

*for Tree Care Operations –  
Tree, Shrub, and Other Woody Plant  
Management – Standard Practices  
(Root Management)*



American National Standard  
for Tree Care Operations –

*Tree, Shrub, and Other Woody Plant Management –  
Standard Practices (Root Management)*

Secretariat  
**Tree Care Industry Association, Inc.**

**Published by**  
Tree Care Industry Association, Inc.  
136 Harvey Road – Ste 101  
Londonderry, NH 03053  
800-733-2622  
603-314-5380  
Fax: 603-314-5386  
Email: [RRouse@tcia.org](mailto:RRouse@tcia.org)  
Web: [www.tcia.org](http://www.tcia.org)

**Copyright © 2013 by the Tree Care Industry Association, Inc.  
All rights reserved.**

No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without prior written permission of the publisher.

## American National Standard

Approval of an American National Standard requires review by ANSI that the requirements for due process, consensus, and other criteria for approval have been met by the standards developer.

Consensus is established when, in the judgement of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that a concerted effort be made toward their resolution.

The use of American National Standards is completely voluntary; their existence does not in any respect preclude anyone, whether he has approved the standards or not, from manufacturing, marketing, purchasing or using products, processes or procedures not conforming to the standards.

The American National Standards Institute does not develop standards and will in no circumstances give an interpretation of any American National Standard. Moreover, no person shall have the right or authority to issue an interpretation of an American National Standard in the name of the American National Standards Institute. Requests for interpretations should be addressed to the secretariat or sponsor whose name appears on the title page of this standard.

CAUTION NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken periodically to reaffirm, revise, or withdraw this standard. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute.

### **American National Standards Institute, Inc.**

Headquarters:

1899 L Street, NW  
11<sup>th</sup> Floor  
Washington, DC 20036

New York Office:

25 West 43rd Street  
4<sup>th</sup> Floor  
New York, NY 10036

**[www.ansi.org](http://www.ansi.org)**

## Contents

<b>Foreword</b> .....	6
<b>1</b> ANSI A300 standards scope, purpose, and application.....	8
<b>80</b> Part 8 – Root Management standards.....	8
<b>81</b> Normative references.....	9
<b>82</b> Definitions.....	9
<b>83</b> Root management practices .....	11
<b>84</b> Root management practices – root pruning and cutting.....	12
<b>85</b> Managing the direction of root growth .....	13
<b>86</b> Post-root management care practices .....	14
<b>Annex A</b> Alternatives to root cutting and pruning .....	15
<b>Annex B</b> Managing trees to mitigate root damage or loss .....	16
<b>Annex C</b> Managing roots in fill .....	17
<b>Annex D</b> Managing trunks, flares, and roots affected by fill, sample specifications.....	18
<b>Annex E</b> Objectives for root pruning and cutting .....	19

**Foreword** This foreword is not considered part of American National Standard *A300 (Part 8)-2013 Root Management*.

ANSI A300 Standards are divided into multiple parts, each focusing on a specific aspect of woody plant management (e.g. Pruning, Soil Management, Supplemental Support Systems, etc).

These standards are used to develop written specifications for work assignments. They are not intended to be used as specifications in and of themselves. Management objectives may differ considerably and therefore must be specifically defined by the user. Specifications are then written to meet the established objectives and must include measurable criteria.

ANSI A300 standards apply to professionals who provide for, or supervise the management of, trees, shrubs, and other woody landscape plants. Intended users include businesses, government agencies, property owners, property managers, and utilities. The standard does not apply to agriculture, horticultural production, or silviculture, except where explicitly noted otherwise.

This standard has been developed by the Tree Care Industry Association (TCIA), an ANSI-accredited Standards Developing Organization (SDO). TCIA is secretariat of the ANSI A300 standards, and develops standards using procedures accredited by the American National Standards Institute (ANSI).

Consensus for standards writing was developed by the Accredited Standards Committee on Tree, Shrub, and Other Woody Plant Management Operations – Standard Practices, A300 (ASC A300).

Prior to 1991, various industry associations and practitioners developed their own standards and recommendations for tree care practices. Recognizing the need for a standardized, scientific approach, green industry associations, government agencies and tree care companies agreed to develop consensus for an official American National Standard.

