SAN JOSÉ

COMMUNITY FOREST MANAGEMENT PLAN

Prepared by:
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Acknowledgments

City of San José

Funding Provided by

California Department of Forestry and Fire Protection – Urban and Community Forestry

Prepared By

Dudek – Urban Forestry and Fire Protection Planning

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Glossary

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Abiotic – a non-living factor typically used to describe a cause of a disorder in trees, such as drought, flooding, limited growing space, and others.

Asset value – as it applies to a community forest, asset value refers to the amount the community forest would be worth, if all of the benefits it provides were sold today.

American National Standards Institute (ANSI) –a private non-profit organization that oversees the development of voluntary consensus standards for products, services, processes, systems, and personnel in the United States.

Arborist – an individual who is trained in the art and science of planting, caring for, and maintaining individual trees.

Canopy cover – the area of land covered by a tree's leaves and branches when viewed from above. Also referred to as urban forest canopy cover.

Community forest – all the trees, both publicly managed by a city, and privately owned by residents and business owners, in an urban environment. The City of San José chose to use "Community Forest" throughout its Community Forest Management Plan to be inclusive of all the built environments in San José, including urban, suburban, rural locations.

Community forest management plan (CFMP) – a roadmap that creates a shared vision for the future of a tree canopy in a given area. The plan guides stakeholders to effectively manage and provide for maximum, long-term benefits of the urban forest to the community.

Diameter at standard height (DSH) – a measurement, usually in inches, of a tree's diameter taken at 4.5 feet above the ground. This measurement is also commonly referred to as diameter at breast height (DBH).

Hardscape – hard materials in the built environment that are incorporated into the landscape. Some examples include roads, parking lots, driveways, sideways, and compressed soils.

International Society of Arboriculture (ISA) – serves the tree care industry as a membership association and a credentialing organization that promotes the professional practice of arboriculture. ISA also works to educate the public about the benefits of trees and the need for proper tree care.

Immature tree – any tree with a diameter at standard height (DSH) between 0 inches and 6 inches.

i-Tree Canopy (application) – a computer-based program that estimates tree cover and tree benefits for a given area with a random sampling process that allows the user to easily identify ground cover types (trees, shrub/grass, impervious surfaces, and bare ground).

i-Tree Eco (application) – a computer-based program that uses tree measurements and other data to numerically estimate, both in economic and environmental terms, the quantity of ecosystem services and the associated value that a given set of trees provide to a given area.

Impervious surface – typically a man-made structure such as roads, sidewalks, parking lots, and buildings that are covered with a material that does not allow water to penetrate it, such as concrete, asphalt, metal, brick or stone. Highly compacted urban soils can also serve as impervious surfaces. See **hardscape**.

Glossary

Mature tree – any tree with a diameter at standard height (DSH) of 24 inches or more.

Middle-aged tree – any tree with a diameter at standard height (DSH) between 19 inches and 24 inches.

Pruning – the selective removal of certain parts of a plant such as branches, buds, or roots. Pruning typically involves removing diseased, damaged, dead, non-productive, structurally unsound, or unwanted tissue from trees or other plants.

Pruning cycle – the time scheduled between pruning events. In a municipal setting, this cycle is typically between 5 to 7 years, and depends on the species of tree.

Photosynthesis – process used by plants and other organisms to convert light energy into food for survival

Right tree, right place – an industry-accepted approach for making tree and landscaping selections to ensure that the vegetation planted is appropriate for a specific purpose or location.

Senescent – the condition or process of deterioration with age.

Stocking rate – the rate at which cities plant trees based on the total number of vacant and planted available space.

Tree – woody perennial usually having one dominant trunk and a mature height greater than 16 feet.

Tree canopy – the extent of the outer layer of leaves of an individual tree or a group of trees.

Tree inventory – the gathering of accurate information on the health and diversity of trees in a given area. Tree inventories can be a sample, partial, or complete analysis of the trees in a given area.

Tree protection ordinance – an ordinance or policy that protects trees from removal and/or damage. Also referred to as tree protection policy.

Tree staking – staking provides support to newly planted or damaged trees by connecting the trunk to a nearby steel or wooden post.

Tree species diversity – the number of different tree species that are represented in a given area.

Urban Forest - all the trees, both publicly managed by a city, and privately owned by residents and business owners, in an urban environment.

Urban heat island – a metropolitan area that is significantly warmer than the areas surrounding it, due to human activities.

Young tree – any tree with a diameter at standard height (DSH) of 7 inches to 18 inches.

Vision: The City of San José Community Forest is a testament to our history and honors our diversity while striving to cultivate the equitable values we hold true towards building a strong and resilient landscape

VISION

The City of San José Community Forest is a testament to our history and honors our diversity while striving to cultivate the equitable values we hold true towards building a strong and resilient landscape and community forest.

Executive Summary

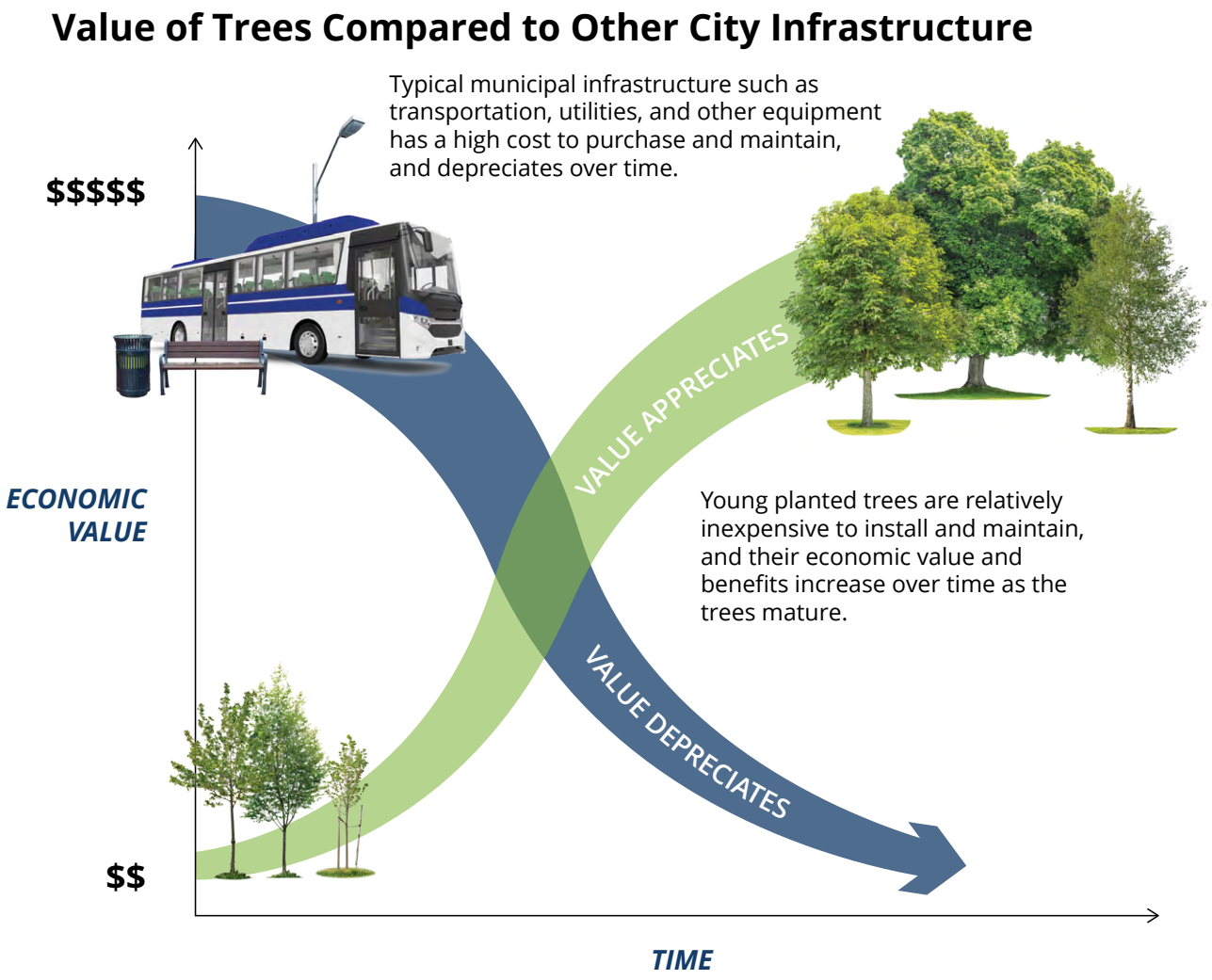
Executive Summary

Once a small community of farms and orchards, the City of San José (City) has transformed from the "Valley of Heart's Delight" into the "Capitol of Silicon Valley" and the 10th largest city in the country. In the evolution of San José from a rural to an urban community, trees remain a key element of the City's landscape. More than 1.6 million trees line the streets, fill the parks, and frame the City's private properties (Xiao et al. 2013). Collectively these trees make up San José's community forest.

San José's community forest is a vital component of the City's assets and infrastructure. Like the pipes that bring water to your faucet or the utility lines that bring electricity to your outlets, trees support the function of the City and provide residents numerous benefits. A unique distinction of trees is that their value increases over time as they age and grow larger, whereas other City assets and infrastructure will depreciate **(Figure 1)**. The San José community forest generates ecosystem services along with property value increases worth $239.3 million annually (Xiao et al. 2013), with street trees having a total **asset value** of approximately $735 million. In California, every $1 invested in a street tree returns $5.82 in benefits (McPherson, et al. 2016). Further increasing the City's return on investment from the community forest is dependent on proper maintenance and long-term planning that will ensure every resident lives in a neighborhood that is healthy and safe. Achieving this vision, in part, depends on the City's trees and its ability to create and maintain a resilient community forest. The City's adaptability is one of the biggest factors in determining if the community forest will continue to thrive with new and changing environmental conditions and challenges, resulting in a more resilient City.

The City most recently demonstrated its commitment to the community forest by signing and adopting two initiatives: (1) in 2005, San José became a signatory to the urban environmental accords, which commits the City to plant 50% of vacant street tree sites by 2020; and (2) in 2007, the Green Vision was adopted, which commits the City to plant 100,000 new trees by 2022. While the City set ambitious goals for expanding the community forest, the resources to implement necessary management practices to reach the desired outcomes were not provided for a variety of reasons. Consequently, approximately 15,000 to 20,000

Figure 1. Value of Trees Compared to Other City Infrastructure

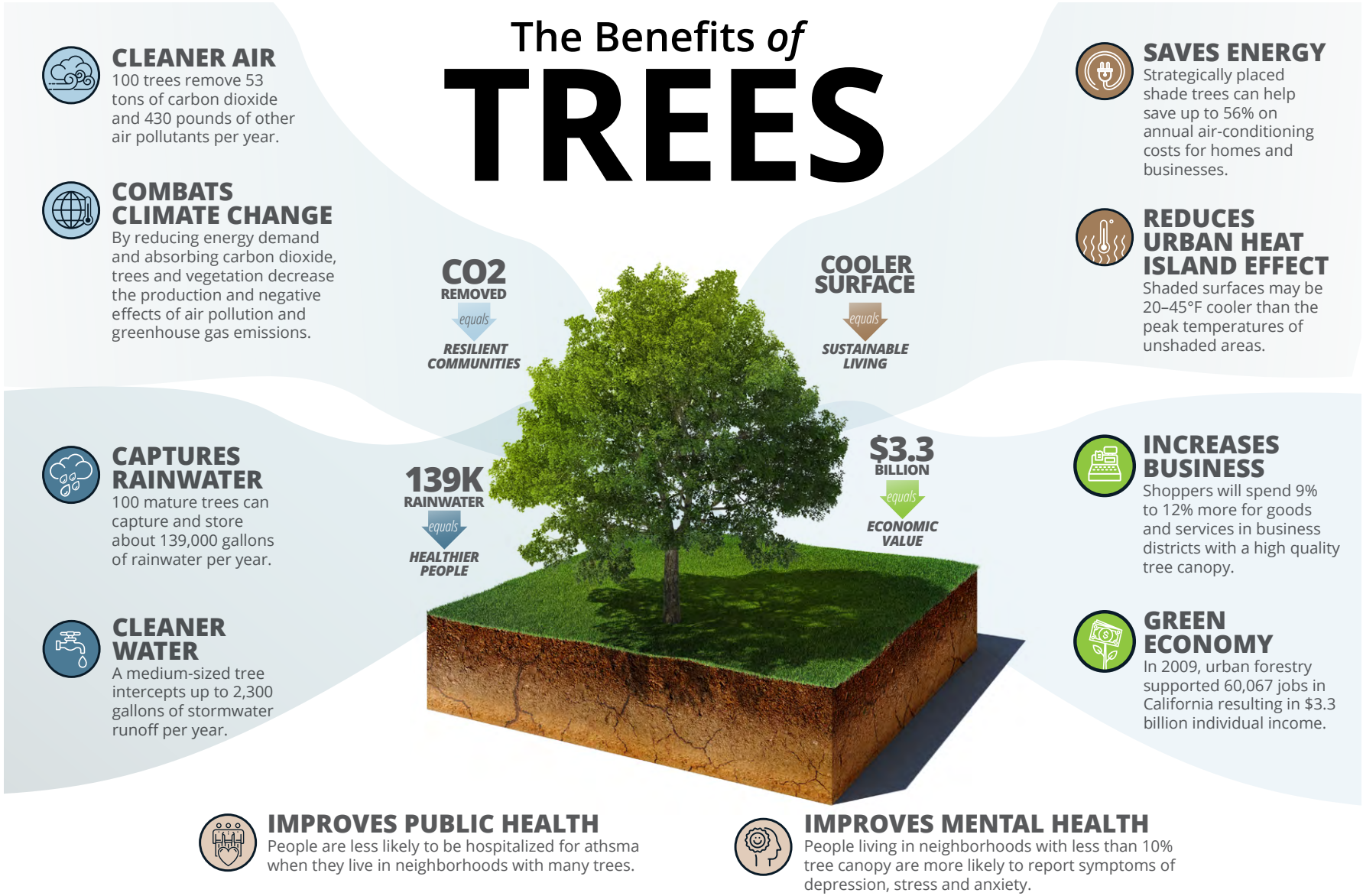


trees have been planted to date. Having now completed this Community Forest Management Plan (CFMP), the City will make every effort to ensure that new goals set for the community forest are obtainable, supported by sound management practices, and based on the level of financial and human resources it is able to commit to toward their achievement. The CFMP offers a vision and strategy to ensure San José is better situated to achieve future goals and initiatives, and creates an expanded, healthy, and thriving community forest for current and future residents to experience the numerous environmental, social, and economic benefits provided by trees **(Figure 2)**.

Community Forest Benefits and Management

Urban forest is an arboriculture term used to describe the collection of trees and other vegetation found within a built urban environment. San José refers to its urban forest as the **community forest** to be inclusive

Figure 2. The Benefits of Trees



of the diverse neighborhood landscape that is not just urban, but suburban and rural. A community forest recognizes a unique set of opportunities and challenges to growing and maintaining healthy trees reflective of land use and neighborhood character. Across San José, land use varies from the density of buildings and housing, shifts between business and commercial corridors to single-family home neighborhoods, and includes historically agrarian communities. A community forest also recognizes the connected relationship between people and trees, which are mutually dependent on each other to thrive.

One of the defining characteristics of the community forest is that the sustainability of trees requires ongoing human intervention (Clark et. al 1997). Trees in a natural forest setting have the necessary resources to grow and regenerate without supplemental intervention from people. The human-created community forest was planted in a setting that is distinguished by paved surfaces and compromised soils that do not support the natural growth and regeneration of trees. Trees in the community forest must also be managed to safely interact with people, buildings, and infrastructure. Since San José's community forest is primarily human created, it will require human intervention to maintain their health and safety in the built environment. The term community forest also recognizes that the benefits provided by trees are shared by everyone who lives and works under their canopies, who in turn have a shared responsibility to protect and preserve trees. The concept of a community forest allows us to think holistically about trees and other vegetation found within the City, quantify their benefits, and manage these natural resources for the enjoyment of present and future generations.

A community forest provides many environmental services to the City, which are correlated with mental and physical health, and economic benefits. Knowing the various types of environmental services and associated benefits helps us appreciate the value trees bring to our everyday life. Understanding how a tree performs these functions demonstrates the importance of maintenance practices and management decisions to support large and healthy trees that are appropriate for their planting locations. For example, it is commonly understood that trees clean the air, but it's perhaps less understood how they do it, and how tree care impacts residents' benefits. There are approximately 1.6 million trees that comprise the entire San José community forest, which annually remove 403 tons of air pollutants and capture 100,181 tons of greenhouse gases (Xiao et al. 2013). Trees use their full crowns of leaves to grow and complete biological functions like **photosynthesis** as well as capturing air pollutants and converting greenhouse gases to its own building blocks. The ability of a tree to carry out biological functions is reduced when trees lack leaves or are in poor health.

This environmental service relates directly to how well trees are maintained. For example, in a community forest, trees will need to be regularly pruned for a variety of reasons that are ultimately aimed at maintaining them in a safe condition. When trees are aggressively pruned by practices like "topping," they are left with little to no leaf cover and poor structure. Conversely, properly pruned trees will maintain a healthy crown that promotes vigorous growth. As a result, the extent to which the City and residents properly prune and maintain trees will have a direct impact on the quality of air breathed and underscores the connection between people and trees in a community forest.

In addition to the environmental services, trees provide mental and emotional health benefits. (Berman et al. 2012). In fact, recent research

Our City Forest Tree Planting
PHOTO: OUR CITY FOREST

has shown that having nearby nature, including trees, may be more important than trips to "big nature" beyond the city for human health and well-being (Kardan et al. 2015). Simply being able to see trees, parks, and gardens while in a city has been scientifically linked to reduced mental and physical stress, better student performance in school, and better attention to tasks while at work (USFS 2018). Additionally, tree-lined streets are more walkable, contribute to more active and healthy lifestyles, and can reduce both the number of traffic collisions and severity of injury for car and pedestrian or cyclist crashes (Ryan et al. 2018; Welle et al. 2015). In addition, well-managed vegetation in neighborhoods may reduce both personal and property crime (Donovan and Prestemon 2012; Kuo and Sullivan 2001a, 2001b; Troy et al. 2016).

A street that is tree-lined and provides mental and physical health benefits begins with planning decisions that determine how available space can be utilized. As the housing demand grows, the City is focusing efforts to create dense urban cores that are easily accessible to places of employment, transportation, and shopping centers. Whether the future residents of the City's dense urban core can live on a tree-lined street and receive the health benefits of mature trees will be heavily reliant on planning decisions being made now. Are streets designed with narrow planting strips and building façades directly abutting a sidewalk that leave little to no room for trees? Are trees included from the beginning of the planning process and afforded the room to plant and grow them? These planning decisions will directly impact the mental and physical health of residents in the same way the maintenance of trees directly impacts the environmental services, such as cleaner air, which are dependent on tree health and size.

Likewise, suburban sections of the City face a unique set of challenges to having healthy neighborhoods. Single-family and multifamily residential lots account for 62% of City land use and 70% of all trees (Xiao et al. 2013). The ability of private property owners to properly maintain, prune, and preserve trees on their landscapes has a measurable impact on canopy cover across the City. Increasing canopy cover in suburban neighborhoods can be supported by the City educating private property owners on the value of trees as part of their landscape and how to implement tree best management practices. It is also supported by ordinances and policies that govern trees on private property and the conditions for when the City allows tree removal. Each decision to allow mature tree removal must be carefully weighed against the years it will take to replace the loss of canopy and associated environmental services.

Finally, the environmental services of trees generate a quantifiable financial benefit to the City and its residents. When considering trees and economics, it is common to only consider what is physically produced by a tree, such as fruit, lumber, paper, and other forest products. In contrast, trees in a community forest deliver a higher return on their economic value the longer they live and mature. All the environmental services, and mental and physical health benefits described above have an associated monetary value. Xiao and collaborators (2013) estimated that the San José community forest provided homeowners with a $154.6 million increase of property values and savings of $77 million in cooling costs each year. Further, the City receives a $6.7 million reduction in stormwater management costs by intercepting 1.2 billion gallons of water from storm drains and directing it into the soil to be stored in underground aquifers and used by trees and plants (Xiao et al. 2013). Continuing to realize this level of financial benefit is dependent on preserving and expanding the community forest, and is dependent on implementing the long-term strategy, goals, and objectives developed in the San José CFMP.

Developing the San José Community Forest Management Plan

The San José Department of Transportation (DOT) was awarded a grant from the California Department of Forestry and Fire Protection (CAL FIRE) Urban and Community Forestry Program to complete the CFMP. DOT is the main City department responsible for the development of the CFMP, providing key insights into City practices, coordinating with internal and external stakeholders, hosting community engagement events, and providing inventory and other data sets for analysis. The following sections detail the analysis, community engagement activities, and processes to develop the CFMP. The results of each step of CFMP development are further outlined in detail throughout the CFMP.

ANALYSIS OF CURRENT PRACTICES

In the fall of 2019, DOT began the process of developing the CFMP, which would include a thorough analysis of City management practices, policies, ordinances, and funding, to understand the deficiencies and strengths of its community forest management program. The analysis of current practices was initially informed by reviewing City planning documents, including the Tree Policy Manual, Envision San José 2040 General Plan, and Climate Smart San José. It also included an analysis of City permit practices, tree ordinances, standard details, and annual service data and budget levels.

STAKEHOLDER INTERVIEWS

Understanding the effectiveness of the community forest management program was further informed by interviews with City staff, elected officials, and external stakeholders. The interviews explored the role each stakeholder had in influencing City tree management, clarified internal City procedures, and informed areas where the City could improve management of the community forest. The list of City staff, offices of elected officials who were available, and stakeholders who participated in the CFMP interview process included the following:

- *The Office of Councilmember Sergio Jimenez, Council District 2*
- *The Office of Councilmember Lan Diep, Council District 4*
- *The Office of Councilmember Devora Davis, Council District 6*
- *The Office of Councilmember Pam Foley, Council District 9*
- *The Office of Councilmember Johnny Khamis, Council District 10*
- *Department of Transportation*
- *Department of Parks, Recreation and Neighborhood Services*
- *Department of Public Works*
- *Department of Planning, Building, and Code Enforcement*
- *Office of the City Attorney*
- *Our City Forest*

COMMUNITY ENGAGEMENT

In addition to the department interviews, extensive input from residents and stakeholders would help to inform the analysis of City management practices and the development of guiding principles, goals, and objectives to reflect the values and priorities of the City and residents. Originally, the avenues for resident and stakeholder engagement were designed to occur both online and in-person. However, shortly before the beginning of in-person community meetings, the City and State of California began to implement restrictions on in-person gatherings in response to the COVID-19 pandemic. The decision was made to transfer in-person meetings to an online meeting format. The City held four online

San José Rose Garden

community meetings in July 2020 attended by 56 participants. The City provided American Sign Language and Spanish translation services at respective meetings. Vietnamese translation was also made available, but the meeting was subsequently cancelled due to lack of attendance. To reach a larger audience of residents unable to attend the online meetings, the City implemented a social media campaign, online survey, and a series of blog posts that summarized each draft of the Plan and associated documents. This community engagement effort was successful in increasing the number of participants, which resulted in:

- ***188,210 impressions or views of social media posts***
- ***2,021 completed online surveys***
- ***1,094 replies or comments to social media posts***

COMMUNITY FOREST ANALYSIS

Finally, the community forest was analyzed to determine the canopy cover extent, and the condition of trees against research-based community forest sustainability metrics. The City canopy cover and land use was derived from LiDAR and other satellite spatial imagery by using an artificial intelligence learning model to classify what is a tree, shrub, grass, building, and other infrastructure, and then determine the differences in height between each classification. The analysis resulted in land use classifications of 13.54% **tree canopy**. The City **tree inventory** was analyzed against sustainability metrics to determine the condition of trees and understand what management practices will need to be improved to have the most meaningful impact on tree health and safety.

CHALLENGES OF CFMP DEVELOPMENT

The COVID-19 pandemic presented a challenge in development of the CFMP by limiting the ability to conduct in-person outreach and community forums and shifting to online platforms like email and social media. While there was a high number of responses to social media efforts, survey results could benefit from further engagement with stakeholders, so participants reflect the diversity of the City. Specifically, there are few survey responses from residents who rent, live in apartments, speak a language other than English at home, are younger than 40, and do not have a bachelor's or graduate degree.

The City desires to ensure stakeholders are engaged in development of the CFMP and have conducted additional outreach and meetings with external stakeholders in refining the analysis of San José's CFMP program, Strategic Plan, and Best Management Practices portions of the CFMP. The City recognizes that the CFMP is a living document and views this iteration as a first step in a process that will require on-going engagement with stakeholders and residents to meet the needs and priorities of San José. The CFMP and the refinement and implementation of the work plan will continue to benefit from additional engagement with local community-based organizations, community leaders, and other external stakeholders who engage with residents and have a shared interest in the San José community forest. The inclusion of these organizations and leaders will further support the City's efforts to reach all demographic and geographic segments of the City by having a trusted community voice directly communicating with their constituency. To that end, the strategic work plan calls for both an annual update to the Transportation and Environment Committee of the City Council, as well as the formation of a Community Forest Advisory Committee consisting of City staff and external stakeholders to guide the implementation of the CFMP.

Key Findings

1 Immediate action must be taken to reverse the trend of declining canopy cover:

Citywide canopy cover has decreased from 15.36% in 2012 to 13.54% in 2018. The 1.82% reduction is equivalent to losing 1,728 acres or 2.7 square miles of tree canopy cover. This trend will most likely continue if funding and management of the community forest continues as is. Many factors contribute to this significant decline including climate change, tree removal for development, and few new trees being planted. While losing canopy cover happens as soon as a tree is removed, replacing lost canopy takes 30–40 years. Delay in taking action to reverse the trend will begin to multiply the scale, cost, and time it will take for the City to achieve an adequate level of tree canopy cover for all residents. The City will have to add approximately 40,000 35-foot canopy spread trees to recover 1% of lost canopy cover, making the preservation of canopy cover the most cost effective and efficient way to increase canopy cover.

2 Limited financial and human resources to manage the community forest:

The City Community Forest Program average budget for the last three years of $3.89 million would need to be increased by an additional $20-$24 million a year to manage all public street and park trees at a sustainable level. This would fund a tree planting campaign to replace lost canopy, establishment care for newly planted trees, and pruning trees on a 5- to 7-year cycle (Miller et al. 1981). Currently this cost is largely passed on to private property owners who are estimated to spend approximately $912 every 5 years to maintain the tree and sidewalk adjacent their property.

3 The City must complete an inventory of all public space street and park trees:

The City last completed a tree inventory in 2014 and does not have current information on the condition of trees in the public space. The inventory provides some useable data to inform management decisions but lacks key information on the health and safety condition of trees. That information is vital to understand what species are in decline and contributing to the loss of Citywide canopy cover as well as to inform the appropriate management actions to preserve the health and safety of trees in the public space.

4 Economically disadvantaged communities have fewer trees than higher income communities

The top ten most economically disadvantaged census tracts have an average tree canopy cover of 12.04%, with 70% having a canopy cover of 10% or less. Conversely, the top ten most economically advantaged census tracts in the City have an average canopy cover of 16.87%, with 50% having a canopy cover of 18% or higher. While canopy cover is low for almost all census tracts, disadvantaged communities experience the lowest totals of canopy cover and highest pollution burdens when compared to other areas of the City.

5 Current urban infill and development practices limit the space for trees:

San José has a need to increase available housing throughout the City and especially within dense urban cores. Current development practices favor maximizing the size of building footprints with minimal consideration for street trees. Space that could be made available to a street tree is either unavailable or greatly reduced, resulting in locations where trees are not planted or planted with a small tree that has lower community benefit. Without trees to shade and cool sidewalks on hot days, the walkable nature of these neighborhoods will be reduced.

6 The City and Our City Forest need to strengthen their partnership:

Our City Forest (OCF) is the main conduit for the City to provide many community forest program functions like community engagement and education, tree planting, establishment care, and volunteer training, while also building financial support for these services through state and federal grant funds. This long-standing partnership has experienced success from its inception, with OCF implementing many new tree plantings throughout San José since 1994. A review of the agreements with OCF is recommended to ensure that there are clearly defined parameters and expected deliverables that align with the goals of the CFMP. It would be beneficial to include an outline of the strategies and processes through which they will collaborate toward the betterment of the community forest. The process of realignment will help the City and OCF leverage their expertise and shared resources in a way that will benefit both programs, the residents of San José, and expansion of the community forest.

7 City Staff are reliant on DOT Arborists for support:

DOT is the only department in the City with arborists on staff qualified to make decisions about the health and safety condition of a tree, how development will impact tree health, and whether tree removal is appropriate on both public and private land. Frequently, Planning, Building, Code Enforcement; Parks Recreation and Neighborhood Services and Public Works staff will seek consultation from DOT arborists to support City functions that are outside the scope of DOT. When DOT can support these requests, it does so at the expense of their main responsibilities and without receiving additional funding for their staff time.

8 Parks are a valued community space that receives minimal funding for tree management:

City staff and the offices of elected officials consistently expressed to the consultant team in interviews that parks are one of the most valued aspects of their communities. They are a favorite location for elected officials to host community volunteer events and other activities. Despite the high value for City parks, Parks, Recreation, and Neighborhood Services (PRNS) receives no funding to plant or maintain trees and only $150,000 to manage an estimated 30,000 trees, which is entirely used to respond to tree failure or emergency safety issues. The lack of funding prohibits PRNS staff from annual tree inspections and maintaining a 5- to 7-year pruning cycle (Miller et al. 1981) that are critical to maintain the safety of park trees.

City Vision and Values

San José represents diverse values and priorities that are unique to each resident, community, business owner, and stakeholder within the City. These values are reflected in the vision statement and guiding principles presented in the Strategic Plan. The vision statement presented in this document establishes the ideal state of the community forest over the 40-year planning horizon of the document. The guiding principles further refine the vision statement into specific categories based on City and resident values. Together, the vision and guiding principles will prioritize how the City progresses towards creating a sustainable community forest and climate change-resilient community.

Vision: The City of San José Community Forest is a testament to our history and honors our diversity while striving to cultivate the equitable values we hold true towards building a strong and resilient landscape and community forest**.**

CFMP Structure

The San José CFMP is presented in three sections that focus on the City's goals in developing the CFMP and progressing towards a sustainable community forest.

PART 1: ANALYSIS OF THE SAN JOSÉ COMMUNITY FOREST PROGRAM

The first section, titled "Analysis of the San José Community Forest Program," is a detailed examination of the entire breadth of the community forest management program to understand the strengths and weaknesses of current City practices and determine the avenues by which the City could improve management practices. **The analysis, while critical at times of City practices, is not intended to single out department(s) for praise or criticism.** All City staff and external stakeholders who participated in the CFMP process provided valuable insights to the consultant team and make daily, meaningful contributions to the well-being of San José residents. City practices are measured against urban forest sustainability metrics, comparison with other cities known to have exceptional community forest management programs, standards of the **International Society of Arboriculture (ISA)** and **American National Standards Institute (ANSI)**, and consultant team experience.

PART 2: STRATEGIC WORKPLAN

The second section of the CFMP is the long-term strategy to advance the City towards a sustainable urban forest. The CFMP is guided by the vision statement expressed at the beginning of this document: "The City of San José Community Forest is a testament to our history and honors our diversity while striving to cultivate the equitable values we hold true towards building a strong and resilient landscape and community forest." The vision statement is further segmented into guiding principles that reflect the specific tree values City staff and residents hold, providing an equitable quality of life for all San José residents and identifying the priority areas towards which City resources should be directed. The guiding principles provide the reasoning for the steps outlined in the goals and objectives. The goals represent the intended CFMP outcomes. The objectives are the specific actions it will take to reach the goals. **Figure 3** represents the design of the CFMP long-term strategy and defines each step. The CFMP is a living document that will require regular review and updating as the current environmental and economic

Figure 3. CFMP long-term strategy

Guiding Principles	Goal
Equity, diversity, and inclusion	The values of the community are reflected in City policies and management practices which annually receive the necessary resources for successful implementation.
Innovation	Emerging technology and current research inform the development of City standards that lead to a sustainable Community Forest.
Regional Identity	The City will maintain the unique sense of place and neighborhood character that comprises the identity of San José as it develops the urban landscape.
Resilient San José	The City will protect communities from the adverse impacts of climate change by maximizing the environmental, economic, social and health benefits of the Community Forest.

conditions change over the 40-year CFMP timeframe. To ensure the City can adapt to the changing conditions, staff are assigned responsibility for implementing objectives and completing goals. They are further provided a time frame during which they will complete the goals and objectives so an expectation is set for when they will be achieved.

PART 3: TREE POLICY & BEST MANAGEMENT PRACTICES MANUAL

The final section of the CFMP is a completed update of the City Tree Policy and Best Practices Manual, which includes all tree-related ordinances, policies, maintenance practices, landscape practices, and standard details. The intent of this section is to provide clarity for City staff and residents on the expected standards for tree planting, watering, tree staking, pruning, irrigation installation, and other physical actions that impact trees. It also provides clarity and updates when needed to existing permit processes and internal practices and makes recommendations for updating ordinances. Updated management practices that are under the purview of DOT and other City departments were made at their discretion. Other practices such as modifying ordinances and policies will require additional consideration and approval of the City Council before they are put into effect and implemented.

1

Analysis of the San José Community Forest Program

Analysis of the San José Community Forest Program

Governance Structure of the San José Community Forest

There are a wide range of management activities necessary to maintain a community forest and many of these overlap between City departments **(Figure 4)**. The overlap is often based on the location of a tree on publicly managed land or on private property. In the City of San José, trees on private property fall under the Department of Planning, Building, and Code Enforcement (PBCE), and trees in the public space are collectively managed, or supported by, DOT, PRNS, and the Public Works Maintenance Division. The division of tree management by land use type is an extension of the defined department roles and responsibilities. PBCE oversees private property development, ordinance enforcement, and zoning, with trees on private property assigned to this department. Likewise, DOT and Public Works manage public space infrastructure such as streets and sidewalks, and street trees are organized within these departments. While organizing tree management in this manner is a natural fit for the responsibilities of each department, it does not necessarily coincide with the expertise and skills of each department, nor does it orchestrate a holistic management of the community forest. As such, it is important to review the current governance structure of the San José community forest for its benefits and tree management limitations, and to explore if alternative management structures may improve City efficiency and ultimately, lead toward a safer and healthier community forest.

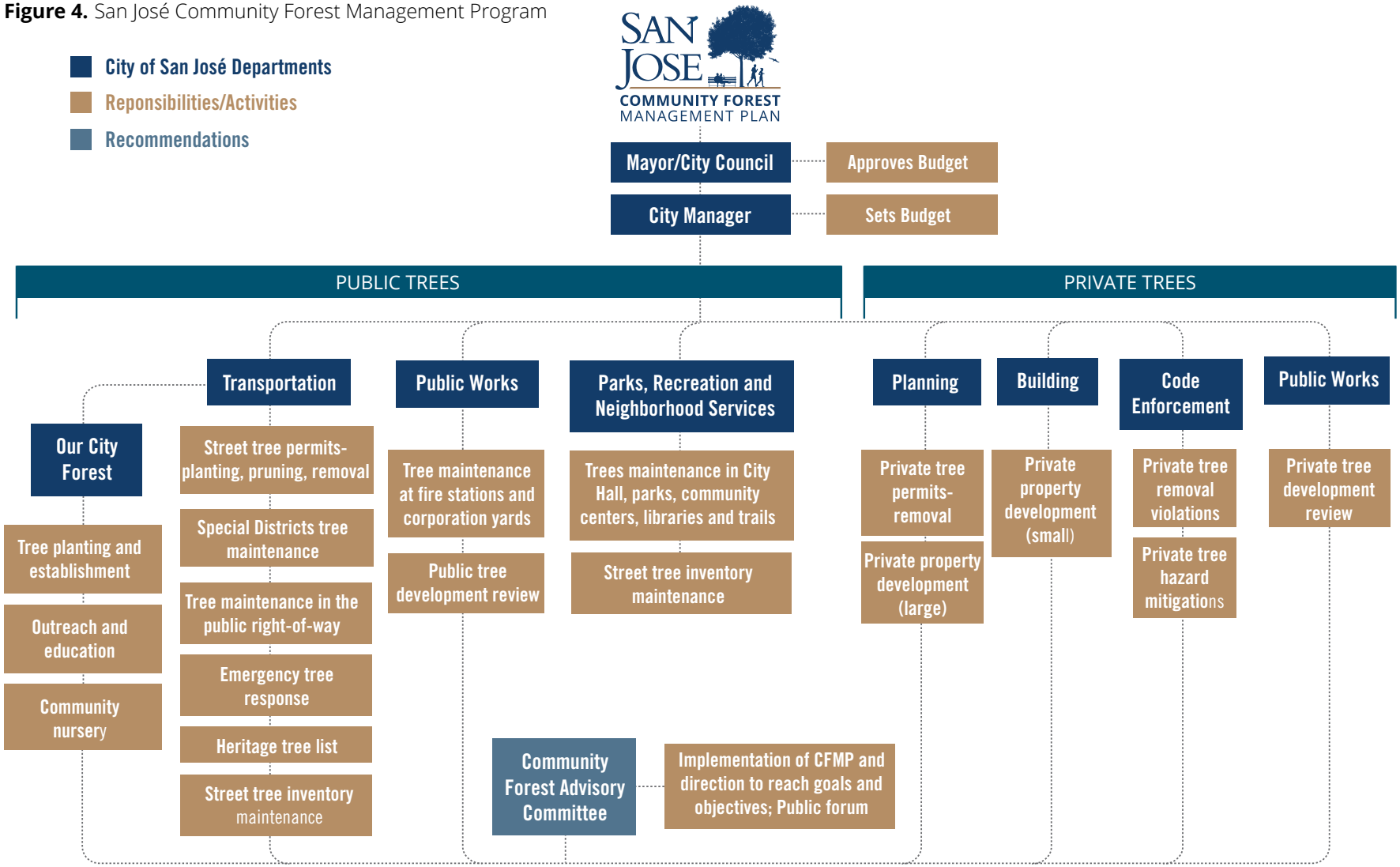
GOVERNANCE STRUCTURE LIMITATIONS

The following section outlines the limitations of the governance structure based on interviews with City staff, feedback from community members during the online public forums held in July 2020, and the observations of the consultant team. It includes a review of internal practices of the various departments and stakeholders that influence tree management, as well as how tree management is distributed among City departments.

DEPARTMENT OF TRANSPORTATION

DOT is responsible for the direct management

Figure 4. San José Community Forest Management Program



of approximately 37,000 street trees within the City of San José right-of-way, with private property owners responsible for the remaining 233,000 street trees in the public right-of-way. The shared responsibility of street trees is clearly defined on the City's website which states, "Since 1951 the municipal code has established that the property owner is responsible for the maintenance of the street tree(s) adjacent to their property. The city maintains trees in median island and roadside landscapes, as well as, in some special landscape districts." The placement of tree responsibilities within DOT reflects that DOT manages projects and City infrastructure related to streets, including sewers and storm drains, streetlights, and parking. DOT categorizes trees as landscaping, which also includes weed control. While street trees are part of the City street infrastructure, they have a set of management needs and environmental benefits to the City that are not fully represented by DOT's work. Because of this, the funding and staff resources needed to effectively manage the street tree population and meet environmental goals of the City is not allocated to tree maintenance. One way by which this is evident is that the City annually allocates $300,000 in funding to ensure tree roots are not blocking sewer lines, but only $120,000 to provide maintenance for

Newly Planted Tree
PHOTO: OUR CITY FOREST

Notification for Tree Removal

street trees. Maintaining working sewer lines is an important City service, but street trees provide millions of dollars in services and benefit to the City that is not recognized in the level of funding directed towards their maintenance.

Another structural issue of City tree management is that knowledge of arboriculture and urban forestry is centralized within DOT staff. No other department has an arborist on staff qualified to make technical decisions about how construction plans will impact trees, health and safety assessments of trees, or incorporating trees into the design review process. These decisions have long-lasting ramifications for the preservation of canopy cover and how the City will maintain trees as it expands the urban footprint. Most City staff recognize that they are not qualified to make decisions that impact trees and will seek consultation from DOT arborists to assist in managing permits, design review, and assessments of trees on private property. DOT arborists frequently provide their technical expertise when requested by staff despite tasks being beyond the scope of DOT responsibilities and without receiving funding to cover staff time. This is one of the main issues with the current City community forest management and is discussed further in the analysis of other City departments that directly impact trees.

PLANNING, BUILDING, AND CODE ENFORCEMENT

The primary limitation of the current governance structure is delineating the management of trees on private property to PBCE. This structure de-prioritizes trees due to the other competing planning responsibilities, such as the development of zoning and planning policies and amendments, plan review, and enforcement of zoning codes. Despite collecting fees related to tree removal permits, PBCE does not have an **arborist** on staff to make science-based decisions about tree-related issues. Arboriculture knowledge and experience is not typically associated with the education and experience of PBCE planners and engineers. As noted in departmental interviews, several PBCE staff expressed this same concern, recognizing arboriculture is outside of their skill set and experience and indicating their preference is to not make decisions on tree-related issues. This scenario provides a workable short-term solution for including arborist review of Planning projects that may be more controversial, but also redirects limited DOT staff time and resources from managing public space trees. Since this short-term solution redirects DOT attention from public space trees to private space trees, it should not be considered a viable long-term solution for the City to effectively manage trees on private property.

Arborist Review of Tree-Related Issues

PLANNING DIVISION

The PBCE Planning Division is responsible for tree issues on private property when it relates to the implementation of tree ordinances and tree removal permits. Each of these responsibilities requires the knowledge of an experienced arborist to ensure that arboricultural and best management standards, as defined by ISA, are correctly applied. When deciding whether a private property tree removal permit should be approved, Planning Division staff must assess whether the tree is alive or dead, whether it poses a risk to people and property, and if there are alternatives to preserve the tree.

CODE ENFORCEMENT

Staff within Code Enforcement (CE) also face a similar issue as they are responsible for investigating tree removals that are completed on private property without the proper permit. Code Enforcement does not have an arborist on staff or the technical experience or training to identify species, or determine size or condition (dead) of the trees they are investigating. To alleviate their concerns, in some cases CE staff will consult with DOT arborists to reach a final determination on enforcement issues. While DOT is able to support most of these requests, it is outside of the purview of their department and done without additional funds.

Design Review and Approval for Development Projects

BUILDING DIVISION

San José, like most cities in California, has a shortage of housing and a desire to increase density in the urban core around transit centers. As expressed in departmental interviews, a perception exists that development and trees are in competition to use limited space to increase housing density, while maintaining or expanding canopy cover. The situation is stated as having only two resolutions; the City can have large trees and a smaller building footprint, or a larger building footprint and smaller trees.

Trees are being considered towards the end of the design review process when it becomes cost prohibitive to make changes to site plans to accommodate trees. DOT arborists are included

Downtown San José Trees

in the preliminary review of plans that include street trees, green stormwater infrastructure (GSI), traffic studies, and safety. In the preliminary review, the assigned DOT arborist provides comments and recommendations that are forwarded to Public Works, who in turn write up a memo providing direction to the applicant. It is then at Public Works' discretion to share the arborist's recommendations with the applicant. While this practice has improved development review, instances still occur where the arborist's recommendations are not relayed to the applicant.. As the project progresses, the applicant is then redirected to the City arborist to address tree issues for site development.

In some cases, developers apply for and receive building permits for residential properties without prior approval for private or street tree removal permits. This structure creates a situation where significant funds have been spent on the design and permitting process, almost obligating the City to remove the trees. This situation can be avoided by correctly following the review process and providing DOT arborist's comments directly to the applicant when they are given at the beginning of the project.

It may not always be feasible to accommodate a building and tree in the same space, but a

more accurate assessment can be made when trees are included in the beginning of the design and review process, while site plans are being further refined and developed. This order allows infrastructure like sewer lines and streetlights to be moved the appropriate distance needed to create growing space for trees underground and overhead. It also allows for the implementation of new design practices, like suspended pavements or structural soils, that create growing space for trees underneath **hardscape**.

For development projects, the Building Division can accept an arborist report provided by the applicant, with no requirement of having a City arborist peer review the report to ensure the information meets arboriculture standards. As a result, Building Division staff must make assumptions as to whether trees can be removed and how mitigation standards may apply. These decisions should only be made by a qualified arborist, who has experience in understanding the health and risk factors associated with trees near construction sites, and the standards to protect and preserve trees during construction. In the absence of an arborist's review, the City cannot be confident that it is correctly assessing tree health and risk, or if a tree can be preserved during construction.

PARKS, RECREATION & NEIGHBORHOOD SERVICES

PRNS is responsible for all tree-related activities that occur in City parks and community centers, including planting, establishment care, pruning, and responding to emergency situations. Like all other City departments outside of DOT, PRNS does not have an arborist on staff and consults with DOT on an as-needed basis for tree maintenance concerns. PRNS manages up to an estimated 30,000 trees located in City parks and on City library and City Hall grounds. The total number of trees and frequency of park users necessitates trees being maintained at an optimal level for the safety of park users. Without a professionally trained and certified arborist on staff, PRNS is unable to ensure park trees are in a safe condition and actively address potential hazards before an emergency occurs.

As stated in the discussion about the needs for park tree maintenance, City staff observed the tree population to be aging and declining in population, with many trees experiencing limb or whole tree failure. PRNS has an internal policy to replace all park trees with three trees for every one removed, and to plant replacement trees in the park where the tree was removed. However, challenges with space, staffing, and available irrigation sometimes prohibit that from occurring. The intent of the policy is to ensure a continuity of the existing tree canopy and to further expand canopy cover in parks. The policy is effective in replacing removed canopy in a park but falls short in the efforts to expand canopy cover throughout the park system. As stated by PRNS staff, tree removal can occur in a park that is approaching a maximum level of canopy cover leaving limited space for the crowns of newly planted trees to grow. In these instances, the crowns of newly planted trees may grow into the crown of an existing tree, which limits the ability of newly planted trees to expand canopy cover.

Another challenge of tree planting in City parks is a lack of coordination on tree placement and species selection during new facility planning and construction. The design and installation of new park facilities is managed outside of PRNS by Public Works. The process does not require consultation with PRNS maintenance staff or the City arborist about how the design will impact existing trees or to make decisions as to what tree species are appropriate for the location. It was stated during interviews with PRNS staff that this level of coordination happens on an ad hoc basis, and in some instances, PRNS staff are not made

Martial Cottle Park Planting
PHOTO: OUR CITY FOREST

aware of the pending development project. On some occasions, the lack of coordination resulted in existing trees being removed that could have otherwise been preserved, and inappropriate species being planted at the site. However, these issues are largely avoided when PRNS or the City arborist are involved in the development process from the beginning of the project. As such, the development process should be updated to include mandatory review by PRNS maintenance staff and professional arborists within PRNS or other departments at project initiation and before plans are finalized.

The planting of new trees in parks also presents the challenge of how establishment care will occur, and who will be responsible for the tree watering. City parks are a favorite location for tree planting events for City Council offices and corporate groups, many of which are coordinated with the assistance of OCF. Parks provide a setting to effectively manage volunteers and create a good volunteer experience. PRNS staff welcome the opportunity to have volunteer groups plant trees in parks, but do not have the capacity to provide establishment care and watering. Often the care is cost prohibitive to provide automated irrigation to the newly planted trees, and funds are not available to contract out watering. As a result, the group who planted the trees are responsible for tree watering. A newly planted tree in San José will require up to 3 years (sometimes longer depending on weather) of regular watering to remain healthy and establish its root system. This long-term commitment is usually difficult for a community or corporate group to fund or provide, and eventually the care will drop off. If community members, corporate groups, and elected officials desire to continue to plant trees in City parks for community engagement and volunteer activities, there must be an established watering and maintenance plan before the planting project moves forward. Without a maintenance plan in place, PRNS cannot guarantee trees planted by volunteers will survive through the establishment period.

PUBLIC WORKS MAINTENANCE DIVISION

The main responsibility of the Public Works Maintenance Division is to maintain the safety of City buildings and facilities, including the maintenance of fewer than 500 trees located on corporation yards and City of San José Fire Department stations. Tree maintenance does not fall within the typical responsibilities of the Maintenance Division, which does not have an on-staff arborist or tree expert. In addition, the Maintenance Division is not able to create an active tree maintenance plan, but rather reacts to situations as they arise. Given the small number of trees, it is not reasonable to add an additional staff member with experience in trees to manage ongoing maintenance. For this reason, the responsibility for tree maintenance for those located on Public Works maintained facilities may be better suited placed under the care of DOT or PRNS along with the sufficient funding for both proactive and reactive care.

Kelley Park

RECOMMENDATIONS FOR GOVERNANCE STRUCTURE

Section	Recommendation	Discussion
Department of Transportation	Consolidate tree responsibilities to one division or create a new division.	Tree responsibilities are dispersed across multiple City departments which contributes to inefficiencies in management. One possibility to streamline tree management is to create a new division or department that encompasses all tree management activities within the City. If all tree-related management activities, permitting, enforcement, and planning decisions were coalesced into one department, it would be clear where to go for answers to tree-related questions, and it would ensure qualified staff are always reviewing tree issues for the City. While tree responsibilities have fallen under the purview of DOT, their funding allocation does not reflect their management needs.
Planning Division	Include trees in the beginning of the design and planning process	In development (public, commercial, and private and both new and remodel/redesign) projects managed by both Planning and PRNS, or Public Works, trees are often not included in the initial design and planning phase, when critical decisions are made that impact the City's ability to plant and preserve trees. In the case of Planning development projects, the City plan check and internal review processes should be updated to include an initial review of projects by either a City arborist or a contracted third-party consulting arborist. For PRNS development projects, a PRNS representative and certified arborist should review site plans. The initial review of all projects should determine if site plans consider how construction will impact existing on-site trees and what available measures can be taken to ensure the long-term preservation/survival of trees before recommending removal. Consideration should also be given to whether the design or location of the project can be modified to accommodate the retention of existing mature trees. It should also include a review of the planting specifications to ensure site-appropriate tree species are selected, and that each newly planted tree has sufficient soil volume and grow space to reach a full canopy size at maturity.
Planning Division	Provide an arborist review of all Planning Division tree responsibilities	Currently, the Planning Division does not have a staff arborist dedicated to the review of private property tree-related issues. This position is needed to implement policies and tree management decisions that support the City's goals of a healthy and safe urban forest. Another option that would reduce the City's financial commitment is to have a City-approved, independent third-party on-call arborist in lieu of an additional full-time employee. This model is often used by municipalities as it provides an unbiased expert opinion on tree issues and demonstrates to residents the extra step in due diligence the City is willing to take when deciding issues concerning their private property.

Section	Recommendation	Discussion
Public Works Maintenance Division	Consolidate Maintenance of Public Works-Maintained City Facility Trees to a new department	The Public Works Maintenance Division does not have the staff capacity or training/experience to manage the approximately 500 trees on City-owned properties. The management of these trees should be consolidated within the department or division that will be responsible for management of the community forest program.
Parks Recreation and Neighborhood Services	Update the PRNS Tree Replacement Policy	The current PRNS policy is to replace every removed tree with three new trees in the same park. This policy has been successful in maintaining high canopy cover levels in some parks, but it has also led to parks receiving new trees that have already filled all available planting locations. Instead of requiring trees to be replanted back in the same park in all cases, replacement trees should be allocated first to the park in which they were removed to fill vacant planting locations. If all vacant planting locations are filled, the balance of trees should be planted in a park within the same neighborhood, council district, or adjacent disadvantaged community that has the space to accommodate more trees.
Parks Recreation and Neighborhood Services	Provide funding for establishment care as a condition to plant trees on PRNS sites	PRNS is not able to adequately water newly planted trees due to a lack of funding for contract watering or the availability of in-house maintenance crews, but values the efforts from community planting events held in parks that are supported by nonprofit organizations, corporate groups, and City-elected officials. As such, groups interested in a community tree planting event in a City park should provide funds to PRNS that support the watering and establishment care of the newly planted trees for a period of up to 3 years. Groups unable to provide maintenance funds should be encouraged to hold community events that provide maintenance and care for newly planted trees in lieu of planting new trees, which would contribute to the health of park trees and are achievable without placing an additional burden on PRNS maintenance staff.

Aerial of San José in the 1930s
PHOTO: SAN JOSÉ HISTORICAL

San José Urban Forest Assessment

The City of San José recognizes that trees provide numerous environmental services and economic benefits and are a unique component of City infrastructure that improves living conditions for residents. While it is commonly understood that trees reduce air pollution, and their shade cools streets and homes, research continues to demonstrate that the value of trees in an urban environment is real and quantifiable. In 2013, Xiao and collaborators conducted the first analysis of San José's environmental and economic value of all the trees in the community forest. Approximately 1.6 million trees comprise the San José community forest and produce ecosystem services and property value increases valued at $239.3 million annually (Xiao et al. 2013). These ecosystem services include $77 million savings in cooling costs, $6.7 million in reduced City stormwater management costs, and an economic benefit of $154.6 million in increased property value.

Research is also providing more evidence of the mental and physical health improvements one experiences when living in a green area comprised of trees. Approximately 80% of the U.S. population lives in an urban area (U.S. Census Bureau 2018), emphasizing the need to develop cities that contribute to the health and well-being of residents. Trees and green space have been shown to improve mood and other cognitive benefits in people dealing with depression (Berman et al. 2012); to increase physical activity (Frank and others 2005); and to reduce crime (Donovan and Prestemon 2012; Kuo and Sullivan 2001a, 2001b; Troy et al. 2016). These findings help support the real and quantifiable ways trees are improving the quality of life for San José residents.

The following sections provide an analysis of how trees in the public space (City- and private property owner-managed) are contributing to the sustainability of San José, with quantifiable data where available. The discussion describes the condition of trees in the inventory against sustainability indicators that will provide an understanding of what management practices the City will need to address to continue to progress towards a sustainable urban forest.

HISTORY AND LAND USE

Members of the Ohlone or Costanoan Native American language group were the first inhabitants of San José and the Santa Clara Valley, with the Tamyen or Tamien group settling along the Gaudalupe River and Coyote Creek. The native peoples settled along dependable water sources and were able to sustain life with the abundant resources of the open grasslands and oak woodlands. Spanish exploration and settlements would end inhabitation of the Santa Clara Valley by the original peoples (*www.sanjosehistory.org*). San José was founded on November 29, 1777, as the first town in what was at that time the Spanish colony of Nueva California and is the oldest civilian settlement in California. San José was also the State's first capitol and host of the first two sessions of the California State Legislature, serving in that role in 1850 and 1851. (Envision 2040)

San José's urban history began with an agricultural economy based on the fruit canning industry, and over the past 60 years transitioned into the world's largest concentration of technology-based companies. The historic agricultural land use of San José is reflected in many neighborhoods as other parts are a dense urban environment. San José annually averages 300 days of sunshine which supports an outdoor lifestyle, including active use of the City's parklands, more than 54 miles of trails in 27 trail systems, pedestrian and bicycle activity, and the development of traditional outdoor

urban spaces such as plazas and cafes (Envision 2040). San José is surrounded by hillsides, open space, preserved parklands and natural habitat, which provide a visual reminder of the nearby natural environment (Envision 2040). The north and west portions of San José are an urban environment adjacent to large open spaces and natural settings, including the Baylands, redwood forests, the Pacific Ocean, the Santa Cruz mountains, and the Monterey Bay area (Envision 2040).

