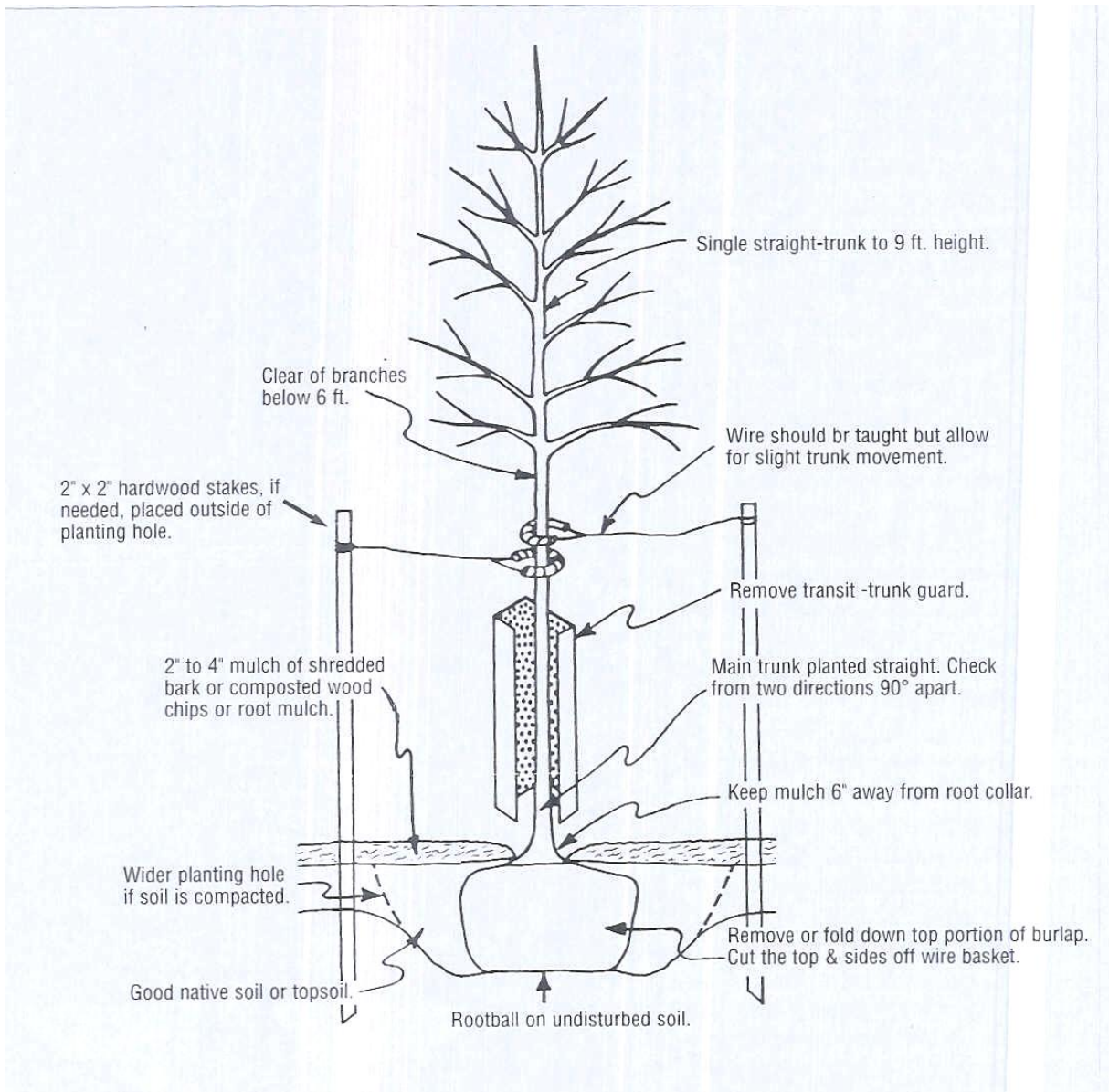


B. Planting Guide for the General Public



1.0 Utilities and Underground Features

- A. Anyone planning to dig, even a tree on private property, needs to notify utility companies (1-800-272-1000) 72 hours in advance of digging to locate utilities, wherever necessary. Severing a live underground wire, with a metal shovel can be deadly. Breaking a pipe or cable can also be costly, especially if you did not call first.
- B. If there is a conflict with the utilities and the planting, you will need to find an alternate location prior to the planting process.

1.2 Protect during Construction

- Large shade trees, taking 100 years or more to grow, are irreplaceable during our lifetime. They raise the value of any property significantly. This being the case, we must strive to keep them safe from construction crews, site planners and engineers.
- You don't have to be working right next to a tree to kill it. Trees can be mortally wounded by injuries to their root system, which extends far beyond its branches, just beneath the soil surface. Drip-line.

