

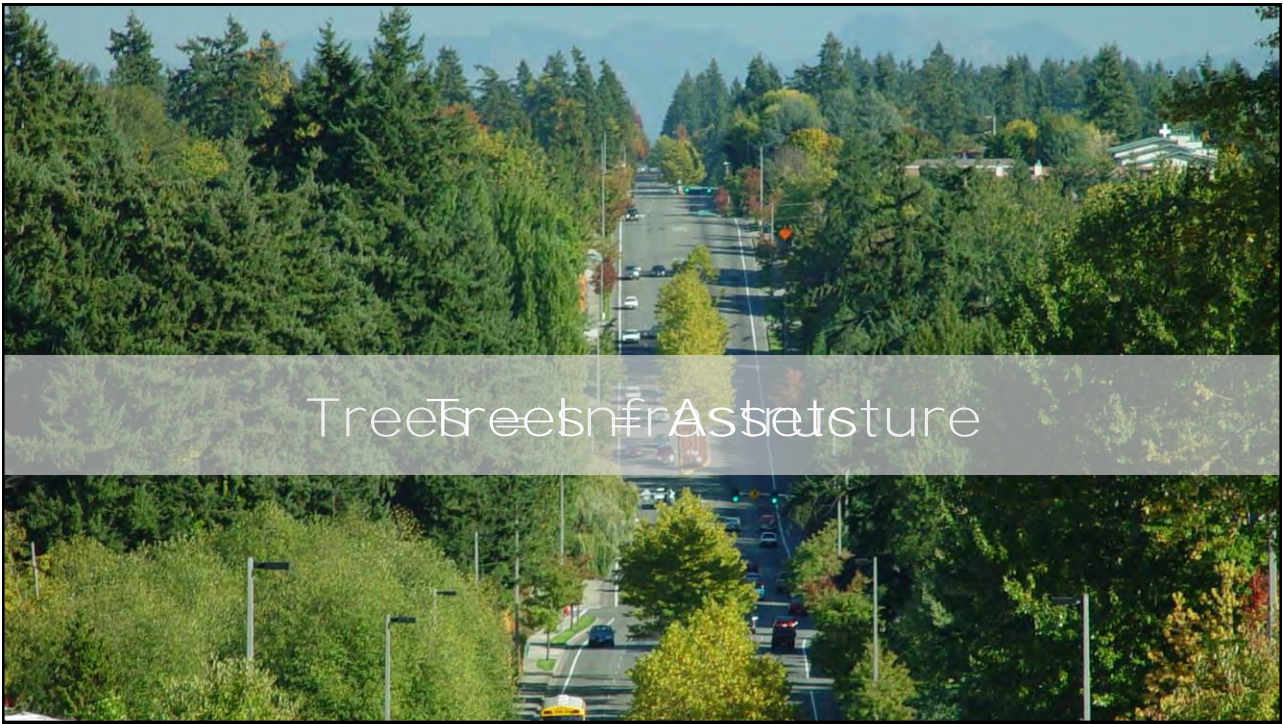
Protecting Trees During Construction



WASHINGTON STATE DEPARTMENT OF
NATURAL RESOURCES
HILARY S. FRANZ | COMMISSIONER OF PUBLIC LANDS
URBAN & COMMUNITY FORESTRY



Why Protect Trees During Development?