THE VALUE OF TREES TO THE CITY OF SAN JOSÉ

The available tree data provided in the 2014 City inventory was analyzed using the **i-Tree Eco** online tool to determine the environmental and economic value of trees in the public space. I-Tree is a peer-reviewed software suite developed by the U.S. Forest Service that provides urban and rural forestry analysis and benefits assessments that can help strengthen forest management and advocacy efforts (https://www.itreetools.org/about). Specifically, the i-Tree Eco online tool results reflect the total services and benefits received from all trees in the City inventory based on individual tree data including species, **diameter at standard height (DSH)**, and health condition.

Table 1. Economic Value of Tree Inventory

Value	Description	Amount	Per Tree Value
Structural Value	Tree replacement cost	$735,000,000	$3,003
Carbon Storage	Value of the carbon stored in the trees	$15,490,000	$63.29
Functional Value	Value based on the functions (services) trees perform	$878,600	$3.59

Source: i-Tree Eco Analysis conducted by Dudek.

The structural value of $735 million presented in **Table 1** represents the total cost to replace every tree in the City inventory with a tree that is the same species, size and condition. The structural value can also be viewed as the value of the trees as City infrastructure, in a similar manner that it would calculate the value of streetlights, sanitary sewer, and stop signs. Just as the condition and age of a sanitary sewer would be considered to appraise its value, the structural value of a tree considers both health and maturity of the community forest trees. The average structural value of a tree in the San José community forest is currently valued at $3,003. However, with the funding of regular maintenance and the maturing of trees in the community forest, the average structural value of trees will increase, as opposed to depreciating in value over time.

Beyond structural value, the community forest also holds value in the carbon stored in trees. As represented in **Table 2,** carbon storage in the San José community forest is valued at $15,490,000 Trees also provide other functional services, including carbon sequestration, avoided runoff, and air pollution removal, valued at $878,600. In total, the value of San José's community forest is just over $750 million dollars. It should be noted that the total value is most likely under represented as the i-Tree valuation does not include the environmental and economic impact from energy savings as data is not available in the City inventory to calculate these totals.

Table 2. Environmental Services and Economic Value of Tree Inventory

Service	Environmental Benefit	Economic Value	Benefit to City
Carbon Sequestration (carbon removed from air)	2.63 thousand tons/ year	$449,000	Emissions captured from 515 cars driven for 1 year
Avoided Runoff	936.5 thousand cubic feet/year	$62,600	7,055,064 gallons of water filtered into underground aquifers
Air Pollution Removal	50.22 tons/year	$367,000	Equivalent to removing pollution for 127,600 gallons of gasoline consumed.

Source: iTree Eco Analysis conducted by Dudek.

In addition to the dollar value of trees, there are also qualitative values inherent in the community forest. Trees have also been linked with fewer emergency asthma cases in highly polluted urban areas (Alckock et al. 2017). Further, the World Health Organization attributes ambient air pollution to deaths related to stroke, heart disease, lung cancer, and chronic respiratory diseases (WHO 2016). This impact underscores the value trees can have on our health and well-being by improving air quality. The quantitative and qualitative value of trees supports the prioritization of this component of the City's infrastructure.

THREATS TO THE URBAN FOREST

The threats to the San José community forest will continue to emerge and evolve over time alongside changing environmental conditions and land use needs of the City. It is important to understand the nature and origin of threats to make decisions on the appropriate management actions to either mitigate against, or prepare for, expected impacts. Threats to the City's community forest include both environmental threats (e.g., plant diseases) and human threats (e.g., urban development).

Environmental threats include more traditionally understood issues like invasive pest infestations and diseases, but also includes climate change issues, such as prolonged heatwaves and drought. It is well documented that the climate in California is changing and temperatures are increasing across the state (EPA 2016). Increasing temperatures impact snowpack, water availability, and human health, while also resulting in more severe wildfires, sea level rise, and a transformation of California's agriculture (EPA 2016). One of the worst droughts in state history spanned 5 years (2012 to 2016), and the expectation is that droughts will worsen as climate scientists forecast hotter and drier conditions (The Climate Reality Project 2018).

Human-generated threats include urban development and illegal removals and pruning. As discussed throughout this report, large healthy trees are essential for a thriving community forest. Large healthy trees (greater than 30 inches in diameter) remove approximately 70 times more air pollution annually (1.4 kilograms per year [kg/yr]) than small healthy trees (less than 3 inches in diameter [0.02 kg/yr]]) (Nowak 2002). Without consideration for how trees will be incorporated into the City's new development, the opportunities to expand the community forest can become limited and lose value.

Similarly, the illegal removal or pruning of trees can reduce the size and number of mature trees, which hold the greatest value in the community forest.

Understanding the difference between human and environmental threats is important for determining the type of management actions available to reduce impacts. For environmental threats, management actions include long-term planning, such as this CFMP and Climate Smart San José. Human threats, however, require ordinances to reduce impacts. For example, the City could establish an ordinance that would require new developments to make considerations for trees, which could include the number, size, placement, and/or type. These measures would ensure trees are a foundational element of a development project, rather than being considered at the end of the process. It is important to highlight California as a leader of progress on climate and sustainability, working toward a target of 80% reduction (compared to 1990s levels) in carbon dioxide emissions by 2050 (California Global Warming Solutions Act of 2006; see CARB 2021). San José has responded in-kind, through the San José Green Vision (Green Vision), Bike Plan, and other policies to implement energy, transport, and water sustainability on a local scale. As part of Climate Smart San José, the City will effectively employ sustainable-use practices for local water and green infrastructure to achieve a 30% reduction in residential water consumption to 42 gallons per day per capita by 2030. Further, Climate Smart San José identifies a need to embrace the California climate and plant species that are particularly suited for low-water climates. These are some of the current actions the City has taken to address impacts of climate change, which can be supported by similar actions to protect the community forest.

CANOPY COVER

Canopy cover is defined as the area of land covered by a tree's leaves and branches when viewed from above and indicates the level of environmental services one experiences from trees. San José was developed on land that was once open grassland and chaparral communities with trees largely existing along available water sources. The trees along streets and backyards were planted as the City was built, as opposed to the City being built into an already forested area and impact the potential for canopy cover across the City. While cities that develop into a forested area may experience 35%–40% canopy cover, 20% is considered a realistic baseline for San José (Leahy 2017).

Table 3. Comparison of Canopy Cover with Other California Cities

City	Canopy Cover
Los Angeles	25%
Oakland	24.8%
Sacramento	19.1%
San Francisco	13.7%
San José	13.54%
San Diego	13%

The U.S. Forest Service (USFS) completed a spatial imagery analysis of canopy cover for all cities in California for the years of 2012 and 2018, which determined California's urban tree canopy cover to be 19% (USFS n.d.). The consultant team analyzed the 2012 and 2018 USFS data sets to determine San José had a canopy cover of 13.54% in 2018. The San José canopy cover can be considered low based on a comparison to the state average and other major cities in California **(Table 3)**.

Figure 5. San José Canopy Cover by Council District

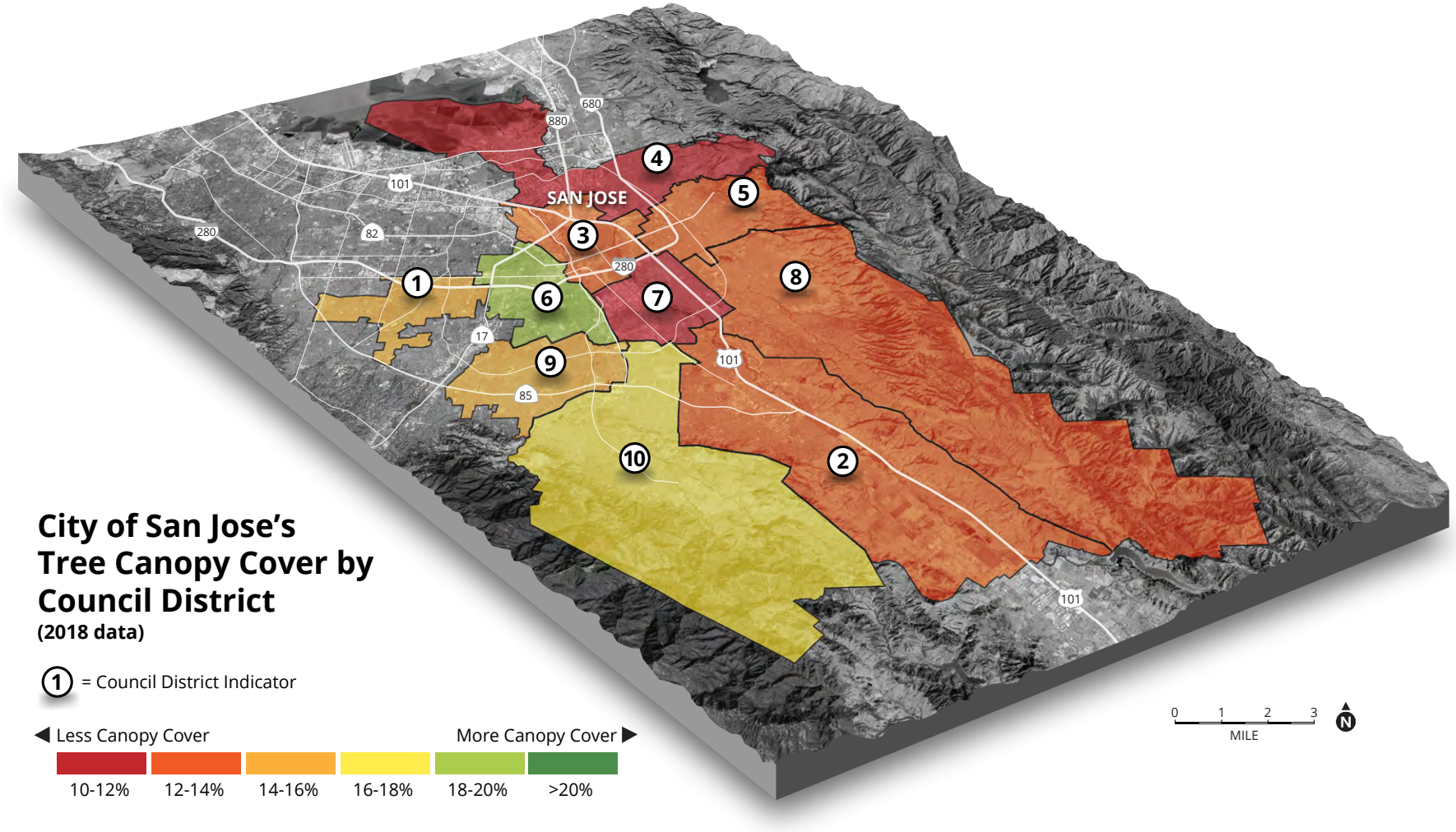
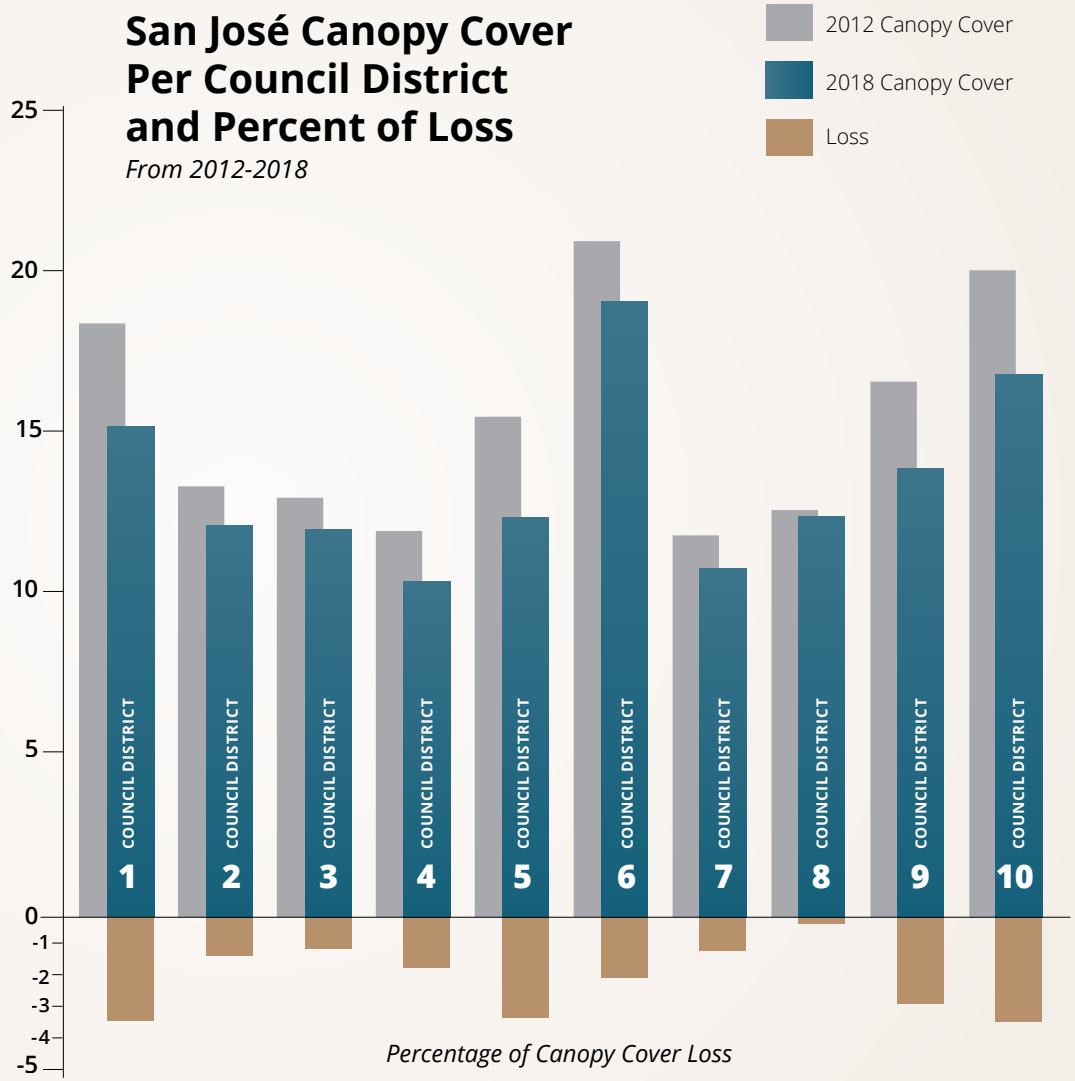
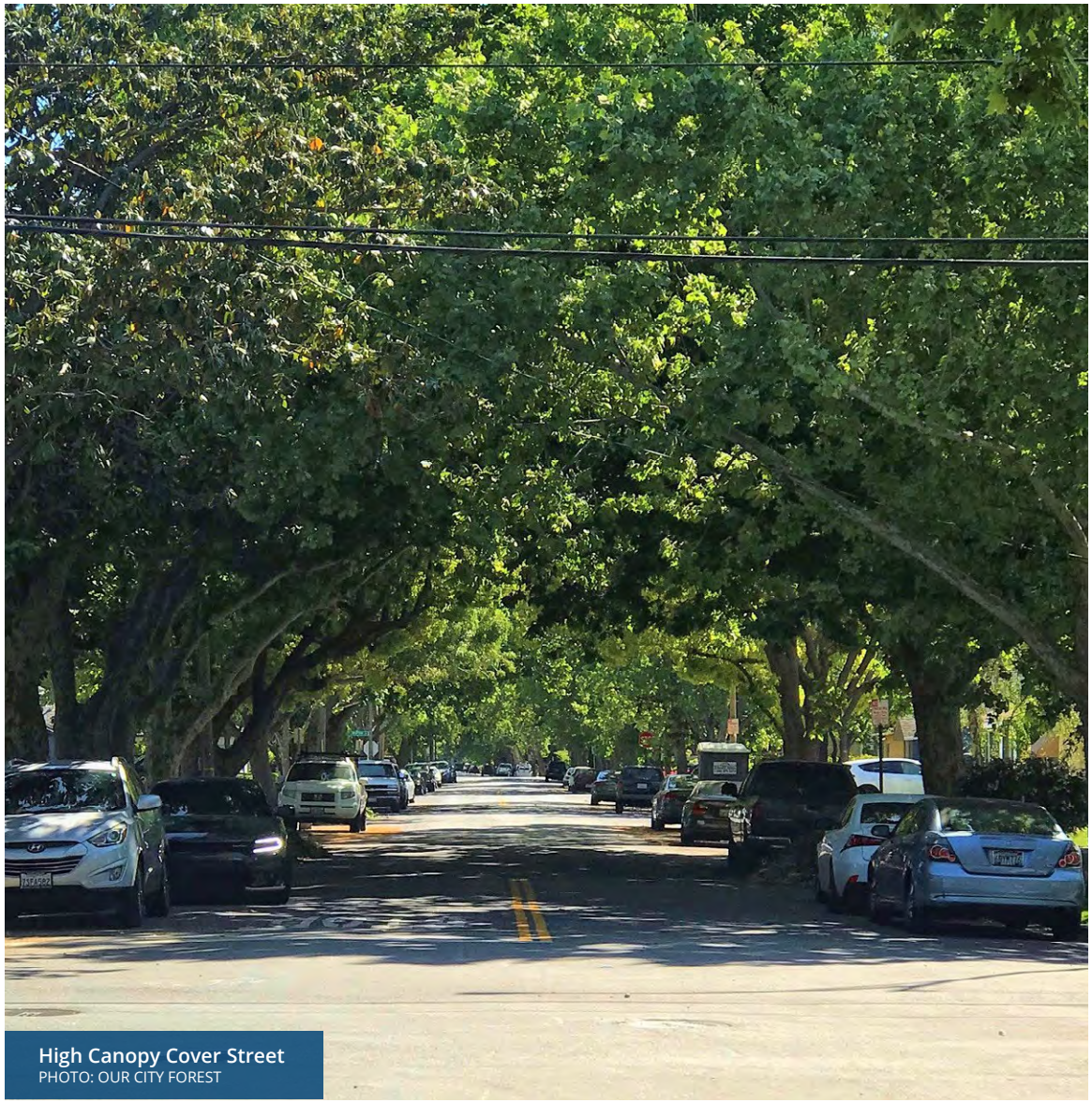


Table 4. San José Canopy Cover by Council District

Area	2012 Canopy Cover	2018 Canopy Cover	Change
San José	15.36%	13.54%	-1.82%
Council District			
1	18.75%	15.50%	-3.26%
2	13.61%	12.39%	-1.22%
3	13.25%	12.27%	-0.98%
4	12.19%	10.62%	-1.58%
5	15.81%	12.64%	-3.17%
6	21.36%	19.46%	-1.90%
7	12.06%	11.02%	-1.04%
8	12.86%	12.67%	-0.19%
9	16.92%	14.18%	-2.74%
10	20.43%	17.14%	-3.30%





High Canopy Cover Street
PHOTO: OUR CITY FOREST

Table 5. Potential Canopy Cover Loss Over 30 Years

Year	Canopy Cover	Canopy Cover (Acres)
2012	15.36%	14,617
2018	13.54%	12,889
2024	11.73%	11,161
2030	9.91%	9,433
2036	8.09%	7,705
2042	6.28%	5,977

The canopy cover data was further analyzed to understand the degree to which canopy cover increased or decreased from 2012 to 2018 and then further broken down by Council Districts, as indicated in **Table 4.**

All council districts have experienced a decline in canopy cover from 2012 to 2018 with Council Districts 1, 5,6,9, and 10 losing more than the City average. The 1.82% loss represents 11.8% of total canopy cover and is equivalent to losing 1,728 acres of trees. **Table 5** indicates what San José canopy cover would be over a 30-year period if it continues to lose 1,728 acres of canopy cover.

Figure 6. Potential Canopy Cover Loss Over 30 Years

The decline of canopy cover is most likely attributed to multiple factors instead of one or two main causes. One issue that will need to be better understood is the rate of tree removal and whether the removal process can be slowed down. The City cannot control environmental factors like longer periods of drought and increased annual temperatures that contribute to tree decline and removal. The City can control other factors like allowing the removal of protected trees on private property, preserving trees during development, and updating development standards to reduce tree and infrastructure conflicts.

Tree canopy is also impacted by maintenance and whether trees are pruned properly to have a full crown. Whatever the cause, slowing down the rate of tree removal is an important step to gaining lost canopy and expanding the community forest as it takes 30 to 40 years for trees to mature **(Figure 6)**.

Expanding canopy cover will take a significant investment from the City to plant and maintain new trees. **Tables 6 and 7** provide estimates of how many new trees will need to be added to increase canopy cover. If the City wishes to achieve a 20% canopy cover, it will need to add approximately 136,412 trees with a 50-foot-wide canopy spread. It will take the City planting 4,547 trees with a 50-foot-wide canopy spread every year for 30 years to reach that goal. The tables do not account for the time it will take for trees to grow and mature, meaning it could take closer to 50 years for the City to realize a 20% canopy cover. Every tree that is removed will extend that timeline to increase canopy cover and the total number of trees that are needed to do so. The City contains approximately 2.1 million potential tree planting sites, with 94% of these on private or institutional lands (McPherson 2013). This indicates that there is ample space to increase tree canopy cover in the City but it is heavily reliant on participation from private property owners.

SUSTAINABILITY INDICATORS OF CITY-MANAGED TREES

To establish a foundation to measure the sustainability of an urban forest, Clark and

Table 6. Total Number of Trees Needed to Increase Canopy Cover by Percent

Total Canopy	Total Number of Trees by Canopy Spread			
	22.75 ft Diameter	35 ft Diameter	50 ft Diameter	75 ft Diameter
14%	46,813	19,757	9,682	4,302
16%	251,058	105,956	51,925	23,071
18%	455,303	192,155	94,169	41,841
20%	659,548	278,354	136,412	60,610
25%	1,170,160	493,851	242,020	107,534
30%	1,680,773	709,349	347,628	154,458

Table 7. Total Number of Trees Needed to Plant per Year for 30 Years to Increase Canopy Cover by Percent

Total Canopy	Total Number of Trees by Canopy Spread			
	22.75 ft Diameter	35 ft Diameter	50 ft Diameter	75 ft Diameter
14%	1,560	659	323	143
16%	8,369	3,532	1,731	769
18%	15,177	6,405	3,139	1,395
20%	21,985	9,278	4,547	2,020
25%	39,005	16,462	8,067	3,584
30%	56,026	23,645	11,588	5,149

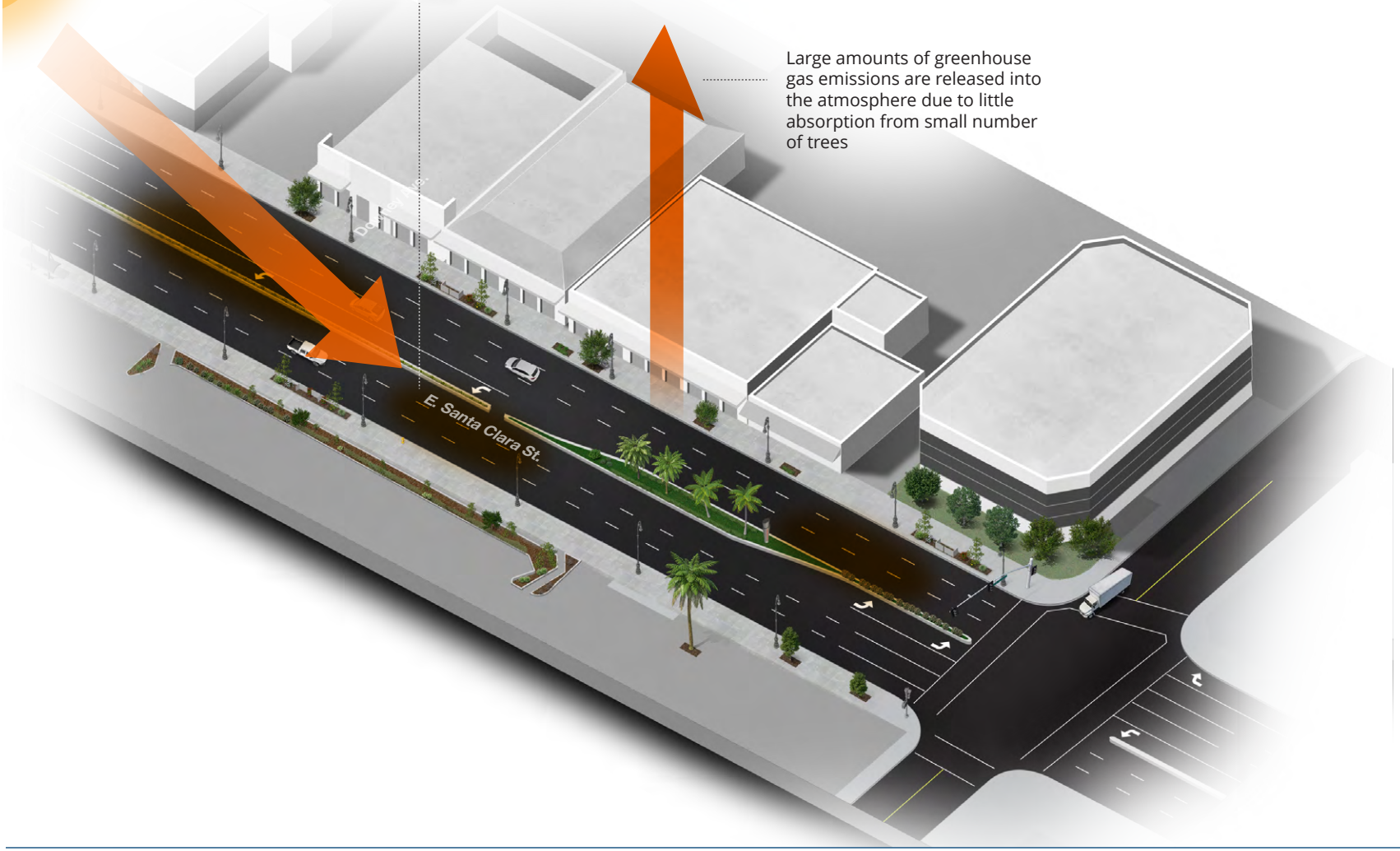
Greenery and the urban heat island effect: Fewer Trees

1 Solar energy is emitted by the sun

2 Heat is absorbed and retained by dark, urban surfaces

3 Heat is slowly emitted throughout the day and evening, increasing temperatures

4 Increased temperatures discourage pedestrian traffic, negatively impacting local economy



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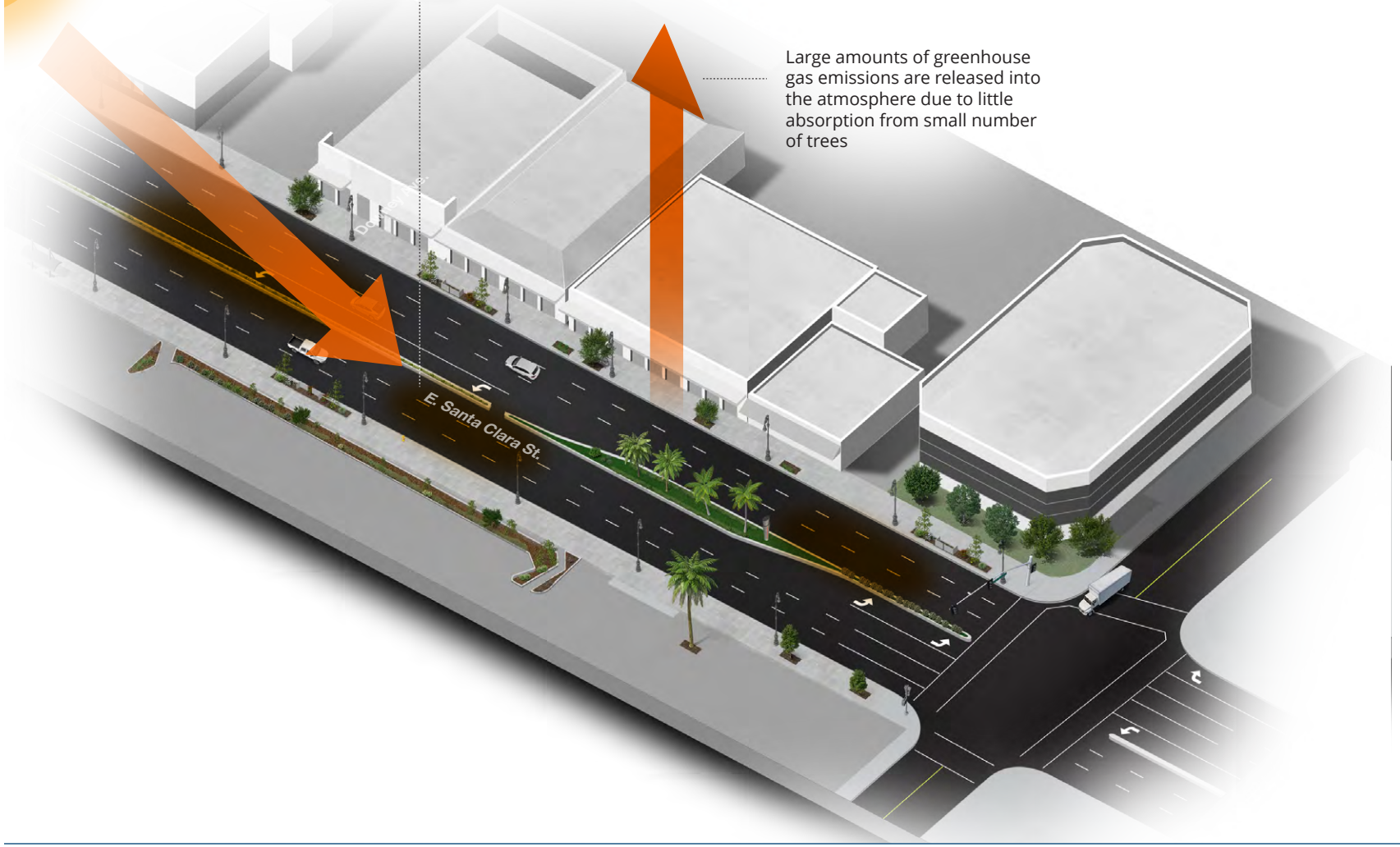
3 Heat is slowly emitted throughout the day and evening, increasing temperatures

4 Increased temperatures discourage pedestrian traffic, negatively impacting local economy



collaborators published a report that remains widely cited by urban foresters and arborists (Clark et al. 1997). The model for urban forest sustainability is based on three components, one of which is the vegetation resource, or the engine that drives urban forests (Clark et al. 1997). The condition of "the engine" is based on the diversity of species, health, age distribution, and other indicators that directly relate to the environmental services it produces. When those conditions align with sustainability indicators, the community forest engine is functioning at an optimal level and providing an equivalent level of services such as reduced **urban heat islands**, cooler homes, captured stormwater, and habitat for wildlife. When the community forest engine is underperforming, so are the environmental services.

The sustainability indicators discussed in the following sections are used to further understand if the community forest is functioning at an optimal level and provide a baseline by which the City can measure progress towards achieving a sustainable community forest. These analyses will further inform the management practices and long-term planning strategies the City will need to implement to progress towards this goal.

It is important to note that the following analysis is based on an inventory completed in 2014 and does not reflect the current condition of City managed trees. The impact on analysis and recommendations varies on the type of dataset. Because the City has planted a limited number of trees in relation to the entire inventory population, it is expected that datasets like the total number of trees and tree species diversity should have remained relatively consistent. Additionally, trees take years to grow and mature, so the age distribution data will most likely not experience a drastic shift over a 7-year period. The overall health condition of inventoried trees and that of individual species can change within a few months, and the analysis of the health condition of City trees should be considered as a baseline of 2014 conditions. The specific recommendations related to the health condition of City managed trees should be updated after the completion of a new inventory. The benefits of updating the inventory and recommendations for maintaining a current inventory are provided in the Tree Management Practices chapter.

SPECIES DIVERSITY

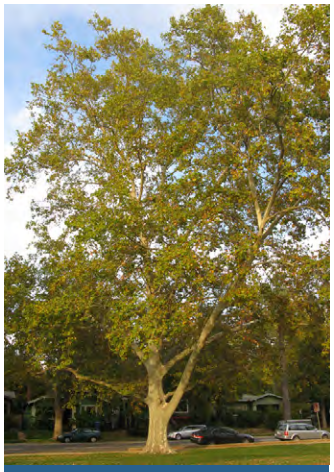
One criterion to measure community forest sustainability of the vegetation resource is the extent of species diversity within the tree population (Clark et al. 1997). Species diversity is a method by which a community forest can be made more resilient to impacts of climate change, such as extended periods of drought or extreme heat events. Threats to the community forest, such as the emergence of pests and diseases, cannot be completely prevented, but can be mitigated against with a diverse tree population. The goal of the species diversity criteria is to ensure that no one threat can drastically impact that entire tree population, and therefore reduce canopy cover and the environmental services provided by trees.

Community forest research has not established a set ratio for species diversity within a tree population. One recommendation suggests that a genus should represent no more than 20% of the trees in a community, whereas no single species should exceed 10% of the tree population (Moll 1989; Clark et. al 1997) Developing an appropriate baseline for San José will need to consider how species diversity is reflected on a Citywide and local level.

SAN JOSÉ'S **TOP 10 TREE SPECIES**

1. *Pistacia chinensis*
(C. STUBLER AND M. RITTER)

2. *Lagerstroemia indica*
(C. STUBLER AND M. RITTER)



3. *Platanus acerifolia*
(M. RITTER AND W. MARK)

4. *Liquidambar styraciflua*
(M. RITTER, W. MARK, J REIMER)

5. *Pyrus calleryana*
(W. MARK AND J REIMER)

6. *Cupressus sempervirens*
(C. STUBLER AND M. RITTER)

7. *Magnolia grandiflora*
(M. RITTER, J. YOST, W. MARK)

8. *Prunus cerasifera*
(W. MARK, J REIMER)

9. *Fraxinus angustifolia 'Raywood'*
(J. REIMER AND M. RITTER)

10. *Quercus agrifolia*
(K. KESSEN, M. RITTER, W. MARK, AND J. REIMER)

Table 8. Top Ten Species by Population in the City Inventory

Rank	Botanical name	Common name	Goal: Species is < 10% of Inventory Total	% of inventory
1	*Pistacia chinensis*	Chinese pistache	24,390	9.6%
2	*Lagerstroemia indica*	Crape myrtle	20,912	8.3%
3	*Platanus acerifolia*	London plane	19,145	7.6%
4	*Liquidambar styraciflua*	American sweetgum	14,577	5.8%
5	*Pyrus calleryana*	Flowering pear	7,954	3.1%
6	*Cupressus sempervirens*	Italian cypress	7,190	2.8%
7	*Magnolia grandiflora*	Magnolia	7,024	2.8%
8	*Prunus cerasifera*	Purple leaf plum	6,644	2.6%
9	*Fraxinus angustifolia 'Raywood'*	Raywood ash	5,632	2.2%
10	*Quercus agrifolia*	Coast live oak	5,496	2.2%

Source: City of San José 2020a.

Species diversity on a Citywide level is provided in **Table 8**, which lists the top ten species by population in the City street tree inventory, and **Table 9**, which lists the top ten genera by population in the City street tree inventory. At the time of this analysis, park tree inventory data was not available. The actual totals would most likely change with the inclusion of park trees.

The City street tree population consists of 548 unique tree species, with the top ten species totaling 47% of the total inventory,

Table 9. Top Ten Genera by Population in the City Inventory

Rank	Genus	Goal: Genus is < 20% of Inventory Total	% of Inventory
1	*Platanus*	27,241	10.8%
2	*Pistacia*	24,429	9.7%
3	*Lagerstroemia*	21,668	8.6%
4	*Quercus*	17,976	7.1%
5	*Liquidambar*	14,662	5.8%
6	*Prunus*	13,253	5.2%
7	*Fraxinus*	12,972	5.1%
8	*Pyrus*	11,556	4.6%
9	*Acer*	8,694	3.4%
10	*Cupressus*	7,330	2.9%

Source: City of San José 2020a.

SAN JOSÉ'S **TOP 10 TREE GENERA**

1. *Platanus*
(M. RITTER, W. MARK, AND J. REIMER)

2. *Pistacia*
(C. STUBLER, M. RITTER, W. MARK, AND J. REIMER)

3. *Lagerstroemia*

4. *Quercus*

5. *Liquidambar*

6. *Prunus*

7. *Fraxinus*
(J. REIMER AND M. RITTER)

8. *Pyrus*
(M. RITTER, W. MARK, J. REIMER)

9. *Acer*
(C. STUBLER, M. RITTER, W. MARK, J. REIMER)

10. *Cupressus*
(VAN DEN BERK NURSERIES)

Table 10. Age Distribution of 2014 Street Tree Inventory by DSH

DSH Range (inches)	Total	% of inventory	Recommended % of inventory	Age Classification
0–6	89,319	37%	40%	Immature
7–18	113,047	47%	30%	Young
19–24	20,425	9%	20%	Middle-aged
24–30+	17,235	7%	10%	Mature

Note: DSH = diameter at standard height.

and the remaining 538 tree species totaling 53% of the inventory. No species individually comprise more than 10% of the tree population, and no genus is above the 20% threshold. These results indicate the street tree population on a Citywide scale may be at a level of diversity that would be resilient against a threat causing significant loss of canopy cover, but does not necessarily correlate to impacts experienced on a street or community scale. To understand these impacts, we must consider the area of land over which the trees are distributed.

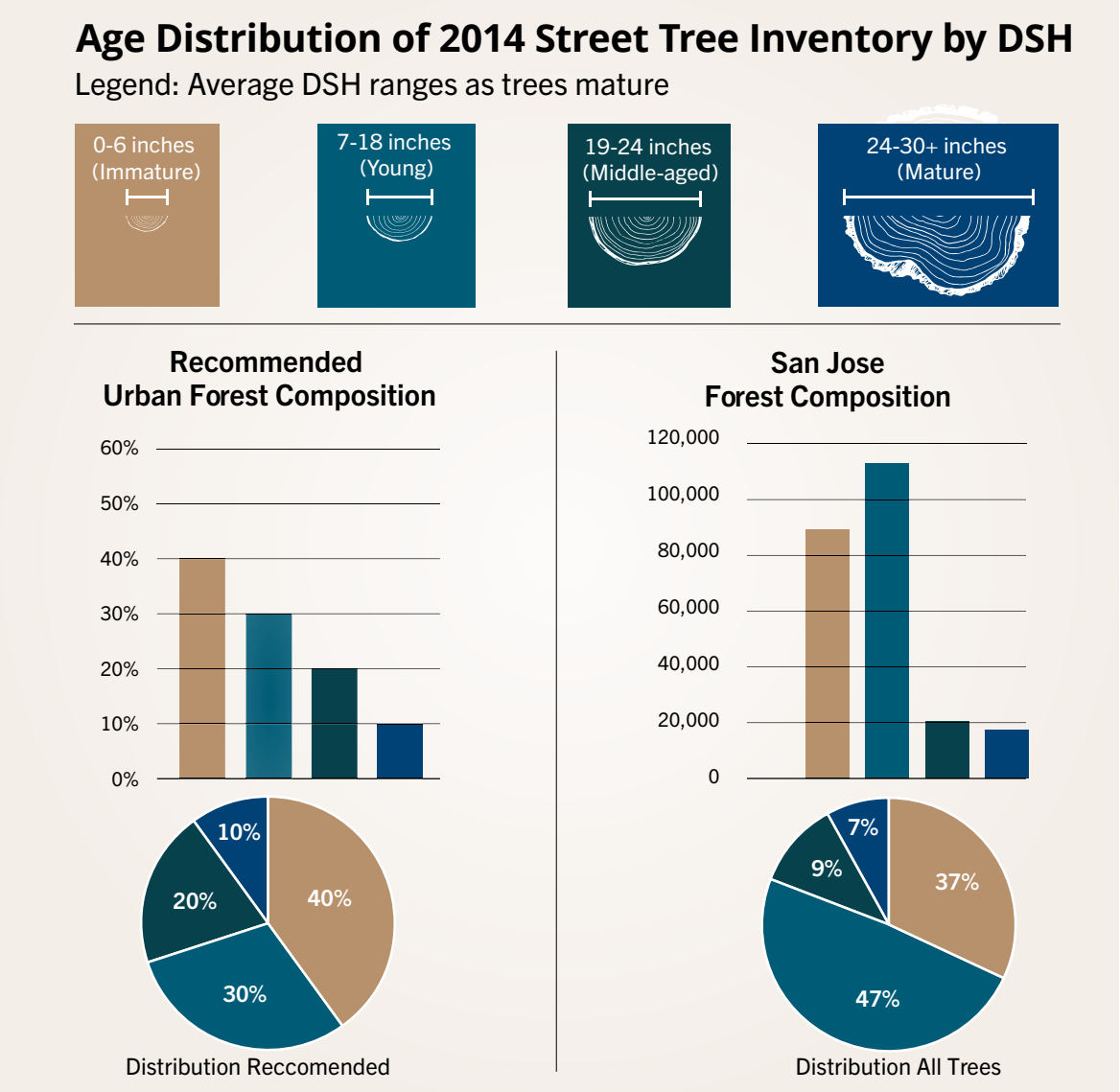
The street tree population is dispersed throughout the 181-square-mile land area of the City, indicating the overall canopy cover total of the City is relatively resilient from threats. However, the loss of one species could have a devastating impact to neighborhoods that are dominated by one species. One example of this is the Downtown neighborhood streets, which are largely dominated by the London plane tree. While the London plane tree creates a unique sense of place and character to this neighborhood, its overuse in the landscape makes the area vulnerable to threats. If the London plane tree was to experience a pest or disease that caused a rapid decline and subsequent removal of trees, the Downtown neighborhood could be left largely void of canopy. Residents and visitors would be left to walk streets with little shade on hot days, waiting years to recover the lost canopy.

AGE DISTRIBUTION OF TREES IN THE CITY INVENTORY

Another important criterion for providing a consistent level of canopy cover and environmental services provided by trees is an appropriate mix of young and mature trees (Clark et al. 1997). Maintaining a sustainable community forest includes mature trees providing a high level of benefit with new trees growing to replace them when they decline. A community forest that is skewed too young is not providing a high level of environmental services, and a community forest skewed heavily towards maturity risks a sudden decrease in environmental services as trees decline and are removed. Understanding the age distribution of the community forest also provides an understanding of how to prioritize community forest funding towards management actions that will achieve a continuum of environmental services. This could include a need to prioritize funding towards removing and replacing **senescent** mature trees to begin to establish new canopy cover or pruning and establishment care to support the growth of young and middle-aged trees as they progress towards maturity.

Table 10 reflects the age distribution of City street trees based on a tree's DSH or diameter at standard height—the trunk diameter measured 4.5 feet above ground. For most trees, a year's worth of growth is reflected as a ring on the tree's trunk, except for tropical climate trees

Figure 7. Age Distribution of 2014 Street Tree Inventory by DSH



that continue to grow year-round. As such, when a tree is removed, one can count the growth rings on the trunk to accurately determine the age of a tree. In the absence of damaging a tree to count annual growth rings, arborists will approximate a tree's age by measuring the size of the DSH. Since trees vary in size and growth patterns, the age can only be considered an estimate. Faster growing trees may develop a larger DSH in a shorter time frame than slower growing trees, and mature trees with slower annual growth may be older than the DSH reflects.

The proposed recommended ideal DSH range distribution is based on research conducted on the Syracuse, New York, urban forest and has since become a standard guideline for the desired optimal age range for an urban forest (Richards 1993). Based on this analysis, the City street inventory can be classified with having a majority of young and immature trees and few middle-aged and mature trees. It is important to note the age distribution classification only pertains to street trees within the San José tree inventory and does not include trees on private property **(Figure 7)**. Further information about the age and health condition of trees on private property would provide valuable insight about the overall sustainability of the community forest and would help identify

about what areas of tree maintenance private property owners need to be educated of.

The age distribution of street trees suggests that the City is not yet maximizing the return on environmental services and economic benefit it could receive from its trees. It is difficult to determine the cause of the age distribution beyond new trees being planted faster than trees reach a mature age range. It may also be related to City service data from fiscal years 2014–2015 through 2018–2019 that show the City completing 6,894 tree removal permits. City records do not indicate the size of trees removed, but the total removal permits as individual trees would represent the removal of approximately 25% of mature City street trees.

HEALTH CONDITION OF TREES IN THE CITY INVENTORY

The health of trees is directly linked to their ability to provide environmental services that contribute to a reduction in the urban heat island effect, lowering energy costs, and reducing stormwater runoff. These services increase or decrease depending on the density of a tree's crown and ability to carry out biological functions that promote vigorous growth. Trees in good health present a lower level of associated risk to the people and things surrounding them by having fewer structural issues in the roots, trunk, and crown that could result in branch or whole tree failures. Finally, trees in good health contribute to the look and feel of a street or community as they are more aesthetically appealing and appear cared for.

Understanding the health condition of trees within the City inventory is another tool to determine the sustainability of the community forest and inform management practices for specific trees and the total tree population. **Table 11** reflects the health condition of the City 2014 inventory data as recoded by the arborists who completed the inventory based on the CAL FIRE grant requirements for categorizing health conditions. The health

Table 11. Health Condition of Trees in the City Inventory

Health	Total	Percent
Excellent	643	0%
Very Good	2,978	2%
Good	72,007	45%
Fair	71,792	45%
Poor	6,037	4%
Very Poor	15	0%
Critical	34	0%
Dead	5,210	3%
Grand Total*	**158,716**	**100%**

Note: * The grand total is less than the total amount of trees in the inventory as some trees were not assigned a health condition.

ratings in general can be described in the following ways:

- **Excellent to Very Good:** Exhibits above normal health, no maladies, high vigor.
- **Good:** Exhibits normal health and vigor.
- **Fair:** Exhibits minor deficiencies in health and vigor.
- **Poor to Critical:** Exhibits significant deficiencies in health and vigor.
- **Dead:** No longer a viable tree and should be removed.

Of the trees assigned a health condition in 2014, 92% are categorized as fair or better, with 47% categorized as good to excellent. These results indicate that, in general, the City street trees have minor maladies in health and canopy structure. It is not known if the health condition of trees categorized as fair are improving or declining in vigor. Trees in fair condition declining in vigor would have a significant impact on the overall health and safety condition of City street trees as 45% of the tree population is rated as fair. The inventory also reflects 5,210 dead trees at the time of the inventory that should be removed and replaced to continue to expand canopy cover. The health condition of the City inventory does not indicate how individual tree species are performing and which species may need further analysis to determine appropriate management actions to maintain vigor. Calculating the relative performance index (RPI) for individual tree species is one analysis tool to determine which trees are performing better in the entire population.

Fruit tree with fire blight

Relative performance index (RPI) is calculated by dividing the percentage of trees in a single species in a good condition by the percentage of trees of all species in a good condition. Trees with an RPI of 1 or higher are performing as well or better than the entire population. Trees with an RPI less than 1 are performing below the entire population. Below is an example:

Chinese pistache

- Chinese pistache (56% good or better) ÷ All species (48% good or better) = 1.17 RPI

In this example, the Chinese pistache tree has an RPI of 1.17, meaning that species has more

trees rated in a good condition or better than the entire inventory.

This baseline was applied to the City inventory with RPI calculated for the top 10 species in the City inventory to further understand the performance of tree species and is reflected in **Table 12 below.**

The RPI analysis of the City inventory indicates three of the six most common species have an RPI below 1 and below the sustainability metric. The Chinese pistache, crape myrtle, coast redwood, and magnolia trees have an RPI of 1 or higher, indicating these trees are performing well throughout the City. London plane, coast live oak, and purple leaf plum trees have RPIs from 0.80 to 0.97, indicating they are minimally underperforming and may not warrant immediate prioritization for additional analysis and management actions. The Raywood ash, flowering pear, and American sweetgum species have RPIs from 0.56 to 0.62, well below the baseline measurement, and should be prioritized for further analysis to determine the factors that are impacting their health.

Whether factors are **biotic** or **abiotic**—will help determine if management actions can improve the health condition, or if the factor cannot be mitigated by management actions. One example of a biotic disorder that can be managed is fire blight (*Erwinia amylovora)*, a bacterial disease that is commonly found on flowering pear trees and impacts tree health and appearance. Fire blight can be controlled with an intensive treatment program, and over time, the infected species can retain its health and vigor. An example of an abiotic disorder that cannot be controlled is an extended period of drought brought on by climate change. Species like the coast redwood are rated as high-water use trees by the Water Use Classification of Landscape Species (WUCOLS) and would be expected to decline in health during extended periods of drought. While it is possi-

Table 12. Relative Performance Index of Top 10 Most Common Trees in City Inventory

Rank	Botanical Name	Common Name	Total Good or Better	% Good or Better	RPI
City Inventory Baseline			*75,628*	*48%*	*1*
1	*Pistacia chinensis*	Chinese pistache	8,752	56%	1.17
2	*Lagerstroemia indica*	Crape myrtle	9,025	67%	1.39
3	*Platanus acerifolia*	London plane	6,044	46%	0.97
4	*Liquidambar styraciflua*	American sweetgum	1,825	27%	0.56
5	*Pyrus calleryana*	Flowering pear	1,559	28%	0.58
6	*Cupressus sempervirens*	Italian cypress	3,464	83%	1.72
7	*Magnolia grandiflora*	Magnolia	2,397	53%	1.10
8	*Prunus cerasifera*	Purple leaf plum	1,477	38%	0.80
9	*Fraxinus angustifolia 'Raywood'*	Raywood ash	1,221	30%	0.62
10	*Quercus agrifolia*	Coast live oak	1,587	44%	0.92

Topped Tree

Low tree canopy area limited by existing hardscape

Table 13. Importance Value of City Managed Trees

Rank	Botanical name	Common name	% of Inventory	% Leaf Area	Importance Value	Size Classification at Maturity
1	*Platanus acerifolia*	London plane	7.6	19.3	26.9	Medium to Large
2	*Liquidambar styraciflua*	American sweetgum	5.8	9.5	15.3	Large
3	*Pistacia chinensis*	Chinese pistache	9.6	1.6	11.2	Small
4	*Lagerstroemia indica*	Crape myrtle	8.3	1.6	9.9	Small
5	*Magnolia grandiflora*	Magnolia	2.8	2.8	5.6	Medium
6	*Fraxinus angustifolia* 'Raywood'	Raywood ash	2.2	3.3	5.5	Medium
7	*Quercus ilex*	Holly oak	2.0	3.1	5.1	Medium
8	*Cinnamomum camphora*	Camphor	1.9	3	4.9	Medium to Large
9	*Prunus calleryana*	Flowering pear	3.1	1.7	4.8	Small
10	*Quercus agrifolia*	coast live oak	2.2	2.2	4.4	Large

ble to provide supplemental irrigation to some high-value coast redwood trees, it is not practical to supply all of them with the amount of water needed to sustain them during a drought that lasts several years. In this case, it would be more prudent to develop a strategy for a planned removal and replacement of these trees as they decline.

The health condition and RPI of trees in the inventory as combined datasets help to inform if the City is receiving a high level of environmental services from the tree population and determine which trees may require immediate analysis and implemented management activities. Another component to help prioritize management actions towards specific tree species is understanding the impact on the total community forest if one species would decline across the City. This impact is assigned by species and called the importance value.

The importance value of tree species in the City inventory is presented in **Table 13** and is calculated by adding the percentage one species comprises of the total inventory with the percent leaf area the species comprises of the City inventory. Percent leaf area is assessed by i-Tree using measurements of crown dimensions and percentage of crown canopy missing. However, the City's inventory did not provide crown dimensions, so i-Tree defers to its estimated

growth models for individual species. As such, the percent leaf area should be considered an estimate that does not reflect actual totals.

The ranking of a species does not mean it should or should not continue to be planted; rather it provides a framework for understanding which trees dominate the community forest landscape. The London plane tree is ranked as the most important tree in the City inventory as it the third most common tree and is a medium to large size tree at maturity. In contrast, the Chinese pistache and crape myrtle are ranked as the third and fourth most important trees despite being the most common and second most common species in the inventory because they are small trees at maturity.

