



VISION 2050 PROGRAM PLAN



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01

THE INFRASTRUCTURE PROGRAM PLAN: OVERVIEW

This section provides an overview of the Vision 2050 Initiative and describes the Program Plan.



1.1 The Vision 2050 Initiative

The Vision 2050 initiative was introduced by Mayor Arreguin at his 2017 State of the City address. He described a complex network of pipes, streets, utility wires, bikeways, and transportation systems that are old and have suffered from historic disinvestment, neglect, and poor maintenance. As our infrastructure ages, we need a plan to make sure our systems are resilient to handle a growing population and climate change, including sea-level rise, more flooding, and wildfires. As technological innovations emerge and the condition of our infrastructure declines, we have an enormous and exciting opportunity to reimagine our streets and public spaces. This initiative is about building a future for Berkeley that provides essential services for future generations.

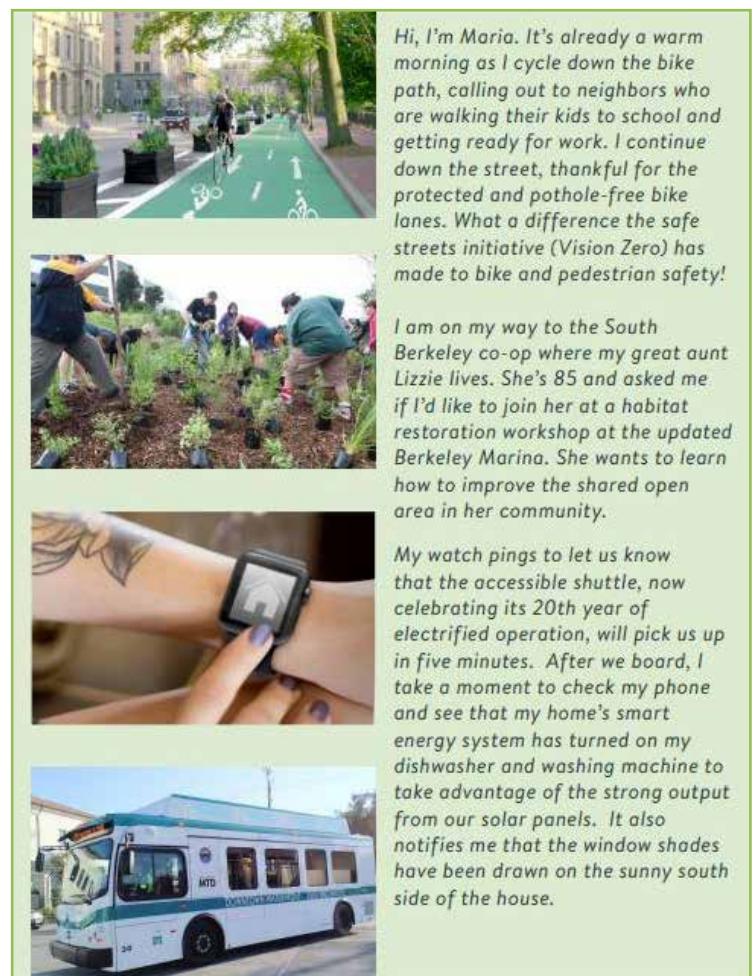
In November 2018, Berkeley voters approved Measure R. The Measure asked: “Shall the measure, advising the Mayor to engage citizens and experts in the development of Vision 2050, a 30-year plan to identify and guide implementation of climate-smart, technologically-advanced, integrated and efficient infrastructure to support a safe, vibrant and resilient future for Berkeley, be adopted?” The response was a resounding yes.

A 40-member residents’ task force was formed and the team analyzed quality of life, environmental and technology trends, and funding issues. To help keep focus on the future, the team imagined being on a street corner in Berkeley in the year 2050. What will Berkeley be like then? Figure 1 shows a street corner view from 2050.

The task force worked diligently for 18 months and developed the principles, strategies and

recommended actions shown on Figure 2.

Community engagement was at the center of Vision 2050. Outreach began early in 2018 with four information nights across Berkeley. Outreach continued in an effort to reach people where they already congregate, including neighborhood and faith-based groups and community organizations. From September 2018 to July 2019, the Mayor’s Office presented at thirteen community organization meetings in conversations that ranged from a handful to one hundred people. Community feedback was used to develop the principles, strategies, and recommended actions.



▲ **Figure 1:** Street Corner View from Vision 2050 report

VISION 2050

The Vision 2050 Framework focused on better coordination, integrated project delivery, utilizing new financing mechanisms, and broad principles and strategies for our infrastructure needs. The Framework was approved by Berkeley's City Council in September 2020. The City Manager then turned to implement the recommendations and assigned the Public Works Department to lead the effort. A timeline for the Vision 2050 initiative is shown below.

2017

Mayor Arreguin announces Vision 2050 Initiative

November 2018

Measure R approved by voters

2018-2019

Residents task force conducted analysis

September 2020

City Council approves Vision 2050 Framework

Current

Implementation led by City Manager

▲ **Figure 3:** Timeline for Vision 2050 Initiative



PRINCIPLES, STRATEGIES AND RECOMMENDED ACTIONS

1

STRATEGY ONE Use Integrated and Balanced Planning

- Use multi-criteria decision-making
- Use adaptive planning
- Prepare and implement a Dig Once policy

2

STRATEGY TWO Manage Infrastructure from Cradle to Grave

- Institute structured master planning
- Develop an Asset Management Program

3

STRATEGY THREE Adopt Sustainable and Safe Technologies

- Accelerate the transition to clean energy and electrification
- Implement Complete Streets to provide sustainable and healthy transportation
- Develop natural streetscapes that provide ecosystem services
- Use sensors, data, and advanced technologies
- Prepare a wildfire mitigation and safety plan

4

STRATEGY FOUR Invest in Our Future

- Take advantage of a strong financial position to address infrastructure needs and commit to reducing large unfunded infrastructure liability by doubling capital expenditures

5

STRATEGY FIVE Prepare the City's Organization to Implement a Major Capital Program

- Develop an organization that is integrated and has capacity to deliver
- Prepare a program approach with management tools
- Provide independent oversight and reporting

▲ **Figure 2:** Vision 2050 Principles, Strategies, and Recommended Actions

1.2 What is an Infrastructure Program Plan?

This Infrastructure Program Plan (Plan) is the City of Berkeley's roadmap to rebuild our public infrastructure over the next 30 years. This Plan supports the Vision 2050 principles and provides information on outcome objectives, program elements, community input, the funding plan, program implementation, and program oversight and reporting. The Plan serves as a roadmap to guide the many infrastructure decisions that will be required throughout the next three decades. The Plan is flexible and adaptable, so the City can anticipate and address new challenges that we will face in the future. Why prepare a Plan now?

Improving the City's infrastructure requires new funding and a revenue measure or measures, which voters may consider on the November 2022 ballot. This Plan is prepared to provide the public with an understanding of the "big picture" for Vision 2050 in advance of voting for new funding. This approach is an advancement from prior measures. The Plan describes the work at the asset category level—streets, stormwater, parks, waterfront, etc. It is not a project-by-project prioritization. That will happen if voters approve funding, after which a project and program team will be formed and an oversight committee designated.

1.3 Core Values and Principles Guide our Planning

Berkeley's streets, storm drains, sewers, and water lines date back to the early decades of the 20th century. Critical systems are simply wearing out. Recent budgets have been insufficient to address these infrastructure needs, let alone modernize our systems or improve their resilience. As defined in the City's resilience strategy, resilience is the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience.

The growing backlog of aging infrastructure leaves the community vulnerable to unplanned failure and service interruptions. For residents, workers, and businesses, this can translate to unsafe conditions, increased cost, and impediments to quality of life. Examples of infrastructure needs are shown in Figure 4.

As we begin to grapple with Berkeley's unfunded infrastructure needs, new challenges are emerging. The local impacts of the global climate crisis pose a major threat to our aging infrastructure. Extreme storm events, wildfires, heat waves, drought, groundwater, and sea level rise will challenge streets, pipes, and open spaces that were designed for a more benign environment. These vulnerabilities are layered upon other acute risks such as a major earthquake, and chronic challenges such as inequity. If our city is to survive and thrive, we must increase our resilience to these challenges.

PRINCIPLE ONE

SUPPORT VIBRANT AND SAFE COMMUNITIES

Infrastructure shall take equity into account and improve the quality of life of all Berkeley residents, including having green open spaces, safe modes of mobility, and being prepared for fires and earthquakes.

PRINCIPLE TWO

HAVE EFFICIENT, INSPIRED AND WELL MAINTAINED INFRASTRUCTURE

Infrastructure shall be long lasting, use advanced technologies, and be maintained to provide efficient service.

PRINCIPLE THREE

FACILITATE A GREEN BERKELEY AND CONTRIBUTE TO SAVING OUR PLANET

Infrastructure shall accelerate the transition to carbon neutrality and include electrification, develop natural streetscapes using green infrastructure, and prioritize human-powered and public transportation.

▲ **Figure 2:** Vision 2050 Principles

As we rebuild our infrastructure and, at the same time, reimagine a landscape for a changing future, our infrastructure decisions must remain flexible, yet grounded in a set of clear values. For this reason, the Vision 2050 Framework identified four core values as shown in Figure 5. These values will guide implementation of Vision 2050.



Street Pavement Damage



Sidewalk Repair



Deteriorated Marina Dock

▲ **Figure 4:** Example Infrastructure Needs

CORE VALUES FOR INFRASTRUCTURE DEVELOPMENT



EQUITY

The benefits of improved infrastructure must be distributed equitably throughout the entire community. Equity should mean that disadvantaged citizens with more pressing needs experience benefits sooner than others and receive benefits particularly tailored to their unique needs.



STRONG LOCAL ECONOMY

A strong local economy provides resources to Berkeley citizens and creates an opportunity to build local skills and employment opportunities that support the city's diverse community.



PUBLIC HEALTH AND SAFETY

This core value considers safe and convenient access to greenspaces, public services, clean air, and social support networks, all of which can have a big impact on people's emotional and physical health.



RESILIENCY AND SUSTAINABILITY

Resilience requires systems and structures that are able to recover quickly from temporary and, sometimes, catastrophic events. Sustainability refers to the ability to minimize our impacts on the environment while still providing core services.

▲ **Figure 5:** Vision 2050 Core Values



INFRASTRUCTURE NEEDS AND COMMUNITY PRIORITIES

This section provides an update on the City's infrastructure funding needs and the community's infrastructure priorities.



2.1 Infrastructure Needs

The City has an extensive portfolio of capital assets and infrastructure, including 216 miles of streets, more than 300 miles of sidewalks, 255 miles of sewers, 78 miles of underground storm drains, 95 public buildings, 52 parks, 2 pools, and 3 camps. In addition, the City operates and maintains the Berkeley Waterfront and its related facilities, including the pier, docks, pilings, channel, streets, pathways, parking lots, buildings, trails, Adventure Playground, and 1,000 berth marina.

A City budget is prepared every two years and it includes a Capital Improvement Program (CIP). The City's ability to fund its CIP is limited by the total available resources that are competing with other community priorities. CIP funding resources include the General Fund, a number of special revenue funds, grants, and loans. The CIP attempts to identify all known CIP projects, categorizing them as baseline (annual, recurring program), one-time (special allocations, grants, loans), and unfunded (funding source has yet to be identified).

The FY2022 CIP identified an infrastructure capital funding need of more than \$1 billion in Berkeley. However, these infrastructure needs are constantly changing due to increased construction costs and new planning studies that result in updated cost estimates. Past estimates also focused primarily on "fix it first" type repairs rather than the transformational infrastructure sought by the Vision 2050 Framework.

