
Street Tree Design

A. Area Requirement per Tree

At least 9 square feet of ground is required for each tree and the trunk of street trees should be no closer than 2.5 feet from impervious surface material.

B. Spacing

For planning purposes, the ideal spacing should be based on species and cultivar of tree selected. Trees should not be spaced closer than the size of their mature horizontal spread.

C. Location within Public Right-of-way

The following criteria are for the location of street trees that are located in the street right-of-way. Jurisdictions may require additional street right-of-way to provide clearances to underground or overhead utilities. The mature tree trunk size should be taken into account when placing the tree. The criterion does not include street trees located within medians. Special designs that meet the required clear zone must be used when locating trees within medians.

1. Minimum distance of 5 linear feet from water service stop boxes.
2. Minimum distance from the edge of the traveled way according to [Chapter 5](#).
3. Minimum distance of 10 linear feet from hydrants, poles, transformers, telephone junction boxes, manholes, and driveway approaches.
4. Minimum distance from street lights of 25 linear feet or the width of spread of the mature tree, whichever is greater.
5. In central business districts where traffic speeds are low, a minimum distance of 3 feet from the back of curb should be used for street trees if a minimum distance of 8 feet exists for right-of-way from the back of curb.
6. No trees should be in the horizontal clear zone or triangular sight distance area. (See [Chapter 5](#)).
7. Do not plant street trees in any public right-of-way that has less than 12 feet from back of curb or edge of pavement to the property line on each side of the street.
8. All underground utilities or any other improvements, either private or public, will be located before excavation is done. Information on contacting Iowa One Call will be included in the contract documents. The Iowa One Call phone number is 811 or use iowaonecall.com for online ticketing.

D. Tree Size

Street trees should be a minimum of 1 1/2 inch diameter for ornamental and shade trees or as specified and measured at 6 inches above grade after planting unless smaller trees are allowed.

E. Selection of Trees

When selecting trees, care must be taken to consider site conditions; including above and below ground spatial and environmental conditions. It is also important to consider how selection(s) complement existing plant material to ensure a diverse, functional, and attractive tree canopy can be developed.

Some of these trees produce fruit or seed pods that can increase maintenance needs along walkways. Others need additional pruning to ensure proper clearance and a healthy leader or have shallow root systems. Consideration should be taken in the maintenance needs, site conditions, and diversity of trees selected. Consulting a licensed landscape architect or certified arborist prior to selecting trees is recommended.

Planting under overhead utility lines is not always feasible and make sure it is allowed by the local jurisdiction. When planting under overhead utility lines, proceed with caution and careful consideration to local jurisdiction requirements and mature tree height impacts.

Table 10B-1.01 offers tree species and cultivar selections for use as street trees along neighborhood and municipal streets. This table is not all-inclusive; other species or different varieties of the listed species may be used with approval of the jurisdiction. Not all these trees will work in every situation; it is important to take local site constraints into consideration. This table should be considered a starting point for individuals looking for well-adapted and pest resistant trees for Iowa communities. It is important to check with each jurisdiction since certain species listed may not be allowed or have quantity restrictions to increase local tree diversity. Monoculture planting of one species can have disease and pest impacts and should be avoided; some jurisdictions have specific guidelines for increasing tree diversity in their communities.

