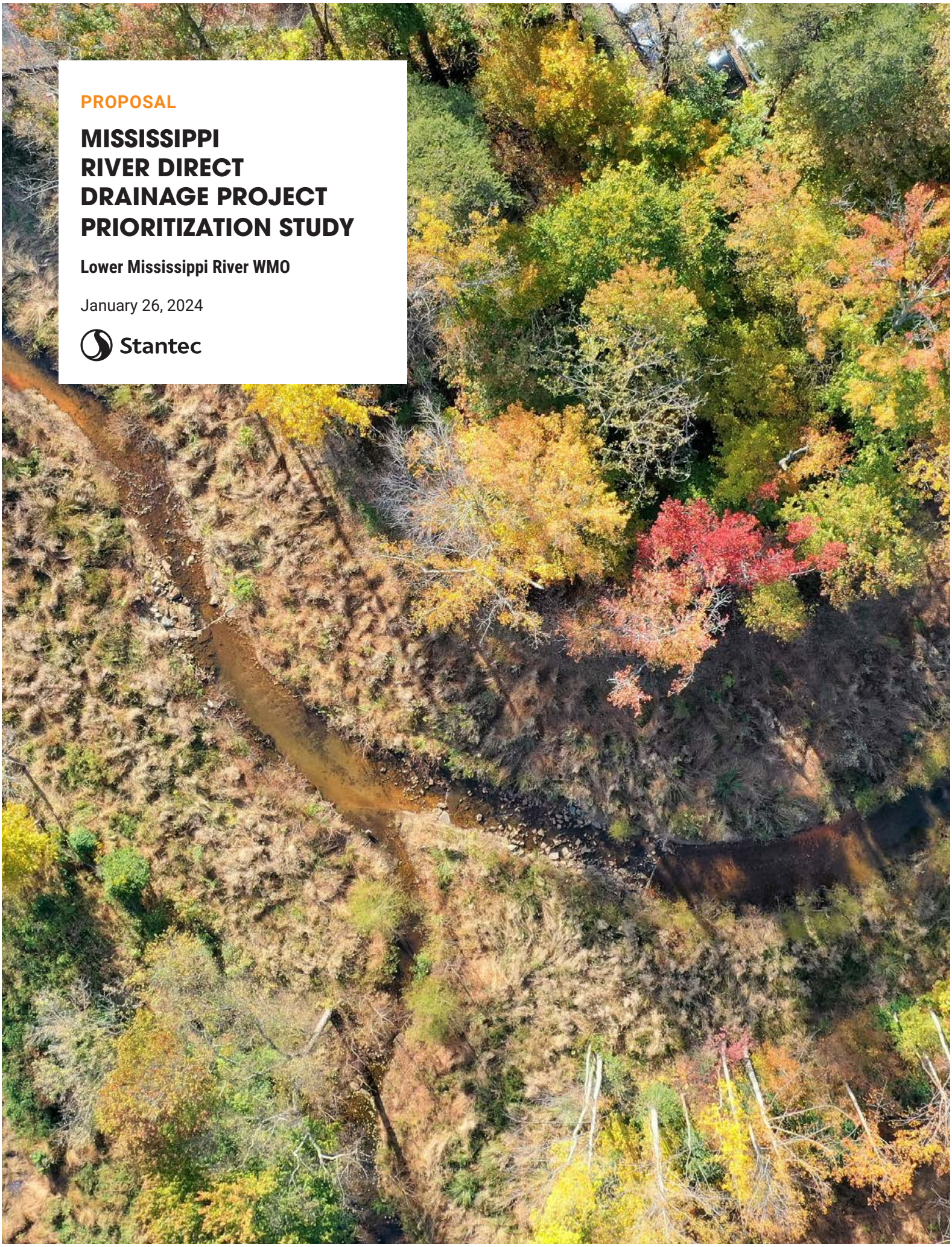


PROPOSAL

MISSISSIPPI RIVER DIRECT DRAINAGE PROJECT PRIORITIZATION STUDY

Lower Mississippi River WMO

January 26, 2024

Stantec

January 26, 2024

Lower Mississippi River WMO
Joe Barten, Administrator
via Dakota County SWCD
Dakota County Soil & Water Conservation District
4100 220th St. West, Suite 102
Farmington, MN 55024

Stantec Consulting Services Inc.
733 S Marquette Ave
Suite 1000
Minneapolis, MN 55402

One Carlson Parkway North
Suite 100
Plymouth, MN 55447

Main Proposal Contact
Erik Megow PE
Senior Water Resources Engineer
733 S Marquette Ave
Suite 1000
Minneapolis, MN 55402
763 252-6857
erik.megow@stantec.com

Secondary Proposal Contact
Chris Meehan PE, CFM
US Water Sector Lead and Senior Principal
One Carlson Parkway North
Suite 100
Plymouth, MN 55447
763 252-6844
christopher.meehan@stantec.com

RE: Lower Mississippi River WMO—Mississippi River Direct Drainage Project Prioritization Study

Dear Mr. Barten and members of the selection committee:

People and water are inextricably linked with the Mississippi River as one of Minnesota's most valuable water resources that has influenced both the region's history and its future. The water resources within the Lower Mississippi River WMO (LMRWMO) are highly visible and form a pathway through the community. Like other metro watershed organizations, staff and elected officials recognize the need to strengthen the link between how urban stormwater is managed and the protection of these resources–promoting improved water quality and erosion control.

