Tower Grove Park

Tree Restoration Master Plan

TOWER GROVE
— PARK —

SWTDESIGN

Acknowledgments

During the development of this plan, the planning team worked closely with Tower Grove Park leadership and staff:

- Bill Reininger, Executive Director
- Will Rein, Director of Operations and Special Projects
- Kevin McIntyre, Forestry Supervisor
- Steve Hogenmiller, Horticulture Supervisor
- Clint Meyer, Maintenance Supervisor

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- Mike Rood, Pea Ridge Forest

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This photo is assumed to be of Henry Shaw in 1879 in front of a mixed species allee within Tower Grove Park.

Since Henry Shaw established Tower Grove Park in 1868, he and the many others involved have stewarded its tree canopy: experimenting with new species, exploring new landscape styles, and adapting to changing climate. Trees were planted, they matured, declined and were replaced with new generations, all while the city grew up around the park and the park expanded and evolved. Visitors to the park grew to cherish it, overtime changing the ways they used the space as tastes and interests changed. Like so many other historic spaces in St. Louis, the park is at once a statement of an earlier time and a marker of the one constant: change.

Nothing has changed and evolved more than the park's trees. Nearly 7000 trees of over 350 taxa make up the canopy. It is integral to the visitor experience: creating spaces, shading and framing roads and pathways, and showcasing the amazing diversity of trees. Those trees form a unique collection, and the concept of a collection of trees is critical to understanding the framework of Shaw's design for the park. His adoption of the Gardenesque style of landscape design, a style focused around showcasing the unique attributes of the parks trees, makes the park almost without parallel in the United States. It is also a primary reason for the park's National Historic Landmark Designation.

Today, the parks trees have reached a tipping point. Nearly 50% of the canopy is considered in fair or poor condition. Park staff has a backlog of required tree removals, with between 200 and 300 planned for this year. Weather events have brought down many other trees over the last year. Storms, disease and pests, and other environmental stressors are indicative of a changing climate to which many of the park's trees are poorly adapted. Without a concerted effort to address this situation and anticipate on-going change, the park's canopy will continue to decline at a faster rate than it can be replaced.

At the same time, over the years, new trees have been planted with limited sensitivity to the nuances of the historic park plan, and likely as a result of changes in design taste. Annual tree planting quotas have likely led to over planting of open areas, while formal plantings like those along pathways have languished or been haphazardly replanted. What was once a collection of many diverse species of trees has become dominated by a very narrow few, with 21 species accounting for over 3500 of the trees. The result is a landscape that has become increasingly distanced from the historic plan, compromising the historic character of the park.

It is within this context that Tower Grove Park's leadership have initiated the preparation of this restoration plan. While initially borne out of a plan to plant 1000 new trees in the park over the next five years, the need for a more comprehensive framework became very evident. This plan serves as both guide for tree planting and tree removals - that looks to refocus the park around its original historic framework. It approaches trees by better defining the purposes that they serve in creating the spaces within the park. These distinct planting "typologies", which are grounded in the historic plan and references, are further prioritized based on how they impact the user experience.

From there, the plan outlines a selection process for choosing new trees to plant within the park from an enlarged species list. Trees are identified by their most appropriate usage, and are to be selected while continually evaluating the overall canopy composition and species in decline.

It is the hope of the park staff and the planning team that this plan will serve as a map for tree planting for years to come, guiding the restoration of Tower Grove Park's canopy and reintroducing park visitors to the uniqueness of its Gardenesque style.

Current Tree Canopy Diagram
Coverage is approximately 44%

Proposed Tree Canopy Diagram
Coverage is also approximately 44%

Introduction

Purpose

Trees are by far the dominant element in Tower Grove Park. They define and create park spaces, serve as wayfinding to park users, and provide vital ecological services. In its nearly 150 years, the park has evolved greatly, with its trees going through several cycles of maturity and decline. With nearly 7000 trees, great efforts in regular tree planting and replacement have clearly sustained the park through these cycles. At the same time, this maintenance approach has been largely reactive to this change, rather than guided by a comprehensive plan. Trends in park design also changed during this time, with a shift from the more formal Gardenesque style to a Picturesque style. Lastly, the effects of climate change have begun to impact many significant tree species within the park.

Spearheaded by the Park's current stewards, the Tower Grove Park Tree Restoration Plan is an effort to create a vision for tree planting that over time will re-establish the historic layout of the park and re-connect with Henry Shaw's intended Gardenesque vision for the Park. This guiding document also defines an approach to achieving greater species diversity and a more consistent response to tree maturation and impacts of climate change.

Goals

1. Re-establish Historic Tree Layout: Henry Shaw's unique layout for trees in Tower Grove Park is a critical component of the park's historic character, creating the structure and forming the spaces within it. The recommendations of this plan will guide placement and replanting of new trees, while also guiding areas for tree removals.

2. Promote diversity of tree species: This plan sets out to introduce more than 55 new species and or cultivars into the park. Henry Shaw, the consummate plantsman, was always experimenting with and exploring new native and exotic plants to test viability for the St. Louis region, and this plan looks to reconnect with that legacy. At the same time, the park canopy is dominated by a few tree species that were planted extensively over the years. This plans recommendations will balance gradual reduction numbers of dominant species with additions of less dominant ones, while maintaining a similar canopy cover.

3. Reduce species in decline: Climate change and related weather events, pests and pollution impacts have led some species within the park to decline. The plan will recommend replacements for these species.

4. Maintain canopy cover: Redefining the historic character of open spaces, allees and clusters of trees should be done within the context of maintaining or increasing the level of canopy cover, ensuring a comfortable park environment with decreased ambient temperatures and adequate shade.
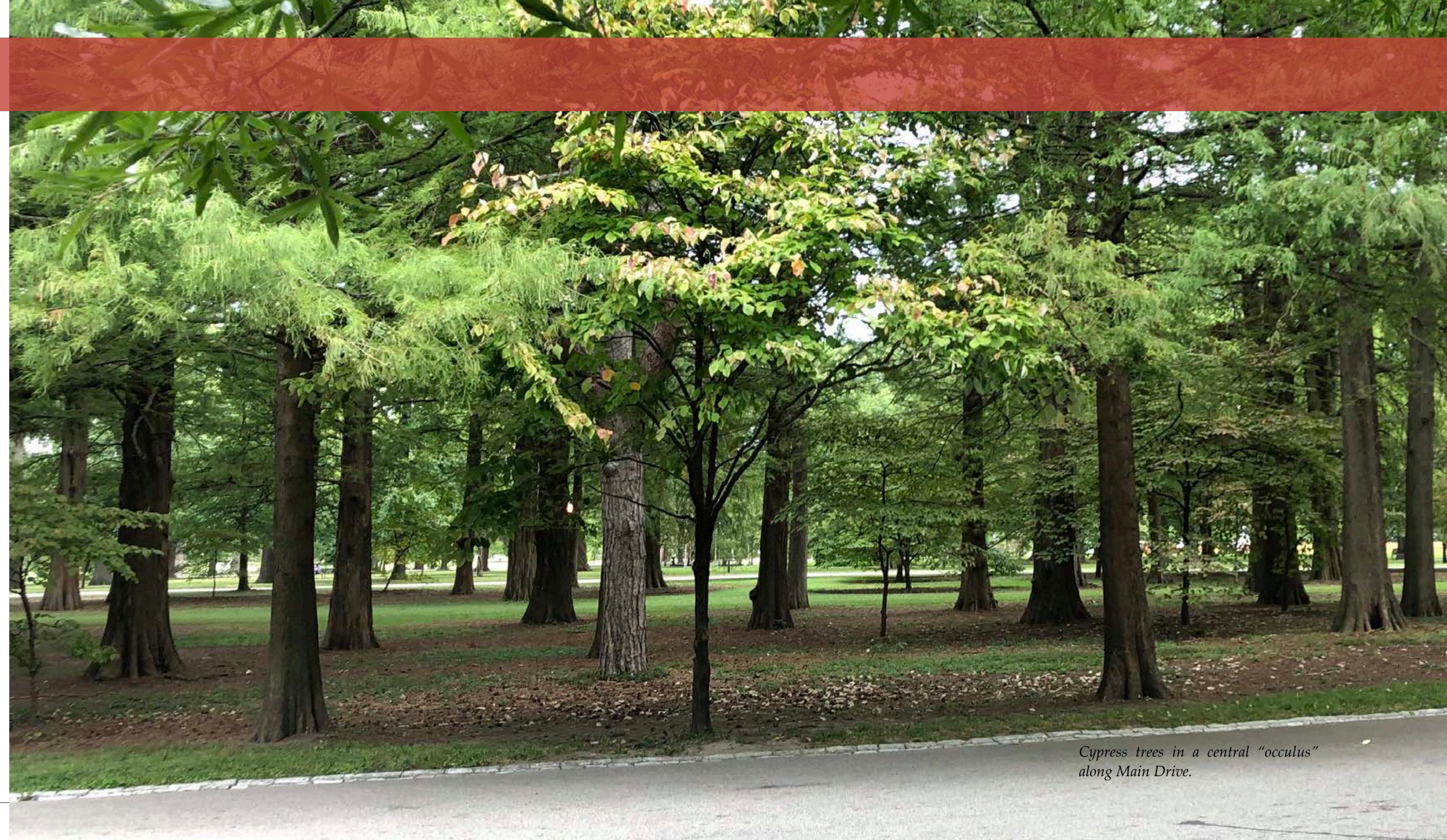
Cypress trees in a central "occulus" along Main Drive.

Process

Over the course of six months in late 2021 and early 2022, the planning team worked closely with Tower Grove Park staff to develop the recommendations of this plan. This process involved developing a thorough understanding of the current conditions of the park's trees, the historic framework for tree planting in the park, and how future tree planting should be approached.

Analysis/Data Collection

The Park's Geographic Information Systems (GIS) data for trees is quite robust, having been compiled by Davey Tree in 2016, and updated continuously thereafter. This data located all trees within the park, providing information about tree species and cultivars, condition, and size.

Utilizing this data, the planning team identified trends and assessed the overall composition of the tree canopy, finding that generally while the park has many species, it is dominated by relatively few. Further analysis suggested that the canopy is in steady decline, supporting the urgency of the actions recommended from this plan.

Existing canopy and placement of trees was also compared extensively against historic plans and for the park. This helped the planning team and staff to better understand the original design framework and to inform the proposed tree restoration framework.

With this information in hand, the team developed base maps for an extensive site assessment.

Site Assessment

Over the course of several days in early Fall 2021, the planning team toured the park extensively, building upon the analysis documentation, and further developing the restoration framework. On site, distinctions between different tree areas, the use of certain tree layouts to reinforce spaces, and a general pattern of tree planting typologies became clear.

While exploring the spaces, the team noted several key elements that compromise or impact the historic design intent of the park:

- Open spaces lost much of their structure and became more forested than originally intended. In particular many trees, especially pin oaks and sweetgum, were planted within previously open areas. While at the same time, perimeter tree planting around these spaces was allowed to become much less formal and structured.

- Street and carriageway allees have been impacted by inconsistent planting strategies, attempts to mix in flowering trees, and improper placement, while in some areas they have completely lost structure.

Tree assessment in progress.

Process

- Flowering and ornamental allees have often been planted too close to walkways, in inconsistent spacing, and along walkways that were not part of the original park layout (due to this they often bisect areas that should be open or have open vistas).

- Flowering trees are generally used within allees (often inconsistently), but are generally missing from the edges of open areas. Clusters of flowering trees along these edges would have dramatic landscape effects, and are important to the Gardenesque style of design.

- Architectural park elements, like entry gates and pavilions, are often hidden from view and sometimes in risk from potential tree damage.

- Evergreens are in decline: While many pine species (Austrian pine, for example) have succumbed to disease and the effects of climate change and been removed from the park. Needle-leaved evergreens are in general poorly represented within the park. However, these evergreens were stalwarts of Shaw's original plans for the park, often being used to contain open spaces and control views.

A more intentional approach to placement around these elements is critical.

At the end of each day's tour, the team met with park leadership to review findings and discuss their potential interpretations. Further analysis following the site assessment combined the digital inventory and site notes to further refine the overall approach to tree restoration and to begin to identify target tree species for discussion with the advisory panel.
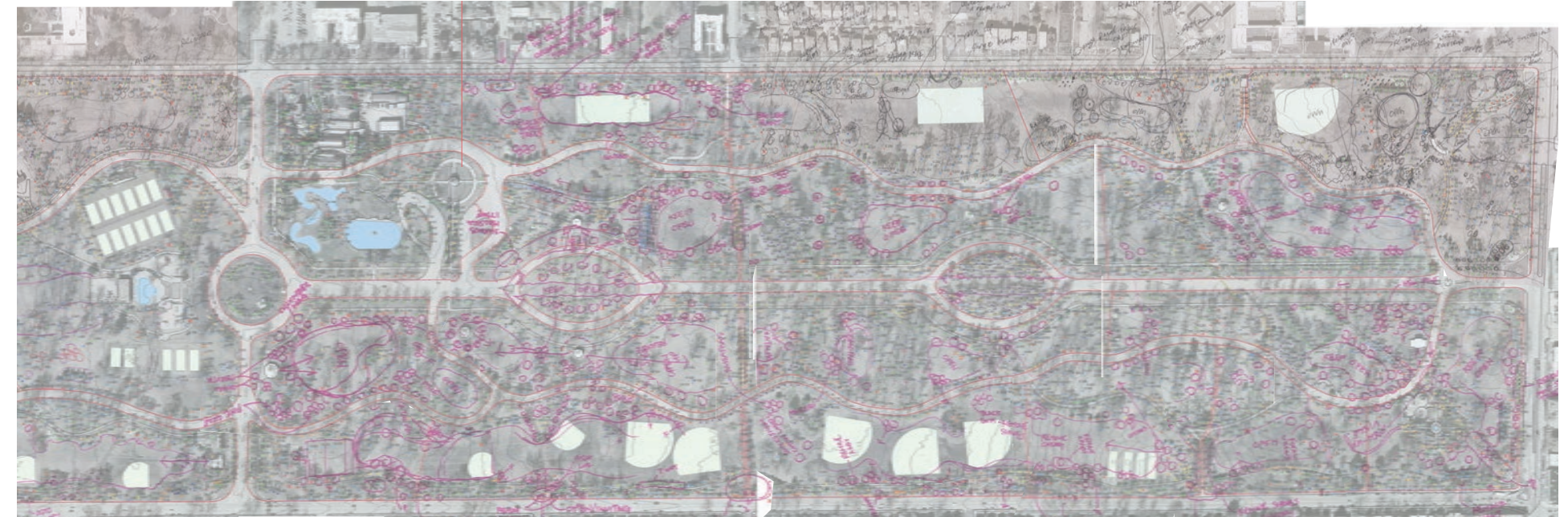
Notes an sketches from the site assessment.

Process

Advisory Panel

The planning team and Tower Grove staff convened a meeting of tree experts to discuss the future of trees within the park. Members of this panel represented academics, leaders in the nursery trade, arborists and forestry experts from the region. A list of panel participants has been included in the acknowledgments section of this document.

Ostensibly, the discussion was focused on defining a priority list of new tree selections and/or recommendations for "phasing out" of existing tree species to anticipate the effects of climate change, though the discussion was considerably more broad in scope. Here are several main points from the discussion:

- In general, the Park should return to being a place for experimentation and collecting, providing a place for testing of regionally adapted native and non-native trees and for maintaining viable collections of trees that may be less common or have fallen out of favor in the landscape trade or with the public-at-large. This also implies an overall diversification of the park's canopy. In addition, the park should be a haven for threatened trees, whenever possible.

- The current canopy cover, the shade and heat island reduction it provides, is critical and should remain at or above today's level of coverage.

- The restoration process should be done such that removals are done to open up space for new trees to thrive (more sunlight, access to water, etc.) The process should also consider tree removals and their waste (lumber harvest, mulch).

Following the meeting, each panel representative shared preferred tree lists with the planning team to consider and include in the recommendations of this plan. This list included an additional 88 species or cultivars for future use in the park (see appendix).

