

Grit City Tree Count

Field Manual



FOREST HEALTH WATCH COMMUNITY SCIENCE

August 2026 version

More information available at <https://treehealth.wsu.edu/tacoma/>

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Introduction

Why Inventory Trees?

Community forests provide ecological, economic, and health-related benefits. Trees can enhance water quality as it filters through the soil and roots of the plants. The root system of trees can help intercept and absorb water which also reduces stormwater runoff. Trees can provide shade and reduce air temperatures, energy costs, greenhouse gas emissions, and air pollutants generated by cooling and air conditioning. Trees also improve our quality of life by providing beautification, privacy, and a sense of wellbeing and place.

Documenting, measuring and monitoring the existing trees and available planting areas is a priority need for the City of Tacoma. Tree inventories are essential for protecting trees and communities. They provide important information about trees within the city, such as the species, location, condition, and size. A complete tree inventory was identified as a need by the City of Tacoma. It will help Tacoma create an effective plan for understanding, managing, and caring for trees as infrastructure. Tacoma has started a tree inventory (Figure 1), but it is not yet complete.

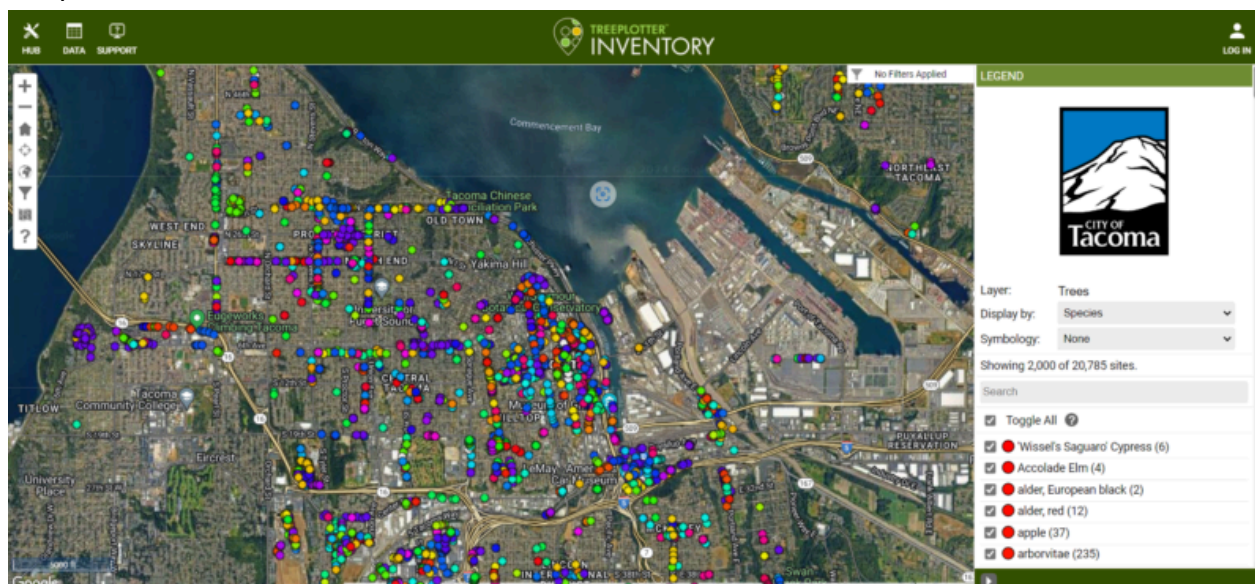


Figure 1. City of Tacoma's current inventory on TreePlotter

A more complete tree inventory will add capacity for the City of Tacoma to:

- Quantify urban forest benefits and economic value
- Manage hazards
- Plan for land use change
- Prioritize tree maintenance
- Conserve biodiversity
- Adapt for mitigating the effects of climate change and invasive species
- Show where there is planting opportunities

- Provide data for developing urban forest policy and regulation
- Generate support for urban forest programs and resources

Project Goals

The overall goal of the project is to address the City of Tacoma's need for a more complete tree inventory. This principally includes:

- Mapping, identifying, and measuring the trees in the public right-of-ways (ROWs) throughout Tacoma's city limits.
- Mapping and rating 'plantable' spaces where trees can be planted in the near future
- Assessing the health and condition of recently planted trees to understand drivers of successful tree establishment and stewardship.

Environmental Disparity and Tree Equity

Trees provide many benefits to our communities. However, these benefits are not equally distributed across Tacoma (Figure 2). A more complete tree inventory will help identify areas where planting more trees would have the most benefit to Tacoma communities. Participating in this program will help address environmental health disparities by identifying areas for equitable tree planting.

Results of the inventories will be shared to raise awareness of vulnerabilities and opportunities to enhance community resilience to urban and community forestry issues.

