



## Systems

Systems run through the City of Berkeley transporting people, energy, water and waste. Public buildings, parks, roads and streets, and infrastructure systems should be designed, built and maintained using principles and methods that protect and enhance the quality of life in Berkeley by minimizing energy consumption and environmental pollution. This chapter lays out actions to create sustainable infrastructure, energy, transportation and natural resource systems in Berkeley.

### Principles

Systems should be designed, built and maintained to:

- Maintain safety
- Increase efficiency
- Create sustainability
- Decrease energy consumption
- Minimize environmental pollution

### Previous Plans

Previously adopted plans that are relevant to systems include:

- 2012 Multi Modal Transportation Plan
- 2019 Energy Plan
- 2020 Parks and Recreation Plan Update

### Land Uses

Systems are integral to all of the future land use categories. However, the following future land use categories are places where investments and improvements can improve the sustainability of the City:

- Neighborhoods
- Institutional
- Parks & Cemetery
- Downtown
- Gateway Corridor

## INFRASTRUCTURE

Infrastructure includes the City's facilities, public utilities owned by the City (water and sewer), and privately owned utilities (electricity, broadband), roads and sidewalks, which are owned and/or managed by the City, Oakland County or the Michigan Department of Transportation. This section concentrates on the City combined sewer system, with electricity and roads addressed in the Energy and Transportation sections, respectively.

The City of Berkley has over 60 miles of combined waste and storm sewer. The system is gravity-fed and drains to the regional George W. Kuhn Drain, formerly known as Twelve Towns, combined relief sewer. The capacity of the system has been overwhelmed by storm events in recent years, leading to improvements intended to decrease the amount of rain water entering the system, including green infrastructure.

### Green Infrastructure

Green infrastructure uses ecological features – trees, rain gardens and bio-swales - to first handle water from rain and storms, rather than sewer pipes. The City can integrate green infrastructure in all levels of development and infrastructure improvements by taking the following actions:

Add Green Infrastructure to Parks: The 2020 Parks and Recreation Plan has an action item for parks to “plant shade trees and add other sustainable features such as rain gardens to help mitigate stormwater issues.” Demonstration rain gardens are planned for all Berkley parks.

Add Green Infrastructure to Municipal Parking: The City should, where feasible, update city owned parking lots with bio-swales, rain gardens and green alleys. The municipal parking lot planned for Twelve Mile and Cummings should include a green infrastructure demonstration project.

### Examples of Green Infrastructure

The following examples of green infrastructure on a small and medium scale were shared during the Green Infrastructure webinar that was part of the community engagement efforts.



Volunteers planting a rain garden at a school.  
Source: Presentation on Green Infrastructure Webinar



Green infrastructure in downtown streetscape  
Source: Presentation on Green Infrastructure Webinar



Green infrastructure in a parking lot  
Source: Presentation on Green Infrastructure Webinar

## Green Infrastructure Options in Berkley Parks & Streets



- A. Trees
- B. Rain Gardens or Planted Swales
- C. Permeable Pavers
- D. Green Roof
- E. Recessed Playing Fields and Amenities
- F. Underground Stormwater Vaults
- G. Retention/Detention Ponds & Constructed Wetlands



- A. Street Trees
- B. Rain Gardens
- C. Inflow Grates
- D. Overflow to Traditional Stormwater Piping
- E. Permeable Paving
- F. Vaults and/or Sidewalk Support Structures
- G. Uncompacted Soil or Structural Soil

Explore Green Infrastructure in City Streets: The City's engineers have advised Berkley to undertake a feasibility study for the implementation of bioswales / bioretention within City road rights-of-way.

Offer Green Infrastructure Education & Resources to Businesses & Residents: The City should encourage business and residential owners to incorporate improvements such as rain barrels, rain gardens, pervious surfaces etc. through an education program. The City participates in the WaterTown program, through the

Clinton River Watershed Council, that provides resources to communities to improve water quality and alleviate climate change impacts by promoting and implementing green infrastructure and advancing water-oriented community and recreation opportunities. The program has education and resources for rain gardens, permeable pavers, and bioretention cells.

