

City of High Point Guidelines and Standard Practices for Trees



Approved January 2006 and
Updated June 2006
by Urban Forestry Committee

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City of High Point Guidelines and Standard Practices for Trees

A. Purpose and Application

1. Authority to Develop Tree Guidelines and Standard Practices

As stated in Section 9-9-7(d) of the City of High Point's Development Ordinance, the City's Urban Forestry Committee has the responsibility to "Develop, adopt and maintain standards and practices for the conservation and maintenance of trees on city owned or controlled property."

2. Benefits of Properly Planted and Maintained Trees

The consistent use of these Guidelines and Standard Practices provides many potential benefits to the High Point community, including:

- ✓ Improvement in local air quality through the removal of carbon dioxide and airborne pollutants, while increasing the supply of oxygen
- ✓ Lower residential and commercial energy costs via additional shade in summer and wind breaks in winter
- ✓ Reduction in the volume and speed of stormwater, reducing soil erosion and lowering potential costs related to stormwater infrastructure
- ✓ Enhancement of the community's overall visual appearance
- ✓ Provision of habitats for wildlife within urban and suburban areas
- ✓ Reduction or elimination of future conflicts between trees and public infrastructure
- ✓ Reduction of potential liabilities from damage caused by improperly planted or poorly maintained trees
- ✓ Enhancement of the city's overall tree canopy so it will not be significantly impaired by any individual instance of disease, infestation or severe weather
- ✓ Enhancement of recreational and educational opportunities within the urban environment
- ✓ Improvement of water quality through filtering of runoff into streams and lakes and by maintaining relatively stable water temperatures
- ✓ Enhancement to public and private property values, encouraging additional private investment
- ✓ Reductions in glare and provision of visual buffers between various land uses
- ✓ Reductions in the harmful effects of wind
- ✓ Support towards the further establishment of a unique community identity

3. Costs for Improperly Planted or Maintained Trees

Without the consistent use of these Guidelines and Standard Practices the High Point community could encounter a variety of tree related problems, including:

- x Conflicts between trees and public infrastructure leading to higher maintenance costs and/or the premature removal or replacement of infrastructure
- x Premature tree death due to improper planting or maintenance practices
- x Increased liability from damage to public and/or private property from trees or tree limbs
- x Reduced air quality, particularly in heavily urbanized areas or areas with high levels of vehicular traffic

- x The need to replace large numbers of particular tree species at one time due to age or general condition
- x Potential reduction in property values due to the absence of mature trees
- x Increased stormwater infrastructure needs and costs
- x Lack of urban forest diversity leading to citywide susceptibility from any individual instance of storm damage, disease or infestations
- x Diminished community appearance that could discourage additional private investment

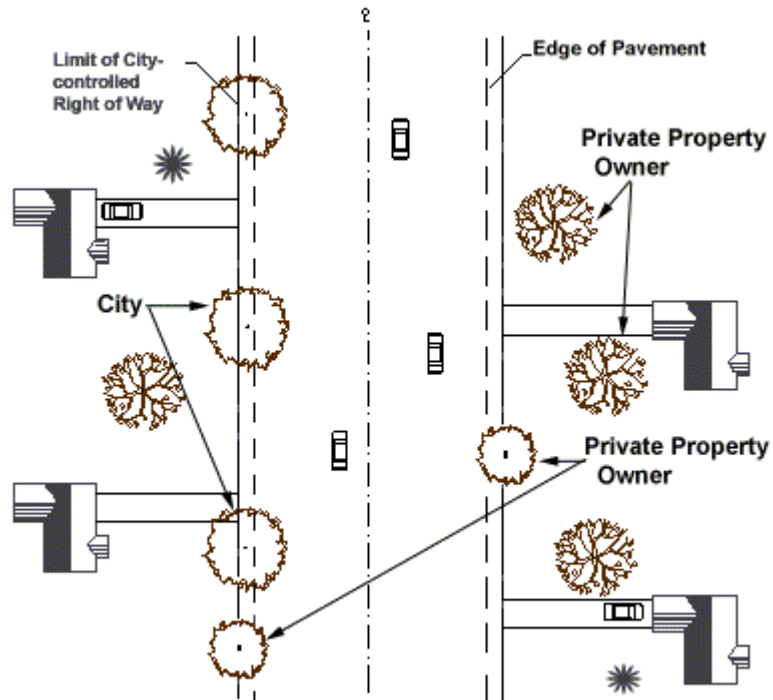
4. Application of Guidelines and Standard Practices

As outlined in Section 9-7-31(a) of the City's Development Ordinance, these Guidelines and Standard Practices shall apply to the planting, maintenance or removal of trees located on city owned or controlled property, which is property owned or leased by the City of High Point or property that the city controls through public rights-of-way and easements for public purposes such as streets, the construction and maintenance of public utilities, the provision of pedestrian access across private land, the development and maintenance of greenways and open space, or the protection of water quality. Private property owners are encouraged to use these Guidelines and Standard Practices whenever possible to ensure the health of trees on their property, thereby enhancing the city's overall tree canopy.

Private property owners are responsible for the maintenance or removal of any tree located partially or entirely outside of any city owned or controlled space. However, the city may address any branch(es) that extend(s) over any city owned or controlled space when it interferes with public infrastructure or is a threat to public safety. Appropriate maintenance for branches over city owned or controlled spaces may require entry onto private space. If such entry is necessary, the city shall contact the appropriate private property owner(s) via mail to notify the person(s) of the need for the required maintenance. If a tree located on private property can be demonstrated to be a direct threat to the public or publicly maintained facilities, as discussed in Section F, Item 3, the city shall contact the private property owner to request that the situation be addressed and inform the owner of their liability for any future damage to infrastructure or the public if the situation is not addressed.

Illustration A-1 below demonstrates when a tree is the responsibility of the City and when it is the responsibility of the private property owner.

(Illustration A-1: Tree Responsibilities - City or Private Property Owner?)



Notes: All of tree within city controlled spaces – City's responsibility

None or only part of tree within city controlled space – Private responsibility

Source: Original image from Street Trees, Overhead Utility Distribution, and Physical Infrastructure: Design Implications, Maintenance Costs and Proposed Alternatives (David V. Bloniarz, Northeast Center for Urban & Community Forestry), www.umass.edu, and adapted to reflect High Point standards.

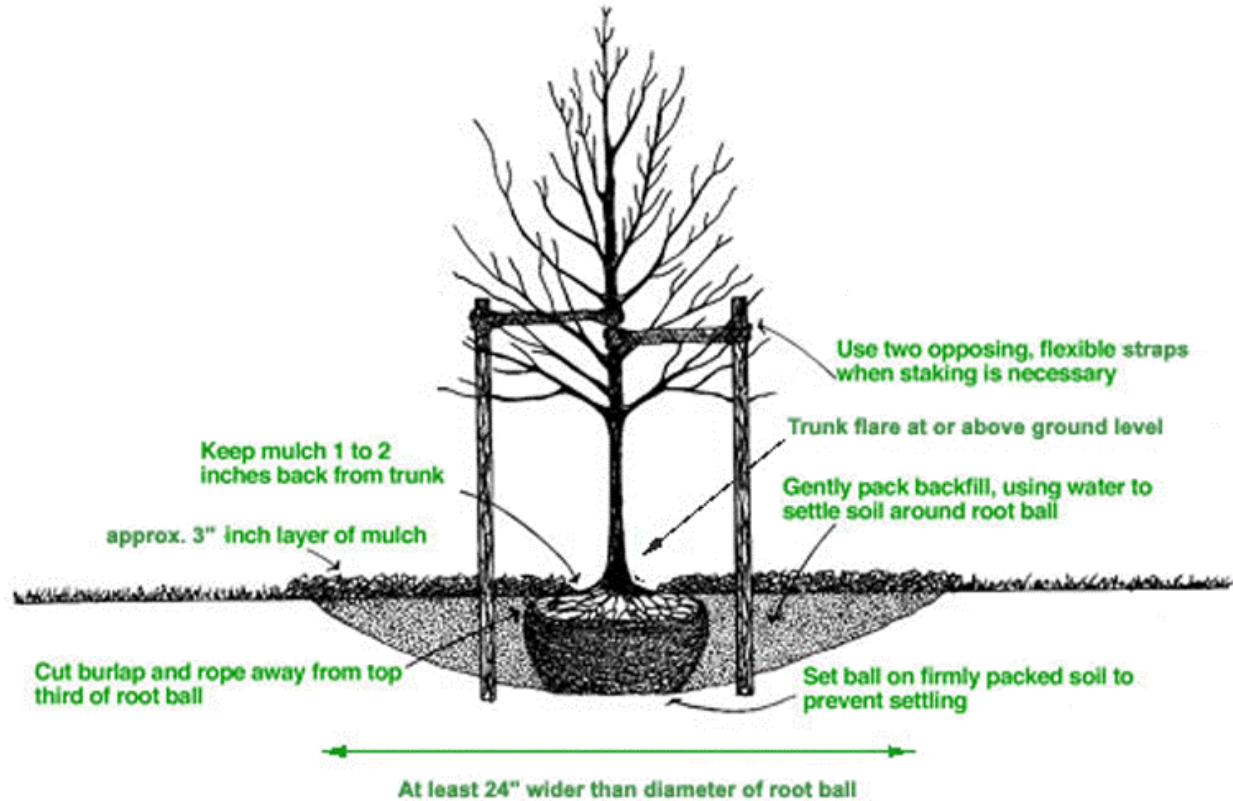
B. Tree Planting

1. Planting Trees (General)

Trees should meet the quality for typical nursery stock (as determined by standards of the American Nursery and Landscaping Association) and be at least 1.5” in caliper for understory trees or at least 2.5” in caliper for canopy trees. Select trees based on their ability to flourish in the particular location for planting, with preference given to native tree species if appropriate. The most appropriate time of year to plant a tree may vary somewhat by tree species, but generally trees should be planted in either the fall or spring to allow time for root development prior to the coming of harsher environmental conditions. The planting of a variety of tree species throughout the city is strongly encouraged so the city’s overall tree canopy is not susceptible to any single incidence of damage from various environmental factors. Trees should be selected using the Tree Index. If the desired tree is not listed in the Index, or is not listed as being appropriate for a certain situation, the Urban Forestry Committee will make the determination on the suitability of the tree.