For this reason, Table 1 provides an updated list of infrastructure needs. This list includes updates from prior estimates and advances Vision 2050 in several significant ways. It adds asset categories

that are more than simply fixing or repairing an asset and are about the ultimate use and safety of the asset. For example, instead of solely identifying the deferred maintenance in our pavement, the list includes the cost of fully implementing our adopted Bicycle and Pedestrian Plans, which would keep our streets safe for all users, especially bicyclists and pedestrians. Instead of focusing solely on traditional infrastructure, it includes trees as an important infrastructure category and begins to address the climate crises by building in the cost of undergrounding the City's evacuation routes.

Some of these categories have existing, dedicated funding for which an increase is necessary to cover these needs. Others categories may require multiple revenue sources, such as the General Fund, grants, State and Federal funding, developer contributions, user rates, and new revenue sources. An estimate of potential revenue from these funding sources is provided in Section 4.

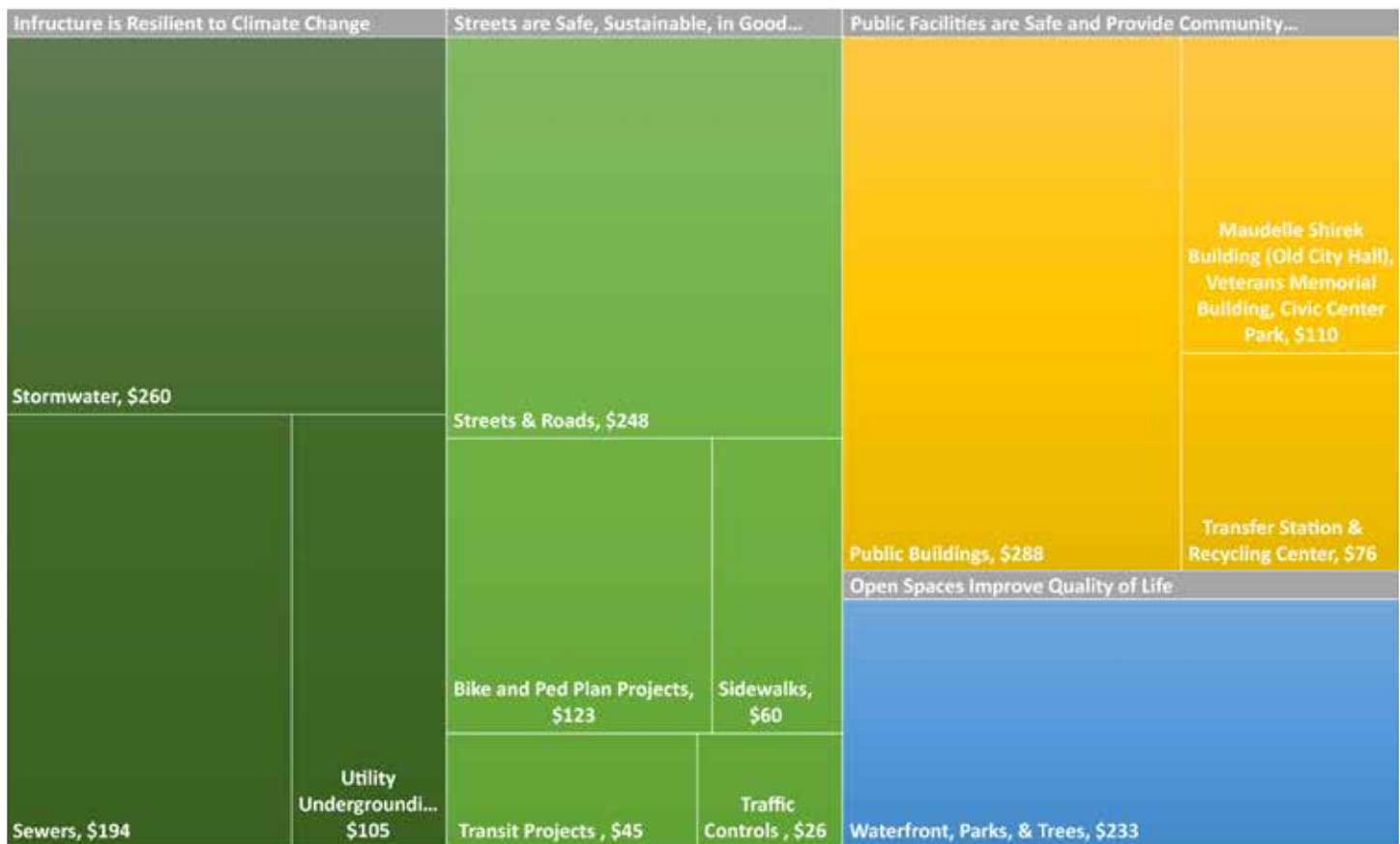
Figure 6 summarizes these same needs, grouped by asset category within each of the four Vision 2050 Program outcomes discussed in Section 3. If these needs are addressed, then Vision 2050's goal of resilient and sustainable infrastructure will be reached.

TABLE 1
INFRASTRUCTURE FUNDING NEEDS
(These are updated on an ongoing basis)

Asset Category	Infrastructure Funding Needs, in 2022 dollars
More immediate needs	
Parks, camps, and pools	\$81,000,000
Watefront	\$131,000,000
Public buildings	\$288,000,000
Sidewalks	\$60,000,000
Streets	\$248,000,000
Sewers	\$194,000,000
Stormwater	\$259,500,000
Traffic Controls, Streetlights, and Parking	\$26,000,000
Longer-term needs	
Bike and Pedestrian plan projects	\$122,500,000
Maudelle Shirek Building (Old City Hall), Veterans Memorial Building, Civic Center Park	\$110,000,000
Transfer station and recycling center	\$76,000,000
Transit projects	\$45,000,000
Trees	\$21,000,000
Utility Undergrounding	\$105,000,000
Total Average	\$1,767,000,000

Table 1's cost estimates are largely work that would be capital funded. In some cases, such as with streets and roads, the estimate includes recurring annual costs to keep the asset performing at the

expected level and without deterioration. The requirement to fund the annual maintenance of assets is addressed in the Asset Management Program discussed in Section 6.



▲ **Figure 6:** Infrastructure Funding Needs by Vision 2050 Outcome Objective

2.2 Community Input and Priorities

To better understand the community's infrastructure priorities, the following was completed in winter 2021 through spring 2022:

- › Two statistically-reliable surveys of a representative sample of 500 Berkeley voters
- › Meetings with over 25 commissions and local community organizations
- › An online public survey that received over 1,000 responses
- › An informational mailer to all Berkeley residents
- › Development of a Vision 2050 website BerkeleyVision2050.org
- › Four virtual large area public meetings

All of these efforts have been instrumental in sharing information and gaining input in the development of this Program Plan.

A survey in October 2021 of a random, representative sample of 500 Berkeley voters elicited respondents' infrastructure priorities and found that voters' top priorities included:

- › Increasing affordable housing for low-income and homeless residents (79% rated as "important")
- › Upgrading storm drains, green infrastructure, and watersheds to keep pollution from the Bay (79% important)
- › Developing climate change resiliency, including protecting against sea level rise, wildfires and drought (78% important)
- › Undergrounding utilities to reduce the risk of wildfire (73% important)
- › Repairing deteriorating streets (73% important)

An online survey was also conducted and a total of 1,024 responses were received. For the most part, the results from the online survey aligned with the scientific survey. More so than the scientific survey, street repair stood out as a clear top priority followed by affordable housing. The top five ranked priorities are listed below, with percentages indicating the number of respondents who ranked the particular item as top priority:

- › 28.5% – Street repair
- › 19.2% – Affordable housing
- › 8.3% – Bike lanes/safety
- › 7.5% – Climate change resiliency
- › 6.8% – Pedestrian safety

Input on this Program Plan was gained from four large area public meetings held on March 30, April 6, April 13, and April 20 and the following Commissions: Environment and Climate, Disaster and Fire Safety, Disabilities, Parks and Waterfront, Public Works, and Transportation. Berkeley residents brought their questions, input, and comments, a summary of which can be found at [BerkeleyVision2050.org](https://www.berkeleyvision2050.org).

This program plan reflects input gathered from these meetings, including:

- › Adding regular five-year updates to the Program Plan to ensure flexibility and keeping up to date with technology
- › Address overall vision
- › Incorporate trees as public infrastructure assets
- › Include indicator on tree canopy and diversity
- › Address sidewalks
- › Address equity and reference existing equity-based plans
- › Include transit
- › Explain why affordable housing is being considered for the revenue measure(s)
- › Include developers' fees as source of revenue
- › Address General Fund commitments to maintaining public infrastructure
- › Include public art
- › Revise indicators on EVs, sidewalks, and micromobility
- › Revise Program Delivery section to address paving and traffic safety
- › Include more on climate change, e.g., resilience and electrification in buildings
- › Include reference to the San Pablo Park pool
- › Include coordination of programs/projects for multiple benefits





03

INTRODUCING THE 30-YEAR PROGRAM PLAN



The City’s infrastructure systems are very complex, are in daily use, and can’t be improved all at once. This Plan proposes making the improvements over a 30-year planning period in order to achieve a sustainable and resilient infrastructure. This is a reasonable time frame given the need to balance the work priority, the funding required, tax impacts, and the ability to deliver the projects. This also allows time for incorporating new technologies as they develop.

This 30-year Program Plan provides the following information:

- > The major outcomes from implementing the Plan
- > Implementing the Plan over 30 years in phases
- > Possible results from the first phase

3.1 Outcomes of the Program Plan

This Plan includes visible outcomes. Four major outcomes have been identified that incorporate and advance Vision 2050 principles and core values, and

incorporate community input received to date. The outcomes are shown in Figure 7 and the related infrastructure components are described below.



▲ **Figure 7:** Outcomes of the Program Plan

Outcome 1 – Have Safe and Good Quality Streets

Streets are Safer, More Sustainable, Improved to a Good Condition, and Maintained

Having streets that are safer, use sustainable technologies, and are in “good” or better condition is a top priority from the community input, has been a subject of City audits, and is a priority of the Council. The asset categories to achieve this outcome are described below.

Asset Category 1 – Street Surface

The poor condition of Berkeley’s streets has been documented by the City Auditor’s report *Rocky Road: Berkeley Streets at Risk and Significantly Underfunded*, by residents’ complaints, and by an overall low Pavement Condition Index (PCI). On a scale of 0 to 100, streets in a “good” condition have a PCI between 70 – 79. Berkeley’s streets are “at risk” with an overall average PCI of 57. From a community survey conducted in the fall of 2021, improving the condition of Berkeley’s streets is one of the community’s highest infrastructure priorities. The target is to improve Berkeley’s streets to a PCI of more than 70.

Berkeley’s streets in 2050 will look much different than today. Personal automobiles will be rarer, and public transit, ride sharing services, bicycling, and walking more common. Streets will better serve all users, and include visible engineering improvements that make bicycling and walking safer. These streets will make transit easier, safer, faster, and more reliable to access and use. Work in our streets will also require a coordinated approach to the infrastructure above, both at and below the street surface. This will require planning that is integrated and uses concepts such as “Dig Once”. We also will use other street surface technologies that are long lasting, help absorb stormwater and

reduce pollution, reduce surface temperatures and the “urban heat island” effect, and reduce our dependence on asphalt paving, the production of which generates greenhouse gas emissions.

The expected outcome is for Berkeley’s street surface to be in an overall “good” condition, to move toward using sustainable technologies, and to have Vision Zero and Dig Once policies fully implemented.

Reimagine Streets:

- Implement Multi modal Streets with Protected Sidewalks and Bike Lanes
- Introduce Pervious and/or Cool Pavement
- Reclaim Street Parking for Trees and Vegetation
- Promote transit use



▲ **Figure 8:** Vision 2050 Streets

Asset Category 2 - Sidewalks

Most Berkeley residents use a sidewalk daily, and many of us much more. Sidewalks in 2050 will be an even more important part of the transportation network. They will accommodate and promote the City’s trees and healthy urban forest, serve users of all levels of ability and accessibility, and use materials that help filter stormwater and reduce



2020 Pedestrian Plan, and has identified projects to help to bring the City closer to these safe and accessible multi-modal goals.