The results – ANSI A300 standards – unify and take authoritative precedence over all previously existing tree care industry standards. ANSI requires that approved standards be developed according to accepted principles, and that they be reviewed and, if necessary, revised every five years.

TCIA was accredited as a standards developing organization with ASC A300 as the consensus body on June 28, 1991. ASC A300 meets regularly to write new, and review and revise existing, ANSI A300 standards. The committee includes industry representatives with broad knowledge and technical expertise from residential and commercial tree care, utility, municipal and federal sectors, landscape and nursery industries, and other interested organizations.

Suggestions for improvement of this standard should be forwarded to: ANSI A300 Secretary, c/o Tree Care Industry Association, Inc., 136 Harvey Road - Suite 101, Londonderry, NH 03053.

ANSI A300 (Part 8)-2013 Root Management was approved as an American National Standard by ANSI on August 26, 2013. ANSI approval does not require unanimous approval by ASC A300.

*(Continued)*

The ASC A300 committee had the following members as of August 26, 2013:

*Dane Buell, Chair  
(SavATree, Inc.)*

*Bob Rouse, Secretary  
(Tree Care Industry Association, Inc.)*

**Organizations Represented**

*Alliance for Community Trees  
American Nursery and Landscape Association*

*American Society of Consulting Arborists*

*American Society of Landscape Architects  
Asplundh Tree Expert Company  
Bartlett Tree Expert Company*

*Davey Tree Expert Company*

*International Society of Arboriculture*

*Professional Grounds Management Society*

*Professional Land Care Network*

*Society of Municipal Arborists*

*Tree Care Industry Association  
USDA Forest Service*

*Utility Arborist Association*

**Name of Representative**

*Carrie Gallagher  
Warren Quinn  
Craig J. Regelbrugge (Alt.)  
Donald Godi  
Stephen Miller (Alt.)  
Ron Leighton  
Geoff Kempter  
Peter Becker  
Dr. E. Thomas Smiley (Alt.)  
Chris Klinas  
Grant Jones (Alt.)  
Dr. Richard Hauer  
Sharon Lilly (Alt.)  
Gene Pouly  
Michael Bova (Alt.)  
Alice Carter  
Tom Delaney (Alt.)  
Nolan Rundquist  
Gordon Mann (Alt.)  
Steve Mays Jr.  
Keith Cline  
Ed Macie (Alt.)  
William T. Rees  
Matthew Simons (Alt.)*

**Additional organizations and individuals:**

*Peter Gerstenberger (Observer)  
Andy Hillman (Observer)  
Myron Laible (Observer)  
Tim Johnson (Observer)  
Guy Meilleur (Observer)  
Beth Palys (Observer)  
Dr. Richard Rathjens (Observer)  
Richard Roux (NFPA-780 Liaison)  
Brittany Giffords (Observer)*

**ASC A300 Mission:** To develop consensus performance standards based on current research and sound practice for writing specifications to manage trees, shrubs, and other woody plants.

**ASC A300 Vision:** ANSI A300 standards will be the foundation for work specifications, training materials, quality protocols, and regulations for the management of trees, shrubs, palms, and other woody plants.

American National Standard  
for Tree Care Operations –

## Part 8 – Root Management

### Subclause 1.1 to 1.3 excerpted from ANSI A300 (Part 1) – *Pruning*

#### 1 ANSI A300 standards

##### 1.1 Scope

ANSI A300 standards present performance standards for the care and management of trees, shrubs, and other woody plants.

##### 1.2 Purpose

ANSI A300 performance standards are intended for use by federal, state, municipal and private entities including arborists, property owners, property managers, and utilities for developing written specifications.

##### 1.3 Application

ANSI A300 performance standards shall apply to any person or entity engaged in the management of trees, shrubs, or other woody plants.

### 80 – Root Management standards

#### 80.1 Purpose

The purpose of this standard is to provide industry consensus guidelines for root management and standards for writing specifications.