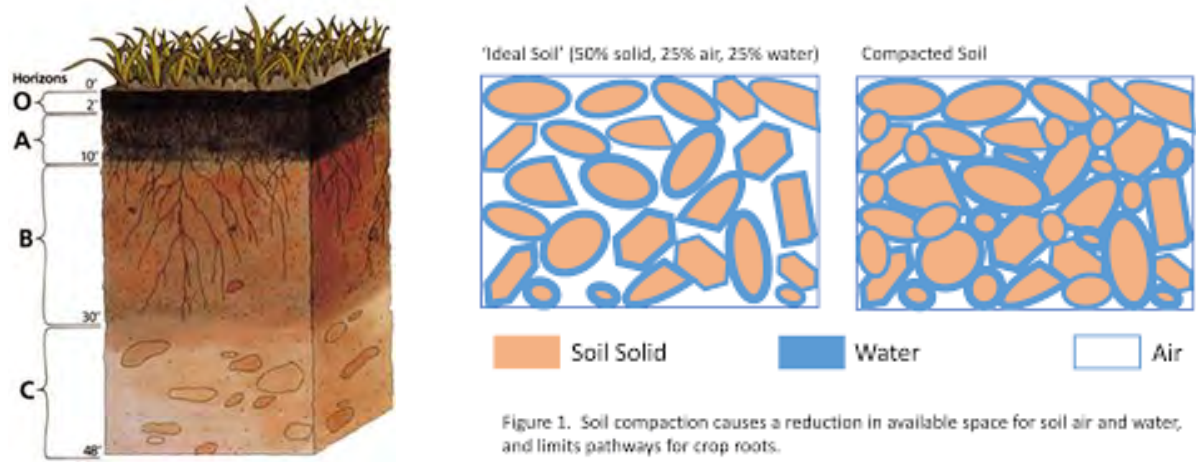


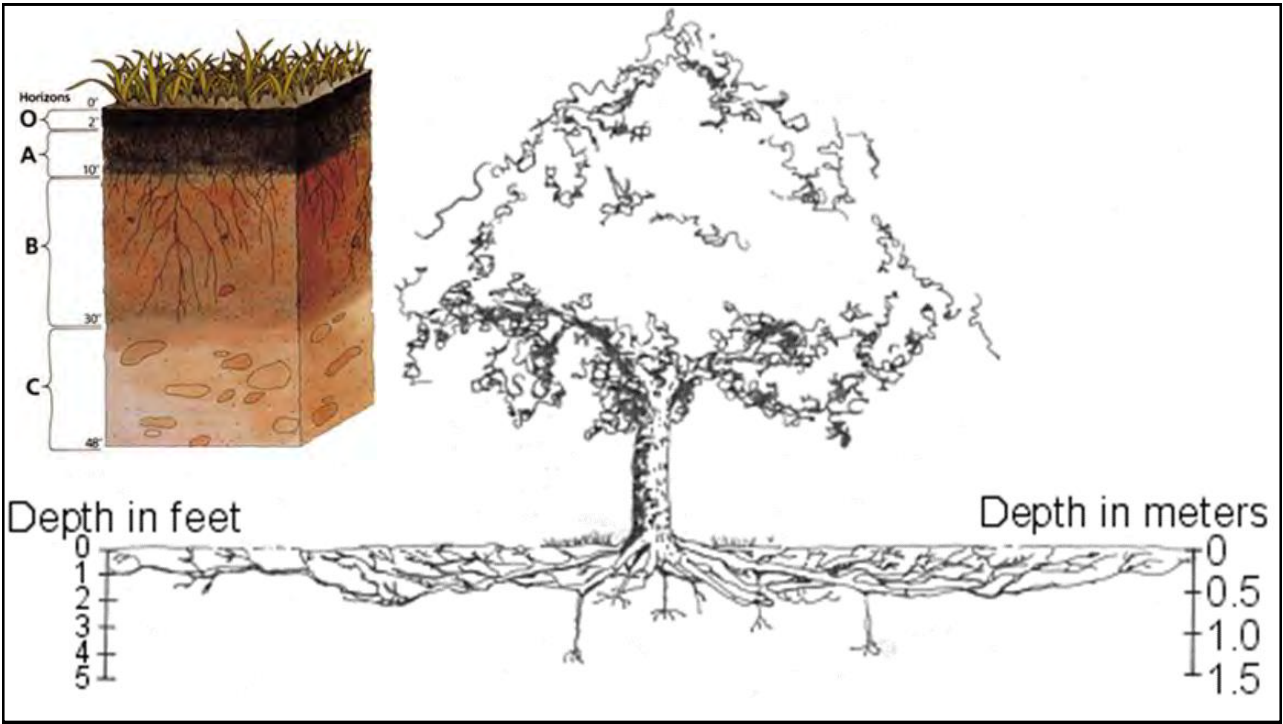
What about native forests and natural areas?





