

Guidelines for Tree & Shrub Pruning & Removal

on Minnesota Department of Transportation Rights of Way & Managed Lands

INTRODUCTION

Tree and shrub pruning has been, and will continue to be a necessary part of vegetation management on Minnesota Department of Transportation (MnDOT) rights of way and other MnDOT managed lands. Tree and other woody vegetation management activities on MnDOT Rights of Way or MnDOT managed lands may be done by MnDOT personnel, or by other entities including but not limited to utility companies, municipalities, business owners, outdoor advertising device (billboard) owners as well as other public agencies or private citizens.

MnDOT's Office of Environmental Stewardship Roadside Vegetation Management Unit (RVM Unit) offers technical assistance and recommendations in all aspects of vegetation management on MnDOT Rights of Way or MnDOT managed lands. The following guidelines will be utilized by the RVM Unit when offering technical assistance and recommendations to the MnDOT Districts and their personnel as well as direction to those outside of MnDOT who may desire to prune woody vegetation on MnDOT rights of way and other MnDOT managed lands. These guidelines are based on the ANSI A300 pruning standard and sound arboricultural care and practices.

MnDOT Pruning & Removal Guidelines

REASONS

The following list represents some of the reasons for the need to prune or remove woody vegetation on MnDOT rights of way and MnDOT managed lands:

- **Safety** – Tree or tree part removal based on a risk assessment for that given tree. Pruning or removal of vegetation for purposes of large vehicle clearance (including snow plows), sight line and/or traffic signage visibility, overhead lighting, sidewalk clearance, clear zone hazards, road shading, visibility for security purposes/public safety, clearance to buildings & structures, and increasing visibility of animals to drivers.
- **Overhead utility line corridor management** – Pruning and/or removal of trees and other woody vegetation for purposes of public safety, preventing the loss of critical services and insure continued access to the lines for future maintenance and repair work. The required clearance distance between the tree branches and the utility line will be dependent on the type of utility line (electric vs communication) in a given location. In the case of electric lines the level of voltage being transmitted will have a direct bearing on how much clearance is required. In some instances, if acceptable pruning methods are not adequate to provide needed clearance, tree removal may be the best option.
- **Tree & shrub health/aesthetics** – Proper pruning will help insure the long term health and appearance of the trees. If improperly performed, pruning can harm the health of the tree, the trees stability as well as the overall appearance of the tree.

- **Removal of infected or infested trees** – By practicing sound sanitation methods, including timely removals, damage caused by certain tree diseases or harmful insect's can be slowed down or stopped in a given area.
- **Woody invasive species control/management** – Help control/slow down the spread of certain invasive woody plants (such as Oriental Bittersweet & Buckthorn) by removal and or proper treatments.
- **Construction** - Removal or pruning of woody vegetation in order to complete a construction project. This could include items such as the repair of existing or building of new MnDOT roads, bridges, buildings (rest areas, headquarter buildings, truck stations, etc.) noise walls or other transportation related structures. Pruning or removal may also be necessary for the creation of proper equipment access routes to complete the work.

PRUNING OBJECTIVES

Prior to pruning or removing woody vegetation, clear objectives should be established. Below are some examples of the main objectives to consider prior to pruning or removing woody vegetation on MnDOT rights of way and MnDOT managed lands:

- **Reduce risk of failure** – on MnDOT rights of way and MnDOT managed lands, a regular pruning cycle is generally not realistic in most cases. Pruning cycles, methods, and amount of pruning will depend on the tree, location & situation. Safety concerns in a given area or situation will drive the urgency for this pruning objective, based on a risk assessment at that point in time.
- **Provide clearance** – This objective can be accomplished by directing growth away from desired object(s) by selectively removing limbs. A regular cyclical pruning schedule is required to maintain clearance in many cases. If pruning for clearance cannot be completed on a given tree by using acceptable pruning methods (see “**PRUNING METHODS**” on following pages) then it will be recommended that the tree be removed. **TOPPING CUTS WILL NOT BE RECOMMENDED ON MnDOT RIGHTS OF WAY AND MnDOT MANAGED LANDS.** Topping cuts may be allowed in special situations for 1 pruning cycle with an agreement that during the next pruning cycle (within 5 years) said trees would be removed and adjacent property owner(s) agree to plant replacements on their property.