The City is transforming the City's bicycle network into a low-stress experience with a goal of reducing motor vehicle conflicts and connecting cyclists with the most utilized portions of the City. At the end of the program, over 50 miles of city streets will comprise bikeways, with 15.8 miles of these streets being full bicycle boulevards that criss-cross the City.

Walking is also a core mode of transportation in Berkeley. Improving walkability makes Berkeley safer, more inclusive, and more connected. As the most accessible and affordable form of transportation, walking lies at the core of an equitable mobility network and a healthy community. In addition to enhancing Berkeley's quality of life, improving walking will help the City to achieve its Vision Zero Policy goal of zero traffic deaths and severe injuries.

The Berkeley Pedestrian Plan includes an infrastructure inventory and an assessment of pedestrian demand and safety. The plan identifies ten priority street segments requiring projects to improve pedestrian safety and walkability. Projects provide improved street design, upgraded pedestrian crossings, installed speed management and traffic calming, and improved sidewalk maintenance and accessibility.

The expected outcome is for Berkeley's Bicycle and Pedestrian plans to be fully implemented.



surface temperatures. At present, the City faces a backlog of thousands of sidewalk repairs that have been requested by residents. While Measure T1 has significantly reduced that backlog, the backlog is about to grow again as City staff complete the first proactive assessment of the City's sidewalks to identify repair locations. This proactive assessment is being conducted as part of the City's update to its Americans with Disabilities (ADA) Transition Plan. The City addresses sidewalk repairs with short-term grinding and filling of problem areas and long-term replacement of damaged sidewalks. Where conflicts with the urban forest exist, tools like meandering sidewalks are used to reduce or resolve those conflicts and make tree removal a last resort.

The expected outcome is for the backlog of Berkeley's sidewalk repairs to be completed and to have adequate resources to address future repair needs.

Asset Category 3 - Bicycle and Pedestrian Plans

Eighty percent of the collisions that result in deaths or severe injuries on our streets involve someone riding a bike or walking. Making our streets safer means prioritizing bicycle and pedestrian safety. This is especially important to help more residents and workers choose these fossil fuel-free active transportation modes, and is why Berkeley's vision for the future of its transportation network is to be multi-modal, fossil-fuel free, and equitably accessed. The City has adopted the 2017 Bicycle Plan and the

Asset Category 4 - Traffic Controls, Streetlights, and Parking

In support of creating safe, accessible, and easy to use streets, the City of Berkeley is planning upgrades to existing traffic signals, including detection at 67 locations, ADA accessibility, pedestrian push buttons at 103 locations, and battery back-ups at 124

locations. Public Works maintains 8,011 streetlights and is planning replacements and upgrades of 2,100 parking meters and 240 pay stations.

The expected outcome is for these traffic controls, streetlights, and parking needs to be addressed.

Outcome 2 - Protect the Environment

Infrastructure is Resilient, Protects the Environment, and is Adapted to Climate Change Impacts

Global warming is a significant threat to communities globally and to the City of Berkeley. Berkeley's 2009 Climate Action Plan, 2016 Resilience Strategy, and 2019 Local Hazard Mitigation Plan establish city-wide actions to reduce greenhouse gas emissions and adapt to climate change impacts. The message is clear that the City's infrastructure must be resilient to prepare the City for these risks. Key goals of the City's climate action plans are to use energy more efficiently, transition to renewable energy as a power source for both buildings and transportation, improve access to sustainable transportation modes, recycle our waste, and build local food systems. The asset categories to achieve this outcome are described below.

Asset Category 1 - Stormwater and Watershed Management

The 2012 Watershed Management Plan (WMP) identified projects to improve storm drains, restore creeks, attenuate peak flows and to reduce pollutants entering San Francisco Bay. That project modelled the Potter and Codornices watersheds. The City is in the process of updating the WMP. The updated plan will consider flooding and drought caused by extreme storm events, sea level, and groundwater rise, implementation of the Green Infrastructure Plan, and modelling of all the watersheds. Infrastructure improvements will include storm drains, flow attenuation basins, permeable surfaces, bio-swales, and improvements at Aquatic Park.

The expected outcome is to have a stormwater system that addresses future climate impacts, reduces impervious surfaces, minimizes flooding, meets the City's stormwater discharge permit into San Francisco Bay, prevents pollution from reaching the San Francisco Bay, and revitalizes the urban watershed.

Asset Category 2 - Sewers

The City's wastewater collection system includes approximately 254 miles of City-owned sanitary



sewers, 7,200 manholes and other sewer structures, seven pump stations, and approximately 31,600 service laterals. The City is responsible for maintenance and repair of the lower portion of the service laterals (located within the public right-of-way) from the property line cleanout to the connection to the City's sewer main. Wastewater generated in the City's collection system is conveyed to the East Bay Municipal Utility District (EBMUD) wastewater interceptor system and is treated at EBMUD's Main Wastewater Treatment Plant.

During the 1980s, EBMUD and the seven Satellite agencies conducted studies to address the problem of overflows and bypasses of untreated wastewater that occurred during large wet weather events due to excessive infiltration and inflow (I/I) into the collection systems. These studies resulted in a long-term program of construction of collection system relief sewers and sewer rehabilitation. The City has rehabilitated or replaced over 200 miles of its gravity sewers and associated lower laterals over the past 30 years. Since 2006, the City has also implemented a private sewer lateral (PSL) certification program requiring the inspection and/or repair or replacement of private (upper) sewer laterals at the time of property transfer or major building remodel.

The seven Satellites and EBMUD are in a Consent Decree with the U.S EPA, the State Water Resources Control Board, and the Regional Water Quality Control Board, which establishes requirements for achieving the elimination of untreated wastewater overflows and bypasses over the next 20 to 25 years.

The expected outcome is to comply with the City's requirements in the Consent Decree and seal the sewer system from storm water intrusion, thereby reducing the risk of untreated sewage reaching the Bay during wet weather. This will become even more important as storms intensify due to the climate crisis.

Asset Category 3 - Undergrounding Overhead Utility Wires

The City of Berkeley's stated goal, as outlined in the General Plan, Disaster Preparedness and Safety Element, is to ensure the City's disaster related efforts are directed toward preparation, mitigation, response and recovery from disaster shocks. The Berkeley Local Hazard Mitigation Plan states that our two greatest disaster challenges are a Hayward Fault rupture and Wildland Urban Interface (WUI) fire. The climate crisis will result in periods of drought followed by very wet winters, producing heavy vegetation, dry summers, and hot easterly winds in the late summer. These conditions are known to create significant fires such as the 1991 Oakland Hills Tunnel Fire and fires in many parts of California in the past five years.

Methods to reduce the threat of overhead wires creating WUI fires include aggressive vegetation management and other fire hardening techniques. Overhead power lines, more so than undergrounded wires, can exacerbate unsafe conditions either by contributing to the disaster itself or hampering public safety efforts and evacuations. Earthquakes and landslides can knock over utility poles creating a special hazard. In an earthquake,



poles have a tendency to sway in opposite directions causing wires to snap and throw sparks. Some of California's biggest fires have started because of live wires in contact with combustible fuel.

The Public Works Commission led a three-phase study to underground overhead utility wires in Berkeley. The Phase 3 report recommended undergrounding along evacuation routes to support public safety through ingress of first responders and egress of community members in the event of a major disaster.

The expected outcome is to implement the Phase 3 study recommendations to underground overhead utility wires along Berkeley's evacuation routes and to support neighborhoods in fire zones that choose to underground.

Asset Category 4 - Electrification of Buildings Neighborhoods and Transportation

A major goal of Vision 2050 is to decrease the City's overall climate impact. This effort requires both the reduction of City-wide energy use and transition away from fossil fuels to renewable energy. The Existing Buildings Electrification Strategy in 2021 transitions existing buildings in Berkeley from natural gas appliances to all-electric alternatives in a way that benefits all residents, especially members of historically marginalized communities. As identified in the City's Resilience Strategy and Climate Action Plan, Berkeley seeks an energy system that, by 2045, is carbon neutral and delivers carbon-free electricity across a highly distributed system. Multifaceted changes to existing infrastructure and its uses are required to achieve carbon neutrality. Improvements to the existing energy grid may include, among other items:

- › Increasing electricity distribution capacity to accommodate neighborhood electrification and mobility charging, in coordination with streets and other infrastructure improvements
- › Improving or expanding access to transformers, vaults, and switchgears
- › Seeking opportunities to decommission gas pipes in areas where buildings or neighborhoods are transitioning to all-electric
- › Supporting solar energy and storage for critical facilities that prioritizes renewable backup power over diesel generators, including mobile batteries and electric vehicle-to-building connections
- › Increasing electric vehicle infrastructure for municipal fleet and distributed mobility charging for residents

The expected outcome is to achieve the City's goal of becoming a fossil fuel-free city as soon as possible.

Asset Category 5 - Urban Forest

The City's municipal forest includes approximately 42,000 street, park, and median trees. These are often referred to as "city trees" or "public trees."

CLIMATE EQUITY FUND PILOT PROGRAMS

In 2021, the Berkeley City Council allocated \$600,000 for Climate Equity Fund Pilot Programs that provide decarbonization and resilience programs for low income community members to retrofit homes, increase access to electric bikes or other forms of electric micro mobility, and gain access to resilience measures and other electrification measures.

They are maintained by the Parks, Recreation, and Waterfront's Urban Forestry Unit, which performs pruning, removing, and planting trees. These trees are hard at work. They remove pollutants and carbon dioxide from the air, help cool the City during the summer, absorb stormwater during storms, and help the City stay green and support a high quality of life. However, there are approximately 10,000 vacant tree locations and many of these locations are in areas with higher proportions of low-income residents of color. The expected outcome is to increase our City's tree canopy by planting thousands more trees for the purpose of enhancing our urban forest, sequestering carbon, addressing equity, mitigating urban heat island impacts, and improving quality of life.

Asset Category 6 - Specific Resilience Infrastructure Assets

While limiting City-wide climate impact is necessary, the effects of global warming are already testing traditional infrastructure and will continue to push our resources to their limits. Worsening drought conditions, increased risk of extreme weather events such as flooding and sea level rise create major challenges for our water supplies, watershed management, and resilience of our underground infrastructure systems. These events also have implications on the safety, health, and well-being of the community. The City has identified several new technologies and infrastructure to build while working towards climate adaptation and resilience. Some of the new infrastructure and adaptation strategies include:

- › Develop rainwater catchments, expanding the use of gray water and expanding the distribution and use of EDMUD recycled water (purple pipe) for landscaping irrigation.
- › Use natural green infrastructure solutions including infiltration basins, wetlands, bioswales, permeable paving, etc. to mitigate

flooding from the combined effects of groundwater, sea level rise, and extreme rain events.

- › Increase the urban forestry canopy and use cool paving technologies to protect against extreme heat.
- › Upgrade Community Resilience Centers and Resilience Hubs to ensure respite and evacuation capacity.
- › Identify and manage urban - wildland forest canopy to mitigate wildfire risks.
- › Install technologies such as air filtration to mitigate wildfire smoke impacts.
- › Use "cool" paving and reduce dark asphalt street surfaces to combat urban heat island effects.
- › Improve seismic safety systems in City facilities to reduce impacts from future earthquakes.



Outcome 3 – Promote Quality of Life

Open Space, Parks, and Recreation Improve Our Quality of Life

A key outcome of the Vision 2050 initiative is to improve our overall quality of life through the promotion of open spaces, parks, and recreational opportunities. The asset categories to achieve this outcome are described below.

Asset Category 1 - Parks

The City has 52 parks that contain 15 athletic fields, 49 sports courts (basketball and tennis), and 63 play areas. Many parks need significant improvements to pathways, lighting, irrigation systems, play structures, and athletic fields. The expected outcome is to implement these improvements.

