



Pima County Transportation Advisory Committee



Description of the Road Repair and Preservation Problem and

Description of the Road Repair and Preservation Program



Table 4 - Condition, Type, and Treatment Costs for Unincorporated Pima County

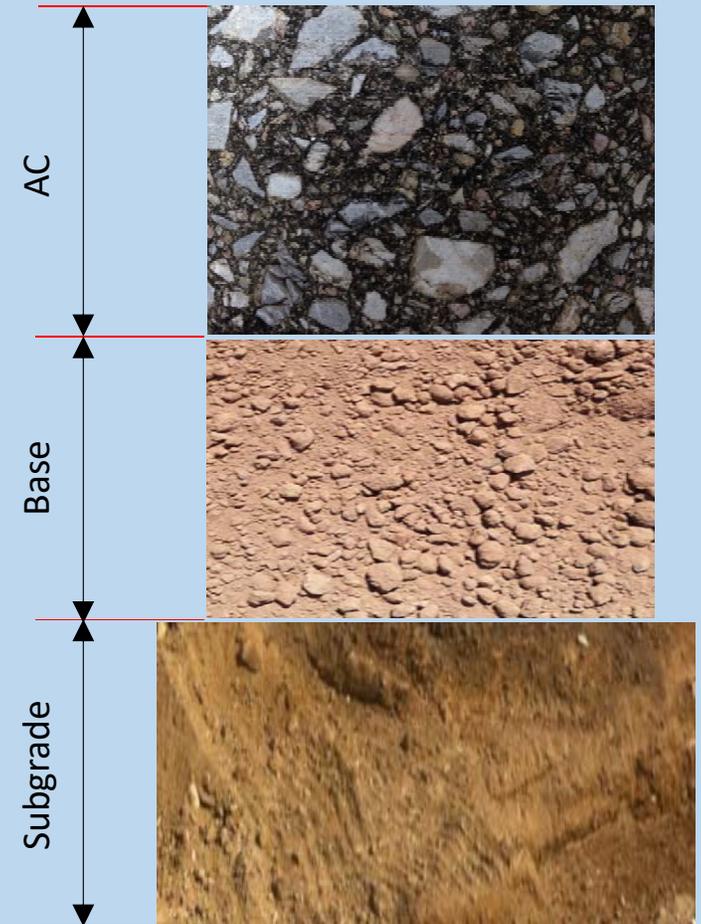
Condition	Arterial	Collector	Local	Total	Treatment Type	Cost Per Mile	Cost
Unrated	2	2	62	66			
Failed	8	109	212	329	Rehabilitation	\$246,400	\$81,065,600
Poor	90	201	582	873	Rehabilitation	\$211,200	\$184,377,600
Fair	16	28	119	163	Major Seal Coat	\$70,400	\$11,475,200
Good	47	60	102	208	Minor Seal Coat	\$26,400	\$5,491,200
Very Good	37	32	158	227	Nothing	\$0	\$0
	200	432	1235	1866			\$282,409,600
Total Miles	2,135				Total Paved Miles	1,866	
Paved Miles	1,866				Arterial Miles	200	\$23,346,400
Dirt Miles	269				Collector Miles	432	\$72,864,000
					Local Miles	1,235	\$186,225,600

What is pavement?