As shown in Illustration B-1, when planting the tree, dig a hole having a diameter at least 24” wider than the diameter of the tree’s root ball. The hole should be relatively shallow in depth, allowing the base of the tree’s trunk to be slightly above the surface of the ground. Cut and remove any type of wrapping around the tree that is not biodegradable and cut any matted or circling roots. Backfill the hole with the original soil, pressing down and watering the replaced soil when halfway through and again when the hole is filled in completely in order to eliminate air pockets. Do not mix in nitrogen fertilizers when filling the hole, although the optional use of phosphorous fertilizers is acceptable. Place a layer of mulch, approximately 3 inches in height, around the entire base of the tree, but at least 1-2 inches away from the base of the tree trunk as this can promote trunk rot and improper root growth. Mulching materials can include hardwood bark, pine bark, and pine needles. Removal of any dead or diseased limbs or leaves at the time of planting is appropriate, but no additional pruning is recommended until at least one year after the tree is planted. Do not use stakes for a new tree unless it is unable to stand upright on its own following planting. If stakes are necessary, use ¾” nylon straps or tree brace straps that are then removed after one year. Water the newly planted tree at least once every two weeks, making sure to water enough so there is adequate water below the surface of the ground to encourage proper root growth. A watering cycle may be skipped if adequate rain falls during the two week cycle.

(Illustration B-1: Proper Tree Planting)



Source: TreesAreGood.com,
International Society of Arboriculture consumer tree care website, 1998, 2004 updated July 2005,
(www.treesaregood.com), adapted to reflect High Point standards

2. Planting Trees Around Above Ground Power Lines

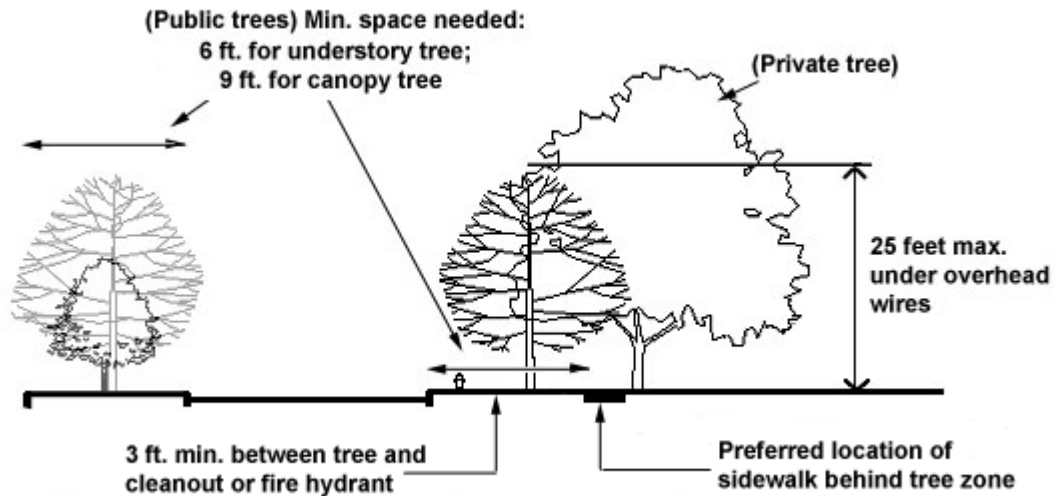
Any tree planted under or within 10 feet of existing above ground power lines shall have a mature height no greater than 25 feet. Trees with columnar or narrower tree canopy widths may be useful to prevent conflicts in these situations. The spacing of trees relative to above ground power lines and poles shall be reviewed and approved by the Urban Forestry Committee to eliminate any potential conflicts. No tree, as measured at maturity, shall be planted within 6 feet of the point of access for ground level electric utility boxes. Consult the Tree Index for information on the most suitable trees for this situation.

3. Planting Trees Along Roadways

As shown in Illustration B-2, the minimum diameter of space needed for understory trees is 6 feet and the minimum diameter of space for canopy trees is 9 feet, with the tree planted in the center of this space. This allows the tree to grow in a healthy manner while limiting any potentially negative impacts on adjacent public infrastructure. Trees with limited mature widths may be appropriate to address concerns of safe passage and adequate visibility. The preferred location for trees along city controlled street rights-of way typically falls between the edge of the street curb and the sidewalk. This is based on providing separation for pedestrians and vehicles to enhance safety, overall roadway appearance, and potential reduction in conflicts with adjacent

infrastructure. However, trees located anywhere within the street right-of-way and associated public easements are beneficial and are encouraged wherever adequate space exists. Plant trees at least three feet from any fire hydrant and any water meter or sewer cleanout. Consult the Tree Index for information on the most suitable trees for this situation.

(Illustration B-2: Planting Trees Along Roadways and Medians)



Source: Original image from Street Trees, Overhead Utility Distribution, and Physical Infrastructure: Design Implications, Maintenance Costs and Proposed Alternatives (David V. Bloniarz, Northeast Center for Urban & Community Forestry) and adapted to reflect High Point standards.

4. Planting Trees in Roadway Medians

Trees planted in roadway medians have the same space needs as those planted along roadways, with at least 6 feet of space provided for understory trees and 9 feet of space for canopy trees. Medians need soil to at least the depth of the root ball comprised of material to encourage root growth and overall tree development. Soil that does not drain well or contains construction debris shall be removed and replaced with appropriate fill materials. Median design needs to ensure water is collected to support trees without creating conditions encouraging standing water around the tree trunks. Consult the Tree Index for information on the most suitable trees for this situation.

5. Planting Trees Adjacent to Sidewalks

It is best for trees planted near sidewalks to typically be those with deeper growing root systems and tolerant of limited root damage that may occur during sidewalk construction or maintenance. The minimum diameter of space needed for understory and canopy trees (as mentioned in Section B, Item 3) should help minimize potential conflicts with sidewalks. In cases where the sidewalk is greater than the city’s standard 5 foot width, such as in the downtown area, a planting area of at least 4’ x 4’ for understory trees and 6’ x 6’ for canopy trees is to be used to provide room for tree growth while limiting sidewalk damage. Sidewalk grates that allow the passage of water and air, while accommodating pedestrian traffic and safety, may be used to protect the tree’s eventual growth area. It is recommended that such grates be divided into sections that can

be easily removed as the tree matures and expands. Consult the Tree Index for information on the most suitable trees for this situation.

6. Planting Trees Around Below Ground Utilities

Avoid trees with aggressive root systems that could easily damage below ground utilities if planting within three feet of below ground utilities. Tree plantings in close proximity to below ground utilities must be reviewed and approved by the Urban Forestry Committee.

7. Planting Trees for Screens or Buffers

Select low branching species to provide visual screening of property and buildings or to create a physical buffer separating adjacent property or buildings. Plant a variety of tree species with varied mature heights suitable to existing topography, soils and vegetation. Trees with dense, evergreen foliage are useful when year-round screening is needed. Conservation of existing understory trees and shrubs is encouraged as they help create a more effective vegetative screen, with new trees planted in a staggered pattern, instead of a single row, where possible given the available planting space. Information on the most suitable trees for vegetative buffers or screens is available in Section 9-5-11(b) (Planting Areas) of the Development Ordinance and the Tree Index.

8. Planting Trees in and Around Parking Lots

Trees planted within parking areas shall adhere to the standards of Section 9-5-11(c)(5) of the Development Ordinance. It is recommended that planting spaces be wide enough to accommodate the critical root zone(s) of the tree(s) at maturity and have enough original (or higher quality) soil to facilitate new root growth if the standards of Section 9-5-11(c)(3) (minimum 7 foot width and at least 200 sq. ft. of space) does not already provide the necessary space. Do not disturb the soil below the level of the root ball as this can cause the tree to sink below ground level after planting and negatively impact the tree. Consult the Tree Index for information on the most suitable trees for this situation.

9. Responsibility for Maintenance of Newly Planted Trees

Responsibility for maintenance of newly planted trees in city owned or controlled spaces will fall to one of the city's operational departments. The Parks and Recreation Department typically maintains trees up to approximately 15 feet in height located in parks, all public greenways, and road medians. Trees adjacent to electrical utilities and those in parks and road medians taller than 15 feet are typically maintained by the Electric Department. Trees located in street rights-of-way and public easements such as sewer or stormwater pond easements are typically maintained by the Public Services Department.