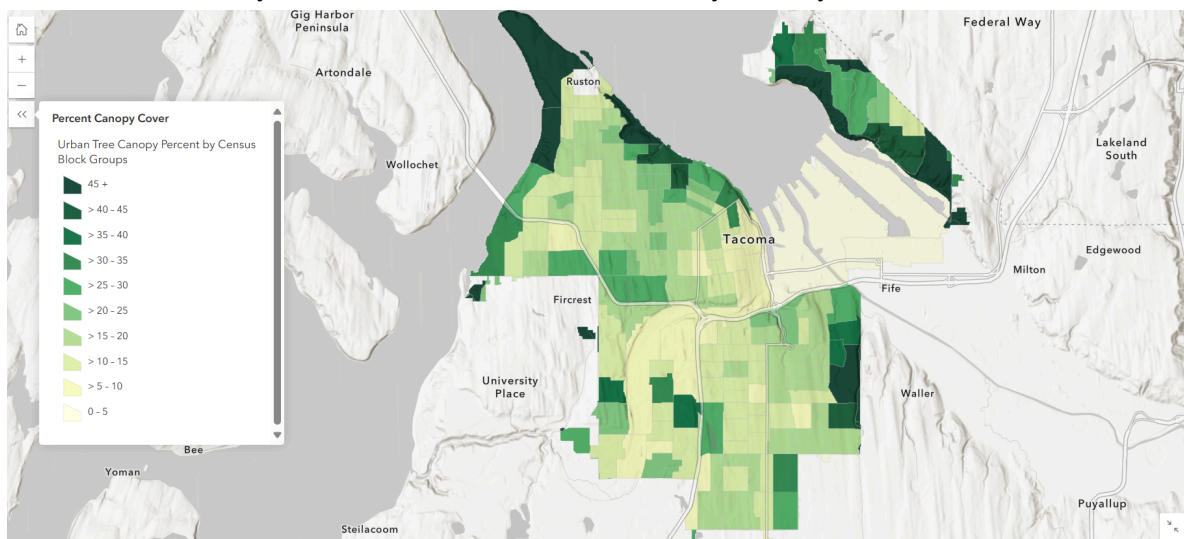


Figure 2. Canopy cover in Tacoma, from Tacoma Community Story Map by Tacoma Urban Forestry

Why Participate?

Add purpose to your schedule and learn with us. Participate in training and inventory events to learn skills and knowledge for identifying, growing, and caring for trees in our community. Your involvement will help equitably grow and enhance Tacoma's urban forest for the benefit of current and future generations. The Grit City Tree Count will grow and keep our neighborhoods and communities healthy.

Compensation and Participation Incentives

Gift cards may be available to compensate you for your time participating. Gift cards were included in the original budget to compensate low income volunteers for their time.

How Can You Help?

Volunteers are needed to help inventory Tacoma's trees and plantable spaces. Sign up to participate at <https://treehealth.wsu.edu/tacoma> and attend a training event or inventory event to participate.

Safety

Safety is our top priority.

Access to trees: Please be cautious when inventorying trees. Do not inventory any tree you are uncomfortable measuring. Use your best judgement about whether to include the tree in the inventory based on your comfort and safety first.

Be aware of your surroundings: Be vigilant about your personal surroundings, as well as your team's. If areas feel unsafe, leave the area and allow a staff member to complete the data collection later.

Wear proper clothing: Wear your high visibility vest at all times to make yourself visible to drivers. Wear clothing that is weather appropriate and dress in layers that can be removed or added depending on the weather.

Practice pedestrian safety: When available, always use sidewalks and stay off the road as much as possible. Keep your eyes on the road and watch out for oncoming traffic. Drivers may not expect people to be in the ROW, so be cautious when walking with your team.

Watch out for your team: Don't ever leave a team member alone in the field. Be aware of where all of your team members are while you are out in the field.

In case of an accident, **call 911**. Once you and your team are safe, call an inventory staff. First aid kits will be on hand with inventory staff, in the case of minor injuries, these staff members can be called for assistance.

Tree Count Events

Attend a Grit City Tree Count event to participate in the volunteer tree inventory project. Events will be scheduled between June and September to ensure trees are leafed out and optimal condition for identification. Each event will have a different meeting location with access to a public restroom. Participants will be divided into teams with volunteer team leaders. Each team will be assigned certain blocks within the area. Walkie talkies will be provided to each team to ensure communication between teams.

Tree Count Team Leaders

Volunteer team leaders with prior experience knowledge about tree identification and measurement will lead teams during events. These leaders will carry walkie-talkies to communicate and ask questions to other groups and organizers.

Typical Tree Count Event Schedule

- 9:00am - Meet at meeting location. Snacks, instructions, and team leader contact details will be shared.
- 9:15am - Demonstration and safety orientation
- 9:30am - Teams head to assigned blocks for tree inventories
- 1:30pm Teams return to the meeting point for debrief, equipment return, and gift cards. Events may end sooner depending on how quickly the trees are inventory

Materials

Provided items

Each team will be provided with:

- Instructions
 - Maps with assigned blocks and contact details (Figure 3)
 - Field Guides
- Safety
 - Safety high-vis vests “WSU Research” or similar titles
 - Walkie Talkie
- Tree Measurement Equipment
 - Diameter (DBH) Tape
 - Tree Height Laser
 - Tree ID Guide
- Data Recording
 - iPad for recording data
 - Data sheets, used if there is technical difficulties
 - Pencils
 - Clipboards with staff phone numbers on back

- Snacks and water will be available at the meeting location before the event starts

What to bring and wear

- Weather appropriate clothing and walking shoes
- Water bottle
- Cell phone
- Backpack or bag for personal materials

