

THE OHIO STATE UNIVERSITY CAMPUS TREE CARE PLAN

Revised December 2016

1. PURPOSE

The purpose of The Ohio State University campus tree care plan is to identify the policies, procedures, and practices that are used in establishing, protecting, maintaining, and removing trees on The Ohio State University campus. The overall goal of the plan is to ensure a safe, attractive, and sustainable campus urban forest. The specific objectives of the plan are to:

- Ensure proper species selection, high-quality nursery stock acquisition, and industry-consensus planting procedures
- Promote species diversity and proper age structure in the tree population
- Protect high-value campus trees before, during, and after construction and renovation projects
- Promote tree health and safety by utilizing ISA's best management practices when maintaining campus trees
- Ensure that trees are reasonably replaced when there is mortality due to weather, pest infestations, injury, or construction displacement
- Encourage campus community members to respect and value the campus urban forest

Note: This plan has been in partial fulfillment of Arbor Day Foundation's standards for Tree Campus USA designation and does not reflect official university policy on all matters. However, many of these policies, procedures, and practices are currently in place and administered. The Why Trees Matter Committee is seeking to have the plan officially adopted by the university.

2. RESPONSIBLE DEPARTMENT

The Ohio State University Facilities Operation and Development in coordination with Chadwick Arboretum and Learning Gardens are responsible for implementing the tree care plan. Both organizations work closely on planting, treatment, pruning/removal of trees on campus grounds and communicating the value of trees.

3. CAMPUS TREE ADVISORY COMMITTEE

The tree advisory committee is formally known as the Why Trees Matter Committee. The committee is comprised of faculty, students, staff and individuals from allied plant related programs throughout the university and community. The committee meets once per academic semester, and provides data-based input in the care and management of the campus landscape.

4. CAMPUS ARBORICULTURE PRACTICES

I. Pruning Schedule - The maintenance pruning schedule will be dictated by tree species, age, function, and placement.

- Trees less than 7 years old should receive structural pruning on a biennial or as needed basis.
- Trees 7-20 years old should receive structural pruning every two to five years or as needed.
- Trees 20 years old and older receive maintenance pruning every five to seven years to clean dead, diseased, dying, and defective branches from the crown.

- Trees adjacent to roadways, walkways, signs, and street lights are annually inspected for safety and clearance issues and maintenance pruned as necessary.

II. Pruning Practices

To encourage the development of a structurally strong, healthy tree, the following guidelines are prescribed.

General

- Prune with a clear objective or outcome.
- Prune first for safety, next for health of tree, and finally for aesthetics.
- Prune without damaging the branch bark ridge or collar when newly branched.
- Internode (heading) cuts should not be used except in storm response and crown restoration procedures.
- Use branch reduction or thinning to achieve pruning objectives rather than making large (>8" diameter) branch removal cuts.
- Pruning is to be conducted by trained personnel or under the direction of trained personnel.
- Provide annual tree pruning training for superintendents in grounds maintenance.
- Train young trees by removing co-dominant leaders and encourage scaffolding branches for the tree as it matures.

Cleaning

- Remove dead, diseased, dying, and defective branches to reduce hazards, promote, health, and improves appearance.
- Remove large branches with the aid of ropes and rigging equipment and/or crane to minimize the risk of tree injury from falling debris.

Thinning

- Perform thinning to reduce the density of branches, which increases light penetration, improves visibility, and decreases wind load.
- Assess how a tree will be pruned from the top down.
- Favor branches with strong, U- shaped angles of attachment. Remove branches with weak, V-shaped angles of attachment and/or included bark.
- Provide lateral branches evenly spaced on the main stem of young trees.
- Remove any branches that rub or cross another branch.
- Make sure that lateral branches are no more than one-half to three-quarters of the diameter of the main stem to discourage the development of co-dominant stems.
- Do not remove more than one-quarter of the living canopy of a tree annually. If it is necessary to remove more, do it over successive years.

Raising

- Judiciously raise canopy to provide vertical clearance from thoroughfares, signs, street lights, and structures while keeping the mature form of the tree in mind.
- Always maintain live branches on at least two- thirds of a tree's total height. Removing too many lower branches will hinder the development of a strong main stem.
- Remove basal sprouts and vigorous epicormic sprouts.

Reduction

- Use reduction techniques to decrease the overall height of a tree or to decrease the length of an individual branch only when absolutely necessary.
- Make the pruning cut at a lateral branch that is at least one-third the diameter of the stem to be removed.
- Remove the entire branch only if it is necessary to remove more than half of the foliage.

Structure

- Use structural pruning when the integrity of the tree has been or will be compromised.
- Use pruning cuts that best preserve the overall structural scaffolding of the tree.
- Engage certified arborist to evaluate and prescribe best practice when structural pruning would alter overall appearance and function of tree.

III. Cultural Practices

Mulching and Irrigation

- Mulch trees every two years for trees up to approximately 6" DBH. Periodically, drip lines of larger trees and tree groupings.
- All mulching practice will follow ISA standards using material approved by the University Landscape Architect.

Fertilization and Pest Management

- Trees are treated for pest problems as needed. There is an ongoing Dutch Elm disease reduction program on campus as well as regular treatments for Lepidoptera, scale pests, and emerald ash borer.
- There is no regular tree fertilization beyond treatment received as a result of fall lawn fertilization. Specimen or high-value trees may receive prescription fertilization when severe nutrient deficiencies are diagnosed.
- Periodic additions of composted organic amendment are applied to the area under the tree canopy of high valued trees.

Cabling and Bracing

- Cabling and bracing should only be used to preserve a tree of great significance such as a historic tree or memorial tree having a long standing history on campus.
- Cabling and bracing should only be used as a preservation method while the committee decides how to best recognize or replace the tree of significance, once it is removed.

IV. Other Practices

Tree Removals

- Live trees are generally removed only when required to protect the public safety, construction, or when detracting from the quality of the landscape.
- Trees may be removed after consultation with and consensus by the Why Tree Matter Committee or a qualified arborist.

- Hazardous or storm damaged trees may be removed or pruned by a qualified arborist to reduce risk to the public.

Planting and Tree Diversity

- The campus is used as a teaching lab, as such, it is extremely important to increase the diversity of tree species.
- A species list will be developed by the Why Trees Matter committee. The list will be reviewed and updated on an annual basis and will accommodate requested trees for teaching as well as underrepresented species and cultivars across campus.
- Site conditions will guide tree selection with emphasis placed on native species but some sites may be planted with exotics or adapted plants.
- The OSU Columbus campus will not sell or plant invasive plants that might threaten natural areas on or adjacent to the university. The plants considered to be invasive are those by the Ohio Invasive Plant Council. Research initiatives may preclude the above statement.

Storm Response and Recovery

Storm response and recovery are generally accomplished in-house. In a crisis, the first priority is to remove tree debris that blocks campus thoroughfares, disrupts campus operations, or poses hazards to the campus community. Once these critical needs are addressed, a prioritized recovery plan is implemented during which, unsalvageable trees are systematically removed and salvageable trees are pruned to restore their health and structure. As the tree planting budget permits, lost trees are strategically replaced to restore the structure and function of the campus urban canopy in a reasonable time frame. During storm response and recovery, trees requiring specialized equipment not available in-house are addressed by outside contractor.

5. PROTECTION AND PRESERVATION PROCEDURES

I. Preservation During Design Phase

On the site survey map, identify all trees whose root systems are likely to be impacted by construction equipment, cut and fill activities, utility corridors, proposed walks and roads, and potential construction staging areas; and whose branches may be damaged by construction equipment. The survey is reviewed with the A/E, University Landscape Architect, and a member of the Why Trees Matter committee in the early design phase. The campus arborist and committee are informed when design changes affect trees.

NOTE: if trees are grouped in a forest or woodlot, then only the location of the woodlot and any trees greater than 24 inches diameter at 4.5 feet above the ground (DBH) need to be identified.

- High priority for protecting
 - Medium (>10 inches DBH) to large (>24 inches DBH) trees of desirable species with good form, good health, and room to continue to grow.
- Low priority for protecting
- Small trees (less than 10 inches DBH) that fall outside of the building footprint, but are likely to be impacted by construction activities.
- Larger trees outside of the building footprint with relatively low landscape value. Examples include but are not limited to, trees with poor form, species of relatively low landscape and

educational value, or trees with inadequate space to accommodate current or future growth event if the site is ameliorated.

- Not salvageable
 - All trees that are within the footprint or in close proximity to the footprint of a proposed building. (Note: alternative footprints to save large, valuable trees should be considered, provided that the alternatives maintain the desired features and costs of the proposed building)
 - Trees of undesirable species or in very poor health. Examples include, but are not limited to species that have low landscape and educational value, and heavily diseased or damaged trees that have little chance of recovering desirable form and function, even if protected from construction damage.
 - Notice should be given to the Why Trees Matter committee and/or campus arborist of small trees that may be salvageable prior to the beginning of construction.

II. Avoid locating the general construction site around low and high priority trees where possible by:

- Planning all construction activities, including new utility corridors, staging areas, new sidewalks and new roads for a minimum clearance of 15 feet away from the base of trees, and not within the edge of the canopy drip line. Greater distances are desirable.
- High priority trees should receive more consideration than low priority trees in planning corridors, staging areas, walks, and roads.
- Consulting the campus arborist will ensure proper considerations are given to preserve the campus tree investment.

III. Protection procedures- See ATTACHMENT ONE at the end of this document

6. GOALS AND TARGETS

I. Tree Inventory

A digital tree inventory covering the Columbus campus was developed in 2005 but has not been updated on a consistent basis. This fall OSU held an Arboblitz which was the kick-off to updating the tree inventory with the data placed on a web based server, updates were performed by Facilities Operations and Development, participating Forestry professor(s), the Chadwick Arboretum and Learning Gardens, and students and community volunteers. The inventory will be used for campus planning purposes, tree management, academic exercises (read only access), and the general public (read only access). All data to be stored locally on a Facility Operations and Development/Mapping Department server. It is our intention to continue updating the tree inventory throughout 2012 utilizing students and volunteers.

II. Tree Canopy

Increasing the campus tree canopy is an important component of the draft University Sustainability Plan and Climate Action Commitment.

7. TREE DAMAGE ASSESSMENT, ENFORCEMENT

Low profile trees will be assessed by the University Landscape Architect and/or the Assistant Director of Landscape Services. Higher profile trees will be assessed by an on campus arborist or a certified arborist consultant with review and input from the Why Trees Matter committee. Project and construction managers will enforce protection measures.

