Campus Tree Care Plan

2022

Drake UNIVERSITY

TABLE OF CONTENTS

PURPOSE..... 3

Objectives..... 3

Goals and Targets..... 3

ROLES AND RESPONSIBILITIES..... 4

COMMUNICATION STRATEGY..... 5

CAMPUS TREE CARE PRACTICES..... 5

Sourcing of Plant Material..... 5

Plant Installation Practices.....6-7

Pruning..... 7-9

Removal of Campus Trees..... 10-11

Landscaping..... 11

Cultural Practices..... 11-12

Recommended and Prohibited Trees..... 13-14

PROTECTION AND PRESERVATION POLICIES..... 15

Tree Protection Zones..... 15-16

Damage Assessment..... 17

TREE MITIGATION POLICY..... 18

PROHIBITED PRACTICES..... 18

DEFINITIONS OF TERMINOLOGY..... 19-20

ATTACHMENTS..... 21

PURPOSE

The purpose of the Drake University Campus Tree Care Plan is to identify policies pertaining to procedures and practices used in establishing, protecting, maintaining, and removing trees on the Drake University campus. The goal of the plan is to ensure a safe, attractive, and sustainable campus urban forest.

Campus Tree Care Plan Objectives

The specific objectives are as follows:

- Preserve and protect existing and future trees on campus.
- Ensure proper species selection and high-quality nursery stock acquisition.
- Promote species diversity and age structure in the tree population.
- Promote tree health and safety by utilizing the International Society of Arboriculture best management practices when maintaining campus trees.
- Manage the impact of development on campus trees.
- Remove hazard trees or limbs.
- Provide an adequate replacement program for dead or dying trees.
- Ensure industry standards for planting procedures.
- Educate the campus and community on the value of trees.
- Provide 30% urban tree cover by the year 2026.

Goals and Targets

- Increase campus tree canopy from 26.5% to 30% by 2025.
- Maintain campus tree inventory.
- Create an annual tree maintenance schedule.
- Measure goals with tree assessments.
- Diversify Drake's urban forest with no single species representing more than 10% of its trees.
- Put a higher emphasis on sightlines as the land surrounding campus is developed.

ROLES AND RESPONSIBILITIES

Facilities Planning and Management

The Grounds Department within Facilities Planning and Management is the responsible authority and department for implementation of the Campus Tree Care Plan.

Advisory Committee

The Tree Advisory Committee serves as a knowledge network and provides input on matters pertaining to the management of tree resources within campus.

Committee shall consist of:

- One student
- One outside arborist
- Two faculty members
- Two Facility Services managers
- Grounds Manager
- Campus Horticulturists

Current Advisory Members:

- Kevin Moran, Director of Facility Services
- Patrick Williams, Grounds Manager
- Jack Bush, Campus Horticulturist
- Lindsay Mack, Campus Horticulturist
- Thomas Rosburg, Faculty
- David Courard-Hauri, Faculty
- Emma Hanigan, State Urban Forester, Iowa DNR
- Olivia Nole, Student - Drake Environmental Action League
- Hannah Remke, Sustainability Coordinator

COMMUNICATION STRATEGY

After the adoption of the Campus Tree Care Plan and Policies by the Campus Tree Advisory Committee and Drake University Administration approval, an article on Drake University's participation in the Tree Campus USA shall be placed in the student's newspaper "The Times Delphic". Also, the adoptions shall be sent to the Drake University community via electronic mail distribution system and placed on the following webpages: Drake Facilities and Planning Management; Drake Sustainability. Also, a press release shall be made to the local media through Drake University Marketing and Communications' office.

Tree protection guidelines will be communicated to project managers for inclusion in project specifications.

CAMPUS TREE CARE PRACTICES

Sourcing of Plant Material

Plant species used on Drake University campus will come from a pre-determined list approved by the Campus Tree Advisory Committee.

All landscape nursery stock shall conform to the standard specification of the American Standard for Nursery Stock.

All plants shall be grown in climatic conditions similar to campus.

The list will contain 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 condition, use, etc.

Where appropriate, the best plant will be selected for a given site, which may or may not be a native.

