



Fall Line Trail Tree Preservation Guide

CITY OF RICHMOND
DEPARTMENT OF PUBLIC WORKS

2025



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Executive Summary

The Fall Line Trail (FLT) will be a transformative addition to the City of Richmond's active transportation network. It will increase connectivity between neighborhoods, promote residents' health and well-being, and reduce car dependency. The success and useability of the trail, however, rely in part on utilizing the City of Richmond's existing urban tree canopy. The preservation of a shaded, temperature regulated and buffer for the trail from traffic and adjacent uses; Trees also contribute to the trail's scenic and experiential qualities. The FLT Tree Preservation Guide seeks to minimize the impact of the Fall Line Trail's construction on existing trees within the City of Richmond.

Constructing the FLT will be a multi-year undertaking that will occur in many phases over 14 segments. To ensure consistency among the many professionals working to bring the Fall Line Trail to fruition, this Tree Preservation Guide aims to provide consistent guidelines for incorporating tree preservation and protection considerations at every phase in the design, planning, and construction process.

This guide incorporates a comprehensive tree inventory for all trees within a variable-width buffer of the proposed trail alignment. The maps and tree inventory within this guide reflects the proposed alignment as it exists as of April 2025. This data is a high-level overview to inform decision-makers and residents about trees in the vicinity of the trail, and is not a determination of whether any specific tree should be preserved or removed. This data is not to be used by trail designers as a substitute for site specific data collection (i.e. surveys, tree inventories, or tree assessments). Regardless of the final alignment of the FLT, the principles, best practices, and requirements contained within this Tree Preservation Guide will continue to apply.



Brook Road near VUU



Goals and Objectives

The primary goals of the Tree Preservation Guide are to:

- Minimize the FLT's impacts on the existing urban tree canopy within the City of Richmond.
- Ensure that professionals involved in the planning, design, and construction of FLT segments within the City of Richmond apply consistent processes regarding evaluating, preserving, and protecting trees in the vicinity of the trail's alignment.
- Provide the public with data relating to existing trees, tree protection techniques, and tree preservation efforts associated with the construction of the FLT.

To achieve these goals, this document will:

- Depict the findings of the tree inventories conducted in 2024-2025 along the entire alignment of the FLT in the City of Richmond.
- Present a suite of best practices, specifications, and technical details tailored to each phase of the planning, design, and construction process that will preserve and protect trees.
- Provide recommendations on tree selections appropriate for the trail right-of-way, in situations where tree removal and replacement are required.



N. 1st St in Jackson Ward



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About the Fall Line Trail

The Fall Line Trail (FLT) will be a regional paved multi-use trail spanning 43 miles north to south between Ashland and Petersburg, Virginia. Thirteen miles of the trail will run through the heart of the City of Richmond. The trail will travel through historic, residential, business, and industrial districts and through vital urban green spaces, spanning from Bryan Park to South Richmond. The “Fall Line” refers to the area where the Piedmont and Atlantic Coastal Plain regions meet, creating the unique geological area marked by changes in elevation. The “Fall Line” also refers to Richmond’s the signature rapids on the James River as it flows through the downtown.

This regional trail will improve connectivity between neighborhoods and parks, improve bike and pedestrian safety, reduce car dependency, and stimulate economic growth through active transportation-oriented tourism. In addition, the FLT will connect to existing trail networks in the City’s James River Parks System and the regional east-to-west Capital Trail.

The Fall Line Vision Plan, developed by Sports Backers and Toole Design and released in 2024, is the guiding conceptual plan for the trail. Development of the trail is being led by the Virginia Department of Transportation’s Richmond District Office, the Central Virginia Transportation Authority and its member localities, PlanRVA, and the Crater Planning District Commission. In Richmond, the Office of Equitable Transit and Mobility within the Department of Public Works is leading the effort on FLT implementation.

The project will occur in several phases. The first City of Richmond segment, which starts at the Henrico County line and navigates through Bryan Park, has been approved for construction and will start work in Summer 2025. The City is working to advance the next design phases of various segments while securing the remaining funds required for each individual segment’s completion. A summary of the various segments and their current statuses can be found at <https://www.rva.gov/public-works/fall-line-trail>.



Fall Line Trail alignment as proposed within the Fall Line Vision Plan, 2024. Graphic used with permission of Sports Backers.

Potential Impacts of Construction on Trees/Tree Protection Zone (TPZ)

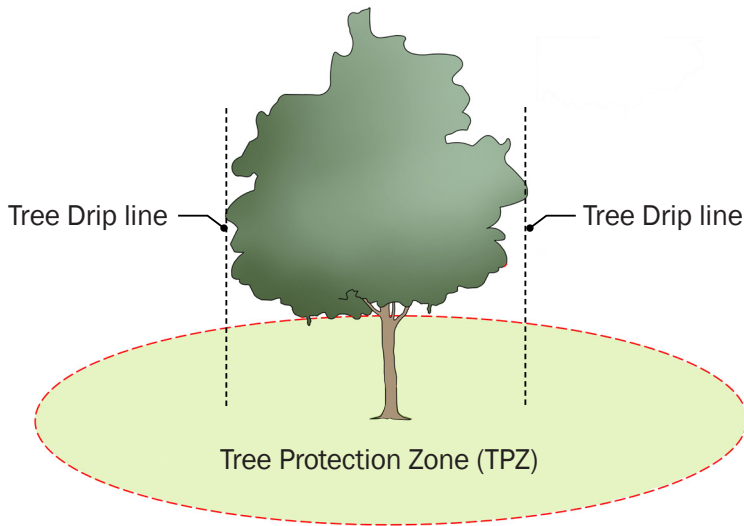


Figure 1. Determining a tree's Tree Protection Zone based on ANSI A300 Tree Care Standards for Trees, Shrubs, and Palms, and Other Woody Landscape Plants

If not done properly, construction can pose serious risks to tree health. Tree roots extend laterally far beyond the tree's trunk. The majority of the fine roots that aid in a tree's abilities to absorb water and nutrients are located in the upper 6-8 inches of the soil and often reach out to the edge of the tree canopy (Tree Drip Line) or beyond.

Tree decline and death primarily occur from damage to the root system during construction. Any activity that disturbs, compacts, adds, or removes soil in a tree's root zone can have impacts on tree health. The construction of a paved pathway such as the FLT frequently involves grading and sub-surface work that removes (cuts) dirt or places (fills) dirt, interfering with the 6-8 inches of soil where most roots are clustered.

Even in cases when roots aren't being cut or pruned (called "root pruning"), heavy construction equipment moving near trees can compact soils, starving the roots of oxygen and reducing the ability of water to permeate down to the roots. In addition, accidental collisions between construction equipment and trees create physical injuries that expose a tree to disease.

Figure 1 depicts the root system of the tree and emphasizes the extents of a tree's root zone. The TPZ is to be calculated using species characteristics, the size of the tree (DBH) and a multiplier based on the tree's age class. Refer to BMP Managing Trees During Site Development and Construction (Third Edition), companion publication for ANSI A300 for information pertaining to calculating the TPZ. Within this zone, strictly limited to no grading, excavation, or construction activities shall occur.

Protecting trees from construction damage begins with collecting accurate data on existing trees, their health, and locations, so that trees to be preserved can be identified and prioritized. These actions are covered in Chapter 2, Tree Inventory & Assessment. Chapter 3, Tree Protection During Construction, addresses tree protection best practices during construction. Lastly, when removing a tree is unavoidable, Chapter 4 provides guidelines for selecting appropriate tree replacements for the FLT's right-of-way.

Tree Data Collection

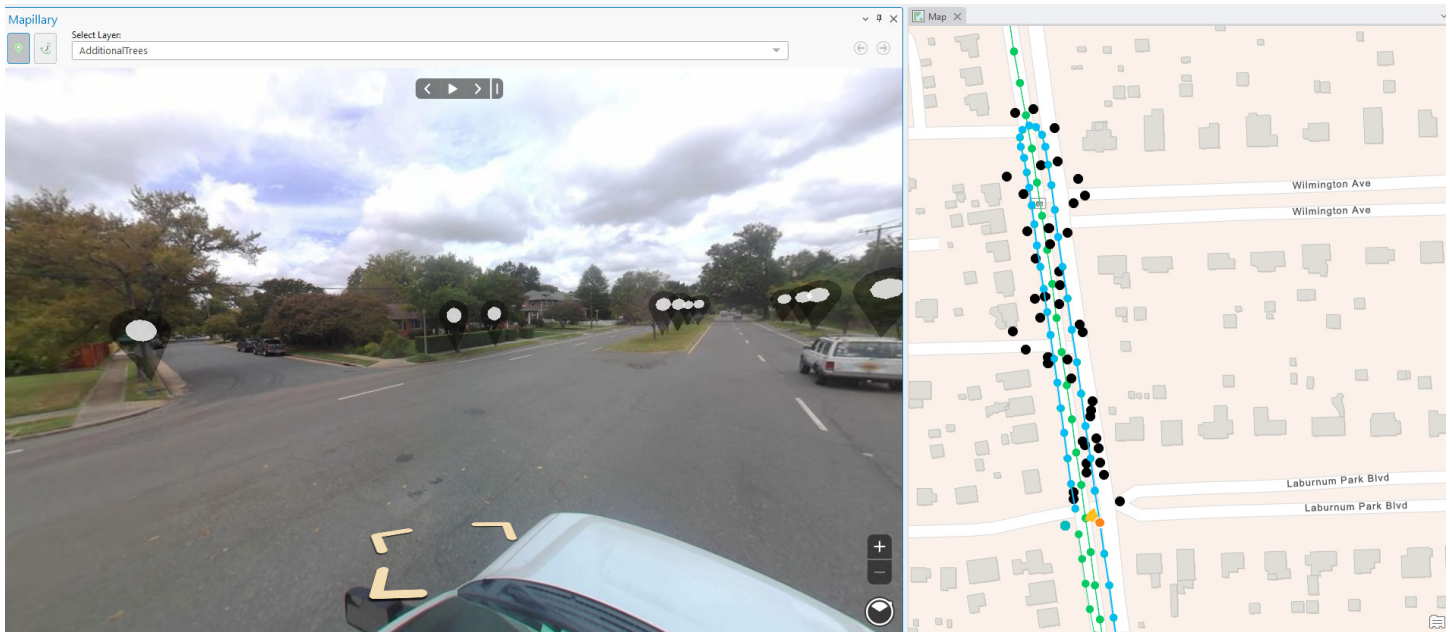


Figure 2. Use of Mapillary to validate trees.

The City of Richmond's Office of Equitable Transit and Mobility launched an initiative to collect and analyze data to aid in trail development. 360-degree imagery was collected along entire length of FLT and automated analysis was conducted to identify objects in proximity to the proposed trail alignment. Critical information relating to current tree and plant density, roads, intersections, and areas of interest throughout the city was collected systematically. This information was supplemented by field data collection to assess the size, health, and species composition of the trees captured in the imagery.



Healthy trees in Bryan Park



Tree Inventory & Assessment

What Is a Tree Inventory?

Before design begins on a new segment of the trail, an International Society of Arboriculture (ISA) Certified Arborist must conduct an inventory of existing trees. The inventory must include the locations of existing trees and their size, species, and other characteristics. Trees can be depicted in the site survey as stands or as individual trees, depending on the density and value of the trees. When considering the trail alignment, trail designers should strive to locate the trail in a manner that minimizes impacts to existing trees, particularly those that are in good health and are of mature size. Other factors that should be considered when deciding which trees to prioritize for preservation versus removal may include the tree's age, condition, susceptibility to disease, and structural characteristics. An example of assessment considerations is included on the following page (see Table 1). Not all of the assessment considerations in Table 1 apply to the Fall Line Trail.

Because conditions may have changed from the time that this report's tree inventory maps were generated, each FLT segment project must inventory all trees to ensure accurate data is incorporated into the project's survey and design.