#### 80.2 Reasons for root management

The reasons for root management may include but are not limited to promoting tree health, stability, and longevity, and managing the interaction of tree roots with soil, infrastructure, property, and other plants. Root management practices for agriculture, horticultural production, or silvicultural purposes are exempt from this standard unless this standard, or a portion thereof, is expressly referenced in these standards for these other related areas.

#### 80.3 Implementation

**80.3.1** Root management specifications should be written and administered by an arborist with related training and experience.

**80.3.1.1** Root management shall be implemented by a qualified professional, familiar with the practices and hazards associated with root management and the equipment used in such operations.

**80.3.1.2** Specifications for root management shall include objectives, scope of work, and timing.

**80.3.1.3** Specifications for root management should include, but are not limited to: objectives; treatment area; methods; materials; equipment; and, timing.

**80.3.2** Practices that minimize damage to roots shall be preferred (see Annex A).

#### 80.4 Safety

**80.4.1** This performance standard shall not take precedence over applicable industry safe work practices.

**80.4.2** Personnel shall follow appropriate safe work practices.

**80.4.3** Performance shall comply with applicable Federal and State Occupational Safety and Health Administration (OSHA) standards, ANSI Z133, and other federal, state, and local regulations.

**80.4.4** The site shall be inspected for visible above-ground hazards prior to beginning any root management procedure.

**80.4.5** The location of utilities and other obstructions both below and above ground shall be taken into consideration prior to root management operations. Utilities and other obstructions include, but are not limited to: gas; electric; communications; sewer; drainage; and, signage.

**80.4.6** Job briefings shall be performed as outlined in ANSI Z133.

## 81 Normative references

ANSI A300 for Tree Care Operations – Tree, Shrub, and Other Woody Plant Management – Standard Practices, all Parts

ANSI Z60, Nursery stock

ANSI Z133 for Arboricultural Operations – Safety Requirements

ASTM A-475, Standard Specification for Zinc-Coated Steel Wire Strand

Federal Standard: FF-T-276b, Thimbles, Rope

29 CFR 1910, Occupational Safety and Health Standards (General Industry)<sup>1)</sup>

29 CFR 1910.268, Telecommunications<sup>1)</sup>

29 CFR 1910.269, Electric power generation, transmission and distribution<sup>1)</sup>

29 CFR 1910.331 - 335, Electrical safety-related work practices<sup>1)</sup>

29 CFR 1910, Subpart S – Electrical, §§ 1910.331 - 335, Safety-related work practices<sup>1)</sup>

<sup>1)</sup> Available from U.S. Department of Labor, 200 Constitution Ave. NW, Washington, D.C. 20210, or [www.osha.gov](http://www.osha.gov).

**82 Definitions** (Definitions are considered part of the ANSI A300 (Part 8)-2013 Root Management standard.)

**82.1 adventitious root:** Root arising from parts of the root or the stem.

**82.2 aggregate:** Materials such as sand, gravel, or rock, often used under paved surfaces, as back-fill, or for other purposes.

**82.3 arborist:** An individual engaged in the profession of arboriculture who, through experience, education and related training, possesses the competence to provide for, or supervise the management of, trees and other woody ornamentals.

**82.4 arborist trainee:** An individual undergoing on-the-job training to obtain the experience and the competence required to provide for, or supervise

the management of, trees and woody plants. Such trainees shall be under the direct supervision of an arborist.

**82.5 berm:** Soil added above grade for a specified purpose, such as a planting bed or barrier.

**82.6 callus:** Undifferentiated, non-lignified tissue, usually developed in response to wounding.

**82.7 crown:** Upper part of a tree, measured from the lowest branch, including all the branches and foliage.

**82.8 decay:** (v.) Decomposition of woody tissues by microorganisms. (n.) Wood that is decomposed.

**82.9 fill:** Soil, sand, gravel, rocks, or other material placed over the existing soil surface to raise the finished grade to some specified level.

**82.10 flare (trunk flare, root flare):** The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots.

**82.11 hardscape:** Built infrastructure such as pavement, sidewalks, curbing, storm drains, walls, and footings.

**82.12 hydraulic soil excavation:** The removal of soil using pressurized water.

**82.13 mitigation:** 1. Reducing or alleviating unfavorable conditions. 2. The process of diminishing risk.

**82.14 mulch:** A material applied to the soil surface to protect the soil, deter erosion, moderate soil temperature, conserve moisture, inhibit weeds; or improve soil structure.

