



## Preventing construction damage to trees

Valuable trees are often cut down, killed, or severely damaged during construction work when simple, inexpensive, preventive care could keep them alive and healthy.

People often spend a great deal of time, trouble, and expense to try to save trees, only to have them sicken and die soon after the construction work is finished. Sometimes one contractor works carefully around a tree, only to find a subcontractor's work later has killed the tree.

When faced with these problems, some people find it easier to cut down or bulldoze all trees on a site. They reason that young trees can be planted when the construction work is done. It's easier and cheaper to build without any trees in the way, and they feel the trees may die anyway.

### How Valuable Is a Tree?

A tree's value depends upon whether it is used for lumber, pulpwood, firewood, or shade. Shade and ornamental trees are worth a great deal more than trees cut for lumber.

If planted by a nursery, an oak tree with an 8-inch trunk could cost several thousand dollars. Smaller trees cost less, but the mortgage on a new house may be paid off before a small tree reaches maturity.

It is usually cheaper and easier to save trees than to replace them. However, you can waste a lot of time and money trying to save the wrong trees or trying to save trees the wrong way.

### Deciding Which Trees To Save

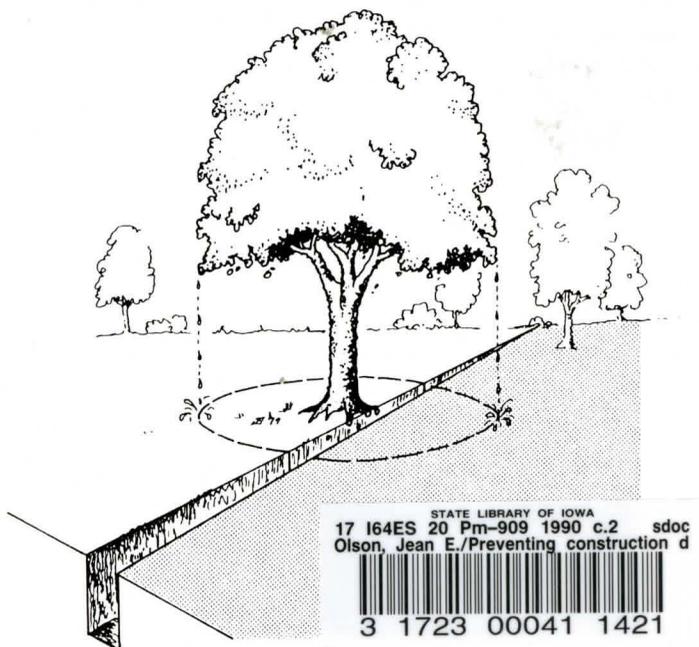
This pamphlet will help you decide which trees to save. And it shows simple, reliable methods that will keep trees safe during construction work.

If possible, have a landscape architect, forester, nurseryman, horticulturist, arborist, or other tree expert

help you identify the kinds of trees and judge their condition and suitability for saving.

The following items will be helpful if you plan to do the work yourself:

- A complete set of building plans, including the proposed utility routes;
- Twine or string to mark out the building, roads, parking areas, and utility routes;
- Stakes—Three-foot long builder's lath (available at lumberyards) is excellent;
- Measuring tape (100 ft. cloth tape is fine); and
- Surveyor's flagging tape or brightly colored strips of cloth to mark stakes and especially valuable trees.



All roots in the shaded area have been killed. The trench should be outside the dripline.

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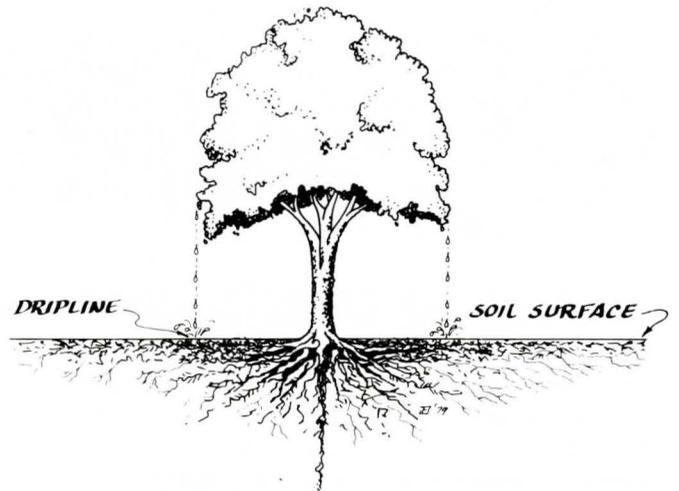
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1. Using the stakes, string, and flagging tape, accurately mark out the proposed location of the building, its road and driveways, and all known utility lines. Include all parking areas and overhead and underground utilities of all kinds.