Our team's ability to identify and rank erosion areas and large-scale BMPs will provide actionable strategies for meeting LMRWMO's constructability, costs, long-term maintenance, and pollutant and stormwater volume reduction goals.

Experienced Team: Our team of experts bring experience designing and constructing viable solutions for streambank restoration/stabilization, hydrologic and hydraulic modeling, and BMPs. We have helped watersheds prioritize projects, inform capital improvement plans, and provided the documentation/justification for funding. We understand the multitude of efficient pathways to implementation and the implications to design and long-term maintenance.

Solution-Driven Approach: Not only does the team understand watershed management and facilitation, but we also have on-the-ground experience with stream restoration, streambank stabilization, stormwater BMPs planning/design—providing the LMRWMO with a comprehensive road map that clearly prioritizes projects with erosion solutions, identifies pollutant reduction opportunities, and identifies realistic BMPs and strategies.

Planning and Funding Expertise: We have completed multiple projects of similar size and complexity in the metro and understand that this study needs to provide resilient feasibility-level solutions to meet current erosion issues and modeling to evaluate future solutions to reducing stormwater volume and peak rate. We will tap into Stantec's dedicated team of funding experts, who have secured more than $6 billion in grant and loan funding for our clients, to provide their expertise during our reporting process to identify project eligibility and funding strategies.

Thank you for this opportunity to serve the LMRWMO. Should you have any questions, or need clarification, please do not hesitate to reach out. We acknowledge Addendum 1. This proposal will remain valid for a period of not less than 90 days form the date of the submittal.

Sincerely,

STANTEC CONSULTING SERVICES INC.

Erik Megow, PE
Project Manager
763-252-6857
erik.megow@stantec.com

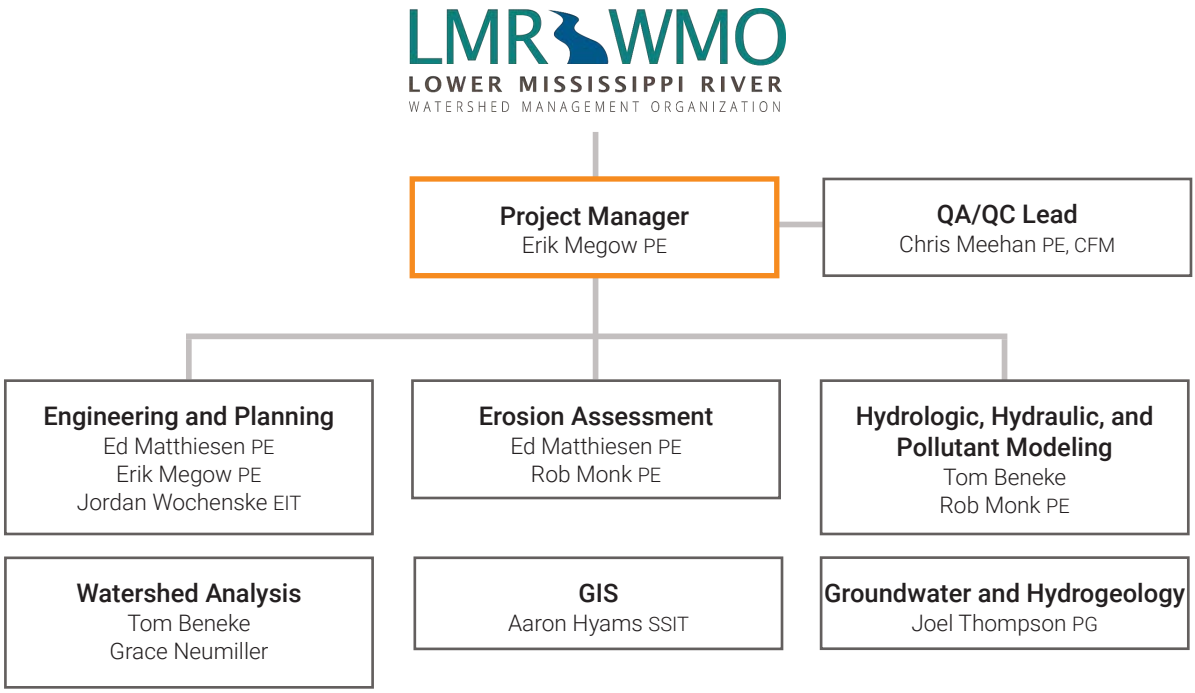
Chris Meehan, PE, CFM
Senior Principal
763-252-6844
christopher.meehan@stantec.com

2 PROPOSER'S TEAM

The below organizational chart identifies our key personnel that bring years of experience working together while delivering high-quality studies and projects. Each of our team members brings specific expertise to contribute to the success of your project–bringing together experts in watershed engineering, planning, and analysis; hydrologic, hydraulic, and pollutant modeling; erosion assessment; groundwater and hydrogeology; stormwater BMPs, and resilience.

Our team is uniquely positioned to provide the LMRWMO with a comprehensive, innovative, and cost-effective study that provides strategic direction for future decision-making and prioritization of projects–promoting improved water quality and erosion control and the prioritization of projects with potential grant funding opportunities.

