

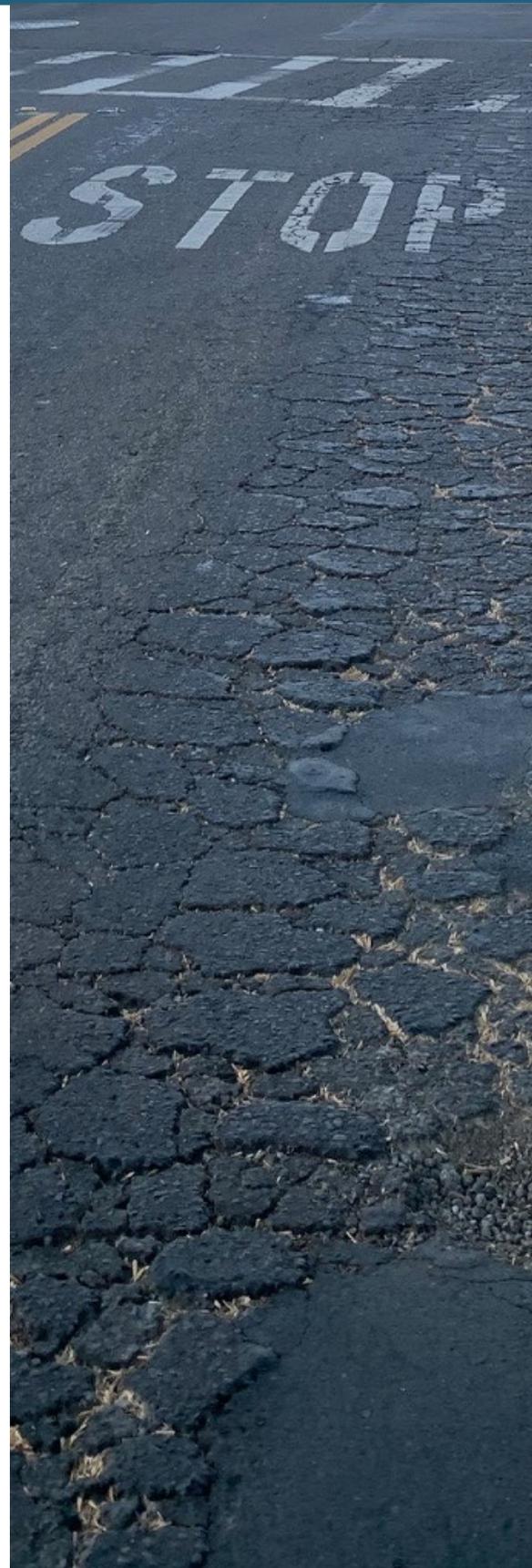
Audit Report

November 19, 2020

# **Rocky Road: Berkeley Streets at Risk and Significantly Underfunded**



BERKELEY CITY AUDITOR



# Rocky Road: Berkeley Streets at Risk and Significantly Underfunded

## Report Highlights

November 19, 2020



### Findings

1. Without significant additional funding, Berkeley streets will continue to deteriorate and deferred maintenance costs will increase. In 2018, Berkeley had a Pavement Condition Index (PCI) rating of 59 out of 100. Continuing with the current level of funding, the PCI will reach an estimated low of 52 by 2023. In addition, the current level of funding would also increase deferred maintenance costs to an estimated \$328 million by 2023. In 2018, a City contractor estimated the City would need an average of \$17.3 million annually to maintain the current PCI or an average of \$27.3 million annually to increase PCI by five points in five years. Revenue decreases from COVID-19 may contribute to further declines in street condition.
2. The Streets Rehabilitation and Repair Policy has not been updated since 2009. Public Works is no longer following the policy to guide annual updates to the Five-Year Street Rehabilitation Plan and there is no mention of equity in the policy. Additionally, the policy is not guided by clear goals or performance measures. Without a clear and updated policy, Public Works and City Council are not able to make fully informed or transparent decisions regarding annual street paving. This may lead to inefficiencies and inequities in street paving.

### Objectives

1. Are there sufficient resources for maintaining Berkeley's streets?
2. Are there clear policies and processes to guide street paving decisions?

### Why This Audit Is Important

Berkeley streets have an asset replacement value of approximately \$777.6 million, and deferred maintenance needs of streets exceeded \$251 million in 2019. It is the responsibility of the City to maintain Berkeley's infrastructure for residents, and it is the goal of the Street Rehabilitation Program to maintain a safe street surface for vehicles, bicycles, transit, and pedestrians. Berkeley has the 15<sup>th</sup> worst Pavement Condition Index (PCI) out of 101 cities in the nine county jurisdiction covered by Metropolitan Transportation Commission in 2017.



### Recommendations

We recommend that the Public Works Department regularly calculates how much money is needed to address the goals of the Streets Rehabilitation Program and identify funding sources to meet those goals. We also recommend that the Public Works Department updates the Street Rehabilitation and Repair Policy with goals and performance measures, and an accurate prioritization of funding.



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## Introduction

We identified the City’s aging infrastructure as an immediate concern to City operations, safety, and strategic planning in our 2020 Audit Plan. Berkeley streets have an asset replacement value of approximately \$777.6 million. The City failed to pave any streets in 2018 after sending out construction bids late, even though the City had set aside \$8.6 million for repairs. The City went out to bid again to complete the 2018 street rehabilitation projects in 2019. The total impact of the delay of paving in 2018 on street condition and deferred maintenance costs is unclear. However, any delay of paving means that the condition of Berkeley’s streets, which are not very good to begin with, will deteriorate further. Ultimately, the longer the City takes to repair streets, the more costly the repairs become. We, therefore, included a performance audit of the City’s Street Rehabilitation Program in our 2020 Audit Plan.

Berkeley streets are used by cars, buses, bicyclists, pedestrians, and others. The deterioration of pavement also has economic costs for users of the road. Potholes can cause damage to car tires, wheels, and suspensions. Hitting a pothole or making a quick decision to avoid a pothole can also lead to a collision resulting in more costly damage, personal injuries, or worse. According to TRIP, a national transportation research group, the additional average annual vehicle operating costs of driving on roads in need of repair in the San Francisco-Oakland area is approximately \$1,049. This includes vehicle repair costs, accelerated vehicle deterioration and depreciation, increased maintenance costs, and additional fuel consumption. Furthermore, people with disabilities often have unique transportation needs and may be more impacted by streets in poor condition. People with disabilities represent 15 percent of Berkeley’s residents and visitors.<sup>1</sup>

## Objectives, Scope, and Methodology

Our objectives were to determine:

1. Are there sufficient resources for maintaining Berkeley’s streets?
2. Are there clear policies and processes to guide street paving decisions?

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<sup>1</sup> In October 2020, the Commission on Disability presented a framework to City Council to guide the City’s decision-making in order to create a fully navigable, inclusive city for people with disabilities. [https://www.cityofberkeley.info/Clerk/City\\_Council/2020/10\\_Oct/Documents/2020-10-20\\_Special\\_Item\\_01\\_Proposed\\_Navigable\\_Cities\\_Framework\\_pdf.aspx](https://www.cityofberkeley.info/Clerk/City_Council/2020/10_Oct/Documents/2020-10-20_Special_Item_01_Proposed_Navigable_Cities_Framework_pdf.aspx)

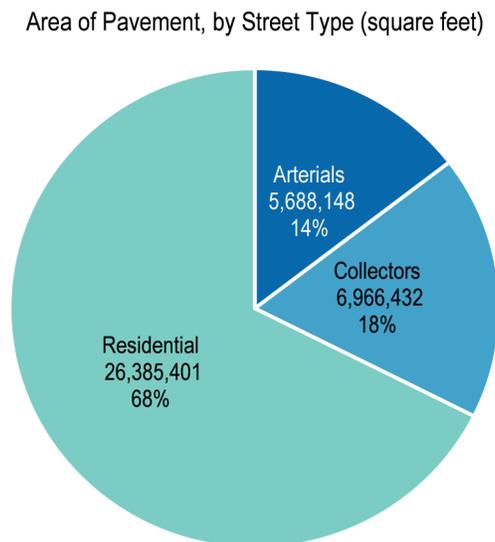
We examined the Berkeley’s Street Rehabilitation Program for fiscal years (FY) 2014 through 2020. We assessed funding levels and pavement condition index (PCI), and evaluated policies and plans. We specifically assessed internal controls relative to the audit objectives. This included a review of selected policies and procedures, as well as interviews with staff from the Public Works Department. In performing our work, we identified concerns about the program’s outdated policies, and insufficient resources, planning, and communication to ensure that Berkeley’s streets are appropriately paved and maintained. While we assessed the fiscal impact of pavement condition, our analysis did not include the external costs on vehicles or safety associated with street condition. For more information, see p. 26.

