

Section 2

Concepts

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Background

In 1978 the City of Saint Paul Parks and Recreation Department set forth the first “Street and Park Tree Master Plan” in response to devastating effects of Dutch elm disease on the urban forest. Five years prior to that, the city began using Capital Improvement Bond funds for reforestation after Dutch elm disease eliminated a large percentage of the urban forest due to the monoculture planting of elm trees. The original plan set forth a new planting scheme which included increased species diversity to reduce the potential for widespread decimation of the urban forest. That commitment to reforest the city’s boulevards and parks with a diverse pallet of tree species has continued to this day. Many of the principles found in the original plan are still sound and have served the city well.

However, with shifting environmental pressures, diverse urban soil and growing conditions, and the introduction of new pest species like the emerald ash borer, some species of trees have fared better than others. Some fruited unexpectedly; some grew larger than expected while others failed to thrive at all for various reasons. Dutch elm disease incited major changes to the urban canopy leading to the removal of the majority of the elm monoculture. The emerging threat posed by the emerald ash borer brings into sharper focus the importance of continued city efforts to further diversify the urban forest. Many of the tree species utilized to replace the elm and ash trees have higher maintenance needs, particularly in the first five to ten years.

Trees are one of the few parts of city infrastructure that increase in value over time- particularly if they are well maintained. They are an integral part of a community’s green infrastructure, and as such, warrant thoughtful planning and budgeted management. With new information emerging about the benefits and management of the urban forest and the development of innovative technologies that can improve the planting success and health of urban trees it is time for some revisions to the original Street and Park Tree Master Plan in both thought and process.

Context

The conditions in which trees are planted in and the benefits that they provide vary across the urban landscape. Different approaches to tree selection and planting as well as the methods and levels of maintenance given each tree are required. Contextual considerations can be broadly broken down by the surrounding land uses and include:

Commercial Districts

Harsh growing conditions exist in the downtown business district and along commercial corridors throughout the city. These include high percentages of impervious pavement including large parking lots, compacted and poor soils, presence of subsurface utilities, increased stormwater runoff with a lack of readily available soil moisture, increased temperatures, variations in light quality and wind patterns, presence of de-icing salts, and increased levels of air pollution. Using innovative planting methods to increase soil volumes, trees are able to mitigate these environmental issues while providing a comfortable pedestrian experience and sense of community identity to business districts.



Residential

A range of growing conditions exist across the large areas of residential neighborhoods in Saint Paul. While conditions are typically better than those found in the urban core, issues of soil compaction, reduced soil volumes, underground utilities, and traffic considerations along the boulevards still exist. Microclimates can vary substantially depending on residential density, percentage of impervious surface cover, and available sunlight and soil moisture. Along with architectural styles, street trees contribute to the character, feel, and safety of a neighborhood.



Industrial

Due to the increased activity associated with industrial land use, conditions found in these areas may limit the establishment of quality street trees. Large amounts of impervious surface, compacted and potentially polluted soils, utility infrastructure, and increased air pollution can negatively impact tree growth. Transportation access for large vehicles may restrict the canopy size or coverage that can develop. Great potential exists within these areas due to large building setbacks and interstices between structures as well as parking and boulevard areas where their benefits will be greatest.



Parks and Natural Areas

These lands are well suited for urban tree planting and the establishment of a large canopy due to the increased soil volumes, adequate moisture levels, and microclimates associated with increased natural land cover. Park lands present the opportunity to increase urban forest diversity by providing space for the planting of native tree species where appropriate. While the effects on tree growth and stormwater infiltration are less severe in parks, soil compaction can be an issue near streets, along trails, and in picnic grounds.

Commercial, residential, industrial, park, and parkway lands vary in impervious surface cover, soil compaction, moisture availability, and ambient pollutant levels which affects tree health and success.

Concepts

Parkways

Saint Paul has 40.7 miles of tree lined parkways planted and maintained by Forestry. Wider boulevards and central medians along many of the parkways provide improved planting conditions for street trees with larger soil volumes and increased stormwater permeability. Parkway allow for a naturalistic design approach that utilizes mass plantings of ornamental species and large trees that defines the character of these roadways. Currently there is no official master plan to provide city wide guidance on the maintenance and improvement of these transportation corridors.