**82.15 pneumatic soil excavation:** The removal of soil using pressurized air.

**82.16 qualified professional:** An individual possessing skills, experience, training, education, certificates, degrees, registration, certification, or licensing as needed to perform job tasks.

**82.17 radial trenching:** Removing soil and other material in trenches radiating from the trunk.

**82.18 root barrier:** A device designed to direct root growth.

**82.19 root channel:** An underground system

used to direct root growth and increase soil volume.

**82.20 root collar:** The transition zone between the flare and the root system.

**82.21 root collar examination:** The process of exposing and assessing the root collar.

**82.22 root cutting:** Severing roots non-selectively.

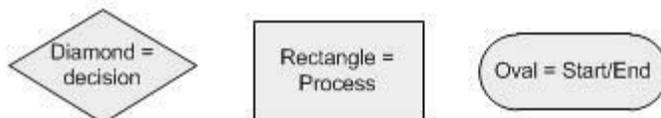
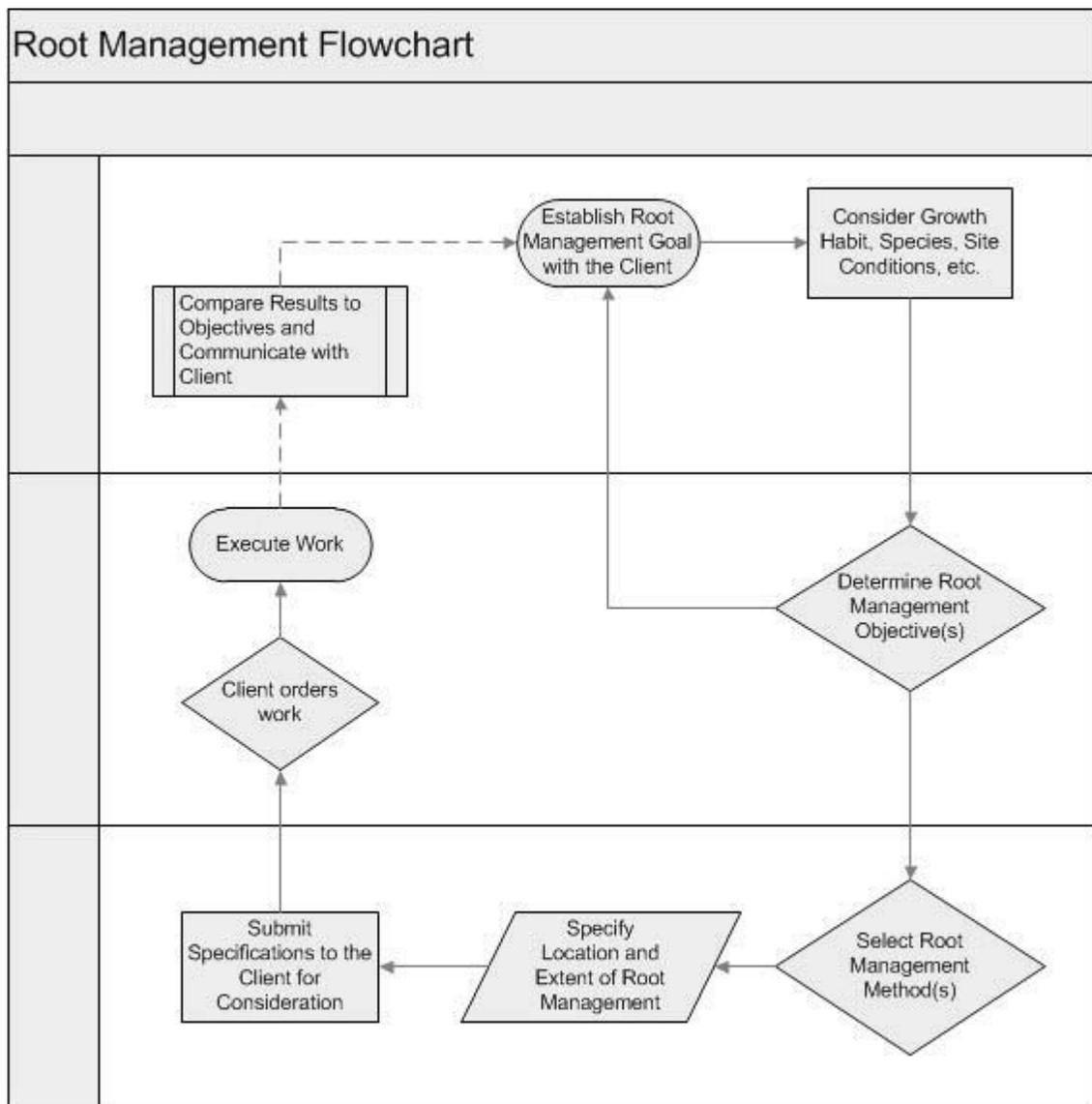
**82.23 root pruning:** Severing roots selectively.

