

THE RIGHT TREE

A guide to proper tree selection and planting near power lines



The Right SIZE

PROPER TREE SELECTION

The right tree in the right place adds beauty to the landscape, offers many environmental benefits, and saves you energy and money. However, the wrong tree in the wrong place is a hazard to both public safety and the reliability of electric service.

Trees can also get in the way of underground utility lines, scrape the sides of houses or cars, interfere with pedestrians, block signage, and cause sidewalks to heave or break. All of these potential problems can easily be avoided by planting the right tree in the right location.

With thoughtful planning and proper tree selection, you can enjoy the trees you plant for years without worry that they will become a power line hazard.

NATURAL BEAUTY

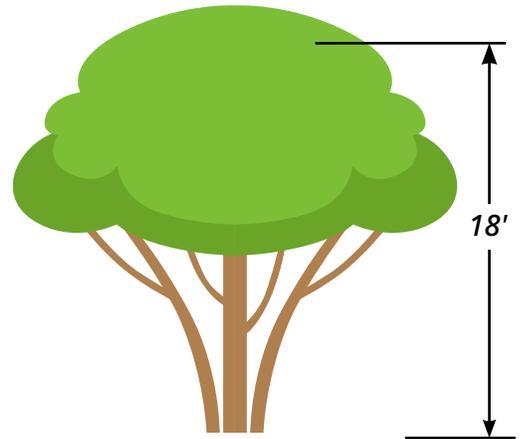
Trees provide beauty to the landscape. They can add to the comfort of a home and screen an unattractive view or provide privacy. Businesses also benefit from trees planted on boulevards and shopping areas.

ENERGY AND COST SAVINGS

Properly placed shade trees lower temperatures in communities and homes and reduce the need for air conditioning, conserving energy and dollars and reducing air pollution. Trees shade homes, streets, and parking lots, reducing the urban heat island effect. In winter, trees provide shelter from winds, also reducing energy usage.

AIR AND WATER QUALITY

Trees reduce air pollution by trapping particulates and absorbing pollutant gases. Their roots help hold soil in place, reducing erosion and slowing water runoff, contributing greatly to water quality.



Look for trees that will stand no higher than 18' when fully grown.

REDUCED GREENHOUSE GASES

Because they store large amounts of carbon in their trunks and leaves, trees play an important role in the environmental cycle by absorbing carbon dioxide and giving off oxygen.

HELP OUR BUTTERFLIES, HUMMINGBIRDS, HONEY BEES, AND BATS

Plant flowering shrubs, wildflowers, and native grasses to give pollinators food and nesting sites so they can transfer pollen to create fruits, nuts, and flowers.



HEIGHT CONSIDERATIONS

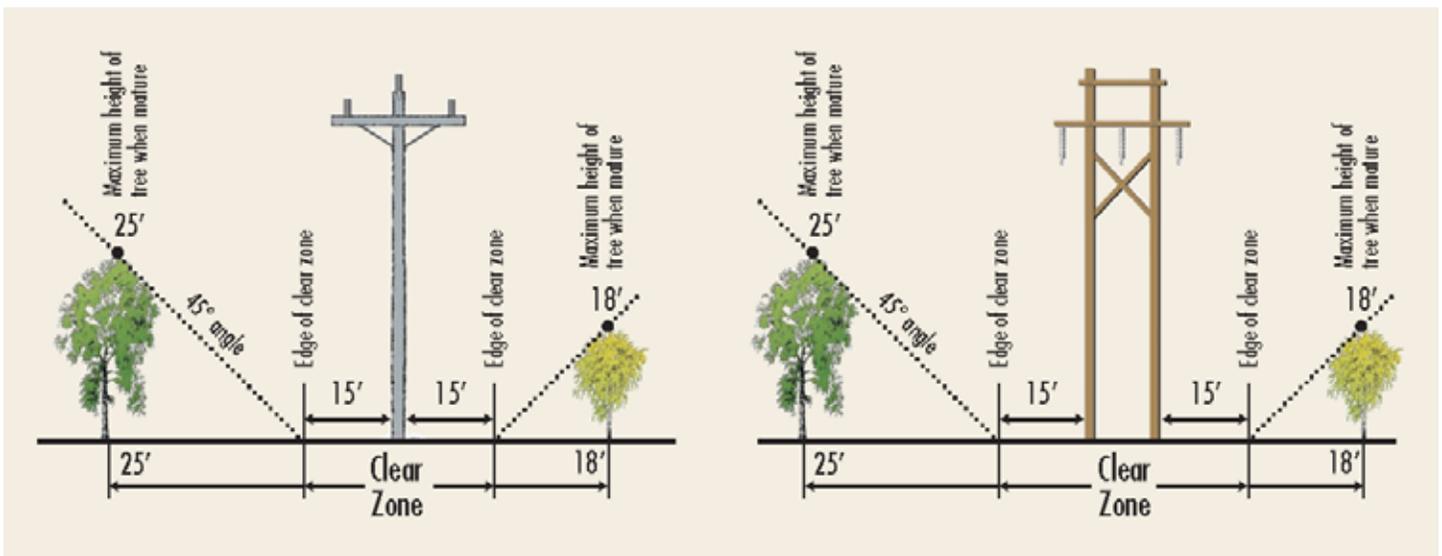
The first step toward selecting and planting the right tree is knowing how tall the tree will be at maturity. Without proper planning, the small tree you get at the nursery can grow rapidly around the power line, threatening public safety and reliability. For example:

