

elm creek Watershed Management Commission

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AGENDA Technical Advisory Committee October 10, 2019

1. Call TAC meeting to Order.
 - a. Appoint Chairman Pro-tem. *(Derek Asche has volunteered to serve in this capacity. Chair Kujawa has chosen to recuse himself from this meeting.)*
 - b. Approve agenda.*
 - c.. Approve Minutes of last TAC meeting.*
2. Responses to RFP – Technical Services.
 - a. Barr Engineering.*
 - b. Hakanson Anderson.*
 - c. Stantec.*
 - d. Wenck Associates.*
 - e. Recommendation to Commission.
3. Responses to RFP – FEMA Mapping Project.
 - a. Barr Engineering.*
 - b. Wenck Associates.*
 - c. Recommendation to Commission.
4. Topics for Future TAC Meetings.
 - a. Draft Policy for Future Wetland Restoration Projects.
 - b. Revisions to Rules of Commission.
 - 1) Composition and procedures of TAC.
 - c. Other.
5. Other Business.
6. Next meeting _____.
7. Adjourn meeting of TAC.

Z:\Elm Creek\Meetings\Meetings 2019\10 TAC Meeting Agenda.docx

*in meeting packet
**available at meeting

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Technical Advisory Committee *(beginning on page 1)* and Regular Meeting *(beginning on page 3)* Minutes - July 10, 2019

I. A meeting of the **Technical Advisory Committee (TAC)** for the Elm Creek Watershed Management Commission was convened at 10:02 a.m., Wednesday, July 10, 2019, in the Mayor's Conference Room, Maple Grove City Hall, 12800 Arbor Lakes Parkway, Maple Grove, MN, by Chairman James Kujawa.

In attendance: Todd Tuominen, Champlin; Kevin Mattson, Corcoran; Sarah Nalven, Wenck Associates, Corcoran; Derek Asche and Mark Lahtinen, Maple Grove; Andrew Vistad, Hakanson-Anderson, Medina; Andrew Simmons, Rogers; James Kujawa, Jason Swenson, and Kirsten Barta, Hennepin County Dept. of Environment and Energy (HCEE); Brian Vlach, Three Rivers Park District (TRPD); Jeff Weiss, Barr Engineering; Steve Christopher, Board of Water and Soil Resources (BWSR); and Judie Anderson, JASS.

Also present: Ken Guenther, Corcoran; Doug Baines, Dayton; Liz Weir, Medina; and Alex Larson, Katerina Meybaum, and Fred Moore, Plymouth.

- A. Motion by Asche, second by Simmons to approve the **agenda*** *Motion carried unanimously.*
- B. Motion by Kujawa, second by Asche to approve the **minutes*** of the April 10, 2019 Technical Advisory Committee meeting. *Motion carried unanimously.*

II. **Rush Creek Subwatershed Assessment.*** Barta's July 2, 2019 memo provided an update on grant progress. She reported that letters have been mailed to approximately 200 residents identified in the SWA as having livestock and/or erosion issues and who came to the open house and indicated interest in the program. Twenty-two site visits have been completed. Two residents have opted to utilize resources provided by Staff to complete projects on their own.

Four projects are under staff review/cost estimate approval; three projects are not being put under contract because residents are happy to pay the costs with staff technical assistance; three projects require cooperation from neighbors in order to be completed; and five more staff visits have been scheduled. In all, about ten projects have been identified, primarily dealing with manure management, grassed waterways, and exclusion fencing

Staff will also follow up with residents who sent in postcards from an unrelated project. Letters will be sent to residents in a larger geographical area not specifically identified in the SWA but still on the creek and who would likely have beneficial projects. Lastly, staff would work with Hennepin Environmental Health on a septic project to target failing systems in the area. This latter item would likely be supported by the MPCA who approached staff about this project.

III. **Ranchview Wetland Bank.*** Included in the meeting packet was a copy of CIP Exhibit A for the Ranchview Wetland Restoration Project. Asche provided background information for this site comprising seven parcels with four different landowners. The CIP calls for 70 acres of restored wetland with an estimated project cost of

RULE D - STORMWATER MANAGEMENT
RULE E - EROSION AND SEDIMENT CONTROL
RULE F - FLOODPLAIN ALTERATION

RULE G - WETLAND ALTERATION
RULE H - BRIDGE AND CULVERT CROSSINGS
RULE I - BUFFERS

elm creek Watershed Management Commission

TAC and Regular Meeting Minutes – July 10, 2019

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\$2,500,000. The City of Maple Grove has proposed a plan to create 35 acres worth of bank credits, with the City owning the credits. Development would probably not occur sooner than 3-5 years. The City would consider incremental levies so as not to exceed the \$500,000 annual cap.

The members raised questions with regard to the appropriateness of providing funding for a project that could be profitable. Asche responded that it was his impression that the funding is for wetland restoration of the 35 acres that is not set aside for banking credits.

The members inquired about the availability of credits for projects in their communities as a condition of watershed funding. Asche responded that he is open to any discussion on the topic. Commissioner Moore questioned if the wetland bank would be used as credit for any current or future TMDL requirements. Asche and Barta understood that was not possible as wetlands are not intended to be used for primary water quality treatment. Future development would be required to provide treatment prior to discharging into the wetland.

It was suggested that the City of Blaine be contacted regarding their wetland banking experiences as there may be a benefit to learning from them.

This item will continue to be discussed at future TAC meetings.

IV. Project Review Fee Schedule.*

The Commission's current project review fee schedule for new development separates residential reviews into two categories – low and high density. Low density development is described as that which is less than forty percent impervious in area; high density as that which is greater than forty percent impervious. Density is defined as the number of units per buildable area prior to development. Buildable area is the site area excluding wetlands and floodplains.

Since the amount of review time and effort is essentially the same for both densities, Staff recommends that the Commission eliminate the low density designation and adopt the high density fees for all residential subdivisions requiring review.

Motion by Simmons, second by Tuominen to recommend to the Commission that Staff's recommendation be adopted. *Motion carried unanimously.*

V. Abstraction Standards.*

The Commission Standards for abstraction states "Stormwater runoff volume must be infiltrated/abstracted onsite in the amount equivalent to one point one inch (1.1") of runoff generated from new impervious surface." Applicants and their engineers interpret "new impervious surface" to mean impervious surface added by the new development, i.e., existing impervious surface areas do not need to be treated for our abstraction rule. Staff believes, in the interest of water quality and quantity, all impervious surfaces should meet Commission abstraction requirements whenever a site is being developed or if it is a redevelopment project that disturbs greater than 50% of the site. Staff is requesting a change to the Commission's Appendix C, Rule D. 3. C: as follows:

Stormwater runoff volume must be infiltrated/abstracted onsite in the amount equivalent to one point one inch (1.1") of runoff generated from **new all** impervious surface

Christopher stated that the proposed change in language would be a clarification of the current language and would not require a Minor Plan Amendment.

The revision was agreed to by consensus.

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elm creek Watershed Management Commission

TAC and Regular Meeting Minutes – July 10, 2019

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VI. Cost Share Policy.

A. In its letter dated May 13, 2019,* the City of Medina requested additional information as it pertains to the **Enhanced Sweeper** proposed by the the City of Plymouth. The sweeper was added to the CIP as a 2020 project at a cost of \$350,000. The City also expressed concern that, in the past, ad valorem taxes have traditionally been spent on water quality improvement projects rather than equipment.

B. In the meeting packet was a copy of the **Shingle Creek and West Mississippi Watershed Management Commissions' Cost Share Policy for Capital Improvements.*** It was drafted as a result of the City of Plymouth's request to add the Enhanced Sweeperr to the SCWM CIP. After consultation with the Commissions' Attorney, BWSR, and the Hennepin County Attorney, the SCWM WMOs are going forward with a Minor Plan Amendment to incorporate this new policy.

The Elm Creek Commission's current policy* was included in the packet for comparison.

VII. The date of the next TAC meeting is indeterminate. The meeting of the Technical Advisory Committee was adjourned at 11:29 a.m.

I. A regular meeting of the Elm Creek Watershed Management Commission was called to order at 11:37 a.m., Wednesday, July 10, 2019, in the Mayor's Conference Room, Maple Grove City Hall, 12800 Arbor Lakes Parkway, Maple Grove, MN, by Chairman Doug Baines.

Present were: Bill Walraven, Champlin; Ken Guenther, Corcoran; Doug Baines, Dayton; Joe Trainor, Maple Grove; Elizabeth Weir, Medina; Fred Moore, Plymouth; Kevin Jullie, Rogers; James Kujawa, Jason Swenson, and Kirsten Barta, Hennepin County Dept. of Environment and Energy (HCEE); Brian Vlach, Three Rivers Park District (TRPD); Jeff Weiss, Barr Engineering; and Judie Anderson, JASS.

Also present: Todd Tuominen, Champlin; Kevin Mattson, Corcoran; Sarah Nalven, Wenck Associates, Dayton; Derek Asche and Mark Lahtinen, Maple Grove; Terry Sharp, Medina; Catherine Cesnik, Alex Larson, and Katerina Meybaum, Plymouth; and Andrew Simmons, Rogers.

A. Motion by Weir, second by Moore to approve the **revised agenda.*** *Motion carried unanimously.*

B. Motion by Weir, second by Walraven to approve the **minutes*** of the March 9, 2019, regular meeting. *Motion carried unanimously.*

C. Motion by Moore, second by Walraven to approve the July **Treasurer's Report and Claims*** totaling \$12,295.38. *Motion carried unanimously.*

II. Open Forum.**III. Action Items.**

A. Project Review 2019-015 Timbers Edge, Plymouth.* This project is approximately 18.7 acres in size, located on the west side of Holly Lane, across from the Hollydale Golf Course. It is currently a wooded lot with an existing parking lot. The proposed project would construct 40 single-family homes, resulting in 4.6 acres of new impervious area. Stormwater is to be managed with a stormwater pond and a sand filtration system. In their findings dated July 2, 2019, Staff recommends approval with no conditions. Motion by Moore, second by Guenther to approve Staff's recommendation. *Motion carried unanimously.*

RULE D - STORMWATER MANAGEMENT
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 RULE I - BUFFERS



proposal to

evaluate site designs for development proposals

prepared for

the Elm Creek Watershed Management Commission

submitted by Barr Engineering Co.
August 30, 2019



August 30, 2019

Mr. Doug Baines, Chair
Elm Creek Watershed Management Commission
3235 Fernbrook Lane
Plymouth, Minnesota 55447

re: proposal to evaluate site designs for development proposals

Dear Mr. Baines:

Barr Engineering Co. is pleased to submit this proposal to continue to serve the Elm Creek Watershed Management Commission. This proposal outlines our plan and qualifications to evaluate development-proposal site designs for compliance with the Commission's Third-Generation Watershed Management Plan. In a trusted partner capacity, Barr has been providing similar services to watershed management organizations for over 50 years, including evaluating, planning, and developing plans and designs related to drainage, hydrologic and water quality requirements, stormwater management, erosion and sediment controls, floodplain, wetlands, shoreland, and natural-resource preservation issues.

Some of the benefits Barr has to offer include:

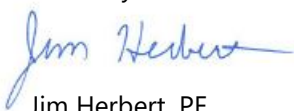
Familiarity—Through our work with the Commission and Hennepin County Environment and Energy over the past 15 years, we have become familiar with your approach to watershed management. We understand your organization's goals, procedures, and rules. In addition, Barr is not a city engineer for any of the member communities, so we are dedicated solely to the interests of the Commission.

Continuity—Having completed prior development-review work for the Commission, Barr can provide a seamless transition. We are also partnering with Jim Kujawa, who has served as the Hennepin County technical advisor for the Commission. With the addition of Mr. Kujawa, the team that has provided technical and wetland services to the Commission will remain largely the same.

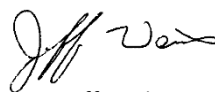
Credibility—Our depth and breadth of staff allows us to offer comprehensive water-resources management services. We have established a reputation as experts in water-resources management, including development review, stormwater and water quality management, and site design for several major watershed management organizations in the Twin Cities metro area.

Thank you for the opportunity to provide information regarding our technical advising services. If you have any questions or require further information, please contact me (952-832-2784, jherbert@barr.com) or project manager, Jeff Weiss (952-832-2706, jweiss@barr.com). We look forward to continuing our successful working relationship.

Sincerely,



Jim Herbert, PE
Vice President, Principal in Charge



Jeff Weiss, PE
Project Manager

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company description

our origins

Barr's roots extend back to the early 1900s with Adolph Meyer, one of the first hydrologists in the United States. Doug Barr began work with Mr. Meyer in the 1950s and built a practice of his own while learning from this skilled hydrologist. By the time the company was incorporated as an employee-owned firm in 1966, it had 16 employees. Today, Barr Engineering Co. has more than 800 employees located in Minnesota, North Dakota, Missouri, Michigan, Colorado, Utah, and Alberta.

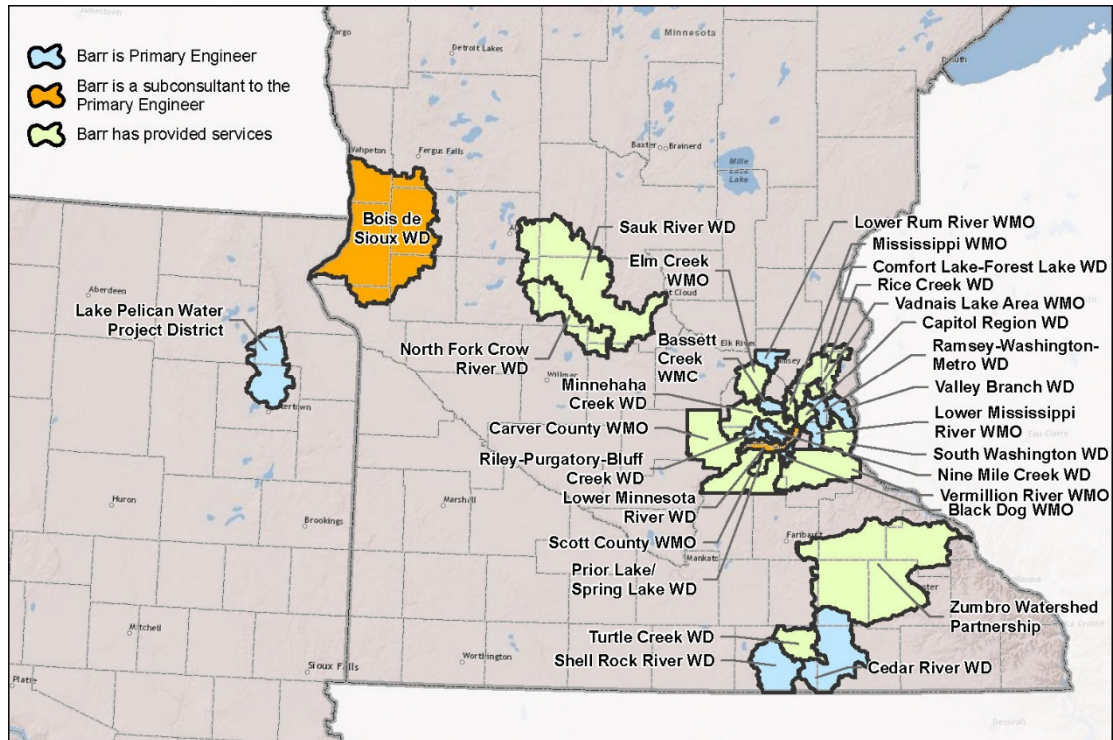
a focus on water resources

Our commitment to water resources remains strong. More than 100 of our Minneapolis-based engineers and scientists are engaged in water-resources engineering and design, stormwater management, wetland management, limnology, and landscape ecology. Our breadth and depth of experience means that we can provide an innovative solution to any water resources challenge you encounter. Our areas of expertise in water resources include:

- evaluating site designs for development proposals
 - including review of erosion and sediment control plans
- stormwater management and BMP design
 - including hydrologic and hydraulic modeling
- wetlands and Wetland Conservation Act administration
- watershed and water-resources management planning
 - including grant applications
- water quality management
 - including aquatic invasive species management
- ecosystem planning, landscape ecology, and landscape architecture
 - including natural resources preservation
- river, stream, and shoreline restoration
- floodplain management
- groundwater and hydrogeology

Barr has been working with the Elm Creek Watershed Management Commission since 2005 and has developed a thorough understanding of the watershed and its characteristics. Our services to the Commission have included:

- project and development reviews to verify compliance with Commission rules and recommendations to the Commission regarding approvals
- reviews of local water-management plans for compliance and consistency with watershed goals and policies
- participation in technical advisor committee meetings
- ongoing monitoring of wetland mitigation sites and preparation of annual reports
- participation in technical evaluation panels on behalf of the Commission



Barr offers services to many watershed management organizations.

We also serve as the primary engineer for 10 other watershed management organizations and watershed districts (see the illustration above), providing a wide range of expertise to watershed organizations across Minnesota. The table on the following page illustrates the services areas we have provided to the Commission, as well as those for the watershed organizations with whom we have long-term working relationships.

Barr's services to watershed organizations

watershed organization	review of development and erosion/sediment control plans	watershed management planning, and grant applications	stormwater management and BMP design	river, stream, and shoreline restoration	stream and lake monitoring	water-quality studies and implementation	aquatic plant management	capital improvement program assistance	innovative stormwater and flood design services	Federal, state, and local rules and NPDES permitting	wetland services
Bassett Creek WMC	•	•	•	•	•	•	•	•	•	•	•
Black Dog WMO		•	•		•	•	•	•	•		•
Capitol Region WD	•	•	•	•	•	•		•	•	•	•
Carver County WMO		•	•			•			•		•
Cedar River WD	•	•	•		•	•	•	•	•	•	•
Elm Creek WMC¹	•	•	•		•	•		•		•	•
Lake Pelican WPD		•	•			•		•	•		
Lower Mississippi River WMO		•	•	•	•	•	•				•
Lower Rum River WMO		•	•	•		•		•		•	•
Mississippi WMO		•	•	•		•		•	•	•	•
Nine Mile Creek WD	•	•	•	•	•	•	•	•	•	•	•
North Fork Crow River WD		•	•	•	•						•
Ramsey-Washington WD	•	•	•	•	•	•	•	•	•	•	•
Prior Lake-Spring Lake WD		•	•		•	•				•	•
Riley-Purgatory-Bluff Creek WD	•	•	•	•	•	•		•	•	•	•
Sauk River WD		•	•	•	•	•	•	•			•
Scott WMO		•	•	•	•	•		•	•		•
Shell Rock River WD	•	•	•	•	•	•	•	•	•	•	•
Turtle Creek WD		•	•		•	•					
Valley Branch WD	•	•	•	•	•	•	•	•	•	•	•
Zumbro WP				•	•	•		•			

¹Including services provided by Jim Kujawa

Barr's experience with evaluating site designs for development proposals

Permitting programs for land alteration activities are one of the ways watershed organizations—and the cities, townships, and counties within their boundaries—can help verify that their water and natural resources are protected and ensure that those aspects of long-term goals and initiatives are implemented. Each year, Barr reviews hundreds of water-resource permits for watershed organizations, counties, and municipalities for compliance with their ordinances and policies and with state requirements.

We also help our governmental clients develop permitting programs for construction projects and land development or redevelopment and regularly review and update these programs so that they provide the needed level of regulatory guidance to be effective, manageable, and enforceable. We are currently assisting with water-resource permitting reviews for the following water management organizations and municipalities:

- Bassett Creek Watershed Management Commission*
- Capitol Region Watershed District
- Cedar River Watershed District*
- **Elm Creek Watershed Management Commission**
- Lower Rum River Watershed Management Organization
- Mississippi Watershed Management Organization
- Nine Mile Creek Watershed District*
- Ramsey-Washington Metro Watershed District*
- Riley-Purgatory-Bluff Creek Watershed District*
- Sauk River Watershed District
- Valley Branch Watershed District*
- City of Blaine
- City of Hastings*
- City of Minnetonka
- City of Willmar*

* Includes assistance with initiating permitting programs

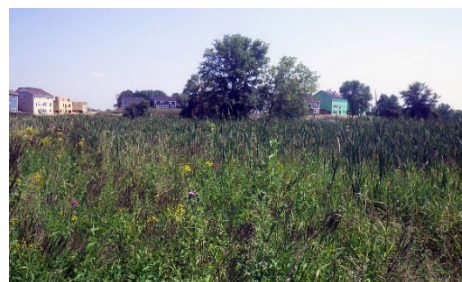
relevant project examples

watershed management organization project review process

client: Elm Creek Watershed Management Commission

For almost 15 years, Barr has supported the Elm Creek Watershed Management Commission's project review process, providing oversight for a range of environmental management activities to ensure that the development plans comply with the Commission's Third Generation Watershed Management Plan. Barr assists the Hennepin County Department of Environment and Energy with review of proposed land development and redevelopment projects. Barr reviews approximately two to six applications per year for:

- development plan reviews
- floodplain management
- wetlands management
- stormwater management
- erosion and sediment control
- water-body crossings or structures
- shoreline and stream-bank improvements



watershed district permit administration

client: Valley Branch Watershed District



As technical advisors to the Valley Branch Watershed District managers, Barr reviews approximately 20 to 40 permits per year for conformance to the district's rules and regulations and the Minnesota WCA. Some of the review items include stormwater rate, volume, and quality; sediment and erosion control; wetland hydrology, impacts, and buffers; and flood levels and associated minimum floor elevations. Barr works with permit applicants to achieve each project's goals while still conforming to the district's rules and regulations. We prepare permit review memoranda and forward them to the permit applicant and officials of the community

where the proposal lies, present the permit application to the managers, and process the approved permit. While the managers have their own inspector who handles the day-to-day inspections of permitted activities, at the direction of the managers, Barr inspects projects that could impact wetlands and performs other inspections as needed.

watershed district permitting program

client: Nine Mile Creek Watershed District



Among other services, Barr provides wetland reviews, monitoring, and recommendations for the NMCWD.

Since 1973, Barr has administered the Nine Mile Creek Watershed District's permitting program, which provides oversight for a range of environmental management activities to help verify compliance with district regulations and the Minnesota WCA. In 2008, Barr helped the district implement revisions to its program based on the district's rule revisions.

Over that five-year period, we have reviewed an average of 65 permits per year. Barr reviews permit applications for:

- floodplain management
- wetlands management
- stormwater management
- erosion and sediment control
- water-body crossings or structures
- shoreline and stream-bank improvements
- sediment removal
- appropriation of public surface waters

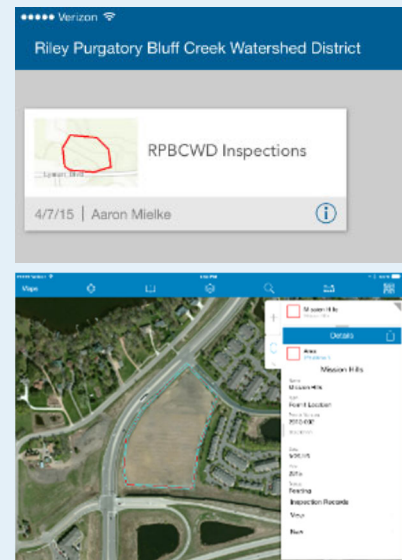
As the district's technical advisor, Barr helps permit applicants meet their project goals within the confines of the district's regulations. We shepherd applicants through the permitting process, including preparing and distributing review memoranda and presenting the application materials to district managers. In addition to permitting assistance, Barr handles day-to-day inspections of permitted activities and assists district managers and staff with evaluating requests for permit variances.

watershed district regulatory program

client: Riley-Purgatory-Bluff Creek Watershed District

In 2014, Barr helped the RPBCWD reinstate the regulatory program based on the district's rule revisions, and since January 1, 2015, we have reviewed permit applications for the district. As the district's technical advisor, Barr assists permit applicants in meeting their project goals within the confines of the district's regulations and helps district managers and staff with evaluating requests for permit variances, financial assurances, and maintenance agreements. We guide applicants through the permitting process, including preparing and distributing review memoranda and presenting the application materials to district managers. Barr reviews permit applications for:


- floodplain management and drainage alterations
- erosion and sediment control
- wetland and creek buffers
- dredging and sediment removal
- shoreline and stream-bank stabilization
- water-body crossings and structures
- appropriation of public waters and groundwater
- stormwater management



Inspection information is collected using the iPad and digital inspection form.

Barr also conducts routine erosion-control site inspections of permitted activities. We developed and use a mobile, GIS-based mapping tool for the tracking and inspection of district permits and BMPs. This tool allows Barr inspectors and RPBCWD staff members to easily identify their location as well as other pertinent information in real time in the field using a mobile tablet and mapping software. Inspection information is collected using the iPad and digital inspection form. This information will be stored in an enterprise database. Reports generated from the data in the database will allow the user to view active and inactive permits, inspection history, and corrective actions. For the RPBCWD, Barr developed a custom review portal to share comments and track the progress of each permit.

Home



RILEY
PURGATORY
BLUFF CREEK
WATERSHED DISTRICT

Add Permit

Permits

CSVExcelPrint

Search all columns:

ID# Data	Construction																
Permit Number	Response Received	Sent to Michael and Claire	Michael and Claire Response	Finalized for Packet	Board Meeting Action Date	Board Action Taken	Permit Expiration Date	Review Summary to Applicant	Permit Drafted	Outstanding Conditions	Buffer Agreement Recorded	Stormwater Agreement Recorded	Financial Assurance Received	Permit Issued	Contractor Company	Contractor Contact Person	Contractor Phone Number
edit	'17	3/1/17															
edit		05/18/2018				06/06/2018	Approved with Conditions.	06/06/2019	07/11/2018	Y	N	NA	Y	NA	07/24/2018		
edit	2015-001		Sent to Claire/Lawyer: Yes			02/04/2015		01/19/2016	01/12/2015	Y	N	N	N		01/19/2015		
edit	2015-002		Sent to Claire/Lawyer: Yes		3/26/2015 12:00:00 AM	04/01/2015	Approved	04/01/2017		Y	Y	N	N				

scope of work and cost estimate

Barr understands that the Elm Creek Watershed Management Commission is seeking a new primary technical advisor to provide a variety of services, including but not limited to: reviewing development plans; participating in Commission and TAC meetings; assisting with technical guidance to cities, developers, and landowners; and assisting, as necessary, with Wetland Conservation Act issues and other miscellaneous technical issues. The following sections provide more information about our anticipated scope of work, estimated budget (assuming approximately 50 project reviews and 2019 rates), and past experience with the level of effort required for pre-project reviews and miscellaneous technical assistance.

Task 1: pre-project review assistance

We understand that some level of pre-project review occurs for most projects. It can be as simple as a phone call or email correspondence to summarize which rules apply to a given project. Other times, it may require a significant amount of effort, as developers use creative solutions to maximize a site while trying to adhere to Commission rules. While it is not the responsibility of the technical advisors to assist in designing the project for the developer, it is necessary to let them know if their proposed plan will not work, while informing them of other approaches that have been successful within the watershed and that should be considered.

staff member	estimated hours	estimated cost
Jeff Weiss	75	\$10,125
Jim Kujawa	175	\$17,500
total	250	\$27,625

Task 2: project reviews

Our team understands that the primary task of the technical advisor to the Commission is to assist with reviewing project applications for conformance with Commission rules and its Third Generation Plan. Barr has been providing assistance in a similar manner to the Commission for approximately 15 years. As described in the RFP, the project reviews require evaluating drainage; hydrology; runoff rates; water quality; stormwater management; erosion and sediment control; and preservation of floodplain, wetland, shoreline, and natural areas. We will then prepare a summary of findings for each project review and present the findings to the Commission.

staff member	estimated hours	estimated cost
Jeff Weiss	100	\$13,500
Jim Kujawa	600	\$60,000
Heather Hlavaty	150	\$15,000
Lulu Fang	150	\$14,250
Jim Herbert	10	\$1,950
total	1,010	\$104,700

Task 3: meeting attendance

Two members from Barr's team will attend each Commission and TAC meeting. Staff will present project review findings at the regular Commission meetings and provide technical input to the

discussion on other topics during the meetings. We will also participate in the TAC meetings, when held, to lead and participate in discussion on various topics.

staff member	estimated hours	estimated cost
Jeff Weiss	40	\$5,400
Jim Kujawa	40	\$4,000
total	80	\$9,400

Task 4: Wetland Conservation Act assistance

The Commission is no longer the Local Government Unit (LGU) for any member cities; however, the Commission may be asked to be present at Technical Evaluation Panel (TEP) meetings and/or provide input about a WCA issue. While it is difficult to predict the frequency for which this task will be needed, it is something that is anticipated on an annual basis.

staff member	estimated hours	estimated cost
Jim Kujawa	20	\$2,000
Karen Wold	8	\$1,040
Brian Burgner	20	\$2,100
total	48	\$5,140

Task 5: miscellaneous technical assistance

Similar to Task 4 above, Barr's team will provide additional technical assistance as requests and needs arise. Items that fall under this task are those that are reasonable to assume will be needed annually; however, the level of effort for each year is difficult to anticipate. For each of the items summarized below, Barr's team assumes a member city or Three Rivers Park District (TRPD) staff will be a lead and/or partner in the task. Some items that may be included in this task are:

grant applications—Barr's team will help the Commission prepare and/or review grant applications for funds to help implement CIP projects. We assume all efforts on this task will be completed with assistance from member cities and/or TRPD.

technical reports—We will review technical reports as requested on behalf of the Commission and provide comments and feedback. These technical reports may include a variety of topics. With Barr's deep bench of specialists, we will find the appropriate person to help review and comment on each report. Anticipated reports include, but are not limited to:

- *subwatershed assessments*—Member cities have been working on subwatershed assessments to help pinpoint locations for implementing best management practices (BMPs). Barr's team will review reports and provide comments on behalf of the Commission as requested.
- *water quality testing reports*—The Commission receives annual water quality testing results from TRPD, member cities, and CAMP volunteers (most years). We will review these reports on behalf of the Commission as requested.
- *floodplain mapping*—The Minnesota Department of Natural Resources (MN DNR) will complete the hydraulic modeling of the streams within the Commission boundaries. Barr's

team anticipates an opportunity to review the model and comment on the model on behalf of the Commission.

- *EAW/EIS review*—Environmental assessment worksheets (EAWs) and environmental impact statements (EISs) are sometimes required for a given project. When these are completed, it is customary for the reports to be submitted to several entities for review and comment, including the local watershed. Barr's team will complete such reviews as requested.

staff member	estimated hours	estimated cost
Jeff Weiss	20	\$2,700
Jim Kujawa	40	\$4,000
Heather Hlavaty	10	\$1,000
Lulu Fang	10	\$900
Jim Herbert	10	\$1,950
specialty staff (as needed)	20	\$2,400
total	110	\$12,950

total hours and estimated budget

The total estimated hours and budget for Barr's team are as follows:

staff member	estimated hours	estimated cost
Jeff Weiss	235	\$31,725
Jim Kujawa	875	\$87,500
Heather Hlavaty	160	\$16,000
Lulu Fang	160	\$15,200
Karen Wold	8	\$1,040
Brian Burgner	20	\$2,100
Jim Herbert	20	\$3,900
specialty staff (as needed)	20	\$2,400
total	1,498	\$159,865

The estimated costs outlined above are anticipated costs based on time spent on similar items in recent years; however, the costs from year to year may vary considerably.

project team

Barr will partner with Jim Kujawa, former Hennepin County technical advisor for the WMC. Barr values long-term relationships with our clients. For that reason, we strive to provide you with high-quality, consistent service. The following pages include brief biographies of the Barr staff members who are currently working on the Elm Creek Watershed Management Commission's projects, or who have served the Commission in the past. These same team members will continue to provide the Commission with the high level of service you have come to expect from Barr and Mr. Kujawa.

