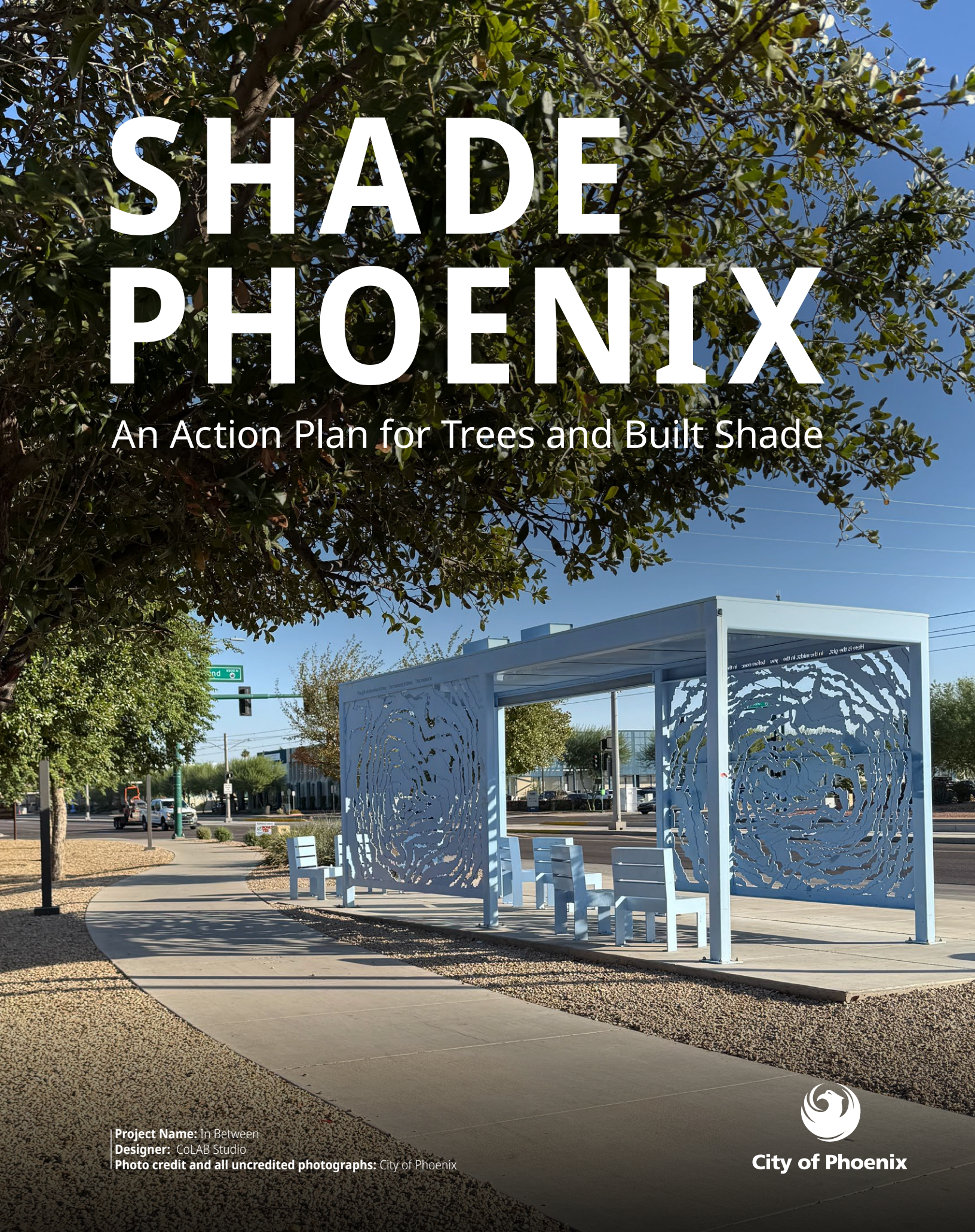
SHADE PHOENIX

An Action Plan for Trees and Built Shade



Project Name: In Between
Designer: CoLAB Studio
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City of Phoenix


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LETTER FROM THE MAYOR

Dear Friends and Neighbors,

I'm excited to introduce the City of Phoenix 2024 tree and shade master plan: Shade Phoenix! This plan will guide our efforts to enhance the livability of our great city, coalescing multiple initiatives to make our neighborhoods cooler and more comfortable.

As Phoenix continues to experience rising summer temperatures and more frequent extreme heat events, it is more important than ever that we expand shade coverage from both trees and built structures. In the hottest months, shade can make up to a 30-degree difference. Those of us in Phoenix know that that difference can be significant and in extreme cases, lifesaving.

Many years in the making, Shade Phoenix represents our commitment to increase our urban tree canopy and promote the use of innovative shade structures, especially in the areas of our city that need it most.

The goals outlined in the Plan complement years of intentional policymaking that puts resilience at the forefront. From implementing our Walkable Urban Code that increases shade in high-volume pedestrian areas to curbing our emissions through efficiency improvements and renewable energy expansion, we are well on our way to becoming the most sustainable desert city in the world—a goal set thanks to the will of Phoenix voters in 2015.

These efforts are not just critical for cooling our city and keeping Phoenicians safe. They are also essential to improve air quality, reduce energy consumption, and provide beautiful, functional spaces for residents and visitors to enjoy year-round. Additionally, the strategies in the Plan were tailored to fit our unique home here in the Sonoran Desert, with water conservation and biodiversity as key considerations.

The Shade Phoenix Plan is the result of countless hours of diligent work and collaboration among City staff, environmental experts, and community members. I invite you to engage with us as we roll out the strategies outlined in this plan. Your feedback, participation, and support are crucial to our shared success. Let's come together to foster a cooler and more resilient Phoenix for ourselves and for future generations!

Thank you,

Kate Gallego
Mayor of Phoenix

ACKNOWLEDGEMENTS

The 2024 Shade Phoenix Plan is an update and expansion of the City's Tree and Shade Master Plan from 2010. The Plan reflects initiatives and perspectives from many local, regional, and national collaborators and community members. It also draws content and direction from a network of related plans, including the City of Phoenix's PlanPHX General Plan, Climate Action Plan, Water Resource Plan, Transportation 2050 Plan, and Transit Oriented Development Plans, as well as the Maricopa County Hazard Mitigation Plan, the Maricopa County Department of Public Health Strategic Plan for Climate and Health, the Heat Action Planning Guide for Greater Phoenix, and the Arizona Department of Health Services Climate and Health Adaptation Plan. Thank you to everyone who contributed insight, ideas, and passion for making Phoenix a better place.

City of Phoenix Mayor and Council

Mayor Kate Gallego

Ann O'Brien - District 1
Jim Waring - District 2
Debra Stark - District 3
Laura Pastor - District 4
Betty Guardado - District 5
Kevin Robinson - District 6
Carlos Galindo-Elvira – District 7
Kesha Hodge Washington - District 8

City of Phoenix Departments

Arts & Culture, Aviation, Budget and Research, City Engineer, City Manager's Office, Communications, Community and Economic Development, Convention Center, Environmental Programs, Fire, Heat Response and Mitigation, Homeland Security and Emergency Management, Homeless Solutions, Housing, Human Services, Innovation, Law, Library, Neighborhood Services, Parks and Recreation, Planning and Development, Police, Public Health, Public Transit, Public Works, Street Transportation, Sustainability, Volunteer Programs, Water Services, Youth and Education.

City of Phoenix Advisory Boards

The City of Phoenix appreciates the contributions of the many community members who serve on public advisory boards and commissions that have provided input to this plan, including the Environmental Quality and Sustainability Commission and all 15 Village Planning Committees.

Local, Regional, and National Partners

Organizations listed below are partners in the tree and shade programs that the City operates or supports, and/or have provided input regarding the content of this plan.

American Forests, American Society of Landscape Architecture Arizona Chapter, Arizona Community Tree Council, Arizona Conservation Corps, Arizona Cooperative Initiative, Arizona Department of Forestry and Fire Management, Arizona Landscape Contractors Association, Arizona Nursery Association, Arizona Public Service, Arizona State University, Arizona Sustainability Alliance, Artlink, Bloomberg Associates, Bloomberg Philanthropies, CHISPA AZ, Keep Phoenix Beautiful, Maricopa Association of Governments, Maricopa County, Phoenix Metro Urban Forestry Roundtable, Resilient Cities Catalyst, Salt River Project, The Design Laboratory, The Nature Conservancy, Trees Matter, U.S. Forest Service, University of Arizona, University of Arizona Maricopa County Cooperative Extension, University of California Los Angeles, Unlimited Potential, Venture Café Phoenix, Watershed Management Group.

The City of Phoenix also deeply appreciates contributions from many individual community members, as well as neighborhood and business associations, who have provided input to the Shade Phoenix Plan and shared their feedback on tree and shade efforts at other community forums in recent years.

OUR VISION AND VALUES

A future in which all community members and visitors experience the benefits of trees and built shade throughout Phoenix.

OUR VALUES

Shade Phoenix is anchored around a set of core values that shaped its development and will guide its implementation.

Focus on people first by targeting actions where shade can have the greatest impact on human health and wellbeing, especially for vulnerable populations.

Recognize that **shade is a critical resource** provided to the community by public and private assets.

Lead with an environmental justice and equity lens to address inequities.

Project Name: Ocotillo Restaurant
Project Landscape Architect: Trueform Landscape Architecture Studio
Photo credit: Matt Winquist
www.trueformlas.com

Respect the unique landscape and heritage of the Sonoran Desert, one of the most special places in the world.

Collaborate within City government, between public and private actors, and with the communities of Phoenix to accelerate collective action.

Go beyond the status quo by innovating and taking risks to change historical trajectories and realize the Plan's vision.

EXECUTIVE SUMMARY

Extreme heat presents a significant risk to the public health and quality of life of Phoenicians. Shade is a critical community resource that addresses these risks.

The Shade Phoenix Plan outlines the actions the City and its partners will take over the next five years to accelerate the creation and enhance the maintenance of shade in Phoenix. The vision of the Shade Phoenix plan is a future in which all community members and visitors experience the benefits of trees and built shade throughout Phoenix. Actions in the plan prioritize places in Phoenix where people are outside the most and populations most vulnerable to extreme heat.

Shade Phoenix is a data-driven plan, leveraging detailed analysis of citywide tree and shade data across City-owned, public, and private properties. At the census tract scale, tree canopy cover varies from 2% to 30%. The median census tract has 11% tree canopy. The plan includes findings from the City's first shade analysis, which estimates the combined impact of shade from both built and natural sources.

The Plan includes 36 actions across four strategy areas, addressing 11 strategic priorities. Collectively, these actions represent more than $60 million in allocated funding over the next five years and will result in more than 27,000 new trees and 550 new shade structures. This represents an almost doubling of the number of trees planted annually by the City of Phoenix. More than 50% of the total investment will be made in low-to moderate-income communities and 85% will be made in low-moderate-and middle-income communities. The four strategy areas are:

1. **Expand Shade** - increase shade for children and on City-owned properties, the public right-of-way, and private properties.
2. **Preserve and Maintain Existing Shade** - care for and maintain trees and shade structures on public property, strengthen code enforcement on private property, and increase City capacity to maintain trees and shade
3. **Evaluate and Institutionalize** - monitor and evaluate progress on the Shade Phoenix Plan; strengthen organizational coordination and staff capacity; strengthen regulations, design standards, and guidelines; and create and expand pathways for careers in urban forestry.
4. **Educate and Empower** - create a citywide movement around shade and heat and provide public education on sustainable and equitable shade practices.

Development of the Shade Phoenix Plan was led by the City's Office of Heat Response and Mitigation and reflects the collective efforts of 30 City departments and offices. The Plan was shaped by significant public engagement that involved more than 2,000 community members who contributed input via public meetings and presentations, an online survey, engagement with Village Planning Committees, community events, and at workshops on heat and mobility held by the Office of Heat Response and Mitigation and the Office of Sustainability.

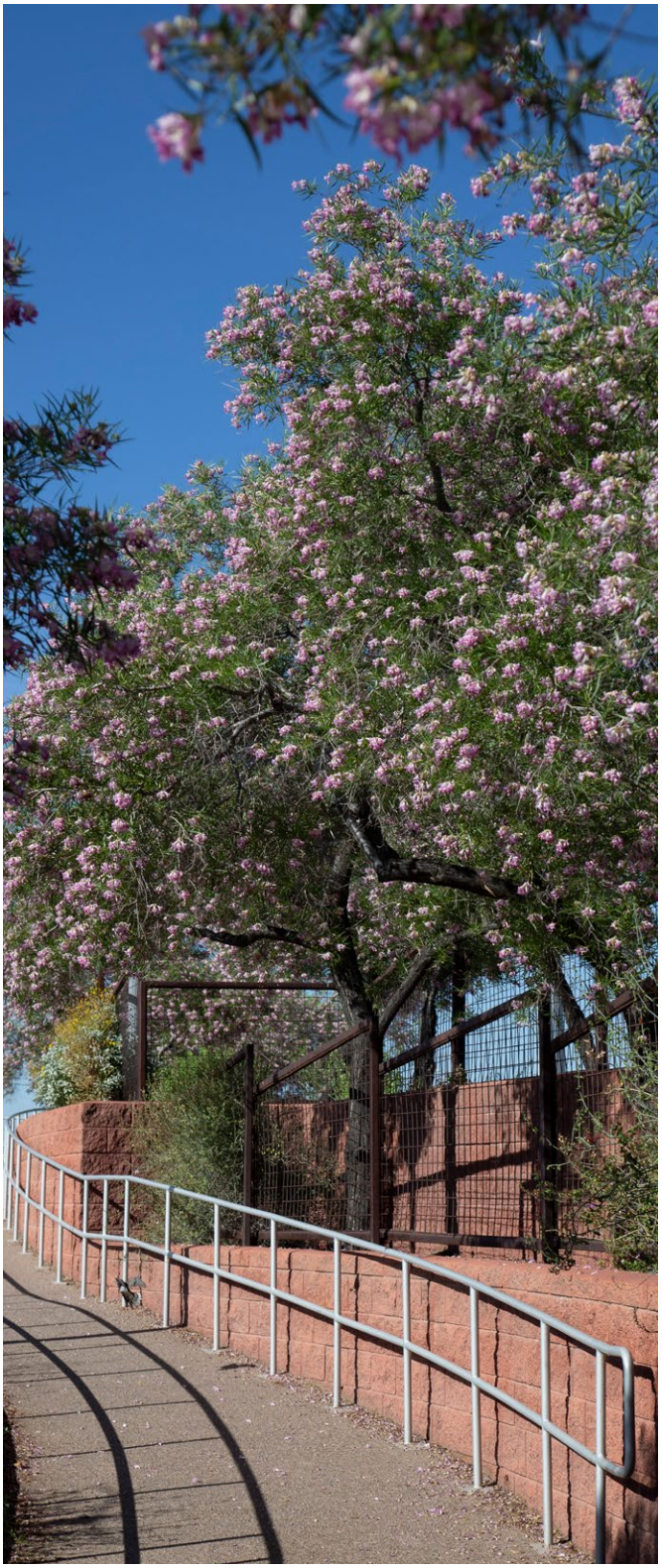
INTRODUCTION

In the hottest large city in the United States, shade is a critical community resource. Shade, provided by trees and built structures, creates cooler, comfortable spaces that protect public health, improve quality of life, and strengthen community resilience. Maintaining and expanding Phoenix's shade will take proactive, coordinated action among residents, businesses, non-profit partners, and across City departments. This plan, an update to and expansion of the City's 2010 Tree and Shade Master Plan, outlines the concrete actions the City and its partners will take over the next five years to scale up and accelerate efforts to expand shade in Phoenix, with an explicit focus on the city's most vulnerable residents.

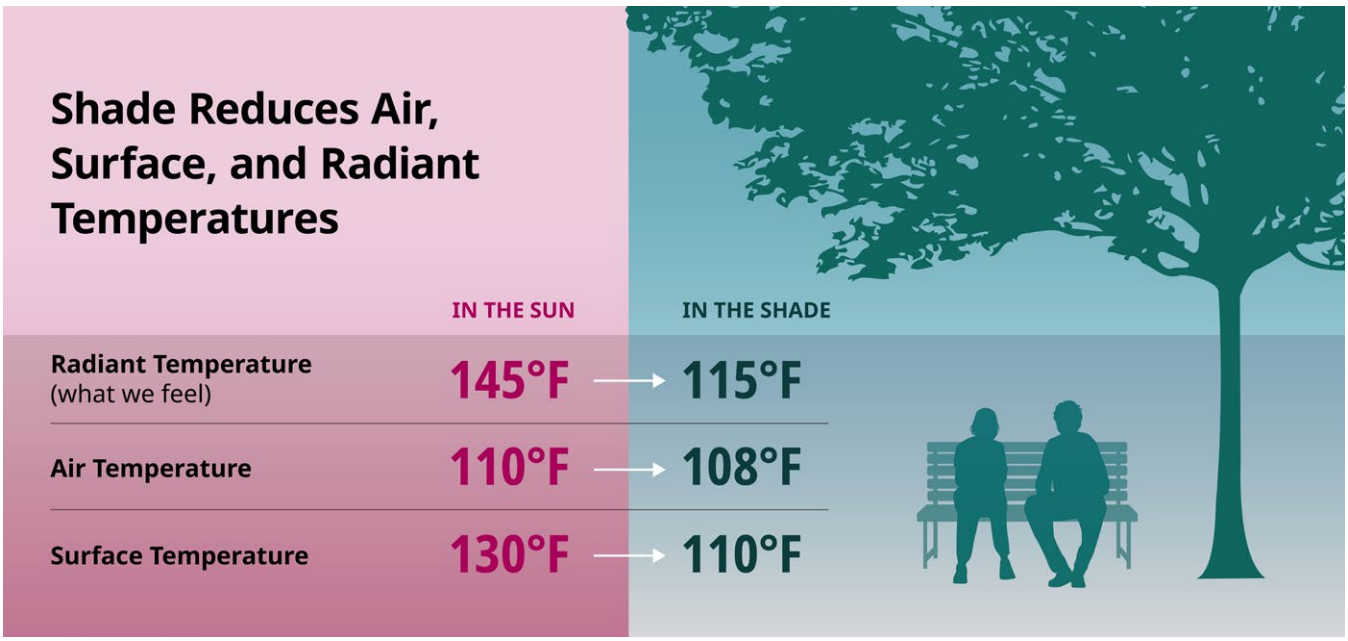
Why focus on shade?

This plan prioritizes increasing shade coverage throughout the city as a strategy to improve health and quality of life. Extreme heat is a public health challenge for the City of Phoenix, especially for community members with higher physical sensitivity, more exposure, and fewer coping resources. Over the past ten years, Phoenix has averaged more than 115 days each year with daytime temperatures exceeding 100°F, and more than 45 days each year when the overnight low temperature does not fall below 85°F. Hot days and nights are becoming more common and are projected to continue to increase in frequency and intensity in the coming decades. People's experiences in the Phoenix of the future will be influenced by how successfully our community maintains and expands publicly available shade, because shade is one of the most effective strategies to make hot outdoor urban environments safe and comfortable.

The heat load of the human body is sensitive to many different environmental variables including air temperature, wind speed, sunlight, and surface temperatures, and physiological research demonstrates that shade is the most consequential variable in determining how safe



Project Name: Arizona Falls
Project Landscape Architect: Steve Martino and Associates



and comfortable people will be as they move through outdoor spaces. The reduction in the net heat burden on the human body that can be achieved by shade has been measured as high as 70 degrees Fahrenheit. Shade also provides benefits to physical infrastructure, increasing the life span of materials that degrade or become more vulnerable when exposed to the sun, and making it easier to keep homes, vehicles, and indoor workspaces safe and comfortable.