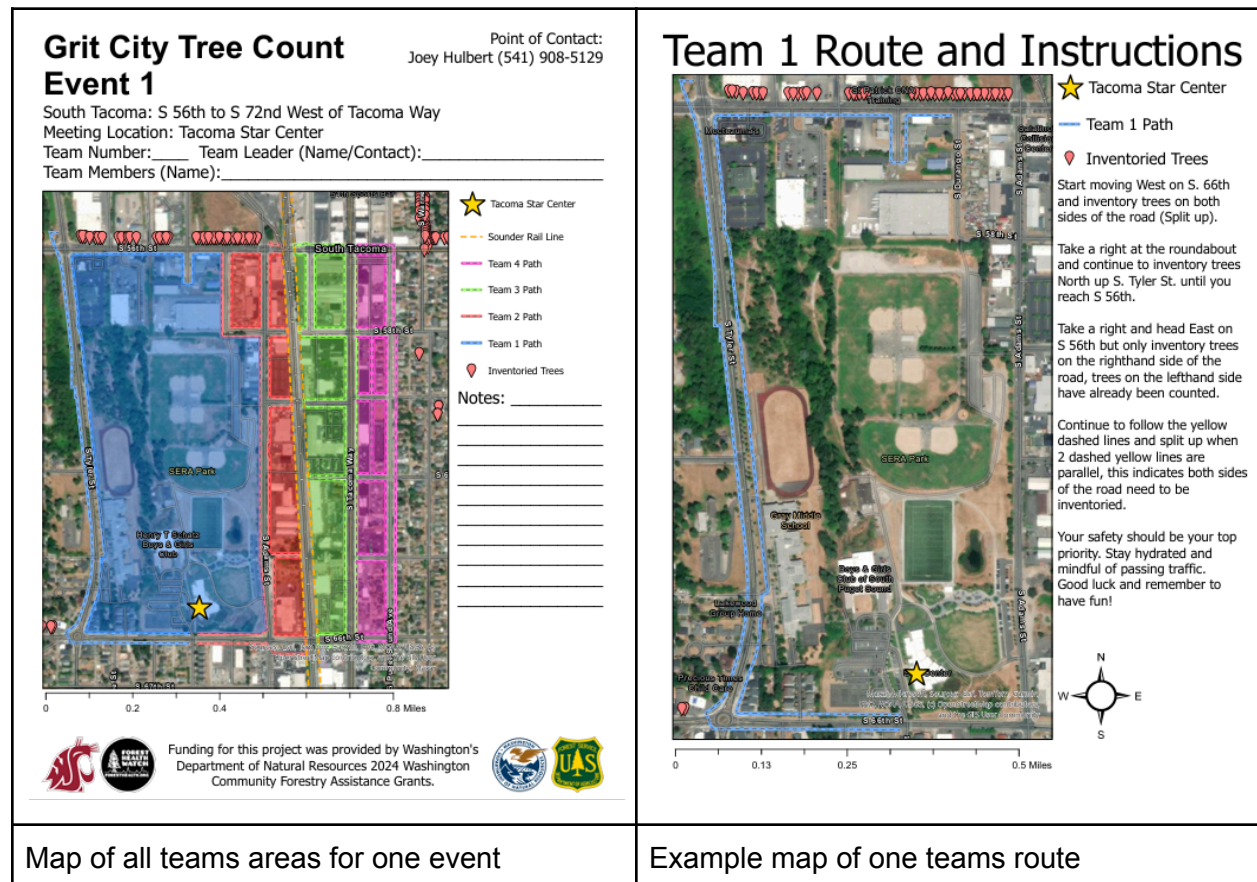


Figure 3. Example of maps that will be provided at each tree inventory event.

Which Trees To Inventory

The purpose of the tree inventory is to document trees on public property. The aim of this project is to capture data for *street trees* on public property throughout the City of Tacoma (Figure 4).

What is a Street Tree?

Tacoma defines street trees as any trees planted or intended to be planted, whose trunk is wholly or partially located within the public right-of-way. The right-of-way (ROW) is the area

outside of private property boundaries, and the areas designated for planting within the ROW are often referred to as the "planting strip" for street trees (Figure 5).

Right of Way (ROW)

Trees in the Right of Way are growing in public property. Additional resources from the City of Tacoma or other state and federal funded programs may be available for planting trees in the ROW.

There are maps online available to view right of ways, but for this project we will use our best judgement to determine if a tree is in the ROW.

What Trees 'Count'?

Count:

- Trees are typically woody shrubs that exceed 10 feet at maturity and have a single, main stem. We will count all trees regardless of size.
- We will count all trees regardless of size
- In general: If it is tree shaped then identify it as a tree

Do NOT Count:

- Shrubs
 - Generally, shrubs are woody plants that are multi stemmed and don't exceed 10 feet in height
- Specimens bred or pruned to be maintained as hedges

Tree Inventory Required Questions

TreePlotter

TreePlotter is the web-based program that we will be using for the Grit City Tree Count. TreePlotter can be used on desktop browsers, tablet devices, and cell phones. TreePlotter will function on any major tablet or browser with an internet connection. The most stable and thoroughly tested platform is Google Chrome and either an iPad or Samsung Galaxy tablet.



Accessing TreePlotter

Access TreePlotter at: <https://pg-cloud.com/TacomaWA/> or by using the QR code to the left.

Login: **Username: Volunteer Team 1, Volunteer Team 2, Volunteer Team 3, Volunteer Team 4**