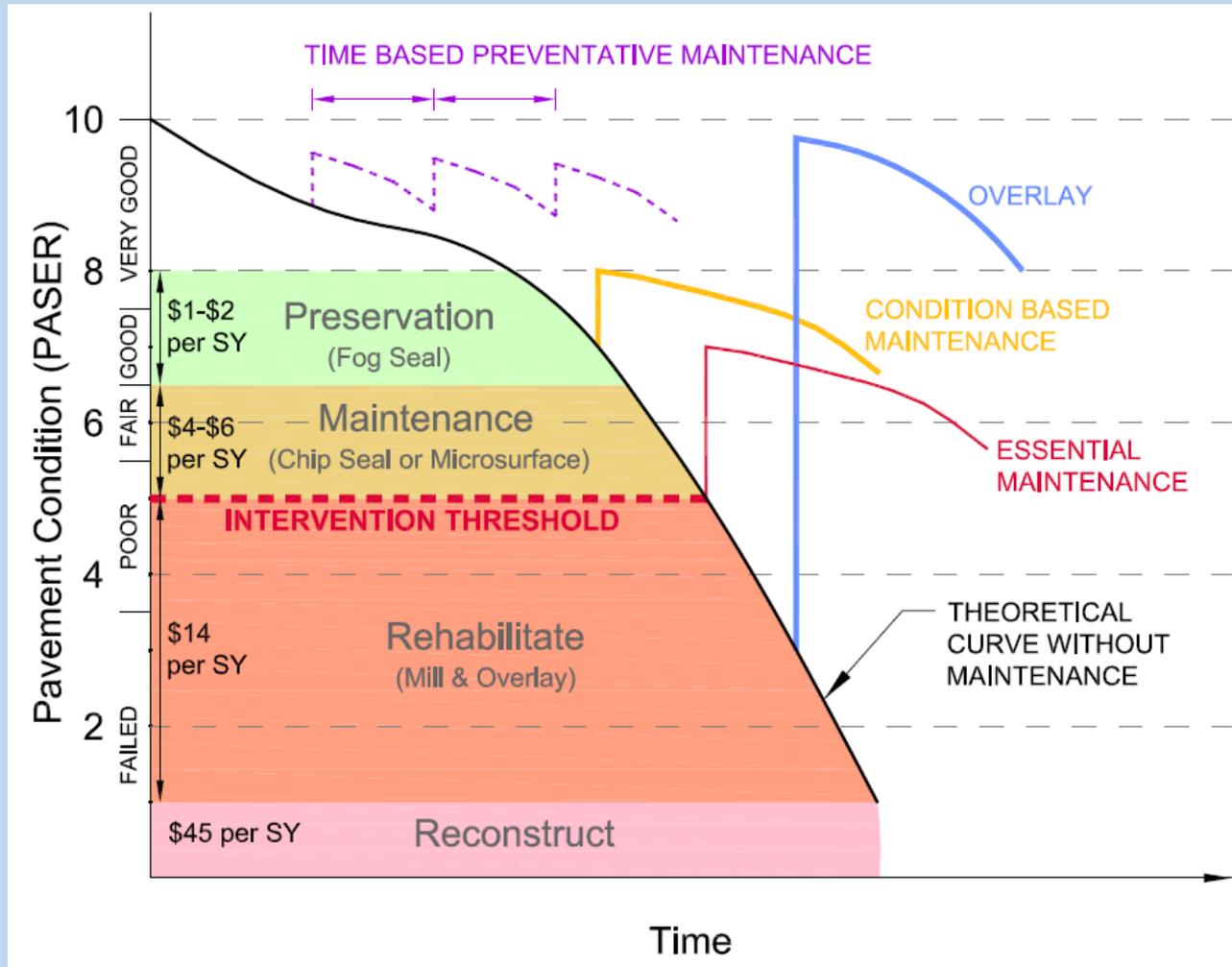
- Asphalt Concrete (AC) is a mixed composite of gravel (coarse) and sand (fine) aggregates bound together with asphalt oil (binder).
- It is a flexible pavement, distributing the vehicle wheel load down through the layers of a pavement section.
- A pavement section consists of:
 - AC,
 - base material layer or layers (an engineered aggregate mixture compacted on top of the subgrade),
 - subgrade (the existing ground).

Why does it fail?

