Pavement Condition Report

March 2020

City of
SACRAMENTO
Department of Public Works

PAVEMENT CONDITION REPORT

2020 UPDATE

City of SACRAMENTO
Department of Public Works

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2020 UPDATE

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Sacramento Today

With over 3,000 lane-miles of streets, the City of Sacramento owns and maintains the fifth largest city street network in California. Only the cities of Los Angeles, San Diego, San Jose, and Fresno have larger street systems in California.

In addition, Sacramento has the highest population density in the region and serves as a regional hub, so the streets carry a correspondingly higher traffic volume than most other cities.

This large street network is a significant public asset, valued at over $1.9 billion and is used by hundreds of thousands of automobiles, buses, trucks, bikes, and pedestrians daily.

With this in mind, the Department of Public Works is committed to cost-effective maintenance strategies that will fulfill their mission and vision to "keep the City of Sacramento operating and moving forward."

To achieve this, the Department has utilized a pavement management program (PMP) for many years. A PMP is a planning tool that answers questions such as:

- What does the City's street network consist of?
- What is the existing condition of the City's streets?
- What maintenance and rehabilitation strategies are deployed to improve street conditions?
- Is the current funding adequate?
- What is the most cost-effective way to implement a multi-year resurfacing program?
- What are the impacts of additional funding?

This report summarizes some of the key information on the City's street network and answers the above questions.

Pavement Condition

In order to determine the health or condition of the streets, a standard called the Pavement Condition Index (PCI) is used. The PCI is a scale from 0 to 100, with zero being a pothole-riddled street and 100 a newly surfaced street. A PCI score of 70 to 100 is considered "Excellent/Good," 50 to 69 is "Fair," 25 to 49 is "Poor," and 0 to 24 is "Very Poor." The PCI may be considered similar to a "grade" for each street section. Generally, it is desirable to achieve a PCI of 75 or above because pavement in this condition can be much more economically maintained. The photos to the right illustrate a range of city streets in different conditions.

A portion of the street network is surveyed every year using the ASTM D6433 pavement distress protocols, which are nationally accepted and used by many cities and counties in the United States, as well as internationally. The arterials are inspected annually and approximately one-third of the residentials are inspected every year. This provides an up-to-date snapshot for planning purposes.

In 2019, Sacramento's streets had an average PCI of 60, which is considered to be in "Fair" condition. For comparison, Figure 1 indicates that Sacramento is in the mid-range compared to other large cities[1]. However, Sacramento is in the bottom third compared to other cities in Sacramento County. The statewide average is 65.

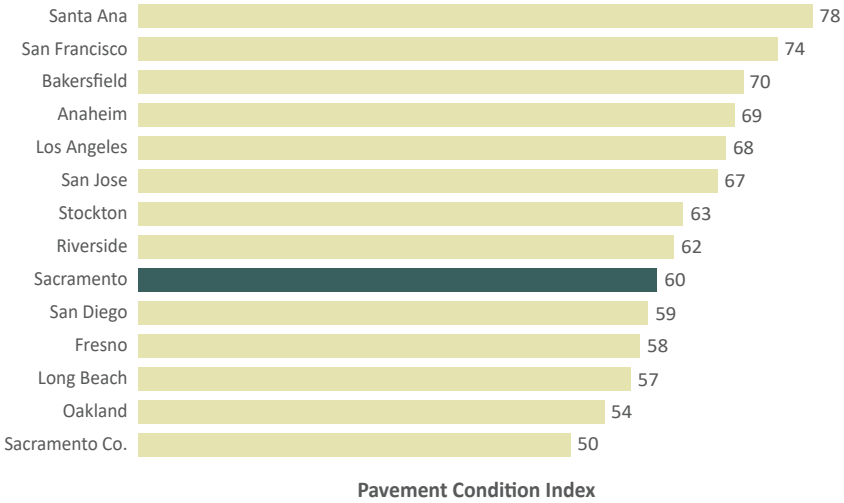


Figure 1. PCI Comparison with Other Large Cities

[1] PCI data are from the 2018 *California Statewide Local Streets and Roads Needs Assessment*, October 2018, with exception of Oakland, Fresno, Sacramento City, and San Francisco (2019).

The pavement network is composed of different classifications, such as arterials, collectors, and residential streets. Arterials are characterized by higher speed; more truck, bus, and automobile traffic; and typically have four lanes or more. Residential streets are typically two lanes and have much lower speed and traffic. Collectors are in-between; their function is to "collect" traffic from residential streets and funnel them to arterials. Like all cities, Sacramento has significantly more residential streets (60 percent) than any other classification (Figure 2). Arterials have a slightly lower PCI (59) than collectors (61) and residential streets (60). This illustrates the impact of higher traffic volumes with a greater percentage of trucks.

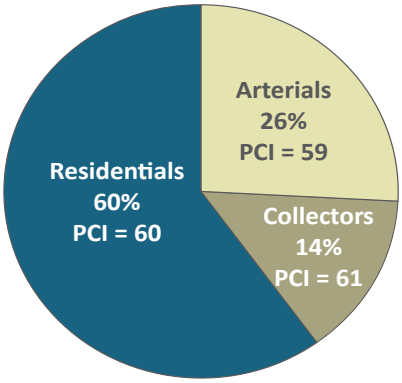


Figure 2. Pavement Network Breakdown

There are significant financial implications to a decreasing PCI. Obviously, pavements deteriorate over time. The deterioration is slow at first, but then accelerates when the PCI drops below 70 (see Figure 3). As the pavement deteriorates, the cost of repair also increases rapidly. If there is inadequate funding to maintain streets in their current condition, the unfunded backlog will grow rapidly in the future.

The unfunded backlog consists of pavement repairs that cannot be performed due to lack of funding. This includes street maintenance, rehabilitation, and reconstruction activities. Deferring maintenance to future years will result in higher costs, as streets that need to be overlaid now will require reconstruction later. The City's current unfunded backlog is approximately $225 million.

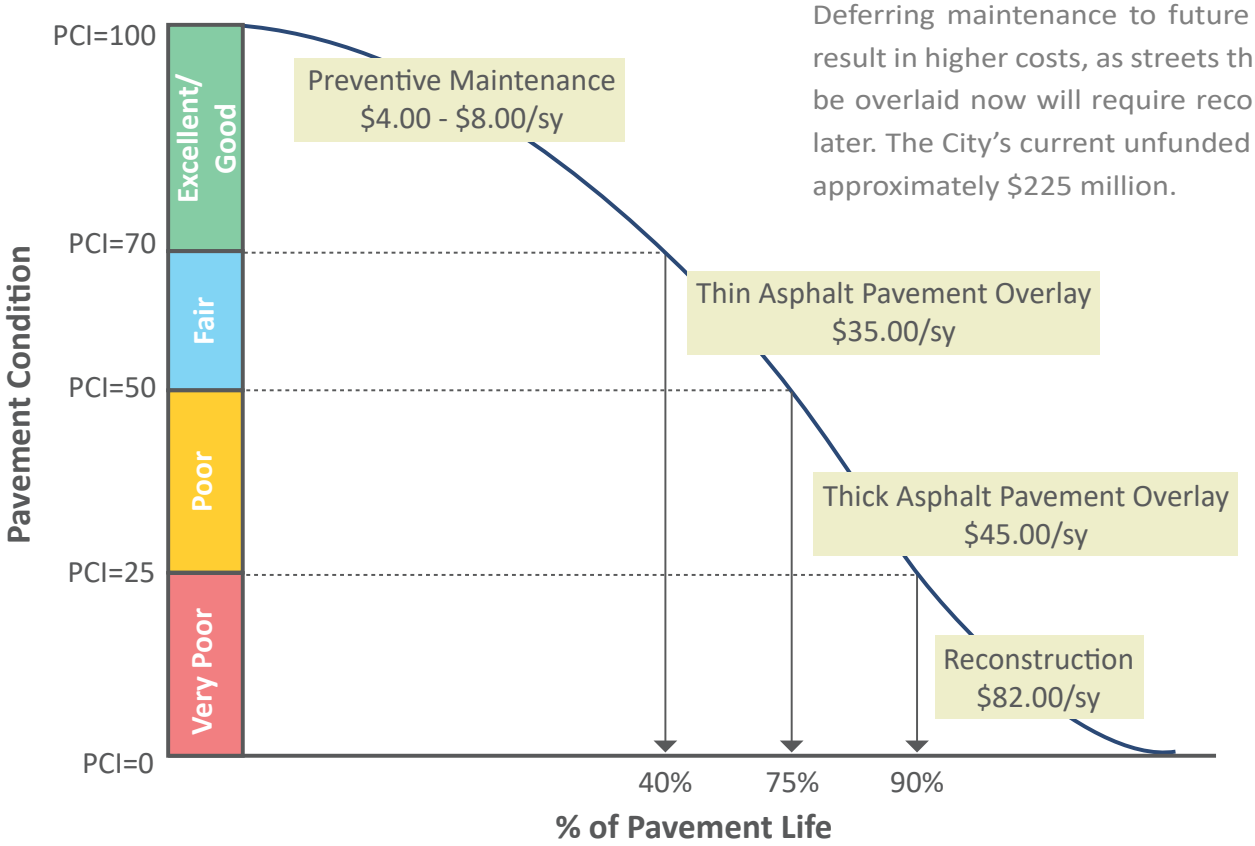


Figure 3. Pavement Life Cycle and Repair Costs

Council Districts

The street network is almost evenly divided among the eight council districts, but the roads are not necessarily all in the same condition. Figure 4 indicates that District 1 has the highest PCI (72) and District 2 the lowest PCI (52), with the remaining districts in the high 50s to low 60s. This is due to the fact that the streets in District 1 are newer than those in most other districts; in addition, deferred maintenance on older streets results in faster deterioration and hence a lower PCI.