This result reflects two basic aspects of species selection and planning for the community forest. First, a smaller total of large trees can provide more canopy cover and subsequent environmental services to the City than a higher total of small trees. This is evident as the combined population of 45,302 Chinese pistache and crape myrtle trees has an importance value of 21.1, whereas the 19,145 London plane trees has an importance value of 26.9. Second, the limited space within a streetscape

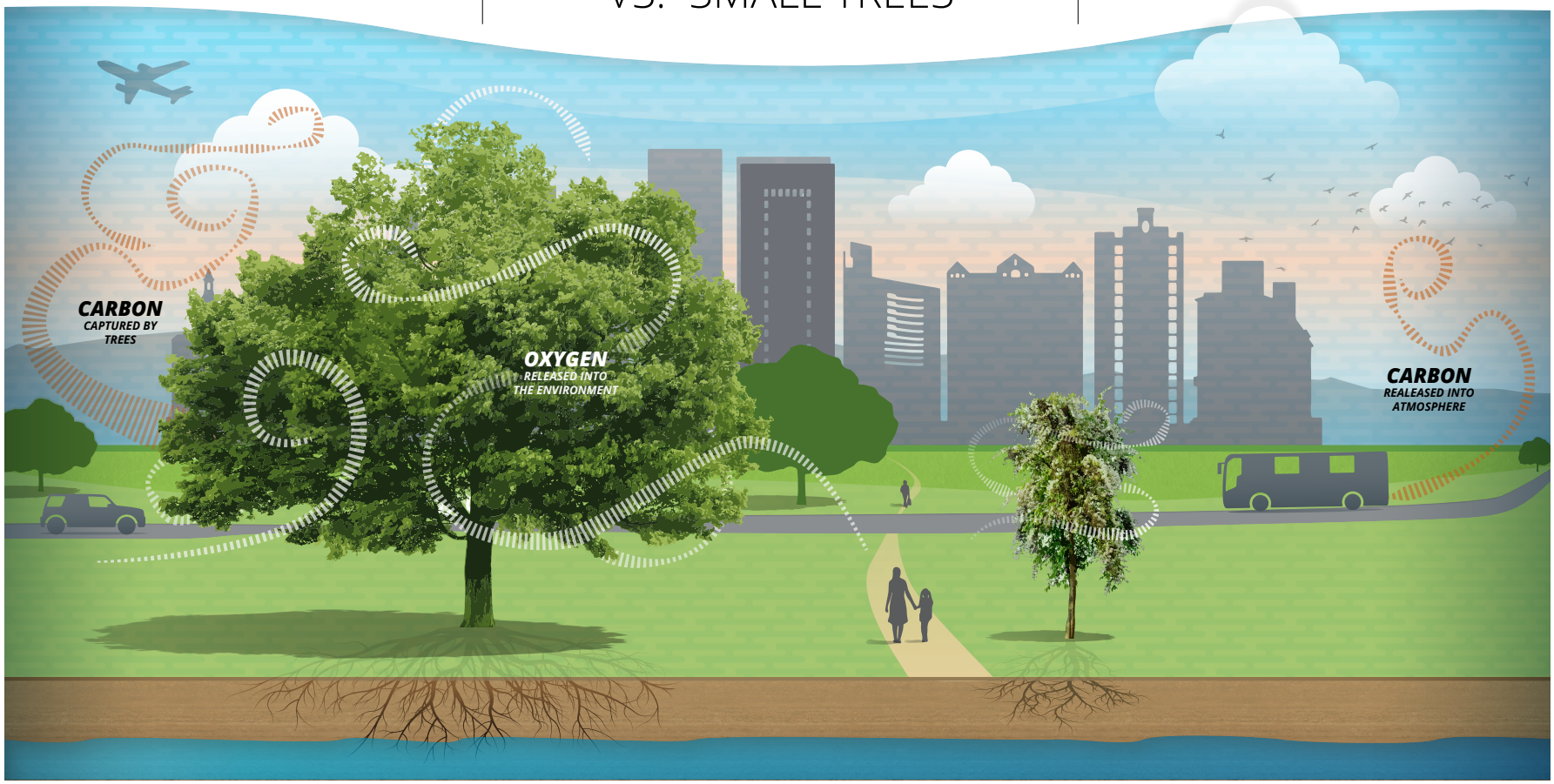
San José City Trees

Figure 8. The Benifits of Large Trees

We analyzed the top 10 species in San José and categorized them by large, medium, and small stature trees. We sampled from 100 of each species and then determined how their environmental benefits compare:

THE BENEFITS OF
LARGE TREES
VS. SMALL TREES

5.5X MORE STRUCTURAL VALUE



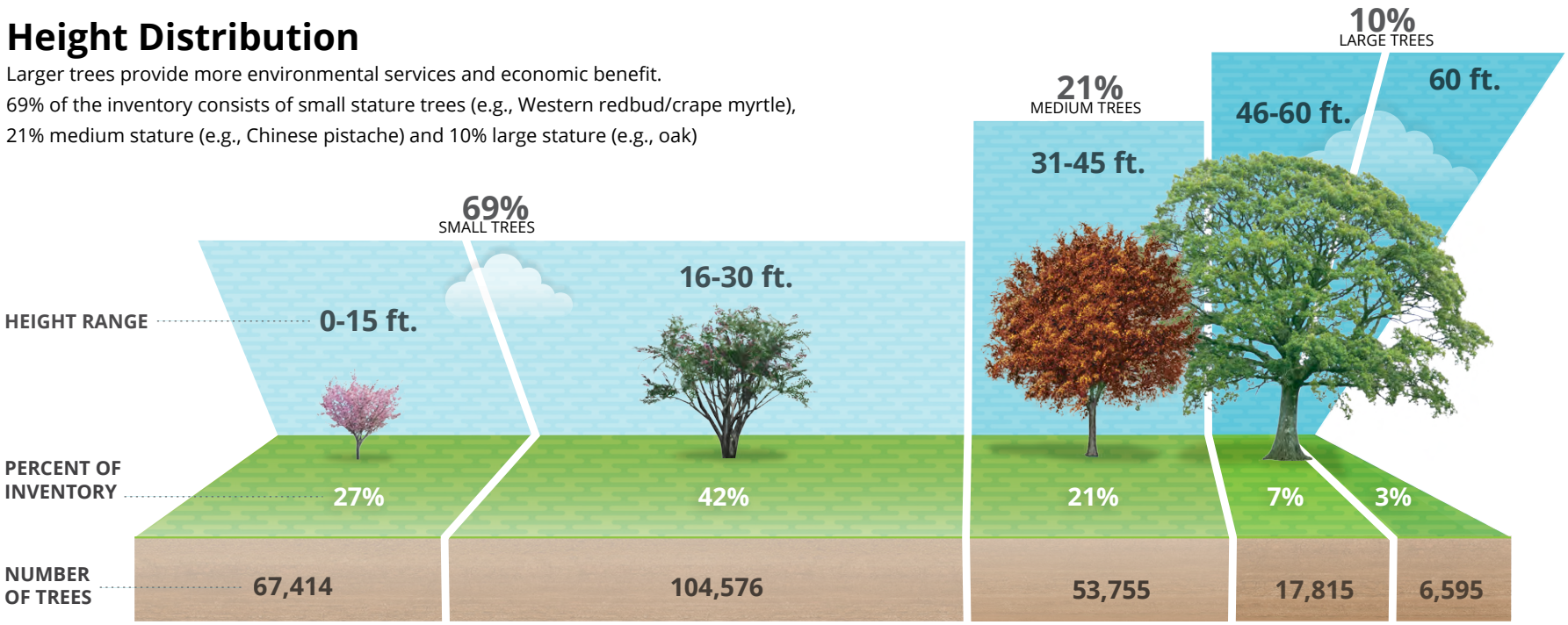
Large trees provide more benefits than small trees:

4X MORE CARBON SEQUESTERED | **4X** GREATER ENVIRONMENTAL BENEFIT VALUE | **5X** MORE STORMWATER AVOIDANCE | **6X** MORE SHADE PROVIDED | **7X** MORE CARBON STORAGE

Figure 9. Height Distribution of 2014 Street Tree Inventory by DSH

Height Distribution

Larger trees provide more environmental services and economic benefit.
69% of the inventory consists of small stature trees (e.g., Western redbud/crape myrtle), 21% medium stature (e.g., Chinese pistache) and 10% large stature (e.g., oak)



for trees and other pieces of City infrastructure to coexist often necessitates planting small and medium size trees. Most of the trees with the highest importance value can be classified as small or medium, which would suggest they are planted in locations that can only accommodate a species of that size.

Figure 9 provides further evidence that City trees are small to medium in size and produce lower level of environmental services to the City. Based on the City inventory, 90% of street trees are less than 45 feet in height, with 69% of trees less than 30 feet. The percent of smaller stature trees represents the current height of trees and correlates with 84% of trees having a DSH of less than 18 inches, but does not reflect how the height distribution will change as trees grow and mature. However, given that the majority of the top ten most common species are small and medium-sized trees at maturity, it would not be expected to see a significant increase of trees measured at 46 feet and larger. The data presented in **Figure 9** further supports the need to increase the size of planting spaces so they can accommodate larger stature trees in order

RECOMMENDATIONS FOR COMMUNITY FOREST SUSTAINABILITY

Section	Recommendation	Discussion
Species Diversity	Based on these factors, it is important for the City to have both Citywide and local species diversity goals, which could form into a three-tiered approach.	• **Tier 1. Citywide Species Diversity Goal:** The City should adopt a goal of having no one species comprise more than 10% of the City tree population and no one genus comprise 20%. This goal will help to ensure that the overall inventory is resilient to threats as it is dispersed over the 181 square miles of the City. The established goal can then be used to further inform a more nuanced plan for individual neighborhoods or geographic areas of the City. • **Tier 2. Implement Goal on Neighborhood Scale:** The City should determine smaller geographic segments of the City and apply the species diversity goal to those areas. Boundaries could be formed from existing defined neighborhoods, Council Districts, or other set boundaries within the City. This strategy would help to identify what species dominate a specific area and plan for the introduction of new species to provide an additional layer of species diversity and protection from threats. This approach would also necessitate specific planting palettes for each area that factor in the current neighborhood-level species diversity percentages into what species are planted. • **Tier 3. Street Level Diversity:** The City should incorporate species diversity on a street or street block level. At this scale, species diversity decisions would include determining whether a street is planted with two or three alternating species, and the extent to which monoculture street plantings would be allowed. The planting palette for individual streets would be formed by decisions made in Tier 2 of the planning process. This tier would not include maintaining the Citywide species diversity goal as continuity and aesthetics are important considerations for developing neighborhood character and would be difficult to achieve with 10 or more species planted on a street.
Species Diversity	Revise the City recommended tree species list to:	• Ensure the total number of species recommended by the City can meet species diversity goals. • Prioritize planting trees rated by Water Use Classification of Landscape Species (WUCOLS) as very low and low water users. • Identify trees that are not expected to adapt to changing climate conditions and replace them with new suitable species. • Increase the quantity of small and medium-sized species trees in the planting palette to provide more species options in locations that have limited soil volume.

Section	Recommendation	Discussion
Age Diversity	Protect and preserve mature trees	It will be difficult to increase the total number of mature trees without the enforcement of City ordinances and policies that protect and preserve trees in the public space. This will be especially important with the City's emphasis on increased urban infill development that seeks to maximize lot space for buildings and not allow room for street trees. It may also require adopting new and innovative approaches to managing tree and sidewalk conflicts, which is a common reason for street tree removal. This could occur through the updated design guidelines or other mechanisms that provide guidance for developers to incorporate trees into the built environment.
Age Diversity	Structural pruning program	Large structural issues within a tree's crown begin developing at an early age. Structural issues such as co-dominant stems or conflicts with adjacent infrastructure are typical of mature trees and can often be avoided by selectively pruning branches when trees are still young and forming their structure. By investing in the structural pruning of young trees, the City can actively mitigate against future structural issues in mature trees that typically have a higher associated cost and may require tree removal if the issue cannot be resolved through pruning.
Age Diversity	Continue to plant and establish trees	Although the current age distribution is skewed towards young and immature trees, the City must continue to plant new trees and ensure they successfully establish. A reduction in planting totals may bring the age distribution range into a more sustainable range in the short term, but would create a shortfall of trees across the entire age spectrum as they progress from immature, to young, and eventually mature.

for the City to increase canopy cover and the environmental services of trees, and become more resilient to climate change.

Diversity, Inclusion, and Community Engagement

As the third most populous city in California, San José is also one of the most diverse cities in the country (U.S. Census Bureau 2019). The City's residents are identified per the census as 26% White, 35% Asian, 32% Hispanic or Latino, and 3% Black or African American, and over 57% of San José residents speak a language other than English (U.S. Census Bureau 2019). In an effort to realize greater racial equity and improved outcomes for all San José residents, and in particular Black, Indigenous, and other community members of color, the Office of Racial Equity was formed in 2020 (City of San José n.d.a). The Office of Racial Equity racial equity practice that will examine and improve San José's internal policies, programs, and decision-making so that, ultimately, the City improves outcomes for communities of color. Through training on a racial equity framework, building the skills to effectively conduct analysis, resourcing equitable community engagement, and developing an efficient data infrastructure and accountability mechanism the City will be better equipped to advance racial equity work.

Table 14. Canopy Cover by Census Tracts with Best CalEnviroScreen Scores

Census Tract	CalEnviroScreen Score	Poverty Level	Canopy Cover
6085511910	1%–5%	4.4	18.92%
6085511913	1%–5%	2.5	16.04%
6085511912	1%–5%	4.6	18.42%
6085511907	1%–5%	5.8	16.39%
6085506604	1%–5%	10	13.33%
6085502907	1%–5%	10.1	15.35%
6085502202	1%–5%	15.3	19.77%
6085506802	5%–10%	11.4	19.27%
6085503334	5%–10%	5.8	11.83%
6085507906	5%–10%	7.8	19.36%
Average Canopy Cover			**16.87%**

Authentic community engagement is a cornerstone to developing a CFMP that reflects the goals, needs, and priorities of the City's residents. Trees, and the canopy cover they create throughout communities, are deeply linked to racial disparities in health outcomes.

CANOPY COVER CAN ILLUMINATE EQUITY ISSUES

Canopy cover in underserved communities is often lower than other parts of a City, and this discrepancy is due to identifiable systemic injustices that are related to race and other socioeconomic factors. Perhaps one of the most crucial environmental services provided by trees is the ability to sequester and store carbon and contribute to cleaner,

Table 15.. Canopy Cover by Census Tracts with the Worst CalEnviroScreen Scores

Census Tract	CalEnviroScreen Score	Poverty Level	Canopy Cover
6085503105	90%–95%	49.5	19.05%
6085500100	85%–90%	40.2	8.91%
6085504318	85%–90%	46.7	8.61%
6085503601	85%–90%	53.2	7.97%
6085503122	85%–90%	59.8	9.54%
6085501600	80%–85%	52.6	22.22%
6085503110	80%–85%	71.7	10.15%
6085503214	80%–85%	52.9	7.94%
6085501102	80%–85%	33.1	17.26%
6085503602	80%–85%	52.8	8.79%
Average Canopy Cover			**12.04%**

Our City Forest Street Tree Planting
PHOTO: OUR CITY FOREST

healthier air. One significant negative impact of a low canopy cover is that residents have an increased vulnerability to pollution, extreme heat, and potential health issues. To this end, the Environmental Protection Agency created CalEnviroScreen, an online mapping tool that identifies California communities that are disproportionately burdened by pollution and vulnerable to the health effects of pollution (OEHHA 2018). The tool uses environmental, health, and socioeconomic information from the U.S. Census to identify the inequities associated with pollution throughout the state. Each census tract is assigned a score to reflect its vulnerability. CalEnviroScreen's scale for vulnerability is presented in percentage ranges, with 1%–10% being least vulnerable and 91%–100% being most vulnerable.

Table 14 shows the census tracts of the City with the lowest CalEnviroScreen Scores, while **Table 15** shows the City's highest scores. There is nearly a 5% gap in canopy cover between the area with the lowest and highest CalEnviroScreen Scores. On average, the lowest scores have a canopy cover that is 3.33% higher than the City average, while the highest scores are 1.5% lower. The three highest canopy cover percentages on either table contain large parks or greenbelts. By comparing the City's CalEnviroScreen Scores, the City can pinpoint the exact areas that can be immediately prioritized

for increasing canopy cover. The large discrepancy in canopy cover is an area that the departments in charge of tree management can collaborate with the Office of Racial Equity on strategizing the best path forward.

Community Engagement

During multiple stages of the CFMP's development, the project team employed a range of online and media engagement actions that informed residents about the project and allowed for meaningful dialogue for an exchange of ideas between residents, stakeholders, and facilitators. Direct conversations occurred through a series of community meetings to help guide the direction of the CFMP and further refine project goals to reflect residents' values. The online and media engagement included a project webpage, online survey, educational video, social media posts, and print flyers. Through these actions, City staff were able to receive input that informed the goals and objectives outlined in this CFMP.

PUBLIC MEETINGS AND DISCUSSIONS

In an effort to capture the diverse voices within the City, multiple in-person public meetings in locations throughout San José's communities were planned to encourage participation and obtain representative feedback. However, as a result of the COVID-19 pandemic and associated public health restrictions by the State of California, the City transitioned to virtual community meetings.

The first round of virtual community meetings was scheduled in July 2020 and offered translations services to promote diversity and accessibility. The first and second meetings were English language meetings, which occurred on July 9 and July 14. The third meeting on July 16, also in English, provided an American Sign Language interpreter. The fourth meeting on July 22 provided Spanish language translation. The fifth and final meeting, which was scheduled for July 28, offered Vietnamese language translation; however, it was cancelled due to the lack of registrants. A total of 56 participants attended the four meetings. All of the meetings covered the following topic areas:

- Overview of the Community Forest Management Plan process
- Forest Management Policies and Activities
- Outreach and Engagement
- Value of Trees

Throughout the course of each meeting, participants were asked to engage in several poll questions, to help guide conversation within each topic. Responses to the poll questions during the first meeting indicated that trees are a valuable component of public spaces, and the CFMP should focus on maintaining existing trees, protecting and preserving large and mature trees, and increasing canopy cover. During subsequent meetings, when asked who should be responsible for the protection, planting, and maintenance of street trees, a majority of respondents indicated the responsibility should be shared between property owners and the City, which deviates from the current policy that requires property owners to maintain street trees adjacent to their property. Further, when participants were asked if they would support a ballot measure that required the City to take full responsibility for the planting, maintenance, pruning, and removal of street trees if it also meant a special tax or assessment on individual property owners to fund the program, most respondents indicated some level of favorable support. These results indicate on a smaller scale what was reflected in the online survey (discussed in more detail below), that residents would prefer a different approach to maintaining street trees than what is currently in place.

Another poll question conducted during the

virtual community meetings was regarding the best way for the City to engage with residents about the CFMP. The responses to this question were highly varied and included preferences for town halls, social media engagement, mailers, through council district representatives, and a CFMP website. These responses confirm that effective community engagement requires a variety of methods to reach the broadest audience. Throughout the community engagement process, the City has used all of these methods except for mailers.

In addition to the polls conducted during each virtual community meeting, participants were encouraged to ask questions throughout the presentation. Questions and comments were submitted on a range of topics, including tree selection, maintenance responsibilities, illegal tree removal, tree removal permits, social justice, social media as a tool for engagement, youth programs, funding for OCF, and engaging leaders from each council district. Almost all participants in the virtual community meetings expressed appreciation for the content, dialogue, and responsiveness of City staff in addressing comments, questions, and concerns throughout the presentation.

Crape myrtle

TREES OF SAN JOSÉ

1 **Trees and landscaping in city parks** offer many benefits to people and wildlife alike. There are nearly 30,000 trees in San José city parks with space to grow large canopies that contribute to vital green space for recreation and cooling centers in the community.

2 **Native trees** such as the coast live oak, black walnut, and California sycamore support local wildlife and encourage biodiversity throughout the City and are a cornerstone of natural ecosystems along riparian corridors and wildland open space areas.

3 **Street trees, median planters, and backups** in the public right-of-way are key elements in creating a resilient San José. Street trees with full crowns and more leafy foliage provide numerous benefits like cooling the City, reducing stormwater runoff, and capturing greenhouse gas emissions.

4 **Most trees in the city are on private property** and offer opportunities to plant new trees and increase canopy cover. Trees on private property shade homes reducing energy use and costs, while increasing property values and contributing to healthy neighborhoods.


3
Street trees, median planters, and backups
4
Most trees in the city are on private property
BUS
ONLY
UNITED • ST ES • POST • OFFICE •

Table 16. Survey Responses by Zip Code

Zip Code	Responses	Zip Code	Responses	Zip Code	Responses	Zip Code	Responses
92115	1	94536	1	94560	1	95002	1
95008	14	95032	1	95070	2	95110	35
95111	36	95112	125	95113	3	95116	26
95117	40	95118	97	95119	13	95120	178
95121	22	95122	18	95123	152	95124	141
95125	159	95126	73	95127	50	95128	70
95129	73	95130	42	95131	29	95132	81
95133	17	95134	12	95135	37	95136	144
95137	1	95138	26	95139	14	95142	1
95418	34	95150	1	95177	1	95184	1
95192	1	95239	1	96120	1	96132	1
96139	1	97127	No Zip Code Provided 89		Not San José Resident 63		

SOCIAL MEDIA

The City and consultant team implemented various social media, print, and email communication strategies to notify residents of community meetings, the ability to participate in the online survey, and the opportunity to provide feedback. Initially, a project webpage was created with the goal to inform residents about the CFMP process and to educate them about the benefits and services of trees. To help reach these goals, the webpage includes a video explaining the CFMP process and benefits for trees, a link to the survey, interactive components on tree benefits, information on upcoming meetings, and the opportunity to provide comments directly to the City.

To further engage residents, five social media posts were created by the consultant team and included on the City's Instagram, Facebook, and Twitter accounts, as well as on Nextdoor. The social media posts each highlighted one specific question from the online survey to help generate interest and discussion on topics that the City decided were key components in creating goals and objectives of the CFMP. The questions are listed below:

1. **Who should be responsible for the protection, planting, and maintenance of street trees?**
2. **What do you like most about trees in the City?**
3. **How much effort should be made to preserve trees in conflict with development?**
4. **What should be the main focus of the City in managing trees?**
5. **Would you support a special tax or assessment to fund the City to take full responsibility for the maintenance, pruning, and removal of street trees?**

The social media efforts resulted in 188,210 impressions and 1,094 comments, indicating a high level of engagement.

ONLINE SURVEY

A public survey was posted online from April through October 2020 with a dual goal of (1) acquiring valuable public input and (2) providing educational outreach. Like the virtual community meetings, the survey was valuable for informing CFMP elements and establishing a framework for future community forest/tree public education and support outreach. The 19-question survey was conducted to learn more about the following:

- **The attitudes and feelings respondents have towards trees**
- **How much respondents understand trees and how to maintain them**
- **How willing respondents would be to support policies that protect trees on private property**
- **How willing respondents would be to support policies that would change current tree management practices**
- **The attitudes and feelings respondents have toward various funding mechanisms**

Table 17 Demographics of Survey Respondents

Category	Survey Respondent Demographics	
Place of residence	San José	96.6%
Housing type	Single-family home	88.5%
Housing status	Homeowner	90.4%
Primary Language Spoken in the Home	English	91%
	East Asian Languages (Vietnamese, Mandarin, Cantonese, Tagalog)	2.8%
	Spanish	1.5%
	Hindi	0.9%
	Other	3.6%
Age	Over 40	84%
	20–39	15%
Education	Associate degree or higher	84.7%

Demographics of Survey Respondents

The survey was made available in English, Spanish, and Vietnamese, and was disseminated through various City social media outlets, local newspapers, the project webpage, and communications by the project team and City Council Offices. In large part due to a successful social media campaign, a total of 2,021 survey responses were recorded.[1] The full survey questions and results can be found in Appendix A. **Table 16** shows the zip codes of the survey respondents, and **Table 17** shows their demographics.[2]

1 The survey results had a margin of error of ±3% and a 99% confidence level that the true percentage of San José's population who would pick an answer lies within the margin of error (Checkmarket 2019).

2 Responding to demographic questions was voluntary and not necessarily completed by all respondents.

Summary of Survey Results

CITY-MANAGED TREES VERSUS PRIVATE PROPERTY OWNER-MANAGED STREET TREES

Several questions of the survey were directed towards understanding how residents view the current condition of street trees, their priorities for trees, and costs they incur to manage adjacent street trees. When asked who should be responsible for the street tree protection, planting, and maintenance, 60.28% of respondents identified the City; 35.36% indicated the City and private property owners should share responsibility; and 4.36% said the private property owner should have full responsibility. The specific actions of what respondents would want the City to manage are further clarified in survey results.

The survey asked respondents to identify what they feel should be the top two goals of the CFMP. The results of this question indicate that the two main goals of the CFMP should be (1) maintenance and (2) removing dead, dying, and hazardous trees. Since residents are responsible for the street tree(s) adjacent their property and observe the tree(s) on a daily basis, it is reasonable to expect residents to prioritize issues that relate directly to their safety, thereby reducing individual liability and costs. These results indicate that respondents are in favor of the City assuming responsibility of all street trees with a priority on tree maintenance and removals. The City does not currently dedicate enough funds to accept full responsibility of all street tree management actions and may consider options to incrementally increase tree management. Residents could potentially support a hybrid City/private property owner management model if major street tree maintenance and removals became the responsibility of the City. This model would allow the City to direct limited general funds to actions that are the priority of residents, while supplementing the needed funding for tree planting and establishment care with local, regional, state, and federal grants or other outside funding sources

An important element of this discussion is that current funding does not support additional management actions, like actively maintaining all City trees. If the City were to take on additional management of street trees, one possible avenue to increase funding could come through a special assessment fee or tax paid for by residents. To that end, the survey asked if respondents would support a special tax or assessment on individual property owners, if it meant that the City would take full responsibility of street tree management. The results indicate a small measure of support for this approach (21.4% supporting and 37.48% maybe in support with more information), with more respondents (35.7%) expecting the City to fully pay for the program from existing general funds. The low level of support to paying a fee or tax is also reflected in that 43% of respondents stating that they are not willing to pay any new taxes, and 31.38% indicating they would be willing to pay $1 to $49.

PRIVATE PROPERTY TREE MANAGEMENT

As presented in the section on City canopy cover, private property trees account for a significant portion of the total tree canopy cover across the City and play a significant role in preserving and expanding the community forest. A core issue to preserving and growing the tree canopy cover in the City is how willing single-family homeowners will be to protect and plant trees on their property. Several survey questions were directed toward better understanding this topic. Respondents favored (61.84% somewhat agree, agree, strongly agree) an ordinance that would establish minimum tree canopy cover standards for individual properties. Additionally, most respondents agreed that the City should protect and preserve trees when they are in conflict with development (73.59%); however, of these respons-

es, a subset (26.41%) expressed preservation and protection should not inhibit development. These results indicate that while tree preservation on private property is important for residents, supporting balanced development that provides needed services to communities and additional dwelling units to meet housing demands is also important for some residents.

Another aspect of understanding private property tree management was to determine what costs residents incur from trees. As part of the survey, residents were asked to identify the main issue with trees on their property. The majority of respondents selected damage to underground pipes, buildings, and sidewalk and pruning and maintenance costs as their most pressing issues. In addition to this question, respondents were asked how much they've spent on maintenance and repairs from tree or tree root damage in the last 5 years. Approximately 60% of respondents reported they have spent $500 or more, and 42.25% reported having spent more than $1,000.

CITY PRACTICES

Respondents were asked what they considered a reasonable fee for a permit to prune or remove a City tree. Of respondents, 74% reported they would prune the tree without a permit, and 44.67% reported they would remove a tree without a permit. Respondents indicated they'd like to be notified about tree removal applications that have been submitted for trees in their neighborhood or Council District, and overall agreed that the current fines were adequate for deterring the illegal removal of trees.

ATTITUDES AND FEELINGS ABOUT TREES

Many respondents expressed the desire to increase the number of trees planted every year in the City, and to plant new species and to protect against climate change. Most respondents agree there are not enough trees in the community forest and that trees are very important to public spaces. It is evident that respondents value trees for the environmental services they provide, such as clean air, that contribute to having healthy neighborhoods and the cooling benefits that tree shade provides.

The survey also assessed respondents' understanding of tree maintenance. The majority of respondents either inspect their trees annually or only if the tree appears to be in poor condition, almost equally. Additionally, respondents reported 2 to 5 years as the recommended frequency for the maintenance pruning of trees in the urban environment. As an objective of this CFMP, the City aims to further educate and provide resources to property owners to achieve optimum maintenance practices for trees on and adjacent to their properties.

Fall color

At the end of the survey, respondents had the opportunity to provide open-ended feedback; more than 900 comments were received. These comments are summarized by categories and can be found in Appendix A. The comments provide insight into how property owners currently interact with the City and how they would prefer to work with the City to achieve a healthier community forest.

RECOMMENDATIONS FOR DIVERSITY, EQUITY, AND INCLUSION

Section	Recommendation	Discussion
Canopy Cover Can Illuminate Equity Issues	Collaborate with the Office of Racial Equity on prioritizing areas of the City with the highest CalEnviroScreen Scores for new tree plantings.	The large discrepancy in canopy cover is an area that the departments in charge of tree management can collaborate with the Office of Racial Equity on strategizing the best path forward.
Online Survey	Increase public outreach and education about trees to renters in San José.	90.4% of survey respondents were homeowners and 88% lived in a single-family home, in comparison to City data that shows 43.9% of housing units are renter occupied. Understanding the priorities of renters is an important step to ensure the CFMP is inclusive of all stakeholder perspectives.
Online Survey – City Managed vs. Private Property Managed Street Trees	Further study the funding mechanisms most appropriate to support community forest management, and the degree to which residents or the City would generate the funding.	Respondents showed varying opinions for how street tree management should be funded. Additional public engagement and education efforts should be undertaken to investigate where public support lies.
Online Survey – Private Property Tree Management	Increase public education about tree benefits.	Respondents identified several costly maintenance actions they needed to take in recent years. The City will need to develop strategies to educate residents on the value of trees to overcome the perception of trees as costly and causing damage, so tree canopy can be preserved and expanded on private property.

Ash Tree

Community Forest Program Funding

To maintain and grow San José's community forest, CFMP goals must be adequately funded to support successful implementation. There are several factors that can be used to determine if the City is funding the community forest management program to meet established safety and economic goals, while maximizing the environmental services provided by trees. These factors include (1) maintaining trees in a safe condition, (2) adequate staffing to enforce ordinances and implement policies, and (3) managing new tree planting to expand Citywide canopy cover in support of Climate Smart initiative goals. Additionally, as the City's economic conditions change, funding should be thoughtfully allocated to prioritized community forest management actions so the City can continue to progress towards a sustainable community forest. Analysis of the City's community forest management program funding incorporated the use of methods that are based on (1) current program goals, (2) a comparison of funding levels with other municipalities' urban forest management programs, and (3) applicable sustainability principles.

Street Tree Maintenance

CURRENT FUNDING

A sustainable community forest program is a sufficiently funded community forest program. There is no set standard for what a City will need to invest in managing its tree population to support a sustainable community forest program. The funding allocation will vary depending on the City's health, safety, and environmental goals. City budgets to manage trees in the public space vary considerably for per-tree spending, from as low as $12.96 (City of San José) to as high as $119 per tree (City of Palo Alto). The substantial gap in per-tree spending requires further examination to understand if it progresses a City's urban forest program goals and is sufficient to support tasks needed to

Table 18 Online Survey Results of Private Property Owner Tree Maintenance and Repair Costs

Costs	$0	$1–$499	$500–$999	$1,000–$1,999	$2,000+
Total Responses	221	189	172	159	240
% of Responses	22.53%	19.27%	17.53%	16.21%	24.46%

manage a tree population (i.e., such as maintaining a 5- to 7-year pruning cycle and annually planting trees to increase canopy cover).

In analyzing the current funding levels of the San José community forest management program, this CFMP reviewed the annual budgets for all tree-related work from fiscal year 2014–2015 to fiscal year 2019–2020, considered the amount of work completed in those years, and compared funding to other municipal tree budgets. Based on an average annual budget of $3.9 million from fiscal years 2018-2020, and an estimated City-managed tree population of 300,000, the City of San José spends approximately $12.96 per tree annually.

An important caveat to this section's discussion is that the City of San José only directly manages street trees located in medians, backups, and special maintenance districts; City-identified heritage trees; and trees requiring maintenance for streetlight clearance, or an approximate 37,000 trees of the total 270,000 street tree population. PRNS is responsible for approximately 30,000 trees in City parks. The maintenance responsibility for the remaining 233,000 street trees resides with the private property owner adjacent to the street tree(s), or 86% of the street tree population. Limited data are available to estimate the costs a private property owner will incur to maintain a street tree. As such, the online public survey asked respondents to indicate how much they have spent on maintenance or repairs related to trees or tree root damage over the past 5 years **(Table 18).**

Based on the survey results, only 22.53% of respondents have had no tree maintenance and associated repair costs; 36.8% have had costs between $1 to $999; and 40.67% of respondents have paid more than $1,000. The total cost for all respondents could be as high as $894,750 when using an average per cost category ($0, $250, $750, $1,500, $2,000), times the total responses per category. Based on these assumptions, each respondent could anticipate a need to spend approximately $912 on tree maintenance and repair costs over a 5-year period, or $182 per year. Using an annual per tree cost of $182, San José residents would need to spend approximately $42.41 million dollars a year to maintain the 233,000 street trees and perform associated repairs from tree root damages. This figure is only provided as an estimate based on survey results, and as an indicator of what it may cost to maintain all City public space street trees. It is not known what each respondent considered a tree maintenance or repair cost, and actual totals may decrease or increase with further clarification of what constitutes a cost for tree maintenance and related repairs to tree or tree root damage.

FUNDING OF MAINTENANCE PRACTICES

An important factor in determining if funding is sufficient, is understanding whether maintenance practices are supporting program goals and other goals developed in the CFMP. Some maintenance practices, such as the frequency with which a newly planted tree is watered, are specific to local climate conditions and annual rain totals in an area. Others, such as maintaining a 5- to 7-year pruning cycle (Miller et al. 1981 are relatively consistent for all tree management programs. As such, the City's

pruning cycle is a useful indicator to understand its funding needs.

A 5- to 7-year pruning cycle is the optimal intersection of maintaining trees in a safe condition and limiting expenses to a City (**Figure 1**; Miller et. al 1981). A pruning cycle on a shorter time frame has a higher cost to the City but does not correlate to a proportional increase in safety. Conversely, a longer time frame lowers costs to the City, but also decreases tree safety. While it is not known how many trees managed by private property owners are pruned annually, City records indicate that between the years of 2014–2019, the annual average of tree pruning permits completed by private property owners was 1,566. If the total number of completed permits directly related to the quantity of trees pruned, it would equate to a pruning cycle of once every 123 years. The City does have the ability to require property owners to maintain trees adjacent to their property. However, enforcement actions are limited to only a small percentage of properties that are reported as noncompliant or required to repair hazardous sidewalks each year as DOT is limited in staff and resources to enforce City policy.

The City is responsible for caring for approximately 19,451 trees on medians and backups, which is approximately 15% of all street trees in the community forest. These City-managed trees, not including the 17,239 trees in Maintenance Districts, are currently on a 100-year pruning cycle. The City receives funding from a limited number of Special Maintenance Districts that is sufficient to prune 17,239 trees on a 5- to 7-year pruning cycle. While the City is not responsible for all 270,000 street trees, the combined expenses of the City and private property owners for tree maintenance and how many trees are pruned annually by private property owners is not known. Therefore, this analysis is based on determining what funding may be needed to maintain the entire tree population on a 5- to 7-year pruning cycle, to create a baseline for the City to measure its progression towards a sustainable community forest.

Table 19. Estimated Funding to Maintain 5-Year Pruning Cycle of Public Space Trees

	*Street Trees (253,000 Total)		Park Trees (30,000 Total)		All Public Space Trees (300,000)	
	Budget	Trees Trimmed	Budget	Trees Trimmed	Budget	Trees Trimmed
To Achieve 5- to 7-Year Cycle	$6,325,000	50,600	$750,000	6,000	$7,075,000	56,600
Current Estimates	$200,000	1,600	$150,000	1,200	$350,000	2,800
Gap To Sustainable Management	$6,125,00	49,000	$600,000	4,800	$6,725,000	53,800

*Does Not Include Special Maintenance Districts

Table 19reflects the estimated funding needed to maintain a 5- to 7-year pruning cycle of public space trees (excluding special districts) in the City. The costs toprune trees is derived from the City's 2020 Deferred Maintenance and Infrastructure Backlog,which assumed $490,000 is needed to prune

19,451 trees on a 5-year cycle. This provides a baseline estimate of $125 to prune a mature tree ($490,000 to prune 3,890 trees annually).If the City were to assume pruning and maintenance responsibilities for all 270,000 streets trees, it would potentially need to annually invest an additional $6,125,000 in the community forest program. All park trees are currently managed by the City, and the $600,000 gap in funding needed to bring park tree pruning into a 5-year cycle reflects an actual deficiency in City management.

Each year the City of San José evaluates the deficit in funds available to maintain the City's infrastructure in a sustained functional condition, which is published in the annual Deferred Maintenance and Infrastructure Backlog staff report. As stated in the 2020 report, to bring all existing City-maintained trees into good condition, it is estimated that $3 million in one-time funding is needed, and an additional $583,000 is needed one time to plant trees in existing City-maintained, appropriate planting sites. Further, ongoing annual funding of $490,000 is needed to maintain a 5-year pruning cycle for the 19,451 City-maintained trees,. With a current base budget funding level of $100,000, that leaves an annual ongoing shortfall of $390,000.

Table 20. Annual Emergency Calls for Street Trees

Fiscal Year	2014–2015	2015–2016	2016–2017	2017–2018	2018–2019
Emergency Calls	769	651	1,208	822	644

HEALTH AND SAFETY CONDITION OF TREES

The current health condition of the community forest is one factor to determine if funding supports maintenance activities that progress the City towards sustainability. A review of the available City tree inventory data shows 48% of the trees as rated "good" or better and another 45% rated fair," which suggests the majority of trees in the inventory (93%) have an average or better health condition. On face value, the health condition of trees would suggest that community forest program funding is sufficient to maintain a relatively healthy tree population. However, without an updated inventory or trees being pruned on a 5- to 7-year cycle, it is not known if trees are currently in a safe condition, despite a positive health condition.

One way to understand if trees are in a safe condition is to examine the total number of emergency tree situations in a given year. **Table 20** provides the number of emergency calls received annually by the City, based on annual Core Service Data reports.

On average, the City annually receives 819 emergency calls for street trees. The lack of regular tree maintenance increases the amount of funding City arborists need to allocate to emergency situations as they present an urgent public safety concern. With a DOT estimated cost of $600 to $700 per tree emergency, expenses for responding to tree emergencies cost on average $491,400 to $573,300. That cost is shared between the City and by private property owners who are billed by the City for completing emergency work on their property. If these costs were reflected in the tree management budget, the City could actively prune five trees for every one tree it prunes in an emergency situation, resulting in annually pruning an additional 4,096 trees. Actively maintaining trees would increase the efficiency of the tree pruning program and help to reduce potential hazardous tree situations before they occur. While active tree management would not eliminate all emergency situations, it would lower the potential for emergencies to occur.

Table 21a. All City Staff involved with Tree Management

Position	Type	Number of FTEs
Maintenance Workers	Trimmer/laborer	2.5
Sr Office Specialist/Office Specialist	Clerical Support/Office	1
Heavy Equipment Operator	Equipment operator	0
Associate Construction Inspector	Laborer	1.5
City Arborist/Assistant Arborist	Management/Supervisor	3
Park Supervisor	Management/Supervisor	0.5
Planner/Sr Planner	Mgmt/Supervisor	2
Arborist Technician	Field Inspection	3
Seasonal Employees/Interns	Seasonal Employees/Interns	0
Truck Driver	Truck Driver	0
Working Foreman	Working Foreman	0.5
	Total	**15.5**

Table 21b. Mean Number of FTEs by population size

Population	Number of Cities	Mean number of FTEs
2,500-4,999	47	3.3
5,000-9,999	35	3.1
10,000-24,999	41	4.7
25,000-49,999	121	5.3
50,000-99,999	146	6.3
100,000-249,999	87	11.8
250,000-499,999	20	18.3
500,000-1,000,000	9	18.2
1,000,000+	2	38.0
San José		15.5

Note: table adapted from Hauer and Peterson 2016a

STAFFING LEVELS

The number of staff available to perform annual tree inspections and enforce ordinances and policies is a critical element of a sustainable forest **(Table 21a)**. In 2016, a large-scale review was published that detailed municipal tree care management and community programs throughout the country (Hauer and Peterson 2016a). Of the 667 cities that responded to the survey, two[3] had populations comparable to San José (1 million+) **(Table 21b)**. The survey results showed that of these two cities, an average of 38 full-time equivalents (FTEs) were involved in the management of the City tree population. These FTEs held positions such as arborists, tree trimmers, clerical support/office staff, equipment operators, laborers, managers, contracted non-

3 The cities represented in the report are not known because all responses were anonymous.

profits, seasonal employees, truck drivers, working foreman, and other.

In comparing the City of San José's staffing for tree management, the City has 15.5 FTEs DOT specifically has a City arborist, two assistant arborists, and three arborist technicians on staff who can perform high-level health and risk inspections and provide recommendations to improve tree health and safety. On average, each inspector is responsible for more than 18,000 trees annually and may exceed a realistic workload for an arborist inspector. PRNS does not have an arborist on staff responsible for tree management. **Table 21b** shows the mean FTEs in cities who responded to the Hauer and Peterson study. San José's current staffing is more closely aligned with the staffing of cities that have half of San José's population size. These comparison data suggest that San José needs to add 22-23 additional FTEs to manage the community forest.

COMPARISON OF FUNDING WITH OTHER CITIES

Another useful way to measure City funding of the community forest program is by comparing the City's budget to those of other municipalities. **Table 22** provides the budgets of various city urban forest management programs throughout California. Comparison cities were selected based in part on the amount of verifiable information for each city to provide an accurate baseline of the potential funding needed to carry out management activities and costs.

As indicated in Table 23, San José has the lowest allocation per resident and lowest allocation per tree of any other City in the comparison group. As discussed, private property owners are responsible for the majority of street trees in the City, whereas all other cities in the comparison study are responsible for any tree in the public right-of-way. This difference in responsibility structure is the main factor contributing to the low funding of San José's trees in comparison with other cities. This difference means San José's tree management funding cannot be directly correlated as sufficient or deficient, as it is not a direct comparison of maintenance responsibilities. Rather, Table 23 provides a framework to understand what spending levels are used throughout the state to manage a municipal tree population and related maintenance activities. To that end, we will examine the tree management budgets and maintenance activities of the comparison cities by the standards used to analyze San José's community forest management program.

In 2012, the City of San Francisco faced a similar set of circumstances in managing their urban forest and completed an audit of its urban forest management program to identify key areas for improvement. Like San José, San Francisco identified limited funds for urban forest management and property owners having responsibility for street tree and sidewalk maintenance. In response, the City assessment continued in 2014 with a report on the financial resources and funding mechanisms needed to implement the changes to management practices. These assessments resulted in the passing of a ballot measure in 2016 that requires the City to budget $19 million a year on urban forest management. The funding supports City management of all trees in the public space (streets and parks), provides 3 years of establishment care to newly planted trees, completion of an urban forestry management plan, and a planting plan in place to increase canopy cover. In addition, the City

Table 22. Comparison of Municipal Urban Forest Management Funding

City	Total Budget	Total Population	Allocation per Resident	Total Trees	Allocation per Tree	Pruning Cycle	Establishment Care	Stocking Rate
San Francisco	$19 million (2018)	874,961	$21.72	236,000	$80.51	3-5 years	3 years	2,500 per year, goal of
Sacramento	$6.7 million (2018)	501,334	$13.36	100,000	$67.00	5 years	3 years	1,000 per year
Los Angeles	$25.4 million (2018)	3,979,576	$6.38	1,000,000	$25.40	18 years	For grant-funded projects	90,000 trees in low canopy areas by 2021
San José	$3.89 million[1] (2019)	1,021,795	$3.81	300,000[2]	$12.97	NA	For grant-funded projects	None

Notes:

[1] Total budget totals are based on average annual community forest program budget data from FY2018-2020.

[2] Total number of trees is based on inventory information provided by the City.

of San Francisco takes full responsibility for tree pruning and repairing sidewalk damage caused by trees. Because of the comprehensive level of the San Francisco urban forest management program, and proximity to San José, the San Francisco tree management budget is a good indicator of what funding might be needed to support a sustainable community forest program in San José. In comparing these cities, the City of San José spends 75% less per resident, and 78% less per tree, than the City of San Francisco.

Another factor examined by the municipal tree care management and community programs report was the annual average spent per tree of each city (Hauer and Peterson 2016a). Of the three cities with populations greater than 1 million that responded to the survey, an average of $25.10 was spent per tree including all public trees. San Francisco's per-tree spending of $80.51 is above the total tree spending average in the report, but suggest the amount could be used as a baseline to determine what level of funding San José may need to sustainably manage the entire public space tree population

Table 23. Costs Associated with Community Forests

Cost	Examples
Direct costs	Planting, pruning, watering, and other types of maintenance
Infrastructure interference costs	Pavement and sewer repair, blockage of signs, tree-initiated power outages
Externally related costs	Emissions of biogenic volatile organic compounds, release of carbon dioxide during decomposition, allergies due to pollen release, leaf/debris cleanup
Opportunity costs	Space for trees cannot be used for parking, bike lanes, etc.
Staff time	Salary and benefits for staff and laborers associated with community forest management and maintenance.

Source: Adapted from Voght et al. 2015.

(300,000 trees). Applying San Francisco per-tree spending San José would need to increase overall program spending by $20.26 million dollars a year, for a total annual budget of $24.15 million, to maintain a sustainable community forest.

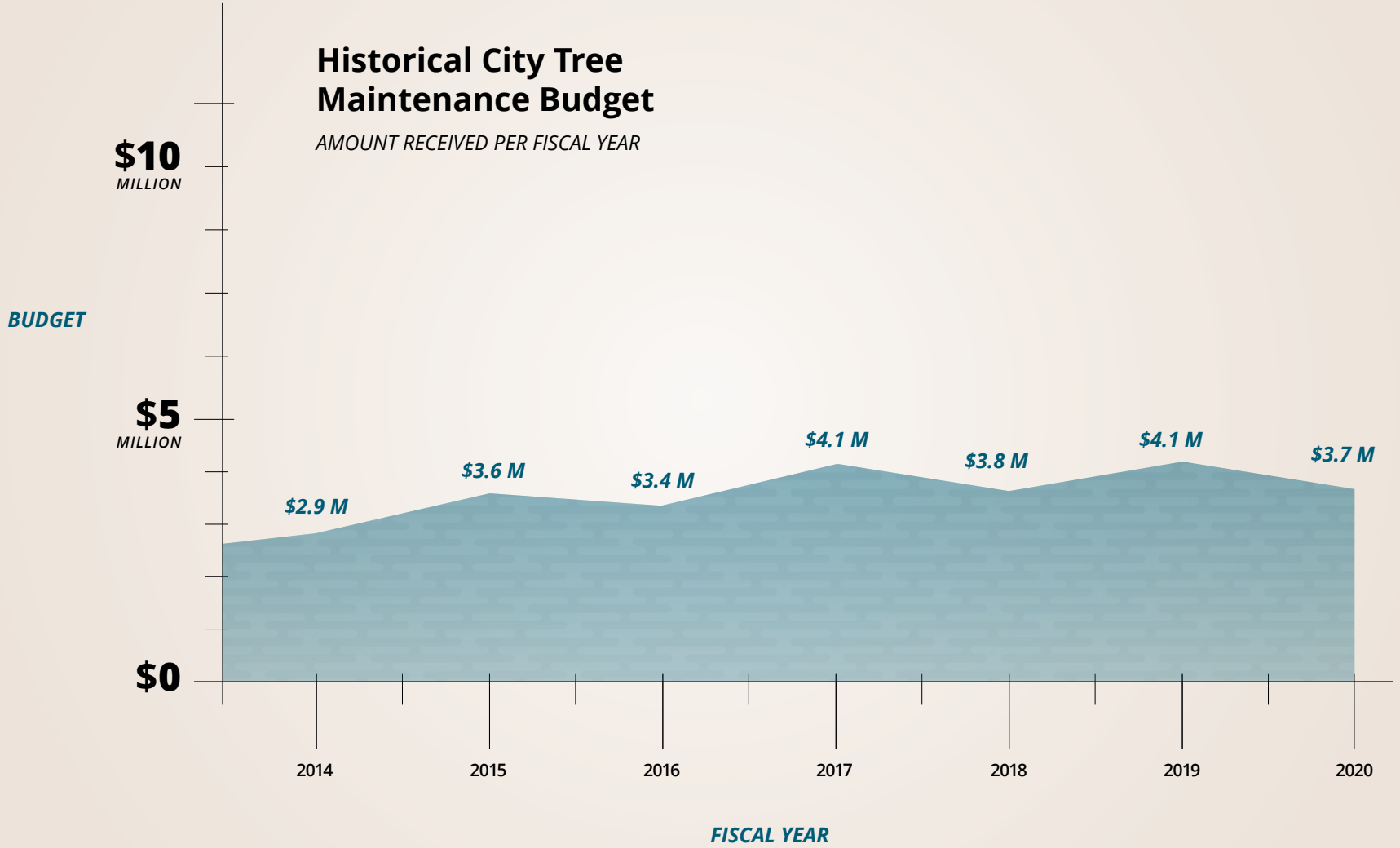
FUNDING THE COMMUNITY FOREST

Maintaining San José's community forest is an investment in the health and safety of the residents and visitors, as well as in the environment. The benefits of community forests are discussed in detail throughout this CFMP, such as greenhouse gas reductions, increased health benefits, environmental justice, and water and energy conservation. As the health and expanse of the community forest canopy cover increases, so do the benefits. Each dollar invested in San José's community forest will be reflected in a realized environmental and economic benefit to the City.

San José must balance how it allocates available resources to numerous competing interests and needs of the residents. Often, funding for municipal urban forest programs is reduced during times of financial downturn, to maintain funding levels for other city services such as the police department, fire department, road projects, schools, and other public services. As a result, tree maintenance budgets are often at risk for reductions (Voght et al. 2015). This trend occurred for the City after the 18-month long recession in late 2007 through 2009 when the tree crews consisting of approximately 12 staff were eliminated and funding levels have yet to be restored.

As outlined in **Table 23,** there are various costs associated with maintaining the community forest. There are also costs associated with not maintaining the community forest, and these costs are typically greater. For example, Browning and Wiant (1997) found that deferring utility tree pruning 4 years past the optimal pruning cycle (5–7 years) yielded $1.47 to $1.69 in costs for every $1 deferred, and resulted in a two-fold increase in pruning debris. In another study, Ryder and Moore (2013) found that pruning trees at a young age (formative pruning) was less expensive than waiting to correct structural defects 20 years later. Ultimately, as demonstrated in urban forestry and arboriculture literature, the cost of not maintaining the community forest is much greater than sustainably funding the community forest.

Figure 10. Timeline for City Tree Maintenance Budget



Funding Opportunities

State Funding	
Environmental Enhancement Mitigation Program (California Natural Resources Agency)	With approximately $13.4 million for the 2021–2023 funding cycle, this program encourages projects that produce multiple benefits that reduce greenhouse gas emissions; increase water use efficiency; reduce risks from climate change impacts; and demonstrate collaboration with local, state, and community entities. Eligible projects like tree planting and habitat restoration, must be directly or indirectly related to the environmental impact of the modification of an existing transportation facility or construction of a new transportation facility.
Urban Flood Protection Grant Program (California Natural Resources Agency)	The Urban Flood Protection Program was created by Proposition 68 for the purpose of multi-benefit projects in urbanized areas to address flooding. Projects must provide multi-benefit solutions to address flooding in urban areas, protect people, and protect property from flood damage. Examples of eligible projects include tree planting and establishment care and creating native landscapes with stormwater capture features like bioswales. There was one funding cycle for fiscal year 2020–2021 totaling $92.5 million.
Urban and Community Forestry Program (CAL FIRE)	Multiple grant programs supported by the Urban and Community Forestry Program will fund tree planting, tree inventories, urban wood and biomass utilization, blighted urban lands improvements, and leading edge work that advances the goals and objectives of supporting healthy urban forests and reducing greenhouse gas emissions. There was an estimated $10 million available to fund a variety of urban forestry projects in fiscal year 2019–2020.
Urban Greening Grant Program (California Natural Resources Agency):	Consistent with Assembly Bill 32 (2006), the Urban Greening Program will fund projects that reduce greenhouse gases by sequestering carbon, decreasing energy consumption, and reducing vehicles miles traveled, while also transforming the built environment into places that are more sustainable, enjoyable, and effective in creating healthy and vibrant communities. During the 2019–2020 fiscal year, there was approximately $28.5 million available for selected project applicants, which included public agencies, nonprofit organizations, and qualifying districts.
Active Transportation Program (California Department of Transportation)	This program provides funding to encourage increased use of active modes of transportation, such as biking and walking. Trees and other vegetation are significant components of several eligible projects under the Active Transportation Program, including parks, trails, and safe routes to schools. $440 million will be distributed to project applicants over fiscal years 2019–2020, 2020–2021, 2021–2022, and 2022–2023. Applicants include public agencies, transit agencies, school districts, tribal governments, and nonprofit organizations.
Affordable Housing and Sustainable Communities (California Strategic Growth Council)	The Strategic Growth Council is authorized to fund land use, housing, transportation, and land preservation projects to support infill and compact development that reduce greenhouse gas emissions. Urban Greening is a threshold requirement for all Affordable Housing and Sustainable Communities funded projects. Eligible urban greening projects include, but are not limited to, rainwater recycling; flow and filtration systems including rain gardens, stormwater planters, and filters; vegetated swales; bioretention basins; infiltration trenches; and integration with riparian buffers, shade trees, community gardens, and parks and open space. Funding for 2021 is estimated at $452 million and will be available to locality (e.g., local agencies), developer (entity responsible for project construction), or program operator (day-to-day operational project administrator) project applicants.

* Local and Regional Funding	
Parcel Tax	A parcel tax is a special tax levied for the provision of special benefits. Revenues from special taxes must be used for the specific purpose for which they are intended, so a parcel tax would create a dedicated funding stream for street trees. Similar to a special assessment, a parcel tax cannot be based on the value of property; however, the amount levied on each parcel need not be directly related to the benefits provided (ILG 2008). Cities have the flexibility to levy parcel taxes as they see fit, but they are typically based on lot square footage or levied as a flat tax, with the same amount per parcel (CTD 2012a). Parcel taxes are designed to encompass entire cities and therefore, are good candidates for a citywide street tree program, as opposed to the district-level approach that often occurs under special assessments.
Landscape and Lighting Assessment Districts	LLADs are a form of special assessment that finance improvements to landscaping, lighting and open space, along with open space acquisition. The Landscape and Lighting Act of 1972 authorizes municipal agencies in California to initiate and administer LLADs. The creation of a LLAD, as with any special assessment, requires the preparation of an Engineer's Report that demonstrates the nexus between fees assessed and benefits provided, followed by majority (50 percent plus one) approval via a special ballot, pursuant to Proposition 218. LLADs are widely used throughout California to fund a range of public realm improvements and services related to street trees, streetscape improvements, street and traffic lights, and recreational facilities, among others. As with parcel taxes, LLADs typically fund more than just street tree planting, establishment and maintenance. While a LLAD could be designed for street trees alone, the process may attract other agencies in need of additional revenue and interested in expanding the scope to services such as park and recreation maintenance. One caution would be to avoid setting the assessment so high as to generate voter backlash. Local municipalities have often convened focus groups to determine the appropriate assessment level.
Maintenance Assessment Districts	The Landscape and Lighting Act of 1972 authorizes Maintenance Assessment Districts (MADs), which are closely related to LLADs. The key difference is that charter cities, can create MADs for the provision of services not specifically authorized under state law, thereby broadening their use (Griffin, pers. comm., 2012). MADs may be used to finance street tree care, but as with a LLAD, a MAD intended for street trees alone could also attract the attention of other agencies interested in funding the provision of additional non-related services.
Partnerships	Partnerships are one opportunity to promote on-going collaborations like that with Our City Forest, while also creating new collaborations with corporate sponsors, individual donors, and utility companies. San José as home to 'Silicon Valley' has many opportunities to create partnerships with several large corporations that could provide one-time or ongoing support to City community forest activities. Partnerships with utility companies have proven to be reliable source of funding for tree planting efforts where there is a shared objective. As an example, Los Angeles has an on-going funding partnership with the Los Angeles Department of Water and Power that helps support tree planting activities as an energy savings program. Finally, a City-wide tree fund would provide an opportunity for individual donors to support City tree efforts and could be focused on increasing canopy cover in areas most in need of trees.
Joint Powers Association:	Multiple public agencies including the Santa Clara Valley Open Space Authority, Valley Water and other entities have an interest in tree management activities in San José. Street trees help mitigate air quality impacts of freeways and other major roadways and retain and divert stormwater runoff from the sewer system. Overlapping interests in street trees may create an opportunity for a unified urban forestry program, such as a Joint Powers Authority, to coordinate on planting and maintenance and engage in cost-sharing. This requires additional analysis of issues such as feasibility, potential cost savings, the involvement of other agencies and organizations, and fair share contributions that reflect the relative benefits enjoyed by the various parties.

* **Source:** City of San Fransico, Financing San Francisco's Urban Forest 2013.

RECOMMENDATIONS FOR FUNDING COMMUNITY FOREST MANAGEMENT

Section	Recommendation	Discussion
Funding of Maintenance Practices	Continue to evaluate the deficit in funds that are available to maintain the City's infrastructure in the annual Deferred Maintenance and Infrastructure Report	This document provides a review and dollar amount of funding gaps for trees, and is an important tool to measure what tree work is being completed and what tree work remains deferred each year.
Health and Safety Condition of Trees	Reallocate funding to allow for active and/or regular tree maintenance	In the current structure, the lack of regular tree maintenance increases the amount of funding City arborists need to allocate to emergency situations as they present an urgent public safety concern.
Staffing Levels	Conduct a review to determine the number of staff members that would need to be hired to increase urban forest program capacity	Based on comparison to the urban forest programs of other Cities, San José's program includes the staffing levels of Cities with approximately one fifth the population size.
Funding Opportunities-Grants	Consider jointly applying to local, regional, state, and federal urban forest grant programs	The six grant programs recommended in this section may require partnership with OCF and/or other City departments for eligibility. Funding provided by these grants may support expansion of sustainable community forest program practices.
Funding Opportunities-Fees, Assessments, and Taxes	Consider expanding fees, assessments, and taxes to generate funding for the Community Forest program	Funding generated by special fees, assessments, and taxes could generate unrestricted funds, which differ from grant funding that has specific requirements

Street Tree Management Practices

Achieving a sustainable San José community forest will in part be dependent on having tree management practices that promote the annual planting of trees to meet canopy goals, provide early tree care that establishes newly planted trees, and use of pruning and removal practices that promote healthy and safe trees, improve life expectancy, and increase the benefits received. A community forest management program that successfully implements these practices will progress the City towards the CFMP goals and other Citywide environmental goals established in planning documents like Climate Smart San José. The tree management responsibility of public space street trees is shared between the City and private property owners, with City park trees managed solely by PRNS.