Barr uses a project team approach that matches our expertise with the unique requirements of each project and client. Directed by Jim Herbert and Jeff Weiss, our team has been created specifically to meet the needs of the Commission in 2019 and beyond. In addition to the staff members listed here, you can expect Barr to access the more than 100 additional water-resources staff members and design engineers to provide you with comprehensive services.



2019 billing rate:
\$135

Jeffrey Weiss, PE

Senior Water Resources Engineer, Project Manager
MS, Civil Engineering

Jeff has more than 15 years of experience in water resources engineering. His work at Barr includes a broad range of projects involving water quality, stormwater runoff, and flood protection as well as stream restoration, erosion control, and hydraulic and hydrologic modeling. He will serve as the main point of contact for the Commission, and will manage day-to-day project activities. Jeff's watershed work has included:

- Attending Commission meetings and technical advisory committee meetings since 2009.
- Completing development reviews and recommendations for the Commission.
- Completing reviews and recommendations for capital improvement plan projects for the Bassett Creek Watershed Management Commission.
- Conducting feasibility studies of three reaches of Bassett Creek and North Branch Bassett Creek in Golden Valley, Crystal, and Minneapolis for updating in city and watershed capital improvement plans.
- Serving as lead designer on multiple erosion control projects in Minnehaha Creek Watershed District, Riley-Purgatory-Bluff Creek Watershed District, Valley Branch Watershed District, and Scott Watershed Management Organization.
- Serving as project manager for numerous projects for the Lower Minnesota River Watershed District.
- Serving as city representative on the technical advisory committee for the Lower Mississippi River Watershed Management Organization.



2019 billing rate:
\$195

Jim Herbert, PE

Vice President, Senior Civil Engineer, Principal in Charge
BS, Civil Engineering

Jim will continue to serve as principal in charge for Barr's work with the Commission. Having also served the Bassett Creek Watershed Management Commission since 1986 and the Capitol Region Watershed District since 2005, he is very familiar with the goals and needs of watershed management organizations. He will be responsible for Barr's overall work and will support Jeff Weiss and Jim Kujawa as they manage technical and wetland services to the Commission. Jim's watershed work has included:

- Reviewing development proposals for conformance with water quality standards, floodplain mitigation criteria, erosion control, and other policies.
- Coordinating and participating in Bassett Creek Watershed Management Commission flood control project inspections, including inspection of the Bassett Creek double box culvert and deep tunnel located beneath the city of Minneapolis.
- Completing engineering studies and design of hydraulic structures and preparing permits.
- Designing and constructing large infrastructure rehabilitation projects.
- Managing lake-level and stream monitoring programs.



2019 billing rate:
\$100

James C. Kujawa

Water Resources Specialist

AAS, Soils/Chemical Technology, with an emphasis in Natural Resources Conservation

Jim has 40 years of experience providing technical assistance with services related to water resources, drainage, wetlands, and floodplains to watershed management organizations, the public, townships, cities, counties, and state and federal governmental agencies. Jim is the lead administrator for Hennepin County's natural-resources grant programs and has expertise in developing, designing, and constructing best management practices for the protection of natural resources. His work has included:

- Providing lead technical assistance to the Elm Creek Watershed Management Commission for the past 15 years.
- Providing primary technical support to the Pioneer-Sarah Creek Watershed Management Commission for 15 years.
- Serving as a water resources specialist for the Hennepin County Department of Environment and Energy for 15 years.
- Serving as a water resources specialist for the City of Maple Grove for 12 years.



2019 billing rate:
\$130

Karen Wold, Certified Wetland Delineator

Senior Environmental Scientist

BA, Environmental Studies

Karen has nearly 20 years of experience in wetland delineations, monitoring, and functional assessments. She has conducted wetland investigations and evaluations for many Minnesota watershed management organizations as well as municipal, county, industry, and commercial clients. Karen prepares mitigation monitoring reports on wetland development, documents compliance with permit conditions, and makes recommendations for management needs. Her work also involves preparing Section 404 permit applications and Wetland Conservation Act wetland replacement plans. Karen's watershed and local government unit work has included:

- Conducting wetland mitigation monitoring services for the Commission since 2006 and other local government units including the City of Maple Grove, Nine Mile Creek Watershed District, and Riley-Purgatory-Bluff Creek Watershed District.
- Serving on the technical evaluation panel for the Valley Branch Watershed District, Nine Mile Creek Watershed District, Bassett Creek Watershed Management Commission, and Lower Rum River Watershed Management Organization for administration of the Wetland Conservation Act.
- Conducting and reviewing wetland delineations, Minnesota Routine Assessment Method assessments, and permit applications for watershed and other local government unit clients, including the Bassett Creek Watershed Management Commission, Ramsey-Washington Metro Watershed District, Riley-Purgatory-Bluff Creek Watershed District, City of Eden Prairie, City of Minneapolis, City of Crystal, Nine Mile Creek Watershed District, and Valley Branch Watershed District.



2019 billing rate:
\$105

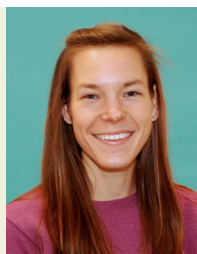
Brian Burgner

Senior Ecologist

BS, Natural Resources and Environmental Studies

Brian has nearly 17 years of experience. He has contributed to more than 200 wetland delineation projects in Minnesota and Wisconsin. As a certified wetland delineator, Brian is proficient in mitigation monitoring, soil profile analysis, plant identification, aerial photo interpretation, installation of monitoring wells, hydrology data collection, and global-positioning-system data collection. He is also skilled in wetland permitting, environmental resource reviews using the Natural Heritage Information System, and geographic-information-system analysis. Brian's work includes:

- Conducting functional assessments of wetlands using the Minnesota Routine Assessment Method methodology.
- Performing aerial photo reviews and employing procedures for wetland mapping.
- Creating vegetation management and restoration plans for mitigation wetlands and adjacent upland buffer areas.
- Monitoring mitigation wetlands and developing annual reports that describe mitigation development and management recommendations.



2019 billing rate:
\$100

Heather Hlavaty

Water Resources Engineer

MS, Civil Engineering

Heather has four years of experience in hydrologic and hydraulic modeling, floodplain modeling and permitting, and water quality management. She has developed and updated several PCSWMM, XP-SWMM, and HEC-RAS models, which have been used to determine flooding impacts, establish storm-sewer network deficiencies, redesign culvert crossings, and evaluate lake-level flood elevations. Heather also works on projects addressing stormwater treatment and reuse. Employing Minnesota minimal impact design standards (MIDS), she has designed and sized best management practices such as bioretention basins (rain gardens) and underground storage and reuse structures using AutoCAD Civil 3D. Examples of Heather's work include:

- Conducting stormwater permit reviews for the Elm Creek Watershed Management Commission and Valley Branch Watershed District.
- Conducting feasibility studies and detailed designs of filtration best management practices using AutoCAD, P8, and XP-SWMM in the Valley Branch Watershed District and Riley-Purgatory-Bluff Creek Watershed District.
- Updating an existing detailed PCSWMM model for the Riley-Purgatory-Bluff Creek Watershed District in largely urbanized areas.
- Developing an XP-SWMM model near Downs Lake for the Valley Branch Watershed District, which was used to summarize and evaluate existing lake-level flood elevations.
- Developing XP-SWMM models of the north and southeast regions of Minneapolis, which will be used to evaluate future stormwater planning and development.



2019 billing rate:
\$95

Lulu Fang

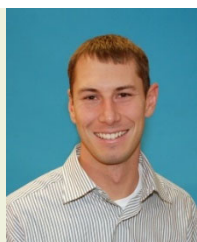
Water Resources Engineer

MS, Civil Engineering; MS, Environmental Science and Engineering

Lulu has more than five years of consulting experience in water resources and environmental engineering. Her focus areas include hydrology and hydraulic modeling, hydraulic structure design and analysis, flood risk assessment, water balance and water quality analysis, contaminant transportation and modeling, and pollution prevention plan design. Lulu's work includes:

- Developing an urbanized detailed XP-SWMM model for the Bassett Creek Watershed Management Commission to determine flood risk and soil erosion.
- Developing five urbanized detailed XP-SWMM models for the City of St. Peters, Missouri, to evaluate current flood conditions and develop channel stabilization design, detention pond extensions, and outlet structure retrofits.

- Modifying and analyzing the City of Edina's XP-SWMM model for Pentagon Park development alternatives.
- Developing a flood damage assessment model for the Mouse River enhanced flood protection project to analyze the flood risk condition before, during, and after proposed hydraulic structure construction.
- Modifying and analyzing an urbanized detailed XP-SWMM model for the I-35W tunnel system in Minneapolis to help determine system efficiency and design proposed underground storage.



Adam Howard, CFM, PE
 Water Resources Engineer
 MS, Civil Engineering

Adam has eight years of experience working on flood mitigation, stream restoration, stormwater, and mine water management projects. He conducts both hydraulic and hydrologic modeling and provides design services to public and private clients. Adam previously worked at the University of Minnesota's St. Anthony Falls Laboratory. His work at Barr includes:

2019 billing rate:
\$120

- Designing a ravine stabilization plan for the Valley Branch Watershed District.
- Developing stream restoration feasibility studies on Plymouth Creek for the Bassett Creek Watershed Management Commission and on Riley Creek for the Riley-Purgatory-Bluff Creek Watershed District and Lower Minnesota River Watershed District.
- Completing stormwater permitting reviews for the Riley-Purgatory-Bluff Creek Watershed District.
- Providing industrial stormwater best-management-practice design for both local and out-of-state clients.
- Performing XP-SWMM modeling for local clients including the cities of Edina and South St. Paul.
- Conducting HEC-RAS unsteady hydraulic modeling for the Mouse River enhanced flood protection project.

Barr's watershed management services

key team members



Jim Herbert



Jeff Weiss



Karen Wold



Brian Burgner



Lulu Fang



Heather Hlavaty

As the key project team members, we will address the specific needs of your project, and we will also have access to Barr's more than 800 engineers, scientists, and technical support staff. Of the more than 450 employees in our Minneapolis office, more than 100 engineers and scientists are engaged in water-resources engineering and planning, stormwater management, floodplain management, wetland management, and landscape ecology. Our significant breadth and depth of experience offer the Elm Creek Watershed Management Commission the assurance that we can provide an innovative solution to any water-resources-related challenge we encounter.

stormwater management and BMP design



Jim Herbert



Jeff Weiss



Jim Kujawa



Heather Hlavaty



Adam Howard



Lulu Fang

services we offer:

- review of compliance with watershed policies and design standards
- green infrastructure and low-impact development design
- application of minimum impact design standards (MIDS)
- infiltration and filtration systems
- hydrologic and hydraulic modeling
- stormwater utility design
- National Pollutant Discharge Elimination System permitting
- flood and erosion control
- infrastructure inventory and assessment

Barr takes a green-infrastructure approach to stormwater-management and best management practices (BMP) design, which highlights the importance of the natural environment in decisions about engineering and land-use planning. Designs created using this approach rely on the life-support functions provided by natural ecosystems, with an emphasis on long-term sustainability. Rooted in ecology, our site designs are community defining, enduring, technically sound, beautiful, and innovative.

We understand that your constituents want to get as much value as possible for their financial contributions to the district. Their goals (besides enhanced water quality) often include improved community health, livability, and economic development. We form interdisciplinary teams of engineers, hydrologists, landscape architects, and ecologists to develop stormwater solutions that look great, accommodate people, and supports ecological function. By addressing economic, social, and environment issues in our designs, we add depth to water management projects.

Local and state regulatory agencies have increased their regulation of stormwater, resulting in increased focus on stormwater BMPs that reduce the rate and volume of runoff and the associated pollutant loading. Our knowledge of and experience with alternative and innovative stormwater practices allow us to suggest creative solutions to stormwater problems on challenging sites.

When it comes to urban stormwater BMPs, we wrote the book—the Metropolitan Council's *Minnesota Urban Small Sites BMP Manual*. Barr developed this manual in 2001. It served as a model for the *Minnesota Stormwater Manual*, published by the MPCA in 2005 and last revised in 2019.

From 2010 to 2014, Barr was the primary consultant to the MPCA for the MIDS project, a low-impact development approach to stormwater management that mimics a site's natural hydrology as the landscape is developed. Barr's work on the project included developing and providing scientific support for volume-based stormwater performance standards, developing stormwater "crediting" methods for innovative stormwater-management techniques, and creating a BMP credit calculator to promote the implementation of low-impact development.

relevant project examples

district stormwater-management system

client: Mississippi Watershed Management Organization



Towerside is a rapidly developing area adjacent to the University of Minnesota and on a light-rail transit line that connects Minneapolis and St. Paul. In 2013, the Mississippi Watershed Management Organization hired Barr to work with it and four private developers to design and construct a system to manage stormwater runoff from a two-block area in this designated innovation district. Barr first assessed the feasibility of capturing, treating, storing, and reusing stormwater from the site. We subsequently helped develop a district stormwater system that will treat all the runoff from four developments to meet or exceed Minneapolis stormwater

requirements. The design includes stormwater conveyance systems from the private developments to the district stormwater system, large biofiltration basins (rain gardens) to filter out pollutants, an underground concrete tank to store the treated stormwater, and a pumping system to enable the treated water to be reused for irrigation by the private developers and a future industrial user. The reuse system is currently being designed and will incorporate fine particulate filtration followed by ultraviolet disinfection.

The first of its kind in the Twin Cities, the district system is the result of a voluntary agreement between the developers, who own adjacent properties, to manage runoff jointly. Taking a communal approach to managing stormwater reduces costs for the landowners while incorporating more effective and environmentally friendly stormwater-treatment methods. In addition to removing stormwater pollutants, the project has created a green space for public use. The community, which has been involved in the development of the Towerside Innovation District, has discovered the stormwater park, and the space has been activated by groups of schoolchildren and gatherings at the adjacent community garden. Barr is currently assisting the Mississippi Watershed Management Organization and local developers in planning the expansion of Towerside and managing stormwater for 20 more acres once it is developed.

Lake Susan Park Pond subwatershed study identifies innovative solution

client: Riley-Purgatory-Bluff Creek Watershed District



Barr prepared feasibility studies and construction documents and oversaw construction of this innovative stormwater treatment and reuse project. Reuse pumps are on the left, and the inundated iron enhanced sand filter is on the right.

In March 2017, Barr conducted a study of watershed-treatment and stormwater-reuse enhancement alternatives at the Lake Susan Park Pond for the RPBCWD, in partnership with the City of Chanhassen. We recommended an alternative that would provide treatment through an iron-enhanced sand filtration bench and stormwater reuse while proactively addressing many of the maintenance concerns with typical filtration benches. We also prepared a Clean Water Fund grant application on the district's behalf that received more than \$230,000 in funding.

Barr designed an iron-enhanced sand filtration bench system along the south side of Lake Susan Park Pond

in an area with minimal impact to upland vegetation, thus maintaining the buffer between the filter and the pond. Water is be pumped from Lake Susan Park Pond into the filtration system. The design discharge rate

allows the filter to draw down Lake Susan Park Pond within 48 hours to prevent the filtration media from becoming anoxic, and potentially releasing phosphorus. A buffer area between the filtration system and the creek is planted with native vegetation and maintained in a natural state. The project design also includes stormwater reuse to irrigate an adjacent ballfield. In order to reuse the water from the pond, the water will need to be pumped, treated with ultraviolet lights, and supplied to the irrigation system. A treatment building was constructed onsite, and Chanhassen's potable water supply was physically disconnected from the reuse system. Barr led the bidding and procurement process by preparing the bid list and bidding documents for distribution, attending the pre-bid meeting, responding to comments during the bid period and issuing addendums, holding the bid opening, and reviewing and compiling the bid results. Construction was substantially complete in late 2018. During construction, we provided construction administration and observation assistance by reviewing shop drawings, fabrication drawings, and product data submittals; led coordination with the city and district; reviewed requests for information; and issued design bulletins and addendums. We will complete a punch-list walk-through with the district and contractor, submit record drawings, and provide assistance to the district with final paperwork and BWSR reporting. Because the system requires ongoing maintenance for proper function, Barr designed the project with easy access. We also helped the district and City of Chanhassen develop a cooperative, long-term maintenance agreement.

greenway design for stormwater treatment and flood mitigation

client: City of Minneapolis



The 50-acre North Minneapolis neighborhood has been plagued with localized flooding during large rain events. Additionally, stormwater runoff was contributing to water quality problems in Crystal Lake. Barr addressed both of these issues by creating a greenway on 37th Avenue North. Six city blocks of paved street were removed so that precast concrete boxes—the largest 18 feet wide and 10 feet high—could be placed underground as flood storage detention cells. Almost 1,400 lineal feet of underground boxes now protect homes from a 100-year flood event.

The project treats stormwater through biofiltration to remove phosphorus, debris, and sediment before water reaches Crystal Lake, and also through sump catch basins and installation of SAFL baffles to limit scouring of material from the sumps, even during large storm events. This cost-effective device was designed at the University of Minnesota by a team of researchers, including two current Barr employees.

On two blocks, the road was narrowed to a single traffic lane with bike contraflow to further slow traffic and increase pedestrian safety. Three blocks of the avenue were converted to a bike/pedestrian path and greenway with no vehicle traffic. We worked with area residents to minimize impacts to the avenue's existing landscape, removing 28 trees but planting 64 new ones, and working to save mature trees. Additional trees will increase rainwater interception and evapotranspiration as the trees mature. Barr also helped the city secure approximately \$950,000 in state funding for water-quality improvements associated with the project. The completed greenway benefits residents and the traveling public by reducing flooding, reducing impervious surfaces, improving water quality, and enhancing public space.

wetlands and Wetland Conservation Act administration



Karen Wold



Brian Burgner



Mark Jacobson



Daniel Tix



Cheryl Feigum



David Haar

Wetland management and monitoring is an important issue, and Barr provides this service for many watershed management organizations, municipalities, and developers. We've been involved in Wetland Conservation Act administration since its inception (1991)—acquiring an in-depth knowledge of the law and subsequent amendments.

Barr conducts Wetland Conservation Act administration for the Nine Mile Creek Watershed District, Valley Branch Watershed District, Bassett Creek Watershed Management Commission, Lower Rum River Watershed Management Organization, and City of Crystal. In addition, we provide regulatory review services for the Riley-Purgatory-Bluff Creek Watershed District, City of Minneapolis, and City of Eden Prairie.

services we offer:

- delineation
- classification
- mitigation
- restoration
- functional assessment
- monitoring and reporting
- permitting
- protection and management
- H&H modeling

wetland monitoring

Barr performs wetland mitigation annual monitoring services for the Elm Creek Watershed Management Commission and many public- and private-sector clients, including the City of Maple Grove, Nine Mile Creek Watershed District, Riley-Purgatory-Bluff Creek Watershed District, Owatonna Country Club, Willmar Airport, Enbridge Energy, Southern Minnesota Beet Sugar Cooperative, Edward Kraemer and Sons, a Habitat for Humanity housing development in Hugo, and several northern Minnesota mining companies.

additional wetland services

Barr provides other technical wetland expertise for:

- Bassett Creek Watershed Management Commission
- Black Dog Watershed Management Organization
- Capitol Region Watershed District
- Ramsey-Washington Metro Watershed District
- City of Alvarado
- City of Burnsville
- City of Golden Valley
- City of Oslo
- City of Minnetonka
- City of Minneapolis
- City of St. Louis Park
- Scott County
- numerous private-sector clients

relevant project examples

wetland mitigation annual monitoring services

client: Elm Creek Watershed Management Commission



Barr has provided wetland replacement and mitigation monitoring services for the ECWMC since 2006 and has completed the annual monitoring services for several wetland replacement and mitigation sites, which have been certified and complete. We are currently conducting annual monitoring services for one active site. Wetland monitoring services include vegetation and hydrology monitoring throughout the growing season to document compliance with U.S. Army Corps of

Engineers Section 404 permit conditions of project specific wetland mitigation requirements and Minnesota Wetland Conservation Act wetland replacement plan approval requirements and performance standards. We work with the ECWMC, permittee, and vegetation management company by providing recommendations for vegetation management and hydrology adjustments as needed during the growing season. We prepare annual monitoring reports documenting the site status and future work needed to comply with requirements for completion.

stormwater treatment wetland

client: Carleton College

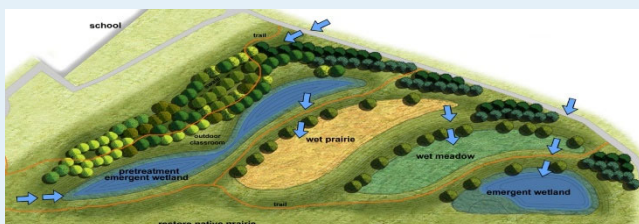


When parking lots and a new recreation center were built near its 800-acre arboretum, Carleton College in Northfield, MN, called on Barr to design a storm water detention pond with wetland function. The pond had to meet functional requirements—treating water before it reached the Cannon River—as well as fit into the natural landscape. Barr recommended a constructed wetland, which would be effective and attractive and provide habitat in the arboretum setting.

Barr performed hydrologic and ecological analyses to determine the size of the new wetland and its potential fit with the natural topography and vegetation. Working with the college to site the wetland, Barr recommended reclaiming a former dumping area, where heaps of old blacktop were overgrown with invasive, exotic trees. By constructing the pond there, the college lost an eyesore and an ecological liability and gained valuable wildlife habitat and a visual amenity. Unlike typical storm water-detention basins, this wetland system has gradual, natural side slopes (15:1) and features a geosynthetic clay liner to allow for more permanent water storage in the basin. Barr also designed the basin to foster a diverse wetland-plant community and resemble oxbow wetlands that occur naturally along rivers like the Cannon.

Medford School stormwater wetlands

client: Steele County



Steele County in southern Minnesota hired Barr to design an urban storm water runoff control project with an educational component on the grounds of the Medford Schools. Project objectives were to reduce pollutant runoff from school grounds, train municipal officials on the storm water-related consequences of development, and educate students about managing

storm water runoff. The storm water retrofit project was designed to: treat approximately 1.7 inches of runoff from existing impervious surfaces; reduce the rate and volume of water discharging from the site; capture pollutants being carried by runoff; reduce erosion; function as an outdoor classroom for biology students; and serve as a natural amenity for the community. Barr's design incorporated four basins, each at a slightly higher elevation than the next. Each basin was designed to perform a different function—pretreatment, emergent wetland, wet prairie, and wet meadow. The landscape design included native vegetation and trees.

urban wetland restoration

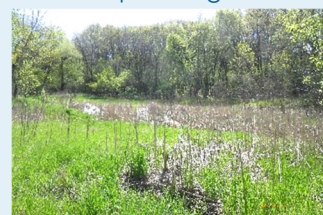
client: City of St. Paul



The City of St. Paul, Minnesota, commissioned Barr to design a wetland park as part of a wildlife corridor that could connect Lake Phalen to the Mississippi River. The Phalen Shopping Center was built in the early 1960s on a filled wetland known as Ames Lake. The crumbling buildings were demolished to make way for a restored wetland and neighborhood park. Barr's plan included restoring hydrologic function to the recreated basin, reconstructing wetland soil profiles, and introducing native-plants diversity. We also designed a traditional park to frame the wetland habitat, create play space, and provide a transition to the surrounding urban neighborhood. Barr specified a long-term maintenance routine, critical to the success of this urban habitat restoration.

Seminary Pond stormwater improvements

client: Capitol Region Watershed District



Seminary Pond is a storm water feature that was originally constructed within a natural wetland area prior to Minnesota wetland regulations. Current improvements to this storm water feature need to comply with current local, state, and federal wetland regulations. Barr conducted wetland boundary delineation surveys and classified wetland type communities within the project area. We provided a comparison of existing conditions versus proposed conditions wetland functions and values assessments and prepared project plans to meet hydraulic and water quality storm water improvement needs including iron enhanced sand filtration while maintaining natural wetland characteristics using gradual slopes and native vegetation. We also assisted with identification and coordination efforts to remove noxious invasive species prior to project work.



Flandreau natural wetland stormwater improvements

client: City of St. Paul

Flandreau-Case Pond is a storm water feature that was originally constructed within a natural wetland area prior to Minnesota wetland regulations. Current improvements to this storm water feature need to comply with current local, state, and federal wetland regulations. Barr conducted wetland boundary delineation surveys and classified wetland type communities within the project area. We provided a comparison of existing-conditions versus proposed-conditions wetland

functions and values assessments. We also prepared project plans to meet hydraulic and water quality storm water improvement needs, including iron-enhanced sand filtration, while maintaining natural wetland characteristics using gradual slopes and native vegetation. The project includes an iron-enhanced sand bench with slotted drain tile and a pretreatment basin to remove suspended solids and total phosphorus. The project is designed to also enhance recreational activities associated with the Boys and Girls Club on the property and the Saint Paul Parks and Recreation Department. The pond improvements will also include a bituminous trail leading from the park area to the pond to encourage appreciation of the natural surroundings for park participants. We prepared a wetland application to request approval of the wetland impacts without requiring wetland replacement/mitigation. The project can be considered a no-loss activity in wetlands since it will not decrease the quantity, quality, and biological diversity of existing wetlands.

watershed and water-resources management planning



Jim Herbert



Jeff Weiss



Karen Chandler



Greg Williams



Karen Wold



Greg Wilson

services we offer:

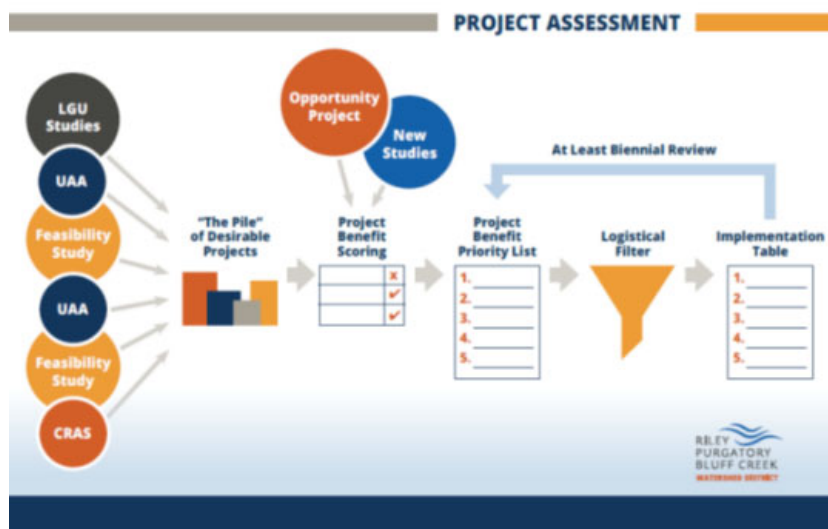
- watershed management planning
- rules and regulations preparation
- governmental agency coordination
- permit review
- stakeholder involvement
- administrative support

Barr has provided engineering expertise to watershed management organizations as well as federal, state, and municipal clients for more than 50 years. Our staff has grown to include more than 150 water-resources engineers and scientists. Whether a client has a single concern or needs help with multiple complex watershed issues, we can provide workable, affordable, and ecologically friendly solutions. We've written dozens of watershed management plans and updates including first-, second-, third-, and fourth-generation plans (e.g., the RPBCWD, Bassett Creek Watershed Management Commission, Nine Mile Creek Watershed District, Ramsey-Washington Metro Watershed

District, Valley Branch Watershed District, Capitol Region Watershed District, Cedar River 1W1P Partnership, and many more) and have also helped more than 50 cities develop local water-management plans (e.g., Bloomington, Minnetonka, Apple Valley, Farmington, and Lakeville, among others).

We can also help secure grants to fund projects, including brownfields redevelopment, watershed and stormwater management, and flood control projects. We have helped prepare winning applications for public and private clients, with awards ranging from \$10,000 to \$10 million.

Barr helps water management organizations educate their boards and stakeholders about water-related issues. Whether it's facilitating a public meeting about policies or plans, making presentations to boards, or conducting BMP "how-to" workshops, we can employ education as a component of design projects or as an independent service. We use a community-based approach that is inclusive, transparent, and



As part of assisting the RPBCWD in developing your 10-year plan for 2018 to 2028, Barr helped the district create a quantitative prioritization process to identify projects across varying water resources types throughout the watershed.

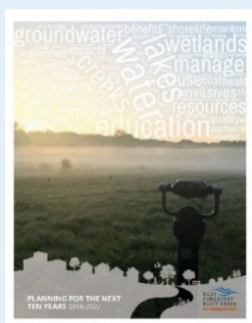
open—providing everyone an opportunity to listen, learn, and participate. We understand that the best solutions often come from stakeholders, which also leads to greater acceptance and buy-in.

We will never lose sight of the fact that resource management and planning is the Commission's responsibility. To that end, we'll provide the information and solution options you need to make important project decisions for cost effectively implementing your plan over the next 10 years.

relevant project examples

watershed management and planning

client: Riley-Purgatory-Bluff Creek Watershed District



As the engineer for RPBCWD for more than 40 years, Barr has helped develop numerous versions of the district's watershed management plan. Recently, Barr worked with the district to develop its fourth-generation, 10-year watershed management plan. We are currently helping implement the plan and associated projects. As part of the plan, Barr developed an easily accessible, graphic-heavy executive summary to engage and educate the public about the management plan and project implementation.

The current plan update was developed with input from district managers; staff; and officials from cities, state agencies, the Metropolitan Council, and Hennepin and Carver counties. An intensive public engagement process also gathered input from watershed

residents and lake associations. Project prioritization was cited as an issue of high importance by stakeholders.

Because of this, Barr and the district worked with stakeholders to develop a prioritization tool. The tool uses several criteria to quantitatively compare and prioritize issues and projects in terms of district goals and project benefits. The methodology was adjusted and enhanced during the planning process in response to feedback from the citizen advisory committee, technical advisory committee, and board of managers.

Projects identified in district studies, partner studies, and cities are included in this prioritization process. Projects are sorted by major watershed, upstream to downstream, and ranked from greatest benefit to least benefit in terms of benefit-priority lists. The benefit-priority lists are living documents, updated as new projects are identified and existing proposed projects are modified.

development of water-management plan and strategic overview

client: Ramsey-Washington Metro Watershed District



Since 1975, Barr has been working with the Ramsey-Washington Metro Watershed District, providing comprehensive water-resource management services. Recently, Barr collaborated with the district to prepare its 2017–2026 watershed management plan. We helped develop and implement an intensive stakeholder engagement process with residents, cities, and regulatory agency staff. Working closely with the administrator, Barr assisted with establishing goals and action items and defining an implementation program to be carried out over the life of the plan.

