TREE SELECTION GUIDE

A LIST OF APPROPRIATE TREES FOR URBAN AND SUBURBAN AREAS

ACKNOWLEDGEMENTS

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ABOUT THIS GUIDE

This Tree Selection Guide provides essential information to help you choose climate-resilient trees suitable for urban and suburban areas in northeast Ohio. This region includes Cuyahoga, Summit, Lorain, Wayne, Lake, Geauga, Portage, Stark, Ashtabula, Trumbull, Mahoning, Columbiana and Ashland counties. It is designed to help you choose from a diverse list of appropriate trees for a variety of situations, with consideration given to trees that are resistant to pests and diseases and tolerate conditions like de-icing salt, air pollution, soil compaction, saturated soils and drought.

Our recommendations are based on our best available current knowledge as to what species will provide the greatest positive impact to increasing Cleveland's canopy cover and also do no harm. The list includes native as well as non-native trees. Trees that are known to be invasive are not included in this guide.
All trees listed are well-suited for the temperature extremes of this region. For ease of use, trees in the guide are grouped by size at maturity (Small, Medium and Large) and then alphabetically by scientific name. Each column provides information about the tree including whether it is deciduous or evergreen and native to the eastern United States, or not. Physical characteristics such as canopy form and spread at maturity, growth rate, tolerances to shade, salt, soil types, landscape suitability, value to wildlife, people and additional notes that would benefit the user are also included.

LIMITATIONS OF THIS GUIDE

This guide does not include all native trees nor does it include all cultivars and varieties, and acknowledges that there is no perfect tree for every situation. Commercially available and appropriate cultivars are listed, along with some rarer cultivars worth noting. It does not include trees that will only perform well in a limited number of areas.

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NORTHEAST OHIO HARDINESS ZONE MAP

The USDA's Hardiness Zone Map divides the U.S. into 11 zones based on average minimum winter temperature. A plant's Hardiness Zone refers to its ability to thrive in the corresponding map location.

Northeast Ohio is in zones 5b, 6a and 6b, with average annual minimum temperatures between 0° to -15° F. Trees featured in this guide are suitable for planting in these zones. You can also find the hardiness zone for the area where you wish to plant by entering the location's zip code in this Interactive Plant Hardiness Zone Map created by the USDA's Agricultural Research Service.

CONSIDERATIONS: KEYS TO SUCCESSFUL PLANTING

BIODIVERSITY: PRIORITIZE NATIVE SPECIES

As an organization, we recommend planting native trees or selections created from natives whenever possible but recognize there are times when native trees are not the best choice, especially in urban environments. Our list does include non-native trees that to the best of our knowledge should not be invasive. Invasive trees should be avoided.

Native species provide many benefits including:

- Protective cover for many animals
- Seeds, nuts, and fruits for squirrels and other mammals
- Seeds, fruits, and insects for birds
- Nectar for hummingbirds and butterflies
- Serving as larval host plants for butterfly caterpillars
- Suppressing introduction of invasive plants
- Creation of natural corridors for migrating wildlife
- Requiring less water, fertilizer, pesticides & fungicides since they are suited to our climate and soil types

Planting only one species, as shown in this residential street, may provide a uniform look but also proliferate insect pests and diseases resulting in decline of the entire planting and loss of benefits to the community. Callery pear (*Pyrus calleryana*) are also invasive and not recommended to plant. (Photo Credit: Courtney Blashka)

DIVERSIFY: PLANT A DIVERSE PALETTE OF TREES

In many urban areas, only a handful of species make up a great majority of trees planted. For example, maple trees (Acer genus) are currently in excess of the 25% of the street tree population in Cleveland. While percentages are unknown, it's assumed a great majority of park and private property trees are also maple. An insect or disease infestation on maple could result in loss of over a quarter of the street tree canopy and even more catastrophic to the broader urban forest.

Institute the 10-20-30 rule as a guideline to reduce the risk of catastrophic tree loss due to pests. The rule suggests an urban tree population should include no more than 10% of any one species, 20% of any one genus, or 30% of any family. A more ambitious aspiration is planting no more than 15% of any family, 10% of any genus, or 5% of any species. As a result, 90-95% of the tree population would remain intact and unscathed should an insect or disease infestation occur. Creating a tree planting plan before planting can aid in urban forest diversity.

Native trees such as Tuliptree (*Liriodendron tulipifera*), Sycamore (*Platanus occidentalis*) and Black Gum (*Nyssa sylvatica*) increase biodiversity and are great selections for restoration sites. (Photo Credit: Courtney Blashka)

MAXIMIZE BENEFITS PLANT LARGE-STATURE TREES WHENEVER POSSIBLE TO MAXIMIZE SOCIAL, ECONOMIC AND ENVIRONMENTAL BENEFITS

Some of the many benefits trees provide communities include:

Improving Public Health & Safety

- Trees provide oxygen and remove particulate matter from the air
- Trees reduce stress
- Tree-lined streets create a visual barrier and slow traffic, providing safe, walkable streets

Adding Economic Value to Residential Properties & Businesses

- Trees save energy
- Trees increase property values
- Trees increase business traffic

Combating Climate Change

- Trees remove carbon dioxide and sequester carbon
- Trees cool the air, provide shade & lessen the effects of urban heat islands
- Trees help prevent water pollution

Well maintained, large-stature trees provide more community benefits as they grow. Tree benefits in terms of property value and ecosystem services (stormwater managed, air pollution removed and carbon dioxide absorbed) varies widely but can be as much as $80 to $120 per tree per year for a large tree. Small stature trees, like the Japanese Tree Lilac, may not provide much more than $15 in benefits on average. In some cases, they are a net loss to communities after the costs of maintenance are subtracted. The Center for Urban Forest Research has studied large, medium, and small trees in a number of locations and found that, on average, mature large trees deliver an annual net benefit two to six times greater than mature small trees.

