

DRAFT Street Tree Maintenance Manual

December 7, 2017

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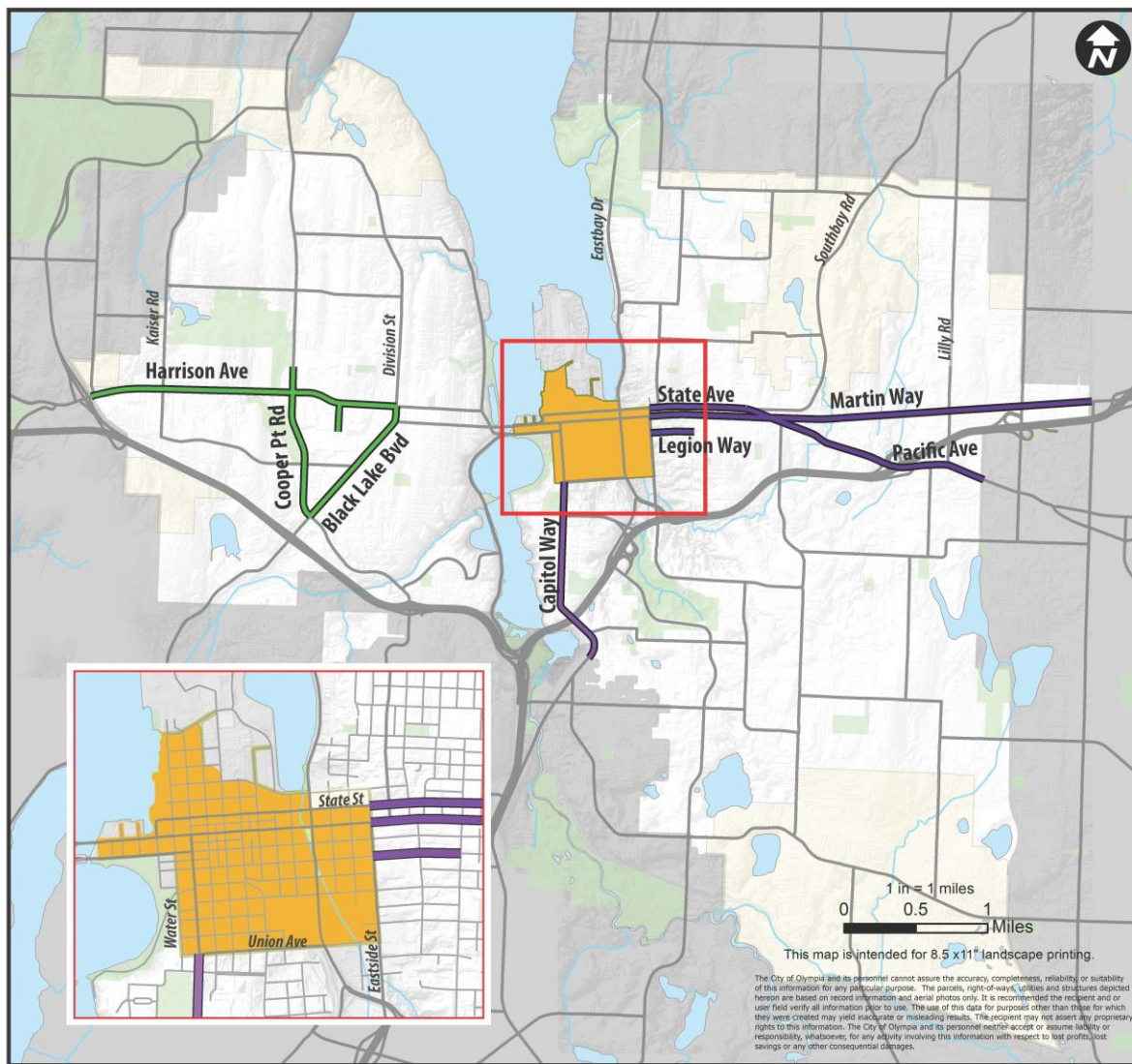
1. Scope

The Street Tree Maintenance Manual (STMM) is an internal technical document used by City staff to guide maintenance decisions for the street trees downtown and on the 10 major arterials shown in Figure 1. OMC 16.60.020 defines street trees as “trees... located within the street rights-of-way”.

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City Maintained Street Trees



City Maintained Street Trees

The City of Olympia only maintains street trees in the areas noted on the above map. All other streets trees are the adjacent property owners responsibility.

Eastside Streets

- 4th Ave
- Capitol Way
- Legion Way
- Martin Way
- Pacific Ave
- State Ave

Westside Streets

- Black Lake Blvd
- Cooper Pt
- Harrison Ave
- Kenyon St

Downtown Streets

- Downtown Olympia, see inset map

Thurston County

UGA

Olympia

Figure 1: City Maintained Street Trees Map

2. Purpose

The STMM is intended to provide City staff with the data and guidance needed to perform consistent and predictable street tree management and maintenance. The guidance in this document should help staff to

- maximize the benefits and reduce the cost of street trees by using resources efficiently.
- manage a financially sustainable program.
- prune and maintain trees to protect their health, safety, and value.
- communicate with business owners, property owners, and community members about street tree management.

The STMM is a living document written to reflect and carry out urban forestry policy. It shall be periodically reviewed and updated as policies change.

3. Application

The STMM standards and protocols shall apply to all City staff members, consultants, and contractors responsible for managing the street trees downtown and on the 10 major arterials shown in Figure 1.

The STMM standards and protocols shall not take precedence over applicable industry safe work practices.

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4. Street Tree Maintenance Program Goals

- Prune and maintain trees to protect their health, safety, and value as well as City and private infrastructure.
- Establish and maintain a regular pruning cycle that is financially sustainable while also protecting tree health and longevity.
- Maintain current street tree data by making inventory updates part of the regular work day.
- Provide ongoing staff training and apply current best professional practices.

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5. Staff Qualifications

All City staff members, consultants, and contractors performing maintenance, management, or removal work on street trees in the field shall be trained in the current arboricultural best management practices.

Arboricultural training shall be provided to City staff members, including

- International Society for Arboriculture (ISA) Arborist certification.
- ISA Tree Risk Assessment Qualification (TRAQ) training.
- Ongoing training needed to maintain those certifications.

All work crews shall have a minimum of one ISA Certified Arborist present in the field. The Certified Arborist staff member shall be responsible for determining pruning objectives, pruning amount, and guiding the team in the use of best management practices.

All City staff members, consultants, and contractors performing tree risk assessments shall have ISA TRAQ certification.

All City staff members, consultants, and contractors performing updates to the Street Tree Inventory or the Tree Appraisal data should be trained to use ESRI Collector and have their own unique login ID.

6. Street Tree Maintenance Program Current Conditions

Historical Conditions

During the 1990s and early 2000s, the urban forestry program planted thousands of new trees (see Appendix F: History of Street Tree Management in Olympia). No dedicated budget or staff was provided for street tree maintenance, leading to the large maintenance backlog seen today.

Program resources were sufficient for a “Reactive” Level of Service:

- Pruning and other maintenance performed in reaction to emergencies and citizen/business owner requests.
- Removal of dead and hazardous trees.

Legion Way trees were the exception. Since the early 2000’s they have received:

- Yearly assessment and maintenance/removal prioritization performed by a consulting arborist.
- Pruning and removal of moderate-high risk trees by contracted tree work crews and Parks maintenance staff in years 2012-14.

