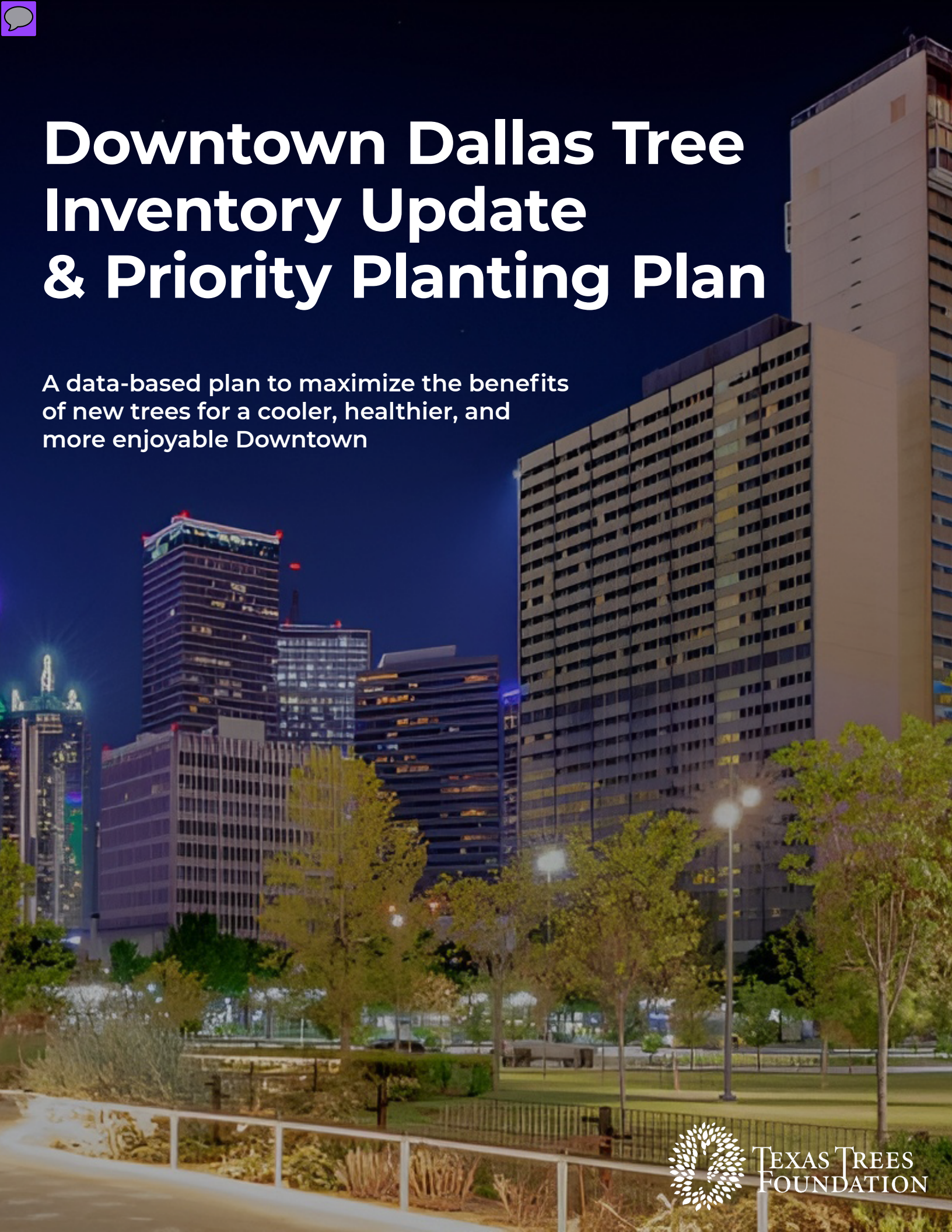
Downtown Dallas Tree Inventory Update & Priority Planting Plan

A data-based plan to maximize the benefits of new trees for a cooler, healthier, and more enjoyable Downtown



Texas Trees Foundation

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1. Executive Summary

1.1 Purpose

This report was prepared by Texas Trees Foundation (Texas Trees) on behalf of Downtown Dallas Inc. (DDI) to assess the current state of the urban forest in Downtown Dallas and identify high impact tree-planting locations for DDI's historic 2025 tree planting initiative, which will add 500 new trees to Downtown Dallas.

Five hundred new trees is a significant investment that would increase the downtown canopy by 7%.1 New trees provide immense benefits to downtown residents, workers and visitors: providing shade and cooling (15 degrees or more) to combat the urban heat island effect; mitigating noise and air pollution from major roadways; improving the pedestrian experience; and beautifying the downtown environment. These improvements in the urban environment will drive meaningful physical and mental health benefits for downtown residents, employees, and visitors, as well as substantial economic returns, as more businesses will be attracted to the area.

1.2 Methodology

In order to ensure that the substantial investment in new trees can yield the highest possible benefit, DDI partnered with Texas Trees to:

Inventory and assess 2,000 downtown trees, building on a full assessment conducted by Texas Trees in 2015.

Conduct a geospatial analysis to identify and prioritize potential tree planting sites, balancing multiple priorities.

Identify high impact tree planting sites that align findings of the geospatial analysis with ground truthing conducted by Texas Trees' team of International Society of Arboriculture (ISA) certified arborists.

1.3 Findings

Downtown tree canopy has increased over the past 9 years, a result of DDI's concerted investment in parks and green spaces. At 6.7%, the tree canopy still lags urban design best practices of 30%+ canopy. Planting new trees combined with best management practices will increase the longevity of existing and new trees while also expanding the tree canopy.

Downtown's trees are relatively young and small, with an average diameter of 10 inches and an average lifespan of 18 years compared to a nationwide average of 19 to 28 years for urban street trees. Informed site and species selection and improved planting and management practices could increase the longevity of downtown trees, increasing the size and benefits generated by each tree.

Texas Trees also discovered there are several clusters of high-impact planting locations downtown, detailed in section 4.2, in which there are high levels of activity and pedestrian utilization with very few trees.