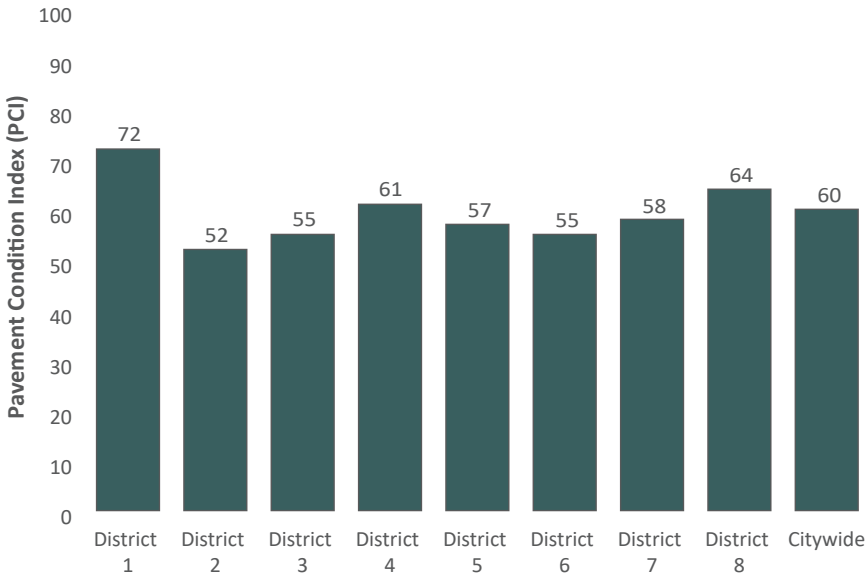


Figure 4. Average PCI by Council District

Pavement age is just one factor in today's pavement condition; traffic levels, the underlying subgrade soils, drainage flows, and past maintenance practices are also contributing factors. Therefore, it should not be surprising that the PCIs for each district are not identical (Figure 5 shows the percentage of streets in each condition category for each district). Consequently, it is not always possible to implement a "one size fits all" approach to maintenance. Each district will have different funding and maintenance needs.

Appendix A, included in the back of this report, contains maps of each council district and the condition of the streets in those districts, as well as the unfunded backlog.

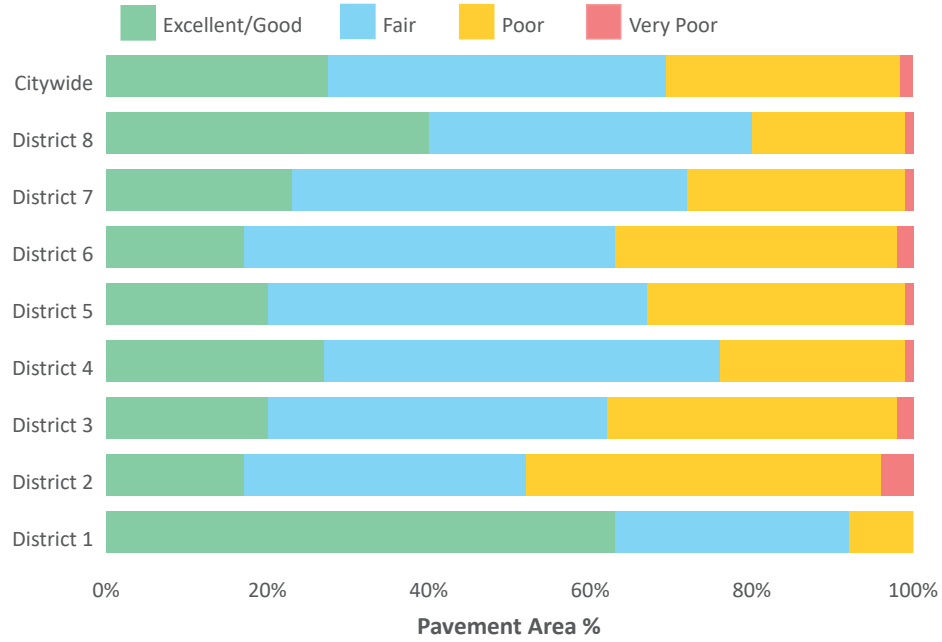


Figure 5. Breakdown of Condition Categories for Each Council District

Maintenance Strategies

The street condition is affected by the type and timing of maintenance strategies. Historically, the Department has implemented a variety of maintenance treatments to repair streets. These techniques include a combination of relatively inexpensive pavement preservation treatments such as slurry seals on streets in good condition to significantly more expensive overlays and reconstruction for streets in fair and poor condition. The Department follows best management practices to extend the paving dollar as much as possible by implementing an aggressive pavement preservation policy. Some of the treatments that have been applied include rubberized overlays and seals, recycled asphalt pavements, and bonded wearing courses.

Figure 3 (on page 3) summarized the general costs of repair for streets in different conditions. For example, streets that are in good condition require seals at an average cost of $4 per square yard. In contrast, streets that are in very poor condition will require reconstruction at costs of as much as $82 per square yard, which is 20 times more expensive. Or to put it another way, the cost of reconstructing one failed street is equivalent to the cost of preserving 20 good streets.

Reconstructing one failed street is equivalent to preserving 20 good streets.

Maintaining streets is, in many ways, similar to maintaining a car. For example, inexpensive oil changes are much more cost-effective in the long run than foregoing maintenance and replacing the engine when it fails.

Americans with Disabilities Act (ADA) Requirements

The maintenance of streets also requires a "complete streets" approach to design, operation, and maintenance to enable safe access for users of different ages and abilities, regardless of the mode of transportation. This affects all aspects, such as restriping for bike lanes, traffic signals, or modifications to reduce speeds. A key component of this is the Americans with Disabilities Act (ADA), which requires public entities to ensure that persons with disabilities have access to the pedestrian routes within the public right-of-way.

In July 2013, a joint technical guidance was published by the Department of Justice and the U.S. Department of Transportation to clarify which road maintenance activities would trigger the need to upgrade affected curb ramps to current standards. Essentially, any street maintenance defined as an "alteration" triggers the requirement to upgrade ADA curb ramps.

Almost all of the treatments utilized by the Department are considered "alterations;" this affects an estimated 25,400 curb ramps and will accelerate the schedule to upgrade non-compliant ramps. The upgrading/replacement of curb ramps represents a significant opportunity for the City to improve ADA access during the completion of pavement rehabilitation and maintenance activities, but the costs for these ramp upgrades need to be planned and accounted for in the City's paving costs. As an older city, most of Sacramento's streets were built prior to current ADA standards. It is estimated that upgrading curb ramps adds as much as 37 percent to street paving costs. The City has committed at least 20 percent of its annual transportation funds for ADA compliance.

The photos show examples of compliant and non-compliant curb ramps.

Compliant curb ramp

Non-compliant curb ramp

Non-compliant curb ramp

Historical Funding and Pavement Maintenance

When sufficient funding is available, it is possible for any city to maintain streets at an acceptable level. However, for Sacramento, Figure 6 illustrates two trends that have occurred since 2008:

1. Reduced Treatment Area: Between 2008 and 2010, almost 180 lane-miles of streets were maintained or repaired each year. However, since 2011, this has dropped to an average of 52 lane-miles per year, or about a third of the previous level of effort.

2. Declining Pavement Condition: The result is a downward trend in pavement condition as illustrated by the Pavement Quality Index (PQI). The PQI is a measure that was used between 2008 to 2016; beginning in 2017, the City switched to the more widely accepted PCI as discussed in the previous section. Note that there was no resurfacing program in 2017 (due to lack of funding) or in 2019 (due to high bids).

There are several reasons for the decreased number of streets treated:

- The City's funding levels reached a high of $14.3 million in 2009 (primarily ARRA[2]) (see Figure 7), and then dropped sharply to $5.3 million in 2010. Funding did not improve significantly until 2019, when SB1 was passed (see next section).
- The cost of complying with regulatory requirements has increased (e.g., ADA compliance).
- Construction costs have steadily increased since 2012.
- Operational costs have also increased.

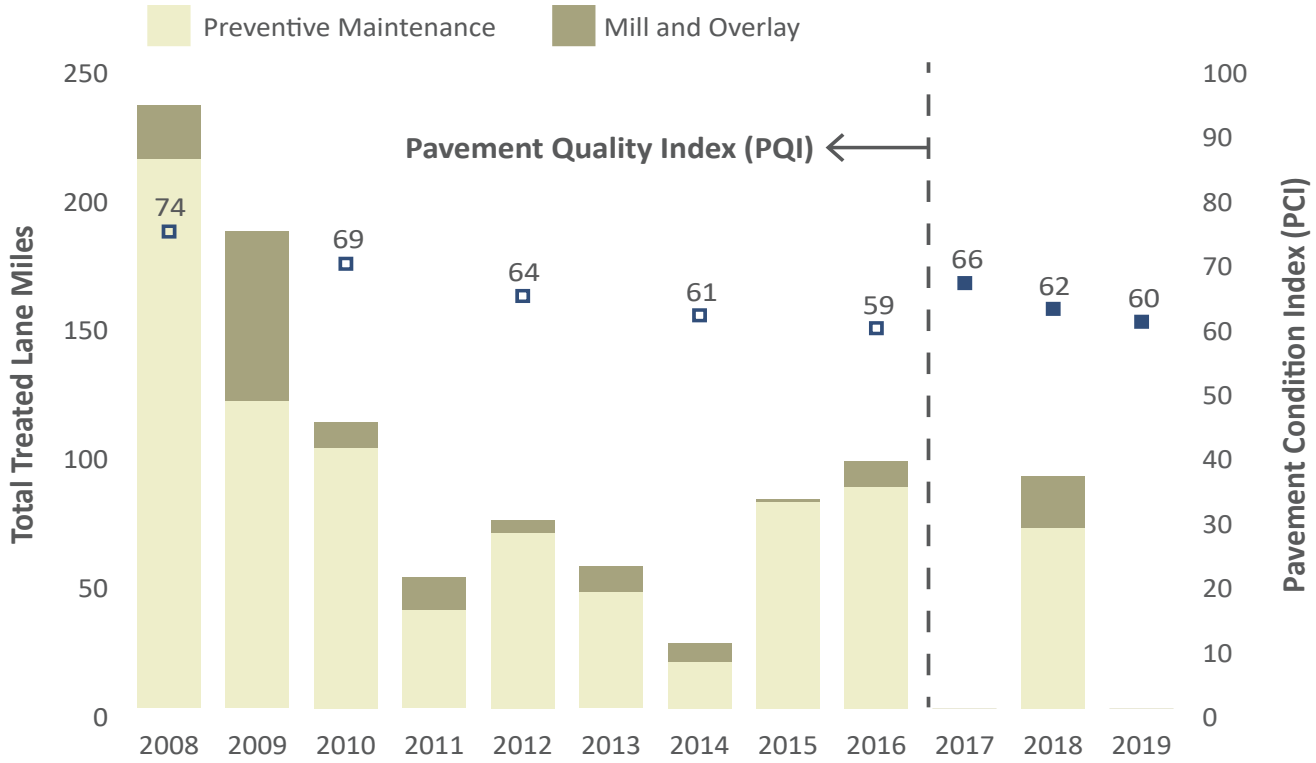


Figure 6. Historical PQI/PCI and Total Treated Lane Miles

[2] *American Recovery and Reinvestment Act* of 2009.