Current Conditions

As of 2017, Parks has the resources to achieve the “Current” Level of Service:

Annual Cost:

- \$174,000 current budget

Staff:

- All staff dedicated 80% to street trees and 20% to park trees
- 1 permanent Maintenance Worker (Arborist)
- 1 permanent Maintenance Worker pulled from other Parks maintenance work for 4 months.
- 1 temporary Maintenance Worker as ground support for 8 months/year.

“Current” LOS Yearly Maintenance Work	
Trees	Maintenance
70	1-6" diameter trees (15 year cycle)
47	7-12" diameter trees (15 year cycle)
29	13-24" diameter trees (17 year cycle)
5	25-36" diameter trees (17 year cycle)
17	Removals (5 year cycle)
All	40 minutes general maintenance (weeding, litter removal, mulching, tree grate maintenance, remove root suckers)
162	20 minute Post-Pruning Inspection
10	Newly planted trees & watering

Table 1: “Current” LOS Yearly Maintenance Work

15/17 Year Pruning Cycle:

- Younger trees pruned every 15 years
- Older trees pruned every 17 years

Equipment:

- 1 aerial lift truck.
- 1 10 inch chipper.
- Outdated climbing gear/saws.

Analysis:

- Arborist is not currently ISA Certified.
- A second climber/dedicated ground support staff is needed.
 - Pulling Maintenance Worker III from other maintenance work impacts overall Parks operations.
 - Arborist cannot be expected to climb every work day, impacting work efficiencies and the level of service that can be provided.
- The 15/17 year pruning cycle length is below basic industry standards.
 - Tree condition will deteriorate in the length of time between prunings.
 - Trees will grow, making work more difficult and expensive.
 - Liabilities such as clearance pruning cannot be proactively managed.
- Equipment/Vehicles need to be replaced.
 - Lift truck too large to be used efficiently in the ROW and has high maintenance costs.
 - Chipper is older and has high maintenance costs.

In addition to the regular street tree maintenance program, there are several special projects and contracts.

- On-call removal contractor for projects outside the capacity of Park's staff or equipment.
- Continued yearly assessments of Legion Way trees by a consulting arborist. The numbers of problem trees are steadily decreasing over time.
- On-call pruning contractor for clearance pruning and work on moderate-high risk trees on Legion Way and other arterials shown in Figure 1.

7. Street Tree Population Current Conditions

In 2016 the City completed an inventory of the street trees downtown and on the 10 major arterials shown in Figure 1. Surveyors collected data many tree attributes, including species, condition, height, trunk diameter, and appraised value.

Olympia's street tree inventory is a critical tool for tree management that must be regularly updated to accurately reflect changes in the population. See the Street Tree Inventory Update Protocol in Section 9 for details on consistently updating the inventory. For more information about the inventory methodology, see Appendix J.

The following sections describe the street tree population existing conditions as found by the inventory and additional field assessments performed in 2017.

Population Diversity

A genetically diverse street tree population will more resilient to threats such as pest and disease outbreaks, storms, drought, and climate change. Current industry guidelines recommend no more than 20% of the population in a single genus and 10% in a single species. The existing diversity conditions of the City's inventoried street trees are listed below.

- 82 tree species.
- Norway maple (*Acer platanoides*) and flowering pear (*Pyrus calleryana*) both at 10% of the population, close to exceeding industry guidelines for species diversity.
- Over 60% of the street tree population inventoried is represented by 5 genera: *Acer* (maple), *Carpinus* (hornbeam), *Pyrus* (flowering pear), *Quercus* (oak).
- *Acer* (maple) at 24% of the population exceeds industry guidelines for genus diversity.

[Insert Figure 2: Current Street Tree Population Diversity]

Appraised Value

The value of the inventoried street tree population was assessed using methods developed by the Council for Landscape Appraisers. The value of each tree is assessed using data on its height, canopy spread, diameter, and growing location.

Appraised Street Tree Value		
Work Cycle Zone	Value	Total Number Of Trees
Downtown	\$2,546,440	1178
West Side	\$1,171,090	583
Harrison Ave	\$308,720	296
Cooper Pt	\$488,010	98
Kenyon St	\$266,590	40
Black Lake Blvd	\$107,770	149
East Side	\$2,424,780	666
Legion Way	\$706,170	78
Capitol Way	\$736,210	166
4 th Ave	\$142,750	129
State Ave	\$93,530	48
Pacific Ave	\$94,470	36
Martin Way	\$651,650	209
Total City Wide	\$6,142,310	2427

Table 2: Current Appraised Street Tree Value

Pruning and Removal

Tree diameter at breast height (DBH), tree condition, and growing site condition are all attributes used to determine pruning objectives, the amount of time allotted to prune, and the need for removal. See Table 8 for more information about assigning condition ratings to trees in the inventory.

Tree Condition

Trees	Percent	Condition	Description
1,395	57	Good	Minor issues or defects that do not require immediate attention.
970	40	Fair	Well-defined issues such as dead branches or co-dominant stems that need maintenance within several years.
85	3	Poor, Very Poor, Dead	Dead or major structural defects that warrant removal.

Table 3: Current Street Tree Population Condition

Tree Size and Age

Trees	Percent	Diameter	Description
1,133	46	1-6"	Young
735	30	7-12"	Young to Semi-Mature
502	20	13-24"	Semi-Mature to Mature
63	2	25-36"	Mature
13	Less than 1	Over 36"	Mature to Over-Mature

Table 4: Current Street Tree Population Size and Age

[Insert Figure 3: Current Street Tree Condition by Diameter]

Analysis

- The downtown area contains the highest number of young trees (561) and the highest number of recommended removals (47).
- 90% of recommended removals are less than 12" in diameter.
- All trees recommended for removal are low risk.
- The most urgent maintenance need is clearance pruning. Street trees blocking visibility in the roadway is a liability for the City.
- Structural pruning is also needed for the majority of trees. The street tree population is young and healthy enough that many of the structural defects present can be corrected with pruning. If maintenance is deferred for several more years, many trees will become too mature for structural pruning to be effective. For more information about structural defects, see Appendix A: Definitions.

Other Maintenance Requirements

- Soil - reference current EDDS (standards) related to new tree planting
- Mulch is applied sporadically? Irregularly? for the majority of street trees.
- Watering for new City-managed plantings is inconsistent, resulting in some tree death.

Planting

- There are low numbers of entirely new or replacement plantings due to coordination issues, budget constraints and maintenance shortfalls.
- The majority of new City-managed plantings are associated with capital facility projects.
- The new planting that are not City-managed are required by private developments. The developers are responsible for maintaining these trees for the first 3 years, after which they are the City's responsibility.
- Young trees need more frequent structural pruning than older trees. As development continues, the percent of young trees in the population may increase, effecting tree work schedules.

8. Street Tree Maintenance Program Desired Conditions

The following resources are needed to achieve the “Desired” Level of Service, which will provide industry-standard maintenance for the City-maintained street population. See also Appendix E: Levels of Service Comparison.

Annual Cost:

- \$313,000

Staff:

- All staff dedicated 80% to street trees and 20% to park trees.
- 1 permanent Maintenance Worker (Arborist).
- 1 permanent Maintenance Worker (Arborist).
- 1 temporary Maintenance Worker I as ground support for 8 months/year.

Trees	Maintenance
211	1-6" diameter trees (5 year cycle)
143	7-12" diameter trees (5 year cycle)
71	13-24" diameter trees (7 year cycle)
11	25-36" diameter trees (7 year cycle)
17	Removals (5 year cycle)
All	40 minutes general maintenance (weeding, litter removal, mulching, tree grate maintenance, remove root suckers)
487	20 minute Post-Pruning Inspection
15	Newly planted trees & watering

5/7 Year Pruning Cycle:

- Younger trees pruned every 5 years.
- Older trees pruned every 7 years.

