

# Memorandum



DATE March 28, 2014

TO Honorable Mayor and Members of the City Council

SUBJECT **Status of Street Condition and Repair Work Briefing April 2, 2014**

The Status of Street Condition and Repair Work briefing will be presented at the April 2, 2014, City Council meeting. The briefing materials are attached for your review.

Please let me know if you have any questions or need additional information.



Jill A. Jordan, P.E.  
Assistant City Manager

## Attachment

c: A.C. Gonzalez, City Manager  
Warren M.S. Ernst, City Attorney  
Craig D. Kinton, City Auditor  
Rosa A. Rios, City Secretary  
Daniel F. Solis, Administrative Judge  
Ryan S. Evans, (I) First Assistant City Manager  
Forest E. Turner, Assistant City Manager  
Joey Zapata, Assistant City Manager  
Charles M. Cato, (I) Assistant City Manager  
Theresa O'Donnell, (I) Assistant City Manager  
Jeanne Chipperfield, Chief Financial Officer  
Shawn Williams, (I) Public Information Officer  
Elsa Cantu, Assistant to the City Manager – Mayor & Council

# Status of Street Condition and Repair Work

Presented to the  
Dallas City Council

April 2, 2014



# Purpose

Demonstrate the way streets are rated, the departments that work on streets, the street's condition and what is needed to maintain them

# Outline

- Life cycle of streets
- Rating streets condition
- Condition of streets and the City's goals
- Work plan for maintaining and improving streets
- Requirements to maintain and/or improve our streets

# Life Cycle of a Street

- Typical life of street - 20 to 50 plus years depending on:
  - Pavement design
  - Traffic loads
  - Soil conditions
  - Weather/precipitation patterns
  - Maintenance schedule
- National records reveal that streets, without proactive and major maintenance programs, degrade annually at the following rates:
  - Satisfactory streets 2.5% - 5.5%
  - Unsatisfactory streets 5.5% - 10%

Note: Work is underway to confirm these rates on Dallas' streets

# How Streets Are Graded

- Visual inspections started in 1975
  - Ratings were subject to judgment by staff
- Since mid 2008 streets and alleys are reviewed every two (2) years using the street analysis vehicle
  - 2008 street inventory is the first condition inventory fully using the machine's data
- Ground penetration testing, radar, cameras used to inspect
- Technical rating of streets based on extent and severity of distress (roughness, cracking, etc.) = Pavement Condition Index [PCI] measuring roughness, cracking and distress
- For decades PCI ratings have been assigned letter grades: A (best) to E (worst)



# Street Condition Ratings

Rating	Description	PCI
<b>A</b> 	<b>Excellent</b> Pavements that have no distress (mostly new or newly rehabilitated surfaces)	100-85
<b>B</b> 	<b>Good</b> Very good ride quality - Can benefit from preventive maintenance (slurry seal or similar)	85-70
<b>C</b> 	<b>Fair</b> Acceptable ride quality, though road surfaces are becoming worn – slurry, microsurfacing, partial reconstruction or similar will prevent rapid deterioration	70-45
<b>D</b> 	<b>Poor</b> Marginally acceptable ride quality – microsurfacing, chip sealing, or partial reconstruction, resurfacing or rehabilitation is needed to slow further deterioration	45-35
<b>E</b> 	<b>Very Poor</b> Pavement has extensive distress and requires partial or full reconstruction or restoration	< 35

