

CITY OF CAMAS

STREET TREE SUCCESSION PLAN

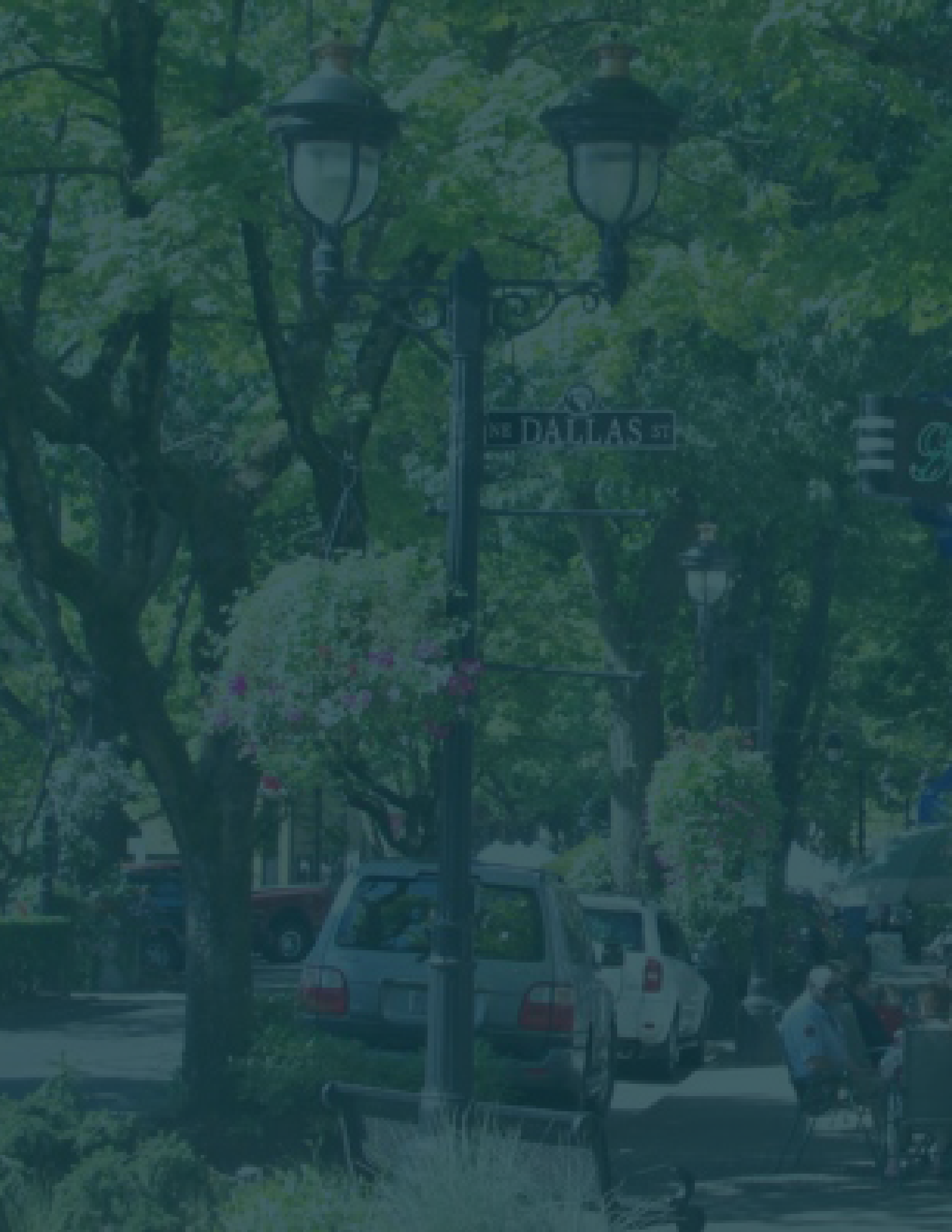
MARCH 2023

GREENWORKS™

City of
Camas
WASHINGTON

TABLE OF CONTENTS

04	SECTION 1: INTRODUCTION
08	SECTION 2: EXISTING CONDITIONS AND TREE INVENTORY
14	SECTION 3: BEST MANAGEMENT PRACTICES
18	SECTION 4: RECOMMENDATIONS
30	APPENDIX A: FULL SIZE MAPS
34	APPENDIX B: ARBORIST TREE INVENTORY



NE DALLAS ST

SECTION 1

INTRODUCTION

INTRODUCTION

The City of Camas downtown is characterized by beautiful tree-lined streets. These trees have created a unique sense of place for the community while also providing economic, environmental, and social benefits. Unfortunately, all trees have a limited lifespan, especially in dense urban environments. The purpose of this document is to help the City of Camas preserve the character of its downtown core through strategic replacement of its existing tree canopy. This succession plan will help reduce risks from aging trees and gradually introduce a more diverse canopy to support the city in the years to come.



BENEFITS OF STREET TREES

Street trees provide a wide range of benefits, not only environmentally, but also economically and culturally.

The tree canopy in downtown Camas is a beloved feature of the city that helps shape the character of the downtown core. The grand oak trees have paralleled the storefronts for many years, framing the street, providing shade, and helping to create the inviting atmosphere that is unique to Camas.

Trees not only add to the aesthetic value of an urban core but also serve an important role in its infrastructure. The environmental benefits of urban trees are also well documented. Trees provide shade in the summer months, helping to provide a respite for shoppers or diners at one of Camas's local restaurants. Urban trees also help reduce urban heat island impacts, reduce stormwater runoff, and provide habitat.

GOALS

This plan aims to guide the replacement of Camas's urban canopy within the downtown core. The plan is further guided by four specific goals:

Healthy, Long-lived, Resilient Urban Forest

Trees are an important part of urban infrastructure, but they can also be expensive and hazardous if not properly managed. With proper planning, tree selection, and maintenance, urban trees can have healthy, long lives.