2. Look carefully at the proposed utility line routes. Even a very shallow trench for a telephone line can kill a tree. Consider the locations of all cuts and fills. A simple rule is, "Whatever is touched by either a cut or a fill is killed."

3. After marking out the building, stand back and look over the site. Quite often a small shift in the position of the building, a change in road or drive location, or even a change in a proposed utility line could make the difference between saving or cutting a valuable tree. A building does not automatically have to be located right in the exact center of a lot. Moving the building only a few feet in one direction can often make it easy to save a tree.

4. Now, decide which trees are worth saving or could be saved with a little effort. If you make wise decisions now, the selected trees will be safe, and the contractor will not be handicapped by trees that would die anyway.



The total volume of the underground roots equals the volume of trunk, branches, twigs, and leaves combined. However, the most important roots are inside the dripline.

## How To Save Trees

### Protect the Roots

There is as much tree underground as above ground. The underground roots are much more delicate than the trunk, branches, or leaves. Since they can't be seen, they are often hurt. Root damage can kill a tree without leaving an obvious mark.

The roots within the dripline are critical. If this area is protected, the tree is not likely to be damaged by construction equipment. So **keep construction activities outside the dripline of trees to be saved.**

### The Miniforest

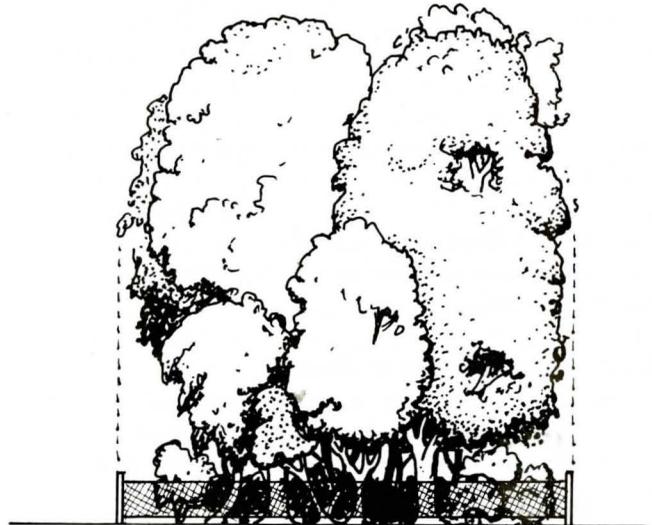
It is easier to save groups of trees than individual trees. Build a fence around the "miniforest" to the dripline of the outside trees. The fence keeps construction machinery away from the trees. And, it is easier for machine operators to work around the clearly fenced area than to try to dodge individual trees.

### The Super Tree

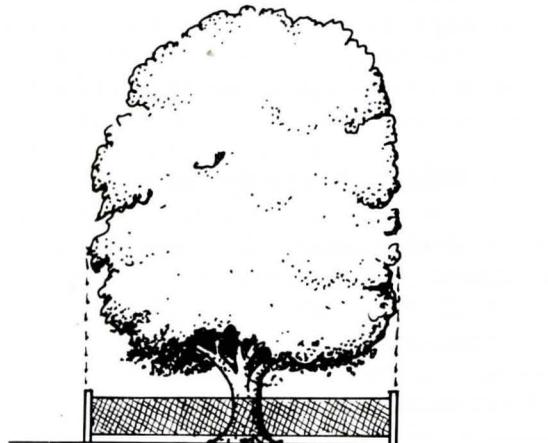
Sometimes an individual tree, although isolated from the others, is still worth saving. Simply build a fence around the dripline of this tree.

### Declare Fenced Areas "Off Limits"

After valuable trees are safely fenced, **leave them alone.** Nothing is to be raked, cut, planted, stored, or disturbed inside the fence.



This miniforest includes a group of trees protected from construction activities by a simple fence at the dripline of the outside trees.



This super tree is protected from construction activities by a fence at the dripline.

Be sure all workers and visitors to the site understand that no one is to enter the fenced areas for any reason. Also be sure that no fires are allowed to drift smoke or hot gasses into the protected areas of the treetops.

Remove the protective fences only after all construction work has been finished, including final grading and smoothing of the site.

### Carefully Remove Unwanted Trees

Be careful about removing unwanted trees. A tree being removed might fall on and injure one of the trees you are saving.

If possible, remove unwanted trees when none of the trees have leaves. This is especially important in heavily wooded areas. When trees are in full leaf, the sudden removal of their neighbors is a great shock, and a tree to be saved could be badly injured by sunburn.

Any final, minor grading and smoothing around the trees, including removal of unwanted small trees or brush, should be done after at least a year has passed. This gives the trees time to adjust to the new conditions before making more changes. Do the final grading by hand.

