





Chapter 8

RESILIENCE

The goals outlined in the Sustainability Chapter of Maplewood's 2030 Comprehensive Plan set the groundwork for protecting and restoring the natural environments that people, economies, and ecological systems depend on. Implementation of the goals since that time have helped Maplewood create a culture of environmental stewardship.

NOTABLE ACCOMPLISHMENTS

- **Energy Policies**
 - Adoption of the Mayor's Climate Protection Agreement – 2008
 - Energy Efficiency and Conservation Strategy – 2009
 - Renewable Energy Ordinance – 2011
- **Partners in Energy (Energize Maplewood! Energy Action Plan) - 2015**
- **Organized Trash Hauling - 2012**
- **Adoption of the Green Building Code - 2013**
- **Living Streets Policy - 2013**
- **GreenStep Cities - Step 5 Award**
- **City Operations**
 - Creation of a Green Team
 - Decrease in energy use at City Buildings
 - Composting in City Buildings
- **Solar panels (City Hall and Nature Center) - 2011/2012**
 - Created opportunities for community gardens
 - Edgerton Park, Harvest Gardens, Rice Street Gardens
- **Green House Gas Emissions**
 - Greenhouse Gas Baseline Inventory – 2015
 - City-wide decrease in greenhouse gas emissions from energy sources - 2016
- **Updated City Tree Ordinance – 2016**
- **Maintaining Tree City USA Standards**
- **Increased Environmental Education – Maplewood Seasons, Improved Environmental Website Pages**

The 2040 Comprehensive Plan will expand on the 2030 Comprehensive Plan Sustainability goals to include resilience planning. Resilience builds the foundation for a prosperous, equitable, livable, and sustainable future. Maplewood's climate is changing, and the growing frequency and large-scale impact of severe weather events demonstrates the importance of resilience planning. To accomplish this, resilience planning and goals are integrated throughout the 2040 Comprehensive Plan and identified with a resilience logo. These goals are overarching and will promote sensitive land use and development patterns that emphasize increasing our flexibility to thrive and prosper regardless of how climate change develops.

In addition to the integration of the resilience goals throughout the plan, the Resilience Chapter will focus on energy and local food goals and policies. Having a resilient energy infrastructure and reduced energy use will enhance reliability of the electricity grid while mitigating climate change impacts. Fostering healthy communities through better access to local, healthy foods will strengthen Maplewood's vulnerable populations and reduce the impact of climate related events.

Background

The City of Maplewood has already seen climate changes. The projections for the City's climate by the middle of this century indicate continued increases in temperatures. Additionally, precipitation patterns are anticipated to change, providing an increase in the overall rainfall as well as an increase in the number of days without rain - exacerbating both flooding and drought potential. The City's location as a "first ring" suburb is prone to heat island effects which act as a multiplier on the overall region's climate extremes. The projected changes to Maplewood climate represent stressors for both the environment and people. Urban tree canopies as well as urban populations have unique vulnerabilities associated with the projected climate changes for the City of Maplewood.

The climate change risks for the City of Maplewood include physical/infrastructural risks as well as population vulnerabilities as follows:

- » Stresses on the City's Urban Tree Canopy, and subsequent increase in heat island effect exacerbating the effects of temperature extremes.
- » Stresses on the City's lakes, streams, and wetlands including threats to aquatic species and water quality.
- » Stresses on the City's storm water management infrastructure with increased flood risk potential.
- » Stresses on the City's public health with increased incidents of days over 95 degrees and humidity are anticipated to contribute to degradations in air and water quality. Each of these will increase public health risk, especially for at-risk populations.
- » Stresses on the City's food security with interruptions in transportation networks that could trigger food shortages and spikes in food cost.
- » Stresses on low income people that may have a difficult time coping with changes. This portion of our population have limited financial resources to cope with heat, relocate or evacuate, or respond to increases in the cost of food. In addition, they frequently have limitations to health care.
- » Stresses on people of color and limited English populations with an increased risk of exposure given their higher likelihood of living in risk-prone areas, areas of older or poorly maintained infrastructure, or areas with an increased burden of air pollution.
- » Stresses on at-risk occupations which will increase the prevalence and severity of occupational hazards related to environmental exposure.