Below are brief overviews of our key personnel and their expertise. Full resumes are provided in section 4.



Erik Megow PE | Project Manager, Watershed Planning

Erik has more than 14 years of extensive experience executing a wide-variety of stream restoration/stabilization, BMP assessment, and subwatershed assessment projects and will provide detail-driven leadership and responsiveness—keeping the project moving forward efficiently, on schedule and budget. Erik brings expertise in stormwater best management practice design, regulatory review, hydraulic and hydrology modeling, stream restoration and stabilization design, floodplain analysis, stormwater management, and surface water mixing zone modeling. Erik has experience and is proficient using XP-SWMM, PC-SWMM, EPA-SWMM, HydroCAD, HEC-RAS, HY8, CORMIX, P8, MIDS, Qual2k, ArcMap (GIS), and ArcGIS Pro.

Chris Meehan PE | QA/QC Lead

Chris brings more than 23 years of experience in watershed planning, water quantity and quality modeling, environmental review, stream restoration, and construction management and will provide the structure for the QA/QC protocols. He has served more than 12 watershed management organizations, three of them as District Engineer. His team was responsible for completing more than 146 projects in 2022/2023 including a wide variety of services ranging from watershed management, floodplain modeling, climate adaptation, stormwater BMPs, groundwater, water resources, funding solutions, and ecological restoration. In addition, Chris is the District Engineer for Minnehaha Creek Watershed District working with the District on more than 54 projects, ranging from watershed-wide model updates for FEMA to wetland restorations.

Ed Matthiesen PE | Environmental Engineering and Erosion Assessment Lead

Ed has more than 43 years of experience in water resources and environmental engineering and has completed more than 160 restoration and slope stability projects. Ed will lead the engineering and erosion assessment, bringing his experience to provide strategic recommendations. 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.

Jordan Wochenske EIT | Watershed Planning and Engineering Support

Jordan's water resources experience includes stormwater best management practice (BMP) design, regulatory review, hydraulic and hydrology modeling, stream restoration and stabilization design, floodplain analysis, and stormwater management. His field experience includes erosion and sediment control inspections, BMP inspections, construction observation, MS4 illicit discharge inspections and sampling, and stormwater pond sampling and analysis. Jordan is proficient in XP-SWMM, PC-SWMM, HydroCAD, HEC-RAS, MIDS, Win-SLAMM, and AutoCAD Civil 3D software/modeling programs.

Tom Beneke | Watershed Analysis; Hydrologic, Hydraulic, and Pollutant Modeling

With more than 10 years of experience, Tom specializes in water quality assessment, geospatial data analysis and mapping, and water quality modeling. Tom is an expert in modeling and development, having developed watershed models in New York, Puerto Rico, and Wisconsin. He recently completed his most sophisticated hydrologic model to date in northeastern Wisconsin to create a highly sophisticated and efficient model. Tom is adept at translating raw point-based projections to interpretable hydrography-based projections, creating a map application for visualizing multiple climate projection scenarios, and facilitating a positive user experience.

Grace Neumiller | Watershed Analysis Support

Grace is a water resources environmental scientist with a passion for limnology, water quality monitoring, freshwater and marine ecology, and statistical data analyses in R. She has synthesized water quality datasets across the Twin Cities Metro to understand drivers of water quality trends in over 1200 urban lakes and water bodies. At Stantec, Grace has expanded her water quality field techniques and analytical skills through P8 watershed runoff modeling, aquatic vegetation statistical analyses, infiltration testing, fisheries surveys, water quality monitoring and sediment coring, storm water sampling, and more.

Rob Monk PE | Erosion Assessment; Hydrologic, Hydraulic, and Pollutant Modeling

Rob has more than 15 years of experience 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. Rob also has experience with stream assessment, streambank stabilization, ravine restoration, and wetland banking projects.

Aaron Hyams SSIT | GIS

Aaron is a soil scientist and GIS analyst experienced in stormwater management projects, wetland delineations, soil reclamation projects, as well as a variety of other GIS-based projects relating to environmental services. Aaron brings experience hydraulic modeling in XP-SWMM (1D, 2D), HydroCAD, HEC-RAS, P8. He is proficient in developing GIS files and tools to support modeling efforts and inspection applications using a combination of Survey123 and ArcGIS Desktop.

Joel Thompson PG | Groundwater and Hydrogeology

Joel has more than 42 years of experience and expertise in groundwater flow and contaminant transport modeling, quantitative analysis of hydrogeologic systems, industrial contaminant site investigations, vadose zone contaminant fate and transport, and groundwater monitoring system design. Joel has a thorough knowledge of hydrogeologic aspects of municipal well field management, quantitative hydrogeology, and contaminant characterization and transport. He has extensive experience in groundwater flow and contaminant transport in fractured bedrock karst, alluvial deposits, and other complex geologic environments.

Firm Overview

The Stantec community unites more than 28,000 employees working in over 400 locations across 6 continents. We are planners, architects, engineers, designers, scientists, and project managers, innovating together at the intersection of community, creativity, and client relationships. Balancing these priorities results in projects that advance the quality of life in communities across the globe.