Image courtesy of Teresa Boardman

Street trees provide a number of benefits within the urban environment and contribute to the social, environmental, and economic vitality of Saint Paul.

Benefits of Trees

The specific benefits that trees provide for a community are too numerous to include in this document and resources will be included in the bibliography for further reference. Generally speaking, these benefits can be grouped into four categories: Social, Community, Environmental, and Economic.

Social Benefits

For most of us trees make life more pleasant. They add beauty, serenity, peacefulness, restfulness and tranquility to our lives. They also represent the ideas of stature, strength, endurance and long life.

Community Benefits

City trees serve several functions with respect to architecture, engineering, and public space. They create privacy and emphasize selected views while screening out objectionable ones. Trees reduce glare and reflection. They provide background to and soften, complement, or enhance architecture. Street trees increase the comfort of the pedestrian environment, help direct pedestrian traffic, provide unity to our public spaces, reduce crime, and create a sense of place in our communities. When planted along streets they reduce pavement temperatures and wear lowering the maintenance costs of city infrastructure, and act as a form of traffic calming.

Environmental Benefits

Moderation of climate, improvement of air quality, conservation of water and the creation of wildlife habitat are a few of the environmental benefits of trees. Trees are able to modify area microclimates reducing temperatures and the “urban heat island” effect caused by the large amount of pavement and building surfaces in the city. Wind patterns, humidity, and evaporation rates are also altered.

Trees reduce the amount runoff produced during storm events by capturing rainfall in their canopies and absorbing it into their roots. In combination with emerging planting methods, street trees can be a way to rethink stormwater systems and capture more rainfall on site. This reduces the amount of water piped to rivers, increases infiltration and groundwater recharge, and reduces the movement of nutrients and pollutants while improving surface water quality.

Improvement of air quality is another benefit from not only trees, but shrubs and turf as well. Dust and other particulates land on tree leaves, are washed off by rain. Ozone, carbon monoxide and sulfur dioxide are absorbed by leaves as is carbon dioxide which is used to form the carbohydrates necessary to build plant structure and function - - and most importantly, give off OXYGEN.

Economic Benefits

The economic benefits of trees can be both direct and indirect.

Direct economic benefits are usually associated with energy costs. Shaded buildings require less air conditioning in the summer and windbreaks reduce heating costs in the winter. A well landscaped home increases in value over time when compared to one that is not.

Indirect economic benefits of trees can be even greater. An entire community or region benefits by lowered utility bills, fewer new facilities are needed to meet energy and stormwater demands, and reduced amounts of fossil fuel are required with fewer measures needed to control air pollution.

Limitations in the Urban Environment

While trees provide many benefits in urban areas there are a number of factors in the built environment that must be addressed when considering tree placement. Selecting the right tree based on site conditions can solve many of these potential conflicts and decrease the overall maintenance costs required to correct them.

Mature tree size both above and below ground level must be considered when planting in areas where there are overhead utilities, buildings within close proximity to the planting area, or where other infrastructure such as sidewalks and curbs are located close to the trunk and roots of the tree. Conflicts with

Concepts



Limiting factors to tree planting and growth exist in many forms in the urban environment

utility lines and the need for severe trimming can be minimized with proper tree placement. Potential damage to buildings or obstructions to views and services can be avoided through proper tree selection.

Considerations of safety and clear sight lines are especially important with street trees located along transportation routes. Making sure that vehicles, bicyclists, and pedestrians have unobstructed views by selecting trees that will not block sight lines with low foliage is crucial to the safety of all users. This includes maintaining open sight lines for street signage and lighting elements. Potential damage to sidewalks and other transportation infrastructure caused by root growth needs to be considered.

Concerns about property damage and maintenance issues like excessive leaf or fruit drop also influence the success of urban trees. When trees begin to impinge upon infrastructure, sidewalks, and sewer lines, requests for removal can impact the development of the urban canopy and influence which tree species are used in the future.

The built environment impacts the growing conditions for trees through increased levels of impervious surface and pollution. This results in reduced rainwater infiltration to rooting zones, increased stormwater runoff, soil compaction, increased salt levels from winter deicing, higher temperatures, and increased incidence of accidental damage to tree trunks.