



POST ACTION AGENDA NOTICE
NOTICE OF THE WORK STUDY SESSION
OF THE
FOUNTAIN HILLS TOWN COUNCIL

Mayor Linda M. Kavanagh

Councilmember Dennis Brown

Vice Mayor Nick DePorter

Councilmember Cassie Hansen

Councilmember Henry Leger

Councilmember Alan Magazine

Councilmember Cecil A. Yates

TIME: 5:30 P.M.

WHEN: WEDNESDAY, NOVEMBER 9, 2016

WHERE: FOUNTAIN HILLS COUNCIL CHAMBERS

16705 E. AVENUE OF THE FOUNTAINS, FOUNTAIN HILLS, AZ

Councilmembers of the Town of Fountain Hills will attend either in person or by telephone conference call; a quorum of the Town's various Commissions or Boards may be in attendance at the Work-Study Session.

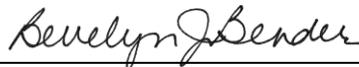
ALL WORK-STUDY ITEMS LISTED ARE FOR DISCUSSION ONLY. NO ACTION CAN OR WILL BE TAKEN.

The primary purpose of work session meetings is to provide the Town Council with the opportunity for in-depth discussion and study of specific subjects. Public comment is not provided for on the Agenda and may be made only as approved by consensus of the Council. In appropriate circumstances, a brief presentation may be permitted by a member of the public or another interested party on an Agenda item if invited by the Mayor or the Town Manager to do so. The Presiding Officer may limit or end the time for such presentations.

AGENDA

- **CALL TO ORDER AND ROLL CALL – Mayor Linda M. Kavanagh 5:30 PM**
- 1. **DISCUSSION** regarding the Pavement Management Program. **NO ACTION TAKEN**
- 2. **ADJOURNMENT. 6:31 PM**

DATED this 3rd day of November, 2016.



Bevelyn J. Bender, Town Clerk

The Town of Fountain Hills endeavors to make all public meetings accessible to persons with disabilities. Please call 480-816-5100 (voice) or 1-800-367-8939 (TDD) 48 hours prior to the meeting to request a reasonable accommodation to attend this meeting or to obtain agenda information in large print format. Supporting documentation and staff reports furnished the council with this agenda are available for review in the Clerk's office.



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TOWN OF FOUNTAIN HILLS

TOWN COUNCIL AGENDA ACTION FORM

Meeting Date: 11/9/2016

Meeting Type: Work Study Session

Agenda Type: Regular

Submitting Department: Public Works

Staff Contact Information: Paul Mood, Public Works Director, pmood@fh.az.gov

Strategic Planning Goal:
I2 Reliable funding for infrastructure maintenance

Operational Priority: Pavement Management Program

REQUEST TO COUNCIL (Agenda Language): DISCUSSION regarding the Pavement Management Program.

Applicant: NA

Applicant Contact Information: NA

Owner: NA

Owner Contact Information: NA

Property Location: NA

Related Ordinance, Policy or Guiding Principle: NA

Staff Summary (background): The Public Works Department is responsible for the Town's Pavement Management Program. Staff has prepared a presentation to outline and discuss the current pavement management program, current funding levels, pavement management components required and proposed funding levels required.

Risk Analysis (options or alternatives with implications):

Fiscal Impact (initial and ongoing costs; budget status):

Budget Reference (page number):

Funding Source: Multiple Funds

If Multiple Funds utilized, list here:

Budgeted; if No, attach Budget Adjustment Form: Yes

Recommendation(s) by Board(s) or Commission(s):

Staff Recommendation(s):

List Attachment(s): Pavement Management Presentation

SUGGESTED MOTION (for Council use):

Prepared by:

Paul Mood, Public Works Director 10/31/2016

Director's Approval:


Paul Mood, Public Works Director 10/31/2016

Approved:


Grady E. Miller, Town Manager 11/1/2016

TOWN OF FOUNTAIN HILLS

Pavement Management Program



Paul Mood, P.E. – Public Works Director

November 9, 2016

Pavement Management Presentation

- Fundamentals of Pavement Preservation
- Pavement Life Cycle
- Pavement Preservation Toolbox
- Town's Current Funding and Pavement Management Program
- Next Steps

Fundamentals of Pavement Preservation

Asphalt Pavement is made up of primarily two components

- Aggregate - Rock
- Asphalt Binder – “glue that holds the rock in place



Fundamentals of Pavement Preservation

A key factor in extending the life of asphalt pavement is to preserve the binder and stop oxidation! Most oxidation occurs within the first 2-4 years.

Oxidation results in:

- Raveling: Loss of bond between aggregate and binder
- Cracking



Del Cambre Ave. & Calaveras Ave.

Fundamentals of Pavement Preservation

A key factor in extending the life of asphalt pavement is to preserve the binder and stop oxidation! Most oxidation occurs within the first 2-4 years.

Primary Causes of Oxidation are UV Rays and Moisture.



