

# **Pavement Management Software / City-Wide Results Evaluation**



To: Brian Denmark, Asst. City Manager

From: Dan Soriano, Acting Public Works Director

Subj: Pavement Management System Presentation, February 27, 2012 Work Session

Date: February 17, 2012

On February 27, 2012, Infrastructure Management Services, IMS, of Tempe, Arizona, will be presenting the initial report of the City of Las Cruces Pavement Management System analysis. Their report submitted to staff discusses the collection and assessment of the road data, recommended improvements to address surface deficiencies, and potential budgetary impacts as it pertains to keeping the city's roadway infrastructure at a satisfactory level of service over a ten year horizon.

The City of Las Cruces' total road network has a present day valuation of approximately \$484 million. The City must protect this investment with a continual funding source earmarked toward rehabilitation of these road facilities each fiscal year.

The economics of the pavement management system is based on the premise of cost avoidance which basically means spending dollars today in preventative maintenance versus 10 times the amount in 5 years toward reconstruction costs. This is a very similar concept to maintaining and prolonging the life of a personal vehicle or making minor repairs to a home.

The management system being proposed by IMS will now afford staff with a strategic plan on how to approach our road rehabilitation program through a more analyzed and engineered process.

Mr. Stephen Smith will be discussing information from the report after which, IMS and City staff will entertain questions from City Council.



## State of the Roadway Network in City of Las Cruces

*Roadways are the economic lifeline of a community; they provide the means for communities to thrive and commerce to flourish.*

*As such they are an investment to be maintained.*

# *State of the Road Network in City of Las Cruces*



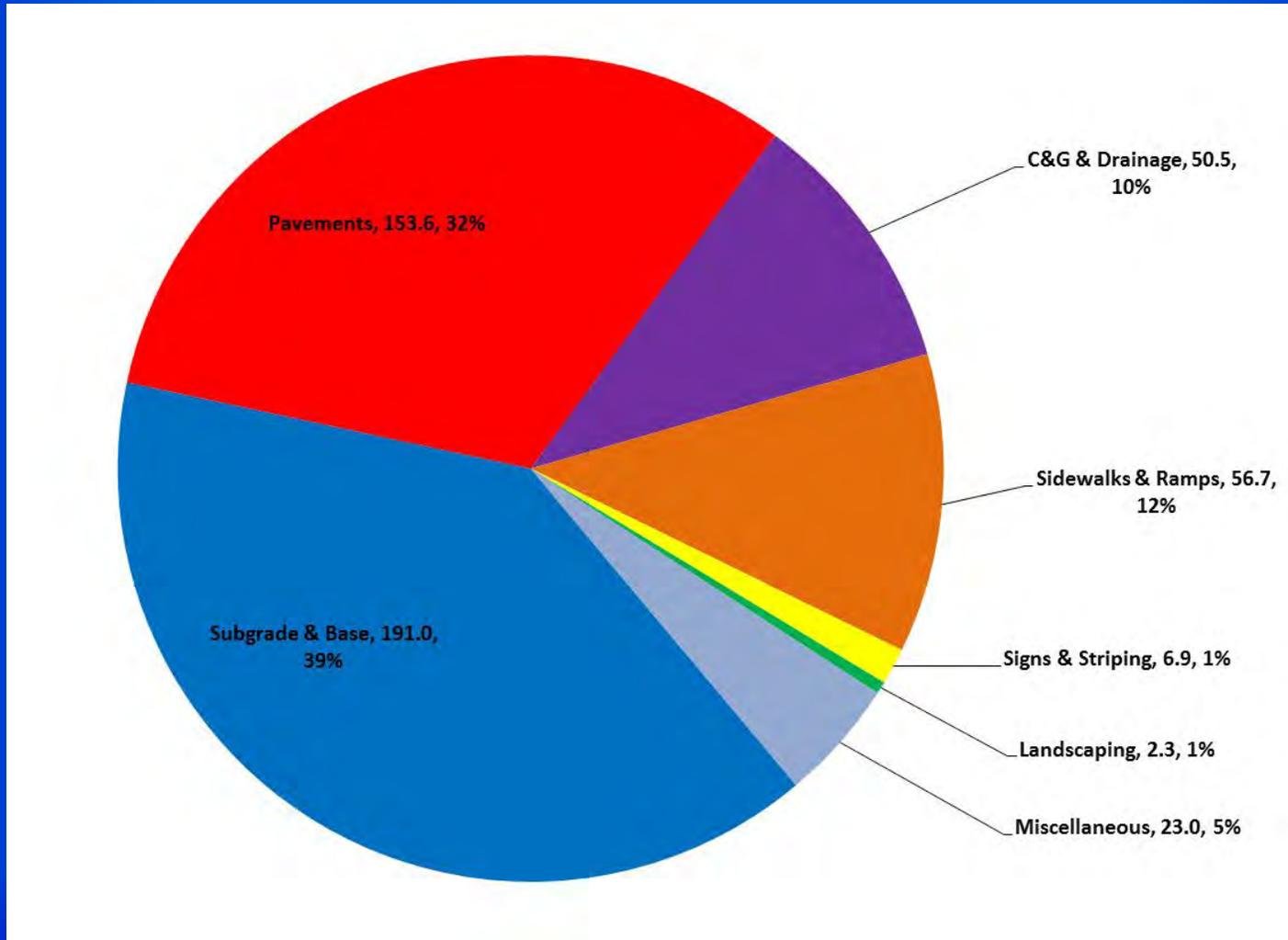
*95,000 +/- people, 76.3 sq. miles  
457 CL +/- miles of City roadways  
85 M square feet of pavement = 1487 football fields*

*City's most visible asset, replacement cost of  
\$484M plus land, signals and improvements.*

*Early look at the results:  
Network OCI = 63  
Network average is slightly above average  
Cautious B+*



