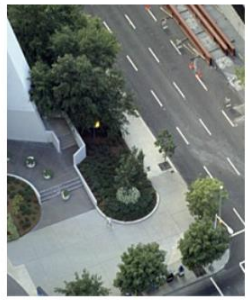
River Bend Tree Medians

Tom Glasgow, Craven County Extension, Spring 2023

Presented to Town Council March 16,2023

ITEM 8A

Urban/suburban design to support trees



Trees grow poorly in urban areas unless the soil beneath and adjacent to hard surfaces supports root growth. Root growth is THE critical factor for successful design execution! The system has to be specially designed to accommodate tree root growth. This does not happen without careful planning, and execution. Occasionally, portions of cities get lucky and trees grow despite poor planning. These examples should not be used as models for future design because these are usually anomalies.

Minimum soil volume for trees	
ultimate trunk diameter	soil volume
16 inches	1000 cu. ft.
24 inches	1700 cu. ft.

Minimum soil volume required to support reasonably healthy trees can be summarized in the table to the left. This soil should be at least three feet deep and must have a bulk density below the critical value for the soil type. Rooting space needs to be wider if it can not be three feet deep. Place trees as far from hardscape as possible.

Tip: Plant the easy places first because it costs less.

Good examples | **Site modifications** | **Root conflicts** | **Sidewalks** | **Parking lots** | **Street trees** | **Special planting situations** | **Tree spacing** | **Tree selection** | **Tree preservation**

Fact sheet: Urban design to support trees (pdf)

