



**Title:** Awarding Contract for Watershed-wide Model Input Refinement

**Resolution number:** 23-055

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**Reviewed by:** Name/Title: Brian Beck/Research and Monitoring Program Manager

**Recommended action:** Authorize contract execution for consultant services for watershed-wide model input refinement

**Schedule:** 9/14/23: Award Contract  
 Late September: Project Kickoff  
 End of 2023: Project completion

**Budget considerations:** Fund name and code: Research and Monitoring-Contracted Services 5-5001-4320  
 Fund budget: \$679,730  
 Expenditures to date: 126,474  
 Fund name and Code: Research and Monitoring-LCCMR Grant 5-5008-4320  
 Fund budget: \$738,000  
 Expenditures to date: \$0  
 Requested amount of funding: disclosed under separate cover

**Past Board action:**

Res # 23-038	Authorization to Release RFP for Watershed-wide Model Input Refinement
Res # 22-076	Authorization to Award Contract for Stormwater Infrastructure Data Standardization
Res # 22-038	Authorization to Submit Proposal to LCCMR for Development of 2D Watershed Model
Res # 21-091	Authorization to Execute Contract for 2D Pilot Model
Res # 21-051	Authorization to Execute Memorandum of Understanding (MOU) with the City of Edina
Res # 21-024	Authorization to Submit Proposal to LCCMR for Development of a 2D Watershed Model

**Background:**

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. Over the past 10 years, Minnesota has experienced both record flood conditions and statewide drought that has negatively impacted aquatic ecology, stressed stormwater infrastructure and created billions in property damage. To successfully adapt to the increasingly volatile extremes in weather, Minnehaha Creek Watershed District (MCWD or District) and communities must be able to identify what landscape interventions are needed, where they are needed, and how much investment is needed.

The first stage of the MCWD's Climate Action Framework is to "Understand and Predict" the impacts of climate change using new data sets and modeling to forecast scenarios, evaluate vulnerabilities, and make decisions about adaptation options. A key tool identified within Understand and Predict pillar is the development of a high-resolution watershed-wide 2D model. To fund this work, the District applied for and successfully secured a grant of \$738,000 from the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

To evaluate and manage for technical risk, the District chose to pursue a pilot model build, designed to provide early learnings that can support the effort to build at a watershed wide scale. In December, 2021, the Board of Managers approved a contract with Kimley-Horn for \$240,000 to carry out the pilot model's scope of work. This work was done in partnership with the City of Edina, which was memorialized through a memorandum of understanding that the Board approved in August of 2021.

The pilot model project had two distinct phases, both centered around areas of technical risk. The first, data processing, looked to develop an overarching automated framework for processing and modifying model input datasets while also flagging data gaps recommended for filling prior to the watershed-wide build. The second phase of the pilot project was centered around evaluating two H&H models, ICM and ICPR, to identify which will better meet the District's climate planning needs.

Both phases of the project are now complete, with the final project report projected to be in front of the Board of Managers for acceptance in October. However, Phase 1 of the pilot model was completed back in the fall of 2022, which allowed those learnings to shape and drive forward watershed-scale work.

#### Pilot Model Phase 1 Work and Learnings:

Each city/agency maintains its stormwater infrastructure in its own unique schema, posing a unique challenge for regional agencies like the District. Incorporating all these disparate datasets into one model hinges on the idea that a repeatable automated process can be established. Phase 1 work within the pilot model established an automated workflow to process required model input datasets, including stormwater infrastructure datasets. A key component of the automated workflow is the utilization of a standard geodatabase; the MetroGIS draft stormwater geodata transfer standard (MGIS) was selected since it has been designed and vetted by industry experts and includes thorough documentation. Within the overarching automated workflow, there are two distinct areas of scripting that stormwater datasets pass through to become model ready, which are referred to as the following:

- **Raw to MGIS:** These automated functions reference mapping tables, specific to the corresponding dataset owner (i.e. municipal, regional, or state agency), to translate the raw infrastructure dataset into the MGIS standard. No new data are added.
- **MGIS to Model-Ready MGIS:** These automated functions are focused on correcting abnormalities and filling data gaps within fields that are critical to building an H&H model.