1.4 Planting Recommendations

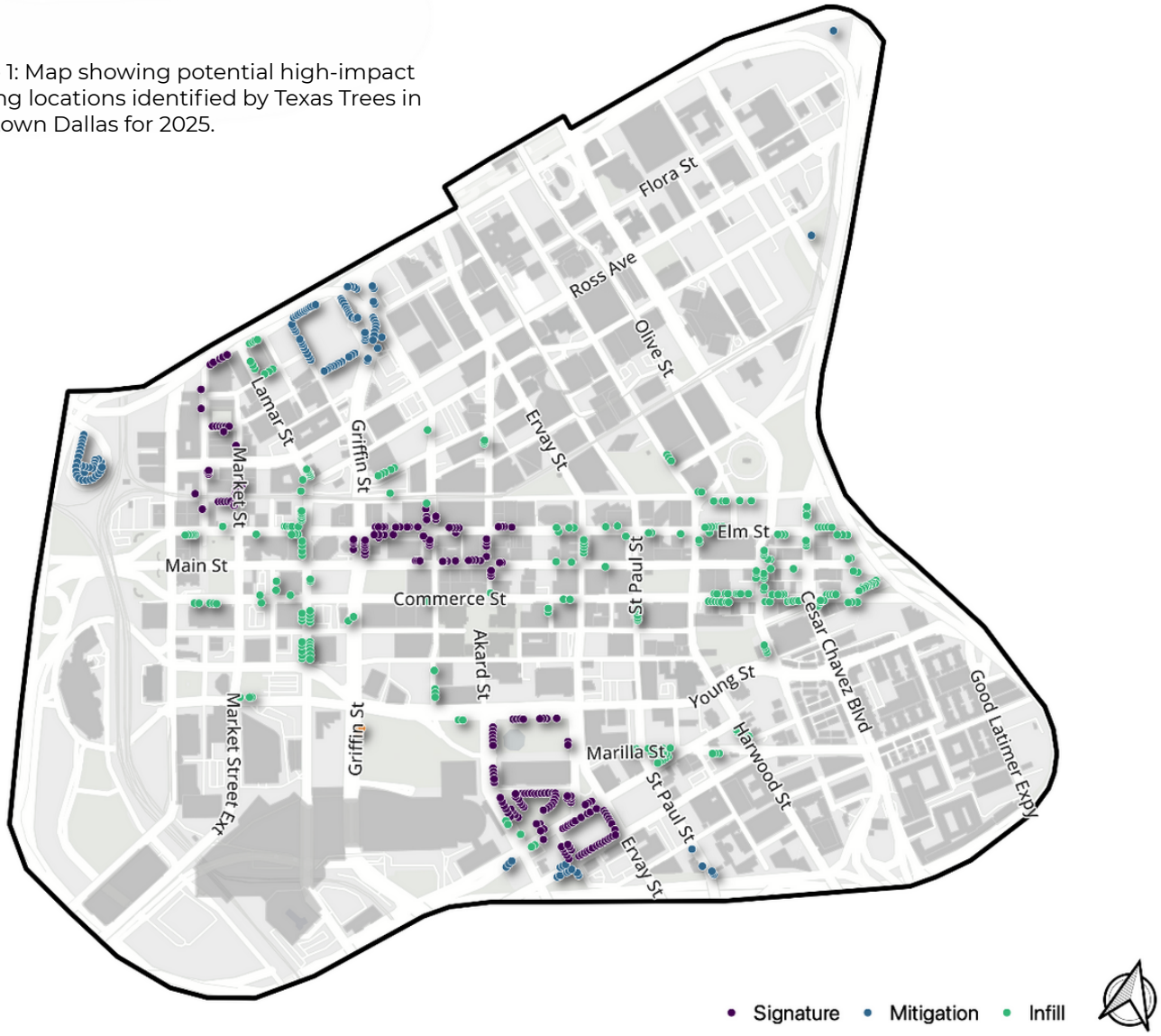
Texas Trees identified 700 potential high-impact tree planting sites for 2025 to initiate a new wave of downtown greening (Figure 1). These sites fall into three categories:

Signature Projects: These are projects where a significant number of trees could be introduced to up to three high-visibility areas (Market Street, Elm/Field, and City Hall). These projects are closely aligned with the planting priority areas identified through geospatial data analysis.

Mitigation Sites: Five locations that could support a very significant number of trees to buffer highways and create gateways into downtown. While not as centrally located as signature projects, they are comparatively simple and cost effective to execute, located primarily in open green space on public land.

Street Tree Infill: These are opportunities to plant trees along six priority corridors that are well-suited to trees, creating a continuous shaded, green walking experience for downtown pedestrians. At least 45 of these sites are empty tree wells and other open green spaces that could be executed with relative ease.

Figure 1: Map showing potential high-impact planting locations identified by Texas Trees in downtown Dallas for 2025.



In addition to these initial planting sites, Texas Trees has identified other high impact zones that could support hundreds of additional trees in years to come. These areas include the Arts District, Deep Ellum, and the area around the Dallas Convention Center.

1.5 Next Steps

In order to support the success of this inaugural tree planting program, we recommend DDI take the following critical steps:

Planting:

Shade trees need adequate space to grow to maturity and produce maximum benefits to Downtown Dallas. Where possible, provide larger landscape areas with room for multiple trees and understory landscape plants. These "groves" of trees have the most significant aesthetic, shade, and health benefits, and increase tree longevity. Avoid tree wells when possible; when tree wells must be used, select appropriate tree species better suited to this space.

Watering and Maintenance:

Dallas summers are hot and dry; new trees require 2-3 years of concerted watering support to fully establish. Irrigation (where possible) or deep hand watering 2-3x/ week is necessary during this initial period. We recommend DDI designate adequate irrigation and maintenance funds to ensure that newly-planted trees will succeed.

Species Selection:

We recommend investing in a diverse mix of native, climate-adapted tree species, suited to the available space and other conditions based on planting location. Choosing the right tree for each location increases the longevity and impact of DDI's investment.

2. Background

2.1 Downtown Dallas, Inc. (DDI)

Downtown Dallas, Inc. (DDI) works with the City of Dallas and downtown corporate stakeholders to help maintain and improve city streetscapes for the benefit of downtown workers, residents, and visitors. A private, non-profit organization, DDI is responsible for management of the Downtown Improvement District (DDID), a 1.4 square mile area located within the boundaries of I-30, I35, Texas State Highway Spur 366 (Woodall Rogers Freeway), and US Highway 75 (Julius Schepps Freeway). (Figure 2) DDI is the champion of a clean and safe Downtown, and of the economic development and vibrancy of this community of diverse, unique neighborhoods.