Password: TreesareNice1, TreesareNice2, TreesareNice3, TreesareNice4

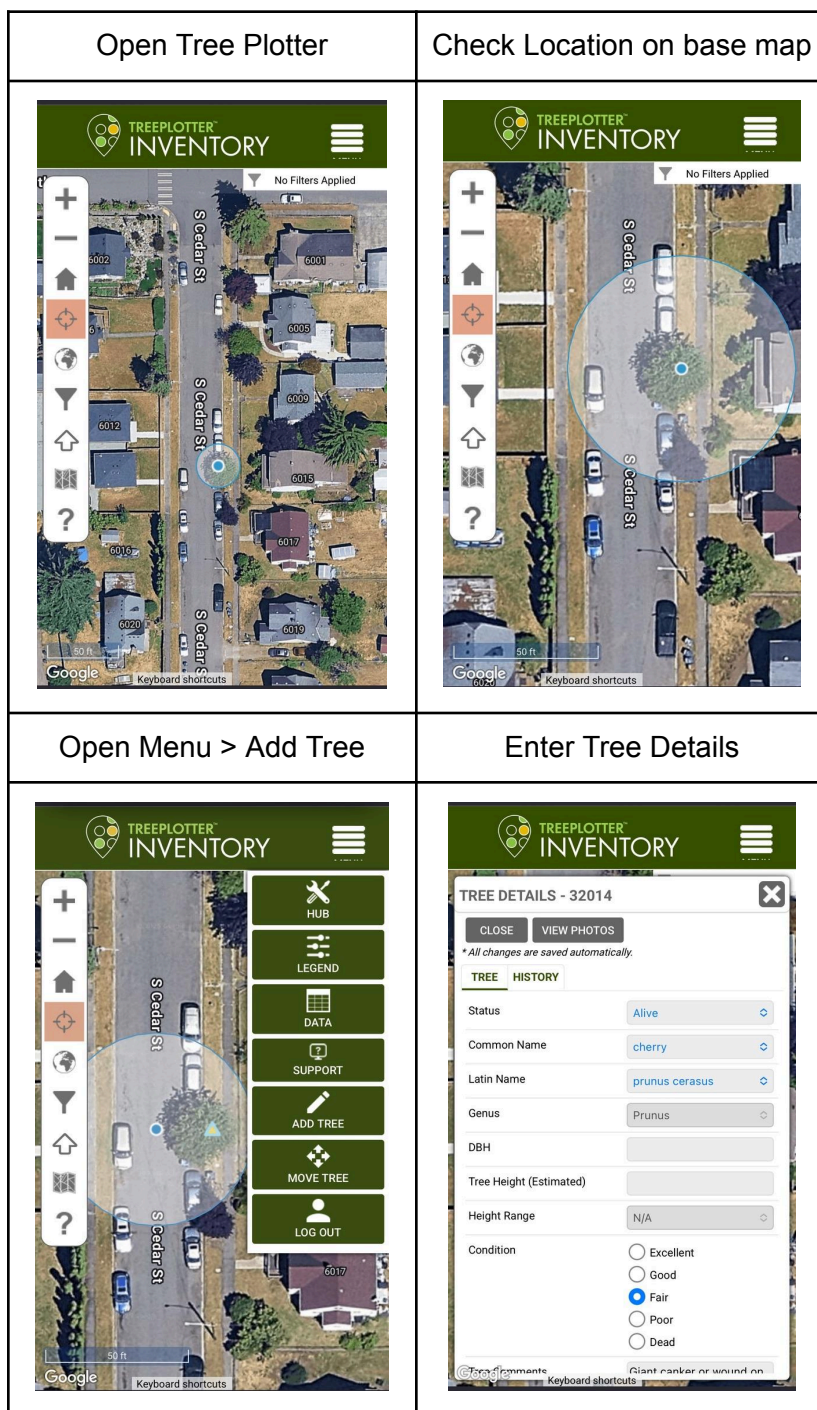


Figure 4. Tacoma Treeplotter homepage and steps on how to add observations on Treeplotter

Latitude and Longitude

Each data point should be located using the GPS on TreePlotter or by using the map on TreePlotter to select the correct tree.

Tip: Make sure when using GPS, double check that the point is directly on top of the tree that you are adding to the inventory, especially for streets with multiple trees.

Status

- Alive
- Dead
- Proposed Site - Large
- Proposed Site - Medium
- Proposed Site - Small
- Removed
- Stump

Proposed Planting Site

A proposed planting site is an empty strip of unpaved land along the ROW that could be used to plant a tree. If a planting site is being proposed, select Proposed Planting Site and the size (Large, Medium, or Small). The distance between trees is measured from stem to stem and the distance between trees and structures will be stem to structure.

- Large Planting Sites: 22 feet
- Medium Planting Sites: 16 feet
- Small Planting Sites: 10 feet

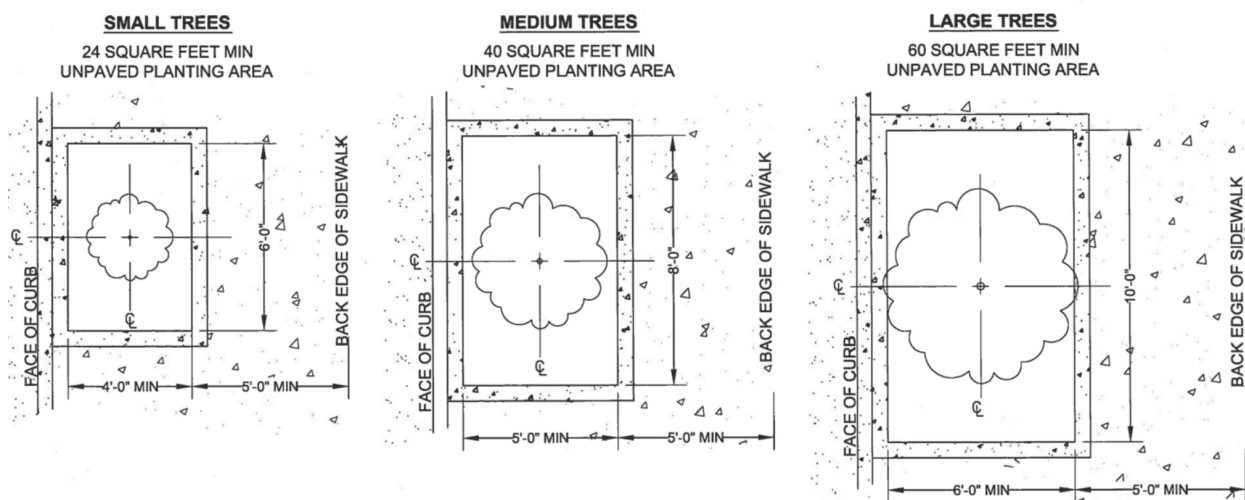


Figure 5. Size requirements for proposed small, medium, and large planting sites.