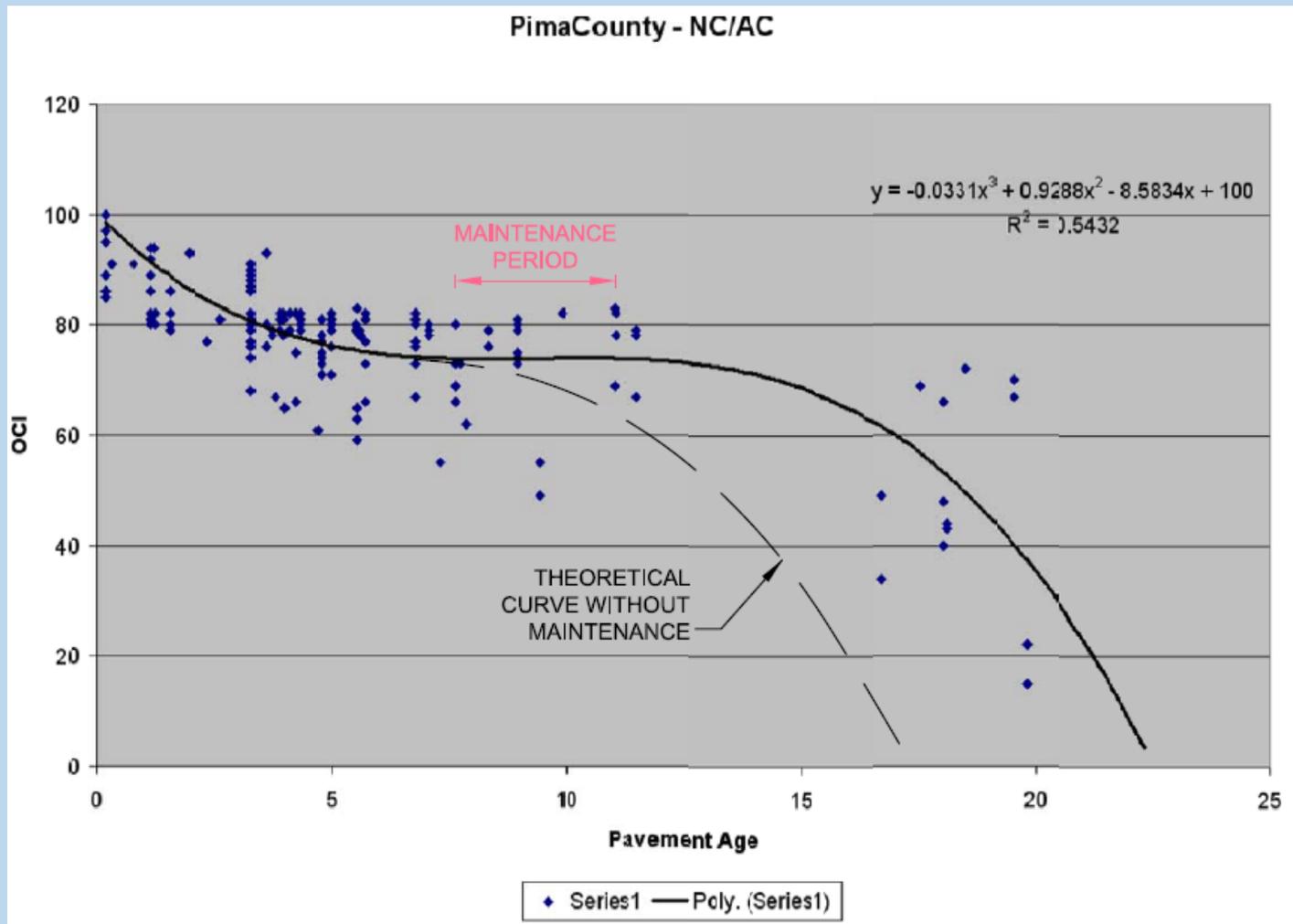
- AC degrades naturally over time due to weathering by the elements and by traffic using the roadway.
- There are four major categories of AC surface distress:
 - Surface Defects (raveling, flushing, polishing)
 - Surface Deformation (rutting, shoving, settling)
 - Cracks (transverse, longitudinal, block, alligator, reflection)
 - Patches and Potholes



What can we do to prevent or delay the process?