Trees to be used on campus must be pre-selected at the nursery for good quality and tagged. Only trees of one and a half inch (1 ½") minimum, caliper to 2.5" maximum caliper is to be planted, unless moving an existing tree and using a tree spade. If the tree is containerized, the minimum may be three fourths inch (¾").

Any exceptions regarding plant material must be approved by Facilities Planning and Management.

Plant Installation Practices	
Fertilization	Newly planted trees should not receive fertilization during the first growing season. Fertilization in the second season of growth may be administered where a soil test recommends its use.
Pruning	Prune only broken or damaged branches at the time of planting.

Installation Practices based on Type of Sourced Materials	
Type of Material	**Practices and Procedures**
Ball and Burlap	The planting hole should be two to three times the width of the root ball, container, or root mass (the poorer the soil, the wider the hole), with sides that slope towards the base of the root ball. Planting hole depth should allow the plant to be positioned so the root collar or trunk flare (where first order roots spread from the trunk) is approximately level with, or slightly higher than the surrounding grade. If the root ball is sturdy, all burlap, sisal and synthetic twine, and the wire basket can be removed before the plant is placed in the hole, or, once in the hole, but before backfilling begins. If the root ball is not sturdy, one-half (1/2) to one-third (1/3) of the wire basket can be removed from the root ball while in the hole. Remove as much of the burlap as is possible. No amendments shall be used as backfill material unless necessary. The soil removed from the planting hole should be used. The backfill soil should be tamped firm enough to remove large sir pockets, but not too firm as to remove all fine air spaces needed to a well aerate soil. Apply water to backfill soil when three-fourths (3/4) completed and again when the backfill matches the surrounding grade. Stake the tree only if necessary: Place stakes on opposite sides of the tree and outside the planting hole for maximum support and to avoid damaging the root system. Stakes should be at right angles to the most critical wind direction. Stakes should be within the planned mulch ring to aid in lawn mowing. The material used to attach the tree to the stake should be broad, smooth and somewhat elastic. The tree should not be totally inhibited from moving. Stakes shall be removed after one year. Move the trunk back and forth to determine if the trunk is rigid at the soil line. Mulch shall be uniformly shredded hard wood, mineral (rock) or composted organic material. Mulch shall be between two inches (2”) and four inches (4”) in depth and shall not touch the trunk of the tree.

	In spring or summer, water trees one (1) to three (3) times each week during the first few months after planting. Provide one (1) to three (3) gallons of water per caliper inch over the root ball. Following the initial few months of frequent irrigation, provide weekly irrigation until plants are fully established.
Container Grown	Use the same techniques as above from planting container-grown or containerized material. However, before backfilling begins, all containers must be removed from the root ball or root mass. Container-grown or containerized plants should be planted so the top of the root ball is at, or slightly above grade (depending on drainage and soil characteristics). Make several vertical cuts the length of the root mass to disrupt circling roots.
Transplanted	Staff shall transplant desirable trees from a development area or other construction sites if the tree caliper is between two inches (2") and four inches (3") where there is an acceptable location and during the planting season. Trees of larger caliper shall be contracted out using a large tree spade.

Pruning

General Pruning Practices

Prune for safety, health, and aesthetics.

Trees will be pruned on a regular maintenance schedule or on an "as needed" basis.

Trees will be surveyed periodically and rated based on their needs to determine scheduling priorities.

When removing branches, the pruning cut shall not damage the branch bark ridge and branch collar.

Internode (heading) cuts should not be used except in storm response and crown restoration procedures.

Branch reduction or thinning should be used to achieve pruning objectives rather than making large (>8" diameter) branch removal cuts.

Wound dressing is recommended only for pruning wounds make on oak and American elm in the spring and early summer.

Deciduous plants can be pruned during the dormant period between leaf fall and the late dormant season (end of winter).

Maple, elm, birch and other trees referred to as "bleeders" may be pruned in summer or early winter to minimize sap flow.

Suckers and water sprouts shall be pruned during the summer to minimize excessive growth.

Pruning Schedules	
The maintenance pruning schedule shall be dictated by tree species, age, function, and placement. Trees adjacent to roadways, walkways, signs and streetlights are annually inspected for safety and clearance issues and maintenance pruned as necessary	
Tree Age	**Schedule**
< 7 Years	Trees less than seven years old should receive structural pruning on an annual or biennial basis.
7 – 20 Years	Trees seven to 20 years old should receive structural pruning every two to five years.
> 20 Years	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.