# *Total Paved Roadway Asset Value....\$484M*



# *Concept of Payroll Management...*



**City Objectives,  
Policies & Budgets**



**Balanced  
Approach**

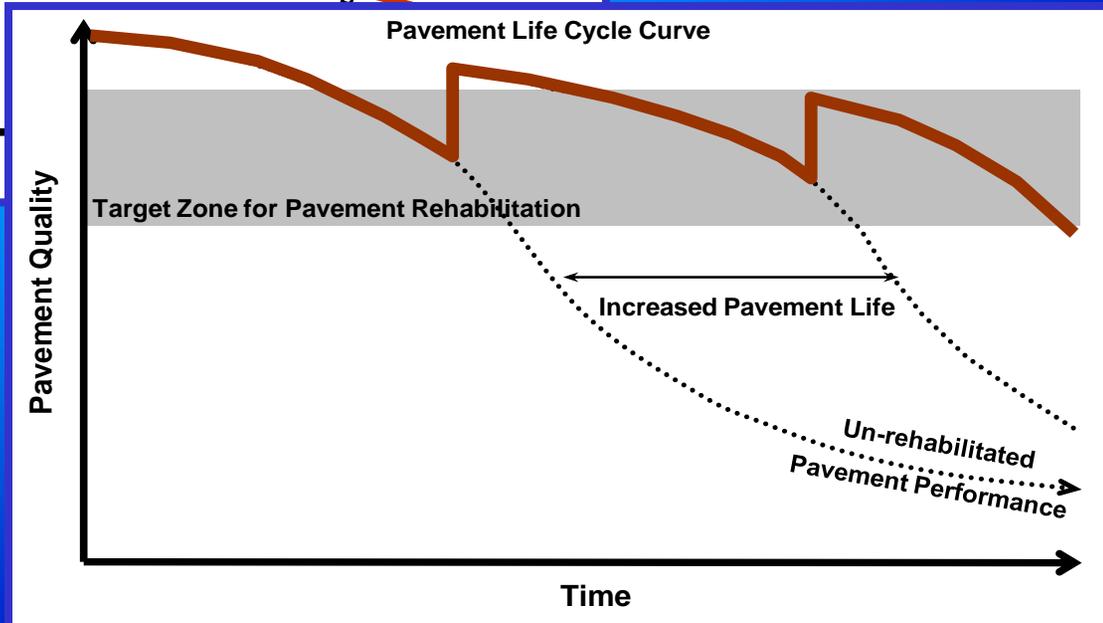
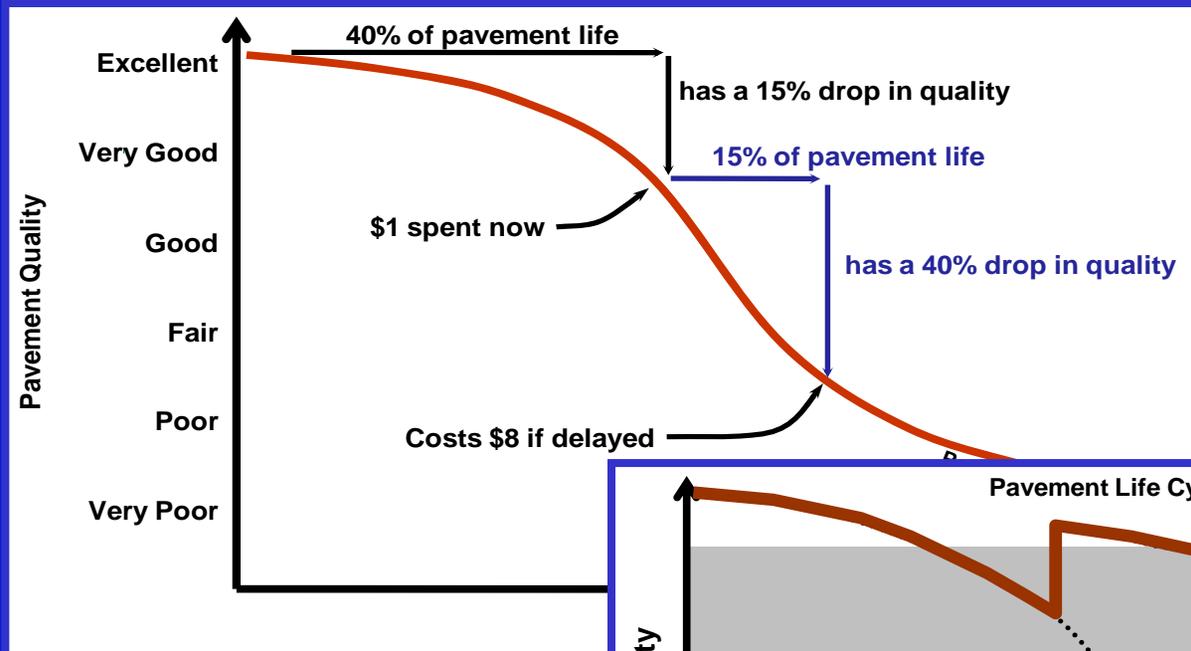
**Priorities,  
Analysis Techniques  
& Reporting**



**Understanding of  
Condition**



# Why do Pavement Management...



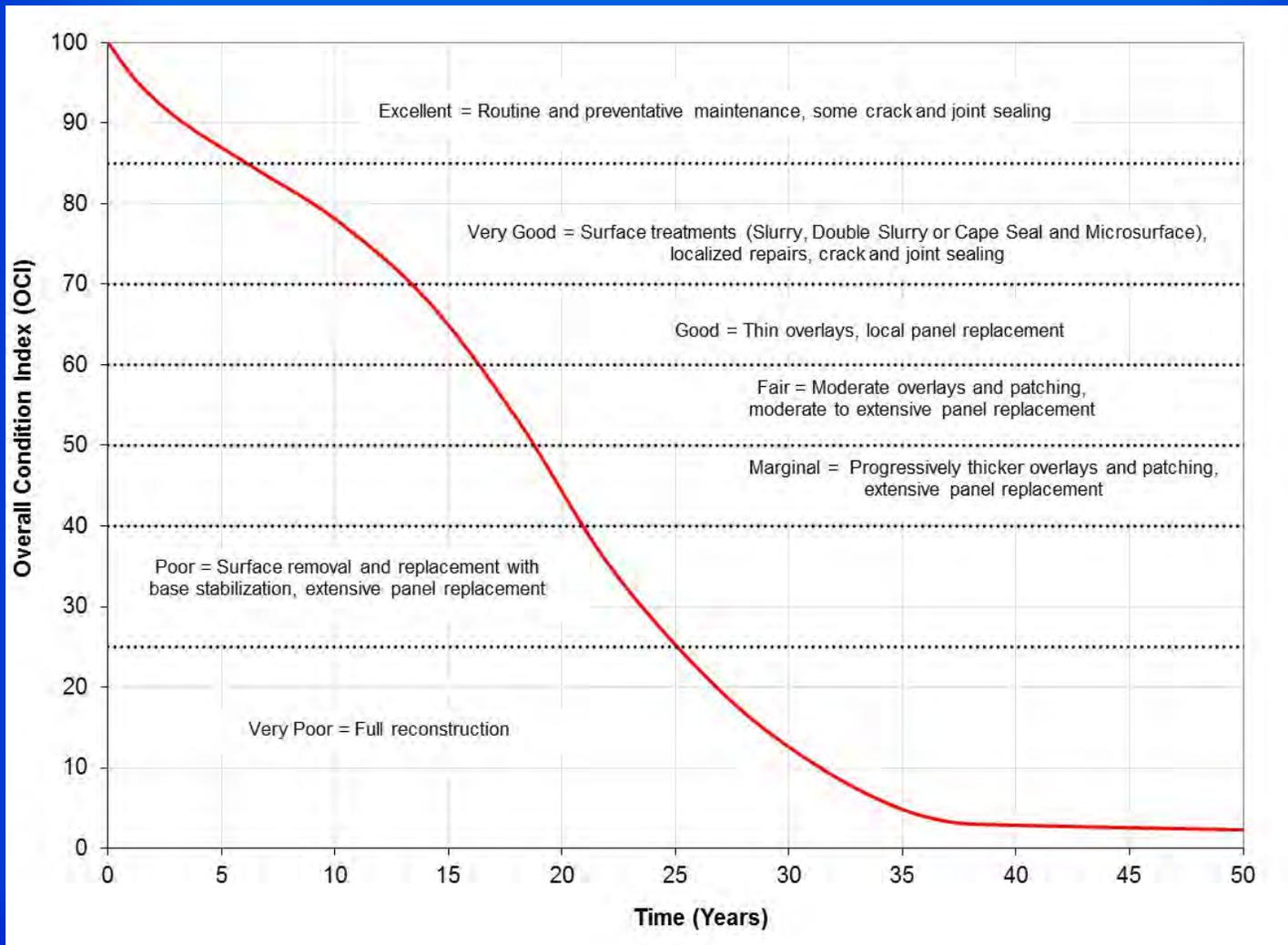
# *Why do Pavement Management....*

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- 1. Investments in preventative maintenance is more cost effective than reconstruction**
- 2. After several rehab cycles, streets still need to be reconstructed – the key is to defer this as long as possible**
- 3. It is critical not to let streets deteriorate past their overlay rehab limit - large jump in costs and inconvenience**
- 4. When pavements start to show cracks – rehab is already past due**

