Research Proposal regarding Electric Utility Lines and Street Trees

Prepared in 2017 by Jeremy Kane (Urban Tree Alliance) and John Harrington (UW-Madison Dept. of Landscape Archtiecture) for a grant application to the Tree Fund and general fundraising. This is document is now presented for review and reference by the Urban Forestry Task Force. Submitted on 6/28/18 by JK.

Project Summary (250)

The proposed research project examines the value of small and large canopy trees within a variety of utility placement scenarios. It is a pragmatic approach to understanding the dynamic factors that determine the benefits of urban trees within several overhead utility arrangements. We propose that while utilities and their maintenance are vital, their physical relationship to urban trees can be more dynamic. A research premise is that the urban canopy, like the electric grid, is a form of public utility. Its vitality has significant and demonstrable benefits that extend to cities and regions.

The research and analysis will produce a case-study based cost-benefit model that will enable urban foresters, utilities, citizens, and urban policy makers to evaluate the comprehensive values of infrastructure projects. Research will combine an assessment of the local urban forestry and overhead utility project dynamics, a cost analysis of recent local project costs, and canopy benefits modeled with I-tree Eco. By integrating these factors into a substantiated decision-making framework, we intend to produce an analysis model with broad geographic applications and possibility for dissemination to diverse urban areas. Furthermore, the project will be administered as collaborative partnership between the Urban Tree Alliance, a Madison based not-for-profit, and the University of Wisconsin-Madison Department of Landscape Architecture. Through such a partnership we can leverage academic and community resources to create a project that can produce knowledge for multiple constituencies.

Statement of Problem

There is significant opportunity, and need, to consider how the urban canopy can be integrated into complex infrastructure systems projects into order to maximize canopy value. Aging urban infrastructures such as roads, storm and sewer lines, and electric transmission systems will be increasing in need of replacement, nationwide. Likewise, naturally aging urban trees and acute management crises like the Emerald Ash Boer mean that canopy resources need consistent renewal. By establishing a method of cost-benefit analysis that integrates the value of large, diversified urban canopies into project planning, outcomes will reflect the considerable eco-service benefits of urban trees.

This study will address the following questions:
1) What are the costs and benefits of *urban canopy arrangements* and sizes at the street level? Or, what are the relative values of ornamental trees and large canopy trees along an urban street?

2) What are the relative costs and benefits of *overhead utility arrangements* at the street level? i.e. burying both electric lines and telecom lines, burying only primary electric lines, and running both electric and telecom on poles?
3) What are the costs (installation and maintenance) and benefits of the canopy and utilities in the following scenarios?

a) small canopy trees under overhead utilities
b) large canopy trees under overhead utilities
c) large canopy trees with underground primary electric transmission lines and raised secondary and telecom lines
d) small canopy trees with underground primary electric transmission lines and raised secondary and telecom lines
d) large canopy trees with underground primary and secondary electric and telecom

Significance of proposed project as it relates to the profession of arboriculture or urban forestry

This project attempts to create a substantiated basis from which professional arborists and urban foresters can participate in, and influence, urban infrastructure projects through out development processes. By projecting the costs and benefits of a variety of canopy and overhead utility scenarios, urban foresters can become proactive arbiters in decision making. Likewise, associated professions such as engineers, urban planners, and policy makers will be more able to balance the value of the urban forest through a project;s lifetime from planning to post-development.

The outcomes of the proposed research can positively affect the profession of urban forestry in the following ways:

1) Provide opportunity to holistically integrate the planning for trees and utilities within street terraces instead of as separate entities.
2) Produce a basis of eco-service and utility based knowledge that will allow profession arborists to be involved in infrastructure planning.
3) Expand the traditional arbortist's role of choosing trees, planting, and pruning maintenance to more comprehensive opportunities to influence policy decisions and infrastructure that otherwise affect growing conditions of the urban forest.
4) Create a pro-active, rather than reactive role for urban foresters
5) Produce a decision-making framework for otherwise disparate groups, intended to maximize that value of tree health and their community benefits.

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