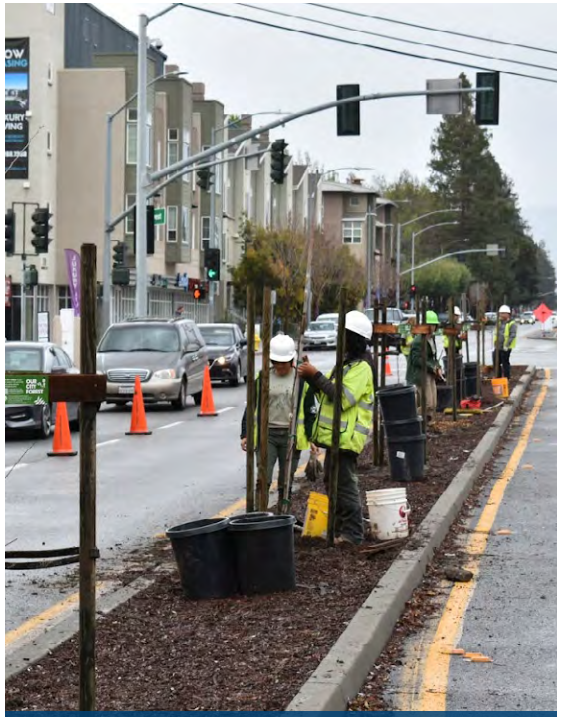
TREE INVENTORY

Having current information on the status of the community forest ensures City community forest program decisions are driven by accurate data and provide the basis for the strategic investment of City resources. A city will often obtain tree condition information by perpetually updating its inventory when it plants, maintains, and prunes trees. In San José, private property owners are responsible for most of the tree management in the City, and the City does not inspect or prune public space trees on a regular basis. As a result, the City would have to implement an inventory and inspection program to understand the current condition of City trees. A conservative estimate for a Citywide tree inventory based on industry rates would cost $3 to $4 per tree, or approximately $900,000-1 million dollars to inventory all 300,000 street and park trees. The City could include updating a portion of the inventory as an annual or every-other-year cost to its community forest management program. Another option would be to invest in maintaining a 5- to 7-year pruning cycle, which would ensure the City tree inventory is updated in perpetuity. Without an updated inventory, the City is missing key information that informs management decisions to maintain trees in a safe and healthy condition.

STREET TREES

Management of street tree populations vary widely depending on the city. Some cities such as Los Angeles ask private property owners to opt into planting and maintaining trees in the parkway, while the City takes responsibility for sidewalk repairs and emergency situations. Others like San Francisco take full responsibility for a street tree from the time it's planted through removal and replacement. No one method is prescribed as a best management practice for all municipalities as each situation comes with a unique set of budget and resource limitations, political climate, and priorities of private property owners. The one consistent reality for all methods is that public tree management is most effective when the City and private property owners understand and agree with their defined roles and responsibilities and work together towards achieving goals for the community forest. The review of public space street trees in San José will discuss management practices of the City and the current expectations of private property owners to manage public space street trees. This model will be measured against baseline sustainability indicators to further understand the impact on the overall community forest, benefits of the model, and recommendations to improve tree management practices so they progress the City towards sustainable community forest management.

Fallen Tree Branch



Street Median Tree Planting
PHOTO: OUR CITY TREES

PROPERTY-OWNER MAINTAINED TREES VERSUS CITY-MAINTAINED TREES

Perhaps the most significant City policy that impacts the ability to progress towards a sustainable community forest is the shared management of street trees adjacent to private property. The City has a street tree population of approximately 270,000 trees, of which private property owners are responsible for approximately 233,000 trees.

Municipal Code 13.28.400 establishes that the property owner is responsible for tree related work on street trees location adjacent to private property located in park strips, behind sidewalk or in the sidewalk cut out where the sidewalk abuts the curb and gutter. The remaining trees directly managed by the City fall into one of the following designations according to the San José Tree Manual:

1. **Trees located between the sidewalk and the curb and gutter or behind sidewalk where the sidewalk abuts the curb and gutter only when the adjacent property is a City-owned facility**

2. **Trees located in all median islands on public streets.**

3. **Trees located in specifically designated City-maintained landscape areas that abut roadways.**

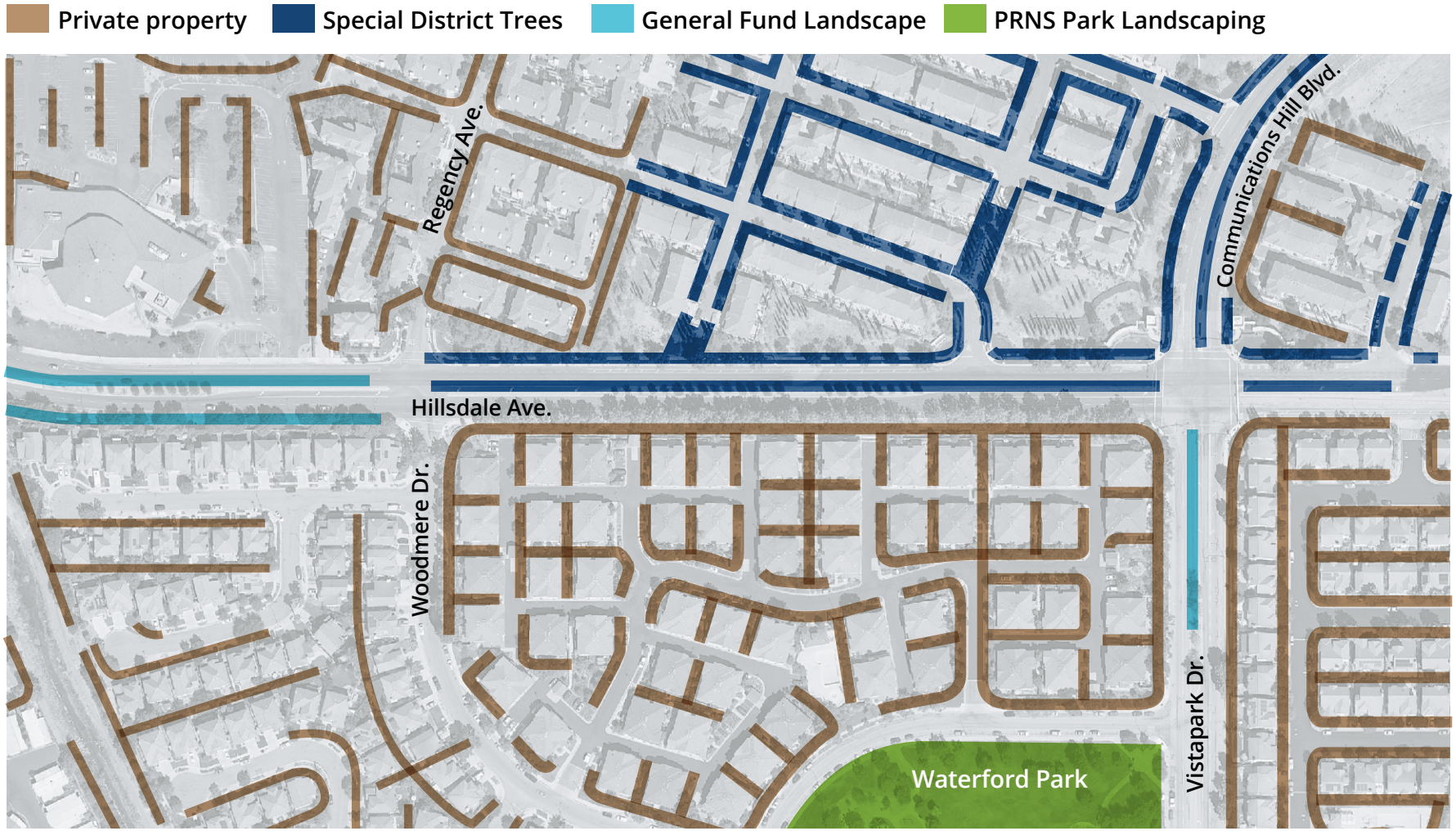
The responsibility of private property owners to maintain the street trees adjacent their property has been in the City municipal code since 1951 (City of San José n.d.b), and when private property transfers ownership, the new owner is notified of their responsibility to maintain the street tree. However, as expressed in interviews with City staff, despite the notification and clear language of the municipal code, many residents and private property owners are not aware of their responsibility to manage the street trees adjacent their property. Often property owners did not plant the trees adjacent their property and assume because it was existing prior to their ownership that the City is responsible for it. The first time they become aware of their responsibility is when they are notified by the City that they are required to prune a tree or fix a damaged sidewalk. This common scenario causes frustration and confusion with property owners who view street tree maintenance as a City responsibility as evidenced by the CFMP online survey with 60% of respondents indicating the City should have full responsibility for street trees (see Appendix D. for all survey results).

The current model can also create a disproportionate burden on low-income residents who may not have the resources to pay for tree pruning or sidewalk repairs. The cost of maintenance can also create a barrier for

Figure 11. Property-Owner Maintained trees versus City-Maintained trees

Who is responsible for these trees?

The photo below shows an area of San José where responsibility for street and landscape trees is divided among multiple property owners. There are many neighborhoods in the City where tree ownership, care, and maintenance are the responsibility of multiple public agencies.



residents in disadvantaged communities to participate in tree planting programs, and further exacerbate disparities in canopy cover between low-income and high-income communities. Transferring the responsibility of street trees to the City would resolve the confusion with private property owners and help alleviate the impact to low-income residents. It would also require a drastic increase of City funding to the community forest program.

City staff and representatives of City Councilmembers indicated during interviews that the current system is beneficial to the City due to budget constraints and reduced liability. Managing the entire tree population could potentially cost the City $20–$24 million annually, which would be a significant increase from the current $3.89 million annual budget to of the community forest program (See Funding section for more details). These factors may cause reluctance from City decision makers to assume responsibility for street trees without additional outside funding beyond what is currently allocated from the City general fund. It may become even more difficult to prioritize an increased level of funding for street trees with the economic uncertainty brought on by the COVID-19 pandemic.

It is difficult to measure the impact of this approach on the condition of street trees in the community forest with available data. The inventory is now seven years old and does not reflect the current health conditions of the trees. Tree health may experience a significant shift in seven years, and it is not known if trees remain in their 2014 condition. It will be important for the City to complete an updated inventory if management practices continue as is to determine if the City street tree population is resilient to climate change, pests, diseases, and development.

The issue is bifurcated between who should be responsible for the management and associated costs of street trees and whether current management practices are progressing the City towards a community forest with healthy trees that increase their benefit as they grow larger and mature. This section will continue to review specific issues related to management of street trees and explore the issues created by the current responsibility model and the effectiveness of practices to plant, care for, and maintain street trees.

Tree Planting and Establishment Care

TREE PLANTING

The tree planting component of the City's community forest program is one example of a City management practice that attempts to bridge the responsibility for street trees by providing trees at a reduced cost to disadvantaged residents, free permits, and with support of outreach and engagement efforts. Outside of OCF grant-funded tree planting projects, the City is limited in its ability to actively plant street trees adjacent to private property. Because of this, planting new street trees is dependent on either a property owner initiating a street tree planting, as a requirement for a development project, or by compelling a property owner to plant a tree through enforcement of Municipal Code Section 13.28.400. Enforcement of the Municipal Code requiring a street tree to be maintained or replaced adjacent a private property typically occurs when the property is not compliant with other repair issues. The City could begin to require any property that has a vacant tree site adjacent their property to increase the annual total of trees planted. It would be difficult to implement this strat-

egy though without an increase in DOT staff that manage street trees. Requiring property owners to plant trees also has the potential to create a negative relationship between the property owner and the newly planted street tree since property owners would also have to assume the maintenance responsibilities and associated costs for a tree they did not want to plant. Based on these factors, the current voluntary tree planting campaign offers the best opportunity for the City to increase the total number of street trees and create a positive experience for community members, but is not likely to significantly increase the number of trees planted annually.

The main way residents are encouraged to get a street tree planted is through OCF, which is one example of how the City benefits from its partnership with OCF. With the support of City and grant funding, OCF can navigate residents through the City permit process, select an appropriate species for the planting location, and deliver a tree to the property for the resident to plant. OCF and its volunteers are also able to provide free tree planting services on a limited basis for elderly or disabled citizens who are physically unable to plant the tree themselves. Approximately 1,600 new and replacement street trees are planted every year from the efforts of OCF in partnership with the City. This program demonstrates a willingness of residents to support community forest program efforts when there is a system in place that has clear permit processes and shared responsibilities with the City.

Community tree planting

ESTABLISHMENT CARE

Another important aspect of a tree planting program is whether a comprehensive establishment care program is in place to ensure trees successfully transplant. Establishment care typically refers to the 3- to 5-year period after planting and related tree maintenance activities to support tree growth and health. Maintenance activities include supplemental watering, monitoring, repairing and removing supportive stakes and ties as needed, removing weeds from the planting area, and pruning as needed to remove dead or broken branches and establish good structure. In California cities such as San José that can experience little or no

rainfall for months, establishment care is crucial to the survival of newly planted trees.

Residents who receive a tree from OCF agree to maintain the tree for 3 years after planting and follow a prescribed maintenance regiment to water weekly, provide necessary pruning, keep the watering basin free of competing vegetation, and properly support the tree with stakes and ties (OCF 2020). The recommended maintenance practices align with ISA standards for establishment care and when implemented would be effective for tree health and growth.

What is not well understood is the extent to which street tree recipients implement the establishment care standards. For trees managed by private property owners, the City street tree inventory indicates a health condition of fair or better for 94% of trees with a DSH of 0 to 6 inches; with 2% of the trees dead.[4] If these percentages are an actual reflection of all similar trees, then it is reasonable to assume newly planted trees are given sufficient establishment care by private property owners. It may also reflect that residents who actively pursue trees for planting in their parkway take the time and effort to obtain City permits and then plant the trees, are invested in their survival. If so, the current model of obtaining trees from OCF and having residents provide establishment care may warrant further investment from the City to expand the current outreach and monitoring program to increase the total number of trees planted each year.

Another possibility to increase resident participation in a tree planting campaign could be for the City to fund the maintenance of newly planted trees when residents absorb the cost of planting. Currently the City provides limited funding for the establishment of newly planted trees on select locations like medians and for trees planted as part of a grant funded program. As reported by the City, it costs approximately $550 to provide 3 years of watering and establishment care to a newly planted tree. A model of sharing planting and establishment care costs would demonstrate to residents that the City is willing to invest in the growth of the community forest by providing a resource to assist residents. It would also increase the total number of trees that successfully establish, contributing to the long-term expansion of Citywide canopy cover.

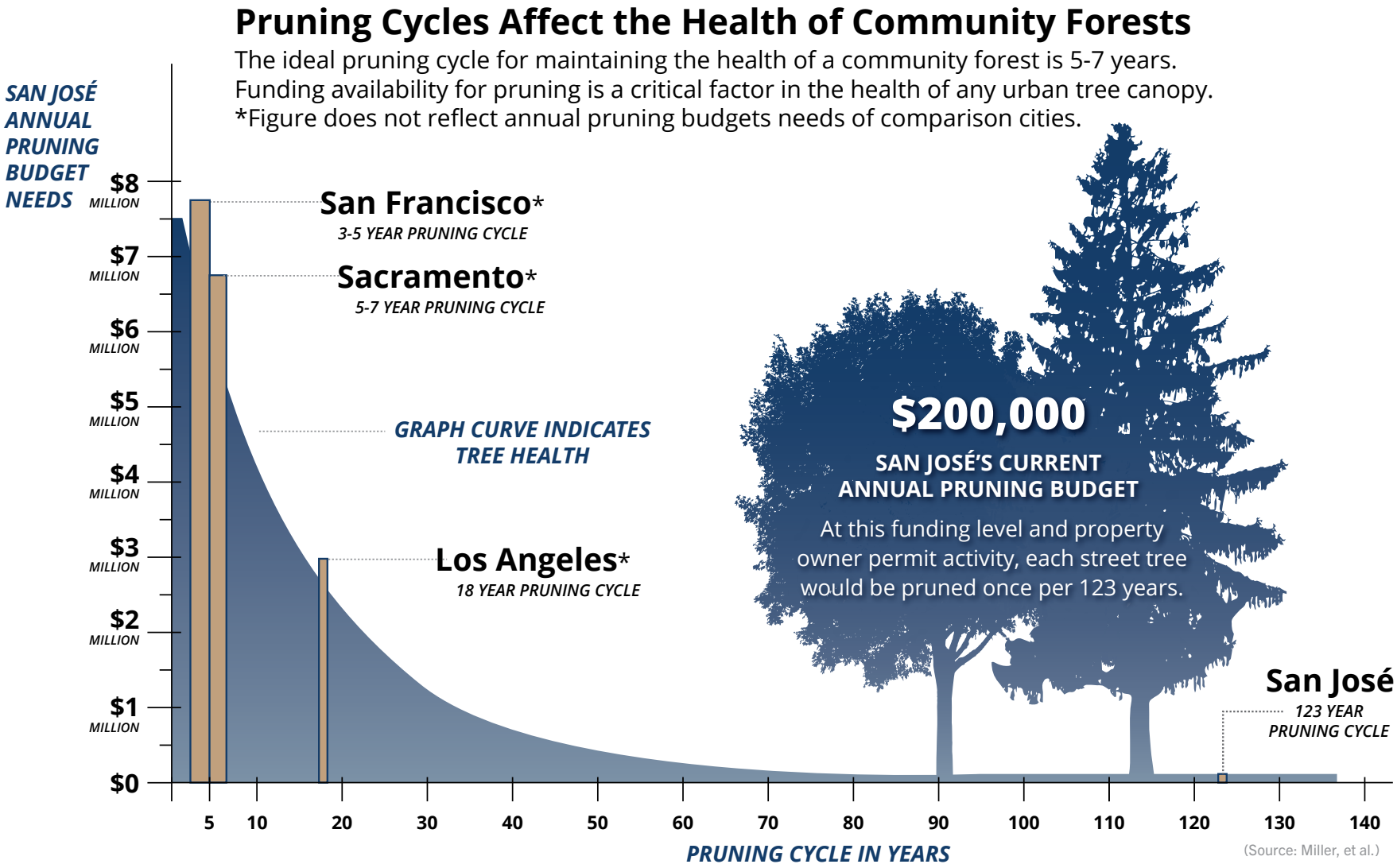
Pruning and Emergency Tree Work

Trees are living organisms, and arborists cannot detect every malady within a tree or determine when a tree might experience failure. However, in general, trees with a good structure and in good health are less likely to have unexpected root, trunk, and limb failures. Therefore, this section is dedicated to discussing both City pruning practices of public space street trees, as well as emergency tree work as one continuous management practice, because it is difficult to separate the effectiveness of a tree pruning program from subsequent emergency tree work.

A 5- to 7-year pruning cycle is the optimal intersection of maintaining trees in a safe condition and limiting expenses to a City (Miller et. al 1981). The majority of City-managed street trees are on a 38-year pruning cycle, with the exception of trees in Maintenance Districts that are on a 14-year pruning cycle. Maintenance Districts have a unique dedicated funding stream that allows for a more frequent pruning cycle, while the City does not provide

4 These data were available for 17,022 privately managed street trees and does not reflect all trees with a DBH of 0 to 6 inches managed by private property owners in the inventory as not all trees had a recorded health condition

Figure 12. Pruning Cycles



the same level of funding for the remaining City-managed general fund street trees. A 100-year pruning cycle is excessively beyond the recommended time frame, and it is important to understand that extending the pruning cycle beyond 5- to 7-years increases the potential for tree part failure.

DOT arborists report that they are not able to identify and correct defects in a timely manner because of the lengthy pruning cycle, and as a result, annually spend 60% to 80% of the tree maintenance budget reacting to instances of tree part failure. Consequently, funding is reduced for active tree pruning and the time period between when trees are actively pruned is extended. If the City continues with the same level of funding for tree maintenance activities, it will be unable to break the cycle of reacting to tree emergencies as opposed to preventing them. This method will not only impact the ability of City arborists to allocate funds to more cost-effective active pruning ($125 a tree for active pruning versus $600 for emergency work as discussed in the Funding section), but it also increases the potential for liability claims and settlement payments that may result from tree failure.

There is not enough data to fully understand the current or potential financial impact to the City from liability claims. However, a comparison with the City of Los Angeles urban forest management program provides some indication of what the City could potentially face. In 2018, the City of Los Angeles completed an analysis of its urban forest management program, including a review of its pruning practices and tree-related settlements. Prior to the 2008 recession, the City of Los Angeles maintained a pruning cycle of 7 to 10 years. After the recession, however, from 2010–2012, the City readjusted the tree pruning cycle to 50 to 60 years. While the City was able to reduce pruning cycle to 18 years by 2015, tree-related settlements began to rise. In fiscal year 2014–2015, Los Angeles paid $796,055.80 in tree-related settlements, with that annual total continuing to increase in fiscal year 2015-2016 to $1,696,8123.14, again in fiscal year 2016-2017 to $3,250,799.30, and then declined to $2,716,915.37 in fiscal year 2017-2018. Tree related settlements were classified as resulting from the tree being in a dangerous condition or from trip and fall hazards due to tree damage to sidewalks. While the City of Los Angeles street population totals approximately 700,000 trees as opposed to the San José street tree population of an estimated 270,000 trees, it does provide an understanding of what costs San José may incur if it assumed responsibility of the street tree population. The lowest total of tree settlements paid by Los Angeles in the study period ($796,055.80) would account for approximately 15% of the entire San José community forest program budget and almost 8 times what San José budgets for tree maintenance.

The frequency of street tree pruning, and emergency tree work is also a pressing issue with private property owner-managed street trees as they represent approximately 80% of the street tree population. The City can annually prune a very limited number of trees for clearance of traffic signals, covering a streetlight, or pavement operations. Outside of those situations, private property owners are fully responsible to maintain their street trees in a safe condition and for any associated pruning costs. Participants in the community survey listed the cost to prune and maintain trees as the second biggest issue they have with a tree on their property, indicating a private property owner may forgo needed pruning if it is deemed too costly.

Additionally, the City does not have data on the frequency pruning occurs on trees managed by private property owners. City records show an annual average of 1,566 completed tree pruning permits between 2014–2019, which

may include one or more trees pruned. Assuming that some permits include more than one tree, the number of private property street trees pruned on an annual basis could potentially range from 2,000 to 4,000 trees, which would equate to a pruning cycle between 58 to 116 years for all private property owner-managed street trees (233,000 trees). More likely, the annual total of trees pruned by private property owners may be higher as some trees are pruned without a permit. However, it is not possible to verify if tree pruning completed without a permit is done to arboriculture standards that would improve tree safety. Based on available data, the number of trees reported as being pruned by private property owners is excessively below the recommended frequency and has the potential to impact public safety if unsafe tree conditions are not mitigated.

As discussed, emergency tree work is inextricably linked to pruning frequency as extended periods between pruning increase the potential for a defect to occur and cause tree part failure. From 2014–2019, the City averaged 1,396 tree emergency calls a year, only 170 short of the total number of processed pruning permits. The emergency calls reflect any time a tree, limb/branch, or other tree part had a failure occur that obstructed the use of the public right-of-way. Data does not exist on the exact number of emergency situations that caused damage to parked cars, homes, pedestrians, or other targets, and 1,396 emergency incidents represent less than 1% of the tree population. However, tree part failures do occur, and depending on the size of the tree part and fall distance, impacts to a target (people, cars, homes) could have severe consequences that can be avoided if trees are pruned on the recommended 5- to 7-year cycle. This threat to public safety increases the potential for the City to incur liability claims and settlement payments that could otherwise be directed toward the maintenance of street trees.

The prolonged tree pruning cycle of street trees also causes additional issues for the private property owners who experience a tree emergency. When a tree part falls into the public space, the adjacent property is responsible to remove the debris at their own expense. Based on the emergency situation or responsiveness of the property owner to remove the debris, the City will remove the debris from the street or sidewalk, and the private property owner is invoiced for the cost of service plus an administrative fee.. When a tree part falls onto the adjacent private property, the property owner is responsible for removing the debris and paying removal costs. On average, emergency tree work costs $600–$700 per incident to address only the hazard, as opposed to the average cost of $150–$250 to prune the entire tree canopy as a part of a proactive program (see Funding section for more details). Prioritizing funds for proactive pruning represents another circumstance by which the City could maximize the limited funds available for the community forest program.

Finally, there is a need to educate private property owners on how to properly prune a tree. Often trees in San José are improperly pruned or topped, a practice that indiscriminately removes branches, creates poor structure, and decreases tree health. Trees need leaves to create food for itself through photosynthesis that is broken down into energy and used to carry out biological functions. Trees that are continually topped do not have the leaf cover to create new food and are constantly relying on stored resources for growth and vigor. Over time the stored resources can be depleted and lead to tree mortality. Branch growth on topped trees also creates poor structure with weak attachment points more prone to failure during wind events impacting public safety. Educating private property owners to prevent practices like tree topping will be important to maintaining tree canopy cover for the existing mature trees and as newly planted trees develop a crown.

Private property owners also need to be educated on what steps they should take to determine if a contractor is qualified to prune their tree. Typically pruning contractors should have an ISA Certified Arborist on-staff to direct tree pruning activities, with other professional credentials for tree climbing, maintenance, and utility line clearance. Identifying contractors with this level of professional credentials will help ensure they perform quality work but does not guarantee work will be completed to industry standards. If property owners do not understand proper tree pruning practices, they are left to trust the contractor to correctly prune the tree and may accept practices like topping without knowing the impacts to tree health and safety. It is difficult to understand how frequently trees are properly or improperly pruned by contractors, but it was identified by stakeholders as a limiting factor to increasing canopy cover.

Under the City street tree policy, property owners can be fined $250 for improper tree pruning, which is low in comparison to the average value of $3,003 for a street tree in San José. Enforcing a higher penalty on a property owner who may not understand proper pruning practices could also be viewed as an overly punitive action and not result in preserving tree canopy. These factors suggest that a robust education campaign on proper maintenance and pruning practice is needed if the City is going to continue to rely on private property owners to maintain trees.

Tree pruning that is dependent on private property owners is resulting in an increased potential for tree failure to impact public safety and higher costs to private property owners. In order to improve these conditions, the City will need to define a new strategy to increase tree pruning by private property owners or the City will need to take responsibility for the pruning of street trees and fund the pruning program at a level to maintain a 5- to 7-year cycle. If private property owners continue to be responsible for street tree pruning, the City should determine what measures it can take to encourage or require private property to prune their street trees. Strategies could include a more robust education and outreach campaign about the need to prune trees, how to prune them to ISA standards, and how to find a qualified contractor to perform the work, or the City could conduct a periodic inspection and property owner noticing program to require pruning. A rebate program for private property owners to recover some or all of the cost they incurred to prune their street tree could also help increase participation.

Sidewalk Repair, Tree Removal, and Tree Replacement

The impact of decisions made by urban foresters, arborists, landscape architects, planners, and engineers are often not realized until years later as trees continue to grow and mature in an urban landscape. One common impact to residents from trees are when they have outgrown the soil space provided and disrupt the adjacent sidewalk. Lifted sidewalks can be impassable for residents with mobility issues, present a trip hazard, and be costly to repair. In San José, private property owners are responsible for the sidewalk adjacent their property in the same way they are for their adjacent street trees. Many private property owners are not aware of these responsibilities and may only come to realize it when they receive a notification from the City requesting sidewalk repair. If the property owner knew sooner, they could take earlier action when there is less damage and potentially lower associated repair costs. The resulting confusion and frustration from unexpected sidewalk repair costs and navigation of a repair process they do not know how to complete could be avoided.

In some cases, it is only possible to repair the sidewalk by removing the tree, which creates another point of contention with private property owners. While some may respond favorably to removing the tree, others are frustrated by the unexpected cost and reality of the many years it will take to replace the lost shade, landscape aesthetics, and property value. When tree removal is necessary, the property owner is then required to plant a new tree in the same location creating additional potential frustration with owners who recognize that future conflicts and damage may occur again. If the City determines site conditions will not support a tree, another location will be selected. Some property owners feel they are being forced to fix a sidewalk they believe they are not responsible for and to remove a tree they don't want to remove. Others may want the tree to be removed, but do not want to be forced to plant a new tree because of unexpected costs, future maintenance, and other hardships. Whatever the situation, confusion over dealing with sidewalk damage is not beneficial for the City, private property owners, or tree/community forest. If private property owners are going to be responsible for the trees, sidewalks, and associated repair and maintenance costs, the City must do a better job to inform property owners of their responsibility.

Tree Root and Sidewalk Conflict

The management practice to actively address hazards within the public right-of-way by repairing sidewalks and removing and replacing trees as needed is important to provide mobility throughout the City and maintain canopy cover. Often, root pruning is the main approach to preserve a tree and fix a sidewalk, but this practice comes with the potential to impact tree health and tree longevity. If a tree cannot be safely preserved after root pruning, it requires removal. However, alternative materials and methods are becoming more common to repair sidewalk issues in lieu of tree removal. New sidewalk materials and technologies can be used that reinforce the structural integrity of concrete to allow tree roots to grow underneath sidewalks and increase useful longevity like suspended pavement systems and structural soils. In some cases, tree planting areas can be expanded to allow more growing space like meandering sidewalks, bulb-outs, or increased tree well sizes. All of these methods should be within the solutions "toolbox" before tree removal is allowed, but they are not all currently codified as available City options and agreed upon by City staff as acceptable City standards.

The tree replacement ratio of 1:1 is also discussed in the section "Planning, Building, Code Enforcement (Private Property)," and should be updated to progress the City towards a more sustainable community forest. In all tree removal and replacement scenarios, the City must consider if the policy is adequately replacing the lost canopy cover and how soon canopy cover should be recovered. The replacement policy does not outline a process that verifies if the tree is alive after it is planted. The City can issue a notice of violation if they discover that the tree is removed, but it does not have the resources to monitor or ensure enforcement of penalties..

Urban Wood Utilization and Waste Diversion

In 2016 California passed SB 1383 to reduce emissions from short-lived climate pollutants (https://www.calrecycle.ca.gov/organics/slcp). One aspect of the new law calls for the reduction of organic waste (food scraps, yard trimmings, paper, cardboard) disposal of 50% by 2020 and 75% by 2025. The goal is to divert organic waste from landfills where materials decompose and release methane, a greenhouse gas contributing to climate change. The policy is reflected in community forest management by utilizing chipped branches and leaves as mulch in City landscape projects. The practice of utilizing mulch helps to reduce waste to the landfills while also providing organic material to improve the health of urban soils. A shortcoming of this practice is that the stored carbon in the wood of the tree is released into the atmosphere as a greenhouse gas. An urban wood utilization program is one method to keep carbon stored in the wood of the tree after is removed.

Urban wood utilization is an emerging practice and economy in California that reclaims the wood of a removed tree to be turned into lumber, tables, chairs, and other wood products. By turning a removed tree into a wood product, stored carbon stays in the wood, and reduces the greenhouse gas inputs of the City, which contribute to Climate Smart San Jose goals. Currently San José does not implement an urban wood utilization program and could explore the financial costs and return on investment to implement a program. In addition to the environmental benefits of carbon storage, urban wood utilization programs contribute to the green economy of San José and can provide employment opportunities throughout the entire process to remove, store, treat, and prepare wood for its second life.

RECOMMENDATIONS FOR STREET TREE MANAGEMENT

Section – Subsection	Recommendation	Discussion
Tree Inventory	Complete an inventory of all street and park trees.	The City does not have a completed inventory for trees in City managed parks, and partially completed inventory of street trees in 2014. Completing and maintaining an inventory of street and park trees will ensure management decisions are made with the most recent and accurate information.
Property-Owner Maintained versus City-Maintained Trees	Educate community members on their responsibility to maintain trees adjacent their property.	It was evident through internal discussions with the City and online survey results that most residents are not aware of their responsibility to maintain the street tree adjacent their property, which contributes to confusion over who should be conducting maintenance, and impacts community forest management.
Tree Planting	Explore the possibilities to expand the City partnership with OCF to engage residents in tree planting.	The City is limited in its ability to actively plant street trees adjacent to private property. Given OCF's ability to plant approximately 1,600 new and replacement trees, the City could further expand these efforts and shared responsibilities.
Establishment Care	Provide watering and establishment care for a minimum of three years to all trees planted by the City.	These recommended maintenance practices align with ISA standards for establishment care and when implemented would be effective for tree health and growth.
Establishment Care	Work with OCF to further engage and educate residents on how to properly water and maintain newly planted trees	Residents who receive a tree from OCF agree to maintain the tree for 3 years after planting. The current model of obtaining trees from OCF and having residents provide establishment care may warrant further investment from the City to expand the current outreach and monitoring program to increase the total number of trees planted each year.
Pruning	Educate private property owners on proper tree pruning practices.	Trees in San José are often topped and/or incorrectly pruned. Under the City street tree policy, property owners can be fined $250 for improper tree pruning. If residents are educated on proper pruning practices, their trees are more likely to contribute to San José's overall canopy cover.

Section – Subsection	Recommendation	Discussion
Pruning	Develop a strategy to reduce reactive tree pruning and emergency work.	Reactive tree maintenance costs significantly more than proactive or preventative maintenance. Identifying a strategy and funding mechanism to conduct proactive maintenance can save the City money in the long term.
Pruning	Determine the feasibility for the City to prune all street and park trees on a 5- to 7- year cycle.	The City's current 123-year pruning cycle of street trees is excessively beyond the recommended 5- to 7-year pruning cycle, which increases the potential for tree part failure.
Sidewalk Repair, Tree Removal, and Tree Replacement	Ensure that residents are aware that they are responsible for adjacent sidewalk repair.	Many residents are not aware that they are responsible for sidewalk repair. If private property owners are going to be responsible for the trees, sidewalks, and associated repair and maintenance costs, the City must inform property owners of their responsibility.
Sidewalk Repair, Tree Removal, and Tree Replacement	Implement sidewalk repair strategies that minimize tree removal.	New sidewalk materials and technologies can be used that reinforce the structural integrity of concrete to allow tree roots to grow underneath sidewalks and increase useful longevity like suspended pavement systems and structural soils. All of these methods should be within the solutions "toolbox" before tree removal is allowed.
Sidewalk Repair, Tree Removal, and Tree Replacement	Update the City's 1:1 tree replacement ratio.	In all tree removal and replacement scenarios, the City must consider if the policy is adequately replacing the lost canopy cover and how soon canopy cover should be recovered. The replacement policy does not outline a process that verifies if the tree is alive after it is planted.
Urban Wood Utilization and Waste Diversion	Explore the financial costs and return on investment to implement an urban wood utilization and waste diversion program.	In addition to the environmental benefits of carbon storage, such a program can contribute to San José's green economy and provide employment opportunities throughout the entire process to remove, store, treat, and prepare wood for its second life.

San José Rose Garden

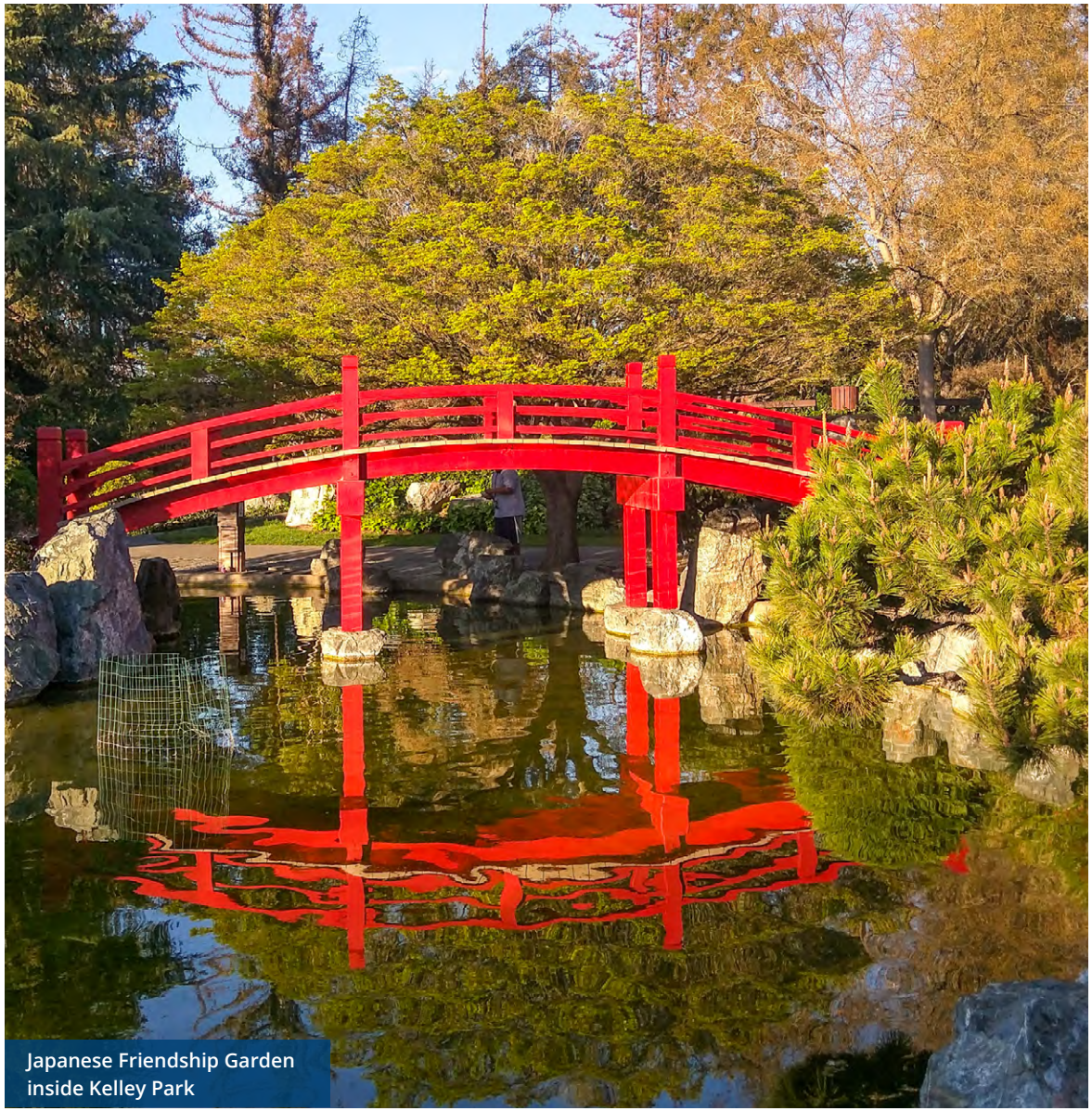
Park Trees

PRNS is solely responsible for managing trees in City parks, community centers, and City-managed open space areas. In interviews with the consultant team, City Council members and Council staff frequently expressed that residents view parks as one of the most valued assets in their community as they provide a respite in the urban environment. While there is a high value placed on parks by residents and some City Council offices, PRNS receives only $150,000 a year to manage the estimated 30,000 park trees. The per-tree spending on park trees is $5.00, which is well below the City average spending per-street tree of $14.41. This low funding impacts PRNS's management practices, ability to plant and establish new trees, and maintain existing trees in a safe condition, and increases the potential for liability claims and settlements. Due to the lack of funds, PRNS staff are not able to actively prune trees, which has necessitated development of partnerships for park tree planting and care. PRNS's maintenance practices and strategies are discussed further in the sections below and are measured against the same sustainability factors as street trees to determine if the current practices progress the City towards a sustainable community forest.

Tree Planting and Establishment Care

TREE PLANTING

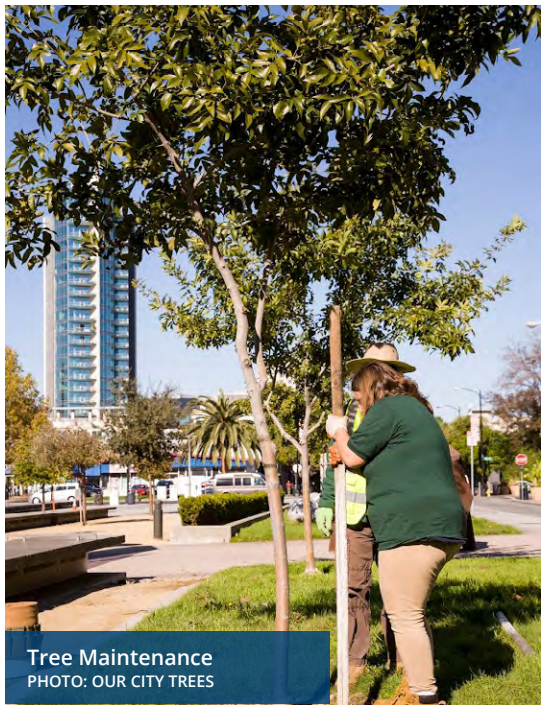
Currently there is no funding available to plant trees in parks, and PRNS staff are dependent on partnerships with OCF, City Council offices, and other community organizations for tree planting. These partnerships help to plant 250–500 trees per year in City parks and planting is typically a community volunteer event. If one of these groups would like to hold a volunteer tree planting in a City park, they must also commit to water and care of the trees for the first 3 years after planting. Outside of these community planting events, new trees are usually only planted to replace a removed tree or with new park development, and it does not occur frequently. There are advantages to the community planting model in that it engages residents, corporate groups, and elected officials in the community forest program and builds a connection with the local park and trees. It also benefits PRNS as



Japanese Friendship Garden inside Kelley Park

OCF can sometimes provide trees for park plantings through grants or other awards as there is no dedicated budget to purchase plant material.

While the current partnerships do provide benefits, there are inconsistencies in the process that limit the structure from fully contributing to the expansion of canopy cover in City parks. The first limitation is the total number of trees that are planted on an annual basis. At the time of writing this CFMP, the park tree inventory is not complete, and the condition of park trees and available planting locations is not known. Based on City staff estimates, there are approximately 30,000 trees dispersed through the more than 200 PRNS-maintained facilities. PRNS staff reported that many of the trees are aging, beginning to decline, and in some instances standing dead. While there currently may be adequate canopy cover in most PRNS-maintained parks, planting 250 to 500 trees within more than 200 parks will most likely fall short of the annual totals needed to replace trees as they are removed due to various causes. However, without funding to plant and care for trees, PRNS staff are limited in their ability to affect tree cover. Thus, there is a strong possibility of a sharp decrease in park tree cover during the



Tree Maintenance
PHOTO: OUR CITY TREES

next inevitable extended drought or introduction of an invasive pest.

ESTABLISHMENT CARE

Another limitation of the current structure is the inability to provide tree establishment watering and care. There is currently no funding for PRNS to provide establishment care. Without supplemental watering, the new trees have the potential to fail during prolonged periods of drought or extreme heat. The type of irrigation currently provided is not ideal for tree root establishment and growth, either. The current watering practice is to deliver water from overhead spray sprinklers. Although trees are correctly planted within the irrigation footprint, the quantity of water delivered is often not sufficient to soak the entire root ball and the area beyond the planting pit to encourage root growth. This watering method can lead to trees with shallow root systems that are not able to support their biological functions without regular irrigation. Shallow rooted trees are typically less resilient during droughts and more dependent on the frequent irrigation applications. In the event irrigation stops, even a mature tree is at risk of decline and failure. The best method to water a newly planted tree is automated irrigation systems (bubbler irrigation) that provide deep watering, or by hand with a hose, which concentrates water into the tree basin, throughout the root ball, and the area just beyond the root ball. Despite being the most efficient watering systems, both methods require funding that is not currently available to PRNS.

Without funding for this type of watering, PRNS staff require the community group that led the tree planting event to provide follow-up watering and care. As reported by PRNS staff in consultant interviews, community groups will often be diligent in watering and care of park trees after planting, but after a few months the groups will begin to provide less and less watering until they eventually stop. This trend is partly due to the level of dedication it takes to water 10 or more trees on a weekly or twice-a-month basis as it can be labor- and time-intensive. However, without dedicated funding to support a City or contractor crew to water trees, or installation of bubbler irrigation, volunteer watering is the only available method to provide supplemental tree watering. Because of the inconsistency of volunteer watering, the City must consider other options to manage park tree planting and establishment care.

COLLABORATIVE APPROACH TO TREE PLANTING AND ESTABLISHMENT CARE

The success of park tree planting is directly related to the success of the establishment care trees receive, which is dependent on funding to support 3 years of maintenance for any tree planted in a park. PRNS understands the level of watering and care new trees require and are capable of either performing the work with City crews or hiring a contrac-

tor if funds were available. There are several options to support establishment care of park trees. First, the City can provide funds requested by PRNS to plant and care for a certain number of trees on an annual basis. PRNS can continue its partnership with OCF to provide trees and hold community tree planting events to offset some of the program costs. Another option would be for PRNS to use existing City fee structures to develop a per-tree cost to water a tree for 3 years and provide that document to OCF, City Council offices, and corporate groups so they can plan their tree planting event. Those groups should then provide the funds to PRNS before the tree planting event to cover 3 years of maintenance for each tree that will be planted. If the funds cannot be provided by the group, the tree planting could continue at the discretion of PRNS, under the assumption that PRNS would be responsible for tree care. Another option could be for PRNS to partner with OCF to apply for a CAL FIRE grant to fund the planting and care of park trees, to build on their current partnership. These are just some options to support the planting and care of park trees, and no one method is prescribed over another. The point is that tree planting and establishment care must be funded to have a successful tree planting program.

Pruning, Tree Removal, and Emergency Tree Work

The $150,000 of funding PRNS receives for tree maintenance is divided among the 10 Council Districts, with each district receiving approximately $15,000. While annual contractor and City costs have increased in recent years, the PRNS tree maintenance budget has either declined or remained constant. This level of funding does not even address all liabilities, and forces PRNS to prioritize trees that present the biggest risk factor, which frequently includes the removal of dead or dying trees. The costs associated with removing large trees means that in some cases only 2 to 3 trees per District are removed each year, leaving hundreds or more trees standing in poor condition. With all the funding directed towards tree removals, no funds remain to proactively prune trees and mitigate risk. In the event of a tree emergency, PRNS staff must find the funds to do the work in other budgets like capital improvement funds, make requests to City Council offices, or identify limited special park funding. As discussed in the section about pruning street trees, this type of reactionary maintenance is more expensive than proactively pruning trees and has the potential to elevate the risk associated with a tree by not mitigating a defect in a timely manner. As reported by PRNS staff, the park tree population is aging and in decline. Older trees result in higher pruning costs, and they are more prone to stem, branch, or whole tree failure as tree parts begin to decay. These trees should be inspected for their health and safety.

Multiple steps will need to be taken for PRNS to be able to actively manage park trees. The completion of a park tree inventory will provide PRNS staff with the information to understand the condition of park trees and determine which trees present elevated risk levels. The inventory can then be used to develop annual maintenance plans that prioritize the highest risk trees for pruning or removal. The maintenance plans should be based on a 5-year timeline to bring the maintenance cycle within the recommended frequency. PRNS will either need a staff arborist or third-party consulting arborist to further conduct tree assessment and risk evaluations throughout the year to continually update the inventory and identify potential hazards. However, this management program is dependent on PRNS receiving funding beyond current levels. The goal is to provide a diligent effort based on a reasonable inspection and maintenance cycle that allows tree health to be improved/maintained while reducing risk through an industry consistent management program.

TREE REPLACEMENT

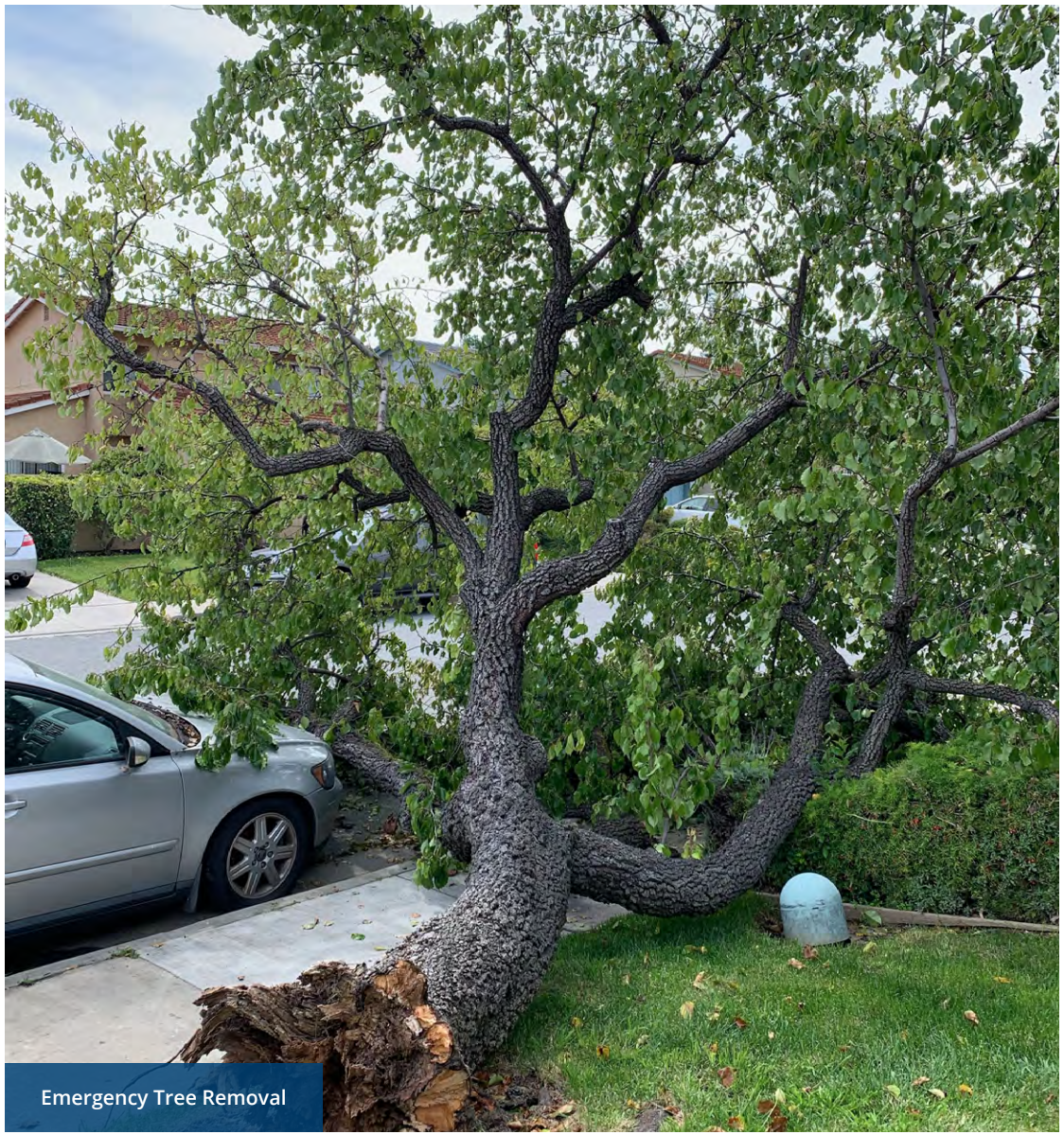
PRNS has an internal standard to plant three trees in the same park where one tree was removed. The policy is a higher replacement ratio than other City policies that usually require a one-for-one replacement of trees on private property and street trees, although four-to-one replacement may be required for mature native trees in parks as well. PRNS also selects the replacement species based on site conditions and does not automatically replace with the same species. Both practices create a more sustainable tree replacement policy as the higher replacement ratio and appropriate species selection would recover lost canopy and environmental services over a shorter time frame. The main issue of the policy is the requirement to plant trees in the same park

from which trees were removed. In some situations, the park with the removed tree(s) does not have the space to support more than one or two new trees despite losing a large tree. PRNS staff must still plant the required number of replacement trees in the park even though they will not have sufficient space for their canopies when mature. The PRNS replacement policy should be directed toward the goal of maximizing canopy cover in City parks overall and revised to allow flexibility in the locations trees are replanted when parks do not have space to support all replacement trees. The remainder of replacement trees could then be planted in nearby parks that lack canopy cover.

San José City Staff

RECOMMENDATIONS FOR PARK TREE MANAGEMENT

Section – Subsection	Recommendation	Discussion
Tree Planting	Identify a mechanism to adequately staff and fund park tree planting.	PRNS staff may partner with City departments and OCF to leverage tree plantings in parks. Without a formalized tree planting mechanism for parks, there is a strong possibility of sharp decrease of park canopy cover because there are not enough trees being planted to replace predicted removals.
Establishment Care	Identify a mechanism to adequately staff and provide establishment care to park trees	Without establishment care, trees planted in parks are likely to fail. The City can provide funds requested by PRNS to plant and care for a certain number of trees on an annual basis. PRNS can continue its partnership with OCF to provide trees and hold community tree planting events to offset some of the program costs. Another option would be for PRNS to use existing City fee structures to develop a per-tree cost to water a tree for 3 years. Another option could be for PRNS to partner with OCF to apply for a CAL FIRE grant to fund the planting and care of park trees, to build on their current partnership.
Pruning, Tree Removal, and Emergency Tree Work	Conduct a risk assessment of all park trees.	As reported by PRNS staff, the park tree population is aging and in decline. Older trees result in higher pruning costs, and they are more prone to stem, branch, or whole tree failure as tree parts begin to decay. These trees should be inspected for their health and safety.
Pruning, Tree Removal, and Emergency Tree Work	Complete a park tree inventory	The completion of a park tree inventory will provide PRNS staff with the information needed to understand the condition of park trees and determine which trees present elevated risk levels. The inventory can then be used to develop annual maintenance plans that prioritize the highest risk trees for pruning or removal.
Tree Replacement	Consider revising the requirement to replant trees in the same park in which they were removed.	The PRNS replacement policy should be directed toward the goal of maximizing canopy cover in City parks overall and revised to allow flexibility in the locations trees are replanted when parks do not have space to support all replacement trees. The remainder of replacement trees could then be planted in nearby parks that lack canopy cover.



Emergency Tree Removal

Planning, Building, Code Enforcement (Private Property)

One factor to developing a sustainable community forest is the extent to which the City can effectively influence the management of trees on private property as most of the community forest exists on privately owned land. These trees are managed differently than street trees on private property, and are under the purview of the Planning, Building, and Code Enforcement Department. The City's methods by which it can influence tree management on private property are a combination of indirect actions, such as community education campaigns, and direct actions, such as City ordinances, policies, and permits. While each method has a different approach to influence private property owners, the goal is the same: to grow and maintain healthy trees on privately owned land. An attractive quality of a robust community education campaign is voluntary participation from private landowners to contribute to reaching environmental and sustainability goals by implementing City standards for tree management. While some private landowners will adopt and implement City tree management standards, it is not reasonable to expect all private landowners to do so, which is the impetus for City ordinances, policies, and permit procedures to further enforce tree management standards on private property.