Table 5: “Desired” LOS Yearly Maintenance Work

Equipment:

- New lift truck.
- Ford F350 Quad Cab truck with chip box.
- New Vermeer chipper.
- New climbing gear/saws.

Analysis:

- Minimum of 1 ISA Certified Arborist on the tree work crew.
- Dedicated, permanent crew with multiple staff trained to climb will make tree work safer and more efficient.
- The 5/7 year pruning cycle length meets basic industry standards.
 - Keeps trees pruned back away from street lights, traffic signs, and buildings improving safety and reducing citizen complaints.
 - Prunes trees when they are younger, making the work easier, cheaper, and better for tree health.
 - Liabilities such as clearance pruning can be proactively managed.
- Replaced equipment/Vehicles reduce cost and improve safety and efficiency.

The special projects and contracts listed in Section 6 will continue in addition to the regular street tree maintenance program

9. Street Tree Population Desired Conditions

Population Diversity

- To guard against insect and disease outbreaks, increase the population diversity at the genus and species level.
- The Allowed Species List (Appendix B) shall be used to plan future street tree planting for both City and private projects. It contains selections that are less likely to damage infrastructure and not susceptible to known pests outbreaks. It also places a moratorium on Callery pears and Norway maples, which are over-represented in the population.
- When planning plantings choose less-well represented species and genera as appropriate.

Pruning and Removal

- The Pruning Standard (Section X) shall be used to plan and implement all pruning work.
- All pruning work shall be recorded in the Street Tree Inventory
- Secure funding and commitment toward street tree pruning on a regular pruning cycle.
- Reference the Prioritized Work Plan for Tree Maintenance (Appendix X) when planning maintenance.

Planting

- Secure funding and commitment toward street tree planting and establishment.
- New street tree plantings shall be added to the Street Tree Inventory data set.
- The method described in the Street Tree Planting Standard (Section X) shall be used when planting.

10. Street Tree Inventory Update Protocol

Purpose and Scope

- a) Olympia's street trees are living infrastructure; their population will change over time as trees are planted, grow, and are maintained. In order to apply the street tree inventory for management planning, it must be updated to accurately reflect these changes in the population.
- b) The following sections describe the protocol for comprehensive and consistent inventory updates.
- c) Table 8 defines the tree condition attributes, and Table 6 defines the other data attributes in the inventory. To ensure data is collected consistently, these definitions should be referenced while performing updates.

Staff Qualifications/Responsibilities

- a) Staff members with authority to update the street tree inventory should have knowledge and professional experience in arboriculture, urban forestry, and urban tree best management practices.
- b) Each staff member should have access to a device with ESRI Collector installed and the Trees Inspections & Work feature class enabled. Staff should be trained to use the device and the Collector app.
- c) Each staff member updating the inventory should have their own Collector login ID. The person signed in should be the only one to enter data.
- d) To enable updates whenever they are needed, staff should always carry the device in the field.

Inventory Update Frequency

- a) When staff are performing tree maintenance, removal, planting or other field work, they should update the inventory to
 - a. Record the work performed.
 - b. Correct any inaccurate data (wrong species, incorrect DBH, etc.).
 - c. Record any new defects, sidewalk damage, or site conditions.
- b) Inventory Attribute Table Organization
 - a. There are 3 data tables associated with each tree point, see Table 6 for definitions of data attributes in each table.
 - i. The main attribute table contains general information about each tree. It is immediately visible when tree points are selected or created.
 - ii. The Defects and Work Performed tables are sub-tables related to the main table. Previously entered data can be viewed or new data entered.

Inputting Data

- a) Staff should record the date and identify themselves in the appropriate fields.
- b) To identify themselves when updating the inventory, staff should use the login ID they use for Collector and other City computers.
- c) Staff should fill in all applicable fields in the main table, the Defects table, and the Work Performed table with the new or corrected tree data.
- d) Inputting Tree Condition attributes should occur only after a Post-Pruning Inspection. See Post-Pruning Tree Inspection Protocol (Section 11) for details.
- e) When new trees are planted fill in the Tree Source and Year Planted fields. If the species is not in the Species list in the inventory, contact the GIS Analyst to add it.

Main Attribute Table		
Field Name	Definition	Entry Method
Site ID	Unique ID for tree site	Fill in the blank.
Created	Date tree point is created.	Dropdown menu.
Modified	Date tree point is updated.	Dropdown menu.
AddrNum	Address number of tree site.	Fill in the blank.
Street	Street of tree site.	Fill in the blank.
Park/Facility	Park/Facility name (if applicable).	Fill in the blank.
Grow space	Describe the width and/or character of the planting site.	Dropdown menu.
Utilities	Type of utilities above or below tree.	Dropdown menu.
Land Use	Type of land this tree site is on.	Dropdown menu.
Site Type	Information about what the site is.	Dropdown menu.
Species	Botanic & common name for the tree	Dropdown menu.
Diameter	Diameter at breast height using a diameter tape	Fill in the blank.
Height	Approximate height of the tree	Fill in the blank.
Spread	Approximate spread of the crown	Fill in the blank.
Trunks	Number of trunks	Fill in the blank.
Condition	Condition of tree. See Table 8. (Dead, Very Poor, Poor, Fair, Good, Excellent)	Dropdown menu.
Landmark Tree	Note if the tree has Landmark status	Dropdown menu.
Specimen Tree	Note if the tree has Specimen status	Dropdown menu.
Tree Source	Information about where the tree came from.	Fill in the blank.
Notes	Comments or notes with regard to the tree or tree site.	Fill in the blank.
Year planted	Year the tree was planted.	Fill in the blank.
SidewalkDamage	Measurement of sidewalk lift.	Dropdown menu.
Tree Inspections and Work - Defects Related Table		
Field Name	Field Name	Field Name
Defect_type	Defect_type	Defect_type
Defect	Defect	Defect
Created	Created	Created
Comments	Comments	Comments
Tree Inspections and Work - Work Related Table		
Field Name	Field Name	Field Name
WorkPerformed	WorkPerformed	WorkPerformed
DateWorkPerformed	DateWorkPerformed	DateWorkPerformed
Comments	Comments	Comments

Table 6: Inventory Data Attribute Definitions

11. Tree Appraisal Protocol

Scope and Purpose

- a) Understanding the monetary value of Olympia's street trees allows for accurate accounting and provides justification for funding tree maintenance programs. Therefore it is important to keep up-to-date records of the appraised value of the street tree population.
 - a) The following sections describe the protocol for comprehensive and consistent updates to the Street Tree Appraisal data.
- b) Appraisal Method
 - a) Street trees should be appraised using the methods developed by the Council for Landscape Appraisers.
 - b) Staff or consultants responsible for appraising street tree value should have training and have professional experience with the above methods.
- c) Update Frequency.
 - a) The Street Tree Appraisal data should be updated every 5 years.
- d) Inputting Data
 - a) Placeholder

Tree Appraisal Attribute Table		
Field Name	Definition	Entry Method
Diameter	Diameter at breast height using a diameter tape.	Autofilled from Tree Inspections and Work feature class.
Height	Approximate height of the tree.	Autofilled from Tree Inspections and Work feature class.
Spread	Approximate spread of the crown.	Autofilled from Tree Inspections and Work feature class.
Condition	Condition of tree. (Dead, Very Poor, Poor, Fair, Good, Excellent)	Autofilled from Tree Inspections and Work feature class.
Location	An average of the site, contribution and placement percentage rating. Very high: 90-100% High: 80-89% Average: 70-79% Low: 60-69% Very: low 10-59%	Fill in the blank.
Appraisal Value	Appraised monetary value of tree.	Calculated from other fields.