# Understanding the Pavement Condition Score....



# *Tools to Rate the Streets – Objective Surveys*



## **Condition Rating Focuses on:**

**Cracking & Rutting**

**Distortions, Weathering & Flushing**

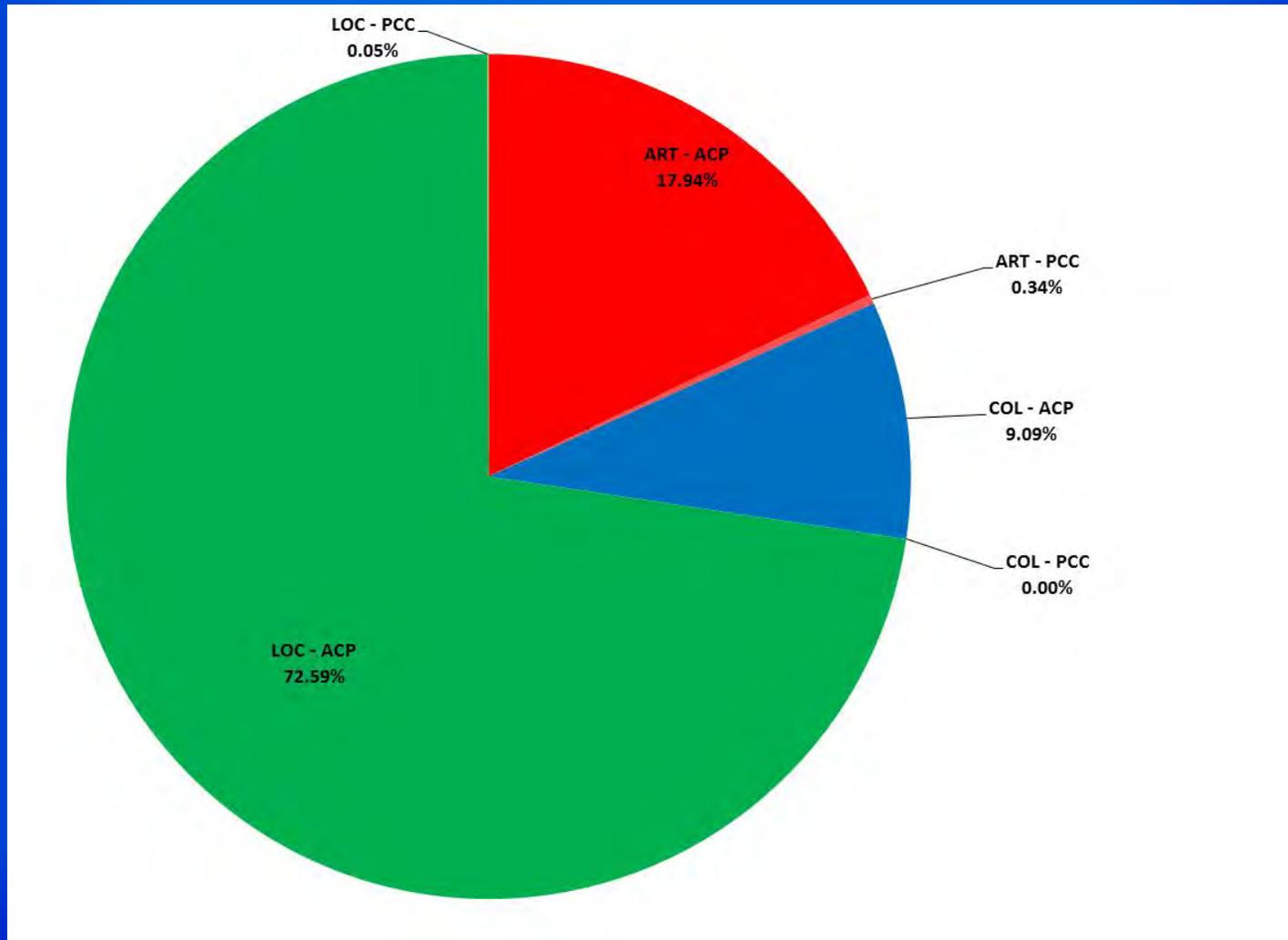