C. Tree Maintenance

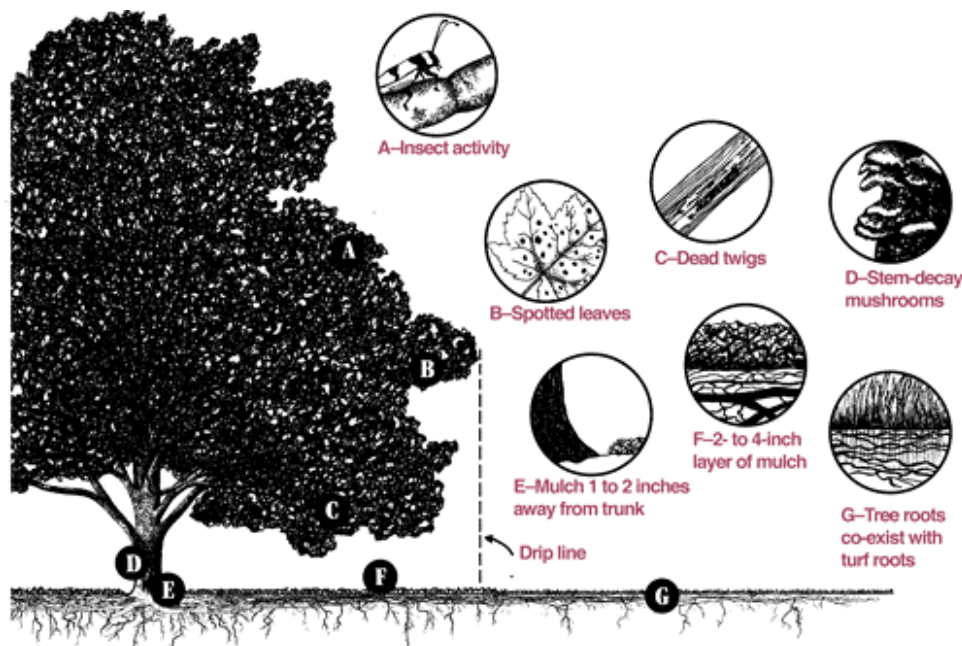
1. General Maintenance Practices

The City of High Point will work to establish a four-year cycle for regular inspection and maintenance of trees on city owned or controlled property, addressing more immediate maintenance needs as identified on a case-by-case basis. Regular assessments of trees will be made in the course of other maintenance work in order to ensure the proper tree maintenance cycle is maintained. Depending on the location of the tree, any identified maintenance needs should be referred directly to the appropriate department as outlined in Section B, Item 9.

Trees should be periodically inspected to identify structural issues (broken branches, damage to trunk, gaps in the wood, etc.), signs of disease, or damage from pests. Additional inspections are important following adverse weather conditions or other events that could cause specific stress to the tree. These events may cause a variety of issues, including failures of the main stem, adjoining branches or the root system. Storm damaged trees may also be more susceptible to pest attacks and to additional damage from wind. Inspections of mature trees should be done more frequently than younger trees, given available resources.

As shown in Illustration C-1, during the tree inspection examine the characteristics of tree vigor, including new leaves or buds, leaf size, twig growth, and absence of crown dieback (gradual death of the upper part of the tree). Items to be addressed and monitored include a reduction in the extension of shoots (new growing parts); trunk decay, loose bark or deformed growth such as trunk conks (mushrooms); evidence of harmful insect activity; or spotted, deformed, discolored, or dead leaves and twigs.

Illustration C-1: Examples of Items to Note During Tree Inspection



Source: TreesAreGood.com,
International Society of Arboriculture consumer tree care website, 1998, 2004 updated July 2005,
(www.treesaregood.com)

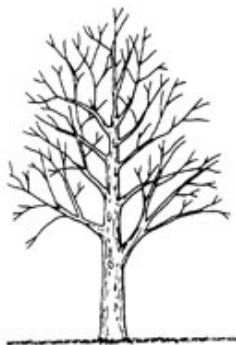
Though additional mulching is not as essential for trees after initial planting, new mulching materials may be added to enhance the tree's appearance and limit growth of grass or weeds around the base of the tree. If a new layer of mulch is added, remove or break up any previous layers to maintain the original three inches of coverage around the base of the tree. As during the tree's original planting, any new mulch must be at least 1-2 inches away from the base of the tree trunk.

Keep lawnmowers, weed eaters and other small equipment away from the tree's trunk to avoid inadvertent damage. Persons using weed killers should be careful to not get any chemicals on the tree's trunk or leaves. Avoid placing heavy equipment and/or storing materials within the tree's critical root zone to avoid soil compaction and root damage, as well as accidental spills that would be harmful to the tree.

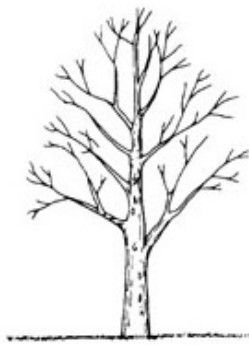
2. Pruning and Maintenance for Trees Planted Within Previous 5 Years

At the time of planting remove any broken, diseased, dying or dead branches, as well as any branches actively rubbing against one another. As shown in Illustration C-2, pruning trees in the early stages of life encourages proper growth that establishes a strong central trunk and network of evenly spaced scaffolding branches (12-18 inches apart) to support the tree's canopy and overall branch and leaf network. Water the tree on a regular basis for about two years after planting to establish a strong root system. Periodic fertilization, using slow release materials, for newly planted trees located in limited growth planting spaces (such as areas with a high concentration of impervious surface) is appropriate. Periodic replacement of mulch placed around the tree at the time of planting is optional as the need for mulch diminishes as the tree establishes itself.

Illustration C-2: Pruning Younger Trees



Select strong, permanent scaffold branches that are spaced 12 to 18 inches apart.



Trees with co-dominant stems as part of the central trunk are structurally weak. It is best to prune one of the stems while the tree is young.

Source: TreesAreGood.com,
International Society of Arboriculture consumer tree care website, 1998, 2004 updated July 2005,
(www.treesaregood.com)

Assess recently planted trees for pruning needs on an annual basis for the first couple of years if possible. Proper pruning of young trees encourages a more aesthetically pleasing mature tree form and greatly reduces or eliminates the need for corrective pruning at a later date. Make pruning cuts just outside the branch collar. For small trees hand pruning shears are recommended for pruning. Make cuts larger than ½ inch in diameter with lopping shears or a pruning saw. Pruning lower branches for trees located along roads and walkways can be useful in guiding the future growth of the tree and providing necessary ground and sight clearance. Though pruning can generally occur at any time of the year, it is best to avoid heavy pruning just after the spring growth flush.

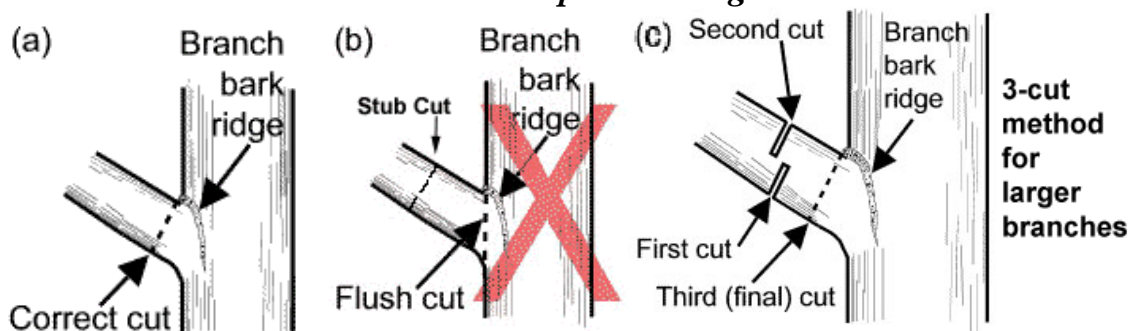
Though younger trees can tolerate higher levels of pruning, avoid the removal of more than ¼ of a tree’s canopy at any one time unless necessary to remove a competing branch to the central leader or if apparent structural weaknesses must be addressed through heavier pruning. If it is possible to address such issues over several growing seasons, this is preferable so the pruning does not prove overly stressful to the tree. As outlined in the city’s Urban Forestry Ordinance, Section 9-7-32(a), tree topping is prohibited.

3. Pruning and Maintenance for Trees Planted Over 5 Years Ago

An arborist certified by the International Society of Arboriculture is best qualified to identify appropriate maintenance needs for more mature trees and to oversee these activities. However, if a certified arborist is not available, these Guidelines should be followed to ensure proper tree maintenance.

Ideally prune mature trees only as a corrective or preventative measure or to address damage. Pruning of more mature trees may be done to remove dead branches, to remove crowded or rubbing limbs, and to eliminate hazards. Mature trees may also be pruned to increase light and air penetration to the inside of the tree’s crown or to the landscape below. Though pruning of mature trees can generally occur at any time of the year, avoid heavy pruning just after the spring growth flush. Proper pruning methods are outlined in Illustration C-3. Larger limbs should be pruned using the three-cut method: an undercut 12-18 inches from the limb’s point of attachment, a second cut made from the top, directly above or a few inches further out on the limb, and finally the removal of the 12-18 inch stub, making sure to stay just outside the tree’s branch collar. Remove no more than ¼ of a tree’s leaf bearing crown during any season and even less at any one time as the tree ages or is stressed. As outlined in the city’s Urban Forestry Ordinance, Section 9-7-32(a), tree topping is prohibited.