Table 7: Street Tree Appraisal Data Attribute Definitions

12. Post-Pruning Inspection Protocol

Purpose and Scope

- e) Street trees must be inspected after pruning in order to assess how well the work achieved the pruning objectives and to assign a condition rating.
- f) The following sections describe the protocol for comprehensive and consistent Post-Pruning Inspections and updates to the street tree inventory.

Staff Qualifications

- g) Staff members conducting inspections should have knowledge and professional experience in arboriculture, urban forestry, and urban tree best management practices.

Inspection Frequency

- h) Inspection should be performed at least one growing season after the pruning work, preferably during the winter when other tree work is less pressing and the branch architecture is easily seen.
- i) To increase efficiency in the field, the Post-Pruning Inspection can be performed during the same field visit as Tree Grate Maintenance (see Section 14).
- j) Inspections should take no more than 5-10 minutes per tree and should be performed on foot.

Tools and Equipment

- k) ESRI Collector installed and the Trees Inspections & Work feature class enabled.
- l) Hand-lens and binoculars (optional but helpful for viewing tree canopy, diagnosing diseases, etc.).

Inspection Procedure

- m) Look over the inventory data for the tree in question. Note tree species, DBH, height and spread, previous work performed, current condition rating, and any site or structural defects.
 - i. Walk all the way around the tree, carefully inspecting the:
 - Growing site.
 - Root zone and root flare.
 - Trunk and scaffold branches.
 - Canopy.
 - ii. Note the following conditions:
 - Tree response to pruning (healthy growth and structure vs. sprouting, over-vigorous growth, or dieback).
 - Overall health and vigor of the tree (average shoot length, signs of insect/disease, etc.).

- Any defects or damage since the last inspection.
 - Problems with the growing site (missing tree grate, etc.)
 - Inaccurate inventory data (wrong species, incorrect DBH, etc.).
- iii. If the tree is potentially hazardous (down, leaning, large cracks or dead limbs, etc.), follow the Hazard Tree Protocol (See Section x.x)

Inputting Data

- n) Staff should record the date and identify themselves in the appropriate fields.
- o) To identify themselves when updating the inventory, staff should use the login ID they use for Collector and other City computers.
- p) Staff should fill in all applicable fields in the main table, the Defects table, and the Work Performed table with the new or corrected tree data.
- q) Staff should update the Tree Condition attribute, referencing Table 8 to assign a condition rating.

Attribute	Definition	Example
Excellent	None or only very minor issues.	
Good	Minor issues that do not need immediate attention and can wait until a later pruning cycle AND good overall health indicators	<ul style="list-style-type: none"> • Dead branches under 2" diam. • Codominant stems under 4" diam. • Trunk or basal scar under 2" diam. • Good health: full crown, no dieback, vigorous growth, green leaves, etc.
Fair	Well-defined issues that need to be addressed in the next pruning cycle OR minor issues and fair health indicators	<ul style="list-style-type: none"> • Dead branches over 2"-4" diam. • Codominant stems 4"-6" diam. • Trunk or basal scar under 2" diam. • Fair health: Thin crown, less than 25% dieback, poor growth, dull or yellow leaves, etc.
Poor	Defects that cannot be corrected but do not pose an immediate hazard OR more minor defects and poor health indicators.	<ul style="list-style-type: none"> • Codominant stems over 6" diam. • Trunk or basal scar over 2" diam. • Poor health: 25-50% crown dieback, poor or no growth, dull or yellow leaves, stress crop of fruit or cones, adventitious sprouts, etc.
Very Poor	Major defects that cannot be corrected but do not pose an immediate hazard.	<ul style="list-style-type: none"> • Over 50% crown dieback. • Included bark or split branches over 6" diam. • Trunk or basal cavity or conks.
Dead	Dead standing tree. See Tree Removal Protocol.	

Table 8: Tree Condition Attribute Definitions

13. Pruning Standard

Scope and Purpose

- a. This section provides standards that are in accordance with current best professional practice for the pruning of street trees in the City of Olympia.
- b. Reasons for pruning include:
 - i. Reducing risk.
 - ii. Improving or maintaining tree health.
 - iii. Developing strong crown structure.
 - iv. Improving appearance.
 - v. Preventing interference with public and private infrastructure.
- c. This standard shall apply to all City staff members, consultants, and contractors responsible for managing the street trees downtown and on the 12 major arterials shown in Figure 1.1.
- d. For more detailed information on pruning, see ANSI 4300 (Part 1)-2017.

Staff Qualifications

- a. All City staff members, consultants, and contractors performing maintenance, management, or removal work on street trees in the field shall be trained in the current arboricultural best management practices.
- b. All work crews shall have a minimum of one ISA Certified Arborist present in the field. The Certified Arborist staff member shall be responsible for determining pruning objectives, pruning amount, and guiding the team in the use of best management practices.

Safety and Protection of Property

- c. This standard shall not take precedence over applicable industry safe work practices.
- d. The location and type of utilities and other obstructions shall be considered prior to pruning operations.
- e. City staff shall not work within 15 ft. of energized conductors. All electrical utility line clearance shall be performed by trained and licensed contractors.

Pruning Process

- f. Before beginning pruning work, one or more pruning objectives shall be determined based on field observations and the results of any previous Post-Pruning Inspections (see Section 11).
- g. When determining pruning objectives and the pruning amount, the following shall be considered:
 - i. Tree health.

- ii. Growth habit.
 - iii. Structure.
 - iv. Species characteristics.
 - v. Expected response.
 - vi. Observed response to any previous pruning.
 - vii. The ability of a plant to sustain the amount of pruning proposed.
- h. Objectives should include, but are not limited to, one or more of the following:
- i. Manage risk
 - Reduce or remove branches, codominant leaders and/or other parts (living or dead) to lower or eliminate the likelihood of failure and impact to targets.
 - ii. Manage health
 - Remove damaging parts, ex: branches that are dead or dying, diseased or infested, rubbing, weakened or broken, or parasitic plants, etc.
 - iii. Develop structure
 - Initiate early to enhance benefits and value, and reduce long-term costs and potential for failure.
 - Develop dominant leader(s) and desirable scaffold branches appropriate for the species and site.
 - Subordinate or remove competing leaders, branches and shoots. If necessary, subordinate larger branches over multiple growing seasons to avoid making large cuts and removing excessive amounts of material.
 - iv. Provide clearance
 - Determine clearance amount according to intended site use, planned maintenance interval, and characteristic form of the plant, including shape, growth rate and likely growth response following pruning.
 - Use directional pruning to encourage growth away from the specified clearance area and to develop compatible and stable structure.
 - v. Improve aesthetics
 - Selectively reduce or remove branches, leaders or other parts to achieve aesthetic objectives.
- i. The following types of pruning shall be used to achieve the pruning objectives:
- i. Crown cleaning
 - Selective pruning to remove one or more of the following: dead, diseased, infested, rubbing, declining, detached and/or broken branches.

- ii. Crown thinning
 - Selective pruning to reduce density of branches and foliage.
- iii. Crown raising
 - Pruning of branches to provide vertical clearance below the crown.
- iv. Crown reduction
 - Decreasing branch length, or plant height and/or spread. Leaders and large branches should be reduced over multiple growing seasons to avoid making large cuts, causing resprouting and stress to the tree.
- v. Crown restoration
 - Pruning to redevelop structure, form, and appearance of topped or damaged woody plants.