Funding Sources

Funding for pavement maintenance typically comes from dedicated sources, including the State gas tax and voter-approved dedicated transportation sales tax. These funds are used for all transportation-related expenses, not just pavement maintenance. These expenses include meeting operational needs; performing emergency repairs; complying with regulatory requirements; and maintaining, replacing and modernizing aging infrastructure and equipment.

The City's funding for pavement repairs comes from a combination of federal, State, and local sources (see Figure 7). Each is briefly described in the following paragraphs.

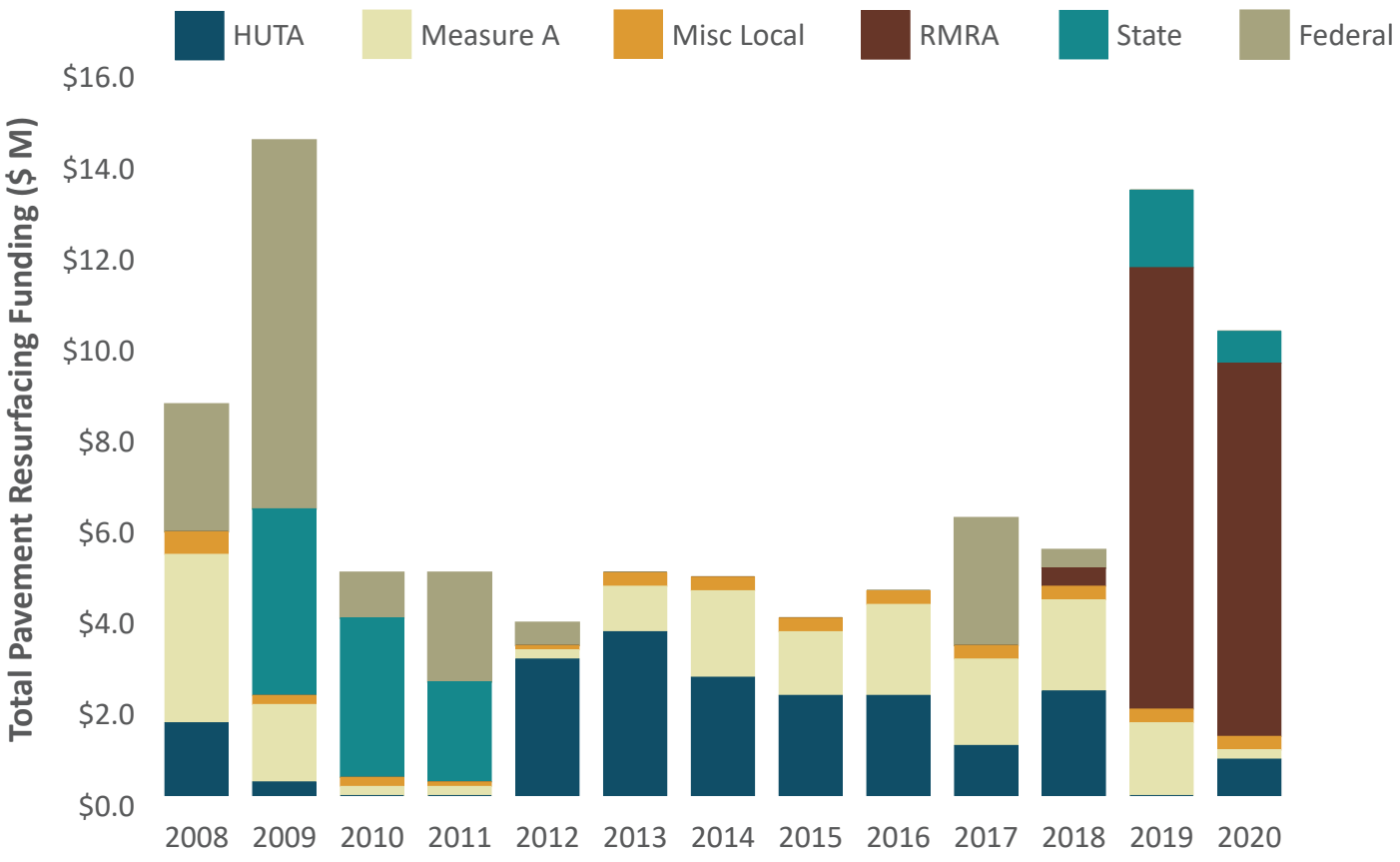


Figure 7. Historical Funding for Pavement Resurfacing

Federal Funding

Federal funding for road rehabilitation historically was available through the Regional Surface Transportation Program (RSTP), the largest and most flexible source of federal transportation funding. Regional shares of RSTP is allocated to the Sacramento Area Council of Governments (SACOG) using a population-based formula.

Prior to 2002, Sacramento received a proportionate share of RSTP to use on priority pavement rehabilitation projects. In 2002, SACOG revised its program to require the four-county region to compete for all regional funding. Over time, it planned to phase out funding for roadway rehabilitation, with the expectation that State funding would increase. Additional sources of State funding did become available, but they were generally one-time funds.

With the great recession, the federal government provided one-time federal stimulus funding to the region, known as the America Recovery and Rehabilitation Act (ARRA), leading to a spike in funding in 2009.

Since that time, federal funding for pavement rehabilitation from RSTP funds, allocated by SACOG, has been very limited. In addition, SACOG's total funding for pavement rehabilitation declined, particularly for its larger member agencies. This corresponded with declines in gas tax, resulting in overall lack of available funds for investment in pavement maintenance at a critical time.

In general, the City of Sacramento receives a substantially lower amount of federal funding per capita than other agencies in the region, particularly smaller and suburban cities. As a result, federal RSTP is no longer considered a reliable or significant source of pavement rehabilitation funding for Sacramento.

Gas Tax (Highway Users Tax Account or HUTA)

California has a per-gallon excise tax on gasoline and diesel which is distributed to cities and counties using a formula based on population and mileage. The gas tax is restricted to specific transportation uses for public roads and associated facilities.

The gas tax was historically the City's single largest source of transportation funding. Until 2017, the base excise tax of 18 cents per gallon had not been raised for over 20 years, so its purchasing power had eroded by about half since 1994.

In 2010-11, the State implemented a complicated process where the sales tax on gasoline was eliminated in favor of a variable excise tax (the so-called "tax swap"), which made gas tax revenues even more volatile. This led to an overall decrease in gas tax revenues of nearly 40 percent between 2013 and 2017. The new State transportation package addresses this volatility and allows for inflation adjustments every three years.

Forecasts of future gas tax revenues are challenging, as they are highly dependent on oil prices and demand. Overall, the long-term expectation is that this will be a declining revenue source as more fuel-efficient and alternative-fuel vehicles comprise a larger portion of the vehicle fleet. In the short-term, gas tax revenues should increase slightly as the result of population growth and adjustments that index to inflation.

Measure A (Countywide Transportation Sales Tax)

Sacramento County has a voter-approved half-cent sales tax to fund transportation improvements such as transit and street maintenance. Sales tax revenues are dependent on the strength of the economy as evidenced by the dramatic decline during the recession in 2009 to 2012. Since then, sales taxes have shown steady but modest increases; barring any future economic downturns, Measure A revenues are expected to grow by about two percent annually through 2025.

The Sacramento Transportation Authority is exploring a supplemental half-cent sales tax measure for voter consideration on the November 2020 ballot. As of February 2020, the components of the measure and a final determination to include such a measure have not been finalized. If approved, this measure would support additional funding for pavement maintenance.

Road Maintenance and Rehabilitation Account (RMRA)

In April 2017, the Governor signed Senate Bill 1 (SB1), also known as the Road Repair and Accountability Act, a State transportation funding package that increases the gas tax, diesel tax, and vehicle registration fees. The new measure also indexed the gas tax to inflation so that its purchasing power will not be eroded as occurred with HUTA.

Half of the funding is allocated to cities and counties through the Road Maintenance and Rehabilitation Account (RMRA); the City began receiving revenues in 2018 and is expected to receive as much as $9.7 million annually.

RMRA is expected to provide $9.7 million a year to Sacramento.

Operating and Capital Expenditures

Operating Expenses

The City's operating expenses include on-going operations to maintain a transportation system used by hundreds of thousands of automobiles, trucks, cyclists, buses, and pedestrians daily. It includes labor, supplies, materials, equipment, and vehicles.

The Public Works Department is tasked with, among other responsibilities, planning, building, and maintaining transportation infrastructure (including roads, bridges, sidewalks, bikeways, streetlights, traffic signals, traffic control devices, street signs, and markings) and providing for safety and accessibility, with over 250 employees assigned to these tasks. In Sacramento's budget model, the costs of providing these services are fully offset with transportation funds and reimbursements from other sources.

Historically, about 70 percent of transportation funding has been needed to maintain ongoing operations, emergency repairs, and day-to-day upgrades.

