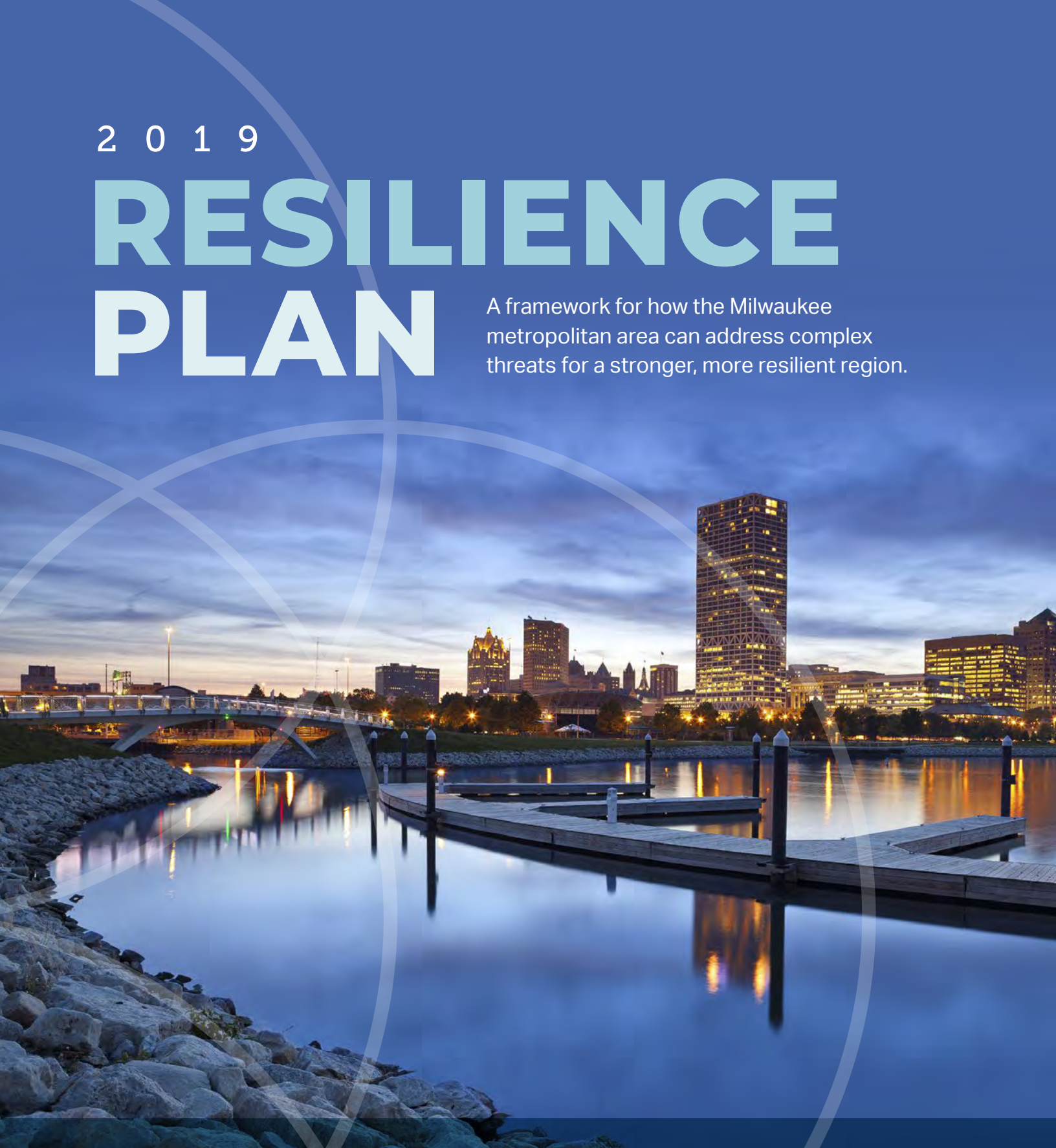2019

RESILIENCE PLAN

A framework for how the Milwaukee metropolitan area can address complex threats for a stronger, more resilient region.

Letter from the Milwaukee
Metropolitan Sewerage District

COMMISSION CHAIR

Our Resilience Plan is a testament to our love for the Great Lakes and the region that surrounds the great City of Milwaukee. The plan accentuates the region's rich history of using the bounties of Lake Michigan to enhance the livelihood and well-being of its people. Hard-working people have worked tirelessly to make the Milwaukee region the beautiful place it is today, and that collaborative spirit will be key to the success of this plan moving forward.

A healthy environment, strong schools, robust economy, and collaborative governments are the foundational elements of this Resilience Plan. The Plan builds from these strengths, identifies the emerging challenges, and charts a path to our future. This future path was built from the ground up around three visions:

VISION 1

Make the Milwaukee region a better place to live by improving the public's participation in decision making and their environment

VISION 2

Boost the region's economic vitality through innovative job creation and access to equal opportunities

VISION 3

Adapt infrastructure to the challenges of the 21st century

The action steps found in each of these visions will be implemented by many partners over many years, and the Milwaukee Metropolitan Sewerage District (MMSD) is excited to collaborate to do its part.

Providing sustainable, livable employment is one of the great challenges identified in the Resilience Plan. As the Chairwoman of the MMSD Commission, I look forward to MMSD providing leadership associated with addressing the effects of climate change and connecting the under-employed with jobs that will be created through the innovation of our 21st century infrastructure.

The Milwaukee region is on an upward trajectory. Working collaboratively as a region to realize these visions will take us to a more sustainable, resilient future. I hope we can all take part in this experience and move onward.

Sincerely,

Kris Martinsek

KRIS MARTINSEK
MMSD Commission Chair

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The Resilience Plan provides general recommendations for how to address risks that are impacting 28 communities in southeastern Wisconsin. Risks and recommendations were decided on collectively by stakeholders. The recommendations can be implemented individually or integrated into projects. The recommendations are flexible and can be applied at various scales depending on the need and the budget.

Note from the Milwaukee Metropolitan
Sewerage District

EXECUTIVE DIRECTOR

KEVIN SHAFER
MMSD Executive Director

Our climate is changing and we need to change with it. Increasingly intense storms in our region make sewer overflows and flooding bigger threats. Incremental steps taken now will help us reduce these risks in the future.

While water flows downhill, adapting to climate change is a dangerous uphill battle. Nevertheless, if each of us takes steps to manage rainwater where it falls, we can reduce the risk of basement and street flooding and the amount of water that leaks into our sanitary systems causing sewer overflows.
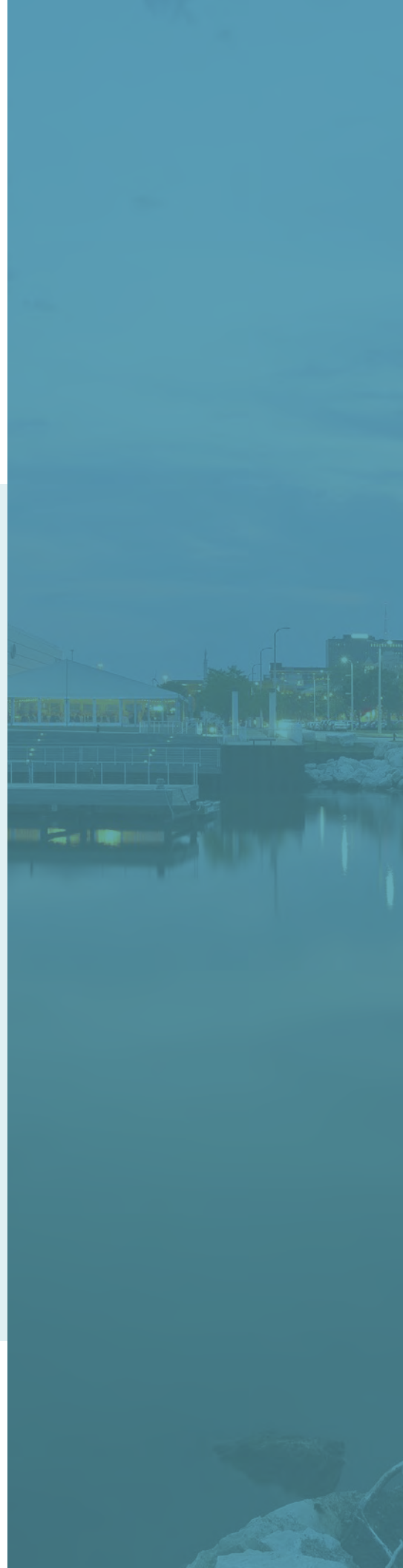
PART 1
Resilience Challenges [i]

BACKGROUND

01

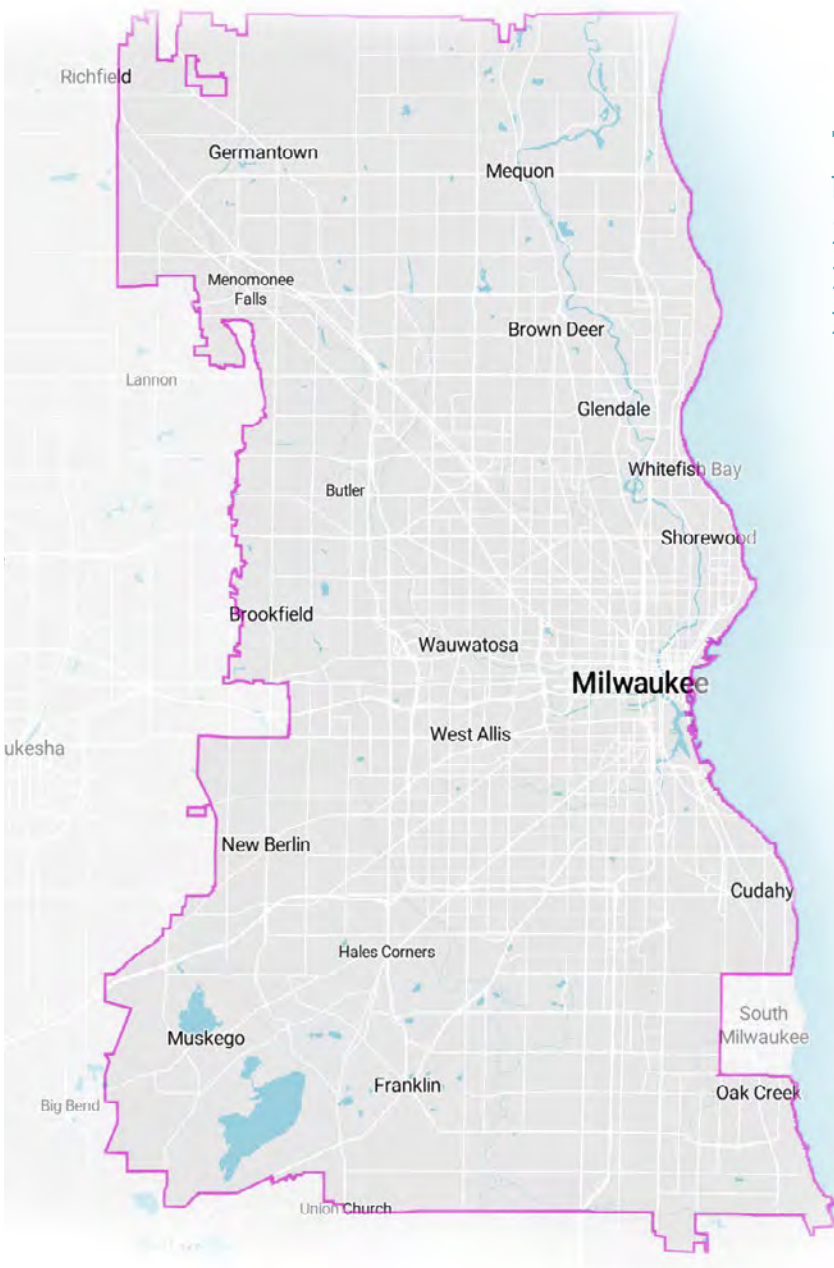
The Milwaukee region is defined by the 28 municipalities that the Milwaukee Metropolitan Sewerage District (MMSD) serves and is home to over 1.1 million people.

To realize a more sustainable, resilient future for our residents we need to understand the social, economic and environmental climate of the Milwaukee region. Our region is home to flourishing businesses and neighborhoods and – at the same time – to concentrations of poverty and high unemployment. We are located on one of the world's most important natural resources along the shores of Lake Michigan (the largest freshwater lake entirely contained within the United States) and the Great Lakes; yet, along with the rest of the planet, we will have to adapt to the uncertainties brought about by climate change. To chart a more resilient path to our future, here is some basic information about who we are.

Bayside
Brookfield
Brown Deer
Butler
Caledonia
Cudahy
Elm Grove
Fox Point
Franklin
Germantown
Glendale
Greendale
Greenfield
Hales Corners
Menomonee Falls
Mequon
Milwaukee
Muskego
New Berlin
Oak Creek
River Hills
Shorewood
St Francis
Thiensville
Wauwatosa
West Allis
West Milwaukee
Whitefish Bay

By the year 2035 our region is projected to grow by about +16 %

POPULATION

02
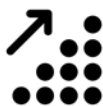
Relatively slow population growth has been one of the challenges facing our region. The Milwaukee region has grown by about 2% since 2000. The full four-county metro area has grown by about 5%. This is somewhat slower than our peer metro areas in the Midwest that have grown on average by about 10% since 2000. It is significantly slower than our peers in other parts of the county, that have grown on average by about 26% since 2000.

The populations of the communities in the Milwaukee region range from about 1,600 residents in River Hills to over 595,000 residents in Milwaukee; however, 18 of our 28 communities have lost population since 2000. Suburban communities such as Oak Creek, Franklin, Muskego, and Menomonee Falls have experienced the most growth in the region since 2000. This population shift and slow growth equate to a reduction in potential property taxes and municipal income that pays for the critical services that communities rely on.

These inequalities are far more pronounced in our region than almost any other large metropolitan area in the country. The four-county Milwaukee metropolitan area has the highest segregation index for black-white segregation (for 2013-2017).[ii] Our minority populations are four times less likely than non-minority populations to have a high school diploma, per capita income for non-minority populations is over two times that of minority populations, and poverty rates are nearly four times higher for minority populations.

Perhaps the greatest challenge facing our region is the continued concentration of minority populations. Nearly two-thirds of City of Milwaukee residents identify as a racial or ethnic minority, while all but three communities in the Milwaukee region report more than 75% white, non-Hispanic populations. The concentration of minority populations aligns with significant disparities in income, poverty rates, and educational attainment between minority populations and non-minority populations.