Inventory Updates

- j. The Street Tree Inventory shall be updated after any pruning work is performed. For the Street Tree Inventory Update protocol, see Section 9.

Inspection

- k. Street trees should be inspected after pruning in order to assess their reaction to the work.
- l. Inspection should be performed at least one growing season after the pruning work.
- m. For the Post-Pruning Inspection protocol, see Section 11.

Pruning Practices

- n. The smallest diameter cut that meets the objective should be preferred.
- o. The number and size of cuts that expose heartwood should be minimized.
- p. Branches shall be precut when necessary to avoid splitting of the wood or tearing of the bark (see Figure 4).
- q. A branch removal cut shall be made without cutting into the branch bark ridge or branch collar, or leaving a stub. The adjacent bark should be firmly attached. (see Figure 4)
- r. Reduction Cuts
 - i. A reduction cut should be made to a live lateral branch or codominant stem when it can be expected to sustain the remaining branch or stem.
 - ii. The remaining lateral branch should typically be at least one-third the diameter of the stem or branch being removed.

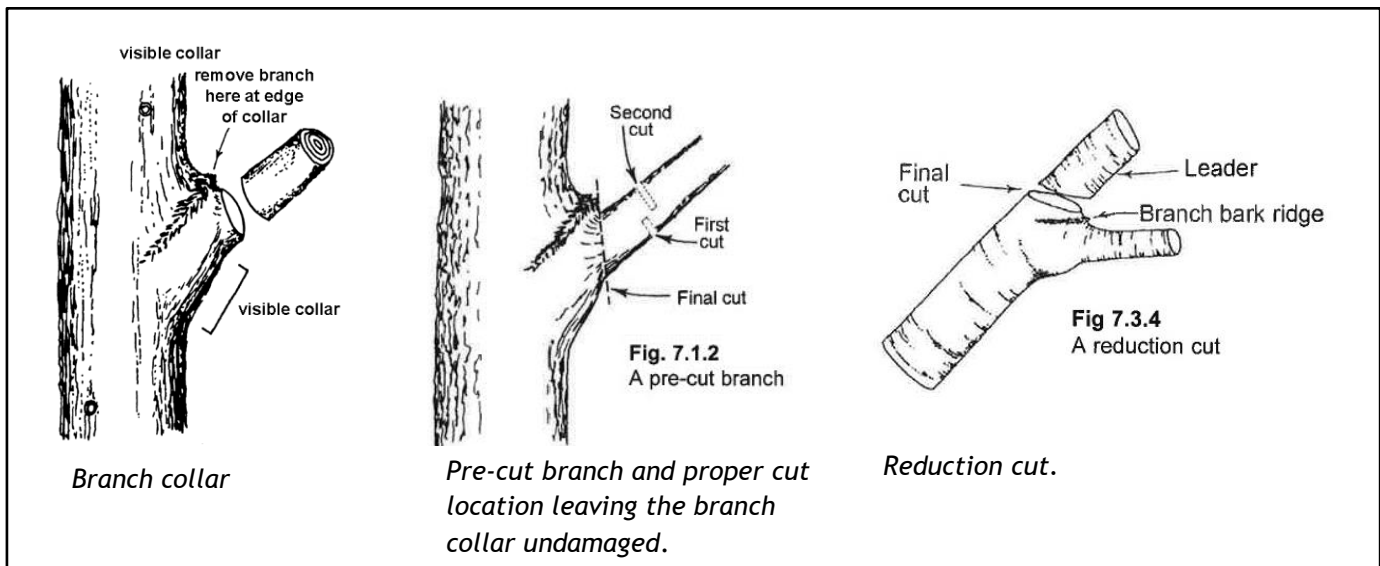


Figure 4: Pruning Cuts

- s. Heading Cuts
 - i. A heading cut should only be made when necessary to conform with certain pruning objectives, such as structural development on young trees.
 - ii. A heading cut should only be made when it can be expected that the remaining lateral(s) or shoots that grow from retained buds are able to sustain the remaining branch.
- t. The following pruning practices are unacceptable and shall not be performed:
 - i. Topping
 - 1. Reduction of tree size by cutting to stubs without regard for long-term tree health or structural integrity.
 - ii. Lion Tailing
 - 1. The removal of interior lateral branches that results in a concentration of growth at branch ends.
 - iii. Flush Cut
 - 1. Pruning cut that removes the branch bark ridge and/or branch collar.

Work Practices

- u. Climbing spurs shall not be used except during tree removals or in a medical emergency.
- v. Wound treatments should be used only when necessary to prevent the spread of pests or for other specified reasons. Wound treatments that damage the plant shall not be used.
- w. Appropriate precautions shall be taken when necessary to prevent the spread of pests and disease, ex: seasonal timing, sterilization of tools, and handling/disposal of debris/by-products.

14. Planting Standard

[Placeholder]

15. Tree Grate Maintenance Protocol

Maintenance Frequency

- a) Tree grates should be inspected and maintained annually, preferably during the winter when other tree work is less pressing.
- b) To increase efficiency in the field, tree grate maintenance can be performed during the same field visit as the Post-Pruning Inspection.

Staff Qualifications and Responsibility

- c) Tree grate maintenance should be performed by the Parks arborist crew or other staff with training and professional experience with arboriculture, urban forestry, and urban tree best management practices.

Performing Maintenance

- d) Inspect tree grate and well and perform the following maintenance tasks as needed. See Figure 6.1 for a diagram of maintained tree well and grate.
 - a. Replace broken or missing grate.
 - b. If tree has grown into the grate or is close, enlarge it by removing the smallest ring around the opening.
 - c. If grate opening cannot be enlarged further, remove grate entirely. Apply mulch to 2 inches deep or as needed to bring mulch level with the tree well, making sure not to bury the root flare.
 - d. Remove any trash and/or weeds.
 - e. Prune any root or trunk sprouts, cutting as close as possible to the tree without damaging the root flare or trunk.
 - f. Expose buried root flare if needed. You may need to remove excess soil in order to apply 2 inches of mulch without covering the root flare.
 - g. If roots are exposed, add soil to cover them, making sure not to bury the root flare.
 - h. Add or replace bark mulch to a depth of 2 inches.

16. Tree Maintenance/Removal Response Protocol

[Placeholder]

17. Response To Sidewalk Damage Protocol

[Placeholder]

Appendix A: Definitions

[Placeholder]

Appendix B. Recommended Species

[Placeholder]

Appendix C. Prohibited Species

The following species are prohibited and shall not be planted as street trees in the City of Olympia.

Common Name	Scientific Name
Ash	<i>Fraxinus</i> sp.
Aspen	<i>Populus tremuloides</i>
Bigleaf maple	<i>Acer macrophyllum</i>
Black locust	<i>Robinia pseudoacacia</i>
Boxelder	<i>Acer negundo</i>
Callery pear	<i>Pyrus calleryana</i>
Cottonwood	<i>Populus</i> sp.
English (cherry) laurel	<i>Prunus laurocerasus</i>
English hawthorn	<i>Crataegus monogyna</i>
English holly	<i>Ilex aquifolium</i>
European mountain ash	<i>Sorbus aucuparia</i>
Japanese zelkova	<i>Zelkova serrata</i>
Little-leaf linden	<i>Tilia cordata</i>
London plane	<i>Platanus x acerifolia</i>
Mountain ash	<i>Sorbus americana</i>
Norway maple	<i>Acer platanoides</i>
Ornamental cherries	<i>Prunus</i> sp.
Poplar	<i>Populus</i> sp.
Purple leaf plum	<i>Prunus cerasifera</i>
Red alder	<i>Alnus rubra</i>
Silver maple	<i>Acer saccharinum</i>
Sweetgum	<i>Liquidambar styraciflua</i>
Sycamore maple	<i>Acer pseudoplatanus</i>
Tree of heaven	<i>Ailanthus altissima</i>
Willow	<i>Salix</i> sp.
White poplar	<i>Populus alba</i>

Table 9: Prohibited Species

Appendix D: 2017 Work Plan for Tree Maintenance

Purpose: To identify and manage our department's tree work in a proactive manner, with an overall goal to reduce the amount of nuisance tree-related calls, to address potential tree failures before they occur, and to help insure a healthy urban tree population.