Asset Category 2 - Pools

The City has two swimming pools, one by King Middle School and the other at West Campus. The pools require improvements to the locker rooms and office areas, and improvements to piping, decking, tiling, and roofs. While the King pool has a 30-year lease, the West Campus site has a five-year lease with the possibility that a new pool will be built at San Pablo Park that serves south and west Berkeley residents.



Asset Category 3 - Park Buildings and Restrooms

The City has four community centers, 2 clubhouses, 29 restrooms, and outbuildings. Many of the required improvements have been made with

funding from Measure T1. Future improvements include seismic/deferred maintenance at some park buildings, renovation of existing restrooms, and construction of new restrooms. The expected outcome is to implement the required improvements, including electrification, elimination of natural gas connections, and the addition of solar and battery storage, where feasible.

Asset Category 4 - Camps

The City of Berkeley's non-resident camps include Cazadero Camp located off the Russian River, Echo Lake Camp located just above South Lake Tahoe, and Berkeley Tuolumne Camp located just east of Yosemite Park. These camps include hundreds of facilities, amphitheaters, bridges, pathways, water systems, and swimming pools.

There are two significant camp projects in progress. The rebuilding of Berkeley Tuolumne Camp is nearly completed and is scheduled to reopen in the summer of 2022. At Cazadero Camp, the Jensen Dorm, which was destroyed by a landslide in 2016, has been reconstructed. These projects are primarily funded by insurance.

The expected outcome is to complete the construction at the camps and to have them back in operation.

Asset Category 5 - Waterfront

The Waterfront is the largest public marina in the Bay Area located on 125 acres of land and 50 acres of water, and includes approximately 1,040 berths, public access docks, pilings, channels, streets, pathways, parking lots, buildings, restrooms, buildings, and small boat launch ramps.

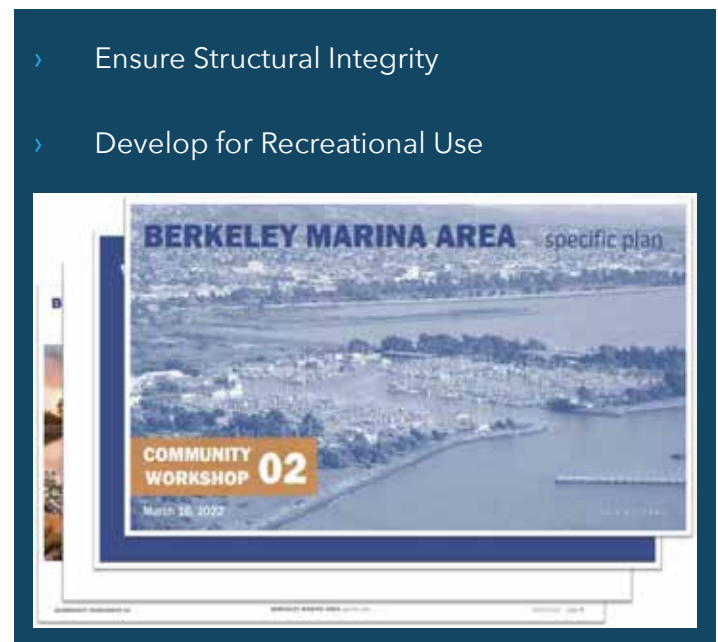
There are many funding needs at the Waterfront,

where many of the facilities have reached the end of their useful life and are starting to fail. As documented in multiple reports, there is a diminishing ability to pay for the pressing capital needs in the Waterfront. The Marina Fund is the City's mechanism for managing all Waterfront revenues and expenditures. Revenues steeply declined in the last two years as a result of safety and security concerns and failing infrastructure. The combination of falling revenue and increasing expenditure needs have strained the relatively small Marina Fund to a breaking point.

The City has begun a long-term planning effort – the Berkeley Marina Area Specific Plan (Figure 9)– to establish the community's vision for the Waterfront and to plan for making the Marina Fund viable and stable. There is still a need to address urgent infrastructure repairs to finger docks, pilings, electrical systems, and restrooms. If these investments are not made, facilities and

infrastructure will either require more costly emergency funding or be closed as in the case of the Berkeley Pier.

The expected outcome is to make the urgent repairs, complete the Berkeley Marina Area Specific Plans, and to return the Marina Fund to solvency.



▲ **Figure 9:** Marina Community Vision

Outcome 4 – Have Safe Public Facilities

Public Facilities are Safe, Resilient, and Provide Community Placemaking

The City is responsible for maintenance of 95 facilities, not including Library facilities and facilities leased to other entities. These facilities include 39 facilities in the Parks, Recreation, and Waterfront inventory and 56 facilities in the Public Works inventory. These facilities house City staff and are places where residents receive public services. These facilities need to be safe, healthy, and resilient, and provide community placemaking, where the connection between people and these places is strengthened. The asset categories to achieve this outcome are described below.

Asset Category 1 – Public Buildings

In 2013, staff retained a consultant to perform

assessments and provide updated condition reports and cost estimates for the City's facility inventory. The recommended improvements are extensive. All projects included in these assessments are considered either major maintenance or capital projects. Despite support from a variety of City funds, the cost for routine maintenance, major maintenance, and capital improvements far exceeds currently existing sources of funds.

The expected outcome is that condition assessments of the City's public buildings will be conducted regularly, and necessary improvements identified and completed. These improvements include electrification, elimination of natural gas

connections, and addition of solar and battery storage, where feasible.

Asset Category 2 – Civic Center

The Civic Center comprises portions of the area surrounding Martin Luther King Jr. Civic Center Park including the Maudelle Shirek Building “Old City Hall” (1909) and the Veterans Memorial Building (1928). Presently, the historic buildings have decades of accumulated deferred maintenance and are seismically unsound. As part of the city’s Measure T1 program, the Veterans Memorial Building and Old City Hall were slated for structural analysis and visioning of possible conceptual design alternatives, in concert with Civic Center Park. A consultant was retained to conduct a community outreach strategy, perform an assessment of the existing infrastructures, identify programs and functions for the two buildings, develop concepts for improvements for the Park. The consultant completed this work and presented a suite of financing and revenue generation strategies for the facility. City Council approved the following vision:

CIVIC CENTER VISION

The Civic Center will be the heart of Berkeley’s community. Civic Center will be the prime space for civic life, culture, and the arts. It will reflect the city’s diverse identities, celebrating its history, and contributing to shaping its future. A place of shared resources and a platform for free expression accessible to all, Civic Center aims to manifest the city’s values, advance social justice, and demonstrate the power of true public space.

The expected outcome is to design and construct a Civic Center consistent with this vision and to provide placemaking.

Asset Category 3 – Transfer Station and Recycling Center

The city’s current solid waste transfer station was opened in 1983. In the late 1980s, Berkeley’s recycling operations relocated to the site to be operated by the Community Conservation Center. In the 1990s, the residential recyclable collection operator, the Ecology Center, was allocated an area at the site for its operations yard and office building. These facilities are not integrated and operations are not coordinated in a way that provides customers ease of use, access, or efficient drop-off of materials. These facilities do not meet current seismic requirements, have not been upgraded or improved since constructed, exceed their serviceable life, and cannot help meet the city’s Zero Waste Goal. The city retained a consultant to conduct a feasibility study to build a new solid waste transfer and recycling facility. Through active collaboration and community participation between November 2018 to May 2019, the city has developed a consensus around two conceptual facility designs.

The expected outcome is that the CEQA analysis and design of the approved project will be completed and a replacement facility constructed that helps the city achieve its Zero Waste goal.



Award Winning Remodel of the Mental Health Building

3.2 Work Prioritization and Phasing

The Vision 2050 program is planned to be implemented over 30 years in approximately three, 10-year phases. Due to the work's complexity and volume, an understandable prioritization process is needed to sequence the work. The Program Plan uses a scoring system based on these components and weighting:

- > Envision criteria, 60% weighting
- > Community input criteria, 40% weighting

The Vision 2050 report recommended the use of multi-criteria decision-making and suggested using the Envision criteria as prioritization tool. Envision is a program that is organized by the Institute for Sustainable Infrastructure and provides an objective framework of criteria designed to help identify ways in which sustainable approaches can be used to plan, design, construct, and operate individual infrastructure projects.

The Envision framework includes 64 sustainability and resilience indicators organized around five categories: quality of life, leadership, resource allocation, natural world, and climate and resilience. Envision is now widely applied to civil infrastructure projects akin to LEED certification. This criteria is given a weighting of 60%.

The other criteria comprises community input from the surveys, online feedback and community meetings. What the community wants for Berkeley is important and this criteria is given a weighting of 40%. The resulting criteria and score sheet is shown on Table 2.

TABLE 2: PRIORITIZATION SCORE CARD	
Envision Criteria (Weight 60%)	
Quality of Life	  
	Public Health and Safety
	Equity
	Public Space
Leadership	 
	Integrated Planning
	Lifecycle Maintenance
	Local Economy
Resource Allocation	 
	Sustainable and Durable Materials
	Reduces Energy Use
	Preserves Water Resources
	Ready to Implement
Natural World	 
	Green Infrastructure
	Open Space and Habitats
Climate and Resilience	  
	Reduces Greenhouse Gas Emissions
	Extreme Climate Impacts
	Resilience Strategy
	Total Envision Points
Community Input Criteria (Weight 40%)	
	Complies with Community Survey Input
	Complies with Commissions and Public Input
	Total Community Input Points

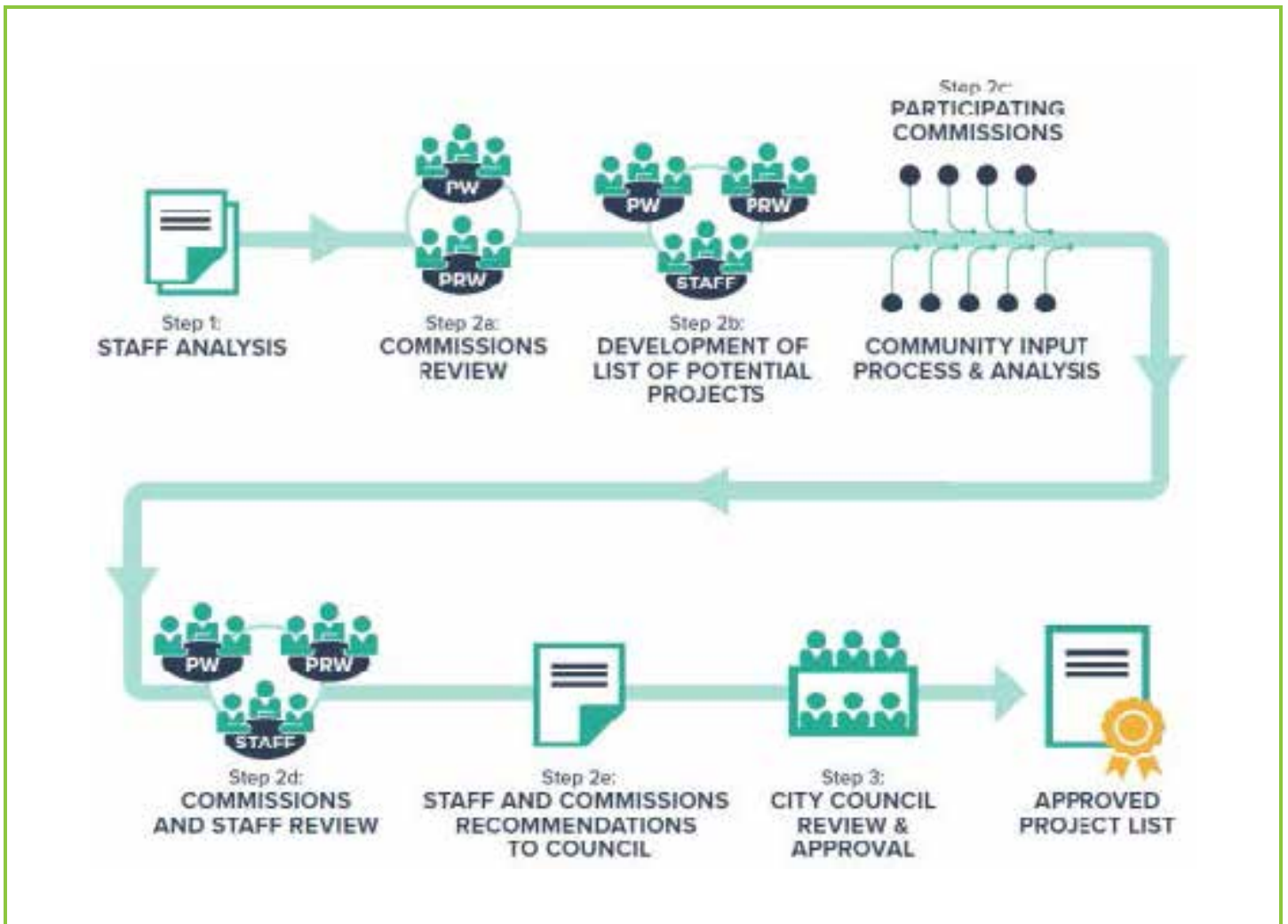


Each asset category was rated using the score sheet, and initial scoring was completed by managers in the Public Works and Parks, Recreation and Waterfront departments. A summary of the scoring results is shown on Table 3. This rating is intended as a general guideline for resource allocation. It does not dictate when the works gets done as there may be other project requirements. For planning purposes, the work can be placed in three priority groups as shown in Table 3. This can serve as a start for the planning of a 30-year program. More details