Diversity of species and ages

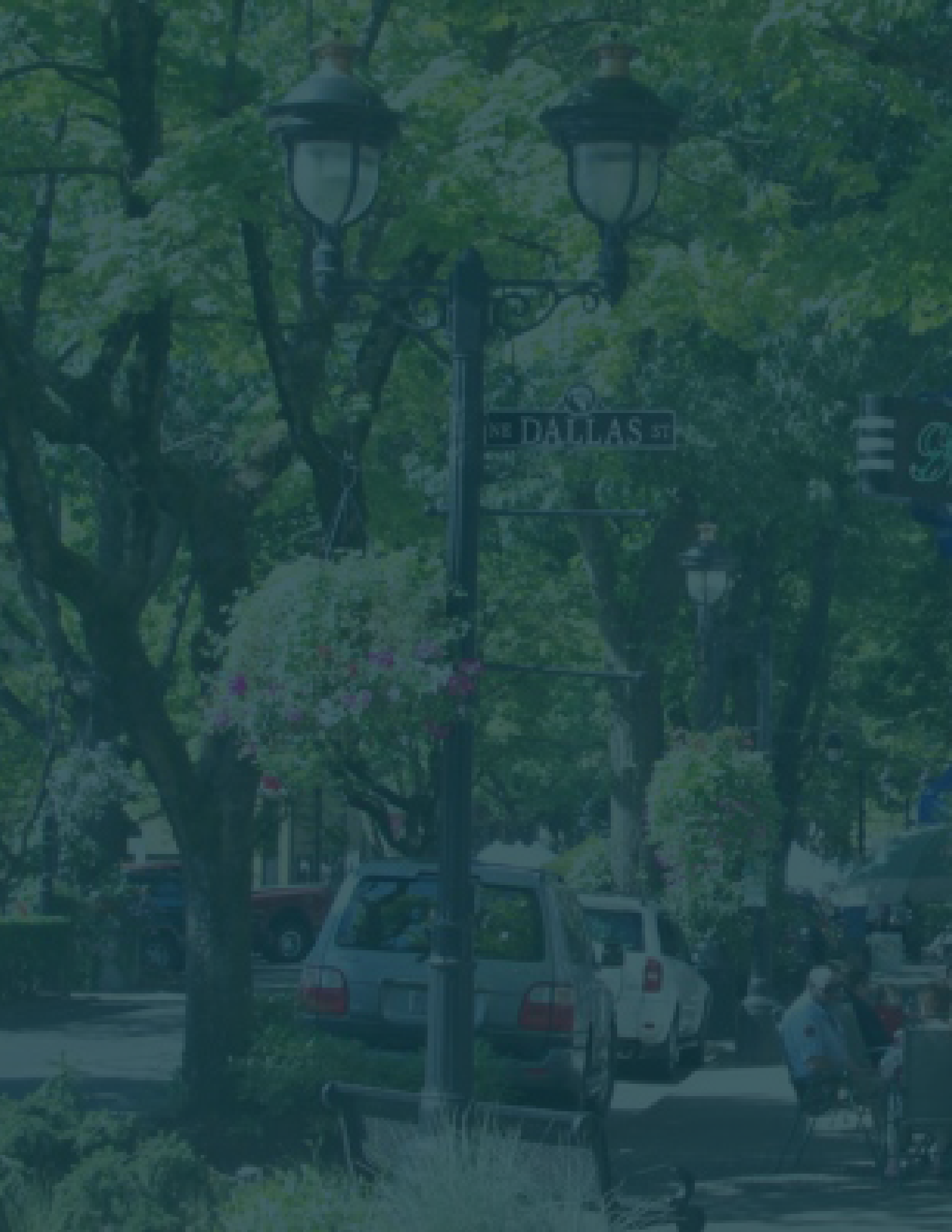
Increasing diversity in both species and age of the urban canopy will help create a more robust and resilient system for years to come.

Maintain Sense of Place for Camas

The mature and majestic urban canopy is central to the identity of Camas.

Balance space limitations in ROW

As a well-developed downtown core, the project area is bound by spatial limitations such as sidewalks, roads, and buildings. Where possible, efforts should be taken to expand the soil available for trees. Minimize conflicts of trees with buildings, utilities, and paving. Promote long-lived, healthy trees with functional canopies.



SECTION 2

EXISTING CONDITIONS AND TREE INVENTORY



EXISTING CONDITIONS ANALYSIS

This tree succession plan covers the downtown core of Camas, WA from NE 3rd Ave to NE 6th Ave and from NE Adams St to NE Garfield St.

A tree inventory for part of this project area was completed in 2017 by New Day Arborist. The report surveyed 102 individual trees with DBHs ranging from 2" to 34.5". Twelve different types of trees are planted on site:

- Norway Maple (28)
- Ash, *Fraxinus spp.* (25)
- Red Oaks, *Quercus rubra* (16)
- Sweetgum, *Liquidamber spp.* (9)
- Eastern Dogwood, *Cornus spp.* (8)
- Cherry, *Prunus spp.* (5)
- Sycamore Maple, (4)
- Autumn Gold Ginko, (2)
- Fl. Pear (2)
- Red Sunset Maple (2)
- Sugar Maple (1)
- Smoke Tree (1)

The tree inventory noted a number of critical issues that helped inform this succession plan:

- Most species within the project area are Red Oaks (*Quercus rubra*) and Norway Maples.
- Most of the Norway Maple trees in the area are over-mature and showing signs of decline. The inventory recommends that the majority should be budgeted for removal and replacement.

- 80% of the trees have a concrete opening that is undersized for the size or age of the tree.
- Most of the Ash trees are small or stunted and appear to be under drought

While there are some challenges to the tree canopy, there are also some positives:

- There is a deep appreciation for the existing tree canopy within Camas.
- The existing trees are generally well spaced and do not overcrowd each other.

Additional Considerations:

- The tree inventory was only conducted for a part of the Succession Plan project area. In order to fully assess the project area, a comprehensive tree inventory for the remain blocks will need to be completed.
- The arborist inventory report covered recommendations for 86 trees within the downtown core, however GIS data provided expanded information and covered 102 total trees. The maps provided in this document utilise the expanded GIS data.
- A 2022 site visit conducted by the GreenWorks team also identified gaps in the urban canopy. These locations are opportunities to plant new trees and are indicated in the Recommendations sections of this plan.

EXISTING TREE INVENTORY

Map from GIS information provided by New Day Arborist



Tree Inventory

Common

- American Sweet Gum
- Ash Species
- Autumn Gold Ginkgo
- Chanticleer Pear
- Eastern Dogwood
- Japanese Flowering Cherry
- Norway Maple
- Red Oak
- Red Sunset Maple
- Smoke Tree
- Sugar Maple
- Sycamore Maple



0 75 150 300 Feet

CURRENT THREATS TO EXISTING TREES

Due to the density of Camas's downtown core, the street trees in this setting face many challenges that make maintaining a healthy, mature canopy difficult. Trees planted in urban environments must compete for space with pavement and various utilities, deal with heavily compacted soil, and suffer from air and soil pollution.

Soil Volume

Most trees in downtown Camas do not have enough soil and/or suffer from soil that is too compacted. The existing trees in this zone are often constrained to narrow ROW spaces between sidewalks and roadways.



Canopy Space

Trees also must compete for aerial space. While most of the existing trees in Camas are generally well spaced apart from each other, many trees are close to buildings and either cause conflict with the building face/ roof, or have been improperly pruned and shaped to avoid conflict, thus creating a weak tree structure. In other areas, trees are planted directly under utility lines. While many trees can grow around this, it does create a hazard for falling limbs and makes utility maintenance difficult.

Species Diversity

Despite having a number of different tree species in the project area, actual species diversity is low in downtown Camas as most trees are Oaks, Maples, or Ash trees. Overplanting of a single species creates a monoculture system and leaves the area vulnerable to pests and disease.

