





Jeff Edgar Silver Creek Nurseries



TREE Fund Supporter Tour des Trees Rider



We support scientific discovery and dissemination of new knowledge in the fields of arboriculture and urban forestry by awarding:

- Grants for new research
- Scholarships for aspiring tree care
 professionals
- Support for arboriculture education

RESEARCH ARCHIVES

treefund.org/researcharchive





TREE FUND RESEARCH PRIORITIES

We listen to you!

TREE Fund's 2019 ISA Conference Survey Results:

WHICH	AREA OF RESEARCH IS MOST VITAL TO YOU?	atilities
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WINNER! ROOT AND SOIL MANAGEMENT









THE LANDSCAPE ARCHITECT IN THE NURSERY: TAGGING TREES AND ENFORCING SPECIFICATIONS





Jim Urban, FASLA Urban Trees + Soil

Paul Josey, ASLA Wolf Josey Landscape Architects

The Landscape Architect in the Nursey

Selecting Trees and Enforcing Specifications

September 10, 2019 James Urban FASLA, ISA Paul Josey ASLA, ISA







James Urban, FASLA

WOLFJOSEY landscape architects Key points of webinar

Role of the Landscape Architect

- What needs to change!
- Specifications
- Nursery inspections and tagging
- Project site reviews

Root Packages / Seasonal Impacts

B&B Trees and Shrubs

- Above the soil line
- Below the soil line

Container Trees and Shrubs

Role of the Landscape Architect What **needs** to change!

The end of the warranty should NOT be the end or our responsibility.

We should be sure that we are passing on a tree for future generations!



Role of the Landscape Architect



Co-dominant stems at time of planting



Stem girdling roots at time of planting

Both of these failures were the result of defects in the tree, several decades earlier *at the time of planting,* that could have (should have) been corrected by the Landscape Architect if they had understood tree defects!

Role of the Landscape Architect

- Specifications
- Nursery inspections and tagging
- Project site reviews









Specifications

MS Word Specifications and dwg Details

Urban Tree Foundation

700 East Murray Visalia, CA 93292

559.713.0631 www.urbantree.org

SECTION 32 9100

PLANTING SOIL

PART 1 - GENERAL

1.1 SUMMARY

Note to specifier: Remove parts of this work description that do not apply.

- A. The scope of work includes all labor, materials, tools, supplies, equipment, facilities, transportation and services necessary for, and incidential to performing all operations in connection with furnishing, delivery, and installation of Planting Soil and /or the modification of existing site soil for use as Planting Soil, complete as shown on the drawings and as specified herein.
- B. The scope of work in this section includes, but is not limited to, the following:
 - 1. Locate, purchase, deliver and install Imported Planting Soil and soil amendments.
 - 2. Harvest and stockpile existing site soils suitable for Planung Soil.
 - Modify existing stockpiled site soil.
 a. Modify existing site soil in place for use as Planting Soil.
 - b. Install existing or modified existing soil for use as Planting Sal
 - 4. Locate, purchase, deliver and install subsurface Drain Lines.
 - 5. Fine grade Planting Soil.
 - 6. Install Compost into Planting Soil.
 - 7. Clean up and disposal of all excess and surplus material
- 1.2 CONTRACT DOCUMENTS
 - A. Shall consist of specification, general condition, and the drawings. The intent of these documents is to include all labor, materials, and services successary for the proper execution of the work. The documents are to be considered asone. Whatever is called for by any parts shall be as binding as if called for in all page.
- 1.3 RELATED DOCUMENTS AND REFERENCES

A. Related Documer

Note to specifier: Coord and fist with the other related specification sections. Add or delete sections as appropriate.

- Drawings and general provisions of contract, including general and supplementary conditions and Division I specifications, apply to work of this section.
- 2. Related Specification Section
 - a. Section Planting
 - b. Section Imigation
 - c. Section Lawn
 - Section Tree and Plant Protection
- B. References: The following specifications and standards of the organizations and documents listed in this paragraph form a part of the Specification to the extent required by the references thereto. In the event that the requirements of the following referenced standards and specification conflict with this specification section the requirements of this specification shall prevail. In the event that the requirements of any of the following referenced standards and specifications conflict with their ments of any of the following referenced standards and specifications conflict with each other the more stringent requirement shall prevail.