TOPPING CUTS



- **Maintain Health** – Removal of dead, diseased and rubbing branches in a younger trees crown as well as maintaining a clean crown in older trees, including the removal of damaged limbs resulting from weather related events (ice, wind, lightning, snow loads) is important in maintaining a trees health. This type of pruning will likely be performed on those trees located in more formal settings such as Rest Areas, Headquarter buildings and Truck Stations.
- **Improve a view** – Selective removal of branches to improve or enhance a view. Pruning method and amount depends on the species, location and situation. This type of pruning would most often occur at scenic overlook areas or areas located within a scenic easement.
- **Improve aesthetics** – Improving the appearance of a given tree can be accomplished through various methods and levels of pruning depending on the tree. This pruning will likely be performed on those trees located in more formal settings such as Rest Areas, Headquarter buildings and Truck Stations.

PRUNING METHODS (TYPES)

- **Pruning to Clean (Crown Cleaning)** – This involves the selective removal of dead, diseased, detached, cracked, and broken branches. This would be the preferred type of pruning for mature trees as it does not unnecessarily remove any live branches.
- **Pruning to Thin (Crown Thinning)** – This involves the selective removal of small diameter live branches (generally located on the outer edge of crown) to reduce the overall density of the crown. Proper thinning will retain the shape & size of the crown while providing an even distribution of foliage throughout the crown. On small trees, thinning will remove branches up to ½ inch in diameter while with mature trees branches up to 2.5 inches in diameter or greater. Percent canopy removed should not exceed 25% of total foliage, particularly on mature trees.
- **Pruning to Raise (Crown Raising)** – For deciduous trees, this involves selective removal of branches to provide vertical clearance. This vertical clearance can be accomplished by shortening or removing lower branches from the canopy. Raising can be used to provide clearance for vehicles, equipment (mowers), signs, pedestrians, various safety and security concerns as well as vistas/views. When raising is completed, live crown to stem ratio (LCR) should be **NO LESS THEN 50%**, and more would be better. If required raising results in a LCR of less than 50%, complete tree removal would likely be recommended. Typically raising of coniferous trees isn't recommended except for the removal of dead or diseased limbs, or in approved situations where safety or liability concerns are present.

- **Pruning to Reduce (Crown Reduction)** – This involves selectively removing branches and stems to reduce the height and/or canopy spread of a tree or shrub. This type of pruning will be especially useful in situations where vegetation needs to be cut in order to provide clearance to utility lines, buildings, signs, as well as improving overall aesthetics and in some cases reduce the risk of failure. Appropriate crown reduction generally removes branches and stems from the outer portion of the canopy back to lateral branches that are at least 1/3 the diameter of the removed stem or branch. Crown reduction pruning should be accomplished using only reduction cuts. Properly executed reduction cuts **ARE NOT HEADING/TOPPING CUTS**. This type of pruning is not recommended for older trees or trees under a great deal of stress.
- **Structural Pruning** – This type of pruning involves removing live branches and stems, ideally on young and medium aged trees in order to create a trunk and canopy that will sustain itself for the long term (have good structure). Smaller trees or shrubs are often structurally pruned to remove rubbing limbs, co-dominant stems, provide proper branch spacing and good crown balance to create a sound, aesthetically pleasing crown. Structural pruning is often accomplished with several prunings over a 15-25 year time span in the younger stages of a trees life. Structural pruning of older/larger trees is much more difficult and is more stressful to the tree. Often times, if structural pruning is done on an older, maturing tree, it is for purposes of removal of one or more co-dominant stems in order to create a strong central leader. In general, this type of pruning is limited to work done by a Contractor during the initial plant establishment period, or at more formal settings such as rest areas, headquarter buildings and truck stations.
- **Pruning to Restore (Restoration Pruning)** – This type of pruning involves the selective removal of any portion of a tree or shrub that has sustained damage. This damage may have been a result of poor pruning practices in the past (topping, severely headed back, lion’s tailed), storm damaged branches, vandalism, vehicle damage, or any other type of damages. The reasons for restorative pruning are to improve the tree or shrubs overall health, appearance and structure. A variety of types of cuts (heading, reduction, removal, etc...) may be needed as part of the restoration pruning depending on the tree, the location, and the level of damage. In some cases, when damage is too severe, removal may be preferred.
- **Rejuvenation Pruning** – This type of pruning practice is specific to deciduous shrubs, and involves cleanly cutting back (not ripped or torn) all branches to within 3 inches of the ground. This practice can be done on an annual basis for certain smaller shrub species (Spirea for example) in order to maintain the shrub at a certain size. For larger shrub species, this would be a maintenance activity that would only make sense on a 10 – 15 year cycle, when the shrubs have become old and overgrown, and may have a fair amount of dead wood. **Rejuvenation pruning should only be done when the shrub(s) is/are dormant**. It should be made aware that when pruning certain shrubs that set their flower buds on the previous year’s growth (like Lilac) that those shrubs will not flower the following spring after a dormant season pruning.