of the 3-phase program will be developed by the program team, should voters approve new funding for the program. Ultimately, the City Council will select the projects to fund and their timing. The Program Plan’s goal is to ensure all of these asset categories become Priority 1 well before 2050. Asset categories in Priorities 1 and 2 are most aligned to resilience and sustainability measures in the criteria and are closest to being able to move into construction. Many of the asset categories in Priorities 2 and 3 require more public process, planning, and/or engineering, some of which may be supported by a revenue measure or measures. Some of these asset categories, such as sewer, have sufficient, dedicated funding sources that make them unnecessary to prioritize for new revenue funding.

TABLE 3 SUMMARY OF PRIORITY SCORING	
Priority	Asset Category by Score
1	Streets
	Bicycle and Pedestrian Plan projects
	Sidewalks
2	Undergrounding
	Stormwater
	Parks
	Trees
	Waterfront
3	Traffic Controls, Streetlights, and Parking
	Transit projects
	Civic center
	City buildings
	Transfer station
	Sewer

When sufficient funding mechanisms and the project team are in place, the work of selecting projects will begin. The process will be carried out separately for each 10-year program phase. The project selection process is shown on Figure 10. This process is being used successfully on the second phase of the Measure T1 program. Projects that are identified as high priority for implementation within each 10-year phase will move forward to final acceptance after staff analysis, community and Commission input, and City Council review and approval. The prioritization of the projects will use the scorecard shown on Table 2, or as updated at the time.

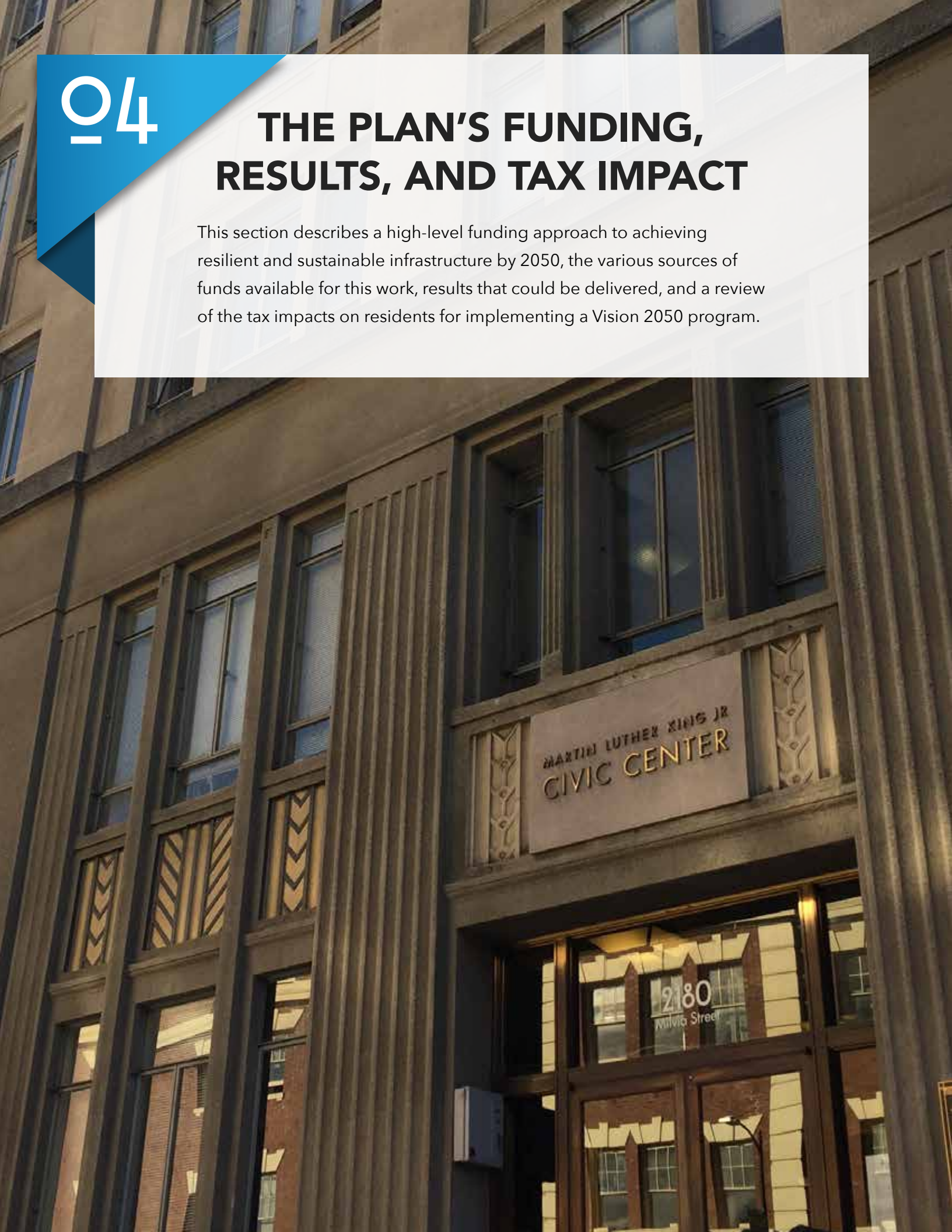


▲ **Figure 10:** Project Approval Process

04

THE PLAN'S FUNDING, RESULTS, AND TAX IMPACT

This section describes a high-level funding approach to achieving resilient and sustainable infrastructure by 2050, the various sources of funds available for this work, results that could be delivered, and a review of the tax impacts on residents for implementing a Vision 2050 program.



4.1 Funding Sources

Achieving a resilient and sustainable infrastructure by 2050 will require new revenue from a variety of sources, including new voter-approved measures. Adjustment to user fees and rates that are dedicated to certain services will be another important source of infrastructure funding. For example, Berkeley's sewer system is operated and maintained through user fees charged to customers. Through financial analysis, staff have determined that the \$194 million needed in the city's sewer systems can be addressed in the next decade or so with cost-of-living adjustments to existing rates. Other services have dedicated funding sources (or rates), but that funding falls short. This is true of the city's

stormwater fee and a special parcel tax for parks and trees. Other sources of funds include grants (federal, state, and other), developer fees, city funds (including the General Fund), and property owner fees, e.g., 50/50 sidewalk repairs.

Figure 11 shows the anticipated funding sources that will be available to complete each of the four Program outcomes and deliver sustainable and resilient infrastructure by 2050. This is a high-level projection with many assumptions yet to be proven, but is offered to show a funding path to the Vision 2050 destination and its dependence on a variety of revenue sources.



▲ **Figure 11:** Vision 2050 Funding Sources



4.2 Funding Alternatives

For the November 2022 ballot, two types of infrastructure revenue measures are being considered: a General Obligation Bond (or Infrastructure Bond) and Parcel Tax.

General Obligation Bonds (GO Bonds) are paid by an ad valorem property tax based on taxable property assessed value and can only be used to fund capital improvements (no maintenance, operations or services). GO Bonds are considered the most secure type of municipal debt and carry the lowest interest rates given the taxing power for repayment of the debt service. GO Bonds can also be structured to match the life expectancy of the infrastructure improvements and be issued in independent series as required based on project costs and timing. This phasing can allow for a better alignment of infrastructure utilization and repayment of the debt. Also, bond measures are generally considered progressive forms of taxation since they are based on the assessed value of properties.

The city has historically managed its GO Bond program for each authorization (Measures G, S, I, FF, M, T1 and O) through the issuance of individual bond series calculated to meet the capital funding requirements of the projects. Bonds were issued in amounts that minimized the impact on the tax rate required to make debt service payments. Since 1992, the city has maintained annual tax rates below original projections represented to voters for each of the GO Bond authorizations.

A **Parcel Tax** is a property tax that generates annual special revenues for capital, operations, maintenance and services. State law provides for

a number of different tax formulas for levies to all properties (residential and commercial) including per parcel, building square footage or land use. A parcel tax cannot be based on property value. A parcel tax based on building square feet is generally considered a progressive form of taxation since larger properties pay more than smaller properties, and exemptions for seniors and low-income property owners are allowed.

Given the scale of the infrastructure need, the Program Plan assumes an initial funding phase in the range of \$600M, to be generated through one or more voter-approved measures in November 2022. The measures could include a single \$600M GO Bond (Infrastructure Bond) or a combination of a \$300M GO Bond and an additional \$0.30 building square foot parcel tax.

Comparisons of general obligation bonds and parcel taxes are summarized in Table 4 on the next page.

Option #1 - \$600 million GO Bond (Infrastructure Bond)

A \$600 million GO Bond would be used to fulfill a portion of the asset replacement priorities following the priorities developed using the Vision 2050/Envision prioritization scorecard, as discussed above. This distribution of funds would focus on improving the city's street, traffic, and pedestrian safety, which present the highest risk for any of the Asset Categories. Such a measure could have the following investment priorities:

- › \$250 million - Outcome 1: Streets are safe, sustainable, and in good condition

TABLE 4
FUNDING MECHANISMS

Type	GO Bond	Parcel Tax
TAX BASIS	Assessed Value (AV)	Building square footage
USE OF FUNDS	Capital only	Capital + Maintenance
TAX PROGRESSIVITY	Progressive	Progressive
EXEMPTIONS	None	Low income/senior
PROS	Relative tax burden decreases as total AV increases	Fixed payments with cost of living adjustments, funds capital and maintenance
CONS	Cannot pay for maintenance or operations Does not adjust for future costs	Increases tax burden if building square footage increases

- › \$150 million – Special Need: Affordable housing for low-income and homeless residents
- › \$125 million – Outcome 2: Infrastructure is resilient and adapts to climate change
- › \$75 million – Outcomes 3 and 4: Other public infrastructure improvements

This option funds the community's top priorities voiced in the public outreach: affordable housing,

street repair, and resilience to climate change. Street repair is also the top and most urgent need identified by online survey respondents, and is supported by the city's prioritization using the Vision 2050/Envision scorecard. This option would significantly reduce the city's risk related to infrastructure unfunded liabilities, and improve the City's streets to good condition while making streets safer for all users.

Why is affordable housing included in these possible revenue measures?

