



City of Tampa

Tree and Landscape Technical Manual

Adopted: April 18, 2019

PREFACE

This Technical Manual is a compendium of ordinance requirements of a technical nature, policy statements, and industry accepted standards. It provides applicants, city departments, other governmental agencies, and the general public with technical requirements and information corresponding to the City of Tampa's tree and landscape regulations, as set forth in Chapter 27 of City Code, ("Tree and Landscape Code"). It includes:

- Tree protection minimum standards with related graphics
- Technical standards for plant materials
- City of Tampa Tree Matrix with related graphics
- City of Tampa Tree Condition Evaluation Form
- Other representative, regulatory illustrations and graphics

Additional References:

USDA, Forest (Forestry) Service:

- (Tree) Facts Sheets, most current publications
- i-Tree: Tools for Assessing and Managing Community Trees and Forests (<http://www.itreetools.org/>)
- *Volume Prediction from Stump Diameter and Stump Height of Selected Species in Louisiana*, pub. 197

University of Florida, Institute of Food and Agricultural Sciences (UF/IFAS): Landscape Plants resources (<http://hort.ifas.ufl.edu/woody/index.shtml>)

Betrock's Reference Guide to Florida Landscape Plants, Timothy K. Broschat and Alan W. Meerow

Trees: North & Central Florida – A Field Guide to 140 Tree Species, Koeser, Hasing, Friedman, and Irving

Florida Exotic Pest Plant Council's 2017 List of Invasive Plant Species (www.fleppc.org)

State of Florida, Florida Statutes (2018):

- Chapter 162 'County or Municipal Code Enforcement'
- Chapter 163 'Intergovernmental Programs'
- Chapter 166 'Municipalities'
- Chapter 369 'Conservation'
- Chapter 581 'Plant Industry'

State of Florida, Department of Agriculture and Consumer Services:

- *Florida Grades and Standards for Nursery Plants 2017*, pub. 2017, Fifth Edition
- Florida Forest Service:
 - 'Florida's Federally Listed Plant Species' (<http://www.freshfromflorida.com/Divisions-Offices/Florida-Forest-Service/Our-Forests/Forest-Health/Florida-Statewide-Endangered-and-Threatened-Plant-Conservation-Program/Florida-s-Federally-Listed-Plant-Species>)
 - 'Champion Tree Program' and Registry (<http://www.freshfromflorida.com/Divisions-Offices/Florida-Forest-Service/Our-Forests/Florida-Champion-Trees>)

State of Florida, Florida Administrative Code:

- Rule Chapter 5B-57, Section 5B-57.007 'Noxious Weed List'
- Rule Chapter 14-40,
- Rule Chapter 68A-27, Section 68A-27.003 'Florida Endangered and Threatened Species List'

Manual of Woody Landscape Plants Their Identification, Ornamental Characteristics, Culture, Propagation and Uses, Michael A. Dirr, pub. January 1, 1990

Council of Tree & Landscape Appraisers – A Guide for Plant Appraisal, 9th edition, ISA, pub. 2000

Arboriculture & the Law, Merullo and Valentine, pub. 1992

Central Basics of Sonic Tree Tomography, Frank Rinn, Rinntech, Inc., December 2014

PiCUS Tree Tomography Methods at a Glance, Eric-Schlesinger-Straße (www.picus-info.com)

Special thanks to Celia Nichols for her artistry in producing the tree images used in this manual.

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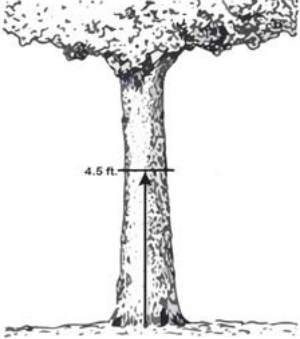
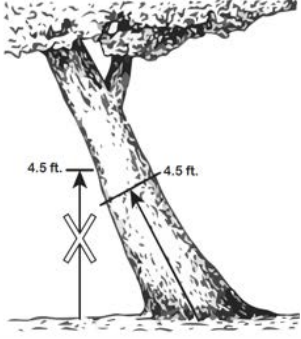
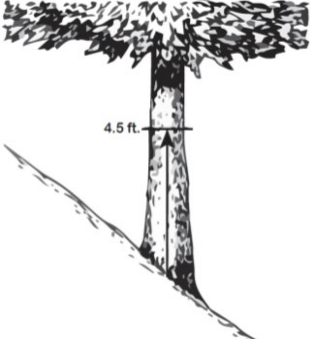
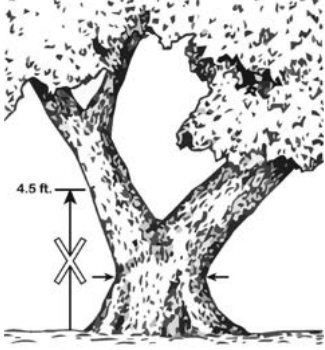
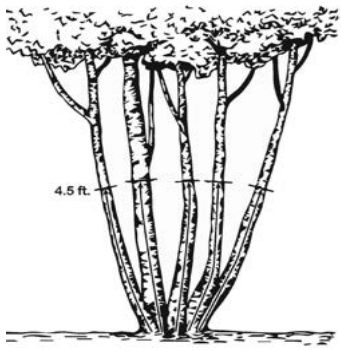
SECTION A.

STANDARDS & METHODS:

**TREE MEASUREMENT, EVALUATION, STAKING, PROTECTION;
OTHER MISCELLANEOUS DETAILS;
PROTECTION OF OTHER NATURAL RESOURCES**

A.1. MEASUREMENT & EVALUATION DETAILS

(a) Diameter at Breast Height (DBH) methods (Sec. 27-284.1.2(c))

284.1.2-A: Straight Tree, on land with minimal-to-no slope	284.1.2-B: Sloped Tree, on land with minimal-to-no slope	284.1.2-C: Straight Tree, on sloped land
		
284.1.2-D: Low-branching tree, on land with minimal-to-no slope	284.1.2-E: Multi-stemmed trunk, on land with minimal-to-no slope	
		

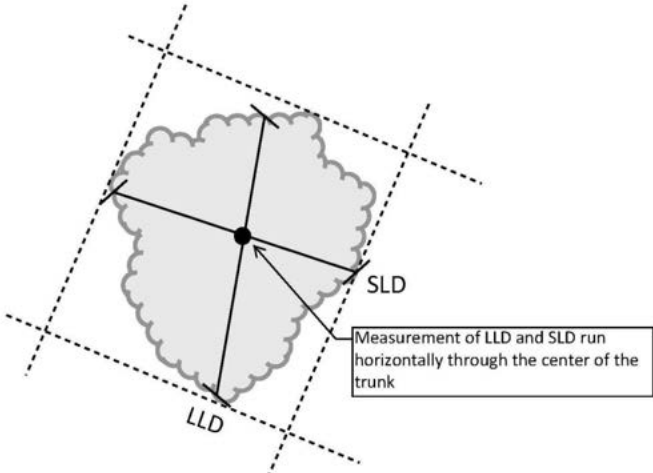
(b) Crown Spread (CS) and Crown Footprint (CF) methods with formulas (Secs. 27-43, 27-284.4.1)

**CROWN SPREAD ("CS") & CROWN FOOTPRINT ("CF")
MEASUREMENT METHODS & FORMULAS**

Crown Spread ("CS") Formula

Long Form: (Long Length Diameter "LLD" + Short Length Diameter "SLD") ÷ 2 = Crown Spread "CS"

Short Form: (LLD + SLD) ÷ 2 = CS



Crown Footprint ("CF") [Area] Formula

Long Form: $\pi(\text{Crown Spread "CS"} \div 2)^2 = \text{Crown Footprint "CF"}$

Short Form: $\pi(\text{CS} \div 2)^2 = \text{CF}$

A.1. MEASUREMENT & EVALUATION DETAILS (cont'd)

- (c) *Tree survey* (Sec. 27-43): A land survey, prepared by a surveyor and mapper, that indicates the location, scientific name, and DBH of any tree on the subject parcel and within twenty (20) feet of the perimeter of the subject parcel, as verified by an arborist. The survey must also indicate the 'crown spread' dimensions and corresponding 'crown area' for any non-'exempt' tree, measuring thirty-two (32) inches DBH and greater.

A.1. MEASUREMENT & EVALUATION DETAILS (cont'd)

(d) Tree Condition Evaluation Report Requirements (Sec. 27-284.1.1)



GRAND TREE EVALUATION REPORT
 Planning and Urban Design – Natural Resources
 1400 N. Boulevard, Tampa, FL 33607
 (813) 274-3100 #4 FAX (813) 259-1838

DATE of Evaluation: / /

SITE Address: <small>(Includes City, State & Zip)</small>	Permit #:
Owner:	Phone
Address of Owner: <small>(If different from Site)</small>	
Contractor:	Phone
Evaluation Type: <input type="checkbox"/> GT Status <input type="checkbox"/> GT Pruning <input type="checkbox"/> GT Removal <input type="checkbox"/> GT Code Enfor. <input type="checkbox"/> Courtesy <input type="checkbox"/> Other	
Background Information:	
EVALUATION DATA	
Species: _____ DBH: _____	<input type="checkbox"/> Grand or <input type="checkbox"/> Protected Tree
RATINGS*: Condition (A-F): _____ Risk/Hazard* (3-12): _____ Damaging Structure: <input type="checkbox"/> YES <input type="checkbox"/> NO	
<small>(A=Excellent – F=Dead)</small>	<small>(3=Low – 12=High)</small>
Physical Attributes are Characteristic of this Species in an Urban Environment? <input type="checkbox"/> YES <input type="checkbox"/> NO	
Structure and Physiology are Satisfactory for Preservation? <input type="checkbox"/> YES <input type="checkbox"/> NO	
Location GPS: Lat. (X) 27_____ and Long. (Y) –82 _____	Sketch
DETERMINATION	
<small>In accordance with Chapter 13, City Code, the designated tree has or has NOT met the criteria for PRUNING or REMOVAL as checked below. See Section 13-45.</small>	
Proposed PRUNING is <input type="checkbox"/> Disapproved <input type="checkbox"/> Approved <input type="checkbox"/> N/A	
Proposed REMOVAL is <input type="checkbox"/> Disapproved <input type="checkbox"/> Approved <input type="checkbox"/> N/A	
Certified Arborist Recommended? <input type="checkbox"/> YES	
Notes/Comments:	
TREE REPLACEMENT INCHES/CODE ENFORCEMENT	
Tree Replacement Inches <input type="checkbox"/> are <input type="checkbox"/> are Not REQUIRED per City Code 13-45, 13-165 and Schedule E. The total tree replacement inches required are: _____ with a caliper measurement of no less than 2 inches per tree. <input type="checkbox"/> Check box to refer the evaluation data and determination to Code Enforcement for assessment of curative and punitive damages.	
COT – P&R, URBAN FORESTRY SERVICES STAFF	
Inspector Name: <small>(print)</small>	Inspector Name: <small>(signature)</small>
Inspector's Office Phone:	ISA #

