St. Paul Street Condition Report
St. Paul Public Works

June 6, 2019

Mississippi River Boulevard

Saint Paul Minnesota
The most livable city in America

Overview:

Purpose of Study/Report:

1) Identify current pavement conditions on a system-wide level

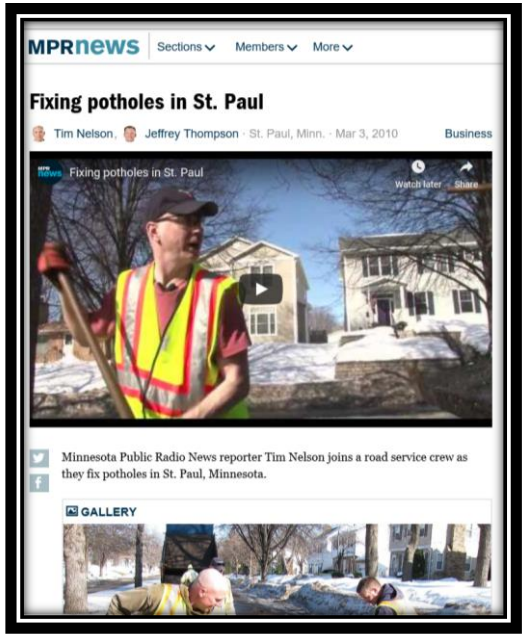
2) Identify program needs given several modeled scenarios and pavement management goals

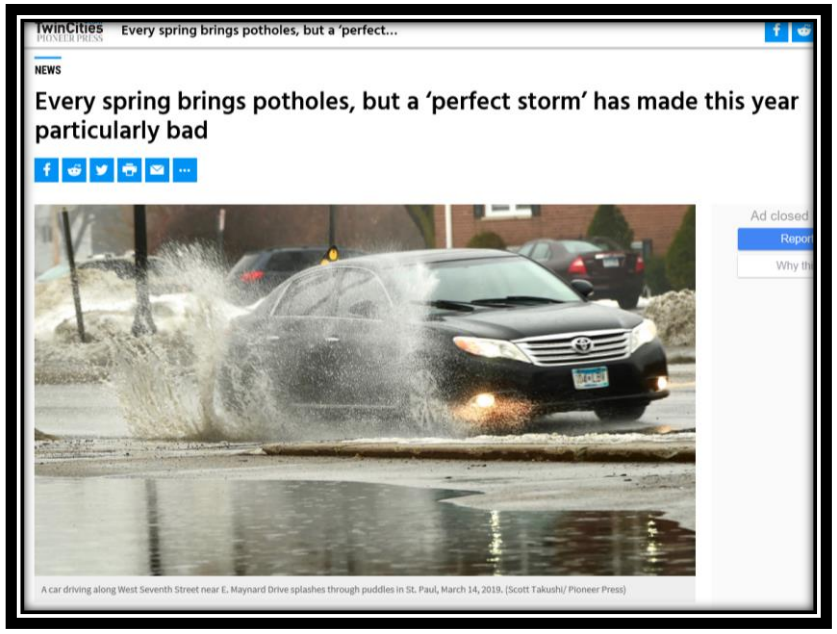
3) Discuss funding needs

Survey:

Please rate your opinion (scale 1-100) on condition of arterial streets, residential streets, and bike lanes.

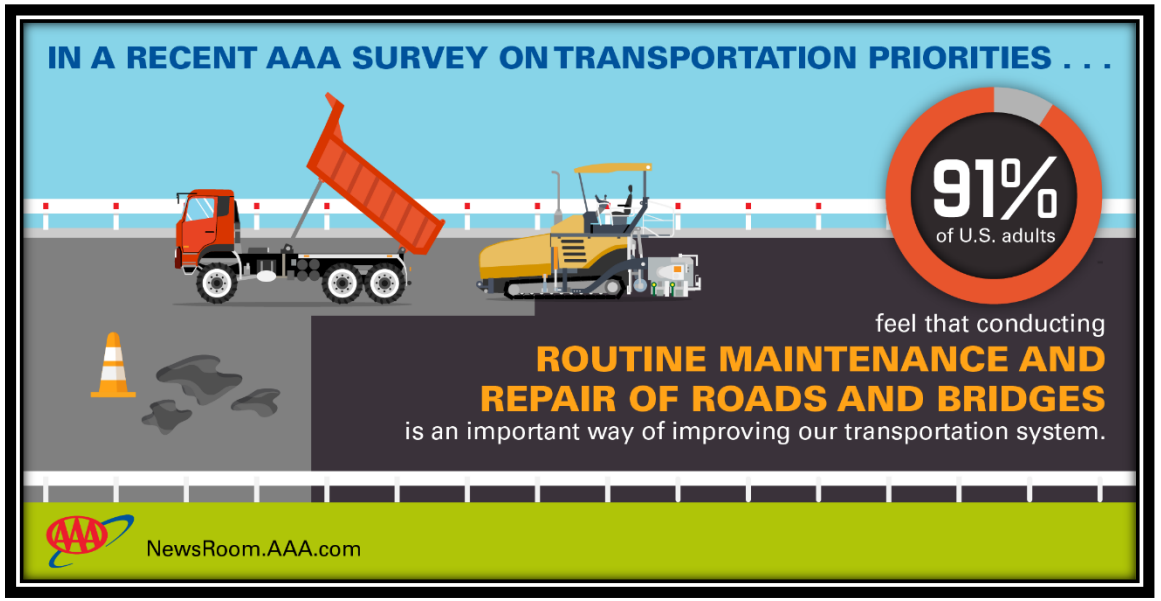
Local Media Coverage – Spring 2019





Public Opinion – Education

Below are examples of transportation funding marketing tools:



AAA Survey

ASCE Report Card

Existing Conditions: Miles of City Streets

Arterial Streets = 199 Miles; $1.056 billion replacement value

Residential Streets = 563 Miles; $1.876 billion replacement value

Total Miles = 762 Miles; $2.932 billion replacement value

Existing Conditions: Miles of MnDOT and Ramsey County Streets (City financial participation required)

County Roads = 82 Miles

MnDOT Trunk Highways = 25 Miles (not freeways)

Total Miles = 107 Miles

Total of 869 miles of streets within the city

Along Grand Avenue at Snelling Avenue intersection

Along Grand Avenue at Dunlap

What is PCI?

Pavement Condition Index (PCI) is a measurement of road quality

- Based on a scale from 0 (Failed) to 100 (Good)
- Criteria are similar throughout the industry; PCI scale was created by US Army Corps of Engineers
- Inspections performed by GoodPointe Consulting; staff assign a score (Inspections done 1/3 of city per year)
- St Paul average PCI for all roads is 62.

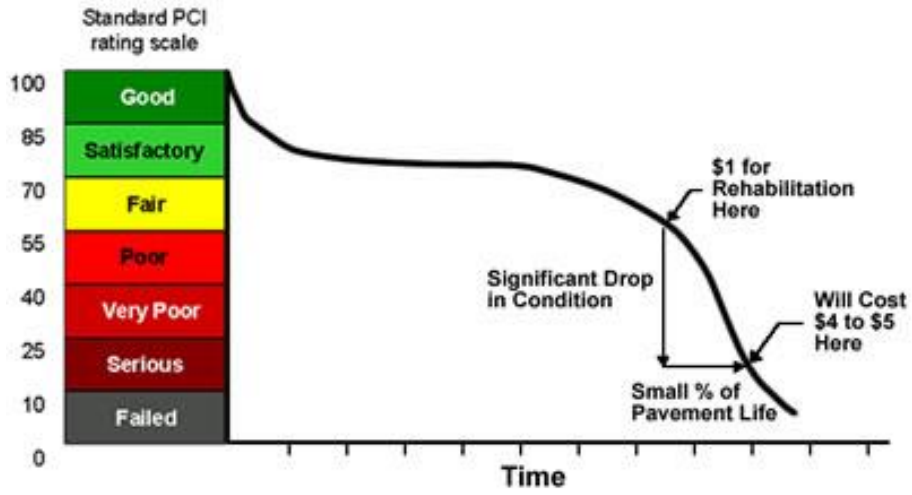


Table courtesy of Colorado State University

PCI Scale Examples

PCI = 100 (Good)

PCI = 80 (Satisfactory)

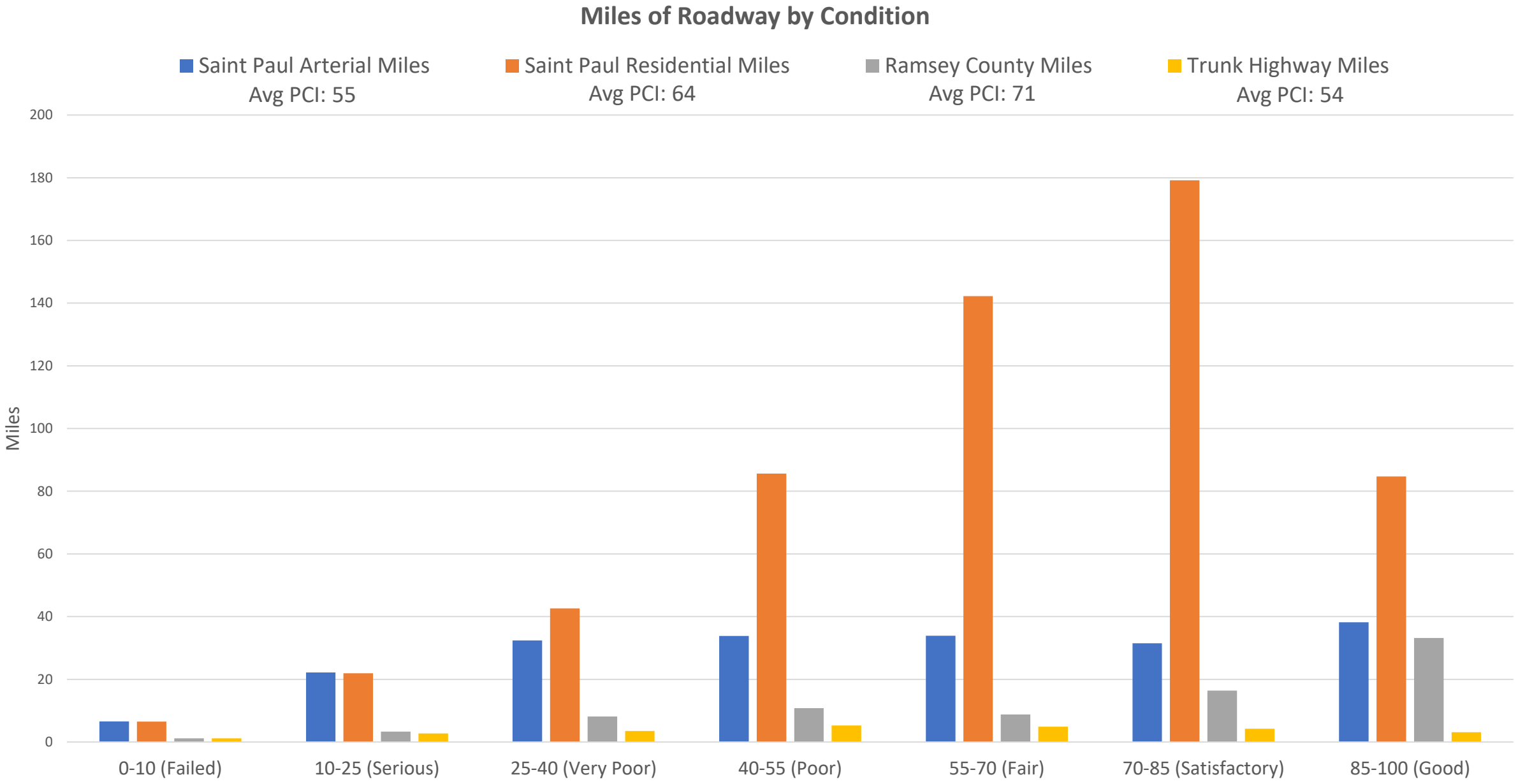
PCI = 60 (Fair)