Planting Site Considerations

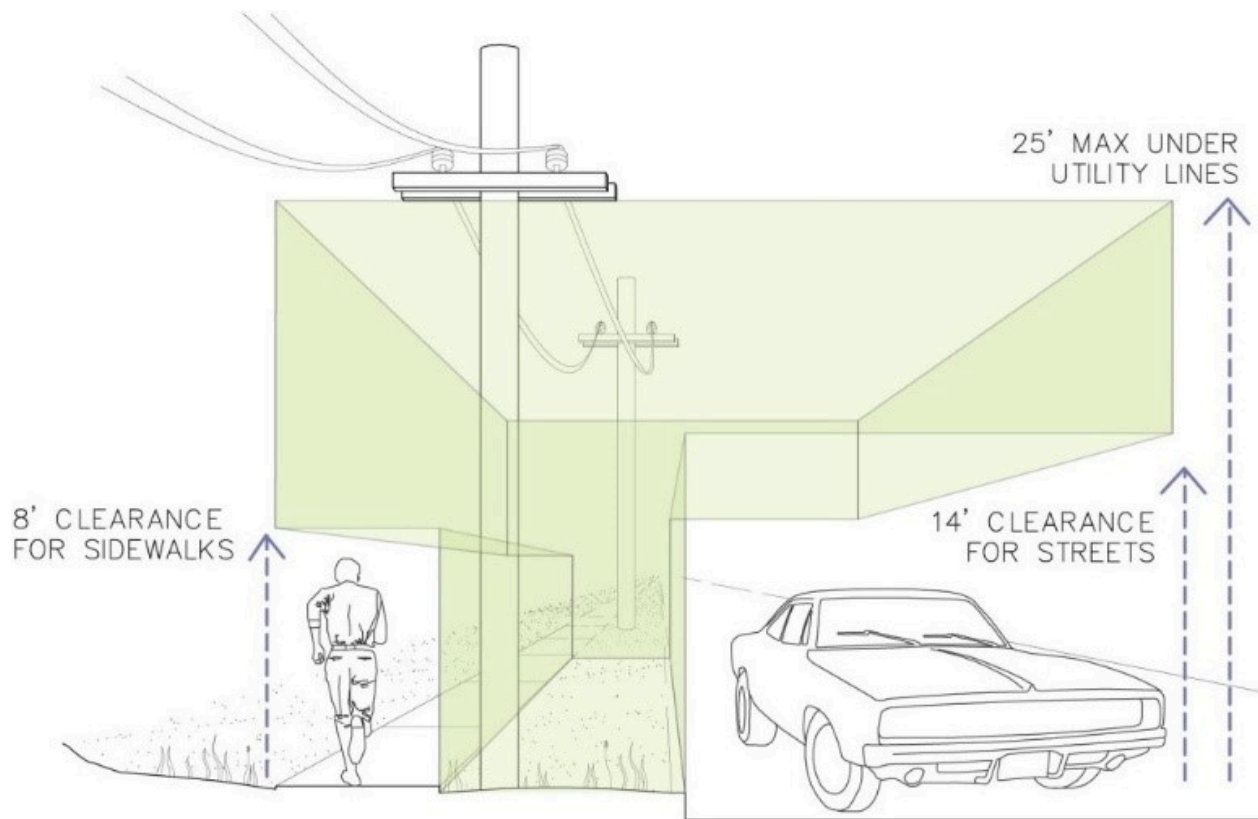


Figure 6. Tree clearance considerations to account for when considering planting sites.

Minimum Tree Setback Standards as defined by Tacoma's Urban Forestry Manual

From – To	Setback Distance (feet)
Center Line of Tree to Center Line of:	
Street Corner (outside face of curb)	25
Stop or Yield Signs	25
Utility Poles	15
Other Traffic Control Signs	5
Center Line of Tree to Edge of:	
Driveways	5
Face of Curb	2.5
Pavement	2

Edge of Tree to Edge of:	
Utility Worker Access Lids	5
Gas Shutoff Valves	5
Fire Hydrants and Hydrant Branches	10
Water Meter, Service, and Mains	5
Storm Inlets, Catch Basins, and Manholes	5
Storm/Sanitary Service and Mains	5

Common and Latin Name

Trees should be identified at least to a genus level (e.g maple, cherry, spruce), but it is encouraged to identify down to a species level if possible (e.g. bigleaf maple or *Acer macrophyllum*)

- In TreePlotter, when one field is filled out (Common or Latin name) the other field auto generates to match your answer. Genus will also auto generate for the selection you made.

Diameter at Breast Height (DBH)

DBH is used to measure the size of the tree. Measurements are taken in decimal inches. Diameter should be recorded at 4.5' above grade to the nearest 1-inch. All trees planted should be inventoried. A diameter tape is a calibrated tape that can measure the diameter by measuring the circumference.

