MINNEHAHA CREEK
WATERSHED DISTRICT
QUALITY OF WATER, QUALITY OF LIFE

Meeting: Board of Managers
Meeting date: 3/25/2021
Agenda Item #: 11.1
Request for Board Action

Title:	Authorization to submit proposal to LCCMR for development of a 2D watershed model
Resolution number:	21-024
Prepared by:	Name: Brian Beck Phone: 952-471-8306 bbeck @minnehahacreek.org
Reviewed by:	Name/Title: Tiffany Schaufler, Project & Land Manager
Recommended action:	Authorize staff to submit a proposal to the Legislative-Citizen Commission on Minnesota Resources (LCCMR), for developing an updated 2-dimensional watershed model
Schedule:	March 25, 2021 – Board considers authorization proposal to LCCMR April 2, 2021 – Submission deadline for 2021 LCCMR proposals May 2021 – Submittals distributed to LCCMR members for review, and evaluation June 17, 2021 – High ranking proposals selected for further consideration July 6-8 and 13-15, 2021 – Presentation to LCCMR July 29, 2021 – Proposals selected for recommendation to the Legislature for funding Jan-May 2022 – LCCMR recommendations introduced as an appropriations bill July 1, 2022 – Money from Environment Resources Trust Fund becomes available
Budget considerations:	Fund name and code: Research and Monitoring, 5001 Fund budget: Research and Monitoring 2021 Budget $1,017,049. Expenditures to date: $60,234.77 Requested amount of funding: $10,000 in 2022 budgeted expenditures as grant match

Summary:

Purpose:

At the March 25, 2021 Meeting the Board of Managers will be asked to consider authorizing staff to submit a $790,500 proposal to the Legislative-Citizen Commission on Minnesota Resources (LCCMR), to develop an innovative 21st century planning tool that more effectively forecasts the impact of changing precipitation patterns on the watershed, and target public investments to protect water, homes, businesses, and infrastructure.

Problem/Opportunity:

Climate change is measurably changing the distribution, frequency and intensity of rainfall in Minnesota. The Minnehaha Creek Watershed has experienced the wettest seven years ever recorded. These changes are stressing our natural and built environments, impacting pollutant loading, stream erosion, wetland function, surface and groundwater interactions, habitat, homes, public infrastructure, and businesses.

Watershed managers must accelerate their ability to evaluate and adapt to these changes. However, the ability to do so is hampered by siloed geographic datasets data sets and course grained watershed models. The lack of high resolution watershed models makes it challenging to predict how specific areas will be impacted, and quantitatively compare potential solutions.

In Minnesota, data collection has outpaced the tools used to make sense of the data. Fortunately, advances in data science have made it affordable to collect exponentially more data, automate data aggregation, and analyze it in more sophisticated ways. Realizing the full potential of these advances requires new systems to integrate this data to identify existing issues, forecast future ones, and guide local decisions.

Proposed Solution:

MCWD is proposing a pioneering program to integrate and maximize the value of recent public investments in data collection to better predict the impacts of changing precipitation across the watershed, and to pinpoint, quantify and evaluate solutions.

The proposal will draw on existing investments made by the MCWD, U.S. Geological Survey, and Hennepin County in monitoring precipitation and watershed response across the District, which will collect more than 1 million real-time data points per year for precipitation, surface and shallow ground water levels, and pollutant loading. The tool being proposed will integrate state topographic and municipal infrastructure data to provide a high resolution watershed model to help improve MCWD's ability to understand and predict the impacts of climate change and potential strategies for adaptation.

Outcomes:

A critical first step in MCWD's Climate Adaptation Framework is building a high resolution 2D watershed model to quantitatively assess the impact of climate change on our watershed. This modeling tool will also support policy development and long range planning with communities, by simulating the impact of future climate forecasts on the watershed, which will drive project identification and design – enhancing MCWD's ability to pinpoint, quantify and evaluate the costs and relative benefits of gray and green by infrastructure investments on the landscape.

Partner Support:

Planning staff worked with the District Administrator to outline the proposal and develop support from District partners. At the time of drafting this RBA, verbal or written support has been provided by the Hennepin County, Minnesota Environmental Quality Board, U.S. Geological Survey, Edina, St. Louis Park, Mound, and the Minneapolis Park and Recreation Board. District staff anticipate additional support from the MnDNR, Minnesota Cities Stormwater Coalition, Metropolitan Council, Minnetonka, Victoria, Wayzata, and Minneapolis.

Cost:
The proposal requests $790,500 in funds from the LCCMR for work in the following areas:
*See attached grant application for additional detail

1. Identifying model inputs and data resources
    a. Defining data input needs for the 2D watershed model
    b. Developing GIS stormwater infrastructure data format based on model requirements
    c. Processing soil, land use, LIDAR and other data required by selected model
    d. Developing scripts to routinely pull meteorological data
    e. Develop documentation on data structure and processing for model inputs

2. Building the external data information processing system
    a. Meet with municipal, regional and state partners that have infrastructure data
    b. Develop consensus and adopt plan for GIS processing system based on findings from Task 1
    c. Implement the GIS infrastructure plan

3. Building the 2D Watershed Model
    a. Select and build watershed 2D model
    b. Calibrating model with stream flow and developing 2D model report

The proposal will leverage an estimated $311,610 of in-kind match from MCWD, in the form of staff time. This is the equivalent of 8,084 hours or 3.9 existing full-time employees, over the three year period of the grant. This represents time spread across a multi-disciplinary team of research and monitoring, planning, GIS and outreach staff. No new staff are proposed under this grant application.