Copies: White to File, Yellow to UFS Staff
 All inspections are completed from ground level and are visual in nature, with occasional, simple wood soundings.
 *See reverse for information on ratings. *Hazard Ratings based on Mathey and Clark: Evaluation of Hazard Trees in Urban Areas, 2nd Edition, 1994

A.1. MEASUREMENT & EVALUATION DETAILS (cont'd)

(d) Tree Condition Evaluation Report Requirements (Sec. 27-284.1.1) (cont'd)

RATING INFORMATION

Tree Condition Evaluation:

A tree's condition is determined from the average of the condition ratings established from the individual rating of the tree's roots, trunk, limb/branch structure, twigs and foliage. The condition ratings range from excellent to poor and are determined by a condition point system that weighs problems identified on each component of the tree. The condition point system is structured as follows: no apparent problem = A, minor problem = B, major problem = C, extreme problems = D and Dead = F

<p>ROOTS Condition = _____</p> <ul style="list-style-type: none"> • Root anchorage • Restricted root system relative to canopy • Mechanical Injury • Girdling roots • Compaction or water-logged roots • Presence of insects or diseases 	<p>LIMB/ BRANCH STRUCTURE Condition = _____</p> <ul style="list-style-type: none"> • Strong attachments, no included bark • Free of decay and cavities • Well-proportioned, good form • Wound closure • Dead limbs/epicormic sprouting • Presence of insects and disease
<p>TRUNK Condition = _____</p> <ul style="list-style-type: none"> • Sound Bark and wood, no cavities • Upright trunk (well-tapered) • Included bark between co-dominant stems • Mechanical or fire injury • Cracks • Swallowed or sunken area • Presence of insects or disease 	<p>TWIGS Condition = _____</p> <ul style="list-style-type: none"> • Shoot vigor compared to past 3-year growth • Presence of weak or dead twigs • Presence of insects and disease <p>FOLIAGE Condition = _____</p> <ul style="list-style-type: none"> • Normal appearance (size, color, density) • Nutrient deficiencies • Herbicide, chemical injury symptoms • Wilted or dead leaves • Presence of insect and disease

Total Condition Points _____

TREE HAZARD EVALUATION FORM

Failure potential (4 points)

Failure potential identifies the most likely failure and rates the likelihood that the structural defects(s) will result in failure within the inspection period. Examples of ratings are:

1. Low: defects are minor (e.g. dieback of twigs, small wounds with good wound-wood development).
2. Medium: defects are present and obvious (e.g. cavity encompassing ten (10) to twenty-five (25) percent of the circumference of the trunk, co-dominant stems without included bark).
3. High: numerous and/or significant defects present (e.g. cavity encompassing thirty (30) to fifty (50) percent of the circumference of the trunk, multiple pruning wounds with decay along a branch).
4. Severe: defects are very severe (e.g. heart-rot decay conks along the main stem. Cavity encompassing more than fifty (50) percent of the trunk).

Size of defective part (4 points)

Size of defective part rates the size of the part most likely to fail. The larger the part that fails, the greater the potential for damage. Therefore, the size of the failure affects the hazard potential. Examples are:

1. Most likely failure less than six (6) inches (fifteen (15) cm) in diameter.
2. Most likely failure six (6) to eighteen (18) inches (fifteen (15) to forty-five (45) cm) in diameter.
3. Most likely failure eighteen (18) to thirty (30) inches (forty-five (45) to seventy-five (75) cm) in diameter.
4. Most likely failure greater than thirty (30) inches (seventy-five (75) cm) in diameter.

Target rating (4 points)

Target rating rates the use and occupancy of the area.

1. Occasional use: (e.g. jogging/cycling trail).
2. Intermittent use: (e.g. picnic area, day-use parking).
3. Frequent-use secondary structure: (e.g. seasonal camping area, storage facilities).
4. Constant-use, structures: (e.g., year-round use for a number of hours each day, residences).

The points in each category are added to obtain the overall hazard rating, with twelve (12) being the maximum value.
Hazard Rating = Failure Potential + Defective Size of Part + Target Rating

Hazard Rating = (Failure Pot.) _____ + Defective Part Size _____ + Target Rating _____ = _____

The assignment of a rating is made with three (3) considerations in mind:

- Length of evaluation cycle
- Level of resolution required by the goals of the hazard management program
- Past history and rating

If records are not available and not employed in the process, then the rating reflects only one moment in time, rather than the long-term development of the tree. Ratings have only relative meaning (i.e., a tree rated an 11 has a greater hazard potential than one rated a 5). By definition, a tree rated a twelve (12) represents a significant hazard. But abating this hazard could be as simple as removing the target.

A.2. TREE PROTECTION DETAILS

Protection Standards for Construction Activities proximate to Protective Root Zone (Secs. 27-43, 27-284.2)

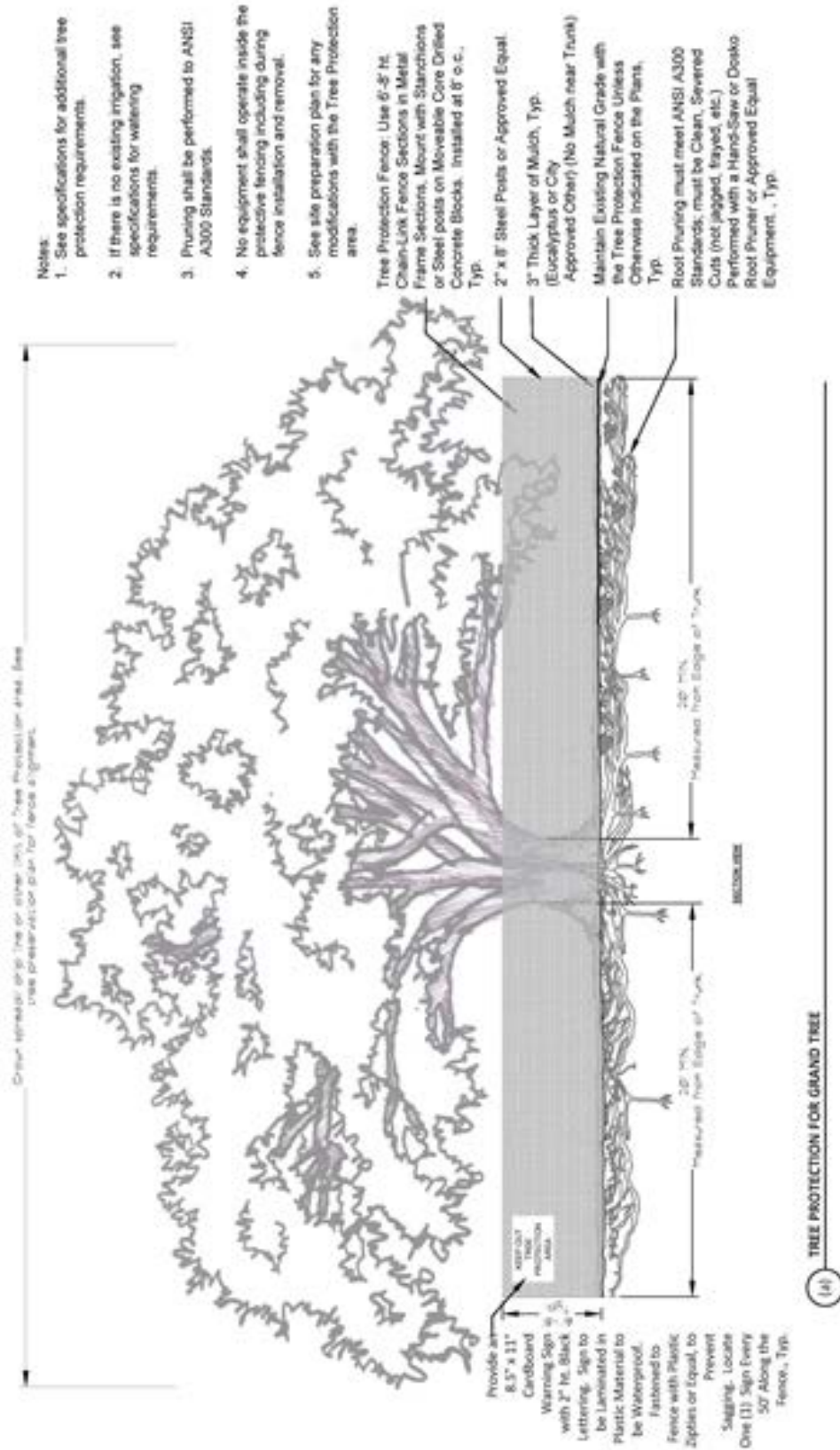
Specific Conditions

- i. Minimum protection standards shall be met for all protected trees, prior to commencement of any construction activities on a development site and/or in public or private right-of-way, in accordance with the tree protection graphics below.
- ii. No changes to the predevelopment conditions within the approved protective root zone during the construction process.
- iii. Protective barricades may be removed only to prepare the development site for final landscaping activities. During this activity only non-mechanical techniques may occur within the designated protective root zone. No alteration(s), of any kind, shall be made to any part of the tree (roots, trunk, canopy/crown), other than those that are approved by the Natural Resources Coordinator or designee, as part of the related permit.
- iv. No parking or storing of vehicles, equipment, or materials is permitted within the minimum protective area, at any time.
- v. No site clearing or grading is permitted within the minimum protective area, other than those changes that are approved by the Natural Resources Coordinator or designee, as part of the related permit.