Table 10B-1.01: Selection of Trees

| Common Name | Genus Name | Mature Shape | Mature Height (feet) | Mature Spread (feet) |
|--|---|------------------------|----------------------|----------------------|
| Maples³ | | | | |
| Autumn Blaze Maple | Acer x freemanii 'Jeffersred' | Broad Oval | 50 | 40 |
| Firefall Maple | Acer x freemanii 'AF#1' | Seedless, Upright Oval | 50 | 35 |
| Marmo Maple | Acer x freemanii 'Marmo' | Seedless, Upright Oval | 55 | 45 |
| Sienna Glen Maple | Acer x freemanii 'Sienna' | Pyramidal | 50 | 35 |
| State Street Maple | Acer miyabei 'Morton' | Upright Oval | 50 | 35 |
| Rugged Ridge Maple | Acer miyabei 'JFS-KW3AMI' | Upright Oval | 55 | 40 |
| Greencolumn Maple ¹⁰ | Acer nigrum 'Greencolumn' | Upright Oval | 60 | 25 |
| Armstrong Gold Maple ⁴ | Acer rubrum 'JFS-KW78' | Narrow Upright | 40 | 12 |
| Red Sunset Maple ⁴ | Acer rubrum 'Franksred' | Upright Oval | 45 | 35 |
| Redpointe Maple ⁴ | Acer rubrum 'Frank Jr.' | Broad Pyramidal | 35 | 30 |
| Apollo Maple ¹⁰ | Acer saccharum 'Barrett Cole' | Narrow Upright | 30 | 10 |
| Fall Fiesta Maple ¹⁰ | Acer saccharum 'Bailsta' | Broad Oval | 50 | 40 |
| Sugar Maple 'Green Mountain' ¹⁰ | Acer saccharum 'Green Mountain' | Broad Oval | 50 | 40 |
| Three-Flower Maple ⁵ | Acer triflorum | Broad Oval | 25 | 20 |
| Serviceberry | | | | |
| Autumn Brilliance Serviceberry (Single Stem Only) | Amelanchier x grandiflora 'Autumn Brilliance' | Upright Oval | 25 | 15 |
| Robin Hill Serviceberry (Single Stem) | Amelanchier x grandiflora 'Robin Hill' | Upright Oval | 25 | 15 |
| Cumulus Serviceberry (Single Stem) | Amelanchier laevis 'Cumulus' | Upright Oval | 25 | 15 |
| Hornbeam | | | | |
| European Hornbeam ^{2, 5} | Carpinus betulus | Broad Oval | 35 | 25 |
| American Hornbeam ^{2, 5, 10} | Carpinus caroliniana | Broad Oval | 25 | 20 |
| Hackberry | | | | |
| Chicagoland Hackberry ¹⁰ | Celtis occidentalis 'Chicagoland' | Upright Oval | 50 | 40 |
| Prairie Pride Hackberry ¹⁰ | Celtis occidentalis 'Prairie Pride' | Upright Oval | 50 | 40 |
| Prairie Sentinel Hackberry ¹⁰ | Celtis occidentalis 'JFS-KSU1' | Upright Oval | 45 | 12 |
| Yellowwood, Cornelian Cherry and Filbert | | | | |
| Yellowwood ^{5,6} | Cladrastis kentukea | Upright Oval | 50 | 40 |
| Golden Glory Cornelian Cherry (Single Stem) | Cornus mas 'Golden Glory' | Broad Oval | 22 | 18 |
| Saffron Sentinel Cornelian Cherry ⁵ (Single Stem) | Cornus mas 'JFS-PN4Legacy' | Columnar | 22 | 12 |
| Turkish Filbert ^{5, 8, 9} | Corylus colurna | Pyramidal | 40 | 25 |
| Hawthorn | | | | |
| Washington Hawthorn ⁵ | Crataegus phaenopyrum | Broad Oval | 25 | 20 |
| Winter King Green Hawthorn | Crataegus viridis 'Winter King' | Wide Vase Shaped | 20 | 25 |

Table 10B-1.01: Selection of Trees (continued)