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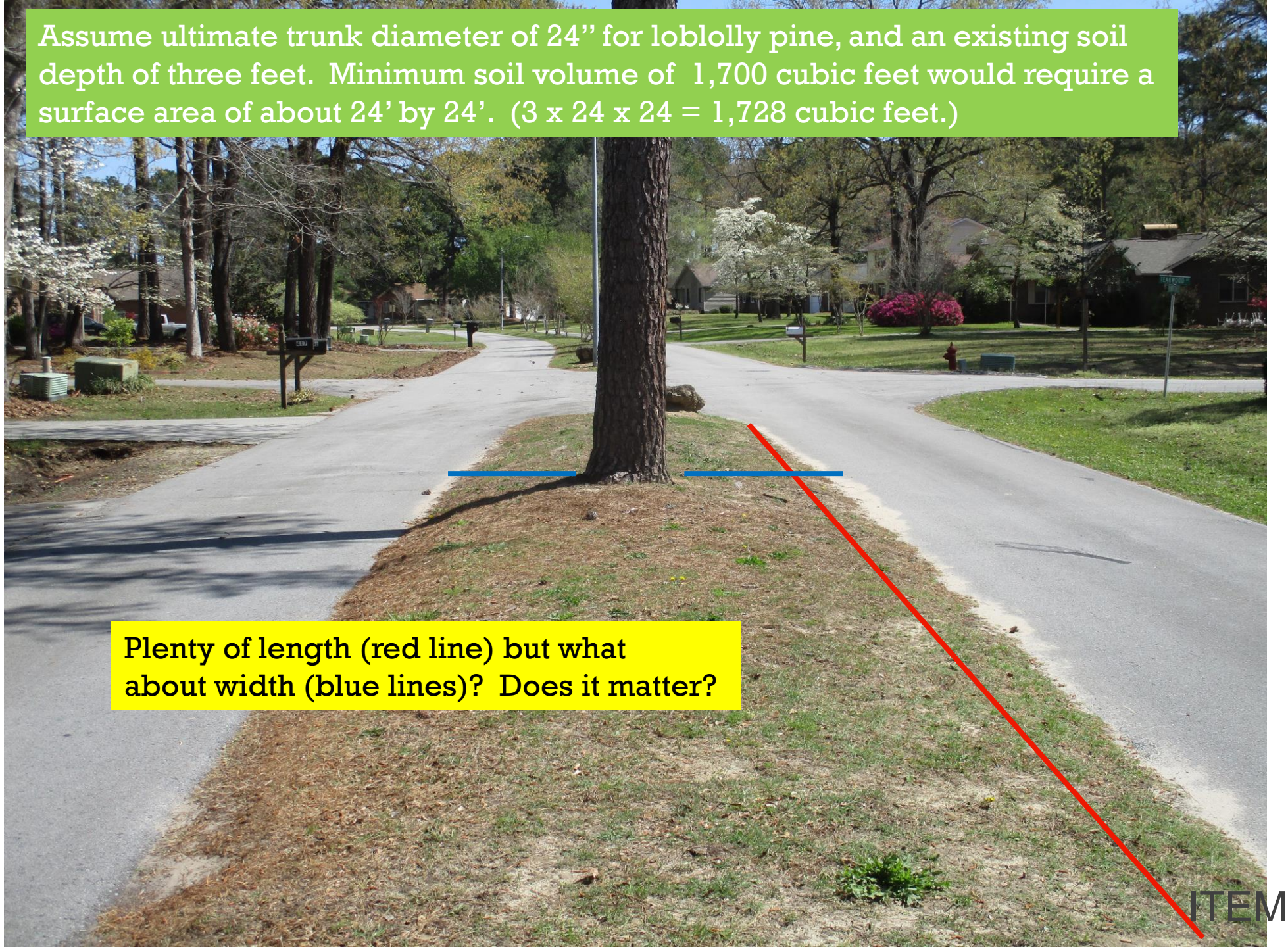