The dominant role of shade in shaping the health of Phoenix's residents and infrastructure has motivated the orientation of this plan. It is a plan that focuses first on adding shade. Its primary emphasis is not on achieving reductions in regional or site-specific air and surface temperatures, although many of the actions proposed in the plan will help realize those additional benefits. Additional strategies to achieve local and regional heat mitigation, including through the deployment of cool and reflective surfaces, are included in the City's Climate Action Plan.

Why was a new plan needed?

The Shade Phoenix Plan provides an update to and expansion of the City's 2010 Tree and Shade Master Plan (2010 Plan). The 2010 Plan has served as a policy tool related to tree and shade initiatives since its adoption and laid an important foundation for efforts to improve and maintain tree canopy and shade coverage in the City. Many of the principles and priorities from the 2010 Plan remain relevant today and are reflected in the new Shade Phoenix Plan. The new plan also addresses community priorities that have emerged or become higher priorities over the past 15 years, especially and the importance of built shade. In April 2021, a Memorandum of Understanding with American Forests was approved by City Council that augmented the vision of the 2010 Plan with specific attention to equity. Having a new plan that clearly articulates values and actions aligned with today's community needs will improve the City's ongoing program and policy development and day-to-day operations.

It was also important to create a new plan to reflect the City's significantly improved capacity to make meaningful progress toward tree and shade goals. Uncertainty around financial resources was presented as a major challenge in the 2010 Plan as the City had made significant cuts to tree and shade initiatives during the Great Recession. At the time of its adoption, City Council directed staff to begin implementing the plan as subject to available financial resources. Today, approximately 70% of the actions from the 2010 Plan have been completed or are ongoing (see Appendix). The new Shade Phoenix Plan more explicitly identifies

financial resources that are available to support its vision, strategies, and actions, and more clearly communicates the community benefits that will be achieved with those resources.

Finally, the new Shade Phoenix Plan serves to provide a comprehensive and updated public accounting of the state of City-led tree and shade initiatives and the status of tree and shade coverage throughout the city, and a new baseline and framework for measuring progress and ensuring accountability moving forward.

What is in the Shade Phoenix Plan?

The Shade Phoenix Plan was crafted with recognition that heat is not the only environmental challenge facing Phoenix. Careful attention to the region's water resources, air quality, and ecology must be integral to planning efforts to increase shade from natural and engineered sources. New trees and shade structures must be resilient to many urban environmental challenges and should be considered as part of a holistic approach to making communities healthier and more sustainable.

Shade Phoenix is a portfolio of community-inspired solutions to solve challenges at the intersection of extreme heat, public health, quality of life, and environmental justice and equity. The Plan includes avenues for investments not only in the physical infrastructures necessary to help Phoenix's hottest, most heat vulnerable neighborhoods become cooler, greener, and healthier, but also in the human capital that is essential for realizing the full suite of environmental and social benefits that natural and built shade can provide. Implementation of the Plan will ensure:

- Phoenicians understand the importance and value of trees and shade and how they can support them
- Built and natural shade is expanded for people where they need it most
- The community works together to support a thriving urban forest and well-maintained built shade
- Ongoing implementation and improvement of shade efforts to scale their impacts and maximize benefits

The 11 strategic priorities and 36 actions in the Plan will guide the spending of more than $60 million in public and private investments over the next five years and will result in more than 27,000 new trees and 550 new shade structures in Phoenix.

Reflecting the values of the Plan, more than 50% of these will be planted or installed in low- to moderate-income communities and more than 85% will be in low, moderate, and medium-income communities. Together, these actions will help achieve the overarching vision of a future where all community members and visitors experience the benefits of trees and built shade throughout Phoenix.

Tree Equity Score

One element central to shade cover, or the lack of it, is tree canopy. In 2021, American Forests developed the Tree Equity Score to address and identify environmental inequities in tree distribution common to cities across the United States. The Tree Equity Score measures how well the critical benefits of urban tree canopy are reaching those who need them most at the census tract level.

The score—which ranges from 0 to 100 and the Priority Index (based on seven equally-weighted factors: age, health burden, heat disparity, people in poverty, linguistic isolation, and people of color) —establishes an equity-first standard to guide investment in low-income communities, communities of color, and areas disproportionately affected by extreme heat, pollution and other environmental hazards.

In November 2023, American Forests launched the Maricopa County Tree Equity Score Analyzer (TESA), providing high resolution information to the region. This tool was custom-built for Maricopa County with input from local stakeholders and includes specific place-based metrics such as heat disparity, qualified census tracts, bus stops, light rails, schools and cooling centers. (Qualified census tracts are defined by the U.S. Department of Housing and Urban Development as those in which 50% or more of the households are income eligible and the population of all census tracts that satisfy this criterion does not exceed 20% of the total population of the respective area.) The TESA supports people-centered planning to improve low neighborhood Tree Equity Scores across Maricopa County.

The tool allows users to see where tree planting can have the greatest impact to address tree inequity, and customize Tree Equity Score targets and create detailed tree planting and protection plans at the property level. TESA can be used to to track progress and forecast project impacts of mature trees.

Project Name: Walter Studios
Project Landscape Architect: Chris Winters

COMMUNITY INPUT AND PARTNERSHIPS

A robust dialog around trees and shade has been ongoing since before the City's first Tree and Shade Master Plan was adopted in 2010.


MARK
Barcelona

Community engagement to inform the Shade Phoenix Plan formally began in 2022 with the creation of the Office of Heat Response and Mitigation, which was delegated the responsibility for the 2010 Tree and Shade Master Plan. The Office of Heat Response and Mitigation, in collaboration with other departments, strived to center community voices in the creation of this new plan. Engagement included presentations to community groups, seeking input at community events and budget hearings, facilitating a bi-language dialogue at community charettes, and soliciting input from an online questionnaire in English and Spanish.

Public documents and plans that were created with substantive community engagement, such as the South Phoenix Transit Oriented Development Plan and the Heat Action Planning Guide for Greater Phoenix, were reviewed for concerns, ideas, stories and expertise. Development of the Shade Phoenix Plan has also been guided by the Core Values of the City of Phoenix 2025 General Plan: Create a network of vibrant cores, centers and corridors, Connect people and places, Strengthen our local economy, Celebrate our diverse communities and neighborhoods, and Build the most sustainable desert city.

The community feedback collectively created and shaped the goals, strategies, and actions of this plan. The level of response, passion, and time Phoenix residents, practitioners, and researchers have dedicated demonstrates the community's prioritization of tree and shade initiatives in pursuit of a higher overall quality of life.

There were three primary modes of feedback:

Online Engagement

- Tree and Shade Community Questionnaire

Direct Engagement Events

- Community Sustainability charrettes with the Office of Sustainability
- Presented and collected feedback at all of the Village Planning Committee (VPC) meetings
- Presented and collected feedback at the Environmental Quality and Sustainability Commission (EQSC) meetings
- Presented and collected feedback at a variety of community meetings

Partnership Events

- Attended and collected feedback at City Council Community Meetings
- Attended and collected feedback at public Budget Hearings
- Innovate PHX Challenge with the Office of Innovation and Venture Café Phoenix
- Tabled and collected feedback at community events

More than 2,000 community members have contributed input on current and future tree and shade efforts.

Tree and Shade Community Questionnaire

A Tree and Shade Community Questionnaire was available online in English and Spanish from March through August 2024 and received more than 1,200 responses. City staff promoted the survey at community events and through traditional and social media channels. Residents from all 15 of Phoenix's Villages completed the questionnaire, with higher representation from Alhambra, Encanto, Central City, Laveen, and North Mountain. Community members who took the questionnaire overwhelmingly described shade as essential to their day-to-day activities, which provided confirmation that the questionnaire reached communities that encounter heat on a regular basis.

Feedback provided through the questionnaire provides clear direction that the City should invest in more trees and shade structures, particularly in areas where people spend time outdoors, commute, or gather for recreation. Respondents pointed to a serious deficiency of natural and built shade in Phoenix. Approximately 90% of respondents said that there is not enough natural or built shade throughout the city and among those respondents, about half described the current state as "severely lacking" (Figure 1). When asked "How is the City doing in terms of providing enough trees and shade for everyone in Phoenix to enjoy a good quality of life?," only 20% of respondents evaluated the City's efforts as Good, Very Good, or Excellent.

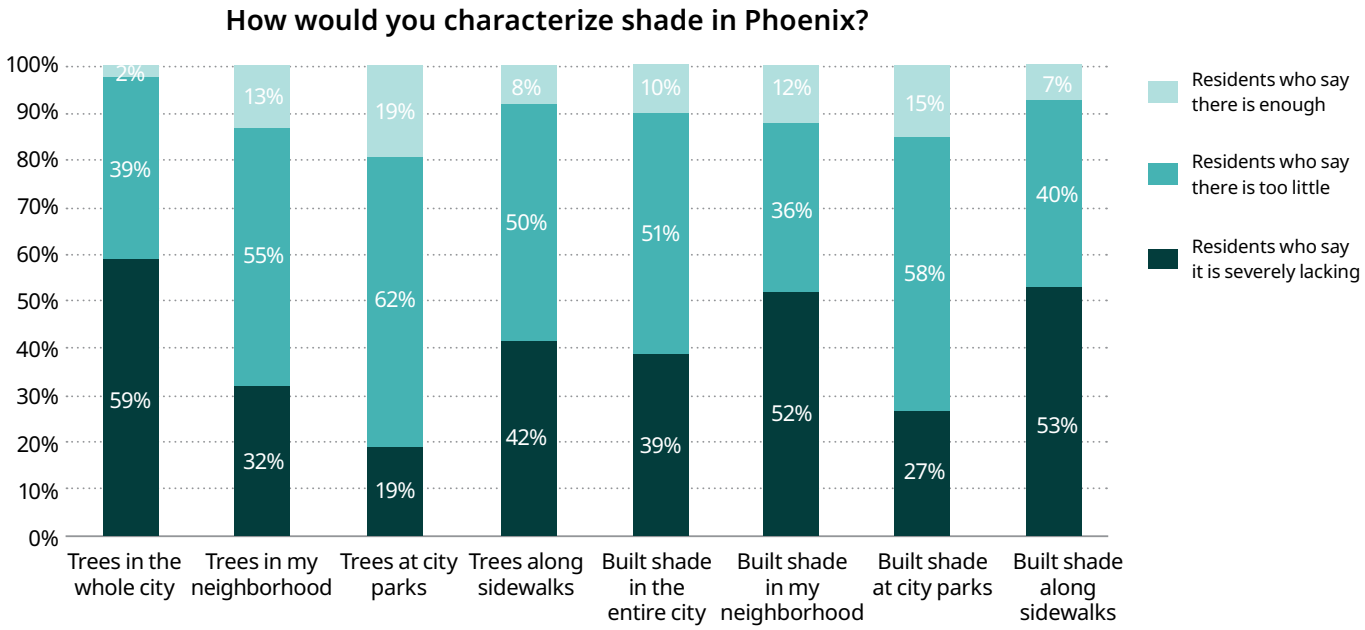


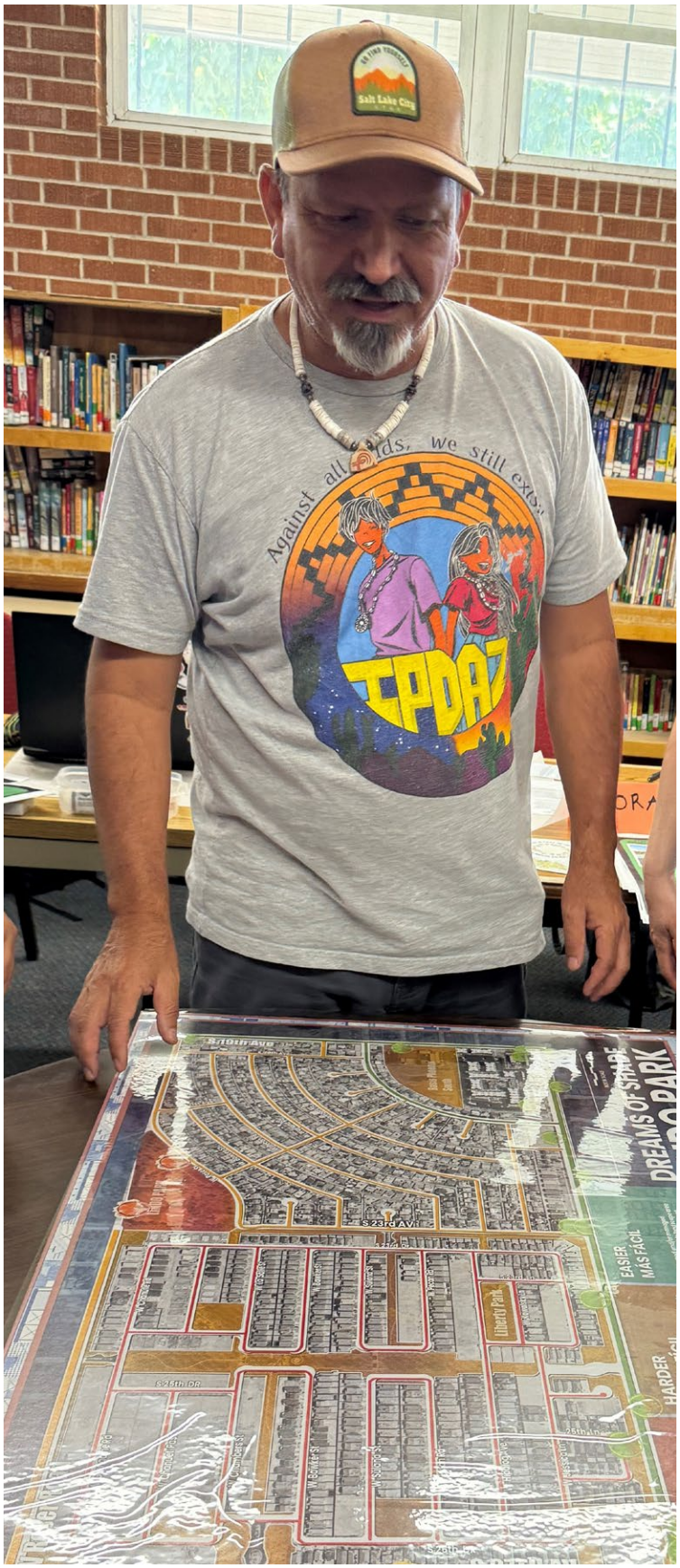
Figure 1. Community Questionnaire responses to prompts about tree and shade coverage in different places in Phoenix. Response rates varied by question, but each prompt received at least 950 responses.

Respondents were asked to identify good examples of places with tree and shade coverage in the community as well as places that needed more shade. Many people responded to these questions in a manner that indicated a need for more trees and shade everywhere in the city. Among more specific responses, the following major themes emerged:

- **Parks with existing natural shade are highly valued, and community members want to see shade in parks expanded to more parts of the city.** Parks with good examples of tree coverage included Encanto Park, Cesar Chavez Park, and the Japanese Friendship Garden. The Phoenix Zoo and Desert Botanical Garden were also frequently mentioned as good examples.
- **Individual built shade structures and canopies on public and private property were viewed favorably.** Specific examples included light rail stops downtown, large shade structures covering playgrounds, such as at Pierce Park, shade canopies at certain bars and restaurants, and the Shadow Play sculpture at 3rd Street and Roosevelt.
- **Major streets were often mentioned as lacking sufficient shade, making them uncomfortable for pedestrians.** A notable exception to this perception is the Murphy Bridle Path in central Phoenix, which many respondents indicated was a place with good tree coverage that they enjoy visiting regularly. Along major streets, bus stops were frequently mentioned as high priority candidates for additional built shade.

Over 1,000 specific locations were identified by community members as either good examples or as places needing more shade. All responses are being compiled into maps for City staff to use in future planning.

Finally, residents were invited to share additional comments and questions about trees and shade in Phoenix. Many community members shared detailed responses supporting additional tree and shade investment, the importance of using the right shade in the right place, concerns about tree maintenance, and ensuring the use of native trees in planting efforts. These responses reflect the deep care and concern residents have around trees and shade.



Examples of community comments include:
General support for tree and shade efforts

"Shade can be life saving; important work you are doing!"

"This should be a high priority for the city, not only as a matter of human rights, but as preparation for continued climate change... Trees will make it more habitable for future residents, which will in turn allow Phoenix to continue to be a place people want to move to, not just for work, but as a place to call home and raise children."

Right Shade, Right Place

"Built shade needs to be oriented to the location. It cannot simply be artistic - it must be functional and provide shade onto the ground at the specific times of days. Otherwise why build it."

"In order for Phoenix to be a walkable city...we need to make all of the pathways leading to mass transit shaded. Same goes for walking to a store or other essential services - it doesn't matter if there is something within a mile if you can't safely walk to it in the heat."

"All city streets and sidewalks should have native trees like Mesquites and Palo Verdes that create a good canopy to help with the heat index while also being drought tolerant."

Maintenance

"Hire enough city employees to take care of the dead trees or trees that need trimming before planting an overabundance"

"Trees that are planted [need to] have a maintenance and irrigation plan that is sustainable and consulted on by certified arborists and skilled professionals."

Community Sustainability Workshops

In 2023, the Office of Heat Response and Mitigation held 16 charettes on heat and mobility in collaboration with the Office of Sustainability, Resilient Cities Catalyst, and Unlimited Potential, a Phoenix-based community organization. The charettes were attended by over 600 community members. The workshops, set up as listening sessions, sought community perspectives in two phases. The first phase focused on identifying mobility solutions and heat mitigation strategy prioritization, like prioritizing the reliability of the transit system. Community members provided over 2,000 specific places where they would like more trees and shade, such as bus stops, community centers, schools, parks, and street intersections.

The second phase established deeper engagement with the community on heat and mobility challenges. Open-ended questions about likes and dislikes were asked.

Out of 576 answers to the question: “What do you like about your community,” the most common answer referenced parks.

Out of 881 answers to the question: “What don’t you like about your community,” some of the top answers were related to lack of trees and shade.

"I don't like my community because there aren't many trees."

"Bus stops need good shade".

"Lack of trees at the edge of the sidewalks."

"It's so hot, please plant more trees."

"We need more shaded structures at the commercial parking lots."

"There isn't enough shade when I go out to walk."

Community Engagement with Unlimited Potential

For almost two years the City of Phoenix's Office of Heat Response and Mitigation and the Office of Sustainability worked with Unlimited Potential, a local community-based organization, and with Resilient Cities Catalyst, a national non-profit, to engage community members in discussions about climate and health. During this period the City held 16 formal community meetings with more than 600 participants, conducted 48 neighborhood canvassing events, and engaged over 30 community-based organizations.

Four main themes were covered during the community sessions: transportation, air quality, heat, and assets and needs.