Tree-lined streets shade hardscape and offer respite on hot summer days. (Photo Credit: CBlashka)

RTRP: PLANT THE RIGHT TREE IN THE RIGHT PLACE

Improperly siting trees can result in economic, environmental, and social losses to the community. The “right tree right place” maxim is central to changing the conversation around trees, specifically with respect to thinking of trees as assets versus liabilities (Arbor Day Foundation). Tree planting and transplanting projects should carefully consider a number of factors.

Girdling roots of a tree lawn planted red maple (*Acer rubrum*) exposed via airspade. Photo taken in a suburban cul-de-sac on Cleveland’s east side. July 2018. (Photo Credit: Margeaux Apple)

SITE CONSIDERATIONS

Conduct a thorough inspection of the planting site prior to selecting a tree. Consider the following:

LIGHT EXPOSURE

Is the site in full sun, part sun, shade, or dense shade?

SOIL ISSUES

Drainage – is there standing water for more than a few hours at any time? If there is, you may have a problem.

Compaction – is the ground hard like concrete or soft as the forest floor? Harder, or dense soils make it more difficult for trees to grow.

pH – a measurement on a scale from (1-14), 7 is neutral; below that is acidic and above is alkaline. The ideal pH for most conditions is 6.5.

Fertility – this factor is directly related to organic matter content. All urban soils in northeast Ohio are low in organic matter and thus, low in fertility.

AVAILABLE ROOT SPACE

Tree roots can extend two to three times the crown width. The larger the tree, the more extensive the root system. Minimum soil volumes for root space are suggested to be 1–2 ft3 for each square foot of projected mature crown (Lindsey and Bassuk 1991). Other formulas have derived minimum soil volumes based on trunk to crown diameter (Urban 2008). Urban foresters generally adhere to the following soil volume minimums: 300 cubic feet for small trees, 600 cubic feet for medium trees, and 1,000 cubic feet for large trees.

PROXIMITY TO INFRASTRUCTURE

How tall and wide will the crown be? How fast does it grow?

Overhead Utilities: Planting medium or large trees underneath overhead utilities is a potentially costly mistake. Only small trees less than 25 feet tall at maturity should be planted underneath utility lines to limit the potential for future conflicts as trees mature in size.

Underground Utilities - The location of below-ground utilities is equally concerning. The presence of buried electrical, natural gas, and water lines can limit the viability of planting sites. Detection of these utilities can be accomplished by dialing 811 for Ohio Utilities Protection Services (OUPS) or visiting oups.org at least 48 hours in advance of planting.

Other Infrastructure - Tree trunks and branches can grow to obscure safety infrastructure such as streetlights and stop signs if planted too closely. Trees should always be planted away from existing infrastructure in order to allow access or reduce visibility conflicts.

Follow the Cleveland Urban Forestry Sections: “Spacing Requirements for Planting Tree Lawn Trees”

When trees are given adequate space, fewer conflicts arise, management costs are reduced, and access to municipal amenities is more efficient.

Trees that reach heights over 25’ at maturity will become disfigured by utility pruning like this honeylocust (*Gleditsia triacanthos*) and should not be planted under energized lines. (Photo Credit: CBlashka)

SPECIES CONSIDERATIONS

Conduct a thorough inspection of the planting site prior to selecting a tree. Consider the following:

HARDINESS

Can it withstand the temperature extremes in NE Ohio? Where was it grown?

FORM

What is the expected shape of the canopy?

FUNCTION

What is it being planted to do? Provide screening, shade, beauty, attract pollinators or something else.

MESSINESS

Will it frequently shed bark or produce copious amounts of seed?

SIZE AT MATURITY (BOTH HEIGHT AND CROWN SPREAD)

How tall and wide will the crown be? How fast does it grow?

SENSITIVITIES AND WEAKNESSES

Is it weak wooded and likely to break in a storm? Is it resistant to pests & disease threats?

American elm (*Ulmus americana*) trees have vase-shaped canopies and require considerable space to expand. (Photo Credit: CBlashka)

Sweetgum's (*Liquidambar styraciflua*) spiky seed capsules are considered a nuisance to many property owners. (Photo Credit: CBlashka)

Ash (*Fraxinus sp.*) trees were once a revered selection for urban areas, especially along streets, until Emerald Ash Borer arrived. Knowledge of existing and potential pest and disease threats will result in resilient selections. (Photo Credit: CBlashka)

A native green ash (*Fraxinus pennsylvanica* [Foothills]) in decline due to borer damage. June 2020 (Photo cred: Margeaux Apple)

CHOOSING A TREE AT THE NURSERY: WHAT TO LOOK FOR

GENERAL APPEARANCE

- The tree should have a balanced shape.
- Make sure there are no bare spots in the foliage, missing or damaged limbs, spotted or discolored leaves.
- The tree should have a single “central leader” (main stem).
- Check the size of the crown and root ball in relation to the caliper of the tree - should not be top heavy.

CROWN

- Seek trees with branches which come off the trunk at between 45° and 90° angles. The closer the angle is to 90°, the stronger the branch will be.
- Wounds from pruning should be callused over or well on their way.
- Branches should be distributed evenly with 6-8” between them on the main trunk.
- Branches should not be longer than 1/4 the height of the tree. Too long limbs place undue burden on the tree.

TRUNK

- The trunk should be straight.
- Look for insect damage such as borer holes.
- The trunk should be free of discolored, swollen, or sunken areas.
- No wound should be larger than 1/4 of the trunk’s circumference.

BAILED AND BURLAPPED (B&B) TREES

- Trees should be dug during or close to dormant season.
- The trunk should not move independently of the root ball.
- The burlap should be tightly wrapped.
- The trunk should be in the center of the root ball.
- Select trees with some indication of a trunk flare at the top of the ball. This indicates you are getting a larger portion of the root system than you would with one in which the trunk flare is buried in
the ball.

CONTAINERIZED TREES

- Pot bound roots are in danger of “girdling” – encircling the pot and cutting off the vascular system. This can continue even after planting.
- Avoid trees that have large roots coming out of the container’s water holes or roots circling on the soil surface.