## Background

Berkeley maintains approximately 215 centerline miles of paved streets within the city limits, which include:

- **Arterials**, which carry the most car, truck, and bus traffic, and typically provide an outlet onto state highways and freeways; they also function as alternatives to highways and freeways to relieve traffic congestion;
- **Collectors**, which serve to “collect” traffic from the residential streets and deposit them onto arterials; and
- **Residential** streets and roads that run through neighborhoods and carry few buses or trucks, other than refuse vehicles.

Figure 1. Most of Berkeley’s Paved Streets Are Residential



Source: Pavement Engineering Inc. 2018 Report

Berkeley’s Streets and Utilities Division of the Public Works Department maintains and repairs the City’s streets, curbs, sidewalks, sewers, and storm water infrastructure. The purpose of the Street’s Rehabilitation Program is to maintain a safe street surface for vehicles, bicycles, transit, and pedestrians. Funding for Streets Rehabilitation is allocated as part of the City’s Capital Improvement Program budgeting process.

## Pavement Condition Index

The Metropolitan Transportation Commission (MTC) is the federally designated metropolitan planning organization for the nine-county San Francisco Bay Area. MTC and local jurisdictions use the Pavement Condition Index (PCI) as a measure that rates segments of paved roadways on a scale of 0 to 100 with condition categories ranging from a low of “failed” to a high of “excellent”.

Figure 2. Examples of Berkeley Streets by Pavement Condition Index (PCI) Classification

Very Good-Excellent (100-80)	Good (79-70)	Fair (69-60)
<p>Pavements are newly constructed or resurfaced and have few if any signs of distress.</p> <p>Photo: PCI 98, Arterial</p>	<p>Pavements require mostly preventive maintenance and have only low levels of distress, such as minor cracks or spalling, which occurs when the top layer of asphalt begins to peel or flake off as a result of water permeation.</p> <p>Photo: PCI 74, Collector</p>	<p>Pavements at the low end of this range have significant levels of distress and may require a combination of rehabilitation and preventive maintenance to keep them from deteriorating rapidly.</p> <p>Photo: PCI 63, Collector</p>
		
At Risk (59-50)	Poor (49-25)	Failed (24-0)
<p>Pavements are deteriorated and require immediate attention including rehabilitative work. Ride quality is significantly inferior to better pavement categories.</p> <p>Photo: PCI 50, Residential Street</p>	<p>Pavements have extensive amounts of distress and require major rehabilitation or reconstruction. Pavements in this category affect the speed and flow of traffic significantly.</p> <p>Photo: PCI 39, Residential Street</p>	<p>Pavements need reconstruction and are extremely rough and difficult to drive.</p> <p>Photo: PCI 20, Residential/Bike Boulevard</p>
		

Sources: Metropolitan Transportation Commission and Auditor analysis of StreetSaver data. Photos by audit staff, Anne Pardee (poor condition), and Seena Hawley (failed condition).

## Funding

Funding for Berkeley’s Street Rehabilitation Program comes from a combination of federal, state, and local sources. The Street Rehabilitation Program is funded by:

- State Transportation (Gas) Taxes,
- Road Repair and Accountability Act of 2017 (SB1),
- Measure B – Local Streets and Roads Fund,
- Measure BB – Local Streets and Roads Fund,
- Measure F – Vehicle Registration Fee,
- General obligation bonds, and
- The City’s Capital Improvement Fund.<sup>2</sup>

Figure 3. Berkeley’s Street Rehabilitation Program Funded by State and Local Sources



Source: Berkeley Capital Improvement Programs FY 2014-15, 2016-17, 2018-19, and 2020-21

Note: The Capital Improvement Fund is the City’s General Fund allocation to the Capital Program.

The revenue streams that fund the Street Rehabilitation Program are also used to fund the City’s transportation improvements, traffic calming, Complete Streets projects, signal maintenance and improvements, transit area improvements, sidewalk maintenance and capital improvements, and storm drainage and green infrastructure improvements.

<sup>2</sup> The Capital Improvement Fund is the City’s allocation of General Fund money to the Capital Program. This funding supports and supplements the capital improvements that do not have other funding sources regularly available.

## Policy

The Streets Program is governed by the Streets Rehabilitation and Repair Policy. The policy states that the City must establish a Five-Year Street Rehabilitation Plan (Paving Plan) to be adopted by Council that makes use of available funding and sets priorities for streets in accordance with their use. Additionally, there are other City plans that have objectives related to street use and design including Berkeley's Strategic Transportation Plan, Climate Action Plan, Local Hazard Mitigation Plan, Vision 2050, Vision Zero, and the Pedestrian and Bike Plans that can impact when streets are paved.

## Without significant additional funding, Berkeley streets will continue to deteriorate and deferred maintenance costs will increase.

Berkeley's street pavement condition is in "at risk" condition with a PCI rating of 59. According to the planned Capital Improvement Program streets budget for FY 2021-2024, the City estimates that recurring funding will remain around \$7 million per year and there will be no increase in Capital Improvement Funding. Continuing with the current level of funding will cause street condition to decline even further, with PCI reaching an estimated low of 52 by 2023. In addition to the continued deterioration of pavement condition, the current level of funding would also increase deferred maintenance costs to an estimated \$328 million by 2023. In 2018, a City contractor estimated the City would need \$17.3 million annually to maintain the current PCI or \$27.3 million annually to increase PCI by five points in five years. Revenue decreases due to COVID-19 may contribute to further declines in street condition.

### Berkeley's pavement condition is well below the regional goal of 75.

According to 2018 updates to StreetSaver, the City's pavement management system, Berkeley's overall PCI was 59. Pavement in this condition is past the point where condition can be improved with preventative maintenance and more costly rehabilitation work is needed. As part of the Transportation 2035 Plan, MTC adopted the regional performance objective to maintain a PCI of 75 or greater for local streets and roads. Berkeley has the 15<sup>th</sup> worst PCI out of the 101 cities in the nine county jurisdiction covered by MTC.<sup>3</sup> Over 19 percent of Berkeley's streets are in a failed condition.

### The City has not invested more recurring funding in street paving, even as PCI remains low and deferred maintenance costs increase.

While the City has secured general obligation bonds to improve aging infrastructure throughout Berkeley, the City has not invested more recurring local dollars in street paving. Actions taken by voters in recent

— "At risk" is a classification of pavement condition

that means pavements are deteriorated and require immediate attention including rehabilitative work. Streets in this classification are past the point where condition can be improved with preventative maintenance. Ride quality is significantly inferior to better pavement categories. (Source: Metropolitan Transportation Commission)

Figure 4. Pavement Condition Index (PCI) of Bay Area Cities Near Berkeley

City	2017 PCI*	Condition
El Cerrito	84	Very Good
Emeryville	77	Good
Alameda	72	Good
San Francisco	70	Good
Richmond	62	Fair
Albany	59	At Risk
Berkeley	57	At Risk
Oakland	55	At Risk

\*This is the three-year moving average. Year 2017 is the most recent year available of comparative data.

Source: The Pothole Report: Bay Area Roads at Risk, September 2018 by Metropolitan Transportation Commission (MTC)

<sup>3</sup> The nine counties under MTC jurisdiction are Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma.

years have provided an important short-term boost to the resources available for streets:

- In 2012, Berkeley voters passed Measure M to secure \$30 million in bonds to fund street paving and greening infrastructure projects.
- In 2016, Berkeley voters approved \$100 million in general obligation bonds to improve aging City infrastructure through Measure T1. City Council is ultimately responsible for discussing and approving the T1 project plans presented by staff. As of November 2019, approximately \$36.8 million T1 funds were allocated by Council to projects throughout the City. Approximately \$9.9 million of the \$36.8 million T1 funds allocated went to Complete Streets projects. The remaining funds were spent on improvement to facilities and buildings, citywide safety, and green infrastructure projects.