LCCMR Category	Task Description	Grant Request	In-Kind Match	Grant Match
1) Identifying model inputs and data resources	Data Processing	$166,000	$111,180	$0
	Data Collection			
	Municipal Stormwater Infrastructure Data Intake/Partner Convening			
2) Build External Data Information Processing System	Data Processing Planning	$286,000	$153,640	$0
	Implementation of Data Processing			
3) Build and Calibrate 2D Watershed Model	Build and Calibrate 2D Watershed Model	$338,500	$46,790	$10,000
Subtotals		$790,500	$311,610	$10,000
Total Cost		$1,112,110		

2020 and 2021 Watershed Modeling Progress

In 2020, the MCWD Board of Managers authorized District staff to submit an application to LCCMR to support developing a 2D watershed model and machine learning model, which ultimately was not selected for funding by the LCCMR. However, the MCWD Board of Managers had articulated the importance of continuing to move the watershed modeling initiative forward in the event the LCCMR proposal was not successful. Therefore, District staff spent the remainder of 2020 and the beginning of 2021:

- Developing a machine learning model that predicts Minnehaha Creek water levels using National Weather Service forecasts
- Improving the coalition of support for the 2D watershed mode
- Expanding staff's technical understanding of 2D watershed models
- Exploring other potential funding sources to support the development of climate change adaptation tools

These steps have improved MCWD's potential for LCCMR grant success in 2021, expanded staff's technical capacity, and strengthened partner support for critical watershed management tools.

Conclusion and Next Steps:

On March 25, 2021 MCWD Staff will be seeking Board authorization to submit a $790,500 proposal to the LCCMR.

Pending Board consideration, following the meeting staff would continue to refine the grant proposal (narrative, costs and letters of support) for submittal to the LCCMR on April 2.

Supporting documents (list attachments):

1. Letters of Support
2. Grant Application

MINNEHAHA CREEK
WATERSHED DISTRICT
QUALITY OF WATER, QUALITY OF LIFE

RESOLUTION

Resolution number: 21-024

Title: Authorization to submit proposal to LCCMR for development of 2D watershed model

WHEREAS, climate change is measurably changing the distribution, frequency and intensity of rainfall in Minnesota;

WHEREAS, these shifting precipitation patterns are stressing our natural and built environments, impacting pollutant loading, stream channel erosion, wetland functions, surface and surficial groundwater interactions, habitat, and homes, businesses and public infrastructure;

WHEREAS, watershed managers, in partnership with local communities, must accelerate efforts to monitor, evaluate and adapt to these changes;

WHEREAS, the Minnehaha Creek Watershed District, in partnership with Hennepin County and the U.S. Geological Survey, has developed a real-time remote sensing network (RESNET) to monitor precipitation and watershed response in high resolution;

WHEREAS, that RESNET data, if combined with local stormsewer and state topographic data sets and developed into appropriate tools, provides the potential to (1) Support policy development and long range planning with communities, by simulating the impact of future climate forecasts on the watershed; (2) Drive project identification and design – enhancing MCWD's ability to pinpoint, quantify and evaluate the costs and relative benefits of gray and green by infrastructure investments on the landscape;

WHEREAS, District staff have developed a project proposal to the Legislative-Citizen Commission on Minnesota Resources (LCCMR) for the development of a 2D watershed model to produce these outputs;

WHEREAS, the technical feasibility, cost, and narrative surrounding the proposal has been developed in coordination with a team of technical experts and communications advisors, resulting in support being expressed from a cross-section of local and regional agencies;

WHEREAS, the Board of Managers has reviewed the proposal and associated costs to develop 2D modeling tools, and finds the potential outputs to be strategically aligned with the District's mission to collaborate with public and private partners to protect an improve land and water for current and future generations.

NOW, THEREFORE, BE IT RESOLVED that the Minnehaha Creek Watershed District Board of Managers hereby authorizes District staff to finalize and submit a proposal for 2021 funding to the Legislative-Citizen Commission on Minnesota Resources in an amount of $790,500, for the development of a 2D watershed modeling tool.

Resolution Number 21-024 was moved by Manager_____, seconded by Manager_____. Motion to adopt the resolution___ayes,____nays,____abstentions. Date: 3/25/2021

_____ Date:_____Secretary

MARION GREENE
CHAIR

612-348-7883

HENNEPIN COUNTY BOARD OF COMMISSIONERS

A-2400 GOVERNMENT CENTER
MINNEAPOLIS, MINNESOTA 55487-0240

March 22, 2021

Legislative-Citizen Commission on Minnesota Resources
100 Rev. Dr. Martin Luther King Jr. Blvd.
State Office Building, Room 65
St. Paul, MN 55155

Dear LCCMR Members,

Thank you for all you do to maintain and enhance Minnesota's environment and natural resources.

I write to you today in strong support of the Minnehaha Creek Watershed District's (MCWD) funding application to the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

Hennepin County has an abundance of natural resources, including 200 lakes, 640 miles of stream, and more than 45,000 acres of wetlands; which are under increasing pressure from population growth, development and climate change. More and more, Hennepin County residents are starting to notice the effects of climate change, from warming winter temperatures to more extreme precipitation-driven flooding events. The number of declared natural disasters has grown significantly in Hennepin County in recent decades. Climate vulnerability assessments make it clear that the risks posed by climate change to Hennepin County residents, infrastructure, and natural resources warrant a significant and coordinated response.

Recently the county published our draft Climate Action Plan (CAP) which identifies strategies to adapt to our changing climate in ways that enhance the natural environment, protect residents, reduce vulnerabilities, and ensure a more equitable and resilient future for Hennepin County. Central to our continued success are strategic partnerships that align priorities and leverage scarce resources.

