

# Mobility Capital Improvement Programs (CIP)

Council Mobility Committee  
Dec. 7, 2016

# ATD PROGRAMS FUNDED THROUGH CIP

Programs	Examples
Corridor/Roadway Improvements	Smart Corridors, I-35 at 51 <sup>st</sup> St.
Safety	Intersection Improvements
Signals	Signals, PHBs, School Zones
Technology	Transit Signal Priority, Video Detection
Local Area Traffic Management	Speed Cushions, Median Islands
Active Transportation	Bike Lanes
Railroad Quiet Zones	Restrict train horn use 24/7

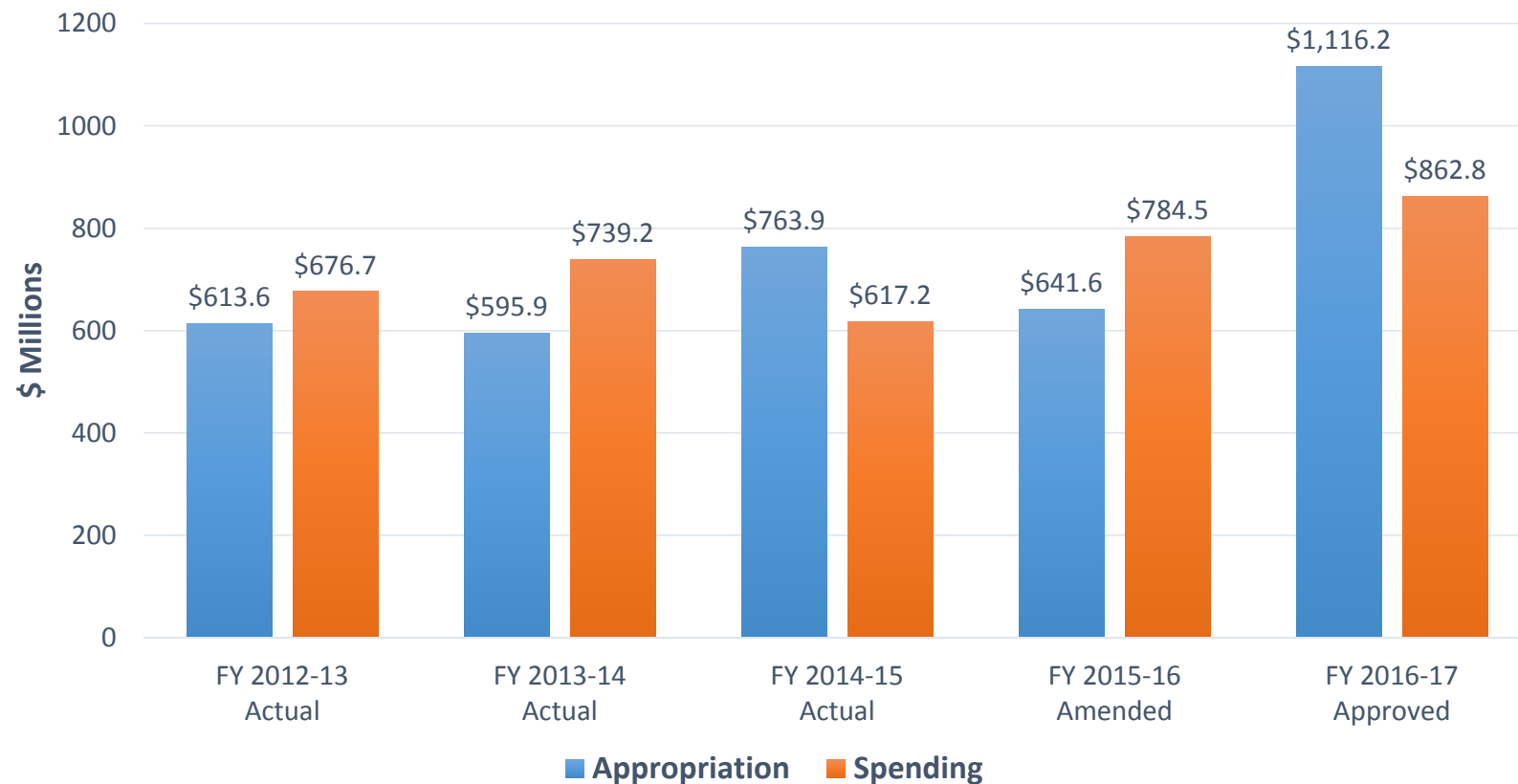
# PWD PROGRAMS FUNDED THROUGH CIP

Programs	Examples
Street Improvements	Colorado Street and Justin Lane Reconstruction Projects
Bridges, Culverts, & Structures Improvements	Barton Springs Road Bridge
Sidewalk Improvements	City Wide Construction and Rehabilitation
Urban Trail Improvements	Violet Crown Trail, MoPac Mobility Bridge
Neighborhood Partnering Program	Tillery Street Sidewalks, Powell Lane Sidewalks

# OPERATING BUDGET VS. CAPITAL BUDGET

Operating Budget	Capital Budget
Funds Day-to-Day Operations	Funds Capital Assets (Buildings, Infrastructure, Vehicles)
Annual Appropriations	Multi-year Appropriations
Primary Funding Sources: Taxes, Fees for Service, Grants	Primary Funding Sources: Debt, Transfer from Operating, Grants
\$3.7 Billion (Includes Debt Service and Transfers to Capital)	\$863 Million Spending Plan

# CAPITAL BUDGET APPROPRIATIONS VS. SPENDING

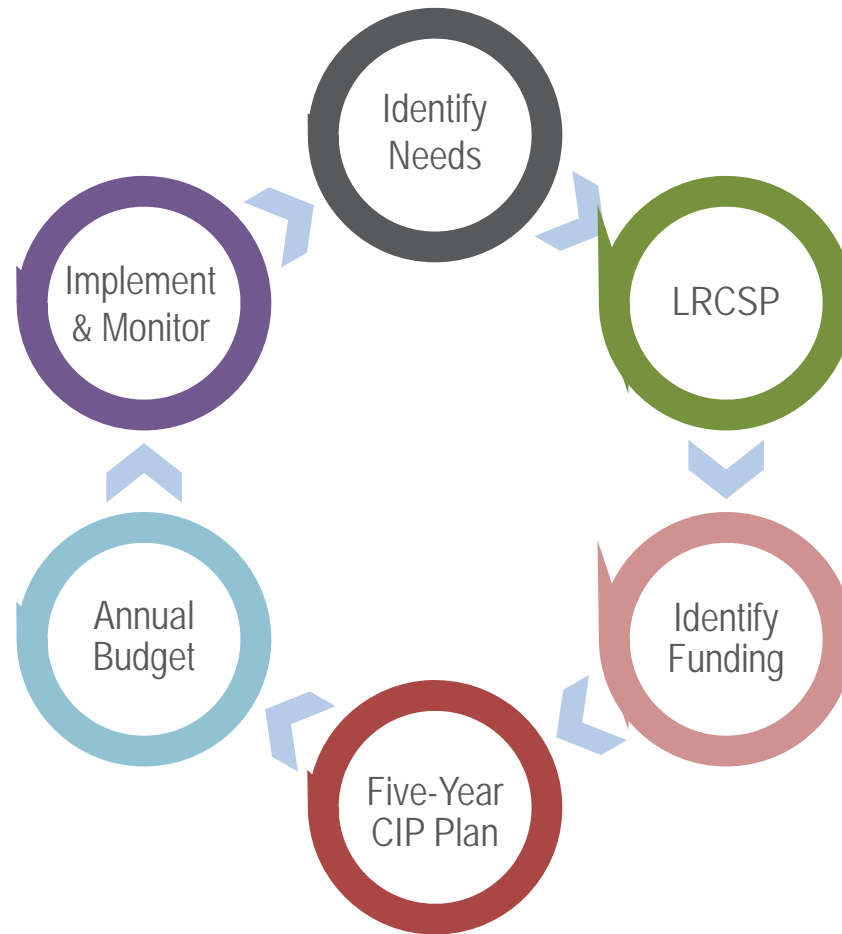


# TYPES OF DEBT

Types of Debt	Purpose	Voter Approval	Term
Public Improvement Bonds (PIBs)	Capital assets	Yes	20 Years
Certificates of Obligation (COs)	Real property; off-cycle capital needs	No	10 – 20 Years
Contractual Obligation (KOs)	Equipment	No	5 – 10 Years
Commercial Paper (CP)*	Capital assets	No	270 Days
Revenue Bonds*	System improvements; Refund CP to longer terms	No	20 – 30 Years

\* CP utilized by AE and AW; Revenue Bonds utilized by AE, AW, Aviation, and Convention Center.

