

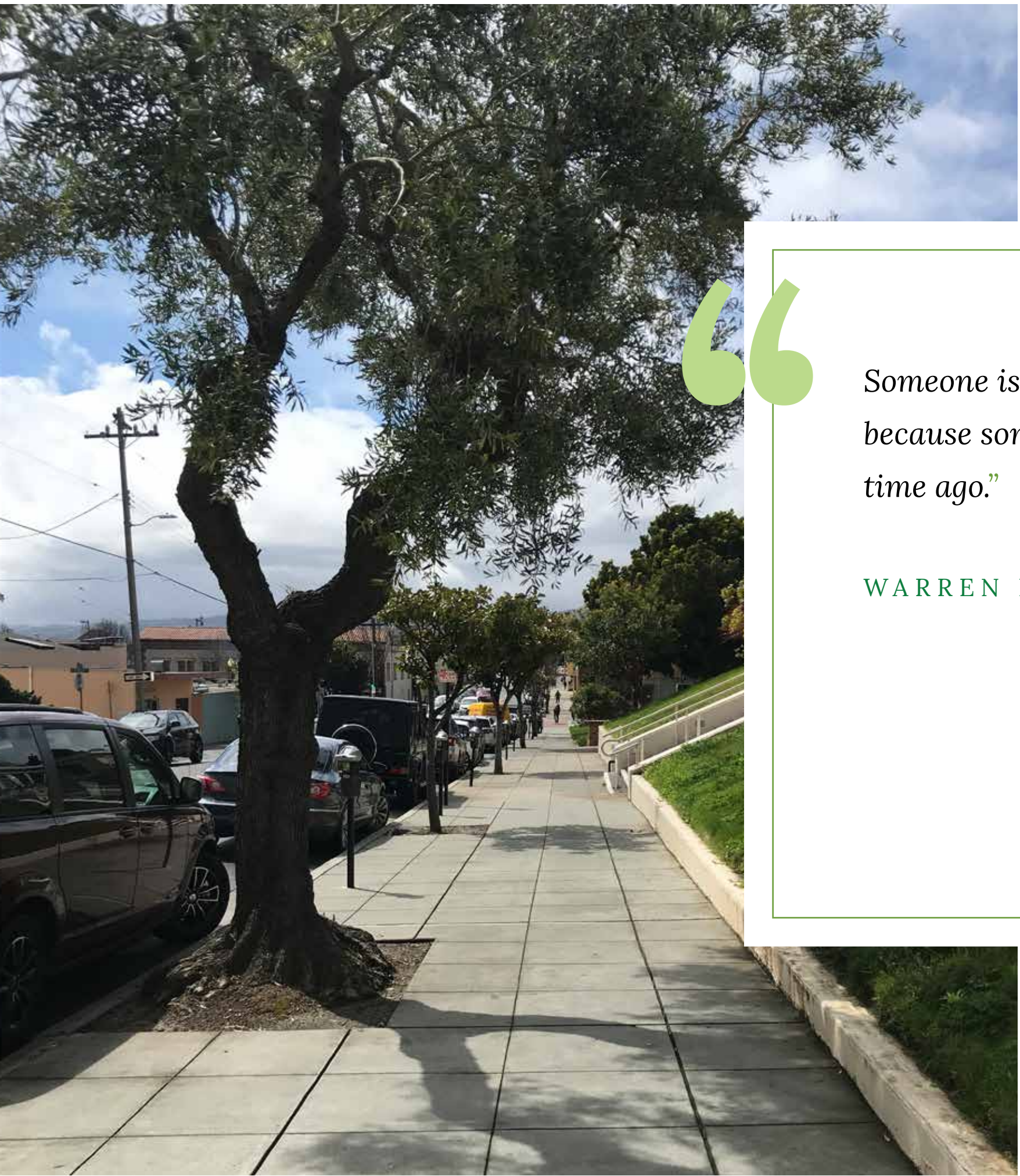


CITY OF

# South San Francisco

URBAN FOREST MASTER PLAN





*Someone is sitting in the shade today  
because someone planted a tree a long  
time ago.”*

WARREN BUFFET

CITY OF

# South San Francisco

URBAN FOREST MASTER PLAN



*Prepared for:*

CITY OF  
SOUTH SAN FRANCISCO

400 Grand Ave  
South San Francisco, CA 94080



*Prepared by:*

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# Acknowledgements

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*DAVEY RESOURCE GROUP, INC.*

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## *PHOTO CREDITS*

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## Scope & Purpose

The Urban Forest Master Plan (UFMP) serves as a guide for managing, enhancing, and growing South San Francisco's urban forest and the community tree resource over the next 20 years. Whereas the urban forest includes all of the trees and woody shrubs in South San Francisco, the community tree resource is comprised of publicly managed trees along streets, in parks, and at City facilities. While the UFMP is primarily focused on the stewardship of the community tree resource, the Plan also considers private trees because they contribute significantly to South San Francisco's livability and environmental quality.

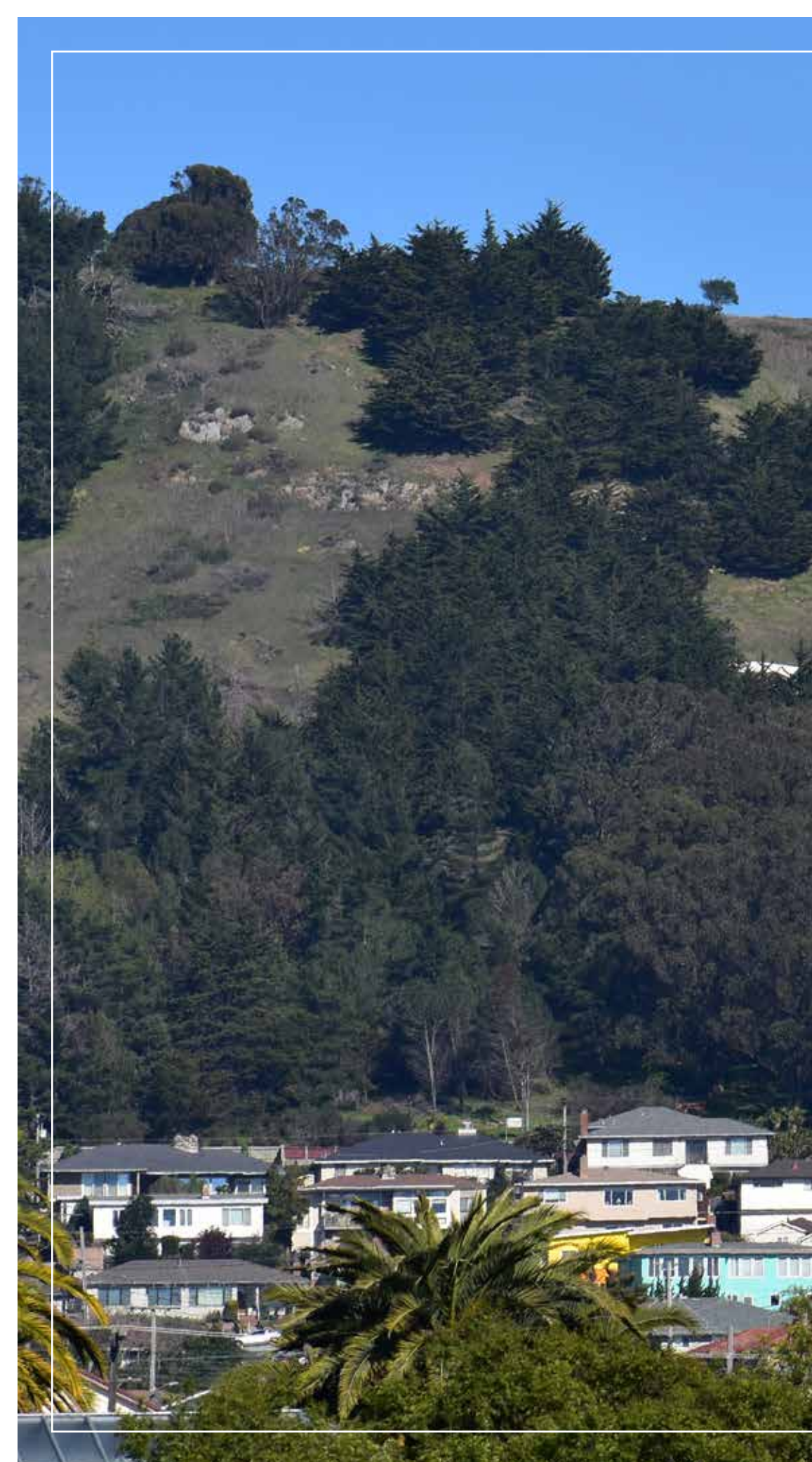
In summary, the UFMP aims to:

- Recognize best management practices that promote tree health, maximum benefits, and community safety
- Promote community outreach, engagement, and advocacy for the urban forest
- Develop a more cohesive organizational structure to facilitate collaboration among all departments and staff who impact or affect the urban forest
- Nurture an ethic of stewardship for the urban forest among City Staff, community organizations, businesses, and residents
- Increase health and resiliency in the urban forest by improving species diversity, and by managing pests and invasive species
- Identify baseline metrics and clear goals for urban forest managers

The UFMP includes short-term actions and long-range planning goals to promote sustainability, species diversity, and greater canopy cover. The UFMP suggests reasonable time frames for achieving goals, based on available resources and community support.

“

*South San Francisco has been recognized as a Tree City USA for 32 years.”*









## Executive Summary

South San Francisco's community urban forest includes an estimated 15,000 public-managed trees along streets and medians, in parks and open space, and around City facilities. Along with their aesthetic contribution, these trees provide valuable and critical services to the community including benefits to air quality, water quality, stormwater management, energy savings, wildlife habitat, and socioeconomics. The Urban Forest Master Plan (UFMP) is a road map which provides long-term management goals and timelines to effectively preserve and enhance the environmental benefits provided by this critical component of infrastructure.

The UFMP's structure is based on the understanding of what we have, what we want, how we get there, and how we are doing. This structure, known as adaptive management, is commonly used for resource planning and management (Miller, 1988) and provides a conceptual framework for the process of improving urban forest management.

The plan development process for the UFMP involved a comprehensive review and assessment of the existing urban forest resource, which included composition, value, and environmental benefits. The process explored community values and vision, including those expressed in guiding documents such as the General Plan 2040, the Climate Action Plan, City Ordinance, state law, and other regulatory and policy documents.

The process also evaluated funding and the current service levels for both in-house and contracted tree crews. In addition to Parks staff, there are multiple stakeholders, internal and external, who play a role in the planning, design, care, and advocacy of the urban forest. These stakeholders include City departments, utility providers, nonprofit organizations, Parks and Recreation commission, and community members. Each of these stakeholders played a role and provided input for the development of this plan.



*People don't remember each tree in a park but all of us benefit from the trees."*

YOKO ONO



## WHAT DO WE HAVE?

The review process identified challenges facing the urban forest, most notably, climate change. The predominate impact of climate change on the urban forest is the effect on tree species that historically have been successful in the region but now, with rising temperatures and more extreme periods of drought, may no longer thrive in the changing environment.

In addition to climate change, the City is still recovering from a financial crisis in the late 2000s. The financial crisis prompted a hiring freeze, resulting in numerous vacant positions as staff retired or left the City. More specifically, the tree crews were reduced by a third. Currently, tree care is highly reactive, and as a result, not all trees are receiving adequate care.

Despite challenges, the City has numerous opportunities to expand the urban forest. As identified by an Urban Tree Canopy Assessment, the City currently has 8.7% canopy cover, but has the potential to achieve 22.6%.

With the support of (1) Council Members and the Parks and Recreation Commission; (2) an Urban Tree Canopy Assessment that includes GIS mapping of the location and extent of South San Francisco's entire tree canopy (public and private); (3) a Tree Preservation Ordinance that promotes the protection of certain species and sizes of trees throughout the community; and (4) a well-trained and motivated Parks staff, South San Francisco has the tools and information necessary to make well-informed and effective management choices. These management choices will increase the environmental benefits and value from the City's public trees.

<b>South San Francisco's Urban Forest Benchmark Values</b>		
<b>Community Urban Forest (Public Tree Resource)</b>		
Inventoried trees (2018)	10,831 trees and 1,505 vacant sites	
Estimated non-inventoried trees	4,000 trees	
<b>Species Diversity (Inventoried Trees, 2018)</b>		
Total number of unique species	165	
Prevalence of top ten species	60.4%	
Species exceeding recommended 10%	1	
<b>Urban Tree Canopy Cover (Public and Private, 2016)</b>		
Overall canopy cover	7.2%	
Overall canopy cover (excluding open water)	8.7%	
Impervious surfaces	58.2%	
Canopy cover – Parks and Open Space	22.7%	
<b>Canopy Benefits (Public and Private, 2016)</b>		
Carbon stored to date	62,113 tons	\$2.2 million
<b>Annual Canopy Benefits (Public and Private, 2016)</b>		
Annual carbon benefits	3,142 tons	\$110,772
Annual air quality benefits	39,822 pounds	\$20,119

# Executive Summary

## WHAT DO WE WANT?

A primary emphasis for the UFMP is to identify adequate resources to ensure that critical tree care needs can be addressed in a timely, cost-effective, and efficient manner. This includes the proactive identification of risk and mitigation measures to promote public safety and reduce liability. The current inventory of City-owned trees does not include all City-trees and does not have a historic record of maintenance. Trees are living organisms, constantly changing and adapting to their environment and increasing in size over time. Because of this, trees have specific needs at various life stages, including training for proper structure when they are young and increased monitoring and proactive risk management when they become mature.

Deferring maintenance can have a significant effect on the overall health, structure, value, and lifespan of a tree. In addition, deferred maintenance often results in higher costs and less beneficial results, including increased risk potential. As a result, the UFMP identifies goals for optimizing urban forest programming, existing funding, staffing, and urban forest policy.

## HOW DO WE GET THERE?

The UFMP identifies four focus areas and 19 goals for preserving the health, value, services, and sustainability of South San Francisco's community urban forest. Each of these goals is supported by comprehensive objectives and actions. Recognizing that community engagement is integral to success, the UFMP includes firm objectives for engaging the community and encouraging partnerships and collaboration.

## HOW ARE WE DOING?

The long-term success of the UFMP will be measured through the realization of Plan goals and demonstrated through increased value and environmental services from the urban forest. The Plan identifies methods of measurement, priorities, potential partners, and estimated costs. Since the UFMP is intended to be a dynamic tool, it can and should be updated in response to available resources and opportunities. One of the greatest measures of success for the UFMP will be its level of success in meeting community expectations for the care and preservation of South San Francisco's urban forest.



# Executive Summary

**Table 1: Summary of Goals and Existing Policies of the Plan**

Focus Areas	Align urban forest management policy with community expectations and cost efficiency.	Enhance community safety.	Optimize the environmental, social, economic, and public health benefits of trees and canopy.	Grow, maintain, preserve, and enhance a sustainable urban forest.
Goals and Existing Policies	<p><b>Goal 1:</b> Promote excellent and efficient customer service.</p> <p><b>Goal 2:</b> Increase uniformity between City policies, documents, and departments.</p> <p><b>Goal 3:</b> Advance the role of Park Staff in City development projects.</p> <p><b>Goal 4:</b> Increase collaboration with developers.</p> <p><b>Goal 5:</b> Provide water to trees efficiently and cost-effectively.</p>	<p><b>Goal 6:</b> Promote a workplace culture of safety.</p> <p><b>Goal 7:</b> Promote a safe urban forest.</p> <p><b>Goal 8:</b> Reduce the risk of fire and mitigate damage caused by fire.</p> <p><b>Goal 9:</b> Improve public safety.</p>	<p><b>Goal 10:</b> Plan for trees, before planting.</p> <p><b>Goal 11:</b> Avoid removing trees whenever possible.</p> <p><b>Goal 12:</b> Reach 22.6% canopy cover by 2040.</p> <p><b>Goal 13:</b> Decrease tree mortality.</p> <p><b>Goal 14:</b> Promote good maintenance practices for trees on private property.</p> <p><b>Goal 15:</b> Review and update Municipal Code as needed and educate the public as changes occur.</p>	<p><b>Goal 16:</b> Increase support for the enhancement of the urban forest.</p> <p><b>Goal 17:</b> Continue to distribute information about the urban forest to the community.</p> <p><b>Goal 18:</b> Create a volunteer tree advocacy group.</p> <p><b>Goal 19:</b> Continue to practice an Integrated Pest Management (IPM) approach when responding to pests and disease pathogens.</p>
Primary Objectives	<ul style="list-style-type: none"> <li>• Increase efficiency to respond in a timely manner to community concerns for trees.</li> <li>• Unify guiding documents to transcend departmental changes and address inefficiencies and reduce confusion.</li> <li>• Improve communication and coordination with other City departments.</li> <li>• Increase the role of Park Staff in design review.</li> <li>• Encourage the inclusion of trees in development projects to expand the tree canopy on public property.</li> <li>• Expand tree canopy through new development projects.</li> <li>• Provide water to trees to encourage establishment.</li> </ul>	<ul style="list-style-type: none"> <li>• Implement policies and procedures that make that tree work as safe as possible.</li> <li>• Develop a risk management policy/procedure.</li> <li>• Focus fire mitigation efforts on Sign Hill and other areas of vulnerability.</li> <li>• Maintain trees throughout their lifetimes to improve structure in maturity and reduce the likelihood of structural failures in the future.</li> </ul>	<ul style="list-style-type: none"> <li>• Invest in trees for the long-term environmental benefits provided to the community.</li> <li>• Improve the diversity of the urban forest on public and private property, to create a more resilient urban forest.</li> <li>• Explore alternative designs instead of removals.</li> <li>• Discourage the removal of protected trees.</li> <li>• Improve everyday care of trees, to prevent future removals.</li> <li>• Expand canopy cover to increase environmental benefits.</li> <li>• Educate the community about property owner responsibilities for the care of City trees.</li> <li>• Reduce unethical and/or poor pruning practices and unnecessary removals on private property.</li> <li>• Meet the changing needs of the urban forest and the community through clear and concise and current policy.</li> </ul>	<ul style="list-style-type: none"> <li>• Engage the community in urban forestry activities and educational events.</li> <li>• Provide sustainable and adequate resources to sustain the urban forest for future generations.</li> <li>• An educated community increases support and understanding of urban forestry policies and procedures.</li> <li>• Market urban forestry through a variety means to promote participation from all community members</li> <li>• Work with volunteer tree advocates to promote urban forestry events and distribute urban forestry educational materials.</li> <li>• Employ multiple tools and strategies to prevent and/or manage pests and pathogens.</li> </ul>

# Introduction

South San Francisco, also known as “South City” by locals, is in San Mateo County on the San Francisco Peninsula. A capital of biotechnology, South San Francisco has attracted various biotechnology companies to the area.

South San Francisco experiences a Mediterranean climate with mild winters and dry cool summers, with an average high temperature of 65.9°F and an average low temperature of 50.6°F. The average annual precipitation is 20.6 inches, with most rainfall occurring between November and April (Climate South San Francisco–California, 2018). The City, like much of the peninsula, experiences fog in the mornings and evenings, with glimpses of sunshine throughout the afternoon.

## COMMUNITY

### South San Francisco History

Separated from the greater San Francisco area by the San Bruno Mountain State and County Park, the City of South San Francisco is marked by the prominent Sign Hill to the north, noting South San Francisco as “The Industrial City,” and reflecting the City’s long history of industry.

#### 1700s

The Ohlone Tribe were the first to call the San Francisco Peninsula home, relying on the bay and surrounding hills for fish and game. The arrival of Spaniards in 1769 led to the decimation of the Ohlone. For the remainder of the century, the Mexican government controlled the area and awarded large land grants to its supporters.

#### 1800s

In 1835, Señor Don Jose Antonio Sanchez was granted the vast Rancho Buri Buri. Following his death, his children inherited the land. The land changed ownership numerous times, eventually leading to the introduction of ranching in the area (History of South San Francisco, 2017).

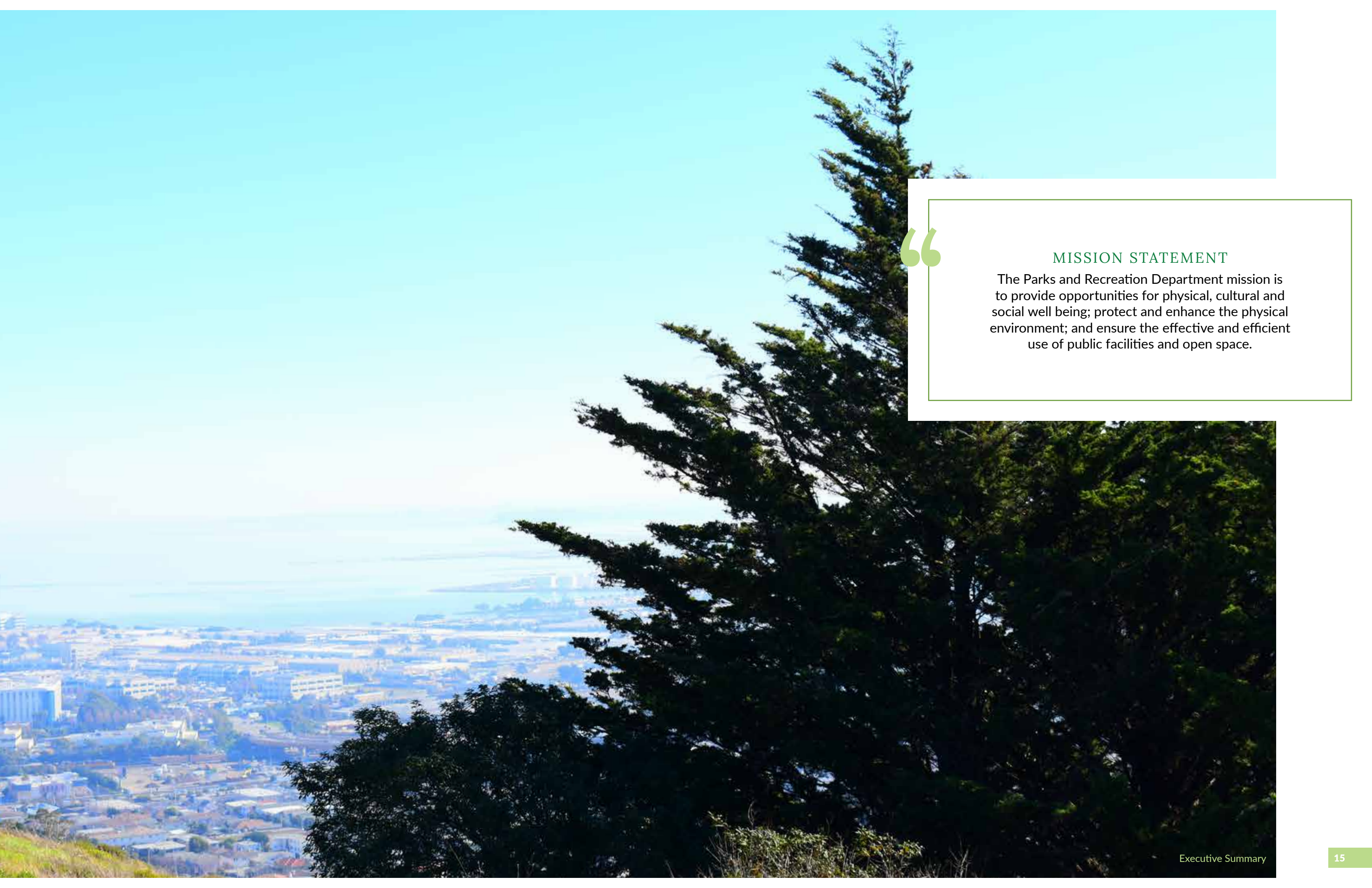
In 1889, Gustavus F. Swift appointed Peter Iler of Omaha, Nebraska to find a location in California where a meat packing plant could be established. Swift formed South San Francisco Land and Improvement Company and the Western Meat Company (which later would be known as Swift & Co.). These companies attracted industries and workers to the area, thus increasing the area’s population. With the increased population, the area was incorporated in 1908. The area continued to grow during World War II. The growth led to the expansion of residential areas as well as creating a thriving shipbuilding industry.

#### 1900s

In 1968, Swift & Co. closed (Spangler, 1968). By 1978, a biotechnology company called Genentech established its headquarters in South San Francisco. Genentech attracted other biotechnology companies to the area and contributed to the City’s new identity, “The Birthplace of Biotechnology” (Genentech, 2018).

#### 2000s

Today, South San Francisco is home to the largest biotech cluster in the world. There are over 200 biotech companies making up 11.5-million square feet of biotech space on 500 acres (Biotech in South San Francisco, 2018).



### MISSION STATEMENT

The Parks and Recreation Department mission is to provide opportunities for physical, cultural and social well being; protect and enhance the physical environment; and ensure the effective and efficient use of public facilities and open space.

# Introduction

## TREE AND CANOPY BENEFITS

Trees in the urban forest work continuously to mitigate the effects of urbanization and development as well as protect and enhance lives within the community. Healthy trees are vigorous, producing more leaf surface and canopy cover area each year. The amount and distribution of leaf surface area are the driving forces behind the urban forest's ability to produce services for the community (Clark et al, 1997). Services (i.e. benefits) include:

- Air quality improvements
- Carbon dioxide reductions
- Water quality improvements
- Aesthetics & socioeconomics enhancements
- Energy savings
- Health benefits
- Wildlife habitat
- Wind protection



### Air Quality Improvements

Trees improve air quality in five (5) fundamental ways:

- Lessening particulate matter (e.g. dust and smoke)
- Absorbing gaseous pollutants
- Providing shade and transpiring
- Reducing power plant emissions by decreasing energy demand among buildings
- Increasing oxygen levels through photosynthesis

Trees protect and improve air quality by intercepting particulate matter (PM<sub>10</sub>), including dust, pollen, and smoke. The particulates are filtered and held in the tree canopy until precipitation rinses the particulates harmlessly to the ground. Trees absorb harmful gaseous pollutants like ozone (O<sub>3</sub>), nitrogen dioxide (NO<sub>2</sub>), and sulfur dioxide (SO<sub>2</sub>). Shade and transpiration reduce the formation of O<sub>3</sub>, which is created at higher temperatures. Scientists are now finding that some trees may absorb more volatile organic compounds (VOCs) than previously thought (Karl, 2010; McPherson and Simpson, 2010). VOCs are carbon-based particles emitted from automobile exhaust, lawnmowers, and other human activities.



# Introduction

## Carbon Dioxide Reductions

As environmental awareness increases, governments are paying attention to global warming and the effects of greenhouse gas (GHG) emissions. As energy from the sun (sunlight) strikes the Earth's surface, it is reflected into space as infrared radiation (heat). Greenhouse gases absorb some of this infrared radiation and trap this heat in the atmosphere, increasing the temperature of the Earth's surface. Many chemical compounds in the Earth's atmosphere act as GHGs, including methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), carbon dioxide (CO<sub>2</sub>), water vapor, and human-made gases/aerosols. As GHGs increase, the amount of energy radiated back into space is reduced and more heat is trapped in the atmosphere. An increase in the average temperature of the earth may result in changes in weather, sea levels, and land use patterns, commonly referred to as "climate change." In the last 150 years, since large-scale industrialization began, the levels of some GHGs, including CO<sub>2</sub>, have increased by 25% (Greenhouse Gases' Effect on the Climate, 2018).

California's Global Warming Solutions Act (AB 32) passed in 2006 set the 2020 GHG emissions reduction goal into law. In December 2007, the California Air Resources Board (ARB) approved the 2020 emission limit of 427 million metric tons of carbon dioxide equivalent (CO<sub>2</sub>). As of 2007, regulations require that the largest industrial sources of GHG must report and verify their emissions. In 2011, the ARB adopted the cap-and-trade regulation. Under a cap-and-trade system, an upper limit (or cap) is placed on GHG emissions. This cap can be applied to any source, industry, region, or other jurisdictional level (e.g., state, national, or global). Regulated entities are required to either reduce emissions to required limits or purchase (trade) emission offsets to meet the cap. In 2011, the ARB approved four (4) offset protocols for issuing carbon credits under cap-and-trade, including the Forest Offset Protocol (Compliance Offset Protocol Urban Forest Projects, 2011). This Protocol recognizes the key role forests play in fighting climate change. The USDA Forest Service Urban Ecosystems and Social Dynamics Program (EUP) recently led the development of an Urban Forest Project Reporting Protocol.

The Protocol, which incorporates methods of the Kyoto Protocol and Voluntary Carbon Standard (VCS), establishes methods for calculating reductions, provides guidance for accounting and reporting, and assists urban forest managers in developing tree planting and stewardship projects that could be registered for GHG reduction credits (offsets). The Protocol can be applied to urban tree planting projects within municipalities, campuses, and utility service areas anywhere in the United States. Trees and forests reduce atmospheric carbon dioxide CO<sub>2</sub> in two ways:

- Directly, through growth and carbon sequestration
- Indirectly, by lowering the demand for energy

Trees and forests directly reduce CO<sub>2</sub> in the atmosphere through growth and sequestration of CO<sub>2</sub> in woody and foliar biomass. Indirectly, trees and forests reduce CO<sub>2</sub> by lowering the demand for energy and reducing CO<sub>2</sub> emissions from the consumption of natural gas and the generation of electric power.





# Introduction

## Water Quality Improvements

Trees and forests improve and protect the quality of surface waters, such as creeks and rivers, by reducing the impacts of stormwater runoff through:

- Interception
- Increased soil capacity and infiltration rate
- Reduction in soil erosion

Trees intercept rainfall in their canopy, which acts as a mini-reservoir (Xiao et al, 1998). During storm events, this interception reduces and slows runoff. In addition to catching stormwater, canopy interception lessens the impact of raindrops on barren soils. Root growth and decomposition increase the capacity and rate of soil infiltration by rainfall and snowmelt (Xiao et al, 1998). Each of these processes greatly reduces the flow and volume of stormwater runoff, avoiding erosion and preventing sediments and other pollutants from entering streams, rivers, and lakes. Urban stormwater runoff is a major source of pollution for surface waters and riparian areas, threatening aquatic and other wildlife as well as human populations. Requirements for stormwater management are becoming more stringent and costly. Reducing runoff and incorporating urban trees in stormwater management planning have the added benefit of reducing the cost of stormwater management, including the expense of constructing new facilities necessary to detain and control stormwater as well as the cost of treatment to remove sediment and other pollutants.

“ It would be so nice to come home from the hustle and bustle and feel a sense of calm in a nicely wooded neighborhood.”  
ONLINE SURVEY RESPONDENT



## Introduction

### Energy Savings

Urban trees and forests modify climate and conserve energy in three (3) principal ways:

- Producing shade for dwellings and hardscape reduces the energy needed to cool the building with air conditioning (Akbari et al, 1997)
- Tree canopies engage in evapotranspiration, which leads to the release of water vapor from tree canopies and cools the air (Lyle, 1996)
- Trees in dense arrangements may reduce mean wind speed and solar radiation below the top of the tree canopy by up to ~90% compared to open areas (Heisler and DeWalle, 1988)

An urban heat island is an urban area or metropolitan area that is significantly warmer than its surrounding rural areas due to human activities.

Trees reduce energy use in summer by cooling the surrounding areas. Shade from trees reduces the amount of radiant energy absorbed and stored by hardscapes and other impervious surfaces, thereby reducing the heat island effect. Transpiration releases water vapor from tree canopies, which cools the surrounding area. Evapotranspiration, alone or in combination with shading, can help reduce peak summer temperatures by 2 to 9°F (1 to 5°C) (Huang et al, 1990). The energy saving potential of trees and other landscape vegetation can mitigate urban heat islands directly by shading heat-absorbing surfaces, and indirectly through evapotranspiration cooling (McPherson, 1994). Individual trees through transpiration have a cooling effect equivalent to two (2) average household central air-conditioning units per day or 70 kWh for every 200 L of water transpired (Ellison et al, 2017). Studies on the heat island effect show that temperature differences of more than 9°F (5°C) have been observed between city centers without adequate canopy cover and more vegetated suburban areas (Akbari et al, 1997).

Trees also reduce energy use in winter by mitigating heat loss, where they can reduce wind speeds by up to 50% and influence the movement of warm air and pollutants along streets and out of urban canyons. Urban canyons are streets flanked by dense blocks of buildings, affecting local conditions, such as temperature, wind, and air quality. By reducing air movement into buildings and against conductive surfaces (e.g., glass and metal siding), trees reduce conductive heat loss from buildings, translating into potential annual heating savings of 25% (Heisler, 1986).

Three trees properly placed around the home can save \$100-\$250 annually in energy costs. Shade from trees significantly mitigates the urban heat island effect - tree canopies provide surface temperature reductions on wall and roof surfaces of buildings ranging from 20-45°F and temperatures inside parked cars can be reduced by 45°F. Reducing energy use has the added bonus of reducing carbon dioxide (CO<sub>2</sub>) emissions from fossil fuel power plants.



*Trees create a haven for relaxation and reflection. It is vital for our physical and emotional to be closer to nature.”*

ONLINE SURVEY RESPONDENT



## Introduction

### Health Benefits

Exposure to nature, including trees, has a positive impact on human health and wellness through improvements in mental and physical health, reductions in crime, and academic success.

A study of individuals living in 28 identical high-rise apartment units found residents who live near green spaces had a stronger sense of community and improved mental health, coped better with stress and hardship, and managed problems more effectively than those living away from green space (Kuo, 2001). In a greener environment, people report fewer health complaints (including improved mental health) and more often rate themselves as being in good health (Sherer, 2003). Other research has revealed lower incidence of depressive symptoms in neighborhoods with greater access to green space (Jennings & Gaither, 2015).

Trees shade impervious surfaces and prevent the sun's rays from hitting them, thus reducing heat storage and later release, which contribute to the urban heat island effect. Tall trees that create a large shaded area are more useful than short vegetation. Trees also contribute to cooler temperatures through transpiration, increasing latent heat storage (the sun's energy goes to convert water from its liquid to vapor form) rather than increasing air temperature (sensible heat). According to a study conducted by the Nature Conservancy, it is estimated that trees have the potential to reduce summer maximum air temperatures by 0.9 to 3.6° F. Trees help to address public health concerns for both heat and air quality. Globally, an annual investment of \$100 million in planting and maintenance costs would give an additional 77 million people a 1° C (1.8° F) reduction in maximum temperatures on hot days (McDonald et al, 2016).

Several studies have examined the relationship between urban forests and crime rates. Park-like surroundings increase neighborhood safety by relieving mental fatigue and feelings of violence and aggression that can occur as an outcome of fatigue (Planning the Urban Forest: Ecology, Economy, and Community Development, 2009). Research shows that the greener a building's surroundings are, fewer total crimes occur. This is true for both property crimes and violent crimes. Landscape vegetation around buildings can mitigate irritability, inattentiveness, and decreased control over impulses, all of which are well established psychological precursors to violence.

Residents who live near outdoor greenery tend to be more familiar with nearby neighbors, socialize more with them, and express greater feelings of community and safety than residents lacking nearby green spaces (American Planning Association, 2003). Public housing residents reported 25% fewer domestic crimes when landscapes and trees were planted near their homes (Kuo, 2001). Two studies (one in New Haven, CT and the other in Baltimore City and County, MD) found a correlation between increased tree coverage and decreased crime rates, even after adjusting for a number of other variables, such as median household income, level of education, and rented versus owner-occupied housing in the neighborhoods that were studied (Gilstad-Hayden et al, 2015; Troy et al, 2012).

A 2010 study investigated the effects of exposure to green space at school on the academic success of students at 101 public high schools in southern Michigan (Matsuoka). The study found a positive correlation between exposure to nature and student success measured by standardized testing, graduation rate, percentage of student planning to go to college, and the rate of criminal behavior. This trend persisted after controlling for factors such as socioeconomic status and race or ethnicity. Conversely, views of buildings and landscapes that lacked natural features were negatively associated with student performance.



Owls roosting in a palm tree in Orange Memorial Park.

## Introduction . —

### Wildlife Habitat

Trees provide important habitat for birds, insects (including bees), and other animal species. Their greatest contributions include:

- Preservation and optimization of wildlife habitat
- Natural corridors for increased movement and dispersal

Furthermore, trees and forest lands provide critical habitat (for foraging, nesting, spawning, etc.) for mammals, birds, fish, and other aquatic species. Trees can offer pollinators a valuable source of flowering plants. With an array of flowering trees that provide pollen and nectar in the urban forest, bees are provided with additional food sources. Increasing tree species diversity and richness contributes to greater numbers of bird species among urban bird communities (Pena et al, 2017). Wooded streets potentially function as movement corridors, allowing certain species—particularly those feeding on the ground and breeding in trees or tree holes—to fare well by supporting alternative habitat for feeding and nesting (Fernandez-Juricic, 2001). Greater tree density also contributes to bat activity in urban environments and improves outcomes for both birds and bats (Threlfall et al, 2016).

