The City of Dover Urban Tree Management Analysis

Background on Urban Forestry in Dover

The City of Dover currently has 25.7% urban tree canopy, which is 3844.6 acres out of the total 14937.8 acres included with the City of Dover limits. Dover has some of the oldest and largest historic trees in Delaware. The city contains the First State National Historic Park and 28 parks, which they are responsible for maintaining the trees along with all street tree plantings. Using spatial data from the University of Vermont it is evident there are several locations within the City of Dover that have adequate space to plant or reforest. These locations however are privately owned by healthcare facilities, Dover International Speed Way, the military base, or in production for agricultural use; which eliminates a large acreage of plantable locations for the City of Dover. Within the City of Dover limits several homeowner associations are included which eliminate the cities direct involvement for planting on locations. These several land use factors negatively affect the potential for the city to grow its urban canopy beyond the already densely clustered main streets.

Currently the available spaces within the City of Dover are not adequately sized to plant street trees. The planting strips along the roadways are roughly 2-3 ft. wide at maximum. The city already has several large tree species planted in these strips which range in conditions from dead to excellent health. The majority of these trees has and still may cause sidewalk conflict issues. Many of the sidewalks near these trees have already been cracked or raised due to tree root expansion. It appears the city tries to keep up with this constant battle by shaving the sidewalks or replacing the slabs. The several instances that the sidewalk slabs that were replaced the roots were severed and the trees suffered significant canopy loss.

The current management setup for the city is to be reactive to incidents rather than proactive. Along several streets the trees required extensive pruning or removals to minimize the risk of the urban forest. Currently the city of Dover has 2 ISA certified arborists on staff, but they are tasked with other priorities in the public works department beside urban tree care. In the past the city has an urban forester position, which at this time is no longer filled and may have been removed from the hiring roster. Funding for the urban management program is limited as the public works department has many responsibilities that are a priority over the maintenance of the trees.

i-Tree Project Summary

The City of Dover is in need of a planting palate of species that can be used for streets, parks, greenspaces and other types of plantings they encounter. Previously working with the City of Dover, one of the arborists on staff made a request to have a street tree list created for medium sized trees that he can use to select from. In April of this year we collaborated on an Arbor Day planting and allowed the city to select several tree species and planting locations for these trees. When the sites were selected it ended up being in 4 parks, a single street and on the historic green in Dover. Several tree species were selected such as red maple, horse chestnut, persimmon, redbud and more. Upon completion of this project, reflecting back on site location and specific planting spots/specie selection it was clear the City of Dover needed some suggestions on better urban forest management protocols.

The first task was to create a planting palate for the city that can be used in a wide range of projects and create a specific street tree list. Using i-Tree Species with no height restriction on maximum and 15 minimum heights, with varying factors (see attached report), I was able to begin generating a species list that would work for Dover and help maximize ecological benefits. Selecting certain species from the list that would work for Dover and eliminating species that may be unsuited or hard to find was my first task. After reducing the i-Tree species list, I created a table of tree species from the Delaware Trees book, our in progress recommended tree list and several tree species I have worked with in the past. I compiled a list of all species that I thought may be suitable for the City of Dover to use in a planting situation. The planting table was created to reflect the species botanic and common name, the height, width, bloom time, fall colors, use, suggested cultivars, common diseases and pests of those species. This was created this way to inform the user of the various aspects that need to be considered when selecting a tree for a planting site. This table would give them a reference to some quick selection details if they were unable to refer to a manual or book for more information. Using Michael Dirr's Woody Landscape Plants Manual and his The Tree Book for the specifics on each tree, so there was a reference point for all the information that would be gathered for the table. This table went through several editing periods of removals and additions of species as it progressed. The table was broken down into deciduous vs evergreen and then by size of small medium and large. The final rendition of this table can be referenced as part of this submission. The table was used to create a secondary list strictly for small and medium sized planting street trees as requested by the City of Dover. After the species selection was complete a search was done of the list of availability of the tree species at nurseries in the area. The gray highlight on the table indicates that the tree species was within the regional area of DE, MD, NJ and PA for ordering.

The next step was to use i-Tree Canopy to get the approximate urban canopy cover for Dover. The categories used for this assessment were Tree, road, sidewalk, grass, water and structures. Using 500 points as my base to identify the percentage of these named categories above, I arrived at 25.8% tree canopy cover. I compared this canopy output to our urban tree canopy spatial data from the University of Vermont Spatial Analysis Lab, which indicated the 25.7% percent canopy cover.(reference the canopy cover map provided in packet) Our GIS Specialist, Jimmy Kroon, created these PDF maps for communities to use while assessing their current canopy to set new goals for themselves. With this data he was also able to create a secondary map (see attached map with title Dover, DE Canopy Assessment) that shows low and high canopy areas for the city to focus on for their planting efforts. The hexagonal shapes within the map are 100 acres per hexagon which always the displayed percentage of each hexagon to be the current canopy covers for those 100 acres. The hexagons themselves are also color coordinated to show low to high priority areas for planting projects. Now using these two maps compared I could begin eliminating areas to look at and eliminating non-plantable areas.

Reviewing these two maps, I eliminated several large parcels of land due to the land use for each specific area. Several large plots were agriculture use and cannot be planted on for a reforestation project. The City of Dover has also the Dover Air Force Base and Dover International Speedway within its limits which are two large land parcels that cannot be utilized for urban plants or green spaces. Other large land use issues involved homeowner association developments, hospitals and other large privately owned industries. Some of these areas could be planted on through our urban grant program for the homeowner associations, but primarily Dover had the main streets to plant on. Using the Canopy Assessment map I visited sites within

those indicated areas to see what environmental factors were present and to see the plantable space.

Several of those sites had relatively new plantings or simply no space to host a suitable tree for long term. There were several streets that had planting strips in the right-of-way, but the size of them was questionable for planting. The potential low canopy areas had the space, but needed a different design to make the plantings here more successful. Site visits were made with Kesha Braunskill, Urban and Community Forestry Coordinator, to help select potential project areas and design ideas to get trees into these low canopy areas.

After the sites were selected i-Tree Design was used to layout potential planting projects and species for the City of Dover to use in future urban planning. Two priority areas were chosen and 3 i-Tree Design selections were run to see the different ecological benefits.

In the original plan the City of Dover's inventory or a sample of inventory was going to be used to run through i-Tree Eco, this was decided against as the inventory data was too old and may not have all the required fields to run through the software. The justification for an urban forester can also be used stating they need to know what they have in order to create a management plan. Can be a task they under take with a new hire or with a volunteer tree steward group.

Findings

- Current urban canopy is 25.7%
- 3844.6 acres out of the total 14937.8 acres are covered in urban forest
- 2 ISA certified arborist on Staff of Public Works
- Has either not backfilled or eliminated the urban forester position
- Currently they are a reactive to urban forestry management needs not proactive
- Limited funding to purchase equipment for arborist climbers
- Has not injected elm trees in two years for Dutch elm disease
- Planting strips are very narrow and give no room for trees to grow
- Species selected in narrow strips are causing conflicts
- Species currently planted are too large for areas (store front coverage and fruit dropping issues)
- Dover includes several Agriculture properties
- Dover includes the Air Force Base
- Dover includes International Speed Way
- Dover includes several larger Hospital properties

Current pests and diseases to contend with in Dover

- Bacteria Leaf Scorch (Red oak family)
- Dutch Elm Disease
- Emerald Ash Borer
- Spotted Lanternfly
- Powdery Mildew
- Verticillium Wilt
- Anthracnose
- Leaf Spot
- Scale

- Japanese Beatles
- Leaf Scorch
- Fire Blight

Other Impacts on Urban canopy

- Girdling Roots
- Small planting strips
- Mechanical Damage (cars and lawn care)
- Lack of nutrients
- Heat Stress
- Lack of water
- Improper planting depths
- Improper mulching
- Frost Damage
- High Water Table
- Sun Scold

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Currently their urban forest offsets over 93,000 tons of carbon per year in either storage or sequestration and 180,000 lbs. per year of pollutants. Based off i-Tree Landscapes calculations this equates to about 916,552 dollars in ecological benefits per year for the City of Dover. This value does not include stormwater mitigation values and reduction of heat and cooling affects trees give us for our buildings. (Reference i-Tree Landscape Executive Summary 1 and 2). The monetary value of the trees can total well over a million dollars once a full inventory analysis is complete through i-Tree Eco.

The City of Dover has an inventory, but this was done roughly 10 years ago and has not been well maintained with removals and additions to the urban canopy. This particular dataset may provide addition ecological benefits to the City of Dover if run through i-Tree Eco. The old inventory dataset can potentially provide Dover with some insight to their urban canopy, but it depends on the data collected at the time of the inventory.

Recommendations

- Hire an Urban Forester

An urban forester can coordinate the urban forest management needs, while providing support to the two arborists on staff. This would allow Dover to transition from a reactive management scenario to proactive, which will lead to a reduce amount of tree failures within the city limits. This position would also undertake tree selection and planting projects which would increase the survival ship of the urban trees and the overall canopy cover.

- Get a crew of arborists or contract one
  Currently having a bucket truck and two certified arborist it may prove to be better to hire a crew to work with these arborists to maintain the urban forest. They will be familiar with the area and with the tree stock. With the cities own crew, they can maintain the trees on a regular basis and respond to tree failures and storm events quicker than a contracted crew.
- Tree bump outs
  Certain roadway planting strips are narrow and will not be sufficient for medium sized shade trees to be used. Building in tree bump outs will provide sufficient space for the trees to develop and will reduce the amount of sidewalk issues associated with larger trees and small planting areas. These bump outs are alternatives to reducing roadway sizes and shifting sidewalks further into properties where it may be encroaching upon private land.
- Sidewalk moved around tree bases
  If the city has large enough right away easements one option is to divert sidewalks further away from the base of the trees. This would reduce the amount of conflicts the tree roots have with the sidewalks. It would allow larger trees to be planted in these areas for better ecological benefits for the community.
- Species Selection improved
  Selecting tree species for specific projects requires a knowledge of particular tree cultivars and alternatives to certain scenarios. Acquire tree manuals and book to help tree selection process. Recommend Michael Dirr's Woody Landscape Manual and The Tree Book.
- Create a 5, 10- and 15-year management plan with set goals and specifics
  Create short term and long-term objectives and goals for the urban management program. These short term and long-term goals will help focus the program on pin-point specifics that the city should focus on over time. These plans can be the road map used to get the urban management program on track.
- Form a shade tree commission to get public support
  Public support can be a huge tool to get projects started and finished. A shade tree commission can help support an urban program by providing volunteers and taking on tasks that the urban forester or they supporting staff cannot do. They can spread the message to other community groups and help advertise the need to fund an urban program for the city.
- Create a pruning system for yearly checkup and scheduling process
  Having a system to prioritize work and yearly routine pruning reduces the risk factor an urban canopy may have when left to its own devices. Having an urban forester with a supporting arborist crew would allow the city to get ahead of failures and reduce the amount of storm related issues with trees.
- Create a protocol for tree pruning and hazard priorities

Implement a public and internal system that will allow the city to get potential tree hazard and pruning notifications that may slip past the daily routine. The public eye will appreciate knowing they are being recognized and a problem is being solved by the city. This type of protocol will also help reduce hazardous situations and provide the public an organized way to report items, without overwhelming someone's phone or email.

- Partner with private industries for planting projects
  Look for large industry partners to plant or sponsor a planting project can lead to long term relationships that may provide the city with additional funding for these types of projects. This may also help the City of Dover increase urban canopy by encouraging their industry partners to increase plantings on their own properties.
- Create tree preservation ordinances
  City of Dover should consider creating ordinances that protect trees from removal or damage them unnecessarily. These types of ordinances can include fees for these types of situation in which can fund the urban program and help the city reduce the budget need for urban program. In new construction the city can require replacement trees or pay out of removals of trees to fund a project elsewhere. This would encourage new development to include trees or pay for other projects that the city would prefer to get done.
- Create a adopt a tree program
  Allow community members a chance to sponsor a tree in front of their house or adopt an existing tree to water it over the summer months. This would alleviate some of the work for the urban program to ensure trees are taken care of at the time of planting. This also may help reduce costs for tree replacements along streets if a homeowner pays for a tree to be planted in their right-of-way. They would receive the benefits from that tree and the labor of installing it.
- Create a tree planting list specific for developers to use as well as a tree NO NO list
  City of Dover should have a list of acceptable trees to be planted in new developments and a list of unacceptable trees. This way there is a diversity in the urban canopy and the city has some control of what species are being planted within the city limits.
- Create root barriers to plant in smaller strips
  When tree pits and planting strips are being installed or redone root barriers should be considered part of the project. This will reduce the sidewalk issues with the roots while providing an area for the roots to grow and allow the trees to flourish.

Delaware Forest Service can help with:

- Begin to promote the Arbor Day Foundation Tree Hospital Program to engage private care facilities to plant more trees to increase urban tree canopy
- Several new homeowner associations have been or being built DFS can provide grant funding to them for tree plantings to increase urban canopy in Dover
- Provide Dover public works staff with training and education on urban tree management, tree selection and more
- Provide the City of Dover with support to create Shade Tree Commission and a Tree steward program (education courses and financial aid)
- Work with City of Dover to create ordinances that would provide protection and preservation to their urban canopy

City of Dover Urban Forest Analysis

City of Dover Current Urban Program

- The City of Dover currently has 25.7% urban tree canopy cover
- 2 ISA certified arborist on Staff of Public Works
- Has either not backfilled or eliminated the urban forester position
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- Limited funding to purchase equipment for arborist climbers
- Has not injected elm trees in two years for Dutch elm disease
- Planting strips are very narrow and give no room for trees to grow
- Species selected in narrow strips are causing conflicts
- Species currently planted are too large for areas (store front coverage and fruit dropping issues)
- Lack of knowledge of cultivar usage for urban plantings

Land Use

- Dover includes several Agriculture properties
- Dover includes the Air Force Base
- Dover includes International Speed Way
- Dover includes several larger Hospital properties
- These three combined reduces the amount of plantable area in Dover as they are private ownership with large acres of property that can be utilized for reforestation or more urban canopy.

