

Barton Springs Planting Plan Draft

Revised 6-10-09

I. Location (see overview map)

Over 60 planting sites have been identified throughout the Barton Springs area. Each individual site was assessed by staff and ranked on a scale of 1-5, with 1 being the least likely sites to be planted and 5 being the best planting sites. Additionally, assessments were made to determine the total number of large growing shade trees and total number of small growing under-story trees that could possibly be planted in each given site. Finally, the size of each potential planting site was determined.

Sites with a ranking of 5 should be prioritized for planting in Fall of 2009, and that as funding is made available, sites that rank in the lower tiers be utilized.

Criteria used to determine the most appropriate ranking includes the following:

- Proximity to salamander habitat
- Condition of existing trees in area,
- Amount of existing shade present
- Size/age of trees present in area
- Available growing space (buildings and sidewalks)
- Presence of buried utility lines
- Slope of site
- Current use of area

Criteria used to determine the number and mature size of trees:

- Size of growing space
- Current canopy density of existing trees
- Presence of overhead utility lines
- Current use of site

Summary of potential planting sites:

Site rank	Total # sites	# large growing (shade) trees	# small growing (under-story) trees	Total area acres
1	7	11	10	0.39
2	14	8	25	0.44
3	13	16	60	1.15
4	18	27	79	1.16
5	13	35	37	0.85
Total	65	97	211	3.99

II. Species selection

See attached table “Barton Springs potential tree planting species list” for a detailed list of potential species that may be selected. Species will be selected based on plant characteristics that best compliment site conditions. Some potential planting sites have already been evaluated for the most appropriate large growing shade tree species. We recommend a broad selection of shade trees be planted to provide greater canopy diversity which will have associated ecological and aesthetic benefits. A broad selection of small growing under story-tree species can be planted in this area; therefore specific species have not been selected for most sites. We recommend that a large assortment of small growing under-story trees be planted.

III. Planting stock

Containerized trees are most commonly planted on parkland and are typically the most reliable and efficient planting stock available. These trees are grown in nurseries for the purpose of planting in landscapes. Containerized trees are available in a wide variety of sizes and species, however, typically species variety becomes limited with larger container sizes. Containerized tree stock must be derived from local or regional seed sources and be grown locally or regionally for optimal success in landscape planting.

Approximate costs for container stock

15 gallon,	\$50
30 gallon,	\$130
45 gallon,	\$200
95 gallon,	\$550
36” box (200 gallon),	\$550
300 gallon,	\$1200

Large transplanted trees are becoming more popular and can be an option for parkland planting. Trees can be transplanted from one location to another on-site, or if suitable specimens are not available on-site, transplants can be obtained from growers or other off-site locations. Some factors that influence the possibility of successful transplants include: tree species, tree health, and site conditions. The size of the tree to be transplanted dictates the type of equipment utilized, which in turn affects cost. The distance that the tree must be moved from one location to another heavily influences the cost associated with the transplant. The total number of trees to be transplanted has a direct effect on the total cost per tree (economy of scale).

Approximate costs for large transplant trees (includes installation)

On-site

6” to 10”	= \$400 - \$1,750
11” to 14”	= \$1,500 - \$12,000
15” to 18”	= \$6,000 - \$24,000
19” and above	= \$29,000

Off-site

6” to 10”	= \$2,000 - \$3,000
11” to 14”	= \$7,500 - \$15,000
15” to 18”	= \$22,000 - \$27,000
19” and above	= \$35,000

(Caliper measured at 1 foot above grade)

Depending on funding, the majority of trees planted in this area should be containerized tree stock and due to the significant increase in cost, large transplants should only be utilized where beneficial impacts will be greatest.

IV. Site preparation & newly planted tree maintenance

Site preparation needs are varied throughout the different sites. All sites will benefit from extensive compost and mulch application. Areas with extensive soil compaction or high use may need to have access restricted during the establishment period of tree growth (approximately 2 years). In addition, soil aeration may be appropriate. Excavation for actual tree planting can be done manually or with the assistance of tractors or digging equipment. The size of the tree root ball and site access will dictate the type of equipment used for both excavation and tree planting. All trees planted must have mulch applied over the root ball and over the surrounding soil directly adjacent to the root ball. Mulch should be applied at a depth of at least 2 inches over the entire area with care not to allow any mulch to be in direct contact with the trunk of the tree (no volcano mulching). Weeds and grass should be kept clear of mulched area. Trunk guards should be installed to protect from accidental mechanical damage. Stakes and support guide wires may need to be supplied and installed for some newly planted trees if the tree requires additional support.