Capital Expenses

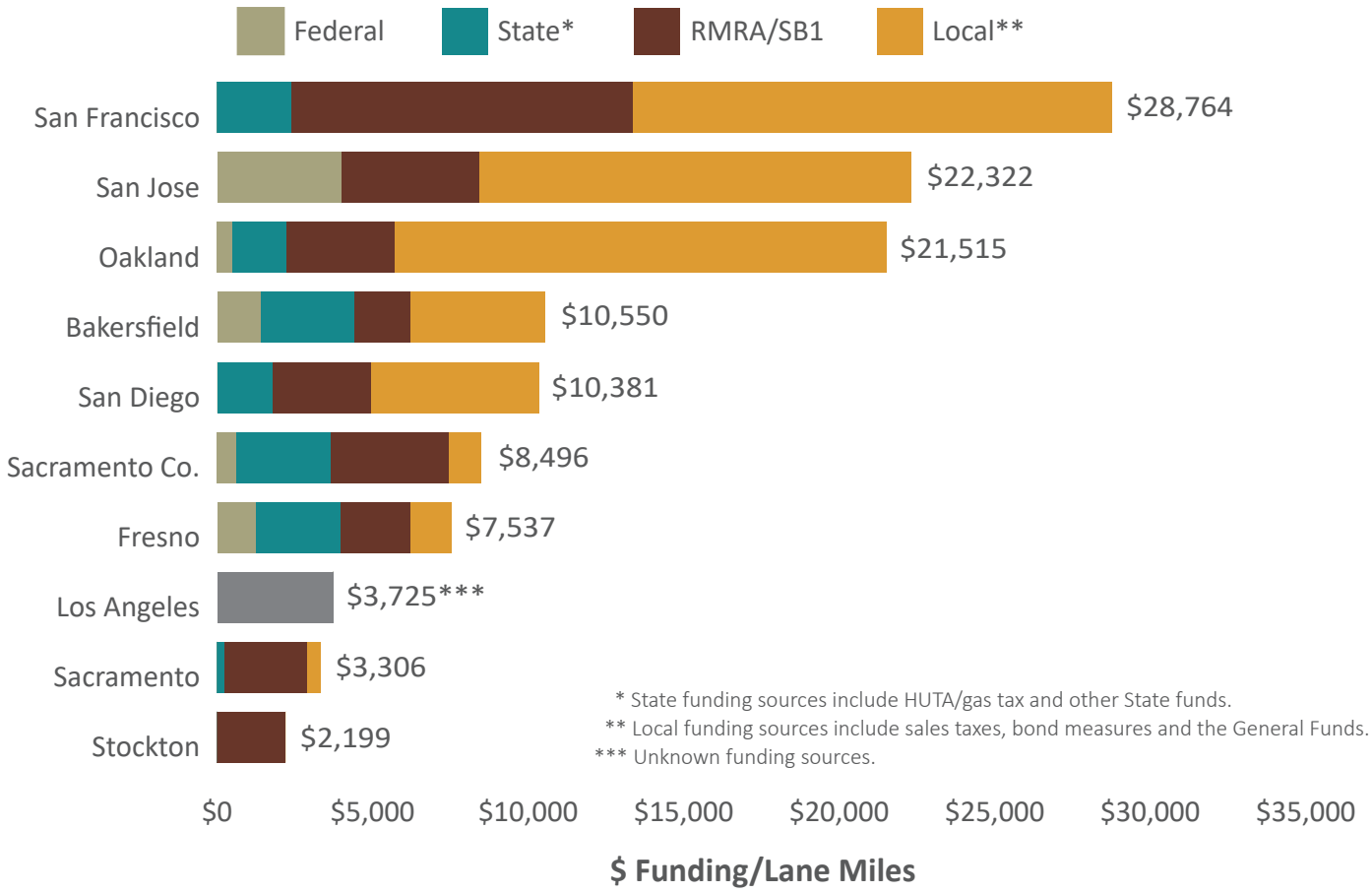
Investments in infrastructure or facilities that exceed $20,000 are included in the City's Capital Improvement Program (CIP). The CIP is made of individual projects, each with its own budget established by funding type. Typically, the largest capital expenses are major transportation projects, most of which have federal funding.

Funding Comparison to Similar Cities

When compared to its peers, Sacramento is near the bottom of the list in terms of pavement funding. Figure 8 examines the funding available as well as the sources of funding[3]. Much of this information was compiled from both the 2018 California Needs Assessment and the cities' websites. Although many of these cities have unique characteristics that dictate different levels of funding (e.g., composite pavements which are more expensive to construct); nonetheless, one trend is clear. The top five cities (San Francisco, San Jose, Oakland, Bakersfield, and San Diego) rely heavily on local funding; more than 40 percent of their budgets come primarily from sales and parcel taxes. For example, Oakland passed a parcel tax (Measure KK) in 2018, which resulted in a bond measure totaling $350 million for street maintenance. San Francisco and San Diego also receive General Funds.

Note that the data includes funding for pavement repairs only such as seals, overlays, and reconstruction. Operational expenses are not included.

Sacramento is at the bottom of the list for pavement funding compared to its peers.



* State funding sources include HUTA/gas tax and other State funds.
** Local funding sources include sales taxes, bond measures and the General Funds.
*** Unknown funding sources.

Figure 8. Comparison of Paving Funding with Other Cities

[3] Pavement funding and funding sources are from 2018 *California Statewide Local Streets and Roads Needs Assessment*, and cities' websites. Funding sources for Los Angeles are unknown. Note that the data includes funding for pavement repairs only such as seals, overlays, and reconstruction. Operational expenses are not included.

Sacramento Tomorrow

The City faces significant challenges in the future for providing adequate roadway conditions, even with new RMRA funding. The pavement condition is, as noted, in "fair" condition and will continue to deteriorate very quickly. Three alternate funding scenarios were performed to determine potential outcomes.

Scenario 1: Current Funding Levels

Assuming that $9.7 million annually in RMRA funding is available beginning in FY 20/21, the City will receive a total of $97.0 million over the next 10 years. Given this funding level, Figure 9 indicates that the following is predicted to occur by 2029:

1. The PCI will deteriorate to 42.
2. The current unfunded backlog ($225 million) will more than triple to $706 million.
3. Approximately 60 percent of the street network will be in poor or very poor condition.

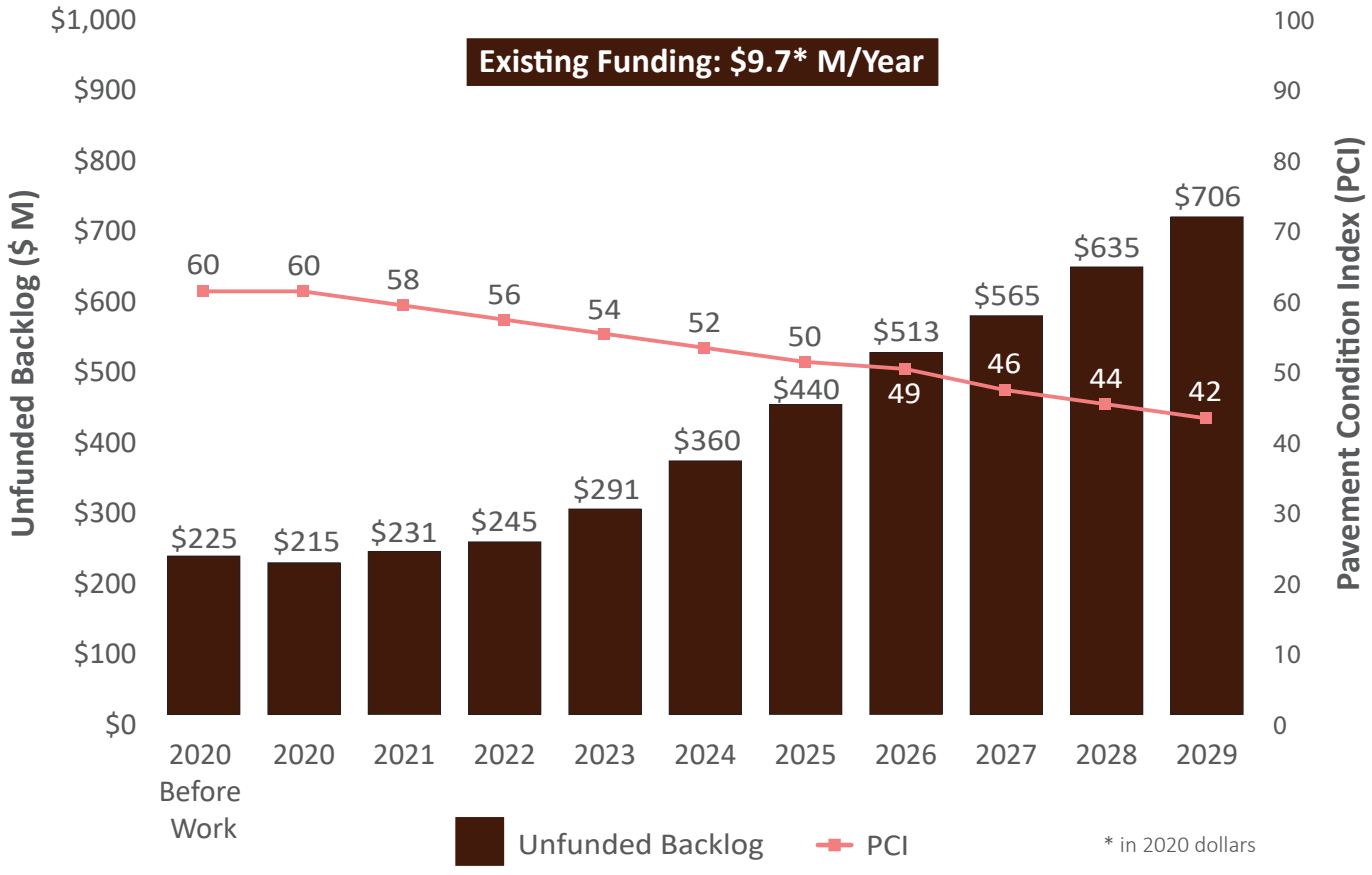


Figure 9. Projected PCI and Unfunded Backlog with Current Funding

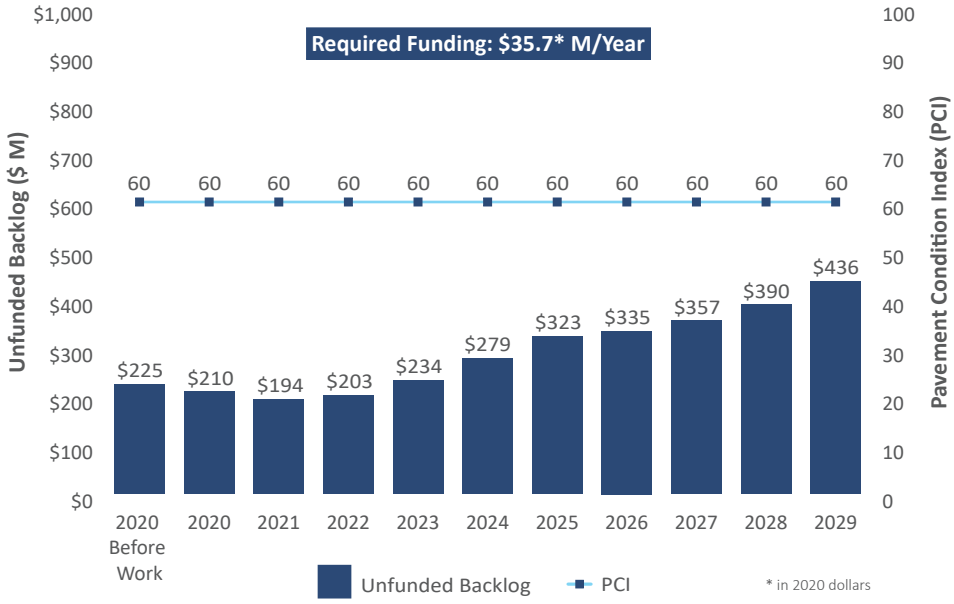


Figure 10. Projected PCI and Unfunded Backlog for Scenario 2

Scenario 2: Maintain Current Conditions (PCI = 60)

In order to maintain current conditions (i.e., PCI at 60), at least $357 million will be required over the next 10 years. This equates to $35.7 million per year, which is $26 million more than the amount currently available. Even with this level of investment, the unfunded backlog would still increase to over $436 million since the current condition represents a "fair" condition (Figure 10).