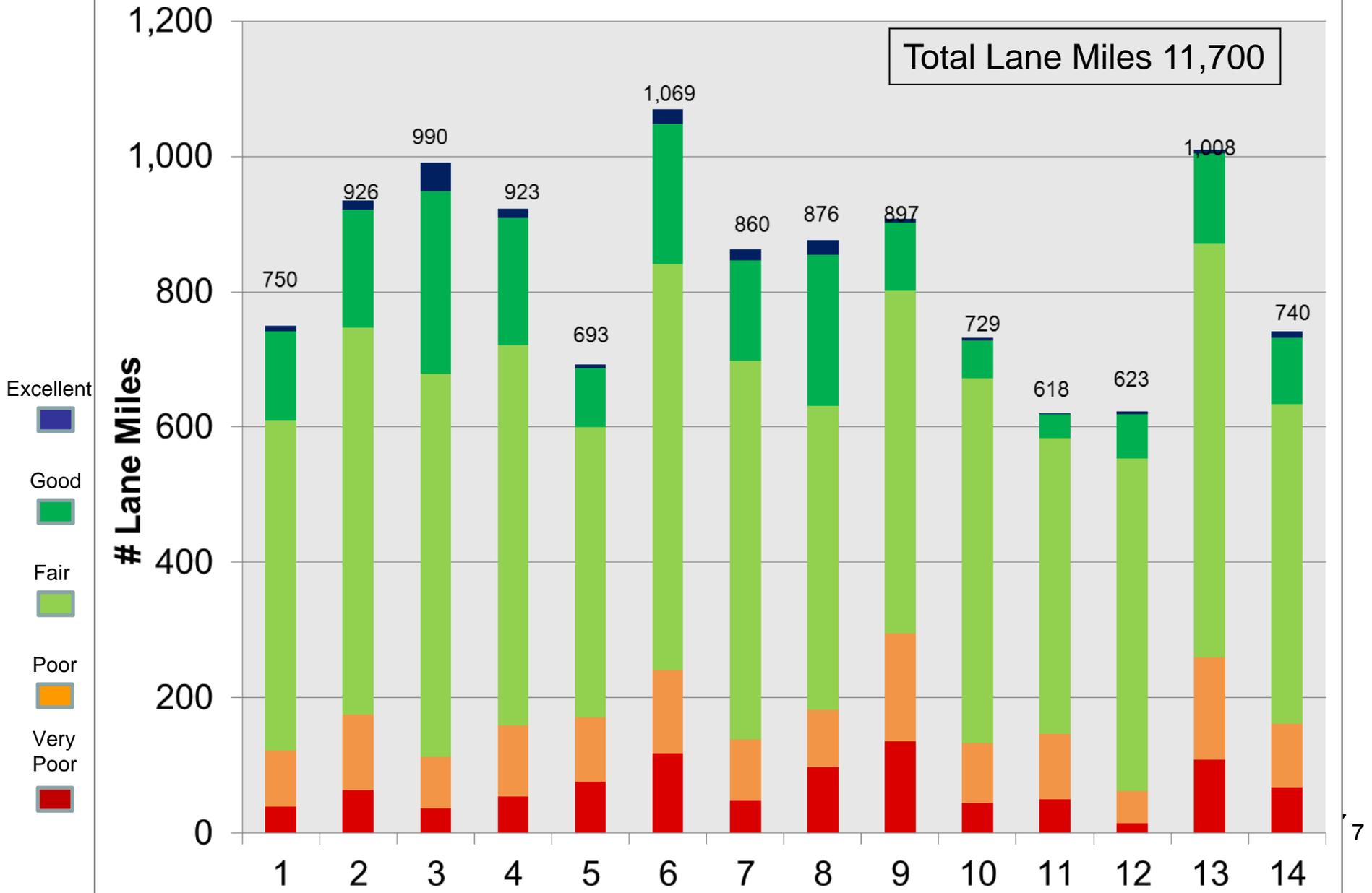
Satisfactory ↑

↓ Unsatisfactory

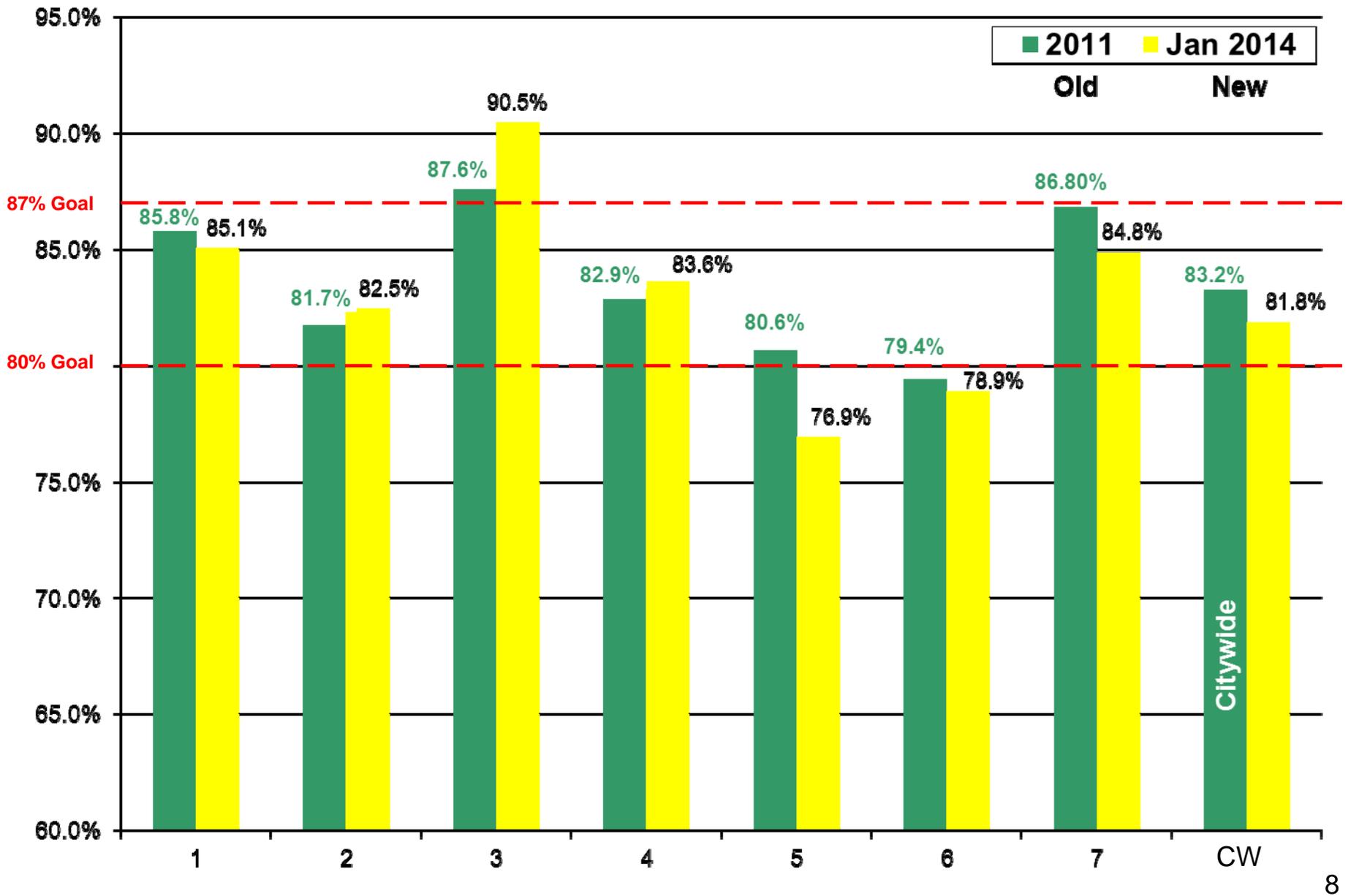
# Street Condition Goals and Background

- In 1995 Council adopted a street satisfaction goal of 75% to be completed by 2015
- In 1996 Council accelerated the street satisfaction goal of 75% to be completed by 2010
- Street condition goals - revised and adopted by City Council in 2006:
  - 87% satisfactory Citywide (Satisfactory = A's, B's, and C's)
  - Minimum 80% satisfactory in each Council District
  - Goals were to be achieved by completion of 2006 Bond Program in conjunction with an enhanced O&M program
- Reaching the Council's 2006 goal of 87% overall satisfaction rating requires additional funding of over \$900 million over the next four (4) years
  - Regular Bond Programs (infrastructure improvements)
  - Annual street maintenance

