Trees and Sidewalks: A Complicated Relationship

By Gary Johnson and Eric North

In the June issue of Arborist News, we offered some thoughts on Total Infrastructure Planning (T.I.P. as it pertains to trees in the built environment. Being mindful of the four Rs is paramount: “the right tree, in the right place, reduces maintenance and realizes benefits over time.”

A primary design objective for urban planners should be to create well-considered tree planting spaces that are large enough to support tree resiliency and longevity. This includes making efforts to properly plan for ways to foster and maintain harmonious relationships between trees and sidewalks. Research has shown that trees in smaller boulevards increased the potential for sidewalk damage and reduced tree size (Sanders et al. 2013). When trees lift or otherwise damage sidewalks, repairs are needed. Often, these repairs negatively impact trees through root severance. In this article, we’d like to offer some examples of recommendations that are sure to hit home:

- Consider new sidewalks or path materials that flex as tree roots grow under the sidewalks without creating a trip hazard.
- Use maintenance methods that reduce repair costs and limit any damage to the established tree roots;

This was a mature American elm (Ulmus americana) on a boulevard 1.3 m wide. Its roots had been severed when the sidewalk was replaced. Notice the arc in the sidewalk to accommodate the trunk flare. The elm toppled after a severe summer storm in 2013.

The sidewalk on the University of Minnesota campus was lifted due to the roots of the mature American elm (Ulmus americana). In this instance, the sidewalk edge was shaved to flatten the lifted portion (circle). The tree was not damaged, and the repair costs were lower than total sidewalk replacement.
A mature Norway maple (Acer platanoides), growing in a boulevard space next to a school, had a large lateral root severed to make room for a new sidewalk. The root size and length can be seen on the left. On the right, the red line indicates where the original sidewalk edge was in relation to the trunk flare. The tree should have been removed given the proximity to a school sidewalk and a small tree used as a replacement.

many municipal planners consider “shaving” the infrastructure to level sidewalk lift.
- Remove the tree and replant it if construction activity requires substantial root severance within 6.5 feet (2 m) of the trunk flare.

As no one solution will work in all situations, communities should seek a combination of design solutions that accommodate increased tree health and longevity and reduced infrastructure costs. Diversity in designs can subtly include genetic, age-class, and site-tolerance diversity, as well as a landscape more capable of sustaining green assets. Communities currently plant trees for the benefits they provide, yet too often do not or are not able to manage trees for these same benefits many years into the future. Total Infrastructure Planning includes tactics that better ensure the longevity of urban trees in order to maximize their benefits.

Additional Reading

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