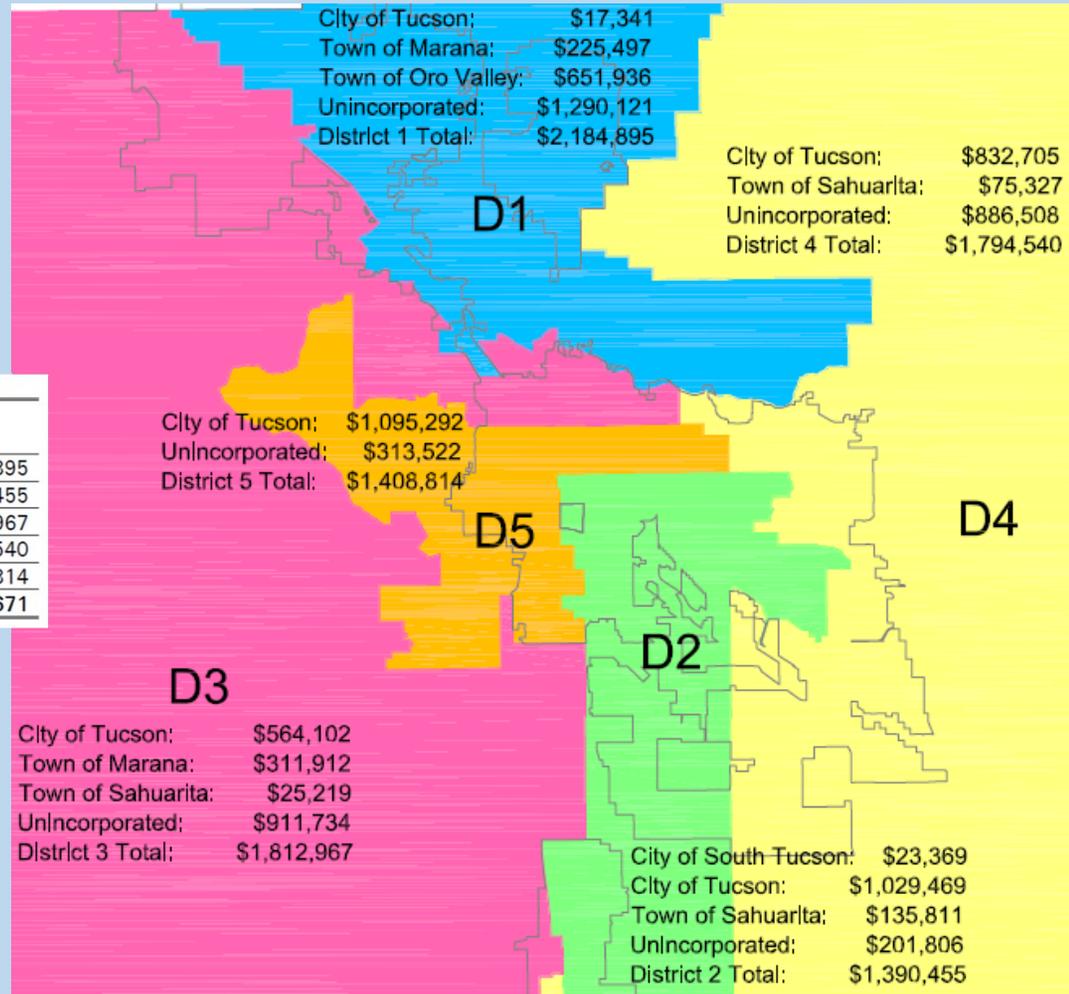
An example of what maintenance can do for pavement life.



Base Funding Map and Table

Table 1: Total Property Road Tax Repair Revenue by Supervisorial District (Fiscally Neutral 11 Cents).