# CAPITAL IMPROVEMENTS PROGRAM CYCLE



# ANNUAL CIP TIMELINE

January – April	<ul style="list-style-type: none"><li>• Annual CIP development kickoff</li><li>• Development of 5-year CIP spending plan</li></ul>
June	<ul style="list-style-type: none"><li>• Publication of 5-year Plan</li></ul>
June	<ul style="list-style-type: none"><li>• General Obligation Debt Schedule</li><li>• Certificates of Obligation Notice of Intent</li></ul>
Early August	<ul style="list-style-type: none"><li>• Proposed budget submitted to Council (including capital program appropriations)</li></ul>
August	<ul style="list-style-type: none"><li>• Bond Sale</li></ul>
September	<ul style="list-style-type: none"><li>• Budget adoption</li></ul>



CITY OF AUSTIN  
PUBLIC WORKS DEPARTMENT

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# Prioritizing Street Renewal Projects

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CONNECTING YOU  
ALL AROUND AUSTIN



# Street Assets

## Basics

- Lane Mile Definition
- Data Collection
- Street Grades

## Austin's Streets

- Street Inventory
- Benchmarking Austin
- Pavement Maintenance
- Pavement Life Cycle

## Prioritization

- Pavement Management
- Prioritization Factors
- Coordination



# Basics

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Lane Mile Definition  
Data Collection  
Street Grades

# Basics

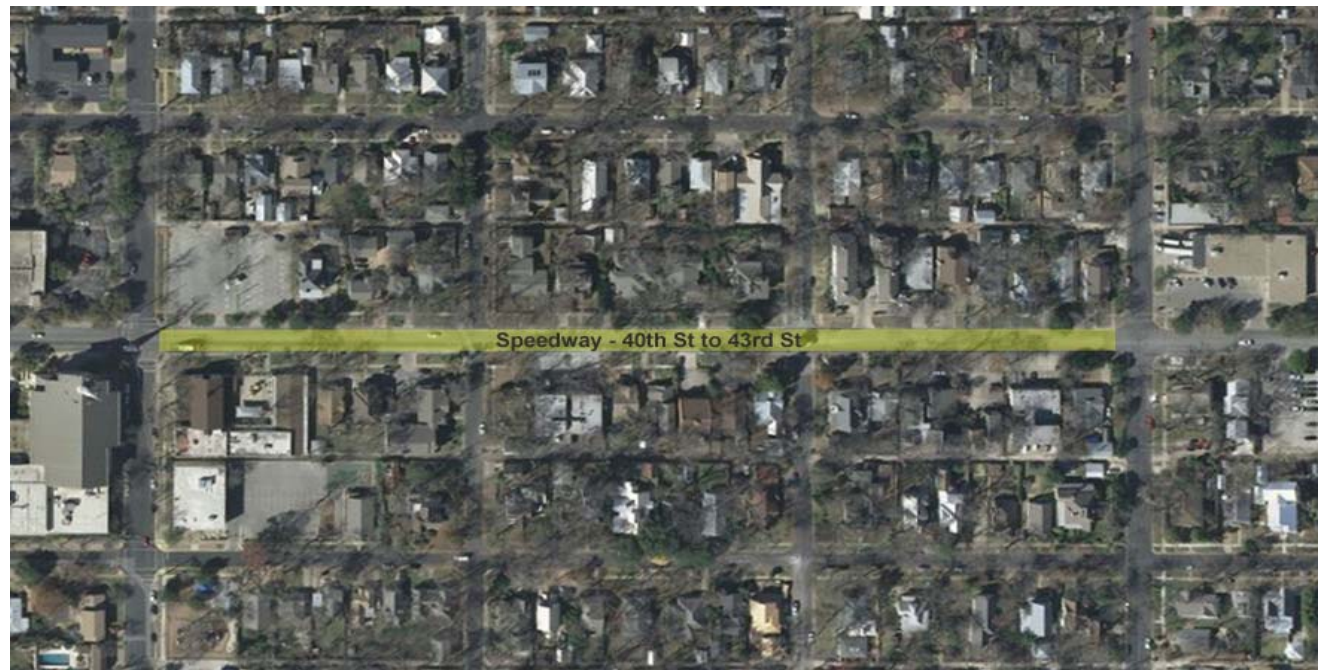
## Lane Mile

Data Collection  
Street Grades

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A Lane Mile (LM) is defined by the area of a 10' lane, one mile long.

$$\begin{aligned} 1 \text{ LM} &= 10' \times 5,280' \\ &= 52,800 \text{ SF} \end{aligned}$$



Example: Speedway from 40<sup>th</sup> St to 43<sup>rd</sup> St  
 $40' \times 1,320' = 52,800 \text{ SF} = 1.0 \text{ LM}$

# Basics

## Pavement Data Collection (PDC)

New street condition data is gathered by a certified contractor on half (50%) of the street network each year.

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## Pavement Data

- 1) **Ride Quality – International Roughness Index (IRI) – ASTM Standards E950, E1926**
- 2) **Surface Distresses – Pavement Condition Index (PCI) – ASTM Standard D6433**

Distresses: 4 Primary Cracking Types

- Alligator Cracking
- Block Cracking
- Longitudinal Cracking
- Transverse Cracking

*\*ASTM – American Society of Testing and Materials*

City of Austin | Public Works Department





# Basics

Lane Mile  
Data Collection  
Street Grades

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## Street Grades – Condition Definitions

<u>Condition Grade</u>	<u>General Description</u>
<b>"A" – Excellent</b>	Very Smooth Ride
<b>"B" – Good</b>	Smooth Ride
<b>"C" – Fair</b>	Acceptable Ride (may have minor roughness)
<b>"D" – Poor</b>	Moderately Rough Ride
<b>"F" – Failed</b>	Very Rough Ride

# Basics

Lane Mile  
Data Collection  
**Street Grades**

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## **A – Excellent Streets**

Very Smooth Ride

Street should need only  
preventative maintenance  
(PM).





# Basics

Lane Mile  
Data Collection  
Street Grades

## B – Good Streets

Smooth Ride

Street should primarily need only preventative maintenance (PM), may need a few minor spot repairs.



# Basics

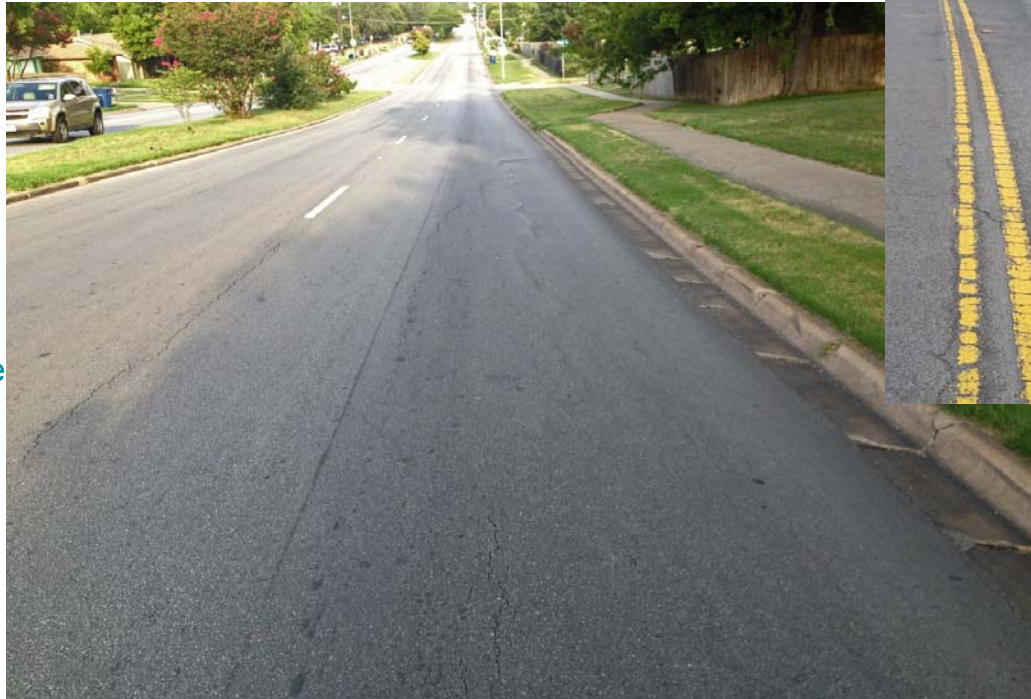
Lane Mile  
Data Collection  
**Street Grades**

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## C – Fair Streets

Acceptable Ride (may have minor roughness)

Street still preserved primarily by preventative maintenance (PM); however, it may need more spot repairs to hold in acceptable condition.