**Patching & Potholes**

**Panel Condition and Separation**

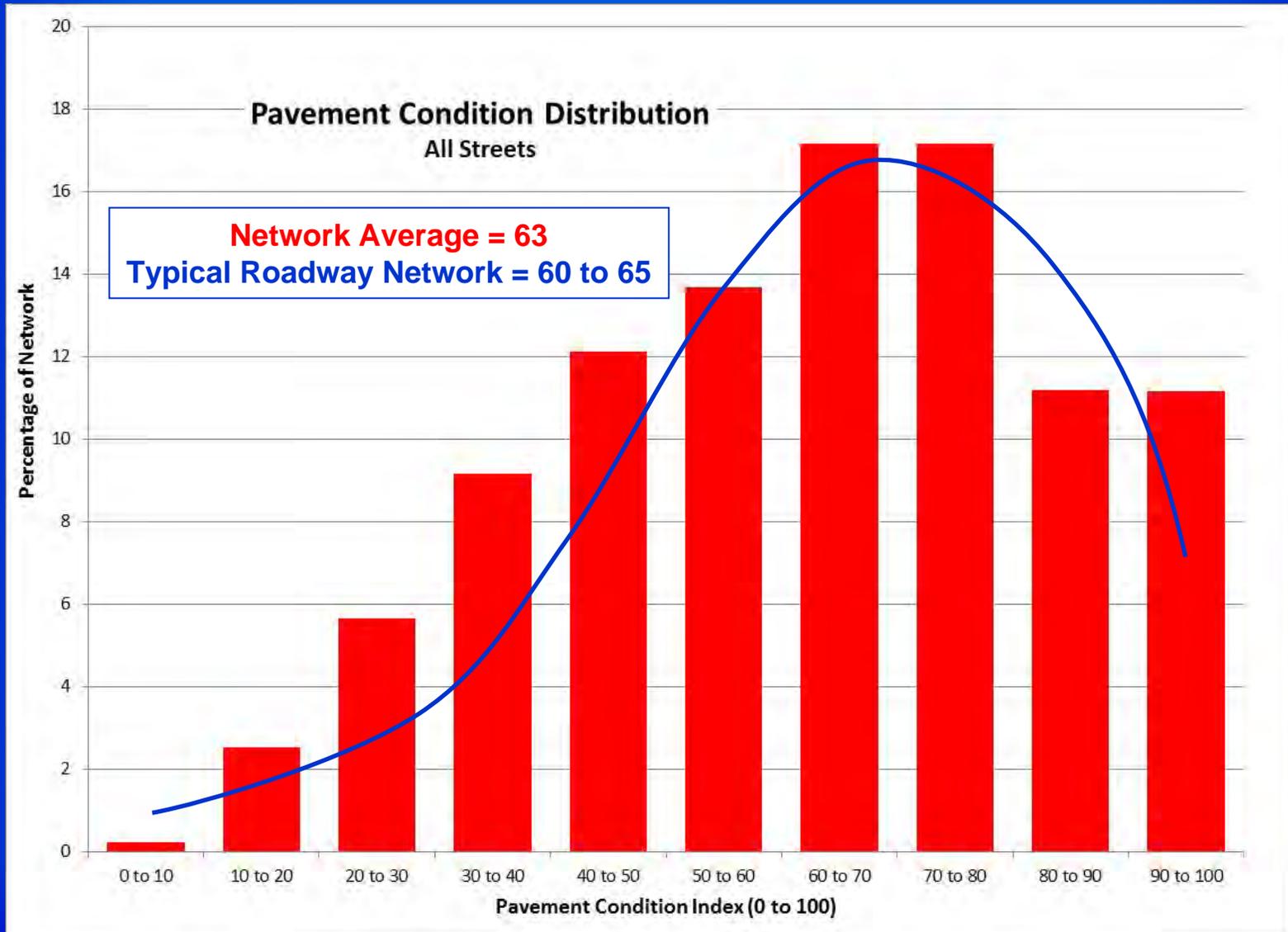
**Roughness**



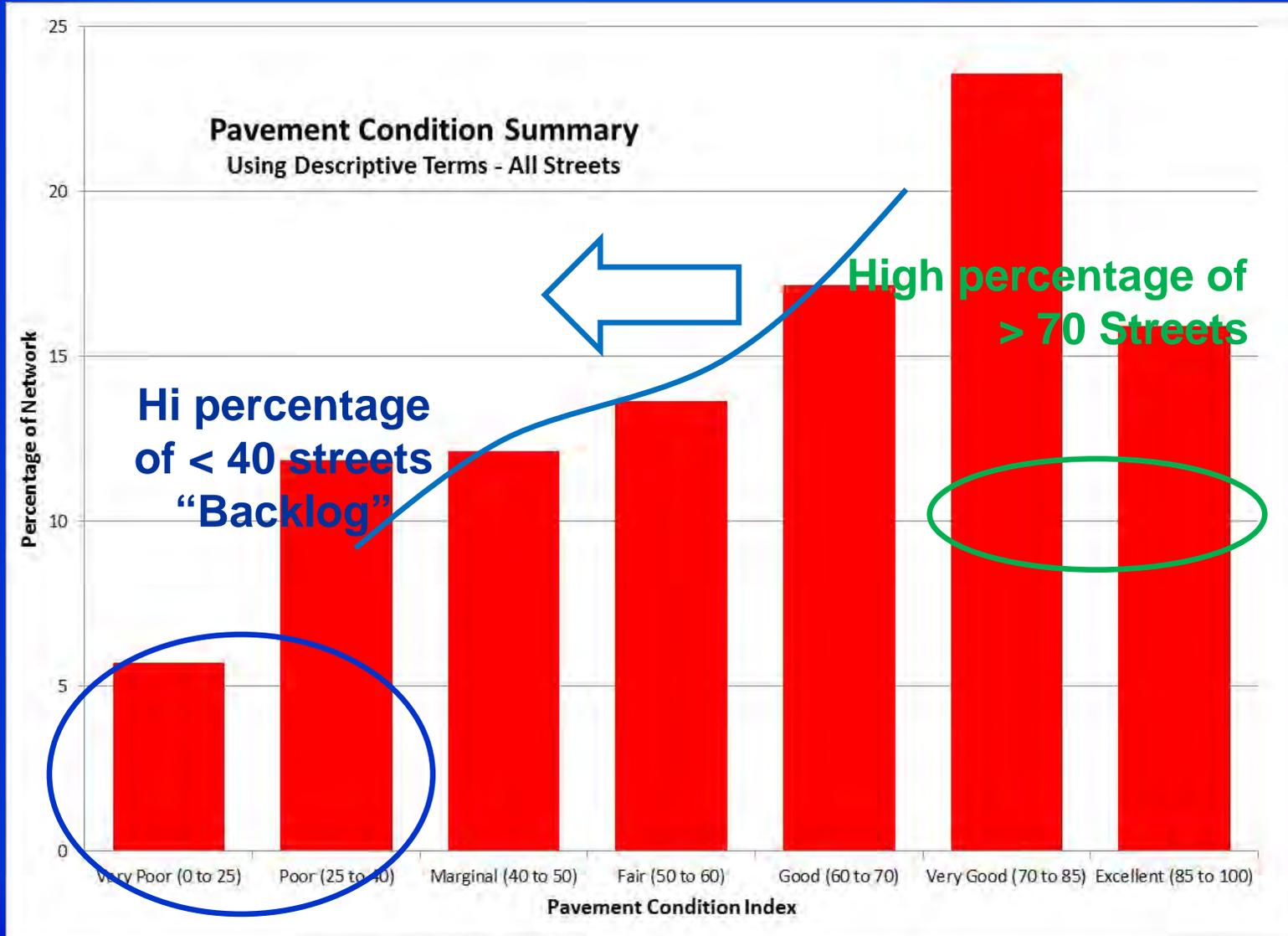
# City of Las Cruces Results...Functional Class & Pavement



