of well manicured turf, over 3,000 stunning annual beds, and thousands of shrubs and trees that required a seasonal workforce of 120 employees to maintain.

The customer request service philosophy that fueled rapid growth of landscaped boulevards during the mid 20<sup>th</sup> century could not be sustained under the fiscal constraints of the 21<sup>st</sup> century. Many of the landscape beds added at the request of residents, or by staff in attempt to conceal the base of light poles, irrigation vacuum breakers, and other street infrastructure, were small and out of scale with the boulevard and consequently added little value. Nevertheless, these low impact beds still required multiple maintenance visits annually to plant, water, weed, edge, and mulch. Forestry recognized that for the boulevard system to survive, significant restructuring would be necessary.

To ensure its future, Forestry developed a thoughtful and deliberative plan based in part on recommendations from community representatives and landscape professionals. The plan provides for long-term sustainability of the boulevard system based on sound design principles and resource alignment. The plan also recognized that tough choices were necessary in today's climate of competing priorities and tight resources. Forestry developed *Sustainable Boulevards*, Milwaukee's Strategic Boulevard Plan.

*Sustainable Boulevards* calls for:

- Removal of approximately 1,800 low-impact flower beds to be replaced with grass and trees
- The addition of signature landscape beds at approximately 300 locations throughout the city
- Planting 4,500 shade trees on boulevards to increase tree canopy; and

- Conversion to an automated drip irrigation system to save water and operating costs

*Sustainable Boulevards* identifies three distinct types of boulevards: Gateway, Historic/Landmark, and Connecting. Gateway boulevards occur at entry points to the city and within the city limits at prominent areas such as the central business district. Gateway boulevards also typically include an entrance sign that is sponsored by local business, with 1/3 of sponsor revenue earmarked for boulevard maintenance. As the name implies, Historic/Landmark boulevards occur in designated historic areas and at significant landmarks. Connector boulevards support the majority of 4,500 new shade trees to be added to the boulevards.

The hallmark of *Sustainable Boulevards* is the striking large raised signature landscape beds that are being installed at key focal points throughout the city. Signature beds average 1,200 square feet in size and include natural stone elements such as boulders, Lannon stone (limestone quarried from Lannon, Wisconsin), or recycled granite street pavers and massed perennials (maximum of three species for ease of maintenance), flowering shrubs, ornamental trees, and annuals strategically placed at the noses or along the borders of the bed for season-long interest. Signature beds also include modern drip irrigation systems to conserve water and reduce operating costs. Most signature beds are raised to provide an adequate volume of quality topsoil and optimal viewing for passing motorists. In narrow boulevards, crushed granite borders or annuals are placed closest to the roadway to minimize impacts from road salt.

*Sustainable Boulevards* was substantially completed in three planned phases (2008-2010). Since 2008, approximately 1,800 low-impact landscape beds along 120 miles of boulevards have been removed and 276 new signature beds have been constructed at strategic locations. A total of thirteen signature beds scheduled to be installed in 2010 were deferred until 2011 or beyond due to street reconstruction projects. A total of 2,800 new shade trees were also added to connector boulevard segments through 2010. Requested funding to plant an estimated 1,500 shade trees on phase III connector boulevard segments was not authorized in the 2011 budget and this work will be completed over time as resources become available. The City's budget allocation of 1.6 million to construct the new signature beds was leveraged by Milwaukee's municipal nursery, which grew most of the plants required to support *Sustainable Boulevards* at a substantial savings over comparable wholesale purchase.

So what makes *Sustainable Boulevards* sustainable?

- **Low maintenance plant composition.** Simplistic designs utilizing perennials, flowering shrubs, and ornamental trees and only limited annuals in signature beds will reduce maintenance frequencies.
- **Fewer, but larger landscape beds.** The strategic placement of larger signature beds near key intersections, commerce centers, landmarks, and gateways to the city will enable the beds to be serviced more efficiently than the smaller widely scattered beds they replace.
- **Water-conserving automated irrigation.** *Sustainable Boulevards* replaces Milwaukee's manual overhead irrigation system with a sophisticated automated drip irrigation system. Automation of the irrigation system represents a significant savings in labor costs.
- **Replacement of 1,800 annual beds with turf and shade trees.** Additional mowing acreage represents a relatively low incremental maintenance cost. Once established the new shade trees will be integrated into the City's street tree pruning cycle and the added tree canopy will provide increasing ecological service benefits as the trees grow.

Milwaukee's investment in *Sustainable Boulevards* enabled the Forestry Section to reduce its seasonal workforce by 6.6 FTE's (full time equivalent positions) in the 2011 budget at a savings of \$180,000 annually, and ensures the longevity of Milwaukee's boulevard system for years to come.

## 2012 Condition Report information Request

### Tree Program

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1) Are there any existing reports, studies or other resources available that would provide relevant information on the tree planting program? No reports specific to tree planting, however a UFORE (Urban Forest Effects) Ecosystem Analysis project completed in 2008 characterizes the ecosystem service values of Milwaukee's urban forest which has relevancy to newly planted trees. Additionally, Forestry's spatial street tree inventory software, Tree Keeper, has reporting and analysis capabilities useful for forestry management, including tree planting programs.