Illustration C-3: Proper Pruning Methods



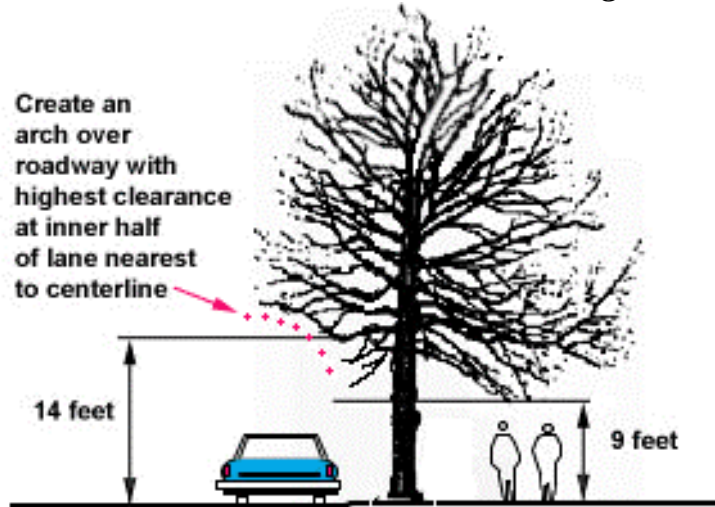
Keep pruning equipment sharp, clean and in good operating condition. Always prune trees back to the parent branch or a lateral that is greater than 1/3 the diameter of the branch being pruned and prune just outside the branch collar. Make proper pruning cuts using the 3-cut method, as discussed above, avoiding stub cuts, flush cuts, and wounds to remaining limbs and trunk. If pruned limbs show evidence of disease, clean pruning equipment between trees. Always wear personal protective safety equipment while pruning, including safety glasses.

Proper maintenance of mature trees seeks to limit potential damage to the tree and allow the tree to properly apportion its resources towards maintenance of its internal structure and to defend itself from pests and disease. Trees do not heal damaged or infected areas, rather they seal off these sections. Avoid activities that create open wounds in the tree that cannot be sealed properly by the tree. If instances of infestations or disease are discovered, generally the only options will be to remove the section of tree affected (if this does not jeopardize overall tree health) or remove the entire tree if it is in serious decline or its continued presence would encourage the spread of disease or infestation to other nearby trees. Additional information on the control of tree pests and disease is available from the International Society of Arboriculture (ISA)'s consumer tree care website (www.treesaregood.com).

4. Pruning and Maintenance for Trees Along Roadways

Prune trees located adjacent to roadways or in close proximity to sidewalks in such a manner as to provide adequate room for vehicular and pedestrian passage while maintaining the shape of individual trees and the overall tree canopy along the roadway. As demonstrated in Illustration C-4, prune trees located along residential roadways in a way to achieve a "street canopy" effect. This may require different levels of pruning for individual trees. Prune limbs extending to the center of the roadway to a height of 14 feet, steadily decreasing this height with closer proximity to the edge of the pavement, with the minimum height being 9 feet by that point. Pruning limbs back to the tree trunk is not necessary or recommended if the tree can be adequately pruned back to the curb. Limiting pruning to the edge of curb, rather than the tree trunk, reduces the potential for direct damage to the tree trunk, reduces the amount of tree canopy cut at one time, and better preserves the overall shape of the tree. Preventative pruning of younger trees to reduce or eliminate future conflicts is encouraged if a direct conflict between the tree and public infrastructure is apparent and will be difficult to address once the tree matures. As mentioned earlier, avoid exceeding 1/4 of the tree's canopy in any individual instance of pruning if possible.

(Illustration C-4: Tree Maintenance Along Roadways)



Source: Original image from Street Trees, Overhead Utility Distribution, and Physical Infrastructure: Design Implications, Maintenance Costs and Proposed Alternatives (David V. Bloniarz, Northeast Center for Urban & Community Forestry), www.umass.edu, and adapted to reflect High Point standards.

In cases where tree roots are actively damaging public infrastructure, such as roadways or sidewalks, some root removal may be warranted. However, accommodate roots located within the tree's critical root zone, if possible, as their removal significantly impacts the long term health of the tree. If roots within the critical root zone are cut, a corresponding portion of the tree's canopy may be pruned to balance the weight born by the remaining root system. Use additional mulching and water for trees where roots are cut to encourage new root growth away from public infrastructure. Cut roots cleanly and backfill loose soil in any trenches created during cutting.

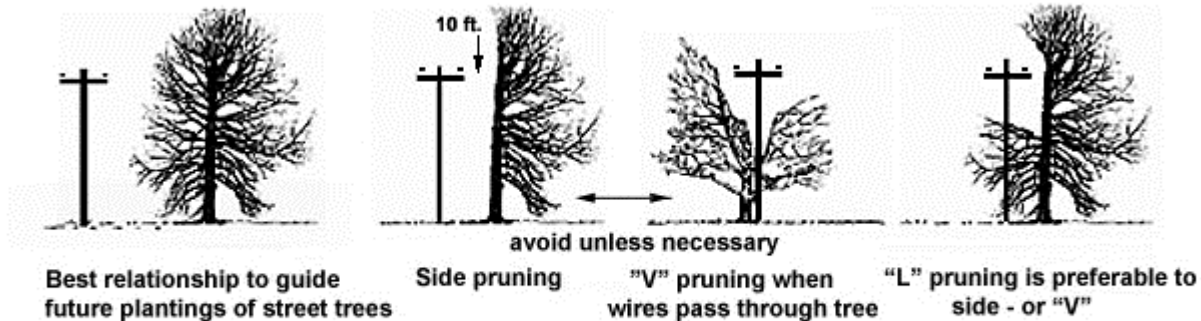
5. Pruning and Maintenance for Trees Near Above Ground Utilities

The use of proper tree planting techniques outlined in Section B, Item 2 can significantly reduce potential conflicts between trees and existing above ground utilities. In cases where conflicts arise between above ground utilities and adjacent trees, several pruning techniques, as shown in Illustration C-5, may be used to address these conflicts.

- V pruning may be used for large trees growing beneath power lines. It involves removal of branches within the tree's central crown, with cuts made at laterals so as to encourage growth away from the lines.
- Side pruning is used when a tree is located adjacent to power lines. It involves removing problem branches while leaving sound scaffolding to minimize regrowth towards the utility lines. Unsightly notches in the trunk and/or canopy of the tree shall be avoided if possible.
- L pruning or under pruning involves the removal of limbs from a section of the tree's crown, either below or above the power lines, solely to maintain adequate conductor

clearance. Emphasis is placed on removal of dead, dying, weak and structurally unsound wood.

Illustration C-5: Examples of Pruning Around Above Ground Utilities



Pruning should be limited to maximum of 25% of the tree's crown

Source: Original image from Street Trees, Overhead Utility Distribution, and Physical Infrastructure: Design Implications, Maintenance Costs and Proposed Alternatives (David V. Bloniarz, Northeast Center for Urban & Community Forestry), www.umass.edu, and adapted to reflect High Point standards.

When pruning follow the information outlined in Pruning Trees Near Electric Utility Lines: A Field Pocket Guide for Qualified Line-Clearance Tree Workers (Dr. Alex L. Shigo, 1990). Some goals for proper pruning around utilities include: 1) clearance sufficient to allow utility lines to function properly without causing unnecessary damage to trees, 2) removal of all dead wood that may under any circumstances contact primary or secondary conductors, and 3) prohibiting pruning that may create negative effects to safe public movement along city streets or sidewalks.

D. Tree Removal

1. When Tree Removal Is Appropriate

Trees may be removed for a variety of reasons. They may be in a location without adequate growing space or may be in conflict with hardscape (driveways, walkways, etc.) or other infrastructure (buildings, roadways, overhead utility lines). The tree may also be nearing the end of its normal life span, or be in poor condition due to a variety of environmental factors. Remove any tree in irreversible decline or that creates a hazardous condition that cannot be remedied through pruning, cabling and bracing, or removal of potential targets for damage from the tree.

In evaluating the need to remove a tree, consider the following items:

- If the tree is dead;
- If the tree is infected with a contagious or fatal disease, particularly if the tree's continued presence will facilitate the spread of the disease to nearby healthy trees;
- If the tree was planted in a location that is not suitable for its long term survival, based on the tree's mature height and canopy, its tolerance for various environmental conditions, or conditions of the surrounding area including inadequate soil drainage or soil compaction from various activities;
- If a more suitable tree is appropriate for the space currently occupied by a less suitable tree that will require excessive maintenance or will have a shortened life span due to site conditions;
- If there is a substantial or imminent risk of failure that could cause injury or significant property damage that cannot be addressed through corrective measures that are feasible or cost effective;
- If the tree blocks vehicular views at an intersection in such a way that cannot be corrected by pruning;
- If the tree has been injured by construction, lightning, vandalism or other event to the point of being in imminent risk of failure;
- If more than 50% of the tree's crown is missing or dying as a result of decline or storm damage;
- If the tree is almost totally obstructing growth of an adjacent tree that is clearly superior based on species, condition or location;
- If the tree's trunk is growing into and damaging a fence, utility box or pole, building foundation, or fire hydrant on city owned or controlled property and no reasonable accommodation for the tree can be made relative to this infrastructure;
- If the tree's roots are growing into water or sewer lines and removal of the roots damaging the lines would impact the tree's critical root zone to the point of killing the tree;
- If the tree is a large growing species located under above ground power lines and cannot be pruned for adequate clearance without compromising the tree's long-term survival;
- If the tree has a serious chronic condition which will result in its death before its normal lifespan; or
- If the tree trunk has grown into or is lifting a driveway apron or sidewalk, creating a high-risk condition, which cannot be addressed through other corrective measures.

