

Appendix 7

Resilience And Sustainability Resilience And Sustainability Plan Draft

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Resilience and Sustainability Plan DRAFT

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CONTENTS

Introduction	4
Vulnerability Assessment.....	5
Natural Infrastructure	6
Trees and Native Plants.....	6
Water Quality and Supply	8
Built Infrastructure	9
Vulnerable Populations.....	10
Extreme Weather and Flooding.....	10
Extreme Heat and Air Quality.....	11
Vector-borne Diseases.....	11
Economic Vulnerability	13
Community-Wide	13
Residential Level.....	14
Community Electricity Consumption	15
Mitigation Opportunities	16
Goals, Objectives, Policies, and Strategies	17
Conclusion and Next Steps.....	29
Appendix A Survey Results	29
Appendix B Focus Groups	33
Appendix C Existing Policies and Programs	39
Appendix D Flood Inundation Map	45
Appendix E Solar Resource Maps	46
Appendix F Critical Infrastructure	48

Introduction

The City of Golden Valley is an aging community with infrastructure and human and natural resources that are increasingly more vulnerable to the effects of climate change, energy uncertainty, and the rising cost of service delivery. The City is committed to environmental stewardship and the economic and social well-being of the community and therefore desires to become more resilient and sustainable. Golden Valley joined the [Minnesota GreenStep Cities](#) program (a voluntary statewide assistance and recognition program that helps cities meet their sustainability goals) in 2016 and was recognized for reaching “Step 2” in 2017. The City is committed to continuing its efforts in the program. Many, though not all, of the policies and implementation actions put forth by this plan are rooted in GreenStep Cities.

As part of the 2040 Comprehensive Plan Update, the City would like to incorporate water, energy, and sustainability goals into several chapters, consistent with Resilience Element of the Metropolitan Council's Local Planning Handbook. To improve its services, the City has inventoried and evaluated its current policies, programs, and practices with respect to sustainability, energy, and climate and weather related variations. The findings from this evaluation were incorporated into a vulnerability assessment, which was completed to determine the strengths, weaknesses, and vulnerabilities across built and natural infrastructure, residents, and the local economy.

The vulnerability assessment and resulting Sustainability and Resilience Plan were completed for the City of Golden Valley as part of the Environmental Assistance grant program funded by the Minnesota Pollution Control Agency. The vulnerability assessment included gathering information from City staff and data from multiple sources to assess how well the City is prepared to respond and recover from abrupt changes and prolonged stresses. The assessment examined the City's built infrastructure, including streets, water mains, sanitary sewer lines, and stormwater lines; natural infrastructure, including trees, native plants, and water; population vulnerabilities; and economic disruptions. A high-level analysis of electricity consumption within the City was conducted to identify opportunities for increased energy efficiency and renewable energy actions.

In addition to the vulnerability assessment, the City conducted a community-wide survey to gather input on how residents envision a more sustainable and resilient future. The voluntary survey was made available through the City's newsletter, website, and social media outlets. The survey received 124 responses from people who live and/or work in Golden Valley. The City also conducted a focus group with organizations that work with low-income and senior residents in Golden Valley to better understand the needs of the most vulnerable residents. The Golden Valley Environmental Commission also participated in a focus group discussion to identify priorities. Summaries of the survey responses and focus groups are included in Appendix A and Appendix B, respectively.

The policy and program inventory (Appendix C), along with the vulnerability assessment and information from community engagement, were used to develop goals, objectives, policies, and implementation strategies for the City. Golden Valley will use these outcomes to inform its 2040 Comprehensive Plan Update, which will guide City regulations, investments, and actions over the next 20 years.

Vulnerability Assessment

The 2013 Report of the Interagency Climate Adaptation Team suggests Minnesota can expect warmer winters, prolonged heatwaves and cold spells; diminished air quality; more extreme weather (droughts, heavy precipitation); and increased ecological changes (invasive species, vector-borne disease). Within the context of the anticipated climate hazards, the Minnesota Department of Health (MDH) completed a statewide vulnerability assessment, where it determined the risk of climate events by county.

The vulnerability assessment completed by MDH provides a framework to understand the climate hazards that will likely impact Golden Valley. It is important to note that these hazards are not unique to Golden Valley, but will be widespread throughout Minnesota and the Midwest. The purpose of using this assessment is to understand what the City can expect in order to know how well prepared it is to respond to these changes.

The climate risks that have been identified to be experienced in Hennepin County include:

HIGH: Extreme Rain Events, Diminished Air Quality
MODERATE: Extreme Heat, Invasive Species
LOW: Drought, Vector-borne Disease

The Golden Valley vulnerability assessment identified the City's strengths, weaknesses, and vulnerabilities in the following categories:

- **Natural Infrastructure:** trees and native plants; water quality and supply
- **Built Infrastructure:** streets, sanitary sewer lines, water mains, stormwater structures, and impervious surface
- **Vulnerable Populations:** elderly, youth, low-income, persons with limited mobility, and residents with respiratory illnesses
- **Economic Vulnerabilities:** Community-wide, and residential level

Opportunities exist to reduce the City's contribution to climate and weather-related variations. This assessment includes an analysis of electricity consumption within the City and identifies renewable energy and energy efficiency resources.

Natural Infrastructure

Natural Infrastructure includes ecological features that enhance and complement the functions of built infrastructure. Trees, native landscaping, and rain gardens are included in this assessment.

Natural Infrastructure – Trees and Native Plants

Trees offer many important benefits to communities: they improve air quality, remove carbon from the atmosphere, provide shade, support stormwater management, enhance aesthetics, are home to wildlife, and may increase property values.

Native plants can also improve surface water quality, provide food and critical habitat to pollinators, improve aesthetics, and reduce maintenance costs.

Climate Hazards:

Invasive Species: **High**

Extreme Wind Events & Tornadoes: **Moderate**

Drought: **Low**

Heavy Rainfall: **Moderate**

Strengths: The City has a healthy tree canopy coverage with a generally diverse mix of tree species; the City follows the 10-20-30 rule (percent of species, genus, family planted) for replacement to maintain biodiversity of the urban forest. The City continues to replace turf with native plantings where appropriate.

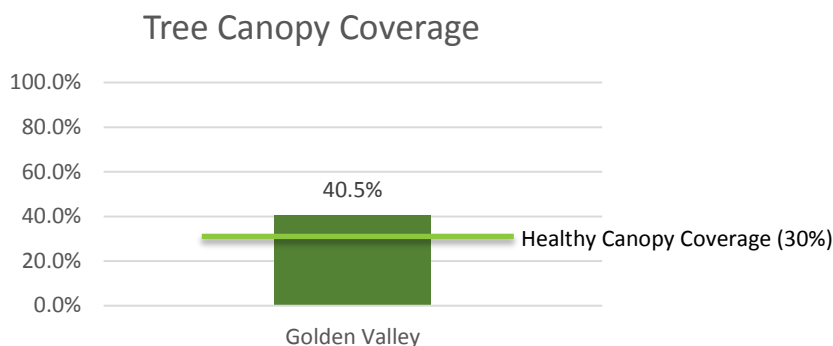


Figure 1 Source: EarthDefine Geospatial Data and Services

Weaknesses: The City's land cover map indicates a low tree canopy for the commercial areas. The City's average tree planting to removal ratio between 2011 and 2016 was 0.5:1, which is well under the recommend 2:1 to maintain a healthy canopy. This may be due in part to storms and public projects where trees were replaced with prairie plantings and water quality facilities. The City has a relatively high count of Ash trees that are susceptible to Emerald Ash Borer (EAB). In 2016, 21.4% of public trees were Ash trees, slightly exceeding the healthy limit for a single genus. However, nearly all the Ash trees were Green Ash (21.0% of all public trees), exceeding the 10% rule for tree species.

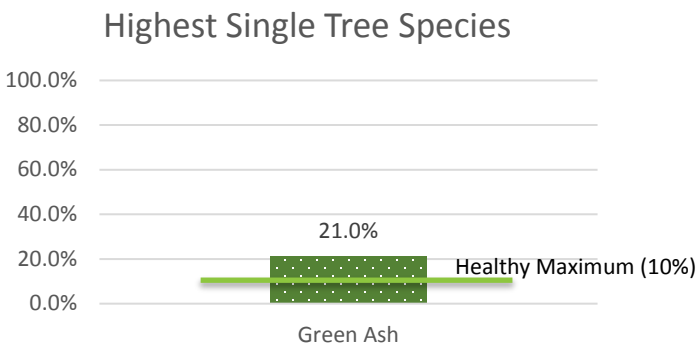


Figure 2 Source: City of Golden Valley



Image Credit: USDA, Emerald Ash Borer

Buckthorn is another invasive species that is a nuisance in the City. Buckthorn is listed as a restricted noxious weed in Minnesota as it out-competes native plants, degrades wildlife habitat, contributes to erosion, and can host other pests. Managing Buckthorn is a challenge for many Minnesota communities. There are [543 acres of Buckthorn](#) in the Golden Valley, by far the most common invasive species in the community. The City has a volunteer program for assisting in the management of buckthorn.

The area of native planting in the City is relatively small as compared to manicured landscape on public property, however as mentioned, the City continues to replace turf with native planting, where appropriate.

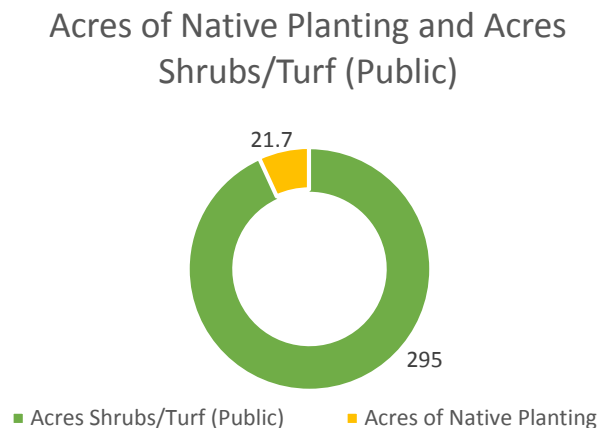


Figure 3 Source: City of Golden Valley

Vulnerability: The greatest concern for tree health in Golden Valley is the spread of Emerald Ash Borer and recovering from strong wind events that have taken down many the City's trees in recent years, including a tornado in 2011.

The City developed an Emerald Ash Borer Management Plan in 2010, which is updated regularly to adjust for new management technologies and strategies. Trees are removed as needed and replaced as funding is made available. Annually, the City plants between 50-75 trees for parks as part of the EAB replacement program.

Natural Infrastructure – Water Quality and Supply

Increased precipitation and freeze/thaw cycles may make it more difficult to maintain stormwater practices that help reduce pollution and maintain the health of surface water.

Climate Hazards:

Freeze/Thaw: **Moderate**

Drought: **Low**

Heavy Rainfall: **Moderate**

Strengths: The City implements best management practices to reduce stormwater impacts on surface water. These practices include, but are not limited to cleaning ponds, stormwater pipes, catch basins and outlets; as well as installing and cleaning sump catch basins and manholes. The City sweeps streets in spring, summer, and fall, and continues to use innovative approaches to reduce and better target the application of chloride in winter while still taking public safety into account.

The City is a member of the Joint Water Commission, which purchases its drinking water from the City of Minneapolis, which draws from the Mississippi River, a historically stable source of water. The Joint Water Commission owns 3 wells, which could be used in the event of an emergency to provide back-up drinking water.

The City receives an allocation of watershed funds to give to homeowners who have property along Bassett Creek or one of its tributaries to cover 50% of the cost of streambank stabilization. Additionally, “enhanced stormwater management” is one of the 20 public amenities listed in the City’s PUD ordinance, encouraging development to exceed capacity for stormwater infiltration beyond the minimum requirements.

Weaknesses: Most stormwater in Golden Valley eventually flows into Bassett Creek, which is an impaired water, and does not meet water quality standards for chloride, fish and insect bioassessments, and fecal coliform (bacteria). More freeze/thaw cycles may lead to an increase in the amount of salt/deicer that is applied to the roads, which may deteriorate stormwater facilities and the quality of the water.



Photo Credit: Bassett Creek Watershed Management Commission

Vulnerability: The primary concern in Golden Valley is the health of surface water such as Basset Creek, which may degrade as heavy precipitation events and freeze/thaw cycles increase.

Built Infrastructure

Increased precipitation and freeze/thaw cycles have the potential to stress and shock built infrastructure systems like pipes (stormwater, sanitary sewers, water), roads, and bridges. This may result in increased maintenance costs, structural damage to public infrastructure, damage to private properties, disruption of services, and inconveniences to residents.

The City has developed a map (Appendix D) of its flood risk and has a good understanding of which locations are most at risk for flooding. As heavy precipitation events increase, the possibility of flash-flooding also increases. The Metropolitan Council is working to develop mapping technology that will help cities anticipate where flash flooding may occur in a heavy rain event. Flash flood events can damage property, and can be unsafe for pedestrians at depths as low as 6 inches, and for vehicles at depths of 1 to 2 feet.