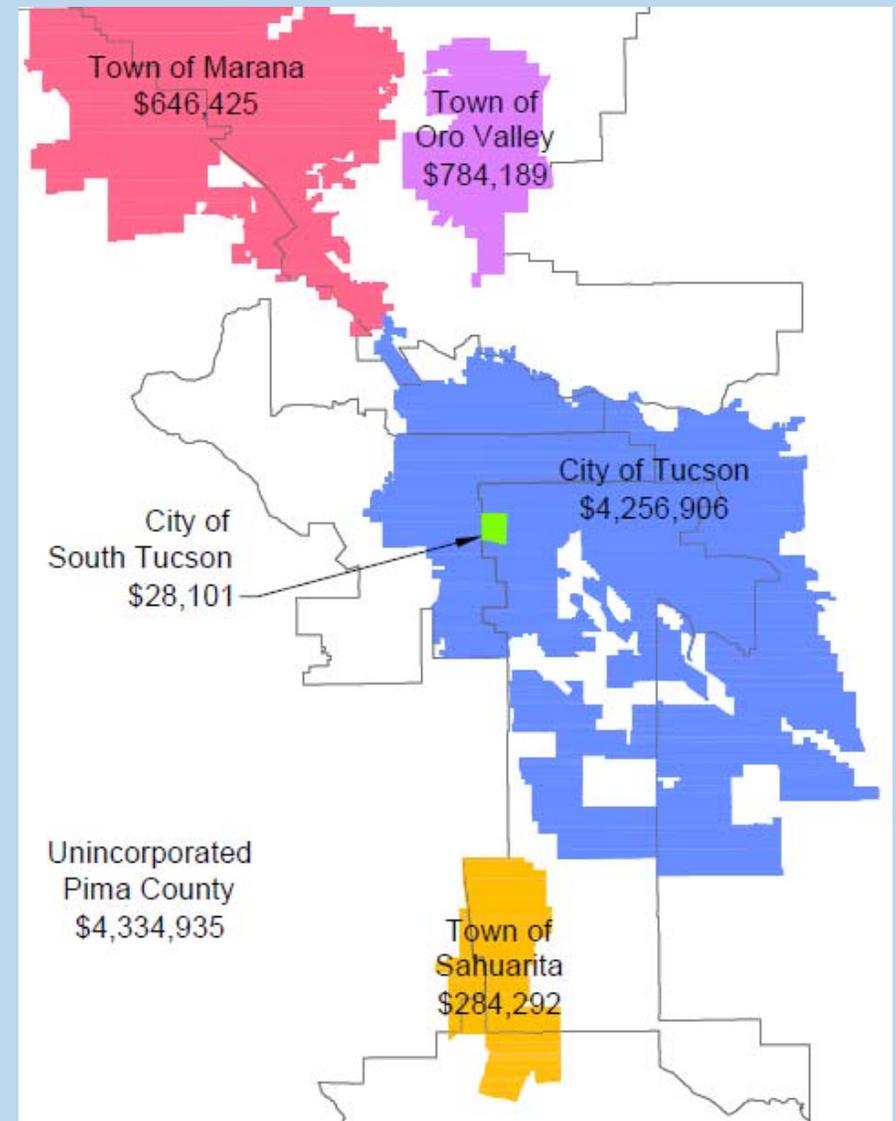
District	Unincorporated Area	Marana	Oro Valley	Sahuarita	South Tucson	Tucson	Total
1	\$1,290,121	\$225,497	\$651,936	0	0	\$ 17,341	\$2,184,895
2	201,806	0	0	\$135,811	\$23,369	1,029,469	1,390,455
3	911,734	311,912	0	25,219	0	564,102	1,812,967
4	886,508	0	0	75,327	0	832,705	1,794,540
5	313,522	0	0	0	0	1,095,292	1,408,814
Total	\$3,603,691	\$537,409	\$651,936	\$236,357	\$23,369	\$3,538,909	\$8,591,671



Accelerated Funding Map & Table*

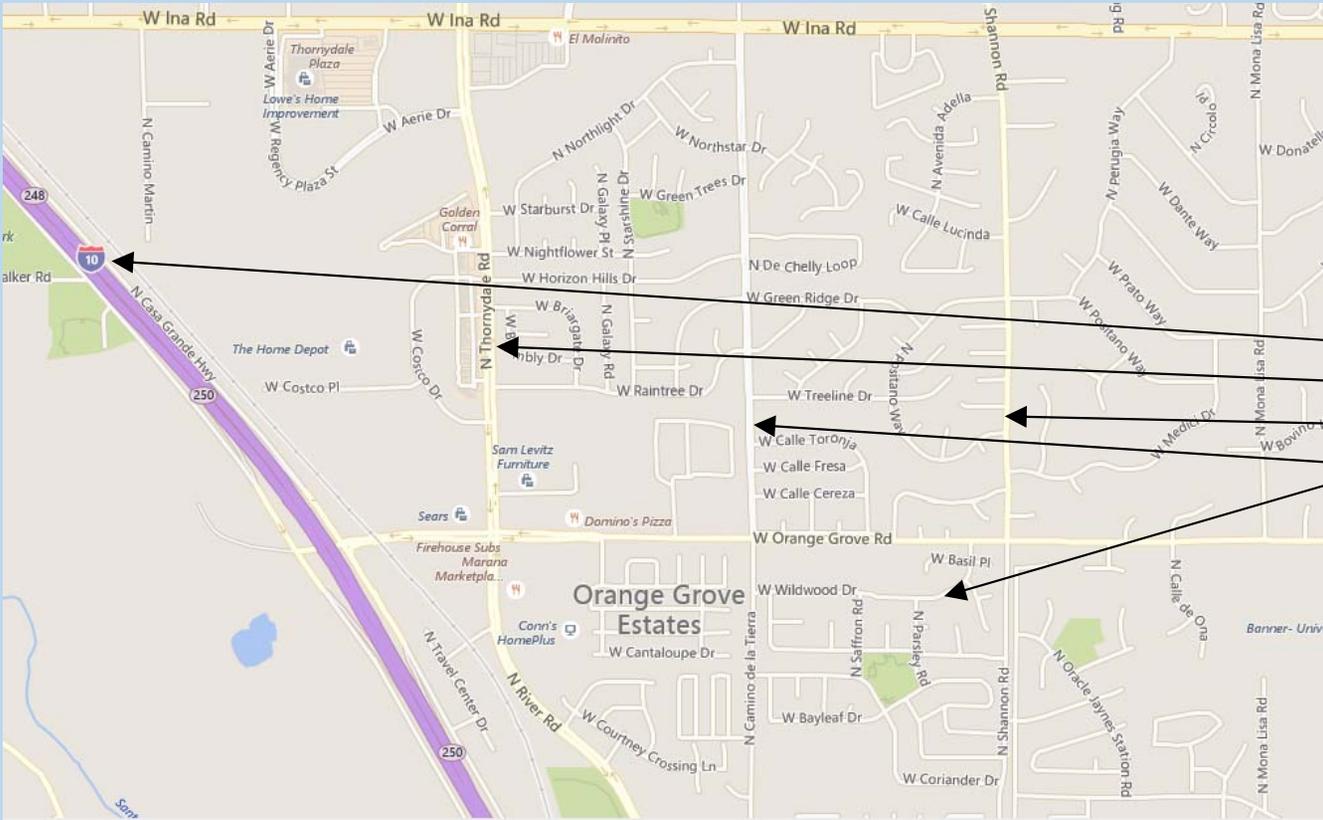
Table 2: Accelerated Funding Property Road Tax Repair Revenue by Jurisdiction