PCI = 40 (Poor)

PCI = 20 (Serious)

PCI = 10 (Failed)

Existing Conditions



Case Studies:

City PCI goals (these are all snow cities with freeze/thaw environments)

- Minneapolis (pop. 413,651) = 70 PCI goal (69 existing PCI for arterials and 71 existing PCI for residential streets)
- Des Moines (pop. 217,521) = 65 PCI goal (65 existing overall PCI)
- Cleveland (pop. 385,809) = 75 PCI goal (70 existing overall PCI)
- Boulder, Colorado (pop. 108,090) = 75 PCI goal (75 existing overall PCI)
- Omaha, Nebraska (pop. 466,061) = 70 PCI goal for arterials; 65 PCI goal for residential (72 existing PCI for concrete; 64 existing PCI for asphalt)
- Tulsa, OK (pop. 404,170) = 65 PCI goal (62 existing overall PCI)

Recommended PCI:

- Arterial Streets = Average 65 - 70 PCI goal
- Residential Streets = Average 60 - 70 PCI goal
- Complaints go up exponentially as PCI goes down (starting at 40 PCI)

Along Hamline Ave

Case Studies - United Kingdom

A 2018 YouGov poll of 2,024 UK residents showed:

- 57% of people avoided cycling by having to share the road with trucks and other large vehicles.
- 56% of people would cycle more if roads had fewer potholes and other faults.
- The survey found other concerns that inhibited cycling included threatening behavior from drivers (for 43% of the respondents), car doors being opened in front of them (40%) and speeding motorists (37%).
- “The pothole epidemic has become nothing short of a national disgrace” – Janet Connor: AA Insurance.

Lorries and potholes put people off cycling, survey suggests

1 June 2018 | Share

More than half of people say they would cycle more if roads were in a better condition, a survey for the charity Cycling UK suggests.

The YouGov poll of 2,024 people found that potholes and drivers overtaking too closely were the joint second most common reasons for avoiding cycling.

The most common concern was having to share the road with large lorries.

Cycling UK wants "fundamental changes" to road design and the Highway Code to give confidence to potential cyclists.

Between 2007 and 2016, potholes and other faults in the road were a factor in the deaths of 22 cyclists, according to the Department for Transport.

More than 350 others were seriously injured.

Article Courtesy of BBC News

Modeling Assumptions:

- Software used – ICON 6.0 provided in consultation with GoodPointe Technology.
- Ped Ramps included for all reconstruction and mill/overlay projects. Utility costs are not included.
- New curb is not included for mill/overlay projects but is included for reconstruction projects.
- Models do not include inflation (unless stated).
- Arterial roadway reconstruction costs were modeled using $234 per square yard and residential roadway reconstruction costs were modeled using $183 per square yard.

Scenarios Modeled:

- Scenarios for both arterial and residential streets
  - Current Funding (with and without inflation)
  - Maintain PCI (55 for arterials; 65 for residential)
  - Increase PCI to 65 (arterials)
  - Increase PCI to 70 (both)

ICON Pavement Management Module

Predicted Condition Report

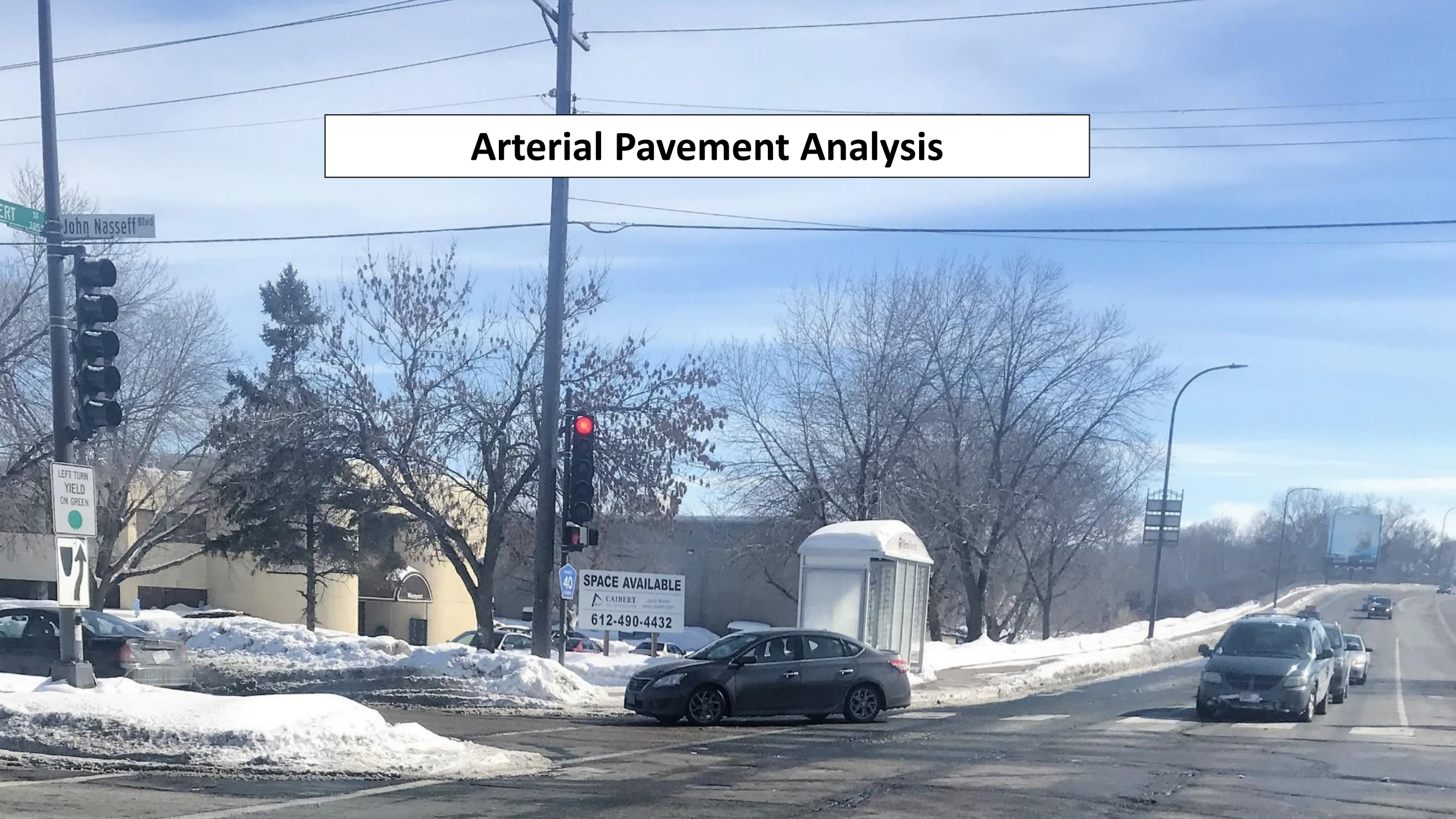
Scenario: ----2019 Arterial to 70 in 20 years----

Total: 4,456,353.76 square yards have been analyzed each year.

Total Square Yards in Different Condition Index Intervals

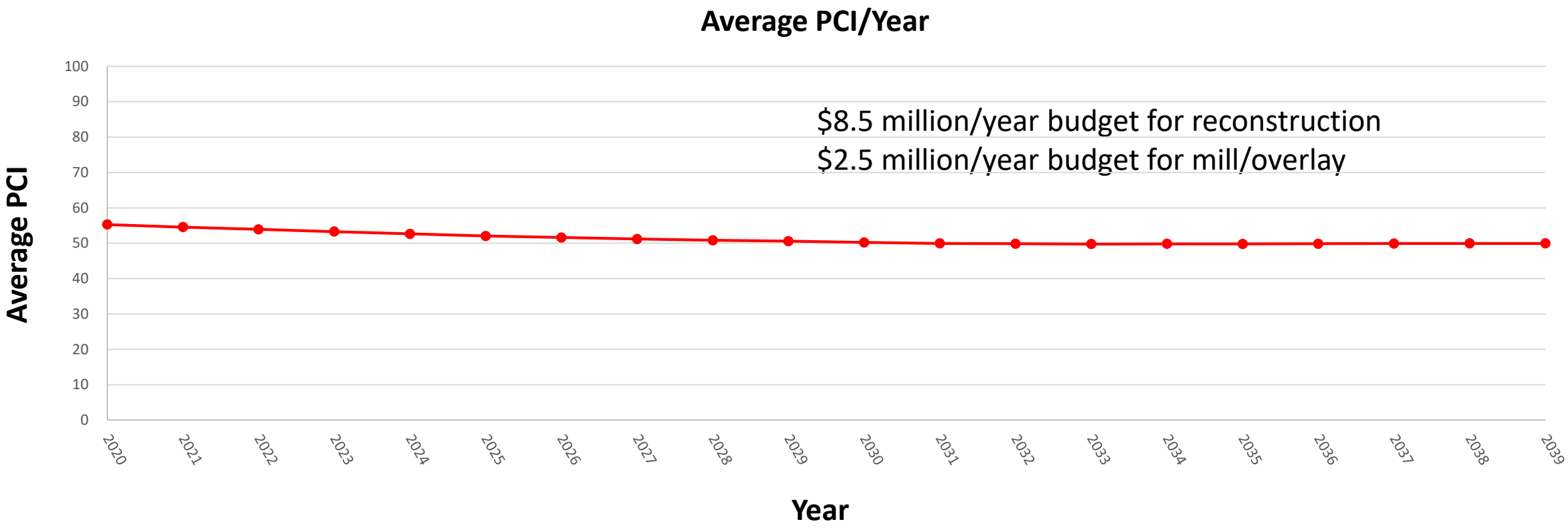
Year	0-9	10-24	25-39	40-54	55-69	70-84	85-100
2020	139,825	636,243	593,606	795,490	704,282	647,173	939,735
2021	175,424	719,195	450,718	793,028	659,228	639,034	1,019,728
2022	258,862	692,066	355,793	806,851	630,855	623,512	1,088,414
2023	367,338	638,241	273,275	783,389	612,384	614,441	1,167,286
2024	436,323	536,773	358,654	648,830	682,995	491,684	1,301,096
2025	548,254	408,594	302,766	658,247	648,646	456,363	1,433,484
2026	598,757	334,027	287,866	680,025	559,588	495,343	1,500,748
2027	620,510	290,207	313,626	625,357	509,530	422,969	1,674,155
2028	623,532	266,500	325,138	560,347	485,321	578,707	1,616,810
2029	658,188	217,913	252,033	561,739	478,438	657,101	1,630,942
2030	721,809	159,647	180,654	556,758	433,683	773,364	1,630,439
2031	786,431	52,465	165,520	518,194	456,155	848,141	1,629,449
2032	771,359	38,614	138,900	460,695	382,473	1,037,498	1,626,815
2033	738,661	31,503	122,020	419,000	559,631	951,857	1,633,682
2034	690,540	40,040	68,594	442,979	584,185	989,938	1,640,079
2035	654,311	32,760	60,745	437,966	628,183	1,006,325	1,636,065
2036	616,240	28,677	58,313	301,836	802,853	1,004,627	1,643,808
2037	577,246	20,388	55,620	312,895	845,202	996,569	1,648,433
2038	531,392	21,222	52,013	350,294	856,772	1,010,732	1,633,929
2039	485,354	58,791	11,492	440,952	805,165	972,718	1,681,881