Climate Hazards:

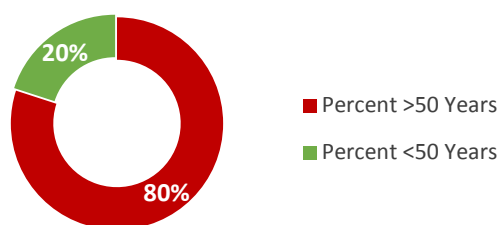
Freeze/Thaw: **High**

Heavy Rainfall: **High**

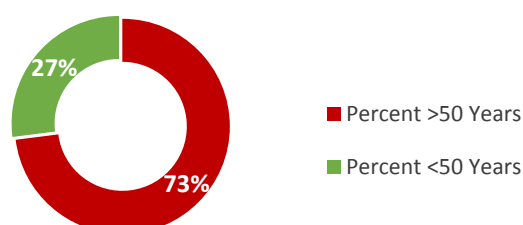
Strengths: The City has a Capital Improvement Program that recognizes aging infrastructure and addresses flooding impacts. The City anticipates that 100% of roads will be reconstructed to City standards by 2022. After 2022, the City will continue to implement a pavement preservation and maintenance program. Inflow and infiltration is a problem that occurs across the Metro area. Inflow and infiltration occurs when clear water (rain or ground water) enters the sanitary sewer system, potentially causing costly back-ups, or the unnecessary treatment of clear water. The City has successfully implemented a program to reduce the amount of clear water that enters the sanitary sewer system.

The City continues to install stormwater infrastructure to reduce the potential for flood damage. For example, the 2017-2021 Capital Improvement Plan budgets \$1.2 million for the creation of flood storage. For its stormwater design, the City uses Atlas 14, which provides precipitation estimates for Midwestern states. Much of the stormwater system was built decades ago using the previous standards in place at the time.

Age of Sanitary Sewer Lines



Age of Watermains



Figures 4 and 5 Source: City of Golden Valley

Weaknesses: The City has a significant amount of aging infrastructure, which has seen an increase in the amount and costs of maintenance (pipe breaks, deterioration, sink holes) over the past 20 years. Much of the system needs to be replaced or rehabilitated.

Vulnerability: The major vulnerability is the age and condition of the underground infrastructure within the City, as well as the water pipes coming into the City as part of the Joint Water Commission system.

Vulnerable Populations

Vulnerable Populations – Extreme Weather and Flooding

Hennepin County is likely to see more heavy precipitation events that may lead to localized flooding, basement flooding, and regional flooding (Bassett Creek). Extreme rain and weather events may have an impact on individuals who need to evacuate or seek safety, and may cause structural damage to personal property.

Climate Hazards:

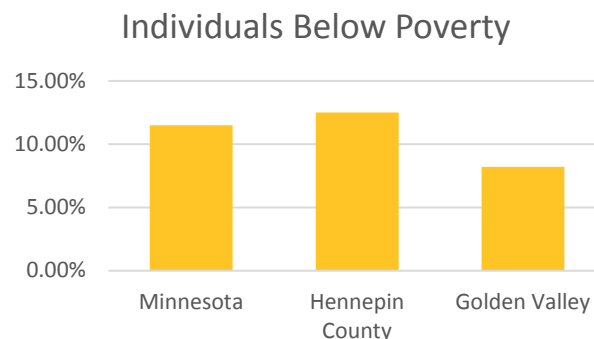
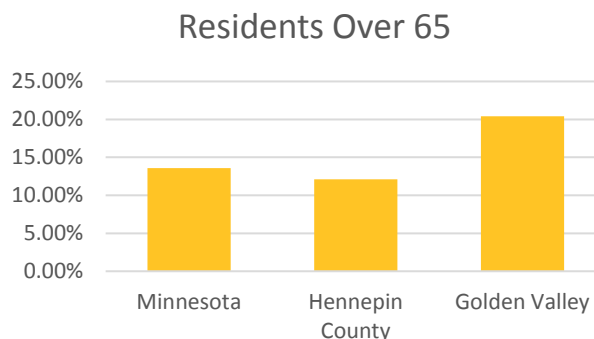
Extreme Wind Events & Tornadoes: **Moderate**

Heavy Rainfall: **Moderate**

Strengths: Golden Valley residents have a higher median income (\$81,534) relative to the Hennepin County (\$65,834), an indication that many residents would be relatively well-positioned to respond to property damage as compared to residents with lower-incomes. The City provides resources on its website to help residents minimize flooding impacts. The community also participates in FEMA's community rating system, which requires higher floodplain management standards in exchange for lower flood insurance premiums for eligible properties.

Weaknesses: Homes that are located in floodplains or are susceptible to basement flooding may pose a greater risk to residents and their property.

Vulnerability: Residents who tend to be the most vulnerable during extreme weather events are those with limited mobility (including senior residents and those with ambulatory difficulty), residents who do not speak English well and may not receive adequate preparation and response instructions, and low-income individuals who are likely to be disproportionately impacted by property



Figures 6 and 7 Source: American Community Survey 2011 to 2015

damage and ability to recover; 8.2% of Golden Valley residents live below poverty. 2.8% of Golden Valley residents speak English less than very well.

Golden Valley has an older population relative to the State and Hennepin County, with more than 20% older than 65 years. Senior residents who live alone may be especially vulnerable during extreme weather events; in 2016, 33% of residents over 65 lived alone. By 2040, the City will likely see an increase in the number of residents over 65 as those who are currently between 45 and 64 (32%) will age.

Vulnerable Populations – Extreme Heat and Air Quality

Minnesota and especially Hennepin County will likely see an increase in the number of days that require a heat advisory. Increased extreme weather may cause power disruptions during times when air conditioning is needed. As wildfires and pollen blooms increase, more air quality alerts will be issued.

Climate Hazards:

Extreme Heat: **High**

Diminished Air Quality: **Moderate**

Strengths: The Community Center and City Hall are critical public facilities with air conditioning. The City has a healthy tree canopy in residential areas to help reduce the impact of urban heat island effect. The City is part of the North Suburban Emergency Management Group which identifies potential refuge and cooling centers depending on the nature of the emergency.

Weaknesses: The City faces potentially significant tree loss (see natural infrastructure). The City's commercial area has a relatively low tree canopy coverage and high impervious surface, particularly asphalt surface parking areas, contributing to urban heat island effect.

Vulnerability: Residents who are most vulnerable to heat and air quality hazards are senior residents, children under 5, low-income residents who live in areas near major roadways, and those with existing respiratory illnesses like asthma or allergies.

Those who appear to be at greatest risk in Golden Valley are the elderly, low-income, and residents with respiratory illness, particularly those who live alone during times of power disruption that coincides with a prolonged heatwave.

Vulnerable Populations – Vector-borne Diseases

Vector borne diseases that are found in Minnesota include West Nile transmitted by mosquitoes, and Lyme Disease that is

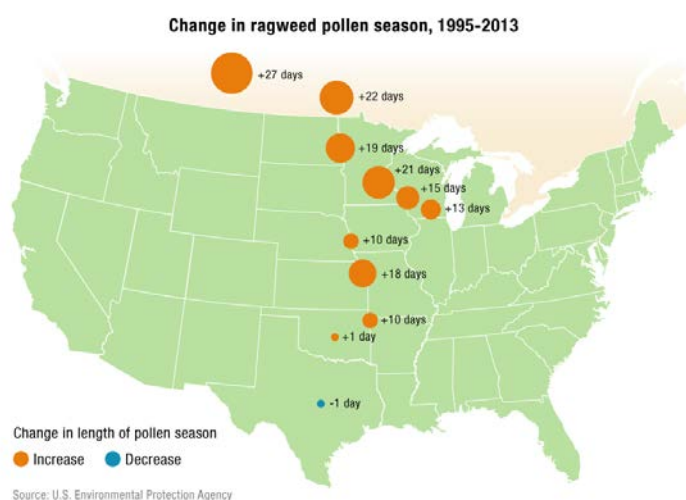


Figure 8 Image credit:
<http://www.mprnews.org/story/2015/02/02/climate-change-primer>

transmitted by deer ticks. Lyme Disease has been rapidly expanding throughout the Midwest as deer ticks and their hosts find it a more favorable climate. Hennepin County is currently at a low to moderate risk for Lyme disease.

Vector-borne diseases: **Moderate**

Strengths: The City currently has low incidence of residents who have contracted vector-borne diseases. The City falls within the jurisdiction of the Metro Mosquito Control District which has a regular program for treating mosquito breeding habitat within Golden Valley.

Weaknesses: The City has many heavily wooded and natural areas that make a good habitat for ticks and mosquitoes. Increased precipitation and warmer winters may also increase mosquito and tick populations.

Vulnerability: Most at risk are children under 5 who play outside and will need to be thoroughly checked by an adult for any sign of ticks or Lyme disease.

Residents Under 5

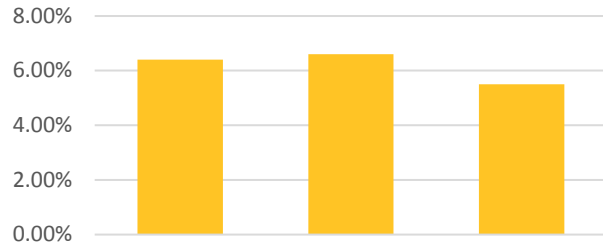


Figure 9 Source: American Community Survey 2011 to 2015

Distribution of Lyme disease cases by county of residence

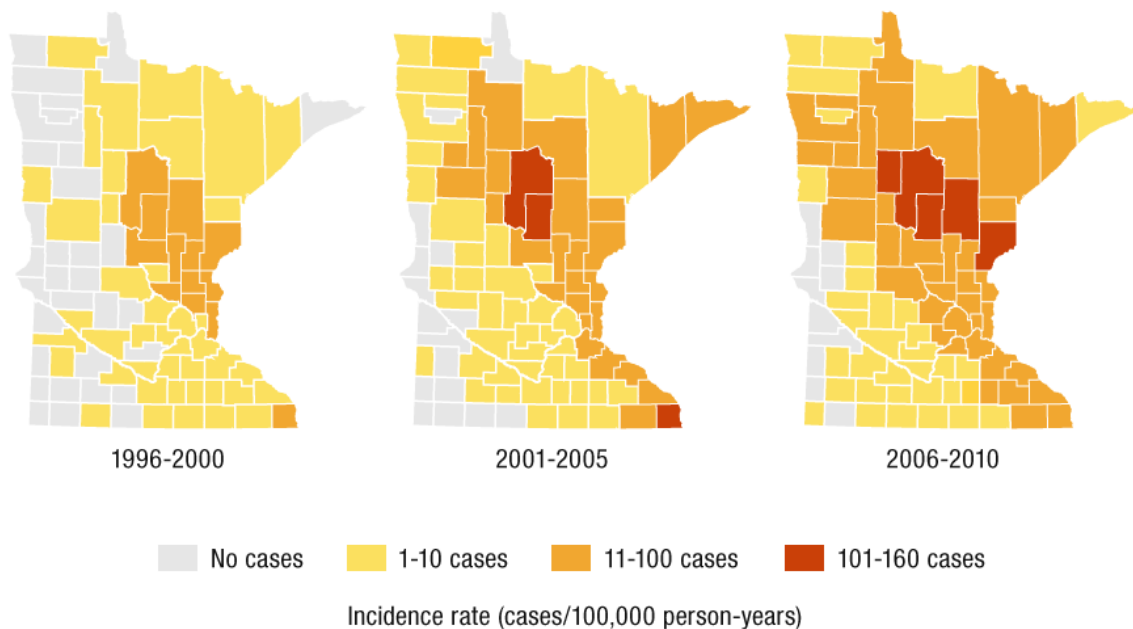


Figure 10 Source: Minnesota Department of Health

Economic Vulnerability

Extreme weather in other parts of the Country and the world may have local impacts on the economy of Golden Valley. Changing growing seasons, drought, and heavy rains may impact agriculture, driving up the costs of purchasing food, or making certain foods unavailable. Extreme weather is already causing home insurance rates to rise nationwide, making home ownership less affordable for lower middle-class and low-income families. Global, national, and regional economic health may impact local jobs.

Economic Vulnerability – Community-Wide

Community-wide vulnerability looks at how the City might fare during an economic disruption. This analysis uses unemployment numbers from 2015 and from 2009 (the peak of the recession) and looks at the diversity of the current employment sectors, highlighting the sectors that suffered the highest percentage of job loss during the economic recession from 2007 - 2011.