Despite the additional funds from Measure M and T1 going to streets projects, PCI increased only slightly from 58 in 2011 to 59 in 2018 and street infrastructure needs continue to exceed available funds. The minimum deferred maintenance needs in street paving exceeded \$251 million in 2019, up from \$111 million in 2014.<sup>4</sup> We do not know the exact cause of this increase, however, we do know that regular maintenance of roads is five to ten times cheaper than full rehabilitation of pavement after it has fallen below a certain threshold. Based on what we know about the condition of Berkeley streets and the lack of funding, this likely can explain a portion of this significant increase in deferred maintenance over such a short time frame. A complete audit of that estimate was beyond the scope of this report. What is clear is that significant additional funding is needed to address the growing backlog of deteriorating streets.



Complete Streets is a design approach that Council adopted in December 2012 in which improvements to the entire street, from sidewalk to sidewalk, are considered for any transportation project. While there is no standard template for applying this approach, common elements typically include bike lanes, sidewalk bike racks, transit stops, pedestrian signals, street trees, and curb ramps.

<sup>4</sup> According to Pavement Engineering Inc.'s (PEI) 2018 report, an initial investment of \$252 million in 2019 and an average of \$3 million in the following 4 years would have eliminated deferred maintenance and increased the PCI from 59 to 84.

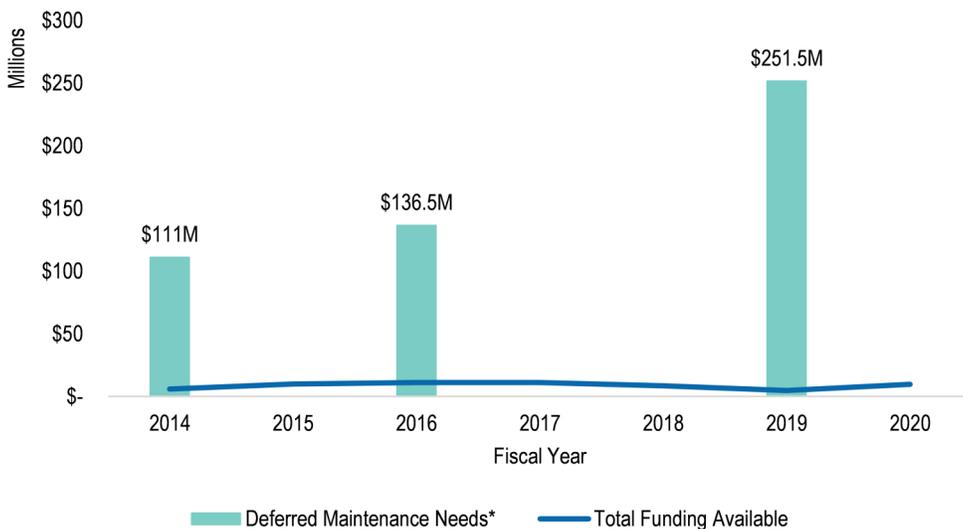
Figure 5. It is Much Cheaper to Maintain Streets than to Rehabilitate Failed Streets



Source: Metropolitan Transportation Commission Pothole Report III 2018

According to MTC, the most cost-effective way to maintain a street is to address cracks in the pavement surface as soon as they appear. Regular maintenance of roads is five to ten times cheaper than allowing roads to fail and then paying for the necessary rehabilitation. Jurisdictions that spend most of their paving budget to fix a few failed streets, instead of proactively maintaining a larger percentage of the street network that is in good condition, are practicing a “worst first” strategy. This approach is cost prohibitive and will allow deferred maintenance on good roads to lead to more costly repairs later on.

Figure 6. Deferred Maintenance Has Grown to Over \$250 Million as Annual Funding Remains Insufficient



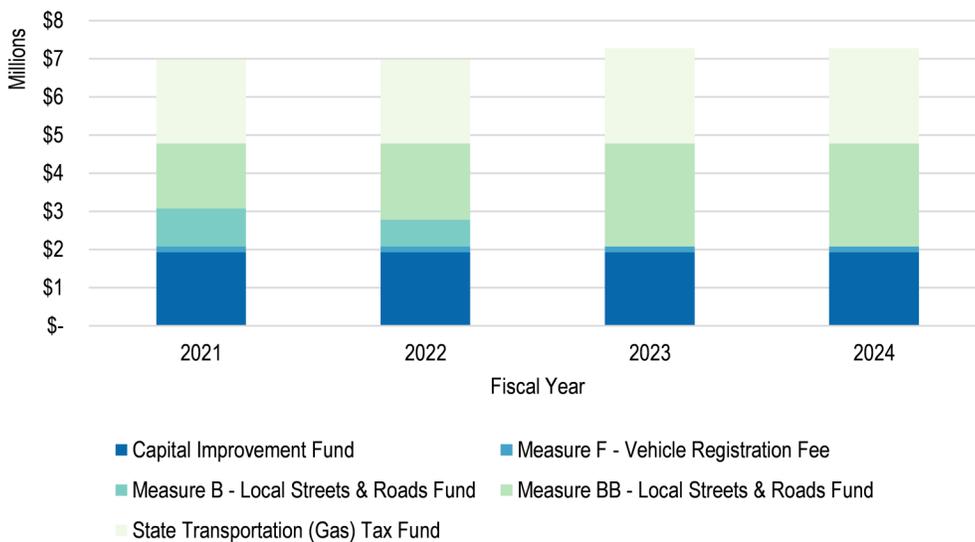
\*Represents the budget required based on the "needs" of the system and assumes all pavements are treated at their optimum timing.

Sources: City of Berkeley Capital Budgets and Pavement Management Certifications

Note: Deferred maintenance needs calculation was not available for all years.

According to the Fiscal Year 2020 Capital Improvement Program, the City estimates that the amount of recurring funding available for the Streets Rehabilitation Program will remain around \$7 million per year, and there will be no increase in Capital Improvement Fund contributions. The City’s contributions of Capital Improvement Funds, which comes from the General Fund, to Street Rehabilitation has remained stagnant at \$1.925 million per year since 2014. This number has not kept pace with inflation. To achieve the same amount of paving in 2020 as 2014, the City would need to have invested \$2.123 million.<sup>5</sup>

Figure 7. Recurring Streets Funding Will Remain Around \$7 Million per Year Through 2024



Source: City of Berkeley Capital Budget FY 2020

Note: This does not include T1 funding.

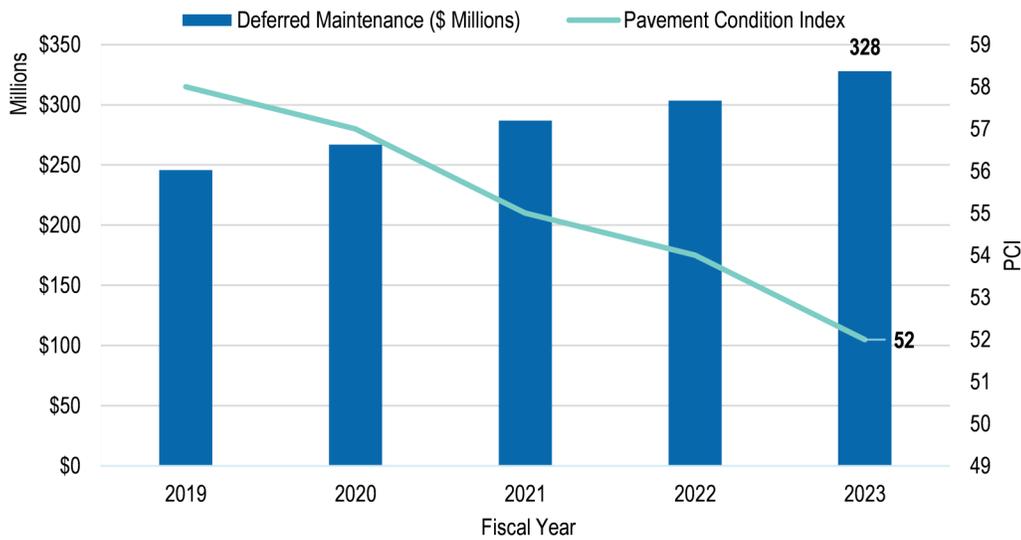
At the current level of funding, streets will continue to deteriorate and the backlog of maintenance will continue to grow. Deferred maintenance of street paving is on track to reach an estimated \$328 million by 2023, and the City’s PCI is estimated to decline to 52.