RACIAL DIVERSITY
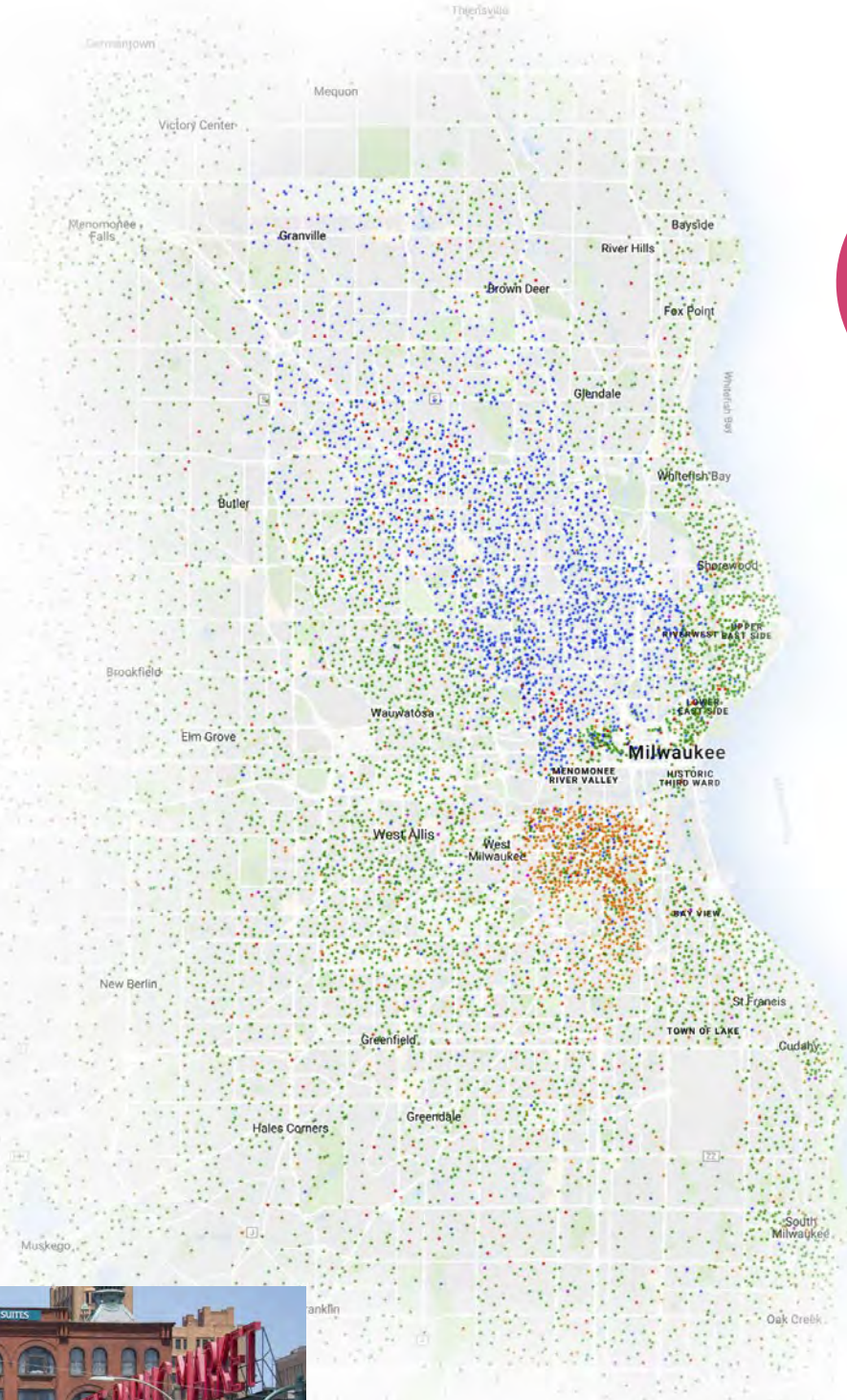
COMMUNITY

Often people of color are left out of the conversations that affect their neighborhoods and only looped in after the plan has been developed...Rarely, are people of color given a place at the decision making table.

COMMENTS

Map Key

One dot = 120 people

CENSUS GROUP

- ■ Black
- ■ Hispanic
- ■ Asian
- ■ White
- ■ Others

There are also economic and educational disparities between the residents of the City of Milwaukee and some inner-ring suburbs and the outlying communities of our region. These disparities are exacerbated by limited housing and transportation choices that reduce access to opportunities in more affluent outlying communities. Less affluent neighborhoods also experience a reduced amount of neighborhood revitalization, higher rates of crime, and higher rates of unemployment.

ECONOMY

03

PERCENTAGE OF POPULATION BELOW POVERTY LEVEL
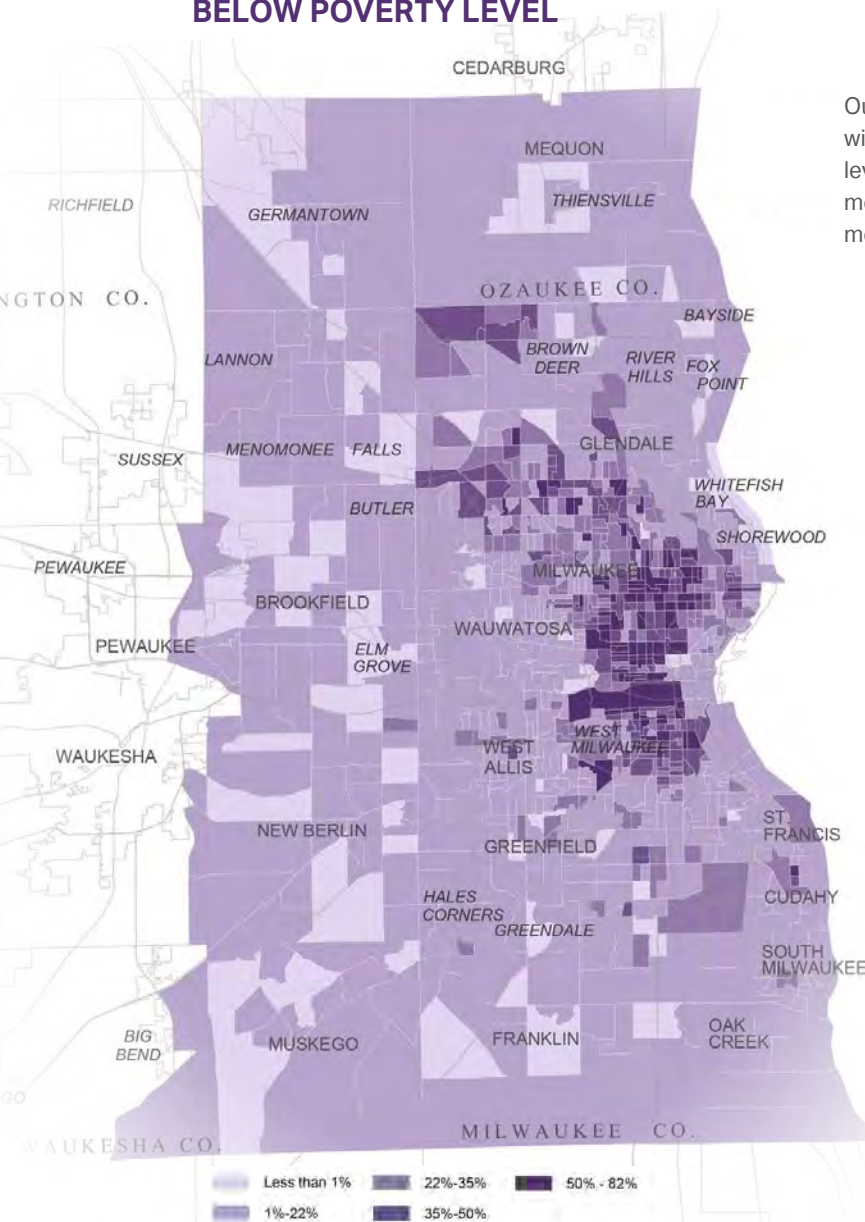
Our region's relatively slow population growth is coupled with economic challenges including relatively low income levels and long-term job losses. In 2015, the Milwaukee metro area ranked 78th out of the nation's 100 largest metro areas for recovery from the recession.[iii]

COMMUNITY

Engage schools to create more opportunities for students to go into the trades-machinists, electricians, plumbers, etc.

COMMENTS

Despite the comparatively slow growth rate, the Milwaukee region has also seen economic success stories with over 25 firms listed in the top Fortune 5000 firms in the country including Northwestern Mutual Life Insurance Company, Kohl's Corporation, WEC Energy Group Inc., and Briggs & Stratton Corporation.[iv] The region's economic future is in part reliant on positioning firms to compete in global markets. Systems like the Port of Milwaukee are already in place to support international trade via an extensive waterway network of over 2,340 miles and over 2 million tons of cargo moving through annually.[v, vi, vii]

Less than 1%   22%-35%   50% - 82%
1%-22%   35%-50%

MANUFACTURING JOBS ARE A CORE RUNG ON THE REGION'S LADDER OF OPPORTUNITY

Unemployment rates can indicate the health of an area's economy. Although most of the region is experiencing record low unemployment, the unemployment rate is currently higher in parts of the region with higher concentrations of minority populations.

The types of jobs available matter, too. According to the Milwaukee Region's Global Trade & Investment Plan, "…manufacturing in the region accounts for 149,300 jobs, or 16% of regional employment, making the Milwaukee region second for manufacturing intensity among the top 50 U.S. metropolitan areas. Moreover, manufacturing jobs are a core rung on the region's ladder of opportunity – paying 31% more than the average job in the region."[viii] With an unemployment rate for minorities at 12.2%[ix], there is job opportunity in skilled manufacturing such as machinists, technicians, and engineers. Currently, the workforce is not able to meet the demand and the gap poses a threat to the region's economic growth.[x]

A significant challenge is the ability to pay for the critical services (such as police, schools, waste collection, water infrastructure, etc.) people need. Levy limits imposed in 2005 connect how much a municipality can levy in property tax to net new construction. With most municipalities seeing construction rates at less than 1.5%, municipal governments are limited in the amount of property tax they can collect to pay for critical services.[xi] This is particularly concerning to communities in the Milwaukee region that have little developable land and have to rely on infill development and redevelopment for new construction to occur.

There are

149,300

manufacturing jobs in the region representing 16% of regional employment.

manufacturing jobs are a core rung on the region's ladder of opportunity, paying

+31%

more than the average job in the region.

CLIMATE CHANGE

04

The Earth's climate has always changed. Science tells us that the Earth's climate is now changing much more rapidly than ever before. Climate change is caused by natural factors such as volcanic eruptions, changes in the Earth's orbit, changes in how much energy is released from the sun and now human factors contribute, too, according to the U.S. Environmental Protection Agency. For most of human history, the Earth's atmosphere contained about 275 parts per million of carbon dioxide. More recently, the Earth's atmosphere has been found to contain about 390 parts per million of carbon dioxide...and that number is rising by about 2 parts per million each year. Most scientists (97%) agree that our carbon emissions are likely influencing the Earth's climate. This influence affects the Earth's rainfall patterns, temperature, plant and animal populations, and more. In an urban environment, the impacts of these changes can be magnified because of dense development and more complex infrastructure.

-- MMSD Sustainability Plan 2012

> "...ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth — all while tackling climate change and working to preserve our oceans and forests.
>
> -*United Nations Sustainable Development Goals*

Climate change puts additional stress on our critical infrastructure when it must be maintained, improved, and expanded in an uncertain financial and physical environment. Critical infrastructure includes systems which are socially, economically, or operationally essential to the functioning of a society or community.[xii] These systems can include transport, electricity, water and communication systems. Ensuring that infrastructure is climate resilient will help reduce direct losses and reduce disruption of service.[xiii]
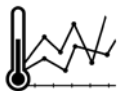
Projections

Based on climate projections, there will be seasonal impacts on our region. Winter months are predicted to be warmer, with more precipitation occurring as rain instead of snow. This may mean an increase in freezing rain storms, and those will cause problems for transportation, above-ground power lines, and other infrastructure. The projections tell us that the number of large rainstorms (greater than two inches of rainfall in a day) will increase by 25% and occur predominantly in the spring and fall. What's more, this trend is already happening. The Milwaukee region storms of 2000, 2002, 2005, 2006, 2008, 2009, 2010, 2012, 2013, 2015, 2016, and 2018 produced significant flooding, basement backups, and sewerage overflows that caused millions of dollars in damage. These large storms demonstrate that the region's existing grey infrastructure, that includes traditional sanitary and storm sewer systems, was not designed for these larger events.[xiv]

An important part of our infrastructure is our transportation system that connects our residents with employment, education, health care, and other important services. While our region is slow growing compared to other large metropolitan areas, our population is still projected to increase by about 16% by the year 2035. This will require not only replacing, but also improving and expanding an already aging transportation system. Roadway condition and traffic flow are critical factors to the growth of our region's   >>>

>>> economy and the safety of our residents. A financial analysis completed for the regional transportation plan (VISION 2050) shows that expected revenues will be insufficient to reconstruct major roadways, particularly our freeway system, as recommended in the plan by the year 2050.[xv] This may have a negative impact on commerce and safety in our region.

And it's not just about transportation. Looming changes in the environment will also have repercussions for all types of infrastructure. The Intergovernmental Panel on Climate Change has concluded that the Earth is experiencing climate change, with an increase in average surface temperature that has been linked to changes in precipitation patterns and storm severity. The possible effects of climate change on Wisconsin were investigated by the Wisconsin Initiative on Climate Change Impacts and found the Milwaukee region may experience a warmer and wetter climate by mid-century, with an increased frequency of large storm events. [xvi] This may result in more flooding, more sewer overflows, more polluted stormwater, reduced air quality, and extreme heat.

WHAT DOES THIS ALL MEAN?

The data illustrate that socio-economic issues such as social equity and environmental problems such as climate change pose some of the greatest risks to the resilience of our region. These two sets of issues are on a collision course over the next several decades without this plan. For instance, critical infrastructure (water mains, sewerage pipes, and energy lines) are connected systems that become increasingly vulnerable with increased precipitation, disinvestment, and population growth. While these risks could hinder the resilience of our region in the face of a "perfect storm," the data also show that our region is comprised of a diverse array of neighborhoods and communities. The actions recommended in the Resilience Plan can help build upon the strengths of our communities and natural resources to make the Milwaukee region an attractive and inclusive place for all residents.
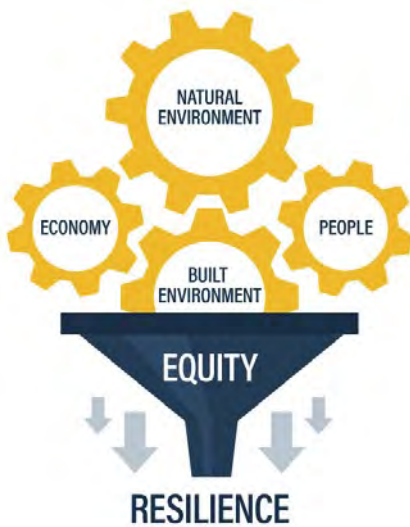
PART 2
Why A Resilience Strategy?

Part 2

URBAN AREAS

01

Our urban areas are complex and constantly adjusting to changes.[xvii] In particular, climate changes are driving the need to adaptively plan to manage the risks and reduce the impact to our communities.

Changes in the climate are likely to cause prolonged periods of heat, less severe winters, floods, droughts and heavy precipitation events in this region. [xviii, xix, xx] Our urban areas will continue to see population increases that are projected at an additional 16% by 2035,[xxi] and our critical infrastructure is stressed and in need of repair. [xxii] We must plan for this, and plan in a new way.

Previously, a problem or risk was identified, and a plan was made to 'fix' the problem. Today, we see our risks connected to each other, and creating a 'fix' is more difficult because these connections have a cascading impact within a broader system where social, economic, environmental, and financial risks are connected.[xxiii] Addressing these risks in a comprehensive and creative way is more important now than ever. Resilience planning looks holistically and proactively at how these systems interact. It creates integrated, inclusive and robust responses through recommended actions.[xxiv]

Urban areas depend on critical infrastructure systems (power, drinking water, wastewater, and communications) functioning properly. Those systems are dependent on each other and are equally vulnerable to changing urban conditions such as fluctuations in temperature and rainfall, varying land use conditions, population influxes, and poverty rates. Therefore, the risks herein are addressed and understood as they relate and correlate to other components of the built, natural and social environments. Oftentimes, a disturbance within one area of infrastructure will result in an impact or disruption in other areas.