Proper Pruning Techniques	
Natural Target Pruning	Pruning will mimic and improve upon natural branch shedding. Branches should be removed at their base without cutting into the branch collar. When removing a living branch, pruning cuts should be made just outside the branch bark ridge, angling away from the trunk outward as close to the branch collar as possible.
Training Young Trees	Remove broken, diseased, dying or dead branches. Select a leader and remove competing leaders. Select scaffold branches and eliminate competing branches. Select temporary branches below the lowest permanent branch to be retained for up to five years. Remove no more than 25% of a young tree's canopy in a one-year period.
Pruning Mature Trees	Crown reduction is not recommended. Crown reduction shall be used to reduce the size of a tree, shorten branches that extend beyond the edge of the new, smaller canopy. The longest portions of main branches shall be cut back to existing, smaller, lateral branches large enough to assume the branch's role. Crown cleaning shall be used for the removal of dead, dying, diseased, damaged, rubbing, broken and out-of-place branches and water sprouts

		Crown thinning shall be used to remove lateral and parallel branches, especially from the end portions of limbs. It is used to reduce limb weight on mature trees to reduce stress and strain on branches with structural defects. Crown raising shall be used for the removal of lower branches of a tree to provide clearance. Raising is best done gradually over a period of years Crown restoration shall be used to improve the health and structural strength of the tree. Sprouts that grow from headed scaffolds shall be thinned to two (2) or three (3) on each scaffold.
	Pruning Conifers	Pruning evergreen trees that produce side buds (lateral buds) on shoots and branches, such as spruce and fir, shall be pruned by cutting the tips back to the desired length in late winter when buds are dormant. Pines shall be pruned in early June to early July when the new growth is in the "candle" stage. Cut or snip off one-half (1/2) to two thirds (2/3) of the candle. Arborvitaes, yews, and junipers shall be pruned before new growth begins in the late dormant season and again in June. Avoid fall and winter pruning. Unwanted lower branches on all conifers shall be removed in the late dormant season.

Removal of Campus Trees	
Live trees shall be removed only when required to protect public safety, are a detraction from the quality of the landscape or construction requires a tree to be removed.	
Fallen Limb Removal	When fallen limbs are observed on campus, members of the campus community may call in or make a service request. Every attempt will be made to clean up the debris the same day, depending on the severity of the damage.
Emergency Tree Removal	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. A prioritized plan will be implemented once these critical needs are addressed. Unsalvageable trees will be removed systematically based on possible targets and salvageable trees shall be pruned to restore their health and structure. As the tree planting budget permits, lost trees shall be strategically replaced to restore the structure and function of the campus urban forest in a reasonable time frame. During a storm response and recovery, trees requiring specialized equipment not available in-house are addressed by an outside contractor.
Hazard Tree Inspection/ Removal	Trees will be evaluated regularly to determine the health of the tree population. Tree inspection may be carried out during the dormant season. Inspections shall be conducted after construction of trees or after severe storms. Defects to look for include internal decay; cankers; root failure; poor branch attachment, codominant stems, included bark; cracks, dead trees, tops or branches; poor tree architecture according to **A Community Guide to Program Design and Implementation** (see attached.) A tree may be deemed a hazard if it is near a target (park bench, building, sidewalk, bike rack, etc.)

Stump Grinding	After trees are removed the stumps shall be scheduled for grinding, provided there is adequate access to the site. Grindings are to be raked and removed. Soil will be used to fill the void left by the stump.

Landscaping
All landscaping, new and old, shall use the list of acceptable trees provided by the Campus Tree Advisory Committee. A list of recommended and prohibited trees will be established and updated every two years to maintain a healthy urban forest.

Cultural Practices	
Mulching	Tree mulch will be replaced every two years, or as needed, for trees up to approximately six inches (6”). Periodically, drip lines of larger trees and tree groupings shall be mulched extensively. Mulch shall be spread the same diameter as the branch spread, or large enough to cover the prepared planting hole. Mulch shall be maintained at a depth between two (2) to four (4) inches. Hardwood bark mulch, composted organic material or mineral (rock) mulch may be used.
Fertilization	There is no regular tree fertilization beyond treatment received as a result of lawn fertilization. Specimen or high-value trees may receive prescription fertilization when severe nutrient deficiencies are diagnosed.