At Stantec, we approach every project we undertake—whether at the local, regional, or watershed level—thoughtfully and execute it with excellence. We partner with our clients to design solutions that address their communities' unique needs throughout the water infrastructure lifecycle.

Dedicated to Watershed Concerns

Our local engineers, scientists, and planners are recognized leaders in water resources. We serve more than two dozen water management organizations in Minnesota, as well as other water management organizations, counties, and municipalities throughout the country. With a reputation for innovation, we provide creative recommendations evaluated in terms of cost-effectiveness, reliability, practicality, implementability, and aesthetic qualities.

Our watershed expertise includes the full range of services from diagnostic studies, hydraulic and hydrologic, water quality monitoring, concept planning, final design to construction.

Commitment to Diversity and Inclusion

Stantec believes that diversity in our operations fosters a healthy range of views, facilitates innovation, improves results, creates opportunities, and is a moral responsibility. Diversity is our end goal and building an inclusive culture is how we get there. We work with industry-leading partners to guide us through the process, using industry best practices and helping us implement real change. Our programs address unconscious bias and champion organizational change.

Sustainable Cities and Communities

We envision a world where infrastructure gives back, water is protected, natural systems are valued, biodiversity is prioritized, economies are circular, nothing gets wasted, development is responsible, and everyone can access renewable energy. We recognize that to fulfill our promise to design with community in mind, we need to consider climate change in our project work. Our focus as design and consulting professionals is to help our clients see their projects through a climate lens—and then act on what they find. No matter your level of climate action maturity, our diverse services will help you adapt—and achieve your mitigation goals.

Our **holistic approach** to developing and managing water resources **balances** environmental, social, and economic needs—considering the inter-dependence of surface water and groundwater; **rivers and watersheds**; natural resources; and ecosystems.

Water Resources Planning and Management

Managing water resources requires a long-term view; this is why we support our projects with implementation plans, monitoring, and economic analyses. We effectively manage water with aesthetic and environmentally friendly designs that create opportunities for recreation and education, increase market value, and enhance the user experience—balancing mitigation, development needs, and community demands.

Construction Management

Stantec often serves as the day-to-day contractor/client liaison providing cost estimates, field observation and documentation, pay application review, submittal review, field engineering, survey services, project closeout, and warranty monitoring. Our construction management expertise on niche water resources projects includes streambank stabilization; innovative filters utilizing biochar as a bacteria removal medium; fish barriers; aluminum sulfate (alum) dosing; underground stormwater infiltration galleries; stormwater pond maintenance; green infrastructure; and flood control via storm sewer network improvements.

Groundwater and Hydrogeology

Our team has the technical expertise to identify groundwater sources and assess alternatives. We will characterize the extent of the problem, determine the options for mitigation, negotiate with appropriate regulatory agencies, and implement the approved plan. Our hydrogeological analysis and design tools allow us to identify groundwater flows and unsaturated groundflow resources. Stantec geologists, hydrogeologists, engineers, and water resource specialists work to understand your groundwater needs, and develop timely, cost-effective solutions that address the issue and advance your goals.

Hydrologic, Hydraulic, and Pollutant Modeling

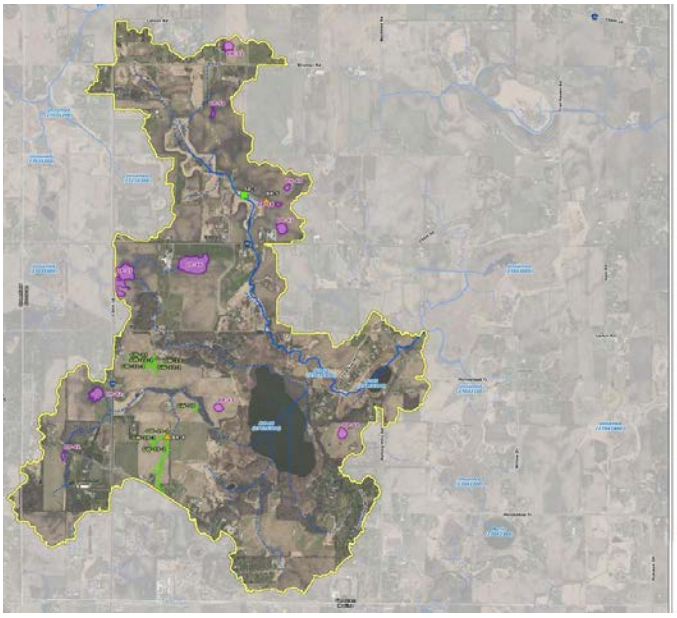
Our professionals are experienced with computer model-based designs for hydrologic and hydraulic studies, water quality analyses, and flood studies. This runs from planning, which includes hydrologic and hydraulic modeling platforms (XPSWMM, ICPR, ICM, InfoSWMM, Hec-RAS, HydroCAD), to water quality modeling platforms (P8, MIDS, WinSLAMM among others), and 3D Computational Fluid Dynamics (FLUENT, Fieldview, and Flow-3D). This includes local and regional expertise, as well as Stantec's hydraulic modeling Delivery Center. Our Delivery Center has 75 modeling staff to support projects across North America. The Delivery Center works with local staff to provide technical leadership and specialized project delivery services related to the analysis, systems modeling, and development of solutions related to the management, planning, and operational enhancement of urban water systems.