MCWD and Hennepin County have a long history of successful collaboration. We are now actively working together to collect data, assess climate impacts, and build the tools needed to effectively plan and adapt to changing hydrology, in partnership with our communities. To date this work has involved partnership with the National Weather Service, the United States Geologic Survey, Hennepin County, and MCWD to install a network of high-resolution sensors to monitor and evaluate the watershed's real-time response to changing precipitation regimes. The work of this unique coalition links weather forecasts with measured precipitation data, soil saturation data, and stream and lake responses, to arm emergency managers and dam operators with predictive capabilities – which significantly boosts the accuracy and lead time of flood predictions and allows communities to proactively respond ahead of storms to reduce property damage.

MCWD's proposal to the LCCMR would leverage these existing investments to deliver on several target strategies in the County's CAP. Specifically, the proposed planning tool would allow counties, cities, and other agencies to identify areas most at risk for surface and groundwater flooding with a level of detail far beyond what is currently possible. Being able to quantify and evaluate climate driven impacts to the natural resources and structures most at risk will allow the District, County and their partners to take focused strategic action. This work would also serve as a model that the County would look to replicate in the other ten watershed management organizations across Hennepin County.

Protecting our residents, communities and natural resources from the effects of climate change requires strong partnerships, innovative solutions, and maximizing the use of the data and systems we already have in place. MCWD's proposal represents an innovative step in leveraging our existing tools to improve the resilience of the county and watershed, as well as other watersheds, and we ask that the LCCMR please support this proposal.

Sincerely,

Marion Greene
Commissioner, District 3

Debbie Goettel
Commissioner, District 5

March 16, 2021

Legislative-Citizen Commission on Minnesota Resources (LCCMR)
100 Rev. Dr. Martin Luther King Jr. Blvd.
State Office Building, Room 65
St. Paul, MN 55155

Dear LCCMR Members,

The City of Edina wishes to express its support for the Minnehaha Creek Watershed District's (MCWD) funding proposal to the LCCMR.

Edina prides itself in being a model of a successful, mature, and progressive urban community, that strives to lead in a modern and evolving world. Given this, we recognize the need to be an innovator that seeks to implement creative solutions to local and regional issues.

In an effort to implement creative landscape solutions, the City of Edina and MCWD have a long history of innovative partnership. Collectively our agencies have agreed to collaborate on land use planning, stormwater management, economic development, flood mitigation, parks and public land management, greenway development, and water resources improvements. The current restoration of Edina's Arden Park meets the goals of both the City and MCWD by restoring over 2,000 feet Minnehaha Creek, connecting the creek to its floodplain to reduce flooding, treating 80 acres of stormwater and improving water quality, while also improving park facilities and recreational opportunities.

Restoring the capacity of our natural systems is important because we recognize that flooding issues within Edina will continue to increase in frequency and severity, and climate change is the lead driver of this increased flood risk. Climatologists indicate that large, intense rainfall events are occurring more frequently, and models predict that large rainfall events will become more intense in the future.

Knowing that flooding is increasing in our community means we need new strategies, skill sets, and tools. MCWD's proposal to develop a 2-dimensional (2D) watershed model would incorporate digital municipal stormsewer data, topographic and land cover data, and insights drawn from the large volume of MCWD remote sensing water level data. Developing a 2D model will provide our city an innovative tool that will help pinpoint, evaluate, and drive solutions on climate adaptation projects.

The ability of our city to lead and evolve requires forward-looking tools and strategies, and for that reason I am writing to ask that the LCCMR consider the City of Edina's support for MCWD's proposal.

Sincerely,

Scott H. Neal
City Manager

United States Department of the Interior
U.S. GEOLOGICAL SURVEY
Upper Midwest Water Science Center

Minnesota Office
2280 Woodale Drive
Mounds View, MN 55112
763.783.3100

Wisconsin Office
8505 Research Way
Middleton, WI 53562
608.828.9901

Michigan Office
6250 Mercantile Way
Lansing, MI 48911
517.887.8903

March 22, 2021

Legislative-Citizen Commission on Minnesota Resources (LCCMR)
100 Rev. Dr. Martin Luther King Jr. Blvd.
State Office Building, Room 65
St. Paul, MN 55155

Dear LCCMR Members,

The U.S. Geological Survey (USGS) wishes to express its support for the Minnehaha Creek Watershed District's (MCWD) application to the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

The USGS strives to be a world leader in the natural sciences through our scientific excellence and responsiveness to society's needs. Information on water is fundamental to our national and local economic well-being, protection of life and property, and effective management of the Nation's water resources. As such, the UGSS works with partners to monitor, asses, conduct targeted research, and deliver information on a wide range of water resources and conditions including streamflow, water quality, and water use and availability.

A key strength of the USGS is its ability to develop partnerships to leverage limited multiple funding sources. Through Cooperative Matching Funds, the USGS partners with more than 1,800 State, Tribal, county, local, regional, and watershed agencies to accomplish our mission. Using these Federal funds, the USGS and MCWD have partnered together for 15 years to collect high quality hydrological data on MCWD's water resources. During this partnership, the USGS and MCWD have invested significant time and resources to monitor, analyze and interpret water level, water flow, and water quality data across MCWD.