Solar panels at the Nature Center

Energy

Existing Conditions

Resources

Local energy resources are abundant and readily available for economic capture. Energy resources available in Maplewood include solar, wind, biomass, and efficiency resources. All of these resources are developed or used at the community scale. Property owners will request local building and zoning permits for solar and wind installations. Biomass is collected, stored, and generated and used in the community. Building improvements use local contractors, need local permits, and affect local property values when they are improved to incorporate energy efficiency. Maplewood must set goals and policies that treat sustainable local energy resources as an economically valuable local resource.

Energy Consumption

In order to set goals and measure progress, Maplewood has assessed its current energy consumption as follows:

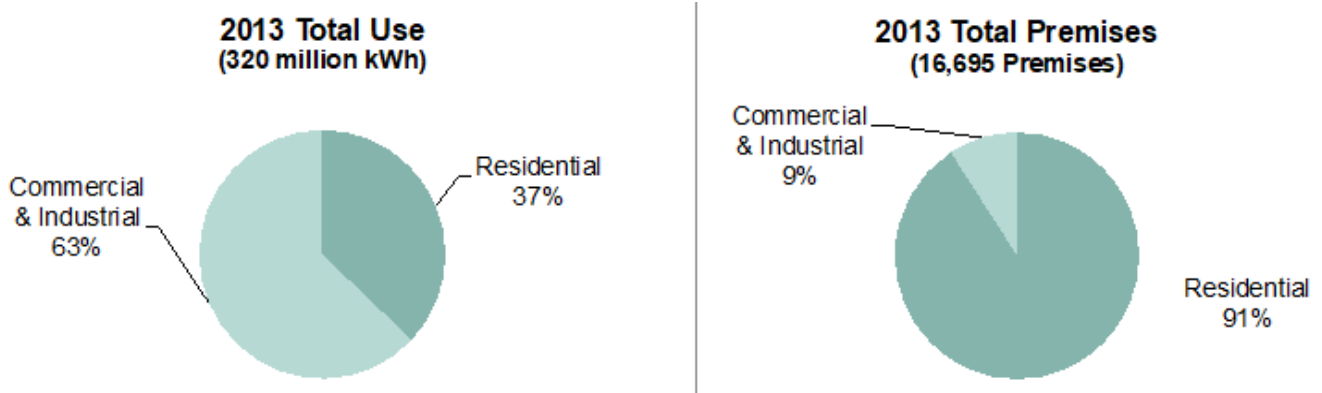


Figure 8-1. 2013 Overall Electricity Use (2013 Xcel Energy Partners in Energy Data)

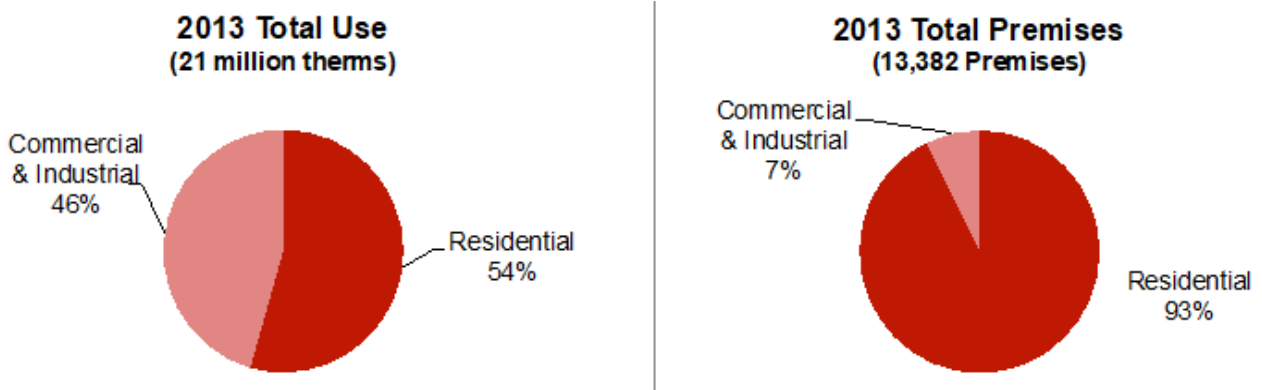


Figure 8-2. 2013 Overall Natural Gas Use (2013 Xcel Energy Partners in Energy Data)

Sector	MMBtu	GHG (Tons)
Residential	1,550,423	119,634
Commercial/Industrial	1,667,991	11,024