# Basics

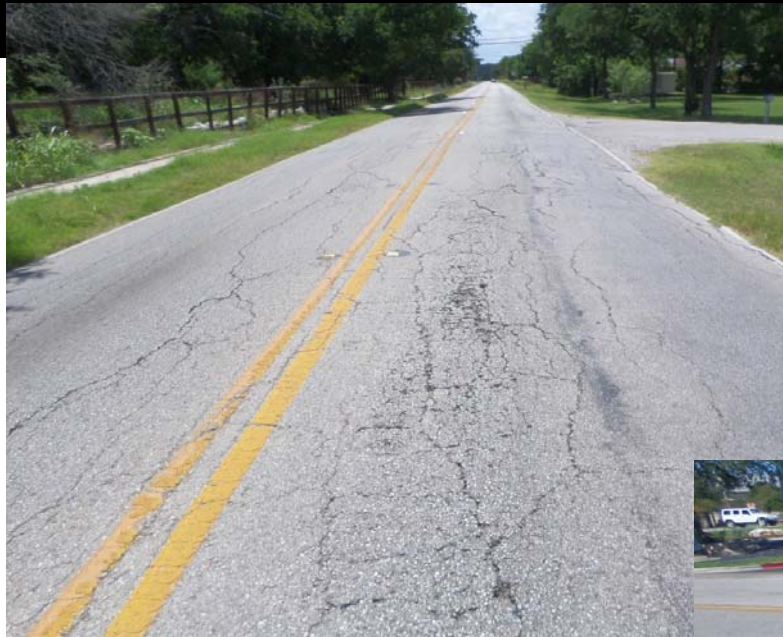
Lane Mile  
Data Collection  
**Street Grades**

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## D – Poor Streets

Moderately Rough Ride

Street is in less than desirable condition and has an unsatisfactory ride.



# Basics

Lane Mile  
Data Collection  
**Street Grades**

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## **F – Failed Streets**

Very Rough Ride

Street does not have an acceptable ride even at reduced speeds.  
Reconstruction is necessary to improve the street.



# Pavement Conditions in Austin

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[Austin's Street Inventory](#)

[Street Condition](#)

[Age of Streets](#)

[Streets by District](#)

# Street Inventory

## Complete FY16 Street Network

Satisfactory (A,B,C)	1,550 LM (20%)	A – Excellent	5,956 LM (78%)
	2,317 LM (30%)	B – Good	
	2,089 LM (28%)	C – Fair	1,707 LM (22%) Unsatisfactory
	1,090 LM (14%)	D – Poor	
(D,F)	<u>617 LM</u> (8%)	F – Failed	
	7,663 LM		