8. PROHIBITED PRACTICES

I. Bicycle Parking

No person may lock a bicycle to any tree on campus.

II. Vehicle Parking

No person may park or drive a vehicle under the canopy of any tree on campus.

III. Event and/or construction set-up

No person may tie or attach anything to a tree on campus.

9. COMMUNICATION STRATEGY

The Ohio State University continues to communicate and educate on behalf of trees and our urban forest both within the university and as outreach to the broader community.

I. Construction Related

Currently, the tree protection guidelines listed in ATTACHMENT ONE are communicated to project managers for inclusion into project specifications. The tree preservation categorizing process is used by Facilities Design and Construction for building siting and campus master planning.

II. Community Outreach

The Ohio State University Extension *Why Trees Matter* Signature Program is a multi-disciplinary program focusing on the ecological, economic and social benefits of trees. This program is tailored for Ohio and Great Lakes area citizens, community officials and foresters, and the green industry.

Our partners include OSU researchers, Extension educators and specialists, Master Gardener and Certified Naturalist volunteers, state agencies including the Ohio Department of Natural Resources Division of Forestry, green industry companies, from nurseryman to landscapers to arborists and tree care companies such as Ohio's own Davey Tree Expert Company, the largest tree care company in the world, and partners from universities and the United States Forest Service throughout the United States.

The Why Trees Matter mission statement is "To develop science-based educational resources to document and demonstrate the ecological, economic and social benefits of trees".

III. Arboblitz

We continue to conduct the Arboblitz program. A tree oriented event meant to bring awareness to the value of trees on campus through lectures, demonstrations, displays, poetry competition, and culminating in a two day effort to update our existing tree inventory utilizing volunteers consisting of students, faculty, staff, and community members.

IV. Annual Arbor Day Celebration

Each year The Chadwick Arboretum and Learning Gardens hosts the Annual Arbor Day celebration that includes tree planting, guest speakers, and educational outreach.

ATTACHMENT ONE

Tree protection fencing must be installed around all existing trees noted to remain on plans within the fenced staging area. Fencing shall extend a distance from the trunk of 1.25 feet per each inch of trunk diameter or 6", whichever is greater. For example, a tree with a 12" trunk diameter shall be fenced 15' from the trunk (30' diameter)

Area within tree protection fencing must be mulched with shredded hardwood or wood chips to depth of 6".

Fencing must be installed prior to any equipment arrival on the site. Work may not begin until fencing is installed.

Fencing shall be galvanized chain link as specified below, 6' minimum height. Plastic fencing and wood stakes, or snow fencing are NOT acceptable.

Fence shall be maintained for the duration of the project, and shall not be removed without the owner's permission.

No material storage, vehicles or any other activity shall occur at any time within tree protection fencing.

Contractor may be required to pay tree replacement and/ or soil compaction remediation costs if there is any incursion in to tree protection zones.

FENCE DESIGN AND MATERIALS

The minimum height for all temporary fencing shall be 6 feet.

The fencing shall be of galvanized 11-1/2 ga. chain-link construction with a minimum of 1-5/8" O.D. tubular steel posts and top rails.

Surface mounted fence panels may be used with the approval of the owner and are to be adequately braced to resist wind and ice loading and shall be continuously connected to prevent access by the public.

Privacy netting to screen construction activities shall be used on all “main campus” (bounded by High Street to Tuttle Park Place, and Lane Avenue to 11th Street) projects, or as specified in the contract documents.

Privacy screen material shall be black, equal to the weave of US Netting’s Windscreen, polyethylene netting.

Barbed wire shall not be used.

ATTACHMENT TWO

Tree Grading Standard – The Ohio State University 2013 (Added to the Building Design Standards in 2014)

Introduction:

Because of the extensive ongoing planting due to construction of new and renovated buildings and greenspaces the Campus Tree committee felt it necessary to produce a document that will aid in the beautification of campus, increase the longevity of trees, reduce tree care costs, and could be used by consultants in selection of trees for campus grounds. This document explains the grade of trees expected for all trees planted on campus. The Ohio State University requires trees to be planted on campus to be graded as Florida Fancy or Florida #1.

The Florida Grades and Standards, which this document is based on, is a result of years of cooperation between the Florida Nursery and Landscape Association, private local growers/nurseries, and Dr. Ed Gilman of the University of Florida in Gainesville, FL. The State of Florida’s Nursery Grades and Standards document will be adopted for The Ohio State University using pertinent species appropriate for the state. The terms “Florida Fancy”, “Florida #1”, “Florida #2” and “Cull” will be utilized to describe the grade class designations for consistency with the original system. The included examples have been adapted to Ohio species and the tree list has been updated to reflect what is most commonly grown in nurseries readily available to OSU. All images and most text in this document have been taken directly from the Florida Grading System and changed to reflect Ohio’s nursery trees.

This grading system is meant to be used while tagging field trees or selecting trees from ones already dug. The Balled and Burlap (B&B) questions are obviously after harvest and may be ignored when grading trees in the field. After several uses the Worksheet at the end of the text should be sufficient to grade trees in the field or nursery holding yard.

Since most trees have a life expectancy of many years, it is important to plant good quality trees. The quality or grade of a tree at planting can have a huge impact on longevity in the landscape. Tree quality is based on trunk, branch, crown, leaf and root characteristics.

Large-maturing trees which are allowed to develop a double or multiple trunks should not be planted unless it is their habit (i.e. (birch) *Betula spp.*) These are sturdy when young, but could become increasingly hazardous as they grow larger and older. Except for small maturing trees normally grown

with multiply trunks, such as; Amelanchier spp (serviceberry), Aesculus parviflora (bottlebrush buckeye) and other nursery trees should have one trunk up through the center to the top of the tree. Some trees can be grown with a modified dominant leader as shown in Figure 1 on page 7 Florida Fancy. Branch diameter should not be larger than 2/3 the diameter of the trunk measured directly above the branch. There should be no flush cuts anywhere on the tree and no open injuries on the trunk or major branches. The crown should be full of foliage and show little, if any, evidence of chlorosis, necrosis, disease or insect infestations. The root ball should be appropriately sized (see any matrix, e.g., page 13), such a tree is given top grade—**Florida Fancy**.

Trees graded **Florida #1** may require some corrective pruning so they develop good trunk and branch structure. They may have minor trunk injuries or could have other defects. Defects can be corrected by pruning the tree once or twice within a year or two after planting.

Florida #2 is a lesser grade. These trees require major corrective pruning to form a structurally strong tree, or are badly misshapen. Great skill and effort (two or more prunings) are required to develop a structure in these trees which will promote longevity. Defects may take several years to correct.

The lowest grade is a **Cull**. Defects are not correctable. These trees lack vigor and/or have poor trunk and branch structure or circling roots. They have other problems such as open wounds, flush cut or loose root ball which may prevent them from becoming established in the landscape. If they become established, long life is unlikely.

The better grades of trees will require less pruning after planting and they will establish more quickly. These have been properly trained and pruned in the nursery to develop a structure which will be resistant to damage from winds and other outside forces. Most tree maintenance budgets have not been developed to allow for the pruning of a tree after planting, so it makes sense to start with a tree which is healthy and well formed. If there is a large tree-pruning allocation in the landscape maintenance budget, trees with the poorer grades may be trained into sturdy trees in the landscape by skilled arborists.

Special Note: There is a specialty market for trees trained into forms which are not typical of their normal growth habit. Examples include standards, braided stems, poodles, espalier, topiary and bonsai to name a few. When grading these trees, the height, spread and root-ball diameter-to-caliper relationships outlined in the matrices for these grades and standards do not apply. Therefore when grading such trees, enter the grading process outlined below beginning at Step 6, skipping Steps 1 through 5. Large-maturing trees, such as oaks

are always graded beginning with Step 1 unless the planting specifications indicate that the trees will be maintained as topiaries or other small, clipped specimens throughout their lives in the landscape.

Grades established for trees (Florida Fancy, Florida #1, and Florida #2) do not apply to trees used in wetland mitigation.

STEPS FOR DETERMINING THE GRADE OF A TREE:

Skip Step 2 if you are grading conifers, magnolias, bald-cypress and other narrow upright trees

Step 1: Trunk Form

Look inside the crown of the tree at the trunk form. Grade the tree according to the drawings and captions in Figure 1 (page 7). Trees with one dominate trunk are graded as Florida Fancy. Those with multiple trunks are given a lesser grade depending on the extent of the defect. Circle the appropriate grade below based on trunk form only.

Florida Fancy	Florida #1	Florida #2	Cull
--------------------------	-----------------------	-----------------------	-------------

Step 2: Branch Arrangement

Check branch arrangement. Grade the tree according to the drawings and captions in Figure 2 (page 8). Trees with optimum branch arrangement are graded as Florida Fancy. Those with branch arrangement defects are given a lesser grade according to the extent of the defects. Circle the appropriate grade below based on branch arrangement only. **Note: All conifers, magnolias, bald cypress and other narrow, upright trees are exempt from Step 2.**

Florida Fancy	Florida #1	Florida #2	Cull
--------------------------	-----------------------	-----------------------	-------------

Step 3: Matrix Type

Choose the appropriate tree matrix type based on the natural form of the tree as it should appear the nursery see index of trees on pages 30-34 for guidance.

Appropriate matrix type: _____

Step 4: Measure Caliper

Measure the caliper of the trunk (under 4" measure 6" up from root flare, 4-6" measure at 12" 6 and above 4.5' off ground).

Caliper: _____

Step 5: Root-ball/container Size

Locate the caliper of the tree in the left column of the appropriate matrix chart chosen in Step 3. Find the container size or root-ball diameter of the plant you are grading and ignore the caliper (see Figure 5 on page 25). A tree must have a spread equal to or larger than the minimum for the grade. Circle the appropriate grade below based on minimum crown spread only.). Refer to Matrix 1 page 13; Matrix 2 page 16; Matrix 3 page 19; Matrix 4 page 22.

Florida
Fancy

Florida
#1

Florida
#2

Cull

Step 6: Crown Uniformity

Grade the tree according to structural uniformity of the crown (see Figure 3 on page 10). Circle the appropriate grade below based on the structural uniformity only. Skip Step 6 when grading other trees with a naturally irregular canopy.