Current pests and diseases to contend with

- Bacteria Leaf Scorch (Red oak family)
- Dutch Elm Disease
- Emerald Ash Borer
- Spotted Lanternfly
- Powdery Mildew
- Verticillium Wilt
- Anthracnose
- Leaf Spot
- Scale
- Japanese Beatles
- Leaf Scorch
- Fire Blight

Other Impacts on Urban canopy

- Girdling Roots
- Small planting strips
- Mechanical Damage (cars and lawn care)
- Lack of nutrients

- Heat Stress
- Lack of water
- Improper planting depths
- Improper mulching
- Frost Damage
- High Water Table
- Sun Scold

Solutions

- Hire an Urban Forester
- Get a crew of arborists or contract one
- Tree bump outs
- Sidewalk moved around trees
- Species Selection improved
- Create a 5, 10 and 15 year management plan with set goals and specifics
- Form a shade tree commission to get public support
- Create a pruning system for yearly checkup and scheduling process
- Create a protocol for tree pruning and hazard priorities
- Partner with private industries for planting projects
- Create tree preservation ordinances
- Create tree replacement and development ordinances that pay out for removals or re plant in other locations
- Create larger planting pits in new construction (review them or get new ordinance passed for this)
- Send Tree related personal to courses to educate them on proper standards for tree care
- Create a adopt a tree program
- Create a tree donation program
- Create a public reporting process for hazards or pruning needs
- Create a tree planting list specific for developers to use as well as a tree NO NO list
- Encourage a Tree steward program within the community.
- Create root barriers to plant in smaller strips

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Common Name	Botanic name	Height (ft)	Width (ft)	Blooms	Fall color	Use	Suggested cultivars	Common Pest, Disease or Issues
Deciduous Tree Species Large-Medium								
Tulip Poplar	Liniodendron tulipifera	70-90	35-50	Spring	Yellow	Specimen tree on large properties, large greenspaces,	Fastigatum, Aureomarginatum	Cankers, leaf spot, powdery mildew, scale, verticillium wilt, aphids
American Elm	*Ulmus americana*	60-80	30-60	N/a	N/a	Street and large lawn plantings	Princeton, Valley Forge	Dutch Elm Disease, cankers, bacterial leaf scorch
American Basswood	*Tilia americana*	60-80	30-60	Mid-Late June	Yellow	Large greenspaces or lawn areas	Fastigiata, Lincoln	Anthracnoise, verticillum wilt, Japanese beetle scales
Cucumber Magnolia	*Magnolia acuminata*	50-80	50-80	May to June	Yellow -brown	Greenspaces and large lawns	Sundance, Butterflies	Scale and Scorch in dry hot summers
American Sycamore	*Platanus occidentalis*	75-100	75-100	N/a	Brown	Can be a street tree, but is messy, suggested to be in a park or greenspace away from walkways	None	Anthracnose, leafspots, scales
Red Maple	*Acer rubrum*	40-60	30-50	March to April	Red	Park and street planting	Armstrong, Autumn Blaze, Bowhall, October Glory	Petiole borers, heat stress
Horse-chestnut	*Aesculus hippocastanum*	50-75	40-70	Mid-May	Poor usually yellow to	Park, campus commercial areas, larger greenspaces	None	Leaf scorch and fungal leaf blotch

					brown			
London Planetree	*Platanus x acerifolia*	70-100	65-80	April, but not showy	Yellow-brown fall, poor color	Open areas parks and campus, street tree plantings should consider size	Liberty, Bloodgood	Cankerstain, anthracnose, powdery mildew
Silver Linden	*Tilia tomentosa*	50-70	25-60	Late June to July	Yellow, usually poor, brown	Street tree(consider size), residential planting use and greenspaces	Green Mountain, Sterling	Aphids, Japanese beetles
Northern Hackberry	*Celtis occidentalis*	40-60	35-50	N/a	Yellow-yellow green not impressive	Park, large areas, street trees, parks	Chicagoland, Prairie Pride	Leaf spot, witches' broom, powdery mildew, scales
Littleleaf Linden	*Tilia cordata*	60-70	30-50	June to July	Yellow-green not showy	Lawn, large areas, streets, malls, can be pruned for hedge look	Greenspire, Green Globe, Shamrock	Aphis, Japanese beetles
Freeman Maple	*Acer freemanii*	40-60	20-40	Not showy	Red	Streets, parks, greenspaces and some cases a windbreak	Autumn Blaze, Armstrong, Firefall	Verticillum wilt, chlorosis symptoms
Japanese Zelkova	*Zelkova serrata*	50-80	40-70	Not showy	Yellow-orange-brown	Residential streets, parks, large areas	Green Vase, Village Green, Autumn Glow	Bacterial canker, leaf scorch
American Beech	*Fagus grandifolia*	50-70	40-60	April-Early May not showy	Golden bronze	Large areas, parks and greenspaces, historic properties	None	Leaf spot, powdery mildew, beech bark disease, cankers, aphids

Sycamore Maple	*Acer pseudoplatanus*	40-60	30-50	May	Dingy brown	Parks, greenspaces, can withstand some saline environment	Eretum, brilliantissium, atropurpureum	Cankers, requires a lot of dead wood pruning
Yellow Buckeye	*Aesculus flava*	60-80	25-35	Mid Spring	Orange	Parks, greenspace, wide medians	None	Leaf scorch and fungal blotch
Dawn Redwood	*Metasequioa glyptostroboides*	70-100	40-50	N/a	Rustic red	Large greenspaces, parks,, screening, if pruned correctly a street tree in large planting strips	Ogon, National	Canker infestation (low potential)
Silver Maple	*Acer saccharinum*	50-70	40-60	Mid-March	Green-yellow brown combo	Parks and greenspaces, limit use to areas were less people activity if pruning is not regularly done when tree reaches maturity	Blair, Silver Cloud	Anthracnose, leaf spot, verticillium wilt, (refer to Dirr), branch failure at old age
European Beech	*Fagus sylvatica*	50-60	35-45	April-Early May not showy	Golden bronze	Open spaces, parks, historic sites	Aurea Pendula, pendula, (Reference Dirr)	Wooly aphids, some dark disease
Ginkgo	*Ginkgo bilobia*	50-80	30-40	N/a	Yellow	Can be used in streets, if crown growth isn't an issue, public areas such as parks and greenspaces	Autumn Gold, Fastigiata, Princeton Sentry	Some leafspots
Hop Hornbeam	*Ostrya virginiana*	25-40	20-30	N/a	yellowish	Lawns, parks, streets and narrow planting strips	None	None
White Oak	*Quercus alba*	50-80	50-80	N/a	Reddish	Medium to large greenspaces and parks, avoid areas where sidewalks and roadways to avoid clean ups	None	Anthracnose, bacterial leaf scorch, cankers, leaf spots
Willow Oak	*Quercus phellos*	40-60	30-40	N/a	Yellow-brown and	Park or greenspace, can be used on a street keep in mind the acorns	None	None

					rusted red			
Sawtooth Oak	*Quercus acutisima*	40-60	40-60	N/a	Golden -brown	Parks, greenspace, shade tree	None	None
Swamp White Oak	*Quercus bicolor*	50-60	50-60	N/a	Yellow -bronze	Parks, greenspaces, street planting without sidewalks	None	None
Sweetgum	*Liquidambar styraciflua*	60-75	40-50	N/a	Yellow -purple-red tones	Lawn, park or street but needs large root area. If you are using in a street or walkway area use cultivar named without fruits to avoid mess	Rotundibola	Leaf spots, necrosis, scale, caterpillars
Baldcypress	*Taxodium distichum*	50-70	20-30	N/a	Rustic red	Parks, large open greenspaces, street tree if pruned right, waterside feature	Fastigiata, Shawnee Brave	Wood decay, small cankers
Kentucky Coffee tree	*Gymncadus dioicus*	60-75	40-50	May (not showy)	Brown sometimes yellow	Parks, greenspaces, larger open areas, select tree withour pods if sidewalk or pathway is a concern for a mess	Espresso	None
Paper Bark Maple	Acer griseum	20-30	20-30	N/a	Muted green to brown	Parks, specimen tree in a garden display, open greenspaces	None	None
Golden Raintree	*Koelreuteria paniculata*	30-40	30-40	June	Orange -yellow	Small lawn planting, street tree (may shed pods), park and greenspaces	None	Leaf spot and cankers, drought issues in our zone
Kwanzan Cherry	*Prunus serrulate* 'Kwanzan'	25-35	25-35	April	Orange -copper	Streets, walkways, green spaces, hardscapes strips	Cultivar itself from Japanese Flowering Cherries	Cankers, leaf spot, avoid high wind areas and pollution zones
Yoshino Cherry	*Prunus x yedoensis*	20-30	20-30	March-April	Bronze-orange	Water accents, walkways, parks, greenspaces and hardscape strips	Cascade Snow, Yoshin Pink Form, Pink Shell,	Cankers, leaf spot, avoid high wind areas and

							Shidare-yoshino	pollution zones
Honeylocust	*Gleditsia triacanthos*	30-70	30-60	May-June	Yellow	Streets, medium planting strips, greenspaces, parks	Street Keeper, Ruby Lace, Green Glory, Skyline	Leaf spot, cankers, powdery mildew, rust, mites, borers
Washington Hawthorn	*Crataegus phaenopyrum*	25-30	20-25	June	Orange, red, purplish	(keep in mind the thorns) parks, greenspaces, boarders, streets, near buildings, deterrent trees in areas of privacy	Fastigiata, Princeton Sentry	fire blight, leaf blight, mildews, and rusts
European Hornbeam	*Carpinus betulus*	40-60	30-40	April (not showy)	Yellow but not consistent	Screens, hedge, privacy, planter boxes, medium spaces, parks, greenspaces	Columnaris, Pendula, Fastigiata, Streetwise, Cornerstone	Mildew and heat stress
Japanese Maple	*Acer palmatum*	15-25	15-25	May-June (not showy unless close up)	Yellow, bronze, orange, red	Greenspaces, parks, medium planting strips, walkways, hardscape areas	Bloodgood(variety), Red Sentinel(variety), Refer to Dirr for various forms	Heat stress, anthracnose, scale, mites, sooty mold
Japanese Pagoda tree	*Styphnolobium japonicum*	50-75	45-60	July-August	Yellow	Lawns, parks, greenspaces, walkways and paths, avoid streets for messy fruit issues	Regent, Pendula, Princeton Upright	Cankers, twig blight, powdery mildew
Katsura Tree	*Cercidiphyllum japonicum*	40-60	20-30	March (not showy)	Apricot color, red to scarlet	Street tree, parks, greenspaces, greenspaces, commercial areas	Pendulum, Boyd's Dwarf, Aureum	Sun Scold
White Willow	*Salix alba*	75-100	50-100	March	Golden yellow	Pondscapes, large green spaces and open areas	Tristis	Twig blight, leaf blight, cankers, anthracnose, leaf spot, powdery mildew, rust,

								lace bug, aphids
Larch	*Larix laricina*	40-80	15-30	N/a	N/a	Large greenspaces or parks	None	Rust, sawfly, wood rot
Cockspur Hawthorn	*Crataegus crusgalli*	20-30	20-35	May	Bronze-red to purplish-red	Screens, parks, greenspaces, near hardscapes (thorns are an issue, but can be used to keep people away from a site)	Var. inermis 'Crusader'	Fireblight, leaf blight, rusts, leaf spots, scab, aphids
Winterking Hawthorn	*Crataegus viridis 'Winterking'*	20-25	20-25	May	Yellow to bronze	Wide roadside plantings, parks greenspaces, medium sized planting strips without sidewalk, near hardscapes	Cultivar itself	Less likely than other hawthorns but can get Fireblight, leaf blight, rusts, leaf spots, scab, aphids
Blackgum	*Nyssa sylvatica*	30-50	20-30	N/a	Yellow, orange, red purple	Street tree, wet areas, parks, greenspace, medium sized planting strips, hardscape areas	Miss Scarlet, Red Jeanne, Wildfire	Cankers, leaf spot, rust, scale
Sugar Maple	*Acer saccharum*	60-75	40-60	April (not showy)	Red, yellow, orange	Large planting strips, possible street (avoid heavy pollution), parks, greenspaces	Green Mountain. Legacy, Newton Sentry, Skybound	Leaf scorch, verticillium wilt
Full Moon Maple	*Acer japonicum*	20-30	30-40	March-April (not showy)	Red, Yellow	Patio tree, container trees, near hardscapes, parks and smaller greenspaces	Green Cascade, Vitifolium, Aconitifolium	Frost damage, vertocillium wilt
American Smoketree	*Cotinus obovatus*	20-30	20-30	April-May	Red-orange	Parks, greenspaces, small planting areas, near hardsacpes	Cabdy Floss, Cotton Candy, Flame, Grace	Verticillium wilt
Yellowwood	*Cladratis kentukea*	30-50	40-55	May-June	Yellow	Medium planting strips, street with sizable planting areas, parks, greenspaces	Rosea	Verticillium wilt,

English Oak	*Quercus robur*	40-60	40-60	N/a	Not showy	Parks, large greenspaces, medians	Fastigiata, Crimson Spire, Heritage, Regal Prince, Skyrocket	Mildew
Japanese Red Cedar	*Cryptomeria japonica*	50-60	20-30	N/a	N/a	Wind breaks, privacy, parks, greenspaces, medium to large planting areas, offset from hardscapes	Yoshino, Radicans, Black Dragon	Leaf blight, lead spot, tip dieback from fungi
Shingle Oak	*Quercus imbricaria*	50-60	50-60	N/a	Brown to rusted-red	Parks, streets, greenspaces, larger spaces,	None	Anthracnose, bacterial leaf scorch, cankers, leaf spots (maybe hard to grow as we are southernmost point of range)
Water Oak	*Quercus nigra*	50-80	20-80	N/a	Yellow	Greenspaces and parks that are not heavily traveled	None	Limbs break in storm events
Carolina Silverbell	*Halesia carolina*	30-40	20-35	April-May	Dark green with little yellow	Park and large greenspaces mixed in with evergreens (not many in urban settings)	Rosea, Jersey Belle, Ceushed Velvet,	Chlorosis in high pH soil
Two-winged Silverbell	*Halesia diptera*	20-30	20-30	April-May	Yellow	Protected areas, parks and greenspaces (not urban tested)	Southern snow, PRN Snowstorm	Difficult to transplant B&B
Bigleaf Magnolia	*Magnolia macrophylla*	30-40	30-40	May-June	Yellow - bronze-brown	Large lawn areas, parks and greenspaces	Julian Hill	Avoid windy areas and doesn't react to pruning well,
Laurel Oak	*Quercus hemisphaerica*	40-60	30-40	N/a	Yellowish	Parks, greenspaces, street planting if enough space	None	None

Amur Corktree	*Phellodendron amurense*	40	40	None	Pale to buttery yellow	Parks, greenspaces (recommended in urban, but can get stressed easily on streets), residential areas	Superfection, His Majesty	Order males only can seed easily, easily stressed,
Korean Moutainash	*Sorbus alnifolia*	40	30	May	Yellow to orange	Parks, large greenspaces	None	Fireblight, borers, does not tolerate urban stresses
Boxelder Maple	*Acer negundo*	30-50	30-50	March to April (not showy)	Yellow eye-green to brown	Parks and greenspaces (selected cultivars can be urban tolerant)	Flamingo, Kelly's Gold (Urban try), Sensation,	Boxelder bugs, Anthracnose, leaf spot, verticillium wilt, get male seeds spread easily
Persimmon	*Diospyros virginiana*	30-60	20-30	May-June	Yellow, orange, red, purple	Parks, native areas, greenspaces	Killen, Miller	Leafspot
Post Oak	*Quercus stellata*	40-50	40-50	N/a	Yellowish	Parks, greenspaces, medium street tree strips	None	oak wilt, , anthracnose, oak leaf blister, cankers, leaf spots and powdery mildew
Sassafras	*Sassafras albidum*	25-40	25-40	April	Red	Native plantings, roadsides, disturbed edges of buffers	None	Cankers, leaf spot, mildew, root rot
Pecan	*Carya illinoinensis*	70-100	40-75	None	Yellow	Greenspaces and parks not near public pathways, natural areas	Green River, Major, Striking Hardy Giant	Large tap root, difficulty transplanting, scab, weevils, phylloxera

River birch	*Betula nigra*	40-70	35-60	N/a	Yellow	Wet areas, large planting strips, greenspaces, parks	Heritage,, City Slicker, Fox Valley, Heritage Improved	Leaf spot, aphids
Overcup Oak	*Quercus lyrata*	40-60	40-60	N/a	Yellow -bronze	Large planting site, greenspaces, parks, streets without walkways	Highbeam, Endurance, Green Spring	None
Chestnut Oak	*Quercus montana*	60-70	20-60	N/a	Orange -yellow to brown-yellow	Parks and greenspaces, potential for street use mindful of acorns	None	Oak wilt and gypsy moth
Southern Red Oak	*Quercus falcata*	70-80	70-80	N/a	Brown	Parks and greenspaces medium to large	None	Root disturbance, Bacteria Leaf Scorch, Oak wilt, Powdery Mildew, Hypoxylon
Turkish Filbert	*Corylus colurna*	40-50	20-40	N/a	Yellow to purple	Street use, parks, greenspaces	None	None
Evergreen Tree Species Large-Medium								
Southern Magnolia**	*Magnolia grandiflora*	60-80	30-50	Late Spring	N/a	Parks, medium greenspaces, needs room to grow	Little Gem, brackens Brown beauty, Edith Bogue	Winter damage in severe storms
Saucer Magnolia	*Magnolia x soulangiana*	20-30	20-30	March-April	Sometimes yellowish-brown	Under utility lines, small to medium parks and greenspaces, near building complex to soften hardscapes	Too numerous to list reference Dirr	Black mildews, leaf blight, leaf spots, dieback, wood decay