Restoration of urban riparian corridors and their linkages to surrounding natural areas has facilitated the movement of wildlife and dispersal of flora (Dwyer et al, 1992). Usually habitat creation and enhancement increase biodiversity and complement other beneficial functions of the urban forest. These findings indicate an urgent need for conservation and restoration measures to improve landscape connectivity, which will reduce extinction rates and help maintain ecosystem services (Haddad et al, 2015).

### Wind Protection

Trees reduce wind speeds relative to their canopy size and height by up to 50%, and when in dense arrangements up to 90% (Heisler, 1990). When selecting trees for use in areas that frequently experience high winds, several tree attributes can optimize their success withstanding high winds, and therefore the wind reduction benefits they provide. Characteristics such as lower tree stature, dense foliage and wood, pyramidal structure, and branch flexibility lend to high wind resistance. Ensuring the root system and canopy are unimpeded to spread horizontally is also important (Gilman and Sadowski, 2007). An individual tree's profile interplays with their proximity to other trees and city structures to decrease wind speeds. As there can be many complex variables when studying wind flow dynamics, trees are often a neglected. Nevertheless, trees are a contribute significantly to wind reduction. Recent work shows wind models are more accurate when trees are taken into consideration, and GIS data of city trees provides an opportunity to quantify the effects of trees on wind speeds (Salim et al. 2015).

### Calculating Tree Benefits

Communities can calculate the benefits of their urban forest by using a complete inventory or sample data in conjunction with the USDA Forest Service i-Tree software tools. This state-of-the-art, peer-reviewed software suite considers regional environmental data and costs to quantify the ecosystem services unique to a given urban forest resource.

Individuals can calculate the benefits of trees to their property by using i-Tree Design. ([www.itreetools.org/design](http://www.itreetools.org/design))

“

*[Trees planted along sidewalks] would make our city look much more beautiful and give our wildlife a place to rest/live.”*

ONLINE SURVEY RESPONDENT

# What do we have? ■

## HISTORY OF URBAN FORESTRY IN SOUTH SAN FRANCISCO

Three hundred years ago, the landscape of South San Francisco and the surrounding area was quite different than it is today. Historically, the area was predominately grassland, dotted with oak chaparral shrublands. Therefore, most trees that exist in South San Francisco were likely planted by someone.

Over time, South San Francisco's urban forest has engendered the support of many advocates within the Parks and Recreation Department and the general community. One of the most notable volunteers is pharmacist Alphonse "Al" Suebert. For over 40 years beginning in the 1960's, Al, along with the Beautification Committee, led the planting of trees on Sign Hill for annual Arbor Day celebrations (Wolfe, 2012). Al was a catalyst for developing the trail system throughout the open space and single-handedly planted an estimated 5,000 trees. In 1991, in recognition of Al Suebert's life commitment to tree planting and conservation in the community, he was awarded the National Arbor Day Foundation Lawrence Enersen Award.

“

*When I was 10 and 11 years old Mr. E. De Monty was our teacher, we planted the trees on the hills...”*

ONLINE SURVEY  
RESPONDENT

While Al passed away in 2006 his legacy of Sign Hill is still enjoyed by the community. However, due to growing concerns for fire hazards and wildlife habitat, tree planting on Sign Hill has ceased and Arbor Day activities now occur in City parks.

Following concerns by the Historic Society about the removal of palms in Orange Memorial Park, a Tree Preservation Ordinance was adopted by the City Council in 1989. The palms were planted by John Previti, a City gardener, in remembrance of fallen military service members from South San Francisco.

For 32 years, South San Francisco has been recognized as a Tree City USA. As part of meeting the standards for this recognition, the City has organized Arbor Day events that include community tree plantings. In 2008, in celebration of the City's 100th birthday, 100 trees were planted. In more recent years, due to water restrictions brought on by extended periods of drought, tree plantings have not been as robust. However, in 2018 as a result of increased rainfall and recently lifted watering restrictions, the City set out to plant 100 trees but instead planted 250.

Tree maintenance has always been the responsibility of the Parks Division. Over time, the Parks Division has shifted back and forth between the Departments of Public Works and Parks and Recreation. Currently, the Parks Division is under the Department of Parks and Recreation. The Division has a tree crew consisting of two tree trimmers and two ground workers. The crew is responsible for pruning (for clearance and visibility), structural pruning, utility pruning, removals, stump grinding, and emergency response. The City maintains contracts with tree care professionals to address pruning and removals of trees in areas that are difficult to access or a crane is needed.



## What do we have? . ———

### JOHN AND TINA PREVITI

*In the 1940s, newlyweds John and Tina Previti moved from their hometown of Chicago to South San Francisco, where John landed a position as a gardener with the City's Parks Department. Tina was disappointed that there were no rows of palm trees in the City, which she had heard was common in California. On a visit to Mission San José de Guadalupe, the couple admired the Canary Island date palms (*Phoenix canariensis*). John harvested some of the fallen dates from the Mission, sprouted them in paper cups, and nurtured the young seedlings. In 1946, John planted the young trees in a row along Tennis Drive and also gave seedlings to neighbors as gifts (S. Ranals, personal communication, August 8, 2018). It has been noted that the Canary Island palms reflect some of the residents' Mediterranean heritage, where they had immigrated to South San Francisco.*

*John's intention with the planting on Tennis Drive was to create a living tribute to South San Francisco veterans who were killed in the line of duty (located near the war memorial at the corner of Tennis Drive and Orange Avenue). The stately and historic row of palms marks the main entrance to the City's central park.*



# What do we have? . —

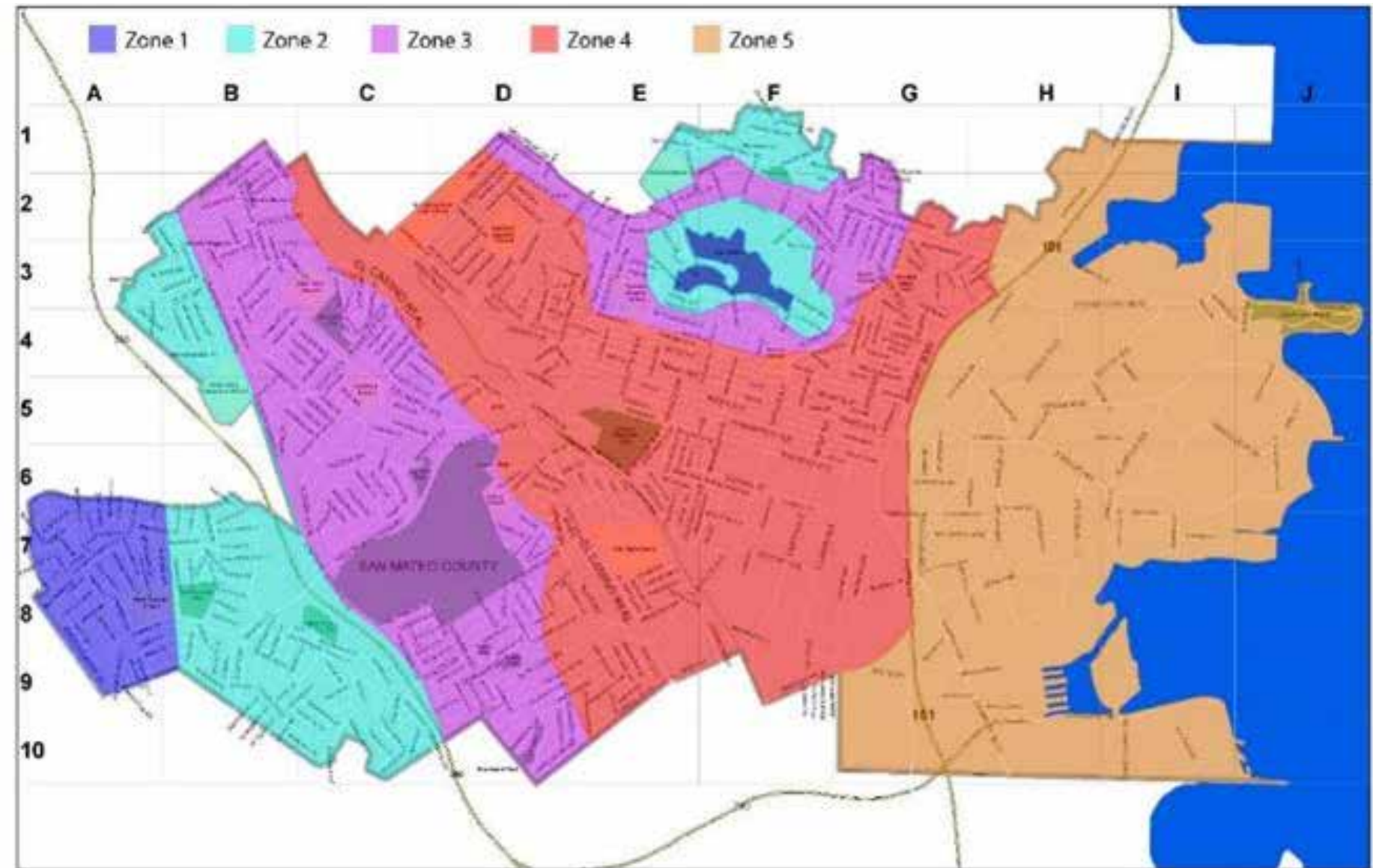
## MICROCLIMATES

Like much of California, South San Francisco experiences periods of drought. In addition to periodic drought, the geography has a strong influence over the local climate, with the San Francisco Bay to the east, the Pacific Ocean to the west, and San Bruno Mountain to the north. Elevations range from 250 feet to 1,314 feet at the summit (San Bruno Mountain Park Natural Features). It is challenging to grow trees in the City because of the dry Mediterranean climate with dominant westerly winds for most of the year along with moderate temperatures and year-round fog. Average hourly wind speeds in South San Francisco are nearly 9 miles per hour (Average Weather South San Francisco). In some parts of the City, there are persistent 20–40 mile per hour winds. Trees can help mitigate the effects of wind. However, individual trees in clusters (i.e., group plantings) can become more vulnerable to windthrow if adjacent trees are removed.

The topography of the City also creates pockets of microclimates where some areas have persistent fog year-round, some parts of the City have fog for portions of the day, and other areas are hotter, drier, and windier than the surrounding terrain. Considering the climate variability across the City, the tree species that perform well in these areas can be highly variable and fog may increase the threat of certain pests and pathogens.

The different climate zones, illustrated in Map 1, are defined as follows:

- Zone 1 – persistent fog
- Zone 2 – fog primarily through the afternoon
- Zone 3 – fog primarily in the morning
- Zone 4 – urban landscape that experiences more heat and high winds
- Zone 5 – industrial landscape with bay influence and wind influence



**Map 1: Climate Zone Map**



## What do we have? —

While these climate zones are a relatively short distance away from one another the types of trees that should be planted in each of these zones is highly variable and zone dependent. Zone 1 is characterized by persistent fog, therefore any sunlight that is present during the day is highly valued. It is important to factor lighting and canopy density when considering trees for this zone. Because sun light is a precious commodity to residents in these areas, tree species that do not block the sun are preferred.

While Zones 2 and 3 both experience periods of fog, the time of day that the fog occurs influences the types of trees that are best suited to the area. Zone 3 experiences some fog in the morning, but the afternoon is sunny and has greater potential for warm temperatures. This area can benefit from taller trees with greater canopy density to improve shade and reduce afternoon temperatures. In contrast, Zone 2 has fog through the afternoon, and benefits more from the same tree species that are recommended for Zone 1 as well as species that can tolerate more sunlight.

Zone 4 has additional challenges that are primarily derived from the urban environment. Highly urbanized areas generally have more compacted and poorly drained soils. These types of soils encourage the roots of some tree species to become more “aggressive” causing problems with hardscape (such as lifting sidewalks). Additionally, pollutants (air and soil) and other stressors (e.g., temperature and moisture extremes) are more prevalent in urban environments. As a result, careful species selection is especially important for Zone 4 as some trees are better able to withstand these extreme conditions than others.

Moisture from the Bay creates a unique conflict for trees in Zone 5. Moisture in this microclimate creates an atmospheric salinity which is not tolerated by all tree species.



### CLIMATE CHANGE

Bay Area’s Mediterranean-type climate and microclimates (areas impacted by regional topography, fog exposure, wind, and heavy urbanization) are important factors to include in climate change projections (Cayan & Peterson, 1993; Kottek et al, 2006). California’s Fourth Climate Change Assessment identifies that the Bay Area is already experiencing symptoms of climate change, including: increased maximum temperatures from 1950–2005, less frequent coastal fog, sea level rise, historic El Niño influence, and drought (Ackerly et al, 2018). These symptoms are expected to get worse over the next century. Precipitation is predicted to be characterized by “booms and busts” with very wet and very dry periods (Ackerly et al, 2018). Along with increased temperatures, heat waves have the potential to be especially harmful as much of the Bay Area lacks cooling infrastructure (i.e., air conditioning) and much of the population has never had that exposure (Ackerly et al, 2018). With higher temperatures and heat waves, there will be a greater demand for electricity for cooling purposes, leading to increased energy costs.

Because South San Francisco has historically enjoyed mild coastal temperatures year-round, residents might not always appreciate shading benefits of trees. Additionally, residents probably have not considered planting a tree in anticipation of the potential increases in temperatures that might result because of climate change.

Recent historic fires in California have increased awareness about communities’ vulnerabilities to fire and how climate change and urban development are contributors to fire risk. In response to these dangers, the management of vegetation, planning, and building standards is critical to fire management.

Trees have a role to play in response to climate change, where they can reduce air and surface temperatures by shading and evapotranspiration (Akbari et al, 1997). Strategically planting trees in proximity to buildings can reduce the need for air conditioning, in turn reducing energy usage, air pollution, and associated greenhouse gas emissions. In addition, trees can contribute to stormwater management strategies by reducing the surface area of hardscape as well as impacts from precipitation events. However, climate change also poses a risk for urban forests as many species of trees will be vulnerable to hotter temperatures and longer periods of drought. Some pests and pathogens are also expected to increase with warming temperatures. Increasing species diversity with an emphasis on species that are better adapted to warmer climates and low-water use is critical for maximizing the resiliency of the overall urban forest.

# What do we have? . ———

## URBAN FOREST RESOURCE

The development of the UFMP included an assessment of the urban forest, including tree canopy (public and private) and analysis of the community tree inventory (public trees on streets, in parks, and at City facilities).



### Tree Canopy

Tree canopy is the layer of leaves, branches, and stems of trees and other woody plants that cover the ground when viewed from above. Understanding the location and extent of tree canopy is critical to developing and implementing sound management strategies that will promote the smart growth and resiliency of South San Francisco's urban forest and the invaluable services it provides. A tree canopy assessment provides a bird's-eye-view of the entire urban forest and includes consideration of tree canopy along with other primary land cover, including impervious surface, bare soils, and water. This information helps managers better understand tree canopy in relation to other geospatial data, including:

- Distribution of tree canopy within the community
- Geopolitical patterns in canopy distribution
- Identification of potential planting areas

The analysis does not distinguish between trees on public and private property since the benefits of trees extend beyond property lines. The information can be used by urban forest managers to explore tree canopy in conjunction with other available metrics, including geography, land use, and community demographics. This data also establishes a baseline for assessing future change.

### Land Cover Summary

The City of South San Francisco encompasses 11 square miles (7,021 acres) with nearly 1,202 acres of open water. Excluding impervious surface (4,038 acres) and open water (1,204 acres), South San Francisco contains approximately 1,079 acres which have the potential to support tree canopy. The following characterizes land cover in South San Francisco:

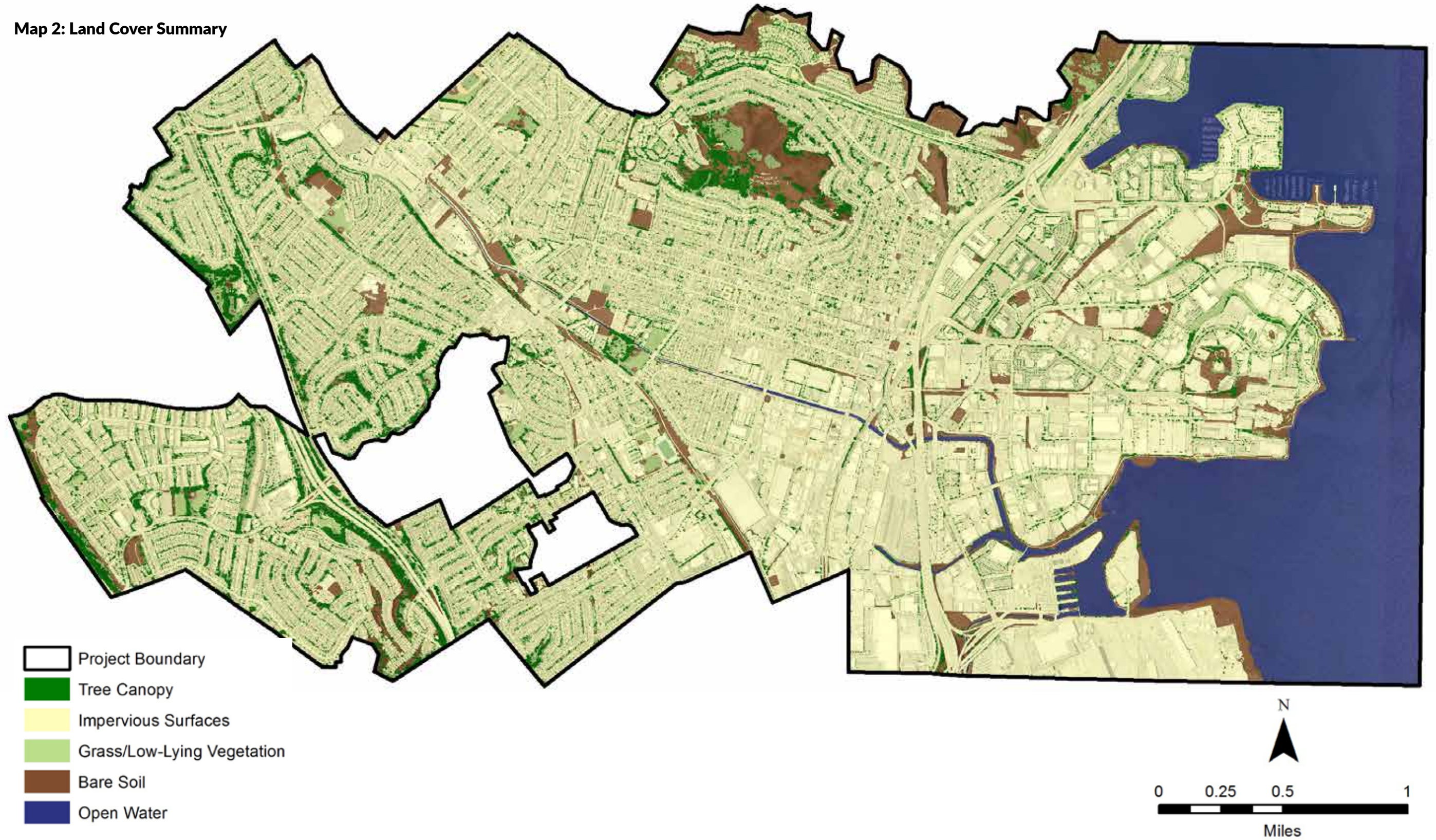
- 8.7% (508 acres) overall canopy cover (excluding open water), including trees and woody shrubs
- 58.2% (4,038 acres) impervious surface, including roads, parking lots, and structures
- 25.8% potential canopy cover (excluding open water)
- 62,113 tons of stored carbon (CO<sub>2</sub>) in woody foliar biomass
- \$167,686 total annual environmental benefits provided by both public and private trees

“

*With all the new developments the city should require developers to plant a certain amount of trees with each development.”*

ONLINE SURVEY RESPONDENT

Map 2: Land Cover Summary



# What do we have? . —



Map 3: South San Francisco Parks



## Tree Canopy by Parks

South San Francisco has 25 areas designated as parks, covering 156 acres. Among the top ten largest parks in the City, Sellick Park has the highest percent canopy cover at 50.8%, with a potential canopy cover of 87.8%, followed by Brentwood Park with a 49.7% canopy cover and a potential canopy cover of 84.2%. Both parks highlight an opportunity for additional planting in South San Francisco parks.

Overall, tree canopy covers 22.7% of parks and open space areas. The assessment identified an additional 32.2 acres of potential planting sites, indicating that parks and open space areas have the potential to support 43.3% canopy cover.<sup>1</sup>

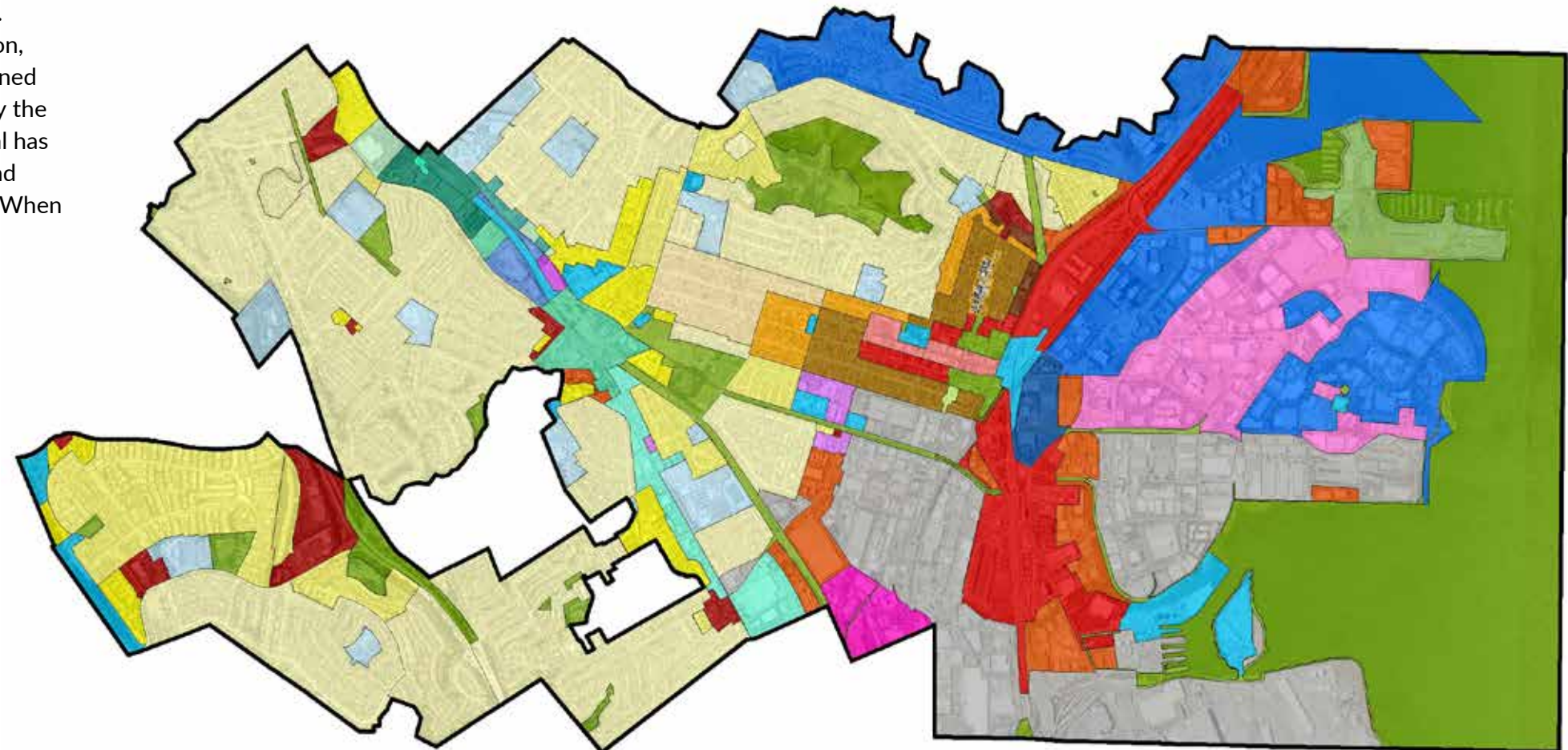
1. Future plantings on Sign Hill are prohibited therefore, this park was not included in potential canopy cover calculation.

# What do we have? . ———

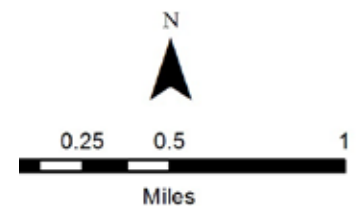
## Tree Canopy by Zoning

Zoning reflects a community's plan for growth in specific areas. Canopy cover can vary significantly between different zones. Much of the City's 7,021 acres is assigned a zoning designation, with the exception of seven acres. Low density residential zoned land (1,767 acres) encompasses the greatest area, followed by the Open Space designation (1,125 acres). Low density residential has the greatest amount of canopy at 189 acres (10.7%). Parks and Recreation has the highest canopy cover at 19.9% (45 acres). When open water is excluded, areas zoned as Open Space have the second highest tree canopy cover at 17.2%

Map 4: South San Francisco Zones



- |                                      |  |  |
|--------------------------------------|--|--|
| Project Boundary                     | Downtown Transit Core                            | Medium Density Residential                 |
| Bay West Cove Specific Plan District | El Camino Real Mixed Use                         | Mixed Industrial                           |
| Business Commercial                  | El Camino Real/Chestnut High Density Residential | Open Space                                 |
| Business Technology Park             | El Camino Real/Chestnut Mixed Use High Density   | Oyster Point Specific Plan District        |
| Business and Professional Office     | El Camino Real/Chestnut Mixed Use Medium         | Parks and Recreation                       |
| Commercial Mixed-Use                 | Freeway Commercial                               | Public/Quasi Public                        |
| Community Commercial                 | Gateway Specific Plan District                   | School                                     |
| Downtown Core                        | Genentech Master Plan                            | Terrabay Specific Plan District            |
| Downtown Mixed-Use                   | Grand Avenue Core                                | Transit Office/R&D Core                    |
| Downtown Residential Core            | High Density Residential                         | Transit Village Commercial                 |
| Downtown Residential High            | Linden Commercial Corridor                       | Transit Village High Density Residential   |
| Downtown Residential Low             | Linden Neighborhood Center                       | Transit Village Medium Density Residential |
| Downtown Residential Medium          | Low Density Residential                          | Transit Village Retail                     |



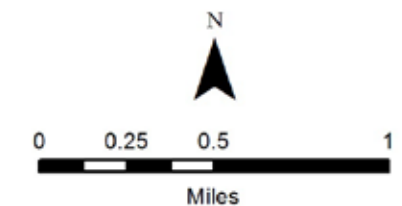
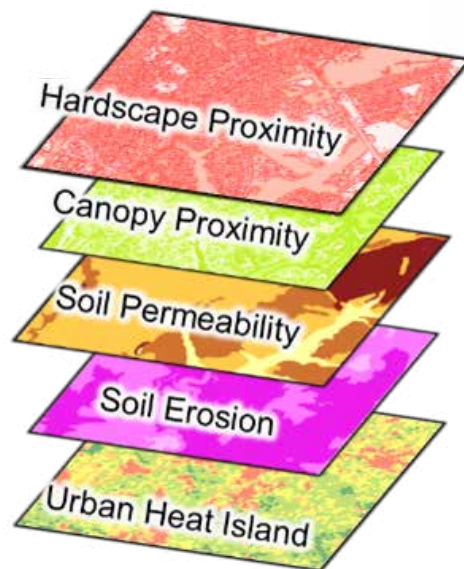
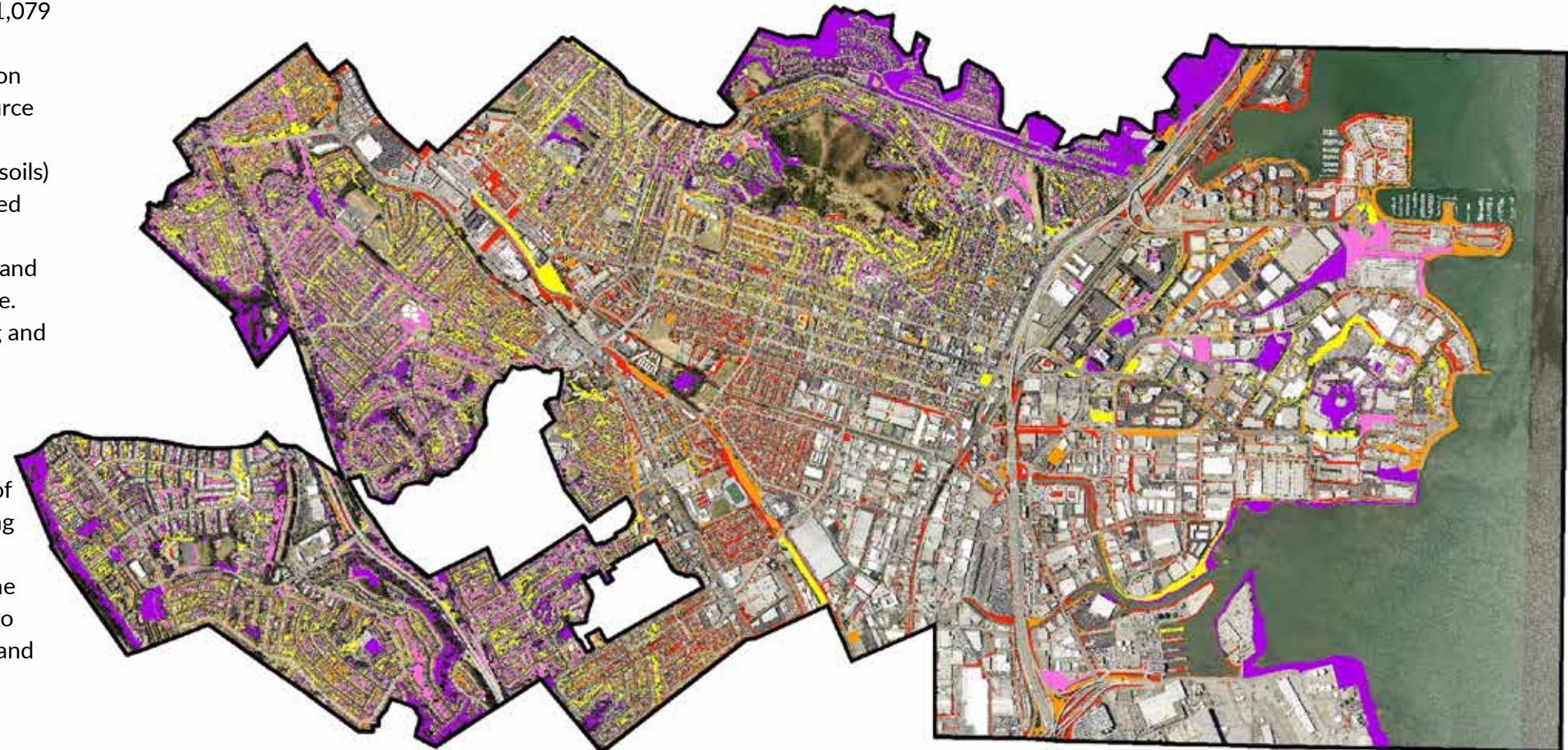
# What do we have? . —

## Priority Planting

South San Francisco has an estimated 1,079 acres of public and private land where additional trees could be planted. Of the 1,079 acres, 376 are identified as high or very high priority planting areas where additional trees will provide the greatest return on investment. To identify potential planting areas, Davey Resource Group (DRG) evaluated areas with pervious surface and no existing tree canopy (i.e., turf, low-lying vegetation, and bare soils) identified by the land cover assessment. DRG then coordinated with City Staff to identify areas where additional trees are undesirable, including sports fields, cemeteries, golf courses, and other sites where tree planting is contrary to planned land use. The remaining areas were prioritized via GIS remote sensing and based on site design and environmental factors (proximity to hardscape, canopy fragmentation, soil permeability, slope, and soil erosion factors).

It is important to note that this analysis provides a snapshot of current conditions and may not fully account for some existing young trees. Site visits are necessary to determine suitability as well as the actual number and location of planting sites. The potential canopy cover for South San Francisco is estimated to be 25.8%, which includes priority planting area (1,079 acres) and existing canopy (508 acres).

Map 5: Planting Priority



# What do we have? . ———

## COMMUNITY TREE RESOURCE

Community trees (publicly managed trees along streets, in parks, and at City facilities) play a vital role in South San Francisco. They provide numerous tangible and intangible benefits to residents, visitors, and neighboring communities.

The City recognizes that public trees are a valued resource, a vital component of the urban infrastructure, and part of the City's identity. As of 2018, the public tree inventory included 10,831 trees. However, some public trees have not yet been inventoried (Staff estimates there are approximately 15,000 community trees).

### Structure

A structural analysis is the first step towards understanding the benefits provided by these trees as well as their management needs. In 2018, South San Francisco's community tree resource includes 10,831 trees and 165 unique species. Considering species composition and diversity, and relative age distribution (diameter at breast height, also known as DBH), DRG determined that the following information characterizes the community tree resource:

- The most prevalent species in South San Francisco is Monterey pine (*Pinus radiata*, 15.8%), followed by Monterey cypress (*Hesperocyparis macrocarpa*, 8.4%), blue gum (*Eucalyptus globulus*, 6.8%), flowering pear (*Pyrus calleryana*, 6.4%), and Australian blackwood (*Acacia melanoxylon*, 6.2%)
- 65.0% of the population are 12-inches or less in diameter
- 10.9% of the population are 24-inches or greater in diameter

Map 6: South San Francisco Inventoried Trees





## What do we have? . ———

### Species Diversity

Maintaining species diversity in an urban forest is essential. Dominance of any single species or genus can have detrimental consequences in the event of storms, drought, disease, pests, or other stressors that can severely affect a public tree resource and the flow of benefits and costs over time. Catastrophic pathogens, such as Dutch elm disease (*Ophiostoma ulmi*), emerald ash borer (*Agrilus planipennis*), Asian long-horned beetle (*Anoplophora glabripennis*), invasive shot hole borer (*Euwallacea sp.*), and Sudden Oak Death (*Phytophthora ramorum*) are some examples of unexpected, devastating, and costly pests, as well as pathogens that highlight the importance of diversity and the balanced distribution of species and genera.

In light of significant pests and diseases, many cities are opting to increase diversity to improve resilience. The widely used 10-20-30 rule of thumb states that an urban tree population should consist of no more than 10% of any one species, 20% of any one genus, and 30% of any one family (Clark et al, 1997). While this rule does ensure a minimum level of diversity, it may not encourage enough genetic diversity to adequately support resilience. Therefore the 10-20-30 rule should be considered a minimum goal. Managers should always strive to increase the range of representation among species and genera within an urban forest.

The most prevalent species in South San Francisco is Monterey pine (*Pinus radiata*, 15.8%), followed by Monterey cypress (*Hesperocyparis macrocarpa*, 8.4%), blue gum (*Eucalyptus globulus*, 6.8%), flowering pear (*Pyrus calleryana*, 6.4%), and Australian blackwood (*Acacia melanoxylon*, 6.2%). The prevalence of Monterey pine exceeds the general rule that no single species should represent 10% of the urban forest resource. Only 23 of the 165 species in South San Francisco's community tree resource represent greater than 1% of the overall population. However, the top five most prevalent species represent 43.6% of the overall population.

Future tree planting should focus on increasing diversity and reducing reliance on overused species. As over-predominant species are removed and replaced, new species should be introduced when possible. New species should be resistant to the known pest issues that currently pose a threat to the region. In addition, consideration should be given to species that withstand higher temperatures and periods of drought.