Table 8-5. 2013 Overall Energy Use from Electricity, Natural Gas, Fuel Oil, Diesel, Coal and Biomass (Regional Indicators Initiative)

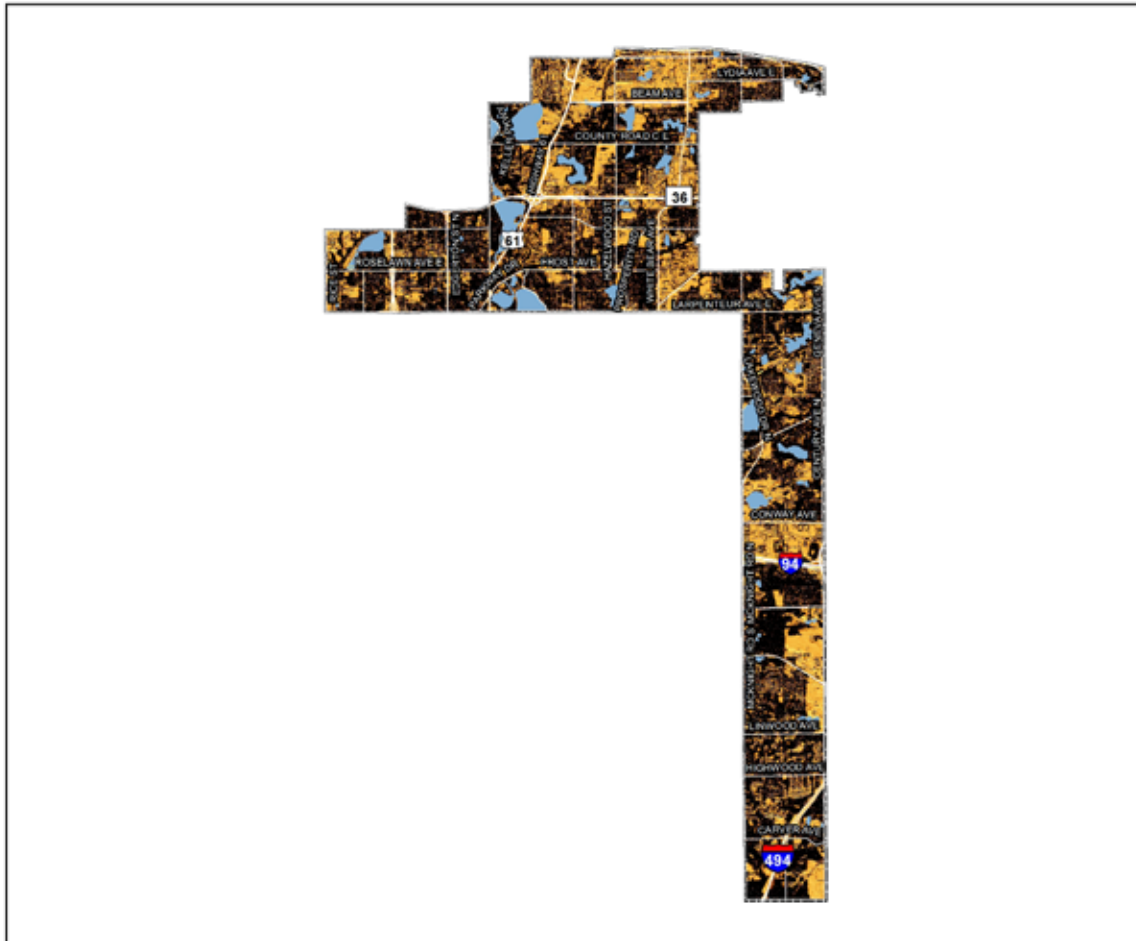


Figure 8-3. 2016 Community-Wide GHG Emission Totals (Maplewood Greenhouse Gas Emissions Inventory)

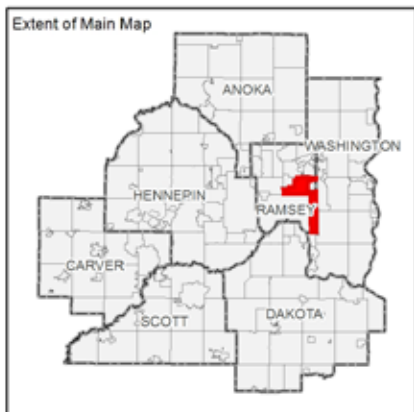
Solar Capacity

Solar reserves are those quantities of solar energy that can be estimated with reasonable certainty to be economically producible. Maplewood's gross solar reserves equal 23,403,633 megawatt hours per year. Based on the City's solar potential study completed September 2017, there are a total of 7,700 rooftops in the City of Maplewood which are viable for solar photovoltaic (pv) installations. The potential annual rooftop solar pv energy generation is 178,400,000 KWH. This is equal to approximately 59 percent of the City's total annual electric use.

