

Plan On It

A Dutchess County Planning Federation eNewsletter



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Getting to the Root of the Issue:

Ensuring Sidewalks and Street Trees Can Successfully Coexist

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We planners love street trees — they can transform a wide, hot road into a narrower, cooler and more pleasant place, and dramatically enhance the quality of a main street. However, street trees and sidewalks can make life difficult for one another, and these conflicts make some communities hesitant to install one or the other — sidewalks out of fear that existing trees will not survive, or street trees to avoid the maintenance issues caused by tree roots. But given that communities in Dutchess County and around the world have beautiful, tree-lined sidewalks, we know it is possible to have both.

So, how can street trees and sidewalks get along?

Understanding Street Tree Basics

Tree roots grow under sidewalks when there is sufficient oxygen, water, and space. However, soil beneath sidewalks is often highly compacted. When roots encounter dense soil or pavement, they change direction, stop growing, or adapt by remaining close to the surface. This can make them susceptible to drought and can also cause the sidewalk to lift. Dense soils can also cause tree roots to rot if the soil is waterlogged.

Trees need adequate pervious space for their roots to grow. If possible, plant trees in a landscaped buffer adjacent to the street. Tree wells or trenches with groundcover, permeable pavers, or another surface that allows water to infiltrate can also be used. Make sure there is sufficient soil volume for the tree's ultimate size. If you have limited space, try to connect areas under the sidewalk so air, water and roots can move below the surface. In areas with heavy pedestrian traffic, tree grates, guards, or covered trenches can be used.

When selecting a tree variety, keep in mind that street trees should be hardy, salt-resistant, deep-rooted, and not drop fruits or seed pods. If you are adding new trees to a row of existing street trees, select a variety that has similar watering requirements. At the same time, keep in mind that a diversity of species can help resist disease. To maximize



An example of lifted sidewalk pavers due to interference from tree roots.



This groundcover and grass planting strip allows water to infiltrate down to the tree's roots.

the benefits of street trees, select ones that can achieve a height and spread of 50 feet for residential streets and 40 feet for commercial streets within ten years. Work with a landscape professional to select the most appropriate trees for the specific location.

We recommend placing street trees between the curb and sidewalk. Trees near the curb are much more effective at visually narrowing the street, calming traffic, creating a canopy to shade the sidewalk and street, and buffering traffic for pedestrians. If that's not possible and you have on-street parking, consider placing tree wells in the street between parking spaces. These can be integrated into

curb extensions, which calm traffic and shorten crosswalks. Finally, you could plant trees on the [inside of the sidewalk](#), but this may require the property owner's agreement and cooperation. We recommend spacing trees 20 to 30 feet apart in town centers, villages and cities with slow speed limits (30 mph or less), and 30 to 40 feet apart in higher-speed areas.



This tree well in the parking lane calms traffic and protects the crosswalk. Photo credit: FHWA.

Measures to Prevent Tree-Sidewalk Conflicts

When installing new sidewalks or street trees, these measures can help ensure a successful tree-sidewalk relationship:

Gravel sub-base is a layer of washed gravel or other free-draining material under the sidewalk can help prevent roots from growing up and lifting the sidewalk. Alternatively, in well-drained soil, foam insulation boards beneath the concrete may also be used.

Structural soil is an engineered mix of crushed gravel and soil that provides both space for tree roots and sufficient support for overlying pavement. It is useful where compacted soil is required, such as under sidewalks.

Case study: Town of Hyde Park, Route 9 and Market Street

In 1999, the Town of Hyde Park's Shade Tree Commission installed street trees along Route 9 and Market Street using structural soil—the first such project in the region. They dug 5 foot wide by 3 foot deep trenches under the entire length of the sidewalks and filled them with structural soil to increase the roots' access to air and water. Pervious brick pavers were installed along the sidewalk to allow water to filter into the soil. Utility wires were relocated underground to avoid conflicts with the trees and increase the attractiveness of the area. In the 15 years since they were planted, the trees have continued to thrive and make the historic crossroads area of Hyde Park more attractive.



Photo credit: Google street view

Root barriers are plastic panels that can be installed in the soil along a sidewalk or around a tree to guide roots downward and away from sidewalks. They can be used for existing or new trees, but work best in well-drained soil.

Unlike bluestone and asphalt, which are prone to lifting and cracking, **flexible or porous pavement** can be used on sidewalks or in tree wells to reduce maintenance. While it won't prevent roots from lifting sidewalks, it can accommodate some lifting while still maintaining a relatively smooth, firm walking surface.



Rubberized sidewalk pavers. Photo credit: FHWA.

Keep Maintenance in Mind

Try to plant trees in the fall to minimize watering needs. Develop a maintenance agreement that specifies who is responsible for regular inspections, watering, pruning and other maintenance. Choosing native trees from local nurseries will minimize maintenance requirements. Using native soil when planting can also help the tree adapt to local conditions. If your community is faced with tree-sidewalk conflicts, here are some techniques to correct the problem:

- **Shave sidewalks:** If a sidewalk is lifted, the top can be shaved to even out the surface and reduce tripping hazards.
- **Install a wedge:** Another option if a sidewalk is lifted is to install a wedge of asphalt or concrete to bring the lower level up to the lifted edge.
- **Re-route the sidewalk:** Sidewalks that are being lifted due to tree roots can be re-installed further from the tree trunk. You may need permission from the adjacent property owner to re-route the sidewalk.
- **Ramp the pavement:** Sidewalks can be ramped or 'bridged' over tree roots. This involves more construction than shaving or installing a wedge. The ramped sidewalk must still meet the ADA maximum slope of 5%.