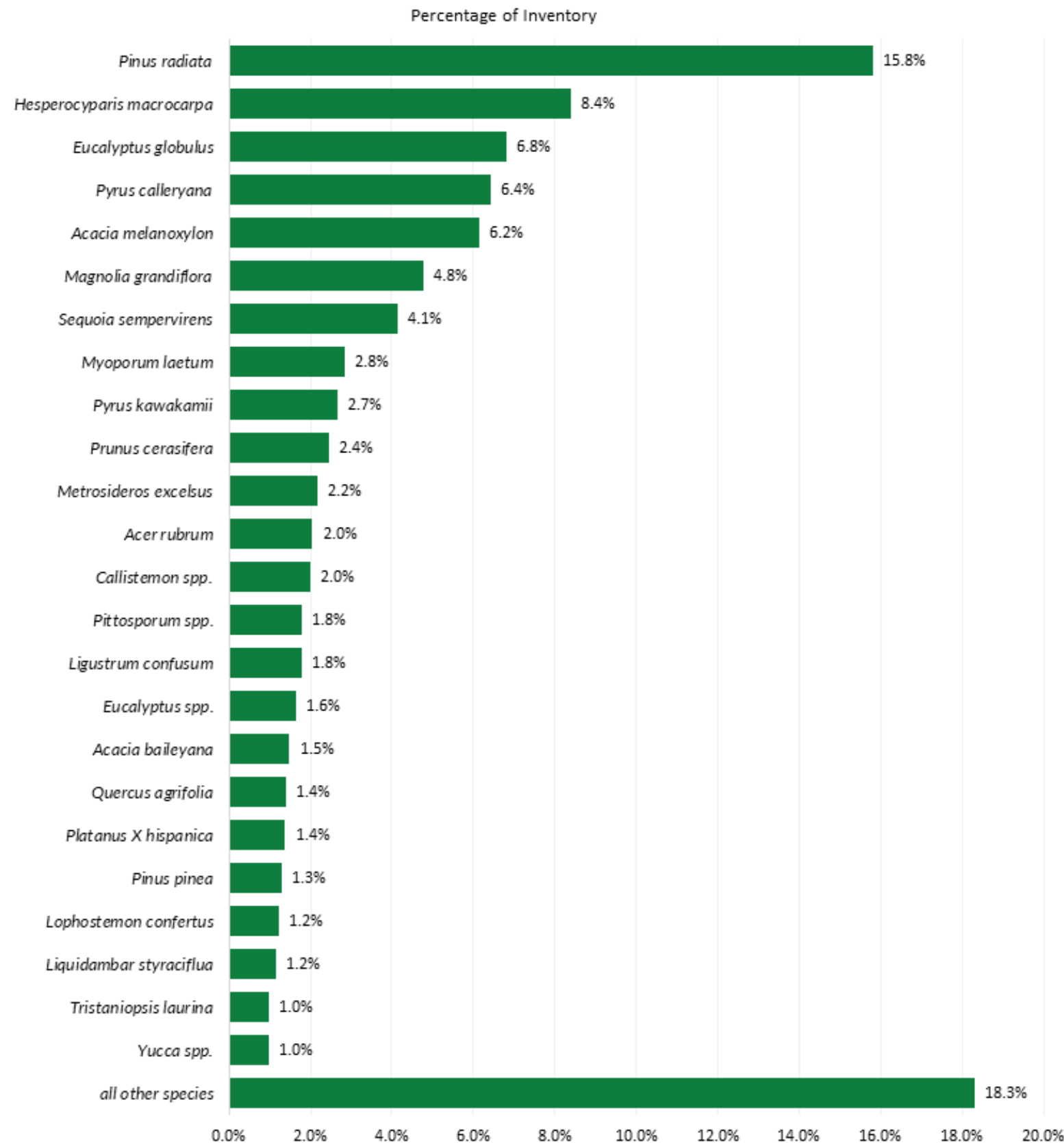
“

[I] would like to see more deciduous trees planted in street medians and public spaces.”

ONLINE SURVEY  
RESPONDENT



**Figure 1: Most Prevalent Species in South San Francisco**



**Age Distribution**

Age distribution can be approximated by considering the DBH range of the overall inventory and of individual species. Trees with smaller diameters tend to be younger. It is important to note that palms do not increase in diameter (DBH) over time, so they are not considered in this analysis. In palms, height more accurately correlates to age.

The age distribution of the urban forest is a key indicator and driver of maintenance needs. The age distribution of South San Francisco’s public tree resource (excluding palms) reveals that 65.0% of trees are 12-inches or less diameter and 10.9% of trees are larger than 24-inches diameter.

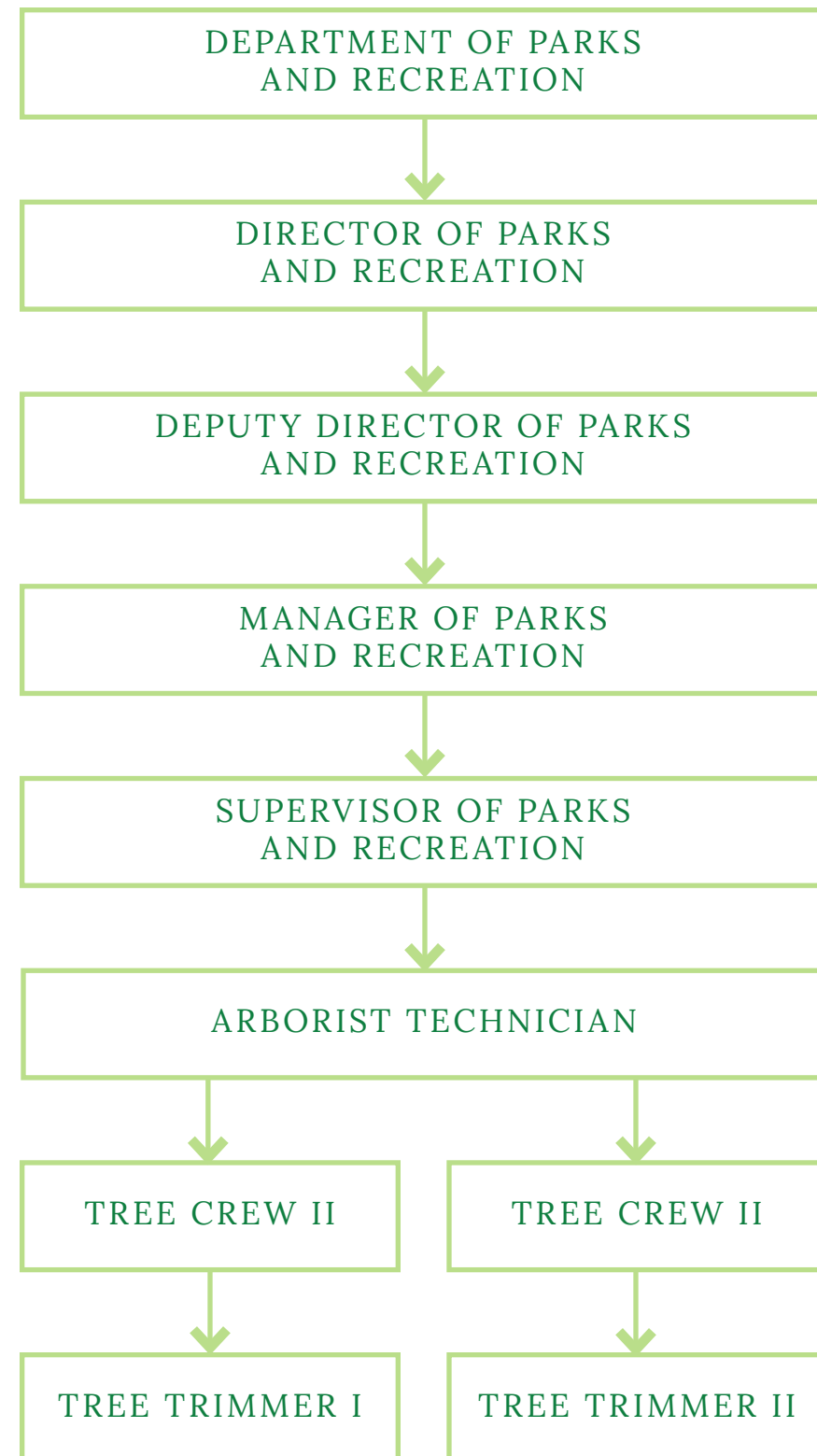
Trees greater than 24-inches diameter require more regular inspections and routine maintenance as they mature. Managers can gain a better understanding of the specific risks that individual mature trees pose with regular inspection and risk assessment.

Many medium and large-stature tree species still have a lot of growing to do before they reach maturity, with 4,113 trees (38.7%) in the inventory less than six inches in diameter. Training, defined as the selective pruning of small branches to influence the future shape and structure of a young tree, is critical at this stage to prevent costly structural issues and branch failures as these young trees mature into their final size in the landscape. Intermediate aged trees, with a diameter between 7 and 24-inches, represent 48.7% of the inventory with 5,172 trees in total. Similarly, the younger trees would benefit from structural pruning.

A high proportion of young, large and medium-stature tree species is a positive indicator for future benefits from the urban forest, since large shade trees typically provide more shade, pollutant uptake, carbon sequestration, and rainfall interception than small trees.

Mature trees, trees with a diameter greater than 24-inches, represent 10.9% of the inventory 1,155 trees in total. When trees reach mature stature, they provide the greatest benefits. However, mature trees should be regularly assessed for health and risk factors as they approach or reach the end of their natural lifespan. They may have higher maintenance needs or require removal to reduce risk and liability.

# What do we have? . —



## URBAN FORESTRY OPERATIONS

The Parks Division within the Department of Parks and Recreation is responsible for planting, maintenance, and protection of all trees within the public right-of-way, parks, and public places. The Division performs the following services:

- Tree pruning
- Tree removals
- Tree planting
- Tree irrigation
- Tree protection and preservation
- Community engagement and outreach

Urban forestry operations are mainly led by a Parks Supervisor. At one time, the City had three tree crews consisting of six crew members in total. As a result of the 2008 financial crisis and subsequent funding reductions, staff reductions were also made. In 2019, four staff members (two crews) care for about 15,000 community trees. The tree crews also assist with every-day park maintenance activities approximately 2-3 weeks a year.

On average, the Parks Division is able to respond to tree-related service requests within two weeks. Tree work is often scheduled daily on a reactive basis to address emergency and priority service requests. Tree crew schedules are typically organized around street sweeping schedules to avoid conflicts with parking, but not all streets have street sweeping signage. Therefore, managing traffic and parking around tree maintenance activities can be a challenge.

In conjunction with the Two-County (San Mateo and Santa Clara) Regional Internship Program, the City of South San Francisco has created several paid internship opportunities. For the Parks Division, an Urban Forestry & Parks Operations Intern was added in 2019 to help maintain and update the City’s tree inventory, identify and record locations for future tree planting, assist with the development of tree pruning grid system maps and with applications for forestry related grant programs.

Supplementary to Parks staff, contractors are primarily used for pruning and removal of trees in areas that are difficult to access or require the use of cranes. Contracted tree operations are generally funded through the Parks operating budget or the Common Greens Fund, depending on the location of the work. On-call agreements have improved response times and increased efficiency and coordination.

## What do we have? . ———



### **SAFETY**

While tree care is dangerous, proper training and good safety practices can help make the work safer. The City uses a contractor to provide safety training and consulting for all City departments. However, to better address the specific needs for training in arboriculture and tree care operations, Parks staff also attend workshops and safety training through International Society of Arboriculture (ISA) and Western Chapter ISA sponsored events.

Parks staff have been proactive in ensuring that tree crew members are trained thoroughly and are provided with all necessary personal protective equipment (PPE). However, there are currently no documented or formalized standard operating procedures (SOP) for safety practices.

Climbing equipment (e.g., ropes, saddles, helmets, etc.) and tree pruning tools (e.g., pole saws, hand saws, and chainsaws) are inspected daily by tree crews. Tree crews assess all work sites for potential hazards, energy sources, and Personal Protective Equipment (PPE) prior to beginning work. During these “tailgates” and job site meetings, safety concerns are freely discussed, but there are no formal processes to record participation and understanding.



### **TREE CARE EQUIPMENT**

The City’s Fleet Services Division is responsible for maintaining vehicles and heavy equipment, including determining the anticipated useful lifespan for all equipment. Because of heavy utilization, tree equipment has a shorter lifespan than regular equipment (especially aerial lifts and chippers). Often, there is not enough consideration for the workload or the hours of utilization of equipment used by the tree crew. For instance, the Parks Division has a front loader; however, it is nearing the end of its useful life.

Currently, there is only one chipper with a winch that can only be used by one crew at a time (therefore productivity is reduced). Much of the equipment used regularly by tree crews is more than 25 years old and finding replacement parts can be challenging or impossible. In addition, outdated equipment does not always have the latest safety features. For instance, the City’s woodchipper has minimum safety features but does not include secondary safety features, such as feed control bars, bottom feed stops, and emergency pull ropes. In addition, the feeder tray requires two people to lift, while modern chipper feeder trays are light enough for one person to safely lift.



Internal decay in trees is not necessarily indicative of structural weakness, nor does it always warrant removal of the tree. In an effort to avoid removing trees solely on detection of internal decay, the City purchased a sonic tomographer and resistograph.

These tool allows for the Parks staff to determine the extent of decay in the tree with colored imagery and scientifically based measurements on loss of strength. In combination with the mapping of the decay and external visual assessments of the tree, Parks staff are better able to assess the risk of a tree and take the necessary actions.

When the structural integrity of large trees is unknown, a resistograph can be used to determine structural stability. The resistograph has a maximum drilling depth of 500mm and is paired with a Bluetooth printer that prints out the results so it can be taken into the field. It also holds the information within the unit and can then be downloaded to a computer for further analysis.

In conjunction with the sonic tomographer, unnecessary removals of large trees can be avoided, as Parks staff have a better understanding of the internal structure of a tree.

# What do we have? . ———



## TREE INVENTORY MANAGEMENT

The tree inventory for South San Francisco was updated in 2015 (initially conducted in 2010). The inventory does not include all neighborhoods within the City. It also does not include some trees in easements, tree wells, or park strips. The inventory also does not distinguish between City trees and privately managed trees, especially trees included in developer's agreements.

### Tree Inventory Management Software

The current tree inventory software has limited capabilities, particularly with maintenance histories. The software is incapable of being interconnected with city grids, making grid pruning scheduling difficult.

## SERVICES

### Tree Pruning

In-house crews are responsible for most pruning, including utility pruning around secondary power lines. All tree crew members are required to have ACRT arborist training, line clearance/rescue certifications, or other equivalent training.

In partnership with City GIS Staff, Parks staff have developed a grid pruning schedule that is connected to the City's GIS mapping system. Currently, this schedule is in the beta testing stages and is intended to provide more efficient scheduling for tree maintenance activities.

Some residents request annual pruning of their city trees, which is not always conducive of tree health. Ideally, City trees should be pruned on a five to seven-year maintenance cycle (using a grid system). However, with current tree crew workloads and limited capabilities of the current inventory management software, most grids are pruned partially and not on a predictable schedule.

## What do we have? . ———



### Tree Removals

Preserving a healthy public tree is ideal. Yet, there are situations where a tree should be removed. Reasons for a removal may include but are not limited to concerns for public safety, disease, tree health, structural issues that cannot be corrected through pruning, internal decay, or inappropriate species selection for the site at planting.

Residents can submit requests for tree removals by contacting the Parks Division. Staff inspects all trees and evaluates requested removals on a case-by-case basis. There are circumstances where a request for removal of a tree will be approved. However, if a tree is mature and in good health, that tree will be preserved to provide benefits to the community for as long as possible. Trees are not permitted to be removed due to leaf debris, nuisance fruit, tree root interference in aged clay sewage pipes, or blocked views.



### Wood Chips and Wood Reuse

Wood chips from pruned or removed trees are utilized in landscape beds throughout the City, at public buildings, and parks. Some chips are diverted to a landfill, particularly if woodchips include Acacia species, which can be invasive.

To divert biomass from the landfill, the City has utilized the wood from trees that are removed to construct benches, raised flower beds, and signs in parks. Staff plans to expand tree reuse opportunities by using an Alaskan mill to create lumber to build new items (benches, etc.).



### Stump Grinding

Following a tree removal, tree crews are scheduled to remove stumps with two stump grinders: a large tow-behind stump grinder and a smaller walk-along stump grinder.

“

*If a coast redwood (Sequoia sempervirens) were planted today in South San Francisco, over 20 years it will have sequestered 1,907 lbs pf carbon.”*

I-TREE PLANTING

## What do we have? \_\_\_\_\_



### **TREE PLANTING**

Historically, the City has planted an average of 20 to 30 trees annually. Species selection and planting location have not always been considered when planting new trees. For instance, many streets have overhead utilities in the right-of-way over sidewalks and parking strips. Due to federal and state regulations, utilities must maintain clearance around high-voltage power lines. As a result, medium and large-stature trees that were planted below power lines are often heavily pruned and poorly structured. In many cases, these trees are eventually removed. Current policies focus on planting the right tree species in the right place to avoid problems in the future. Staff is also focusing on ways to improve species diversity.

In 2018, more than 400 trees were planted (this is more than was planted in the last ten years). Parks staff provides recommendations to residents on selecting trees species. Additionally, residents may purchase trees at wholesale prices through the City's vendors.

When streets are narrow or parcel space is limited, trees often compete with hardscape and the demand for parking space. Municipal Code (Title 20 Zoning) specifies that maximum lot coverage by impervious surfaces shall not exceed 40% of the gross land area. However, enforcement of this requirement has been relaxed and in many neighborhoods planting sites for street trees have been paved over in favor of parking. In an effort to increase the number of street trees, Parks staff have begun reclaiming tree wells and removing concrete where appropriate and where American Disabilities Act (ADA) compliance allows.

### **Memorial Tree Planting Program**

While currently on hold due to an extended period of drought, the Memorial Tree Program (established in 1982) provided residents with an opportunity to purchase a tree for the City in honor or in memory of loved ones. Plaques for the trees that were planted are displayed at the Municipal Services Building. In the past, the program was popular, having provided approximately 350 trees. The Memorial Tree Program was paused due to the drought, but Staff are looking to re-institute the program.

### Circle 3.0

Through grant funding provided by California's Initiative to Reduce Carbon and Limit Emissions, Circle 3.0 provided 200 15-gallon trees to Paradise Valley and Peck's Lot Neighborhoods. This grant also provided another 200 5-gallon trees elsewhere in the City for the 2019 Arbor Day Celebration.

### Tree Irrigation

Currently, two full-time staff members use a water truck to irrigate newly planted trees to aid in their establishment. Despite recent relief from a few relatively wet winters, California is still considerably dry and water is becoming more expensive. Additionally, the water truck used for irrigation requires the driver to hold a Class B driver's license. This requires a full-time staff member to drive the truck, which increases the cost to irrigate trees. Approximately 500 trees are irrigated manually each week during dry months.

### Treegrator®

Treegrator bags are slow release watering systems for newly planted trees. Easily installed and with no required tools, these green bags are placed at the base of newly planted trees and are refilled with water on a weekly basis. The bags slowly drip 15 gallons of water into the soil, allowing the water to percolate deeper into the soil profile. The City currently has 30-40 Treegrator bags on-hand, with another 200 currently in use in the field. The use of Treegrator bags have improved tree establishment and reduced mortality rates for newly planted trees.

### Water Cistern

To reduce irrigation costs, there is a proposal to install a cistern under an existing ballfield in Orange Memorial Park. This project has the potential to provide an inexpensive water source for Parks staff to water trees.



## What do we have? . ———

### TREE PROTECTION AND PRESERVATION

Tree removals are not uncommon in South San Francisco. Be that as it may, Parks staff strive to protect and preserve trees whenever possible. Through collaboration with other City Departments, Parks staff provide solutions to any tree-related conflicts with existing or future infrastructure.

Parks staff are responsible for reviewing applications for tree permits. A permit is required to prune or remove any tree protected by the Tree Preservation Ordinance. However, not everyone is aware (or compliant) with the requirement to obtain a tree permit and trees are often illegally pruned or removed.

For Capital Improvement Projects (CIP), Parks staff promote alternative solutions to the removal of healthy and well-established trees within project boundaries. Engineering uses a construction management software called e-Builder for real-time collaboration on active CIPs. When included, Parks staff have an opportunity to review designs and the ability to recommend design changes to protect such trees. If a tree is recommended by Parks staff for preservation, Tree Protection Zones (TPZ) can be added directly into the design specifications. As part of this process, Parks staff setup TPZ on CIP construction sites and regularly inspect compliance with the TPZ. For more information on Tree Protection Zones see Appendix F.

When residents submit building permits, the Planning Division is responsible for the review and approval of applications. The Division uses a work-flow software, Track-it!, which provides an opportunity for other Departments to comment during plan review. Ideally, the Parks Department should review design plans for tree placement, species selection, and options for the retention of existing trees. However, while Parks Staff currently provide final inspection of newly installed trees and can request revisions prior to final sign-off, existing work-flow practices often do not allow for enough time or notice to illicit and implement comment from the Parks Department prior to plan approval. Going forward, Parks sees value in greater participation in plan review through the use of Track-it!.

Parks staff are frequently called upon from Public Works to inspect tree and hardscape conflicts. Trees roots can lift sidewalks and create a need for sidewalk repairs. In some cases, trees that are causing problems with sidewalks are in poor condition and are removed. In other circumstances, Parks staff coordinates with Public Works Staff to make sidewalk repairs and avoid tree removal through root pruning.

Similarly, to tree and sidewalk conflicts, Parks staff frequently respond to concerns about tree roots and sewage lines. Residents with old, cracked, clay sewer pipes often experience issues with tree roots exploiting existing cracks in sewer lines to get water. This occurrence can result in sewage back-ups into homes. While the tree roots can exacerbate the problem, in all cases trees are taking advantage of already corrupted lines, which need to be replaced. In such instances, Parks staff will not remove a healthy City tree that has impacted sewage lines. Root pruning will only be performed in instances where tree roots have crushed sewage lines.







## Pest Management

Like any urban forest, South San Francisco has pest problems. With a changing climate, a highly mobile population and proximity to a large port of entry for international trade, South San Francisco has some characteristics that make the community especially vulnerable to potential introduced pests. As such, the Parks Supervisor is required to hold a Qualified Applicator Certificate to appropriately respond to pest problems. Additionally, Parks staff regularly consult a Pest Control Advisor (PCA), who is also an arborist, to get recommendations for pest management strategies.

Although Polyphagous Shot Hole Borer is not currently a problem in South San Francisco, research suggests that there is potential for the pest to spread to northern California. As a result of a wide host-range, many species of trees in South San Francisco are vulnerable to this invasive pest (Mitchell, 2019). Similarly, citrus greening (*Candidatus liberibacter asiaticus*), a bacterial disease that causes bitter, hard fruit production, is among the most concerning pest as it threatens the viability of California's citrus crop. While citrus species represent less than 1% of the public tree population, many residences in South San Francisco grow citrus trees. Due to quarantines in place to protect California's citrus crop, infected trees must be destroyed and disposed of appropriately (Grafton-Cardwell et al, 2019). The result of either Polyphagous Shot Hole Borer or citrus greening would be significant losses to canopy on both public and private property.

At this time, there are no major active threats to South San Francisco's urban forest. Existing pests that require management to control include:

## Pocket Gophers

As of late, South San Francisco has been contending with pocket gophers (*Thomomys bottae*) gnawing on tree roots which damages and kills trees. Gophers have extensive burrow systems that are characterized by crescent or horseshoe shaped mounds that can cover an area that is 200 to 2,000 square feet (Salmon, 2009). Parks staff have primarily managed this pest through trapping. Staff recently incorporated an integrated pest management (IPM) strategy including carbon monoxide fumigation and natural enemies, utilizing owls to reduce the pocket gopher population. Parks staff have assembled "owl houses" in Orange Memorial Park and in other parts of the City to encourage nesting of owls within the City.

## Pine Bark Beetles

With recent periods of drought, Monterey pines (*Pinus radiata*) and other pine species in South San Francisco have been susceptible to native bark beetle species. Generally, native bark beetles attack only the most stressed pines; however, with higher population densities, they can attack and kill healthier trees (Swain, 2015). With continued dry conditions, these beetles have the potential to be even more destructive. There are few treatments for bark beetle infestations. Preventative maintenance practices are the best tools for combating these pests, including: removing trees as infestations are detected, pruning trees in the colder winter months when the insects are less active, and irrigating trees (Swain, 2015). Insecticides are available for highly valued, uninfected host trees, but Parks staff have not used this method (Seybold, 2011).

Many of the pines in South San Francisco are also susceptible to pitch canker, caused by the fungus *Fusarium circinatum*.



## Myoporum Thrips

Myoporum thrips (*Klambothrips myopori*) is an invasive species from New Zealand that has been a problem for *Myoporum* plants in South San Francisco (Bethke and Bates, 2013). Thrips feeding damage stunts, curls, and discolors leaves. Additionally, the new branch growth becomes distorted, typically folding downward. When thrips are persistent, death can occur even in well-established plants (Bethke and Bates, 2013). Parks staff have managed the pest primarily by avoiding planting *Myoporum* species and by pruning infested terminal shoots and removing and disposing of infected shoots.

## Sudden Oak Death

Sudden oak death (*Phytophthora ramorum*) is a plant pathogen that infects susceptible trees, such as coast live oak (*Quercus agrifolia*). While this pest is not currently a problem in South San Francisco, the presence of fog makes host species more susceptible to this pathogen as the moisture assists in the spread of the infection (Parke and Lucas, 2008).

## What do we have? . ———

### COMMUNITY ENGAGEMENT AND OUTREACH

Community engagement opportunities are available during the annual Arbor Day celebration. At the events, Parks staff actively work with volunteers to plant trees properly and distribute educational information on trees.

Important tree information can be accessed through the Parks Division Tree webpage. The site advertises tree planting events and other community engagement activities. Information on the Tree Preservation Ordinance is summarized on the webpage for ease of access. Links are also available with information on tree permit applications and definitions for pruning and trimming as defined by Title 13 of Municipal Code. The webpage also includes information to help guide residents about species of trees that are recommended for the local environment.

Parks staff periodically update the webpage to include links to external education materials, including information about species selection, proper tree care, benefits of trees, and homeowner tree care accidents. In addition to the Parks Division webpage, Parks staff promote and share volunteer opportunities and other tree care information through social media, emails, and newsletters.

### Sign Hill

Sign Hill, a historic sign and prominent landmark in South San Francisco, can be seen from most parts of the City and is important to community members. The sign is a nod to the history of industry in the community. Today, the hillside is a 66 acre open space, and a popular hiking destination with panoramic views of the San Francisco Bay and Peninsula.

Although naturally the hill would have few trees and be dominated mostly by grasses, community members have planted an assortment of trees over the years on the hill, including citrus trees and an avocado tree. However, eucalyptus, cypress, pines, and acacia species dominate much of the hill side and are known to be particularly flammable.





With many introduced species, there are concerns about the impact on native grass species. To protect the habitat, the U.S. Fish and Wildlife Service ordered tree planting to cease on the hill.

Several neighborhoods border Sign Hill, which is concerning for Wildfire Urban Interface (WUI), the area where houses meet or intermingle with undeveloped wildland vegetation (Radeloff et al, 2005). With recent California fires, creating a defensible space around structures has been heavily discussed in communities that are near forested areas. There are active efforts to reduce ladder fuels, fuel that can carry a fire burning in low-growing vegetation to taller vegetation, in Sign Hill areas that are adjacent to homes (Menning and Stephens, 2007).

Tree maintenance on hills is challenging to manage, as steep grades make moving tree removal equipment into project areas both difficult and expensive. To address some vegetation management in these areas, Parks has purchased a slope mower (a “Green Climber”) which can operate remotely and can better handle the open space’s steep slopes. While the green climber can assist with reducing some of the ladder fuels, larger dead trees will still need to be removed according to standard forestry maintenance practices.

In an effort to be proactive City Staff contracted with Davey Resource Group Vegetation Management Services to formulate a Cooperative Forest Management Plan to address the specific management needs for the area.

Parks staff identified management priorities and objectives for Sign Hill and Davey Resource Group identified corresponding management strategies to achieve Parks staff desired results. The primary objective for Sign Hill is to create defensible space around structures, such as the homes adjacent to the open space. As funding comes available, another objective is to reduce the fuel load. In the event of a fire, this strategy would allow for low-intensity fire that may be more easily managed to benefit the overall health of the forest and reduce risk to infrastructure. Along with creating defensible spaces around structures, Parks staff identified the creation of sheltered fuel breaks along roads and near trending ridgelines throughout the open space as an objective. Other secondary objectives are to create a healthier forest to improve and maintain watershed protection and recreational opportunities for the community, reduce susceptibility

to bark beetles and other pests and diseases, and promote diverse habitat to promote wider wildlife diversity and browse material for deer and other species.

To achieve management objectives, some important management measures should be implemented. Management Measures include 1) restore to a healthier and fire resilient state through fuel reduction, 2) remove competing vegetation to increase vertical and horizontal spacing, and 3) remove dead or dying trees and selectively thin forested areas.

Specific strategies to employ to reduce fuels include 1) not removing healthy trees greater than 12-inches diameter, 2) removing dead or dying trees of any size class, 3) 50-70% of brush and slash shall be masticated or removed and chipped (achieve residual tree density of 50 to 100 trees per acre (20-foot spacing)), 4) dead surface fuel depth shall be less than three inches, 5) retaining standing dead trees for wildlife habitat and 6) retaining dominant and co-dominant trees except where removal of co-dominant trees is needed to improve forest health and fire safety and as determined by an RPF.

Some considerations for vegetation management include:

- Avoid ground-based equipment on slopes over 40% or on unstable ground. If such conditions exist material should be removed by hand and removed to areas with slopes less than 40%
- Avoid use of equipment under saturated soil conditions
- Use mulch to provide effective erosion control
- Install erosion control structures along roadsides
- Reduce fuels by removing small diameter trees and brush to create vertical and horizontal separation between the ground and lowest branches
- Improve wildlife habitat through fuel reduction
- Improve access to remote areas to improve overall aesthetics and recreation opportunities

# What do we have? . ———

## FUNDING

Stable and predictable funding is critical to effective and efficient management of the urban forest. Trees are living organisms, constantly growing and changing over time and in response to their environment. There are a number of factors that affect tree health and structure, including nutrition, available water, pests, disease, wind, and humidity. While it might seem like most changes to trees take a long time to occur, some specific maintenance is critical at certain stages of life. For instance, young trees benefit greatly from early structural pruning and training. Minor corrections that are simple can be applied with low costs when a tree is young. However, if left unattended they can evolve into very expensive structural issues and increase liability as trees mature (at which point it may be impossible to correct the issue without causing greater harm). Over-mature trees often require more frequent inspection and removal of dead or dying limbs to reduce the risk of unexpected failure. A stable budget allows urban forest managers to program the necessary tree care at the appropriate life stage when it is most beneficial and cost effective.

### Summary of Annual Funding

The total 2018-2019 municipal budget for South San Francisco is approximately \$105 million. The Parks and Recreation Department has a budget of over \$16 million (of which approximately \$462,134 is the annual budget for the tree crew).

### Park Impact Fee

Developers are required to provide three acres of park space per 1,000 people. However, there is no current requirement to provide trees.

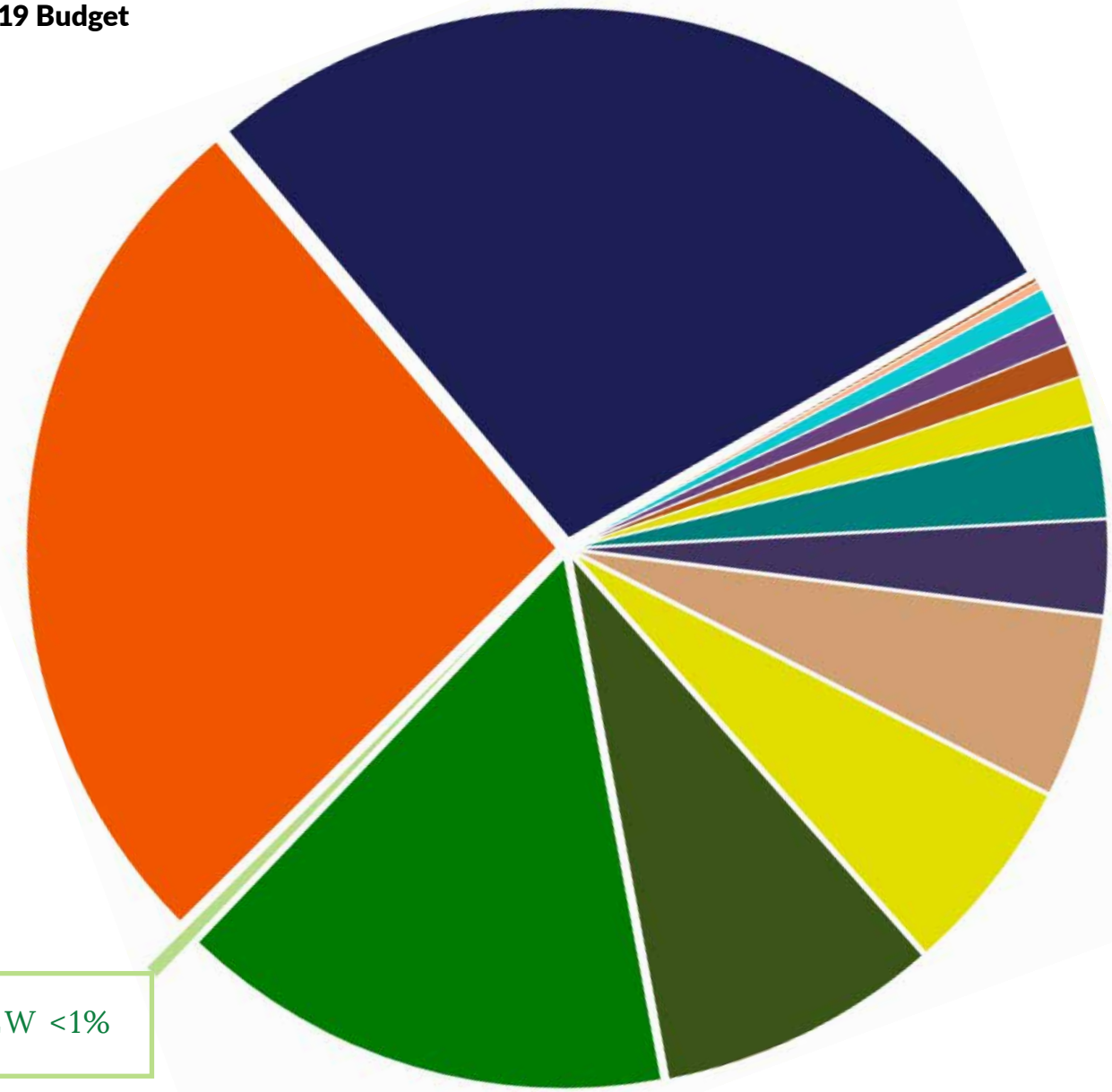
### Tree Permit Fees

Tree permit application fees are \$100. This money is set aside for tree plantings. In addition to the application fee, unreturned \$350 tree replanting deposits are also allocated towards tree plantings. Tree removal permit fees are refunded when tree replanting requirements are met.

**Figure 2: South San Francisco 2018-2019 Budget**

- Police Department 28%
- Fire Department 26%
- Parks & Recreation Department 16%
- Economic & Community Development 10%
- Public Works Department 6%
- Library Department 6%
- Finance Department 3%
- City Manager 3%
- Human Resources 1%
- Non-departmental 1%
- City Attorney 1%
- City Clerk 1%
- City Council <1%
- City Treasurer <1%
- Tree Crew <1%

TREE CREW <1%





## **INTERDEPARTMENTAL COORDINATION**

All City departments can confirm with Parks staff if a tree is a city-owned tree, through the tree inventory database. This allows staff to identify which trees are City-owned. However, communication between departments is inconsistent and Parks staff have not always been included in construction and design discussions that involve trees or could potentially incorporate trees. This disconnect reduces the ability for Parks staff to provide effective input on issues that could affect the urban forest.

Forestry operations could further benefit from increased access to heavy and specialty equipment. As a result of budget's being specific to each City department, heavy equipment is most often assigned to a specific department. Interdepartmental collaboration and the establishment of equipment sharing protocols has the potential to increase Park's ability to perform tree care operations more cost-effectively and efficiently.

## **Planning**

The Planning Division is responsible for approving and inspecting development projects in the public right-of-way. The Division recommends trees for inclusion in plans as much as possible. Following project completion, Planning provides a post-construction inspection for compliance with design plans. If the requirements are met, the Planning Division will provide a "final sign-off" on the project. The inspection includes reviewing the location of trees that have been installed; however, it does not include a review of irrigation installation (and programming) or other landscape materials.

## **Public Works**

The Public Works Department is responsible for maintaining and repairing sidewalks. Heaving sidewalks are common throughout the City, creating concerns for ADA compliance. In many instances, lifting sidewalks are a result of inappropriate tree species selection and tree wells that do not have adequate soil volume to support root growth. Public Works contacts Parks staff for repairs for sidewalks, sewers, and lighting that involve any cutting or removal of tree roots, branches, or entire trees.

