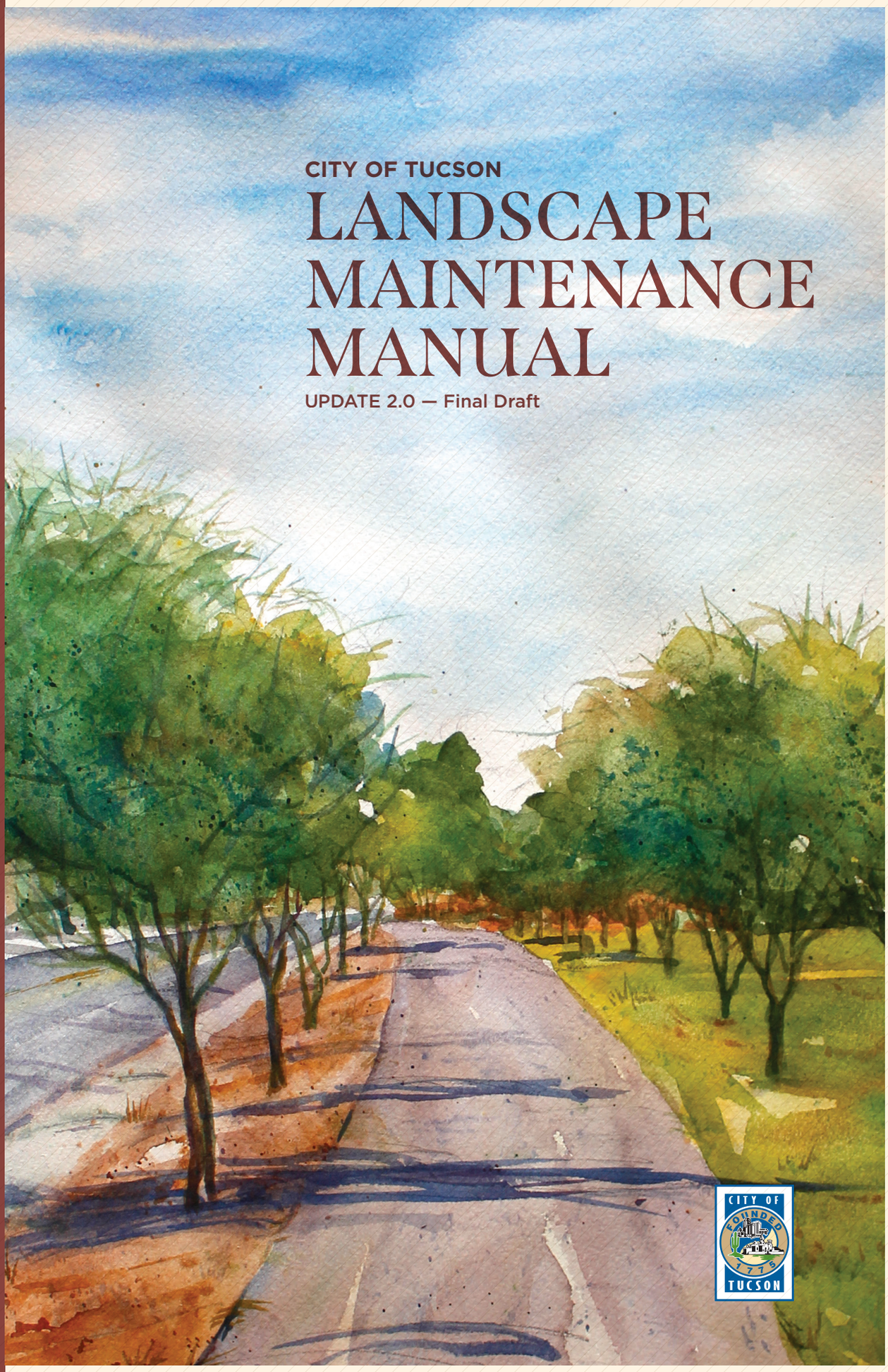
CITY OF TUCSON

LANDSCAPE MAINTENANCE MANUAL

UPDATE 2.0 — Final Draft



NOVEMBER 2020

ACKNOWLEDGEMENT:

MAYOR AND COUNCIL

Mayor Regina Romero

Vice-Mayor Paul Cunningham

Lane Santa Cruz, Ward 1

Paul Durham, Ward 3

Nikki Lee, Ward 4

Richard Fimbres, Ward 5

Steve Kozachik, Ward 6

CITY OF TUCSON

Michael Ortega,
City Manager

Tim Thomure, Interim,
Director, Parks and Recreation

Diana Alarcon,
Director, Department of Transportation & Mobility

Tim Thomure,
Director, Tucson Water

LANDSCAPE ADVISORY COMMITTEE

Laura Mielcarek,
Chairperson

Ron Van Ommeren,
Vice Chairperson

Rebeca Field

Parker Filer

Katie Gannon

Jackie Lyle

Alison Meadow

Deborah Munoz-Chacon

Flor Sandoval

Kasy Schug

Nick Shipley

Cover and inside cover artwork:
Michaela Slattery, Tucson, AZ

TABLE OF CONTENTS

I. GENERAL FRAMEWORK

Proper landscape management is the City of Tucson's primary tool to provide for the orderly maintenance and protection of City landscape assets, especially the urban forest. Trees and vegetation promote the health, safety, welfare, and quality of life for the residents of the city. These guidelines help to assure that these resources will retain their significant contributions to the landscape, address climate resilience, the built environment, pest/disease threats and continue to define the Great Desert City of Tucson.

A. GUIDING STANDARDS

One of the most structurally visible public landscape feature is trees. Trees provide multiple benefits to the city functionally, socially, and aesthetically. Public trees are one of the only public assets that appreciate with time. This Landscape Maintenance Manual establishes best management practices to accompany the implementation of:

- Establishing a single point of contact for tree maintenance: the Director of Parks & Recreation; with assistance from the Director of Transportation or designated urban forestry/landscape manager when related to trees in the City's rights-of-way;
- Pima Association of Government Standard Details and Specification for Public Improvements, 2015 edition, and subsequent updates in 2019 and 2020;
- Current standards established by the American National Standards Institute (ANSI) Z133.1: Safety Requirements for Pruning, Trimming, Repairing, Maintaining, and Removing Trees and for Cutting Brush;
- The International Society of Arboriculture (ISA), best management standards and maintenance practices; and
- OSHA Safety Rules and Regulations (OSHA 29 CFR 1910) relating to safety standards when pruning near electrical and communication power lines; and
- City of Tucson Municipal Code Part II: Tucson Code: Chapter 25: Streets and Sidewalks Article II: Duties and Prohibitions Sec. 25-53. Duty to trim:

The owner, occupant, or agent in charge of any lot, piece, or parcel of land within the corporate limits of the city shall not allow any tree, shrub, or other form of vegetation of any kind upon such property or upon the right-of-way, street, or alley adjoining the same to extend over or under the sidewalk space or roadway in such street or alley in such a manner as to interfere with the reasonable use of such street, sidewalk, or alley for pedestrian or vehicular devices or luminaries. It shall be the duty of every such owner, occupant or agent in charge to keep such trees, shrubs, or any other vegetation trimmed in such manner that the same will not interferewith the reasonable use of such street or alley for pedestrian or vehicular traffic. (1053 Code, ch.24§16; Ord. No. 6195, § 3, 3-11-85; Ord. No 8327, § 2,7-5-94)