Barr worked with the district to develop a strategic overview—an abbreviated, graphic-rich summary document intended to make the plan more accessible to a wider audience and the general public. Barr condensed more than 200 pages of technical plans into the 20-page strategic overview. The overview summarized the district's vision and goals for watershed management for the next decade. Written in straightforward, nontechnical language, the overview was designed to support discussions between the district and citizens and public officials about effective watershed management.

surface-water management plan

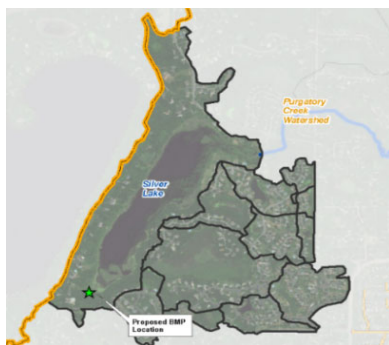
client: City of Bloomington



Barr worked with the City of Bloomington to update its surface-water management plan to meet the requirements of the RPBCWD, Nine Mile Creek Watershed District, Lower Mississippi River Watershed Management Organization, and Richfield-Bloomington Watershed Management Organization, as well as its own evolving needs. The plan, approved by its watershed districts and the Metropolitan Council in 2018, describes a wide range of issues of concern (including local and regional flooding, impaired waters, groundwater quality, and vulnerability of wetlands and natural areas) and their corrective actions. Goals and policies for each of these areas were established in accordance with watershed district rules and the city's municipal separate storm-sewer system (MS4) permit. The plan culminates in a 10-year implementation plan that outlines the capital improvement projects, operations and maintenance programs, and surface-water management studies that will help the city achieve its surface-water management goals.

subwatershed assessment to improve Silver Lake

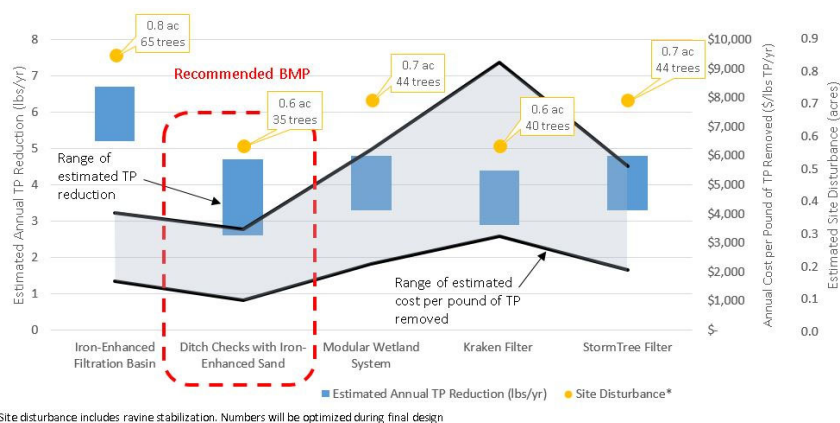
client: Riley-Purgatory-Bluff Creek Watershed District



location of proposed water-quality BMP

Barr completed a subwatershed assessment to evaluate proposed actions to improve the water quality in Silver Lake. This site presents several design and maintenance challenges including, but not limited to, drainage patterns, tree canopy, and topography. Five BMPs, in conjunction with the stabilization of an existing ravine to Silver Lake, were identified that would minimize site impacts (both wetland and upland), could be constructed primarily on publically owned property, and have comparably low maintenance costs. BMPs evaluated included both proprietary and non-proprietary BMPs. An evaluation for each BMP was completed, which considered water quality benefits, regulatory approvals, affected property owners, wetland and upland impacts, and cost to construct and maintain. Based on the results of the evaluation; potential upland, wetland, and tree impacts; and the cost per pound of phosphorous

removed, a combination of ditch checks with iron-enhanced sand and ravine stabilization is feasible BMPs for the site. The recommended iron-enhanced ditch checks, in conjunction with the ravine stabilization, minimize adverse impacts and erosion potential to natural resources in the area and will help improve and protect the water quality in Silver Lake.



Of the five BMPs evaluated, ditch checks with iron-enhanced sand have the lowest annualized cost per pound of phosphorus removed.

Cedar River One Watershed One Plan (1W1P)

clients: Cedar River 1W1P Partnership and Mower Soil and Water Conservation District



Barr is leading the planning effort to develop a 10-year comprehensive watershed management plan for the Cedar River watershed that is in compliance with BWSR's (1W1P requirements. The planning process is supported by funding from BWSR.

The partnership includes four counties and soil and water conservation districts, two watershed districts, and the City of Austin. The Cedar River watershed, located in southern Minnesota, is 722 square miles in area and includes watershed areas that are tributary to the Cedar River in Minnesota, as well as

five additional watersheds that drain to the Cedar River south of the Minnesota/Iowa border. The project includes working with the advisory committee and policy committee to identify and prioritize issues and resources of concern into a three-tiered priority framework, as well as establishing long-term and short-term (10-year) measurable goals to address each issue. Some of the issues considered include degraded surface-water quality, accelerated erosion and sedimentation, groundwater contamination, excessive flooding, degraded soil health, threatened groundwater supply, threats to fish and wildlife habitat, and reduced livability and recreation.

The work includes using watershed-wide digital terrain mapping, water-quality modeling results, and H&H modeling results to identify target areas for BMP implementation. The targeting and prioritization methodology selected allows for implementation of practices that address the full range of priority issues facing the partnership and emphasizes multi-benefit practices. Barr is currently assisting the partnership with developing an implementation program that includes prioritized capital improvements as well as non-structural practices that will yield measurable progress towards achieving the partnership's goals.

The project includes coordinating with the partnership's planning workgroup, advisory committee (including state agency staff), and policy committee (including elected officials). Following completion of the draft 1W1P document, Barr will assist the partnership with guiding the 1W1P document through the local and state agency review process and local adoption, expected in 2019.

water quality management



Jim Herbert



Jeff Weiss



Greg Wilson



Keith Pilgrim



Chris Bonick



Meg Rattei

Barr provides a number of services to identify and address water quality issues:

modeling: With increased regulation of stormwater and TMDLs to address impaired water bodies, many watershed districts, WMOs, and municipalities are working to implement BMPs and need to know whether their efforts are having the desired results. Using software such as P8, Barr has modeled the effectiveness of BMPs for more than 15 years. We also developed a proprietary software program, SHSAM, to predict the pollutant removal from underground stormwater treatment structures and sump manholes.

monitoring and field services: We conduct water quality monitoring and hydrologic gauging and are equipped with modern sampling gear for lakes, streams, sediments, and groundwater. Our work ranges from routine grab sampling to sophisticated runoff-triggered, flow-paced monitoring (such as continuous monitoring stations).

services we offer:

- lake studies and restoration
- lake and stream water-quality monitoring
- watershed runoff treatment
- shoreland restoration
- hydrologic and hydraulic modeling
- ecological use classification
- wastewater impact statements
- aquatic invasive species management

lake studies: We routinely conduct TMDL analyses, use attainability analyses, and diagnostic feasibility studies for urban lakes. TMDL studies performed for local watersheds include:

- Bassett Creek Watershed Management Commission (Sweeney, Parkers Lake, and Medicine lake)
- Black Dog Watershed Management Organization (Crystal, Keller, Earley, and Lee lakes)
- Nine Mile Creek Watershed District (Nine Mile Creek)
- Ramsey-Washington Metro Watershed District (Kohlman, Keller, and Beaver lakes)
- Riley-Purgatory-Bluff Creek Watershed District (Ann, Lucy, Susan, Riley, Rice, Marsh, Staring, Round, Mitchel, and Red Rock lakes)
- Sauk River Watershed District (Sauk Lake)

monitoring plan development: With almost four decades of water quality monitoring experience, we can quickly determine the appropriate level of monitoring needed for a cost-effective determination of whether water quality standards and goals have been met or to address other issues.

lab analysis: In circumstances where commercial laboratories do not provide the accuracy and precision required, we use our own lab to analyze monitoring samples. Our lab can analyze phosphorous and nitrogen compounds and biological specimens and perform specialty experiments in support of lake and stream diagnostic-feasibility studies.

existing data compilation review: With expertise in physical, biological, hydrologic, and water chemistry, Barr can analyze, interpret, and summarize data relevant to water quality. Our long Minnesota history also gives us an awareness

relevant project examples

aquatic invasive species rapid-response plan

client: Bassett Creek Watershed Management Commission



In 2016, the Bassett Creek Watershed Management Commission convened an aquatic plant management/aquatic invasive species (APM/AIS) committee to help define the commission's role in aquatic invasive species management. The committee included commission and city staff; lake groups; and staff from Three Rivers Park District, the Minneapolis Park and Recreation Board, Hennepin County, the Metropolitan Council, and the Minnesota DNR. Barr attended and assisted with the meetings. The committee met eight times between June 2016 and June 2017, and determined the activities needed to address AIS (early detection, monitoring, vulnerability assessments, rapid-response needs, boat launch management, education, and AIS treatments), identified the entities already filling all or parts of those roles, and determined how the

commission could augment those activities.

The committee recommendations included a new APM/AIS budget and development of an aquatic invasive species rapid-response plan for key aquatic invasive species (starry stonewort, Eurasian watermilfoil, and zebra mussels) in the commission's priority lakes. Barr developed the rapid-response plan after discussions with various organizations; the plan, completed in early 2018, is the first of its kind to involve multiple partners. It outlines the actions required to address new aquatic invasive species infestations, including communication, surveys, containment, and treatments, and defines the roles of the Commission and partners so that they can efficiently and effectively address new infestations. Barr continues to assist the commission as it implements the rapid-response plan to address new zebra mussel and starry stonewort infestations in Medicine Lake.

Spring Lake alum treatment achieves state water-quality criteria

client: Prior Lake-Spring Lake Watershed District



To date, this is the largest in-lake alum treatment project in Minnesota.

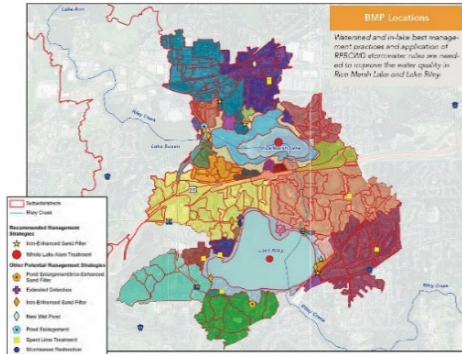
Spring Lake is a 642-acre lake that has been placed on the impaired-waters list for excess phosphorus. According to the approved TMDL report for Spring Lake, the 10-year mean summer total-phosphorus concentration was approximately three times higher than the water quality criteria for deep lakes in the North Central Hardwood Forest ecoregion, and internal loading contributes about half of the phosphorus load to the lake.

Barr prepared a report for the Prior Lake-Spring Lake Watershed District that prescribed an in-lake alum dose, a recommended approach for alum applications, and estimated cost to control internal loading of phosphorus in Spring Lake. To address questions and concerns, a comparative analysis on alum treatment

effectiveness explained why other whole-lake alum treatments have succeeded or failed and how this information can be used to improve the lifespan and success of the treatment proposed for Spring Lake.

Rice Marsh Lake and Lake Riley UAA update

client: Riley-Purgatory-Bluff Creek Watershed District



In 2016, Barr completed the Rice Marsh Lake and Lake Riley UAAs update, originally conducted in 1999, to assess the water quality in these lakes based on more recent physical, chemical, and biological data, and to identify and evaluate watershed and in-lake BMPs to improve and protect the water quality of these lakes. The study found that water quality in both lakes does not achieve current state or district water-quality standards. Soluble (or dissolved) phosphorus is especially prevalent in the watershed runoff reaching the lake since much of the particulate phosphorus appears to settle out in the existing stormwater ponds. Lake Riley is also heavily influenced by inflows from upstream Rice Marsh Lake. Strong thermal stratification in

Lake Riley limits the amount of phosphorus transferred from the lake's deep water to its surface waters.

Based on modeling results, Barr developed customized management strategies for Rice Marsh Lake and Lake Riley, including practices to target removal of dissolved phosphorus from watershed runoff and in-lake management to address internal phosphorus loading. We developed concept-level designs for iron-enhanced sand filtration, a spent-lime treatment system, and alum treatments, and prepared planning-level construction costs for each management practice. The watershed and in-lake models were used to quantify pollutant-removal effectiveness and predict the resulting improvements in water quality in Rice Marsh Lake and Lake Riley. We also computed project costs per pound of phosphorus removal to help the RPBCWD evaluate and prioritize projects.

Battle Creek stressor identification report

client: Ramsey-Washington Metro Watershed District



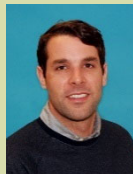
In 2014, Battle Creek was added to Minnesota's impaired-waters list for biological impairment of the fish and macroinvertebrate communities. Working with the MPCA and Ramsey-Washington Metro Watershed District, Barr analyzed water quality data and fish and macroinvertebrate survey information collected over the past 30 years to develop a stressor identification report. Following the EPA CADDIS stressor identification process, various measures of biological integrity—IBI, tolerance indicator values, biological metric analytical techniques, etc.—were compared to water quality data to determine which ecological “stressors” (e.g.,

turbidity, low dissolved oxygen, heavy metals, etc.) are primarily responsible for biological impairment within the stream ecosystem. The Battle Creek stressor identification report was submitted and approved by the MPCA in 2016. Following recommendations developed in the report, a TMDL for total suspended sediment was developed and completed in 2016. The TMDL report has been submitted to the MPCA and is under final review.

ecosystem planning, landscape ecology, and landscape architecture



Fred Rozumalski



Brendan Dougherty



Matt Kumka



Kurt Leuthold

Erin Anderson
Wenz

Michelle Kimble

services we offer:

- rain gardens
- ecosystem restoration
- native plant communities
- master planning
- site design
- restorative landscaping
- lakescaping
- natural resource inventories
- greenway planning
- fish and wildlife management
- education and interpretive planning
- environmental review

We understand that when a project looks good and functions in sync with nature—providing wildlife habitat and an ecologically stable landscape—citizens and public officials are satisfied. We've successfully completed sustainable landscape design projects for a variety of clients ranging from watershed districts and cities to mining companies. Our goal for these projects is to improve environmental quality while creating great outdoor places for people to experience.

Barr has also been planning and designing sustainable landscape design projects for more than 20 years for cities, watershed districts, and industrial clients. We focus on creating multi-use landscape and stormwater management systems to improve environmental quality while creating great outdoor places. We work in concert with nature to design beautiful landscapes that require minimal maintenance. Some of our services include community

planning, natural resources preservation, native plant restoration, sustainable landscape design, and park and trail design. Barr is at the forefront of low-impact site development, taking a green infrastructure approach to stormwater management and BMP design.

relevant project examples

sustainable site design on former brownfield site

client: *Mississippi Watershed Management Organization*



The Mississippi Watershed Management Organization built a new headquarters along the Mississippi River near the Lowry Bridge in northeast Minneapolis. The site serves as a model for sustainable design, provides outdoor classrooms, and demonstrates alternative stormwater techniques. Barr was brought in for site remediation, site master planning, and landscape design.

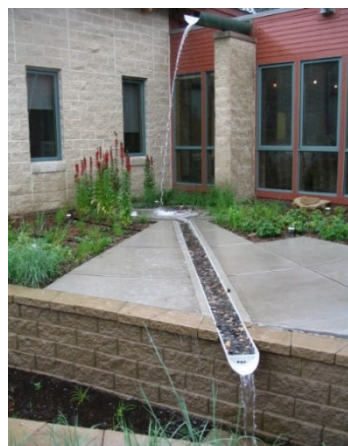
We worked closely with the project architects and client to develop a context-sensitive site design that exceeded client expectations while working within the constraints of the polluted urban infill site. Ecological principles provided the basis for the

design, which works with nature to filter stormwater, restores habitat on the Mississippi flyway, conserves energy in the building, and sequesters carbon. Features designed for the site include:

- a parking lot shared with the tavern next door to eliminate the need for two, separate parking lots, resulting in a decrease in non-permeable surface area and an increase in off-hour usage of the lot
- cisterns to harvest stormwater for indoor use
- a tree-rill system to water trees
- rainwater gardens to treat water and slowly release it into the Mississippi river
- permeable pavement to reduce runoff during storm events and diminish pollutants
- a natural turf amphitheater for an outdoor classroom
- overlooks and paths to provide views and access to the Mississippi River

low-impact ecological site development

client: Ramsey-Washington Metro Watershed District



The Ramsey-Washington Metro Watershed District set out to build a “green” office facility that would incorporate multiple methods of environmental stewardship and serve as an example of low-impact site development. Serving as the district’s primary engineering consultant since 1975, Barr was asked to help evaluate the site and to work closely with the district and the building’s architect to design an infiltration-based stormwater management system using native plants, rainwater gardens, a green roof, and a pervious asphalt parking lot.

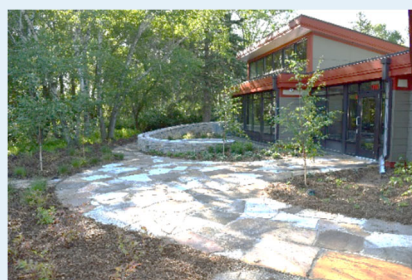
Initially, some of the “green” aspects of the facility proved to be too expensive for the district, but Barr was able to successfully incorporate ecological site design and meet the project’s budget. The design incorporated recycled and recyclable materials, as well as materials from local sources. The landscaping includes a mixture of native prairie grasses

and wild flowers appropriate for a variety of site conditions.

By tailoring stormwater systems and landscape design to our client, the site, and even to federal permit requirements, we helped the Ramsey-Washington Metro Watershed District achieve a new headquarters that “lies lightly” on the land and serves as a sustainable showplace.

water resources center green infrastructure design

client: Nine Mile Creek Watershed District



The Nine Mile Creek Watershed District renovated a large home on a five-acre wooded parcel into an innovative water resources facility that now acts as the district’s new offices and education and outreach center, known as Discovery Point. Barr was hired to develop a landscape master plan for the entire site that included a site grading and drainage plan; a 26-stall parking lot and entrance drive; electrical, water, and sanitary service utilities; retaining walls; and stormwater features including a 1,050-gallon interactive cistern with a decorative runnel wall, rain gardens, and multiple permeable pavement systems.

The site was designed to display replicable commercial and residential landscaping and green infrastructure practices that are lower maintenance, ecologically appropriate, and aesthetically pleasing. Barr also designed an interpretive signage suite, as well as a long-term plant-community restoration project.

West Side Flats greenway design

client: City of Saint Paul



Barr worked with the City of Saint Paul to plan and design a new seven-acre park near downtown in an area referred to as West Side Flats. Historically, the area was an important fishing and hunting location for the native people and, during European settlement, served as first housing for many immigrant groups. Flooding in the mid-20th century led to the destruction of this vibrant community and displaced many people.

With flood protection now in place and new redevelopment pressures, the city is carefully planning a new neighborhood

in a way that respects the groups that lived there in the past, as well as the current adjacent residents (primarily Hispanic) and anticipated future residents. At the center of the redeveloping West Side Flats is a proposed park, designed by Barr, with community gathering spaces, regional trail connections, and a several-acre stormwater wetland basin to treat, store, and slowly release stormwater from adjacent development in an ecologically friendly manner consistent with the historic habitat of the Mississippi River floodplain. The park establishes a green neighborhood center with multiple social and ecological functions.

Barr worked closely with the city and partnered with several subconsultants to provide robust community engagement and to help the city achieve its minority- and women-owned business goals. We worked closely with the surrounding neighborhood organizations, local artists, and other stakeholders to plan and design a park that meets the various needs of current residents while respecting the displaced communities of the past. Barr and our community partners facilitated public meetings and site visits to the future park to help the community imagine the park's possibilities. The project is currently 50 percent designed and will be completed as the surrounding redevelopment occurs.



river, stream, and shoreline restoration



Jeff Weiss



Miguel Wong



Tom MacDonald



Briana Drake



Ron Koth



Adam Howard

Barr has been a leader in implementing ecological methods for stream and river restoration, habitat preservation, and erosion control. Our restoration efforts are informed by the hydrology, geomorphology, biology, water quality, and connectivity of each stream—enabling our engineering solutions to align with the function and character of the stream corridor. We gather data from a variety of sources and then identify problem sources and cost-effective alternatives so that decision makers can make informed, justifiable choices with a full understanding of the expected outcomes. Our restoration projects include work on portions of the following streams:

- Riley Creek
- Bluff Creek
- Battle Creek
- Farney Creek
- Fish Creek
- Nine Mile Creek
- Purgatory Creek
- Raleigh Creek
- Bassett Creek
- Valley Creek
- Minnehaha Creek

services we offer:

- fluvial geomorphology, channel monitoring, and classification
- erosion protection
- streambank stabilization and bioengineering
- sediment transport
- project reviews

relevant project examples

streambank restoration projects

client: Riley-Purgatory-Bluff Creek Watershed District



Serving as district engineer for more than four decades, Barr has assisted the RPBCWD in implementing numerous ecological methods for stream, wetland, and lake restoration; habitat preservation; and floodplain management. Several of the more recent stream restoration efforts are summarized below.

Purgatory Creek restoration: In 2013, Barr assessed approximately 2,200 feet of Purgatory Creek in Minnetonka for stream stability. Concept designs were developed for 25 erosion areas. After additional cost-benefit analysis, final designs were completed to stabilize 12 sites along

1,100 feet of stream. Our restoration efforts included surveying, wetland delineation, hydrology, hydraulics, geotechnical services, cultural resources review, stakeholder coordination, design, construction quality-assurance review, and contract administration. Stabilization work was substantially completed in 2016, and final plantings were completed in spring 2017. Because most of the project is in a city park, more natural stabilization methods—such as root wads, vegetated reinforced soil slope, and boulder grade controls—were used. Areas with exotic vegetation were replanted with native vegetation

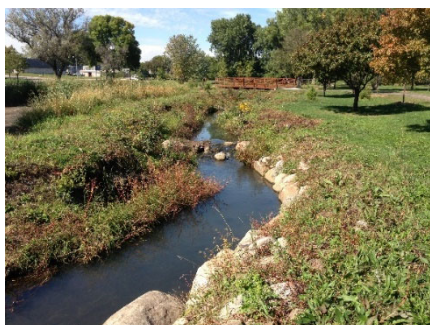
Lower Riley Creek restoration: In 2016, Barr assessed approximately 1 mile of Riley Creek in Eden Prairie, where deep channel incision has resulted in significant bank erosion, which contributed to destabilizing tall, steep slopes and disconnecting the creek from the floodplain. Barr completed concept designs involving natural stabilization methods such as root wads, vegetated reinforced soil slope, and boulder grade controls. Cost estimates were completed in 2016, with final design continuing into 2017.

Bluff Creek restoration: In early 2017, Barr assessed two reaches totaling approximately 3,200 feet on Bluff Creek in Chanhassen to assess the feasibility of stabilization and habitat enhancement. Barr developed concept designs for each reach and provided a recommendation for proceeding with one reach into final design. Final design began in February 2017.

CRAS: In 2015, Barr worked with district staff to complete a simplified method to efficiently assess and prioritize potential stream projects across the 50-square-mile watershed district with three unique creeks. The project split three creeks and tributaries into approximately 90 reaches and sub-reaches. Scores for items such as water quality, habitat quality, stream stability, and threat to infrastructure were assigned to each reach to assist in developing a restoration priority list. In 2017, Barr completed the Upper Riley Creek sediment source assessment identified stream restoration measures and watershed improvements to counteract development-driven hydrologic watershed changes.

Nine Mile Creek bank stabilization

client: Nine Mile Creek Watershed District



Barr evaluated and designed stream stabilization measures for the north fork of Nine Mile Creek within the city of Hopkins, Minnesota. The project was divided into two phases. The first phase included an approximately 3,800-foot reach that flows through a deep, confined ditch bounded primarily by commercial and high-density residential housing.

Stabilization focused on armoring the lower banks with native fieldstone and improving the quality of vegetation on the upper stream banks. The second phase included restoration of approximately 4,000 feet of Nine Mile Creek, with construction of 3,100 feet of new, meandering channel to restore reaches that had previously been straightened. Because most of

the project site is in a city park, more natural stabilization methods were used, such as root-wad bank protection, vegetated reinforced soil slope, and boulder grade controls. Areas with exotic vegetation were replanted with native vegetation.

stream assessment and restoration design

client: City of Duluth, Minnesota



In June 2012, a more than 9-inch rain event caused significant flooding in northeastern Minnesota. Barr provided evaluation and design services for several severely damaged sections of Miller, Amit, and Coffee creeks—popular trout streams that run through City of Duluth parks and a golf course. Amity Creek is crossed in several locations by Seven Bridges Road and its stone-arch bridges. Throughout the watershed, the flood caused slope failures and realigned the stream in several reaches, threatening public infrastructure including one of the bridges. A level 1 Rosgen characterization guided the design, which required protecting a 330-foot eroding clay bank and shifting the channel to avoid further impacts to

the downstream bridge. Due to the naturally shallow stream and predominance of rock and bedrock within this reach, a composite design was developed to protect the bank from further erosion. Boulder vanes were installed upstream and downstream of the composite rock wood bank feature to direct flow away from the bank.

Pine Creek floodplain restoration and habitat improvement

client: Minnesota Trout Unlimited



A 1-mile reach of Pine Creek in Winona County, located in the Driftless Region, was identified by Minnesota Trout Unlimited and the Minnesota DNR for a reach restoration to reconnect the stream with the floodplain and improve instream fish-habitat features. The project reach of stream is located within a DNR fishing access easement. Barr worked with the DNR, Hiawatha Chapter of Trout Unlimited, Natural Resource Conservation Service, and adjacent landowners to identify project objectives and scope that would meet both stream-habitat-improvement objectives and the

ongoing and future use of adjacent private agricultural and pasture lands. Geomorphic assessment and initial site topographic survey were used in conjunction with appropriate regional hydraulic geometry curves and H&H models to develop proposed future channel-geometry and floodplain dimensions. The existing stream reach was deeply entrenched in legacy sediment deposition from past agricultural land uses. Approximately 60,000 cubic yards of soil were regraded or removed to create a new accessible floodplain. Instream habitat elements designed and installed included bioengineered, fabric-wrapped bank lifts; boulder-constructed rock riffles; wood and rock vanes; instream cover rock clusters; and root wads for purposes of adding instream cover elements, as well as for interim stabilization of newly graded stream banks and floodplain areas. A section of new stream channel was constructed to establish a more expected radius of curvature and planform than the deeply entrenched, actively eroding section present at project onset. Coordination with adjacent landowners and the Natural Resource Conservation Service allowed for installation of fencing for future riparian grazing management.

floodplain management



Nathan Campeau



Sarah Stratton



Joe Waln



Scott Sobiech



Adam Howard



Ross Mullen

services we offer:

- hydrologic and hydraulic modeling
- flood insurance studies
- floodplain mapping and map revisions
- floodplain permitting
- dam failure analyses
- flood control structures

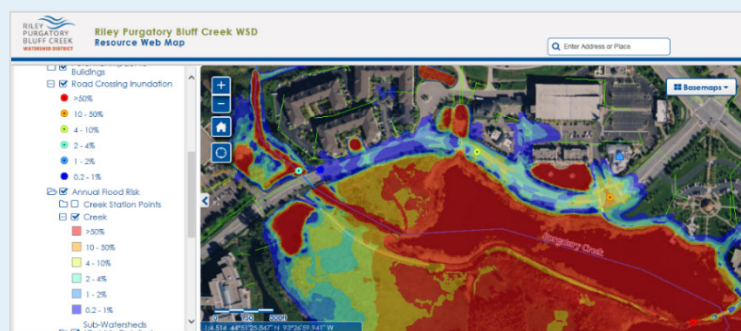
Since the 1970s, we have worked with FEMA, the U.S. Army Corps of Engineers, and state agencies on floodplain-related projects ranging from small-watershed streams and lakes to large, complex river and basin studies. Our knowledge of agency practices and preferences, along with the relationships we've built, help us shepherd projects successfully through the regulatory process. Our certified floodplain managers specialize in resolving regulatory tangles and modeling issues.

As governments, municipalities, and water management organizations continue to face new flood-management challenges (such as changing climate and precipitation estimates), we continue to provide the tools and expertise necessary to meet changing needs. Projects frequently include analyzing and designing flooding vulnerability assessments and mapping, flood-risk reduction systems, floodplain-management plans and insurance studies, stormwater management systems, erosion control measures, dam and hydropower facilities, spillway design, structural flood proofing, and water supply and water treatment systems.

relevant project examples

PC-SWMM modeling and vulnerability evaluation

client: Riley-Purgatory-Bluff Creek Watershed District



Flood inundation areas and vulnerable structures/roadways were mapped based on a range of rainfall depths.

compared to technical paper 40. Recent studies of long-term extreme weather trends in the Twin Cities area found that precipitation amounts are predicted to increase significantly over what is currently used in floodplain assessments and infrastructure design.

In 2013, NOAA released updated precipitation frequency estimates for the Midwestern states (*NOAA Atlas 14, Volume 8*). These estimates, which serve as an update to the U.S. Weather Bureau's technical paper 40, published in 1961, reflect the results of statistical analyses performed for a much longer period of recorded precipitation data. The results show significant increases in rainfall amounts in the Twin Cities area where the 100-year, 24-hour rainfall depth increased by approximately 30 percent when

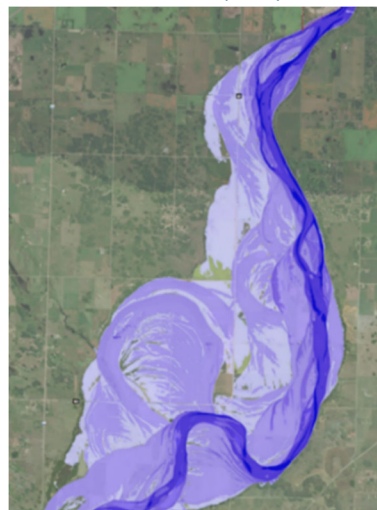
Barr updated the RPBCWD's H&H model to evaluate the higher rainfall depths published in Atlas 14 as well as floodplain uncertainty associated with Atlas 14 rainfall depth, and to estimate potential flood elevations as a result of future climate change (mid-21st century). Model results were used to develop flood-risk figures to illustrate the current and potential future flood risk along the creeks. The evaluation identified current and potential estimated future impacts to creek crossings and structures.

Assessment results identified resilient areas (i.e., flood risk to structures and crossings was not sensitive to change in rainfall depths), and areas where flood elevations are sensitive to rainfall depths. During the development of flood-risk figures, input was provided by the RPBCWD's technical advisory committee. Four sets of flood-risk figures were developed: 1) water surface profiles; 2) variability in the 100-year, 24-hour floodplain; 3) annual flood-risk maps; and 4) flood risk over a 30-year period.

The district is using the figures generated from this study to inform communities of current flood risk and potential future flood risk within the watershed. This information provides the district and municipalities with a water management tool that looks at how future climate change could potentially impact infrastructure; it also helps determine where flood mitigation might be needed.

South Saskatchewan River two-dimensional floodplain modeling

client: Rural Municipality of Corman Park



Flood--depth mapping for the South Saskatchewan River floodplain; dark blue indicates deepest water levels.

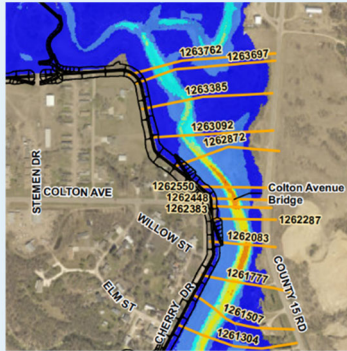
The Rural Municipality of Corman Park is experiencing growing pressure to allow development near the South Saskatchewan River. Provincial regulations prohibit development within the river's floodway based on previous one-dimensional models. The municipality hired Barr to create a two-dimensional hydraulic model to estimate flood depths and velocities across the 2 to 7 kilometer-wide, 1:500-year floodplain of the South Saskatchewan River.

The Barr team collected bathymetry data of the South Saskatchewan River channel for use in developing the calibrated hydraulic model. We coordinated closely with stakeholders to obtain existing models, terrain data, and high-water-mark data. This information was used to develop and calibrate the two-dimensional hydraulic model, which was also used to create a future-conditions development scenario for a limited number of potential structures elevated on mounds 0.5 meters above the 1:500-year flood elevation. Barr created inundation maps showing velocities and depths at various flood levels along with a hydraulics report documenting the analysis and results. The municipality will use this study to inform development planning in a way that mitigates flood risk while being

responsive to development pressure within the community. Large study areas like this one have the potential to result in hydraulic models with long simulation run times, which can delay a project. Barr was able to use an adaptive mesh to reduce model run time from several days to just hours. We also developed an automated GIS process for classifying land cover based on color variations in the aerial imagery, greatly reducing the typical time and effort needed for this task for this rural location where GIS-based land cover data was unavailable.

Burlington 2D modelling and mapping

client: Souris River Joint Board



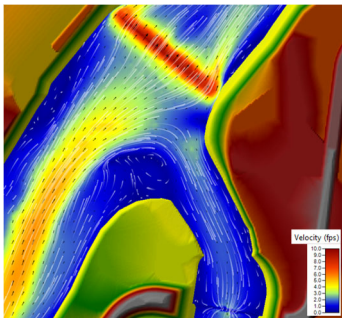
Velocity mapping was used to identify critical locations for the design of scour revetment and embankment armoring.