- Trees and falling limbs can bring down power lines during storms, creating dangerous situations and outages.
- Trees that are close to or touch a power line can cause serious and fatal accidents.
- Trees are a common cause of power outages. Even with regular tree pruning, electric utility companies respond to many service calls because of trees, adding to the overall cost of electrical service.
- Overgrown trees can block the path of construction vehicles that need access to the lines for maintenance and emergency repairs.

For these reasons, it is important to plant the right tree in the right place.

WHAT YOU CAN PLANT AND WHERE

A clear area along the power line route, called a clear zone, must be maintained at all times. Shrubs, other low-growing plants, and many trees can safely be placed near power lines, as long as the proper clear zones are maintained.



For safety and reliability, a **minimum** 15' clear zone is required on both sides of a power line. A tree should never be planted closer than its height at maturity to the edge of the clear zone. For instance, an 18' tree must be planted at least 18' from the edge of the clear zone.

The Right KIND

APPEARANCE

When choosing a tree, you should consider its appearance and how it fits into your landscape. Trees vary widely in size and shape. They can be evergreen or drop their leaves each year. Many have showy blossoms, turn bright colors in the fall, or have attractive bark all winter.



Consider how the tree will look when mature. Will it frame the house nicely or seem too large? Sometimes a tree that seems too big in a front yard will make a good background for the house when placed in the back.

Consult your local nursery about trees that grow well in your area and their mature size. This will help you make the right decision about what to buy and where to place your trees.

The right kind of tree for you may be:

- American Smoketree
- Nannyberry Viburnum
- Cherry – Pin or Sargent
- Panicle Hydrangea
- Dogwood – Pagoda or Grey
- Plum – Princess Kay or American
- Flowering Crabapple
- Redbud
- Lilac – Japanese, Peking, or Dwarf Korean
- Serviceberry – Apple or Allegheny
- Magnolia – Star or Loebner
- White Fringe Tree

WHAT YOU CAN PLANT AND WHERE CONTINUED

Maintain a 10' clearance in front of the transformer and a 4' clearance to the sides and back. Use gravel, wood chips, grass, or low ground cover around the transformer. Flowers are okay but may get trampled if we must work on the transformer. Never dig beside a transformer or install fences or storage buildings near them. Crews need clear access 24 hours a day to safely perform maintenance or restore power.



HARDINESS & HEALTH

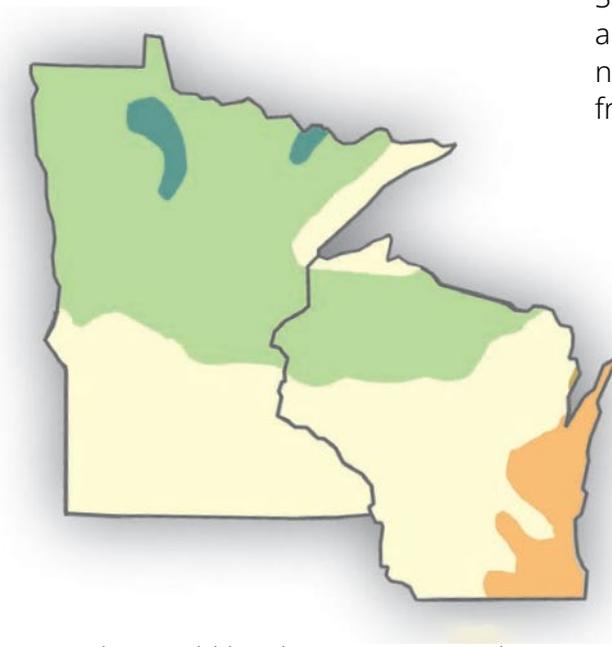
Another consideration in tree selection is the long-term health of the tree, which can be affected by soils, climate, susceptibility disease, and quality of nursery stock.