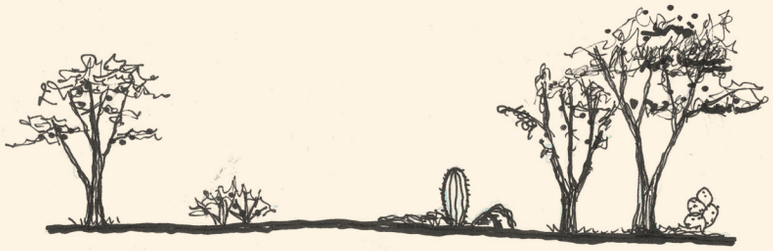
B. PURPOSE OF THIS MANUAL

- Provide direction and techniques to maximize the health and preservation of existing tree canopy cover over streets, parks, open space, drainageways and trails maintained by City of Tucson Department of Transportation and Mobility, Streets Division; Parks; Housing & Community Services; and Environmental & General Services Department.
- Provide acceptable standards of maintenance for City-owned trees.
- Assure survivability and sustainability of trees and vegetation in the urban environment by implementing these best management practices for urban landscape care including shaping young trees for balanced growth form.

C. OUTCOMES OF APPLYING BEST MANAGEMENT PRACTICES

- Safe, clean, and neat public areas
- Properly-irrigated landscape areas within and adjacent to public rights of way, parks and City-owned open spaces
- Transportation corridors (i.e., streets, trails, alleys, etc.) that are pedestrian and bicycle comfortable. This goal will be measured by the shade provided to reduce the urban heat island and the pedestrians'/bicyclists' safety.
- Maintenance procedures are performed on a routine based on flowering cycle, seasonal growth cycles, and as needed. Seasonal maintenance generally includes pruning, fertilizing, adjustment of irrigation scheduling, and applying herbicides/pesticides. As-needed maintenance is generally removing/replacing dead and dying plants and damage done due to natural climate-related causes or human accidents.

Planting



Establishment

Maturing

Need to plan for regeneration

II. PRUNING PRACTICE

A. BEST PRACTICE OBJECTIVES

- Pruning at proper time and method
- Having tree or shrub respond by providing appropriate new growth and form
- Maintain safety by eliminating and reducing risks of limbs falling and/or interfering with overhead and underground utilities
- Enhance civic appearance and/or improve views
- Trees naturally grow with minimal need for maintenance or pruning. Trees in urban environments require management to remove hazardous branches, improve tree structure, and enhance form to maintain safety. Understanding a plant's response to pruning will assist in achieving a healthy and aesthetically pleasing plant within the urban context.

B. GENERAL RULE OF THUMB: PRUNING SEASON

Winter: Hard-wood trees (non-flowering trees); trees flowering in summer

Spring: Spring flowering trees, pruning after flowers have faded; or to direct growth, early spring just before new growth

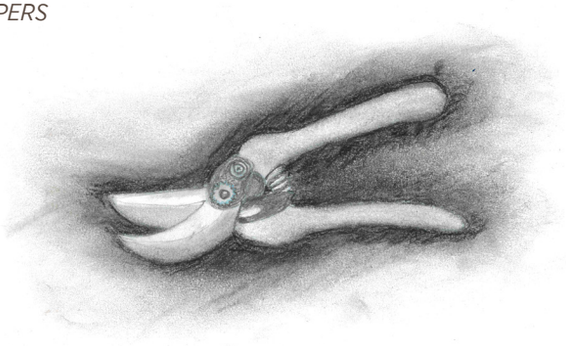
Summer: Prune to remove hazardous limbs, diseased limbs, and storm damage

Fall: No tree pruning

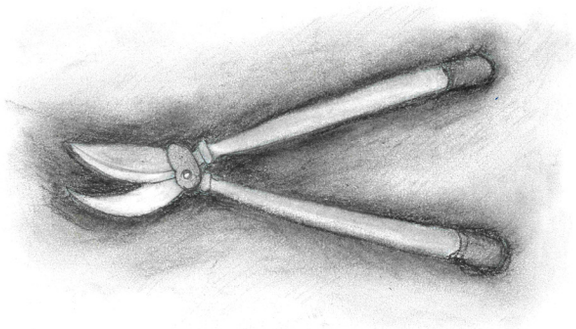
C. TOOLS

- Utilize clean and disease-free equipment (follow industry standards for cleaning & disinfecting tools). When cleaning a diseased tree, tools should be dipped in a 10% bleach solution after each cut.
- <1 inch diameter limbs – by-pass, hook and blade, clippers
- 1-2 inch diameter limbs = loppers
- <6 inch diameter limbs – saws with fine teeth, curved blades
- >6 inch diameter limbs = chain saws okay (DO NOT use chain saws for limbs less than 5 inches in diameter)

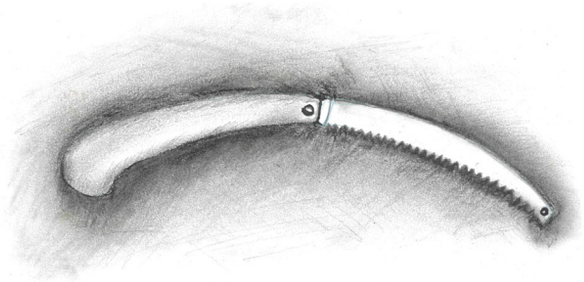
CLIPPERS



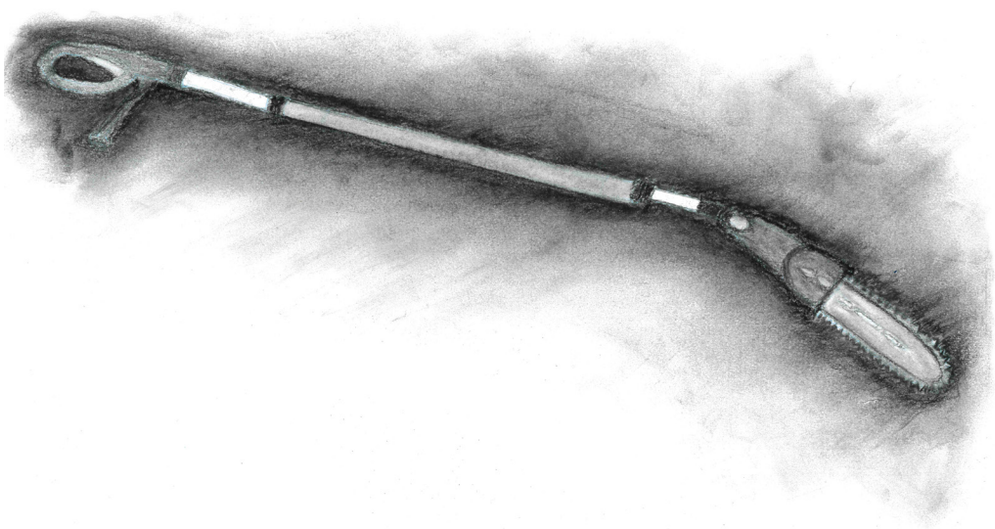
LOPPERS



CURVED BLADE SAW



ELECTRIC POLE CHAINSAW



D. PRUNING TREES

1. **Structural:** Properly maintained and trained trees seldom require structural pruning. Structural pruning encourages the development of one strong leader for strength and branching patterns.
2. **Deadwooding:** Removal of dead, weak, and dying branches.
3. **Reduction:** Decreases the height and/or spread of a tree. This has also been referred as “drop-crotch pruning.” (fig.2)
4. **Branch Removal** (formerly classified as ‘thinning’)**:** Reduces the density of live branches, reduces weight, increases light and air movement through the tree, stimulates inner foliage, enhances appearance, and increases storm resistance. (fig.3)
5. **Raising:** Removes lower branches to provide vertical clearance for pedestrians, vistas, and vehicles. (fig.4)
6. **Practices to Avoid:** Do not remove more than one-third of foliage in any one season.