The technical work for phase 1 has been completed and learnings have been identified and documented. Learnings from Phase 1 have been and continue to be utilized to drive forward on watershed-wide model development. Three important tasks were identified as prerequisites for initiating the construction of the watershed-wide model, aiming to equip the District with the necessary foundation to utilize the automated framework and successfully construct the model. These tasks include:

- **Standardize Stormwater Infrastructure Data:** Standardizing all municipal/agency stormwater infrastructure datasets into the MGIS format will require an understanding of each dataset's structure and nomenclature, through coordination with each public entity, and the creation of field mapping tables.
- **Refine Automated Processes:** The MGIS to Model-Ready MGIS automated process must be adapted to account for the range of gaps, values, and issues present across the 27-stormwater infrastructure. This will be important to ensure that the processes are comprehensive and able to generate a watershed-wide model-ready dataset for the District to utilize in upcoming and future model builds.

- **Collect Data Gaps:** Additional data collection efforts are needed to accurately portray overland and channel flow within the watershed-wide model:
  - **Channel cross-sections:** channel storage and key hydrologic areas need to be defined through cross-sectional data since current LiDAR data are insufficient.
  - **Culverts:** Culverts that are responsible for routing water under roads are not always represented in stormwater infrastructure datasets, which can lead to inaccurate ponding and flows.

Watershed-Wide Model Build:

In December 2022, the Board of Managers approved a contract with Bolton & Menk for \$34,785 to standardize stormwater infrastructure datasets, which represents preliminary steps to prepare all stormwater infrastructure datasets for the Watershed-Wide Model Build. Carrying out this work has allowed the District to make continued progress toward the watershed-wide build, ahead of LCCMR funds which have just now become available as of July of 2023.

Table 1 provides an overview of the Pilot Model Build and Watershed-Wide Model build work, which also includes the status of each project phase and funding source since the staff are simultaneously closing out the Pilot Model Build and beginning the Watershed-Wide Model Build.

*Table 1. Overview of past and future 2D model related work*

Project	Project Phase	Status	Funding Source
Pilot Model Build	Phase 1: Developing Data Processing Automation System	Done	District \$258,700
	Phase 2: Model Evaluation	Done	
	Prerequisite: Watershed Wide Stormwater Data Standardization	Closing Out	District \$34,785
Watershed Wide Model	Phase 1: Watershed-Wide Model Input Refinement	Current RFP Process	District and LCCMR funds
	Phase 2: Watershed-wide Model Build and Calibration	Start January 2024	LCCMR funds

MCWD staff are applying insights gained from Pilot Model Build (Phase 1) to begin Phase 1 of the Watershed-Wide Model Build, which is the subject of the Request for Proposals (RFP). This is an exciting milestone as LCCMR funding is now available and this scope of services begins to draw on those dollars.

**Watershed-wide Model Input Refinement RFP Process:**

Scope:

On July 13, 2023 the Board of Managers authorized the release of the RFP, with an anticipated budget range of \$130,000 to \$170,000, with a scope of work that included three key task areas:

1. **Stream Channel Data Collection:** One of the key findings from the pilot model was that channel morphometry data have a disproportionately large impact on the quality of modeling output relative to other easily accessible geographic datasets. The District is looking to accurately characterize channel storage via cross-section data collection within Minnehaha Creek and three of the primary tributaries to Lake Minnetonka. The overall collection strategy will be guided by industry best practices and existing datasets but primarily driven by the end goal of building an accurate H&H model. This work will result in a database of georeferenced data (x,y,z elevations and pictures) pertaining to each cross-section location.
2. **Gap Analysis and Automated Process Refinement:** It's understood that each stormwater infrastructure dataset has unique data gaps and a number of inaccuracies/abnormalities. This task is centered around

automated process development to identify and address the range of issues present within the watershed-wide dataset to support future model builds. Work will include understanding the range of issues and gaps that exist within the watershed-wide stormwater infrastructure dataset and reviewing the existing MGIS to Modified MGIS automated process package for areas of refinement or improvement. The bulk of this task will be working to implement the identified areas improvement to process and provide the District with a model ready stormwater infrastructure dataset.