Increasing demand on natural resources, infrastructure, and public services challenges cities' sustainable development and economies. Smarter planning, development and management of infrastructure and

WHAT IS CLIMATE RESILIENCE?

Climate resilience is the ability to anticipate, prepare for, and respond to hazardous events, trends, or disturbances related to climate. Improving climate resilience involves assessing how climate change will create new, or alter current, climate-related risks, and taking steps to better cope with these risks.[xxvii]

> The purpose of the Resilience Plan is the identification, evaluation, and prioritization of risks followed by coordinated and economical application of recommendations to minimize, monitor, and control the probability or impact of unfortunate events or to maximize the realization of opportunities.

Regional Planning is...

A necessary governmental function in large metro areas across the country because development and infrastructure problems often transcend the political boundaries and fiscal capabilities of individual communities. A regional approach is necessary to provide efficient, cost-effective public works systems...Regional planning is also a sound approach to address issues such as flooding, air and water pollution, changing land use, and preserving natural and agricultural resources.

—*About SEWRPC Handout, March 2018*

public services for our cities will be an absolute necessity. The American Society of Civil Engineers cites the lack of investment in infrastructure as an impediment for Wisconsin to compete in an increasingly global marketplace.[xxv] Wisconsin needs to invest $1 billion in drinking water infrastructure and $6.33 billion in wastewater infrastructure over the next 20 years.[xxvi]

Cities across the world are developing resilience plans to proactively prepare communities to take on the systematic and intertwined risks facing populations today for a stronger future tomorrow. Prioritizing risks and strategies to reduce those risks is becoming a matter of importance for utilities, municipalities, and private and public partners.

Public, non-profit, and private partners will continue to fund crucial services and projects. The Resilience Plan is a guide with agreed-upon risks and actions that can be used to respond to the ever-changing environmental and social conditions in an uncertain financial future. We must broaden our perspectives and see that our problems, solutions and responsibility to act are connected.

Part 2

OUR PROCESS

02

Reinventing the wheel was not required for this effort! The planning effort used two tried-and-true processes to involve leaders who, in turn, identified strategies:

No. 1   **THE 100 RESILIENT CITIES EFFORTS,** a Rockefeller Foundation-supported initiative, develops a road map for cities, engages a broad range of stakeholders, identifies priorities, and creates an actionable set of initiatives. The project team completed an extensive review of existing **100 Resilient Cities** plans as well as local plans to identify and incorporate the best components into a single strategy while filling identified gaps. The project team used the City Resilience Framework to group the essential systems of cities into four areas: **Health & Wellbeing**; **Economy & Society**; **Infrastructure & Environment**; and **Leadership & Strategy.**[xxviii]

Infrastructure & Environment

Health & Wellbeing

CITY RESILIENCE FRAMEWORK

Economy & Society

Leadership & Strategy
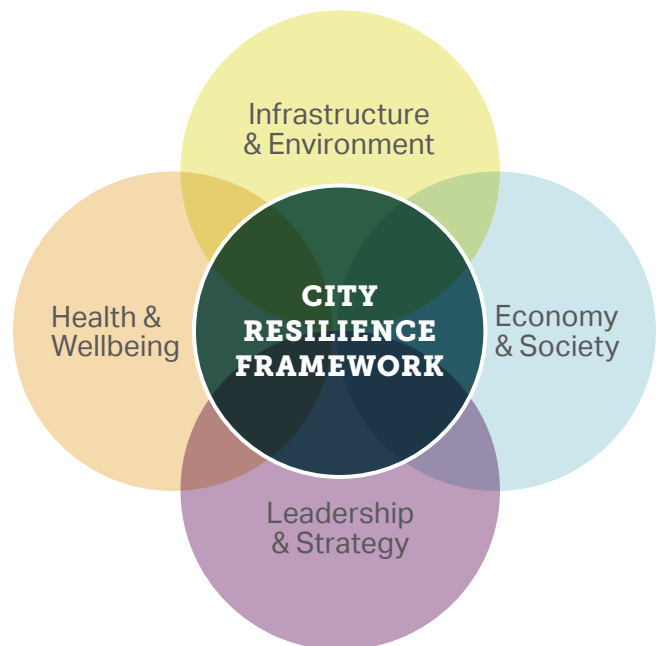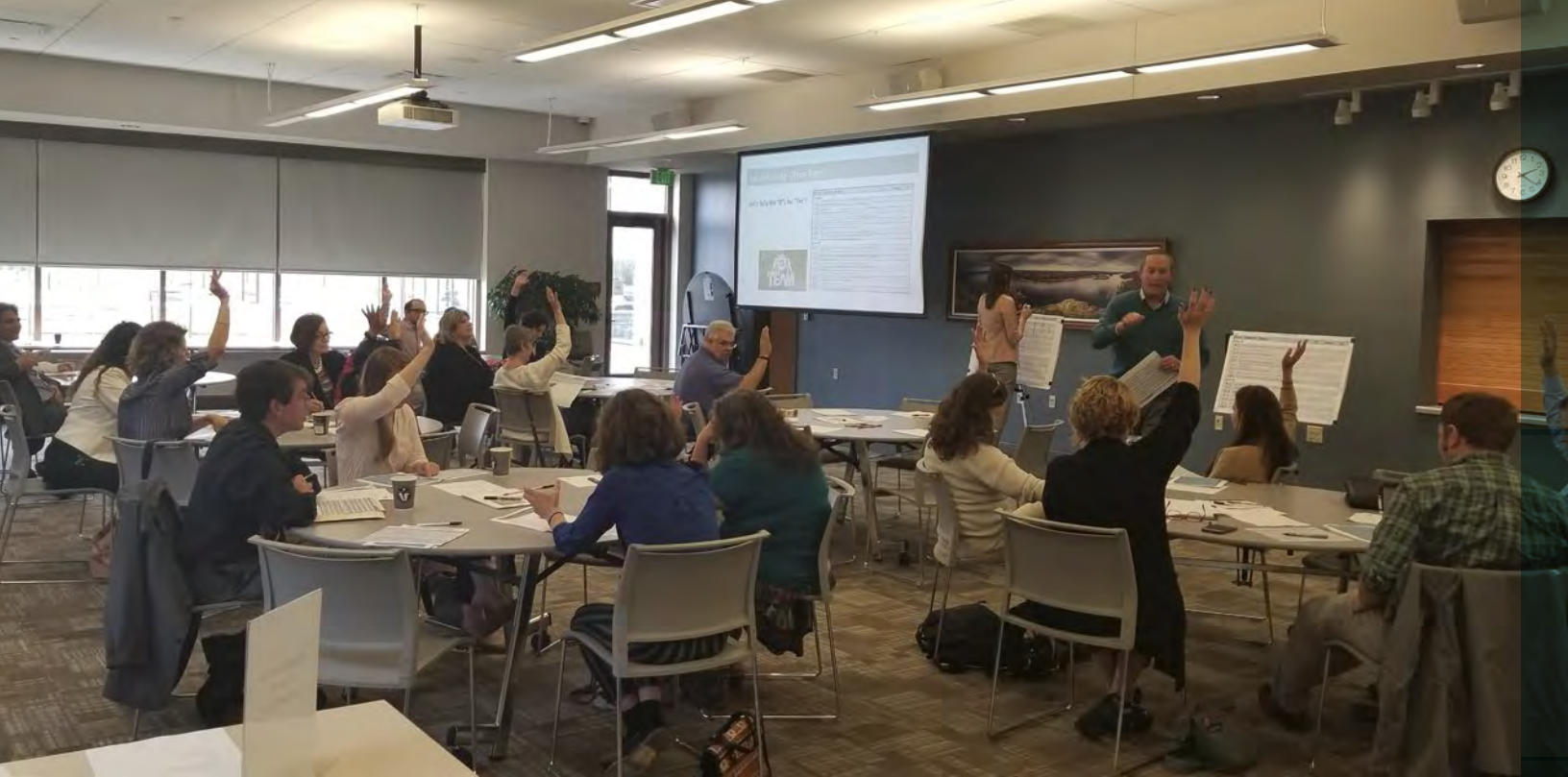
No. 2 — COMMUNITY RESILIENCE BUILDING WORKSHOPS

is a structured process that identifies and prioritizes actions that accelerate resiliency. This process was developed in part for The Nature Conservancy and has been used in over 45 municipalities. This community-driven process facilitates dialogue and decision making by using a risk matrix to define risks, identify vulnerabilities and develop and prioritize actions for the community. This process ensures that all voices are heard and results in consensus among diverse stakeholders.

Meaningful participation for this planning effort from community representatives was crucial to:

- ☑ Ensure previous plans and stakeholder goals were included
- ☑ Understand how the good work happening now can be scaled up and used by all
- ☑ Create a consensus future goal

The project team gathered information using a variety of techniques including individual interviews, case studies, online surveys, and stakeholder workshops. Participants fell into two groups: municipal representatives and community representatives from public, private, nonprofit, utility and academic institutes from across the greater Milwaukee area.

TIMELINE

Over the course of 12 months, the project team completed the following:

2017 / FALL → 2018 / WINTER

LITERATURE REVIEW

The team completed a review of over 45 local, regional, state, national and international planning documents to identify best practices.

2017

2018

2017 / FALL

STAKEHOLDER INTERVIEWS

Representatives from all 28 municipalities were invited to participate in this process and included mayors, village presidents, engineers, and planners. The project team completed 17 interviews, representing 22 municipalities, to better understand the unique challenges, opportunities, and assets for each community. The challenges were synthesized during the development of the risks.

Identified community assets include:

- Relationships & collaborations with other municipalities
- Lake Michigan & area rivers
- Municipal employees
- Strong community leaders & organizations
- People living in the communities & diversity
- Sense of community
- Affordable housing

2017 / DECEMBER

RISK WORKSHOP

The project team held workshops to review the methodology used to identify the risks, prioritize the top 12 risks, and determine the top six risks. The workshop included both small and large group exercises and discussion.

The goals of the workshop were to:

- Understand the implications and connections between risks
- Discuss strengths and vulnerabilities of municipalities
- Identify initial opportunities to reduce the impacts from risks

ONGOING

ADVISORY COMMITTEE

The Advisory Committee included representatives from universities, planning agencies, utilities and community leaders who provided direction during the planning process. The group served as a sounding board for strategy and advocates for engagement in the planning process within the communities.

2018 / SPRING

ACTION PRIORITIZATION WORKSHOP

The project team identified 35 actions as the most relevant strategies to address the risks. During the workshop, stakeholders narrowed down the actions that should be considered as priorities in the Plan. Participants scored each action according to feasibility (i.e., how difficult the action is to implement) and level of impact (i.e., how effective the action would be in decreasing the risk, increasing quality of life, and providing cost savings). Each participant then ranked each action as: should be included in the Plan, may be included, or not included at all. Each participant had an equally weighted vote, and after all the votes were aggregated, the team identified the top 20 actions.

2018 / SUMMER

DIGITAL COMMUNITY SURVEY

A digital survey was conducted to ensure that community members were able to weigh in on which actions should be a priority. 144 participants provided input and chose the top two priority actions in each Vision category:

VISION 1

- Improve Public Spaces, Community Health And Reduction In Crime Through Sensible Environmental Design
- Accelerate Local Efforts To Improve Communities By Replacing Grey Impervious Surfaces With Green Space

VISION 2

- Create A Job Training/Shadow Program With The Schools And Major Employers In The Region
- Support The Creation Of/And Training For Jobs Related To Sustainability In Specific Industries And Trades

VISION 3

- Increase Green Infrastructure In The Region
- Integrate Energy, Waste, And Sustainable Material Components Into RFPs And/Or Bids

OUR PROCESS

>>> The Resilience Plan helps us understand how our investments can be leveraged to reduce the risks associated with climate change and fiscal constraints, and the overall benefits of social wellbeing.

Why MMSD?

As a regional government agency, the Milwaukee Metropolitan Sewerage District (MMSD) understands the need for reliable infrastructure systems. MMSD plans for replacement of equipment, maintenance of the system, and adjustments to how we operate. Increasingly, we see that factors external to our systems such as rainfall, population changes, and changes in land use impact our ability to deliver service…and this will only continue. MMSD undertook and led the development of the Resilience Plan because understanding the external risks driven by climate change and shifts in the urban environment are crucial to our ability to provide reliable and cost-effective services. We understand that for every dollar spent on infrastructure there is an impact on social, environmental and economic components of the region.

Prioritizing the top risks and actions across the region helps identify where MMSD and other agencies could make a difference. Although the Resilience Plan addresses the top risks, MMSD will only invest in the actions that have a benefit to a risk related to our infrastructure. We hope that through the development of this plan, the stakeholders involved will take ownership of the actions related to their goals through implementation. Stakeholders came from all sectors, and through this planning effort have agreed on the risks and actions needed to improve our communities. Addressing these issues will only happen through structured collaboration and commitment.

> The core focus of any clean water agency is to be a well-run utility that meets or exceeds its public health and environmental obligations, provides value to its ratepayers, is a responsible steward of its assets and is financially sustainable. A changing climate creates greater uncertainty regarding future conditions and can make each of these factors more challenging—making resilience planning imperative."[xxix]
>
> *— NACWA Principles On Climate Adaptation & Resiliency*

03

RISK IDENTIFICATION

The process was complicated, but well worth it!

Managing risks starts with identifying and estimating the probability and impact of given threats.[xxx] The project team (consisting of Veolia, MMSD, Southeastern Wisconsin Regional Planning Commission (SEWRPC), and The Nature Conservancy) identified as many risks as possible through stakeholder interviews and a comprehensive plan review. The project team then ranked the risks by likelihood and negative impact. During the workshop, the top 12 risks were presented and stakeholders prioritized and chose the top six risks for the focus of this planning effort.

COMMUNITY

Engage stakeholders in a way that they realize their individual decisions and help water quality overall.

COMMENTS

COMMUNITY

We really need help to encourage our young inner city youth to achieve goals and career paths.

COMMENTS

Here is the process:

No. 1   RISKS IDENTIFIED FROM STAKEHOLDER INTERVIEWS

Interview participants identified the following hazards facing their communities (listed in alphabetical order):

- ☑ Aging infrastructure
- ☑ Drinking water supply
- ☑ Economic hazards—availability of jobs, getting people to jobs, succession planning and filling middle-level positions
- ☑ Flooding and extreme weather events
- ☑ Impacted quality of life—potentially from increased traffic and lack of services that residents want
- ☑ Limited public financing—due to State levy limits

No. 2   COMBINED ALL RISKS AND STARTED TO GROUP INTO CATEGORIES

The project team combined risks identified from the qualitative interviews with the comprehensive list of risks identified during the plan review. During the plan review more than 200 individual preliminary risks were identified and categorized according to The City Resilience Framework categories (Health & Wellbeing; Economy & Society; Infrastructure & Environment; and Leadership & Strategy). Examples of the 200 individual preliminary risks include financial gaps, crime and violence, pollution, inadequate public transportation systems, welfare system failure, water supply failure, and floods.