MCWD's LCCMR proposal would build on our existing partnership, leverage our past investments, and support a USGS priority to develop new science-based tools that use observation-network data to assist communities with hazard planning, response, and recovery. MCWD's proposed two-dimensional watershed model would create a new science-based tool and would utilize and optimize past and current datasets to provide a much higher resolution model than is available today. This data-driven analytical tool would inform where future green infrastructure investments should be implemented on the landscape to mitigate future flood impacts.

Having the ability to predict changes to the water cycle from factors such as land-use change and climate variability will be critical as we strive for sustainable and resilient ecosystems and communities. MCWD's approach to monitoring, assessment and modeling will provide the forward-looking tools needed to understand, predict and mitigate hazardous situations. For these reasons we wholeheartedly support the work being proposed by MCWD.

Sincerely,

JOHN WALKER Digitally signed by JOHN WALKER
Date: 2021.03.21 21:05:14 -05'00'

John F. Walker
Director, Upper Midwest Water Science Center

March 19, 2021

Legislative-Citizen Commission on Minnesota Resources (LCCMR)
100 Rev. Dr. Martin Luther King Jr. Blvd.
State Office Building, Room 65
St. Paul, MN 55155

Dear LCCMR Members,

The City of Wayzata wishes to express its support for the Minnehaha Creek Watershed District's (MCWD or District) funding proposal to the LCCMR.

Wayzata is a forward-thinking lakeside community that is in the forefront of prioritizing sustainability, with a healthy environment, vibrant parks and enticing city spaces. The community's proximity to Lake Minnetonka, large growth forest land, and significant wetlands have served as important natural amenities for the City's growth and development.

As the City grows, care must be taken to balance changes in the built form against their impact to the community's important natural resources. MCWD's proposal to build a two-dimensional model, that leverages state LiDAR and local municipal stormsewer data will provide a collaborative planning tool will do just that.

The City of Wayzata and MCWD have a long history of collaboration, and the development of these tools will continue that tradition. With an understanding of changes in hydrology at a system scale, we can continue to work in partnership to identify capital improvements and policy that will protect and enhance the natural environment while guiding sustainable investments in development and infrastructure.

For these reasons I am writing to ask that LCCMR members consider the City of Wayzata's support when making their funding decision on the Minnehaha Creek Watershed District's proposal for 2022 funding.

Sincerely,

Jeffrey Dahl
Wayzata City Manager
jdahl@wayzata.org
(952) 404-5309

St. Louis Park
MINNESOTA

Experience LIFE in the Park

March 22, 2021

Legislative-Citizen Commission on Minnesota Resources (LCCMR)
100 Rev. Dr. Martin Luther King Jr. Blvd.
State Office Building, Room 65
St. Paul, MN 55155

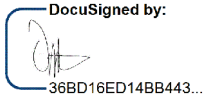
Dear LCCMR Members,

The City of St. Louis Park wishes to express its support for the Minnehaha Creek Watershed District's (MCWD) funding proposal to the LCCMR.

The City of St. Louis Park is a community that continually reinvents itself to best meet its future challenges and opportunities. In order to provide a livable community, we have committed to leading in environmental stewardship and have made it a priority to protect and improve the quality of our natural resources, parks, lakes, creek, and wetlands. St. Louis Park and MCWD have a strong history of partnership that has worked to fulfill this environmental stewardship and restore water resources across our city.

Since 2010, the City and MCWD have proactively coordinated public and private development to manage regional stormwater and expand and connect the riparian Minnehaha Creek Greenway to the St. Louis Park community. Through early coordination of land use planning and innovative public and private partnerships, efforts to-date have resulted in hundreds of acres of regional stormwater management, two miles of restored stream, over ten acres of wetland restoration, public access to over 50 acres of previously inaccessible greenspace, and two miles of new trail network. Building on these shared endeavors, MCWD will continue to focus within this area of St. Louis Park – part of the Minnehaha Creek Greenway – to continue corridor restoration and stormwater management efforts while maximizing community goals of St. Louis Park.

As St. Louis Park looks to continue its work to protect and improve our city's natural resources, we recognize that climate change will continue to stress these systems. MCWD's recent installation of a real time sensor network collects more than one million data points a year on surface water levels, shallow groundwater levels, and pollutant loading. MCWD's LCCMR proposal would harness all this data and other state data to develop a 2D watershed model that will provide out city a tool in which we can evaluate future green and gray infrastructure investments and enhance our ability to protect and improve our natural resources.
MCWD is a critical partner to St. Louis Park as we work to provide a livable community, which is why we are asking the LCCMR to consider the City of St. Louis Park's support in its decision to fund this project.
Sincerely,

DocuSigned by:

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Tom Harmening
St. Louis Park City Manager

MINNESOTA
ENVIRONMENTAL QUALITY BOARD

March 25, 2021

Legislative-Citizen Commission on Minnesota Resources (LCCMR)
100 Rev. Dr. Martin Luther King Jr. Blvd.
State Office Building, Room 65
St. Paul, MN 55155

Dear LCCMR Members,

The Minnesota Environmental Quality Board (EQB) is writing to express its support for the Minnehaha Creek Watershed District's (MCWD) application to the LCCMR.

Minnesota's way of life is intertwined with water. We depend on water for drinking, food production, healthy ecosystems and recreation. Climate change is already impacting our more than 10,000 lakes, 100,000 miles of rivers and streams, abundant groundwater, and all of us. The effects of climate change are expected to accelerate in the coming decades.

Planning for the future of Minnesota's water must include an honest appraisal of the effects our changing climate is having on this vital resource and how these changes will impact Minnesotans, wildlife, habitat and landscapes across the state. The purpose of EQB's 2020 State Water Plan (Plan) was to establish a framework for aligning state agencies, legislative priorities, and local government policy, programs and actions for the coming decade.