BARE ROOT TREES

- When available, bare root is a good choice. Properly dug, they will retain more roots than similar sized B&B trees. Bare-root trees will adapt to their site more quickly.
- Care must be taken to ensure that the roots do not dry out.
- Bare-root trees must be planted before leafing-out.

Root-bound Tree. The circling roots of this tree indicate it was in the container too long. (Photo Credit: CBlashka)

TREE MATRIX CATEGORY DEFINITIONS

SIZE CLASSIFICATIONS

Trees are grouped by size which indicates the expected mature height from the ground to top of the crown under ideal conditions.

Small- A tree that can attain a height of less than 25' at maturity. Only small trees should be planted under power lines.

Medium- A tree that can attain a height between 25 and 50 feet at maturity.

Large- A tree that can attain a height over 50 feet at maturity.

Nordmann fir (*Abies nordmanniana*)
(Photo cred: Margeaux Apple)

EVERGREEN

Trees are considered evergreen if they have foliage that persists throughout the year. Trees not indicated as evergreen are deciduous and will drop their leaves during the fall or dormant season.

GENERAL FORM AT MATURITY

This refers to the expected characteristic shape of the tree's crown (branches and leafy area) at maturity. It provides a mental picture of the ultimate form of the tree. A tree's overall form may vary due to age and site selection. The tree's mature form provides guidance for how well it will fit into the space available, helps forecast problems that might occur and provides insight into how well the tree will meet the goals for the above-ground space

Forms include:

Columnar
Cylindrical shaped and/or narrow crown. Their shape makes them useful where space is limited.

Irregular
Crown is not uniform

Oval
Egg-shaped or elliptical; wider along the horizontal axis and narrower at the top and bottom of the crown.

Pyramidal
Christmas tree or triangular shaped; widest at the base and more narrowly pointed toward the upper crown.

Rounded
Ball or circular shaped crown.

Spreading
Horizontally extending crown.

Vase
Inverted triangular shaped crown; widest at the top and tapering towards the bottom of the crown.

Weeping
Spreading crown with branches that cascade downward.

The broadly pyramidal mature habit of a silver linden cultivar (*Tilia tomentosa* [Sterling]) (Photo Credit: CBlashka)

MATURE SPREAD

Mature spread refers to the expected width of its canopy, measured from edge to edge, at maturity.

GROWTH RATE

The growth rate refers to the expected increase in vertical growth of the tree. Growth rates vary for different species and can be influenced by numerous factors including light, exposure, root volume, soil fertility, tree care, etc. In the matrix tree growth rates are categorized as Slow, Medium or Fast.

Slow- grows 12" or less per year

Medium- 13 to 24" of growth per year

Fast- grows 25" or greater per year

Landscape features such as soil compaction, moisture, texture, shade and salt can influence how well a tree will grow and prosper. It is important to match these features with the needs of a tree before selecting.

A NOTE ABOUT MAPLE TREES

A very few select maples are listed in the species matrix and noted with an asterisk(*). Maples (*Acer genus*) are over-represented in Cleveland's urban forest and should planted sparingly; only after consideration is given to other species. The City's Urban Forester requests no maples be planted in the city's right-of-way.

TOLERANCES

SOIL COMPACTION

Soil compaction reduces pore space in the soil and can limit water, oxygen and nutrients to the tree roots. Trees in this category are known to perform well in areas of high traffic where soil is compacted.

DROUGHT

Soil compaction reduces pore space in the soil and can limit water, oxygen and nutrients to the tree roots. Trees in this category are known to perform well in areas of high traffic where soil is compacted.

CLAY SOILS

Clay soils tend to have poor drainage and are dense and compact. Trees in this category have shown to perform well in heavy soils such as clay.

WET/SATURATED SOILS

Trees in this category can withstand prolonged periods of saturated soils. A wet tolerant tree selection may need to be considered when a site will have excessive moisture present.

AIR POLLUTION

Polluted air can contribute to decline in trees causing short term (acute) damage or longer term (chronic) damage. Ozone, sulfur dioxide and other particulates can damage tissues and inhibit leaf function. Trees in this category are generally not negatively affected by airborne pollutants.

SHADE

Most trees require full sun, although some will tolerate the lower light levels of partial shade and a few will tolerate full shade.

Full sun
Require more than 6 hours of direct sunlight a day.

Partial shade
Tolerate direct sun for less than 6 hours a day, or filtered light for most of the day.

Full shade
Tolerate little or no direct sunlight, or less than 6 hours of filtered sunlight a day.

SALT

Careful consideration should be given to trees that are to be planted along roads, in parking lots or other or areas where they are subject to de-icing salts. Salt damages trees in two ways: salt in the soil and salt in the air. Soil salt can pull water out of the tree and salt spray can damage evergreen foliage, buds and stem tissue. Data on species tolerance to salt varies and doesn't always differentiate between salt spray and soil salt. This section is referencing only the tree's known tolerance to salt.

SITE SELECTION

Site selections include location recommendations for the tree based on its size, characteristics, tolerances and limitations.

BENEATH POWERLINES

Trees in this category are suitable for planting underneath overhead powerlines. They achieve mature heights under 25 feet and will not require pruning by utility companies.

STREET

Trees in this category are suitable to plant in areas with restricted growth space. This can be along streets in the tree-lawn, or grassed strip between street and sidewalk, a median area or parking lot island. If the area falls within the city's right-of-way, a permit for planting is required and can be obtained by contacting Cleveland's Urban Forestry Department at jkipp@city.cleveland.oh.us or calling 216-664-2388.

NOTE: Evergreen trees are not recommended for planting in tree-lawn spaces or medians due to their low branching habit and foliage that can obstruct visibility. We would not plant them due to their growth habit & need for additional maintenance for visibility purposes.