>>>

RISK IDENTIFICATION

>>> **No. 3**

Risk Board

ASSIGNED VALUES OF FREQUENCY, LIKELIHOOD, AND CONTROL TO RISKS

Each of the 200 risks was evaluated based on three parameters. The parameters include potential impact, likelihood/frequency, and level of control. The potential impact (the effect of the risk occurring in the most likely scenario) was scored based on how a risk would affect finances, population and/or the environment. The likelihood/frequency describes how often a risk may occur. The level of control relates to the current risk-mitigation activities that are in place to address a risk. Lastly, the risk was given a correlation score. This score evaluated how strongly a risk was connected with another risk. For example, vulnerability of critical infrastructure is impacted by climate change. If pipes are designed to take in one unit of rain but the rainfall consistently is three units, then climate change impacts the ability for the pipes to function properly. Each score was entered into an equation that produced a single combined score. The risks that had the highest combined score were the top 12 risks for the region.

	Specific Risks	Impact	Frequency	Criticality (I x F)	Level of Control	Correlation (x)	Correlation (y)	Scoring incl. Correlation
1	Financial constraints	2.85	3.71	10.22	2.73	0.36	0.39	8.11
3	Social equity	3.43	04.04	13.72	3.23	0.09	0.36	7.75
	Efficiency of mitigation plans	3.11	4.25	13.38	3.57	0.61	0.32	7.75
2	Vulnerability of critical infrastructure	3.55	2.98	10.35	3.29	0.36	0.48	7.02
	Effectiveness of emergency and crisis management	3.12	2.65	8.01	3.06	0.45	0.27	6.05
4	Climatic hazard	2.78	2.56	7.13	2.80	0.32	0.09	5.25
	Soil and water pollution	2.38	3.50	8.31	3.25	0.11	0.32	5.00
5	Ability to adapt and respond to job market changes	2.69	3.88	10.38	3.88	0.25	0.25	4.81
	Suburban sprawl	2.04	3.77	7.65	3.70	0.43	0.20	4.25
6	Distribution of public services	1.93	3.55	6.99	3.93	0.32	0.32	3.89
	Water quality and supply security	2.64	1.87	4.44	3.46	0.27	0.30	3.82
	Access to healthcare system	1.81	3.25	6.47	4.47	0.20	0.50	3.07

Action Workshop

COMMUNITY

> Develop process to look at the array of workforce development efforts and needed training at a systems level to better address the need for family supporting jobs and to fulfill employer needs for trained employees.

COMMENTS

No. 4 RISK WORKSHOP TO VET TOP 12 RISKS AND COME TO CONSENSUS ON TOP SIX

Participating stakeholders ultimately determined which risks should be the focus of the plan. Information about the risks presented during workshops included methodology, correlation, descriptions and background information. Through a guided process, each stakeholder chose their top five risks and discussed their decisions as a small group.

The group came to consensus that the most pressing risks, in order of priority, are:

FINANCIAL CONSTRAINTS
Budget constraints due to tax policy (infrastructure investment, public workforce shortage, etc.).

SOCIAL EQUITY
Social issue due to segregation: inequalities, crime and violence.

VULNERABILITY OF CRITICAL INFRASTRUCTURE
Risk associated with aging infrastructure and infrastructure failure (pipes, buildings, bridges, highways, communication networks, industrial areas, etc.), significant and rising costs of maintenance and repair.

CLIMATIC HAZARD
Climatic events (flooding, electrical storms and tornadoes, cold snaps) which impact existing assets.

ABILITY TO ADAPT TO JOB MARKET CHANGES
Risk of non-alignment of skills, competencies and demand. The need to maintain local skills and human capital (competitive workforce training and regional attractively) to an evolving labor market.

DISTRIBUTION OF PUBLIC SERVICES
Ability of public services to meet basic needs (accessibility, equitability and effectiveness).

04

DEVELOPING ACTION STRATEGIES

The identified actions are intended to be a menu of strategies that can be implemented by public, private and non-profit partners. The recommendations can be implemented individually or integrated into projects. The recommendations are flexible and can be applied at various scales depending on the need and the budget.

These actions, some of which are already underway, continue and expand existing efforts and adapt best management strategies used in other resilient communities for the risks and needs in the region. Implementation of the actions is intended to happen on an ongoing basis and the actions can be integrated into existing plans/projects or be implemented as a standalone strategy. The visions (categories) and accompanying actions address the range of critical risks at different scales. The goal is that as stakeholders implement actions, the risks will decrease over time because everyone is moving towards the same risk reduction goals.

Nothing moves forward without strategies.

>>>

04
DEVELOPING ACTION STRATEGIES

Action Workshop

>>> **The actions were selected using the following process:**

1 Urban Review

Review of 36 urban resilience plans from around the world resulted in the identification of 200 potential actions that would address the six risks.

2 State Review

Review of 70 state, regional, and municipal plans were used to match recommendations identified in other plans to the 200 identified actions.

3 Present

Present top 30 actions to the Advisory Committee and refine based on feedback.

4 Assess

Assess the actions for level of impact, scale of implementation necessary to address the risk, and regional applicability.
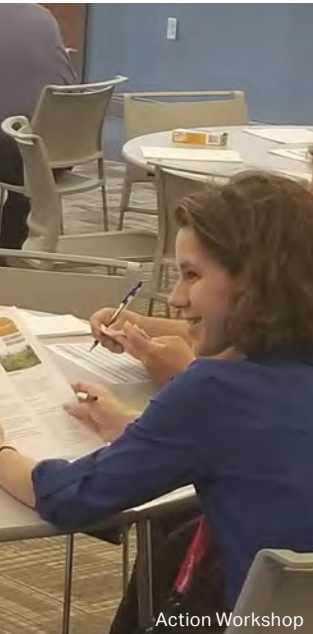
Action Workshop

5 Categorize

Categorize the 30 actions by Vision in alignment with the 100 Resilient Cities categories.

VISION 1 Environment & Society

Make the Milwaukee region a better place to live by improving the public's participation in decision making and their environment

VISION 2 Economy & Society

Boost the region's economic vitality through innovative job creation and access to equal opportunities

VISION 3 Infrastructure & Environment

Adapt infrastructure to the challenges of the 21st century

6 Refined 30 actions presented at Action Workshop where stakeholders prioritized each action for impact, feasibility and consideration to include in plan (yes, no, maybe)

Regional Infrastructure Resilience Plan: Vision-Initiative-Action Score Card									
Vision - Initiative - Action	High	Med	Low	High	Med	Low	YES*	Maybe	NO
Vision #1									
1.1.1 Identify the Gaps in Partnerships and/or Employment Sectors to Create Stakeholders Relationships	X				X				X
1.1.2 Create a Regional Resilience Resource Center - Space for Consolidated Community Resources	X			X			X		
1.1.3 Develop A Climate Risk Engagement Campaign		X			X				X
1.1.4 Engage Stakeholders in Collaborative Decision Making - Watershed Restoration/Water Quality Plans		X				X		X	
1.2.1 Accelerate Local Efforts to Improve Communities - Replace Impervious Surfaces with Green Spaces	X			X			X		
1.2.2 Launch an Urban Farming project at the South Shore Waste Reclamation Facility			X		X			X	
1.2.3 Add Addititional Healthy Food Programs - Access to Fresh, Locally Sourced Foods		X			X			X	
1.2.4 Improve Public Spaces, Community Health, Reduce Crime through Sensible Environmental Design	X			X				X	
1.2.5 Increase Value Of Existing Resources (Such As 286 - City) By Improving Access, Adding Necessary Organizations/Services, And Connecting Residents Quickly		X			X			X	
1.2.6 Expand Litter Pickup Programs - Change Behaviors through Targeted Communications Campaigns		X			X			X	
Vision #2									
2.1.1 Launch a Utilities Efficiency Program to Improve Low Income Housing and Boost Employment		X				X		X	
2.1.2 Create a Job Training/Shadowing Program with Schools and Major Employers in Region			X		X			X	
2.1.3 Develop Entrepreneurship Opportunities with Direct Links to Water and Energy Technologies that meet Future Job Needs			X			X		X	
2.1.4 Facilitate Development of Social Enterprise Sector through "Pop-up" Projects		X			X				X
2.1.5 Support Creation of and Training for Jobs Related to Sustainability in Specific Industries and Trade		X		X	X		X		
2.2.1 Create Pathways to Career Success for Young Men and Women of Color		X			X			X	
2.2.2 Design a Suite of Inclusive Economic Development Services to Help Entrepreneurs of Color Gain Equal Footing in Milwaukee Region's Economy		X			X			X	
2.2.3 Advance Racial Equity in Private Sector	X			X				X	
2.2.4 Create "Colaboratorios" as Public Experimentation Workshops		X			X		X		

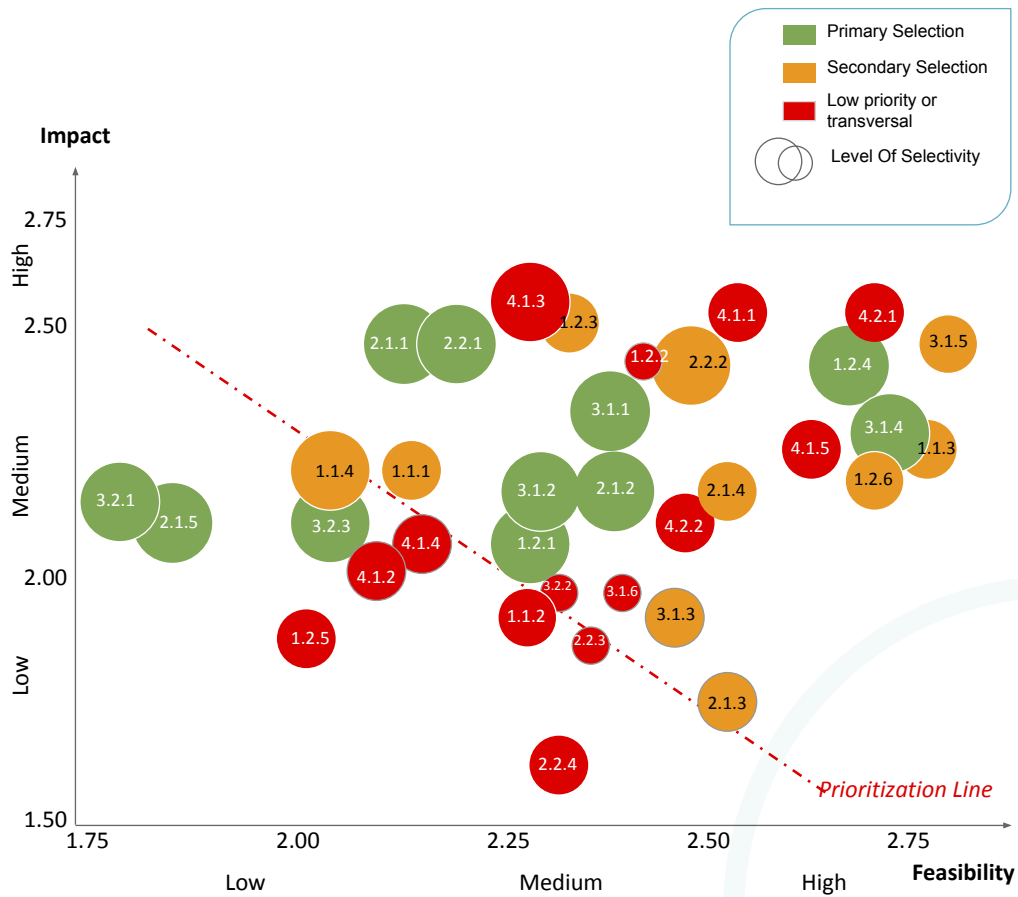** Please no more than 10 "X"s in the "Yes" column.*

**^ Vision - Initiative - Action score card sample**

DEVELOPING ACTION STRATEGIES

>>>   **7**   Qualitative rankings were given numerical values and ranked on an action feasibility and impact matrix that showed a fully weighted score and allowed the project team to identify the most highly prioritized actions

8 Resulting top 20 actions are the Resilience Plan recommendations

ENVIRONMENT & SOCIETY

ECONOMY & SOCIETY

INFRASTRUCTURE & ENVIRONMENT
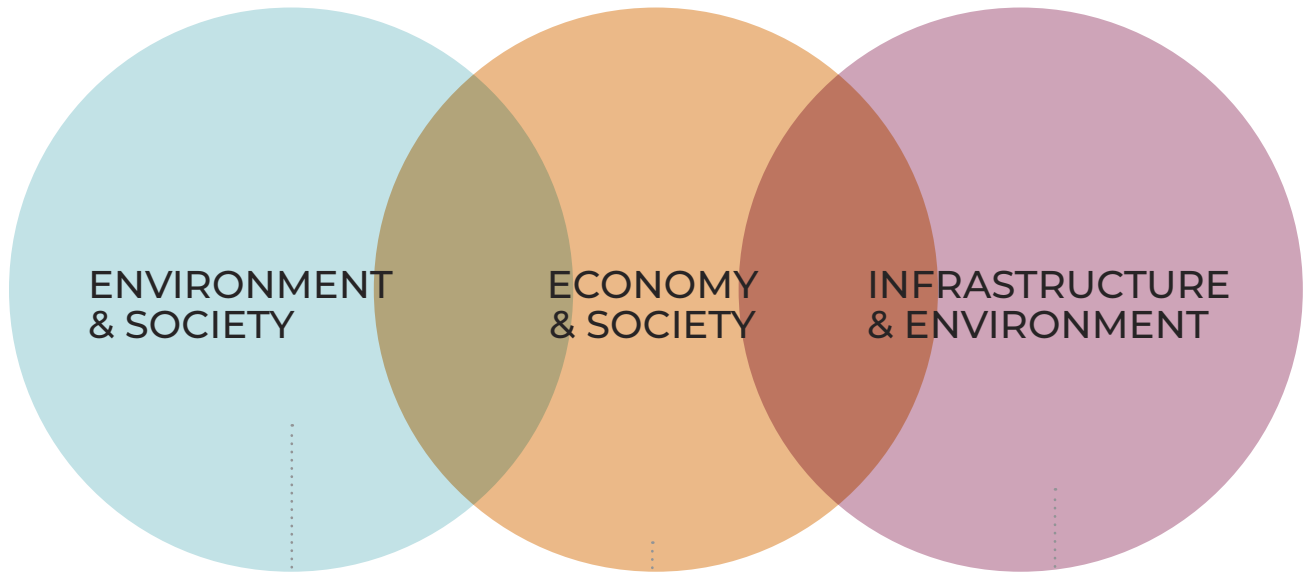
VISION 1

1 Identify Gaps That May Exist In Current Partnerships And/Or Employment Sectors To Create More Meaningful And Intentional Stakeholder Relationships

2 Create A Regional Resilience Resource Center That Can Serve As A Space For Consolidated Community Resources

3 Engage Stakeholders In Collaborative Decision Making And Implementation Of Watershed Restoration & Water Quality Plans

4 Accelerate Local Efforts To Improve Communities By Replacing Grey Impervious Surfaces With Green Spaces

5 Add Additional Healthy Food Programs So More Residents Have Access To Fresh, Locally-Sourced Foods

6 Improve Public Spaces, Community Health And Reduce Crime Through Environmental Design

7 Increase Access To And Understanding Of Existing Resources By Connecting Residents To Available Community Resources

8 Expand The Existing Litter Pickup Programs And Change Behaviors Through Targeted Communication Campaigns

VISION 2

9 Launch A Utilities Efficiency Program To Improve Low-Income Housing And Boost Employment

10 Create/Connect Job Training / Shadowing Program With The Schools And Major Employers In The Region

11 Develop Entrepreneurship Opportunities With Direct Links To Water And Energy Technologies That Meet Future Job Needs

12 Support The Creation Of And Training For Jobs Related To Sustainability In Specific Industries And Trades

13 Create Pathways To Career Success For Young Men And Women Of Color

14 Design A Suite Of Inclusive Business Development Services To Help Entrepreneurs Of Color Gain Equal Footing In The Milwaukee Region's Economy