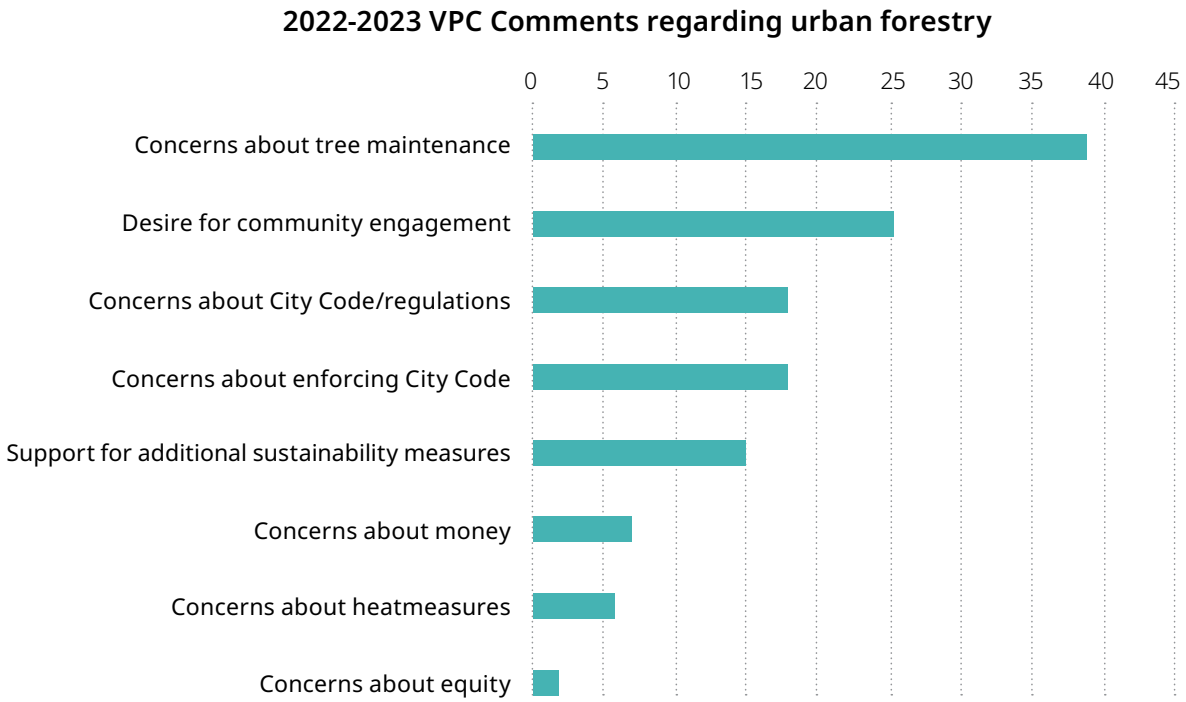
In the category of **"Air quality"** five subgroups were identified: air pollution, pollution sources, individuals at higher health risk, health issues and possible solutions. In the theme **"Heat"**, increasing tree canopy was mentioned as the number one solution for heat mitigation. Additional solutions included: increasing the number of cooling centers, shaded areas, community gardens and pools, improving home cooling/AC. Maps were provided for community members to tell the City where they would like to see more trees and cooling elements like drinking water and cooling spaces.

Infrastructure, nature and sense of community were identified as community assets. However, areas of concern raised by participants included: homelessness, lack of infrastructure, poor lighting, public safety, increase in drug use, and high rent.

The Office of Sustainability will work with Resilient Cities Catalyst and community members on ideas for shade structures for the neighborhood from round one of engagement. The Office of Heat Response and Mitigation will work with Unlimited Potential and a team from ASU to create neighborhood tree plans using this engagement as a starting point. The City will seek to continue these types of events and the level of engagement to ensure that community members are part of the solutions for their communities.

Village Planning Committee Meetings

The Office of Heat Response and Mitigation engaged all 15 Village Planning Committees (VPCs) in 2022 and 2023 to inform the Shade Phoenix Plan. The 2022 VPC meeting discussions were designed to solicit heat-related priorities from the community including trees and shade. The 2023 VPC meetings considered potential solutions to improve tree and shade coverage and provided feedback on tree and shade goals. The feedback from the VPC echoes previous feedback on the need for more shade, concerns about tree maintenance and replacement, and the sustainability of funding sources that support tree and shade investments (Figure 2).



| **Figure 2.** Feedback from Village Planning Committees received by the Office of Heat Response and Mitigation between 2022 and 2023.

Public Advisory Boards and Commissions

The City of Phoenix Environmental Quality and Sustainability Commission (EQSC) identifies and advises the Phoenix City Council on environmental quality and sustainability issues affecting the city. EQSC also recommends to City Council policies, positions, and action the City might take to address issues that protects, promote, restores, or enhances the city's natural and built environments. City staff participated in four EQSC meetings between 2022 and 2024 to share progress updates on the Shade Phoenix Plan and receive feedback. EQSC members provided feedback and advice on numerous aspects of the Plan including community engagement, tree care on public and private property, and stewardship of water resources.

In 2018, the EQSC established an Urban Heat Island and Tree Shade (UHITS) Subcommittee to make recommendations related to urban heat, including recommendations related to the implementation of the 2010 Tree and Shade Master Plan. The Urban Heat Island and Tree Shade Subcommittee performed this role through 2022, the first full year of the formation of the Office of Heat Response and Mitigation.

During their five years of service, UHITS members and community leaders spearheaded numerous tree and shade-related initiatives. Key recommendations to the EQSC from the UHITS are listed in the following table.

UHITS Recommendations and Status

Recommendation	Status
Creation of an ordinance to strengthen tree protection language.	**Completed-** The Landscape Text Amendment (Z-TA-5-15) was adopted by City Council in 2021.
Creation of a full-time Urban Forest Infrastructure Manager Position.	**Completed-** This position was created as part of the Office of Heat Response and Mitigation in 2021. The Office now has 7 full time positions including two solely focused on urban forestry.
Establishment of an Urban Forest Interdepartmental Team (UFIT) of City employees to coordinate implementation of tree and shade initiatives	**Completed-** the UFIT was formed and meets monthly
Prioritization of tree and shade programs to benefit public transit stops, people vulnerable to extreme heat, and highly used walking routes	**In process-** this is an action in the Shade Plan and Phoenix Climate Action Plan
Incorporation of Green Stormwater Infrastructure features, designed to meet site-specific needs and characteristics	**In process-** this is an action in the Shade Phoenix Plan, Climate Action Plan and was included in PlanPHX 2025.
Development of a citywide Cool Corridor program. Definitions, prioritization factors, stakeholder engagement strategies, and evaluation and accountability methods for the Cool Corridors program are defined.	**In process-** The Cool Corridor program was launched in 2021 and is an action in the Shade Phoenix Plan.
Development of a city-wide heat equity policy to serve as a framework for guiding future investments related to heat	**In process-** The Shade Phoenix Plan addresses critical components of the citywide heat strategy and prioritized equity
Delivery of annual reports from City staff to the public on the state of the urban forest and related programs and initiatives	**In process-** this is an action in the Shade Phoenix Plan

Full copies of UHITS recommendation memos and meeting minutes are available on the City's webpage for EQSC.

Partnerships: American Forests and Phoenix Metro Urban Forestry Roundtable

The vision, strategies, and actions in the Shade Phoenix Plan are also informed by and will be implemented with valued partnerships with local, regional, and national organizations. In March 2022, the Phoenix City Council adopted a resolution committing the City to a Tree Equity partnership agreement with American Forests, the nation's oldest forestry nonprofit organization. Tree Equity is climate justice and health justice, and achieving Tree Equity means investing in communities with the most need by growing trees, creating jobs, and implementing just policies which prioritize built shade and tree planting investments in neighborhoods with less shade, and which support changes to a system that led to inequity in built shade and tree planting.

In November 2019, the City of Phoenix, American Forests, and the Arizona Sustainability Alliance founded the Phoenix Metro Urban Forestry Roundtable, a civic-led coalition that has grown to over 60 organizations with the goal of achieving Tree Equity in the Phoenix Metro area to help combat extreme heat and ensure historically disadvantaged community members have access to the benefits that trees provide. The Phoenix Metro Urban Forestry Roundtable consists of nonprofits, private sector entities, cities, county and state level representatives, and university stakeholders all focused on solving the underlying challenges needed to improve the tree canopy in the region.

Partnerships: Academic

Partnerships with academic institutions have also informed the Shade Phoenix Plan. Through research collaborations and course instruction, the City works closely with Arizona State University to ensure that tree and shade initiatives are informed by cutting-edge science. For example, as a partner on a Department of Energy-funded project, the Southwest Urban Integrated Field Laboratory (SWIFL), the Office of Heat Response and Mitigation worked with researchers who

provided plan evaluations for the 2010 Tree and Shade Master Plan and a draft of the Shade Phoenix Plan. Additionally, the Office of Heat Response and Mitigation participated in six university classes and design studios in Fall 2022 where ASU Sustainability students analyzed shade best practices and made recommendations for the plan, while the ASU senior Landscape Architecture Studio developed built environment designs based on the plan's core principles. The City also collaborates with multiple research teams with specialized expertise in urban climate, heat-health, and urban forestry, including partners at the University of California Los Angeles (UCLA) and ASU.

Innovate PHX Challenge

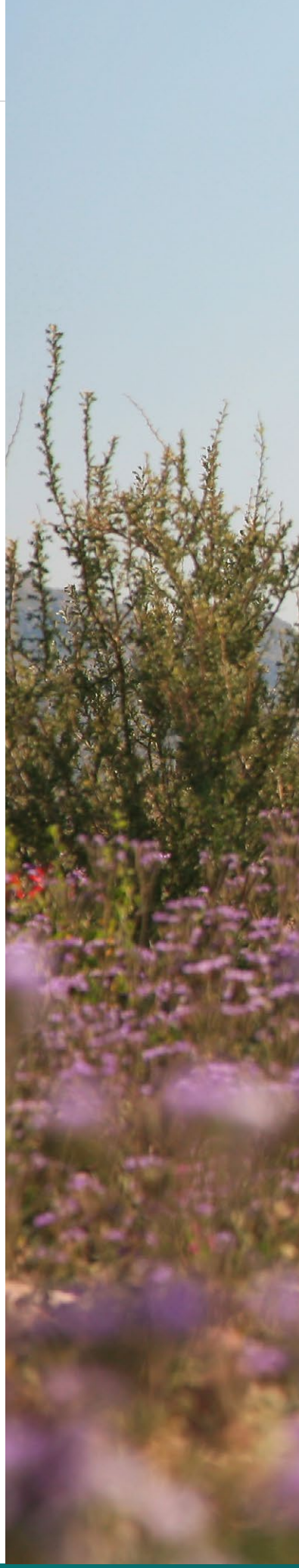
The Office of Innovation launched the Innovate PHX Challenge to engage diverse communities in creating solutions to the city's most pressing challenges. In December 2023, the Office of Innovation partnered with the Office of Heat Response and Mitigation and Venture Café Phoenix to explore innovative manufactured shade solutions with more than 170 innovators, students, researchers, and residents from across the city. Some ideas produced by the participants include ideas for passive wind cooling incorporated into the structure, shaded bike lanes, artistic concepts, and multi-directional shade. The City is currently working to prototype and test ideas from the Innovate PHX Challenge event.

City Budget Hearings

The City of Phoenix conducts a rigorous public engagement process each year to inform the adoption of the City's budget. This process includes a series of public hearings in every City Council district, as well as opportunities for comment and input through an online tool and at multiple City Council meetings. Requests for more trees and shade in Phoenix have been consistently voiced by community members at budget hearings in recent years. Notably, in spring 2021, increased investment in tree and shade initiatives ranked as the second most-requested action by the public in the hearings for the 2021-2022 City budget.

ASSESSMENT AND INVENTORY

Strategic planning and implementation of Phoenix's tree and shade programs are dependent upon accessible and actionable data. This section presents state-of-the-art analysis of tree and shade data available to support City decision-making and evaluation of progress. The section focuses both on community-wide data as well as data specific to City-managed properties. All analysis is based on the most current, quality-controlled data products as much as possible. To understand Phoenician's access to shade from all sources, this Plan includes a case study assessment of shade coverage from built and natural sources using the City's first shade analysis. As described in the Values and Introduction, equity is a fundamental consideration for the tree and shade analysis included in this Plan. While future work is needed to formally quantify tree and shade targets for different properties, land use categories, and neighborhoods in Phoenix, this section provides a detailed analysis of contemporary conditions that will guide future efforts.



Location: Rio Salado Trailhead
Project Landscape Architect: Floor Associates
Photo taken by: Chris Brown
www.floorassociates.com

Tree Canopy Analysis – Citywide

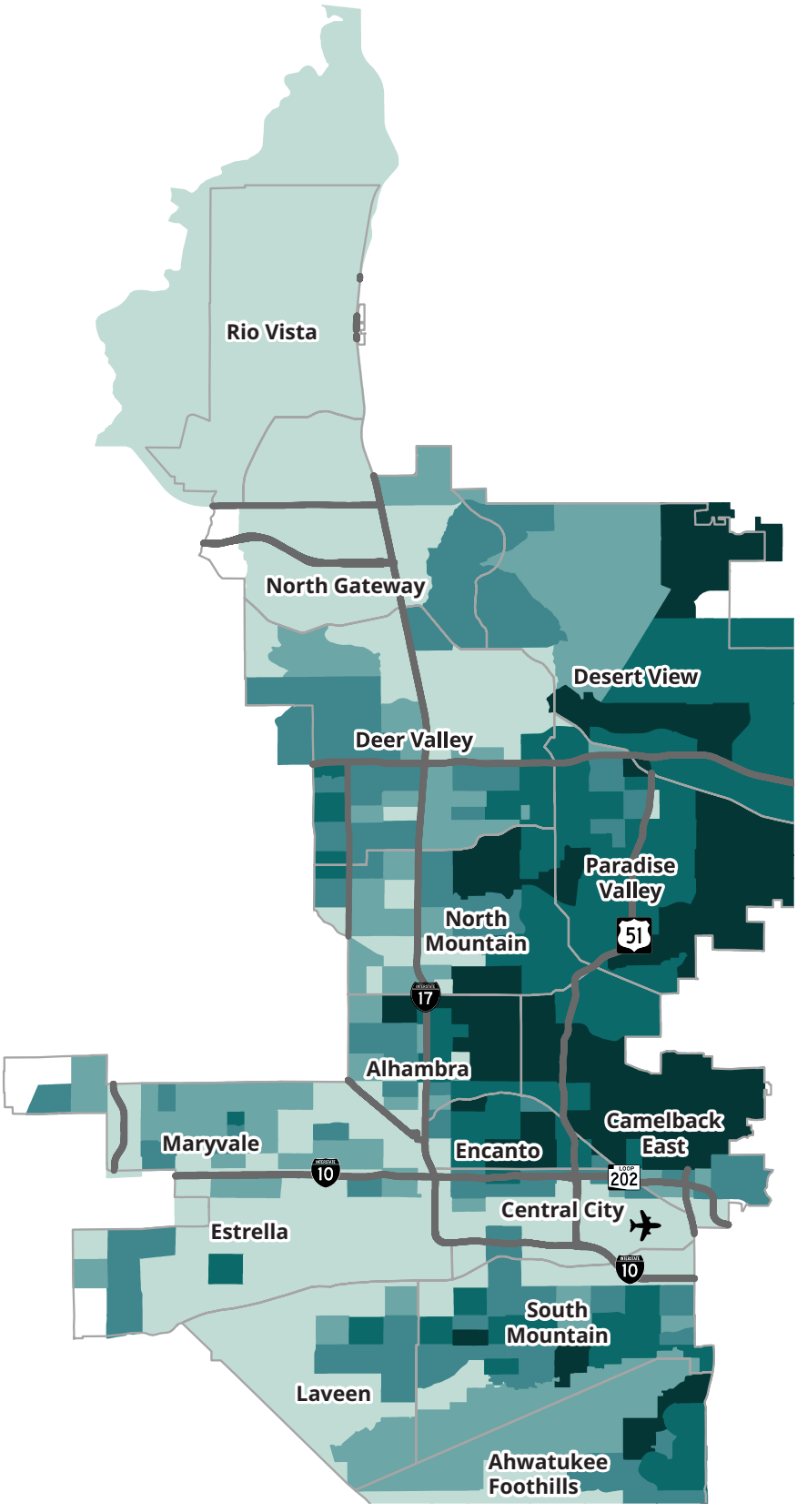
Citywide tree canopy coverage was assessed using publicly available data from Google's Environmental Insights Explorer. This tool measures tree canopy as a percentage of the total land area and building footprint area is excluded from those calculations for the Shade Phoenix Plan. The Google Environmental Insights Explorer data are highly detailed and have been summarized in this plan at different levels, such as individual properties and neighborhoods (represented by census tracts, see Figure 3).

The median tree canopy coverage at the neighborhood scale for Phoenix is 11%, but canopy is highly variable from one neighborhood to another. 78% of neighborhoods fall below American Forests' recommendation for desert cities of 15% tree canopy cover, although recommendations for specific neighborhoods and sites should be developed in collaboration with community members and with recognition for land use, topography, and other factors.

The neighborhoods with the most tree canopy coverage are located in central and eastern portions of the city including the Arcadia and Encanto neighborhoods. In these areas, tree canopy cover often exceeds 15%, and in some cases, over 25%. Tree canopy coverage is lowest in Central City South, in much of West Phoenix, and in many neighborhoods along the Interstate 17 Corridor. In those communities, tree canopy cover is often less than 8%, and in some cases, lower than 5%. There is more than a 10-fold difference in tree canopy cover between the neighborhood with the least tree coverage and the one with the most.

Measuring tree canopy coverage on specific parcel and property types is important because there are different tree planting programs, funding sources, and policies that apply to different properties. Single-family residential property is one important parcel type to consider because it accounts for approximately 30% of the total land area of Phoenix, and people spend a high percentage of their time at home (U.S. Department of Labor, Bureau of Labor Statistics). The median single-family residential property in Phoenix has 14% tree canopy cover, excluding the building footprint. The proportion of single-family residential parcels having more or less tree canopy than this citywide median is also highly variable across Phoenix (Figure 4). Summary statistics for different property types across the city are shown in Figure 5.

Location: Shadow Play
Designer: Meejin Yoon of Höweler + Yoon Architecture/MY Studio



Village	Tree Canopy*
Ahwatukee Foothills	9.2
Alhambra	15.0
Camelback East	17.1
Central City	5.7
Deer Valley	9.3
Desert View	13.0
Encanto	14.3
Estrella	6.2
Laveen	7.8
Maryvale	7.8
North Gateway	7.7
North Mountain	12.3
Paradise Valley	15.5
Rio Vista	6.4
South Mountain	11.1

*Building footprints are not included in percentage calculation.

Tree Canopy%

- 2.6 - 8.2
- 8.3 - 9.9
- 10.0 - 11.8
- 11.9 - 15.3
- 15.4 - 30.4

Figure 3. Tree Canopy by Census Tract
Derived from Google Environmental Insights Explorer high resolution tree canopy data from 2022 with building footprints removed from analysis.

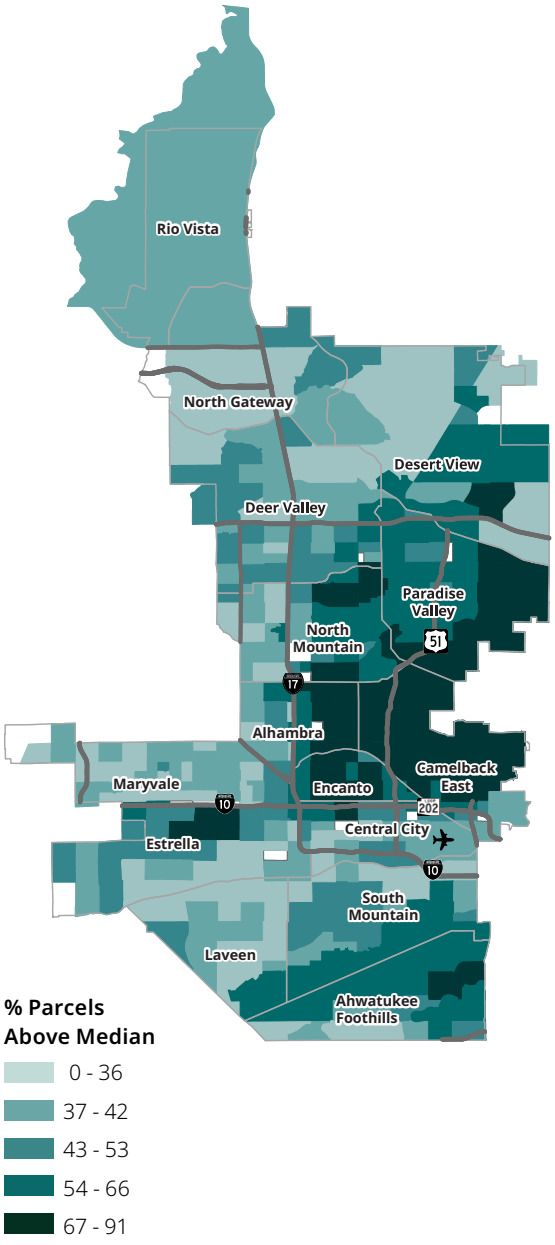


Figure 4. Single-Family Residential Parcels
Above Median Tree Canopy % for Single-Family Residential Parcels. Map shows the percent of single-family residential parcels that exceed the median tree canopy of all single-family residential parcels (14%) in the city, aggregated to census tract. Tree canopy data are derived from Google Environmental Insights Explorer high resolution tree canopy data from 2022 with building footprints removed from analysis.