The City’s contributions of Capital Improvement Funds, which come from the General Fund, to the entire Capital budget decreased from \$5.8 million in FY 2014 to only \$5 million in FY 2020. Due to additional funding sources, the overall Capital budget increased from \$26.3 million in FY 2014 to \$111.3 million in FY 2020.<sup>6</sup> However, there is still a huge funding shortfall to address the City’s infrastructure needs. The City’s Vision 2050 Initiative Report includes an action item for the City Manager to identify resources to double the City’s capital investment.

<sup>5</sup>This calculation was made using the Bureau of Labor Statistics CPI inflation calculator. [https://www.bls.gov/data/inflation\\_calculator.htm#](https://www.bls.gov/data/inflation_calculator.htm#)

<sup>6</sup>The FY 2020 Capital budget includes a \$49.8 million allocation for Tuolumne Camp.

Figure 8. Pavement Condition Index Will Decline and Deferred Maintenance Costs Will Increase at Current Funding Levels



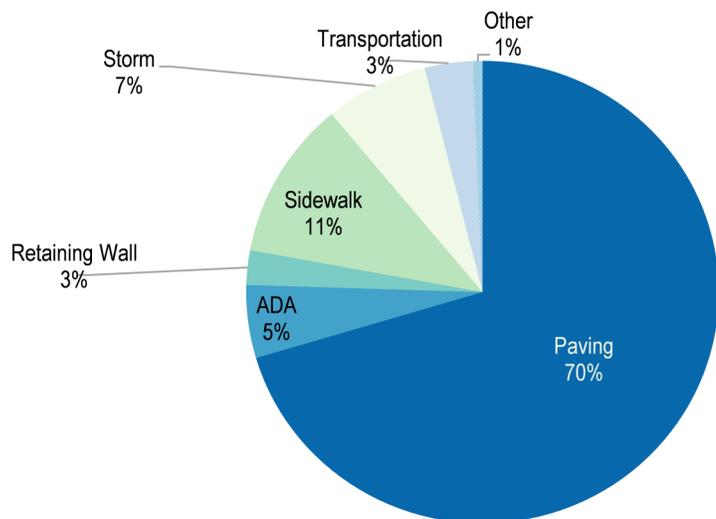
Source: Pavement Engineering Inc. Report September 2018

Note: Deferred Maintenance represents the budget required based on the "needs" of the pavement system. Assumes all pavements are treated at their optimum timing and does not include the costs to conduct Complete Streets projects.

### Streets Rehabilitation Program funding is spent on more than just paving costs.

According to the Public Works Department, approximately 15-20 percent of project funds are spent on personnel and consultant costs for design, project management, and survey. Even though individual paving projects appear in one year on the Five-Year Paving Plan, they actually run on a two year timeline. In the first year, a paving project is designed, and in the second year, the actual construction happens. A significant portion of the construction budget is spent on other street improvements. Between FY 2014-2019, only about 70 percent of construction costs for Annual Street Paving projects were spent directly on paving. The remaining 30 percent was spent on the construction of storm drain and green infrastructure, ADA and traffic-related improvements, retaining walls, and concrete (curbs, gutters, and sidewalks).

Figure 9. Not All Construction Costs Spent on Paving



Source: Auditor analysis

Berkeley adopted a Complete Streets policy in December 2012. According to the policy, Complete Streets infrastructure should be incorporated into all planning, funding, design, approval, and implementation processes for any streets projects. MTC estimates that a Complete Streets project can average additional costs of 15-25 percent, including pavement and non-pavement costs. The City did not contribute additional Capital Improvement Fund dollars to implement the Complete Streets Policy. In fact, Capital Improvement Fund contributions to streets capital declined from \$2.8 million in FY 2013 to \$1.9 million in FY 2014 and has remained below FY 2013 levels since.

**In 2018, an MTC contractor estimated \$136.5 million were needed to increase PCI by five points.**

If the City wants to address the deferred maintenance needs while also improving the condition of the streets, Pavement Engineering Inc. (PEI) estimated that the City would need to secure Street Rehabilitation Program funding at \$27.3 million per year over five years. With an average investment of \$27.3 million per year, PEI estimated that in five years the City could raise the PCI from 59 to 64 and decrease deferred maintenance by \$16.6 million.<sup>7</sup>

Why was Measure M not enough to fix our streets?

The City asked voters in 2012 for \$30 million in general obligation bonds to address paving needs as well as storm water and green infrastructure improvements. Only a portion of Measure M funds were spent directly on paving costs. It is unclear why the City only went out for \$30 million.

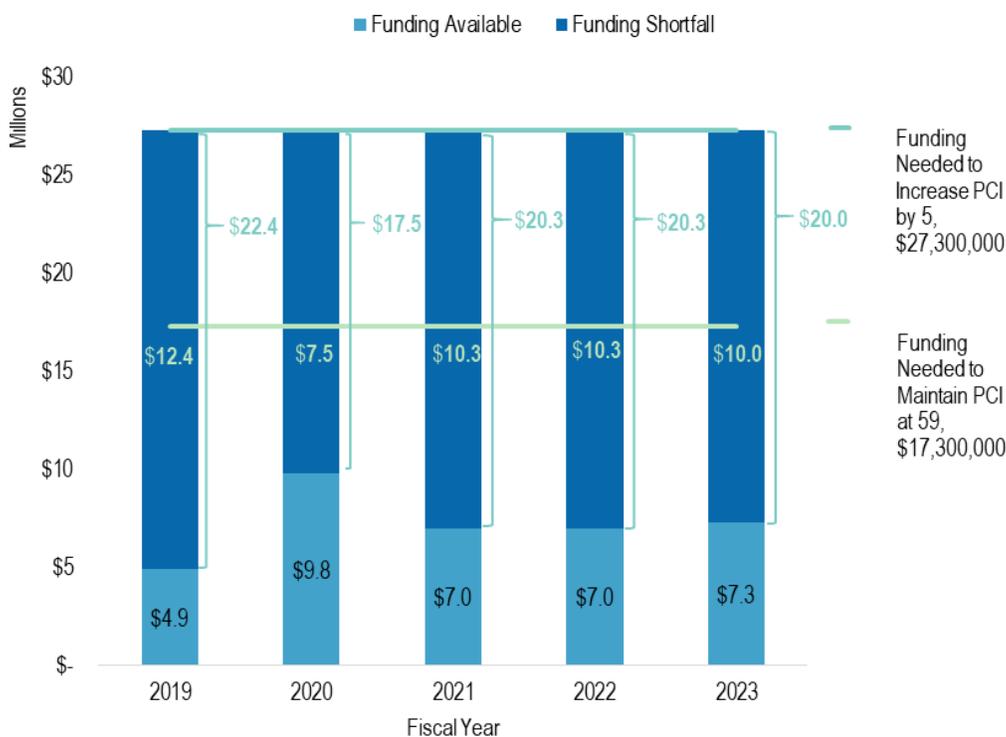
In our 2011 audit of streets, we found that the City needed \$54 million to spend just on paving to improve Berkeley's average street condition from a PCI of 58 to a PCI of 75. This audit work was conducted prior to the adoption of the Complete Streets policy and did not take into account the additional project costs that come with the Complete Streets approach. In addition to the \$54 million, the City would have also needed approximately 15-25 percent or \$8.1-\$13.5 million more to account for Complete Streets project costs. The Auditor warned that the funding of the bond measure along with other available funding would not improve the PCI and the most deteriorated streets would be left to fail.

<sup>7</sup> This does not include the cost to conduct Complete Street projects.

PEI’s budget analysis was based on maintenance and rehabilitation strategies developed by City staff, available funding, and base construction unit prices adjusted to include the financial impact of design, construction management, contingencies, and other relevant construction costs (e.g., ADA ramps, curb and gutters, striping, etc.). This analysis was conducted in 2018 and the estimates would need to be adjusted for any changes that have occurred since then, to provide a more accurate estimate based on current and future needs, funding, and strategies.