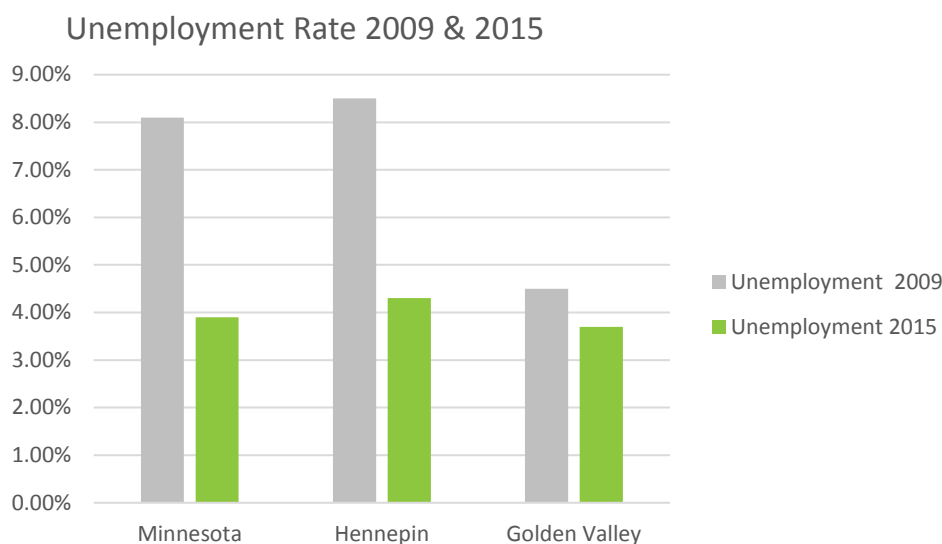


Figure 11 Source: American Community Survey 2011 to 2015

Strengths: Golden Valley is well-positioned to withstand economic disruption. Both Minnesota and the Twin Cities Metro Region performed better than much of the Country during the last economic recession. Golden Valley currently has a healthy unemployment rate and a diverse workforce.

Weaknesses: The Twin Cities metro region has some of the greatest income disparities between white residents and residents of color in the country.

Vulnerability: Low-income residents, residents of color, and immigrants are often hit hardest by economic disruptions. During the Great Recession, the employment sectors that saw the greatest job loss include financial, construction, manufacturing, retail, and transportation (denoted by red in the graph below). While the City has a diverse workforce, approximate 40% work in the affected employment sectors.

Golden Valley Employment Sectors

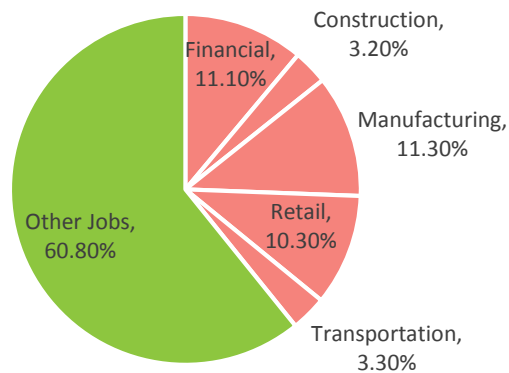


Figure 12 Source: U.S. Bureau of Labor Statistics. The Recession of 2007-2009

Economic Vulnerability – Residential Level

Additional economic impacts that could burden residents are high heating and cooling costs due to prolonged heatwaves and cold spells. Travel may also be impacted by extreme weather, which could impede emergency routes or limit commutes and transit options.

Extreme weather events may have a disproportionate impact on people who are economically vulnerable. Many climate hazards can have a direct or indirect impact on the financial stability of low-income residents. Economic disruptions are also likely to have greater consequences for low-income residents relative to middle class or wealthy residents.

Strengths: Golden Valley has a relatively low percentage of low-income residents, and 76% of homes are owner-occupied. Most residents have access to a vehicle.

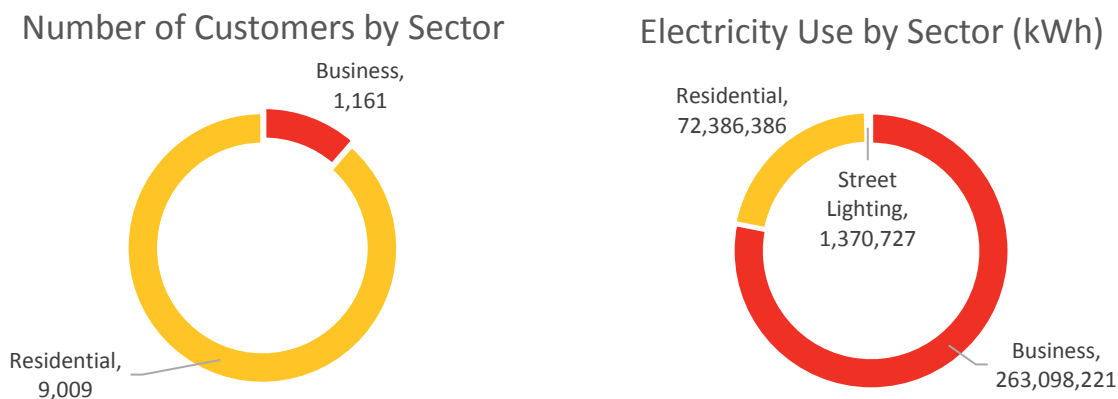
Weaknesses: 8.2% of the City's population live below the poverty line, and 20.6% are eligible to receive heating assistance. By choice or personal reasons, 5.6% of Golden Valley residents do not have access to a vehicle.

Vulnerability: Heatwaves and prolonged cooling spells can have significant financial impacts on households with a high-energy burden. Residents without access to a vehicle may have difficulty making it to work, or evacuating in times of extreme weather events.

Community Electricity Consumption

A major contributor to climate change is greenhouse gas emissions from the generation of electricity. While the electric grid in Minnesota continues to get cleaner, it remains important for local governments to understand energy consumption in their communities.

Golden Valley residents and businesses get their electricity from Xcel Energy. Residents make up the largest customer sector with more than 9,000 customers, however 78% of the electricity is consumed by the business sector.



Figures 13 and 14: Source: Xcel Energy Community Energy Report, 2016

Xcel Energy offers several programs to customers to increase efficiency and clean energy actions. The Community Energy Report released by Xcel Energy indicates that very few Golden Valley residents and businesses are taking advantage of these programs. In 2016, 435 residents participated in Windsource®, and only 3 businesses did. Further, while fewer businesses tend to take advantage of energy efficiency rebates offered by the utility for energy conservation projects, their impact tends to be greater. The 2016 Community Energy Report states that 81 energy conservation projects were completed by business, resulting in 3,803,391 kWh of savings; 350 were completed by residents saving 224,997 kWh.

Overall the current participation in clean energy and energy efficiency programs is having little impact on the energy consumption within the City.

Xcel Energy offers a production incentive for solar installations called Solar*Rewards; 13 residents and 4 businesses have taken advantage of this program. City records show a total of 9 single-family residences and 5 businesses have been issued permits for solar energy system installations since the City began keeping electronic permit records in 2001.

Since 2015, the City has installed four 40kW solar PV systems on public buildings: Public Safety building, Park Maintenance building, Streets Maintenance building, and Utilities Maintenance building.

Mitigation Opportunities

The potential solar resource in Golden Valley has been mapped to identify how much solar energy is possible in the City and where there might be good locations for solar installations. This tool can be used to help residents and businesses determine whether their solar resource is adequate to pursue installation. See the map in Appendix E.

The following summarizes the rooftop solar opportunity within the City of Golden Valley:

Total rooftop solar resource capacity: 125 MW

Rooftop resource capacity of top 10 buildings: 22 MW

There is a significant solar resource in the City of Golden Valley. For example, the potential solar resource of the top 10 buildings could offset approximately 9% of the electricity consumed in the City, helping to achieve the State's goal of 10% solar electricity by 2030.

The total rooftop solar resource available in Golden Valley could generate 64% of the electricity consumed in the City.

Beyond Solar:

- Windsource®
- Energy Efficiency Rebates
- Community Solar Subscriptions

There are several opportunities available to help residents and businesses improve energy efficiency and increase clean energy generation that will help reduce overall greenhouse gas emissions.

City Operations include building energy and vehicle fleet fuel consumption. The City enters energy data from all buildings and facilities into the B3 Benchmarking database to track changes in usage and building efficiency. In the summer of 2017, 8 City buildings were using more energy than the benchmark predicted by the B3 model, suggesting opportunities for energy savings.

For the purpose of this assessment, the City provided a snapshot of its fleet vehicles. Using the data provided, the City's diesel fleet has a fuel economy of 4.75 miles per gallon; the gasoline vehicles have a fuel economy of 10.13 miles per gallon; the City has 22 e85 (ethanol) vehicles, though there are no fueling stations; the City does not own any electric vehicles. Further, there are not currently any alternative fueling stations anywhere in the community, including e85 and electric charging stations.

There are 13 facilities that are considered critical infrastructure (Appendix F). Most of these facilities have back-up power generation from either diesel or natural gas sources. There may be opportunity for the City to investigate solar with storage back-up power generation to increase the resilience of these facilities.

Goals, Objectives, Policies, and Strategies

Creating a comprehensive plan in today's uncertain and rapidly evolving world requires preparing for a new climate and weather reality, advancing technologies, and shifting social structures.

Golden Valley has already taken several steps to improve its resilience. While elements of sustainability and resilience are incorporated into the City's existing Comprehensive Plan, they are not explicit. City practices have addressed resilience including stormwater management, encouraging active living, natural resource protections, and more.

Golden Valley has identified the importance of building on its previous efforts to become more resilient. Information from the vulnerability assessment and feedback from community members were used to develop the following goals, objectives, policies, and strategies. This section is intended to provide guidance to the City as it considers which elements to include in its 2040 Comprehensive Plan Update.

Goal 1: Promote and Develop Clean, Renewable Energy

Remove barriers and increase renewable energy use to strengthen and diversify the energy grid and mitigate climate-related impacts

Objectives

- Increase City-wide renewable energy use, purchase, and generation
 - Communicate opportunities and information about clean, renewable energy to the public
 - Use solar mapping tools to identify potential solar resources and share mapping tools with residents and businesses
 - Support programs that enable community members to participate in community renewable energy projects
 - Create City-wide clean energy and emissions goals
- Encourage new development, redevelopment, and retrofit projects to add renewable energy capacity or infrastructure
 - Review and revise renewable energy standards or ordinances to remove barriers and encourage appropriate renewable energy installations
 - Create a transparent and consistent permit process for residents and businesses to install renewable energy systems
 - Partner with other public entities, utility companies, and private sector to provide clean energy infrastructure and accomplish energy goals
 - Require renewable energy systems or its supporting infrastructure in projects that receive City financial support
- Continue to incorporate renewable energy or its supporting infrastructure into City projects and operations

- o Look for programs and opportunities to fund construction of renewable energy projects on City property
- o Evaluate new energy technologies as they become available and incorporate into City projects and operations where feasible

Goal 2: Improve Energy Efficiency in Buildings, Lighting and Infrastructure

Energy efficiency improvements will decrease costs and lower energy-related emissions over time

Objectives

- Provide education and communication to residents and businesses about opportunities to decrease energy costs and lower energy-related emissions
 - o Connect property owners with assistance providers who offer energy audits and assistance
 - o Partner with non-profit organizations, local utilities and/or the state energy office to facilitate energy savings opportunities for low income residents
 - o Create or participate in outreach programs to promote energy conservation
- Integrate energy efficiency best practices information and assistance into building permit process
 - o Integrate energy efficiency standards and sustainable design features into project review and approval processes
 - o Adopt a voluntary sustainable/green building code for new development
 - o Provide incentives to residential and commercial property owners who add energy efficiency improvements
 - o Require higher efficiency standards and/or renewable energy generation or its infrastructure for projects that receive City financial support
- Increase the energy efficiency of all public buildings, campuses, infrastructure, and operations
 - o Make no/low cost lighting and operational changes to reduce energy costs
 - o Use an integrated approach when designing new City buildings and infrastructure (heating, cooling, water, etc.)
 - o Partner with other public entities, utility companies, and private sector to maximize energy efficiencies

Goal 3: Promote Waste Reduction, Recycling and Composting

Comprehensive management of waste will lower energy costs and reduce energy-related emissions over time

Objectives

- Improve efficiencies in solid waste removal
 - o Meet or exceed goals included in the Hennepin County Solid Waste Management Master Plan
 - o Review the frequency of waste and recycling pickups
 - o Explore the potential of implementing organized collection systems, including residential and business/institutional source separated organics collection

- Research options for improving the management of yard waste, woody brush and soil
 - Take advantage of opportunities to expand the recycling program or recyclable products (i.e. organics, textiles, electronic waste, certain plastics, other)
- Motivate residents, businesses, and institutions to reduce, reuse and recycle waste
 - Continue to partner with other public entities to reduce costs and provide improved services
 - Create goals for solid waste reduction, recycling, and organics/composting for City operations as well as residential and commercial sectors
 - Provide education and incentives to residents and businesses to reduce waste and recycle
 - Require that City events are zero waste events
 - Communicate with residents about events, like Fix-it Clinics, that are hosted by the County and other entities
 - Increase accessibility to composting/organics recycling