VISION 3

15 Develop And Implement Sustainable Practices Through Bids And Businesses Across The Region

16 Drive A Regional Energy Efficiency Program

17 Assess The Reliability Of Critical Infrastructure By Performing A Criticality Analysis

18 Establish A Policy Review And Response Mechanism

19 Increase Green Infrastructure In The Region

20 Develop And Implement A Plan To Make Critical Infrastructure Around Water Systems Cyber Resistant
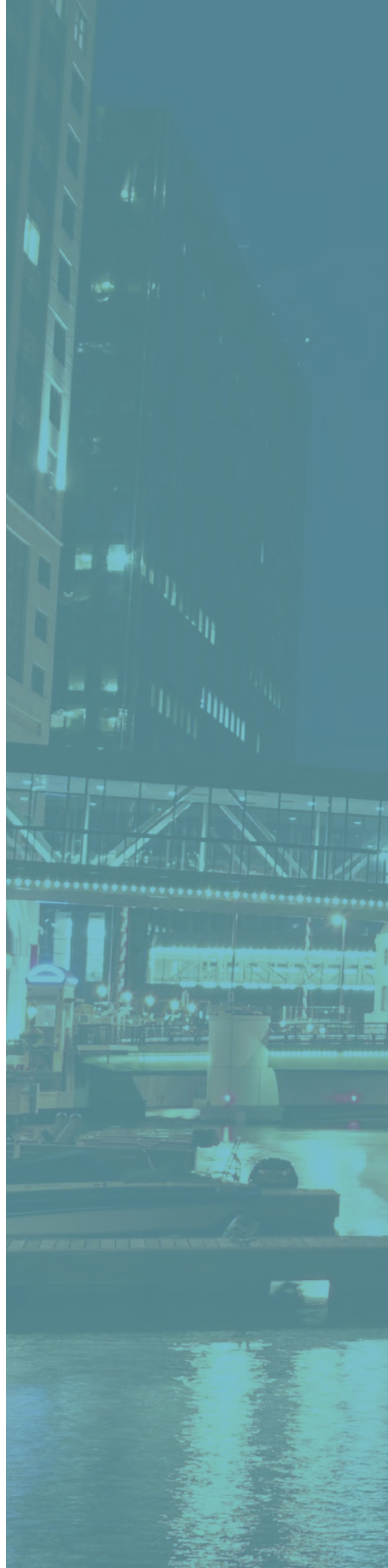
PART 3

Visions and Action Strategies

Part 3

01

ACTION STRATEGIES

The following section details the 20 actions chosen by stakeholders. The actions are grouped into three vision categories and have focus areas that are in-line with the 100 Resilient Cities focus areas.

1 VISION 1 ENVIRONMENT & SOCIETY

focuses on creating a path toward increasing well-being for community members by mobilizing them around key issues and by improving the quality of public spaces and services. The actions focus on addressing the environment and society.

2 VISION 2 ECONOMY & SOCIETY

looks to improve access to jobs by creating and connecting people to current and future opportunities to close the wealth gap and ensure that quality of life is not determined by race or ethnicity. The vision is to create a community in which intergenerational wealth-building opportunities are accessible to all and that youth are connected to educational opportunities that prepare them for their careers. The actions focus on addressing the economy and society.

3 VISION 3 INFRASTRUCTURE & ENVIRONMENT

understands that infrastructure (both new and aging) strain budgets and can limit the growth potential for businesses and communities. Innovation and new technologies have the potential to save time and money and individually contribute to resilience. But to have a truly resilient region, new systems must be created and old ones adapted. This vision takes a collaborative approach on adapting critical infrastructure to the challenges of the 21st century to mitigate risk, optimize assets, and enhance the quality of life. The actions focus on addressing infrastructure and the environment.

VISION 1

1 Identify.
2 Create.
3 Engage.
4 Improve.
5 Access.
6 Design.
7 Connect.
8 Expand.

VISION 2

9 Launch.
10 Connect.
11 Develop.
12 Support.
13 Create.
14 Design.

VISION 3

15 Implement.
16 Drive.
17 Assess.
18 Establish.
19 Increase.
20 Plan.

ACTION STRATEGIES

VISION 1

Make the Milwaukee region a better place to live by improving the public's participation in decision making and their environment.

Action Pages

On the following pages each action includes a goal, an objective, risks addressed (identified by the icon in the upper left corner), as well as the status and suggested lead. The Plan is meant to be a guide, rather than a prescription and stakeholders will play varying roles in implementation.

5 Access.

4 Improve.

3 Engage.

2 Create.

1 Identify.

VISIO

Actions

Improve dialogue with residents and key stakeholders

1

Identify Gaps That May Exist In Current Partnerships And/Or Employment Sectors To Create More Meaningful And Intentional Stakeholder Relationships

2

Create A Regional Resilience Resource Center That Can Serve As A Space For Consolidated Community Resources

3

Engage Stakeholders In Collaborative Decision Making And Implementation Of Watershed Restoration & Water Quality Plans

4

Accelerate Local Efforts To Improve Communities By Replacing Grey Impervious Surfaces With Green Spaces

Promote a safe and sustainable community

5

Add Additional Healthy Food Programs So More Residents Have Access To Fresh, Locally-Sourced Foods
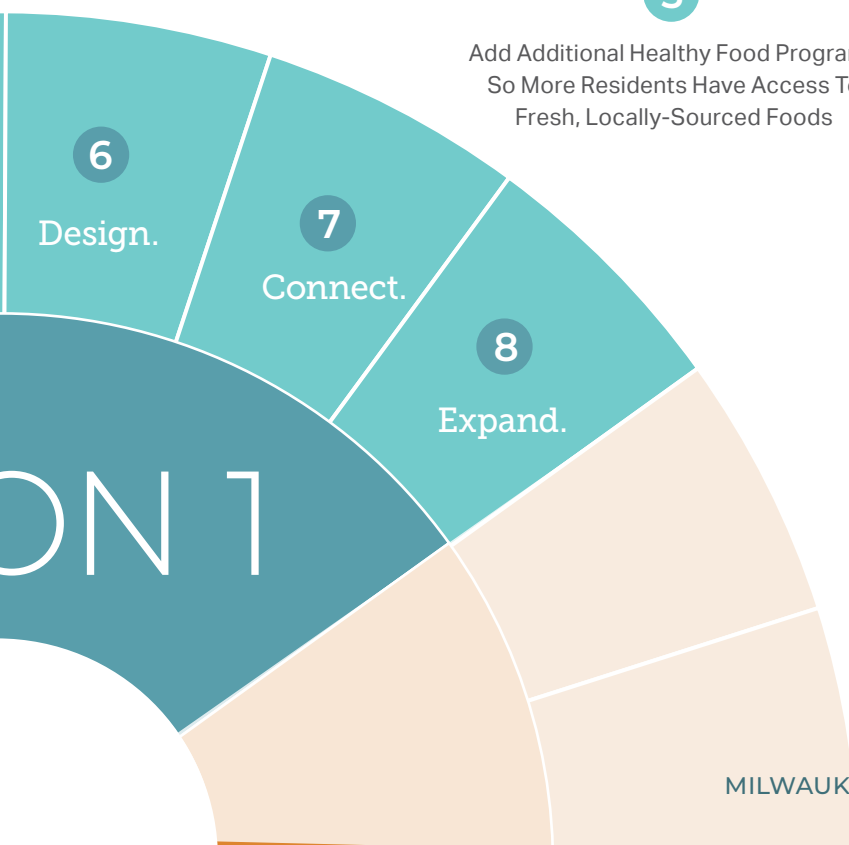
6

Improve Public Spaces, Community Health And Reduce Crime Through Environmental Design

7

Increase Access To And Understanding Of Existing Resources By Connecting Residents To Available Community Resources

8

Expand The Existing Litter Pickup Programs And Change Behaviors Through Targeted Communication Campaigns

6 Design.

7 Connect.

8 Expand.

ON 1

Action 1

Identify Gaps That May Exist In Current Partnerships And/Or Employment Sectors To Create More Meaningful And Intentional Stakeholder Relationships

STATUS
● New Action
● To Be Scaled Up
● Ongoing

LEAD
● Municipalities
● Non-profit/ Business Partner
● MMSD

● **SOCIAL EQUITY**

● **ABILITY TO ADAPT TO JOB MARKET CHANGES**

● **DISTRIBUTION OF PUBLIC SERVICES**

OBJECTIVE

Leverage existing partnerships and identify new opportunities with stakeholders to create and expand meaningful employment and job training opportunities.

DESCRIPTION

Boosting employment opportunities for underserved communities can be achieved by establishing and increasing partnerships between companies, communities, municipalities and public entities at the regional level. The intent of this action is to create a regional cohesive working group of municipalities, local businesses and non-profit organizations whose mission is to:

- Identify the gaps between employment opportunities and demand in sectors ranging from trades to technologies
- Identify the initiatives that are already in place in the region that can be leveraged such as UMOS's workforce development program, LISC's leadership and training program and West Allis's Five Year Strategic Plan
- Establish partnerships between municipalities, businesses and non-profit organizations to help fill the gaps and boost employment at the local level

IMPLEMENTATION

1 Identify existing local initiatives/ partnerships

2 Establish intentional stakeholder partnerships and create a one-stop shop to fill gaps

3 Identify gaps that exist

PARTNERSHIP EXAMPLES: *School Districts, Businesses, UMOS, Meta House, Employ Milwaukee*

RISK MITIGATION

By developing partnerships between companies, communities, municipalities and public entities at the regional level, this action would help job seekers to better understand the local job market. This action would represent an improvement in the distribution of public services and would contribute to creating better social equity.

REFERENCE

West Allis, WI

The City of West Allis has identified this action in its City of West Allis Five Year Strategic Plan: 2017 –2021.

Action 2

Create A Regional Resilience Resource Center That Can Serve As A Space For Consolidated Community Resources

SOCIAL EQUITY

$ FUNDING SOURCE EXAMPLE

Municipal Planning/ Development Departments, Emergency Management Departments of Emergency Response Services.

+ RISK MITIGATION

Improve social equity by ensuring that every neighborhood has the ability to access information and assistance.

REFERENCE

West Allis, WI

West Allis plans to create the "City 101 Academy" to deepen resident and stakeholder knowledge regarding city services and budget/plans/priorities, and strategic goals and outcomes/ progress of city-wide plan alignment. The initiative could be used as a basis for the creation of a Regional Resilience Resource Center.

source: World National Bank Database

OBJECTIVE

Promote resilience at the local level and across the region by creating a resource center with consolidated information and services.

DESCRIPTION

A Regional Resilience Resource Center can increase residents' knowledge and participation in resilience at the local and regional level. Community resources include events that promote: health and human services (e.g., lead education), recreation and culture (e.g., park programs), and decisions about municipal projects (e.g., street repaving with additional pedestrian enhancements). The goal is to:

- Inform residents of how being proactive can improve resilience and how resilience benefits the community
- Present and promote local projects, initiatives and services around resilience
- Host workshops & classes with emergency services
- Organize community resource mapping initiatives to map neighborhood assets in order for the residents to better identify what the community assets are (social, infrastructure, emergency), the characteristics and places that make neighborhoods strong, and provide crucial support in times of emergency
- Enhance residents' participation and empower stakeholders in the decision-making processes to guide public investment. This can be done by ensuring meeting times and locations are offered for people working during the day (i.e., night meetings) and including meaningful opportunities for decision making about expenditures. Using non-traditional ways of engaging people such as webinars, electronic communication, training and surveys, should also become a standard

The Regional Resilience Resource Center could be accessed through the municipalities' websites and could be a shared resource by multiple municipalities.

IMPLEMENTATION

1 Create inventory of programs and events

2 Consolidate existing programs and events into a single space

3 Identify new needs and opportunities for information and services

4 Create community mapping plan

5 Advertise and promote events

PARTNERSHIP EXAMPLE: *Planning, Neighborhood Development, Communications, Emergency Departments*

LEADERSHIP: *Civic leagues, faith-based communities, non-profit organizations*

Action 3

Engage Stakeholders In Collaborative Decision Making And Implementation Of Watershed Restoration & Water Quality Plans

STATUS
- New Action
- To Be Scaled Up
- Ongoing

LEAD
- Municipalities
- Non-profit/ Business Partner
- MMSD

CLIMATIC HAZARD

SOCIAL EQUITY

OBJECTIVE

Engage stakeholders (both professional and public) in decision-making around the connections between land, water and people.

DESCRIPTION

Watershed restoration plans provide comprehensive recommendations for watershed health that address four interrelated areas: flooding, habitat conditions, water quality and recreational use. Engaging stakeholders (both professional and public) in decision-making in plan development allows for recommendations to move beyond decisions around land and water. Understanding how land and water projects can be designed to incorporate more benefits (i.e., extension of trails, park improvements, acceleration of other capital projects in the neighborhood) can improve the quality of life for residents within the watershed and provide an opportunity for multiple stakeholders to benefit from these long-term plans.

Public and private partners are working together to develop water quality improvement plans that will provide additional guidance to delist impaired water bodies and identify actions to improve the overall quality of water resources. The water quality improvement plans will incorporate and dovetail with existing and future watershed plans.

IMPLEMENTATION

1. Create engagement strategy and project milestones

2. Ensure stakeholders understand the problem

3. Present options and provide meaningful ways for decision making

4. Incorporate multi-faceted quality of life components

RISK MITIGATION

From a financial perspective, identifying recommendations that meet multiple goals (e.g., habitat and recreational) provides an opportunity for the development of cost-effective projects that address climate change and can reduce overall project costs.

REFERENCE

SEWRPC Community Assistance Planning Report No. 316, A Restoration Plan for the Root River Watershed

Using existing plans and recent scientific data from established sources, planners at the Southeastern Wisconsin Regional Planning Commission, working with an advisory group of experts and interested parties, developed specific, targeted recommendations to improve water quality, recreational access and use, habitat conditions, and to reduce flooding in the Root River Watershed. These water quality recommendations include measures to reduce the levels of phosphorus, bacteria, and pollutants and can be found at www.sewrpc.org/SEWRPCFiles/Publications/CAPR/CAPR-316-root-river-executive-summary.pdf.

Action 4

Accelerate Local Efforts To Improve Communities By Replacing Grey Impervious Surfaces With Green Spaces

STATUS
- ○ New Action
- ● To Be Scaled Up
- ○ Ongoing

LEAD
- ● Municipalities
- ● Non-profit/ Business Partner
- ● MMSD

CLIMATIC HAZARD

SOCIAL EQUITY

DISTRIBUTION OF PUBLIC SERVICES

VULNERABILITY OF CRITICAL INFRASTRUCTURE

$ FUNDING SOURCE EXAMPLE

Municipal Planning/Development Departments, Emergency Management Departments of Emergency Response Services.

+ RISK MITIGATION

Removing impervious surfaces and replacing them with green (grass, trees, etc.) not only makes the spaces more attractive, but also creates spaces that contribute to lowering air temperatures during a heat wave, reduces stormwater runoff, and improves the neighborhood environment and air quality. This action addresses the climatic hazard and vulnerability of critical infrastructure while improving public services and social equity.

OBJECTIVE

Reduce stormwater runoff, energy costs, impacts of climate change, and the urban heat island effects.