## ENERGY

The 2019 Energy Plan has recommendations for project selection and implementation, funding, staffing, policies and procedures, data and communications. While the Environmental Advisory Committee will guide implementation of the Energy Plan, the following actions should be pursued in the Master Plan to help realize the City's vision of becoming a sustainable, efficient municipality, powered increasingly by renewable energy.

### Energy Efficiency Guiding Principle in Capital Improvements

Energy efficiency should be a guiding principle for capital improvement budgets and decisions across all City departments. The Energy Plan recommended that the City identify a suite of clean energy and energy saving projects to undertake in the short-term. In addition, when reviewing the Capital Improvement Program, the Planning Commission and City Council should prioritize the following type of improvements:

- Energy savings and clean energy projects identified in the Energy Plan.
- Conversion of lighting in City facilities and street lights to LED lighting.
- Installations of submeters for public buildings.
- Increased energy efficiency, including recycling considerations, when purchasing supplies, equipment, etc.
- Costs of equipment purchase or replacement that result in savings over the lifetime of the equipment are a higher priority.
- Improvements for facilities to meet the minimum requirements of the National Fire Protection Association and National Electrical Code.

### Increased Funding for Energy Efficiency and Renewable Energy

In the Energy Plan, the City committed to increasing funding for municipal energy efficiency and renewable energy projects through internal and external sources. The City should designate staff or consultant time to pursue funding from federal, state, and private sources.

## Municipal Facilities

The municipal facilities shown below are examples of places where energy efficiency could be enhanced.



The Berkley Historical Museum and City Hall can become more energy-efficient through capital improvements. Source: City of Berkley



Upgrading street lights like the one shown here to LED lights would increase energy efficiency and save the City funds in the long run. Source: City of Berkley

## Sustainable Building and Site Design Features

- Water Use Reduction
- Water Efficient Landscaping
- Innovative Wastewater Technologies
- Low Impact Stormwater Management
- Optimization Of Energy Performance
- On-Site Renewable Energy
- Passive Solar Heating
- Reuse/Recycled/ Renewable Materials
- Indoor Air Quality Or Other Elements identified as sustainable by established groups such as the US Green Building Council (LEED), ANSI National Green Building Standards, or SEMCOG Low Impact Design Manual



The Zoning Ordinance could be amended to require bicycle parking.

Source: Adobe Stock

### Revolving Energy Fund for Municipal and Private Energy Improvement Projects

A goal of the Energy Plan is to establish a revolving energy fund. The fund would be used to invest in energy improvement projects, such as LED street lights, and then reinvest at least 80 percent of the resulting savings into subsequent energy saving or demonstration projects. The fund should focus on municipal projects first, and then private and non-profit projects. Once established, the Revolving Energy Fund could support an Energy Manager position for the City.

### Develop Plans and Policies to Increase Energy Efficiency

The Energy Plan includes recommendations to develop plans and policies to increase energy efficiency and the City's resilience. While touched on in this Master Plan, the following should be developed as part of the implementation of this plan and subsequent updates:

- Sustainability standards for maintaining, remodeling, upgrading and replacing municipal buildings.
- A stand-alone Sustainability or Climate Action Plan.
- Incentives for use of sustainability standards in private sector construction and maintenance activities.

### Amend City Zoning Ordinance to Codify Sustainability

The following zoning amendments would codify sustainability in development, increasing energy efficiency in the City overall:

- Mixed use corridors with a residential component and increased density.
- Sustainability measures in new developments or renovations such as required bicycle parking and pedestrian improvements, installation of electronic vehicle infrastructure, LED lighting, and landscaping with green infrastructure components.
- Incentives of zoning flexibility where sustainable building and site design features, transit amenities, public art, open space, green roofs or "cool roofs".



Sidewalks in neighborhoods should be regularly maintained.  
Source: CWA



Bike route markers help cyclists to navigate.  
Source: CWA



The bicycle lane on Woodward planned across communities would be part of a continuous system.  
Source: Woodward Area Action Association

## TRANSPORTATION

The transportation system in Berkley has streets, sidewalks, bicycle lanes and paths as well as stops for a regional mass transit system and multi-jurisdiction bike share program. The City is highly walkable, with a Walk Score of 77 out of 100.

