PART TWO

2

Principle 2: Make Larger Planting Spaces

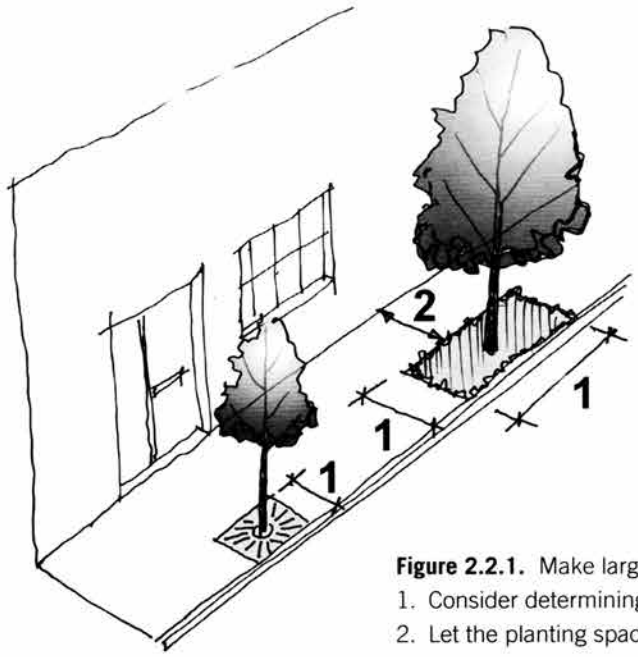

Figure 2.2.1. Make larger planting spaces.
1. Consider determining minimum paving dimensions.
2. Let the planting space fill the space available.

When trees must have paving or structures on all sides, design the largest planting spaces possible. Larger planting spaces, filled with good soil, will produce healthier, longer-lived trees. A single successful tree in a consolidated planting space is much better than many trees struggling in small holes.

As the landscape becomes more urban, it is more difficult to design adequate soil volumes. Pavement needs more ground to handle more pedestrians and vehicles. The result? Spaces for trees tend to be as small as possible.

Larger planting spaces should be used even if there are resources to accommodate roots under the paving. Larger spaces are more sustainable, using fewer resources to improve soil and reducing paving conflicts. Like planting the easy places first, making larger planting spaces is a design decision that must begin with the very earliest sketches.

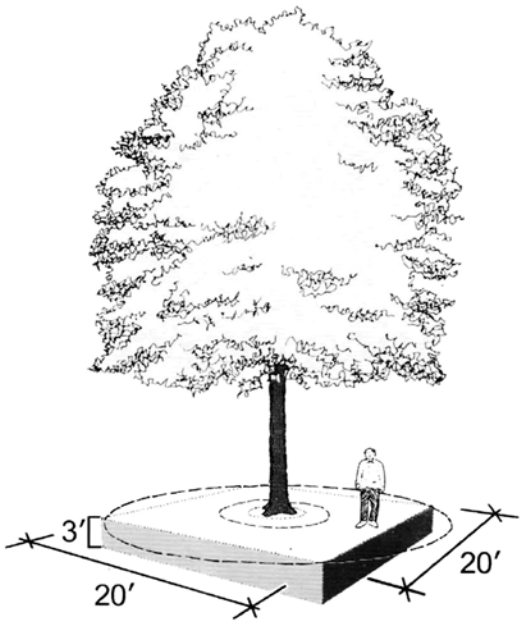

Figure 2.2.2. Minimum tree planting space. This is not to say that smaller spaces cannot be designed, only to recognize that smaller spaces are not optimum.

MINIMUM TREE SPACES

What is the minimum size hole for planting a tree? Ideally, 20 feet or larger in diameter is a reasonable minimum to support a functional, large-canopy tree. Anything smaller will compromise the tree at some point in the future, but a 20-foot space for a tree is prohibitive in most urban areas. What then is a realistic size for an urban setting? The practical answer is that the space for the tree and the paving should be developed together, with the paving designed to provide the minimum width needed for the use of the space, and the area for tree planting designed to be the largest size practical. The size of the space for the tree should vary within the design, putting a premium on design approaches that allow flexibility of geometry.

This approach is counter to fundamental urban design principles, which put a premium on consistency and rhythm in paving and other urban features. A craftily designed paving pattern around a small tree opening remains one of the hallmarks of a "good" urban streetscape plan, even though such standards most often predict failure for the tree. The design community must acknowledge that a healthy, large tree provides significantly greater value to the space than a clever paving pattern and visual rhythm.