In June 2011, the Souris (Mouse) River in North Dakota experienced the flood of record, with flows more than five times what the existing flood risk reduction system could handle, causing over a billion dollars in structural and environmental damages. The North Dakota State Water Commission (NDSWC) hired a team led by Barr to rapidly develop an enhanced flood risk management plan for the entire North Dakota reach of the Mouse River. After a draft alignment and preliminary design and report were completed within just five months, project ownership transitioned to the Souris River Joint Board (SRJB). The SRJB hired Barr to provide project design, permitting, and construction administration for over two miles of flood risk reduction features. Part of the design included a more robust levee system for the City of Burlington, one of the communities impacted by the flood. The hydraulic analysis for the Burlington levee design included a 2D hydraulic model of the Des Lacs and Souris Rivers adjacent to the levee system. The model was calibrated to observed high-water

marks. Inundation and velocity maps created from the model results were used to design embankment protection and scour-prevention measures.

Grafton flood risk reduction 2D modelling and mapping

client: Souris River Joint Board

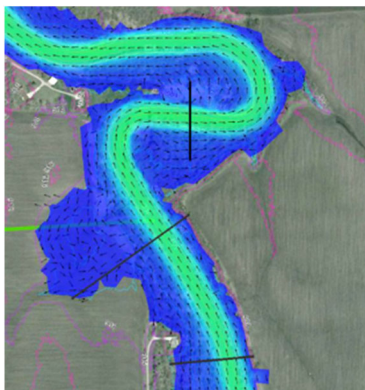


Velocity magnitude (colour gradient), velocity vectors, and particle tracing paths show flow split at a control structure and bypass-channel inlet.

To provide flood protection to Grafton, North Dakota, Barr supported local firms by providing high-end hydraulic expertise, hydraulic modelling and QAQC, and engineering design of flood control structures. Barr demonstrated that the proposed concrete weir-type inlet and outlet structures could be replaced with earthen structures protected with rip rap, providing significant cost savings to the city. Barr used the depth and velocity results from 2D hydraulic modelling to optimize the riprap design to further reduce the cost of the features. 2D hydraulic modelling was also used by Barr to support the environmental impact review, specifically related to fish passage, making it possible to obtain the necessary approval and permits. Construction will begin in the spring of 2018.

Red River flood management—2D modelling & hydraulic structure design

client: Diversion Authority



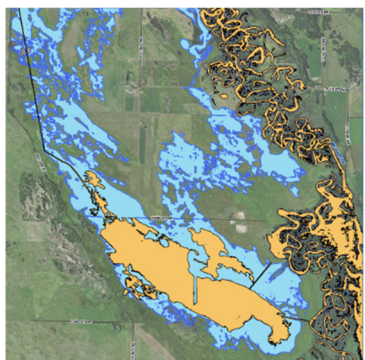
Pre-project velocity distribution and inundation extents along the Red River of the North.

In 2009, the Diversion Authority—comprised of the cities of Fargo, North Dakota, and Moorhead, Minnesota, along with two counties and two watershed districts—hired a team of consultants (including Barr) to design and develop a project that will reduce flood damage risk up to the 500-year event for nearly 200,000 people and 181 square kilometers of infrastructure, with an estimated total cost of \$2.1 billion (USD). Barr worked with the U.S. Army Corps of Engineers to develop and compare alternative solutions for a multi-phased feasibility study. Barr developed 2D hydraulic models of the hydraulic structures and fish passages to capture velocity distribution across channels and structures. For each structure, existing conditions were compared to post-construction conditions. Multiple flow events were analyzed for each hydraulic structure to calculate velocity distribution over a range of flow rates. Barr calibrated the 2D hydraulic models using available measured velocity distributions and calibrated 1D-model high-water elevations. Model results were used to support the environmental review. The project has now moved into final

design and construction, adhering to strict engineering, environmental, and cost/benefit criteria.

Outlaw Creek 2D modelling and mapping

client: Souris River Joint Board



A 2D hydraulic model was used to simulate complex flow paths and evaluate flood mitigation alternatives.

As part of an overall flood risk reduction project, the Souris River Joint Board hired Barr to complete a feasibility study for mitigating flood risk for properties in the Souris (Mouse) River flood plain in North Dakota. Outlaw Creek is an overland drainage-way located west of the Mouse River channel within the Mouse River flood plain. The study area includes a wide, flat flood plain with complex flow paths and limited channel gradient. Barr developed and calibrated a 2D hydraulic model of existing conditions to simulate flow through the Outlaw Creek and Mouse River flood plains. This model was the basis for several proposed condition scenarios, exploring options for reducing the depth and duration of flooding during higher frequency flood events. Inundation mapping showing depths and velocities were used to compare existing and proposed conditions scenarios. The study resulted in recommendations and planning-level cost estimates for steps the Board could take to reduce flood risk for the area.

groundwater and hydrogeology



Ray Wuolo



Brian LeMon



John Greer



Evan Christianson



Tina Pint

services we offer:

- groundwater modeling and groundwater/surface-water connection analysis
- contaminant transport
- wellhead protection and well design

Barr's water system specialists develop and analyze all aspects of water systems, including supply, treatment, storage, and distribution. We have experience with water treatment plants, surface and groundwater, wells and well houses, and associated pumping systems and pipelines. We also have experience navigating the complexity associated with planning and permitting new groundwater and surface-water supplies.

To be effective, water supply systems need to take into consideration multiple demand-side factors, including population growth projections, land and water use data, per-capita demand, current water systems, hydrology, and conservation concerns. These factors establish the boundaries of how much water will be needed in the present and the future. An area's natural characteristics such as hydrology, geology, hydrogeology, protected natural resources, or the presence of potential sources of contamination, also need to be considered.

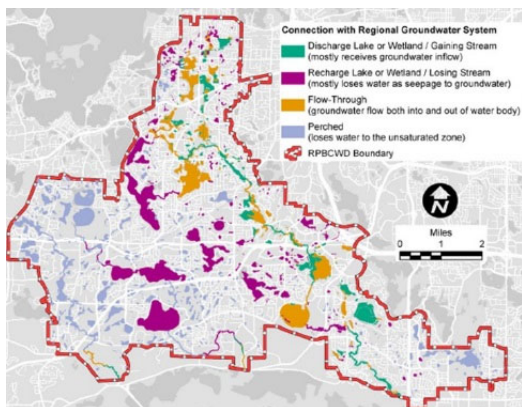
Finally, effective systems need to comply with rules and regulations imposed by governing authorities. Barr understands all sides of the equation so we can help you plan and design a system that meets your needs, is feasible within the natural system, and complies with the regulatory world (including wellhead protection requirements). We take this comprehensive approach to provide solutions that are economical and meet U.S. Environmental Protection Agency Safe Drinking Water Act requirements.

Barr's hydrogeologists use groundwater modeling for a variety of different projects, including wellhead protection, water supply studies, groundwater contamination investigations, surface-water/groundwater interface analysis, and geotechnical evaluations. We have been using and developing groundwater flow models since the early 1970s. Our clients appreciate our focus on selecting the right models to control project costs; technical credibility with regulators to facilitate complex negotiations; and ability to explain complicated models to gain public understanding and support.

relevant project examples

groundwater/surface-water interaction and slope-stability study

client: Riley-Purgatory-Bluff Creek Watershed District (RPBCWD)



Barr performed a groundwater/surface-water interaction and slope-stability study for the RPBCWD to evaluate 1) the connection of regional groundwater and surface water across the district, 2) the vulnerability of surface waters to changes in the groundwater system, 3) areas that are most conducive for large-scale infiltration, and 4) the current slope stability across the district and areas where the risk of slope failure is greatest in the presence of increased infiltration. We are working with the RPBCWD to implement the groundwater management recommendation from this study, as incorporated into RPBCWD's 10-year plan—such as establishing baseflow thresholds for the creeks within the district, either lake-stage or outlet-discharge thresholds for lakes identified as vulnerable to

changes in the groundwater system; targeting hydrographs for wetlands identified as vulnerable to changes in the groundwater system; re-establishing a monitoring-well network within the district and implementing a monitoring program; and developing a fully coupled groundwater/surface-water model for the district.

Blaine well field planning, design, and construction

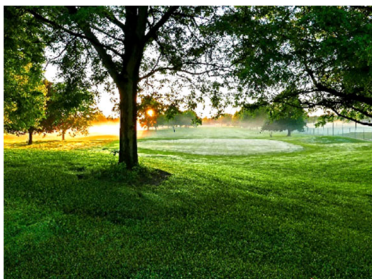
client: City of Blaine



Barr conducted a thorough well siting study for Blaine, Minnesota, to site a new well field in the northeast area of the city. Barr and the city worked together with the Minnesota Department of Natural Resources (DNR) to install monitoring wells in the area, perform pumping tests, and conduct groundwater modeling to show that future wells would not have an impact on surface water features or other wells in the area. The city was able to site the new well field with DNR approval, and Barr completed the construction of new city wells 18–21 in 2017. This new well field will provide the city with an additional 8 MGD of groundwater well capacity.

Hiawatha Golf Course groundwater pumping assessment

client: Minneapolis Parks and Recreation Board



In 2015, the Minneapolis Park and Recreation Board hired Barr to help determine why and quantify how the golf-course park routinely exceeds the groundwater pumping volume specified in its water appropriations permit. Barr monitored groundwater and lake levels, pumping/flow rates, and surface-water and groundwater quality. We also conducted a short-term recovery test of the pumping system to understand how groundwater and pond levels responded. We developed and calibrated a regional groundwater model and an XP-SWMM model to determine impacts to groundwater, surface water, and flooding during design storm events and Lake Hiawatha

tailwater conditions. A pump test was performed on a deep irrigation well to identify connections between regional groundwater inflows and aquifers.

attachment A: **2019 fee schedule**

Principal	\$145-295
Consultant/Advisor	\$155-250
Engineer/Scientist/Specialist III	\$125-150
Engineer/Scientist/Specialist II	\$95-120
Engineer/Scientist/Specialist I	\$65-90
Technician III	\$125-150
Technician II	\$95-120
Technician I	\$50-90
Support Personnel II	\$95-150
Support Personnel I	\$50-90

Rates for litigation support services will include a 30% surcharge.

A ten percent (10%) markup will be added to subcontracts for professional support and construction services to cover overhead and insurance surcharge expenses.

Invoices are payable within 30 days of the date of the invoice. Any amount not paid within 30 days shall bear interest from the date 10 days after the date of the invoice at a rate equal to the lesser of 18 percent per annum or the highest rate allowed by applicable law.

Meals will be reimbursed on a per diem basis. For travel destinations within the continental U.S. (CONUS) the per diem rate will be as published by the U.S. Internal Revenue Service (IRS) based on the High-Low method. For travel destinations outside the CONUS list, the per diem rate will be as published by the U.S. Department of State for foreign per diem rates. Full day per diem rates will be pro-rated on travel days.

All other reimbursable expenses including, but not limited to, costs of transportation, lodging, parking, postage, shipping and incidental charges will be billed at actual reasonable cost. Mileage will be billed at the IRS-allowable rate.

Materials and supplies charges, printing charges, and equipment rental charges will be billed in accordance with Barr's standard rate schedules.

Principal category includes consultants, advisors, engineers, scientists, and specialists who are officers of the company.

Consultant/Advisor category includes experienced personnel in a variety of fields. These professionals typically have advanced background in their areas of practice and include engineers, engineering specialists, scientists, related technical professionals, and professionals in complementary service areas such as communications and public affairs.

Engineer/Scientist/Specialist categories include registered professionals and professionals in training (e.g. engineers, geologists, and landscape architects), and graduates of engineering and science degree programs.

Technician category includes CADD operators, construction observers, cost estimators, data management technicians, designers, drafters, engineering technicians, interns, safety technicians, surveyors, and water, air, and waste samplers.

Support Personnel category includes information management, project accounting, report production, word processing, and other project support personnel.

*Rates do not include sales tax on services that may be required in some jurisdictions.

attachment B: **2019 rental equipment rate schedule**

	Rate	Unit
Non-Expendable Equipment		
<u>Air Quality</u>		
Air-Cooled M5 Probe/Oven Assembly	300.00	Day
Ambient SO ₂ Monitor	100.00	Day
Analytical Balance (each usage)	6.00	Use
Analyzer Filter Oven	15.00	Day
Analyzer Support Kit (a.)	400.00	Day
Anemometer	50.00	Day
CO Analyzer	250.00	Day
CO Cal Gases (set of 2)	40.00	Day
CO/O ₂ /CO ₂ Regulators (set of 2)	20.00	Day
Data Logger	40.00	Day
Delta Calibrator	100.00	Day
Digital Calibrator	30.00	Day
Dilution Calibrator	200.00	Day
Dual Pen Strip Chart	50.00	Day
EPA 6 SO ₂ Analysis Kit	60.00	Day
EPA Method 25 (TGNMO) Sampling Train	250.00	Day
EPA Method 202	130.00	Test
EPA Method 3 ORSAT Analyzer	25.00	Day
EPA Method 30B Probe	50.00	Day
EPA Method 4	270.00	Day
EPA Method 5 Sampling Train	400.00	Day
EPA Method 5 Wet Test Meter Calibrator	240.00	Day
Gas Chromatograph Model 302	367.00	Day
Gas Conditioner	60.00	Day
Heated Sample Line (100')	100.00	Day
Heated Sample Line (150')	100.00	Day
Heated Sample Line (50')	60.00	Day
Hivol Ambient Sampler Calibration Kit	25.00	Day
Hydrocarbon Calibration Gases	60.00	Day
Hydrocarbon Regulator Set	30.00	Day
Meteorological Station	1,000.00	Month
Met Station Calibration Kit	120.00	Day
Midget Impinger Sample Line	50.00	Day
Midget Impinger Sampling Train	40.00	Day
MKS Multi-Gas Analyzer	1,100.00	Day
NCASI Method 8A Train	250.00	Day
NCASI Sample Train	50.00	Day
NO _x Analyzer	260.00	Day
NO _x Cal Gases (set of 2)	40.00	Day
NO _x /SO ₂ Regulators (set of 2)	25.00	Day
O ₂ /CO ₂ Analyzer	250.00	Day
O ₂ /CO ₂ Cal Gases (set of 2)	40.00	Day
PM ₁₀ /2.5 In. Stack Separators	100.00	Day
Ohio Lumex Mercury Analyzer	1,500.00	Day
PM ₁₀ BAM-1020	370.00	Month

	Rate	Unit
PM ₁₀ HiVol	120.00	Month
Portable Oxygen Analyzer	40.00	Day
Primary Standard Flow	60.00	Day
Single Pen Strip Chart Recorder	35.00	Day
SO ₂ Analyzer	300.00	Day
SO ₂ Calibration Gas	40.00	Day
Testo 350 Portable Analyzer.....	270.00	Day
Total Hydrocarbon Analyzer	400.00	Day
TRS Kit.....	100.00	Day
TSP Hi-Vol Sampler	30.00	Day
Unheated Sample Line (100 ft.)	40.00	Day
Universal Control Console (Vost Meter)	200.00	Day
Volumetric Air Flow Measurement Kit.....	60.00	Day
<u>Field Equipment</u>		
1½-inch Submersible Purge Pump	35.00	Day
360 Degree Camera	18.00	Day
Alpha Water Bottle (each usage).....	3.00	Use
Arc Flash Label Printer	5.00	Use
Area/Velocity Flow Meter	35.00	Day
Automatic Sampler with Depth Sensor and Flow Meter	60.00	Day
Automatic Sampler.....	30.00	Day
Bladder Pump w/Controller	125.00	Day
Conductivity Meter	17.50	Day
Current Meter Suspension Kit.....	55.00	Day
Data Transfer System (DTU)	22.00	Day
Depth Sensor/Flow Meter Only.....	30.00	Day
Differential Pressure Datalogger.....	18.00	Day
Dissolved Oxygen Meter	29.00	Day
Dissolved Oxygen Sensor/Data Logger System	30.00	Day
Dissolved Oxygen/Conductivity Meter.....	38.25	Day
Ekman Dredge	6.00	Day
Electric Vacuum Pump.....	10.00	Day
Electromagnetic Flowmeter	65.00	Day
Environmental Equipment Shelter	2.75	Day
Field Rugged Laptop or Pocket PC	25.00	Day
Fluorometer Kit, Model 10-AU	240.00	Day
GEM 2000 Landfill Gas Analyzer.....	87.00	Day
Gas Centrifugal Pump	26.75	Day
Gas Generator.....	29.00	Day
Gator Diesel Air Compressor.....	60.00	Day
Go-Pro Camera	100.00	Day
Hand Vacuum Pump.....	2.30	Day
Hand-held Velocity Flow Meter	40.50	Day
Heavy-Duty Weed/Brush Trimmer.....	17.00	Day
HOB0 Weather Station	21.00	Day
Kemmerer Vertical Bottle Sampler.....	33.50	Use
LR-24 Electro-Fisher	200.00	Day

	Rate	Unit
Measurement and Control Datalogger.....	13.00	Day
Oil, Water Interphase Probe	60.00	Day
Orbital Shaker Table	105.00	Day
Peristaltic Pump	35.00	Day
Petite Ponar Dredge	14.50	Day
pH Meter	27.75	Day
Phipps & Bird Jar Tester	30.00	Day
Pneumatic Slug Kit.....	9.00	Day
Portable Colorimeter	34.75	Day
Portable Doppler or TT Ultrasonic Flow Meter	69.00	Day
Portable Field Scale.....	15.00	Day
Portable Greenhouse Gas Analyzer	200.00	Day
Portable SVE Blower	29.00	Day
Power Cable for Sodar Equipment	167.00	Month
Radon Monitor	62.00	Day
RST Single-Channel Vibrating Wire Data Logger.....	4.00	Day
Sediment Corer (per sample)	5.75	Use
Seisgun.....	60.00	Day
Shear Cell	419.00	Day
Sodar Trailer (3-month minimum)	3,000.00	Month
Soil Core Sampler/Bucket Auger	29.00	Day
Soil Vapor Extraction System with Trailer	135.00	Day
Solar Panel Module w/Charge Controller.....	12.00	Day
Sontek ADV (Acoustic Doppler Velocimeter).....	128.00	Day
Spectrometer UV/VIS Ocean Optics.....	115.00	Day
Spill Containment Kit.....	10.00	Day
Split Tube Soil Probe/Hand Auger	12.00	Day
Submersible Pump (SS w/controller)	125.00	Day
Sub-Slab Vapor Sampling Kit	50.00	Use
Temperature Datalogger.....	1.50	Day
Temperature, Level, Conductivity Meter (Solinst)	45.00	Day
Tent.....	15.00	Day
Turbidimeter.....	25.00	Day
Turbidity Sensor w/Cable, DTS-12	43.00	Day
Underwater Viewing Camera	60.00	Day
Unmanned Aircraft System (UAS)	160.00	Day
Vibra-coring System (for Jon Boat).....	150.00	Day
Vibra-coring System (for Pontoon)	500.00	Day
VW Piezometer/Data Logger Combo	200.00	Use
Water Level/Temp Transducer (Level Troll)	45.00	Day
Water Quality Meter (ProDSS)	150.00	Day
Water Quality Meter (YSI 556 MPS).....	85.00	Day
Well Level Indicator	22.00	Day
WTW 1970i Conductivity Meter	85.00	Day
Zooplankton Net	7.00	Day
Zooplankton	145.00	Day

	Rate	Unit
<u>GSHM Hardware and Software</u>		
900 MHz Base Station	250.00	Month
AMTS Protective Enclosure.....	523.00	Month
AMTS Solar Power Package	500.00	Month
Cellular Modem.....	100.00	Month
Cellular Modem Antenna	25.00	Month
Chemcad	38.00	Hour
Geomos Alarm Package	250.00	Month
GNSS Sensing Base Station	500.00	Month
GNSS Sensing Receiver	500.00	Month
I-Site Software	63.00	Hour
In-Place Inclinator (IPI) System.....	21.00	Day
IPI System Data Acquisition Auxiliary Station w/Radio	7.00	Day
IPI System Data Acquisition Base Station w/Cell and Radio	8.00	Day
Metsim	35.00	Hour
MineSight Software.....	50.00	Hour
Multi Channel 900 MHz Logger	100.00	Month
Prism – 360 Degree (c).....	50.00	Use
Prism – Long Range (c).....	35.00	Use
Prism – Short Range (c)	25.00	Use
Single Channel 900 MHz Logger.....	50.00	Month
Tablet Computer	15.00	Day
Vibration System.....	1,000.00	Day
Vista Data Vision, Presentation Software	150.00	Month
Vista Data Vision Site License.....	150.00	Each
Vulcan Software.....	50.00	Hour
VW Readout	25.00	Day
Weekly AMTS Active Monitoring	1,000.00	Week
Weekly AMTS Inactive Monitoring.....	250.00	Week
Wireless Vibration Sensor	700.00	Month
Wireless Vibration Sensor Communication Hub.....	1,200.00	Month
<u>Materials and Testing</u>		
Borehole Camera System.....	140.00	Day
Brass Sieve Set	6.00	Day
Chlorophyll a (CHL a)	60.00	Day
Coarse Sieve Set.....	10.00	Day
Concrete Air Meter.....	36.00	Day
Concrete Test Hammer	40.50	Day
Cyre Sampler	150.00	Day
Cyre Sampler Push Frame	100.00	Day
DL Plus Ultrasonic Kit (37DL, 36DL, 26XTDL)	62.00	Day
Double Ring Infiltrometer	65.00	Day
Dual-Mass Dynamic Cone Penetrometer	50.00	Day
Dye Penetrant Kit.....	22.00	Day
Filter Press.....	160.00	Day
Flat Plate Dilatometer	500.00	Day
Geomil VST Electrical Vane Tester	50.00	Test

	Rate	Unit
Hand Vane Shear	98.50	Day
Heavy-Duty Balance	16.00	Day
Horizontal Sample Ejector	29.50	Day
Kessler Field Moisture Oven	45.00	Day
Liquid Limit Set	7.50	Day
Load Plate Apparatus	230.00	Day
Magnetic Crawler	48.00	Day
Magnetic Particle Kit	38.00	Day
Manual Extensometer (Slideminder)	32.00	Day
Metal Thickness Gauge	50.00	Day
Minimate Plus Blast Monitor	100.00	Day
MPD Infiltrometer – Triple Kit	61.00	Test
Paint Thickness Gauge	15.00	Day
Phytoplankton	145.00	Day
Platform Beam Scale	14.75	Day
Point Load Testing System	78.00	Day
Portable CPT	200.00	Day
Power Auger	43.00	Day
Proctor Set	4.50	Day
Proving Ring Penetrometer	36.00	Day
Resistivity Meter (Ultra Mini-Res)	110.00	Day
Sample Splitter	5.00	Day
Sand Cone Set	10.00	Day
SINCO Inclinator Probe	200.00	Day
Soluble Reactive Phosphorus	28.00	Day
Thermal Imaging Camera, Flir E60	170.00	Day
Torvane Shear Device	2.50	Day
Total Dissolved Phosphorus	30.00	Day
Total Nitrogen (TN)	40.00	Day
Total Phosphorus (TP)	23.00	Day
Vane Inspection Kit	19.00	Day
Vertex CPT Equipment	593.00	Day
Vibrating Wire Logger SINCO VW2104	24.00	Day
Water Treatment Lab	200.00	Day
Weld Inspection Equipment	12.00	Day
<u>Safety</u>		
3M PAPR (powered Air Purifying Respirator)	19.00	Day
Emergency Escape Breathing Device	18.00	Day
Aerosol/Dust Monitor (PDR-1000)	67.75	Day
Automatic External Defibrillator (AED)	14.00	Day
Calibration Gas Kit	8.75	Day
CO Monitor (ISC T82)	36.00	Day
Combustible Gas Indicator - O ₂ , LEL, H ₂ S and/or CO Meter	45.00	Day
Confined Space Rescue Retrieval Equipment	295.00	Day
Confined Space Ventilator	54.75	Day
Detector Tube Pump	15.00	Day
Diesel Particulate Monitor Kit FLIR	200.00	Day

	Rate	Unit
Dry Cell Air Flow Calibrator.....	50.00	Day
Flame Ionization Detector TVA1000	133.00	Day
Flotation Worksuit.....	19.75	Day
Full-Face Respirator	8.00	Day
H ₂ S Meter (I.S.C. T40).....	27.00	Day
Half-Face Respirator	6.00	Day
Helium Detector	55.00	Day
InReach Satellite Communication Device.....	10.75	Day
Personal Air Sampling Pump (SKC)	38.00	Day
Photoionization Detector (10.6eV Lamp).....	110.00	Day
Photoionization Detector (11.8eV Lamp).....	130.00	Day
RKI Eagle-2 Multi-gas Monitor	105.00	Day
Satellite Phone.....	13.35	Day
Self-Retracting Lifeline (30')	56.00	Day
Sound Level Meter.....	48.75	Day
Spot Messenger Device	5.85	Day
Supplied Air Breathing System with SCBA	75.50	Day
Traffic Control Signs	2.10	Day
UltraRAE 3000 Photoionization Detector.....	150.00	Day

Survey

Aquatic Invasive Species Decon System	170.00	Day
Bathymetry Survey System - Odom.....	524.00	Day
Canoe	21.75	Day
Centimeter Grade Differential GPS System (Trimble)	115.00	Day
Chain Saw.....	23.00	Day
Communication Radios (set)	17.75	Day
Differential GPS System (Trimble).....	90.00	Day
Garmin GPS	12.00	Day
GPS Camera Kit (Ricoh 500SE).....	22.00	Day
Hand Ice Auger	7.00	Day
Iron Locator.....	17.50	Day
iPad with R1 GPS Receiver.....	50.00	Day
Jon Boat & Trailer	52.00	Day
Kayak.....	35.00	Day
Laser Range Finder	87.00	Day
LCD Depth Locator	11.50	Day
Leica HDS Scan Station	125.00	Hour
Leica Structural Monitoring AMTS	97.00	Day
Outboard Motor.....	46.50	Day
Pontoon Boat Coring Platform	200.00	Day
Power Ice Auger	30.00	Day
Robotic Total Station.....	45.00	Hour
RTK GPS Survey System (4-hour minimum).....	55.00	Hour
Side Scanning Depth Finder.....	75.00	Day
Spectra Laser Level.....	25.00	Day
Survey Set (Level, Tripod and Rod)	20.75	Day
Total Station Survey Set – Complete.....	116.50	Day

	Rate	Unit
Trolling Motor and Battery.....	48.00	Day
Utility Locator	41.00	Day
Z-Boat Bathymetry Survey System.....	150.00	Hour
<u>Vehicles and Trailers</u>		
4WD All-Terrain Vehicle (Ranger)	89.50	Day
Air Sampling Trailer	110.00	Day
Heavy Trailer Towing Mileage (in addition to vehicle mileage at IRS rate).....	0.25	Mile
Utility Trailer	35.00	Day
Vehicle – 2WD Field	58.00	Day
Vehicle – 4WD/AWD Field.....	75.00	Day
Vehicle – Cube Truck	80.00	Day
Vehicle – Personal (b)	58.00	Day
Vehicle Mileage (company and personal).....	IRS Rate	
Yakima Canoe Trailer	35.00	Day
<u>Communications and Imaging</u>		
Digital Camera	12.00	Day
Video Camera.....	20.00	Day
<u>Expendable Field Supplies</u>		
¼-Inch Bladder Pump Tubing	1.10	Foot
¼-Inch ID PVC Tubing	0.30	Foot
¼-Inch ID Silicone Pump Tubing.....	2.60	Foot
1-Liter Hazmat Cooler Packaging	86.80	Each
2-Liter Hazmat Cooler Packaging	113.60	Each
250-ml Disposable Filtration Apparatus.....	14.80	Each
3/8-Inch I.D. PVC Tubing	0.40	Foot
3/8-Inch I.D. Silicone Pump Tubing	7.80	Foot
3M Airstream P100 PAPR Filter	49.50	Each
3M Versaflo P100 PAPR Filter	57.70	Each
4-mil Quart Recloseable Bag (pack of 50).....	5.40	Pack
5-Gallon Hazmat Packaging	40.80	Each
500-ml Disposable Filtration Apparatus.....	21.60	Each
Colorimetric Water Analysis Kit (each test)	1.90	Test
Compressed Nitrogen (84 cf "Q Tank")	20.84	Each
Core Tubing – 3" Aluminum	3.76	Foot
Detector Tubes	15.80	Each
Distilled Water (1 gal.)	0.80	Each
Dot Gloves	1.60	Pair
Encore Sampler - 25 Gram.....	10.00	Each
Fabric Soil Sample Bag	1.40	Each
Fence Post & Hardware for Stream Gages	14.70	Each
Field Book/Construction Diary (large).....	23.30	Each
Field Book/Construction Diary (small)	7.90	Each
Five Gallon Pail with Lid.....	11.10	Each
Hydrochloric Acid (per liter)	7.40	Each
Ice	2.50	Bag
In-Line Groundwater Filter	23.20	Each
Knit Glove, Latex Coated.....	3.80	Pair

	Rate	Unit
Knit Glove, Latex Coated, Insulated	7.70	Pair
Latex Boot Covers	7.30	Pair
Lath, 4' (bundle of 50)	40.40	Bundle
Leather Gloves	6.70	Pair
Lock	15.80	Each
Nitrile Gloves – Heavy Duty.....	2.20	Pair
Paper Towels.....	2.40	Roll
Pin Flagging (bundle of 100).....	20.20	Bundle
Poly-Coated Tyvek Coverall	10.60	Each
Polyethylene Tubing for Bladder Pump, ¼"	0.20	Foot
PVC-Coated Heavy Winter Gloves	15.90	Pair
RAE-Sep Benzene Separation Tube	9.80	Each
Replacement Bladder Kit for QED Pump.....	21.70	Each
Respirator Cartridges – OVAG	31.90	Pair
Respirator Cartridges – Particulate	14.50	Pair
Rock Chip Tray	4.50	Each
Roll Flagging (150').....	3.40	Each
Saranex Tyvek Coverall	23.50	Each
Snap Top Sediment Container (8 oz.)	1.10	Each
Spray Paint	4.80	Each
Staff Gauge	50.20	Each
Stakes (bundle of 50).....	15.90	Bundle
Surgical Gloves – Thin Nitrile	0.20	Pair
Tyvek Boot Covers	1.00	Pair
Tyvek/Kleenguard Coverall.....	3.50	Each
Vapor Pin – Permanent Install Kit	91.90	Each
Versaflo OVAG/P100 PAPR Filter	131.10	Each
Weighted Disposable Bailer.....	4.90	Each
Whirl-Pak Headspace Bags (per 50 bags)	14.30	Pack
Winter Glove Liner, Blue Knit	2.50	Pair
Zooplankton Bottle.....	1.80	Each

General Notes: Applicable to all Equipment Listed on this Schedule

- 1.) Minimum rental period is 0.5 days unless noted.
- 2.) Rental charges begin on the first day the equipment is used on a project.
- 3.) Rental charges end on the last day the equipment is used on a project.
- 4.) A 25 percent weekly rate discount will apply to equipment rented on a daily basis for 5 or more days
- 5.) A 40 percent monthly discount will apply to equipment rented on a daily basis for 20 or more days.
- 6.) Equivalent equipment/models may be substituted for the items listed.