Maintenance needs for containerized trees are minimal for the first 2 years aside from irrigation. Stakes and supporting materials should be removed after year 1. Mulch rings should be replenished as needed and area should remain free of grass and weeds indefinitely. Training pruning will be appropriate by year 3 or 4 after planting. Training pruning is care that focuses on eliminating future maintenance issues associated with tree structure and infrastructure conflicts.

Maintenance needs for large transplanted trees include increased monitoring of health (monthly inspections), an Integrated Pest Management Plan, fertilization (including root invigoration), and possible fungicide treatments (each of these to occur several times yearly).

Approximate costs associated with site preparation and maintenance

(# of hours depends on # trees planted)

Forestry Technicians (2) at \$16.50/hr

Forestry Technician Senior (1) at \$19.80/hr

Forester/Specialist (1) at \$29.00/hr

Pick-up truck (1) at \$4.00/hr

Brush truck (1) at \$25.00/hr

TRACTOR

Transplanted trees: post transplant care \$300 - \$600/yr

MULCH, STAKES, GUARDS

V. Irrigation

All newly planted trees must be irrigated at least once weekly for a period of at least 2 years in order to establish adequate root systems to support long term health. Trees with large root balls may require more frequent irrigation for the first several months after planting. Irrigation can be achieved

by installing temporary below ground irrigation systems with bubblers at each tree. Costs associated with temporary irrigation line installation vary depending on availability of water sources, linear feet of line needed, costs of hardware, presence of existing trees, and number of trees to be irrigated. Another route is by utilizing employees that hand water each tree. Costs associated with hand watering are typically higher and include employee salary and equipment costs; availability of additional staff is limited.

The amount of water required per tree depends on the size and type of planting stock. Containerized trees need at least 1 gallon of water per diameter inch of trunk (measured at 1.5" from the ground). Large transplanted trees require significantly more water, and the water must be applied evenly across the root ball.

Approximate costs for irrigation

Temporary irrigation line installation

Container stock, \$150 per tree

Transplanted tree, \$300 to \$3,000 based on tree size

Hand watering @ 12 trees per hour average, one cycle per week

Water truck driver \$16.50/hr (salary and fringe)

Water truck \$20.00/hr

COMPARE EQUALLY (per tree, per year???)

VI. Funding

1. How much funding is available for each type of cost parameter?

2. Who is responsible for the funds?

The answers to questions 1 & 2 will help guide the answer to the next question:

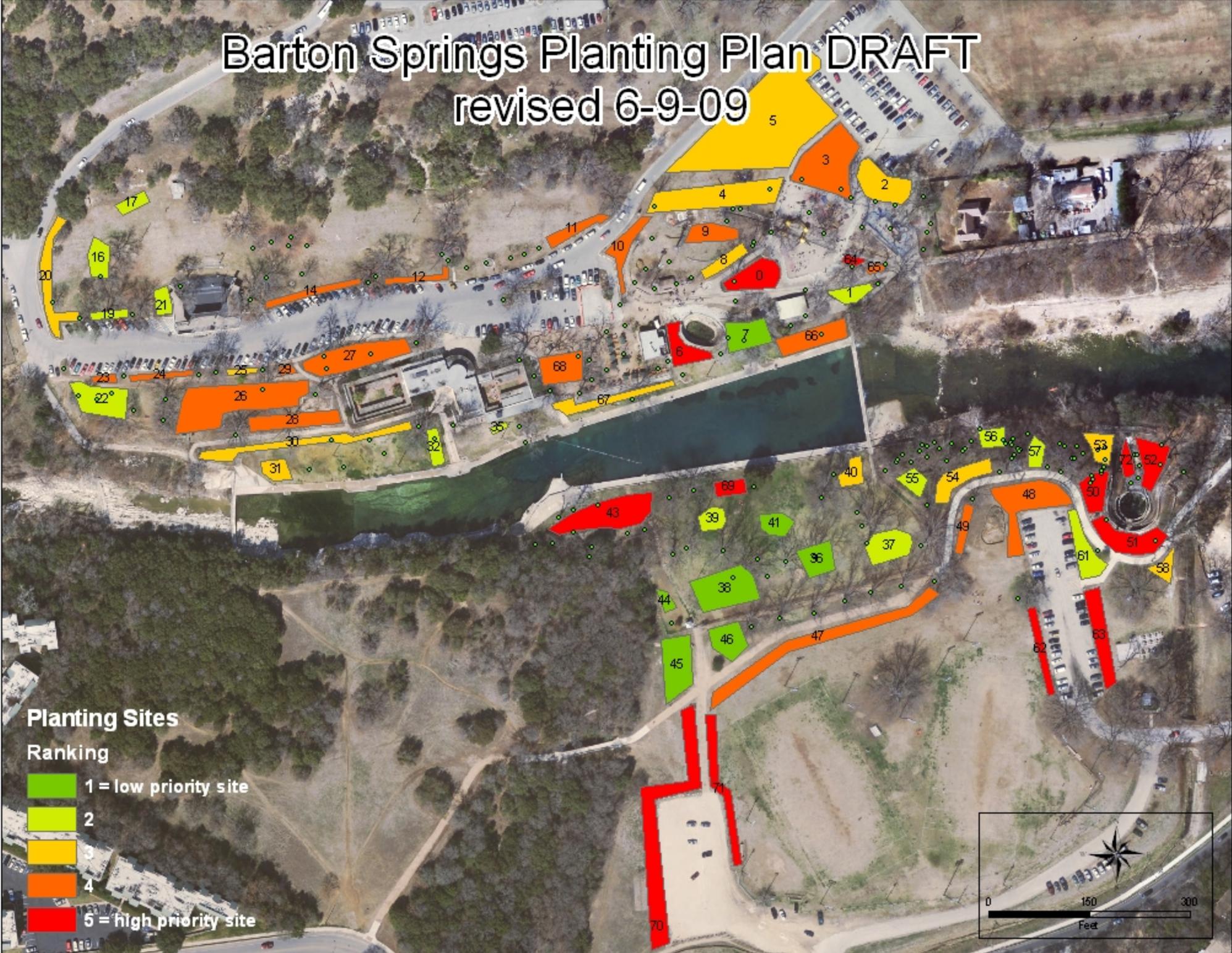
3. What is the priority for this tree planting?

a. Plant the biggest trees possible?

b. Plant the largest number of trees possible?