Pests and Disease

Trees are also subject to stress from biotic disorders such as pests and disease. One of the primary high-threat pest across the U.S. currently is the Emerald Ash Borer (EAB). EAB (*Agrilus planipennis* Fairmaire) is a beetle that feeds on Ash trees. The insect lays its eggs in the crevices of Ash tree bark. When they hatch, the larvae tunnels into the bark, feeding on the inner bark and destroying the vascular tissue. This severely harms and typically kills the tree. Since its discovery, EAB has killed millions of Ash trees across the country. In 2022, it was found in Forest Grove, Oregon, the first sighting in the Pacific Northwest. Mortality rates of Ash trees in the region are expected to be as high as they've been in the rest of the country.

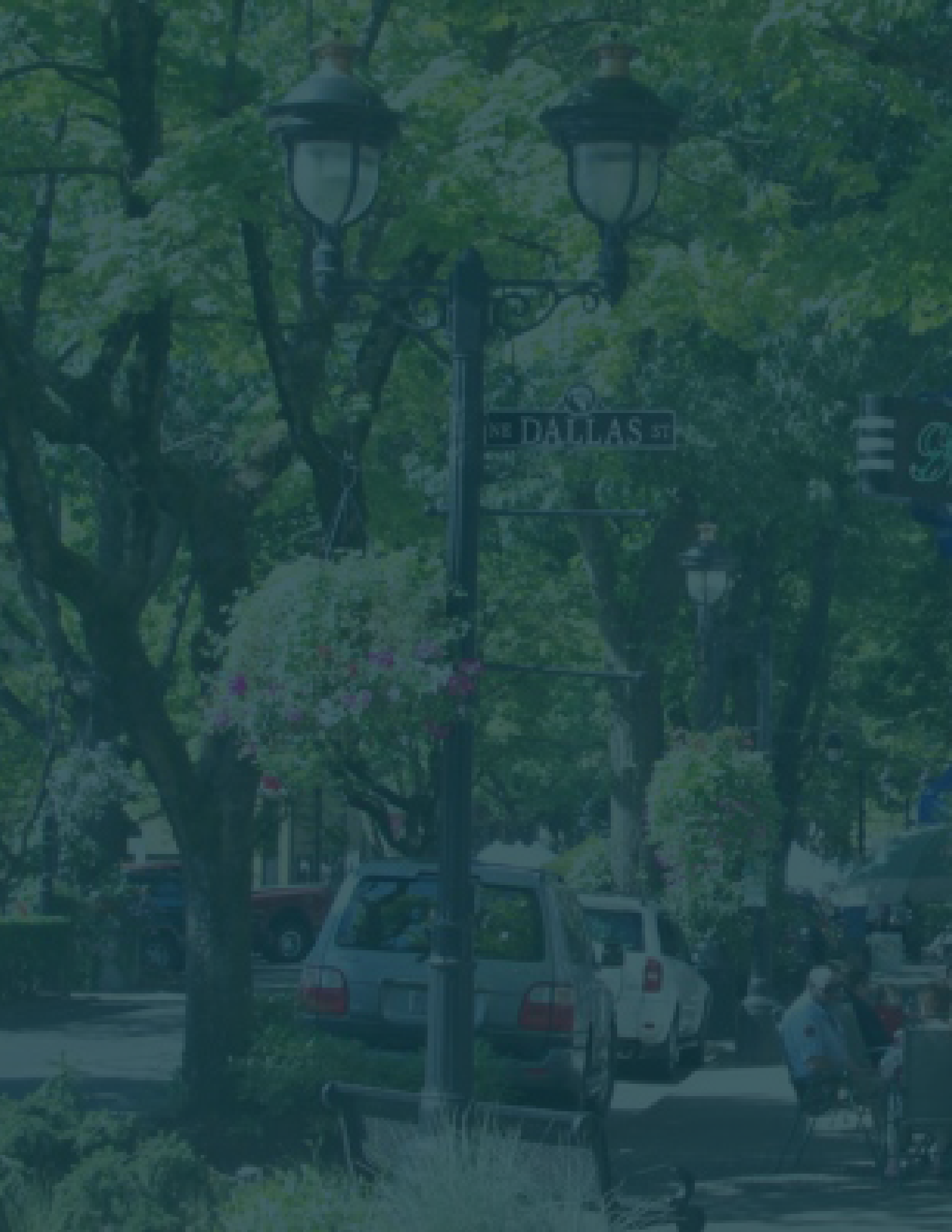
Climate Change

As the impacts from Climate Change become increasingly evident, urban trees will have to contend with increasingly severe weather patterns such as longer and colder winter conditions and hotter, drier summer heat and drought.

DANGERS FROM EXISTING TREES

Existing trees that are in poor health or declining health should be attended to in an appropriate time frame as they can be a serious hazard for people, cars, utilities, and buildings. As downtown Camas is a highly trafficked area, the potential for conflict is high and high risk trees should be taken seriously.





SECTION 3

BEST MANAGEMENT PRACTICES



BEST MANAGEMENT PRACTICES

The recommendations in this Succession Plan will be guided by the current best management practices (BMPs) in urban forestry and arboriculture.

The following is a list of "Ingredients of Successful Resilient Urban Trees"

Location

This category guides all aspects of tree BMPs. Choosing the right location for street trees, and choosing the right tree for each location will help create longer-lived trees and reduce potential conflicts with existing infrastructure.



Soil

Soil is one of the most important aspects for tree health and is often a key limiting factor for urban trees. Ideally, trees should have an appropriate soil volume for their size. It's also best to provide soil that is uncompacted and regularly has organic matter introduced. Use soil that is well-draining and rich in nutrients.



Mulch

Mulch is a highly beneficial supplement to urban trees. Much helps keeps the soil cool, conserves moisture, and reduces competition from unwanted plants. It also provides organic matter as it breaks down, helping to nourish trees. Aim for 2"-4" of mulch depth in a ring around the trunk. Avoid placing mulch directly against the trunk as this traps moisture and can lead to decay.

Water and Irrigation

Water needs will vary by tree species and depend on other context pieces. It's crucial that trees get sufficient water, especially during their establishment period. Supplemental irrigation may be necessary during the summer months.

Species Diversity

Historically many cities relied on homogenous planting plan for their street trees. While this approach is aesthetically pleasing, the canopy is more vulnerable as just one pest or disease could impact all the trees at once. It is now recommended to plant a diversity of tree species to create a more resilient system.

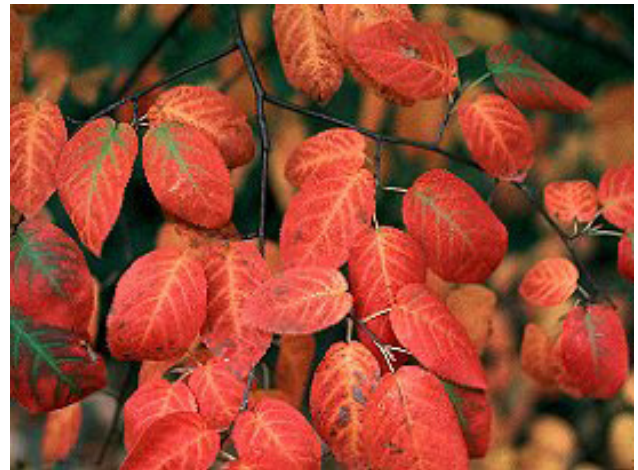
Tree Planting and Establishment

Proper tree planting helps maintain a healthy canopy for the long-term. The City of Camas standard tree planting details provide good instruction on appropriate depth and width required for holes when planting new trees.