The EQB's Plan outlined that as Minnesota works to plan for the future, we will need accurate climate data and new tools to incorporate current conditions and future projections. MCWD's effort to improve watershed resiliency by using advances in monitoring and data science is a leading example of this and was featured in the EQB's Plan. MCWD's proposal would leverage these monitoring and data investments while also integrating state topographic and municipal infrastructure data to provide a high resolution two-dimensional (2D) watershed model. This 2D model would improve MCWD's ability to understand and predict the impacts of climate change and potential adaptation strategies for communities.

In addition to allowing MCWD to quantitatively assess the impacts of climate change, development of this 2D model would also implement a strategy from the EQB's 2020 State Water Plan to manage built environments and infrastructure for greater resiliency by improving data sources and modeling.

Climate change will require Minnesota to invest in new tools and innovative technology solutions. MCWD's proposal answers this call and the EQB strongly urges the LCCMR to support this proposal.

Sincerely,

Katie Pratt
Executive Director

KP:bt
Equal Opportunity Employer

CITY OF MINNETONKA
14600 Minnetonka Blvd. | Minnetonka, MN 55345 | 952-939-8200 | minnetonkamn.gov

March 24, 2021

Legislative-Citizen Commission on Minnesota Resources (LCCMR)
100 Rev. Dr. Martin Luther King Jr. Blvd.
State Office Building, Room 65
St. Paul, MN 55155

RE: Letter of Support for Minnehaha Creek Watershed District Grant Funding

Dear LCCMR Members,

The City of Minnetonka supports the Minnehaha Creek Watershed District's (MCWD) funding proposal to the LCCMR.

Climate change brings many challenges, and the City of Minnetonka is focused on carefully balancing growth and development with preservation efforts that protect the highly valued water resources within our community. As the city's natural environment is one of woods and wetlands, we are particularly aware of the balance between the need for urban services and the importance of protecting and managing our natural surroundings.

The city understands that MCWD's proposal to the LCCMR will position the watershed district as a partner to help communities plan for and respond to climate change issues. It will also support the level of detailed evaluations needed to make informed decisions and investments in infrastructure.

Please consider the City of Minnetonka's support when evaluating the Minnehaha Creek Watershed District's proposal for 2022 funding.

Sincerely,

Geralyn Barone

Geralyn Barone
City Manager
City of Minnetonka

CITY OF MOUND

2415 WILSHIRE BOULEVARD ▪ MOUND, MN 55364-1668 ▪ PH: 952-472-0600 ▪ FAX: 952-472-0620 ▪ WWW.CITYOFMOUND.COM

March 19, 2021

LCCMR
100 Rev. Dr. Martin Luther King Jr. Blvd.
State Office Building, Room 65
St. Paul, MN 55155

Dear LCCMR Members,

The City of Mound wishes to express its support for the Minnehaha Creek Watershed District's (MCWD or District) application to the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

Located on the western shores of Lake Minnetonka, Mound is a full service community that recognizes and appreciates its unique setting. Our commitment to preserving the natural environment ensures everyone can enjoy the community's four lakes, numerous wetlands, open space and parks.

With goals of creating land development patterns that fulfill social and economic needs, while enhancing and preserving natural resources, we have a long history of partnership with MCWD to implement low impact development practices to address water quantity and quality issues.

To continue to strike balance in the future between the built and natural environments, land use and water planning decisions must be integrated and based on best available information. The District's proposal to integrate watershed, city stormsewer and state topographic and land cover into a 2 dimensional watershed model will provide a detailed understanding of the patterns of water, and the tools needed to help us collectively evaluate the need, opportunity, and benefits of investing in gray and green infrastructure.

Having such a detailed understanding of the function and constraints of our local watershed systems, under changing precipitation patterns, will support the ability to make wise decisions related to the need for increased volume storage on the landscape, where to locate water quality improvement projects, assess upstream and downstream considerations, and guide policy planning to support sustainable growth.

Please consider the City of Mound's support for this proposal as you make decisions related to 2022 funding.

Sincerely,

Eric Hoversten
Mound City Manager

City of Victoria
1670 Stieger Lake Lane
P.O. Box 36
Victoria, MN 55386
952.443.4210

March 23, 2021

LCCMR
100 Rev. Dr. Martin Luther King Jr. Blvd.
State Office Building, Room 65
St. Paul, MN 55155

Dear LCCMR Members,

The City of Victoria is writing in support of the Minnehaha Creek Watershed District's (MCWD or District) application to the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

The City of Victoria and the District have a strong history of partnership, and have worked closely to integrate plans and investments for the built and natural environments – to ensure the protection of our valuable water resources while sustainably guiding our community's growth.

As outlined in our 2040 Comprehensive Plan vision – Victoria actively preserves and enhances the natural features and environmental qualities that make it an attractive place to live, work and play. The District was an integral partner in that planning process and worked with the City to develop a "greenprint" for growth policy - promoting the intentional integration of natural systems into future planned development.

Meanwhile, over the course of our partnership, during the last six years record rain has stressed municipal infrastructure and waterbodies across our community and made it apparent that, as the City of Lakes and Parks, new tools and data driven approaches are needed to effectively plan for the future.

As we collectively look towards an uncertain future, we need to embrace next-level data driven approaches to community development and natural resource planning. MCWD's innovative proposal to stitch together digital municipal stormsewer data, with statewide topographic and land cover information made available through LIDAR, and insights drawn from the large volumes of District remote sensing data, will achieve that next level.

