



# MEMORANDUM

## Department of Transportation



DATE: October 14, 2011

TO: Landscape Consultants on Pima County DOT roadway projects

FROM: Ellen Barth Alster, RLA, LEED AP

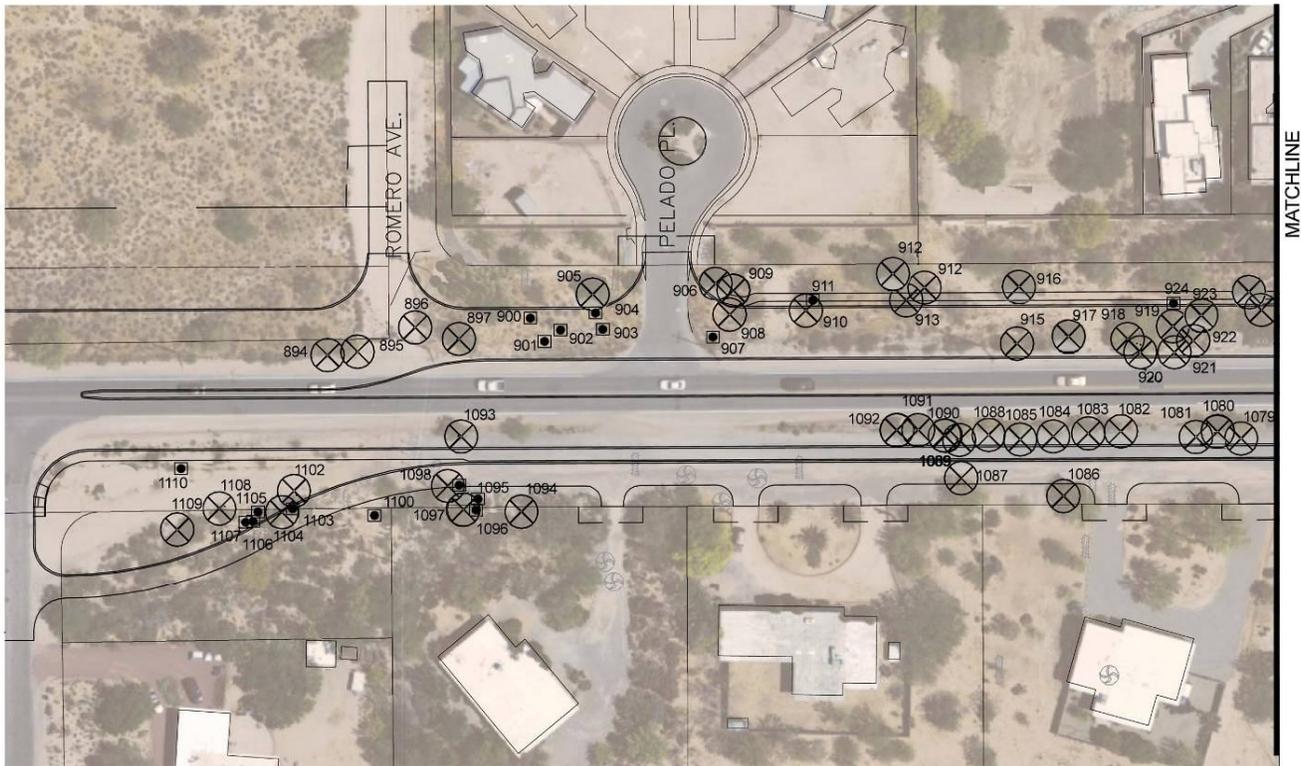
SUBJECT: Procedures and Checklist for all Pima County Landscape and Irrigation Plans

**THIS IS A WORKING DOCUMENT AND WILL BE UPDATED PERIODICALLY. IT PROVIDES DESIGN PROCEDURES AND REQUIRMENTS FOR PIMA COUNTY ROADWAY PROJECTS. THE LANDSCAPE CONSULTANT IS ENCOURAGED TO CONTACT THE COUNTY LANDSCAPE ARCHITECT FOR GUIDANCE, CLARIFICATION, AND UPDATES: email: Ellen.Alster@dot.pima.gov phone: 520-740-6655**

1. Complete the preliminary steps listed (a and b below) for all Pima County Department of Transportation roadway projects. These preliminary steps shall be provided to the County and must be reviewed and approved before preparation of landscape plans is initiated. No landscape plan shall be submitted to Pima County without the completion of these steps. These items, including the Native Plant Inventory, shall not be included as part of the construction document set.
  - a) Prepare a Native Plant Inventory according to the procedure outlined in the Pima County DOT Roadway Design Manual, including “Update to Step 1 of Appendix 4D of the Environmentally Sensitive Roadway Design Guidelines, Pima County DOT Roadway Design Manual.