Florida
Fancy

Florida
#1

Florida
#2

Cull

Step 7: Lowest Grade

What is the lowest grade determined in Steps 1,2,5 and 6?

Grade _____

Step 8: Considerations

If two of the following statements are true, reduce the grade determined in Step 8 by one. If more than two of the statements are true, reduce the grade by two. **Note: It takes two true statements to reduce a Florida Fancy to a Florida #1, three, true statements to reduce a Florida Fancy to a Florida #2.**

T F The tree with a trunk caliper larger than 1" requires a stake to hold it erect.

T F The crown is thin and sparsely foliated. Many evergreen and other trees are thin and sparsely

foliated in the late winter/early spring just prior to the spring growth flush. Recently dug field-grown trees might also be thin. Do not downgrade for this.

- T F More than 5% of the branches have tip die-back.
- T F Tree height (see Figure 9 on page 28) is shorter than the maximum height specified in the appropriate matrix chart. Small multi-stemmed specialty plants should not be downgraded if they are shorter than the minimum height.
- T F Flush cuts were made when pruning branched from the trunk (see Figure 4 on page 11)
- T F Branch stubs are left beyond the branch collar (see Figure 4 on page 11). A branch stub can be removed and not reduce the grade.
- T F Open trunk wounds or other bark injury is evident. (Open trunk wounds must be less than 10% of the trunk circumference and less than 2 inches tall on Florida #1 trees. An open pruning scar on the trunk resulting from removing a branch is not considered an open trunk wound.)
- T F More than the lower 40% of the trunk is free of branches. (The portion of the lower trunk with shortened, temporary branches is not considered part of the canopy.) **Note: If planting specifications require that a larger portion of the trunk should be clear of branches, do not downgrade.**
- T F More than 5% of the leaves are chlorotic or more than 5% of the canopy exhibits damage from pests and diseases. **Note: A Florida #1 cannot have more than 10% of the leaves chlorotic or more than 10% of the canopy damaged from pests or diseases.**
- T F Most leaves are smaller than normal.
- T F There is bark included between the trunk and a major lateral branch or between main trunks (Figure 8a on page 27).
- T F Trunks and/or major branches are touching. Secondary branches on major branches may touch each other.

Grade: _____

The tree is a cull if 1) any or all of the branches are tip pruned. 2) If it has a root greater than 1/10 the diameter of the trunk circling around more than 1/3 of the trunk in the top half of the root ball. Circling roots can be found on the periphery of the root ball or inside the root ball (Figure 6 on page 25). Those inside the root ball result from being in a smaller container when the tree was younger. Circling roots less than 1/3 the trunk diameter can be cut at the point where they begin to circle. Following cutting, the tree is no longer a Cull.

Final Grade: _____

Additional Consideration if any are true the tree is a Cull:

- T F** The root ball or container is undersized (consult proper tree matrix Type I page 13, Type II page 16, Type III page 19, Type IV page 22).
- T F** The root ball on B&B tree is not secured tightly with pins, twine or wire.
- T F** The tree is excessively root-bound.
- T F** There is evidence that one or more large roots (greater than 1/5 the diameter of the trunk) were growing out of the container .
- T F** There is excess soil on top of the root ball (excess soil may be removed to make it acceptable)..

STEP 1—Determining the Quality of Trunk Structure

Instructions: Locate the drawing, caption and associated text below that most closely represents the trunk structure of the tree you are grading. Circle the appropriate tree grade at the end of Step 1 on page 3.

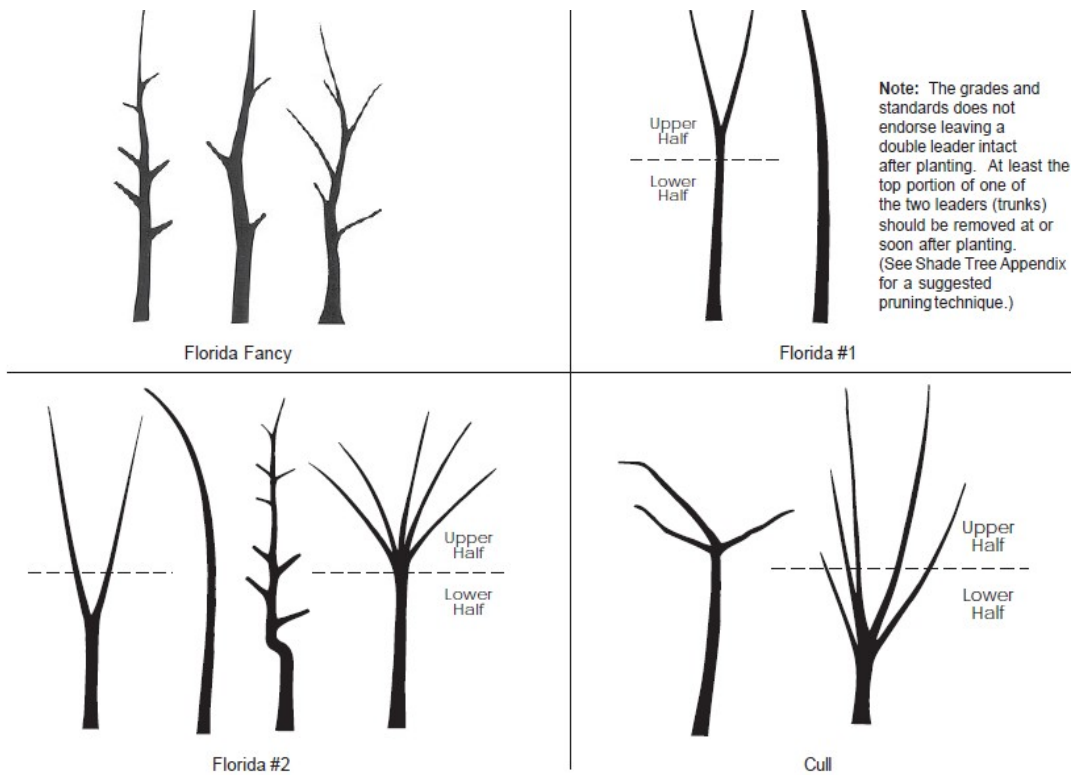


Figure 1.

Florida Fancy—There is one trunk, more or less in the center of the tree as shown above. It may be straight or have a very slight bow less than 5 degrees. Some trees such as Chinese elm, live oak, and some others can be grown with a modified (not straight) trunk as shown on the right and center. The tip of the leader on the main trunk must be intact and its terminal bud must be the highest part of the tree. No trunk or branch can have a diameter greater than 2/3 the trunk diameter measured directly above the branch crotch. If the trunk divides in two nearly equal-diameter stems in the upper 10% of the tree, the trunk is not downgraded to a Florida #1.

Florida #1—The trunk branches (forks) into two nearly equal-diameter trunks in the upper 1/2 of the tree. If one trunk is 2/3 or less than the diameter of the other trunk (they do not have equal diameters) making the trunk Florida Fancy. A noticeable but small void will be left in the crown after removing the top portion of one of the trunks. If there is one trunk, but it has a 5 degree to 15 degree bow, grade it Florida #1. The tip of the leader on the main trunk must be intact and its terminal bud must be the highest part of the tree.

Florida #2—The trunk branches into two nearly equal trunks along the lower 1/2 of the tree as shown on the left; or, the trunk branches into three or more nearly equal-diameter trunks in the upper 1/2 of the tree as shown on the right. (Do not downgrade the tree if competing trunks are 2/3 or less the diameter of one main trunk measured above the crotch.) Pruning to create only one trunk will leave a large void in the

crown. If there is one trunk, but it has a bow greater than 15 degrees or a dogleg (see Glossary), grade it Florida #2. A dogleg in the crown of the tree is not a downgrading factor.

Cull—The trunk branches into three or more nearly equal-diameter trunks along the lower 1/2 of the trunk.

STEP 2—Determining the Quality of Branch Arrangement

Instructions: Locate the drawing, caption and associated text below that most closely represents the branch structure of the tree you are grading. Circle the appropriate tree grade at the end of Step 2 on page 3. **Note:** All conifers, magnolias, hollies, loblolly bay and other narrow, upright trees are exempt from Step 2. Major branches on trees less than 5 feet tall do not have to be 4" or 6" apart to meet Florida #1 or Florida Fancy standards, respectively.

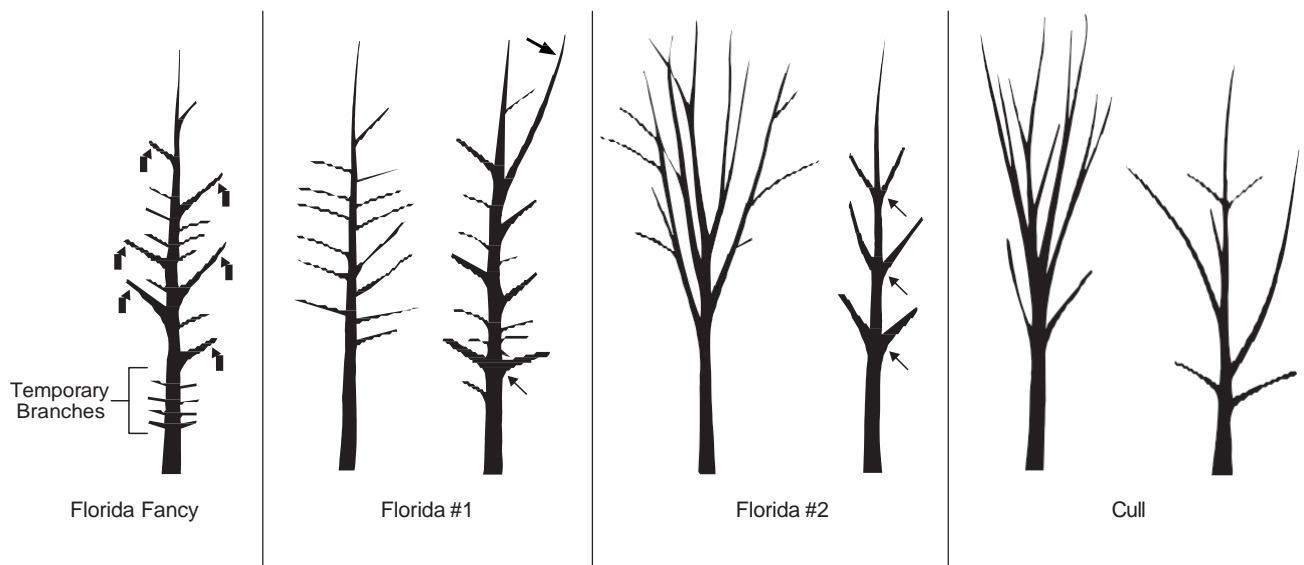


Figure 2

Florida Fancy—Several branches are larger in diameter (and obviously more dominant) than others. These (indicated by arrows) should be spaced at least 6" apart along the trunk. No branches are greater than 2/3 the diameter of the trunk measured directly above the branch. No major branches are oriented nearly vertical with the trunk. There may be temporary branches on the lower trunk, but these should be no larger than 1/5 the diameter of the trunk.