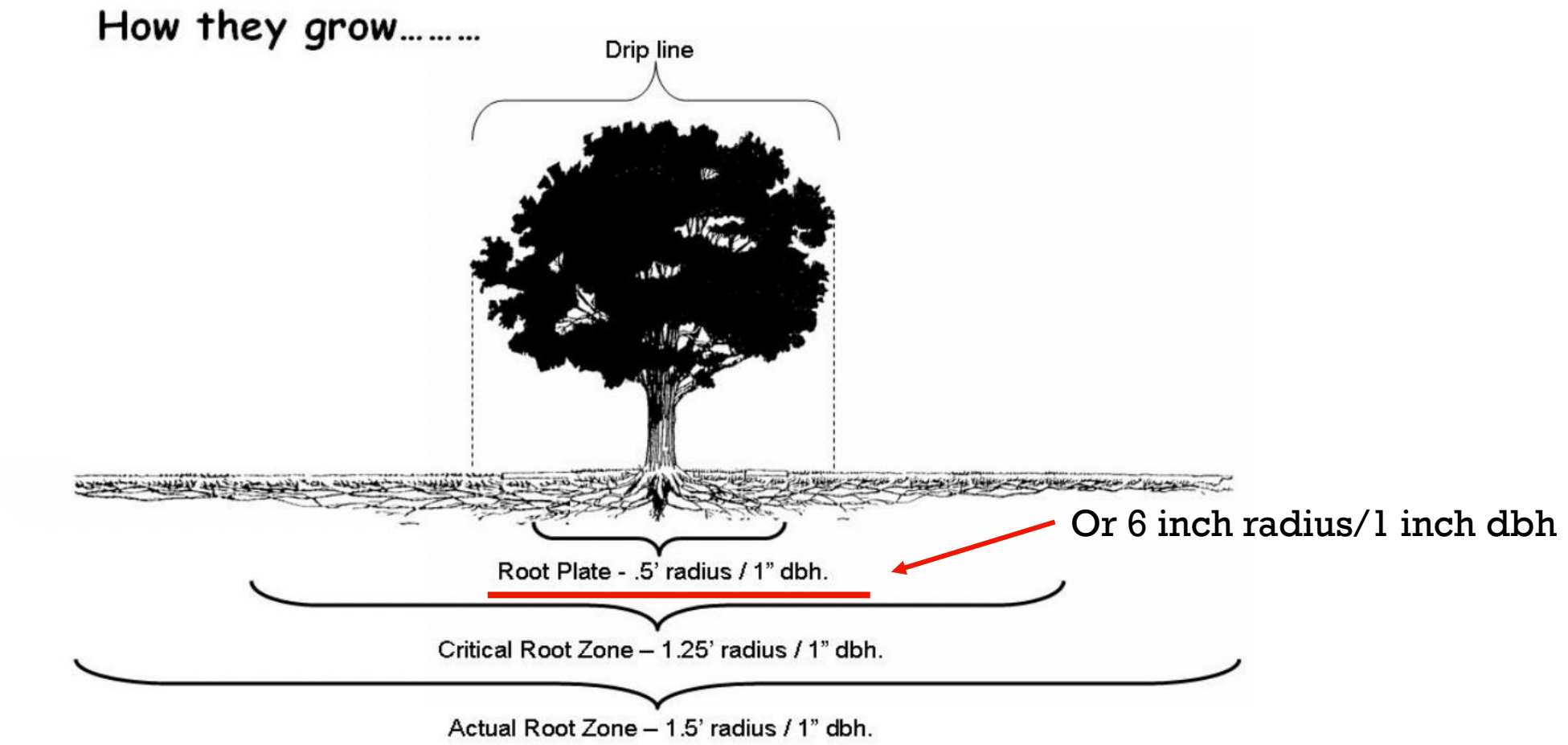
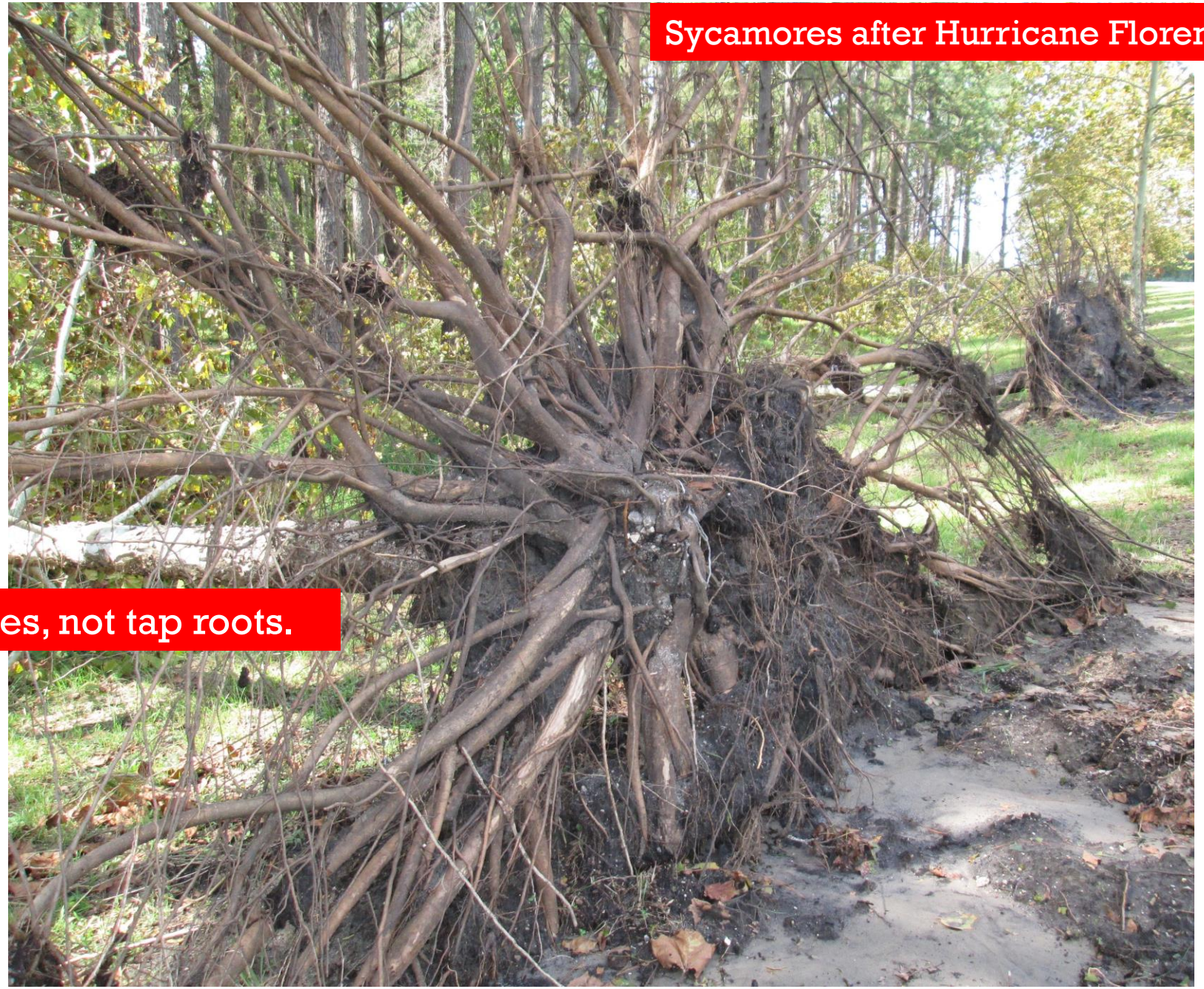