| Common Name | Genus Name | Mature Shape | Mature Height (feet) | Mature Spread (feet) |
|---|--|-----------------------------|----------------------|----------------------|
| Honeylocust | | | | |
| Street Keeper Honeylocust ¹⁰ | Gleditsia triacanthos var. inermis 'Draves' | Narrow Upright | 45 | 20 |
| Northern Acclaim Honeylocust ¹⁰ | Gleditsia triacanthos var. inermis 'Harve' | Broad Pyramid | 45 | 35 |
| Skyline Honeylocust ¹⁰ | Gleditsia triacanthos var. inermis 'Skycole' | Broad Pyramid | 45 | 35 |
| Shademaster Honeylocust ¹⁰ | Gleditsia triacanthos var. inermis 'Shademaster' | Upright Vase Shape | 50 | 35 |
| Ginkgo | | | | |
| Autumn Gold Ginkgo (Fruitless, Male) | Ginkgo biloba 'Autumn Gold' | Broad Conical | 45 | 35 |
| Magyar Ginkgo (Fruitless, Male) | Ginkgo biloba 'Magyar' | Pyramidal | 50 | 30 |
| Presidential Gold Ginkgo (Fruitless, Male) | Ginkgo biloba 'The President' | Broad Conical to Oval | 50 | 40 |
| Princeton Sentry Ginkgo (Fruitless, Male) | Ginkgo biloba 'Princeton Sentry' | Narrow Conical | 45 | 25 |
| Kentucky Coffeetree and Osage Orange | | | | |
| Kentucky Coffeetree 'Espresso' (Seedless, Male) ¹⁰ | Gymnocladus dioicus 'Espresso' | Oval to Vase Shaped | 60 | 40 |
| White Shield Osage Orange (Fruitless, Thornless) ⁵ | Maclura pomifera 'White Shield' | Upright Spreading, Rounded | 35 | 35 |
| Crabapples | | | | |
| Adirondack Crabapple ⁵ | Malus 'Adirondack' | Dense Upright | 18 | 10 |
| Ivory Spear Crabapple ⁵ | Malus 'JFS-KW214MX' | Narrow | 18 | 7 |
| Golden Raindrops Crabapple | Malus 'Schmidtcutleaf' | Upright, Vase Shaped | 20 | 15 |
| Marilee Crabapple | Malus 'Jarmin' PP 14337 | Narrow Upright, Vase Shaped | 24 | 10 |
| Purple Prince Crabapple | Malus 'Purple Prince' | Rounded | 20 | 20 |
| Raspberry Spear Crabapple ⁵ | Malus 'JFS-KW213MX' | Narrow | 20 | 8 |
| Royal Raindrops Crabapple | Malus 'JFS-KW5' | Upright, Spreading | 20 | 15 |
| Ruby Dayze Crabapple ⁵ | Malus 'JFS-KW139MX' | Upright, Oval | 22 | 16 |
| Snow Crystal Crabapple ⁵ | Malus 'JFS KW218MX' | Pyramidal, Compact | 15 | 12 |
| Sparkling Sprite Crabapple ⁵ | Malus 'JFS-KW207' PP27954 | Compact Dense Round | 12 | 12 |
| Black Gum, Ironwood, Planetree and Sargent Cherry | | | | |
| Black Gum (Black Tupelo) ⁷ | Nyssa sylvatica | Pyramidal | 35 | 20 |
| American Hophornbeam (Ironwood) ^{2,5} | Ostrya virginiana | Upright Oval | 22 | 16 |
| Excamation Planetree ⁴ | Platanus x acerifolia 'Morton Circle' | Upright Pyramidal | 55 | 35 |
| Oak^{4,9} | | | | |
| White Oak ¹⁰ | Quercus alba | Spreading | 50 | 50 |
| Swamp White Oak ^{1,7,10} | Quercus bicolor | Upright Spreading | 75 | 60 |
| Crimson Spire Oak | Quercus x bimundorum 'Crumschmidt' | Columnar | 45 | 15 |
| Prairie Stature Oak | Quercus x bimundorum 'Midwest' | Broad Pyramid | 50 | 40 |
| Scarlet Oak | Quercus coccinea | Round Open | 50 | 40 |