## **Engineering**

The Engineering Staff are responsible for maintaining the public infrastructure within the public right-of-way and for the oversight for Capital Improvement Projects (CIP). Engineering Staff work with Parks staff to address clearance for streets, sidewalks, lights and signage; visibility for pedestrians on walkways and around bulb outs; compliance with the ADA; and request input from Parks staff on CIP during joint coordination meetings. Prior to planting trees along streets and in center medians, Parks staff work with Engineering Staff to avoid line-of-sight issues, conflicts with lights and signage, and ADA compliance.

## **Code Enforcement**

Code Enforcement is responsible for investigating concerns regarding compliance with the Municipal Code. Currently Code Enforcement is within the Department of Public Works. The most common complaints received about trees are overgrown trees and illegal removals of trees designated as protected under the Tree Preservation Ordinance, heaving sidewalks, fire concerns, and property boundary disputes. Code Enforcement generally responds to complaints within a range of 24-hours to 14 days.

# What do we have? . ———

## COMMUNITY PARTNERSHIPS

### Design Review Board (DRB)

Every project that is new or breaking the roofline of a structure and adds 50% or more to existing structure must go through the Design Review Board (DRB). The DRB includes two landscape architect appointees who review landscape plans. For the DRB to recommend project compliance, the project must meet development standards. The DRB reviews and recommends species of trees and the location of trees included in a project.

### Technical Advisory Group (TAG)

The Technical Advisory Group (TAG) is an internal group that meets once a month to review applications. Representatives from each department provide input on design plans. Parks staff have an opportunity to help review tree species selection and placement.

### Parks and Recreation Commission

The Parks and Recreation Commission consists of South San Francisco residents who are appointed by the City Council. Members serve as advocates for parks and recreation needs of the community, oversee programs and facilities, provide direction to staff, and serve as the appeal body for the City's Tree Ordinance.

### Improving Public Places Group

In partnership with the Parks and Recreation Department, the Improving Public Places Group hosts several cleanup days as well as flower and tree planting events throughout the year. The Improving Public Places group was founded by current City Council Member, Karyl Matsumoto. This group assists with planting, maintaining, cleaning litter, minor trimming, weeding, spreading mulch, and coordinating special event projects.

### South San Francisco Unified School District

South San Francisco Parks and Recreation Department has a joint use agreement with South San Francisco Unified School District. The agreement outlines maintenance activities for portions of school property that provide benefit to the greater community (e.g., ballfields).

Historically, the School District has not observed the Tree Preservation Ordinance even though local schools have removed high numbers of trees without replacing them. With a significant amount of acreage, trees on school property have the potential to provide benefits to more than just the children who attend those schools.

### Pacific Gas & Electric (PG&E)

In California, all utility providers are subject to General Order 95; Rule 35 Vegetation Management (California Public Utilities Commission, revised 2012) and FAC-003-2 Transmission Vegetation Management (NERC) which outline requirements for vegetation management in utility easements. These requirements include clearance tolerances for trees and other vegetation growing in proximity to overhead utilities.

Trees located under utility lines should be directionally pruned by trained, authorized line clearance personnel only to provide clearance and/or reduce height. Selecting small-stature tree species that are utility friendly for planting sites in utility right-of-way can minimize the need for these maintenance activities.

PG&E shares responsibility with tree crews in pruning trees around secondary lines. In past projects, PG&E removed trees above gas lines and provided funding to mitigate (plant) trees in other areas.

### Bay Area Air Quality Management District

In 1955, the California Legislature created the Air District as the first regional air pollution control agency in the country. The [Bay Area Air Quality Management District](#) has a 24-member Board of Directors composed of locally elected officials from each of the nine Bay Area counties who oversee policies and adopt regulations for the control of air pollution within the district.

### Bay Area Open Space Council

The [Bay Area Open Space Council](#) is a regional network of 75 nonprofits, public agencies, businesses, and individuals that work to maintain thousands of miles of trails and steward over one million acres of publicly accessible parks. Cities in the Bay Area that are members include San Francisco, American Canyon, San Jose, San Ramon, and Walnut Creek. The Council also engages in advocacy for regional conservation funding.

### California Public Health Advocates

California [Public Health Advocates](#) promote health and work to eliminate health disparities by transforming neighborhoods into places that nurture well-being through education, research, and policy recommendations.

### Change Lab Solutions

[Change Lab Solutions](#) is a public health advocacy group that works to increase the interaction between public health officials, cities, and regional planning officials through education and the facilitation of roundtable discussions.

# What do we have? . \_\_\_\_\_

## DEVELOPMENT

Development brings new real estate and economic opportunities for communities. However, development sometimes comes at a cost to trees, either through removals or reduced space for potential future plantings.

Like much of California, South San Francisco has experienced significant development, particularly with a growing number of biotechnology companies. Developers, through conditions of approval and developer agreements are responsible for landscaped areas with trees. For example, developers provide landscaping and trees for center medians and areas adjacent to city streets.

Developer agreements are often unclear about the responsibility of the care of trees planted by developers in the public right-of-way, as well as species selection.

Developers may not be aware of the important role they have in the expansion and preservation of the urban forest, benefiting the community outside of the footprint of the development project.

Some potential opportunities for developers to help with the urban forest include payment of impact fees as part of developer agreements and providing volunteers and supplies for tree plantings. Additionally, another opportunity for developers would be for them to participate in a “adopt a park or street median” programs.

## POLICIES AND REGULATION

City policies and regulations provide the foundation for the urban forestry program. They outline requirements and specifications for the planting, installation, and care of South San Francisco’s public trees and provide the regulatory framework for the protection and preservation of the urban forest assets as well as the enforcement of activities and issues that impact the community's trees.

The development of South San Francisco's Urban Forest Master Plan included a comprehensive review of City policies, development and construction standards, ordinances and other regulations that apply to the urban forest. The following provides a summary of the review process and key findings.

### FEDERAL AND STATE LAW

#### Endangered Species Act

Signed in 1973, the Endangered Species Act provides for the conservation of species that are endangered or threatened throughout all or within a significant portion of their range, as well as the conservation of the ecosystems on which they depend. The listing of a species as endangered makes it illegal to "take" (i.e., harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to do these things) that species. Similar prohibitions usually extend to threatened species.

#### Migratory Bird Treaty Act (MBTA)

Passed by Congress in 1918, this Act defines that it is unlawful to pursue, hunt, take, capture, kill, possess, sell, purchase, barter, import, export, or transport any migratory bird, or any part, nest, or egg or any such bird, unless authorized under a permit issued by the Secretary of the Interior.

The Migratory Bird Treaty Act can impact forestry operations during times when birds are nesting, which may delay work in order to avoid violating the MBTA.

## California Urban Forestry Act

Section 4799.06-4799.12 of the California Public Resources Code defines a chapter known as the California Urban Forestry Act. The Act defines trees as a “vital resource in the urban environment and as an important psychological link with nature for the urban dweller.” The Act also enumerates the many environmental, energy, economic, and health benefits that urban forests provide to communities.

The purpose of the Act is to promote urban forest resources and minimize the decline of urban forests in the state of California. To this end, the Act facilitates the creation of permanent jobs related to urban forestry, encourages the coordination of state and local agencies, reduces or eliminates tree loss, and prevents the introduction and spread of pests. The Act grants the authority to create agencies and mandates that urban forestry departments shall provide technical assistance to urban areas across many disciplines (while also recommending numerous funding tools to achieve these goals).

### Model Water Efficient Landscape Ordinance (MWELO)

To promote the conservation and efficient use of water and to prevent the waste of water, a Model Water Efficient Landscape Ordinance (MWELO) was adopted in 2009 and later revised in 2015. The Ordinance requires increases in water efficiency standards for new and retrofitted landscapes through the use of more efficient irrigation systems, greywater usage, and onsite stormwater capture. It also limits the portion of landscapes that can be covered in turf.

# What do we have? . ———

## California Solar Shade Control Act

Passed in 1978, California's Solar Shade Control Act supported alternative energy devices, such as solar collectors, and required specific and limited controls on trees and shrubs. Revised in 2009, the Act restricted the placement of trees or shrubs that cast a shadow greater than ten percent of an adjacent existing solar collector's absorption area upon the solar collector surface at any one time between the hours of 10am and 2pm.

The Act exempts trees or shrubs that were:

- Planted prior to the installation of a solar collector
- Trees or shrubs on land dedicated to commercial agricultural crops
- Replacement trees or shrubs that were planted prior to the installation of a solar collector and subsequently died or were removed (for the protection of public health, safety, and the environment) after the installation of a solar collector
- Trees or shrubs subject to City and county ordinance

## Public Park Preservation Act

The Public Park Preservation Act of 1971 ensures that any public parkland converted to non-recreational uses is replaced to serve the same community.

## SOUTH SAN FRANCISCO MUNICIPAL CODE

South San Francisco Municipal Code has eight titles that provide considerations for trees, including: Title 6, Title 8, Title 10, Title 13, Title 14, Title 15, Title 19, and Title 20.

### Title 6: Business Regulations

Provides restrictions for the placement of news racks near trees.

### Title 8: Health and Welfare

Prohibits dead, decayed, diseased or hazardous trees on private property that create an unsightly appearance or are dangerous to public safety and welfare or detrimental to neighboring property or property values.

### Title 10: Public Peace, Morals and Safety

Prohibits the removal and vandalism of trees on park property and restricts the parking of bicycles against trees.

### Title 13: Public Improvements

Defines protected trees and provides definitions for "pruning" and "trimming." The Title restricts the abuse or mutilation of protected trees. Title 13 defines the responsibility of property owners to care for protected trees and authorizes the removal, pruning, or trimming of protected trees in emergencies. The Title authorizes the director or designee to make decisions on protected trees and requires the replacement of protected trees, including issuing fines for violations.

The Title sets requirements for the planting and maintenance of trees for new developments and for property that is already developed. Title 13 establishes an appeal process and authorizes the use of penalties for violations.

### Title 14: Water and Sewage

Authorizes enforcement officials to require the removal of dead trees to prevent pollutants from entering the City storm sewer system. The Title also requires the use of design strategies on-site to conserve natural areas, including existing trees.



### Title 15: Building and Construction

Provides a definition for trees.

### Title 19: Subdivisions

Provides a minimum number of trees per plot and spacing specification required by the street tree ordinance of the City. Requires the replacement of street trees for public improvement projects as a condition of the approval and acceptance of a project.

### Title 20: Zoning

Title 20 establishes lot and development standards, including the use of trees in the landscape and limits the coverage of a lot by impervious surfaces. Landscape plans are required to accurately show existing trees and specify soil depth to achieve reasonable success of trees with a paved environment and the use of trees in tree screens in downtown and residential districts.

The Title requires the practical preservation of existing trees. It also provides some standard for the protection of trees from construction vehicles and equipment and excavated soils under the canopy of any trees on a site which are to be preserved. Title 20 provides guidelines for pruning (for clearance and visibility of street trees) and prohibits the use of signs in the public right-of-way that harm street trees.



# What do we have? . \_\_\_\_\_

## CITY OF SOUTH SAN FRANCISCO GENERAL PLAN

The South San Francisco General Plan is a document adopted by the City Council that provides the following:

- A vision for South San Francisco's long-range physical and economic development.
- Strategies and specific implementing actions that will allow this vision to be accomplished.
- A basis for judging whether specific development proposals and public projects are in harmony with Plan policies and standards.
- Authorization for City departments, other public agencies, and private developers to design projects that will enhance the character of the community, preserve and enhance critical environmental resources, and minimize hazards.
- The basis for establishing and setting priorities for detailed plans and implementing programs, such as the Zoning Code, the Capital Improvements Program, facilities plans, and redevelopment and specific plans.

**Chapter 3.1 Downtown** recommends using emphatic street trees to help link the downtown area with the BART station.

**Chapter 4.3 Alternative Transportation Systems and Parking** suggests the use of street trees as part of frontage improvements for new development and redevelopment projects.

**Chapter 7.1 Habitat and Biological Resources Conservation** identifies threats to historic vegetation, including oak woodlands and significant stands of trees in South San Francisco, and provides guidelines for the conservation of these natural resources.

**Chapter 8.4 Fire Hazards** specifically identifies strategies to mitigate fire hazards through tree maintenance.

## City of South San Francisco Climate Action Plan

Chapter 5 of the City of South San Francisco Climate Action Plan defines and lists non-native species and shade trees with high water usage as favorable for reducing the impact of climate change, but unfavorable for adapting to climate change.

## California Environmental Quality Act (CEQA)

CEQA requires state and local agencies to identify the significant environmental impacts of proposed projects that meet specific criteria and actions to avoid or mitigate those impacts where feasible.

## TREE CARE ON PRIVATE PROPERTY

Private property owners can hire contractors to prune private trees. However, some tree care companies are not professionally licensed or may not be knowledgeable about tree physiology and best management practices (BMPs) for tree care (such as the consequences of topping trees). While superficially the topping of trees may be objectionable because of the aesthetic, the bigger concern with the practice is that it makes individual trees more vulnerable to pests and disease. In some cases, private trees that are infested with pests or pathogens pose a threat to the urban forest, including public trees. Trees that are topped can also become structurally unsafe when their crowns grow back.

In addition to concerns about the maintenance of trees on private property, there are concerns about the decreased availability of planting space on private property as a result of property owners hardscaping their lots. While Title 20 of the Municipal Code restricts the percentage of impervious surface on private lots, violations are evident across the community.

The Tree Preservation Ordinance provides protections for specific species and sizes. However, this ordinance is not enforceable on school property. As a result, trees on school property are frequently removed and never replaced.

## CONCLUSIONS

Considering an existing canopy cover of 8.7% (excluding open water) and a potential canopy cover of 22.6%, South San Francisco has ample room to grow the urban forest. Areas slated for development (residential and commercial) will eventually represent a mixture of land cover that includes both hardscape (impervious surface) and tree canopy. It is important to recognize that impervious surfaces and canopy cover can co-exist in many instances, especially with appropriate design standards. Canopy that extends over hardscape features, including parking lots, streets, and structures can add to the overall amount of canopy cover and reduce the ratio between canopy cover and impervious surfaces. In addition, shade provided by tree canopy can demonstrably extend the lifespan of materials used in the construction of hardscape features (McPherson et al, 2005). Another opportunity for expanding tree canopy cover is through collaboration with the South San Francisco Unified School District. Although many trees have been removed on school properties, there is a potential to plant new, more appropriate, tree species that will benefit students as well as the community.

The City currently has an inventory of nearly 15,000 public trees. The Urban Forest Resource Assessment summarizes the composition of this community resource. The urban tree canopy assessment provides a landcover layer that identifies the location and extent of existing canopy (public and private), establishes a baseline for monitoring overall tree canopy cover throughout the community, and augments the City's GIS database. Tree protection regulations promote the preservation and protection of some large or unique tree species. A well-trained and dedicated Parks staff can provide leadership and expertise to provide stewardship of the urban forest. All these factors listed above provide the foundation and tools necessary to make meaningful and effective management choices about the urban forest and illustrates the investment that South San Francisco has made in this resource. The information provides a basis for developing community goals and urban forest policies and establishes benchmarks for measuring the success of long-term planning objectives over time.

## What do we have? . ———

Stakeholder interviews and a review of operations identified a number of opportunities and challenges facing South San Francisco's urban forestry program over the next couple of decades, including maintaining adequate resources (staffing, funding, and equipment), increasing forest resiliency, climate fluctuations, inventory management, revisions to the Municipal Code, community engagement, and volunteer coordination.

With limited staffing and equipment, the care of public trees is currently reactive. Care is focused on clearance pruning and response to hazardous and emergency situations. Urban trees are a living resource that benefit from timely maintenance to address health and safety needs and encourage strong structure. Proactive inspection and maintenance promotes tree longevity, maximizes benefits, and helps manage risk potential. Best management practices (BMPs) suggest a 5-7-year maintenance cycle for all public trees. Mature, over-mature, and trees in high-use locations (e.g., retail zones, parks, etc.) often require more frequent maintenance to maintain clearance and minimize risk.

The Parks Division ensures that tree care staff follow BMPs and industry standards, including standards for safety and professional training. However, there is currently no documentation for operating procedures or standard policies for training, tailgates, and job-site safety briefings. Developing a policies and procedures manual will provide documentation of standard operating procedures and ensure that policies are clearly outlined for existing and future tree care staff.

Increased interdepartmental coordination for planning and resource sharing will promote greater efficiencies for urban forestry operations. Improving standards for planting sites, including consideration of soil volume, minimum dimensions, and alternative designs, will improve environmental conditions for trees in support of community canopy goals.

The urban forest is a living resource subject to environmental and cultural stressors, including pests, disease, extreme weather and climate change, pollution, and accidental damage. While it is impractical to protect and preserve every tree, actions and strategies that increase overall resilience can ensure that the community continues to receive a stable flow of benefits. Strategies that increase forest resilience include increasing species diversity, planting the right tree in the right location, regular inspection and maintenance, and management of pests and disease.

A complete inventory of public trees and a comprehensive inventory management system are vital components for urban forest management. Ideally, inventory management software should provide a geospatial data interface to track the location, species, condition, size (DBH), and maintenance needs of every public tree. A system that allows managers to track tree history, create work orders, and create grid-based pruning cycles will improve program efficiency and provide information and support for budget requests and scheduling work for tree care.

Requirements and standards for trees can be found in multiple chapters and sections of the Municipal Code and can be difficult to locate and interpret. Where confusion exists, codes should be revised to reduce ambiguity and subjectivity.

**Community support for the urban forest is critical for sustainable programming and the realization of long-term goals.** Engaging community members through workshops, online resources, and volunteer projects builds an educated community that sees value in protecting this resource for future generations. South San Francisco's Arbor Day celebration and other tree planting events are especially important for cultivating a greater sense of ownership and stewardship for the urban forest. Partnering with volunteer and nonprofit groups could help facilitate further community engagement and provide support for education and outreach event campaigns. The urban forest webpage should continue to provide important links and fact sheets that summarize key messages to increase community member's knowledge-base about trees and the urban forest.

For 32 years, South San Francisco has achieved Tree City USA status, reflecting the City's commitment to responsibly care for trees through tree care ordinances, dedicated funding, and annual observances of Arbor Day. Beyond this recognition, Parks staff are motivated to improve the existing urban forestry program and ensure that the urban forest is preserved and protected for future generations. With a changing climate and an increasing risk of introduced pests and disease pathogens, Parks staff are acutely aware of the challenges and potential vulnerabilities that urban trees face. Because the urban forest is a dynamic, growing, and ever-changing resource, it requires sound and proactive management to fully realize its maximum potential.

The urban forest is a public asset that has the potential to increase in value and provide benefits.



# What do we have? . ———



## COMMUNITY MEETING

A community meeting was held on Tuesday, March 26, 2019, from 6:30 pm to 8:00 pm at the City Council Chambers. The meeting was advertised through social media, City emails, City website, and City newsletters. The meeting was attended by 22 community members, four of which were City Staff.

The meeting included a presentation about the community's urban forest and current program status. Following the presentation, attendees participated in a discussion and planning session to identify goals and objectives for the Plan. Attendees were asked to provide their expectations for public tree maintenance and locations for additional tree plantings. Participants were also asked to share their opinions on 1) effective education and outreach, 2) the best opportunities for providing educational materials and outreach activities, 3) the professional licensing requirement for tree care providers within the City, 4) higher penalties for unpermitted removals, and 5) collaboration opportunities.

Community meeting participants overwhelmingly supported a canopy goal of 22.6% (potential canopy cover) and did not support a goal of a no net loss (to maintain the current level of 8.7% canopy cover). Similarly, the majority favored additional plantings along streets and in park strips, followed by additional plantings at schools, but did not support opting for no additional plantings of trees.

Most participants indicated support for a proactive management approach for caring for public trees. This approach would include cyclical maintenance with regular inspection and pruning of public trees. Participants indicated that they would need more information about any changes to the Municipal Code that would require professional licensing for tree care providers operating within the City. Community members did not support higher penalties for illegal removals.

Questions posed to participants about the best methods of outreach and topics for education indicated that community members appreciate multiple methods of outreach and engagement and are interested in a wide range of educational topics. Among the collaborative efforts proposed to participants at the meeting, providing high school credits to improve youth engagement was well supported.

Although participants were not asked directly about the benefits of trees that are valued most by the community, many expressed support for trees for noise abatement capabilities, since some homes are in close proximity to San Francisco International Airport.

## PARKS AND RECREATION COMMISSION MEETING

On November 19, 2019, a Parks and Recreation Commission meeting was held at the City Council Chambers to discuss the Urban Forest Master Plan (UFMP) among other items. Commissioners were given time to review the document beforehand. Parks Staff presented a draft of the Urban Forest Master Plan to the Parks and Recreation Commission, explained the intent, importance, and future impacts the document would have on the community. After the Staff presentation, each Commissioner asked questions, and provided feedback. Their thoughts were incorporated into the UFMP whenever possible.

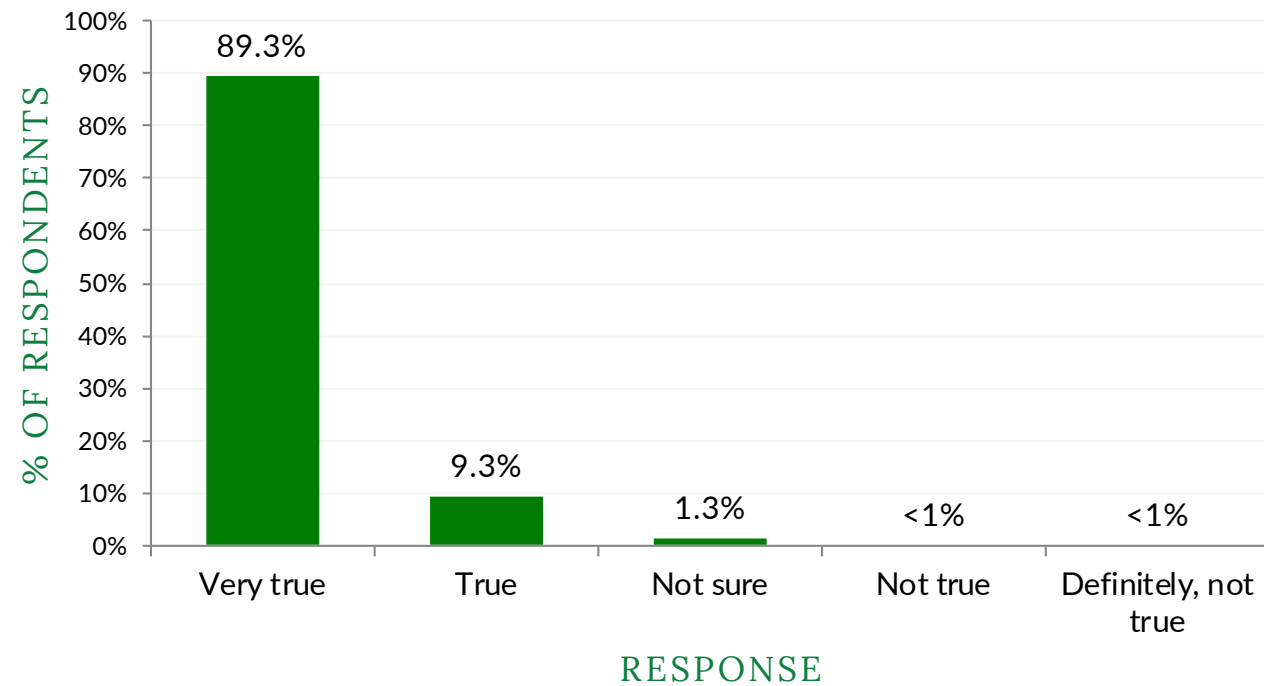
# What do we want? .

## ONLINE SURVEY

An online survey, available from March 26 to May 6, provided additional opportunity for public input into the UFMP development. The survey was available, via a link on the City of South San Francisco’s website, Parks and Recreation Department social media pages, and through City emails. The survey included a series of 18 questions, including questions about views on tree benefits, education and outreach, requiring licensing for tree care professionals, increasing penalties for unpermitted tree removals, and collaboration activities. Seventy-five people responded to the survey during a six-week period. The Buri Buri/Alta Loma and Avalon/Brentwood/Southwood neighborhoods had the most responses. The complete survey and results (including comments received) are presented in Appendix D.

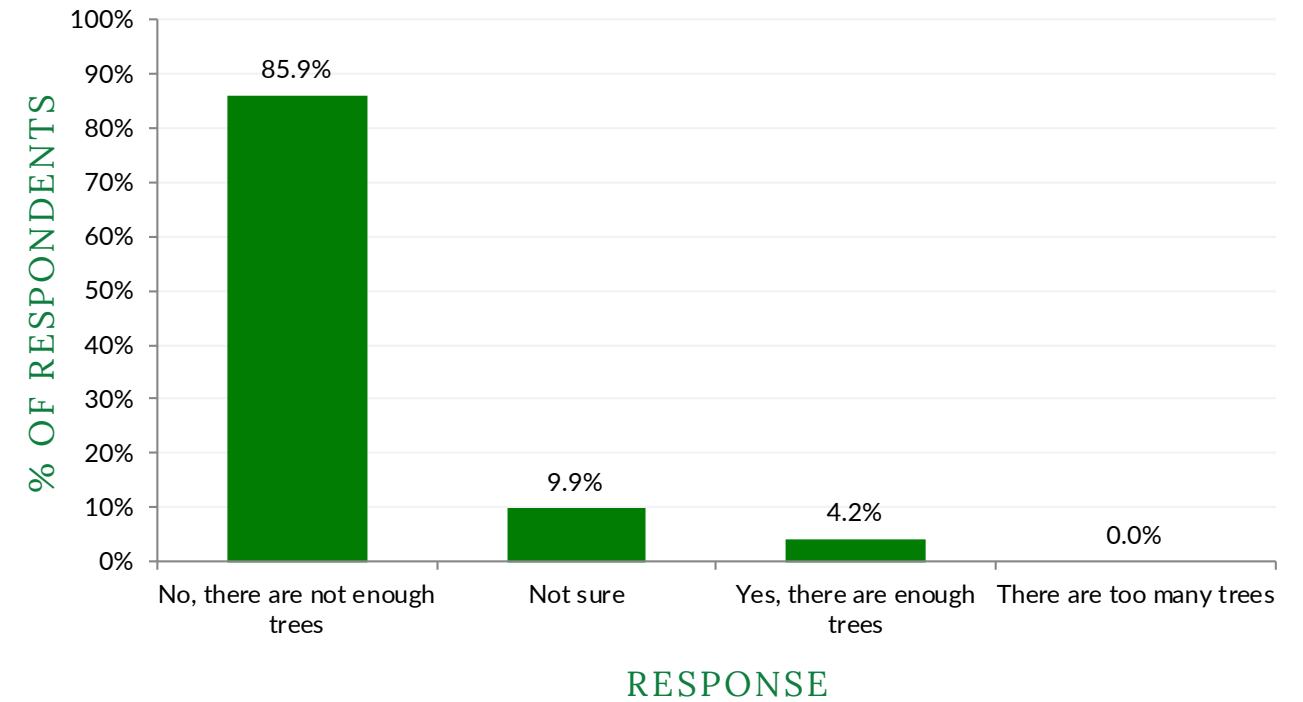
Over 89% of respondents identified “very true” when asked if trees are important to the quality of life in South San Francisco.

**Figure 3: Responses to “Trees are important to the quality of life in South San Francisco”?**



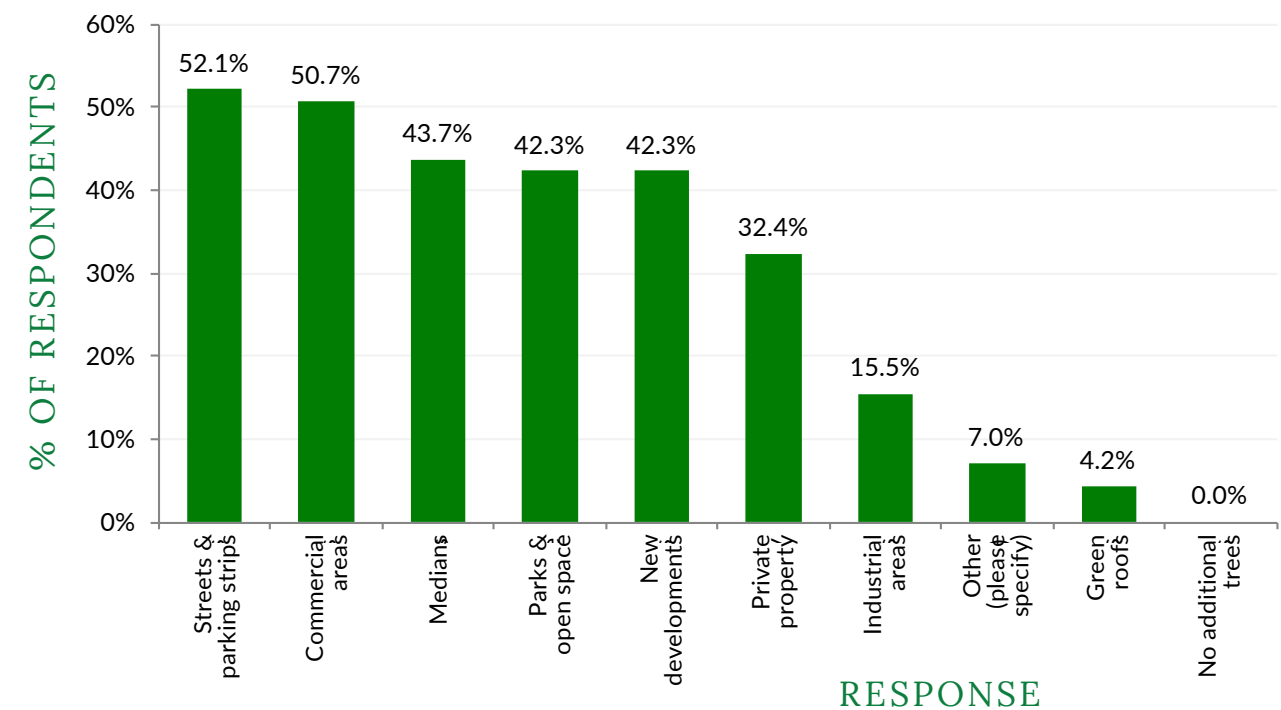
**Figure 4: Responses to “Are there enough trees in South San Francisco”?**

When asked if there are enough trees in South San Francisco:



**Figure 5: Responses to “Where would you like to see more trees planted”?**

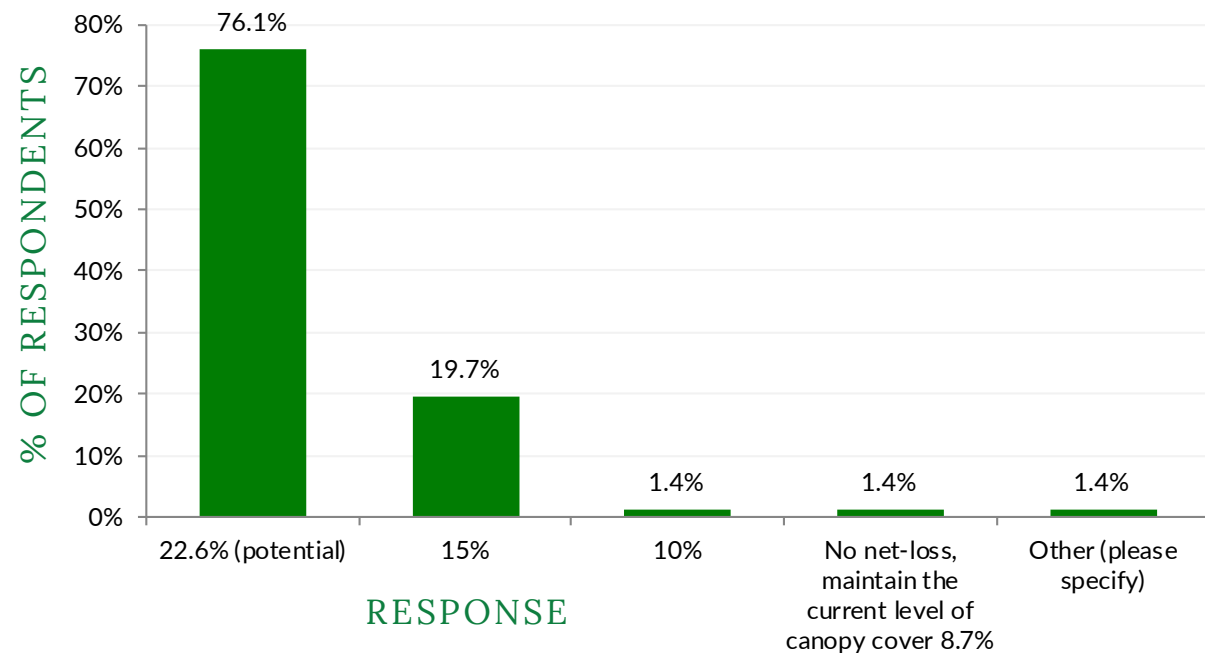
Survey respondents were asked to identify where they would like to see more trees planted:



**Figure 6: Responses to “What Canopy Goal Should South San Francisco Adopt?”**

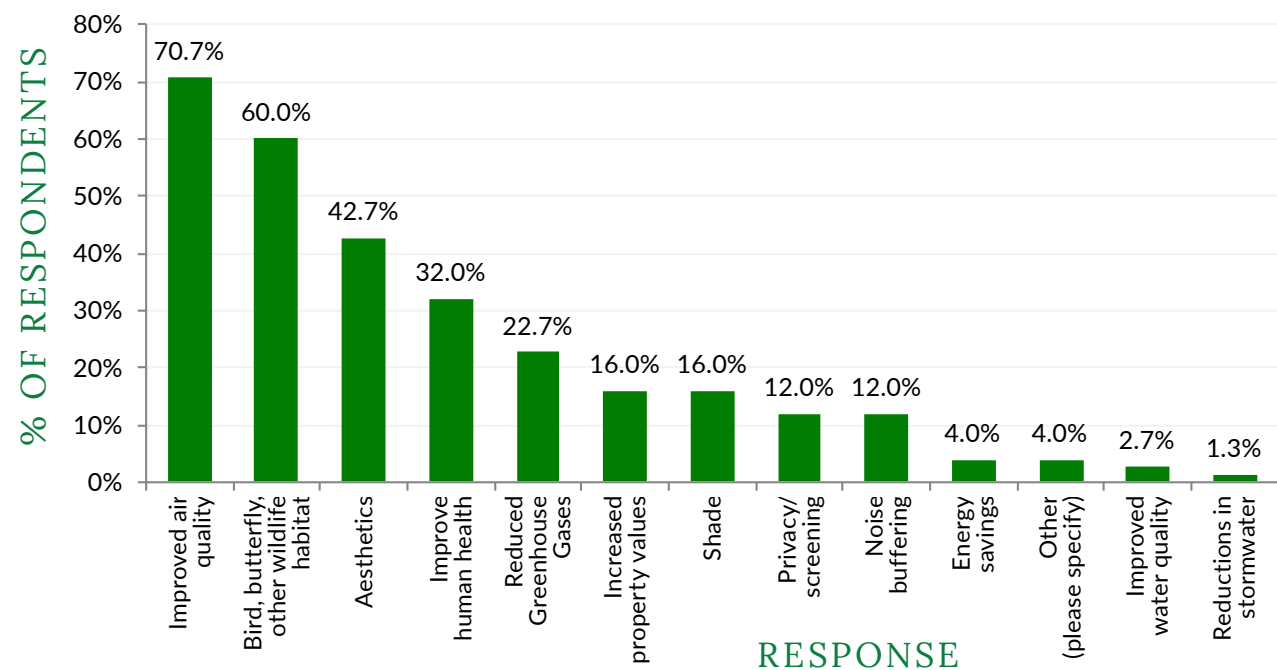
When asked which canopy goal the City of South San Francisco should adopt:

The respondent that selected “other” identified through the comment box “not sure”. The following summarizes common comments provided in the optional comment box for additional comments about canopy cover: 1) suggestions for increased canopy coverage along main thoroughfares and 2) concerns for removal of trees or lack of planting of trees on private property or in new development.