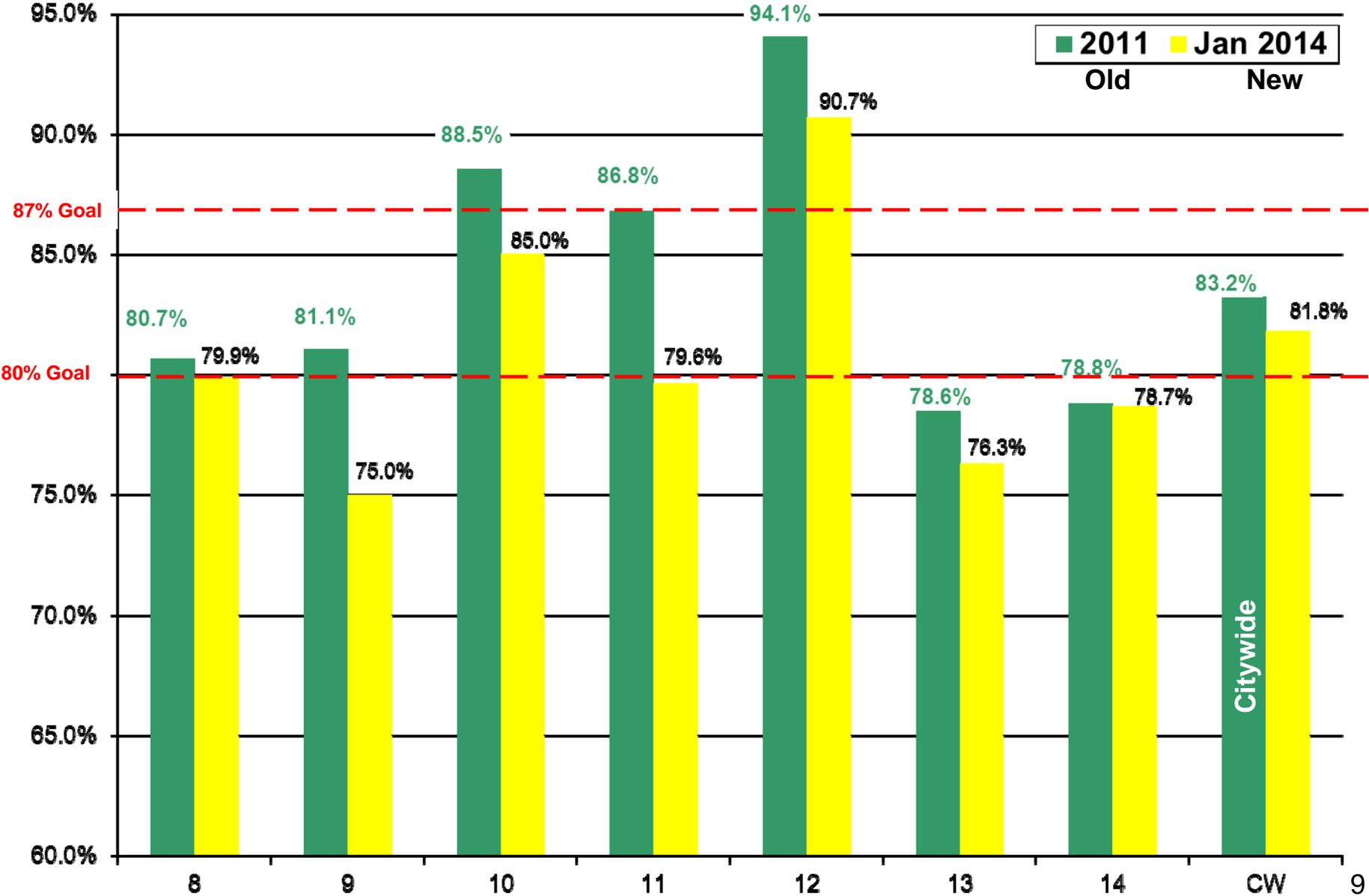
# Street Conditions by Council District (Jan 2014)