June 2011: Sundown Drive after TRMSS Application



June 2013: Sundown Drive

Fundamentals of Pavement Preservation

“An effective pavement preservation program will address pavements while they are still in good condition and before the onset of serious damage. By **applying a cost-effective treatment at the right time**, the pavement is restored almost to its original condition.”

“Preventive maintenance is typically applied to pavements in good condition having **significant remaining service life**. As a major component of pavement preservation, preventive maintenance is a strategy of extending the service life by applying cost-effective treatments to the surface... of structurally sound pavements. “

“Examples of preventive treatments include asphalt crack sealing, chip sealing, slurry sealing or micro surfacing...”

Fundamentals of Pavement Preservation

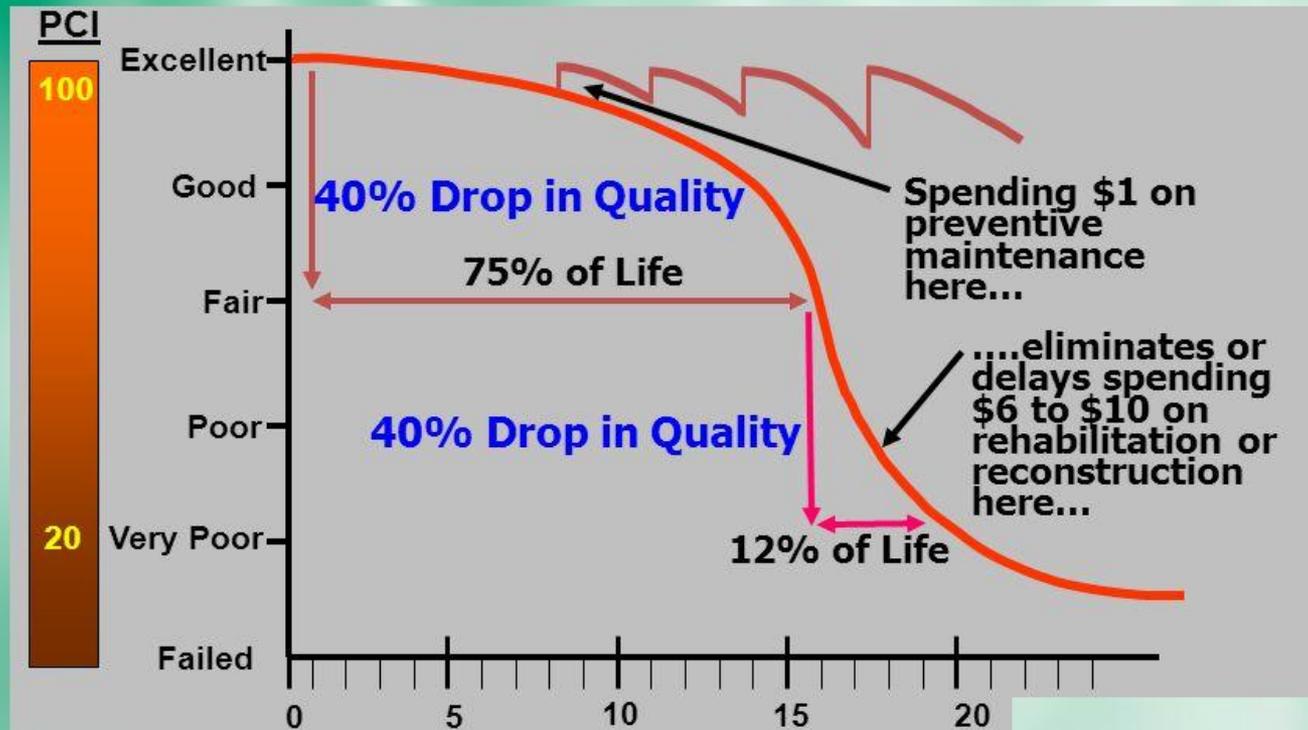
Strategies to LOW COST Pavement Preservation

“Many maintenance practices have **not been effective**, because they were applied reactively to roads in poor condition instead of proactively to roads still in good condition, Succinctly stated, the correct approach to preventative maintenance is to **“place the right treatment on the right road at the right time.”**”

-Larry Galehouse, Director for Pavement Preservation at Michigan State University