Information regarding the existing native plant inventory shall be provided as follows: Provide an air photo showing disturbed area project limits and inventoried plant numbers. Provide an excel spread sheet that correspond the plant numbers to locations. The plants to be included on the excel spread sheet that shall have corresponding plant numbers include the following:

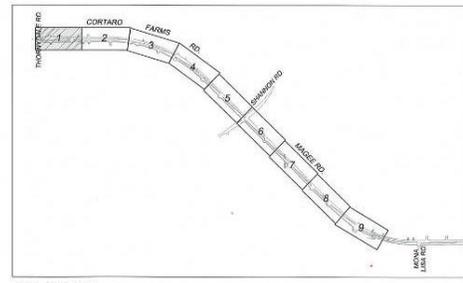
Scientific Name	Common Name	Minimum Size
Acacia constricta	Whitethorn Acacia	8” Caliper
Acacia greggii	Catclaw Acacia	8” Caliper
Carnegiea gigantea	Saguaro	All
Chilopsis linearis	Desert Willow	3” Caliper
Celtis reticulata	Canyon Hackberry	3” Caliper
Olneya tesota	Ironwood	3” Caliper
Parkinsonia floridum	Blue Palo Verde	3” Caliper
Parkinsonia microphyllum	Foothills Palo Verde	3” Caliper
Prosopis velutina	Velvet Mesquite	3” Caliper
Prosopis pubescens	Screwbean Mesquite	3” Caliper



**LEGEND**

- ⊗ TREE (Number refers to inventory)
- SAGUARO (Number refers to inventory)

**SAMPLE NATIVE PLANT INVENTORY PLAN SHEET**



ID #	Scientific Name	Common Name	Caliper	Height
119	Parkinsonia floridium	Blue Palo Verde	5	
120	Parkinsonia floridium	Blue Palo Verde	4	
121	Parkinsonia floridium	Blue Palo Verde	13	
123	Carnegiea gigantea	Saguaro		7
125	Carnegiea gigantea	Saguaro		8
128	Parkinsonia microphyllum	Foothills Palo Verde	12	
131	Olneya tesota	Ironwood	9	
134	Carnegiea gigantea	Saguaro		6