Plan Development

With the recommendations of the panel and analysis findings, the planning team developed an overall plan for tree restoration within the park. This plan identified an overall framework for re-establishing the historic design for the park, while providing guidance for tree planting and removals over time to reach this goal.

This framework is achieved through defining a series of tree planting typologies (for example, street trees, flowering allees, clusters). Put together, these typologies define the spaces within the park. Furthermore, this framework provides a map for prioritization of restoration based on the relative importance of each typology in defining these spaces and promoting a great visitor experience.

Within that framework, each typology has a defined planting approach, with recommendations for species, spacing, and placement. At the same time, it allows for a certain amount of flexibility and discretion on the part of park staff to take into account the surrounding conditions and other considerations when making their selections and placing the trees. To make this framework actionable, a tree selection toolkit was developed.

Tree Selection Toolkit

A key element of this plan includes a process and toolkit for selecting priority tree species and balancing the overall composition of the park's tree diversity. This tool is to be actively utilized by park management. The toolkit uses GIS based mapping and tables to select trees and identify planting locations. It also clearly defines areas that are to be opened up, providing clear direction on existing trees to be removed over time. This plan and the tree selection toolkit were evaluated by park management to ensure ease of use and clarity of application. In addition, park staff will be integrating these tools into their digital asset inventory with the expectation that it will be a critical management tool going forward.

Process

Proposed Plan
This plan defines the overall approach to restoration through the reestablishment of clearly defined tree planting typologies and their specific parameters.

Site Tour Notes
The extensive site tour involved on-site visioning and sketching of proposed tree areas. At the same time, it was of critical importance in understanding the original park design framework.

Analysis of Trends
Tree condition, species and the overall balance of the canopy informed strategies for diversification and the general response to the effects of climate change in the process for tree restoration.

Historical Framework
Henry Shaw's plans, other historical record, and background on Gardenesque planting laid the groundwork for the recommendations of the plan, and also served for assessment of the proposed plan recommendations.

Current Understanding
Staff experience and their recommendations formed the basis of the overall approach to the development of the plan. Their keen understanding of the nuances of the park's current trees and conditions, as well as the park's evolution over time, was invaluable to this planning process .
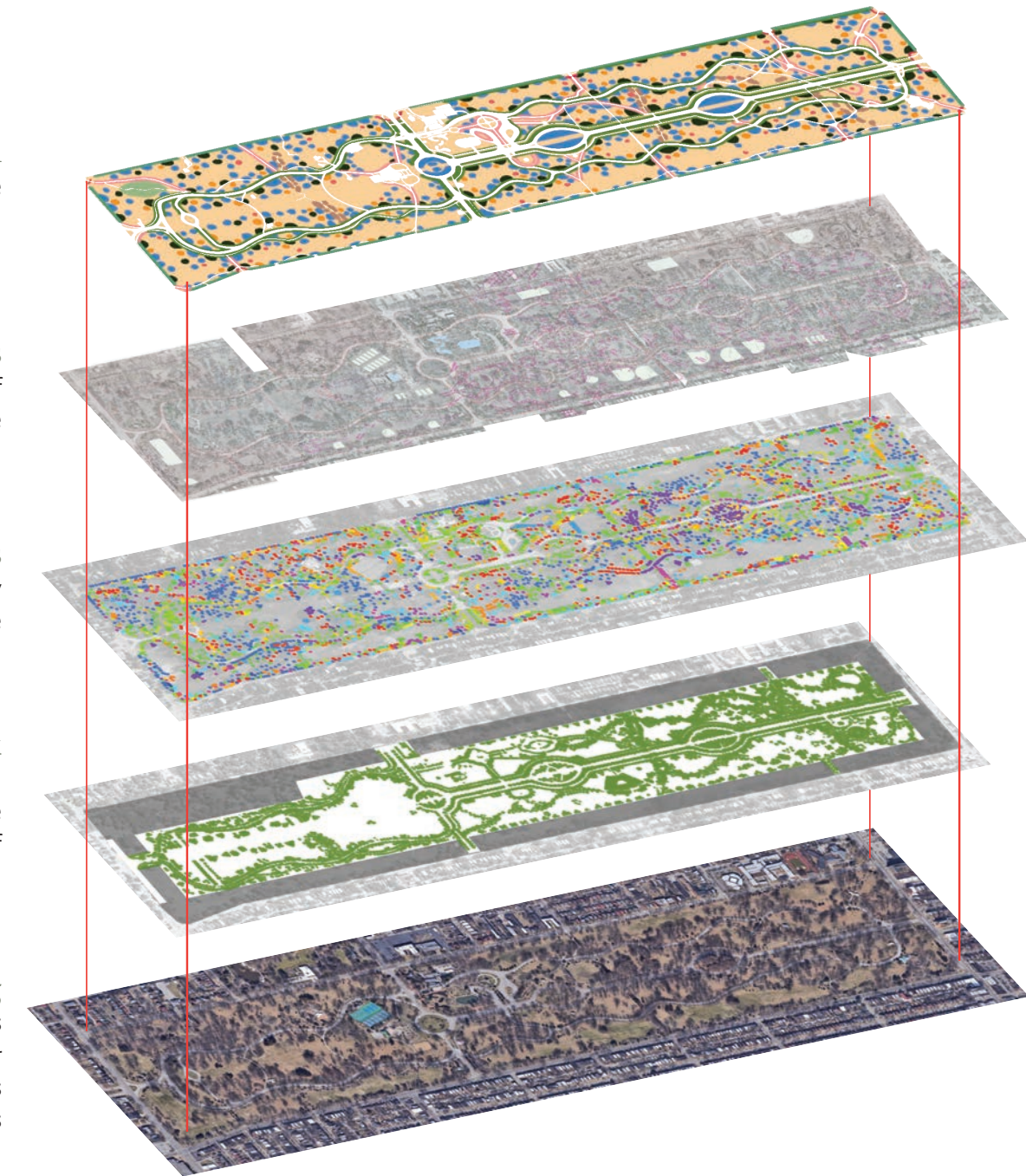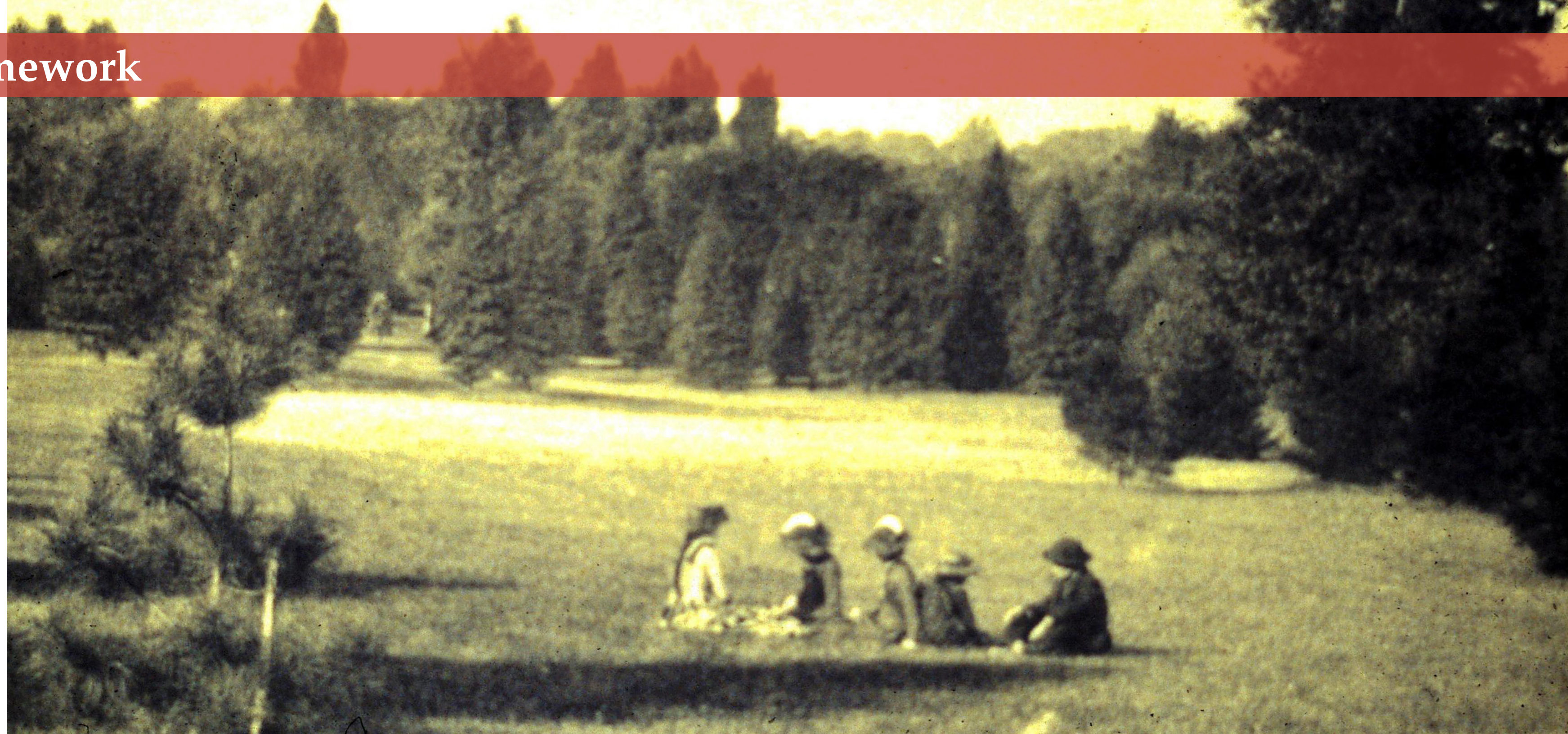
A group picnics in an open area in Tower Grove Park in 1875. Note the extensive planting of evergreens to frame the open space.

Gardenesque Style

Henry Shaw designed Tower Grove Park in the Gardenesque style, a unique style that distinguishes it from nearly all other parks in the United States and further enhances the park's historical significance. Most parks, like New York's Central Park or St. Louis' Forest Park, are designed following the picturesque style. This style is based largely on landscape painting traditions, focusing on idealized compositions of nature. The Gardenesque style, however, comes from the horticultural garden movement, best showcased in botanical gardens like London's Kew Gardens and Boston Common, both gardens Henry Shaw knew very well. The style was introduced by John Claudius Loudon in the 1830s in England and brought to the United States in the 1840s by Andrew Jackson Downing. Understanding this approach to park design is critical to understanding the purpose that trees serve the overall form of the park and how individual tree species are selected and placed within the space.

Furthermore, today's Park is much more picturesque in style than originally designed. Per Tower Grove Park's National Historic Landmark application, the park transitioned to a picturesque style as tastes changed, but also in response to reduced maintenance budgets. Gardenesque is much more costly to maintain – particularly the difference in plant maintenance, where in picturesque plants are mostly allowed to mature on their own, in gardenesque they would often be highly pruned and shaped.

The following page describes some of the key features of the Gardenesque style.

Allees were less of monocultures than a series of plants on display along a walk. Loudon, "View at Hendon Rectory, " Middlesex, England, from The Suburban Gardener, *1838*

Inherent Artificiality:

- Planting should not look to imitate nature (that is picturesque), but should look like it was planted as garden/art.

- Great example from Henry Noel Humphreys: fountains should be placed at the top of a hill to celebrate the effort, engineering and artifice of getting water up to that point

- Emphasis on exotics (avoid imitation of nature). Even when using natives, they are to be used in a way that would not look natural.

Context:

- The garden should easily be distinguished from it's surrounding landscape. For example, if the garden is planted in an area surrounded by forest, it should be very formal and clearly distinguished from the forest. If it is in a formal area a less formal approach is more appropriate.

- Focus was on unique natives, like catalpa, taxodium (at the time it was used), columnars, evergreens, tropical appearing foliage. All things to make it stand out from the Missouri landscape.

Landscape Collection:

- All plants are specimens and part of a collection. It is less about a harmonious visual than it is about experiencing the plants. Think of an allee as a promenade of trees, you walk along and experience each unique tree.

- Each tree should be showcased in its best form, with individual specimens allowed room to grow. Even trees in clusters should be placed far enough apart as to reach its mature form, though still forming a cluster when viewed from afar.

- Allees are more about the consistency of spacing and placement than monoculture

- No layering trees—this is achieved by combining rows of different trees, that once you see them from a distance away, they give a layered effect.

- Overall make-up of the park's trees: Many examples of many species, rather than any single species as dominant.

References:
- *National Gallery of Art,* "Gardenesque"
- *1883 McAdams Report on Tower Grove Park*
- *Tower Grove Park, National Register of Historic Places Registration, February 14, 1989*
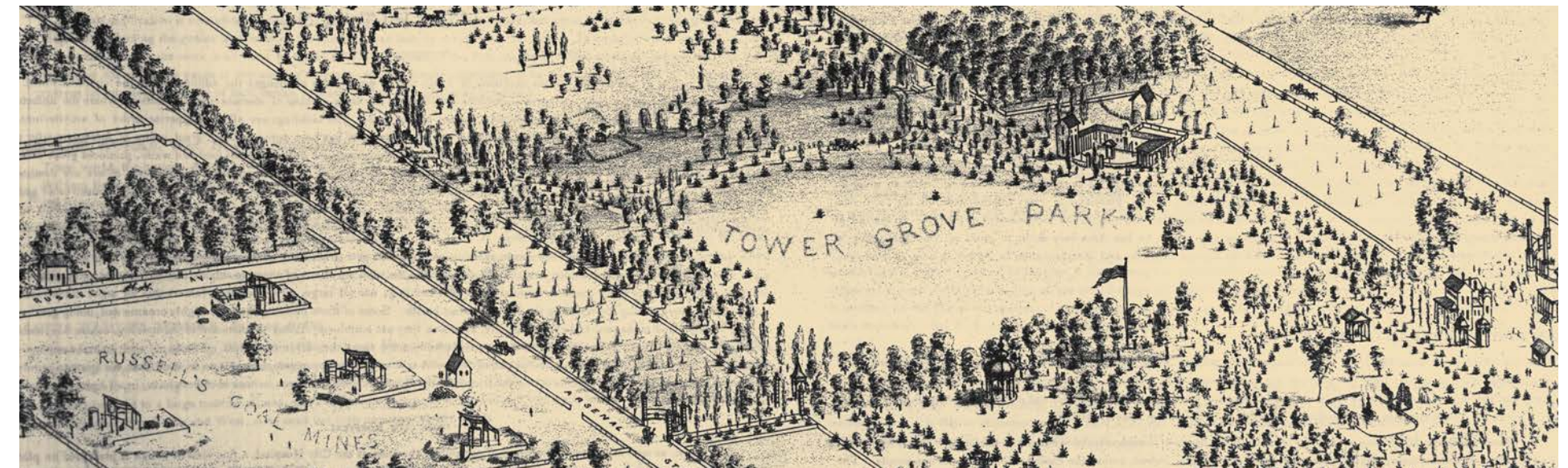
Tower Grove Park as featured in Compton and Dry's 1876 "Pictorial St. Louis, the great metropolis fo the Mississippi Valley".

The Plan for Tower Grove Park

Henry Shaw's 1875 Plan of Tower Grove Park shows the extensive tree plantings for the park, which at this point had already been evolving for seven years. Shaw's experimentation and gradual build out of the park revolved around his plant collecting, that saw many first plant introductions to the United States. That same process meant that, within the park, trees that were not successful in St. Louis were replaced regularly with new introductions that kept Shaw's collection "fresh" and new for visitors. The 1883 McAdams report speaks to some of the trees which Shaw tested in the early years of the park and to the gradual coelecscense around a palette that

worked well for Missouri's hot summers and cold winters.

The overall form of the park is created by the trees themselves, along with their relationships to circulation pathways. Spaces are defined in three main ways:

Formal plantings: Tree allees are used extensively along the edges of the roadways and primary pathways within the park. In many instances, these formal plantings shape and create the open space "rooms" within the park. They also highlight the

entrances and serve as wayfinding elements.