Florida #1—All branches are more or less equally dominant as shown in the left illustration; or, as shown in the illustration on the right, there are several dominant major branches but two are nearly equal diameter and less than 4" apart (see arrow at bottom). Other major branches of nearly equal diameter are at least 4" apart. One branch in the upper half of the tree can be greater than 2/3 the diameter of the trunk measured directly above the branch. No branch tips are taller than the trunk (see arrow).

Note: A number of trees such as bald-cypress, and others with an excurrent (strong dominant leader) growth habit naturally have many lateral branches with a similar diameter. These trees should not be downgraded to Florida #1 due to this growth habit. (See page 3 for trees exempt from step 2.)

Florida #2—Most major branches are oriented vertically; and/or nearly equal-diameter major branches are located within 4" of each other at two or more positions on the trunk (see arrows); and/or one or more branches in the lower half of the tree are larger than $\frac{2}{3}$ the diameter of the trunk measured directly above the branch.

Cull—All branches are growing vertically, and they are forming narrow angles with the trunk; or most major branches are growing from the same point on the trunk. Culls may have only a few large branches as in the illustration on the right. Some are less than 4' from the ground. Several branches of nearly equal diameter are opposite each other on the trunk.

STEP 6 - Determining the Structural Uniformity of the Crown

Instructions: Identify the drawing, caption and associated text below that most closely represents the structural uniformity of the tree you are grading. Circle the appropriate tree grade at the end of Step 6 on page 4.

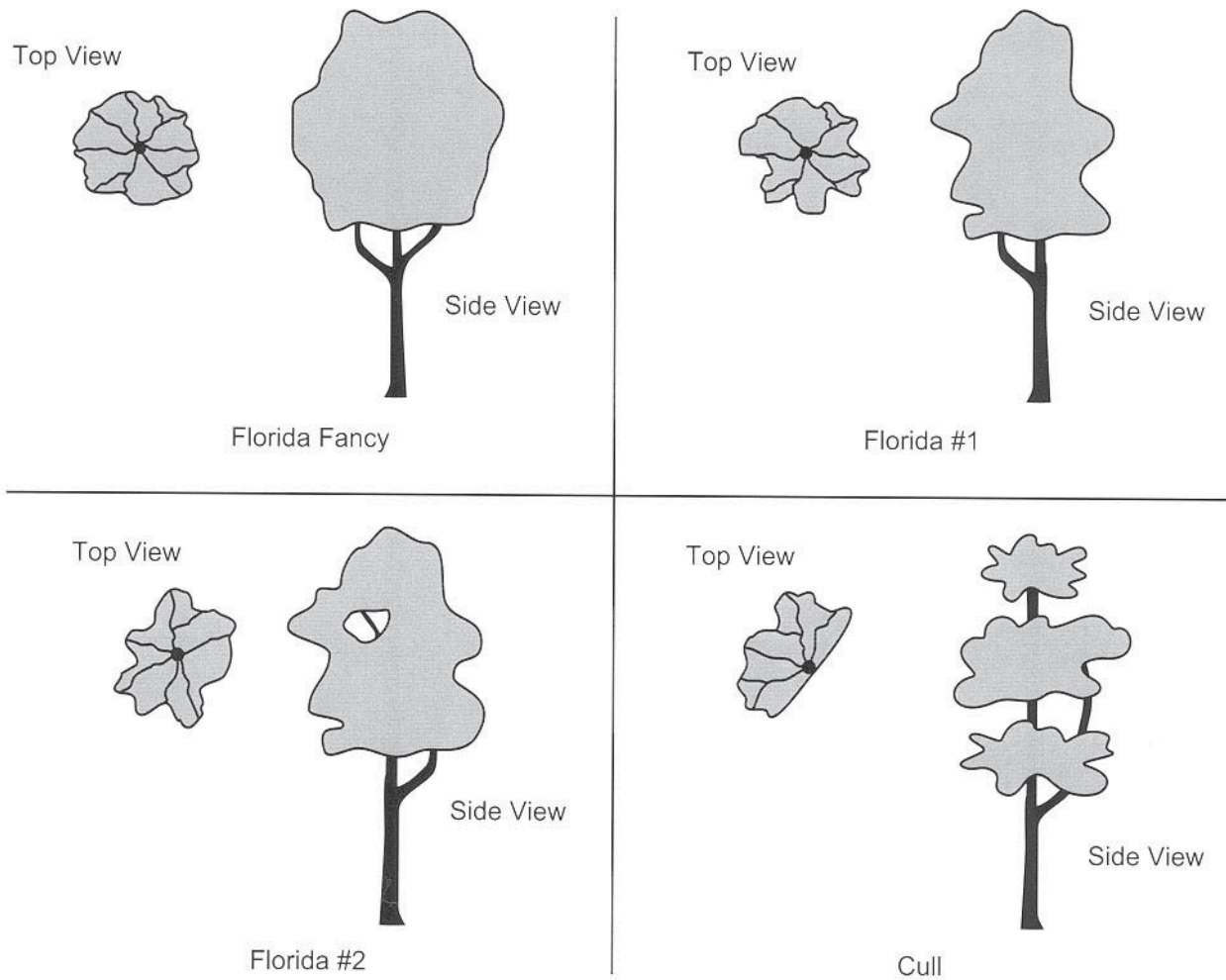


Figure 3.

Florida Fancy—Branches are evenly distributed around the trunk. No major branch is located directly above another. The crown is full of foliage which is evenly distributed around the tree.

Florida #1—One major branch may be located directly above another but the others are nearly evenly distributed around the trunk. The crown is not completely full of foliage and there may be some small voids.

Florida #2—Branches are not evenly distributed around the trunk. Several are growing from the same side of the trunk and two or more may be located directly above others. The crown has a large void.

Cull—The tree is one-sided or is flat-sided. Major branches are growing from only one or two sides of the trunk. There are large gaps in the crown.

Step 8 - Determining If Pruning Cuts Were Made Correctly

Instructions: Locate the photograph, drawing, caption and associated text below which most closely represents the condition of the pruning scars on the tree you are grading. Check the 'true' column in Step 9-b if incorrect pruning cuts were made. Check the 'false' column if correct pruning cuts were made, and if there are no trunk injuries.

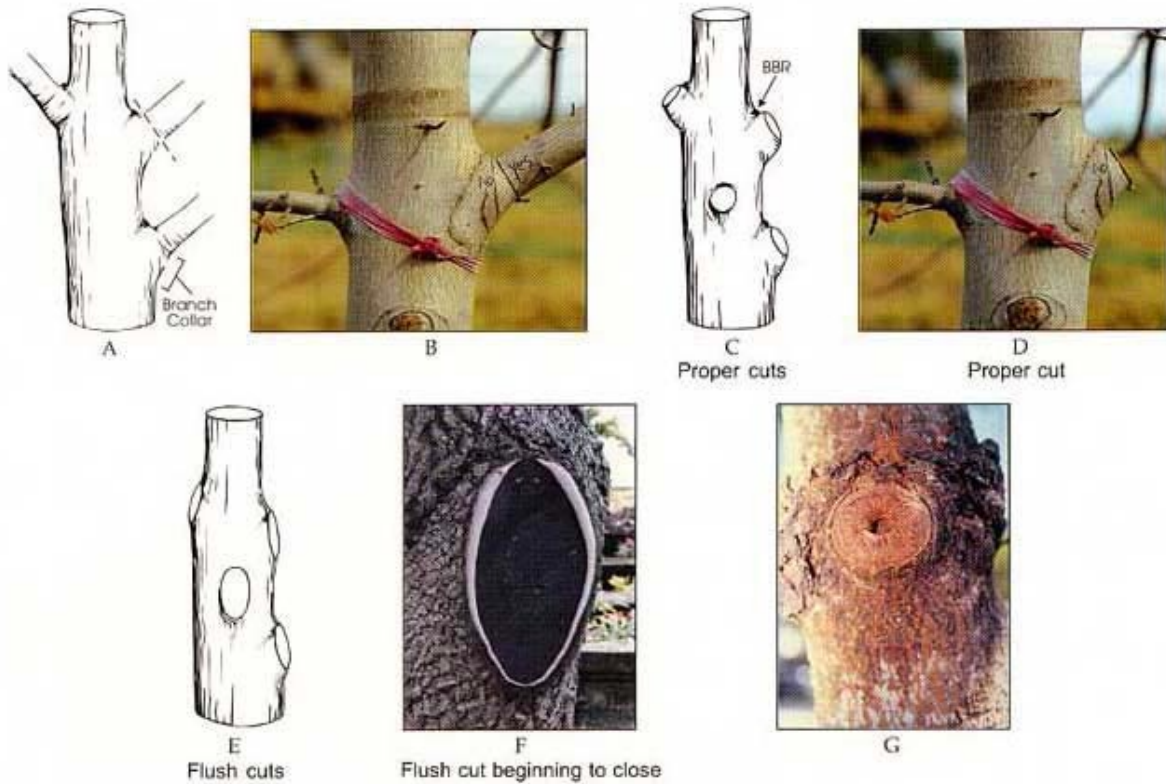


Figure 4

Fig. 4A—Notice the swelling at the base of each branch. This is trunk tissue (called the branch collar) and helps hold the branch securely on the trunk. A proper cut is made along the dashed line.

Fig. 4B—Cut along the line just to the left of the word 'yes' to properly remove the branch. If the cut is made closer to the trunk, this is a flush cut. If it is made farther from the trunk, a stub will be left.

Fig. 4C—This shows how to properly remove branches from the trunk. Always cut to the outside of the branch collar and branch bark ridge (BBR). Notice that the branch bark ridge is still visible on top of the pruning cut and the pruning scar is nearly circular.

Fig. 4D—This shows a properly executed pruning cut (right hand side of photograph).