Private Property Tree Removal Definitions

PROTECTED TREE

The first component in reviewing Municipal Code 13.32, which regulates tree removal on private property, is to understand and discuss what is defined as a protected tree (i.e., a tree protected by ordinance and requiring a permit approval for removal) on private property. The Municipal Code requires a property owner to obtain a permit prior to the removal of any live or dead "tree" on a residential private property and provides the following definition of a "tree" on private property:

> *"Tree" means any live or dead woody perennial plant characterized by having a main stem or trunk which measures thirty-eight (38) inches or more in circumference at a height of fifty-four (54) inches above natural grade slope. For purposes of this Chapter, a multi-trunk tree shall be considered a single tree and measurement of that tree shall include the sum of the circumference of the trunks of that tree at a height of fifty-four inches above natural grade slope. "Tree" shall include the plural of that term.*

Oak Tree

The private property tree removal ordinance's definition of a protected tree has a positive impact on the sustainability of the community forest. Typically, a municipal code will define a protected tree by the trunk DSH and specific tree species. However, the San José Municipal Code only uses trunk DSH to define a protected tree and allows for the removal of a limited number of 'unsuitable' tree species under specific circumstances. Trees that meet this size threshold (38-inch circumference, which equates to an approximately 12-inch DSH) for protection are considered "ordinance-sized" trees. The choice to protect all species that meet a 12-inch DSH threshold is a significant step to protecting most trees that make up the community forest on private property. While the removal of any tree results in a loss of canopy cover and associated environmental services, middle-aged (DSH of 19 to 24 inches) and mature trees (DSH of 25 inches or larger) provide significantly higher canopy cover and environmental services than immature (DSH of 0 to 6 inches) and young (DSH of 7 to 18 inches) trees. Using a 12-inch DSH as a standard for tree protection is a sufficient balance of retaining trees with a high environmental value to the City without making the ordinance a burden on private property owners. The size threshold for when a tree becomes protected on private property should remain in place and be reviewed periodically to ensure it continues to meet CFMP sustainability goals. It should be noted that this protection for ordinance-sized trees applies to single-family or duplex lots, while trees of any size on multifamily, commercial, or industrial lots are protected.

HERITAGE TREE

Per Municipal Code Section 13.32.140, heritage trees are also protected by City ordinance. The Municipal Code defines "heritage trees" as follows:

> *Any tree as the term "tree" is defined in Section 13.28.020 located on private property which, because of factors including but not limited to its history, girth, height, species or unique quality, has been found by the city council to have a special significance to the community shall be designated a heritage tree. Such trees shall be placed on a heritage tree list which shall be adopted by the city council by resolution, which resolution may be amended from time to time to add to or delete certain trees therefrom.*

The protection for heritage trees includes enforcement action by the City against any person who unlawfully vandalizes, grievously mutilates, removes or destroys a heritage tree. The penalty includes an administrative citation and a fine set forth by the city council for each afflicted heritage tree. This protection of trees that are large, historic trees, or of unique quality is another positive step toward protecting trees that significantly contribute to character of neighborhoods as well as the City's overall canopy cover.

UNSUITABLE TREE

The City includes an additional definition of "unsuitable trees" that can be used to apply for a tree removal permit. The definitions of an "unsuitable tree" by land use types are as follows (Municipal Code Section 13.32):

- **For single-family and duplex lots:**
- **The tree trunk is 5 feet or less from the existing residence, secondary unit or garage.**
- **The tree trunk is 5 feet or less from the centerline of a below-ground utility line or pipe.**
- **The tree is on the City's List of Unsuitable Trees, which are certain tree species identified as being unsuitable for single-family lots, and includes: Eucalyptus, Liquidambar, Pine, Tree of Heaven, Tulip tree, and Palm tree (unless in the Palm Haven Conservation Area). This list does NOT apply to street trees or trees on duplex, multifamily, or commercial/industrial properties.**
- **For multifamily lots: The tree trunk is 5 feet or less from the existing multifamily residential building.**
- **For all land uses: The tree trunk is 5 feet or less from the centerline of a below-ground utility line or pipe.**

During interviews, City staff expressed that the intent of the above clause was to make it easier and less expensive for residents to remove certain tree species that are undesirable in the San José landscape or when a tree is perceived to be a nuisance. The conditions are in support of that effort by allowing tree removal when a tree is within 5 feet of a residence, secondary unit, garage, or the centerline of a below-grade utility pipe or line. These definitions indicate the intent of the City is to prevent damage to existing houses and infrastructure by anticipating that the proximity of the tree would eventually cause a conflict. However, the proximity of a tree to a home, utility line, sidewalk, or driveway does not inherently mean that it will cause damage in the future. Many factors contribute to whether a tree root, trunk, or limb will impact adjacent hardscape like the tree's health, soil conditions, water availability, and surface root growth. The unsuitable tree species allowance could allow for the removal of trees that appear to present a conflict but may grow their entire lifespan near infrastructure without ever causing damage.

A removal permit can also be issued for trees that have been found by the City Council to be "uniquely less compatible with the immediate environment because the species is invasive or non-native to the San José region or is suscepti-

Exhibit 1. Tree Risk Assessment Matrix

Matrix1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impact			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk rating matrix.

Likelihood of Failure	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

ble to disease" (Municipal Code 13.32.020). The selected species are currently defined as eucalyptus, liquidambar, palm, pine, tree of heaven, and tulip. It should be noted that eucalyptus, liquidambar, palm, pine, and tulip are not tree species but the larger species categorization of multiple genera of trees. If the City wishes to continue to define unsuitable tree species, it should update the language to better reflect if it is targeting a specific species such as *Liquidambar styraciflua* (American sweetgum tree), or the larger *Liquidambar genus*. It also assumes that the aforementioned species are unsuitable under any circumstance without examining site conditions, tree health, and benefit to the landscape. The unsuitable tree species allowance has the potential to lead to the removal of healthy trees that present a low risk and would otherwise be considered appropriate for the landscape. Based on these factors, the definition of an unsuitable species should either be completely removed or be narrowed to a specific list of species that is determined by City arborists and other arboriculture experts of the San José region.

HAZARDOUS TREES

Another condition under which the City will allow permitted tree removal is in the instance of a safety hazard as defined in the tree removal permit application:

> *If an ordinance-size tree on private property presents an imminent safety hazard, it may qualify for an over-the-counter (same day) Unsuitable Tree Removal Permit. Please bring the completed application and required materials to the Permit Center to obtain the permit. If the tree is a street tree or heritage tree, immediately contact the City Arborist at 408-794-1901.*

It is reasonable to allow for the expedited processing of trees that present an imminent hazard to people or property to avoid consequences for tree failure. However, the definition presented is vague at defining an imminent safety hazard and who is qualified to determine if a tree presents an imminent safety hazard. A leaning tree or broken limb can have the appearance that there is an immediate threat to people and property by whole tree or tree part failure. But determining whether a tree is safe or presents a hazard requires an arborist with specialized knowledge and training from the ISA Tree Risk Assessment Qualification (TRAQ) program. The TRAQ standards provide

Dead Tree

the arboricultural risk rating system that uses a combination of the likelihood a tree or tree part will fail, the time frame in which failure may occur, likelihood of impact to target (e.g., people, home, car), and severity if impact should occur to determine the overall risk associated with a tree. Each factor of the TRAQ assessment is important to determine the overall risk rating as presented in Exhibit 1. While a tree may have a very likely possibility of failure and impact, if the consequences of the impact are negligible, then the overall risk associated with a tree is low. Conversely, a tree with severe consequences from impact to a target but unlikely to actually impact a target is also considered to have a low risk rating. All of these decisions should only be made by an arborist who is qualified in tree risk assessment, and not by Planning division staff members who lack the expertise. The City should process all hazardous tree requests through a City certified arborist or by a third-party consultant who are tree risk assessment qualified.

DEAD TREE

The final definition used in the private property tree removal permit application is for "dead" trees. The Municipal Code provides the following definition of a dead tree:

> *"Dead tree" means a tree that is no longer alive, has been removed beyond repair, or is in an advanced state of decline (where an insufficient amount of live tissue, green leaves, limbs or branches exists to sustain life) and has been determined to be in such a state by a certified arborist during a non-dormant or other natural stage of the tree that would minimize the likelihood that the tree would be mistakenly identified as being in such a dead state.*

The Municipal Code provides a useful definition of a dead tree as no longer living, but also includes trees that are in decline and are approaching the end of their life cycle. It is important that this determination is made by a certified arborist during a time of the year when a tree is nondormant to ensure an accurate assessment of its health condition is conducted.

PERMIT PROCESS AND FEES

Property owners must obtain a permit for removal of any tree protected by Municipal Code Section 13.32, as defined above. The permit process and associated fees vary for each type of tree removal permit application, including live trees, heritage trees, unsuitable trees, and dead trees. **Table 24** presents all tree permit fees of the Planning Department.

The processing of all permit applications begins with submitting the application and the following instructions:

- **You MUST provide the following required documents when you submit your application.**
- **Tree description table and site plan.**
- **Clear photograph of each tree. Provide a clear, color photograph showing the entire tree, printed or mounted on 8½ x11" paper. If seeking to remove a tree that is 5' or less from a structure, include a tape measure in the photograph that extends from the tree to the primary residence.**
- **Non-refundable fee if required. Make check payable to: City of San José.**
- **An arborist's report may be required. After reviewing your application, City staff may require you to submit a report from a licensed arborist; a report is typically required for dead and hazardous trees. If you already have a report, you may include it with your submission.**

The tree evaluation and tree description table and site plan require the applicant to provide several pieces of information that are not commonly understood by the public and would make the application difficult to complete. First, the applicant is asked to answer a series of questions related to tree risk, diseases, and whether they are dead or dying, conditions which should only be assessed by a qualified arborist. Second, the applicant must list each species of tree that are on the property and whether they are to be removed, remain, or replaced. Again, it is unreasonable to expect someone not experienced in tree species identification to identify a tree by its

Table 24. City of San José Planning Department Tree Removal Fee Schedule

Tree Type	Permit Fee	11.97% Citywide Planning Fee	Total fees
Dead Tree	$227	$27	**$254**
Each additional tree	$30	$3	**$33**
Unsuitable Tree	$227	$27	**$254**
Each additional tree	$30	$3	**$33**
Live Trees			
Single-family and two-family/duplex properties	$1,969	$235	**$2,204**
All other properties	$2,272	$271	**$2,543**
Heritage Trees	$10,038	$1,201	**$11,239**
Off-Site Tree Replacement Fee (per tree)	$775	NA	**$775**

Note: throughout the CFMP, the amounts shown for various fines and fees are subject to change.
Source: City of San José 2020b.

species or genus, where there is a high potential for trees to be identified incorrectly. The table also requires the applicant to include the trees circumference in inches but does not provide any further instruction on how to do so or the equipment needed. Again, this type of information is not commonly understood by those outside of the arboriculture profession and could be confusing for residents.

Finally, the tree removal permit requires the applicant to describe the reason for removal or replacement and lists the following as reasons why a tree would be considered for removal:

- **The tree is a safety hazard.**
- **The tree is dead, dying, or diseased.**
- **The tree is unsuitable.**
- **The tree restricts economic development and proposed improvement of a parcel.**

Determining a tree's health and safety condition or viability in a landscape are all judgments that should be made by a qualified arborist. Placing the expectation on a resident to clearly define the reasons for removal based on those considerations places an undue burden on an applicant that could lead to an incomplete or inaccurate application. The last part of the process states that an arborist report may be required for some applications but not all. An arborist report is required for a dead tree application but should also be required with a live tree or unsuitable tree application based on the information required by the application.

The application process requires applicants to pay a nonrefundable permit fee, as shown in Table 25. The permit fees for live trees ($2,204/$2,543) are significantly higher than fees associated with dead or unsuitable trees ($254). It is not clear how the Planning Division justifies the higher permit fees for live trees, when the $254 fee to process a permit for an unsuitable or dead tree requires the same application as a live tree removal permit. According to the Planning Application Filing Fee Schedule effective August 17, 2020, the hourly rate for Planning Division review of tree removal permit applications is $303 per hour (City of San José 2020b). These rates indicate it will take more than 7 hours of staff time to review an application, but less than 1 hour to review an unsuitable or dead tree application. Without further justification from the Planning Division, the tree removal permit fee for live trees appears to be excessive. When compared to the fines for illegal tree removal on private property without a permit, the excessive permit fee may actually discourage a resident from obtaining a legal permit to remove a tree:

- **$1,500 fine for illegal removal of a tree with a trunk diameter of 17.83 to 23.99 inches**
- **$2,000 fine for illegal removal of a tree with a trunk diameter of 24 inches or greater**

The fee schedule is also confusing when considering the permit fee for removal of a heritage tree. The permit fee for removal of a heritage tree is $11,239. While heritage trees warrant extra protections, the excessive permit fee may dissuade property owners from obtaining the appropriate permits for tree removal. Additionally, the fine for illegally removing or pruning a heritage tree is up to $10,000 (for the first offense). Similar to other live trees, the permit fee for heritage trees is greater than the fine for violating the ordinance.

The discrepancy in the permit fee and fine structure should be further reviewed and assessed so residents are encouraged to follow the City process to remove trees on private

Shade of street trees

property, and ensure replacement trees are planted to continue to expand Citywide canopy cover. The fine amount should also be reviewed to determine if it is sufficient to deter violation of the Municipal Code. Each San José street tree is worth approximately $3,003 in its structural and functional value based on the tree's species, size, and health condition (see San José Urban Forest Assessment section for more details). It might be more appropriate to determine a fine that reflects the loss in environmental services and economic value when a tree is removed.

The one variance in the tree removal permit process is that a permit application for dead trees must be submitted with a certified arborist report. The City correctly requests an extra layer of analysis before the application is submitted but does not require the same level of due diligence for ordinance-size and unsuitable tree removal applications. It is unclear why there is a higher standard of information required with dead tree removal applications, and the City would benefit from applying the same level of reporting to all application types.

REPLACEMENT TREE REQUIREMENTS

If a tree removal permit application is approved, the applicant is required to replace a tree as stated in the Planning Division application page:

- **You must replace each ordinance-size tree that you remove.**
- **Single-family/duplex lots: Replace with a minimum 15-gallon tree.**
- **Other properties: Contact the Planning Division for information about replacement trees**.

An effective tree replacement policy should be directed towards specific goals of the community forest program such as maintaining or increasing canopy cover, species diversity, or the environmental service benefits received from trees. The City's required one-to-one replacement ratio with smaller nursery stock (15-gallon trees) will not adequately address those goals without further clarification and refinement of the requirement. The tree species (current size and at maturity) being removed must be considered as there is the potential for a net loss of canopy cover and environmental services and benefits if an applicant removes, for example, a large tree such as a coast live oak, and replaces it with a small tree like a crape myrtle. The location of the removed tree is also important as trees planted close (beyond 5 feet) to a residence would have the added benefit of cooling homes during hot summer months and lowering energy use and costs. It may be difficult for single-family or duplex lot owners to find room on their property for more than one tree to be appropriately planted and maintaining a one-to-one replacement ratio would be important so the requirement can be met by all applicants.

It would be appropriate to update the replacement policy so the applicant is required to plant the tree in a location that would provide additional cooling and energy reduction benefit, and require a species that is similar in size and appropriate for site conditions without creating a future conflict with utilities or structures. Another consideration is giving each removed tree an appraised value based on the most recent approved methods of the Council for Tree and Landscape Appraisal, which would help recover the lost economic value of the tree. These updates would help to recover the loss of canopy cover and environmental services of the removed tree and meet goals of the community forest program. The permit application form directs applicants to contact OCF, which would be able to further assist in determining suitable tree

species and planting locations to meet the replacement requirement. The City benefits from OCF providing this consultation in the permit process by reducing City staff workloads and costs. Continuing with this arrangement could benefit the City as long as they do not have the City arborist inspector staff to provide this service.

Tree Protection During Construction

The City Municipal Code includes two sections that define standards to protect trees during construction. Section 13.28.420 discusses the methods to protect street trees when nearby construction work or activity is occurring on a building or structure, and Section 13.32.130 directs protection of trees on private property during site development. When tree protection is not reasonable or feasible during construction, tree removal permits are issued, and no further protection standards are required. In all other situations the site developer should follow the standards discussed in the City Municipal Code to protect trees during construction. Preserving trees during construction is key to ensuring a continuum of canopy cover within a specified development site or streetscape. ISA and the ANSI have both developed industry-standard tree protection measures that, when implemented, reduce the potential for impacts to tree health during and after construction. The review of the City tree protection construction standard is based on both ISA and ANSI standards and measured by their ability to protect and preserve trees during site development.

Municipal Code Section 13.28.420 outlines the standards to protect street trees during construction and are consistent with other municipalities and industry standards. The section provides clear direction that anyone without written permission is prohibited from damaging a street tree and lists several activities that are damaging to a tree. One area that could benefit from further clarification is the requirement to place guards around all nearby street trees to prevent injury to a tree. Instead of a general description of placing a guard around a tree, the City should provide a standard detail for protecting the tree trunk so there is no ambiguity in the requirement.

Municipal Code Section 13.32.130 provides a thorough list of protection methods that site developers should implement to protect trees during construction. While the section provides many standards that are industry-standard tree protection measures, it does not state that an arborist is required to have any oversight during the process. Instead of the City providing a list of protection measures, it should be incumbent upon the site developer to provide a tree protection plan that is developed or reviewed by a qualified certified arborist. Further, construction- related activities should only be allowed to begin after the City completes a site visit with the project arborist to verify that all protection measures are in place.

During interviews, Planning and DOT staff stated that while the City has standards for tree protection, they are not a requirement for development projects. As such, tree protection measures are often not implemented, resulting in the potential for trees on development projects to be impacted by construction-related activities. With the influx of urban infill development, it is anticipated that mature trees will continue to be impacted from development. Without a set standard and process for protecting and preserving trees, the City risks losing canopy cover on each development project.

RECOMMENDATIONS FOR PRIVATE PROPERTY TREE MANAGEMENT

Section – Subsection	Recommendation	Discussion
Private Property Tree Removal – Unsuitable Tree	Eliminate the "unsuitable tree" definition	The definition for an unsuitable tree is broad, not scientifically accurate, and allows for the unnecessary removal of many trees that are not actually unsuitable. The City would benefit from entirely getting rid of the unsuitable tree allowance to permit tree removal, so all tree removals are evaluated by a criterion based on arboriculture standards and not an arbitrary definition.
Private Property Tree Removal – Permit Process and Fees	Require due diligence from a certified arborist that no alternative exists to tree removal	If the City continues to allow tree removal when a tree is 5 feet from a residence, secondary unit, garage, or the centerline of a below-grade utility pipe or line, the City should also require a report from a certified arborist that the tree is in conflict with the adjacent structure or utility. The certified arborist report could determine if the tree in question is causing or has substantial evidence to indicate that it will cause a conflict in the future. The applicant and certified arborist should also explore mitigation options to resolve the conflict without removing the tree. Options could include root pruning, crown reduction, tree cables or bracing, and adjustments to the existing infrastructure.
Private Property Tree Removal – Permit Process and Fees	Provide an incentive for applications that are submitted with an arborist report	Multiple steps will need to be taken to improve the permit application process for ordinance-size and unsuitable private tree removals beginning with the information provided by the applicant. One option would be to give applicants a reduced permit fee when they provide a report prepared by a certified arborist who is also ISA Tree Risk Assessment Qualified. This incentive would encourage private property owners to have an expert review their tree concern before submitting removal applications to the City. It has the potential to reduce the number of applications submitted to the City, as arborists would be able to fully explain the options for tree preservation and whether the resident's concern warrants tree removal. It would also provide the City with better information to assess applications, which should reduce application processing time and associated staff review costs.
Private Property Tree Removal – Permit Fees and Fees	Review and align permit fees	The current permit fee for live tree removal is excessive and not supported by the level of review needed to process permits. It is also higher than the fine for illegal tree removals, and consequently does not encourage residents to file for a permit to remove a protected tree. For the City to have an effective ordinance to protect trees on private property, the permit fee must align with realistic costs of the City and not be a burden on applicants.

Section – Subsection	Recommendation	Discussion
Private Property Tree Removal – Permit Fees and Fees	Review the fine structure for illegal removal and pruning	It should be determined if the current fine structure for illegal tree pruning and removal is sufficient to deter violation and adequately replace the lost value of the tree. The review of the illegal removal fines should happen concurrently with the permit fees so there is continuity between the fees and fines that encourage participation in the City process to legally remove protected trees. The review process should also include a resource assessment that outlines how code enforcement will occur.
Private Property Tree Removal – Replacement Tree Requirements	Focus requirements of replacement trees on community forest program goals	The 1:1 tree replacement ratio should be directed towards goals of the community forest program to increase canopy cover, species diversity, and the environmental services of trees. It should also include a requirement for replacement trees to be similar in size at maturity of the removed tree. The City could also provide an approved replacement species list to applicants based on neighborhood-level species diversity goals. The City could further expand its partnership with OCF to provide guidance to homeowners to properly place trees around their property to cool homes and lower energy use.
Tree Protection During Construction	Require site developers to provide detailed tree protection plans in alignment with industry standards	It should be a condition of approval for development projects to provide a tree protection plan for all on-site and street trees that are to be preserved during construction. Tree protection plans should be prepared by a certified arborist hired by the site developer, and the plan should be approved by a City arborist. The protection plan should adhere to City, ISA, and ANSI standards.
Tree Protection During Construction	Conduct a site visit prior to any construction to ensure protection measures are installed	The site developer, project arborist, and City arborist (or contracted arborist) should conduct a site visit to confirm that all protection measures are implemented as described in the protection plan.
Tree Protection During Construction	Require a certified arborist to periodically monitor on-site construction activities when there is potential to impact trees	A certified arborist should be on-site whenever construction encroaches upon the critical root zone of a tree or a tree requires limb or root pruning. Any impacts to a tree should be documented by the project arborist with a report submitted to the Planning Division and City arborist to determine if the site developer is compliant with the protection plan.

City Planning Documents

This section will describe the relationship of the CFMP to other City documents that provide goals and policies relating to the community forest. The two main documents that influence Citywide environmental policy and programs are the City's Envision San José 2040 General Plan and Climate Smart San José. The City's General Plan is a long-range vision which establishes land use and circulation patterns with consideration for other issue area policies, such as those established for safety, conservation, or open space. The City has also adopted Climate Smart San José, which builds on the City Green Vision with a people-focused approach, encouraging the entire San José community to join an ambitious campaign to reduce greenhouse gas emissions, save water, and improve quality of life.

ENVISION SAN JOSÉ 2040 GENERAL PLAN

California law requires that every city and county prepare and adopt a long-range comprehensive general plan to guide future development and to identify the community's environmental, social, and economic goals. A general plan is currently required to include seven elements: land use, circulation, housing, conservation, open space, noise, and safety (OPR 2021). In addition to the mandatory elements, each jurisdiction can also include locally relevant elements, such as arts and culture, economic development, or air quality. The Envision San José 2040 General Plan is an integrated plan that consolidates mandatory elements with optional elements targeted at addressing the unique planning needs of the City. Adopted on November 1, 2011, and last amended on March 16, 2020, the Envision San José 2040 General Plan plans for future growth, development, and the provision of municipal services for San José. The Envision San José 2040 General Plan has a planning horizon of 2040 and plans for the development of up to 382,000 new jobs and 120,000 new dwelling units, supporting a population of approximately 1.3 million people.

The Envision San José 2040 General Plan identifies 12 major strategies. Collectively, these strategies build on the vision to directly inform the Land Use/Transportation Diagram and the Goals, Policies, and Implementation Actions formulated to guide the physical development of San José and the evolving delivery of City services over the life of the General Plan. These 12 interrelated and mutually supportive strategies are considered fundamental to achievement of the City's vision and together promote the continuing evolution of San José into a great city. These strategies are:

1. **Community Based Planning**
2. **Form Based Plan**
3. **Focused Growth**
4. **Innovation/Regional Employment Center**
5. **Urban Villages**
6. **Streetscapes for People**
7. **Measurable Sustainability/ Environmental Stewardship**
8. **Fiscally Strong City**
9. **Destination Downtown**
10. **Life Amidst Abundant Natural Resources**
11. **Design for a Healthful Community**
12. **Plan Horizons and Periodic Major Review**

Of these major strategies, the CFMP would directly support:

- **Urban Villages,** which aims to provide active, walkable, bicycle-friendly, transit-oriented, mixed-use urban settings for new housing and job growth;

- **Streetscapes for People,** which aims to provide safe, comfortable, attractive, and convenient access and travel for pedestrians, bicyclists, motorists, and transit users of all ages, abilities, and preferences;

San José Aerial View

- **Measurable Sustainability/ Environmental Stewardship,** which aims to advance the City's Green Vision through 2040 and establish Measurable Environmental Sustainability indicators consistent with Green Vision Goal #7;

- **Life Amidst Abundant Natural Resources,** which aims to promote access to the natural environment and a favorable climate as important strengths for San José by building a world-class trail network, reinforcing the Greenline/Urban Growth Boundary as the limit of the City's urbanized area, and preserving the surrounding hillsides largely as open space, and by adding parks and other recreational amenities to serve existing and new populations; and

- **Design for a Healthful Community,** which aims to support good nutrition and healthful air and water, protect the community from human-made and natural hazards and disasters, provide for economic opportunities that meet the needs of all residents, and provide for the equitable distribution of public resources, including public health facilities, throughout the City.

Each of the goals and policies included in the Envision San José 2040 General Plan supports one or more of these major strategies, of which 39 policies incorporate trees into the various goals. Additionally, the Envision San José 2040 General Plan recognizes ongoing tree planting activities as one method it will use to achieve its 2007 Green Vision to "create jobs, preserve the environment, and improve the quality of life for our community."

Table 25. Management Practices Related Goals and Policies

Goal MS-21 – Community Forest	
MS-21.1	Manage the Community Forest to achieve San José's environmental goals for water and energy conservation, wildlife habitat preservation, stormwater retention, heat reduction in urban areas, energy conservation, and the removal of carbon dioxide from the atmosphere.
MS-21.2	Provide appropriate resources to preserve, protect and expand the City's Community Forest.
MS-21.11	Create and maintain an inventory of the City's street and park trees.
MS-21.12	Complete the development of a Community Forest Master Plan that provides a strategy to achieve the City's Community Forest Goals; implement this Master Plan.
MS-21.13	Develop performance measures for tree planting and canopy coverage which measure the City's success in achieving the Community Forest goals. These performance measures should inform tree planting goals for the years between 2022 (the horizon year for the Green Vision) and 2040.
MS-21.14	Secure adequate human and financial resources to oversee all City tree services, to implement policies and to address the deferred and on-going maintenance funding needs for the community forest.
MS-21.18	Implement the Heritage Tree Ordinance to maintain and protect San José's heritage trees.
MS-21.19	Periodically update the heritage tree list, identifying trees of special significance to the community.

RELATIONSHIP TO CFMP

Each of the following discussions provide a brief analysis and recommendations for how the CFMP will support the goals and policies outlined in the Envision San José 2040 General Plan.

MANAGEMENT PRACTICES

Table 25 identifies the goals and policies that provide the foundation for the City's approach to managing the community forest. The current funding and staffing allocations prohibit the City from achieving the measurable sustainability (MS) directives MS-21.1, MS-21.2, and MS-21-14 of the General Plan. Some trees are providing a high level of environmental services, but others lack the care and maintenance needed to have a healthy and mature canopy. The goals and

objectives of the CFMP will help move the City toward directive MS-21.1, but without dedicated funding, the program will be difficult to achieve.

Most of the resources are in place to meet directive MS-21.2 except for having an arborist in the Planning Division to review development plans and removal applications. Currently, some staff who are not arborists are making decisions about the health and risk associated with trees, and they are not qualified to do so. The City should hire a certified arborist to work directly in reviewing development designs, project permits, and removal applications to ensure the best arboricultural practices are being instituted.

A street and park tree inventory needs to be completed, to meet directive MS 21.1. The City will need to continue to maintain an updated inventory by ensuring every tree is assessed on a 5-year cycle. To meet directives MS 21.12 and MS 21.13, the City can follow the implementation and monitoring protocols of the CFMP, and adjust goals and objectives based on the current environmental and economic conditions of the City.

Regarding directive MS 21.14, the City needs to first decide if property owners or the City will be financially responsible for the maintenance of trees in the public space, and then develop a dedicated funding stream, or cost reimbursement program, that funds the community forest management program at a sustainable level.

Directives MS-21.18 and MS-21.19 do not have clear success criteria for the Heritage Tree Ordinance or the desired outcomes. Currently, 134 trees and over 300 palms (Palm Haven Conservation Area) are listed in the inventory as heritage trees, out of the City inventory of 270,000 trees. The Heritage Tree Ordinance would benefit from clear objectives and goals that could be developed with an outreach and education campaign to highlight the services residents receive from trees.

Table 26. Species Selection Related Goals and Policies

Goal MS-11 – Toxic Air Contaminants [TACs]	
MS-11.5	Encourage the use of pollution absorbing trees and vegetation in buffer areas between substantial sources of TACs and sensitive land uses.
Goal MS-21 – Community Forest	
MS-21.3	Ensure that San José's Community Forest is comprised of species that have low water requirements and are well adapted to its Mediterranean climate. Select and plant diverse species to prevent monocultures that are vulnerable to pest invasions. Furthermore, consider the appropriate placement of tree species and their lifespan to ensure the perpetuation of the Community Forest.
MS-21.9	Where urban development occurs adjacent to natural plant communities (e.g., oak woodland, riparian forest), landscape plantings shall incorporate tree species native to the area and propagated from local sources (generally from within 5–10 miles and preferably from within the same watershed).
MS-21.10	Prohibit London plane trees from being planted in the Coyote Planning Area, which is located near the most significant stands of sycamore alluvial woodland in the City. Planting of this species is discouraged elsewhere, particularly near riparian areas. Prohibit holly-leaved oaks from being planted in areas containing stands of native oaks or in proximity to native oak woodland habitat.

SPECIES SELECTION

Table 26 identifies the goals and policies that frame the City's approach to species selection within the community forest. Species selection was reviewed through the CFMP process, with consideration for the directives related to species selection, and created a standard for species selection based in part from the elements discussed in this section. Next steps include updating the list of recommended species and providing residents with guidelines for selecting an appropriate species for their residential location.

Table 27. Development and Design Practices Related Goals and Policies

Goal MS-14 – Reduce Consumption and Increase Efficiency	
MS-14.4	Implement the City's Green Building Policies (see Green Building Section) so that new construction and rehabilitation of existing buildings fully implements industry best practices, including the use of optimized energy systems, selection of materials and resources, water efficiency, sustainable site selection, passive solar building design, and planting of trees and other landscape materials to reduce energy consumption.
Goal MS-21 – Community Forest	
MS-21.6	Ensure that San José's Community Forest is comprised of species that have low water requirements and are well adapted to its Mediterranean climate. Select and plant diverse species to prevent monocultures that are vulnerable to pest invasions. Furthermore, consider the appropriate placement of tree species and their lifespan to ensure the perpetuation of the Community Forest.
MS-21.7	Where urban development occurs adjacent to natural plant communities (e.g., oak woodland, riparian forest), landscape plantings shall incorporate tree species native to the area and propagated from local sources (generally from within 5-10 miles and preferably from within the same watershed).
MS-21.20	Prohibit London plane trees from being planted in the Coyote Planning Area, which is located near the most significant stands of sycamore alluvial woodland in the City. Planting of this species is discouraged elsewhere, particularly near riparian areas. Prohibit holly-leaved oaks from being planted in areas containing stands of native oaks or in proximity to native oak woodland habitat.
Goal ER-6 – Urban Natural Interface	
ER-6.8	Design and construct development to avoid changes in drainage patterns across adjacent natural areas and for adjacent native trees, such as oaks.
Goal CD-1 – Attractive City	
CD–1.9	Give the greatest priority to developing high-quality pedestrian facilities in areas that will most promote transit use and bicycle and pedestrian activity. In pedestrian-oriented areas such as Downtown, Urban Villages, or along Main Streets, place commercial and mixed-use building frontages at or near the street-facing property line with entrance directly to the public sidewalk, provide high-quality pedestrian facilities that promote pedestrian activity, including adequate sidewalk dimensions for both circulation and outdoor activities related to adjacent land uses, a continuous tree canopy, and other pedestrian amenities. In these areas, strongly discourage parking areas located between the front of buildings and the street to promote a safe and attractive street façade and pedestrian access to buildings.
Goal ES-3 – Law Enforcement and Fire Protection	
ES–3.19	Remove excessive/overgrown vegetation (e.g., trees, shrubs, weeds) and rubbish from City-owned property to prevent and minimize fire risks to surrounding properties.
ES–3.20	Require private property owners to remove excessive/overgrown vegetation (e.g., trees, shrubs, weeds) and rubbish to the satisfaction of the Fire Chief to prevent and minimize fire risks to surrounding properties.

DEVELOPMENT AND DESIGN PRACTICES

Table 27identifies the goals and policies that frame the City's approach to development and design practices as they relate to the community forest. Frequently, trees are considered at the end of the design review process. As such, they are placed where space is available, which limits the amount and canopy size of the tree that can be planted to avoid conflicts with other parts of infrastructure. In recognition of this practice, the City has recently developed a guideline for private property development projects aimed at the long-term sustainability of trees on the project site. The guidelines include recommended practices to provide adequate soil volume for tree growth, minimizing conflict with infrastructure, and site canopy cover goals. If adopted and implemented at the beginning of the review process, development projects should be able to meaningfully include trees with other infrastructure to increase the amount and canopy size of the trees that can be planted.

Directive MS-14.4 accurately suggests planting of trees to reduce energy consumption. However, further details related to tree placement would help ensure that buildings are receiving

Table 28. Tree Preservation Related Goals and Policies

Goal MS-21 – Community Forest	
MS-21.4	Encourage the maintenance of mature trees, especially natives, on public and private property as an integral part of the community forest. Prior to allowing the removal of any mature tree, pursue all reasonable measures to preserve it.
MS-21.5	As part of the development review process, preserve protected trees (as defined by the Municipal Code), and other significant trees. Avoid any adverse effect on the health and longevity of protected or other significant trees through appropriate design measures and construction practices. Special priority should be given to the preservation of native oaks and native sycamores. When tree preservation is not feasible, include appropriate tree replacement, both in number and spread of canopy.
MS-21.8	For Capital Improvement Plan or other public development projects, or through the entitlement process for private development projects, require landscaping including the selection and planting of new trees to achieve the following goals: Avoid conflicts with nearby power lines. Avoid potential conflicts between tree roots and developed areas. Avoid use of invasive, non-native trees. Remove existing invasive, non-native trees. Incorporate native trees into urban plantings in order to provide food and cover for native wildlife species. Plant native oak trees and native sycamores on sites which have adequately sized landscape areas and which historically supported these species.
Goal ER-1 – Grassland, Oak Woodlands, Chaparral and Coast Scrub	
ER – 1.5	Preserve and protect oak woodlands, and individual oak trees. Any loss of oak woodland and/or native oak trees must be fully mitigated.
Goal CD-1 – Attractive City	
CD – 1.24	Within new development projects, include preservation of ordinance-sized and other significant trees, particularly natives. Avoid any adverse affect on the health and longevity of such trees through design measures, construction, and best maintenance practices. When tree preservation is not feasible, include replacements or alternative mitigation measures in the project to maintain and enhance our Community Forest
Goal CD-9 – Access to Scenic Resources	
CD – 9.2	Preserve the natural character of Rural Scenic Corridors by incorporating mature strands of trees, rock outcroppings, streams, lakes and reservoirs and other such natural features into project designs.

optimal energy reduction benefits of trees. Directives MS-21.6, MS-21.7, and MS-21.20 include guidance for selecting native trees and trees that are adapted to the City's climate, as well as prohibiting specific tree species. These directives would be supported by further guidance in the form of a recommended tree species and prohibited tree species list and providing guidelines for selecting an appropriate species based on the planting location.

Directive CD-1.9 provides valuable guidance for creating walkable and bikeable communities by providing pedestrian and bicycle amenities. However, the direction to "place commercial and mixed-use building frontages at or near the street-facing property line" and include "adequate sidewalk dimensions for both circulation and outdoor activities" is in conflict with the direction to have a 'continuous tree canopy' as it does not consider providing adequate space for street trees. Trees are an important component of creating attractive spaces that encourage pedestrian and bicyclist activity by providing shade and creating buffers between vehicular traffic and sidewalks or bike lanes.

TREE PRESERVATION

Table 28identifies the goals and policies that frame the City's approach to tree preservation. Directive MS-21.4 encourages the maintenance of mature trees on public and private property; however, it does not appear the City is making any investment in the education of residents on how to maintain trees, and directs a limited amount of funding to DOT and PRNS for tree management and maintenance. If these trees are an "integral" part of the community forest, then more attention needs to be given to them. It's not apparent that "all rea-

sonable measures" are being taken to preserve trees. Frequently, residential or commercial property owners who want to remove trees can do so without providing a possible alternative to removal.

Based on department interviews, when there is a conflict between existing trees and new development, the tree is usually removed to make room for the structure. Staff are reluctant to suggest or promote any alternative designs or construction practices as these are not included in approved City details. If they were, then staff could include them as a requirement in construction plans. To meet the intent of directive MS-21.5, the City has developed new design standards that provide City planners and engineers options for how a site can be developed to include trees on site plans so they have the necessary soil volume and aboveground space to reach a mature and full canopy without interfering with existing infrastructure.

Directive MS-21.8 suggests that trees that are non-native are not appropriate to be planted in the City and that native trees should be prioritized. The added benefit to planting native trees is an increase wildlife habitat and biodiversity. However, all trees provide environmental benefits, and some non-native trees are appropriate for the current and changing climate conditions of the City. Removing non-native trees without further reasoning beyond their status as non-native is contradictory to goals of creating a sustainable urban forest and assumes that sites that historically supported native oaks and sycamore trees will continue to do so.

Species selection, and what is recommended to be preserved, should be based on CFMP goals and favor any species of tree that is suitable for the space provided and is low-water-use, drought-tolerant, and adaptable to future climate conditions. Native trees should be encouraged when appropriate and planted to the extent that they meet species diversity goals.

Table 29. Community Investment and Collaboration-Related Goals and Policies

Goal MS-21 – Community Forest	
MS-21.15	Strengthen the City's existing partnership with Our City Forest, and develop new partnerships with other non-profits, businesses, other agencies and the community, to maximize available resources to maintain and expand the Community Forest.
MS-21.16	Collaborate with other government agencies – local, state and federal – to leverage resources to achieve the City's Community Forest goal.
MS-21.17	Support volunteer urban forestry programs that encourage the participation of citizens in tree planting and maintenance in neighborhoods and parks throughout the City.

COMMUNITY INVESTMENT AND COLLABORATION

Table 29 identifies the goals and policies that frame the City's approach to community investment and collaboration for the community forest. OCF is the City's primary partner in engaging the City's residents in the community forest and in it's 25-year history has helped support the MS-21.15 goals by leveraging over $15 million dollars in local, state, and federal funds to support community forest program goals. Modeling from the successes of initiatives like OCF's 2015 CAL FIRE-funded "Trees for All" project which targeted plantings in disadvantaged San José neighborhoods, the City and OCF could pool resources so more state grant opportunities can be pursued to support the planting of trees and education efforts in disadvantaged

communities. This is one example of many ways the two entities could partner on future grant opportunities that support the defined efforts and strengths of each.

The City could also begin to explore partnerships with other community-based organizations that have a direct relationship to various neighborhoods and demographic segments of the City. A similar model is used in Los Angeles where six different nonprofit organizations partner with the City to engage residents in specifically designated areas of the City. The organizations provide a deeper connection and relationship with the residents in the neighborhoods they serve that can be advantageous for advancing the community forest goals of the City. It would be important to have clearly defined outcomes and deliverables for new organizations similar to the OCF and City partnership.

NEIGHBORHOOD CHARACTER

Table 30 identifies the goals and policies that frame the City's approach to neighborhood character as it relates to the community forest. These directives collectively underscore the importance of trees to neighborhood character, and the City should continue to utilize the community forest to provide a com-

Table 30. Neighborhood Character-Related Goals and Policies

Goal CD-2 – Function	
CD-2.1	Promote the Circulation Goals and Policies in this Plan. Create streets that promote pedestrian and bicycle transportation by following applicable goals and policies in the Circulation section of this Plan. Create a comfortable and safe pedestrian environment by implementing wider sidewalks, shade structures, attractive street furniture, street trees, reduced traffic speeds, pedestrian-oriented lighting, mid-block pedestrian crossings, pedestrian-activated crossing lights, bulb-outs and curb extensions at intersections, and on-street parking that buffers pedestrians from vehicles.
CD-2.3	Enhance pedestrian activity by incorporating design techniques and regulating uses in private developments, particularly in Downtown, Urban Villages, Main Streets, and other locations where appropriate. Include attractive and interesting pedestrian-oriented streetscape features such as street furniture, pedestrian scale lighting, pedestrian oriented way-finding signage, clocks, fountains, landscaping, and street trees that provide shade, with improvements to sidewalks and other pedestrian ways. Sidewalks should be wide with ample pedestrian amenities, including street trees, high-quality landscaping, pedestrian curb extensions or bulb-outs, enhanced street crossings, and pedestrian-oriented signage identifying trails and points of interest.
Goal LU-12 – Urban Agriculture	
LU-12.6	Use the City's public works projects (street lights, street tree plantings, sidewalk design, etc.) to promote, preserve, or enhance the historic character of Conservation Areas.
Goal LU-13 – Landmarks and Districts	
LU-13.10	Ensure City public works projects (street lights, street tree plantings, sidewalk design, etc.) promote preserve, or enhance the character of Historic Districts.
Goal LU-14 – Historic Structures of Lesser Significance	
LU-14.7	Ensure City public works projects (street lights, street tree plantings, sidewalk design, etc.) promote preserve, or enhance the character of Conservation Areas.
Goal LU-17 – Hillside / Rural Preservation	
LU-17.3	Minimize grading on hillsides and design any necessary grading or recontouring to preserve the natural character of the hills and to minimize the removal of significant vegetation, especially native trees such as Valley Oaks.

fortable and safe pedestrian environment, enhance Conservation Areas and Historic Districts, and minimize impact to native trees.

LONG-TERM GOALS

Table 31 identifies the goals and policies that frame the City's approach to long-term goals as they relate to the community forest. These directives lead San José to growing the community forest's canopy with a goal to plant 100,000 trees by 2022. The City is a leader in climate resiliency planning and should continue to invest in its community forest as an asset in achieving climate adaptation.

Table 31.
Long-Term Goals-Related Goals and Policies

Goal IP-3 – General Plan Annual Review and Measurable Sustainability	
IP-3.8	Consistent with the City's Green Visions, evaluate achievement of the following goals for environmental sustainability as part of each General Plan annual review process: Develop performance measures for tree planting and canopy coverage which measures the City's success in achieving the Community Forest goals. These performance measures should inform tree planting goals for the years between 2022 (the horizon year for the Green Vision) and 2040. [Community Forest Action MS-21.16]
IP-17.1	Use San José's adopted Green Vision as a tool to advance the General Plan Vision for Environmental Leadership. San José's Green Vision is a comprehensive fifteen-year plan to create jobs, preserve the environment, and improve quality of life for our community, demonstrating that the goals of economic growth, environmental stewardship and fiscal sustainability are inextricably linked. Adopted in 2007, San José's Green Vision establishes the following Environmental Leadership Goals through 2022: Plant 100,000 new trees and replace 100 percent of our streetlights with smart, zero emission lighting; With an integrated approach, planting 100,000 new trees and replacing all of the of the City's streetlights with smart, zero emission lights, will help the San José "green" its transportation system—to create an integrated, sustainable system that consumes less energy, protects the environment, and accommodates growth in a manner that enhances the City's quality of life.

CLIMATE SMART SAN JOSÉ

Adopted in 2018, the Climate Smart San José plan builds upon the foundational goals and policies identified in the Envision San José 2040 General Plan, and provides additional analysis, recommendations, and corresponding metrics. It articulates how every facet of the City—from buildings, to mobility, to growing the workforce—needs to transform to minimize the City's impact on climate change.

To achieve the goals outlined in the Climate Smart San José plan, multiple stakeholders must come together: City departments, related agencies, the private sector, and, ultimately, residents and community groups. Climate Smart San José introduces a new framing coined "the Good Life 2.0," which gains traction by articulating the quality of life benefits of sustainability. In addressing benefits through the priorities of residents, such as an affordable home, time with their loved ones, and pleasant open space to enjoy with their families, Climate Smart San José generates excitement around tangible issues that matter to the community.

Climate Smart San José outlines a framework for action that includes three pillars, each of which provides strategies towards implementation. **Table 32** outlines each pillar and strategy and addresses potential ways the CFMP could support each pillar.

Table 32. Potential ways the CFMP Can Support Climate Smart San José

Pillars	Strategies	Potential Ways the CFMP Can Support Climate Smart San José
Pillar 1: A sustainable and climate smart city	1. Transition to a renewable energy future 2. Embrace our Californian climate	Plan for a community forest filled with diverse species that are appropriate for California's current and changing climate.
Pillar 2: A vibrant city of connected and focused growth	1. Densify our city to accommodate our future neighbors 2. Make homes efficient and affordable for our families 3. Create clean, personalized mobility choices	Provides more walkable communities, reduces heating and cooling costs, and beautifies neighborhoods.
Pillar 3: An economically inclusive city of opportunity	1. Develop integrated, accessible public transport infrastructure 2. Create local jobs in our city to reduce vehicle miles traveled (VMT), 3. Improve our commercial building stock 4. Make commercial goods movement clean and efficient	Provides shade for public transit stops, adds new jobs as the community forest grows, and reduces air pollutants from the transportation of commercial goods

The CFMP is uniquely primed to support the strategies and goals outlined in Climate Smart San José. While none of the 94 options for supporting City action directly mentions trees, the community forest is currently serving the City in achieving its Climate Smart San José vision by supporting strategies to make homes efficient and affordable for residents.

While Climate Smart San José does not directly capitalize on the City's community forest, the CFMP will highlight opportunities that can be incorporated in future iterations of the Climate Smart San José plan. For example, Climate Smart San José aims to reduce household energy use to 5,704 kilowatt-hours by 2050; proper placement of trees on private property can help reduce heating and cooling costs for households, which could help achieve this milestone. The community forest can also support the milestone to have 114,400 vehicles off the road as trees support walkable neighborhoods, which help to reduce car dependency. The community forest is an existing City asset that with a relatively small investment would enhance the Climate Smart San José plan.

Coast live oak

Urban Village Plan

The Envision San José 2040 General Plan establishes the Urban Villages concept and land use designation to encourage new jobs and housing growth via infill development and redevelopment in areas that are walkable, bicycle-friendly, mixed-use settings that have access to existing transit, infrastructure and facilities. The Urban Villages presented in the General Plan are divided into four categories: Regional Transit Urban Villages, Local Transit Urban Villages, Commercial Corridor and Center Urban Villages, and Neighborhood Urban Villages. Each Urban Village area would be implemented through development of a written Urban Village Plan.

The Urban Villages concept guides the City toward sustainable growth through infill development and redevelopment of underutilized sites. The concept also helps the City to attain its environmental, fiscal, economic, and transportation goals by protecting the City's remaining open space areas and discouraging urban sprawl; reducing greenhouse gas emissions and creating healthier communities by encouraging alternative and active transportation; and promoting economic development by revitalizing urban areas.

Goal CD-7 of the General Plan sets forth design goals for the Urban Village Plan areas:

> *Goal CD-7, Urban Villages Design: Create thriving, attractive Urban Villages that reflect unique urban characteristics of an area and provide complete neighborhoods for residents, workers, and visitors.*

Policies CD-7.1 through CD-7.10 provide design guidelines related to land use types, urban design character, outdoor gathering spaces, building height and density, access to parks, and Urban Village Plan development and approval. Additional policies throughout the General Plan guide Urban Village Plan development in terms of urban form, transportation, housing, commercial areas, educational facilities, healthcare facilities, public services, and amenities. However, the policies lack guidance for inclusion of trees and green infrastructure in the design of Urban Villages. One policy, PR-1.9, considers access to open space and parkland:

> *PR-1.9: As Urban Village areas redevelop, incorporate urban open space and parkland recreation areas through a combination of high-quality, publicly accessible outdoor spaces provided as part of new development projects; privately or, in limited instances, publicly owned and maintained pocket parks; neighborhood parks where possible; as well as through access to trails and other park and recreation amenities.*

Chapter 7 of the General Plan presents implementation strategies for the goals and policies set forth in the General Plan. Implementation Goal IP-5 and its sub-policies provide strategies for implementing the Urban Village Planning process. Some of these sub-policies (IP-5.1, IP-5.9, and IP-5.10) assert that plans for urban character and streetscape design as well as provision of parks and public open space are necessary components that should be addressed in an Urban Village Plan.

While the Urban Village Plan concept encourages sustainable growth through mixed-used, transit-oriented development, the concept does not specify or encourage the inclusion of green infrastructure within the plan areas. Green infrastructure plays an important role in placemaking while also providing environmental services and benefits to the residents and visitors of the Urban Village Areas. Planning for green infrastructure in dense urban areas, such as those envisioned for the Urban Village concept, is an important component of creating pedestrian friendly environments

American Sweet Gum

that promote health and well-being. By prioritizing green infrastructure in the Urban Village Plans, the City would receive additional benefits from the Urban Villages concept, such as cleaner air and reduced stormwater runoff, increased property values, reduced urban heat island effect, and attractive urban environments. As each Urban Village Plan is developed, the City should look to the CFMP to guide tree planting opportunities in each Urban Village area during the planning stages.

Green Stormwater Infrastructure Plan

The City of San José Green Stormwater Infrastructure Plan (GSI Plan) provides a framework for advancing the City's "gray" infrastructure to include green stormwater infrastructure. Green stormwater infrastructure (GSI) uses plants, soil, and pervious surfaces to capture and treat urban stormwater runoff and reduce the water quality impacts to receiving waters, such as local creeks and the San Francisco Bay. The GSI Plan includes guidance and standards for GSI project design and construction and aims to implement and institutionalize the concepts of GSI into standard municipal engineering, construction, and maintenance practices. The GSI Plan introduces the concept that urban forestry can be integrated with GSI to achieve multiple benefits that are in addition to reduced stormwater impacts, such as greening and beautifying of public spaces, increased pedestrian safety, habitat and ecological benefits (e.g., species diversity), improved air quality, reduced urban heat island effect, and reduced energy use. Additionally, the GSI Plan appropriately asserts that GSI facilities can be used to harvest rainwater that can be used for irrigation of trees and other vegetation.

Opportunities for implementing GSI facilities exist throughout the City and priority projects have been identified. For example, traffic calming improvements such as curb extensions and bulb-outs provide opportunities to integrate GSI facilities that include trees. The GSI Plan provides prioritization strategies for implementing GSI projects in the City. As part of the prioritization process, the existing conditions of potential project location and siting are considered for constraints; the presence of mature trees and the number of trees per block were included as a constraint to implementing GSI projects in certain locations, along with utility, space, and slope constraints. Estimated driplines of mature trees, and specifically 24-inch diameter trees are given a 2 foot buffer around the tree. By considering mature trees as a constraint to implementing GSI projects, the City has made an effort to preserve the existing mature trees when identifying locations for GSI projects.

The GSI Plan includes details about five existing and early implementation City projects, which consist of street improvement projects or "green street projects". Of these, two identify trees that have been or will be implemented as part of the projects (Chynoweth Avenue Green Street and San Carlos Safety Improvement Project). Additionally, Appendix C of the GSI Plan introduces concept design and fact sheets for six conceptual projects in the City, two of which discuss the planting of trees (Kelley Park Disc Golf Regional Stormwater Capture Concept) or the preservation of existing trees (Vinci Park Regional Stormwater Capture Concept).

RELATIONSHIP TO THE CFMP

The inclusion of trees and the community forest as part of GSI facilities is addressed, but the positive impact that trees can have on stormwater retention and filtration is not thoroughly explained. Additionally, when including trees in GSI facilities, it is important that the site is designed appropriately for trees. Soil properties and soil volume are key to growing trees in urban landscapes and using them successfully in GSI facilities.

Species selection should also be made in consideration of site specifics, growth rate, ornamental traits, size, canopy shape, shade potential, and benefits for wildlife. The project site should be evaluated during the planning stages to understand site constraints. Species used in GSI facilities should be resilient and compatible with the growing conditions asso-

ciated with the site, including the potential for pollution and other stressors associated with stormwater runoff and the urban environment.

While trees are generally recognized for their many benefits, their innate ability to absorb and divert rainfall is often underutilized. As addressed in the GSI Plan, maintaining surface and groundwater quality is important for both human health and the environment. Impervious surfaces in urban areas create an interconnected network of hardscapes, which reduces infiltration and groundwater recharge. Additionally, high volumes of runoff may lead to flooding, overloading of the stormwater system, and contamination of surface and groundwater resources (Berland et al. 2017). Trees can reduce the amount of stormwater runoff and pollutants that reach local waters by slowing and storing runoff, capturing and storing rainfall, creating conditions that promote infiltration of rainwater, and absorbing and converting pollutants into less harmful substances (EPA 2013).

Trees planted in areas designed for stormwater capture (e.g., bio retention basins/ bioswales) provide benefits of both stormwater capture and increasing the City's canopy. Incorporated trees into GSI facilities can include various design elements like the use of tree grates, bioretention soils, and suspended pavements. Designing GSI facilities to accommodate the largest size tree possible will increase its stormwater utility function while also making a greater contribution to the City's canopy cover (EPA 2013).

RECOMMENDATIONS FOR CITY PLANNING DOCUMENTS

Section – Subsection	Recommendation	Discussion
Envision San José 2040 General Plan-Relationship to CFMP-Management Practices	Adequately fund MS-21.1 to ensure the program will be achievable.	Some trees are providing a high level of environmental services, but others lack the care and maintenance needed to have a healthy and mature canopy. The goals and objectives of the CFMP will help move the City toward directive MS-21.1, but without dedicated funding, the program will be difficult to achieve.
Envision San José 2040 General Plan-Relationship to CFMP-Management Practices	To meet MS-21.2, the City should hire a certified arborist an arborist in support of the Planning Division to review development plans and removal applications.	The City should hire a certified arborist to work directly in reviewing development designs, project permits, and removal applications to ensure the best arboricultural practices are being instituted.
Envision San José 2040 General Plan-Relationship to CFMP-Management Practices	Clarify the Heritage Tree Ordinance	The Heritage Tree Ordinance would benefit from clear objectives and goals that could be developed with an outreach and education campaign to highlight the services residents receive from trees.
Envision San José 2040 General Plan-Relationship to CFMP-Species Selection	Update the list of recommended species and provide residents with guidelines for selecting an appropriate species for their residential location	Providing residents with an easily understandable resource list can increase resident education and health of newly established trees. Species selection, and what is recommended to be preserved, should be based on CFMP goals and favor any species of tree that is suitable for the space provided and is low-water-use, drought-tolerant, and adaptable to future climate conditions.
Envision San José 2040 General Plan-Relationship to CFMP-Community Investment and Collaboration	The City and OCF could pool resources to engage the City's residents in the community forest	The City and OCF could pool resources so that more state grant opportunities can be pursued to support the planting of trees and education efforts in disadvantaged communities.

Section – Subsection	Recommendation	Discussion
Envision San José 2040 General Plan-Relationship to CFMP-Community Investment and Collaboration	The City could also begin to explore partnerships with other community-based organizations that have a direct relationship to various neighborhoods and demographic segments of the City	Different nonprofit organizations that engage residents in specific areas of the City could provide partnerships that offer a deeper connection and relationship with the residents in the neighborhoods they serve. These relationships can be advantageous for advancing the community forest goals of the City.
Envision San José 2040 General Plan-Relationship to CFMP-Neighborhood Character	Leverage neighborhood character goals and priorities	The directives listed in CD-2.1 collectively underscore the importance of trees to neighborhood character, and the City should continue to utilize the community forest to provide a comfortable and safe pedestrian environment, enhance Conservation Areas and Historic Districts, and minimize impact to native trees.
Envision San José 2040 General Plan-Relationship to CFMP-Long-Term Goals	Leverage the City's leadership in climate resiliency planning.	The City should continue to invest in its community forest as an asset in achieving climate adaptation, as listed in goal IP-3.
Climate Smart San José	Align the CFMP with Climate Smart San José's 3 pillars	Opportunities for alignment include planning for a community forest that contains climate ready tree species, encouraging walkable communities, and managing trees that provide shade and other environmental benefits to residents.
Urban Village Plan	Prioritize green infrastructure in the Urban Village Plan	The City would receive additional benefits from the Urban Villages concept, such as cleaner air and reduced stormwater runoff, increased property values, reduced urban heat island effect, and attractive urban environments. As each Urban Village Plan is developed, the City should look to the CFMP to guide tree planting opportunities in each Urban Village area during the planning stages.
Green Stormwater Infrastructure Plan	Continue to consider mature trees in projects identified in the GSI Plan	By considering mature trees as a constraint to implementing GSI projects, the City has made an effort to preserve the existing mature trees when identifying locations for GSI projects.
Green Stormwater Infrastructure Plan	Evaluate all project sites identified in the GSI Plan during the planning stages	Species selection should also be made in consideration of site specifics, growth rate, ornamental traits, size, canopy shape, shade potential, and benefits for wildlife. Evaluating the project site during the planning stage will help understand and ideally prevent site constraints.