Informal planting: In the form of clusters/ groupings of species and individual specimens placed in open spaces and alongside allees. They are used to further reinforce the "rooms" and to showcase the horticultural collection within the park.

Open Space: Open, tree-less areas or "rooms" are the primary spaces for visitors and support various park programming. In Shaw's vision for the park, the open areas were as critical to experiences the plant collections as the plants themselves.
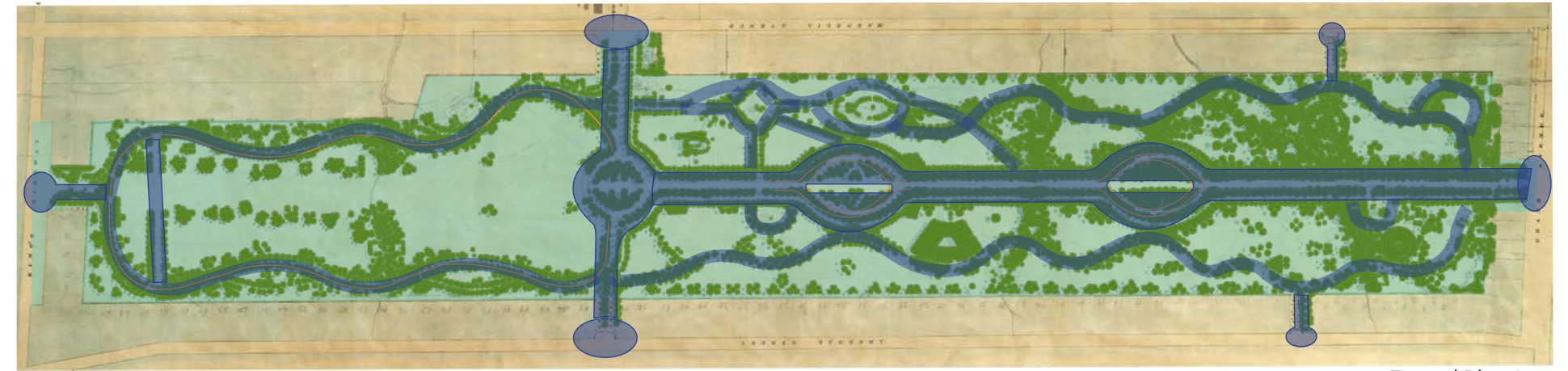
Formal, Informal Plantings, and Open Spaces in Shaw's Plan

▆ Formal Planting
▆ Open Space
▆ Informal Planting
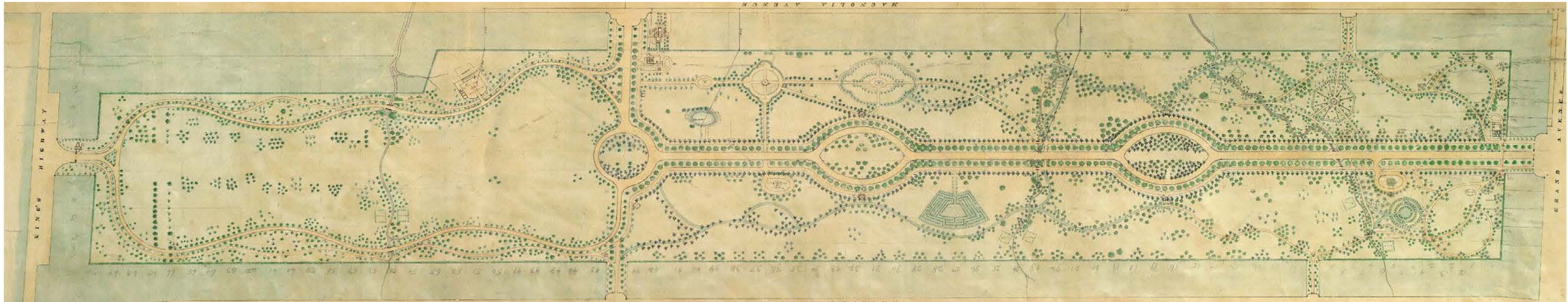
Henry Shaw's 1875 Plan for Tower Grove Park

Tree Area Typologies

Elements of the 1875 Plan

1. Grand Allee
The Grand Allee creates the primary entry experiences from Grand Boulevard and Tower Grove Avenue.

2. Secondary Allee
These allees follow the internal carriageways within the park and feature regularly spaced trees with varying forms. Along these curvilinear paths, park visitors can take in the varied collection of trees, moving along as if through the halls of a museum. The regular placement of the trees creates structure and provides shade to the space, while defining direction and wayfinding in the park.

3. Ornamental Allee
Ornamental allees are part of the horticultural display present at the Park's entrances. They lead visitors into the park and to the internal carriageways and spaces. These allees are opportunities to showcase specific collections of unique and/or flowering trees, and create a sense of drama and seasonality.

4. Specimen
Specimen trees are placed out in open areas for greatest impact and to allow them to reach their full maturity. They are often located near the terminus or centrally located within an open space, depending on viewshed and the tree's form. Large trees with broad canopies are typically used in this way.

5. Cluster
Clusters or groups of a single tree species are used to showcase trees within the tree collection and to frame and shape open spaces in the park. They are often used alongside allees to reinforce them. Even though placed in a group, trees are still spaced to allow each of them to reach their mature potential.

6. Reinforcing Clusters
Reinforcing allees help anchor and shape open spaces in a strategic way. They are higher priorities for replanting/replacement than other clusters.

7. Riparian Clusters
Clusters of trees placed along water courses, planted similarly to other clusters, but with trees that emphasize and tolerate the wet environment like weeping willow and cypress.

8. Horticultural Display
Ornamental plants and trees highlight the Park entrances. Mid-size canopy and evergreen trees are used as a backdrop to this planting. These displays also segue into ornamental allees in many instances.

9. Open Space
Open space is shaped, contained by, and delineated by the tree plantings within the park. When the plantings are well placed, the open spaces create individual "rooms" and are clearly recognizable as unique spaces within the park. Open space has been highly impacted over the years through the park's evolution, and much of the tree restoration revolves around both reinforcing these spaces through new planting and removing plants within historically open areas.

Trees as a backdrop to the northwest gate at Magnolia and Kingshighway.

Overview

In general, trees are well-dispersed throughout the park. Clear definition of pathway and roadway allees are visible, and one can see the interplay of densely planted trees and open space. One can also see that the central core of the park is more densely planted than the perimeter areas - this is described more in detail in the comparison of historic and current canopy in the following pages.

The park's trees were suveyed extensively in 2016 by Davey Tree. On the whole, that data showed a wide variety of species (XXX) and a relatively diverse canopy, meeting many of the standard metrics for analysis. However, the continued evolution of the park, through climate change, weather events, and normal cycles of tree maturation, has prompted a reevaluation of the tree canopy.

In terms of condition, the colored map below shows the condition of trees throughout the park. Trees marked with a red "X" are hazard trees that are in significant decline, or have been recently removed.

The trees are mid-range in terms of overall condition, but, based on the pie chart on the adjacent page, are trending towards fair/poor. The distribution of trees in decline is fairly even, though there does appear to be a greater concentration in the historic core area of the park.

From this data, we can define four overarching areas of focus moving forward:

1. Canopy Cover:
The historic layout of the park is important to align with. Approximating the historic and current canopy cover are also important considerations that help to maintain the overall feel of the park and provide a similar level of ecological services.

2. Reduce Species in Decline:
While the park should continue to showcase and harbor unique and less-represented species, it is important to recognize which trees are in decline, determine why, and assess a replacement strategy.

3. Increase species diversity:
While the park is quite diverse in quantity of species, the canopy is dominated by a very small percentage of that total number.

4. Re-establish Tree Typologies:
Henry Shaw's unique layout for trees in Tower Grove Park is a critical component of the park's historic character, creating the structure and forming the spaces within it. The recommendations of this plan will guide placement and replanting of new trees, while also guiding areas for tree removals.

Canopy Condition

Legend
- ■ Dead
- ■ Critical
- ■ Poor
- ■ Fair
- ■ Good
- ■ Very Good
- ■ Excellent
- ■ N/A

3%
1%
5%
39%
52%
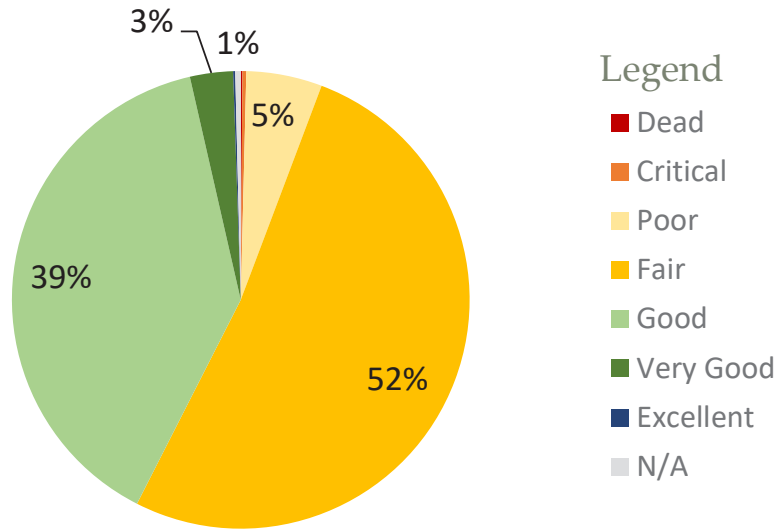
Tree condition as a percentage of total canopy

Maintain Canopy Cover

The existing canopy cover, the shade and ecological services it provides, is a distinguishing feature of Tower Grove Park. Throughout the development of this plan, it was important to assess the proposed restoration against this metric in an attempt to maintain a similar balance of open space and cover. In addtion, the historic canopy cover was approximated from Henry Shaw's plan to consider how the proposed plan responded to the original layout.

The canopy coverage of the park was derived from photographic analysis techniques, and is an approximation of the balance of canopy and open space.

Historic Canopy
The historic canopy as approximated from Henry Shaw's plan of the park reprsents a canopy cover of about 49% within the original footprint of the park (shown in white). At this time the park was approximately two-thirds the size it is today. When later acreage was added, extending the park to it's perimeter streets, much of this area was programmed for sports fields inherently requiring a more open canopy treatment.

Current Canopy
Today, the tree canopy covers approximately 44% of the park based on recent aerial photography. One thing to note is the loss of definition of many of the open areas within the original Shaw footprint. Allees are also less defined. Considering the placement of many trees within areas that were originally open (compare the west lawn, west of Center Cross Drive), it is interesting that canopy cover is not significantly higher. Though, analysis errors notwithstanding, this is likely due to aforementioned open recreational space that was added to the park, and the decline in the park's allees.

Proposed Canopy
The proposed canopy was reviewed using the same methodology, with tree areas scaled to existing canopy areas for congruence. The proposed canopy covers approximately the same area as the existing canopy. At the same time compared to the historic footprint (the lighter white area), the proposed plan has 47% cover versus 49% historically.
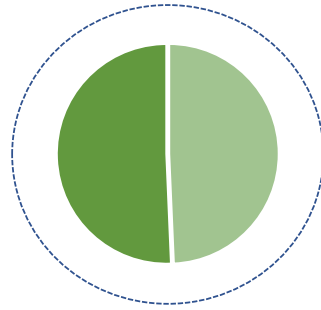
Historic: approx. 49% Canopy Cover
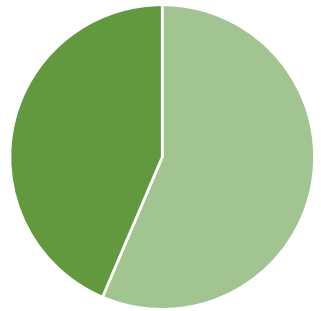
Existing: approx. 44% Canopy Cover
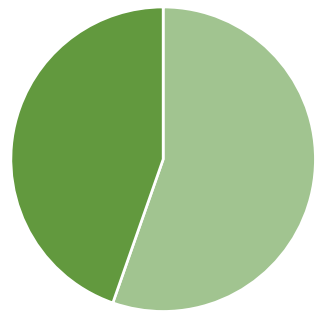
Proposed: approx. 44% Canopy Cover
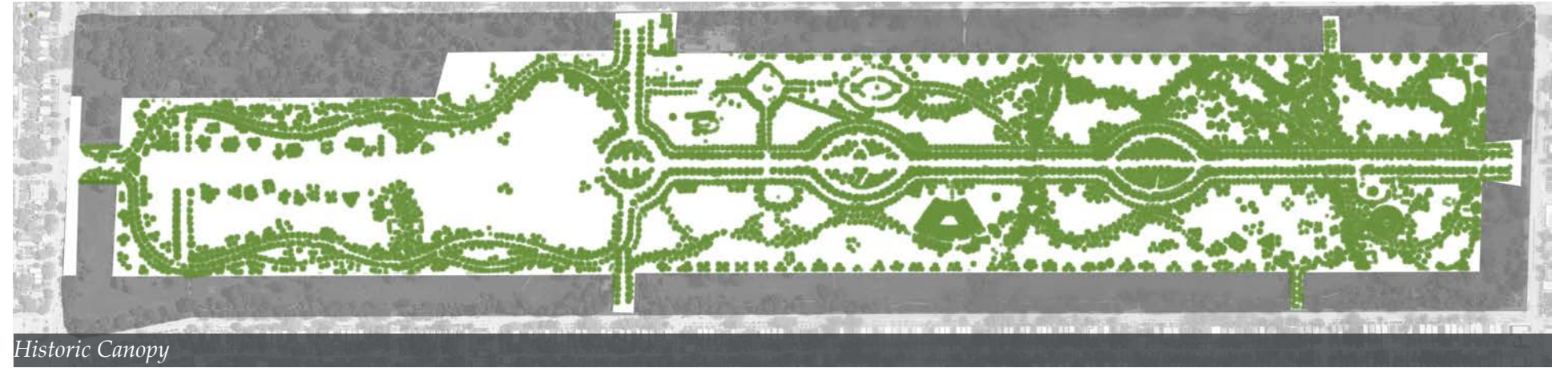
Historic Canopy

Existing Canopy
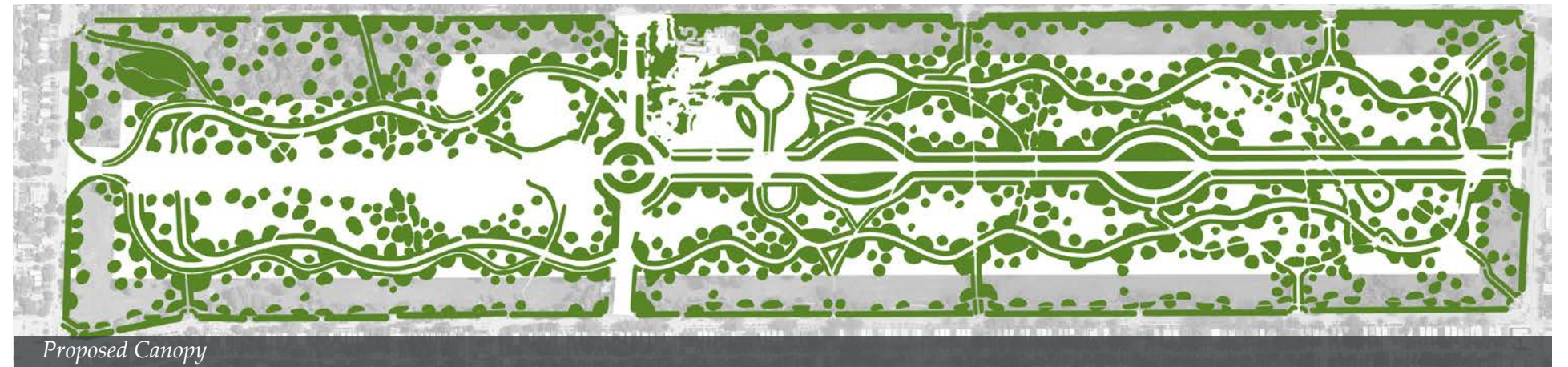
Proposed Canopy

Reduce Species in Decline

Target Species with Low Condition Ratings

Species in decline can be an indicator of several factors:

1. Many instances of a given species may have been planted at the same time and are reaching maturity at the time.

2. Many instances of a given species are planted all around the park, and due to the shear size of that population, there are a considerable number in decline.

