

Campus Forest Management Plan

Stephen F Austin State University is graced with a majestic and diverse campus forest that is the hallmark feature and defining image of the university. In order to perpetuate that image, this plan will set forth the guidelines for the management and preservation of this mission critical resource. These guidelines will provide architects, engineers, designers, construction firms, contractors, faculty, staff, students and other persons working on the campus with the tools and knowledge needed to minimize the impact of their operations and programs on the campus forest. The university recognizes that project conditions and requirements vary, however, unless there is valid justification, it is expected that these guidelines will govern the design and specifications for campus projects for the following reasons:

- I. To protect, preserve, maintain and increase the survivability of campus trees during construction and renovation projects.
- II. To encourage respect and value for the campus forest and to acknowledge the vital environmental role of trees and ensure that protection and management of the campus forest is a priority.
- III. To provide for proper species selection, stock acquisition, planting methods, species diversity and age structure.
- IV. To reduce tree/infrastructure conflicts.
- V. To enhance the relationship of the campus forest to the built environment and increase the value of the university's educational mission.
- VI. To provide an aesthetically pleasing, sustainable environment in which to live, work, study and play.
- VII. To provide a consistent, standardized approach to tree related issues.

1. All firms and persons working on the campus of Stephen F. Austin State University will have knowledge of these guidelines before any work begins. It is the contractor's or site manager's responsibility to communicate and ensure that all workers and sub-contractors understand and abide by these and any subsequent standards. Penalty assessments may be made in the event of a breach of these guidelines and contractors may be required to reimburse SFA for tree damages caused by failing to follow these guidelines. By promoting thoughtful planning and conscientious management, the campus forest will be available for the enjoyment and use for generations to come.

2. Responsible Department

- I. SFA Grounds Department located within the Physical Plant Department, under the direction of the Vice President of Fiscal Affairs.

3. Objectives

- I. To maintain stands of large native trees with associated understory that provides a regionally appropriate theme and that unifies and beautifies the campus. It should be recognized that in areas of high visual sensitivity, the aesthetic quality of the forest should be given priority.
- II. To provide the environmental benefits of cooling and reduced energy expenditures. Large, heavy canopied trees can block up to 95% of incoming radiation, significantly reducing summertime building temperatures, and can extend the useable lifespan of asphalted areas by 10 years or more prior to seal-coating.
- III. To enhance storm water management, erosion control and water quality protection, through the process of interception by the leaves and root systems, reduce peak runoff levels and stabilize soil and filter sediment.
- IV. To reduce airborne particulates and pollutants, and promote carbon sequestration. The process of photosynthesis enables trees to filter and store carbon and polluting gases and filter significant amounts of particulates from the air.
- V. To provide areas for research, education and passive recreation on the campus. Trees provide unique educational opportunities in our campus setting. A diverse selection of trees is important for species identification and research associated primarily with Forestry, Environmental Science, Horticulture and Botany classes without the need for travel, thereby providing cost savings.
- VI. To provide an example of environmental responsibility and heighten public awareness of the relationship between human society and the natural environment. Social research has shown that a campus with trees is more desirable than a campus without trees, correlating into increased enrollment; having positive benefits to human health by reducing stress, and creating feelings of relaxation and well-being. Landscape design planning parameters should include the elements for the maintenance of campus safety and security and the preservation of significant views.

4. Selection

Located in a region endowed with good soils, an excellent supply and quality of water, and a long growing season, there is a vast amount of plant material that may be successfully grown on the campus of SFA. As the campus is used as a teaching lab, increasing the diversity of tree species is critically important. However, species selection must be dictated by site conditions. A 'species list' for campus planning does not exist, and selections for campus use may include both native and exotic species that have been screened for adaptability to physical conditions and serviceability, to meeting planting needs based on site orientation, drainage, soil type and condition, use, shape, mature size, and other such as showy flowers, interesting foliage, seasonal color, or attractive fruit or bark. When choosing a tree for a site, specific light, water, soil condition and

growing space requirements should be considered. Tree species and/or cultivars should be hardy to a minimum of USDA hardiness zone 8 and be pest resistant so as to minimize pesticide use and maintenance needs. Trees to be used on campus must be preselected at the farm or nursery and tagged, and must meet the approval of the Grounds Department. The Grounds Department will have final say on the selection of campus trees.