In addition to proper planting techniques, several establishment practices can be utilized to help promote healthy trees. These techniques include applying mulch, providing adequate water, structural pruning, tree stabilization and staking, and even fertilization in some select cases.

Removal Strategies

Tree removal in urban environments can be difficult due to the proximity of other infrastructure and nearby trees. After a tree is successfully removed, consider ways to use the felled wood, such as mulch, if possible.

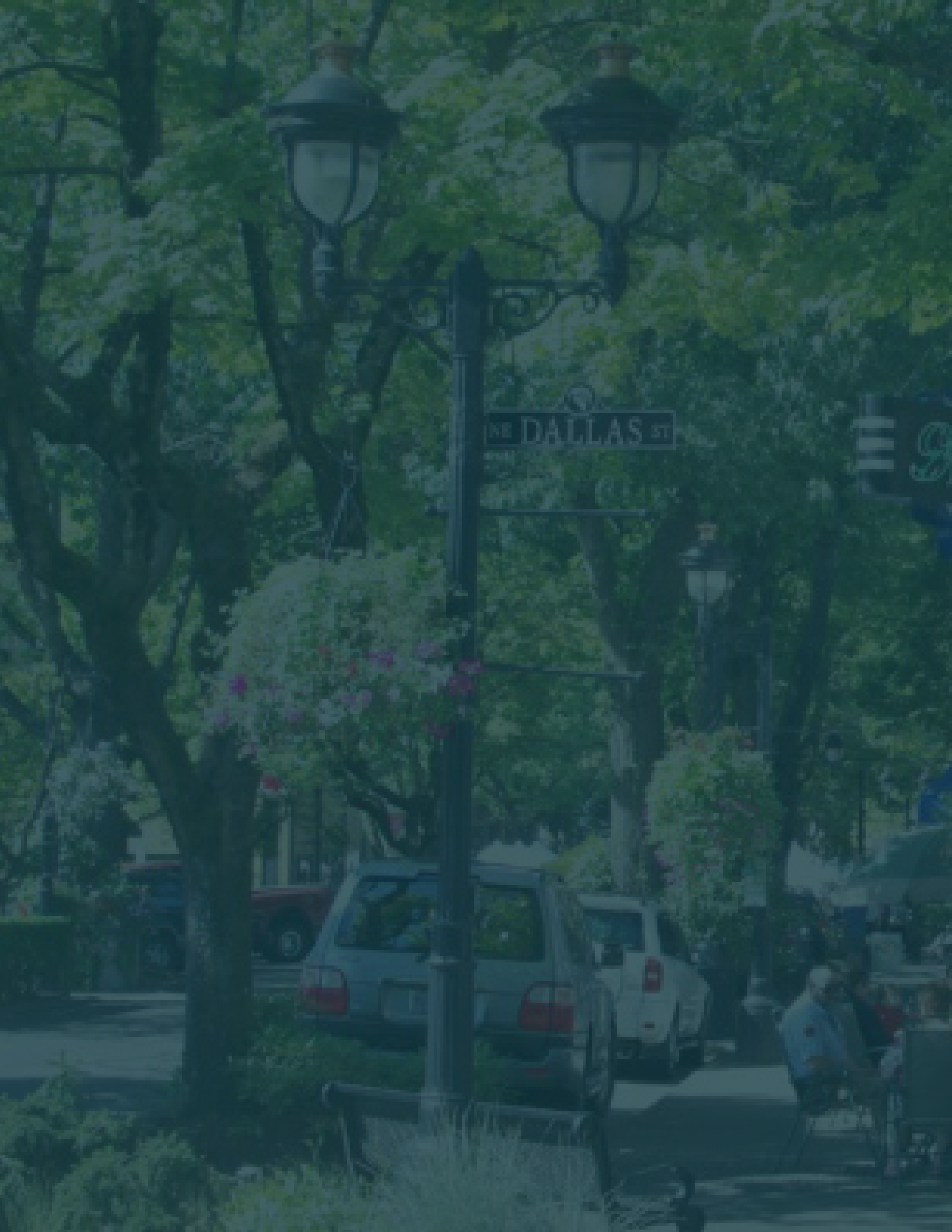


Tree Preservation Strategies

As trees begin to age, strategic interventions can extend the life of existing trees and reduce the need for frequent replacement. These strategies include strategic pruning, bracing, cabling, and other plant health care strategies.

Maintenance

Consistent and appropriate maintenance can help extend the life of urban trees.



SECTION 4

RECOMMENDATIONS FOR TREE SUCCESSION

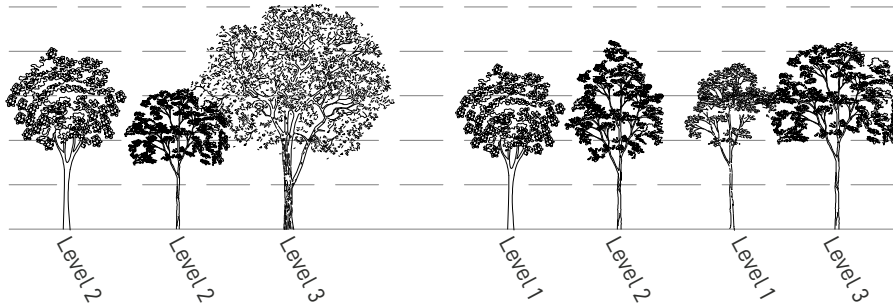
INTRODUCTION

This strategy guides the future replacement of trees so that the City of Camas retains its lush, tree-lined street character. The succession plan is broken down into three parts:

- REMOVE** This step provides recommendations for which trees should be removed first and canopy phasing.
- REPLACE** This step provides suggestion on suitable replacement trees.
- IMPROVE** This section provides recommendations for possible street infrastructure improvements that could happen alongside tree replanting to support a long-living healthy canopy.

This succession plan also recommends strategies for planting techniques of new trees, ongoing maintenance, and best management practices to foster a healthy canopy in perpetuity. These recommendations are based upon the 2017 Arborist Inventory, on-site assessments, and visual assessments.