*condition figures as of September 2016*

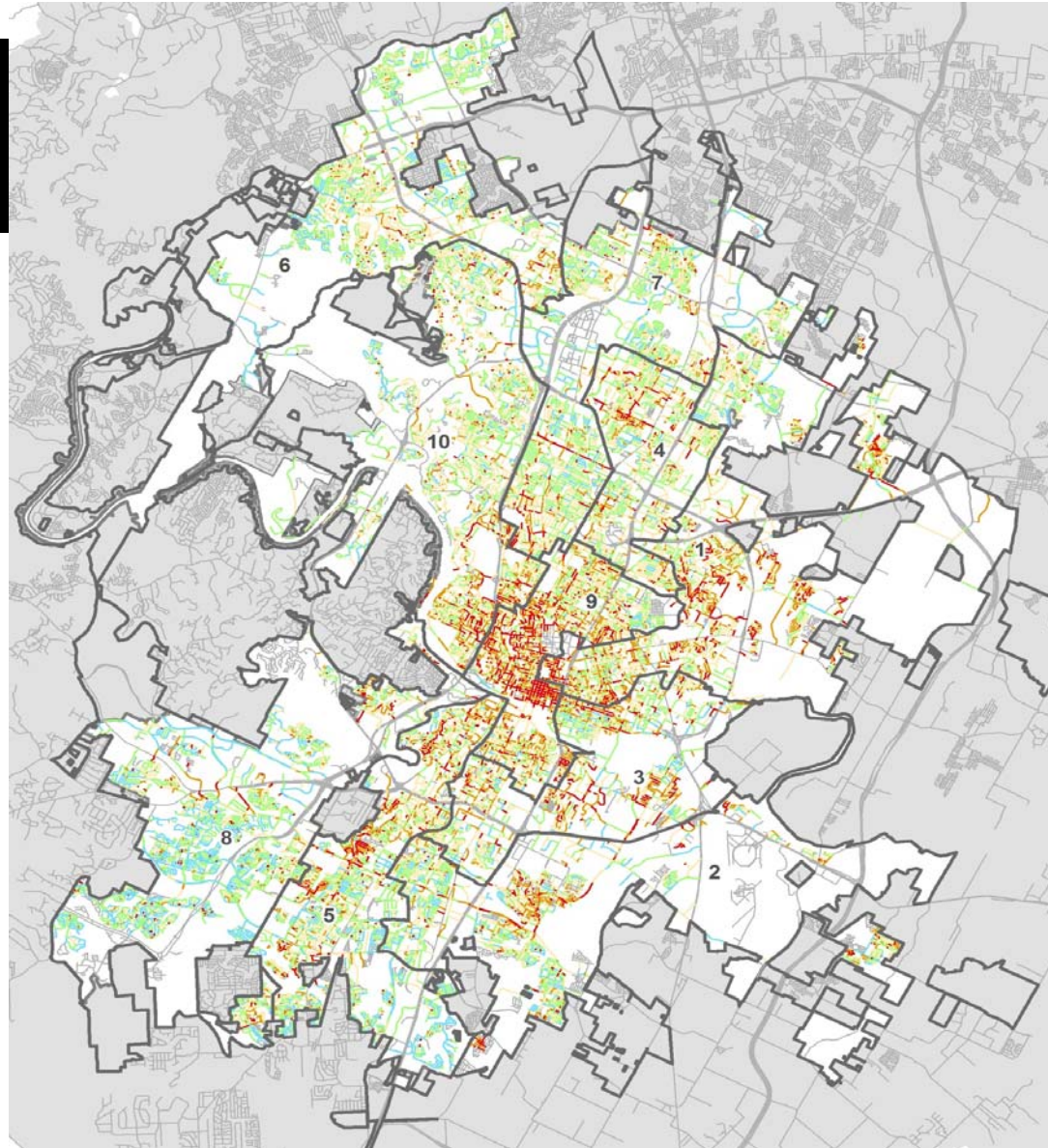


# Street Condition

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## Condition Grades

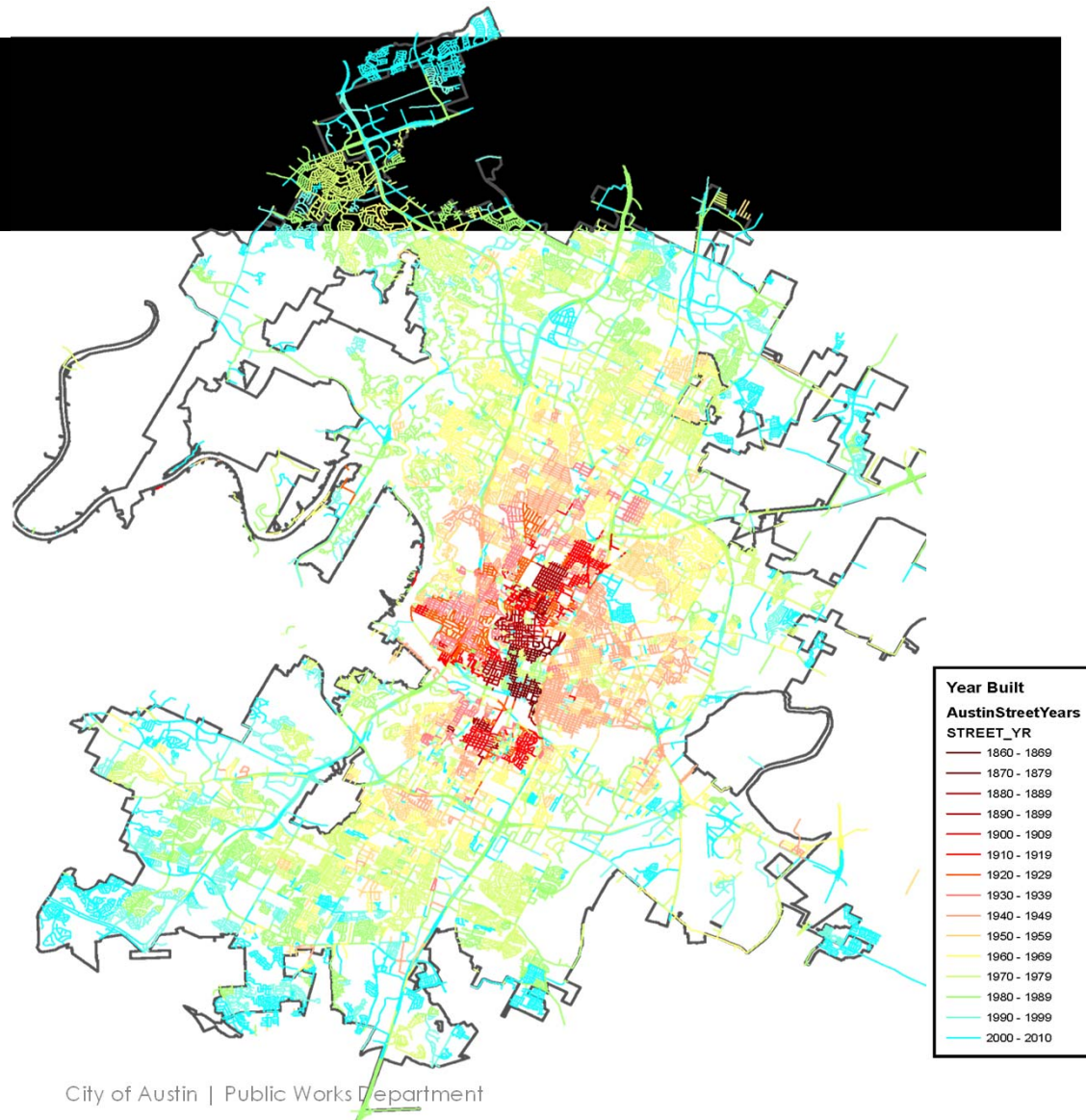
Blue – Excellent  
Green – Good  
Yellow - Fair  
Orange – Poor  
Red - Failed



# Age of Streets

## Street Ages Key

Blue – 0 to 20 years  
Green – 20 to 40 years  
Yellow – 40 to 50 years  
Orange – 60 to 80 years  
Red – older





# Street Inventory by District

District	1	2	3	4	5	6	7	8	9	10	Network
<b>A</b>	115 LM 12%	127 LM 18%	83 LM 14%	73 LM 15%	148 LM 19%	259 LM 34%	238 LM 27%	308 LM 34%	44 LM 6%	155 LM 18%	1,550 LM 20%
<b>B</b>	234 LM 25%	199 LM 28%	148 LM 26%	167 LM 33%	228 LM 29%	309 LM 41%	301 LM 35%	319 LM 36%	119 LM 16%	293 LM 33%	2,317 LM 30%
<b>C</b>	282 LM 31%	226 LM 32%	179 LM 31%	161 LM 32%	228 LM 29%	145 LM 19%	211 LM 24%	171 LM 19%	222 LM 29%	264 LM 30%	2,089 LM 28%
<b>D</b>	180 LM 20%	108 LM 15%	107 LM 18%	72 LM 14%	120 LM 15%	38 LM 5%	80 LM 9%	61 LM 7%	207 LM 27%	117 LM 13%	1,090 LM 14%
<b>F</b>	106 LM 12%	53 LM 7%	63 LM 11%	30 LM 6%	68 LM 8%	10 LM 1%	40 LM 5%	32 LM 4%	167 LM 22%	48 LM 6%	617 LM 8%
<b>Total</b>	917 LM	713 LM	580 LM	503 LM	792 LM	761 LM	870 LM	891 LM	759 LM	877 LM	7,663 LM
<b>Percent</b>	12%	9%	8%	7%	10%	10%	11%	12%	10%	11%	

District	1	2	3	4	5	6	7	8	9	10	Network
<b>Average Age</b>	43 years	30 years	49 years	50 years	36 years	25 years	42 years	24 years	67 years	48 years	41 years
<b>Satisfactory</b>	68%	78%	71%	80%	77%	94%	86%	89%	51%	81%	78%
<b>Unsatisfactory</b>	32%	22%	29%	20%	23%	6%	14%	11%	49%	19%	22%

Districts 1, 3, 9 share the oldest core area of Austin and are generally in poorer condition

Additionally, District 9 contains Downtown and the oldest streets

Districts 2, 4, 5, 10 vary from 30 to 50 years old and have conditions near the network average

Districts 6, 7, 8 contain the newer growth areas and are generally in better condition

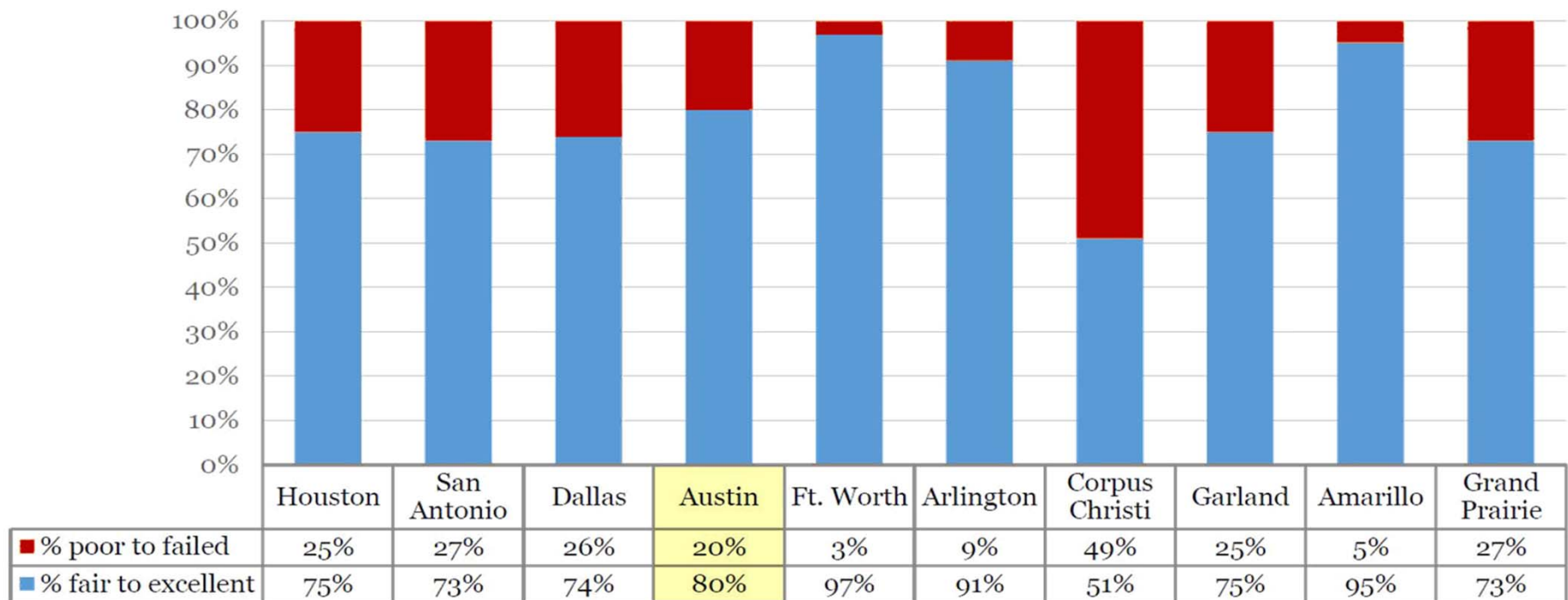
*condition figures as of September 2016*

# Benchmarking Austin

## Pavement Quality Statistics for the Major Texas Cities

source: 2016 Corpus Christi Street Survey

Percentages of Satisfactory and Unsatisfactory Roadways



# Pavement Maintenance

Maintenance  
Rehabilitation  
Reconstruction

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## Repair Maintenance

Repair or Corrective Maintenance typically fixes spot problems. Repairs are funded by the Operating Budget (Transportation User Fee).