### Handling Grade Changes

Changes in grade, cutting banks next to trees, or piling dirt close to them is almost always a sentence of slow death for a tree. However, saving a tree still may be possible if you are willing to spend the time and money to do it.

In all cases where either cutting or filling around the roots of a tree is considered, seek expert advice before you decide which trees to keep.

Following are some simple rules of thumb that may help you decide.

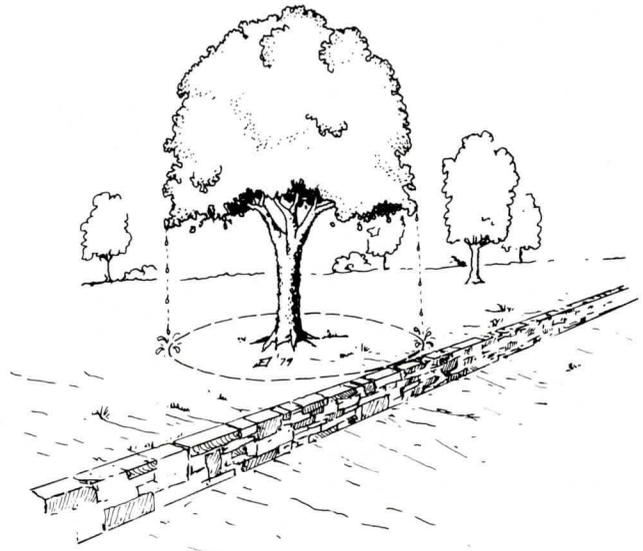
### Protecting Trees from Cuts

Cutting soil away from a tree changes the soil moisture level. If the cut is relatively shallow, 1 or 2 feet, and the edge of the cut is out by the dripline, the tree usually is not harmed. A cut directly next to the trunk will kill the tree. Cuts that extend into the dripline usually will kill all but the most tolerant species.

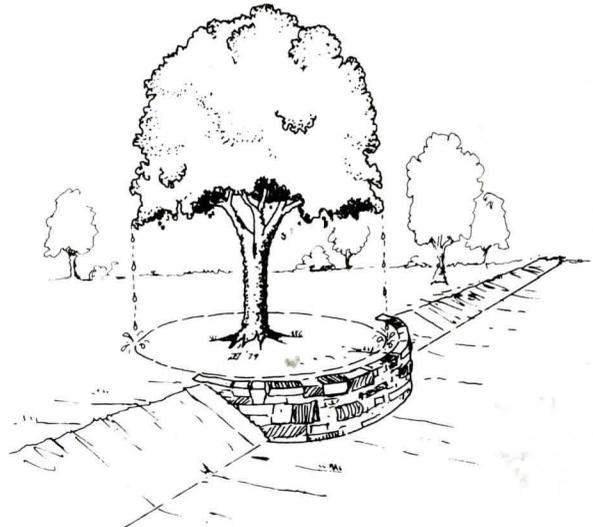
Deep cuts are hard on a tree, especially if the cut is open during hot, dry weather. The cut must be twice as far out as the dripline, and the retaining wall should be installed immediately.

### Protecting Trees from Fills

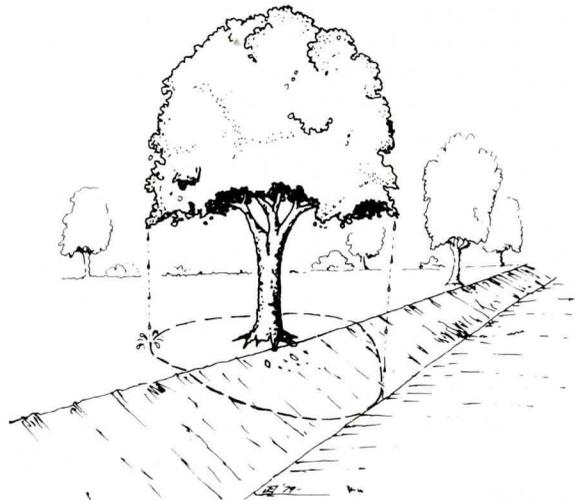
Filling around a tree smothers roots. Although the deep roots that attach the tree to the ground are not affected by filling, the fine feeder roots, which are in the top 1 to 2 feet of soil, are very sensitive to changes in their environment. If these delicate, small roots are