Fundamentals of Pavement Preservation

Pavement Preservation Concept



Pavement Lifecycle



Pavement Lifecycle

ROUGH ROADS AHEAD, page 8

Life Cycle of a Road

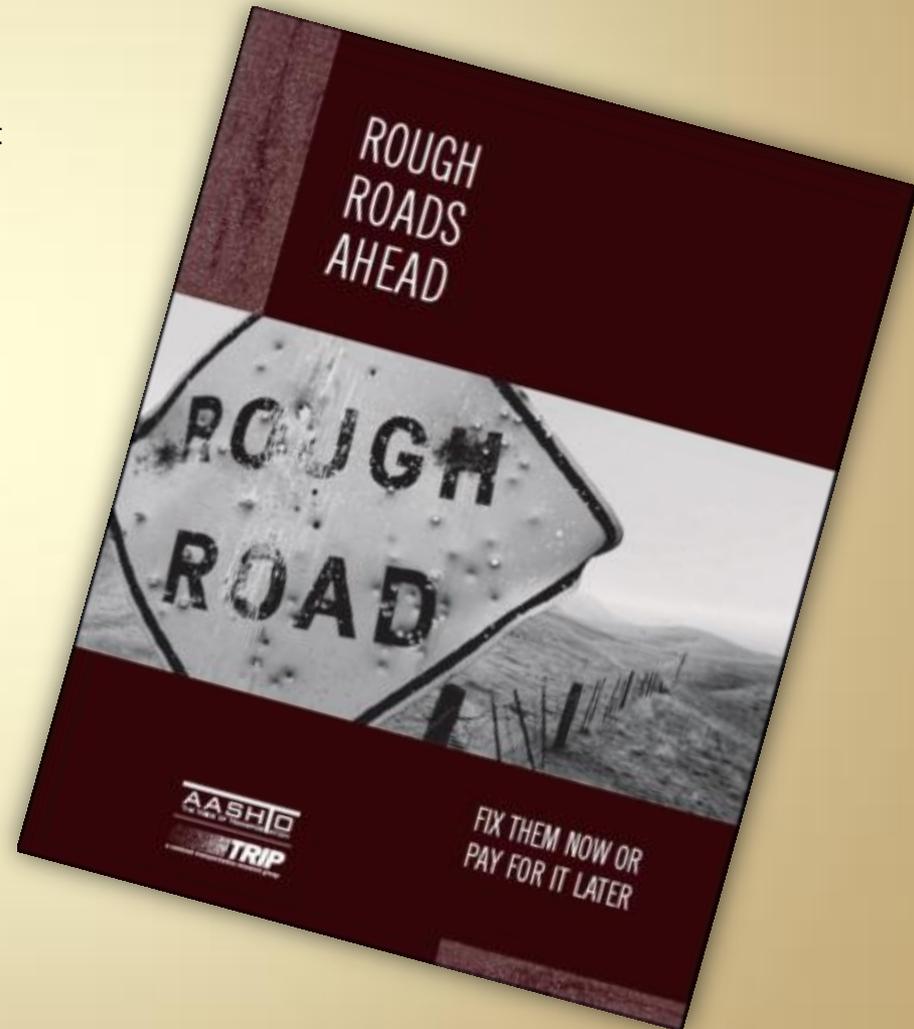
1 Design —This stage deals with dimensions, type of materials, thickness of base and top surfaces, and the drainage system. Investments made at the design stage affect the long-term durability of the pavement surface. If, however, sufficient funding is not available to upgrade the design, the road starts out and stays mediocre.

2 Construction —A high-quality construction process produces a longer-lasting pavement surface.

3 Initial Deterioration —During the first few years of use, the road surface starts to experience some initial deterioration caused by traffic volume, rain, snow, solar radiation, and temperature changes. At this stage, the road appears in good condition, providing a smooth ride. **Preservation strategies during Stage 3 will sustain the smooth ride, preserve the foundation, extend the life, and reduce the need for costly reconstruction later on.**

4 Visible Deterioration —At Stage 4, visible signs of distress such as potholes and cracking occur. Repairs made at this stage using overlays and milling to eliminate ruts will restore a smooth ride and extend the life of the road.

5 Disintegration and Failure —Roads not maintained at Stage 3 and repaired at Stage 4, eventually will fail and need costly reconstruction. Once a road's foundation disintegrates, surface repairs have an increasingly short life.



Pavement Management “Toolbox”

Common Pavement Preservation treatment types:

- Crack Seal
- Fog/Surface Seal
- Slurry Seal (Types I, II & III)
- High Density Mineral Bond
- Slurry Seal
- Micro Surfacing



Pavement Management “Toolbox”

Crack Seal

What: Crack seal is a highly elastic material used to seal cracks against moisture and debris infiltration.

Where: Crack sealing is effective on structurally sound asphalt with good drainage and low severity surface cracking. Crack sealing should also be done over cracked pavements prior to surface treatments such as slurry seals, chip seals and micro-surfacing.

Why (advantages): Crack sealing prevents moisture intruding into pavement cracks, to prevent further crack deterioration and to protect the pavement structure from moisture damage.

Why not (disadvantages): There are very few disadvantages to crack sealing, unless a pavement has an unstable base, poor drainage or shows signs of moderate to severe fatigue cracking (which indicates structural problems). In these cases, sealing without base and/or drainage repair will only be a temporary fix.



Source: Crafcoc, Inc.

When: Crack sealing is most effective when the pavement is structurally sound.

Estimated life extension: 3-4 years over pavements in good condition; 2-3 years on pavements in fair condition; 0-2 years for pavements in poor condition.

Pavement Management “Toolbox”

Fog Seal/Surface Seal

What: Fog seal is a light spray of a diluted asphalt or rejuvenator emulsion that is applied by a distributor truck. By renewing the surface asphalt, it delays further oxidation, weathering and raveling. It seals micro-cracks and is a very low cost and effective pavement preservation treatment when applied on asphalt in good condition.