OPEN AREAS

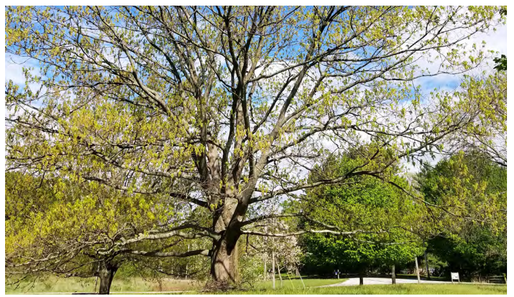
Trees in this category require more root space and are recommended for planting in unrestricted lawns, vacant lots or open areas such as parks.

WETLAND, RIPARIAN, BIORETENTION

Trees help mitigate flooding and reduce pollutants that flow into storm sewers and streams through reducing runoff, improving soil infiltration and decreasing erosion. Trees in this category are suited for wet sites such as rain gardens, wetlands, riparian areas and/or bioretention planters.

This Japanese Tree Lilac (*Syringa reticulata*) is considered a small stature tree and good choice under power lines. (Photo Credit: CBlashka)

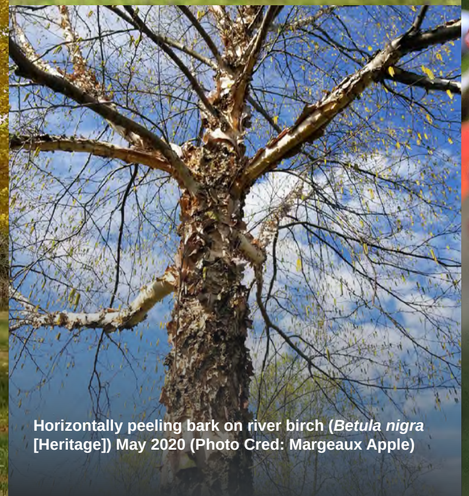
Elm tree (*Ulmus*) planted in an adequately sized tree-lawn. (Photo Credit: CBlashka)



A 65 year old red oak (*Quercus rubra*) in bloom: 58' tall x 71' wide. A good specimen for an open area. (Photo Credit: Margeaux Apple)

Fall foliage on a ginkgo (*Gingko biloba*). (Phot0 Cred: Margeaux Apple)

Redbud (*Cercis canadensis*) flowers decorate leafless branches in spring. The flowers are edible too. (Photo credit: CBlashka)



Horizontally peeling bark on river birch (*Betula nigra* [Heritage]) May 2020 (Photo Cred: Margeaux Apple)

Fall foliage on a black gum (*Nyssa sylvatica*)

VALUE

This section includes trees that are beneficial to pollinators such as bees, moths, birds, beetles and other wildlife. It also includes trees that provide sheer enjoyment to people in the form of showy flowers, unique bark, displays of fruit/fall color or provide an interesting backdrop to the winter landscape.

POLLINATOR FRIENDLY

Many trees have flowers that provide nutrient-rich pollen and nectar and are a critical source of forage for many pollinators such as bees, birds, beetles, moths and butterflies. Trees in this category are known to support pollinators.

ORNAMENTAL VALUE

Trees in this category display the following noteworthy aesthetic attributes:

Flower

Although all angiosperm trees flower, some are more conspicuous than others. Trees in this category are often selected for their showy flowers which are in bloom for one to three weeks in spring to early summer. In rarer instances some trees bloom in fall.

Fruit

Trees in this category have unique fruit of interest

Fall Foliage

Trees in noted in this category display strong autumn foliage in yellow, orange, red, and/or purple. Leaf color can create interesting views.

Winter Interest

Trees in this category display interesting foliage, form, structure or fruit through the dormant season.

Bark

Trees in this category display unique bark that can be used as an identification feature and described as exfoliating, mottled or striped to name a few.

NATIVE TO EASTERN US

Trees in this category are native to states east of the Mississippi, but not including small portions of Louisiana and Minnesota. According to The United States Department of Agriculture (USDA) Natural Resources Conservation Service, only plants found in the United States before European settlement are considered to be native.

ADDITIONAL NOTES

This section expands on a unique feature or adaptability trait worth mentioning, such as the tree's resistance to disease or edibility.

Small Trees

35' and under

Scientific Name	Common Name	Growth Rate	Spread	Form	CHARACTERISTICS: Evergreen	CHARACTERISTICS: Native to eastern N. America	TOLERANCES: Compacted Soil	TOLERANCES: Drought	TOLERANCES: Salt	TOLERANCES: Wet/ Sat. Soils	TOLERANCES: Clay Soils	TOLERANCES: Air Pollution	TOLERANCES: Shade	SITE SELECTION: Beneath Powerlines	SITE SELECTION: Treelawn or Median	SITE SELECTION: Open spaces (parks/ lawns)	SITE SELECTION: Wetlands	VALUE: Pollinator Friendly	VALUE: Ornamental	Notes
*Acer buergerianum**	trident maple	slow	25’	Oval					●				Full Sun / Partial Shade	●						
Aesculus pavia	red buckeye	moderate	20’	Round		●							Full Sun	●						
Asimina triloba	pawpaw	moderate	20’	Pyramidal		●				●	●		Full Sun / Partial Shade	●		●		●	Fruit	edible fruit
Cercis canadensis	eastern redbud	moderate	25’	Round		●		●	●			●	Partial Shade	●	●			●	Flower	
Chionanthus retusus	Chinese fringetree	slow	20’	Round									Full Sun	●				●	Flower	
Juniperus chinensis ’Keteleeri’	upright Chinese juniper	moderate	15’’	Pyramidal	●			●					Full Sun	●						
Magnolia ’Golden Gift’	magnolia	moderate	20’	Pyramidal									Full Sun	●				●		
Magnolia stellata	star magnolia	moderate	15’	Round									Full Sun	●				●	Flower	
Magnolia virginiana	sweet bay magnolia	moderate	20’	Oval		●				●			Full Sun	●				●		
Magnolia x *loebneri*	Loebner magnolia	moderate	15’	Round									Full Sun	●				●	Flower	
Malus ’Bob White’	flowering crabapple	moderate	20’	Round					●				Full Sun	●	●			●	Fruit, Flower	edible fruit
Malus ‘‘Prairifire’	flowering crabapple	moderate	20’	Round					●				Full Sun	●	●			●	Fruit, Flower	
Malus [Red Jewel]	flowering crabapple	moderate	15’	Round					●				Full Sun	●	●			●	Fruit, Flower	
Malus [Sugar Tyme]	flowering crabapple	moderate	15’	Round					●				Full Sun	●	●			●	Fruit, Flower	
Quercus prinoides	dwarf chinquapin oak	slow	10’	Pyramidal		●							Full Sun / Partial Shade	●				●		