Gross Solar Potential City of Maplewood, Ramsey County



12/23/2016



Gross Solar Potential (Watt-hours per Year)

High : 1279387
Low : 900001

- Solar Potential under 900,000 watt-hours per year
- County Boundaries
- City and Township Boundaries
- Wetlands and Open Water Features

Source: University of Minnesota U-Spatial Statewide Solar Raster.

Figure 8-4. Gross Solar Potential, City of Maplewood

Energy Goals and Policies

1. The City will follow the state energy goal guidelines of reducing greenhouse gas emissions to 20 percent of the City's 2015 baseline levels by 2050 (an 80 percent reduction).

1.1 The City will establish interim goals every 5 to 10 years to assure City emission reductions track against the primary goal outlined above, and to adjust policies and strategies as needed. Future interim goals will be established by the City at the completion of the first interim timeframe.

2. The City will encourage and support renewable energy.

2.1 The City will obtain a minimum of 50 percent of all electric energy from renewable sources by 2040. This includes having a minimum of 20 percent in on-site solar photovoltaic generation within the City, with the balance being met through Xcel Energy's 31.5 percent renewable portfolio requirement.

2.2 The City will own all renewable energy credits for renewables used on City facilities.

2.3 City facilities will be powered by 100% renewables by 2040.

Energy Actions

1. Set interim goals as follows:
 - a. Greenhouse Gas Reduction Interim Goal: Reduce City-Wide greenhouse gas emissions to 80% of 2015 Baseline levels by 2025 (a 20 percent reduction).
 - b. On-Site Solar Interim Goals:
 - 1) Achieve 5.5 percent on-site solar photovoltaic by 2022.
 - 2) Achieve 15 percent on-site solar photovoltaic by 2030.
2. Modify the City's operating procedures and annual budgets to implement the Climate Action and Adaption goals.
3. Conduct a site-specific solar energy capacity study to identify the 20 most beneficial sites for solar PV development. Use the site-specific study as the basis of outreach to the owners of the top 20 sites, educating them on the opportunities and benefits of installing solar PV within the existing timeframe of the Federal Tax Incentive. Study should occur by mid-2018 to support leverage of tax incentive potential.
4. Coordinate with Ramsey County and Minnesota PACE to develop a communications plan to review the financing opportunities and financial advantages available to utilizing PACE financing for solar PV, especially while the Federal Tax Incentive remains in effect through 2021.
5. Develop and distribute an informational brochure outlining the current incentives available to Maplewood residents and businesses as well as the potential short and long-term benefits of installing solar PV. Work with City businesses and community groups to assure broad distribution.
6. Coordinate with Ramsey County to explore the development of new incentive programs, particularly those aimed at low and moderate income residents. Program opportunities may include development of LIHEAP based funding sources.
7. Conduct a Green Economy Business and Economic Development Potentials study to identify strategies in leveraging economic opportunities in the Green Economy and emerging renewable energy field. Study should focus not only on national, state, and metro area trends, but should identify strengths, weaknesses, opportunities, and threats unique to Maplewood. The goal of establishing a robust business atmosphere capable not only of serving Maplewood renewable energy and green economy needs but fulfilling a unique economic niche within the Metropolitan area.