This work will strengthen our partnership and support the City's strategic goals to protect our natural systems in balance with our planned growth and economic development. These investments will provide us with high resolution tools to quantitatively evaluate when, where and how to most cost effectively manage increasing runoff volumes to reduce pollutant loading, manage stream channel erosion, reduce impacts to wetlands, better understand surface and groundwater interactions, and mitigate the impacts of high water to homes and businesses.

MCWD is a valued partner in sustainably planning for our community's future, and we would like the LCCMR to consider the City of Victoria's support in its decision to fund this project.

Sincerely,

Dana Hardie
City Manager

Minneapolis
Park & Recreation Board

Administrative Offices
2117 West River Road North
Minneapolis, MN 55411-2227

Northside Operations Center
4022 1/2 North Washington Avenue
Minneapolis, MN 55412-1742

Southside Operations Center
3800 Bryant Avenue South
Minneapolis, MN 55409-1000

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www.minneapolisparks.org

March 23, 2021

Legislative-Citizen Commission on Minnesota Resources (LCCMR)
100 Rev. Dr. Martin Luther King, Jr. Boulevard
State Office Building, Room 65
St. Paul, Minnesota 55155

Dear LCCMR Members,

The Minneapolis Park and Recreation Board (MPRB) is writing in support of the Minnehaha Creek Watershed District's (MCWD) funding proposal to the LCCMR.

The MPRB exists to provide places and recreation opportunities for all people to gather, contemplate, and engage in activities that promote health, well-being, community and the environment. Central to our park system are its natural resources and regional parks, drawing 23 million visits annually. Within the nearly 7,000 acres of parkland and 180 park properties are 22 lakes, half of which lie within the Minnehaha Creek watershed. Those parks and trail include some of the most popular park destinations in the state, such as the Minneapolis Chain of Lakes Regional Park which draws more than seven million visitors each year, Minnehaha Regional Park which features the iconic 53-foot Minnehaha Falls, and Minnehaha Parkway Regional Trail which traces the flow of the creek through Minneapolis.

Urbanization has led to drastic changes in the historical patterns of water movement that impact the health of these treasured resources. The use of storm sewers has caused an increase in the amount of water, pollutants and sediment entering Minneapolis lakes and creeks. Within this context, MPRB and the MCWD have a long history of partnership and considerable investment to address water quality, stream health and ecological issues that are inherent to the park system's urban setting.

In recent years the MPRB system has been on the front lines in experiencing the impact of Minnesota's increasingly wet climate. The increased volume, frequency and intensity of runoff producing rain events impacts water quality, interactions between surface water and surficial groundwater, and contributes to flooding.

As the MPRB develops strategic plans for the future of its park system, adapting to these changing precipitation patterns is a key focus. The 2-dimensional (2D) modeling tool that MCWD is proposing to develop will improve MPRB's ability to plan for and implement strategies to manage the predicted increases in rainfall. Utilizing a 2D model, coupled with MCWD's robust watershed monitoring, will enable MPRB to pinpoint and evaluate the solutions needed to implement stormwater management facilities, restore stream geomorphology, expand floodplain storage, and better manage flooding.

Protecting our natural resources for future generations, while rising to address the challenges of a changing climate, requires innovative partnerships and next-level tools to aide us in identifying the projects and polices requiring public investment. For these reasons, please consider the MPRB's support for the MCWD's proposal when making your 2022 funding decisions.

Sincerely,

Michael Schroeder
Assistant Superintendent, Planning Services

Environment and Natural Resources Trust Fund

2022 Request for Proposal

General Information

Proposal Title: Leveraging Innovations in Data Analytics for Project Implementation

Project Manager Information

Name: Brian Beck

Organization: Minnehaha Creek Watershed District

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Project Basic Information

Project Summary: Integrate local and statewide datasets into a 21st-century planning tool, widely called for by our communities, that forecasts the impacts of changing precipitation patterns and quantitatively compare the most cost-effective solutions.

Funds Requested: $790,500

Proposed Project Completion: 2024-12-31

LCCMR Funding Category: Water Resources (B)

Project Location

What is the best scale for describing where your work will take place?

Region(s): Metro

What is the best scale to describe the area impacted by your work?

Statewide

When will the work impact occur?

During the Project

Narrative

Describe the opportunity or problem your proposal seeks to address. Include any relevant background information.

Water systems throughout Minnesota were built for stable climate patterns that no longer exist. Extreme swings in precipitation are stressing our natural and built environments, impacting pollutant loading, stream erosion, wetland function, surface and groundwater interactions, habitat, and the safety of homes, public infrastructure, and businesses.

Watershed managers must help communities understand and adapt to these changes. However, the ability to do so is hampered by sparse and static historic data sets, which make it difficult to predict how specific areas will be impacted and quantitatively compare potential solutions.

Fortunately, advances in data science have made it affordable to collect exponentially more data and analyze it in more sophisticated ways. These advances allow water planners around the world to understand and predict changes with unprecedented accuracy and detail, allowing for more effective use of scarce public investment to address these issues. In Minnesota, data collection has outpaced the tools used to make sense of the data. Realizing the full potential of these advances requires new systems to integrate this data to identify existing issues, forecast future ones, and guide local decisions.

What is your proposed solution to the problem or opportunity discussed above? i.e. What are you seeking funding to do? You will be asked to expand on this in Activities and Milestones.

In partnership with Hennepin County, MnDNR, and USGS, and with formal support from 14 partners and communities, MCWD is proposing a pioneering program to maximize the value of recent public investments in data collection.