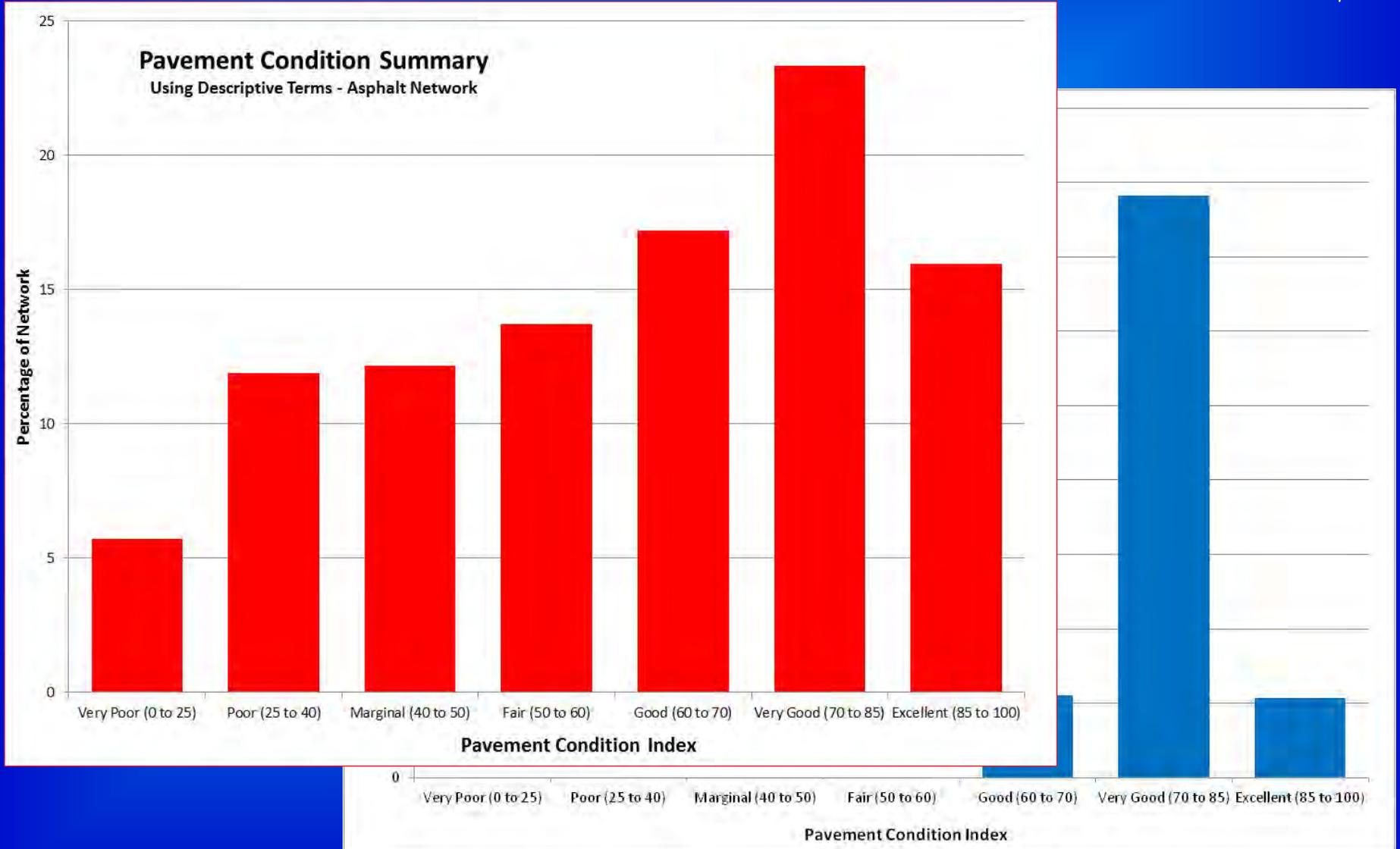
# City of Las Cruces Results...by PCI



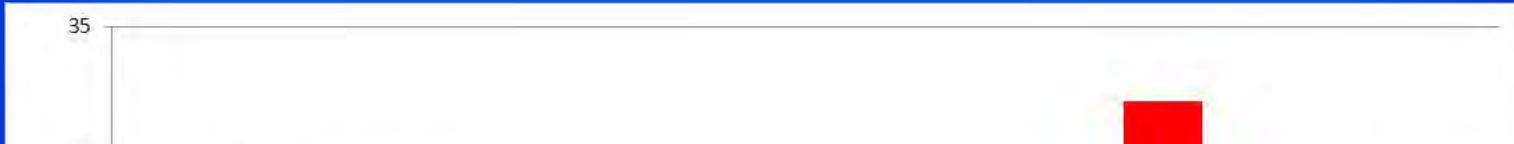
# City of Las Cruces Results...by Good/Fair/Poor



# City of Las Cruces Results...by Pavement Type



# City of Las Cruces Results...by Functional Class



Collectors have the lowest OCI at 61

Arterials have the highest OCI at 66

Local streets form the greatest percentage of streets

Arterials however, are the most costly



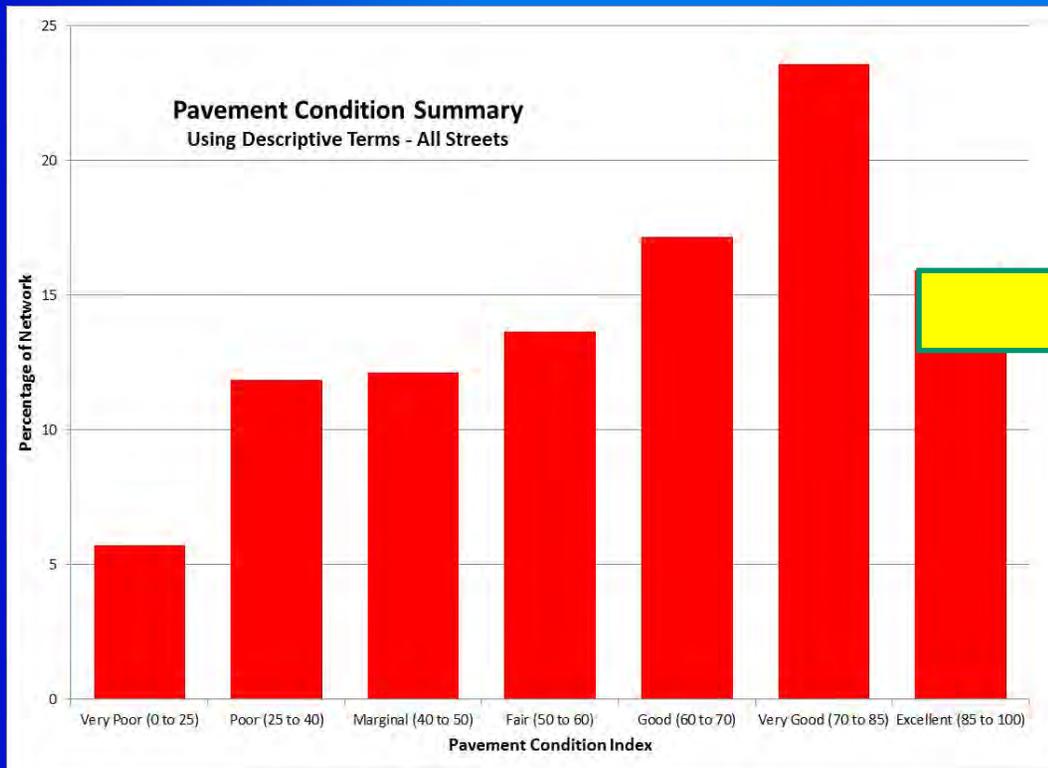
# *City of Las Cruces Looking Forward....*

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1. Funding is not \$0, nor is it unlimited
2. Las Cruces places a value on its roadway network  
*arterials – collectors - locals*
3. Identify annual budget to maintain current PCI  
and existing backlog (62 @ 17.5%)
4. Examine effects of current funding levels
5. Prevent deterioration in pavement quality

# Step 1.... Identify Magnitude of Current Deficit



ACP Rehab Function	Total Cost (\$)
Full Reconstruction	17,155,056
Partial Reconstruction	28,068,151
Thick Overlay	18,629,187
Moderate Overlay	19,864,935
Thin Overlay	20,752,377
Surface Treatment	2,541,450
Slurry Seal / Seal Coat	2,852,574
Routine Maintenance	377,500
<b>Total Asphalt Network:</b>	<b>110,241,230</b>
PCC Rehab Function	Total Cost (\$)
PCC Full Recon	0
PCC Partial Recon	0
PCC Extensive Pnl Rplcmnt	0
PCC Moderate Pnl Rplcmnt	0
PCC Localized Pnl Rplcmnt	55,500
PCC Localized R&R	0
PCC Crack Seal & Patch	146,700
Routine Maintenance	1,600
<b>Total PCC Network:</b>	<b>203,800</b>
<b>Total Network Rehab:</b>	<b>110,445,030</b>

The Fix All cost to raise the network OCI to 87 = \$110.4M

# Step 2.... Estimate Annual Steady State Costs



## Estimate #3 - Based on Average Life Cycle of Fix All Estimate

Rehabilitation Activity	Total Fix All Cost (\$)	Life Cycle (yrs)	Annual Life Cycle Cost (\$)
Full Reconstruction	17,155,056	40	429,000
Partial Reconstruction	28,068,151	35	802,000
Thick Overlay	18,629,187	17	1,096,000
Moderate Overlay	19,864,935	17	1,169,000
Thin Overlay	20,752,377	17	1,221,000
Surface Treatment	2,541,450	7	363,000
Slurry Seal / Seal Coat	2,852,574	5	571,000
Routine Maintenance	377,500	2	189,000
PCC Localized Pnl Rplcmnt	55,500	25	2,000
PCC Crack Seal & Patch	146,700	5	29,000
Routine Maintenance	1,600	2	1,000
<b>Fix All Estimate:</b>	<b>110,445,030</b>	<b>Annual Budget:</b>	<b>5,872,000</b>