End Notes: Applicable to Only the Equipment Noted

- a.) Analyzer Support Kit includes the following: Airflow Kit, Heated Sample Line (50'), Heated Sample Line (100'), Gas Conditioner, Heated Filter Box, Single Pen Recorder, Dual Pen Strip Chart, Data Logger, C3/C4 Cal Gases (set), NO_x/SO₂ Cal Gases (set), CO Cal Gases (set), CO₂/O₂ Cal Gas (set of 2), SO₂ Cal Gas (set of 2), C3 Regulator Set, NO_x/SO₂ Regulators (set of 2), and CO/CO₂/O₂ Regulators (set of 2)
- b.) Employee personal vehicles subjected to field, off-site, transport or other severe duty.
- c.) Used prisms.

attachment C: **2019 copy production rate schedule**

Reproduction

Photocopies (8½ x 11, 8½ x 14, 11 x 17)	0.07
Color Copies (8½ x 11, 8½ x 14, 11 x 17)	0.50
Large-Format B&W Copies/Plots (22 x 34, 24 x 36, etc.)	1.00

Printing/Plotting

Color Prints (8½ x 11, 8½ x 14, 11 x 17)	0.50
Large-Format Color Plots (22 x 34, 24 x 36, etc.)	
Bond	2.00/sq. ft.
Photo Grade	4.00/sq. ft.

Other

Binding (dependent on size)	2.00-24.00
CD Holders	0.85
Tabs	0.50
Laminate Pocket Sheets	0.50

PROPOSAL FOR THE ELM CREEK WATERSHED MANAGEMENT COMMISSION CONSULTANT



August 30, 2019

Main Office:

3601 Thurston Avenue
Anoka, MN 55303
Ph: (763) 852-0479
Fax: (763) 427-0520
Contact: Shane M. Nelson
shanen@haa-inc.com

Prepared by:



August 30, 2019

Judie Anderson
Watershed Administrator, Elm Creek Watershed Management Commission
3235 Fernbrook Lane North
Plymouth, MN 55447

RE: Proposal for Elm Creek Watershed Management Commission Consultant

Dear Ms. Anderson:

Hakanson Anderson is pleased to respond to your request for proposals for the Elm Creek Watershed Management Commission Consultant. We have carefully selected a dedicated team that will provide the best combination of experience and flexibility available to assist the Commission. This team of energetic professionals are qualified and well suited to successfully accomplish the engineering and environmental services required and continually meet your expectations.

We understand that the work will consist of reviewing development plans and designs, providing technical guidance and recommendations, applying hydrology and water quality models, meeting attendance, and other miscellaneous design and environmental services as directed by the Commission.

Hakanson Anderson is committed to providing high quality cost-effective service to its' clients by maintaining low overhead rates. Our competitive billing rates are possible by maintaining high staff utilization and consistently managing our administrative, marketing, and other overhead costs.

The following list includes the three individuals that would provide a majority of the services under this contract.

Principal in Charge

Shane M. Nelson, Vice President
(763) 852-0479
shanen@haa-inc.com

Water Resources Engineer


Andrew Vistad, P. E.
(763) 852-0484
andrewv@haa-inc.com

Environmental Specialist

Kaci Fisher
(763) 852-0496
kacif@haa-inc.com

Once again, we appreciate the opportunity in providing you with our Proposal for the Elm Creek Watershed Management Commission Consultant. If you have any questions or need additional information please contact me at 763-852-0479.

Sincerely,
Hakanson Anderson


Shane Nelson, Vice-President

Qualifications and Experience - Section 1

Hakanson Anderson is a client-centered practice that provides professional consulting services in the areas of water resources, municipal and environmental engineering, land development, transportation engineering, and land surveying. We have provided these services to clients in the metropolitan area and outstate communities for over 40 years.

Founded in 1975, we established our office to give our clients personalized attention, timely response, and most importantly, cost-effective solutions. Solutions that meet project requirements, yet still fit within a budget, require ingenuity and expertise. We have a proven history in water resource management, municipal engineering, construction administration, and specialty consulting engineering. Many of our clients have been with us for over 20 years. A list of our routine Water Resource Engineering Services include:

- Development Review
- Total Maximum Daily Load (TMDL) Implementation
- Non-Degradation Modeling (P8)
- Ordinance Development
- NPDES Permitting
- Wetland Delineation
- Wetland Mitigation
- Wetland Monitoring
- Wetland Conservation Act Administration
- Wetland Management Plans
- Storm Water Management Plans
- Comprehensive Storm Water Plans
- Hydraulic and Hydrologic Analysis
- Erosion Control Monitoring



*Ardmore Area Subwatershed
Stormwater Retrofit Assessment*



Loretto Creek Water Quality Improvement Project

Qualifications and Experience - Section 1



Rum River Channel Restoration



City of Anoka Water Quality Structure

Our office has extensive experience in plan reviews, as we are the City engineers for multiple cities within the metro area. All of our engineers routinely review commercial and residential development plans for compliance with municipal ordinances, WCA regulations, NPDES requirements, SWPPP requirements, and planning studies.

Due to overall economic constraints, communities are left with inadequate revenue resources which continue to delay or defer necessary projects. Hakanson Anderson has been successful in assisting its clients by obtaining a wide variety of grant funds.



Otsego Creek Restoration

Qualifications and Experience - Section 1



Shane M. Nelson, P.E.

**Licensed Professional
Engineer
State of Minnesota #43381**

Shane Nelson, P.E., is proposed to be your Principal in Charge. Shane is a Vice President with the firm and has 20 years of experience in water resource and municipal engineering. **Shane will be solely responsible for the management and administration of all services required of Hakanson Anderson.** Shane has worked with numerous governmental clients assisting them with hydraulic and hydrologic design requirements for nearly 20 years.

Shane is actively involved with the MS4 program and regularly meets with MPCA staff to discuss our clients needs and concerns. He worked on the 2011 General Storm Water Permit workgroup, which helped to provide feedback and guide the MPCA as they wrote the 2013-2018 permit. Shane also regularly attends MS4 Stakeholder meetings and other pertinent training sessions to ensure our clients are well informed of current and upcoming stormwater regulations. He assists numerous clients with their Storm Water Pollution Prevention Programs, delivering sound and common sense advice.

Shane will be the main point of contact for contract related services, including preparing statements of work and fee estimates. Shane will oversee the work and services that Hakanson Anderson provides.



Andrew Vistad, P.E.

**Licensed Professional
Engineer
State of Minnesota #56235**

Andrew Vistad, P.E., is proposed to be your Water Resources Engineer. Andrew received his Bachelor of Science in Civil Engineering from North Dakota State University. He has 7 years of experience in water resource and municipal engineering with a focus in design for municipal development, stormwater modeling, preparation of stormwater management plans, and flood protection projects. He has utilized GIS software to process and analyze data to create exhibits for municipal development, stormwater modeling, and flood protection. Andrew is proficient in numerous hydrology and water quality models, including: HydroCAD, P8, PondNet, MIDS, Win TR-55, HEC-1, HEC-RAS, Qual2k, Rational Method Calculations, HY-8, and Autodesk Storm and Sanitary Analysis.

Andrew also has extensive experience in reviewing both residential and commercial development plans for compliance with applicable codes and planning documents.

Qualifications and Experience - Section 1



Kaci Fisher

Certifications:

- **Wetland Delineator
#1319**

Kaci Fisher is proposed to be your Environmental Specialist.

Kaci has over 5 years of experience in Wetland Delineation and Wetland Conservation Act (WCA) administration and applications. Kaci has her Masters Degree in Environmental Science. She works with local, state, and federal authorities and applicants on complex issues to resolve differences on technical issues relating to wetland and other environmental regulations.

Kaci is the Local Government Unit (LGU) contact pertaining to the Wetland Conservation Act for multiple cities and townships within four counties of the Twin Cities metropolitan area. She has attended Technical Advisory Committee meetings as a city representative for the Elm Creek Watershed and Pioneer-Sarah Creek Watershed.



Brent Larson, P.E.

**Licensed Professional
Engineer
State of Minnesota #45850**

Brent Larson P.E., is proposed to be a Design Engineer.

Brent has over 16 years of engineering experience working with municipal clients as the City of Otsego Assistant Engineer. He specializes in the review of residential and commercial plats, plans, and specifications to ensure all City and NPDES requirements are met. Brent also helps manage the City's MS4 program to ensure SWPPPs for various development and municipal projects are in compliance throughout a project.

Qualifications and Experience - Section 1



Tim Eggerichs, P.E.

**Licensed Professional
Engineer
State of Minnesota #43362**

Timothy Eggerichs, P.E., is proposed to be a Design Engineer. Tim has a Bachelor of Science in Civil Engineering and is a Licensed Professional Engineer. Tim is in his 20th year with Hakanson Anderson. Tim's focus over the past 20 years has been development of plans and specifications for a variety of improvement projects. He is proficient in several hydrology and water quality models, including: HydroCAD, MIDS, XP-SWMM, SHSAM, and Autodesk Storm and Sanitary Analysis.



Adam Thiele, P.E.

**Licensed Professional
Engineer
State of Minnesota #51317**

Adam Thiele, P.E., is proposed to be a Design Engineer. Adam will carry out specific assignments and complete the design of individual project elements. Adam received a Bachelors of Science from the University of Minnesota and is a Licensed Professional Engineer. Adam routinely carries out assignments from Project Managers, successfully implementing his analytical and technical skills to complete portions of an overall project. Adam will assist the Hakanson Anderson team in performing the duties as appropriate. He has successfully completed detailed design, plans, and specifications for numerous improvement projects.

Basis of Compensation - Section 2

Hakanson Anderson is flexible in customizing a compensation method and invoicing process that is preferable to the Elm Creek Watershed Management Commission. Our typical billing methods are discussed below.

A. Defined Scope of Work and Project Work

For services where the scope of work can be clearly defined and for project work a not-to-exceed method is preferred. This method would provide a maximum fee for services. The not-to-exceed cost would be developed based on the hourly rates discussed in this section. For these not-to-exceed services, a proposal letter would be prepared for approval by the Commission. We would invoice at our hourly billing rates with a maximum fee set by the approved proposal.

B. General Engineering Services

Hakanson Anderson typically utilizes an hourly billing method for providing and invoicing general engineering services and work that does not have a well defined scope. We also provide a billing rate “Maximum Cap” for the Principal Engineer. This allows senior personnel to be actively involved in the day-to-day Commission’s operations and projects.

Hakanson Anderson 2020 and 2021 Billing Rate Schedule	
<i>Job Classification</i>	<i>Hourly Billing Rate</i>
Shane Nelson - Principal Engineer	\$120
Andrew Vistad - Water Resources Engineer	\$92
Kaci Fisher - Environmental Specialist	\$87
Design Engineers	\$80-115
Clerical	\$65

For the years 2020 and 2021, the hourly billing rates for all service types by job classification are proposed as follows:

C. Reimbursable Expenses

We would invoice for Commission approved outside professional services, permit fees, and colored reproduction costs. We do charge mileage at the IRS approved rates for our project related visits. All other expenses are included in our hourly billing rates.

Hakanson Anderson 2020 and 2021 Reimbursable Expense Items	
Survey Equipment/Vehicles	No Charge
Computers	No Charge
Cell Phones/Long Distance Calls	No Charge
Routine Printing	No Charge
Postage and Faxed Documents	No Charge
Subconsultant Fees	Actual Cost
Outside Printing	Actual Cost
Permit and Regulatory Fees	Actual Cost
Color 8 1/2 x 11 Prints	\$0.25 per copy

D. Private Development Review

Reimbursable services would be provided to the Commission for meeting with private parties such as developers and reviewing developer proposed projects in the Elm Creek Watershed as directed by the Commission. We propose to bill these services in accordance with our standard 2020 and 2021 Billing Rate Schedule.

List of Client References for Hakanson Anderson

1. **City of East Bethel**

2241 - 221st Avenue N.E.
East Bethel, MN 55011-9631
(763) 367-7850

Contact Person:

Jack Davis, City Administrator



2. **City of Anoka**

2015 - 1st Avenue N.
Anoka, MN 55303
(763) 576-2781

Contact Person:

Greg Lee, City Manager



3. **City of Coon Rapids**

11155 Robinson Drive
Coon Rapids, MN 55433-3761
(763) 767-6465

Contact Person:

Mark Hansen, City Engineer



4. **City of Elk River**

13065 Orono Parkway
Elk River, MN 55330
(763) 635-1051

Contact Person(s):

Justin Femrite, P.E., Public Works Director



5. **City of Otsego**

8899 Nashua Avenue N.E.
Otsego, MN 55330
(763) 235-3173

Contact Person(s):

Jessica Stockamp, Mayor



7. **City of St. Michael**

11800 Town Center Drive NE
St. Michael, MN 55376
(763) 416-7931

Contact Person(s):

Steve Bot, City Administrator/Engineer



References - Section 3

8. **City of Independence**
1920 County Road 90
Independence, MN 55359
(952) 292-2458
Contact Person:
Mark Kaltsas, Planner/Administrator



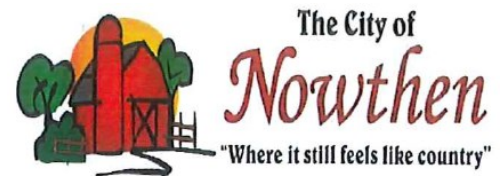
9. **City of Medina**
2052 County Road 24
Medina, MN 55340
(763) 473-4043
Contact Person:
Scott Johnson, Administrator



10. **City of St. Francis**
23340 Cree Street NW
St. Francis, MN 55070
(763) 235-2310
Contact Person:
Steve Feldman, Mayor



11. **City of Nowthen**
8188 199th Avenue NW
Elk River, MN 55330
(763) 441-1347
Contact Person:
Ellen Lendt, City Clerk



12. **Credit River Township**
18985 Meadow View Blvd.
Prior Lake, MN 55372-3128
(612) 986-8162
Contact Person(s):
Chris Kostik, Chairman





Technical Advisory Services

Elm Creek Watershed Management Commission

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Watershed Team

TEAM DEDICATED TO SUPPORTING ELM CREEK WATERSHED MANAGEMENT COMMISSION STAFF

Stantec is a global, full-service engineering firm of more than 22,000 employees, 4,000 of whom are dedicated to serving clients in the water industry. Locally, the Minneapolis office has expertise working with watershed districts and various municipalities throughout the Twin Cities metropolitan area and State of Minnesota, state agencies such as the Minnesota Department of Transportation (MnDOT), and other entities. Stantec's local experience, coupled with its resources nationally, enables Stantec to provide the top level of service to its clients and help the Elm Creek Watershed Management Commission solve the most unique of issues, by drawing upon national expertise within the company if needed. Together, we've managed major urban and suburban watersheds, provided innovative stormwater management projects, and implemented and managed stormwater/municipal separate stormwater system (MS4) programs throughout the country.

Stantec has assigned qualified and experienced watershed management personnel to serve as resources to the Elm Creek WMC. This team is dedicated to protecting, preserving, and managing surface and groundwater systems as urban growth and agricultural activity continue to occur within the watershed. In addition to the highlighted team below, we also have over 25 additional local water resources engineers and scientists to draw expertise from when needed.

We have included qualifications summaries below for our key staff members who will work with the Elm Creek WMC, and full resumes follow. Hourly rates are also provided.



Dan Edgerton, PE – Project Lead

As your project lead, Dan will be your primary point of contact. He will be the lead reviewer of development proposals and will attend Commission meetings as appropriate. He will also assign work to others on the team as needed for design and other additional services. Dan is a Senior Project Manager in the water resources group at Stantec's Minneapolis office. He has Bachelor's and Master's Degrees in Civil and Environmental Engineering and 37 years of experience in the profession. He has extensive experience reviewing site development plans and designs to evaluate drainage, hydrologic and water quality requirements, stormwater management, erosion and sediment controls, floodplain, wetland, shoreland, and natural resource preservation issues.

Hourly Rate: \$196/hour



Tyler Johnson, PE – Water Resources Engineer

Tyler will assist Dan in the work and serve as backup at meetings. Tyler is an experienced Professional Engineer with over eleven years of experience who has focused on assisting clients with green infrastructure designs including rain gardens, infiltration/filtration basins, tree trenches, stormwater ponds,

underground filtration trenches, iron-enhanced sand filters, and stormwater reuse tanks used for irrigation. Tyler has extensive experience in site design and review, water quality analyses and designs, hydraulic and hydrologic modeling, storm sewer designs, sanitary sewer designs and modeling, MS4 permitting, and construction observation. He is proficient in numerous design programs including XPSWMM, InfoSWMM, HEC-RAS, HydroCAD, MIDs, P8, AutoCAD, and ArcGIS.

Hourly Rate: \$175/hour



Peter Allen, PE – Water Resources Engineer

Peter will provide development review and design services as needed for the work. He has Bachelor's Degrees in Civil Engineering and Mathematics and more than eleven years of experience. His experience is focused in hydrologic and hydraulic modeling, site design, and environmental remediation and compliance. Peter has experience in water quality analyses and designs, hydraulic and hydrologic modeling, storm sewer designs, site design and review, and MS4 permitting. He is proficient in numerous design programs including XPSWMM, HEC-RAS, HydroCAD, MIDs, P8, AutoCAD, and ArcGIS.

Hourly Rate: \$166/hour



John Smyth – Bioengineering and Wetland Specialist

John is a water resource specialist with extensive experience in wetland, bioengineering and erosion control projects. His wetland experience includes inventories/evaluations, design, delineations, Wetland Conservation Act technical support, and wetland bank establishment. His bioengineering/erosion control experience is used to restore ravines, streambanks and lake shorelines. John's experience includes developing natural and structural stabilization solutions for areas impacted by erosion, including ravines draining to Seminary Fen in Chaska, Minnesota. He has designed solutions that have used vegetated crib wall and vegetated geogrids to create a natural appearance. John has completed wetland delineations and assessments for over 1,000 acres of wetlands across the Twin Cities metro area. He has also completed more than 500 acres of wetland design and restoration.

Hourly Rate: \$175/hour



Rob Monk, EIT – Water Resources Engineer

Rob serves as a water resources staff engineer for the water resources group. He works primarily with stormwater issues, including hydrologic and hydraulic modeling, bridge/culvert sizing, floodplain mapping, storm sewer design and catch basin spacing, as well as assisting in the design and review of various stormwater BMPs (Best Management Practices). Rob has extensive experience in stream assessment, streambank stabilization, ravine restoration, and wetland banking projects throughout Minnesota.

Hourly Rate: \$147/hour



Paul Bockenstedt – Ecologist

Paul is a restoration ecologist with over 20 years of experience in inventory, monitoring, management, and restoration of a wide variety of natural areas across the Upper Midwest. He also provides public and professional education and training on a variety of natural resource-related topics. Paul has conducted/managed on-the-ground work to restore a variety of natural communities in the upper Midwest including prairies, savannas, forests, and wetlands. He regularly works with communities and businesses, so that the natural resources within and outside of a particular property are managed in a manner that provides multiple benefits.

Hourly Rate: \$166/hour

Daniel Edgerton PE

Project Lead

EDUCATION

Master of Science, Civil and Environmental Engineering, University of Wisconsin, Madison, Wisconsin, 1982

Bachelor of Science, Civil and Environmental Engineering, University of Wisconsin, Madison, Wisconsin, 1980

Dave Rosgen & MnDNR, Applied Fluvial Geomorphology Training, Level I, Duluth, Minnesota, 2013

REGISTRATIONS

Professional Engineer #19206, State of Minnesota

PROJECT EXPERIENCE

Water Resources Technical Advisor, City of Chaska, Minnesota (Project Lead)

Dan serves as Technical Advisor to the Chaska City Engineer for water resources. In this role, Dan reviews site development plans and designs to evaluate drainage, hydrologic and water quality requirements, stormwater management, erosion and sediment controls, floodplain, and shoreland issues. He also coordinates John Smyth's work in reviewing the developments for wetland and natural resource preservation. Dan also leads stormwater design work for the City.

Northwest Expansion Area Watershed Study, Plymouth, Minnesota (Project Manager)

A surface water plan was prepared for a rapidly developing portion of the City. The plan addressed both water quality and quantity and provided technical details on the design of surface water facilities to handle the anticipated growth. HydroCAD, P8, and PondNet were used to model the system. In addition, design criteria and hydrologic parameters for new development were provided. The plan incorporated a philosophy of no net increase in stormwater impacts due to development.

Rum River Fishery Improvements, Milaca, Minnesota

A dam on the Rum River in Milaca was impeding fish passage and connectivity, causing habitat fragmentation. The dam impacted the downstream transport of suitable habitat elements such as sediment, water, wood, and other material. Milaca elected to remove the dam restore pool and riffle habitat and fish passage. Removing the dam helps the distribution of rare species, such as the creek heel splitter and black sandshell mussels that have been found within 1.5 miles of the site. A riffle was installed to change channel morphology characteristics of the stream by increasing the amount of stable substrate and creating wider and deeper pool areas. Riffles create important habitat and improve the

quality of the stream for sensitive fish by restoring flows to the center of the river and reducing flow velocities and erosion along the shoreline. Dan led the hydraulic design of the project.

Arctic Lake Iron-Enhanced Sand Filter, Prior Lake, Minnesota

Stantec worked for Scott County, in collaboration with the Shakopee Mdewakanton Sioux Community and Three Rivers Park District, to design trail and water quality improvements at Spring Lake Regional Park. As part of the work, Stantec provided stormwater design services to improve the quality of downstream Arctic Lake. Stormwater improvements included water level controls to increase the storage within an upstream wetland, thus increasing water quality treatment while also enhancing the wetland. The improvements also included an iron-enhanced sand filter to treat dissolved phosphorus in the wetland runoff prior to discharge into Arctic Lake. Dan led the design of the stormwater improvements.

Mississippi Watershed Management Organization NE Green Campus Sustainable Stormwater Management, Minneapolis, Minnesota (Project Manager)

Dan managed the NE Green Campus study, whose goals included: Developing low impact design approaches to manage the stormwater runoff in the area, which currently drains untreated to the Mississippi River; Fostering collaborative management of open space and stormwater among three affected government entities; Educating and involving the neighborhood residents and students and staff of Edison High School in the maintenance and management of the stormwater facilities. The centerpiece of the project is a stormwater reuse component. Stormwater is collected in underground storage and is then pumped to football fields at Edison High School for irrigation. This replaces the previous use of municipal potable water for this purpose. Educational signage is provided for this and other stormwater facilities that have been implemented on the site.

County Road 9/61 Ravine Stabilization, Plymouth, Minnesota (Project Manager)

This was a \$425,000 ravine stabilization project near Medicine Lake. Inadequate stormwater storage in the watershed led to excessive erosion along a 1,200-foot drainage way. The erosion was continuously contributing sediment and phosphorus to Medicine Lake and compromising the integrity of a road crossing and regional park trail. The project repaired the drainage way by re-grading the eroded channel and installing three flow-control weirs and stilling basins to slow flow and prevent future erosion. Water quality ponding, which provides additional holding capacity, was also constructed.

Tyler Johnson ^{PE}

Water Resources Engineer

EDUCATION

Bachelor of Science in Civil Engineering, North Dakota State University, Fargo, North Dakota, 2007

REGISTRATIONS

Registered Engineer #9374, State of North Dakota

Registered Engineer #51473, State of Minnesota

PROJECT EXPERIENCE

Sumter Avenue Underground Filtration Retrofit, New Hope, Minnesota

When the City received complaints from their residents about an overgrown detention basin that was difficult to maintain by City staff, they asked Stantec to find an alternative solution. Tyler was the lead stormwater engineer for the project that consisted of clearing the existing detention basin and designing an underground stormwater chamber system that would be able to convey as much water as the detention basin and provide additional water quality through filtering water through the system into drain tiles prior to discharging into the City's trunk storm sewer system.

Local Surface Water Management Plan and Ongoing Assistance, New Hope, Minnesota

Tyler currently assists the City with their site plan reviews, specifically the stormwater components for each project. Tyler works with the City so that developments comply with their Surface Water Management Plans and MS4 permits. Reviews include stormwater management plans, hydrologic models, storm sewer system calculations, proposed ponding, and proposed BMPs. As part of this work, Tyler has become very familiar with the City's stormwater goals and design standards and has strong relationships with the Engineering staff.

Northwood Lake Stormwater Improvements, New Hope, Minnesota

Tyler was the lead stormwater engineer for this stormwater project that will help reduce the pollutants entering

Northwood Lake. Tyler designed a series of stormwater BMPs that included a stormwater pond, a swirl chamber manhole, rain gardens, underground storage for stormwater reuse, and underground filtration trenches. The underground storage tank is designed to hold 160,000 gallons of water that will be pumped to nearby ballfields for irrigation purposes. When the tank is already full of water, there is an emergency outfall into a series of three rain gardens prior to entering Northwood Lake. A stormwater pond was also constructed on the west side of the lake adjacent to Jordan Avenue that collects backyard drainage and street runoff from Jordan Avenue, prior to discharging to the lake. The project treats stormwater runoff from approximately 110 acres that was previously untreated. An XPSWMM model was created to analyze this complex system to see how the storm sewer would function when the underground tank was empty and when it was full. This was done to verify no negative impacts were being created in the watershed. In addition to these improvements, street reconstruction and utility improvements also occurred in the Northwood Lake neighborhood.

MS4 Permit Implementation, Various Locations, Minnesota

Tyler lead our effort to assist approximately ten Minnesota communities in completing the implementation items identified in their approved SWPPP Documents. The communities had a one-year time frame in which to complete these items. The work included development of enforcement response procedures, stormwater webpage content, potential illicit discharge identification and prioritization, facilities inventory, program tracking, and staff training. Tyler continues to assist these clients in keeping their City's in compliance with their MS4 permits. This includes assisting in completing their annual reports, quantifying load reductions to meet their TMDL requirements, training public works staff on the MS4 permit, and reviewing development plans to ensure they are meeting the MS4 permit requirements.

Peter Allen^{PE}

Water Resources Engineer

EDUCATION

Bachelor of Science, Civil and Environmental Engineering, University of Wisconsin, Madison, Wisconsin, 1980

REGISTRATIONS

Certified Designer of Construction Stormwater Pollution Prevention Plans, State of Minnesota

Professional Engineer #50376, State of Minnesota

PROJECT EXPERIENCE

Stormwater Design Review, Spring Lake Park, Minnesota

Peter conducted a review of a development submittal in Park. The review included verifying the design followed City stormwater rules and that the design would not adversely affect the surrounding properties. This involved review of rate control and water quality treatment standards and direct communication with the developer's design engineers.

MS4 Permit Implementation, Various Communities, Minnesota

Peter assists in providing support to multiple Municipal Separate Storm Sewer System (MS4) communities in Minnesota to achieve the requirements of the current Minnesota MS4 General Permit and the City's Stormwater Pollution Prevention Plan (SWPPP). Tasks include pond assessments, annual reports, presenting at public meetings, and leading training for city staff.

Waseca Surface Water Management Plan, Waseca, Minnesota

Peter conducted XP-SWMM modeling for the Gaiter Lake watershed within the City of Waseca, which includes approximately one-third of the city's storm sewer system. The primary objectives of the project included the analysis of the existing storm sewer system to determine locations of high flood risk; analysis of the high water level of Gaiter Lake and evaluate its flooding impacts to the surround areas; and analysis of a proposed stormwater detention pond to study its effects to the flooding issues surrounding Gaiter Lake.

Medicine Lake Road and Winnetka Avenue

Stormwater Improvements, New Hope, Minnesota

Peter conducted the XP-SWMM modeling for the feasibility study of the Rosalyn Court area in the City of New Hope. This area has a history of flooding and measures to alleviate flooding were analyzed to install on-site flood mitigation measures. Coordination with neighboring cities and the watershed district was required.

Stormwater Pollution Prevention Plans*, Various Locations

Peter has participated in the development of various Stormwater Pollution Prevention Plans (SWPPP) for both industrial facility and construction sites. He also varied the compliance of industrial facility current SWPPPs in multiple states and helped determine if updates to the facilities SWPPPs were necessary.

Enclave Residential Development, New Brighton, Minnesota

Peter lead the stormwater permitting effort for watershed district approval for a new residential development. The design followed watershed district requirements for rate control and water quality treatment standards, as well as, analyzing the downstream wetlands for bounce and inundation period standards. Modification of an existing infiltration basin into a biofiltration feature required coordination with the developer, city and watershed district.

Bossen Field Park, Minneapolis, Minnesota

The project includes the redevelopment of a city park and features six softball fields, a new playground area, basketball courts, various open field areas, and new parking areas. Peter led the stormwater management analysis and design for meet both city and watershed districts rules for rate control, volume control and water quality.

Anthem on the Park, Chanhassen, Minnesota

Peter led the stormwater management design for a single family residential development with several stormwater management limitation. These limitations included low permeable soils, existing downstream flooding issues and proximity to existing wetlands. Peter worked with the city and developer to design a functional stormwater management system that fits in with the layout of the development as well as meets all of the City's requirements. The primary stormwater features were iron enhanced sand filters and filtration basins.

John Smyth^{WDC}

Wetland Specialist

EDUCATION

Bachelor of Science, Natural Resources, University of Wisconsin, Stevens Point, Wisconsin, 1992

Training, Wetland Plant Identification, St. Paul, Minnesota, 2010

Training, Wetland Soils and Hydrology, St. Paul, Minnesota, 2011

REGISTRATIONS

Certified Wetland Delineator #1044, State of Minnesota

PROJECT EXPERIENCE

Wetland Delineation and Permitting

While at Stantec, John has completed wetland delineations and assessments for over 1,000 wetlands that extend across 20 cities or watershed. This information was used for environmental review, permitting and natural resource management. John has helped clients secure and meet permit requirements for large complex projects that required Corps of Engineers and WCA permit approvals. Some of the larger projects include: Highway 494 reconstruction, Highway 41 reconstruction, Lake Julia Waterway Improvements, and CSAH 14 re-alignment. He completes all the utility permits, exemptions and post construction compliance for 10 municipal clients as well as the Metropolitan Council and other private projects.

Sauk River Park Wetland Restoration, Melrose, Minnesota

The wetland located in Sauk River Park was converted to a fish rearing pond in the 1950s. As part of the site conversion from a wetland to a fish rearing pond, the historic drainage was diverted into a large ditch that bypassed the site. This project involved wetland delineation, permitting, and design to restore 4.0 acres of wet meadow, 4.8 acres of shallow marsh, and 2.2 acres of upland prairie within this park setting in Melrose.

Wetland Ordinance and Inventory, Farmington, Minnesota

John developed the wetland report section of the Surface Water Management Plan and the Wetland Ordinance. John was LGU administering for the WCA and Wetland Ordinance for eight years and Stantec continues to serve in this role. Wetlands were inventoried and assessed for the functions and values related to floral diversity. The inventory was used to develop an ordinance for wetland protection, which included buffer, setback, and stormwater protection.

Stream Bank Stabilization

John has designed and managed many miles of stream bank stabilization. An example project is Bassett Creek in Golden Valley in which he was responsible for the design document, which included bioengineering techniques to reinforce the berm and adjacent creek banks around the pond with native plantings combined with field stone, live staking, and riffles segments

Luce Line Trail Wetland Restoration/Bank, Wayzata, Minnesota

John served as senior wetland scientist and project manager for this wetland restoration project that included restoration of wet meadow, shallow marsh, floodplain forest, and upland buffer. The project included an assessment to determine the wetland restoration potential, delineation, hydrologic analysis, and wetland bank application documents, as well as project specifications and construction documents to restore the hydrology and vegetative community of the wetland and surrounding upland. Stantec also completed the construction staking and construction observation.

Paumen Wetland Bank Mitigation, Maple Lake, Minnesota (Project Manager and Designer)

John served as project manager, planner, designer, and inspector for this wetland restoration. The wetland bank involved restoration of 19 acres of fully drained wet meadow. The project included wetland delineation, hydrologic analysis, and wetland bank application documents, as well as USDA project specifications and details, and construction documents to restore the hydrology and vegetative community of the wetland and surrounding upland. Stantec completed the construction staking, construction observation, on-the-ground vegetative restoration (seeding), as-built survey, and agency-required Annual Wetland Monitoring.