- I. All outside landscape architecture or design firms or personnel must complete an on-site visit to include a meeting with Physical Plant personnel comprised of, but not limited to, Director or Assistant Director of Physical Plant, Manager of Construction Services, Physical Plant Operations Analyst, Manager and Assistant Manager of Grounds, and Grounds Irrigation Technician, prior to any landscape plan development. This visit should allow ample time for touring the campus and learning the requirements and maintenance needs of the University. This exercise is valuable to all parties concerned, not meaning to stifle creativity, but to reduce the likelihood of misinterpretation and misunderstandings, conserve time and that most valuable resource, public money. Plans submitted without meeting these criteria will be rejected.

5. Planting

Tree plantings will be approved by the Grounds Department and unless contracted out via a project, will be performed by the arborist and tree crew. Species selection will be at the discretion of the Grounds Department, taking into consideration current inventory and the desire to diversify species as needed. When utilizing a contractor, trees will be inspected by the Grounds Department upon arrival at the job site and SFA reserves the right to refuse any plant material due to damage, small size, insect/disease problems or any other visible problem that would jeopardize the vigor of the tree. SFA also reserves the right to reject a planting due to improper techniques at the time of installation.

6. Timing

Although trees may be planted at any time of year, late fall to early winter is the optimal time for tree planting. Planting at this time allows trees to establish their root systems during a time of reduced active growth, generally lower ambient temperatures and higher soil moisture. Heat and drought stress are thus avoided, and the survival rate of plantings increases substantially.

7. Site Preparation

Identify and locate any underground utilities by contacting the Plant Operations Analyst at SFA Physical Plant Department.

- I. Verify that irrigation is installed or that water is available.
- II. Remove any sod from the intended site. Planting hole should be at least twice as wide as the diameter of the root ball.

- III. Do not dig deeper than the root ball as loose fill at the bottom of the hole will cause settling, leading to the eventual death of the tree from lack of oxygen.
- IV. Excavated soil should be saved to backfill with.
- V. All plant material to be used on campus should be thoroughly hydrated prior to planting.
- VI. Remove container or burlap and inspect for girdling roots and correct as necessary.
- VII. Loosen the root ball to promote outward root growth and successful establishment.
- VIII. Set tree in the planting hole with the root flare 1 – 3 inches above existing grade.
- IX. All wire and burlap and any visible ropes should be removed.
- X. The tree should be visually inspected from two directions to ensure the tree is as close to vertical as possible.
- XI. Backfill with soil previously excavated, **lightly** packing soil so as to maintain stability, without compressing the fine air space in the soil necessary for tree growth and development. Do not cover the root flare.
- XII. Water the planting site thoroughly to prevent dehydration. In the absence of adequate rainfall, newly planted trees should be watered deeply once per week for the first two years after establishment.
- XIII. Spread mulch 2-4 inches deep in a 3 foot radius of the tree, without covering the root flare.

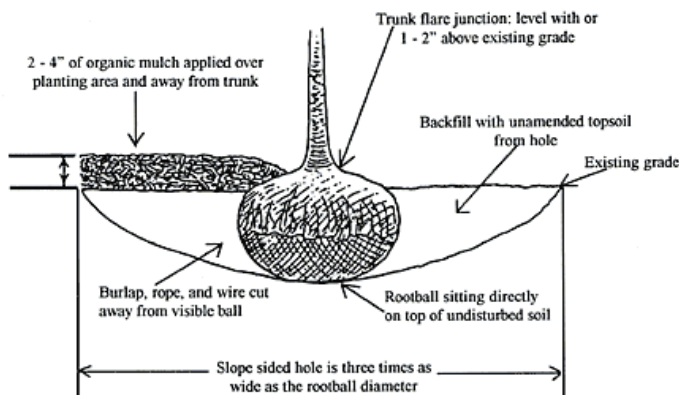


Diagram illustrating proper planting procedure for a tree or shrub.