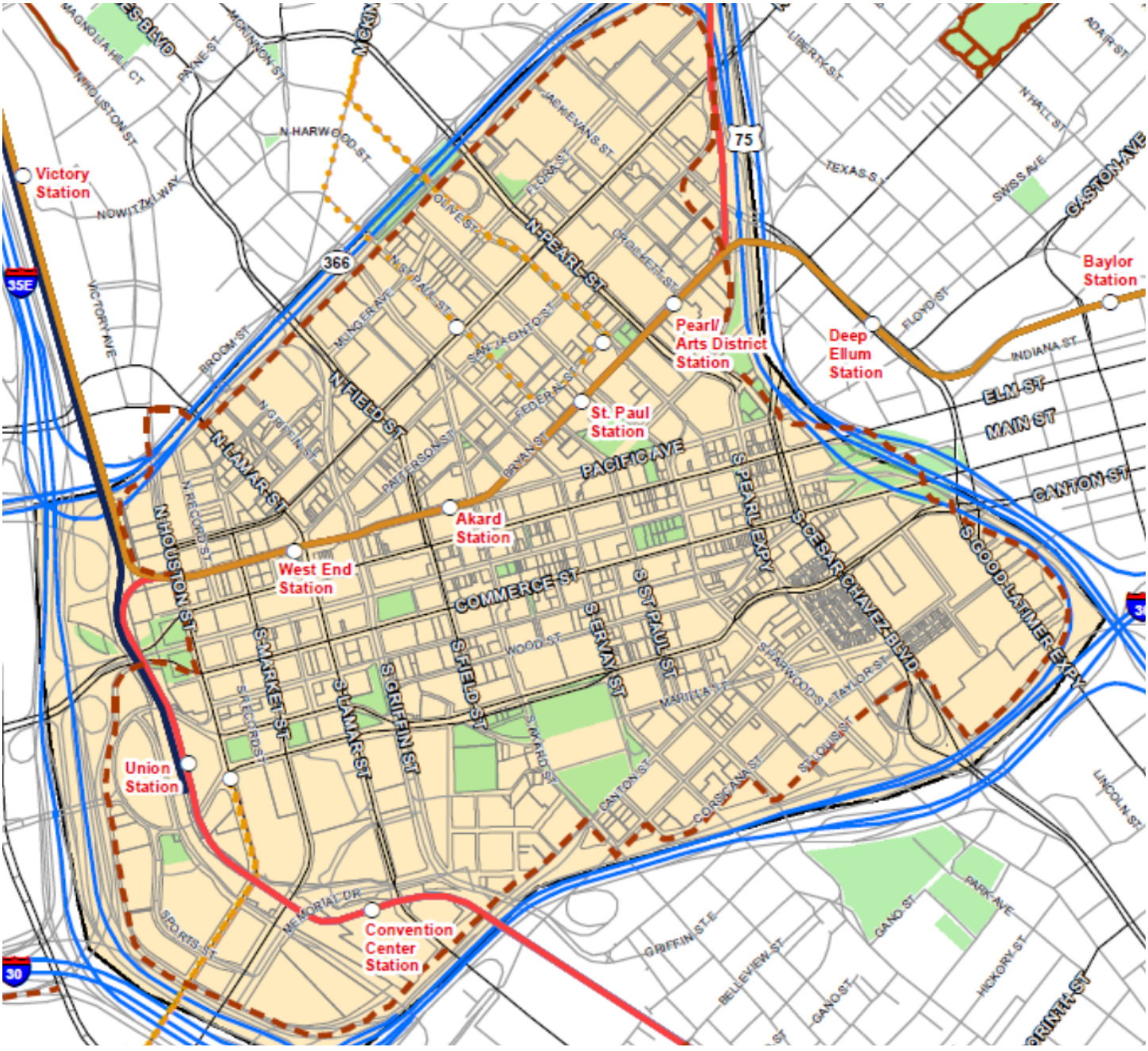


Figure 2. Map showing the Downtown Dallas Improvement District (DDID), which is outlined in blue.

2.2 Texas Trees Foundation (TTF)

Texas Trees Foundation is a nonprofit organization that advances urban forestry through collaboration, education, and action to realize healthy, resilient landscapes for people and trees. Since its inception in 1982, Texas Trees has grown from a tree planting organization supporting our city's parks to a strategic green space leader, working with cities and communities throughout Texas (and beyond) to improve quality of life for everyone.

Texas is experiencing phenomenal growth and development, which is accompanied by rising temperatures and poor air quality. Trees are crucial to addressing the challenges facing Dallas and making the city sustainable and resilient. Texas Trees strives to maximize the benefits the urban forest provides as it has proven to be the most impactful method to mitigate urban heat and many other issues affecting human health and wellbeing.

2.3 The Importance of Trees

Trees offer a wide variety of benefits to cities including pollution reduction, energy savings, heat island mitigation, storm water management, erosion control, wildlife habitat, beautification, and improvements to human health.

Trees are a key component of a city's infrastructure. However, unlike traditional gray infrastructure, when properly planted and managed, the value of urban trees increases over time. In the US alone, urban forests save over $10 billion annually in ecosystem benefits.3 Investing in its tree canopy is one of the most cost-effective ways the City of Dallas and DDI can improve the quality of life downtown and benefit economically.

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The Power of Trees

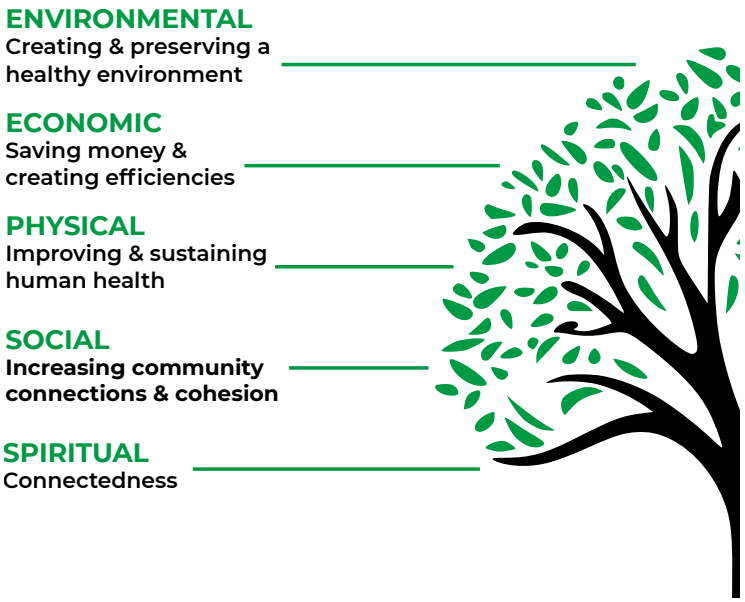

Figure 3. The Benefits of Trees

One of the most important attributes of urban trees is their ability to lower temperatures. Densely developed areas such as downtown Dallas typically contain sizeable urban heat islands, locations where the concentration of pavement, buildings and other impervious surfaces results in greater heat absorption leading to significantly higher air and surface temperatures. Trees are the most impactful strategy to cool and enhance urban environments, frequently lowering surface temperatures by 15-20 degrees or more. This contributes to the health of the community, reducing heat-related illnesses and deaths.

Trees provide many vital benefits to human health including:

Improved air quality.
Trees remove pollutants and particulate matter from the air, mitigating the impacts of motor vehicles and construction activities. Cleaner air results in fewer illnesses and deaths from asthma and other diseases related to air quality.

Stormwater management.
Tree roots and canopies capture rainfall, reducing runoff, soil erosion, and slow flooding.

Improved emotional and physical health and wellbeing.
Trees make it possible for people to spend more time outdoors, resulting in increased physical activity. Numerous studies show that an environment with trees helps to reduce stress, improves mental health and focus, and increases social interactions.

Increase safety.
Trees provide separation between pedestrians and drivers, and studies have shown that people drive slower along tree lined streets. The presence of trees has also been shown to reduce crime rates.

Cities with healthy residents and employees have more robust, stable and productive workforces and populations with increased rates of saving and spending. Trees increase property value, with large, established shade trees capable of raising property value by 15%. Green spaces and trees also draw visitors and support employer and employee retention – key goals for downtown's businesses. Investment in trees can generate multiple returns to the district and its property owners.