Copyright 2014 Urban Tree Foundation Review June 2, 2014

Nursery inspections and tagging Above AND below the ground Asthenic AND technical requirements



Project site reviews

Does the plant quality including the root ball meet the specifications and any required modification at the time of planting!



Balled and Burlapped Trees & Shrubs

Root Package Types

Various types of Root Packages

Field grown / Bare root Field grown / Balled and Burlap twine or wire basket Field Grown / Spade Harvested and Transplanted Field grown / Containerized Root Safe Container grown Fabric Grow Bag Wood Box grown Container grown

Each type needs its own specification and has different nursery inspection methods and planting requirements!



















Seasonal considerations

Root growth begins once soils warms up

Credit: After Coder

Best time to dig trees vs. Fall transplant hazard

Root growth begins once soils warms up

Credit: After Coder

Best time to dig trees vs. Fall transplant hazard

Is fall planting hazard a myth?

Critical the tree is dormant before digging.

Ex. Oaks typically go dormant very late in the fall.

	Common Fall Hazard Traits				
Species Presumed to be Fall Hazards	Minimize Moisture Loss	Thin Barked Trees	Harvest Time	Trees with Coarse Roots	
Acer rubrum	x	х			
<i>Betula</i> sp.	x	x	x		
Carpinus sp.	x	x	x	x	
<u>Celtis</u> sp.	X	X			
Cercis sp.	X	X		X	
Cercidiphyllum	x	x			
Cornus sp.	x	x			
Crataegus sp.	x		X		
Fagus sp.	x	x			
<i>Halesia</i> sp.	x		X		
Liquidambar styraciflua	x		X		
Liriodendron <u>tulipifera</u>	X	X			
Malus sp.	X	X	X		
Nyssa sylvatica	X			X	
Ostrya virginiana	X	X	X	X	
<u>Platanus</u> sp.	X	X			
Pyrus sp.	x		X		
Quercus sp.	x	x	X	x	
Taxodium distichum	X		X		
<u>Tilia tomentosa</u>	x	x			
Zelkova serrata	X	x			

Chart by Matt Stephens, Director of Street Tree Planting for NYC Parks

"The fall-planted [swamp white oaks] even put out typically twice as much growth for us the following spring than do the springplanted ones."

 Matthew Erb, Pittsburgh Director of Urban Forestry

Image credit: Michelle Sutton

Transplant response

This is why small caliper trees generally grow to be larger and healthier after 10 years than larger caliper trees

Above the Soil Line: Co-dominant Leaders

Reject tree with two or more main stems coming from the same location. These are the result of the nursery topping the tree to make a "full" crown.

Included bark, tight crotch angles, branch collars

Weak branch connection, no branch collar. Reject!

Included bark

Strong branch connection developing branch collar

Image credit: Shigo

Developing branch collars

Included bark, tight crotch angles, branch collars

You can fix these problems in the nursery or during installation!

Go to Ed Gilman's U of Florida website for pruning Module 8, 9 and 10 https://hort.ifas.ufl.edu/woody/instructional-videos.shtml

Pruning in the Nursery

Before Pruning

Central leader

Co-dominant leaders headed back or removed

Evenly spaced branch attachments

Maintain lower branches

After Pruning

Bark deformities, cracking, fungus, etc.

Cracks and peeling bark

Wet splits and borer holes

Wounds and bark discoloration

Different tree genetics in seed propagated trees

Visual cues in leaf color, growth rates

Late spring leaf out, unusual leaf growth pattern

Early fall color

Below the Ground Line: Buried Root Flare, Roots too Deep

Below the Ground Line: Roots too deep / Tree harvested with buried root flare

No roots in this zone

Actual top of root ball

Correct top of root ball

Less roots in root ball. Greater stem circling roots. Slower root growth in the establishment period.