Table 10B-1.01: Selection of Trees (continued)

| Common Name | Genus Name | Mature Shape | Mature Height (feet) | Mature Spread (feet) |
|---|--|-------------------------|----------------------|----------------------|
| Shingle Oak ¹⁰ | Quercus imbricaria | Broad Oval | 50 | 40 |
| Burr Oak ¹⁰ | Quercus macrocarpa | Broad Open | 55 | 45 |
| Urban Pinnacle Oak ¹⁰ | Quercus macrocarpa 'JFS-KW3' | Narrow Pyramid | 55 | 25 |
| Chinkapin Oak | Quercus muehlenbergii | Round Open | 45 | 45 |
| Heritage Oak ⁵ | Quercus robur x macrocarpa | Broad Pyramid, Oval | 60 | 40 |
| Northern Red Oak ¹⁰ | Quercus rubra | Pyramidal to Round Open | 60 | 60 |
| Kindred Spirit Oak | Quercus x warei 'Nadler' | Tightly Columnar | 30 | 6 |
| Regal Prince Oak | Quercus x warei 'Long' | Narrow Oval | 45 | 18 |
| Tree Lilacs | | | | |
| Ivory Silk Japanese Tree Lilac | Syringa reticulata 'Ivory Silk' | Oval, Rounded | 25 | 20 |
| Beijing Gold Peking Lilac | Syringa reticulata subsp. Pekinensis 'Zhang Zhiming' | Oval, Rounded | 20 | 15 |
| China Snow Peking Lilac | Syringa subsp. Pekinensis 'Morton' | Rounded | 25 | 20 |
| Great Wall Peking Lilac | Syringa subsp. Pekinensis 'WFH2' | Upright, Oval Habit | 20 | 12 |
| Summer Charm Peking Lilac | Syringa subsp. Pekinensis 'DTR 124' | Oval, Rounded | 20 | 15 |
| Bald-cypress | | | | |
| Bald-cypress ⁷ | Taxodium distichum | Pyramidal | 55 | 30 |
| Linden | | | | |
| Boulevard Linden ^{2, 3, 5, 10} | Tilia americana 'Boulevard' | Narrow Pyramid | 50 | 25 |
| American Sentry Linden ^{2, 3, 5, 10} | Tilia americana 'McKSentry' | Pyramidal | 45 | 30 |
| Redmond Linden ^{2, 3, 5, 10} | Tilia Americana 'Redmond' | Pyramidal | 50 | 35 |
| Harvest Gold Linden ^{2, 3, 5} | Tilia cordata x mongolica 'Harvest Gold' | Pyramidal | 40 | 30 |
| Glenleven Linden ^{2, 3, 5} | Tilia x flavescens 'Glenleven' | Pyramidal | 50 | 30 |
| Silver Linden ^{3, 5} | Tilia tomentosa | Pyramidal | 45 | 35 |
| Elms | | | | |
| Jefferson Elm ¹⁰ | Ulmus americana 'Jefferson' | Vase-shaped | 70 | 59 |
| Princeton Elm ¹⁰ | Ulmus americana 'Princeton' | Vase-shaped | 60 | 40 |
| Prairie Expedition Elm ¹⁰ | Ulmus americana 'Lewis & Clark' | Broad Rounded | 55 | 60 |
| Accolade Elm | Ulmus 'Morton' | Vase-shaped | 70 | 60 |
| Triumph Elm | Ulmus 'Morton Glossy' | Upright Oval | 55 | 45 |
| New Horizon Elm | Ulmus 'New Horizon' | Upright Oval | 55 | 40 |
| Prospector Elm | Ulmus 'Prospector' | Vase-shaped | 40 | 30 |
| Discovery Elm | Ulmus 'Discovery' | Vase-shaped | 50 | 40 |

¹ High PH sensitive.² Salt intolerant.³ Restrictions of use may exist due to over planting or pests. Check with the local jurisdiction.⁴ Spring dig only. Fall quantities may be limited.⁵ May be limited quantities available.⁶ Susceptible to wind damage.⁷ Tolerant of wet soils.⁸ Not suitable for heavy clay sites.⁹ Fruit or nut litter may be a concern.¹⁰ Tree native to Iowa.