Our City Forest

The following section provides a discussion of the San José-based nonprofit organization Our City Forest (OCF), which is the main community partner for the City in engaging residents to plant and care for the community forest. This section is dedicated to a discussion of the OCF and City partnership because of the multiple OCF program areas that intersect with various community forest management activities and the depth of the partnership. It is also intended to highlight the potential to further leverage the strengths that both the City and OCF bring to the partnership, to bring more financial and human resources to maintaining and expanding the San José community forest.

BACKGROUND

In 1989, the City set a goal to plant 1 million trees for its 1 million residents. In response, OCF was formed in 1991 (incorporated in 1994) with supplemental funding provided by the City. Since that time, OCF has been a leading urban forestry and environmental stewardship nonprofit in Silicon Valley, and states the values of the organization are:

> *"We believe in the power of trees to turn our neighborhoods and cities from gray to green, and we believe in the power of people to help achieve this transformation."*

These values have guided the programs and direction of OCF since its inception, which began with a focus on community tree-planting activities. Since that time, OCF has expanded its programming to include tree care services, management of a tree nursery, a turf-removal program, and educational and training programs. As reported by OCF, these programs throughout its history have resulted in the engagement of over 200,000 community volunteers and residents, the planting and establishment of at least 80,000 trees and shrubs, and completion of approximately 15,000 community projects. Using state and federal grants, OCF has conducted tree plantings at 225 schools for 24 school districts, added 10,000+ trees to over 100 City parks, and planted tens of thousands of street trees throughout the city. OCF has also provided nearly 500 young adults with 1-year of job training opportunities where they provide community service in exchange for a $20,000 stipend. These AmeriCorps service members

Table 33. Our City Forest Revenue by Type, Fiscal Years 2006–2016

Type	Total Revenue	OCF-Generated Revenue	City Funds			
			Development Mitigation	Fee for Services	AmeriCorps Matching Grant	Operating Grant
Amount	$14,321,950	$10,252,035	$884,350	$616,785	$1,080,000	$1,488,780
Percent of Total	100%	72%	6%	4%	8%	10%

Table 34. City Funds as a Percent of Our City Forest Revenue by Type, Fiscal Year 2018–2019

Type	City Funds					
	OCF Operating Budget	Office and Nursery Lease	Fee for Services	AmeriCorps Matching Grant	Operating Grant	Total
Amount	$1,829,673	$275,000	$100,000	$123,600	$179,014	$697,614
Percent of Operating Budget	100%	15%	5.5%	6.8%	9.8%	37%

Note: City funding support of OCF increased in 2018-2019 due to unexpected new lease expenses

have contributed a total of approximately 740,000 service hours valued at an estimated $22.9 million dollars. The value of tree stewards caring for their trees and of community volunteers who have helped plant the trees is estimated at approximately $25 million. The service data of Our City Forest reflects their commitment to engage residents, contribute to the community forest, and empower people to transform their neighborhood. The City of San José and OCF have the opportunity to strengthen this partnership in order further engage residents, continue its work in disadvantaged communities, and meet City goals established in the CFMP.

OCF and City Partnership

CITY FUNDING

As a nonprofit organization, OCF generates funding for its operations and programs through individual and corporate donations, grants, fee for services, and funding provided by the City. **Table 33**reflects revenue reported by OCF to the consultant team from fiscal years 2006–2016.

Table 33 indicates that, on average, OCF total annual revenue for the time period was $1.4 million, with the City contributing 28% of OCF total revenue. In 2018-2019 City financial support increased to 37% of OCF total annual revenue (**Table 35**) This allocation is largely accounted for by the additional funds provided by the City to cover unexpected new lease expenses for the OCF main office and land that holds the OCF nursery.

The high level of financial support indicates that the City values the contributions of OCF and conversely, that OCF is reliant on the City to maintain operations. While the City is making a significant contribution to support OCF operations and programs, the current levels of operational support have not kept up with inflation since they were first initiated and may warrant an adjustment based on the Consumer Price Index.

OCF Community Nursery & Training Center

The Community Nursery is an example of OCF's ability to collaborate with other funding partners on behalf of the community forest and to create partnerships. OCF utilized two federal grants and one CAL FIRE grant to fund the building of the nursery on an empty City parcel on Airport property. Over 1,000 community volunteers helped build the nursery from scratch, coached by the OCF staff team and trained service members. The nursery officially opened to the public in 2013 and now holds thousands of trees, shrubs, and plants that are available to the public on a donation basis. Nursery trees are also used for City street and park projects and for distribution to single-family homes. The nursery is operated by OCF staff and AmeriCorps service members who manage approximately 2,500 nursery volunteers annually. In addition to providing trees on a suggested donation basis, OCF frequently holds training and workshop events to educate the public on the value of native plants, propagation, and other tree-related issues.

OCF initiated the program to improve the quality of nursery stock, expand species options and to provide the community trees for private property, since government grants at that point were restricted to public property. Both OCF and City staff recognize the need to increase the variety of species available in the nursery and are taking steps to address the issue. The City is beginning to develop a long-term plan for the species the City would like to plant in the future, so OCF can begin to acquire the desired species from commercial nurseries and grow them to a size appropriate for the public space. Further exploration into commercial nursery contracts for specific species is recommended.

AmeriCorps

In 2007 OCF began to apply for and receive AmeriCorps member placements to build the capacity of the organization. Since its inception, OCF has leveraged $1 million in City funding into an estimated value of $13 million of AmeriCorps service time. AmeriCorps is one of many service programs of the federally funded Corporation for National and Community Service that focus on six services areas, including disaster services, economic opportunity, education, healthy futures, veterans and military families, and environmental stewardship. Currently, 30 AmeriCorps members serve with OCF to support all programmatic areas from planting and caring for trees, leading volunteers, managing the nursery, and providing outreach to community members. AmeriCorps members have also assisted in the inventory of City trees, bilingual tree maintenance trainings, and turf conversion projects. To receive AmeriCorps members, OCF must provide matching funds to the Corporation for National and Community Service, which in return provides a living stipend and education award given to AmeriCorps members. Of the matching funds, 55% is directly contributed by the City on an annual basis, with the remaining balance the responsibility of OCF.

AmeriCorps members are a reliable source of support for OCF programs and staff to increase organizational capacity. More funding for this program may be warranted if it can be demonstrated that organizational capacity increases in proportion to the addition of new AmeriCorps members. If program funding is expanded, the City should set clear expectations and deliverables for OCF that align with the City's CFMP goals and where the increased capacity is most beneficial or has the highest return on investment.

Table 35. 2019/2020 CAL FIRE Urban and Community Forestry Program Grant Awards

Applicant	Location	Population	Project Type	Award Amount	Required Match
City of Los Angeles Sanitation	Los Angeles	3,966,936	Urban Forest Expansion and Improvement	$1,500,000	$375,000
Tree San Diego	San Diego	1,409,573	Urban Forest Expansion and Improvement	$1,180,000	$295,000
Our City Forest	San José	1,027,690	Urban Forest Expansion and Improvement	$748,000	$187,000
Friends of the Urban Forest	San Francis-co	874,961	Urban Forest Expansion and Improvement	$1,489,236	$372,309
Sacramento Tree Foundation	Sacramento	500,930	Urban Wood and Bi-omass Utilization	$750,000	$187,500
City of Watsonville	Watsonville	53,800	Inventory and Urban Forestry Manage-ment Plan	$700,000	$175,000

Grants

One avenue for nonprofit organizations to receive sizeable cash contributions in support of its programs is through government grants (see Funding Opportunities section for an extensive list). Over its 26-year history, OCF has been successful in applying for state and federal grants, receiving over $15 million in funding to support tree planting, establishment care, and community engagement activities. A key component of a successful grant application is demonstrating that other funds are contributing to the project from either the applying organization or from an outside entity. These matching funds can be in the form of cash contributions, like those OCF receives from the City, or in donated staff time, materials, and volunteer hours.

In California, one of the largest publicly funded grant opportunities is through the CAL FIRE Urban and Community Forestry Program. The CAL FIRE grant opportunity directly funds the planting and maintenance of trees, and other urban forest management activities including the creation of the San José CFMP. To receive these funds, the applying organization must provide 25% of the total budget through matching funds. As an example, a $1 million grant application would ask for $750,000 in funds and contribute $250,000 in match. An additional added benefit to this program is that a City or nonprofit organization can receive up to $1.5 million in funding to be used over a 3-year grant period. **Table 35**lists some of the awarded CAL FIRE Urban and Community Forestry Program projects for the 2019/2020 grant cycle. The full list of grant awards can be found on the CAL FIRE Urban and Community Forestry grants webpage.

Table 36. City of Los Angeles Sanitation Department's CAL FIRE Grant Awards

Year Awarded	Grant Total	Trees Planted	New Tree Planting Locations	Trees Watered for 3 Years	Outreach and Education
2019 –2020	$1,500,000	2,000	750	1,550	Yes
2018–2019	$1,500,000	1,800	1,100	1,300	Yes
2017–2018	$1,500,000	2,700	900	1,000	Yes
2016–2017	$1,000,000	2,000	350	350	Yes
2014–2015	$750,000	1,847	700	700	Yes
Totals	**$6,250,000**	**10,547**	**2,700**	**3,600**	**Yes**

These projects highlight the significant amount of grant funds being distributed to cities and nonprofit organizations throughout the state and demonstrate the potential for San José to receive a similar level of funds.

The current structure of the OCF and City partnership provides a solid foundation for successful joint grant applications. The maximum CAL FIRE award of $1.5 million requires a 25% matching contribution of $375,000, which is feasible for the City to provide through current operating grant funds and contribution of staff time. Matching City staff time can come in the form of staff time needed to prepare grant materials, permit tree planting locations and other related activities. OCF can also leverage trees from the nursery as a matching contribution towards a grant application.

One example of how Our City Forest has leveraged City support is through a CAL FIRE grant that awarded OCF $748,000 to plant 2,000 trees in disadvantaged and low-income neighborhoods of San José. This grant also supported OCF's stewardship model which ensures every tree is adopted and watered by the resident receiving the tree, and also financed follow-up tree inspections. These tree stewards continue to water their trees and report regularly to OCF using online tree tracking forms. This project is made possible by support of OCF's partners including the City, school districts, volunteer organizations, and neighborhood groups who commit matching funds in the form of staff time and tree establishment efforts. This grant demonstrates that OCF's current engagement model and partnership with San José can continue to be leveraged to help meet the City's tree planting goals while also staying focused on the OCF mission to educate and engage residents.

Another model for a grant-funded project is to have the City lead the development of the application and include OCF as a subconsultant to implement the project. The City of Los Angeles's Sanitation and Environment (LASAN) department has successfully used this model and received multiple CAL FIRE grant awards to complete tree planting projects in disad-

vantaged communities throughout Los Angeles. **Table 37** reflects awarded CAL FIRE grant funding and the expected grant deliverables of LASAN by year since 2014. Table 37 shows that CAL FIRE has recently increased the amount of available grant funds and OCF and the City could receive a higher amount of funding through a joint CAL FIRE grant application. A joint application would also add a layer of transparency to the partnership as both the City and OCF would work towards an agreed-upon set of deliverables.

An important aspect of the LASAN example is that the model and responsibilities of LASAN, other City departments, and non-profit partners are similar to San José. The grants are designed so LASAN, City departments, and non-profit partners can bring their specific strengths and functions to implement the project. The City of Los Angeles Urban Forest Division provides free City permits, watering, and inspections for tree planting locations; City Plants provides additional match in the form of trees to be planted; and the nonprofit partners plant and water the trees in the local communities they serve. This model ensures each partner is not asked to complete a task out of their scope of work and meets the individual and collective goals of the partners.

In San José, a grant project can be led by DOT, supported by other departments like PRNS, and implemented with OCF. DOT and PRNS can provide permits to plant trees, criteria for species selection, and confirming viable tree planting locations. OCF can engage and train community members, plant trees, and lead volunteer events focused on disadvantaged communities. It is reasonable that the City could submit a project within the same parameters as LASAN and be awarded a maximum grant amount of $1.5 million, as smaller sized cities like San Francisco have been awarded CAL FIRE grant funds of $1.4 million (**Table 35**).

Our City Forest AmeriCorps Member
PHOTO: OUR CITY FOREST

RECOMMENDATIONS FOR OUR CITY FOREST PARTNERSHIP

Section	Recommendation	Discussion
OCF and City Partnership	The City and OCF should further define OCF's role in supporting the goals of the City's community forest program	OCF has a mission to improve the community forest of San José by educating and engaging the community. The City and OCF should work together to define their shared goals and determine how current OCF programs will help meet those goals. Funding can then be dedicated to those programs to ensure OCF can use City funds to support its core values and mission.
Grants	OCF and the City should explore joint grant applications	Both the City and OCF independently apply for, and receive, state and federal grant funds to expand community forest programs. While the grant funding is sufficient to support the objectives of the individual project, more substantial funding can be received through a joint OCF and City grant application. A joint application could be designed so each entity provides a core service function to the project and matching contribution of a resource they already have available. This avenue would ensure the project does not require either OCF or the City to provide a service of which it does not have experience and could greatly expand funding for tree planting and establishment care in disadvantaged communities of San José.

OCF Nursery
PHOTO: OUR CITY FOREST

2

Strategic Workplan

Strategic Plan

Vision: The City of San José Community Forest is a testament to our history and honors our diversity while striving to cultivate the equitable values we hold true towards building a strong and resilient landscape and community forest.

Guiding Principles	Definition
Equity, diversity, and inclusion	City policies and management practices will reflect community values and achieve equitable outcomes by seeking the necessary resources for successful implementation.
Innovation	The City seeks emerging technologies and current research to inform the development of standards and best management practices that lead to a sustainable Community Forest.
Regional Identity	The City will maintain the unique sense of place and neighborhood character that comprises San José as it identifies distinctive community landscapes.
Resilient San José	The City will seek to protect neighborhoods from the adversities of climate change, and to restore and grow canopy cover to maximize the environmental, economic, social and health benefits of the Community Forest.

In order to implement the vision and guiding principles of the Community Forest Master Plan, the following strategies are recommended for implemementation. These strategies and objectives are to bring the City into alignment with the CFMP. Finally, recommendations for ways the City can reach the strategies and objectives are presented.

Streamline the Governance Structure

Strategy	
1	**Consolidate tree responsibilities to one division or create a new division.**
Objectives	
1a.	Evaluate respective benefits of consolidation of responsibilities, or expansion of citywide tree staffing to properly manage trees located within the public rights-of-way and at City-owned facilities; and on private property if removal is required. Propose appropriate structure not later than the 2023-2024 budget process.
1b.	Create one central City arborist or urban forester position to oversee and coordinate all community forest programs.
1c.	Consolidate Maintenance of Public Works-Maintained City Facility Trees to a new department.
1d.	Develop a strategy to manage trees in designated Riparian Corridors.

Strategy	
2	**Include trees in the beginning of the design and planning process**
Objectives	
2a.	Update the approval process for all development projects to require an arborist report with permit application materials that at a minimum includes: (1) a discussion of the existing conditions of the trees, (2) project impacts to trees, (3) tree candidates for preservation, (4) tree protection methods, and (5) required replacement plantings.

Strategy	
3	**Provide an arborist review of all Planning Division tree responsibilities**
Objectives	
3a.	Update the process for design review and approval of development projects to require the Building Division to provide City arborist recommendations to the project applicant as part of the initial review of the site plan.
3b.	All private property tree removal applications submitted to the Planning Division are reviewed by either a City arborist or on-call third party consulting arborist, who is also ISA Tree Risk Assessment Qualified.
3c.	All arborist reports submitted with private property development applications must be reviewed and verified by a City arborist as a condition of the protected tree removal permit approval process.

Ensure Community Forest Sustainability

Strategy	
1.	**Tree planting activities will promote a sustainable urban forest.**
Objectives	
1a.	Develop criteria for selecting tree species to plant on City managed streets, parks, and other public and open spaces that prioritizes trees known to be adapted to changing climate conditions such as extreme heat and drought.
1b.	The City tree inventory will comprise no more than 10% of one species, 20% of one genus, or 30% of one family.
1c.	Apply the 10% species, 20% genus, and 30% family standard to smaller geographic segments of the City based on existing defined neighborhood boundaries.
1d.	Create a dashboard of community forest sustainability indicators and annually update dashboard statistics based on the most recent City tree inventory data.
1e.	Continue to plant new trees to ensure a continuum of age diversity within the City managed tree inventory.

Strategy	
2.	**Increase tree canopy cover across all census tracts and neighborhoods.**
Objectives	
2a.	Achieve 20% Citywide canopy cover by 2051.
2b.	Annually plant 2,000 new trees on both public and private property. Total will not include trees that are required as replacement for a removed tree.
2c.	Evaluate and adjust the annual tree planting goal every 5 years to ensure the City is progressing towards canopy cover goals.
2d.	Work with local tree nurseries to ensure tree species and quantities are available to meet City tree planting goals.

Strategy	
3.	**Continually review the City recommended tree species list to ensure trees are adapted to climate change and support local habitat and wildlife.**
Objectives	
3a.	Tree planting projects in open space, riparian, and native habitat areas will prioritize tree species that contribute to wildlife habitat.
3b.	Tree planting projects in a City park will prioritize the use of local and regional native tree species.
3c.	Prioritize planting trees rated by Water Use Classification of Landscape Species (WUCOLS) as very low and low water users.
3d.	Identify trees that are not expected to adapt to changing climate conditions and replace them with new suitable species.
3e.	Increase the quantity of small and medium-sized species trees in the planting palette to provide more species options in locations that have limited soil volume.
3f.	Develop a strategy to create a network of trees that will support wildlife connectivity and biodiversity.

Support Diversity, Equity, and Inclusion

Strategy	
1.	**Ensure the diverse demographics of the City are represented by the community stakeholders who participate in guiding the development of the community forest program.**
Objectives	
1a.	Establish and maintain partnerships with community-based organizations that are inclusive of the diverse demographics of the City.
1b.	Establish a Community Forest Advisory Committee consisting of City staff and external stakeholders to guide the implementation of the Community Forest Management Plan.
1c.	Develop direct outreach and education programs informing the community on the value of trees, and roles and responsibilities, to under-represented communities; property renters, non-English speaking, and others.
1d.	Maintain the CFMP webpage and use it as a resource to update community members about new initiatives, educational programs, and outreach events.
1e.	All CFMP program materials, notices, and permits are made available in the 5 most common non-English speaking languages in the City and adhere to web content accessibility guidelines, and City branding guidelines.
1f.	Annually update the Transportation and Environment Committee on the status of the community forest and report on the progress of achieving CFMP goals. Invite stakeholders to attend and provide an opportunity for input on setting priorities for the community forest management program.
1g.	Review and modify, if needed, the agreements with OCF and any other non-profit partners the City may use to ensure that there are clearly defined parameters that align with the goals of the CFMP to expand tree canopy cover and promote equal representation in planning efforts.

Strategy	
2.	**Prioritize increasing canopy cover in disadvantaged communities.**
Objectives	
2a.	Prioritize tree planting activities in census tracts with low CalEnviroscreen scores and tree canopy cover or designated as areas of need by the San José equity atlas.
2b.	Collaborate with the Office of Racial Equity on prioritizing areas of the City with the highest CalEnviroScreen Scores for new tree plantings.
2c.	Develop a framework for the City and Our City Forest (OCF) to partner on and/or submit joint grant applications by providing matching resources that align with their expertise and mission statements, and directs resources to low-canopy and underserved communities.
2d.	Develop a residential shade tree distribution program in partnership with a utility, corporate sponsor, or community benefit stakeholder, to provide free trees to be planted on private property.

Funding the Community Forest

Strategy	
1.	**Develop a plan to annually provide funding to the community forest program so the City can sustainably manage the tree inventory, engage the community, and implement policies and ordinances.**
Objectives	
1a.	Define funding scenarios for tree maintenance to determine how much funding would be required to properly maintain: 1) existing trees in City right-of-way areas, 2) all street trees and park trees in the City inventory, 3) Trees at all City facilities
1b.	In collaboration with PRNS and other City stakeholders, research and identify potential funding mechanisms that would provide the necessary resources for the City to maintain all street and park trees.
1c.	Develop a multi-year proposal that will result in the maintenance of all City owned trees that meets the standards of the International Society of Arboriculture, American National Standard Institute, and quantify the budgetary impact to the City Council for inclusion in the annual budget.
1d.	Evaluate the policy benefits and costs of an incentive program for trees that relieves some (or all) of the maintenance responsibility from property owners for both existing and newly planted trees and make a recommendation during the 2022-2023 budget process.
1e.	Continue to evaluate the deficit in funds that are available to maintain the City's infrastructure in the annual Deferred Maintenance and Infrastructure Report
1f.	Collaborate with local and regional stakeholders including the urban forestry alliance of Santa Clara County to maximize funding opportunities.

Strategy	
2.	**Fund community forest management activities at a level to meet best management practices as defined by the City.**
Objectives	
2a.	All newly planted street trees will have a dedicated source to provide watering and establishment care for the first three years after planting, which may include a commitment for residential property owners, contracted maintenance, or irrigation.
2b.	Dedicate City or other appropriate funding to maintain and water the newly planted trees for projects initiated through community tree planting events within PRNS-managed sites.
2c.	Incrementally increase funding for the pruning of all street and park trees until the City achieves a pruning cycle that more closely aligns to the industry standard of 5-7 years.
2d.	Begin to allocate resources to the structural pruning of young trees.

Efficient and Effective Tree Management

Strategy	
1.	**Maintain current information on the community forest to ensure management decisions are based on the best available data.**
Objectives	
1a.	Complete a City tree inventory that at a minimum includes the information needed to analyze tree species diversity, health condition, age distribution, and inform management practices.
1b.	Maintain the City tree inventory in perpetuity, with each tree in the inventory assessed on a regular cycle.
1c.	Centralize tree inventory data using existing management software so community forest program dashboard goals and operational outcomes can be made available on a public online platform.
1d.	Regularly conduct an urban tree canopy cover analysis using LiDAR or other high-resolution spatial imagery.
1e.	Inspect trees for signs of decline, insect infestation, or pathogen infection. Collect samples from suspect trees and submit to a diagnostic laboratory or the Agriculture Commissioner's Office of Santa Clara County. Develop an appropriate long-term maintenance plan, or strategy to remove and replace failing species, to maintain canopy cover. Each tree to be evaluated every 5-7 years.

Strategy	
2.	**Ensure all City tree management activities and design standards reflect the most current understanding of community forest sustainability.**
Objectives	
2a.	Regularly review and update City tree management practices to reflect the current industry standards as defined by the International Society of Arboriculture, American National Standards Institute, and current research.
2b.	Develop and adopt alternative design standards for sidewalk installation and repair that minimizes conflicts between trees, sidewalks, and other infrastructure by considering and providing sufficient growing space for trees.
2c.	Develop and adopt design standards for street trees that provide access to stormwater runoff.
2d.	Green Stormwater Infrastructure projects will include the planting of one or more shade tree(s) that will contribute to stormwater reduction and avoided runoff.

Strategy	
3.	**Community members and private property owners will understand their role in growing and maintaining the community forest.**
Objectives	
3a.	Educate community members on their responsibility to maintain trees adjacent their property.
3b.	Continue to work with OCF to engage and educate residents on how to properly water and maintain newly planted trees, and explore the possibilities to expand the City and OCF partnership.
3c.	Educate private property owners on proper tree pruning practices.

Standardize and Improve Planning and Development

Strategy	
1.	**Protect and preserve mature trees**
Objectives	
1a.	All private property tree removal applications submitted to the Planning Division will provide written justification that no alternatives exist to tree removal.
1b.	Remove the 'unsuitable tree' definition from the private property tree removal application.
1c.	Update the notification process of all tree removal applications for development projects so City Council Offices and community stakeholders have the opportunity to provide comments on tree removals impacting their community.
1d.	Review the fee structure associated with private property tree removal applications and determine if it is feasible to institute incentives that would result in reduced fees for applicants.
1e.	Update the permit fees and illegal tree removal fee structure for private property tree removals so the fine to illegally remove a tree is greater than the permit fee to legally remove a tree.
1f.	Develop an integrated pest management plan that is coordinated on a regional scale with the City, Santa Clara County, and other relevant government agencies and municipalities.

Strategy	
2.	**City planning and development will contribute to increasing tree canopy cover.**
Objectives	
2a.	All development projects will provide site plans that result in 100% canopy cover over adjacent sidewalks within a 15-year timeframe.
2b.	Update the tree replacement policy for single-family and duplex lots to state that the property must maintain or achieve 35% canopy cover over a 15-year timeframe.
2c.	Update the PRNS tree replacement policy to allow for replacement trees to be planted in adjacent park locations when the current park cannot accommodate all replacement trees.
2d.	Review other local regional planning documents including the "Integrating Planning With Nature" and "Urban Ecological Planning Guide" and incorporate regional strategies into community forest management where appropriate.
2e.	Support wildlife connectivity and biodiversity through tree management in designated riparian corridors and an integrated network of native trees.

Recommendations

The recommendations contained in Part 1 of the CFMP are summarized on the following pages.

GOVERNANCE STRUCTURE

Section	Recommendation	Discussion
Department of Transportation	Consolidate tree responsibilities to one division or create a new division	Tree responsibilities are dispersed across multiple City departments which contributes to inefficiencies in management. One possibility to streamline tree management is to create a new division or department that encompasses all tree management activities within the City. If all tree-related management activities, permitting, enforcement, and planning decisions were coalesced into one department, it would be clear where to go for answers to tree-related questions, and it would ensure qualified staff are always reviewing tree issues for the City. While tree responsibilities have fallen under the purview of DOT, their funding allocation does not reflect their management needs.
Planning Division	Include trees in the beginning of the design and planning process	In development (public, commercial, and private and both new and remodel/redesign) projects managed by both Planning and PRNS, or Public Works, trees are often not included in the initial design and planning phase, when critical decisions are made that impact the City's ability to plant and preserve trees. In the case of Planning development projects, the City plan check and internal review processes should be updated to include an initial review of projects by either a City arborist or a contracted third-party consulting arborist. For PRNS development projects, a PRNS representative and certified arborist should review site plans. The initial review of all projects should determine if site plans consider how construction will impact the existing on-site tree and what available measures can be taken to ensure the long-term preservation/survival of trees before recommending removal. Consideration should also be given to whether the design or location of the project can be modified to accommodate the retention of existing mature trees. It should also include a review of the planting specifications to ensure site-appropriate tree species are selected, and that each newly planted tree has sufficient soil volume and grow space to reach a full canopy size at maturity.
Planning Division	Provide an arborist review of all Planning Division tree responsibilities	Currently, the Planning Division does not have a staff arborist dedicated to the review of private property tree-related issues. This position is needed to implement policies and tree management decisions that support the City's goals of a healthy and safe urban forest. Another option that would reduce the City's financial commitment is to have a City-approved, independent third-party on-call arborist in lieu of an additional full-time employee. This model is often used by municipalities as it provides an unbiased expert opinion on tree issues and demonstrates to residents the extra step in due diligence the City is willing to take when deciding issues concerning their private property.

GOVERNANCE STRUCTURE (continued)

Section	Recommendation	Discussion
Public Works Maintenance Division	Consolidate Maintenance of Public Works-Maintained City Facility Trees to a new department	The Public Works Maintenance Division does not have the staff capacity or training/experience to manage the approximately 500 trees on City-owned properties. The management of these trees should be consolidated within the department or division that will be responsible for management of the community forest program.
Parks Recreation and Neighborhood Services	Update the PRNS Tree Replacement Policy	The current PRNS policy is to replace every removed tree with three new trees in the same park. This policy has been successful in maintaining high canopy cover levels in some parks, but it has also led to parks receiving new trees that have already filled all available planting locations. Instead of requiring trees to be replanted back in the same park in all cases, replacement trees should be allocated first to the park in which they were removed to fill vacant planting locations. If all vacant planting locations are filled, the balance of trees should be planted in a park within the same neighborhood, council district, or adjacent disadvantaged community that has the space to accommodate more trees
Parks Recreation and Neighborhood Services	Provide funding for establishment care as a condition to plant trees on PRNS sites	PRNS is not able to adequately water newly planted trees due to a lack of funding for contract watering or the availability of in-house maintenance crews, but values the efforts from community planting events held in parks that are supported by nonprofit organizations, corporate groups, and City-elected officials. As such, groups interested in a community tree planting event in a City park should provide funds to PRNS that support the watering and establishment care of the newly planted trees for a period of up to 3 years. Groups unable to provide maintenance funds should be encouraged to hold community events that provide maintenance and care for newly planted trees in lieu of planting new trees, which would contribute to the health of park trees and are achievable without placing an additional burden on PRNS maintenance staff.

COMMUNITY FOREST SUSTAINABILITY

Section	Recommendation	Discussion
Species Diversity	Based on these factors, it is important for the City to have both Citywide and local species diversity goals, which could form into a three-tiered approach.	• Tier 1. Citywide Species Diversity Goal: The City should adopt a goal of having no one species comprise more than 10% of the City tree population and no one genus comprise 20%. This goal will help to ensure that the overall inventory is resilient to threats as it is dispersed over the 181 square miles of the City. The established goal can then be used to further inform a more nuanced plan for individual neighborhoods or geographic areas of the City. • Tier 2. Implement Goal on Neighborhood Scale: The City should determine smaller geographic segments of the City and apply the species diversity goal to those areas. Boundaries could be formed from existing defined neighborhoods, Council Districts, or other set boundaries within the City. This strategy would help to identify what species dominate a specific area and plan for the introduction of new species to provide an additional layer of species diversity and protection from threats. This approach would also necessitate specific planting palettes for each area that factor in the current neighborhood-level species diversity percentages into what species are planted. • Tier 3. Street Level Diversity: The City should incorporate species diversity on a street or street block level. At this scale, species diversity decisions would include determining whether a street is planted with two or three alternating species, and the extent to which monoculture street plantings would be allowed. The planting palette for individual streets would be formed by decisions made in Tier 2 of the planning process. This tier would not include maintaining the Citywide species diversity goal as continuity and aesthetics are important considerations for developing neighborhood character and would be difficult to achieve with 10 or more species planted on a street.
Species Diversity	Revise the City recommended tree species list to:	• Ensure the total number of species recommended by the City can meet species diversity goals. • Prioritize planting trees rated by Water Use Classification of Landscape Species (WUCOLS) as very low and low water users. • Identify trees that are not expected to adapt to changing climate conditions and replace them with new suitable species. • Increase the quantity of small and medium-sized species trees in the planting palette to provide more species options in locations that have limited soil volume.

COMMUNITY FOREST SUSTAINABILITY (continued)

Section	Recommendation	Discussion
Age Diversity	Protect and preserve mature trees	It will be difficult to increase the total number of mature trees without the enforcement of City ordinances and policies that protect and preserve trees in the public space. This will be especially important with the City's emphasis on increased urban infill development that seeks to maximize lot space for buildings and not allow room for street trees. It may also require adopting new and innovative approaches to managing tree and sidewalk conflicts, which is a common reason for street tree removal. This could occur through the updated design guidelines or other mechanisms that provide guidance for developers to incorporate trees into the built environment.
Age Diversity	Structural pruning program	Large structural issues within a tree's crown begin developing at an early age. Structural issues such as co-dominant stems or conflicts with adjacent infrastructure are typical of mature trees and can often be avoided by selectively pruning branches when trees are still young and forming their structure. By investing in the structural pruning of young trees, the City can actively mitigate against future structural issues in mature trees that typically have a higher associated cost and may require tree removal if the issue cannot be resolved through pruning.
Age Diversity	Continue to plant and establish trees	Although the current age distribution is skewed towards young and immature trees, the City must continue to plant new trees and ensure they successfully establish. A reduction in planting totals may bring the age distribution range into a more sustainable range in the short term, but would create a shortfall of trees across the entire age spectrum as they progress from immature, to young, and eventually mature.

DIVERSITY, EQUITY, AND INCLUSION

Section	Recommendation	Discussion
Canopy Cover Can Illuminate Equity Issues	Collaborate with the Office of Racial Equity on prioritizing areas of the City with the highest CalEnviroScreen Scores for new tree plantings	The large discrepancy in canopy cover is an area that the departments in charge of tree management can collaborate with the Office of Racial Equity on strategizing the best path forward
Online Survey	Increase public outreach and education about trees to renters in San José.	90.4% of survey respondents were homeowners and 88% lived in a single-family home, in comparison to City data that shows 43.9% of housing units are renter occupied. Understanding the priorities of renters is an important step to ensure the CFMP is inclusive of all stakeholder perspectives.
Online Survey – City Managed vs. Private Property Managed Street Trees	Further study the funding mechanisms most appropriate to support community forest management, and the degree to which residents or the City would generate the funding.	Respondents showed varying opinions for how street tree management should be funded. Additional public engagement and education efforts should be undertaken to investigate where public support lies.
Online Survey – Private Property Tree Management	Increase public education about tree benefits.	Respondents identified several costly maintenance actions they needed to take in recent years. The City will need to develop strategies to educate residents on the value of trees to overcome the perception of trees as costly and causing damage, so tree canopy can be preserved and expanded on private property.

FUNDING COMMUNITY FOREST MANAGEMENT

Section	Recommendation	Discussion
Funding of Maintenance Practices	Continue to evaluate the deficit in funds that are available to maintain the City's infrastructure in the annual Deferred Maintenance and Infrastructure Report	This document provides a review and dollar amount of funding gaps for trees, and is an important tool to measure what tree work is being completed and what tree work remains deferred each year.
Health and Safety Condition of Trees	Reallocate funding to allow for active and/or regular tree maintenance	In the current structure, the lack of regular tree maintenance increases the amount of funding City arborists need to allocate to emergency situations as they present an urgent public safety concern.
Staffing Levels	Conduct a review to determine the number of staff members that would need to be hired to increase urban forest program capacity	Based on comparison to the urban forest programs of other Cities, San José's program includes the staffing levels of Cities with approximately one fifth the population size.
Funding Opportunities-Grants	Consider jointly applying to local, regional, state, and federal urban forest grant programs	The six grant programs recommended in this section may require partnership with OCF and/or other City departments for eligibility. Funding provided by these grants may support expansion of sustainable community forest program practices.
Funding Opportunities-Fees, Assessments, and Taxes	Consider expanding fees, assessments, and taxes to generate funding for the Community Forest program	Funding generated by special fees, assessments, and taxes could generate unrestricted funds, which differ from grant funding that has specific requirements

STREET TREE MANAGEMENT

Section – Subsection	Recommendation	Discussion
Tree Inventory	Complete an inventory of all street and park trees.	The City does not have a completed inventory for trees in City managed parks, and partially completed inventory of street trees in 2014. Completing and maintaining an inventory of street and park trees will ensure management decisions are made with the most recent and accurate information.
Property-Owner Maintained versus City-Maintained Trees	Educate community members on their responsibility to maintain trees adjacent their property.	It was evident through internal discussions with the City and online survey results that most residents are not aware of their responsibility to maintain the street tree adjacent their property, which contributes to confusion over who should be conducting maintenance, and impacts community forest management.
Tree Planting	Explore the possibilities to expand the City partnership with OCF to engage residents in tree planting.	The City is limited in its ability to actively plant street trees adjacent to private property. Given OCF's ability to plant approximately 1,600 new and replacement trees, the City could further expand these efforts and shared responsibilities.
Establishment Care	Provide watering and establishment care for a minimum of three years to all trees planted by the City.	These recommended maintenance practices align with ISA standards for establishment care and when implemented would be effective for tree health and growth.
Establishment Care	Work with OCF to further engage and educate residents on how to properly water and maintain newly planted trees	Residents who receive a tree from OCF agree to maintain the tree for 3 years after planting. The current model of obtaining trees from OCF and having residents provide establishment care may warrant further investment from the City to expand the current outreach and monitoring program to increase the total number of trees planted each year.
Pruning	Educate private property owners on proper tree pruning practices.	Trees in San José are often topped and/or incorrectly pruned. Under the City street tree policy, property owners can be fined $250 for improper tree pruning. If residents are educated on proper pruning practices, their trees are more likely to contribute to San José's overall canopy cover.
Pruning	Develop a strategy to reduce reactive tree pruning and emergency work.	Reactive tree maintenance costs significantly more than proactive or preventative maintenance. Identifying a strategy and funding mechanism to conduct proactive maintenance can save the City money in the long term.

STREET TREE MANAGEMENT (continued)

Section – Subsection	Recommendation	Discussion
Pruning	Determine the feasibility for the City to prune all street and park trees on a 5- to 7- year cycle.	The City's current 123-year pruning cycle of street trees is excessively beyond the recommended 5- to 7-year pruning cycle, which increases the potential for tree part failure.
Sidewalk Repair, Tree Removal, and Tree Replacement	Ensure that residents are aware that they are responsible for adjacent sidewalk repair.	Many residents are not aware that they are responsible for sidewalk repair. If private property owners are going to be responsible for the trees, sidewalks, and associated repair and maintenance costs, the City must inform property owners of their responsibility.
Sidewalk Repair, Tree Removal, and Tree Replacement	Implement sidewalk repair strategies that minimize tree removal.	New sidewalk materials and technologies can be used that reinforce the structural integrity of concrete to allow tree roots to grow underneath sidewalks and increase useful longevity like suspended pavement systems and structural soils. All of these methods should be within the solutions "toolbox" before tree removal is allowed.
Sidewalk Repair, Tree Removal, and Tree Replacement	Update the City's 1:1 tree replacement ratio.	In all tree removal and replacement scenarios, the City must consider if the policy is adequately replacing the lost canopy cover and how soon canopy cover should be recovered. The replacement policy does not outline a process that verifies if the tree is alive after it is planted.
Urban Wood Utilization and Waste Diversion	Explore the financial costs and return on investment to implement an urban wood utilization and waste diversion program.	In addition to the environmental benefits of carbon storage, such a program can contribute to San José's green economy and provide employment opportunities throughout the entire process to remove, store, treat, and prepare wood for its second life.

PARK TREE MANAGEMENT

Section – Subsection	Recommendation	Discussion
Tree Planting	Identify a mechanism to adequately staff and fund park tree planting.	PRNS staff may partner with City departments and OCF to leverage tree plantings in parks. Without a formalized tree planting mechanism for parks, there is a strong possibility of sharp decrease of park canopy cover because there are not enough trees being planted to replace predicted removals.
Establishment Care	Identify a mechanism to adequately staff and provide establishment care to park trees	Without establishment care, trees planted in parks are likely to fail. The City can provide funds requested by PRNS to plant and care for a certain number of trees on an annual basis. PRNS can continue its partnership with OCF to provide trees and hold community tree planting events to offset some of the program costs. Another option would be for PRNS to use existing City fee structures to develop a per-tree cost to water a tree for 3 years. Another option could be for PRNS to partner with OCF to apply for a CAL FIRE grant to fund the planting and care of park trees, to build on their current partnership.
Pruning, Tree Removal, and Emergency Tree Work	Conduct a risk assessment of all park trees.	As reported by PRNS staff, the park tree population is aging and in decline. Older trees result in higher pruning costs, and they are more prone to stem, branch, or whole tree failure as tree parts begin to decay. These trees should be inspected for their health and safety.
Pruning, Tree Removal, and Emergency Tree Work	Complete a park tree inventory	The completion of a park tree inventory will provide PRNS staff with the information needed to understand the condition of park trees and determine which trees present elevated risk levels. The inventory can then be used to develop annual maintenance plans that prioritize the highest risk trees for pruning or removal.
Tree Replacement	Consider revising the requirement to replant trees in the same park in which they were removed.	The PRNS replacement policy should be directed toward the goal of maximizing canopy cover in City parks overall and revised to allow flexibility in the locations trees are replanted when parks do not have space to support all replacement trees. The remainder of replacement trees could then be planted in nearby parks that lack canopy cover.

PRIVATE PROPERTY TREE MANAGEMENT

Section – Subsection	Recommendation	Discussion
Private Property Tree Removal – Unsuitable Tree	Eliminate the "unsuitable tree" definition	The definition for an unsuitable tree is broad, not scientifically accurate, and allows for the unnecessary removal of many trees that are not actually unsuitable. The City would benefit from entirely getting rid of the unsuitable tree allowance to permit tree removal, so all tree removals are evaluated by a criterion based on arboriculture standards and not an arbitrary definition.
Private Property Tree Removal – Permit Process and Fees	Require due diligence from a certified arborist that no alternative exists to tree removal	If the City continues to allow tree removal when a tree is 5 feet from a residence, secondary unit, garage, or the centerline of a below-grade utility pipe or line, the City should also require a report from a certified arborist that the tree is in conflict with the adjacent structure or utility. The certified arborist report could determine if the tree in question is causing or has substantial evidence to indicate that it will cause a conflict in the future. The applicant and certified arborist should also explore mitigation options to resolve the conflict without removing the tree. Options could include root pruning, crown reduction, tree cables or bracing, and adjustments to the existing infrastructure.
Private Property Tree Removal – Permit Process and Fees	Provide an incentive for applications that are submitted with an arborist report	Multiple steps will need to be taken to improve the permit application process for ordinance-size and unsuitable private tree removals beginning with the information provided by the applicant. One option would be to give applicants a reduced permit fee when they provide a report prepared by a certified arborist who is also ISA Tree Risk Assessment Qualified. This incentive would encourage private property owners to have an expert review their tree concern before submitting removal applications to the City. It has the potential to reduce the number of applications submitted to the City, as arborists would be able to fully explain the options for tree preservation and whether the resident's concern warrants tree removal. It would also provide the City with better information to assess applications, which should reduce application processing time and associate staff review costs.
Private Property Tree Removal – Permit Fees and Fees	Review and align permit fees	The current permit fee for live tree removal is excessive and not supported by the level of review needed to process permits. It is also higher than the fine for illegal tree removals, and consequently does not encourage residents to file for a permit to remove a protected tree. For the City to have an effective ordinance to protect trees on private property, the permit fee must align with realistic costs of the City and not be a burden on applicants.

PRIVATE PROPERTY TREE MANAGEMENT (continued)

Section – Subsection	Recommendation	Discussion
Private Property Tree Removal – Permit Fees and Fees	Review the illegal removal fine structure	It should be determined if the current fine structure for illegal tree removal is sufficient to deter violation and adequately replace the lost value of the tree. The review of the illegal removal fines should happen concurrently with the permit fees so there is continuity between the fees and fines that encourage participation in the City process to legally remove protected trees.
Private Property Tree Removal – Replacement Tree Requirements	Focus requirements of replacement trees on community forest program goals	The 1:1 tree replacement ratio should be directed towards goals of the community forest program to increase canopy cover, species diversity, and the environmental services of trees. It should also include a requirement for replacement trees to be similar in size at maturity of the removed tree. The City could also provide an approved replacement species list to applicants based on neighborhood-level species diversity goals. The City could further expand its partnership with OCF to provide guidance to homeowners to properly place trees around their property to cool homes and lower energy use.
Tree Protection During Construction	Require site developers to provide detailed tree protection plans in alignment with industry standards	It should be a condition of approval for development projects to provide a tree protection plan for all on-site and street trees that are to be preserved during construction. Tree protection plans should be prepared by a certified arborist hired by the site developer, and the plan should be approved by a City arborist. The protection plan should adhere to City, ISA, and ANSI standards.
Tree Protection During Construction	Conduct a site visit prior to any construction to ensure protection measures are installed	The site developer, project arborist, and City arborist (or contracted arborist) should conduct a site visit to confirm that all protection measures are implemented as described in the protection plan.
Tree Protection During Construction	Require a certified arborist to periodically monitor on-site construction activities when there is potential to impact trees	A certified arborist should be on-site whenever construction encroaches upon the critical root zone of a tree or a tree requires limb or root pruning. Any impacts to a tree should be documented by the project arborist with a report submitted to the Planning Division and City arborist to determine if the site developer is compliant with the protection plan.

CITY PLANNING DOCUMENTS

Section – Subsection	Recommendation	Discussion
Envision San José 2040 General Plan-Relationship to CFMP-Management Practices	Adequately fund MS-21.1 to ensure the program will be achievable.	Some trees are providing a high level of environmental services, but others lack the care and maintenance needed to have a healthy and mature canopy. The goals and objectives of the CFMP will help move the City toward directive MS-21.1, but without dedicated funding, the program will be difficult to achieve.
Envision San José 2040 General Plan-Relationship to CFMP-Management Practices	To meet MS-21.2, the City should hire a certified arborist an arborist in support of the Planning Division to review development plans and removal applications.	The City should hire a certified arborist to work directly in reviewing development designs, project permits, and removal applications to ensure the best arboricultural practices are being instituted.
Envision San José 2040 General Plan-Relationship to CFMP-Management Practices	Clarify the Heritage Tree Ordinance	The Heritage Tree Ordinance would benefit from clear objectives and goals that could be developed with an outreach and education campaign to highlight the services residents receive from trees.
Envision San José 2040 General Plan-Relationship to CFMP-Species Selection	Update the list of recommended species and provide residents with guidelines for selecting an appropriate species for their residential location	Providing residents with an easily understandable resource list can increase resident education and health of newly established trees. Species selection, and what is recommended to be preserved, should be based on CFMP goals and favor any species of tree that is suitable for the space provided and is low-water-use, drought-tolerant, and adaptable to future climate conditions.
Envision San José 2040 General Plan-Relationship to CFMP-Community Investment and Collaboration	The City and OCF could pool resources to engage the City's residents in the community forest	The City and OCF could pool resources so that more state grant opportunities can be pursued to support the planting of trees and education efforts in disadvantaged communities.

CITY PLANNING DOCUMENTS (continued)

Section – Subsection	Recommendation	Discussion
Envision San José 2040 General Plan-Relationship to CFMP-Community Investment and Collaboration	The City could also begin to explore partnerships with other community-based organizations that have a direct relationship to various neighborhoods and demographic segments of the City	Different nonprofit organizations that engage residents in specific areas of the City could provide partnerships that offer a deeper connection and relationship with the residents in the neighborhoods they serve. These relationships can be advantageous for advancing the community forest goals of the City.
Envision San José 2040 General Plan-Relationship to CFMP-Neighborhood Character	Leverage neighborhood character goals and priorities	The directives listed in CD-2.1 collectively underscore the importance of trees to neighborhood character, and the City should continue to utilize the community forest to provide a comfortable and safe pedestrian environment, enhance Conservation Areas and Historic Districts, and minimize impact to native trees.
Envision San José 2040 General Plan-Relationship to CFMP-Long-Term Goals	Leverage the City's leadership in climate resiliency planning.	The City should continue to invest in its community forest as an asset in achieving climate adaptation, as listed in goal IP-3.
Climate Smart San José	Align the CFMP with Climate Smart San José's 3 pillars	Opportunities for alignment include planning for a community forest that contains climate ready tree species, encouraging walkable communities, and managing trees that provide shade and other environmental benefits to residents.
Urban Village Plan	Prioritize green infrastructure in the Urban Village Plan	The City would receive additional benefits from the Urban Villages concept, such as cleaner air and reduced stormwater runoff, increased property values, reduced urban heat island effect, and attractive urban environments. As each Urban Village Plan is developed, the City should look to the CFMP to guide tree planting opportunities in each Urban Village area during the planning stages.
Green Stormwater Infrastructure Plan	Continue to consider mature trees in projects identified in the GSI Plan	By considering mature trees as a constraint to implementing GSI projects, the City has made an effort to preserve the existing mature trees when identifying locations for GSI projects.
Green Stormwater Infrastructure Plan	Evaluate all project sites identified in the GSI Plan during the planning stages	Species selection should also be made in consideration of site specifics, growth rate, ornamental traits, size, canopy shape, shade potential, and benefits for wildlife. Evaluating the project site during the planning stage will help understand and ideally prevent site constraints.

OUR CITY FOREST PARTNERSHIP

Section	Recommendation	Discussion
OCF and City Partnership	The City and OCF should further define OCF's role in supporting the goals of the City's community forest program	OCF has a mission to improve the community forest of San José by educating and engaging the community. OCF should work with the City to define their shared goals and determine how current OCF programs will help meet those goals. Funding can then be dedicated to those programs to ensure OCF can use City funds to support its core values and mission.
Grants	OCF and the City should explore joint grant applications	Both the City and OCF independently apply for, and receive, state and federal grant funds to expand community forest programs. While the grant funding is sufficient to support the objectives of the individual project, more substantial funding can be received through a joint OCF and City grant application. A joint application could be designed so each entity provides a core service function to the project and matching contribution of a resource they already have available. This avenue would ensure the project does not require either OCF or the City to provide a service of which it does not have experience and could greatly expand funding for tree planting and establishment care in disadvantaged communities of San José.

Monitoring Plan

One of the most efficient models the City can use to monitor the implementation of the CFMP is the Vibrant Cities Lab Community Assessment and Goal-Setting Tool (Vibrant Cities Lab n.d.). The tool is based on the work of Clark et al. (1997), Kenney et al. (2011), and Leff (2016), and establishes criteria and indicators to measure urban forest sustainability. The tool functions as an assessment with multiple questions that provide different descriptions to define the current state of a specific area of urban forest sustainability. The user is asked to decide what the current state is and what the goal should be. The "low" level scores of -1 reflect actions that have a negative impact. The "optimal" level scores of 4 reflect the best possible standard for the City. The "Total Current Score" reflects the perceived state of how the City is functioning. The "Total Goal Score" reflects where the City wants to be. The "Gap Score" reflects how far off the current state is from the desired goal. A city that has a gap score between 20 to 40 is not far from achieving the goals of its urban forest program and is progressing towards a sustainable urban forest. Conversely, a gap score of 40+ indicates that a City is still implementing programs and policies to close the gap and develop a sustainable urban forest.

Table 37. Vibrant Cities Lab Community Assessment and Goal Setting Scores

City	Total Current Score	Total Goal Score	Current Gap
Melbourne, Australia	65	109	44
Irvine, California	62	111	49
Toronto, Canada	34	111	77
Los Angeles, California	2	109	107
San José, California	-6	103	109

San José's assessment was initially conducted on August 21, 2019, by DOT staff and the consultant team. **Table 37** reflects the Vibrant Cities Lab scores for San José and several other cities for comparison, with each city's assessment conducted by City representatives or by knowledgeable arborists who work closely with the respective cities.

The Cities of Melbourne and Irvine are known to have well run and sustainably funded urban forestry programs. Even so, they continue to seek goal achievement that will reduce their respectable current gaps. The City of Los Angeles is currently in the process of developing its urban forest management plan and has nearly the same gap score identified as San José. Despite San José having a seemingly insurmountable current gap, it is important to note that reducing the gap can happen quickly with implementation of some basic urban forestry baselines. The results to San José's Assessment are shown in **Table 38.**

Table 38. San José's Vibrant Cities Lab Community Assessment and Goal Setting Scores

Category	Current Rating		Goal Rating		Gap
Canopy cover	The existing canopy cover for entire municipality is <50% of the desired canopy.	**-1**	The existing canopy is >75%-100% of desired – at individual neighborhood level as well as overall municipality.	**4**	**5**
Inventory & assessment methodology	Complete or sample-based inventory of publicly owned trees.	**1**	Systematic comprehensive inventory system of entire urban forest – with information tailored to users and supported by mapping in municipality-wide GIS [geographic information system]. Provides for change analysis.	**4**	**3**
	No assessment.	**-1**	As described for "Better" rating – and all utilized effectively to drive urban forest and green infrastructure policy and practice municipality-wide and at neighborhood or smaller management level.	**4**	**5**
Publicly owned trees	No information	**-1**	Complete GIS tree inventory that includes detailed tree condition and risk ratings.	**4**	**5**
Publicly owned natural areas	No information	**-1**	Management plan focused on sustaining and, where possible, improving overall ecological structure and function while facilitating appropriate public use. Plan should consider impacts on contiguous natural areas [open space corridors] outside the community's borders.	**4**	**5**
Private property trees	No information	**-1**	Bottom-up sample-based assessment, as well as detailed urban tree canopy analysis of entire urban forest, including private property, integrated into municipality-wide [multi-agency] GIS system. LIDAR and hyper-spectral imaging most helpful.	**4**	**5**
Relative performance index by species	No information.	**-1**	All six most common species have higher RPI scores than the average of all species in community. (>1.)	**4**	**5**
Use of native vegetation	Voluntary use of native species on publicly and privately owned lands; invasive species are recognized.	**1**	Use of native species is encouraged on a project-appropriate basis in all areas; invasive species are recognized and discouraged on public and private lands.	**2**	**3**
Align municipal departments	Municipal departments/ agencies recognize potential conflicts and reach out to urban forest managers on an ad hoc basis – and vice versa.	**1**	Municipal policy implemented by formal interdepartmental/interagency working teams on all municipal projects.	**4**	**3**

Table 38. San José's Vibrant Cities Lab Community Assessment and Goal Setting Scores

Category	Current Rating		Goal Rating		Gap
Engage residents in planning and implementation	Some neighborhood groups engaged across the community but no minimal outreach to ensure underserved neighborhoods participate effectively.	**1**	Proactive outreach and coordination efforts by municipality and nongovernmental organization partners resulting in widespread citizen involvement and structured engagement among diverse neighborhood groups.	**4**	**3**
Environmental equity	Planting and outreach include attention to low canopy neighborhoods or areas.	**1**	Equitable planting and outreach at the neighborhood level is guided by strong resident involvement in low canopy/high need areas. Residents participate actively in identifying needs for their neighborhoods, planning, implementation, and monitoring.	**4**	**3**
Trees acknowledged as vital community resource	Trees generally recognized as important and beneficial.	**1**	Urban forest recognized as vital to the community's environmental, social, and economic well-being.	**4**	**3**
Engage large private landowners and institutions	Large private landholders are generally uninformed about urban forest issues and opportunities.	**-1**	Tree management plans developed with input from community, and public access to the property's forest resource.	**4**	**5**
All utilities work with municipality, employ best management practices	No utility consideration of the health of the urban forest resource.	**-1**	Utilities are included in informal municipal teams that communicate regularly and collaborate on a project-specific basis.	**3**	**4**
Green industry embraces goals, high standards	Little or no cooperation among segments of green industry or awareness of municipality-wide urban forest goals and objectives.	**-1**	Shared vision and goals and extensive committed partnerships in place. Solid adherence to high professional standards and commitment to credentialing and continuing education.	**4**	**5**
Develop urban forest management plan	No urban forest management plan	**-1**	New or recent urban forest and green infrastructure management plan which targets public and private tree planting and protection based on assessment of anticipated benefits, and ensures these benefits are distributed equitably among neighborhoods.	**4**	**5**

Table 38. San José's Vibrant Cities Lab Community Assessment and Goal Setting Scores

Category	Current Rating		Goal Rating		Gap
Cooperative planning with other municipalities	Municipalities have no interaction with each other or the broader region. No regional planning or coordination on urban forestry.	**-1**	Some urban forest planning and cooperation across municipalities and regional agencies.	**2**	**3**
Forestry plan integrated into other municipal plans	Urban forestry plan mentions how it could meet other municipal objectives or inform other planning efforts.	**-1**	All agencies whose goals are served by urban forestry practices, participate in creation of forestry plan, and commit to designated roles and responsibilities.	**4**	**5**
Urban forestry program capacity	Lack of personnel and/or adequate equipment severely limits needed maintenance. Few resources, if any available to achieve new goals.	**-1**	Team has no [capacity issues] to achieve all goals of the urban forest management plan, to maintain the resource over time, and adapt management as circumstances change.	**4**	**5**
Municipality-wide urban forestry funding	Little or no dedicated funding.	**-1**	Sustained, long-term funding from multiple municipal, regional and/or state agencies, along with private sources to implement a comprehensive urban forest management plan and provide for maintenance and adaptive management as circumstances change.	**4**	**5**
Growing site suitability	Appropriate tree species are considered in site selection	**1**	All trees planted in sites with adequate soil quality and quantity, and with sufficient growing space and overall site conditions to achieve their genetic potential and thus provide maximum ecosystem services. Where growing conditions are poor, guidance provided on how to improve soil volume, quality, and other factors.	**4**	**3**
Tree establishment and maintenance	Some tree planting and establishment occurs, but with limited overall municipality-wide planning and post-planting care.	**-1**	Comprehensive tree establishment plan provides concrete guidance on most of the following criteria: site selection, size, age class, diversity of species, native plant choice; planting protocols [e.g., minimum soil volumes, soil conditions]; young tree care, including region appropriate irrigation requirements. Includes provisions and funding for maintenance.	**4**	**5**
Management of publicly owned natural areas	Only reactive management to facilitate public use, e.g., hazard abatement, trail maintenance.	**1**	Management plan in place for each publicly owned natural area to facilitate appropriate public use.	**2**	**1**

Table 38. San José's Vibrant Cities Lab Community Assessment and Goal Setting Scores

Category	Current Rating		Goal Rating		Gap
Policies that foster good urban forestry on private lands	No tree protection ordinance, or one that's weak and rarely enforced.	**-1**	All relevant municipal policies require or incentivize adherence by private owners to standards incorporated in the plan. Incentives and sanctions applied when appropriate.	**4**	**5**
Tree protection policy and enforcement	Policies in place to protect public trees and employ industry best management practices, but rare or inconsistent enforcement.	**1**	Integrated municipality-wide policies and practices to protect public and private trees, consistently enforced and with penalties sufficient to deter violations.	**4**	**3**
Monitoring	Monitoring is infrequent and reactive to reported changes in tree health, site condition.	**1**	Monitoring adheres to the standards and protocols established by the Urban Tree Growth and Longevity network.	**4**	**3**
Tree risk management	No tree risk assessment or risk management program. Response is on a reactive basis only.	**-1**	Includes "better" but with TRAQ-qualified contractors on City projects. Educate tree care companies and public about importance of TRAQ qualifications.	**4**	**5**
Urban wood and green waste utilization	While most green waste does not go to landfill, uses are limited to chips or mulch.	**1**	The majority of green waste is reused or recycled for energy, products, and other purposes beyond chips or mulch.	**2**	**1**

The City's CFMP monitoring plan should be based around the Vibrant Cities Lab Community Assessment and Goal Setting Tool and should be retaken each year to track, measure, and celebrate progress. To demonstrate, since the City first took the assessment, several of the responses that had significant gaps such as the lack of a CFMP (5), a completed City inventory (5), and RPI by species (5) are already well on their way towards achieving the goal rating.