   Do not top trees for any reason. Topping is removing large branches from tops of trees, leaving large branch stumps in an attempt to reduce the tree crown (see fig. 5)

   Liontailing is over pruning the branches of a tree stripping the branch with only tufts at the ends and hazardous weight at the tips of branches (see fig. 6)

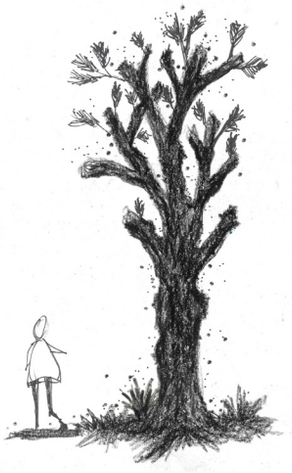


Fig. 5 Tree topping (unacceptable)

Fig. 6 Lion-tailing (unacceptable)

Fig. 1 Existing

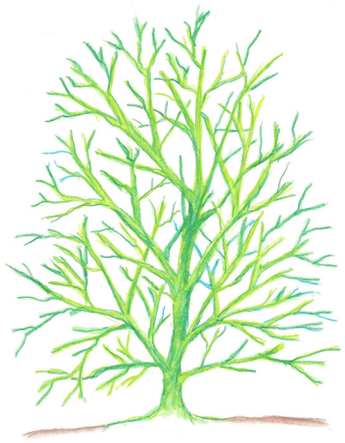


Fig. 2 Reduction

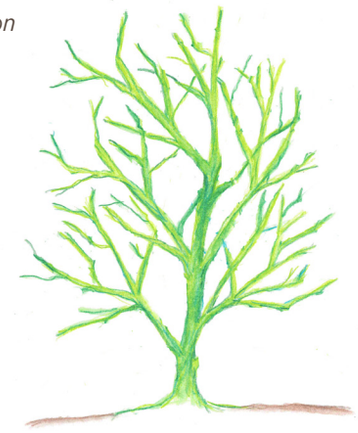


Fig. 3 Branch Removal

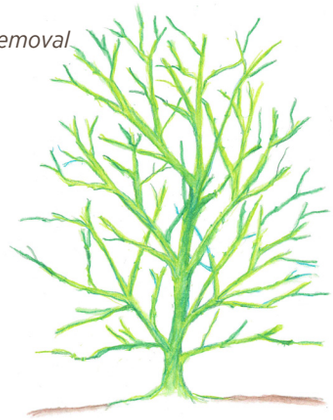
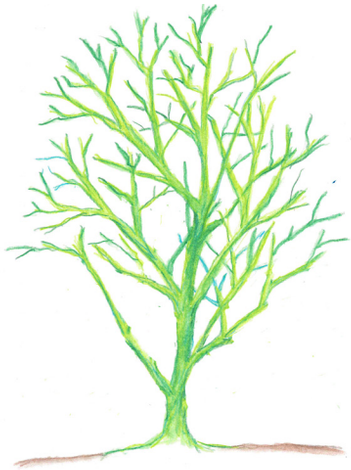


Fig. 4 Raising



E. PRUNING TECHNIQUES

Cut 1 – undercut limb

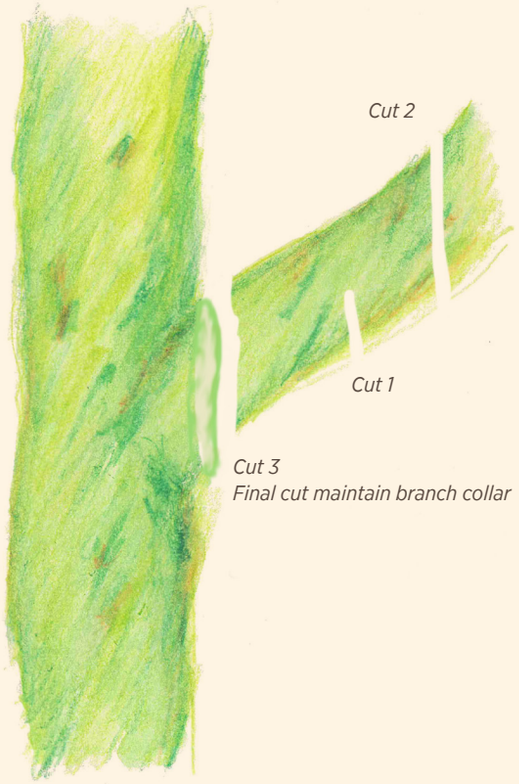
Cut 2 – remove entire limb, leaving stub

Cut 3 – Final cut, remove stub

1. **Branch Collar:** Each cut should be made at the enlarged area of the branch where it meets the trunk (the branch collar)(see fig. 7).

2. **Large Limbs:** Limbs larger than 2 inches, require a 3-cut process:

3. **Incorrect Cuts:**
   Flush Cut: Results in larger wounds and jeopardizes the tree's ability to form a barrier between the damaged tissues and healthy parts of the tree.
   Leaving Branch Stub: Prevents callus from forming over cut.