**82.24 root, buttress:** A major lateral root radiating from the base of the trunk.

**82.25 root, circling:** A root that encircles all or a portion of a trunk but does not contact it.

**82.26 root, girdling:** A root that encircles all or a

The following flowchart is the recommended procedure for normal root management operations:



portion of a trunk and contacts the trunk or a buttress root.

**82.27 root, surface:** A lateral root that is visible above grade.

**82.28 shall:** As used in this standard, denotes a mandatory requirement.

**82.29 should:** As used in this standard, denotes an advisory recommendation.

**82.30 soil volume:** The volume of soil available to trees and other woody plants for root development.

**82.31 specifications:** A detailed, measurable plan or proposal for performing a work activity or providing a product; usually a written document.

**82.32 standard, ANSI A300:** The performance parameters established by industry consensus as a rule for the measure of extent, quality, quantity, value or weight used to write specifications.

**82.33 stem:** A woody structure bearing buds, foliage, and giving rise to other stems.

**82.34 tracing:** The removal of loose, damaged tissue from in and around the wound.

**82.35 utilities:** Facilities associated with services such as telephone, data, CATV, electricity, gas, steam, energy transmission and distribution, water and sewage, and transportation.

**82.36 wood-chip mulch:** A material placed on the soil surface composed of ground wood, bark, and leaves usually generated by sending tree parts through a wood chipping machine.

**82.37 wound:** Damage to plant tissue caused by pests, pruning, mechanical damage, or other natural forces.

## 83 Root management practices

### 83.1 Root management objectives

**83.1.1** Arborists developing objectives and specifications, and managing roots shall have sufficient training and experience.

**83.1.2** Arborists developing objectives and speci-

fications, and managing roots should visually inspect the tree(s) and the site.

**83.1.3** Soil volume, fill, air and water movement, drainage, and the distance between roots and infrastructure should be considered.

**83.1.4** Root management objectives shall be established with the owner or owner's agent.

**83.1.5** Root management objectives shall be defined based on potential tree benefits, the intended use of the site, tree stability, and the scope of the assignment.

### 83.2 General

**83.2.1** If a condition is observed requiring attention beyond the original scope of the work, the condition should be reported to an immediate supervisor, the owner, or the person responsible for authorizing the work.

**83.2.2** Root management practices should include, but are not limited to, one or more of the following:

- Inspection of the tree, including the trunk, flare, root collar, detectable roots, and soil volume;
- Selective root pruning;
- Non-selective root cutting; and,
- Directing or redirecting roots.

**83.2.3** Tools and equipment should be maintained according to manufacturer's recommendations.

**83.2.4** Equipment, tools, and work practices that damage living tissue, bark, or soil beyond the scope of work shall be avoided.

**83.2.5** Wound treatments that are damaging to tree tissues outside the scope of work shall not be used.

**83.2.6** Wound treatments shall not be used to cover wounds, except to manage desiccation or pests, or for aesthetic purposes.

**83.2.7** Tracing of wounds shall remove only dead, loose, and damaged tissue.

**83.2.8** Evaluation of decay, callus and woundwood growth, and response growth in the trunk and crown shall be considered.