Three common hazards are:

1. **Soil compaction** around the root system and
2. **Changing the grade** of the site.
3. Trees are also **wounded by machinery** and open wounds make the tree more susceptible to insect infestation and disease.

Protect The Root System

- The roots of trees, especially in clay soils, rarely have roots deeper than 24" below grade which spread outward from the trunk 1 ½ times the size of the crown.
- The major feeding roots of the tree, a fibrous matt of root hairs lie in the top 6" of soil.
- These are what are commonly destroyed by heavy construction equipment.
- Therefore when building around existing trees, the single, most important mission is to protect their root system.
- Maples, oaks and most hardwood species are the most sensitive to root damage by compaction.

Changing Grade

- Changing a site's grade can alter drainage patterns, or smother a tree's roots.
 - Piling soil on top of the roots will limit the oxygen that gets to them, thereby, "suffocating" them.
 - A new grade that causes water to puddle will drown the roots and cause root rot.
 - Also, trees can suffer if all of their water is drained away, like in the case of new subdivisions that sink in new wells or draw water from the upper water tables and the trees.
 - Topsoil should be free from stones, lumps, plants, roots and other debris over 1 ½". Topsoil must also be free from plants or plant parts of Bermuda grass, quack grass, crab grass, Johnson grass, mug wort, nut sedge, poison ivy, dodder, Japanese knotweed Canadian thistle or other noxious weeds.

2.0 Planting Procedure for Trees

2.1 Preparing Tree Pit (See Figures)

A. Walls of tree pit shall be dug so that they are vertical or sloping outward in heavy soils and scarified (sides loosened-up).

B. Width -

- Dig a planting **hole @ 50% wider than the root ball's diameter**. (For a 20" root ball, dig a 30" wide hole.)
- For soil compacted by construction equipment, dig a wider hole, up to 3x the root ball diameter.

C. Depth –

- The tree pit needs to be deep enough to allow the top of the ball to be even with the existing grade. Plants shall rest on undisturbed existing soil or well-compacted backfill.
- Too shallow, the feeder roots are easily exposed and dry out, stressing and killing the tree.
- To determine the right depth for planting: Locate the root flair – (the point where the tree trunk starts to flair out and the root system begins) – and make sure it remains at or above the soil level.
- Sometimes, soil gets pushed up around the trunk by mechanical tillers when trees are mechanically dug. You have to untie the burlap and pull away the soil from the top of the root ball with a blunt tool or your fingers.
- Use a shovel to measure from the root flair to the bottom of the root ball. This is the proper depth for planting a hole.
- To plant the tree, lift by the root ball, never the trunk, and lower it into the hole.

i. Interpretation and Discussion

If a tree is planted too deep, not enough air can circulate through the feeder roots just beneath the surface. This causes gases and other chemicals to get trapped in the soil, which gradually burns the roots and suffocates the tree.

2.2 Placing Tree in Pit (See Figures)

- A. Place the tree in the pit carrying the ball and then lowering it into the pit. Never lift the tree by the trunk or branches.
- B. Set the tree straight in the center of the pit with the most desirable side facing toward the prominent view.
- C. Cut and remove rope off the top 50% of the root ball and remove top of wire basket if present (See below) Pull burlap back to edge of the ball.

All plastic or synthetic film must be removed from the root ball. Cut all twine away from trunk.

D. Burlap –

- Keep the burlap on the root ball while lowering the tree into the hole – this protects the root ball and keeps it intact.
- Remove any nylon or other twine from around the trunk or the root ball, since most do not break down and could eventually injure the tree.
- Nurseries usually protect trees during their transport and sale by binding root balls with plain or treated burlap. These days, most nurseries use treated burlap, which extends the “shelf life” of a root ball.
- Sometimes, nursery growers use a plastic covering that resembles burlap – this should be totally removed.
- Cut away the top portion of the burlap and remove it. You can leave the rest on, as it will eventually decay. As many burlaps are treated, taking a very long time to break down:
- Leaving burlap around the collar or trunk will retain moisture, and keep the covered portion soft. Just what insects, borers and fungus love.
- Do not remove it, as it could destroy fine roots.
- Instead, Peel it back, partially down the sides and
- Make slits cutting the burlap, in the lower sides of the burlap, giving roots an avenue of escape.

E. Wire baskets

- Wire baskets help to hold the root ball together.
- In the past, it was thought to be OK to leave them on, as they would rust away in time. Today, most of the wire cages are galvanized, treated with zinc to prevent rusting, so partial removal may be necessary.
- After the tree is in the hole at the correct depth, untie the cage, removing the plastic twine.
- Cut away the top portion of the basket and snip down the sides with wire cutters, bending the wire away from the root-ball. This will give the roots plenty of space to spread, yet keeping the ball intact.