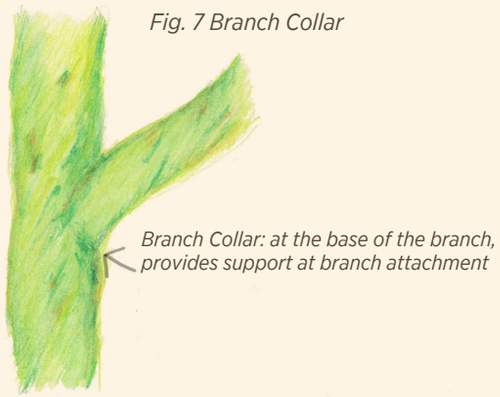
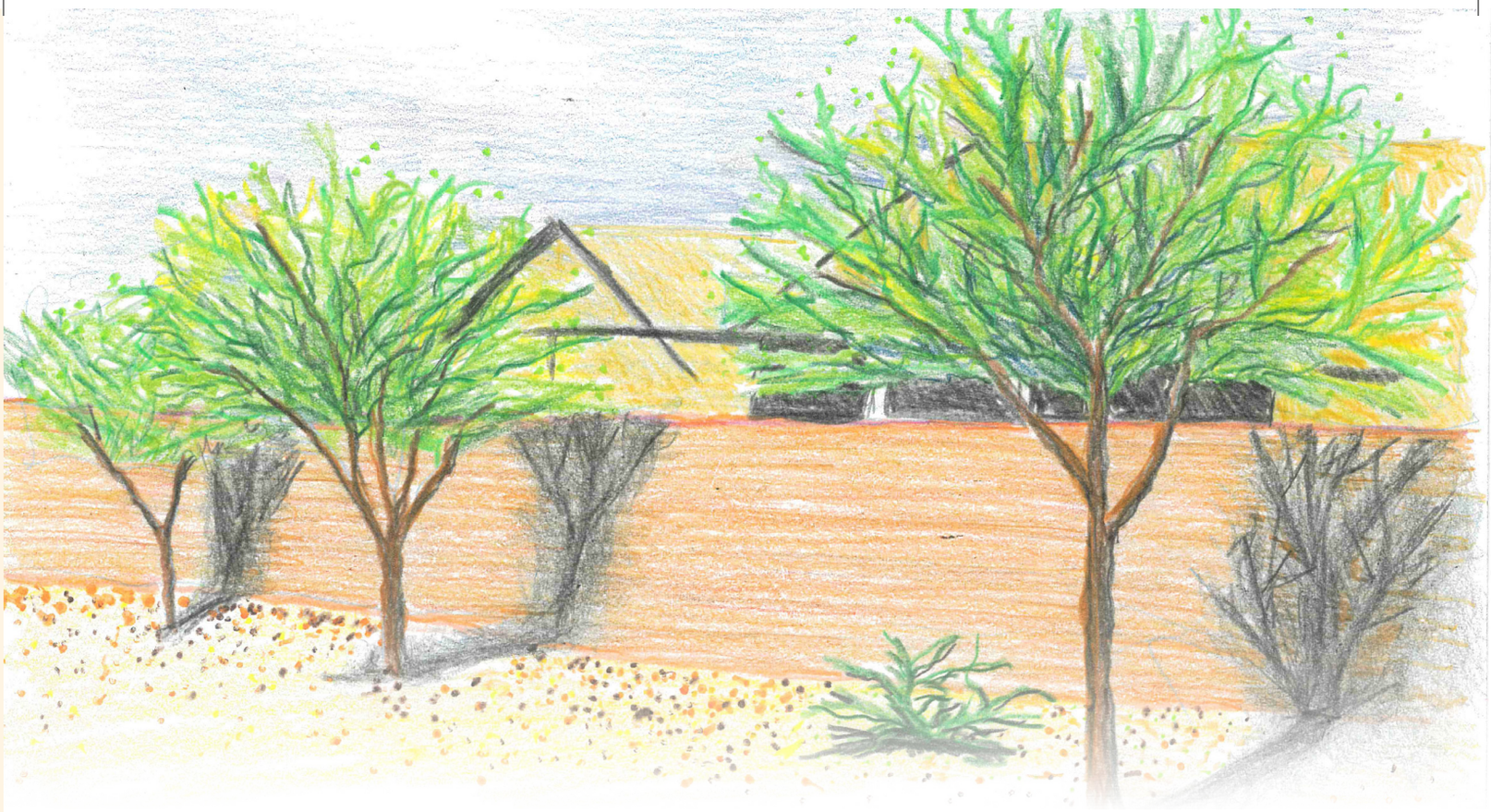


Fig. 7 Branch Collar

Flush Cut

Stub Peeling

Stub



F. TRAINING JUVENILE TREES

Proper structural pruning is essential in the development of a young tree to develop strong structure and desirable form. Depending on location, desirable tree structure will vary (i.e., trees located in street rights-of-way with pedestrian activity may require more upright form vs trees in open space areas without pedestrian walkways may allow for lower spreading branches)

BASIC PRINCIPLES

Growth habits can be changed with each cut. Improper large cuts can create large structural damages. Structurally strong trees require little corrective pruning as they mature.

1. Establish a strong structural trunk with well-spaced branches
2. For single-trunk trees, eliminate co-dominant stems. (stems that arise from a single point of origin, multiple branching)
3. Determine lowest permanent branch based on site-specific requirement (i.e., for pedestrian, bicycle or vehicular clearance).

   For example, along city street rights-of-way where pedestrian access exists, the Tucson Urban Development Code, Technical Standards Section 7.01.4.3 states an 84" minimum clearance.

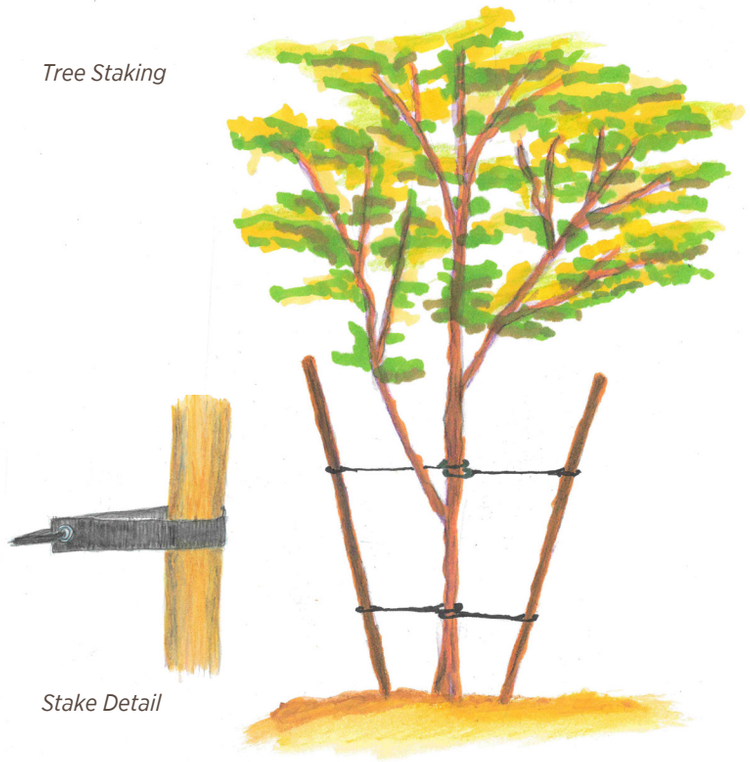
Eliminate co-dominant branch

Determine lowest permanent branch

G. TREE STAKING AND PLANTING

1. Trees do not need to be routinely staked.
2. Stake only if they cannot stand without support or are threatened by wind or other inclement weather.
3. Use only 2 stakes.
4. Place stakes outside of the root ball.
5. Place ties at the lowest point on the trunk at which it will not bend.
    - Large trees: tie wire and webbing or tie wire and hose
    - Small trees: horticultural tape. Twist wires to tighten. Keep enough slack to allow the trunk and tie to move as a unit
6. Cut stakes below the tree canopy to prevent wounds to the branches.
7. Inspect and loosen wires periodically.
8. Remove stakes as soon as possible, usually within the year.