Legend

● Applicable

Form

- Oval
- Round
- Columnar
- Pyramidal
- Vase
- Spreading
- Weeping
- Irregular

Light Conditions

- Full Sun
- Partial Shade
- Shade

Ornamental

- Fruit
- Flower
- Fall Color
- Winter Interest
- Bark

Small Trees

35' and under

Scientific Name	Common Name	CHARACTERISTICS: Growth Rate	Spread	Form	Evergreen	Native to eastern N. America	TOLERANCES: Compacted Soil	Drought	Salt	Wet/ Sat. Soils	Clay Soils	Air Pollution	Shade	SITE SELECTION: Beneath Powerlines	Treelawn or Median	Open spaces (parks/ lawns)	Wetlands	VALUE: Pollinator Friendly	Ornamental	Notes
Syringa pekinensis ''Great Wall'	Chinese tree lilac	moderate	15'	Oval		●		●	●		●		☀	●	●	●			✿	
Syringa reticulata 'Ivory Silk'	Japanese tree lilac	moderate	20'	Round		●			●				☀ ⛅	●	●				✿	
Tilia cordata [Summer Sprite]	littleleaf linden	moderate	15'	Round		●							☀	●	●					
Zelkova serrata [City Sprite]	Japanese zelkova	moderate	20'	Vase									☀	●	●					

● Applicable

Form

- Oval
- Round
- Columnar
- Pyramidal
- Vase
- Spreading
- Weeping
- Irregular

Light Conditions

- ☀ Full Sun
- ⛅ Partial Shade
- ☁ Shade

Ornamental

- Fruit
- ✿ Flower
- Fall Color
- Winter Interest
- Bark

Medium Trees

35' - 50'

Scientific Name	Common Name	Growth Rate	Spread	Form	CHARACTERISTICS: Evergreen	CHARACTERISTICS: Native to eastern N. America	TOLERANCES: Compacted Soil	TOLERANCES: Drought	TOLERANCES: Salt	TOLERANCES: Wet/ Sat. Soils	TOLERANCES: Clay Soils	TOLERANCES: Air Pollution	SITE SELECTION: Shade	SITE SELECTION: Beneath Powerlines	SITE SELECTION: Treelawn or Median	SITE SELECTION: Open spaces (parks/ lawns)	SITE SELECTION: Wetlands	VALUE: Pollinator Friendly	VALUE: Ornamental	Notes
*Acer griseum**	paperbark maple	slow	20’	Oval									Partial Shade						Bark	
*Acer miyabei**	Miyabei maple	slow	25’	Oval									Partial Shade		●					
*Acer triflorum**	three-flower maple	slow	30’	Spreading				●			●		Partial Shade			●			Flower, Fall Color, Bark	
Aesculus glabra	Ohio buckeye	moderate	40’	Round		●							Full Sun					Pollinator Friendly		
Amelanchier x *grandiflora*	apple serviceberry	moderate	30’	Round		●							Partial Shade		●			Pollinator Friendly	Fruit, Flower, Fall Color, Bark	edible fruit
Carpinus betulus [Emerald Avenue]	upright European hornbeam	moderate	30’	Pyramidal		●							Partial Shade		●					
Carpinus caroliniana	American hornbeam	slow	30’	Round, Irregular		●							Shade		●					
Celtis laevigata	hackberry	moderate	50’	Oval		●							Full Sun		●					
Celtis ‘‘Magnifica’	hybrid hackberry	fast	40’	Oval		●							Full Sun		●					
Cladrastis kentukea	American yellowwood	moderate	40’	Round		●		●					Full Sun							
Cornus florida ‘‘Appalachian Spring’	flowering dogwood	slow	20’	Round		●						●	Partial Shade					Pollinator Friendly	Flower, Fall Color	resistant to dogwood anthracnose
Cornus kousa	Asian flowering dogwood	slow	30’	Round									Partial Shade		●				Flower, Fall Color	
Crataegus viridis ’Winter King’	green hawthorn	slow	25’	Vase		●		●	●				Full Sun		●				Flower	
Halesia tetraptera	Carolina silverbell	moderate	30’	Round		●							Partial Shade						Flower	
Juniperus virginiana ’Canaertii’	eastern redcedar	moderate	20’	Pyramidal	●	●	●	●	●		●	●	Full Sun		●					

Applicable

Form
- Oval
- Round
- Columnar
- Pyramidal
- Vase
- Spreading
- Weeping
- Irregular

Light Conditions
- Full Sun
- Partial Shade
- Shade

Ornamental
- Fruit
- Flower
- Fall Color
- Winter Interest
- Bark

Medium Trees

35' - 50'