Fig. 4E—Never make a flush cut as shown here. Notice that the branch bark ridge is missing from the top of the pruning cut. This improper cut, usually oval, initiates trunk decay and can reduce growth in the nursery and landscape after planting.

Fig. 4F—The pruning scar and the woundwood or callus growth which begins to close over the pruning scar from an improperly executed pruning cut is often shaped like an oval. Callus is often missing from the top or bottom of the pruning scar on an improperly executed pruning cut.

Fig. 4G—Woundwood or callus growth around a proper pruning cut is circular. Some species have no swelling at the base of branches, and it may be more difficult to determine exactly where to make a proper pruning cut. Always begin the cut to the outside of the branch bark ridge, and angle it away from the trunk.

TYPE ONE MATRIX — SPREADING & ROUNDED SHAPES

CALIPER	MINIMUM TREE HEIGHT	MAXIMUM TREE HEIGHT	MINIMUM CROWN SPREAD DIAMETER			MINIMUM B&B ROOT-BALL DIAMETER	MINIMUM CONTAINER VOLUME
			FL. FAN.	#1	#2		
1/4"	18"	30"	10"	8"	6"	6"	4" Sleeve
1/2"	24"	6'	14"	12"	8"	8"	1 Gal.
3/4"	4'	8'	30"	24"	18"	14"	3 Gal.
1"	5'	10'	36"	30"	24"	16"	5 Gal.
1 1/4"	6'	11'	42"	36"	30"	18"	7 Gal.
1 1/2"	7'	12'	48"	42"	34"	20"	15 Gal.
2"	8'	15'	54"	48"	42"	24"	15 Gal.
2 1/2"	9'	16'	60"	54"	48"	28"	25 Gal.
3"	10'	18'	66"	60"	54"	33"	45 Gal.
3 1/2"	11'	18'	6'	5 1/2'	5'	38"	65 Gal.
4"	12'	22'	7'	6 1/2'	6'	44"	95 Gal.
4 1/2"	14'	24'	8'	7 1/2'	7'	50"	95 Gal.
5"	16'	26'	10'	9'	8'	55"	95 Gal.
5 1/2"	17'	28'	11'	10'	9'	61"	200 Gal.

Notes:

1. Trees to be graded under this matrix are listed in the index of trees **on pages 29-32.**
2. Any liner less than 1/4" caliper shall be a minimum of 12" in height, well-rooted in its container which shall not be less than 2" in diameter. Bare-root trees shall be so noted.
3. Ball depth on B&B stock shall be at least 2/3 of the root-ball diameter shown. For trees larger than 5 1/2" caliper, root-ball diameter shall be 8.5" for each inch of tree caliper. Trees grown in soils with a high water table can have shallower root balls provided the root-ball diameter is increased to the next larger tree size in the table..
4. ANZI Standards Z60.1 designations for container size (e.g. #3, #15, #30, etc.) can be substituted for minimum spread diameter
5. NO excess soil above the trunk fair or transport roots is allowed for container or B&B grown plants.



Type One Matrix

Spreading and Rounded Shapes

Florida Fancy—Branches are well-distributed along a dominant trunk, and the crown is uniform and full of foliage.



Florida #1—Branches are well-distributed along a straight dominant trunk, but the crown is not uniform and is thin.



Florida #2—The trunk forks in the bottom half of the tree and the canopy is sparse. There are few branches on the tree, and they are not well distributed along the trunk.



Type One Matrix

Spreading and Rounded Shapes

Florida Fancy—The trunk has a slight bend which is acceptable for a Florida Fancy on any species.



Florida #1—The trunk forks in the top half of the tree



Florida #2—The trunk is nicely formed, but the crown is one-sided and not uniform.

TYPE TWO MATRIX — PYRAMIDAL SHAPES

CALIPER	MINIMUM TREE HEIGHT	MAXIMUM TREE HEIGHT	MINIMUM CROWN SPREAD DIAMETER			MINIMUM B&B ROOT-BALL DIAMETER	MINIMUM CONTAINER VOLUME
			FL. FAN.	#1	#2		
1/4"	18"	30"	10"	8"	6"	6"	4" Sleeve
1/2"	24"	6'	14"	12"	8"	8"	1 Gal.
3/4"	4'	8'	30"	24"	18"	14"	3 Gal.
1"	5'	10'	36"	30"	24"	16"	5 Gal.
1 1/4"	6'	11'	42"	36"	30"	18"	7 Gal.
1 1/2"	7'	12'	48"	42"	34"	20"	15 Gal.
2"	8'	15'	54"	48"	42"	24"	15 Gal.
2 1/2"	9'	16'	60"	54"	48"	28"	25 Gal.
3"	10'	18'	66"	60"	54"	33"	45 Gal.
3 1/2"	11'	18'	6'	5 1/2'	5'	38"	65 Gal.
4"	12'	22'	7'	6 1/2'	6'	44"	95 Gal.
4 1/2"	14'	24'	8'	7 1/2'	7'	50"	95 Gal.
5"	16'	26'	10'	9'	8'	55"	95 Gal.
5 1/2"	17'	28'	11'	10'	9'	61"	200 Gal.

Notes:

1. Trees to be graded under this matrix are listed in the index of trees **on pages 29-32.**
2. Any liner less than 1/4" caliper shall be a minimum of 12" in height, well-rooted in its container which shall not be less than 2" in diameter. Bare-root trees shall be so noted.
3. Ball depth on B&B stock shall be at least 2/3 of the root-ball diameter shown. For trees larger than 5 1/2" caliper, root-ball diameter shall be 8.5" for each inch of tree caliper. Trees grown in soils with a high water table can have shallower root balls provided the root-ball diameter is increased to the next larger tree size in the table..
4. ANZI Standards Z60.1 designations for container size (e.g. #3, #15, #30, etc.) can be substituted for minimum spread diameter
5. NO excess soil above the trunk fair or transport roots is allowed for container or B&B grown plants.



Type Two Matrix

Pyramidal Shapes

Florida Fancy—Branches are well distributed along the single trunk. The crown is uniform and full of foliage.



Florida #1—The trunk has a moderate bend or bow, and the crown is not uniform. Either characteristic alone places this tree in the Florida #1 category. The crown is also sparsely foliated.



Florida #2—The trunk has a major bend or bow and is sparsely foliated



Type Two Matrix

Pyramidal Shapes

Florida Fancy—There is one straight trunk, branches are well distributed along it, and the crown is full and uniform.



Florida #1—The crown is very narrow for this species of tree.



Florida #2—There is one trunk, but it has a major dogleg at the bottom of the crown.

TYPE THREE MATRIX — COLUMNAR / UPRIGHT SHAPES

CALIPER	MINIMUM TREE HEIGHT	MAXIMUM TREE HEIGHT	MINIMUM CROWN SPREAD DIAMETER			MINIMUM B&B ROOT-BALL DIAMETER	MINIMUM CONTAINER VOLUME
			FL. FAN.	#1	#2		
1/4"	18"	30"	10"	8"	6"	6"	4" Sleeve
1/2"	24"	6'	14"	12"	8"	8"	1 Gal.
3/4"	4'	8'	30"	24"	18"	14"	3 Gal.
1"	5'	10'	36"	30"	24"	16"	5 Gal.
1 1/4"	6'	11'	42"	36"	30"	18"	7 Gal.
1 1/2"	7'	12'	48"	42"	34"	20"	15 Gal.
2"	8'	15'	54"	48"	42"	24"	15 Gal.
2 1/2"	9'	16'	60"	54"	48"	28"	25 Gal.
3"	10'	18'	66"	60"	54"	33"	45 Gal.
3 1/2"	11'	18'	6'	5 1/2'	5'	38"	65 Gal.
4"	12'	22'	7'	6 1/2'	6'	44"	95 Gal.
4 1/2"	14'	24'	8'	7 1/2'	7'	50"	95 Gal.
5"	16'	26'	10'	9'	8'	55"	95 Gal.
5 1/2"	17'	28'	11'	10'	9'	61"	200 Gal.

Notes:

1. Trees to be graded under this matrix are listed in the index of trees **on pages 29-32.**
2. Any liner less than 1/4" caliper shall be a minimum of 12" in height, well-rooted in its container which shall not be less than 2" in diameter. Bare-root trees shall be so noted.
3. Ball depth on B&B stock shall be at least 2/3 of the root-ball diameter shown. For trees larger than 5 1/2" caliper, root-ball diameter shall be 8.5" for each inch of tree caliper. Trees grown in soils with a high water table can have shallower root balls provided the root-ball diameter is increased to the next larger tree size in the table..
4. ANZI Standards Z60.1 designations for container size (e.g. #3, #15, #30, etc.) can be substituted for minimum spread diameter
5. NO excess soil above the trunk fair or transport roots is allowed for container or B&B grown plants.



Type Three Matrix

Columnar/Upright Shapes

Florida Fancy—There is a single trunk, and the crown is full and uniform.



Florida #1—There is a single trunk, and the crown is full but not uniform.



Florida #2—There is a single trunk, but the crown is thin and not well-balanced.



Type Three Matrix

Columnar/Upright Shapes

Florida Fancy—There is one trunk, and the crown is uniform.



Florida #1—There is one trunk, and there is a portion of the crown missing, forming an asymmetrical canopy.



Florida #2—The crown is very one-sided and asymmetrical.

TYPE FOUR MATRIX — VASE SHAPES

CALIPER	MINIMUM TREE HEIGHT	MAXIMUM TREE HEIGHT	MINIMUM CROWN SPREAD DIAMETER			MINIMUM B&B ROOT-BALL DIAMETER	MINIMUM CONTAINER VOLUME
			FL. FAN.	#1	#2		
1/4"	18"	30"	10"	8"	6"	6"	4" Sleeve
1/2"	24"	6'	14"	12"	8"	8"	1 Gal.
3/4"	4'	8'	30"	24"	18"	14"	3 Gal.
1"	5'	10'	36"	30"	24"	16"	5 Gal.
1 1/4"	6'	11'	42"	36"	30"	18"	7 Gal.
1 1/2"	7'	12'	48"	42"	34"	20"	15 Gal.
2"	8'	15'	54"	48"	42"	24"	15 Gal.
2 1/2"	9'	16'	60"	54"	48"	28"	25 Gal.
3"	10'	18'	66"	60"	54"	33"	45 Gal.
3 1/2"	11'	18'	6'	5 1/2'	5'	38"	65 Gal.
4"	12'	22'	7'	6 1/2'	6'	44"	95 Gal.
4 1/2"	14'	24'	8'	7 1/2'	7'	50"	95 Gal.
5"	16'	26'	10'	9'	8'	55"	95 Gal.
5 1/2"	17'	28'	11'	10'	9'	61"	200 Gal.