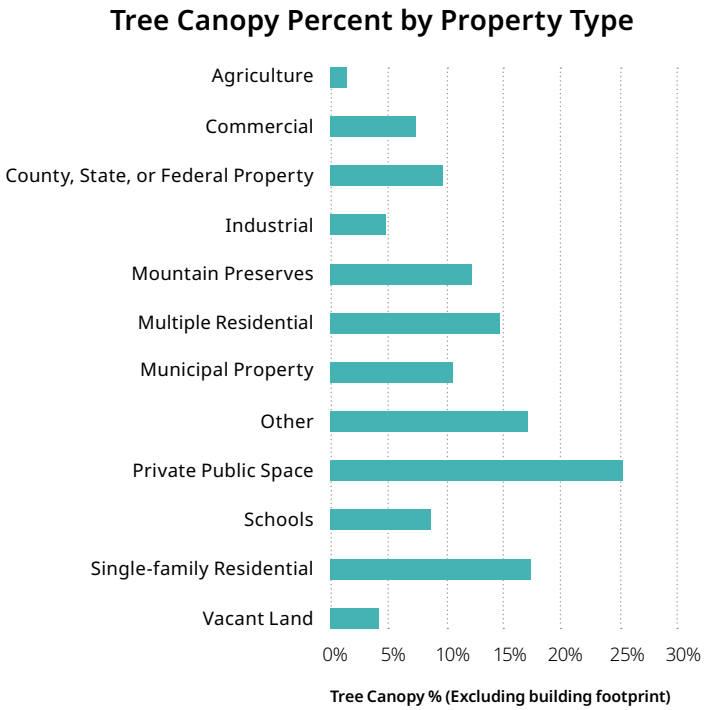


Figure 5. Tree Canopy Percent by Property Type
Average tree canopy % by parcel property type/groups. Using Google Tree canopy data (2022) with building footprints removed from analysis. Property types are groups of similar property use codes. "Private public space" includes residential recreation centers/clubhouses, greenbelts/retention basins, open space and walkways owned by HOA/community, and golf courses.

The inequitable distribution of tree canopy coverage throughout Phoenix is closely related to many social and economic variables. Overall, tree canopy coverage is lower in communities with lower incomes, a higher percentage of people of color, and more people who do not own a personal vehicle (Figures 6-8, Figure 10).
This pattern has been well-documented for many communities across the United States. Increasing tree canopy coverage in the neighborhoods where it is most needed was formally adopted as a City priority in 2021 with the adoption of the Tree Equity Pledge to American Forests. As a component of the City's partnership with American Forests, City staff use the American Forests Tree Equity Score to help identify priority communities for tree and shade initiatives. The Tree Equity Score (Figure 9) combines nine indicators of social, economic, and environmental conditions into one index on a 0-100 scale.

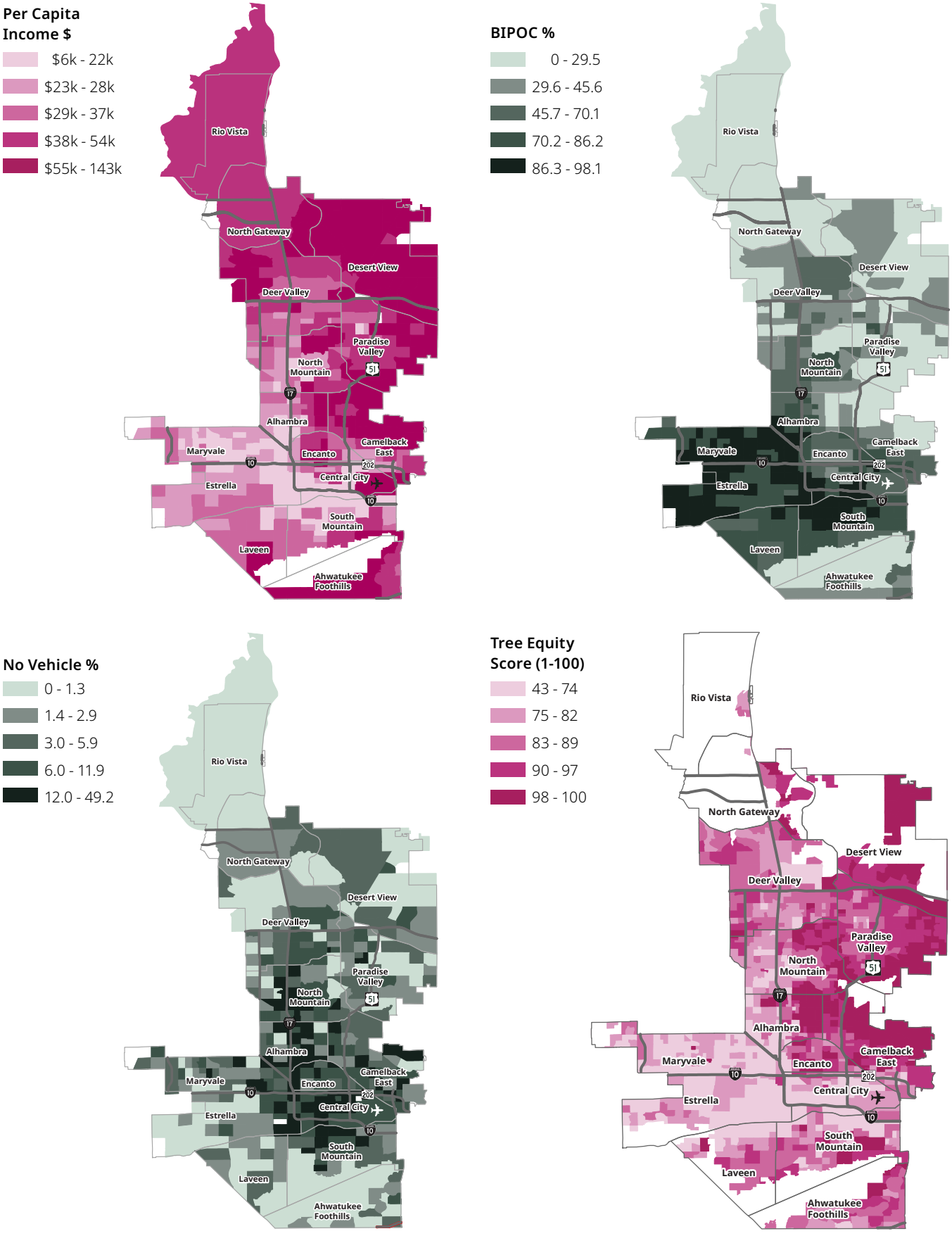


Figure 6-9. Per Capita Income; Percent of Population Identifying as Black, Indigenous, Hispanic, People of Color; Percent of Population with No Vehicle (U.S. Census Bureau 2022 5-year American Community Survey); Tree Equity Score (American Forests, 2017-2022).

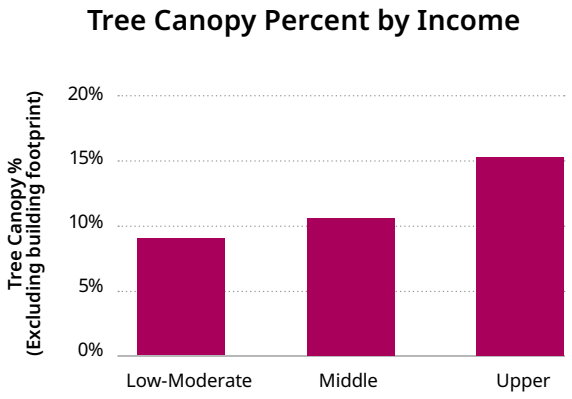


Figure 10. Average Tree Canopy Percent in Low-Moderate, Middle, and Upper-Income Neighborhoods. Using Google Tree canopy data (2022) with building footprints removed from analysis.

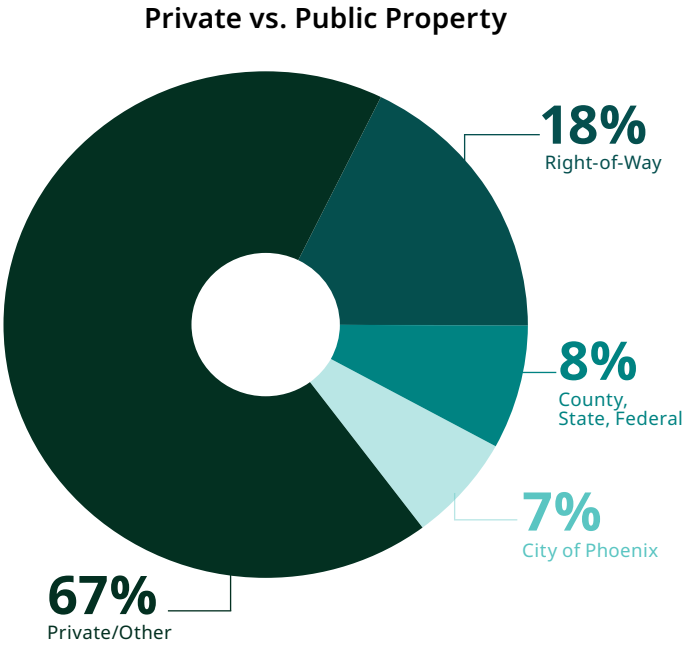


Figure 11. Private vs. Public Property in Phoenix
Based on parcel data property use codes from Maricopa County Assessor database. Mountain preserves and undeveloped land are removed from analysis. Right-of-way includes all developed land between parcel property boundaries, which is largely composed of streets, freeways, canals, alleys, sidewalks, and landscaping abutting property boundaries.

Tree Canopy Analysis and Inventory – City Property

Shade Phoenix places a special emphasis on tree and shade actions for properties owned and managed by the City of Phoenix. Many City properties are highly used and valued public resources where people need and seek shade—especially the City's flatland parks and the areas of the streetscape right-of-way that are owned and managed by the City. Collectively, City facilities and flatland parks account for about 7% of the total land area of the city (Figure 11). Road networks, sidewalks, canals and other rights-of-way, which are owned and managed by a combination of the City, Maricopa County, State of Arizona, and utilities, account for an additional 18%. While the City of Phoenix owns a relatively small percentage of the total area of interest for tree and shade initiatives, one-third of the land area in Phoenix is publicly owned managed, or accessible, not including mountain preserves and undeveloped land. Those areas are prioritized for planning and investment because of their public purpose as well as the imperative for the City to lead by example in providing effective shade in places where it is needed.

The City's most recent comprehensive tree inventory, which involves a professional measurement and assessment of every physical tree on City property (excluding mountain preserves), was completed in 2014. Portions of the inventory have been updated intermittently since that time. As of the most recent update, the City inventory included approximately 106,000 trees. However, as the previous inventory is now more than a decade old, a new inventory (planned for 2025) is necessary to guide tree planting and maintenance efforts on City property.

Over the past 14 years, the City has tracked and reported the number of trees planted and removed by the Street Transportation Department, Parks and Recreation Department, and Aviation Department, as part of the City's engagement with the Arbor Day Foundation for the Tree City USA Program.

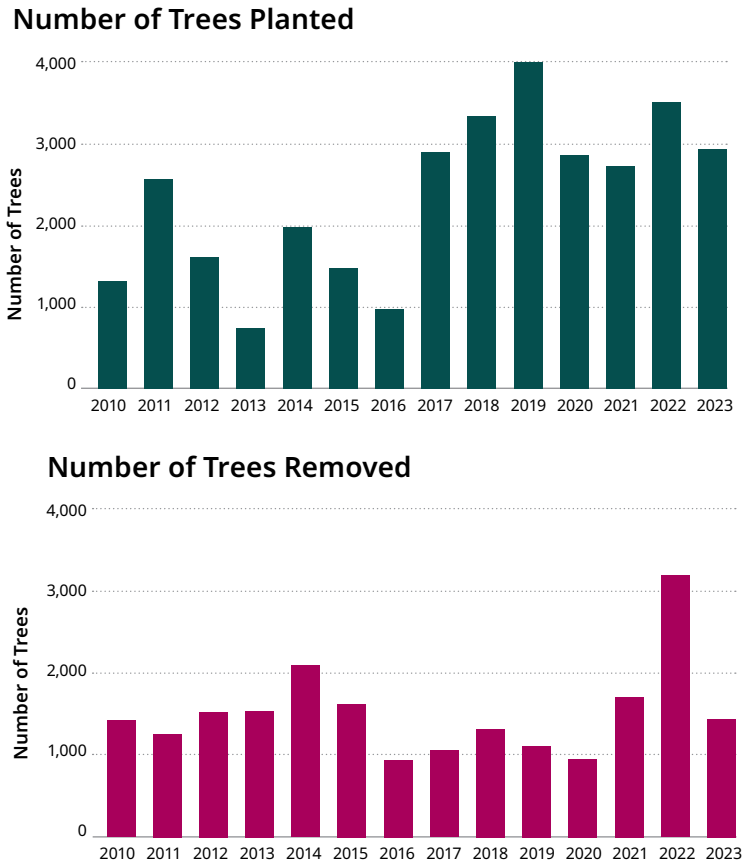
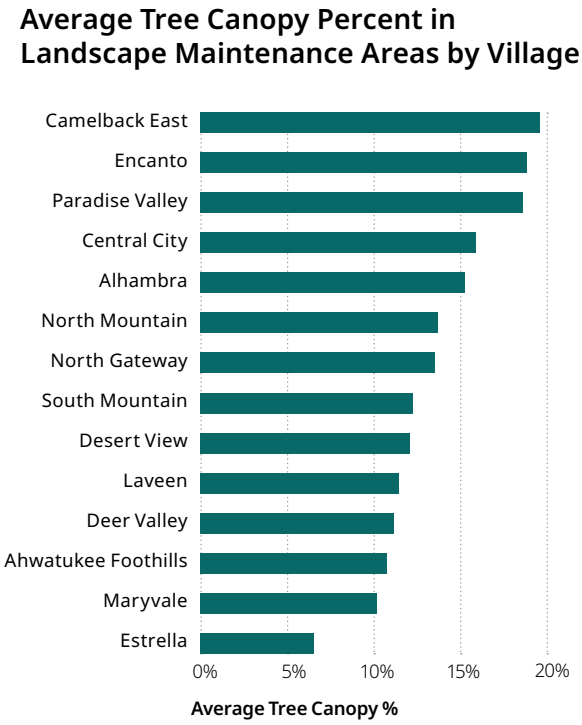


Figure 12. Tree Planted and Removed by the Parks and Recreation, Street Transportation, and Aviation Departments, 2010–2023.



That reporting shows a total of 32,968 trees planted on City property since 2010 by those three departments. Tree removal due to damage from accidents, storms, or aging, has resulted in 21,222 trees lost on these City properties over the same time period (Figure 12). A net of 11,746 trees were added to these City properties over the period 2010–2023.

Analysis of tree canopy coverage on City property provides a useful complement to the tree inventory to guide future City investment. Staff are completing a detailed analysis of tree and shade coverage and opportunities on all relevant City properties as an action in this plan. The City manages trees and landscape in approximately 55 million square feet of public streetscape, freeway, and canalscape area as part of the Landscape Maintenance Area program. There are 13,700 unique Landscape Maintenance Areas across the city, which largely fall on the sides and medians of major arterial streets. Across the entire city, Landscape Maintenance Areas tend to be highly fragmented, interrupted by private property and infrastructure conflicts. The majority of Landscape Maintenance Areas are found along major arterial streetscapes in Phoenix; there is minimal Landscape Maintenance Area along collector and neighborhood streets. Trees and landscape outside of the Landscape Maintenance Areas are the responsibility and the liability of the owner of the adjacent private lot.

The public can explore the entire inventory of Landscape Maintenance Areas through the City's open data portal: **https://mapping-phoenix.opendata.arcgis.com/**

As is the case for citywide tree canopy coverage, the percentage of tree canopy on the City-managed Landscape Maintenance Areas is highly variable (Figure 13).

Figure 13. Landscape Maintenance Areas Tree Canopy by Village. Tree canopy values in Landscape Maintenance Areas shown here include all landscape types: Streetscape, Freeways, Canalscape, Other, and Roundabout. Rio Vista does not encompass any Landscape Maintenance Areas, so it does not appear on the figure. Google Tree canopy data (2022) with building footprints removed from analysis.

Shade Analysis

In the urban setting, shade is provided by a combination of natural and engineered sources. Advances in environmental monitoring systems and computational resources are enabling the generation of maps of shade coverage for entire metropolitan areas. While the tree canopy estimates introduced earlier in the plan provide some information about shade in the city, comprehensive shade assessment must also account for shade cast from urban features other than trees as well as the movement of the sun. For instance, the shade cast by buildings in the downtown region is significant, especially later in the day (Figure 14).

In this plan, shade estimates for Phoenix are derived from a joint research project between the Luskin Center for Innovation at University of California Los Angeles and Arizona State University that models how sunlight is obstructed by the three-dimensional structure of the city. The shade estimates are based on sun angles on June 21 (the summer solstice) at 2 PM, 3 PM, and 6 PM (Figure 14). The City will continue to work closely with partners from the University of California Los Angeles and Arizona State University to ensure the most accurate and up-to-date data are used in shade studies moving forward.

Shade estimates for particular land use types, such as residential, commercial, or City-owned can be used for policy guidance and program implementation. Pedestrian areas are identified by stakeholders as a high priority for shade, and the Maricopa Association of Governments (MAG) has established recommendations for sidewalk shade coverage in the Phoenix Metropolitan Area.