Seventy-seven is a high score, signifying that most errands can be accomplished on foot. The City should build on the strengths of the existing transportation system while preparing for future transportation innovations that would increase the quality of life and sustainability of Berkley. The following strategies should be pursued:

### **Regular Investments to Maintain Walkability**

In 2020, the City of Berkley pivoted its Sidewalk Replacement Program from a 15-year replacement cycle to a five-year cycle by section of the City. This program, combined with the yearly Fall Tree Replacement program, offers continuous investment to maintain the walkability of Berkley neighborhoods. The Downtown Development Authority and the City also invest to improve and maintain the City's corridors as pleasant places to walk, gather and shop. The City can further aid pedestrian access by improving street crossings, installing additional marked cross walks, and partner with the county to create more mid-block crossings.

### **Continuous Trail System Connecting Adjacent Communities & Key Locations**

The 2012 Multi-modal Transportation Policy and 2020 Parks and Recreation Plan prioritize the development of trails connecting the parks to form a continuous park system tying together community facilities, schools, neighborhoods, downtown Berkley, and regional recreation facilities. The system should include site amenities such as bike racks, benches, trash receptacle, mile markers, and signs along the trails and at destination points.

### Rethink the Role of Parking Lots

Currently, the City’s policies treat parking lots as needed places to store vehicles, assumed to be the primary mode of transportation. The City should amend its policies and programs for parking lots as opportunities for sustainable design and places that welcome all forms of transportation. Zoning amendments could include increased flexibility for parking in mixed-use corridors, decreased vehicle parking requirements overall, requiring bicycle parking, allowances for permeable pavers, and requirements or incentives for green infrastructure within parking lots.



Green infrastructure in parking lot islands.  
Source: Presentation on Green Infrastructure Webinar

### Bicycle and Transit Improvements within Street Projects

The City should integrate bicycle and transit improvements in street projects, such as repaving. To prepare for these opportunities, the City should evaluate the feasibility of bike lanes or wide right turn lanes at major intersections, identify upgrades for bus stops and seek funding sources to support those improvements.



The road diet on Coolidge with on-street parking and a bicycle lane is an example of a Complete Streets improvement.  
Source: Google Streetview

### Policy and Infrastructure for Sustainable Transportation

The City should support policy and infrastructure for sustainable transportation – such as bicycle parking, electric vehicle charging, and micro-mobility. Actions could vary from zoning amendments for bicycle parking, to incentives for or actual construction of electric vehicle charging, to permitting processes for scooter share stations in street rights-of-way.



Bicycle parking, electric charging stations and micro-mobility kiosks with scooters could be incorporated on Coolidge and other corridors in Berkley.  
Source: CWA

## NATURAL SYSTEMS

Natural systems, such as the tree canopy and green infrastructure, weave throughout Berkley. Adding and strengthening these natural systems can improve the quality of life in Berkley, increase energy efficiency, manage stormwater and lessen pollution. The following recommendations should be undertaken:

### Increase Green Space

The 2020 Parks and Recreation plan recommended that the City Council and Planning Commission, when reviewing development proposals, encourage developers to set aside open space and parkland. The City could also develop regulations to require green space and parkland for developments, based on their size and use.

### Maintain and increase Berkley's Tree Canopy

Berkley's tree canopy, the percentage of Berkley's area covered by trees, should be maintained and increased. The 2020 Parks and Recreation plan recommended prioritizing replacement and upgrade of existing tree canopy using the criteria of potential for stormwater capture/detention. The Fall Tree Replacement Program currently offers new tree planting in the street right-of-way for Berkley residents on a first come, first serve basis. The City should include tree maintenance and planting, as feasible, in all projects and improvements.

### Increase Green Infrastructure

As discussed in the Infrastructure section of this chapter, the City can integrate green infrastructure in all levels of development and infrastructure improvements.



City parks offer opportunities to increase green space, the City's tree canopy and green infrastructure.  
Source: CWA