For example, MCWD has created a remote sensor network that collects more than 1 million data points per year about surface water levels, shallow groundwater levels, and pollutant loading. State leaders have invested in mapping the detailed topography of the state. Municipal partners have digitized data about their storm sewer systems.

MCWD wants to partner with LCCMR to develop a reproducible process that brings these disparate data sets together into a quantitative planning tool. Using advances in 2-dimensional modeling, these tools will be able to pinpoint, quantitatively evaluate and drive decisions on climate adaptation projects and policies.

Such a tool will be critical to the climate adaptation planning efforts as watershed managers and communities begin to understand the impact of changing precipitation patterns on our built and natural systems. The result will be more effective green and gray infrastructure solutions that protect and conserve the watershed's iconic resources.

What are the specific project outcomes as they relate to the public purpose of protection, conservation, preservation, and enhancement of the state's natural resources?

- A single, continuously-updated tool that integrates previously-siloed public data sets
- A high-resolution understanding of the balance of all surface and groundwater inputs and outputs in the system, to identify environmental and public assets in need of protection
- Improved ability to predict the impact of changes in precipitation or land use,to enhance infrastructure planning
- Improved ability to quantify and compare the cost-effectiveness of potential conservation projects needed to address predicted impacts

Activities and Milestones

Activity 1: Identifying model inputs and data resources

Activity Budget: $166,000

Activity Description:
One of the most common ways watershed districts synthesize data is by developing computer models that can predict how water flows through our streams, lakes, and landscapes. In recent years, the State of Minnesota and counties have invested heavily to develop a series of high-quality standardized digital datasets about our landscape, such as topography, land use, and soils that have made model development much less labor-intensive.

Local municipalities have also invested time and resources in developing digital stormsewer infrastructure databases, however, each municipal dataset varies in data structure, complexity, and quality. Combining these 29 unique datasets into a unified watershed model has historically been labor-intensive, prohibitively expensive, and nearly impossible to maintain. Therefore, this project will include an initial discovery phase, which will be devoted to meeting with municipalities to understand the unique nature of their stormwater infrastructure dataset.

The goal of this phase is to characterize all available spatial datasets and fill remaining surficial groundwater and lake level data gaps. The scope and cost for subsequent activities may be refined based on the findings of Activity 1 to ensure that the development of the automated data processing system and watershed model will require minimal manual effort.

Activity 2: Building the external data information processing system

Activity Budget: $286,000

Activity Description:
Because land use and stormwater infrastructure are constantly changing, watershed managers face the recurring challenge of using tools that are not based on up-to-date information. Historically, the process of updating watershed models has been a time-intensive endeavor because all data collection and processing has been done manually. However, recent advances in data science have resulted in frameworks that automate complex data processing, which will dramatically reduce the cost of future model updates for MCWD and other public agencies throughout the state that use our process as a template for enhancing and automating their own watershed model development.

MCWD will develop a reproducible data processing system that can incorporate publicly-available datasets into a watershed modeling framework. Then, MCWD will work with technical experts to plan and build a GIS system that automatically updates based on changing landuse and infrastructure datasets to ensure the watershed model used for project identification is using the most current landscape and infrastructure information.

Activity 3: Building the 2D Watershed for Climate Adaptation Planning

Activity Budget: $338,500

Activity Description:
MCWD will incorporate the data produced from the automated processing system developed in activity 2 into a high-resolution watershed model that can predict, in unprecedented detail, how water and pollutants will move through the system under current and predicted scenarios. The outcome from building the watershed model will be a tool that can help watershed managers meet their water quality, water quantity, and ecologic improvement goals.
Building this model will involve an iterative process to ensure that the automated processes developed in activity 2 can be incorporated into a high-resolution watershed planning tool. In addition, the consultant will use streamflow data

collected by MCWD staff to calibrate the model to ensure it can accurately predict how water moves through the built and natural environment.

MCWD and the consultant will meet with local municipalities and engineers to communicate the use cases for the model to ensure it can be used by other entities to identify water quality, ecological, and flood reduction projects.