Any of the above factors may be used as justification for removal of a tree and shall be duly noted through a thorough assessment of the tree prior to removal. Notification of a tree's removal (and reasons for removal) to the owner(s) of any private property directly adjacent to the tree is encouraged. Such notification is not necessary however, particularly if a tree must be removed quickly due to its imminent threat to the public's safety.

2. Tree Removal Practices

Preserve trees located on city owned or controlled property if identified concerns can be addressed through appropriate pruning techniques, removal of items in potential conflict with the tree, cost effective adjustments in the construction or reconstruction of public infrastructure, or through relocation of the trees to a more suitable site. Any proposal to remove a tree on city owned or controlled property shall be previously reviewed and approved by the Urban Forestry Committee. Trees authorized for removal by the Urban Forestry Committee must be replaced at a one for one rate in order to maintain and enhance the city's urban forest. Replacement trees (as approved by the Urban Forestry Committee) can be located in either the same general location (if suitable site conditions are present) or in another city controlled space that is deemed appropriate by the Committee. Funds equivalent to the trees' replacement costs (as determined by the Urban Forestry Committee) may be provided in lieu of replacement at the time of removal. If the city requests the removal of a tree on private property due to its inherent threat to the public's health and safety, a more suitable replacement tree may be offered to that property owner.

Following the removal of a tree, ground the remaining stump to a level one foot below ground level. If a replacement tree will be planted in this space it is important to remove the sawdust and wood chips from the ground stump and to fill the space with the original soil. If no tree will be placed back in this space, then replace the original soil and then seed the area with grass to prevent erosion.

E. Protection of Existing Trees From Construction Related Activities

1. Potential Issues Requiring Protective Measures

- Significant alteration in flow of water to the tree due to site clearance and grading operations
- Compaction of soil within the tree's critical root zone due to constant passage of vehicles or persons in this area, or storage of equipment or materials
- Root damage within the critical root zone due to grading or trenching for the installation of utilities
- Damage to the tree's trunk or broken limbs from passage of vehicles or equipment
- Release of materials or substances hazardous to a tree's health within the tree's critical root zone due to placement of areas to clean equipment

2. Tree Protection Plan

If any of the above construction related activities occur adjacent to trees on city owned or controlled property, a Tree Protection Plan must be prepared in accordance with these guidelines. The Tree Protection Plan identifies trees in need of protection and outlines the measures to be taken to protect the trees. The Tree Protection Plan shall be in writing (with applicable illustrations as needed), submitted to the Planning and Development Department for review, and made available to every person who will be working in close proximity to any protected tree. A Plan is also required for any demolition permit request if trees in city owned or controlled spaces may be impacted by these activities.

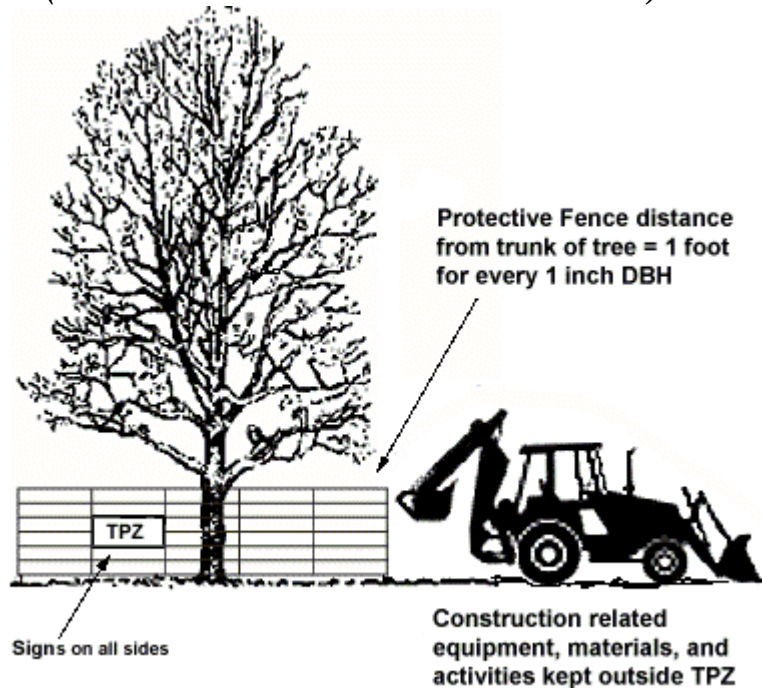
A Tree Protection Plan must include the following information:

- The location, species and approximate size of all trees located in adjacent city owned or controlled spaces
- A listing of anticipated construction activities on site (based on the activities listed in Item 1 above) that could impact these trees
- The location of existing public and private utilities, buildings and other infrastructure within thirty feet of any protected tree
- Illustration showing dimensions of the "tree protection zone" around protected trees

3. Standards for Tree Protection Zone

As shown in Illustration E-1, the tree protection zone includes the entire area around the tree equal to one foot of width for every one inch DBH of the tree's trunk. This area contains the tree's critical root zone and none of the construction related activities listed in Item 1 of this section shall take place within this area. If multiple trees in close proximity to one another are to be protected, the tree protection zone is measured from the outermost trees to determine the protection area.

(Illustration E-1: Tree Protection Zone)



To create a tree protection zone use, at a minimum, place orange construction fencing of at least 4 feet in height around the entire tree protection zone and secured by posts to ensure durability. Affix signage on all sides noting the tree protection zone. Also use silt fencing if there is concern about erosion within the tree protection zone. Per section 9-7-32(c) of the Development Ordinance, the attachment of any rope, wire, nail, or sign to any tree, or the application of any liquid or solid substance that is harmful and could damage or destroy the tree is prohibited.

It is recommended that all utilities remain outside this tree protection zone. However, if it is necessary for utilities to cross the tree protection zone they should be installed via tunneling rather than trenching, if this can be accomplished in a cost effective manner. Brush and undergrowth within the tree's protected area may be addressed if no heavy equipment is used and any stumps are cut flush to and not below the ground, where root damage could occur. Additionally, break up the soil at the surface in areas where such work takes place to prevent soil compaction.

4. Corrective Actions for Tree Damage From Construction Activities

While adequate tree protection measures should limit potential damage, some types of accidental damage may occur. Any trees listed on a Tree Protection Plan that are subsequently damaged by construction related activities should be noted and brought to the attention of the Urban Forestry Committee. The entity charged with implementing tree protection measures is responsible for corrective measures or tree replacement for damage noted during or shortly following construction activities. Failure to address noted issues may delay approval of the final site inspection. The following corrective measures may be taken to address damage from construction activities:

- The removal of dead wood within the tree's crown using appropriate pruning techniques outlined in these Guidelines.

- The application of low-level nitrogen or a balanced nitrogen/phosphorous fertilizer around the base of the tree to encourage new root and foliage growth. While granules spread around the critical root zone may be used, high pressure injection directly into the soil is recommended
- Loose bark from damage to the tree's trunk should be removed or cut flush with a sharp knife, being careful not to cut into living tissue. This will aid the tree's healing process for such wounds.

F. Daily Operations

1. Use of Guidelines for Day to Day Operations

The Tree Guidelines and Standard Practices will be given to all Department Directors and supervisors for the departments that are responsible for the regular planting, maintenance or removal of trees on city owned or controlled property. Notification of the availability of these Guidelines and Standard Practices will be given to all other department directors and the general public. The Urban Forestry Committee shall determine the appropriate means of distribution and training related to these Guidelines. The same procedures for notification will be used for any revisions to the originally approved Guidelines and Standard Practices.

In addition to the full Guidelines and Standard Practices, smaller “field guides” that outline basic requirements for various field situations (planting standards, proper pruning cuts, standards for tree removal, etc.) without needing to consult the full Guidelines will be developed and made available to all city crews with regular tree related responsibilities.

2. Maintenance Activities Not Subject to Prior Authorization

Any tree related maintenance occurring on a regular basis shall be exempt from prior authorization, as long as it can be demonstrated that the tree maintenance activity is being done in accordance with these Guidelines and Standard Practices. Such activities include regularly scheduled maintenance work or work to address previously identified tree hazards. Work related to the clearance of storm damage and addressing emergency situations is waived from prior authorization, per Section 9-7-33(c) of the city’s development ordinance. The Urban Forestry Committee may determine additional situations where tree related activities are exempt from prior authorization if such work is in accordance with these Guidelines and Standards and the Urban Forestry Committee determines that the process for prior authorization is overly burdensome for the completion of the activity.