Goal 4: Protect and Enhance the Natural Environment

Protect the natural environment and enhance it to mitigate weather and climate-related impacts

Objectives

- Preserve open spaces and natural areas and seek to expand these areas as opportunities arise
 - Support the goals and policies of the City's Natural Resources Management Plan and reference this plan when reviewing development proposals
 - Utilize an adaptive management approach to protection, preservation, and enhancement of natural areas
 - Encourage, through education or incentives, development that saves or increases green spaces and protects areas with high ecological diversity
 - Identify areas with steep slope vulnerabilities and consider policies regarding protection
 - Periodically survey conditions in natural areas and gather data on the effectiveness of management techniques
 - Maintain and develop natural corridors to foster ecosystem continuity and provide connections to parks and open space
 - Partner with public and private entities to enhance the natural environment and build resilience
- Increase the amount of native vegetation cover including pollinator habitat
 - Reduce the use of chemicals, such as fertilizers, herbicides, and pesticides, that have potentially negative impacts on natural resources and human health
 - Establish land management standards and practices that lower inputs and maximize resilience (i.e. utilize low maintenance turf, replace turf with native and resilient species wherever possible)
 - Provide information and assistance to residents on natural landscaping techniques, including rain garden installation and creation of pollinator habitats
- Preserve and enhance wetlands, streams, lakes and floodplain areas

- Support the goals and policies of the City’s Water Resources Plan and the management plans of the Bassett Creek Watershed Management Commission and the Minnehaha Watershed District
 - Update the City’s shoreland management ordinance consistent with state requirements
 - Maintain and improve natural infrastructure assets such as streambanks, wetlands, ponds, and rain gardens
 - Encourage the preservation or establishment of native and natural vegetation near shorelands
 - Continue to review development proposals for conformance with ordinances regarding water quality, wetland protection and mitigation, and floodplain and shoreland protection
- Establish a diverse urban forest and adequate tree canopy coverage
 - Continue to take a proactive approach in efforts to identify and treat diseased and insect-infested trees in a timely manner through implementation of the City’s shade tree disease program
 - Increase tree canopy in areas with low coverage, high heat vulnerability (non-residential areas, high impervious surface coverage), and areas exposed to more vehicle exhaust
 - Increase the ratio of tree planting to tree removal
 - Work with private property owners and developers to encourage reforestation and enforce the current tree and landscape ordinance
- Control existing and emerging invasive plant species, pests and diseases
 - Continue to monitor and prepare for invasive species and pathogens that could significantly damage the City’s vegetation and water resources
 - Plan and budget for targeted invasive species removal and, where appropriate, native species replacement
 - Provide education on invasive species removal and work with homeowners to limit the spread of invasive species from private properties
- Encourage the construction of green infrastructure to enhance water quality and reduce stormwater runoff rates, volumes, and nutrient loads
 - Encourage businesses and residents to retain stormwater runoff onsite and to reuse it whenever feasible
 - Conduct education and outreach on the effects of nutrient loads and contaminants in stormwater on local water quality
 - Integrate multi-benefit green infrastructure into City capital improvement projects
 - Review and update lawn maintenance ordinance to encourage native, low water-use plantings
- Provide education and outreach on maintaining and protecting natural resources
 - Expand environmental education programs with schools and in the community
 - Involve community members in hands-on land restoration and stewardship projects
 - Provide information to community members about water use and conservation
 - Support community efforts to improve the natural environment

Goal 5: Plan for Resilient and Sustainable Infrastructure

Ensure the stability and reliability of constructed systems through long-term planning and consideration of weather and climate trends

Objectives

- Protect and maintain constructed systems that provide critical services
 - Support the goals and policies in the Water Resources and Transportation Chapters of the Comprehensive Plan
 - Assess public buildings and sites for vulnerabilities to extreme weather, and make improvements to reduce or prevent damage and sustain function
 - Improve the reliability of back-up energy for critical infrastructure
 - Continue to reduce the inflow and infiltration of clear water into sanitary sewer system
 - Review operations and maintenance procedures and practices in response to climate impacts
 - Continue to explore and incorporate new and emerging technologies to construct, rehabilitate, maintain and manage public assets and infrastructure in an efficient, cost effective manner
- Ensure new buildings and infrastructure are built to be resilient
 - Integrate multi-benefit green infrastructure into public capital projects
 - Consider emerging climate patterns when designing stormwater infrastructure
 - Design infrastructure to minimize environmental and public health impacts
 - Develop strategies to fund infrastructure renewal
 - Include life cycle costs (e.g. operations and maintenance, resource consumption, disposal) when planning projects and selecting construction materials
 - Reduce impervious surface area where possible and use lighter colored pavements and building materials to mitigate urban heat island effect
- Minimize the excavation of public streets and disruption to public services
 - Work with public and private partners to plan and schedule infrastructure projects to reduce disruptions and decrease costs
 - Encourage efficient use of rights-of-way including joint trench construction and construction of duct banks and conduits for future expansion of facilities within public right-of-way, where feasible
 - Continue to utilize trenchless technologies to rehabilitate underground infrastructure
- Support well-planned improvements to the private utility and communications networks that provide efficiency, security and needed redundancy
 - Work with the electric utility to identify opportunities to enhance the electric grid to be more resilient to power outages
 - Support improvements to the natural gas network, electric grid, and smart grid technologies
 - Engage natural gas and electric utility in discussions to include City's energy and resilience goals in franchise agreements
 - Support microgrids (e.g. combined heat and power, distributed energy of wind and solar, and district energy) that provide efficiency, security, and back-up power

- Lower City-wide transportation-related emissions
 - Improve fuel efficiency of City vehicle fleet
 - Encourage alternative fuel/charging stations or supporting infrastructure at commercial and office sites and parking ramps
 - Install alternative fuel/charging stations or supporting infrastructure for low emissions vehicles at City campuses and public parking areas
 - Plan, design and maintain infrastructure to accommodate emerging vehicle technology (connected and automated vehicles)

Goal 6: Increase Community Resilience and Preparedness

Enable communities to withstand and adapt to weather and climate-related impacts

Objectives

- Prepare to maintain public health and safety during extreme weather and climate related events
 - Coordinate with regional partners to ensure basic needs of all residents are met during an emergency
 - Continue to routinely review and participate in updating the County Hazard Mitigation Plan
 - Identify staff responsible for City preparedness, emergency response, and recovery efforts for each type of event
 - Designate appropriate facilities that will be made available to the public as community safe shelters and arrange for adequate provisions and backup power
- Ensure all residents are prepared to respond to emergency situations
 - Continue to participate in FEMA's National Flood Insurance Program Community Rating System to maintain a higher level of floodplain management in exchange for lower flood insurance premiums for eligible properties
 - Provide education to residents on what actions they can take to reduce their risk to extreme weather and climate related events
 - Coordinate with emergency dispatch and first responders to address the specific concerns of residents who may be more vulnerable in each type of event
 - Make emergency communications available in multiple languages and platforms
 - Prepare to communicate when power and communications networks are down
- Promote social connectedness
 - Strengthen relationships with community organizations to support the most vulnerable residents
 - Facilitate relationship building between members of the community across age, ethnicity, income, and/or other demographic differences
 - Support and promote opportunities for public engagement in sustainability efforts
 - Promote and report on the City's sustainability projects and initiatives
- Promote economic resilience to acute and chronic stressors
 - Explore opportunities to strengthen and diversify the local economy
 - Foster small business and green business development

- Develop a post-disaster impact assessment in partnership with the local business community
 - Promote low-income weatherization and heating assistance programs through City communication mediums
- Prepare for and respond to climate related public health impacts
 - Conduct education and outreach on the health impacts of air pollution, longer allergy seasons, extreme heat, and vector-borne disease
 - Review ordinances with respect to wood burning and update as needed to protect and maintain air quality
 - Make air conditioned public facilities available during poor air quality days and high heat days
 - Promote local food production, sales, and consumption and review City Codes to remove barriers for urban farming (i.e. vertical farms, community gardens)
 - Continue to work with regional partners to connect and expand options for multi-modal transportation (see Transportation Chapter)

Implementation Strategies

Promote and Develop Clean, Renewable Energy

Increasing renewable energy generation capacity in the City would reduce greenhouse gas emissions and increase the City's resilience to energy supply and price shocks. The City can take several actions to promote clean, renewable energy, from communicating with residents to developing plans and policies. Creating a climate or energy action plan would allow the City to assess how energy is consumed, identify usage patterns, and understand local clean energy resources. It would also establish desired conditions based on current usage and opportunities, allowing the City to set specific goals for each energy type and sector.

Implementation Strategies:

- **Participate in existing energy or climate technical assistance program.** Energy or action planning programs available to assist cities in 2017 include:
 - Partners in Energy (PiE) is an energy action and technical assistance program offered by Xcel Energy. Applications open every six months (GreenStep Cities [Best Practices 2.1, 25.2](#)).
 - The Local Government Planning for Energy Project (LoGoPEP) provides communities with planning tools and actual results to measure progress toward their goals.
 - The Clean Energy Resource Teams (CERTs) are a statewide partnership to connect Minnesota communities with the resources they need to identify and implement community-based clean energy projects.
- **Include information on renewable energy opportunities in City communications.** Post information about green power purchasing programs or incentives for property owners to install renewable energy systems on City website and social media outlets. Include information in multiple languages (GreenStep Cities [Best Practice 26.2](#)).
- **Complete a city operations greenhouse gas inventory.** A City operations greenhouse gas inventory assesses energy used in City operations. This includes electricity and natural gas

used in buildings and facilities, streetlights, water delivery services, wastewater systems, municipal solid waste, and transportation fuels used by City fleet vehicles (GreenStep Cities [Best Practice 6.5](#)).

- **Perform a wind and solar ordinance review and update on a regular basis.** Review language in wind and solar ordinance and update to remove barriers, protect solar access and development, and align better with changing technologies. Encourage or require owners of solar energy systems to obtain solar access easements (GreenStep Cities [Best Practices 26.1, 26.7](#)).
- **Complete a City-wide climate action plan.** A community-wide climate action plan inventories City-wide greenhouse gas emissions, sets goals to reduce emissions, and identifies strategies to achieve those goals (GreenStep Cities [Best Practice 6.5](#)).
- **Work with private sector partners.** Identify opportunities and engage in community projects that increase renewable energy and allow community members to participate (GreenStep Cities [Best Practice 26.4](#)).

Improve Energy Efficiency in Buildings, Lighting, and Infrastructure

The City's large stock of existing buildings represents a significant opportunity to make efficiency improvements and lower greenhouse gas emissions. Ensuring that new buildings are built to be sustainable "locks in" reduced operating costs and lower energy-related emissions for building occupants and owners for years to come.

Implementation Strategies:

- **Incorporate efficiency upgrades into the capital improvement program (CIP) and City budgets.** Invest in larger efficiency projects through performance contracting (such as the Guaranteed Energy Savings Program from the Minnesota Department of Commerce) or other funding or through smaller retro-commissioning/retrofit projects. Incorporate strategic and comprehensive efficiency upgrades into CIP and operating budgets (GreenStep Cities [Best Practices 1.2, 1.3](#)).
- **Create a green building guide.** Create a guide to constructing efficient, sustainable buildings that includes references to local resources (such as certified green builders) and make available on City website. Direct all building permit applicants to this resource to encourage the construction of more sustainable, energy-efficient buildings (GreenStep Cities [Best Practice 2.2](#)).
- **Adopt language to govern sustainable private renovation and development projects.** Regulate energy efficiency of new City-owned buildings and projects that receive City financial support, and consider regulating energy efficiency of private buildings that receive City regulatory approval (i.e. PUDs) (GreenStep Cities [Best Practice 2.7](#)). Require energy use disclosure for commercial/multifamily buildings over a certain size (GreenStep Cities [Best Practice 2.3](#)).
- **Incentivize enhanced water and energy efficiency on private properties.** Offer incentives such as lowered building permit fees, tax breaks, and expedited review to private residential and commercial property owners who make efficiency improvement and/or incorporate efficiency above and beyond current requirements into new projects (GreenStep Cities [Best Practices 2.6, 3.4](#)).

Promote Waste Reduction, Recycling, and Composting

There are many benefits that result from solid waste reduction, including but not limited to reduced county and state fees, reduced greenhouse gas emissions, and economic benefits from job creation and tax revenue.

Implementation Strategies:

- **Adopt waste reduction goals for internal City operations.** Measure waste generated by City operations, develop goals, implement actions to reduce waste, and report success in terms of waste diverted and money saved. (GreenStep Cities [Best Practice 22.2](#), [Step 4](#) metric 13.6).
- **Complete a community-wide zero-waste study.** A community-wide study will help the City understand the challenges, barriers, and costs associated with achieving a zero-waste future.
- **Adopt a waste reduction plan.** Engage community members including residents and businesses, utilize report recommendations, and identify best practices to develop and adopt a waste reduction plan.
- **Host zero-waste City events.** Use City events as an opportunity to showcase strategies for reducing waste. Distribute educational materials about holding zero-waste events to residents and community organizations (GreenStep Cities [Best Practice 15.7](#)).