GOODPOINTE TECHNOLOGY



Arterial Pavement Analysis

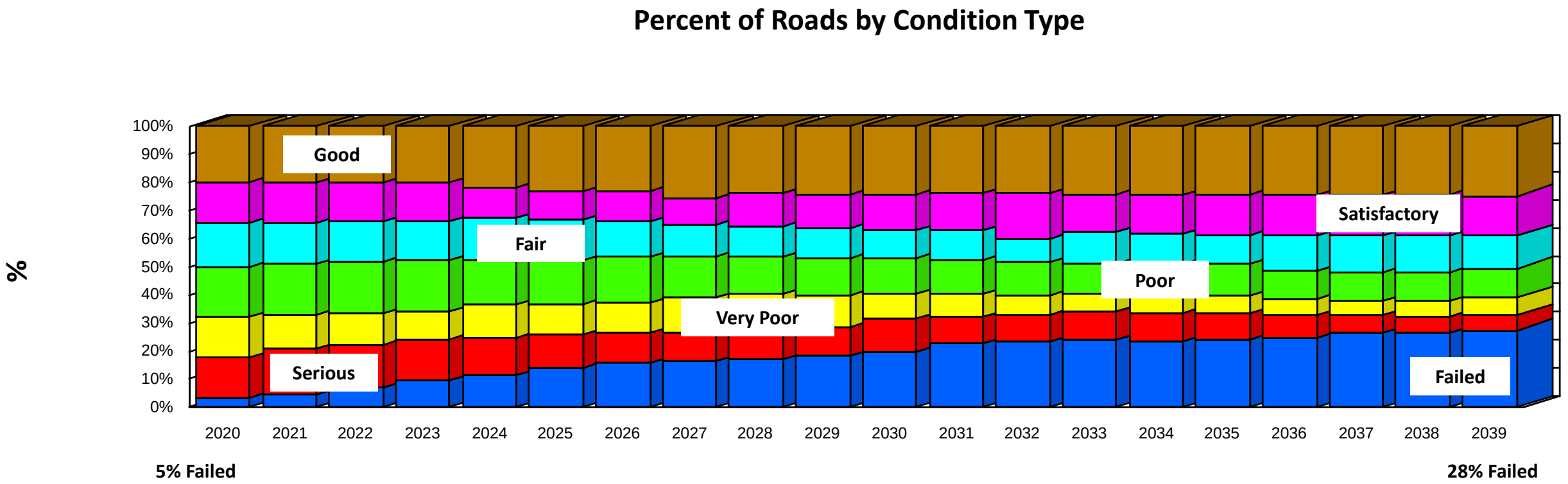
Current Funding Scenario: Arterial Streets



<u>Conclusion</u>: If funding levels stay constant, average PCI's will drop from 55 to 50 in 20 Years

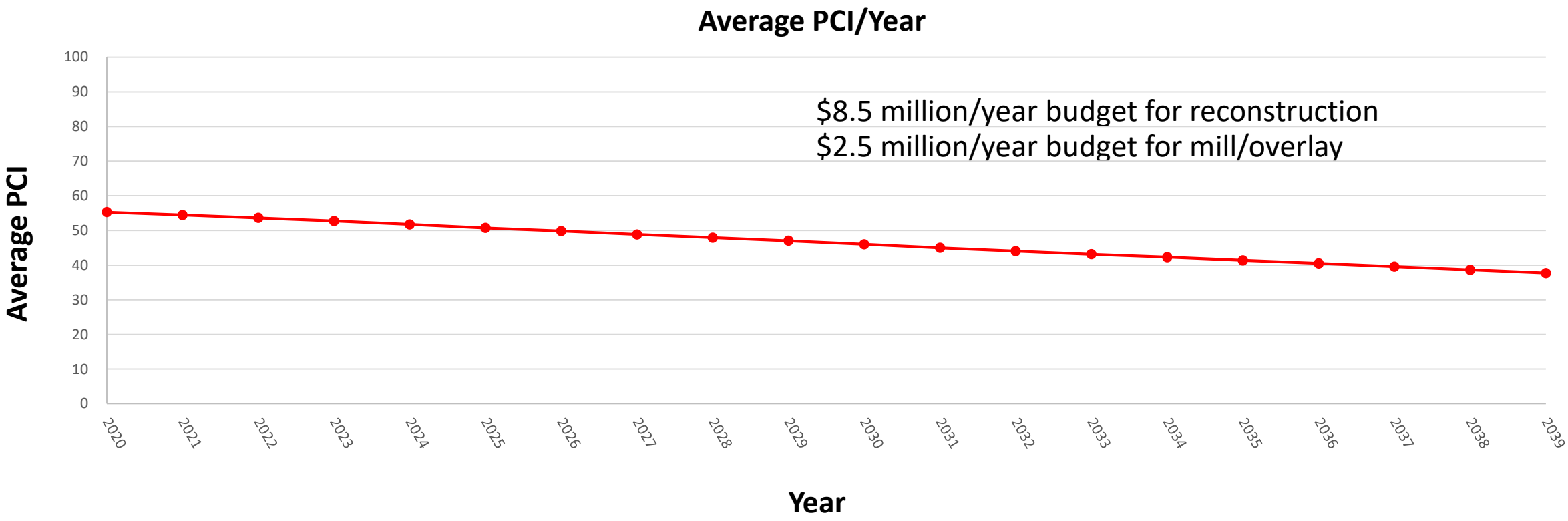
<u>Conclusion</u>: With current funding levels, a street is reconstructed on a 124-year cycle. A street is designed to have a maximum 60-year life.

Current Funding Scenario: Arterial Streets



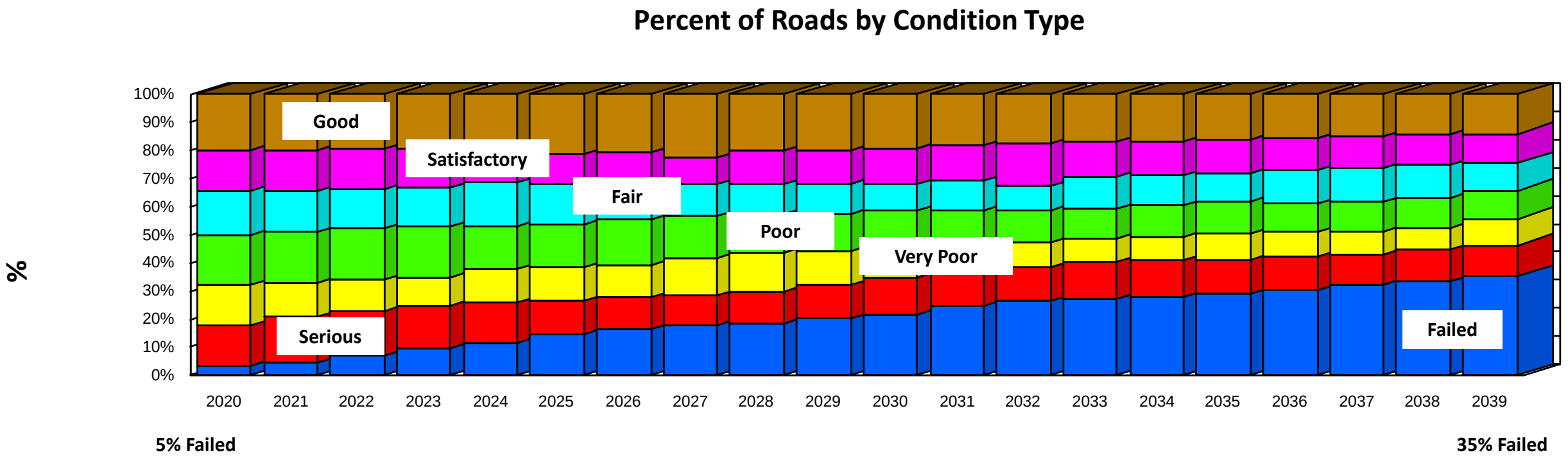
<u>Conclusion</u>: If funding levels stay constant, almost 30% of streets will be in a failed condition by 2039. This represents a six-fold increase in failed roadway mileage. Failed/unserviceable roads will increase from 10 miles to about 60 miles in 2039.

Current Funding Scenario: Arterial Streets with Inflation



<u>Conclusion</u>: If funding levels stay constant, average PCI's will drop from 55 to 38 in 20 Years

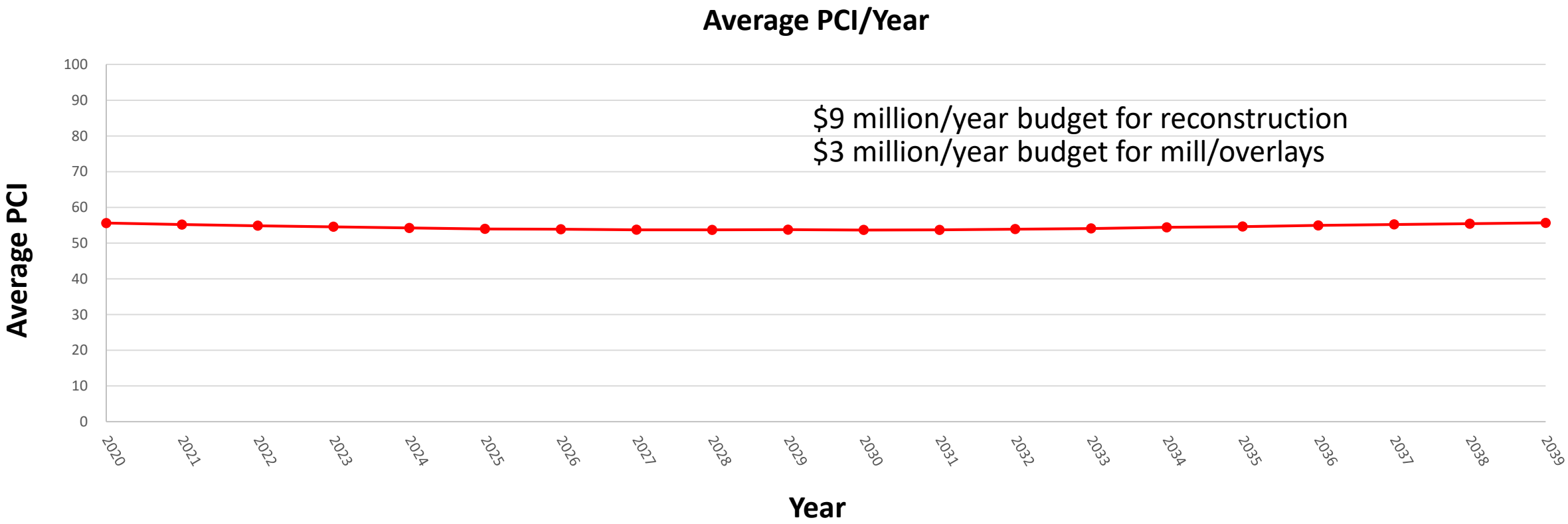
Current Funding Scenario: Arterial Streets with Inflation



<u>Conclusion</u>: If funding levels stay constant, 35% of streets will be in failed condition by 2039. This represents a seven-fold increase in failed roadway mileage. Failed/unserviceable roadway mileage will increase from 10 miles to 69 miles in 2039.