<table>
<tr>
<td>Plant Health Care</td>
<td>
Control of insect and disease problems will be accomplished through a program of integrated pest management (IPM).

Species and cultivars will be chosen for resistance to insect and disease problems.

Monitoring reports shall be used to maintain effective and evolving plant health care programs.

To determine the need for intervention, monitors shall use a plant health continuum and classification outline:
<table>
<tr><th>Class Number</th><th>Class Description</th><th>Recommended Action</th></tr>
<tr><td>1</td><td>Normal appearance for the plant</td><td>No action needed.</td></tr>
<tr><td>2</td><td>Minimal (less than 5%) visible plant injury detected or anticipated. The plant injury may take the form of discolored or wilted leaves, defoliation, or twig dieback among many other symptoms.</td><td>Classify problems as a true threat to the health of the plant or simply aesthetic injury.</td></tr>
<tr><td>3</td><td>Plant injury between 5% and 10% is detected or anticipated.</td><td>Make a record of injury or stressor observed. Treatments may be warranted to maintain plant health.</td></tr>
<tr><td>4</td><td>Plant vitality or structure is significantly compromised by stressor(s).</td><td>Intense multiple treatments are essential.</td></tr>
<tr><td>5</td><td>Plant is in severe decline or a major structural failure has occurred.</td><td>Remove portion of or entire plant.</td></tr>
</table>
</td>
</tr>
</table>

Recommended and Prohibited Tree Species	
Recommended Species	**Shade Trees**
	Aesculus glabra—Ohio buckeye *Aesculus hippocastanum*—Horse chestnut *Betula nigra*—River Birch *Carya ovata*—Shagbark Hickory *Catalpa Speciosa*—Northern Catalpa *Celtis Laevigata*—Sugarberry *Celtis Occidentalis*—Hackberry *Cercidiphyllum japonicum*—Katsuratree *Cladrastis kentuckea*-Yellowwood *Fagus grandifolia*—American Beech *Ginkgo biloba*—Ginkgo *Gleditsia triacanthos*—Thornless honeylocust *Gymnocladus dioicus*—Kentucky Coffeetree *Larix decidua*—European larch *Liquidambar styraciflua*—Sweetgum *Liriodendron tulipifera*--Tuliptree *Nyssa sylvatica*—Blackgum *Platanus x acerfolia*—London planetree *Platanus occidentalis*—Sycamore *Quercus alba*—White Oak *Quercus bicolor*—Swamp White Oak *Quercus imbricaria*—Shingle Oak *Quercus muehlenbergii*—Chinkapin oak *Tilia americana*—American Linden *Tilia cordata*—Littleleaf Linden *Tilia tomentosa*-Silver Linden
	Low-growing Trees
	Amelancheir spp—Serviceberry *Carpinus caroliniana*—American Hornbeam *Cercis canadensis*—Eastern redbud *Cornus alternifolia*—Pagoda dogwood *Hamamelis virginiana*—Witch hazel *Heptacodium miconioides*—Seven son flower *Magnolia acuminata*—Cucumbertree/Magnolia *Malus spp.—Crabapple* *Ostrya virginiana*—Ironwood/American hophornbeam *Syringa reticulata*—Japanaese tree lilac *Vibernum lentago*—Nannyberry vibernum *Vibernum prunifolium—Blackhaw vibernum*

	Conifers *Abies balsamea*—Balsam fir *Abies balsamer var. Phanerolepis*—Canaan fir *Abes concolor*—White concolor fir *Abies fraseri*—Frasier fir *Metasequoia glyptostrobiodes*—Dawn redwood *Picea abies*—Norway spruce *Picea glauca*—Black Hills Spruce *Pinus bungeana*—Lacebark Pine *Pinus flexilus*—Limber Pine *Pinus strobus*—Eastern white pine *Taxodium distichum*—Bald cypress
Prohibited Species	*Acer negundo*—Boxelder *Acer freemanii*—Maple, hybrid/Freeman *Acer ginnala*—Amur maple *Ailanthus altissima*—Tree of Heaven *Elaeagnus umbellate*—Autumn olive *Fraxinus spp.*—Ash *Picea pungens*—Blue spruce *Pyrus spp.*--Callery/ornamental pear *Robinia pseudoacacia*—Black locust *Ulmus x hollandica*—Chinese elm *Ulmus pumila*—Siberian elm