Scientific Name	Common Name	CHARACTERISTICS: Growth Rate	Spread	Form	Evergreen	Native to eastern N. America	TOLERANCES: Compacted Soil	Drought	Salt	Wet/ Sat. Soils	Clay Soils	Air Pollution	Shade	SITE SELECTION: Beneath Powerlines	Treelawn or Median	Open spaces (parks/ lawns)	Wetlands	VALUE: Pollinator Friendly	Ornamental	Notes
Liriodendron tulipifera 'Little Volunteer'	tuliptree	moderate	15'	△		●					●		☼					●		
Maackia amurensis	Amur maackia	slow	20'	▽				●					☼		●					
Maclura pomifera 'Whiteshield'	Osage-orange	fast	35'	○		●			●				☼							
Magnolia 'Butterflies'	yellow-flowered magnolia	moderate	20'	△									☼							
Magnolia 'Coral Lake'	magnolia	moderate	20'	△									☼					●	✿	
Magnolia 'Daybreak'	magnolia	moderate	20'	△									☼					●	✿	
Magnolia 'Elizabeth'	magnolia	moderate	20'	△									☼					●	✿	
Magnolia 'Yellow Bird'	magnolia	moderate	20'	△									☼					●	✿	
Magnolia tripetala	umbrella magnolia	moderate	20'	△		●							☼⛅					●	✿	
Parrotia persica 'Vanessa'	Persian parrotia	moderate	15'	△									⛅		●				🍃	
Pinus virginiana	Virginia pine	slow	30'	△	●	●		●					☼						❄	
Quercus x warei [Kindred Spirit]	hybrid white oak	slow	10'	▯									☼							
Ulmus davidiana [Emerald Sunshine]	white elm	fast	25'	▽					●				☼							

● Applicable

Form

- Oval
- Round
- Columnar
- Pyramidal
- Vase
- Spreading
- Weeping
- Irregular

Light Conditions

- Full Sun
- Partial Shade
- Shade

Ornamental

- Fruit
- Flower
- Fall Color
- Winter Interest
- Bark

Large Trees

50' and over

		CHARACTERISTICS					TOLERANCES							SITE SELECTION						VALUE	
Scientific Name	Common Name	Growth Rate	Spread	Form	Evergreen	Native to eastern N. America	Compacted Soil	Drought	Salt		Clay Soils	Air Pollution	Shade	Beneath Powerlines	Treelawn or Median	Open spaces (parks/ lawns)	Wetlands	Pollinator Friendly	Ornamental	Notes
Abies nordmanniana	Nordmann fir	slow	30’	△	●							●	☀ ⛅			●			❄	
Acer x freemanii [Autumn Blaze]*	Freeman maple	fast	40’	⬭		●	●	●	●	●	●	●	☀ ⛅		●	●	●		🍂	
Acer rubrum	red maple	moderate	40’	⬭		●		●		●	●	●	☀ ⛅		●	●	●	🐝	🌸 🍂	many cultivars available
Aesculus flava	yellow buckeye	moderate	50’	⬭		●				●	●		☀			●			🌸 🍂	
Betula nigra [Heritage]	river birch	fast	50’	△		●	●	●	●	●	●		☀		●	●	●	🐝	▬	resistant to bronze birch borer
Betula nigra [City Slicker]	river birch	fast	50’	△		●	●	●	●	●	●		☀		●	●	●	🐝	▬	resistant to bronze birch borer
Cedrus libani var. stenocoma	cedar of Lebanon	slow	50’	△	●								☀			●			❄	
Diospyros virginana	common persimmon	moderate	35’	△		●	●	●					☀			●			🍂	edible fruit
Ginkgo biloba	gingko	slow	40’	△			●	●	●		●	●	☀		●	●			🍂	male clones preferred
Gleditsia triacanthos [Imperial]	honeylocust	fast	40’	◠		●	●	●	●	●	●	●	☀		●	●			🍂	
Gleditsia triacanthos [Shademaster]	honeylocust	fast	40’	◠		●	●	●	●	●	●	●	☀		●	●			🍂	
Gleditsia triacanthos [Skyline]	honeylocust	fast	35’	◠		●	●	●	●	●	●	●	☀		●	●			🍂	
Gleditsia triacanthos [Street Keeper]	honeylocust	fast	20’	▯		●	●	●	●	●	●	●	☀		●	●			🍂	
Gymnocladus dioica ‘Espresso’	Kentucky coffee-tree	slow	35’	▽		●	●	●	●			●	☀		●	●			❄ ▬	
Gymnocladus dioica [*Prairie Titan*]	Kentucky coffee-tree	slow	34’	⬭		●	●	●	●			●	☀		●	●			❄ ▬	

● Applicable

Form

- ⬭ Oval
- ○ Round
- ▯ Columnar
- △ Pyramidal
- ▽ Vase
- ◠ Spreading
- Weeping
- Irregular

Light Conditions

- ☀ Full Sun
- ⛅ Partial Shade
- Shade

Ornamental

- Fruit
- 🌸 Flower
- 🍂 Fall Color
- ❄ Winter Interest
- ▬ Bark

Large Trees

50' and over

Scientific Name	Common Name	CHARACTERISTICS: Growth Rate	Spread	Form	Evergreen	Native to eastern N. America	TOLERANCES: Compacted Soil	Drought	Salt	Wet/ Sat. Soils	Clay Soils	Air Pollution	Shade	SITE SELECTION: Beneath Powerlines	Treelawn or Median	Open spaces (parks/ lawns)	Wetlands	Pollinator Friendly	VALUE: Ornamental	Notes
Gymnocladus dioica 'Stately Manor'	Kentucky coffee-tree	slow	40'	Oval, Irregular		●	●	●	●			●	Full Sun		●	●			Flower, Bark	
Cercidiphyllum japonicum	katsura tree	moderate	30'	Oval					●	●			Full Sun			●			Fall Color, Flower	shallow-rooted; needs cool soil temps
Liquidambar styraciflua 'Moraine'	sweetgum	fast	40'	Pyramidal		●	●	●		●	●	●	Full Sun			●	●		Fall Color	
Liquidambar sytraciflua 'Variegata'	variegated sweetgum	moderate	35'	Pyramidal		●	●	●		●	●	●	Full Sun			●	●		Flower, Fall Color	variegated leaf form
Liriodendron tulipifera	tuliptree	fast	40'	Pyramidal, Round		●					●		Full Sun			●		Pollinator Friendly	Flower, Fall Color	
Liriodendron tulipifera [Emerald City]	tuliptree	fast	25'	Pyramidal, Round		●					●		Full Sun			●		Pollinator Friendly	Flower, Fall Color	
Magnolia acuminata	cucumber magnolia	moderate	40'	Pyramidal, Round		●					●		Full Sun			●				wildlife forage
Metasequoia glyptostroboides	dawn redwood	fast	25'	Pyramidal						●		●	Full Sun			●			Fall Color, Bark	deciduous conifer
Nyssa sylvatica	tupelo	moderate	30'	Pyramidal		●	●	●	●	●		●	Full Sun			●	●	Pollinator Friendly	Fall Color	high nutrient mammal & bird forage
Ostrya virginiana	hop hornbeam	slow	30'	Round		●		●				●	Partial Shade		●	●			Bark	
Picea omorika	Serbian spruce	slow	20'	Pyramidal	●			●					Full Sun			●			Winter Interest	
Picea orientalis	Oriental spruce	slow	20'		●								Full Sun			●			Winter Interest	
Pinus strobus	eastern white pine	fast	40'	Pyramidal	●	●		●					Full Sun			●			Winter Interest	
Pinus rigida	pitch pine	moderate	40'	Pyramidal, Irregular	●	●		●	●				Full Sun			●			Winter Interest	
Pinus rigida x taeda	pitch-lob pine	fast	40'	Pyramidal	●	●		●	●				Full Sun			●			Winter Interest	