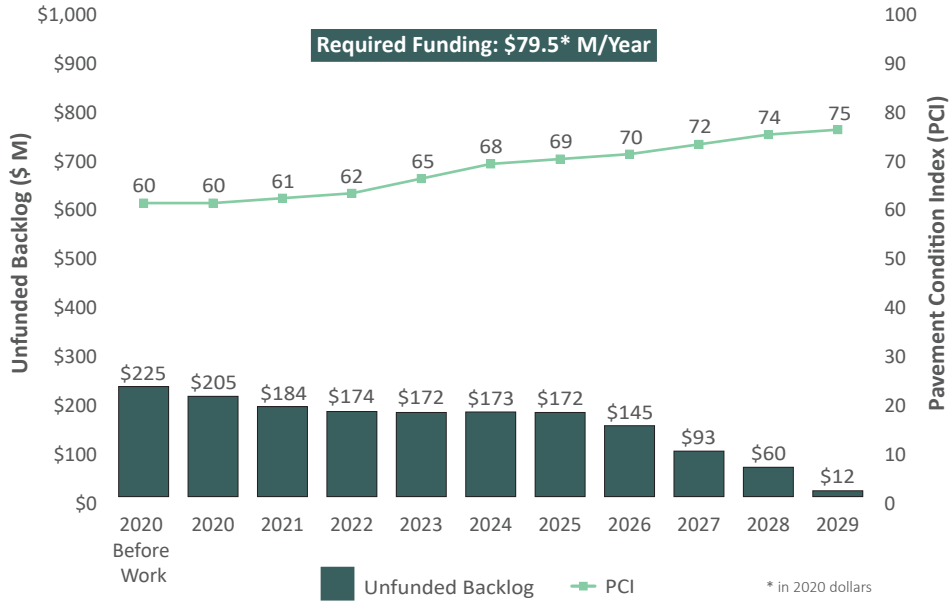


Figure 11. Projected PCI and Unfunded Backlog for Scenario 3

Scenario 3: Improve Conditions to a State of Good Repair (PCI = 75)

To improve the network condition to a state of good repair within 10 years would require $795 million over the next 10 years. For subsequent years, approximately $58.5 million per year would be required to maintain the PCI at that level. This unfunded backlog would decrease to less than $12 million by 2029 (Figure 11).

Finally, Figure 12 shows the impacts on the street network by condition. Currently, 70 percent of the network is in good or fair condition, with the remaining 30 percent in poor to very poor condition. Under the current funding levels, it is predicted that streets in poor to very poor condition will double to 60 percent by 2029.

The other two funding scenarios illustrate marked improvements; Scenario 2 would result in less pavement in very poor condition (11 percent) while Scenario 3 would result in less than 1 percent in poor/very poor condition by 2029.

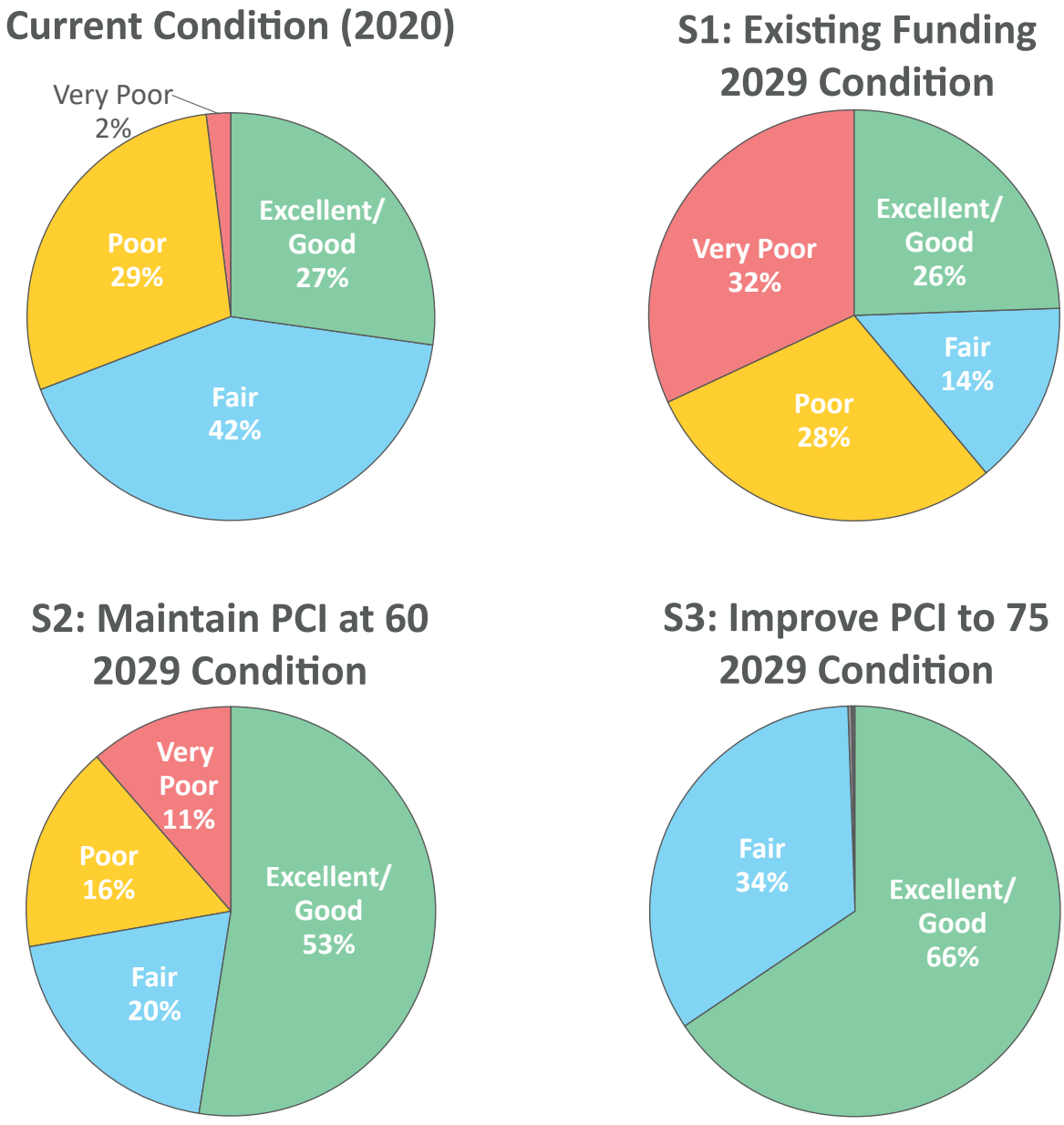


Figure 12. Comparison of Network Condition by Funding Scenario

Conclusions

To summarize, the City has a substantial asset of over $1.9 billion in the pavement network (this does not include sidewalks, signals, landscapes, storm drains etc.) Overall, the street network is in "Fair" condition with a network PCI of 60. About 70 percent of the streets currently fall into the "Fair" to "Good" condition categories.

In the previous Pavement Condition Report (August 2017), it was predicted that if current funding levels remained, the PCI would drop from 66 to 62 by 2020. During that period, the funding level did remain the same and the PCI has actually dropped to 60, two points lower than estimated. The dramatic decline in PCI over the last two years reflects the effects of delayed investments in preventive maintenance combined with the effects of the severe drought followed by high levels of rain. Major new revenue sources will be needed to prevent significant ongoing deterioration.

The analyses indicate that the City needs approximately $79.5 million annually for pavement maintenance in order to improve the average PCI to 75. By doing so, streets can be maintained in good condition with on-going preventive maintenance.

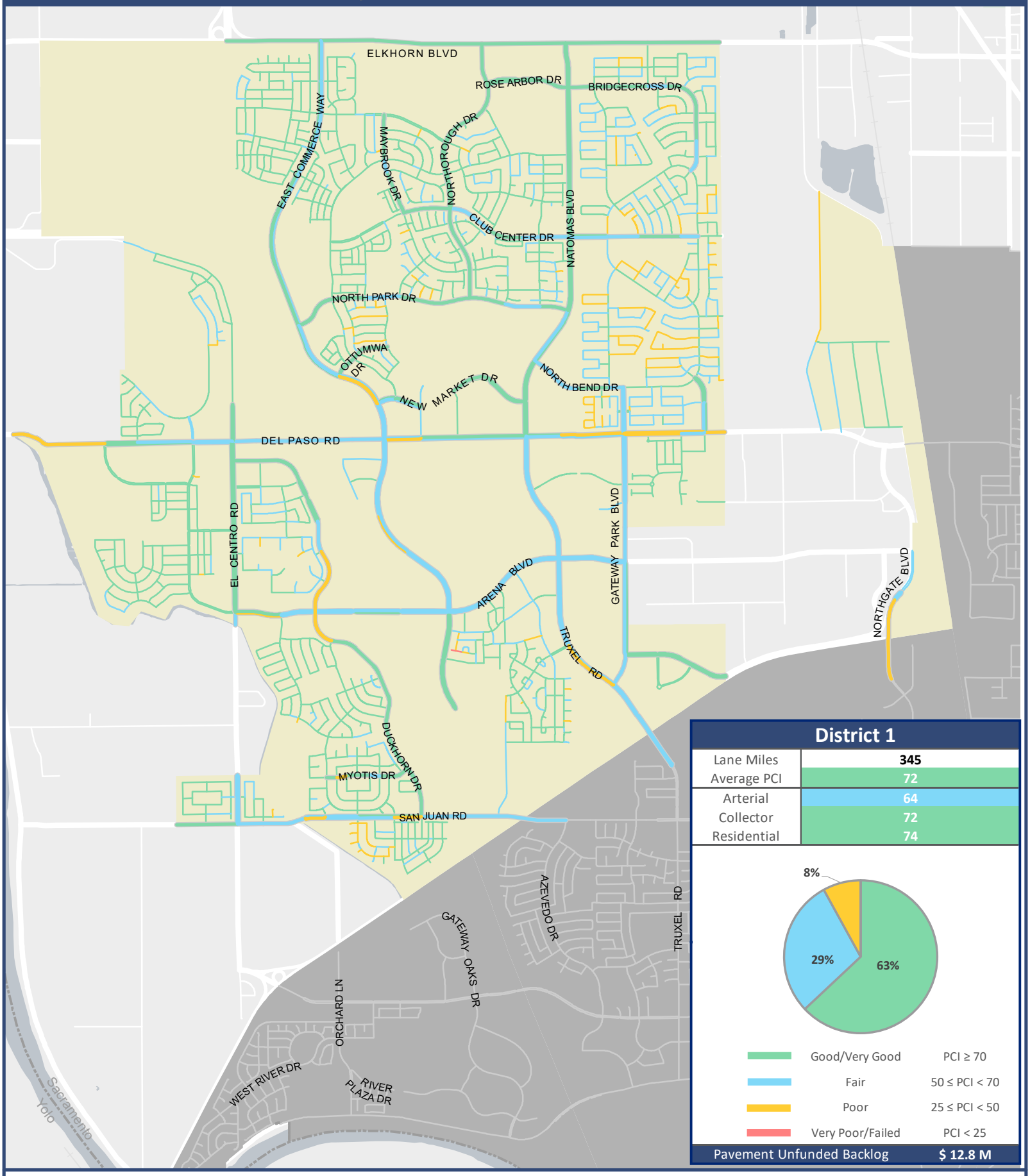
The City's projected funding level (average of $9.7 million/year) will result in a decrease of the network PCI to 42 over the next 10 years and the unfunded backlog will triple to $706 million by 2029. The new funding with SB1 came too late to arrest the steep decline without significant additional investment.