*Measuring the diameter at breast height (DBH) of a black oak (*Quercus velutina*) tree 4.5 feet above finish grade.*

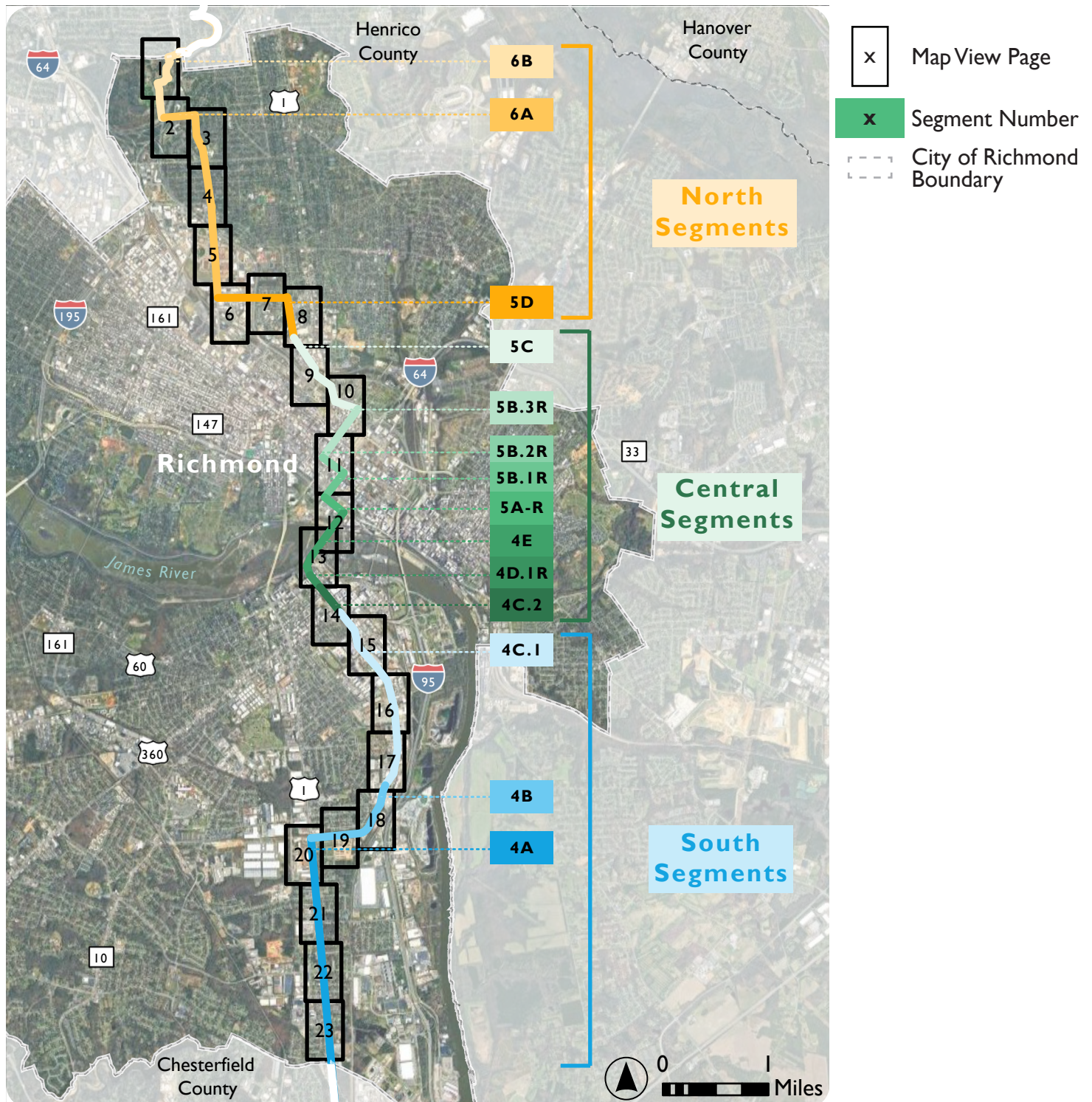


Table 1. Table C-SSM-01-2 Example Design Criteria for Tree Preservation and Protection, from DEQ's Virginia Stormwater Management Handbook.

Life expectancy and present age	Preference should be afforded to trees with a long life span such as oak, beech, and maple. Long-lived specimens that are past their prime may succumb to the stresses of construction; therefore, smaller, younger trees of desirable species are preferred because the younger trees are more resilient and will last longer.
Health and disease susceptibility	Check for scarring caused by fire or lightning, insect, or disease damage and rotted or broken trunks or limbs. Pest- and pollution-resistant trees are preferred.
Structure	Check for structural defects that indicate weakness or reduce the aesthetic value of a tree such as trees growing from old stumps; large trees with overhanging limbs that endanger property; and trees with brittle wood (such as silver maple), misshapen trunks or crowns, and small crowns at the tops of tall trunks. Open grown trees often have better form than those grown in the woods. Trees with strong tap or fibrous root systems are preferred to trees with weak rooting habits.
Cleanliness	Some trees (such as River Birch, Pines, or Sweetgum) are maintenance-intensive, dropping twigs, bark, fruit, or plant exudates. Trees that seed prolifically or sucker profusely are generally less desirable in urban areas. Thornless varieties are preferred.
Aesthetic values	Handsome bark and leaves, neat growth habit, fine fall color, and attractive flowers and fruit are desirable characteristics. Trees that provide interest during several seasons of the year enhance the value of the site.
Comfort	Trees help relieve the heat of summer and buffer strong winds throughout the year. Summer temperatures may be 10 degrees cooler under hardwoods than under conifers. Deciduous trees drop their leaves in winter, allowing the sun to warm buildings and soil. Evergreens are more effective wind buffers.
Wildlife	Preference should be given to locally native trees that provide food, cover, and nesting sites for birds and game.
Adaptability to the proposed development	<p>a. Consider the mature height and spread of trees, as these features may interfere with proposed structures and overhead utilities. Roots may interfere with walls; walks; driveways; patios; and other paved surfaces or water lines, septic tanks, and underground drainage.</p> <p>b. Trees must be appropriate to the proposed use of the development; select trees that are pollution-tolerant for high-traffic and industrial areas, screen and buffer trees for noise or objectionable views, and salt-tolerant species for areas exposed to de-icing salts.</p> <p>c. Consider adjacencies to industrial uses. Pollutants can travel long distances underground through soil and groundwater, injuring trees.</p> <p>d. Determine the effect of proposed grading on the water table.</p>
Survival needs of the tree	<p>Chosen trees must have enough room to develop naturally. Trees will be subject to injury from increased exposure to sunlight, heat radiated from buildings and pavement, and wind. It is best to retain groups of trees rather than individuals.</p> <p>Gradually thin trees as they mature and only when necessary.</p>
Ecological Core	<p>The Virginia Natural Heritage Program (VNHP) in the Department of Conservation and Recreation has developed a network of natural lands for the commonwealth of Virginia. This project, named the Virginia Natural Landscape Assessment (VaNLA), is a landscape-scale geospatial analysis for identifying, prioritizing, and linking natural lands in Virginia. Using land cover data derived from satellite imagery, the VaNLA identifies large patches of natural land with at least one hundred acres of interior cover. This interior cover, known as core area, begins one hundred meters from patch edges.</p> <p>Small patches with ten to ninety-nine acres of interior cover are included as habitat fragments that support landscape corridors and that may be important in localities with few large patches of natural land. Core areas and habitat fragments are referred to collectively as "ecological cores." Although the VaNLA is predominantly an analysis of forests, ecological cores include marshes, where these covers are abundant and exceed minimum size requirements. Tree removal should be avoided if any trees on site are determined to be ecological cores.</p>

Index Map

The map below shows each of the views in the following 23 map pages. The Fall Line Trail is divided into 14 segments in Richmond, categorized by “North,” “Central,” or “South.”



Understanding the Maps

The maps that follow show the results of the tree inventory conducted in 2024-2025. Below is a guide introducing you to the information you will find on each page and what each item means.

Fall Line Trail Segment(s): 6A, 6B

The Fall Line Trail segment number(s) represented within each map view page. The segments were originally created by VDOT.

Tree Diameter at Breast Height

- 0 - 10"
- 10" - 20"
- 20" - 30"
- 30"+

Diameter at Breast Height, or DBH, is the standard measurement for a tree's diameter at 4.5 feet. This measurement is widely used for estimating tree volume, biomass, and overall size. Generally, the larger the DBH, the more mature the tree.

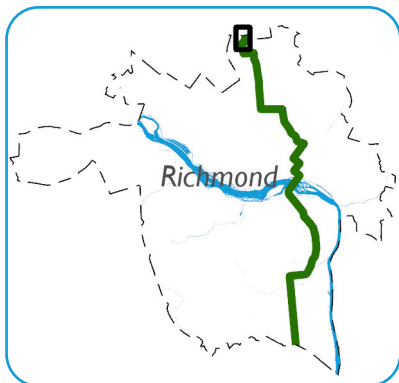
Tree Condition

- Excellent
- Good
- Fair
- Poor
- Stump
- Dead
- Removed Tree
- Unmeasured New Tree

Tree Condition is a visually-represented score determined by tree health, growth rate, structure quality, insect and disease problems, crown development, and overall life expectancy ranging from "Excellent" to "Poor". "Stump" is a tree that was removed with a stump remaining. A "Dead" tree is a dead tree that has not yet been removed. A "Removed" tree is a tree that was originally in the City of Richmond's tree inventory, but was not present when the tree validation team ran the analysis. An "Unmeasured New Tree" is a tree that was not in the City of Richmond's tree inventory at the time of analysis and is assumed to be new and in excellent condition.

- FLT Tree Validation Alignment
- FLT Tree Validation 250' Buffer
- City of Richmond Boundary

The FLT Tree Validation Alignment, including a 250' buffer in each direction, represents the general route of the FLT as of April 2025 and used in this tree validation/inventory. Final alignment for each segment will be further developed during the design phase. The City of Richmond Boundary is the legal bounds separating Richmond from its surrounding counties.



This map shows the entire City of Richmond, with the James River in blue and the FLT Tree Validation Alignment in green. The black rectangle represents the extent of the map view page shown.



Fall Line Trail North 6A | Henrico to Rosinas Ln



Fall Line Trail Segment(s):
6A, 6B

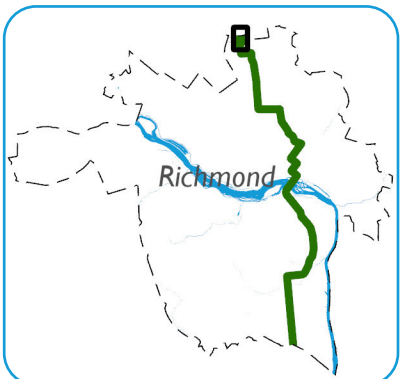
Tree Diameter at Breast Height

- 0 - 10"
- 10" - 20"
- 20" - 30"
- 30"+

Tree Condition

- Excellent
- Good
- Fair
- Poor
- Stump
- Dead
- Removed Tree
- Unmeasured New Tree

- FLT Tree Validation Alignment
- FLT Tree Validation 250' Buffer
- City of Richmond Boundary