Barton Springs Planting Plan DRAFT

revised 6-9-09



BARTON SPRINGS PLANTING PLAN DRAFT 06-09-09

Site ID	Site rank (1-5, 5 is highest priority)	Num Lg	Num Sm	Lg transplant possible?	Overhead utilities present?	Possible species to plant	Area: sq ft	Area: acres
0	5	3	12	M	N	BUR OAK, TX ASH	2797.36	0.06
1	2	1	4	M	N		1163.17	0.03
2	3	2	12	Y	Y	LIVE OAK, ANACUA, BUMELIA, SYCAMORE	3388.11	0.08
3	4	1	12	Y	Y	PECAN, ANACUA, SYCAMORE, LIVE OAK	6419.36	0.15
4	3	1	12	Y	Y	1 MEDIUM TREE. BIG TOOTH MAPLE	6500.16	0.15
5	3	3	12	Y	Y	ANACUA, SYCAMORE, MESQUITE, LIVE OAK	22850.54	0.52
6	5	2	3	M	Y	RED OAK, CEDAR ELM, BALD CYPRESS	2059.56	0.05
7	1	3	2	N	N		2484.34	0.06
8	3	1	2	M	N	OAK	1277.29	0.03
9	4	3	5	N	Y	WALNUT	1805.56	0.04
10	4	1	0	Y	N	LIVE OAK	1892.13	0.04
11	4	1	3	Y	Y	AMERICAN ELM, RED OAK, OAK	1388.65	0.03
12	4	1	4	Y	N	OAK	914.09	0.02
14	4	1	4	Y	N	OAK	1478.95	0.03
16	2	1	0	Y	N	OAK	1560.41	0.04
17	2	1	0	Y	N	OAK	881.04	0.02
19	2	1	2	Y	N	OAK	660.68	0.02
20	3	2	5	Y	Y	OAK, BIG TOOTH MAPLE	2961.65	0.07
21	2	1	1	Y	N	BIG TOOTH MAPLE	953.05	0.02
22	2	0	3	Y	Y		3316.58	0.08
23	4	0	1	Y	N		378.35	0.01
24	4	1	2	Y	Y	OAK	796.44	0.02
25	3	0	1	Y	N		398.61	0.01
26	4	2	9	Y	N	CEDAR ELM, PECAN, ANACUA, LIVE OAK	8875.95	0.20
27	4	2	12	Y	N	PECAN, LIVE OAK	4919.88	0.11
28	4	1	6	Y	N	BIG TOOTH MAPLE	2969.52	0.07
29	4	1	0	Y	N	OAK	308.11	0.01
30	3	0	6	N	N		3700.83	0.08
31	3	2	0	Y	N	TX ASH	1130.51	0.03
32	2	0	2	N	Y		997.12	0.02
35	2	0	3	N	Y		265.02	0.01
36	1	2	0	Y	N		2054.05	0.05
37	2	0	0				2693.09	0.06
38	1	1	0	Y	N		4733.17	0.11
39	2	1	0	Y	N		1224.76	0.03
40	3	1	1	N	Y	WALNUT	1152.93	0.03
41	1	1	0	Y	N		1372.91	0.03
43	5	2	0	N	N	BALD CYPRESS, SYCAMORE, WALNUT	5489.84	0.13
44	1	1	0	Y	N		524.14	0.01
45	1	3	5	Y	N	OAK, ANACUA	3634.53	0.08

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Site ID	Site rank (1-5, 5 is highest priority)	Num Lg	Num Sm	Lg transplant possible?	Overhead utilities present?	Possible species to plant	Area: sq ft	Area: acres
46	1	0	3	Y	N		2166.59	0.05
47	4	6	7	Y	N	PECAN	6209.76	0.14
48	4	2	6	Y	Y	PECAN, TX ASH, SYCAMORE	5293.90	0.12
49	4	1	4	Y	N	TX ASH	982.76	0.02
50	5	2	0	N	N	RED OAK, WHITE OAK, AMERICAN ELM, BALD CYPRESS, TX ASH	1912.78	0.04
51	5	5	0	N	N	RED OAK, WHITE OAK, AMERICAN ELM, BALD CYPRESS, TX ASH, SYCAMORE	3246.34	0.07
52	5	3	0	N	N	CEDAR ELM, BALD CYPRESS, WALNUT, TX ASH	2372.58	0.05
53	3	1	3	N	N	SYCAMORE, BUCKEYE, DOGWOOD	1452.98	0.03
54	3	1	4	Y	N	SYCAMORE, PECAN, MX BUCKEYE, DOGWOOD	2359.60	0.05
55	2	1	2	Y	N	MX BUCKEYE, DOGWOOD	1022.70	0.02
56	2	1	2	N	N	DOGWOOD, MX BUCKEYE	1004.79	0.02
57	2	0	3	N	N	DOGWOOD, MX BUCKEYE	927.47	0.02
58	3	2	2	Y	N	SYCAMORE	895.99	0.02
61	2	0	3	Y	Y		2449.56	0.06
62	5	1	0	Y	N	TEXAS ASH	1559.03	0.04
63	5	0	6	Y	Y	TX MNT LAUREL, YAUPON HOLLY, MX PLUM	3112.83	0.07
64	5	1	0	N	N	AMERICAN ELM	346.45	0.01
65	4	0	1	N	N	TX MTN LAUREL	306.40	0.01
66	4	0	3	N	Y		2999.82	0.07
67	3	0	0	N	Y		2086.49	0.05
68	4	3	0	M	N		2695.60	0.06
69	5	1	0	N		BALD CYPRESS	997.75	0.02
70	5	10	10	Y	N		9023.40	0.21
71	5	5	5	Y	N		3236.80	0.07
72	5	0	1	N	N		759.70	0.02