WHEN TO PRUNE

Ideally, Pruning should be done when trees and shrubs are dormant (November-March). Exceptions to this include removal of dead or dying branches, broken/injured branches, as well as branches that need removal for immediate safety/sightline concerns or construction project needs, for which pruning can be done when necessary and as needed (see exceptions below). Generally, coniferous trees (evergreens) can be pruned at any time during the year, however pruning during the dormant season would minimize sap and resin flow from the cut branches.

Exceptions:

-Oak trees should not be pruned between April and the end of July due to Oak Wilt concerns. If it is absolutely necessary to prune Oak trees during this period, a latex paint or shellac should be applied immediately to all pruning wounds. (See MnDOT Standard Specification 2572.3A.9).

-To avoid the increased risk of stem cankers, prune honeylocusts when they are dormant (ideally late winter). If they must be pruned while they are actively growing, avoid doing this work during rainy or humid weather conditions.

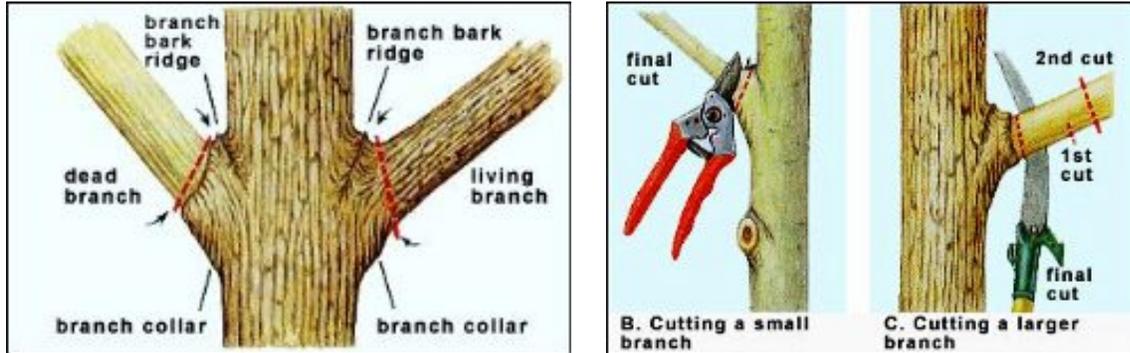
PROPER PRUNING CUTS

Any time a tree or shrub is to be pruned on MnDOT Rights of Way and properties, regardless of whether or not the work is being done by a MnDOT employee or a hired contractor, it is very important that good pruning cuts are made. Generally with arboricultural pruning there will be either a branch removal cut (thinning cut) or a reduction cut. In most cases removal cuts are preferred as they leave the branch protection zone intact. Reduction cuts will also come into play as they will be used to complete reduction pruning in cases where crown reduction is necessary as well as during structural pruning.

- **Branch Removal Cut (Thinning Cut)** – A branch removal cut is when the branch is removed from its point of origin on the trunk, stem or larger branch. This type of pruning cut should be done as close to the trunk as possible while avoiding the wounding of the branch bark ridge or branch bark collar and without leaving a stub. Known as natural target pruning (also known as the “Shigo Method”), this method of pruning should be used on all pruning cuts (see diagrams on following page for illustration of this method).
- **Reduction Cuts** – A reduction cut basically shortens a limb or branch back to a node or smaller lateral branch or a limb of similar size. With a proper reduction cut, a general rule of thumb that should be followed is the remaining lateral branch should be at least one-third to one-half the diameter of the removed portion. The cut should be made at a slight downward angle relative to the stem or branch left in place and not cause damage to the remaining branch/stem.