PRUNING

Again, size is important. Trees that need to be pruned severely to fit into their space are prone to disease, insect infestation, and wind damage.

COLD HARDINESS ZONE

Select trees that are hardy in your area so they will withstand cold winters and the heat of summer. The Connexus Energy service area is in Zone 3 and Zone 4. Check the map below to see which trees will thrive in your area.



Hardiness Zone Key

Zone 2	-50	To	-40	
Zone 3	-40	To	-30	
Zone 4	-30	To	-20	
Zone 5	-20	To	-10	

SOIL

Soil conditions can affect the health of your trees. Some trees don't do well in boggy, poorly drained clay or heavily compacted sites. Others have problems in sandy soils that don't hold moisture. The pH of the soil can affect growth in some trees.

Check the special notes to make sure the tree you choose will do well on your site. If you need help determining your soil type, consult your local agricultural extension office. They can give you information for your area and even test your soil if necessary. Numbers for these offices are listed on the last page of this guide.

INSECTS AND DISEASE

Some tree species are particularly prone to certain disease or insect infestations. Choosing other species or disease-resistant cultivars of these trees can help assure the long-term health of your trees.

PLANT STOCK

Purchase trees with healthy stems and roots. Stems should be free of wounds, cankers (dead areas), or other damage. Roots should be at or near the surface of the soil ball and growing away from the stem.

Use these cold hardiness zones to select trees that will survive winter in your region.

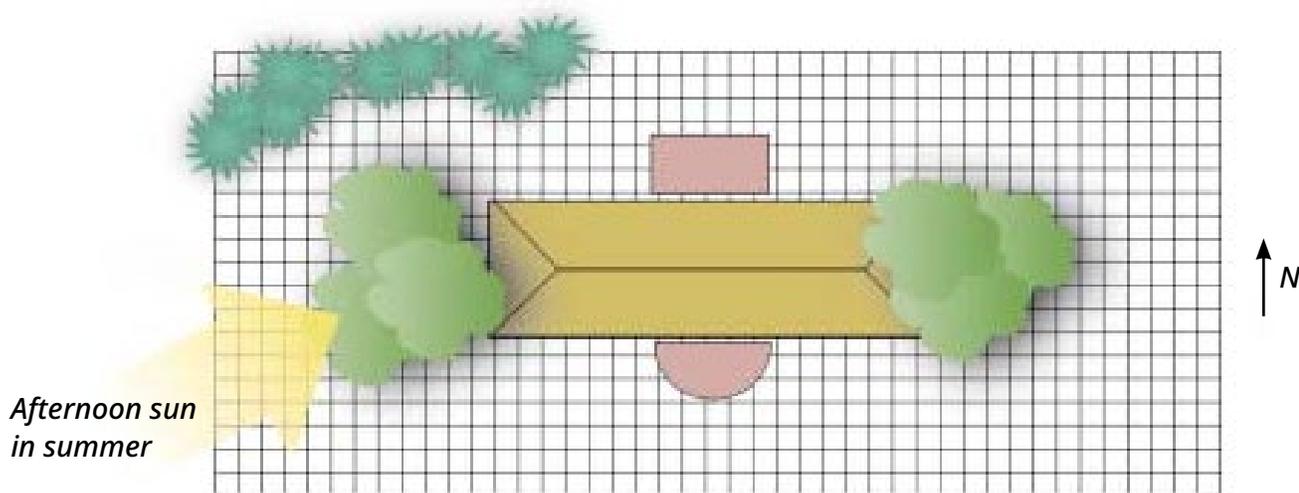
The Right PLACE

ENERGY CONSERVATION

Properly placed trees conserve energy and reduce both heating and cooling bills. Planting deciduous trees – trees that drop their leaves in the fall – on the west and east sides of your house will provide the greatest energy savings during both summer and winter. The mature size of the tree should also be considered when siting in relation to your house.