Wetland Inventories/Evaluations and Ordinance Development

John has completed wetland inventories and evaluations for over one dozen cities and watersheds. These inventories include assessing wetland functional values and stormwater sensitivity. In addition, he has assisted in the development of wetland policy/ordinances for the Cities of Farmington, Chanhassen, Carver, Sartell, Oak Park Heights, Orono, Carver, Dayton and Rockford. The wetland protection and buffer ordinances John has developed have involved extensive stakeholder input and public process.

Wetland Conservation Act/Ordinance Rule Compliance

John has extensive knowledge of the Wetland Conservation Act (WCA). He has served on the Technical Evaluation Panel and/or helped administer the WCA Rules and local wetland ordinances for several communities including the Cities of Chaska, Sartell, Orono, Medina, Carver, Rockford, Maple Lake and Wayzata.

Rob Monk^{EIT}

Water Resources Engineer

EDUCATION

Bachelor of Science, Watershed Hydrology and Management, University of Wisconsin, Stevens Point, Wisconsin, 2006

Bachelor of Science, Environmental Engineering, University of Wisconsin, Platteville, Wisconsin, 2009

Dave Rosgen & MnDNR, River Morphology & Applications Training, Level II, Stillwater, Minnesota, 2013

REGISTRATIONS

Engineer-In-Training, State of Wisconsin

Erosion and Stormwater Management Certification, University of Minnesota, Minnesota, 2013

PROJECT EXPERIENCE

Cedar River Watershed District Plan Reviews, Austin, Minnesota

This project was an ongoing arrangement with the Cedar River Watershed District to complete design/plan reviews for all proposed bridge/culvert projects with the District. The district was looking for increased technical support to review projects based on newly adopted District rules that became effective on December 1, 2011. Rob created a plan review checklist based on the District rules and he completed the design/plan reviews based on the hydraulic data submitted with each culvert/bridge permit application.

Forest Lake Surface Water Management Plan, Forest Lake, Minnesota

This project was an update to the existing Surface Water Management Plan (SWMP) for Forest Lake, MN, to match recent updates to watershed district rules and policies. The Rice Creek Watershed District and Comfort Lake-Forest Lake Watershed District recently updated their rules, thus the City of Forest Lake was required to update their SWMP to reflect the watershed district changes. Rob worked with Phil Elkin to analyze the updated watershed district rules and determine the necessary changes for the existing SWMP. He also updated existing figures and created new figures within the SWMP using ArcMap 10, GIS software.

Lilydale Park Improvements, St. Paul, Minnesota

Rob completed hydraulic analysis of various development scenarios using HEC-RAS. The analysis was used to complete a No-Rise Certificate, which demonstrates no increase in water surface elevation through the project area. This

project upgraded Lilydale Park along the Mississippi River through the addition of walking and biking trails and a pavilion/common area. It also included the creation of a 4' cap over a former dump site to meet MPCA standards.

Industrial Stormwater Permit Compliance, MVTA, Eagan, Minnesota

Stantec provides ongoing permitting and compliance services to the Minnesota Valley Transit Authority to satisfy the requirements of the Minnesota Pollution Control Agency NPDES Industrial Stormwater Permit. Stantec coordinated the permit application process, created a SWPPP to reflect existing site conditions, conducted water quality sampling, recommended best management practices to improve water quality, and updated the SWPPP to reflect BMP changes. Stantec also worked directly with MVTA staff on site to do training for both ESC and water quality sampling. Stantec has also coordinated compliance with Metropolitan Council Environmental Services as related to existing drainage easements adjacent to the facility.

Pipestone County Bridge Replacement, Osborne Township, Minnesota

Rob used HEC-RAS to hydraulically model no-bridge, existing conditions, and proposed conditions scenarios for the project. Using the model, he completed Hydraulic Data and Risk Assessment forms which are used to determine the required bridge opening and length. Upon preliminary plan completion, Rob compiled the materials to apply for the necessary permits including approvals from the MnDNR, U.S. Army Corps of Engineers, and the Pipestone County SWCD. This project entails replacement of a deficient, existing 5-span timber slab span bridge (L3605) with a 3-span concrete slab span bridge (No. 59544) in Pipestone County, MN. The bridge is located on CSAH 17 over the Rock River, S.A.P. 059-617-016.

Minnesota Pollution Control Agency – Biological Monitoring Intern*, St. Paul, Minnesota

Rob measured biological, physical, and chemical water quality using techniques including macroinvertebrate collection, water sampling, GPS navigation and plant surveys. Field work was supplemented with data entry utilizing spreadsheet programs and Microsoft Access. This experience expanded his knowledge of and skill in utilizing current field sampling techniques as well as demonstrated the importance of work done in an office environment.

Paul Bockenstedt^{PE}

Ecologist

EDUCATION

Training, Iowa Carex Workshop, Iowa State University, 2002

Training, Plants for Stormwater Design, Minnesota, 2005

Training, Calcareous Fens of SE MN, Minnesota, 2006

B.S. Environmental Sciences, University of Dubuque, Dubuque, Iowa, 1989

M.A. Biology, University of Northern Iowa, Cedar Falls, Iowa, 2002

REGISTRATIONS

Commercial Pesticide Applicator, State of Minnesota, General Ground and Rights-of-Way Categories

PUBLICATIONS

Presentation. "Seedling Identification in Wetland and Upland Buffer Restoration Projects". 4th Annual Minnesota Wetland Conference, St. Paul, MN, 2011.

Presentation. "Developing Grazing Plans for Remnant Prairie with Conservation as the Highest Priority". MN Native Plant Society Meeting, 2011.

Bockenstedt, P. Prairie Seedling & Seeding Evaluation Guide; 2nd Edition. Stantec, 2008.

Bockenstedt, P. Field Guide to Minnesota's Wetland & Buffer Plant Seedlings. MN Board of Water & Soil Resources, 2009.

PROJECT EXPERIENCE

Chaska Seminary Fen Wetland Restoration, Chaska, Minnesota

Design/Build of 10-acre seepage meadow, hydrologic, and wetland restoration project.

Environmental Assessment Worksheet, MCEs Victoria/St. Bonifacious Area Interceptor

Dodge County Roadside Prairie Inventory/Management

Natural Resource Inventories - Various Locations
Conducted natural resource inventories for communities, DNRs, watersheds, and Goodhue County totaling over 1,200 square miles in Minnesota, Iowa and Wisconsin.

Cedar Creek, Anoka County, Minnesota

Minnesota DNR, Prairie Stewardship Plan Creation for Private Landowners throughout Southern Minnesota, Minnesota

Kingswood Camp, Restoration and Management Plan, Minnetrista, Minnesota

County-Wide Natural Areas Inventory, Goodhue County, Minnesota
Project manager and primary plant ecologist for county-wide inventory of natural communities, rare plants, and sensitive resources (complementary to MCBS data).

Blaine Greenway Corridor Plan, Blaine, Minnesota

Old-growth Pine Forest Assessment, Silver Bay, Minnesota

Prescribed Fire Effects Monitoring Using NPS Rx 80 Methodology, Minnesota Valley SRA and Great River Bluffs State Park, Minnesota

Natural Area Inventories in Minnesota — Inver Grove Heights, Chaska, Red Wing, Savage, Roseville, Brooklyn Park, Lower Wells Creek Watershed, New Market Township, Rochester, Independence



1,300+ planners, designers, engineers, scientists and construction specialists managing water systems for communities across the world.

Project Summaries

COUNTY ROAD 9/61 RAVINE EROSION REPAIR – PLYMOUTH, MINNESOTA



A 72-inch RCP discharged to this site with minimal rate control in the upstream watershed. For several years erosion had been occurring along the 1,100 linear foot drainage way east

of County Road 61 between County Road 9 and 42nd Place North. The channel did not have the capacity to handle the flows it received. Lack of capacity combined with the channel's steep gradient resulted in downcutting and lateral erosion.

The erosion left steep unstable slopes and channel bottom that continually contributed sediment downstream causing blocking in the County 9 culvert and sedimentation of a downstream wetland. We reviewed several alternatives including:

- Creating stormwater ponding for rate control on-site
- Installing a storm sewer pipe to replace the channel
- Reshaping the channel to develop a stable cross-section
- Implementing bioengineering techniques
- Armoring with rip rap and grade control techniques
- Implementing a combination of these techniques to eliminate the unnatural erosion occurring within the channel

The approach chosen was the most cost-effective, aesthetically pleasing approach and reduced the risk to the users of the park trails adjacent to the ravine. It involved raising the stream bottom, reducing the slope of the stream with weirs and taking much of the energy of the ravine out with plunge pools located immediately downstream of the weirs. The channel bottom was graded to a more gradual slope and stabilized using live stakes, native seeding and shrub plantings.

MINNEAPOLIS NORTHEAST GREEN CAMPUS STORMWATER FEASIBILITY STUDY – MISSISSIPPI WATERSHED MANAGEMENT ORGANIZATION

The NE Green Campus area includes Jackson Square Park, Thomas A. Edison High School, and a flood mitigation basin. The goals of the NE Green Campus study included:

- Developing low impact design approaches to manage the stormwater runoff in the area, which drained untreated to the Mississippi River
- Fostering collaborative management of open space and stormwater among three affected government entities
- Educating and involving the neighborhood residents and students and staff of Edison High School in the maintenance and management of the stormwater facilities

As part of the study, a number of stormwater options were developed: collecting stormwater for reuse as irrigation; redirecting roof drains to rain barrels and grassy areas; installing permeable pavers or pavement; installing tree trenches in boulevards and the high school parking lot; placing prairie plantings within the flood mitigation basin; and replacing some existing paved boulevards with pervious surface.

The centerpiece of the project is the stormwater reuse component. Stormwater is collected in underground storage adjacent to the high school gym and pumped to football fields at Edison High School for irrigation. This replaced the previous use of municipal potable water for this purpose.

An extensive program of neighborhood involvement was performed, including an open house, an onsite presentation and cookout, and a presentation to the local neighborhood association. This garnered strong interest in and support for the project.



RUM RIVER FISHERY IMPROVEMENTS – MILACA, MINNESOTA

A dam on the Rum River in Milaca was impeding fish passage and connectivity, causing habitat fragmentation.



The dam impacted the downstream transport of suitable habitat elements such as sediment, water, wood, and other material. Because natural sediment transport was impeded by the dam, unnaturally high sedimentation rates were occurring upstream.

Milaca elected to remove the dam and established additional project objectives to restore pool and riffle habitat and fish passage.

Removing the dam is anticipated to help the distribution of rare species, such as the creek heel splitter and black sandshell mussels that have been found within 1.5 miles of the site.

A riffle was installed to change channel morphology characteristics of the stream by increasing the amount of stable substrate and creating wider and deeper pool areas. Riffles create important habitat and improve the quality of the stream for sensitive fish by restoring flows to the center of the river and reducing flow velocities and erosion along the shoreline.

Native vegetation was used for restoration work along the shoreline. The project required close coordination with the Minnesota Department of Natural Resources and the Mille Lacs County Soil and Water Conservation District.

NORTHWOOD LAKE STORMWATER IMPROVEMENTS, NEW HOPE, MINNESOTA

The City of New Hope and the Bassett Creek Watershed Management Commission teamed up on this regional stormwater project that will help reduce the pollutants entering Northwood Lake. Stantec, the City's engineering consultant, designed and prepared plans and specifications for a series of stormwater BMPs that included a stormwater pond, a swirl chamber manhole, rain gardens, and underground storage and stormwater reuse. The underground storage tank is designed to hold 160,000 gallons of water that will be pumped to nearby ballfields for irrigation purposes. The swirl chamber manhole will act as a pretreatment device before the

stormwater enters the underground storage tank. In the situation where the tank is already full of water, there is an emergency outfall into a



series of three rain gardens before entering Northwood Lake. A stormwater pond was also constructed on the west side of the lake adjacent to Jordan Avenue that collects backyard drainage and street runoff from Jordan Avenue, prior to discharging to the lake. The project treats stormwater runoff from approximately 110 acres that was previously untreated.

ARCTIC LAKE IRON-ENHANCED SAND FILTER – PRIOR LAKE, MINNESOTA

Spring Lake Regional Park consists of 373 acres of maple-basswood and oak forests, wetlands and prairie areas. Stantec worked for Scott County, in collaboration with the Shakopee Mdewakanton Sioux Community and Three Rivers Park District to design trail and water quality improvements at Spring Lake Regional Park. As part of the work, Stantec provided stormwater design services to improve the quality of downstream Arctic Lake. Stormwater improvements included water level controls to increase the storage within an upstream wetland, thus increasing water quality treatment while also enhancing the wetland.



The improvements also included an iron-enhanced sand filter to treat dissolved phosphorus in the wetland runoff prior to discharge into Arctic Lake. Stantec provided wetland inventory, stormwater modeling, and preliminary and final design of the improvements.

Other park amenities designed by Stantec include a 10-acre off-lease dog park, self-composting restroom, parking, lighting, and access control.



Fee Schedule

2019 RATE SCHEDULE

Classification	Range		
Senior Principal	\$ 196.00	-	\$ 232.00
Principal	\$ 185.00	-	\$ 216.00
Specialist*	\$ 185.00	-	\$ 240.00
Project Manager	\$ 147.00	-	\$ 196.00
Senior Engineer Scientist Architect Landscape Architect Planner	\$ 158.00	-	\$ 196.00
Architect Landscape Architect	\$ 126.00	-	\$ 224.00
Land Surveyor	\$ 126.00	-	\$ 158.00
Engineer Planner Scientist	\$ 116.00	-	\$ 166.00
Designer GIS Landscape Designer Graphics Senior Technician	\$ 116.00	-	\$ 196.00
Engineering Technician	\$ 116.00	-	\$ 158.00
Project Technician	\$ 92.00	-	\$ 126.00
Field Supervisor	\$ 137.00	-	\$ 196.00
Crew Chief	\$ 116.00	-	\$ 175.00
Inspector	\$ 92.00	-	\$ 158.00
Survey Technician	\$ 92.00	-	\$ 116.00
GPS Survey Equipment			\$ 38.00
Total Station Equipment			\$ 28.00
GIS Workstation Equipment			\$ 22.00
GPS Sub meter Unit (per use)			\$ 80.00
Flow Meter (per week)			\$ 200.00
Air Detection Equipment (per half day)			\$ 25.00

*Specialist: Experts in highly technical disciplines including Principal Planner, Market Analyst, and Certified Industrial Hygienist

These rates are adjusted annually in accordance with the normal review procedures of Stantec.



RESPONSE TO REQUEST FOR PROPOSAL

EVALUATIONS OF
SITE DESIGNS FOR
DEVELOPMENT
PROPOSALS

August 30, 2019

Address to:

**ELM CREEK WATERSHED
MANAGEMENT COMMISSION**
3235 Fernbrook Lane
Plymouth, MN 55447



August 30, 2019

Mr. Doug Baines

Chair
Elm Creek WMO
3235 Fernbrook Lane N
Plymouth, MN 55447

RE: Request for Qualifications for Site Design Evaluations

Dear Mr. Baines:

Wenck is pleased to submit our qualifications to assist the Elm Creek Watershed Management Organization (ECWMO) with professional watershed and water resource engineering/ professional/ technical services. We are committed to providing ECWMO with the highest level of quality and service, helping you achieve your Management Plan objectives and serve the communities within the watershed.

We understand that your primary need is assistance with evaluating site designs for development proposals within the watershed for compliance with your Watershed Management Plan. You also desire to have technical representation at your regular and TAC meetings. You also may have the occasional need for technical assistance in the preparation of your Capital Improvements Program (CIP), hydrologic and hydraulic modeling, grant writing, etc.

We have assembled an exciting team that bring significant experience and knowledge to your table. Our team is led by Diane Spector, with project reviews led by Lisa Tillman, PE. Both Diane and Lisa have extensive experience serving watershed organizations as well as cities and counties. We have partnered with Rebecca Carlson, PE of Resilience Resources to prepare project reviews in the two cities where we are City Engineer. Wenck also has a deep bench of water resources scientists and engineers, biologists and ecologists, and landscape architects to provide a full suite of services should you have need.

The enclosed Statement of Qualifications provides an overview of our experience and expertise. We can provide the following unique qualifications to the ECWMO:

Knowledge of Watershed - Wenck has worked with the ECWMO to prepare your Third Generation Watershed Management Plan and with Three Rivers Park District to prepare your TMDLs and WRAPS. We know your watershed. We have also worked with cities in the ECWMO to complete improvement projects, including stream restorations on Elm Creek.

Water Quality Emphasis - Wenck is deeply involved in protecting and improving water resources not only in Minnesota, but nationally. We have completed more TMDLs than any other consultant in Minnesota. More importantly, we have continued to work with our clients as they implement those plans, and have helped our clients achieve lake and stream Impaired Waters delistings.

Mr. Doug Baines
Chair
Elm Creek WMO
August 30, 2019



Highly Collaborative Partnership - Our style is highly collaborative – we serve as *your* staff. Effectively communicating with our clients is an essential component of our approach. While we have identified a core team of people to serve you, any one of our nearly 300 team members are available based on your needs.

We are excited about expanding our relationship with ECWMO and look forward to the next steps in this process. Should you have any questions or concerns, please contact me at dspector@wenck.com or 763-252-6880.

Sincerely,

A handwritten signature in black ink, appearing to read 'Diane Spector', with a stylized flourish at the end.

Diane Spector
Senior Water Resources Planner/Principal

COMPANY BACKGROUND

Year established: 1985

Professional disciplines:

Environmental
Engineering
Response

Legal status: Corporation

Ownership: ESOP

Size: 300+
employee-owners

Locations:

- Golden Valley, MN
- Woodbury, MN
- Maple Plain, MN
- Windom, MN
- New Hope, MN
- Duluth, MN
- Fargo, ND
- Mandan, ND
- Roswell, GA
- Fort Collins, CO
- Denver, CO
- Sheridan, WY
- Cheyenne, WY

Markets:

- Food & Agriculture
- Manufacturing
- Power & Utilities
- Metals
- Mining
- Government
- Oil & Gas
- Real Estate
- Transportation
- Sports & Recreation
- Education
- Waste Management
- Water Resource Management



About Us

Wenck is a 100 percent employee-owned consulting enterprise that was founded 30+ years ago and now features 13 branch offices in five states strategically located around the country.

We are a united team of engineers, scientists, consultants, hazardous materials specialists, and construction professionals prepared to deliver the outcome you need. We are known and trusted for our technical excellence, and our experienced team can help manage every aspect of your most complex projects. Working jointly with all stakeholders, we are your **responsive partner** committed to producing **exceptional outcomes** for your organization.

We have over 1,000 clients in 49 states and four foreign countries. Our clientele includes many Fortune 500 companies, small-to-medium-sized manufacturing businesses, financial institutions, law firms, K-12 school districts, and government entities.

COMPANY BACKGROUND (CONT.)

Our partner, Resilience Resources, LLC was founded by Rebecca Carlson, in 2018. At Resilience Resources, we believe resilience in the natural and built environment is critical to health, well-being and prosperity for all. This belief drives our purpose: to support local, state and federal governments and private clients in cultivating resilience and managing risk through our expertise in planning, facilitation, science and engineering. We help our clients develop and achieve water, natural resource and infrastructure goals, develop partnerships and measure and communicate outcomes across stakeholders for the greater good.



Services:

- Permitting and Development Review
- Water Resources Engineering
- Hydrologic and Hydraulic Modeling Solutions
- Water Quality Modeling
- Design and Implementation for Water Quality
- TMDL /OWOP
- Planning & Facilitation

OUR SAFETY COMMITMENT

Wenck maintains a comprehensive safety and health program that includes roles and responsibilities, specific goals and objectives, policies and procedures. The details of the program are contained in a comprehensive Health and Safety Manual. The safety program is managed by the Corporate Safety Manager and fully supported by company leadership.



All field employees complete monthly safety training. Topics include, but are not limited to, Hazard Communication, slips, trips and falls, ergonomics, heat stress, cold stress and defensive driving. Select employees receive HAZWOPER or HAZTECH training and annual refresher training.

Wenck's Corporate Safety Manager, Patrick Kinney, is a Certified Industrial Hygienist (CIH) and holds a Masters of Public Health degree, Industrial Hygiene emphasis. Several employees are Certified Hazardous Materials Managers (CHMM). Select employees have OSHA 10 and OSHA 30 construction certificates and HAZWOPER certificates.

RESPONSIVE PARTNER. EXCEPTIONAL OUTCOMES.

Regardless of the project, Wenck has one goal: providing ECWMO with the best possible service to meet your needs. To that end, this Statement of Qualifications will demonstrate how we can further our relationship while assisting you to reach your goals. When it comes to Water Resources Engineering, Planning, and Management related to surface water and natural resources, Wenck is a leader. We serve over a dozen water management organizations in Minnesota, as well as numerous other water management organizations, counties, and municipalities. Our work in Minnesota has been nationally recognized for innovation by our peers.

Wenck has designated a project team for ECWMO consisting of engineers and scientists who are well-acquainted with the diversity of tasks involved in regulatory practices and project/permit reviews. Our 30 years of experience in this arena means you will receive strategic advice with respect to water regulations such as Minnesota Rules, the Clean Water Act (CWA), the Wetland

COMPANY BACKGROUND (CONT.)

Conservation Act (WCA), the National Pollutant Discharge elimination System (NPDES) rules and associated Minnesota General and Construction Permits, and watershed rules. Our surface water expertise includes the full range of services from diagnostic studies, concept planning, final design to construction. We also provide an array of groundwater services ranging from modeling to sampling to pollutant remediation.

As evidenced by the awards listed below, Wenck has a history of providing award-winning services to our clients on innovative Water Resources Projects. Wenck is effective and experienced with permitting so that proven and innovative designs move forward toward construction. Wenck is rated #135 in the 2019 ranking of Engineering News-Record (ENR) Top 200 Environmental Firms.

During our 30 year history, we have been fortunate to serve as the engineer for five watershed districts that were named the Watershed District of the Year by the Minnesota DNR (Minnehaha Creek, Coon Creek, Sauk River, Prior Lake-Spring Lake, and Pelican River).

<i>Award-winning Water Resources Projects</i>					
American Consulting Engineers Council (ACEC)		Consulting Engineers Council of Minnesota (CECM)		Minnesota Society of Professional Engineers (MSPE)	
2016	Honor Award, ACEC Cottageville Park City of Hopkins Comprehensive Water Resources Management Plan				
2010	Grand Award, ACEC Endangered Topeka Shiner Habitat Conservation	1999	Honor Award, CECM Long Lake Watershed Restoration Project	1993	Seven Wonders of Engineering Award, MSPE Fast-Track Air Permitting
2009	Honor Award, ACEC Metro Metals Underground Stormwater System	1996	Honor Award, CECM Cedar Lake Restoration	1992	Seven Wonders of Engineering Award, MSPE Lake Chain Restoration
2009	Honor Award, ACEC MW Stormwater Management System	1990	Honor Award, CECM Flood Control in Minneapolis		
2008	Honor Award, ACEC Minnehaha Creek Watershed District Comprehensive Water Resources Management Plan	1989	Honor Award, CECM Stream Reclamation for Oil Spill		
2007	Honor Award, ACEC Biorestitution of the Prior Lake Channel	1987	Honor Award, CECM Flood Control on Chain of Lakes		
2005	Grand Award, ACEC Grand Rapids Environmental Outreach Program				
Other Awards					
2001	Governor's Award for Environmental Excellence – Minneapolis Chain of Lakes Restoration – Clean Water Partnership				
2001	Environmental Initiative Award by Minnesota Environmental Initiative				

RELATED WORK/PROJECTS/CLIENTS

MN WATER ORGANIZATIONS SERVED BY WENCK

Wenck currently provides water resources and civil/municipal engineering to the following clients:

Watershed Organizations

- Capitol Region Watershed District
- Minnehaha Creek Watershed District
- Coon Creek Watershed District
- Shingle Creek Watershed Management Commission
- West Mississippi Watershed Management Commission
- Rice Creek Watershed District
- Carver County Watershed Management Organization
- Pelican River Watershed District
- Clearwater River Watershed District
- Sauk River Watershed District
- Middle Fork Crow River Watershed Management Organization

Municipalities

- Minneapolis
- St. Paul
- Eden Prairie
- Woodbury
- Chanhassen
- Eagan
- Dayton
- Corcoran
- Delano
- Fort Dodge, IA
- Ames, IA
- Dubuque, IA
- Davenport, IA

Counties

- Washington
- Dakota
- Hennepin
- Carver

Other

- Metropolitan Council Environmental Services
- Metropolitan Airport Commission



KEY PERSONNEL

YOUR TEAM

Wenck proposes a core team of highly experienced water resources and watershed management professionals to meet your various needs. Project manager and your primary contact person will be Diane Spector. As author of your Third Generation Watershed Management Plan, she is very familiar with the watershed, your Commission and TAC, and your goals and policies. A water resources scientist and planner, she has worked closely with other WMOs and cities to help them meet their TMDL and NPDES goals and obligations, whether through development and redevelopment or improvement projects. She is ready to provide you with strategic advice as you implement your Plan. She is also highly skilled at obtaining grants, having secured over \$4 million for the Shingle Creek WMO and over \$1 million for other clients.

As lead project reviewer, Wenck proposes Lisa Tillman, an experienced watershed engineer. While working with another firm, Lisa conducted development reviews for projects within the Brown's Creek Watershed District, Rice Creek Watershed District, Middle Fork Crow River Watershed District, and the Comfort Lake-Forest Lake Watershed, all of which as part urban, part rural/agricultural. Ed Matthiesen will serve as senior reviewer and provide QA/QC.

Wenck serves as City Engineer for the cities of Dayton and Corcoran. To avoid any potential conflict of interest, we have partnered with Rebecca Carlson of Resilience Resources to complete development reviews in those cities. Wenck and Resilience have seamlessly partnered on other projects, and we know each other well. Rebecca has served as Watershed Engineer for the Clearwater River and Sauk River Watershed Districts, and brings a wealth of knowledge about agricultural practices and BMPs.



Diane Spector | *Project Manager*

Diane has a diverse twenty-plus year background in water resources management, project planning and management, environmental policy, municipal public works operations, and planning and analysis. Her experience includes watershed and local water management plans, stream assessments, stream stressor identification studies, total maximum daily load (TMDL) studies, development reviews, project management, educational program development, and public participation planning, in addition to several years as a Twin Cities Suburban Public Works Director. As a project manager for the Shingle Creek WMO, Diane has secured nearly \$3.5 million in implementation grants and \$875,000 for TMDLs, special studies, and research projects. Diane assisted the Elm Creek WMO in the completion of its Third Generation Watershed Management Plan, including a revision to the Commission's Rules and Standards. She also assisted Three Rivers Park District with the completion of the watershed-wide TMDL and WRAPS studies and secured a Clean Water Fund Grant for and managed the Rush Creek Headwaters Subwatershed Assessment.

KEY PERSONNEL (CONT.)



Lisa Tilman, PE, LEED AP | *Water Resources Engineer*

Lisa has fourteen years of experience focused on helping government agencies conduct watershed and sustainability planning, develop and implement standards and rules for water resource protection and improvement, and evaluate and implement projects that protect and improve water resources. Experience includes managing and conducting watershed and sustainability planning, surface water quality analysis, stormwater permit reviews, hydrologic modeling, facilitating public input, presenting scientific information to technical and public audiences, and analyzing technical data to guide decision making.



Rebecca Carlson, PE | *Water Resources Engineer, Resilience Resources*

Rebecca has provided engineering services to watershed-based clients in Minnesota for over almost 20 years. She brings her proven track record of achieving measurable water quality improvements in lakes and streams through design and implementation, especially in rural and agricultural watersheds. She understands both the big picture and the engineering details. She knows that successful watershed organizations lay the groundwork for success: As District Engineer for the Clearwater River Watershed District she secured grants to conduct the first watershed-wide TMDL studies in Minnesota. After finalizing TMDLs and implementation plans, she went on to secure over \$3 million in grant dollars for implementation in the past 10 years; she has helped the District complete implementation of their 10-year plan, achieving significant and measurable water quality improvements. Her Clearwater River Targeted Fertilizer Application Project won the 2014 Watershed Program of the Year award from the Minnesota Association of Watershed Districts.



Ed Matthiesen, PE | *Senior Review*

Ed has 30 years of extensive experience in water resources and environmental engineering. His water resources experience includes being the District Engineer for three Twin Cities area watershed districts and four Joint Powers Associations, writing municipal comprehensive stormwater plans, outlet structure and storm sewer design, conducting evaporation studies, aquifer analysis, water quality protection plans, developing computer hydrologic and hydraulic models, as well as the design and construction of lift stations. In addition, Ed has experience in biological sampling techniques, virus isolation in surface runoff, and chemical modeling of leachate.



WATER RESOURCE SERVICES

Wenck guides our clients based on the insight and expertise we derive from understanding the balance between all the demands on water. We know water. Communities need water. Business needs water. People need water. Clean water is critical to environmental and human health. We are known and trusted for our award-winning and forward- thinking, practical and visionary water solutions.

Services:

- Water Resources Engineering
- Water & Natural Resources
- Modeling
- Wetlands
- Agricultural Drainage
- Ecological Assessment, Management, & Restoration
- Watershed Planning
- Stormwater Management
- Stream Restoration & Remeandering
- Water Quality & Quantity Monitoring Watershed
- District/WMO Engineering
- Water Resources Permitting & Compliance
- TMDL Studies & Implementation/One Water One Plan/WRAPs

WATER SUPPLY

Wenck understands the importance of a clean water supply. We help our clients secure, design, build, protect, and monitor their water supply. We have experience with surface and groundwater supply sources, treatment plants, storage tanks, and pumping and distribution systems. We have successfully completed surface water dams and reservoirs, intakes, infiltration galleries, water wells, well field expansions, and hydrogeologic studies, among many other water supply projects.

Services:

- Hydropower
- Dam & Reservoir Design
- Water Rights
- Water Reuse

WASTEWATER

Wenck knows that the generation of wastewater is an inevitable result of daily life and industrial processes. We help our clients protect public health and the environment while maintaining regulatory compliance.

Services:

- Planning & Design
- Building
- Monitoring
- Grant Writing

WATER RESOURCE PERMITTING

Wenck has developed a strong reputation with Minnesota watershed organizations for our ability to effectively develop, implement, and oversee water resource permitting programs. Wenck understands the importance of effective permit programs, which is why we emphasize timely response to applicants, develop innovative solutions, and effectively communicate with both applicants and Commissioners to meet Watershed goals.

Collectively, the Wenck project team undertakes approximately 500 development reviews annually for our watershed clients. Our staff performs the primary technical review of rate control and water quality treatment detention facilities, infiltration Best Management Practice implementation, hydrologic structure design, and erosion and sediment control measures required in developing areas. Five Wenck staff are certified erosion control experts.

CAPITOL REGION WATERSHED DISTRICT PERMIT ENGINEER

Wenck has had a successful relationship with Capitol Region Watershed District (CRWD) since 2005, when we assisted CRWD with its Rulemaking Study. Since that time, we have served as CRWD's Permit Engineer as well as supported construction inspections. Wenck annually reviews our CRWD permitting process and costs. We discuss methods to improve and streamline the permitting process both internally and with CRWD staff. We also regularly evaluate the cost of permit reviews and have found the average permit review cost has been relatively unchanged since 2010.

COON CREEK WATERSHED DISTRICT

For 20 years, Wenck staff has been reviewing permits for the Coon Creek Watershed District. We review approximately 200 permits per year and provide assistance and direction in meeting the District's rules on rate, water quality, easements, erosion control, and floodplain management.

We typically assist applicants in hydrologic review by providing the District's HydroCAD and XP-SWMM models. Meetings with applicants occur frequently and are encouraged by the District so the rules and goals are well communicated. Wenck has set up an accounting system to record professional time spent on a project. This time is then charged to cover the costs of the permit program.