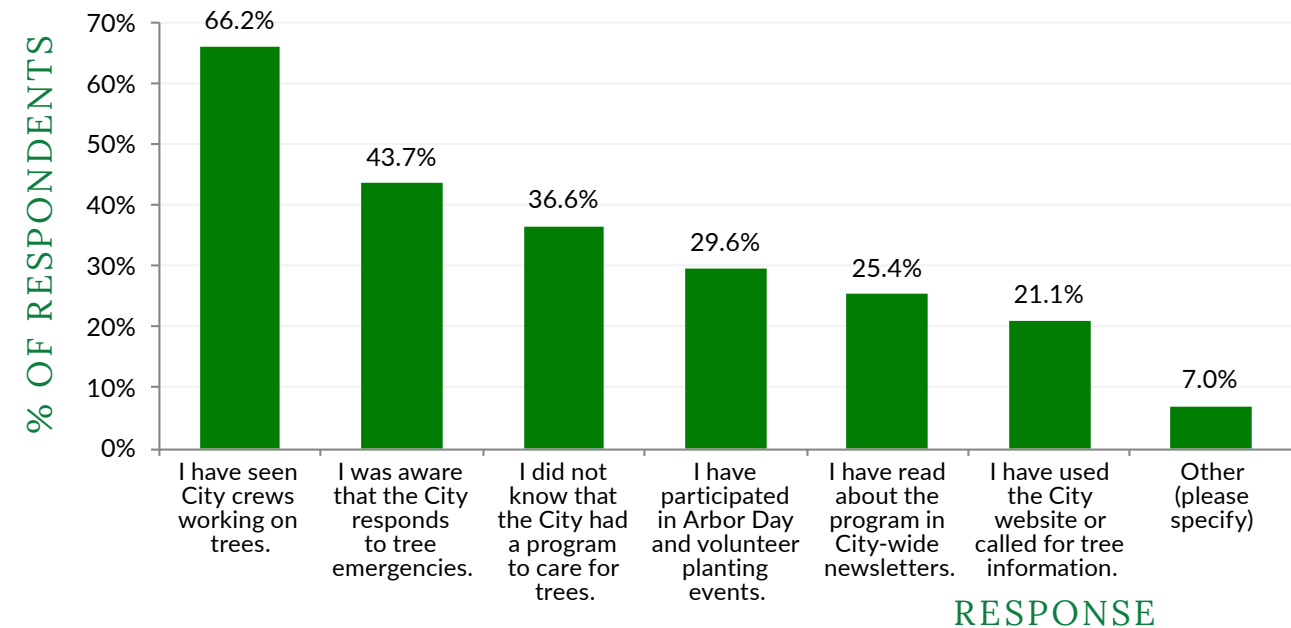
**Figure 7: “Which benefits provided by trees do you value most? Please select the top three benefits”.**

Survey respondents were asked to choose the top three benefits that trees provide that they value most. Respondents that selected “other” identified the following categories: 1) all of the benefits are valued, 2) wind buffers, and 3) as play space for children. A comment box was provided to allow for additional comments on the benefits of trees. Comments primarily echoed the aesthetic benefits of trees but also included the category of trees wind buffering capabilities.



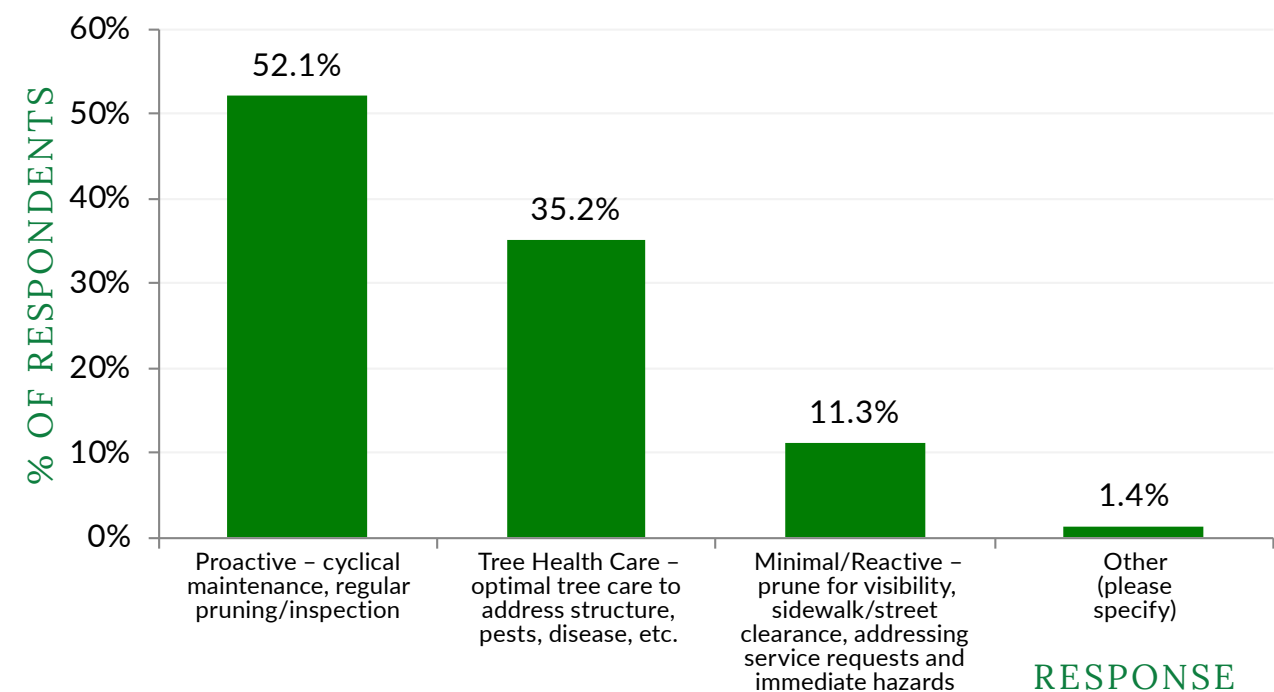
**Figure 8: “Describe your awareness and/or interactions with South San Francisco’s urban forest program. Please check all that apply”.**

To help gauge the public’s perception of urban forestry operations, respondents were asked to describe their awareness and/or interactions with South San Francisco’s urban forestry program: Francisco: Among respondents who selected “other” there was no commonality in opinions expressed.



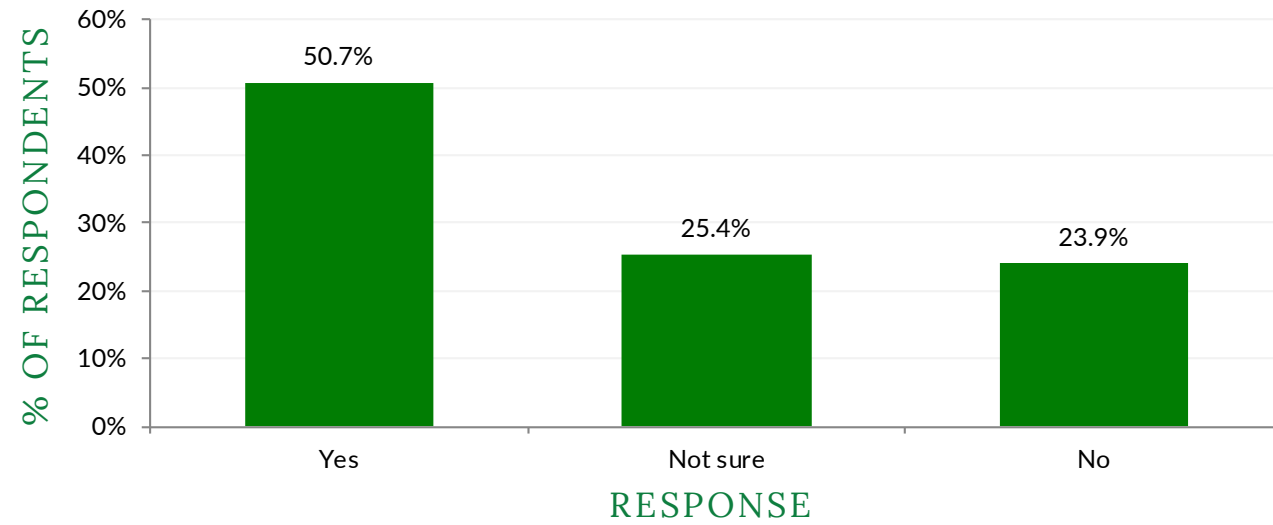
**Figure 9: “What level of care for public trees would you prefer?”**

A comment box was provided to allow for additional comments regarding the care of public trees. The following summarizes the most common comments: 1) additional staff to care for trees, 2) additional educational material, and 3) concerns for the level of care in neighborhoods and along specific streets.



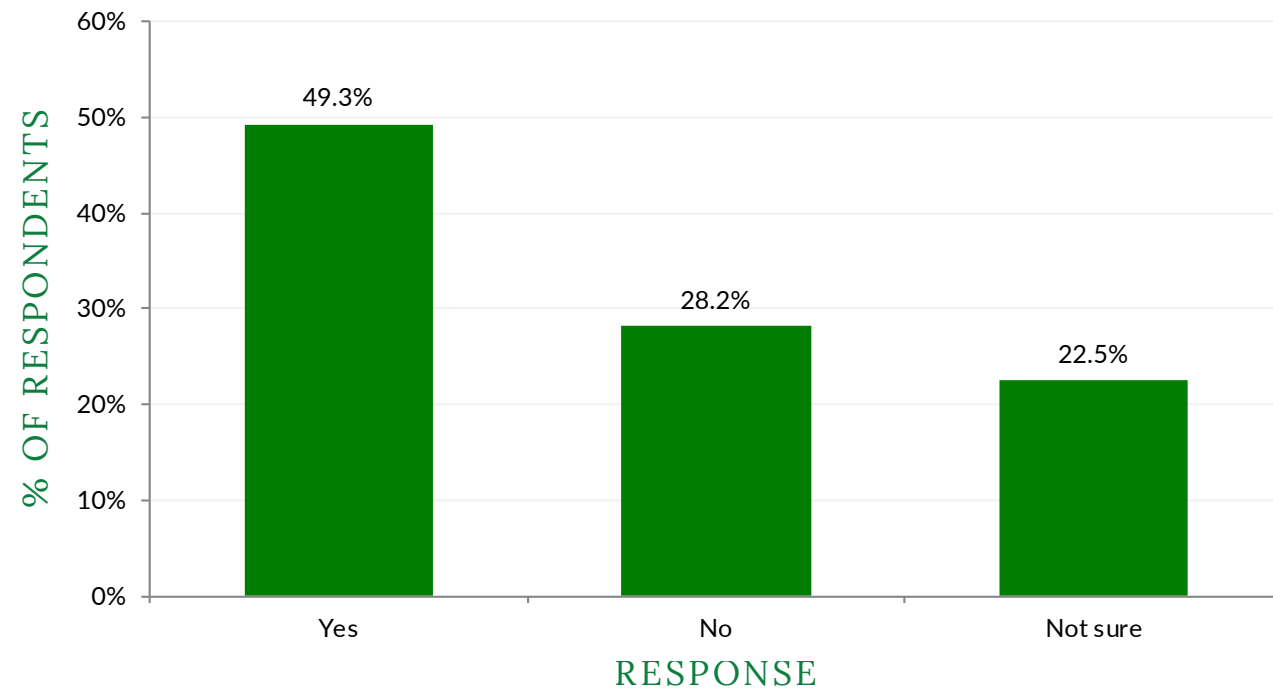
**Figure 10: “Should the City require professional licensing for tree care providers?”**

Online survey respondents were asked to provide their level of support for the City requiring professional licensing for tree care providers:



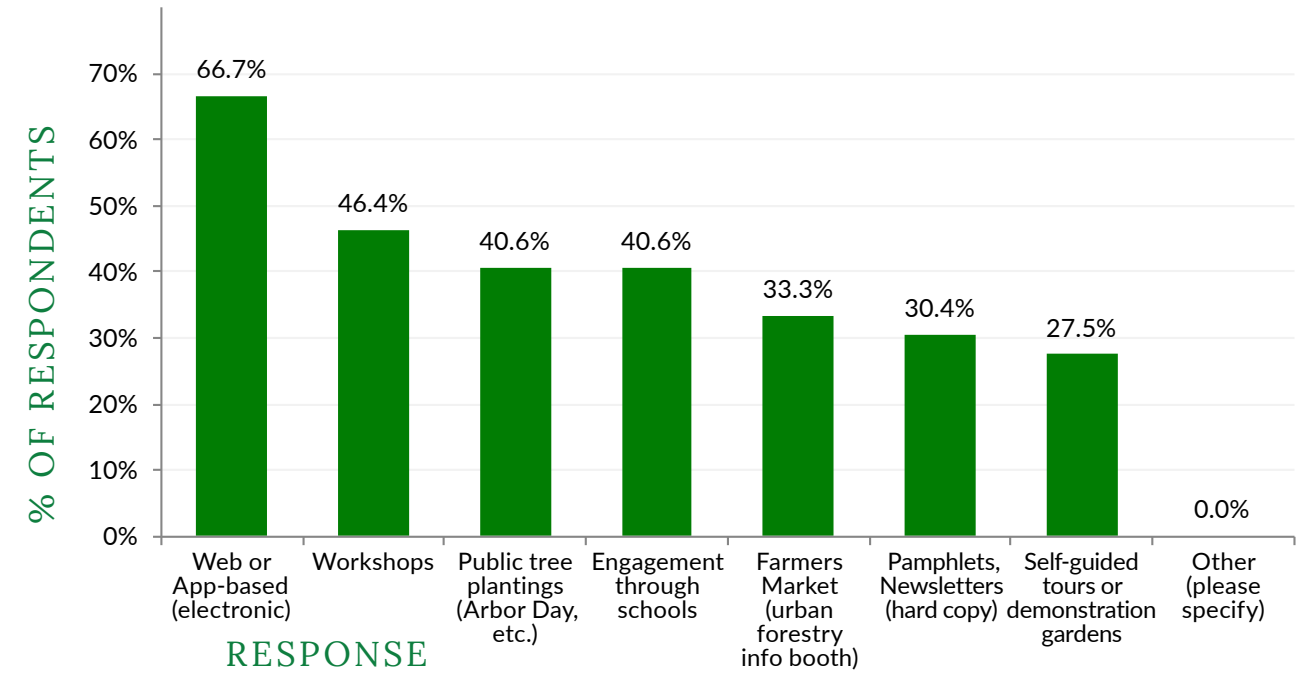
**Figure 11: “Would you support a higher penalty for unpermitted removals?”**

Respondents were also asked about their support of higher penalties for unpermitted removals:



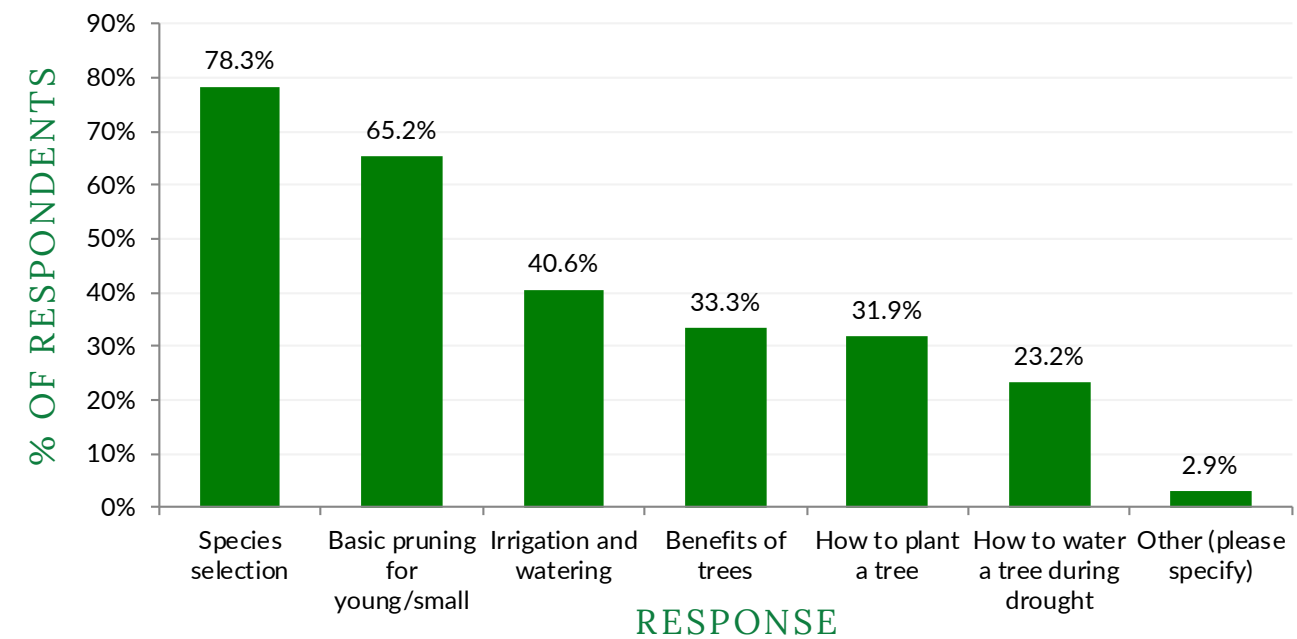
**Figure 12: “What methods for education/outreach do you prefer? Please select your top three (3).”**

Online survey participants were asked to identify which methods of outreach and education they prefer:

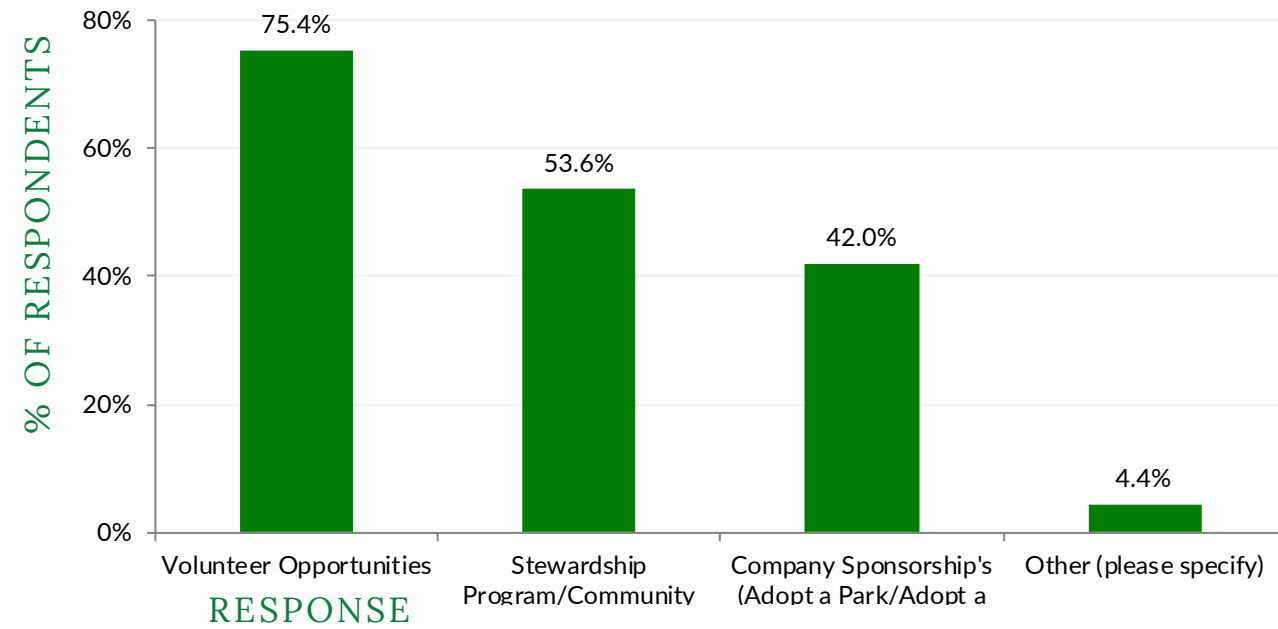


**Figure 13: “What education topics about trees interest you? Please select your top three (3)?”**

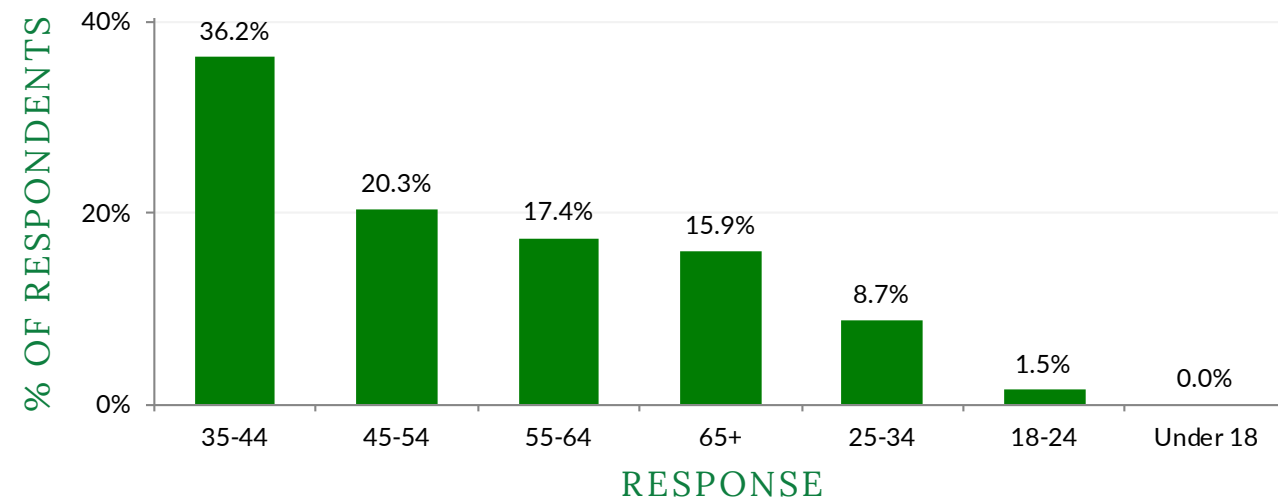
To understand which educational topics the community is interested in, the survey requested that respondents indicate their top three (3) preferred educational topics:



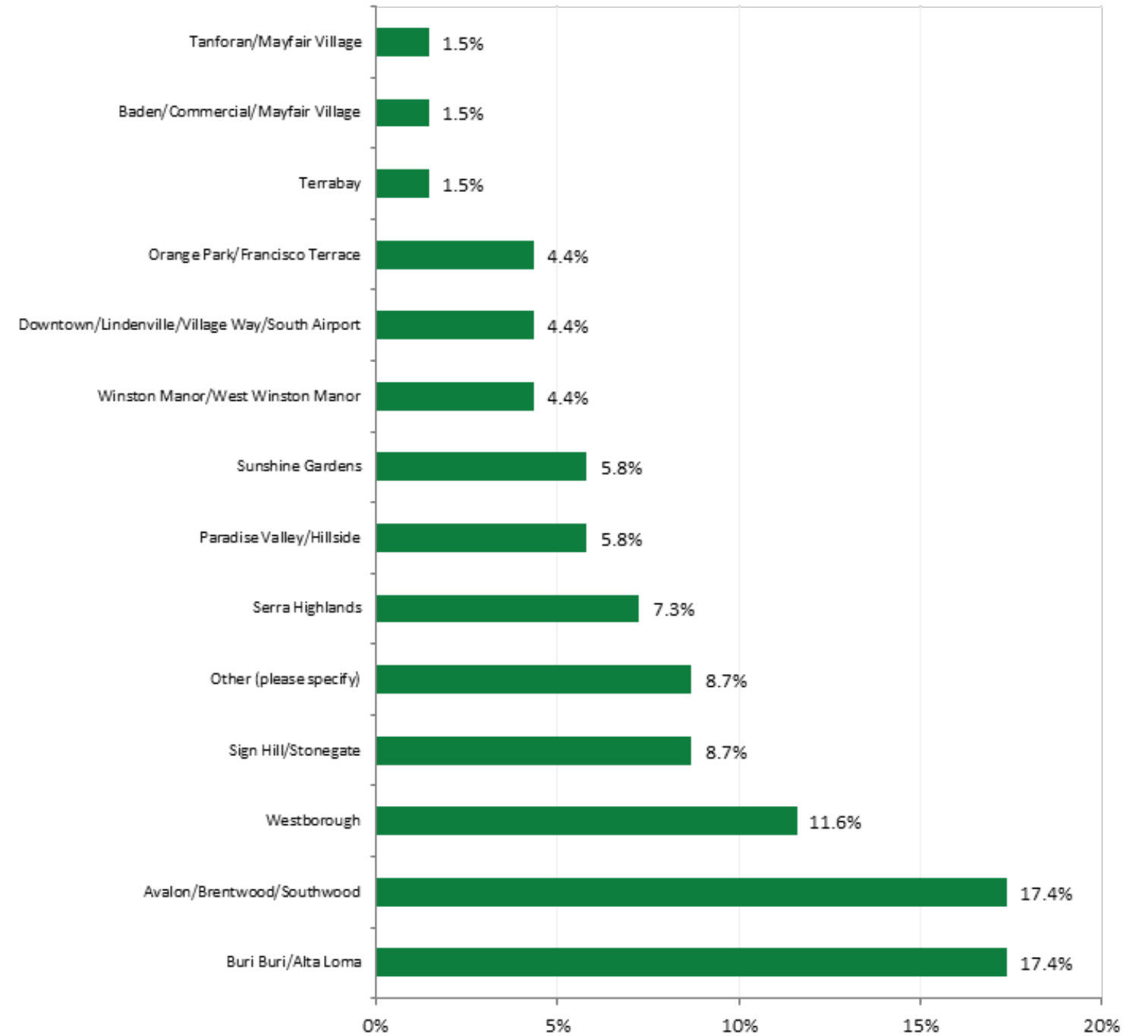
**Figure 14: “What volunteer/collaborative efforts interest you most? Please select all that apply”.**  
Participants who selected “other” indicated interest in collaborating with schools.



**Figure 15: “What is your age?”**  
Community members that participated in the online survey were asked to provide their age range:



**Figure 16: “What neighborhood do you live in?”**  
Community members were asked to provide which neighborhood they live in:



The online survey provided a comment box at the end of the survey to allow for additional feedback. Comments primarily identified concerns over inappropriate past species selection, requests for additional plantings in specific areas, concerns for lack of trees in certain developments, and questions about appropriate placement of trees near buildings and hardscape.



# What do we want? . —

## ALIGN URBAN FOREST MANAGEMENT POLICY WITH COMMUNITY EXPECTATIONS & COST EFFICIENCY

Increasingly, there is more scientific data on the benefits that trees provide to communities. Increased knowledge on the benefits of trees promotes a greater appreciation for the urban forest. Optimization of urban forestry funding and programming allows the City to meet and exceed community expectations and increases cost-efficiency for managing the resource.

### Goals

- Promote excellent and efficient customer service.
- Increase uniformity between City policies, documents, and departments.
- Advance the role of Park Staff in City development projects.
- Increase collaboration with developers.
- Provide water to trees efficiently and cost-effectively.

## ENHANCE COMMUNITY SAFETY

Enhancing community safety related to trees should focus on two areas: 1) tree maintenance, and 2) worker safety. In general, the risk that trees pose to the public is minimal. However, tree care should always strive to make trees even safer to reduce risk to the community. Additionally, tree maintenance can also be dangerous. Therefore, the City should look for opportunities to improve the safety of staff responsible for caring for trees.

### Goals

- Promote a workplace culture of safety.
- Promote a safe urban forest.
- Reduce the risk of wildfire.
- Manage risk.

## OPTIMIZE THE ENVIRONMENTAL, SOCIAL, ECONOMIC, AND PUBLIC HEALTH BENEFITS OF TREES AND CANOPY

Trees are a valuable community asset and an integral part of the infrastructure. The environmental, social, economic, and public health benefits provided by trees and canopy are directly related to the distribution of leaf surface and tree canopy. As trees mature, the benefits that are provided to the community increase.

### Goals

- Plan for trees, before planting.
- Avoid removing trees whenever possible.
- Decrease tree mortality.
- Promote good maintenance practices for trees on private property.
- Review and update Municipal Code as needed.

## GROW, MAINTAIN, PRESERVE, AND ENHANCE A SUSTAINABLE URBAN FOREST

The urban forest provides numerous benefits to the community. Although it might be tempting to plant as many trees as possible, it is prudent to grow and enhance the urban forest in a sustainable manner. It is important to ensure not only that trees are planted but also that they can be maintained throughout their lifetimes.

### Goals

- Increase support for the enhancement of the urban forest.
- Continue to distribute information about the urban forest to the community.
- Create a volunteer tree advocacy group.
- Continue to pursue an Integrated Pest Management approach when responding to pests and pathogens.

# What do we want? . ———

## FOCUS AREAS AND PLAN GOALS

Based upon a review of the current Urban Forestry program and resources (What Do We Have?) and input from the community and stakeholders, the Plan identifies 19 goals that are organized under four areas of focus. These goals represent the Community's vision for the urban forest. The goals and actions are intended to adequately manage the City's urban forest in a timely, cost-effective, and efficient manner. Through the collaborative stakeholder and community input process, the Plan identifies four major guiding principles (focus areas):

1. Align urban forest management policy with community expectations and cost efficiency
2. Enhance community safety
3. Optimize the environmental, social, economic, and public health benefits of trees and canopy
4. Grow, maintain, preserve, and enhance a sustainable urban forest

### **FOCUS AREA: ALIGN URBAN FOREST MANAGEMENT POLICY WITH COMMUNITY EXPECTATIONS AND COST EFFICIENCY**

Increasingly, there is more scientific data on the benefits that trees provide to communities. Increased knowledge on the benefits of trees promotes a greater appreciation for the urban forest. Optimization of urban forestry funding and programming allows the City to meet and exceed community expectations and increases cost-efficiency for managing the resource.

#### **Goal 1: Promote excellent and efficient customer service.**

Trees are a community asset. Parks staff are responsible for providing quality, efficient, and cost-effective services for public trees. It is also expected that they are responsive, courteous, and fair to community members.

#### **Goal 2: Increase uniformity between City policies, documents, and departments.**

Inconsistencies across City policies, documents, and departments creates confusion between departments and the community. Policy uniformity promotes strong and efficient policy that aligns with community expectations.

#### **Goal 3: Advance the role of Parks staff in City development projects.**

Parks staff are stewards for all urban trees that currently exist or have the potential to be planted in the City. Staff should be engaged in conversations about development projects that could affect or add trees.



#### **Goal 4: Increase collaboration with developers.**

New development provides an opportunity to expand the urban forest through the addition of trees at project sites. Increasing collaboration between Parks staff and developers creates the opportunity for Staff to educate developers on 1) the value of trees to projects and the community and 2) the importance of selecting appropriate species and providing the necessary care to maintain those trees over their lifetime.

#### **Goal 5: Provide water to trees efficiently and cost-effectively.**

All trees, especially newly planted ones, need some level of water to thrive. Identifying efficient and cost-effective means for watering trees is critical for their health. Additionally, achieving this goal is imperative for meeting community expectations regarding efficiently managing this community asset.

## What do we want? . ———

### **FOCUS AREA: ENHANCE COMMUNITY SAFETY**

Enhancing community safety related to trees should focus on two areas: 1) tree maintenance, and 2) worker safety. In general, the risk that trees pose to the public is minimal. However, tree care should always strive to make trees even safer to reduce risk to the community. Additionally, tree maintenance can also be dangerous. Therefore, the City should look for opportunities to improve the safety of staff responsible for caring for trees.

#### **Goal 6: Promote a workplace culture of safety.**

When all City Staff share core values and behaviors that promote safety, everyone, including the community, is safer.

#### **Goal 7: Promote a safe urban forest.**

Tree-related incidences that result in damage to property or injury to persons occur infrequently but can happen. With regular inspection and maintenance, the risks that trees pose to the public are reduced, along with people's anxieties about trees. When community members feel safe around trees, they are more likely to respect and desire their inclusion in the urban landscape.

#### **Goal 8: Reduce the risk of fire and mitigate damage caused by fire.**

In the last decade, California has experienced catastrophic losses as a result of wildfire. With prolonged periods of drought and a changing climate, wildfire is likely to continue to be a threat to communities that neighbor the wildland urban interface. The risk of living in these areas can be reduced through numerous wildfire mitigation strategies.

#### **Goal 9: Manage risk.**

When trees are well-maintained throughout their lifetimes, the risks trees pose to the public are reduced.

### **FOCUS AREA: OPTIMIZE THE ENVIRONMENTAL, SOCIAL, ECONOMIC, AND PUBLIC HEALTH BENEFITS OF TREES AND CANOPY**

Trees are a valuable community asset and an integral part of the infrastructure. The environmental, social, economic, and public health benefits provided by trees and canopy are directly related to the distribution of leaf surface and tree canopy. As trees mature, the benefits that are provided to the community increase.

#### **Goal 10: Plan for trees, before planting.**

When proper consideration is given to planting trees, future removals can potentially be avoided. Selecting the right tree for the right place increases the ability for a tree to reach maturity and ensure that it has ample space for canopy and root growth.

#### **Goal 11: Avoid removing trees whenever possible.**

Trees take a long time to grow and the benefits that they provide increase as they mature. Therefore, tree removals should be avoided whenever possible to ensure all trees provide the maximum potential benefits. Trees that pose an unacceptable risk to public safety or the overall urban forest should be removed and replaced with a suitable species.

#### **Goal 12: Reach 22.6% canopy cover by 2040.**

South San Francisco has the potential to support a canopy cover of nearly 23%. Through a community survey and at community meetings, community members indicated support for a canopy goal of 23%.

#### **Goal 13: Decrease tree mortality.**

Like all living things, trees have a finite lifespan, though some are longer lived than others. Managers play an important role in reducing mortality rates through proactive tree maintenance practices, education, and discouraging the removal of existing trees.



#### **Goal 14: Promote good maintenance practices for trees on private property.**

Although the City is not directly responsible for the care of trees on private property, all trees are an important component of the urban forest. Education and outreach to encourage best management practices for trees on private property should be done to support the wellness and benefits of the overall urban forest.

#### **Goal 15: Review and update Municipal Code as needed and educate the public as changes occur.**

As a community grows, its needs can change. The Municipal Code should be periodically reviewed and revised to refine and identify requirements to support the urban forest and canopy cover goal.

## What do we want? . ———

### **FOCUS AREA: GROW, MAINTAIN, PRESERVE, AND ENHANCE A SUSTAINABLE URBAN FOREST**

The urban forest provides numerous benefits to the community. Although it might be tempting to plant as many trees as possible, it is prudent to grow and enhance the urban forest in a sustainable manner. It is important to ensure not only that trees are planted but also that they can be maintained throughout their lifetimes.

#### **Goal 16: Increase support for the enhancement of the urban forest.**

The urban forest is more likely to be preserved and maintained by a community that understands the benefits that the urban forest provides. Educating the community on urban forest benefits creates an environment for the community members to advocate for the urban forest.

#### **Goal 17: Continue to distribute information about the urban forest to the community.**

The Parks Division should continue to distribute educational material and educate the public on the urban forest and tree care.

#### **Goal 18: Create a volunteer tree advocacy group.**

Growing, maintaining, and educating the community about the benefits of the urban forest can be greatly enhanced when volunteers are engaged. Volunteers can serve as advocates for the urban forest.

#### **Goal 19: Continue to pursue an Integrated Pest Management approach when responding to pests and pathogens.**

Pests and disease will always be a threat to the urban forest. Having a pest management strategy will make the urban forest more resilient and able to withstand diseases and pest infestations. The strategy should incorporate the use of multiple tools for preventing pests and managing current pest problems.



# How do we get there?



The goals and actions proposed by the Urban Forest Master Plan are organized by guiding principles:

1. Align urban forest management policy with community expectations and cost efficiency
2. Enhance community safety
3. Optimize the environmental, social, economic, and public health benefits of trees and canopy
4. Grow, maintain, preserve, and enhance a sustainable urban forest

Each guiding principle is supported by measurable goals, existing policies, and specific actions that are intended to guide South San Francisco's urban forest programming over the next 25 years, providing the foundation for annual work plans and budget forecasts. Many goals and actions support more than one focus area.

For each action, the UFMP identifies a priority, a suggested timeframe for accomplishing the action, an estimated cost range, and potential partners. Priority is identified as:

- High- An action that is critical to protecting existing community assets, reducing/managing risk, or requires minimal resources to accomplish
- Medium- An action that further aligns programming and resource improvements that have been identified as desirable by the community, partners, and/or urban forest managers, but that may require additional investment and financial resources over and above existing levels
- Low- An action that is visionary, represents an increase in current service levels, or requires significant investment

The estimated cost is categorized in the following ranges:

- \$ = less than \$25,000
- \$\$ = \$25,000-\$100,000
- \$\$\$ = more than \$100,000

The UFMP is intended to be a dynamic tool that can and should be adjusted in response to accomplishments, new information, changes in community expectations, and available resources. In addition to serving as a day-to-day guide for planning and policy making, the UFMP should be reviewed regularly for progress to ensure that the actions and sub actions are integrated into the annual work plan.