To maintain the PCI at 59, PEI estimated that that City will need an average of \$17.3 million in annual funding over five years. Even with \$17.3 million in dedicated funding, streets that are not maintained will continue to deteriorate and the deferred maintenance costs will continue to grow.

Figure 10. An Estimated Additional \$10 Million Needed per Year to Maintain Pavement Condition Index



Source: Auditor analysis of data from City of Berkeley Capital Budgets FY 2014-2020 and Pavement Engineering Inc. Report, September 2018

**A lack of sufficient funding is not unique to Berkeley, but other jurisdictions are doing better.**

MTC reported in 2018, that as Bay Area roads have continued to age and the need for maintenance grows, available funding has decreased, leading to more deferred maintenance and more costly repairs. Money for street rehabilitation

PEI is an MTC consulting partner that was responsible for updating Berkeley’s Pavement Management System, StreetSaver, and identifying maintenance and rehabilitation needs and costs in 2018. The purpose of StreetSaver is to track inventory, store pavement condition history, and produce budget estimates to optimize funding for improving pavement condition. While this tool is useful, it does have limitations. StreetSaver helps the City identify candidate streets for maintenance and repair. It cannot provide detailed designs for street improvements. Additional analysis on a project level can help further optimize the City’s Street Rehabilitation funds.

and maintenance traditionally comes from a range of sources, including state gas tax, county sales tax, and local sources.

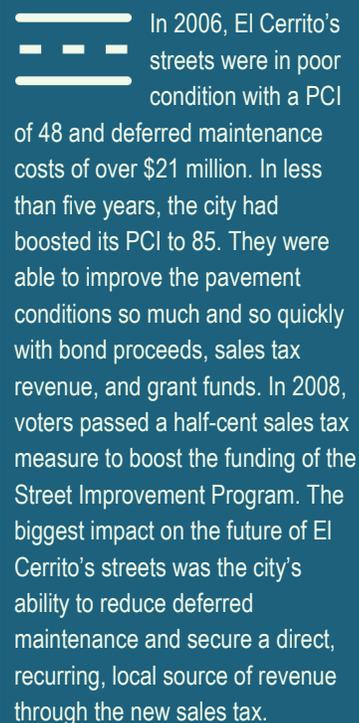
In 2017, the state Legislature passed Senate Bill 1 (SB1) establishing a transportation funding package estimated to generate more than \$52 billion for statewide improvements. Half of these funds are dedicated to fixing local streets and transportation infrastructure, and the other half is dedicated to state highway and transportation infrastructure.

This has shown the State's commitment to improving infrastructure for transportation and specifically the investment in improving roads, after decades of disinvestment. Even with the passage of SB1 in 2017, California's gas tax has seen a 46 percent drop in purchasing power since 1963. More funding is necessary to reach the MTC goal of "good" PCI, and lack of sufficient funding remains a challenge for MTC and local governments.

While every city in MTC's jurisdiction has faced the same challenges with funding from the State, some cities have been more successful in securing adequate local funding to improve street condition. El Cerrito, Moraga, and Orinda have all secured additional sales tax revenue through ballot measures to finance street repair and rehabilitation. Since sales taxes disproportionately impact lower income residents, a sales tax may not be the best solution for Berkeley. However, the City does need to secure additional stable funding sources for streets. El Cerrito was able to improve PCI from 48 to 85 in less than five years. Moraga's three-year moving average PCI score increased 10 points from 58 for 2012-2014 to 68 for 2015-2017. Orinda was able to improve their three-year PCI score from 49 to 60 over the same period.

### COVID-19 will impact available funding for street paving.

Due to COVID-19 economic impacts, the City is facing a decrease in revenue. Public Works predicts a decrease of \$1.13 million in FY 2020 and \$1.06 million in Fiscal Year 2021 in street funding from state transportation tax, SB1, Measure B, and Measure BB funds. This could impact the Five-Year Paving Plan by decreasing the size of planned rehabilitation projects. However, Public Works will be able to maintain street maintenance operations at the current level.



In 2006, El Cerrito's streets were in poor condition with a PCI of 48 and deferred maintenance costs of over \$21 million. In less than five years, the city had boosted its PCI to 85. They were able to improve the pavement conditions so much and so quickly with bond proceeds, sales tax revenue, and grant funds. In 2008, voters passed a half-cent sales tax measure to boost the funding of the Street Improvement Program. The biggest impact on the future of El Cerrito's streets was the city's ability to reduce deferred maintenance and secure a direct, recurring, local source of revenue through the new sales tax.

## Recommendations

To ensure there are sufficient resources to maintain Berkeley streets, we recommend that the Public Works Department:

- 1.1 Annually, conduct a budget analysis, based on the deferred maintenance needs at that point in time, to determine what level of funding is necessary to achieve the desired goals of the Street Rehabilitation Program. Report findings to City Council. This information will be helpful during updates to the Five-Year Street Rehabilitation Plan and during the budgeting process.
- 1.2 Identify funding sources to achieve and maintain the goals of the Street Rehabilitation Program.

## The Streets Rehabilitation and Repair Policy is out-of-date and Public Works is not following it.

The Streets Rehabilitation and Repair Policy has not been updated since 2009. Public Works is no longer following the policy to guide annual updates to the Five-Year Paving Plan and there is no mention of equity in the policy. Additionally, the policy is not guided by clear goals or performance measures. Without a clear and updated policy, Public Works and City Council are not able to make fully informed or transparent decisions regarding annual street paving. This may lead to inefficiencies and inequities in street paving.

### The Policy has not been updated since 2009.

The Street Rehabilitation and Repair Policy establishes that the City shall have a Five-Year Paving Plan that is adopted by Council. Both the policy and the Five-Year Paving Plan are to be reviewed and updated annually to ensure that they are consistent with each other and with the City's General Plan and Area Plan policies. It is unclear who is responsible for updating the policy. Public Works staff and the Public Works Commission acknowledged that the policy is outdated and expressed the need for updates to help guide the planning process and promote transparency. The Public Works Commission has taken action to begin updating it.

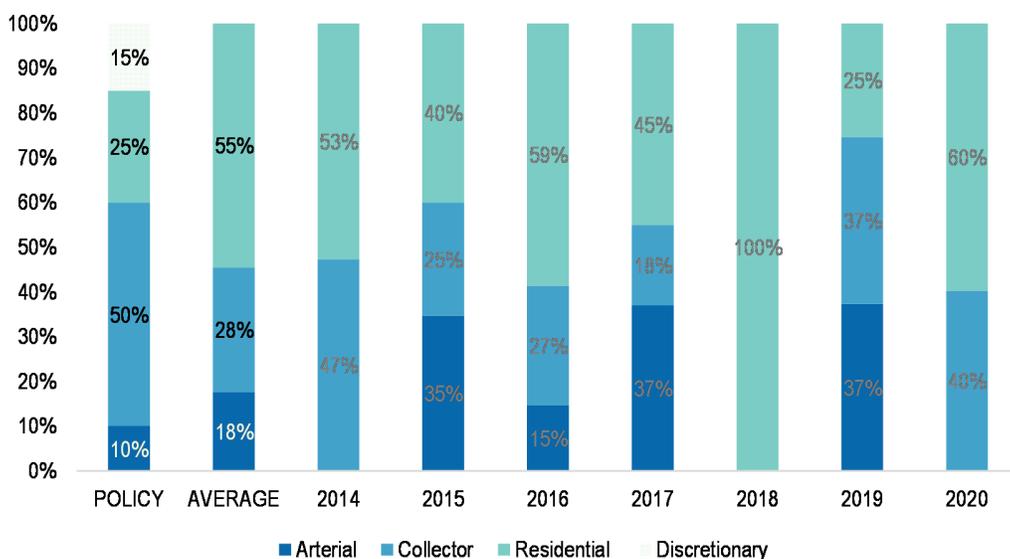
### The City has not allocated funding for paving in accordance with the Policy.