SUMMER

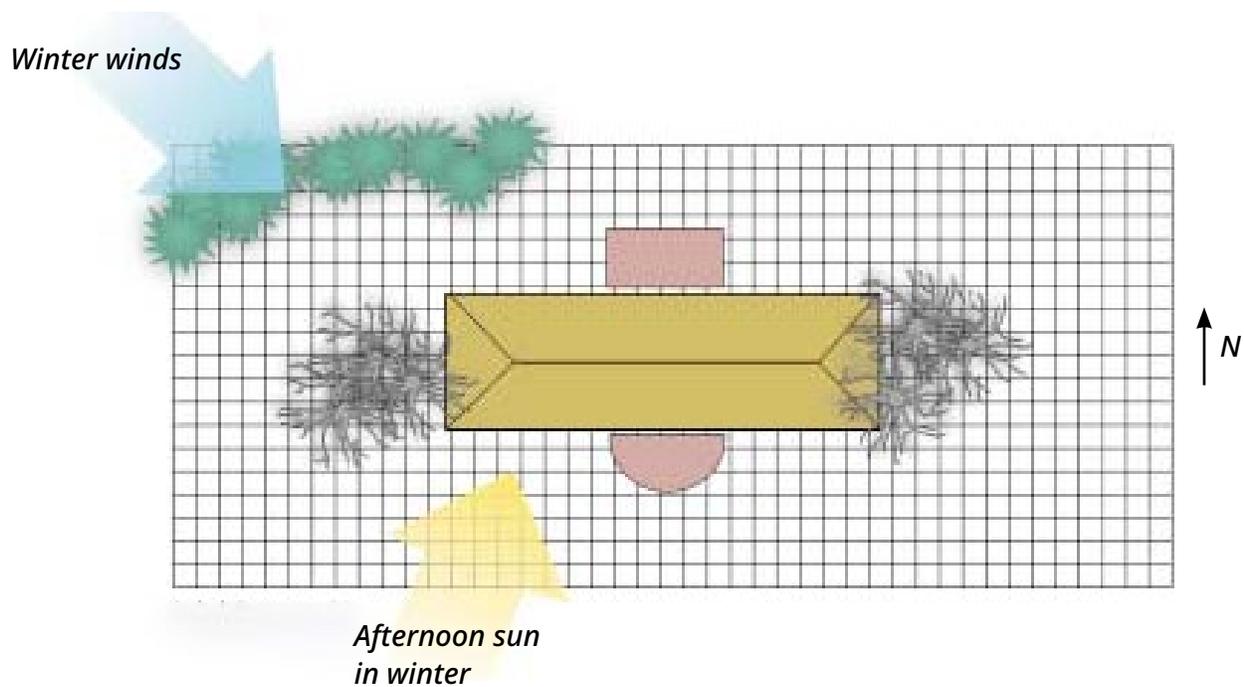
- Planting trees on the east and west sides of your house will block the morning and afternoon sun in the summer, thereby reducing your cooling bill.
- Trees planted to shade driveways, patios, sidewalks, and streets will help create a cooler atmosphere around the home. Trees do this by transpiration, a natural evaporative cooler. Such plantings will make your house more comfortable in the summer, even if you do not have air conditioning.
- Reducing cooling costs also reduces the peak demand for electricity in summer months, which helps reduce the need for new power plants and keep electricity costs down.
- Locate air conditioners away from south windows and shade them with deciduous trees, which will help them to run more efficiently by making the area cooler but still allow good air circulation.



Save energy by planting trees that shade your house on the east and west sides in summer and then shed their leaves in the fall to allow heat gain from the winter sun. Evergreens planted on the north or northwest side can provide a windbreak in cooler climates.

WINTER

- In cold climates, avoid planting trees on the south side of your house. On sunny winter days, you can open your shades on the south side to take advantage of passive solar warmth gained from the winter sun as it travels low in the southern sky. If trees already exist on the south side of the house, prune their lower branches to allow more sun through.
- Coniferous trees – trees that keep their “leaves” all year round – can be planted as a windbreak on the north-northwest side of the house. Such plantings can reduce heating costs that result from evaporative cooling and air infiltration in the winter.
- Windbreaks also guide wind up and over the house. Conserve energy by planting a dense row or continuous clusters of evergreen trees with a row of shrubs or smaller trees in front.
- Properly space windbreak rows so that the sun can reach the lower branches of all plants.