If there is no practical minimum size for the tree opening, is there a minimum dimension into which a tree should not be planted? Unfortunately, there is no simple answer to this question. Factors in such a decision include:

- The type of tree
- Surrounding soil conditions, existing or constructed
- Project goals
- Willingness to compromise the tree
- Client tolerance for risk of losing the tree and/or damaging the pavement

A Hot Dog or a Tree?

Often it is argued that the spaces for street trees cannot be larger because of the need to accommodate pedestrians on a busy street. In New York City, the typical street tree is allowed a 4-foot by 4-foot hole. However, the typical hot-dog vendor occupies a space more than twice as large. These vendors are usually at the corner, where the greatest numbers of pedestrians collect. So why is a larger space for a tree, which provides greater value to the community, a problem but a larger space for a hot-dog stand is not?

Figure 2.2.3. Long planting spaces allow the largest open soil space while accommodating other urban functions.

Figure 2.2.4. A good balance between trees and other urban requirements

Most of the conflicts in a very small planting space are related to the future growth of trunk flare and zone of rapid taper (see Principle 5 for discussions of these constraints).

Although developing a larger width for the planting area is critical, in areas of linear pedestrian traffic, making the tree space longer in the direction of travel has significant advantages. The longer space provides additional soil volume at low cost, and the trunk flare and zone of rapid taper will adapt somewhat to the shape of the space.

In areas of intense pedestrian activity, providing a curb or fence around the planting space is a reasonable alternative to installing a tree grate or paving over the planting soil. The curb has the added advantage of reducing salt intrusion into the soil around the tree in northern climates.

TRUNK-TO-PAVING TRANSITION

The ground immediately around the base of a tree is subject to relatively rapid and constant change. The adequacy of the planting hole depends on how the design accommodates the tree's trunk flare and the roots' zone of rapid taper as required in Principle 5, "Respect the base of the tree." The zone of rapid taper is the area 15 feet or more in diameter around the trunk where root diameters are the largest. Although it is best not to have rapid-taper roots under paving, this may be unavoidable in dense urban areas. The more paving is near the expected zone of large roots, the more conflicts a designer can expect, and the more it will cost to accommodate them—or to repair damage if the designer fails to do this planning. Principle 5 must guide decisions on the minimum size of tree openings.

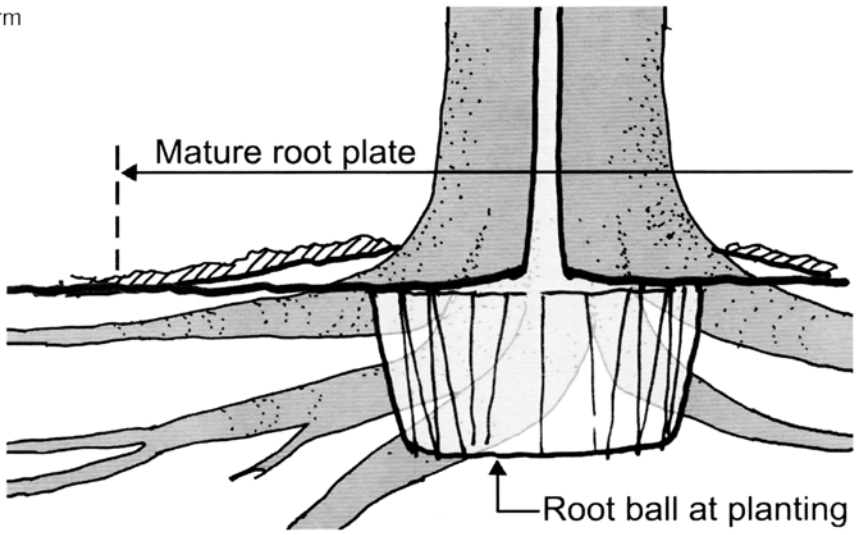

Figure 2.2.5. Trunk base transition. Long-term changes in the base of the tree are best accommodated with larger planting spaces.

When the tree is young, the bare soil between the trunk and the paving needs some type of covering such as mulch ground-cover plants, gravel, or loosely laid pavers. Designers need to think of this space as a transition zone that will gradually fill with trunk wood and roots. The less flexible the material that is used to fill the space, the more conflicts will occur as the tree grows. Therefore, tree grates should never be used.

Although a planted understory is the preferred alternative, never plant ground-cover plants within the root ball of a newly planted tree. This damages critical roots at the precise time when the tree is most stressed. The area directly above the root ball at planting must remain mulch. Plant ground covers around the edge of the root ball and allow them to expand over the root ball with time.