Tree Staking



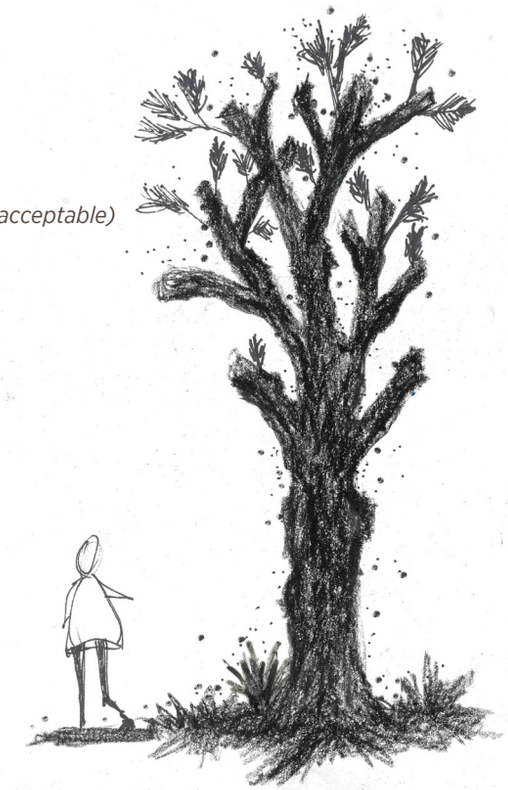
Stake Detail

H. TOPPING OF TREES

Topping is exclusively PROHIBITED. There are alternatives to reduce a tree's height or spread. Seek a certified arborist for assistance and advise. Topping can affect a tree in the following ways:

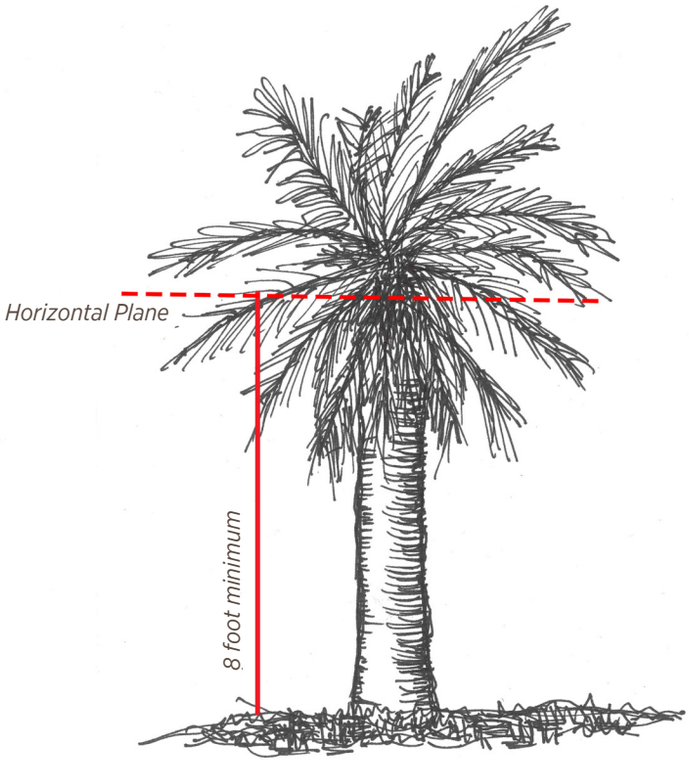
- **Stress:** Topping stresses trees by reducing 50-100% of the leaf-bearing crown and forcing rapid growth of multiple shoots, compromising the trees structural strength. This makes the tree vulnerable to insect and disease infection.
- **Decay:** Decay can occur due to multiple cuttings below the branch crown causing an inability for the tree to heal effectively leading to tissue decay.
- **Sunburn:** Sunburn can occur due to open crown exposure to the sun without leaves to absorb the sunlight. Bark sunburn can lead to bark splitting, cankers, and the death of the tree.
- **Hazardous Conditions:** Hazardous conditions are created due to instability and weakness of branches that are prone to breakage, especially during windy conditions.
- **Loss of aesthetics:** Topping causes a loss of aesthetics due to loss of natural branching form and topping leaves unsightly stubs.
- **Expense:** Additional expense is incurred as repeated pruning will be required to remove weakened branches that have become a hazard.

Tree Topping (unacceptable)



I. PALM TREE PRUNING

- Palm trees need to be pruned to remove hazardous and dead fronds.
- Healthy fronds should be removed to a minimum clearance of 8 feet.
- Healthy fronds should be removed only if below horizontal plane.
- Do not remove healthy fronds above horizontal plane.



III. MAINTENANCE OF SHRUBS

A. WHEN TO PRUNE SHRUBS

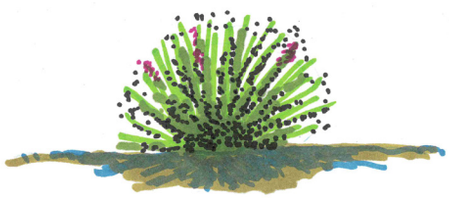
- Depending on growth rate, annually or semi-annually
- Grown too tall for area
- Safety and visibility issue (i.e., blocking line of sight)
- Grown too woody or rangy
- Dead flower stalks; do not prune healthy flowering stalks if not impeding safety conditions
- Blocking access, walk-ability or bike-ability

1. **Time**
   - Fall or spring
   - Flowering plants - after they have bloomed
2. **Equipment**
   - Hand held pruning equipment
   - If using power sheers, initially reduce height then selectively remove branches with hand pruners.

Natural Form

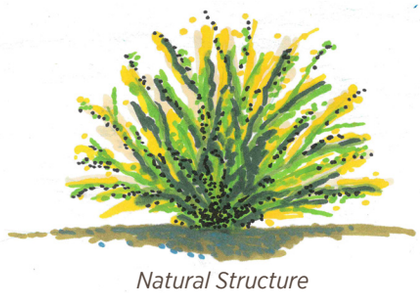
B. BEST PRACTICE FOR SHRUBS

- Reducing shrubs will depend on species
- Reduce shrubs applying tree reduction principles, considering plant structure and stability
- DO NOT prune/shear into geometric form (i.e., balls, squares, rectangles, etc)
- Exception is specialized topiary requirement or if creating a screen or hedge



Unacceptable

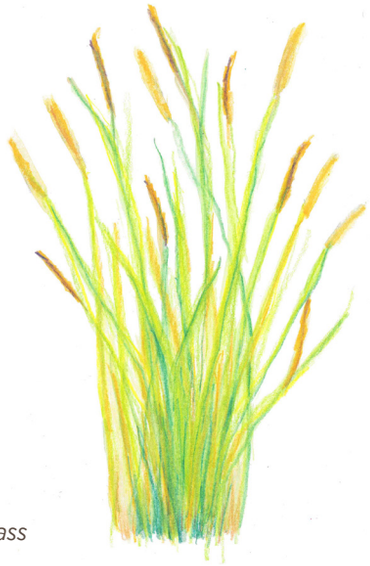
Unacceptable pruning into geometric shape



Natural Structure

IV. MAINTAINING GROUNDCOVERS

- Planting areas to be kept free of weeds and trash.
- Maintain groundcovers similar to shrubs, selectively prune to reduce size, eliminate excessive growth and dead or dying portions of the plant.