3. The given species is in decline due to climate change, pests or other issues.

The chart on this page represents the largest populations of various tree species in the park with the lowest condition rating across that entire population. An average condition score of 2 is considered "Poor" while an average score of 3 is "Fair", based on the 2016 tree assessment.

Owing to the various factors above, tree species need to be evaluated in terms of their individual condition and, based on an assessment of the reason for their decline, replaced or replanted. Since the trees listed here represent nearly 42% of the total canopy, they should be considered for most immediate assessment and action.

Species	Quantity	Average Cond.
Liquidambar styraciflua	556	3.19
Acer saccharinum	294	2.96
Taxodium distichum	281	3.20
Quercus palustris	276	3.12
Liriodendron tulipifera	194	3.09
Pinus nigra	182	3.23
Ginkgo biloba	139	3.19
Quercus rubra	134	3.46
Catalpa speciosa	111	3.06
Maclura pomifera	86	2.88
Tilia cordata	70	3.10
Quercus pagoda	63	3.21
Acer saccharum	56	3.09
Juniperus chinensis 'Hetzii'	56	3.23
Platanus occidentalis	54	3.33
Ulmus pumila	48	2.54
Acer rubrum	42	3.14
Ulmus rubra	34	2.56
Sassafras albidum	30	3.43
Tilia americana	29	3.34
Morus alba	27	2.63
Robinia pseudoacacia	27	2.67
Magnolia acuminata	27	3.19
Ulmus glabra	24	2.75
Chionanthus virginicus	14	2.86
Quercus robur	14	3.07
Ulmus parvifolia	14	3.29
Total	**2882**	

Promote Diversity

Minimize Dominant Species

The table to the right shows the most dominant species within the park. Each species on the list represents 1% or more of the total canopy of the park. Taken in aggregate, these 21 species represent over 52% of the total canopy. Thus, while the park has nearly 350 species of trees, it is very heavily dominated by a few species. Greater diversity makes the canopy more resilient, provides for a healthier park, and will add to the visitor experience.

In order to promote diversity, species should not exceed more than 1% of the total canopy, and cultivars should not exceed 50% of a given species represented.

Diversify Oaks

Oaks (Quercus) are one of the most important genus of trees in North American forests, providing important habitat and ecological services that are critical to healthy ecosystems. While oaks, on the whole are well represented in the park, with 34 species and/or cultivars, just five of these oak species account for 63% of those oaks (654 of 1031). In lieu of gradual replacement of oaks with other genera of trees, oaks should be retained at the current levels around 8-10% of canopy, while diversified within the genera (more oaks of different species).

In addition, four of the five dominant oaks are on the in-decline list on the next page and account for nearly 10% of the total trees in decline. Thus diversification among oaks is critical.

Quantity	Species	Percentage of Overall Trees
552	Liquidambar styraciflua	8.19%
293	Taxodium distichum	4.34%
268	Acer saccharinum	3.97%
247	Quercus palustris	3.66%
233	Cornus florida	3.45%
189	Liriodendron tulipifera	2.80%
172	Juniperus virginiana	2.55%
169	Pinus nigra	2.51%
165	Platanus x acerifolia	2.45%
152	Ilex opaca	2.25%
137	Ginkgo biloba	2.03%
135	Cercis canadensis	2.00%
127	Quercus rubra	1.88%
111	Catalpa speciosa	1.65%
111	Quercus phellos	1.65%
88	Quercus macrocarpa	1.30%
85	Pinus strobus	1.26%
84	Maclura pomifera	1.25%
83	Magnolia x soulangiana	1.23%
81	Quercus coccinea	1.20%
70	Magnolia grandiflora 'Bracken's Brown Beauty'	1.04%

Quantity	Species	Percentage of Overall Trees
247	Quercus palustris	3.66%
127	Quercus rubra	1.88%
111	Quercus phellos	1.65%
88	Quercus macrocarpa	1.30%
81	Quercus coccinea	1.20%
63	Quercus pagoda	0.93%
50	Quercus stellata	0.74%

Re-establish Typologies

The Introduction section of this document established 3 primary goals: (1) Re-establish historic tree layout, (2) Promote diversity of tree species, and (3) Reduce species in decline. In addition, the Historic Framework section dissected the Shaw's historic park plan into a typology consisting of various classifications, or types, based on common characteristics found in the plan. The plan below was developed to help realize the 3 primary goals by utilizing the types extracted from the historic plan.

Typology Classifications

The following pages of this section provide detailed descriptions of each type, as well as implementation criteria and design considerations for Tower Grove Park staff to use when planning for new tree plantings.

Typology Plan As Part Of A Tool Kit

The Tree Typology Plan below has been digitized into a GIS file to be used as part of tool kit for staff to determine what trees to plant, where to plant them, and how they are to be arranged. The GIS file is to be used in combination with a comprehensive tree species list in an accompanying Excel spreadsheet provided to Tower Grove Staff. The Typology Plan GIS file and tree species Excel spreadsheet enable staff to narrow down potential tree species recommended for each classification of the typology based on various attributes. This tool kit is further explained in the following section of this document.

Tree Typology Legend

- Grand Allee
- Secondary Allee
- Ornamental Allee
- Park Perimeter / Street Trees
- Cluster
- Reinforcing Cluster
- Riparian Cluster
- Flowering Cluster
- Specimen
- Horticultural Display
- Open Space / Do Not Plant Area
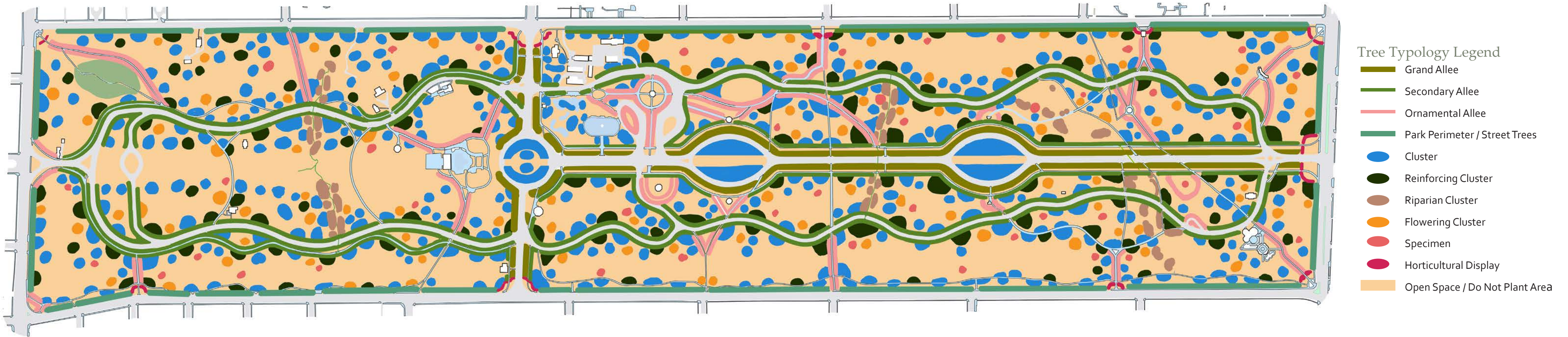
Proposed Tree Typology. Refer to the following pages for additional Tree Typology descriptions and information.

Tree Typologies - Allees

Grand Allee/Streets

Heroic canopy trees at least along the roadway edge. Limited tree palette.

- Main allee should be deciduous and relatively broad canopy: Think Oaks
- Replacement of allees: Wait until there is a 90-100' gap, then replace all at the same time with same species for consistency and light.

Implementation Criteria

Arrangement

- Single row of trees
- Spacing of new allee trees shall match spacing of existing allee trees on either side of the gap that is being filled. If no regular spacing exists, new spacing shall be equal to the mature canopy width plus 5'. (Ex. 30' canopy @ 35' OC)
- Desired setback from the curb is 10', however for most situations, distance from back of curb shall match existing trees. When 5+ trees are being replaced, that is a good opportunity to step back the distance to the desired 10'.

Secondary Allee

Carriageway allees with less regular species selections. These are really about the collection.

- Could include columnar trees, evergreens, too.
- Replacement of allees: Wait till there is a 90-100' gap, then replace all those at the same time with same species. Allows light in and let's trees be similar size.

Implementation Criteria

Arrangement

- Single row of trees
- Spacing of new allee trees shall match spacing of existing allee trees on either side of the gap that is being filled. If no regular spacing exists, new spacing shall be equal to the mature canopy width plus 5'.
- Distance from edge of path to be minimum 8'

Ornamental Allee

Flowering trees, small trees, columnar allees: juniper, hornbeam, etc.

- Focus on collections: witchhazel, cherries, etc.
- If a collection, it should be a true collection with varied cultivars.
- Replacement/ Re-establishment: Full replacement, as needed. Replace individual examples as they are removed.

Implementation Criteria

Arrangement

- Primarily use single row of trees on both sides of path. Certain exceptions may apply.
- Spacing between trees shall vary per site and tree species. As a general rule of thumb, spacing shall be equal to the mature canopy width plus 5'
- Distance from edge of path to be minimum 6'. Exact distance varies per species and site.

Park Perimeter / Street Trees

Canopy trees along the park perimeter, primarily located within City Right-of-Way.

- Tree palette is limited to trees that are appropriate for the Allee, Secondary Alee, and are considered appropriate as street trees by the City's Forestry Division.
- Replacement of street trees: Wait till there is a 90- 100' gap, then replace all those at the same time with same species. Allows light in and let's trees be similar size.

Implementation Criteria

Arrangement

- Single row of trees
- As a general rule of thumb, spacing shall be equal to the mature canopy width plus 5'
- Distance from back of curb / sidewalk to be minimum 8'. If the plant-able space is less than 6', center the tree in the space.

> **NOTE: Placement at Pavilions and Historic Structures**
> To protect structures and to ensure good visibility, all planting typologies should be considered closely in their immediate vacinity, taking into account the following:
> - Identify the most important view shed of the structure and from the roadway or path, adjust plantings to frame that view. Keep large trees 1.5x mature height away from structure on all sides.

The grand allee along Main Drive

Tree Typologies

Cluster

Clusters: small, med/large trees, shrubs. Clusters to be typically 3 – 7 trees, depending on required spacing.

Implementation Criteria

Arrangement:
- Staggered spacing at a distance of the width of mature canopy plus 5'.

Other Considerations:
- No species shall make up more than 20% of total species in a given area.
- Aim to vary attributes (leaf texture,etc.) adjacent clusters and existing trees. See pg. 34 for additional information.
- To determine number of trees per cluster, Multiply the GIS shape's sf by the numbers below:
1. For 30' spacing: 0.001111/sf
2. For 15' Spacing: 0.004444/sf
3. For 12' spacing: 0.006944/sf

Reinforcing Cluster

Reinforcing clusters are higher priorities and help define an open area. Typically evergreen trees.

Implementation Criteria

Arrangement:
- Staggered spacing at a distance of the width of mature canopy plus 5'. (Example: 25' mature canopy tree spaced at 30' O.C.)

Other Considerations:
- No species shall make up more than 20% of total species in a given area.
- Aim to vary attributes (leaf texture, canopy size, leaf color, flowering, fall color) between adjacent clusters and existing trees.
- See Cluster section to the left for determining number of trees per cluster

Riparian Clusters

Trees along water courses are placed in clusters that meander with water courses.

- Clusters of 3-7 trees based on mature form.
- Dramatic forms: weeping willows, cypress, sycamore, river birch
- Smaller, flowering clusters

Implementation Criteria

Arrangement
- Staggered spacing at a distance of the width of mature canopy plus 5'. (Example: 25' mature canopy tree spaced at 30' O.C.)

Other Considerations
- Select riparian species
- See Cluster section to the left for determining number of trees per cluster

Specimen

Individual, unique trees placed strategically as a focal point in the landscape.

- Typically large trees with broad canopies
- Unique leaf or other forms.

Implementation Criteria

Arrangement
- Individual trees where shown on GIS map

Other Considerations
- Amount/type of leaf/fruit litter and the litter's impact on adjacent open space activities.

Horticultural Display

Trees are used to form the backdrop as part of a horticultural display at Park Entrances. Trees should be selected based on the desired effect as part of the larger horticultural idea.

Implementation Criteria

Arrangement
- Trees are to be placed behind entrance gate structures, allowing these architectural features to prominently welcome visitors.
- Tree should be spaced from the structure to allow it to reach mature form.

Other Considerations
- Dark/dense foliage creates a good base for a horticultural display. However, these trees should be spaced more widely to keep open views into the park for a greater sense of welcome. Allow for light to pass between at mature form.

Open Space

Open spaces are shaped and reinforced by allees and clusters.

Implementation Criteria

Considerations
- Allow these spaces to open up over time.
- Once a consistent perimeter of allees are established, open areas may be more actively opened and new clusters established.

Spacing Diagrams

Scenario A

Scenario B

Grand Allee

The diagram to the left of the Grand Allee shows two scenarios. When replacing a few trees (Scenario A), spacing from back of curb shall align with existing trees.

When replacing a gap from many trees, if setback is less than 10', that is time to start stepping back the planting.

Secondary Allee

Secondary Allees are to be a single row of trees along both sides of the carriage paths, and a single row of trees along the outside of the walks adjacent-to and running parallel-with Main Drive

Street Tree

Page 29 calls for new street trees to be a minimum 8' from back of curb/pavement, unless confined to a smaller space. The goal is to avoid planting trees too close to pavement, as seen in the image to the right, to prevent future damage to the trees and pavement

Spacing Diagrams

Scenario A

Scenario B

6' Min.
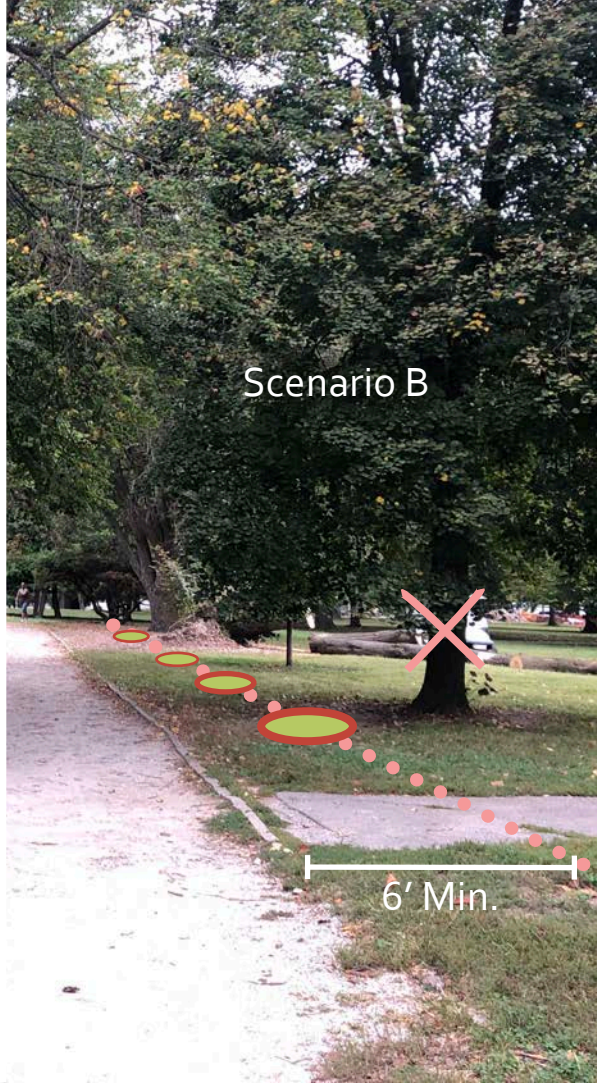
Ornamental Allee
The diagram to the left shows two different scenarios. When replacing a few trees of an ornamental allee (Scenario A), align new tree with existing. When replacing an entire allee (Scenario B), space trees min. 6' from edge of path depending on tree species.