Federal, State, and Regional Programs

We regularly work with agencies to improve, enhance, and protect the natural resources in Minnesota. Our team works with these partners on regulatory, funding, and planning initiatives critical to the state. Through our strong relationships, we help navigate overlapping initiatives and streamline programs for more effective implementation.

We serve on advisory boards to the Minnesota DNR, PCA, BWSR, and EQB along with regional initiatives like the Minnesota Stormwater Research Council and Minnesota Cities Stormwater Coalition allowing us to stay in tune with the changing tides of partner priorities and directives.

Our strength in these relationships also helps secure funding sources to help move projects forward. Stantec's ability to work with regional, state, and federal funding sources has resulted in bringing more than $35 million in outside funding to our clients in Minnesota.



RUSH CREEK HEADWATERS AND SOUTH FORK SUBWATERSHED ASSESSMENTS

Hennepin County, Minnesota

Stantec completed a Subwatershed Assessments for the Elm Creek watershed in the 24 square mile Rush Creek Headwaters and South Fork priority areas. This exurban and agricultural subwatershed in Hennepin County on the edge of the Metro area drains to the North Fork and the South Fork of Rush Creek. The two streams are impaired by excess E. coli and low dissolved oxygen and one lake in the drainage area is impaired by excess nutrients Both of the fish and macroinvertebrate and fish communities are impaired due to high nutrient concentrations and altered habitat and flow.

The headwaters study area was subdivided into six Management Units (MUs) based on topography and drainage. The hydrology of each MU was modeled to estimate precipitation runoff and sediment and nutrient pollutant loading to the lakes and streams. In addition, a considerable amount of other data was collected for each MU to better understand the potential sources of sediment, nutrients, and bacteria. This data included topography, soil type and characteristics, land cover and land use, feedlot and other animal locations, potential septic system locations, stream conditions, and known flooding areas. Watershed staff, city staff, and residents in the area also provided valuable information about the conditions and problem areas.

Several methods and tools were used to identify the most feasible and cost-effective practices to address the several impairments in the study area, including both structural and nonstructural practices. These range from agricultural best management practices (BMPs) such as grassed waterways, alternative tile intakes, and manure management practices to streambank stabilization, septic system inspection and repair, and education and outreach. The model-generated BMPs were then reviewed to eliminate those that would be technically impractical or infeasible or which were likely to have minimal benefit. The most technically feasible were then evaluated for estimated cost and pollutant load reductions. The top ten practices by cost-effectiveness and pollutant load removals were identified for each MU.

In addition, each MU-scale assessment also identified fields that had the greatest sediment delivery potential, fields that were likely tile-drained, and animal locations that were in close proximity to stream or ditch conveyances. These are areas where outreach to property owners about additional practices they could consider would have the most potential impact on water quality improvement. The Elm Creek Watershed Commission subsequently received a Clean Water Fund grant to implement priority practices identified in the Subwatershed Assessment.

Year Completed
Headwaters Subwatershed Assessment: 2018

South Fork Subwatershed Assessment: 2024

Key Personnel & Project Role

Erik Megow: Project Manager
Tom Beneke: Technical Lead
Ed Matthiesen: Technical Assistance

Reference:
Kevin Mattson, PE
Public Works Director
City of Corcoran
763-400-7028
kmattson@corcoranmn.gov

RELEVANCY

- Watershed coordination
- Desktop analysis of sediment/ phosphorus sources
- Upfront work to define pollutants
- Identified grant funding opportunities to fit client's CIP Plan
- Stream restoration
- Stream rehabilitation
- Grant assistance
- Watershed modeling
- Partner collaboration

REITZ LAKE RAVINE

Carver County, Minnesota

Reitz Lake is a moderately-sized lake located east of the City of Waconia. The lake was impaired for excessive nutrients in 2002 and the TMDL, approved by the EPA in 2007, required a phosphorus load reduction of up to 1,129 pounds per year. A large ravine system, totaling 1,700 linear feet in length, is eroding into the lake, increasing nutrients to the lake. Since 2000, this ravine has contributed to a 1,100 square feet delta within the lake or roughly 3,500 cubic feet of sediment. With increasing storm intensities observed in Carver County, the rate of sediment is expected to increase over time unless the ravine is stabilized.

In 2023, Stantec completed a 30% design and opinion of probable cost for the stabilization of the ravine based on data collected in the field. As part of the stabilization concept, Stante calculated pollutant loads and reductions using the BWSR Water Erosion and Pollution Reduction Estimator 2.0. The ravine and subwatershed assessment found that the stormwater runoff routed through the ravine has caused severe erosion throughout 1,700 linear feet of the ravine. This erosion resulted in 298 pounds of phosphorus and 298 tons of sediment loading to Reitz Lake. Stantec completed the survey, design, and 30% design for the project.

As part of the design, Stantec prepared a stabilization concept for the ravine that would reduce annual phosphorus load by an estimated 199 pounds annually. Using the project construction estimate from the feasibility study, the Carver County Watershed Management Organization will look to align funding opportunities for the project to move into the final design and construction phases in 2024 and 2025.