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A.2. TREE PROTECTION DETAILS (cont'd)

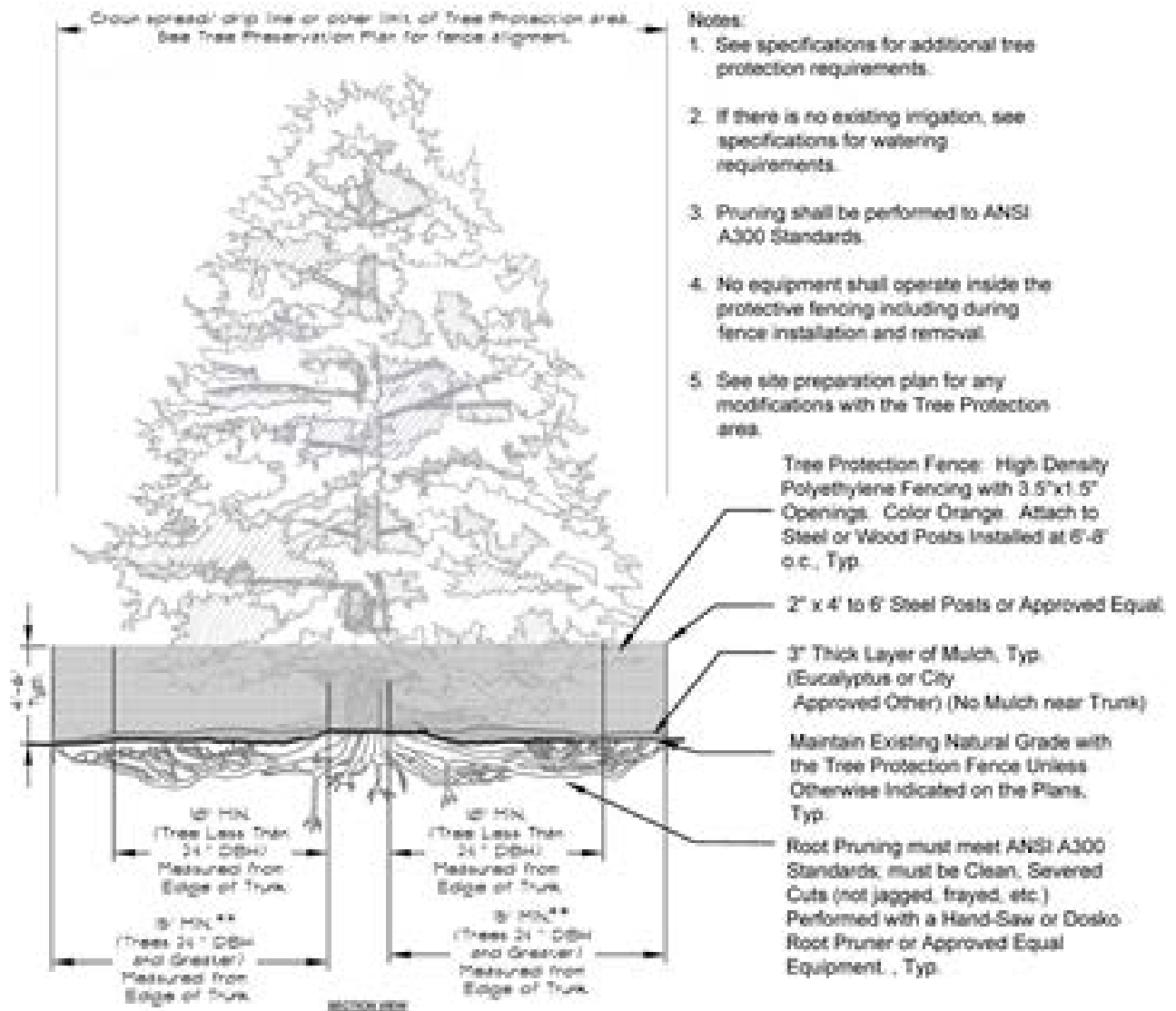
(a) Grand Tree Protection Details



A.2. TREE PROTECTION DETAILS (cont'd)

(b) Protected Tree Protection Details, by Tree Type

(1) Large Ornamental, Shade, and Conifer Trees (protection details for Specimen Trees included)



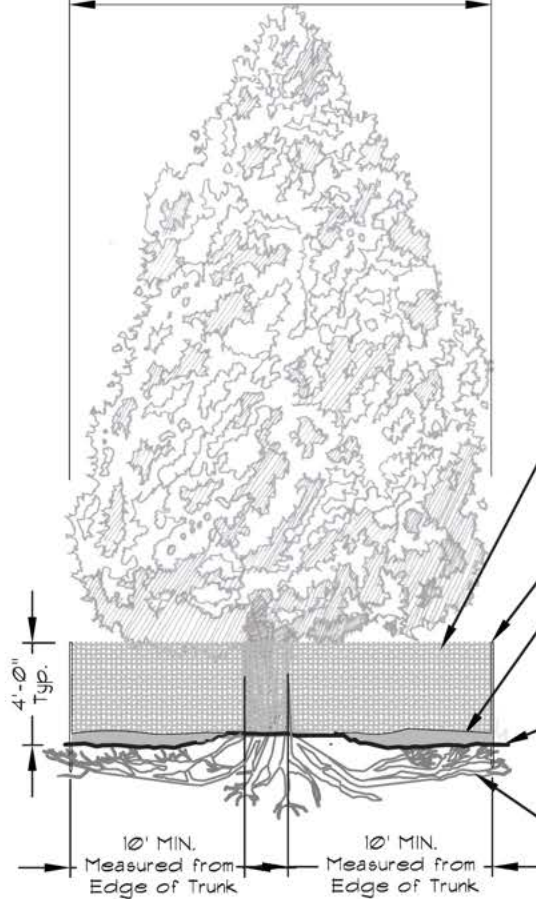
(1) TREE PROTECTION FOR LARGE ORNAMENTAL, SHADE, AND CONIFER TREES

**15' Minimum Protective Root Zone applies to Specimen Trees. See Sec. 27-63.

A.2. TREE PROTECTION DETAILS (cont'd)

(2) Medium Ornamental, Shade, and Conifer Trees

Crown spread/ drip line or other limit of Tree Protection area.
See Tree Preservation Plan for fence alignment.



SECTION VIEW

Notes:

1. See specifications for additional tree protection requirements.
2. If there is no existing irrigation, see specifications for watering requirements.
3. Pruning shall be performed to ANSI A300 Standards.
4. No equipment shall operate inside the protective fencing including during fence installation and removal.
5. See site preparation plan for any modifications with the Tree Protection area.

Tree Protection Fence: High Density Polyethylene Fencing with 3.5"x1.5" Openings. Color Orange. Attach to Steel or Wood Posts Installed at 6'-8' o.c., Typ.

2" x 4' Steel or Wood Posts or Approved Equal.

3" Thick Layer of Mulch, Typ. (Eucalyptus or City Approved Other) (No Mulch near Trunk)

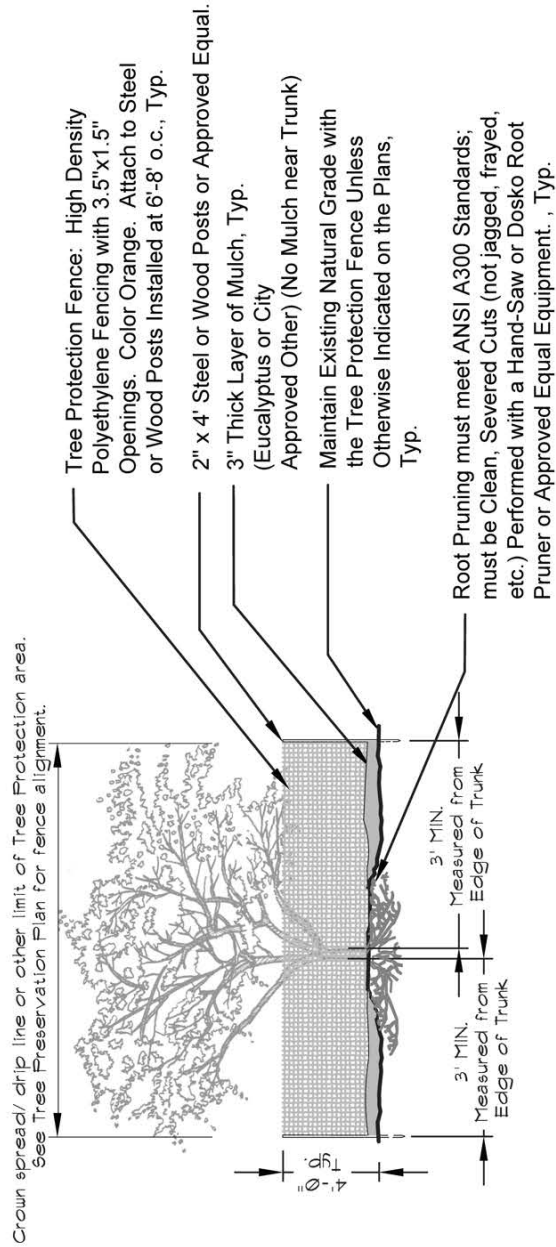
Maintain Existing Natural Grade with the Tree Protection Fence Unless Otherwise Indicated on the Plans, Typ.

Root Pruning must meet ANSI A300 Standards; must be Clean, Severed Cuts (not jagged, frayed, etc.) Performed with a Hand-Saw or Dosko Root Pruner or Approved Equal Equipment. , Typ.