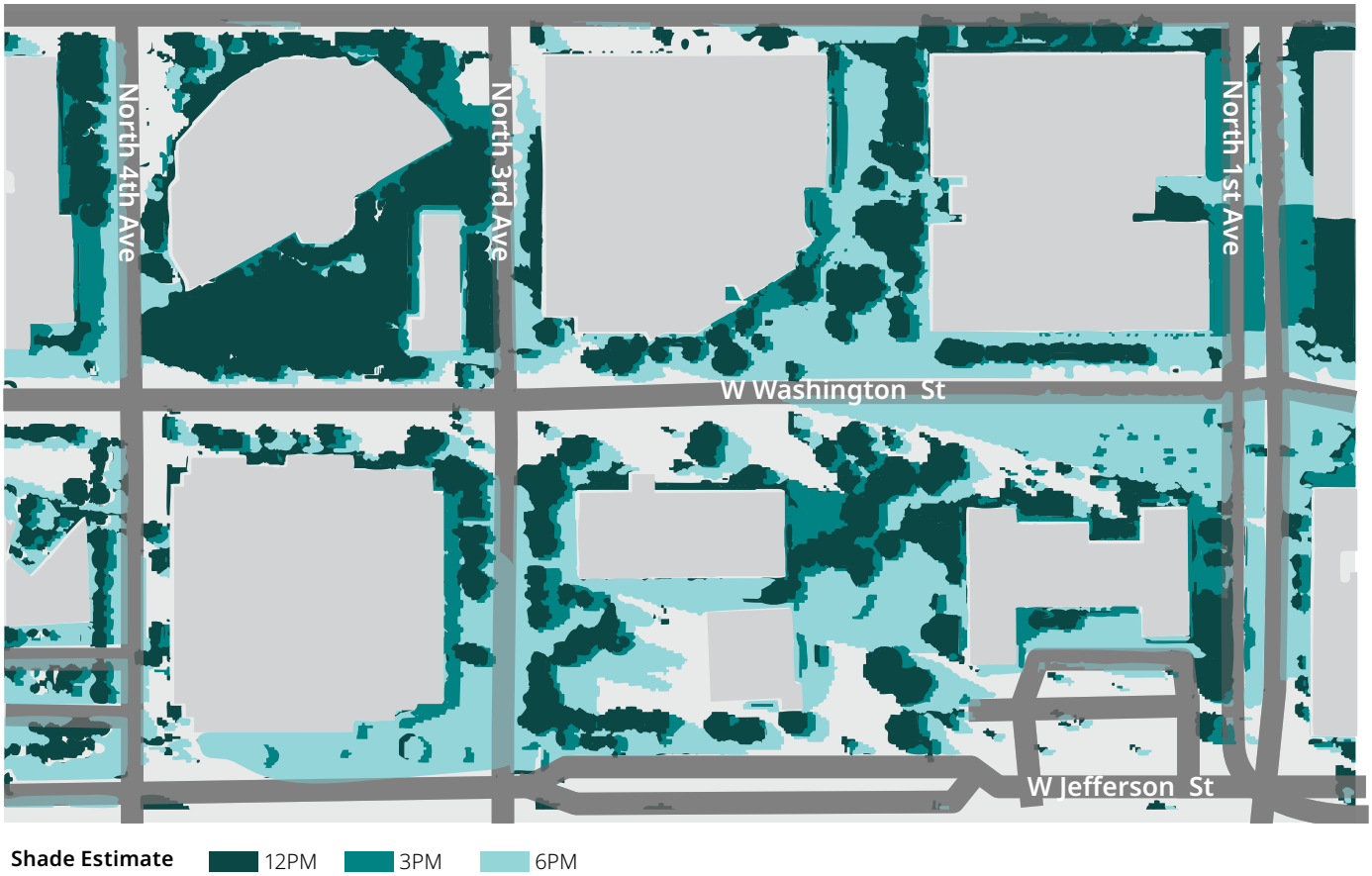
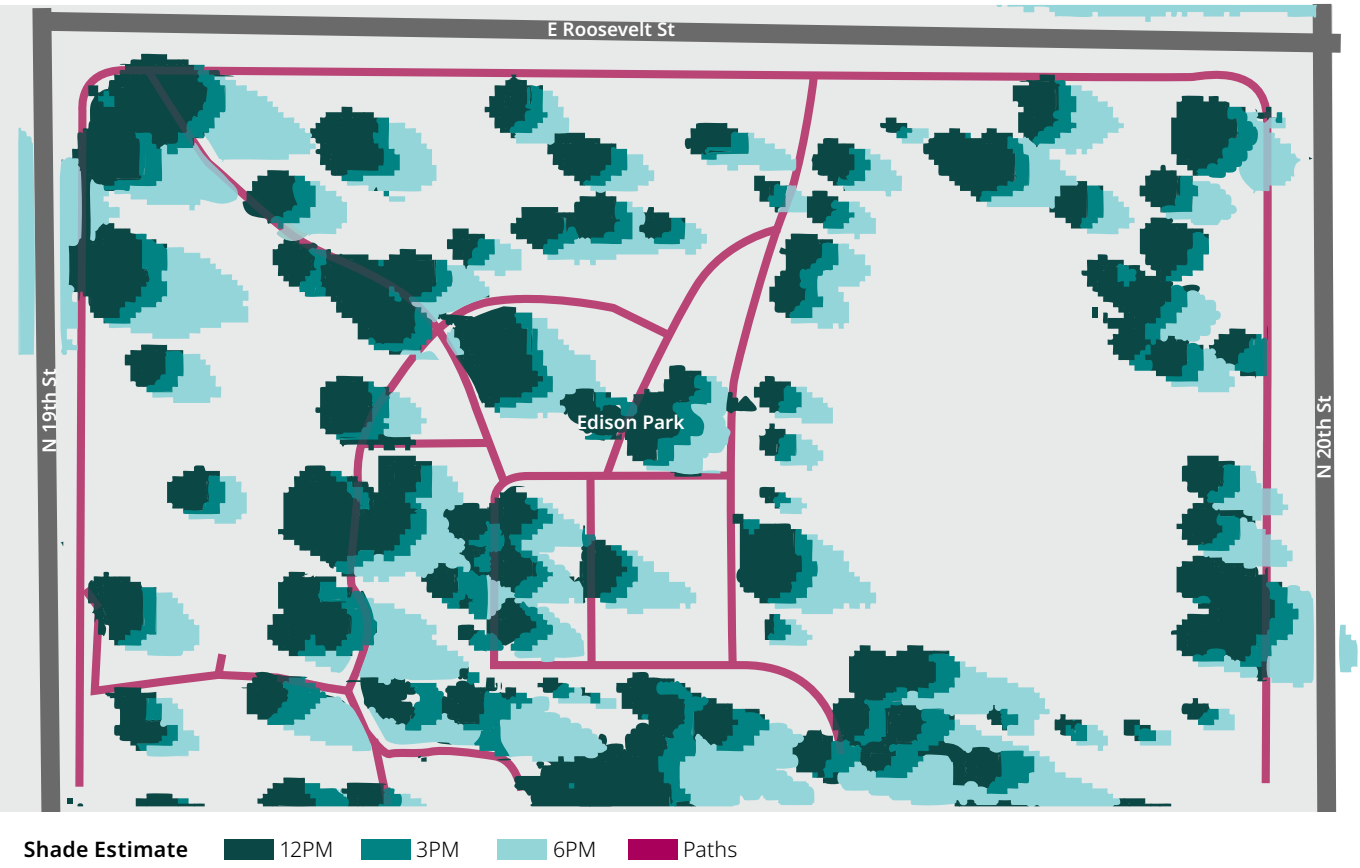


Figure 14. Shade estimates for an area of downtown Phoenix at 12PM, 3PM, and 6PM on June 21. Shade estimates include both built and natural shade.



| **Figure 15.** Shade estimates in Edison Park at 12PM, 3PM, and 6PM on June 21. Shade estimates include both built and natural shade.

The current shade map for Edison Park, located to the east of downtown Phoenix, is presented as an illustrative example (Figure 15). Today, shade coverage on all walking paths in and along the perimeter of Edison Park is estimated at 13% at 12 PM, 15% at 3 PM, and 29% at 6 PM. There is higher shade coverage on some of the interior paths in the park, and lower coverage along the perimeter sidewalks. MAG recommends a minimum of 20% shade coverage for pedestrian paths.

As a part of the transformative investments being made in the larger Edison-Eastlake Community, Edison Park is scheduled for major renovation and expansion over the next two years. Improving shade coverage, including along walking routes, is a priority component of those plans. Ongoing shade assessments should be completed in future years to ensure that planned investments are realized and shade coverage throughout the park, including along walking paths, is improved.

Built Shade Analysis and Inventory – City of Phoenix Property

The City of Phoenix builds and maintains a wide variety of shade structures on its properties to help protect the public from heat and direct sun exposure. A recommended action in this plan is the development of a comprehensive shade structure inventory for all City property. As of the publication of this plan, a preliminary inventory has been compiled with the shade structures available at City parks and the structures managed by the Public Transit Department at public bus stops.

There are currently 3,054 bus stops with shade shelters throughout the City of Phoenix, representing 75% of all public bus stops. The Villages with the highest percentage of shaded bus stops are those with higher transit ridership, including South Mountain, Encanto, and Alhambra (Figure 16). In those villages, nearly 80% of bus stops have shade structures. At City of Phoenix parks, there are 639 shade structures, including 530 ramadas and 109 shade canopies.

Bus Stops with Shelters Percent by Village

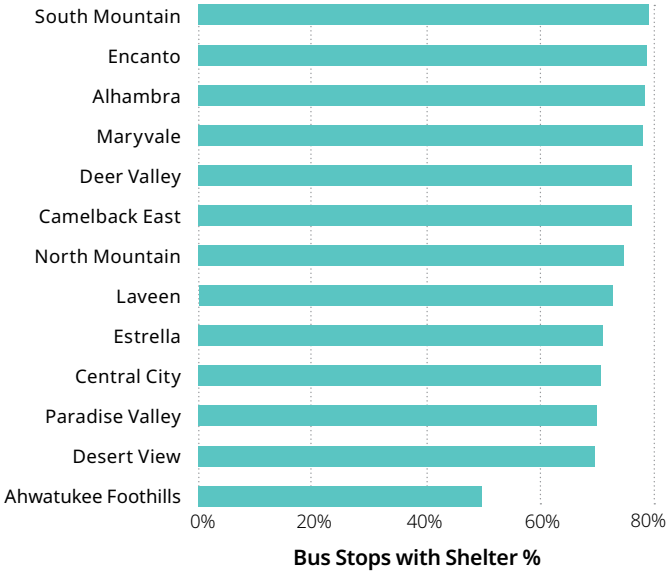


Figure 16. Bus Stops with Shelter Percent by Village. Note: Rio Vista and North Gateway do not have any Valley Metro bus stops.


AZSTRUT
Arizona
Sustainability
Alliance

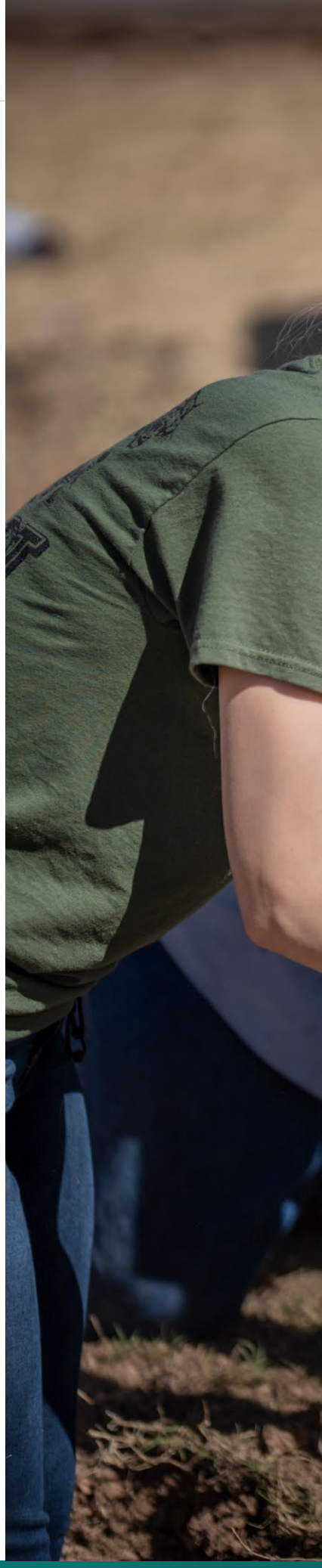
Heat, Shade, and Playground Safety for Children

In this plan, playgrounds are highlighted as a priority location for shade because children are particularly sensitive to the effects of heat and common playground equipment can become extremely hot when exposed to direct sunlight. At playgrounds, children are usually engaged in active play and extra exertion that can cause them to overheat quickly. Shaded playgrounds are safer because shade reduces children's heat and sun exposure. Integrating shade in playgrounds is a standard for the Parks and Recreation Department when installing or renovating municipal playgrounds. Ensuring adequate shade at playgrounds throughout Phoenix, including those managed by schools, churches, neighborhood and homeowner's associations, and multifamily properties will help youth have more opportunities for safe outdoor recreation.

SETTING THE VISION

Guidance and Goals

As part of this Plan, the City developed recommendations for shade goals for different use cases and is providing guidance on the costs and water use associated with tree planting. As the city moves toward a future with more shade, it is important to guide the efforts of all City departments and community partners to provide shade consistently and equitably where it is most needed. It is also important to provide guidance about how tree and shade efforts should be implemented with recognition of limited financial resources, careful stewardship of water resources, and environmental change.




PETZL

Project: Bloomcanopy
Designer: Matter Architecture Practice + Gavan & Barker

HOW TO DESIGN A SITE FOR SHADE:

Goals for shade coverage should change based on the use of the space

Shade recommendations are based on four criteria:

Duration of use - The duration people are exposed to direct sunlight at a specific location. The term 'Forced Wait' is sometimes used to describe situations where individuals must wait for a service, such as at a crosswalk or bus stop. As exposure to the sun increases, the need for shade becomes more critical.

Intensity of activity - The level of activity among people at a location. Highly active individuals are more prone to overheating than those who are less active, making shade especially important for them.

Quantity of people/Occupancy - The number of people at a location. Crowded areas require more shade for two reasons: First, body heat and restricted airflow in dense spaces can make the area feel hotter. Second, providing adequate shade ensures a more comfortable environment for larger groups of people.

Use of the space by high-risk populations / The presence of high-risk populations at the site - Certain groups are more vulnerable to heat-related injuries, including young children, the elderly, individuals with health conditions, those with mental illness, outdoor workers, and people taking certain medications, using illegal substances, or consuming alcohol. Shade could help prevent heat-related injuries in these populations.

How to Design a Site for Shade	Shade Guidance		
Land Use Type	**% shade cover goal minimum**	**% shade cover goal better**	**% shade cover goal best**
A: Priority sites due to high duration of exposure to heat from high-risk populations that are forced to wait outside and/or engaging in high intensity activity Examples: Bus Stops, Playground equipment and seating	100	100	100
B: High duration of exposure, forced wait, high-risk populations, intense activity, crowded Examples: School pick up and drop off zones, waiting areas at intersections, sidewalks, pathways, patios, plazas, eating areas, parking spots, sidelines at play areas, bleachers, areas where lines form for large events	25	50	75
C: Short duration of exposure, light activity, low occupancy, individuals are not forced to wait Examples: Residential yards open space, dog park, entire parking lots, open space in parks	10	20	30

Sun angles and shade:

When designing and placing shade elements, consider the impact of changing sun angles to ensure shade is cast in the location people are mostly likely to be at the time of day and year which is most impactful. The hottest parts of the day typically occur between 12:00 PM and 5:00 PM, and most shade should be placed to maximize shade at these times. In some cases, it may make more sense to prioritize shade in the morning hours if that is when more people will be present, such as at recreational sites.

While there will be cases in which shade is not appropriate or practical, these shade recommendations should be followed whenever possible.

TREE CARE GUIDELINES:

Water and Costs

In budgeting for tree planting, it is important to account for more than the cost of the tree alone. Additional funds are required for irrigation supplies, recurring maintenance, and water.

An estimate of these costs is presented below for a single tree. While these costs will vary depending on the specific scenario, these costs apply to the average tree planting on public or private property.

Category	Cost	Recurring
Tree (24" box + labor)	$750	one-time cost
Irrigation supplies	$300	one-time cost
Maintenance	$100*	annual cost
Water Cost	$114.32	annual cost

* No maintenance needed during the establishing period of a tree (year 1-2). Annual cost assumes one $300 maintenance visit every 3 years.

** Everyone in the City of Phoenix gets a water allowance of 2,244-3,740 gallons per month, depending on the month. If one can add the gallons needed to water a tree, without going over, there is no additional charge. For further information please go to https://www.phoenix.gov/waterservices/customerservices/rateinfo

*** The cost for one extra unit (748 gallons) for an entire year is $57.16; a household that already exceeds its allowance may incur charges for up to two additional units per year per tree.For further information please go to https://www.phoenix.gov/waterservices/customerservices/rateinfo

How to water a new low-water use tree

Low-water use tree

	How often to water	Total gallons per watering session	Total gallons per month
First 6 months	2 times each week	5 -10	40 - 80
0.5 years - 3 years	Winter: 1 - 2 times each month	10	10 - 20
	Summer: 2 - 4 times each month	20	40 - 80
After 3rd year	Winter: 1 - 2 times each month	15	15 - 30
	Summer: 2 - 4 times each month	30	60 - 120

This is a guide only. Water should be added to the tree slowly. Each individual tree may need more or less than this amount. Be aware of the symptoms of stress from too much or too little water. Correct the water issue as soon as you can with little trees, they are sensitive to water issues. Winter refers to November-February.

HOW TO PRIORITIZE FUNDING FOR SHADE

This rubric can be used by local practitioners to evaluate the relative merit and impact of a shade project. While all projects that add shade have merit, limited budgets often necessitate prioritization. This sample rubric is intended to serve as a starting point and may be adapted for specific decision-making needs.

Metric	Total Points per Metric
Shade improvements: Successful projects achieve more points the closer they are achieving the highest shade coverage for their land types.	30
Areas of Need or People in Need: Successful projects have higher amount of people who are within formal or informal areas or classes of need	30
Community Priority: Successful projects have demonstrated that the project is a high priority project to the community.	20
Pedestrian High Use Areas: Successful projects are found within area with high traffic pedestrian activity.	10
Leverage Projects: Successful projects are adding shade to existing projects.	10
Total Points	100
Bonus Points: Added points come from extra sustainability, economic or social benefits. **Examples:** Solar Components, Green Stormwater Infrastructure, Hardscape Removal, Native Species, Education Components, Art Components, other Additional Co-benefits	10

ACHIEVING THE VISION

Strategies and Actions

Increasing and caring for shade in the city is a long-term effort that will require all parts of our community and city. The City is committed to leading this effort to ensure Phoenix remains the most sustainable desert city in the U.S. and achieves the vision set forth in this Plan. Shade Phoenix contains 11 strategic priorities and 36 actions the City and its partners will take across four key strategies: expand shade on public and private properties, maintain built and natural shade we have, evaluate and institutionalize these efforts, and educate and empower the community.

Collectively, these actions represent more than $60 million in investments over five years and will result in more than 27,000 new trees and 550 new shade structures across the city. More than 50% of these will be planted or installed in low-to-moderate income communities and more than 85% will be planted or installed in low, moderate, and medium-income communities.

STRATEGY 1: EXPAND SHADE

Increase shade for people where they need it most

Increase shade for children

1 Complete implementation of the Shade for Students program

In 2023, the City launched the Shade for Students grant program to construct built shade at public and private nonprofit schools and nonprofits who use their sites to serve youth. This program was funded by an allocation from the Federal American Rescue Plan Act (ARPA). Through this program, schools could apply for up to $75,000 per site to install shade structures. Projects were selected by a panel of internal and external partners and had to be located within areas that are designated as disadvantaged by the U.S. Department of Housing and Urban Development (HUD), or at facilities that provide free or reduced lunch to at least 80% of their students. To date, 47 structures have been funded serving 26 campuses.

Funding	American Rescue Plan Act (ARPA) Funding ($1.5M)
Lead Department	Office of Heat Response and Mitigation
Partners	Youth and Education Office

2 Complete implementation of Canopy for Kids program

In 2023, the City allocated $2 million from the ARPA to launch the Canopy for Kids grant program to plant trees at public and private nonprofit schools and nonprofits who use their sites to serve youth. All projects must be located within areas that are designated as disadvantaged by HUD, or at facilities that provide free or reduced lunch to at least 80% of their students. Nearly 200 trees have been planted at seven different sites since the program began, and approximately 1,100 trees will be planted on 53 sites in Fall 2024. Unlike many other tree planting funding sources, this funding can also be spent to install or modify irrigation systems to ensure the trees are sufficiently watered.

To continue the program for five more years, the City has allocated an additional $2 million from the Inflation Reduction Act. Schools will collaborate with local nonprofits to complete comprehensive tree planting projects with drip irrigation systems, integrating GSI elements where possible. Partnering nonprofits will deliver educational programming and resources for teachers, students, and families as part of the tree planting initiatives to bolster community urban forestry knowledge and appreciation.

Funding	ARPA ($2M), IRA ($2M)
Lead Department	Office of Heat Response and Mitigation
Partners	ARPA: various school partners, Youth and Education Office, Arizona Public Service, Trees Matter, AZ Sustainability Alliance, Keep Phoenix Beautiful; IRA: Watershed Management Group, Arizona State University

3 Integrate shade in new construction and renovation at municipal playgrounds

Children are particularly vulnerable to the impacts of extreme heat. Playgrounds can provide outdoor spaces for children and their families to recreate and cool off during hot days. Parks and Recreation will continue to work with designers, engineers, and relevant City departments to review new and substantial renovations for Capital Improvement Program (CIP) projects to ensure that shade is provided at playgrounds as feasible. OHRM will work to identify funding opportunities to increase shade at existing playgrounds.