8. Adopt a Climate Action and Adaptation Plan that includes strategies for dealing with the effects of climate change. Strategies to be considered should strive to:
 - a. Decrease City-wide GHG emissions to meet the City's long-range emissions goals.
 - b. Increase renewable energy to meet the City's long-range renewable energy goals.
 - c. Conduct a climate vulnerabilities study.
 - d. Decrease the urban heat island effect, especially in areas with populations most vulnerable to heat.
 - e. Minimize health issues caused by extreme heat days, especially for populations most vulnerable to heat.
 - f. Increase the resilience of Maplewood's water supply in drier summers.
 - g. Increase food security for Maplewood residents, especially those most vulnerable to food environment.
 - h. Increase the resilience of natural and built systems to adapt to increased timeframes between precipitation and increased drought conditions.
 - i. Increase the resilience of the natural and built environment to more intense rain event and associated flooding.
 - j. Manage the increased risk of disease due to changes in vector populations.
 - k. Strengthen emergency management capacity to respond to weather-related emergencies.
 - l. Institutionalize climate change preparation planning and best practices.
 - m. Improve the capacity of the community, especially populations most vulnerable to climate change risks, to understand, prepare for and respond to climate impacts.

NOTABLE ACCOMPLISHMENTS

Community Gardens

- **2010 - Harvest Gardens (southwest corner of County Road C and Hazelwood Street)**
 - Coordinated by the First Evangelical Free Church in Maplewood
 - 1,160 individual plots
- **2011 - Edgerton Community Garden (Edgerton Park - Roselawn Ave. and Edgerton St)**
 - Coordinated by the City of Maplewood
 - 46 individual plots
- **2016 - Rice Street Gardens (1958 Rice Street)**
 - Coordinated by the Galilee Lutheran Church in Roseville
 - 250 individual plots

2011 - Maplewood Chicken Ordinance

- The City of Maplewood adopted a chicken ordinance in 2013 which allows the keeping of up to ten hens with a permit.

2018 - Harvest Park Farm Training Program

- Partnership between the City of Maplewood and The Food Group, a local food access nonprofit.
- 3.5 acre urban vegetable farm
- Farmer education and community events

Local Food Access

Existing Conditions

Today there is mounting evidence that good nutrition and regular physical activity are essential to keeping our communities healthy. The benefits of a healthy diet and regular physical activity include people living longer and experiencing less chronic diseases, such as type 2 diabetes, heart disease and obesity. Along with factors such as access to good schools, healthcare, and the ability to be active, access to healthy food is one of the most influential factors affecting healthy communities.

Minnesota has the fifth largest agricultural economy in the US, contributing to the state's ranking as the eight best in the nation for business. However, nearly 900,000 residents still live in communities with insufficient grocery store access. This gap contributes to the state's ranking as fourth worst in the nation for grocery store access. Anticipated changes in climate will require the City of Maplewood to address food security and access at a local level, in order to be resilient to potential destabilization by extreme weather events. Building a strong foundation for residents of Maplewood to readily access locally-produced agriculture will strengthen the community's ability to address resilience under the lens of economic, environmental, and social growth.

Vulnerable populations, such as elderly people and those with lower incomes, have further difficulty reaching grocery stores due to transportation and financial barriers. In many communities, the foods and drinks that are most available, accessible, and inexpensive are also the foods that are the least healthy. Conversely, often foods that are best for the long-term health of our communities are more expensive and take more effort to find. Grocery stores are not the only place where we can find healthy food—other points of access, such as farmers markets, Community Supported Agriculture (CSAs), school lunches, community gardens, and mobile markets or food trucks are alternative ways that people can access healthy food locally. Local food shelves can provide low or no-cost food options for those experiencing poverty.

In 2010, only about 20% of Ramsey County students reported consuming the recommended five servings of fruits and vegetables per day. Consumption was best among 6th graders at about 21% and decreased to 18% among 9th-12th grade students. On average, 26.3% of adults in Ramsey County eat five or more recommended servings of fruits and vegetables. (Source: Centers for Disease Control and Prevention, 2011. Behavioral Risk Factor Surveillance System)

The resulting costs of obesity and diet-related diseases to society can be demonstrated economically; on average Minnesota incurs \$2.8 billion dollars in obesity-related healthcare costs per year.¹ However, investing in healthy food infrastructure and agriculture could potentially yield \$2.9 billion dollars per year in Minnesota.²

¹www.health.state.mn.us/cdrr/obesity/pdfdocs/obesityplan20090112.pdf

² http://fairfoodnetwork.org/wp-content/image_archive/Michigan20PercentShift_FullReport.pdf

Nutrition and Food Insecurity

Food insecurity and obesity

Food insecurity is having unreliable access to a sufficient quantity of affordable, nutritious food.