DESCRIPTION

Depaving and removing grey impervious surfaces reduces stormwater runoff, allows for natural infiltration and creates public green spaces. This action aims to accelerate work that is being done by the municipalities and entities like MMSD to green the region's public spaces by continuing to push for green infrastructure to "manage rainwater where it falls" (MMSD Regional Green Infrastructure Plan) as well as increasing tree canopy in the public spaces (playgrounds, streets, sidewalks), with a focus on low-income neighborhoods. Tree City USA is an example of a program that supports municipalities in increasing tree canopy. Municipalities such as Milwaukee, Oak Creek and Wauwatosa are already part of that program, and their experience should be shared with the remaining Milwaukee region.

IMPLEMENTATION

1 Identify and prioritize publicly owned parcels with substantial impervious space

2 Increase funding that can support investments in green space and associated co-benefits

3 Identify and eliminate duplication of effort and waste

4 Implement projects that meet multiple triple bottom line objectives (i.e., social, environmental and economic)

5 Share best management practices with other partners

REFERENCE

depave

depave is a non-profit organization in Portland, Oregon that promotes the transformation of over-paved places to overcome the social and environmental impacts of pavement. They engage communities and reconnect urban landscapes to nature through action-oriented projects, education, advocacy and stewardship.

© depave

Action 5

Add Additional Healthy Food Programs So More Residents Have Access To Fresh, Locally-Sourced Foods

STATUS
- ⬤ New Action
- ⬤ To Be Scaled Up
- ⬤ Ongoing

LEAD
- ⬤ Municipalities
- ⬤ Non-profit/ Business Partner
- ⬤ MMSD

SOCIAL EQUITY

DISTRIBUTION OF PUBLIC SERVICES

$ FUNDING SOURCE EXAMPLE

Local Food Promotion Program (see Description).

+ RISK MITIGATION

Identifying clusters of negative health outcomes will help to target the evaluation of available food and food services. Focusing implementation of food programs and workshops in these areas as a start would directly impact social inequality by improving the health of residents through targeted services and programs.

OBJECTIVE

Expand programs to promote access to local and healthy food.

DESCRIPTION

Increasing access to healthy food can improve the health and well-being of the region's population. A healthy population is essential to the resilience of the region. With over 83% of Milwaukee Public Schools students enrolled in the Free and Reduced Lunch program, including schools in the Green and Healthy School Program, this would help to support access to healthy food. The Green and Healthy School Program addresses nine focus areas related to health, sustainability and the environment. Related to food, schools evaluate their effort to provide proper and balanced nutrition and couple that with curriculum related to food systems, physical health, and school policies. However, this model should be expanded beyond schools to address social inequality.

Increasing the quantity and accessibility of healthy food programs can be coupled with municipalities and public partners hosting workshops to teach residents how to prepare meals, use healthier food options and read nutrition labels. Programming around how to use SNAP benefits, particularly connecting residents to local farmers markets that accept SNAP should be part of workshops.

The Local Food Promotion Program (LFPP) offers grant funds with a 25% match to support the development and expansion of local and regional food business enterprises to increase domestic consumption of, and access to, locally and regionally produced agricultural products, and to develop new market opportunities for farm and ranch operations serving local markets.

IMPLEMENTATION

1. Identify target neighborhoods through GIS mapping
2. Create mobile market to send to priority areas
3. Replicate successful healthy food workshops
4. Create and implement promotional strategy for program awareness

REFERENCE

Sixteenth Street Community Health Centers: Healthy Choices Program

Through family education and community advocacy, the Healthy Choices Program strives to improve health outcomes through education. A 12-week bilingual family program provides nutrition education, healthy cooking strategies, physical activities that can be replicated at home, and stress management techniques.

Action 6

Improve Public Spaces, Community Health And Reduce Crime Through Environmental Design

STATUS
● New Action
● To Be Scaled Up
● Ongoing

LEAD
● Municipalities
● Non-profit/ Business Partner
● MMSD

SOCIAL EQUITY

VULNERABILITY OF CRITICAL INFRASTRUCTURE

$

FUNDING SOURCE EXAMPLE

City budget provided to the Mayor's Office of Criminal Justice (MOCJ) and asset forfeiture in the case of NYC.

+

RISK MITIGATION

To promote public safety in high-crime neighborhoods, CPTED principles could be developed for low- and no-cost changes to buildings, parks, and other features of an established environment that could reduce crime, improve social equity and decrease the vulnerability of critical infrastructure. Public spaces can be improved through investments in green infrastructure that reduce stress on the water infrastructure system and can integrate CPTED principles during design.

OBJECTIVE

Improve the quality of life for residents and reduce crime by altering the physical design of public and private spaces.

BUDGET EXAMPLE

Budget required: $51.5 M - (ratio: $6.3/inhabitant) for NYC
Cost savings: For every $1 invested = $1.33 in return

DESCRIPTION

The social determinants of health are conditions in the places where people live, work and play; oftentimes, they can have a greater impact on health outcomes than access to health care. Proper urban design of public spaces can ensure physical activity, positive activation of the space, integration of multi-modal transportation, and Crime Prevention Through Environmental Design (CPTED). CPTED is a multi-disciplinary approach to deterring criminal behavior by altering the physical design and encouraging legitimate use of public spaces. CPTED design components should take into consideration sight lines, lighting, landscaping and physical security. Integrating CPTED principles into planned retrofits or redevelopment can help build a sense of community and help neighbors gain control of their public spaces.

IMPLEMENTATION

1 Identify priority areas based on population, available space, and planned expenditures

2 Create comprehensive plans that take into account all aspects—the public should be engaged at all stages of planning

3 Create and implement a phased approach for public space redevelopment

4 Amend land use regulations, such as zoning ordinances, to incorporate CPTED principles

REFERENCE

30th Street Corridor flood relief project—Milwaukee, WI
*Concept rendering of project site (left)

Partners including MMSD, the City of Milwaukee, the Milwaukee Police Department, the Milwaukee Fire Department, the Milwaukee County District Attorney's Office, Safe and Sound, WHEDA, Wisconsin Department of Natural Resources, The Corridor, Clean Wisconsin, and Northwest Side Community Development Corporation have worked together to create a new green space in the heart of a neighborhood plagued with flooding. Although the primary function of this space is to hold 8.5 million gallons of stormwater, residents held an active seat at stakeholder and community meetings through the planning and design phases to ensure priority neighborhood aesthetic, recreational and safety concepts were incorporated into the project.

Increase Access To And Understanding Of Existing Resources By Connecting Residents To Available Community Resources

STATUS
● New Action
● To Be Scaled Up
○ Ongoing

LEAD
● Municipalities
○ Non-profit/ Business Partner
○ MMSD

DISTRIBUTION OF PUBLIC SERVICES

SOCIAL EQUITY

RISK MITIGATION

The purpose of this action is to improve communication with residents and provide simplified public access to the local government, thus contributing to better access to public services and improved social equity by providing all residents easy access to affect change in their neighborhoods and lives.

REFERENCE

Milwaukee, WI

In June of 2006, the City implemented (414) 286-CITY (2489), the single access telephone number for all City services and information. The purpose of (414) 286-CITY (2489) is to streamline public access to City government. The same suite of services are also available online in an easy to use portal.

OBJECTIVE

Increase awareness and use of community resources to improve the quality of life for vulnerable populations.

DESCRIPTION

Community resources exist to help address a variety of issues that residents may face. The problem is, some of the people that may benefit the most from these resources are unaware of their existence and/or do not use them. Increasing awareness of these resources will lead to increased use of the resources. In doing so, resilience is improved because awareness, access, and use of services decreases inequity.

Community resources including social services, municipal services and public safety are available to all residents. Because of a lack of awareness, the use of these services is not being maximized particularly by the people that could benefit the most from the services. Not knowing about these resources increases disparity and can negatively impact the quality of life for the most vulnerable populations (i.e. minorities, non-native English speakers, low-income, and elderly).

Community resources fall into the following three categories:

1. **Social services:** Provides connections to information and resources related to utility assistance, housing, food, elder care, crisis intervention, alcohol and drug recovery and more. This service is provided through Impact 2-1-1 and can be accessed by calling 2-1-1.

2. **Municipal services:** Provides connections to report and request more information related to public services such as trash/recycling, replacement of street lights, graffiti, and property nuisances. See reference below.

3. **Public safety:** Provides access to both emergency and non-emergency police. Often, residents are unaware that they can report crime anonymously. By opening communication with police, crimes can be logged more accurately which results in more accurate man power distribution.

IMPLEMENTATION

1 Identify resources offered for your community

2 Create communication platform to increase awareness

3 Promote use through integration with existing outreach efforts

Action 8

Expand The Existing Litter Pickup Programs And Change Behaviors Through Targeted Communication Campaigns

STATUS
- New Action
- To Be Scaled Up
- Ongoing

LEAD
- Municipalities
- Non-profit/ Business Partner
- MMSD

DISTRIBUTION OF PUBLIC SERVICES

SOCIAL EQUITY

$ FUNDING SOURCE EXAMPLE
- People could opt to donate a monthly fee on their water bill.
- Corporate sponsors.

Adopt-A-Beach

+ RISK MITIGATION
Awareness and communication campaigns should highlight creating a social norm for clean communities with a focus on individual behavior. It will enhance social equity and contribute to improved distribution of public services regarding waste removal. The goal is to beautify public spaces and build social cohesion.

OBJECTIVE

Empower and educate residents in order to reduce the amount of litter in public spaces and on the street and take pride in their community.

DESCRIPTION

Every April, Milwaukee Riverkeeper helps clean 55 locations across the Milwaukee River Basin and involves 4,000 volunteers. Developing and scaling up litter pickup programs in conjunction with a communications platform allows people to gain ownership of their spaces and participate in keeping their community clean and safe.

A strong contributor to littering is the presence of existing litter and lack of receptacle bins. Ensuring consistent and ongoing cleanup efforts at a neighborhood scale is crucial. As stated in the 'Broken Windows' theory, visible signs of decay in a neighborhood signal public disinterest and encourage crime. Keep America Beautiful suggests property values may decrease by 7% due to the presence of litter. In addition, getting individuals to physically touch litter by picking it up is proven to be an effective way of raising awareness about waste management that leads to behavior change: reduce, recycle, reuse, restore.

IMPLEMENTATION

1 Create Adopt-A-Street program

2 Contract out litter pickup with workforce development agency

3 Municipalities provide containers to households

4 Cigarette butt campaign to reduce litter

REFERENCE

Keep America Beautiful

Litter is costly to clean up, degrades our quality of life and economic development, and eventually ends up in our waterways and Lake Michigan. Changing behavior is key to preventing littering. The presence of litter and lack of receptacles encourages littering. The cost of litter abatement is substantial and is estimated at $11.5 billion annually for the U.S. Studies suggest that ongoing cleanup efforts are necessary at all scales (individual to municipal).
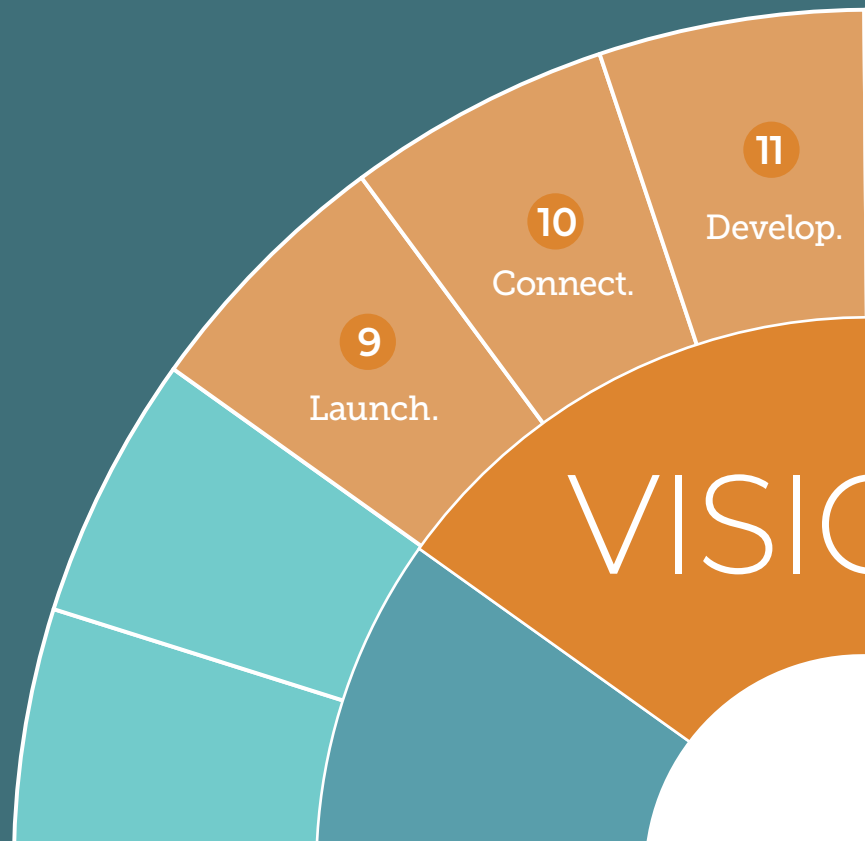
VISION 2

Boost the region's economic vitality through innovative job creation and access to equal opportunities

Action Pages

On the following pages each action includes a goal, an objective, risks addressed (identified by the icon in the upper left corner), as well as the status and suggested lead. The Plan is meant to be a guide, rather than a prescription and stakeholders will play varying roles in implementation.

11

Develop.

10

Connect.

9

Launch.

VISIO

Actions

Establish a direct link between regional innovation and job creation

9

Launch A Utilities Efficiency Program To Improve Low-Income Housing And Boost Employment

10

Create/Connect Job Training / Shadowing Program With The Schools And Major Employers In The Region

11

Develop Entrepreneurship Opportunities With Direct Links To Water And Energy Technologies That Meet Future Job Needs

12

Support The Creation Of And Training For Jobs Related To Sustainability In Specific Industries And Trades

Equal opportunity for all

13

Create Pathways To Career Success For Young Men And Women Of Color

14

Design A Suite Of Inclusive Business Development Services To Help Entrepreneurs Of Color Gain Equal Footing In The Milwaukee Region's Economy

12
Support.

13
Create.

14
Design.

ON 2

Action 9

Launch A Utilities Efficiency Program To Improve Low-Income Housing And Boost Employment

STATUS
- New Action
- To Be Scaled Up
- Ongoing

LEAD
- Municipalities
- Non-profit/ Business Partner
- MMSD

ABILITY TO ADAPT TO JOB MARKET CHANGES

SOCIAL EQUITY

DISTRIBUTION OF PUBLIC SERVICES

OBJECTIVE

Create workforce development opportunities and improve low-income housing by creating and expanding training programs for under- and unemployed residents.

DESCRIPTION

Efficient home energy and water systems save property owners and taxpayers money by reducing overall utilities consumption. Energy efficiency also reduces the use of traditional energy sources thus reducing climate-change-causing greenhouse gasses. Yet not everyone can afford to make the up-front investment in water or energy-saving systems.

This is especially true for low-income residents.

Improving the utilities efficiency of low-income housing can create new jobs in the water and energy fields such as plumbing, heating and cooling. Reduced energy consumption through efficiency programs improves local housing stock through the investment, reduces the use of fossil fuels and saves homeowners money.

This action aims to:

- Provide training and employment opportunities by implementing partnerships between municipalities and contractors
- Form a task force at the municipal level with newly trained workers to repair and improve damaged utilities systems for low-income households

IMPLEMENTATION

Steps for implementation will be identified with partners.