Soil structure





Consider damage to trees in two categories:

Above Ground

- Mechanical damage to trunks and branches
- Improper or unnecessary pruning
- Air pollution from idling equipment
- Alteration of environmental conditions:
 - Sunlight
 - Wind patterns

Below Ground

- Soil compaction
 - crushing or suffocation of roots
- Grade changes; removal of soil
 - Loss of native soil
 - ripping or tearing of roots
- Grade changes; addition of soil
 - root suffocation
 - Alteration of soil type
- Chemicals absorbed by roots
 - Petroleum products
 - Paint and solvents
 - Others?
- Other
 - Loss of soil structure
 - Loss of soil microbiota
 - Loss of organic material
 - Loss of soil nutrition



Impacts to Roots and Soil



Biological

- Reduced Oxygen in soil
- Decline of beneficial soil microorganisms
- Altered hydrology can change water availability
- Root loss =
 - drought stress
 - decrease in nutrient uptake
 - loss of stored energy reserves
- Root injury = increased potential for disease, decay

Structural

- Altered hydrology may result in wet soils with reduced friction between roots and soil particles
- Root loss = reduction in tree anchorage



Post-construction response of trees

- New leaves in following spring may be:
 - Fewer
 - Smaller
 - Yellow/off-color/less vibrant
- New growth may be delayed or stunted
- Flowering may be less abundant
- Sunscalding on leaves or stems (light pattern changes)
- Greater incidence of branch or tree failures (wind pattern changes)
- Dead leaves or branches
- The whole tree dies or fails



Factors to consider

Site Factors

- Exposure
 - Sun
 - Wind
- Grade
- Soil type
- Existing features
- History

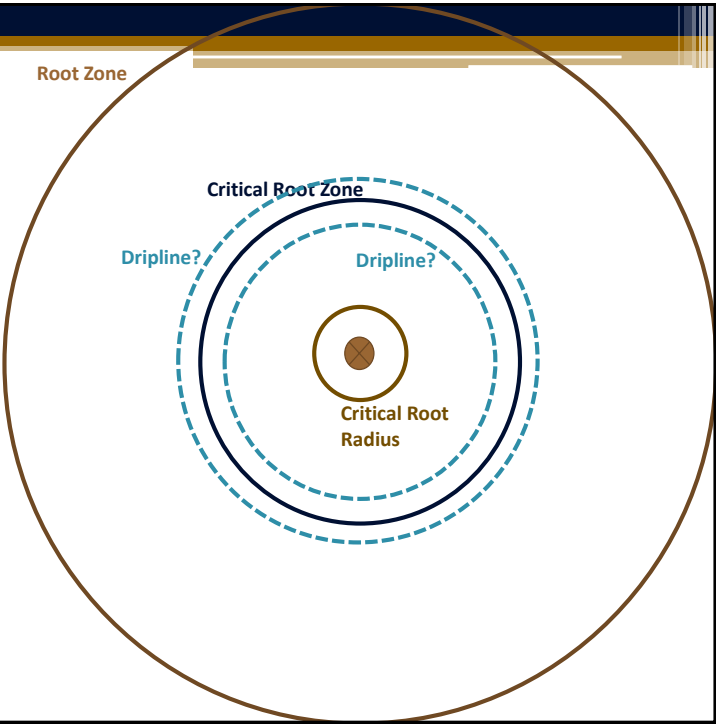
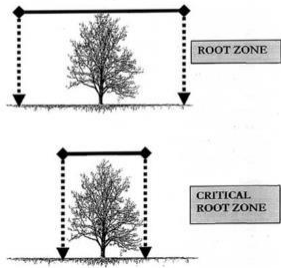
Tree factors

- Species
- Size
- Age
- Location
- Condition
 - Health
 - Leans
 - Growth Habit

Get in the zone...