8. Fertilization

Newly planted trees should receive a slow release type of fertilizer, used around the tree basin. Routine tree fertilization is not recommended; however, campus trees receive adequate nutrients from routine fertilizer applications to turf and shrubs.

9. Staking

Staking of trees at planting should be on an “as needed” basis. Stakes for support will not be necessary in most landscape situations if the tree is grown properly at the nursery or tree farm. Trees develop stronger trunk and root systems if they are not

staked at the time of planting. However, temporary protective staking may be required on sites where windy conditions are a concern.

10. Pruning

Under no circumstances should pruning be done by anyone other than the university arborist or technician, tree service companies contracted by the university Grounds Department or vegetation management services employed by energy delivery companies, **with the following exception:** Catastrophic events and failures that pose an immediate life safety threat or eminent, significant structural damage. After the threat has been mitigated, the university Grounds Department should be notified at the earliest possible time to assess, repair and/or remove the tree.

11. Pruning Schedule

The maintenance pruning schedule shall be dictated by tree species, age, function, and placement. Pruning operations should conform to the following standards recognized by the industry.

12. Pruning Standards

- I. American National Standards Institute (ANSI) A300 Pruning Standards.
- II. ANSI Z133.1 Safety Standards.
- III. ISA Best Management Practices: Tree Pruning.
- IV. Trees less than 7 years old should receive structural pruning on an annual or biennial basis to establish a dominant leader where appropriate, to select and maintain the lowest permanent branch, to select and establish scaffold branches and subordinate temporary branches.
- V. Trees 7 – 20 years old should receive structural pruning every two to five years.
- VI. Trees 20 years old and older receive maintenance pruning every five to seven years to remove dead, dying, diseased and defective branches from the crown.
- VII. Trees adjacent to roadways, walkways, signs and streetlights are annually inspected for safety and clearance issues and maintenance pruned as necessary.

13. Pruning Practices

To encourage the development of a strong healthy tree, the following guidelines should be followed when pruning.

- I. Pruning shall not be conducted without a clear objective, the order of significance is as follows:
 - i. Safety
 - ii. Tree health
 - iii. Aesthetics
14. When removing branches, the pruning cut shall not damage the branch bark ridge and branch collar.
15. Internode cuts should not be used except in storm response and crown restoration procedures.
16. Branch reduction or thinning should be used to achieve pruning objectives rather than large branch removal cuts.
17. Large branches that are dead, diseased, dying or defective should be removed

with the aid of ropes and rigging equipment to minimize risk of tree injury from falling debris.

- VI. Thinning is performed to reduce the density of branches, which increases light penetration, improves visibility and decreases wind load.
 - I. Assess how the tree will be pruned from the top down.
 - II. Favor branches with strong U-shaped angles of attachment. Remove branches with weak V-shaped angles of attachment and/or included bark.
 - III. Remove any branches that rub or cross each other.
 - IV. 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.
 - V. Do not remove more than one-quarter of the living crown of a tree at one time. If it is necessary to remove more, do so over successive years.
 - VI. When laterals are thinned from a limb, inner laterals should be well spaced to prevent "Lion-Tailing".
- VII. Raising is performed to provide vertical clearance from thoroughfares, signs, streetlights and structures.
 - I. Maintain live branches on at least two-thirds of a tree's total height.
 - II. Remove basal sprouts and vigorous epicormic sprouts.
- VIII. Reduction is performed to decrease the overall height of a tree or to decrease the length of an individual branch.
 - I. Use only when absolutely necessary.
 - II. Make the pruning cut at a lateral branch that is at least one-third the diameter of the stem to be removed.
 - III. If it is necessary to remove more than half the foliage from a branch, remove the entire branch.
- IX. Topping, Heading-Back, Hat-Racking, and Pollarding are prohibited pruning practices. These inappropriate practices result in tree starvation, shock, insect and disease infestations, weak limbs, rapid undesirable growth, aesthetically unpleasing trees, tree death and large costs associated with replacement or correction of damage.