# 2011 and 2014 Street Condition Ratings



# 2011 and 2014 Street Condition Ratings



# Departments that Construct and Maintain Streets

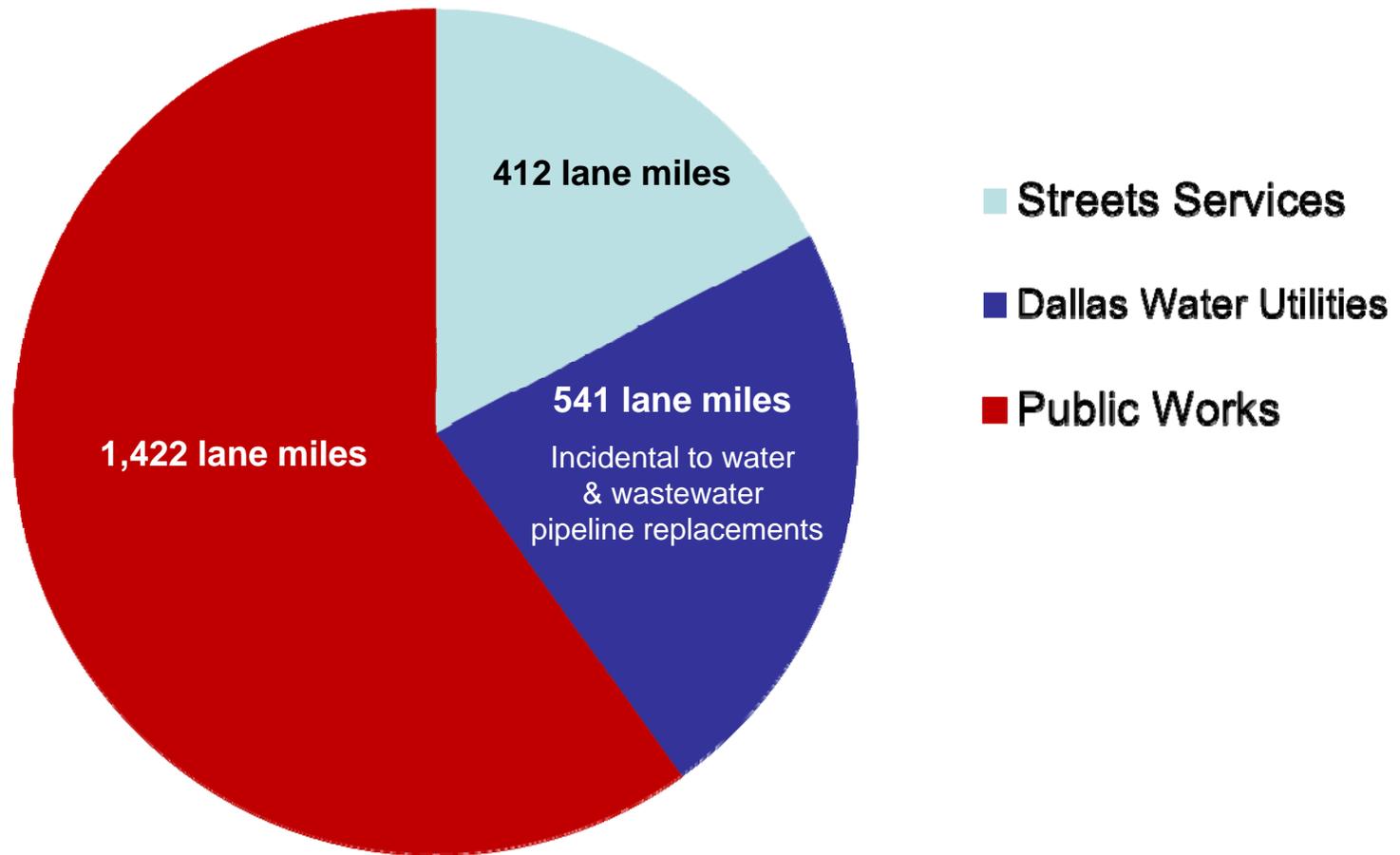
Street Services	Public Works	Water Department
<ul style="list-style-type: none"> <li>• <b>Responsible for Streets, Alleys &amp; Bridges through:</b> <ul style="list-style-type: none"> <li>• <b>Maintenance &amp; Repair</b></li> <li>• <b>Major maintenance</b></li> <li>• <b>Restoration &amp; Rehabilitation of “unimproved” asphalt streets</b></li> <li>• <b>Performs own construction</b></li> <li>• <b>Selects contractors to perform overflow construction</b></li> </ul> </li> </ul> <p><b>Funding: General fund</b></p> <p><u>Note:</u> larger projects are referred to <b>Public Works</b></p>	<ul style="list-style-type: none"> <li>• <b>Responsible for Streets, Alleys and Bridges through:</b> <ul style="list-style-type: none"> <li>• <b>New construction</b></li> <li>• <b>Reconstruction</b></li> <li>• <b>Resurfacing</b></li> <li>• <b>Selection of design consultants</b></li> <li>• <b>Bidding projects for construction</b></li> <li>• <b>Managing, inspecting design and construction projects</b></li> </ul> </li> </ul> <p><b>Funding: Bond program</b></p>	<ul style="list-style-type: none"> <li>• <b>Street reconstruction as a result of water and wastewater replacement</b> <ul style="list-style-type: none"> <li>• <b>Selection of design consultants</b></li> <li>• <b>Bidding projects for construction</b></li> <li>• <b>Managing, inspecting design and construction</b></li> </ul> </li> </ul> <p><b>Funding: Enterprise funding</b></p>

- Bond Program investment is for construction, reconstruction & resurfacing
- Maintenance extends the life of these infrastructure items

# Street Replacements

**2,375 Lane Miles**

**Resurfaced/Reconstructed/Rehabilitated/Restored 2004-2013**



Departments & private utilities collectively develop multi-year work plans to avoid conflicts and duplication of efforts as well as adding to and expanding projects



## Street Services Department

- \$62M Budget with 588 employees
- Maintains over 11,700 lane miles of streets
- Organized into four business units:
  - Street Repair Division
  - Service Maintenance Areas (4 plus night operations)
  - Contracts, Finance & Inspections
  - Transportation Operations



# Street Services

- Streets & Alleys
  - Pothole repair
  - Street & alley repair
  - Litter removal
  - Response to roadway hazards
  - Roadside drainage
  - Guard rail repair
  - Inlet cleaning
  - Severe weather response
- Contracted Services
  - Street sweeping (major thoroughfares)
  - Mowing of medians/ TXDOT rights-of-way
  - Sealing of streets (prevent water infiltration)
  - Lane line and crosswalk
- Transportation Operations
  - Traffic Studies
  - Traffic Signals
  - Street Striping
  - Traffic Signs
  - Street Lighting
  - Congestion Management
  - Lane Closure Permits

## Slurry Seal/MicroSurfacing for "B" and "C" rated streets



## Full-Depth Asphalt Repair for "C" rated streets



**Slurry Seal** - This treatment for CONCRETE STREETS WITH ASPHALT SURFACE consists of a ¼-inch layer of sand and fine stone mixed with asphalt emulsion. This seals and smooths the surface and conceals scars from previous repairs. It is used predominately for residential roads with curb and gutter. The work is outsourced to a specialized contractor – after Street Services performs preparation work (such as minor base repair and crack sealing).

**Cost:** \$13K per lane-mile. **Life:** 5-7 years.

**Micro Surfacing** – A treatment for CONCRETE STREETS WITH ASPHALT SURFACE which places a ¼-inch layer of crushed stone mixed with asphalt emulsion. This seals and smooths the surface and conceals scars from previous repairs. It is used predominately for higher-traffic-volume streets with curb and gutter. It is more expensive than slurry seal, but cures more quickly. This work is outsourced to a specialized contractor – after Streets Services prepares the site (doing minor base repair and crack sealing, curb & gutter repair).

**Cost:** \$19K per lane-mile. **Life:** 5-7 years.

**Full-depth Asphalt Repair** - A treatment for ASPHALT STREETS to repair the surface and base failures. Repairs are typically larger than a pothole, but smaller than either Street Resurfacing or Street Rehabilitation projects. After the failed area is cut square and removed, a new base is placed and compacted and an asphalt surface is put in place.

**Cost:** \$20.50 per square yard. **Life:** 5-7 years.

## Partial Reconstruction for "C" rated (and some "D" rated) streets



**Partial Reconstruction** - This is a method used on CONCRETE STREETS. It is **removal and replacement of large, failed sections**, including breakout and removal of old pavement, repair of any base failures, and placing new concrete. To be a candidate for this repair, residential and thoroughfare streets must have less than 25% of failed area.