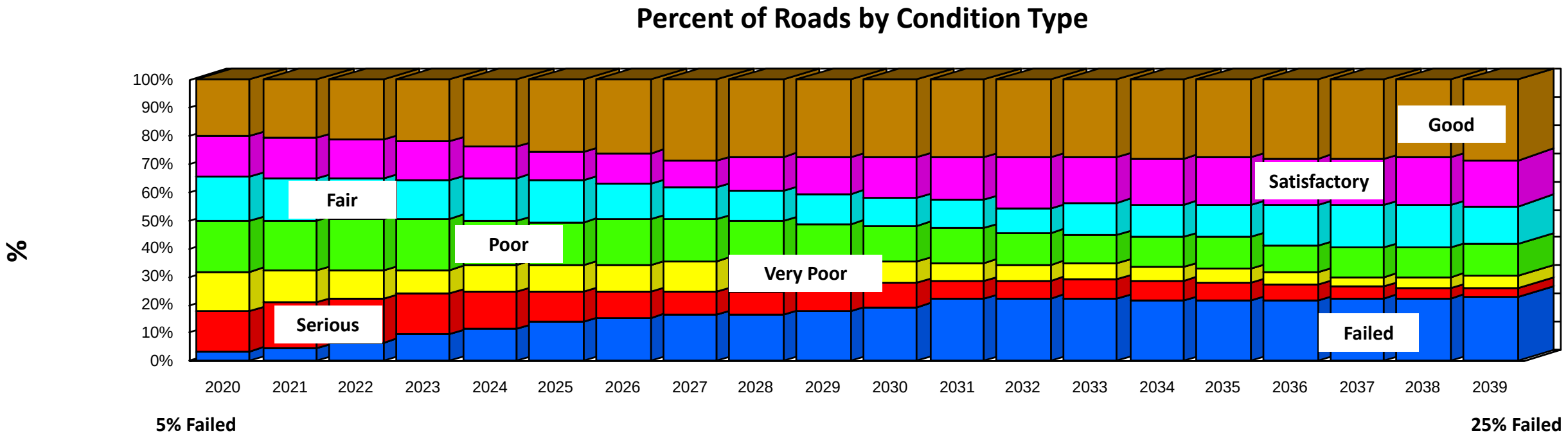
With no additional funding…

Maintain PCI Scenario: Arterial Streets with PCI of 55



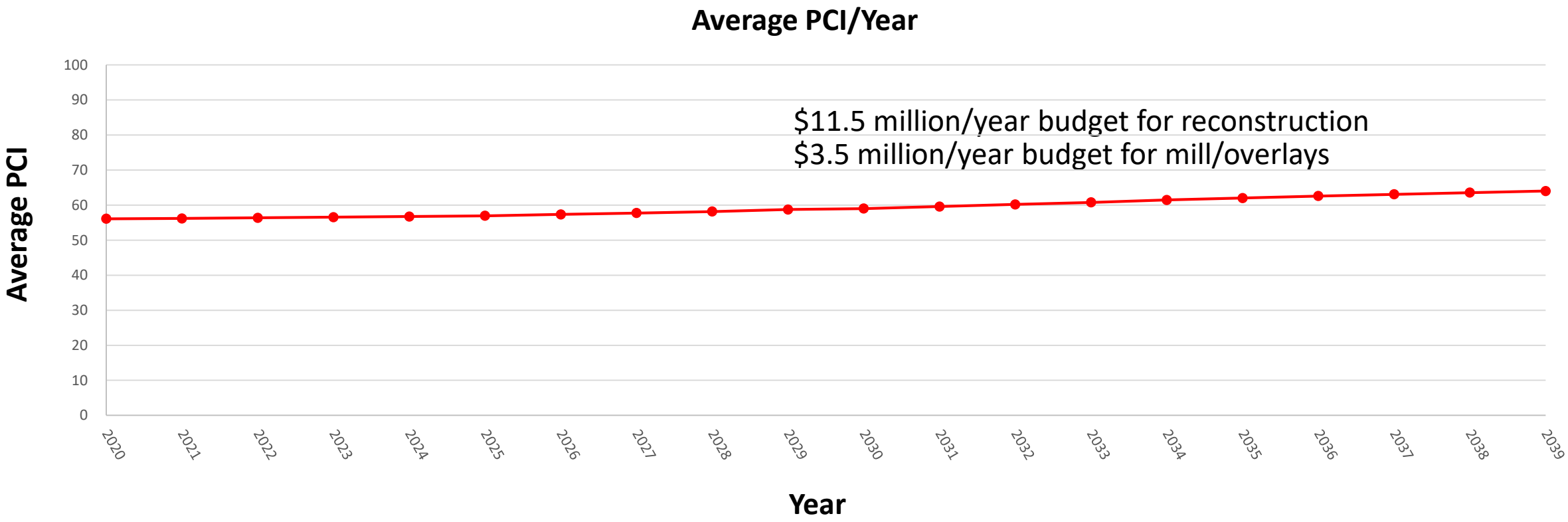
<u>Conclusion</u>: $1 million additional investment per year is needed to keep PCI's steady (average of 55 PCI) into the future.

Maintain PCI Scenario: Arterial Streets with PCI of 55



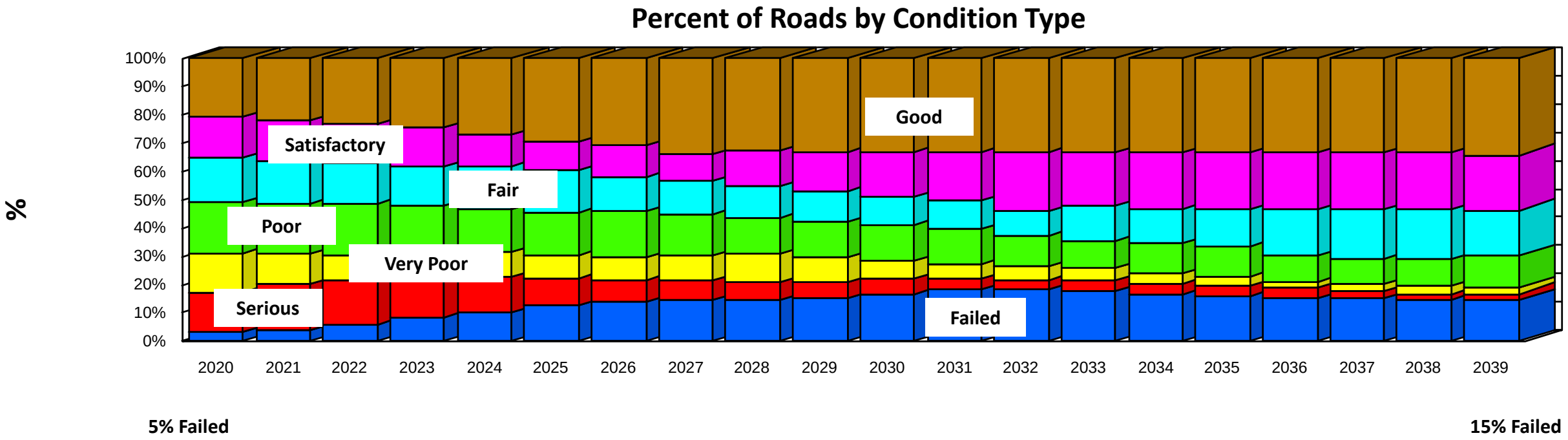
<u>Conclusion</u>: If PCI levels increase to 55 after 20 years, 25% of roads will be in failed condition by 2039, a five-fold increase over the current condition.

Increase PCI Scenario: Arterial Streets with PCI of 65



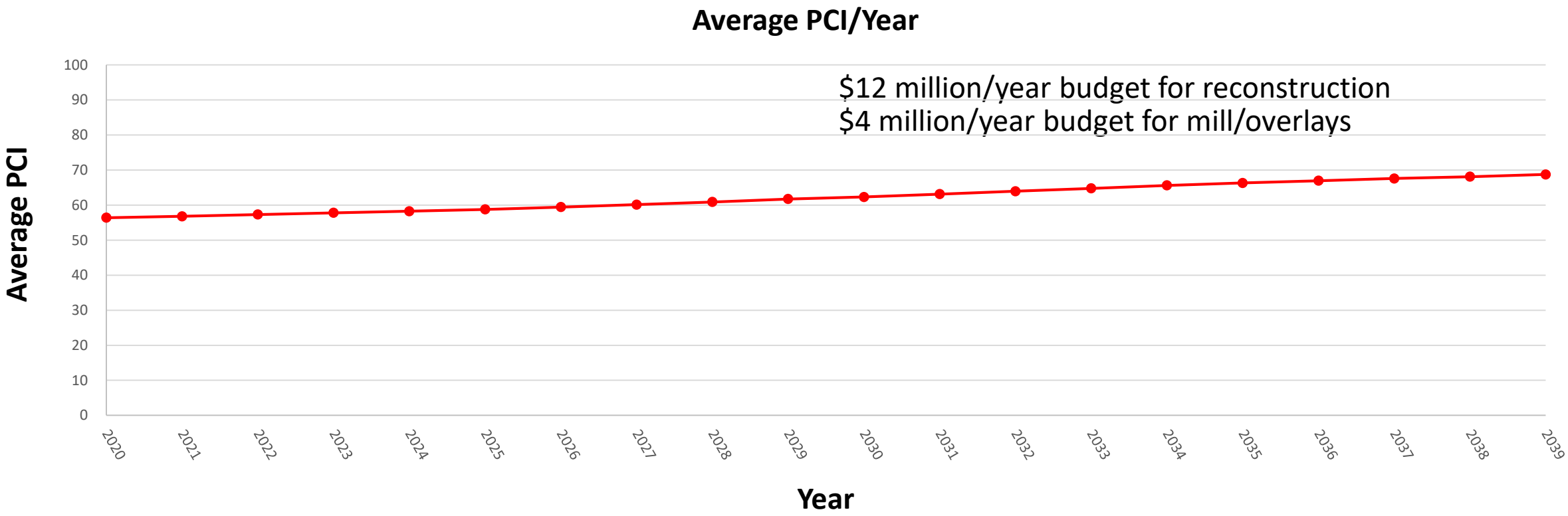
<u>Conclusion</u>: $4 million additional investment per year is needed to increase the PCI to 65 after 20 years.

Increase PCI Scenario: Arterial Streets with PCI of 65



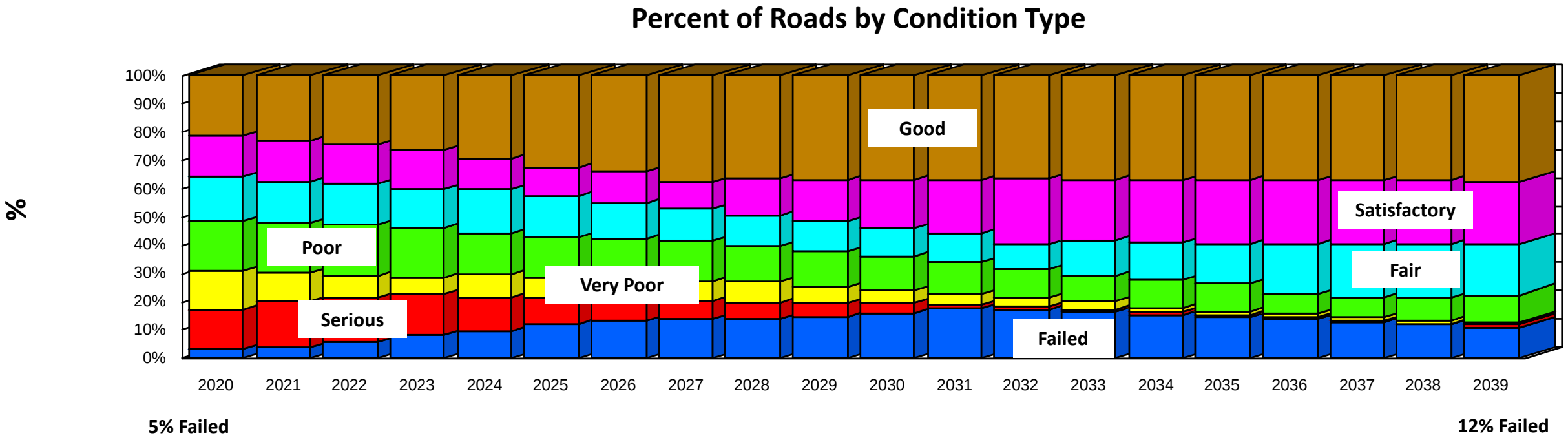
<u>Conclusion</u>: If PCI levels increase to 65 after 20 years, over 15% of roads will be in failed condition by 2039, tripling from the current condition.