# How do we get there? . —

**Focus Area: Align urban forest management policy with community expectations and cost efficiency**

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## Goal 1:

**Promote excellent and efficient customer service.**

### Performance Measure:

Known duration between maintenance activities for every tree in inventory.

### Rationale:

Trees are an asset valued by the community. Holding Parks staff to a high standard elevates the level of care for trees on both public and private property.

### Risk:

If the community is not satisfied with the level of service provided for public trees, then support for forestry programming is diminished.

### Benefit:

When trees receive the highest standard of care in an efficient time frame, trees in the urban forest and the community are better served.

### Objective:

Increase efficiency to respond in a timely manner to community concerns for trees.

### Actions:

1. Explore creating a position for a dedicated City arborist.
2. Continue to use interns to update inventory of City trees.
3. Explore water trucks that do not require CDL Class B Driver's License to reduce the need for full-time staff to water newly planted trees.
4. Set pruning cycle based on maintenance and risk management needs.
5. Launch GIS Grid Pruning System.
6. Create a user-friendly interface to determine tree ownership (City tree/private tree).
  - a. Use MyTreekeeper® or similar mobile application that identifies City trees.
7. Update tree inventory as maintenance occurs.
  - a. Update inventory to include all trees that are the responsibility of the City.
  - b. Conduct a Resource Analysis to quantify the benefits that City-owned trees are providing to the community.

### Cost:

\$

### Priority:

High

### Timeframe:

Ongoing

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\$= less than \$25,000 \$\$=\$25,000-\$100,000 \$\$\$=more than \$100,000

# How do we get there? . —

**Focus Area: Align urban forest management policy with community expectations and cost efficiency**

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## Goal 2:

**Increase uniformity between City policies, documents, and departments.**

**Performance Measure:**

Number of policies, documents, and departments that cross-reference the UFMP.

**Rationale:**

Having a uniform policy reduces confusion between departments and community members and transcends departmental changes.

**Risk:**

When policies have inconsistencies, setting a high standard of care is difficult.

**Benefit:**

Uniformity promotes a strong and efficient policy that aligns with community expectations.

**Objective:**

Unify guiding documents to transcend departmental changes and address inefficiencies and reduce confusion.

**Actions:**

1. Ensure that UFMP goals are considered in all overarching planning and visionary documents as revisions and updates occur.
  - a. General Plan as it is revised.
  - b. Climate Action Plan as it is revised.

**Objective:**

Improve communication and coordination with other City departments.

**Actions:**

1. Share the Urban Forest Master Plan among City departments following completion.
2. Communicate internally to develop standards for all departments.
3. Participate in cross-training activities to create understanding of other departmental roles.
4. Increase communication with code enforcement to increase enforcement of tree preservation ordinance.
  - a. Continue to follow current code enforcement model and facilitate discussions with Public Works to determine mitigation measures for tree complaints.
  - b. Explore new code enforcement policies.
5. Coordinate with other departments to establish procedures for sharing equipment interdepartmentally.

**Cost:**

\$

**Priority:**

High

**Timeframe:**

1-5 Years

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\$= less than \$25,000 \$\$=\$25,000-\$100,000 \$\$\$=more than \$100,000

# How do we get there? . —

**Focus Area: Align urban forest management policy with community expectations and cost efficiency**

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## Goal 2 (continued):

**Increase uniformity between City policies, documents, and departments.**

**Performance Measure:**

Number of policies, documents, and departments that cross-reference the UFMP.

**Rationale:**

Having a uniform policy reduces confusion between departments and community members and transcends departmental changes.

**Risk:**

When policies have inconsistencies, setting a high standard of care is difficult.

**Benefit:**

Uniformity promotes a strong and efficient policy that aligns with community expectations.

**Objective:**

Increase the role of Parks staff in design review.

**Actions:**

1. Provide recommended species list with corresponding climate zone map to the Design Review Board.
2. Develop conditions of approval for design plans.
3. Inspect tree installations at final inspections.
4. When permits are filed, check to see if 40% of the gross land is pervious and if not apply a condition of approval to amend this violation.
5. Use Track-it! to comment and create check-ins during the review of building permits.
6. Participate in design plan commenting periods, TAG meetings, and Track-it.
7. Provide final review of building permits to check compliance with design specifications for tree plantings.

**Cost:**

\$

**Priority:**

High

**Timeframe:**

1-3 Years

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\$= less than \$25,000   \$\$=\$25,000-\$100,000   \$\$\$=more than \$100,000



# How do we get there? . —

**Focus Area: Align urban forest management policy with community expectations and cost efficiency**

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## Goal 3:

**Advance the role of Parks staff in City development projects.**

**Performance Measure:**

Number of trees planted through City projects and increased survivability of trees planted in City projects.

**Rationale:**

City development projects offer another opportunity to improve public places through tree plantings.

**Risk:**

Potential planting sites could be lost without Parks staff input.

**Benefit:**

Adding trees to City projects increase the benefits provided to the community through public spaces.

**Objective:**

Encourage the inclusion of trees in development projects to expand the tree canopy on public property.

**Actions:**

1. Participate in Technical Advisory Group meetings to advocate for the inclusion of trees in City development projects.
2. Participate in joint coordination meetings between Engineering and Parks and Recreation.
3. Determine if there is potential to include trees in all City and development projects.
4. Create a formal review process for project planning that includes consultation with forestry. Require sign-off at all steps during the review process, including when trees are installed.
5. Review Capital Improvement Projects (CIP) to ensure the inclusion of trees.

**Cost:**

\$

**Priority:**

High

**Timeframe:**

Ongoing

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\$= less than \$25,000 \$\$=\$25,000-\$100,000 \$\$\$=more than \$100,000

# How do we get there? . —

**Focus Area: Align urban forest management policy with community expectations and cost efficiency**

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## Goal 4:

**Increase collaboration with developers.**

**Performance Measure:**

Increased canopy cover in new developments.

**Rationale:**

Development projects provide an opportunity to expand tree canopy.

**Risk:**

Parks staff may not collaborate with developers to create opportunities to incorporate trees into new developments.

**Benefit:**

Trees planted in new developments not only increase property values, but also increase the benefits provided by the urban forest to the overall community.

**Objective:**

Expand tree canopy through new development projects.

**Actions:**

1. Explore the expansion of existing park impact fees to support tree plantings when new development projects occur.
2. Consider the creation of a tree impact fee, similar to the existing park impact fee, that would provide funding for trees based on number of constructed units.
3. Explore Adopt-a-Park or Adopt-a-Median program to partner with developers.
4. Identify processes for transfer of responsibility for the care of trees and requirements for that transfer to the City within developer agreements.
5. Expand developer agreements to include tree plantings that contribute positively to community benefits.

**Cost:**

\$

**Priority:**

High

**Timeframe:**

1-5 Years

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\$= less than \$25,000   \$\$=\$25,000-\$100,000   \$\$\$=more than \$100,000

# How do we get there? . ———

**Focus Area: Align urban forest management policy with community expectations and cost efficiency**

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## Goal 5:

**Encourage the establishment of trees through efficient and sustainable irrigation solutions and programs.**

**Performance Measure:**

Reduced staff hours in watering trees.

**Rationale:**

While water is becoming more scarce and costly, trees need water to survive. Continuing to look for more efficient cost-effective watering solutions which will help to ensure that young trees get established. Additionally, cost-effective watering solutions will ensure that the cost of caring for these young trees is not cost prohibitive, thus discouraging future plantings.

**Risk:**

Increased mortality rates in young trees.

**Benefit:**

Reduced mortality rates in young trees and reduced labor and water costs.

**Objective:**

Provide water to trees to encourage establishment.

**Actions:**

1. Collaborate with the department responsible for flushing water lines, in order to utilize that water that otherwise goes down the storm drain.
2. Require separate valves for irrigated landscapes and trees.
3. Continue to use TreeGator® bags and other water efficient systems to water trees.
4. Continue to explore the potential for a water cistern in Orange Memorial Park.
5. Look for additional funding sources.
6. Partner with residents/property owners to assist with watering street trees.

**Cost:**

\$

**Priority:**

High

**Timeframe:**

1-5 Years

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\$= less than \$25,000 \$\$=\$25,000-\$100,000 \$\$\$=more than \$100,000

# How do we get there? . —

## Focus Area: Enhance community safety

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### Goal 6:

#### Promote a workplace culture of safety.

##### Performance Measure:

Reduction in accidents and time for workers recovery from work related accidents.

##### Rationale:

Tree work is dangerous. Promoting a culture of safety results in reduced workplace accidents, less down-time, and greater productivity. With every staff member engaging in safe behaviors, everyone (even the community) is safer.

##### Risk:

Unsafe practices and lack of understanding of safety policies make even those who are complying with safety procedures vulnerable.

##### Benefit:

Fewer accidents and claims against the safety, as a result of improved public safety.

##### Objective:

Implement policies and procedures that make that tree work as safe as possible.

##### Actions:

1. Develop a Standard Operating Procedure (SOP) Manual for tree care operations.
  - a. Include sections on safety training, tree removal policies, and tree maintenance.
  - b. When crews go to a site, have a standard assessment or “tailgate” to identify hazards that exist for each job.
  - c. As personnel are trained, require signoffs from supervisor to ensure understanding.
  - d. Require that tree maintenance be performed according to best management practices and American National Standards Institute (ANSI) 300 standards.
2. Continue to support forestry worker safety.
  - a. Seek out safety trainings provided by consultants that are familiar with Arboriculture.

##### Cost:

\$

##### Priority:

High

##### Timeframe:

1-3 Years

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\$= less than \$25,000   \$\$=\$25,000-\$100,000   \$\$\$=more than \$100,000

# How do we get there? . ———

## Focus Area: Enhance community safety

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### Goal 7:

#### Promote a safe urban forest.

##### Performance Measure:

The number of claims against the City involving trees. To decrease the number of claims against the city.

##### Rationale:

Many different circumstances can result in tree failure. While not all tree failures can be prevented, many can be mitigated through proactive management and regular inspections.

##### Risk:

Injury to persons or damage to property is costly. When residents perceive trees as a risk to public safety, those residents are less likely to be supportive of including trees in the urban landscape. Therefore, fewer trees will be widely accepted by the community or many may be unnecessarily removed.

##### Benefit:

Community members feel safer around trees and want more included in the urban landscape.

##### Objective:

Develop a risk management policy/procedure.

##### Actions:

1. Include inspection cycles, inspection protocols, and thresholds.
2. Set risk thresholds and prioritize removals or other maintenance based on safety.
3. Develop a protocol for regular inspection of equipment, including signoffs from supervisor.
4. Review all equipment to ensure they meet minimum safety standards.
5. Coordinate with fleet services to develop life cycles for arboriculture equipment.
6. Explore alternative equipment repair and replacement program.

##### Cost:

\$

##### Priority:

High

##### Timeframe:

1-5 Years

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\$= less than \$25,000 \$\$=\$25,000-\$100,000 \$\$\$=more than \$100,000

# How do we get there? . —

## Focus Area: Enhance community safety

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### Goal 8:

Reduce the risk of fire and mitigate damage caused by fire.

#### Performance Measure:

Improved defensible spaces around structures and reduction in ladder fuels.

#### Rationale:

California has had historic fires over the last decade. Many of these fires were in urban areas. South San Francisco has identified areas that are vulnerable to fire. To reduce the risk of living in the wildland urban interface, the City is working to mitigate potential fire hazards.

#### Risk:

Given the right conditions and lack of premediated response to fire, fire is a risk to the community. Fire can result in devastating losses to property and life.

#### Benefit:

Reduced vulnerability to fire.

#### Objective:

Focus fire mitigation efforts on Sign Hill and other areas of vulnerability.

#### Actions:

1. Adopt the City of South San Francisco California Cooperative Forest Management Plan.
2. Reduce ladder fuels and create defensible space in proximity to structures.
3. Plant trees to not interfere with emergency response, such as, planting too close to fire hydrants and too close to fire escapes.

#### Cost:

\$

#### Priority:

High

#### Timeframe:

Ongoing

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\$= less than \$25,000 \$\$=\$25,000-\$100,000 \$\$\$=more than \$100,000

# How do we get there? . ———

## Focus Area: Enhance community safety

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### Goal 9:

#### Goal 9: Improve public safety.

##### Performance Measure:

Reduction in claims related to damage and injury caused by City trees.

##### Rationale:

Trees rarely cause injuries and damage property; however, the City has a responsibility to maintain trees to reduce the minimal risk that trees pose to the public.

##### Risk:

If trees fail, people can get hurt and property can be damaged.

##### Benefit:

Trees that are maintained on a regular cycle are often healthier and are less likely to fail and cause injury or damage to property.

##### Objective:

Maintain trees throughout their lifetimes to improve structure in maturity and reduce the likelihood of structural failures in the future.

##### Actions:

1. Create a pruning cycle schedule and communicate this schedule to the community.
2. Identify and repair or remove trees that pose a threat to life and property on an ongoing basis.
3. Communicate planting designs with Engineering to ensure safety and avoid line-of-sight problems.

##### Cost:

\$

##### Priority:

Moderate

##### Timeframe:

Ongoing

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\$= less than \$25,000 \$\$=\$25,000-\$100,000 \$\$\$=more than \$100,000

# How do we get there? . —

**Focus Area: Optimize the environmental, social, economic, and public health benefits of trees and canopy**

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## Goal 10:

**Plan for trees, before planting.**

### Performance Measure:

Greater health and longevity of individual trees and reduced mortality/tree removals.

### Rationale:

Trees take a long time to grow and are a long-term investment. If a tree is planted in a space that is too small or too large for a space or is not well suited for the local climate and soil conditions, the potential benefits that that tree could have provided to the community are lost.

### Risk:

Premature death of trees.

### Benefit:

Fewer removal of trees and maximized community benefit.

### Objective:

Invest in trees for the long-term environmental benefits provided to the community.

### Actions:

1. Set emphasis on right tree in the right place.
  - a. Matching tree species to local microclimate.
  - b. Reducing hardscape and utility conflicts.
  - c. Matching tree species to soil and water conditions.
  - d. Matching tree species to planter size and intended use.
2. As design standards are updated, include minimum tree well sizes.
  - a. Require that planting sites are designed and constructed to provide the soil space requirement that will reasonably support the mature size of the tree species intended for the site. See Appendix F for soil volume and planter designs.
  - b. Explore the use of strata-vaults, structural soils and other soil volume designs to increase space and healthy soils for trees.
  - c. Formalize planting distances from water meters, fire hydrants, or other public utilities.
3. Explore expanding existing tree wells.
  - a. Review impervious surface coverage at the parcel level. Reclaim pervious surface as appropriate.
4. Require that all plans include irrigation plans and planting specifications.
5. Revise Municipal Code 20.300.
  - a. Include tree planting requirements for single-family homes and remodels.

### Cost:

\$

### Priority:

High

### Timeframe:

Ongoing

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\$= less than \$25,000   \$\$=\$25,000-\$100,000   \$\$\$=more than \$100,000



# How do we get there? . ———

**Focus Area: Optimize the environmental, social, economic, and public health benefits of trees and canopy**

---

## Goal 10 continued):

**Plan for trees, before planting.**

### Performance Measure:

Greater health and longevity of individual trees and reduced mortality/tree removals.

### Rationale:

Trees take a long time to grow and are a long-term investment. If a tree is planted in a space that is too small or too large for a space or is not well suited for the local climate and soil conditions, the potential benefits that that tree could have provided to the community are lost.

### Risk:

Premature death of trees.

### Benefit:

Fewer removal of trees and maximized community benefit.

### Objective:

Improve the diversity of the urban forest on public and private property, to create a more resilient urban forest.

### Actions:

1. Use “tree tags” to increase awareness of the value and benefits of trees.
  - a. Consider including:
    1. Species
    2. Annual
    3. Replacement value
2. Create a program to provide free or reduced cost trees for private property for single-family homes or duplexes.
3. Incentivize tree planting on private property, particularly in high and very high priority planting areas.

### Cost:

\$

### Priority:

High

### Timeframe:

Ongoing

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\$= less than \$25,000 \$\$=\$25,000-\$100,000 \$\$\$=more than \$100,000

# How do we get there? . —

**Focus Area: Optimize the environmental, social, economic, and public health benefits of trees and canopy**

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## Goal 11:

**Avoid removing trees whenever possible.**

### Performance Measure:

Reduced number of removals.

### Rationale:

Trees take a long time to grow. While the needs for land use change and sometimes trees are prohibitive of a desired use, considerations should be given to preserving trees for all projects.

### Risk:

Removals that could have been avoided through alternative design solutions and repairs.

### Benefit:

The potential for all trees to reach maturity and provide the optimal amount of benefits to a community.

### Objective:

Explore alternative designs instead of removals.

### Actions:

1. Explore alternative sidewalk designs to allow space for trees and compliance with ADA and avoid tree removal.
  - a. Detour walkways around trees, ramping over roots, and grinding down displaced sidewalk panels to reduce tripping hazards without causing undue harm to critical roots.
  - b. Use alternative sidewalk materials such as:
    1. Crushed granite
    2. Gravel sub-base and other structural soils
    3. Other structural cells (Strata Cells or Silva Cells)
    4. Interlocking concrete paver products
    5. Flexipave, a system similar to rubber sidewalks
    6. Alternative tree grate structures
    7. Polygrate, a recycled plastic form of tree grate
2. Revisit Municipal Code to include provisions for tree planting in development of single-family and duplex homes with additions.
3. Revisit zoning ordinance to include minimum standards of maintenance of landscaping and replanting requirements or allow for tree mitigation fees to provide a tree elsewhere in the City.
4. Standardize the use of Tree Protection Zones in all city development projects.
  - a. See Appendix G
5. Protect valuable trees during construction.
6. Require a ratio of impervious surface to tree canopy cover in new developments.

### Cost:

\$

### Priority:

**Moderate**

### Timeframe:

**1-5 Years**

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\$= less than \$25,000   \$\$=\$25,000-\$100,000   \$\$\$=more than \$100,000

# How do we get there? . ———

**Focus Area: Optimize the environmental, social, economic, and public health benefits of trees and canopy**

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## Goal 11 (continued):

**Goal 11: Avoid removing trees whenever possible.**

**Performance Measure:**

Reduced number of removals.

**Rationale:**

Trees take a long time to grow. While the needs for land use change and sometimes trees are prohibitive of a desired use, considerations should be given to preserving trees for all projects.

**Risk:**

Removals that could have been avoided through alternative design solutions and repairs.

**Benefit:**

The potential for all trees to reach maturity and provide the optimal amount of benefits to a community.

**Objective:**

Discourage the removal of protected trees.

**Actions:**

1. Revise Municipal Code Title 13.
  - a. Provide specific protections for publicly owned trees along streets and in parks.
  - b. Clarify when tree permits are required.
  - c. Redefine “pruning” consistent with ANSI 300 standards.
  - d. Redefine “trimming” to define specific tasks that adjacent property owners are allowed to perform on protected trees.
  - e. Review fee structure for violations to account for the replacement costs for mature trees.
2. Collaborate with the South San Francisco Unified School District to encourage the protection of existing trees and the replacement of trees that have been removed.
  - a. While the South San Francisco Unified School District is exempt from the Tree Protection Ordinance, according to University of Illinois study of more than 400 children, visible access to trees and nature reduced student anxiety and symptoms of ADD/ADHD and improve test scores (2011).

**Cost:**

\$

**Priority:**

High

**Timeframe:**

Ongoing

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\$= less than \$25,000 \$\$=\$25,000-\$100,000 \$\$\$=more than \$100,000

# How do we get there? . —

**Focus Area: Optimize the environmental, social, economic, and public health benefits of trees and canopy**

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## Goal 11:

**Goal 11 (continued): Avoid removing trees whenever possible.**

**Performance Measure:**

Reduced number of removals.

**Rationale:**

Trees take a long time to grow. While the needs for land use change and sometimes trees are prohibitive of a desired use, considerations should be given to preserving trees for all projects.

**Risk:**

Removals that could have been avoided through alternative design solutions and repairs.

**Benefit:**

The potential for all trees to reach maturity and provide the optimal amount of benefits to a community.

**Objective:**

Improve everyday care of trees, to prevent future removals.

**Actions:**

1. Revise Municipal Code Title 13.
  - a. Clarify the responsibility of tree maintenance.
    1. Set minimum irrigation standards for residents
    2. Revise definition of trimming to avoid excessive pruning and to prohibit residents from using ladders to prune anything that cannot be reached from the ground
  - b. Define a minimum standard of care for regular tree maintenance and replanting requirements.

**Cost:**

**\$-\$\$**

**Priority:**

**Low**

**Timeframe:**

**10-15 Years**

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\$= less than \$25,000 \$\$=\$25,000-\$100,000 \$\$\$=more than \$100,000

# How do we get there? . —

**Focus Area: Optimize the environmental, social, economic, and public health benefits of trees and canopy**

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## Goal 12:

**Reach 22.6% canopy cover by 2040.**

### Performance Measure:

Increased canopy cover.

### Rationale:

The benefits that an urban forest provides to the community are directly related to the expanse of tree canopy cover and leaf surface area. The greater the tree canopy cover, the greater distribution of benefits to the community.

### Risk:

No expansion or even loss of canopy cover may result in a reduction or stagnation in the benefits provided to the community by the urban forest.

### Benefit:

Expansion of tree canopy increases the benefits provided by trees and can be realized by more areas of the community.

### Objective:

Expand canopy cover to increase environmental benefits.

### Actions:

1. Create a planting plan, which identifies specific planting priorities for different areas of the City.
  - a. Consider planting priority areas in planting plans.
  - b. Consider planting priorities identified by the community.
2. Utilize best management practices for planting and maintaining trees.

### Cost:

\$

### Priority:

Low

### Timeframe:

Ongoing

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\$= less than \$25,000 \$\$=\$25,000-\$100,000 \$\$\$=more than \$100,000

# How do we get there? . —

**Focus Area: Optimize the environmental, social, economic, and public health benefits of trees and canopy**

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## Goal 13:

**Decrease tree mortality.**

**Performance Measure:**

Reduced mortality rates.

**Rationale:**

Trees are a valuable component of the urban infrastructure, and when trees die prematurely, the investment in that infrastructure is lost.

**Risk:**

If efforts are not made to reduce tree mortality, the investment in the time and labor to plant and care for a tree is lost.

**Benefit:**

Reductions in tree mortality provide the opportunity for all trees to reach maturity and offer the most community benefits.

**Objective:**

Educate the community about property owner responsibilities for the care of City trees.

**Actions:**

1. Complete the tree inventory to include all City-owned trees.
  - a. Regularly update the inventory to include condition and address symptoms of stress whenever possible to reduce rapid decline and potential death of trees.
  - b. Use an inventory management software to prioritize maintenance needs and prevent loss of trees that which are exhibiting symptoms of decline.
2. Increase education around watering trees (even during periods of drought).
3. Utilize the quarterly Parks and Recreation Guide to educate the public about forestry events and educational items.
4. Revisit mitigation fees for replacement of trees that have been illegally removed.
  - a. Consider the use of the Council of Tree and Landscape Appraisers Guide for Plant Appraisal 10th Edition to design fee structure.

**Cost:**

**\$-\$\$**

**Priority:**

**Low-Moderate**

**Timeframe:**

**Ongoing**

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**\$= less than \$25,000   \$\$=\$25,000-\$100,000   \$\$\$=more than \$100,000**

# How do we get there? . —

**Focus Area: Optimize the environmental, social, economic, and public health benefits of trees and canopy**

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## Goal 14:

**Promote good maintenance practices for trees on private property.**

**Performance Measure:**

Expansion of tree canopy on private property.

**Rationale:**

Trees on private property are an important part of the urban forest. While the City does not care for these trees, Parks staff have an opportunity to educate private property owners about the benefits that trees provide directly to the property and to the community. Improvements in the care of trees on private land makes public trees less vulnerable to pests and pathogens.

**Risk:**

Loss in benefits provided to the community from privately owned and maintained trees.

**Benefit:**

Improved care of private trees and reductions in removals on private property make the urban forest more resilient to pests and better able to provide benefits to the whole community.

**Objective:**

Reduce unethical and/or poor pruning practices and unnecessary removals on private property.

**Actions:**

1. Collaborate with the School District to improve forestry practices on school property.
2. Explore requiring tree care companies operating within City limits to have professional licensing.
3. Explore providing a list of tree care professionals to the community.

**Cost:**

\$

**Priority:**

Low

**Timeframe:**

Ongoing

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\$= less than \$25,000 \$\$=\$25,000-\$100,000 \$\$\$=more than \$100,000

# How do we get there? . —

**Focus Area: Optimize the environmental, social, economic, and public health benefits of trees and canopy**

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## Goal 15:

**Review and update Municipal Code as needed and educate the public as changes occur.**

**Performance Measure:**

Number of reviews and revisions.

**Rationale:**

Communities evolve and the rules and laws that govern the City should change to better meet community expectations.

**Risk:**

If the Municipal Code is not revised, outdated rules that do not protect the urban forest will leave the urban forest vulnerable.

**Benefit:**

Municipal Code changes can better protect, preserve, and enhance the urban forest.

**Objective:**

Meet the changing needs of the urban forest and the community through clear and concise and current policy.

**Actions:**

1. Explore the creation of an ordinance that defines responsibility when tree roots impact sewage pipes.
2. Unless tree roots are determined by the City Arborist to have crushed sewage pipes or lifted sewage pipes, the City is not responsible for sewage pipe repairs.
3. Revisit ordinance that identifies that sidewalk repairs are the responsibility of the City if the damage is caused by trees within the right-of-way.

**Cost:**

\$

**Priority:**

**Low-Moderate**

**Timeframe:**

**Ongoing**

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\$= less than \$25,000 \$\$=\$25,000-\$100,000 \$\$\$=more than \$100,000



# How do we get there? . ———

**Focus Area: Grow, maintain, preserve, and enhance a sustainable urban forest**

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## Goal 16:

**Increase support for the enhancement of the urban forest.**

**Performance Measure:**

Participation in forestry programming.

**Rationale:**

An educated and engaged community is more likely to support and advocate on the behalf of the urban forest.

**Risk:**

Apathy towards the urban forest may result in loss in benefits provided by the urban forest to the community.

**Benefit:**

A community that supports the urban forest protects the urban forest and the benefits that it provides to the City.

**Objective:**

Engage the community in urban forestry activities and educational events.

**Actions:**

1. Facilitate tree plantings with community groups on private property and in parks.
2. Develop a presence at local farmers markets.
3. Coordinate engagement activities with local schools.
4. Offer workshops on a variety of tree care topics.
5. Develop a relationship with local biotech companies to encourage biotech employee participation in tree planting events.
6. Maintain the City webpage to include tree educational materials.
  - a. Provide downloadable fact sheets.
  - b. Provide responses to Frequently Asked Questions (FAQ).
  - c. Provide a summary of tree ordinances.

**Cost:**

\$

**Priority:**

Low

**Timeframe:**

Ongoing

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\$= less than \$25,000 \$\$=\$25,000-\$100,000 \$\$\$=more than \$100,000

# How do we get there? . —

**Focus Area: Grow, maintain, preserve, and enhance a sustainable urban forest**

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## **Goal 16 (continued):**

**Increase support for the enhancement of the urban forest.**

**Performance Measure:**

Participation in forestry programming.

**Rationale:**

An educated and engaged community is more likely to support and advocate on the behalf of the urban forest.

**Risk:**

Apathy towards the urban forest may result in loss in benefits provided by the urban forest to the community.

**Benefit:**

A community that supports the urban forest protects the urban forest and the benefits that it provides to the City.

**Objective:**

Provide sustainable and adequate resources to sustain the urban forest for future generations.

**Actions:**

1. Explore the use of a Park Bond to supplement existing General Fund appropriations available for tree maintenance activities.
2. Explore community support for Park District overlay that would provide dedicated funding to parks and urban forestry.
3. Consider the creation of a tree impact fee, similar to the existing park impact fee, that would provide funding for trees based on number of constructed units.

**Cost:**

**\$-\$\$**

**Priority:**

**High**

**Timeframe:**

**1-5 Years**

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\$= less than \$25,000 \$\$=\$25,000-\$100,000 \$\$\$=more than \$100,000

# How do we get there? . ———

**Focus Area: Grow, maintain, preserve, and enhance a sustainable urban forest**

## Goal 17:

**Continue to distribute information about the urban forest to the community.**

**Performance Measure:**

Participation in forestry programming.

**Rationale:**

Reaching out to the community through a variety of avenues increases participation in forestry programming and advocacy for the urban forest.

**Risk:**

When people are unaware of forestry programming, they cannot participate in educational outreach activities.

**Benefit:**

A better-educated community will likely be more engaged in caring for the urban forest.

**Objective:**

An educated community increases support and understanding of urban forestry policies and procedures.

**Actions:**

1. Continue to distribute information to the community through the quarterly Parks and Recreation Guide.
2. Continue to use social media to engage the community.

**Objective:**

Market urban forestry through a variety means to promote participation from all community members.

**Actions:**

1. Continue to distribute information to the community through the quarterly Parks and Recreation Guide.
  - a. Market the accomplishments of the program, i.e. Arbor Day events and other tree plantings.
  - b. Continue to coordinate with Improving Public Places Group for volunteer recruitment.
2. Continue to use social media to engage the community.

**Cost:**

\$

**Priority:**

**Moderate**

**Timeframe:**

**Ongoing**

**Cost:**

\$

**Priority:**

**Low**

**Timeframe:**

**Ongoing**

\$= less than \$25,000   \$\$=\$25,000-\$100,000   \$\$\$=more than \$100,000

# How do we get there? . —

**Focus Area: Grow, maintain, preserve, and enhance a sustainable urban forest**

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## Goal 18:

**Create a volunteer tree advocacy group.**

### Performance Measure:

Participation in forestry programming.

### Rationale:

A tree advocacy group allows for Parks staff to have a larger pool of volunteers to depend on for tree planting events and other educational and volunteer activities.

### Risk:

Without a dedicated group of volunteer tree advocates, Parks staff may have difficulty managing the urban forest.

### Benefit:

A dedicated group of volunteer tree advocates ensures that the urban forest has support from the community, increasing the protection and preservation of the benefits that the urban forest provides to the community.

### Objective:

Work with volunteer tree advocates to promote urban forestry events and distribute urban forestry educational materials.

### Actions:

1. Collaborate with Improving Public Places (IPP) committee or other existing volunteer groups to create a community urban forest volunteer group.
2. Explore partnering with Friends of the Urban Forest.
3. Explore offering high school credits to incentivize participation from youth.

### Cost:

\$

### Priority:

**Low-Moderate**

### Timeframe:

**Ongoing**

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\$= less than \$25,000   \$\$=\$25,000-\$100,000   \$\$\$=more than \$100,000

# How do we get there? . ———

**Focus Area: Grow, maintain, preserve, and enhance a sustainable urban forest**

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## Goal 19:

**Continue to practice an Integrated Pest Management (IPM) approach when responding to pests and disease pathogens.**

**Performance Measure:**

Reduction in the loss of trees associated with pests and pathogens.

**Rationale:**

When managing pests there is not a “one size fits all” approach to management and prevention. The urban forest is more resilient to pests and disease, when multiple tools are used.

**Benefit:**

Using comprehensive information about pests in combination with pest control methods promotes economical management of pests and disease.

**Objective:**

Employ multiple tools and strategies to prevent and/or manage pests and pathogens.

**Actions:**

1. Continue to diversify the urban forest.
  - a. Continue to choose species that are better suited to the local climate.
  - b. Continue to avoid planting species of trees that are susceptible hosts to pest problems.
  - c. Continue to incorporate native species into planting palettes.
  - d. Continue to use drought tolerant species.
  - e. At a minimum, pursue species diversity goals that meet the 10-20-30 rule, but strive for even greater diversity among genera.
2. Continue the use of natural enemies (i.e. owls).
3. Continue monitoring and identifying pest issues.
4. Continue to respond to pests based on economic threats.

**Cost:**

\$

**Priority:**

**Moderate**

**Timeframe:**

**Ongoing**

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\$= less than \$25,000 \$\$=\$25,000-\$100,000 \$\$\$=more than \$100,000

# How are we doing?

With appropriate care and planning, the urban forest is an asset that has the potential to increase in value over time. As young trees mature and their leaf surface and canopy grow, so too will the overall benefits and value from the community's urban forest. The objectives and strategies of the UFMP are intended to support this process in an appropriate manner that encourages the sustainable stewardship of community trees with consideration for safety, cost efficiency, and community values. The UFMP includes strategies for measuring the success of the Plan over time.



## MONITORING

Through talking with community partners and those within the urban forestry program, a set of goals were created to meet the strong demand for protecting and enhancing the urban forest, as stated in the community vision. The success of these goals is largely dependent on creating objectives and strategies to meet the targets outlined in the UFMP as well as monitor the progress of these action steps.

### ANNUAL PLAN REVIEW

The UFMP is an active tool that will guide management and planning decisions over the next 20 years. Its goals and actions will be reviewed annually for progress and integration into an internal work plan. The UFMP presents a long-range vision and target dates are intended to be flexible in response to emerging opportunities, available resources, and changes in community expectations. Therefore, each year, specific areas of focus should be identified, which can inform budget and time requirements for Urban Forest Managers.

### RESOURCE ANALYSIS

With a Resource Analysis, South San Francisco can identify quantitatively the value of the composition of public trees, the annual benefit provided to the community, replacement value, and benefit versus investment ratios. With this information, South San Francisco can improve health (condition), species diversity, annual benefits, and overall resource value of its tree resource. When a resource analysis is conducted every five years, the City can illustrate progress and success towards Plan goals. A five-year Resource Analysis review is a possible way to monitor progress on efforts to increase diversity through a list of tree species appropriate for a variety of different spaces and landscapes.

### CANOPY ANALYSIS

With the recent Urban Tree Canopy (UTC) assessment, South San Francisco has a baseline tree canopy for the entire urban forest, which allows for continued monitoring of trends in the canopy cover on private property.

## COMMUNITY SATISFACTION

Plan results will be measurable through increased benefits and value in the community tree resource and the preservation and eventual increase in canopy cover over time. Attainment of the objectives and strategies will support better tree health, greater longevity, and a reduction in tree failures. However, one of the greatest measurements of success for the UFMP will be its level of success in meeting community expectations for the care and preservation of the community tree resource. Community satisfaction can be measured through surveys and will be evidenced by public support for realizing the objectives of the Plan. Community satisfaction can also be gauged by the level of engagement and support for forestry programs.

## REPORTING

Completion of this Plan is the first step towards achieving the vision for South San Francisco's urban forest. Continual monitoring, analysis, and revisions will help forest managers keep stakeholders informed and engaged. By organizing data into specific components (for example; Urban Forest Reports, Community Satisfaction Surveys), it will be possible to revise specific areas of weakness and buttress areas of strength. Revisions to the Plan should occur with major events, such as newly discovered pests or diseases, or significant policy and regulation changes. A complete formal revision should occur in unison with major municipal projects, such as the comprehensive Master Plan. It is important to remember that the South San Francisco Urban Forest Master Plan is a living document that should adapt to new conditions.

### STATE OF THE COMMUNITY FOREST REPORT

The purpose of the report is to provide structural and functional information about the urban forest (including the municipal forest) and recommend strategies for its proactive management, protection, and growth.

# Appendices

## APPENDIX A: TERMS AND DEFINITIONS

### AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

A Federation of United States industry sectors (e.g. businesses, professional societies and trade associations, standards developers, government agencies, institutes, and consumer / labor interest groups) that coordinates the development of the voluntary consensus standards system.

### AMERICAN PUBLIC WORKS ASSOCIATION (APWA)

An organization that supports professionals who operate, improve, or maintain public works infrastructure by advocating to increase awareness, and providing education, credentialing, as well as other professional development opportunities.

### ARBORICULTURE

The science, art, technology, and business of tree care.

### BEST MANAGEMENT PRACTICES (BMP)

Management practices and processes used when conducting forestry operations, implemented to promote environmental integrity.

### CAPITAL IMPROVEMENT PROJECTS (CIP)

Infrastructure projects and equipment purchases identified by a government in order to maintain or improve public resources. Projects such as (1) constructing a facility, (2) expanding, renovating, replacing, or rehabilitating an existing facility, or (3) purchasing major equipment are identified, and then purchasing plans and development schedules are developed.