Examples: Potholes, Level-up (small distortions), and Spot Repairs

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## Preventative Maintenance

Preventative Maintenance surface treatments protect the pavement surface from the effects of aging, oxidation, and weathering. Most treatments also seal cracks in the surface to keep water out of the pavement and further extend its useful life. Preventative Maintenance is funded by the Operating Budget (Transportation User Fee).

Examples: Crack Sealing, Fog Seal, Seal Coat, Slurry Seal, Overlay

## Crack Sealing

Purpose: seal surface cracks to keep water out



before



after



## Fog Seal

Purpose: protect surface from aging



before



after

## Slurry Seal

Purpose: seal cracks to keep water out; protect surface from aging



before



after



## Seal Coat

Purpose: seal cracks to keep water out; protect surface from aging



before



after

## Overlay

Purpose: protect surface; improve rideability and restore smoothness



before



after



# Pavement Maintenance

Maintenance  
**Rehabilitation**  
Reconstruction

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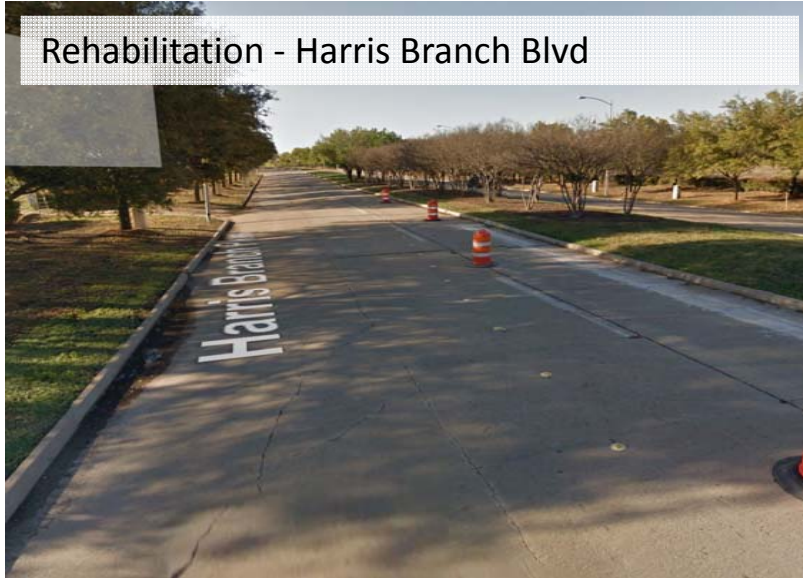
## Street Rehabilitation

A street should be Rehabilitated when the pavement structure has deteriorated to a point where routine preventative maintenance (PM) is no longer adequate.

Rehabilitation includes full-depth repairs (FDR) to restore all damaged areas of the street prior to renewing the entire surface with an overlay. Rehabilitation is typically limited to less than 50% FDRs, but may also include damaged or ponding curb & gutter, valley gutters, and other spot structural improvements.

Street Rehabilitation is funded by the Capital Budget (GO Bonds).

Rehabilitation - Harris Branch Blvd



before



after





Rehabilitation  
S Lamar Blvd  
before/after



before



after

# Pavement Maintenance

Maintenance  
Rehabilitation  
**Reconstruction**

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## Street Reconstruction

Street Reconstruction is warranted when a street deteriorates to a point where more than 50% of the pavement requires full-depth repair due to generalized failures.

Full street reconstruction consists of replacing the entire depth of the pavement section. Streets typically have an asphalt surface, granular base course, and may also include some stabilization layers to control underlying swelling and shrinking soils.

Street Reconstruction is funded by the Capital Budget (GO Bonds).