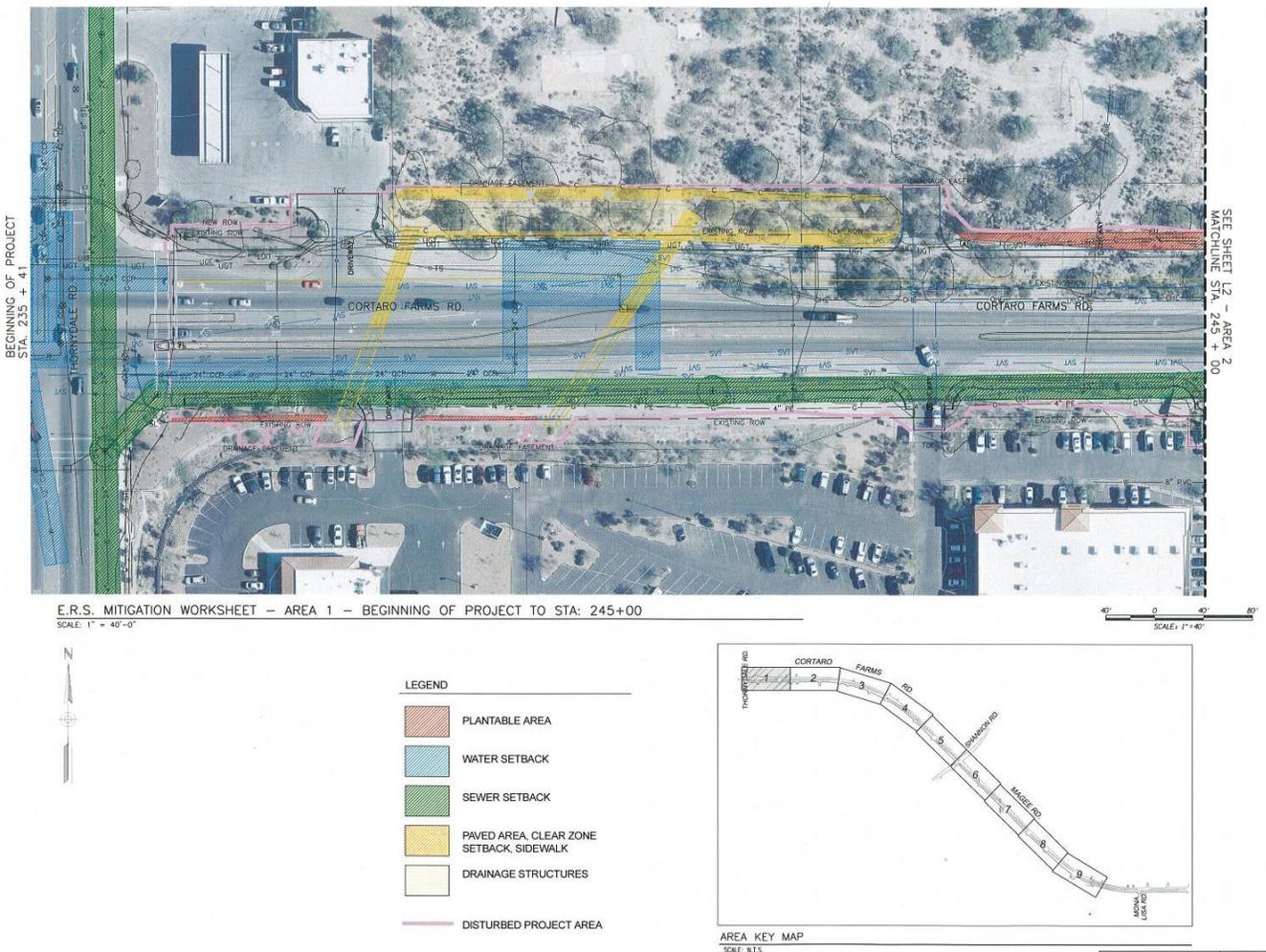
**SAMPLE NATIVE PLANT INVENTORY**

● Tree: indicate caliper inches      ● Saguaro: indicate heights

- b) Provide a diagram of the plantable area to the County Landscape Architect. This should be submitted as a supplement and is not part of the construction set. See the “Update to Step 1 of Appendix 4D of the Environmentally Sensitive Roadway Design Guidelines, Pima County DOT Roadway Design Manual” for definition of plantable area.

Calculate the plantable area. Plantable area is defined as the disturbed project area that can be planted with trees and saguaros. It excludes the following:

- Road
- Unpaved area between and curb and sidewalk
- 10’ offset from water and sewer lines and manholes
- Medians
- 10’ offset from pavement edge if no curb
- Sight Visibility Triangle (SVT)
- Drainage structures (include 10’ offset around drainage structure)



2. Calculate ESR requirements. For methodology, see <http://dot.pima.gov/transeng/roaddesign/ESRAppendix4DupdateAugust2010.pdf>  
 The calculations should be shown on the construction set in the format shown by the example below:

ENVIRONMENTALLY SENSITIVE ROADWAY (ESR) MITIGATION REQUIREMENTS

TREES	TOTAL NUMBER OF PLANTS INVENTORIED	TOTAL CALIPER INCHES INVENTORIED	TOTAL REPLACEMENT CALIPER INCHES REQUIRED*	NURSERY TREE BOX SIZE	AVERAGE CALIPER INCH PER BOX SIZE	TOTAL NURSERY PLANTS PURCHASED PER EACH BOX SIZE	TOTAL CALIPER INCHES PROVIDED	TOTAL REQUIRED CALIPER INCHES	CALIPER STATUS
ACACIA CONSTRICTA WHITETHORN ACACIA	82	869	119	24" BOX 15 GAL	2.50 1.00	24 72	60.0 72.0 TOTAL 132.0	119.0	FULFILLED
ACACIA GREGGII CATCLAW ACACIA	53	593	82	24" BOX 15 GAL	2.50 1.00	16 42	40.0 42.0 TOTAL 82.0	82.0	FULFILLED
CHILOPSIS LINEARIS DESERT WILLOW	2	16	2	15 GAL	1.00	22	22.0 TOTAL 22.0	2.0	FULFILLED
OLNEYA TESOTA IRONWOOD	7	86	12	24" BOX	2.50	5	12.5 TOTAL 12.5	12.0	FULFILLED
PARKINSONIA FLORIDUM BLUE PALO VERDE	428	3692	508	48" BOX 36" BOX 24" BOX 15 GAL	6.00 4.00 2.00 1.00	8 25 76 208	48.0 100.0 152.0 208.0 TOTAL 508.0	508.0	FULFILLED
PARKINSONIA MICROPHYLLA FOOTHILLS PALO VERDE	198	2013	277	36" BOX 24" BOX 15 GAL	4.00 2.00 1.00	28 55 64	112.0 110.0 64.0 TOTAL 286.0	277.0	FULFILLED
PROSOPIS VELUTINA VELVET MESQUITE	289	4097	563	48" BOX 36" BOX 24" BOX 15 GAL	6.00 4.00 2.00 1.00	9 28 84 261	54.0 112.0 168.0 261.0 TOTAL 595.0	563.0	FULFILLED