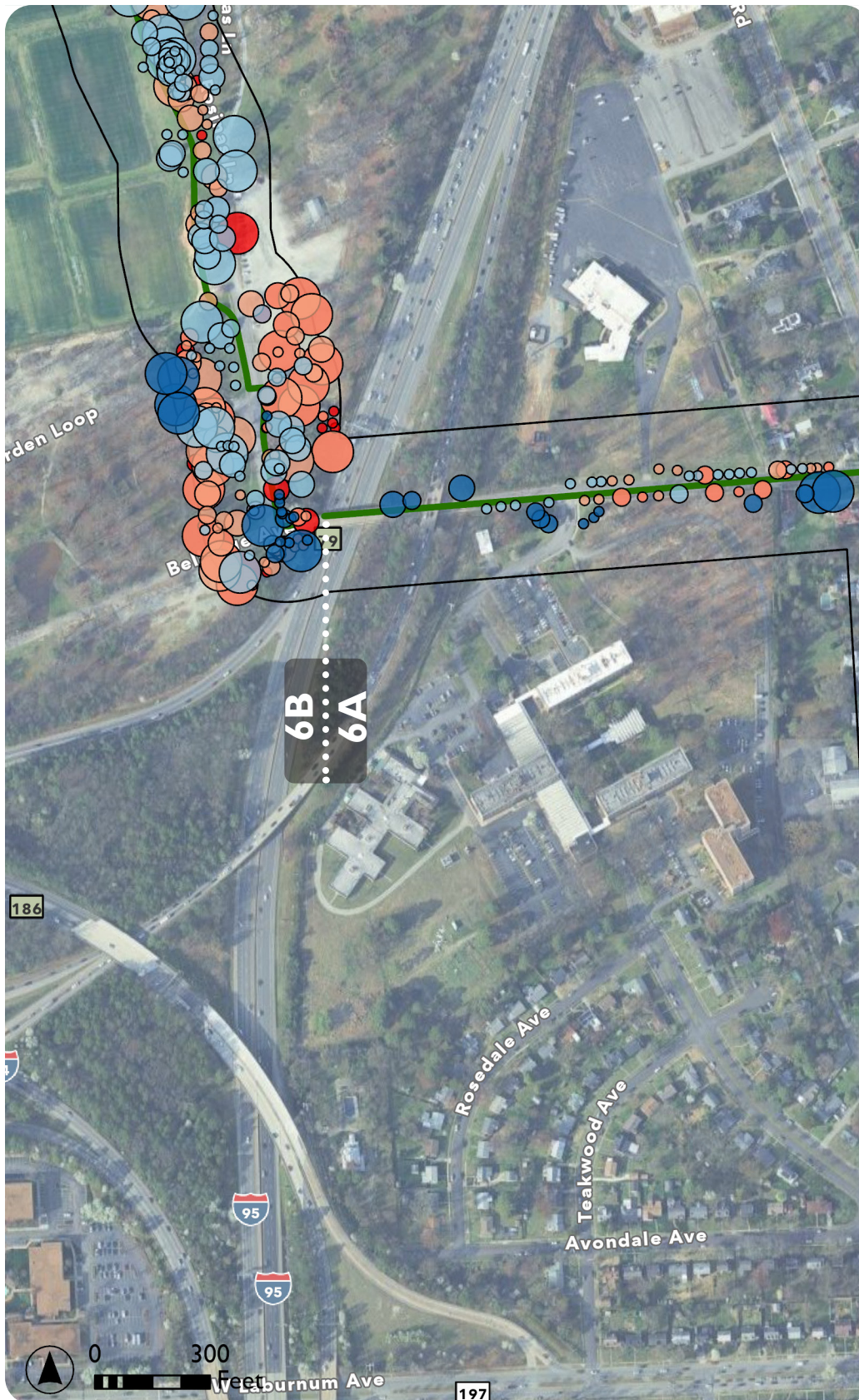


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Fall Line Trail North

6A, 6B | Rosinas Ln to Bellevue Ave



Fall Line Trail Segment(s):
6A, 6B

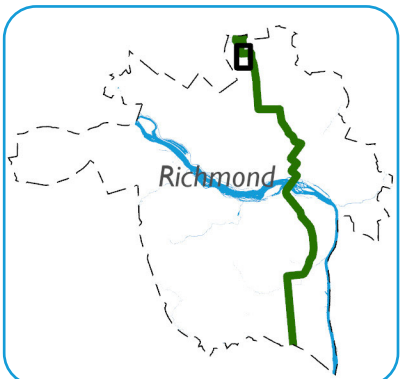
Tree Diameter at Breast Height

- 0 - 10"
- 10" - 20"
- 20" - 30"
- 30"+

Tree Condition

- Excellent
- Good
- Fair
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- Stump
- Dead
- Removed Tree
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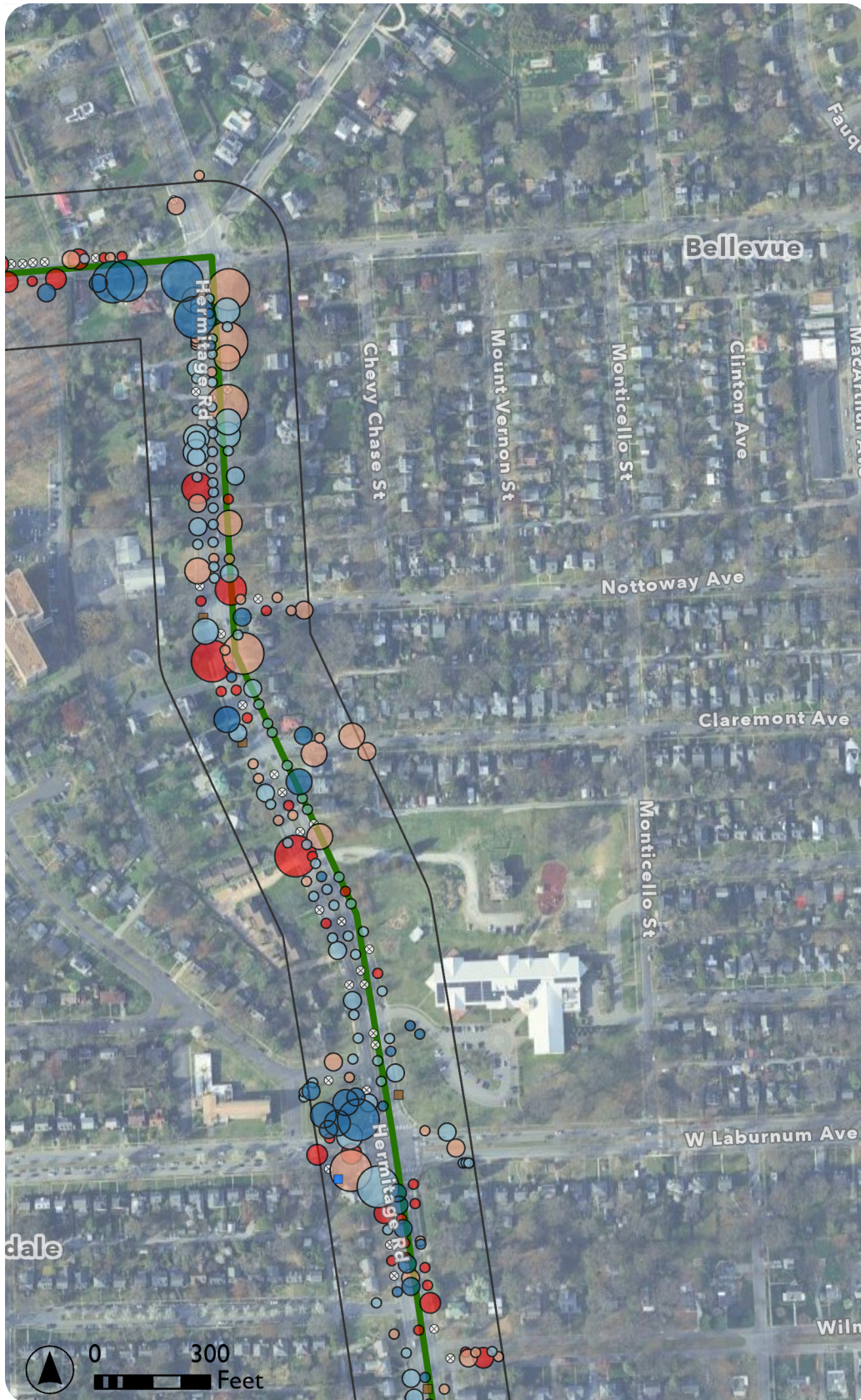


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Fall Line Trail North

6A | Bellevue Ave to Hermitage Rd



Fall Line Trail Segment(s):
6A

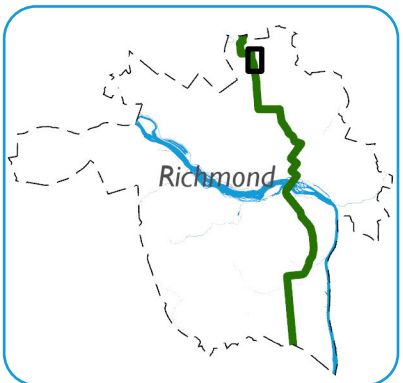
Tree Diameter at Breast Height

- 0 - 10"
- 10" - 20"
- 20" - 30"
- 30"+

Tree Condition

- Excellent
- Good
- Fair
- Poor
- Stump
- Dead
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Fall Line Trail North

6A | Hermitage Rd: Laburnum Ave to I-64



Fall Line Trail Segment(s):
6A

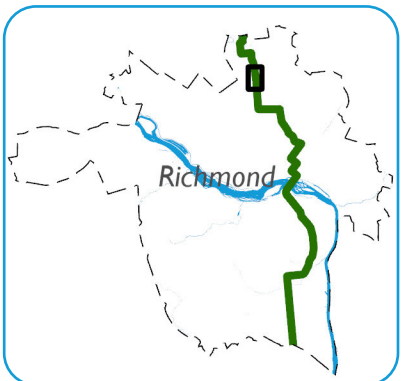
Tree Diameter at Breast Height

- 0 - 10"
- 10" - 20"
- 20" - 30"
- 30"+

Tree Condition

- Excellent
- Good
- Fair
- Poor
- Stump
- Dead
- Removed Tree
- Unmeasured New Tree

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- FLT Tree Validation 250' Buffer
- City of Richmond Boundary



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Fall Line Trail North

6A | Hermitage Rd: Brookland Pkwy to Rhoadmiller St



Fall Line Trail Segment(s):
6A

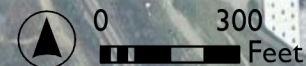
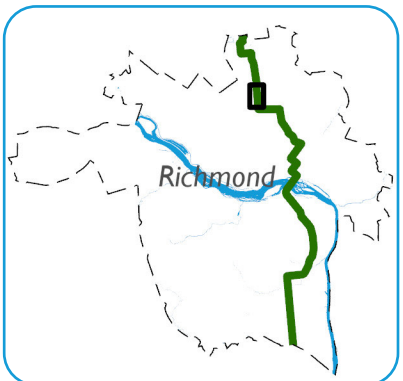
Tree Diameter at Breast Height

- 0 - 10"
- 10" - 20"
- 20" - 30"
- 30"+

Tree Condition

- Excellent
- Good
- Fair
- Poor
- Stump
- Dead
- Removed Tree
- Unmeasured New Tree

- FLT Tree Validation Alignment
- FLT Tree Validation 250' Buffer
- City of Richmond Boundary

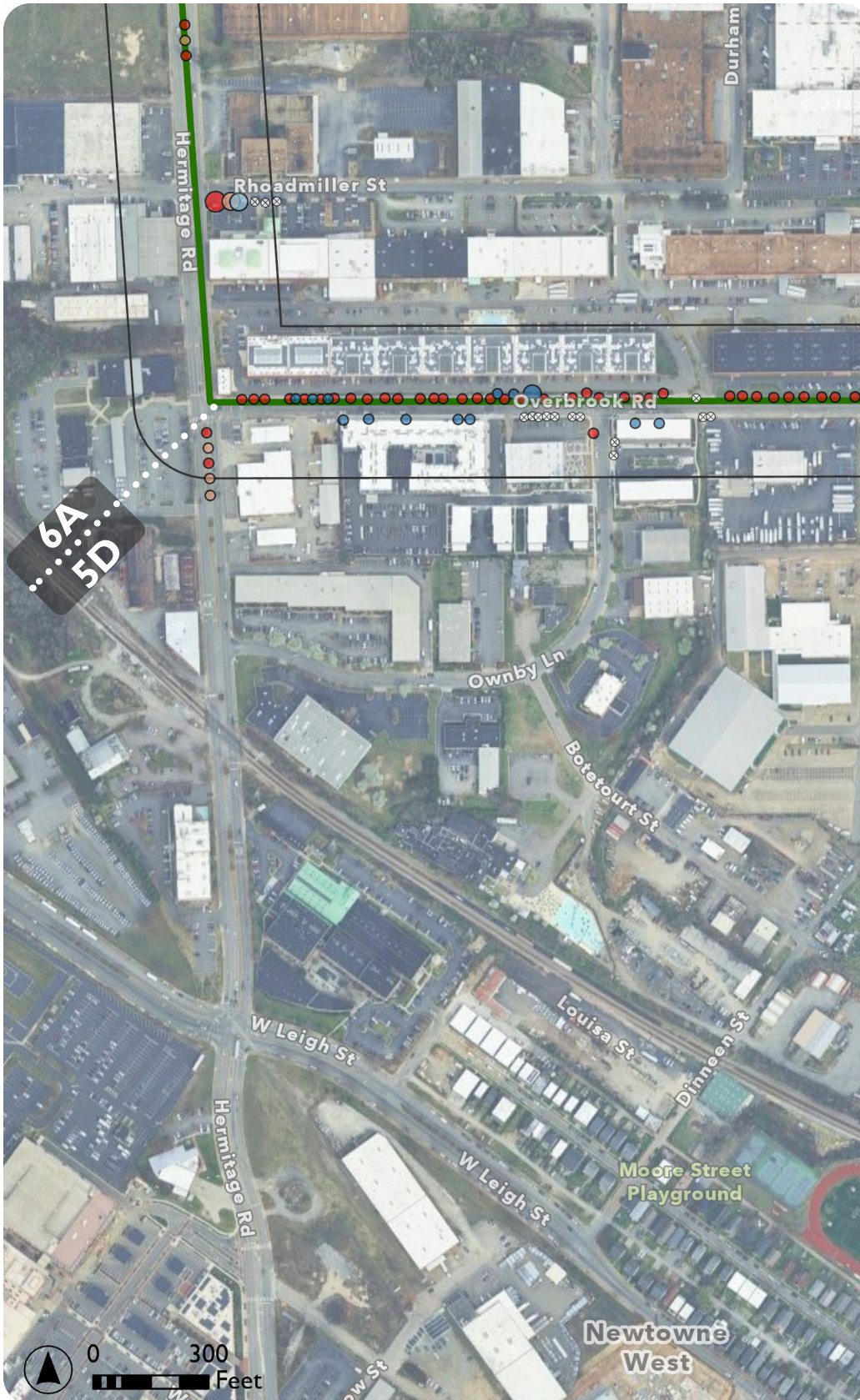


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Fall Line Trail North

5D, 6A | Hermitage Rd to Overbrook Rd



Fall Line Trail Segment(s):
5D, 6A

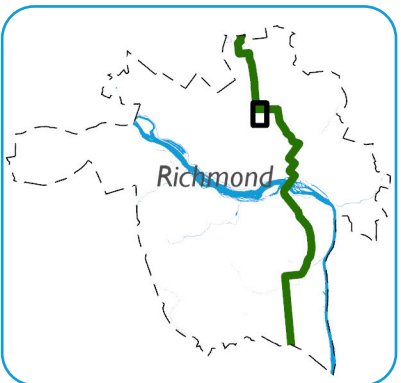
Tree Diameter at Breast Height

- 0 - 10"
- 10" - 20"
- 20" - 30"
- 30"+

Tree Condition

- Excellent
- Good
- Fair
- Poor
- Stump
- Dead
- Removed Tree
- Unmeasured New Tree

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- FLT Tree Validation 250' Buffer
- City of Richmond Boundary



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Fall Line Trail North

5D | Overbrook Rd: I-64 to Brook Rd



Fall Line Trail Segment(s):
5D

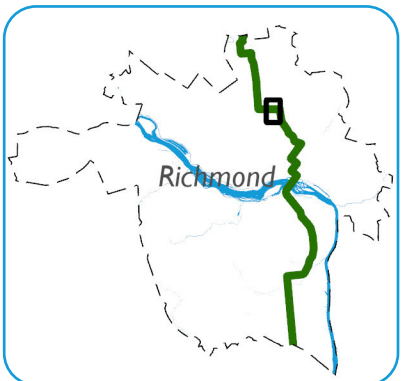
Tree Diameter at Breast Height

- 0 - 10"
- 10" - 20"
- 20" - 30"
- 30"+

Tree Condition

- Excellent
- Good
- Fair
- Poor
- Stump
- Dead
- Removed Tree
- Unmeasured New Tree