3

Tree Policy & Best Management Practices Manual

Chapter 1 | **Our City, Our Community Forest**

The tree canopy in the City of San José is a valuable and precious asset that enhances the quality of life in this City. It is the duty of the City and its residents to protect and support the growth of the tree canopy so that it remains a viable asset for future generations.

The community forest is the only infrastructure asset that continually increases in its value and its benefits to the community. The City of San José recognizes that the community forest is not a self-renewable asset, but that it requires human intervention to preserve, protect and enhance. Our stewardship responsibilities include partnering with, and educating, the community and regional stakeholders, to provide thoughtful tree management, centered on developing a knowledge-based, insightful decision-making process. As the local government, it is our responsibility to foster and develop this vision of a community forest for every resident of San José and the surrounding communities that depend on us.

The City of San José is committed to promoting the growth and care of its Community Forest. The Community Forest is made up of trees on private property, in parks and other open spaces, and approximately 243,000 street trees that are primarily located in park strips and median islands throughout the City.

The City has chosen to use the term "Community Forest" rather than the more common "Urban Forest" in recognition of the diversity of our City, which ranges from urban to semi-rural neighborhoods. It also reflects the City's philosophy of actively engaging the community in defining and growing our City.

Three primary goals for the Community Forest Program have been established in the *Strategic Framework for the San José* Community Forest Master Plan (2010):

Grow, Protect, Preserve, Restore and Expand San José's Community Forest. A healthy community forest helps to enhance the City's quality of life, protect public health, encourage economic vitality and promote environmental sustainability.

Engage, Develop and Maintain Support for the Community Forest. The more informed and engaged the public and City staff are in growing and sustaining the community forest, the more the forest will flourish and be viewed as an asset by the entire community.

Equity. Manage the Community Forest to Maximize Benefits for All Residents of the City. Resources should be allocated equitably and appropriately so that all residents of San José can realize the benefits of a thriving community forest to the greatest extent possible.

The purpose of the City of San José Community Tree Policy Manual & Best Management Practices is to define responsibilities for tree management within the City of San José and to provide guidelines and current recommended Best Management Practices to City staff, residents and others who provide services to the Community Forest in the City of San José.

Our Community Forest Asset

Unlike other pieces of infrastructure such as roadways, sewer systems, streetlights, etc., our Community Forest consistently provides a return on our investment through the benefits it provides and must be treated as an asset. Further, if managed appropriately, the Community Forest is always growing and increases in value over time. Recent scientific research across the United States and around the globe provides solid data proving that

trees provide a vast array of benefits which include: monetary, physical, psychological, emotional, environmental, ecological, and social benefits. The community forest improves and enhances the quality of life for those who work, live and play in the City of San José.

Trees clean the air

Trees absorb and trap airborne air pollutants and particulate matter. Trees reduce wind speed which allows more particulates to settle out of the air. Researchers calculated that trees in the Chicago area removed 15 metric tons of carbon monoxide, 84 tons of sulfur dioxide, 89 tons of nitrogen oxide, 191 tons of ozone, and 212 tons of small particulate matter. The trees saved over $9 million for the greater Chicago area in pollution removal costs. (*Norwak 1994*) Visit the California EPA website for more information on Trees and Air Quality.

Trees provide energy savings

Trees cool the air by providing direct shade and releasing water in the form of vapor. Trees placed strategically around a conventional home have been found to cut energy use by up to 25 percent. *(Heisler, 1986).*

Scientific data show that shade from trees planted in strategic locations reduce energy consumption. In California it is estimated that 50 million trees could eliminate the need for seven 100-megawatt power plants, *(McPherson and Simpson, 2001).*

Trees mitigate the urban heat island effect

According to the US Environmental Protection Agency (EPA), trees are a solution to the urban heat island effect. The term "heat Island" describes built up areas that are hotter than the nearby rural areas. The annual mean air temperature of a city with 1 million people or more can be 1.8-5.4°F (1-3°C) warmer than its surroundings. In the evening, the difference can be as high as 22°F (12°C). Heat islands can affect communities by increasing summertime peak energy demand, air conditioning costs, air pollution, greenhouse gas emissions, heat-related illness and mortality, and water quality *(EPA, May 2011).*

Trees provide oxygen

Through the process of photosynthesis, trees produce oxygen. On a daily basis, 1 acre of trees can provide enough oxygen for 18 people. *(Coder, 1996).*

Trees reduce air pollution

Trees remove pollution by intercepting airborne particles. While some particles can be absorbed into the tree, most particles that are intercepted are retained on the plant surface at least temporarily. *(Nowak 2002).*

Trees help prevent flooding

Trees capture, absorb, and slow down rainfall and stormwater runoff, thereby reducing the total amount of runoff and spreading the flow of water from storm events over a longer period of time (delaying peak flow). Without trees, cities would be more vulnerable to flooding and would need to spend more on heavily engineered stormwater drainage and sewage systems to cope with increased runoff.

Trees clean contaminated soil

The US Department of Agriculture is conducting research to use trees to clean up contaminated soils. This process is "phytoremediation". Dr. Joel Burken of the University

of Missouri is a leader in this field of study. His research shows a great monetary and environmental advantage to using trees to clean up soils. Learn more at Science Daily.

Trees prevent soil erosion

Wind, rainfall and stormwater runoff cause soil erosion. Tree roots hold soil in place and increase the ability of the soil to accept water. Tree leaves reduce the wind and decrease the force of the rain as it hits the ground. By preventing soil erosion, trees ultimately help reduce the amount of sediment, which negatively impacts fish and other aquatic species, from being carried with stormwater runoff to creeks.

Trees protect against skin cancer

Skin cancer is the most common form of cancer in the United States. Purdue University researchers can now calculate the amount of sun protection shade trees provide. More shade trees, especially in urban areas, will help to prevent skin cancer and reduce health care costs.

Trees reduce the cost of maintenance for our roadways

Trees shade and protect asphalt pavement and extend the longevity of the road bed. A study of street pavement in Modesto, California showed that an unshaded street required 6 slurry seals over 30 years while a street with large shade trees required only 2.5. 20% shade on a street improves pavement condition by 11%, which provides a 60% savings for resurfacing over 30 years.

Trees increase property values

Research indicates the average value of tree canopy is $20,226 or 10.7% of the sale price of the home. *(Dimke, Sydnor, Grader, 2013)*

Trees make our roadways safer

Tree lined roadways are safer. Drivers have a better sense of their speed as they pass by street trees. Motorists slow down and drive more carefully making streets safer for both pedestrians and drivers. *(Dumbaugh, 2005)*

Trees help patients heal faster

Children with Attention Deficit Disorder (ADD) show fewer symptoms when they have access to greener settings when compared to indoor activities or activities in paved areas with less landscaping. It is called Green Therapy. Studies have shown that hospital patients with a bedside view of a window with trees outside compared to those with a view of a brick wall heal faster and with fewer complications when recovering from surgery. *(Taylor, et. al., 2001; Ulrich, 1984).*

Trees provide habitat for wildlife

Trees provide much needed food and shelter for chipmunks, squirrels, birds, opossums, insects, spiders and many other species important to a healthy ecosystem. Trees also provide refuge to many important migratory bird species to roost en route to and from their breeding grounds. *(National Wildlife Federation)*

Trees build stronger and safer communities

Studies find that residents in inner-city buildings with trees have a stronger sense of community than buildings in the same area surrounded by concrete and asphalt. There are also fewer reports of physical violence in homes with trees and greenery outside the buildings. *(Kuo, Sullivan, 2001)*

Trees are good for businesses

Studies show that tree-lined business districts are places where visitors have a more favorable experience. More shoppers frequent, shop longer, and spend more in business districts with trees. Planting and providing proper maintenance for street trees in commercial districts boosts the local economy and is a smart business investment *(Wolf, 2009).*

Chapter 2 | **Responsibility for the Care and Maintenance of Trees**

The City of San José provides for the protection of the Community Forest trees in Municipal Code Sections 13.28, 13.32 and 13.44.220.

Trees in the Public Right-Of-Way (Street trees)

Per the Municipal Code Section 13.28.090: *" `Street' shall mean a public right-of-way owned by or under the control of the City of San José whose primary function is to carry vehicular traffic and shall also include sidewalks, park strips and planting easements." (*See Appendix A)

Per the Municipal Code Section 13.28.095: *"`Street tree' shall mean any tree that is planted on a street."*

Trees within the City of San José Right-Of-Way (City of San José maintained roads)

Per the Municipal Code Section 13.28.400: *"The property owner of a lot or portion of a lot adjacent to or fronting on any portion of a street shall maintain and replace, if necessary, any street trees, shrubs, hedges or other landscaping adjacent to or fronting on the subject property in such condition that the street trees, shrubs, hedges or other landscaping comply with this chapter. Each property owner shall plant and replace any removed or otherwise missing street trees in accordance with the requirements of Sections 13.28.300 and 13.28.310"* To report a tree related issue within the City of San José right-of-way call (408)794-1901.

Property owner maintained
This is any tree within the right-of-way and along a property frontage where the adjacent owner is a private property owner.

City of San José maintained (Property Frontages)
This is any tree within the right-of-way and along the frontage where the adjacent owner is the City of San José.

City of San José maintained (General Fund Landscape Areas)
These are defined as any tree within a median island landscape or roadway frontage landscape that falls within the public right-of-way.

City of San José maintained (Special Landscape Assessment Districts)
This is any tree within the right-of-way and along a property frontage, median or landscape area where the adjacent owners are part of a specially funded area where the owners pay a special assessment on their property taxes to receive enhanced services such as tree maintenance.

Trees within County of Santa Clara Rights-Of-Way (County of Santa Clara Maintained Roads)

The County of Santa Clara, County Roads & Airport Department is responsible for any tree related work located along expressways and unincorporated county roads. The County Tree Preservation and Removal Ordinance requires permits for tree removal or other work around trees. To report a tree related issue within the Santa Clara County right-of-way you can submit a Customer Service Request or call (408)494-2750.

Trees within CALTRANS Right-Of-Way (CALTRANS Maintained Roads)

The California Department of Transportation (CALTRANS) is responsible for any tree related work along freeways and highways. Caltrans

Adopt-A-Highway program utilizes volunteers to plant and maintain trees. See the Caltrans Adopt-A-Highway website for additional information. To report an issue within the CALTRANS right-of-way you can submit a Customer Service Request or call (916)654-4470.

Trees within Private Right-Of Way (Privately Maintained Roads)

Private property owners are responsible for any tree related work along privately maintained roadways.

Park Trees

Trees within City of San José Parks

The City Department of Parks, Recreation and Neighborhood Services (PRNS) is responsible for maintenance of the trees within City-owned parks. Through the use of park staff and tree maintenance contractors, park trees are planted, pruned or removed for the health and safety of our park visitors and/or the forest. To report an issue within a City of San José park, call (408)535-3570 or park.concerns@sanjoseca.gov.

Trees within County of Santa Clara Parks

The Santa Clara County Parks Department is responsible for maintenance of the trees within County Parks. To report an issue within a City of San José County Park, call (408)355-2200 or parkinfo@prk.sccgov.org.

Tree within Private Parks

Private property owners are responsible for the maintenance of trees within private parks.

Creek Corridors or Riparian Habitat

The oversight of trees in or near creek corridors and riparian habitat within the boundaries of the City of San José is divided into three jurisdictions (City of San José, Santa Clara Valley Water District and The Department of Fish and Game) depending on the exact location of the creek and the tree. Sources of information for the three agencies are found in the Appendix, Contact Information.

Public Property Trees

The responsibility for trees located on public property such as Airports, Community Centers, Libraries, Fire Stations, Police Stations, Corporation Yards, Water Treatment facilities, Pump Stations is currently divided among four departments (SJ Airport, PRNS, DOT and Public Works).

Private Property Trees

The responsibility for trees located on private property are the responsibility of the property owner. Examples of private property include but are not limited to the following: Single family residences, Multi-family residences, Commercial/Industrial buildings, Shopping Malls, Retail businesses, Private recreation facilities, Private parking facilities, Churches and Schools.

Chapter 3 | **Permits and the Law**

Over the past few decades it has become common for local governments to implement ordinances which are intended to protect the urban forest. These ordinances vary from one jurisdiction to the next and often depend on whether the tree is located on public or private property. This chapter is intended to clarify current tree ordinances which may affect the owners of property within San José.

Street Tree Planting Permit

Section 13.28.300 of the Municipal Code states: *"It shall be unlawful for any person to plant or install any street tree within the City, unless one of the following conditions exist:*

1. *A permit that allows the planting or installation of a street tree was issued by the Director in accordance with this chapter; or"*
2. *There is a valid written contract with the City for the planting or installation of street trees approved by the City manager or City Council, as applicable."*

Street Tree Planting Permits are free and available upon request through the Department of Transportation (DOT) by request treesandsidewalks@sanjoseca.gov or by phone at (408)794-1901. Street Tree Planting Permits are valid for 60 days and are eligible for up to 60 days extension.

Once a street tree planting permit is complete, the holder of the permit is required to report completion of the work to DOT. Failure to report completion of any planting prior to expiration of the permit will result in an automatic inspection by the Trees and Sidewalks team and the potential issuance of a *"Street Tree Repair Notice"* if work is required and not yet complete.

Street Tree Pruning and Removal Permit requirements

Section 13.28.310 of the Municipal Code states: *"Except as provided in this section, it shall be unlawful for any person to prune or remove any street tree, or do any construction work or activity that may affect the critical root zone of a street tree, without a permit issued by the Director."*

Street Tree Pruning Permits

Pruning permits are available on request for the routine pruning of the upper canopy or roots of a street tree. Street tree pruning permits are free and can be obtained through Department of Transportation at treesandsidewalks@sanjoseca.gov or by phone at (408) 794-1901. Street tree pruning permits are valid for 60and are eligible for up to 60 days extension.

Once a street tree pruning permit is complete, the holder of the permit is required to report completion of the work to DOT. If the property owner declines to remove the tree after a permit is issued, the permit may be cancelled after 60 days or the expiration of any extensions. Failure to report completion of any pruning prior to expiration of the permit will result in an automatic inspection by the Trees and Sidewalks team and the potential issuance of a *"Street Tree Repair Notice"* if work is required and not yet complete.

Street Tree Root Pruning Permits

Street Tree Root Pruning Permits are available on request for the routine pruning of the roots of a street tree. Street Tree Root Pruning Permits are free and can be obtained through

the DOT at treesandsidewalks@sanjoseca.gov or by phone at (408)794-1901. Street Tree Root Pruning Permits are valid for sixty days and are eligible for up to 60 days extension.

Once a Street Tree Root Pruning Permit is complete, the holder of the permit is required to report completion of the work to DOT. If the property owner declines to root prune after a permit is issued, the permit may be cancelled after sixty (60) days or the expiration of any extensions. Failure to report completion of any root pruning prior to expiration of the permit will result in an automatic inspection by the Trees and Sidewalks team and the potential issuance of a *"Street Tree Repair Notice"* if work is required and not yet complete.

Street Tree Removal Permits

Section 13.28.310c of the Municipal Code states: *"The director shall issue a permit to remove a street tree only if at least one of the following criteria is met:"*

1. *The street tree is in a hazardous condition or imminently hazardous condition"*
2. *The type, species, or location of the street tree is in conflict with a community forest master plan adopted by the city council or the street tree policy, guidelines, and best practices published by the director."*
3. *The street tree interferes with high tension electrical lines and the interference cannot be corrected by topping the street tree."*
4. *The street tree has caused extensive concrete damage and the concrete has been replaced more than once in the preceding ten years."*
5. *The street tree has done extensive sewer system damage that cannot be resolved by any other reasonable means".*
6. *The street tree is in conflict with an approved development permit for the adjacent property or right-of-way pursuant to* Title 20 of this Municipal Code."

Application for Street Tree Removal Permit

Street Tree Removal Permit Applications are free and available upon request through the DOT by request at treesandsidewalks@sanjoseca.gov or by phone at (408)794-1901. Street Tree Removal Permits are valid for 60 days and are eligible for up to 60 days extension.

Once a Street Tree Removal Permit is complete, the holder of the permit is required to report completion of the work to DOT. If the property owner declines to remove the tree after a permit is issued, the permit may be cancelled after 60 or the expiration of any extensions. Failure to report completion of any removals prior to expiration of the permit will result in an automatic inspection by the Trees and Sidewalks team and the potential issuance of a *"Street Tree Repair Notice"* if work is deemed required and not yet complete.

Street Tree Removal Permit Posting

Section 13.28.360 of the Municipal Code states: *" Any street tree for which a removal permit is required pursuant to Section 13.28.310, and the surrounding area, within one hundred and fifty feet on both sides of the street tree and on both sides of the street, shall be posted with a notice of proposed removal in accordance with this section, unless the director determines that such street tree poses an imminently hazardous condition."*

The DOT posts all trees with a "Tree Removal Request" notice for a minimum of 14 calendar days. This notice includes the date of posting, reason for the proposed removal, any replanting require-

ments and information on how any citizen may file an objection to proposed tree removal.

Street Tree Removal Permit Protests

Anyone who wishes to object to the permitting of a street tree removal has the right do so within 14 days of the tree posting. Protests must be filed in writing with the Arborist's Office and can be sent by email to Arborist@sanjoseca.gov or standard mail to City Arborist, 1404 Mabury Rd, San José CA 95133. Protests submitted through standard mail must be received within 17 days of the posting. Once a protest is received a protest hearing will be scheduled to allow for all parties to discuss the merits of the tree(s), the justifications for requesting removal and potential solutions that allow to retention of the tree(s) in question.

Street Tree Removal Permit Protest Hearings

The DOT is responsible for conducting of protest hearings. Hearings are typically held on weekdays and allow for both in-person and virtual participation. Hearings are informal and intended to stimulate discussions around the issues or concerns that precipitated the request for removal and potential alternatives that would effectively address any issues or concerns and allow for retention of the tree for a period of time.

Presentation of Permit

Section 13.28.370 of the Municipal Code states:

"A. It shall be unlawful for any person to prune or remove or cause the same to be done to a street tree unless the permit or a copy of the permit allowing for this activity is maintained on the site where the street tree to be pruned or removed is located.

B. It shall be unlawful for any person to prune or remove or cause the same to be done to a street tree unless the permit or a copy of the permit can immediately be presented upon request to the director of planning, building, and code enforcement, director of transportation, police officers, and their designees.

C. It shall be unlawful for any person to engage in any work on the street tree or allow any work on the street tree that is the subject of the permit to occur unless and until: (1) the permit or a copy of the permit is located on the site where the subject tree is located; and (2) the permit or a copy of the permit is readily available for presentation upon request as described in this section.

Street Tree Repair Notice

Section 13.28.440 of the Municipal Code states: *" No owner or person in possession or control of any premises shall maintain any tree, shrub, hedge or other landscaping located on such premises in a manner that causes or may cause a hazardous condition on a street. No owner or person in possession or control of any premises on any corner or interior lot abutting upon a street shall permit the existence of any tree, shrub, hedge, landscaping, mound of earth, or boulders that obscure and impair the view of intersecting or entering traffic from a street of passing motorists or pedestrians or which impairs the view of the street signs, traffic signs, or any other control devices or signs placed upon the streets for the safety and convenience of the public."* Further, 13.28.500 of the Municipal Code states: *"If the director determines that the condition of any tree, shrub, hedge, or landscaping constitutes a violation of any provision of this chapter, the director shall, by notice in writing, notify the owner of the property in violation to prune or remove the tree, shrub, hedge, or landscaping or take any other necessary corrective action to cure the violation."*

When trees, whether public or private, that pose a threat to vehicle and pedestrian safety by

blocking regulatory signage, advisory signage, streetlights, traffic signals or from broken branches or other defects are identified, the City will issue a Street Tree Repair Notice to the property owner that identifies any mitigation work that is required. The property owner has up to 60 days to complete any work identified in the Street Tree Repair Notice.

Section 13.28.540 of the Municipal Code states: "*If the corrective action required by notice is not completed within the time specified in the notice of violation, the city shall have the authority to perform this work or cause this work to be performed and the owner of the affected property shall be billed for the costs incurred. The property owner shall be responsible for all costs associated with the corrective action including costs of planting, removal or pruning of the tree, shrub, hedge, or landscaping, administration time and expense, late charges, and the handling of any lien placed on the property owner's property due to failure of the property owner to pay within the required period."*

Private Property Tree Pruning Permit

No notification or permits are required for the pruning of private property trees with the exception of "Heritage Trees". However, any pruning that involves removal of more than 25% of the foliage or woody tissues within a one year period shall be deemed excessive and can be treated as an illegal removal under section 13.32.020.J which states: *"Remove" means eliminate, take away, uproot or destroy. For purposes of this Chapter, "remove" also means taking any action that reasonably and foreseeably will lead to the death of a tree or to permanent significant damage to the health or structural integrity of a tree. Such actions can include, without limitation and by way of example, excessive pruning, cutting, girding, poisoning, or watering of a tree; the unauthorized relocation or transportation of a tree; excessive excavation, alteration, or grading of the soil within the dripline of a tree, or excessively bruising, tearing or breaking the roots, bark, trunk or branches of a tree.*

Private Property Tree Removal Permits on Single Family Lots

Section 13.32.020 defines a tree as: ""*any live or dead woody perennial plant characterized by having a main stem or trunk which measures thirty-eight (38) inches or more in circumference at a height of fifty-four (54) inches above natural grade slope. For purposes of this Chapter, a multi-trunk tree shall be considered a single tree and measurement of that tree shall include the sum of the circumference of the trunks of that tree at a height of fifty-four inches above natural grade slope. "Tree" shall include the plural of that term".* Further sections 13.32.030, 13.32.040 and 13.32.041 state: *"It shall be unlawful for any person to remove, or cause to be removed, any tree, as defined in Section 13.32.020, from any private parcel of land in the city unless a permit has been issued."*

For specific information related to conditions required for the issuance of a Private Property Tree Removal Permit or to obtain an application, please contact the Planning Department at (408)535-3555, or email them at Live Tree Removal Permit Application Planning Department Website.

Private Property Tree Repair Notice

Section 13.28.440 of the Municipal Code states: *" No owner or person in possession or control of any premises shall maintain any tree, shrub, hedge or other landscaping located on such premises in a manner that causes or may cause a hazard-*

ous condition on a street. No owner or person in possession or control of any premises on any corner or interior lot abutting upon a street shall permit the existence of any tree, shrub, hedge, landscaping, mound of earth, or boulders that obscure and impair the view of intersecting or entering traffic from a street of passing motorists or pedestrians or which impairs the view of the street signs, traffic signs, or any other control devices or signs placed upon the streets for the safety and convenience of the public." Further, 13.28.500 of the Municipal Code states: "*If the director determines that the condition of any tree, shrub, hedge, or landscaping constitutes a violation of any provision of this chapter, the director shall, by notice in writing, notify the owner of the property in violation to prune or remove the tree, shrub, hedge, or landscaping or take any other necessary corrective action to cure the violation."*

When trees, whether public or private, that pose a threat to vehicle and pedestrian safety by blocking regulatory signage, advisory signage, streetlights, traffic signals or from broken branches or other defects are identified, the City will issue a Street Tree Repair Notice to the property owner that identifies any mitigation work that is required. The property owner has up to 60days to complete any work identified in the Street Tree Repair Notice.

Section 13.28.540 of the Municipal Code states: "*If the corrective action required by notice is not completed within the time specified in the notice of violation, the city shall have the authority to perform this work or cause this work to be performed and the owner of the affected property shall be billed for the costs incurred. The property owner shall be responsible for all costs associated with the corrective action including costs of planting, removal or pruning of the tree, shrub, hedge, or landscaping, administration time and expense, late charges, and the handling of any lien placed on the property owner's property due to failure of the property owner to pay within the required period."*

Public Tree Pruning Permits

While no permits are currently required for pruning of trees that grow on public property, the City of San José is committed to following all best management practices and permit conditions required as a part of our street tree permits.

Public Tree Removal Permits

While no permits are currently required for removal of trees that grow on public property, The City of San José is committed to following the all best management practices, posting notifications and permit conditions required as a part of our street tree permits.

Heritage Tree Pruning Permits

Heritage Tree Pruning Permits are available on request for the routine pruning of the upper canopy or roots of a Heritage Tree. Heritage Tree Pruning Permits are free and can be obtained through the DOT at treesandsidewalks@sanjoseca.gov or by phone at (408)794-1901. Street tree pruning permits are valid for sixty (60) days and are eligible for up to 60 days extension.

Once a Heritage Tree Pruning Permit is complete, the holder of the permit is required to report completion of the work to DOT. If the property owner declines to prune the tree after a permit is issued, the permit may be cancelled after sixty (60) days or the expiration of any extensions. Failure to report completion of any pruning prior to expiration of the permit will result in an automatic inspection by the Trees and Sidewalks team and the potential issuance of a *"Street Tree Repair Notice"* if work is required and not yet complete.

Heritage Tree Removal Permits

Heritage Tree Removal Permits for street trees and private trees are processed in the same manner as Street and Private Tree Removal Permits described above. Failure to obtain a permit prior to performing work may result in the issuance of an illegal tree removal citation as described below.

Emergency Tree Services by Property Owner

Section 13.28.340 of the Municipal Code states: *"Notwithstanding any provisions of this part, no permit shall be required for pruning or removing a street tree if any of the following criteria are met prior to any work being performed:*

1. *An imminently hazardous condition exists where the immediate pruning of a street tree(s) is necessary to protect the public health, safety or welfare. The person who performs the emergency work must not prune the street tree(s) more than is reasonably required to eliminate the imminently hazardous condition and must provide, within two business days of the completion of the emergency work, written notice to the director that includes a full description of the work completed, the exact location where the work was performed, and the basis for the emergency pruning.*
2. *An imminently hazardous condition exists and the director has provided written notice to the responsible property owner to take certain corrective action to abate the imminently hazardous condition and the work performed complies with the notice."*

While no permits are required to address "imminently hazardous trees" it should be noted that the person taking corrective action must clearly document the imminent nature of the hazard and why the corrective action taken was the only option to mitigate the risk.

Emergency Tree Services by City of San José

Section 13.28.550 of the Municipal Code states:

"A. In cases of imminently hazardous conditions, the director shall have the authority to perform or cause to be performed the corrective work to abate the imminently hazardous condition without observance of any notice requirements. The property containing a tree, shrub, hedge, or landscaping that poses an imminently hazardous condition or the property adjacent to or fronting on the subject street tree, shrub, hedge, or landscaping that poses an imminently hazardous condition may be assessed for the costs incurred in accordance with this part.

B. The owner of a property containing a tree, shrub, hedge, or landscaping that poses an imminently hazardous condition or adjacent to or fronting on a street tree, shrub, hedge, or landscaping or a property containing a tree, shrub, hedge, or landscaping that poses an imminently hazardous condition for which the city takes corrective action shall pay any costs and expenses associated with the emergency services, including costs of removal of the tree, shrub, hedge, or landscaping, administration time and expense, late charges, and the handling of any lien placed on the property owner's property due to failure of the property owner to pay within the required period. The city shall send an invoice to the property owner setting forth the costs and expenses as described herein and the date specified for full payment to the city.

C. If the property owner has failed to pay the invoice, the director shall issue a notice of cost informing the property owner of the failure to pay the invoice and that failure to pay the amount will result in the initiation of proceedings to place a lien against the property owner's property."

While every effort will be made to contact the adjacent property owner or responsible party will be made prior to the City of San José taking corrective action, public safety does not always allow sufficient time and is not required.

Tree Citations

Street trees

Section 13.28.310 of the Municipal Code states: *"Except as provided in this section, it shall be unlawful for any person to prune or remove any street tree, or do any construction work or activity that may affect the critical root zone of a street tree, without a permit issued by the director."*

Street Tree Planting Permit Violation

The DOT is responsible for the issuance of administrative citations related to plantings of street trees without a permit. Prior to issuing an official "Administrative Citation", a "Notice of Violation" is mailed to the property owner. The property owner must respond within 14 days of receipt and provide justification for the illegal planting. If the justification provided is determined to be inadequate, an Administrative Citation is issued. The fines for planting a street tree without a permit or of an inappropriate species is as follows:

Trunk Diameter	Fine Amount
Any size	$50.00

Street Tree Pruning Permit Violation

The DOT is responsible for the issuance of administrative citations for unpermitted or improper pruning of Street Trees. Prior to issuing an official "Administrative Citation", a "Notice of Violation" is mailed to the property owner. The property owner must respond within 14 days of receipt and provide justification for the illegal pruning. If the justification provided is determined to be inadequate, an Administrative Citation is issued. The fines for pruning a street tree without a permit or improperly is as follows:

Trunk Diameter	Fine Amount
0 to 5.99 inch	$150.00
6.0 to 11.99 inch	$175.00
12.0 to 17.99 inch	$200.00
18.0 to 23.99 inch	$225.00
24.0 and greater	$250.00

Street Tree Removal Permit Violation

The DOT is responsible for the issuance of administrative citations for unpermitted removal or failure to plant a replacement street tree as a condition of the removal permit. Prior to issuing an official "Administrative Citation", a "Notice of Violation" is mailed to the property owner. The property owner must respond within 14 days of receipt and provide justification for the illegal removal. If the justification provided is determined to be inadequate, an Administrative Citation is issued. The fines for removing a street tree without a permit are as follows:

Trunk Diameter (When measured at 4.5' above natural grade)	**Fine Amount** (1st violation in 3 year period)	**Fine Amount** (2nd violation in 3 year period)	**Fine Amount** (3rd violation in 3 year period)
0 to 5.99 inch	$500.00	$1,000.00	$1,500.00
6.0 to 11.99 inch	$750.00	$1,500.00	$2,250.00
12.0 to 17.99 inch	$1,000.00	$2,000.00	$3,000.00
18.0 to 23.99 inch	$1,500.00	$3,000.00	$4,500.00
24.0 to 29.99 inch	$2,000.00	$4,000.00	$6,000.00
30.0 to 35.99 inch	$3,000.00	$6,000.00	$9,000.00
36.0 to 39.99 inch	$4,000.00	$8,000.00	$12,000.00
40.0 and greater	$5,000.00	$10,000.00	$15,000.00

Private Property Tree Removal Permit Violation

Code Enforcement is responsible for the issuance of citations for unpermitted removal of private property trees. The fines for violating this ordinance are as follows:

Trunk Diameter (When measured at 4.5' above natural grade)	**Fine Amount** (1st violation in 3 year period)	**Fine Amount** (2nd violation in 3 year period)	**Fine Amount** (3rd violation in 3 year period)
12.0 to 17.99 inch	$1,000.00	$2,000.00	$3,000.00
18.0 to 23.99 inch	$1,500.00	$3,000.00	$4,500.00
24.0 to 29.99 inch	$2,000.00	$4,000.00	$6,000.00
30.0 to 35.99 inch	$3,000.00	$6,000.00	$9,000.00
36.0 to 39.99 inch	$4,000.00	$8,000.00	$12,000.00
40.0 and greater	$5,000.00	$10,000.00	$15,000.00

Administrative Citation Appeal

Any individual who has been issued an administrative citation and wishes to contest a Tree Citation may do so by submitting an Administrative Citation Hearing Request Application and paying an advance deposit of the citation costs. If you are contesting the citation and are unable to pay the advance deposit, there is a portion of the Hearing Request form that allows you to request a hardship waiver. Hardship waivers must be requested within 15 calendar days of the citation date.

County of Santa Clara – Tree Regulation

Any private tree that resides within the jurisdiction of the County of Santa Clara is subject to the rules and regulations of the County. For the most up to date information, please contact:

Santa Clara County Department of Planning
70 W Hedding Street, East Wing, 7th Floor, San José, CA 95110
Phone: (408) 299-5770
Website: https://www.sccgov.org/sites/dpd/Iwantto/Permits/Pages/Tree-Removal.aspx

Hazardous or fallen street trees along County Roadways should be reported to County Communications at (408)299-2750

Hazardous or fallen trees within Santa Clara County Parks should be reported to:
County Parks Division
298 Garden Hill Dr., Los Gatos, CA 95032
Phone: 408-355-2200
Email: parkinfo@prk.sccgov.org
website https://www.sccgov.org/sites/parks/Pages/Welcome-to-Santa-Clara-County-Parks.aspx

School Districts – Tree Regulation

Street trees located adjacent to school district property are subject to the permits requirements of the appropriate agency (e.g. City, County, etc.).

Trees located within School District property are subject to the rules and regulations of the individual School District and the State of California. No planting, pruning or other tree related work may be performed without specific permission from the school district office (not the particular school or facility). For more information or to report tree emergencies residents should contact the School Districts Main office.

Riparian Areas and Valley Water – Tree Regulation

Trees located within the various riparian areas of San José are the responsibility of the property owner as identified in Santa Clara County parcel records.

Trees located within property that is owned by Valley Water, or street trees along its frontage and in riparian areas, are subject to the rules and regulations of the Santa Clara Valley Water and the State of California, and not subject to City permitting. No planting, pruning or other tree related work may be performed without specific permission from Valley Water. For more information or to report tree emergencies with riparian areas residents should contact:

Valley Water
5750 Almaden Expressway, San José, CA 95118
Phone: (408)265-2600
Email: info@valleywater.org
Website: https://www.valleywater.org/

California Fish and Wildlife

The California Department of Fish and Wildlife (CDFW) is responsible for the protection of California's natural resources and provide public safety through effective and responsive law enforcement. CDFW is responsible to regulate, but not manage, trees in riparian corridors. The City is responsible for tree and habitat maintenance on the City's creek side property. The City of San José falls within District 3-Bay Delta Region. For more information or to report concerns with wildlife, residents should contact:

CA Fish and Wildlife
825 Cordelia Road, Suite 100, Fairfield, CA 94534
Phone: (707)428-2002
email: askbdr@wildlife.ca.gov
website: https://wildlife.ca.gov/Regions/3

State of California Highways (CALTRANS)

Trees located within property that is owned by the State of California are subject to the rules and regulations of the State of California. No planting, pruning or other tree related work may be performed without specific permission from CALTRANS. For more information or to report tree emergencies or concerns along State Highways residents should contact:

CALTRANS District 4
111 Grand Ave, Oakland, CA 94612

Phone: (510)286-4444
email: caltrans_d4@dot.ca.gov
Online: Service Request Portal
website: https://dot.ca.gov/caltrans-near-me/district-4

Non-permit related section of City of San José Municipal Code

Disclosure Upon Sale or Transfer of Residential Real Property

Section 13.28.410 states: *"A. Not less than seven business days before the sale or other transfer of residential real property concludes a selling or transferring property owner must disclose to the acquiring property owner, on a disclosure form provided by the city, whether the residential real property to be sold or transferred fully complies with the city's street tree maintenance and replacement requirements of Section 13.28.400*. B. If the selling or transferring property owner cannot determine whether street trees located on or adjacent to the residential property are substantially in compliance with the approved development permits for the property, or the property's approved development permits are inconclusive as to the requirements for the presence and location of street trees on or adjacent to the property, then the following requirements for the planting and presence of street trees shall apply:

1. The property must have one street tree for any adjacent street if it is an interior lot and at least three street trees if it is a corner lot, unless otherwise modified by the director in the interest of public safety.

2. If the current general plan requirements for street trees on or adjacent to the property differ from the requirements specified in Subsection B.1., then the current general plan requirements shall govern the number and location of street trees required on or adjacent to the property at the time of sale or transfer. If the property meets the general plan requirement, then the selling property owner must indicate such compliance with the general plan on the disclosure form provided to the acquiring property owner.

3. All street trees shall be planted in accordance with the requirements of Section 13.28.300.

C. Upon a written request, the director may grant the selling or transferring property owner an exemption in writing from the requirements of this section if the director determines in the interest of public safety that planting and maintaining street trees on or adjacent to the residential property at the time of sale or transfer is not appropriate. Such an exemption does not run with the land and shall not allow any deviations from the disclosure requirements upon residential real property sales or transfers for future sellers or transferors."

Willful Damage to Tree

Section 13.28.420.B.A states *"No person shall, except with written permission of the director damage, cut, carve, girdle or injure the bark of any street tree."*

Attaching of Anything to Trees

Section 13.28.420.B.B states "*No person shall, except with written permission of the director, attach or keep attached, or cause the same, any sign, wire, device or injurious material to any such tree or to the guard or stake intended for the protection of such street tree."*

Section 13.28.420.E states" *Every person having any wire charged with electricity running through a street in the city shall securely fasten such wire so that it will not come in contact with any street tree therein; and no person shall, without the written permit of the director, attach any electric wire, insulator or any device for the holding of any electric wire or for bracing the poles which carry the same to any street tree growing or planted upon any street."*

Protection of Street Trees during construction

Section 13.28.420.C states *"As part of any construction work or activity of a building or structure, the owner or responsible party thereof shall place such guards around all nearby street trees as shall in the opinion of the director effectively prevent injury to them."*

Chapter 4 | **Design Guidelines and Specifications**

Proper tree care starts with the design and placement of trees into an environment that is able to meet their basic needs and avoid significant conflicts that may impact the health or structure of the tree reducing its life span or the benefits it provides. Below are the most critical factors that must be considered when planting a tree.

Site assessment

Before planting any tree, a full site assessment should be completed to ensure it will thrive in its environment and have the space needed to accommodate the tree at maturity. On a developed site where buildings, utilities and other features have already been installed, the process is fairly straight forward. For designers or planners that are working on new developments or redevelopments, the process may be more difficult. This is because the future building design, and utility locations are frequently on separate drawings.

A Site Assessment check list can be downloaded free of charge from the Cornell University publication, *Recommended Urban Trees: Site Assessment and Tree Selection for Stress Tolerance*.

Some of the most important features of the site assessment are discussed below

Sufficient Root and Trunk Space

Trees need adequate space for trunk expansion and space to develop woody structural roots for support. Since every location is unique, it is important to involve a professional Arborist to provide guidance on species location selection.

For street tree plantings the Office of the City Arborist has a list of recommended set-backs that can be found in Appendix A, Clearance and Setback Guidelines for City Streetscape Projects. Keep in mind that the setbacks are recommendations and can be adjusted depending on the individual planting locations.

Recent research has also suggested that to ensure the sustainability of newly planted trees one must consider the availability of loosely compacted soils (soil volume) available to the tree to reduce conflicts related to root growth and provide sufficient water and nutrients for the tree at maturity. Recommended soil volumes are listed in Appendix B.

Placement of the tree in relation to other plant material on the site must be considered. In a new landscape turf and other ground cover, shrubs and annuals should be planted a minimum of two feet from the outside edge of the planting pit. In existing landscapes, the same guideline should be followed.

Similar to the upper canopy of a tree, tree roots require water, nutrients and oxygen to grow. To limit the availability of these basic needs frequently results in undue stress on the tree and reduces the benefits the tree is able to provide. Therefore, the City of San José encourages the use of designs that address these basic needs.

Tree Wells

In the dense urban areas (downtown) of San José it is common for the City to require trees to be planted in tree wells or small cut-outs within the sidewalk to ensure safe and efficient movement of pedestrians. Unfortunately, this type of design is not conducive to proper tree development and frequently results in hazardous conditions when the roots or the root flare begin to grow underneath the surrounding sidewalk. To address this issue the City of San José recommends designers create the largest possible tree

well possible for the given right-of-way. Further, the City of San José encourages the use of alternative technologies and surfaces that improve water infiltration and the absorption of air when appropriate.

Decorative Tree Grates in the Public Right of Way

In the urban environment it is common for designers to recommend the use of decorative tree grates and tree guards. Decorative tree grates are often used to provide some aesthetic appeal to the sidewalk or to account for differences in grade between the tree well and surrounding sidewalk. These decorative grates are commonly built with mostly solid surfaces and provide only limited openings to ensure a solid and safe walking surface. Unfortunately, this means the decorative tree grates require continual monitoring, adjustment or enlargement to account for the growth of the tree trunk. When this preventative maintenance is not addressed in a timely manner, the resulting damage to the tree is often significant enough that the structural integrity of the tree is compromised and complete removal may be required. The City of San José does not recommend the use of decorative tree grates in most instances and would instead encourage designers to use permeable pavers over a sand and gravel base or other similar permeable surface that accommodates tree growth without requiring the additional on-going maintenance.

Decorative Tree Guards in the Public Right-of-Way

Similar to decorative tree grates, it is common for designers to recommend the use of decorative tree guards in the urban environment. Unfortunately, the challenges are similar to those with decorative tree grates. The City of San José does not recommend the use of decorative tree grates in most instances and would encourage designers to use permeable pavers over a sand and gravel base or other similar permeable surface that accommodates tree growth without requiring the additional on-going maintenance.

Parkstrip or Landscape Strip

The majority of San José's residential neighborhoods consists of parkstrip or landscape strips between the curb and gutter and the sidewalk. The depth of this areas ranges from as little as 1 to two (2) feet across to as much as ten (10) feet in some of the older neighborhoods north of downtown. Similar to tree wells in the more urban areas of San José, this limited grow space frequently results in conflicts with the surrounding hardscape and utilities that result in significant impacts to the tree when repairs are made. Of additional concern is that it is not uncommon for property owners to pave or otherwise fill the parkstrip/landscape strip with concrete aggregate or other impervious surfaces that provide a walkable surface but prevent the infiltration of water and diffusion of oxygen into the soil. The City of San José recommends that property owners maintain the parkstrip/landscape strip free of impervious surfaces. As inspection of these properties occurs the City of San José will require that impervious surfaces be removed to provide a minimum amount of pervious surface area adjacent to the stem of a tree that allows for air and oxygen to enter the soil. The minimum dimensions of the pervious surface area will be equivalent to the depth of parkstrip by five feet in width. In cases where the depth of parkstrip is larger, the property owner will be expected to provide a surface area with equal dimension of the depth and width (5 feet x 5 feet, 6 feet x 6 feet, 10 feet x 10 feet).

Utility Conflicts

Further complicating the issue of sufficient root volume and limiting the impacts to our trees is the installation of utility conduits and vaults within the public rights-of-way and in close proximity to our street trees. Therefore the City of San José encourages the use of alternative technologies such as directional boring or complete relocation of utilities when repair or replacement is required to reduce the long term impacts that repair and replacement of these utility facilities have on our trees and the sustainability of the Community Forest.

Sufficient Canopy Space

The shape and size of the tree canopy at maturity is one of the primary considerations to accurately determine the placement of the tree. It is the goal of the City of San José to maximize the tree canopy of our Community Forest. To accomplish this goal the City Arborist staff chooses a street tree species that will provide the largest canopy at maturity and that is suitable for the size of the planting site.

Unfortunately, street trees in the urban environment frequently have limited growing space. To ensure street trees have the ability to maximize their canopy and limit future maintenance needs, the project arborist must balance the need for canopy over the street with the need for clearance from vehicle traffic, buildings, street lights, traffic signals, overhead utilities, etc.

On new developments, building designs should consider incorporating step back architecture to provide increased grow space for the upper canopy at maturity. Consideration should also be given to the undergrounding of overhead utilities or selecting a species with mature canopy height that provides a minimum of five feet of clearance.

As a general rule, tree spacing should be equivalent to roughly 80% of what the canopy spread will be at maturity. This means that for a tree with a canopy spread of 50 feet at maturity, the spacing should be roughly 40 to 45 feet. Recommended tree spacings are listed in Appendix B.

Species Selection and Diversity

Experience has taught us that species diversity is the key to a healthy community forest. In the middle of the 20th Century, an over-reliance on the American Elm (*Ulmus americana*) resulted in the significant loss of tree canopy for many cities in the Eastern and Central United States when Dutch Elm Disease arrived in the United States. To prevent similar issues from arising in the future, it is important to maintain species diversity and limit the effect any one pest or disease can have on the Community Forest. As such, experts recommend using the "10-20-30 rule" to prevent over-reliance on any one species. The 10-20-30 rule can be described as follows:

- no more than 10 % of the overall tree population is composed of one species
  EX: Coast Live Oak (*Quercus agrifolia*)
- no more than 20 % composed of one genus
  EX: Red oak, black oak, live oak, etc. *Quercus*
- no more than 30 % is composed of one family
  EX: Fagaceae family includes the oaks (*Quercus*), tanoaks (*Lithocarpus*), beech (*Fagus*) and chestnut (*Castanea*)

Currently the street tree portion of our Community Forest has three popular tree species, the Chinese Pistache (*Pistacia chinensis*), the Crape Myrtle (*Lagerstroemia* spp.) and the London Plane tree (*Platanus acerifolia*) or Sycamore, that

are very close to or are already exceeding the 10 % of one species guideline. Therefore, planting more of these species should be avoided and other tree species should be considered when planting new trees in San José.

For assistance with selecting appropriate species, the City of San José recommends using the SelecTree website published by California Polytechnic University (https://selectree.calpoly.edu).

Climate Change

Given the potential for significant climate change and that trees are a long term asset, the City of San José is committed to exploring alternative non-native species that may be better suited to a warmer and drier environment.

Native Species

Native species are those species that have either evolved in a geographic area or have naturally migrated to that area and very important to the overall ecological health of the environment. As such, the City of San José is committed to prioritizing the use of native plants that are appropriate to the location whenever possible with particular focus on Riparian and Urban Wildland interface areas as well as Regional Parks.

Invasive Tree species

Imported trees (imported by design or by accident) often adapt well to our California climate and spread to open space, wetlands and forested areas. Often these imported or invasive trees can be detrimental to the habitat of native plants and wildlife. Invasive trees can cause a decline of the native species of plants, insects and wildlife. Selection of landscape trees for planting (whether on private property or in the public right-of¬way) should include investigating whether the tree species is considered invasive or detrimental to our California Landscape.

The nonprofit organization California Invasive Plants Council (Cal-IPC) is vigilant in its efforts to prevent, detect and remove plant species detrimental to California to protect and restore waterways and wildlands. The CalIPC website provides information on invasive species including photographs and descriptions of invasive tree species.

The list of invasive tree species for the Bay Area include trees commonly found in San José.

- Black Acacia (*Acacia melanoxylon*)
- Tree-of-Heaven (*Ailanthus altissima*)
- Blue Gum tree (*Eucalyptus globulus*)
- Chinese Tallow Tree *(Sapium sebiferum*)

Refer to the Cal-IPC site before selecting any tree, shrub, groundcover or other plant material to plant in the City of San José.

Wildlife

Wildlife habitat life thrives where the complex interactions between organisms and their surroundings are balanced. Trees provide habitat for a wide variety of wildlife that might otherwise have a difficult time living in our cities. Native trees support insects that provide pollination services and that move energy up the food chain from plants to birds, frogs, lizards and other wildlife. For example, a single oak tree can support up to 500 species of insects and invertebrate species, thereby providing a broad range of dietary choices for birds, bats, and other wildlife. This wildlife can in turn provide pest control services in our gardens and agricultural areas. Additionally, by reducing both the amount of pollutants that reach the Bay and soil erosion, the trees support aquatic and riparian wildlife as well as micro-organisms that live in the soil itself.

Water Usage and Conservation

The City of San José is dedicated to long-term water conservation to address the chronic water shortage, to protect the aquifers of the city, and to prevent land surface subsidence. Moreover, the city is subject to periodic droughts, a circumstance which requires the city council to take steps to protect the health, safety and general welfare of the public. Given the potential for climate change and decreased levels of annual rainfall, the City of San José is committed to prioritizing the use of tree species that are categorized as moderate, low and very low as identified in the California "Water Use Classification Of Landscape Species" (WUCOLS) database.

Green Stormwater Facilities

Trees are perfectly suited for green stormwater infrastructure (GSI). As presented in this CFMP, trees naturally capture stormwater in their canopies while absorbing precious stormwater runoff with their roots. The next time there is a light rain, observe the dry patch underneath a leafy tree to understand the benefits of its canopy, where the leaves will absorb moisture. Stormwater capture within the root zone is becoming a prized resource during times of drought when supplemental irrigation is insufficient. When a storm occurs, roots will absorb moisture where trees can store their supply throughout dry seasons. This section discusses trees, their compatibility with GSI, and some challenges for successful designs.

The CFMP compliments the City of San José's Green Stormwater Infrastructure Plan, or GSI Plan (2019) that references trees eleven times within Part 1, including assurances for the protection of existing trees when installing subsurface infiltration chambers (Appendices, p. 6-1). One of the first discussions of trees highlights the benefits of green systems, "especially for the types of GSI that use vegetation and trees. Vegetated GSI systems can help improve air quality by filtering and removing airborne contaminants from vehicle and industrial sources and can reduce urban heat island effects by providing shade and cooling landscapes. Increasing vegetation can also provide an ecological benefit by improving the biodiversity of plant types in the urban environment and providing habitat for birds, butterflies, bees, and other local species" (p. 15). Trees are key components to the multi-benefits of green stormwater infrastructure.

Trees are considered when discussing community quality of life and new career paths in the GSI Plan. "These include greening and beautifying public spaces by planting additional trees, installing green roofs that provide park-like spaces (if accessible), providing unique design opportunities for the integration of public art, and enhancing parks and public rights-of-way for public gathering. When traffic calming improvements such as curb extensions and bulb-outs at intersections are used to promote active transportation and increased pedestrian bicycle safety, there is an opportunity to use the additional space created by the improvements to integrate GSI facilities. The trend toward development of GSI facilities is also creating the need for a new 'green workforce' to perform installation and maintenance of the facilities, which helps create jobs" (p. 15). Combined, trees within GSI participate in the City's plan to support a triple bottom line to improve opportunities for quality of life, the environment, and prosperity through new jobs and career options.

Trees do not need to be specifically integrated into GSI to be included for stormwater capture considerations. For example, the GSI Plan highlights median trees that were planted for the Chynoweth Green Street (p.61). These trees and related median renovation replaced an exposed landscape area that would have otherwise contributed sediment to runoff and increased heat island effect. As the newly installed trees mature, their canopies will support these mitigations.

Another example of an existing facility utilizing trees in stormwater systems is discussed in the GSI Plan. At the City of San José's Environmental Innovation Center, 100-year-old olive trees are irrigated by a cistern capturing water from the facility's roof, an example of rainwater harvesting and storage for later use during the dry season (p. 18). While this example highlights an opportunity when building new construction, the GSI Plan recognizes the value of existing trees when determining the feasibility of new installations and their compatibilities within existing infrastructure, including said trees with established root and canopy structures.

As the GSI Plan establishes criteria for the prioritization of sites to install GSI, the evaluation considers "site space constraints" (p. 41). Utility densities that present conflicts when installing GSI facilities, street typologies (from residential to grand boulevards), public transportation stops, and mature trees are assessed to determine the feasibility of retrofitting GSI along our public rights-of-way. Should the co-benefits for improving water quality, flood mitigation, groundwater recharge plus community, place-making, and enhanced habitat outweigh hydrological and site space constraints, a site may be reprioritized for GSI.

Looking further into site space constraints, the GSI Plan's Table 5-1, Updated Green Street Prioritization Methodology specifically discusses length constraints of GSI treatments along roadways by what appears to be a 2' buffer around existing trees 24" in diameter (p. 43). This direction is unclear when considering larger or smaller trees or if the buffer is adequate, nor does it consider site specific situations where tree roots are either shallow, deep, twist, or turn. In other words, this direction provides an opportunity to discuss how trees will be evaluated by a certified arborist so a GSI site can be properly prioritized. Site constraints also include right-of-way length and number of trees per block (p. 45) and "estimated driplines of mature trees" (p. 52).

The GSI Plan, while considering site constraints, also looks at opportunities when improvements can include street trees. As an example, the San Carlos Safety Improvement Project, located on West San Carlos Street between Highway 880 and McEvoy Street, will include street trees and landscaping while integrating GSI facilities. At the time of this writing, it is unclear if the street trees will be integrated or act as compliments to GSI (p. 62). As the GSI workplan continues, additional efforts will be directed toward updating site space constraints to evaluate barriers and conflicts, which includes established trees in the landscape (p. 78). Should a site meet the GSI Plans criteria for feasibility, the next step is to determine how the trees, mature or newly proposed, will be integrated within stormwater treatments. Currently, GSI designs present challenges to this tree integration.

One such challenge is the use of biotreatment soil mix (BSM) in GSI practices. BSM is a mixture of sand and compost that allows for the fast drainage to minimize ponding within GSI. The resulting condition creates an engineered drought that may require careful selection of trees for their drought tolerance.