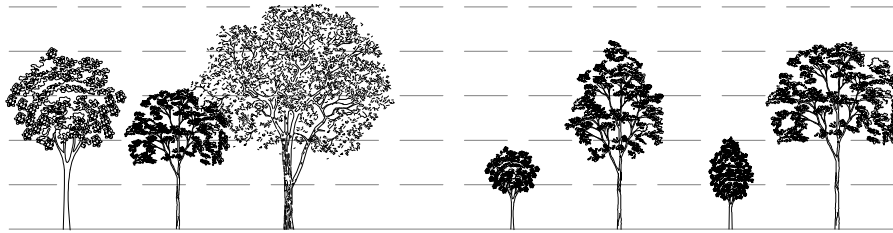
TREE SUCCESSION DIAGRAM



Existing Conditions:

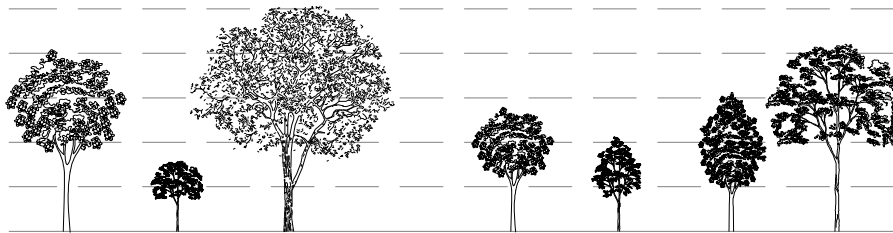
Some diversity in species and age but many trees in moderate or poor health.

See page 22 for descriptions of Level 1, Level 2, and Level 3 trees.



0-5 Years

Dead, hazardous, and high risk trees removed and replaced.



5-10 Years:

Level 2 trees replaced. All trees monitored for changes in health.



10+ Years:

Level 3 trees begin to decline in health and will need to be replaced.

Plant trees in gaps in the tree canopy.



Goal:

Healthy canopy with a diversity of tree species and ages.

REMOVE

The 2017 Arborist Inventory is instrumental in understanding existing tree health. The inventory collected tree health information for each surveyed tree and categorized them into "good, fair, or poor" health.

These categories formed the baseline for the recommended removal timeline. Trees are recommended for removal and replacement based on the following criteria:

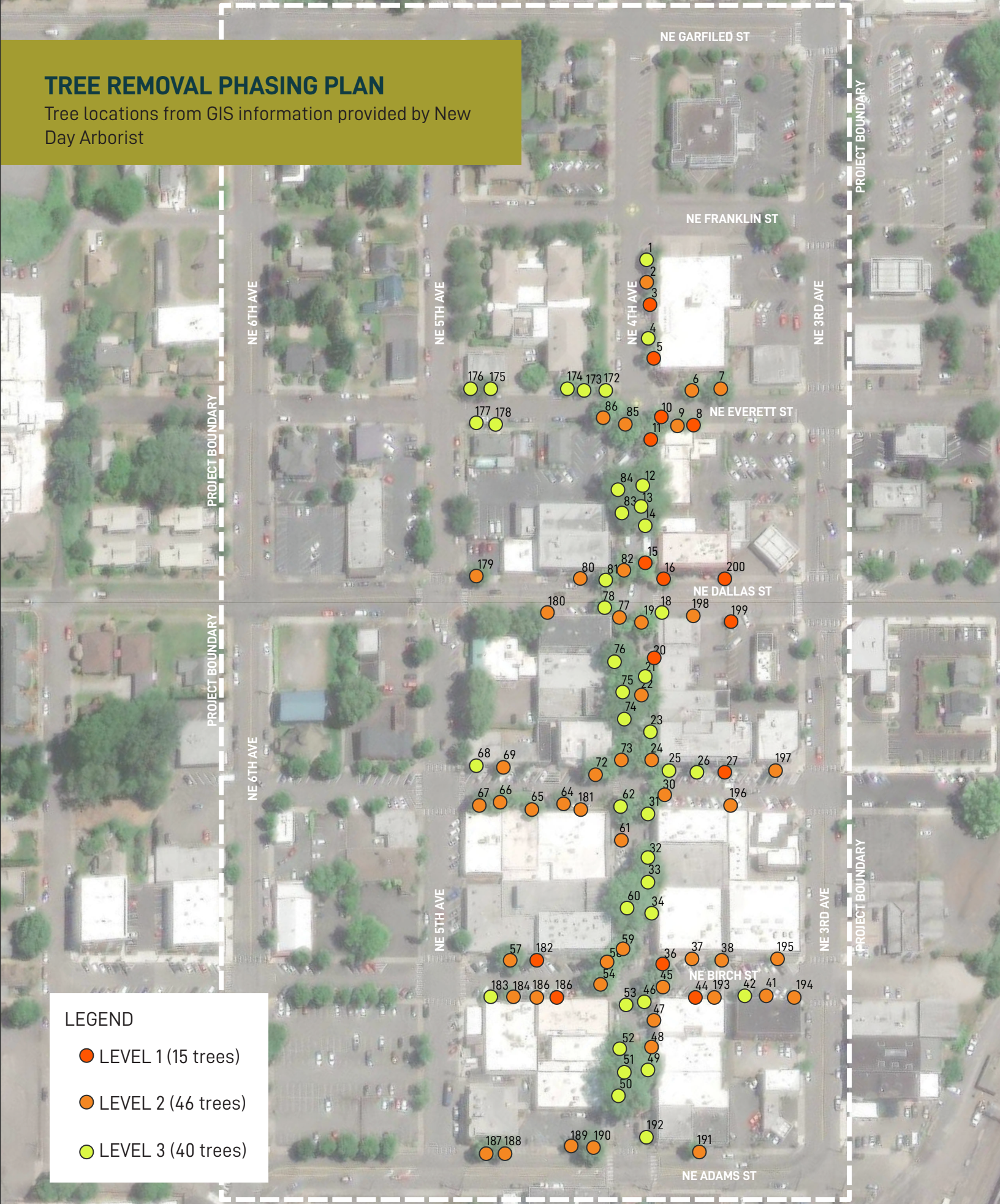
- **Level 1: Urgent/High Risk/Hazard Tree**
Timeframe: 0-5 years
Remove any dead or dying trees or trees classified as 'high risk'. Remove dead wood in the canopy of all species.
- **Level 2: Moderate**
Timeframe: 5-10 years
Tree is in moderate or poor health but does not immediately pose a risk. Remove and replace on an ongoing basis as time and budget allows. This category generally includes
- **Level 3: Good**
Timeframe: Monitor
Tree currently in good health. Monitor every 10 years. If tree health declines, consider moving it to Level 1 or Level 2 as needed.
- **Level 4: Infill**
Timeframe: Ongoing
Infill identified gaps in the streetscape with recommended trees.

Additional notes and considerations related to the removal timeline:

- The tree inventory was only conducted for a part of the Succession Plan project area. If the tree inventory is updated or expanded in the future, that report will supplement the recommendations in this section.
- The level assigned to each tree may need to be adjusted based on severe weather, stress, or other conditions.
- All Ash trees on site have been placed in the 'Level 2' category to reflect the specific health risks they face from the Emerald Ash Borer.