**Cost:** \$67.50 per square yard with curb-and-gutter repair. **Life:** 10-12 years.

## Street Rehabilitation for "D" rated streets



## Street Restoration for "E" rated streets



**Rehabilitation** - A treatment for ASPHALT STREETS when a large portion of the surface and the base have deteriorated to an unsatisfactory level. It includes the full-depth repair of base failures, followed by a chip seal, and a new two-inch layer of hot mix asphalt placed over the entire treated segment. Candidate streets are predominately residential asphalt surfaced streets without curb and gutter. **Cost:** \$160K per lane-mile. **Life:** 10-12 years.

**Restoration** - A treatment for ASPHALT STREETS when the entire surface and the base have deteriorated to an unsatisfactory level. It includes rebuilding the entire base by recycling the old base and surface materials into a new base, followed by a chip seal, and new two-inch layer of hot mix asphalt placed over the entire treated segment. Candidate streets are predominately residential asphalt surfaced streets without curb and gutter. **Cost:** \$180K per lane-mile. **Life:** 18-20 years.

## Impacts of Maintenance on Street Condition Ratings

- Proactive maintenance effectively extends life expectancy of streets
- Maintenance work is planned or service request-driven
  - Preventive Maintenance (primarily Full-depth Asphalt/Concrete, Micro Surfacing and Slurry Sealing)
  - Major Maintenance (primarily Rehabilitation, Restoration, and Partial Reconstruction)
- Since most preventive maintenance is performed on satisfactory streets, the overall rating does not increase. Preventive maintenance prevents deterioration that decreases ratings
- Major maintenance on unsatisfactory streets increases the satisfactory overall ratings

## Public Works Department

- Implements bond program proposition #1 (Streets & Transportation Improvements) \$331M for the construction or reconstruction of streets, thoroughfares, alleys, bridges and sidewalks
- Develops and maintains the Needs Inventory List and other requested needs (see slide 20)
- \$16.6M annual operating budget with 173 employees
  - Engineers, Surveyors, Inspectors & Support staff
- \$47M capital budget for Aviation, Convention Center and city facilities
- Organized into three (3) main work units
  - Street and Paving Infrastructure – Design and Construction
    - New facilities and facility major maintenance
    - Air Quality, Parking Adjudication, and Finance

# Public Works

- Street and Paving Infrastructure – Design and Construction
  - Street and alley reconstruction and street resurfacing
  - New street and alley petitions
  - Complete Streets
  - Thoroughfares and urban design / streetscaping
  - Intergovernmental partnerships and bridge repairs
  - Bike lanes
  - Pavement management and life cycle analysis

# Public Works

- Project Selection Process for Needs Inventory
  - Maintains the Needs Inventory List
    - D and E rated condition streets (improved - with curb & gutter)
    - D and E rated condition alleys (improved – concrete or asphalt)
    - Identified thoroughfares requiring improvements and/or widening
    - Identified bridges
  - Helps Neighborhoods with Obtaining Petitioned Streets or Target Neighborhood Projects
    - Unimproved streets (with no curb & gutter) that fronting property owners petition for improvements or that the City deems requiring improvements
  - Works on or Assists with Master Plans
    - Bike plans
    - Trails
    - Thoroughfare plans
    - Forward Dallas/Planning Efforts/Complete Streets

# Street Selection Process For Capital Annual Work Plans

- Develop criteria for candidate streets and group them by type of treatment improvement
- Allocate funding per group
- Obtain Council input on other street needs
- Evaluate candidate streets (includes field verification)
- Coordinate with utility owners and City departments
- Select projects for recommendation to Council

## Public Works

### Resurfacing of Pavement for “D” rated streets



**Re-Surfacing** – This treatment removes the entire asphalt surface, and pulverizes and recycles the old material with new asphalt binder. The new asphalt surface is then placed over the entire surface, compacted, and smoothed to a proper finish. Curb and gutter repair, if needed, is accomplished with the re-surfacing efforts.

**Cost:** \$200K per lane-mile. **Life:** 15-20 years (with maintenance).

## Public Works

### Full Reconstruction for "E" rated streets



**Reconstruction** - This process is the removal of an existing street with extensive failures and/or badly deteriorated condition. In the process, the pavement is broken and removed (and often recycled), as is the base. Drainage concerns are addressed with this process. The sub-base may be reconditioned as needed, then a new base is placed and compacted. The new concrete surface pavement is then placed, as shown above. The construction work is outsourced under bond-issued funding.

**Cost:** \$1 M per lane-mile. **Life:** 20-50 years (with maintenance).

## Street Treatments Managed by Dallas Water Utilities



Street and alley repairs by the Dallas Water Utilities are associated with pipeline replacement. For asphalt streets the City policy requires that an entire lane be reconstructed at the location for where the pipeline is replaced. From joint to joint for concrete streets.

## Four Year Work Plan For Repairing and Replacing Unsatisfactory Streets By Department

	<b>2013/14</b>	<b>2014/15</b>	<b>2015/16</b>	<b>2016/17</b>
Street Services (E's & D's into C's)	42	42	42	42
Public Works (E's & D's into A's & B's)	59	89	78	56
DWU (E's & D's into B's & C's)	48	58	65	67
Total Lane Miles to be Improved	149	189	185	165

Note: The total lane miles in unsatisfactory condition today is 2,361

# How Streets Degrade

- Streets degrade for the following reasons:

- Shifting soil
- Harsh weather
- Age
- Usage
- Under-designed streets

These events cause streets to crack, allowing for water infiltration that undermines the base material