Jurisdiction	Percent of Assessed Value	Accelerated Property Road Tax Repair Allocation	Amount Allocated for Debt Issuance and Interest Costs	Adjusted Accelerated Property Road Tax Repair Allocation
Marana	6.255	\$683,955	(37,530)	\$646,425
Oro Valley	7.588	\$829,717	(45,528)	\$784,189
Sahuarita	2.751	\$300,798	(16,506)	\$284,292
South Tucson	0.272	\$29,733	(1,632)	\$28,101
Tucson	41.19	\$4,504,046	(247,140)	\$4,256,906
Unincorporated Area	41.945	\$4,586,605	(251,670)	\$4,334,935
Total	100	\$10,934,854	(600,006)	\$10,334,848



*This slide updated from original presentation to show the Debt Issuance and Interest Costs.

Classification



Road networks distribute traffic and are generally made up four types of roads that vary in terms of access control, traffic volume and the geographic nature (rural or urban). These roadway types are:

- Freeways/highways
- Arterials
- Collectors
- Locals

Road Rating

- Pima County utilizes the PASER (PAVement Surface Evaluation and Rating) system to evaluate the condition of roads.
- PASER is a rating system based on the surface conditions (roughness, potholes etc.) as described in the manual developed by the Transportation Information Center.
- The region uses a van to determine road conditions on the Arterial and Collector network, roughly every two years.
- Local road surveys vary, Pima County measures every 5 years.

Table 5 - Pavement Rating (as of May 2017)

Very Good (PASER 8 - 9 - 10)
Good (PASER 7)
Fair (PASER 6)
Poor (PASER 4 - 5)
Failed (PASER 1 - 2 - 3)



Pavement Surface Evaluation and Rating

PASER Asphalt Roads Manual

The complex block contains four photographs of asphalt roads, each with a blue arrow pointing to a rating. The top-left photo shows a smooth road with a rating of 10. The top-right photo shows a road with a large crack and a rating of 7. The bottom-left photo shows a road with several cracks and a rating of 4. The bottom-right photo shows a road with significant potholes and a rating of 1.

RATING 10

RATING 7

RATING 4

RATING 1

Transportation Information Center
University of Wisconsin-Madison

Treatment Types

- Preservation
 - Fog Seal (PASER 7, sometimes 6)
- Maintenance (PASER 6-5, sometimes 4)
 - Chip Seal, Micro Seal, & Micro Surface
 - Crack Seal-when cracks larger than ¼” are present
- Rehabilitate (PASER 4-3-2-1)
 - Mill & Overlay

These are general treatment types, there are many products and installation methodologies that encompass the Preservation and Maintenance treatments.