Between fiscal years 2014 to 2020, the planned paving projects did not align with the funding prioritization based on street use established by the City's Street Rehabilitation and Repair Policy. The policy states that the City should prioritize and use all available funding for the rehabilitation of streets in accordance with their use. There are three types of streets according to the policy – arterials, collectors, and residential. All Berkeley Measure B Sales Tax, and new and current gas tax funds shall be used as follows:

- 10 percent for arterials
- 50 percent for collectors
- 25 percent for residential
- 15 percent for discretionary/demonstration projects

Over the course of the seven years, collector streets were significantly underfunded, receiving on average 28 percent of the annual funding when according to the policy, collectors should be funded at 50 percent annually. Residential streets were funded above the minimum funding level every year. In FY 2018, paving projects on residential streets received 100 percent of the annual funding. According to Council reports from Public Works staff and Commission, the redirection of funds towards residential streets was an attempt to address immediate improvement in the citywide PCI. Council only approved the first year of the FY 2018 five year paving plan as recommended by the Public Works Commission.

Figure 11. A Majority of Funds Spent on Residential Streets, Not Aligned With Policy



Source: Auditor analysis

Additionally, Council decisions that directly impact how streets funds are spent have not been incorporated into the policy. For example, in October 2019, Council passed a recommendation to direct the City Manager to establish a paving pilot program to prioritize bikeways and Vision Zero pedestrian high-injury streets. This initiative requires the City to allocate at least 50 percent of the paving budget towards such streets. This new prioritization and allocation of streets funding should be reflected in the policy.

**Public Works staff consider many factors when updating the Paving Plan.**

As the City is determining which street repairs to prioritize, decision makers consider the PCI of streets, plus Council priorities, the volume of traffic,

other scheduled work on streets, the funding available, and the distribution of projects across council districts, bikeways, and street types. The policy states that updates should be made annually to the Five-Year Paving Plan. Between 2014 and 2020, the City made updates annually, except in 2017.

Figure 12. Process for Updating the Five-Year Paving Plan



Source: Public Works

First, Public Works staff create a preliminary list to determine where repairs or more basic maintenance are needed throughout the City based on available funding. One challenge the City can face is having to coordinate with another major project in the area. This could be a City initiated project, or a project from another agency, such as utility companies (e.g., Pacific Gas & Electric and East Bay Municipal Utility District). Public Works staff have told us they would likely wait until a conflicting project is finished before doing repair and maintenance work. That can mean some street paving is delayed. Berkeley established a five-year moratorium on pavement cuts following the paving of streets, but unplanned, emergency issues can also complicate matters and lead to newly repaired streets being dug up.

Then, staff determine what street segments should be on the list based on the cost effectiveness of treatment, volume of traffic, where they can pave contiguous blocks, and the distribution of paving throughout Council districts, to come up with a draft plan. According to MTC, it is more cost effective to maintain streets in good condition and keep them from falling into lower categories, than to spend limited funds on more invasive full rehabilitation of streets that have already fallen into disrepair. This can explain why some roads that do not seem in most need of repairs are on the

paving list. Additionally, it can be more cost effective to pave contiguous street segments.

Decision-makers must balance pavement management best practices with competing interests, and with limited streets funding. In recent years, the City has focused more resources on residential streets in direct response to public complaints. The Public Works Commission and City Council have been in support of this decision, even though it is in contradiction to the policy. The draft plan is presented to the Public Works and Transportation Commissions. Finally, the plan is presented to Council. The presentation is usually accompanied with a recommendation from the City Manager and a separate recommendation from the Public Works Commission. Council may choose to adopt either recommendation, or propose changes to the plan before voting to approve the final plan.

### **Equity is not defined in the policy.**

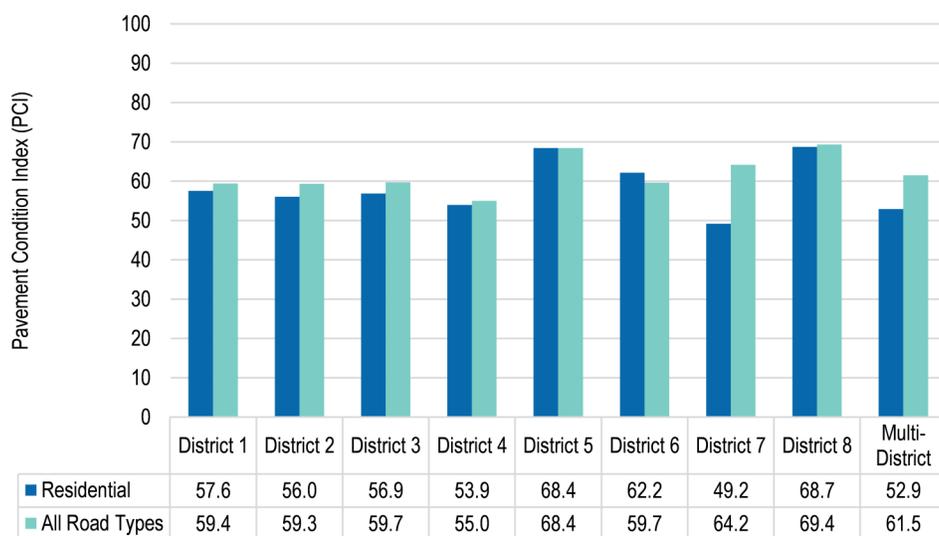
While the word “equity” does not appear in the Streets Rehabilitation and Repair Policy, it is a stated goal of the Public Works Department to take equity into consideration in developing the paving plan. Due to limited resources, Public Works balances equity with cost-effectiveness, including working on contiguous paving projects, rather than small piecemeal projects throughout the City. The mechanism by which Public Works checks for equity is by attempting to ensure an equal split of funds across City Council districts. While this is their practice, staff expressed a desire for more guidance as to how to apply equity into the planning process.

Using equity as criteria to prioritize projects may be most appropriate in the long-term planning of street paving. The City has defined equity and incorporated the definition into the transportation planning processes in the Bike Plan and Vision Zero. The Bike Plan is a long-term plan for building out the bikeway network through 2035. Projects in the plan were evaluated against a set of criteria that prioritize each project based on safety, community support, and equity factors. The equity score was based on whether the project was located in an MTC designated Community of Concern. The definition of Community of Concern include minority population, low-income households, people with limited English proficiency, households with no cars, seniors, people with disabilities, single-parent families, and households with severe rent burden. Additionally, Oakland recently developed a similar prioritization framework for street paving based on equity and additional factors.

Berkeley has voiced its commitment to improving infrastructure and doing so in an equitable way through Vision 2050.<sup>8</sup> The Vision 2050 Task Force recently produced a report detailing a long-term infrastructure plan to address challenges to Berkeley’s aging infrastructure. Berkeley voters supported this initiative with the passage of Measure R in November 2018. The report establishes four core values on which all infrastructure planning decisions should be based. One of those core values is equity. According to the report, all benefits of infrastructure improvements should be distributed equitably throughout the community. This means that underserved individuals should experience the benefits of infrastructure improvements sooner than others, and improvements should be tailored to meet their unique needs.

So how is Berkeley doing with regard to equity in our streets? When looking specifically at residential streets throughout the City, Districts 8 and 5 have the highest average residential PCI and District 7 has the lowest. Additionally, street segments that are in more than one district (multi-district) have the second lowest average PCI in this comparison.

Figure 13. Average Pavement Condition Index by Street Segment, by District



Source: Auditor analysis of StreetSaver data

Note: Multi-district street segments are segments in more than one district.