### CLIMATE ACTION PLAN (CAP)

Government lead initiatives to decrease greenhouse gas emissions and prepare for the impacts of climate change.

### COMMUNITY URBAN FOREST

The collection of publicly owned trees within an urban area, including street trees and trees in parks and other public facilities.

### DUTCH ELM DISEASE (DED)

A wilt disease of elm trees caused by plant pathogenic fungi. The disease is either spread by bark beetles or tree root grafts.

### EMERALD ASH BORER (EAB)

The common name for *Agrilus planipennis*, an emerald green wood boring beetle native to northeastern Asia and invasive to North America. It feeds on all species of ash.

### GREENHOUSE GAS (GHG)

A gas that traps heat in Earth's atmosphere.

### GEOGRAPHIC INFORMATION SYSTEM (GIS)

Computer-based tools designed to increase the organization and understanding of spatial or geographic data. Many different kinds of data can be displayed on one map for visualization and interpretation.

### INTEGRATED PEST MANAGEMENT (IPM)

Using pest and environmental information to determine if pest control actions are warranted. Pest control methods (e.g. biological control, habitat manipulation, cultural control, plant resistance, and chemical control) are chosen based on economic and safety considerations.

### I-TREE

A computer program with tools used to determine the costs and benefits of urban trees based on inventory data, operations costs, and other factors.

### INTERNATIONAL SOCIETY OF ARBORICULTURE (ISA)

An international nonprofit organization that supports professionals in the field of arboriculture by providing professional development opportunities, disseminating applicable research findings, and promoting the profession.

### INVENTORIED TREES

Includes all public trees collected in the inventory as well as trees that have since been collected by city staff.

### MAJOR MAINTENANCE

Includes major trimming or pruning or cabling, and any other similar act, which promotes the life, growth, health or beauty of trees, excepting watering and minor pruning.

### MAJOR TRIMMING AND PRUNING

The removal of branches of three inches in diameter or greater.

### MIGRATORY BIRD TREATY ACT (MBTA)

A United States federal law adopted to protect migratory birds.

### NATURAL AREA

A defined area where native trees and vegetation are allowed to grow and reproduce naturally with little or no management except for control of undesirable and invasive species.

### OAK WILT

A tree disease caused by the fungus *Ceratocystis fagacearum*. It is spread by sap feeding beetles and tree root grafts.

### OPEN SPACE

A defined area of undeveloped land that is open to the public. The land can include native or naturalized trees and vegetation.

### PLANT HEALTH CARE (PHC)

A program that consists of (1) routinely monitoring landscape plant health and (2) individualized plant management recommendations in order to maintain or improve the vitality, appearance, and safety of trees and other plants.

### PERSONAL PROTECTIVE EQUIPMENT (PPE)

Equipment worn to enhance workplace safety and minimize the risk to physical hazards (e.g. gloves, hard hats, bodysuits, and foot, eye, or ear protection).

### PRIVATE TREE

Any tree located on private property, including residential and commercial parcels.

### PROTECTED TREE

Landmark, heritage, quality, or secondary trees.

### PUBLIC TREE

Any tree located in the public ROW, city park, and/or city facility.

## Appendices . —

### RIGHT TREE RIGHT PLACE

The practice of installing the optimal species for a particular planting site. Considerations include existing and planned utilities and other infrastructure, planter size, soil characteristics, water needs as well as the intended role and characteristics of the species.

### SPECIMEN TREE

Any tree of interest because of size or unusual species, other than a heritage tree, which is of good quality in terms of health, vigor or growth and conformity to generally, accepted horticultural standards of shape for its species, as designated by the city council upon the recommendation of the tree commission.

### STREET TREE

Any tree growing within the tree maintenance strip whether or not planted by the city.

### STRUCTURAL AND TRAINING PRUNING

Pruning to develop a sound and desirable scaffold branch structure in a tree and to reduce the likelihood of branch failure.

### TREE

Any live woody plant having one or more well-defined perennial stems with a diameter at maturity of six inches or more measured at fifty-four inches above ground level (breast height).

### TREE CANOPY

The layer of leaves, branches, and stems of trees that cover the ground when viewed from above.

### TREE CITY USA

A program through the Arbor Day Foundation that advocates for green urban areas through enhanced tree planting and care

### TREE RISK ASSESSMENT QUALIFIED (TRAQ)

An International Society of Arboriculture qualification. Upon completion of this training, tree care professionals demonstrate proficiency in assessing tree risk.

### URBAN FOREST

The collection of privately owned and publicly owned trees and woody shrubs that grow within an urban area.

### URBAN FOREST MASTER PLAN (PLAN)

A document that provides a comprehensive information, recommendations, and timelines to guide for the efficient and safe management of a city's tree canopy. The Plan uses adaptive management model to provide reasoned and transparent calls to action from an inventory of existing resources.

### URBAN FORESTRY

The cultivation and management of native or introduced trees and related vegetation in urban areas for their present and potential contribution to the economic, physiological, sociological, and ecological well-being of urban society.

### URBAN TREE CANOPY ASSESSMENT (UTC)

A document based off of GIS mapping data that provides a birds-eye view of the entire urban forest and establishes a tree canopy baseline of known accuracy. The UTC helps managers understand the quantity and distribution of existing tree canopy, potential impacts of tree planting and removal, quantified annual benefits trees provide to the community, and benchmark canopy percent values.

### WILDFIRE URBAN INTERFACE (WUI)

A transition zone where homes are located on the edge of fire prone areas, and are at an increased risk of personal injury or property damage resulting from a wildfire.





# Appendices

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# Appendices

## APPENDIX C: INDUSTRY STANDARDS

### **ANSI Z133 SAFETY STANDARD, 2017**

Reviews general safety, electrical hazards, use of vehicles and mobile equipment, portable power hand tools, hand tools and ladders, climbing, and work procedures.

### **ANSI A300**

ANSI A300 standards represent the industry consensus on performing tree care operations. The standards can be used to prepare tree care contract specifications.

ANSI A300 Pruning Standard-Part 1, 2017

ANSI A300 Soil Management-Part 2, 2011

ANSI A300 Support Systems Standard-Part 3, 2013

ANSI A300 Construction Management Standard-Part 5, 2012

ANSI A300 Transplanting Standard-Part 6, 2012

ANSI A300 Integrated Vegetation Management Standard-Part 7, 2012

ANSI A300 Root Management Standard-Part 8, 2013

ANSI A300 Tree Risk Assessment Standard. Tree Failure-Part 9, 2017

ANSI A300 Integrated Pest Management-Part 10, 2016

Includes guidelines for implementing IPM programs, including standards for Integrated Pest Management, IPM Practices, tools and equipment, and definition.

## BEST MANAGEMENT PRACTICES (BMPS)

### **INTEGRATED PEST MANAGEMENT, SECOND EDITION, 2016**

Provides a comprehensive overview of the basic definitions, concepts, and practices that pertain to landscape Integrated Pest Management (IPM). The publication provides specific information for designing, planning, and implementing an IPM program as part of a comprehensive Plant Health Care (PHC) management system, including topics such as:

- IPM Concepts and Definitions
- Action Thresholds
- Monitoring Tools and Techniques
- Preventive Tactics
- Control Tactics
- Documentation and Recordkeeping

### **INTEGRATED VEGETATION MANAGEMENT, SECOND EDITION, RANDALL H. MILLER, 2014**

A guide to the selection and application of methods and techniques for vegetation control for electric rights-of-way projects and gas pipeline rights-of-way. Topics included: safety, site evaluations, action thresholds, evaluation and selection of control methods, implementing control methods, monitoring treatment and quality assurance, environmental protection, tree pruning and removal, and a glossary of terms.

### **MANAGING TREES DURING CONSTRUCTION, SECOND EDITION, KELBY FITE & E. THOMAS SMILEY, 2016**

Describes tree conservation and preservation practices that help to protect selected trees throughout the construction planning and development process so that they will continue to provide benefits for decades after site disturbance, including planning phase, design phase, pre-construction phase, construction phase, and post-construction phase.

### **ROOT MANAGEMENT, LARRY COSTELLO, GARY WATSON, AND TOM SMILEY, 2017**

Recommended practices for inspecting, pruning, and directing the roots of trees in urban environments to promote their longevity, while minimizing infrastructure conflicts.

Special companion publication to the ANSI A300 Part 8: Tree, Shrub, and Other Woody Plant Management-Standard Practices (Root Management)

### **TREE PLANTING, SECOND EDITION, GARY WATSON, 2014**

Provides processes for tree planting, including site and species selection, planting practices, post-planting pruning, and early tree care. Other topics included are time of planting, nursery stock (types, selection, and handling), preparing the planting hole, planting practices, root loss and new root growth, redevelopment of root structure, pruning, palms, after planting, final inspection, and a glossary of terms.

### **TREE INVENTORIES, SECOND EDITION, JERRY BOND, 2013**

Provides considerations for managing large numbers of trees considered as individuals rather than groups and serves as guide for making informed decisions that align with inventory goals with needs and resources, including inventory goals and objectives, benefits and costs, types, work specifications, and maintaining inventory quality.

### **TREE RISK ASSESSMENT, SECOND EDITION, E. THOMAS SMILEY, NELDA MATHENY, AND SHARON LILLY, 2017**

A guide for assessing tree risk as accurately and consistently as possible, to evaluate that risk, and to recommend measures that achieve an acceptable level of risk, including topics such as: risk assessment basics, levels and scope of tree risk assessment, assessing targets, sites, and trees, tree risk categorization, risk mitigation (preventive and remedial actions), risk reporting, tree related conflicts that can be a source of risk, loads on trees, structural defects and conditions that affect likelihood of failure, response growth, and description of selected types of advanced tree risk assessments.

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## **TREE SHRUB FERTILIZATION, THIRD EDITION, E. THOMAS SMILEY, SHARON LILLY, AND PATRICK KELSEY, 2013**

Aids in the selection and application of fertilizers for trees and shrubs, including essential elements, determining goals and objectives of fertilization, soil testing and plan analysis, fertilizer selection, timing, application, application area, rates, storage and handling of fertilizer, sample fertilizer contract for commercial/municipal clients.

## **SOIL MANAGEMENT, BRYANT SCHARENBRUCH, E. THOMAS SMILEY, AND WES KOCHER, 2014**

Focuses on the protection and restoration of soil quality that support trees and shrubs in the urban environment, including goals of soil management, assessment, sampling, and analysis, modifications and amendments, tillage, conservation, and a glossary of terms.

## **UTILITY PRUNING OF TREES**

Describes the current best practices in utility tree pruning based on scientific research and proven methodology for the safe and reliable delivery of utility services, while preventing unnecessary injury to trees. An overview of safety, tools and equipment, pruning methods and practices, and emergency restoration are included.

## APPENDIX D: ONLINE COMMUNITY SURVEY RESULTS

### **SOUTH SAN FRANCISCO–COMMUNITY SURVEY**

#### **Introduction–South San Francisco Urban Forest**

The trees planted throughout the City of South San Francisco, on both public and private property, are its “urban forest.” Scientists have found that urban forests provide many environmental and health benefits. The City of South San Francisco has contracted with Davey Resource Group, Inc. to develop an Urban Forest Master Plan (UFMP) to support the urban forest and the benefits that it provides to the community.

The Plan will provide a vision for the future of the city's urban forest and goals for maintenance, planting, and management to be implemented over the next 20 years.

Your response to the following questions will help us more clearly understand community values and will help guide the development of the UFMP.

This survey should take you 5 to 10 minutes to complete. Thank you for your participation.

#### **1. Trees are important to the quality of life in South San Francisco.**

	Response %	Response Count
Very True	89.33%	67
True	9.33%	7
Not Sure	1.33%	1
Not True	0.00%	0
Definitely, not true	0.00%	0
Total		75

Trees provide numerous benefits to the community and the environment. Understanding which benefits are most appreciated by residents can help guide long-term management strategies.

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## 2. Which benefits provided by trees do you value most? Please select the top three (3) benefits.

	Response %	Response Count
Improved air quality	70.67%	53
Bird, butterfly, other wildlife habitat	60.00%	45
Privacy/Screening	42.67%	32
Energy savings	32.00%	24
Increased property values	22.67%	17
Reduced Greenhouse Gases	16.00%	12
Improved human health	16.00%	12
Reductions in stormwater	12.00%	9
Improved water quality	12.00%	9
Shade	4.00%	3
Noise buffering	4.00%	3
Aesthetics	2.67%	2
Other (please specify)	1.33%	1
• All of the above		
• Good for kids to see, play hide & seek, & climb		
• Wind buffer		
<b>Total</b>		<b>75</b>

## 3. Optional. Use this space to provide additional comments on the benefits of South San Francisco's trees.

- Who is going to fix the sidewalks when the roots crack the concrete?
- Trees create a haven for relaxation and reflection. It is vital for our physical and emotional to be closer to nature. I would love to see a door to door tree program in the Brentwood park neighborhood so we can truly make a literal neighborhood full of "woods" ( ie: rosewood, wildwood, Northwood). It would be so nice to come home from the hustle and bustle and feel a sense of calm in a nicely wooded neighborhood.
- Taking the time now to plan for planting trees to off-set the air quality and pollution due to extensive new development and increased populations is an investment in our city for current and future generations.
- They improve the aesthetics
- I like to win the city would let you plant one at your home and they would do the maintenance on the tree
- Stop building
- When I was 10 and 11 years old Mr. E. De Monty was our teacher, we planted the trees on the hills to reprove the environment.
- Sense of wellbeing, beauty
- Get rid of the eucalyptus trees!
- Look at google earth from a certain height and you notice our City looks grey and most other affluent City's look green. Tree lined streets can provide shade, and wind buffers.
- Trees add a nice touch to the city. No eucalyptus trees please
- The Sunshine Gardens neighborhood could especially use more trees, however long time residents who care little for aesthetics will unlikely be motivated to plant a tree in their front yard, especially if they think their water bill will increase. Will these "city trees" be watered by the city? Promoting the program requires careful targeting to these uninformed folks.
- Trees add beauty
- It will improve the beauty of the city. SSF. Is bleak compared to the rest of the peninsula. Increase self worth of population, help block the wind in some cases. Increase property values. Might encourage residents to take care of outdoor space rather than parking on the lawns, might pick up garbage rather than toss in front of house
- Will give residents more pride in their community

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- Large trees help diffuse the high winds we have. Should've been thought out better at Orange Park for example where the wind just whips through the playground.
- We collect rainwater. We channel the water to storm drains, We pay the state to dump the water into the bay. If we cannot keep the rainwater where it falls by providing local reservoirs, why can't we at least use the water to keep our parks green?
- Trees are therapeutic on many levels.
- Trees along streets, property lines and open space must be maintained, trimmed, inspected annually
- Trees not only add to well being of the city and its population they also increase the aesthetics of the city. Palo Alto, Redwood City and Burlingame are beautiful cities and their trees are 100% responsible for that beauty.
- Increased trees in general can help improve our health, quality of life, slow traffic and increase overall well being of the community. Choosing native species and cultivars increases ecological benefits and bio diversity.
- Improved quality of life to be able to walk tree lined streets.
- N/A
- It makes the city look friendlier and softer, not just buildings
- Have always wanted my neighborhood to have tree's planted on sidewalks. Live in Mayfair village area. Would make our city look much more beautiful and give our wildlife a place to rest/live.
- So many neighborhoods seem to lack trees so I appreciate the city designing more trees into new and existing places
- I'm sad that so many trees have fallen/have been cut down recently but I understand that people are nervous about big trees near their homes. I have one up the hill behind me that makes me nervous every time we have moderate winds and I don't know what to do about it since it's not my tree.
- Beautify the surroundings
- Help provide buffer from wind
- Happy to see a future improved So. San Francisco.
- I am saddened that it seems the city, in response to extended drought chose to the people that "brown is the new green" instead of encouraging drought resistant plants.

## Canopy Goals and Tree Planting

Nearby communities have the following canopy cover:

- City of Mountain View has 17.7%
- City of San Jose has 15.4%
- City of San Francisco has 13.7%
- Daly City has 5%

South San Francisco trees are providing 8.7% canopy cover. Considering impervious surface and open water, the potential for canopy in South San Francisco is 22.6%.

Existing canopy cover in South San Francisco varies by zoning and land use:

- Parks have an average 22.7%
- Parks and Recreation zone has 19.9%
- Open Space with 17.2%
- Low-density residential areas have an average of 10.7%
- Commercial designations have an average 5.4%

## 4. Are there enough trees in South San Francisco?

	Response %	Response Count
Yes, there are enough trees	4.23%	3
No, there are not enough trees	85.92%	61
There are too many trees	0.00%	0
Not sure	9.86%	7
Total		71 (4 skipped)

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## 5. Where would you like to see more trees planted? Select your top three (3).

	Response %	Response Count
Parks and open space	42.25	30
Medians	43.66	31
Industrial areas	15.49	11
Commercial areas	50.70	36
Private property	32.39	23
Green roofs	4.23	3
Streets and parking strips	52.11	37
New developments	42.25	30
No additional trees	0.00	0
Other (please specify)	7.04	5
• Brentwood shopping center		
• Schools (2 responses)		
• I would like to see those ugly pine trees on Junipero Serra cut down and that whole highway be redone.		
• On the hill and mountain		
<b>Total</b>		<b>71 (4 skipped)</b>

## 6. What canopy goal should South San Francisco adopt?

	Response %	Response Count
22.6% (potential)	76.06	54
15%	19.72	14
10%	1.41	1
No net-loss, maintain the current level of canopy cover 8.7%	1.41	1
Other (please specify)	1.41	1
• Not sure		
<b>Total</b>		<b>71 (4 skipped)</b>

## 7. Optional. Please use this space for any additional comments about canopy cover in South San Francisco.

- If you plant trees near the side walk the city should be responsible for the repairs.
- 22.6% does not seem realistic, but increasing canopy coverage along main thoroughfares, such as along 101, South Airport, Westborough, Gellert, Hickey, Orange, El Camino etc would help with air pollution, aesthetics and overall health for residents.
- No comment
- Stop building
- Empty lots owned by the city without development plans should be forested.
- I wish there was a center where we can monitor and show the public about the improvements and benefits of air quality due to the addition and care of plants in our community.
- Visit other communities in the Bay Area. Ask yourself why South San Francisco must always take a backseat to these other places. We are told that our residents are not the correct "demographics" for improvements. What does that mean?
- Trees with blossoms
- An area of concern is the current removal requirements for trees on private property, as well as annual maintenance of existing trees on city property, in residential areas. I cannot be responsible for costs associated with city trees that cause problems to sidewalks, injury to others and be coninuting responsible to notify you when there is a potential problem!
- There is definitely not enough canopy cover in SSF.
- I appreciate canopy cover but I hope the planners take into account the reality of earthquakes and the resulting potential damage if the "right" canopy is not selected.
- N/A
- The cities mentioned in the previous questions are south of SSF and get more sun and heat so I can see why people wouldn't require quite as many trees here--we never see the sun.
- Junipero Serra pine trees got to go. What about dogwood trees or maples. That whole strip needs to be redone and refreshed. Look at how nice the trees are in Burlingame or Stanford.
- For the protection of people especially when raining
- Incentives for residents to plant trees would be great! Sunshine gardens has very few trees and could benefit from more!
- Residents used to have to maintain some portion of "green space" in front of individual homes but it seems too many areas are being paved over or covered in rocks.

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## Tree Protection

Maintenance practices can impact tree health. Topping and other improper practices can harm trees, introduce pests, create safety issues, and prematurely kill trees. Proper tree care preserves tree health and structure and promotes greater benefits over time.

City Ordinance No. 1271-2000 requires a permit for the removal of City trees and trees designated as "protected" on private property. Currently, the maximum penalty for an unpermitted removal is \$1,000. However, this amount rarely covers the value of the tree and the cost for replacement.

### 8. Would you support a higher penalty for unpermitted removals?

	Response %	Response Count
Yes	49.30	35
No	28.17	20
Not sure	22.54	16
Total		71 (4 skipped)

### 9. Should the City require professional licensing for tree care providers?

	Response %	Response Count
Yes	50.70	36
No	23.94	17
Not sure	25.35	18
Total		71 (4 skipped)

### 10. Describe your awareness and/or interactions with South San Francisco's urban forest program. Please check all that apply.

	Response %	Response Count
I was aware that the City responds to tree emergencies.	43.66	31
I have seen City crews working on trees.	66.23	47
I have used the City website or called for tree information.	21.13	15
I did not know that the City had a program to care for trees.	36.62	26
I have read about the program in City-wide newsletters.	25.35	18
I have participated in Arbor Day and volunteer planting events.	29.58	21
Other (please specify)	7.04	5
<ul style="list-style-type: none"> <li>I just found out through recently about South city's urban forest program, and would like to participate.</li> </ul>		
<ul style="list-style-type: none"> <li>I called the tree department about a tree in my front yard that is threatening the street light electrical cord, and the woman I spoke with basically said that it was my responsibility to maintain the tree. I am confused about why she would decide for the city that damage to the wire isn't a priority. I am disappointed that she refused to send someone to my house to prune the tree. I will be calling about this issue again</li> </ul>		
<ul style="list-style-type: none"> <li>Never once has my request been responded to appropriately within two weeks!</li> </ul>		
<ul style="list-style-type: none"> <li>On my street on Fairfax way the trees are overly pruned. It's damaging to the trees, and the trees never get the opportunity to develop a canopy. Therefore, it's not only visually unappealing, the trees provide no shade and can't be used as homes for birds/wildlife.</li> </ul>		
<ul style="list-style-type: none"> <li>I saw the adopt a tree info in newsletter</li> </ul>		
Total		71 (4 skipped)



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## 11. What level of care for public trees would you prefer?

	Response %	Response Count
Minimal/Reactive—prune for visibility, sidewalk/street clearance, addressing service requests and immediate hazards		
Proactive—cyclical maintenance, regular pruning/inspection	11.27	8
Tree Health Care—optimal tree care to address structure, pests, diseases, etc.	52.11	27
Other (please specify)	35.21	25
• Get rid of the pine trees. They are a nuisance	1.41	1
<b>Total</b>		<b>71 (4 skipped)</b>

## 12. Optional. Please use this additional space for any comments about the care of trees.

- I have seen other cities have interactive websites with information on trees that will grow well in the area, have information on tree maintenance resources, and even downloadable booklets. That may be worthwhile for South San Francisco.
- No comment
- Guidance on how homeowners and renters can maintain trees, including a rental program for tools.
- Stop building
- Hire more staff for the tree care!
- I would appreciate more education on this subject.
- As I said before I think the city has an obligation to maintain trees around electrical wires that are owned by the city, on residential/commercial/city property, it behooves the city to prune trees to avoid further electrical damage costs.
- If we impose too many restrictions on private protection and removal of trees it will deter residents from planting
- Tree selection is the key.
- I hope that you are caring for the trees in the Westborough area. Lived there since 1971. Saw a tree grow up. Unfortunately, it covers the beautiful view I once had but appreciate its majesty. Concern - hope the City is caring for all trees' good health. If the tree in the green area behind my house dies, my house is in the line of its drop.
- Please address the overly, unnecessary pruning of all the trees on Fairfax Way.
- N/A
- Why did all the trees along Juniper Serra median get cut down? They didn't hurt visibility. If anything, the new plantings are going to be a visibility problem.
- Take a drive down Stanford or parts of Burlingame, Hillsborough and get some ideas about making south San Francisco aesthetically pleasing. Btw, the plants and trees on Junipero Serra and King across the street from that apartment complex are very nice.
- Everyone should participate
- I think the city should hire more employees to maintain our Urban Forest.

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## EDUCATION AND OUTREACH

The City organizes annual Arbor Day events and other tree planting events.

### 13. What education topics about trees interest you? Please select your top three (3).

	Response %	Response Count
Species selection	78.26	54
Basic pruning for young/small trees	65.22	45
Irrigation and watering	40.58	28
Benefits of trees	33.33	23
How to plant a tree	31.88	22
How to water a tree during drought	23.19	16
<ul style="list-style-type: none"> <li>How to maintain mature trees, root growth that breaks pipes and sidewalks, how to move trees.</li> </ul>	2.90	2
<ul style="list-style-type: none"> <li>How to care for trees</li> </ul>		
Total		69 (6 skipped)

### 14. What methods for education/outreach do you prefer? Please select your top three (3).

	Response %	Response Count
Web or App-based (electronic)	66.67	46
Workshops	46.38	32
Public tree plantings (Arbor Day, etc.)	40.58	28
Engagement through schools	40.58	28
Farmers Market (urban forestry info booth)	33.33	23
Pamphlets, Newsletters (hard copy)	30.43	21
Self-guided tours or demonstration gardens	27.54	19
Other (please specify)	0.00	0
Total		69 (6 skipped)

### 15. What volunteer/collaborative efforts interest you most? Please, select all that apply.

	Response %	Response Count
Volunteer Opportunities	75.36	52
Stewardship Program/Community Foresters	53.62	37
Company Sponsorship's (Adopt a Park/Adopt a Median)	42.03	29
Other (please specify)	4.35	3
<ul style="list-style-type: none"> <li>Collaborate more with the schools because they have large amounts of property to plant more trees on, and have a large community of parents, teachers, staff, and our next generations (the students).</li> </ul>		
<ul style="list-style-type: none"> <li>A number if parents and I volunteer at Monte Verde Elementary. With proper training, we would be happy to share our knowledge through our gardening program.</li> </ul>		
<ul style="list-style-type: none"> <li>not sure at this time</li> </ul>		
Total		69 (6 skipped)

## About You

### 16. What is your age?

	Response %	Response Count
35-44	36.23	25
45-54	20.29	14
55-64	17.39	12
65+	15.94	11
25-34	8.70	6
18-24	1.45	1
Under 18	0	0
Total		69 (6 skipped)

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### 17. What neighborhood do you live in?

	Response %	Response Count
Buri Buri/Alta Loma		
Avalon/Brentwood/Southwood	17.39%	12
Westborough	17.39%	12
Sign Hill/Stonegate	11.59%	8
Other (please specify)	8.70%	6
• Lower Parkway Heights	8.70%	6
• Old Town	7.25%	5
• Magnolia avenue and tamarack, this is the stop place for all buses taking pictures of Sign Hill	5.80%	4
• Chestnut and Miller	5.80%	4
• B street	4.35%	3
• Pecks lot	4.35%	3
Serra Highlands	4.35%	3
Paradise Valley/Hillside	1.45%	1
Sunshine Gardens	1.45%	1
Winston Manor/West Winston Manor	1.45%	1
Downtown/Lindenville/Village Way/South Airport	0.00%	0
Orange Park/Francisco Terrace	0.00%	0
Terrabay	0.00%	0
Baden/Commercial/Mayfair Village	0.00%	0
Tanforan/Mayfair Village	0.00%	0
East of 101	0.00%	0
Parkway	0.00%	0
Parkway Heights	0.00%	0
El Camino/Treasure Island	0.00%	0
Terrabay	0.00%	0
Brentwood	0.00%	0
Treasure Island	0.00%	0

Alta Loma	0.00%	0
Paradise Valley/Hillside	0.00%	0
Old Town	0.00%	0
South Airport	0.00%	0
Stonegate	0.00%	0
Village Way	0.00%	0
Mater Delorosa	0.00%	0
Mission Road	0.00%	0
Brentwood	0.00%	0
County Club	0.00%	0
Southwood	0.00%	0
Francisco Terrance	0.00%	0
Los Cerritos		
South Linden		
South Maple		
San Francisco High School		
Oyster Point Marina		
Total		69 (6 skipped)

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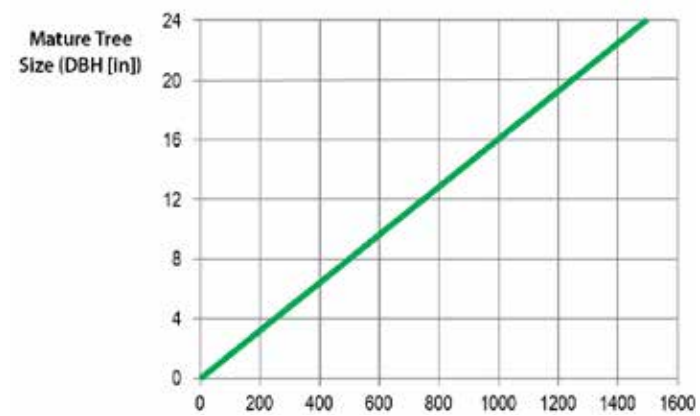
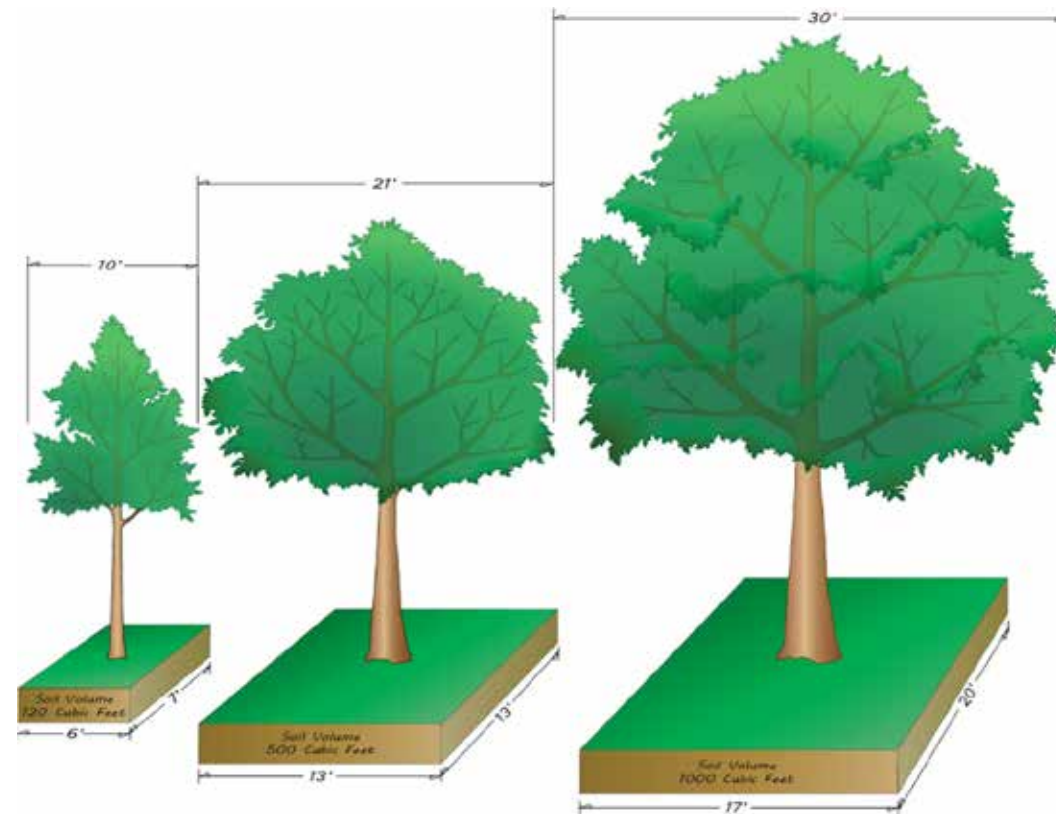
## Optional. Please provide any additional comments or feedback.

- No comment
- I have major allergies and know many cities want only Male trees planting to avoid the mess of flowering, fruiting and trees that drop onto cars, sidewalks and cars. I also would like help in dealing with mature trees that cross over property lines and drop sap and leaves onto neighbor property because of wind. Many property owners who rent homes refuse to maintain mature trees or repair fences that mature trees lean against to ruin. I want the City to provide clear rules and guidance that homeowners and tenants can abide by.
- Stop building
- Can the Eucalyptus trees in Orange park be replaced with other large species? San Bruno Park off of Crystal Springs has some beautiful trees but not sure their species.
- Please add a park to Sunshine Gardens.
- Are there free workshops currently offered for volunteers and the community?
- Would like to see more deciduous trees planted in street medians and public spaces. Also a more overall professional landscaping job done in our public spaces and streets!
- "Please let me know about any plans to promote residential trees in Sunshine Gardens. I will help if I can. Kathryn Van de Kamp 1041 Sunnyside drive 415-235-1777"
- I used to be on the Beautification Committee and became more aware of urban beauty through the committee.
- "An onsite workshop. Get a volunteer homeowner. Go to a treeless site, there are many to choose from, select location, show how to check for underground interference (pipes, sewer), select tree with particular emphasis on maximum size and height, maybe use chalk to mark, discuss wind issues, discuss debris issues so people know before selecting. Make one of those speeded up YouTube videos.
- Return to site for hands on planting, staking. Monitor and show photo on website once per year through maturity. People can visualize what tree will be like in 5 to 10 years and select accordingly.
- Another way would be to develop an experimental garden in Orange Park. Stake out a row for a species of tree or shrub. Plant one in the row each year or two for 5 or 10 years. Until the plant reaches maturity or decline. People can visualize what that cute little one gallon plant will look like in years (and maybe avoid planting it 12 inches from house or 6 inches from sidewalk!)"
- Thank you for the opportunity to provide input
- Mayfair could benefit with street trees as the original cherry blossoms planted in the 60's have all but died out.
- N/A
- Would love more trees in our neighborhood, feel neglected.
- Please cut down the ugly pine trees on Junipero Serra between Hickey and Westborough and redo that whole median. Add a lane, new trees like maples or dogwoods, and even a walkway. Also a lot of the homes in south San Francisco don't have trees because the city planners decades ago picked the wrong trees—obviously they were clueless. Hopefully, you guys can do a better job and plant trees in our neighborhood.
- More privilege for those who volunteer
- With all the new developments the city should require developers to plant a certain amount of trees with each development.
- Old, existing and removed tree roots seem to be causing problems in our area because of the close proximity of our buildings. I would like to know some guidelines about planting near buildings.
- Please give Randolph some much needed attention, the city is hiring outside companies for the care ,and it's not good.

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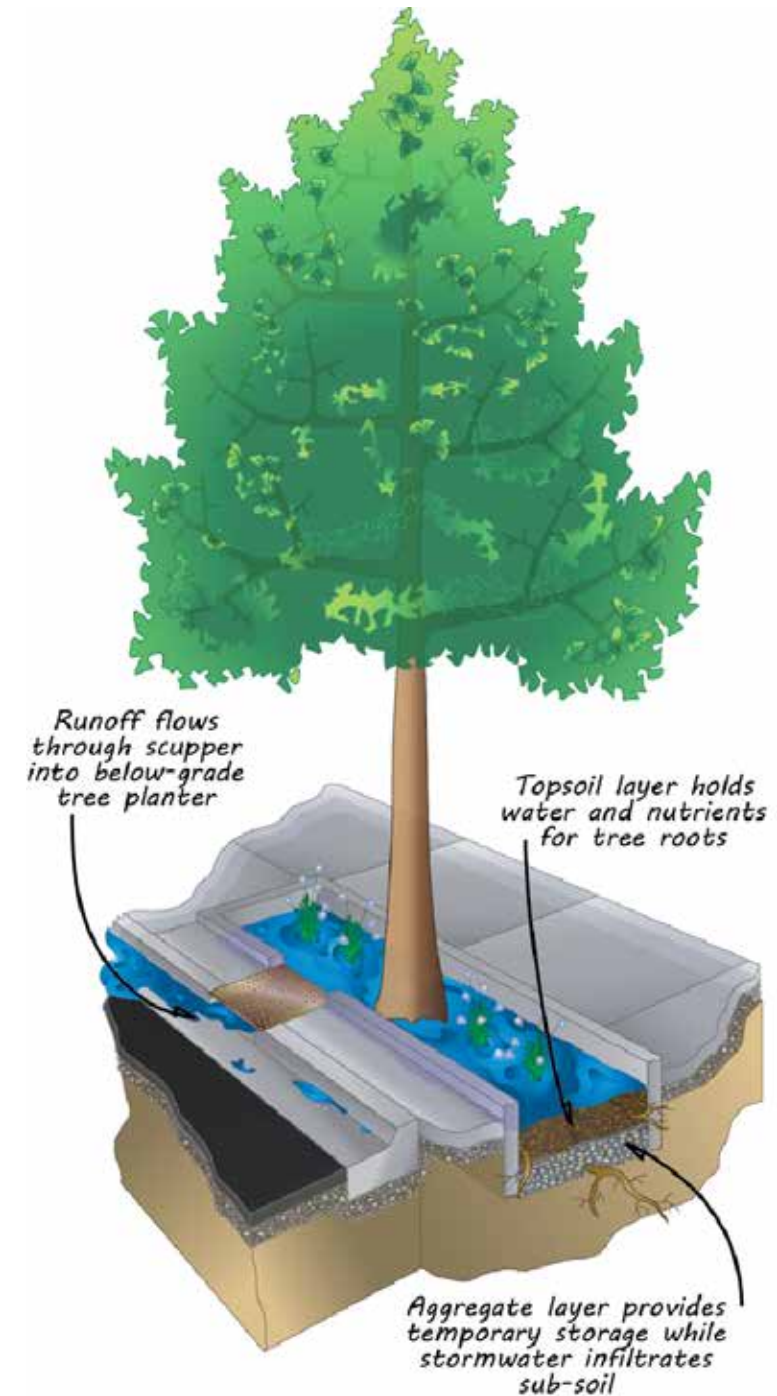
## APPENDIX E: SOIL VOLUME AND TREE STATURE

Tree growth is limited by soil volume. Larger stature trees require larger volumes of uncompacted soil to reach mature size and canopy spread (Casey Trees, 2008).