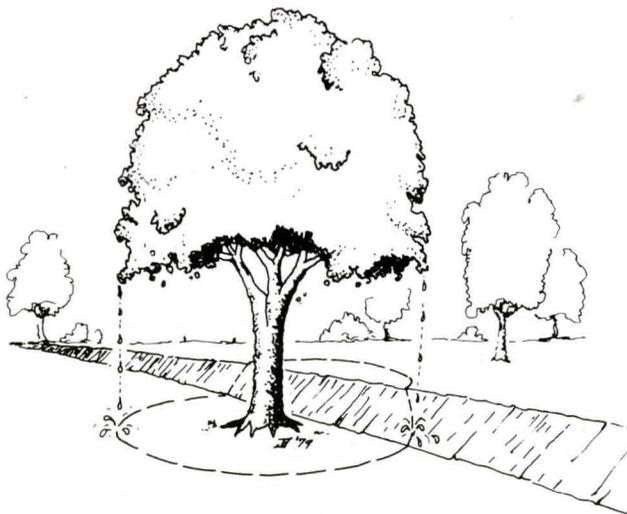
This relatively shallow cut is outside the dripline and is protected by an attractive retaining wall. The tree should be unharmed.



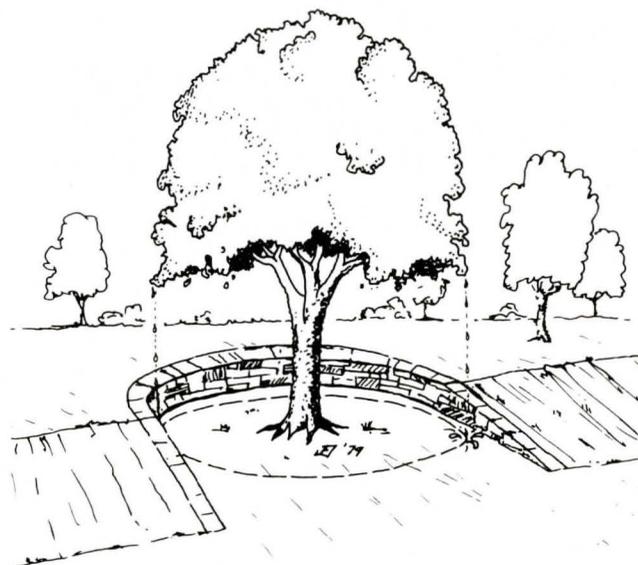
This cut has been protected by a short, curved retaining wall at the dripline. The tree should be unharmed. Deeper cuts should be even further from the trunk.



This cut has killed half of the tree's roots. Most trees will die from root damage.



The roots buried under the fill will die from suffocation. Most trees are killed by such fills.



The roots inside the dripline of this tree are protected from the fill by the curved retaining wall. The tree should be unharmed.

injured or die, the tree is doomed. Death from filling sometimes takes 3 to 5 years. The sketches give guidance for minor fills.

It is possible to "completely bury" a valuable tree with special techniques. However, these are very expensive and require expert design and installation. Generally speaking, it is easier, cheaper, and more practical to alter grading plans than it is to protect a tree that is to be "buried."

If you have a tree protection problem that cannot be solved with the information in this pamphlet, consult an expert, such as a landscape architect, arborist, nurseryman, horticulturist, or other person with experience in saving "difficult" trees.

### Tolerance to Root Damage

**Trees very sensitive to root damage** (see chart) include some of the most desirable shade and ornamental trees. Saving these trees can be inconvenient because great care must be taken to prevent any disturbance to their roots. However, if the entire root system is protected, as well as the rest of the tree, these valuable trees survive very well.

**Trees moderately sensitive to root damage** usually tolerate minor root disturbance. If a vigorous, healthy tree can be protected so no more than 10 percent of its total root area is disturbed, covered, or cut, it normally will survive.

**Trees fairly tolerant to root damage** are generally found native in flood plains, where they have adapted to rather unstable conditions. As a result, they tolerate root damage. Young trees often survive after as much as 50 percent of their roots have been damaged. To ensure a reasonable chance of survival, especially in older specimens, take care that no more than 25 percent of the total root area is harmed. Also, protect and properly care for the entire tree during and after construction activities.

### Tree tolerance to root damage, by species.\*

Very sensitive	Moderately sensitive	Fairly tolerant
Oaks, all	Sugar maple	Silver (soft) maple
Hickories, all	Black maple	Basswood
Honey locust	Ash, all	Cottonwood
Kentucky coffee	Walnut	White poplar
Larch	Sycamore	Willow, all
White bark birch	Red maple	River birch
Horse chestnut	Hackberry	
Conifers, all (pine, spruce, fir, etc.)	Cherry	
Serviceberry	Hawthorne	
Redbud	Ironwood, all (both muscle-wood and Ostrya)	
	Pagoda dogwood	

\*This chart is based on the author's personal experiences. It is not complete and is not guaranteed to be accurate.

Prepared by Jean E. Olson, retired extension landscape architect, and Paul H. Wray, extension forester.

### and justice for all

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