It is important to note that no two districts are the same size or contain the same make up of street types. This makes comparisons across districts challenging. The current process for allocating funding does not consider other outcome measures besides PCI. Looking at average PCI scores across

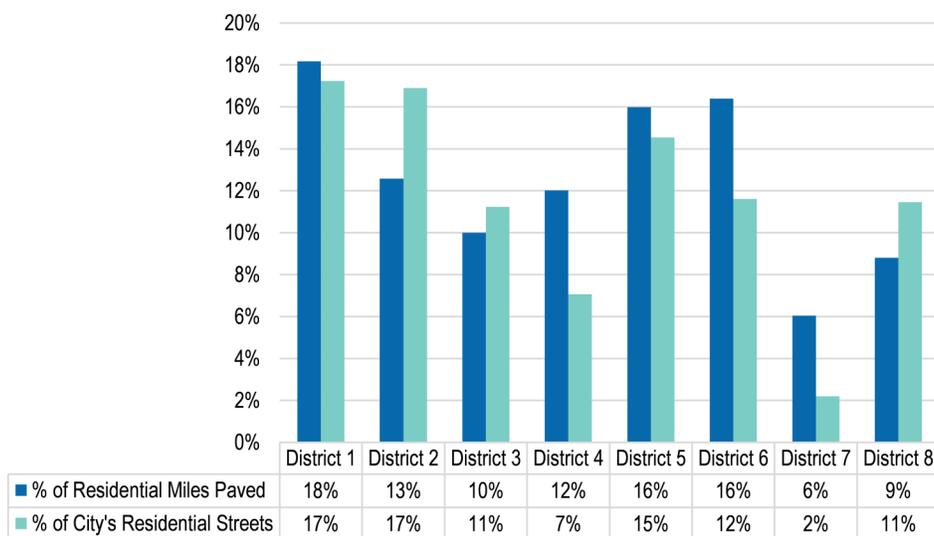
<sup>8</sup> Task Force Recommendations: [https://www.cityofberkeley.info/Clerk/City\\_Council/2020/09\\_Sep/Documents/2020-09-29\\_Special\\_Item\\_01\\_Vision\\_2050\\_Task\\_Force\\_Recommendations\\_pdf.aspx](https://www.cityofberkeley.info/Clerk/City_Council/2020/09_Sep/Documents/2020-09-29_Special_Item_01_Vision_2050_Task_Force_Recommendations_pdf.aspx)

After securing a \$600 million bond, through the passage of Measure KK, Oakland prepared a three-year paving plan which represents \$100 million construction investment. Oakland anticipates the plan to be fully funded by Measure KK. The Oakland Department of Transportation developed a framework to prioritize streets for repaving based on equity, street condition, and traffic safety. For the prioritization of local streets, Oakland staff developed a weighted system that equally accounts for street condition and underserved populations. The definition of underserved population includes people of color, low-income households, people with disabilities, households with severe rent burden, people with limited English proficiency, and youth/seniors. The two metrics were combined by planning area, to produce a weighted factor that was used to distribute 85 percent of the local street program funding.

Measure R Ballot Language: “Shall the measure, advising the Mayor to engage citizens and experts in the development of Vision 2050, a 30-year plan to identify and guide implementation of climate-smart, technologically advanced, integrated and efficient infrastructure to support a safe, vibrant and resilient future for Berkeley, be adopted?”

districts might tell us something about the overall condition within a specific district, however, additional factors should be taken into consideration when discussing equity of paving citywide. For example, Figure 14 shows that Districts 1 and 2 have the most residential streets in the City, with each containing 17 percent of the City’s total residential streets, while District 7 contains only two percent of the City’s residential streets. When looking at all the residential streets paved between 2014 and 2020 under the Five-Year Paving Plans, District 2 received the least street paving in proportion to the percentage of residential streets in their district. This comparison does not take into account the cost variances in the types of pavement treatment. Some treatments are more expensive than others, which may result in less miles paved for the same amount of money as other less expensive treatments. This is just one additional way to look at equity across districts.

Figure 14. Residential Miles Paved Relative to Residential Miles by District, Years 2014-2017



Source: Auditor analysis of StreetSaver data

Berkeley has not developed deeper ways to look at equity in paving like the ones described above. Demographic data by district is not readily available. However, by looking at the overall picture of our streets, it is clear that the streets in the Berkeley hills are generally in slightly better condition than the streets in the flat areas. If the City continues to underfund street repair and prioritize keeping better paved streets in good condition, the disparity in street condition among districts will continue to grow. According to forecasts conducted by PEI, Districts 1 and 2 are projected to have the lowest PCIs of 45.5 and 46.2 by 2025 at the current rate of funding.<sup>9</sup>

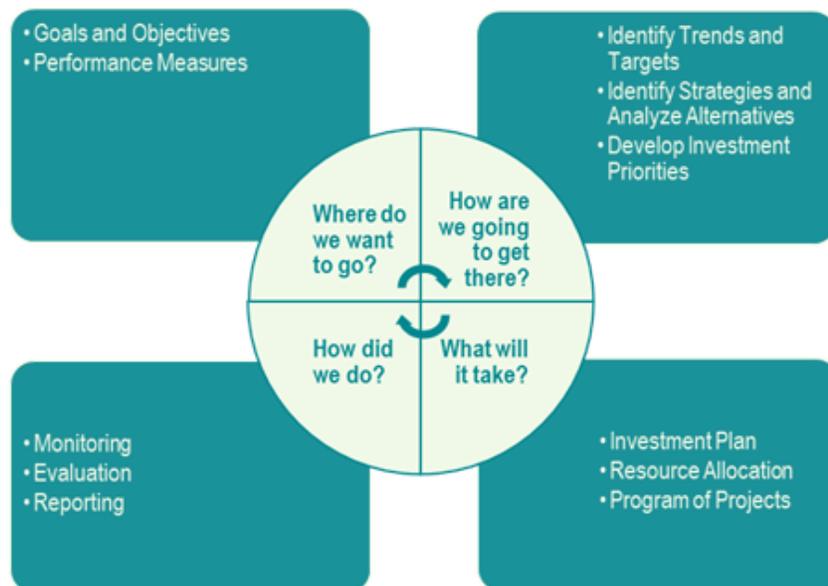
<sup>9</sup>This forecast includes all street types (arterials, collectors, and residential streets).

## The Policy is not guided by clear goals or performance measures.

The current policy includes outdated priorities and lacks any goals or performance measures to track the success of the program. Other transportation plans in the City including the Bike Plan and Berkeley Strategic Transportation Plans, include goals and performance measures. While Public Works does take other transportation plans and programs into account when updating the Five-Year Paving Plan, there is room for improvement to increase transparency and ensure the best use of limited funds.

Performance-based planning and programming involves integrating performance management concepts into the existing planning and programming process to achieve desired outcomes of the entire transportation system. This type of planning attempts to ensure transportation dollars are spent based on the ability to meet established goals for improving the overall system. It involves using data to support long-range and short-range investment decision-making, and it is considered a best practice in the transportation industry. It generally starts with a vision and goals, selection of performance measures, and use of data and analysis tools to inform priorities, which are carried forward into short-term planning.

Figure 15. Performance-Based Planning and Programming Framework



Source: US Department of Transportation Performance Based Planning and Programming Guidebook, 2013

 The Bike Plan  
 defines safety goals  
 and performance  
 measures.

### Goal 1: Safety First

Performance Measure: Zero bicycle-involved fatalities by 2025.

Performance Measure: Zero bicycle-involved severe injuries by 2035.

 The Berkeley  
 Strategic  
 Transportation Plan  
 (BeST Plan)

provides a prioritized vision of how to improve Berkeley's transportation network over 5-, 10-, and 30-year periods. This is a guide for achieving a transportation network that aligns with the City's Complete Streets Policy and other transportation visions established by other City plans and policies. The BeST Plan defines the methodology for measuring success of transportation improvements and includes defining metrics based on the vision, goals, and policies. There are five goals:

1. Increase mobility and access for all mode choices
2. Increase user safety
3. Increase access to commercial districts and opportunity areas
4. Increase transportation choices for disadvantaged communities
5. Increase environmental sustainability and resiliency

## Paving decisions are not transparent and inefficiencies may exist.

There is a lack of transparency about how paving decisions are being made. Without a clear and updated policy, guided by goals and performance measures, Public Works and City Council are not able to make fully informed or transparent decisions regarding annual street paving. This may lead to inefficiencies and inequities in the streets program.

### Recommendations

To ensure a transparent decision-making process, we recommend that the Public Works Department:

- 2.1 Update the Street Rehabilitation and Repair Policy annually and define who is responsible for ensuring the Policy is updated, as stated in the Policy.
- 2.2 When updating the Street Rehabilitation and Repair Policy, incorporate equity to align with Vision 2050 and clearly define how it will be applied to the street maintenance and rehabilitation planning process.
- 2.3 Define goals and performance measures to guide the Street Rehabilitation and Repair Policy and Street Rehabilitation Program that align with other plans and policies relevant to street paving (e.g., Complete Streets Policy, Vision 2050, etc.). Regularly report to Council on performance measures.