F. Trees NOT Recommended for Planting in the Public Right-of-Way

The species of trees listed in Table 10B-1.02 are not recommended for street tree use. Species may be used with approval of the jurisdiction. Conifers are generally inappropriate for use along city streets and therefore are not included in Table 10B-1.01. Table 10B-1.02 is a summary of species considered to be undesirable or invasive by many jurisdictions.

Table 10B-1.02: Trees Not Recommended

| | | |
|-----------------|-----------------------|---------------------------|
| Siberian Elm* | Box Elder | Cotton-Bearing Cottonwood |
| Chinese Elm* | European Mountain Ash | White Poplar |
| Silver Maple* | Catalpa | Willows |
| Russian Olive | Tree of Heaven | Austrian Pine |
| Bolleana Poplar | Weeping Birch | Lombardy Poplar |
| Black Locust* | Autumn Olive | Ash |
| Mulberry | | |

* Some cultivars and hybrid varieties accepted; however, use caution and confirm it is acceptable with the local jurisdiction.

G. Guideline for Selection of Nursery Trees

If inspecting nursery stock prior to delivery to the project site, use the following criteria and the requirements of [SUDAS Specifications Section 9030, 2.01](#) to evaluate the plant materials.

1. There should be no roots greater than 1/10 the trunk diameter circling more than one-third the way around in the top half of the root ball. Roots larger than this may be cut provided they are smaller than one-third the trunk diameter. There should be no kinked roots greater than 1/5 the trunk diameter. Roots larger than this can be cut provided they are less than one-third the trunk diameter.
2. Plants should be in a healthy, vigorous condition and essentially free of dead or broken branches, scars that are not completely healed, frost cracks, disfiguring knots, broken or abraded bark, redundant leaders or branches, rubbing branches or aberrations of any kind. Plants should not have multiple leaders, unless that is their natural form.
3. Ensure trees are rooted into the root ball so that soil or media remains intact and trunk and root ball move as one when lifted. The trunk should bend when gently pushed, not pivot at or below soil line.
4. The point where the top-most root in the root ball emerges from the trunk, called the root flare, should be visible at the soil surface.
5. Comply with ANSI Z60.1 for the relationship between caliper, height, and root ball size, as shown in Table 10B-1.02.
6. There should be one dominant leader more-or-less straight to the top of the tree with the largest branches spaced at least 6 inches apart. There can be a double leader in the top 10% of the tree.
7. The tree canopy should be symmetrical, free of large voids, and typical of the species or cultivar. Live crown ratio (distance from bottom of canopy to tree top/tree height) should be at least 60%.

8. Branches should be less than $2/3$ the trunk diameter, free of bark inclusions, and more-or-less radially distributed around the trunk.
9. Trees greater than 1 1/2 inches caliper should be able to stand erect without a supporting stake.
10. Ensure the trunk and main branches are free of wounds (except for properly-made pruning wounds), damaged areas, conks, bleeding, and signs of insects or disease.
11. In areas near overhead utility lines, the mature height of the tree should be a minimum of 10 feet lower than the overhead lines.
12. If any of the above conditions are not met, trees may be rejected.

Table 10B-1.02: Caliper/Rootball/Height Relationship

| Caliper (inches) | Average Height (feet) | Minimum Rootball Diameter (inches) |
|-----------------------------|----------------------------------|---|
| 1 | 8 to 10 | 16 |
| 1 1/2 | 10 to 12 | 20 |
| 2 | 12 to 14 | 24 |
| 2 1/2 | 12 to 14 | 28 |
| 3 | 14 to 16 | 32 |
| 3 1/2 | 14 to 16 | 38 |
| 4 | 16 to 18 | 42 |

Source: American Standard for Nursery Stock (ANSI Z60.1), 2014

H. Staking of Trees

Depending on the size of the trees identified to be planted, the jurisdictional engineer should designate if staking is required. Generally, if plant stock is delivered with well developed root balls, and if properly planted, it will not require staking. In areas where damage due to deer is of a concern, trees can be protected by placing sturdy wood stakes or fence posts at 18 inch intervals around the tree. In some jurisdictions, staking of trees in the public right-of-way is not allowed.