2.4 2015 Tree Inventory and Ecosystem Services Benefits Report

In 2015, DDI partnered with the Texas Trees Foundation (TTF) to conduct an inventory of accessible public and private trees in the DDID and calculate the environmental benefits these trees provide. Key findings included:

Number of trees: 6,218

Canopy cover: 7.4%

Most common species: live oak, cedar elm, Shumard red oak

Size: Over 60% of trees were between 4-12 inches in diameter

Tree condition: 92.9% of trees were in fair to excellent condition (5,7181 trees)

Downtown trees provided annual benefits of $19,795 in carbon storage and sequestration, $44,514 in energy savings, and had a structural value of $17.8 million.

This assessment of the downtown Dallas urban forest serves as a baseline for future

7.4%
canopy cover

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inventories and evaluations. An additional 500 trees were added to the inventory by DDI between December 2022 and May 2024.

2.5 2025 Tree Planting Initiative

Downtown Dallas Inc. has made great strides in advancing the quality of life for residents and businesses. DDI's 2024 stakeholder survey showed overall downtown satisfaction rates at 83%, but notably only 41% of people were satisfied with the current state of tree canopy and landscaping. In order to improve the resident and business experience of Downtown Dallas, DDI has launched a signature initiative supported by an increase in the Public Improvement Districts assessment to plant 500 new trees throughout downtown.

DDI's vision also aligns with City of Dallas priorities to combat urban heat and care for and expand the urban forest, as described in the City's 2020 Comprehensive Climate and Environmental Action Plan, and 2022 Urban Forest Master Plan.

To achieve this goal, DDI has collaborated with TTF to update the 2015 report and develop a plan to enhance greenspace and reduce urban heat through strategic tree planting. The plan was developed to identify and prioritize areas of the Downtown Dallas District that will provide the maximum benefit to downtown employees, residents, and visitors.

Plan development included the following activities:

- Update the existing tree inventory
- Analyze aerial imagery cross-referenced with inventory, environmental, and population data, and
- Utilize the findings and foresters to develop a priority planting plan identifying locations for the proposed trees.

This report provides DDI with comprehensive findings from certified arborists and cutting-edge algorithmic models. The report identifies precise planting locations throughout downtown that can be used as a roadmap for developing planting projects, i.e. organized efforts to plant a large number of trees in one event, and planting and maintenance strategies to increase the health and longevity of downtown trees. Additionally, the report will support DDI in budgeting for future projects and ongoing tree care and maintenance. Investments in Downtown Dallas' urban forest will have impactful, long-lasting benefits for the economy and people of Dallas.

3. Methodology

The current tree health and management needs of inventoried trees were assessed, ecosystem service benefits of the trees were calculated, and tree canopy cover was determined based on the latest geospatial technology. Geospatial models were constructed with up-to-date economic, social, ecological, and land-usage information to identify areas of Downtown that were both under-forested and would benefit the most from tree plantings. After the model identified priority areas that would benefit the most from new trees, TTF certified arborists ground-verified model findings and recommended specific planting sites.

3.1 Tree Inventory

The inventory portion of the update consisted of assessing approximately 2000 trees along key corridors within the DDID. Species, diameter, condition, and location data were recorded for each tree using TreePlotter, a comprehensive GIS-based tree inventory and management software program. The initial phase of the inventory focused on Commerce, Elm, Akard, and Harwood Streets, which were identified by DDI as heavily used, high-impact corridors. The inventory was then expanded into locations that the data analysis identified as potential priority areas, including portions of Lamar, Griffin, St. Paul, Marilla, and Young Streets.

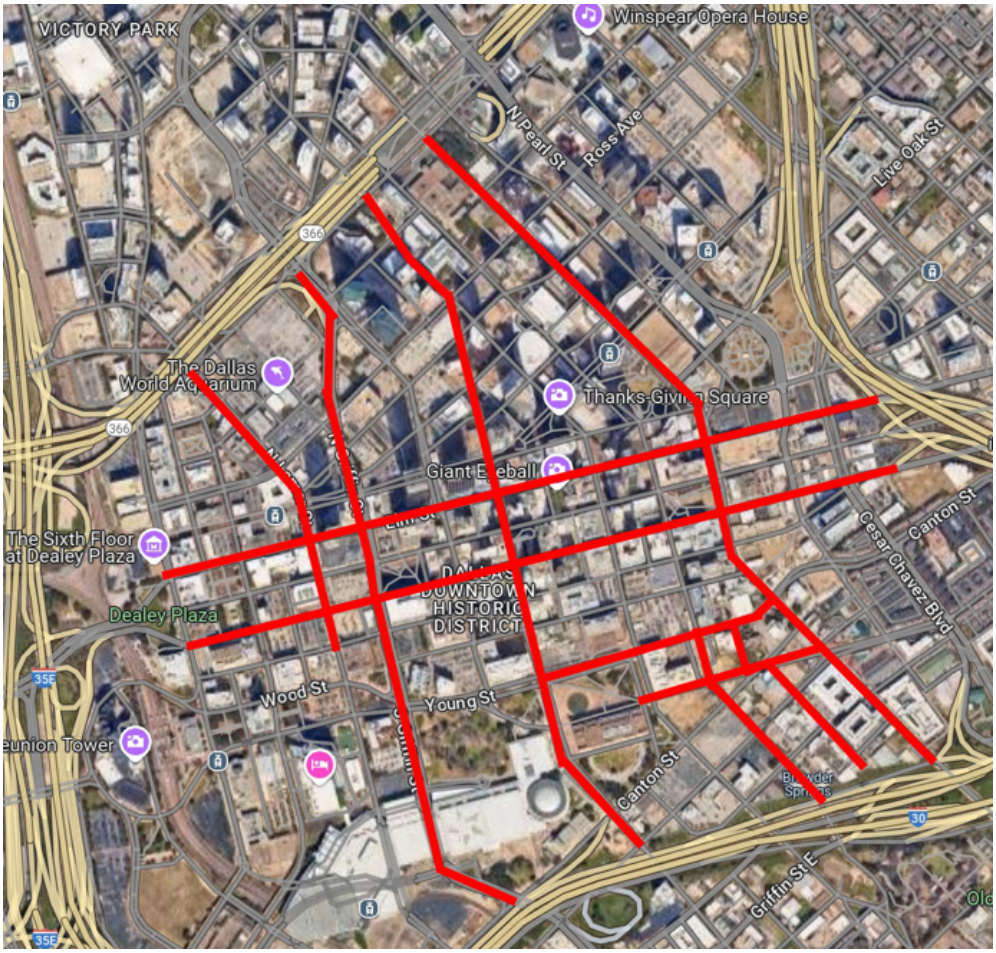
All trees along the selected streets were inventoried. Data collected included location, species, size, and condition. Size was determined by the diameter of the tree's trunk at breast-height (1.3 meters above the ground). Condition was assessed on a scale of good to poor condition based on the following criteria.