● Applicable

Form
- Oval
- Round
- Columnar
- Pyramidal
- Vase
- Spreading
- Weeping
- Irregular

Light Conditions
- Full Sun
- Partial Shade
- Shade

Ornamental
- Fruit
- Flower
- Fall Color
- Winter Interest
- Bark

Large Trees

50' and over

Scientific Name	Common Name	CHARACTERISTICS: Growth Rate	Spread	Form	Evergreen	Native to eastern N. America	TOLERANCES: Compacted Soil	Drought	Salt	Wet/ Sat. Soils	Clay Soils	Air Pollution	Shade	SITE SELECTION: Beneath Powerlines	Treelawn or Median	Open spaces (parks/ lawns)	Wetlands	Pollinator Friendly	VALUE: Ornamental	Notes
Platanus x *acerifolia* [Exclamation!]	London planetree	fast	40’	△			●	●	●		●	●	☼		●	●			≡	cold hardy selection
Platanus occidentalis	sycamore	fast	50’	△		●	●			●	●	●	☼			●	●		≡	
Quercus bicolor	swamp white oak	moderate	50’	○		●	●	●		●	●		☼		●	●	●			
Quercus imbricaria	shingle oak	slow	60’	○		●	●			●	●		☼		●	●				
Quercus lyrata	overcup oak	slow	40’	○		●		●		●	●		☼			●	●		🍒	
Quercus macrocarpa	bur oak	slow	70’	○		●	●	●	●	●	●	●	☼		●	●	●		🍒	
Quercus muehlenbergii	chinkapin oak	moderate	40’	○		●	●	●					☼		●	●				
Quercus palustris	pin oak	fast	40’	△		●	●	●		●	●	●	☼		●	●	●			
Quercus palustris [Green Pillar]	pin oak	fast	15’	▯		●	●	●		●	●	●	☼		●	●	●			
Quercus phellos	willow oak	fast	40’	⬭		●	●			●	●		☼		●	●				
Quercus x warei [Regal Prince]	hybrid oak	slow	20’	▯							●		☼		●	●				
Quercus rubra	red oak	fast	60’	○		●	●	●	●		●		☼		●	●			🍃	high wildlife value
Quercus shumardii	Shumard oak	moderate	50’	○		●	●	●		●	●		☼		●	●			🍃	
Styphnolobium japonicum [Regent]	Japanese pagodatree	fast	40’	⬭				●	●			●	☼		●	●		🐝	❁	
Taxodium distichum	bald cypress	moderate	25’	△		●	●		●	●	●	●	☼		●	●	●		🍃 ≡	deciduous conifer

● Applicable

Form

- ⬭ Oval
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- ▯ Columnar
- △ Pyramidal
- ▽ Vase
- ◠ Spreading
- ◠ Weeping
- Irregular

Light Conditions

- ☼ Full Sun
- Partial Shade
- Shade

Ornamental

- 🍒 Fruit
- ❁ Flower
- 🍃 Fall Color
- Winter Interest
- ≡ Bark

Large Trees

50' and over

		CHARACTERISTICS					TOLERANCES								SITE SELECTION					VALUE		
Scientific Name	Common Name	Growth Rate	Spread	Form	Evergreen	Native to eastern N. America	Compacted Soil	Drought	Salt	Wet/ Sat. Soils	Clay Soils	Air Pollution	Shade	Beneath Powerlines	Treelawn or Median	Open spaces (parks/ lawns)	Wetlands	Pollinator Friendly	Ornamental	Notes
Thuja occidentalis	arborvitae	slow	15’	△	●	●				●	●	●	☀ ⛅			●			❄	
Thuja plicata	western redcedar	moderate	25’	△	●	●				●	●	●	☀ ⛅			●			❄	
Thuja ‘Green Giant’	giant arborvitae	fast	20’	△	●					●	●	●	☀ ⛅			●		🐝	❄	
Tilia americana	basswood	moderate	40’	⬭		●	●				●	●	☀			●		🐝	✿	
Tilia cordata [Green Spire]	littleleaf linden	moderate	30’	⬭			●		●		●		☀		●	●		🐝	✿	fragrant flowers
Tilia tomentosa	silver linden	moderate	40’	△				●			●	●	☀		●	●			✿	fragrant flowers
Tilia x *euchlora*	Crimean linden	moderate	25’	○									☀		●	●				
Ulmus americana ‘Princeton’	American elm	moderate	50’	▽		●	●	●	●	●	●	●	☀		●	●	●	🐝		Dutch Elm Disease (DED) resistance
Ulmus americana ‘Jefferson’	American elm	moderate	50’	▽		●	●	●	●	●	●	●	☀		●	●	●	🐝		Dutch Elm Disease (DED) resistance
Ulmus ‘Regal’	elm	fast	25’	▯					●		●	●	☀			●	●	🐝		Dutch Elm Disease (DED) resistance
Ulmus [Triumph]	elm	fast	45’	▽					●		●	●	☀			●		🐝		Dutch Elm Disease (DED) resistance
Zelkova serrata [Green Vase]	Japanese zelkova	moderate	30’	▽			●	●	●			●	☀		●	●				
Zelkova serrata ’Musashino’	Japanese zelkova	moderate	15’	▽			●	●	●			●	☀		●	●				
Zelkova serrata [Village Green]	Japanese zelkova	moderate	40’	▽			●	●	●			●	☀		●	●				