Notes:

1. Trees to be graded under this matrix are listed in the index of trees **on pages 29-32.**
2. Any liner less than 1/4" caliper shall be a minimum of 12" in height, well-rooted in its container which shall not be less than 2" in diameter. Bare-root trees shall be so noted.
3. Ball depth on B&B stock shall be at least 2/3 of the root-ball diameter shown. For trees larger than 5 1/2" caliper, root-ball diameter shall be 8.5" for each inch of tree caliper. Trees grown in soils with a high water table can have shallower root balls provided the root-ball diameter is increased to the next larger tree size in the table..
4. ANZI Standards Z60.1 designations for container size (e.g. #3, #15, #30, etc.) can be substituted for minimum spread diameter
5. NO excess soil above the trunk fair or transport roots is allowed for container or B&B grown plants.



Type Four Matirx

Vase Shapes

Florida Fancy—Branches are well-distributed along a single trunk, and the crown is uniform.



Florida #1—The crown is uniform, but two major branches in the crown are opposite to each other.



Florida #2—The trunk divides into two nearly equal-sized trunks in the lower half of the tree.

Tree Terms Glossary

Balled and burlapped (B & B): A soil ball containing roots of the plant wrapped and secured in synthetic, natural or treated burlap, and/or wire. All synthetic fabric (Lenomesh) and wire should be removed from the root ball prior to planting. True biodegradable burlap can be left around the root ball.

Branch Collar: The attachment structure in woody plants connects a branch to its parent branch or to the trunk.

Caliper: Trunk caliper (trunk diameter) is measured 6 inches from the ground on trees up to and including 4 1/2 inches in caliper, and 12 inches above the ground for larger trees.

Dominant leader: The trunk that grows up through the center of the tree and obviously dominates the rest of the branches. A dominant leader originates from a single dominant trunk and is the topmost part of a tree.

Chlorotic: A lightness or bleaching (typically yellowing) of green color in the foliage unlike the normal color. This indicates that the plant has not been maintained in the best of health. Chlorotic is not to be confused with normal yellowing of foliage common on many deciduous species late in the season. It is also not to be confused with yellowing of leaves on evergreens just prior to a new leaf flush.

Clear trunk: An industry term referring to that portion of the trunk maintained free of any branches. The clear trunk is the lower portion of the trunk measured from the soil line up to the first major branch. Temporary branches may exist on a clear trunk.

Conifer: A cone bearing tree such as a fir, spruce or pine. Includes the genera ***Abies, Picea, Pinus.***

Corrective pruning: Pruning which removes one or more branches or trunks to create a stronger, well-structured tree framework.

Crown: The branches, twigs and leaves that make up the foliage portion of the tree. The above-ground portion of the tree including the branches, twigs and leaves

rown spread diameter: Crown spread diameter is the average of the widest branch spread and that perpendicular to it (see Fig. 5).

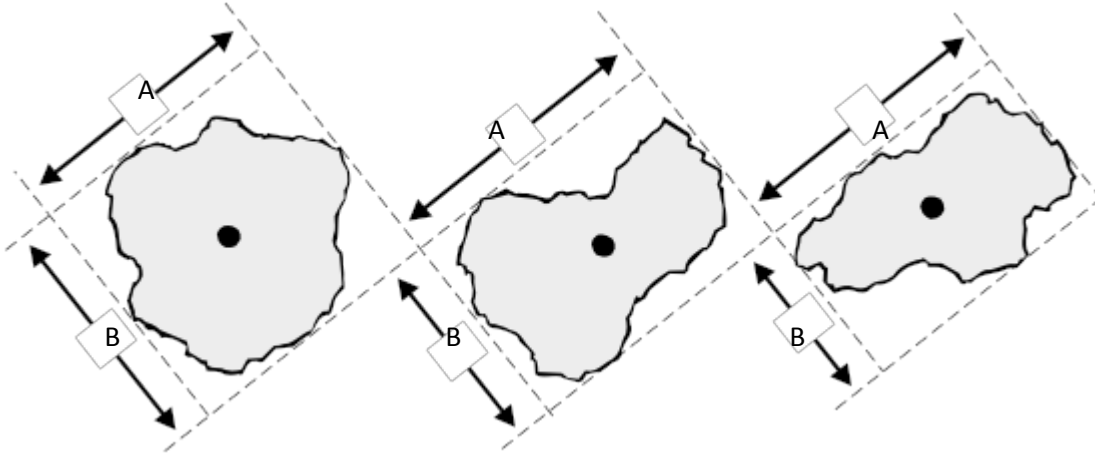


Fig. 5. Add A and B together and divide by two to obtain crown spread diameter.

Cull: A tree that, as a result of multiple defects (structural and/or health), does not meet the basic standard or specification and is otherwise not acceptable.

DBH: Diameter at breast height, which is 4.5 feet of the ground for trees over 6" caliper.

Excessively root bound: A condition of container-grown trees where there are several roots larger than 1/4 inch diameter growing on the outside edge of the root ball (see Fig. 6).



Fig. 6. Note the circling roots growing along the outside surface of the root ball

Flush cut: A pruning cut made too close to, or directly against the trunk. This type of cut is very detrimental to tree health and is not recommended (see Fig. 4 on page 13). It is often difficult to determine whether a flush cut was made 2 or more years after the cut was made on a young tree.

Grade: A level of plant quality that meets minimum standards.

Included bark: Also referred to as embedded bark. Tree bark growing in contact with tree bark because of the growth of 2 stems (trunks and/or branches) against one another (see Fig. 7a). This typically happens on upright-growing, large-diameter branches which grow at a rate which is similar to the growth rate of the trunk. This branch will be poorly connected to the trunk and could easily break off from the trunk as the tree grows older.



Fig. 7a. Example of a weak union illustrating embedded or included bark which is squeezed between the two trunks.



Fig. 7b. Example of strong branch union without embedded or included bark. **Note** the dark tissue on the trunk just above the branch crotch. This is the branch bark ridge. Its presence above the branch indicates there is no included bark.

Leader: That part of the trunk that extends into the top 1/4 of the tree.

Major branch: A branch that is among the largest in diameter on the tree.

Multiple leaders: Two or more trunks growing nearly parallel to each other, originating any place along the stem. The crotch angle between them is often very narrow. This tree defect is more serious when it occurs on the lower portion of the tree.

Nearly-equal diameter: One trunk or branch is at least 2/3 the diameter of the other. Measure the branch diameter several inches out from the crotch beyond any swelling at the branch base. Measure the larger branch or trunk just above the crotch.

Necrosis: dead non-functioning tissue of the foliage

Root-ball diameter: The average diameter of the widest portion of the root ball and that perpendicular to it. This shall be measured near the top of the root ball.

Root crown: also known as the root collar or root neck (Figure 8), is that part of a root system from which a stem arises. Since roots and stems have quite different vascular anatomies, major vascular changes take place at this point.

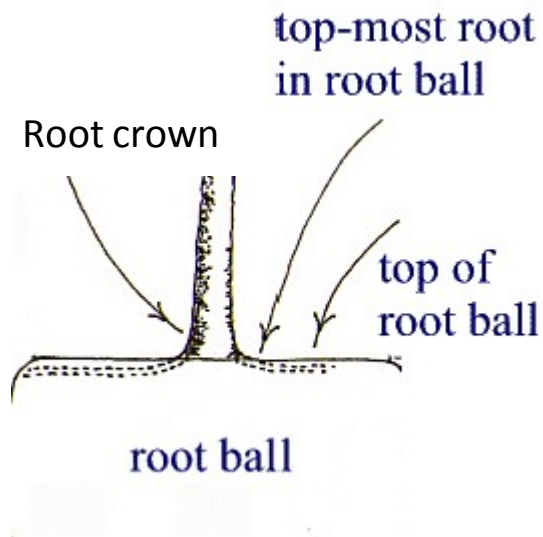


Figure 8

Secondary branches: Branches originating from primary or major branches.

Sturdy in the root ball: When the trunk bends along its vertical length instead of pivoting at the base of the trunk, or moving in the root ball. When the root ball of a container-grown plant can be slipped from the container with all or most of the media intact with the roots.

Temporary branches: Short branches meant to be pruned from the tree in the near future as the tree grows and produces major branches.

Tree height: Tree height is measured from the ground to the topmost portion of the tree (see Fig. 9). Height must be measured before pruning the tree. On small, multi-trunked trees, tree height is measured to the top of the main body of the crown.

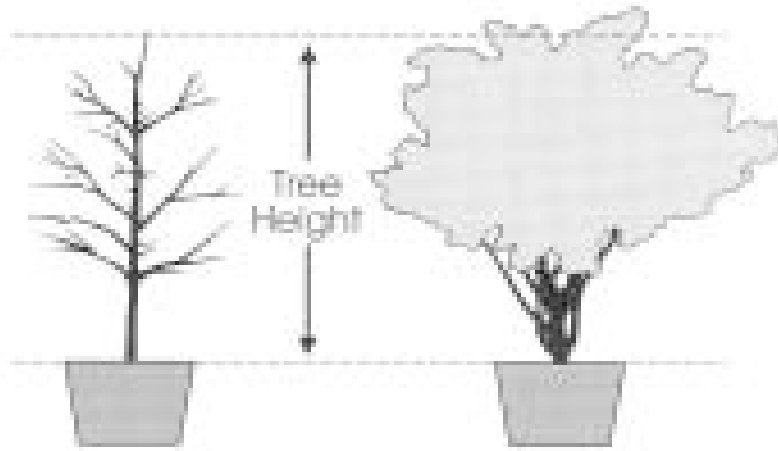
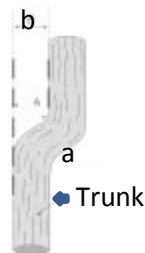


Fig. 9. Measuring tree height

Trunk dogleg: A significant 's' - shaped deformation in the trunk (see Fig. 10). A dogleg in the crown is not a downgrading factor.

Fig. 10. The angle 'A' can be no more than 30°. The distance 'B' can be no more than the trunk diameter



Trunk wound: A trunk injury that is open and not sealed over, or closed. A properly executed pruning cut that is not closed over is not considered a trunk wound.