- Root Zone
- Critical Root Zone (CRZ)
- Critical Root Radius
- Dripline
- Tree Protection Zone (TPZ)
 - Where and how big is the TPZ?

Illustration 2-1: Root zone vs. Critical root zone (CRZ)
From: Urban Forest Management Plan.

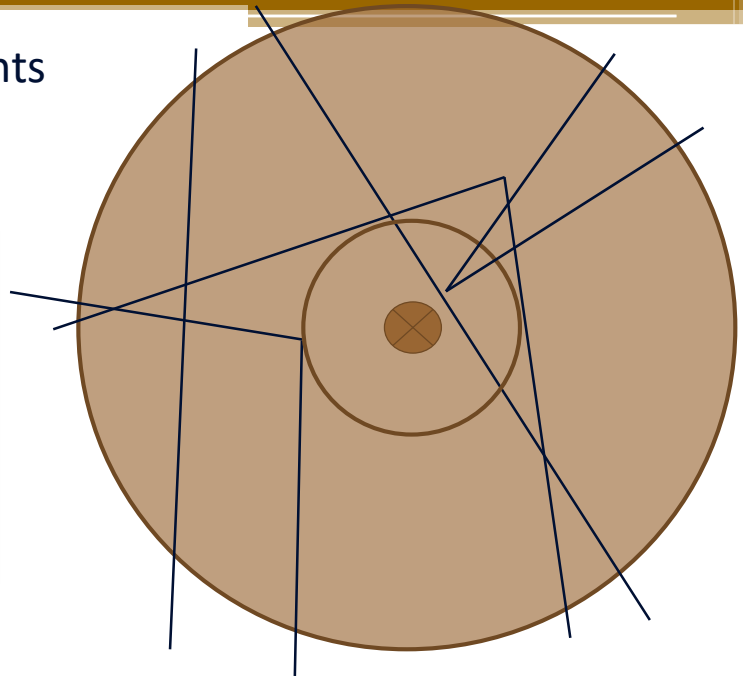


Application of CRZs and TPZs in the field



Infringements on the CRZ:

- Do not remove more than 1/3 of roots within CRZ for healthy trees
- Avoid Critical Root Radius
- Prune roots when CRZ is infringed upon



“A failure to plan is a surefire plan for failure”