Depending on the pavement itself, some areas may require spot Mill & Fill treatment.

Fog Seal

Expected life: 4 Years

Cost: \$1 - \$2 per square yard (\$35,200 per mile)

A light application of slow setting asphalt emulsion applied to the surface of a bituminous pavement. Fog seals are used to renew aged asphalt surfaces, seal small cracks and surface voids, or adjust the quality of binder in newly applied chip seals.

Chip Seal

Expected life: 7 Years

Cost: \$4 per square yard (\$70,400 per mile)

A surface treatment in which the pavement is sprayed with asphalt and then covered with aggregate and rolled. Chip seals are used primarily to seal the surface of a pavement with non load-associated cracks and to improve surface friction on low volume streets.

Micro Surface

Expected life: 7 Years

Cost: \$5 - \$6 per square yard (\$105,600 per mile)

This treatment provides a "skim coat" of a restorative asphalt to the existing pavement surface, filling minor cracks and correcting pavement defects such as rutting and raveling when applied.

Mill and Overlay

Expected life: 15 Years

Cost: \$14 per square yard (\$246,400 per mile)

This process removes a defined thickness of the surface of the existing asphalt pavement, and after observed defects are corrected, the same thickness is replaced with new asphalt thereby returning the pavement to a nearly new condition.

This is the second most expensive pavement treatment option.

Reconstruct

Expected life: 20 Years

Cost: \$45 per square yard (\$792,000 per mile)

Complete design and pavement section replacement of an existing roadway.

There are 17,600 square yards in a mile of road that is 30 feet wide. Many Local roads are between 32 and 28 feet.



Prioritization Methodology

- Worst First
- Maximize Miles
- Combine for Area Treatment

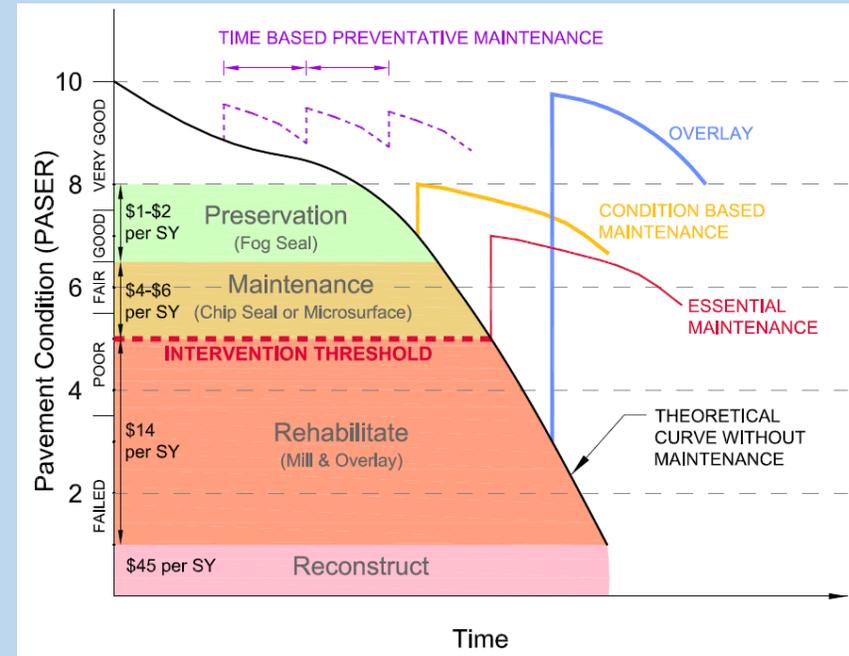
Total Miles Treatable in Unincorporated Pima County

Condition ¹	Local Road Miles	Improvement Cost Total ²	Year 1 Disbursement	Total Miles Constructable ³
GOOD	102	\$2,692,800	\$8,190,296	102 (G) + 78 (FR) = 180
FAIR	118	\$8,307,200		116 (FR)
POOR	582	\$122,918,400		38 (PR)
FAILED	212	\$52,236,800		33 (FL)

¹ Good (G), Fair (FR), Poor (PR), Failed (FL)

² Cost for each Treatment (per mile): G-\$26,000; FR-\$70,400; PR-\$211,200; FL-\$246,400