Good – Few apparent problems or issues; few dead limbs or leaves and the tree is growing extremely well with little to no scarring, wounds, or decay.

Fair – Moderate apparent problems or issues; few dead limbs or twigs were present, and leaves may have been slightly chlorotic or scorched/wilted. Root collar may be buried but few scars, wounds or decay present.

Poor – Many problems and issues were present, including but not limited to wounds and decay; many scars, buried root collars and death or decline of large tree parts.

Due to the inherently subjective nature of condition data, results cannot be directly compared to data from the 2015 report. However, data regarding the condition of individual trees is recorded on TreePlotter, so the findings recorded here can be ground-verified with ease by DDI, TTF, or third parties.



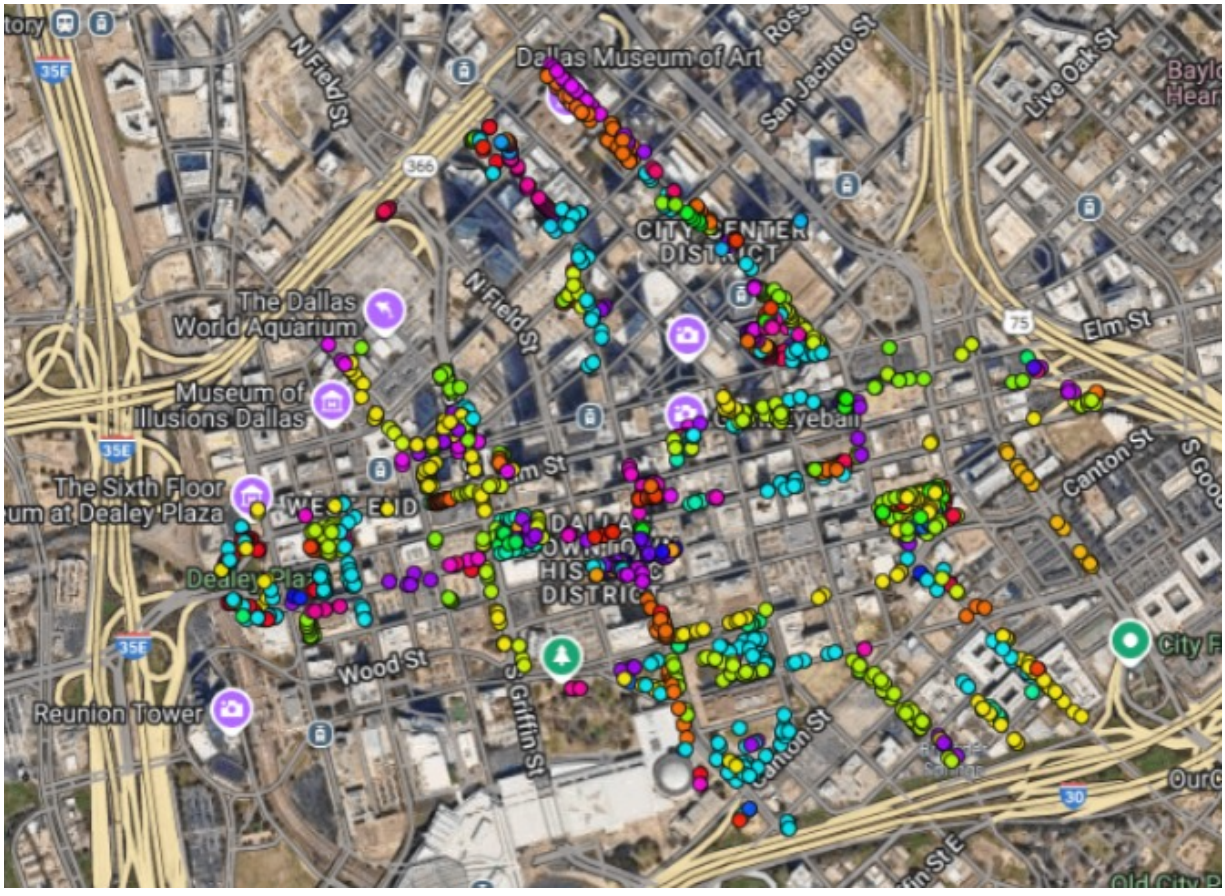


Figure 4. Top map shows downtown streets highlighted in red that were inventoried in 2024. The bottom map shows inventoried trees, represented by different colored dots to denote tree species, on the TTF tree plotter software

3.2 Ecosystem Benefits Calculation

The estimated environmental benefits provided by the existing DDID urban forest were calculated using i-Tree Eco, a computer software tool designed to assess and value urban forest resources. The tool utilizes tree species, size, light exposure, and mortality rate to calculate current and future benefits.

3.3 Canopy Cover Assessment

Tree canopy coverage was calculated using TreePlotter Canopy software. This software utilizes the USDA's National Agriculture Imagery Program (NAIP) imagery to classify landcover as trees, shrubs, low-lying vegetation, bare soil/dry vegetation, impervious surface, or water. The program uses Light Detection and Ranging (LiDAR) data to estimate height of vegetation to differentiate between trees and other vegetation.

3.4 Geospatial Analysis

TTF partnered with Owen Wilson-Chavez to develop a spatial prioritization model (Figure 5) supporting identification of high-impact locations – areas where tree planting would provide the greatest benefit for downtown residents, workers, and visitors. The model was created using publicly available data, proprietary information from TTF and DDI, and specially compiled datasets representing specific land use and demographics.

The DDID was divided into a grid with 5,637 cells. Individual cells were then analyzed and scored based on the categories of People, Access, Cool, and Trees, as shown in Figure 5 below.

Each criterion was weighted based on the goals of the 2025 Tree Planting Initiative and the overarching goals of DDI and TTF as individual organizations and as partners. For example, areas with residential units, workplaces and tourist destinations were all considered higher priorities when compared to railroads. These 'weights' ensured that the findings of the models were fine-tuned to the needs of Downtown Dallas.

3.5 Development of Priority Planting Plan

TTF utilized the inventory data and the designated priority areas as a starting point to identify potential planting locations for the proposed trees. This was done by walking high-scoring areas to pinpoint and map feasible planting locations. Limiting factors included sidewalk width/ADA compliance, driveway/turn lane visibility, building access, and utilities (above and below-ground). Additionally, some high-scoring areas, such as privately-owned parking lots, pose significant challenges for tree planting. This report does not propose planting in these areas, but TTF recommends that DDI begin looking at options to incorporate trees and greenspace in areas with high concentrations of impervious surfaces over time. Care was also taken to avoid planting on property that appeared slated for construction or redevelopment. However, the adjacent right-of-way may be an option, as developers are required to protect those trees whenever possible.