TREE REMOVAL PHASING PLAN

Tree locations from GIS information provided by New Day Arborist



LEGEND

- LEVEL 1 (15 trees)
- LEVEL 2 (46 trees)
- LEVEL 3 (40 trees)



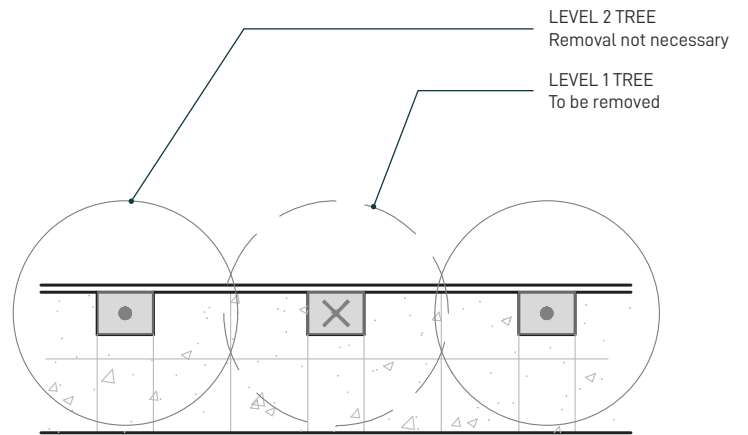
0 75 150 300 Feet

REMOVE cont.

In order to maintain phasing and diversity of age within the tree canopy, removal and replacement should not happen all in the same year.

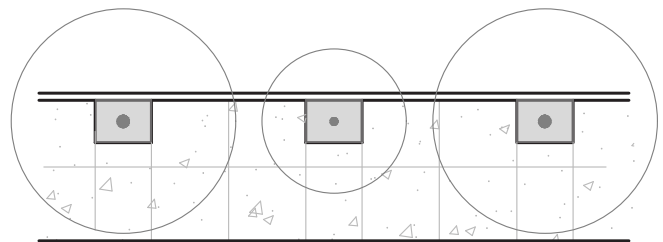
Spatial context should also be taken into consideration. Generally, it is not recommended to remove all the trees on a single block face at the same time UNLESS where doing so will allow for infrastructure changes to support healthier trees in the long term.

Additionally, in some instances, it may make sense to remove Level 2 trees earlier to support these larger infrastructure changes as well.



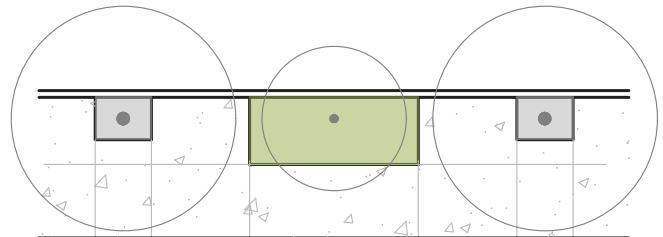
Existing Conditions:

Sidewalk with street trees. Tree wells are undersized and soil volume is too small. One tree is listed as Level 1 and ready for removal.



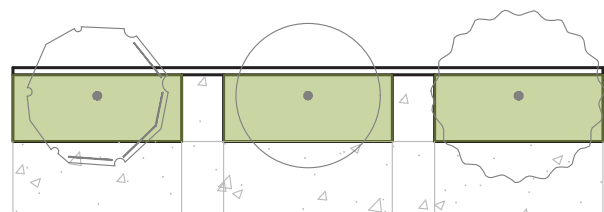
Option 1:

Remove and replace single Level 1 tree. No supplemental infrastructure improvement. Lowest cost in the short term. Option not recommended as it does not improve tree health long-term.



Option 2:

Remove and replace single Level 1 tree with supplemental infrastructure improvement to increase soil volume. Moderate cost in the short term. Some improvement in individual tree health however infrastructure is piecemeal.



Option 3:

Remove and replace Level 1 tree and adjacent Level 2 trees. Higher upfront cost but cost savings over time. Improved soil volume increases long-term tree health and reduces maintenance costs.

Example removal phasing of Level 1 Trees:

Year 1	<p>Trees to remove: 44, 10, 11 Additional maintenance: Deadwood removal on 8, 27</p>	}	<p>Tree 44 considered high risk and trees 10 and 11 considered moderate risk. Remove dead branches to decrease risk in remaining trees</p>
Year 2	<p>Trees to remove: 16, 20, 36 Additional maintenance: Remove any additional deadwood. Monitor canopy health for changes.</p>	}	<p>Remove and replace tree 16 so there is diversity in age between 15 and 16 at this corner. Decay in 36.</p>
Year 3	<p>Trees to remove: 3, 5, 182 Additional maintenance: Consider additional improvements in this area to increase planter size.</p>	}	<p>Group removal of 3 and 5 together to increase ability to improve infrastructure for additional soil volume.</p>
Year 4	<p>Trees to remove: 8, 15, 27, 186 Additional maintenance: Remove any additional deadwood. Monitor canopy health for changes.</p>	}	<p>Trees not currently identified as immediate risk. Monitor and remove earlier if conditions change.</p>

Note: This phasing recommendation is based on tree health and risk as noted in the 2017 arborist report. Adjustments may be needed in response to changes in tree health and risk.

Considerations:

- Remove high risk and hazardous trees first.
- Generally trees to be removed are phased spatially across the area to support age diversity.

REPLACE

Suggestions for proposed trees are guided by the adage "right tree, right place."

Tree Replacement Guidelines

- New trees should be planted with a diverse range of species.
- No species shall exceed 20% of total site area and no species should make up more than half the trees of each block face.
- No large trees should be planted under overhead utilities.

Recommended tree species for each location are broken into categories rather than specific species. Each category contains a few species that can be chosen from for the site based on availability, surrounding species diversity, and other considerations. All recommended species were selected for drought tolerance in anticipation of further climate change.

Recommendations were made based on the following spatial elements:

- 1) Existing sidewalk width
- 2) Overhead Utilities
- 3) Distance to Adjacent Buildings
- 4) Adjacent Trees