### **83.3 Trunk, flare, and root inspection**

**83.3.1** Objectives of inspections shall be established.

**83.3.2** The method, area, depth, and limitations of inspection shall be specified.

**83.3.3** Tools and equipment used for inspection shall be specified.

**83.3.4** Inspection should include, but is not limited to, one or more of the following:

- Conditions in the crown that may reflect root conditions;
- Stem tissue connecting the crown and the roots;
- Girdling of the buttress roots or stems by roots or other materials, and the tree's response;
- Tree association with beneficial and harmful insects;
- Tree association with pathogenic and beneficial microorganisms (e.g. mycorrhizae);
- Wounds, and the tree's response to wounds;
- Mechanical damage to detectable roots and response;
- Indications of root disease and response; and,
- Graft unions in grafted trees.

**83.3.5** Mulch, soil, and other materials should be removed as needed to allow for the inspection.

#### **83.3.6 Soil excavation for root collar examination**

**83.3.6.1** Small adventitious roots that interfere with excavation or examination should be moved or pruned.

**83.3.6.2** Adventitious roots should be considered for retention.

**83.3.6.3** Temporary protection of newly exposed rootzone, root tissue, and stem tissue shall be considered.

**83.3.7** Detectable flare and root diseases and disorders should be diagnosed.

**83.3.8** If significant structural defects are

observed, a risk assessment should be recommended, see ANSI A300 (Part 9) – *Tree Risk Assessment* standard.

**83.3.9** The flare and buttress roots should remain visible after inspection.

### **84 Root management practices – root pruning and cutting**

#### **84.1 Root pruning and cutting objectives**

**84.1.1** Root pruning and cutting objectives shall be established.

**84.1.2** The extent and method of root pruning or cutting shall be based on the objectives, species tolerance, environmental factors, timing, age, health, lean, and structural condition of the tree(s).

**84.1.3** When establishing objectives, potential for tree decline or destabilization shall be considered.

**84.1.4** Tools and equipment shall be specified.

#### **84.2 Root pruning and root cutting practices**

**84.2.1** The owner should be notified of the risk to tree health and stability prior to the pruning or cutting of roots.

**84.2.2** When mitigating or avoiding infrastructure damage, only roots causing or likely to cause damage should be pruned.

**84.2.3** Surface roots should be managed by removing soil or reducing soil density in accordance with ANSI A300 (Part 2) – *Soil Management* standard, to meet the objective including, but not limited to raising the grade with porous soil, sand, or mulch.

**84.2.4** Selective root pruning or non-selective root cutting shall be specified where needed to meet the objective.

**84.2.5** When root removal is unavoidable, selective pruning shall be the preferred method.

**84.2.6** Root pruning and cutting tools should be sharp.

#### **84.3 Selective root pruning**

**84.3.1** The size and/or location of roots to be pruned shall be specified.

**84.3.2** Roots should be exposed using the least injurious excavation method prior to pruning.

**84.3.3** A pruning cut that removes a root at its point of origin should not cut into the trunk or parent root.

**84.3.4** Smaller pruning cuts shall be preferred.

**84.3.5** The final cut should result in a flat surface with adjacent bark firmly attached.

#### **84.4 Selective root pruning – girdling roots**

**84.4.1** Roots that encircle or girdle the trunk or a buttress root should be considered for redirecting or pruning.

**84.4.2** Girdling roots should be exposed before pruning cuts are planned or made.

**84.4.3** Retention of encircling or girdling roots that are providing more benefit than damage shall be considered.

**84.4.4** The trunk and buttress roots shall not be damaged beyond the scope of the work.

**84.4.5** If one or more large girdling roots are present, progressive root pruning over a specified time period should be considered.

**84.4.6** Root pruning tools shall include, but are not limited to: handsaws; lopping shears; chisels; hand shears; chain saws; reciprocating saws; and, circular saws (see subclause **80.4 Safety**).

#### **84.5 Non-selective root cutting**

**84.5.1** When non-selective root cutting is necessary, roots shall be cut as far from the trunk as practical.

**84.5.2** The location and depth of excavation for root cutting shall be specified.

**84.5.3** Minimum distance from the trunk for root cutting should be adjusted according to trunk diameter, species tolerance to root loss, tree age, health, and site condition.