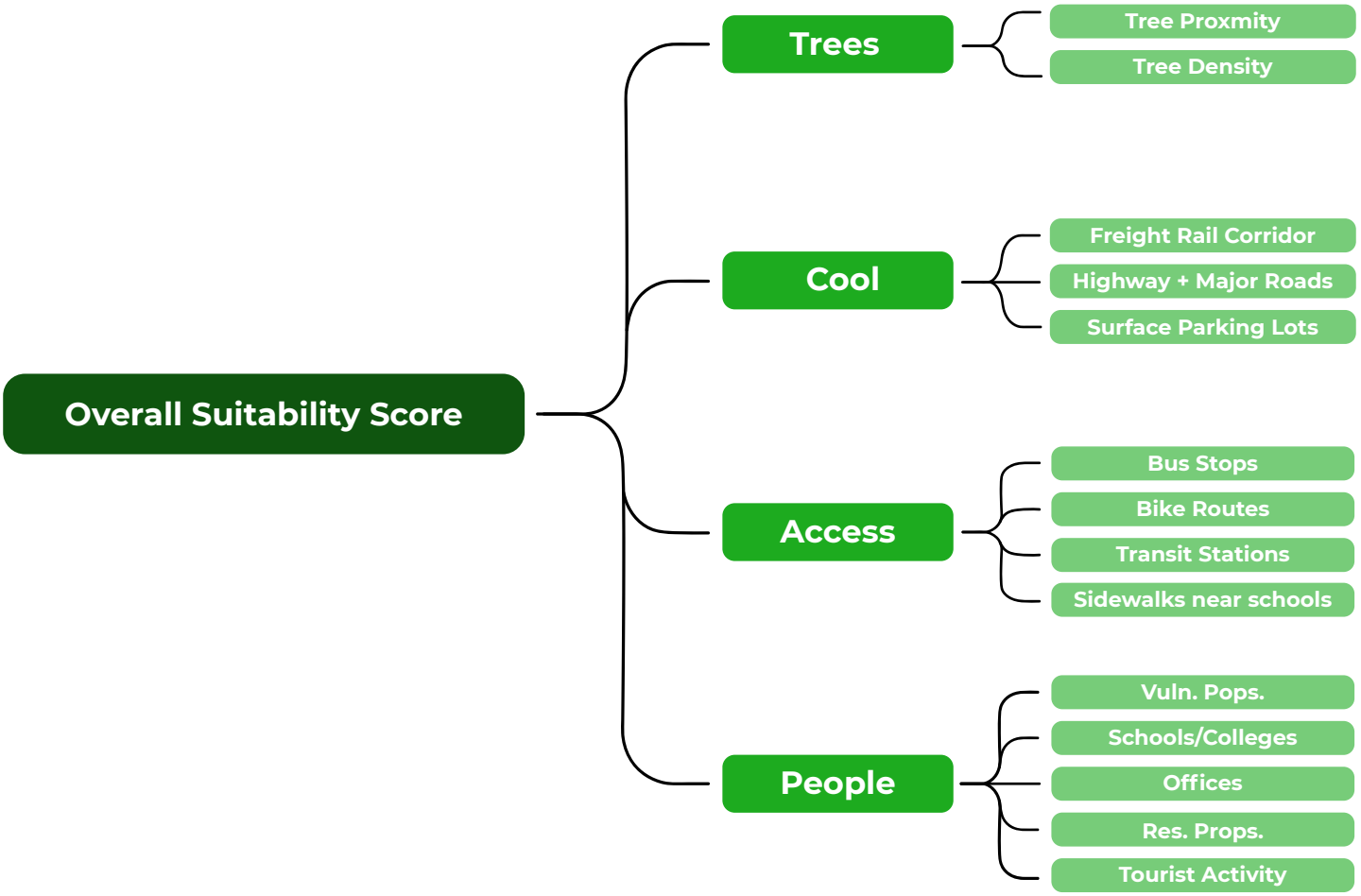


Figure 5: Data Categories and Criteria for the Spatial Prioritization Model

4. Findings

4.1 Urban Forest Composition

4.1.1 Tree Population

A total of 2,011 living trees were inventoried between July and September 2024. Of these, 1,334 were updated from the previous inventory and 861 (over 40%) were new additions. An additional 188 trees were classified as “dead” or “removed”. These trees included standing dead trees, stumps and empty tree wells, trees that had been removed and replaced, and trees that were in areas that have been redeveloped, such as the AT&T Discovery District.

Based upon data from the 2015 and 2024 inventories, there are an estimated 6,705 living trees in the DDID. This estimate does not account for trees that have died or been planted in areas that were not re-inventoried in 2024.