Sacramento needs at least $79.5 million/year to improve the PCI to 75.

Appendix A

PCI Maps for Council Districts

City of Sacramento



District 1	
Lane Miles	345
Average PCI	72
Arterial	64
Collector	72
Residential	74

Good/Very Good	PCI ≥ 70
Fair	50 ≤ PCI < 70
Poor	25 ≤ PCI < 50
Very Poor/Failed	PCI < 25
Pavement Unfunded Backlog	$ 12.8 M

City of SACRAMENTO
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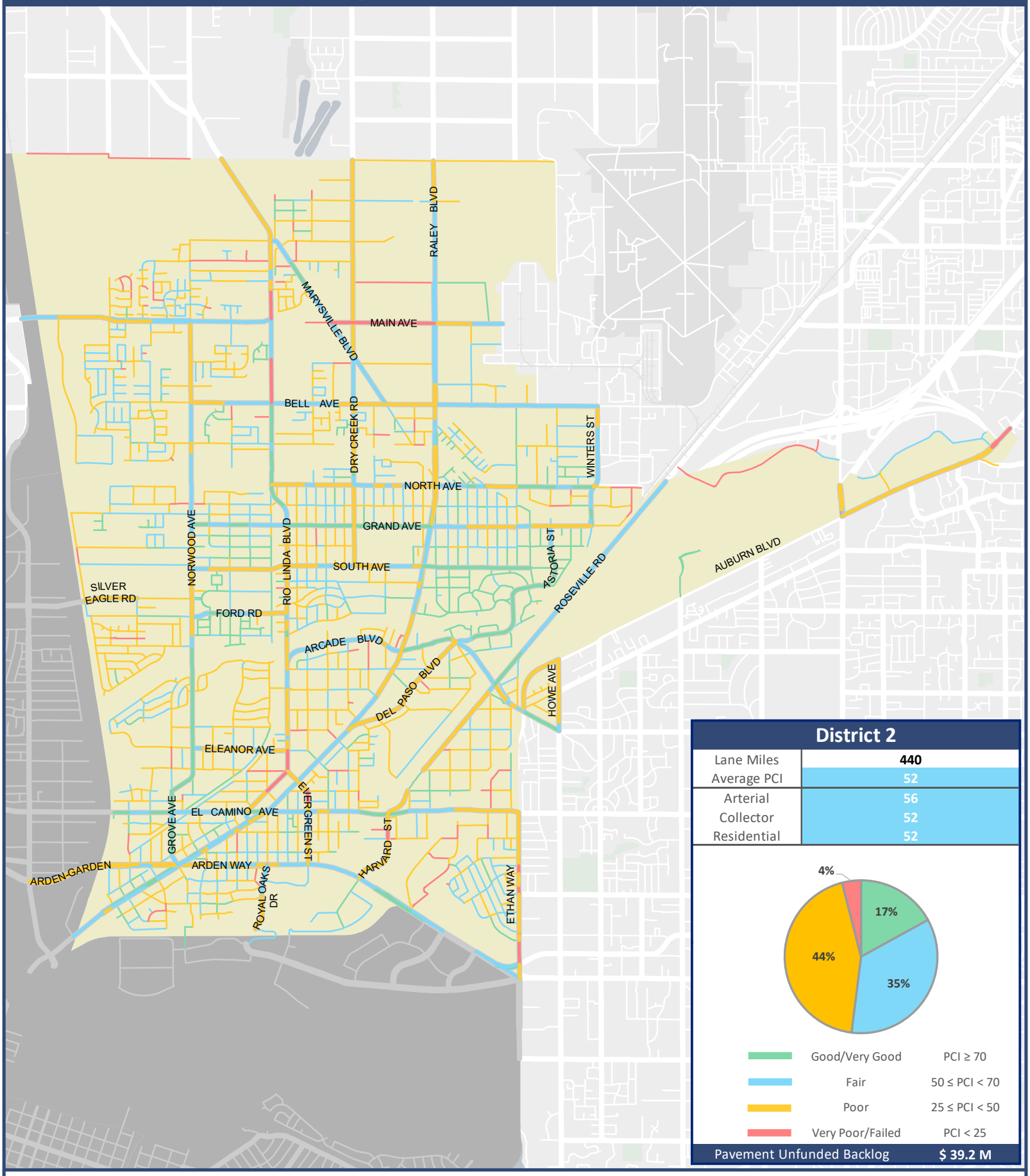
January 2020

Pavement Condition Index (PCI)
Council District 1

0 0.5 1 Miles

City of Sacramento



District 2

Lane Miles	440
Average PCI	52
Arterial	56
Collector	52
Residential	52

Good/Very Good	PCI ≥ 70
Fair	50 ≤ PCI < 70
Poor	25 ≤ PCI < 50
Very Poor/Failed	PCI < 25
Pavement Unfunded Backlog	$ 39.2 M

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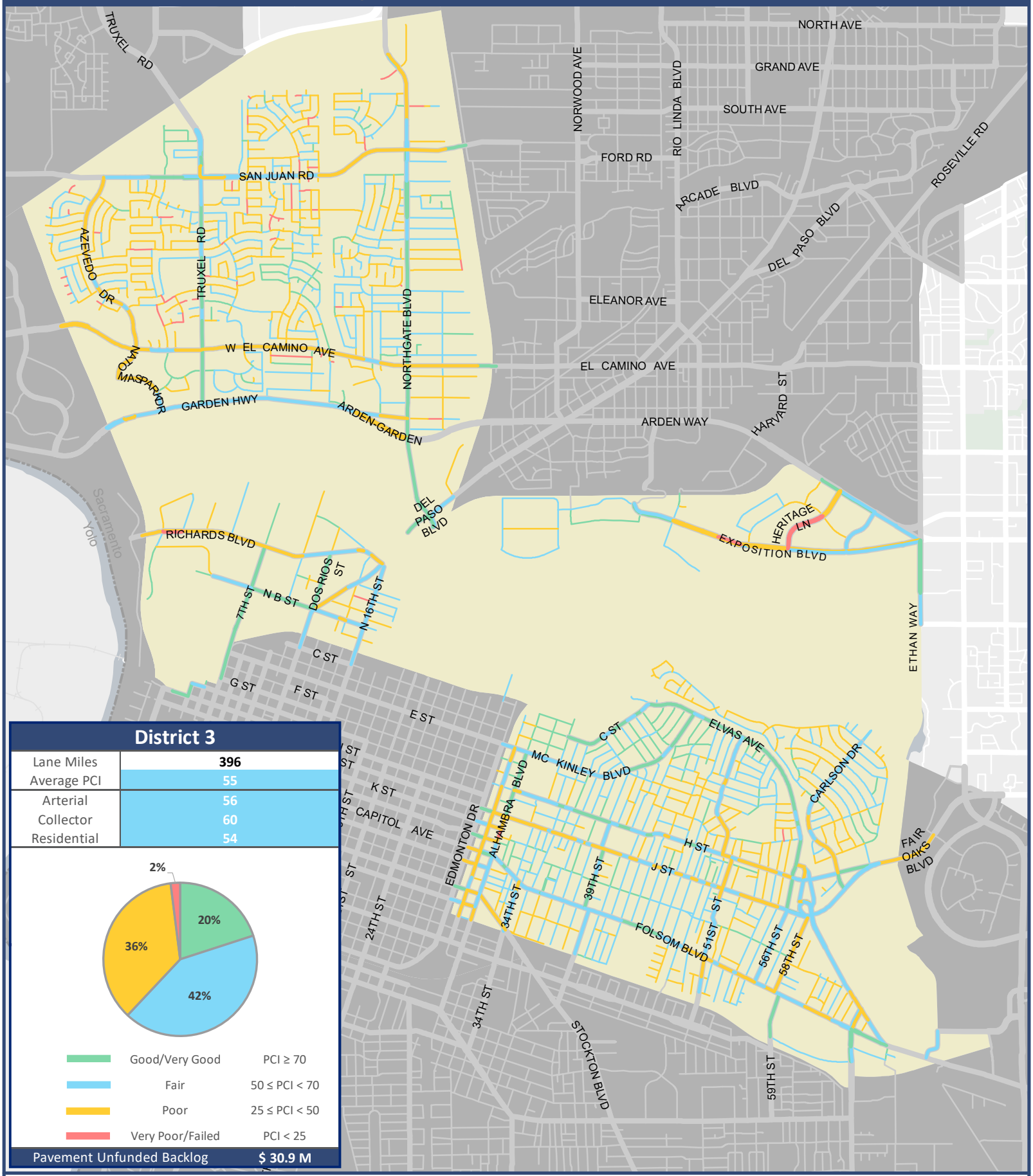
Pavement Condition Index (PCI)
Council District 2

0 0.5 1 Miles

City of Sacramento



District 3

Lane Miles	396
Average PCI	55
Arterial	56
Collector	60
Residential	54

Good/Very Good	PCI ≥ 70
Fair	50 ≤ PCI < 70
Poor	25 ≤ PCI < 50
Very Poor/Failed	PCI < 25
Pavement Unfunded Backlog	$ 30.9 M