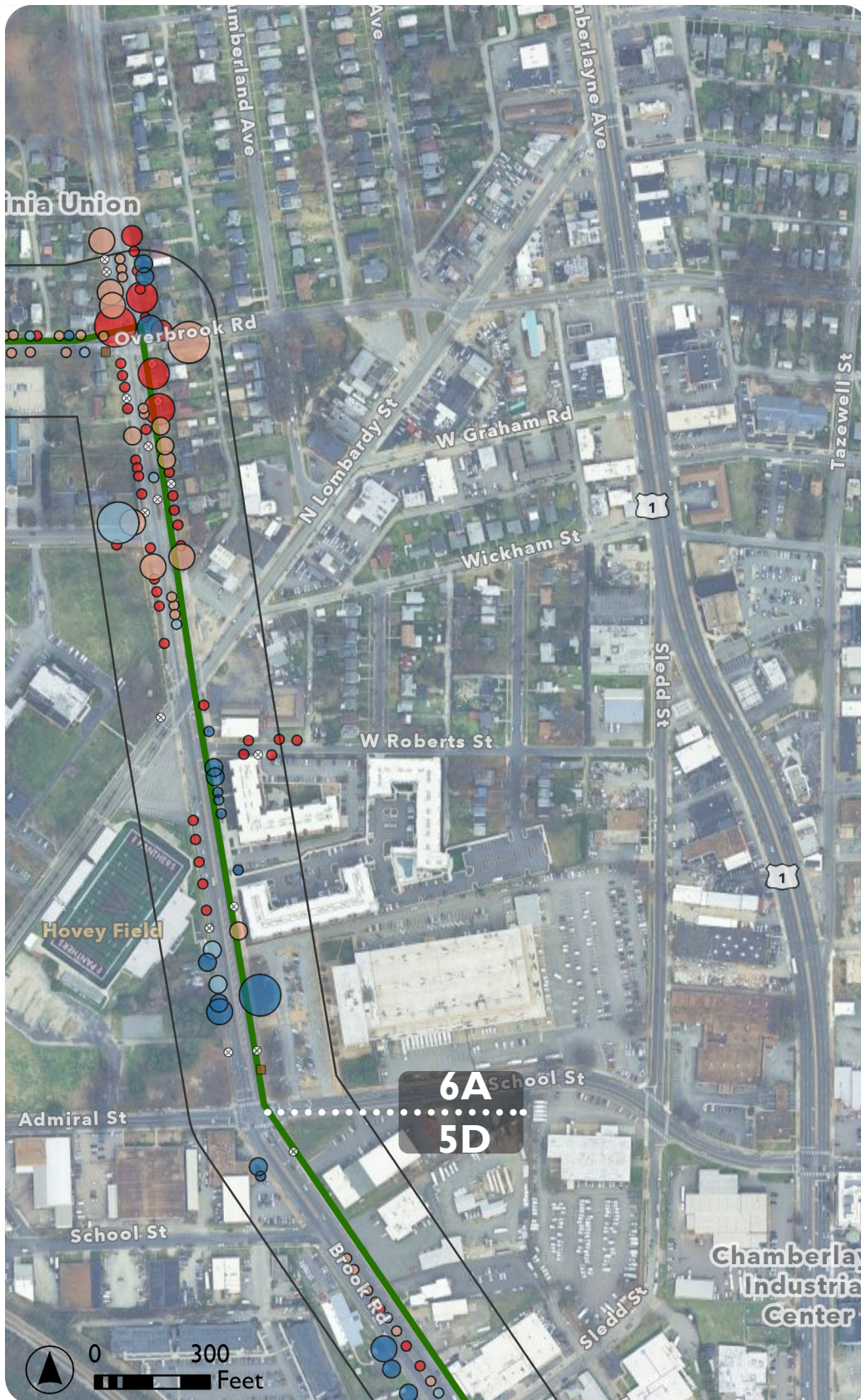
- FLT Tree Validation Alignment
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- City of Richmond Boundary



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Fall Line Trail North/Central 5C, 5D | Overbrook Rd to Brook Rd



Fall Line Trail Segment(s):
5C, 5D

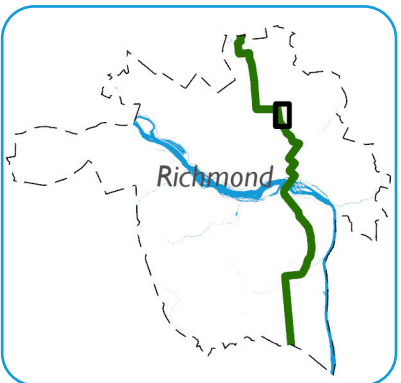
Tree Diameter at Breast Height

- 0 - 10"
- 10" - 20"
- 20" - 30"
- 30"+

Tree Condition

- Excellent
- Good
- Fair
- Poor
- Stump
- Dead
- Removed Tree
- Unmeasured New Tree

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- City of Richmond Boundary



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Fall Line Trail Central

5C | Brook Rd: School St to Calhoun St



Fall Line Trail Segment(s):
5C

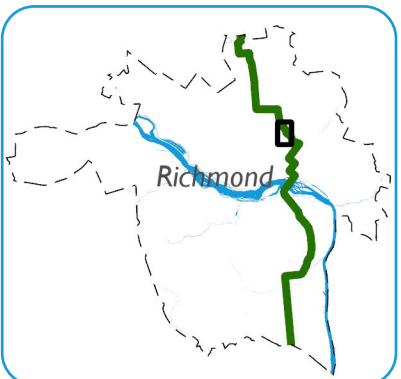
Tree Diameter at Breast Height

- 0 - 10"
- 10" - 20"
- 20" - 30"
- 30"+

Tree Condition

- Excellent
- Good
- Fair
- Poor
- Stump
- Dead
- Removed Tree
- Unmeasured New Tree

- FLT Tree Validation Alignment
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- City of Richmond Boundary



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Fall Line Trail Central

5B.3R, 5C | Brook Rd to N. 1st St



Fall Line Trail Segment(s):
5B.3R, 5C

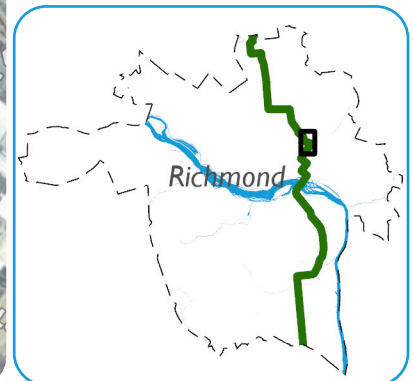
Tree Diameter at Breast Height

- 0 - 10"
- 10" - 20"
- 20" - 30"
- 30"+

Tree Condition

- Excellent
- Good
- Fair
- Poor
- Stump
- Dead
- Removed Tree
- Unmeasured New Tree

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Fall Line Trail Central

5B.1R, 5B.2R, 5B.3R | N. 1st St to E. Byrd St



Fall Line Trail Segment(s):
5B.1R, 5B.2R, 5B.3R

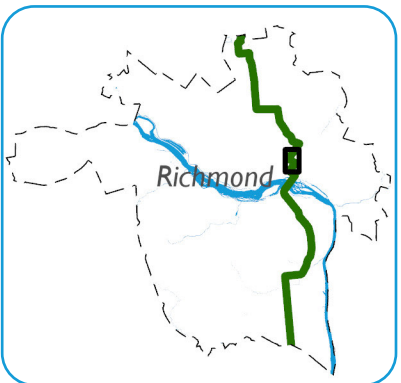
Tree Diameter at Breast Height

- 0 - 10"
- 10" - 20"
- 20" - 30"
- 30"+

Tree Condition

- Excellent
- Good
- Fair
- Poor
- Stump
- Dead
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Fall Line Trail Central

4E, 5A-R, 5B.1R | S. 5th St to Manchester Bridge



Fall Line Trail Segment(s):
4E, 5A-R, 5B.1R

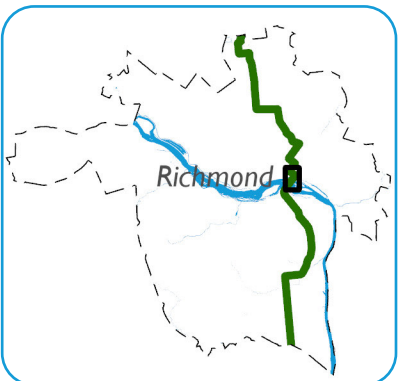
Tree Diameter at Breast Height

- 0 - 10"
- 10" - 20"
- 20" - 30"
- 30"+

Tree Condition

- Excellent
- Good
- Fair
- Poor
- Stump
- Dead
- Removed Tree
- Unmeasured New Tree

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Fall Line Trail Central

4C.2, 4D.1R, 4E | Manchester Bridge to W. Commerce Rd



Fall Line Trail Segment(s):
4C.2, 4D.1R, 4E

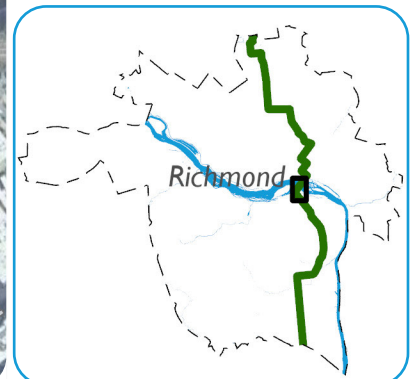
Tree Diameter at Breast Height

- 0 - 10"
- 10" - 20"
- 20" - 30"
- 30"+

Tree Condition

- Excellent
- Good
- Fair
- Poor
- Stump
- Dead
- ⊗ Removed Tree
- Unmeasured New Tree

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- FLT Tree Validation 250' Buffer
- - - City of Richmond Boundary



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Fall Line Trail Central/South

4C.1, 4C.2, 4D.1R | Commerce Rd: Perry St to Maury St



Fall Line Trail Segment(s):
4C.1, 4C.2, 4D.1R

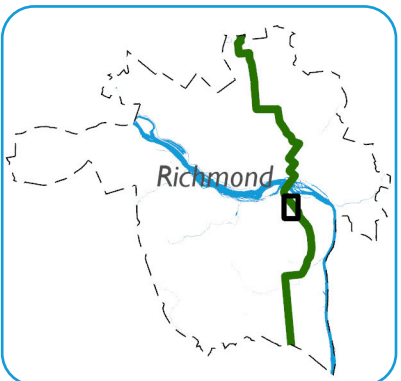
Tree Diameter at Breast Height

- 0 - 10"
- 10" - 20"
- 20" - 30"
- 30"+

Tree Condition

- Excellent
- Good
- Fair
- Poor
- Stump
- Dead
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- Unmeasured New Tree

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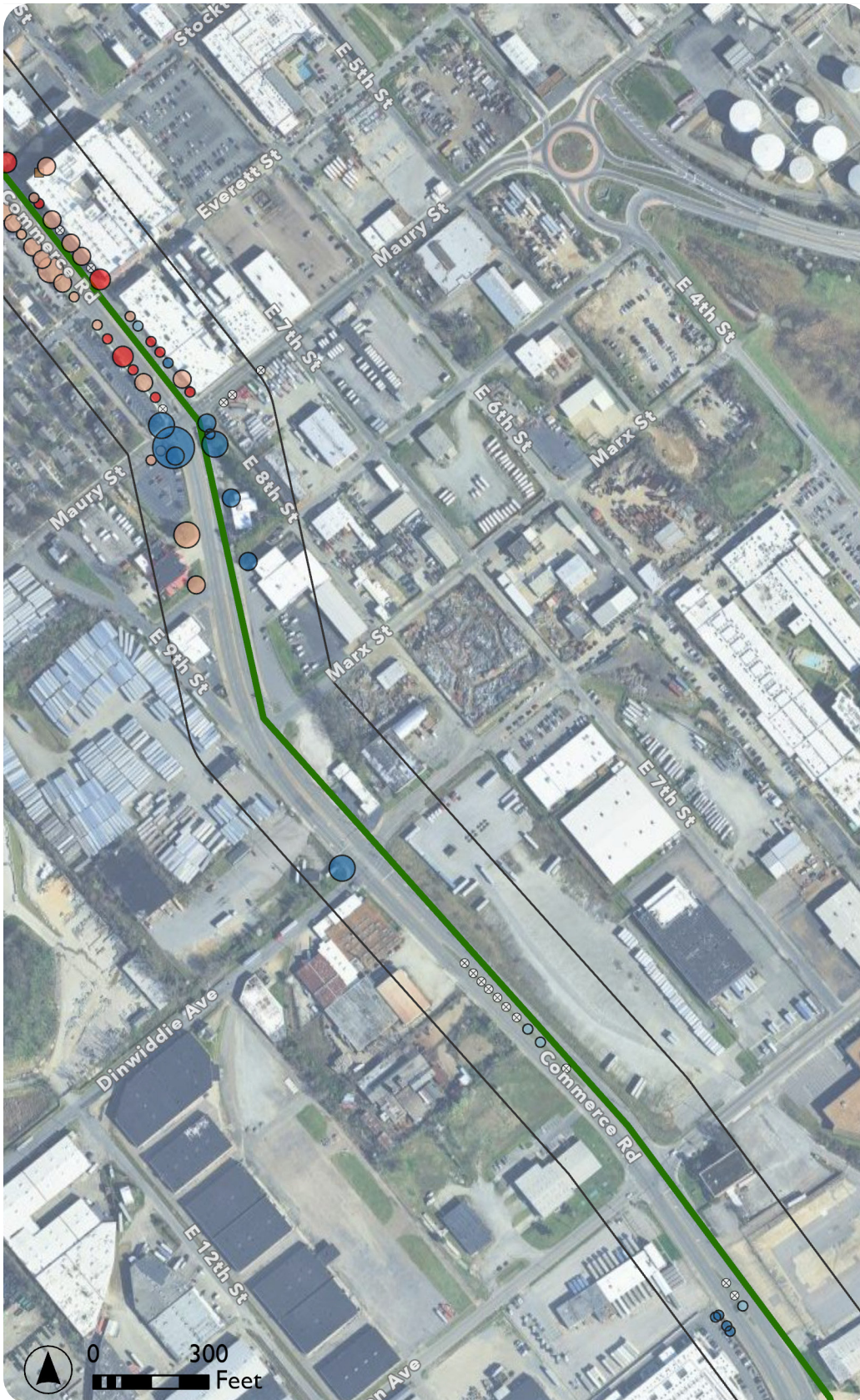


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Fall Line Trail South

4C.1 | Commerce Rd: Stockton St to Gordon Ave



Fall Line Trail Segment(s): 4C.1

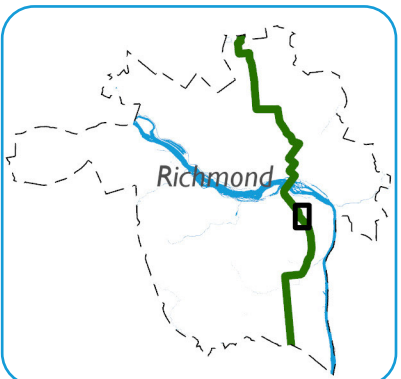
Tree Diameter at Breast Height

- 0 - 10"
- 10" - 20"
- 20" - 30"
- 30"+

Tree Condition

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- Good
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- Poor
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- Dead
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Fall Line Trail South