2) How many trees does the city maintain in its right of ways and public spaces? 193,326 Street trees are maintained on a 6-year pruning cycle. The number of trees maintained in other public spaces (lots, green spaces, city parks, city-owned vacant lots) is unknown and maintained on an as needed basis to eliminate hazardous conditions

3) How many species and varieties are there? The inventory currently records 136 distinct species and 122 cultivars of trees

4) How is the tree inventory maintained? Spatial GIS inventory completed in 2009 and updated during pruning cycles and as other work is performed

5) Is the base inventory from 1957 still used to calculate current inventory? No, a new GIS spatial street tree inventory was completed in 2009

6) How often is the tree inventory updated? 2009 last complete update. Forestry management is integrating field computers to allow crews to update the inventory and work history on an individual tree basis daily as work is performed.

7) Between 1979 and 1981 Forestry & UW Stevens Point did an inventory of trees to determine species, size, condition and vigor class. Has anything similar to that study been done since? The 2009 updated inventory is supported by a subscription based street tree management system (Davey Tree Keeper 7.7) and tracks comprehensive information on the tree (size, condition), site location, and maintenance work requests and orders, and maintenance history on an individual tree basis. In 2008 a city-wide urban forest tree canopy assessment project was completed to quantify the number of trees, species and size distribution, condition assessment, and ecological service benefits provided by Milwaukee's 3.4 million trees (21.5% canopy cover). In 2009 the nation's first successful application of remote sensed hyperspectral imagery technology was used to map the location of ash trees at risk to emerald ash borer.

8) Is distribution data available for the age, size, condition and species of trees? Size, condition and species data is readily available on a city-wide, aldermanic district, quarter section, street or block basis. Tree age is not tracked although could be determined for specific trees through planting records.

9) How is tree condition assessed? Visual assessment completed by qualified arborists with strength loss evaluation, laboratory analysis, etc. completed as necessary.

10) How often or under what circumstances is tree condition assessed? During inventory update and routinely assessed in conjunction with service requests and maintenance operations. Additionally, the Forestry Section conducts an annual dead and hazard tree assessment to identify hazardous public and private trees.

11) What factors are considered when evaluating a tree? Structure (branch, trunk, root and decay symptoms, signs and distribution patterns), overall health (vigor, color, growth rate), biotic disorders (absence or presence of disease or inspect signs or symptoms) and abiotic disorders (mechanical or chemical damage, storm damage, vandalism, and influencing external site factors).

12) What factors determine if a tree requires removal? Structural condition, health, presence or absence of disease or insects, location, risk to public safety, fitness for public use and enjoyment

13) What is the average life expectancy for a city tree? Highly variable based on many factors, but over 50 years with regular maintenance

14) How many trees have been planted in each of the last 10 years?

- Total: Approximately 36,000
  - By species (if available) Captured in a database but not easily retrievable on a broad scale. New street tree inventory management system in use will support future tracking and reporting.
  - By reason (if available) Captured in a database but not easily retrievable on a broad scale. New street tree inventory management system in use will support future tracking and reporting 15)
- How many trees have been removed in each of the last 10 years?

- Total: Approximately 36,000
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- By reason (if available) Captured in a database but not easily retrievable on a broad scale. New street tree inventory management system in use will support future tracking and reporting

16) Describe any trends in tree loss. (eg. Dutch elm, emerald ash borer, storm damage, etc) Dutch elm disease killed over 200,000 elm trees in the city, Emerald Ash Borer threatens 33,000 ash street trees and an estimated 587,000 ash trees city-wide; aging Norway maple trees are prone to disease and girdling roots, storm damage is a function of weather and the pruning cycle with the incidence and severity of loss from storm damage increasing with longer pruning cycles

17) Is there a backlog of planting sites? Yes, approximately 6-12 months caused by a stump removal backlog resulting from position vacancies. The stump backlog is being addressed with the assistance of private contractors. Forestry's longstanding goal of replacing street trees within 1 year of removal is achievable at 2012 authorized position levels.

18) How are tree planting projects selected and prioritized? Goal is to maintain a fully stocked street tree inventory with no more than 2% loss in any given year and replacement within 1 year of removal.

19) What guidelines does Forestry use when determining placement of trees? Available grow space, soil conditions, proximity to other trees, utilities, structures, street lighting, carriage walks, driveways, and other street elements and infrastructure.

20) For the following preventative maintenance practices please describe the intended purpose, the number of trees affected, approximate cost, the optimal and actual schedule, reasons for and consequences of any differences between the optimal and actual schedule. Please indicate if any of the practices are no longer used and include any additional measures that are currently used but not listed.