Budget Summary

LCCMR Category	Task Description	Sub-task	Grant	Role	Consultant	Grant In-Kind Match	Grant Match	Grant Request	MCWD In-Kind Match	Grant Match (USGS)	Narrative and Assumptions	Consultant Billing Rate	Concultant Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost	Hours
1) Identifying model inputs and data resources	Data Processing	Task 1a. Define Data input needs for 2D Model	Grant Reimbursable	Consultant	$7,500	$8,400		$166,000	$111,180	$0	Consultant will identify data or input requirements for the selected 2D model. This may include input layers such as stormwater infrastructure, LiDAR, and other common input datasets for model development.	$150.00	50	$4,800.00	80	$0.00		$0.00		$3,600.00	80	$0.00		$0.00	
		Task 1b. Develop GIS Stormwater Infrustructure Data Format Based on Model Requirements	Grant Reimbursable	Consultant	$0	$0					Consultant will work with MCWD and IT consultant to develop a single GIS stormwater infrastructure format based on the required inputs of the 2D model selected by MCWD	$175.00	20	$0.00		$0.00		$0.00		$0.00		$0.00		$0.00	
		Task 1c. Process soil, landuse, LiDAR, and other data required by selected model	Grant Reimbursable	Consultant	$15,000	$8,800					The consultant will process all input datasets required by the model. These will likely be a one time process since parameters such as soils will not need to be changed.	$136.79	106	$4,800.00	80	$4,000.00	80	$0.00		$0.00		$0.00		$0.00	
		Task 1d. Develop Scripts to routinely pull meteorological data	In-kind	MCWD	0	$6,400					MCWD staff will develop a python script that will routinely pull meteorological data from partner agencies such as National Weather Service and Hennepin County.			$2,400.00	40	$4,000.00	80	$0.00		$0.00		$0.00		$0.00	
		Task 1e. Develop documentation on data structure and processing for model inputs	Grant Reimbursable	Consultant	$0	$0					Consultant will develop documentation that will be published in the final report outlining the data used for the model and data preperation needed prior to model implementation.	$147.73	44	$0.00		$0.00		$0.00		$0.00		$0.00		$0.00	
	Data Collection	Task 2a. Install Surficial groundwater wells	Grant Reimbursable	MCWD/Hennepin County/MnDNR	$0	$0					Note: This cost assumes that MCWD will install 16 wells. Well installation will cost $4k and equipment will cost $1.5k. This cost may change if the technical panel decides fewer or more groundwater wells are required.			$0.00		$0.00		$0.00		$0.00		$0.00		$0.00	
		Task 2c. Channel and bridge surveying for model			$50,000							$140.00													
		Task 2c. Survey wetland volumes throughout MCWD			$50,000						Consultant will work with MCWD to survey wells throughout the District. Assume that surveying will include 1 staff from consulting firm and 1 staff from MCWD.			$0.00		$0.00		$0.00		$0.00		$0.00		$0.00	
		Task 2d. Install stream and lake water level sensors	Grant Reimbursable	MCWD	$0	$0					MCWD staff will be purchasing and installing 3 acoustic doppler sensors in the upper watershed to improve model calibration. MCWD staff may also install several lake level sensors depending on recommendations on of the technical panel. This assumes that 4 additional lake level sensors will be installed at a cost of $1.5k each.			$0.00		$0.00		$0.00		$0.00		$0.00		$0.00	
		Task 2e. Update bridge/structure data on Minnehaha Creek		MCWD		$0					Confirm what, if any, data are available from municipalities			$0.00		$0.00		$0.00		$0.00		$0.00		$0.00	
		Task 2f. Update Minnehaha Creek bathymetry/transects		MCWD		$0					Confirm what, if any, data are available from municipalities			$0.00		$0.00		$0.00		$0.00		$0.00		$0.00	
	Municipal Stormwater Infrastructure Data Intake/Partner Convening	Task 3a. Meet with Municipalities/Regional Agencies within MCWD that have stormwater infrastructure	In-kind/Grant Request	MCWD	$43,500	$87,580					MCWD staff will be reaching out to communities to obtain their GIS stormwater infrastructure or hydraulic models.	$150.00	290	$17,400.00	290	$8,000.00	160	$17,980.00	290	$3,600.00	80	$23,200.00	290	$17,400.00	290
2) Build External Data Information Processing System	Data Processing Planning	Task 4a. Develop and adopt plan for GIS processing system based on Task 3a findings	Grant Reimbursable	Consultant	$25,000	$20,800		$286,000	$153,640	$0	Consultant will develop a plan that outlines a GIS intake and processing system for municipal and regional entity (MnDOT, Hennepin County, etc).	$150.00	167	$9,600.00	160	$4,000.00	80	$0.00		$7,200.00	160	$0.00		$0.00	
	Implementation of Data Processing	Task 4b. GIS Stormwater Infrastructure Plan Implementation for continually processing stormwater infrastructure data	Grant Reimbursable	Consultant/MCWD	$261,000	$132,840					Implementation and development of GIS intake and processing system for municipal and regional entity stormwater GIS data into a format that can be directly imported to MCWD 2D model. This assumes that each of the municipality within MCWD will require approximately $4k in consulting to sift through each dataset. This tasks assumes it will cost $35k to develop a conversion tool for GIS stormwater infrastructure.	$150.00	1740	$34,800.00	580	$26,000.00	520	$19,840.00	320	$52,200.00	1160	$0.00	0	$0.00	
3) 2D and Machine learning model build	Build and Calibrate 2D model	Task 5a. Meet with municipalities to discuss model build	Grant Reimbursable/In-kind	Consultant/MCWD	$43,500	$37,990		$338,500	$46,790	$10,000	Time that staff and consultant will need to spend working with external city staff and consulting engineers to identify what model makes the most sense for MCWD and partners	$150.00	290	$8,700.00	145	$0.00		$8,990.00	145	$0.00		$11,600.00	145	$8,700.00	145
		Task 5b. Select and Build MCWD watershed 2D Model	Grant Reimbursable	Consultant	$225,000	$0					Build watershed model using information and data developed in previous tasks. Assumes that LMCW model is built on a 1-D/2-D platform like XPSWMM or Mike Flood, and that UMCW model is 1-D SWMM-like with groundwater	$145.83	264	$0.00		$0.00		$0.00		$0.00		$0.00		$0.00	
		Task 5c. USGS review of MCWD 2D watershed model					$10,000																		
		Task 5d. Calibrate model with stream flow and lake level data	Grant Reimbursable	Consultant	$50,000	$8,800					Calibrate 2D model using stream level and lake level data collected by MCWD. Assumes that MCWD verifies accuracy and reasonableness of data for calibration purposes.	$147.57	432	$4,800.00	80	$4,000.00	80	$0.00		$0.00		$0.00		$0.00	
		Task 5e. Develop 2D Model Report	Grant Reimbursable	Consultant	$20,000	$0					Develop final report that describes data used, model build, assumptions, and calibration of the 2D model. Assumes 2 review cycles for final document.	$145.83	156	$0.00		$0.00		$0.00		$0.00		$0.00		$0.00	
		Subtotals			$790,500			$790,500	$311,610	$10,000															