## Street Reconstruction



Loyola Lane

before



after



Todd Lane



## Street Reconstruction



before



after



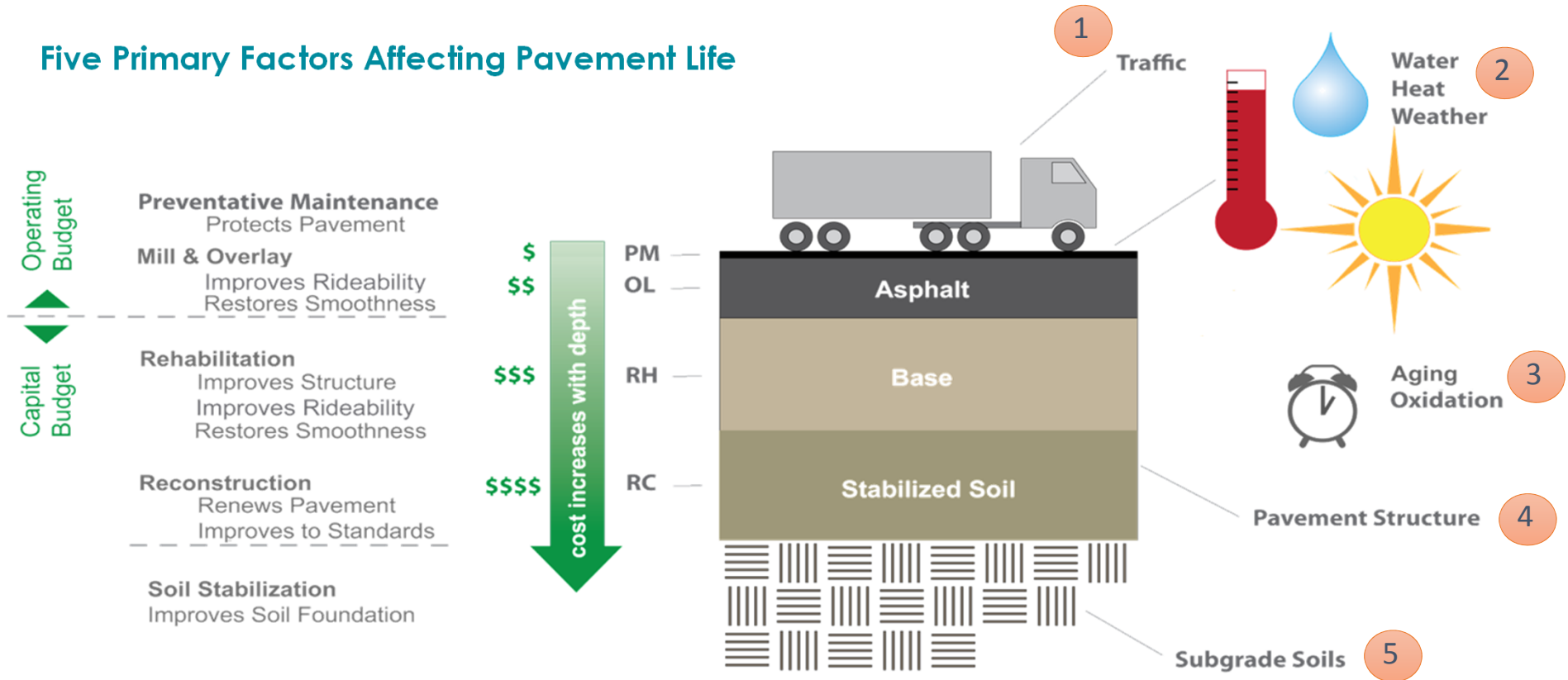


# Street Activity Strategy by Source

Source	Strategy Type	Treatment	Grade(s)	Purpose
Capital	Reconstruction	Reconstruction – Downtown	F	Restore pavement back to new condition
		Reconstruction - Arterial	F	Restore pavement back to new condition
		Reconstruction - Collector	F	Restore pavement back to new condition
		Reconstruction - Residential	F	Restore pavement back to new condition
	Rehabilitation	Major Rehabilitation	F	Repair spot damage, improve rideability, restore smoothness
		Minor Rehabilitation	D	Repair spot damage, improve rideability, restore smoothness
O&M	Maintenance	Structural Overlay	D	Repair spot damage, improve rideability, restore smoothness
		Overlay	C, D	Protect surface, improve rideability, restore smoothness
		Thin Overlay	C	Protect surface, improve rideability, restore smoothness
		Cape Seal	B, C	Seal cracks from water, protect surface from aging
		Microsurfacing	A, B, C	Seal cracks from water, protect surface from aging
		Slurry Seal	A, B	Seal cracks from water, protect surface from aging
		Seal Coat	A, B, C	Seal cracks from water, protect surface from aging
		Fog Seal	A, B	Protect surface from aging
		Crack Seal	A, B, C	Seal cracks from water

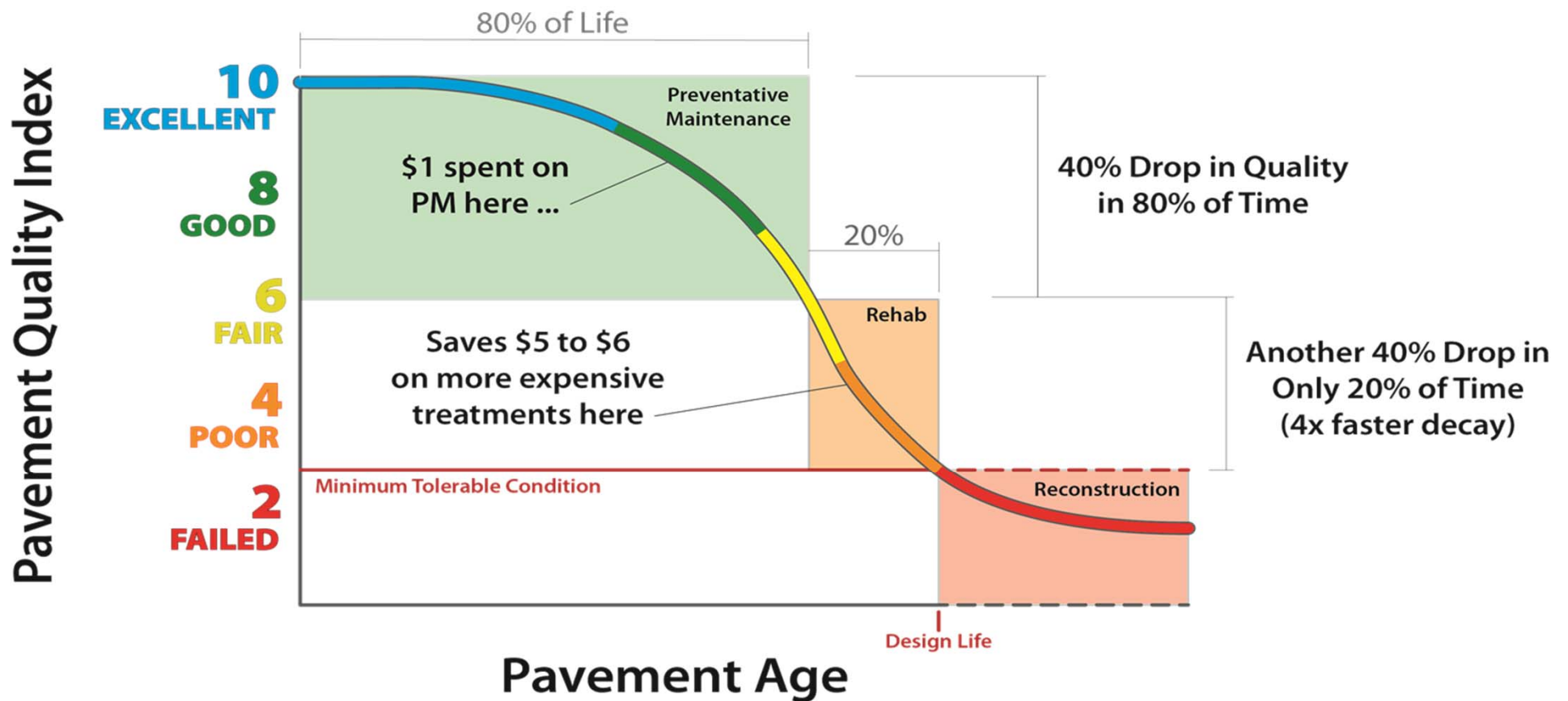
# Pavement Life Cycle

## Five Primary Factors Affecting Pavement Life



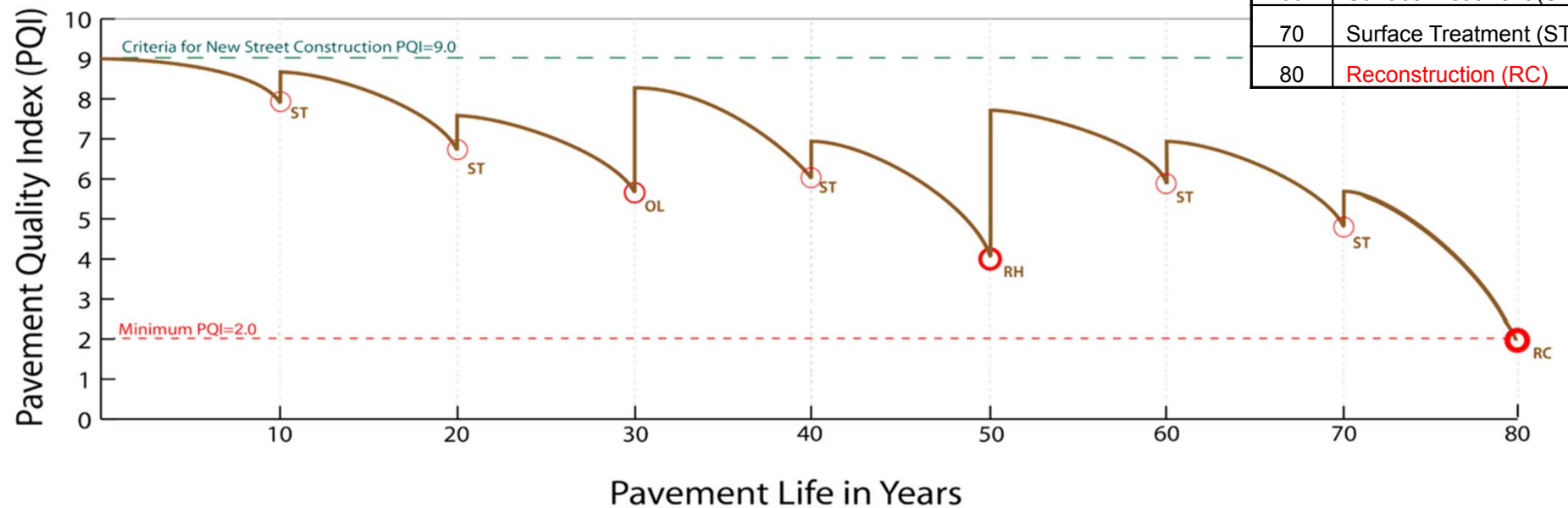


# Cost Savings with Preventative Maintenance



# Pavement Life Cycle

## Typical Pavement Life Cycle with Preventative Maintenance



# Maintenance Cycle

## 10% PM GOAL

Our 10% PM Goal has its basis in our preventative maintenance cycle. We try to touch every street at least once every 10 years with a PM surface treatment.