REFERENCE

Reference: Existing Programs

This action is inspired by two programs already implemented in Milwaukee that could be replicated and / or scaled up:

- the Milwaukee Energy Efficiency (Me²) program aimed at financing energy saving improvements
- the TIN (Targeted Investment Neighborhood) program designed to sustain and increase owner-occupancy

RISK MITIGATION

Providing support to low-income populations with training programs would mitigate risks related to adaptation to job market changes, social equity and distribution of public services.

Action 10

Create/Connect Job Training/Shadowing Program With The Schools And Major Employers In The Region

STATUS
- New Action
- To Be Scaled Up
- Ongoing

LEAD
- Municipalities
- Non-profit/ Business Partner
- MMSD

ABILITY TO ADAPT TO JOB MARKET CHANGES

SOCIAL EQUITY

DISTRIBUTION OF PUBLIC SERVICES

OBJECTIVE

Identify opportunities to connect youth with companies to introduce them to a variety of jobs through hands-on job training and shadowing programs.

DESCRIPTION

According to the Education Commission of the States, business leaders in Wisconsin cannot find the science, technology, engineering and mathematics (STEM) talent they need to stay competitive.* At the same time, STEM jobs are expected to grow by 8% in the next 10 years whereas non-STEM jobs are expected to grow by 4%.* The industry projections developed by the Wisconsin Department of Workforce Development predict that demand in sectors such as education and health services and financial activities are expected to grow through 2024. Those numbers support the creation of job training / shadowing programs in partnership with the schools and major employers in the region to meet future job market needs.

Before creating a new program, programs that already exist should be identified as well as the gaps between those and the job market needs and the local businesses willing to participate in a job shadowing / training program. Partnership agreements between schools and local employers could be put in place to create a pipeline of students to training opportunities. These efforts can be scaled up by establishing partnerships with new businesses, providing additional training, and better connecting youth to these opportunities.

MMSD Workforce Development

RISK MITIGATION

Increasing job opportunities for youth reduces social inequalities while helping the population to adapt to job market changes and improving the distribution of new public services.

IMPLEMENTATION

1. Identify existing programs and gaps
2. Create partnerships with schools and employers
3. Promote to schools and students

REFERENCE

Milwaukee 7 Talent Partnership GROW HERE Campaign

GROW HERE brings industry and education together to help students discover careers. GROW HERE is a partnership that connects companies and career coaches with educators and students. GROW HERE is designed to dramatically increase career-based learning in the Milwaukee region and drive young people to careers in high-potential growth industries through career-based learning experiences.

Partnership Examples: School Districts, Businesses, UMOS, Meta House, Employ Milwaukee, Social Development Commission, LISC

* http://vitalsigns.ecs.org/state/wisconsin/overview

Action 11

Develop Entrepreneurship Opportunities With Direct Links To Water And Energy Technologies That Meet Future Job Needs

STATUS
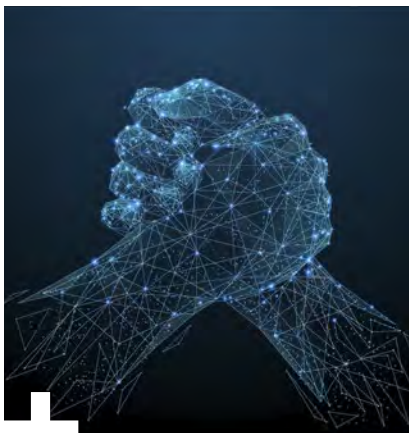- New Action
- To Be Scaled Up
- Ongoing

LEAD
- Municipalities
- Non-profit/ Business Partner
- MMSD

ABILITY TO ADAPT TO JOB MARKET CHANGES

VULNERABILITY OF CRITICAL INFRASTRUCTURE

OBJECTIVE

Support the emergence and reinforcement of entrepreneurship and innovation to adapt to market changes in the water and energy sectors.

DESCRIPTION

© The Milwaukee Water Council

The region continues to emerge as a major national actor in the water and energy sectors. The Water Council, the Global Water Center and the Midwest Energy Research Consortium (M-WERC) are initiatives that demonstrate the vitality of the region as a hub for the water and energy sectors. The intersection between water and energy sectors represents an opportunity for synergistic research programs and entrepreneurship initiatives.

This action seeks to identify the use of existing facilities, programs and resources such as the Global Water Center, the M-WERC, and the Milwaukee County Research Park in Wauwatosa. The goal is to identify and grow the region as an attractive national leader in the water and energy sectors.

RISK MITIGATION

By creating an environment conducive to innovation, investment and job opportunities, this action aims to create long-term benefits that would reduce costs and increase efficiency of water and energy facilities .

IMPLEMENTATION

1. Identify the synergies between the water and energy sectors' stakeholders
2. Build a joint entrepreneurship program based on the identified needs
3. Accompany and mentor startups
4. Develop internship programs

LEADERSHIP: Water Council, M-WERC

PARTNERSHIP EXAMPLE: Milwaukee County Research Park, We-Energies, MMSD, Milwaukee Water Works, Universities, The Water Equipment and Policy Center

REFERENCE

Municipal Strategic Plans

This action is inspired by two strategic actions identified by the cities of Milwaukee and Wauwatosa:

- Grow Milwaukee's cluster of energy efficient and clean tech companies to create local jobs and exports (ReFresh Milwaukee Plan)
- Advance efforts to plan for and accommodate spin-off businesses generated by the Research Park and educational institutions (Wauwatosa)

Action 12

Support The Creation Of And Training For Jobs Related To Sustainability In Specific Industries And Trades

STATUS
- New Action
- To Be Scaled Up
- Ongoing

LEAD
- Municipalities
- Non-profit/ Business Partner
- MMSD

ABILITY TO ADAPT TO JOB MARKET CHANGES

SOCIAL EQUITY

OBJECTIVE

Promote, adjust and create jobs related to sustainability.

DESCRIPTION

The water, waste and energy sectors represent job opportunities that must be taken advantage of by the region.

In the water sector alone, between 130 and 150 water-related companies are located in the Milwaukee region, including five of the 11 largest water firms in the world. Therefore, training and preparing individuals for jobs related to sustainability makes sense now and for the future.

Through partnerships between public entities like MMSD and private companies, the goal is to provide job opportunities to train residents in needed workforce sectors, particularly those related to infrastructure.

Examples of jobs include wastewater treatment operator, sustainability analyst, electrical field technicians, production managers, solar panel technician, green HVAC/R technician, sustainable industrial designer and green construction manager.

IMPLEMENTATION

1. Partner with public agencies
2. Develop training and certification programs
3. Establish partnerships with private sector
4. Support creation and development of businesses that can supply workers
5. Develop policy that guides opportunities to impacted communities

RISK MITIGATION

Supporting the creation of and training for jobs related to sustainability requires an understanding of the barriers and an identification of the gaps between supply and demand.

The action would also benefit residents living in low-income neighborhoods by providing jobs.

REFERENCE

Green infrastructure jobs

- The Department of Environmental Protection (DEP) of New York City plans to hire 260 maintenance and horticultural workers to monitor and maintain the agency's growing number of bioswales (9,000) and other stormwater- management tools in public areas.

- The Northeast Ohio Regional Sewer District (NEORSD) in Cleveland will create 146 direct jobs to maintain green infrastructure, and indirectly create 73 jobs.

NEORSD employees
facebook.com/yoursewerdistrict/photos

Action 13

Create Pathways To Career Success For Young Men And Women Of Color

STATUS
- New Action
- To Be Scaled Up
- Ongoing

LEAD
- Region
- Non-profit/ Business Partner
- MMSD

ABILITY TO ADAPT TO JOB MARKET CHANGES

SOCIAL EQUITY

$ FUNDING SOURCE EXAMPLE

Philanthropy, corporate sponsorships

+ RISK MITIGATION

This action supports social equity by increasing the number of people of color who are succeeding academically and socially in schools. An additional benefit is the ability to introduce individuals to new careers or vocational opportunities.

OBJECTIVE

Increase job opportunities for people of color to reduce social inequalities.

BUDGET EXAMPLE

Budget required: $25 M - (ratio: $60/inhabitant)
Cost savings: For every $1 invested = $2 in return

DESCRIPTION

The Milwaukee Public Schools District has already joined the My Brother's Keeper effort and will collaborate with families, other branches of government, local businesses and community organizations to increase the number of males of color who are succeeding academically and socially in schools. The goal is to improve long-term outcomes of men and boys of color.

This and other programs provide strategies to help ensure children enter kindergarten ready to learn, all students graduate from high school ready for college or a career, and that students have access to higher education or job training. The creation of pathways to career success for people of color should be scaled up all across the region through local programs like *Teens Grow Greens* and *Earn & Learn*.

IMPLEMENTATION

1 Create mentor program to connect students to volunteer mentors from local businesses, organizations and associations

2 Develop professional skills like goal setting, communication and time management

3 Provide career exploration in partnership with local universities

LEADERSHIP: Region

PARTNERSHIP EXAMPLE: Municipalities, school districts, local colleges and universities, local employers, Urban Strategies Council

REFERENCE

Reference: Oakland, CA

The City of Oakland is advancing the My Brother's Keeper Local Action Plan. As part of Oakland Promise, the city is going to launch Future Centers, which are college and career hubs on middle-school and high-school campuses.

They will provide support to these students to develop college and career plans. Future Centers will also help connect students with financial aid, scholarships, and internships.

The *"Classroom2Careers"* program will offer meaningful opportunities for youth to gain real-world internship experience.

Action 14

Design A Suite Of Inclusive Business Development Services To Help Entrepreneurs Of Color Gain Equal Footing In The Milwaukee Region's Economy

STATUS
- ● New Action
- ● To Be Scaled Up
- ● Ongoing

LEAD
- ● Region
- ● Non-profit/ Business Partner
- ● MMSD

ABILITY TO ADAPT TO JOB MARKET CHANGES

SOCIAL EQUITY

OBJECTIVE

Create a diverse and thriving job base that supports communities of color.

BUDGET EXAMPLE

Budget required: $1 M /year (loan volume) in Oakland, California
Cost savings: $6 M at the end of year three for Oakland

$ **FUNDING SOURCE EXAMPLE**

Philanthropy, savings from prioritizing and leveraging resources of chambers of commerce

DESCRIPTION

The region should expand and scale up the offering of programs, such as chambers of commerce, to benefit lower-income and minority entrepreneurs. These efforts should be integrated into an inclusive suite of services that help local businesses to expand, including referrals to service providers, location assistance, mentoring, and hiring assistance. Services should include training on business development plans, marketing, and mentorship. Minority-owned businesses oftentimes struggle to compete for contracts, meet bonding or other contractual requirements, and secure business loans. Numerous businesses are owned by people of color, but they generally have lower sales and fewer employees than white-owned businesses.

IMPLEMENTATION

1 Scale up existing disadvantaged business development programs (City of Milwaukee & MMSD already have programs)

REFERENCE

The African American Chamber of Commerce of Wisconsin seeks to help grow and support African American-owned businesses by providing access to capital, education and advocacy through capacity building and strategic partnership.

+ **RISK MITIGATION**

Including loan programs and an online business portal would help small businesses start, then scale their operations and increase jobs, and might potentially reduce unemployment for low-income residents.
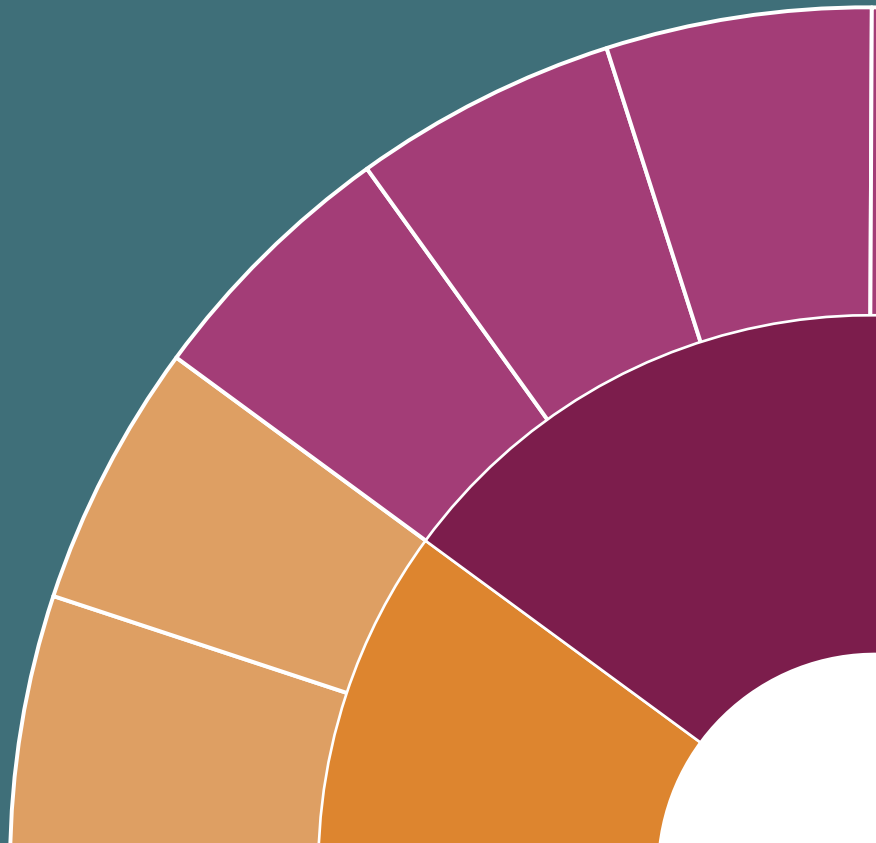
VISION 3

Adapt infrastructure to the challenges of the 21st century

Action Pages

On the following pages each action includes a goal, an objective, risks addressed (identified by the icon in the upper left corner), as well as the status and suggested lead. The Plan is meant to be a guide, rather than a prescription and stakeholders will play varying roles in implementation.

Actions

Prepare critical infrastructure for tomorrow

15

Develop And Implement Sustainable Practices Through Bids And Businesses Across The Region

16

Drive A Regional Energy Efficiency Program

17

Assess The Reliability Of Critical Infrastructure By Performing A Criticality Analysis

18

Establish A Policy Review And Response Mechanism

Innovate to preserve water resources

19

Increase Green Infrastructure In The Region

20

Develop And Implement A Plan To Make Critical Infrastructure Around Water Systems Cyber Resistant

18 Establish.

19 Increase.

20 Plan.

Action 15

Develop and Implement Sustainable Practices Through Bids And Businesses Across The Region

STATUS
- New Action
- To Be Scaled Up
- Ongoing

LEAD
- Municipalities
- Non-profit/ Business Partner
- MMSD

ABILITY TO ADAPT TO JOB MARKET CHANGES

VULNERABILITY OF CRITICAL INFRASTRUCTURE

OBJECTIVE

Integrate energy, waste, and sustainable material components into RFPs and/or bids.

DESCRIPTION

Buildings and attendant infrastructure are responsible for the largest component of global energy and water use, as well as related sewage and organic waste production.

Due to continuing urbanization, global-level strategies need to be developed that facilitate both the sustainable construction of new cities and the redevelopment of existing urban environments. A response to this need is the integration of environmentally sound infrastructure systems for integrated resource management. Incorporation of the Envision sustainable infrastructure rating system into projects, RFPs and bids should be considered as a consistent tool to integrate sustainable practices.