Where: Fog seals should be used on good condition, structurally sound asphalt pavements.

Why (advantages): Fog seals are very low cost, are easily applied, replace asphalt that has worn off surfaces, reduce raveling, waterproof surface, rejuvenate and protect surface from UV aging, seal micro-cracks before they have a chance to widen and protect pavement structure from moisture intrusion.

Why not (disadvantages): The lifespan is less than some other surface treatments.



When: Fog seals should be placed on asphalt pavements before they show signs of surface distress.

Estimated life extension: 4-5 years over pavements in good condition; 1-4 years on pavements in fair condition; not recommended for pavements in poor condition.

Pavement Management “Toolbox”

High Density Mineral Bond (HA5)

What: High Density Mineral Bond (HA5) combines uniquely emulsified asphalt with a near-neutral charge that is able to hold exceptionally high concentrations of fine aggregates and other components that resist deterioration.

Where: HA5 should be used on good condition, structurally sound asphalt pavements.

Why (advantages): HA5 is relatively low cost and reduces asphalt cracking and raveling by effectively preserving the existing asphalt binder and deflecting UV rays. HA5 is aesthetically pleasing and has a “surface friendly” finish

Why not (disadvantages): The lifespan is less than some other surface treatments such as slurry seals and chip seals but is more . Typically used on Collector and local roads.



Paradise Valley, AZ

When: HA5 should be placed on asphalt pavements before they show signs of surface distress.

Estimated life extension: 5-6 years over pavements in good condition.

Pavement Management “Toolbox”

Slurry Seal

What: Slurry seal is a mixture of emulsified asphalt, fine aggregate, mineral filler, water and additives that is uniformly spread in thin layer. Some slurry seals may be made with polymer modified asphalt emulsions and/or have crumb rubber additives.

Where: Slurry seals are appropriate for aging asphalt pavements in good structural condition with only minor cracks and/or raveling, or where there has been a loss of skid resistance.

Why (advantages): The treatment seals and waterproofs the surface, fills minor cracks, restores skid resistance and restores aesthetic appeal with a black surface at a relatively low cost.

Why not (disadvantages): Slurry seals are not appropriate for pavements with rutting (more than ¼”) or high severity surface distresses. When placed over severe cracks, conventional slurry seals (those without polymers) are subject to reflective cracking, so any cracks greater than 1/8” should be sealed before slurry seal application.



When: Slurry seals are recommended when the primary deterioration is related to oxidation and hardening of the existing asphalt. Slurry seals are most effective on pavements with only very minor cracking (less than 1/8”) or raveling.

Estimated life extension: 6-7 years over pavements in good condition; 3-6 years on pavements in fair condition; 2-4 years for pavements in poor condition.

Pavement Management “Toolbox”

Chip Seal

What: Chip seals are an asphaltic binder that is sprayed on the pavement surface, followed immediately by an application of aggregate. The chip seal is then rolled to seat the aggregate in the binder. After sufficient curing, the surface is broomed to remove any loose aggregate.

Where: Chip seals have been successfully applied on all types of asphalt pavements. The road should be structurally sound with only minor surface defects.

Why (advantages): Chip seals protect asphalt pavements from sunlight and rain. It improves skid resistance, seals minor cracks and surface imperfections, inhibits raveling, addresses bleeding and when properly designed, protects pavement structure and extends pavement life. Chip seals are one of the most cost-effective pavement preservation treatments.

Why not (disadvantages): Chip seals are not appropriate over rutted, potholed, rough, moderately or severely distressed surfaces. Chip seals have a rougher surface causing vehicle noise and problems with dislodged chips.



When: Ideally, chip seals should be applied when a road is still in good condition, with only minor surface problems, such as loss of friction, drying surface or very minor cracking. Chip seals are an excellent choice for keeping good pavements in good condition.

Estimated life extension: 6-8 years over pavements in good condition; 4-6 years on pavements in fair condition; 3-4 years for pavements in poor condition.

Pavement Management “Toolbox”

Micro Surfacing

What: Micro surfacing is a high performance enhanced slurry seal composed of a mixture of polymer modified emulsified asphalt, dense-graded crushed fine aggregate, mineral filler, break control additives and water.

Where: Pavements in good structural condition with loss of friction and/or low to medium severity surface distresses such as cracking and raveling. Any cracks greater than $\frac{1}{4}$ inch should be sealed prior to micro surfacing. Micro surfacing is an effective pavement preservation treatment for very high volume roadways where quick traffic return is important.

Why (advantages): High performance surface that corrects minor surface profile irregularities, fills ruts, cures quickly for traffic return in less than an hour and lasts longer than some other surface treatments such as slurry seals.

Why not (disadvantages): Micro surfacing requires special equipment and the cost is higher than a slurry or chip seal treatment.



When: Micro Surfacing should be applied when the pavement structure is in good condition, but there are minor to moderate surface distresses.