PROTECTION AND PRESERVATION POLICIES AND PROCEDURES

Tree Protection Zones

Tree protection zones shall be established and maintained for all trees to be preserved in a construction site. A tree protection barrier may consist of an orange plastic snow fence, chain link fence or wood barrier.

A tree protection zone must be large enough to protect the soil from compaction and the tree from limb and root damage, and it must be explained by a sign:

> ***Warning! This fence shall not be relocated or removed without written authorization from the Facilities Manager.***

The size of the tree protection zone may be calculated in three ways:

1	2	3
Measure the diameter of the tree trunk at four and a half feet (4 ½') above the ground (diameter at breast height or DBH). For every inch of trunk diameter, allow at least one (1) to one-and-a-half feet (1 ½') of space away from the trunk (radius distance). A minimum root protection distance should always be at least six feet (6'), regardless of trunk diameter.	Measure the length of the branch that extends horizontally the farthest from the tree. This drip-line distance, in feet, multiplied by 1.5 yields the distance (in feet) away from the trunk to be protected.	Estimate the expected diameter (DBH) of a tree 10 years in the future. The number of feet (radius) of tree protection distance is calculated by multiplying the expected diameter (in inches) by 2.25.

If erecting plastic fence to limit activity within sensitive tree protection zones becomes impractical, alternative methods for protecting roots can be used including:

- Spreading several inches of wood chips over the root zone.
- Bridging root areas with plates of steel or low wooden bridges.
- Pumping concrete from trucks through conveyor pipes instead of driving over root systems.

Heavy equipment access, material storage, chemical or cement rinsing, vehicular parking for contractors and subcontractors, and site office locations will be limited to non-tree areas.

No root raking shall be allowed within a tree protection zone during clearing, grading or construction of a project.

All site work shall be planned and conducted in a manner that will minimize damage to protected trees from environmental changes such as altered site drainage or any other land disturbance within or immediately adjacent to the critical root zone of the tree.

Grade Changes

If the grade must be lowered in the vicinity of a tree, retaining walls shall be used to keep significant portions of the root system at their existing grade, while allowing the grade to be lowered beyond the wall. The wall should be built as far away from the tree as possible to conserve the maximum amount of soil for root growth.

If the grade must be raised in the vicinity of a tree, vertical aeration tiles or chimneys shall be spaced over the root system and connected to a layer of gravel placed over the original soil surface. Topsoil will then be back filled over the gravel to the desired grade. However, it is best to avoid grade changes whenever possible.

Utility Installation

Trenching should be completed in early spring or late summer if possible.

Keep the backfilled trench sufficiently irrigated to encourage the establishment of new roots.

Trenches shall be one foot for each inch at DBH from the trunk if possible.

Tree Damage Assessment

Assessment

Assessment on low profile trees is performed via the Facility Services Department using the designated tree evaluation form (see attachment A.) Results from the evaluation determine whether the tree should be removed, pruned, or receive treatment such as fertilization, and insect/disease control.

Higher profile trees are assessed by an outside consultant.

Removed trees shall be updated on the tree inventory list.

Enforcement

Enforcement of protection measures is to be handled by project managers, on-site engineers and Facility Services.

Whenever it is determined that violation of this procedure has occurred, the Facilities representative or designee shall immediately issue written and oral notice to the person or company or department in violation identifying the nature and location of the violation and specifying that remedial action is necessary to bring the violation into compliance.

The person or company or department in violation shall immediately, conditions permitting, commence remedial action and shall have seven (7) working days after the receipt of the notice, or such longer times as may be specified in the notice, to complete the remedial actions required to bring the activity into compliance with this policy.

Penalties

Penalties will be assessed based on the value of the damaged tree(s) according to the ISA's "Guide for Plant Appraisal, 9th Edition."