- Streets degrade at different rates

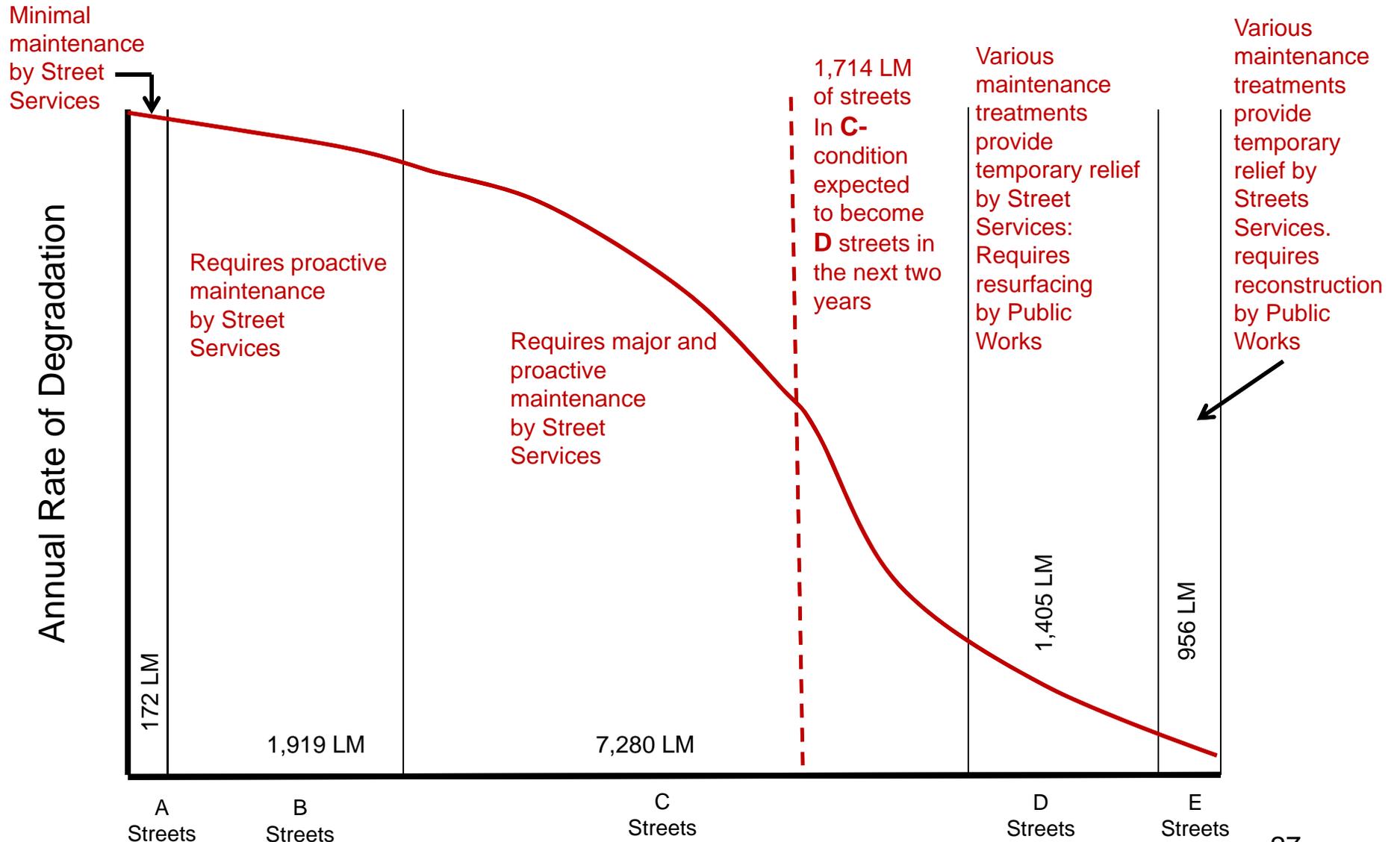
- A, B and E streets degrade the slowest
- C and D streets degrade the fastest

- 62% of our streets are in C condition

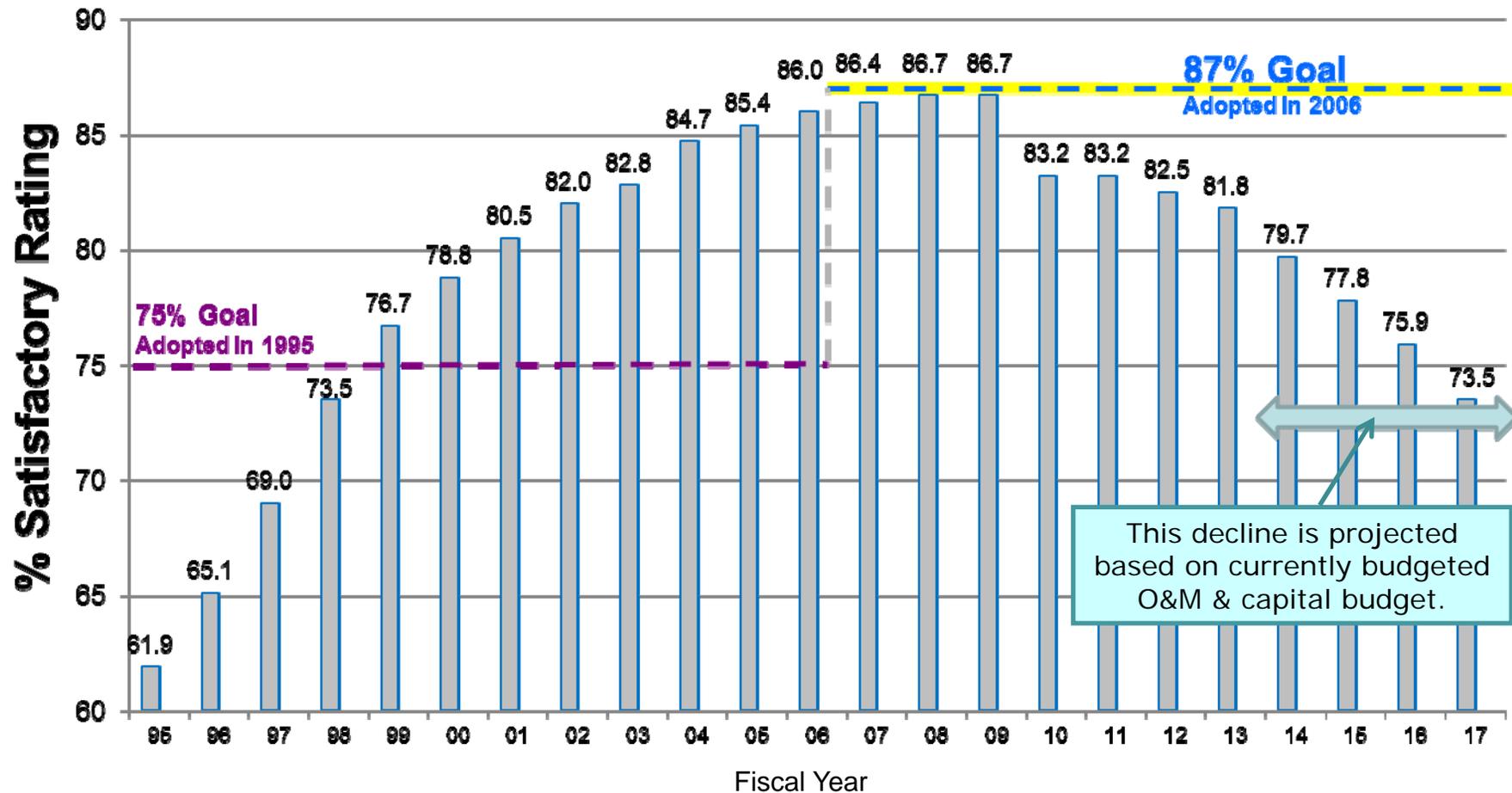
- A at 1.5%, B at 16.4%, C at 62%, D at 12% and E at 8.1%