Cluster
This example of a gardenesque cluster within the park. The existing oaks are approaching full-maturity and have grown tightly together. Upon replacement, a cluster within approximately the same footprint might have (A) several more small/medium-sized trees, or (B) be replaced by fewer large trees.

Scenario A

Scenario B

Plan Implementation Tool Kit

Cypress tree grove within an occulus along Main Drive. The central open space aligns with the view corridor from Grand all the way to the Roman Pavilion.
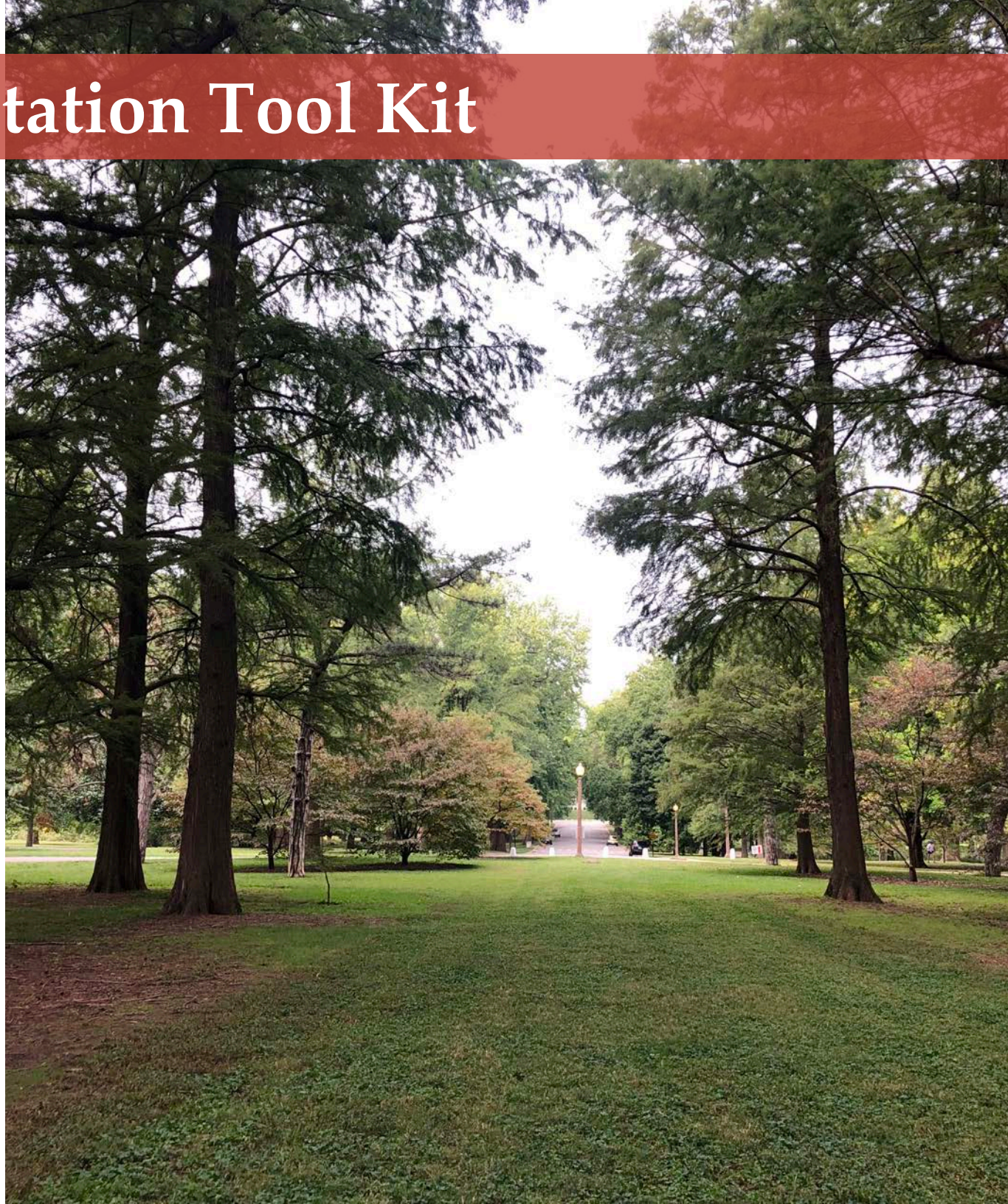
How to Use the Tool Kit

Introduction
The plan toolkit is designed to guide tree selection and placement throughout the park in alignment with the recommendations of the restoration plan.

Identify the Space
The first step in using the toolkit is to identify the priority area to be restored. Following a field assessment, the area should be reviewed in the typologies plan (GIS), and the appropriate proposed typologies can be identified. This will include identifying areas that are proposed as open space that may currently have trees, which will ultimately be cleared over time as trees decline or through selective removals.

Selection of Trees
Based on the typology, the next step is to select trees that fit in that typology, considering the overall diversity of the Park's canopy and particular species targets (species spreadsheet). Once selected, each tree species has recommendations for mature size - which informs spacing and placement.

Layout of Trees
Trees are then laid out in plan, within the typology area, based on size, spacing, and that typology's recommendations. This layout can then be used for purchasing and field placement of the trees. This layout can also be used for as-built record of new trees within the Park's digital inventory.

Prioritization of Restoration Zones
With nearly 7000 trees, it is difficult to determine where to start. Thinking about the visitor experience is a simple way to focus that work -welcoming visitors, creating clear wayfinding, and providing well-defined spaces. These guidelines can serve as a way to focus restoration within an individual area and/or as a way to prioritize park-wide improvements (i.e.: first, restore all of the ornamental allees at entrances.)

Priority Order for Restoration

1. **Welcome visitors: Ornamental Allees at Entries, Horticultural Displays**

2. **Show them around: Grand Allee, Secondary Allees, Ornamental Allees**

3. **Put them in a comfortable room**

   • **Complete the walls: Allees, Secondary Allees**

   • **Reinforce the corners: Reinforcing clusters**

   • **Clean out the clutter: Open up the space**

   • **Hang some artwork: Clusters, Specimens**

Plan Toolkit - Flowchart

This flowchart describes how to use the GIS and spreadsheet-based tree planting tools. The process is described for both new tree planting and for instances of tree removals.

```
┌──────────────┐      ┌──────────────────┐
│ Tree Removal │      │ New Tree Planting │ ········· Select Area with Greatest Need, Follow
└──────────────┘      └──────────────────┘            the Priority Order for Restoration
        │                      │
        └──────────┬───────────┘
                   ▼
      ┌──────────────────────┐
      │ Identify appropriate │ ··········· Use GIS map to identify
      │     typology(ies)    │              the typology
      └──────────────────────┘
          │              │
          ▼              ▼
  ┌──────────────┐  ┌──────────────┐
  │  Open Space  │  │  All Other   │
  │              │  │ Typology(ies)│
  └──────────────┘  └──────────────┘
          │              │
          ▼              ▼
  ┌──────────────┐  ┌──────────────┐
  │ Do not plant │  │ Choose new   │      Use  spreadsheet  to  identify
  │ tree - leave │  │ tree species │ ····· appropriate  replacement  based  on
  │ as open space│  │ and identify │      typology and plan objectives.
  └──────────────┘  │   spacing    │
          │         └──────────────┘
          ▼                 │
  ┌──────────────┐          ▼
  │ If removal,  │  ┌──────────────┐
  │record removed│  │ Layout tree(s)│ ··········· Use GIS map to layout new trees
  │tree, location│  │  within the  │
  │  and type.   │  │ typology area│
  └──────────────┘  └──────────────┘
          │                 │
          │                 ▼
          │         ┌──────────────┐
          │         │ Procure and  │
          │         │ plant tree(s)│
          │         └──────────────┘
          │                 │
          └────────┬────────┘
                   ▼
          ┌──────────────┐
          │ Record new   │
          │ tree planted,│ ··········· Update spreadsheet and
          │ location and │              ArcGIS databases
          │    type.     │
          └──────────────┘
```

Plan Toolkit - Species Selection

Tree Species Selection Workflow

1. Use spreadsheet to filter potential tree species based on the typology in which you with to plant a tree (i.e. cluster, grand allee, etc.)
2. Once the potential tree species list is narrowed down based on typology, Tower Grove Park Forestry staff to use their expertise and the following considerations to choose the species to plant:
   - Species' availability
   - Site conditions (dry vs. wet, available sunlight, soil type/compaction, potential exposure to strong winds)
   - # of trees of the species/variety/cultivar currently in the park
   - Amount/type of litter commonly produced
   - Tree's ability to withstand strong storms if located within storm prone areas

	A	B	C	D	E	F	G	H	I	J	K	L
1	Species	Quantity	Percentage	New Species to Park	Existing in Park	Recommended by TPE	Tree Type	Allee Tree	Cluster	Specimen	Flowering	Columnar
2	Abies balsamea 'Canaan'	2	0.03%				E					
3	Abies concolor	8	0.12%	N	Y		E					
4	Acer buergerianum	3	0.04%	N	Y	Y	D					
5	Acer campestre	3	0.04%				D	Y				
6	Acer carpinifolium	2	0.03%				D					
7	Acer cissifolium	2	0.03%				D					
8	Acer ginnala	4	0.06%				D					
9	Acer ginnala 'Flame'	5	0.07%				D					
10	Acer griseum	2	0.03%	N	Y	Y	D					Y
11	Acer griseum x nikoense 'Ginzam'	1	0.01%				D					
12	Acer japonicum 'Aconitifolium'	2	0.03%				D					
13	Acer miyabei 'Morton' STATE STREET	3	0.04%	N	Y	Y	D	Y				
14	Acer negundo	1	0.01%				D					
15	Acer nigrum	1	0.01%				D					
16	Acer nikoense		0.00%	Y	N		D					
17	Acer palmatum	9	0.13%				D					
18	Acer palmatum 'Bloodgood'	8	0.12%				D					
19	Acer palmatum 'Roseo Marginata'	1	0.01%				D					
20	Acer palmatum var. atropurpureum	1	0.01%				D					
21	Acer palmatum 'Wolff' EMPEROR I	1	0.01%				D					
22	Acer platanoides	10	0.15%				D					
23	Acer platanoides 'Crimson King'	2	0.03%				D					
24	Acer pseudoplatanus	2	0.03%				D					

Supplemental Diagrams - Arrangement And Spacing

Clusters -
Diversify Adjacent Attributes

The intention of the diagram on the right is to show how park staff might aim to diversity the different attributes of tree clusters between proposed clusters and existing adjacent trees, using the Turkish Pavilion area as an example. Please note that the diagram is only an example and not a set-in-stone recommendation for this area. Main tree attributes to consider include: Leaf texture, leaf color, leaf size, fall color, flowering vs. non-flowering, and growth habit (spreading / pyramidal / oval / rounded / etc.)
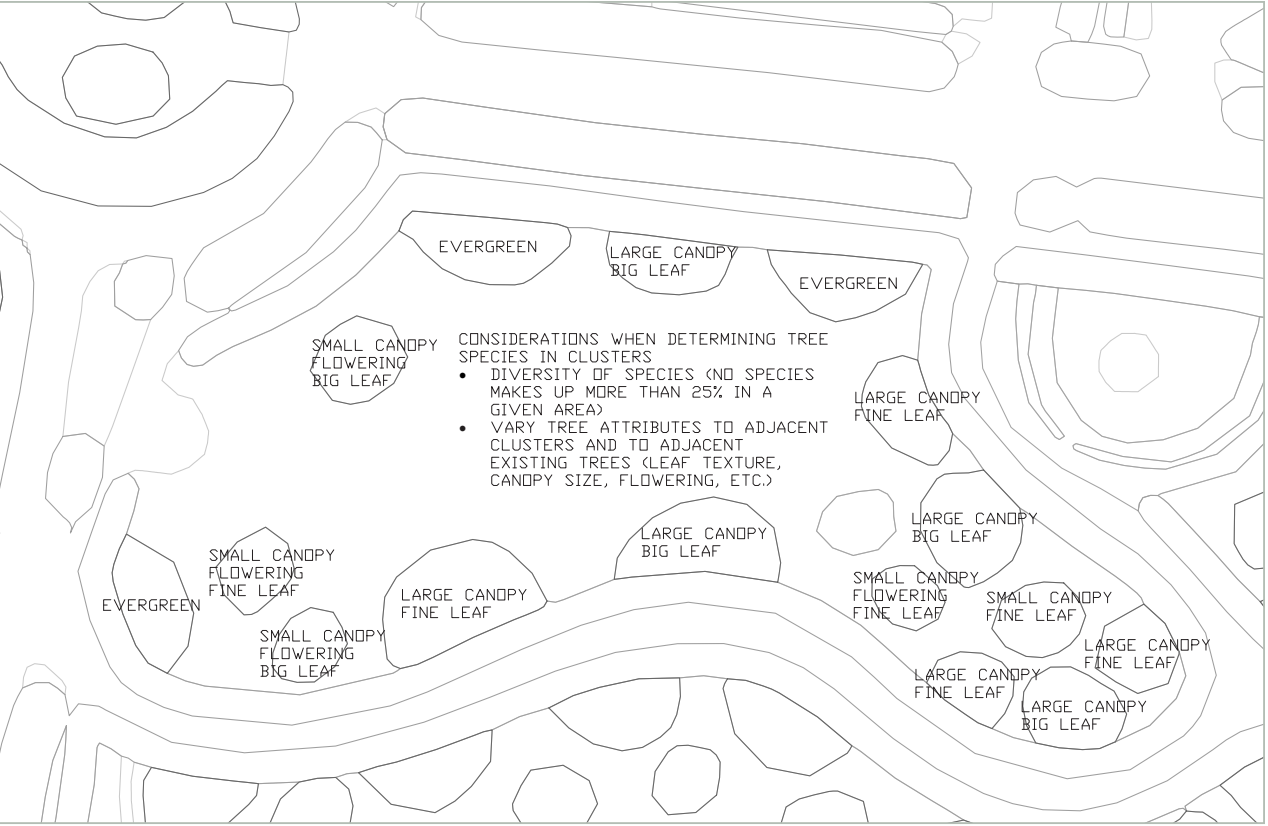
Tree Attribute Diversity Diagram

Spacing/Layout/Arrangement

The intention of the diagram to the right is to portray how trees are to be spaced within the cluster polygons of the ArcGIS File. The diagram shows trees of various sizes with staggered spacing to fit within the polygon.

Tree Spacing / Layout / Arrangement with Diagram

Horticultural display and allee at Thurman entrance to the Park.

Turkish Pavilion Area

Zone I near the Turkish Pavilion is a high priority area. Per the guidance in the recommendations, should phasing over several seasons be required for restoring this area, prioritization would be as follows:

1. Allees

2. Reinforcing Clusters

3. Opening-up of Open Areas

4. Clusters and Specimens

Tree Typology Legend

- 🟩 Grand Allee
- 🟩 Secondary Allee
- 🟥 Ornamental Allee
- 🟩 Park Perimeter / Street Trees
- 🔵 Cluster
- 🟢 Reinforcing Cluster
- 🟤 Riparian Cluster
- 🟠 Flowering Cluster
- 🔴 Specimen
- 🔴 Horticultural Display
- 🟧 Open Space / Do Not Plant Area

Cemetery Gate Allee

Cemetery gate is an example of a historic allee that has fallen into disrepair. It is recommended that this allee be re-established. Along with the allee, entry plantings welcome guests, while reinforcing clusters create a backdrop to the entry sequence.