4C.1 | Commerce Rd: Gordon Ave to Bruce St



Fall Line Trail Segment(s):
4C.1

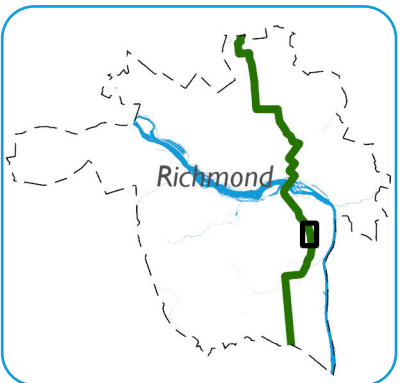
Tree Diameter at Breast Height

- 0 - 10"
- 10" - 20"
- 20" - 30"
- 30"+

Tree Condition

- Excellent
- Good
- Fair
- Poor
- Stump
- Dead
- ⊗ Removed Tree
- Unmeasured New Tree

- FLT Tree Validation Alignment
- FLT Tree Validation 250' Buffer
- - - City of Richmond Boundary



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Fall Line Trail South

4B, 4C.1 | Commerce Rd: Bruce St to Commerce Ct



Fall Line Trail Segment(s):
4B, 4C.1

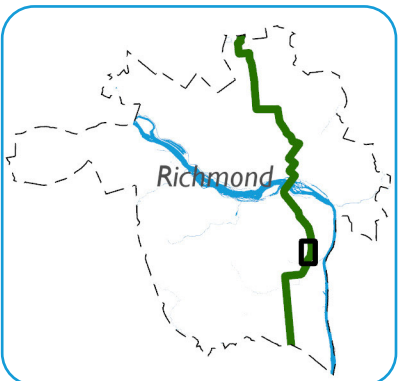
Tree Diameter at Breast Height

- 0 - 10"
- 10" - 20"
- 20" - 30"
- 30"+

Tree Condition

- Excellent
- Good
- Fair
- Poor
- Stump
- Dead
- Removed Tree
- Unmeasured New Tree

- FLT Tree Validation Alignment
- FLT Tree Validation 250' Buffer
- City of Richmond Boundary



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Fall Line Trail South

4B, 4C.1 | Commerce Rd to Bellemeade Rd



Fall Line Trail Segment(s):
4B, 4C.1

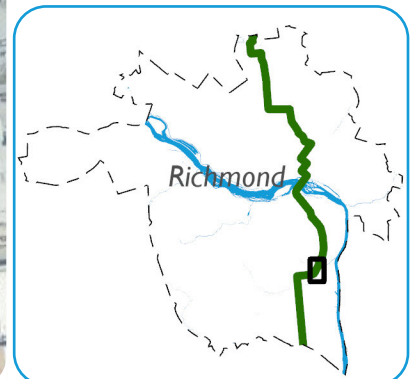
Tree Diameter at Breast Height

- 0 - 10"
- 10" - 20"
- 20" - 30"
- 30"+

Tree Condition

- Excellent
- Good
- Fair
- Poor
- Stump
- Dead
- ⊗ Removed Tree
- Unmeasured New Tree

- FLT Tree Validation Alignment
- FLT Tree Validation 250' Buffer
- - - City of Richmond Boundary



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Fall Line Trail South

4B | Bellemeade Rd: Lynhaven Ave to Columbia St



Fall Line Trail Segment(s):
4B

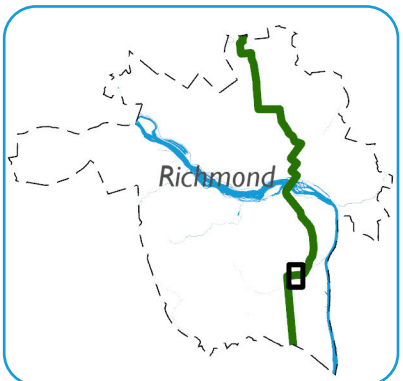
Tree Diameter at Breast Height

- 0 - 10"
- 10" - 20"
- 20" - 30"
- 30"+

Tree Condition

- Excellent
- Good
- Fair
- Poor
- Stump
- Dead
- Removed Tree
- Unmeasured New Tree

- FLT Tree Validation Alignment
- FLT Tree Validation 250' Buffer
- City of Richmond Boundary



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Fall Line Trail South

4A, 4B | Bellemeade Rd to Richmond Hwy



Fall Line Trail Segment(s):
4A, 4B

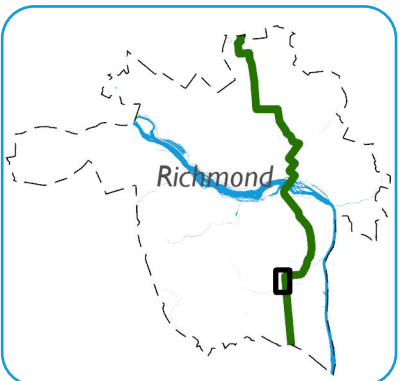
Tree Diameter at Breast Height

- 0 - 10"
- 10" - 20"
- 20" - 30"
- 30"+

Tree Condition

- Excellent
- Good
- Fair
- Poor
- Stump
- Dead
- Removed Tree
- Unmeasured New Tree

- FLT Tree Validation Alignment
- FLT Tree Validation 250' Buffer
- City of Richmond Boundary



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Fall Line Trail South

4A | Richmond Hwy: Concord Ave to Lamberts Ave



Fall Line Trail Segment(s):
4A

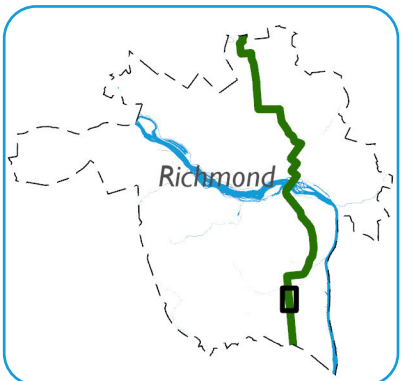
Tree Diameter at Breast Height

- 0 - 10"
- 10" - 20"
- 20" - 30"
- 30"+

Tree Condition

- Excellent
- Good
- Fair
- Poor
- Stump
- Dead
- ⊗ Removed Tree
- Unmeasured New Tree

- FLT Tree Validation Alignment
- FLT Tree Validation 250' Buffer
- - - City of Richmond Boundary



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Fall Line Trail South

4A | Richmond Hwy: Haden Ave to Sisco Ave



Fall Line Trail Segment(s):
4A

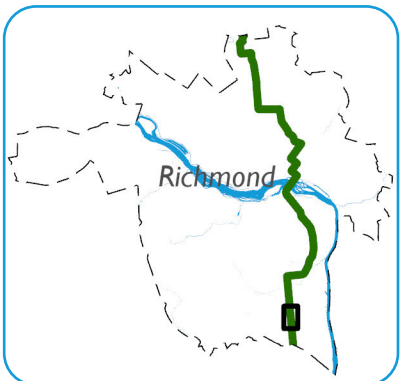
Tree Diameter at Breast Height

- 0 - 10"
- 10" - 20"
- 20" - 30"
- 30"+

Tree Condition

- Excellent
- Good
- Fair
- Poor
- Stump
- Dead
- Removed Tree
- Unmeasured New Tree

- FLT Tree Validation Alignment
- FLT Tree Validation 250' Buffer
- City of Richmond Boundary



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Fall Line Trail South

4A | Richmond Hwy: Sisco Ave to Chesterfield



Fall Line Trail Segment(s): 4A

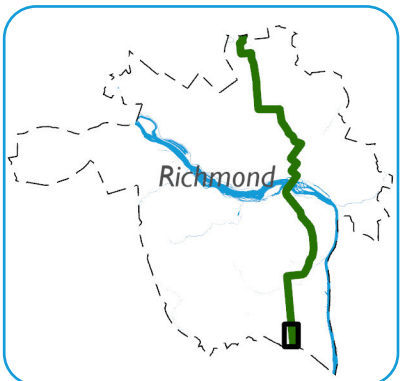
Tree Diameter at Breast Height

- 0 - 10"
- 10" - 20"
- 20" - 30"
- 30"+

Tree Condition

- Excellent
- Good
- Fair
- Poor
- Stump
- Dead
- Removed Tree
- Unmeasured New Tree

- FLT Tree Validation Alignment
- FLT Tree Validation 250' Buffer
- City of Richmond Boundary



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Tree Protection During Construction

Tree Preservation Plan

During the design phase, trail designers shall strive to minimize the number of trees to be removed.

The first step in this process is to identify trees that should be prioritized for preservation based on the tree inventory and assessment. Best practices for identifying trees and stands to be preserved include:

- Identify trees to prioritize for preservation before trail layout takes place.
- Prioritize preserving trees in good health, of mature size, and that are likely to thrive for many additional years if left undisturbed.
- Critical areas, such as floodplains, steep slopes, and wetlands, shall be left in their natural condition.

The trail alignment should be laid out, attempting to avoid the prioritized trees as much as feasible. Best practices for locating the trail and other features to minimize tree impacts include:

- Locate the trail alignment and any other trail features (hardscape, structures, et cetera) to cause the least damage to valuable trees or stands.
- Follow the existing contours, where feasible, to minimize cuts and fills.
- At a minimum, the limits of clearing should be located outside the drip line of any tree to be retained.

- All earthwork including excavations and grading should be kept outside of the TPZ unless provisions for protecting root zones are provided as part of the trail design.
- Construction material storage areas, soil stockpiles, and worker parking should be identified on the site plan and located where they will not cause soil compaction to root zones.
- Locate erosion and sediment control measures at the limits of clearing (not in wooded areas) to prevent sediment from being deposited within the drip lines of trees being preserved.
- Sediment basins should be constructed in the natural terrain, if possible, rather than where extensive grading and tree removal will be required.

Once the preliminary trail alignment and layout has been developed, the designers must consider how the trees in vicinity may be impacted by construction activities. For all trees within 100 feet of the trail alignment, designers must consider:

- the tree's proximity to the proposed trail alignment and other site features
- how the proposed construction operations such as earth-moving may impact a tree or its root system

If the construction impacts are unavoidable and are likely to cause the tree to decline in health or die, tree removal must be considered. Removing or severing more than 25% of the TPZ is likely to have a significant, permanent impact on tree health and in these cases, removal should be considered.

Tree removals are expensive, and avoiding unnecessary removals reduces overall project costs. Dead or declining trees within 100' feet of the trail alignment that are not otherwise impacted by construction will not be removed except in special cases where they pose a hazard to the safety of the construction crew or future trail users.

Once the trail alignment has been finalized and decisions have been made regarding which trees are to be preserved or removed, the designers must develop a Tree Preservation Plan (TPP).

The purpose of the TPP is to depict the trees being preserved and to establish Tree Protection Zones (TPZ) around them. Fencing shall be proposed to delineate the extents of the TPZ.

The TPP must be submitted to and approved by the City of Richmond prior to commencement of any construction activities. The TPP also shall be clearly depicted on the project's demolition, grading, and erosion and sediment control plans.

The TPP shall include:

- The tree inventory and assessment report detailing each tree's species, size, condition, and whether the tree is being removed or preserved
- A site plan that is drawn to scale and depicts:
 - All trees to be preserved labeled with their species and diameter at breast height (DBH)
 - Location of tree protection zones (TPZ) and tree protection fences
 - Site layout including any planned utilities, stormwater design, et cetera
 - The location of any temporary features such as construction trailers
 - Grading plan
 - Erosion and sediment control features for equipment storage and staging yards, soil stockpiles, and sediment basins
- Accompanying notes and details depicting the construction and/or installation of tree preservation measures being utilized

Tree Protection Plans must be prepared by an ISA Certified Arborist or a related professional, such as a landscape architect, with qualifying certification or license.

The project arborist may also elect to include other measures and details within the TPP to ensure the best possible growing conditions and reduction of stress during construction, such as soil surface coverings (mulch or other materials) to prevent soil compaction and retain moisture. Construction activities outside of the established TPZ can also affect the protected trees. Designated tree removals, stump removals, pruning, grading, changes to site drainage patterns, and other factors need to be considered.

Pre-Construction Actions

Pre-Construction Meeting

Prior to the start of construction, conduct a pre-construction meeting to discuss tree protection with the job site superintendent, grading equipment operators, Owner's Representative and/or other Consultants. At this time, the TPP and best practices for preventing and mitigating construction impacts to trees are to be reviewed.

Tree Protection Fencing

Tree protection fencing is to be installed during pre-construction at the same time as other sediment and erosion control fencing and systems. Fencing will be erected around all trees to be preserved during construction as follows:

- Fencing and specialized trunk and scaffold limb protection shall be installed as designated in the TPP and will be checked by the project arborist or related professional.
- All trees to be preserved shall be protected with chain link or welded wire fences with a minimum height of five feet (5') above soil grade.
- Fences are to be supported by steel posts at no more than 10-foot spacing, driven into the ground to a depth of at least eighteen inches.
- Fencing shall be flush with the initial undisturbed grade.
- Tree Protection Signs shall be attached to the fencing, with project manager and/or project arborist contact information (see Figure 3). Do not affix signs to trees.
- Fencing shall be rigidly supported and maintained during all construction periods (see Figure 4).
- For trees located in constrained locations such as within tree wells, erect tree fencing at the edge of the tree well or at a minimum width of 4 feet on all sides, whichever is greater.