Food insecurity can lead to overeating of unhealthy foods when food is available.¹

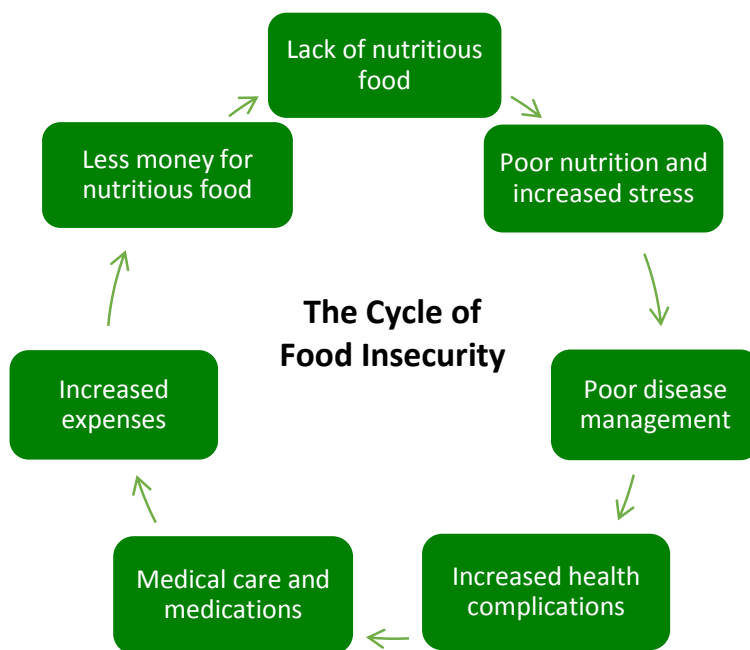
Often access to unhealthy foods is higher than access to healthier foods. This combination of unhealthy foods in large quantities can lead to obesity.

About 50% of boys and girls 9-18 years old in Minneapolis homeless shelters are either at risk for overweight or actually overweight.²

Lack of access to healthier foods

Many people experiencing food insecurity do not have the access and means to buy healthier foods.

Although people surveyed knew it was unhealthy, 81% of people experiencing food insecurity bought the inexpensive, unhealthy foods in order to manage their hunger.³



1. <https://www.pittsburghfoodbank.org/resources/about-hunger/hungerandhealth/>. 2. Smith, C. & Richards, R. (2008). Dietary intake, overweight status, and perceptions of food insecurity among homeless Minnesotan youth. *American Journal of Human Biology*, 20, 550-563. 3. Minnesota Food Charter. (2014). 4. Project Homeless Connect Survey. June 15 2010. 5. Wilder Research. (2013). *Homelessness in Minnesota*.





Edgerton Community Garden

Issues and Opportunities

To examine healthy food access in Maplewood, the following were explored:

- » Locations of community gardens
- » Locations of farmers markets
- » Proximity of food outlets and grocery stores to single family, multi-family, and manufactured housing parks in Maplewood
- » Proximity of food outlets and grocery stores to schools
- » Pedestrian access within a half-mile radius (about ten minutes walking) of food outlets and grocery stores

Within the city limits of Maplewood, there are ten food outlets, with another half-dozen stores very close to the city limits. Most of the stores within Maplewood are larger retailers, such as Cub Foods or ALDI. The St. Paul Farmers Market hosts a farmers market once a week during the spring, summer and fall at the Aldrich Arena (1850 White Bear Avenue) in Maplewood. Locally-grown fresh produce is provided at the market.

A number of locally-owned, smaller food retailers are located within the Payne-Phalen neighborhood of St. Paul, along Payne Avenue, Case Avenue, and White Bear Avenue, to the south of Maplewood.