Protect and Enhance the Natural Environment

Land-use decisions and ecological changes can significantly impact the health of urban forests and natural environments. Protecting and enhancing these assets has enormous benefits, including improving air and water quality, slowing and reducing stormwater runoff, providing habitat, reducing urban heat island effect, and providing aesthetic value. There are opportunities to soften the built environment and enhance the resilience of the urban forest and natural systems to withstand damage from extreme storm events or invasive pests.

Implementation Strategies:

- **Inventory and assess vegetation and green space.** Complete an inventory and assessment of the current canopy coverage, future impact of emerald ash borer, native planting areas, open spaces, and opportunities to replace impervious surfaces and areas of high heat vulnerability with site appropriate vegetative coverage.
- **Complete neighborhood-specific engagement process.** Involve residents and businesses located in areas identified as a concern for stormwater management, urban heat island effect, or invasive species in a process that allows them to influence how the City plans for and manages these areas in the face of climate variation.
- **Review and update City Code.** Review language in codes and policies related to tree and vegetation management to reflect the goals, objectives, and policies of this plan.
- **Update Natural Resource Management Plan to support resilience.** Incorporate the goals, objectives, and policies of this plan regarding the resilience of natural resources into the Natural Resource Management Plan.
- **Implement updated Natural Resource Management Plan.** Implement the plan, monitor progress, and report on success. Ensure the implementation plan is adaptive, flexible, and adequately funded to prepare for unexpected weather events or invasive pests.

- **Create and implement a Buckthorn Management Program.** Using information gained from the inventory of vegetation and green space, identify high priority areas and long-term management plans to remove buckthorn from the City.
- **Budget for adequate urban canopy coverage.** Set aside funds for increased tree planting after unexpected disturbances (disease, storm damage, etc.) that resulted in tree loss.
- **Increase native species planted along streets and in publicly owned parking lots.** Plant native species in impervious surface areas to enhance stormwater management and provide habitat to pollinators and other wildlife.
- **Create and fund an annual City-wide restoration event.** Engage community members in restoration of City's natural areas (replanting shoreland buffers, restoring prairie, buckthorn and garlic mustard removal, etc.) by hosting and promoting an annual event open to all community members (GreenStep Cities [Best Practice 18.8](#)).

Plan for Resilient and Sustainable Infrastructure

Resilient infrastructure includes public buildings and constructed facilities (roads, storm sewer, sanitary sewer, water mains, etc.) that are built to sustain their functions during extreme weather events or other disruptions.

Increasing the resilience of City infrastructure will require a hybrid approach where green infrastructure is integrated with fortified gray infrastructure. Green infrastructure is planned and managed natural and semi-natural systems that are designed to support the function of traditional infrastructure. Green infrastructure imitates natural ecological systems, managing stormwater, providing shade, filtering air, and sequestering carbon. Examples include rain gardens, shoreline stabilization, tree planting, vegetated streetscapes, and reconstruction of wetlands. Gray infrastructure includes physical assets like streets, catch basins, and stormwater pipes. These traditional systems are necessary to move stormwater away from the built environment to avoid damage from flooding. However, many sections of the system are aged, maintenance is expensive, and they may be inadequate for future weather events.

A combination of green infrastructure and enhanced gray infrastructure will help Golden Valley adapt to changing weather events. Implementation strategies include:

Implementation Strategies:

- **Incorporate resilient infrastructure into the capital improvement plan (CIP).** Funding for major infrastructure enhancement projects need to be strategic and opportunistic rather than come from routine street improvement projects. This may include supplements from other CIP sources, redevelopment opportunities, or grants and partnerships. Incorporating resilience into the CIP allows the City to identify improvement in the near-term and prepare it for future events (GreenStep Cities [Best Practice 29.2](#)).
- **Research ways to lower emissions related to City fleet.** Research the purchase of low emissions vehicles for City operations and make appropriate recommendations to the City Council.
- **Install alternative fuel/charging stations on a City campus.** Make low carbon fuel or electricity available on City property for community-members with low emissions/electric vehicles.

- **Create appropriate green infrastructure design standards.** Use the City’s regulatory authority to implement green infrastructure design standards for new construction and substantial renovations. Expand Minimal Impact Design Standard ordinance to include green infrastructure projects (GreenStep Cities [Best Practice 17.5](#)).
- **Incentivize enhanced stormwater management on private properties.** Create a stormwater credit program that provides incentives to implement effective stormwater management practices that improve stormwater quality and/or reduces runoff quantity (GreenStep Cities [Best Practice 17.4](#)).

Increase Community Resilience and Preparedness

Enhanced education and communication can prepare residents and businesses for abrupt changes in weather as well as prolonged environmental stresses. Engaging community members in resilience action builds social cohesion and strengthens the City’s ability to withstand unexpected disruptions.

Implementation strategies:

- **Host community workshops on resilience.** Host periodic workshops for residents to provide instruction on resilient best practices that can be implemented at home. Include stormwater best management practices, emergency checklists, City communication protocols, and resilience resources. (GreenStep Cities [Best Practice 24.4](#))
- **Include information on community resilience in City communications.** Post resilience preparation materials on City website and social media outlets. Include tips and best practices in City newsletter and other communication outlets. Create and distribute an annual publication focused specifically on sustainability and resilience best practices. Make information available in multiple languages (GreenStep Cities [Best Practice 29.1](#)).
- **Develop a volunteer community preparedness program.** Work with community leaders from every neighborhood to help residents prepare for extreme weather and create plans for safe evacuation in the event of an emergency. Once established, this group can conduct localized outreach and education to the public, encourage volunteerism, and coordinate within their neighborhoods to respond in the event of a disaster.
- **Complete a ready and resilient guide.** Several other cities in the metro area have created Ready and Resilient guides. The development of these guides involved research into the impact climate variation will have on the region and in-depth community engagement. These guides are designed to educate residents about what they can expect from a changing climate and how to best prepare for it (GreenStep Cities [Best Practice 29.4](#)).

Table 1. Summary of Implementation Strategies

Strategy	Estimated Cost	Timeframe	Ongoing
Promote and Develop Clean, Renewable Energy			
Participate in existing energy or climate technical assistance program	\$10,000	0-5 years	

Include information on renewable energy opportunities in City communications	\$	0-5 years	X
Complete a City operations greenhouse gas inventory	\$12,000	5-10 years	
Perform a solar ordinance review/update on a regular basis	\$	5-10 years	X
Work with private sector partners to identify opportunities	\$	0-5 years	X
Complete a City-wide climate action plan	\$30,000	5-10 years	
Improve Energy Efficiency in Buildings, Lighting, and Infrastructure			
Incorporate efficiency upgrades into the capital improvement program (CIP) and City budgets	\$\$\$	0-5 years	X
Create a green building guide	\$	5-10 years	
Adopt language to govern sustainable private development and renovation projects	\$\$	10-20 years	
Incentivize enhanced water and energy efficiency on private properties	\$\$	5-10 years	X
Promote Waste Reduction, Recycling, and Composting			
Adopt waste reduction goals for internal City operations	\$\$	0-5 years	
Complete a community-wide zero-waste study	\$15,000	5-10 years	
Adopt a waste reduction plan	\$15,000	5-10 years	
Host zero-waste City events	\$	0-5 years	X
Protect and Enhance the Natural Environment			
Inventory and assess vegetation and green space	\$10,000	0-5 years	
Complete neighborhood-specific engagement process	\$	0-5 years	X
Review and Update City Code	\$	0-5 years	X
Update Natural Resource Management Plan to support resilience	\$	5-10 years	
Implement updated Natural Resource Management Plan	\$\$\$	10-20 years	X
Create and implement a Buckthorn Management Program	\$	0-5 years	X
Budget for adequate urban canopy coverage	\$\$	0-5 years	X
Increase native species planted along streets and in publicly owned parking lots	\$	5-10 years	X
Create and fund annual City-wide restoration event	\$\$	5-10 years	X
Plan for Resilient and Sustainable Infrastructure			
Incorporate resilient infrastructure into the capital improvement plan (CIP)	\$\$\$	0-5 years	X
Research strategies to lower emissions related to City fleet	\$	0-5 years	

Install alternative fuel/charging stations on a City campus	\$\$	5-10 years	
Create appropriate green infrastructure design standards	\$12,000	5-10 years	
Incentivize enhanced stormwater management on private properties	\$	5-10 years	X
Increase Community Resilience and Preparedness			
Host community workshops on resilience	\$5,000/year	0-5 years	X
Include information on community resilience in City communications	\$1,000/year	0-5 years	X
Create annual sustainability and resilience focused publication	\$	5-10 years	X
Develop a volunteer community preparedness program	\$	10-20 years	
Complete a ready and resilient guide	\$3,000	0-5 years	

Conclusion and Next Steps

The City of Golden Valley has been a leader in environmental stewardship for many years. It is now looking to expand its efforts to be more sustainable and resilient through its Comprehensive Plan Update. Comprehensive plans are the primary policy documents for cities. They guide regulations, investments, and City action. Goals, objectives, policies, and implementation strategies support the community's vision by identifying interim objectives and actions to help achieve desired future conditions.

Cities located within the jurisdiction of the Metropolitan Council are required to complete a Comprehensive Plan every ten years that is in line with the Council's land use policy. In its land use policy and in the Local Planning Handbook, the Council encourages communities to plan for resilience in their Plan updates. In consideration of its forthcoming Comprehensive Plan Update, Golden Valley has chosen to include resilience and sustainability elements.

This document was developed to guide the City's decision-making as it continues to develop its Comprehensive Plan Update. The goals, objectives, policies, and strategies were developed with the support of City staff, and the input of community members. This document will serve as the foundation from which the City can implement policies, programs, and actions to be better prepared for an uncertain future. The recommendations included in this document are intended for consideration as the City updates its Comprehensive Plan.

Appendix A

Resilience Survey: Summary and Key Findings

A survey was developed to better understand the City's strengths and weaknesses with respect to environmental, economic, and social stresses. This voluntary survey was made available to

the community through the City's newsletter, website, and Facebook page. Overall 124 people responded, of which 120 live in the City, 21 work in the City, and 3 spend time in the City but live elsewhere (respondents could check all that applied).

PERCEPTION OF IMPACTS AND RISKS

Q: “Select which climate-related impacts you think are likely to affect Golden Valley.”

A: The top 5 selected from a list of 7 (respondents could select more than 1) were:

1. Power outages from extreme weather events (70 votes or 56%).
2. Increased road maintenance (pothole repair, snow and ice control) due to increase in winter precipitation and freeze-thaw cycles (62 or 50%).
3. Increased risk of flooding and diminished surface water quality from heavier rainfalls (54 or 53%).
4. Invasive species and habitat changes (52 or 42%).
5. Diminished air quality (46 or 37%).

Q: “Rank the importance of non-climate vulnerabilities that could affect Golden Valley.”

A: Respondents indicated that they are most concerned about aging and deteriorating infrastructure. With 85 people (70%) who indicated that aging infrastructure is either “most important” or “important,” it stands out that this is an area of concern. Respondents were equally concerned about lack of access to healthy food (59 votes or 49%) and lack of social connectedness (56 votes or 46%) indicating both areas are either “most important” or “important.” Economic turbulence or lack of job/housing opportunities was supported with 42 votes (35%), indicating it is an important vulnerability for the City.

LEVEL OF CONCERN

Q: “Is Golden Valley adequately addressing its vulnerability to climate and non-climate disruptions?”

A: Interestingly, 54 (45%) respondents indicated that they were unsure if the City is adequately addressing climate change. Yet, 47 (39%) agreed and 20 (16%) disagreed to some extent. This might suggest that the City should pay attention to communication strategies in order to inform citizens about its efforts to address resilience and sustainability.

Q: “The City is well prepared to respond to the potential effects of extreme weather and climate-related events.”

A: Again, 51 people (42%) indicated that they were unsure if the City is well-prepared, while 43 agreed (36%) and 27 (22%) disagreed to some extent.

ASSESSMENT OF CITY PRACTICES

Q: “Indicate your satisfaction with the City’s natural infrastructure (i.e. trees, native landscaping).”

A: Respondents were mostly satisfied with the maintenance of urban forests and planting of natural landscaping (65 and 56 satisfied votes respectively). For the installation/maintenance of rain gardens and the management of invasive species residents were mostly neutral (62 and 56 neutral votes respectively). Each of the four natural infrastructure areas received between 15 and 26 votes for dissatisfaction.