3. Assessment of Potential Tree Hazards

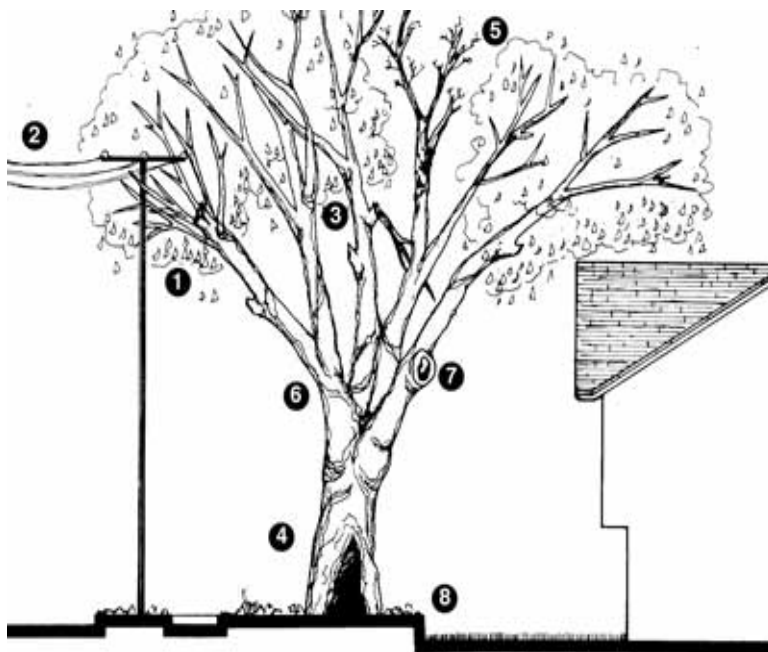
While the implementation of regular planting and maintenance schedules will help identify hazardous trees, and the risk they present to people and public or private property, city employees who have some responsibilities related to the city’s trees are encouraged to report potential tree hazards as they are identified. In identifying potential tree hazards, the following list of questions are to be considered:

- Are there large dead branches in the tree’s crown and if so how far above the ground are they?
- Are there detached branches hanging in the tree and if so how far above the ground are they?
- Does the tree have cavities, cankers, missing bark, or rotten wood along the trunk or in major branches?
- Are mushrooms present at the base of the tree?
- Are there cracks or splits in the trunk where branches are attached?
- Have any branches fallen from the tree?
- Have adjacent trees fallen over or died?

- Has the trunk developed a strong lean and have roots been pulled to the surface as a result?
- Do many of the major branches arise from one point on the trunk and are any cracks present at the point of attachment?
- Have the roots been broken off, injured or damaged by lowering soil level, installing pavement, repairing sidewalks, or digging trenches?
- Has the site recently been changed by construction, raising the soil level or installing lawns?
- Have the leaves prematurely developed an unusual color or size?
- Have trees in adjacent wooded areas been removed?
- Has the tree been topped or otherwise heavily pruned?

Potential tree hazards, such as those in Illustration F-1, noted by city employees working in the Electric, Public Services, Parks and Recreation or Planning and Development Departments should be reported to their appropriate supervisor. Employees from other city departments that note potential tree hazards should report these issues to the responsible department, based on the location of the tree. Trees up to approximately 15 feet in height located in parks, public greenways and road medians are typically maintained by the City's Parks and Recreation Department. Trees adjacent to electrical utilities and those in parks and road medians taller than 15 feet are typically maintained by the Electric Department. Trees located in city rights-of-way and public easements such as sewer or stormwater pond easements are typically maintained by the Public Services Department.

Illustration F-1: Examples of Potential Tree Hazards



1. Regrowth from topping, line clearance, or other pruning
2. Electrical line adjacent to tree
3. Broken or partially attached branch
4. Open cavity in trunk or branch
5. Dead or dying branches
6. Branches arising from a single point on the trunk
7. Decay and rot present in old wounds
8. Recent change in grade or soil level, or other construction

Source: TreesAreGood.com,
International Society of Arboriculture consumer tree care website, 1998, 2004 updated July 2005,
(www.treesaregood.com)

Potential tree hazards can be managed in a variety of ways, including removing potential targets that falling trees or tree limbs could hurt or damage; pruning the tree to remove defective branches; cabling and bracing the tree; providing routine care in the form of water, fertilizer (in some cases), mulch and pruning; or removing the tree.

4. Tree Protection During Regular Maintenance Operations

It is recommended that existing trees of 4" DBH or greater be protected during any vegetative clearance activities, such as along public rights-of-way, as trees of this size typically enhance the city's urban forest, are firmly established on the site, and would be potentially expensive to replace. Avoid the use of heavy equipment for clearance of brush or undergrowth around these trees, as the resulting soil compaction may be as damaging to the tree's health as accidental trunk damage. Additionally, maintenance work for underground utilities located in or adjacent to the critical root zones of these trees shall be done using preferred tunneling techniques rather than open trenches to limit potential damage unless tunneling is not possible or cost prohibitive.

Protect newly planted trees from damage during regular maintenance activities such as mowing and weed trimming, digging for installation or repair of public utilities, or the use of vehicles and/or equipment in close proximity to these trees. Additionally, take care in spraying chemicals, such as weed killers, around the tree to ensure these chemicals do not drift onto the tree's leaves, limbs or trunk. Storage of heavy equipment and vehicles within the critical root zone of a tree is strongly discouraged to avoid soil compaction and root damage, and to avoid accidental spills that would be harmful to the tree. While younger trees are better able to overcome various types of damage than older trees, they are more susceptible to premature death until they have an established root system and canopy following several growing seasons.

5. Responsibilities of the Urban Forestry Committee

In addition to implementing the city's urban forestry program and reviewing requests to plant, maintain, or remove trees on city owned or controlled property, the Urban Forestry Committee may be involved in other activities, including:

1. Proposed changes to either the urban forestry ordinance or these Guidelines and Standard Practices
2. Proposed changes to the city's landscape ordinance
3. The creation of new city owned or controlled spaces that will incorporate trees or roadway improvements initiated by the city where trees are present (or will be planted) in the rights-of-way
4. State Department of Transportation funded roadway projects (when there is city participation in design or funding) where trees are present (or will be planted) in the rights-of-way
5. Review of operational procedures for city departments involving trees
6. Any other instances where the Committee's technical expertise is requested

G. Procedures for Authorization to Plant, Prune or Remove Trees

1. Prior Authorization Required

As required by the City's Urban Forestry Ordinance, Section 9-7-33(a), prior authorization from the City's Urban Forestry Committee is needed for any person, group or organization that wishes to plant, maintain or remove trees located on city owned or controlled property. All work in such spaces must be done either directly by or under the supervision of qualified city employees.

2. Exemptions From Authorization

As outlined in the Urban Forestry Ordinance, Section 9-7-33(b), public and private utilities and city departments are exempt from the required authorization process for normal tree maintenance activities such as pruning around electrical lines, ensuring appropriate visibility for traffic, and addressing identified public health and safety issues. However, such activities should follow these Guidelines and Standard Practices to ensure uniformity for trees in all city owned or controlled spaces. Towards this end the Urban Forestry Committee will identify key contacts for all private utility companies with equipment in or right of access to city owned or controlled spaces. These contacts will receive copies of these Guidelines, along with future updates, and instructions to contact the City for any proposed activity falling outside the course of regular tree maintenance.

3. Waivers

As outlined in the Urban Forestry Ordinance, Section 9-7-33(c), the required authorization process is waived for the pruning or removal of trees on city owned or controlled property when there is significant tree damage resulting from severe weather, fire or other emergency conditions and where immediate removal of such tree(s) is necessary to protect the health and safety of the public, restore order, or remove obstructions blocking access to streets and property.

4. Required Documentation for Authorization

The Urban Forestry Committee must approve any tree related activity (planting, maintenance or removal) on city owned or controlled property requiring authorization as outlined in the city's Urban Forestry Ordinance. A request for authorization shall include the applicant's contact information and the contact information for the person, group or company that will conduct the tree activity, if different. Information needed to evaluate a request for authorization includes the tree related activity, the location where the tree activity is to occur (including addresses and owners of any private property directly adjacent to the site), the anticipated timeframe for completion of the tree activity, and compliance with applicable OSHA safety standards.

The applicant shall provide an illustration that includes the following:

1. The location for the proposed tree related activity
2. The name, number, size and types of trees to be planted, removed, pruned or otherwise maintained
3. Existing utility easements, rights-of-way and electric lines, or other existing utilities within 30 feet of activity area

4. Existing sidewalks, driveways, plazas, light poles, buildings, fire hydrants, road signs, fences, walls and other permanent features within 30 feet of the activity area
5. Existing trees, including their critical root zones if possible, and bushes within 30 feet of the activity area
6. For proposals involving tree removal, indicate the reason(s) for removal based upon the items outlined in Section D. (Tree Removal)

Trees should be selected using the Tree Index. If the desired tree is not listed in the Index, or is not listed as being appropriate for a certain situation, the Urban Forestry Committee will make the determination on the suitability of the tree.

Note: The illustration included with the request for authorization is not required to be an engineered drawing. However applicants should review the illustration prior to submittal to ensure that all information is legible and the approximate distance of various items is accurate. Applicants are advised to contact the city to obtain any needed information they do not have knowledge of.