Assume ultimate trunk diameter of 24" for loblolly pine, and an existing soil depth of three feet. Minimum soil volume of 1,700 cubic feet would require a surface area of about 24' by 24'. (3 x 24 x 24 = 1,728 cubic feet.)
Plenty of length (red line) but what about width (blue lines)? Does it matter?



Or 6 inch radius/1 inch dbh

Source: Georgia Forestry Commission

Sycamores after Hurricane Florence



Root plates, not tap roots.

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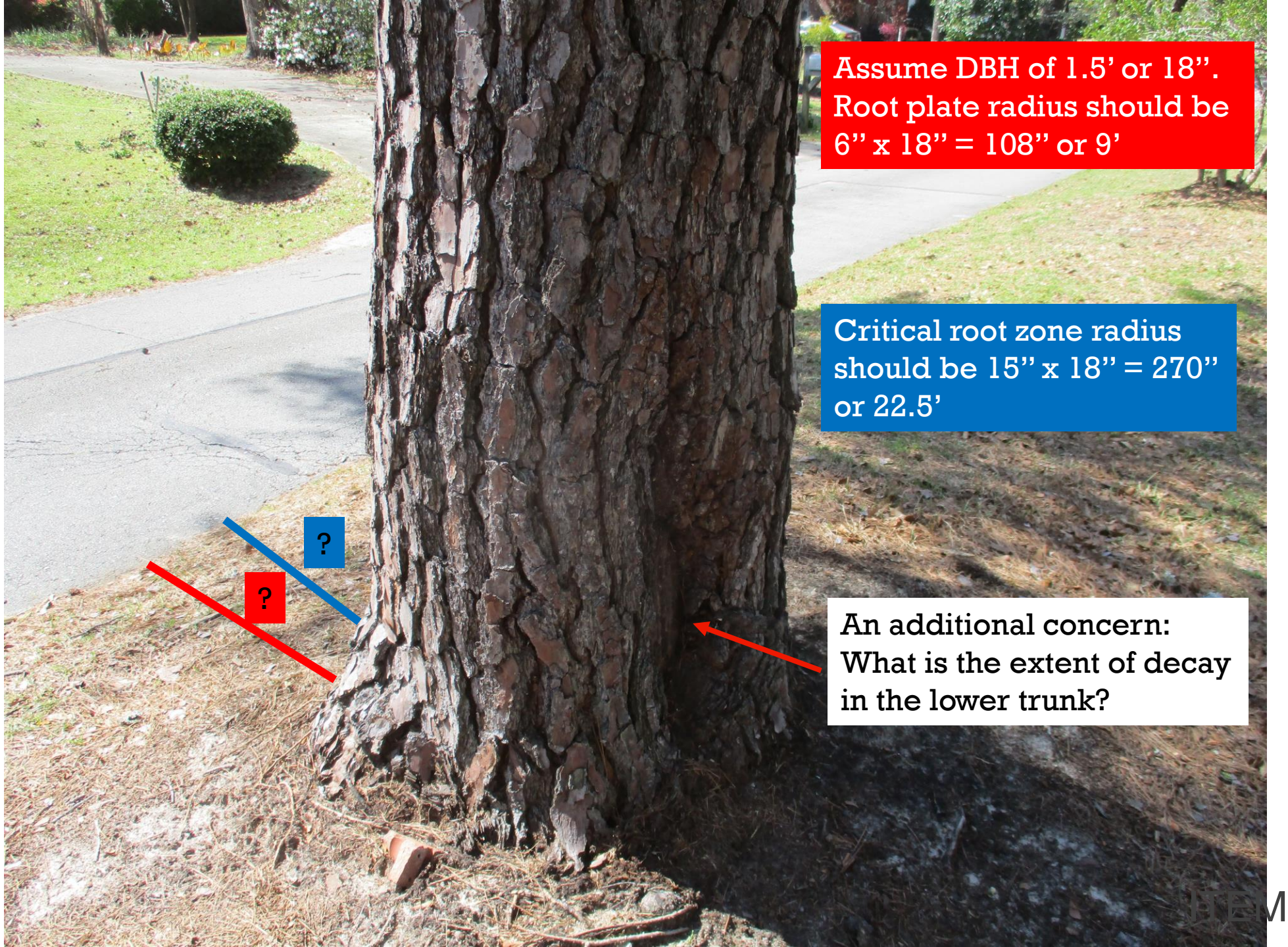
Assume DBH of 1.5’ or 18”. Root plate radius should be 6” x 18” = 108” or 9’
Critical root zone radius should be 15” x 18” = 270” or 22.5’
?
?
An additional concern: What is the extent of decay in the lower trunk?