Funding	Parks Capital Improvement Program (CIP) and General Obligation (GO) Bond
Lead Department	Parks and Recreation
Partners	Street Transportation, Planning and Development, Office of Heat Response and Mitigation, Office of the City Engineer

Increase shade on public property

4 Plant trees in City parks

Phoenix's City-managed parks are home to an urban forest of tens of thousands of trees that provide significant benefits to residents' quality of life including shade, stormwater management, and air quality improvements. The Parks and Recreation Department has planted nearly 17,000 trees in city parks since the 2010 Tree and Shade Master Plan was released. They currently manage a large portion of the City's total tree inventory, including all trees in public parks. The City will continue to explore opportunities to build upon this work to enhance and maintain natural shade within parks as aligned with the values of the Shade Phoenix Plan, the Parks Master Plan, and Parks and Recreation policies.

Funding	Parks and Recreation
Lead Department	Parks and Recreation
Partners	Office of Heat Response and Mitigation

Parks and Recreation Department Urban Forestry Team

The Phoenix Parks and Recreation Department has an Urban Forest Team dedicated to caring for Phoenix's trees on City-owned land and along the public right-of-way. The team's daily responsibilities include tree pruning, planting, removals, hauling green waste from job sites or division brush areas, watering trees, and storm clean-up. The Urban Forestry team also handles after-hours tree-related emergency requests from the Streets, Police, Fire, and Water Departments.

Each Urban Forestry Team includes multiple staff and there are five teams currently responsible for the maintenance of over 100,000 trees across the city. Team members undergo extensive training in various areas, including proper tree pruning techniques, aerial vehicle operations, tractor and equipment large truck operations, CDL licensing, tree climbing, tree identification, and chain saw operation. The goal is for each team member to achieve certification as a Certified Arborist.

The team is responsible for the planting of 85% of the trees planted in City parks.

5 Add natural and built shade to City facilities

Many City facilities provide shade that directly benefits Phoenix residents, especially along walkways and bikeways and in outdoor gathering spaces. The City is using data from recent and upcoming tree and shade assessments to prioritize City facilities for new natural and built shade investments. The focus will be on facilities where outdoor space is used by the public in order to meet or exceed the shade standards established in this Plan. Additional natural and built shade will be included in the construction of new City facilities funded by the GO Bond Program including police and fire stations.

Funding	GO Bond Program (portion of $7.7M Heat Resilience program and other projects), IRA ($0.25M)
Lead Department	Office of Heat Response and Mitigation
Partners	Aviation, Convention Center, Fire, Housing, Human Services, Innovation, Library, Parks and Recreation, Police, Planning and Development, Public Transit, Public Works, Street Transportation, Water, Office of Environmental Programs, Office of the City Engineer

6 Build Green Stormwater Infrastructure projects in the right-of-way

Green stormwater infrastructure (GSI) can support vegetation while providing many co-benefits, including heat reduction, stormwater improvements, assistance with localized ponding and flooding, and reductions in potable water irrigation needs. The City will find opportunities to install GSI in Capital Improvement Program (CIP) projects and in landscape improvement projects on existing City properties and rights-of-way.

The City is working to identify priority neighborhoods that have wide rights-of-way that are good candidates for trees to be supported with GSI (especially curb cuts and bioswales). Funding provided by the Inflation Reduction Act (IRA) will support project construction and will also cover water and maintenance of the trees for the establishment period of three years. After three years these renovated right-of-way areas will become part of the Street Transportation Department's landscape maintenance areas and will be maintained in perpetuity using City funds. The City is exploring mechanisms to increase resources for maintenance as more trees are added to the publicly managed inventory.

Funding	IRA ($1.23M), Capital Improvement Program (CIP), Street Transportation Operating Budget
Lead Department	Street Transportation, Office of Heat Response and Mitigation
Partners	Parks and Recreation, Water Services, Planning and Development, Office of Environmental Programs, Green Stormwater Infrastructure Working Group

Project Name: Helios Foundation
Project Landscape Architect: Colwell Shelor Landscape Architecture

Green Stormwater Infrastructure : South Phoenix Streetscape and the Parking Lot at the Phoenix Zoo

In 2024, the first bioswale built and maintained by the City of Phoenix started construction along the new light-rail extension in South Phoenix. The bioswales are located in three segments along Central Ave, between W. Lynne Ave. and St Charles Ave. This project will bring approximately 570 linear feet of plantings, including 171 plants and 15 trees, that will collect stormwater run-off from streets during rain events. The City worked with the South Central Collaborative, which advocated for GSI projects in their community for many years. This project, along with other GSI projects around the city, will serve as a model for future street GSI projects to support the City's tree and water goals and reduce flooding.

From June 2020 to January 2022, the City of Phoenix constructed a new parking lot and renovated the existing parking lots at the Phoenix Zoo in Papago Park. The project consisted of a new 608-space parking lot (Lot D) and renovation of existing Lots A, B, and C, which altogether provide parking for 1,818 vehicles. The parking lots include new curbs, asphalt paving, lighting and landscaping and green stormwater infrastructure elements such as landscape islands and bioswales designed to capture runoff from the parking lot. These features will benefit the vegetation and reduce the amount of storm water runoff leaving the site.

| **Project:** Central Ave. project under construction

| **Project:** GSI at the Phoenix Zoo

7 Expand Cool Corridors network

In 2022, Phoenix's Street Transportation Department launched the Cool Corridors program to plant trees in targeted transportation corridors to keep pedestrians, bicyclists, and transit users safe and provide relief from high temperatures. Corridors were envisioned as one-quarter to half-mile walkways or trails adjacent to an arterial street and were selected using four key criteria: neighborhood heat vulnerability, transit dependency, pedestrian use, and shade coverage and temperature. Cool Corridors can also include engineered shade, chilled drinking water stations, and other design features and amenities to promote thermal safety and comfort, and should be implemented through a combination of public and private partnerships and resources.

The focus on equity in the Shade Phoenix Plan and learnings from the first few years of the Cool Corridors program require a reconsideration of its goals and investment plan, which originally called for 1,800 trees to be planted per year and projects across all City Council districts. The focus of the program will continue to be to increase shade coverage on highly used walking routes in communities disproportionately impacted by summer heat. However, construction and maintenance of successful Cool Corridor projects in the places with the greatest need requires a more comprehensive implementation strategy with higher per-project costs. OHRM will work with the Street Transportation Department to identify key community destinations, such as schools and community centers, in priority areas to be incorporated into the program. The City will also work with community and private property owners to understand how people walk to and want to walk to priority destinations and focus investments on those preferred routes. The Cool Corridor program will focus on construction and maintenance of exemplar projects in priority communities that address infrastructure deficiencies and conflicts to provide robust shade. Projects will seek to include additional elements such as structured shade, green stormwater infrastructure (GSI), chilled drinking fountains and bottle-filling stations, wayfinding, public art, seating, and "Smart Cities" technologies that support active transportation activities. When feasible, Cool Corridor investments will align with major construction and capital improvement program (CIP) projects to maximize impact and efficiency.

Funding	General Fund ($1.4M/year), Department Capital Improvement Program (CIP) funds
Lead Department	Office of Heat Response and Mitigation
Partners	Street Transportation, Parks and Recreation, Office of Innovation, Planning and Development

8 Add shade structures at bus stops

Phoenix has 4,080 designated public bus stops supporting 15.6 million annual riders. Approximately 75%, or 3,054, have shelters, which can provide some shade and thermal relief for riders. Since the 2010 Tree and Shade Master Plan was released, 1,869 shelters have been added, representing an investment of more than $18 million in new and replacement bus shelters. Bus stops were prioritized based on ridership to maximize program impact.

The Public Transit Department will install at least 80 shade structures at bus stops each year as it works toward the goal of having shade structures at all public bus stops where feasible in the city within the next 10 years. As part of this effort, the Public Transit Department will continue to explore innovative design strategies to maximize shade provision at bus stops.

Funding	Public Transportation 2050 (T2050), Public Transit General Fund
Lead Department	Public Transit
Partners	Street Transportation, Office of Heat Response and Mitigation

Innovative Bus Shelter Design with ASU

In 2016, the Phoenix Public Transit Department (PTD) worked with the ASU School of Industrial Design to develop alternative bus shelter designs that would improve the amount of shade provided by bus stop structures, particularly in areas where public right-of-way is limited. In partnership with ASU's faculty, a competition was held for Design School students. The competition received 15 individual and team submissions and five finalists selected for a final interview process. Four winners were selected and offered summer internships to work with PTD staff and an engineering firm to develop new bus shelter designs.

The process resulted in two major designs and another kit-of-parts design that allowed for multiple configurations based on the specific location for installation.

All the designs were further refined during a structural engineering analysis and with input from PTD's bus shelter manufacturer to ensure cost-effectiveness and long-term durability. The designs now provide PTD flexibility when analyzing a location for a bus shelter.

9 Construct Phoenix Sidewalk Shade installations in high-traffic public right-of-way

Providing shade for pedestrians and bicycle riders can improve public health and the economic vitality of communities. The City will design and construct shade structures for heavily trafficked public rights-of-way. Current structure designs include contributions from local artists and target major intersections and crosswalks where people are forced to wait while transiting. Construction of tup to 20 structures is expected to begin in 2025 and conclude in 2026. Locations were selected based on pedestrian and bicycle volumes, heat vulnerability index, tree canopy coverage, and access to vehicles. Due to funding requirements, all locations are in or near federally designated Qualified Census Tracts. To date, five standard shade structure designs have been developed. Ongoing development will incorporate concepts produced from the Innovate PHX Challenge @ Venture Café focusing on expanding manufactured shade and other community driven projects. Some ideas produced by the nearly 170 challenge participants include passive wind cooling incorporated into the structure, shaded bike lanes, artistic concepts, and multi-directional shade.

Funding	ARPA ($3M)
Lead Department	Street Transportation
Partners	Office of Heat Response and Mitigation, Office of Arts and Culture, Office of Innovation, Office of Sustainability, Office of Public Health

10 Pilot a shade structure right-of-way revocable permit

Currently, if a property owner wants to construct a shade structure in the public right-of-way within the Downtown Phoenix area and areas covered by the Walkable Urban Code, they must obtain a revocable permit (also known as an encroachment permit) in addition to appropriate variances as needed. The revocability, and the potential lack of permanence, and unfamiliarity with the permitting process can discourage property owners from making shade investments in shade in public rights-of-way. The City will explore the feasibility of piloting a streamlined permitting process for shade structures, canopies, and building overhangs, as long as the structures are built in accordance with all associated City requirements. Development of this permitting process may require changes to guidance documents, City code, ordinances, and/or variances to be obtained to allow for shade structure permits both inside and outside high-density urban development.

Funding	N/A
Lead Department	Planning and Development
Partners	Office of Heat Response and Mitigation, Street Transportation

Increase shade on private properties

11 Complete implementation of the Community Canopy Grant Program

Launched in 2023, the Community Canopy Grant Program aims to improve tree canopy coverage in communities within Qualified Census Tracts (as defined by the U.S. Department of Housing and Urban Development) throughout Phoenix. Through this program, neighborhood associations, community nonprofits, multi-family residential sites, and individual community members can submit applications requesting trees, supplies and support for tree planting projects designed to assist communities in increasing their tree canopies.

To date, approximately 800 trees have been planted through this program on approximately 400 residential properties. The goal for the fall 2024 planting season is to plant an additional 1,500 trees. A portion of the IRA funding will be allocated to extend this program and allow more residents to benefit with the planting of 6,000 trees over the next five years.

Funding	ARPA ($2M), IRA ($2.5M)
Lead Department	Office of Heat Response and Mitigation
Partners	Neighborhood Services, West Coast Arborists, Dusty Landscaping, Treeland Nurseries, Whitfill Nursery, Desert Tree Farm

Community Canopy Grant Program

The Community Canopy Tree Grant Program managed by OHRM is a unique effort to green our city's residential spaces in the neighborhoods that have the lowest tree canopy coverage. The grant provides up to two free trees for each house and up to 50 trees to multifamily complexes. This program provides more than just trees—City staff, along with a team of landscape architects, contractors, and arborists, work with residents to select the appropriate trees and ensure proper placement. Additionally, landscape contractors handle irrigation installation and the tree planting for residents. With the support of the landscape contracts, the City is able to plant larger trees.

The grant encourages neighborhoods to apply to trees for their entire neighborhood. For the neighborhood plantings, City staff and residents collaborate on an event to celebrate the neighborhood and give away supply bags and t-shirts. Often the events included live music, face painting or a food truck.

Each house that receives a tree also gets a supply bag with a 100-foot hose, irrigation timer, soil moisture meter, and educational materials in English and Spanish to help grantees care for their new trees. Each tree planted in homes comes with two t-shirts with a design from a local artist.

Fully supported tree plantings like this cost more than just the price of a tree. A tree by itself can cost around $180 and the City of Phoenix tree planting program for single family homes costs (tree, labor for planting, kit of supplies) approximately $1,088 per tree.

This program, the first of its of its kind at the City of Phoenix, was created by the Office of Heat Response and Mitigation. They entered into dozens of new contracts with vendors, most of them small businesses that had not previously worked with the City. In the first year of this program, over 2,000 trees were planted at homes in front-line neighborhoods that have lower than average tree coverage. With the Inflation Reduction Act grant, OHRM can offer this program through 2029.

12 Develop a permit for small tree planting projects

Planting a tree on a private multi-family residential or non-residential property in the City of Phoenix requires a permit from the Planning and Development Department. Replacements of pre-existing permitted trees do not require a new permit but must adhere to similar tree species and size standards. This process is time and labor intensive for individual community members, which can be a burden for small tree planting projects.

To help support small tree planting projects, the City is exploring options for a streamlined permitting and approvals process. OHRM is working with the Planning and Development Department to develop simpler processes for projects that would plant five or fewer trees.

Funding	N/A
Lead Department	Office of Heat Response and Mitigation, Planning and Development
Partners	Street Transportation

13 Develop sample shade stipulations for Village Planning Committees and Planning Commission

Phoenix is divided into 15 urban Villages, each with a Village Planning Committee (VPC) appointed by the Mayor and City Council. The VPCs provide guidance on a range of citywide and local issues, and they hear and discuss re-zoning cases, general plan amendments, and text amendments and provide recommendations to the Planning Commission.

One tool used by the VPCs are stipulations, which can take the form of legal, enforceable rezoning stipulations drafted together with the village planners. Planning and Development and OHRM will work together to refine and strengthen existing and develop new sample stipulations for use by VPCs and the Planning Commission to support the goals of this plan, including expanding shade, incorporating green stormwater infrastructure (GSI) features where relevant.

Funding	N/A
Lead Department	Planning and Development
Partners	Office of Heat Response and Mitigation


volunteer

STRATEGY 2: PRESERVE AND MAINTAIN EXISTING SHADE

The community works together to support a thriving urban forest and well-maintained built shade

Care for and maintain trees and shade structures on public property

14 Continue and expand tree replacement program using 'right tree, right place' and 'no-net-loss' approaches

The Street Transportation Department will continue to be responsible for ensuring the timely replacement of trees that are damaged, pose safety risks, or have died in landscape maintenance areas. Replacement trees will be chosen using recommendations from the species list developed by Phoenix Metro Urban Tree Roundtable and to comply with all regulatory requirements with the Phoenix Active Management Area as defined by the Arizona Department of Water Resources. The City will work to expand the number of departments that have dedicated funding for tree replacement and follow similar processes to those used by Street Transportation. In cases where there is a utility conflict on City-managed property that requires tree removal, Salt River Project (SRP) and Arizona Pubic Service (APS) will help to identify and remedy the conflict while preserving total tree canopy coverage. Both utilities will remove conflicting trees and provide replacement(s) at their expense.

Funding	~$390K/year funding allocated in Street Maintenance Operation budget, Salt River Project, Arizona Public Service
Lead Department	Street Transportation
Partners	Office of Heat Response and Mitigation, Parks and Recreation, Landscape maintenance contractors

15 Maintain City-managed trees and shade structures

Caring for and maintaining the City's existing tree canopy is critical to ensuring a healthy and thriving city. The City will continue to perform regular maintenance work, including trimming, pruning, and removal of dead limbs and seek additional resources as available to expand this vital work.

The City will also work to ensure that shade structures remain in good working condition. Routine maintenance will include actions such as power washing, graffiti removal, repainting, tightening bolts, and re-attaching and repairing shade sails.

Funding	Office of Heat Response and Mitigation General Fund
Lead Department	Office of Heat Response and Mitigation
Partners	Planning and Development, Arizona State Department of Forestry and Fire Management, Parks and Recreation, Street Transportation, Office of Innovation

Preserve trees and shade structures on private property

16 Strengthen enforcement of tree code

The City will review and update its codes and processes as necessary to strengthen tree and plant violation enforcement on commercial and multi-family residential. properties. This includes exploring the designation of a tree and plant violation inspector. The City will explore more proactive identification of at-risk properties, including possible development of screenings to identify properties that are out of compliance with enforceable site plans.

Funding	N/A
Lead Department	Neighborhood Services
Partners	Office of Heat Response and Mitigation, Planning and Development, Law

STRATEGY 3: EVALUATE AND INSTITUTIONALIZE

Ongoing implementation and improvement of shade efforts to scale their impacts and maximize benefitsshade

Monitor and evaluate progress on Shade Phoenix plan

17 Complete citywide tree and shade assessments

The City will assess both tree canopy and shade coverage to better understand the existing conditions and identify opportunities for expansion in the areas of greatest need. This assessment will provide data about the percentage of land area in the city, in different neighborhoods, and on individual sites and properties that is covered by tree canopy and/or shaded by natural or engineered sources. The current tree assessment uses data embedded in Google's Environmental Insights Explorer, which uses high-resolution overhead imagery. While many cities have conducted tree assessments, few have assessed total shade. The City will also conduct a citywide assessment of where shade exists at different times of day and different times of the year. This first-of-its kind assessment for Phoenix will use three-dimensional building and landscape data, run through a model that casts shadows based on sun positions. OHRM will work with experts at University of California Los Angeles (UCLA) and Arizona State University (ASU) to create a best management reporting practice for shade assessments. These assessments will be updated at least once every five years if possible based on data availability, and staff will continue to review evolving monitoring techniques and technologies to improve citywide assessments.

Funding	N/A
Lead Department	Office of Heat Response and Mitigation
Partners	Google, University of California Los Angeles (UCLA), Arizona State University (ASU)

18 Conduct and maintain an inventory of trees and shade structures on City property

To help complement the shade assessment and to identify opportunities for new shade structures in areas of high need, the City will conduct a citywide inventory of shade structures on publicly managed property. This will include, but not be limited to, bus shelters, City facilities, and park spaces. For trees, the City will complete an updated citywide inventory of trees on publicly managed property, using asset management software. Once completed, the tree inventory will be managed by the Office of Heat Response and Mitigation in coordination with all relevant City departments.

Using property inventories, data from the citywide assessments, and ongoing community engagement, city staff will work to assess and prioritize needs for shade on City-owned property. Staff will also work to identify additional sources of funding to add shade and cover other critical installation and maintenance costs including irrigation, archeological surveying and preservation, and utility conflict avoidance.

Funding	Parks and Recreation (tree inventory), N/A (shade structure inventory)
Lead Department	Office of Heat Response and Mitigation
Partners	Parks and Recreation, Street Transportation

19 Provide an annual progress report on Shade Phoenix

The Shade Phoenix Plan outlines the actions the City and its partners will take over the next five years. To track progress toward the goals, OHRM will produce an annual report documenting the City's progress on each of the actions in the Plan. This public-facing document will ensure these efforts are transparent and stakeholders can follow the City's progress.