Estimated life extension: 6-8 years over pavements in good condition; 5-7 years on pavements in fair condition; 2-5 years for pavements in poor condition.

Pavement Management Funding

Through Resolution 2013-02 and Ordinance 15-10 the Town has allocated \$1,900,000 for annual pavement maintenance. Funding sources include:

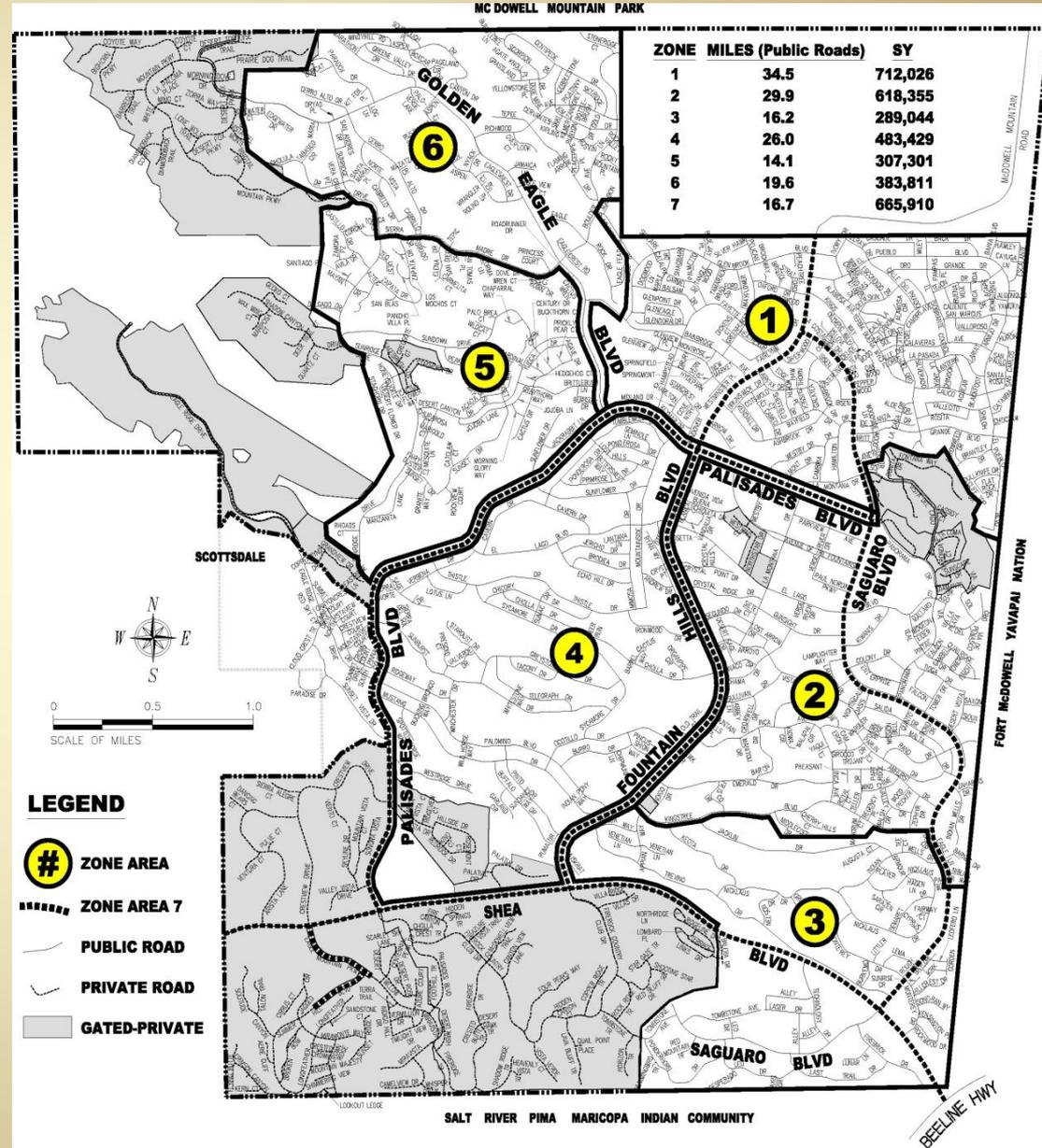
\$750,000	Vehicle License Tax
\$700,000	General Fund/Sales Tax (if available)
\$200,000	CIP Fund Transfer (if available)
\$250,000	Highway User Revenue Fund (HURF)
\$1,900,000	

Starting in FY20-21, the Town will not have to pay debt service for the MPC Bonds issued to pay for the Community Center. This would free up approximately \$300,000 annually which could be dedicated to pavement maintenance with Council authorization.

Pavement Maintenance Zones

Fountain Hills Roadway Statistics

- 390 lane miles
- 3,460,000 SY of pavement surface
- 7 Pavement Maintenance Zones
- Zone Approach vs. Need Base Approach



Asphalt Pavement Distress



“Alligator” Cracking – La Montana Drive



Slurry Seal “Peeling” – Pinto Drive



“Block” Cracking - Desert Vista Dr.