- Pruning
  - INTENDED PURPOSE
    - Remove dead, broken and weak branches that constitute a public safety risk
    - Develop strong branch structure that is able to sustain storm events
    - Remove branches that obstruct vehicular and pedestrian traffic, traffic control devices and signs or branches that are in conflict with adjoining structures or property uses
    - Conduct full tree inspection to identify hazards or conditions that render the tree unsafe for public use and enjoyment, insect and disease signs or symptoms, and other maintenance needs.
  - TREES AFFECTED: 193,306 street trees, plus thousands of trees on city vacant lots, parks, and greenways.
  - APPROXIMATE COST: Pruning costs vary annually based on the number of trees serviced in a given year. The majority of cycle pruning is completed in the winter months. As Urban Forestry Specialist and Crew Leaders staff the Snow B Team, the amount and frequency of snow received during the winter months and winter temperatures significantly impacts pruning production. A \$5 Million transfer payment is made annually from the Storm Water Fee to the O&M Budget to fund pruning and related tree maintenance activities.

- PRUNING CYCLE: The optimal pruning schedule for Milwaukee’s street tree population is a split 3-6 year cycle where trees 12” diameter and smaller are pruned every 3 years, and trees larger than 12” diameter are pruned every 6 years. The 3-6 cycle proactively serviced the trees with the highest maintenance needs on a 3 year rotation, thus significantly reducing the number of trees that had to be serviced reactively “out of cycle” to address citizen service requests. In 2004 budget reductions forced a conversion to a straight 5 year pruning cycle, which is not sustainable with current staffing. A 5-year pruning cycle is too long to meet the higher maintenance needs of smaller trees; predictably resulting in sharp increases in citizen service requests and reduced efficiency by attending to pruning needs on a reactive rather than proactive basis. Current funding supports a 6-year pruning cycle.
- Disease & Insect Control
  - Trees are monitored and treated as needed for major insect and pests and diseases. Dutch elm disease is no longer a major problem for the city as most of the elm trees have died and been removed. Gypsy moth remains an active pest that requires active monitoring and periodic treatment. Emerald Ash Borer first detected in Milwaukee County in 2009, threatens 33,000 ash street trees and up to 587,000 ash trees on all property within the City of Milwaukee. Forestry has a multi-pronged strategy for managing public safety risks associated with EAB, including the inoculation of 27,000 ash street trees over 8” diameter (13,500 annually) with a chemical that provides 2 years of protection, utilization of hyperspectral imaging to map the location of ash trees at risk on private property, and outreach to affected residents alerting them to the presence of ash and EAB management options. The 2012 capital appropriation for Emerald Ash Borer inoculations is \$913,000, which provides 2 years of protection for 13,500 street trees at an average cost of \$68.00 per tree. In contrast, the average cost to remove and replace an ash street tree is \$750.00.
- Surgery
  - Very limited use to dress trunk wounds and install cabling and bracing in high value trees with correctable structural defects.
- Fertilization: Service eliminated to meet prior budget reductions
- Root Control: Limited to incidental root pruning on an as needed basis for sidewalk or utility repairs.
- New Tree Watering /Post Planting Maintenance: Post planting maintenance is limited to watering of newly planted boulevard trees and street trees fronting commercial or multi-family properties where there is low potential for citizen assistance in watering. Residents are provided a door hanger at the time of planting with watering instructions. Watering assignments are made on a staff availability basis during periods of drought.

21) What funding sources are utilized for the tree planting program? Capital Improvement budget and grant funds as available.

22) Describe any trends in funding. In most years, annual requests for tree planting are to replace trees that were removed in the prior year due to tree death, disease, advanced decline or structural defects. The 2008 - 2010 Capital Budget included funding for 2,050 new trees on boulevards in conjunction with the Sustainable Boulevards project.

23) Does Forestry still use the formulas developed by the International Society of Arboriculture and the American Council of Tree and Landscape Appraisers to value trees? Yes

24) What is the current value of the city’s trees? Approximately 300 million dollars, plus millions of dollars in ecosystem service values



25) Is distribution data available for the value of trees by size? Not readily. The value averages \$100.00 per diameter inch.

26) Has the City won any urban forestry awards in the last 5 years? Several. Annual Tree City USA Awards for 33 consecutive years including Tree City Growth Awards for 2002, 2008, 2009, 2010, and 2011; 2007 Professional Grounds Maintenance Society Honor Award for Milwaukee's Boulevards; 2008 Mayor's Urban Design Award – Kilbourn Ave Boulevard; 2008 EPA Earth Day Award; 2009 America in Bloom - Urban Forestry Category Award; 2009 America in Bloom - over 100,000 Population Category Award; 2010 Wisconsin Arborist Association - Innovation in Urban Forestry Award.

27) Describe any relevant policy changes that have affected the tree planting program. Reductions in funding for boulevard irrigation, tree fertilization and post planting structural pruning programs has negatively impacted tree health and tree establishment rates. Street tree species diversification is now accomplished on an intra-block basis rather than block or street basis to protect against catastrophic loss of trees within a block due to an exotic pest or disease such as Emerald Ash Borer. Intra-block diversification goals include a minimum of 4 genera or species per block and a maximum 2 contiguous identical species within the block.

28) What are the key challenges of maintaining an urban forest? Maintaining fiscal and resource alignment with the maintenance needs of a large street tree population in a fiscal climate of shrinking resources.

29) Describe projects, departmental highlights or any other information that you would like included in the condition report. \_\_\_\_\_