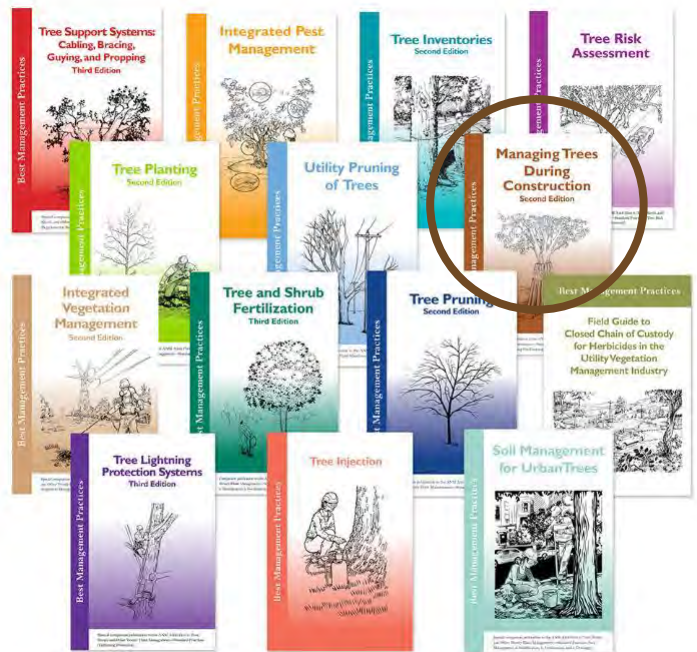
~A wise person

Tree protection measures

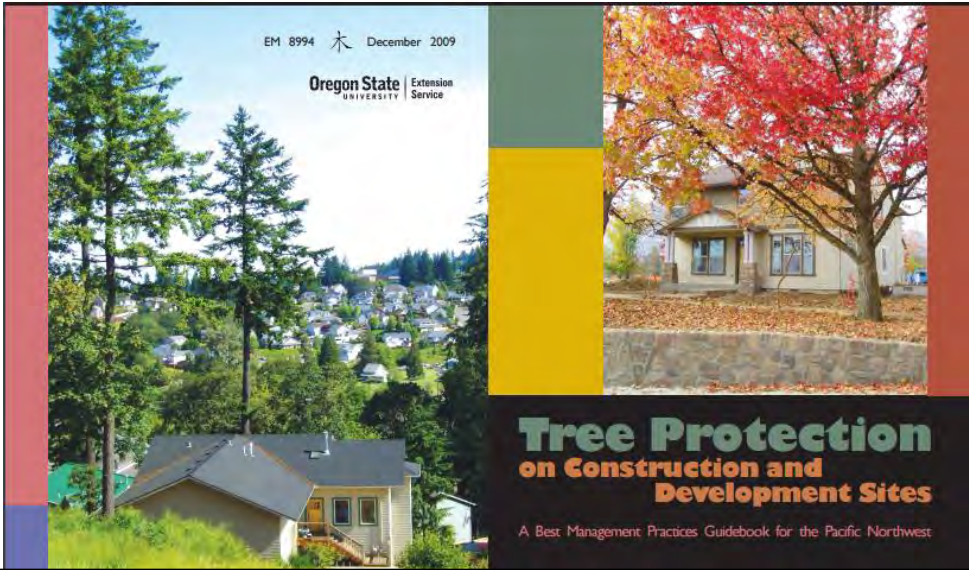
- Municipal Tree requirements
 - Tree protection ordinances
 - Tree protection plans & permits
 - Explicit policies
 - Design standards
- Fencing
- Trunk wrapping
- Mulching/mulch pads
- Tunneling vs. trenching
- Root pruning
- Crown Pruning
- Transplanting
- Handwork
- Temporary irrigation
- Prescriptive fertilization



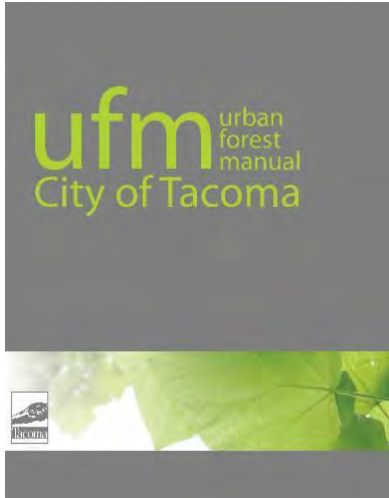
Standards and Best Practices for Tree Care



Tree Protection Guidebook



Adopt Policies, Specifications and Standard Operating Procedures



A tree by any other name...

- Special Tree Designations
 - Heritage/Historic
 - Legacy
 - Landmark
 - Champion
 - Specimen
 - Significant
- Criteria are set by each jurisdiction
 - Age
 - Size
 - Species
 - Character
 - Location
 - Historic significance
- Designations may carry additional protections



Tree protection fencing

Stands vs. Individual Trees



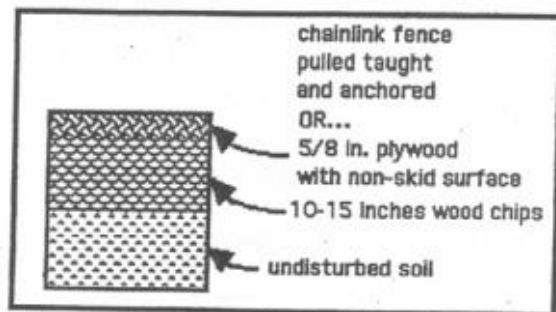
Trunk Wrapping

- Only protects trunk
- Does not protect roots or soils
- Does not create distance with heavy equipment
- Often used for street trees
- A less common technique but has a time and place