5. Review Process

Requests for authorization to plant, maintain or remove trees on city owned or controlled property must be submitted at least two weeks prior to the next meeting of the Urban Forestry Committee. A decision on authorizing the tree related activity shall be made at this meeting, unless a continuation is warranted due to the need for additional information or an inability of the Committee to reach a consensus.

Requests and supporting materials for authorization to plant, maintain or remove trees on city owned or controlled property shall be submitted to the Planning and Development Department. The Department staff will distribute copies of the materials to all members of the Urban Forestry Committee for their individual review prior to the Committee's next meeting. Applicants will be notified of the meeting date, time and location and are encouraged to attend in order to aid the review and decision-making process.

The Urban Forestry Committee will consider all the information at their meeting and develop a consensus decision on whether to authorize or deny the request. The applicant will be notified in writing of the Urban Forestry Committee's decision and the reasons for approval or denial. This notification shall be mailed out as soon as practical following the meeting and shall also provide instructions for appealing the Committee's decision if the applicant so chooses.

6. Determination of Future Maintenance Responsibilities

Future maintenance responsibilities for trees authorized to be planted will be determined during the Urban Forestry Committee meeting according to the standards of Section B, Item 9. Information on future maintenance responsibilities will be detailed in the authorization letter.

7. Minimum Standards (Credentials) for Companies Working With Trees

Companies that wish to secure contracts for the regular planting, maintenance or removal of trees located in city owned or controlled spaces shall do so through the City's prescribed purchasing process. At a minimum companies must agree to follow these Guidelines and provide proof of

insurance for their activities, references for previous work, own or have the ability to easily acquire the proper equipment for proposed activities, demonstrate the appropriate qualifications for workers, and have an appropriate safety record from previous tree activities. Having a certified arborist and/or certification from the International Society of Arboriculture (ISA) is preferred. Citizens or organizations that wish to hire companies for tree related work are strongly encouraged to choose companies with a certified arborist or ISA certification.

8. Timeframe for Which Authorization is Valid

As stated previously, the anticipated timeframe for tree planting, pruning or removal shall be submitted with the request for authorization. Once approved by the Urban Forestry Committee, authorization for the tree related activity is effective as of the date of the decision and is good for up to six months following that date, or a longer period if specifically approved by the Committee.

9. Unauthorized or Prohibited Tree Activities

Persons or groups that plant, maintain or remove trees on city owned or controlled property without prior authorization, or engage in prohibited activities outlined in Section 9-7-32 (Tree Maintenance and Protection) of the Development Ordinance, may be subject to civil penalties authorized by Section 9-8-5 (Civil Penalties) of the Development Ordinance. Each tree removed by an offending party without authorization must be replaced by two trees (as approved by the Urban Forestry Committee), either in the same location (if suitable site conditions exist) or in another city controlled space that is deemed appropriate by the Committee. The offending party may provide funds equivalent to the trees' replacement costs (as determined by the Urban Forestry Committee) in lieu of tree replacement. Any city staff should report instances of unauthorized tree activities to the Urban Forestry Committee, via the Planning and Development Department, which will review the situation and recommend appropriate actions to the Enforcement Officer as described in the Development Ordinance.

10. Appeals

Any decision of the Urban Forestry Committee regarding authorization to plant, prune or remove trees may be appealed to the City Council if an applicant so chooses. Appeals must be made in writing to both City Council and the Urban Forestry Committee within thirty (30) days of the date of the decision. All relevant facts, information or other evidence that affect a decision of the Urban Forestry Committee, must be presented to the Committee prior to an appeal being filed. The City Council may send an appeal back to the Urban Forestry Committee for review if new information is presented before ruling on the original appeal.

H. Review and Amendment Process

1. Schedule for Periodic Review

To ensure these Guidelines and Standards continually meet the objectives of the City's Urban Forestry Ordinance, the Urban Forestry Committee shall review them in their entirety approximately every three years, or more often as needed, with appropriate changes, if any, incorporated at the completion of each review.

2. Amendments

Requests to amend any standard listed in these Guidelines and Standard Practices may come from any citizen, business, city department, board, commission, City Council, or organization, located or operating in High Point, or the Urban Forestry Committee. Proposed changes must be submitted at least two weeks prior to the next Urban Forestry Committee meeting in order to be considered at that meeting. Proposals shall be in writing and identify the reason for the proposed change and a contact person. The proposed change(s) will be reviewed at the next meeting of the Urban Forestry Committee, with a decision to accept or deny the proposed change secured through a consensus of Committee members. The contact person shall be notified in writing of the meeting where the proposed change will be reviewed and will also be notified of the decision and reasons for approval or denial. Any approved changes will also be distributed to any person or organization that received the original Guidelines.

I. Glossary

Backfill – The original soil removed when a hole is dug for either tree planting or removal.

Branch Collar – The point where a limb is attached to the tree's trunk.

Caliper - A standard trunk diameter measurement for nursery grown trees taken six inches above the ground for trees up to and including four-inch caliper size, and twelve inches above the ground for trees of larger size.

Canopy Tree – A species of tree that normally grows to a mature height greater than thirty-five (35) feet. Canopy trees are typically planted to provide shade.

Central Leader (Trunk) – The center structure of the tree that supports the tree's crown. Trees with multiple leaders are inherently weak, as the weight of the tree cannot be supported evenly.

Critical Root Zone (CRZ) - A circular region measured outward from a tree trunk representing the essential area of the roots that must be maintained in order for the tree's survival. The critical root zone is typically measured as a circle around the trunk of the tree with a radius equal to one foot for every inch of the tree's trunk diameter as measured approximately 4.5 feet from the ground.

Crown - The woody and leafy component of the tree, composed of large, scaffold branches that support smaller branches, twigs, leaves and buds.

Diameter at Breast Height (DBH)- The diameter of a tree's trunk, as measured at a height of 4.5 feet from the ground.

Drip Line - A vertical line running through the outermost portions of the tree's crown extending to the ground. In some cases the drip line is similar to the tree's Critical Root Zone, allowing a quick visual reference for the tree's most important roots.

Flush Cut – A cut that runs directly vertical to a tree's trunk, causing the removal of some portion of the trunk that hampers the tree's ability to properly seal wounds from pruning.

Impervious Surface – Improvements including street pavement, driveways, gravel areas, buildings, and other structures, which cover the soil surface, and prevents infiltration of water into the soil.

Lateral – The point where multiple smaller branches are attached to a main scaffolding branch.

Roots – Roots anchor the tree and absorb water and nutrients necessary for the tree's survival. The anchoring roots are large, ropelike and woody and usually number 4 to 11. Tree roots grow out from the trunk for a distance of at least 2 to 3 times the radius of the tree's crown, or at least 2 times the tree trunk. However they taper rapidly as they move away from the tree trunk. Approximately 85% of a tree's roots are located in the top 18 inches of soil.

Scaffold Branch – One of several primary branches that establish the shape of the tree’s canopy and supports all other branches and foliage.

Soil Compaction – A change in the physical properties of soil around a tree that includes an increase in soil weight and a decrease in porous space. Soil compaction is caused by repeated vibrations, frequent traffic and weight. As related to tree roots, compacted soil can cause physical root damage, a decrease in soil oxygen levels with an increase in toxic gasses, and can be impervious to new root development.

Stub Cut – A cut that leaves a small portion of tree limb that hampers proper sealing of wounds from pruning and creates the potential for damage to the tree trunk as this piece slowly separates from the tree.

Tree Protection Plan – A plan that identifies trees on or adjacent to a site that are to be protected from a variety of activities that could potentially harm the tree and measures taken to protect the tree. The Plan includes both written information and typically some type of illustration showing the tree(s) location and protection measures and should be kept on site whenever protection measures are needed.

Tree Topping – Per the city’s Urban Forestry Ordinance, the severe pruning of tree limbs larger than three inches in diameter within the tree’s crown to such a degree as to remove the normal canopy or disfigure the tree.

Understory Tree – A species of tree that normally grows to a mature height of fifteen (15) to thirty-five (35) feet. Understory trees often grow beneath canopy trees within natural tree stands.