Suggestions to improve natural landscaping include: improving stormwater management for better water quality; providing training on rain garden construction; replacing trees more aggressively; rebuilding wetlands and wildlife corridors; taking a targeted and aggressive approach to invasive species removal; and focusing efforts on constructing pollinator friendly habitat.

Q: “Indicate your satisfaction with the City’s built infrastructure (i.e. streets and waterlines).”

A: Overall most respondents indicated they were satisfied with the four built infrastructure areas: maintenance of roads, maintenance of stormwater sewers, maintenance of drinking water infrastructure, and maintenance of wastewater infrastructure. Over 60% of respondents said they were either “very satisfied” or “satisfied” with these areas. Dissatisfaction was very low (less than 6% in all but one category). The highest level of dissatisfaction (15%) was in the maintenance of roads area.

Although in this section respondents indicated they are mostly satisfied with maintenance of built infrastructure, it is important to note that in the first section of the survey respondents said that increased road maintenance and aging infrastructure is of high concern when thinking about the potential impacts from climate-related changes. Therefore, the importance of this area should not be overlooked.

Q: “Indicate your satisfaction with the City’s social and economic well-being.”

A: There was a high number of neutral votes across the five areas. In particular, energy bill-pay assistance, employment related services, and economic competitiveness received 87, 79, and 59 neutral votes respectively. Residents were most satisfied with weather-related emergency communication systems and neighborhood connectedness, with 69 and 60 satisfied votes respectively.

To foster social and economic well-being, respondents suggested the City could facilitate relationship building between members of the community across age and ethnicity, such as fostering connections between elders and youth in the community. In addition, one respondent suggested promoting more economic diversity by making it easier for small businesses to succeed. Others recommend keeping taxes low for residents, increasing density at hub locations, expanding opportunities to walk to stores, and attracting more/smaller grocery stores.

DETERMINING CITY GOALS AND PRIORITIES

Q: “Indicate which goals and priorities would best help the City improve sustainability efforts.”

A: After combining the number of respondents who indicated that a goal was either “very important” or “important,” the top 5 goals of 9 were:

1. Increase native landscaping for pollinator habitat (94)
2. Increase walking and biking infrastructure (86)
3. Increase urban tree canopy coverage (83)
4. Increase surface water quality (82)
5. Increase water conservation (79)

Increasing renewable energy for public buildings also had strong support from the public (78 supporting votes) as did increasing renewable energy for private buildings (68 supporting votes). The goals with the least support were increasing infrastructure for electric vehicles and purchasing electric vehicles for City fleet.

Other goals that respondents identified include: exploring curbside composting; shifting to a single trash hauler; prioritizing invasive species removal; partnering with area businesses; limiting pesticide and chemical use throughout the City; and promoting bike sharing.

HOW CAN THE CITY SUPPORT YOUR EFFORTS?

Q: “Which sustainability topic areas have you taken action on?”

A: Just over 50% of respondents indicated they have participated in planting natural landscaping (including pollinator habitat) (61), and have implemented renewable energy and/or energy efficiency actions (58). Nearly 45% of respondents indicated they have participated or volunteered in community events (49), have conserved water in some way (49), and have taken advantage of alternative transportation (48). 30% (33) said they have a home emergency preparedness checklist.

Other examples of actions residents have taken include carpooling, utilizing home smart technology, diverting rainwater from stormwater system, and reducing household waste.

Q: “I feel the City offers the resources I need to live a sustainable lifestyle.”

A: About half of respondents (54 or 54%) said that they agree with this statement to some extent, a quarter said they disagree to some extent (23%), and a quarter were unsure (24%).

Q: “Which topic areas are you most interested in receiving assistance or information from the City?”

A: Respondents are most interested in receiving assistance or information about natural landscaping (51 most interested votes or 46%). Closely following was interest in alternative transportation (33 or 31%), renewable energy (33 or 31%), programs to increase community connectedness (28 or 26%), water conservation practices (24 or 22%), and emergency preparedness checklist (19 or 43%).

Some respondents said they would like to see expanded public transportation or car sharing options to support 1-car households and expanded waste and recycling programs to include more materials.

Q: “What can the City do to further support a more resilient and sustainable Golden Valley?”

A: There were a whole range of ideas on what Golden Valley can do to further support sustainability in the community. Supporting renewable energy development was mentioned several times, especially through reducing the costs of renewables. In addition, energy efficiency in public buildings and homes was of interest to respondents.

Second, there were numerous comments related to local business development. Several people said they would like more grocery stores and smaller grocery stores that could increase food access to residents, especially by way of walking or public transit. And, creating a “downtown” character would help in attracting and fostering a small business community.

Third, respondents commented about walking and biking options. There were people both in support of more biking and walking infrastructure as well as those who are opposed and concerned about shared road space between cars and bikes. A number of people said they would like to be able to walk to more places around the City.

Composting and curbside pickup is something that residents would like more information about and access to. In addition, some residents mentioned a desire for the City to explore organized recycling and waste pick-up to reduce wear and tear on the roads.

There were several comments related to what the City should do around water quality and conservation. Examples include lawn watering limits, reduce lawn chemical use, train residents on rain garden installation, and improve infrastructure to deal with stormwater and flooding.

Lastly, there were general comments about strengthening City ordinances to reflect sustainable best practices; expanding relationships with organizations and area businesses to achieve goals; and increasing opportunities for the community to get involved through volunteering. There were also a handful of comments to keep or lower taxes for residents in the pursuit of new initiatives and stay true to the suburban feel of Golden Valley. It should be noted that because of the diversity of sustainability-related interests from the community, it is important that the City consider efforts that span multiple topic areas and reach a broad range of citizens throughout the process.

Appendix B

Summary of Focus Groups

Supporting Vulnerable Populations in Golden Valley

Focus Group Summary

March 1st, 2017
3:00-4:30pm
Golden Valley City Hall
7800 Golden Valley Road
Golden Valley, Minnesota

Problem Statement: Climate-related events have the potential to disproportionately impact vulnerable residents, including residents who are low-income, over 65 and living alone, or those with limited mobility.

Goal: The City of Golden Valley sought to better understand: 1) the concerns and challenges around impacts on vulnerable residents as a result of extreme weather events, and 2) recommendations for increasing the resilience for those residents and the services they rely on.

Attendees: City staff sent invitations to representatives from local organizations that work to support low-income and/or senior residents. Attendees included the following individuals:

- Jeanne Tramel Rasmussen, Senior Community Services
- Lee Friedman, Jewish Family and Community Services
- Brian Erickson, City of Golden Valley
- Eric Eckman, City of Golden Valley (observer)
- Hannah Garry, City of Golden Valley (observer)
- Trevor Drake, Great Plains Institute (facilitator)

Summary of Process:

Introductions, Agenda Review, Presentation: Group members introduced themselves and then the facilitator explained the process and goals. Erick Eckman presented the vulnerability assessment as it relates to vulnerable populations in Golden Valley.

Inquiry into Current Situation. Participants wrote down any questions that came to mind in response to the presentation. They were then asked to reword their questions to be open-ended (e.g. what/where/how/why rather than yes/no) and categorize the questions into themes.

Open Discussion of Concerns. Reflecting on their questions and themes, participants cited what they thought were key concerns. The facilitator wrote down their responses on butcher paper and categorized them into themes:

Focus Group Outcomes:

Theme 1: Communication and Outreach

As a key resource for its residents and businesses, what can the City do to improve its communication abilities to support resilience efforts, both to address long-term issues such as high energy bills for low-income populations and short-term responses to climate-related emergencies?

Questions and concerns raised by focus group participants included:

- How would the City communicate with vulnerable populations? Both in an ongoing way and for emergency communications?
 - o How might the City need to translate its messages into different languages?
 - o How can the City utilize existing networks, such as schools, to reach key audiences?
 - o For some seniors, it may be important to communicate with their caregivers.
- How and where can the City reach transient populations? And how can the City take stock of the need to do so?
- How can we overcome barriers around social connectedness [to enable and empower people to help each other]? (e.g. people can now be more connected virtually to their networks through social media, but less connected to the neighbors on their own street)

Theme 2: Preparedness and Response

Whether providing direct services or serving as a hub for coordinating services from other organizations, what can the City do to ensure its vulnerable populations have access to resources and services that can reduce the impacts of climate-related shocks and stressors?

Questions and concerns raised by focus group participants included:

- What actions is the City already taking, or already planning to take, to address both the causes of climate events and the impacts on vulnerable populations?
- How can the City address housing maintenance and repair costs for vulnerable populations?
- How can the City help to coordinate between organizations that provide services to vulnerable populations?
- Coordination between resilience efforts and emergency/disaster response efforts.
- Access to air conditioning for renters may require a conversation with landlords.
- What kind of relationships does the City have with disaster relief organizations and other local governments that provide or coordinate those services?
- How do we ensure people have access to critical services including food, community venues, medicine, and daily care?
- Where is, or where should be, the “supply cache” for disaster relief?
- How is the City utilizing its Community Emergency Response Team (CERT)?
- How well are first responders trained to work with individuals with dementia or mental health needs? How well are they trained to work with individuals with disabilities?

Theme 3: Prioritizing Resources

How does the City’s work to address the needs of vulnerable populations for climate resilience purposes relate to the City’s efforts to address those needs in general?

Questions and concerns raised by focus group participants included:

- What actions by the City would be justified for addressing the needs of vulnerable populations, given limited resources? For example:
 - o What is the highest priority for investing in vulnerable populations?
 - o How does investment in resilience fit with the City's overall priorities for vulnerable populations?
 - o What is the relative value of investing in certain concerns over others?
 - o How does the City balance its obligations to different audiences?
- How addressing resilience-specific needs of vulnerable populations fits within the broader context of providing services for those populations.

Solutions and Recommendations. Participants offered recommendations to address the facts and concerns and achieve moderate successes (i.e. what's achievable in the next 10 years). The facilitator wrote down responses to record outcomes on a "success spectrum."

Table 1 Success Spectrum

Themes	Moderate Success	Epic Success
Communication and Outreach	Most people can be reached in response to events: • Translate into multiple languages • Broad portfolio of communication channels • Example: Amber Alert	Everybody can be reached and understands what to do.
Preparedness and Response	City has some way to coordinate with other organizations • Example: Have Memorandums of Understanding already in place City has physical assets needed to respond to events: • Supply cache • Food, water, medicine • Emergency shelter City is able to address the needs of multiple audiences: • Residents • Non-resident workers/students • Individuals with limited mobility • Individuals with mental health needs • Individuals with pets City is helping people deal with preparing for weather-related events, as well as the costs of recovering	There is a widespread system for people to look out for each other. • Example: Neighborhood watch program • The least vulnerable could be responsible for the most vulnerable
Prioritizing Resources	City has made clear what its priorities are in the context of this work	

Wrap-up: The facilitator reviewed the key issues identified, definitions of success, and key recommendations. Attendees asked if other stakeholders not present would have the chance to comment and provide feedback. City staff offered to send the notes to additional stakeholders for input.

Sustainability and Resilience Goals in Golden Valley Focus Group Agenda

Focus Group Meeting

City Hall
Golden Valley, Minnesota
March 27, 2017
6:30 - 8:00 PM

Problem Statement: The City has completed a resilience assessment to identify the strengths and weaknesses of its built and natural infrastructure, population vulnerabilities, and potential economic disruptions. This information, along with community feedback, will serve as the basis to set goals for the community to increase its resilience and sustainability.

Focus Group: This is the second of two focus group sessions. The first focused on the resilience needs of vulnerable populations and included representatives from organizations working with those populations. This group includes members of the City's Environmental Commission and will focus more broadly on resilience and sustainability goals, as described below.

Goal: The goal of the focus group is to identify and refine goals that would enhance the resilience and sustainability of the City. The goals will be included in the City's Sustainability and Resilience Plan, and considered for the Comprehensive Plan Update.

Defining Success. Commission Members reviewed problem statements across 5 topic areas and then voted on the topics they felt are the highest priority for defining goals. Members then offered suggestions to define success on each topic, using a "Success Spectrum" like the one below.