The annual progress report will be part of an annual public engagement process. The Office of Heat Response and Mitigation will invite community participation in progress evaluation and goal setting for subsequent years and annual progress reports should center community perspectives and wisdom.

Funding	General Fund
Lead Department	Office of Heat Response and Mitigation
Partners	All relevant City departments

20 Update the Shade Phoenix Plan every 5 years

Achieving the City's long-term goals and expanding and maintaining shade in Phoenix will take time, continued effort, and investments. The City and its partners will also continue to learn about the most effective ways to deliver this work and better understand the unique needs of Phoenix's diverse communities as it implements Shade Phoenix. To ensure that Phoenix's shade efforts remain current and focused on the most pressing needs, OHRM will work with all City departments and partners to update the Shade Phoenix Plan every 5 years.

Funding	General Fund
Lead Department	Office of Heat Response and Mitigation
Partners	All relevant departments, All relevant stakeholders, City Council

Strengthen organizational coordination and staff capacity

21 Review and improve City processes governing landscaping and tree care

The Budget and Research Department completed a study of the City's current landscape maintenance efforts in summer 2024, which included a detailed assessment of current practices within City departments as well as comparisons to landscape maintenance efforts in peer cities. The Office of Heat Response and Mitigation will work with City departments to explore opportunities for implementation of recommendations that emerged from the study related to staffing models, inter-departmental coordination, contract management and oversight, and water use.

Funding	General Fund
Lead Department	Budget and Research
Partners	Office of Heat Response and Mitigation, All relevant departments

22 Assess and improve proper planting and maintenance practices for City-managed urban trees, following industry-standard best management practices

Planting and maintaining trees require specific knowledge and expertise. Trees on City of Phoenix property are planted and maintained both by in-house City staff and by contractors. To increase the health of public trees, it is critical to ensure sufficient personnel, training, training, equipment, budgets and time to plant and maintain trees properly. It is also important that the City staff that oversee the work of the contractors have proper training to guide and oversee the work based on evolving best practices. Building upon the results of the landscape maintenance study, the Office of Heat Response and Mitigation will benchmark the City's urban forestry processes and resources against care standards developed by the International Society for Arboriculture (ISA). A comprehensive report will be presented to City Council by the end of 2025, with suggestions on strategies to close any gaps in capacity and service.

Funding	N/A
Lead Department	Office of Heat Response and Mitigation
Partners	Parks and Recreation, Street Transportation, Budget and Research

23 Build institutional capacity for Green Stormwater Infrastructure

The City is working to expand the use of green stormwater infrastructure (GSI) across Phoenix and build the capacity to design and maintain GSI projects. The recently initiated cross-departmental working group serves as a resource to departments and provides a forum for learning. The City will identify opportunities to provide specific training to City project managers on incorporating GSI into design, construction, and maintenance practices. GSI expertise will be included in future engineering on-call contract requests for proposals. To help lead this work, the City will also explore opportunities to fund a new position to coordinate work on GSI across departments. Private property owners and developers are also critical in expanding the use of GSI. The City will evaluate opportunities to streamline permitting processes and expand resident and professional familiarity with GSI installation and maintenance. To this end, the City will provide educational resources for private parties to support implementation of GSI on their property/development, including a GSI Handbook for Residents and other resources on the City's GSI website.

Funding	N/A
Lead Department	Planning and Development, GSI Working Group
Partners	Office of Heat Response and Mitigation, Office of Environmental Programs, Street Transportation, Parks and Recreation

24 Re-establish cross-departmental working group on urban forestry and establish a new built shade working group

To better align City staff across departments, the City has re-established a cross-departmental working group on urban forestry comprised of staff that manage trees on their properties. In addition to the urban forestry working group, the City will establish a new working group to coordinate this work across departments. These working groups will also help to align City departments in their engagement with community stakeholders and external partners, and serve as a mechanism to ensure that city staff, management, and leadership are kept up to date on tree and shade initiatives, successes, and challenges.

Funding	N/A
Lead Department	Office of Heat Response and Mitigation
Partners	Aviation, Convention Center, Office of Environmental Programs, Fire, Housing, Human Services, Library, Neighborhood Services, Parks and Recreation, Planning and Development, Police, Public Transit, Public Works, Street Transportation, Sustainability, Water Services

Strengthen regulations, design standards and guidelines

25 Update City of Phoenix plant species guidance

Planting the right tree in the right place is critically important to expanding natural shade in Phoenix. The urban desert setting requires special attention to many factors when selecting tree species that will thrive into the future. Trees planted today, throughout their long lives, are likely to experience climatic conditions that differ from those observed in Phoenix in decades prior. The City and its partners must think ahead to which trees species will be best adapted to future environmental conditions including projected hotter and drier summers. Planning and Development will continue to work with other City departments to evaluate species guidance and regulatory plant lists against the tree list developed by the Urban Forestry Roundtable. The City will explore any necessary updates to codes on species requirements and guidance and, where possible, contribute to new or updated tree species lists adopted by other regulatory bodies.

Funding	N/A
Lead Department	Planning and Development
Partners	Office of Heat Response and Mitigation, Office of Environmental Programs, Parks and Recreation, Street Transportation, Law, Water Services

26 Embed shade recommendations into City-owned building design standards and facility review

The City is updating its standards for new municipal building construction projects and substantial renovations to shape projects funded by the General Obligation (GO) Bond Program. In addition, to ensure these standards are followed consistently, the City re-established the Facility Review Committee. The Committee will provide recommendations on all new construction and substantial renovation projects for compliance with the new building standards. OHRM provided recommendations for the building standards related to shade and will serve on the Facility Review Committee to ensure alignment with the vision and goals of the Shade Phoenix Plan.

Funding	N/A
Lead Department	Public Works
Partners	Office of Heat Response and Mitigation, Street Transportation, Office of the City Engineer

27 Pilot a Public Shade Fund

Several types of property developments are required by City Code to include trees and built shade. In some instances, the development cannot comply with the shade requirements due to factors out of their control, such as proposed tree locations in conflict with existing underground infrastructure. The City is seeking to create a Shade Fund that can be used in instances where these projects cannot meet the required square footage of shade. Planning and Development will work with other City departments to design and launch a pilot Shade Fund and ensure that funds are used in close proximity to the project to mitigate the loss of shade in an equitable manner.

Funding	N/A
Lead Department	Planning and Development
Partners	Private developers, Office of Heat Response and Mitigation, Law

28 Integrate tree and shade goals in all relevant City plans

The City has several plans to guide efforts to ensure Phoenix is the most sustainable desert city in the U.S. This includes documents and planning processes like the General Plan – PlanPHX 2025, as well as topic-specific plans like the Climate Action Plan and Hazard Mitigation Plan, and departmental strategies such as the Parks and Recreation Master Plan, the Street Planning and Design Guidelines Manual, and Stormwater Policies and Standards. OHRM will work with colleagues across the City to ensure that all plans and planning processes are aligned with the vision and goals presented in this Plan. Community members participating in the Urban Heat Leadership Academy, led by the Nature Conservancy, will help identify opportunities to integrate tree and shade initiatives into local and regional hazard mitigation plans.

Funding	FEMA BRIC Grant ($300K)
Lead Department	Office of Heat Response and Mitigation
Partners	All relevant departments

Create and expand pathways for careers in urban forestry

29 Create a Tree Steward Program

The City recognizes the importance of planting trees in high need areas, but also considers educating the public on how to plant and care for trees just as critical. With funding from the Inflation Reduction Act (IRA), the City will partner with community organizations focused on workforce development to hire and train ten community members as Community Tree Stewards. The Tree Stewards will work in conjunction with the City to organize and lead neighborhood tree plantings, inventory and monitor neighborhood trees, coordinate tree maintenance, and help educate and inspire other residents about the importance and value of trees.

OHRM has been working with the Arizona Department of Forestry and Fire Management on the development of a training manual to educate community members. Community Tree Stewards will be trained in the following subjects: tree biology, soil, water and fertilizer, tree identification, tree selection and planting, tree maintenance and on-going care, biological and physical tree threats, and the benefits of trees and environmental justice.

Funding	Inflation Reduction Act (IRA) ($2M)
Lead Department	Office of Heat Response and Mitigation
Partners	Parks and Recreation, Community-based organizations, Arizona State Department of Forestry and Fire Management

30 Support youth workforce development for urban forestry career pathways

An Arizona State University (ASU) team is working with state apprenticeship offices, local and national urban forestry industry leaders, professional organizations, and community colleges to document and design urban forestry workforce and entrepreneurial pathways with a focus on addressing barriers to access and points of disconnection. With funding from the Inflation Reduction Act (IRA), the ASU team will create an urban forestry vocational program that includes experiential courses, internships and apprenticeships. The aim is to create pre-professional on-ramps for underserved communities, with a focus on opportunity youth (ages 16–24). The City will support this project by exploring opportunities to pilot contracting and hiring of program participants.

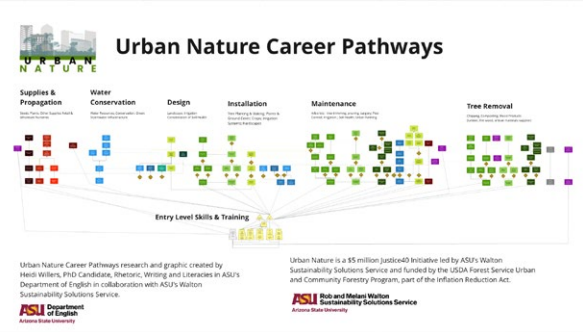
Funding	Inflation Reduction Act (IRA) via Arizona State University
Lead Department	Office of Heat Response and Mitigation
Partners	Arizona State University, Arizona Conservation Corps, Arizona Landscape Contractors Association, Bartlett Tree Experts, Arizona Community Tree Council, Arizona Nursery Association, Arizona Cooperative Initiative, Parks and Recreation

Workforce Development Pathways for Urban Forestry

Urban Nature is a new three-year project led by Arizona State University's Rob and Melani Walton Sustainability Solutions Service - in partnership with community-based organizations, industry partners, national organizations, several ASU departments and with the City of Phoenix. The Urban Nature program will offer five community-based, industry-supported learning pathways into viable and thriving green jobs. Residents of frontline communities will be offered 95 paid learning opportunities in English and in Spanish across a range of sectors and 63 paid internships in green jobs that grow and sustain our urban tree ecosystems.

The program will also include three courses for entrepreneurs aiming to launch or scale businesses that promote urban nature, as well as a Seed Start Center offering hands-on learning related to tree nursery operations and business development.

These Urban Nature pilot programs will develop local infrastructure and industry pipelines to help make shade for all achievable and sustainable while bringing the social, health, environmental, and economic benefits of trees to residents and neighborhoods most impacted by extreme heat.



Scan here to learn more about Urban Nature Career Pathways

31 Provide Certified Arborist Training to professionals and residents

Proper tree planting and maintenance requires specialized knowledge and expertise. The City has partnered with the Arizona Community Tree Council to host Certified Arborist Training courses with the Parks and Recreation Department. These courses are designed to prepare tree care industry workers for the International Society of Arboriculture (ISA) Certified Arborist Exam, the industry standard certification. The City will work with community partners to promote this course, as well as other training opportunities, to a wide audience to expand the trained workforce to help care for trees in the city and to inspire the next generation of urban foresters.

Funding	General Fund
Lead Department	Parks and Recreation, Office of Heat Response and Mitigation
Partners	Arizona Community Tree Council

STRATEGY 4: EDUCATE AND EMPOWER

Phoenicians understand and support the importance and value of trees and shade

Create a citywide movement around shade and heat

32 Launch Shade Phoenix public communications campaign

Create and launch, in consultation with community stakeholders, a citywide communications campaign to engage residents and businesses about the importance of shade and how it can be incorporated into the city, and to maximize awareness of public resources available to support trees and shade. The campaign will create multi-media content for diverse stakeholders, with emphasis on areas with low amounts of trees and shade . Content will be distributed through a variety of traditional and social media channels.

Funding	Inflation Reduction Act (IRA) Urban and Community Forestry program
Lead Department	Office of Heat Response and Mitigation
Partners	Communications, Departmental Public Information Officers

33 Create shade award and recognition opportunities for innovative projects adding shade in Phoenix

Programs that recognize and celebrate innovative and well-designed shaded places will help drive new approaches to shading and promote the importance of shade as a fundamental design element for outdoor spaces. This effort could include certification for well-shaded outdoor spaces, annual awards for effective shade projects, businesses, municipal workers, and other actors contributing to shade efforts in our communities. OHRM will work with partners to establish certification criteria that corresponds to different typologies of outdoor spaces.

Funding	Office of Heat Response and Mitigation General Fund
Lead Department	Office of Heat Response and Mitigation
Partners	Planning and Development, Arizona State Department of Forestry and Fire Management, Parks and Recreation, Street Transportation, Office of Innovation

34 Commission local artists to design and deploy public art shade installations in public spaces

Public art can be a powerful tool to raise awareness about extreme heat as well as celebrate the identity and history of a neighborhood or community. In 2023, the City of Phoenix was one of eight U.S. cities selected as a winner of Bloomberg Philanthropies' Public Art Challenge, which invites mayors and artists to submit proposals for innovative public art projects designed to address local challenges. Phoenix's submission, '!Sombra! - The Celebration of Shade', commissioned nine artists to create shading and cooling installations in neighborhood parks across Phoenix. The temporary structures will be installed in 2025 and be accompanied by community engagement activities and a one-day festival celebrating the city's resilience to heat and the importance of shade in Phoenix.

Funding	Bloomberg Philanthropies' Public Art Challenge ($1M)
Lead Department	Arts and Culture
Partners	Office of Heat Response and Mitigation, Parks and Recreation, Office of Innovation, Artlink, Arizona State University

35 Develop neighborhood tree plans in partnership with local communities

Urban Nature is a new three-year project led by Arizona State University's Rob and Melani Walton Sustainability Solutions Service — in partnership with community-based organizations, industry partners, national organizations, and several ASU departments — working directly with Phoenix residents to co-create Neighborhood Tree Action plans while supporting economic growth.

ASU has mapped Phoenix resident input from previous listening sessions for 2,066 locations where trees, water stations, cooling stations, and built shade are needed. Starting fall 2024, ASU will conduct eight Shade for ALL workshops with the City of Phoenix and Unlimited Potential, resulting in four Neighborhood Tree Action Plans for Phoenix's hottest and least shaded neighborhoods: Lindo Park neighborhood in South Phoenix, South Central Corridor, Desert West Park neighborhood in Maryvale, and the Mountain View Park neighborhood in Sunnyslope.

Funding	Inflation Reduction Act Funds to Arizona State University
Lead Department	Office of Heat Response and Mitigation
Partners	ASU Rob and Melani Walton Sustainability Solution Service, Neighborhood Services, Planning and Development

Provide public education around sustainable and equitable shade practices

36 Create and distribute materials for a variety of audiences on natural and built shade

The City will use new and existing resources created by public and private partners to engage and activate a variety of audiences to support the goals of expanding and maintaining natural and built shade in Phoenix. Topics may include 'Right Tree, Right Place' and 'Right Shade, Right Place' campaigns, proper tree maintenance practices (e.g. trimming and watering), designs for green stormwater infrastructure (GSI) installations, tree and heat equity, urban climate science, physiology, and public health. All resources will be aligned with the values of this plan and be provided in Spanish and English.

The City recently published a new website with resources to provide information and guidance on GSI – what it is, how it can be designed, and how to navigate permitting and plan review processes. The City will continue to explore other partnership opportunities to educate the public about trees and shade.

Funding	Citywide General Fund
Lead Department	Office of Heat Response and Mitigation
Partners	Street Transportation, Planning and Development, Water Services, Office of Environmental Programs, Office of Innovation, Parks and Recreation, Communications, Trees Matter, Maricopa County, American Forests, Arizona Sustainability Alliance, U.S. Forest Service, Watershed Management Group

EXPANDING THE VISION

Priorities for New Investments

The Shade Phoenix Plan proposes transformative actions to improve the quality of life across our community. Yet, fully achieving the collective vision will require additional investments beyond the scope of this Plan. While implementing the Shade Phoenix Plan is an essential first step, it should also ignite efforts to secure more resources, broaden community involvement in tree and shade initiatives, and refine City processes. This section highlights the key priorities for further investments and actions beyond current commitments.

Project Name: City Grocery
Project Landscape Architect: Steve Martino and Associates
Photo credit: Steve Gunther

1 The level of sustained funding for new trees and built shade must increase

To meet the community's needs, investments in trees and built shade from both public and private sectors must significantly accelerate. Over the next five years, the City of Phoenix is committed to planting at least 27,000 trees on public and private properties. Private investment is also expected to contribute tens of thousands more trees on residential and commercial lands. However, these combined efforts are still projected to fall short of the tree and shade coverage needed citywide. Achieving the minimum shade coverage goals set forth in this Plan for different land-use types will require significantly more funding over the coming decades for additional trees and built shade structures.

Currently, over half of the Shade Phoenix Plan's funding for new trees and shade comes from one-time sources, such as federal grants and the voter-approved General Obligation Bond. The City should continue exploring ways to reinforce its commitment to tree and shade projects in public spaces through the General Fund and Capital Improvement Program. Additionally, Phoenix must collaborate with regional, state, and federal agencies to identify or create new funding streams, and work with private and philanthropic partners to expand support for tree and shade investments.

2 Gaps in maintenance practices and budgets for public property trees and built shade must be closed quickly

Maintenance is a top concern regarding public trees and built shade for City staff, local experts, and residents alike. Many believe that the City already faces challenges in adequately maintaining its existing tree and shade inventory, raising concerns that these issues will increase as tree planting and shade structure projects expand in the coming years. In 2024, the Budget and Research Department completed a Landscape Maintenance Study to assess current practices across multiple City departments and compare them with those of peer and regional cities. This report provided several recommendations for improving landscape maintenance, which will be further explored with a focus on trees and built shade.

The study highlighted key areas for improvement, including hiring and retaining qualified staff, enhancing contract monitoring and enforcement, upgrading technology to track water usage, and modernizing maintenance equipment. Currently, a significant portion of the City's tree and shade maintenance operates on an as-needed or complaint-based basis. Adopting a more proactive, scheduled maintenance approach would help extend the quality and lifespan of the City's tree and shade assets.

While the City has committed to adding numerous new trees and shade structures over the next five years, this growth has not been matched with a proportional increase in maintenance budgets, risking the long-term benefits of these investments. Rather than waiting until resources are overstretched, City staff should proactively seek new funding mechanisms to ensure maintenance budgets grow in tandem with tree and shade expansions. This will help secure the maximum community benefits from these investments over time.

3 Community members from all parts of the City, especially those with low tree and shade coverage, need to be more fully integrated into planning, implementation, and evaluation

Phoenix is a diverse, dynamic city, with neighborhoods and residents that have unique experiences, perspectives, and needs regarding trees and shade. Meaningful, consistent, and respectful engagement across all Phoenix communities is essential to ensure that tree and shade investments are tailored to address local needs within each neighborhood's distinct context and culture. Including voices from all community members throughout the planning and implementation process is crucial; however, historically, institutions have not fully responded to the needs of all residents.

To bridge this gap, the City and its partners must invest in innovative approaches to integrate under-engaged individuals, neighborhoods, and organizations into tree and shade initiatives. The Whole Measures Rubric for Urban Heat Solutions identifies the highest-impact modes of community engagement as those founded on trust and respect. Effective engagement builds long-term relationships beyond individual projects, centers historically marginalized voices in decision-making, and provides flexible opportunities for community members to participate in ways that align with their lives and livelihoods. It also involves a diverse range of stakeholders, encourages openness to change, and maintains mutual transparency.

While the Shade Phoenix Plan includes several actions for community outreach and engagement, the effectiveness of these efforts in truly engaging Phoenix's diverse communities must be carefully monitored and evaluated. Achieving the highest level of impact will likely require additional, sustained resources and expertise to support a more inclusive and impactful engagement process.