Tree Typology Legend

- 🟩 Grand Allee
- 🟩 Secondary Allee
- 🟥 Ornamental Allee
- 🟩 Park Perimeter / Street Trees
- 🔵 Cluster
- 🟢 Reinforcing Cluster
- 🟤 Riparian Cluster
- 🟠 Flowering Cluster
- 🔴 Specimen
- 🔴 Horticultural Display
- 🟧 Open Space / Do Not Plant Area
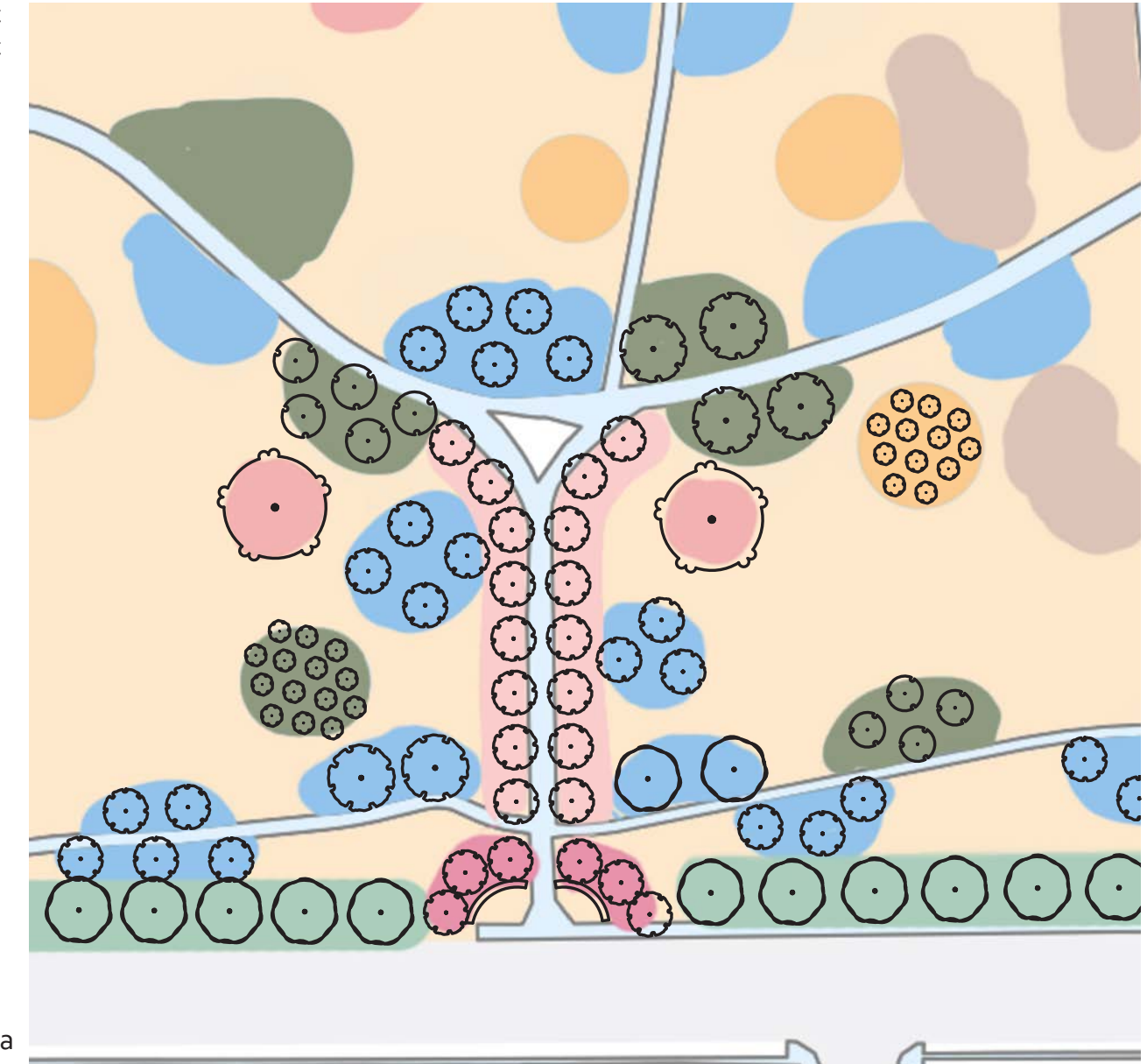
Stupp Center Allee

At the southeast entry to the park, near Stupp Center, the tree planting strategy should be around opening up the entry - pulling back street trees, opening up the trees as part of the horticultural display, and establishing a consistent ornamental allee into the carriage way.

Tree Typology Legend

- Grand Allee
- Secondary Allee
- Ornamental Allee
- Park Perimeter / Street Trees
- Cluster
- Reinforcing Cluster
- Riparian Cluster
- Flowering Cluster
- Specimen
- Horticultural Display
- Open Space / Do Not Plant Area
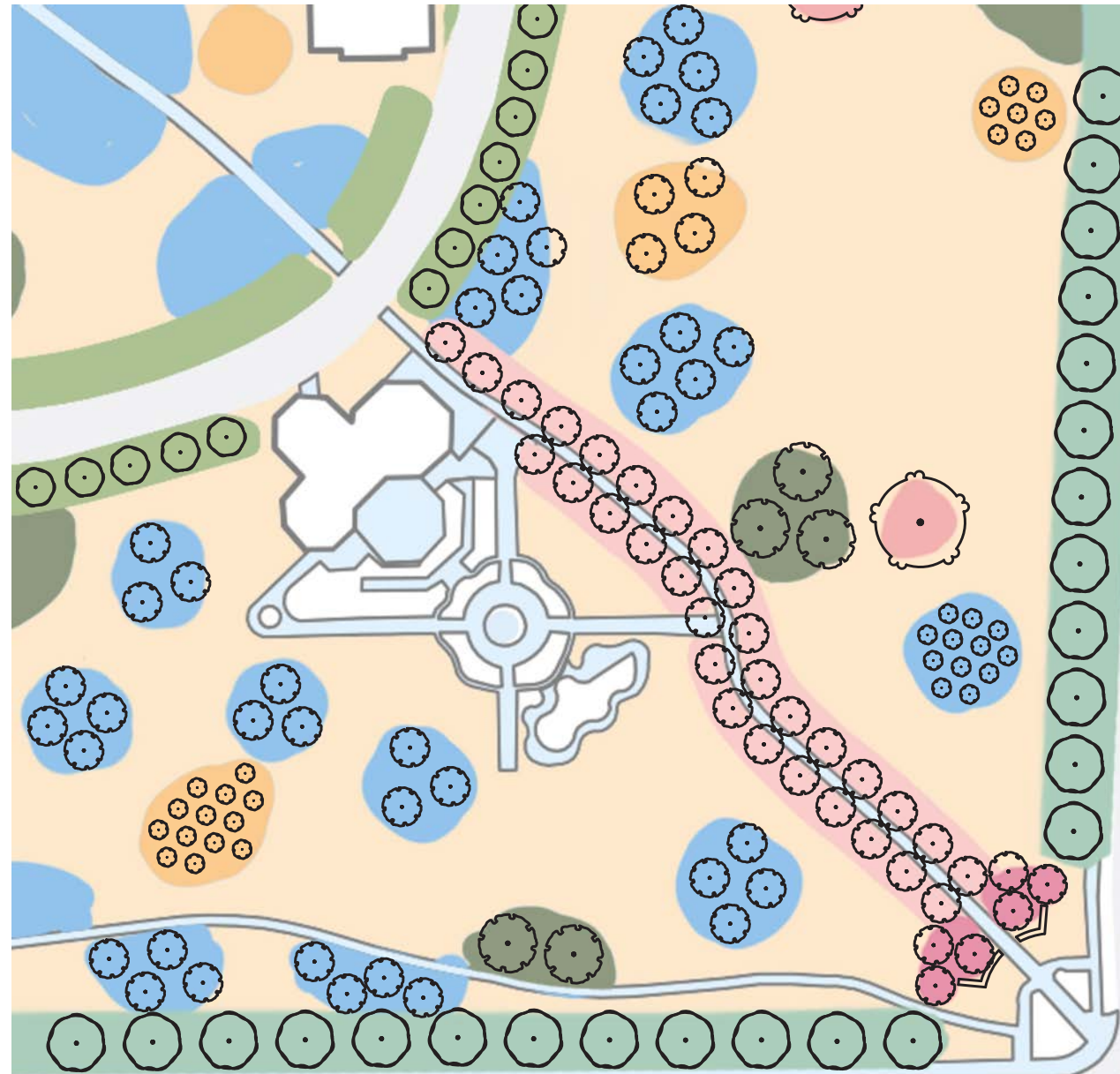
Old Comfort Station Allee

At the northeast corner of the park, the historic layout of walkways has shifted over time, particularly with the construction of the comfort station. The proposed layout replaces the existing allee with a more simplified and open layout. Street trees and horticultural display trees are opened up for a more welcoming approach to the space. `

Tree Typology Legend

- Grand Allee
- Secondary Allee
- Ornamental Allee
- Park Perimeter / Street Trees
- Cluster
- Reinforcing Cluster
- Riparian Cluster
- Flowering Cluster
- Specimen
- Horticultural Display
- Open Space / Do Not Plant Area

TOWER GROVE
— PARK —

Site Tour Plan

Notes and Sketches from the Site Tour
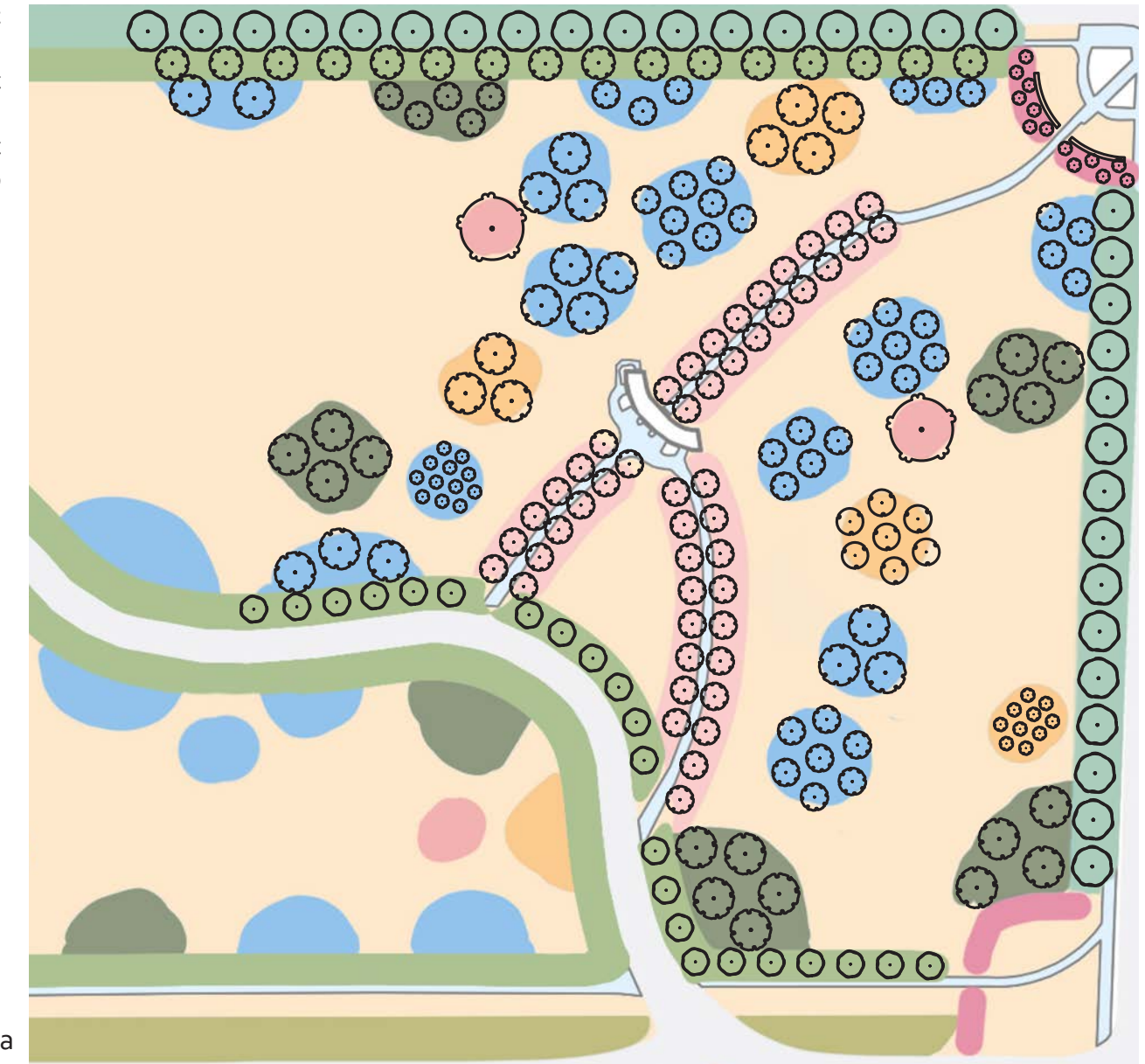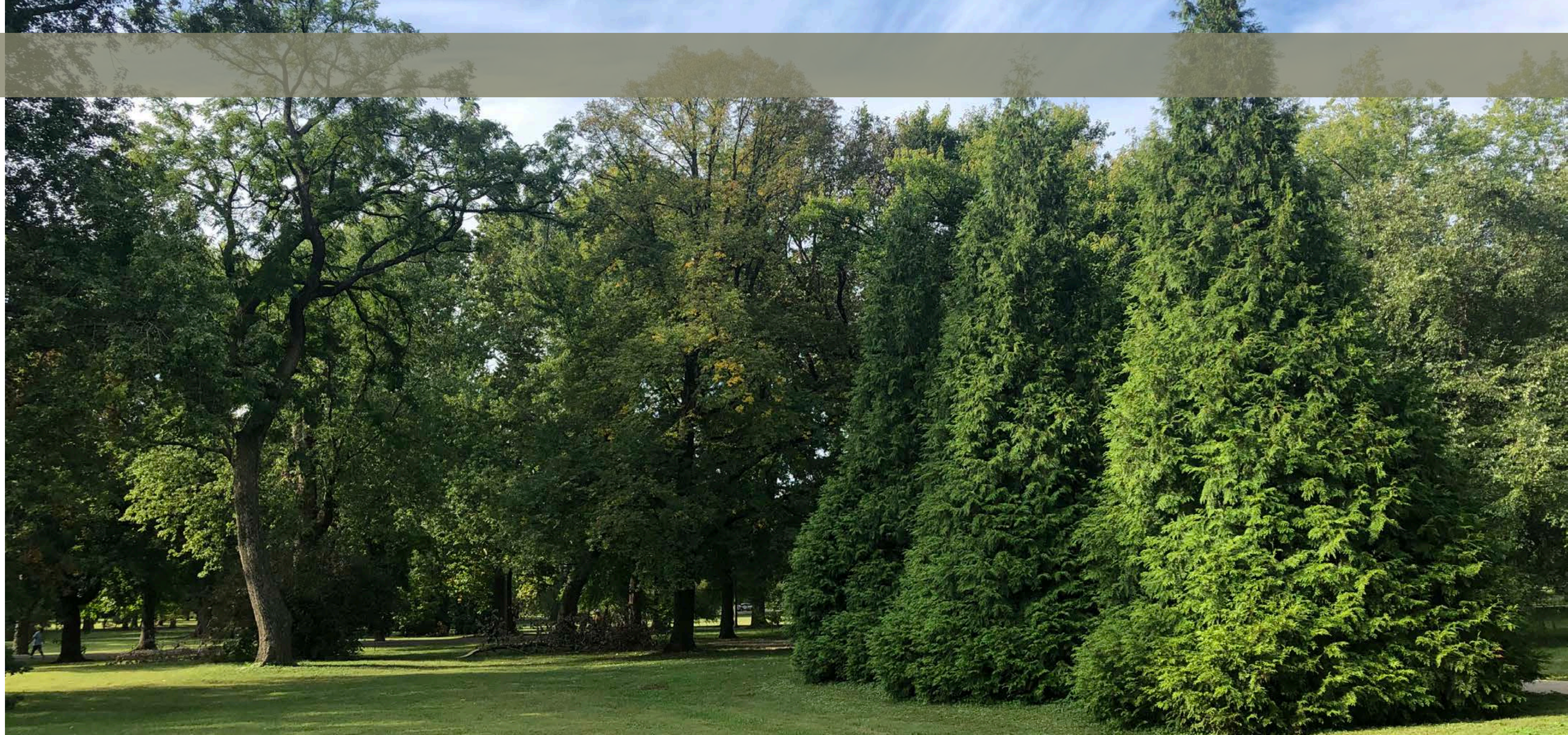
Tree Panel Species List