Thus, the 10% goal is from the intent to treat 1/10 of the network each year and results in a 10 year cycle for the network.

\$195 Million was invested in Preventative Maintenance over the last 10 years covering a total of 7,236 LM

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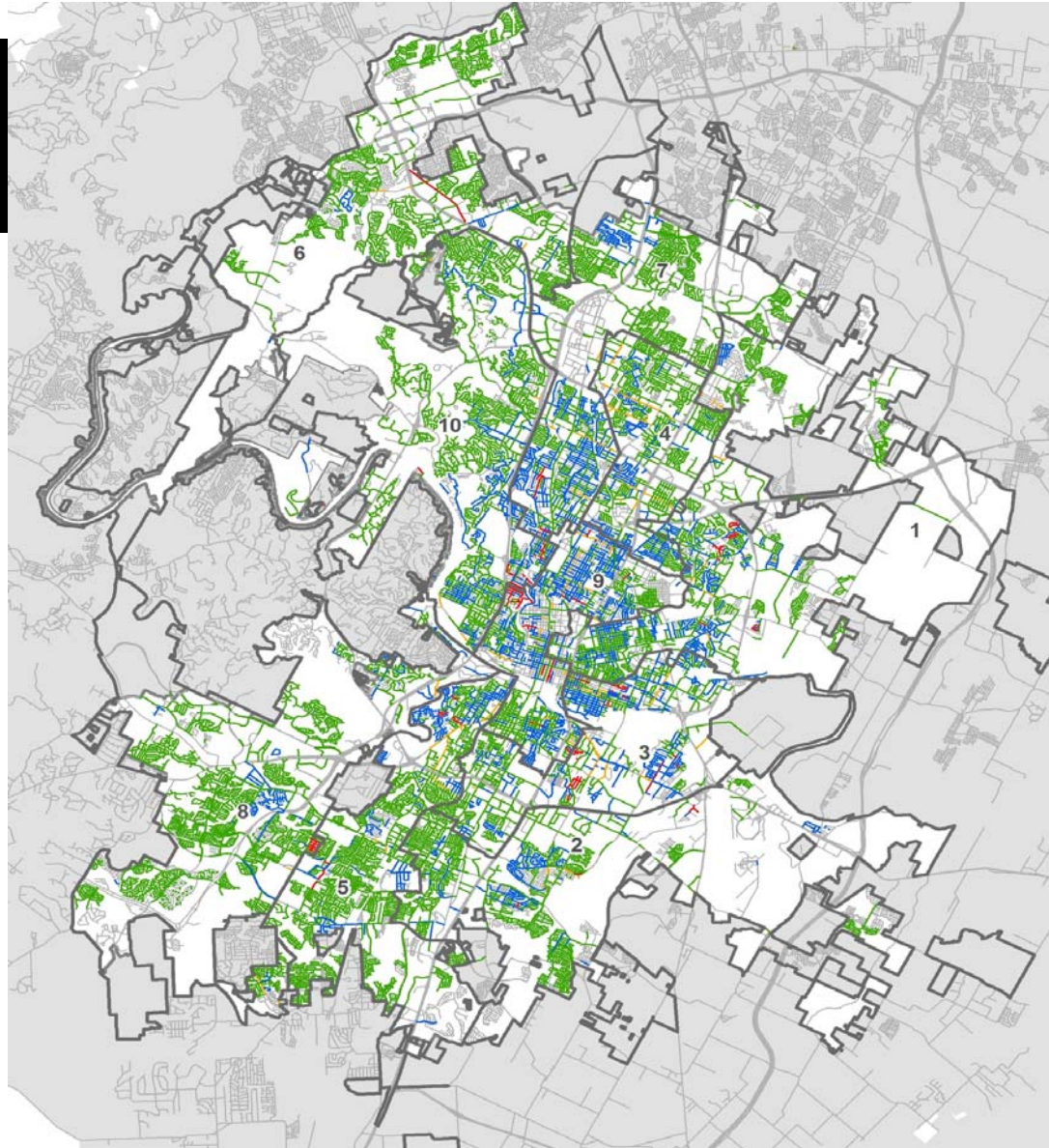
### FY2007-16 10-year Maintenance History

Green – Surface Treatments

Blue – Overlays

Orange – Rehabilitation

Red – Reconstruction





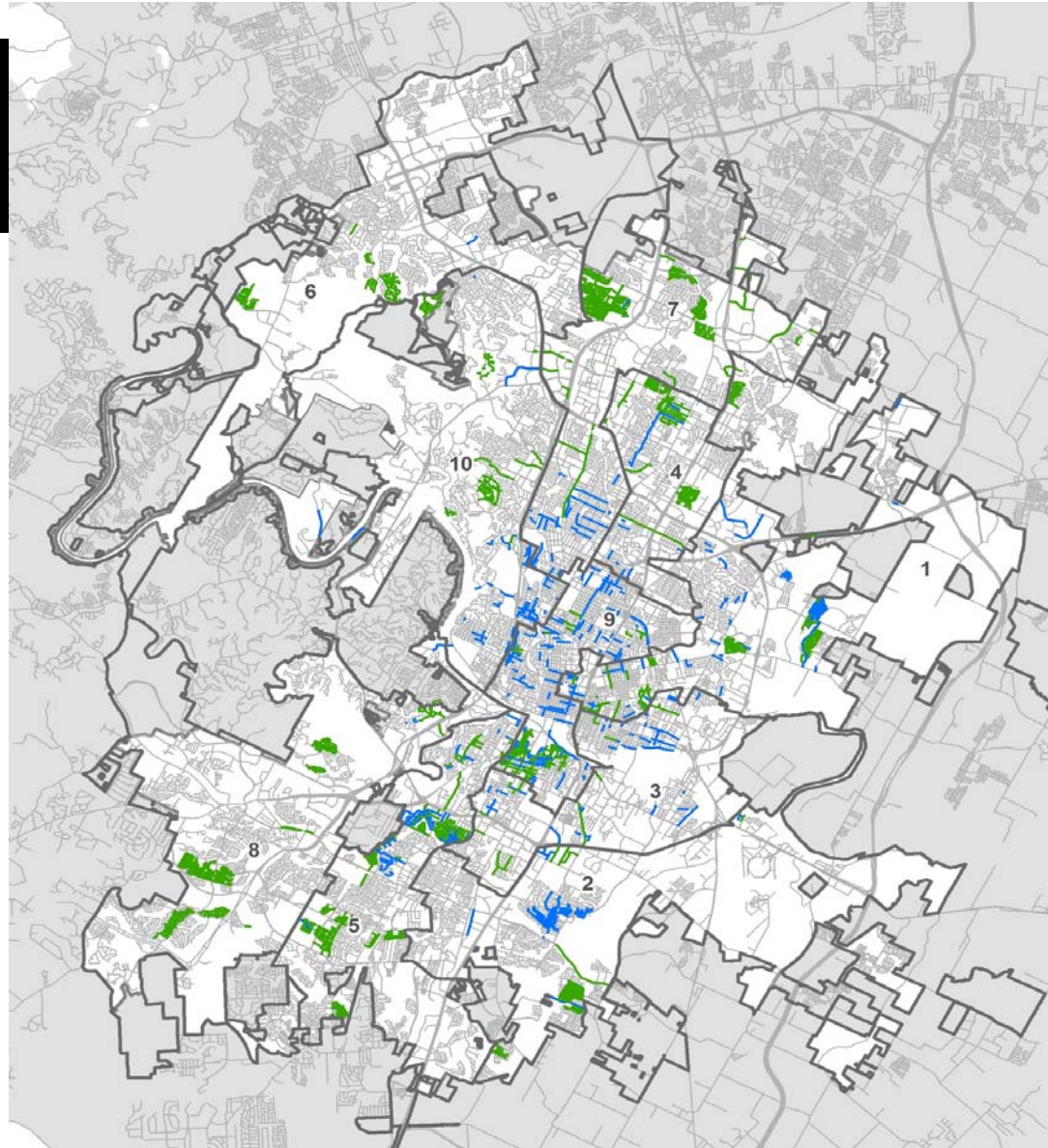
# Street Maintenance Service Plan

FY17 Preventative Maintenance  
\$16.2 Million covering 597 LM

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Street Maintenance Service Plan for FY17  
by District