Norway Spruce**	*Picea abies*	40-60 (can get larger)	25-30	N/a	N/a	Used as a windbreak, large planting strips or greenspace (overplanted)	No suggestions, Check Dirr	Red spiders, spruce gall aphid, budworm and borers
Deodar Cedar**	*Cedrus deodara*	40-70	40-60	N/a	N/a	Specimen tree, greenspaces and parks	Kashmir	Die back in tops from cankers or cold winter
Cedar of Lebanon**	*Cedrus libani*	40-60	30-50	N/a	N/a	Specimen tree in park or greenspace	Pendula, Sargentii	None serious
Eastern White Pine**	*Pinus strobus*	50-80	20-40	N/a	N/a	Parks, large properties, windbreak	Pendula, Compacta, Glauca	Blister rust, bark disease, white pine decline, may break in severe storms
Loblolly Pine**	*Pinus taeda*	60-90	40-60	N/a	N/a	Quick screen in younger years, good for poor soil sites	Nana	Heart and butt rot, pine beetles
Shortleaf Pine**	*Pinus echinata*	80-100	50-60	N/a	N/a	Greenspaces and open areas	None	Southern pine beetle, little leaf disease
Colorado Blue Spruce**	*Picea pungens* var. *glauca*	30-60	15-30	N/a	N/a	Parks, large lawn areas, greenspaces	Fat Albert, Montgomery, Blue Kiss, Mission Blue	Aphids, spider mites, cankers, heat stress
Blue Atlas Cedar**	*Cedrus atlantica* 'glauca'	40-60	30-40	N/a	N/a	Large lawns, greenspaces, parks	Glauca Pendula	Tip blight, root rot, scale
Lacebark Pine**	*Pinus bungeana*	30-50	20-35	N/a	N/a	Corners of large buildings, greenspaces, parks	Compacta, Temple Gem	Root rot, dieback, tip blight, rust, cankers, scale
American Holly**	*Ilex opaca*	40-50	18-40	N/a	N/a	Parks, greenspaces, offse4t from hardscapes, (keep in mind needles are sharp)	Jersey Knight, Jersey Delight, Dan Fenton,	Leaf miner, leaf spots, powdery mildew, anthracnose, leaf

								scorch, cankers, scale
Arborvitae**	*Thuja occidentalis*	40-60	10-20	N/a	N/a	Screen, hedge, street tree without sidewalk, foundation plantings	Wintergreen, Emerald, Nigra,	Bagworms, leaf miners, deer browse
Eastern Red Cedar**	*Juniperus virginiana*	30-50	8-25	N/a	N/a	Screen, windbreaks, salt spray areas,	Emerald Sentinel, Providence, Taylor	Cedar Rust, bagworms
Japanese Umbrella Pine**	*Sciadopitys verticillata*	20-30	15-20	N/a	N/a	Park or greenspace as a specimen tree, accent tree	Wintergreen, Gruene Kugel,	None
Himalayan Pine**	*Pinus wallichiana*	30-50	20-40	N/a	N/a	Parks and greenspaces	Zebrina. Oculus-draconis	Air pollution, pine blight, salt damage, scale, leaf cast
Douglas Fir**	*Pseudotsuga menziesii*	40-80	15-25	N/a	N/a	Large greenspaces and park settings, large road medians without road salt applied	Blue, Emerald Twist, Fastigiate	Cankers, leaf cast, leaf and twig blight, adelgid, aphids, road salt
Austrian Pine**	*Pinus nigra*	50-60	20-40	N/a	N/a	Screen or windbreak, park and greenspaces	Arnold Sentinel, Pyramidalis	Tip blight, pine nematode
Deciduous Tree Species Small								
Crapemyrtle	*Lagerstroemia indica*	15-25	10-15	July-August	Yellowish	Under utility lines, street, parks and greenspaces in clusters	Too numerous to list reference Dirr	Powdery mildew, black spot, sooty mold, winter damage
Sweetbay Magnolia	*Magnolia virginiana*	10-20	10-20	May-June	Yellow-brown	Under utility lines, small green spaces, parks, garden settings	Dwarf, satellite (Reference Dirr for more)	chlorosis
Star Magnolia	*Magnolia stellata*	15-20	10-20	Late February-March	Yellow to bronze	Utility lines, medium greenspaces, parks, near buildings and hardscapes	Too numerous to list reference Dirr	None

Downy Serviceberry	Amelanchier arborea	15-25	20-30	April	Orange -rustic red	Small greenspaces, parks, in hardscape, under utility lines(can get single stem varieties for street uses)	Autumn brilliance, forest prince (Refer to Dirr)	Rust, fire blight, leaf blight, powdery mildews
Flowering Dogwood	*Cornus florida*	20-35	20-35	April-May	Red to reddish purple	Small planting strips or lawns, parks, greenspaces, near hardscapes	Numerous Cultivars Reference Dirr to fit your needs	Leaf spot, spot anthracnose, borers, powdery mildew, heat stress
Kousa Dogwood	*Cornus kousa*	20-30	20-30	June	Yellow to red to reddish purple	Parks, greenspaces, small area plantings, near hardscapes, under utility lines	Numerous Cultivars Reference Dirr to fit your needs	None
Eastern Redbud	*Cercis canadensis*	20-30	25-35	March-April	Yellowish-green	Under utility lines, parks, streets (seedpods maybe an issue), hardscapes areas, greenspaces	Forest Pansy, Lavender Twist, Rising Sun, Oklahoma, Appalachian Red, Ace of Hearts (Refer to Dirr for more)	Canker, leaf spots, verticillium wilt, scales, root rot
Japanese Tree Lilac	*Syringa reticulata*	20-30	15-25	June	Minimum fall color	Under utility lines, streets, walkways, greenspaces, parks, near large buildings	Ivory Silk, Regent, Snow Dance, Chantilly Lace	Bacterial Blight, leaf blight, leaf spots, powdery mildew, frost injury, leaf miners, scale
Persian Ironwood	*Parrotia persica*	20-40	15-30	March-April	Yellow - yellow-orange	Streets, parks, planting strips, medians, greenspaces, under utility lines (depends on cultivar), small spaces	Ruby Vase, Vanessa, Select, Lamplighter	None

American Hornbeam	*Carpinus caroliniana*	20-30	20-30	April (not showy)	Yellow to orange-red	Small areas, parks, greenspaces, under utility lines, near hardscapes	Firespire. Ball O'Fire, Pyramidalis	Leaf spot, canker, twig blight, heat stress
Sorrel tree	*Oxydendrum arboreum*	25-30	15-20	June to July	Yellow, red, purple mix	Under utility lines, walkways, paths, greenspaces, parks, small planting areas	Mt. Charm (not many on the market)	Leaf spots, twig blight
Amur Maackia	*Maackia amurensis*	20-30	20-30	June-July	None	Under utility lines, small areas, greenspaces, street tree, near hardscapes, containers, parks	Starburst, Summertime	Maybe cankers
Witch-Hazel	*Hamamelis virginiana*	10-15	10-15	February to March	Yellow -orange	Under utility lines, parks, greenspaces, small planting areas, against hardscapes	Goldcrest, Wisley Supreme, Early Bright	Japanese beetles
Snowgoose Cherry	*Prunus serrulate 'Snowgoose'*	25-35	25-35	April	Orange -copper	Streets, walkways, green spaces, hardscapes strips	Cultivar itself from Japanese Flowering Cherries	Cankers, leaf spot, avoid high wind areas and pollution zones
Amur Maple	*Acer ginnala*	15-18	15-20	April-May	Yellow and red	Screen tree, near patio settings, small planting spaces, near buildings/hardscapes, under utility lines	Compactum, Flame, Red Rhapsody	Anthracnose, leaf spot, verticillium wilt
Trident Maple	*Acer buergerianum*	20-30	30-35	March	Yellow, orange, red	Under utility lines, small areas, street, near patio settings, near buildings and hardscapes	Streetwise	Anthracnose, leaf spot, verticillium wilt
Hybrid Witch-hazel	*Hammamelis x intermedia*	10-15	10-15	January to March	Yellowish	Under utility lines, hedge, near patios or buildings, smaller planting spaces, parks	Arnold Promise, Diane, Moonlight, Sunburst	Japanese beetles, heat stress
Vernal witch-hazel	*Hamamelis vernalis*	6-10	10-15	January-March	yellow	Near large buildings, planter boxes, screen, small planting spaces, parks	Autumn Embers, Christmas Cheer, Red Imp	Aphids, mildew
Okame Cherry	*Prunus serrulata 'Ok*	15-20	15-20	March	Reddish	Under utility lines, parks, small spaces, near hardscapes,	Cultivar itself from Japanese	Cankers, leaf spot, avoid high

	ame'				bronze	greenspaces near pathways	Flowering Cherries	wind areas and pollution zones
Japanese Stewartia	*Stewartia pseudocamelliia*	20-40	20-40	July	Red to dark reddish-purple	Parks, medium planting strips, greenspaces, near hardscapes(street potential but not sure)	None	None
Corneliancherry Dogwood	*Cornus mas*	20-25	15-20	March	Poor fall colors	Screen, hedge, mear buildings, small planting areas, parks, greenspaces	Aurea, Spring Glow, Spring Sun	Keep in protected area not as robust in this area
Benjamin Franklin Tree	*Frankliniaal atamaha*	10-20	10-20	July-August	Orange-red	Protected areas, small greenspaces, garden in parks	None	*Phytophthora cinnamomi*
Paw-Paw	*Asimina triloba*	15-20	15-20	April	Yellow	Natural wood planting, understory planting, park or greenspace in protected area	Sunflower, Wabash, Potomac, Allegheny	Transplanting, Asimina Webworm Moth, mildew
Crabapple	*Malus spp.*	10-25	10-25	March-April	Cultivar dependent	Under utility lines, small greenspaces and parks, street planting, parking lots	Refer to Dirr for countless cultivar, some to look for are: Donald Wyman, Adirondack, Mary Potter, Snowdrift, Cardinal, royal raindrops	Powdery mildew, rust, frog-eye leafspot, scab, fireblight

*Note Selection of Species is not limited to this list, other factors may affect planting selection, if this is the case a different species may be used for the site.
*Please Reference Michael Dirr's Woody Landscape Plants Manual for common pest and diseases of these species if such occasions are needed
*Common Issues does not mean species is guaranteed to get these disorders or pests, but there may be others that was not listed
*Tree sizes and information were derived from Dirr (Michael Dirr, 1975, Manual of Woody Landscape Plants, Stipes Publ.Co.Champaign IL. 1007p.)

Key
Red = Large to Medium
Blue = Small
** = Evergreens
Gray Highlight=Sourced at Regional Nursery (De, NJ, Pa, MD)

Common Name	Botanic name	Height (ft)	Width (ft)	Blooms	Fall color	Use	Suggested cultivars	Common Pest, Disease or Issues
Deciduous Tree Species Medium for Streets								
Red Maple	*Acer rubrum*	40-60	30-50	March to April	Red	Park and street planting	Armstrong, Autumn Blaze, Bowhall, October Glory	Petiole borers, heat stress
Northern Hackberry	*Celtis occidentalis*	40-60	35-50	N/a	Yellow -yellow green not impressive	Park, large areas, street trees, parks	Chicagoland, Prairie Pride	Leaf spot, witches' broom, powdery mildew, scales
Littleleaf Linden	*Tilia cordata*	60-70	30-50	June to July	Yellow -green not showy	Lawn, large areas, streets, malls, can be pruned for hedge look	Greenspire, Green Globe, Shamrock	Aphis, Japanese beetles
Freeman Maple	*Acer freemanii*	40-60	20-40	Not showy	Red	Streets, parks, greenspaces and some cases a windbreak	Autumn Blaze, Armstrong, Firefall	Verticillum wilt, chlorosis symptoms
Japanese Zelkova	*Zelkova serrata*	50-80	40-70	Not showy	Yellow - orange-brown	Residential streets, parks, large areas	Green Vase, Village Green, Autumn Glow	Bacterial canker, leaf scorch
Sycamore Maple	*Acer pseudoplatanus*	40-60	30-50	May	Dingy brown	Parks, greenspaces, can withstand some saline environment	Eretum, brilliantissium, atropurpureum	Cankers, requires a lot of dead wood pruning
Hop Hornbeam	*Ostrya virginiana*	25-40	20-30	N/a	yellowish	Lawns, parks, streets and narrow planting strips	None	None

Sawtooth Oak	*Quercus acutisima*	40-60	40-60	N/a	Golden -brown	Parks, greenspace, shade tree	None	None
Swamp White Oak	*Quercus bicolor*	50-60	50-60	N/a	Yellow -bronze	Parks, greenspaces, street planting without sidewalks	None	None
Paper Bark Maple	Acer griseum	20-30	20-30	N/a	Muted green to brown	Parks, specimen tree in a garden display, open greenspaces	None	None
Golden Raintree	*Koelreuteria paniculata*	30-40	30-40	June	Orange -yellow	Small lawn planting, street tree (may shed pods), park and greenspaces	None	Leaf spot and cankers, drought issues in our zone
Kwanzan Cherry	*Prunus serrulate* 'Kwanzan'	25-35	25-35	April	Orange -copper	Streets(in shaded and protected areas), walkways, green spaces, hardscapes strips	Cultivar itself from Japanese Flowering Cherries	Cankers, leaf spot, avoid high wind areas and pollution zones
Honeylocust	*Gleditsia triacanthos*	30-70	30-60	May-June	Yellow	Streets, medium planting strips, greenspaces, parks	Street Keeper, Ruby Lace, Green Glory, Skyline	Leaf spot, cankers, powdery mildew, rust, mites, borers
Katsura Tree	*Cercidiphyllum japonicum*	40-60	20-30	March (not showy)	Apricot color, red to scarlet	Street tree, parks, greenspaces, greenspaces, commercial areas	Pendulum, Boyd's Dwarf, Aureum	Sun Scold
Blackgum	*Nyssa sylvatica*	30-50	20-30	N/a	Yellow, orange, red purple	Street tree, wet areas, parks, greenspace, medium sized planting strips, hardscape areas	Miss Scarlet, Red Jeanne, Wildfire	Cankers, leaf spot, rust, scale
Overcup Oak	*Quercus lyrata*	40-60	40-60	N/a	Yellow -bronze	Large planting site, greenspaces, parks, streets without walkways	Highbeam, Endurance, Green Spring	None

Chestnut Oak	*Quercus montana*	60-70	20-60	N/a	Orange-yellow to brown-yellow	Parks and greenspaces, potential for street use mindful of acorns	None	Oak wilt and gypsy moth
Turkish Filbert	*Corylus colurna*	40-50	20-40	N/a	Yellow to purple	Street use, parks, greenspaces	None	None
Deciduous Tree Species Small for Streets								
Star Magnolia	*Magnolia stellata*	15-20	10-20	Late February-March	Yellow to bronze	Utility lines, medium greenspaces, parks, near buildings and hardscapes	Too numerous to list reference Dirr	None
Downy Serviceberry	Amelanchier arborea	15-25	20-30	April	Orange-rustic red	Small greenspaces, parks, in hardscape, under utility lines(can get single stem varieties for street uses)	Autumn brilliance, forest prince (Refer to Dirr)	Rust, fire blight, leaf blight, powdery mildews
Eastern Redbud	*Cercis canadensis*	20-30	25-35	March-April	Yellowish-green	Under utility lines, parks, streets (seedpods maybe an issue), hardscapes areas, greenspaces	Forest Pansy, Lavender Twist, Rising Sun, Oklahoma, Appalachian Red, Ace of Hearts (Refer to Dirr for more)	Canker, leaf spots, verticillium wilt, scales, root rot
Japanese Tree Lilac	*Syringa reticulata*	20-30	15-25	June	Minimum fall color	Under utility lines, streets, walkways, greenspaces, parks, near large buildings	Ivory Silk, Regent, Snow Dance, Chantilly Lace	Bacterial Blight, leaf blight, leaf spots, powdery mildew, frost injury, leaf miners, scale
Persian Ironwood	*Parrotia persica*	20-40	15-30	March-April	Yellow-	Streets, parks, planting strips, medians, greenspaces, under	Ruby Vase, Vanessa, Select,	None

					yellow-orange	utility lines (depends on cultivar), small spaces	Lamplighter	
American Hornbeam	*Carpinus caroliniana*	20-30	20-30	April (not showy)	Yellow to orange-red	Small areas, parks, greenspaces, under utility lines, near hardscapes	Firespire. Ball O'Fire, Pyramidalis	Leaf spot, canker, twig blight, heat stress
Sorrel tree	*Oxydendrum arboreum*	25-30	15-20	June to July	Yellow, red, purple mix	Under utility lines, walkways, paths, greenspaces, parks, small planting areas	Mt. Charm (not many on the market)	Leaf spots, twig blight
Amur Maackia	*Maackia amurensis*	20-30	20-30	June-July	None	Under utility lines, small areas, greenspaces, street tree, near hardscapes, containers, parks	Starburst, Summertime	Maybe cankers
Amur Maple	*Acer ginnala*	15-18	15-20	April-May	Yellow and red	Screen tree, near patio settings, small planting spaces, near buildings/hardscapes, under utility lines	Compactum, Flame, Red Rhapsody	Anthracnose, leaf spot, verticillium wilt
Trident Maple	*Acer buergerianum*	20-30	30-35	March	Yellow, orange, red	Under utility lines, small areas, street, near patio settings, near buildings and hardscapes	Streetwise	Anthracnose, leaf spot, verticillium wilt
Okame Cherry	*Prunus serrulata 'Okame'*	15-20	15-20	March	Reddish bronze	Under utility lines, parks, small spaces, near hardscapes, greenspaces near pathways	Cultivar itself from Japanese Flowering Cherries	Cankers, leaf spot, avoid high wind areas and pollution zones
Crabapple	*Malus spp.*	10-25	10-25	March-April	Cultivar dependent	Under utility lines, small greenspaces and parks, street planting, parking lots	Refer to Dirr for countless cultivar, some to look for are: Donald Wyman, Adirondack, Mary Potter, Snowdrift, Cardinal, royal raindrops	Powdery mildew, rust, frog-eye leafspot, scab, fireblight

*Note Selection of Species is not limited to this list, other factors may affect planting selection, if this is the case a different species may be used for the site.
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Gray Highlight=Sourced at Regional Nursery (De, NJ, Pa, MD)

Report

- Top 10% shows the best matches.
- All shows the entire ranked list.