# Street Degradation Curve

Streets degrade at a rate from 0.3% to over 10% yearly

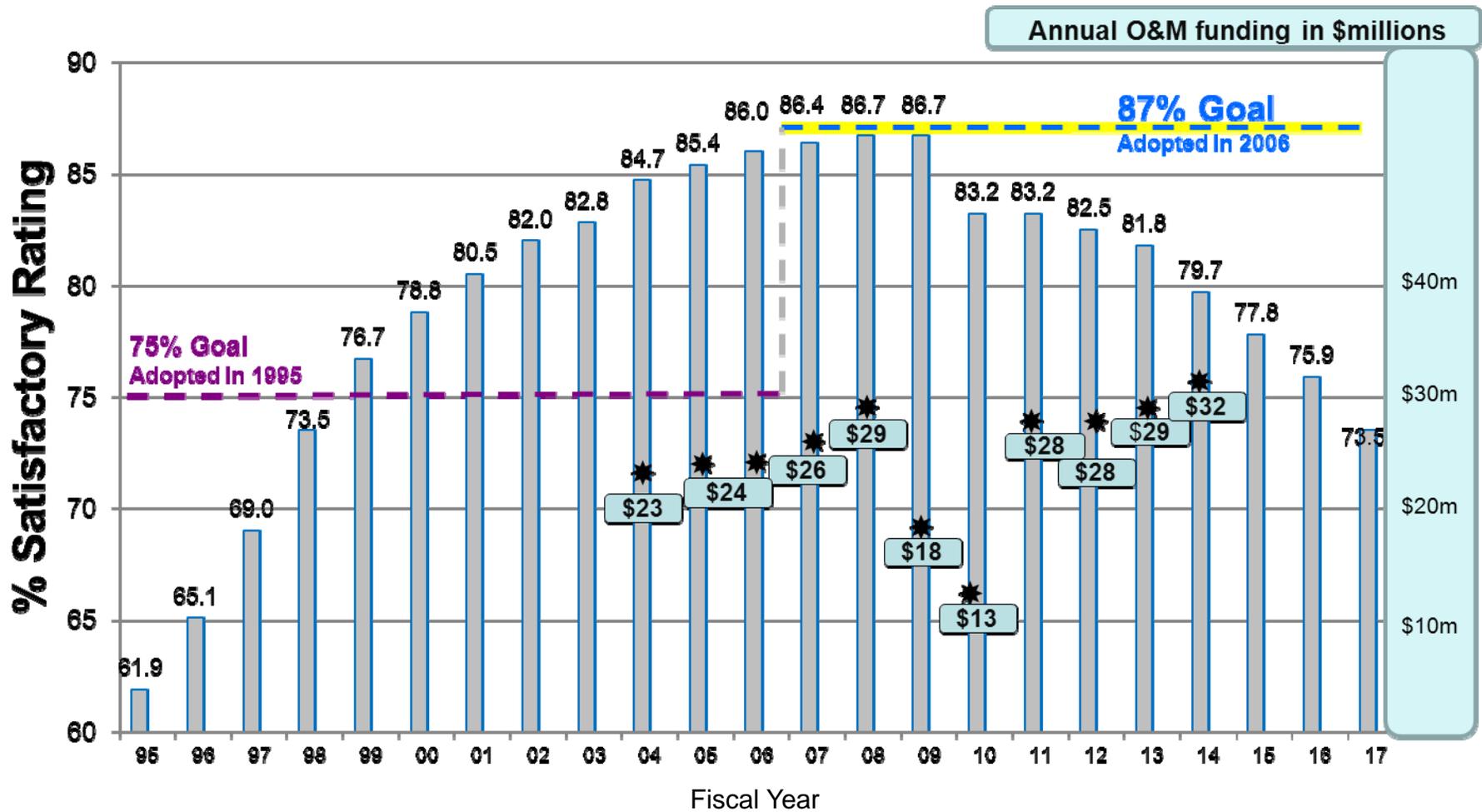


# Condition of our Streets: How satisfactory?



Projections of future conditions assumes that annual O&M expenditures remain the same and no new capital funds over what is included in the existing bond program