4 The City should look for and leverage advances in technology and analytical tools that can improve tree and shade efforts

Ongoing advancements in environmental monitoring and analytical capabilities offer the City new opportunities to track and address the needs of its assets, plan strategically for the future, and improve project outcomes. In terms of environmental monitoring, breakthroughs in remote sensing and image processing are enabling the City to better monitor the urban forest and built shade infrastructure over time on both public property and across the community. This data can inform future decisions on species selection, maintenance strategies, community engagement, budgeting, and policy development.

Additionally, new monitoring technologies can help the City more effectively steward its water resources. These technologies will allow for precise irrigation scheduling throughout the year, real-time leak detection, and other measures to support the health and longevity of trees. As the City continues to invest in tree and shade infrastructure, it will also benefit from research quantifying the value of shade to the community. City staff are currently collaborating with Bloomberg Associates and Replica, an environmental and transportation analytics firm, to explore how shade impacts public space usage and economic activity in Phoenix. Enhanced estimates of shade's value will inform cost-benefit analyses for Federal funding applications and aid local and regional leaders in advocating for and making budget decisions for public projects.

REFERENCES & RESOURCES

References demonstrating the inequitable distribution of tree canopy coverage and urban heat in Phoenix and other large cities.

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Mitchell, B. C., & Chakraborty, J. (2015). Landscapes of thermal inequity: Disproportionate exposure to urban heat in the three largest US cities. Environmental Research Letters, 10(11), 115005. https://doi.org/10.1088/1748-9326/10/11/115005

References discussing the impacts of shade and lack of shade on the human body, as well as the importance of shade for making outdoor spaces safe and comfortable.

Middel, A., AlKhaled, S., Schneider, F. A., Hagen, B., & Coseo, P. (2021). 50 grades of shade. Bulletin of the American Meteorological Society, 102(9), E1805-E1820. https://doi.org/10.1175/BAMS-D-20-0193.1

Turner, V. K., Middel, A., & Vanos, J. K. (2023). Shade is an essential solution for hotter cities. Nature, 619(7971), 694-697. https://doi.org/10.1038/d41586-023-02311-3

Vanos, J. K., Middel, A., McKercher, G. R., Kuras, E. R., & Ruddell, B. L. (2016). Hot playgrounds and children's health: A multiscale analysis of surface temperatures in Arizona, USA. Landscape and Urban Planning, 146, 29-42. https://doi.org/10.1016/j.landurbplan.2015.10.007

Data Resources

Tree Canopy

All tree canopy data presented in this plan were processed from Google Environmental Insights Explorer high resolution tree canopy data for Phoenix (accessed July 2023). https://insights.sustainability.google/

Shade Estimates

Data used for shade estimates were accessed through a data sharing partnership with the Luskin Center for Innovation at University of California Los Angeles and Arizona State University. Others may request data by contacting the authors of the study:

Buo, I., Sagris, V., Jaagus, J., & Middel, A. (2023). High-resolution thermal exposure and shade maps for cool corridor planning. Sustainable Cities and Society, 93, 104499. https://doi.org/10.1016/j.scs.2023.104499

Building Footprints

Building footprints were accessed through Microsoft Building Footprints – Features (accessed July 2023). https://hub.arcgis.com/datasets/esri::microsoft-building-footprints-features/

Census Data

U.S. Census Bureau American Community Survey (ACS) 5-year estimates (2018-2022) for census tracts. Census data were used for maps and figures displaying: Per Capita Income, Black, Indigenous, People of Color (BIPOC), and Population with No Vehicle. https://www.census.gov/programs-surveys/acs

Parcel Data

Parcel data sourced from Maricopa County Assessor's Office via City of Phoenix Mapping Open Data (https://mapping-phoenix.opendata.arcgis.com/) and Arizona State University GeoData Map and Geospatial Hub (https://geodata-asu.hub.arcgis.com/).

Tree Equity Score

Tree Equity Score was accessed from American Forests Tree Equity Score explorer (2024). http://www.treeequityscore.org/


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APPENDIX

Shade Phoenix Plan - Implementation Table

Strategic Priority		Action	Lead Dept.
STRATEGY 1: EXPAND SHADE - Increase shade for people where they need it most			
Increase shade for children	1	Complete implementation of the Shade for Students program	OHRM
	2	Complete implementation of Canopy for Kids program	OHRM
	3	Integrate shade in new construction and renovation at municipal playgrounds	PRD
Increase shade on public property	4	Plant trees in City parks	PRD
	5	Add natural and built shade to City facilities	OHRM
	6	Build green stormwater infrastructure projects in the public right-of-way	STD/OHRM
	7	Expand Cool Corridors network	OHRM
	8	Add shade structures at bus stops	PTD
	9	Construct Phoenix Sidewalk Shade installations in high-traffic public right-of-way	STD/OHRM
	10	Pilot a shade structure right-of-way revocable permit	STD/PDD
Increase shade on private properties	11	Complete implementation of the Community Canopy Grant Program	OHRM
	12	Develop a permit for small tree planting projects	OHRM
	13	Enhance sample shade stipulations for Village Planning Committees and Planning Commission	PDD

Key:

OHRM: Office of Heat Response and Mitigation
PRD: Parks and Recreation Department
STD: Street Transportation Department
PDD: Planning and Development Department
PTD: Public Transit Department
NSD: Neighborhood Services Department
B&R: Budget and Research Department
PWD: Public Works Department
OAC: Office of Arts and Culture

Key Performance Indicators. All quantities are cumulative.

Milestone - Year 1 (by June 30, 2025)	Milestone - Year 3 (by June 30, 2027)	Milestone - Year 5 (by June 30, 2029)	Impact Metrics
Install 47 structures	Evaluation of installed shade structures, pursue additional resources	Pursue additional resources	# of sites # of shade structures installed
Plant 1,000 trees	Plant 1,800 trees	Plant 2,500 trees	# trees planted # of schools
Increase shade at 5 playgrounds	Increase shade at 15 playgrounds	Increase shade at 25 playgrounds	# of municipal playgrounds receiving shade structures % of municpal playgrounds meeting shade goal
Plant at least 120% of the number of trees lost the prior year.	Plant at least 120% of the number of trees lost the prior year.	Plant at least 120% of the number of trees lost the prior year.	# of trees planted in parks
Increase tree and shade coverage at 5 facilities	Increase tree and shade coverage at 15 facilities	Increase tree and shade coverage at 25 facilities	# of trees planted # of shade structures installed
Finalizing location for 3 projects	Design 3 and install 1 project	Install and evaluate 3 projects	# of projects installed
Assess potential project sites and complete prioritization assessment	At least 1 Cool Corridor project complete and additional sites evaluated	At least 3 Cool Corridors projects completed	# of Cool Corridor projects installed
Install at least 80 shade structures	Install at least 240 shade structures	Install at least 400 shade structures	% of bus stops providing shade # of new bus stop shelters installed
Begin construction of 10 shade structures	Complete installation of 20 shade structures	Evaluate and identify resources needed	# of shade structures installed
Draft requirements for permit	Permit process finalized; Issue permits	Issue permits	# of permits issued
Plant 1,000 trees	Plant 3,000 trees	Plant 7,000 trees	# of trees planted # of properties participating
Draft requirements for permit	Permit process finalized; Issue permits	Issue permits	# of permits issued # of trees planted
Complete review of existing stipulations and begin drafting enhancements	Finalize enhanced stipulations and begin incorporating into planning processes	Evaluate shade stipulations and revise as needed	# of shade stipulations issued

Strategic Priority		Action	Lead Dept.
STRATEGY 2: PRESERVE AND MAINTAIN EXISTING SHADE - The community works together to support a thriving urban forest and well-maintained built shade			
Care for and maintain trees and shade structures on public property	14	Continue and expand tree replacement program using 'right tree, right place' and 'no-net-loss' approaches	STD
	15	Maintain City-managed trees and shade structures	ALL
Care for and maintain trees and shade structures on public property	16	Stengthen enforcement of tree code	NSD
STRATEGY 3: EVALUATE AND INSTITUTIONALIZE - Ongoing implementation and improvement of shade efforts to scale their impacts and maximize benefits			
Monitor and evaluate progress on Shade Phoenix Plan	17	Complete citywide tree and shade assessments	OHRM
	18	Conduct and maintain an inventory of trees and shade structures on city property	OHRM
	19	Provide an annual progress report on Shade Phoenix	OHRM
	20	Update the Shade Phoenix Plan every 5 years	OHRM
Strengthen organizational coordination and staff capacity	21	Review and improve City processes governing landscaping and tree care	B&R/OHRM
	22	Assess and improve proper planting and maintenance practices for city-managed urban trees, following industry-standard best management practices	OHRM
	23	Build institutional capacity for green stormwater infrastructure	PDD
	24	Re-establish cross-departmental working group on urban forestry and establish a new built shade working group	OHRM

Reference page 78 for Lead Dept. Key*

Key Performance Indicators. All quantities are cumulative.

Milestone - Year 1 (by June 30, 2025)	Milestone - Year 3 (by June 30, 2027)	Milestone - Year 5 (by June 30, 2029)	Impact Metrics
Plant 500 replacement trees	Plant 1500 replacement trees	Plant 2500 replacement trees	# of trees replaced
Develop consistent maintenance protocol across all departments, explore additional resources needed for maintenance	Explore additional resources needed for maintenance	Review and update maintenance plans and resources	$ allocated to tree and shade structure maintenance; % of trees/structures in 'good' condition
Create pilot program for enhanced enforcement	Formally adopt revised enforcement process	Complete evaluation of new enforcement process	% of landscape plans in compliance # of enforcement actions taken for non-compliance
Complete tree assessment; Complete shade assessment	Maintain tree assessment; Maintain shade assessment	Update tree assessment; Update shade assessment	% of canopy coverage; % of shade coverage % of sites/properties meeting specific shade goals
Finalize tree inventory; Finalize shade inventory	Update shade inventory	Update tree inventory; Update shade inventory	# of trees inventoried, # of structures inventoried
Develop reporting mechanisms and begin data collection	Annual progress reports completed and published (2025, 2026)	Annual progress reports completed and published (2027, 2028)	% of actions complete and underway
n/a	n/a	Update Shade Phoenix Plan	n/a
Complete initial study, pursue recommendations in relevant working groups	Formally adopt recommendations from initial study	Evaluate adopted recommendations	n/a
Collect data and benchmarking guidelines to inform assessment	Complete study, pursue recommendations in relevant working groups	Formally adopt recommendations and evaluate adopted recommendations	n/a
Train at least 10 employees on GSI	Train at least 30 employees on GSI, include GSI in on-call contracts	Train at least 50 employees on GSI, update GSI contract language	# of people trained
Urban Forestry working group meeting regularly; Built Shade working group has been initiated	Urban Forestry working group meeting regularly; Built Shade working group meeting regularly	Urban Forestry working group meeting regularly; Built Shade working group meeting regularly	# of City Departments engaged, # of City employees engaged

Strategic Priority		Action	Lead Dept.
STRATEGY 3: EVALUATE AND INSTITUTIONALIZE - Ongoing implementation and improvement of shade efforts to scale their impacts and maximize benefits			
Strengthen regulations, design standards and guidelines	25	Update City of Phoenix plant species guidance	PDD
	26	Embed shade recommendations into City-owned building design standards and facility review	PWD
	27	Pilot a Public Shade Fund	PDD
	28	Integrate tree and shade goals in all relevant City plans	OHRM
Create and expand pathways for careers in urban forestry	29	Create a Tree Steward Program	OHRM
	30	Support youth workforce development for urban forestry career pathways	OHRM
	31	Provide Certified Arborist training to professionals and residents	PRD/OHRM
STRATEGY 4: EDUCATE AND EMPOWER - Phoenicians understand and support the importance and value of trees and shade			
Create a citywide movement arround shade and heat	32	Launch Shade Phoenix public communications campaign	OHRM
	33	Create award and recognition opportunities for innovative projects adding shade in Phoenix	OHRM
	34	Commission local artists to design and deploy public art shade installations in public spaces	OAC
	35	Develop neighborhood tree plans in partnership with local communities	OHRM
Provide public education around sustainable and equitable shade practices	36	Create and distribute materials for a variety of audiences on natural and built shade	OHRM

Reference page 78 for Lead Dept. Key*

Key Performance Indicators. All quantities are cumulative.

Milestone - Year 1 (by June 30, 2025)	Milestone - Year 3 (by June 30, 2027)	Milestone - Year 5 (by June 30, 2029)	Impact Metrics
Analyze existing tree species guidance	Issue updated tree species guidance	Review updated tree species guidance	n/a
Review projects for compliance with shade recommendations	Review projects for compliance with shade recommendations	Review projects for compliance with shade recommendations	# of projects incorporating shade recommendations
Conduct research, stakeholder and public engagement	Design and launch pilot fund	Plant trees and install shade structures using Public Shade Fund resources	$ invested through the Fund # of trees planted through the Fund # of shade structures installed through the Fund
All relevant City plans incorporate tree and shade goals	All relevant City plans incorporate tree and shade goals	All relevant City plans incorporate tree and shade goals	# of plans w/ tree and/or shade goals, or supporting actions
Create contracts with non-profit partners to operate program	Hire and train 10 tree stewards	Identify opportunities to continue and expand program beyond IRA funding	# of tree stewards trained
Design and launch program with non-profit partners	Provide training and hands on experience	Secure employment for program graduates	# of youth trained # of youth placed in jobs
Promote Certified Arborist training to other City Departments and the public annually	Promote Certified Arborist training to other City Departments and the public annually	Promote Certified Arborist training to other City Departments and the public annually	# of trainings offered
Consult w/ stakeholders on communications campaign	Launch communications campaign	Expand communications campaign	Audience reached (estimated impressions/ people)
Develop shade award and identify other recognition opportunities	Recognize projects with awards	Evaluate impact and replication	# of projects awarded
Announce winning artists and install temporary public art projects	Evaluate opportunities for permanent installations	Install permanent public art projects	# of installations # of people participating in associated programming
Host 4 workshops	Host 8 workshops. Co-create 4 neighborhood tree plans	n/a	# plans written, # of people involved
Consolidate materials and create single packet of 'Shade Phoenix' materials for distribution	Distribute Shade Phoenix info packets; Revise and update info packets	Distribute Shade Phoenix info packets; Revise and update info packets	# of materials distributed # of campaigns launched # of people reached (estimated)

Implementation Status of Actions from 2010 Tree and Shade Master Plan

	Raise awareness about the condition and benefits of the urban forest by educating staff and the public. Build demonstration projects. Establish partnerships that promote stewardship and investment in trees.	
A.1	Create a council-approved Citizen Tree and Shade Committee to oversee Urban Forest issues.	**Completed**[1]
A.2	Provide information to the public about on-going efforts and long-term strategies.	**Ongoing**
A.3	Develop and Establish Education and Outreach Programs	**Ongoing**
A.4	Create Channel 11 Programs, Streaming Web Videos and DVDs	**Redirected**[2]
A.5	Hold Urban Forest and Shade Symposium	**Redirected**[3]
A.6	Develop Shade and Urban Forest Excellence Award	**Incomplete**
A.7	Research grant opportunities	**Ongoing**
A.8	Establish and Maintain Partnerships	**Ongoing**
A.9	Develop and Complete Shade Demonstration Projects	**Ongoing**

	Preserve, protect and increase the quality and quantity of trees and vegetation, especially large shade trees in appropriate areas.	
B.1	Conduct a baseline tree inventory that will assess canopy coverage for the entire city	**In process**[4]
B.2	Develop a Tree and Shade Management Plan	**In process**
B.3	Research and develop additional sources of revenue for the care and maintenance of our urban forest	**Ongoing**
B.4	Incrementally restore budget for street trees, landscape and park maintenance as well as community tree outreach programs.	**Ongoing**
B.5	Establish Best Management Practices (BMP) based upon national arboriculture specifications, and adopt them into the Parks and Recreation Department's Field Operation Procedures.	**Completed**[5]
B.6	Establish an Urban Forest Infrastructure Team to oversee implementation of the Master Plan	**Completed**
B.7	Update Tree and Shade Master Plan biannually to ensure action items are being completed.	**Incomplete**

Treat the urban forest as infrastructure to ensure that trees and engineered shade are an integral part of the city's planning and development process		
C.1	Integrate goals of the Tree and Shade Master Plan into the General Plan	**Completed**
C.2	Develop and establish a comprehensive tree, shade and landscape ordinance	**Redirected**
C.3	Further develop a green waste program, and look for ways to improve efficiencies	**Ongoing**
C.4	Research and complete shade demonstration projects	**Ongoing**

[1]A council-approved committee was created and sunseted. The EQSC currently holds the responsibility for overseeing tree and shade issues.

[2] Focus has shifted away from videos to broader online materials

[3] PDD held an Urban Tree workshop as part of the ReinventPHX initiative and an annual Shade Conference is now hosted by regional partners.

[4] A tree inventory was conducted in 2014 of City of Phoenix owned property

[5] The Parks and Recreation Department has adopted the American National Standards Institute Tree Care standards for field operations.

Completed: Action was completed

In process: Action is in process of being completed

Ongoing: Action does not have a finite milestone or state of completion and represents ongoing activities

Redirected: Action was redirected to other activities, reflecting a change in focus or understanding of need

Incomplete: Action has a finite milestone that has not been completed

A La Sombra de Un Mesquite

A la sombra de un mezquite
O si no de un palo fierro
Aquí en Phoenix Arizona
Los niños se ven alegres
Por los árboles que plantan
Y que al pueblo reverdecen.

No cualquiera sobrevive
Arriba de los 100 grados
Y menos la gente humilde
Que un techo le a faltado
El caloron del desierto
Muchas vidas a cobrado.

Ay que servir a la gente
Todos juntos como hermanos
Juntos creamos conciencia
Que el mundo se está acabando
Rios lagos de Arizona
Los sauces y los saguaros.

Somos hijos del desierto
Y por eso lo cuidamos
Para devolverle un poco
De lo que el nos a dado
Nuestra meta es muy clara
Disfrutar de un bosque urbano.

Los niños son el reflejo
Del ejemplo que les damos
Son el futuro del pueblo
Con valores bien marcados
Los mentores son los viejos
De experiencia bien sobrados.

Que bonitos palos verdes
En los parques de Arizona
Y también en las escuelas
A los niños les dan sombra
Hechan ramas y raíces
Y las lluvias ya se asoman.

Escrita por Heriberto Payan Cazares

Beneath a Mesquite's Shade

Under the shade of a mesquite,
Or an ironwood tree so grand,
Here in Phoenix, Arizona,
Children smile hand in hand.
For the trees they plant with pride,
Make the town green far and wide.

Not everyone can survive,
When the heat's past one-oh-five,
Especially those with no home,
Who in hardship have to roam.
Desert's blazing, ruthless heat,
Has claimed lives upon the street.

We must serve the people here,
Together, all brothers near,
Raise awareness, spread the word,
The world's end is being heard.
Arizona's rivers dry,
Willows and saguaros standing by.

We are children of the sand,
So we guard this precious land,
Giving back for all it's done,
Sharing what we all have won.
Our goal is crystal clear,
To make urban forests near.

Children mirror what we teach,
Lessons planted well within reach,
They are the future, bright and strong,
So, education must be long.
We build parks and schools today,
Where firm values lead the way.

Oh, the palo verdes bright,
In Arizona's parks, what a sight.
And in schools, they cast their shade,
Where the children laugh and play.
Spreading roots so strong and deep,
As the rains begin to seep.

Written by Heriberto Payan Cazares

A RESILIENT PHOENIX: COOLING OUR NEIGHBORHOODS

El Oso Park Tree Planting 10/25/2024

RUMBO
A Resilience Pathway for Arizona

Arizona Sustainability Alliance

SRP
Delivering water and power®

ARIZONA COMMUNITY FOUNDATION

Phoenix Parks & Recreation
PHX PLAYS

City of Phoenix