- **Heading Cut (Topping)** - There can also be what is called a heading cut, but on MnDOT trees, **TOPPING WILL NOT BE RECOMMENDED OR TOLERATED.**

Natural Target Pruning



Illustrations from - How to Prune Trees (USDA Forest Service)

HOW MUCH TO PRUNE

In order to put the least amount of stress as possible and preserve energy reserves in the tree(s) to be pruned, it is important to remove only the number of live branches needed to accomplish the given objective(s). With that being said, unless there is a very good reason, it is not recommended to remove more than 25% of the live crown in a single pruning cycle (year).

USE PROPER PRUNING TOOLS

Tools adequate for the size of the cuts being made should always be used. It is important that pruning tools are kept sharp so clean cuts are made at the time of pruning without stubs or jagged edges. Use of "anvil-type" pruners is not allowed on MnDOT pruning jobs, instead a bypass pruner is highly recommended when hand pruners are being used (see images below). **The use of climbing spurs is not allowed when climbing is required to complete work on live trees.**



Bypass pruner



Anvil pruner

Other acceptable hand pruning tools include bypass type loppers and saws that are made specifically for pruning. Below are images of other acceptable hand pruning tools:



Bypass lopper



Hand Saw



Pole Saw/Pruner

When hand tools aren't adequate, there are a number of acceptable power tools that can be used for pruning. Examples shown below include chain saws, gas powered pole saws, and "Giraffe" type saws. These types of saws should only be operated by qualified personnel, using proper pruning techniques:



Chain Saw



Gas Powered Pole Saw



"Giraffe" type Saw

There are a number of other types of power equipment available for use in cutting trees and other woody vegetation. These types of equipment are commonly referred to as “forestry mowers”, forestry heads” and “brush cutters” among other names. While they can be useful tools for tree and brush removal, **they are not designed or intended for use as pruning tools.** Below are some images of this type of equipment:



Forestry mower/head



Brush cutters

Debris Removal

When pruning or removing woody vegetation on MnDOT rights of way and other MnDOT managed lands, there will be debris generated from these activities. What can be done with this debris will be dependent on several factors including but not limited to the type of debris (branches, logs, chips, etc...), quantity of debris and location where work is taking place. For smaller branches (less than 2 inches in diameter) it is acceptable to leave them scattered out on the backslopes of the roadside or other areas where they won't interfere with drainage systems or vehicle traffic (not on inslopes or shoulders). For branches or logs greater than 2 inches in diameter, they must be removed from the site. If the wood can be run through a chipper on site, it can be left in the general vicinity of the work if the following criteria are met:

- Chips must be spread out evenly at a depth of 1 inch or less.
- Chips must be spread out on a flat surface, or on a backslope (not steeper than 3:1 slope) where washing away into a ditch bottom or other drainage structure would not be an issue.
- Leaving chips on the inslope or shoulder areas is not acceptable.

When work is being done at a MnDOT building facility (rest area, headquarter building, truck station, etc.) where higher levels of landscape maintenance are expected, all debris should be removed from the site or taken to a dedicated area for such debris at the site.

PRUNING SPECIFICATIONS

When pruning is to be completed under contract, under permit, or through cooperative agreement with a local unit of government, the following list of items should be considered when writing specifications for that work:

- Include language in the specifications that state all work will be performed in accordance with the guidelines laid out in this document (*Guidelines for Tree & Shrub Pruning & Removal on Minnesota Department of Transportation Rights of Way & Managed Lands*).
- Specifications should include language stating all work is to be completed by or under the direct supervision of an ISA (International Society of Arboriculture) Certified Arborist.
- Specifications should include clear language or a clearly identifiable map that states which tree(s) should be pruned or removed.
- Specifications should include the objective(s) of the pruning.
- Specifications should include the pruning type or method to be used.
- Specifications should include the branch size range (minimum and maximum in diameter inches) to be removed.
- Specifications should include the maximum amount of live crown/canopy to be removed for each tree in a percentage amount. This amount should generally not exceed 25% of the live crown/canopy.

Sources of Information

Best Management Practices – Tree Pruning (2008 edition), companion publication to the ANSI A300 Part 1: Tree, Shrub, and other Woody Plant Maintenance – Standard Practices, Pruning

How to Prune Trees (USDA Forest Service)

Landscape Plants: Pruning Shade Trees in Landscapes

(<http://hort.ifas.ufl.edu/woody/pruning.shtml>) - Edward F. Gilman, Professor, Environmental Horticulture Department, IFAS, University of Florida

MnDOT Standard Specifications For Construction – 2016 Edition