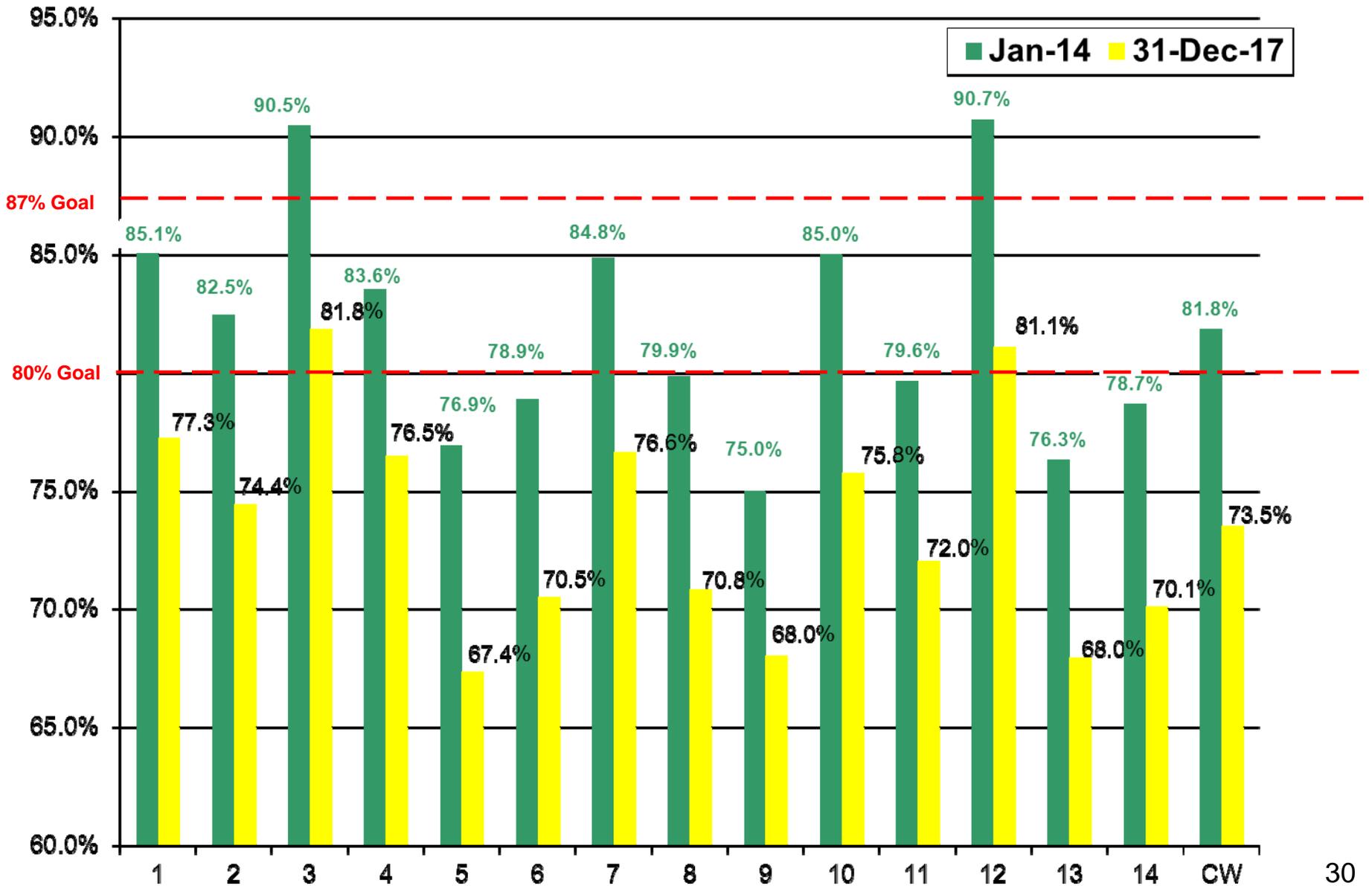
# What affect does O&M funding have ?



Projections of future conditions assumes that annual O&M expenditures remain the same and no new capital funds over what is included in the existing bond program

# Street Condition Ratings Projections – Present through December 2017

(based on currently budgeted O&M and capital budget)



# Alternatives for Reducing the Deterioration Rate

- Repair C streets to avoid them from becoming D streets  
62% of streets are C streets and have the highest deterioration rate
  - Requires additional investment of \$245 million over four (4) years to reach a degradation rate of 0%
  - Disadvantage is that many repairs have a short term effect 3-10 years
- Resurfacing D streets at the rate that C's become D's to achieve 0% degradation
  - Requires an additional investment of \$728 million over four (4) years
  - Makes D streets into A & B streets which last longer
- Resurface and reconstruct thoroughfares, collector and arterial streets – most used by the public
  - 444 LM of thoroughfares, collector and arterial streets are in unsatisfactory condition
  - Requires an investment of \$187 million over four years to replace 444 LM
  - Does not address residential streets
  - Overall deterioration rate continues to climb

# Future Policy Considerations

- Adoption of new iSWM streets. Concrete streets with earthen swales instead of concrete curb and gutters
- Don't address broken curbs in street resurfacing projects
- In future bond programs, focus on projects that improve street conditions
  - Only 55% of the Proposition 1 (Street and Thoroughfare Improvements) in the 2012 Bond Program improved street conditions

# Future Policy Considerations

- Allow for unequal street repair funding among Council Districts
- Set aside additional funds in future bond programs to allocate to Dallas Water Utilities for replacing the remaining portion of streets not addressed in a pipeline replacement project
- Dedicate either a portion of the existing, or a new tax rate, to streets
- Dedicate a portion of the growth in the tax base to streets
- Lobby state legislature to allow municipalities to charge a road use fee

# Next Steps

- Continue to examine local street deterioration rates compared to national rate
- Conduct policy discussions
- Evaluate impacts during budget process
- Present alley briefing

# Questions & Comments

# Appendix

NEEDS INVENTORY - March 24, 2014  
STREET and TRANSPORTATION

Traffic Safety Improvements - Guardrail Upgrades	\$ 5,021,472
Traffic Sign Upgrades	\$ 16,500,000
Traffic Intersection Improvement and Safety Improvements	\$ 42,958,875
Traffic System Management	\$ 6,130,289
Traffic Signal Upgrades	\$ 148,080,000
Street Lighting	\$ 14,469,362
School Flasher Upgrades	\$ 2,676,360
ITS	\$ 975,659
Sidewalks	\$ 5,105,297
Bridge Repair and Modification	\$ 2,350,000
Thoroughfares	\$ 1,917,216,182
Street Petitions	\$ 255,008
Target Neighborhood	\$ 43,344,906
Alley Reconstruction	\$ 729,102,960
Street Reconstruction	\$ 827,772,897
Street Resurfacing	\$ 252,424,614
TOTAL	\$ 4,014,383,881