Woundwood : Woundwood is a very tough, woody tissue that grows behind callus and replaces it in that position. When woundwood closes wounds, then normal wood continues to form. After wounding, callus forms first about the margins of the wound. Woundwood forms later as the cells become lignified. Callus is a tissue that is meristematic, low in lignin, and homogenous as to cell types. Woundwood is not meristematic, is high in lignin, and has differentiated cells -vessels, fibers, axial and radial parenchyma. Woundwood is differentiated tissue that has lots of lignin.

Table 5. Matrix or habit rating for trees and other plants in Ohio. Plants are listed alphabetically by scientific name.

Scientific Name	Common Name	Matrix Type
<i>Abies balsamea</i>	Balsam Fir	2
<i>Abies concolor</i> & cultivars	White Fir	2
<i>Acer buergerianum</i>	Trident Maple	1
<i>Acer campestre</i> & cultivars	Hedge Maple	1
<i>Acer xFremannii</i> F	Freeman Maple	1
<i>A.F. Armstrong</i>	Armstrong Fremann Maple	1
<i>Acer ginnala</i> & cultivars	Amur Maple	4
<i>Acer griseum</i> & cultivars	Paperbark Maple	1
<i>Acer japonicum</i> & cultivars	Full Moon Maple	4
<i>Acer negundo</i> & cultivars	Box Elder	1
<i>Acer nigrum</i> & cultivars	Black Maple	1
<i>Acer palmatum</i>	Japanese Maple	4
<i>Acer pensylvanicum</i>	Striped Maple	1
<i>Acer platanoides</i> & cultivars	Norway Maple	1
<i>A.p. Columnare</i>	Upright Norway Maple	3
<i>Acer pseudoplatanus</i> & cultivars	Sycamore Maple	1
<i>Acer rubrum</i> varieties and cultivars	Red Maple	1
<i>Acer saccharinum</i> & cultivars	Silver Maple	1
<i>Acer saccharum</i> & cultivars	Sugar Maple	1
<i>Acer tegmentosum</i> & cultivars	Manchu Striped Maple	1
<i>Acer tataricum</i>	Tatarian Maple	1
<i>Aesculus x carnea</i>	Ruby Red Horsechestnut	1
<i>Aesculus glabra</i>	Ohio Buckeye	1
<i>Aesculus hippocastanum</i> & cultivars	Common Horsechestnut	1
<i>Aesculus octandra</i>	Yellow Buckeye	1
<i>Aesculus parviflora</i>	Bottlebrush Buckeye	1
<i>Aesculus pavia</i>	Red Buckeye	1
<i>Alnus glutinosa</i> & cultivars	Black Alder	1
<i>Amelanchier canadensis</i>	Common Serviceberry	4
<i>Amelanchier x grandiflora</i> & cultivars	Apple Serviceberry	4
<i>Amelanchier laevis</i> & cultivars	Allegheny Serviceberry	4
<i>Aralia spinosa</i>	Devil's Walking Stick	3
<i>Asimina triloba</i>	Pawpaw	1
<i>Betula lenta</i>	Sweet Birch	1
<i>Betula alleghaniensis (lutea)</i>	Yellow Birch	1
<i>Betula nigra</i> & cultivars	River Birch	1
<i>Betula papyrifera</i>	Paper Birch	1
<i>Betula pendula</i> & cultivars	European White Birch	1
<i>Betula populifolia</i> & cultivars	Gray Birch	1
<i>Caragana arborescens</i>	Siberian Peashrub	1
<i>Carpinus betulus</i>	European Hornbeam	1
<i>Carpinus betulus fastigiata</i>	Upright European Hornbeam	2
<i>Carpinus caroliniana</i>	American Hornbeam	1
<i>Carpinus japonica</i>	Japanese Hornbeam	1
<i>Carya</i> (species not listed)	Hickory	1
<i>Carya ovata</i>	Shagbark Hickory	1
<i>Carya illinoensis</i>	Pecan	
<i>Castanea mollissima</i> & cultivars	Chinese Chestnut	1
<i>Catalpa speciosa</i>	Northern Catalpa	1
<i>Cedrus atlantica</i>	Atlas Cedar	2
<i>Celtis laevigata</i>	Sugar Hackberry	1
<i>Celtis occidentalis</i>	Common Hackberry	1

<i>Cercidiphyllum japonicum</i> & cultivars	Katsura Tree	1
<i>Cercis canadensis</i> & cultivars	Redbud	1
<i>Cercis chinensis</i>	Chinese Redbud	1
<i>Chamaecyparis nootkatensis</i> & cultivars	Nootka Falsecypress	2
<i>Chamaecyparis obtusa</i> & cultivars	Hinoki Falsecypress	2
<i>Chamaecyparis pisifera</i> & cultivars	Sawara Falsecypress	2
<i>Chionanthus retusus</i>	Chinese Fringe Tree	1
<i>Chionanthus virginicus</i>	White Fringe Tree	1
<i>Cladrastis kentuckea</i>	American Yellowwood	1
<i>Cornus alternifolia</i>	Pagoda Dogwood	1
<i>Cornus controversa</i>	Giant Dogwood	1
<i>Cornus florida</i> & cultivars	Flowering Dogwood	1
<i>Cornus kousa</i> & cultivars	Kousa/Chinese Dogwood	1
<i>Cornus mas</i> & cultivars	Cornelian Cherry Dogwood	4
<i>Cornus officinalis</i>	Japanese Cornel	4
<i>Cornus racemosa</i>	Gray Dogwood	1
<i>Corylus avellana</i> & cultivars	European Hazel	1
<i>Corylus colurna</i>	Turkish Hazel	1
<i>Corylus maxima</i> & cultivars	Giant Filbert	4
<i>Crataegus crus-galli</i> & cvs	Cockspur Hawthorn	4
<i>Crataegus phaenopyrum</i>	Washington Hawthorn	4
<i>Crataegus</i> species & cultivars	Hawthorn	4
<i>Crataegus viridis</i> & cultivars	Green Hawthorn	4
<i>Diospyros virginiana</i>	Common Persimmon	1
<i>Elaeagnus angustifolia</i>	Russian Olive	4
<i>Elaeagnus umbellata</i>	Autumn Olive / Elaeagnus	1
<i>Eleutherococcus (Acanthopana) sieboldianus</i>	Five-leafed Aralia	4
<i>Eucommia ulmoides</i>	Hardy Rubbertree	1
<i>Euonymus alata</i>	Burningbush	4
<i>Euonymus atropurpurea</i>	Wahoo Euonymus	4
<i>Euonymus bungeana</i>	Winterberry Euonymus	1
<i>Euonymus europaea</i>	European Spindletree	1
<i>Evodia daniellii</i>	Korean Evodia	1
<i>Fagus grandifolia</i>	American Beech	1
<i>Fagus sylvatica</i> & cultivars	European Beech	1
<i>Franklinia alatamaha</i>	Franklin Tree	1
<i>Ginkgo biloba</i> & cultivars	Ginkgo	1
<i>Gleditsia triacanthos (armed)</i>	Common Honeylocust	1
<i>Gleditsia triacanthos (thornless)</i>	Thornless Honeylocust	1
<i>Gymnocladus dioica</i>	Kentucky Coffeetree	1
<i>Halesia carolina</i>	Carolina Silverbell	1
<i>Hamamelis x intermedia</i> & cultivars	Hybrid Witch Hazel	1
<i>Hamamelis japonica</i> & cvs	Japanese Witch Hazel	1
<i>Hamamelis mollis</i>	Chinese Witch Hazel	1
<i>Hamamelis vernalis</i>	Vernal Witch Hazel	4
<i>Hamamelis virginiana</i>	Common Witch Hazel	4
<i>Hydrangea paniculata grandiflora</i>	Pee Gee Hydrangea	1
<i>Ilex decidua</i>	Possumhaw	1
<i>Ilex opaca</i>	American Holly	3
<i>Ilex pedunculosa</i>	Longstalk Holly	1
<i>Ilex verticillata</i>	Winterberry	4
<i>Juglans cinerea</i>	Butternut	1
<i>Juglans nigra</i>	Black Walnut	1
<i>Juglans regia</i>	English Walnut	1
<i>Juniperus chinensis</i> & cultivars	Chinese Juniper	2
<i>Juniperus communis</i>	Common Juniper	2

<i>Juniperus scopulorum</i> & cultivars	Rocky Mountain Juniper	2
<i>Juniperus virginiana</i> & cultivars	Eastern Redcedar	2
<i>Kalopanax pictus</i>	Kalopanax, Castor Aralia	1
<i>Koelreuteria paniculata</i> & cultivars	Golden Raintree	4
<i>Kolkwitzia amabilis</i>	Beauty Bush	4
<i>Laburnum</i> species & cultivars	Golden-chain Tree	1
<i>Larix decidua</i> & cultivars	European Larch	2
<i>Larix laricina</i>	American Larch, Tamarack	2
<i>Ligustrum</i> species	Privet	1
<i>Liquidambar styraciflua</i> & cultivars	American Sweetgum	2
<i>Liriodendron tulipifera</i> & cultivars	Tulip Tree, Yellow Poplar	2
<i>Maackia</i> species	Maackia	1
<i>Maclura pomifera</i> & cultivars	Osage-Orange	4
<i>Magnolia acuminata</i> & cultivars	Cucumbertree	2
<i>Magnolia grandiflora</i> & cultivars	Southern Magnolia	2
<i>Magnolia kobus</i> & cultivars	Kobus Magnolia	1
<i>Magnolia x loebneri</i> & cultivars	Loebner Magnolia	2
<i>Magnolia macrophylla</i>	Bigleaf Magnolia	1
<i>Magnolia quinquepetala</i> & cultivars	Lily Magnolia	1
<i>Magnolia x soulangeana</i> & cultivars	Saucer Magnolia	1
<i>Magnolia stellata</i> & cultivars	Star Magnolia	1
<i>Magnolia tripetala</i>	Umbrella Magnolia	1
<i>Magnolia virginiana</i> & cultivars	Sweetbay	1
<i>Malus</i> species, varieties & cultivars	Flowering Crabapples	4
<i>Malus sylvestris</i> (domestica)	Apple	4
<i>Metasequoia glyptostroboides</i>	Dawn Redwood	2
<i>Nyssa sylvatica</i>	Sour Gum, Tupelo	2
<i>Ostrya virginiana</i>	American Hophornbeam	1
<i>Oxydendrum arboreum</i>	Sorrel Tree, Sourwood	2
<i>Parrotia persica</i>	Persian Parrotia	1
<i>Paulownia tomentosa</i>	Royal Paulownia,	1
<i>Phellodendron amurense</i>	Amur Corktree	4
<i>Photinia villosa</i>	Oriental Photinia	4
<i>Picea abies</i> & cultivars	Norway Spruce	2
<i>Picea glauca</i> varieties & cultivars	White Spruce	2
<i>Picea mariana</i> & cultivars	Black Spruce	2
<i>Picea omorika</i>	Serbian Spruce	2
<i>Picea orientalis</i>	Oriental Spruce	2
<i>Picea pungens</i> & cultivars	Colorado Spruce	2
<i>Pinus banksiana</i>	Jack Pine	4
<i>Pinus bungeana</i>	Lacebark Pine	2
<i>Pinus cembra</i>	Swiss Stone Pine	2
<i>Pinus densiflora</i> & cultivars	Japanese Red Pine	2
<i>Pinus echinata</i>	Shortleaf Pine	2
<i>Pinus flexilis</i>	Limber Pine	3
<i>Pinus monticola</i>	Western White Pine	2
<i>Pinus mugo</i> & cultivars	Mountain Pine	
<i>Pinus nigra</i>	Austrian Pine	2
<i>Pinus parviflora</i> & cultivars	Japanese White Pine	2
<i>Pinus ponderosa</i>	Ponderosa Pine	2
<i>Pinus resinosa</i>	Red Pine	2
<i>Pinus rigida</i>	Pitch Pine	2
<i>Pinus strobus</i> & cultivars	White Pine	2
<i>P.s. fastigiata</i>	Upright White Pine	3
<i>Pinus sylvestris</i> & cultivars	Scotch Pine	2
<i>Pinus thunbergiana</i> (<i>thunbergii</i>)	Japanese Black Pine	2