TREE MITIGATION POLICY

The tree removal and mitigation plan shall provide mitigation for the loss of canopied area existing on or after May 1, 2009, that has already been removed, and for any existing mature trees to be removed, in accordance with the following rations:

One replacement tree shall be provided for each 2,000 square feet of canopied area existing on or after May 1, 2009, that has already been removed; and,

Replacement trees shall be provided for each mature tree to be removed based upon the diameter at breast height (DBH) of the removed tree in the following rations:

DBH of Removed Tree (Inches)	Ratio of Replacement Trees to Removed Tree
At least 12 and less than 18	1:1
At least 18 and less than 24	2:1
For each increment of 6 inches of DBH above 24 inches, one additional replacement tree shall be provided.	

PROHIBITED PRACTICES

- No person shall willfully damage, cut, carve or remove any tree or shrub on campus.
- Under no condition shall a tree be planted on Drake University campus for dedication without pre-approval from Facility Services Management.
- Under no condition shall bicycles be allowed to park at campus trees. All bicycles must be parked only at bicycle racks. Bicycles found parked and or locked in areas other than those allowed may be impounded or immobilized by Campus Security. The person responsible for the bike will receive a bicycle parking citation.
- Under no condition shall a tree be vandalized with paint. Persons found applying paint to trees will be issued a citation.

DEFINITIONS OF TERMINOLOGY

Branch collar- *A combination of parent stem (trunk) tissue and branch tissue generated around the base of a branch through coordinated growth*
Branch bark ridge- *Rough, typically darkened, raised bark that forms in the angle at the union of a branch and the trunk, and extends down from both sides of the union.*
Branch protection zone- *A zone that forms within the branch base made of chemicals from stored energy that resists the spread of decay-causing pathogens from the branch into the trunk*
Caliper-*The diameter or thickness of the main stem of a young tree or sapling as measured at six inches above ground level.*
Callus- *Undifferentiated, non-lignified tissue ini9tially formed by the cambium at the wound margin*
Canopy trees- *A tree that will grow to a mature height of at least 40 feet with a spread of at least 30 feet*
Codominant stems- *Stems that grow from multiple apical buds located at the same tip. They are similar to branches, but have no branch collars or branch protection zones*
Critical Root Zone- *The minimum area surrounding a tree that is considered essential to support the viability of the tree and is equal to a radius of one foot per inch of trunk diameter (DBH)*
Decurrent growth habit-*A round-headed or spreading growth habit with no main leader to the top of the plant. Lateral branches grow almost as fast as fast as the terminal shoot or may even outgrow it so that the central leader becomes lost among the other branches*
Development- *The act, process or state of erection buildings or structures, or making improvements to a parcel or tract of land*
DBH (Diameter, Breast Height)- *The diameter or width of the main stem of a tree as measured 4.5 feet above the natural grade at its base. Whenever a branch, limb, defect or abnormal swelling of the trunk occurs at this height, the DBH shall be measured at the nearest point above or below 4.5 feet at which a normal diameter occurs*
Dripline- *The area defined by the outermost circumference of a tree canopy*
Excurrent growth habit- *A cone-shaped crown with a well-defined central leader that out grows and subdues lateral branches*
Flush cut- *A pruning cut made inside the branch collar and branch bark ridge*
Included bark- *Bark tissues that fold inward between the branch and trunk*
Fertilizer- *Any substance used to fertilize the soil, esp. a commercial or chemical manure*
Injection- *A technique employed to introduce chemicals directly into the xylem of trees*
Native tree- *Any tree species which occurs naturally and is indigenous within the region*
Nutrient- *A chemical constituent that is involved in the metabolism of the tree or that is necessary for the tree to complete its life cycle*
Scaffold Branches- *Branches selected for good attachment, appropriate size and desirable spacing in relation to other branches*
Tree protection zone- *The area surrounding a preserved or planted tree that is essential to the tree's health and survival, and is protected within the guidelines of these regulations*

Woundwood- *When lignified callus tissue differentiates to form transport cells. When pruning has been properly accomplished, a ring of Woundwood forms completely around the wound the first growing season after the cut*

ATTACHMENTS

Attachment A

Form found in Guide for Plant Appraisal, 9th Edition