(2) TREE PROTECTION FOR MEDIUM ORNAMENTAL, SHADE AND CONIFER TREE

A.2. TREE PROTECTION DETAILS (cont'd)

(3) Small Ornamental Trees



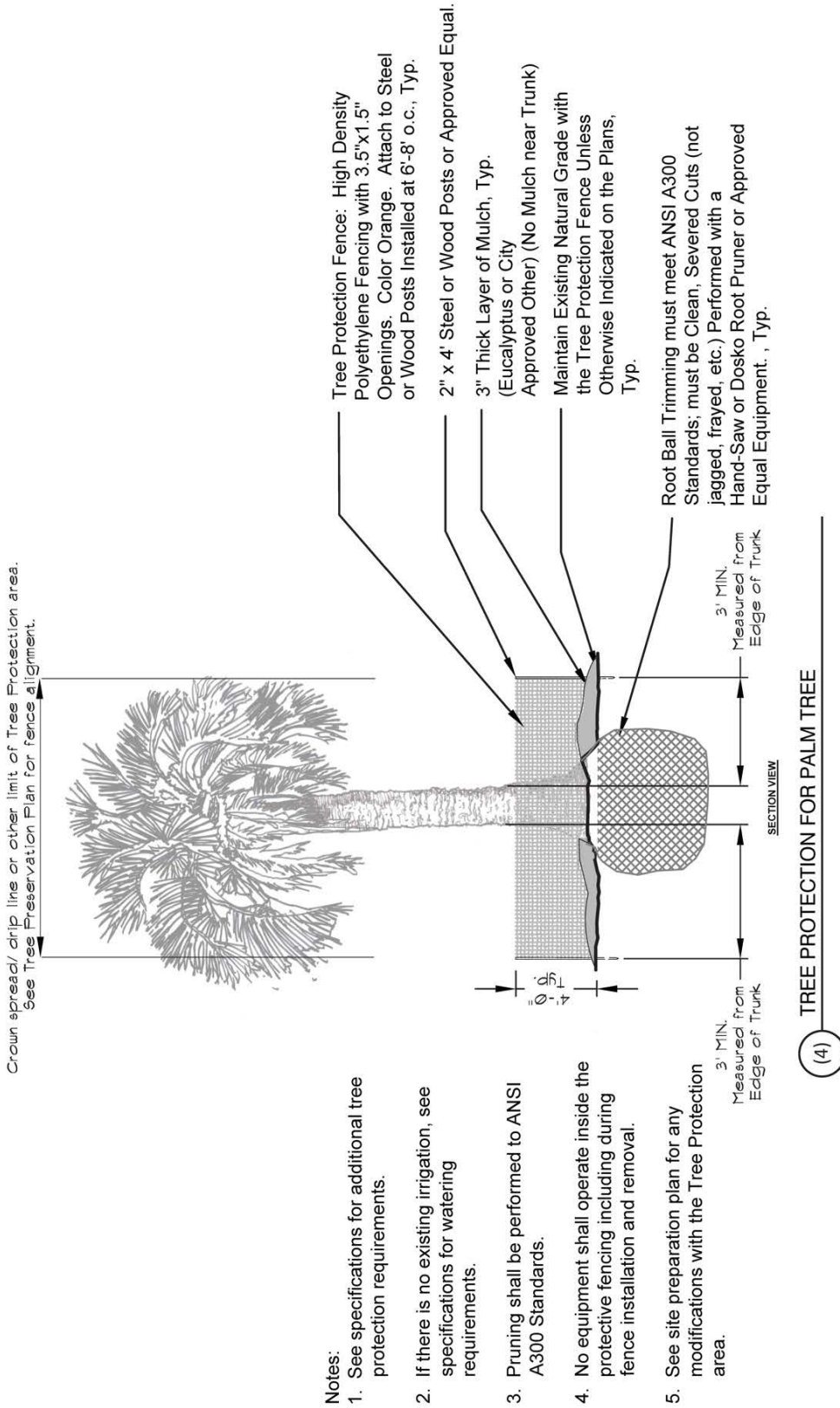
SECTION VIEW

(3) TREE PROTECTION FOR SMALL ORNAMENTAL TREE

- Notes:
1. See specifications for additional tree protection requirements.
 2. If there is no existing irrigation, see specifications for watering requirements.
 3. Pruning shall be performed to ANSI A300 Standards.
 4. No equipment shall operate inside the protective fencing including during fence installation and removal.
 5. See site preparation plan for any modifications with the Tree Protection area.

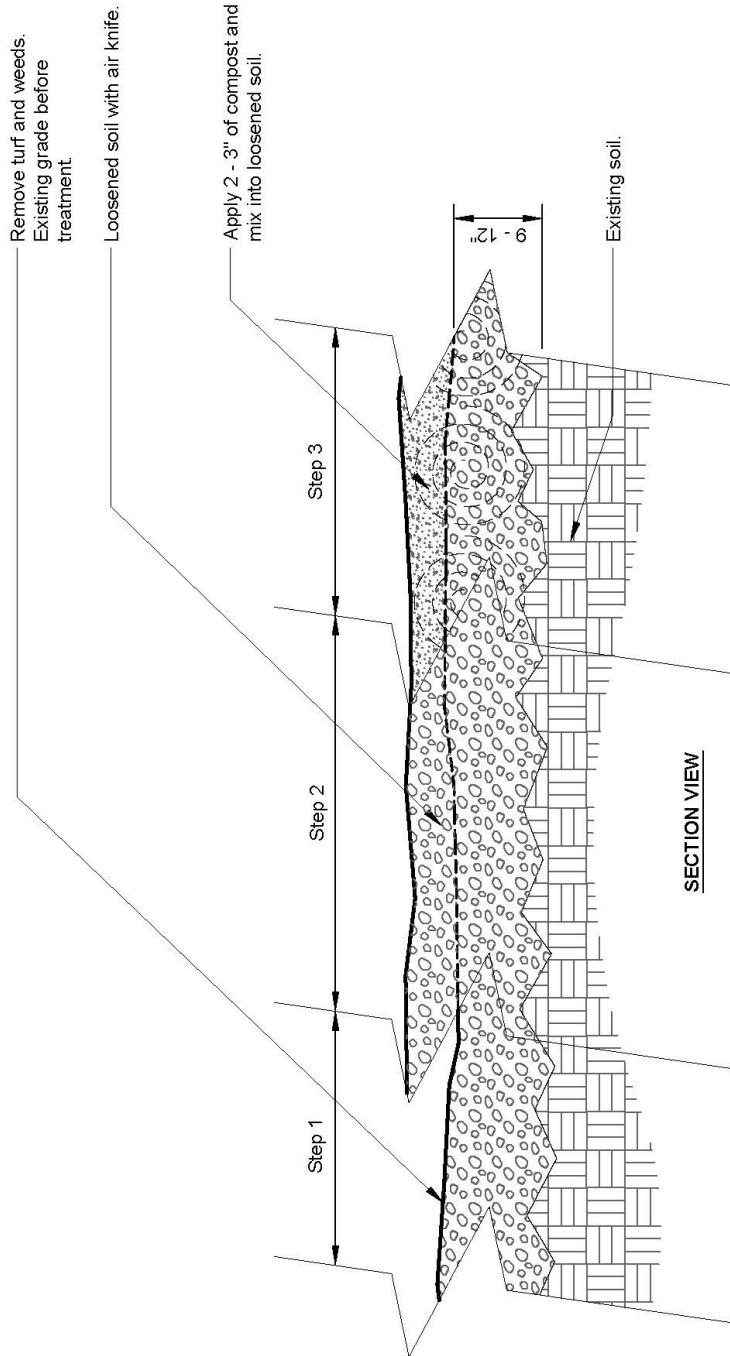
A.2. TREE PROTECTION DETAILS (cont'd)

(4) Palms



A.3. MISCELLANEOUS DETAILS

(a) Removal of Existing Soil – Root Exposure for Structure Placement



Notes:

- 1- Prior to the start of work remove all thatch, sod, and/or weeds.
- 2- Loosen soil with Air Knife or approved equal to a depth of 9 - 12" and work around encountered roots.
- 3- Apply 2 - 3" of compost over loosened soil. Using an air knife mix compost into loosened soil.
- 4- Water entire root zone at end of each work day.