“Transverse” Cracking – Sunridge Drive

Asphalt Pavement Distress



Bainbridge Ave. (Before)

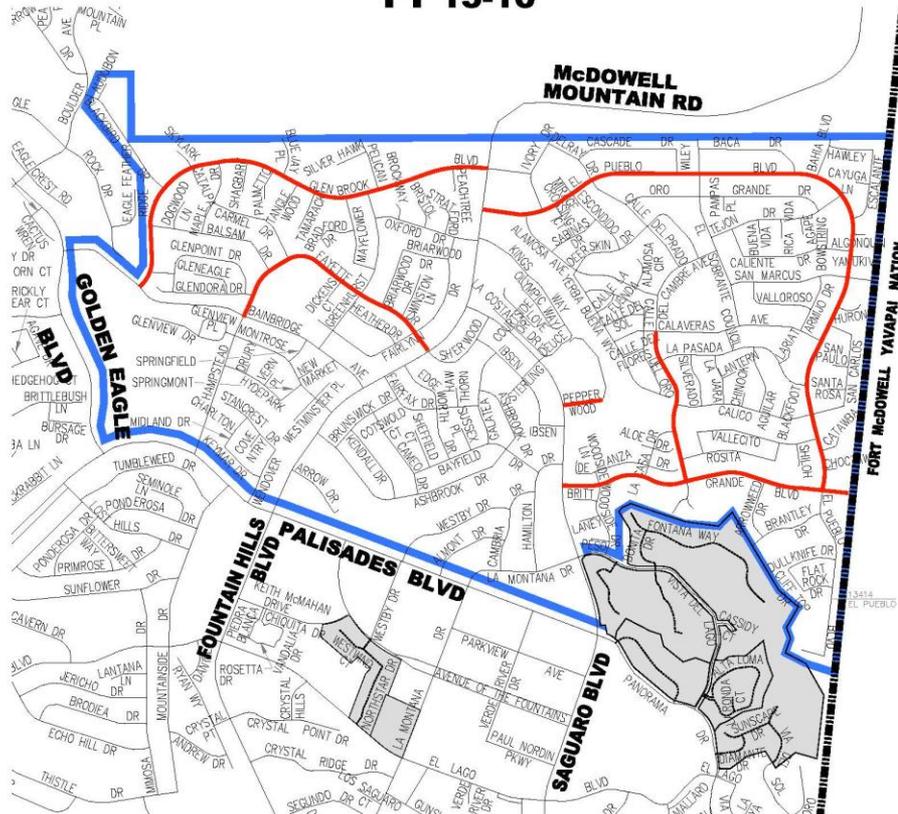


Bainbridge Ave. (After Mill & Overlay)

- Stantec Engineering Pavement Management Report from 2009 showed that Bainbridge Ave. was in “very good” condition.
- Without any pavement maintenance the roadway deteriorated to the point where a more costly mill and overlay was required in 2016.