City of SACRAMENTO
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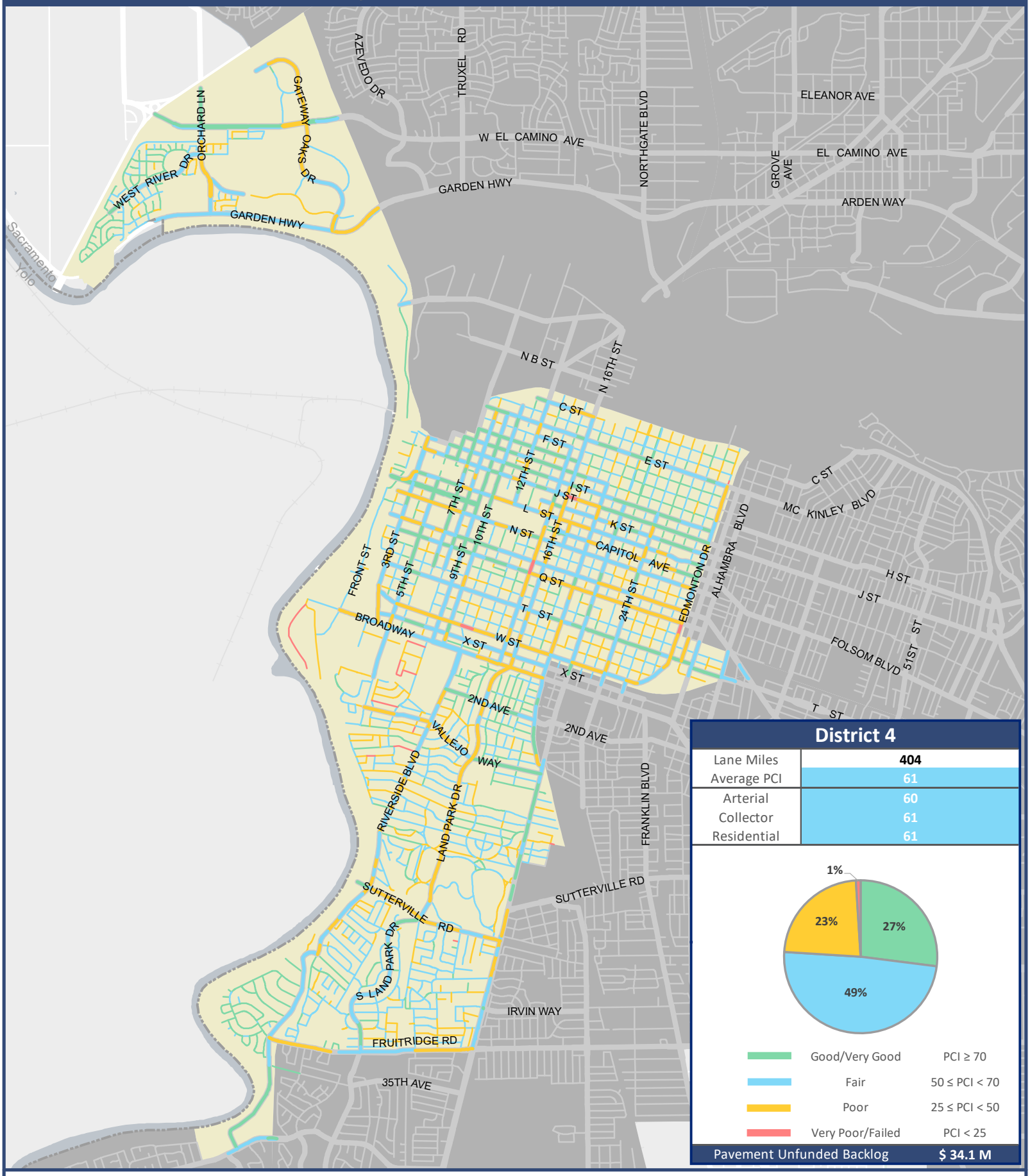
Pavement Condition Index (PCI)
Council District 3

0 0.5 1 Miles

City of Sacramento



District 4

Lane Miles	404
Average PCI	61
Arterial	60
Collector	61
Residential	61

Good/Very Good	PCI ≥ 70
Fair	50 ≤ PCI < 70
Poor	25 ≤ PCI < 50
Very Poor/Failed	PCI < 25
Pavement Unfunded Backlog	$ 34.1 M

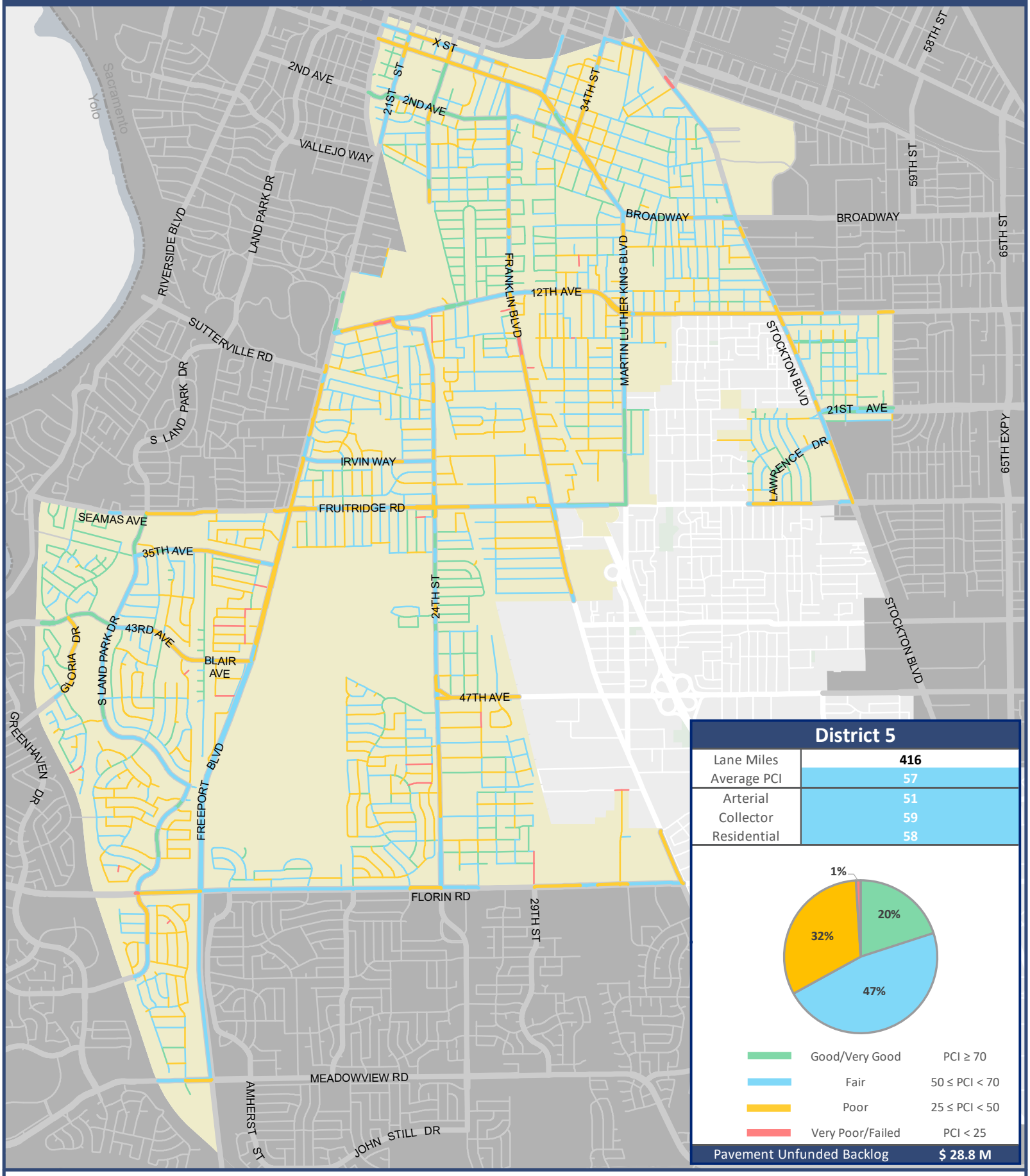
City of SACRAMENTO
Department of Public Works

January 2020

Pavement Condition Index (PCI)
Council District 4

0 0.5 1 Miles

City of Sacramento



District 5	
Lane Miles	416
Average PCI	57
Arterial	51
Collector	59
Residential	58

	Good/Very Good	PCI ≥ 70
	Fair	50 ≤ PCI < 70
	Poor	25 ≤ PCI < 50
	Very Poor/Failed	PCI < 25
Pavement Unfunded Backlog		$ 28.8 M

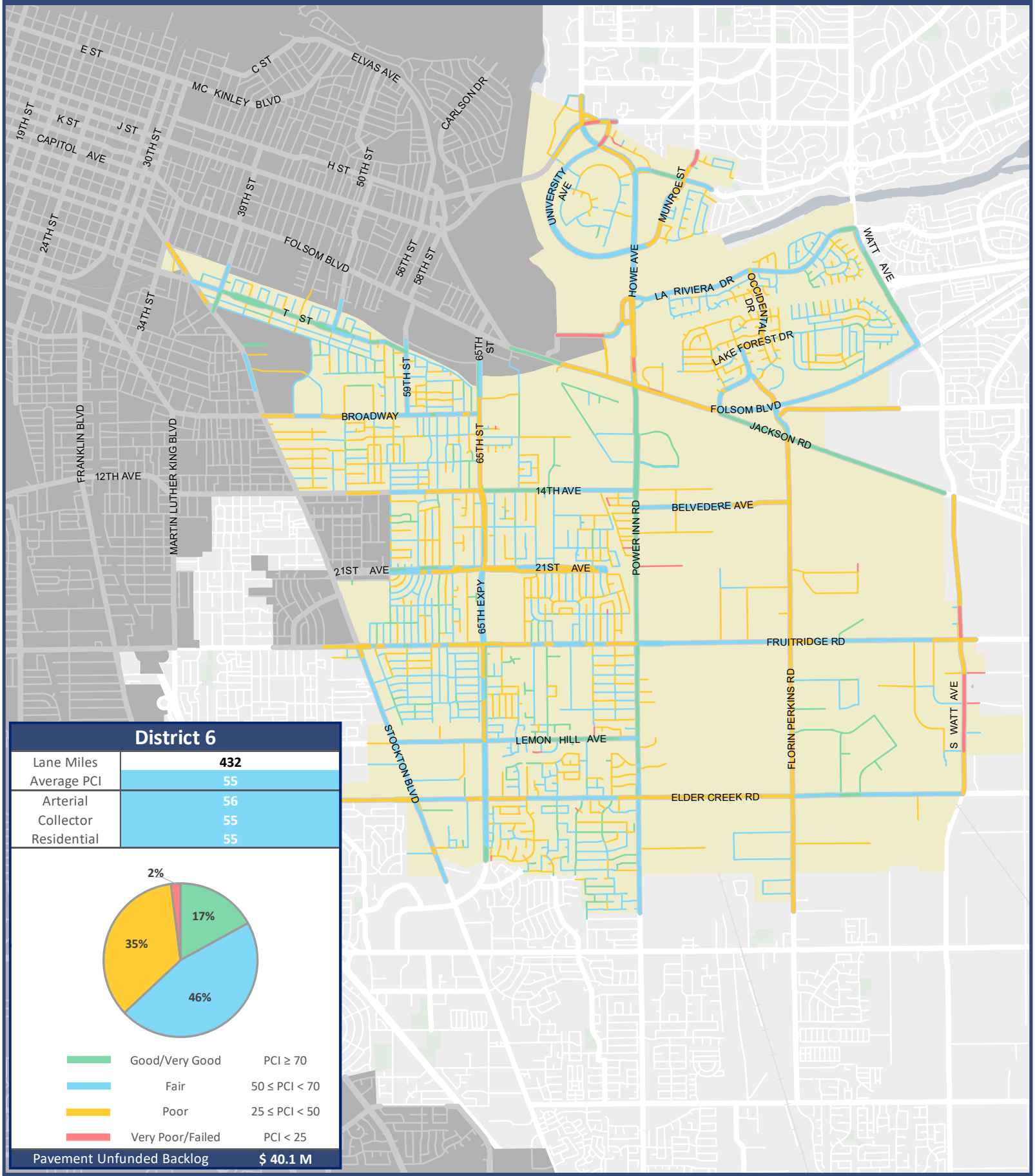
City of SACRAMENTO
Department of Public Works