\*ESR CALCULATIONS

DISTURBED PROJECT AREA = 64.7 ACRES

TOTAL PLANTABLE AREA = 7.44 ACRES

AREA WITHIN THE DISTURBED LIMIT THAT IS UNPLANTABLE INCLUDES:

ESR MULTIPLIER = PLANTABLE AREA/DISTURBED PROJECT AREA = 0.11

- ROAD
- SIDEWALK AND UNPAVED AREA BETWEEN CURB AND SIDEWALK
- MEDIANS
- 10' OFFSET FROM WATER AND SEWER LINES AND MANHOLES
- 10' OFFSET FROM PAVEMENT EDGE IF NO CURB
- SIGHT VISIBILITY TRIANGLE
- DRAINAGE STRUCTURES AND ASSOCIATED RIPRAP

TOTAL REPLACEMENT CALIPER INCHES REQUIRED =  
 TOTAL CALIPER INCHES INVENTORIED X 125% X ESR MULTIPLIER

INVENTORY SUMMARY CARNEGIA GIGANTEA (SAGUARO)

SAGUARO HEIGHT	TOTAL INVENTORIED	MINIMUM REPLACEMENT SIZE	TOTAL REPLACEMENT SAGUARO REQUIRED
0-2 ft	20	1-2 ft	20
2-4 ft	21	2-4 ft	21
4-6 ft	21	4-6 ft	21
6-8 ft	8	6-8 ft	8
Greater than 8 ft	15	8 ft maximum	15
Total	85		85

SAGUARO WILL BE SALVAGED BY OTHERS

3. Conduct Revele Step of Appendix 4D (Step 2). This should be done 2x a year (spring and fall). Use this inventory as a basis of making plant selections for understory plants, particularly in areas where trees cannot be planted due to restrictions such as clear zone or utilities.
4. A redline showing existing trees to be fenced off during construction shall be provided to the project engineer for inclusion on the demolition plan.
5. Landscape budget shall be 4% of the overall construction cost. All 800 bid items numbers with the exception of the SWPPP items shall be included in the landscape budget.

Landscape plans must include required caliper inches for trees and must include all required saguaros. Shrubs and understory plants however are discretionary and an area that can be reduced if necessary to meet project budget. Concentrate shrubs and understory plants in areas where trees cannot be planted due to restrictions such as clear zone or utilities.

6. Landscape plans shall include the following information:

The intent is to make a complete representation of all the conditions which affect the planting plan. This benefits the contractor as well as the landscape reviewer. Much of this information can be screened. The intent is not to clutter the plans but to provide a context for plant locations.

- Utilities-overhead and underground (screened)
- Topography – existing if remaining and proposed new slopes, with steepness indicated (screened)
- Existing culture if available (screened)
- Street names including all minor cross streets
- Limits of disturbed area
- Walls – retaining and sound
- Stationing. If stationing on engineering base is not sufficient at the scale landscape plan is done (due to changes in plotted scale of plans), additional stationing should be drafted on landscape plan
- Sight visibility triangles
- All drainage information (drainage structures, channels, etc.)
- Existing vegetation – both within the project area as well as adjacent to the project area. This can be clouded in – if in a mass, individual trees can be shown, but do not have to.
- Bar scale and north arrow
- Clear zone
- Right of way line
- Matchlines
- Key Map
- Plant legend on each sheet
- Lighting
- Stop Signs
- Utility Boxes
- Army Corps Jurisdictional washes – these should be labeled
- All washes should be shown and labeled. If wash has no name, label as “unnamed wash”
- Existing riparian areas (if applicable)

- Riparian mitigation areas (if applicable - per Pima County Regional Flood Control Requirements in item #15)
- Existing entry monuments and landscaping for all developments along road project. See Item #18.