Pavement Management Program

Town of Fountain Hills ZONE 1 PAVEMENT MANAGEMENT FY 15-16



LEGEND

▬	ZONE AREA
▬	MILL & OVERLAY
	PRIVATE ROAD
	GATED-PRIVATE

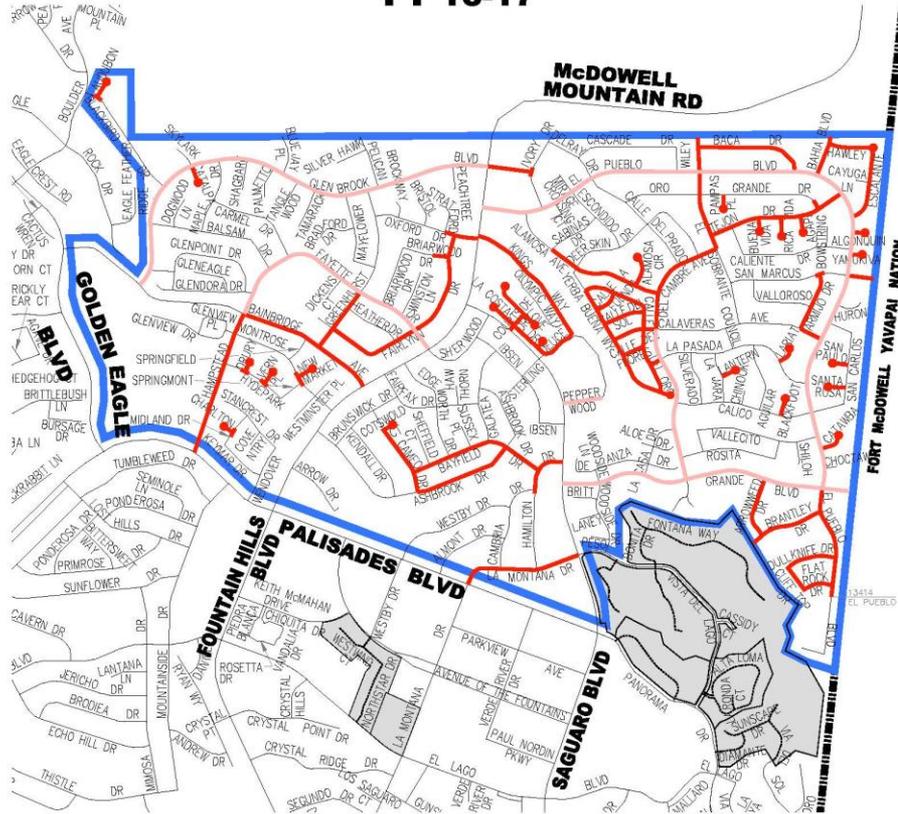
MAP DATE: 10-11-16

FY2015-16: Zone 1 Mill & Overlay

- Grande
 - El Pueblo
 - Glenbrook
 - Fayette
 - Del Cambre (partial)
 - Pepperwood (partial)
-
- Project Cost: Approx. \$1.6 million
 - 153,000 SY of 1.5" Asphalt
 - ADA Sidewalk Ramps & Curb Repairs
 - Manhole & Water Valve Adjustments
 - Striping

Pavement Management Program

Town of Fountain Hills ZONE 1 PAVEMENT MANAGEMENT FY 16-17



LEGEND	
	ZONE AREA
	MILL & OVERLAY
	PRIVATE ROAD
	GATED-PRIVATE

MAP DATE: 10-25-16

FY2016-17: Zone 1 Mill & Overlay

- Project Cost: Approx. \$1.85 million
- 200,000 SY of 1.5" Asphalt
- ADA Sidewalk Ramps & Curb Repair
- Manhole & Water Valve Adjustments
- Striping

Pavement Management Program – Next Steps

Based upon visual inspections of all public roads in Fountain Hills it would require approximately \$15 million to mill and overlay roads requiring that level of treatment today.

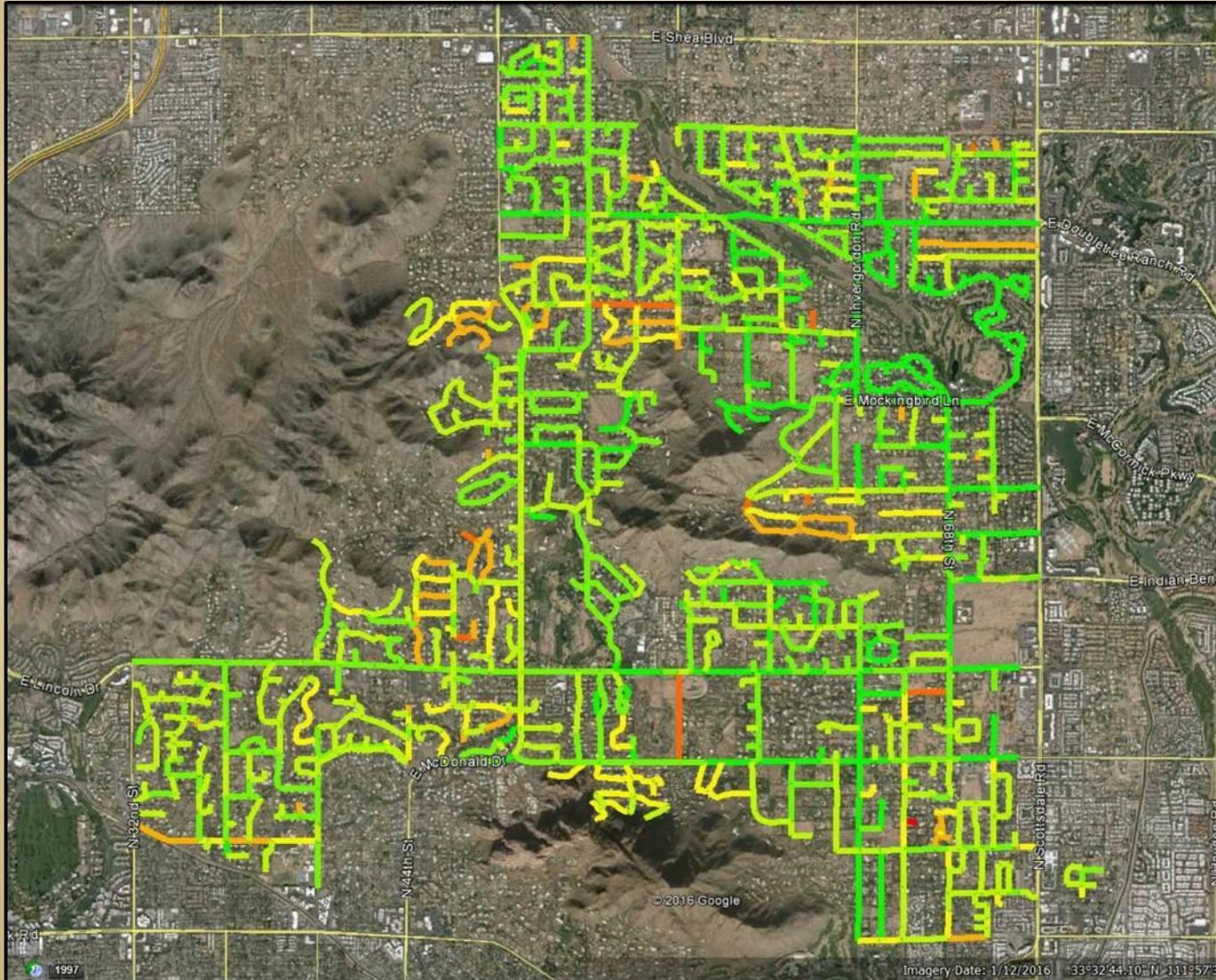
Contract with asset management firm for pavement management reporting and software.

