Early Piety
CERTIFIED ARBORIST

SPECIALTY TREE SURGEONS
TREE PRESERVATION CONSULTANTS

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INTERNATIONAL SOCIETY OF ARBORCULTURE

I have rewritten and revised the Tree Protection Outline for Builders and Developers to make it more focused on Architects, Engineers and Site Developers, mainly because that is actually where tree preservation can be best accomplished.

Proper planning for tree preservation is the only way to prevent tree abuse during construction. You can use this outline to help plan your project so it is as tree compatible as possible, but I would prefer if you called me for an appointment to go over the plans and visit the job site to give you the best possible ideas for tree preservation.

You can e-mail me at treesrus@att.net or visit my web site if you would like at www.specialtytree.info

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#SO-0584A

OTHER THOUGHTS ON TREE PRESERVATION DURING CONSTRUCTION

Barricade Fencing

Tree protection barricades should not be placed around the trees. Instead, the barricades should be placed around the building, creating a work zone without the trees in it. Plans must be made to leave adequate room for storing and staging of materials as well as work space to complete the project. If the barricades are placed around the trees it leaves too much opportunity to abuse the root zones of the trees by parking and storing of materials in areas that are not necessary.

Landscape

The final step in tree preservation is the landscape package. Beds as big as practical should be designed under all the trees. This is to simulate the natural forest floor. All trees want to live in the forest, not in the urban environment. Less grass and more mulch is as close to the natural forest floor as we can replicate. Also, the smaller the grassed area, the fewer places that turf chemicals can be applied. Weed control products and insect control products can be harmful to trees when applied year after year. Also root compaction due to foot traffic during mowing and other turf management practices are detrimental to trees over the long run. Pine straw is the best mulch to use as it decomposes well and also lowers the PH. Pine nuggets are the second best mulch. All other mulches are not as helpful to the trees and do not decompose as well.

Irrigation

No irrigation lines inside the drip line of the tree. This is not to say the area under the tree should not have irrigation, it means that the irrigation should be applied from a different direction. All irrigation lines should be at the drip line of the tree and spray inward to apply water in the desired areas. This is to prevent any trenching inside the drip line. All the previous plans are moot if at the final stage of the project someone comes along with a ditch witch and installs irrigation lines in the root system that we have tried so laboriously to save. Also no sprinkler should hit directly on the trunk of the tree. This will cause very adverse effects. All trees were designed to be wet when it is raining. They are not designed to be wet at any other time. If a sprinkler is allowed to spray on the trunk of the tree on a regular basis it will trigger a fungal growth that will kill the tree over time. Plans should be made to apply water inside the drip line of the tree to support any plants but NEVER hitting the trunk of the tree.

Design Ideas for Better Tree Compatibility
For Architects, Engineers and Site Developers

There are six areas that must be addressed when planning a project to insure Maximum Tree Compatibility. These must be discussed at length during the planning phase to insure all ideas and plans are thoroughly understood so as to be conveyed to the site contractor and all sub- contractors.

Land Clearing

Land clearing is a very essential part of tree preservation during construction.
No "Grubbing" of organics in selected areas.
Plans must be made to do as little root damage as possible during this process.

Elevation

What is the finished elevation of the project in relation to the current elevation?
This must be discussed at great length so as to do as little root destruction as possible.
This will also include the fill, if any.

Drainage

Where are the ditches to be dug for the pipes?
These must be located so as to place them in the most compatible part of the root zone to stay as far away from the base of the tree as possible.

Water

The incoming water pipes must be routed away from the trees.

Electrical

The incoming electric must be placed in the most compatible part of the property to minimize tree root damage.

Footer Design

Pier footers and/or bridge footers should be considered within the drip line of the tree.

Avoiding Tree Damage During Construction

As cities and suburbs expand, wooded lands are being developed into commercial and residential sites. Homes are constructed in the midst of trees to take advantage of the aesthetic and environmental value of the wooded lots. Wooded properties can be worth as much as 20% more than those without trees, and people value the opportunity to live among trees.