Table 2. Success Spectrum

Themes	Failure	Target Success	Epic Success
Clean Energy	• Energy consumption increases in Golden Valley	• City Infrastructure is off the grid • Adopt emissions reduction goals consistent with the State's goal, at a minimum • Local grid is enhanced to be more resilient to disruption • Explore options for renewable energy for heating that don't produce more pollution • Clean energy is number one priority for equipment replacement, non-clean energy sources are not an option (City operations) • City supports educational materials for residents and businesses for energy improvements • City explores new technologies as they become viable	• City and its residents are 100% off the grid • City includes sustainability in its procurement policy
Stormwater Infrastructure	• Flooding that lasts more than 2 days • Not improving the infrastructure to handle rain events • More people are experiencing failures and backups	• All infrastructure and projects meet current design standards • Infrastructure is designed with future climate impacts in mind • Maintenance is planned comprehensively with the whole system in mind • City has completed a comprehensive assessment to identify how to deal with flooding, including new ideas like green roofs, rain gardens, water harvesting and reuse.	• No floods, no backups, no frozen water mains • Property owners capture/use/reuse most rain water that falls on their property; mimic the rainfall amount of historical runoff conditions prior to development.
Waste Reduction	• Any net increase in waste going to landfill/incinerator • Reduction in recycling rates • No change of status quo	• Single garbage hauler • Bi-weekly(?) garbage pickup • Weekly recycling • Curbside composting pickup, including textiles • Mechanism to address E-Waste • Explore opportunities to encourage businesses to reduce waste, AND take action on those opportunities • Identify ways to recycle materials that have been taken off the acceptable list/ are not accepted. • Fix-it clinics IN Golden Valley or nearby, more frequently • Explore opportunities to reduce costs/provide improved services through Joint Power Agreements with other local governments (this applies to other topics beyond waste).	• Zero waste sent to landfill/incinerator

Appendix C

Existing Sustainability Plans, Policies, and Actions

Since the formation of the Environmental Commission in 2000, the City of Golden Valley has demonstrated strong commitment to the environment and sustainability through the many plans, policies, and initiatives carried out. The City continues to be a leader by setting higher goals and taking steps to ensure Golden Valley is a healthy place to live and work for all people both now and in the future. The table below summarizes existing policies, plans, and regulations that support the City's sustainability and resilience efforts.

NATURAL ENVIRONMENT/ BUILT INFRASTRUCTURE	
Susceptibility to Flood Damage	A hydrologic and hydraulic model of the Bassett Creek Watershed shows areas of Golden Valley susceptible to flood damage. Several sections of streets have been identified as being at risk of inundation during the 1% annual chance flood event (100-year flood). Areas identified in the model, including streets, buildings, and homes are prioritized for planning and preparedness efforts to reduce risks of flooding. During an extreme rain event, a flood preparation checklist is followed that requires City staff to monitor critical and at risk infrastructure, including road crossings, bridges, culverts, and streets. The Physical Development Department's "Red Book" provides City staff with the locations and procedural information of critical infrastructure such as sewer systems, stormwater infrastructure and water supply lines. The Red Book is updated on a continuous basis in preparation for emergency events and disasters. As of 2016, the City has restored and stabilized 5.2 miles along stream shorelines and drainageways. During street reconstruction, the Golden Valley Forestry Department follows industry tree and shrub planting best management practices as well as Minnesota Department of Transportation specifications for all projects, which helps reduce the severity of flooding events.
Stormwater Management	The City adopted and uses Minnesota's Minimal Impact Design Standards which contain best practices for clean water performance, infiltrating rainwater, innovative stormwater techniques, and streamlined regulatory programs during development. Stormwater management strategies and infiltration practices have been adopted by ordinance. New development and redevelopment must consider including green stormwater practices such as filtration,

	infiltration, and reuse in order to reduce runoff rates, volume, and phosphorus and sediment loads.
Sump-pumps	To reduce issues associated with water inflow from illegal connections of sump pumps, downspouts, and foundation drains, the City conducted a study from 2000-2004 on sump pumps. Surveyors found 14% of sump pumps to be noncompliant. To address this issue, an ordinance was revised in 2007 which requires sump pumps to be inspected at point of sale, when plumbing permits exceed \$10,000 or when construction occurs.
Street Reconstruction	Golden Valley's Pavement Management Plan guides street reconstruction projects, including sanitary sewer and watermain repair and replacement.
Drinking Water	Drinking water for Golden Valley has been serviced by the Joint Water Commission (JWC) since 1963. The JWC manages the storage and transmission of drinking water purchased from Minneapolis. The JWC owns 3 back-up wells, which could provide drinking water in the event of an emergency. Its services ensure that the City has a secure, reliable, and cost-effective water supply. Water mains are repaired when necessary.
Natural Resources	A natural resource inventory of Golden Valley was conducted in 2003 and updated in 2013. The inventory was used to create a Natural Resource Management Plan in 2015 which identifies strategies for conserving and restoring natural areas. City ordinances were created to preserve high quality natural areas when evaluating and carrying out development projects. The City manages a conservation easement program which has established the protection of thirteen natural areas covering 25.7 acres as of 2016. Parks and green space are important assets to residents. The City has dedicated 1,140 acres or 15% of land in Golden Valley is parks and open space. The City maximizes sustainable practices in those areas.
Urban Forestry	Overall, the City has a tree canopy of 40.5%. As a certified Tree City USA, Golden Valley has adopted best management practices for urban tree planting, including planting tree varieties resilient to invasive species.

Native Planting and Pollinators	The City developed an Emerald Ash Borer Management Plan in 2010, which is updated regularly to adjust for new management technologies and strategies. City staff work with residents to remove ash trees and other species in poor condition or vulnerable to disease. Trees are removed as needed and replaced as funding is made available. A replacement tree diversity guideline of “10-20-30” is followed. Annually, the City plants between 50-75 trees for parks and as part of the Emerald Ash Borer replacement program. Projects are monitored for success and effectiveness of practices. Typically, assessments of planting projects have a high rate of tree survival. Residents can find information on Golden Valley’s website about planting native and resilient tree species.
	For over 20 years, the City has contracted with a professional consultant to manage native buffer areas using integrated pest management. In 2016, there were over 50 acres of native buffer in Golden Valley.
	Chemicals are applied only when needed and on a limited basis. Some parkland is designated as “low-maintenance,” which reduces inputs, labor, and costs, while promoting the growth of diverse species. Species that promote pollinators are preserved and planted when possible, including milkweed. Milkweed is not removed from any public lands and is included in public planters, medians, and along roadways. In 2015, 6 total acres of pollinator habitat were planted in public areas and 1.6 acres around ponds and along streams; 2.5 acres were added in 2016.
Waste Reduction	Golden Valley promotes businesses to reduce and reuse waste. Recycling efforts have significantly increased in parks, at public events, and at high use facilities. In addition, the City had a curbside recycling program since 1987; in 2012 the service was expanded. Residents can take advantage of a spring brush pick-up program and fall leaf drop off program.
COMMUNITY	
	Staff regularly update and monitor information regarding critical facilities, sites with hazardous materials, high density employment centers, and high density housing areas. Special attention is paid to areas with health care facilities,

Weather Preparedness	nursing home and assisted living facilities, senior housing, group homes, schools, child care centers, and high density housing. In the event of power outage, of the fourteen City-owned buildings considered critical facilities, eleven contain back-up power generation to ensure reliable power. Currently, the City uses multiple communication channels to reach residents, including: automated notifications (call, text, email), City website, City Facebook, and press releases. Staff are exploring ways to use technologies and alternative modes of communication to reach community members with disabilities. If shelters are needed in an emergency event, the City coordinates efforts with the American Red Cross and Hennepin County government. Plans for opening and operating shelters are coordinated between these institutions and the City. Metro Transit would also help provide transit for residents to and from shelters.
Extreme Heat	In the event of extreme heat, the public is notified of cooling center locations. In addition to City maps and databases with information on critical areas and populations, the Hennepin County Dispatch maintains a database with similar information.
Hazards	Residents in Golden Valley can inform Hennepin County of potential hazards and comment on hazard mitigation plans through a survey on the Hennepin County website. Feedback is incorporated into strategies and activities that will strengthen critical infrastructure and increase community preparedness for future events.
Vector-Borne Diseases	Emergency response to vector-borne illness outbreaks are led and coordinated by the Minnesota Department of Health.
Local Foods	The City facilitates local food production and distribution through a local farmers' market held every Sunday in the City Hall parking lot June-October. The City now grants licenses to residents to keep chickens.
Transportation	The City encourages citizens to use alternative modes of transportation such as walking, biking, and public transit.

CLIMATE MITIGATION/ECONOMY	
Energy Efficiency	In 2008, Golden Valley signed the US Mayors' Climate Protection Agreement, signaling the City's commitment to energy efficiency, clean energy, and climate action. Staff began collecting energy use data for City owned facilities in 2008 using the Minnesota B3 Benchmarking program. Subsequent implementation of energy savings projects led to a significant reduction in electricity consumption, resulting in a 7.8% decrease in 2015 compared to the 2007 baseline year.
Renewable Energy	In 2008, Golden Valley signed the US Mayors' Climate Protection Agreement, signaling the City's commitment to energy efficiency, clean energy, and climate action. In 2015, the City completed the installation of two 40 kW systems on the public safety building and park maintenance building. These systems will meet 15% and 100% of electricity demand, respectively. In 2017, the City installed two 40 kW systems on the utility maintenance building and streets maintenance building. These systems are expected to meet 75% and 100% of electricity demand, respectively. The City is an active participant in the Department of Energy's SolSmart Program, which provides no-cost technical assistance to local governments to help reduce barriers to solar energy growth in the community. As of 2016, 9 single-family residents, 5 businesses, and 2 public buildings were issued permits for solar panels.

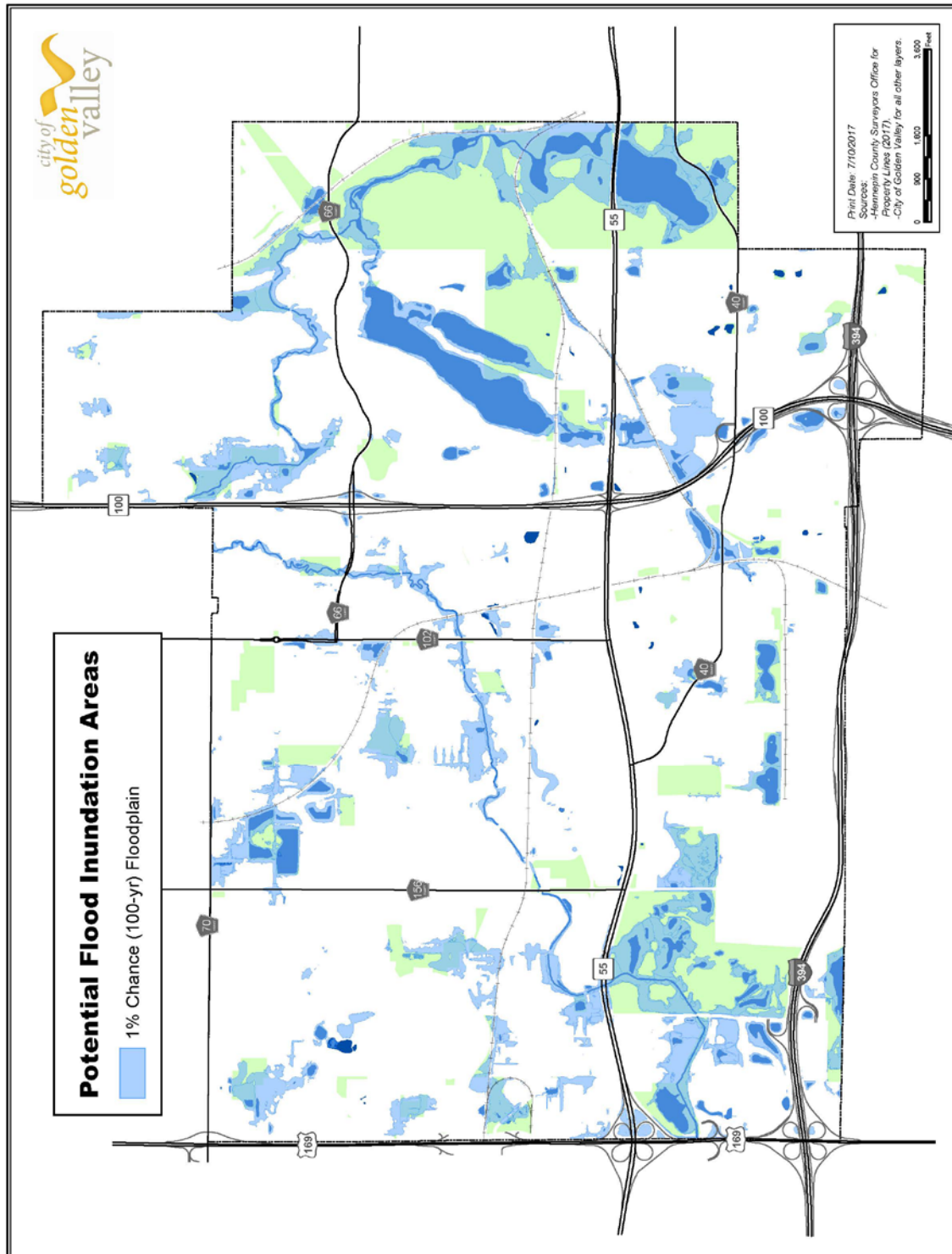
NATURAL AREA PROTECTION ORDINANCES
Planned Unit Development Ordinance (section 11.55) preserves substantial portions of sites including tress, scenic views, creeks, wetlands, and open waters.
Subdivision Regulations (section 12.30) allows the City to require up to 10% of a proposed subdivision to be dedicated as a public park, playground, or storm water holding areas.
Floodplain Management Zoning Overlay District (section 11.60) protects the critically important floodplains of Bassett Creek and its tributaries from any development that would threaten water quality, groundwater infiltration, or cause rapid runoff.