As drivers move to the left to give pedestrians and bikers more space …
The root plate supports the vertical weight of the tree!
… vehicles pass within inches of the trunk, resulting in substantial damage to the root plate and diminishing the stability and health of the tree.

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Fencing along the red line could keep vehicles off the roots and root plate. Alternatively, large trees that are growing too close to the pavement could be removed.

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Trees
Urban design | Site | Selection | Nursery | Planting | Pruning | Health | Species | Roots | Structure | Wood | Storms | Arborists | Plan | **See:** Power lines

Shrubs
Selection | Production | Maintenance | Species | **See:** Planting

Groundcover
Selection | Production | Maintenance

Palms

PowerPoints

Place trees far from hardscape

Trees that can grow to a large size such as oaks should be positioned ten feet or more from curbs (see photo), pavement, and other root barriers. This allows them enough space to develop a root system that will hold trees firmly compared to trees positioned closer. Trees placed too close to curbs blew over by the thousands in recent storms and hurricanes.

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Readiness: Getting Your Trees Ready for the Storm

Watch later Share

Provide enough space!

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Full screen (f)

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Anchor Way
As a general rule, plant large-growing trees here
Not here

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First North Carolina Colored Volunteers
States first regiment of black Union soldiers rallied here on July 24, 1863. In 1864, designated 35th U.S. Colored Troops
MX
STOP
Good placement for a large-maturing tree
Bad placement

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Location at corner of Shoreline and Plantation

Strangling roots, co-dominant tree trunks, fungal reproductive structure;
Likely *Inonotus*





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Landscape Plants

- **Trees**
  Urban design | Site | Selection | Nursery | Planting | Pruning | Health | Species | Roots | Structure | Wood | Storms | Arborists | Plan | **See:** Power lines
- **Shrubs**
  Selection | Production | Maintenance | Species | **See:** Planting
- **Groundcover**
  Selection | Production | Maintenance
- **Palms**
- **PowerPoints**
- **Fact sheets**
- **Research papers**
- **Landscape designs**
- **Other resources**
- **Topic index**

Codominant stems, trunk and branch structure

Trunks need enough wood tissue arranged appropriately to hold the tree up in stormy weather. Branches well attached to the trunk can remain secured for a long time (left and center photos). Weakly attached branches (right photo) can split from the tree. Trees with weakly attached branches fail more often than trees without these defects.

The two **codominant stems** on the right are weakly attached because they are the same size and because of the bark inclusion between them. The codominant stems below are better attached because there is no bark inclusion. Cabling and bracing can be used to help hold certain trees together (**See:** cabling and bracing). Trees can also be structutally pruned to either prevent or modify the impact of this defect.

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Codominant trunks. As the trunks expand in diameter, they push against each other, becoming more prone to splitting and falling apart every year.

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Location at corner of Shoreline and Plantation