SHINGLE AND WEST MISSISSIPPI WATERSHED MANAGEMENT COMMISSIONS

The Commissions have project review programs that annually review 20-30 projects for compliance with the rules and standards. Wenck staff reviews the projects for meeting rate, water quality, floodplain, erosion, and infiltration and buffer requirements. Wenck staff frequently meets with applicants before submittals so that the rules are well understood. We annually review the cost of the project review program and adjust fees so the program is self-supporting.

WATER RESOURCE PERMITTING (CONT.)

MINNEHAHA CREEK WATERSHED DISTRICT

As the District Engineer for Minnehaha Creek Watershed District since 1992, Wenck is intimately familiar with the District's regulatory program and creating an adaptive management approach to implementation. During our time with the District, Wenck staff has assisted in every revision of the District rules, which have continually adapted to the needs of the watershed. The rules have adapted to include volume management, urban redevelopment, buffer implementation and baseflow enhancement.

Our staff works side-by-side with staff for reviews of permit applicants, assisted with permit negotiations, and served as interim regulatory manager. Wenck has assisted the District on over 5,000 permits. By working collaboratively with District staff and permit applicants we have been able to develop innovative solutions to achieve the District's goals.

SAUK RIVER WATERSHED DISTRICT

Since 2002, Wenck has assisted the District with their permit program. Wenck provides strategic advice as permit engineer to help the District reach its water quality goals. We participate in pre-application meetings or telephone calls to assist applicants interpret standards and design projects to gain permit approval. We provided significant guidance during the rules process in 2007 and assist District staff in preparing and presenting information to the board of managers.

PELICAN RIVER WATERSHED DISTRICT

Wenck has served as the permit review engineer for PRWD since 2003. We perform the primary technical review of rate control and water quality treatment detention facilities, hydrologic structure design, and erosion and sediment control measures required in developing areas. At the request of District staff, Wenck conducted a BMP seminar for local engineering firms. The purpose of the seminar was to educate local firms of emerging technologies and design methods to satisfy common stormwater management regulations.

WETLAND CONSERVATION ACT ADMINISTRATION AND LOCAL GOVERNMENT UNIT (LGU) REPRESENTATIVE

Wenck has assisted a number of cities and watershed districts with the administration and enforcement of the Wetland Conservation Act (WCA). Wenck works with the MN Board of Water and Soil Resources (BWSR) to administer WCA rules and distribute the necessary Notices for projects in and adjacent to wetlands in each unit of government. Wenck reviews wetland delineations to ensure that they are conducted accurately according to the 1987 Army Corps of Engineers Manual and Regional Supplements. Wenck participates in pre-application discussions to assist applicants with the interpretation of WCA and other wetland regulations. Wenck also coordinates Technical Evaluation Panel (TEP) meetings to facilitate the review and approval of applications.

Wenck administers WCA in the City of Delano, City of Dayton, and Shingle Creek-West Mississippi Watershed Management Organizations and also provides technical assistance with WCA applications to a number of additional cities and watershed districts. Although the ECWMO will no longer be serving as an LGU for WCA, our staff knows Wetland Conservation Act rules, so we can assist with Technical Evaluation Panels or if projects trigger WCA and Corps of Engineers permits.

WATERSHED AND LOCAL WATER MANAGEMENT PLANNING

Wenck has completed over 50 Watershed and Local Water Management Plans in Minnesota, including multiple generations of plans for some clients ranging from agricultural watersheds in greater Minnesota, Metro-area urban watersheds, and a watershed in the Boundary Waters Canoe Area Wilderness. We have also completed several Watershed Restoration and Protection Strategy (WRAPS) reports, integrating TMDL results with more detailed protection and restoration implementation plans. The list below illustrates some of our more recent efforts.

Additionally, Wenck staff has compiled natural resource inventories using state-of-the-art techniques including Indexes of Biological Integrity (IBI's), GIS and MnRAM. Recent examples include natural resource plans for Burnsville, Hanover, Cloquet, Eden Prairie, and St. Cloud, and the Minnehaha Creek Watershed District's innovative Ecosystem Evaluation Program (E-Grade), which will form the backbone of the District's next watershed management plan.

Pelican River Watershed District Water Management Plan. In Process.

City of Chanhassen 3rd Generation Surface Water Management Plan. Wenck updated hydrologic and hydraulic modeling for the City of Chanhassen, and updated the Plan to integrate TMDL and UAA plans, a revised implementation plan and a capital improvement plan

City of Inver Grove Heights 4th Generation Local Water Management Plan. Updated models for seven subwatersheds and prepared a limited update to incorporate new watershed requirements, updated data, and housekeeping revisions.

Elm Creek Watershed Management Commission Third Generation Watershed Management Plan. 2015. The Elm Creek Plan incorporated the findings of the Elm Creek Watershed WRAPS, including more stringent development Rules and Standards; identification of agricultural priority areas for more detailed subwatershed assessments and BMP implementation; systematic process for surveying stream condition and undertaking streambank restoration projects; and establishing a more detailed Capital Improvement Program and Cost Share program.

Pioneer-Sarah Creek Watershed Management Commission Third Generation Watershed Management Plan. 2015. The Pioneer-Sarah Plan focused on incorporating lake TMDL implementation policies and practices into the Plan; developing an enhanced routine monitoring program; and identifying key communication and outreach messages and stakeholders.

Eagan-Inver Grove Heights Watershed Management Commission Watershed Management Plan. 2015. This new joint powers WMO is unique in that it is almost entirely comprised of one city. The Plan focused on identifying a role for the joint powers organization: providing communication and outreach about water resources issues, and providing coordination and oversight.

WATERSHED AND LOCAL WATER MANAGEMENT PLANNING (CONT.)

City of Eden Prairie Local Water Management Plan. 2015. This local plan integrated the City's NPDES permit-required activities with partnership efforts with the three watershed districts having land in the city.

Vermillion River Watershed Restoration and Protection Strategy (WRAPS) Report. 2015. Wenck worked with the MPCA, Vermillion River Watershed Joint Powers (VRWJPO), and other local stakeholders to develop the watershed's WRAPS report. The Vermillion River Watershed contains a mixture of agricultural land and urban development across 3 counties and nine municipalities. Wenck helped facilitate several meetings with stakeholders throughout the watershed to develop restoration and protection strategies and identify potential projects.

Upper Minnehaha Creek Upper Watershed TMDL Restoration Strategy Report. 2014. Wenck completed nutrient TMDLs for 20 lakes in the Minnehaha Creek Upper Watershed, and one stream bacteria TMDL and identified priority actions, costs estimates, and load reductions for each of the impaired waters.

Sauk River Watershed District Comprehensive Watershed Management Plan. 2014. Wenck worked with multiple counties and stakeholders to prepare the watershed management plan, including identifying issues and priority actions within each of ten Management Units. Wenck helped facilitate public CAC and TAC meetings to gain stakeholder input and review.

Shingle Creek and West Mississippi Watershed Management Commissions Third Generation Watershed Management Plan. 2014. This Plan integrated several TMDL Implementation Plans into the ongoing management efforts of the joint powers organizations; revised development Rules and Standards, and enhanced routine monitoring and education and outreach efforts.

Kawishiwi Watershed Protection Project Implementation Plan. 2013. Wenck worked with over 25 stakeholder groups to develop an Implementation Plan of actions to be undertaken by a partnership of federal, state, county, local, and private stakeholders to protect and improve the beneficial uses of the water resources within the Kawishiwi watershed in northern Minnesota. About one-third of the watershed is within the Boundary Waters Canoe Area Wilderness.

Minnehaha Creek Watershed District Comprehensive Water Resources Management Plan. 2013. Wenck provided plan development and public outreach for the fourth generation of the District's Management Plan. The project included development of policies and strategies for 11 subwatersheds and the 181 square mile watershed; compiling and integrating data from the Functional Assessment of Wetlands, Upper and Lower Watershed Stream Assessments, Lake TMDLs, and HHPLS modeling; extensive public and agency input; development of \$80 million CIP; identification of Key Conservation Areas; and preparation of plan documents.

Clearwater River Watershed District 2010 Watershed Management Plan. 2010. This Plan integrated the TMDL Implementation Plan into the ongoing management efforts of the Watershed District. The District has obtained nearly \$2 million in grant funds to undertake actions included in this Plan.



OTHER EXPERIENCE

Wenck provides a wide range of water resource services including design and construction of urban and agricultural Best Management Practices (BMPs): lake and stream restorations; hydrologic and hydraulic, groundwater and water quality modeling; TMDLs and WRAPS; watershed and local water management planning; regulatory permitting; wetland delineation and restoration and WCA administration; and floodplain management.

Wenck specializes in ecological restorations and ensures that storm water management projects not only meet stormwater rate and volume conveyance and control needs, but also water quality and habitat management standards. Wenck's ecological restoration projects have been nationally recognized for their innovative and sensitive design.

Urban Stormwater BMPs

Technology is changing rapidly, and Wenck is leading the way. While experienced with the design and construction of familiar BMPs such as stormwater detention ponds, hydrodynamic separators and bioinfiltration basins, Wenck has pioneered the use of biochar and iron-enhanced sand filters to reduce bacteria in stormwater runoff. We have also designed and constructed a 72,000 sf, underground infiltration gallery of 1.42 miles of 72" perforated pipe; used porous asphalt pavement at street intersections to reduce the need to use road salt; worked with the Capitol Region Watershed District and cities of St. Paul and Minneapolis to design and install tree trenches along the Central Corridor for stormwater management; installed stormwater capture and reuse systems to reduce the use of potable water for irrigation; and created and oversaw construction of a central water feature at the new Fridley Civic Center Campus that provides stormwater capture, treatment and reuse, recirculating the runoff through iron-enhanced sand filters to improve water quality and clarity prior to discharge into Rice Creek.

Lake and Stream Protection and Restoration

Wenck is an expert in lake and stream management. Our team of over 60 water resources professionals routinely monitor lake and stream water quality and have completed lake diagnostic studies, stream assessments, stressor ID reports, and natural resources assessments. We have completed a number of lake alum treatments, and have brought that expertise to stormwater pond management, to determine when ponds that are exporting dissolved phosphorus may benefit from alum treatment. We have completed numerous stream restorations, ranging from spot stabilization to full-scale reconstruction. We re-meandered 2,000 feet of Rice Creek at Rice Creek Commons on the old TCAAP site. We restored several reaches of trout stream in southeast Minnesota – and then caught newly recolonized trout.

Our approach is to consider both the physical and biological components of these living systems. We routinely undertake submersed aquatic vegetation (SAV) surveys and manage the treatment of invasive nonnative species; undertake Floristic Quality Assessments to evaluate the ecological integrity of lake and wetland vegetation; undertake fish surveys; and undertake carp tracking and removal. Wenck recently completed a Carp Management Project for Twin and Ryan Lakes in Crystal, Brooklyn Center, Robbinsdale, and Minneapolis. This included tagging and tracking fish

movement throughout the four lake system; removal of more than 14,000 pounds of carp, and setting up a netting system for future annual removals; design and installation of carp barriers at two locations to prevent migration and recolonization; and SAV delineation and AIS treatment.

Hydrologic and Water Quality Computer Modeling

Wenck is experienced with computer model-based designs for hydrologic and hydraulic studies, water quality analyses, and flood studies. We have developed linkages between SWMM and GIS to allow for enhanced visualizations and greater usability. We also use smaller and less complex models for day-to-day evaluation of new land development.

- Our modeling capabilities and experience provide the following benefits:
- Experience with complex water resources problems
- Documented performance of our clients' projects
- High quality and defensible water resources management solutions
- Risk assessments and evaluations
- Resiliency evaluations and planning

Some interesting recent modeling projects include:

- *Robert Watershed Corridor. City of Inver Grove Heights, MN.* We evaluated how runoff from future land use would be conveyed to downstream resources to protect people and property within the watershed. The City anticipates new development to occur within the Corridor over the next decade and beyond per the City's Comprehensive Plan.
- *Davenport Stormwater Management Plan. City of Davenport, IA.* Wenck developed a stormwater management plan for the City, including an assessment of conditions in two major streams that drain the City - Duck and Blackhawk Creeks. We prepared an XPSWMM model for current and build out conditions in the 65-square mile watershed, which includes a significant area of rural watershed outside the City's corporate boundary. These models were used to better understand conditions impacting stream stability in Duck and Blackhawk Creeks and the significant number of other smaller streams and channels that drain the City. The models were also used to identify and site best management practices and to make zoning and regulatory requirement recommendations that the city can implement as it continues to develop its upper watershed area.
- *Two-Dimensional Flow Models of Flood Flows (FLO-2D). Wind farm client, Ocotillo, CA.* Wenck used an integrated river and floodplain model (FLO-2D), enabling us to compute depths and velocities in complex flows and landscape features. The FLO-2D hydrologic and hydraulic model is useful for estimating flow characteristics where flood flows have the potential to break out of the main channel of rivers and spread into the floodplain. The model estimates flow rates, velocities, and depths anywhere within the model domain. It is also capable of routing flows through developed municipal areas.
- *Millwork District, Dubuque, IA.* Wenck worked for the City of Dubuque to reduce street flooding within an area of the Millwork District. We used the two-dimensional (2D) capability of XPSWMM to determine the source of flooding and simulate potential solutions. We calibrated the existing condition model to an actual storm event using HD-quality traffic cameras. Solutions that were evaluated ranged from roof storage to enlarging and/or rerouting storm sewer pipes.

Aquatic Invasive Species (AIS)

Wenck has been assisting watershed districts, lake associations and counties with a variety of AIS related services including the development of aquatic vegetation surveys, AIS early detection monitoring plans, rapid response plans, carp population assessments and lake management plans. The focus of our work is to develop comprehensive plans that meet the identified goals for each water body, further the science and data gathered, and position the client's outcomes toward related outside funding sources to improve water quality and habitat.

OTHER EXPERIENCE (CONT.)

Total Maximum Daily Load Studies (TMDLs)

Wenck has completed more TMDLs than any other consultant in Minnesota – over 300 lake and stream TMDLs running the gamut of excess nutrients, E. coli and fecal coliform, turbidity, low dissolved oxygen, chloride, and fish and macroinvertebrate IBI. We pioneered the use of load duration curves in establishing TMDLs with the Shingle Creek Chloride TMDL. We have also completed several Stressor ID reports for both warm water and cold water streams. We have completed several Watershed Restoration and Protection Strategy (WRAPS) reports, integrating TMDL results with more detailed protection and restoration implementation plans and then segueing into watershed management planning.

Watershed Management Planning

Wenck has completed over 50 Watershed and Local Water Management Plans in Minnesota, including multiple generations of plans for some clients. Clients have ranged from agricultural watersheds in greater Minnesota, Twin Cities Metro-area urban and suburban watersheds, and a watershed in the Boundary Waters Canoe Area Wilderness.

Natural Resources Planning

Additionally, Wenck staff has compiled natural resource inventories using state-of-the-art techniques including Indexes of Biological Integrity (IBI's), GIS and MnRAM. Recent examples include natural resource plans for Burnsville, Hanover, Cloquet, Eden Prairie, and St. Cloud, and the Minnehaha Creek Watershed District's innovative Ecosystem Evaluation Program (E-Grade), which forms the backbone of the District's Watershed Management Plan.

- Fish barriers
- GIS merge/overlay/prioritize slopes, soil type, soil erodibility, existing development, planned development, known problems, land cover.
- Stream bank stability assessments (CCWMO, Aberdeen (2 miles), and Davenport (18 miles))
- Stormwater retrofits (CCWMO and Coon Creek WD)
- Numerous FEMA and floodplain analysis projects (Coon Creek WD and Aberdeen, SD)
- LID/infiltration/filtration Design (Cap Region WD, Central Corridor, and CCWMO)
- Grant writing (Shingle Creek, Sauk River WD, etc.)
- Feedlot design review (Windom, MN)
- Ditch law (Sauk River WD)
- Regional hydrologic and hydraulic modeling (Various clients)
- Low Impact Development design
- Rain garden design (CCWMO and Central Corridor)
- Aquatic habitat conditions (MCWD, Shingle Creek, and Clearwater WD)
- NPDES Phase II (Municipal, Community College and WD staff support)
- Watershed assessment (Various clients)
- Ecological assessments (Federal lands in ND oil fields)
- Public facilitation and support (Various clients)

Clearwater River Watershed District

Rebecca Carlson, founder of Resilience Resources, LLC. has served this watershed-based organization since 2000 and continues to do so through her new firm. In her role as District Engineer, she has balanced restoration and protection needs through assessment and water quality modeling, planning, design and implementing multiple projects and programs. She has effectively guided the District through prioritizing projects and programs and ***together they have achieved measurable water quality outcomes.***

Key Projects and Outcomes:

- Variable rate targeted fertilizer application program employed a novel program delivery that reduced the administrative burden on the watershed district, and increased participation in the program. Rebecca authored 319 grant to support providing financial support to farmers for gridded soil testing and variable rate fertilizer application through the local coops. The

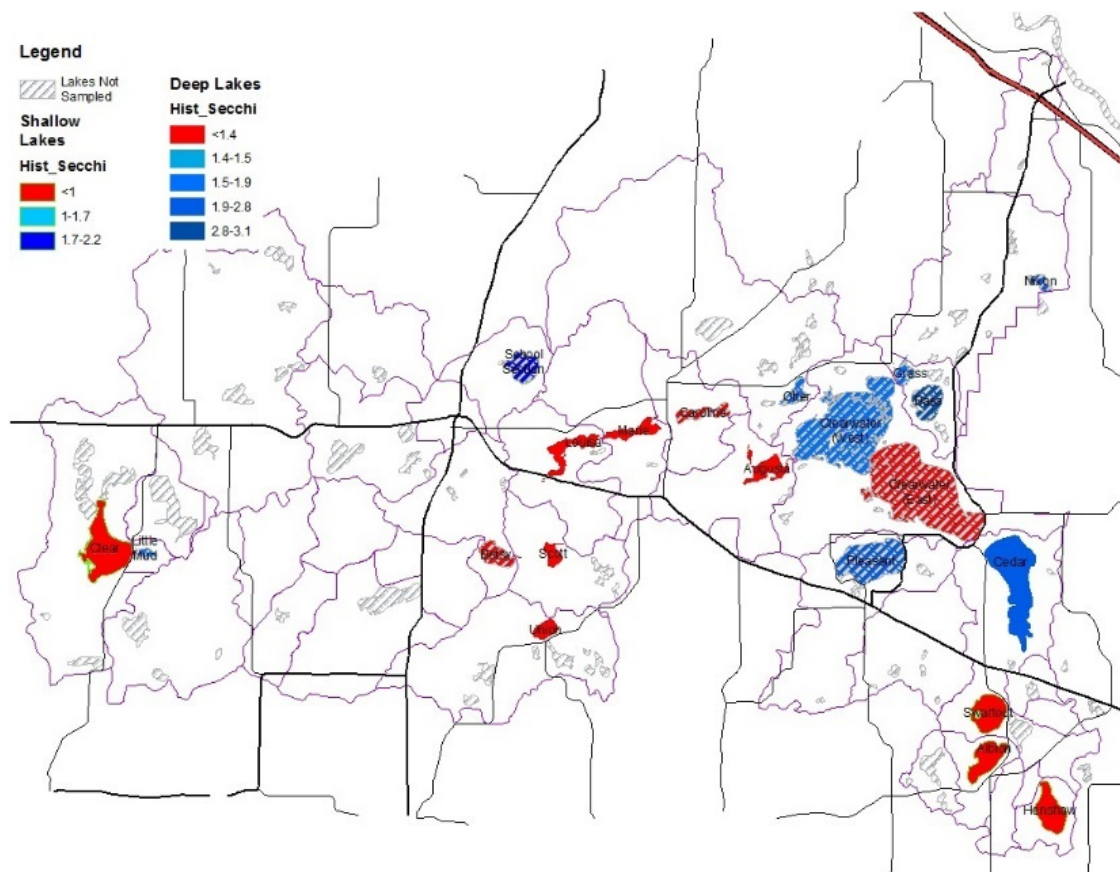
OTHER EXPERIENCE (CONT.)

program eliminated fertilizer application in sensitive areas. Water quality in the upper watershed improved measurably.

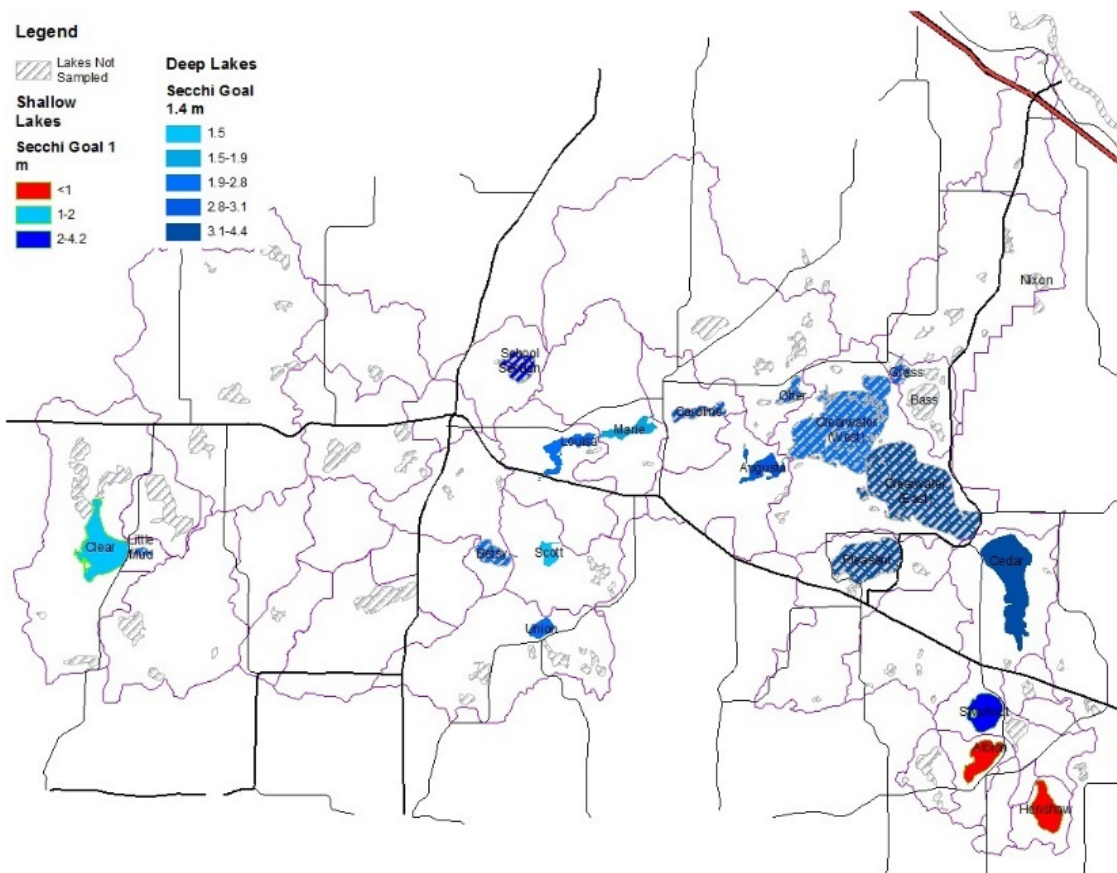
- The 500-acre Kingston Wetland/ Clearwater River restoration achieved one of the states only Dissolved Oxygen impairment resolutions. The project improved the river IBI to state standards, having registered mostly super tolerant species prior to the project. It also improved water quality in the downstream lake from an average of 330 ug/L TP to 92 ug/L TP in 2017 by reducing soluble P export from the wetland. The solution was a mix of hydrologic restoration, stream restoration, and soluble phosphorus filtration.
- The shallow Clear Lake registered 75 ug/L at TMDL time, but has improved to close to state standards as the result of watershed programs like the award-winning variable rate fertilizer application program, and sever soluble phosphorus filtration systems designed by Rebecca.
- Cedar Lake, this high value recreational lake was at risk of impairment, suddenly experiencing dramatic and increasing average summer TP concentrations and severe algae blooms. Implementation of three proprietary SRP filters (two limestone and one iron enhanced sand) and a mix of shallow lake management strategies upstream, have resulted in a dramatic improvement in lake water quality and a very happy lake association. Rebecca conducted the feasibility studies, authored the grants, designed and constructed the projects.
- Conducted one of Minnesota's first watershed-wide TMDL studies leading to 13 EPA approved TMDLs and an approved implementation plan.

Clarity in District Lakes prior to implementation of third generation plan (images courtesy of the Clearwater River Watershed District):

Before:



After:



Rebecca prepared and then implemented the District's Third Generation Comprehensive Management Plan, integrating the District's comprehensive planning process with its approved TMDL Implementation Plan. Rebecca also authored their TMDL's, one of Minnesota's first watershed-wide TMDLs. Projects she's developed and implemented (summarized below) have led to measurable water quality improvements in lakes and streams of the wetland. This shows her history of solid planning that facilitates measurable improvements.

FEE SCHEDULE

Wenck Associates, Inc. Fee Schedule January 2019

<u>Classification</u>	<u>Hourly Rate</u>
Interns	\$63.00
Administrative Support / Technician	\$86.00
Professional I-A	\$97.00
Professional I-B	\$108.00
Professional I-C	\$120.00
Professional II-A	\$130.00
Professional II-B	\$145.00
Professional II-C	\$158.00
Professional III-A	\$168.00
Professional III-B	\$178.00
Professional III-C	\$188.00
Professional IV-A	\$198.00

- *Classifications listed above refer to the firm's internal system for billing purposes. The term "Professional" refers to engineers, scientists and business professionals.*
- *Vehicle mileage will be billed at the IRS approved rate.*
- *Invoices are due upon presentation. Invoice balances not paid within thirty (30) days of invoice date are subject to 1-1/2% (18% annual) interest or finance charge.*
- *Specialized software used on a given project will be billed at a rate of \$15.00/hour.*
- *Rates to be adjusted annually.*

Hourly Rates

Diane Spector	\$188
Lisa Tillman	\$168
Ed Matthiesen	\$198
Junior Engineers	\$108 - \$120

Resilience Resources

Rebecca Carlson	\$185
Support staff	\$100



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October 1, 2019

Mr. Doug Baines, Chair
Elm Creek Watershed Management Commission
3235 Fernbrook Lane
Plymouth, Minnesota 55447

re: proposal to provide FEMA floodplain modeling and mapping

Dear Mr. Baines:

Barr is pleased to provide this proposal to provide FEMA floodplain modeling and mapping services for the Elm Creek Watershed Management Commission (ECWMC). The ECWMC will benefit from Barr's extensive experience with floodplain modeling and mapping; our current projects with a similar scope of work to map floodplains in other watersheds in the metro area; and our understanding of the Elm Creek watershed.

Barr has a long history of completing floodplain modeling and mapping services for many public entities. Barr helped develop the first floodplain map in Minnesota in 1961 by modeling the Nine Mile Creek Watershed and mapping a floodplain for the Nine Mile Creek Watershed District. Since then, hydrologic and hydraulic (H&H) modeling has been one of our specialties as we have helped to model and map floodplains throughout the Midwest. Through this long history, we have developed deep institutional knowledge about the best ways to complete the models efficiently and accurately.

Barr is currently working with the Minnesota Department of Natural Resources (DNR) on other floodplain mapping efforts. Our scope of work for other watershed management organizations (WMOs), including neighboring Bassett Creek Watershed Management Commission, is in the second year of the anticipated two-year schedule. We work closely with DNR staff to understand the details of their specific wants and needs for floodplain modeling and mapping efforts, and we will use this experience to bring added efficiency to the ECWMC modeling effort.

We have a thorough understanding of both the Elm Creek watershed and the need to engage the member cities in the modeling and mapping process. Flooding is an important issue and accurate models help Cities and WMO's understand current flooding risks as well as minimizing flooding risk associated with future development. We will work closely with the member cities to review known flooding "hotspots" and to review the modeling and mapping results for accuracy.

Finally, through discussions with the DNR on the other projects, we understand the DNR may wish to modify the negotiated scope of work to include developing a Digital Flood Insurance Rate Map (DFIRM). If the DNR chooses to modify the contract with ECWMC in a similar manner, Barr is prepared to complete this task. We have completed the development for DFIRMs for several counties in Minnesota and we have the experience necessary to complete this task to meet FEMA requirements.

Project Understanding and Scope of Work

We understand ECWMC has already negotiated a contract with the DNR that includes a defined scope of work and budget. The associated March 7, 2018 scope of work (Attachment A) prepared by Hennepin

County is attached to this proposal as a reference. Barr proposes making the following additions or clarifications to the scope of work provided as Attachment A:

General

- Replace “Hennepin County” with “Barr Engineering Co”. Referenced work assumed to be completed by Hennepin County will be completed by Barr Engineering Co.

Task 1: Meetings

- Scope includes up to three meeting as defined in the original scope. Barr assumes meetings will be scheduled to meet one of the following scenarios:
 - a. Immediately adjacent to ECWMC meetings
 - b. Located at Barr’s office
 - c. Conducted via WebEx or Conference Call
- Scheduling meetings as such will minimize travel time and costs for Barr, city, and DNR staff.

Task 2: Data Collection and Organization

- We understand that Hennepin County had already completed at least some of this task and compiled data will be provided to Barr. We will re-engage with the cities during the kickoff meeting regarding additional data requests.

Task 3: Provide Required Survey Locations for others

- No changes necessary

Task 4: Hydrology Update

We understand that a “first draft” of the hydrology was previously completed, and that may ultimately provide efficiencies for completing this task. Getting the hydrologic modeling right is critical for accurate floodplain modeling and mapping. Inaccurate flows in the hydraulic model can result in a significant over- or under-prediction of the extents of the floodplain. As such, the hydrology task will address the uncertainty regarding whether the critical runoff event is a rainfall event or a snowmelt event by completing the following tasks:

- Use HEC-HMS to model the watershed hydrology.
- Calibrate the hydrology using the USGS gage (as specified in the contract).
- Use two rain storm and two snowmelt events to calibrate the HEC-HMS model
- Use NEXRAD data to accurately distribute rainfall across the watershed for the calibration events. Barr has allocated up to 40 hours to complete the calibration to these events.
- Use the National Weather Service (NWS) snow water equivalent (SWE) gridded data to simulate snowmelt for calibration of snowmelt events.
- Barr has allocated up to 40 hours to complete the calibration to these events.
- Barr assumes one hydrologic modeling iteration to address comments from the DNR.

Task 5: Hydraulics Update (Detailed Study Areas)

- The model cross sections will be limited to existing cross section locations and the necessary two cross sections upstream and downstream of each creek crossing.
- Barr assumes one detailed hydraulic modeling iteration to address comments from the DNR.

Task 6: Hydraulics Update (Non-Detailed Study Areas)

- Barr assumes one non-detailed hydraulic modeling iteration to address comments from the DNR.

Task 7: Mapping Products

- Barr assumes preparation of final DFIRM will be completed by the DNR.

Task 8: Narrative Products

- Barr assumes one review iteration for each for the 60% and 90% submittals.

Barr's Team

Key technical staff that will be working on this project are:

- Jeff Weiss, PE – Jeff will serve as the overall project manager and primary point of contact between Barr, the member cities and the DNR. Jeff has worked on numerous FEMA mapping projects, including modeling and mapping over 100 miles of rivers in multiple Minnesota counties. He has also provided QA/QC for several modeling and mapping projects.
- Joe Waln, PE, CFM – Joe is a Certified Floodplain Manager (CFM) and will perform QA/QC for the project in accordance to the scope. Joe has worked on several FEMA mapping projects and has been helping the City of Rochester develop Atlas 14 based floodplain maps so they can regulate development to a higher standard than the effective FEMA maps.
- Anthony Vecchi, Water Resources Engineer – Anthony will lead both the HEC-HMS and HEC-RAS. He has completed multiple projects using HEC-HMS to determine design flows and HEC-RAS to complete flood modeling for flood control systems to reduce flood risk in municipal systems.
- Brandon Barnes, PE and Ross Mullen, CFM, PE – Brandon and Ross are leading parallel efforts to model and map floodplains for the Ramsey-Washington Metro Watershed District (RWMWD) and for the Bassett Creek Watershed Management Commission (BCWMC), respectively. They will be technical resources and provide lessons learned from the parallel modeling and mapping efforts.
- Josh Vosejпка, GIS Specialist – Josh will lead the GIS work tasks and is completing the mapping for the RWMWD and BCWMC projects.