Buffelgrass

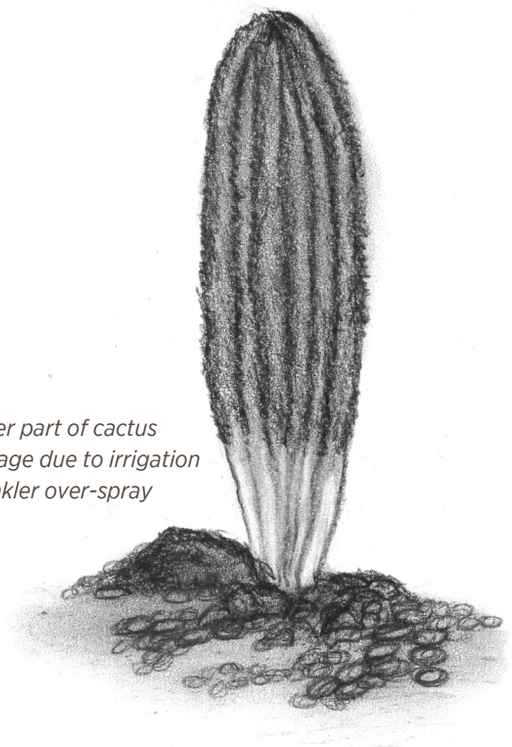
V. CONTROLLING INVASIVE SPECIES – BUFFELGRASS

(PENNISETUM CILIARE)

- Maintain right-of-way areas free of buffelgrass in conjunction with keeping the areas weed-free.
- Removal to be done by herbicide and/or manual removal.
- Best time for spraying is during active growth period, usually after the monsoons or early spring after the winter rains. Spraying on public properties to be done by certified sprayers.
- Manual removal can be done at any time.

VI. MAINTAINING CACTI AND SUCCULENTS

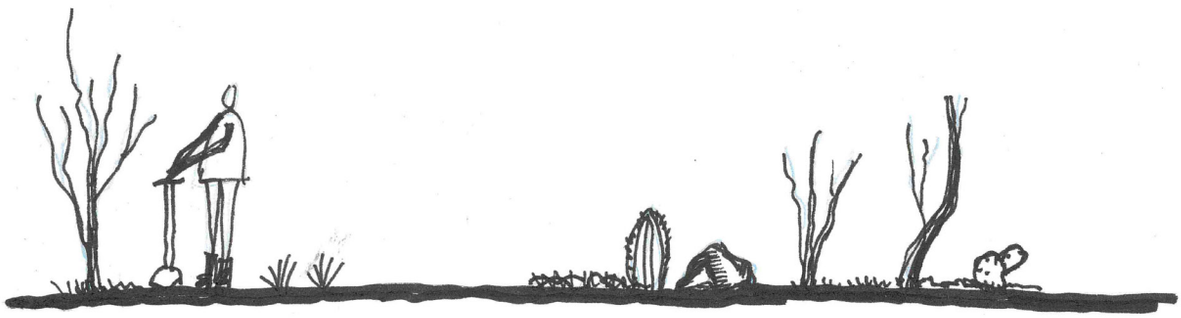
- Monitor growth and inspect for disease and problems
- Maintain appropriate irrigation schedule to prevent over watering, root rot and topping.



Lower part of cactus damage due to irrigation sprinkler over-spray

VII. PLANTS IN THE CITY RIGHT-OF-WAY OR EASEMENTS

- Permit/Approval required to plant trees on City properties
  - o Permission from Parks Director, or
  - o If in Streets rights-of-way, Transportation & Mobility Landscape Architect
- Approval is needed to remove any plants in the City right-of-way or easements.
  - o Permission from Parks Director, or
  - o If in Streets rights-of-way, Transportation & Mobility designated representative

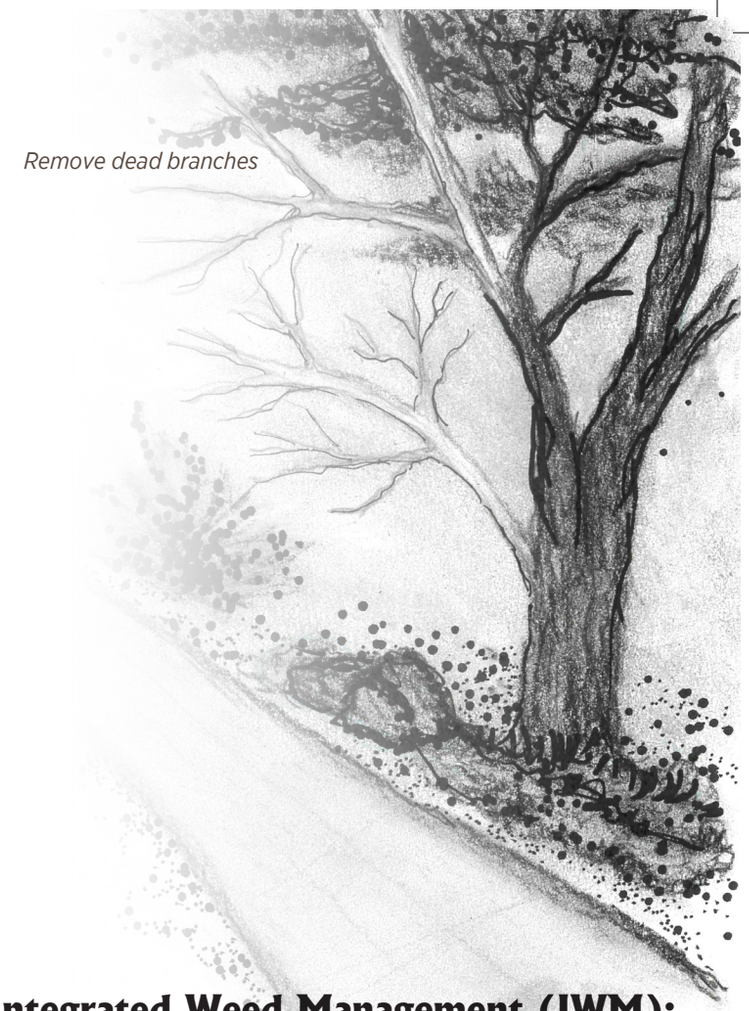


VIII. HAZARDOUS PLANTS/TREES

WHEN TO REMOVE

The condition of the tree or plant is to be evaluated by a City landscape architect and/or arborist. Plants or trees should be removed when:

- They are diseased or infested and they jeopardize surrounding plants.
- 50% or more of the plant or tree, including foliage, branching, trunk or root structure, is decayed or dead.
- Trees that are structurally unsound are next to structure(s), vehicular or pedestrian areas and causing damage to infrastructure and utilities.
- Trees with frequent limb breakage or trunk rot are considered hazardous.



Remove dead branches

IX. FERTILIZING & INTEGRATED WEED MANAGEMENT

A. GENERALLY, MATURE TREES DO NOT NEED FERTILIZING

- Supplemental fertilizing is not a common practice for vegetation plantings on public properties; but for non-native plantings may be required to improve the nutrient level of the soil or correct iron chlorosis or other micro-nutrient deficiencies.
- Applications will be scheduled in accordance with the National Arborist Association Standard for fertilizing Shade and Ornamental Trees, and in accordance with the manufacturer specifications.