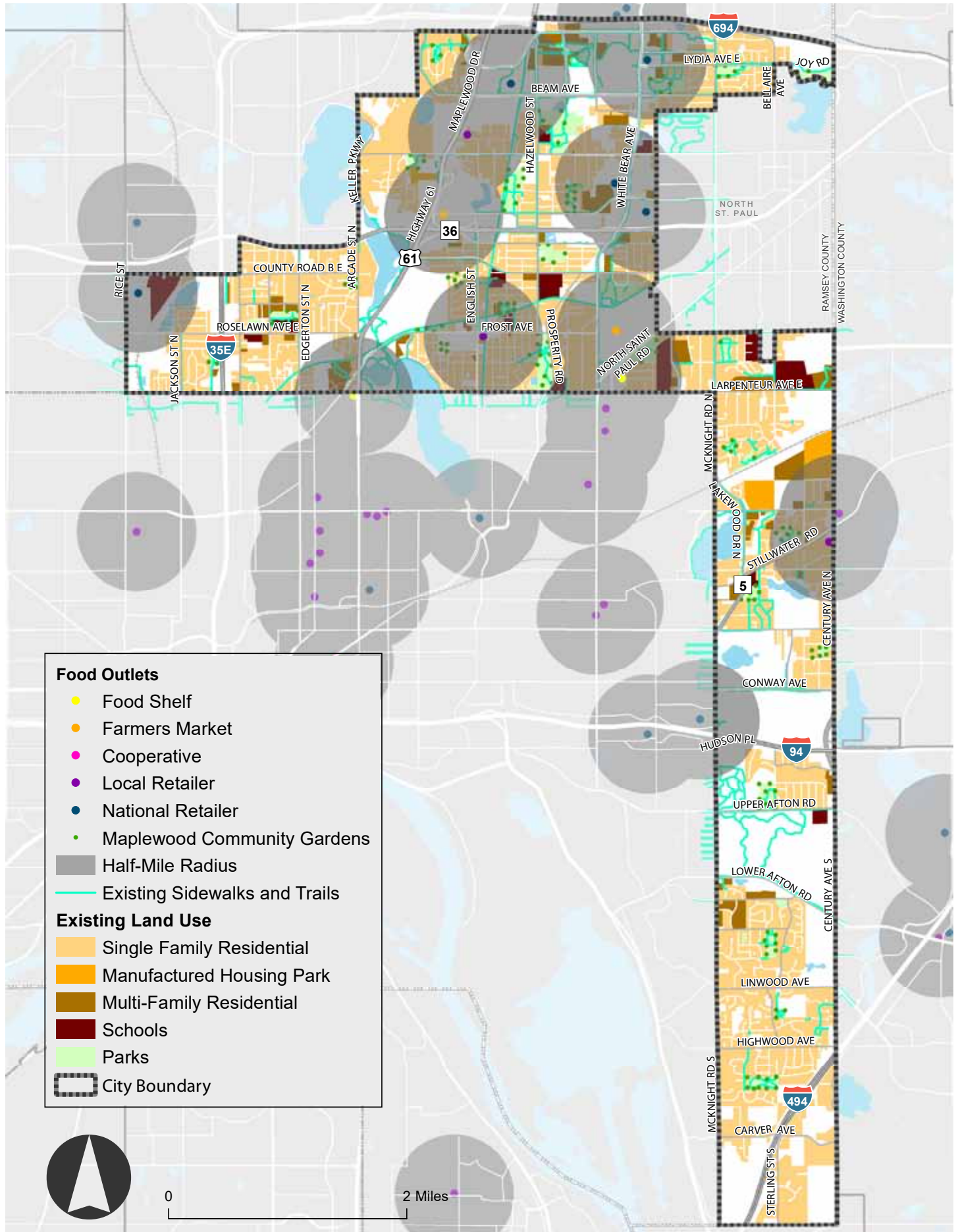
The City of Maplewood manages a community garden within Edgerton Park, with two other large community gardens and several smaller gardens managed by the school district and private organizations.

The Merrick Food Shelf has two locations that serve residents of Maplewood (1669 Arcade Street in St. Paul and 1740 Van Dyke Street in Maplewood). Additionally, the Christian Cupboard Emergency Shelter in Woodbury serves residents of Maplewood who live south of Stillwater Road and east of McKnight Road.

The following residential areas of Maplewood are not currently located within a half-mile walking distance of any grocery stores or food-related outlets:

- » The southern neighborhoods south of 494, north of 494 to 94
- » The neighborhoods north of Conway Avenue between McKnight Road, Century Avenue up to Stillwater Road
- » The neighborhood surrounding the intersection of McKnight Road and Larpenteur Avenue to the east
- » The western neighborhood between 35E and Highway 61
- » The northeastern neighborhood south of 694 to Beam Avenue

Figure 8-5. Local Food Access Map



CASE STUDY EXAMPLE: FRUIT AND VEGGIE RX

The following is an example of one of the actions HealthEast took to address food insecurity. Depending on the results and replicability of these pilot programs the City could partner to explore how to expand it to other locations.