Figure 3. Tree Protection Signs

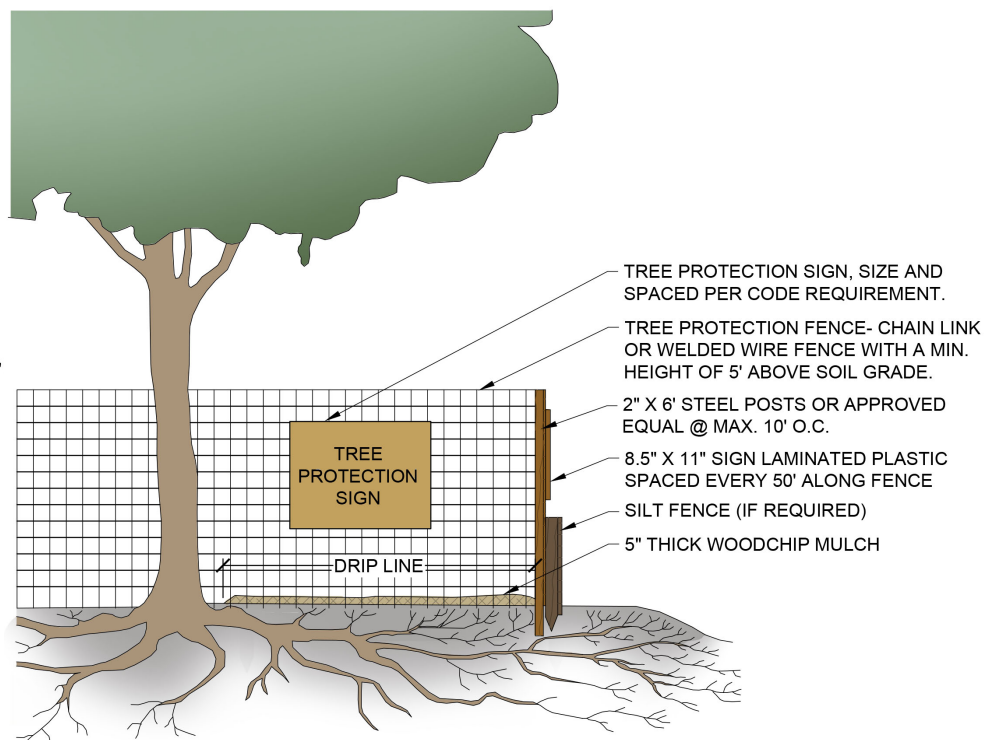


Figure 4. Tree Protection Fencing



Additional requirements:

- Trees being removed should not be felled, pushed, or pulled into any tree being preserved.
- Maintain the fencing in place until the City authorizes removal.
- Ensure all material and vehicle storage locations are at minimum 100 feet outside of drip lines of any trees to be retained.
- Ensure all toxic materials such as paint, acid, nails, gypsum board, wire, chemicals, fuels, and lubricants are stored or disposed of away from the TPZ.

Restricted Activities

Restricted work within the TPZ includes but is not limited to:

- Construction vehicle or equipment access
- Temporary or permanent storage of equipment, vehicles, or materials (including soil)
- Installing pavement, asphalt or hardscape of any kind
- Changing soil grades
- Dumping of construction waste
- Compacting soil with vehicle or equipment traffic
- Attaching anything to trees using nails, screws or items causing physical damage



NOTES:

1. **LIMB TREES TO THE MAXIMUM OF 1/3 OF THE TOTAL TREE HEIGHT.**
2. **REMOVE SUBCANOPY AND UNDERSTORY VEGETATION USING FELLER-BUNCHER, CHAINSAW OR BRUSH SAW AS NECESSARY, AVOIDING TREE TRUNKS.**
3. **AVOID SCRAPING AWAY ORGANIC MATTER ON THE SOIL SURFACE.**

REMOVE INVASIVE UNDERSTORY VEGETATION AND MAINTAIN PRESERVATION OF DESIRABLE SPECIES UNDER 10 FEET IN HEIGHT.

BEFORE CLEARING



AFTER CLEARING



Figure 5. Tree Protection: Limb and Understory Clearing



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Construction Actions

Working in Tree Protection Zones

While certain construction activities are restricted within the TPZ, it is recognized that some activities are unavoidable. No construction activity shall occur within the TPZ without prior written approval from the City. If construction activities are desired to be conducted within the TPZ, the City shall be given at least 24-hour notice prior to the anticipated commencement of construction activities. If any construction activities are approved to be conducted within the TPZ, the following protective measures shall be taken:

Trunk Protection Measures

If traffic and construction activities cannot be kept out of the TPZ for the entire duration of construction, actions shall be taken to protect the trunk from incurring damage (see Figure 6).

Surface Protection Measures

If traffic and construction activities cannot be kept out of the TPZ for the entire duration of construction, actions shall be taken to disperse the vehicular load to minimize soil compaction and potential root damage. Surface protection measures include:

- Applying 6 to 12 inches of wood chip mulch to the area.
- Laying ¾-inch plywood over 4 x 4 wood beams over a 4 inch or greater layer of wood chip mulch.
- Applying 4 to 6 inches of gravel over a taut, staked geotextile fabric.
- Placing steel plates on top of a 4 inch or greater layer of wood chip mulch; or,
- Placing commercial or logging road mats on top of a 4 inch or greater layer of wood chip mulch.
- Use a manufactured load distribution system or vehicle pad. Refer to Vehicle Tracking Pad detail.
- Temporary pedestrian paths, trails or accessible routes relocated within root zones due to construction should be placed on top of cushioning layers of mulch and aggregate. Layering these porous materials provides adequate air exposure and drainage at root surface.

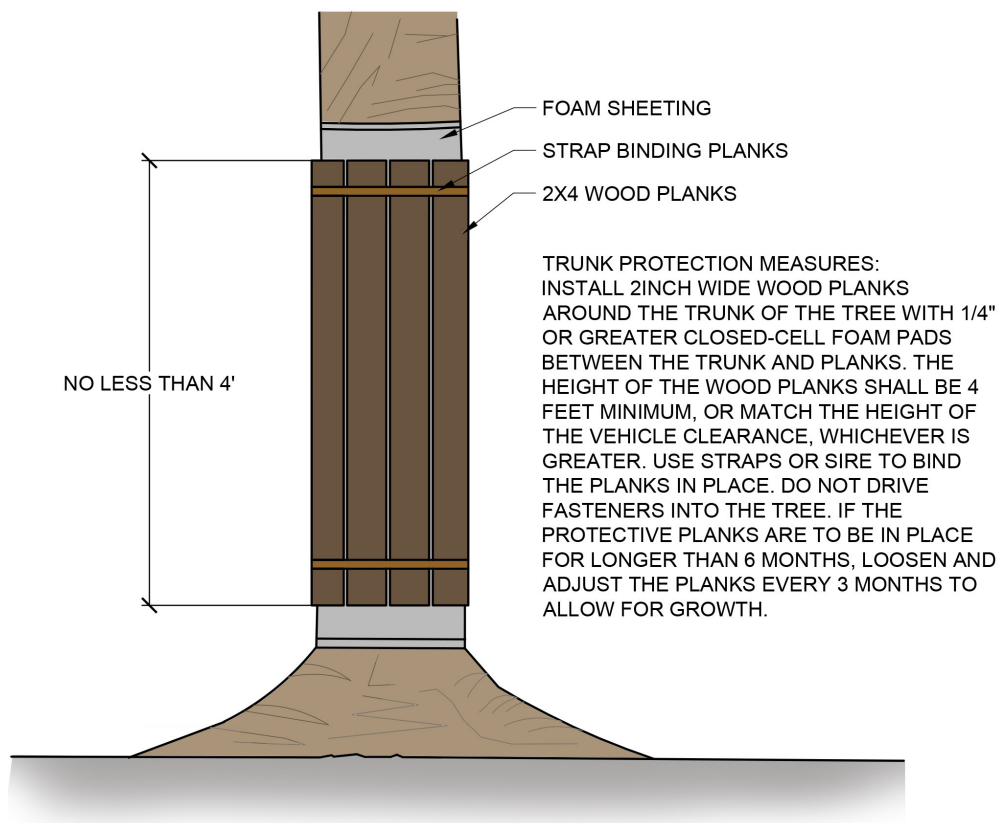


Figure 6. Trunk Guards

Supplemental Irrigation

Provide supplemental or temporary irrigation around trees especially during dry periods during June through September. Apply about three gallons irrigation per inch of trunk diameter two or three times a week for the duration of dry period or on small or newly planted trees. Tree donuts may also be used to improve water retention (see Figure 7).

Root Pruning

If it is necessary to cut or prune roots outside the TPZ, use an airspade (supersonic air tool) to decompact soil and reveal roots. Cut roots cleanly perpendicular to the natural growth direction using only sharp tools such as a vibratory saw. Backfill areas within one hour of cutting roots and water the tree within 24 hours.

Roots larger than 1-3" diameter may be major structural roots, and cutting them could increase the likelihood that a tree falls over. If questions exist regarding whether a root should be pruned, consult the project arborist (see Figure 8 and Figure 9).

Grade Changes

Changes in grade should be avoided as much as possible, and abrupt grade changes using retaining walls should only take place outside the TPZ. Use care to protect existing roots. Following root pruning, install root barrier fabric where roots will be directly adjacent to the trail and other hardscaped areas.

Limb and understory clearing

Tree branches overhanging the trail may create hazards for users. In addition, best practices recommended by Crime Prevention Through Environmental Design (CPTED) recommend removing overhanging branches lower than 6 feet above the ground and clearing spreading, thicket-forming shrubs away from pathways to create clear sightlines and reduce opportunities for concealment. Limb trees to at least 6 feet above the ground and no more than one-third of their total height. Clear undergrowth within 5-10 feet of the trail's edges, taking care to avoid damage to tree trunks. Use only hand tools when working within the TPZ (see Figure 5).



Tree with hanging limbs in Bryan Park

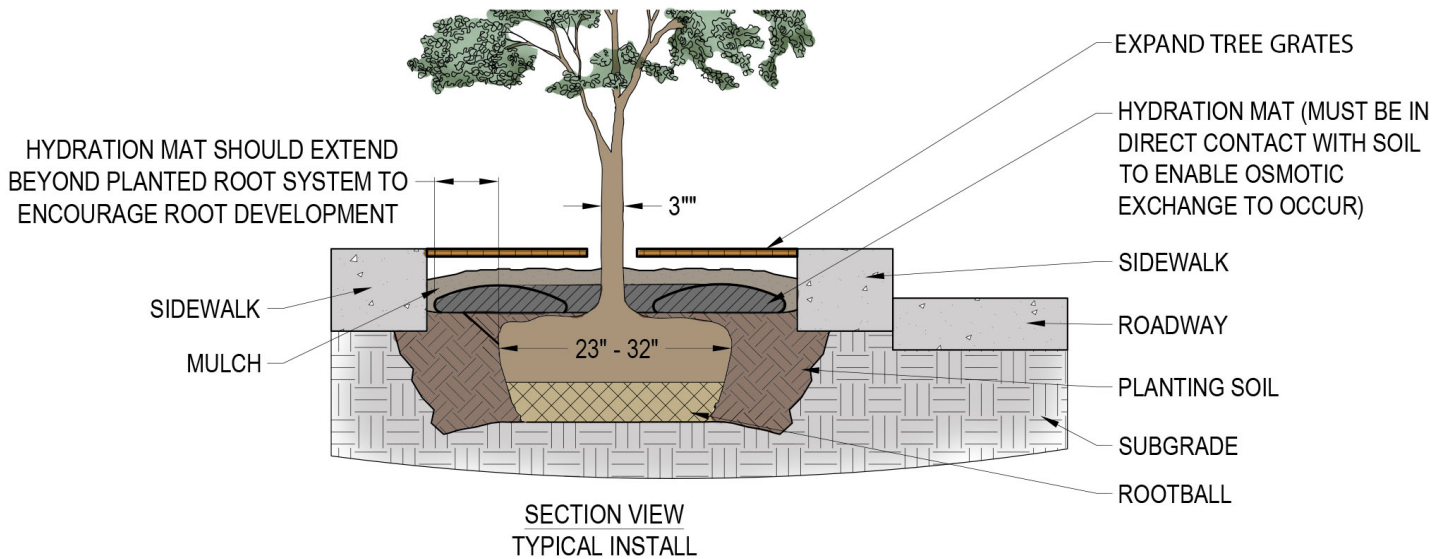


Figure 7. Tree Donut Irrigation System

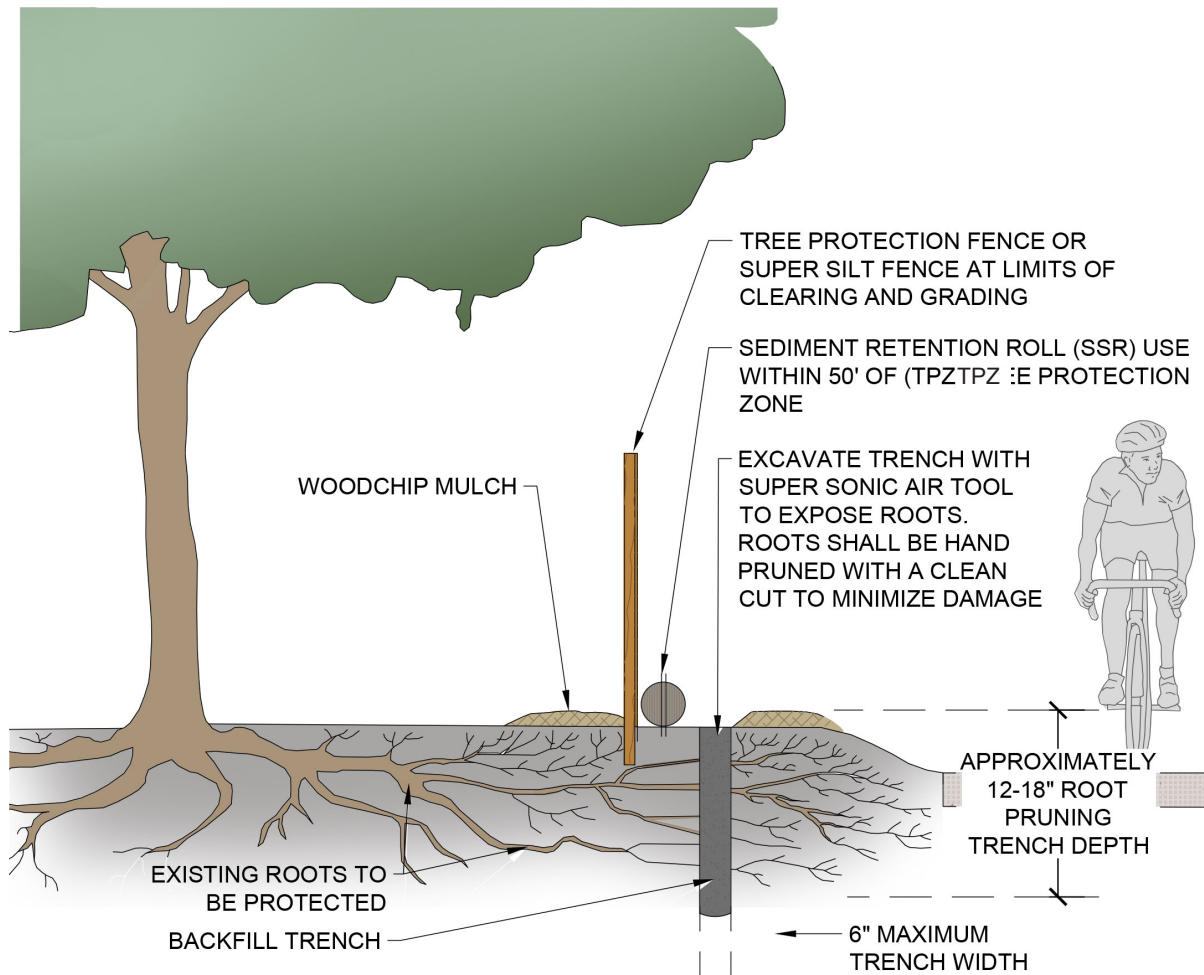


Figure 8. Tree Protection: Air Spade Trench (Cut)