Case study: Village of Millbrook Sidewalk Improvement Plan

The Village of Millbrook shaves sidewalks to remove tripping hazards as part of its annual sidewalk improvement plan. The Village has found shaving to be much more cost effective than replacing sidewalk sections, and more effective at reducing trip hazards and preserving the pavement than sidewalk grinding. The cost is programmed into the Village budget each year. By taking responsibility for the condition of sidewalks, the Village ensures that its sidewalks are maintained consistently and in a timely manner.



A sidewalk in the Village of Millbrook that has been shaved to even out the surface where lifting occurred.

- **Use paver blocks:** Paver blocks or rubber pavers can be used to replace paved sidewalks in areas with root damage. Such pavers do not prevent lifting, but allow for a smoother transition if lifted and can be more easily replaced if needed.
- **Shave roots:** If other solutions are not feasible, tree roots can be shaved and new concrete installed. However, it is best not to cut large roots (more than 2 inches in diameter), to limit shaving to one-third of the root's diameter, and to not shave roots that are closer than three times the trunk diameter from the tree's base. Rigid foam can be installed between the shaved root and the concrete to prevent a root callus from lifting the new pavement.
- **Remove roots:** As a last resort, roots at the edge of a sidewalk can be removed and the sidewalk replaced. Root removal can endanger the tree's stability, so enlist the help of a professional before removing roots.



This sidewalk was routed around the street tree.

Did You Know?

Street trees provide many benefits to a community, including:

Property Values: Large trees can increase commercial and residential property values by up to 10 percent.^[1]

Retail sales: In tree-lined retail areas, people shop more often, longer, and spend about 12 percent more than in retail districts without trees.^[2]

Stormwater: 100 mature trees capture approximately 139,000 gallons of rainwater a year—water is absorbed, evaporates, and slowly soaks into the ground, reducing runoff.^[3]

Air Pollution: 100 trees remove 53 tons of carbon dioxide and over 400 pounds of air pollutants.^[4]

Crime: a 10 percent increase in tree canopy is associated with a 12 percent drop in crime.^[5]

Other Issues to Consider

Here are other issues to consider when installing street trees:

Signs: To ensure building or street signs are visible, consider installing tall trees, with the lowest branches 12 to 14 feet above the ground, and provide adequate clear space between trees and signs.

Street lights: Pedestrian-scale lights are best, as they generally don't conflict with street trees. If needed, place trees and street lights about 10 feet apart.

Utility wires: Depending on the height of the utility wires, there are two options: either install tall trees so the canopy is above the utility wires; or short trees that won't need drastic trimming around utilities.

Underground utilities: Mark out any underground utilities in the area to avoid planting trees over them.

Technical Guidance

View our [technical appendix](#) for more detailed information about some of the topics covered in this article.

Local Planning Tools

A tree ordinance can create a tree commission, require a tree inventory and management plan, and outline tree maintenance requirements. Good ordinances also require coordination between a tree commission and other municipal bodies, and provide for the tree commission to review proposed site plans.

Currently, seven municipalities in Dutchess County have a [shade tree commission](#) or similar body. These committees are responsible for the regulation, planning, care and control of all trees on municipal property and right-of-way. To ensure that local goals for street trees and sidewalks are coordinated, consider establishing a joint sidewalk/street tree committee or appointing a tree committee member as a liaison to the local sidewalk committee, if one exists.

The “Right Tree in the Right Place”

Ultimately, successful street trees rely on selecting the right tree for the location and making sure it has adequate soil, water, and air to thrive. There are many options for creating sidewalk environments that support trees. Work with your local tree commission, a landscape professional, and the roadway owner (NYSDOT, Dutchess County DPW, or your local Highway Superintendent) to ensure the success of your street trees.

[1] 2004 study by University of Pennsylvania's Wharton School; cited in Urban US Forest Service, *Trees Pay Us Back*, 2005.

[2] University of Washington's Center for Urban Horticulture study; cited in US Forest Service, *Trees Pay Us Back*, 2005.

[3] US Forest Service, *Trees Pay Us Back*, 2005.

[4] US Forest Service, *Trees Pay Us Back*, 2005.

[5] Baltimore Sun, May 19, 2012; study by US Forest Service.

More Information

Greenway Guide: [Street Trees](#)

[Cornell Community Forestry](#)

[Cornell Urban Horticulture Institute](#)

Bartlett Tree Research Technical Report: [Sidewalk Repair Near Trees](#)

[NYS Urban Forestry Council](#)

More Information *(continued)*

[NYSDEC Urban and Community Forestry](#)

[Arbor Day Foundation](#)

[Planting Street Trees Beyond the Right of Way](#), by Al Wegner

FHWA: [Construction Techniques to Lessen Maintenance for Sidewalks and Paths](#)

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