PMPD

Construction site protection and restoration standards April 19, 2023

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Why is landscape protection important?

"Cornell's landscapes are its most distinguishing physical feature.

They are essential not only to the image of the Ithaca campus, but also to the university's academic mission and quality of life."

2008 Cornell Master Plan





Tree Campus USA: 2009 - 2023 What have we accomplished in 15 years?

Cornell by the numbers:

- 9,100+ Trees measured and located in GIS
- 4,500 Trees planted
- 9,800 Trees pruned
 - 15 Arbor Day Celebrations
 - 25 Student-designed & installed plantings











What benefits does this Hickory provide?

- intercepts 6,300 gallons of runoff per year
- absorbs pollutants through its leaves
- intercepts dust and smoke
- releases oxygen
- reduces atmospheric carbon by 695 pounds And that's just one mature tree...





FACILITIES

Three easy ways to kill a tree in five years or less:

- Soil Compaction in the Critical Root Zone
- Cutting the Roots
- Backfilling over the Roots

Results of poor protection



Tree/Landscape Preservation Concepts

- Requires planning for all construction components & phases.
- Tree protection is soil and root protection.
- Properly identify tree protection zone and maintain tree protection fencing.
- Respect the critical root zone and no cut zone.
- Plan for site restoration, including soil.



What should we be protecting?







Where are the majority of the roots?



No Cut Zone

- Typically within 6' 10' of a mature (24" dbh) tree
- Cutting within this radius can destabilize the tree

Critical Root Zone

- Radius = 1.5' x DBH of tree or 5' beyond the dripline
- No vehicles, equipment, stockpiling or grading



Critical Root Zone (CRZ)

- 50% of the root system is in the top one foot of soil and over 90% is in the top three feet.
- Construction equipment with large tires or tracks tends to go deep within the soil, 12-20 inches, whereas compaction associated with pedestrian traffic is often restricted to the surface 3 to 6 inches. Both types of compaction are harmful to tree roots.
- A single pass by a cement or dump truck can sever or crush roots.
- Wet soils will compact to a greater degree than dry soils.
- Smothered roots have their oxygen supply cut off. The most common method of smothering roots is changing the grade. This also cuts off water supply too. For some tree species, like red oak, only a few inches of fill is enough to do serious damage. Roots can be smothered by 'temporary' piles of soil placed inside the tree's dripline or by pools of water impounded by construction activities.
- Soil compaction should be considered permanent. Recovery for significant compaction is at least two human generations. Soils do not 'come back' from compaction.

From: Construction damage causes and remedies – Minnesota Dept. of Natural Resources.

Soil Compaction Impacts on Tree Roots – Dr. Kim Coder, University of Georgia

Protection detail g LB.11 DOC PRNT SIZE: 11x17 EXISTING TREE TREE DRIP LINE ROOT ZON - UBE 10 PENNY NAILS 4.0 2"x8" (LENGTH VARIES) - CRITICAL ROOT ZONE: DRAMETER OF TRUNK IN INCHES MULTIPLIED BY 1.6 FEET OR MAILBOX POST ANCHOR (TYP.) --4"#" STAKES FXF STAKES COU POST SIGN, B 1/2%11", "VEGETATION AND SOL PROTECTION ZONE, NO VEHICLES, NO STORAGE - BOTTOM RAIL OPTIONAL NOTES: 1.9 CONTACT DIG SAFELY NEW YORK (DIAL 811) PRIOR TO INSTALLING PROTECTIVE REE DRUP LINE 2.0 PROTECTION ZONE FENCING SHALL BE ERECTED AT THE EDGE OF THE CRITICA PRIDE TO THE START OF ANY CONSTRUCTION ACTIVITY. 3.0 THE PROTECTED CRITICAL ROOT ZONE OF EACH TREE SHALL EXTEND FROM THE THE DAMETER OF TRUNK IN INCHES (MEASURED AT 4.5 ABOVE GROUND) MULT DRP UNE, WHICHEVER IN GREATER. 4.9 WOOD FENCE SHALL BE MINIMUM 4 HIGH ON ALL SIDES. 6.0 FENCE SHALL BE SUPPORTED BY VERTICAL POSTS WITH MANUFACTURED MAI 8.0 NO VEHICULAR TRAFFIC, STOCKPILING OF MATERIALS OR STORAGE OF EQUIP WITHIN THE FENCING. FENCING SHALL NOT BE MOVED OR REMOVED UNLESS / CRITICA COT ZON 7.0 FENCING SIGNAGE AS DETAILED MUST BE POSTED IN A VISUALLY PROMINENT MULTIPLE TREES OR SHRUBS 8.0 MULTIPLE TREE FENCE LAYOUT PREFERRED OVER FENCING EACH TREE INDA PROTECTIVE WOOD CONSTRUCTION FENCING FOR TREES, SHRUBS, NO SCALE

What Goes on a Tree Preservation Plan

- Trees labeled and CRZs noted
- Trees to be removed labeled
- Tree protection fence
- Access routes
- Mulched areas for access inside the CRZs of trees
- Areas for boring or air spading within CRZs
- Storage areas, parking areas
- Tree protection notes
- Details

Anticipate construction methods





Protecting Tree Roots From ConstructionDamage



Poor or no root protection

Protecting Tree Roots From ConstructionDamage





Poor or no root protection

Good root protection

Mitigating Work Inside a CRZ

• Work has to be done inside at least some of the trees' CRZs



Boring (HDD Horizontal Directional Drilling)





Directional Drilling tunnels cleanly under obstacles

Cross Hatch View



Use of Air Spade





Soils, importance of getting them right!



Proper planting





Take aways

- Restoration plan in place prior to project start, staging areas identified
- Site protection in place prior to mobilization and maintained throughout project – protect critical root zone from compaction
- Methods for construction within critical root zone identified
- Soils specified located, tested, approved, secured and procured
- Proper planting techniques followed landscape contractors with proper experience