One of the challenging design elements of this project was the coordination with private homeowners and an upcoming street reconstruction project to provide a resilient design that provides multiple options for construction access to limit tree removals and disturbances to adjacent properties.

Year Completed
2023

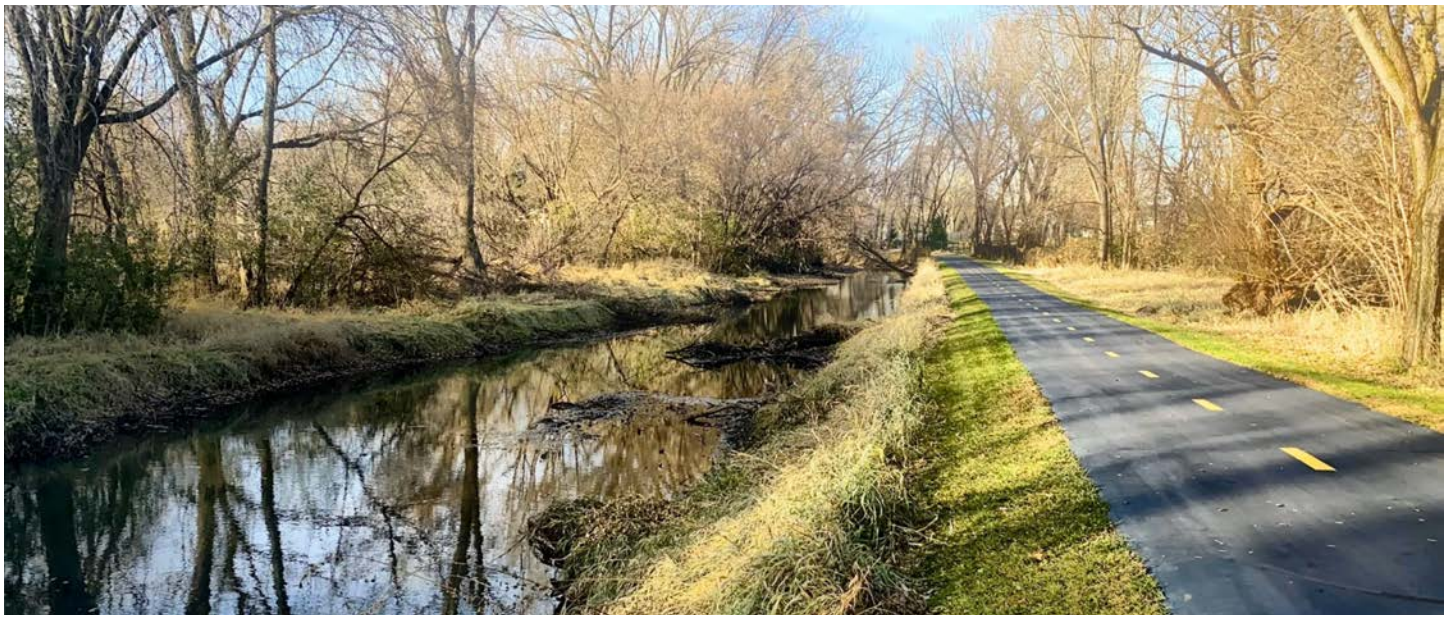
Key Personnel & Project Role

Erik Megow: Design Engineer
Ed Matthiesen: Senior Engineer Review
Rob Monk: Design Engineer

Reference:
Tim Sundby
Water Resources Supervisor
Carver County Water Management Organization
952-361-1816
tsundby@co.carver.mn.us

RELEVANCY

- Stream restoration
- Stream rehabilitation
- Watershed modeling
- Partner collaboration
- Watershed coordination
- Identified grant funding opportunities to fit client's CIP Plan



SHINGLE CREEK RESTORATION PHASE 1 AND 2

Brooklyn Park, Minnesota

Shingle Creek has been channelized and dredged as a flat-bottomed, trapezoid-shaped channel to convey high flows more efficiently. However, at low flows the channel is overwide, and stream depth is just inches or even dry. Shingle Creek has been designated by the State of Minnesota as an impaired water containing too much chloride from road salt and too little dissolved oxygen. It does not support a fish and macroinvertebrate community that would be expected in a stream of this size.

The City of Brooklyn Park hired Stantec to design a stream restoration project to stabilize eroding streambanks, improve water quality, and enhance habitat and aesthetics. Before restoration the Creek was overwide, with a flat bottom and eroding banks. Turf grass was maintained up to the edge of the creek. Stantec's design modified the stream from a ditched to a meandered stream reach with a native vegetation buffer stabilizing the stream banks and rock vane riffles providing grade control, reaeration, and new in-stream habitat.

A significant number of large cottonwoods and other trees were removed along the streambanks to increase light penetration to the Creek and to the streambanks, which were stabilized with willow live stakes and planted with a native buffer. Property corners were marked with decorative boulders indicating the edge of the buffer, to discourage property owners from encroaching into the buffer.