Barton Springs Tree Planting Potential Species List DRAFT

Legend:	CO =Color	NA =Nursery Availability	BP =Blackland Prairie	FP =Floodplain
	EQ =Evergreen Qualities	NT =Native to Texas	DS =Dry Site	GG =Grow Green
	FG =Faster Growth Rate	SS =Significant Shade	HC =Hill Country	PC =Previous Class System (1-4)
	FS =Full Sun	US =Understory	MS =Moist Site	ST =Streetscape
	MH =Mature Height (Feet)	WV =Wildlife Value	WS =Wet site	UC =Utility Compatible
	MW =Mature Width (Feet)			

COMMON NAME <i>Scientific Name</i>	TREE CHARACTERISTICS											SOIL CHARACTERISTICS					CITY OF AUSTIN'S LISTS				
	CO	EQ	FG	FS	MH	MW	NA	NT	SS	US	WV	BP	DS	HC	MS	WS	FP	GG	PC	ST	UC
ANACACHO ORCHID TREE <i>Bauhinia congesta</i>	x			x	10	10	x	x		x	x		x	x				x		x	x
ANACUA <i>Ehretia anacua</i>	x	x	x	x	30	45	x	x	x		x	x			x	x			3		
ASH, TEXAS <i>Fraxinus texensis</i>	x		x	x	30	45	x	x	x		x	x	x	x				x	1	x	
BUCKEYE, MEXICAN <i>Ungnadia speciosa</i>	x		x		15	20	x	x		x	x		x	x	x			x	2	x	x
BUCKTHORN, CAROLINA <i>Rhamnus caroliniana</i>	x				15	15	x	x		x	x	x	x	x	x			x	2	x	x
BUMELIA, GUM <i>Bumelia lanuginosa</i>				x	45	50		x	x		x	x	x	x					2		
CEDAR, EASTERN RED <i>Juniperus virginiana</i>		x		x	50	20	x	x	x		x	x			x			x			
CHERRY, ESCARPMENT BLACK <i>Prunus serotina var. eximia</i>	x		x	x	40	25	x	x	x		x		x	x	x			x	2		
CHERRY-LAUREL, CAROLINA <i>Prunus caroliniana</i>	x	x	x	x	40	15	x		x		x				x			x	2	x	
CHITALPA <i>Chitalpa tashkentensis</i>	x		x	x	30	25	x		x			x	x		x			x			x
CRAPEMYRTLE <i>Lagerstroemia indica</i>	x		x	x	30	20	x					x	x		x			x	2	x	
CYPRESS, BALD <i>Taxodium distichum</i>			x	x	100	40	x	x	x		x	x	x	x	x	x	x	x	1	x	
CYPRESS, MONTEZUMA <i>Taxodium mucronatum</i>			x		50	40	x	x	x		x				x			x			x
DESERT WILLOW <i>Chilopsis linearis</i>	x		x	x	30	20	x	x			x		x	x	x			x	3	x	x
DOGWOOD, ROUGHLEAF <i>Cornus drummondii</i>	x		x	x	15	15	x	x		x	x	x		x	x			x	2	x	x
ELM, AMERICAN <i>Ulmus americana</i>			x	x	80	80		x	x		x				x	x	x		1	x	
ELM, CEDAR <i>Ulmus crassifolia</i>				x	60	30	x	x	x		x	x	x	x			x	x	1	x	
EVE'S NECKLACE <i>Sophora affinis</i>	x			x	25	20	x	x		x	x		x	x	x			x	1	x	x
GOLDENBALL LEAD-TREE <i>Leucaena retusa</i>	x		x	x	25	15	x	x			x		x	x	x			x	2	x	x
HOLLY, POSSUMHAW <i>Ilex decidua</i>	x		x	x	20	15	x	x		x	x	x	x	x	x			x	1	x	x
HOLLY, YAUPON <i>Ilex vomitoria</i>	x	x	x	x	20	15	x	x		x	x	x	x	x	x			x	1	x	x
KIDNEYWOOD <i>Eysenhardtia texana</i>	x		x	x	15	10	x	x		x			x		x			x			x
MAPLE, BIGTOOTH <i>Acer grandidentatum</i>	x		x	x	40	25		x	x		x		x	x	x			x	1	x	
MESQUITE, HONEY <i>Prosopis glandulosa</i>				x	30	25	x	x			x	x	x		x			x	3		x
MOUNTAIN LAUREL, TEXAS <i>Sophora secundiflora</i>	x	x		x	25	10	x	x		x	x		x	x	x			x	1	x	x
OAK, BUR <i>Quercus macrocarpa*</i>			x	x	100	50	x	x	x		x	x	x	x			x	x	1		
OAK, CHINQUAPIN <i>Quercus muhlenbergii*</i>			x	x	60	35	x	x	x		x	x	x	x				x	1	x	
OAK, LACEY <i>Quercus laceyi*</i>				x	45	25	x	x	x		x		x	x	x			x	1	x	
OAK, LIVE (Plateau) <i>Quercus fusiformis</i>		x	x	x	40	50	x	x	x		x	x	x	x				x	1	x	
OAK, MEXICAN WHITE <i>Quercus polymorpha*</i>		x	x	x	40	35	x	x	x		x		x		x			x			x
OAK, SHUMARD RED <i>Quercus shumardii</i>	x		x	x	75	40	x	x	x		x		x	x				x	1	x	
OAK, TEXAS RED <i>Quercus texana</i>	x		x	x	40	25	x	x	x		x		x	x	x			x	1	x	