(a) REMOVAL OF EXISTING SOIL - ROOT EXPOSURE FOR STRUCTURE PLACEMENT

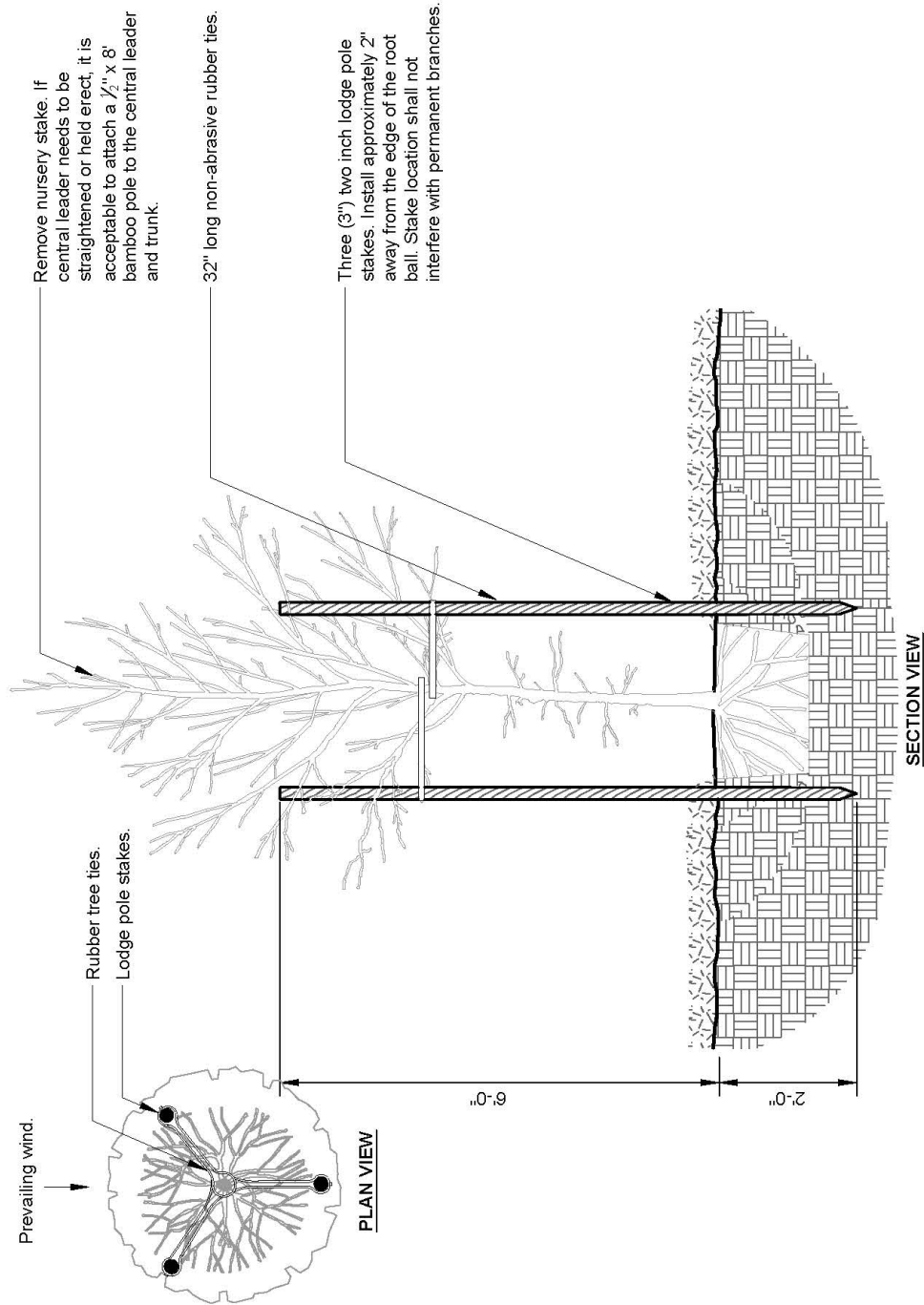
A.3. MISCELLANEOUS DETAILS (cont'd)

(b) Root pruning standards:

1. All root pruning shall be overseen and approved by an arborist, prior to the pre-construction site inspection.
2. All roots must be severed clean at the protective root zone of protected and grand trees to prevent root damage.
3. Root pruning must be performed with an approved cutting type of equipment, such as a chainsaw, hand saw, or other cutting equipment (i.e. Dosko).
4. Root pruning must be performed prior to any construction activities and inspected before requesting inspections.

A.4. PLANTING DETAILS

(a) Typical Tree Staking – Lodge Poles

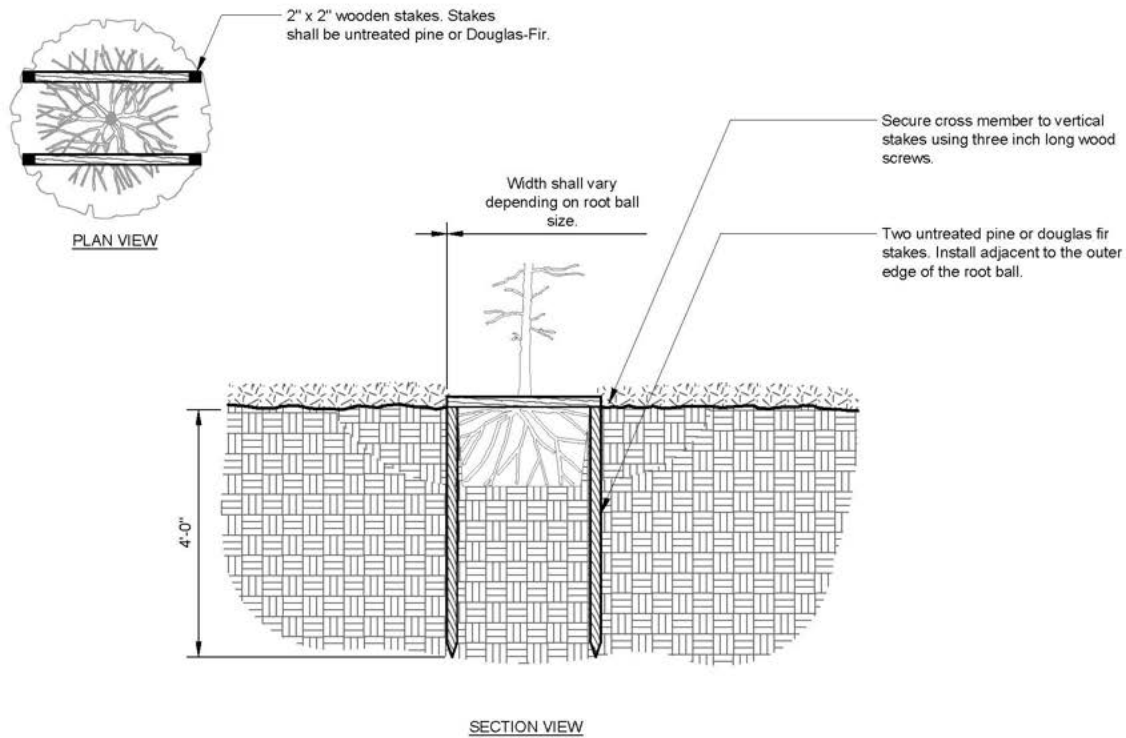


TYPICAL TREE STAKING - LODGE POLES (3)

(a)

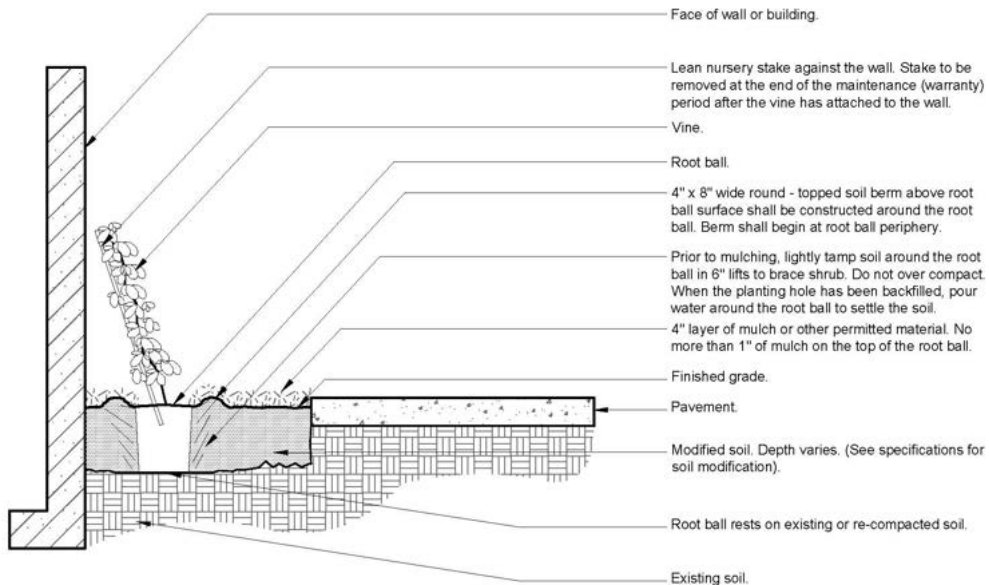
A.4. PLANTING DETAILS (cont'd)

(b) Tree Staking [Staple] for Streetscape, Parking Lot Islands, and other Constrained Areas



(b) TREE STAKING - STAPLE - USE IN STREETScape, PARKING LOT ISLANDS, OTHER CONSTRAINED SPACES

(c) Vine - Modified Soil



(c) VINE - MODIFIED SOIL

SECTION B.

LIST OF GRAND TREE SPECIES (Sec. 27-284.1.2)

Table 284.1.2: Grand Tree Species		
Scientific Name	Common Name	Florida Native
Acer rubrum	Red Maple	Yes
Carya glabra	Pignut Hickory	Yes
Carya illinoensis	Pecan	No
Cinnamomum camphora	Camphor	No
Fraxinus tomentosa (sp. "profunda")	Pumpkin Ash	Yes
Liquidambar styraciflua	Sweetgum	Yes
Magnolia grandiflora	Southern Magnolia	Yes
Magnolia virginiana	Sweetbay Magnolia	Yes
Nyssa sylvatica	Black Gum (Black Tupelo)	Yes
Pinus elliotii var densa	Slash Pine	Yes
Pinus palustris	Longleaf Pine	Yes
Pinus taeda	Loblolly Pine	Yes
Platanus occidentalis	(American) Sycamore	Yes
Quercus austrina	Bluff Oak	Yes
Quercus durandii (sinuata)	Durand Oak	Yes
Quercus falcata	Southern Red Oak	Yes
Quercus geminata	Sand Live Oak	Yes
Quercus laurifolia	Laurel Oak (Diamond Leaf Oak)	Yes
Quercus michauxii	Swamp Chestnut Oak	Yes
Quercus virginiana	Southern Live Oak (Live Oak)	Yes
Taxodium ascendens	Pondcypress	Yes
Taxodium distichum	Baldcypress	Yes
Ulmus alata	Winged Elm	Yes
Ulmus americana	American Elm	Yes
Notes:		
[1] Refer to sec. 27-43 for definition of "grand tree."		
[2] Refer to sec. 27-284.1.2(d)(3) for specific conditions for camphor (<i>Cinnamomum camphora</i>).		

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SECTION C.