Background: In 2016, the City utilized grant funding to have an inventory and assessment performed on its street trees (I.E., those which are on the City's main arterials, and/or in tree wells in the downtown vicinity, and also those which have been identified as having been previously maintained by the City's Parks department). The project called for the identification, inventory, and condition assessment of (up to) 2,500 street trees. This effort did not gather data on trees in any other areas that the Parks department is tasked to maintain (I.E. trees within Parks, and various other trees that may have been previously maintained by the Parks department). The zones inventoried and assessed through the grant were then prioritized by City staff, and are as follows:

Area 1 (Downtown, 1187 trees):

Downtown core

Area 2 (Eastside, 666 trees):

2) Legion Way, 3) Capitol Way, 4) 4th avenue, 5) State avenue, 6) Pacific avenue, 7) Martin Way

Area 3 (Westside, 583 trees):

8) Cooper Point, 9) Kenyon street, 10) Harrison avenue, 11) Black Lake boulevard, 12) W. Harrison avenue, 13) N. Cooper Point

Staffing: The City has recently filled its vacant Arborist position, as well as has secured funding for additional support from a temporary (seasonal) Maintenance Worker 1 position. These two positions will be committed to working exclusively on tree-related issues. As the term for the seasonal Maintenance Worker 1 comes to an end, a Maintenance Worker 2 will backfill the position until the MW 1 position is refilled in the late winter/early spring.

Rationale: Begin with (1) documented issues (I.E. those identified in tree risk assessments), then (2) move onto previous, non-addressed tree complaints beginning with those that have the most merit (I.E. have the ability to cause injury or harm to people and/or structures) Then begin to work proactively on the inventoried zones with a prioritized approach (I.E. utilizing historic knowledge of most typically identified areas of requests/knowledge of already identified issues) and also to respond to tree emergencies as they may arise (I.E., storm response, exceptional citizen requests, etc.)

The approach is as follows:

1. ***Current, yet to be completed tree assessments:***
 - a. LBA Woods, Bentrige parcel
 - b. Springwood (Zabels Rhody Garden)
2. ***Backlog of certain citizen, etc. requests:***
 - a. 110 5th Avenue (corner of Capitol and 5th)
 - b. 4th and Washington-3 trees on building (adjacent to “Dillingers”)
3. ***Area “1” (downtown):***
 - a. 4th Avenue from the bridge to Plum street
 - b. State Avenue from Plum street to Water street
 - c. 5th avenue from Columbia to Plum
 - d. Legion Way from Columbia to Plum
 - e. Olympia avenue from Columbia to Franklin street
 - f. Thurston/Olympia avenues from Columbia avenue to East Bay drive *
 - g. A avenue from Columbia street to Washington street
 - h. B avenue from Columbia street to Washington street
 - i. Corky avenue/Market street from Columbia street to Franklin street
 - j. 8th avenue from Capitol Way to Washington street
 - k. 9th avenue from Washington street to Jefferson street
 - l. 10th avenue from Columbia street to Jefferson street
 - m. Union avenue from Capitol Way to Adams street
 - n. Capitol Way from Corky avenue to Union avenue
 - o. Washington street from Market avenue to Union avenue
 - p. Franklin street from Olympia avenue to Union avenue
 - q. Adams street from State avenue to Union avenue
 - r. Jefferson street from Marine drive to 10th avenue
 - s. Cherry avenue from 4th avenue to 8th avenue
 - t. Chestnut street from Olympia avenue to 8th avenue
 - u. Plum street from Legion avenue to Union avenue
 - v. Pear street from Olympia avenue to Legion Way
 - w. Quince street from 4th avenue to Legion Way
 - x. Eastside street from 4th avenue to 7th avenue
4. ***Area “2” (Eastside arterials, and S. Capitol Way)***
 - a. Legion Way from Plum street to Central street
 - b. Capitol Way from Union avenue to Carlyon avenue
 - c. 4th avenue from Plum street to Chambers street
 - d. State avenue from Plum street to Wilson street
 - e. Pacific avenue from Phoenix street to Lansdale road
 - f. Martin Way from Ensign road to College
5. ***Area “3” (Westside arterials)***
 - a. Cooper Point road from Black Lake blvd to Harrison avenue
 - b. Kenyon street from Harrison avenue to Mall Loop drive
 - c. Harrison avenue from Division street to Cooper Point road
 - d. Black Lake blvd/Division street from Harrison avenue to Cooper Point road
 - e. Harrison avenue from Cooper Point road to Greenwood drive
 - f. Cooper Point road from Harrison avenue to Conger avenue

Appendix E: Levels of Service Comparison

“Current” Level of Service			“Desired” Level of Service		
Annual Cost					
\$174,000 current budget			Additional \$135,400		
Staff (dedicated 80% to street trees, 20% to park trees)					
a) 1 permanent Maintenance Worker (Arborist). b) 1 permanent Maintenance Worker pulled from other Parks maintenance work for 4 months. c) 1 temporary Maintenance Worker as ground support for 8 months/year.			Additional Maintenance Worker (Arborist) and associated vehicle and equipment.		
Pruning Cycle					
<ul style="list-style-type: none">Younger trees pruned every 15 yearsOlder trees pruned every 17 years			<ul style="list-style-type: none">Younger trees pruned every 5 yearsOlder trees pruned every 7 years		
Yearly Maintenance Work					
Cycle Length	Trees	Maintenance	Cycle Length	Trees	Maintenance
15 yrs	70	Pruning 1-6” diameter trees	5 yrs	211	Pruning 1-6” diameter trees
	47	Pruning 7-12” diameter trees		143	Pruning 7-12” diameter trees
17 yrs	29	Pruning 13-24” diameter trees	7 yrs	71	Pruning 13-24” diameter trees
	5	Pruning 25-36” diameter trees		11	Pruning 25-36” diameter trees
5 yrs	17	Removals	5 yrs	17	Removals
N/A	All	40 minutes general maintenance (weeding, litter removal, mulching, tree grate maintenance, remove root suckers)	N/A	All	40 minutes general maintenance (weeding, litter removal, mulching, tree grate maintenance, remove root suckers)
	162	20 minute Post-Pruning Inspection		487	20 minute Post-Pruning Inspection
	10	Planting & watering new trees		15	Newly planted trees & watering

Table 10: Levels of Service Comparison

Analysis

Trees are pruned 2-3 times more often in the “Desired” LOS.

“Current” LOS

Far below basic industry standards for tree maintenance.

Pulling Maintenance Worker from other maintenance work impacts overall Parks operations.

Longer pruning cycle

- Tree condition will deteriorate in the length of time between prunings.
- Trees will grow, making work more difficult and expensive.
- Liabilities cannot be proactively managed.

“Desired” LOS

Meets basic industry standards for tree maintenance.