- Roadway Data Collection (RST)
- Pavement Analysis & Report
- Street Network Mapping
- Asset Management Software (Lucity)
- Pavement Condition Analysis Based on Funding, Funding Increase, Bond Package, etc.
- Council Presentation



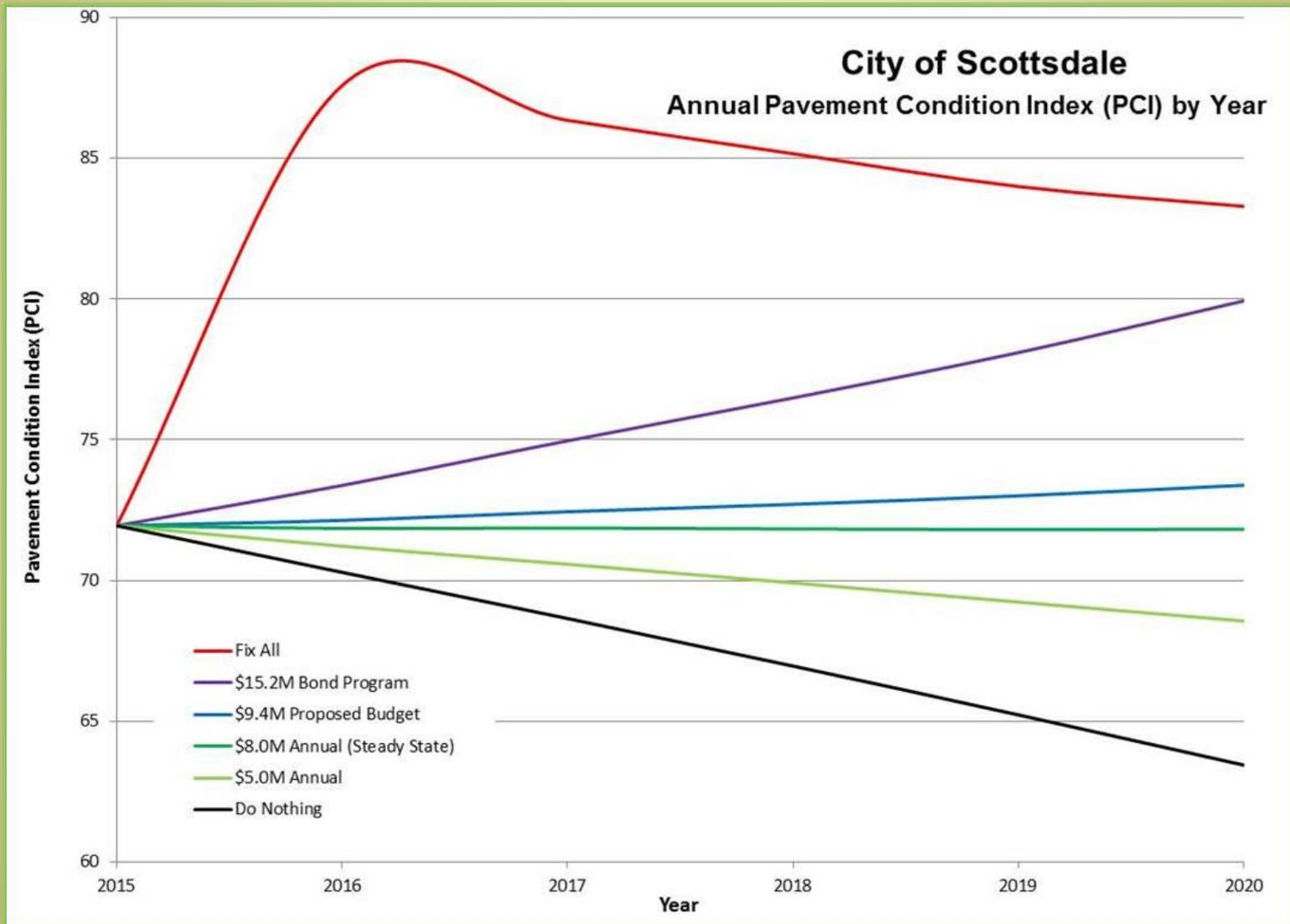
Laser Road Surface Tester (RST)

Pavement Management Program – Next Steps



Pavement Condition Map – Paradise Valley, AZ

Pavement Management Program – Next Steps





Questions?