Increase PCI Scenario: Arterial Streets with PCI of 70



<u>Conclusion</u>: $5 million additional investment per year is needed to increase the PCI to 70 after 20 years. This is $1 million more per year to boost the PCI goal from 65 to 70 after 20 years.

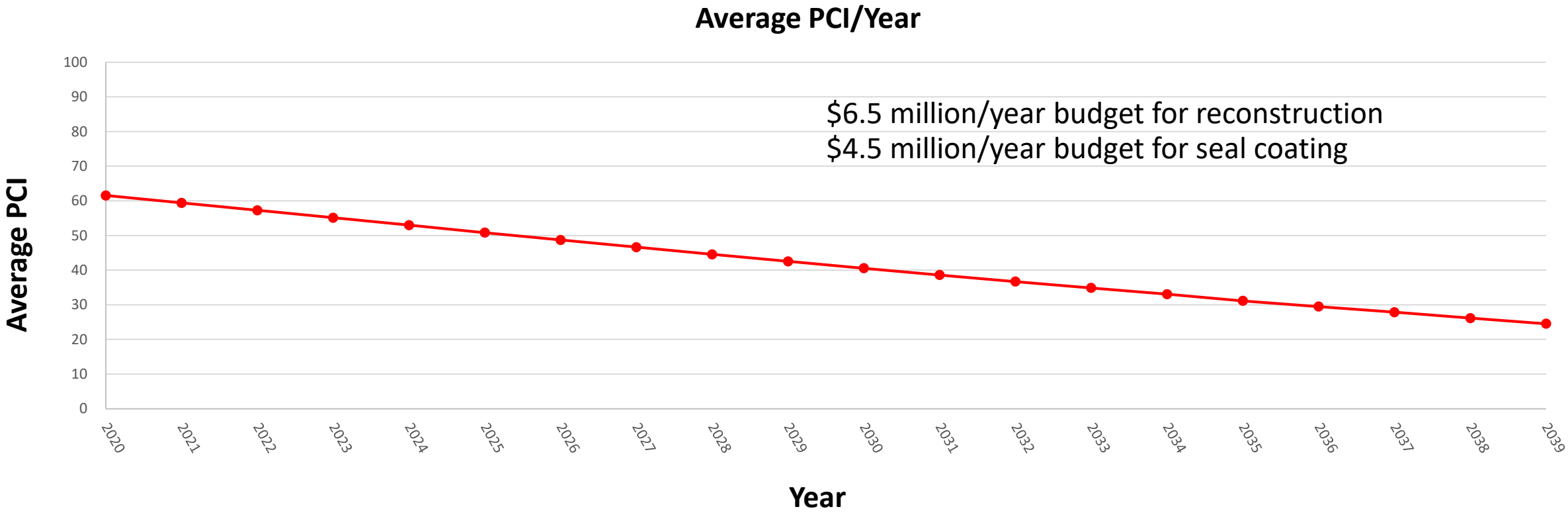
Increase PCI Scenario: Arterial Streets with PCI of 70



<u>Conclusion</u>: If PCI levels increase to 70 after 20 years, over 80% of roads will be better than poor by 2039.

Residential Pavement Analysis

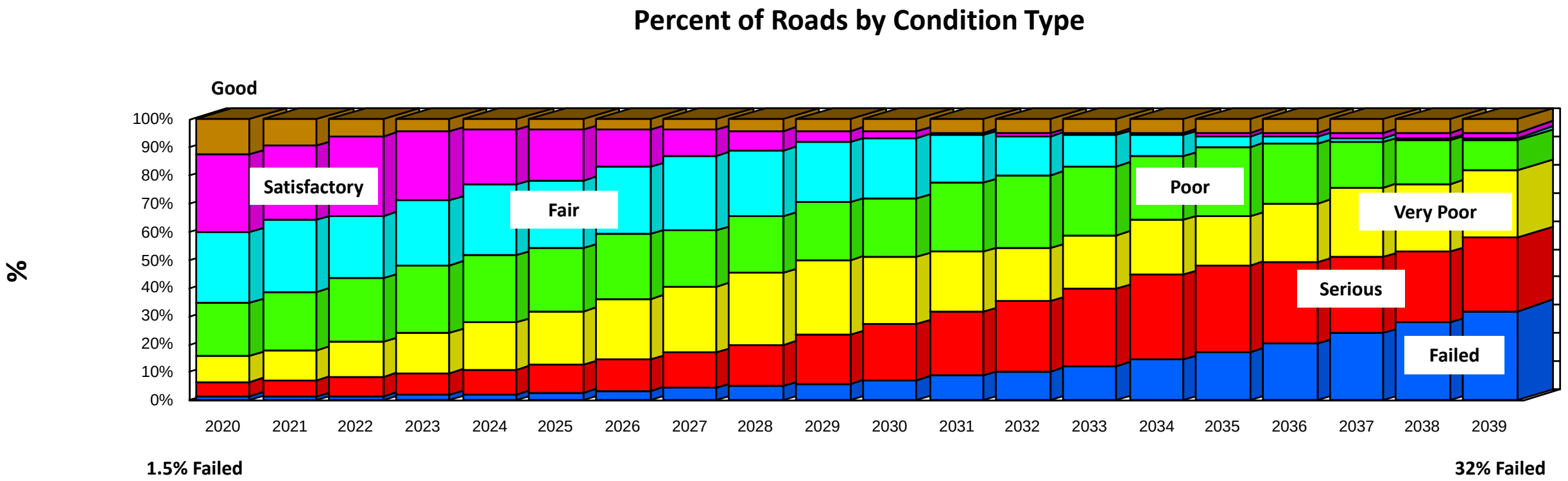
Current Funding Scenario: Residential Streets



<u>Conclusion</u>: If funding levels stay constant, average PCI's will drop from 64 to 25 in 20 Years

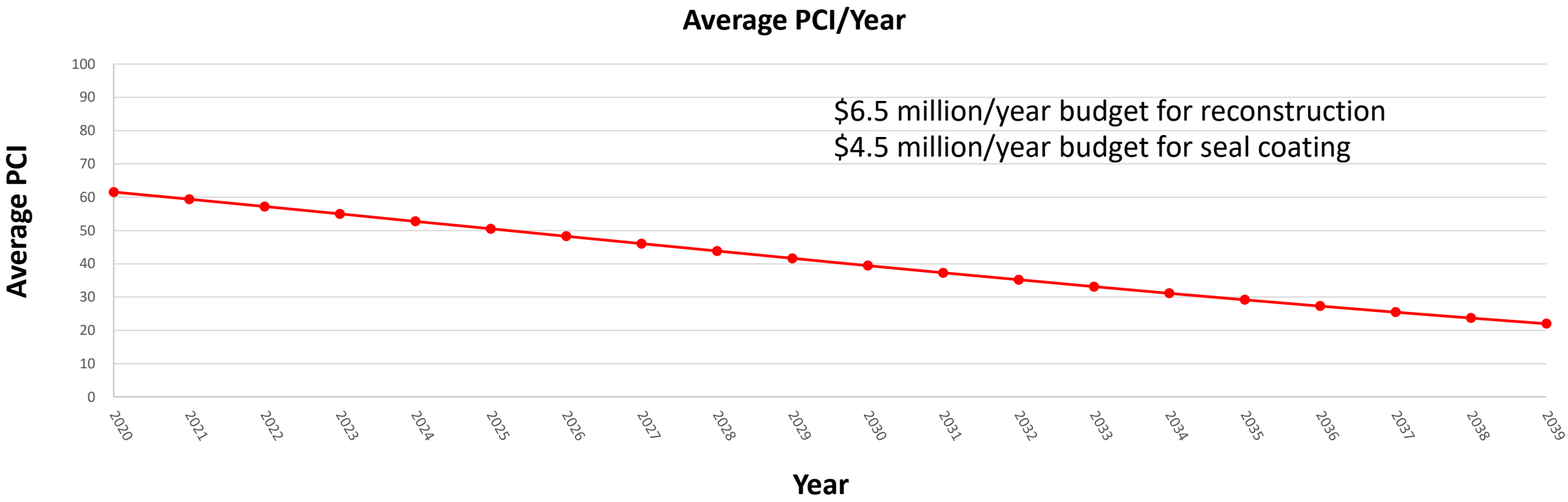
<u>Conclusion</u>: With current funding levels, a street is reconstructed on a 289-year cycle. Streets are designed to have a 60 year life with time critical maintenance.

Current Funding Scenario: Residential Streets



<u>Conclusion</u>: If funding levels stay constant, over 80% of streets will be in poor, very poor, serious, or failed condition by 2039. Failed and unserviceable mileage increases thirty-fold.

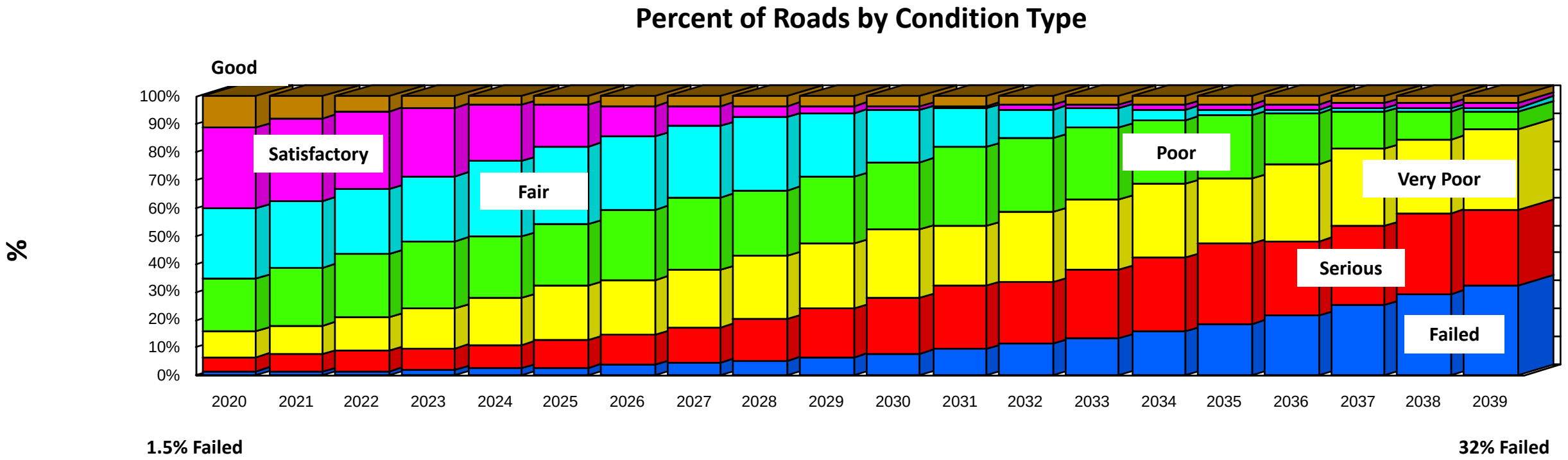
Current Funding Scenario: Residential Streets with Inflation



<u>Conclusion</u>: If funding levels stay constant, average PCI's will drop from 64 to 22 in 20 Years with inflation factored in.