Steps to measure DBH

1. Identify where you will measure DBH by observing how many stems and the location of the tree. (**list ways to measure DBH depending on the slope, stems etc**)
2. Locate 4.5' on the tree using the **standard tape measure side** of the tape.
3. Use the hooked end of the tape on the bark to hold the tape in place. Stretch the tape around the trunk with the **decimal inches side (specify)**, making sure to stay evenly at breast height without twisting.
4. Read the diameter at the point that it overlaps with the zero mark on the tape and record that number for your data.

Tip!

Make sure that you are using the correct side of the DBH tape! If you are unsure which side to use, or how to read the tape please ask a team leader or staff member to help!

Measuring DBH of tree with multiple stems

For multi stem trees, record each stem measurement at 4.5' and the measurements will automatically average within the TreePlotter website.

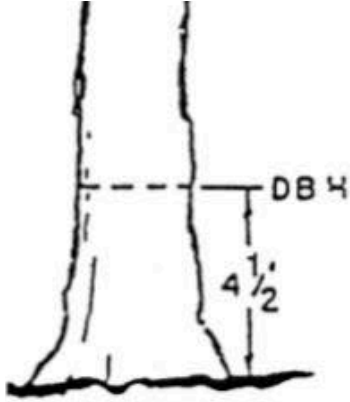
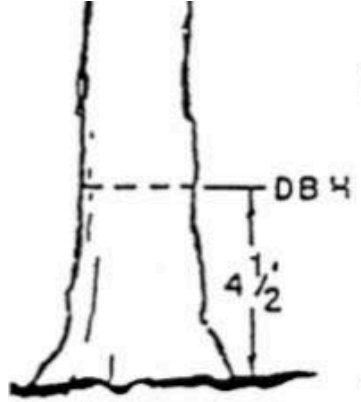
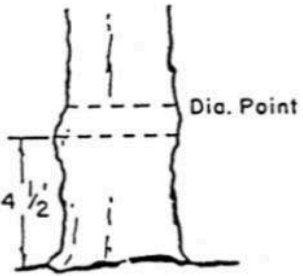
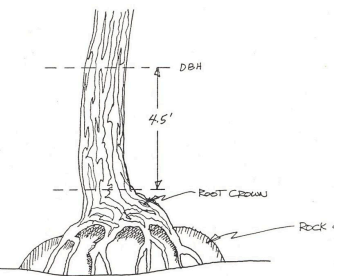
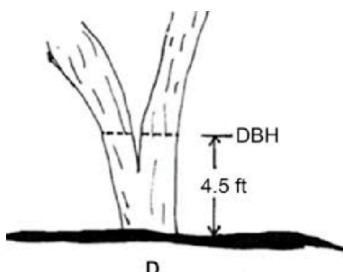
Tree on a Slope  Measure from uphill side if the tree is on a slope	Tree on a Level Ground  Measure any side on level ground	Tree Leaning  Measure the longer side if the tree is leaning
Tree Deformed at 4.5 ft  Measure from above the obstruction.	Tree with Roots Above Ground  Measure from above the root crown.	Tree with Multiple Stems  Measure each stem. Log the other diameter of the second stem in the notes section.

Figure 7. Example of different ways DBH will be measured depending on how the tree is growing

Tree Height (Estimated)

Tree heights will be estimated in feet. The 'Height Range' field will auto generate into categories based on your height estimate.