## Appendix I: Methodology and Statement of Compliance

### Methodology

We audited the Streets Rehabilitation Program for fiscal years (FY) 2014 through 2020. We performed a risk assessment of the program's practices and procedures to identify potential internal control weakness, including fraud risks, within the context of our audit objectives. We assessed funding levels and the pavement condition index, and evaluated policies and plans. This included a review of selected policies and procedures, as well as interviews with staff from Public Works. In performing our work, we identified concerns about the program's outdated policies, and insufficient resources, planning, and communication that would help ensure that Berkeley's streets are paved and maintained. While we assessed the fiscal impact of pavement condition, our analysis did not include the external costs on vehicles or safety associated with street condition.

To gain an understanding of the Streets Rehabilitation Program operations and threats to performance and to achieve our audit objectives, we:

- Reviewed the Street's Rehabilitation and Repair Policy and Complete Streets Policy.
- Reviewed and analyzed the Five-Year Street Rehabilitation Plans from FY 2014 through FY 2020 and accompanying council items.
- Reviewed MTC's 2035 Transportation Plan, 2018 Pothole Report, and certification letters.
- Interviewed Public Works Staff, Public Works Commissioners, City Councilmembers, and community members.
- Reviewed Pavement Engineering Incorporated's 2018 report on the City's pavement management program.
- Reviewed the City's budgets and Capital Improvement Programs from FY 2014 through FY 2020.
- Reviewed paving project costs for construction projects completed in FY 2014 through FY 2019.
- Reviewed the Bike, Pedestrian, and Berkeley Strategic Transportation Plans.
- Compared best practices for transportation planning with the City's current process.

### Data Reliability

StreetSaver data is sufficient and reliable for the purposes of providing overall descriptive statistics on the condition of pavement throughout the City. Outside experts are hired to conduct periodic condition analyses of city streets and update the pavement management database (StreetSaver). Under contract with MTC, Pavement Engineering Inc. (PEI) updated the City's Pavement Management System in 2018. The purpose of a Pavement Management System is to track inventory, store work history and furnish budget estimates to optimize funding for improving the City's pavement system.

We relied on reports produced by the Metropolitan Transportation Commission (MTC) and PEI to answer our audit objectives. These reports are sufficient and appropriate in the context of our audit objectives. MTC is the metropolitan planning organization for the nine-county San Francisco Bay Area that includes Berkeley.

Pavement Engineering Inc. is a civil engineering firm that specializes in pavement management and rehabilitation. They are currently under contract with MTC as qualified Pavement Management Technical Assistance Partner consultants, and were responsible for reviewing and updating Berkeley's pavement management system, StreetSaver, in 2018.

### Statement of Compliance

We conducted this performance audit in accordance with Generally Accepted Government Auditing Standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

## Appendix II: Recommendations and Management Response

City Management agreed to our findings, conclusions, and recommendations. In our meetings with Public Works Department management, they described their current and planning actions to address our audit recommendations. We found those verbal responses reasonable. Below is the Public Works Department initial corrective action plan and proposed implementation dates. As part of the follow-up process, the Berkeley City Auditor will be actively engaging the Public Works Department every six months to assess the process they are making towards complete implementation.

- 1.1** Annually, conduct a budget analysis, based on the deferred maintenance needs at that point in time, to determine what level of funding is necessary to achieve the desired goals of the Street Rehabilitation Program. Report findings to City Council. This information will be helpful during updates to the Five-Year Street Rehabilitation Plan and during the budgeting process.

Management Response: Agree.

Proposed Implementation Plan: By January 2021, include this information in Public Works' staff recommendation for City Council's approval of 5 year paving plan.

Proposed Implementation Date: January 2021

- 1.2** Identify funding sources to achieve and maintain the goals of the Street Rehabilitation Program.

Management Response: Agree.

Proposed Implementation Plan: By January 2021, include this information in Public Works' staff recommendation for City Council's approval of 5 year paving plan.

Proposed Implementation Date: January 2021

- 2.1** Update the Street Rehabilitation and Repair Policy annually and define who is responsible for ensuring the Policy is updated, as stated in the Policy.

Management Response: Agree.

Proposed Implementation Plan: By June 2021, Public Works staff and Public Works Commission submit a proposed revised policy for Council adoption, which addresses both equity and Vision 2050. This policy will then be approved annually by City Council at the same time as the paving plan.

Proposed Implementation Date: June 2021

**2.2** When updating the Street Rehabilitation and Repair Policy, incorporate equity to align with Vision 2050 and clearly define how it will be applied to the street maintenance and rehabilitation planning process.

Management Response: Agree.

Proposed Implementation Plan: By June 2021, Public Works staff and Public Works Commission submit a proposed revised policy for Council adoption, which addresses both equity and Vision 2050.

Proposed Implementation Date: June 2021

**2.3** Define goals and performance measures to guide the Street Rehabilitation and Repair Policy and Street Rehabilitation Program that align with other plans and policies relevant to street paving (e.g., Complete Streets Policy, Vision 2050, etc.). Regularly report to Council on performance measures.

Management Response: Agree.

Proposed Implementation Plan: By May 2021, Public Works includes annual performance goals and measures as part of the citywide budget development process, and includes reports on these measures as part of the future biennial budget development.

Proposed Implementation Date: May 2021

### **Mission Statement**

Promoting transparency and accountability in Berkeley government.

### **Audit Team**

Erin Mullin, Auditor-in-Charge  
Claudette Biemeret, Audit Manager (Former)  
Tracy Yarlott-Davis, Audit Team Member

### **City Auditor**

Jenny Wong

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**BERKELEY CITY AUDITOR**



**To:** Honorable Mayor and Members of the City Council  
**From:** Jenny Wong, City Auditor *JW*  
**Subject:** Rocky Road: Berkeley Streets at Risk and Significantly Underfunded

RECOMMENDATION

We recommend City Council request that the City Manager report back by June 15, 2021, and every six months thereafter, regarding the status of our audit recommendations until reported fully implemented by the Public Works Department.

CURRENT SITUATION AND ITS EFFECTS

Without significant additional funding, Berkeley streets will continue to deteriorate and deferred maintenance costs will increase. Continuing with the current level of funding, the Paving Conditions Index (PCI) will move from 59 in 2018 and reach an estimated low of 52 by 2023. In addition, if the City simply maintains the current level of funding, the deferred maintenance costs will increase to an estimated \$328 million by 2023. This estimate represents just the cost for paving streets, and does not include the additional 15-25 percent needed to implement the City's Complete Streets Policy. Our report notes that this is one area of concern as prior paving cost projections have not included Complete Streets costs yet paving funds have been spent to implement Complete Streets. In 2018, a City contractor estimated the City would need an average of \$17.3 million annually to maintain the current PCI or an average of \$27.3 million annually to increase PCI by five points in five years. Revenue decreases from COVID-19 may contribute to further declines in street condition.

The Streets Rehabilitation and Repair Policy has not been updated since 2009. Public Works is no longer following the policy to guide annual updates to the Five-Year paving plan. For example, from 2014 to 2020, on average, collector streets were significantly underfunded according to the policy. Furthermore, Council decisions such as prioritizing bikeways are also not reflected in the current policy. Decision makers must balance a myriad of considerations in making complex decisions about street paving. Equity is currently not defined in the policy. Additionally, the policy is not guided by clear goals or performance measures. Without a clear and updated policy, Public Works and City Council are not able to make fully informed or transparent decisions regarding annual street paving. This may lead to inefficiencies and inequities in street paving.

BACKGROUND

Berkeley streets have an asset replacement value of approximately \$777.6 million, and deferred maintenance needs of streets exceeded \$251 million in 2019. It is the responsibility of the City

to maintain Berkeley's infrastructure for residents, and it is the goal of the Street Rehabilitation Program to maintain a safe street surface for vehicles, bicycles, transit, and pedestrians. Berkeley has the 15<sup>th</sup> worst Pavement Condition Index (PCI) out of 101 cities in the nine county jurisdiction covered by Metropolitan Transportation Commission (MTC) with a score of 57 in 2017.

ENVIRONMENTAL SUSTAINABILITY

While they are beyond the scope of our audit, there are environmental impacts associated with deteriorating street conditions.

RATIONALE FOR RECOMMENDATION

Implementing our recommendations will increase transparency of how paving decisions are made, and enable decision makers to make efficient, effective, and equitable paving decisions.

CONTACT PERSON

Jenny Wong, City Auditor, City Auditor's Office, 510-981-6750

Attachments:

- 1: Audit Report: Rocky Road: Berkeley Streets at Risk and Significantly Underfunded