Dedicated, permanent crew will make tree work safer and more efficient.

Shorter pruning cycle

- Keeps trees pruned back away from street lights, traffic signs, and buildings improving safety and reducing citizen complaints.
- Prunes trees when they are younger, making the work easier, cheaper, and better for tree health.

Appendix F: History of Street Tree Management in Olympia

In the 1990's and early 2000's, the Urban Forestry Program focused heavily on street tree planting, installing thousands of new trees during the first decades of the program. Trees were planted downtown and on major arterials as capital (City-funded) projects, and through volunteer efforts. OMC 16.60 required every new development project to protect, retain, and plant trees, including street trees. Subsequently, new development contributed greatly to the increase in street trees citywide. In addition, the NeighborWoods program organized and trained citizen volunteers to plant street trees in neighborhoods.

The strong emphasis on planting trees has significantly increased Olympia's street tree population, creating tree-lined streets and opportunities to experience the benefits previously noted. However, trees grow and change as they mature, so ongoing maintenance is critical to maintaining a healthy and safe street tree population.

The Urban Forestry Program has experienced challenges to providing consistent and thorough street tree maintenance. Examples include a need for greater inter-departmental coordination and common agreement about priorities, responsibilities, and resource allocation. Additionally, funding for tree work has not allowed for the staff needed to perform regular tree work. For years the maintenance program has been only able to react to urgent problems rather than prevent them, resulting in a large maintenance backlog. The City has also lacked comprehensive and up-to-date data to guide street tree asset management. Several inventories were performed over the years, but have not been maintained or integrated into management planning across departments.

Olympia's urban forestry program has evolved in the last several years to a more collaborative and inter-departmental approach to management. Based on recommendations from the Strategic Plan completed in 2015, City staff formed an interdepartmental urban forestry policy team to clarify roles and responsibilities and coordinate responsibilities for urban forest management among three departments: Community Planning & Development, Public Works, and Parks, Arts, and Recreation. Parks recently hired an arborist who is responsible for park and street tree management. The new street tree inventory, and the standards, protocols and management actions called for in the STMM will continue to build on past successes to develop a more sustainable and resilient Urban Forestry Program.

Below - Table 11: Olympia's Street Tree Planting History

Year	Location	Notes
1970s and 1980s (400-500 trees total)	Washington St outside the Washington Center	Red oak
	Percival Landing	
	Capital Way	
	5 th Ave RUDAT Demonstration Project	Honeylocust
	4 th Ave west of Franklin St	
	Pacific Ave between Dehart and Pattison Sts	Green ash
	Cooper Point Rd by Capitol Mall	London plane – several were root pruned due to sidewalk damage and later died from anthracnose infection; replaced in 2000 or 2001
	Black Lake Blvd	Damaged in 1996 ice storm and replaced over time
1992	Capitol Way north of State Ave	20 trees - Hedge maple and little leaf linden
	Martin Way	250 trees - Autumn Applause ash and Norwegian Sunset maple - planted as part of a Local Improvement District project
	State Ave between Capitol Way and Franklin St	40 trees
	Capitol Way north of State	Approx 20 trees
1994	State and 4 th Aves between Franklin and Chestnut or Plum	100 trees
1995	Capitol Way from 14 th Ave to city limits	23 trees - Pacific Sunset Maples (14 th to 18 th Ave) 45 trees – Red oak (18 th Ave to 25 th Ave) 49 trees – Chanticleer pear (25 th Ave to city limits)
1998 (100 trees total)	Washington St, Legion Way, 4 th Ave	
	North end of Black Lake Blvd	Planted by volunteers with hedge maple and thornless upright Washington hawthorn - hawthorns all did poorly and were replaced over time; this area has very challenging soils and exposed southwest aspect making species election challenging
Early 2000s	Mud Bay Rd	<i>Magnolia denudata</i> - planted during road improvement project; most died and were replaced with ash (by Rite Aide property owner) and black gum (by city)
2001	South end of Black Lake Blvd	50 trees - American mountain ash
	State and 4 th Aves between Plum or Chestnut and Sawyer St	200 trees; includes structural soil demonstration project on State Ave
	Cooper Point Rd by Capitol Mall	15 trees - Replacement London planes
	Franklin St	30 trees
2006	Harrison Ave between Cooper Pt Rd and Yauger Way	

Appendix G: Benefits of Olympia's Street Trees

Olympia's urban forest is an important natural resource that provides a multitude of benefits. City trees reduce cooling costs by creating more comfortable summer microclimates¹. Trees contribute to positive health outcomes for city dwellers, including decreased stress and instances of violence², lower overall mortality rates³, increased social cohesion, and greater motivation to exercise⁴. Studies show that street trees provide numerous economic values, including boosting property values and increasing the price consumers are willing to pay for goods⁵.

In light of these benefits, the City of Olympia (City) recognizes that the urban forest must be managed as an integral element of our infrastructure. The strategies, and management actions, and maintenance protocol in the Street Tree Maintenance Manual (STMM) enhance the benefits and reduce the costs associated with street trees by providing guidance for caring for this valuable asset.

¹ Wolf, Kathy. 1998. Human Dimensions of the Urban Forest Fact Sheet #3: Urban Forest Values: Economic Benefits of Trees in Cities. Center for Urban Horticulture, University of Washington.

² Wolf, Kathy. 1998. Human Dimensions of the Urban Forest Fact Sheet #1: Urban Nature Benefits: Psycho-Social Dimensions of People and Plants. Center for Urban Horticulture, University of Washington.

³ Donovan, Geoffrey H. et. al. 2013. The Relationship Between Trees and Human Health: Evidence from the Spread of the Emerald Ash Borer. *Am J Prev Med.* 44 (2): 139-145.

⁴ Douglas, Ian. 2012. Urban ecology and urban ecosystems: understanding the links to human health and well-being. *Current Opinion in Environmental Sustainability.* 4:385-392

⁵ Wolf, Kathy. 1998. Human Dimensions of the Urban Forest Fact Sheet #5: Trees in Business Districts: Positive Effects on Consumer Behavior!. Center for Urban Horticulture, University of Washington.

Appendix H: Emerging Challenges for Olympia's Street Trees

There are several known emerging challenges that will impact the health and/or diversity of our urban forest within the next decade. While we may not see the anticipated impacts of these emerging conditions yet, urban forestry management best practices include learning from the research and the experience of other communities as to how to effectively plan for how to prepare and adapt to these conditions when they do occur.

Climate Change. Models predict that as the global climate changes, the Puget Sound region will experience warmer, rainier winters with more extreme storms, and hotter, more drought-prone summers. These changes in regular climate cycles and conditions will make it difficult for some tree species to survive without intense maintenance, and will alter the planting palate of regionally adapted trees. Trees that can't adapt to changes in climate will become stressed, which will increase vulnerability to invasive species, pests, and diseases. This cycle will be exacerbated as certain pests and diseases may become more, and new ones may emerge.⁶

Sea Level Rise. Sea level rise will significantly impact street trees downtown, where periodic salt water inundation and/or urban flooding may become a more regular occurrence in coming decades. Few trees that can withstand inundation are also appropriate as street trees. Solutions may include limiting the planting palate, planting above-ground with a more frequent removal and replacement rotation, or accommodating more non-traditional street trees with greater soil volumes and alternative planting designs.

Pests/Diseases. Pest and disease epidemics have catastrophic effects on street tree populations, particular those that consist of only several different species. The emerald ash borer (EAB) and Asian longhorn beetle (ALB) are two insects that have caused the devastating removal of entire urban forests in other parts of the country. These insects are expected to arrive in Washington in the next several years. Maintaining street tree population diversity and selecting pest-resistant varieties will reduce the damaged anticipated by possible outbreaks.