14. Mulching

Mulching should be accomplished twice per year on all new plantings and for trees that are currently under a mulch regime. Mulch rings should be a minimum of six feet in diameter and may frequently be larger based on species, tree size and location within the campus landscape. Mulch should be 2-4 inches thick, leaving the root flare clear and visible. Under no circumstances should mulch be piled into "mulch volcano's" that are in contact with the tree trunk. Composted pine bark, shredded hardwood bark and pine straw are examples of acceptable mulch products.

15. Pest and Disease Management

Although there is no formal plan, Pest Management is accomplished in accordance with the principles of Integrated Pest Management. The university Grounds Department is committed to using the absolute minimum of pesticides possible, using the lowest impact rates and formulations when pesticides must be used, and using proactive, preventative dosages in an effort to prevent using higher curative application

rates. IPM is a strategy in which a combination of means including design choices, cultural practices, and chemical controls are used to manage pests in the landscape. A healthy, sustainable landscape that requires a minimum of chemical inputs is dependent upon choosing the right plant for the site. The SFA Grounds Department is committed to using improved cultivars, disease resistant varieties and proven species in an effort to reduce the amount, type and impact of chemical controls used on campus. For this reason, the Management of the SFA Grounds Department has final say concerning plant material used on the campus.

16. Tree Removals

Live trees are generally removed only when they pose a safety hazard to the public or structures, pose a significant interference to emergency access or to construction, renovation or repairs that absolutely cannot be addressed by other means, or significantly detract from the quality of the campus landscape. Trees that have structural, insect, or disease issues will be treated where the possibility of recovery is reasonable, and the tree is of a desirable species. Trees may only be removed after consultation with the Grounds Department, with the exception outlined below.

I. Emergency Situations

- i. Storm response and recovery are generally accomplished in-house. Additional labor may be contracted as needed. In a crisis, roads and streets necessary for emergency access will be cleared first, then access to critical buildings such as administration, university police, power plants, cafeterias and student housing and Physical Plant. Other buildings and facilities would follow. In advance of severe weather conditions, all necessary equipment shall be checked for readiness and safety by designated essential personnel. Designated essential personnel will be notified and on stand-by status. Campus Grounds and other operational responsibilities for pre-storm preparations are detailed in the SFA Continuity of Operations Plan.

II. Protection and Preservation during Construction

- i. To adequately ensure that the campus forest remains a healthy and viable cornerstone of the university infrastructure and a defining public image, the following standards are set forth. While intended to be as comprehensive as possible, no printed document can substitute for the knowledge and experience of a qualified urban forester. The recommendations of an urban forester may differ from a strict interpretation of these standards. The urban forester should be prepared to justify non-standard decisions, and work cooperatively with officials to reach a mutually agreed decision. Towards that end, tree protection and preservation should be integrated into the initial phases of the planning stage, rather than the review stage. In this manner informed decisions can be made, costly changes and repairs avoided, and the best

possible action plan for the trees being preserved can be formed and implemented prior to construction. Preconstruction tree preparation should begin a year in advance of construction; therefore, inclusion of the campus Grounds Department / urban forester is critical.

17. Site Planning

The process of site planning should include, but is not limited to:

- I. The identification and analysis of suitability for preservation for all trees 4 inches and larger within the construction zone.
- II. Trees accurately and precisely located on planning documents, with both trunk and canopy diameters to scale.
- III. An analysis of design constraints and alternatives including buildings, parking, access, mechanical, utilities, civil engineering, final grading, and landscape and irrigation.
- IV. Inclusion of tree protection plan in final construction documents.
- V. Continued post-construction assessment.