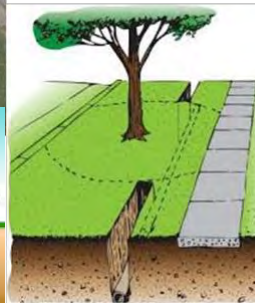
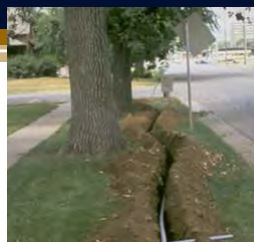
Mulch and mulch pads

- Wood chips can act like a cushion, absorbing and dispersing weight of people and equipment
- Trees removed from this site are often the source of the chips
- Mulch pads are used when space necessary for construction work overlaps with CRZ
- Almost always directly adjacent to tree protection fencing on at least one side
- Mulch pads should be applied and removed by hand
 - Must be removed after construction activities are complete



Tunneling vs trenching & airspading

- Trenching can sever roots
- Tunneling (directional boring) can go under trees
- Airspading can be used to trench, leaving roots in tact
- Airspading can also be used to decompact soils around roots
 - Often used as mitigating treatment for violations of tree protection



Root Pruning

- Process often starts with a ditch witch
 - Ditch witch leaves roots shredded
- After trench is cut:
 - Roots should be pruned by hand
 - Cut roots should be covered back up as quickly as possible



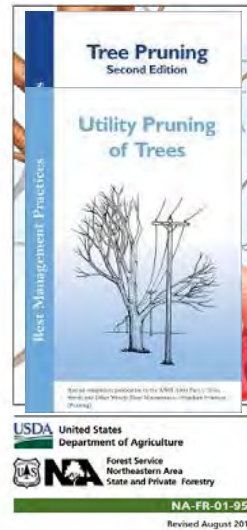
Tree pruning



Tree Pruning

- Understand why you're pruning
- Remove no more than 25% of the foliage
- DON'T TOP TREES!!!
- Enlist the services of an ISA Certified Arborist

HOW to Prune Trees



Tree Topping is Wasteful, Costly and Dangerous

- Costs a lot of money
- Increases risks
- Damages the tree
- Shortens trees' lifespan
- Undercuts tree benefits



DO NOT TOP TREES!!!



Topping hurts trees.

It costs more long-term, it's unsafe and shortens the life of a tree. Proper pruning costs less, reduces storm damage and helps trees live longer. For more information, visit dnr.wa.gov/urbanforestry







PUBLIC SERVICE MESSAGE BROUGHT TO YOU BY WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES, URBAN & COMMUNITY FORESTRY, IN PARTNERSHIP WITH THE U.S. FOREST SERVICE

Transplanting!



NOTE

Width of planting hole is at least 3 times root ball diameter in highly compacted soil; at least 2 times root ball diameter in poorly drained soils. Be sure the root collar is exposed.

2-4" (5-10 cm) layer of mulch over root ball and backfill.



TYPICAL PLANTING SITE
Some sites will require special modifications.

Extend stakes into undisturbed soil.

Set ball on undisturbed soil to prevent settling.

Cut burlap, rope and wire basket away from root ball. Remove entirely if possible.

Keep mulch away from trunk base and root collar.

Root collar and top of root ball should be at grade in well-drained soil; up to 4" (10 cm) above grade in poorly drained soils.

If staking is necessary, use one or two stakes with separate flexible ties. Stakes and ties should remain no longer than one year.

Raised ring of soil to direct water into rootball — especially important if top of root ball is raised above grade.

Use native soil to backfill. No soil amendments are necessary.

Gently pack backfill soil around base of root ball to stabilize; allow rest of backfill to settle naturally, or tamp lightly.

Handwork

Any type of activity done with hand tools rather than large equipment:

- Grading
- Digging post holes
- Removing or installing hardscape
- Landscape planting/installation
- Others?