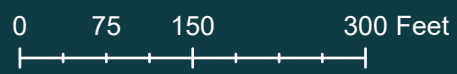
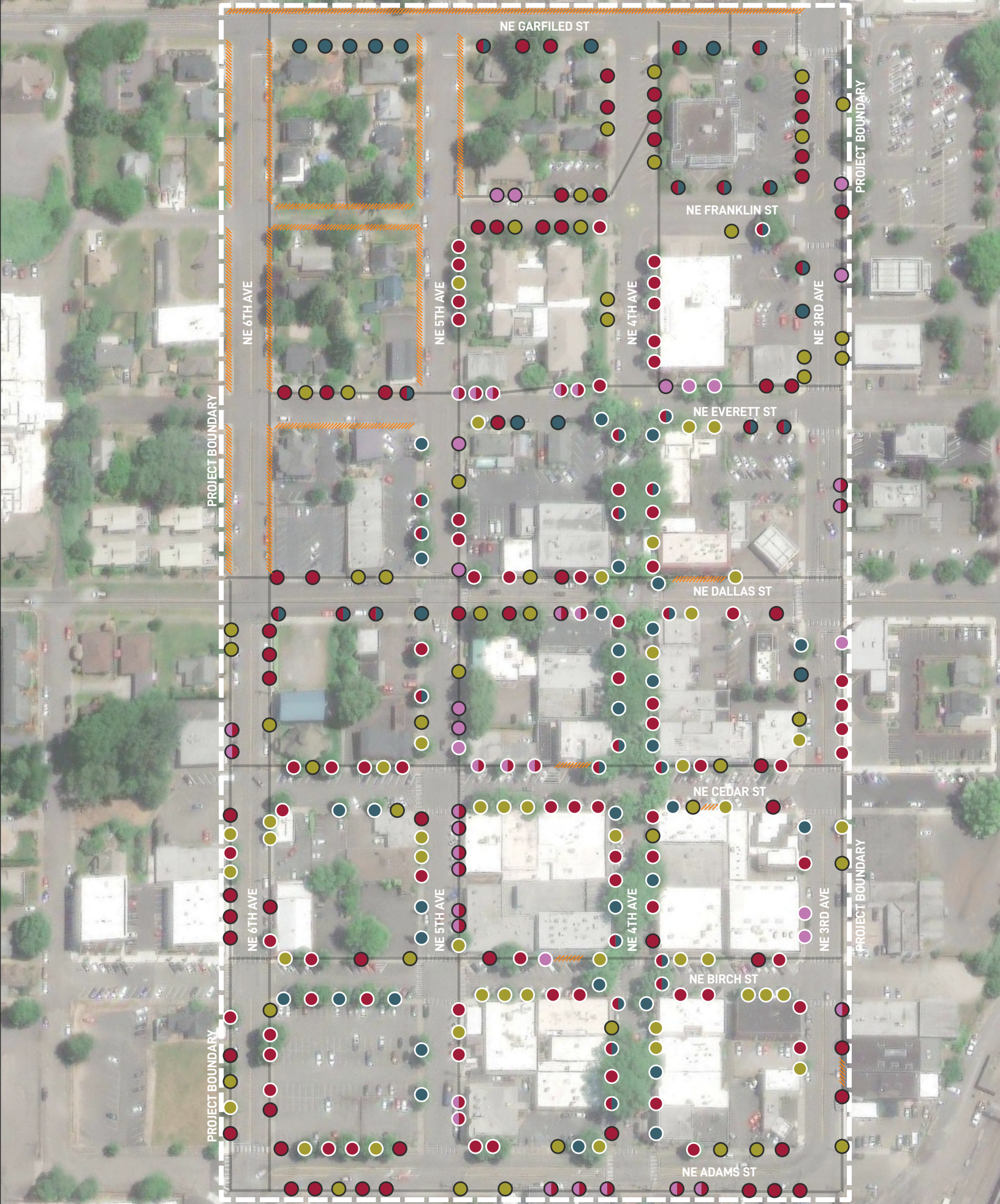
Planting under overhead utilities

Trees recommended for under powerlines are marked with an * next to species name.

- Small and Ornamental
 - Galaxy Magnolia, *Magnolia 'Galaxy'* *
 - *Cornus 'Eddie's White Wonder'* *
 - Redbud 'Summers Tower', *Cercis canadensis* *
- Broadleaf Evergreen
 - Canyon Live Oak, *Quercus chrysolepis*
 - Oregon Myrtle, *Umbellularia californica*
 - Cork Oak, *Quercus suber*
 - Silverleaf Oak, *Quercus hypoleucoides*
 - Bambooleaf Oak, *Quercus myrsinifolia*
- Medium Deciduous
 - Cascara, *Rhamnus purshiana*
 - Honeylocust, *Gleditsia triacanthos*
 - Starlight Dogwood, *Cornus kousa x nutallii 'KN4-43'* *
 - Hackberry, *Celtis occidentalis*
 - Wireless Zelkova, *Zelkova serrata 'Wireless'**
- Large Deciduous (Plant 35'-45' apart)
 - Oregon White Oak, *Quercus garryana*
 - Espresso Kentucky Coffeetree, *Gymnocladus dioicus 'Espresso'*
 - Presidential Gold Ginko, *Ginko biloba 'The President'*
 - Frontier Elm, *Ulmus 'Frontier'*

LEGEND

- | | | | |
|----------------------------|----------------------------------------------------------------------------|-----------------------------|---------------------------------------------------------------------------------------------------------|
| ● Small or Ornamental Tree | ● Small tree recommended, Medium possible with infrastructure improvements | ○ Existing Tree Replacement | — Overhead Utility |
| ● Broadleaf Evergreen Tree | ● Medium tree recommended, Large possible with infrastructure improvements | ○ Gap or Infill Tree | ▨ Existing sidewalk too narrow to support street trees. Consider future improvements to widen sidewalk. |
| ● Medium Deciduous Tree | | | |
| ● Large Deciduous Tree | | | |



IMPROVE

In addition to selecting the most appropriate tree for each location, long-term canopy health should also be supported by additional improvements in infrastructure where possible.

This section lists a number of possible improvements that should be considered in alongside tree replacement.



Increase Tree Well Size

As mentioned, one of the most beneficial factors in maximizing tree health is soil volume. Consider ways to enlarge this in the existing ROW space. When additional width is not available, tree wells can be made longer and still provide benefits to the tree.



Co-Planting

Including ground cover plants in the tree well can help support a healthy canopy as well. Co-planting helps support healthy soil by increasing organic matter. It can also help reduce compaction by discouraging foot traffic over the tree well and can assist in taking up stormwater as well.



Raised Planter

Planter boxes can help provide additional soil volume by using vertical space when horizontal space is not available. Raised planters come in variety of styles and can be purchased off the shelf or customized designed for Camas.



Tree Grates

Tree grates can be a useful tool when space is limited. Tree grates help to preserve pedestrian space while also providing soil below for the tree. However, tree grates are not always the best option for the tree as they can outgrow the size of the grate, thus damaging the overall tree health.



Structural Soils

Structural soils are a type of soil medium that can be compacted to support paving but still allow for root growth by urban trees. It is generally comprised of a certain percentage of soil and carefully graded crushed gravel.