7. Only one symbol should be used for each species. Size differentiation should be noted with either minor variation in the symbol or by noting the container size on the symbol.
8. Shrub and cacti symbols should be as simple and readable as possible. Illustrative symbols that do not reproduce well at small scales should not be used. It should be assumed that the plans will be reproduced as half size 11 x 17 sheets.
9. Plant symbol on plant legend should exactly match the symbol on the plan. Do not show the plant symbols on the plant legend at a different scale or with different thickness than on the plan.

Saguaro plant symbol should be somewhat bolder than other plant symbols to facilitate finding saguaro locations on plan. Indicate height of saguaros on plan. Place saguaros where they will have a significant impact on the landscape; they are the signature landscape plant of the Sonoran desert and should be planted in locations where they will provide maximum visual impact.

10. Make sure that terminology on planting and irrigation plan matches terminology in standard Pima County bid list. Cross reference with bid item numbers on planting and irrigation plan. Show bid item on summary plant and irrigation legends.
11. Emphasize use of cacti, succulents and shrubs with longevity over several years that have consistent year round long, particularly in medians and areas of high visibility. Avoid heavy use of smaller plants with long dormancy periods or that last for only a few seasons. Think long term, not short term. Assume plants will have minimum to no maintenance.

The ratio of cacti and succulents to leafy shrubs should be a minimum ratio of 1:1 (one part cacti/succulents to one part leafy shrubs) or greater. Cacti and succulents may be watered with DriWater to minimize length of shrub mainline, particularly in smaller medians and those with extensive sight visibility triangles.

Emphasize use of understory plants in areas where trees cannot be planted, typically due to utility restrictions.

12. Specify low branching and multi-trunked trees, not single leader, unless there is an exceptional reason why single leader should be used in specific situations.
13. Plant larger specimen trees around wash areas to encourage habitat.
14. Design separate valves that can be turned off after plant establishment for irrigation within drainage easements and other planted areas that may not be owned by Pima County. Plants within landscape easements may also be established with the use of DriWater.

15. Planting for Riparian Habitat Mitigation areas shall be shown on the overall landscape plan. These areas should be outlined in the overall landscape plan. A separate sheet should be included in the overall planting plan satisfying the requirements of the Riparian Mitigation Plan.
16. For all sidewalk, multi-use path, bike lane, and shoulder projects (**this requirement is for smaller scale transportation enhancement projects only**): Verify location of all significant vegetation in relation to proposed improvements within vicinity of proposed path. Landscape architect shall not assume new paths will be able to bypass existing vegetation without verification. If minimal CAD base information is available for these type projects, an aerial photo shall be included as background on all landscape sheets. All vegetation within or adjacent to the improvements shall be field verified as to type, caliper, and location.
17. Standard contract language in the contract between Pima County and the prime consultant specifies for plans be drafted in Microstation. Landscape and irrigation plans shall match the plans produced by the prime consultants' plans in appearance.
18. Landscape Architect shall make field visits prior to and during the design process in order to document, when applicable, adjacent and adjoining conditions that will affect landscape design. If landscaping from adjacent projects protrudes into the public right of way and will be impacted by the roadway project, the consultant landscape architect shall bring this to the attention of the project team. Potential items of conflict include plants, irrigation, lighting, boulders, signs, decorative rock, planters, decorative edging and other features. If proposed drainage features, railings, sound or retaining walls, or other project feature will visually impact an existing features (an example of this would be a proposed drainage swale with railing directly in front of an existing entry feature); this shall immediately be brought to the attention of the project manager.  
  
All items, such as boulders or gravel that can be salvaged, re-used, or re-claimed shall be called out on the demolition and/or landscape plans.
19. Plants in Sight Visibility Triangles shall have a mature height of less than thirty inches. Assume that no trees will be pruned. No trees shall be planted in locations where they may impair visibility when at mature size.
20. Landscape Architect shall coordinate location of irrigation mainline with Pima County Traffic Engineer in regard to ITS conduit. Mainline shall be located a minimum distance of 6' from ITS conduit. Note location of irrigation mainline in reference to curb line and ITS conduit on irrigation plans.
21. Install all meters, backflow preventers, mainlines and remote control valves on one side of the street, to the extent feasible. Extend lateral lines through sleeves below the roadway pavement to the median (where applicable) and to the opposite side of the roadway.
22. Seed mix should show PLS to nearest 10th of a percentage. Seed mix shall be determined in conjunction with Pima County DOT's landscape architect.