The Vision 2050 Framework focused on infrastructure, not affordable housing. However, on April 27, 2021, City Council approved exploring revenue measures that addressed both infrastructure and affordable housing, given both were top priorities for residents. Housing and infrastructure are connected. Ensuring affordable housing in a city such as Berkeley reduces greenhouse gas emissions because it affords lower and middle-income residents an opportunity to live closer to where they work, which means less emissions getting to work. At the same time, ensuring affordable housing is an important tool for ensuring a diverse and equitable city, which is an important priority of our community and City Council.

Option #2 – Bond and Parcel Tax Measures

Multiple measures on the November 2020 ballot could include the following:

- › An parcel tax of \$0.30 per building square foot, raising approximately \$28 million annually, that is dedicated to streets and traffic safety as described under Outcome No. 1
- › An infrastructure bond of \$300 million with \$150 million to address affordable housing for low-income persons and the unhoused and \$150 million to improve resilience to climate change, wildfire prevention and protection, and to improve other select public infrastructure, as described in Outcome No. 2, 3, and 4

Similar to Option No. 1, this approach also funds voters' top priorities. In addition, having multiple measures provides more flexible sources of funding that could address maintenance needs in addition to capital improvements. Results from these investments are likely to be better than the results from Option No. 1. However, each of these measures would have to separately meet the two-thirds voter-support threshold for approval. If one or both measures are not approved by voters, the city will not be able to address the current backlog of infrastructure or housing needs.

Results

Per Section 4.1, these results assume the City continues its track record of successfully leveraging state, federal, and regional grants, and City Council allocates a total of \$15 million to annual paving from non-revenue measure sources in order to ensure proper ongoing maintenance of the City's streets. These investments would:

- › Improve streets to good paving condition
- › Implement 75%+ of adopted traffic safety plans (bike/ped) and achieve Berkeley's vision of a low-stress bike network
- › Complete selected sea level rise projects, and begin to implement undergrounding of evacuation routes and the stormwater/green infrastructure plan
- › Assist in advancing the city's park and public realm projects, e.g., Waterfront and Civic Center Renovation

One significant caveat is that Option #2 is much better positioned to deliver these needs after accounting for costs that increase in future years. A parcel tax can include an annual cost of living adjustment, whereas a GO bond's funding maximum amounts are static.



4.3 Review of Tax Implications

Property tax rates for Berkeley property owners are comparable to neighboring cities. After accounting for ad valorem taxes, city voter-approved taxes and assessments, school district taxes, and other fixed charges, FY 2021 tax rates in Berkeley (1.58%) were on par with Oakland (1.54%) and lower than in Albany (1.89%).

The city's prior bond issuances include Measure FF (neighborhood libraries), Measures G, S, and I (public safety, main library/seismic retrofit, animal shelter), Measure O (affordable housing), Measure M (streets and watershed), and Measure T1 (infrastructure and public facilities). Debt service from prior bond measures constitutes only 3.2% of the average property owner's tax bill.

The city has a current debt service of \$52.90 per \$100,000, which is low compared to nearby cities and their school districts, as shown in the table below. Even after implementation of Options 1 or 2, the city's debt service will continue to be lower than nearby cities and school districts.

TABLE 6
DEBT SERVICE COMPARISON

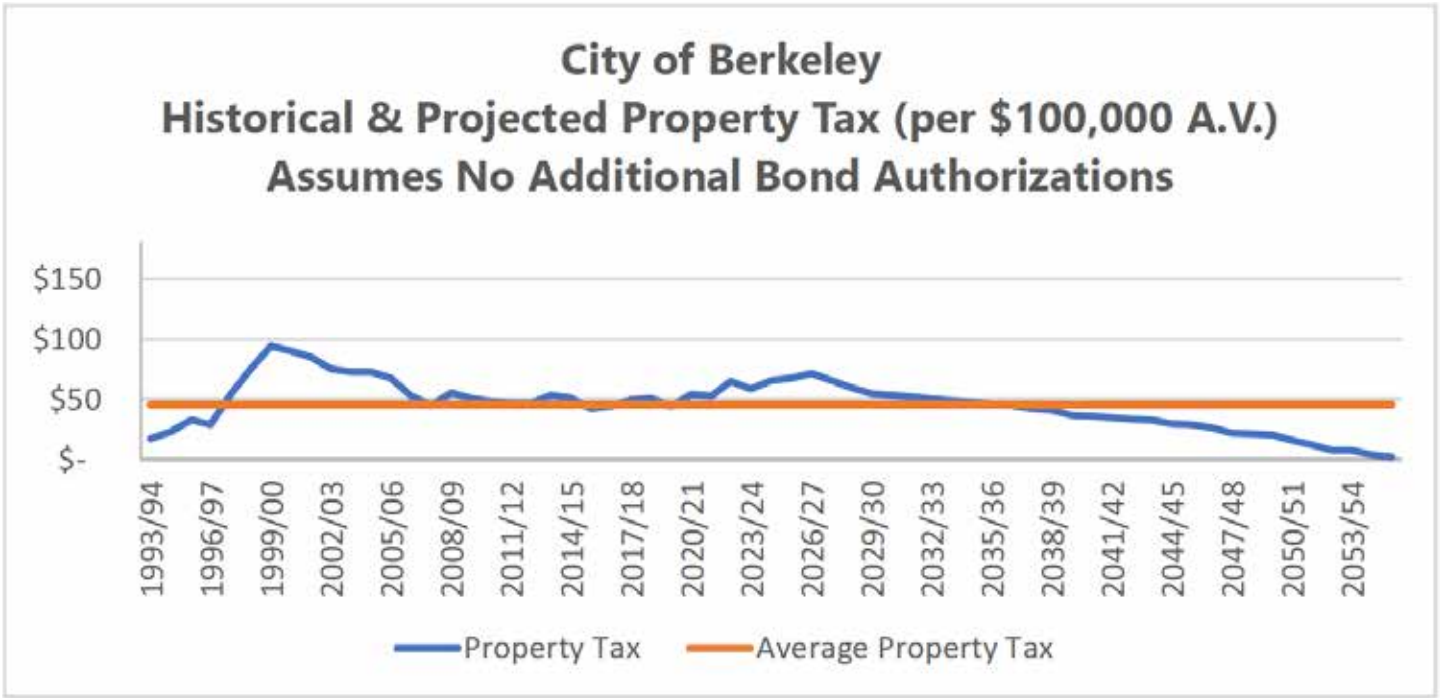
City or District	Debt Service per \$100,000 of Assessed Value
City of Oakland	\$201.10
Albany School District	\$195.00
Berkeley School District	\$145.10
City of Albany	\$130.30
Oakland School District	\$120.20
City of Berkeley plus Option 1, \$600M Bond	\$103.90 (average)
City of Berkeley plus Option 2, \$300M bond	\$79.75 (average)
City of Berkeley (current)	\$52.90 (average)

TABLE 5
EXISTING DEBT SERVICE AND TAX IMPACT

2021/22 Tax Rates	Total GO Bond Tax Burden
Per \$100,000	\$52.90
Average Tax (based on assessed property value of \$647,972)	\$342.78

The city has historically maintained low GO Bond tax rates as shown in Figure 12. This represents the previously approved bond measures including the remaining bonds for Measures T1 and O to be issued over the next four years.

If voters approved a \$600 million GO bond, the maximum tax required for the new bond authorization will be \$91 per \$100,000 of assessed value. Assuming the existing GO bond authorization capacity are issued as scheduled, the cumulative debt service on all GO Bonds will increase through 2036, and then begin to decrease as prior bonds are paid off. Over the life of the \$600M GO Bond,



▲ **Figure 12:** Historical & Projected Property Tax

a property owner will have an average annual property tax of \$51 per \$100,000 of assessed value. If a \$300 million bond is approved by voters, the average annual property tax is estimated to be \$26 per \$100,000 of assessed value (excluding the existing GO Bond authorizations). Due to this lower bond amount being insufficient to address the City’s infrastructure need, it is coupled with a separate parcel tax at an estimated value of \$0.30 per square foot of developed property. Assuming average

developed property size of 1,900 square feet, this parcel tax would add \$570 annually to the average property owner’s tax bill, which is comparable to the annual cost of refuse service based on a 32-gallon cart.

Below is a summary of the tax impacts of these options on an average property, assumed to be an average valued house at \$647,972 (assessed value) with 1,900 sq ft.

TABLE 7 SUMMARY OF TAX IMPACTS		
	Option #1 \$600M GO Bond	Option #2 \$300M GO Bond + Parcel Tax
Tax Rate (\$100,000 A.V.)	Avg \$51 Max \$91	Avg Bond = \$27 Parcel = 30 cents per sq. ft.
Tax (Avg Home: \$647,972; 1,900 sq ft)	Avg \$332 Max \$589	Avg Bond = \$166 Parcel = \$570 Total = \$736

4.4 Other Benefits of Infrastructure Spending

Infrastructure spending has other benefits. It creates jobs. The U.S. Department of Transportation has found that for every \$1 billion in infrastructure investment, 13,000 jobs are created. In a place like Berkeley, which follows both state law on public works expenditures and local law via a Community Workforce Agreement, this means jobs that pay prevailing wages and benefits.

Infrastructure spending also can add art to our public spaces. If 1 percent of a revenue measure is dedicated to local public art, as was the case with Measure T1, or City Council commits an annual General Fund allotment of a similar amount, then Berkeley's public spaces will get more public art. Public art plays an integral role in improving our community's wellbeing by creating inspired spaces that reflect the unique character of our city. Public art breathes life into the built environment, engages the community with creative art experiences, and fosters a sense of belonging.