3. *Culvert Gap Assessment*: This work is intended to establish awareness of where the District has gaps in the watershed-wide culvert dataset and prioritize locations for gap filling that will yield the biggest impact on modeling results. This work requires spatial analysis methods to identify gaps followed by documentation to describe how data gaps should be prioritized during future data collection efforts.

The RFP was posted to the District website and directly distributed to firms with known GIS and scripting abilities. The deadline for submittal was Monday, August 7. The District received proposals from two firms: Bolton & Menk and Geosyntec.

#### Proposal Evaluations:

In the RFP, firms were advised that the District would select a consultant on the basis of proposed methodology, experience, and cost. The Board may consider these factors as it chooses and select a consultant for the work on the basis of its judgement.

The written proposal evaluated was conducted by three District staff. The team evaluated the firms based on the following:

- Project understanding
- Team composition and experience
- Methods and approach
- Cost

Due to the high-level of impact this work will have on the District's upcoming 2D climate model build, Staff pursued interviews with both firms to stress-test their project understanding and better understand their proposed methods and scoping. In addition, District staff issued follow-up questions to obtain clarification where needed.

As an added measure of review, the two Board-appointed 2D Model project liaisons, Manager Hejmadi and Manager Miller, were provided the proposals, viewed both interviews, and debriefed with staff in advance of staff's formal recommendation to the full Board of Managers.

#### Recommendation:

Based on staff's evaluation of proposals, interviews, and dialogue with MCWD Board Liaisons, staff is recommending that Bolton & Menk be selected as the consultant and awarded the contract for services detailed in the Bolton & Menk Watershed-wide Model Input Refinement Proposal, which is provided under separate cover to the Board of Managers.

Bolton & Menk's proposal, scope, and interview demonstrated a strong understanding of the work, its importance, and the anticipated challenges. Bolton & Menk brings a strong project team with extensive GIS and scripting experience specific to stormwater datasets, proven through our previous Data Standardization project. Their work for that project, paired with their relationship as municipal engineer for many District cities, gives them a unique relational advantage and strong baseline understanding of the issues present within the project datasets. Bolton & Menk's decision to partner with Kimley-Horn, the consultant for the Pilot Model Build, will allow the team to better capitalize on previous learnings and work, and further ensure the datasets will support the upcoming climate model build. Lastly, Bolton & Menk's methods and approach to scoping the survey work, which we learned through the pilot model is a critical dataset to model accuracy, better ensures the District will obtain the number and accuracy of cross-sections needed to support the upcoming climate model build.

In accordance with Minnesota Statutes 13.591, subdivision 3(b), the submitted proposals will not be part of the public record until the contract has been executed. A copy of each of the submitted proposals will have been distributed to the Board of Managers, via email, for review prior to the September 14, 2023 meeting.

The work outlined in Bolton & Menk's proposal will be funded through a combination of District ad valorem and LCCMR grant funds. The Research and Monitoring Department allocated levied funds in 2023 year for data collection efforts to support the model build. The remainder of the work will begin drawing on the awarded LCCMR funding. Detail on the allocation of these funds will also be provided to the Board of Managers, under separate cover, in conjunction with the proposals. A decrease to Bolton & Menk's budget and scope can be expected if the District is able to take advantage of its active contract with MnDOT to fly a LiDAR collection along Minnehaha Creek, approved by the Board in October of 2022 for \$32,800. This work would only be conducted if drought conditions persist, and seasonal conditions are met. The level in which Bolton's scope is reduced would be dependent on how much of Minnehaha Creek is able to be captured through LiDAR.

**Next Steps:**

Following authorization to award the contract, staff will work closely with Bolton & Menk's project manager to finalize the scope of work and contract. Staff do not anticipate the scope of work needing much refinement. However, staff will ensure that the survey work remains flexible and allows the District to take advantage of LiDAR. Project work is anticipated to kick-off at the end of September and will be ongoing through the remainder of 2024.