<i>Pinus virginiana</i>	Virginia Pine	4
<i>Pinus wallichiana</i> (griffithi)	Himalayan Pine	2
<i>Platanus x xacerifolia</i> & cultivars	London Plane	1
<i>Platanus occidentalis</i>	American Sycamore	1
<i>Populus</i> species, varieties & cultivars	Poplar	1
<i>Populus deltoides</i>	Cottonwood	1
<i>Prunus armenica</i>	Apricot	1
<i>Prunus avium</i>	Sweet Cherry	1
<i>Prunus</i> x 'Hally Jolivette'	Hally Jolivette Cherry	4
<i>Prunus x blireiana</i>	Purpleleaf Plum	1
<i>Prunus cerasifera</i> & cultivars	Cherry Plum	1
<i>Prunus persica</i> & cultivars	Peach	4
<i>Prunus padus</i>	European Bird Cherry	1
<i>Prunus serrula</i>	Red-bark Cherry	1
<i>Prunus sargentii</i> & cultivars	Sargent Cherry	1
<i>Prunus serotina</i>	Black Cherry	1
<i>Prunus serrulata</i> & cultivars	Japanese Flowering Cherry	1
<i>Prunus subhirtella</i> & cultivars	Higan Cherry	4
<i>Prunus virginiana</i> 'Shubert'	Shubert Chokecherry	1
<i>Prunus yedoensis</i> & cultivars	Yoshino Cherry	1
<i>Pseudotsuga menziesii</i> & cultivars	Douglas Fir	2
<i>Ptelea trifoliata</i>	Water Ash, Hop Tree	1
<i>Quercus acutissima</i>	Sawtooth Oak	1
<i>Quercus alba</i>	White Oak	1
<i>Quercus bicolor</i>	Swamp White Oak	1
<i>Quercus cerris</i>	Turkey Oak	1
<i>Quercus coccinea</i>	Scarlet Oak	1
<i>Quercus ellipsoidalis</i>	Northern Pin Oak	1
<i>Quercus falcata</i>	Southern Red Oak	1
<i>Quercus ilicifolia</i>	Scrub Oak/Bear Oak	1
<i>Quercus imbricaria</i>	Shingle Oak	1
<i>Quercus laurifolia</i>	Laurel Oak	1
<i>Quercus macrocarpa</i>	Mossycup Oak, Bur Oak	1
<i>Quercus marilandica</i>	Blackjack Oak	1
<i>Quercus Muehlenbergii</i>	Chinquapin Oak	1
<i>Quercus palustris</i>	Pin Oak	1
<i>Quercus petraea</i>	Durmast Oak	1
<i>Quercus phellos</i>	Willow Oak	1
<i>Quercus prinus</i>	Chestnut Oak	1
<i>Quercus robur</i> & cultivars	English Oak	2
<i>Q. r. fastigiata</i>	Upright English Oak	3
<i>Quercus rubra</i>	Northern Red Oak	1
<i>Quercus shumardii</i>	Shumard Red Oak	1
<i>Quercus stellata</i>	Post Oak	1
<i>Quercus variabilis</i>	Oriental Oak	1
<i>Quercus velutina</i>	Black Oak	1
<i>Rhus</i> species & cultivars	Sumac	1
<i>Robinia pseudoacacia</i> & cultivars	Black Locust	1
<i>Salix</i> species, cultivars & varieties	Willow	1
<i>Sassafras albidum</i>	Sassafras	1
<i>Sophora japonicum</i> & cultivars	Japanese Pagodatree	1
<i>Sorbus</i> species & cultivars	Mountain-Ash	1
<i>Stewartia</i> species	Stewartia	1
<i>Styrax japonica</i>	Japanese Snowbell	1
<i>Symplocos paniculata</i>	Asiatic Sweetleaf	1
<i>Syringa</i> species & cultivars	Large Shrub Lilacs	4

<i>Syringa pekinensis</i>	Peking Lilac	1
<i>Syringa reticulata</i>	Japanese Tree Lilac	1
<i>Taxodium distichum</i> & cultivars	Bald Cypress	2
<i>Taxodium distichum nutans (ascendens)</i>	Pond Cypress	2
<i>Taxus cuspidata</i> , Tree forms	Taxus	4
<i>Thuja occidentalis</i> & cultivars	American Arborvitae	2
<i>T. o. fastigiata</i>	Upright American Arborvitae	2
<i>Thuja plicata</i> & cultivars	Giant Arborvitae	2
<i>Tilia americana</i> & cultivars	American Linden, Basswood	1
<i>Tilia cordata</i> & cultivars	Littleleaf European Linden	1
<i>Tilia x euchlora</i>	Crimean Linden	1
<i>Tilia heterophylla</i>	White Linden	1
<i>Tilia mongolica</i>	Mongolian Linden	1
<i>Tilia platyphyllos</i> & cultivars	Large-Leaved Linden	1
<i>Tilia tomentosa</i> & cultivars	Silver Linden	1
<i>Tsuga canadensis</i> & cultivars	Canada Hemlock	2
<i>Tsuga caroliniana</i>	Carolina Hemlock	2
<i>Tsuga diversifolia</i>	Japanese Hemlock	2
<i>Ulmus alata</i>	Winged Elm	1
<i>Ulmus americana</i> & cultivars	American Elm	4
<i>Ulmus carpinifolia</i> & cultivars	Smooth-leaf Elm	1
<i>Ulmus glabra</i> & cultivars	Scotch Elm	1
<i>Ulmus japonica</i>	Japanese Elm	1
<i>Ulmus parvifolia</i> & cultivars	Lacebark Elm	4
<i>Ulmus pumila</i>	Siberian Elm	1
<i>Ulmus rubra</i>	Slippery Elm	1
<i>Ulmus thomasii</i>	Rock Elm	1
<i>Ulmus x</i>	Hybrid Elm	1
<i>Viburnum lentago</i>	Nannyberry	4
<i>Viburnum prunifolium</i>	Black Haw	4
<i>Viburnum rhytidophyloides</i>	Willowwood Viburnum	4
<i>Viburnum rhytidophyllum</i>	Leatherleaf Viburnum	4
<i>Viburnum rufidulum</i>	S Blackhaw Viburnum	4
<i>Viburnum sieboldii</i>	Siebold Viburnum	1
<i>Viburnum x</i>	Hybrid Viburnum	4
<i>Zelkova serrata</i> & cultivars	Japanese Zelkova	4

STEPS FOR DETERMINING THE GRADE OF A TREE Draft

Step 8: If two of the Following are true reduce the grade in Step 7 by one. If more than two are true reduce the grade by two: _____

T F The tree with a trunk caliper larger than 1" requires a stake to hold it erect.

T F The crown is thin and sparsely foliated. Many evergreen and other trees are thin and sparsely foliated in the late winter/early spring just prior to the spring growth flush. Recently dug field-grown trees might also be thin. Do not downgrade for this.

T F More than 5% of the branches have tip die-back.

T F A) Tree height is taller than the maximum height specified in the appropriate matrix chart.

T F B) Flush cuts were made when pruning branches from the trunk

T F C) Branch stubs are left beyond the branch collar. A branch stub can be removed and not reduce the grade.

T F D) Open trunk wounds or other bark injury is evident. (Open trunk wounds **must be less than 10% of the trunk circumference** and less than 2 inches tall on Florida #1 trees. An open pruning scar on the trunk resulting from removing a branch is not considered an open trunk wound.)

T F F) More than the lower 40% of the trunk is free of branches. (The portion of the lower trunk with shortened, temporary branches is not considered part of the canopy.) **T F G)** More than 5% of the leaves are chlorotic or more than 5% of the canopy exhibits damage from pests and disease infestations. Reject as Cull if significant or serious. **T F H)** Most leaves are smaller than normal.

T F I) There is bark included between the trunk and a major lateral branch or between main trunks

T F J) Trunks and/or major branches are touching. Secondary branches on major branches may touch each other.

Consider a cull if: The branches are tip pruned:

Additional considerations of trees in containers or are already harvested if

any are true consider the tree a Cull and do not accept: **T F B)** The root ball

or container is undersized (consult proper tree matrix).

T F C) The root ball on B&B tree is not secured tightly with pins, twine or wire.

T F D) The tree is excessively root-bound.

T F E) There is evidence that one or more large roots (greater than 1/5 the diameter of the trunk) were growing out of the container.

T F F) Does it have a root larger than 1/10 the diameter of the trunk circling 1/3 of the root ball.

Final Grade: _____