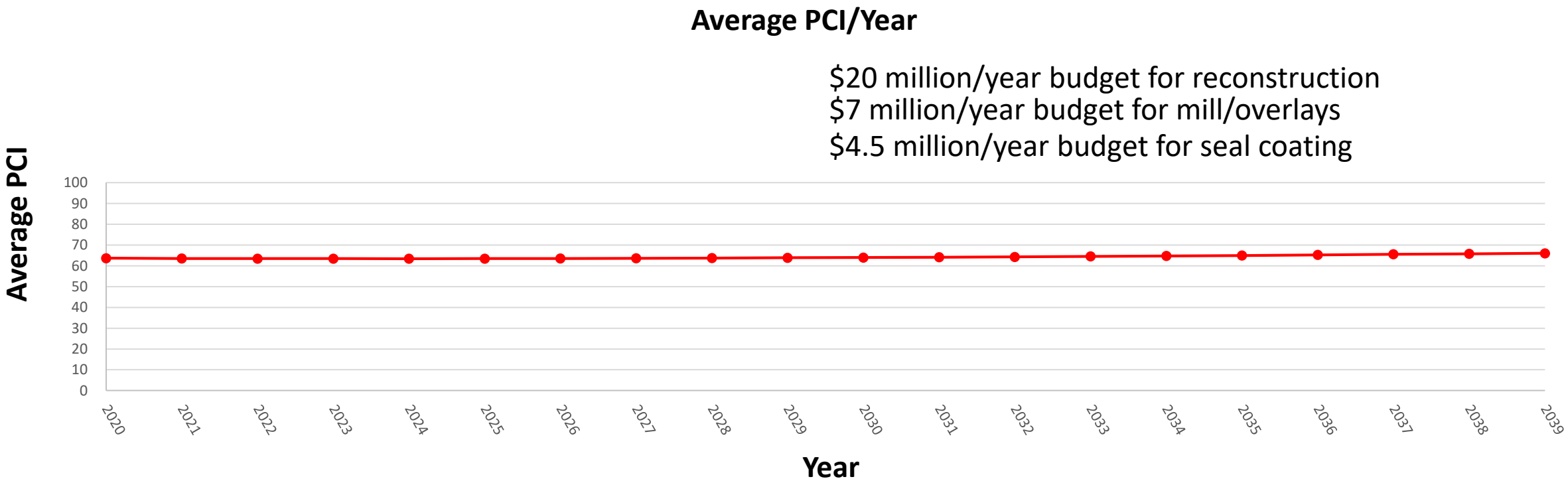
With no additional funding…

Current Funding Scenario: Residential Streets with Inflation



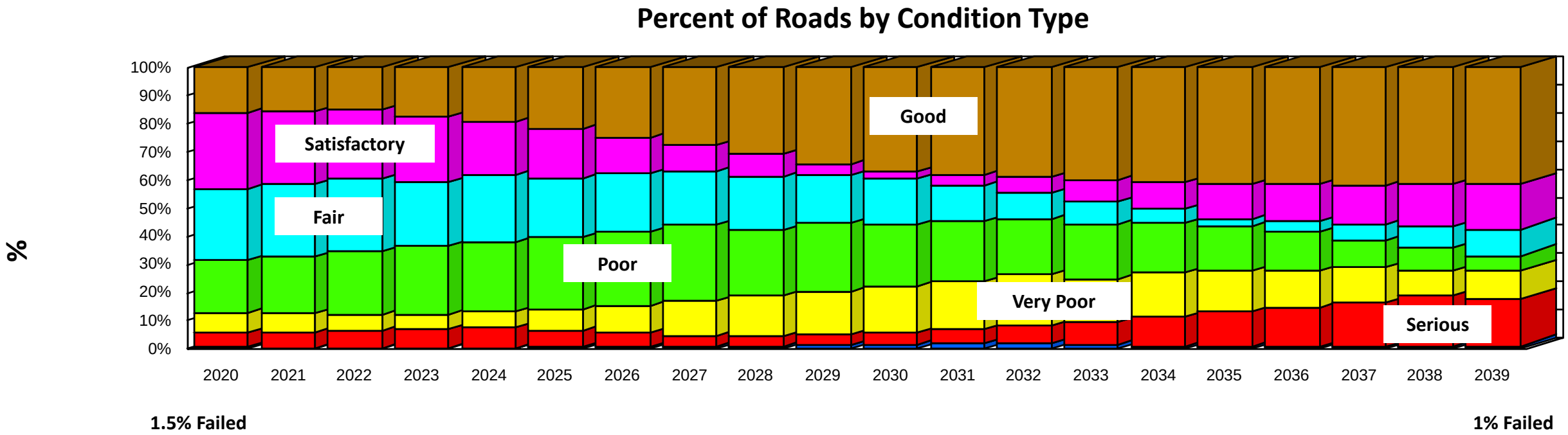
<u>Conclusion</u>: If funding levels stay constant, almost 90% of streets will be in poor, very poor, serious, or failed condition by 2039, assuming inflation is accounted for.

Maintain PCI Scenario: Residential Streets with PCI of 65



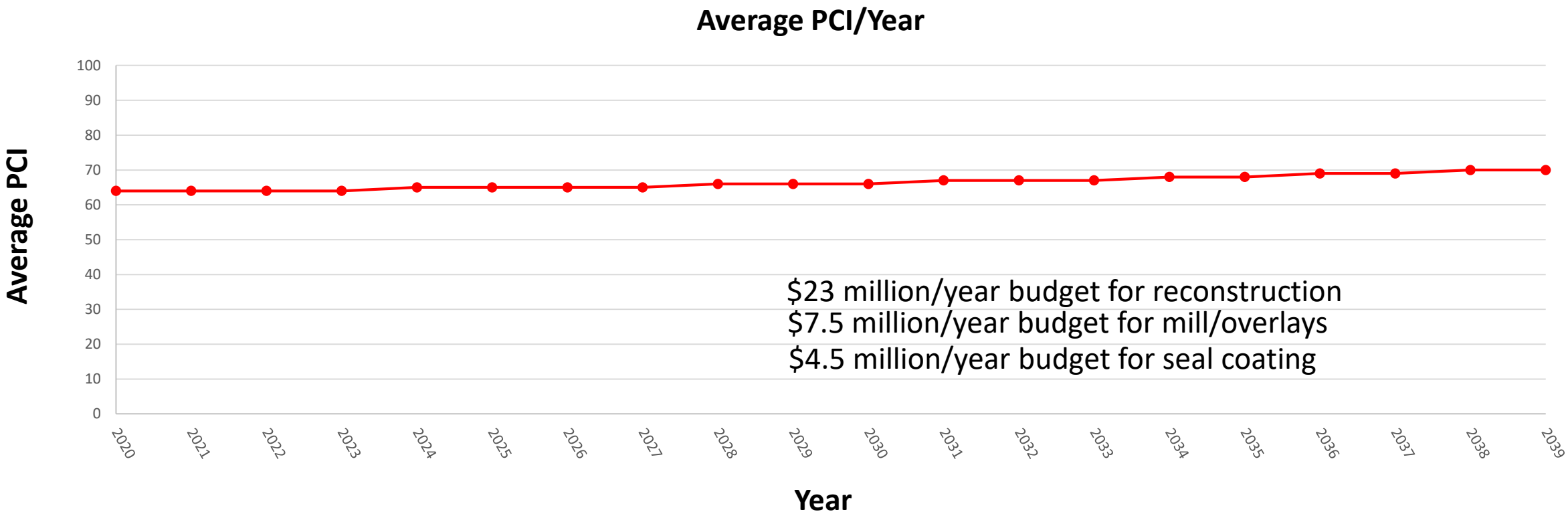
<u>Conclusion</u>: Additional $20.5 million investment per year is needed to keep PCI's steady (average of 65 PCI) into the future.

Maintain PCI Scenario: Residential Streets with PCI of 65



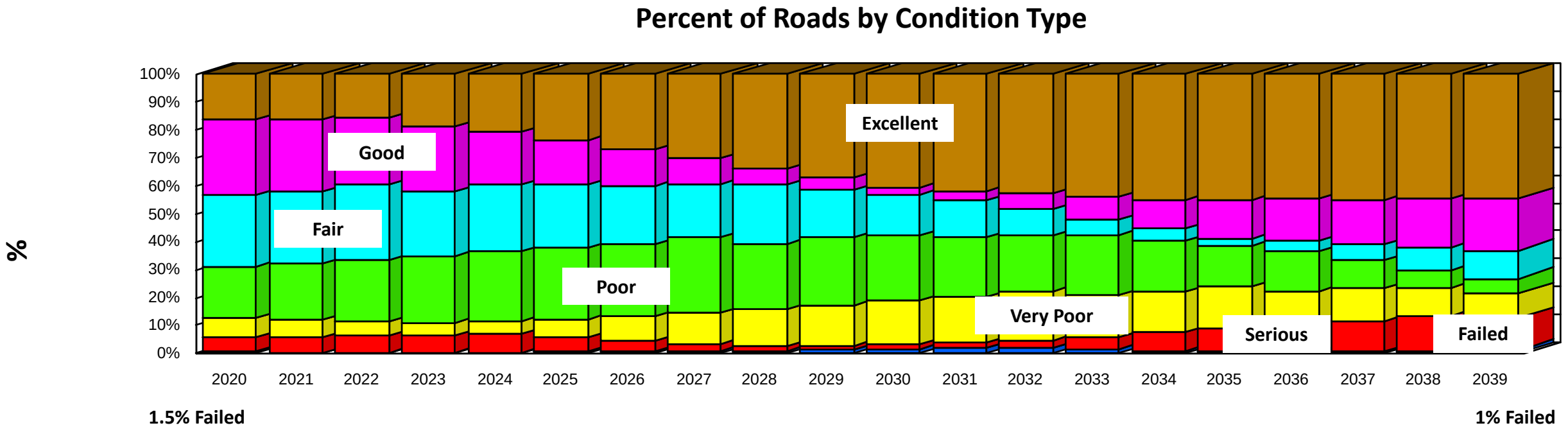
<u>Conclusion</u>: If an average PCI of 65 is maintained, over 65% of roads will be better than poor condition.

Increase PCI Scenario: Residential Streets with 70 PCI



<u>Conclusion</u>: Additional $24 million investment per year is needed to increase PCI to 70 after 20 years. This is an additional investment of $3.5 million to go from maintaining existing PCI of 65 to 70 after 20 years.

Increase PCI Scenario: Residential Streets with 70 PCI



<u>Conclusion</u>: If an average PCI of 70 is achieved, almost 75% of roads will be better than poor.