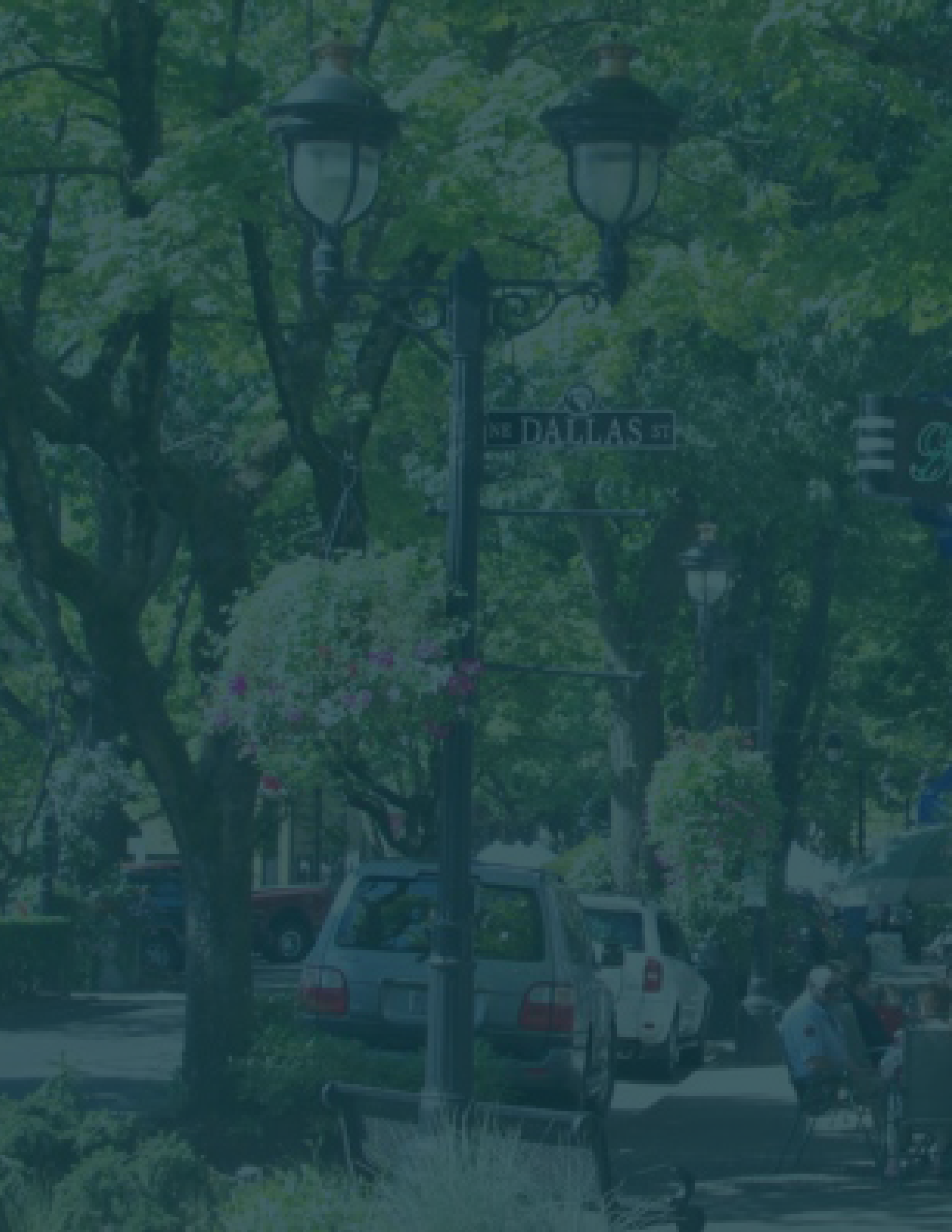
Permeable Pavers

Permeable pavers allow water to infiltrate into the soil below instead of running off. This also puts less pressure on the stormwater system and reduces irrigation needs for trees.



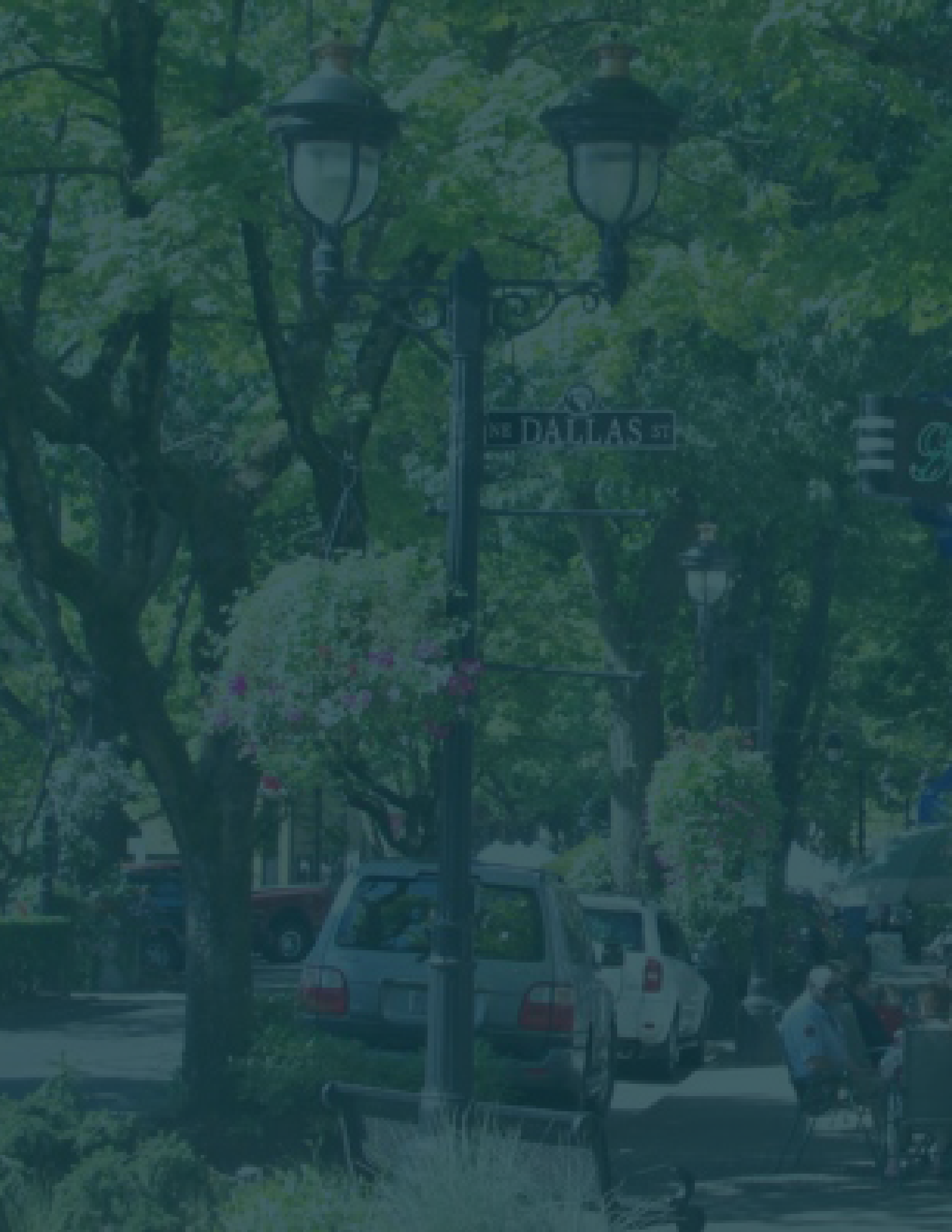
Structural Cells & Suspended Pavement

Suspended pavement systems allow for the weight of hardscape elements to be supported while providing a larger area of uncompacted soil for trees to use. Suspended pavement systems are typically modular, such as the Silva Cell system.



APPENDIX A

FULL SIZE MAPS



APPENDIX B

ARBORIST TREE INVENTORY