New civil infrastructure will establish energy, water and materials efficiencies as well as result in ecosystem benefits for the next few decades. Integrated resource management is useful to develop and implement sustainable practices such as:

- Adopting green construction codes for commercial buildings
- Improving the physical condition of deteriorating cities, including residential and commercial buildings
- Encouraging green building practices for redevelopment of sites in the region
- Integrating energy, waste, and sustainable material components into RFPs and/or bids (Envision)

IMPLEMENTATION

Steps for implementation will be identified with partners.

REFERENCE

Municipal Strategic Plans

This action is inspired by three strategic actions identified by the City of Milwaukee and Village of Fox Point:

- Implement sustainable building practices and standards for development and major redevelopment *(ReFresh Milwaukee Plan)*
- Improve the physical condition of deteriorating and blighted city, residential, and commercial buildings *(ReFresh Milwaukee Plan)*
- Encourage green building practices for redevelopment of sites in the Village including practices that promote energy conservation, stormwater management, and improved air quality *(Fox Point)*

RISK MITIGATION

To reduce the vulnerability of critical infrastructure, communities and private companies must do the best they can with existing technologies and seek to apply emerging technologies, designing and delivering the most resource- and energy-conserving infrastructure within the limits of budgets and priorities. This could result in the development of a framework conducive to sustainable development and the creation of new jobs related to sustainability.

Action 16

Drive A Regional Energy Efficiency Program

STATUS
- ○ New Action
- ● To Be Scaled Up
- ○ Ongoing

LEAD
- ● Region
- ○ Non-profit/ Business Partner
- ○ MMSD

VULNERABILITY OF CRITICAL INFRASTRUCTURE

OBJECTIVE

Improve energy efficiency and energy savings across the region.

DESCRIPTION

The region has enormous potential to benefit from the greater use of renewable energy and energy efficiency measures.

The cost of importing coal is a drain on the region's economy, which relies on gas and coal-fired power. Investments in energy efficiency and homegrown renewable energy can help stimulate the economy by redirecting funds into local economic development that would otherwise leave the region.

The Midwest Energy Efficiency Alliance (MEEA) is a collaborative network advancing energy efficiency in the Midwest for sustainable economic development and environmental stewardship. Regional partners can work with MEEA to integrate new technologies, products and best practices. Additionally, MEEA can assist the region on policy, training and education, and building energy codes. The Environmental Protection Agency offers programs that assist local governments in working with utilities to design efficiency programs for homes and businesses, and to improve the efficiency of facilities.

RISK MITIGATION

Energy efficiency can support community resilience by strengthening local energy systems and delivering more-reliable and affordable energy for local governments, households, and businesses.

IMPLEMENTATION

Steps for implementation will be identified with partners.

REFERENCE

Municipal Strategic Plans

Here are some actions included in ReFresh Milwaukee Plan:

- Improve residential and commercial energy efficiency in Milwaukee
- Replace fossil fuel energy use with more clean renewable energy in City of Milwaukee facilities

Action 17

Assess The Reliability Of Critical Infrastructure By Performing A Criticality Analysis

STATUS
- ○ New Action
- ○ To Be Scaled Up
- ● Ongoing

LEAD
- ● Municipalities
- ● Non-profit/ Business Partner
- ● MMSD

FINANCIAL CONSTRAINTS

CLIMATIC HAZARD

VULNERABILITY OF CRITICAL INFRASTRUCTURE

+ RISK MITIGATION

This action anticipates risks related to critical infrastructure by diagnosing the vulnerabilities. Knowing these vulnerabilities improves the ability to anticipate reconstruction, develop multi-partner solutions to mitigate the risk, adapt regulations and mobilize adequate financing.

OBJECTIVE

Measure, understand and monitor the state of infrastructure.

DESCRIPTION

Critical infrastructure (e.g., wastewater, drinking water, energy and communications) is the keystone of urban life. As urban populations increase and the climate continues to change, infrastructure becomes more stressed and is unable to adapt.

Climate impacts are projected to lead to increases in investment required for infrastructure, and the use of tools for decision-making under these uncertain circumstances can reduce the need for costly retrofitting and potential up-front costs. There is reduced reliability from deteriorating infrastructure and the lack of adequate funding and support to invest in infrastructure.

Addressing these challenges involves anticipating risks related to critical infrastructure and developing multi-partner solutions to mitigate them. Although risks can be addressed on an individual project basis, to increase resilience a strategic approach to infrastructure network planning should be created.

An audit can be completed to get a comprehensive understanding of infrastructure investment needs and would include the level of vulnerability to climate hazards (e.g., increased precipitation). That information would be integrated into a spatial mapping application to better coordinate major infrastructure improvements to reduce costs and disruptions to the public. This would require development of a common platform to identify infrastructure needs that can be shared among stakeholders and coordination meetings to collaborate on planning improvements.

IMPLEMENTATION

Utilize MMSD-developed dashboards as a template to allow municipalities to assess and visualize sewer infrastructure investment needs.

1. Leverage tool developed by regional agency for municipal benefits

2. Provide understanding of regional investment needs for sewer infrastructure

3. Pilot first step in developing a regional approach to manage infrastructure needs

Action 18

Establish A Policy Review And Response Mechanism

STATUS
- New Action
- To Be Scaled Up
- Ongoing

LEAD
- Municipalities
- Non-profit/ Business Partner
- MMSD

CLIMATIC HAZARD

VULNERABILITY OF CRITICAL INFRASTRUCTURE

OBJECTIVE

Allow communities and organizations to be flexible and respond to changes in policy needs, to adapt to changing social, environmental and economic conditions.

DESCRIPTION

Resilient communities are communities that can adapt to changing conditions. No single approach to adapting to changing conditions is appropriate for all communities. Each municipality and the region has to contend with unique geographic and specific climatic hazard issues.

© Milwaukee Water Council

RISK MITIGATION

Municipalities could decide on a set of criteria that would trigger a review of ordinances.

Those criteria could be as simple as a review that happens every five to 10 years, or the criteria could include consideration of changing environmental conditions such as changing Lake Michigan levels or a specified threshold of rainfall. When these criteria are met, the municipalities would have the opportunity to review their policies or to put in place early responses in order to reduce the impact of identified risks on communities.

Creating a mechanism that allows communities to review their rules, plans, procedures and regulations in the light of changing conditions can place stakeholders in an adaptive position to ever-changing urban circumstances. Adaptive management identifies uncertainties and then establishes methodologies to test hypotheses concerning those uncertainties. It uses management as a tool not only to change the system, but as a tool to learn about the system.

IMPLEMENTATION

Steps for implementation will be identified with partners.

REFERENCE

Milwaukee region

This action is inspired by the collaborative strategy developed in "Integrated Assessment on Water Level Variability and Coastal Bluffs and Shores, Northern Milwaukee County and Southern Ozaukee, Wisconsin."

Action 19

Increase Green Infrastructure In The Region

STATUS
- New Action
- ● To Be Scaled Up
- Ongoing

LEAD
- ● Region
- Non-profit/ Business Partner
- ● MMSD

CLIMATIC HAZARD

VULNERABILITY OF CRITICAL INFRASTRUCTURE

$ FUNDING SOURCE EXAMPLE
Stormwater fees

+ RISK MITIGATION
GI would reduce the vulnerability to climate hazards by reducing stormwater runoff and the amount of water entering the combined sewer system. It also increases groundwater recharge and may capture and store carbon.

* REFERENCE
Coakley Brother's

Coakley Brothers's new stormwater landscape courtyard uses a variety of green infrastructure strategies to manage runoff on site. The highlight of this project is the underground storage system that collects the water from the parking lot and walkways. The smart drain technology employed on site allows this system to temporarily detain and release stored water so it does not overwhelm the local sewer system. This project can manage over 207,000 gallons in any given storm!

OBJECTIVE

Reduce the vulnerability of sewerage infrastructure while providing social, economic and environmental benefits.

DESCRIPTION

Green Infrastructure (GI) complements the grey infrastructure system by reducing inflow and retaining the water on the surface. Grey infrastructure is extremely costly to replace or retrofit in response to changes in rainfall and flow. GI is an adaptive and responsive strategy that can be implemented on various levels and at all scales.

The MMSD Regional Green Infrastructure Plan recommends adding 740 million gallons of GI capacity across the region to reduce the risk of basement backups and sewer overflows by the year 2035. GI practices need to be properly installed, operated and maintained to help the region achieve the 740 million gallon goal and Wisconsin Department of Natural Resources (DNR) permit requirements.

GI practices, such as rain gardens, green roofs, bioswales, rainwater catchment and porous pavement, have unique operation and maintenance needs compared to traditional grey stormwater management approaches and also have many co-benefits for communities:

- Capture and long-term storage of carbon
- Enhances biodiversity
- Reduces stormwater runoff during more frequent events
- Increases groundwater recharge
- Improves community livability
- Cultivates public education opportunities

On a broader scale, the Fresh Coast Resource Center is an ambitious resource center with a goal of increasing GI implementation by providing resources and support to stakeholders. www.freshcoastguardians.com

IMPLEMENTATION

1 Communicate stormwater runoff issues and discuss the solutions

2 Engage the public and co-design the solution

3 Involve the public in implementation

4 Raise awareness around new neighborhood features

5 Identify best practices for green infrastructure, including funding sources, and substantially scale up implementation

Action 20

Develop And Implement A Plan To Make Critical Infrastructure Around Water Systems Cyber Resistant

STATUS
- New Action
- To Be Scaled Up
- Ongoing

LEAD
- Municipalities
- Non-profit/ Business Partner
- MMSD

FINANCIAL CONSTRAINTS

CLIMATIC HAZARD

VULNERABILITY OF CRITICAL INFRASTRUCTURE

RISK MITIGATION

The study and assessment would lead to the identification of the level of risk for critical infrastructure components and the development of an action plan to counter the 'cyber hazard' for critical infrastructure.

OBJECTIVE

Increase the cyber resilience of water systems to reduce vulnerability.

DESCRIPTION

While increasing automation of the region's water systems, it is important to consider the cyber risks of Information and Communications Technology (ICT) systems as well as cascading impacts if there is a technology malfunction. Climate resilience and critical infrastructure are closely related; some learning from this action will be used to support other actions related to critical infrastructure asset management.

Climate change with increasing digitalization and automation of the systems will test this, and will likely expose more cascading impacts and vulnerabilities, specifically to ICT disruptions. The study to be carried out from the resilience perspective considers ICT, security and emergency response. Operational specialists and policy–oriented professionals from both municipal and water authorities should be included.

A quick scan of risks for critical functions of the water systems can highlight a greater need for tactical awareness regarding the cyber risks of Industrial Control Systems. A deeper assessment, identification of level of risk and development of an action plan can respond to this risk. What components of critical infrastructure are currently at risk would need to be identified and compared with existing plans.
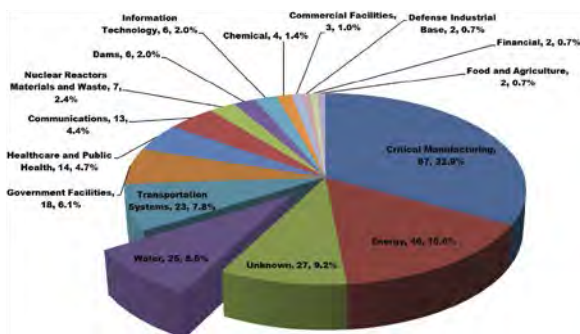
IMPLEMENTATION

Steps for implementation will be identified with partners.

REFERENCE

London and Singapore

London and Singapore have identified the same challenges related to cyber threats. Partnerships with private companies were built to protect key infrastructure related to cyber risks, especially on water management system.

Part 3

02
IMPLEMENTING RESILIENCE

In developing the Resilience Plan, numerous municipalities, organizations, and stakeholders helped identify the region's most pressing risks. These risks continue to be exacerbated by changing populations, economic challenges and climate change. This Plan presents a comprehensive vision for the actions that can help move the needle to reduce those risks, improve our neighborhoods, and more strategically address climate change. Based on other resilience plan efforts, it is clear that addressing these big and complicated risks will need participation and implementation at all scales and from all sectors.

As projects are identified, key performance indicators should be created to demonstrate how effectively the project is addressing the action it is related to. The indicator should include a baseline, a target/goal, and a timeframe for when the target should be met. Because projects are likely to vary substantially, evaluating the impacts of the Plan is particularly challenging.

A STRONGER MORE RESILIENT REGION CAN ONLY BE ACHIEVED IF WE WORK TOGETHER.

The recommended actions can be implemented individually or integrated into projects. They are intended to be a menu of options for how to create stronger, more meaningful projects in the face of strained budgets. A stronger more resilient region can only be achieved if we work together. This strategy represents a starting point for a path forward, but the real work will come from the conversations, policies and projects that take place into the future. Our communities can become stronger, they can become resilient, and the risks can be reduced—but only if we all work towards the same goal.

The following are suggested categories that key performance indicators could address.

Cost Avoidance
This relates to the "return on investment" of a project by comparing the capital expenditures invested in the project with the costs incurred if a risk materializes and nothing is done.

Environment
This relates to evaluating the actions by measuring indicators that track impacts on natural systems such as land, air and water.

Quality of Life
This relates to the improvement of specific social-based indicators such as housing, income, jobs, education, engagement, health, and life satisfaction.

Population
This relates to the number of people, or a subsection of the population that benefit from a particular action or project.

PARTNERSHIPS

This process and our future resilience would not have been possible without participation of the following experts and leaders. Thank you for your time and commitment to strengthen our communities.

Commissioner John Hermes

Commissioner Kris Martinsek

Islamic Society of Milwaukee

Ossie Kendrix (African American Chamber of Commerce)

Mayor Dan Devine (City of West Allis)

Mayor Kathleen Ehley (City of Wauwatosa)

Mayor Tom Barrett (City of Milwaukee)

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Diane Wagner (Miller-Coors)

Leah Redding (Milwaukee County)

Adam Bechle (Wisconsin Coastal Management Program)

Benjamin Juarez (Wisconsin Policy Forum)

Gordie Bennett (Milwaukee County)

Christopher Gluesing (Marquette University)

John Willis Gardner (University Wisconsin-Milwaukee)

Kate Nelson (University Wisconsin-Milwaukee)

Nancy Frank (University Wisconsin-Milwaukee)

Dave Lee (We Energies)

Sarah Gatzke (The Nature Conservancy-Wisconsin)

Emily Cialdini (Mandel Group)

Nate Gebert (Mandel Group)

Karen Bleach (Covanta)

Suzanne Ferris (HGA)

Ross MacKinnon (DR Diedrich)

Phillip Aello (Mandel Group)

Milwaukee Metropolitan Sewerage District

COMMUNITY

I am hopeful that the Resiliency Plan becomes more than a plan - a plan is no good until it is implemented and put in action.

COMMENTS

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The Nature Conservancy-Connecticut

Adam Whelchel

REFERENCES

i   Unless otherwise cited, the socio-economic and transportation-related data discussed in this section are based on U.S. Census data presented in SEWRPC Memorandum Report, MMSD Resilience Plan: Socio-economic Overview, April 2018 and SEWRPC Memorandum Report No. 221, A Comparison of The Milwaukee Metropolitan Area to its Peers, May 2015.

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THANK
YOU

The Resilience Plan provides general recommendations for how to address risks that are impacting 28 communities in southeastern Wisconsin. Risks and recommendations were decided on collectively by stakeholders. The recommendations can be implemented individually or integrated into projects. The recommendations are flexible and can be applied at various scales depending on the need and the budget.

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