January 2020

Pavement Condition Index (PCI)
Council District 5

0 0.5 1 Miles

City of Sacramento



District 6

Lane Miles	432
Average PCI	55
Arterial	56
Collector	55
Residential	55

Good/Very Good	PCI ≥ 70
Fair	50 ≤ PCI < 70
Poor	25 ≤ PCI < 50
Very Poor/Failed	PCI < 25
Pavement Unfunded Backlog	$ 40.1 M

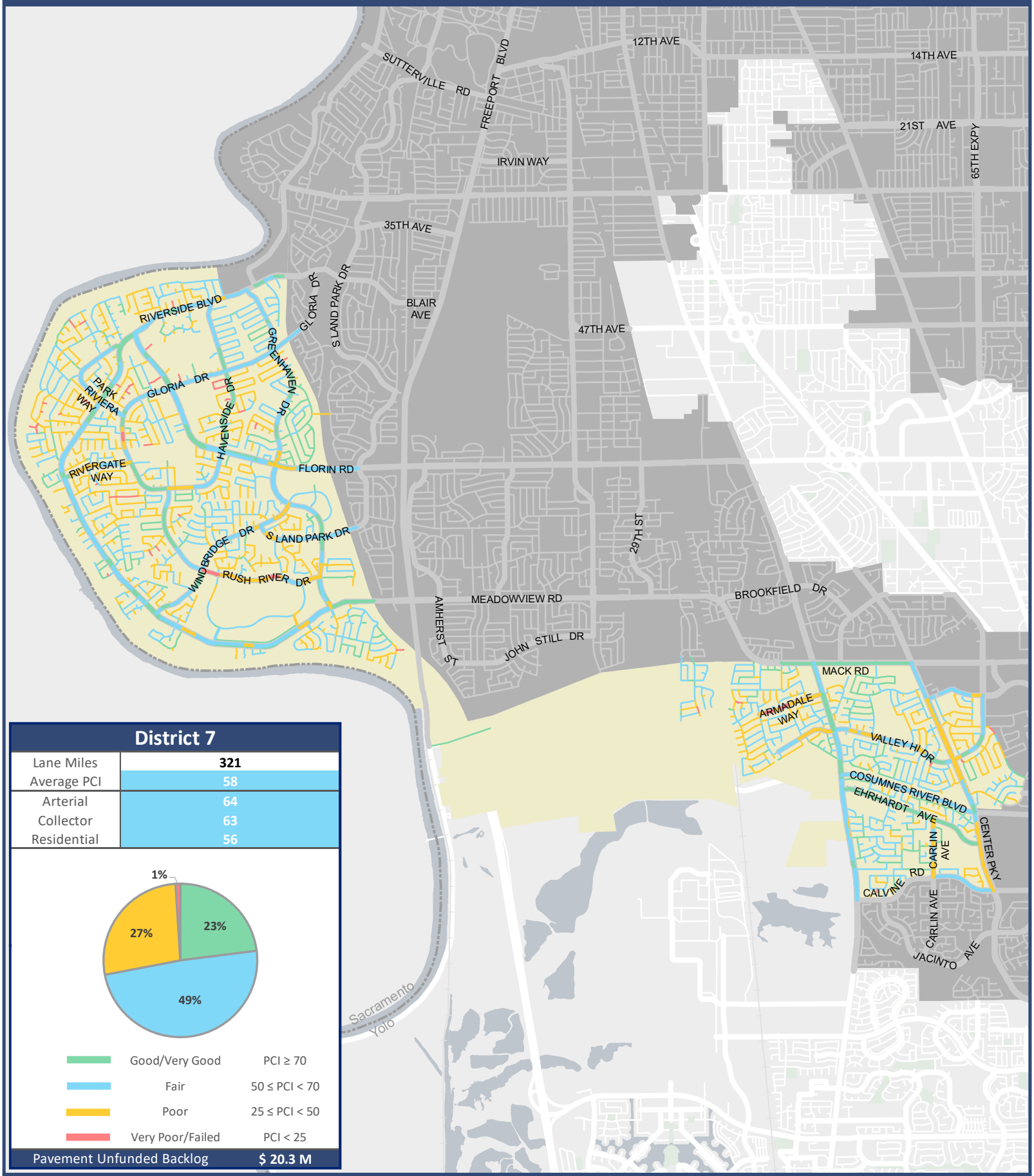
City of SACRAMENTO
Department of Public Works

January 2020

Pavement Condition Index (PCI)
Council District 6

0 0.5 1 Miles

City of Sacramento



District 7

Lane Miles	321
Average PCI	58
Arterial	64
Collector	63
Residential	56

	Good/Very Good	PCI ≥ 70
	Fair	50 ≤ PCI < 70
	Poor	25 ≤ PCI < 50
	Very Poor/Failed	PCI < 25
Pavement Unfunded Backlog		$ 20.3 M

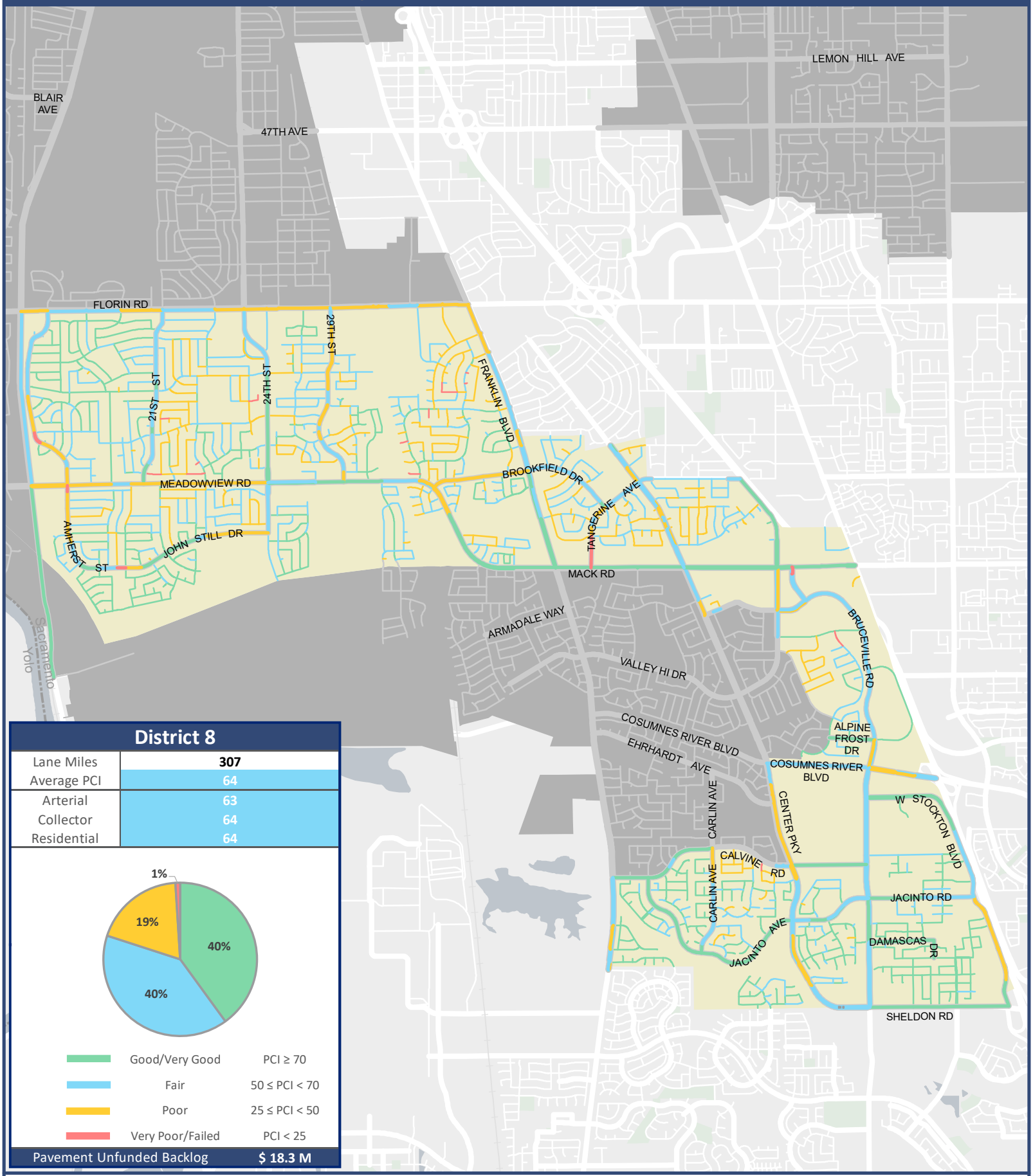
City of SACRAMENTO
Department of Public Works

January 2020

Pavement Condition Index (PCI)
Council District 7

0 0.5 1 Miles

City of Sacramento



District 8

Lane Miles	307
Average PCI	64
Arterial	63
Collector	64
Residential	64

Good/Very Good	PCI ≥ 70
Fair	50 ≤ PCI < 70
Poor	25 ≤ PCI < 50
Very Poor/Failed	PCI < 25
Pavement Unfunded Backlog	$ 18.3 M

City of SACRAMENTO
Department of Public Works

January 2020

Pavement Condition Index (PCI)
Council District 8

0 0.5 1 Miles

City of
SACRAMENTO
Department of Public Works