● Applicable

Form

- Oval
- Round
- Columnar
- Pyramidal
- Vase
- Spreading
- Weeping
- Irregular

Light Conditions

- Full Sun
- Partial Shade
- Shade

Ornamental

- Fruit
- Flower
- Fall Color
- Winter Interest
- Bark

TOP TEN TREE CARE TIPS TO HELP YOUR NEWLY PLANTED TREE THRIVE

#1 PLANT DURING THE RIGHT TIME OF YEAR.

Spring (late March through early-June) and fall (late October to mid-December) are the best times for planting new trees in NEOH. Plant when the tree is dormant - either before the tree breaks bud in the spring or just after it loses leaves in the fall. Another good rule is to plant at least four to six weeks before either the extreme conditions of winter or summer are expected to arrive.

#2 BREAK UP AND LOOSEN ENCIRCLING ROOTS PRIOR TO PLANTING.

Containerized trees often have roots that encircle the trunk. Roots should be gently massaged or teased to loosen them from the soil. Pruning matted roots with bypass pruners or vertically shaving the outside root ball with a saw may be required to loosen the roots.

#3 DIG A SHALLOW AND WIDE (ELLIPTICAL-SHAPED) PLANTING HOLE.

Tree roots are shallow, typically found in the first foot of soil, and need oxygen they grow. It's important to not plant them too deeply. Digging a saucer-shaped hole, 2 to 3 times the width of the tree's root ball, will allow the roots to expand freely into surrounding soil.

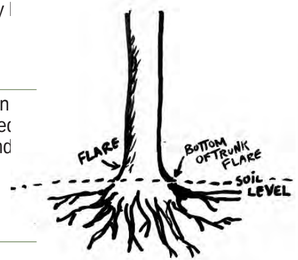
#4 KEEP ROOT FLARE ABOVE GROUND.

The root flare is the fluted area at the base of the trunk where support roots emerge. It keeps the tree stable, provides oxygen to the root system and should always be exposed.

#5 REMOVE EXCESS SOIL FROM THE ROOT FLARE.

Excess soil or other materials around a root f lare or trunk should be removed either by hand or with a pneumatic air tool. An air tool uses high-pressure air to blow away soil from the roots or trunk without inflicting any damage. Removing soil or materials by hand requires great care as roots and trunks are easily damaged by the slip of a shovel.

#3 Dig a shallow and wide (elliptical-shaped) planting hole.



#4 Keep root flare above ground.

#6 Mulch wide, low and away from the trunk.

#8 Continue to water your newly planted tree during the growing season until it's established.

#6 MULCH WIDE, LOW AND AWAY FROM THE TRUNK.

Mulch 2-4 inches deep and as wide as the canopy of the tree with natural mulch such as decomposing wood chips. Keep the mulch at least a fist's-width away from touching the trunk.

Proper mulching:

- Reduces mechanical damage to the bark from lawn mowers and string trimmer
- Keeps the root system moist
- Reduces root competition from weeds and grasses
- Insulates the soil and keeps it from becoming too dry or cold
- Provides nutrients and conditions the soil as it breaks down

#7 USE NATURAL HARDWOOD MULCH.

Wood chip mulch breaks down over time and slowly add nutrients to the soil. Natural mulch also loosens compacted soil, adds organic matter and keeps moisture levels up.

#8 CONTINUE TO WATER YOUR NEWLY PLANTED TREE DURING THE GROWING SEASON UNTIL IT'S ESTABLISHED.

Newly planted trees expend a lot of energy getting their roots to grow into the surrounding soil and require frequent watering during the hot, dry months. Tree roots drying out from lack of water is one of the main causes of new planting failures

Apply water:

- frequently – a few times a week unless there is frequent rain
- slowly – to ensure it doesn't run off the mulch
- deeply – enough saturation to ensure water gets into the root system

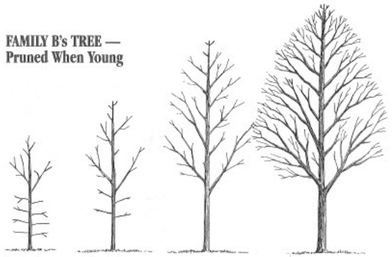
Applying 15 gallons of water, 2-3x/week at the root system during the dry, summer months for the first 3 years after planting should do the trick!

#9 PROTECT THE TRUNK OF YOUNG, THINBARKED TREES SUCH AS MAPLE FROM DEER AND OTHER CRITTERS.

Properly pruning a young tree every few years is essential for developing a tree with a strong structure and desirable form. Trees that receive the appropriate pruning measures while they are young will require less corrective pruning as they mature.

#10 TRAIN YOUR YOUNG TREE TO BECOME HEALTHY AND STRONG THROUGH STRUCTURAL PRUNING.

Properly pruning a young tree every few years is essential for developing a tree with a strong structure and desirable form. Trees that receive the appropriate pruning measures while they are young will require less corrective pruning as they mature.



#10 Train your young tree to become healthy and strong through structural pruning.

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Tree plantings should follow tree care industry standards, such as ANSI A300 (Part 6) Planting and Transplanting and ANSI Z60.1 American Standard for Nursery Stock https://www.americanhort.org/page/standards?&hhsearchterms=%22nursery+and+stock+and+standards%22