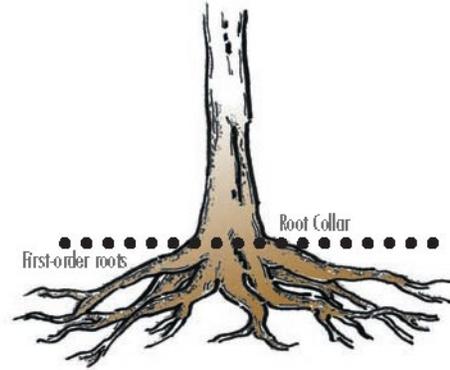
Save energy by planting trees on the east and west sides, keeping the south side clear to allow heat gain from the winter sun. Evergreens planted on the north or northwest side can provide a windbreak in cooler climates. If you plan on planting on the south side, choose a deciduous tree.

The Right WAY

PROPER TREE PLANTING

Once you have selected the right tree for your site, follow these general steps to make sure it will grow well. Refer to *Special Planting Considerations* for the type of tree you are using.

- **Call before you dig!** Call 811 or visit gopherstateonecall.org to locate all underground lines in your yard before digging.
- **Decide how deep to plant the tree.** The tree should be planted so that its root collar (the bulge or flare right above the root system) or the first main branch root is even with or slightly above the soil surface. Many trees are planted too deep at the nursery. So, to locate the root collar, probe with a wire or remove extra soil. Prune away smaller roots growing from the trunk down to where the first large side roots (first-order roots) occur, about the width of a pencil.
- **Prepare the site.** Dig a large saucer-shaped hole two to five times wider than the root ball and just deep enough so that the root collar is slightly above the soil surface. To determine how deep to dig the hole, measure from the first-order roots to the bottom of the root ball. Do not dig the hole deeper than you plan to plant the tree. (See diagram on next page.) It is better if the root collar is slightly higher than ground level because of possible settling. Do not disturb the soil beneath the root ball.
- **Place the tree carefully in the center of the hole** after removing it from the container.
- **Backfill** when the tree is positioned and straight. Backfill the hole with the soil that was removed. As the backfill is added, lightly push the soil around the roots or water the soil to eliminate air pockets. (Do not pack the soil after you water.) Backfill to the height just below the root collar. Don't plant the tree too deep.



Root collar should be even with or slightly above the ground level.

- **Mulch** with wood chips to a depth of 4 inches on top of the planting circle. Keep the mulch 4 inches away from the trunk to keep fungus from growing on the trunk.
- **Water** is very important to a newly-planted tree. A slow, root-saturating, one-hour trickle once a week is a good rule of thumb for a new tree. This provides the new roots with sufficient moisture without drowning them. If it rains or is very dry, the watering schedule should be adjusted accordingly.

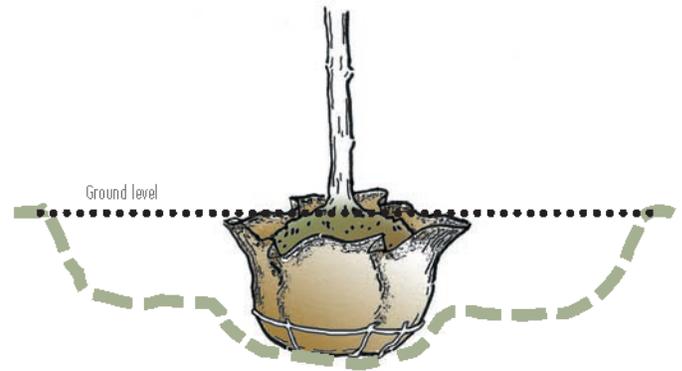
SPECIAL PLANTING CONSIDERATIONS

Nurseries sell trees in three types: ball and burlap, containerized, and bare-root. There are some special planting considerations for each one.

Ball and burlap trees are generally larger trees dug from the ground at the nursery and might weigh several hundred pounds. The root ball is wrapped in burlap and encased in a wire or string basket.

- The basket and burlap should not be removed until the tree is positioned in the hole. This keeps the root ball intact.