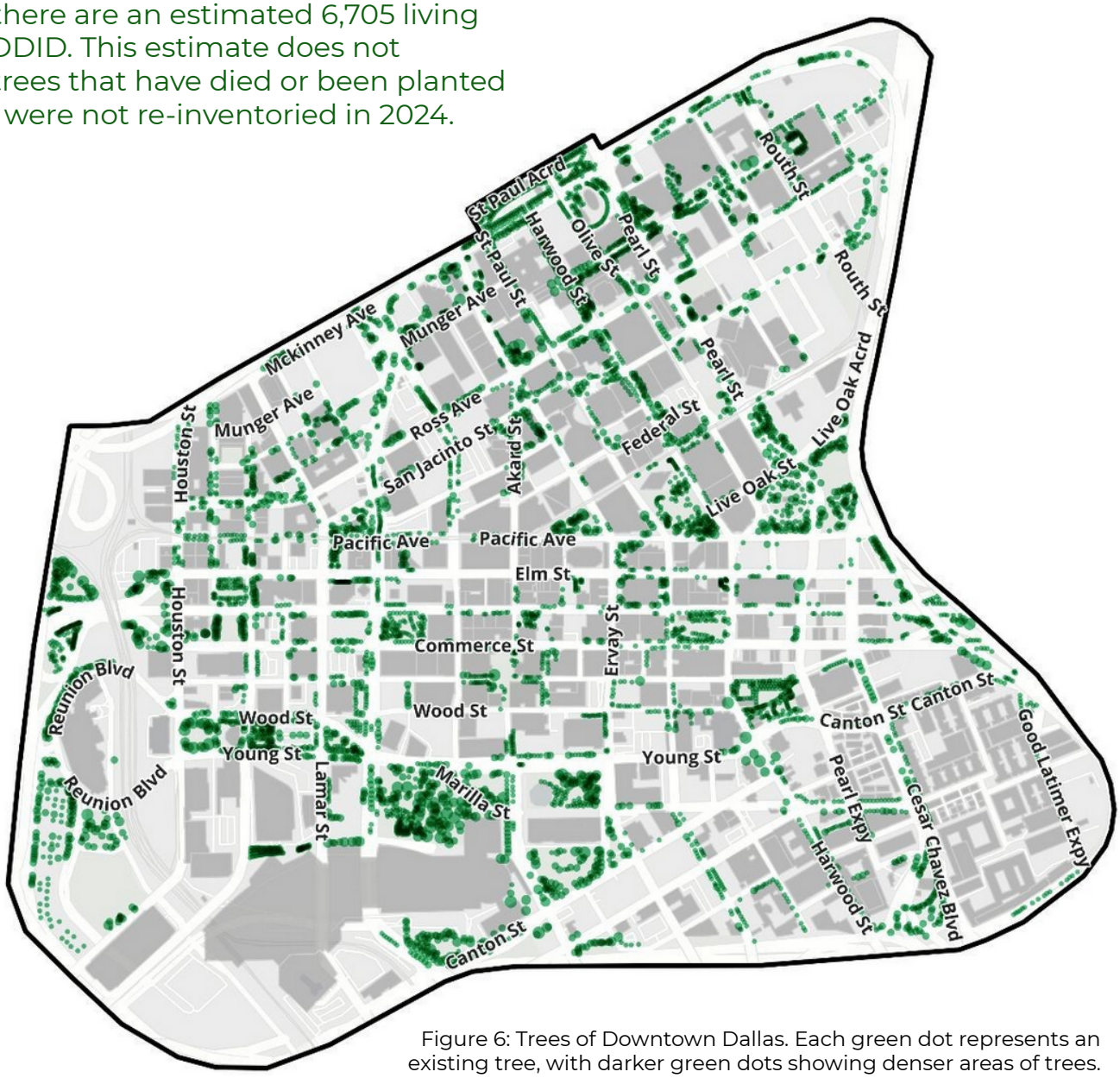


Figure 6: Trees of Downtown Dallas. Each green dot represents an existing tree, with darker green dots showing denser areas of trees.

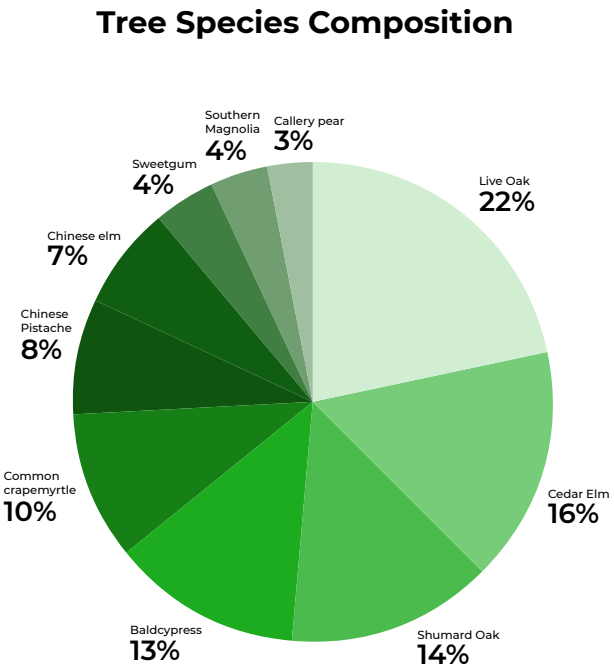


Figure 7: Ten Most Common Tree Species in Downtown Dallas.

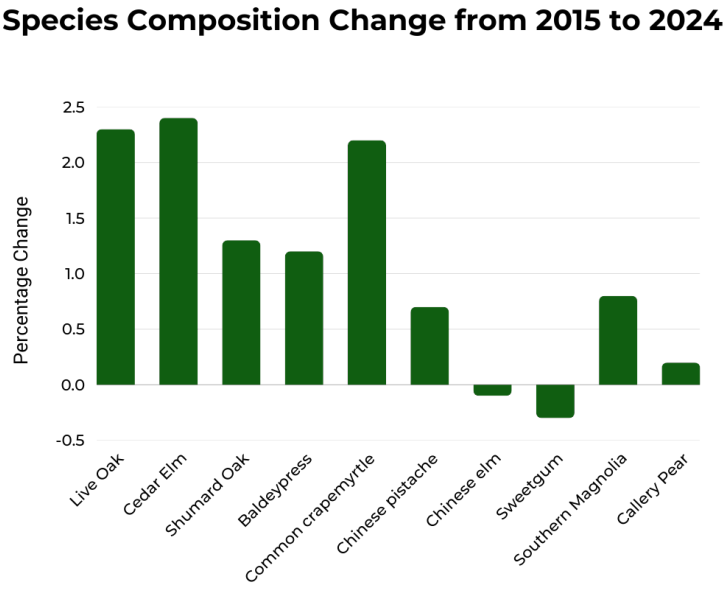


Figure 8: Tree Species Composition Change (%) for the Ten Most Common Tree Species

Positive translates to an increase in a species relative to others, negative translates to a decrease in a species relative to others.

4.1.2 Species Composition

The combined data from the 2015 inventory, subsequent additions by DDI, and the 2024 inventory indicate that the most common tree species are live oak, cedar elm, baldcypress, Shumard oak, and crape myrtle. Together, these five species make up almost 75% of the trees in the DDID. This indicates a decrease in species diversity since 2015, where these species comprised just under 65% of all trees.

An ideal tree population for an urban forest should have no more than 30% of the same family *(e.g. Fagacea;* the beach family, which includes oaks), 20% of the same genera (e.g. Quercus; oak trees), and 10% of the same species (e.g. Quercus virginiana; live oaks). The current tree species composition is heavy on oak trees, a Texas staple, making up 35% of the current canopy. With oak wilt present in Dallas, this could potentially lead to serious die-off of much of downtown's urban canopy if species diversity is not considered in future tree planting efforts.

Figure 9: Number of Trees by Size Class with Trend Line Showing Estimated Distribution.

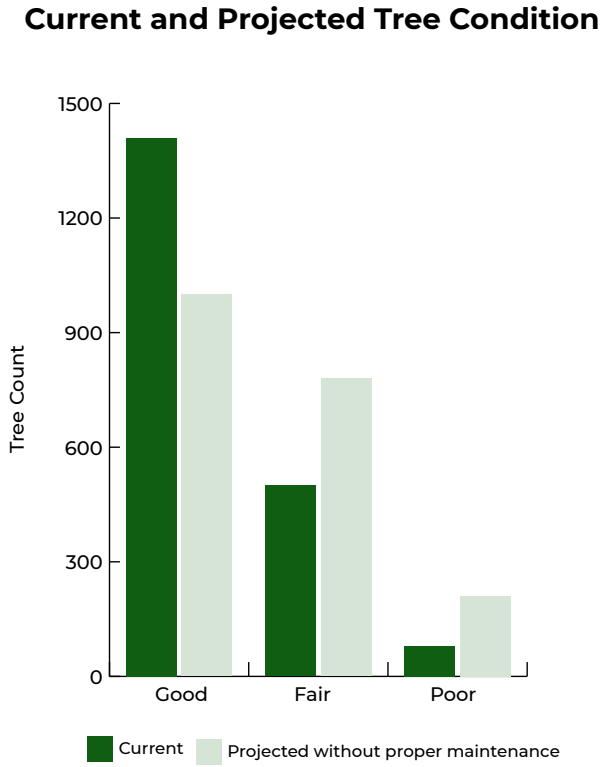


Figure 10: Current and Projected Conditions for Downtown Trees.