Unfortunately, the processes involved with construction can be deadly to the nearby trees. Further, unless the damage is extreme, the trees may not die immediately but could decline over several years. With this delay in symptom development, you may not associate the loss of the tree with the construction.

It is possible to preserve trees on building sites if the right measures are taken. The most important step is to hire a professional arborist during the planning stage. An arborist can help you decide which trees can be saved, and can work with the builder to protect the trees throughout each construction phase.

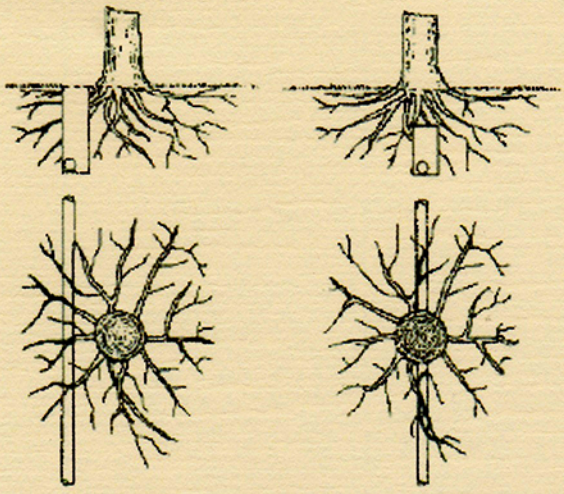
How Trees Are Damaged During Construction

Physical injury to the trunk and crown
Construction equipment can injure the above-ground portion of a tree by breaking branches, tearing the bark, and wounding the trunk. These injuries are permanent, and if extensive, can be fatal.

Cutting of roots
The digging and trenching that are necessary to construct a house and install underground utilities will likely sever a portion of the roots of many trees in the area. It is easy to appreciate the potential for damage if you understand where roots grow. The roots of a mature tree extend far from the trunk of the tree. In fact, roots typically will be found growing a distance of 1-3 times the height of the tree. The amount of damage a tree can suffer from root loss depends, in part, upon how close to the tree the cut is made. Severing one major root can cause the loss of 5-20% of the root system.

The roots of a tree will extend far from the trunk and will be found mostly in the upper 6 to 10 inches of the soil.

Another problem that may result from root loss due to digging and trenching is that the potential for the trees to fall over is increased. The roots play a critical role in anchoring a tree. If the major support roots are cut on one side of a tree, the tree may fall or blow over.



Less damage is done to tree roots if utilities are tunneled under a tree rather than across the roots.

Soil compaction
An ideal soil for root growth and development is about 50% pore space. These pores, the spaces between soil particles, are filled with water and air. The heavy equipment used in construction compacts the soil and can dramatically reduce the amount of pore space. This not only inhibits root growth and penetration but also decreases oxygen in the soil that is essential to the growth and function of the roots.

Smothering roots by adding soil
Most people are surprised to learn that 90% of the fine roots that absorb water and minerals are in the upper 6-12 inches of soil. Roots require space, air, and water. Roots will grow best where these requirements are met, which is usually very near the soil surface. Piling soil over the root system or increasing the grade will smother the roots. It only takes a few inches of added soil to kill a sensitive mature tree.

Exposure to the elements
Trees in a forest situation grow as a community, protecting each other from the elements. The trees grow tall with long, straight trunks and high canopies. Removal of neighboring trees or opening the shared canopies of trees will expose the remaining trees to sunlight and wind. The higher levels of sunlight may cause sunscald on the trunks and branches. Also, the remaining trees will be more prone to breaking from wind or ice loading.

Getting Advice

Hire a professional arborist in the early planning stage. Many of the trees on your property may be saved if the proper steps are taken. Allow the arborist to meet with you and your building contractor. Your arborist can assess the trees on your property, determine which are healthy and structurally sound, and suggest measures to preserve and protect them.

One of the first decisions is determining which trees are to be preserved, and which should be removed. You must consider the species, size and maturity, location, and the condition of each tree. The largest, most mature trees are not always the best choices to preserve. Younger, more vigorous trees can usually survive and adapt to the stresses of construction better. Try to maintain diversity of species and ages. Your arborist can advise you about which trees are more sensitive to compaction, grade changes, and root damage.