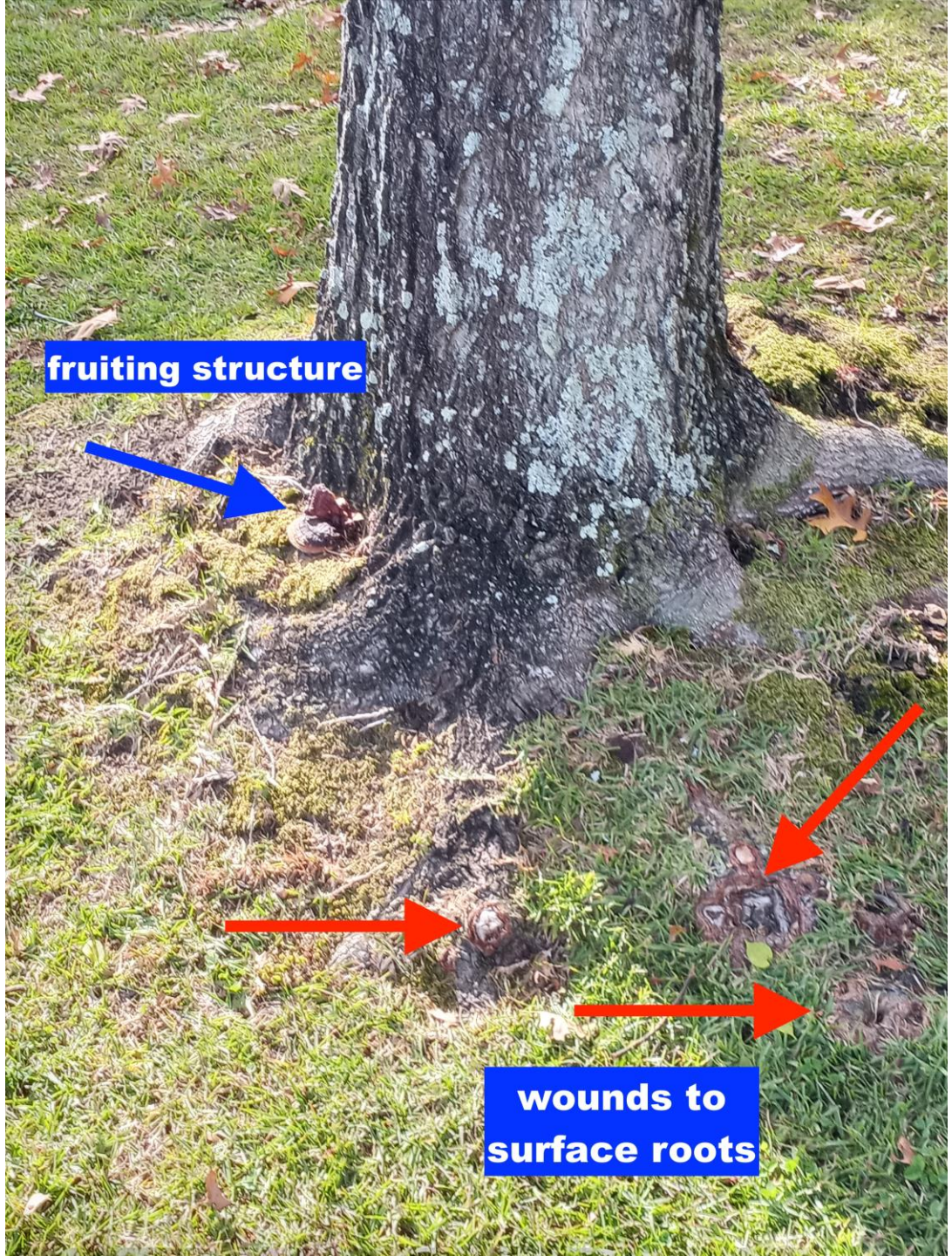
1. Tape left on trunk; 2. & 4. Volcano-mulching, harmful to lower trunks; 3. Trees too close to each other and the road; 5. Codominant trunks

Identified as *Laetiporus cincinnatus*, a wood-decay pathogen, by NC State. Summer 2022, Plantation Drive.

Decay is most common cause of tree failure!

Barb Fair, NCSU

Ganoderma and armillara root rots



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Wounds to surface roots and trunks provide easy access for wood decay pathogens.

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Intersection Anchor Way and Plantation Drive
Ligustrum japonicum
Invasive species in NC
Nandina domestica
Invasive species in NC
STOP

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Not wide enough to support anything other than small to medium trees with fastigiate growth habit. And that's not even considering potential rooting depth issues.

Callicarpa americana

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Ilex vomitoria weeping form

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‘Tokyo Tower’ Chinese fringetree

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Buddleja 'Miss Molly'
Photo by Dennis Werner/NCSU

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As monocots, palms do not require the same rooting space (surface area) as dicot trees.

Windmill palm – more cold-hardy than *Sabal palmetto*

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In Summary:

1. Available rooting space should guide decisions regarding retention or removal of existing trees, as well as selection of new trees

2. Avoid damage to trunks, roots, stems, root plates and critical root zones

3. Scout for disease and structural problems

4. Minimize presence of non-native invasive plant species

5. Contract with a certified arborist for routine inspections

Inspect, Remediate, Document