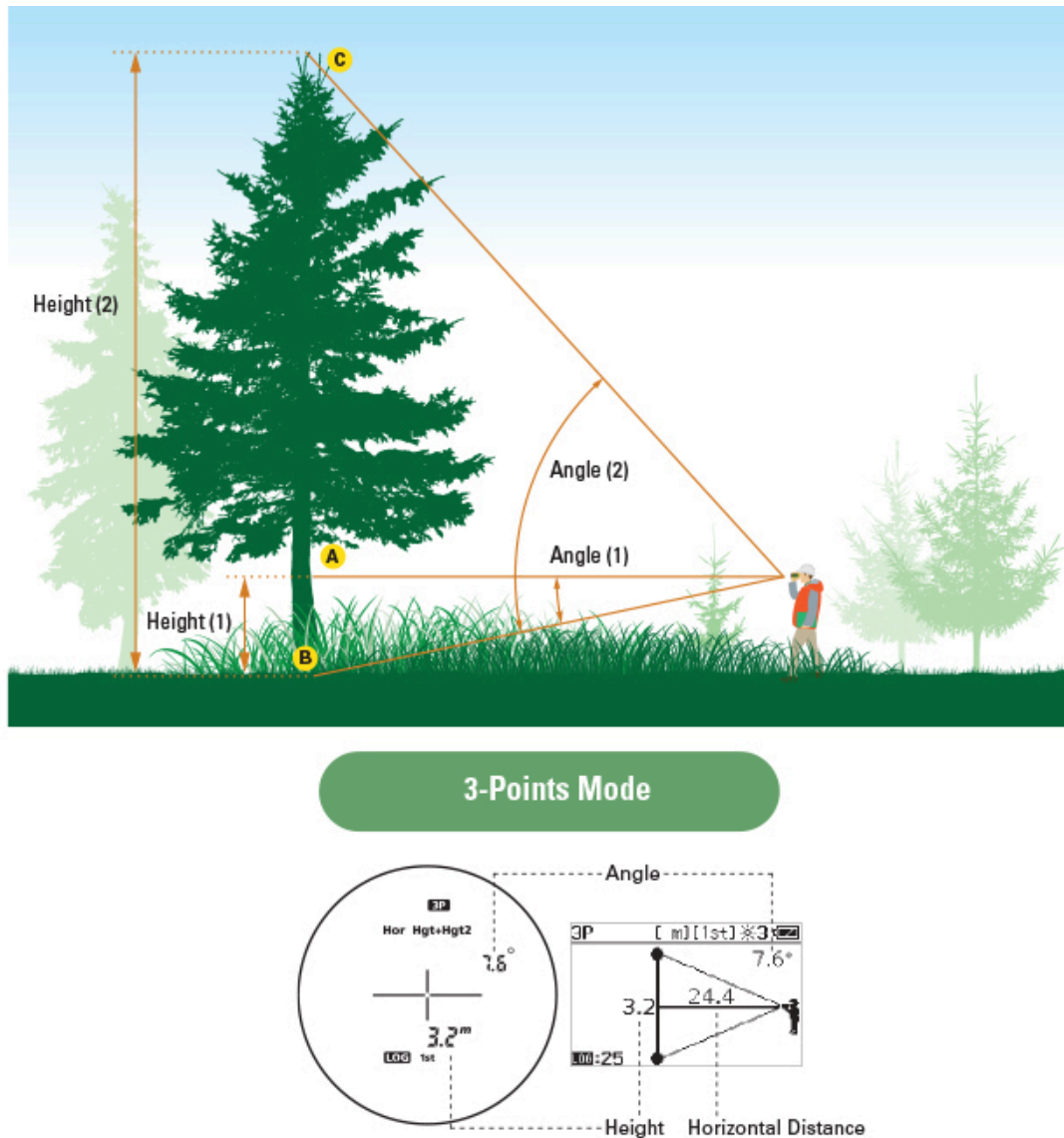


Figure 8. Diagram displaying angles to point tree height laser at trees for measurement (above) and an example of the display screens on the tree height laser (below).

Instructions for using the tree height laser:

1. Turn on tree height laser by clicking the PWR ON button
2. Set tree height laser to 3P mode by clicking MODE button until top left corner of screen reads 3P
3. Adjust focus by rotating the viewing lens
4. Shoot the distance to the tree (A in Figure 5)
5. Shoot the angle to the bottom of tree (B in Figure 5) to calculate Height (1)
6. Shoot the angle to the top of tree (C in Figure 5) to calculate Height (2)
7. Record tree height

Condition

The condition of each tree should be recorded in one of the following categories adapted from the rating system established by the ISA: Excellent, Good, Fair, Poor, Dead

Tree condition is a visual assessment of the tree that should be recorded after examining the entire tree. Look at every aspect of the tree, including but not limited to the bark, the canopy, evidence of pests and pathogens, and wounds.

Classification Categories

Excellent: The tree is in ideal condition with no apparent health or structural problems. The trunk is solid with no damage, the roots are sound, and the crown is full.

Good: The tree has minor structural or health issues, not of major concern

Fair: The tree has structural or health issues that could compromise the stability under stress. The tree may need some pruning or may have dead branches. Wounds are minimal and are not showing significant decay.

Poor: The tree has significant structural or health issues, and it is unknown if the tree will recover. There are multiple signs and symptoms of decline.

Dead: The tree is standing dead

		
Excellent	Good	Fair
		
Poor	Dead	

Figure 9. Examples of trees that would fit the ISA tree condition ratings of Excellent, Good, Fair, Poor, Dead

Signs and Symptoms of Poor Health, Damages, and Wounds

- Symptoms
 - Branch tip dieback
 - Branch Flagging (individual branches dying)
 - Sprouts, epicormic shoots, suckers or new branches from base
 - Soft or decaying wood
 - Leaf defoliation, deformation, discoloration, wilting
 - Premature leaf or needle drop
 - Late leaf emergence
 - Cankers or wounds
 - Heavy cone or seed production
 - Sap, bleeds, or liquid dripping from tree
 - Stains or discoloration, possibly from insect exit holes
 - Thinning canopy (canopy is too easy to see through)
- Signs
 - decay or fungal conks growing on living tree
 - Insect exit holes in woody portions of tree
 - Insect feeding on leaves
 - Leaf spots
 - Insect frass (looks like saw dust) at base of tree
 - Insect galleries visible on loose bark sections
- Damage
 - Severed roots
 - Peeling or loose bark, bark splitting
 - Cavities
 - Wounds on bark or base of stem
 - Injuries from landscape care equipment
 - Fire scars

		
Sprouts/basal shoots	Bark Peeling	Dead Stems
		
Branch Tip Dieback	Thinning	Bleeds
		
Insect Gallery	Branch Flagging	

Figure 10. Examples of signs and symptoms of poor health, wounds, and damage that can be found on trees.

Tree Comments

The tree comments section can be used to note extra information about the tree.

Some things to consider could be:

- Heritage trees
 - Tacoma's Heritage Tree Program celebrates and protects the city's most notable trees, recognizing their vital contributions to the community
 - Trees must have notable age, size, rarity, or historical significance. Property owners committed to long-term care are eligible.

Photos

Pictures should be taken of each tree, but no photo is required for the suggested planting spaces. Pictures of the whole tree are most important. Be sure to include photos to help identify the tree when others are looking at your observation. Pictures of leaves, bark, flowers, cones, and other key characteristics can be useful.

Using iNaturalist to Assess Tree Health

The iNaturalist project "Urban Tree Health Watch" was created for this project to track the health of inventoried trees. Tracking tree health is important for our project, as it allows us to inspect trees for pests and pathogens and can inform us on how we should prepare for potential tree health issues.