2.3 Backfilling Tree Pit

A. Backfill Mixture

- A. Backfill mixture of existing soil and topsoil should be a minimum of 3 to 1 or adjusted depending on the hardness and clay content of the soil.

- B. Thoroughly mix soil amendments, if needed, either prior to filling pit as pit is being filled.
- C. The tree must remain straight during backfill procedure.
- D. Backfill sides of tree pit halfway with soil mixture and tamp as pit is being filled.
- E. Finish backfilling sides of tree pit and tamp firmly.
- F. Never cover top of root ball with soil.
- G. Form a saucer above existing grade, around the outer rim of the tree pit., especially in slopes and in heavy soil.
- H. Mulch top of root ball and saucer to a depth of 2", not to exceed 3". Do not place mulch against the trunk.

2.4 Mulch

- A. Mulch material should be composted, shredded, hardwood bark, pine bark, or hardwood with less than 10% sapwood.
- B. Material should be in uniform size and free from foreign matter and dyes. (Many cedar mulches contain red dye. Cedar also contains natural chemicals that are toxic to other plants.)

i. **Mulch: Interpretation and Discussion**

- § Mulch works wonders when it comes to water conservation and it modifies the microclimate around the plants it protects.
- § Mulch helps retain soil moisture by reducing evaporation, helping the soil to absorb rainfall and it lessens runoff and erosion.
- § It will keep the soil cooler in the summers and warmer in the winters.
 - In summer, mulch absorbs the sun's ultraviolet rays and converts them into long-wave rays and reduces the root-zone temperatures up to 12 degrees as compared to lawn areas.
 - In the fall, the mulched soil loses heat more slowly.
 - Warmer winter soil temperatures result in less root loss due to freezing and minimize frost heaving.
- Not all soil covers are good mulches.
 - Rocks, gravel and limestone chips are not true mulches.
 - They do not improve the rooting environment of the plants; in fact they do just the opposite.
 - They retain cold and heat longer which makes the soil too hot or cold for the plants.

ii. **Mulch Volcanoes - Interpretation and Discussion**

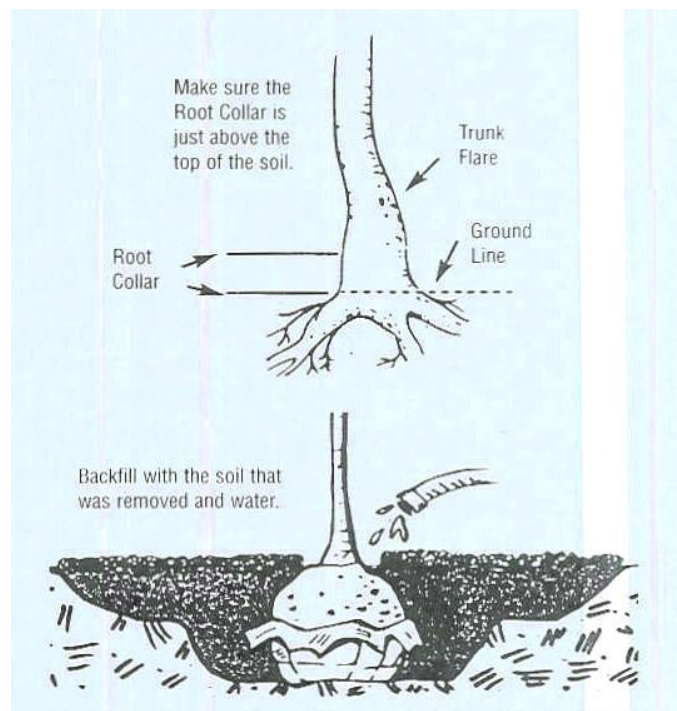
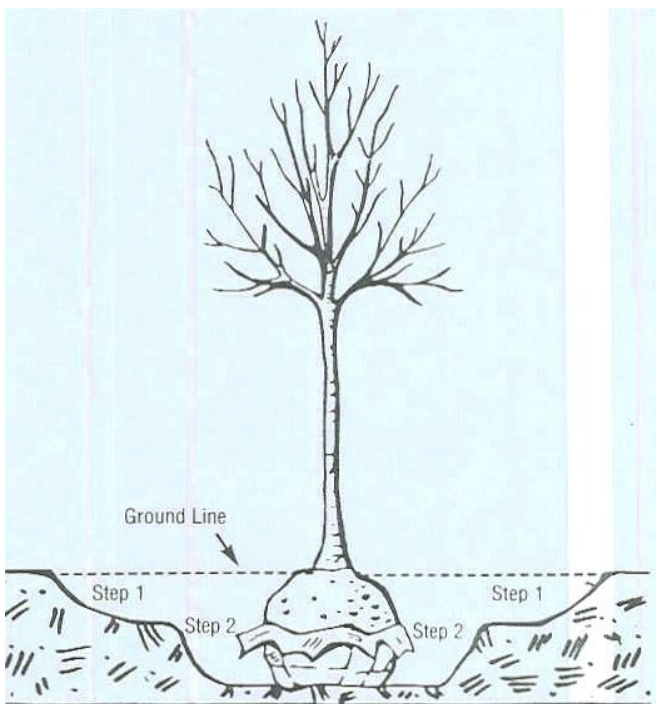
- Too much mulch, can be lethal for trees and shrubs.
- Mulch volcanoes are one of the worst horticultural practices around.
- Mulch around the trunk of any woody plant keeps moisture at the trunk, attracting borers, insects and mice to make a meal and/or home of your favorite tree or shrub.