Protection of trees that remain within a construction site is a high priority and the University requires contractors to use every reasonable measure to protect the root system and canopy of these trees. Prior to developing a cost estimate, all parties involved should be made aware of the Tree Protection Standards and the specific site recommendations. Design and bid specifications will incorporate these standards for awareness.

As it is impossible, and probably not desirable, to preserve every tree on a construction project, an analysis of the stand should be conducted to identify which trees are of the most value to the project specifically and to the campus as a whole. In this manner, resources allocated to protection and preservation can be more efficiently utilized, consensus is reached, the potential for survival is increased and the project flows more smoothly.

Tree selection should include, but is not limited to, the following factors:

- I. Condition, in assessing a tree's condition, the trunk condition, growth rate, tree structure, insect and disease problems, crown development, crown to trunk ratio, and life expectancy should be assessed.
- II. Species. Priority should be given to species that are hardy and well adapted (whether native or exotic) to the site.
- III. Size. Preference should be given to large trees on site that are viable candidates for preservation. This does not preclude the preservation of smaller trees that may be of a more desirable variety, better condition, etc.
- IV. Screening and aesthetics. Trees may be retained if their value for screening is

high, or they are in good condition and have exemplary form and add significantly to the landscape.

- V. Energy conservation and heat abatement. Large canopied trees shading buildings can provide a substantial savings in energy expenditures. Pedestrian use areas and parking areas are enhanced by the shade provided by trees.
- VI. Safety. If a tree produces a hazardous situation due to external factors related to man-made features (*not inherent in the condition of the tree*), for example, its location relative to a road intersection, its potential for preservation is diminished. Any tree identified as a hazard tree should be removed at the discretion of the Urban Forester.
- VII. Adjacent trees. The proximity of other trees has a bearing on a tree's value. Everything else being equal, a lone tree has greater value than one tree of many. The fate of other trees in the vicinity also affects the potential for preservation.
- VIII. Water quality protection and soil conservation. Trees help reduce storm water runoff and enhance groundwater recharge by breaking the impact of raindrops and improving the soil structure. A tree's effectiveness in this capacity is correlated with the size of the crown and the root area. Large trees with full crowns and unrestricted root areas are desirable for this quality.
- IX. Historical significance. Trees that are on a registry of historic or champion trees, or has been documented as historically significant, or due to its location and size, serves as a significant landmark in the landscape should be given preference.

After determination of trees to be preserved, the Grounds Department will mark the trees and ensure that protection measures are applied from the outset of the project so as to increase the potential of successful preservation. Any deviation from these standards must be approved in writing by the Grounds Department prior to change. These standards apply to in-house operations as well as contracted jobs, regardless of size.

18. Critical Root Zone

The Critical Root Zone is defined as 1.5 times the crown diameter of the tree at its widest point, with the exception of very narrow crowned species, for which it shall be 2 feet for every inch of trunk diameter, measured at 4.5 feet.

19. Tree Preservation Rules and Procedures

- I. The SFA Grounds Department will determine which trees require protection and the area of protection and mark the area.
- II. Prior to commencing work, the contractor is required to meet with the owner's representative to review all work procedures, access routes, storage areas, and tree protection measures.
- III. The contractor or personnel responsible for the project will construct and maintain fencing for each protected tree or group of trees on the site, encircling