Art Installation at Civic Center Garage



Statue of William Byron Rumford

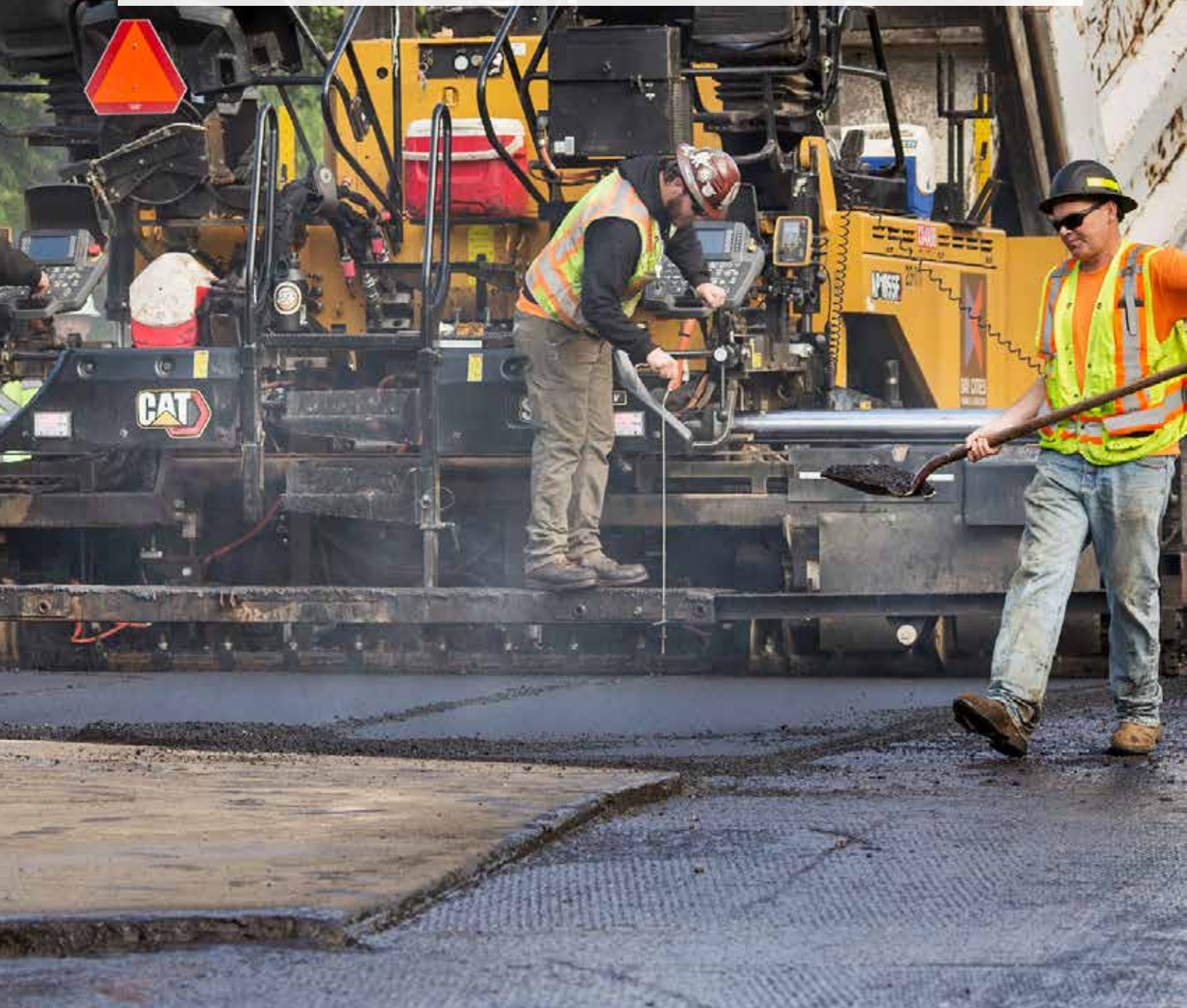


Art Installation at Shattuck & Center

▲ **Figure 13:** Public Art in Berkeley

PROGRAM DELIVERY

The City has well-established capital project divisions in the Public Works Department and Parks, Recreation, and Waterfront Departments, delivering a wide range of infrastructure projects. Given this major 30-year program to rebuild infrastructure, this section looks ahead on how the City will deliver the program, evaluating the City's current capabilities, sharing information on other cities' approaches to implementing large capital programs, and recommending actions to implement the Vision 2050 program.



5.1 Current Organization and Measure T1 Implementation

Capital projects are delivered by the Engineering and Transportation Divisions in the Public Works Department, and Capital Projects Division of the Parks, Recreation and Waterfront Department. Most of this work is based on regular, annual contributions from special funds, including ratepayer funds (sewer, stormwater, and streetlight) and a parks-focused parcel tax.

As shown in the table below, capital investments have more than doubled in the last decade.

Year	Capital Program
2010	\$41.6 million
2020	\$114.5 million

This growth has largely been driven by Measure T1 and the large project to rebuild Tuolumne Camp. In November of 2016, Berkeley voters passed Measure T1, authorizing the city to sell \$100 million of General Obligation Bonds to repair, renovate, replace, or reconstruct portions of the city's aging infrastructure.

The City of Berkeley has managed all T1 projects internally with a team that includes administrative, financial, and project management staff from the Public Works and Parks, Recreation, and Waterfront Departments. Five full-time equivalent positions were allocated across 11 staff within PW and PRW. One of the five FTEs is a T1 Associate Management Analyst. While projects are managed by city staff, the planning, design, and construction management of projects are largely completed by consultants.

As a part of preparing this Program Plan, interviews were conducted with the T1 Management Team and project managers to learn what has worked well and how things can be done better in the future.

Positive outcomes of T1 implementation:

- › The City has completed nearly all of the 39 projects in Phase 1. Phase 2 projects are approved and are on track to be completed by 2026
- › Interdepartmental collaboration has been very effective with regular meetings and open communications
- › Community messaging has been regular and recurring, with ongoing updates to the website and email distribution lists, periodic reporting to Council, and a January 2022 informational brochure mailed to residents
- › The program team has been able to staff up and retain staff during the program
- › Staff costs have been kept to a minimum, i.e., less than 12% of project costs
- › Meetings are held at the conclusion of each project to discuss challenges, successes, and lessons learned
- › The project teams have largely been able to keep up with the project schedules

Ideas for future improvements:

- › Reduce the time it takes to hire staff
- › Increase IT and legal support to match the program size
- › Add consultants to help with certain tasks in project management
- › Improve tools to aid in project management

- › Streamline contracting policies, including bid protest procedures and purchasing policies

It is important to note there will be overlap with the T1 team completing the Phase 2 projects and the Vision 2050 team ramping up. The future organization will need to account for this to ensure the success of both programs.

5.2 Research on Other Programs

The City and its consultants conducted interviews with three cities implementing large capital programs. Interview topics included organization, tools, implementation, and accountability.

Successes, challenges, and lessons learned were discussed with each group, too. Table 8 summarizes the cities and their programs.

TABLE 8 CITIES INTERVIEWED AND THEIR CAPITAL PROGRAMS		
City	Program Description	Budget and Staff
City of Oakland		
› Measure KK’s funding allocations are a) \$350 million for streets and roads, b) \$150 million for facilities and c) \$100 million for anti-displacement and affordable housing › CIP projects are delivered through Public Works (PW) and Transportation (OakDOT). PW delivers non-transportation projects, such as sewer, drainage, and parks. OakDOT delivers transportation projects through two divisions: a) Great Streets (large projects) and b) Safe Streets (street repairs) › Program management is primarily done with City staff with some consultant support. There are about 20 dedicated staff members for program management › Staffing vacancies have been as high as 25%		\$87M / 20 employees = ~\$4.4M per employee.

City of Oakland (cont.) › Oakland's PCI was 53 in 2019 and increased to 58 in 2021. They are using \$100 M of Measure KK funds over 3 years to improve 350 miles of street surface › Measure KK has a 9 member Public Oversight Committee. The members were appointed by the Mayor and report to the City Council	
City of Sunnyvale › The Public Works Engineering Division delivers all capital projects through four groups: a) special projects, b) project design, c) construction management, and d) land development › The special projects group manages very large capital projects, e.g., \$1 billion wastewater treatment plant re-build. Consultants handle the day-to-day project management but do not have monetary authority › There are 8 staff in the project design group, who manage the smaller on-going capital projects › The City uses e-Builder software › Staffing vacancies are a problem › City Council's target PCI is 80. Their current PCI is about 76	\$176.5M / 30 employees = ~\$5.9M per employee.
City of San Diego › The City delivers capital projects through two departments: a) Capital Projects and b) Strategic Capital Projects. Capital Projects perform projects that are \$5 to 20 million in size, the work is long-term and they have about 700 staff. The Strategic Capital department works on projects over \$100 million in size, the work requires special expertise, there are about 50 staff and there is a high reliance on consultants › The current 5-year CIP has a funding need of \$8.4 billion › The City uses OCI (overall condition index) instead of PCI. The City's target for OCI is 70 › Staff vacancies range from 15 - 20% › A State of CIP Report is provided to City Council twice per year › San Diego is a participant in a California multi-agency benchmarking group	\$830M / 750 employees = ~\$1.1M per employee

While Berkeley uses City staff for project management and consultants for planning, design, and construction management, by comparison, the larger programs are managed by a combination of City staff and consultants. Berkeley's 5 full time equivalent employees are handling \$45 million projects at present, a higher ratio than these other cities. City staff make all financial decisions, manage City processes, and complete repeatable tasks. Consultants assist City staff with a wide variety of tasks involving project planning, design, construction management, and execution, and provide necessary specialized expertise and knowledge. Some program teams include a

dedicated group who administer grant funding. Challenges experienced during large program implementation include difficulty in recruiting and retaining a talented workforce, having sufficient administrative and support services, and having effective and efficient hiring and on-boarding processes, including a continuous recruitment process.

These issues could be addressed in part by including dedicated financial and recruiting staff that are funded through the revenue measure, and developing program-specific hiring policies and procedures.

5.3 Recommendations for Vision 2050 Implementation

The recommendations presented in the section below build off the successes and lessons learned from implementation of Measure T1 and the City's regular capital program, and from the three cities we interviewed and researched. These recommendations will help in delivering a more significant investment in the city's infrastructure:

- › **Responsible organization** - A Vision 2050 program management team should be formed and report to the Public Works Director for the first phase of improvements, given this phase's focus is likely within the right of way, which is Public Works' responsibility. This team would be multi-discipline, meaning the team would be responsible for implementing all aspects of the Vision 2050 program, including projects outside of the normal purview of Public Works. In future phases, as determined by future Vision 2050 priorities, this program management team could report either to Directors of Public Works or Parks, Recreation, and Waterfront, a Deputy City Manager, or the City Manager.

- › **Multiple Benefits** - The Vision 2050 Framework recommended infrastructure improvements that have multiple benefits. Given this Plan's initial focus on streets and traffic safety, the program management team will ensure projects are delivered that, to the extent feasible, combine paving, traffic safety, and green infrastructure improvements. Recent annual paving projects demonstrated progress in this regard, as they have included paving, green infrastructure, and various traffic safety features such as traffic circles, traffic diverters, and pedestrian islands. Given this plan prioritizes the co-benefits of street paving and traffic safety, staff have modeled how to meet both goals simultaneously. By dedicating two-thirds of streets-focused investments to paving and one-third to traffic safety, this Plan's goals can be met in ten years or so.

- › **Program management team and staffing** - The City should initiate a recruitment for a new full-time position, Vision 2050

Program Manager. The manager should have an administrative support person and project managers (the number to be determined prior to implementation). The City team would ideally include dedicated staff in lieu of 3-year limited term positions, given the duration of the work. In addition, the city team should include both an in-house construction inspector and a project coordinator to assist with time-intensive tasks such as compiling budget data, preparing public outreach materials, and coordinating meetings. Outreach support should be included on this team as well. The Program Manager should also have a mix of staff and consultant support in a blended team. Consultant support may include: a) preparation of a project management manual, b) project cost tracking, c) performance indicator tracking, and d) management of special projects.

› **Engineering functions** - As discussed above, the engineering and capital delivery divisions in the Public Works and Parks, Recreation and Waterfront Departments will continue to deliver ongoing projects. These include aspects of street paving, sidewalk repairs, sewer rehabilitation, and park and playground improvements.

› **Special projects** - Projects that are not normally handled by the City's engineering

divisions should be managed by the program management team or assigned to a consultant. Examples of these projects may include utility undergrounding, seismic improvement to public buildings, public realm projects, etc

› **Supporting departments** - Advanced planning needs to be held with the City's procurement, legal, human resources and information technology departments. Challenges experienced during large program implementation include difficulty in recruiting and retaining a talented workforce and having effective on-boarding processes. In addition, the City's procurement procedures need updating and improvement. The ideal Vision 2050 organization may include dedicated recruitment and financial staff, as well as new policies that are developed specifically for the program. For example, the City of Oakland cut 500 staff hours and months from project timelines by reducing the number of project and procurement approvals.

› **Tools, software and procedures** - An evaluation of current and new tools will be made for delivering the program. This will include: a) procurement tools for goods and services, b) project scheduling and tracking software, c) document management, and d) reporting.



SUPPORTING STRATEGIES

This section describes the performance monitoring, oversight and reporting and on-going maintenance that will be a part of implementing a successful Vision 2050 program.



6.1 Performance Indicators

A large complex program like Vision 2050 can benefit from identifying Key Performance Indicators (KPIs) to track progress. An initial list of KPIs is shown on Table 9 and are organized around the four Vision 2050 outcome objectives. The indicators go beyond the traditional tracking of cost and schedule progress and incorporate indicators that reflect sustainability and resilience goals.

It will be important to update these KPIs at the beginning of each phase of this thirty-year program, and more frequently in some areas, in order to incorporate changing conditions, new technologies, and new priorities.