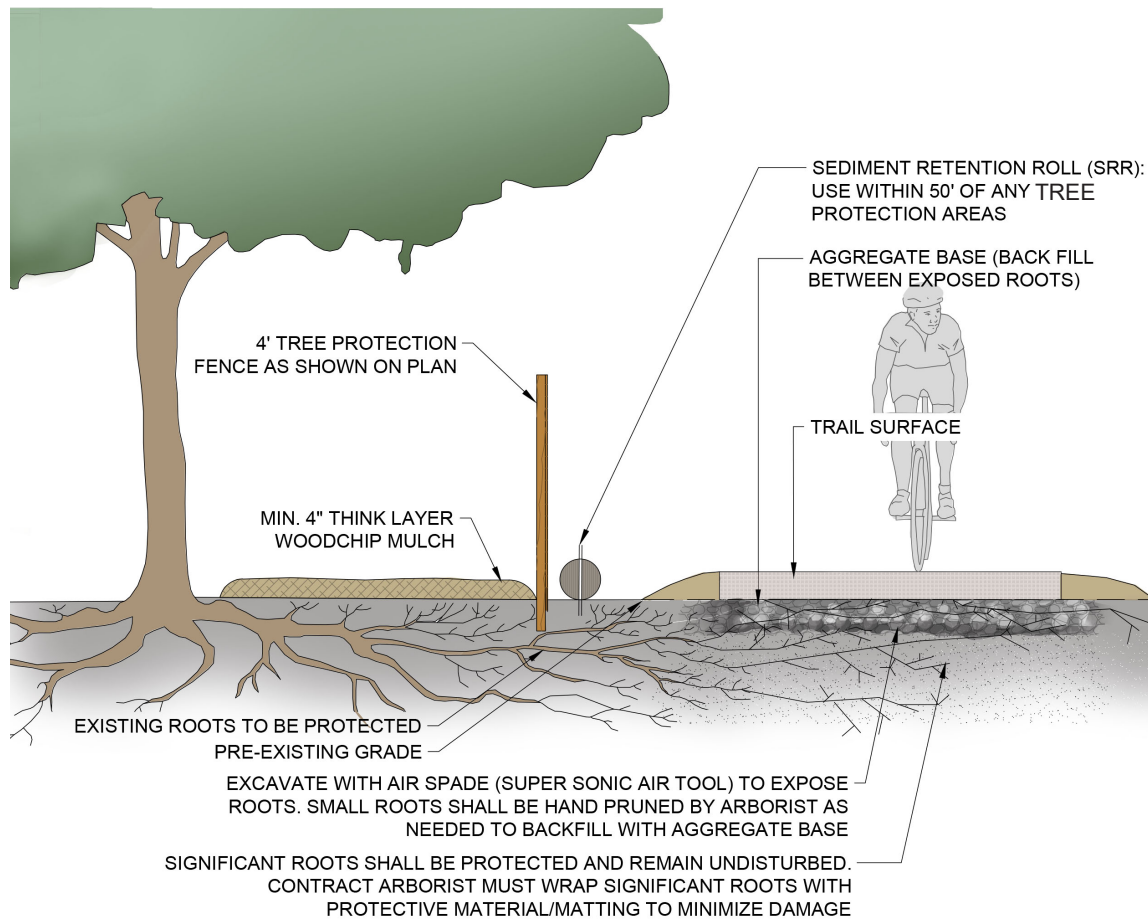


Figure 9. Tree Protection: Air Spade Trench (Fill)

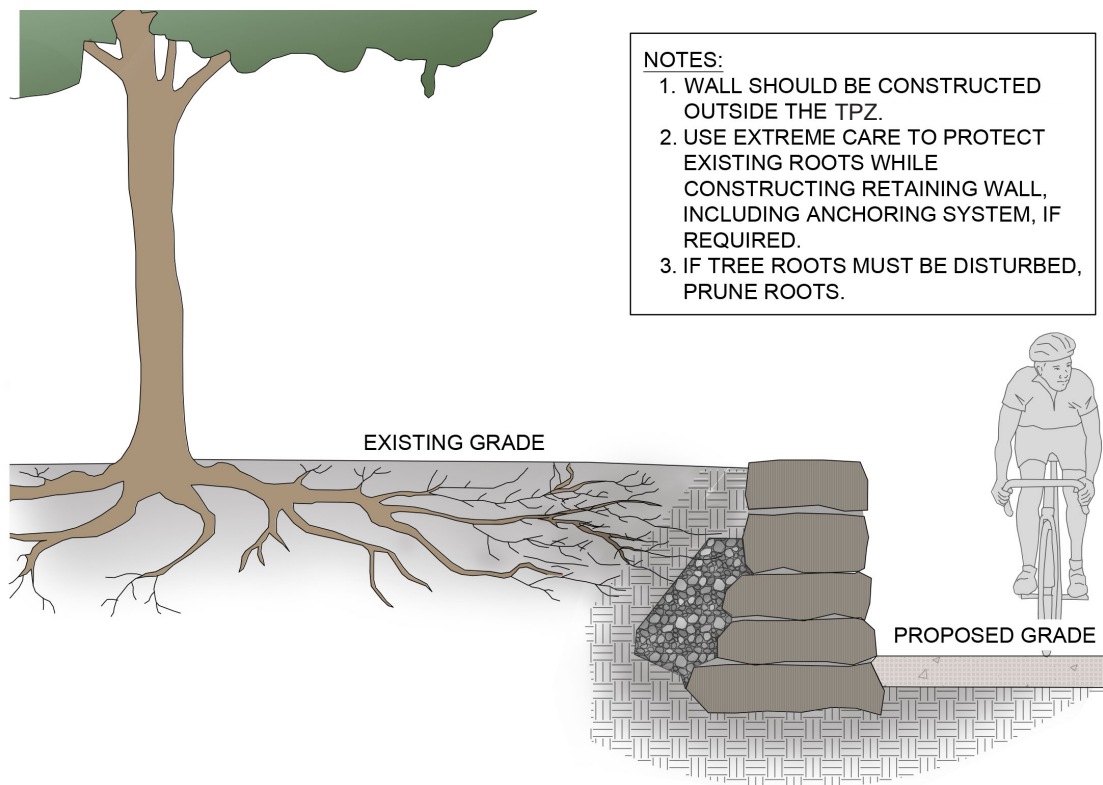
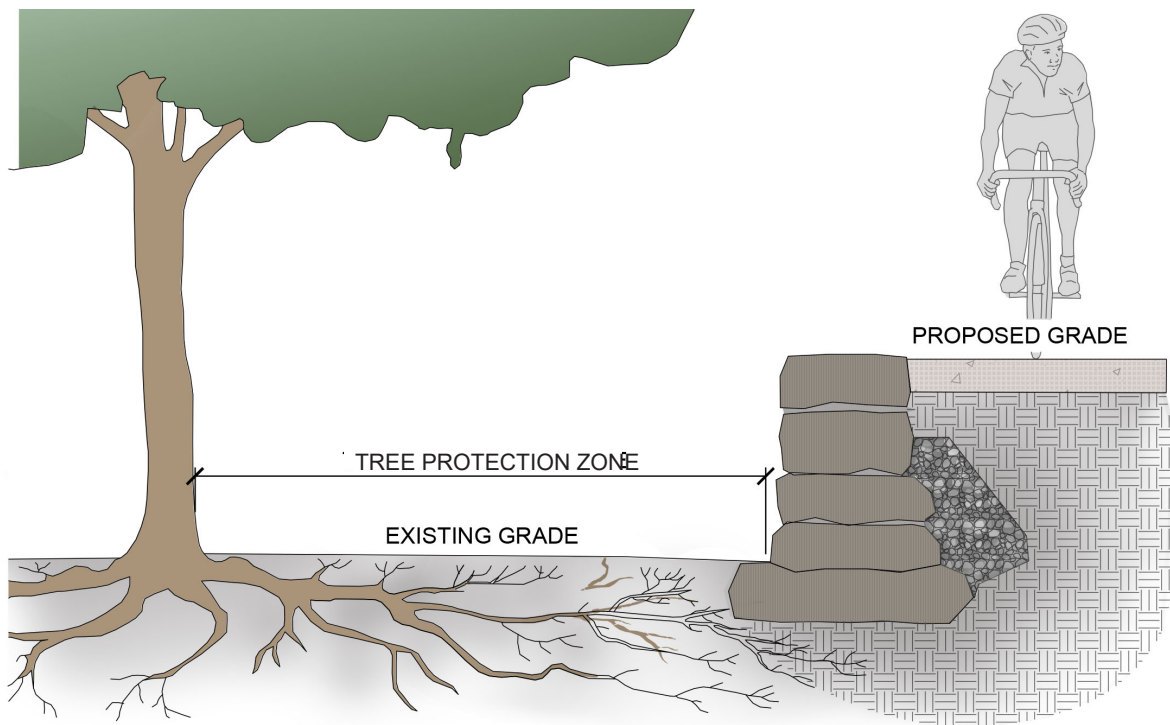


Figure 10. Tree Protection Retaining Walls (Cut)





NOTES:

1. WALL SHOULD BE CONSTRUCTED OUTSIDE THE TPZ. NE (TPZ).
2. USE EXTREME CARE TO PROTECT EXISTING ROOTS WHILE CONSTRUCTING RETAINING WALL, INCLUDING ANCHORING SYSTEM, IF REQUIRED.
3. IF TREE ROOTS MUST BE DISTURBED, PRUNE ROOTS.

Figure 11. Tree Protection Retaining Walls (Fill)