Trees Recommended by i-Tree Species

List w/o height max.

This is a list of the top 10% of tree species based on the following functions.

Generated: 6/13/2019
Location: Dover, Delaware, United States of America
Hardiness: 7
Constraints:

- Minimum Height: 15 feet
- Maximum Height: None

Air Pollutant Removal (0-10 Importance)

- Overall: 0

Other Functions (0-10 Importance)

- Low VOC: 8
- Carbon Storage: 7
- Wind Reduction: 9
- Air Temperature Reduction: 8
- UV Radiation Reduction: 9
- Building Energy Reduction: 9
- Streamflow Reduction: 2
- Low Allergenicity: 4

S = Sensitive I = Intermediate S/I = Indeterminate

Species				Sensitivity			Pest Risk
Scientific Name	Common Name	Hardiness Zone	Invasive	Ozone (O3)	Nitrogen Dioxide (NO2)	Sulfur Dioxide (SO2)	Possible Pests
LIRIODENDRON TULIPIFERA	TULIP TREE	5 ~ 9		S			
SEQUOIA SEMPERVIRENS	COAST REDWOOD	7 ~ 10					
ULMUS AMERICANA	AMERICAN ELM	3 ~ 9			I/S		Asian Longhorned Beetle, Dutch Elm Disease, Winter Moth
MAGNOLIA GRANDIFLORA	SOUTHERN MAGNOLIA	7 ~ 10					
ULMUS GLABRA	WYCH ELM	4 ~ 7					Asian Longhorned Beetle, Dutch Elm Disease
TSUGA HETEROPHYLLA	WESTERN HEMLOCK	6 ~ 7			I		Southern Pine Beetle, Western Spruce Budworm
TSUGA MERTENSIANA	MOUNTAIN HEMLOCK	5 ~ 7					Fir Engraver, Southern Pine Beetle, Western Spruce Budworm
TSUGA CANADENSIS	EASTERN HEMLOCK	4 ~ 7		I			Hemlock Woolly Adelgid, Southern Pine Beetle
TILIA AMERICANA	AMERICAN BASSWOOD	4 ~ 9		I	I		Gypsy Moth, Winter Moth
LIRIODENDRON CHINENSE	CHINESE TULIP TREE	5 ~ 9**					
PLATANUS RACEMOSA	CALIFORNIA SYCAMORE	7 ~ 9					Polyphagous Shot Hole Borer
MAGNOLIA ACUMINATA	CUCUMBER TREE	4 ~ 8					
TSUGA X JEFFREYI	JEFFREY HEMLOCK	5 ~ 7**					Southern Pine Beetle
BETULA ALLEGHANIENSIS	YELLOW BIRCH	3 ~ 7		I	S		Asian Longhorned Beetle, Large Aspen Tortrix, Winter Moth
PLATANUS ORIENTALIS	ORIENTAL PLANETREE	7 ~ 9					
PLATANUS WRIGHTII	ARIZONA SYCAMORE	7 ~ 9					

Species				Sensitivity			Pest Risk
Scientific Name	Common Name	Hardiness Zone	Invasive	Ozone (O3)	Nitrogen Dioxide (NO2)	Sulfur Dioxide (SO2)	Possible Pests
PINUS STROBUS	EASTERN WHITE PINE	4 ~ 7		I/S	S		Pine Shoot Beetle, Sirex Wood Wasp, Southern Pine Beetle, White Pine Blister Rust
JUGLANS NIGRA	BLACK WALNUT	4 ~ 9					Thousand Canker Disease
QUERCUS PETRAEA	DURMAST OAK	5 ~ 8					Gypsy Moth, Oak Wilt
CELTIS LAEVIGATA	SUGARBERRY	5 ~ 10					
PINUS JEFFREYI	JEFFERY PINE	5 ~ 8		S			Jeffrey Pine Beetle, Pine Shoot Beetle, Sirex Wood Wasp, Southern Pine Beetle, Pine Black Stain Root Disease
AESCULUS FLAVA	YELLOW BUCKEYE	4 ~ 8		S			Asian Longhorned Beetle
ABIES CONCOLOR	WHITE FIR	4 ~ 7			I		Fir Engraver, Western Spruce Budworm, Balsam Woolly Adelgid
ABIES GRANDIS	GRAND FIR	6 ~ 8			I		Fir Engraver, Western Spruce Budworm, Balsam Woolly Adelgid
ABIES HOLOPHYLLA	MANCHURIAN FIR	3 ~ 7					Balsam Woolly Adelgid
ACER SACCHARINUM	SILVER MAPLE	3 ~ 9		I			Asian Longhorned Beetle, Winter Moth
ULMUS SEROTINA	SEPTEMBER ELM	5 ~ 8					Asian Longhorned Beetle, Dutch Elm Disease, Winter Moth
LARIX LEPTOLEPIS	JAPANESE LARCH	5 ~ 7*		I		S	Spruce Budworm
METASEQUOIA GLYPTOSTROBOIDES	DAWN REDWOOD	5 ~ 8*					
FAGUS SYLVATICA	EUROPEAN BEECH	4 ~ 7					Beech Bark Disease
FRAXINUS QUADRANGULATA	BLUE ASH	5 ~ 7					Emerald Ash Borer, Winter Moth
PINUS DENSIFLORA	JAPANESE RED PINE	4 ~ 7					Pine Shoot Beetle, Sirex Wood Wasp, Southern Pine Beetle
ULMUS CRASSIFOLIA	CEDAR ELM	7 ~ 9					Asian Longhorned Beetle, Dutch Elm Disease, Winter Moth
PICEA KORAIENSIS	KOREAN SPRUCE	4 ~ 7**					Southern Pine Beetle, Spruce Beetle
POPULUS DELTOIDES	EASTERN COTTONWOOD	3 ~ 9			I		Asian Longhorned Beetle, Winter Moth
ACER SACCHARUM	SUGAR MAPLE	5 ~ 8					Asian Longhorned Beetle, Winter Moth
PINUS TAEDA	LOBLOLLY PINE	7 ~ 9		S			Pine Shoot Beetle, Sirex Wood Wasp, Southern Pine Beetle
PRUNUS SEROTINA	BLACK CHERRY	4 ~ 9		S			Winter Moth
CORYLUS COLURNA	TURKISH HAZELNUT	5 ~ 7					
GINKGO BILOBA	GINKGO	4 ~ 8					
PINUS TABULAEFORMIS	CHINESE RED PINE	6 ~ 8					Pine Shoot Beetle, Sirex Wood Wasp, Southern Pine Beetle
AESCULUS GLABRA	OHIO BUCKEYE	4 ~ 7		I			Asian Longhorned Beetle
ULMUS PUMILA	SIBERIAN ELM	4 ~ 9					Asian Longhorned Beetle, Dutch Elm Disease, Winter Moth
PICEA BICOLOR	ALCOCK SPRUCE	4 ~ 7**					Southern Pine Beetle, Spruce Beetle
PINUS ECHINATA	SHORTLEAF PINE	6 ~ 8		I			Pine Shoot Beetle, Sirex Wood Wasp, Southern Pine Beetle

Report

- Top 10% shows the best matches.
- All shows the entire ranked list.

Trees Recommended by i-Tree Species

List w/ height maximum

This is a list of the top 10% of tree species based on the following functions.

Generated: 7/11/2019

Location: Dover, Delaware, United States of America

Hardiness: 7

Constraints:

- Minimum Height: 10 feet
- Maximum Height: 60 feet

Air Pollutant Removal (0-10 Importance)

- Carbon Monoxide: 10
- Nitrogen Dioxide: 5
- Sulfur Dioxide: 5
- Ozone: 8
- Particulate Matter: 9

Other Functions (0-10 Importance)

- Low VOC: 7
- Carbon Storage: 10
- Wind Reduction: 9
- Air Temperature Reduction: 8
- UV Radiation Reduction: 8
- Building Energy Reduction: 9
- Streamflow Reduction: 6
- Low Allergenicity: 5

S = Sensitive I = Intermediate S/I = Indeterminate

Species				Sensitivity			Pest Risk
Scientific Name	Common Name	Hardiness Zone	Invasive	Ozone (O3)	Nitrogen Dioxide (NO2)	Sulfur Dioxide (SO2)	Possible Pests
TSUGA X JEFFREYI	JEFFREY HEMLOCK	5 ~ 7**					Southern Pine Beetle
TSUGA CAROLINIANA	CAROLINA HEMLOCK	4 ~ 7					Hemlock Woolly Adelgid, Southern Pine Beetle
FRAXINUS UHDEI	EVERGREEN ASH	7 ~ 10					Emerald Ash Borer
AESCULUS GLABRA	OHIO BUCKEYE	4 ~ 7		I			Asian Longhorned Beetle
OSTRYA CARPINIFOLIA	HOP HORNBEAM	6 ~ 9					
ACER SACCHARUM	SUGAR MAPLE	5 ~ 8					Asian Longhorned Beetle, Winter Moth
FAGUS SYLVATICA	EUROPEAN BEECH	4 ~ 7					Beech Bark Disease
LARIX LEPTOLEPIS	JAPANESE LARCH	5 ~ 7*		I		S	Spruce Budworm
MORUS RUBRA	RED MULBERRY	5 ~ 9					
JUGLANS CINEREA	BUTTERNUT	4 ~ 7					Butternut Canker
BETULA LENTA	BLACK BIRCH	3 ~ 7			S		Asian Longhorned Beetle, Large Aspen Tortrix, Winter Moth
PICEA KORAIENSIS	KOREAN SPRUCE	4 ~ 7**					Southern Pine Beetle, Spruce Beetle
JUGLANS AILANTHIFOLIA	JAPANESE WALNUT	5 ~ 9**					
JUGLANS X BIXBYI	BIXBY WALNUT	5 ~ 9**					
JUGLANS X INTERMEDIA	INTERMEDIATE WALNUT	5 ~ 9**					
JUGLANS JAMAICENSIS	WEST INDIAN WALNUT	5 ~ 9**					
JUGLANS MICROCARPA	LITTLE WALNUT	5 ~ 9**					
JUGLANS X QUADRANGULATA	NCN - WALNUT	5 ~ 9**					
TILIA EUCHLORA	CRIMEAN LINDEN	4 ~ 7*		I			Gypsy Moth

Species				Sensitivity			Pest Risk
Scientific Name	Common Name	Hardiness Zone	Invasive	Ozone (O3)	Nitrogen Dioxide (NO2)	Sulfur Dioxide (SO2)	Possible Pests
TILIA PETIOLARIS	PENDENT SILVER LINDEN	6 ~ 7*					Gypsy Moth
TILIA X VULGARIS	COMMON LINDEN	4 ~ 7*					Gypsy Moth
PICEA BICOLOR	ALCOCK SPRUCE	4 ~ 7**					Southern Pine Beetle, Spruce Beetle
ULMUS PARVIFOLIA	CHINESE ELM	6 ~ 10		I	S		Asian Longhorned Beetle, Gypsy Moth
PICEA ABIES X ASPERATA	NORWAY X CHINESE SPRUCE	2 ~ 7					Southern Pine Beetle, Spruce Beetle
NYSSA BIFLORA	SWAMP TUPELO	6 ~ 9**					
NYSSA URSINA	BEAR TUPELO	6 ~ 9**					
MAGNOLIA MACROPHYLLA	BIGLEAF MAGNOLIA	5 ~ 8					
PICEA MONTIGENA	MONTIGENA SPRUCE	4 ~ 7**					Southern Pine Beetle, Spruce Beetle
CUPRESSUS MACROCARPA	MONTEREY CYPRESS	7 ~ 9					
PICEA KOYAMAI	YATSUGATAKE-TOHI	4 ~ 7**					Southern Pine Beetle, Spruce Beetle
JUGLANS REGIA	ENGLISH WALNUT	5 ~ 9		S			
FAGUS CRENATA	JAPANESE BEECH	5 ~ 7**					
PICEA X LUTZII	LUTZ'S SPRUCE	4 ~ 7**					Northern Spruce Engraver, Southern Pine Beetle, Spruce Beetle
PICEA GLEHNII	SAGHOLIA SPRUCE	4 ~ 7					Southern Pine Beetle, Spruce Beetle
AESCULUS X WORLITZENSIS	WORLITZ'S CHESTNUT	5 ~ 8**					Asian Longhorned Beetle
AESCULUS X BUSHII	BUSH'S CHESNUT	5 ~ 8**					Asian Longhorned Beetle
AESCULUS CHINENSIS	CHINESE HORSE CHESTNUT	5 ~ 8**					Asian Longhorned Beetle
AESCULUS X HYBRIDA	HYBRID CHESNUT	5 ~ 8*					Asian Longhorned Beetle
AESCULUS X MARYLANDICA	MARYLAND CHESNUT	5 ~ 8**					Asian Longhorned Beetle
AESCULUS X MUTABILIS	APRICOT-FLOWERED DWARF HORSE CHESTNUT	5 ~ 8**					Asian Longhorned Beetle
AESCULUS X NEGLECTA	SPRING YELLOW HORSE CHESTNUT	5 ~ 8**					Asian Longhorned Beetle
AESCULUS PARVIFLORA	BOTTLEBRUSH BUCKEYE	5 ~ 8*					Asian Longhorned Beetle
ZELKOVA SCHNEIDERIANA	SCHNEIDER ZELKOVA	6 ~ 8					
PINUS ECHINATA	SHORTLEAF PINE	6 ~ 8		I			Pine Shoot Beetle, Sirex Wood Wasp, Southern Pine Beetle
OSTRYA KNOWLTONII	KNOWLTON HOPHORNBEAM	5 ~ 9**					
CELTIS IGUANAEA	IGUANA HACKBERRY	6 ~ 9**					
CELTIS LINDHEIMERI	LINDHEIMER'S HACKBERRY	6 ~ 9**					
CELTIS TETRANDRA	NCN - HACKBERRY	6 ~ 9**					