LIST OF EXEMPT TREE SPECIES (Sec. 27-284.1.2)

Exempt trees – city wide. Exempt trees, as defined in sec. 27-43 of the city code, **shall not require permit for removal** and shall adhere to the following requirements:

- (1) **All Category I species**, as listed on the *Florida Exotic Pest Plant Council's 2017 List of Invasive Plant Species* (inset below), with the exception of camphor (*Cinnamomum camphora*), shall be required to be removed concurrent with any site work-related permit, unless otherwise approved by the natural resources coordinator or designee. Category I species shall not be factored into Tree Retention-Mitigation Equivalency Tables (see Technical Manual Section D), as set forth in sec. 27-284.4.1, for any project or development. Refer to (3) below for specific requirements related to camphor.
- (2) **All Category II species**, as listed on the *Florida Exotic Pest Plant Council's 2017 List of Invasive Plant Species* (inset below), if existing may remain in place or be planted as new, but no credit shall be factored into the Tree Retention-Mitigation Equivalency Tables (see Technical Manual Section D), as set forth in sec. 27-284.4.1, for retention or planting such species.
- (3) The **camphor tree** (*Cinnamomum camphora*) is classified as a Category I invasive species, according to the *Florida Exotic Pest Plant Council's 2017 List of Invasive Plant Species*. This tree species, however, has been successfully planted and maintained, under certain conditions, throughout the city. With strict adherence to the following criteria and conditions, the camphor tree provides benefits and ample crown footprint to the overall city urban forest canopy, and shall be deemed 'protected' for purposes of mitigation (replacement) calculation and can reach 'grand' status for same, subject to the following:
 - a. Standard 'credit' awarded for retaining any camphor tree rated in excellent or good condition (protected or grand), that is not located within or proximate to (within 50' of) any environmentally sensitive land (i.e. river, lake, bay, wetland, upland habitat, or significant wildlife corridor);
 - b. Standard 'credit' awarded for planting any camphor tree (Florida Grade No. 1), that is not located within or proximate to (within 50' of) any environmentally sensitive land (i.e. river, lake, bay, wetland, upland habitat, or significant wildlife corridor);
 - c. Any camphor tree that is located within or proximate to such environmentally sensitive lands shall be required to be removed, and shall be factored into Tree Retention-Mitigation Equivalency Tables (see Technical Manual Section D), as set forth in sec. 27-284.4.1, as a 'debit'; and,
 - d. Regardless of size or location, camphor trees can be removed without performing any applicable public notice or any site development redesign, but shall adhere to mitigation requirements.

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CATEGORY II (continued)

Scientific Name**	Common Name	Gov. List	Zone
<i>Tradescantia spathulacea</i>	oyster plant		C, S
<i>Rhoxo spathulacea</i> , <i>Rhoxo discolor</i>			N, C, S
<i>Tribulus cristoides</i>	puncture vine, burr-nut		C, S
<i>Vitex trifolia</i>	simple-leaf chaste tree		C, S
<i>Washingtonia robusta</i>	Washington fan palm		C, S
<i>Wisteria sinensis</i>	Chinese wisteria		N, C
<i>Xanthosoma sagittifolium</i>	malanga, elephant ear		N, C, S

Recent changes to plant names

Old Name	New Name
<i>Aletris fordsii</i>	<i>Vernicia fordii</i>
<i>Aristolochia littoralis</i>	<i>Aristolochia elegans</i>
<i>Brachilaria mutica</i>	<i>Urochloa mutica</i>
<i>Hibiscus tiliaceus</i>	<i>Talipariti filiaceus</i>
<i>Macfadyena unguis-cati</i>	<i>Dolichandra unguis-cati</i>
<i>Melidencia viminalis</i>	<i>Callistemon viminalis</i>
<i>Panicum maximum</i>	<i>Urochloa maxima</i>
<i>Phymatosorus scolopendria</i>	<i>Microsorium grossum</i>
<i>Sapinum schferum</i>	<i>Tradica sabjera</i>
<i>Wedelia trilobata</i>	<i>Sphaerocotula trilobata</i>

Current nomenclature can be found at florida-plantatlas.usf.edu

**Plant names are those published in "Guide to Vascular Plants of Florida Third Edition," Richard P. Wunderlin and Bruce F. Hansen. University of Florida Press. 2011. Plant names in parentheses are synonyms or misapplied names that have commonly occurred in the literature and/or indicate a recent name change. Not all synonyms are listed.

FLEPPC List Definitions: **Exotic** – a species introduced to Florida, purposefully or accidentally, from a natural range outside of Florida. **Native** – a species whose natural range includes Florida. **Naturalized exotic** – an exotic that sustains itself outside cultivation (it is still exotic; it has not "become" native). **Invasive exotic** – an exotic that not only has naturalized, but is expanding on its own in Florida native plant communities.

Abbreviations: Government List (Gov. List): Possession, propagation, sale, and/or transport of these plants is regulated by: F=Florida Department of Agriculture and Consumer Services; U=United States Department of Agriculture

Zone: **N** = north, **C** = central, **S** = south, referring to each species' general distribution in regions of Florida (not its potential range in the state). Please refer to the adjacent map.



Citation example
FLEPPC. 2017. List of Invasive Plant Species. Florida Exotic Pest Plant Council. Internet: www.fleppc.org

Daniel F. Austin and Daniel B. Ward

Daniel F. Austin (2015) and Daniel B. Ward (2016) recently passed away. Both Dons were instrumental in maintaining, managing, and providing insight into Florida's many invasive plants. They first volunteered for this effort before it was even formalized as the FLEPPC, participating from that beginning through retirement. Their sage comments and wit are missed.

The 2017 list was prepared by the FLEPPC Plant List Committee

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Florida Exotic Pest Plant Council's 2017 List of Invasive Plant Species

The mission of the **Florida Exotic Pest Plant Council** is to support the management of invasive exotic plants in Florida's natural areas by providing a forum for the exchange of scientific, educational and technical information. www.fleppc.org

Note: The FLEPPC List of Invasive Plant Species is not a regulatory list. Only those plants listed as Federal Noxious Weeds, Florida Noxious Weeds, Florida Prohibited Aquatics Plants, or in local ordinances are regulated by law.

Purpose of the List

To provide a list of plants determined by the Florida Exotic Pest Plant Council to be invasive in natural areas of Florida and to routinely update the list based on information of newly identified occurrences and changes in distribution over time. Also, to focus attention on –

- the adverse effects exotic pest plants have on Florida's biodiversity and native plant communities,
- the habitat losses in natural areas from exotic pest plant infestations,
- the impacts on endangered species via habitat loss and alteration,
- the need for pest-plant management,
- the socio-economic impacts of these plants (e.g., increased wildfires or flooding in certain areas),
- changes in the severity of different pest plant infestations over time,
- providing information to help managers set priorities for research and control programs.



www.fleppc.org

For more information on invasive exotic plants, including links to related web pages, visit www.fleppc.org

CATEGORY I

Invasive exotics that are altering native plant communities by displacing native species, changing community structures or ecological functions, or hybridizing with natives. This definition does not rely on the economic severity or geographic range of the problem, but on the documented ecological damage caused.

Scientific Name**	Common Name	Gov. List	Zone
<i>Abies procumbens</i>	rosy pine	F	C, S
<i>Acacia curculioniformis</i>	earleaf acacia	C, S	N, C, S
<i>Acacia pulchris</i>	mimosa, silk tree	N, C	N
<i>Albizia lebeck</i>	woman's tongue	F, U	C, S
<i>Albizia crinita</i>	coral ardisia	F	C, S
<i>Ardisia elliptica</i>	strobilatum ardisia	F	C, S
<i>Asparagus aethiopicus</i> (A. sprengeri, A. densiflorus)	asparagus-fem	N, C, S	N, C, S
<i>Bahinia variegata</i>	orchid tree	C, S	F
<i>Bischofia javanica</i>	bishopwood	C, S	F
<i>Calophyllum antillarum</i> (C. calabo)	Santa Marta, mast wood	S	C, S
<i>Casuarina equisetifolia</i>	Australian pine	F, N, C, S	F
<i>Casuarina glauca</i>	suckering Australian pine	F, N, C, S	F
<i>Cinnamomum camphora</i>	camphor tree	N, C, S	N, C, S
<i>Calceolaria esculenta</i>	wild taro	N, C, S	N, C, S
<i>Colubrina asiatica</i>	lather leaf	F, S	F
<i>Cupressus macrocarpa</i>	carriewood	F, C, S	F
<i>Dipentia petersenii</i>	Japanese false spleenwort	F, N, C, S	F
<i>Dioscorea alata</i>	winged yam	F, N, C, S	F
<i>Dioscorea bulbifera</i>	air potato	F, N, C, S	F
<i>Eichhornia crassipes</i>	water hyacinth	F, N, C, S	F
<i>Eugenia turbinata</i>	Suntim cherry	C, S	C, S
<i>Ficus microcarpa</i> (F. nitida and F. retusa var. nitida)	laurel fig	F, U	N, C, S
<i>Hydrilla verticillata</i>	hydrilla	F, U	N, C, S
<i>Hydrophyla poyseriana</i>	green bygro	F, U	N, C, S
<i>Hymenocle appeltancalis</i>	West Indian marsh grass	N, C, S	N, C, S
<i>Imperata cylindrica</i>	cogon grass	F, U	N, C, S
<i>Ipomoea aquatica</i>	water spinach	F, U	C
<i>Jasminum alatum</i>	Gold Coast jasmine	C, S	C, S
<i>Jasminum flamense</i>	Brazilian jasmine	C, S	C, S
<i>Lantana camara</i> (L. strigocamara)	lantana, shrub verbena	N, C, S	N, C, S
<i>Ligustrum lucidum</i>	glossy privet	N, C	N, C
<i>Ligustrum sinense</i>	Chinese privet	F ³	N, C, S
<i>Lonicera japonica</i>	Japanese honeysuckle	N, C, S	N, C, S
<i>Ludwigia hexapetala</i>	Ungary waterprimrose	N, C	N, C
<i>Ludwigia peruviana</i>	Peruvian primrosewillow	N, C, S	N, C, S
<i>Lumnitzera racemosa</i>	black mangrove	S	S
<i>Luqoida subintegra</i>	tropical American watergrass	S	S
<i>Lygodium japonicum</i>	Japanese climbing fern	F	N, C, S
<i>Lygodium microphyllum</i>	Old World climbing fern	F, U	N, C, S
<i>Macfadyena unguis-cati</i> (Dichlandia unguis-cati)	catchawine	F, U	N, C, S
<i>Manilkara zapota</i>	sapodilla	S	S
<i>Melaleuca quinquevneria</i>	melaleuca, paper bark	F, U	C, S

¹Does not include *Ficus microcarpa* subsp. *fulviventris*, which is sold as "Green Island Ficus"

²Many names are applied to this species in Florida because of a complicated taxonomic and nomenclatural history. Plants cultivated in Florida, all representing the same invasive species, have in the past been referred to as *Ruellia brittoniana*, *R. tweediana*, *R. carniola*, and *R. simplex*.