Projected conditions assume no corrective actions taken to address existing issues.

4.1.3 Size Distribution

Over 75% of the trees assessed were 12 inches in diameter or smaller, and only 7% were larger than 20 inches. These findings are consistent with the 2015 report. Tree diameter provides clues to a tree's age, but the actual age of any given tree will vary based upon species, climate, and growing conditions.

A study by the USDA found that the average life expectancy for street trees is between 19 and 28 years (Alsup, 2020). However, a report by the Dallas Morning News stated that the average tree in downtown Dallas lives only 18 years (Reddy, 2020).

The reasons for the overrepresentation of small/young trees include (1) planting of trees in areas that previously did not contain trees and (2) replacement of dead and declining trees and trees that have outgrown available space. As noted in 2015, many of the tree pits in the inventoried areas do not provide adequate soil volume to support a mature shade tree. As these trees mature, their health declines and they frequently suffer physical damage from tree pit infrastructure. This leads to a cycle of planting trees that should have a lifespan of several decades and replacing them within 10-15 years when they outgrow the allotted space.

4.1.4 Condition Rating

Over 71% of trees assessed were ranked in good condition. Though this finding is promising, it is important to note that a tree's rating is a snapshot of its condition on the day of assessment. Bark damage, decay, girdling roots, buried root flares, and restrictive tree pit infrastructure were all noted on trees that appeared to be in good health. If not abated, these conditions will impact future tree health, ultimately resulting in death or removal of trees prior to reaching maturity. We estimate that up to 30% of the trees currently in fair to good condition may begin showing signs of decline in the absence of corrective actions. These may include removal of tree grates, removal of girdling roots, excavation of root flares, pruning, and other best practices mentioned later in this report.

4.1.5 Tree Population Summary

The species mix, size composition, and observed defects are not uncommon for urban areas, space constraints, altered soils, and the harsh urban environment create a challenging environment for trees. However, the results indicate a lack of diversity and a cycle of removal and replacement of trees prior to reaching maturity, creating a discrepancy between calculated future benefits and actual benefits provided.

4.2 Canopy Cover Assessment and Economic Benefits Calculation

The tree canopy in Downtown Dallas Improvement District (DDID) is currently estimated at 6.7%, based on aerial imagery from 2022. This modest canopy coverage highlights the potential for expanding urban greenery to maximize environmental and economic benefits. Existing trees in the DDID already provide substantial ecosystem services, contributing to carbon reduction, energy savings, stormwater management, and air quality improvements. These contributions underscore the value of the urban forest as a vital component of sustainable city planning.

Annually, the trees in the DDID deliver $162,889 in ecosystem benefits. These include carbon benefits such as 1,035,274 pounds of CO2 avoided ($24,077) and 954,885 pounds of CO2 sequestered ($22,208). Energy benefits, including 745,508 kWh of electricity saved ($91,698) and 275 MMBtu of fuel conserved ($3,873), reduce reliance on non-renewable energy sources. Hydrological advantages include intercepting 3.8 million gallons of rainfall, evaporating and transpiring over 21 million gallons of water, and avoiding 921,491 gallons of runoff ($8,234). The trees also contribute to air quality by avoiding 2,192 pounds of pollutants ($989) and removing 6,819 pounds of pollutants ($11,810). These figures emphasize the critical role of trees in enhancing urban resilience and quality of life. It should also be noted that these tree benefits increase with tree size and focusing on trees surviving to maturity and reaching a larger size will lead to exponentially more benefits.

Annual Ecobenefits Table:

Carbon benefits

CO2 avoided: 1,035,274 pounds ($24,077)

CO2 sequestered: 954,885 pounds ($22,208)

Energy benefits

Electricity saved: 745,508 kWh ($91,698)

Fuel saved: 275 MMBtu ($3,873)

Hydrological Benefits

Rainfall interception: 3,801,912 gallons

Evaporation: 3,795,912 gallons

Transpiration: 17,317,633 gallons

Avoided runoff: 921,491 gallons ($8,234)

Air Benefits

Pollutants avoided: 2192 pounds ($989)

Pollutants removed: 6819 pounds ($11,810)

Total: $162,889 annually in ecosystem benefits

The i-Tree benefits report is included in Appendix A.

trees in the DDID deliver

$162,889

annually in ecosystem benefits

4.2 Canopy Cover Assessment and Economic Benefits Findings

The suitability model identified 21% of downtown (1,213 cells) as high-scoring areas for tree planting. Of these high-scoring areas, five clusters were identified as top priority for the current tree planting program. Each of these clusters has relatively few trees and high scores for proximity to people, access routes, and/or high surface temperatures. Within these five high priority areas, there are only 170 downtown trees (2.5% of downtown trees).

The five priority areas are identified as:

- Field Street
- Marilla and Park Streets
- Southwest of Downtown (North and South of Young Street)
- West End
- Bryan & Live Oak Streets.

A map depicting the areas and a table of the estimated tree density for each area are provided below. The full Spatial Model Final Report is included in Appendix B

Figure 11. High Scoring and Priority Areas as Determined by the Spatial Model.

Not all high scoring areas were considered priority areas due to either lower concentrations of high scoring cells or due to model bias that was corrected through ground-verification.

4.3 Ground-verification

The findings provided by the spatial model successfully highlight areas of downtown that are in dire need of tree planting and will contribute the largest economic and social good to Downtown Dallas. To verify that the recommended areas and specific sites are accurate, ground-verification was conducted by a certified arborist. Every area discussed above was visited by an arborist who analyzed the sites and determined areas that were acceptable planting locations based off logistical and environmental factors. These finalized, arborist-informed findings are discussed below.

Priority Area Tree Density

Map Area	Priority Area	Estimated Acreage	Estimated Current Tree Count
4	Field Street	13 acres of land	22 trees
2	Marilla and Park Streets	13 acres of land	5 trees
3	Southwest of Downtown	30 acres of land	8 trees
1	West Street	10 acres of land	45 trees
5	Bryan & Live Oak Streets	9 acres of land	2 trees

Figure 12. Tree Density for the Five Priority Areas.

Acreage and tree counts are estimates based on the boundaries provided by the model.

5. Conclusion

This 2025 Tree Planting Initiative represents a transformative opportunity for Downtown Dallas to improve its urban forest, enhance quality of life, and strengthen its environmental resilience. Through comprehensive analysis, geospatial modeling, and ground-truthing, this report identifies high-impact locations where 500 new trees can deliver maximum environmental, social, and economic benefits. Despite recent gains, the downtown tree canopy remains well below a desirable threshold, and the current tree population faces challenges related to species diversity, site conditions, and limited lifespan. Strategic planting, improved management practices, and thoughtful species selection will be essential to ensuring the long-term health and impact of this investment. By advancing this initiative, Downtown Dallas Inc. and the Texas Trees Foundation are not only addressing current gaps but laying the groundwork for a greener, cooler, and more vibrant downtown for generations to come.

TEXAS TREES FOUNDATION