TABLE 9

VISION 2050 KEY PROGRAM PERFORMANCE INDICATORS

1. Streets are Safer, More Sustainable, Improved to a Good Condition, and Maintained

Paving condition	% of sidewalks in safe condition
Three year average of severe injuries/fatalities	% of Bicycle, Pedestrian, and ADA Transition Plans implemented
% of 2020 pavement surface converted to pervious surface	Public satisfaction with right of way
% of commute trips by solo occupant vehicle	% of trips by walking, micro mobility or transit

2. Infrastructure is Resilient, Protects the Environment, and is Adapted to Climate Change Impacts

Citywide GHG reductions	% of public buildings fossil-fuel free
Citywide natural gas consumption	% of automobiles that are EV citywide
% of Stormwater and GI plans implemented	% of sea level rise, undergrounding, and evacuation route projects completed
% of target acres treated by Green Infrastructure	% of 2022 vacant street tree sites planted
% of public buildings seismically retrofitted	

3. Open Space, Parks, and Recreation Improve our Quality of Life

% of Backlog Addressed Annually	Diversity of the Urban Forest
# of Street Trees/Tree Canopy Ratio	Public satisfaction at Parks and open spaces

4. Public Facilities are Safe and Provide Community Placemaking

% of public realm/placemaking opportunities implemented	% of Backlog Addressed
% of ADA Transition Plan implemented in buildings	Public satisfaction in public spaces
% of public buildings with battery storage	

6.2 Equity

Incorporating equity into infrastructure is a core value of the Vision 2050 Framework, and is something Berkeley residents want. Three-fourths of voters said an infrastructure measure should incorporate equity.

Poorly maintained infrastructure is inherently inequitable, as it is more detrimental to Berkeley's most vulnerable residents. Those with mobility impairments can find potholes, deficient sidewalks, failing hand rails, or out-of-service elevators as insurmountable challenges. Those on bikes or walking, instead of in vehicles, are more at risk of death or serious injury on streets with potholes, failing pavement markings, and lacking traffic safety controls. As reported by the city auditor, low-income residents who depend on their automobile to get to work face greater risk from the estimated annual \$1,049 repair bill attributable to poorly maintained streets. The state of our parks, recreation and senior

centers has a serious impact on the programs and services delivered to children of color and lower income seniors.

In implementing equity into Vision 2050, Berkeley will build on recent progress. The City's transportation plans prioritize projects in historically underinvested neighborhoods in Berkeley, including improvements like bus bulbouts and dedicated bus lanes which help lower income residents more likely to use transit. Many capital projects approved in Measure T1 implementation advanced equity. These projects include the African American Holistic Resource Center, South Berkeley Senior Center, the Martin Luther King Jr. Youth Services Center, and public restrooms citywide approved as part of Measure T1, Phase 2. In addition, Phase 1 projects such as paving and park improvements at San Pablo Park and 10 play structures in West Berkeley also advance equity.

6.3 Reporting and Oversight

A Vision 2050 program team will prepare a Program Management Manual. The manual will include the performance indicators and a format for reporting progress. Typically, performance monitoring reports are prepared on a semi-annual basis. The reports will be provided to Council and will be available to the public via the Vision 2050 website.

To ensure accountability, an independent oversight committee will be formed. This can be an existing Berkeley commission or a newly formed oversight committee, as has been used with Berkeley's Sugar Sweetened Beverage Product Panel of Experts,

Berkeley Unified School District's Bond Oversight Committee, and Oakland's Measure KK Public Oversight Advisory Committee. The committee will review the progress of the work and will prepare an independent annual report of progress.

6.4 Lifecycle Maintenance

Asset Management is an important concept in which the city's infrastructure systems are managed throughout the life cycle from 'cradle to grave.' Taking an asset management approach was a key part of the City Council adopted Vision 2050 recommendations.

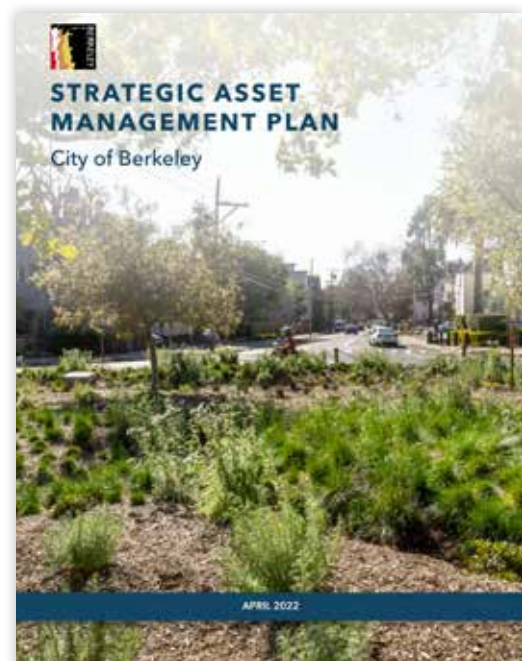
A Strategic Asset Management Plan (SAMP) was recently prepared to develop policy guidance, to review the city's current maintenance practices, and to prepare a roadmap of key initiatives for implementing a full Asset Management Program (AMP) in Berkeley's Public Works and Parks, Recreation & Waterfront Departments. Critical systems that we depend on every day are simply wearing out. Recent budgets were inadequate for infrastructure capital and maintenance needs, let alone modernizing them. An AMP is needed to manage our infrastructure assets throughout their useful life.

The city retained a consultant to assess the city's current asset management practices against a global standard benchmark on Asset Management in six areas: asset strategy and planning, asset management decision-making, lifecycle delivery, asset information, organization and people, and risk assessment. Based on the benchmark, Berkeley's average assessment was in the 'developing' level of asset management implementation and comparable to many U.S. cities, but not nearly good enough. The consultant worked with city staff to develop a 'Roadmap' of key initiatives in the next two years to implement an effective AMP.

The components include:

- › Prepare an Asset Management policy for City Council's adoption
- › Form an Asset Management team, consisting of a team leader and two program staff
- › Form an AM Steering Committee to guide the program implementation
- › Provide consultant support
- › Prepare the strategies, procedures and analyses to implement an AMP

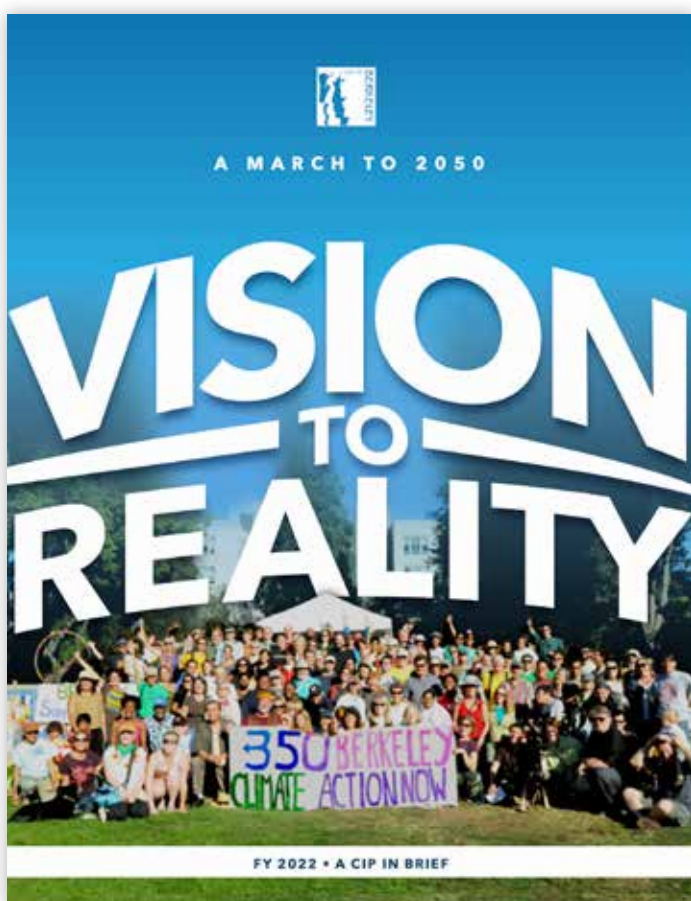
The SAMP conducted an asset-by-asset review of annual infrastructure maintenance funding and found that some asset categories such as streets and city buildings had insufficient maintenance funding by a wide margin, while other assets like sewer and streetlights had adequate maintenance funding. Assets such as stormwater have sufficient maintenance funding now. However, climate change and green infrastructure might make current funding commitments insufficient in future years.



6.5 General Fund Support for Infrastructure Maintenance

The level of General Fund contribution for public infrastructure in the last 12 years has remained flat in nominal terms. Given escalating annual costs, this led to a decline in General Fund support for infrastructure. To remedy this, City Council is currently considering two budget referrals to find existing City funding sources that total \$15 million per year for street maintenance, which is the level of investment required to ensure paving condition does not deteriorate. A common theme

from community engagement has been to grow General Fund support for infrastructure and, at the very least, that revenue from any new measures not replace existing General Fund commitments to infrastructure. One approach is to set a “floor” for General Fund support of infrastructure moving forward, akin to the State of California’s requirement that cities demonstrate a maintenance of effort in street funding before allowing cities to use Gas Tax proceeds to maintain a city’s streets.



The FY 2022 CIP in Brief was the beginning of melding Vision 2050 into the City’s capital budget

A. Acknowledgements

City of Berkeley

Paul Buddenhagen, Deputy City Manager

Liam Garland, Director, Public Works

Scott Ferris, Director, Parks, Recreation and Waterfront

Ray Yep, Vision 2050 Implementation Team Member (volunteer)

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B. GLOSSARY OF TERMS AND ABBREVIATIONS

Terminology	Definition
ADA	Americans with Disabilities Act
AMP	Asset Management Program
Asset categories	A logical grouping of similar assets or equipment types used to categorize, organize, and manage the asset portfolio.
Asset management	Data driven planning that improves operational, maintenance and capital forecasting of potential needs, and optimization of investments to realize the greatest value from assets while operating over their lifecycle.
CEQA	California Environmental Quality Act
CIP	Capital Improvement Program
City	City of Berkeley
Council	City Council of Berkeley
EBMUD	East Bay Municipal Utility District
Envision	Developed by the Institute for Sustainable Infrastructure and Harvard University, Envision provides industry-wide sustainability metrics for all types and sizes of infrastructure to help users assess and measure the extent to which their project contributes to conditions of sustainability across the full range of social, economic, and environmental indicators.
KPI	Key Performance Indicator
General obligation bond	A General Obligation bond is a common type of municipal bond that is secured by a government's pledge to use legally-available resources, including tax revenues, to repay bondholders.
Parcel tax	The parcel tax is a tax on parcels of real property collected as part of a property tax bill. Unlike the property tax, the parcel tax cannot be based on property value. To impose a parcel tax, governments must win support from two-thirds of voters.
PCI	Pavement Condition Index, which is a scale of 0 to 100 (with 100 being the best) that indicates the condition of an asphalt street surface.
Program plan	A structured approach to organizing a long term complex array of subcomponents. The plan typically describes the project components, schedule, outcomes, funding, and reporting.
SAMP	Strategic Asset Management Plan. This is a high level plan that reviews an organization's policies, assesses its maturity on maintenance, and develops a roadmap to implement a lifecycle maintenance management program.
U.S. EPA	United States Environmental Protection Agency
Vision 2050	An initiative of Berkeley's Mayor Jesse Arreguin to take a long term approach to improving Berkeley's aging infrastructure. The approach incorporates sustainability and resiliency and anticipating a future world with climate impacts.
WMP	Watershed Management Plan

C. Reference Documents

1. Information on Vision 2050 can be found on its website: BerkeleyVision2050.org.
2. Reference documents referenced in this program plan can be found on the City of Berkeley website (BerkeleyCA.gov) using the search feature
3. Information on Berkeley's Measure T1 program can be found on its website: BerkeleyCA.gov/your-government/our-work/ballot-measures/measure-t1.
4. Information on the Envision process can be found on the Institute for Sustainable Infrastructure's website: SustainableInfrastructure.org.

MEET YOUR COUNCILMEMBERS



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Term Expires 11/30/2024



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