³Chinese privet is a FLADCS Noxious Weed except for the cultivar 'Vantageum'

⁴Added to the FLEPPC List of Invasive Plant Species in 2017

**Plant names are those published in "Guide to Vascular Plants of Florida Third Edition," Richard P. Wunderlin and Bruce F. Hansen. University of Florida Press, 2011. Plant names in parentheses are synonyms or misspelled names that have commonly occurred in the literature or indicate a recent name change. Not all synonyms are listed.

CATEGORY II

Invasive exotics that have increased in abundance or frequency but have not yet altered Florida plant communities to the extent shown by Category I species. These species may become ranked Category I if ecological damage is demonstrated.

Scientific Name**	Common Name	Gov. List	Zone
<i>Adiantum pedatum</i>	red sandalwood	S	S
<i>Agave sisalana</i>	sisal hemp	C, S	C, S
<i>Amaranthus foxtail</i> (Vernicia foxtail)	tung oil tree	N, C	N, C
<i>Albizia macrophylla</i>	devil tree	S	S
<i>Alternanthera philoxeroides</i>	alligator-weed	F, N, C, S	F, N, C, S
<i>Ardisia japonica</i>	coral vine	N, C, S	N, C, S
<i>Ardisia stricta</i>	Japanese ardisia	N	N
<i>Aristolochia litoralis</i> (A. elegans)	elegant Dutchman's pipe, calico flower	N, C, S	N, C, S
<i>Asystasia gangetica</i>	Ganges primrose	C, S	C, S
<i>Begonia cucullata</i>	wax begonia	N, C, S	N, C, S
<i>Bromelia puyupuyana</i>	paper mulberry	N, C, S	N, C, S
<i>Bruguiera gymnorhiza</i>	large-leaved mangrove	S	S
<i>Callitriche viminalis</i> (Melandrena viminalis)	botchbush	C, S	C, S
<i>Cassipouira canariensis</i>	inch palm, spirouema	F	C, S
<i>Casuarina cunninghamiana</i>	Australian pine	F	C, S
<i>Cecropia palmata</i>	trumpet tree	S	S
<i>Cestrum diurnum</i>	day jessamine	C, S	C, S
<i>Chamaedorea sefrigi</i>	bamboo palm	N, C	N, C
<i>Clematis integriflora</i>	Japanese clematis	N, C	N, C
<i>Cocos nucifera</i>	coconut palm	S	S
<i>Crocosiphon crepidoides</i>	redflower ragleaf, Okinawa spinach	C, S	C, S
<i>Cryptantha madagascariensis</i> (C. alternifolia)	rubber vine	C, S	C, S
<i>Cyperus rotundatus</i>	umbrella plant	C, S	C, S
<i>Cyperus profler</i>	dwarf papyrus	C, S	C, S
<i>Dactyloctenium aegyptium</i>	Durban crowfoot grass	N, C, S	N, C, S
<i>Dalbergia sissoo</i>	Indian rosewood, stessoo	C, S	C, S
<i>Elaeagnus pungens</i>	Silverthorn, thorny olive	N, C	N, C
<i>Elaeagnus umbellata</i>	silverberry, autumn olive	N	N
<i>Euphorbia pinnatum</i> cv. <i>Anthem</i>	pothos	C, S	C, S
<i>Euphorbia graminea</i>	Chinese crown orchid	C, S	C, S
<i>Ficus altissima</i>	false banyan, counsel tree	S	S
<i>Ficus indica</i>	governor's plum	S	S
<i>Hamamelis altissima</i>	limpo grass	C, S	C, S
<i>Heteropterys brachiata</i>	red wing, Beechey's willie	N, C, S	N, C, S
<i>Ipomoea carnea</i> ssp. <i>fulva</i> (I. <i>fulva</i>)	shrubby morning-glory	F	F
<i>Kalanchoe pinnata</i> (<i>Bryophyllum pinnatum</i>)	mother-of-millions	N, C, S	N, C, S
<i>Koeberlinia elegans</i>	hale plant	C, S	C, S
<i>Koeleria glauca</i>	flamegold tree	C, S	C, S

continued

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SECTION D.
TREE REMOVAL ZONE (“TRZ”);
MITIGATION FORMULA – TABLE OF DEBITS & CREDITS;
MITIGATION TABLES

D.1 TREE REMOVAL ZONE ("TRZ")

(Secs. 27-43, 27-284.2.4, 27-284.2.5)

Tree Removal Zone (TRZ): That portion of a zoning lot, which remains after the principal structure yards (setbacks), plus five (5) feet on the front, side, side street, and corner yards, and ten (10) feet on the rear yard, have been deducted.

Tree Removal Zone (TRZ) eligible lot: A lot of record, in any zoning district, that meets all of the following dimensional standards: a. Lot Width: ≤ 65 feet; b. Lot Depth: ≤ 130 feet; and, c. Lot Area: ≤ 6,500 square feet. Refer to sec. 27-43 for specific definitions and sec. 27-161 for applicable lot measurement standards. Lots within the Parkland Estates Overlay District, set forth in sec. 27-242, are controlled by Chapter 29126 Laws of Florida, as amended by 2003 HB 0731, and shall not be deemed TRZ eligible lots by the City, for any reason.

D.2 TREE MITIGATION FORMULA – TABLE OF DEBITS & CREDITS

TREE MITIGATION FORMULA FOR REPLACEMENT CROWN FOOTPRINT "RCF"				
(CF) X (CR) X (SR) = RCF				
(Crown Footprint "CF" [as Square Feet]) X (Species Rating "SR" [as Percent]) X (Condition Rating "CR" [as Percent]) = Replacement Crown Footprint ("RCF") [as Square Feet]				
NOTES:				
[1] Crown as defined in 27-43 means "foliated".				
[2] Deciduous trees: Measure longest and shortest "live" or "foliated" branches.				
KEY:				
DBH ["Diameter at Breast Height"]: Tree measured by industry standard method, at 4.5' above grade; recorded in INCHES				
HGT ["Height"]: Overall height of tree, measured from existing grade surrounding base of tree to highest point of tree canopy; recorded in FEET				
SLD ["Short Length Diameter"]: Shortest length of tree canopy measured horizontally; recorded in INCHES				
LLD ["Long Length Diameter"]: Longest length of tree canopy measured horizontally; recorded in INCHES				
CS ["Crown Spread"]: Average of SLD and LLD measurements; recorded in INCHES for Grand Tree Points & converted to FEET for Tree Mitigation [Formula: CS=(SLD+LLD)/2]				
CF ["Crown Footprint"]: Area of crown, using Crown Spread; calculated using 'area of a circle' as a standard geometric shape; recorded in SQUARE FEET [Formula: CF=(CS/2)² X π]				
CR ["Condition Rating"]: Rating using Tree Hazard Evaluation Method (Matheny and Clark 1994); recorded as a PERCENT ['A'=100%, 'B'=90%, 'C'=75%, 'D'=40%, 'F'=0%]				
SR ["Species Rating"]: Rating denotes comparative value by species, based on suitability & performance as 'urban trees', using FL ISA's Tree Species Ratings (2016 or most current); recorded as PERCENT				
RCF ["Replacement Crown Footprint"]: Area of Crown Footprint required to be replaced using 5-year PARITY, recorded in SQUARE FEET (Refer to Look Up Tables for Equivalent Replacements)				
CROWN SPREAD "CS": Average Diameter Factor	AREA OF CROWN FOOTPRINT "CF": Use Area of Circle Formula	SPECIES RATINGS "SR": Reduction Factor for Crown Footprint "CF"	CONDITION RATING "CR": Reduction Factor for Crown Footprint "CF"	CONDITION RATING "CR" Equivalent Factors** (Council of Tree & Landscape Appraisers "CTLA")
$(SLD + LLD) \div 2$	$\pi(CS/2)^2$	Refer to most current ISA Florida Chapter Species Ratings List for Central Region	A = 100% B = 90% C = 75% D = 40% F = 0% ["Dead"]	4 = No Apparent Problems 3 = Minor Problems 2 = Major Problems 1 = Extreme Problems 0 = N/A (Dead)

(Sec. 27-284.4.1.)

(a) *Tree equivalency credit for removal or replacement.* In determining the number and size of trees that shall be used in the calculation of mitigation of the protected tree or grand tree, Table 284.4.1-A below shall be used. Table 284.4.1-A1 shall be used

- (1) All existing, non-exempt/non-grand tree species to be retained and/or removed shall be added to the Table 284.4.1-A below, by applicable tree type (Type 1, 2, 3, or Palm), as set forth in the *2017 State of Florida Grades and Standards for Nursery Plants*.

D.2 TREE MITIGATION FORMULA – TABLE OF DEBITS & CREDITS (cont'd)

- (2) All existing grand tree species to be retained and/or removed shall be added to the Table 284.4.1-A grand tree table below.
- (3) All resulting debits shall be replaced with tree species from the tree Type (i.e. 1, 2, 3, Palm). Palm trees shall be replaced one (1) for one (1), with any tree type (Type 1, 2, 3, or Palm), as set forth in the 2017 *State of Florida Grades and Standards for Nursery Plants*. Refer to Table 27-284.4.1-B for equivalency ratios between tree types.
- (4) At least sixty (60) percent of the replacement trees planted on a parcel shall be native trees.