## RESOLUTION

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**Title:** Awarding Contract for Watershed-wide Model Input Refinement

- WHEREAS, climate change is measurably changing the distribution, frequency and intensity of rainfall in Minnesota;
- WHEREAS, a key pillar in Minnehaha Creek Watershed District's (District) climate action framework is to understand and predict the impacts of climate change using new data analytical and planning tools;
- WHEREAS, to support this strategy, the District has identified the need to develop a watershed-wide two-dimensional (2D) model that incorporates high resolution stormwater infrastructure and land surface data to improve our ability to inform current and future water resource management decisions in the face of climate change;
- WHEREAS, in June 2022, the Board of Managers authorized staff to submit a proposal for \$738,000 to the Legislative-Citizen Commission on Minnesota Resources (LCCMR) to develop a watershed-wide model;
- WHEREAS, in advance of the watershed-wide build, the District chose to pursue a pilot 2D model build to constrain the technical and relational risk associated with a large scale, high-resolution model build;
- WHEREAS, one of the technical challenges that the pilot model was designed to address is to identify a method to assemble, process, and incorporate unique stormwater infrastructure datasets from the multiple public agencies within the District;
- WHEREAS, in December, 2021, the Board of Managers authorized a contract with Kimley-Horn to deliver on the pilot model's scope of work that would result in an automated and repeatable process for transforming model input datasets, including stormwater infrastructure datasets (phase 1) and the evaluation of two different models, ICM and ICPR (phase 2);
- WHEREAS, phase one of the pilot model has been completed and three key next steps have been identified to position the District to utilize the automated framework and effectively construct the model: (1) standardize all of the stormwater infrastructure datasets within the District into the MetroGIS draft geodatabase transfer standard (MGIS), (2) refine the automated processes to account for issues and gaps within the watershed-wide stormwater infrastructure dataset, and (3) fill data gaps critical for the model build, such as channel cross-sections and culverts;
- WHEREAS, based on learnings from the pilot model and to advance work for the watershed-wide build, in December, 2022, the Board of Managers authorized a contract with Bolton & Menk to standardize all the watershed-wide stormwater infrastructure datasets into the MGIS standard;
- WHEREAS, in August of 22, the LCCMR recommended funding the project entitled "Leveraging Innovations in Data Analytics for Project Implementation" in the amount of \$738,000, and in May of 2023 the Minnesota legislature approved funding in the recommended amount;

WHEREAS, the watershed-wide model input refinement scope tackles the remaining next steps identified during phase 1 of the pilot model build and will begin to draw on LCCMR funds;

WHEREAS, on July 13, 2023, the Board of Managers authorized the release of a request for proposals (RFP) for watershed-wide Model Input Refinement, which included three key elements: (1) acquiring stream channel cross-sections, (2) automated process refinement, and (3) culvert gap assessment;

WHEREAS, the RFP was posted to the District website and directly distributed to firms with known GIS and scripting experience, which resulted in the receipt of two proposals;

WHEREAS, District staff evaluated the two written proposals, submitted by Bolton & Menk and Geosyntec, and interviewed representatives of those firms on project understanding, methods and approach, project team and experience, and cost;

WHEREAS in the course of its review District staff has coordinated with Board-appointed 2D Model project liaisons Managers Hejmadi and Miller;

WHEREAS on the basis of its evaluation, staff recommends the selection of Bolton & Menk, based on its strong project understanding, its experienced team, and its relationship and familiarity with District municipalities and stormwater datasets;

WHEREAS the Board of Managers finds that the evaluation has been thorough and properly structured, and that the work proposed by Bolton & Menk is demonstrated to be competitive and within budget;

NOW, THEREFORE, BE IT RESOLVED that the Minnehaha Creek Watershed District Board of Managers authorizes the District administrator, on advice of legal counsel, to execute a contract with Bolton & Menk for consultant services for Watershed-wide Model Input Refinement, in accordance with the developed scope of work as the Administrator may refine it, and in an amount not to exceed the amount set forth in the proposal, and authorizes the Administrator to execute contract amendments in his discretion up to an additional 10 percent, in aggregate, of the contract amount.

Resolution Number 23-055 was moved by Manager \_\_\_\_\_, seconded by Manager \_\_\_\_\_. Motion to adopt the resolution \_\_\_ ayes, \_\_\_ nays, \_\_\_ abstentions. Date: 9/14/2023

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Secretary Date: \_\_\_\_\_