# Step 3.... Set Priorities and Operating Parameters



Rehabilitation Strategies and Unit Rates

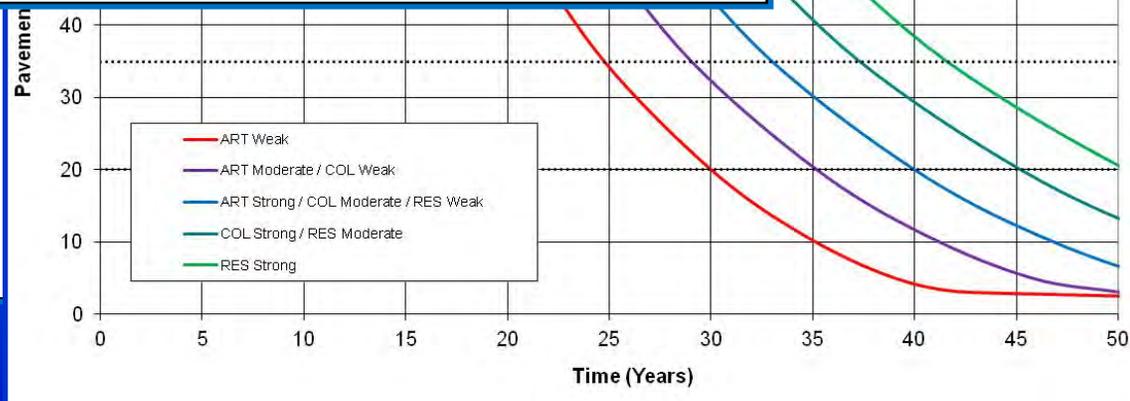
Rehab Code	Pavement Type	Rehabilitation Activity	PCI Range			Constraint					Unit Rate (\$/yd2)		
			imum PCI	cal PCI	imum PCI	imum ctural Index	imum ctural Index	ab Selection	ar	at PCI	imum (Yrs)	rials	ectors

Priority Weighting Factor (PWF)

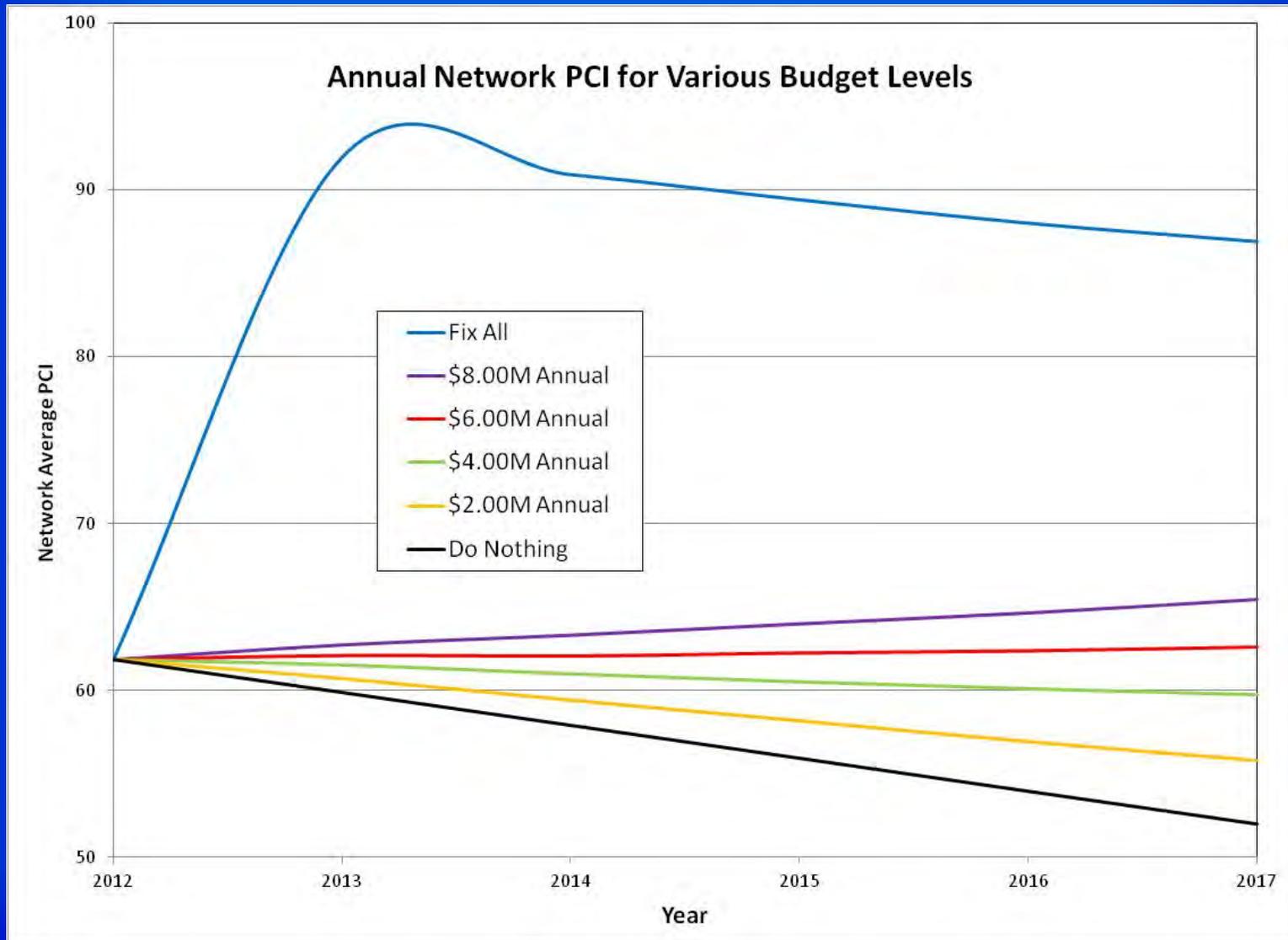
Pavement Type	Strength	Arterial	Collector	Residential
Asphalt	Weak	1.5	1.4	1.3
	Moderate	1.4	1.3	1.2
	Strong	1.3	1.2	1.1
Concrete	Weak	1.4	1.3	1.2
	Moderate	1.3	1.2	1.1
	Strong	1.2	1.1	1.0