Street Redevelopments Downtown. The Downtown Strategy calls for the reconstruction of five street sections in downtown during the life of the STMM. The recommendations in this plan will allow operations staff to plan and implement regular maintenance for the newly planted trees that result from re-development.

⁶ Mauger, G.S., J.H. Casola, H.A. Morgan, R.L. Strauch, B. Jones, B. Curry, T.M. Busch Isaksen, L. Whitely Binder, M.B. Krosby, and A.K. Snover, 2015. State of Knowledge: Climate Change in Puget Sound. Report prepared for the Puget Sound Partnership and the National Oceanic and Atmospheric Administration. Climate Impacts Group, University of Washington, Seattle. doi:10.7915/CIG93777D

Appendix I: Regulatory Framework

The Street Tree Maintenance Manual is part of a larger regulatory framework used by the City to manage the urban forest. Other plans, standards, and regulations related to the management of street trees are described below.

Policy Documents

Policy documents set high level goals and priorities for Olympia's urban forest and urban forestry program.

2001-2011 Master Street Tree Plan. The STMM replaces the 2001-2011 Master Street Tree Plan to reflect new best professional maintenance practices, as well as the current state of the street tree population and the maintenance program. The Master Street Tree Plan presented and analyzed a street tree inventory for downtown and the 12 arterials, as well as limited data for residential streets. The 2001-2011 Plan also:

- Discussed streetscape design considerations.
- Set priority areas for tree planting.
- Described street tree management programs, roles, and responsibilities.
- Established tree management standards.

Comprehensive Plan. The Comprehensive Plan is a 20-year plan for the city's growth and development required by the state Growth Management Act. It includes the community's values and vision. It also establishes goals and policies, which direct other planning efforts. Three chapters, Transportation, Land Use and Urban Design, and Natural Environment, include goals and policies to achieve a healthy and diverse tree canopy.

Urban Forest Management Strategic Proposal (Strategic Plan). The Strategic Plan was completed in April, 2015. The Strategic Plan assessed the existing policies, codes, roles and responsibilities, and other elements of the City's Urban Forestry Program. The Strategic Plan identified major challenges and included recommendations for addressing those. Several recommendations, such as developing a tree inventory system and establishing an inter-departmental urban forestry team, have been accomplished. Completion of the STMM will fulfill additional recommendations, including: clarifying the program roles and responsibilities.

Downtown Strategy. The Downtown Strategy (DTS) identifies goals and priorities for downtown Olympia, including a five-year action plan for achieving those goals.

Actions in the Downtown Strategy that address street trees include:

(1) Design

- D.1: Update building and site design guidelines

(2) Transportation

- T1: Redevelopment of five streets downtown
- T.2: Traffic calming on 4th Ave intersections
- T.3: Updating the EDDS
- T.7: Prepare a Street Tree Maintenance Manual

Sea Level Rise Response Plan (Currently In Process). The scheduled completion date for the Sea Level Rise Response Plan is October 2018. The plan will prioritize strategies and investments to protect downtown’s economic, social, and environmental values. The planning process includes an inventory and vulnerability assessment of downtown assets, including street trees. The inventory data, inventory analysis, and management strategies in the STMM will contribute to this process.

Urban Forest Management Plan (Start Date to Be Determined). During development of the STMM, staff and stakeholders identified many issues that are outside the scope of the plan. These issues have been captured and are better addressed through a process to develop a Citywide Urban Forest Management Plan. The Strategic Plan also recommends completion of an Urban Forest Management Plan. Currently no resources or funding have been identified for this effort.

Regulatory Documents and Code

Regulatory documents and sections of the Olympia Municipal Code carry out policies “on the ground” by establishing regulations and standards for street trees either impacted by or required to be planted as part of a new development project.

Engineering Design and Development Standards. The Engineering Design and Development Standards (EDDS) establish technical design requirements used by the City and private developers to design and construct drinking water, reclaimed water, sewer, transportation, stormwater, and solid waste collection systems. Included in the development of the City's transportation system are streets, sidewalks, and street trees. The standards in the EDDS for street tree include:

- (a) 4C: Sidewalks and Curbs: Describes standards for sidewalk and curb design, including bulb-outs. 4C.030G states that maintenance of the sidewalk and streetscape features including trees and landscaping are the abutting property owner's responsibility.
- (b) 4H.100: Street Trees: Describes standards for species, planting stock, tree spacing and location, tree grates, planting bed configuration, and structural soils.
- (c) Tree Related Detail Drawings
- (d) 4-49: Street Tree Frame and Grate
- (e) 4-50: Typical Tree Planting and Staking Detail
- (f) 5-8: Post Construction Soil Quality and Depth
- (g) 5-18: Tree Planting within Bioretention Swale

Olympia Municipal Code, Chapter 12.44 Street Trees. This section of the Olympia Municipal Code (OMC), adopted in 1915 and 1920, addresses City responsibility for the management of street trees.

Olympia Municipal Code, Chapter 16.60 Tree, Soil, and Native Vegetation Protection and Replacement. This section of the OMC regulates tree planting and removal as it relates to private property, including new development.

Urban Forest Manual. The Urban Forest Manual (UFM) is adopted per OMC 16.60, and establishes standards for the retention, protection, planting, and maintenance of trees. The UFM also includes a Prohibited Tree List.

Appendix J: 2017 Street Tree Inventory

In 2016, the Washington Department of Natural Resources (WADNR) Urban and Community Forestry (UCF) program and the US Forest Service (USFS) funded an inventory of street trees in Olympia. The scope of the inventory was confined to downtown and the 12 arterials OPARD is responsible for maintaining (See Figure 3.1). An arboricultural consultant, Community Forestry Consultants, Inc. (CFC) performed the inventory.

Inventory methodology

International Society of Arboriculture (ISA) certified arborists performed limited visual assessments of each tree in the inventory, a total of 2,448 trees. Surveyors collected data using TreeWorks, an ArcGIS tree management software, and Trimble field GPS units.

The attributes used by the surveyors were determined by WADNR UCF staff (see Appendix 1). Attributes recorded include:

- species, chosen from a list provided by WADNR UCF,
- growing space type,
- land use type,
- diameter,
- height,
- spread,
- appraisal value,
- condition rating from excellent to dead, and
- structural defect type, for example co-dominant stems, included bark, and stem girdling root.

Trees in “fair” condition are defined by CFC as having well-defined issues such as dead branches or co-dominant stems that require pruning or other maintenance within the next pruning cycle. “Good” trees have minor issues or defects that do not require immediate attention and can wait until later pruning cycles. See Table X.x for more information about assigning condition ratings to trees in the inventory.

The data was analyzed by CFC and City staff to provide a preliminary assessment of Olympia’s street trees, including population diversity characteristics, appraisal value, and maintenance requirements. This analysis was made available to WADNR UCF as part of the grant requirements.

Inventory Shortcomings

In spring and summer of 2017, qualified City staff and a consultant from Sound Urban Forestry performed quality assurance (QA) on the inventory data. They conducted visual assessments of a subset of trees and compared their findings with the data recorded in the inventory. Staff found some inaccuracies in the data, such as defects that were not recorded or incorrect species, height or spread information.

Despite these concerns, the tree inventory data is valuable for street tree management. The shortcomings should be kept in mind when using the data for budgeting or management decisions. As they perform work and assess trees in the field, City staff should also update and correct the inventory as needed. See Section 6.1 for details on updating the inventory.