In a partnership formed with the Hmong American Farmers Association and HealthEast Roselawn and Rice Street Clinics, HealthEast sought to ease food insecurity, provide culturally specific nutrition information, and distribute fresh fruit and vegetables to prevent and combat chronic disease. In the program, which is targeted to Karen and Hmong refugees and immigrants, 37 food-insecure individuals with chronic diet-related diseases worked with a dietician to learn about nutrition and set healthy eating goals for their families. For a period of 18 weeks in 2017, the Hmong American Farmers Association provided participant families with weekly Community Supported Agriculture (CSA) boxes filled with fresh fruits and vegetables chosen to appeal to cultural preferences. Physicians measured changes in recipients' food security, body mass index, and healthy eating behavior.

Local Food Access Goals and Policies

Local partnerships, planning and zoning policies, and community initiatives can reduce the barriers and challenges to providing healthy, local food access to everyone in Maplewood. Education, engagement, collaboration, and action towards policy changes will promote greater access to healthy foods.

1. Create a healthy, walkable community by providing healthy food options and accessibility for all people, regardless of income.

- 1.1 Support development patterns that decrease the distance between households and healthy retail food options.
- 1.2 Encourage healthy retail food options such as food stores and farmers markets are located in places easily reached by bus, bike or foot.
- 1.3 Support the establishment and maintenance of community gardens throughout the community to provide residents with easy access to healthy food.
- 1.4 Support the establishment of urban farms in appropriate areas.
- 1.5 Encourage edible and pollinator-friendly landscapes on all properties.
- 1.6 Support the keeping of bees, chickens, goats and other animals appropriate for the size and location of the property.
- 1.7 Support food-related business and initiatives that advance the development of local and regional economies.
- 1.8 Support innovative practices such as mobile food markets and mobile food pantries/shelves to bring food closer to under-resourced consumers.
- 1.9 Support the efforts of small food stores to sell more healthy and fresh foods.

Local Food Access Actions

1. Conduct a community food security assessment to identify barriers and gaps in healthy food access and community assets.
2. Complete an urban agriculture zoning review to remove barriers and promote local food access in all zoning districts.
3. Allow and encourage single-family subdivisions and multi-family developments to incorporate community gardens.
4. Integrate community gardens into public housing developments and create incentives for community gardens in affordable housing developments that receive public assistance.
5. Encourage townhome and other types of housing associations to allow gardening as part of allowable activities.
6. Analyze and address sidewalk and trail gaps near food stores, hunger relief programs, farmers markets, community gardens, and other healthy food sources.
7. Require new developments that will have food options to provide safe, internal circulation for pedestrians and cyclists and bike racks.
8. Explore partnership opportunities to provide education and skill development for families around healthy food selection and preparation.
9. Collaborate on equipment-lending libraries and seed and seedling programs to support garden efforts of families.
10. Identify and educate on options for testing of soil of contaminants to ensure new gardens are safe.
11. Review and modify as needed healthy food options available at city facilities.
12. Explore how to add community supported agriculture delivery sites to serve multi-family developments.
13. Modify land use policies to support pollinators through city ordinance and city operations/maintenance.
14. Partner with the business and school communities to promote health and well-being within worksites.
15. Review management of locally owned public land, and take steps to increase its contribution to pollinator health.
16. Partner with local food retailers to market a buy local food campaign.

CASE STUDY EXAMPLE: RICE STREET COMMUNITY GARDEN

In 2015, St. Paul Regional Water Services purchased land north of Roselawn Avenue and Rice Street at the McCarrons water treatment plant. The parcel included wetlands, a former nursery, and two acres of vacant land behind McCarron's Pub and Grill. A local environmental activist, interested in the vacant land, partnered with a few other community garden allies in Maplewood to create Rice Street Community Garden. The garden has 16x20 plots that are gardened by members of the community, notably Karen refugees who live in the neighborhood. This project was the result of a number of individuals and entities working together to provide a place where people can come together to grow healthy food.

- » St. Paul Regional Water Services is donating use of the land for the community garden for at least two years, free of charge
- » The City of Maplewood granted the garden a conditional use permit
- » McCarron's Pub and Grill is donating water from their well to be used for watering at the community garden
- » Resettlement agencies, such as the International Institute of Minnesota in St. Paul, help newly settled refugees connect with the community garden