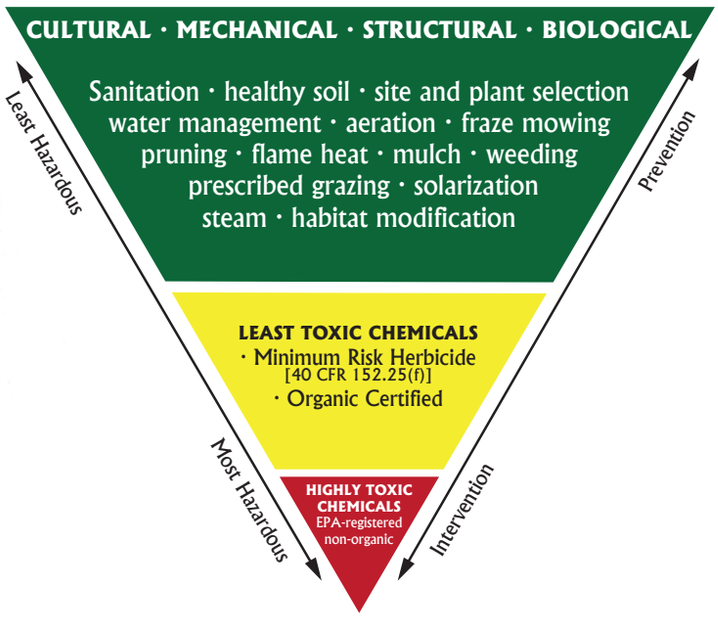
B. WEED CONTROL

- Ciy of Tucson has an Organic First weed management philosophy
- Weed control may include both mechanical and chemical treatments.
- Use of pre-emergent prior to rainy seasons will cut down on future maintenance requirements
- Chemical herbicide treatments can only be done by an Arizona State certified applicator utilizing proper techniques and chemical concentration mixtures.

Integrated Weed Management (IWM):
Organic First Tucson

Monitoring • Record Keeping
Setting Action Levels • Evaluation

Weed Control Strategies Hierarchy



London Rocket

Mechanical removal of weeds

C. PLANT DIAGNOSIS

The initial diagnostic is a visual inspection for abnormalities.

Check for:

- wounds,
- sun burn, and
- canker

Check conditions of leaves:

- Dead – environmental or mechanical problem
- Curled – insect, herbicide, or viral infection
- Yellowing – mineral deficiency
- Check the root structure, black or brown may indicate root rot.

Signs of soil born fungus:

- Wet wood
- Slime flux
- Leaf spotting
- Blotchy leaf coloring

Soil samples should be tested by a recognized facility or laboratory.

Pine Ark beetle

D. INSECT RELATED PROBLEMS

Inspect for harmful pests, such as:

- Aphids,
- Scale,
- Spider mites,
- Thrips, white flies, beetles, weevils, and borers

Signs of insect problems include leaves that are:

- Blotched,
- Deformed,
- Stunted,
- Dusty appearance,
- Discolored,
- Skeletonized,
- Defoliated, or
- Wilted

Aphids

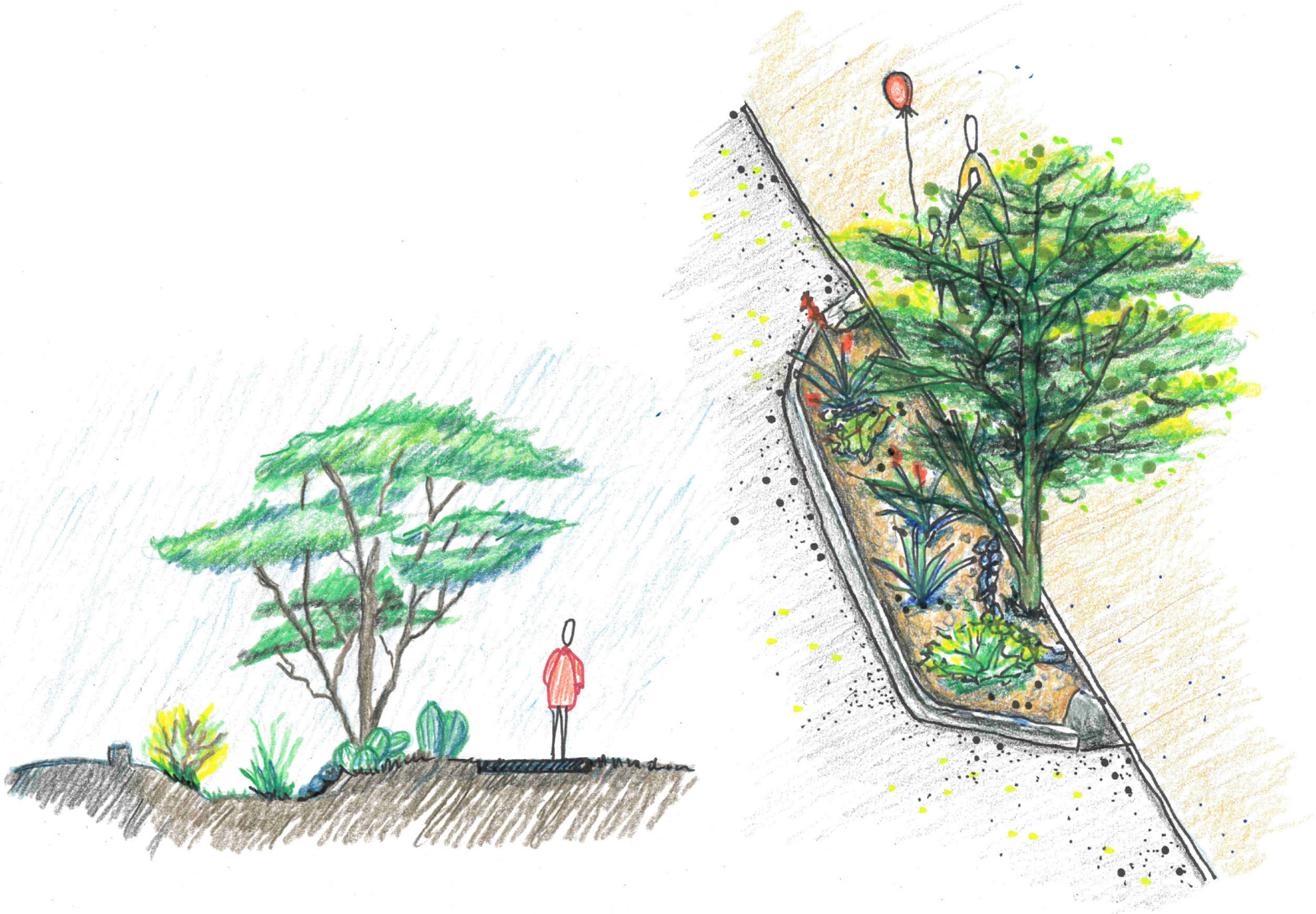
X. WATERING / IRRIGATION / GREEN INFRASTRUCTURE: WATER HARVESTING

A. GENERAL WATERING PRACTICE

- Utilize Landscape watering by the Numbers – a Guide for the Arizona Desert.
- Utilize water sources such as reclaimed, water harvesting, and potable.
- Inspect and check irrigation systems periodically, at a minimum, once a year.
  - Utilized a smart controller with or without weather stations

B. GREEN INFRASTRUCTURE : RAINWATER/STORMWATER WATER HARVESTING

- General vegetation maintenance practices described above applicable: pruning and integrated weed management
- These sites will usually have no permanent irrigation equipment; plant material will largely be supported by rainwater/stormwater collection features
- Additional inspection and maintenance
  - Check clearance of inlet/outlet features – trash and debris
  - Removal of unwanted volunteer trees, shrubs, invasive grasses
  - Check water infiltration rate (percolate within 48-72 hours), evaluate if need for sediment removal
  - Inspect for basin erosion, rock reinforcement condition – may require adjustments



APPENDIX

A. WATERING SCHEDULE

AMWA Landscape Watering by Numbers

WATER USE IT WISELY.