- the outer limits of the Critical Root Zone to prevent unnecessary damage.
- IV. Fences will be erected prior to any work on site, and will remain until all work on the site has been completed. Fences may not be relocated or removed without the written permission of the university Grounds Department.
 - V. Fencing material shall be 6' chain link fence on 8' steel "T" post's spaced 6' on-center and driven a minimum of 2' deep into the ground. Wooden stakes, rebar posts, and vinyl construction fencing are not considered an approved method sufficient to protect the Critical Root Zone.
 - VI. Clearly visible, English – Spanish bilingual "KEEP OUT- TREE PROTECTION ZONE" signs are to be posted on all sides of fencing at intervals of 15'. These signs are to be maintained as long as the fence is in place. Fences will remain in place until all work is completed.
 - VII. All construction trailers, traffic and storage areas must remain outside fenced areas at all times.
 - VIII. All underground utilities drain or irrigation lines shall be routed outside the tree protection zone. If lines must traverse the tree protection zone, they shall be tunneled, bored, or trenched by the use of an air-spade type device. In addition, if multiple utilities must cross the TPZ, the operations should be consolidated so as to impact the tree only once during construction. Consultation with and supervision by the university Grounds Department is required.
 - IX. No materials, equipment, spoil, waste or washout water, fuels, oils, paints, solvents, chemicals, concrete, stucco mix, dirty water or any other substances may be deposited, stored, placed, poured or parked within the tree protection zone at any time during the project.
 - X. Additional pruning required for clearance during a construction project must be brought to the attention of the university Grounds Department. Work must be performed by a qualified Arborist or technician and NOT by construction personnel.
 - XI. Any herbicides placed under paving materials must be safe for use around trees and labeled for that use. Any pesticide used on site must be tree safe and not easily transportable by water. Accurate, legal records must be maintained for any applications to the site.
 - XII. All grading, construction, demolition, utility or other work that is expected to encounter tree roots must be monitored by the university Grounds Department.
 - XIII. All trees within a Tree Protection Zone shall be irrigated on a schedule to be determined by the university Grounds Department. Each irrigation cycle shall wet the soil within the Tree Protection Zone to a depth of 6 inches.
 - XIV. If injury should occur to any tree during construction, The university Grounds Department should be notified immediately, so as a timely evaluation can be made and appropriate treatments applied.
 - XV. Erosion control devices, such as silt fences, debris basins and water diversion

structures shall be installed to prevent siltation and/or erosion within the Tree Protection Zone.

- XVI. No root raking shall be allowed within any Tree Protection Zone at any time during clearing, grading or construction of a project.
- XVII. Before any grading, pad preparation, or excavation for foundations, footings, walls or trenches in close proximity to a Tree Protection Zone occurs, Tree roots should be pruned one foot outside the zone by cutting all roots cleanly to a depth of 36 inches. Roots shall be cut by manually digging a trench and cutting exposed roots with a saw, sharp pruners, or loppers, or other approved root pruning equipment. These operations must be supervised by the university Grounds Department.
- XVIII. Any roots exposed during grading or construction shall be exposed to sound tissue and cut cleanly with approved root pruning equipment.
- XIX. In the event that temporary access or haul roads must pass over the root area of trees to be retained, a road bed of no less than 12 inches of coarse mulch, topped by a layer of ¾ inch plywood shall be created to protect the soil. The road bed material shall be replenished as necessary to maintain a minimum of 12 inch depth.
- XX. No spoil from trenches, basements or other excavations shall be placed within the Tree Protection Zone, either temporarily or permanently.
- XXI. No burn piles or debris pits shall be placed within the Tree Protection Zone. No ashes, construction debris of any type, garbage, trash or litter may be placed, dumped or buried within the Tree Protection Zone.
- XXII. Maintain fire safe areas around fenced areas. No heat sources, flames, ignition source, fuels, flammable gasses, welding or smoking is allowed in the Tree Protection Zone.
- XXIII. To ensure compliance of tree protection and preservation, a weekly inspection shall be conducted by the university Grounds Department. Reports shall be provided to the university Construction Manager. Inspections shall include, but are not limited to the following items. Tree Protection Zone encroachment, structural integrity of TPZ fencing, irrigation/soil moisture levels, evidence of plant stress, insects or disease as a result of activity, and dust levels on trees.

20. Conclusion

Management of a campus forest is a very long-term undertaking, with results only gradually becoming evident. Stand improvement is a prolonged process that requires much patience and persistence. The results of years of planting, pruning, preservation and thoughtful removal will hopefully be enjoyed by many generations of Lumberjacks to come.