**84.5.4** Root cutting distances from the trunk shall be adjusted for disease management, root location, tree species and condition, and, site and soil conditions.

**84.5.5** When roots are damaged within six times the trunk diameter (DBH), mitigation shall be recommended.

**84.5.6** Roots should be cut with equipment that minimizes cracking the wood and tearing the bark.

**84.5.7** Heavy equipment should be located outside the root cut line or remain on existing pavement or on a soil-protecting surface.

**84.5.8** Temporary staging areas for excavated soil should be located at a safe distance on the side of the trench furthest from the trunk.

**84.5.9** Upon completion of non-selective root cutting, selective root pruning of damaged roots in accordance with subclause 84.3 shall be considered.

### **85 Managing the direction of root-growth**

**85.1** Objectives for managing the direction of root growth shall be established prior to beginning operations.

**85.2** The type, depth, and location of root direction materials shall be specified to achieve the objective.

**85.3** Root direction methods shall include, but are not limited to, one or more of the following:  
Designing, installing, and/or maintaining root barriers; and,  
Designing, installing, and/or maintaining root channels.

**85.4** Managing the direction of root growth shall be considered as an alternative, or in conjunction with, root pruning or cutting.

**85.5** Managing the direction of root growth shall be considered following root pruning.

**85.6** Use and installation of root management devices should follow manufacturer's recommendations.

**85.7** Root barriers should be installed as far from tree trunks as possible.

**85.8** Roots that grow over the root barrier should be pruned on the tree trunk side of the barrier.

**86 Post root – management care practices**

**86.1** Specifications for monitoring and maintaining tree health and stability should be established.

**86.2** Root damage that affects the stability of the tree should be mitigated (see *ANSI A300 (Part 9) – Tree Risk Assessment standard*).

**86.3** Post-root management care should be specified for an appropriate period of time based on the region, site conditions, and species.

**86.4** Specifications for post root – management

care should consist of, but are not limited to, one or more of the following:

- a. soil moisture management;
- b. mulching;
- c. integrated pest management;
- d. pruning (see *ANSI A300 (Part 1) – Pruning standard*);
- e. soil management (see *ANSI A300 (Part 2) – Soil Management standard*);
- f. maintenance/removal of tree support systems (see *ANSI A300 (Part 3) – Supplemental Support Systems standard*); and,
- g. appropriate use of growth regulator.

**Annex A – Alternatives to root pruning and cutting** (This annex is for informational purposes only and is not considered part of the ANSI A300 Part 8 standard.)

- A-1** Alternatives to root pruning and cutting may include, but are not limited to:
- Changing project design;
  - Tunneling around or beneath roots;
  - Re-routing utility lines away from roots;
  - Tree grates;
  - Bridging over roots;
  - Discontinuous footings for retaining walls, footings, and foundations;
  - Ramping sidewalks;
  - Using flexible paving materials or shallower sections;
  - Using permeable paving materials;
  - Enlarging tree wells (cut-outs) or converting them to open retaining walls;
  - Reducing sidewalk width;
  - Relocating pavement;
  - Increasing the thickness of the pavement;
  - Reinforcing with rods or under-laying it with a geotextile fabric;
  - Use of geogrids or other 'no-dig' pavement systems;
  - Using a coarse aggregate under sidewalks;
  - Supporting pavement on piers; and,
  - Covering surface-roots with soil or mulch.

**Annex B – Managing trees to mitigate root damage or loss** (This annex is for informational purposes only and is not considered part of the ANSI A300 Part 8 standard.)

- B-1** Define objectives for management of trees with root damage or loss prior to beginning operations.
- B-2** Objectives include, but are not limited to one or more of the following:  
To improve stability;  
To minimize drought stress and pest problems; and,  
To create conditions favorable for root regeneration and growth.
- B-3** Specify follow-up care for trees and shrubs sustaining root loss.
- B-4** Monitor trees sustaining root loss for symptoms of stress or decline for a specified period.
- B-5** Irrigate prior to, during, and after root pruning.
- B-6** In general, reducing or thinning woody plants to compensate for root loss is not considered an effective practice to mitigate water stress.
- B-7** Consider supporting, reducing, or thinning woody plants when stability of a root-pruned tree has been significantly decreased.
- B-8** Consider applying a 2- to 4-inch (5-10 cm) layer of organic mulch. Do not let mulch contact the flare or trunk.