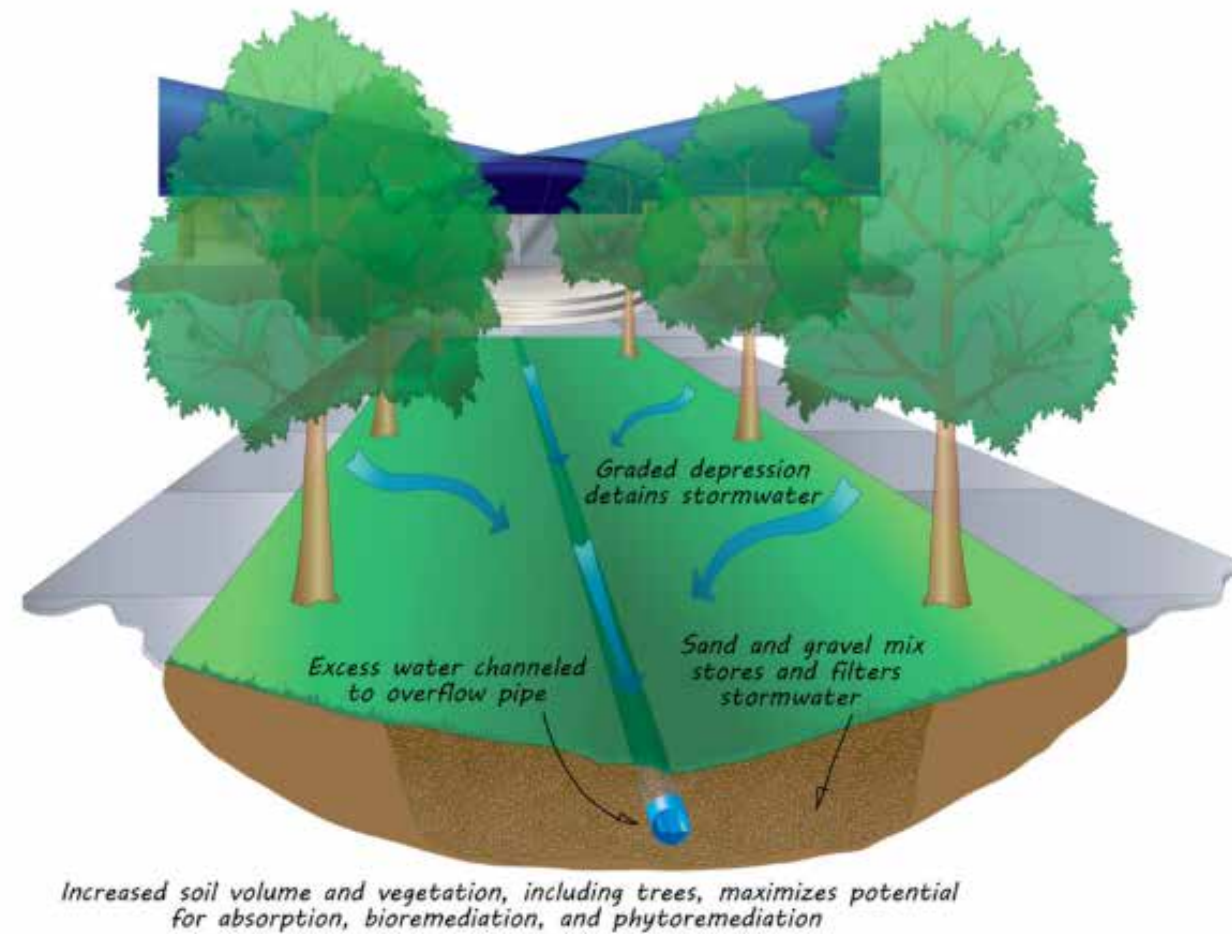
## APPENDIX F: ALTERNATIVE PLANTER DESIGNS

Stormwater tree pits are designed to collect runoff from streets, parking lots, and other impervious areas. Stormwater is directed into scuppers that flow into below-grade planters that then allow stormwater to infiltrate soils to supplement irrigation.

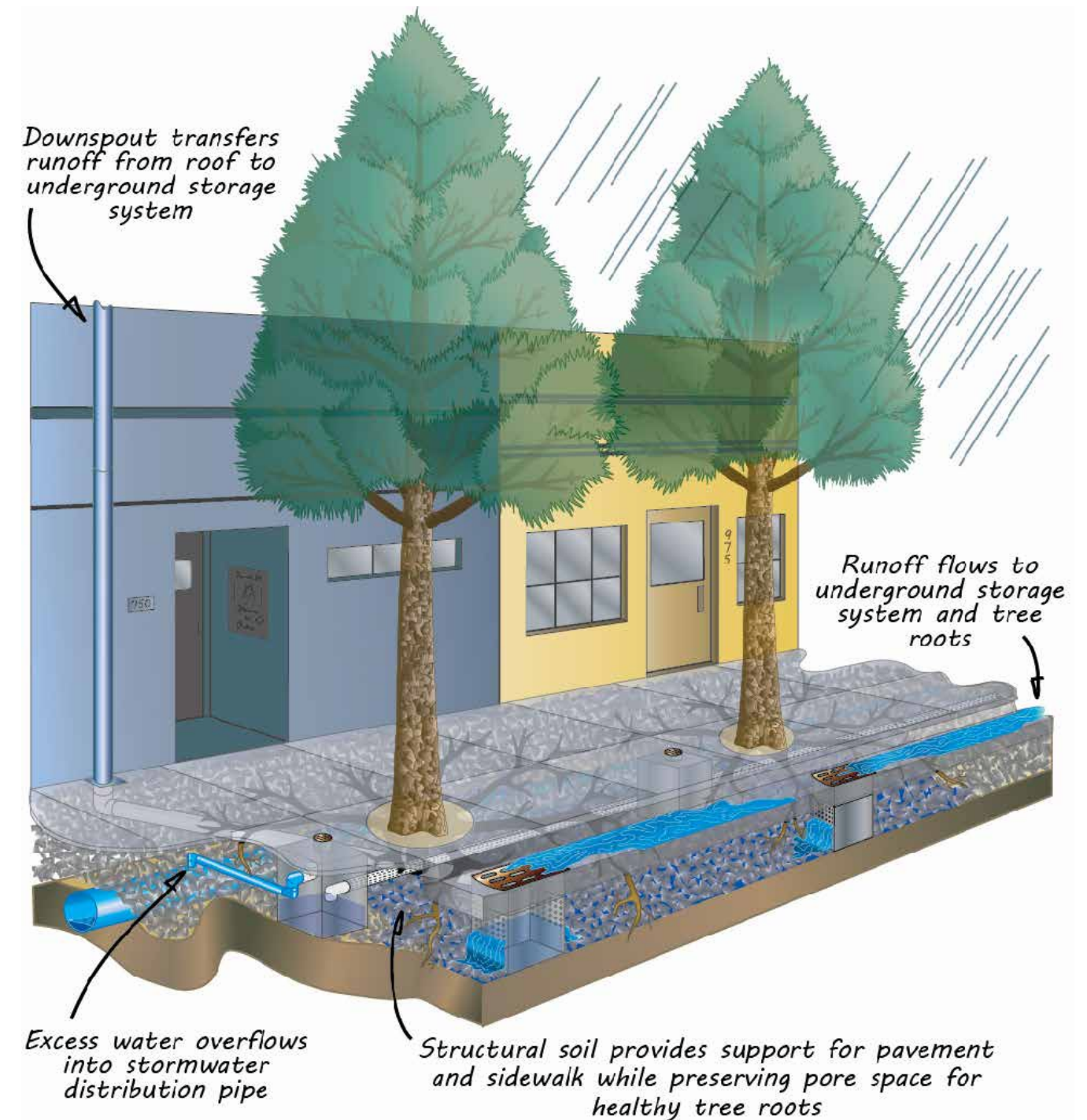


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Bioswales are landscaped drainage areas with gently sloped sides designed to provide temporary storage while runoff infiltrates the soil. They reduce off-site runoff and trap pollutants and silt.

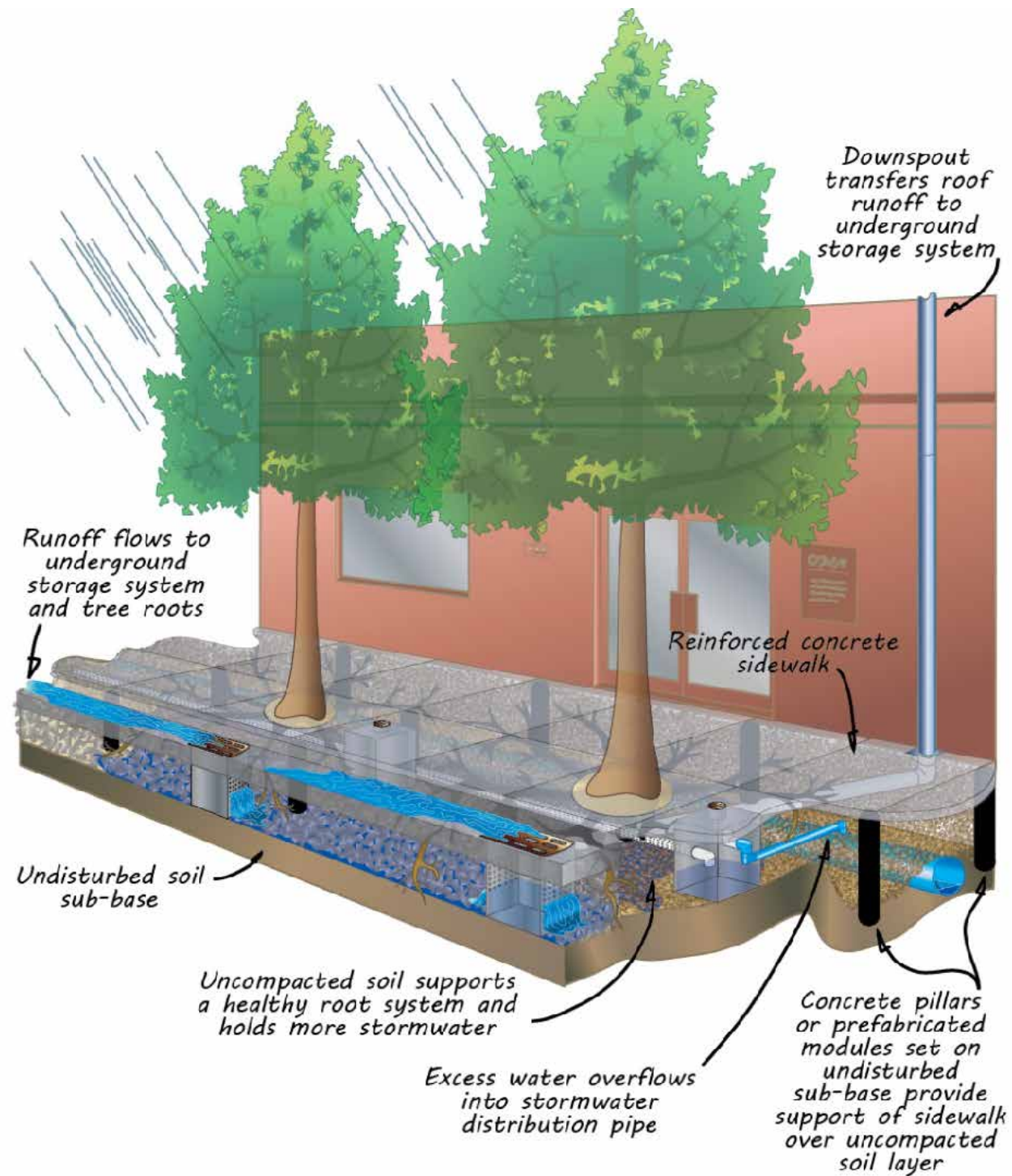


Structural soil is a highly porous, engineered aggregate mix, designed for use under asphalt and concrete as a load-bearing and leveling layer. Pore spaces allow for water infiltration and storage and also root growth.

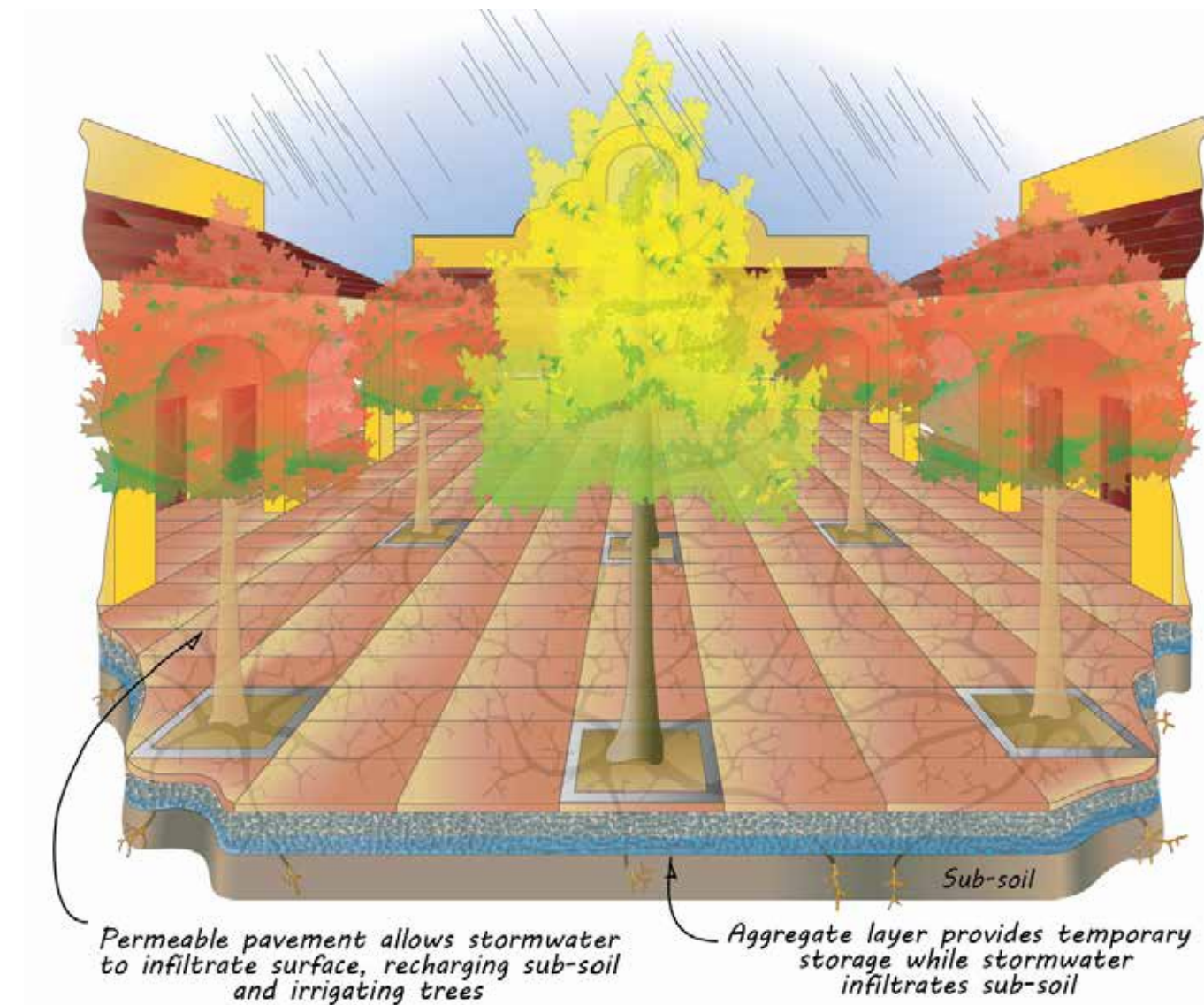


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Sidewalks use pillars or structured cell systems to support reinforced concrete, increasing the volume of uncompacted soil in subsurface planting areas and enhancing both root growth and stormwater storage.



Pervious pavements allow stormwater and oxygen to infiltrate the surface, promoting tree health and groundwater recharge



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## APPENDIX G: SUSTAINABLE URBAN FOREST INDICATORS

<i>Indicators of a Sustainable Urban Forest</i>		Assessed Performance Level		
		Low	Medium	High
<b>The Trees</b>	Urban Tree Canopy		X	
	Equitable Distribution		X	
	Size/Age Distribution	X		
	Condition of Public Trees - Streets, Parks		X	
	Condition of Public Trees - Natural Areas			X
	Trees on Private Property		X	
	Species Diversity		X	
	Suitability	X		
	Soil Volume	X		
	Neighborhood Action	X		
<b>The Players</b>	Large Private & Institutional Landholder Involvement		X	
	Green Industry Involvement	X		
	City Department/Agency Cooperation		X	
	Funder Engagement	X		
	Utility Engagement		X	
	Developer Engagement		X	
	Public Awareness		X	
	Regional Collaboration	X		
<b>The Management Approach</b>	Tree Inventory		X	
	Canopy Assessment			X
	Management Plan		X	
	Risk Management Program			X
	Maintenance of Publicly-Owned Trees (ROWs)		X	
	Maintenance of Publicly-Owned Trees Natural Areas		X	
	Planting Program	X		
	Tree Protection Policy		X	
	City Staffing and Equipment		X	
	Funding		X	
	Disaster Preparedness & Response		X	
	Communications		X	
	Totals	8	19	3



## A Sustainable Urban Forest Indicators: The Trees

Indicators of a Sustainable Urban Forest	Overall Objective or Industry Standard	Performance Levels		
		Low	Medium	High
Urban Tree Canopy	Achieve the desired tree canopy cover according to goals set for the entire city and neighborhoods. Alternatively, achieve 75% of the total canopy possible for the entire city and in each neighborhood."	Canopy is decreasing. - and/or - No canopy goals have been set.	Canopy is not dropping, but not on a trajectory to achieve the established goal.	Canopy goal is achieved, or well on the way to achievement.
Location of Canopy (Equitable Distribution)	Achieve low variation between tree canopy and equity factors citywide by neighborhood. Ensure that the benefits of tree canopy are available to all, especially for those most affected by these benefits.	Tree planting and public outreach and education is not determined by tree canopy cover or benefits.	Tree planting and public outreach and education is focused on neighborhoods with low tree canopy.	Tree planting and public outreach and education is focused in neighborhoods with low tree canopy and a high need for tree benefits.
Age of Trees (Size and Age Distribution)	Establish a diverse-aged population of public trees across the entire city and for each neighborhood. Ideal standard: 0-8" DBH: 40%                      9-17" DBH: 30% 18-24" DBH: 20%                    Over 24" DBH: 10%	No current information is available on size. - OR - Age distribution is not proportionally distributed across size classes at the city level.	Size classes are evenly distributed at the city level, though unevenly distributed at the neighborhood level.	Age distribution is generally aligned with the ideal standard diameter classes at the neighborhood level.
Condition of Publicly Owned Trees (trees managed intensively)	Possess a detailed understanding of tree condition and potential risk of all intensively-managed, publicly-owned trees. This information is used to direct maintenance actions.	No current information is available on tree condition or risk.	Information from a partial or sample or inventory is used to assess tree condition and risk.	Information from a current, GIS-based, 100% complete public tree inventory is used to indicate tree condition and risk.
Condition of Publicly-Owned Natural Areas (trees managed extensively)	Possess a detailed understanding of the ecological structure and function of all publicly-owned natural areas (such as woodlands, ravines, stream corridors, etc.), as well as usage patterns.	No current information is available on tree condition or risk.	Publicly-owned natural areas are identified in a sample-based "natural areas survey" or similar data.	Information from a current, GIS-based, 100% complete natural areas survey is utilized to document ecological structure and function, as well as usage patterns.
Trees on Private Property	Possess a solid understanding of the extent, location and general condition of trees on private lands.	No data is available on private trees.	Current tree canopy assessment reflects basic information (location) of both public and private canopy combined.	Detailed information available on private trees. Ex. bottom-up sample-based assessment of trees.
Diversity	Establish a genetically diverse population of publicly-owned trees across the entire city and for each neighborhood. Tree populations should be comprised of no more than 30% of any family, 20% of any genus, or 10% of any species.	No current information is available on species. - OR - Fewer than five species dominate the entire tree population citywide.	No species represents more than 20% of the entire tree population citywide.	No species represents more than 10% of the entire tree population citywide.
Climate Resilience/ Suitability	Establish a tree population suited to the urban environment and adapted to the overall region. Suitable species are gauged by exposure to imminent threats, considering the "Right Tree for the Right Place" concept and invasive species.	No current information is available on species suitability. - OR - Less than 50% of trees are considered suitable for the site.	50% to 75% of trees are considered suitable for the site.	More than 75% of trees are considered suitable for the site.
Space and Soil Volume	Establish minimum street tree soil volume requirements to ensure there is adequate space and soil for street trees to thrive. Minimum soil volumes by mature size: 1000 cubic feet for large trees; 600 cubic feet for medium trees; 300 cubic feet for small trees.	Minimum street tree soil volumes have not been established.	Minimum street tree soil volume has been established based on mature size of tree.	Minimum street tree soil volumes have been established and are required to be adhered to for all new street tree planting projects.

## A Sustainable Urban Forest Indicators: The Players

Indicators of a Sustainable Urban Forest	Overall Objective or Industry Standard	Performance Levels		
		Low	Medium	High
<b>Neighborhood Action</b>	Citizens understand, cooperate, and participate in urban forest management at the neighborhood level. Urban forestry is a neighborhood-scale issue.	Little or no citizen involvement or neighborhood action.	Some active groups are engaged in advancing urban forestry activity, but with no unified set of goals or priorities.	The majority of all neighborhoods are organized, connected, and working towards a unified set of goals and priorities.
<b>Large Private &amp; Institutional Landholder Involvement</b>	Large, private, and institutional landholders embrace citywide goals and objectives through targeted resource management plans.	Large private land holders are unaware of issues and potential influence in the urban forest. No large private land management plans are currently in place.	Education materials and advice is available to large private landholders. Few large private landholders or institutions have management plans in place.	Clear and concise goals are established for large private land holders through direct education and assistance programs. Key landholders and institutions have management plans in place.
<b>Green Industry Involvement</b>	The green industry works together to advance citywide urban forest goals and objectives. The city and its partners capitalize on local green industry expertise and innovation.	Little or no involvement from green industry leaders to advance local urban forestry goals.	Some partnerships are in place to advance local urban forestry goals, but more often for the short-term.	Long-term committed partnerships are working to advance local urban forestry goals.
<b>City Department and Agency Cooperation</b>	All city departments and agencies cooperate to advance citywide urban forestry goals and objectives.	Conflicting goals and/or actions among city departments and agencies.	Informal teams among departments and agencies are communicating and implementing common goals on a project-specific basis.	Common goals and collaboration occur across all departments and agencies. City policy and actions are implemented by formal interdepartmental and interagency working teams on all city projects.
<b>Funder Engagement</b>	Local funders are engaged and invested in urban forestry initiatives. Funding is adequate to implement citywide urban forest management plan.	Little or no funders are engaged in urban forestry initiatives.	Funders are engaged in urban forestry initiatives at minimal levels for short-term projects.	Multiple funders are fully engaged and active in urban forestry initiatives for short-term projects and long-term goals.
<b>Utility Engagement</b>	All utilities are aware of and vested in the urban forest and cooperates to advance citywide urban forest goals and objectives.	Utilities and city agencies act independently of urban forestry efforts. No coordination exists.	Utilities and city agencies have engaged in dialogues about urban forestry efforts with respect to capital improvement and infrastructure projects.	Utilities, city agencies, and other stakeholders integrate and collaborate on all urban forestry efforts, including planning, site work, and outreach/education.
<b>State Engagement</b>	State departments/agencies are aware of and vested in the urban forest and cooperates to advance citywide urban forest goals and objectives.	State departments/agencies and City agencies act independently of urban forestry efforts. No coordination exists.	State department/agencies and City agencies have engaged in dialogues about urban forestry efforts with respect to capital improvement and infrastructure projects.	State departments/agencies, City agencies, and other stakeholders integrate and collaborate on all urban forestry efforts, including planning, site work, and outreach/education.
<b>Public Awareness</b>	The general public understands the benefits of trees and advocates for the role and importance of the urban forest.	Trees are generally seen as a nuisance, and thus, a drain on city budgets and personal paychecks.	Trees are generally recognized as important and beneficial.	Trees are seen as valuable infrastructure and vital to the community's well-being. The urban forest is recognized for the unique environmental, economic, and social services its provides to the community.
<b>Regional Collaboration</b>	Neighboring communities and regional groups are actively cooperating and interacting to advance the region's stake in the city's urban forest.	Little or no interaction between neighboring communities and regional groups.	Neighboring communities and regional groups share similar goals and policy vehicles related to trees and the urban forest.	Regional urban forestry planning, coordination, and management is widespread.

## A Sustainable Urban Forest Indicators: The Management Approach

Indicators of a Sustainable Urban Forest	Overall Objective or Industry Standard	Performance Levels		
		Low	Medium	High
Tree Inventory	Comprehensive, GIS-based, current inventory of all intensively-managed public trees to guide management, with mechanisms in place to keep data current and available for use. Data allows for analysis of age distribution, condition, risk, diversity, and suitability.	No inventory or out-of-date inventory of publicly-owned trees.	Partial or sample-based inventory of publicly-owned trees, inconsistently updated.	Complete, GIS-based inventory of publicly-owned trees, updated on a regular, systematic basis.
Canopy Assessment	Accurate, high-resolution, and recent assessment of existing and potential city-wide tree canopy cover that is regularly updated and available for use across various departments, agencies, and/or disciplines.	No tree canopy assessment.	Sample-based canopy cover assessment, or dated (over 10 years old) high resolution canopy assessment.	High-resolution tree canopy assessment using aerial photographs or satellite imagery.
Management Plan	Existence and buy-in of a comprehensive urban forest management plan to achieve city-wide goals. Re-evaluation is conducted every 5 to 10 years.	No urban forest management plan exists.	A plan for the publicly-owned forest resource exists but is limited in scope, acceptance, and implementation.	A comprehensive plan for the publicly owned forest resource exists and is accepted and implemented.
Risk Management Program	All publicly-owned trees are managed for maximum public safety by way of maintaining a city-wide inventory, conducting proactive annual inspections, and eliminating hazards within a set timeframe based on risk level. Risk management program is outlined in the management plan.	Request-based, reactive system. The condition of publicly-owned trees is unknown.	There is some degree of risk abatement thanks to knowledge of condition of publicly-owned trees, though generally still managed as a request-based reactive system.	There is a complete tree inventory with risk assessment data and a risk abatement program in effect. Hazards are eliminated within a set time period depending on the level of risk.
Maintenance Program of Publicly-Owned Trees (trees managed intensively)	All intensively-managed, publicly-owned trees are well maintained for optimal health & condition in order to extend longevity & maximize benefits. A reasonable cyclical pruning program is in place, generally targeting 5–7 year cycles. Maintenance program is outlined in the management plan.	Request-based, reactive system. No systematic pruning program is in place for publicly-owned trees.	All publicly-owned trees are systematically maintained, but pruning cycle is inadequate.	All publicly-owned trees are proactively and systematically maintained and adequately pruned on a cyclical basis.
Maintenance Program of Publicly-Owned Natural Areas (trees managed extensively)	The ecological structure and function of all publicly-owned natural areas are protected and enhanced while accommodating public use where appropriate.	No natural areas management plans are in effect.	Only reactive management efforts to facilitate public use (risk abatement).	Management plans are in place for each publicly-owned natural area focused on managing ecological structure and function and facilitating public use.
Planting Program	Comprehensive and effective tree planting and establishment program is driven by canopy cover goals, equity considerations, and other priorities according to the plan. Tree planting and establishment is outlined in the management plan.	Tree establishment is ad hoc.	Tree establishment is consistently funded and occurs on an annual basis.	Tree establishment is directed by needs derived from a tree inventory and other community plans and is sufficient in meeting canopy cover objectives.
Tree Protection Policy	Comprehensive and regularly updated tree protection ordinance with enforcement ability is based on community goals. The benefits derived from trees on public and private property are ensured by the enforcement of existing policies.	No tree protection policy.	Policies are in place to protect trees, but the policies are not well-enforced or ineffective.	Protections policies ensure the safety of trees on public and private land. The policies are enforced and supported by significant deterrents and shared ownership of city goals.
City Staffing and Equipment	Adequate staff and access to the equipment and vehicles to implement the management plan. A high level urban forester or planning professional, strong operations staff, and solid certified arborist technicians.	Insufficient staffing levels, insufficiently-trained staff, and/or inadequate equipment and vehicle availability.	Certified arborists and professional urban foresters on staff have some professional development, but are lacking adequate staff levels or adequate equipment.	Multi-disciplinary team within the urban forestry unit, including an urban forestry professional, operations manager, and arborist technicians. Vehicles and equipment are sufficient to complete required work.
Funding	Appropriate funding in place to fully implement both proactive and reactive needs based on a comprehensive urban forest management plan.	Funding comes from the public sector only, and covers only reactive work.	Funding levels (public and private) generally cover mostly reactive work. Low levels of risk management and planting in place.	Dynamic, active funding from engaged private partners and adequate public funding are used to proactively manage and expand the urban forest.
Disaster Preparedness & Response	A disaster management plan is in place related to the city's urban forest. The plan includes staff roles, contracts, response priorities, debris management and a crisis communication plan. Staff are regularly trained and/or updated.	No disaster response plan is in place.	A disaster plan is in place, but pieces are missing and/or staff are not regularly trained or updated.	A robust disaster management plan is in place, regularly updated and staff is fully trained on roles and processes.
Communication	Effective avenues of two-way communication exist between the city departments and between city and its citizens.	No avenues are in place. City departments and public determine on an ad-hoc basis the best messages and avenues to communicate.	Avenues are in place, but used sporadically and without coordination or only on a one-way basis.	Avenues are in place for two way communication, are well-used with targeted, coordinated messages.

APPENDIX H: SOUTH SAN FRANCISCO GOALS AND OBJECTIVE GANTT CHART

City of South San Francisco Urban Forest Master Plan											
Goals & Objectives	Cost	2020	2021	2022	2023	2024	2025 - 2030	2030 - 2035	2035 - 2040	Timeframe	Priority
<b>Goal 1: Promote excellent and efficient customer service.</b>											
Objective 1.1: Increase efficiency to respond in a timely manner to community concerns for trees.	\$									Ongoing	High
<b>Goal 2: Increase uniformity between City policies, documents, and departments.</b>											
Objective 2.1: Unify guiding documents to transcend departmental changes and address inefficiencies and reduce confusion.	\$									Ongoing	High
Objective 2.2: Improve communication and coordination with other City departments.	\$									Ongoing	High
Objective 2.3: Increase the role of Parks Staff in design review.	\$									Ongoing	High
<b>Goal 3: Advance the role of Parks Staff in City development projects.</b>											
Objective 3.1: Encourage the inclusion of trees in development projects to expand the tree canopy on public property.	\$									Ongoing	High
<b>Goal 4: Increase collaboration with developers.</b>											
Objective 4.1: Expand tree canopy through new development projects.	\$									Ongoing	High
<b>Goal 5: Provide water to trees efficiently and cost-effectively.</b>											
Objective 5.1: Encourage the establishment of trees through efficient and sustainable irrigation solutions and programs.	\$-\$\$									Ongoing	High
<b>Goal 6: Promote a workplace culture of safety.</b>											
Objective 6.1: Implement policies and procedures that make tree work as safe as possible.	\$									1-3 Years	High
Objective 6.2: Continue to support forestry worker safety.	\$									Ongoing	High
<b>Goal 7: Promote a safe urban forest.</b>											
Objective 7.1: Develop a risk management policy/procedure.	\$									1-5 Years	High
<b>Goal 8: Reduce the risk of fire and mitigate damage caused by fire.</b>											
Objective 8.1: Focus fire mitigation efforts on Sign Hill and other areas of vulnerability.	\$									Ongoing	High
<b>Goal 9: Improve public safety.</b>											
Objective 9.1: Maintain trees throughout their lifetimes to improve structure in maturity and reduce the likelihood of structural failures in the future.	\$									Ongoing	Moderate
<b>Goal 10: Plan for trees, before planting.</b>											
Objective 10.1: Invest in trees for the long-term environmental benefits provided to the community.	\$									Ongoing	Low-Moderate
Objective 10.2: Improve the diversity of the urban forest on public and private property to create a more resilient urban forest.	\$									Ongoing	High

\$ = less than \$25,000      \$\$ = \$25,000-\$100,000      \$\$\$ = more than \$100,000

**City of South San Francisco Urban Forest Master Plan**

Goals & Objectives

	Cost	2020	2021	2022	2023	2024	2025 - 2030	2030 - 2035	2035 - 2040	Timeframe	Priority	
<b>Goal 11: Avoid removing trees whenever possible.</b>												
Objective 11.1: Explore alternative designs instead of removals.	\$	[Bar chart showing cost from 2020-2023]									1-5 Years	Moderate
Objective 11.2: Discourage the removal of protected trees.	\$	[Bar chart showing cost from 2020-2023]									Ongoing	High
Objective 11.3: Improve everyday care of trees, to prevent future removals.	\$	[Bar chart showing cost from 2020-2023]									10-15 Years	Low
<b>Goal 12: Reach 22.6% canopy cover by 2040.</b>												
Objective 12.1: Expand canopy cover to increase environmental benefits.	\$	[Bar chart showing cost from 2020-2023]									Ongoing	Low
<b>Goal 13: Decrease tree mortality.</b>												
Objective 13.1: Educate the community about property owner responsibilities for the care of City trees.	\$	[Bar chart showing cost from 2020-2023]									Ongoing	Low-Moderate
<b>Goal 14: Promote good maintenance practices for trees on private property.</b>												
Objective 14.1: Reduce unethical and/or poor pruning practices and unnecessary removals on private property.	\$	[Bar chart showing cost from 2020-2023]									Ongoing	Low
<b>Goal 15: Review and update Municipal Code as needed and educate the community as changes occur.</b>												
Objective 15.1: Meet the changing needs of the urban forest and the community through clear and concise and current policy.	\$	[Bar chart showing cost from 2020-2023]									Ongoing	Low-Moderate
<b>Goal 16: Increase support for the enhancement of the urban forest.</b>												
Objective 16.1: Engage the community in urban forestry activities and educational events.	\$	[Bar chart showing cost from 2020-2023]									Ongoing	Moderate-High
Objective 16.2: Provide sustainable and adequate resources to sustain the urban forest for future generations.	\$\$	[Bar chart showing cost from 2020-2023]									1-5 Years	
<b>Goal 17: Continue to distribute information about the urban forest to the community.</b>												
Objective 17.1: Educate the community to increase support and understanding of urban forestry policies and procedures.	\$	[Bar chart showing cost from 2020-2023]									Ongoing	Moderate
Objective 17.2: Market urban forestry through a variety means to promote participation from all community members.	\$	[Bar chart showing cost from 2020-2023]									Ongoing	Low
<b>Goal 18: Create a volunteer tree advocacy group.</b>												
Objective 18. 1: Work with volunteer tree advocates to promote urban forestry events and distribute urban forestry educational materials.	\$	[Bar chart showing cost from 2020-2023]									Ongoing	Low-Moderate
<b>Goal 19: Continue to practice an Integrated Pest Management (IPM) approach to responding to pests and disease pathogens.</b>												
Objective 19.1: Employ multiple tools and strategies to prevent and/or manage pests and disease.	\$	[Bar chart showing cost from 2020-2023]									Ongoing	Moderate

\$ = less than \$25,000      \$\$ = \$25,000-\$100,000      \$\$\$ = more than \$100,000



URBAN FOREST  
MASTER PLAN

**2020**