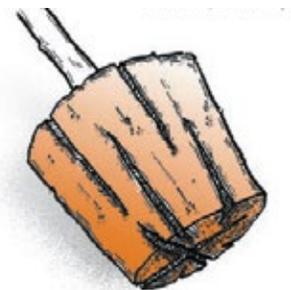
- Carefully loosen the top of the burlap. Probe with a wire or remove soil to determine where the root collar is located – right above where the large roots begin. Dig the hole so the root collar is even with or slightly above the soil surface.
- Carefully place the tree in the hole and backfill some soil around the tree to stabilize it. Cut away as much of the wire basket as you can without disturbing the soil ball.
- Remove all twine and rope from around the ball.
- Remove the nails holding the burlap together and gently fold the burlap back.
- Cut away loose burlap without damaging the root ball. Push any part of the basket and burlap that could not be removed down into the ground. This will allow the roots to grow out into the soil.



Ball and burlap tree properly placed in wide hole.

Containerized trees usually come in plastic or paper pots or wooden baskets.

- Remember, the tree may be planted too deep in the pot. Remove soil down to the root collar, where the first large side roots begin (those about the width of a pencil). If the soil ball is dry, water it.
- Determine if the tree roots hold the soil together in the pot or if the soil is loose.
- If the soil is packed or the pot is root-bound, carefully remove the tree from the pot. You may have to lay the tree on its side and press the pot to free it from the soil ball.
- If you see roots circling around the edge of the soil ball once the container is off, make a vertical slice up each quarter of the root ball. Cut an X across the bottom of the soil ball and continue planting normally. Cuts should be 1 to 1½ inches deep. (*See below.*) This will reduce the chances of the tree developing stem-girdling roots or restricted roots as it grows.
- If the container cannot be removed easily or the tree starts to come out without the soil, first carefully cut off the bottom of the container. Place the tree and remaining pot in the planting hole and adjust for final position. Then cut the container away from the soil ball. Gently backfill and remove the sides of the pot.



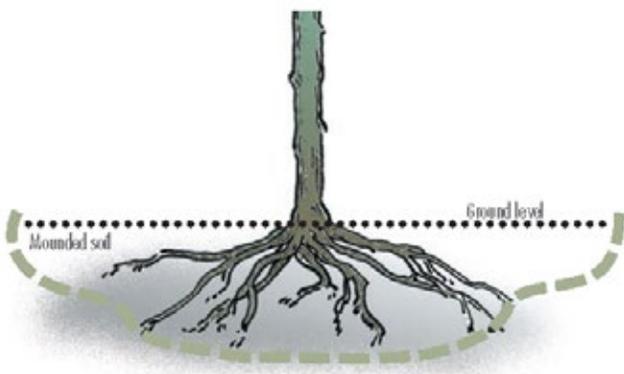
Containerized root ball showing proper scoring.

The Right CARE

SPECIAL PLANTING CONSIDERATIONS CONTINUED

Bare-root trees have no soil on the roots. The roots must be carefully protected from drying out.

- Bare-root trees must be kept cool and moist at all times. Small, hair-like absorbing roots can dry out quickly on a sunny or windy day. Leave these trees in their packing materials and keep them moist or cover with moist mulch until you are ready to plant.
- Soak in water for 6-12 hours before planting. Prune damaged, diseased, or girdling roots before planting.
- Make sure the hole you dig is wide enough to spread the roots all the way out. Don't wrap the roots around in the hole.
- Stabilize the tree and spread roots out to their normal position by mounding a little soil in the bottom of the hole, setting the tree on the mound, and then positioning the roots out. (See below.)
- Since there is no root ball to hold the tree straight, you will need to support it carefully while backfilling the hole. Backfill the hole half way and



Bare-root tree planted with root collar placed at ground level and backfill for stabilizing the tree and positioning roots.

then water it to eliminate any air pockets under the roots. Don't pack the soil after watering.

- Be sure to plant the tree so the root collar is slightly above ground level. Occasionally, you may need to stake a bare-root tree after planting. Be sure to remove the stake after the first growing season.
- Some bare-root species may have to be "sweated" to break dormancy, or they will not grow. Sweating requires a dark, humid environment to help trees leaf out. Consult your nursery about whether your trees need this procedure.

AFTER-PLANTING CARE

Watering – Newly-planted trees need regular watering. Generally, a deep watering once a week is enough. You do not need to water if there has been sufficient rainfall. Ball and burlap and containerized trees have all their roots confined to the root ball. Be sure to water the ball thoroughly. Water the tree during dry periods for the first three years after planting.