Following Phase I of the restoration project, the City hired Stantec to design a 1,500-foot stream restoration project upstream on Shingle Creek to stabilize eroding streambanks, improve water quality, and enhance habitat and aesthetics. Stantec's design retrofitted the stream within its existing channel with rock vanes, boulder toe, live stakes, and brush mattresses to stabilize the stream and provide habitat and reaeration improvements. A significant number of trees on the streambank was removed to increase light penetration and to remove leaning and undercut trees. Storm sewer outfalls were stabilized and rock plunge pools added to prevent channel bottom scour. As during phase I of the project, property corners were marked with decorative boulders to indicate the edge of the buffer and discourage property owners from encroaching into City owned property in the stream corridor.

Year Completed
2023

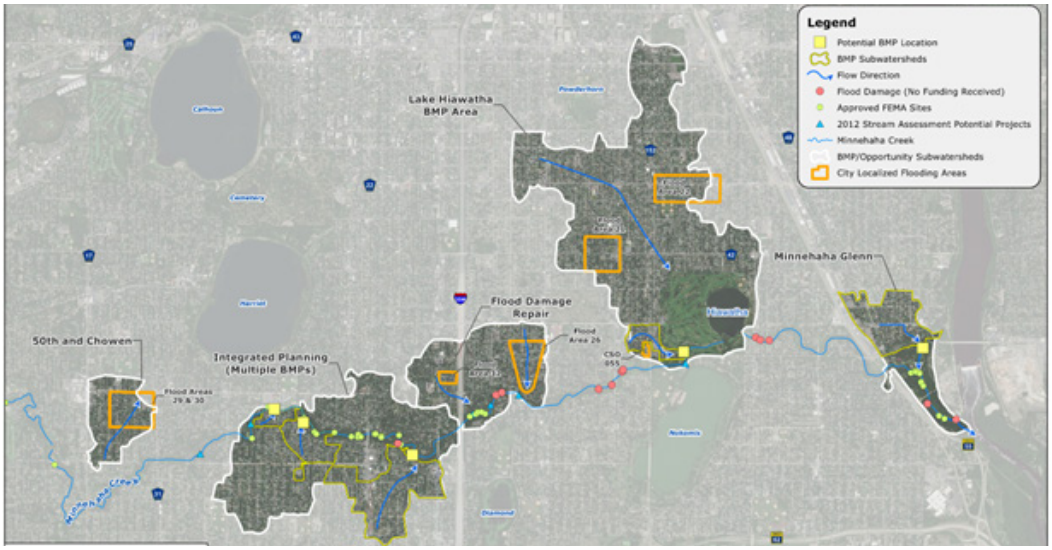
Key Personnel & Project Role

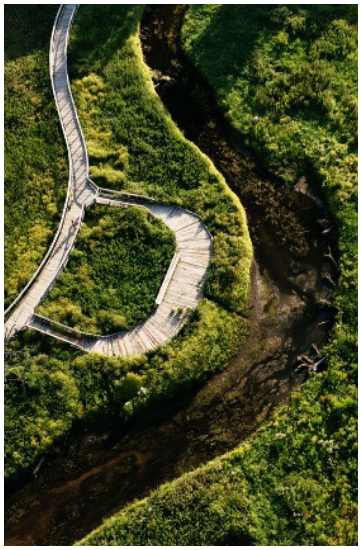
Erik Megow: Project Manager
Ed Matthiesen: Lead Engineer

Reference:
Mitchell Robinson
Water Resources Engineer
City of Brooklyn Park
763-493-8291
mitchell.robinson@brooklynpark.org

RELEVANCY

- Watershed coordination
- Stream restoration
- Stream rehabilitation
- Watershed modeling
- Grant assistance
- Partner collaboration
- Identified grant funding opportunities to fit client's CIP Plan





↑ *Targeted project identification integrated with the City of Minneapolis surface flooding priority areas.*

MINNEHAHA CREEK GREENWAY CORRIDOR STUDY

Minneapolis, Minnesota

Stantec worked with the Minnehaha Creek Watershed District (MCWD), Minneapolis Park and Recreation Board (MPRB), and the City of Minneapolis (City) to study the Minnehaha Creek corridor from the confluence of the Mississippi River to France Avenue. The study took a holistic manner in evaluating the corridor that integrates stormwater management, recreation, and natural resource improvements to identify potential best management practice locations along the Minnehaha Creek Corridor. The goal of the project was to identify locations to optimize total phosphorus reduction in terms of dollars per pound removed. The study involved site screening and analysis, rough grading plans, and preliminary cost estimating. Potential BMP locations were identified based on the following:

- Availability of public land
- Feasibility of connecting existing storm sewer network to proposed BMP via gravity or proximity to an existing lift station
- Contributing area to potential BMP
- TP load to potential BMP

Upon identification of a potential BMP site, proposed BMPs were preliminarily designed in AutoCAD Civil-3D using publicly available LiDAR data. To determine BMP efficiency, a P8 model was created to evaluate the efficiency of potential BMPs with TP removal rates being the primary parameter of interest.

BMP-specific summaries were compiled that present estimated project costs, estimated annual TP removal rates, effective costs, design-specific considerations, and other parameters.

With this report, stakeholders may select individual BMPs as project funding is available and planning efforts are completed, or BMPs may be wrapped into larger infrastructure improvement projects. Identification of potential BMP locations also provides the opportunity to incorporate future BMPs into regional master plans and other collaborative efforts going forward.