The City may resort to experimenting with new and alternative soils that can be submitted for approval by the County-wide Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) and the Regional Water Quality Control Board (RWQCB) Executive Officer. The City of San José's Infrastructure Maintenance Section has learned that careful monitoring of soil moistures, mulch layers, and irrigation operations is required to insure both short- and long-term success of its managed GSI landscapes. This experience should inform how trees are used in public rights-of way when integrated with GSI. Alternatively, trees could be planted in native soil adjacent to BSM, which allows trees and plants to adapt to familiar soil textures while gaining access to stormwater runoff, depending on facility type.

Proprietary Tree Well Filters

Known for their convenience in constructing GSI along public rights-of-way, proprietary systems are designed to hold one or two large shrubs or small trees within a subterranean planter. Their installation supplements curb drain inlets, and from the outside look very similar. Stormwater enters the inlet where the sediment and trash are captured, allowing the water to filter through the tree's planter as the final cleaning process before flowing into a nearby storm drain or infiltrating into the native soil below.

Principally, these systems are effective practices, however, their confined space restricts root growth. Once trees reach container capacity, there is growing concern that trees will no longer effectively perform, become rootbound and will likely decline, prompting a necessary replacement and related expenses. Currently, proprietary tree well filters are exclusively used for projects that meet specified criteria allowing them to provide less than 100% LID stormwater treatment onsite.

Site-Constructed Tree Trenches

Large cities, such as Philadelphia, Canada's Toronto and Vancouver, and state agencies from CalTrans to Minnesota Pollution Control and Delaware's Division of Energy & Climate have either implemented or encouraged the use of tree trenches. Visually, tree trenches within the public rights-of-way are camouflaged to appear like ordinary parkstrips between the curb and sidewalk. For residential or high-aesthetic areas, parkstrips have diverse plantings, including street trees and understory shrubs or ground covers serving as attractive streetscapes for pedestrians and drivers alike, effectively turning bland streets into dynamic public landscapes. Parkstrips may also act as landscape buffers for protected bikeways, further enhancing safety on urban streets.

Tree trenches enhance tree and landscape performance by providing access to stormwater runoff and subsequent capture. Through curb inlets, water is collected then dispersed through perforated pipes running the length of the tree trench, enabling the stormwater to be captured and cleaned for use by trees and other ornamental plants. Excess water will

overflow into a storm drain through a lower elevation pipe, if necessary, or infiltrates into the native soil. In times of drought, this offers an opportunity to provide trees with additional moisture that trees will internally store over the dry season.

Unlike standard parkstrips, tree trenches will likely require additional structural support, particularly adjacent to roadways and buildings, and greater coordination with underground infrastructure. To satisfy this requirement, designs may include structurally engineered soils, vertical retaining walls, and/or suspended pavement systems. While the short-term cost may be higher, the long-term gain is proven with mature trees while reducing heat island effects. This is not the answer for all street trees, but as we look for opportunities to integrate GSI and trees into our landscape or rights-of-way, tree trenches offer significant public benefits.

Alternative Systems

Following the parkstrip model, permeable pavers set between trees will provide a comfortable walking experience where pedestrians do not need to maneuver around other landscape plants or uneven surfaces. These permeable pavers would be set on a gravel subbase and sand bed, allowing water to percolate into the native soil. The trees will effectively utilize this water as they mature, minimizing their search for superficial water. Using permeable paver options over the alternative poured concrete and tree wells offers another benefit by being less costly when repairs are needed. Permeable pavers are collected, repairs resolved, then pavers are reinstalled. Should any permeable pavers become damaged, there are plenty of manufacturers that can provide the same or similar, standardized replacements when needed. Conversely, poured concrete, when damaged, will require removal and disposal to a landfill, only to be replaced with more custom concrete.

Consider further the differences between parkstrips and city standard tree wells. As landscape areas, parkstrips offer opportunities to be self-treating stormwater facilities for sidewalk runoff, allowing for "infiltration, evapotranspiration, and other natural processes [to] remove pollutants from stormwater," as defined in SCVURPPP's C.3 Stormwater Handbook (p. xvii). By contrast, tree wells minimize this opportunity, as they are in most cases surrounded by impervious pavement. This suggests that trees will potentially perform better in parkstrips where water could be more readily available during rain events versus the confined space of a tree well. Tree wells, however, offer pedestrian comfort, and there are ways to accommodate both trees and pedestrians alike.

New technologies, such as porous asphalt and pervious concrete, are other options in support to trees' access to water. These materials are already implemented on private developments around the Bay Area, where porous asphalt has replaced traditional parking lots, and pervious concrete provides an alternative to traditional sidewalks.

Chapter 5 | **Tree Planting and Replacement**

As discussed in Chapter 1 there are numerous benefits to voluntarily planting trees within the community. These include aesthetics, increased property values, improved air quality and personal health, reduced energy consumption and stormwater runoff, and a more livable/walkable community. In addition to voluntary planting of trees, there are instances where tree planting is required. These include as a condition of development, as a replacement for trees removed by permit, etc. To assist property owners with their tree planting needs, the City of San José has partnered with Our City Forest. Our City Forest is a non-profit tree planting group in the Santa Clara Valley that may be able to help with providing and planting a tree. See Chapter 6, Our City Forest.

Nursery Stock Selection

When choosing a young tree, make sure it is free of significant defects, such as poor branching structure, major wounds, overgrown roots, disease or insect infestations. Also look at the root structure. Trees that have been in their nursery containers too long have roots that have overgrown the available soil space and are circling around one another. Poor quality nursery stock is one of the major causes of poor tree growth and tree failure.

Choosing younger trees of size that may not look like trees, but more like a tall shrub is highly recommended. The lower branches (less than 3/8" diameter) help the trunk to grow and become sturdy. The lower branches are only temporary and will be removed later. It may take two to three seasons of pruning before the tree form begins to develop, but it is then possible to make sure that the trunk develops good stability and the lowest branches are high enough to allow for safe pedestrian and vehicle traffic.

The City of San José recommends the planting of 15 gallon trees over the larger box or container grown trees as it limits the potential for circling roots to have developed, it is easier to correct any branch or structural issues when the tree is smaller and the smaller trees will typically establish faster and out-perform the larger trees as a result.

A guide to choosing good quality nursery stock was developed by the Urban Tree Foundation in cooperation with the UC Cooperative Extension. This guide has many excellent photographs showing both "good quality" and "bad quality" trees from roots to branches. It contains a detailed checklist of characteristics that are both acceptable and not acceptable for nursery grown trees. Reading this guide is strongly recommended to professionals and homeowners before choosing any nursery plants. This guide can be found and downloaded for free at The Urban Tree Foundation website.

Tree Inspection for City Projects

Container grown trees to be planted on City property or in the public right-of-way should be inspected by the installing contractor and City staff prior to planting the tree. Both above ground and below ground parts of the tree are inspected for conformity to species characteristics, pests and diseases, branch structure and root structure.

Branches should be uniformly spaced both vertically and radially along the trunk. A central leader should be present. The woody structural roots should be present within the top one inch of soil mix and flare out in a radial pattern from the trunk. No bruised, torn, sunken, discolored or soft tissues are acceptable on the trunk. No

broken branches or other defective branches should be removed without approval of the City inspection staff.

The entire rootball must be inspected. To perform the root inspections, the tree should be removed from the container and inspected for the presence of circling roots. Small circling roots less than one-half inch in diameter may be easily removed before planting. However, circling roots on the inside of the rootball are not acceptable. A long knife or other probe must be used to check the rootball for circling roots within the rootball. If circling roots are present near the trunk that are greater than one-fourth inch in diameter the tree should be rejected. In some cases, circling roots can be pruned to correct this defect. The City arborist staff or inspection team must approve of any corrective pruning to the roots.

To avoid issues with contractors ordering, delivering and then having to return nursery stock that does not meet City of San José quality standards, the City has identified an independent contractor that can be dispatched to the local wholesale nurseries at the expense of contractor to perform the required inspections.

How to Plant Trees

The City of San José provides standard guidelines to developers and contractors for City projects involving planting street trees. In 2013, the City of San José published our Streetscape Guidelines and Streetscape Standard Details. These Guidelines contain the written specifications for street landscape improvements including soil testing, nursery stock selection, planting procedures, etc. The Details contain the drawings for all aspects of street tree plantings for development projects. The following sections present general information for contractors and homeowners, but contractors shall adhere to the specifications, as written, for each individual project.

Soil Testing

Prior to planting a tree in disturbed soil (recently graded, altered or amended) the City requires the developer or contractor to have the soil tested for nutrient content, chemical suitability and physical characteristics. Appendix C contains both soil sampling guidelines (how to properly procure, package and submit a soil sample) and the types of tests to be performed.

Typically, any data generated from the soil samples are interpreted by the soil testing laboratory and recommendations for fertilizers and soil amendments (organic and inorganic) are provided to improve the characteristics of the soil.

Tree Planting Pit Width

The tree planting pit should be dug a minimum of two times the diameter of the rootball of the tree being planted whenever possible. The sides of the planting pit should be scarified, loose and free of any auger slick.

Tree Planting Pit Depth

The depth of the planting pit is shallow enough to allow for the top of the root ball (where the primary woody root flare out from the trunk) to provide a finished planting height that is at least equal or no more than one (1) inch above the surrounding final soil grade on the outside of the planting pit. This depth is not the same as the depth of the rootball when pulled out of the container. The depth of the pit is equal to the depth of the rootball after any loosening or disturbance to the rootball that has been removed from the container.

Be careful not to plant the tree too deeply. If your tree looks like a pole in the ground, remove some of the soil from the top until the trunk flare is exposed. This may require adjustment of the pit depth or removal of some of the soil from the nursery pot the tree came in. Planting a tree too deeply can cause many issues and can lead to premature death.

Symptoms of trees planted too deeply are:

- Branch dieback
- Reduced growth or dwarfing
- Splits in the trunk
- Leaf yellowing
- Girdling Roots
- Death

Root Barriers

Root barriers are no longer required or recommended by the City as their effectiveness is limited to the area immediately adjacent to the barrier. The most effective way to prevent roots from breaking up your sidewalk is to select the proper species, plant the tree properly in soil with limited compaction and care for the tree by deep-root watering (See Hand Watering below). While the City does not prohibit the installation of linear root barriers if desired by the property owner, they must be linear along either the edge of curb or sidewalk and allow for lateral growth within the parkstrip. Round or fully enclosed root barriers are prohibited as they lead to trees with girdling roots and the higher than normal risk of complete failure or uprooting. Please consult the installation procedure provided by the manufacturer except in cases it may violate city standards.

Fertilizer and Amendments

For City projects the planting process for the contractor differs from the process for a homeowner. For the contractor: The soil from the planting pit should be set aside and amended per the recommendations generated by the soil analysis. Most fertilizers and inorganic amendments can be mixed in the excavated soil.

The excavated soil mixed with inorganic amendments is used to backfill the planting pit. Organic amendments should only be mixed into the last batch of soil that is placed in the upper soil profile (0 to 8 inches deep in a clayey soil; up to 12 inches deep in a sandy soil). Contractors and homeowners should avoid placing organic amendment below 8 to 12 inches deep in the planting pit.

Homeowners are not required to test the soil or add fertilizer or inorganic amendments, but may do so if done through the methods described above.

Root Pruning

For street tree planting on City projects see previous section, Tree Inspection for City Projects. Homeowners should also inspect the rootball of trees before buying and planting them. Any root pruning that may be required should be minor in nature. See the guidelines provided by the Urban Tree Foundation for more details.

Backfilling the Planting Pit

Soil excavated from the planting pit (or if the soil analysis indicates, a contractor may be required to use imported topsoil) should be placed from the bottom of the pit to within 8 to 12 inches of the top of the pit. No organic amendments should be placed at the lower depths. (See directions above, Fertilizer and Amendments).

Watering Berm and Basin

Create a berm around the outer edge of the planting pit (not the outer edge of the rootball) by building a berm that is at least 4 inches high and 36 inches in diameter. The berm will provide a basin to store an adequate volume to keep the tree well watered. When a new tree is planted it is important to immediately and thoroughly soak the newly planted tree with approximately 15 to 20 gallons of water to settle the soil and collapse large air pockets. Once the initial watering is complete, the watering basin should be filled with 3 to 4 inches of organic mulch, such as wood or bark chips, to conserve water and protect the roots from high temperatures. See section below.

Organic Mulch

There are many benefits to placing a layer of wood chip mulch on the soil under woody trees and shrubs. Mulch can provide significant water savings during the summer months. The wood chip mulch over the bare soil helps to prevent the surface of the soil from "crusting," which often occurs when irrigation water evaporates too quickly. When the soil surface is crusty, water does not penetrate well and runs off the soil surface and into the gutter.

Wood mulch also helps woody plants by protecting the roots that grow just under the soil surface. This surface soil can reach high temperatures quickly in the hot summer months. The temperature increase and the lack of water as the soil dries out kills the roots growing in the top few inches of soil. Organic mulch provides an insulated layer which prevents the soil from heating and drying out. Further, as wood chip mulch decomposes it provides organic nutrients to woody plants that are not available in most fertilizers. Be aware that applying mulch directly to the trunk of the tree or creating a "volcano" around the base of the tree can be detrimental to the tree. When the mulch is in constant contact with the base and bark of a tree and holds any moisture, the tree can begin to rot or grow adventitious roots that have the potential to girdle the tree. As the mulch decomposes, it can also produce and accumulate heat in this area that can cause additional damage to the bark and the underlying transporting systems of nutrients and water.

Similar to laying too much organic mulch, the use of cobble rock, pea gravel or other non-organic materials can be detrimental to long term tree health of the tree because of excessive heat build-up and storage.

A 3 or 4 inch layer of wood chips is all that is needed. That amount translates to about one cubic yard per 100 square feet. Often, free wood chip mulch can be obtained from tree service companies. A Bay Friendly Guide to Mulch can be downloaded for free by clicking on this link. Contractors working on City projects receive a package that contains specifications for the quality and type of mulch required for City projects.

Staking

Research in the field of arboriculture shows that trees develop stronger and larger trunks when no stakes are installed. However, many trees from the nursery have not developed trunks strong enough to stand alone. When the trunk is weak or when the tree requires protection from vandalism, stakes may be needed.

Typically trees from the nursery will come with a small stake attached directly to the stem of the tree using landscape tie or some other

similar material. Failure to remove a stake that is tied tightly to the trunk can prohibit trunk development and cause serious injury if left in place. If damage to the trunk from the nursery stake is noted at the time of removal, the tree may require replacement.

The city requires the installation of at least 2 lodge pole pine stakes that are each 2-inches in diameter on 15 gallon sized trees that are installed as part of a city project. Tree stakes and ties should be installed perpendicular to the direction of the prevailing wind. The height of the stake should be slightly lower than the lowest permanent branch. This stake height may vary between 3 and 6 feet depending on the strength of the trunk and the height of the lowest permanent branch.

"Young trees with weak trunks may also require an additional set of ties at 1 m (3 ft) below the leader terminal and about 150 mm (6 in.) above the lowest level at which the trunk can be held and the top return upright after being deflected." -Arboriculture, 2004.

As important as the height of the stake is the distance between the stake and the flexible tie which should be no more than 6 inches from the top of the stake. Two tree ties are used and affixed to each stake. The flexible ties are installed with a twist around the trunk and secured with a nail or screw. The ties should be installed with enough slack to allow the trunk to sway slightly in the wind. Ties can be made of recycled tires, elastic nylon shock cord or recycled watering hose.

Tree ties should be adjusted periodically for the first two years to ensure that the tree is not absorbing them or being damaged by these ties.

Hand Watering

Once the tree is planted, keep it well watered for the first three years to help establish a deep root system. Water requirements will be greater and more frequent during hot summer days; less often if the tree is planted near turf or other groundcover that is watered frequently. Water requirements during the winter depend on rainfall, irrigation of adjacent plantings, the tree species and the soil type.

Monitoring Soil Moisture

The best way to judge if the planting site requires additional water is to dig using a small shovel or trowel in the soil surrounding the rootball about 4 to 6 hours after water has been applied. The sample should be taken at a depth of 6 to 12 inches. A better tool to use to monitor soil water is a soil probe. Soil probes can be purchased at a nursery supply or hardware store.

Place a sample of the soil in the hand and squeeze it. If free water runs out or the hand remains wet and the soil sample is likely in a tight ball (if loamy to clayey in texture) – the soil is too wet . If the soil is moist to the touch and slightly crumbly – the soil moisture is near field capacity and perfect after irrigation. If the soil sample is dry and feels like dust – the soil moisture is near permanent wilting point and water should be applied immediately.

The soil moisture for new tree plantings should be monitored weekly at minimum for the first 6 months, bi-weekly for the next 6 months and monthly thereafter to make sure you are on a good schedule for your soil and climate. For newly planted trees a sample should be obtained from near the bottom of the original rootball – usually about 12 to

16 inches for a 15-gallon size tree. Water will often run through the nursery soil and accumulate at the bottom of the planting pit. The top may appear overly dry, when the bottom of the rootball may be supersaturated.

Apply enough water in the basin so that it fills, but drains within an hour or less. Apply water slowly so that it will percolate into the soil deeply, taking care not to apply water so fast that it runs off.

Chapter 6 | **Tree Stewardship and Maintenance**

The Community Forest provides benefits to every person who lives, works or plays in the City of San José. Properly planting and caring for trees is a gift of clean air, clean water and healthy living to not just the current generation but many generations to come. Each of us shares a role as stewards of the Community Forest.

The Community Forest in San José consists of a diverse array of location types. From highly developed urban streets, to suburban neighborhoods, parks, gardens and riparian corridors, the community forest provides continuing economic, social, environmental and ecological benefits. The Community Forest is the only infrastructure asset that continually increases in value and the amount of benefits that it provides to the community. The City of San José recognizes that the Community Forest is not a self-renewable asset and that frequently requires human intervention to enhance, protect and preserve. As the local government, it is our responsibility to foster and develop a vision of a community forest for every citizen of San José and the surrounding communities that depend on us. Our responsibilities include educating ourselves and partnering with the community and regional stakeholders to provide proactive management of the urban forest that aligns with industry standards and community needs.

Monitoring and Inspection

One of the most important aspects of tree care is the act of monitoring or inspecting the trees. It could be said that most trees progress through four different life stages - establishment, growth, maintenance and decline. Each period has a different frequency of monitoring and inspection, but the points to be inspected are fairly consistent. Below are some basic guidelines on what to watch for:

Ground Plane

- Is the watering berm intact?
- Is soil moisture low, adequate or wet?
- Are mushrooms present (often indicates over-watering)?
- Are there exposed or circling roots?
- Are weeds present?
- Is their cracking or lifted soil?

Trunk

- Is the trunk vertical or leaning?
- Is bark missing or damaged?
- Is sap or dark liquid oozing from the trunk?
- Are unusual growths (galls) present?
- Are there fungal bodies (mushrooms) on the trunk?

Structural Branches (Lower Canopy)

- Are cracked, broken or hanging branches present?
- Are branches too close or crossing and rubbing?
- Are large structural branches spaced adequately?
- Are there any branches that have included bark or weak points of attachment?
- Are branches discolored or oozing sap?
- Are there fungal bodies (mushrooms) on the branches?

Upper Canopy

- Are the leaves fully formed and the right color for the species and season?

- Are the leaves distorted, show signs of insect chewing or dead spots?
- Are any insects present or signs of insects, like sticky sap on the ground?
- Are leaves falling prematurely?
- Are there any dead/dying or crossing branches?
- Are cracked, broken or hanging branches present?
- Do any of the branches have heavy end weights?

Are there any branches which extend beyond the typical form for the canopy

During establishment stage (0-3 years), it is recommended that property owners monitor or inspect their tree on weekly basis during warmer summer months and bi-weekly during cooler winter months. Monitoring should include soil moisture, repair the watering berm, replacement of organic mulch, adjust, replace or remove tree stakes or ties and identify potential damage from yard tools such as string trimmers, lawn mowers, or vandalism that require mitigation.

During the growth stage (3-20 years), it is recommended that property owners monitor or inspect their tree on a quarterly to annual basis. Monitoring should include but is not limited to soil moisture levels, replacement of organic mulch, removal of tree stakes or ties, monitoring for defects in the trunk, branches or upper canopy and the monitoring of the trunk and upper canopy for presence of disease or pests.

During the maintenance stage (20-60 years), it is recommended that property owners monitor or inspect their tree on an annual basis. Monitoring should include but is not limited soil moisture levels, replacement of organic mulch, monitoring for defects in the trunk, branches or upper canopy and the monitoring of the trunk and upper canopy for presence of disease or pests.

During the decline stage (20-60 years), it is recommended that property owners monitor or inspect their tree on an annual basis. Monitoring should include but is not limited soil moisture levels, replacement of organic mulch, monitoring for defects in the trunk, branches or upper canopy and the monitoring of the trunk and upper canopy for presence of disease or pests.

Monitoring for Tree Defects

Tree defects present potential danger if repairs are not completed in a timely manner. To help address this problem in the Community Forest, the USDA funded research and published a manuscript to help communities recognize and report tree defects. The document is written for both community members and professionals. It provides detailed information about detecting tree defects, what the defect indicates and how to manage tree risk. Also, the Appendix contains the USDA Community Tree Risk Evaluation Form which can be printed and used as a guideline for monitoring community trees.

Automatic irrigation systems for trees

As with the hand watering procedures described above, Irrigation systems installed for the purpose of watering trees should be designed in such a manner that it waters the entire rootball and surrounding soils to a depth of at least twenty-four (24) inches. The recommended method to achieve this level of watering is drip irrigation as it provides a slow flow of water that can penetrate deep into

the soil without generating much run-off. The irrigation should be placed at the edge of the rootball (approximately 12 inches from the trunk) for new 15 gallon trees and progressively moved out or away from the trunk on an annual basis.

Irrigation should not be placed on or directly against the base of the woody stem of a tree as it can lead to rot or disease and affect the long term health and structure of the tree..

Irrigation for shrubs, groundcover and turf nearby should be designed to prevent the irrigation water from wetting the trunk of any tree for any duration.

Irrigation designers should be aware of the City of San José Municipal Code section 15.11 which details the requirements for water efficient landscapes. See Chapter 3, Permits and the Law.

Tree Pruning

General Guidelines and Standards

Pruning is the most common tree maintenance procedure. Although forest trees grow well with only nature's pruning, urban trees require a higher level of care to maintain certain clearances, improve structural integrity and aesthetics and reduce risk related to branch or tree failure. Pruning must be done with at least a basic understanding of tree biology because improper pruning can create lasting damage, increase risk and shorten the tree's life. For more information on the proper care of trees, visit the TREESAREGOOD.ORG website brought to you by the International Society of Arboriculture (ISA).

The City of San José follows the American National Standards Institute (ANSI) A300 Pruning Standard. (ANSI) A300 pruning standards are a nationwide pruning standard prepared by professional arboricultural industry leaders and university researchers to ensure the proper care of trees that may be obtained from your local library or purchased online.

The City of San José endorses the use of the ISA Best Management Practices – Pruning 3rd edition (2019) published by the International Society of Arboriculture (ISA) for tree related work performed by all professional tree care companies providing services within the City of San José.

The City of San José does not currently provide funds for pruning street trees except in cases of financial hardship or work related to special public works projects. For example, the City may prune trees before a major neighborhood street resurfacing project or when a street light is repaired or replaced. For individuals on a limited income or those that are experiencing a temporary hardship, The City of San José does provide funding to cover the expense of required planting, pruning, removal or stump grinding services at households that meet income guidelines. An application for hardship assistance can be obtained by contacting the Trees and Sidewalks section at 408-794-1901.

Pruning Techniques

Several different types of pruning techniques have been defined by professional arborists. In San José the two primary types of proper pruning performed are "crown raising/clearance pruning" and "structural pruning".

Crown Raising/Clearance Pruning

As trees grow and mature, it is important to remove or reduce branches that would otherwise impede vehicle or pedestrian traffic,

roadway signage, street lighting, traffic signals or buildings. It is recommended that crown raising/clearance pruning be performed to provide the follwing clearances for vehicles (14') and pedestrians (8'), signage (5'), street-lights (5') or other structures (5'). This type of pruning can often be accomplished by the property owner with a basic understanding of making proper cuts. Additional information on proper pruning techniques is available through the International Society of Arboriculture at their site Trees Are Good.

Structural Pruning

The first step in structural pruning is the establishment of a central leader. This is accomplished by identifying the dominant leader that has the potential to be the tallest growing point for the canopy and performing either removal or reductive pruning on any competing laterals. The second step involves the removal of dead or dying, cracked, broken, crossing, or diseased branches and any additional branches to create branch spacing of 8 inches for small canopy trees and up to 24 inches for large canopy trees. The third step is to perform crown raising or limb reduction as appropriate to provide sufficient clearance for vehicles (14') and pedestrians (8'), signage (5'), streetlights (5') or other structures (5'). As structural pruning requires a significant understanding of a trees physiology, The City strongly recommends residents contact a licensed and certified tree care professional to perform these tasks (See section Why Hire a Certified Arborist), but general instruction and guidelines for pruning are provided with the Street Tree Pruning Permit.

Clearance Pruning for overhead utilities

Occasionally, clearance pruning is required to remove potentially dangerous branches that threaten high voltage electrical lines or their utility poles. It is extremely important to keep trees and their branches away from these high voltage lines to prevent wildfires and electrical service disruption. This type of pruning must be performed by an Electrical Line Clearance Certified Contractor that has employees specifically trained on electrical hazard awareness and prevention. PG&E has an active Utility Line Clearing program that actively monitors vegetation along these high voltage electrical lines (typically the thin wires at the top of the utility pole, not the thick black lines that are lower on the pole or that drop down directly to your home) and will assist with clearing branches. PG&E does this work for property owners free of charge as is required by state law. If clearance cannot be obtained, removal of the tree may be required (I.e. a palm directly under the lines). If you have Questions About Trees and Power Lines visit the PGE website.

Illegal Pruning Practices

The harmful act of making large cuts to reduce branch length for safety reasons is called topping or heading and is a misguided and injurious method of cutting a tree that frequently damages the tree and results in a tree with a weaker more hazardous structure. When a tree is topped or headed the trees natural response is to produce multiple new shoots near the cut to make up for the loss of foliage. Unfortunately, these new shoots are weakly attached, grow at an accelerated rate and stress the tree because it is forced to draw upon stored energy reserves. Topping or severe pruning of more that 25% of the tree canopy within a growing season is prohibited. The City may issue a citation for trees that are

topped or pruned without obtaining a permit or for not following the pruning permit guidelines. See Chapter 3, Permits and the Law,

Unhealthy Pruning Practices

Misguided tree pruners often remove the inner branches within a canopy to "show off" the branch structure of the tree. This is called "over thinning" or "lions tailing". Although some individuals may see this be aesthetically pleasing, this type of pruning practice is damaging to the long term health and structure of the tree. This interior growth is the primary source of energy for development of new wood on the structural branches that support the upper canopy. When this foliage is removed from the interior of the tree, it is forced to share the energy produced in the upper canopy. This frequently results in reduced branch caliper that is unable to support the heavy foliage on the ends of the branch resulting in an increased risk of branch failure.

Tree Removal

Tree removal should be done in accordance with ANSI A300 standard and ISA Best Management Practices. Tree removal should include grinding of the stump to a depth and width that allows for future replant. In cases where tree replacement is not required, flush cutting of the stump to at or below the surrounding grade to prevent any tripping hazard is required.

Stump Grinding

The City of San José recommends that stump removal be performed to a minimum depth of 18 inches and at least 12 inches wider than the stump to be removed. As discussed in Chapter 4, there are numerous utilities that have been installed below the soil surface but within the parkstrip/landscape strip areas. Any time a property owner will be digging, grinding or otherwise disrupting the surface of the parkstrip/landscape strip, they are legally required to contact Underground Service Alert (USANorth811) to have all underground utilities marked for safety reasons. USANorth811 can be reached by dialing 811 from your telephone.

Why Hire a Certified Arborist

Tree pruning or removal involves a significant level of risk of both personal injury and property damage and should mostly be left to a trained and qualified professional. Unfortunately there are numerous businesses and individuals offering tree care services that are not licensed by the state, county or city and have very little professional training or experience. The City of San José highly encourages the hiring of only ISA Certified professionals and TCIA accredited business that have undergone significant training. A list of certified arborists can be viewed at the ISA website Why Hire an Arborist.

In addition to possessing professional technical expertise, the City of San José recommends that a professional arborist performing tree services should provide a minimum of the following to the property owner before commencing work:

- A Tree Pruning or Removal Permit as required
- A City business license
- A State of California Contractor License
- Proof of Insurance coverage including personal and property damage
- Proof of Workers' Compensation Insurance

- Professional references from other customers that have hired the company to do similar work.

Heritage Trees

Municipal Code, section 13.28.220 describes a heritage tree as follows: "Any tree which, because of factors including but not limited to its history, girth, height, species or unique quality, has been found by the city council to have a special significance to the community shall be designated a heritage tree. Such trees shall be placed on a heritage tree list which shall be adopted by the city council by resolution, which resolution may be amended from time to time to add to or delete certain trees therefrom."

Nomination Process

Designation of a tree as a heritage tree resides within the jurisdiction of the City Arborist's Office. The property owner can contact the Arborist's office to nominate a tree for Heritage status or someone other than the property owner may nominate a tree only after obtaining written permission form the property owner.

Maintenance Responsibility

Any tree that is designated as a heritage tree is subject to the same maintenance responsibilities as a street tree whether or not it is located on private property. For any tree related services performed on a heritage tree the property owner should contact the Arborist's Office for consultation.

Heritage Tree Removal

Permits to remove a heritage tree on private property must be obtained from the Department of Planning, Building and Code Enforcement. For removal of a heritage tree planted in the public right-of-way contact the Arborist's Office for permit information. Violations can lead to a citation and a fine of up to $10,000 for a first offense.

Transfer of Ownership

Property owner should disclose the presence of any heritage trees prior to sale or transfer of property ownership.

Inventory Collection and Updates

The City of San José will endeavor to maintain its street, parks and facilities tree inventory data through periodic updates. The International Society of Arboriculture recommended best practices calls for periodic updates to be in the range of every 5-7 years.

Chapter 7 | **Our City Forest**

Our City Forest (OCF) is a 501(c)3 nonprofit serving the San José community since 1994. OCF was founded in 1994 in partnership with the City of San José, replicating a successful strategy already used by other major cities throughout the U.S. for advancing urban forestry. Our City Forest's mission to cultivate a green and healthy metropolis by engaging the community to grow, maintain, appreciate and understand our urban forest, aims to increase the capacity of residents to be effective tree stewards. With a more informed and engaged populace, San José can achieve its urban forestry goals. OCF's programs combine education with action and are proven strategies for cost-effectively growing and maintaining trees in cities.

With foundational support from the city, OCF garners state and federal grants to underwrite its direct services for residents, neighborhoods, schools, businesses, and agencies. OCF has, to date:

- obtained and administered $15+ million in non-City cash grants
- leveraged an estimated additional $25 million in donated volunteer time, including tree stewards
- hosted/trained 425 individuals with green jobs who have provided San José 700,000 hours of service
- certified 782 Tree Amigo volunteers
- engaged 180,000+ community volunteers with greening opportunities
- developed and managed 15,000+ tree planting and tree care events
- planted 100,000+ 15-gallon trees and shrubs
- converted 196,000 sq ft of lawn to climate-smart gardens to save 6 million gallons of water annually
- conducted educational presentations for 41,431 elementary and middle school students

Green Jobs Training (AmeriCorps Service Program)

OCF hosts an AmeriCorps program which trains and supports up to 30 full-time service members every year to provide urban forestry assistance to residents. Each member provides 1,700 hours of service to the San José area over 11 months. In 2015, OCF was one of two organizations in the nation to win the Senator Harkin Service Award from the AmeriCorps national office. To date, OCF has graduated some 400 service members, many immediately embarking on an urban forestry or related career. Service members receive a stipend of $20,000 for 11 months of full-time community service. The AmeriCorps grant pays for approximately one-third of OCF's cost for stipends and health insurance, plus a portion of the cost to train and daily manage the service members. OCF obtains match funds from the City of San José and others to pay the remaining two-thirds cost plus seeks additional funding to cover field project expenses, fleet operations, accounting and other expenses. The AmeriCorps program provides a cost-effective means to deliver services and programming for California's 3rd largest city, including planting trees in every zip code across San José for the past 13 years.

For more information, please visit www.ourcityforest.org/americorps

Volunteer Recruitment, Training & Opportunities

Our City Forest has engaged an average of

5,000 volunteers each year to assist with a variety of urban forest projects. Opportunities include nursery work days, tree plantings, tree care projects, community outreach, watering and office assignments. OCF is committed to recruiting and engaging residents from various ethnic, age, social and employment backgrounds, and who reflect our community's vast diversity. Volunteers include high-school students, retirees, corporate employees, non-profit groups, business associations, people with disabilities, at-risk youth, government and elected officials, and members of such service clubs as Rotary and Kiwanis.

All volunteers receive training from OCF staff and service members. For plantings, one-time volunteers are required to watch a planting demonstration as well as a tool safety demonstration. For those desiring to be regular volunteers, OCF offers more in-depth training through its Tree Amigo course. Since 1994, the number of residents attending the complete course is 782. Tree Amigos are invited to help with such tasks as coaching the many one-time planting volunteers, conducting planting or tree staking demonstrations, or contacting tree stewards for health updates. Additional training is also available for specialized opportunities such as helping with nursery open hours or assisting with truck watering in non-residential locations.

Interested volunteers can register for events and trainings on the OCF website www.ourcityforest.org/volunteers

Community Nursery & Training Center

Our City Forest (OCF) operates a nursery for the general public that offers 250+ species of largely drought-tolerant trees, shrubs, and grasses, including many California natives. OCF cultivates trees from seedlings as well as from small container stock until the trees are ready to be planted. OCF promotes tree diversity to ensure a sustainable, healthy urban forest that is resilient to pests and disease. An average of 1,500 volunteers assist at the nursery every year, helping maintain the younger trees and preparing them for future plantings throughout the community.

The nursery is a valuable regional resource for the general public as well as for cities and agencies throughout the South Bay. The nursery welcomes an average of 2,000 visitors every year. Anyone can visit the nursery during open hours, or place a phone or online order and arrange for curbside pick-up. Open hours can change, but are typically Thursday, Friday and Saturdays from 9 AM to noon. Agencies wishing to source trees through OCF may schedule an appointment with the nursery manager during the week. For planning large-scale plantings that are scheduled one or two years into the future, OCF can accommodate contract-grow requests.

During the winter holiday season, OCF also offers residents and businesses a Rent-A-Holiday-Tree program. These often smaller versions of traditional Christmas trees are returned by renters in January to be cared for until they are ready for planting.

Nursery tours for neighborhood groups, businesses and others are available by appointment.

For current open hours and curbside pick-up options, as well as any other questions, please visit www.ourcityforest.org/nursery.

3-Year Tree Stewardship Program

Any resident, school, business, or agency can receive a tree from OCF after signing a stewardship agreement to properly water and care for the tree for at least 3 years. This agreement helps ensure that every new tree will be cared for and properly maintained by a steward - whether that is a resident, a teacher, a business owner, or a park manager. Throughout this 3-year establishment period, stewards are also asked to complete and return surveys to OCF to report on the health of their trees. OCF also invites stewards to contact OCF via email or phone with any questions.

This community engagement model for tree establishment is a best practice. It is the only economically feasible approach for establishing newly planted trees, given that relying on truck watering by any agency is simply cost-prohibitive. Investing resources in the training and ongoing support of residents as tree stewards not only ensures tree survival, but also protects the considerable capital and labor outlay of getting the trees in the ground. Community engagement is the essential key to a healthy urban forest.

For more information please visit www.ourcityforest.org/tree-care

Community Tree Plantings

The Community Tree Planting program coordinates and oversees tree planting events for neighborhoods, schools, parks, businesses, and all other public and private properties. The Community Planting team conducts site visits, recommends tree species, obtains planting permits, secures stewardship agreements, discusses the maintenance plan, and creates planting sitemaps in consultation with tree applicants. Other pre-event tasks include recruiting an adequate number of volunteers, hand-selecting trees, subcontracting for augering and/or cement-cutting as needed, and arranging for delivery of trees, stakes, mulch, safety equipment, vests, gloves, materials and tools. For all plantings, volunteers are carefully instructed in the proper techniques for planting, staking, and tool safety.

To request planting services, please visit www.ourcityforest.org/plant-on-your-street

Parks

Park plantings are essential for a healthy urban ecosystem and provide an opportunity to plant trees that may require more space than is available for trees in residential parking strips. The larger the canopy, the more environmental benefits a tree can provide, including filtering dangerous air particulates, managing stormwater, recharging groundwater, and providing habitat for birds and insects. OCF has granted and planted more than 15,000 15-gallon shade trees in San José parks using state urban forestry grants. OCF continues to provide free trees when grants are available, relaying these opportunities to the city, and working closely with parks personnel to determine potential projects. Species selections, tree locations, and tree care plans are discussed and agreed upon prior to moving forward.

Trees For All Program

Residents may request trees through OCF for the street or their yard. When OCF has a state planting grant available, residents in the eligible area may receive street trees at no cost. The vast majority of street trees (as well as parks and schools) planted through OCF have been provided in this manner.

To request one or more trees, residents complete an online tree application form which includes a stewardship agreement which also must be signed. If the resident is a renter, the property owner must sign the application, while the renter can sign on as the steward. Street tree requests can be for replacement street trees where the resident has been referred to OCF with a planting permit already issued. In other cases, the resident may request OCF to obtain a street tree planting permit. Residents must have a valid permit in order to plant in any street location.

OCF works closely with each tree applicant to determine whether the tree will be planted by OCF, or if the resident prefers to pick up the tree at the OCF Community Nursery and attend the required planting and staking class. Senior citizens, as well as anyone with a disability, have always been able to request the cost of planting waived. Residents are responsible for the care and maintenance of each tree that is planted per signed stewardship agreements.

Please visit www.ourcityforest.org/plant-trees for more information and a tree application form.

Lawn Busters

Lawn Busters is an innovative OCF lawn conversion program for installing drought-tolerant landscapes for residents who meet low income, disabled, veteran, or senior citizen qualifiers. The Lawn Busters program is sponsored, in part, by the Santa Clara Valley Water District and thus adheres to the District's rebate program requirements. Lawn Busters was created to address the severe drought by assisting high-need residents to lower their water use by replacing thirsty lawns with water-wise gardens. These conversions also create beneficial urban habitats by adding plants which thrive in Santa Clara Valley's climate. Plants are sourced from Our City Forest's Community Nursery and hand-selected for residents. For residents who do not qualify for Lawn Busters, OCF offers a 3-day DIY training course.

To inquire about Lawn Busters, please visit www.ourcityforest.org/lawnbusters

Planet Tree & Youth Education

Planet Tree is OCF's popular school program for elementary and middle school students. Planet Tree engages our future generation, especially underserved youth, in environmental topics such as the importance of our urban forest, tree biology, how trees address climate change, and the meaning of environmental stewardship. Though this program has been significantly curtailed in recent years due to funding challenges, it has managed to reach more than 40,000 students through nearly 600 school presentations. Educating young children about trees in cities at a young age provides a foundation for future community stewardship. OCF also offers online educational and immersive activities such as neighborhood tree tours, an urban scavenger hunt, pollinator activities, and coloring pages.

For more information about environmental education opportunites for youth, please visit www.ourcityforest.org/activities

Urban Forestry Education Center

Our City Forest's unique outdoor environmental education venue is under development at Martial Cottle County Park in San José. The Urban Forest Education Center currently includes a new outdoor education classroom, an arboretum, a native garden, and a DIY Lawn

Busters teaching area. OCF is seeking funding to add additional features, including an educational greenhouse for propagation workshops, a fruit tree orchard and a rainwater harvesting system. OCF is committed to raising awareness about the benefits that trees and shrubs provide, all with the goal of emphasizing the importance of stewardship in order to build and maintain a healthy urban forest. With its outdoor demonstration areas, this venue adds an important dimension to Our City Forest's ongoing efforts to engage, inspire and teach.

To learn more about the Education Center and scheduled events, please visit www.ourcityforest.org/martialcottle

OCF Plantings - 20 Years

To view a 7-second animated map showing locations of trees planted by Our City Forest, please go to www.ourcityforest.org/

These data are taken from the OCF database using the longitude and latitude of each planted tree.

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Chapter 8 | RIPARIAN CORRIDOR POLICY

City of San José, California

COUNCIL POLICY

TITLE	PAGE	POLICY NUMBER 6-34
RIPARIAN CORRIDOR PROTECTION AND BIRD-SAFE DESIGN	Page 1 of 8	
EFFECTIVE DATE August 23, 2016	**REVISED DATE**	
APPROVED BY COUNCIL ACTION: 08-23-16, Item 4.2(b)		

PURPOSE

The purpose of this Council Policy (Policy) is to provide guidance consistent with the goals, policies, and actions of the City's Envision San José 2040 General Plan (General Plan) for:

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City of San José, California

COUNCIL POLICY

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Appendices

APPENDIX A- Street Tree Planting Setback Recommendations.

(Note: The following are recommendations, not requirements, and are not intended to exempt property owners from planting required street trees)

- *Street Lights .....20 Feet*
  To reduce blocking light & dark streets
- *Traffic signals .....20 Feet*
  To reduce likelihood of vehicles striking the trees upon entry and exit; To improve visibility for vehicles that are backing out.
- *Stop signs and other regulatory signage ...20 Feet*
  To reduce likelihood vehicle, bicycle and pedestrian collisions
- *Underground utilities .....5 Feet*
  To reduce damage to roots if the utility needs to be accessed
- *Sewer Lines .....10 Feet*
  To reduce likelihood of roots entering sewer lines which are broken/damaged
- *Water Meter .....5 Feet*
  To reduce likelihood of tree roots or trunks flare displacing or damaging water meters or water lines
- *Fire Hydrants .....5 Feet*
  To reduce likelihood of tree roots or trunks flare displacing or damaging fire hydrants or preventing access
- *Driveways .....5' Residential and 10' Commercial*
  To reduce likelihood of vehicles striking the trees upon entry and exit; To improve visibility for vehicles that are backing out.
- *Intersections/Corners .....40 Feet*
  To reduce likelihood vehicle, bicycle and pedestrian collisions

APPENDIX B-- Tree Planting Recommendations

Crown Spread (in feet)	Tree Height (in feet)	Recommended Tree Well or Parkstrip depth (in feet)	Minimum soil volume (Non-compacted)	Tree Spacing (in feet)
20	20	2	600	16
25	30	4	800	20
35	40	6	1000	28
45	50	6	1200	36
55	60	8	1400	44
55	60	8	1600	44
65	70	10	1800	60
65	70	10	2000	60

APPENDIX C - Soil Sampling & Testing Recommendations

SOIL SAMPLING & TESTING GUIDELINES

1. Provide a soil test for each site as follows:
   Greater than 5 acre:Minimum 1 sample per 5 acre section.
   Less than 5 acres: Minimum 1 sample.
   - Medians and roadsides: Minimum 1 sample per 3000 linear feet
   - Provide 1 additional sample for every batch of import soil.
   - Provide one additional sample for every 3 foot drop in grade.

   1 per 1000 linear feet of continuous area or 1 per each median or roadside separated by hardscape

2. Take soil samples in accordance with the following procedures:
   Sample soil to the proper depth.
   e.g. typical rooting depths are:
   - Turf and herbaceous groundcovers: 1 - 8"
   - Shrubs: 1 - 18"
   - Trees: 1 - 18" and 24 to 36" (two samples:1 sample at each depth)

3. For existing landscape one soil sample should represent only one soil or plant condition. Subdivide general areas described in part 1 based on the following:
   e.g. landscape conditions requiring different samples:
   - Different irrigation types
   - Different irrigation frequencies
   - Different soil textures, colors or odors.
   - Different drainage patterns.
   - Import fills or borrow stockpile.
   - Areas receiving different fertilizer or amendment treatments.
   - Plants showing symptoms of poor development.

4. Samples should not contain any plant or organic material from the soil surface. The best collecting tool is a sampling tube which removes a core of soil from the surface to the lower rooting depths. If a shovel is used, then a hole should be dug to the correct depth and a vertical 1" slice taken from the side of the hole.

   The sub-samples should be randomly collected from each representative area. They should be mixed thoroughly and placed in a water proof container (e.g. gallon ziplock freezer bags). The final sample submitted to the laboratory should be at least 1 quart of soil per sample.

   Labels with all pertinent information should be placed on the **outside** of the container. Label a corresponding map with the locations represented by each sample.

   Field notes should include all observations of sampling site (from 2 and 3 above), how soil was sampled (depth, random or spot specific) and observations of the soil (moist, dry, odor, rocks, debris, etc.).

5. For top soil the analysis should include fertility (N, P K, Ca, Mg, CEC or est. CEC) and basic soil chemistry (pH, soluble salts, SAR, boron). For subsoil the analysis should include basic soil chemistry at minimum.

LABORATORY ANALYSES FOR LANDSCAPE QUALITY OF SOIL

Physical Properties

Particle sizes	USDA Clasification is base on the percentage of particles of sand, silt and clay. The soil tht is measured must fall through a 2.0 mm screen. The USDA classification **does not** take into account any gravel, rocks or organic matter. Rock – less than 10% by volume and none greater than ½" Organic<15% CSJ Topsoil Specification does specify the allowable gravel, but does not provide for analysis of rocks or debris. These detrimental items must be found during the inspection process. Gravel <15% Coarse Sand <15% All sands <85% and > 45% Silt <35% and >10% Clay <30% and >5% Silt+Clay <60% and >30%
Half Saturation/TEC	The half saturation percentage is a measure of the ability of a soil to hold water. Sandy soils have a low number (5 to 15) and clayey soils have a high number (25 to 25). The Theoretical Exchange Capacity is a measure of the ability of a soil to hold nutrients. The higher the number the more exchange sites available.

Chemical Properties

pH 5.5 – 7.5	pH is affected by other soil components, e.g. sodium, lime and affects nutrient availablity
Qualitative Lime	This is a relatively subjective test that indicates the ease of changing the soil pH It is either High, Mediuim or Low
EC_e <3.0	Electrical Conductivity is a measure of the amount of soluble salts (also called TDS or total dissolved salts). Normal topsoil has a reading of less than 1.0 mmhos/cm.
SAR <6.0	Sodium Adsorption Ratio is a measure of the "stickiness" of the soil. The cations or positively charged ions adhere to the negatively charged particles in the soil (e.g. clay and organic). Sodium is a small negatively charged particle which, if it is predominant in the soil will cause the soil particles to stick tightly together and impair drainage. The SAR calculation is based on the saturation extract values for the cations calcium (Ca++), magnesium (Mg++), potassium (K+) and sodium (Na+). Since it a ratio of Ca+Mg : Na, if sodium is excessive, then the SAR value is high OR if calcium and magnesium are very low then the SAR value can be high. This value is also relative to EC.
B	Boron must be <1.0 ppm.
SO_4	Sulfate is typically in a range of 1.0 to 10.0 me/l (milliequivalents per liter).

APPENDIX D— Glossary

Glossary of Terms

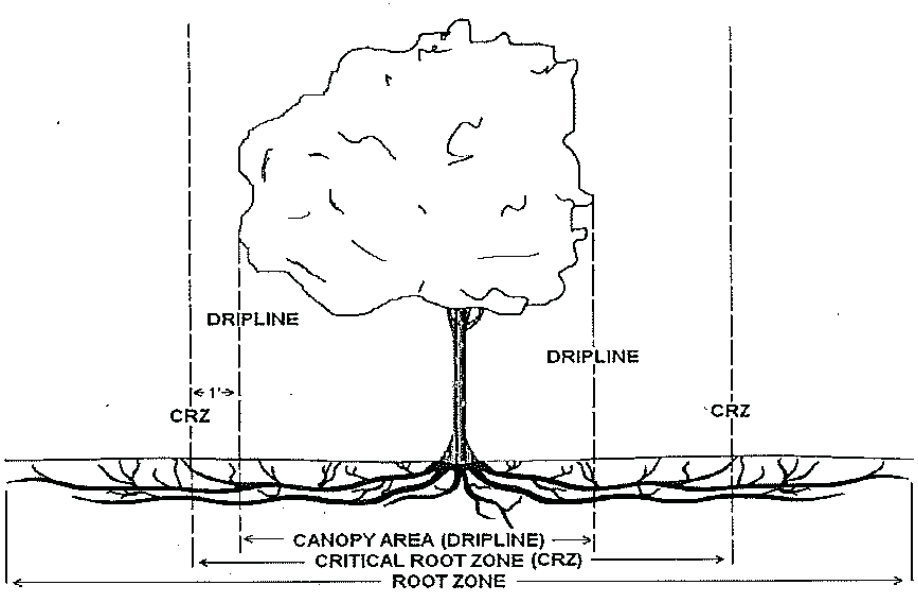
ANSI Standards – a set of standards put forth by the American National Standards Institute (ANSI) to help ensure openness, balance, consensus and due process in tree-related work

****Arborist, Certified -** a person that holds an arborist certification from the International Society of Arboriculture, a Registered Consulting Arborist number from the American Society of Consulting Arborists or an expert in arboriculture as determined by the director

****Arborist Report -** a written, formal report which documents the species, condition, description of work required, alternatives to the work (where applicable) and recommendations for action including, but not limited to mitigation methods, pruning, removal and planting of tree(s)

Auger Slick – the smooth, compacted soil resulting from drilling an auger into clay soil

Back-Up Landscaping – an area of city-maintained landscaping located between a city street and a city fence or soundwall; for further clarification, please contact the City Arborist's office



Canopy – the upper layer of vegetation formed by tree crowns

Central Leader – the upright, main stem of a tree from which all secondary branches originate

Circling Roots – roots growing in a circular manner around the trunk of a tree, often crossing and constricting other roots, as well as restricting the development of the trunk of the tree

Community Forest – the collection of trees growing in the City of San José, which includes street trees, parks trees, trees along City properties and private property trees

****Critical Root Zone (CRZ) -** a defined area around a tree with a radius measured to the nearest foot measurement of the trees longest dripline radius plus 1 foot; see Figure below. The root zone may extend 2 to 3 times the distance of the CRZ.

APPENDIX D— Glossary

Cut-out (tree well) – an opening in a paved area adjacent to a sidewalk or walkway in which a tree is planted

***Dripline -** the area around the base of a tree directly under the canopy cover of the tree and ex- tending out as far as the canopy

Exotic Species – vegetation introduced to an area in which it would not naturally grow

Frontage Landscaping – an area of city-maintained landscaping that lies between a front property line and a city street; for further clarification, please contact the City Arborist's office

General Fund – the operating fund that supports the majority of the City's programs Ground Plane – the surface of the soil

Hardiness Zone – a geographically or climatically defined zone in which a specific category of plant is capable of growing

****Hardscape -** the paved surfaces within the landscape like sidewalks, driveways, curb, gutter and pavement

Hardship Program - a limited program to assist low-income property owners with the cost of their street tree and/or sidewalk repairs; if the property owner meets the low-income qualification, the cost of required repairs, including pruning or removal of street trees, or the tree emergency services performed, will be paid for by the program

***Heritage Tree -** any tree which, because of factors including but not limited to its history, girth, height, species or unique quality, that has been determined by the city council to have a special significance to the community

Integrated Pest Management (IPM) - a decision making process for managing pests using monitoring to determine pest injury levels and combines biological, cultural, physical and chemical tools to minimize health, environmental and financial risks

Invasive Species – vegetation introduced into an area where it is not naturally found that possesses the ability to overtake the plant community in which it is introduced

Line-of-Sight – a straight line in which clear visibility exists

Median Island – a City-maintained area of either landscaping or concrete located along the centerline of a City street

Mulch – a protective covering placed around the base of vegetation in order to discourage weed growth and help to retain soil moisture

Native Species– vegetation growing in the geographic area where it is naturally inherent

Nursery Stake – a rigid stake affixed directly to the trunk of a sapling while at the nursery; proper planting techniques involve removing this stake in favor of properly placed planting stakes

***Ordinance Tree -** any live or dead woody perennial plant characterized by having a main stem or trunk which measures fifty-six inches or more in circumference at a height of twenty-four inches above natural grade slope. A multi-trunk tree shall be considered a single tree and measurement of that tree shall include the sum of the circumference of the trunks of that tree at a height of twenty-four inches above natural grade slope

***Parkstrip - t**he area of the street lying between the face of curb and the sidewalk

****Planting Easement -** an area of a property

APPENDIX D— Glossary

owned by others used for the benefit of the public for planting trees, shrubs or hedges contiguous to the public right-of-way for vehicular traffic

Planting Stake – a post loosely fastened around the trunk of a newly planted tree in order to provide additional sup- port; a proper planting stake should not be taller than the lowest permanent branch on the tree and should not be inserted into the root ball

****Prune -** removing any segment of the above or below-ground woody tissues of a tree

Public Right-of-Way – an area of land allotted to public use through an easement

***Remove –** to eliminate, take away, uproot or destroy a tree; includes taking any action that reasonably and foreseeably will lead to the death of a tree or to permanent significant damage to the health or structural integrity of a tree. Can include, without limitation and by way of example, excessive pruning, cutting, girding, poisoning, or watering of a tree; the unauthorized relocation or transportation of a tree; excessive excavation, alteration, or grading of the soil within the dripline of a tree, or excessively bruising, tearing or breaking the roots, bark, trunk or branches of a tree.

Riparian Corridor – any defined stream channels including the area up to the bank full-flow line, as well as all riparian (streamside) vegetation in contiguous adjacent uplands

Root Ball – the main roots of a tree and soil attached to them

Root Flare – the widened area at the base of the tree where the main, woody roots of the tree extend into the soil from the trunk

Site Plan – a detailed scale diagram showing what changes or improvements will be made to a location

Soil Amendment – a material added to the soil to change the chemistry or physical properties in order to improve the health of vegetation

Soundwall – a concrete wall built in order to help block or dampen sound in noise-sensitive areas from heavy traffic and other forms of noise pollution

Special Landscape Assessment Districts – areas of the city in which property owners pay an assessment fee on their annual property tax bill in order to receive benefits such as street islands with enhanced landscaping, foun- tains, plazas and other decorative features in the public right of way

Street Tree – a tree located in the public right-of-way

***Topping -** cutting the branches of an ordinance tree in a manner that destroys the existing symmetrical appearance or natural shape of the tree; involves the removal of main lateral branches and leaving the trunk of the tree or major branches of the tree with a stub appearance

Traffic Calming – the deliberate reduction of traffic speed, commonly using the installation of medians or barriers or changes to the road itself

Tree Form – general structure and typical growth habit of a tree species as seen from a distance

Tree Grate – a metal structure set flush with the pavement in a tree cutout around the base of a tree; typically found in downtown areas

Tree Protection Zone – a designated area around the base of a tree that is to be protected with fencing during construction activities in order to avoid soil compaction and damage to tree roots

Watering Basin – a ring of soil surrounding the CRZ of a young planting that serves to hold water in the root zone rather than allowing for runoff

APPENDIX E— Acronyms

ASCA – American Society of Consulting Arborists **ANSI –** American National Standards Institute

APN – Assessor's Parcel Number

Cal FIRE – California Department of Forestry and Fire Protection

Caltrans – California Department of Transportation

CFW – California Department of Fish and Wildlife

DOT – Department of Transportation

IPM – Integrated Pest Management

ISA – International Society of Arboriculture

PBCE – Department of Planning, Building and Code Enforcement PG&E – Pacific Gas and Electric

PRNS – Parks, Recreation and Neighborhood Services

SCVWD – Santa Clara Valley Water District

USDA – United States Department of Agriculture

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