Budget

We understand the budget has already been negotiated between the ECWMC and the DNR. The total proposed budget and the estimated hours and budget for each task is summarized in the following table:

Task	Description	Hours	Cost
1	Meetings	17	\$2,315
2	Data Collection and Organization	17	\$1,965
3	Survey Locations and Identification	16	\$1,970
4	Hydrologic Analysis	236	\$23,900
5	Hydraulic Analysis – Detailed	266	\$27,050
6	Hydraulic Analysis – Non-Detailed	91	\$10,025
7	Mapping Products	138	\$12,670
8	Narrative	102	\$11,050
	Total	883	\$90,945

Schedule

The original schedule includes a timeline that spans approximately two years. Our proposed schedule assumes a more condensed timeline to complete the project more quickly and efficiently. Meeting this schedule will depend in part on the ability of the DNR to complete reviews in a timely manner.

Task	Estimated Completion Date
Kick-off Meeting	November 2019
Draft Hydrology to interagency hydrology review committee	January 2020
Receive comments on Hydrology	February 2020
Final Hydrology Completed	March 2020
Hydraulic models submitted to DNR for review	June 2020
Receive comments back from DNR	July 2020
Final models submitted to DNR	August 2020
Draft Shapefiles to DNR	October 2020
60% Narrative to DNR and cities for comment	November 2020
90% Narrative to DNR and cities for comment	January 2021
Final Files submitted to DNR	February 2021

Thank you for your consideration to complete this work for the Commission. If you have any questions or require further information, please contact me (952-832-2784, jherbert@barr.com) or project manager Jeff Weiss (952-832-2706, jweiss@barr.com). We look forward to continuing our successful working relationship.

Sincerely,



Jim Herbert, PE
 Vice President, Principal in Charge



Jeff Weiss, PE
 Project Manager

**STATE OF MINNESOTA GRANT CONTRACT
WITH THE ELM CREEK WATERSHED MANAGEMENT COMMISSION FOR IMPROVED
FLOODPLAIN MODELING AND MAPPING**

This grant contract is between the State of Minnesota, acting through its Commissioner of Natural Resources, ("State") and the Elm Creek Watershed Management Commission, 3235 Fernbrook Lane, Plymouth, Minnesota 55447 ("Grantee").

Recitals

1. Under Minn. Stat. Section 84.026, Subdivision 2, the State is empowered to enter into this grant agreement.
2. The State agrees that updating and improving floodplain data is in the interest of the State.
3. The Grantee represents that it is duly qualified and agrees to perform all services described in this grant contract to the satisfaction of the State. Pursuant to Minnesota Statutes §16B.98 Subdivision 1, the Grantee agrees to minimize administrative costs as a condition of this grant contract.

Grant Contract

1 Term of Grant Contract

- 1.1 **Effective date:** May 15, 2018, or the date the State obtains all required signatures under Minnesota Statutes §16C.05, subdivision 2, whichever is later. Per Minn.Stat. §16B.98 Subd. 7, no payments will be made to the Grantee until this grant contract is fully executed. **The Grantee must not begin work under this grant contract until this contract is fully executed and the Grantee has been notified by the State's Authorized Representative to begin the work.**
- 1.2 **Expiration date:** April 30, 2020, or until all obligations have been satisfactorily fulfilled, whichever occurs first.
- 1.3 **Survival of Terms.** The following clauses survive the expiration or cancellation of this grant contract: 8. Liability; 9. State Audits; 10. Government Data Practices and Intellectual Property; 13. Publicity and Endorsement; 14. Governing Law, Jurisdiction, and Venue; and 16. Data Disclosure.

2 Grantee's Duties

The Grantee, who is not a state employee, will be responsible for tasks generalized below, consistent with the details included in Attachment A – *Hennepin County Proposal to Provide FEMA Floodplain Modeling and Mapping*, dated March 7, 2018, attached and incorporated hereto:

- Submit updated hydrology modeling for the watershed using either HEC-HMS or SWMM
- Submit updated stream hydraulics using HEC-RAS
- Create and submit floodway and floodplain shapefiles using HEC-RAS mapper
- Create and submit depth grids using the RAS Mapper built in to HEC-RAS
- Create and submit new work maps illustrating new SFHA and other information required by the State
- Attend kickoff, data review, and 90% progress meetings
- Prepare and submit reports documenting hydrology, hydraulics, and mapping methods and results

All work shall comply with required grants management policies and procedures set forth in Minn.Stat. §16B.97, Subd. 4 (a)(1).

3 Time

The Grantee must comply with all the time requirements described in this grant contract. In the performance of this grant contract, time is of the essence.

4 Consideration and Payment

4.1 *Consideration.* The State will reimburse Grantee for all eligible products received and services performed by the Grantee under this grant contract as follows:

(a) *Compensation.* The Grantee will be reimbursed 100% for eligible project expenses, not to exceed \$92,773.00. This grant does not require a local match.

(b) *Travel Expenses.* Grantee shall not be reimbursed for travel and subsistence expenses incurred as a result of this grant contract.

(c) *Total Obligation*

The total obligation of the State for all compensation and reimbursements to the Grantee under this grant contract will not exceed \$92,773.00.

4.2. *Payment*

(a) *Invoices/Deliverables*

The State will pay the Grantee after the Grantee submits itemized invoices for deliverables produced or the services actually performed and the State's Authorized Representative accepts the invoices. Invoices must include the billing period of work performed and be submitted timely and with project deliverables. Reimbursement will be made in accordance with the following schedule:

- upon receipt and acceptance of Grantee's updated/new hydrologic model and technical memorandum describing assumptions and methods used.
- upon receipt and acceptance of Grantee's HEC-RAS models and documentation for detailed and non-detailed areas.
- upon receipt and acceptance of Grantee's GIS work and mapping, including depth grids, shapefiles for flood inundation areas, cross-sections, and stream centerlines.
- upon receipt and acceptance of invoice for data organization and survey location review.
- upon receipt and acceptance of completed project reporting.
- upon documentation of meeting participation and invoice for time.
- final financial reconciliation for any outstanding eligible project reimburseables.

Requested reimbursement amounts for each work task shall not exceed 120% of the amount identified for each work task in the estimated budget contained in Attachment A of this agreement. Upon project completion, financial reconciliation will be done to ensure Grantee is reimbursed for all actual costs of services and deliverables, not to exceed \$92,773.00.

(b) *Federal funds*

Payments under this grant contract will be made from federal funds obtained by the State through FEMA Cooperating Technical Partners Program, CFDA number 97.045. The Grantee is responsible for compliance with all federal requirements imposed on these funds and accepts full financial responsibility for any requirements imposed by the Grantee's failure to comply with federal requirements.

(c) *Unexpended Funds*

The Grantee must promptly return to the State any unexpended funds that have not been accounted for annually in a financial report to the State due at grant closeout.

4.3 *Contracting and Bidding Requirements*

Grantees that are municipalities as defined in state statute must comply with the contracting provisions of Minn. Stat. §471.345.

5 **Conditions of Payment**

All services provided by the Grantee under this grant contract must be performed to the State's satisfaction, as determined at the sole discretion of the State's Authorized Representative and in accordance with all applicable federal, state, and local laws, ordinances, rules, and regulations. The Grantee will not receive payment for work found by the State to be unsatisfactory or performed in violation of federal, state, or local law.

6 **Authorized Representative**

The State's Authorized Representative is Patrick Lynch, Floodplain Hydrologist, Department of Natural Resources, 500 Lafayette Road, St. Paul, Minnesota, 55155, 651-259-5691, pat.lynch@state.mn.us, or his/her successor, and has the responsibility to monitor the Grantee's performance and the authority to accept or reject the services provided under this grant contract. If the services are satisfactory, the State's Authorized Representative will certify acceptance on each invoice submitted for payment.

The Grantee's Authorized Representative is Judie Anderson, Administrator, Elm Creek Watershed Management Commission, 3235 Fernbrook Lane North, Plymouth, Minnesota 55447, (763)553-1144, judie@jass.biz. If the Grantee's Authorized Representative changes at any time during this grant contract, the Grantee must immediately notify the State.

7 **Assignment, Amendments, Waiver, and Grant Contract Complete**

7.1 **Assignment.** The Grantee shall neither assign nor transfer any rights or obligations under this grant contract without the prior written consent of the State, approved by the same parties who executed and approved this grant contract, or their successors in office.

7.2 **Amendments.** Any amendments to this grant contract must be in writing and will not be effective until it has been executed and approved by the same parties who executed and approved the original grant contract, or their successors in office.

7.3 **Waiver.** If the State fails to enforce any provision of this grant contract, that failure does not waive the provision or the State's right to enforce it.

7.4 **Grant Contract Complete.** This grant contract contains all negotiations and agreements between the State and the Grantee. No other understanding regarding this grant contract, whether written or oral, may be used to bind either party.

8 **Liability**

The Grantee must indemnify, save, and hold the State, its agents, and employees harmless from any claims or causes of action, including attorney's fees incurred by the State, arising from the performance of this grant contract by the Grantee or the Grantee's agents or employees. This clause will not be construed to bar any legal remedies the Grantee may have for the State's failure to fulfill its obligations under this grant contract.

9 **State Audits**

Under Minn. Stat. §16B.98, Subd.8, the Grantee's books, records, documents, and accounting procedures and practices of the Grantee or other party relevant to this grant agreement or transaction are subject to examination by the State and/or the State Auditor or Legislative Auditor, as appropriate, for a minimum of six years from the end of this grant agreement, receipt and approval of all final reports, or

the required period of time to satisfy all state and program retention requirements, whichever is later.

10 Government Data Practices

The Grantee and State must comply with the Minnesota Government Data Practices Act, Minn. Stat. Ch. 13, as it applies to all data provided by the State under this grant contract, and as it applies to all data created, collected, received, stored, used, maintained, or disseminated by the Grantee under this grant contract. The civil remedies of Minn. Stat. § 13.08 apply to the release of the data referred to in this clause by either the Grantee or the State.

If the Grantee receives a request to release the data referred to in this Clause, the Grantee must immediately notify the State. The State will give the Grantee instructions concerning the release of the data to the requesting party before the data is released. The Grantee's response to the request shall comply with applicable law.

11 Workers' Compensation

The Grantee certifies that it is in compliance with Minn. Stat. § 176.181, subd. 2, pertaining to workers' compensation insurance coverage. The Grantee's employees and agents will not be considered State employees. Any claims that may arise under the Minnesota Workers' Compensation Act on behalf of these employees and any claims made by any third party as a consequence of any act or omission on the part of these employees are in no way the State's obligation or responsibility.

12 Prevailing Wages

Grantee agrees to comply with all of the applicable provisions contained in Chapter 177 of the Minnesota Statutes, and specifically those provisions contained in Minn. Stat. §§ 177.41 through 177.435, as they may be amended, modified or replaced from time to time with respect to the Project.

13 Publicity and Endorsement

12.1 Publicity

Any publicity regarding the subject matter of this grant contract must identify the State as the sponsoring agency and must not be released without prior written approval from the State's Authorized Representative. For purposes of this provision, publicity includes notices, informational pamphlets, press releases, research, reports, signs, and similar public notices prepared by or for the Grantee individually or jointly with others, or any subcontractors, with respect to the program, publications, or services provided resulting from this grant contract. All projects primarily funded by state grant appropriation must publicly credit the State of Minnesota, including on the grantee's website when practicable.

12.2 Endorsement

The Grantee must not claim that the State endorses its products or services.

14 Governing Law, Jurisdiction, and Venue

Minnesota law, without regard to its choice-of-law provisions, governs this grant contract. Venue for all legal proceedings out of this grant contract, or its breach, must be in the appropriate state or federal court with competent jurisdiction in Ramsey County, Minnesota.

15 Termination

15.1 Termination by the State. The State may immediately terminate this grant contract with or without

141447 / 3000131351

cause, upon 30 days' written notice to the Grantee. Upon termination, the Grantee will be entitled to payment, determined on a pro rata basis, for services satisfactorily performed.

15.2 Termination for Cause. The State may immediately terminate this grant contract if the State finds that there has been a failure to comply with the provisions of this grant contract, that reasonable progress has not been made or that the purposes for which the funds were granted have not been or will not be fulfilled. The State may take action to protect the interests of the State of Minnesota, including the refusal to disburse additional funds and requiring the return of all or part of the funds already disbursed.

16 Data Disclosure

Under Minn. Stat. § 270C.65, Subd. 3, and other applicable law, the Grantee consents to disclosure of its social security number, federal employer tax identification number, and/or Minnesota tax identification number, already provided to the State, to federal and state tax agencies and state personnel involved in the payment of state obligations. These identification numbers may be used in the enforcement of federal and state tax laws which could result in action requiring the Grantee to file state tax returns and pay delinquent state tax liabilities, if any.

1. STATE ENCUMBRANCE VERIFICATION

Individual certifies that funds have been encumbered as required by Minn. Stat. §§16A.15 and 16C.05.

Signed: Felicia Barnes
(with delegated authority)

Date: 5/4/2018

SWIFT Contract/PO No(s). 141447/3000131351

3. STATE AGENCY

Individual certifies the applicable provisions of Minn. Stat. §16C.08, subdivisions 2 and 3 are reaffirmed.

By: [Signature]

Title: Director, Ecological & Water Resources

Date: 5-22-18

2. GRANTEE

The Grantee certifies that the appropriate person(s) have executed the grant contract on behalf of the Grantee as required by applicable articles, bylaws, resolutions, or ordinances.

By: Doug Barnes
Chair

Date: 05-09-18

By: Indi Anderson
Admin

Date: 05-09-18

Distribution:
Agency
Grantee
State's Authorized Representative - Photo Copy

ATTACHMENT A
ELM CREEK WATERSHED MANAGEMENT COMMISSION

Hennepin County Proposal to Provide FEMA Floodplain Modeling and Mapping**March 7, 2018****Project Understanding and Approach**

The purpose of this project is to update the Special Flood Hazard Areas shown on the FEMA Floodplain maps that are located within the Elm Creek Watershed. In order to accomplish this, the existing Elm Creek Hydrologic and Hydraulic models will be created/updated in current modeling packages acceptable to the Minnesota DNR. The areas to be studied are those presented to us by the Minnesota DNR in their figure for the Elm Creek Watershed as attached. There are both detailed and non-detailed areas that require work under this scope to be included in this project.

In general, the scope of this proposal is to:

1. Update the Hydrology modeling for the watershed using either HEC-HMS or SWMM.
2. Update Creek Hydraulics using HEC-RAS
3. Create Floodway and Floodplain shapefiles using HEC-RAS mapper
4. Create Depth Grids using the RAS Mapper built into HEC-RAS
5. Create New Work Maps showing the new SFHA and other information required by the DNR
6. Other reports and documentation of the work

Task 1: Meetings

Several Meetings will be required at various states between project partners. We assume the Minnesota DNR will provide meeting agendas and notes for each of these meetings. We anticipate the following meetings:

1. Kickoff Meeting: An overall meeting to introduce the project. Attendees would include representatives from Elm Creek, Hennepin County, the Minnesota DNR, and a representative of the cities. The purpose of the meeting will be to introduce the overall project tasks and schedule and get all expectations on the table.
2. Meeting with all cities in the watershed: The purpose of this meeting will be to review data needs to complete the studies as required. Specific topics will include availability of data and identification of any specific areas of concern from the cities representatives.
3. 90% Progress Meeting / Flood Risk Review Meeting (FRR): This meeting is to present near final work products, discuss any outstanding issues, and determine the final scheduling.

Task 2: Data Collection and Organization

Hennepin County will provide each City a data request for all record plan information required for their particular city in addition to any information the Minnesota DNR may request. Hennepin County proposes to provide this list at the meeting under Task 1 where the project is introduced to the Cities.

Specifically, Hennepin County will request:

- Any drainage system maps showing all stormwater features such as ponds and pipes.
- Land use mapping showing existing and proposed land uses
- Any information including construction plans and as-built plans for any crossing locations of the special flood hazard areas identified on mapping.

In addition, Hennepin County will compile:

- USGS Gauging station data
- LIDAR Data from the MNDNR and prepare for use in modeling
- Previous TR-20 and HEC-2 Modeling for Elm Creek.

Hennepin County will review the compiled data and identify areas that require further investigation, whether that is digging deeper to find information or identifying areas where others may need to conduct a survey to obtain the information.

Task 3: Provide Required Survey Locations for others to complete survey

Hennepin County will work with the Minnesota DNR to identify all locations where a detailed site survey is required to comply with the Minnesota DNR's required scope of work for crossings. The information will be provided to the Minnesota DNR or a contractor of the DNR's choosing to collect the survey data. Hennepin County will review all supplied survey data for errors and provide direction for additional survey as needed as a result of errors and or omissions.

Deliverables:

- Survey location figures

Task 4: Hydrology Update

This task will result in an updated model of the Elm Creek Watershed, better reflecting current conditions as opposed to the present modeling dating back to the 1970's. This effort will build upon the existing modeling that currently exists for the watershed which includes the original TR-20 modeling from the 1970's and the HydroCAD model created from the TR-20 model as part of the Elm Creek Channel study conducted in the mid 2000's.

A new model, using either HEC-HMS or SWMM will be created. The previous watershed boundaries will be reviewed for consistency with the 2011 LIDAR data collected by the DNR, as well as information on storm drainage systems provided by each of the cities. Non-detailed areas will also be analyzed at a level to permit the non-detailed hydraulic analysis to occur.

Runoff will be determined using a method agreeable to the Minnesota DNR. While the current models use a curve number approach, other methods will be discussed and an agreement reached on one to use that meets the needs of this project as well as furthers the potential of future studies. Rainfall distributions will also be reviewed, including for snowmelt to ensure the proper method is selected.

Peak runoff rates for the 10%, 4%, 2%, 1% and 0.2% annual chance flood events will be determined for both detailed and non-detailed study areas. Peak flows will be calibrated with the flow data available from the USGS gauging station located on Elm Creek near Champlin.

Calibration to known flows at the USGS stream gauge on Elm Creek near Champlin will be provided as part of this task.

Internal QA/QC on the hydrology modeling will be done using internal Hennepin County staff to verify input data and output results.

Deliverables:

- An updated/new hydrologic model of the Elm Creek Watershed in HEC-HMS or SWMM
- A technical memorandum describing the assumptions and methods used to create the model and results
- Documentation of the QA/QC analysis from Hennepin County and the DNR.

Task 5: Hydraulics Update (Detailed Study Areas)

This task will create a revised hydraulic model of the Elm Creek Watershed in HEC-RAS. The proposed models will be a completely new model created from scratch instead of trying to replicate the previous HEC-2 models created in the 1970's. This will be done for all detailed areas shown in the DNR figure for the Elm Creek Watershed. The Hydraulic analysis will be done for the 10%, 4%, 2%, 1%, and 0.2% peak flood events. In order to create this model, the following tasks will be performed:

- Cut new cross sections at all old cross section locations (cross section locations already available in GIS) using the DNR's LIDAR data for overbank areas. Inchannel geometry will be created from the DNR requested survey bridge crossings, other channel survey locations, and as-built structures. Determine Manning's N values based on current conditions for overbank and channel areas,
- Run the models and review, revise, and troubleshoot.

Floodway analysis would be conducted on all detailed study areas as identified in the figure supplied by the DNR.

Similar to the Hydrology task, the initial QA/QC will be provided by internal Hennepin County staff who will review inputs and model outputs.

Deliverables:

- HEC-RAS models for each stage of the analysis and flood events.
- Documentation of responses to the QA/QC review process.

Task 6: Hydraulic Update (Non Detailed Study Areas)

Non-detailed study areas will be analyzed in a different manner. Areas identified on the figure supplied by the DNR as non-detailed study areas will still be analyzed with HEC-RAS where appropriate, and for all storm events as done in the detailed study areas. However, cross sections will be based solely on cross sections cut using the DNR's LIDAR data. No channel data will be collected or determined for this modeling. In addition, only as-builts or construction plans will be used to determine information for all culverts or bridge crossings.

QA/QC will be provided by the Hennepin County internal staff.

Deliverables:

- HEC-RAS model(s)
- Cross Sections data and locations where not previously identified
- Documentation of QA/QC has been resolved

Task 7 – Mapping Products

For detailed study areas, inundation maps for the 1%, 0.2% and floodway scenarios will be developed and produced using the RAS mapper functions of HEC-RAS and then edited in the Arc-GIS environment. For non-detailed study areas, only the 1% events will be mapped.

The maps produced by the RAS mapper package and then edited in Arc-GIS will be QA/QC'd for conformance with the model results. This step can be done internally by Hennepin County staff and documentation of all QA/QC processes and steps will be provided.

The information from these steps will then be imported into the required shapefile format provided by the DNR.

Depth Grids will also be generated in the same fashion and events as documented above. QA/QC and documentation will also be provided.

Deliverables:

- ~~Final Work Maps in digital format (PDF)~~
- Final Depth Grids for all return intervals as documented above.
- Final shapefiles for flood inundation areas, cross sections, and stream centerlines.
- Documentation of the QA/QC process

Task 8 – Narrative Products

Elm Creek/Hennepin County will provide written narrative documentation at the 60, 90 and 100% levels. All steps will be distributed to the DNR and all cities in the watershed for comment and review. The 90% document will reflect the comments and changes from the 60% review, and the final document will address and additional comments from the 90% stage.

The summary report will document the process of creating the hydrology, hydraulics, and mapping products.

Budget:

The total budget proposed for this task is \$92,772.45. This is based on a rate of \$71.09 per hour from Hennepin County.

Task	Task Description	Hours	Cost
1	Meetings	35	\$2,488.15
2	Data Collection and Organization	40	\$2,843.60
3	Survey Location Identification	30	\$2,132.70
4	Hydrologic Analysis	275	\$19,549.75
5	Hydraulic Analysis – Detailed	425	\$30,213.25
6	Hydraulic Analysis – Non-Detailed	175	\$12,440.75
7	Mapping Products	225	\$15,995.25
8	Narrative	100	\$7,109.00
	Grand Total:	1305	\$92, 772.45

Schedule:

Kickoff Meeting: March 2018

Hydrology to IAHC: June 2018

Hydraulic Model Submittal to DNR for Review: December 2018

Revised Model Submittal to DNR: May 2019

Draft Floodplain Shapefiles and Depth Grids to DNR: September 2019

60% Narrative to DNR for Review and Comment: October 2019

All Final Files to DNR: February 2020

Note that this schedule is shifted later than the suggested DNR schedule due to staffing constraints and timing of starting the project.



October 1, 2019

Mr. Doug Baines

Chair
Elm Creek Watershed Management Commission
3235 Fernbrook Ln N
Plymouth, MN 55447

RE: Elm Creek Special Flood Hazard Area Mapping
Wenck Proposal # P2019-1477

Dear Mr. Baines:

We appreciate the opportunity to present to you our qualifications and proposal to provide Special Flood Hazard Area Mapping for the Elm Creek watershed. We are committed to providing the Commission with the highest level of quality and service at a very competitive price.

The enclosed Proposal provides an overview of our extensive experience, expertise, and our approach to meeting this project's objectives. We can provide the following unique qualifications to the Elm Creek Watershed Management Commission:

- **30+ Years of Experience** – water resources is one of our company's key services. We have over 50 individuals focused almost exclusively in this field, including four Certified Floodplain Managers.
- **Proven Track Record** – of success working with clients, the DNR, and FEMA to providing hydrologic and hydraulic modeling, flood hazard area mapping, and floodplain management. We are currently working with the DNR to develop or update special flood hazard area mapping in the Coon Creek, Shingle Creek, and Minnehaha Creek watersheds.
- **Excellent Customer Service** - our track record of 70% repeat business and 95% highly satisfied customers are a testament to our mantra "Responsive Partner, Exceptional Outcomes."

Project Approach and Scope

The Elm Creek Commission has received grant funding from the Minnesota DNR to update the Special Flood Hazard Areas shown on the FEMA Floodplain maps of the Elm Creek watershed. The work is expected to be substantially complete by December 2020. We have flexibility to deliver substantial completion prior to that date if necessary. Wenck is available to start this project immediately.

As a project team we propose Erik Megow as the lead modeler, with Eileen Weigel, PE, providing QA/QC. Erik is currently updating the Minnehaha Creek model, and Eileen is updating the Shingle Creek model. Brendan Barth, EIT, and Rena Weiss will provide modeling and GIS assistance. Our project manager will be Diane Spector.

The following is our approach:

Task 1 –Meetings

Several meetings will be required at various states between project partners. We assume the Minnesota DNR will provide meeting agendas and notes for each of these meetings. We anticipate the following meetings:

- Kickoff meeting. At this meeting Wenck and City staff will discuss the project and project objectives including schedule, key deliverables and the responsible party. We will identify data gaps and next steps.
- Internal city meetings. Wenck will meet with the cities to discuss changes, observations and known data availability.
- TAC meetings. We assumed attendance at two TAC meetings to review progress and findings.
- Periodic check-ins by phone and/or online meetings to review project progress and discuss and resolve issues.
- 60% progress meeting – At this meeting we will have a good idea of what the new flood inundation is, and its associated impacts. This meeting will be held when the 60% draft report has been completed.
- 90% progress meeting – At this meeting we will present the 90% model results, report and figures for comments.
- Twin Cities HUC8 Flood Risk Review Meeting. This meeting will be called by the DNR in January 2020.

Deliverables:

- Meeting Agendas
- Meeting Minutes

Task 2 – Data Collection and Review

It is our understanding that the field survey work necessary for this study has already been completed. Wenck will review this data and any other data already compiled by the Commission and if necessary prepare an information request for each City for storm drainage system shapefiles and all record plan information as required. Wenck will request all effective models from the DNR, including LOMRs, and will determine representative Atlas 14 locations. Wenck will also download and analyze flow data from the USGS gauge and prepare raster data sets from LiDAR data.

Data likely to be requested from the cities, unless already compiled by the Commission includes:

- Any drainage system maps and shapefiles/geodatabases showing all stormwater features such as ponds and pipes.
- Shapefiles indicating proposed future land use.
- Any information including construction plans and as-built plans for any crossing locations of the special flood hazard areas identified on mapping.

Task 3 – Hydrology Update

Wenck will create a new model using EPA SWMM. We will review subwatershed boundaries and delineate to reaches appropriately. If not already completed, we will develop Atlas 14

hyetographs using the MSE3, nested, and Atlas 14 quartile distributions. One curve will be selected during the validation analysis. Using current land use and soils data, we will develop an infiltration/extraction method using the Green-Ampt method. We will use the new EPA SWMM model to run the 10%, 4%, 2%, 1%, and 0.5% annual chance flood events, and calibrate to the USGS gauge.

Wenck will perform an internal QA/QC and write a technical memorandum narrative for the hydrologic model update. The tech memo and the models will be sent to the Internal Hydrology Review Comity (IAHRC). Time will be budgeted to respond to comments from the IAHRC and make appropriate changes to the model.

Deliverables:

- A new hydrologic model of the Elm Creek Watershed in EPA SWMM
- A technical memorandum describing the assumptions and methods used to create the model and results
- Documentation of the QAQC analysis and responses to comments.

Task 4 – Hydraulics Update (Detailed Study Area)

This task will create a new hydraulic model of the Elm Creek watershed in EPA SWMM. This will be done for all detailed areas shown in the DNR figure for the Elm Creek watershed. The hydraulic analysis will be done for the 10%, 4%, 2%, 1%, and 0.2% peak flood events. In order to create this model, the following tasks will be performed:

- Import effective models and verify bridges and structures
- Create a duplicate effective combined model geometry
- Update/verify Mannings roughness based on recent soils, land use, and survey data
- Convert all data to NAVD88 Datum
- Cut sections at all existing model sections using LiDAR and burn in any cross section data
- Update overbank areas on existing cross sections
- Create peak flow files for each calibration hyetograph
- Perform floodway analysis
- Develop output tables
- Internal QAQC will be performed and documented as part of this task.

Deliverables:

- EPA SWMM models for each stage of the analysis and flood events.
- Documentation of the QAQC review process and responses to comments.

Task 5 – Hydraulics Update (Non-Detailed Study Area)

Non-detailed study areas will be analyzed with EPA SWMM where appropriate, and for all storm events as done in the detailed study areas. Cross sections will be cut in appropriate locations using statewide LiDAR. No channel information below the LiDAR elevations will be surveyed. Bridge and road crossing information will be entered based on as-built information.

Deliverables:

- EPA SWMM models for each stage of the analysis and flood events.
- Cross sections.
- Documentation of the QAQC review process and responses to comments.

Task 6 – Mapping

Inundation maps for the 1%, 0.2% and floodway scenarios will be developed for the detailed study areas using ArcGIS. The inundation shapefiles will be QAQC'd for accuracy and consistency with the model results. For non-detailed study areas, only the 1% events will be mapped. Geodatabases using the required DNR format will be produced. Depth Grids will also be generated for those scenarios.

Deliverables:

- Final Work Maps in digital format (PDF)
- Final Depth Grids for all return intervals as documented above.
- Final shapefiles for flood inundation areas, cross sections, and stream centerlines.
- Documentation of the QAQC review process and responses to comments.

Task 6 – Reporting

Wenck will provide written narrative documentation at the 60%, 90% and 100% levels. All steps will be distributed to the DNR and all cities in the watershed for comment and review. The 90% document will reflect the comments and changes from the 60% review, and the final document will address and additional comments from the 90% stage.

The summary report will document the process of creating the hydrology, hydraulics, and mapping products.

Deliverables:

- 60%, 90%, and Final reports.

Budget

The estimated cost to perform this work is shown by task below. Wenck will invoice the Watershed Commission monthly based on time and materials. Wenck will not exceed the authorized budget without obtaining written approval.

Task		Hours	Cost
1	Meetings	46	\$6,919
2	Data Collection and Review	30	\$3,596
3	Hydrology Update	158	\$18,442
4	Hydraulics Update (Detailed Area)	198	\$23,146
5	Hydraulics Update (Non-Detailed Area)	110	\$12,148
6	Mapping	128	\$13,020
7	Reporting	114	\$13,742
	TOTAL	784	\$91,013

Mr. Doug Baines
Chair
Elm Creek WMC
October 1, 2019



Schedule

The list below is a proposed schedule for key project deliverables and meetings. Those labeled with (target) are approximates depending on data availability. Wenck understands that this project is behind schedule and will work with the Commission and DNR to complete work based on the DNR's needs.

- Kickoff meeting (internal meeting) – **October 2019**
- Survey Received from DNR - **TBD**
- Submittal of Hydrology to IAHRRC – **April 2020 (target)**
- Submittal of hydraulic models to MnDNR for review and comment – **August 2020 (target)**
- Submittal of revised hydraulic model – **October 2020 (target)**
- Draft floodplain shapefiles and depth grids to MnDNR – **November 2020**
- 60% Draft Narrative to MnDNR for review and Comment – **November 2020**
- 90% Draft Narrative to MnDNR for review and Comment – **December 2020**
- All Preliminary files to MnDNR – **December 2020**
- Twin Cities HUC8 Flood Risk Review meeting – **January 2021**
- All final files to MnDNR staff – **April 2021**

On behalf of the 300+ employee-owners of Wenck, thank you for this opportunity to submit this proposal. Should you have any questions, or need clarification of anything, please do not hesitate to call me at 763-252-6880 or Erik at 763-252-6857.

Sincerely,

A handwritten signature in black ink, appearing to read 'Diane Spector'.

Diane Spector
Senior Water Resources/Principal

A handwritten signature in black ink, appearing to read 'Erik Megow'.

Erik Megow
Project Engineer/Associate