As the tree grows, the available light, water, and nutrients within the soil will change. Select understory and ground-cover plants that can survive these more difficult growing conditions. At the time of planting, the area under the tree may be in full sun, and few plants can thrive in both full sun and full shade. Wider spacing of trees reduces this conflict. If the planting can change as the tree matures, the landscape will be more successful. Designers should make clients aware of this need for change and incorporate modification recommendations into their plans.

SOIL WITHIN AND AROUND THE PLANTING SPACE

Once the designer has determined the size of the tree growing space, the next step is to optimize the quality of the soil and drainage within and around this area. Principles 3, 4, 5, and 6 will discuss strategies for this optimization. Principles 3 and 4 provide methods to reuse or improve the existing soil. Principle 5 sets requirements for the ever-enlarging trunk flare and zone-of-rapid-taper roots. Principle 6 provides ways to improve the roots' growth potential under the pavement.

Start by calculating the volume of soil that is available or provided to determine whether it is adequate for the expected growth. Use the soil volume chart presented in Part 2, Chapter Four, "Improve soil and drainage." Remember that improved soil covered by pavement is never as useful to the tree or as sustainable to install as good soil without pavement. Following the strategies in Principle 6, "Make space for roots," does not remove the requirement to follow Principle 2, "Make larger planting spaces."

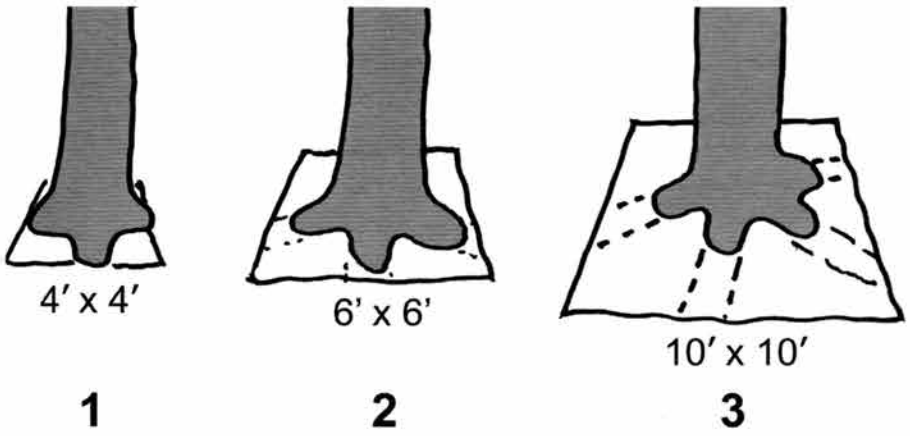

Figure 2.2.6. Bigger spaces offer less conflict, but none of these options provides sufficient soil volume. Where possible, make the spaces longer in the direction of pedestrian travel.

1. 4-foot space: Conflict with mature flare and ZRT roots
2. 6-foot space: Conflict with mature ZRT roots
3. 10-foot space: Conflict with ZRT roots only when tree becomes quite large

If the space for planting becomes too small and budgets are insufficient to provide for the requirements of the tree, it may be best to plant fewer trees to allow for adequate conditions with the available resources or, in extreme cases, to plant no trees.

SUMMARY

- Improving soil within the area of the planting hole is the cheapest and most sustainable way to improve growing conditions for a tree.
- The minimum planting space size is 20 feet or greater in diameter.This size is an impractical standard for most urban areas.
- Consider minimum paving space as opposed to minimum planting space.

Figure 2.2.7. Mature tree in a small space, successfully altering the paving around its base. Though planted in a 4-foot space, the tree has enlarged the hole many times and lifted the ground almost a foot. Several generations of sensitive landowners have reset bricks to accommodate the tree's needs. Unfortunately, not everyone is this considerate.

- Optimize soil and drainage within and around the planting space.
- Allow planting spaces to grow as circulation requirements vary. Avoid uniform planting spaces designed to fit the most restrictive dimension.
- In areas of linear circulation, make the holes longer in the direction of travel.
- Use fences or curbs to elevate and separate planting areas from foot traffic and salt applications.
- Provide for plants, mulch, gravel, or other flexible materials on the ground around the tree. Never dig into the root ball of a newly planted tree to plant ground-cover plants.
- Ensure that shrubs and other plantings under trees are compatible with shade and drought conditions that can be expected as the trees mature.
- Calculate the soil volume. Develop sufficient volume to support the long-term growth of the tree.
- Eliminate the tree if the need for paving overly restricts space for it and budgets are insufficient to allow soil for roots under the pavement.
- Follow the strategies in Principle 6, "Make space for roots." Remember that improving the soil under the paving is not a substitute for larger planting spaces. The two concepts are complementary.

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