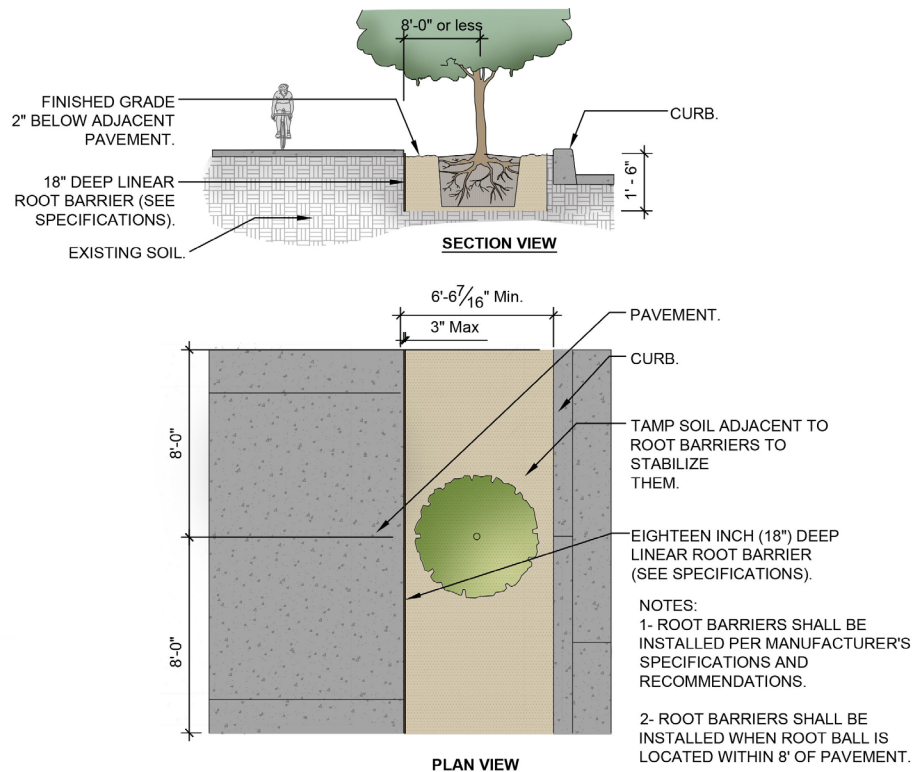


Figure 12. Tree Protection Root Barrier



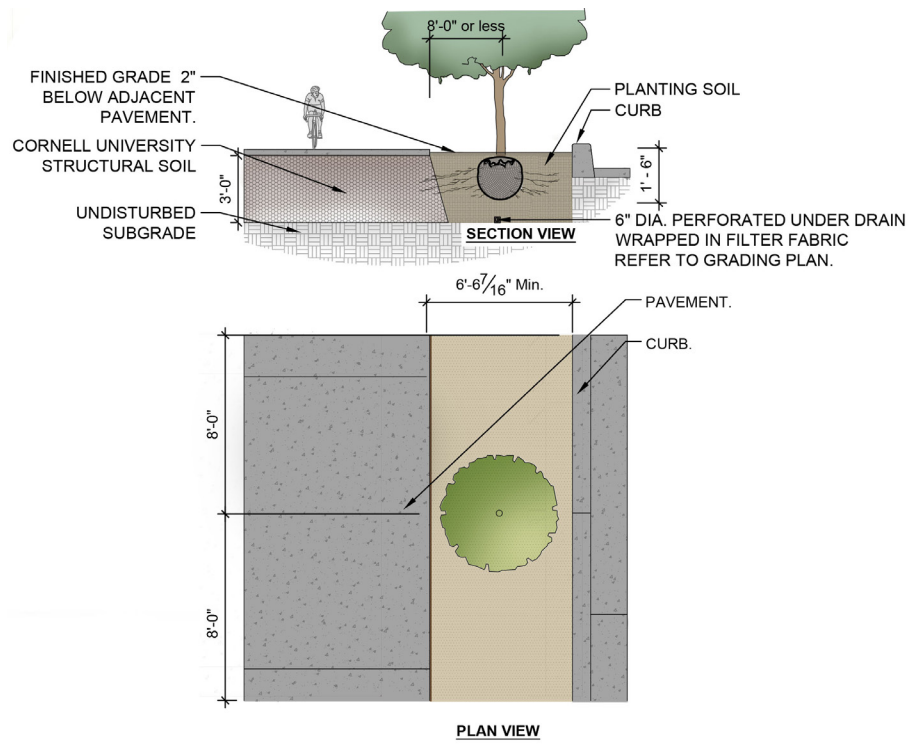


Figure 13. Tree Protection Structural Soils

Post-Construction Actions

Post-Construction Cleanup

Cleanup after a construction project can be a time that poses significant risk of damage to trees. Fences and barriers should be removed last, after everything else is cleaned up and carried away. Equipment operators should not clean any equipment by slamming or scraping it against the trunk of any tree to be preserved. If a tree suffers damage during cleanup or at any other point in the construction process, consult the project arborist for the appropriate response.

Post-Construction Monitoring

Following construction, all preserved trees shall be monitored and maintained including mulching, irrigation, and pruning where necessary, for a set period determined by the city. Trees shall be inspected annually for changes in condition and signs of pests or disease.

Ongoing maintenance activities include:

- Maintaining a mulched, grass-free area around the trunk to avoid damage by mowers or string trimmers
- Keeping building and other maintenance activities away from the limbs and trunks of trees during repair projects
- Avoiding soil contamination from oil, gasoline, paint, or other chemicals
- Upkeep of self-release watering devices such as tree donuts



N 1st St in Jackson Ward



Hermitage Rd next to the future Diamond District



Tree Removals & Replacements

Tree Removals

If a tree becomes seriously damaged during construction, the project arborist must determine whether the tree should be removed and replaced. Any tree determined to be high risk due to construction impact, root loss, damage or other reasons, and trees deemed hazardous for any reason should be reported to the City of Richmond's Urban Forestry Division.

Tree removal plans shall be reviewed before work is conducted. The plans shall include measures to limit soil compaction of surrounding trees and mechanical damage from the tree removal operation. Use thick mulching and heavy-duty matting designed for vehicle loading over tree roots (see Figure 14).

As with any trees removed in the initial demolition phase, trees being removed shall not be felled, pushed, or pulled into any tree being preserved.

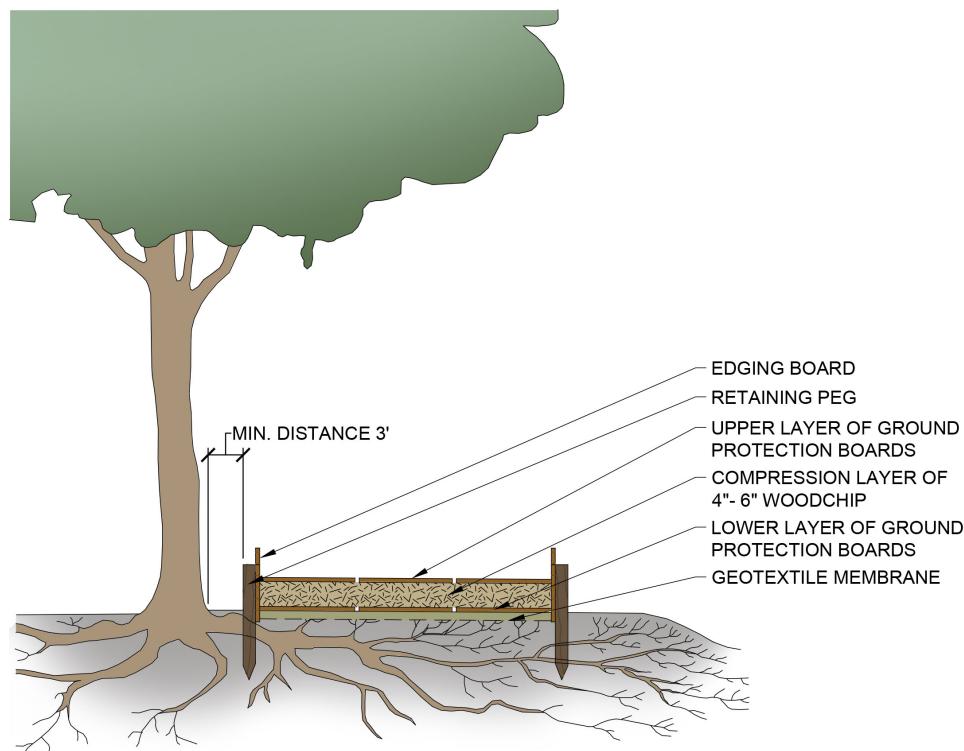


Figure 14. Vehicle Tracking Pad



Tree Replacement

The replacement tree should be a minimum of 2" caliper. The project arborist or related licensed professional such as landscape architect is to select the replacement tree species. Factors to be considered when selecting the species of replacement trees are listed below:

Environmental conditions

Consider sun/shade conditions, slope and aspect, soil moisture, soil chemistry, pollution tolerance, and available soil volumes. The constructed site may possess different conditions than what was present prior to construction.

Proximity to built elements

Consider the replacement tree's location relative to the trail, other amenities, overhead utility lines, and other built elements. Select trees whose mature size and form will not conflict with built site elements or block critical site lines at curves in the trail. Avoid planting species with prominent surface roots in close proximity to the trail or other hardscape elements to prevent pavement damage. Trees that drop copious amounts of seeds, fruit, or twigs should also be avoided close to the trail.

The replacement tree's proximity to the trail should be considered when making selections. Smaller and lower branching trees may block sightlines; in these cases, it is better to select a tree species that is well-suited for its new trailside location rather than attempting to mirror the tree that was removed.

Tree functions

If feasible and desirable, replace trees with similar form, function, and size as to the species that was replaced. For instance, if a shade tree has been removed, replace with another shade tree species. Consider the functions that trees provide when selecting trees. Shade trees lower temperatures, improving user comfort. Evergreen trees provide windbreaks in open areas and some level of noise attenuation. Ornamental trees enhance trail aesthetics and highlight important trail moments like seating areas, signage, and trail heads.

Diversity and nativity

Designers should strive to minimize the use of non-native trees. Choose stock from a reputable nearby nursery to ensure plants are regionally adapted.

Tree diversity can mitigate the spread of tree diseases and prevent widespread losses of tree canopy. Avoid planting long monoculture strips consisting of just one species of trees. Instead, if a uniform look is desired, select multiple tree species that have high visual similarity. Mix species that have similar mature size, overall shape, branching density, and foliage texture.



New tree planted on Overbrook Rd

Recommended Tree Species

The tree species listed below were selected as species appropriate for planting along the trail. This list was adapted to select for species that don't have surface roots, will work well for Crime Prevention Through Environmental Design (CPTED), and avoids fruiting species that would potentially litter the trail. These are selected for non-invasive root systems, lack of fruiting, and our recommendations specifically tailor to areas within 15-20' of the Trail.



American Sycamore on Duval St in front of Sixth Mount Zion Baptist Church

Small Ornamental Trees:

mature height <30'

Acer buergerianum, **Trident Maple**
Cercis canadensis, **Eastern Redbud**
Cornus x rutgersensis, **Hybrid Flowering Dogwood**
Cornus kousa, **Kousa Dogwood**
Magnolia stellata, **Star Magnolia**
Magnolia virginiana, **Sweetbay Magnolia**
Ostrya virginiana, **Eastern Hop-hornbeam**
Pistacia chinensis, **Pistache**
Prunus x yedoensis, *P. serrulata*, **Flowering Cherry**
Styrax japonicus, **Japanese Snowbell**

Medium Trees:

mature height 30'-60'

Betula nigra, **River Birch**
Carpinus caroliniana, **Ironwood**
Cladrastis kentukea, **Yellowwood**
Gymnocladus dioica, **Kentucky Coffeetree** (*male cultivars only)
Nyssa sylvatica, **Tupelo**
Pistachia chinensis, **Chinese Pistache**
Tilia cordata, **Littleleaf Linden**

Large Shade Trees:

mature height exceeds 60'

Celtis occidentalis, **Common Hackberry**
Ginkgo biloba, **Ginkgo** (*male cultivars only)
Platanus occidentalis, **American Sycamore**
Oaks: *Quercus bicolor*, *Q. lyrata*, *Q. palustris*, *Q. shumardii*, *Q. phellos*, *Q. nigra*, *Q. imbricaria*, *Q. virginiana*
Taxodium distichum, **Bald Cypress**
Tilia americana, **American Linden**
Ulmus parvifolia, **Lacebark Elm**



Conclusion

The Fall Line Trail represents a major investment in sustainable, equitable active transportation and community connectivity within the City of Richmond. As the trail is constructed, the City has a unique opportunity—and responsibility—to preserve and protect the existing urban tree canopy that enhances the trail’s safety, value, and functionality. Trees provide shade, beauty, and comfort to trail users, while reducing the urban heat island effect, and acting as critical buffers between the trail and surrounding uses. This Tree Preservation Guide establishes a consistent, practical framework to ensure these essential natural assets are considered at every stage of planning, design, and construction. Through the use of a comprehensive tree inventory, detailed best practices, and clear specifications for protection and replacement, this guide helps reduce unnecessary tree loss, minimize construction impacts, and ensure long-term canopy health. It empowers designers, contractors, and city staff with the tools they need to make informed decisions and protect one of Richmond’s most valuable natural resources. When implemented in full, the guidance in this document will help the Fall Line Trail grow not just as a transportation corridor, but as a living, shaded, and resilient public space for generations to come.



Bellemeade Rd



Hermitage Rd



Appendix A: Definitions & References

Definitions

Diameter at Breast Height (DBH)

Diameter at breast height (DBH) is the diameter of a tree's trunk measured 4.5 feet above the ground. It's a standard method used to measure trees and is a common dendrometry measurement.

Drip Line

The drip line is the area on the ground below the tree with a boundary designated by the edge of the tree's crown.

Feeder Root Zone

"Feeder Root Zone" is the area under and around a tree. The radius of the Feeder Root Zone measures 2 feet per one inch of DBH from the trunk outwards and 24 inches in depth. For example, for a 10-inch DBH tree, the Feeder Root Zone is located at least 20 feet out from the trunk and 24 inches deep.

Introduced Tree

An introduced tree is a tree that is not native to the area where it grows. They are also known as non-native, exotic, or alien species.

Invasive Tree

Non-native trees that can harm the environment, human health, or the economy. Invasive trees grow and spread quickly and can outcompete native species.

ISA Certified Arborist

A specialist in the care of individual trees. Arborists are knowledgeable about the needs of trees and are trained and equipped to provide proper care. ISA Certified arborists are individuals who have achieved a level of knowledge in the art and science of tree care through at least three years of experience and have passed a comprehensive examination. They are also required to continue their education in order to maintain their certification, ensuring that their knowledge is updated on the latest arboriculture techniques.

Keystone Species

A keystone species is a plant, animal, or microbe that has a large impact on its ecosystem relative to its abundance. Keystone species are vital to the long-term health of their ecosystems.

Native Trees

Trees that are indigenous and original to a particular geographical area.

Specimen Tree

This is a tree planted apart from other trees that is used as a focal point of a garden or backyard.

Street Tree

Large canopy trees planted along existing or proposed public streets. Street trees may be within existing or proposed rights-of-way, but when outside of public right of way, must be within fifteen (15) feet of the edge of such rights-of-way.

Structural Root Zone

The structural root zone (SRZ) is the area of soil around a tree's base that's required for the tree to stay upright.

Tree Canopy / Tree Cover

All areas of coverage by plant material exceeding five feet in height, and the extent of planted tree canopy at 10- or 20-years maturity.

Tree Protection Fence

Temporary enclosure erected around a tree to be protected at the boundary of the tree protection zone. Tree protection fencing.

Tree Protection Zone

Area surrounding individual trees or groups of trees to remain during construction, and defined by fencing and signage as described below unless otherwise indicated.

References

Virginia Stormwater Management Handbook Version 1.1, Virginia Department of Environmental Quality (DEQ). <https://online.encodeplus.com/regs/deq-va/doc-viewer.aspx?secid=671#secid-671>

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