Planning

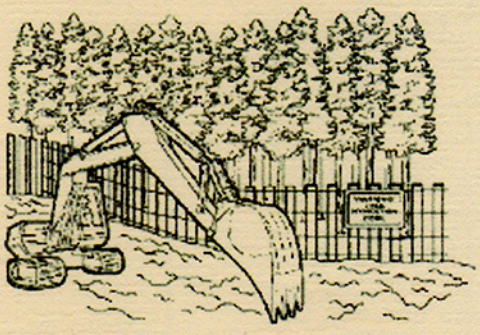
Your arborist and builder should work together in planning the construction. The builder may need to be educated regarding the value of the trees on your property and the importance of saving them. Few builders are aware of the way trees' roots grow and what is needed to protect them.

Sometimes small changes in the placement or design of your house can make a great difference in whether a critical tree will survive. An alternative plan may be more friendly to the root system. For example, bridging over the roots may substitute for a conventional walkway. Or, instead of trenching beside a tree for utility installation, tunneling under the root system is much less damaging.

Erecting Barriers

Because our ability to repair construction damage to trees is limited, it is vital that the trees be protected from injury. The single most important action you can take is to set up construction fences around all of the trees that are to remain. The fences should be placed as far out from the trunks of the trees as possible. As a general guideline, allow one foot of space from the trunk for each inch of trunk diameter. The intent is not merely to protect the above-ground portions of the trees but also the root systems. Remember that the root systems extend much farther than the driplines of the trees.

Instruct the construction personnel to keep the fenced area clear of building materials, waste, and excess soil. No digging, trenching, or other soil disturbance should be allowed in the fenced area.



Protective fences should be erected as far out from the trunks as possible in order to protect the root system.

Limiting Access

If at all possible, it is best to allow only one access route on and off the property. All contractors must be instructed where they are permitted to drive and park their vehicles. Often this same access drive will later serve as the route for utility wires, water lines, or the driveway.

Specify storage areas for equipment, soil, and construction materials. Limit areas for burning (if permitted), cement wash-out pits, and construction work zones. These areas should be away from protected trees.

Specifications

Get it in writing. All of the measures intended to protect your trees must be written into the

construction specifications. The written specifications should detail exactly what can and cannot be done to and around the trees. Each sub-contractor has to be made aware of the barriers, limitations, and specified work zones. It is a good idea to post signs as a reminder.

Fines and penalties for violations should be built into the specifications. Not too surprisingly, sub-contractors are much more likely to adhere to the tree preservation clauses if their profit is at stake. The severity of the fines should be proportional to the potential damage to the trees, and should increase for multiple infractions.

Maintaining Good Communications

It is important to work together as a team. You may share clear objectives with your arborist and your builder, but one sub-contractor can destroy your prudent efforts. Construction damage to trees is often irreversible.

Visit the site at least once a day if possible. Your vigilance will pay off as workers learn to take your wishes seriously. Take photos at every stage of construction. If any infraction of the specifications does occur, it will be important to prove liability.

Final Stages

It is not unusual to go to great lengths to preserve trees during construction, only to have them injured during landscaping. Installing irrigation systems and rototilling planting beds are two ways the root systems of trees can be damaged. Remember also that small increases in grade, as little as 2-6 inches, which place additional soil over the roots can be devastating to your trees. Careful planning and communicating with landscape designers and contractors is just as important as avoiding tree damage during construction.

Post-Construction Tree Maintenance

Your trees will require several years to adjust to the injury and environmental changes that occur during construction. Stressed trees are more prone to health problems such as disease and insect infestations. Talk to your arborist about continued maintenance for your trees. Continue to monitor your trees, and have them periodically evaluated for declining health or safety hazards.

Despite the best intentions and most stringent tree preservation measures, your trees may still be injured from the construction process. There are remedial treatments that your arborist can suggest to help reduce stress and improve the growing conditions around your trees.