Shoreland Management Ordinance (section 11.65) requires sufficient vegetation cover within critical shoreland areas to prevent runoff and soil erosion.
Tree and Landscape Code encourages planting native grasses and wildflowers where appropriate in developed areas as an alternative to traditional landscaping.
RENEWABLE ENERGY RELATED ORDINANCES
Solar Energy Systems Ordinance (section 11.75) allows solar energy systems in all zoning districts provided they meet certain requirements.
Wind Energy Conservation Systems Ordinance (section 11.74) allows both mounted and freestanding wind energy conversion systems in certain districts, including: commercial, industrial, business offices, institutional, Planned Unit Development and the I-394 mixed use district, provided they meet certain requirements.
OTHER ENVIRONMENTAL ORDINANCES TO-DATE
• Stormwater Management • Shoreland Management • Floodplain Management • Tree Preservation – in process of updating and merging with landscape requirements • Planned Unit Development • Animal Waste • Feeding of Deer • Shade Tree Diseases • Lawn Maintenance (allowing for native vegetation upon permit) • Application of fertilizers and pesticides • Regulating coal-tar based sealer products

*This table is intended to be a summary of Golden Valley's environmentally related policies and may not be comprehensive.

Appendix D

Potential Flood Inundation Areas in Golden Valley



Appendix E

City of Golden Valley, MN Solar Resource

Gross Solar Resource

Production: 11,997,808 MWh

Capacity: 923 MW

Rooftop Resource

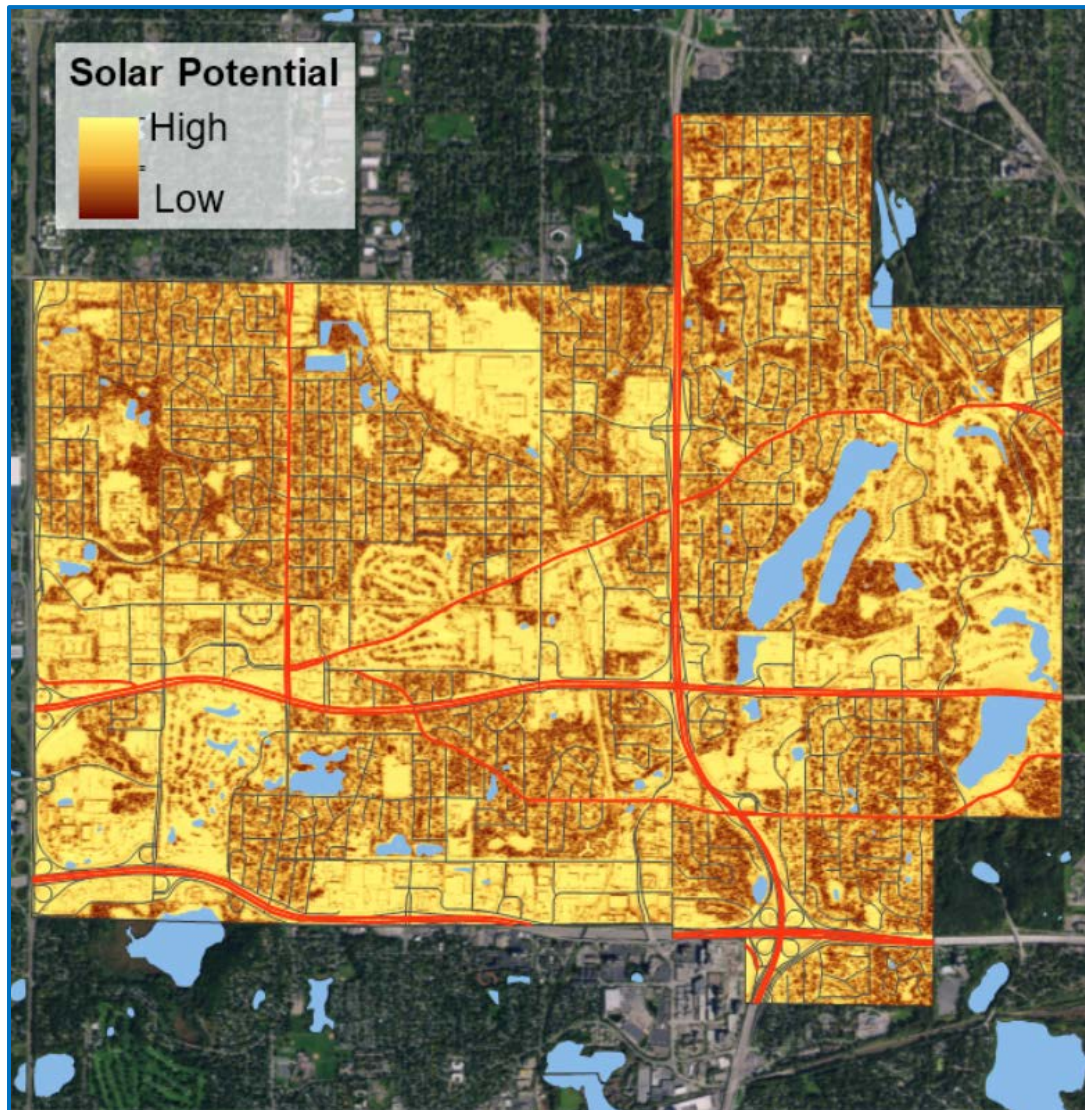
Production: 163,780 MWh

Capacity: 125 MW

Top 10 Rooftops

Production: 28,570 MWh

Capacity: 22 MW



Gross Solar Resource: Total energy produced if all solar resources are developed, regardless of location.

Rooftop Resource: Total energy produced if all economic solar resources located on building rooftops are developed.

Solar Capacity: Maximum output of solar energy systems if the solar resource is fully developed, similar to a power plant.

City-wide Solar Resource Map Sources: ESRI, MN DOT, MN DNR, UMN, MN GIO

GOLDEN VALLEY RESILIENCE AND SUSTAINABILITY PLAN DRAFT

City of Golden Valley, MN Solar Rooftop Resource

Total Rooftop Resource

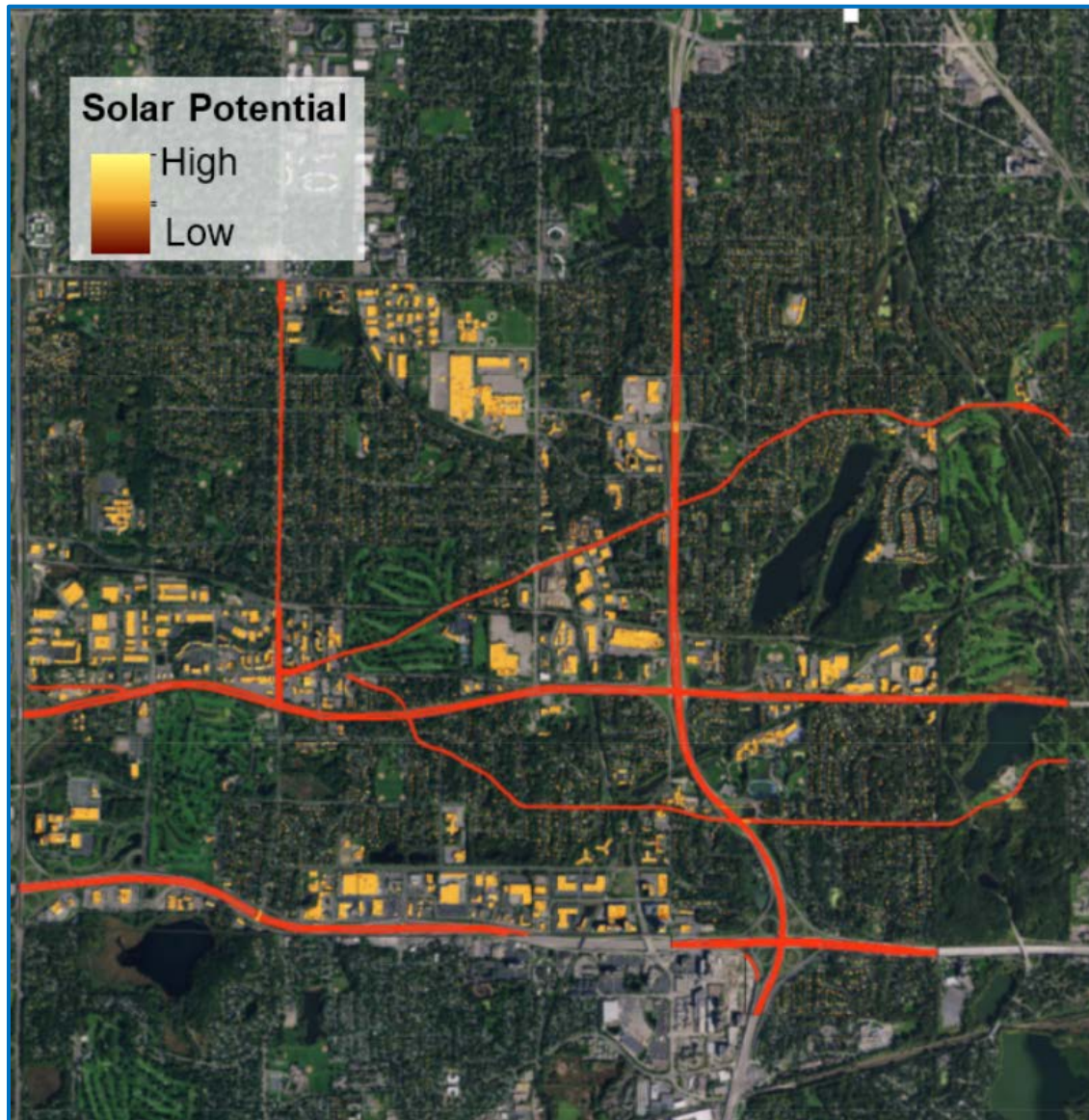
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Top 10 Solar Rooftops

Production: 28,570 MWh

Capacity: 22 MW



Rooftop Resource: Total energy produced if all solar resources located on building rooftops are developed.

Solar Capacity: Maximum output of solar energy systems if the solar resource is fully developed, similar to a power plant.

City-wide Solar Resource Map Sources: ESRI, MN DOT, MN DNR, UMN, MN GIO

GOLDEN VALLEY RESILIENCE AND SUSTAINABILITY PLAN DRAFT

Appendix F

Critical Infrastructure Facilities and Fuel Type

The table below includes facilities that were identified as publicly-owned critical infrastructure. Because operation of these facilities is critical in the time of a power disruption, the back-up power for each is included. The facilities highlighted in yellow are those that have limited or no back-up power. These may be good candidates for solar plus storage options.

Back-up Power for Critical Infrastructure / Facilities			
Facility 1	Police Station	Facility 2	Fire Station 1
Type	Emergency Response	Type	Emergency Response
Address	7700 Golden Valley Rd	Address	7700 Golden Valley Rd
Back-up power operational?	Yes	Back-up power operational?	Yes
Generator Type	Natural Gas	Back-up power type:	Natural Gas
Facility 3	Fire Station 2	Facility 4	Fire Station 3
Type	Emergency Response	Type	Emergency Response
Address	400 Turners Crossroad S	Address	3700 Golden Valley Rd
Back-up power operational?	Yes	Back-up power operational?	Yes
Back-up power type:	Natural Gas	Back-up power type:	Natural Gas
Facility 5	Brookview Community Center	Facility 6	10th Ave Cold Storage
Type	Public Attraction	Type	Government/Military
Address	200 Brookview Parkway South	Address	9400 10th Ave N
Generator	None	Back-up power operational?	None
Generator Type	None	Back-up power type:	None
Facility 7	Brookview Golf Course	Facility 8	Golden Valley City Hall
Type	Government/Military	Type	Government/Military
Address	101 Brookview Parkway North	Address	7800 Golden Valley Rd
Back-up power operational?	None	Back-up power operational?	Yes
Back-up power type:	None	Back-up power type:	Diesel
Facility 9	Woodstock Lift Station	Facility 10	Olson Lift Station

Type	Utility	Type	Utility
Address	4000 Woodstock Ave	Address	5000 Olson Memorial Hwy
Back-up power operational?	Yes	Back-up power operational?	Yes
Back-up power type:	Portable	Back-up power type:	Portable

Facility 11	Ottawa Lift Station	Facility 12	West End Lift Station
Type	Utility	Type	Utility
Address	635 Ottawa Ave N	Address	1600 Lilac Dr S
Generator	Yes	Back-up power operational?	Yes
Generator Type	Portable	Back-up power type:	Unknown

Facility 13	Boone Lift Station
Type	Utility
Address	710 Boone Ave N
Back-up power operational?	Yes
Back-up power type:	Natural Gas