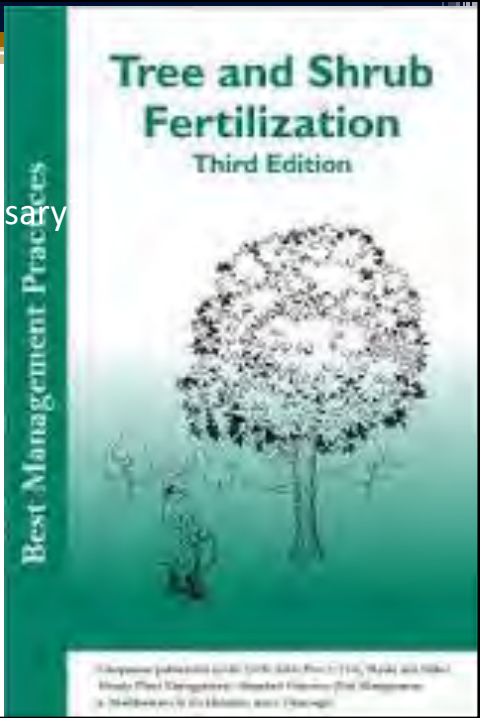


Temporary Irrigation

- Root loss results in drought stress
 - Reduced root mass = reduced water uptake
- Often, water is the best thing you can offer a tree under stress
- Some sites may not have water until well is dug or new water lines connected
- Commercial sites may have water trucks or temporary access to hydrants



Prescriptive fertilization plans



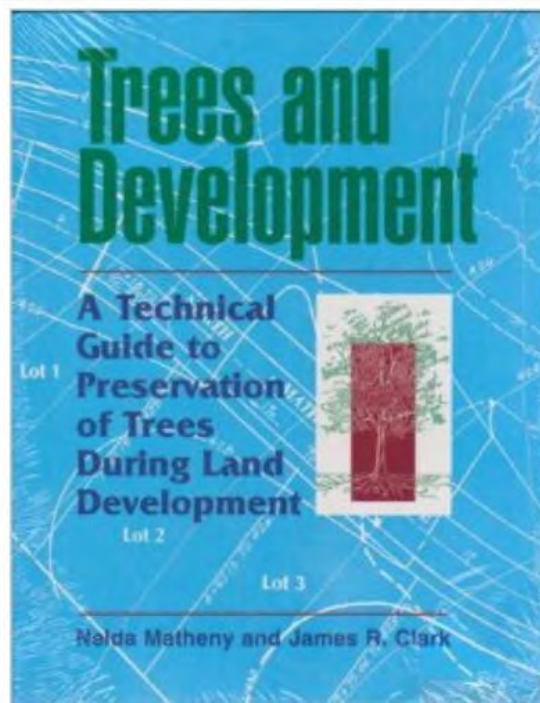
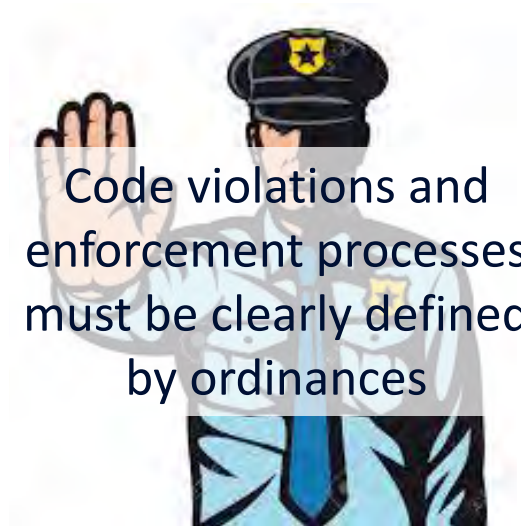
Commercial developments...



Violations of Tree Protection

- Fines
- Stop work orders
- Restoration work
 - Fixing fences
 - Decompacting soils
 - Pruning trees
 - Providing supplemental water
 - Implementing fertilization plan
 - Compost and mulching
 - Removal and replacement
 - Supplemental planting

Code violations and enforcement processes must be clearly defined by ordinances





Questions???

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