³ Assumes all of disbursement would be used per condition



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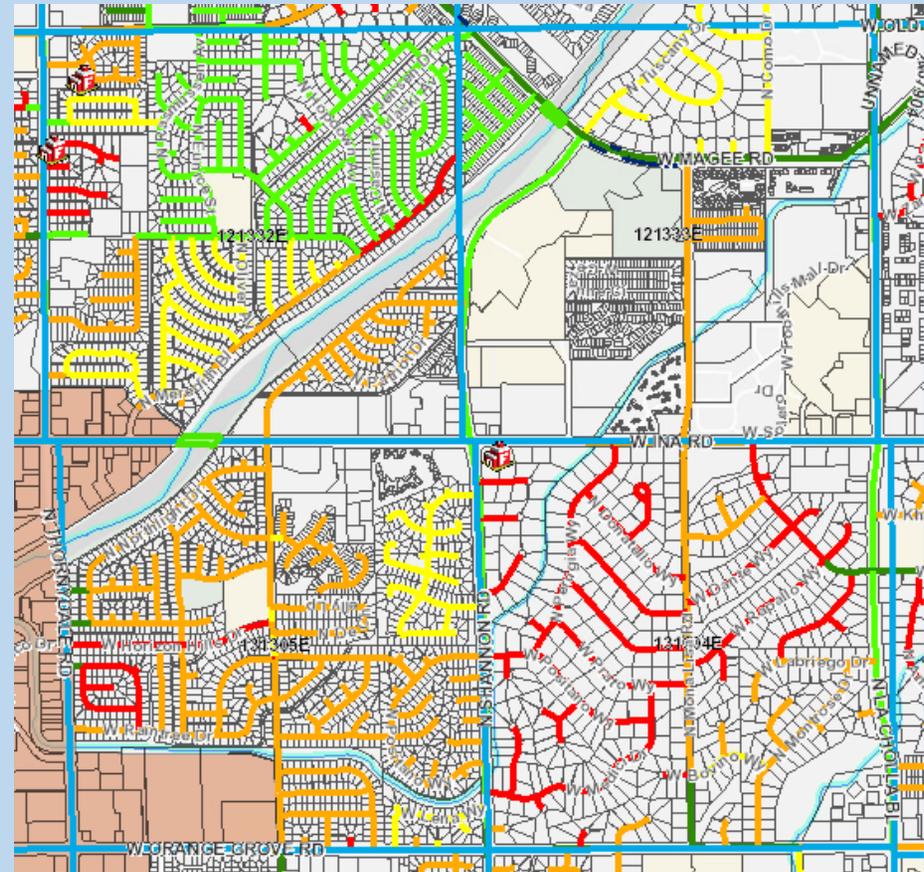
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Other Jurisdictions

- Other jurisdictions have indicated that they have established methodologies for roadway prioritization. The following summarizes the approaches:
 - Marana: Applies a “keep good roads good” philosophy, and will repair as necessary.
 - Oro Valley: Applies a “keep good roads good” philosophy, and will repair as necessary.
 - Sahuarita: Applies a preserve first approach and performs repairs when funds are available.
 - South Tucson: May utilize same as Pima County, coordination continuing.
 - Tucson: Uses a Bond Oversight Committee and tries to strike a balance between preservation and reconstruction.

Performing work, Reporting, and Program Evaluation

Project Administration

- All of the work performed under this program will be administered by Pima County Department of Transportation (PCDOT).
- PCDOT will develop the pavement material specifications, specify roadway limits and bid the work in all five jurisdictions.
- The County will oversee the construction activities via a right-of-way use permit within each jurisdiction.

Annual End of Fiscal Year Reporting

- Pima County staff will develop an annual report at the end of each fiscal year.
- The report will summarize the roads treated, provide a financial update and address lessons learned or recommendations for the following year.

Program Evaluation

As a new program, all aspects will be evaluated after the first year of implementation. Staff will assess the internal and external aspects of the program, including the coordination with the cities and towns. At a minimum, an evaluation will include the following:

- Prioritization process for roads and treatments
- Coordination with cities and towns
- Procurement process
- Financial management process
- Quality of work/quantity of work
- Appropriateness of selected treatment types
- Utility coordination
- Estimated cost versus actual bid prices
- Effectiveness of project status reporting
- Public outreach and other public communications

Questions?