Fertilizer – Newly-planted trees are easily burned by fertilizer. If the trees are planted into fertile soil, do not add any fertilizer during the first three years.

Staking – Most newly-planted trees do not need staking; only those that are unstable should be staked. Secure the tree to the stakes using soft materials that will not damage the cambium (the layer right under the bark) of the tree. Stakes should be removed once the tree is established, usually one year.

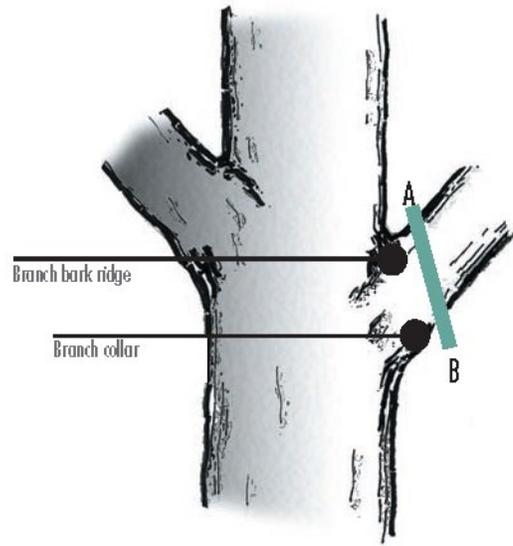
Pruning – This is an important maintenance practice that will improve the health and development of the tree. When you plant and each following year, prune all broken, dead, or rubbing branches. Trim away any secondary or competing “leaders.” Be very careful not to trim the tree’s main leader.

For younger trees, you may want to “raise the crown” by removing some of the lower branches, especially to provide clearance for pedestrians. Only remove a few branches each season. Don’t cut the tips off the branches. Instead, make your cuts at the unions between the two branches.

Proper pruning can be a successful defense against insects and disease, if the proper cut is made. Refer to the illustration at right for guidance on how to make the proper type of cut for smaller branches.

Application of wound dressings or pruning paints is unnecessary in most instances. These paints can prevent wounds from healing correctly. Only use pruning paint when pruning oaks from April to June, the high-risk period for spread of oak wilt.

When to prune – The best time to prune most trees is when they are dormant – in the winter or very early spring. This helps reduce the spread of disease as well as reducing the stress on the trees. Efforts should be made to avoid pruning oaks or elms during the growing season.



Avoid cutting into branch bark ridge and branch collar.

How to prune – Follow these steps:

Step 1: Locate the branch bark ridge.

Step 2: Locate the branch collar.

Step 3: Locate the A & B targets.

Step 4: Support the branch as you cut to keep the bark from ripping.

Step 5: Use clean, sharp pruning shears or a pruning saw to cut from A to B.

Note: It is important not to cut into the branch collar because it creates a larger wound and it’s more difficult for the tree to cover the wound.



CAUTION

Touching a power line can be fatal. When you’re pruning, keep yourself and all equipment away from any power line. Always assume that all overhead lines are energized.

If you are concerned that a branch or tree is too close to a power line, call Connexus Energy at 763.323.2650 to inspect the vegetation clearance. During regular working hours, Connexus will assess and solely determine whether to:

- Remove the lines temporarily while the work is being done by the owner or their licensed tree contractor or
- Trim the tree/branch to an approved distance from the power line, leaving the remaining portion of the tree and the clean-up work to be done by the owner

In both cases, no charge will be assessed to the owner.

The Experts

FOR MORE INFORMATION

University of Minnesota Extension – extension.umn.edu/garden

Minnesota Landscape Arboretum – arboretum.umn.edu

Ask a Master Gardener Line – 612.301.7590

SOIL TESTING

University of Minnesota – 612.625.3101 or soiltest.cfans.umn.edu

THANK YOU TO THE EXPERTS WHO CONTRIBUTED TO THIS GUIDE

Kelly Fleissner, Former City Forester, City of Duluth

Gary Johnson, Professor Emeritus of Urban & Community Forestry, University of Minnesota

Paul Walvatne, Retired Forestry Unit Supervisor, Minnesota Department of Transportation

Mark Hasse, Fair's Nursery



**Know what's below.
Call  before you dig.**

*Before you dig, you must have your underground lines located.
IT'S THE LAW. Contacting Gopher State One Call is easy!
Call or go to their website to schedule an appointment
at least three days before digging.*

811

800.252.1166

gopherstateonecall.org