LANDSCAPE WATERING GUIDELINES

How Much & How Often Water to the outer edge of the plant's canopy and to the depth indicated. Watering frequency will vary depending on season, plant type, weather and soil.		Seasonal Frequency — Days Between Waterings				Water This Deeply (Typical Root Depth)
		Spring Mar - May	Summer May - Oct	Fall Oct - Dec	Winter Dec - Mar	
Trees	Desert adapted	14-30 days	7-21 days	14-30 days	30-60 days	24-36 inches
	High water use	7-12 days	7-10 days	7-12 days	14-30 days	24-36 inches
Shrubs	Desert adapted	14-30 days	7-21 days	14-30 days	30-45 days	18-24 inches
	High water use	7-10 days	5-7 days	7-10 days	10-14 days	18-24 inches
Groundcovers & Vines	Desert adapted	14-30 days	7-21 days	14-30 days	21-45 days	8-12 inches
	High water use	7-10 days	2-5 days	7-10 days	10-14 days	8-12 inches
Cacti and Succulents		21-45 days	14-30 days	21-45 days	if needed	8-12 inches
Annuals		3-7 days	2-5 days	3-7 days	5-10 days	8-12 inches
Warm Season Grass		4-14 days	3-6 days	6-21 days	15-30 days	6-10 inches
Cool Season Grass		3-7 days	none	3-10 days	7-14 days	6-10 inches

These guidelines are for established plants (1 year for shrubs, 3 years for trees). Additional water is needed for new plantings or unusually hot or dry weather. Less water is needed during cool or rainy weather. Drip run times are typically 2 hours or more for each watering.

WATERINGS PER MONTH

WATERING SHOULD BE EVENLY DISTRIBUTED THROUGHOUT THE MONTH.

Smartscape offers free, practical landscape water conservation classes for homeowners & professionals. Visit **PIMASMARTSCAPE.ORG** *or call* **520-626-5161.**

	PLANT TYPE	PRECIPITATION RATE & RUN TIME*	PLANT WATER USE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
				NUMBER OF WATERING DAYS PER MONTH (EVENLY DISTRIBUTED WATERINGS THROUGHOUT EACH MONTH)											
LOAMY SAND SOIL	**GRASS:**	**ROTOR:** 28min • **SPRAY:** 14min		5	6	10	13	16	17	16	13	11	9	6	4
	TREE:	**DRIP:** 2 GPH for 85min	**Low**	0	1	1	3	3	3	2	1	2	2	0	1
			Medium	1	1	3	4	5	6	4	4	3	3	1	1
			High	1	3	4	7	9	10	6	6	5	5	2	2
	SHRUBS:	**DRIP:** 2 GPH for 57min	**Low**	0	1	3	3	5	5	3	2	3	2	1	1
			Medium	1	2	5	6	9	10	6	5	5	4	2	1
			High	2	4	7	11	15	15	11	9	9	7	4	2
SANDY LOAM SOIL*	**GRASS:**	**ROTOR:** 15min • **SPRAY:** 7min		9	11	19	25	31	30	31	26	22	17	11	8
	TREE:	**DRIP:** 2 GPH for 80min	**Low**	1	2	2	2	4	4	2	2	2	1	1	1
			Medium	1	1	4	5	6	7	5	4	3	4	1	1
			High	2	2	6	7	10	10	8	7	6	5	3	2
	SHRUBS:	**DRIP:** 2 GPH for 53min	**Low**	0	2	2	4	6	6	3	3	3	2	2	1
			Medium	1	3	5	7	11	10	7	6	5	5	3	1
			High	3	4	8	13	15	16	13	11	9	8	5	3
SILTY CLAY SOIL	**GRASS:**	**ROTOR:** 32min • **SPRAY:** 16min		4	5	9	11	14	15	14	12	10	8	5	4
	TREE:	**DRIP:** 2 GPH for 198min	**Low**	0	0	1	1	2	2	1	1	1	1	0	0
			Medium	0	1	2	2	3	3	2	2	2	2	0	1
			High	1	1	2	2	4	5	4	3	3	3	1	1
	SHRUBS:	**DRIP:** 2 GPH for 132min	**Low**	0	0	2	2	3	3	1	1	2	1	1	0
			Medium	0	1	1	3	5	5	3	3	3	2	1	1
			High	1	2	4	5	8	7	6	5	5	3	2	2

YOUR WATERING CHART FOR GRASS AND DRIP IRRIGATION SYSTEMS *IF YOU ARE UNFAMILIAR WITH YOUR SOIL TYPE AND PLANTS' WATER NEEDS, WE SUGGEST THAT YOU BASE YOUR WATERING SCHEDULE ON SANDY LOAM SOIL (MIDDLE SECTION ABOVE) AND MEDIUM WATER USE PLANTS. DRIP SCHEDULE IS BASED ON ONE 2-GALLON PER HOUR (GPH) EMITTER PER PLANT, ROTOR IS BASED ON 0.75 IN/HR AND SPRAY IS BASED ON 1.5 IN/HR. IF DRIP EMITTERS HAVE HIGHER OR LOWER FLOW, RUN TIME MAY BE ADJUSTED LONGER OR SHORTER. THESE GUIDELINES ARE FOR ESTABLISHED PLANTS (1 YEAR FOR SHRUBS, 3 YEARS FOR TREES).

B. WEEDS

Common Weeds in Tucson

Photos from University of Arizona, Cooperative Extension Photo Library ("©2003 Regents, University of Arizona").
Buffelgrass photo: Arizona Sonora Desert Museum – Beat Back Buffelgrass

London Rocket, Sisymbrium irio L

Horse purslane, Trianthema prtulacastrum L

Sweet Clover, Melilotus indica L

Buffelgrass, Cenchrus ciliaris (Pennisetum ciliare)

C. PESTS

Common Southwest Desert Landscape Pests

Reference: Pests of Plants – University of Arizona
https://cals.arizona.edu/apmc/docs/6%20Plant%20pests%20F.pdf

Agave weevil adult (left) and larvae (right)
Photos: Ursula Schuch, University of Arizona

Green peach aphid
Photo: Whitney Cranshaw, Bugwood.org

Winged aphid
Photo: Scott Bauer

Adult pinon Ips
Photo: Tom Gomez
Source: University of Arizona Cooperative Extension

Rust-colored pitch tubes indicating a successful attack by bark beetles.

Successful pruning requires an understanding of the growth habits and unique horticulture of the tree being pruned.

Juan Barba, *Certified Arborist, ISA; Tree Instructor with Smartscape (2020)*

References:

www.TreesAreGood.org/treecare
Urban forestry: A Manual for the state Forestry Agencies in the Southern Region Unit: tree Maintenance (www.urbanforestrysouth.usda.gov). May 22, 2002
International Society of Arboriculture. Arborists' certification Study Guide. 1991

Watering Trees and Shrubs: Simple techniques for Efficient Landscape Watering, AZ 1298. University of Arizona Cooperative Extension. August 2017