Area of roots lost due to digging tree with root flare too deep

If the tree does not have any root flare coming out of the ball, it's a good bet that the root flare is too deep in the ball. Better check it!

Below the Ground Line: Circling Roots in B&B tree formerly in a container

B&B trees are sometimes started in a container then transplanted into the field without cutting the resulting circling roots.

Below the Ground Line: Other root and root flare problems

J roots

T roots - Roots only on one axis

Auger hole roots Dig till you find that root flare

Mistaking the graft for the flare

But propagation techniques can create a variety of root architecture

Below the Ground Line:

Nursery inspection: What tools to bring

Small short shovel

Black and white markers

Below the Ground Line:

There is no substitute for Digging!

Nursery inspection: What to do and look for.

You can fix root problems in the nursery!

But you have to go there and inspect at least a sampling of the trees.

Mark reference line

Remove adventitious roots above trunk flare

Required position of top of root ball when tree is harvested

At the Ground Line:

When are you looking at a root and when is it the trunk?

Trunk bark - typical to the species

Transition zone

Root bark - circular ridges perpendicular to the root direction. Similar in almost all species!

Root Ball measuring point for planting depth

May need to be worked out at the nursery based on their ball processing equipment. The top of the root ball at the tree trunk is **never a good place** to set adjacent soil line

Edge of root ball is typically the best place set the adjacent soil line For an extremely sloped root ball this may be the best place, BUT *where is the root flare* inside this ball?

Problems below the soil line Note: Problems above the soil line are similar to B&B

Does container type make a difference in rooting on the edge and circling and kinked roots?

Not really!

Boxed

Standard

Faceted

Dimple Openings

Slotted openings

Promising alternative and emerging container technology

Grow bags Jim Barborinas Open mesh Brian Kempf

Gravel Bed / Bare Root Chris Starbuck Poly fabric Dan Struve

So what's the problem?

Soil on top of roots

Circling roots Girdling roots

Buried trunk flare

Callused Too large a root cut

Container Defects

There are three root balls in this root system. Root balls 1 and 2 cannot be fixed

Pin to find roots in a container

Three layer container Get rid of **A** and **C** and only plant the roots in the middle layer **B**

Finding the trunk flare in a container tree can be hard work due to the dense matt of roots at the top of the ball

Shaving container root balls

This fixes the outer circling roots BUT NOT the ones inside the root ball from previous containers

Container Trees & Shrubs

Fix the circling roots

Roots keep growing in the alignment of the root just before the cut

Root response to pruning

The Ultimate and Sustainable FIX- Bare Root and Bare Rooted

Hydro-gel dip Bare Root Nina Bassuk

B&B to Bare Rooted Jim Flott Bonnie Appleton

Gravel Bed Bare Root Chris Starbuck

The goal is to see the entire root system at planting to assure a future root system.

Source from a reliable nurseries that understand the tree/root issues

Urban Forest Nursery Washington

Select Trees Georgia

Halka Nursery New Jersey

NW Shade Trees Oregon

Cherry Lake Nursery Florida

Schichtel's Nursery New York

Ruppert Nursery Maryland

Quail Ridge Nursery Ohio

Kaneville Tree Farm Illinois

The above nurseries are a *REPRESENTATIVE* sample of growers who work hard too supply quality trees both above and below the ground.

Get to know your local growers, find ones that understand the problems and will work with you to deliver trees that meet your specifications.

Scentific Journal of the International Society of Arbonculture Volume 45, No. 2, March 2010

Tree Planting Second Edition

Shrub, and Other Woody Plant Management—Standard Practices (Transplanting)

ISA BMP manuals and journals

ROOTS

Healthy Soils and Trees in the Built Environment

James Urban

Up By Roots by James Urban

Researchers

The following researchers have an interest and undertaken research into nursery issues, and have been funded by the Tree Fund.

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