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PECAN <i>Carya illinoensis</i>			x	x	100	70	x	x	x		x	x		x	x		x	x	1		
PERSIMMON, TEXAS <i>Diospyros texana</i>				x	20	10	x	x		x	x	x	x	x				x	1		x
PISTACHE, TEXAS <i>Pistacia texana</i>	x	x	x	x	20	20	x	x	x		x	x	x					x	2	x	x
PLUM, MEXICAN <i>Prunus mexicana</i>	x		x	x	20	20	x	x		x	x	x	x	x				x	2		x
REDBUD, MEXICAN <i>Cercis canadensis var. mexicana</i>	x		x	x	15	15	x	x		x	x		x		x			x	2	x	x
REDBUD, TEXAS <i>Cercis canadensis var. texensis</i>	x		x	x	30	15	x	x			x	x	x	x				x	2	x	x
SMOKE-TREE, AMERICAN <i>Cotinus obovatus</i>	x			x	25	20	x	x		x	x		x	x	x			x	2	x	x
SOAPBERRY <i>Sapindus drummondii</i>	x		x	x	30	30		x	x		x	x			x	x			2	x	
SUMAC EVERGREEN <i>Rhus virens</i>	x	x	x	x	10	10	x	x		x	x		x					x			
SUMAC FLAMELEAF <i>Rhus lanceolata</i>	x		x	x	15	10	x	x		x	x	x	x	x				x	2	x	x
SYCAMORE, AMERICAN <i>Platanus occidentalis</i>			x	x	80	60	x	x	x			x		x	x	x	x		2	x	
SYCAMORE, MEXICAN <i>Platanus mexicana</i>			x	x	60	40	x	x	x						x						x
VIBURNUM, RUSTY BLACKHAW <i>Viburnum rufidulum</i>	x			x	20	15	x	x		x	x	x	x	x				x	1	x	x
WALNUT, ARIZONA <i>Juglans major</i>			x	x	50	30	x	x	x		x			x	x	x	x		1		
WALNUT, EASTERN BLACK <i>Juglans nigra</i>			x	x	80	50	x	x	x		x			x	x	x	x		1		
WALNUT, LITTLE <i>Juglans microcapra</i>			x	x	30	30	x	x	x		x				x	x	x		2		
WAX MYRTLE <i>Myrica cerifera</i>		x	x	x	15	15	x			x	x	x			x	x		x		x	x

Footnote
*Oak trees less susceptible to oak wilt