Green – 437 LM Surface Treatments  
Blue – 160 LM Overlays



# Approximate Cost of Street Activities

2016 Average Street Activity Costs (Pavement Only)			
Source	Strategy Type	Cost/Lane Mile	Treatment
Capital	Reconstruction	\$1,250,000/LM	Reconstruction – Downtown
		\$750,000/LM	Reconstruction - Arterial
		\$500,000/LM	Reconstruction - Collector
		\$400,000/LM	Reconstruction - Residential
	Rehabilitation	\$250,000/LM	Major Rehabilitation
		\$150,000/LM	Minor Rehabilitation
O&M	Maintenance	\$90,000/LM	Structural Overlay
		\$75,000/LM	Overlay
		\$50,000/LM	Thin Overlay
		\$33,000/LM	Cape Seal
		\$25,000/LM	Microsurfacing
		\$20,000/LM	Slurry Seal
		\$18,000/LM	Seal Coat
		\$6,000/LM	Fog Seal
		\$1,500/LM	Crack Seal



# Street Prioritization

## Methodology used by Pavement Management Information System (PMIS) to Select and Prioritize Street Maintenance and Capital Projects

- Initialize Multi-Constraint Analysis
  - Establish Budgets
  - Set Performance Goals
- Select Benefit Calculation
  - Maximize Distress or Roughness Index
- Select Treatment Candidates based on Condition Data
  - PMIS uses Decision Trees to select the correct treatments
  - Calculates a Benefit value for each treatment
- Perform Optimization Analysis
  - PMIS searches for the best set of candidate maintenance and reconstruction projects to maximize the total Benefit within budget and performance constraints



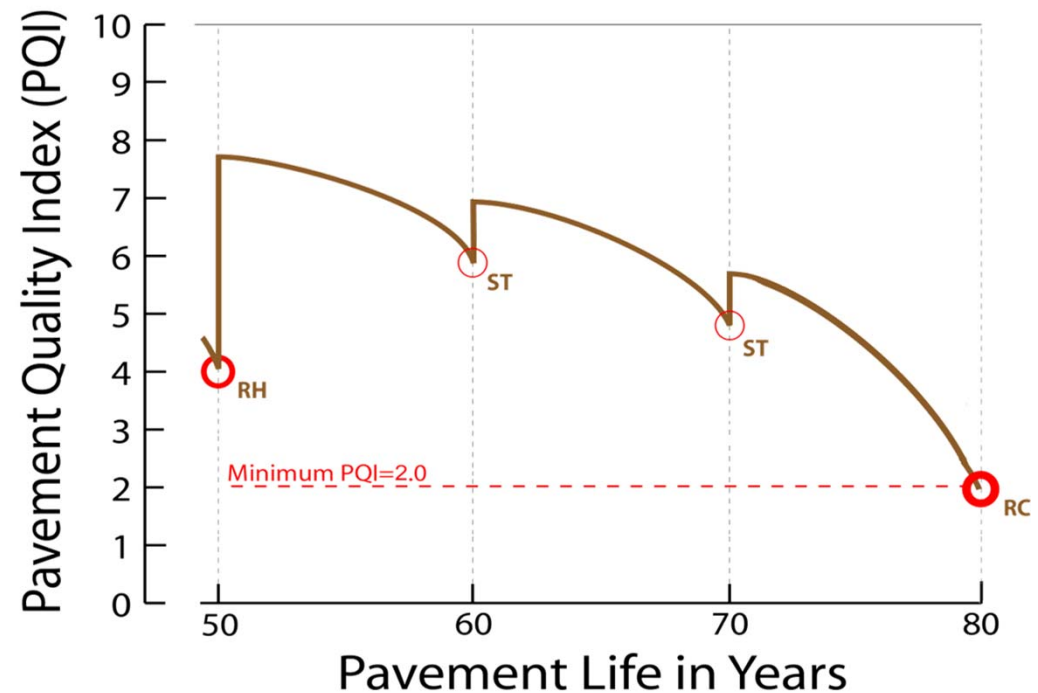
# Street Prioritization

## Methodology used by Pavement Management Information System (PMIS) to Select and Prioritize Street Maintenance and Capital Projects

The two most critical factors for selecting street reconstruction projects are

- 1) Extensive Street Roughness
- 2) Severe Damage and Distress

No maintenance strategy other than complete reconstruction will be practical or cost-effective after the PQI deteriorates down to the minimum tolerable level.



# Plan Development Process

## PMIS Candidate Projects

The Pavement Management process identifies a proposed annual maintenance plan and new CIP project candidates.

## Partially Designed or Shovel-Ready

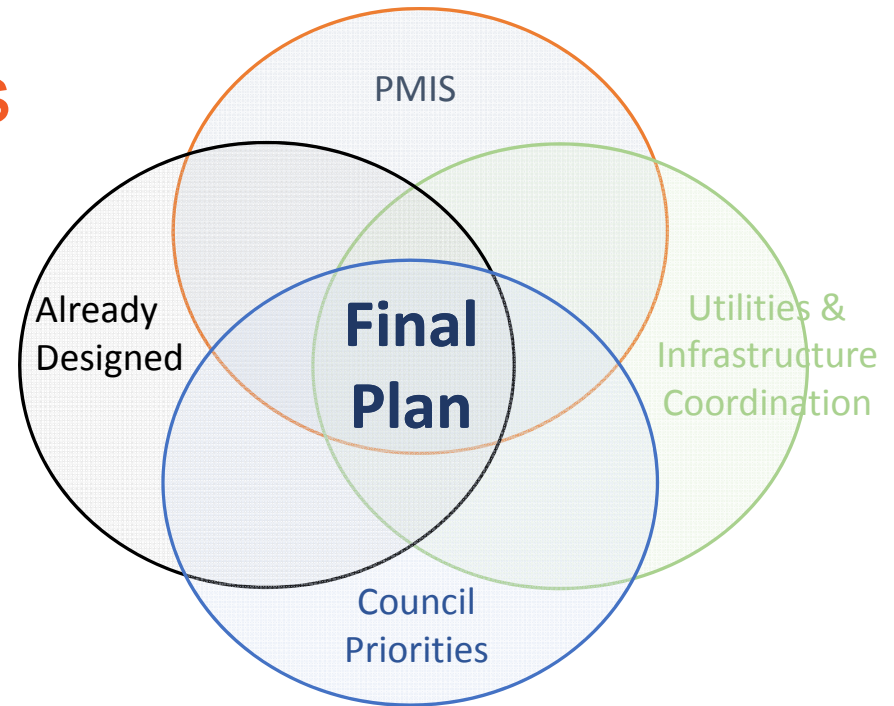
A higher priority is given to projects with some or all design work completed.

## Council Priorities

City Council policies and concerns are given priority in project selection.

## Utilities & Infrastructure Coordination

Coordination processes maximize benefits and attempt to minimize disruption.



# Coordination Processes

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## Objective of Coordination

Coordinating work between the City departments and our partnering agencies is cost efficient and maximizes dig-once opportunities.

## Annual Service Plan

SBO publishes an Annual Service Plan of all planned street maintenance activities. This plan is shared with all infrastructure departments within the City to coordinate all capital projects and Citywide O&M.

## Austin Water

A special interdepartmental coordination and clearance process is used between PWD and AWU for all Overlay, Rehabilitation, and Reconstruction projects to assure each is adequately protected.



# Coordination Processes

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## Austin Transportation

The surface treatment plans are shared and coordinated with the Bike Program and ATD planning and engineering staff to assure striping reconfigurations for bike lanes and other transportation needs are addressed.

## Other Major Utilities

Monthly Asset Management Coordination meetings using GIS mapping and the IMMPACT system reveals dig once opportunities with the other major utilities and partnering departments/agencies and coordination with Special Events.

## Coordination Outside the Agency

The Annual Service Plan and CIP projects are distributed through the Austin Utility Location and Coordination Committee (AULCC) for additional coordination with franchise utilities, partnering agencies, and all City departments.

## Public

The Annual Service Plan is posted and available for public download on the internet.



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PUBLIC WORKS DEPARTMENT  
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# QUESTIONS + ANSWERS

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