**Priority = (100 - PCI) x PWF**

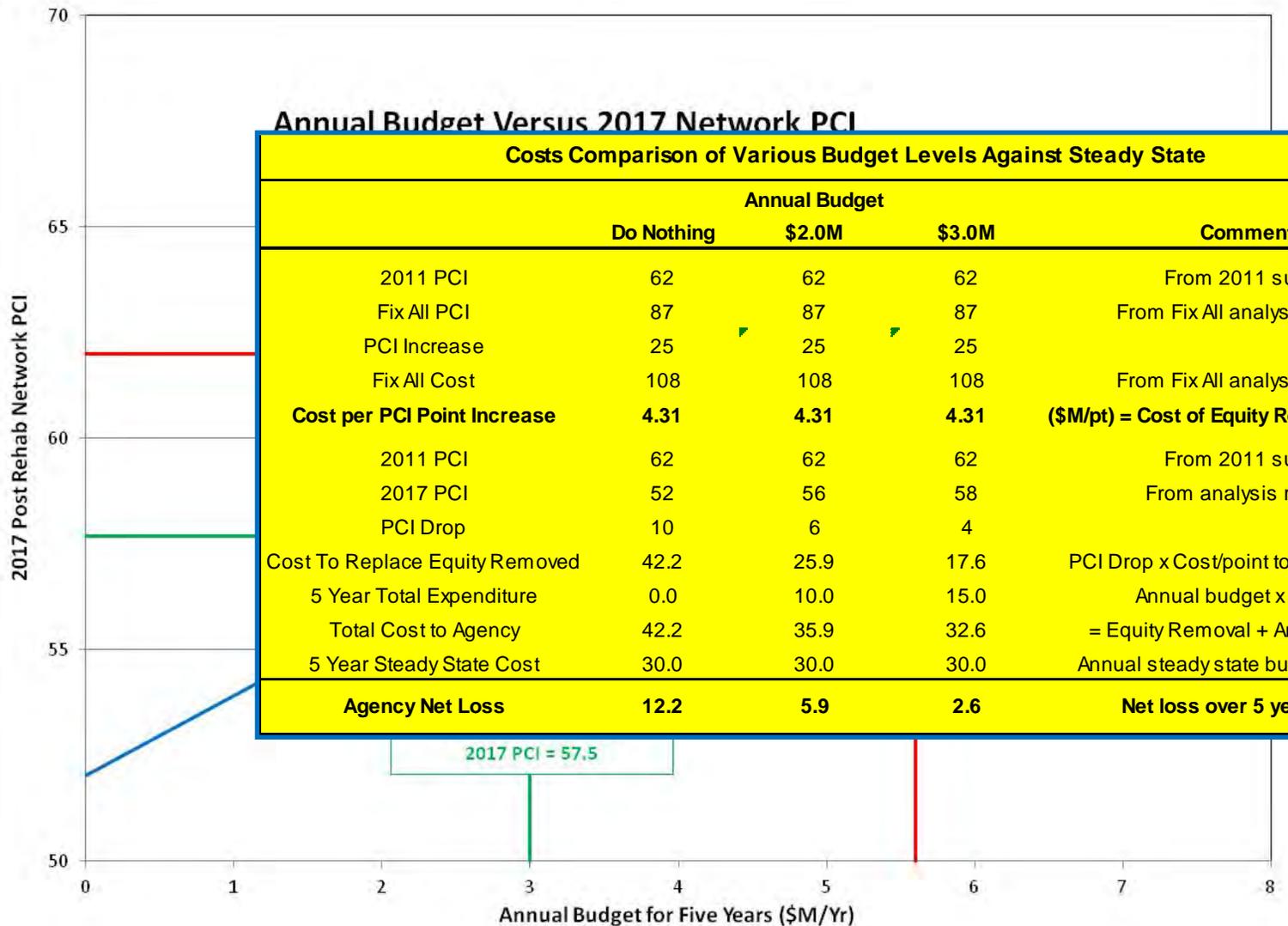
10	Asphalt	Slurry Seal			
20	Asphalt	Surface Treatment			
21	Asphalt	Surf Treat + RR			
22	Asphalt	Surf Treat + RR 2			
30	Asphalt	Thin Olay			
31	Asphalt	Thin Olay + RR			
32	Asphalt	Thin Olay + RR 2			
40	Asphalt	Moderate Olay			
41	Asphalt	Moderate Olay + RR			
42	Asphalt	Moderate Olay + RR 2			
50	Asphalt	Thick Olay			
51	Asphalt	Thick Olay + RR			
52	Asphalt	Thick Olay + RR 2			
60	Asphalt	Partial Reconstruction			
70	Asphalt	Full Reconstruction	0	10	25
510	Jointed Concrete	Localized PCC Repairs Hi	75	77	85
520	Jointed Concrete	Localized PCC Repairs Lo	70	72	75
530	Jointed Concrete	Localized Panel Replace	60	62	70
540	Jointed Concrete	Moderate Panel Replace	50	52	60
550	Jointed Concrete	Extensive Panel Replace	40	43	50
560	Jointed Concrete	PCC Partial Reconstruct	25	30	40
570	Jointed Concrete	PCC Full Reconstruction	0	10	25



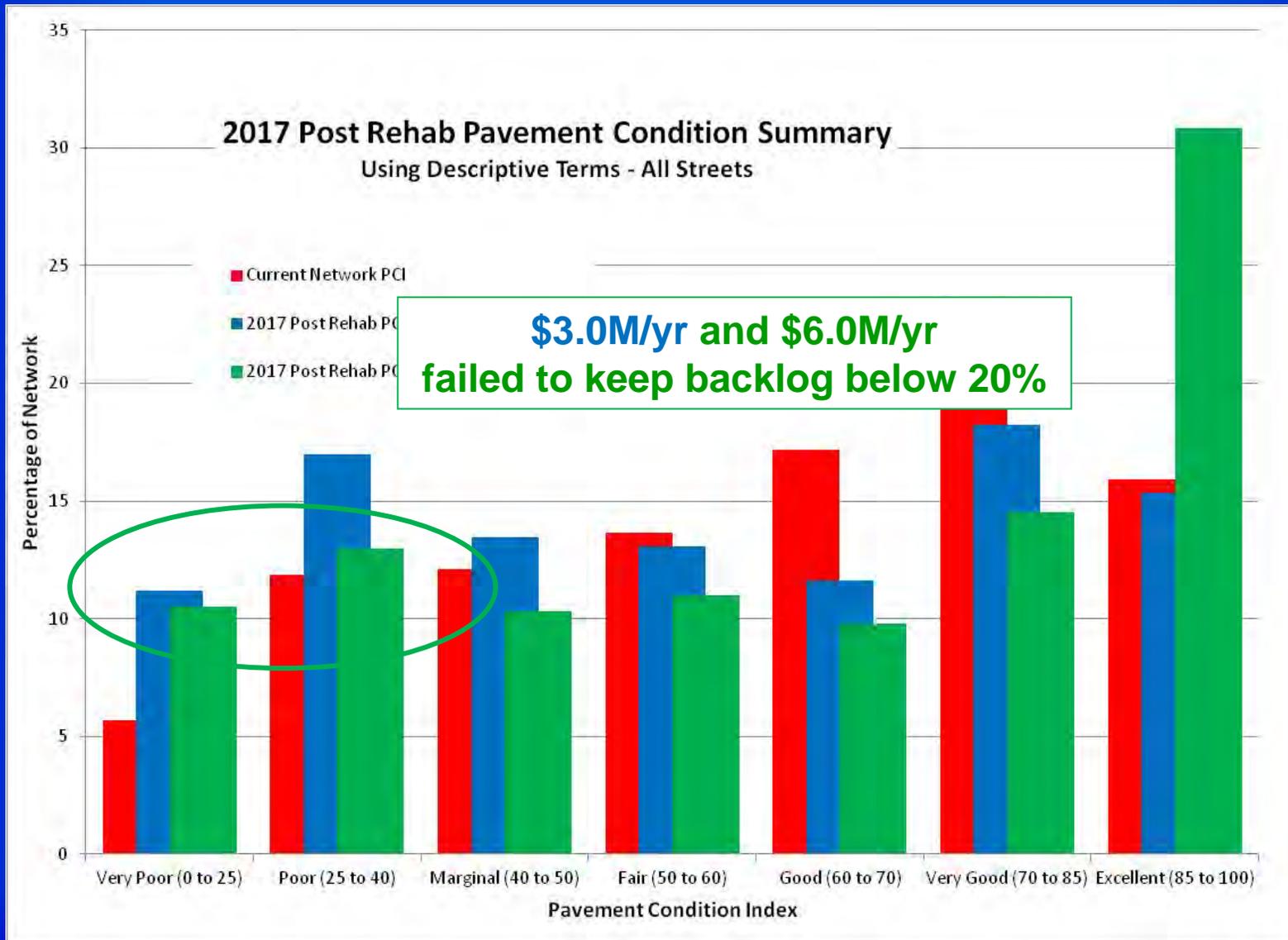
# Step 4.... Complete 5 Year Budget Analysis