Species				Sensitivity			Pest Risk
Scientific Name	Common Name	Hardiness Zone	Invasive	Ozone (O3)	Nitrogen Dioxide (NO2)	Sulfur Dioxide (SO2)	Possible Pests
CELTIS TRINERVIA	ALMEX	6 ~ 9**					
CARPINUS BETULUS	EUROPEAN HORNBEAM	5 ~ 7					
PINUS SYLVESTRIS	SCOTCH PINE	3 ~ 7		I			Mountain Pine Beetle, Pine Shoot Beetle, Sirex Wood Wasp, Southern Pine Beetle, Western Spruce Budworm
ALNUS RUBRA	RED ALDER	7 ~ 8		S			Gypsy Moth, Large Aspen Tortrix
NYSSA SYLVATICA	BLACK TUPELO	5 ~ 9					
SASSAFRAS ALBIDUM	SASSAFRAS	4 ~ 8		S			Laurel Wilt
PTEROCARYA STENOPTERA	CHINESE WINGNUT	6 ~ 9					
PINUS TABULAEFORMIS	CHINESE RED PINE	6 ~ 8					Pine Shoot Beetle, Sirex Wood Wasp, Southern Pine Beetle
PICEA PUNGENS	BLUE SPRUCE	3 ~ 7				I	Southern Pine Beetle, Spruce Beetle, Western Spruce Budworm
FRAXINUS DIPETALA	CALIFORNIA ASH	7 ~ 10*					Emerald Ash Borer
BETULA BOREALIS	NORTHERN BIRCH	4 ~ 7**			S		Asian Longhorned Beetle, Large Aspen Tortrix
BETULA X CAERULEA	BLUE BIRCH	4 ~ 7**			S		Asian Longhorned Beetle, Large Aspen Tortrix
BETULA X DUGLEANA	DUGLE'S BIRCH	4 ~ 7**			S		Asian Longhorned Beetle, Large Aspen Tortrix
BETULA X EASTWOODIAE	EASTWOOD'S BIRCH	4 ~ 7**			S		Asian Longhorned Beetle, Large Aspen Tortrix
BETULA X HORNEI	HORNE'S BIRCH	4 ~ 7**			S		Asian Longhorned Beetle, Large Aspen Tortrix
BETULA X JACKII	JACK'S BIRCH	4 ~ 7**			S		Asian Longhorned Beetle, Large Aspen Tortrix
BETULA NEOALASKANA	RESIN BIRCH	4 ~ 7**			S		Asian Longhorned Beetle, Large Aspen Tortrix
BETULA X SANDBERGII	SANDBERG'S BIRCH	4 ~ 7**			S		Asian Longhorned Beetle, Large Aspen Tortrix
BETULA X UTAHENSIS	NORTHWESTERN PAPER BIRCH	4 ~ 7**			S		Asian Longhorned Beetle, Gypsy Moth, Large Aspen Tortrix, Winter Moth
BETULA X WINTERI	WINTER'S BIRCH	4 ~ 7**			S		Asian Longhorned Beetle, Large Aspen Tortrix
BETULA PUBESCENS	CUT LEAVED BIRCH	4 ~ 7**			S		Asian Longhorned Beetle, Large Aspen Tortrix
MAGNOLIA TRIPETALA	UMBRELLA MAGNOLIA	5 ~ 8					
PINUS DENSIFLORA	JAPANESE RED PINE	4 ~ 7					Pine Shoot Beetle, Sirex Wood Wasp, Southern Pine Beetle
ULMUS RUBRA	SLIPPERY ELM	4 ~ 9*					Asian Longhorned Beetle, Dutch Elm Disease, Winter Moth
ULMUS PROCERA	ENGLISH ELM	3 ~ 9*					Asian Longhorned Beetle, Dutch Elm Disease
ULMUS THOMASII	ROCK ELM	3 ~ 7*					Asian Longhorned Beetle, Dutch Elm Disease, Winter Moth

Species				Sensitivity			Pest Risk
Scientific Name	Common Name	Hardiness Zone	Invasive	Ozone (O3)	Nitrogen Dioxide (NO2)	Sulfur Dioxide (SO2)	Possible Pests
ULMUS X NOTHA	NOTHA ELM	5 ~ 9**					Asian Longhorned Beetle, Dutch Elm Disease
ULMUS WILSONIANA	WILSON ELM	5 ~ 8*					Asian Longhorned Beetle, Dutch Elm Disease

Hardiness zone derived from Horticopia database based on USDA Hardiness zones. For hardiness zones with decimal (e.g., 4.5) values were rounded down for maximum hardiness (e.g., 4) and up for minimum hardiness zone (e.g., 5)

* Some uncertainty to hardiness zone - hardiness zone estimates derived from Dirr (M.A. Dirr, 1975, Manual of Woody Landscape Plants. Stipes Publ. Co. Champaign IL. 1007 p.) and Sunset (1985, New Western Garden Book, Lane Publ. Co. Menlo Park, CA. 512 p.). As hardiness estimates or maps did not always exactly match USDA Hardiness zone ranges, some extrapolations were made to the closest hardiness zone.

** Moderate uncertainty to hardiness zone - hardiness zone estimate based on genera average of minimum and maximum hardiness zone based on Horticopia database and information from Dirr (1997) and Sunset (1985). Average value was rounded to nearest hardiness zone class (1 -11).

*** High uncertainty to hardiness zone - hardiness zone estimate based on family average of minimum and maximum hardiness zone based on Horticopia database and information from Dirr (1997) and Sunset (1985). Average value was rounded to nearest hardiness zone class (1 -11).

Sensitivity - "S" indicates sensitive to pollutant; "I" indicates intermediate rating between sensitive and tolerant to pollutant; and "S/I" indicates a mix of sensitive and intermediate ratings in the literature.

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www.caseytrees.org
www.esf.edu
www.northeasternforests.org

Dover, DE

Urban Tree Canopy

Created: 2/9/2018 by J Kroon, DE Dept of Agriculture
Data Credits: University of Vermont Spatial Analysis Lab *(Tree Canopy Data)*, State of Delaware

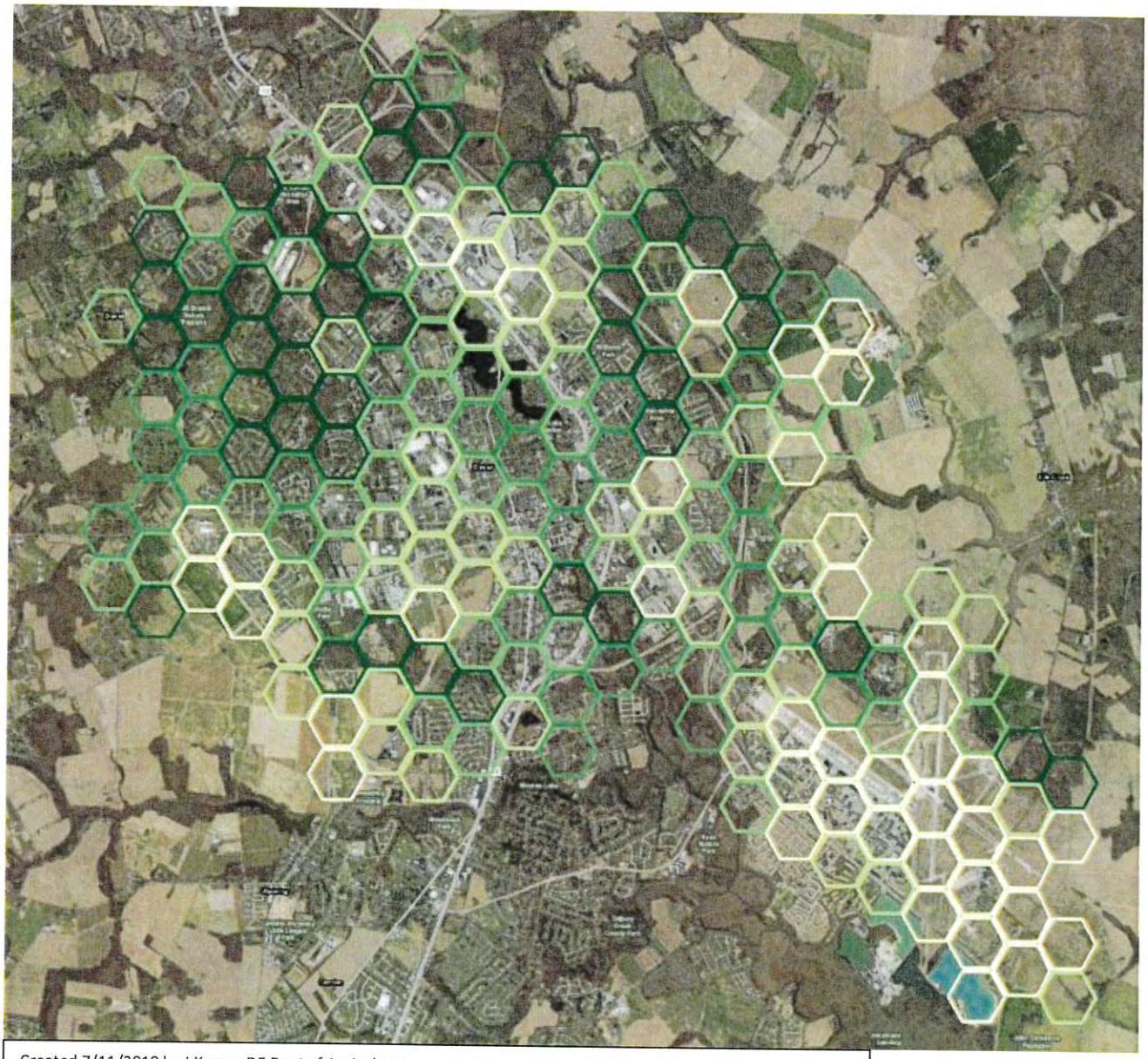
DELAWARE FOREST SERVICE
DEPARTMENT OF AGRICULTURE

2014 Urban Tree Canopy: 25.7% *(3844.6 Acres)*

Total Incorporated Land (excluding open water): 14937.8 Acres

0 0.75 1.5 3 Miles

Dover, DE



Created 7/11/2019 by J Kroon. DE Dept of Agriculture
Data Credits: University of Vermont Spatial Analysis Lab (Tree Canopy Data), State of Delaware

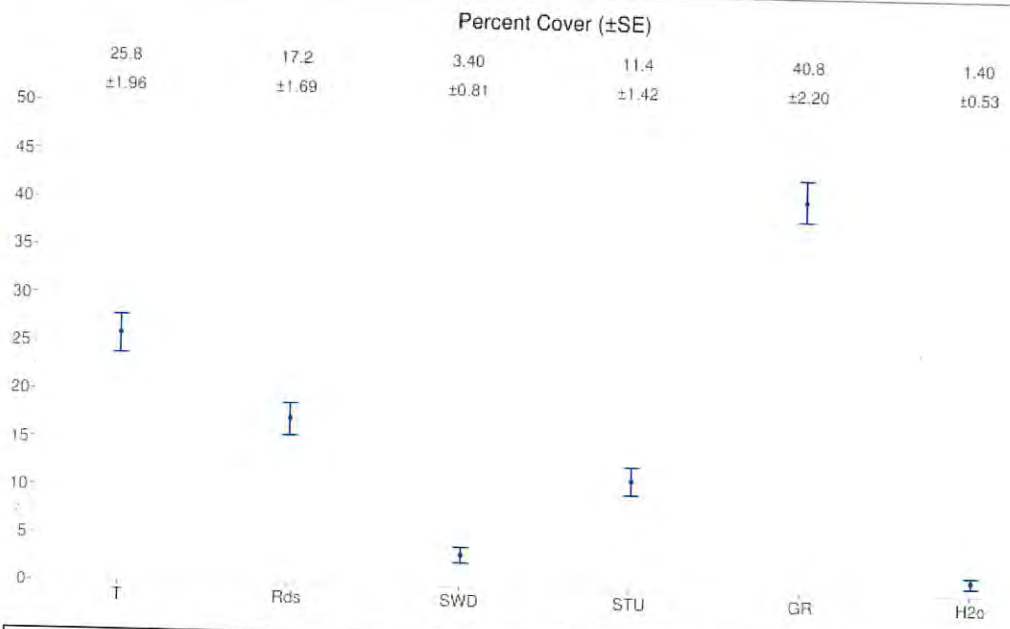
2019 Urban Tree Canopy Assessment

DELAWARE Urban and Community Forestry

i-Tree Canopy v6.1

Cover Assessment and Tree Benefits Report

Estimated using random sampling statistics on 6/13/19



Cover Class	Description	Abbr.	Points	% Cover
Tree	Tree, non-shrub	T	129	25.8 ±1.96
Roads		Rds	86	17.2 ±1.69
Sidewalk		SWD	17	3.40 ±0.81
Structures		STU	57	11.4 ±1.42
Grass		GR	204	40.8 ±2.20
Water		H2o	7	1.40 ±0.53

i-Tree Landscape

Executive Summary

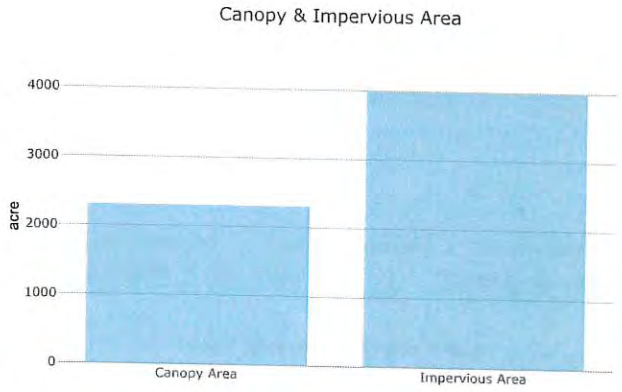
City Dover limits

Date: 06/13/2019

landscape.itreetools.org

Version: 4.0.1

Location Information



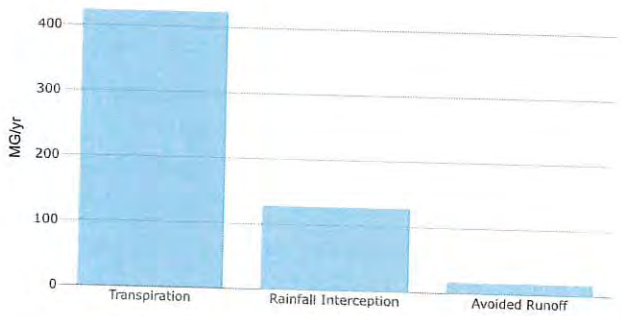
Canopy & Impervious (2011 NLCD)

	Area		Canopy		Impervious		Plantable Space	
	acre	%	acre	%	acre	%	acre	%
Selection Total:	15,002.3	100.00	2,302.8	15.54	3,989.4	26.93	8,680.9	58.60

Tree Benefits

	$/yr	lb/yr (pounds per year)	Health Incidence	Emergency Room Visits	Hospital Admissions	Acute Respiratory Symptoms	Asthma Exacerbation	Mortality	School Loss Days	Hospital Admissions, Respiratory	Hospital Admissions, Cardiovascular	Acute Myocardial Infarction	Chronic Bronchitis	Acute Bronchitis
Selection Total:	372,139	180,417.3	58	0.03	0.09	27.97	19.30	0.03	9.81	0.00	0.00	0.00	0.00	0.01

Hydrology Quantity

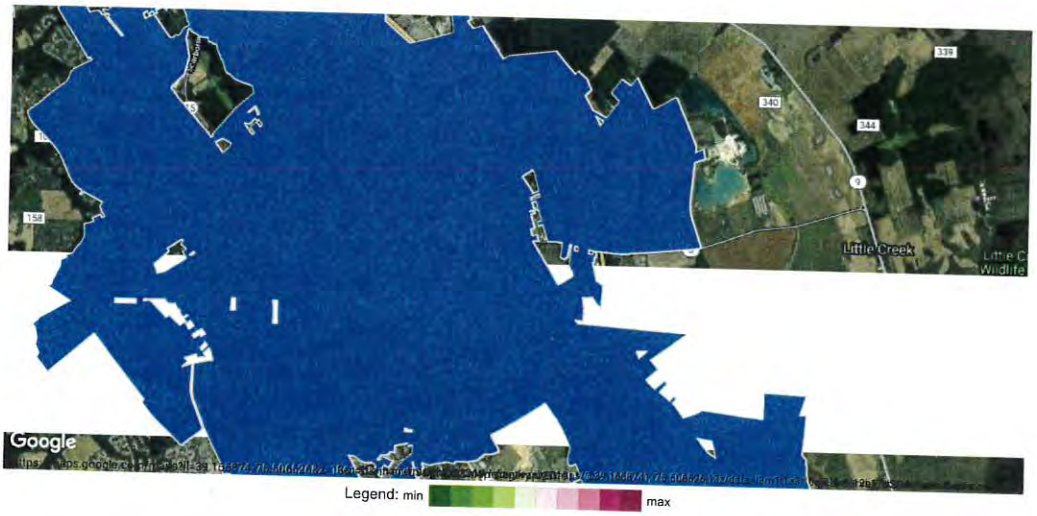


Hydrology Quantity (2011 NLCD)