**Annex C – Managing roots in fill** (This annex is for informational purposes only and is not considered part of the ANSI A300 Part 8 standard.)

- C-1** Remove as much fill as possible without damaging roots outside the scope of work.
- C-2** If adventitious roots need to be removed, specify the diameter or quantity according to tree species and condition, site factors, and whether they are needed.
- C-3** Where fill is needed to raise the grade for a specific objective, provide for drainage, adequate air, and water movement by modifying soil [see ANSI A300 (Part 2) – Soil Management standard], or by installing ventilation systems [see ANSI A300 (Part 5) – Construction standard].
- C-4** Where needed to limit erosion and manage surface water movement, install retaining devices such as silt fences, bales, logs, branches, or berms, as required by regulations. Establish berms of a size and material to permit sufficient exchange of air with the soil. Ensure contact between retaining devices and the earth.
- C-5** Design devices that provide for adequate air and water movement.

**Annex D – Managing trunks, flares, and roots affected by fill, sample specifications** (This annex is for informational purposes only and is not considered part of the ANSI A300 Part 8 standard.)

#### **D-1 Sample specification for multiple root collar examinations with hand tools**

**Trees and location:** Small and Large trees with fill contacting the trunk, as indicated on site.

**Objective:** Mitigate tree damage from the effects of fill on the trunk.

##### **Specifications:**

1. All work shall be done in accordance with ANSI A300 tree care management standards.
2. Coarse woody debris or fresh mulch will be raked away from the root collar area.
3. Excavated material will be moved away from the trunk and placed in a temporary staging area.
4. Excavation will be performed with a hand trowel and/or manual shovel.
5. Separate and dispose of any infertile soil and debris. Retain the fertile soil, fine roots, mycorrhizae, and decomposed mulch in the temporary staging area.
6. Smaller hand tools, vacuum, or compressed water or air, will be used to complete the excavation.
7. Upon completion of the excavation, the trunk and flare will be clear to the root collar and to the point of the first root branching location, according to the scope of the work.
8. Upon completion of the excavation, a visual and non-invasive hand tool (rubber sounding mallet, magnifying lens, etc.) trunk flare and root inspection will be performed.
9. The owner or owner's agent may be notified if replanting of a tree should be considered when the flare is over 2 inches (5 cm) below grade and the tree is small and/or newly planted. The root ball size and ability to withstand the operation will be considered.
10. Individual adventitious roots and stem-girdling roots 2-inch (5 cm) diameter or under will be removed as needed to meet the objective. Larger roots will be managed according to ANSI A300 (Part 8), subclauses 84.3 and 84.4. Upon completion, contact between the trunk and remaining adventitious, girdling, and circling roots will be broken or minimized according to the scope of the work.
11. Remove soil and fine roots outside of the root collar to make a gradual slope.
12. Apply 2-4 inches (5-10 cm) of mulch over the root collar. Avoid mulch contact with the flare.
13. Incorporate fertile soil, fine roots, mycorrhizae, and decomposed mulch into the outer rootzone, without raising the final grade more than 2 inches (5 cm).

**Note:** This sample specification is for hand tool excavation/inspections only, use of mechanical equipment requires knowledge and consideration of manufacturer's recommendations when writing work specifications.

**Annex E – Objectives for root pruning and cutting** (This annex is for informational purposes only and is not considered part of the ANSI A300 Part 8 standard.)

**E-1** Root pruning and cutting objectives include, but are not limited to, one or more of the following:

- Mitigating and preventing damage to the trunk or the buttress roots from girdling or circling roots;
- Preparing trees for transplanting;
- Protecting roots from infrastructure and other uses of the area;
- Managing interference with infrastructure and other uses of the area;
- Managing interactions with other plants;
- Managing pests and diseases;
- Gaining access to the root zone to install, repair, or replace infrastructure;
- Facilitating alternate use of the rootzone;
- Mitigating damage to roots; and,
- Minimizing root damage during construction.