List of tree recommendations from the expert panel

Acer buergerianum
Acer griseum
Acer miyabei 'Morton' STATE STREET
Acer rubrum 'Frank Jr. Redpoint'
Acer triflorum
Alnus serrulata
Amelanchier canadensis
Asimina triloba
Castanea dentata
Castanea ozarkensis
Cedrus deodara
Celtis tenuifolia
Cephalanthus occidentalis
Cercidiphyllum japonicum
Cercis canadensis 'little woody'
Chionanthus retusus
Cladrastic kentukea
Cladrastis kentukea
Cornus alternifolia
Cornus drummondii
Cornus foemina
Cornus racemosa
Corylus americana
Cotinus coggygria 'ancot golden spirit'
Eucommia ulmoides
Euonymus atropurpureus
Euonymus bungeana
Fagus sylvatica
Gymnocladus dioicus
Gymnocladus dioicus 'espresso'
Hamamelis vernalis
Hamamelis virginiana
Heptacodium miconoides
Laburnum anagyroides
Lagerstromea indica
Liriodendron tulipifera 'emerald city'
Maclura pomifera

Maclura pomifera 'white shield'
Magnolia ashei
Malus 'royal raindrops'
Malus 'spring snow'
Metasequoia glyptostrobodies 'raven'
Nyssa sylvatica 'david odom'
Parrotia persica
Pinus banksiana
Pinus bungeana
Pinus flexilis 'Vanderwolf's Pyramid'
Pinus parviflora
Pinus resinosa
Pinus tabuliformis
Pinus thunbergii
Platanus x acerifolia 'exclamation'
Platanus x acerifolia 'morgan circle'
Prunus cistena
Prunus sargentii
Prunus virginiana 'canada red'
Ptelea trifoliata
Quercus muehlenbergii
Quercus nutallii (texana)
Quercus texana
Quercus x comptoniae
Salix discolor
Sambucus canadensis
Sophora japonica
Staphylea trifolia
Taxodium distichum 'Mickelson'
Taxodium distichum var. imbricarium
Tilia cordata
Ulmus americana 'princeton'
Ulmus x frontier

Toolkit - Tree Selections

List of tree selections from the selector tool

Species	Quantity	Percentage	New Species to Park	Priority Tree	Tree Type	Grand Allee	Allee	Ornamental Allee	Cluster	Reinforcing Cluster	Flowering Cluster	Riparian	Specimen
Abies balsamea 'Canaan'	2	0.03%	N		E					x			
Abies concolor	8	0.12%	N		E					x			
Acer buergerianum	3	0.04%	N	Y	D				x				
Acer campestre	3	0.04%	N	Y	D		x	x	x				
Acer carpinifolium	2	0.03%	N		D								
Acer cissifolium	2	0.03%	N		D								
Acer ginnala	4	0.06%	N		D								
Acer ginnala 'Flame'	5	0.07%	N		D								
Acer griseum	2	0.03%	N	Y	D				x				
Acer griseum x nikoense 'Ginzam'	1	0.01%	N		D				x				
Acer japonicum 'Aconitifolium'	2	0.03%	N		D				x				
Acer miyabei 'Morton' STATE STREET	3	0.04%	N	Y	D	x	x						
Acer negundo	1	0.01%	N		D				x				
Acer nigrum	1	0.01%	N		D								
Acer nikoense		0.00%	Y		D								
Acer palmatum	9	0.13%	N		D			x					
Acer palmatum 'Bloodgood'	8	0.12%	N		D			x					
Acer palmatum 'Roseo Marginata'	1	0.01%	N		D			x					
Acer palmatum var. atropurpureum	1	0.01%	N		D			x					
Acer palmatum 'Wolff' EMPEROR I	1	0.01%	N		D			x					
Acer platanoides	10	0.15%	N		D								
Acer platanoides 'Crimson King'	2	0.03%	N		D								
Acer pseudoplatanus	2	0.03%	N		D								
Acer rubrum	45	0.67%	N		D								
Acer rubrum 'Frank Jr. Redpoint'		0.00%	N	Y	D		x		x			x	
Acer rubrum var. Drummondii	17	0.25%	N		D							x	
Acer saccharinum	268	3.98%	N		D				x				
Acer saccharum	53	0.79%	N		D				x				
Acer saccharum 'Green Mountain'	1	0.01%	N		D		x		x				
Acer saccharum 'Legacy'	3	0.04%	N		D		x		x				
Acer triflorum		0.00%	Y	Y	D				x				
Acer truncatum	5	0.07%	N		D								
Acer x freemanii	2	0.03%	N		D								
Acer x freemanii 'Armstrong'	6	0.09%	N		D		x						
Acer x freemanii 'Jeffersred' AUTUMN BLAZE	6	0.09%	N		D								
Aesculus chinensis	1	0.01%	N	Y	D							x	x
Aesculus flava	2	0.03%	N	Y	D							x	x
Aesculus glabra	12	0.18%	N		D				x				
Aesculus hippocastanum	6	0.09%	N	Y	D							x	x
Aesculus pavia	25	0.37%	N		D							x	
Aesculus x carnea	5	0.07%	N		D								
Aesculus x carnea 'Briotti'	3	0.04%	N		D								
Ailanthus altissima (Invasive)	13	0.19%	N		D								
Albizia julibrissin (Invasive)	1	0.01%	N		D								
Alnus glutinosa (Listed as noxious weed)	4	0.06%	N		D								
Alnus glutinosa 'Imperialis'	2	0.03%	N		D								
Alnus incana subsp. rugosa	1	0.01%	N		D								
Alnus serrulata	4	0.06%	N	Y	D				x				

Species	Quantity	Percentage	New Species to Park	Priority Tree	Tree Type	Grand Allee	Allee	Ornamental Allee	Cluster	Reinforcing Cluster	Flowering Cluster	Riparian	Specimen
Alnus x spaethii	3	0.04%	N		D								
Amelanchier arborea	24	0.36%	N		D								
Amelanchier arborea 'Robin Hill'	5	0.07%	N		D								
Amelanchier canadensis		0.00%	Y	Y	D						x		
Amelanchier x grandiflora 'Autumn Brilliance'	2	0.03%	N	Y	D				x		x		
Aralia spinosa	4	0.06%	N	Y	D				x				
Asimina triloba	22	0.33%	N	Y	D				x				
Asimina triloba 'Shenandoah'	1	0.01%	N		D				x				
Asimina triloba 'Wabash'	1	0.01%	N		D				x				
Betula alleghaniensis	3	0.04%	N		D				x				
Betula lenta	3	0.04%	N		D				x				
Betula nigra	27	0.40%	N		D				x			x	
Betula nigra 'BNMTF' DURA-HEAT	5	0.07%	N		D				x			x	
Betula nigra 'Cully' HERITAGE	3	0.04%	N	Y	D				x				
Betula populifolia 'whitespire'		0.00%	Y		D								
Carpinus betulus	10	0.15%	N		D								
Carpinus betulus 'Frans Fontaine'	20	0.30%	N	Y	D		x	x					
Carpinus caroliniana	20	0.30%	N		D					x			
Carya aquatica	3	0.04%	N		D							x	
Carya cordiformis	5	0.07%	N		D				x				
Carya glabra	7	0.10%	N		D				x				
Carya illinoinensis	17	0.25%	N		D				x				
Carya laciniosa	13	0.19%	N	Y	D				x				x
Carya ovata	1	0.01%	N	Y	D				x				x
Carya pallida	3	0.04%	N		D				x				
Carya texana	7	0.10%	N		D				x				
Carya tomentosa	5	0.07%	N		D				x				
Castanea dentata		0.00%	Y	Y	D								x
Castanea mollissima	4	0.06%	N		D								
Castanea ozarkensis		0.00%	Y	Y	D								x
Castanea sativa	2	0.03%	N		D				x				
Castanea sativa x crenata	2	0.03%	N		D				x				
Catalpa bignonioides	10	0.15%	N		D				x	x			
Catalpa ovata	1	0.01%	N	Y	D				x	x			
Catalpa speciosa	111	1.65%	N		D				x	x			
Cedrus deodara		0.00%	Y	Y	E		x			x			x
Celtis laevigata	24	0.36%	N		D		x		x				
Celtis occidentalis	49	0.73%	N	Y	D	x	x		x				
Celtis tenuifolia		0.00%	Y	Y	D				x				
Cephalanthus occidentalis		0.00%	N	Y	D							x	
Cercidiphyllum japonicum	8	0.12%	N	Y	D				x	x			
Cercis canadensis	135	2.01%	N		D			x			x		
Cercis canadensis 'Appalachian Red'	4	0.06%	N		D			x			x		
Cercis canadensis f. alba	15	0.22%	N		D			x			x		
Cercis canadensis 'Forest Pansy'	9	0.13%	N		D			x			x		
Cercis canadensis 'little woody'		0.00%	N	Y	D			x			x		
Cercis chinensis 'Bubble Gum'	2	0.03%	N		D			x			x		
Chamaecyparis nootkatensis 'pendula'		0.00%	Y		E				x				
Chionanthus retusus	2	0.03%	N	Y	D			x	x				
Chionanthus virginicus	14	0.21%	N		D			x	x		x		

Species	Quantity	Percentage	New Species to Park	Priority Tree	Tree Type	Grand Allee	Allee	Ornamental Allee	Cluster	Reinforcing Cluster	Flowering Cluster	Riparian	Specimen
Cladrastic kentukea	1	0.01%	N	Y	D				x	x			
Cladrastis kentukea 'Perkins Pink'	3	0.04%	N		D				x	x			
Cornus alternifolia		0.00%	Y	Y	D			x	x				
Cornus contraversa 'Variegata'	1	0.01%	N		D				x				
Cornus drummondii		0.00%	Y	Y	D				x		x	x	
Cornus florida	233	3.46%	N		D			x	x		x		
Cornus florida 'Cherokee Chief'	1	0.01%	N		D			x	x		x		
Cornus florida "Cherokee Brave"	1	0.01%	N		D			x	x		x		
Cornus florida 'Cherokee Brave'	2	0.03%	N		D			x	x		x		
Cornus florida 'Cherokee Princess'	10	0.15%	N		D			x	x		x		
Cornus florida 'Cloud Nine'	2	0.03%	N		D			x	x		x		
Cornus florida x kousa	1	0.01%	N		D			x	x		x		
Cornus foemina		0.00%	Y	Y	D						x		
Cornus kousa	23	0.34%	N		D			x	x		x		
Cornus kousa 'Heart Throb'	1	0.01%	N		D			x	x		x		
Cornus kousa var. chinensis	1	0.01%	N		D			x	x				
Cornus kousa var. chinensis 'Milky Way'	1	0.01%	N	Y	D			x	x				
Cornus mas	67	1.00%	N		D				x				
Cornus mas 'Redstone'	3	0.04%	N		D				x				
Cornus racemosa		0.00%	Y	Y	D				x				
Cornus 'Rutban' AURORA	2	0.03%	N		D				x				
Corylus americana		0.00%	Y	Y	D				x				
Corylus avellana		0.00%	Y		D				x				
Corylus colurna	7	0.10%	N		D				x				
Cotinus coggygria	2	0.03%	N		D				x				
Cotinus coggygria 'ancot golden spirit'		0.00%	N	Y	D				x				
Cotinus obovatus	10	0.15%	N	Y	D				x		x		
Crataegus crus-galli var. inermis	10	0.15%	N		D				x				
Crataegus marshallii	3	0.04%	N		D				x				
Crataegus mollis	1	0.01%	N		D				x				
Crataegus phaenopyrum	17	0.25%	N		D				x				
Crataegus spp.	12	0.18%	N		D				x				
Crataegus viridis 'Winter King'	8	0.12%	N		D				x				
Cryptomeria japonica	1	0.01%	N	Y	E					x			
Cryptomeria japonica 'Yoshino'	2	0.03%	N		E		x	x	x	x			
Diospyros virginiana	29	0.43%	N	Y	D				x				
Eucommia ulmoides	3	0.04%	N	Y	D		x	x	x				
Euonymus atropurpureus	6	0.09%	N	Y	D				x				
Euonymus bungeana		0.00%	Y	Y	S				x				
Evodia daniellii (Tetradium daniellii)		0.00%	Y	Y	D				x				
Fagus grandifolia	19	0.28%	N		D								x
Fagus sylvatica	1	0.01%	N	Y	D		x	x					x
Fagus sylvatica 'Pendula'	1	0.01%	N		D								x
Fagus sylvatica 'Purple Fountain'	2	0.03%	N		D								x
Fagus sylvatica 'Riversii'	2	0.03%	N	Y	D								x
Franklinia altamaha		0.00%	Y		D								
Fraxinus americana	22	0.33%	N		D								
Fraxinus americana 'Autumn Purple'	8	0.12%	N		D								
Fraxinus pennsylvanica	14	0.21%	N		D	x	x						
Fraxinus profunda	6	0.09%	N		D		x						

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Fraxinus quadrangulata	11	0.16%	N		D								
Ginkgo biloba	137	2.03%	N		D	x	x						
Ginkgo biloba 'Autumn Gold'		0.00%	N		D	x							
Ginkgo biloba 'Fastigiata'		0.00%	N		D			x	x				
Ginkgo biloba 'Magyar'		0.00%	N		D				x				
Gleditsia triacanthos	3	0.04%	N	Y	D		x		x				
Gleditsia triacanthos f. inermis	14	0.21%	N		D		x						
Gleditsia triacanthos f. inermis 'Skyline'		0.00%	N		D		x		x				
Gymnocladus dioicus	59	0.88%	N	Y	D				x				
Gymnocladus dioicus 'espresso'		0.00%	N	Y	D				x				
Halesia Carolina		0.00%	Y	Y	D			x			x		
Halesia monticola	1	0.01%	N		D								
Halesia tetraptera	4	0.06%	N		D								
Hamamelis vernalis		0.00%	Y	Y	D			x			x		
Hamamelis virginiana		0.00%	Y	Y	D			x			x		
Heptacodium miconoides		0.00%	Y	Y	D			x			x		
Hovenia dulcis		0.00%	Y		D								
Ilex aquifolium	5	0.07%	N		E				x	x			
Ilex decidua	25	0.37%	N		D				x	x			
Ilex opaca	152	2.26%	N		E				x	x			
Ilex opaca 'Greenleaf'	19	0.28%	N		E				x	x			
Ilex x attenuata 'Fosteri'	24	0.36%	N		E		x		x	x			
Juglans cinerea	3	0.04%	N		D				x				
Juglans nigra	24	0.36%	N		D				x				
Juniperus chinensis	2	0.03%	N		E				x				
Juniperus chinensis 'Hetzii'	43	0.64%	N		E				x				
Juniperus chinensis 'Hetzii Columnaris'	7	0.10%	N		E			x					
Juniperus virginiana	172	2.55%	N		E				x	x			
Juniperus virginiana 'Canaertii'	31	0.46%	N		E				x	x			
Juniperus virginiana 'Taylor'		0.00%	N		E			x					
Koelreuteria paniculata	19	0.28%	N		D		x		x				
Laburnum anagyroides		0.00%	Y	Y	D				x				
Lagerstroemia indica		0.00%	Y	Y	D			x			x		
Liquidambar styraciflua	552	8.20%	N		D	x	x						
Liquidambar styraciflua 'Rotundiloba'		0.00%	N		D	x							
Liquidambar styraciflua 'Slender Silhouette'		0.00%	N		D			x					
Liriodendron tulipifera	189	2.81%	N		D	x	x						
Liriodendron tulipifera 'emerald city'		0.00%	N	Y	D	x	x						
Maackia amurensis	3	0.04%	N	Y	D				x				
Maackia chinensis	2	0.03%	N		D								
Maclura pomifera	84	1.25%	N	Y	D		x		x	x			
Maclura pomifera 'white shield'		0.00%	N	Y	D				x	x			
Magnolia acuminata	22	0.33%	N		D				x			x	
Magnolia ashei		0.00%	Y	Y	D				x				
Magnolia 'Butterflies'	7	0.10%	N		D								
Magnolia denudata	1	0.01%	N		D								
Magnolia grandiflora	60	0.89%	N		E				x	x			
Magnolia grandiflora 'Alta'	1	0.01%	N		E				x	x			
Magnolia grandiflora 'Bracken's Brown Beauty'	70	1.04%	N		E				x	x			
Magnolia grandiflora 'Claudia Wannamaker'	8	0.12%	N		E				x	x			