	Transpiration (MG (Millions of Gallons)/yr (year))	Rainfall Interception (MG (Millions of Gallons)/yr (year))	Avoided Runoff (MG (Millions of Gallons)/yr (year))	Avoided Runoff ($/yr (year))
Selection Total:	423.5	128.5	17.0	152,099

Prioritization

Population (2011 NLCD)



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i-Tree Landscape

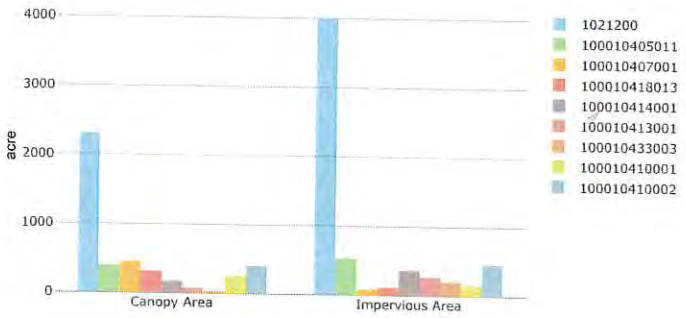
Executive Summary

U.S. Census block Data & Dover as whole Comparison

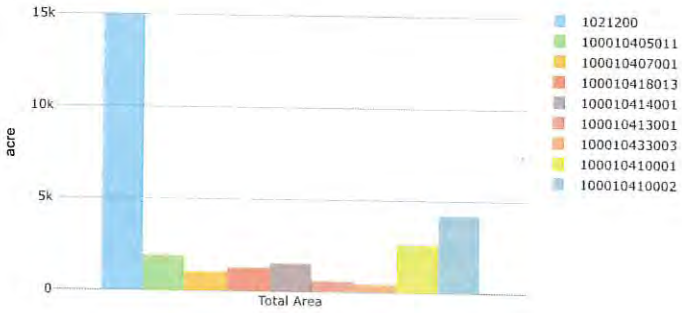
Date: 06/13/2019
landscape.itreetools.org
Version: 4.0.1

Location Information

Canopy & Impervious Area



Total Area

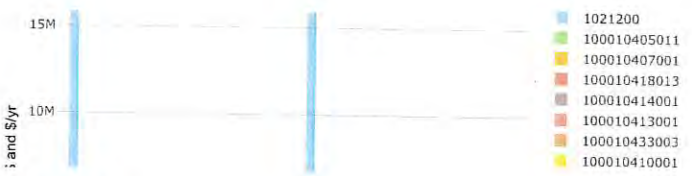


Canopy & Impervious (2011 NLCD)

	Area		Canopy		Impervious		Plantable Space	
	acre	%	acre	%	acre	%	acre	%
Selection Total:	28,447.4	100.00	4,373.6	15.48	6,141.8	21.74	17,903.6	63.37

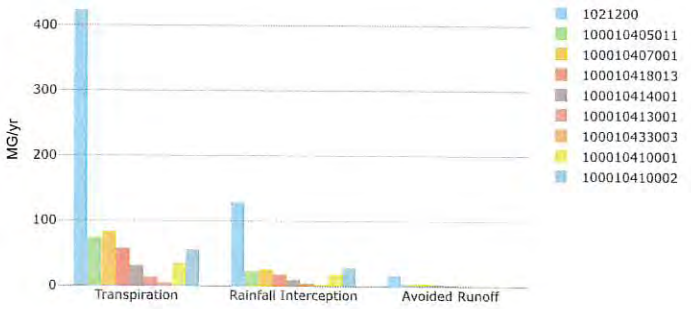
Tree Benefits

Monetary Benefits



	$/yr	lb/yr (pounds per year)	Health Incidence	Emergency Room Visits	Hospital Admissions	Acute Respiratory Symptoms	Asthma Exacerbation	Mortality	School Loss Days	Hospital Admissions, Respiratory	Hospital Admissions, Cardiovascular	Acute Myocardial Infarction	Chronic Bronchitis	Acute Bronchitis
Selection Total:	609,263	350,440.2	96	0.03	0.15	45.92	31.72	0.03	16.11	0.00	0.00	0.00	0.00	0.01

Hydrology Quantity



Hydrology Quantity (2011 NLCD)

	Transpiration (MG (Millions of Gallons)/yr (year))	Rainfall Interception (MG (Millions of Gallons)/yr (year))	Avoided Runoff (MG (Millions of Gallons)/yr (year))	Avoided Runoff ($/yr (year))
Selection Total:	776.7	253.4	27.9	249,546

Prioritization

Population (2011 NLCD)

www.fs.fed.us
www.davey.com
www.arborday.org
www.urban-forestry.com
www.isa-arbor.com
www.caseytrees.org
www.esf.edu
www.northeasternforests.org

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Clara 1

Total Projected Benefits (2019-2044) - Over the next 25 years, based on forecasted tree growth, i-Tree Design projects total benefits worth $10,303:

- $6,297 of stormwater runoff savings by intercepting 636,041 gallons of rainfall
- $221 of air quality improvement savings by absorbing and intercepting pollutants such as ozone, sulfur dioxide, nitrogen dioxide, and particulate matter; reducing energy production needs; and lowering air temperature
- $1,443 of savings by reducing 62,044 lbs. of atmospheric carbon dioxide through CO_2 sequestration and decreased energy production needs and emissions
- $504 of summer energy savings by direct shading and air cooling effect through evapotranspiration
- $1,838 of winter energy savings by slowing down winds and reducing home heat loss

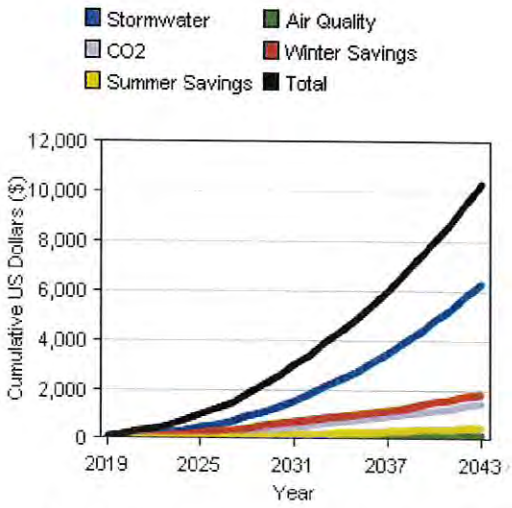

Figure 1. Tree benefit forecast for 25 years

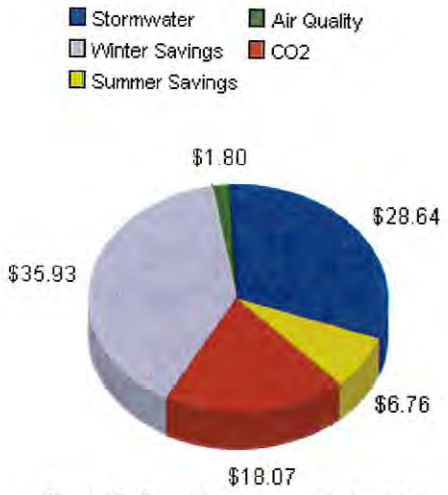

Figure 2. Annual tree benefits for 2019

Current Year - For 2019, i-Tree Design estimates annual tree benefits of $91.20:

- $28.64 of stormwater runoff savings by intercepting 2,898 gallons of rainfall
- $1.80 of air quality improvement savings
- $18.07 of carbon dioxide reduction savings
- $6.76 of summer energy savings
- $35.93 of winter energy savings

Future Year - In the year 2044, based on forecasted tree growth, i-Tree Design projects annual benefits of $807.63:

- $554.16 of stormwater runoff savings by intercepting 55,973 gallons of rainfall
- $16.26 of air quality improvement savings
- $90.95 of carbon dioxide reduction savings
- $31.97 of summer energy savings
- $114.29 of winter energy savings

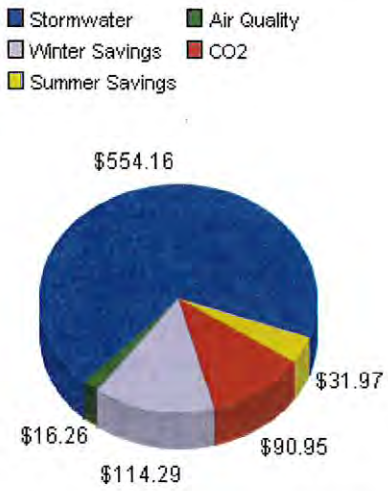

Figure 3. Annual tree benefits for the year 2044

Figure 4. Total benefits to date

Total Benefits to Date - Over the life of the tree(s) so far, i-Tree Design calculates total benefits worth $42:

- $33 of stormwater runoff savings by intercepting 3,338 gallons of rainfall
- $2 of air quality improvement savings
- $8 of carbon dioxide reduction savings
- $1 of summer energy savings
- $-1 of winter energy savings

Individual Tree Benefits							
Tree	DBH (in)	Condition	Location to Structure	Benefits			
				Current Year (2019)	Future Year (2044)	Projected Total (2019-2044)	Total to Date
1. Hackberry	2	Excellent	1: Northeast (254 ft) 3: East (629 ft)	$1.16	$55.28	$539	$1
2. Hackberry	2	Excellent	1: Northwest (95 ft) 3: East (335 ft)	$1.16	$55.28	$539	$1
3. Littleleaf linden	2	Excellent	1: North (93 ft) 3: East (382 ft)	$1.72	$35.39	$393	$1
4. Littleleaf linden	2	Excellent	1: North (98 ft) 3: East (430 ft)	$1.72	$35.39	$393	$1
5. Littleleaf linden	2	Excellent	1: Northeast (227 ft) 3: East (600 ft)	$1.72	$35.39	$393	$1
6. Littleleaf linden	2	Excellent	1: Northeast (196 ft) 3: East (565 ft)	$1.72	$35.39	$393	$1
7. American hornbeam	2	Excellent	1: Northeast (162 ft) 3: East (527 ft)	$1.67	$12.32	$182	$3
8. American hornbeam	2	Excellent	1: Northeast (132 ft) 3: East (489 ft)	$1.67	$12.32	$182	$3
9. Eastern hophornbeam	2	Excellent	1: Northwest (36 ft) 3: East (352 ft)	$13.45	$43.98	$799	$4
10. Eastern hophornbeam	2	Excellent	1: Northeast (234 ft) 3: East (633 ft)	$1.64	$12.88	$192	$3
11. Red maple	2	Excellent	1: Northeast (198 ft) 3: East (597 ft)	$1.25	$55.60	$650	$1

12. Red maple	2	Excellent	1: North (33 ft) 3: East (391 ft)	$12.32	$116.99	$1,769	$1
13. Eastern hophornbeam	2	Excellent	1: Northeast (36 ft) 3: East (428 ft)	$12.75	$41.77	$753	$3
14. Eastern hophornbeam	2	Excellent	1: Northeast (160 ft) 3: East (558 ft)	$1.64	$12.88	$192	$3
15. Hawthorn	2	Excellent	1: Northeast (129 ft) 3: East (527 ft)	$1.61	$9.42	$125	$3
16. Hawthorn	2	Excellent	1: Northeast (74 ft) 3: East (470 ft)	$1.61	$9.42	$125	$3
17. Japanese zelkova	2	Excellent	1: Northeast (101 ft) 3: East (500 ft)	$1.03	$15.41	$156	$2
18. Black tupelo	2	Excellent	2: East (264 ft) 3: Southeast (120 ft)	$1.81	$36.84	$410	$1
19. Black tupelo	2	Excellent	2: South (115 ft) 3: Southwest (303 ft)	$1.81	$36.84	$410	$1
20. Black tupelo	2	Excellent	2: Southeast (134 ft) 3: Southwest (143 ft)	$1.81	$36.84	$410	$1
21. Goldenrain tree	2	Excellent	2: East (192 ft) 3: South (116 ft)	$1.66	$7.74	$118	$3
22. Goldenrain tree	2	Excellent	2: Southeast (111 ft) 3: Southwest (210 ft)	$1.66	$7.74	$118	$3
23. Katsura tree	2	Excellent	2: East (179 ft) 3: South (51 ft)	$12.16	$33.73	$398	$1

24. Katsura tree	2	Excellent	2: Southeast (41 ft) 3: Southwest (157 ft)	$10.46	$52.80	$661	$-1
Total				**$91.20**	**$807.63**	**$10,303**	**$42**

Note: "Location to Structure" lists location information for two closest structures, with structure ID numbers shown.
DBH: "diameter at breast height" is the standard measurement of tree trunk width at 4.5 feet (1.5 meters) above the ground.

clara 2

Total Projected Benefits (2019-2044) - Over the next 25 years, based on forecasted tree growth, i-Tree Design projects total benefits worth $10,995:

- $7,557 of stormwater runoff savings by intercepting 763,376 gallons of rainfall
- $213 of air quality improvement savings by absorbing and intercepting pollutants such as ozone, sulfur dioxide, nitrogen dioxide, and particulate matter; reducing energy production needs; and lowering air temperature
- $2,225 of savings by reducing 95,671 lbs. of atmospheric carbon dioxide through CO_2 sequestration and decreased energy production needs and emissions
- $159 of summer energy savings by direct shading and air cooling effect through evapotranspiration
- $841 of winter energy savings by slowing down winds and reducing home heat loss

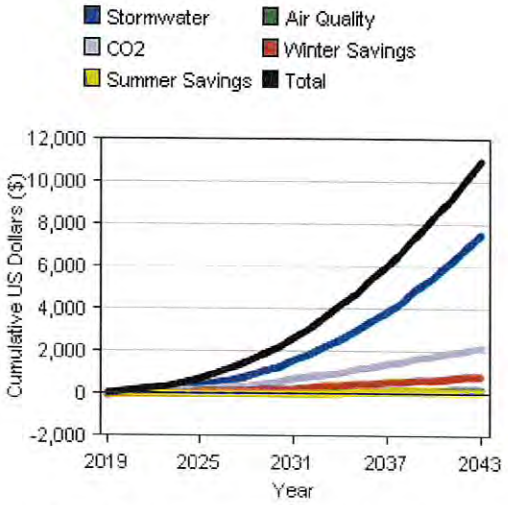

Figure 1. Tree benefit forecast for 25 years

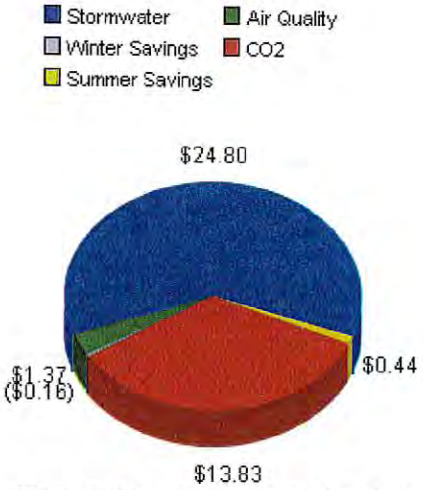

Figure 2. Annual tree benefits for 2019

Current Year - For 2019, i-Tree Design estimates annual tree benefits of $40.28:

- $24.80 of stormwater runoff savings by intercepting 2,505 gallons of rainfall
- $1.37 of air quality improvement savings
- $13.83 of carbon dioxide reduction savings
- $0.44 of summer energy savings
- $-0.16 of winter energy savings

Future Year - In the year 2044, based on forecasted tree growth, i-Tree Design projects annual benefits of $961.57:

- $737.66 of stormwater runoff savings by intercepting 74,505 gallons of rainfall
- $17.30 of air quality improvement savings
- $148.75 of carbon dioxide reduction savings
- $8.94 of summer energy savings
- $48.92 of winter energy savings

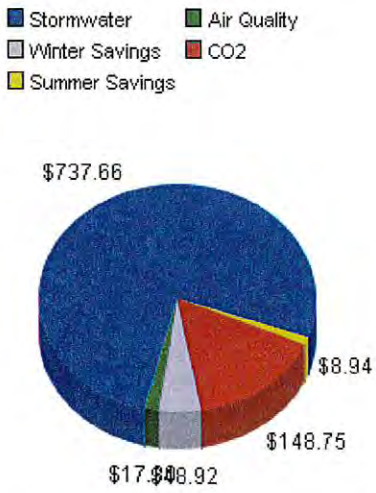

Figure 3. Annual tree benefits for the year 2044

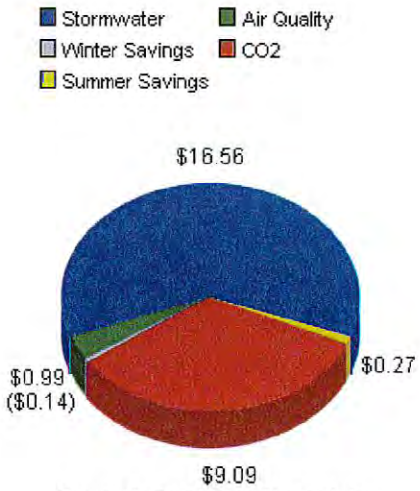

Figure 4. Total benefits to date

Total Benefits to Date - Over the life of the tree(s) so far, i-Tree Design calculates total benefits worth $27:

- $17 of stormwater runoff savings by intercepting 1,669 gallons of rainfall
- $1 of air quality improvement savings
- $9 of carbon dioxide reduction savings
- $0 of summer energy savings
- $-0 of winter energy savings

Individual Tree Benefits							
Tree	DBH (in)	Condition	Location to Structure	Benefits			
				Current Year (2019)	Future Year (2044)	Projected Total (2019-2044)	Total to Date
1. Eastern redbud	2	Excellent	1: Northeast (235 ft) 3: East (634 ft)	$1.75	$2.23	$54	$1
2. Eastern redbud	2	Excellent	1: Northeast (252 ft) 3: East (628 ft)	$1.75	$2.23	$54	$1
3. Eastern redbud	2	Excellent	1: Northwest (95 ft) 3: East (335 ft)	$1.75	$2.23	$54	$1
4. Eastern redbud	2	Excellent	1: Northwest (31 ft) 3: East (347 ft)	$2.30	$14.39	$334	$2
5. Eastern redbud	2	Excellent	1: Northeast (164 ft) 3: East (529 ft)	$1.75	$2.23	$54	$1
6. Eastern redbud	2	Excellent	1: Northeast (137 ft) 3: East (493 ft)	$1.75	$2.23	$54	$1
7. Eastern redbud	2	Excellent	1: Northeast (107 ft) 3: East (506 ft)	$1.75	$2.23	$54	$1
8. Freeman maple	2	Excellent	1: Northeast (203 ft) 3: East (601 ft)	$1.67	$51.39	$594	$1
9. Freeman maple	2	Excellent	1: Northeast (152 ft) 3: East (549 ft)	$1.67	$51.39	$594	$1
10. Freeman maple	2	Excellent	1: Northeast (66 ft) 3: East (462 ft)	$1.67	$51.39	$594	$1
11. Freeman maple	2	Excellent	1: North (33 ft) 3: East (400 ft)	$1.67	$112.78	$1,586	$1

12. Freeman maple	2	Excellent	1: North (92 ft) 3: East (375 ft)	$1.67	$51.39	$594	$1
13. Freeman maple	2	Excellent	1: North (94 ft) 3: East (415 ft)	$1.67	$51.39	$594	$1
14. Freeman maple	2	Excellent	1: North (110 ft) 3: East (453 ft)	$1.67	$51.39	$594	$1
15. Freeman maple	2	Excellent	1: Northeast (191 ft) 3: East (559 ft)	$1.67	$51.39	$594	$1
16. Freeman maple	2	Excellent	1: Northeast (219 ft) 3: East (590 ft)	$1.67	$51.39	$594	$1
17. Japanese tree lilac	2	Excellent	2: East (175 ft) 3: South (56 ft)	$1.66	$12.42	$163	$1
18. Japanese tree lilac	2	Excellent	2: East (77 ft) 3: Southwest (96 ft)	$1.73	$12.56	$166	$1
19. Japanese tree lilac	2	Excellent	2: South (47 ft) 3: Southwest (225 ft)	$1.66	$12.42	$163	$1
20. Swamp white oak	2	Excellent	2: East (227 ft) 3: South (123 ft)	$1.48	$74.50	$702	$1
21. Swamp white oak	2	Excellent	2: Southeast (162 ft) 3: South (123 ft)	$1.48	$74.50	$702	$1
22. Swamp white oak	2	Excellent	2: Southeast (123 ft) 3: Southwest (153 ft)	$1.48	$74.50	$702	$1
23. Swamp white oak	2	Excellent	2: Southeast (118 ft) 3: Southwest (204 ft)	$1.48	$74.50	$702	$1
24. Swamp white oak	2	Excellent	2: South (111 ft) 3: Southwest (297 ft)	$1.48	$74.50	$702	$1

Total	**$40.28**	**$961.57**	**$10,995**	**$27**

Note: "Location to Structure" lists location information for two closest structures, with structure ID numbers shown.
DBH: "diameter at breast height" is the standard measurement of tree trunk width at 4.5 feet (1.5 meters) above the ground.

Clara 3

Total Projected Benefits (2019-2044) - Over the next 25 years, based on forecasted tree growth, i-Tree Design projects total benefits worth $3,147:

- $2,710 of stormwater runoff savings by intercepting 273,775 gallons of rainfall
- $97 of air quality improvement savings by absorbing and intercepting pollutants such as ozone, sulfur dioxide, nitrogen dioxide, and particulate matter; reducing energy production needs; and lowering air temperature
- $340 of savings by reducing 14,595 lbs. of atmospheric carbon dioxide through CO_2 sequestration and decreased energy production needs and emissions
- $0 of summer energy savings by direct shading and air cooling effect through evapotranspiration
- $0 of winter energy savings by slowing down winds and reducing home heat loss

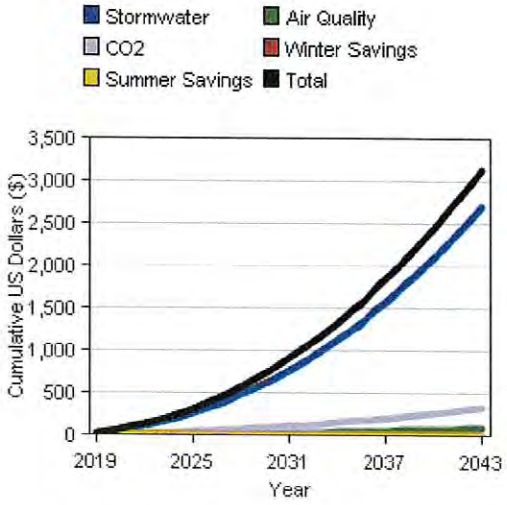

Figure 1. Tree benefit forecast for 25 years

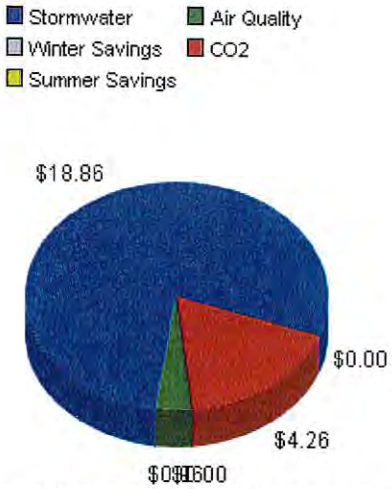

Figure 2. Annual tree benefits for 2019

Current Year - For 2019, i-Tree Design estimates annual tree benefits of $24.08:

- $18.86 of stormwater runoff savings by intercepting 1,905 gallons of rainfall
- $0.96 of air quality improvement savings
- $4.26 of carbon dioxide reduction savings
- $0.00 of summer energy savings
- $0.00 of winter energy savings

Future Year - In the year 2044, based on forecasted tree growth, i-Tree Design projects annual benefits of $252.35:

- $221.23 of stormwater runoff savings by intercepting 22,344 gallons of rainfall
- $6.73 of air quality improvement savings
- $24.39 of carbon dioxide reduction savings
- $0.00 of summer energy savings
- $0.00 of winter energy savings

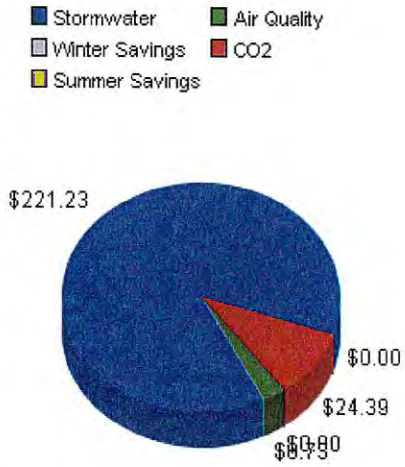

Figure 3. Annual tree benefits for the year 2044

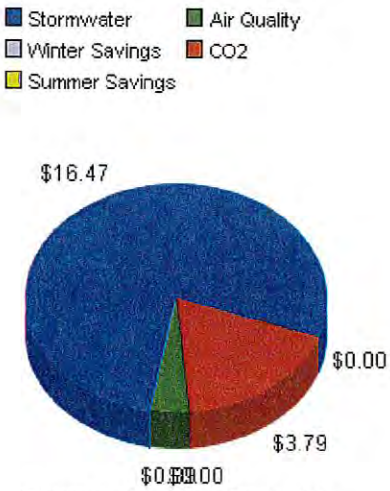

Figure 4. Total benefits to date

Total Benefits to Date - Over the life of the tree(s) so far, i-Tree Design calculates total benefits worth $21:

- $16 of stormwater runoff savings by intercepting 1,660 gallons of rainfall
- $1 of air quality improvement savings
- $4 of carbon dioxide reduction savings
- $0 of summer energy savings
- $0 of winter energy savings

Individual Tree Benefits							
Tree	DBH (in)	Condition	Location to Structure	Benefits			
				Current Year (2019)	Future Year (2044)	Projected Total (2019-2044)	Total to Date
1. Kwanzan cherry	2	Excellent	1: Northeast (165 ft) 3: East (530 ft)	$1.80	$3.59	$82	$1
2. Kwanzan cherry	2	Excellent	1: Northeast (126 ft) 3: East (480 ft)	$1.80	$3.59	$82	$1
3. Littleleaf linden	2	Excellent	1: North (105 ft) 3: East (444 ft)	$1.72	$35.39	$393	$1
4. Littleleaf linden	2	Excellent	1: North (94 ft) 3: East (408 ft)	$1.72	$35.39	$393	$1
5. Littleleaf linden	2	Excellent	1: North (95 ft) 3: East (373 ft)	$1.72	$35.39	$393	$1
6. Littleleaf linden	2	Excellent	1: Northeast (189 ft) 3: East (559 ft)	$1.72	$35.39	$393	$1
7. Littleleaf linden	2	Excellent	1: Northeast (217 ft) 3: East (589 ft)	$1.72	$35.39	$393	$1
8. Japanese tree lilac	2	Excellent	1: Northwest (93 ft) 3: East (334 ft)	$1.73	$12.56	$166	$1
9. Japanese tree lilac	2	Excellent	1: Northeast (250 ft) 3: East (625 ft)	$1.73	$12.56	$166	$1
10. Eastern hophornbeam	2	Excellent	2: East (227 ft) 3: South (124 ft)	$1.64	$12.88	$192	$3
11. Eastern hophornbeam	2	Excellent	2: South (116 ft) 3: Southwest (306 ft)	$1.64	$12.88	$192	$3

12. Eastern hophornbeam	2	Excellent	2: Southeast (118 ft) 3: Southwest (168 ft)	$1.64	$12.88	$192	$3
13. Eastern redbud	2	Excellent	2: Southeast (155 ft) 3: South (121 ft)	$1.75	$2.23	$54	$1
14. Eastern redbud	2	Excellent	2: South (115 ft) 3: Southwest (226 ft)	$1.75	$2.23	$54	$1
Total				**$24.08**	**$252.35**	**$3,147**	**$21**

Note: "Location to Structure" lists location information for two closest structures, with structure ID numbers shown.
DBH: "diameter at breast height" is the standard measurement of tree trunk width at 4.5 feet (1.5 meters) above the ground.

Pear 1

Total Projected Benefits (2019-2044) - Over the next 25 years, based on forecasted tree growth, i-Tree Design projects total benefits worth $5,968:

- $2,801 of stormwater runoff savings by intercepting 282,973 gallons of rainfall
- $119 of air quality improvement savings by absorbing and intercepting pollutants such as ozone, sulfur dioxide, nitrogen dioxide, and particulate matter; reducing energy production needs; and lowering air temperature
- $860 of savings by reducing 36,992 lbs. of atmospheric carbon dioxide through CO_2 sequestration and decreased energy production needs and emissions
- $498 of summer energy savings by direct shading and air cooling effect through evapotranspiration
- $1,689 of winter energy savings by slowing down winds and reducing home heat loss

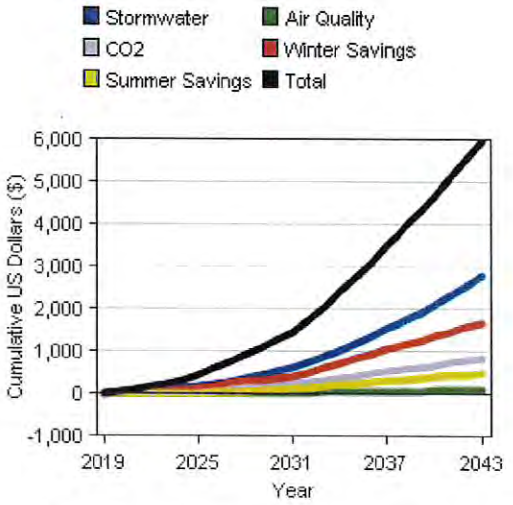

Figure 1. Tree benefit forecast for 25 years

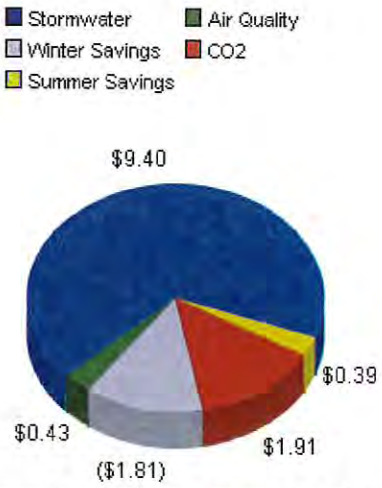

Figure 2. Annual tree benefits for 2019

Current Year - For 2019, i-Tree Design estimates annual tree benefits of $10.32:

- $9.40 of stormwater runoff savings by intercepting 952 gallons of rainfall
- $0.43 of air quality improvement savings
- $1.91 of carbon dioxide reduction savings
- $0.39 of summer energy savings
- $-1.81 of winter energy savings

Future Year - In the year 2044, based on forecasted tree growth, i-Tree Design projects annual benefits of $452.98:

- $249.95 of stormwater runoff savings by intercepting 25,245 gallons of rainfall
- $8.63 of air quality improvement savings
- $56.63 of carbon dioxide reduction savings
- $30.60 of summer energy savings
- $107.17 of winter energy savings