Joining the iNaturalist Project

Access the iNaturalist project at:

<https://www.inaturalist.org/projects/grit-city-tree-count-unhealthy-trees>

or by using the QR code to the left.

iNaturalist Questions

Tree Number From Inventory Data

When inventorying trees on TreePlotter, each tree is given an identification number. This tree number will be taken from the TreePlotter website and used for the tree's health assessment. The Tree Number is listed in the top left corner when the desired tree is selected (Figure 6)

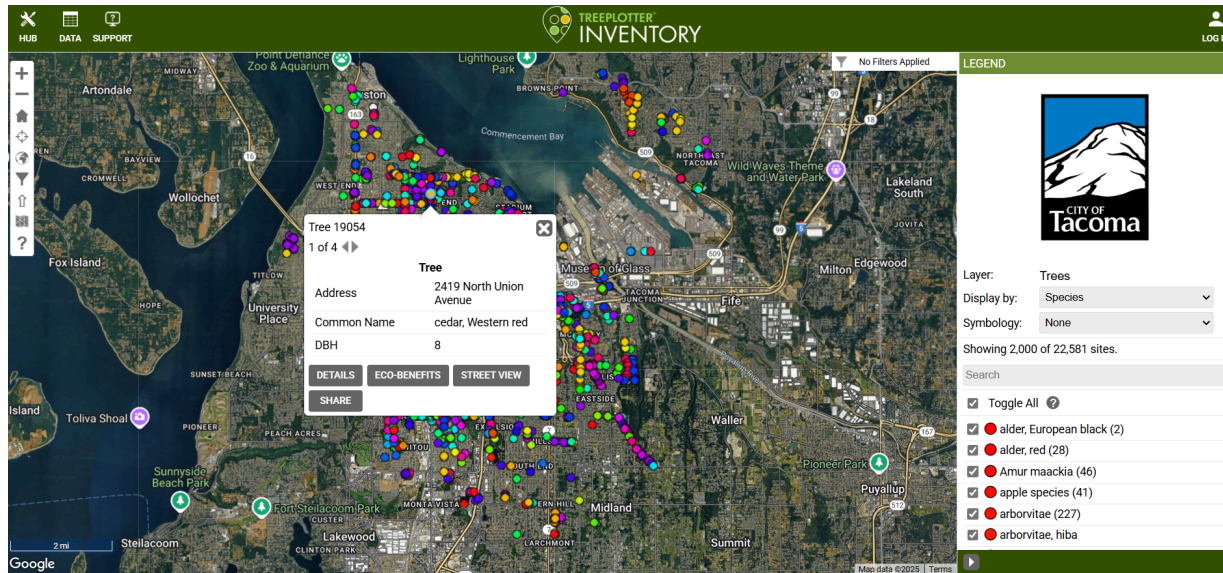


Figure 11. TreePlotter displaying one trees identification number

Urban Tree Health Condition

The condition of each tree should be the same as what was recorded while inventorying the tree. The categories adapted from the rating system established by the ISA: Excellent, Good, Fair, Poor, Dead

Dieback Percent

Estimate the percent of the canopy that is unhealthy or dying. To estimate dieback, visualize the crown of the tree if full and in a percentage, determine what portion of the tree is unhealthy. If in a group, comparing dieback estimates can help get more accurate measurements if unsure.

Tree Health Issue

Inspect the health of the tree to determine if the underlying cause of tree health decline is fungal/ bacterial, insect, injury, or other.

Fungal/ Bacterial:

Suspected decline in tree health is due to fungus or bacteria. Trees can show reduced vigor, smaller leaves, dieback, and even death. Refer to *Tree Pests and Pathogens of Concern Field Guide* for examples.

Insect:

Evidence of insects is present. Evidence of insects could be boring holes, galleries, egg masses, frass, or the bug itself. Refer to *Tree Pests and Pathogens of Concern Field Guide* for examples.

Injury:

Injuries could be caused by humans, animals, or natural events. Damage from maintenance tools, construction, or improper pruning.

Other:

Drought, heat stress, over watering, nutrient deficiencies, flooding, air pollutants, herbicides, adverse environmental conditions

Brief Tree Health Description

This iNaturalist question can be used to gather the information about the health of the tree. All signs and symptoms observed should be recorded.

Tree Identification

Common Trees of Tacoma

- *Acer* spp.
 - Red Maple
 - Norway Maple
 - Japanese Maple
 - Vine Maple
 - Freeman Maple
 - Amur Maple
- *Prunus* spp.
 - Cherry Plum
 - Japanese Cherry
 - Kwanzan Cherry
- *Pseudotsuga* spp.
 - Douglas Fir
- *Quercus* spp.
 - Garry Oak
 - Red Oak
 - Scarlet Oak
 - Pin oak(?)
- *Pyrus* spp.

- Flowering Pear
- Fraxinus spp.
 - Green ash
 - Oregon Ash
 - Caucasian ash
 - European ash
 - White ash
- Thuja spp.
 - Western Red cedar
 - Arborvitae
- Pinus spp.
 - Austrian pine
 - Limber pine
 - Lodgepole pine
 - Japanese White Pine
 - Ponderosa Pine
 - Western White Pine
- Chamaecyparis
 - Hinoki Cypress
 - Japanese False Cypress
- Betula spp.
 - Himalayan Birch
 - European white birch
 - Paper birch
 - River Birch
- Sweet gum
- Deodar cedar
- Parrotia persian

Using Seek for Tree Identification

Seek is an app that was made by iNaturalist and is free to use! We suggest using the app 'Seek' to help with identification.

1. Download the app
 - a. 'Seek' does not require an account but we recommend making an account.
2. Use the camera to give identification suggestions
3. You can also upload photos you have already taken!
4. Once the camera scans the organism, take a photo!
5. After you take a picture, you can discover more about the organism by selecting 'View Species'