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Magnolia grandiflora 'DD Blanchard'	15	0.22%	N		E				x	x			
Magnolia grandiflora 'Edith Bogue'	17	0.25%	N		E				x	x			
Magnolia grandiflora 'Green Giant'	5	0.07%	N		E				x	x			
Magnolia grandiflora 'Little Gem'	2	0.03%	N		E		x		x	x			
Magnolia grandiflora 'Majestic Beauty'	16	0.24%	N		E				x	x			
Magnolia grandiflora 'Victoria'	1	0.01%	N		E				x	x			
Magnolia 'Jane'	5	0.07%	N		D								
Magnolia kobus	2	0.03%	N		D								
Magnolia liliflora	1	0.01%	N		D								
Magnolia liliflora 'Ann'	7	0.10%	N		D								
Magnolia macrophylla	5	0.07%	N		D								
Magnolia macrophylla subsp. ashei	1	0.01%	N		D								
Magnolia 'Red Baron'	3	0.04%	N		D								
Magnolia salicifolia	9	0.13%	N		D								
Magnolia spp.	33	0.49%	N		D								
Magnolia stellata	32	0.48%	N		D				x			x	
Magnolia 'Toro'	3	0.04%	N		D								
Magnolia tripetala	2	0.03%	N	Y	D			x					
Magnolia virginiana	51	0.76%	N		D				x		x		
Magnolia virginiana 'Jim Wilson' MOONGLOW	3	0.04%	N	Y	D				x	x			
Magnolia 'Vulcan'	4	0.06%	N		D								
Magnolia x kewensis 'Wada's Memory'	3	0.04%	N		D								
Magnolia x loebneri 'Leonard Messell'	1	0.01%	N		D								
Magnolia x loebneri 'Merrill'	1	0.01%	N		D								
Magnolia x loebneri 'White Rose'	1	0.01%	N		D								
Magnolia x soulangiana	83	1.23%	N		D				x			x	
Magnolia x soulangiana 'Alexandrina'	4	0.06%	N		D				x			x	
Malus baccata	3	0.04%	N		D							x	
Malus 'Coralcole' CORALBURST	3	0.04%	N		D							x	
Malus coronaria	3	0.04%	N		D							x	
Malus domestica 'McIntosh'	1	0.01%	N		D							x	
Malus 'royal raindrops'		0.00%	N	Y	D				x			x	
Malus sargentii	7	0.10%	N		D							x	
Malus spp.	51	0.76%	N		D							x	
Malus 'spring snow'		0.00%	N	Y	D				x	x		x	
Malus x astrosanguinea	1	0.01%	N		D							x	
Malus x 'JFS-KW5'	2	0.03%	N		D							x	
Malus x 'Lollizam'	2	0.03%	N		D							x	
Metasequoia glyptostrobodies 'raven'		0.00%	N	Y	D	x	x			x			
Metasequoia glyptostroboides	19	0.28%	N		D	x	x			x			
Morus alba	23	0.34%	N		D				x				
Morus rubra	2	0.03%	N		D				x				
Nyssa aquatica	25	0.37%	N		D							x	
Nyssa sylvatica	51	0.76%	N		D			x	x				
Nyssa sylvatica 'david odom'		0.00%	N	Y	D			x	x			x	
Nyssa sylvatica 'Green Gable'	2	0.03%	N		D			x	x				
Nyssa sylvatica 'Wildfire'	1	0.01%	N	Y	D			x	x			x	
Ostrya virginiana	8	0.12%	N	Y	D			x	x	x			
Oxydendrum arboreum	11	0.16%	N		D				x				
Parrotia persica	5	0.07%	N	Y	D				x	x			

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Paulownia tomentosa	7	0.10%	N	Y	D						x		x
Phellodendron amurense	6	0.09%	N	Y	D						x		x
Picea abies	29	0.43%	N		E				x	x			
Picea abies 'Cupressina'		0.00%	N		E			x	x	x			
Picea glauca	6	0.09%	N	Y	E				x	x			
Picea omorika	2	0.03%	N		E				x	x			
Picea orientalis	1	0.01%	N		E				x	x			
Picea pungens	8	0.12%	N		E				x	x			
Picea pungens 'Hoopsi'	1	0.01%	N		E				x	x			
Picea pungens var. glauca	1	0.01%	N	Y	E				x	x			
Pinus aristate		0.00%	Y		E				x				
Pinus banksiana	2	0.03%	N	Y	E				x				
Pinus bungeana	1	0.01%	N	Y	E				x				
Pinus cembra		0.00%	Y	Y	E				x	x			
Pinus echinata	18	0.27%	N		E		x		x	x			
Pinus flexilis 'Vanderwolf's Pyramid'	3	0.04%	N	Y	E				x	x			
Pinus glauca 'Pendula'		0.00%	Y		E			x	x				
Pinus heldreichii var. Leucodermis	2	0.03%	N		E				x	x			
Pinus koraiensis	1	0.01%	N		E								
Pinus nigra	169	2.51%	N		E								
Pinus parviflora		0.00%	Y	Y	E				x				x
Pinus resinosa	2	0.03%	N	Y	E				x	x			
Pinus rigida x taeda	5	0.07%	N	Y	E				x	x			
Pinus strobus	85	1.26%	N		E				x	x			
Pinus sylvestris	7	0.10%	N		E								
Pinus tabuliformis		0.00%	Y	Y	E				x				
Pinus taeda	40	0.59%	N		E		x		x	x			
Pinus taeda x echinata	10	0.15%	N		E		x		x	x			
Pinus thunbergii	4	0.06%	N	Y	E				x				
Pinus virginiana	5	0.07%	N		E				x				
Pistacia chinensis	2	0.03%	N		D				x	x			
Platanus occidentalis	54	0.80%	N		D	x	x		x				
Platanus orientalis	1	0.01%	N		D								x
Platanus x acerifolia	165	2.45%	N		D	x	x						
Platanus x acerifolia 'exclamation'		0.00%	N	Y	D	x	x						
Platanus x acerifolia 'morgan circle'		0.00%	N	Y	D	x	x						x
Platycladus orientalis	2	0.03%	N		E				x				x
Poliothyrsis sinensis	2	0.03%	N		D								
Poncirus trifoliata	2	0.03%	N		D				x				
Populus deltoides	6	0.09%	N	Y	D				x			x	
Populus grandidentata	1	0.01%	N		D				x				
Populus nigra		0.00%	Y		D				x				
Populus tremula 'Erecta'		0.00%	Y		D				x				
Populus tremuloides	9	0.13%	N		D				x				
Populus tremuloides 'Prairie Gold'		0.00%	N		D								
Prunus americana	45	0.67%	N		D								
Prunus angustifolia	32	0.48%	N		D								
Prunus cistena		0.00%	Y	Y	D								
Prunus munsoniana	3	0.04%	N		D								
Prunus sargentii		0.00%	Y	Y	D								

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Prunus serotina	24	0.36%	N		D								
Prunus serrulata 'Kwanzan'	17	0.25%	N	Y	D			x	x				
Prunus spp.	10	0.15%	N		D								
Prunus subhirtella	8	0.12%	N		D								
Prunus subhirtella 'Autumnalis'	7	0.10%	N		D								
Prunus subhirtella 'Pendula'	1	0.01%	N		D								
Prunus subhirtella var. pendula	1	0.01%	N		D								
Prunus virginiana	18	0.27%	N		D								
Prunus virginiana 'canada red'		0.00%	N	Y	D				x				
Prunus virginiana 'Schubert'	7	0.10%	N		D								
Prunus x 'Okame'	3	0.04%	N	Y	D			x	x				
Prunus x 'Snofozam'	1	0.01%	N		D								
Prunus x yedoensis	65	0.97%	N		D								
Pseudocydonia sinensis	2	0.03%	N		D								
Pseudolarix amabilis	2	0.03%	N	Y	D				x				
Pseudotsuga menziesii	1	0.01%	N	Y	E				x				
Psuedolarix kaempferi		0.00%	Y		D								
Ptelea trifoliata	1	0.01%	N	Y	D				x				
Pyrus calleryana 'Bradford'	1	0.01%	N		D								
Quercus acutissima	4	0.06%	N		D								
Quercus alba	23	0.34%	N		D	x							x
Quercus bicolor	29	0.43%	N		D	x							
Quercus bicolor 'Bucks Unlimited Oak'	9	0.13%	N		D								
Quercus coccinea	81	1.20%	N		D								
Quercus ellipsoidalis	3	0.04%	N	Y	D	x	x						
Quercus falcata	29	0.43%	N		D				x				
Quercus glandulifera	2	0.03%	N	Y	D				x				
Quercus imbricaria	14	0.21%	N		D								
Quercus lyrata	14	0.21%	N	Y	D	x	x						
Quercus macrocarpa	88	1.31%	N		D				x				
Quercus marilandica	5	0.07%	N		D				x				
Quercus michauxii	14	0.21%	N		D				x				
Quercus montana	7	0.10%	N		D				x				
Quercus muehlenbergii	14	0.21%	N	Y	D	x			x				
Quercus nigra	6	0.09%	N		D				x				
Quercus nutallii (texana)		0.00%	Y	Y	D	x	x		x				
Quercus pagoda	63	0.94%	N		D				x				
Quercus palustris	247	3.67%	N		D				x				
Quercus palustris 'Green Pillar'		0.00%	N		D	x							
Quercus phellos	111	1.65%	N		D				x				
Quercus prinoides	8	0.12%	N		D				x				
Quercus robur	16	0.24%	N		D				x				
Quercus robur 'Fastigiata'	1	0.01%	N	Y	D				x				
Quercus robur x bicolor 'Long'	6	0.09%	N		D				x				
Quercus rubra	127	1.89%	N		D	x		x	x				
Quercus shumardii	23	0.34%	N		D			x	x				
Quercus stellata	50	0.74%	N		D				x				
Quercus texana	7	0.10%	N	Y	D				x				x
Quercus variabilis	2	0.03%	N		D				x				
Quercus velutina	9	0.13%	N		D								

Species	Quantity	Percentage	New Species to Park	Priority Tree	Tree Type	Grand Allee	Allee	Ornamental Allee	Cluster	Reinforcing Cluster	Flowering Cluster	Riparian	Specimen
Quercus wutaishanica	1	0.01%	N		D								
Quercus x bebbiana	2	0.03%	N		D								
Quercus x comptoniae		0.00%	Y	Y	D		x		x				x
Quercus x jackiana	1	0.01%	N		D								
Quercus x schuettei 'Kimberley Selection'	5	0.07%	N		D								
Quercus x warei 'Nadler' Kindered Spirit Oak	10	0.15%	N		D								
Rhamnus caroliniana	5	0.07%	N		D								
Rhamnus cathartica	1	0.01%	N		D								
Robinia pseudoacacia	23	0.34%	N		D								
Robinia pseudoacacia 'Purple Robe'	1	0.01%	N	Y	D				x				
Salix alba 'Tristis'	1	0.01%	N	Y	D								x
Salix babylonica	5	0.07%	N		D							x	
Salix discolor		0.00%	Y	Y	D				x			x	
Salix eriocephala	2	0.03%	N		D							x	
Salix interior	3	0.04%	N		D							x	
Salix matsudana	2	0.03%	N		D							x	
Salix nigra	5	0.07%	N		D							x	
Sambucus canadensis		0.00%	Y		D				x				
Sapindus drummondii		0.00%	Y	Y	D				x				
Sassafras albidum	31	0.46%	N		D				x				
Sciadopitys verticillate		0.00%	Y		E								
Sophora japonica		0.00%	Y	Y	D		x	x	x				
Staphylea trifolia		0.00%	Y	Y	D				x				
Stewartia pseudocamellia	2	0.03%	N		D								
Styphnolobium japonicum	10	0.15%	N		D								
Styrax japonicus	1	0.01%	N	Y	D				x				
Styrax japonicus 'Emerald Pagoda'	2	0.03%	N		D								
Syringa reticulata	22	0.33%	N		D			x					
Syringa reticulata 'Ivory silk'		0.00%	N	Y	D			x					
Taxodium ascendens	7	0.10%	N		D		x					x	
Taxodium distichum	293	4.35%	N		D		x					x	
Taxodium distichum 'Mickelson'		0.00%	N	Y	D		x		x			x	
Taxodium distichum nutans		0.00%	N		D		x		x			x	
Taxodium distichum 'Peve Minaret'	2	0.03%	N		D				x			x	
Taxodium distichum var. imbricarium		0.00%	N	Y	D		x		x			x	
Tetradium daniellii	4	0.06%	N	Y	D								x
Thuja 'Green Giant'	37	0.55%	N		E				x	x			
Thuja occidentalis	14	0.21%	N		E				x				
Tilia americana	31	0.46%	N		D		x		x				
Tilia americana var. heterophylla	1	0.01%	N		D		x		x				
Tilia cordata	64	0.95%	N	Y	D	x	x		x				
Tilia cordata 'Greenspire'	2	0.03%	N		D		x		x				
Tilia platyphyllos	2	0.03%	N		D				x				
Tilia platyphyllos 'Laciniata'	3	0.04%	N		D				x				
Tilia tomentosa	5	0.07%	N		D				x				
Tilia tomentosa 'Sterling'	1	0.01%	N		D				x				
Tilia x euchlora	3	0.04%	N		D				x				
Torreya taxifolia	3	0.04%	N		E				x				
Tsuga canadensis	31	0.46%	N		E					x			
Ulmus alata	1	0.01%	N		D		x						

Species	Quantity	Percentage	New Species to Park	Priority Tree	Tree Type	Grand Allee	Allee	Ornamental Allee	Cluster	Reinforcing Cluster	Flowering Cluster	Riparian	Specimen
Ulmus americana	32	0.48%	N		D		x						
Ulmus americana 'American Liberty'	1	0.01%	N		D		x						
Ulmus americana 'princeton'		0.00%	N	Y	D	x	x						
Ulmus carpinifolia	6	0.09%	N		D								
Ulmus carpinifolia 'Homestead'	4	0.06%	N		D								
Ulmus carpinifolia 'Jersey'	1	0.01%	N		D								
Ulmus crassifolia	5	0.07%	N		D								
Ulmus davidiana var. japonica 'JFS-Bieberich'	1	0.01%	N		D								
Ulmus davidiana var. japonica 'Morton'	6	0.09%	N		D								
Ulmus glabra	15	0.22%	N		D								
Ulmus parvifolia	14	0.21%	N		D				x	x			
Ulmus parvifolia 'UPMTF' BOSQUE	5	0.07%	N	Y	D				x	x	x		
Ulmus procera	1	0.01%	N		D								
Ulmus proinqua		0.00%	Y		D								
Ulmus pumila	41	0.61%	N		D								
Ulmus rubra	25	0.37%	N		D								
Ulmus thomasii	4	0.06%	N		D								
Ulmus x frontier		0.00%	Y	Y	D				x				
Ulmus x hollandica	5	0.07%	N		D				x				
Ulmus x spp.	4	0.06%	N		D								
Vitex agnus-castus (will not work)		0.00%	Y		D								
x Chitalpa tashkentensis	2	0.03%	N		D								
x Cuprocyparis leylandii		0.00%	Y		E				x	x			
x Gordlinia grandiflora SWEET TEA	1	0.01%	N	Y	S						x		
Zanthoxylum americanum	2	0.03%	N		D				x				
Zelkova serrata	10	0.15%	N		D				x				
Zelkova serrata 'Village Green'	2	0.03%	N	Y	D				x				
Ziziphus jujube		0.00%	Y	Y	D				x				