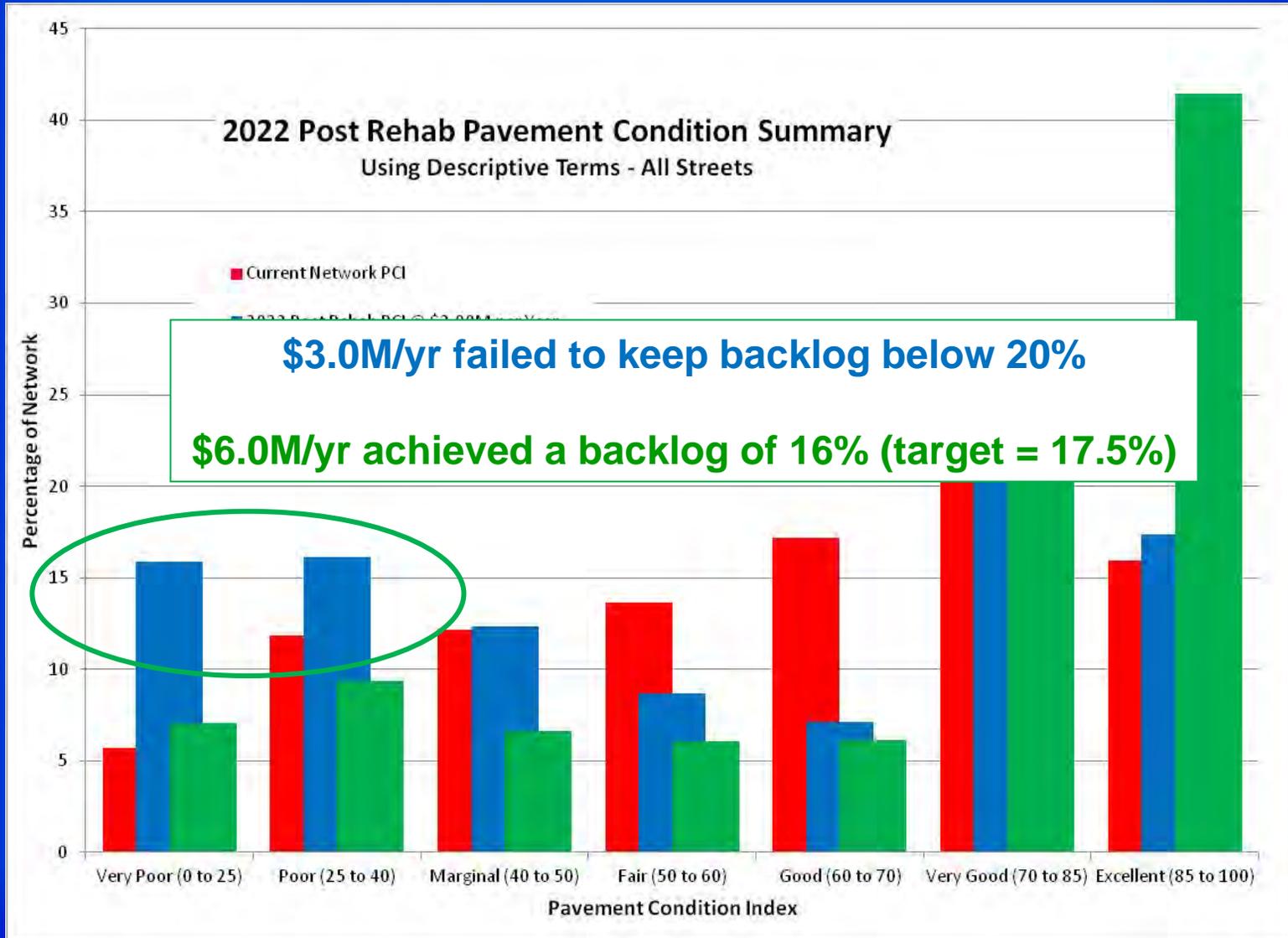
# Step 5.... Examine Results



# Step 5.... Examine Results and Program Effectiveness



# Step 5.... Examine 10 Year Backlog



# *City of Las Cruces Recommendations....*



1. Target OCI of 62 after 5 years  
**This equates to a \$5.6M annual budget**
2. Target Backlog < 17.5% after 10 years  
**This equates to a \$6.0M annual budget**
2. Additional long-term funding needs to be secured  
**Borrowing /bonding will not provide full solution – growth, inflation**
3. Budgets do not include inflation, growth or conversion of gravel roads to pavement
4. Steady – effective rehabilitation and maintenance on an annual basis saves the City money over deferred maintenance.

# Questions....



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TO BE UPDATED

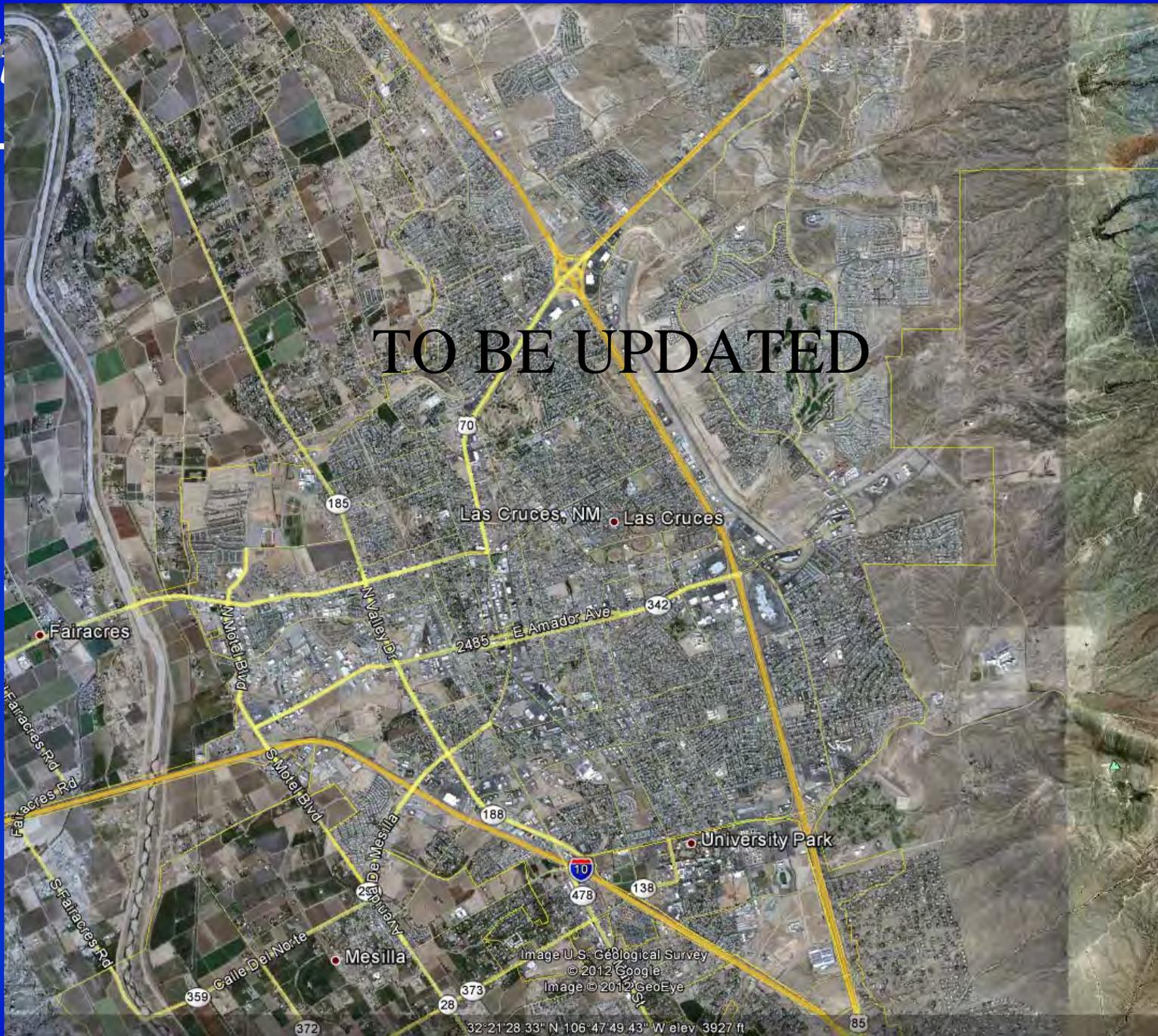


Image U.S. Geological Survey  
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32°21'28.33" N 106°47'49.43" W elev 3927 ft