TABLE 284.4.1-A: TREE RETENTION-MITIGATION EQUIVALENCY TABLES BY TREE TYPE [6]				
TYPE 1 – TALL & WIDE				
Trees Retained		Multiplier for Credit		Multiplier for Debit
<i>Diameter (inches) / Dripline (feet)</i>				
5" to 10"		-1		1
11" to 20"		-2		2
21" to 25"		-4		3
26" to 31"		-12		4
'Grand' species – (refer to Grand Tree Tables below)				
TYPE 2 – TALL & NARROW				
Trees Retained		Multiplier for Credit		Multiplier for Debit
<i>Diameter (inches) / Dripline (feet)</i>				
5" to 17"		-1		1
18" to 29"		-2		2
30" to 31"		-3		3
'Grand' species – (refer to Grand Tree Tables below)				
TYPE 3 – SHORT/WIDE-MULTI-STEM				
Trees Retained		Multiplier for Credit		Multiplier for Debit
<i>Diameter (inches) / Dripline (feet)</i>				
5" to 7"		-1		1
8" to 17"		-2		2
18" to 29"		-3		3
30" to 31"		-12		4
'Grand' species – (refer to Grand Tree Tables below)				
TYPE – PALM				
Trees Retained		Multiplier for Credit		Multiplier for Debit
Palm, any species with 6' clear trunk		1		1
GRAND TREE TABLE [5]				
COMMON NAME	GROWTH RATE	TREE TYPE	CONDITION RATING	RISK RATING
<i>Enter tree name</i>	Moderate [1]	<i>Enter 1, 2, 3</i>	<i>Enter A, B, C, D, F</i>	<i>Enter 1-12</i>
DBH (in)	HGT (ft)	SLD (in)	LLD (in)	SR (%) [2]
<i>Enter #</i>	<i>Enter #</i>	<i>Enter #</i>	<i>Enter #</i>	<i>Enter #</i>
CS (ft)	CF (SF)	CR (%)	RCF (SF)	Equivalent # OF 2.5" Cal Trees [1]
Auto-Calculates	Auto-Calculates	Auto-filled [3]	Auto-Calculates	Auto-Calculates
NOTES:				
[1] All grand tree species calculated at "moderate" growth rate and using 10" caliper tree as standard 5-Year Parity (i.e. 154 SF replacement Crown Footprint per 2.5" caliper tree planted).				
[2] Species Rating % standardized to mid-point of range. SR ["Species Rating"]: Rating denotes comparative value by species, based on suitability & performance as 'urban trees', using FL ISA's Tree Species Ratings (2016); recorded as PERCENT. If SR not available, use CR value (see Table 284.3.2-A City of Tampa Tree Matrix).				

[3] CR ["Condition Rating"]: Rating using Tree Hazard Evaluation Method (Matheny and Clark 1994); recorded as a PERCENT ['A'=100%, 'B'=90%, 'C'=75%, 'D'=40%, 'F'=0%].

[4] Refer to Table 284.4.1-A1 Range of Species Ratings below.

[5] Credit for grand tree retention is calculated in the same manner as debits.

[6] All mitigation trees measuring less than 5" shall be factored into this table as a 5" tree.

Reference: "ft" means "feet;" "in" means "inches;" "SF" means "square feet;" "cal" means "caliper."

TABLE 284.4.1-A1: RANGE OF SPECIES RATING [WITH EXAMPLE EMBEDDED FOR REFERENCE]

COMMON NAME	CROWN SPREAD "CS" (ft)	CROWN FOOTPRINT "CF" (SF)	CONDITION RATING "CR" (%) [1]	SPECIES RATING "SR" (%) [2,3,4]	REPLACEMENT CROWN FOOTPRINT "RCF" (SF) [3]	EQUIVALENT # OF 2.5" CAL TREES REQ'D [5]
LAUREL OAK	74.8	4388	1	1	4388	28
				0.95	4169	27
	DBH (in)			0.9	3950	26
	49			0.85	3730	24
				0.81	3555	23
			0.9	0.8	3950	26
				0.75	3752	24
				0.7	3555	23
				0.65	3357	22
				0.61	3199	21
			0.75	0.6	3291	21
				0.55	3127	20
				0.5	2962	19
				0.45	2798	18
				0.41	2666	17
			0.4	0.4	1755	11
				0.35	1668	11
				0.3	1580	10
				0.25	1492	10
				0.21	1422	9

NOTES:

[1] 1 = A; 0.9 = B; 0.75 = C; 0.40 = D.

[2] SR% based on tree evaluation. ISA ranges: 100%-81%, 80%-61%, 60%-41%, 40%-21%, 20%-0%.

[3] Arborist, following field evaluation, shall use a specific Species Rating % applicable to current condition of existing tree and location in which it grows.

[4] If Species Rating not available from Florida ISA (see Table 284.3.2-A City of Tampa Tree Matrix), use Condition Rating factor as Species Rating factor in Mitigation calculation for specimen and grand trees; use 0.75 for all other trees, as applicable.

[5] If 2.5" Caliper or equivalent

D.3 TREE MITIGATION FORMULA – TABLE OF DEBITS & CREDITS (cont'd)

Tree Mitigation “Look Up” Tables – by Tree Type

FL Grades & Standards - Type 1 Matrix - TALL & WIDE FORM ["moderate growth rate"]			
Range of Protected DBH [4]	<i>"Parity" / "Replacement in 5-year Period" Scenario</i>		
	Equivalent 2.5" Caliper Crown Area	# of Replacement Trees / Equivalent Credit Multiplier for Retention [1,2,3]	Total Replacement Inches
31	169	4	10
30	156	4	10
29	156	4	10
28	156	4	10
27	143	4	10
26	143	4	10
25	130	3	8
24	130	3	8
23	130	3	8
22	117	3	8
21	117	3	8
20	104	2	5
19	104	2	5
18	104	2	5
17	91	2	5
16	91	2	5
15	78	2	5
14	78	2	5
13	78	2	5
12	65	2	5
11	65	2	5
10	52	1	3
9	52	1	3
8	52	1	3
7	39	1	3
6	39	1	3
5	26	1	3

[1] When the resulting calculation for mitigation tree(s) is less than 1.0 but more than 0, then the result shall be rounded up to 1.0. Otherwise, when the result is .5 or greater, the total will be rounded up to the next whole number.

[2] Minimum planting size required: 2.5" caliper/45 gal. Replacement tree results use the 2.5" caliper as a baseline and extrapolate caliper & crown area for equivalent replacement trees, over a 5-yr growth period, as PARITY.

[3] PARITY over 5-year period, for Type 1 Tall & Wide, at Moderate Growth Rate = 5.5" Caliper Canopy Area.

[4] All onsite trees measuring 32" DBH and larger are deemed 'grand' trees and will be individually evaluated to determine condition and mitigation requirements, as applicable.

FL Grades & Standards - Type 2 Matrix - TALL & NARROW FORM ["moderate growth rate"]

Range of Protected DBH [4]	"Parity" / "Replacement in 5-year Period" Scenario		
	Equivalent 2.5" Caliper Crown Area	# of Replacement Trees / Equivalent Credit Multiplier for Retention [1,2,3]	Total Replacement Inches
31	13	3	7.5
30	13	3	7.5
29	12	2	5
28	12	2	5
27	11	2	5
26	11	2	5
25	10	2	5
24	10	2	5
23	10	2	5
22	9	2	5
21	9	2	5
20	8	2	5
19	8	2	5
18	8	2	5
17	7	1	3
16	7	1	3
15	6	1	3
14	6	1	3
13	6	1	3
12	5	1	3
11	5	1	3
10	4	1	3
9	4	1	3
8	4	1	3
7	3	1	3
6	3	1	3
5	2	1	3

[1] When the resulting calculation for mitigation tree(s) is less than 1.0 but more than 0, then the result shall be rounded up to 1.0. Otherwise, when the result is .5 or greater, the total will be rounded up to the next whole number.

[2] Minimum planting size required: 2.5" caliper/45 gal. Replacement tree results use the 2.5" caliper as a baseline and extrapolate caliper & crown area for equivalent replacement trees, over a 5-yr growth period, as PARITY.

[3] PARITY over 5-year period, for Type 1 Tall & Wide, at Moderate Growth Rate = 5.5" Caliper Canopy Area.

[4] All onsite trees measuring 32" DBH and larger are deemed 'grand' trees and will be individually evaluated to determine condition and mitigation requirements, as applicable.

FL Grades & Standards - Type 3 Matrix - SHORT/WIDE & MULTI-TRUNKED FORM [moderate growth rate]

Range of Protected DBH [4]	<i>"Parity" / "Replacement in 5-year Period" Scenario</i>		
	Equivalent 2.5" Caliper Crown Area	# of Replacement Trees / Equivalent Credit Multiplier for Retention [1,2,3]	Total Replacement Inches
31	91	4	9.460784314
30	84	4	10
29	84	3	8
28	84	3	8
27	77	3	8
26	77	3	8
25	70	3	8
24	70	3	8
23	70	3	8
22	63	3	8
21	63	3	8
20	56	3	8
19	56	3	8
18	56	3	8
17	49	2	5
16	49	2	5
15	42	2	5
14	42	2	5
13	42	2	5
12	35	2	5
11	35	2	5
10	28	2	5
9	28	2	5
8	28	2	5
7	21	1	3
6	21	1	3
5	14	1	3

[1] When the resulting calculation for mitigation tree(s) is less than 1.0 but more than 0, then the result shall be rounded up to 1.0. Otherwise, when the result is .5 or greater, the total will be rounded up to the next whole number.

[2] Minimum planting size required: 2.5" caliper/45 gal. Replacement tree results use the 2.5" caliper as a baseline and extrapolate caliper & crown area for equivalent replacement trees, over a 5-yr growth period, as PARITY.

[3] PARITY over 5-year period, for Type 1 Tall & Wide, at Moderate Growth Rate = 5.5" Caliper Canopy Area.

[4] All onsite trees measuring 32" DBH and larger are deemed 'grand' trees and will be individually evaluated to determine condition and mitigation requirements, as applicable.