Options

Types of Pavement Treatments

Sealcoat

Crack-Seal

Mill and Overlay

Reconstruction

Pavement Life Cycle: Maintenance Treatments

PCI ↓

Category	Maintenance Activity
Prevention	Seal coat; crack-seal
Rehabilitation	Mill and Overlay; Reclamation
Replacement	Reconstruction

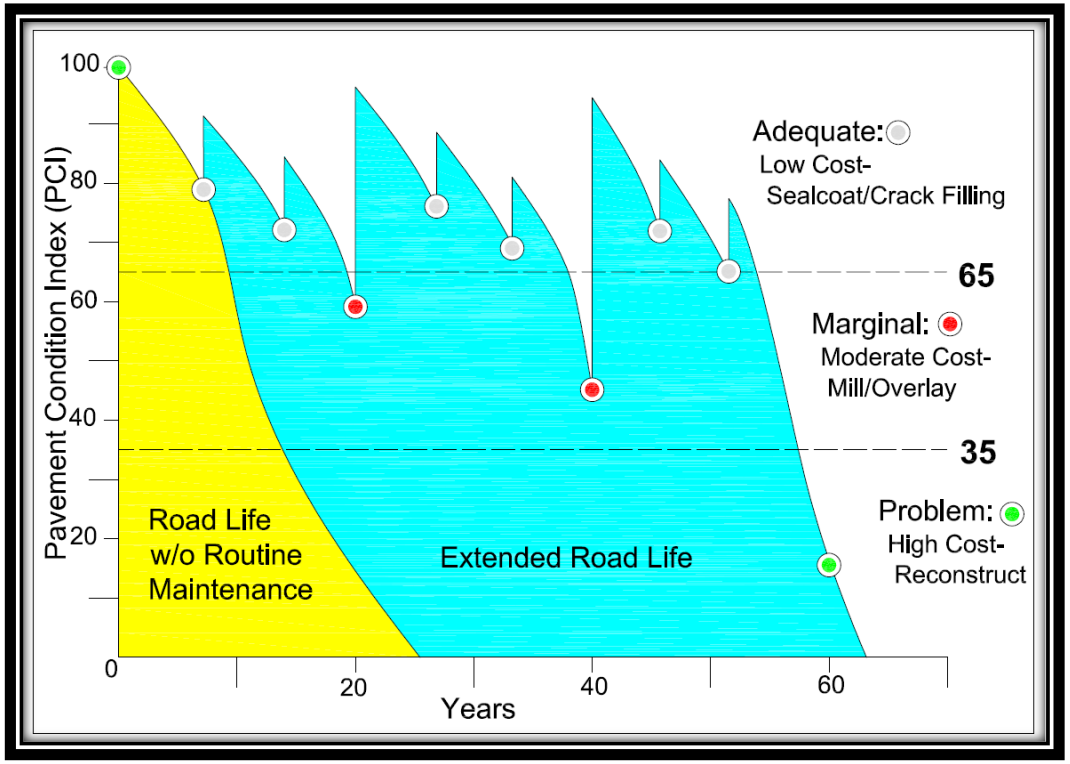
Annual Maintenance Considerations:

- An average of $4 - $6 million per year is spent on pothole patching
- There are staffing and equipment strains when patching, sweeping, and plowing must be done in the same timeframe
- This money could be gradually applied to paving if PCI's were to improve

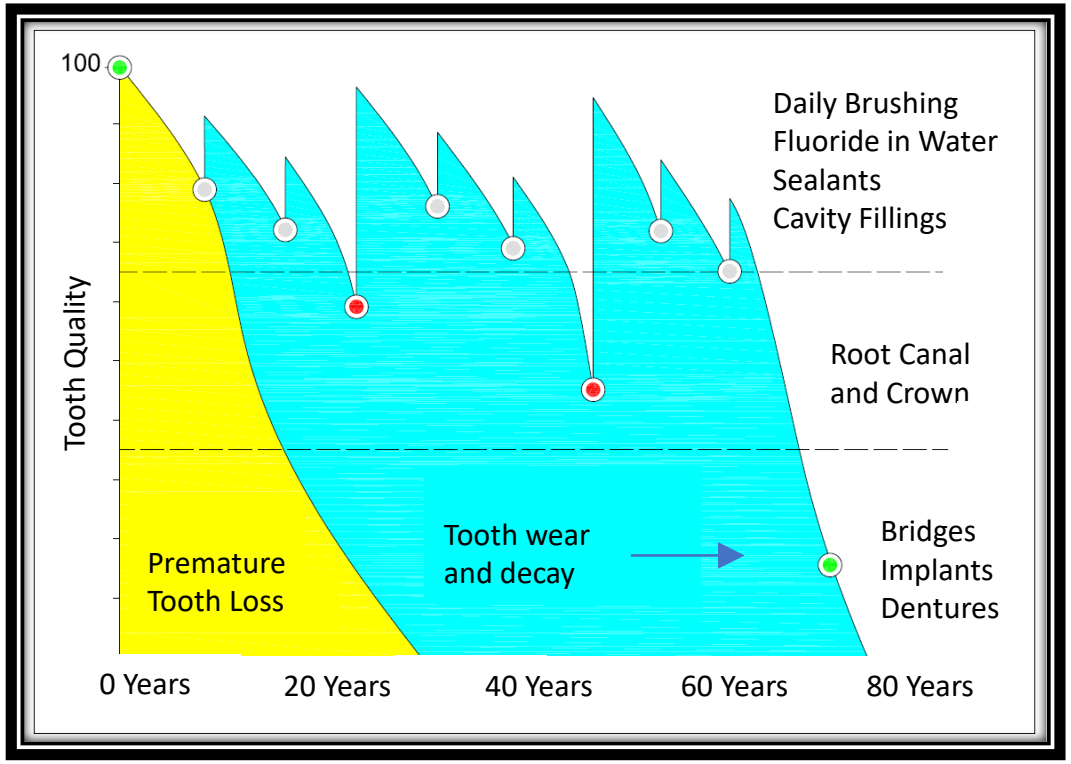
Along Earl Street near 3rd Street East

Pavement Life Cycle: Analogies

Pavement Life Cycle



Dentistry Treatments



Reconstruction vs. Mill and Overlay

- Mill and overlays on asphalt roads are most beneficial when PCI's are over 40 and the road is under 40 years old. Most roads should be reconstructed when PCI's fall below 40 or when the road is at the end of its useful life (50-60 years).

- Most of the "terrible 20" (roads given a mill and overlay in 2014/2015) will need attention again within 5 years.

- Residential streets should be considered for mill and overlays to prolong pavement life (currently the city does not mill and overlay residential streets).

Fairview Avenue near Highland Parkway in 2010 after the roadway was milled. Current PCI is 47 just 9 years after this mill/overlay occurred.

Concrete Streets

- Approximately 2% of city-owned streets are concrete pavements.
- Concrete roads require joint maintenance every 20 years.
- A concrete rehab program should be created similar to the mill and overlay program.
- The choice between asphalt or concrete pavement depends on criteria including heavy vehicle usage, soil condition, and cost.

The Jackson Street Reconstruction Project

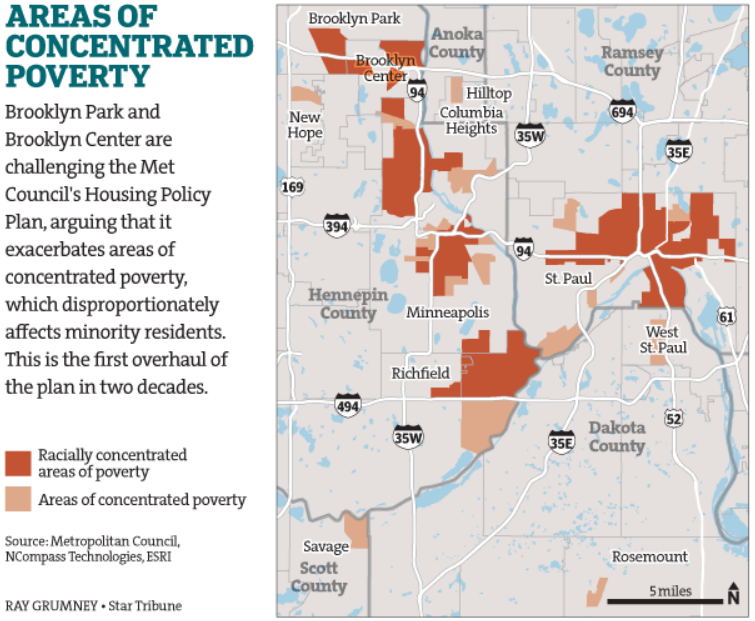
Non-motorized Benefits from Reconstruction Projects

- New reconstruction projects allow for the curb line to move, often allowing for a new bike facility.
- Smoother roadway surface for cyclists (also benefiting motorcyclists and electric scooter users).
- New sidewalks can be added where needed.
- New pedestrian ramps/ability to achieve ADA compliance.
- New signals with countdown/auditory features may be installed.
- New pavement markings and signage increase visibility.
- Improved geometry improves safety.
- New curb and gutter improves drainage (less water and ice in bike facilities and sidewalks).

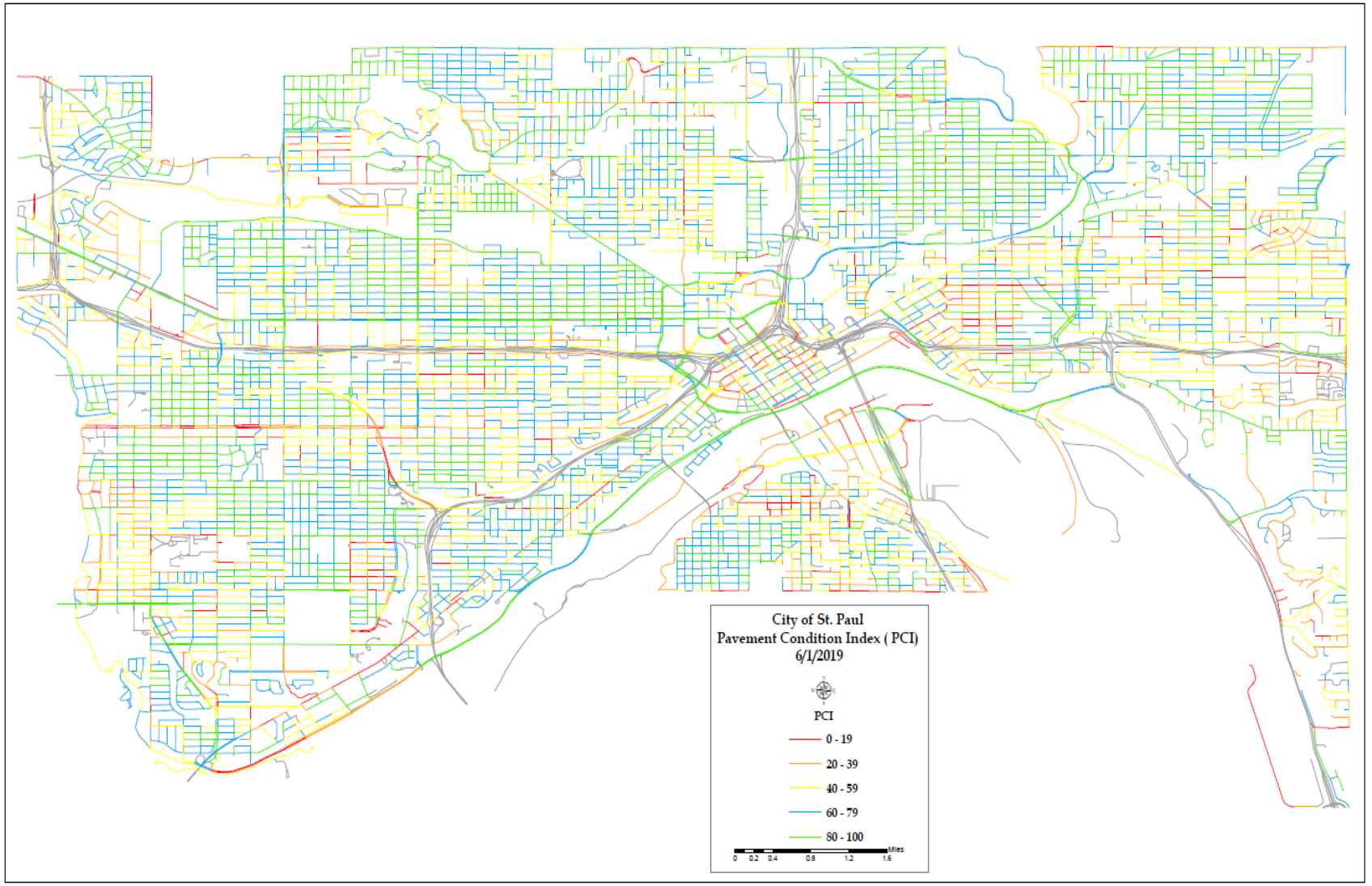
Newly constructed Como Avenue is a good example of how a reconstruction project can help improve the non-motorized environment.