APPENDIX - TREE INDEX

✓ – Indicates Tree is Appropriate For This Situation

Tree Type	Common Name	Scientific Name	Mature Height	Canopy Width	Plant Near Roadways & Medians	Plant Near Sidewalks	Plant Near Above Ground Utilities	Tolerant of Drought Conditions	Tolerant of Wet Conditions	Plant as Screen	Plant in Parking Areas	Plant in Parks or Large Open Spaces
Canopy												
	American Sycamore	<i>Platanus occidentalis</i>	75-100'	50-70'	-	-	-	-	✓	-	-	✓
	Armstrong Maple	<i>Acer rubrum</i> 'Armstrong'	50-60'	25-35'	✓	-	-	-	✓	-	✓	✓
	Bald Cypress	<i>Taxodium distichum</i>	50-80'	20-30'	-	-	-	-	✓	✓	-	✓
	Bowhall Maple	<i>Acer rubrum</i> 'Bowhall'	50-60'	30-40'	✓	-	-	-	✓	-	✓	✓
	Canadian Hemlock	<i>Tsuga canadensis</i>	40-80'	20-30'	✓	-	-	-	-	✓	✓	✓
	Carolina Hemlock	<i>Tsuga caroliniana</i>	45-60'	20-30'	✓	-	-	-	-	✓	✓	✓
	Chanticleer Pear & Cleveland Select Pear	<i>Pyrus calleryana</i>	30-50'	15-20'	✓	✓	-	-	-	-	✓	✓
	Dawn Redwood	<i>Metasequoia glyptostroboides</i>	70-100'	25-30'	✓	-	-	-	-	✓	-	✓
	Eastern Red Cedar	<i>Juniperus virginiana</i>	40-50'	10-20'	✓	✓	-	✓	-	✓	-	✓
	European Hornbeam	<i>Carpinus betulus</i>	40-50'	30-40'	✓	✓	-	✓	-	-	✓	✓
	Ginkgo	<i>Ginkgo biloba</i> (male)	50-80'	30-50'	✓	✓	-	✓	-	-	✓	✓
	Green Ash	<i>Fraxinus pennsylvanica</i>	50-60'	30-40'	✓	-	-	✓	✓	-	✓	✓
	Green Giant Arborvitae	<i>Thuja plicata</i>	30-50'	10-15'	✓	✓	-	-	-	✓	✓	✓
	Hinoki Falsecypress	<i>Chamaecyparis obtusa</i>	50-75'	10-15'	✓	-	-	-	-	✓	✓	-
	Japanese Cedar	<i>Cryptomeria japonica</i>	50-60'	25-35'	✓	-	-	-	-	✓	✓	✓
	Japanese Zelkova	<i>Zelkova serrata</i>	50-80'	40-70'	✓	-	-	✓	-	-	✓	✓

	Common Name	Scientific Name	Mature Height	Canopy Width	Plant Near Roadways & Medians	Plant Near Sidewalks	Plant Near Above Ground Utilities	Tolerant of Drought Conditions	Tolerant of Wet Conditions	Plant as Screen	Plant in Parking Areas	Plant in Parks or Large Open Spaces
	Leyland Cypress	Cupressocyparis leylandii	60-70'	12-17'	✓	-	-	-	-	✓	✓	✓
	Littleleaf Linden	Tilia cordata	60-70'	30-50'	✓	-	-	-	-	-	✓	✓
	Pin Oak	Quercus palustris	60-70'	40-50'	✓	-	-	-	✓	-	✓	✓
	Red Maple (October Glory & Red Sunset)	Acer rubrum	40-50'	25-35'	✓	-	-	-	✓	-	✓	✓
	Red Oak	Quercus rubra	60-75'	40-60'	✓	-	-	-	-	-	✓	✓
	River Birch	Betula nigra	40-50'	35-45'	✓	✓	-	-	✓	-	✓	✓
	Sawtooth Oak	Quercus acutissima	35-60'	35-50'	✓	-	-	-	-	-	✓	✓
	Scarlett Oak	Quercus coccinea	70-75'	40-50'	✓	-	-	-	-	-	✓	✓
	Shumard Oak	Quercus shumardii	40-60'	40-60'	✓	-	-	✓	-	-	✓	✓
	Southern Magnolia	Magnolia grandiflora	50'	25-35'	✓	-	-	-	-	✓	-	✓
	Sugar Maple	Acer saccharum	60-75'	50-60'	✓	-	-	-	-	-	✓	✓
	Thornless Honeylocust	Gleditsia triacanthos	50-75'	25-40'	✓	✓	-	✓	-	-	-	✓
	Water Oak	Quercus nigra	50-80'	30-40'	✓	-	-	-	-	-	✓	✓
	White Oak	Quercus alba	50-90'	50-90'	✓	-	-	-	-	-	-	✓
	Willow Oak	Quercus phellos	40-90'	30-40'	✓	-	-	-	-	-	✓	✓
	Sycamore	Platanus occidentalis	75-100'	75-100'	✓	-	-	✓	-	-	✓	✓
	Tulip Poplar	Liriodendron tulipifera	60-90'	30-50'	✓	-	-	-	-	-	-	✓
	Tupelo Black Gum	Nyssa sylvatica	30-50'	20-30'	✓	-	-	-	✓	-	✓	✓
Understory												
	American Hornbeam	Carpinus caroliniana	20-30'	15-20'	✓	✓	-	✓	-	-	✓	✓
	Amur Maple	Acer ginnala	15-20'	15-20'	✓	✓	✓	✓	-	✓	✓	

	Common Name	Scientific Name	Mature Height	Canopy Width	Plant Near Roadways & Medians	Plant Near Sidewalks	Plant Near Above Ground Utilities	Tolerant of Drought Conditions	Tolerant of Wet Conditions	Plant as Screen	Plant in Parking Areas	Plant in Parks or Large Open Spaces
	American Hophornbeam & Ironwood	<i>Ostrya virginiana</i>	25-40'	25-30'	✓	✓	-	✓	-	-	✓	✓
	Autumn Brilliance Serviceberry	<i>Amelanchier arborea</i>	15-25'	10-20'	✓	✓	✓	-	✓	-	✓	✓
	Carolina Cherry Laurel	<i>Prunus caroliniana</i>	20-40'	15-20'	-	-	✓	-	-	✓	-	-
	Chinese or Lacebark Elm	<i>Ulmus parvafolia</i>	30-40'	25-30'	✓	✓	-	✓	-	✓	✓	✓
	Chinese Fringe Tree	<i>Chionanthus retusus</i>	15-25'	10-15'	✓	✓	✓	-	✓	-	✓	-
	Crape Myrtle	<i>Lagerstroemia faure</i>	20-40'	10-15'	✓	✓	✓	-	-	-	✓	✓
	Crape Myrtle-dwarf and semi-dwarf	<i>Lagerstroemia indica</i>	5-10'	5-10'	✓	✓	✓	✓	-	✓	✓	-
	Eastern Redbud	<i>Cercis canadensis</i>	20-25'	20-30'	✓	✓	✓	✓	-	-	✓	✓
	Emily Bruener Holly	<i>Ilex 'Emily Bruener'</i>	20-30'	10-15'	✓	✓	✓	-	-	✓	✓	✓
	Foster Holly	<i>Ilex attenuate 'Fosteri'</i>	20-30'	7-10'	✓	✓	✓	✓	-	✓	✓	✓
	Green Japanese Maple	<i>Acer palmatum</i>	15-20'	10-15'	✓	✓	✓	-	-	-	-	✓
	Greenleaf Holly	<i>Ilex opaca</i>	20-25'	10-20'	✓	✓	✓	-	-	✓	✓	✓
	Hedge Maple	<i>Acer campestre</i>	25-35'	20-30'	✓	✓	✓	✓	-	✓	✓	-
	Kousa Dogwood	<i>Cornus kousa</i>	15-25'	10-15'	✓	✓	✓	-	-	-	✓	-
	Kwanzan Flowering Cherry	<i>Prunus serrulata</i>	20-40'	15-20'	✓	✓	-	-	-	-	✓	✓
	Little Gem Magnolia	<i>Magnolia grandiflora</i>	20'	10'	✓	✓	✓	-	-	-	✓	-

	Common Name	Scientific Name	Mature Height	Canopy Width	Plant Near Roadways & Medians	Plant Near Sidewalks	Plant Near Above Ground Utilities	Tolerant of Drought Conditions	Tolerant of Wet Conditions	Plant as Screen	Plant in Parking Areas	Plant in Parks or Large Open Spaces
	Nellie Stevens Holly	Ilex 'Nellie Stevens'	15-25'	10-15'	✓	✓	✓	-	-	✓	✓	✓
	Okame Cherry	Prunus 'Okame'	25-30'	25-35'	✓	✓	✓	-	-	-	✓	✓
	Paperbark Maple	Acer griseum	20-30'	15-25'	✓	✓	✓	-	-	✓	✓	-
	Red Japanese Maple	Acer palmatum 'Atropurpureum'	15-20'	10-15'	✓	✓	✓	-	-	-	-	-
	Royal Purple Smoketree	Cotinus coggyria	10-25'	10-15'	✓	-	✓	-	-	-	✓	✓
	Saucer Magnolia	Magnolia soulangiana	15-30'	15-25'	✓	✓	✓	-	-	-	✓	✓
	Savannah Holly	Ilex attenuate 'Savannah'	20-30'	8-15'	✓	✓	✓	-	-	✓	✓	✓
	Shadblow Serviceberry	Amelanchier canadensis	20-40'	15-20'	✓	✓	-	-	✓	-	✓	✓
	Star Magnolia	Magnolia stellata	10-20'	8-10'	✓	✓	✓	-	-	-	✓	✓
	Trident Maple	Acer buergeranum	20-35'	20-30'	✓	✓	✓	✓	-	-	✓	-
	Washington Hawthorn	Crataegus phaenopyrum	20-30'	20-25'	✓	✓	✓	✓	-	✓	✓	-
	Weeping Willow	Salix babylonica	30-40'	20-40'	-	-	-	-	✓	✓	-	✓
	White Fringetree	Chionanthus virginicus	10-25'	8-10'	✓	✓	✓	-	✓	-	✓	-
	Yoshino Cherry	Prunus x yedoensis	20-40'	20-40'	-	✓	-	-	-	-	✓	✓