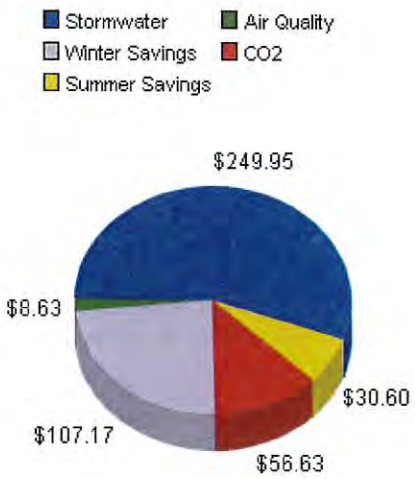

Figure 3. Annual tree benefits for the year 2044

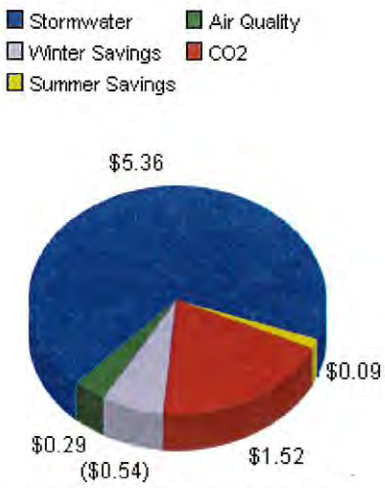

Figure 4. Total benefits to date

Total Benefits to Date - Over the life of the tree(s) so far, i-Tree Design calculates total benefits worth $7:

- $5 of stormwater runoff savings by intercepting 539 gallons of rainfall
- $0 of air quality improvement savings
- $2 of carbon dioxide reduction savings
- $0 of summer energy savings
- $-1 of winter energy savings

Individual Tree Benefits							
Tree	DBH (in)	Condition	Location to Structure	Benefits			
				Current Year (2019)	Future Year (2044)	Projected Total (2019-2044)	Total to Date
1. Northern hackberry	2	Excellent	1: Northwest (26 ft) 2: South (41 ft)	$1.51	$123.43	$1,816	$1
2. Northern hackberry	2	Excellent	1: West (79 ft) 3: Northeast (21 ft)	$1.19	$96.61	$1,379	$1
3. Northern hackberry	2	Excellent	1: Southwest (117 ft) 3: Southeast (34 ft)	$-0.99	$78.83	$1,034	$0
4. Littleleaf linden	2	Excellent	1: South (999 ft) 3: South (935 ft)	$1.72	$35.39	$393	$1
5. Littleleaf linden	2	Excellent	1: South (882 ft) 3: Southeast (818 ft)	$1.72	$35.39	$393	$1
6. Littleleaf linden	2	Excellent	1: South (926 ft) 3: Southeast (863 ft)	$1.72	$35.39	$393	$1
7. Littleleaf linden	2	Excellent	1: South (547 ft) 3: Southeast (482 ft)	$1.72	$35.39	$393	$1
8. Japanese tree lilac	2	Excellent	1: South (703 ft) 3: Southeast (639 ft)	$1.73	$12.56	$166	$1
Total				**$10.32**	**$452.98**	**$5,968**	**$7**

Note: "Location to Structure" lists location information for two closest structures, with structure ID numbers shown.
DBH: "diameter at breast height" is the standard measurement of tree trunk width at 4.5 feet (1.5 meters) above the ground.

Pear 2

Total Projected Benefits (2019-2044) - Over the next 25 years, based on forecasted tree growth, i-Tree Design projects total benefits worth $5,279:

- $2,299 of stormwater runoff savings by intercepting 232,245 gallons of rainfall
- $104 of air quality improvement savings by absorbing and intercepting pollutants such as ozone, sulfur dioxide, nitrogen dioxide, and particulate matter; reducing energy production needs; and lowering air temperature
- $1,000 of savings by reducing 43,005 lbs. of atmospheric carbon dioxide through CO_2 sequestration and decreased energy production needs and emissions
- $617 of summer energy savings by direct shading and air cooling effect through evapotranspiration
- $1,260 of winter energy savings by slowing down winds and reducing home heat loss

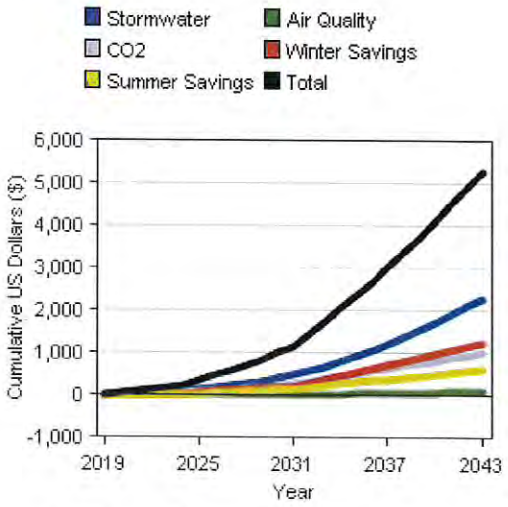

Figure 1. Tree benefit forecast for 25 years

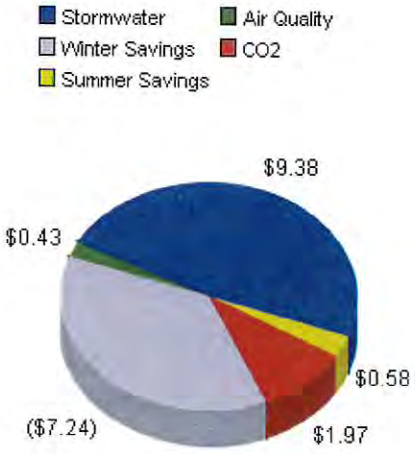

Figure 2. Annual tree benefits for 2019

Current Year - For 2019, i-Tree Design estimates annual tree benefits of $5.12:

- $9.38 of stormwater runoff savings by intercepting 949 gallons of rainfall
- $0.43 of air quality improvement savings
- $1.97 of carbon dioxide reduction savings
- $0.58 of summer energy savings
- $-7.24 of winter energy savings

Future Year - In the year 2044, based on forecasted tree growth, i-Tree Design projects annual benefits of $413.52:

- $219.76 of stormwater runoff savings by intercepting 22,198 gallons of rainfall
- $7.83 of air quality improvement savings
- $60.54 of carbon dioxide reduction savings
- $38.14 of summer energy savings
- $87.25 of winter energy savings

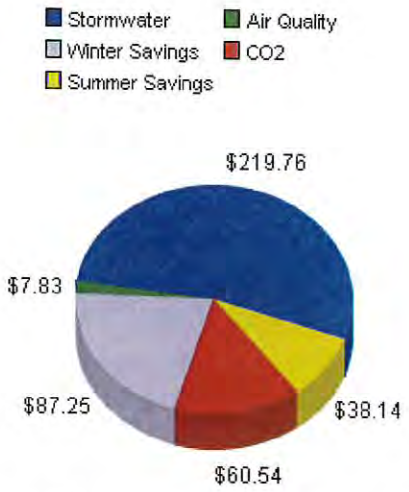

Figure 3. Annual tree benefits for the year 2044

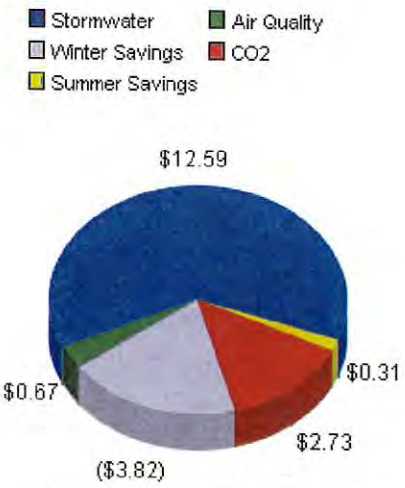

Figure 4. Total benefits to date

Total Benefits to Date - Over the life of the tree(s) so far, i-Tree Design calculates total benefits worth $12:

- $13 of stormwater runoff savings by intercepting 1,274 gallons of rainfall
- $1 of air quality improvement savings
- $3 of carbon dioxide reduction savings
- $0 of summer energy savings
- $-4 of winter energy savings

Individual Tree Benefits

Tree	DBH (in)	Condition	Location to Structure	Benefits			
				Current Year (2019)	Future Year (2044)	Projected Total (2019-2044)	Total to Date
1. Freeman maple	2	Excellent	1: Northwest (34 ft) 2: South (33 ft)	$-3.59	$119.84	$1,574	$-2
2. Freeman maple	2	Excellent	1: West (76 ft) 3: Northeast (24 ft)	$1.71	$107.88	$1,507	$1
3. Freeman maple	2	Excellent	1: Southwest (118 ft) 3: Southeast (37 ft)	$-1.48	$90.10	$1,154	$-1
4. Paperbark maple	2	Excellent	1: South (541 ft) 3: Southeast (477 ft)	$1.53	$1.92	$46	$3
5. Japanese zelkova	2	Excellent	1: South (874 ft) 3: Southeast (810 ft)	$1.03	$15.41	$156	$2
6. Japanese zelkova	2	Excellent	1: South (903 ft) 3: Southeast (840 ft)	$1.03	$15.41	$156	$2
7. Japanese zelkova	2	Excellent	1: South (931 ft) 3: Southeast (868 ft)	$1.03	$15.41	$156	$2
8. Japanese zelkova	2	Excellent	1: South (972 ft) 3: South (909 ft)	$1.03	$15.41	$156	$2
9. Japanese zelkova	2	Excellent	1: South (999 ft) 3: South (936 ft)	$1.03	$15.41	$156	$2
10. Green hawthorn	2	Excellent	1: South (712 ft) 3: Southeast (647 ft)	$1.80	$16.73	$220	$1
Total				**$5.12**	**$413.52**	**$5,279**	**$12**

Note: "Location to Structure" lists location information for two closest structures, with structure ID numbers shown.
DBH: "diameter at breast height" is the standard measurement of tree trunk width at 4.5 feet (1.5 meters) above the ground.

Pear 3

Total Projected Benefits (2019-2044) - Over the next 25 years, based on forecasted tree growth, i-Tree Design projects total benefits worth $6,061:

- $2,877 of stormwater runoff savings by intercepting 290,605 gallons of rainfall
- $131 of air quality improvement savings by absorbing and intercepting pollutants such as ozone, sulfur dioxide, nitrogen dioxide, and particulate matter; reducing energy production needs; and lowering air temperature
- $1,031 of savings by reducing 44,314 lbs. of atmospheric carbon dioxide through CO_2 sequestration and decreased energy production needs and emissions
- $544 of summer energy savings by direct shading and air cooling effect through evapotranspiration
- $1,477 of winter energy savings by slowing down winds and reducing home heat loss

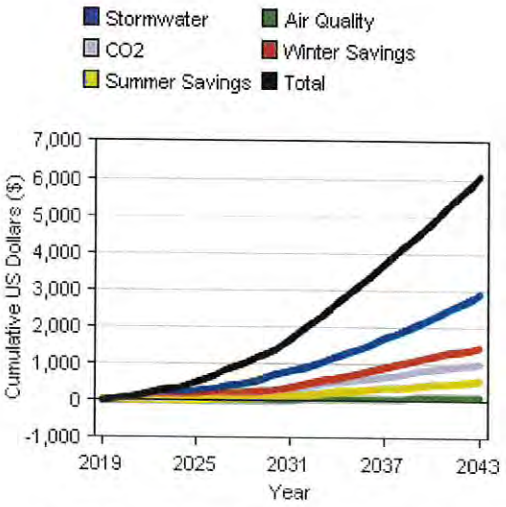

Figure 1. Tree benefit forecast for 25 years

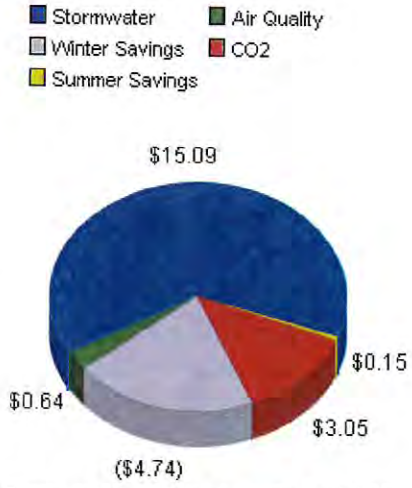

Figure 2. Annual tree benefits for 2019

Current Year - For 2019, i-Tree Design estimates annual tree benefits of $14.19:

- $15.09 of stormwater runoff savings by intercepting 1,527 gallons of rainfall
- $0.64 of air quality improvement savings
- $3.05 of carbon dioxide reduction savings
- $0.15 of summer energy savings
- $-4.74 of winter energy savings

Future Year - In the year 2044, based on forecasted tree growth, i-Tree Design projects annual benefits of $419.38:

- $223.39 of stormwater runoff savings by intercepting 22,563 gallons of rainfall
- $8.61 of air quality improvement savings
- $60.92 of carbon dioxide reduction savings
- $33.29 of summer energy savings
- $93.17 of winter energy savings

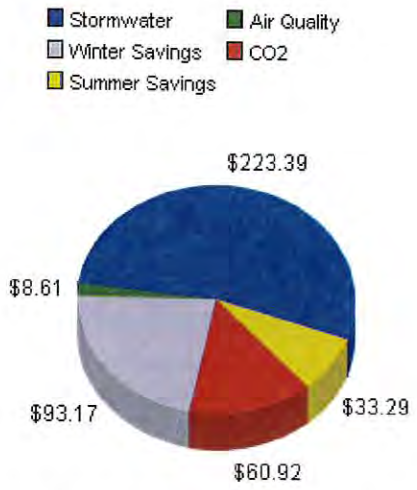

Figure 3. Annual tree benefits for the year 2044

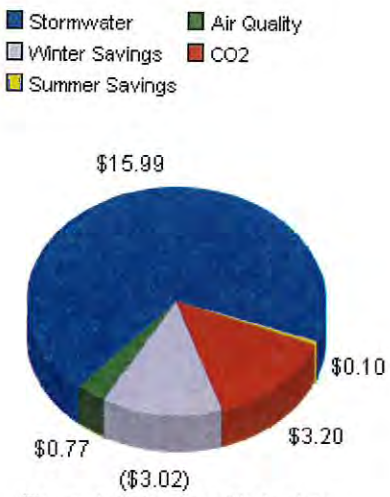

Figure 4. Total benefits to date

Total Benefits to Date - Over the life of the tree(s) so far, i-Tree Design calculates total benefits worth $17:

- $16 of stormwater runoff savings by intercepting 1,612 gallons of rainfall
- $1 of air quality improvement savings
- $3 of carbon dioxide reduction savings
- $0 of summer energy savings
- $-3 of winter energy savings

Individual Tree Benefits

Tree	DBH (in)	Condition	Location to Structure	Benefits			
				Current Year (2019)	Future Year (2044)	Projected Total (2019-2044)	Total to Date
1. American hornbeam	2	Excellent	1: South (786 ft) 3: Southeast (723 ft)	$1.67	$12.32	$182	$3
2. American hornbeam	2	Excellent	1: South (701 ft) 3: Southeast (637 ft)	$1.67	$12.32	$182	$3
3. American hornbeam	2	Excellent	1: South (539 ft) 3: Southeast (474 ft)	$1.67	$12.32	$182	$3
4. Black locust	2	Excellent	1: South (867 ft) 3: Southeast (803 ft)	$2.15	$33.32	$504	$1
5. Black locust	2	Excellent	1: South (999 ft) 3: South (935 ft)	$2.15	$33.32	$504	$1
6. Black locust	2	Excellent	1: South (930 ft) 3: South (866 ft)	$2.15	$33.32	$504	$1
7. Kousa dogwood	2	Excellent	1: South (890 ft) 3: Southeast (826 ft)	$1.56	$3.74	$70	$3
8. Kousa dogwood	2	Excellent	1: South (956 ft) 3: South (892 ft)	$1.56	$3.74	$70	$3
9. Black tupelo	2	Excellent	1: Northwest (41 ft) 2: South (26 ft)	$-2.97	$104.28	$1,438	$-2
10. Black tupelo	2	Excellent	1: West (75 ft) 3: Northeast (25 ft)	$1.84	$93.33	$1,354	$1
11. Black tupelo	2	Excellent	1: South (118 ft) 3: Southeast (45 ft)	$0.74	$77.37	$1,069	$0

Total	**$14.19**	**$419.38**	**$6,061**	**$17**

Note: "Location to Structure" lists location information for two closest structures, with structure ID numbers shown.
DBH: "diameter at breast height" is the standard measurement of tree trunk width at 4.5 feet (1.5 meters) above the ground.