Areas of Concentrated Poverty

- Roadway reconstruction prioritization criteria must look at areas of concentrated poverty.



Courtesy: Star Tribune



Saint Paul's PCI Map

How can we prevent these average conditions in the future?

Cost Breakdown Table:

	Scenario	Funding (Year)			**Total (Year)**	**Additional Funding Need**
		Reconstruction	Mill and Overlay	Sealcoat		
Arterial	Current Funding Scenario	$8.5 M	$2.5 M	-	**$11 M**	
	Maintain PCI at 55	$9 M	$3 M	-	**$12 M**	**$1 M**
	Increase PCI to 65	$11.5 M	$3.5 M	-	**$15 M**	**$4 M**
	Increase PCI to 70	$12 M	$4 M	-	**$16 M**	**$5 M**
Residential	Current Funding Scenario	$6.5 M	-	$4.5 M	**$11 M**	
	Maintain PCI at 65	$20 M	$7 M	$4.5 M	**$31.5 M**	**$20.5 M**
	Increase PCI to 70	$23 M	$7.5 M	$4.5 M	**$35 M**	**$24 M**

Conclusion:

65 Overall PCI = $46.5 million per year ($24.5 million per year increase)

70 Overall PCI = $51 million per year ($29 million per year increase) = 60 year reconstruction cycle

Funding Gap Options

- Reduce mileage, refuse new miles, and prolong roadway life:
  - Agency turn-backs should be minimized or at a minimum upgrades to the roadway must be made prior to the acceptance. New roads should have development agreements.
  - Roads are typically narrower when reconstructed.
  - Initiate and enforce road restrictions to minimize truck damage.
  - Experiment with pavement mixes to get longer lasting pavement.
- Reallocate or reprioritize existing funding (cut other spending):
  - Maintenance funds can be shifted over time.
  - Reduce debt

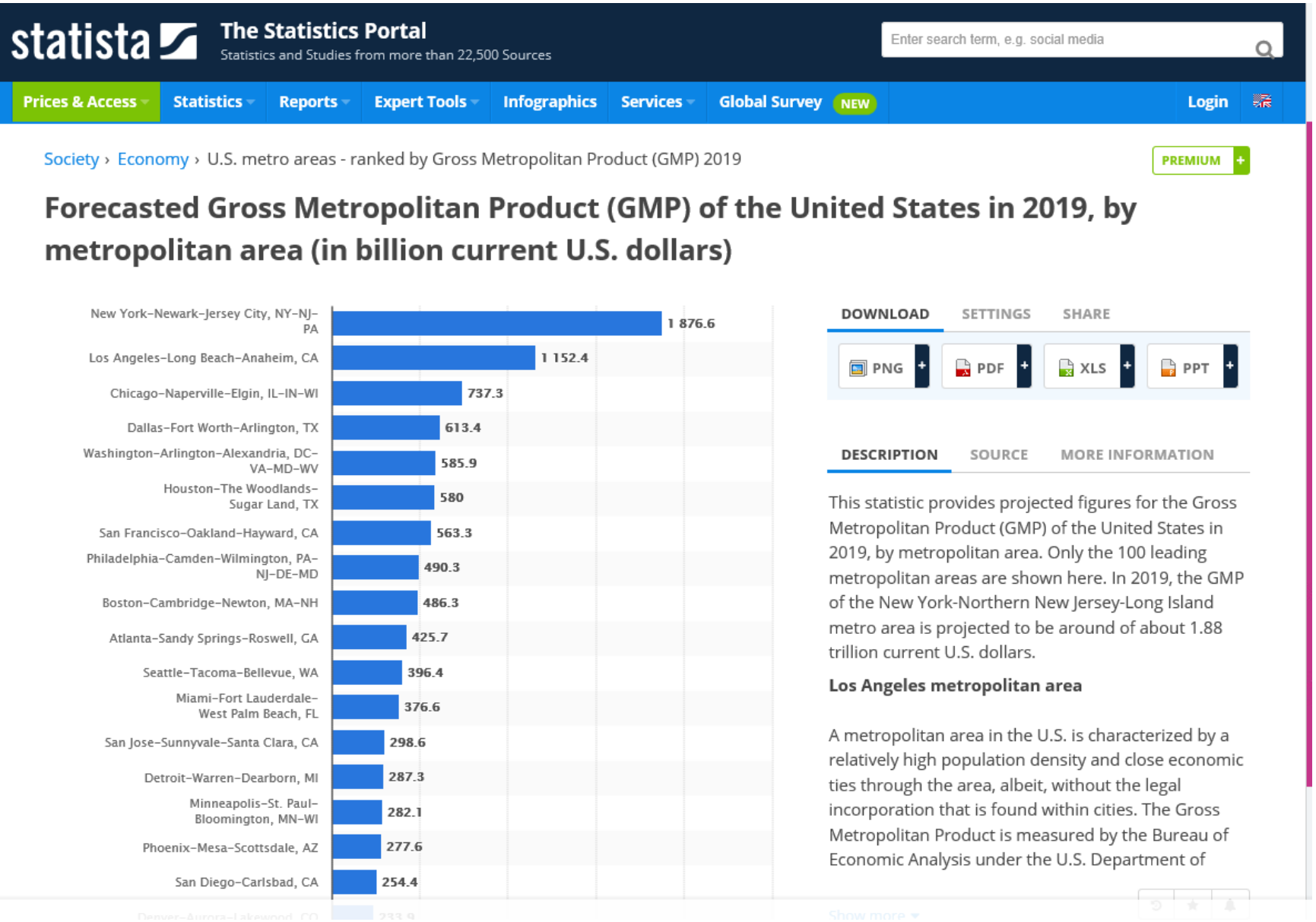
Along Earl Street

Funding Gap Options

- Find new funds:
  - Gas tax increase ($3 million per year – based on Governor's proposal).
  - Reform assessments.
    - Assess Ramsey County projects ($500,000 per year).
    - Assess by type of infrastructure.
    - Special Service Districts.
  - Sales Tax (may require legislative approval).
  - Raise Property Taxes/Bonding Referendum.
  - Explore User Fees

Minnesota State Capitol

Gross Domestic Product



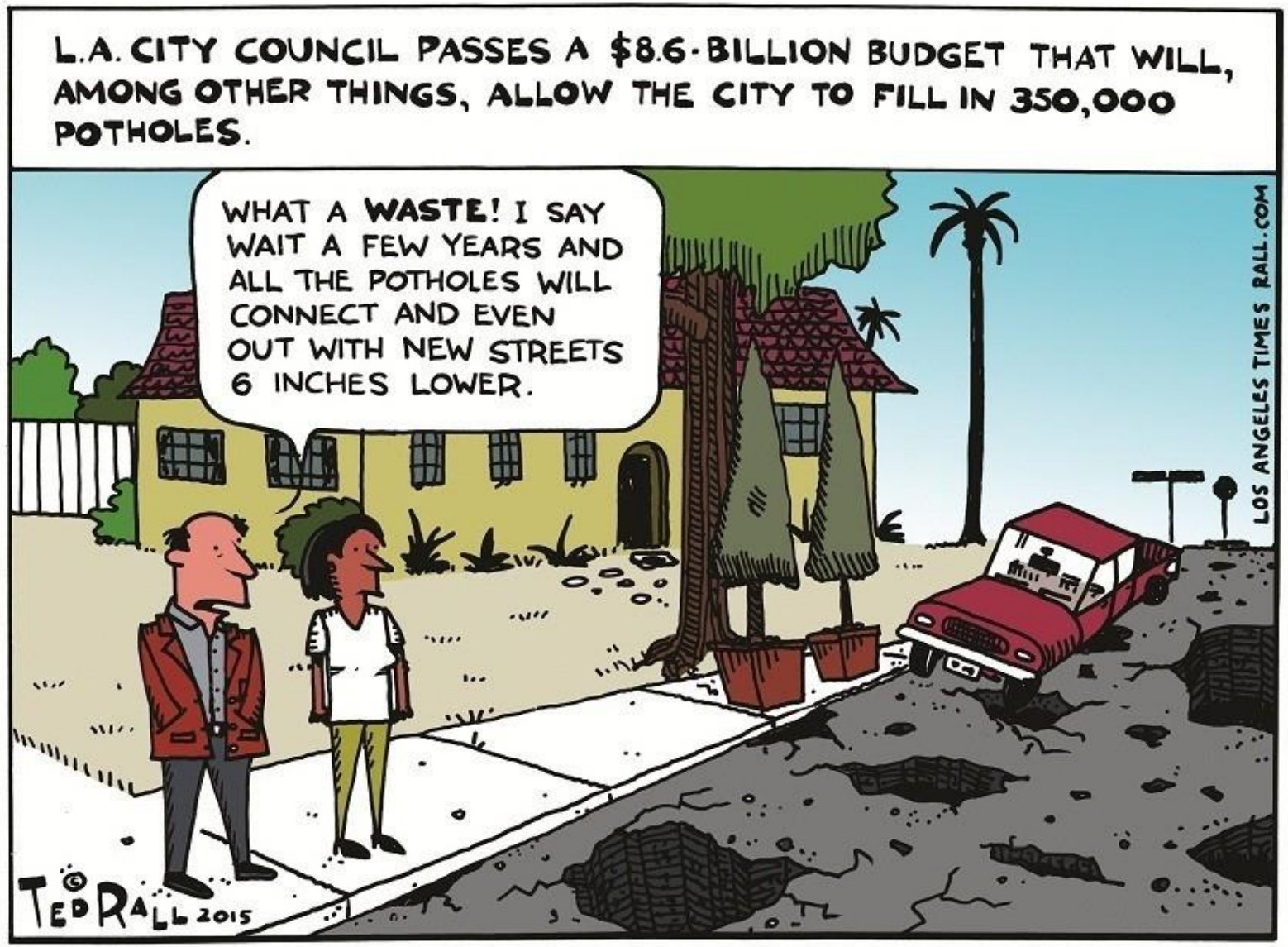
Facts:

- The Twin Cities has the 15th largest economy in the US
- The Twin Cities region has a larger GDP than Finland, Greece, Hungary, New Zealand, and Vietnam
- St. Paul currently has 158,618 employees within the city and 309,180 residents.
- St. Paul has added 27,101 residents since 2010.

Survey:

- How good was your PCI guess? Does this presentation change your opinion?

Questions


L.A. CITY COUNCIL PASSES A $8.6-BILLION BUDGET THAT WILL, AMONG OTHER THINGS, ALLOW THE CITY TO FILL IN 350,000 POTHOLES.
WHAT A WASTE! I SAY WAIT A FEW YEARS AND ALL THE POTHOLES WILL CONNECT AND EVEN OUT WITH NEW STREETS 6 INCHES LOWER.
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