- It also encourages shallow root growth around the trunks, which leads to drought stress, root girdling and subsequent death. Often the trees will not die right away, but will go into decline, new growth is retarded, and by the time the tree dies, the contractor is long gone, or more often the decline is blamed on lack of water during drought.
- Pull that mulch away from the trunks, and spread it out to @ 3" thick, under the tree, as far as the drip line, or as far out as you can reasonably go. Replenish mulch when there is 1" or less.

C. Water thoroughly on the interior of the tree saucer until it is filled, even if it is raining. A second watering may be necessary to attain saturation of the root ball and elimination of air pockets.

D. Pruning should be restricted to corrective pruning to improve form only. This includes structure, double or multiple leaders, dead, damaged, diseased and/or conflicting or crossing branches. Do not cut the main leader. Trees planted along roadways prone to pedestrian traffic shall be elevated to a height of 8' from ground level.

E. Remove all tags, labels, strings and wire from the tree, unless otherwise directed.



Planting Too Deeply or "Too-Deep Syndrome"

"Too-deep syndrome" (TDS) does not necessarily start with planting in the landscape, but may begin during nursery production. Sometimes container stock that is transplanted into larger pots is buried during the process. Balled and burlaped trees fall victim to TDS in the nursery when excess soil is piled around them during cultivation and digging. As a result, the roots become too deep in the ball.

When TDS occurs in the landscape, it is often due to planting holes that are dug too deep. Backfill is placed at the bottom of the hole; the root ball is set on the backfill, the soil settles and the root ball sinks. The tree may be initially planted to specification (10 percent of the root ball aboveground), but with subsequent settling of the soil, the tree may ultimately end up too deep.

A more common and easily corrected cause of TDS is excess mulch. Mulch should never be piled up around the trunk. Never apply more than 2-3 inches of mulch. Excess mulch reduces the amount of oxygen reaching the roots. As a result, the roots grow into the mulch. During a drought the mulch often dries out and the roots in the mulch die from desiccation. Remember that a leading cause of failure of newly planted material is improper installation

Planting too deeply can lead to several problems:

- Trees become more susceptible to wood-boring insects and basal canker-causing *Armillaria* and *Pytophthora* fungi. However, these problems alone do not cause death. Death arises from the moisture held in the excess soil, or in mulch that is in direct contact with the bark. The moisture penetrates the bark, suffocates the phloem cells and disrupts the translocation of food from the leaves to the roots. The result is weakened wood and a stressed tree that is susceptible to borer and fungi attack.
- The roots of trees planted deeply will grow towards the surface. If the grass is planted under the tree, the grass roots will compete with the tree roots for nutrients and moisture.
- Trees that are too deep in the ground are more susceptible to frost cracks.
- Suckering shoots will grow from the underground portion of the trunk.
- Girdling roots may form that will choke the trunk.

Trunk Girdling

Trunk girdling may lead to tree decline. Plastic strings, synthetic burlap and girdling roots can encircle the trunk and slowly cut off water and nutrient supply to part of the tree, much like a tourniquet inhibits blood flow to an arm. Girdling roots often suppress trunk growth so that one side on the tree will not have a flare. Girdling roots can be caused by other factors besides improper planting depth, including:

- Spiraling roots that develop in the nursery pot.
- Digging a planting hole that is too small.
- Addition of soil amendments and fertilizer to the backfill soil at planting. Changing soil texture may restrict root growth out into the surrounding soil.
- When planting holes are dug with an auger, especially in heavy clay soil, the sides of the hole are compacted and may become glazed. Wall glazing may lead to root circling and eventual girdling of the trunk.

On smaller trees, girdling roots should be cut and removed. On older trees, weigh the injury caused by removal versus benefit. If the tree has survived for a long time, it may be best to leave it alone