The outcome of the study was a comprehensive road map that would provide enough total phosphorus reduction opportunities such that the City of Minneapolis could meet assigned load reduction requirements to meet the Lake Hiawatha nutrient TMDL.

Year Completed
2019

Key Personnel & Project Role

Chris Meehan: Project Manager
Ed Matthiesen: Senior Advisor
Aaron Hyams: GIS

Reference:
James Wisker
District Administrator
Minnehaha Creek Watershed District (MCWD)
952-641-4509
Jwisker@minnehahacreek.org

RELEVANCY

- Watershed coordination
- Watershed modeling
- Partner collaboration
- Regional BMP siting and design
- Stream restoration
- Identified grant funding opportunities to fit client's CIP Plan

MINNESOTA RIVER BLUFFS PROJECT

Eden Prairie, Minnesota

Stantec was hired by the City of Eden Prairie to evaluate the slope failure, severity, and solutions for several hundred-foot-long bank failures on the Minnesota River. The failure potential would immediately affect a city-owned stormwater pond that was installed under a court order and remove residential backyards.

The investigation began with an air photography review showing the meander corridor would eventually go over the storm water pond resulting in massive material wasting and infrastructure loss as well as unresolved residential concerns. Soil borings and slope inclinometers were installed to measure the depth of slope plane failure and the rate of movement.

The results of the geotechnical work showed the rate of movement to be so slow that immediate construction of protective measures was not needed as potential solutions of toe stabilization and rock vanes to reposition the striking flow were more than one hundred thousand. The City and Lower Minnesota River Watershed District continue to monitor the inclinometers.

Year Completed
2020

Key Personnel & Project Role

Ed Matthiesen: Water Resource Engineer

Reference:
Carter Schulze
City Engineer
City of Eden Prairie
952-949-8339
cschulze@edenprairie.org

RELEVANCY

- Watershed coordination
- Stream restoration
- Stream rehabilitation
- Watershed modeling
- Partner collaboration
- Grant assistance
- Identified grant funding opportunities to fit client's CIP Plan

ERIK MEGOW

PE

PROJECT MANAGER

Erik is a water resource engineer with more than 14 years of experience as a consulting engineer and water resources. Erik brings expertise in stormwater best management practice design, regulatory review, hydraulic and hydrology modeling, stream restoration and stabilization design, floodplain analysis, stormwater management, and surface water mixing zone modeling. Erik has experience and is proficient using XP-SWMM, PC-SWMM, EPA-SWMM, HydroCAD, HEC-RAS, HY8, CORMIX, P8, MIDS, Qual2k, ArcMap (GIS), and ArcGIS Pro.

EDUCATION

BS, Mechanical Engineering, University of Minnesota, Twin Cities, Minnesota

BA, Physics, Lawrence University, Appleton, Wisconsin

REGISTRATIONS

Professional Engineer: Minnesota

RELEVANT EXPERIENCE

Elm Creek Watershed Management Commission | Plymouth, MN | Project and Client Manager
Erik has served as the Commission's Engineer since 2021 where he is assists the Commission with implementation of a comprehensive stormwater management plan. The Commissions have an active water quality management program that assesses the chemical and biological status of the stream systems and lakes. He was also the project manager for the HUC 8 HEC-RAS modeling updates.

Minnehaha Creek Watershed District | Minnetonka, MN | Project Manager
Erik was the lead permitting engineer for the Watershed District from 2014-2020. In this role he has helped District staff and applicants work through meeting the District's rules for stormwater management, waterbody crossing, erosion control, floodplain management, and wetland protection projects throughout the District.

Biochar- and Iron-Enhanced Sand Filters | Coon Rapids, MN | Lead Design Engineer
Erik was the lead design engineer for three innovative, large-scale iron-enhanced sand filters (IESFs) to also use biochar to target the removal of Phosphorus and bacteria (E. Coli) from stormwater and runoff. The two filters were constructed in 2020 for the Coon Creek Watershed District and have shown to be as effective at removing phosphorus and more effective at removing E.coli than a standard IESF.

HUC-8 FEMA Updates | Twin Cities, MN | Project Manager and Lead Modeler
Using FEMA grant money, Erik worked with the Minnesota DNR and Local Watersheds to update and complete floodplain modeling for waterbodies in the Twin Cities HUC-8 Area. Erik led the MCWD and Shingle Creek Watershed Management Commission studies and was a technical advisor for the Coon Creek Watershed District study to confirm the projects met FEMA modeling and reporting standards.

Streambank Stabilization Projects | Twin Cities, MN | Design Engineer
Erik performed hydrologic and hydraulic modeling to determine the design of suitable stabilization practices for various streams throughout the greater Twin Cities area including Woodcrest Creek in Coon Rapids, MN, Plymouth Creek in Plymouth, MN, South Creek in Lakeville, MN, and Straight River in Faribault, MN.

Natural Channel Stream Restoration Projects | Twin Cities, MN | Design Engineer
Erik performed hydrologic and hydraulic modeling to determine the design of suitable stabilization and restoration practices for various streams in the Twin Cities including Coon Creek, Bass Creek, and Shingle Creek. The restoration practices used included vegetated riprap, brush mattresses, log toe, root wads, cover boulders, and two-stage channel design.

Blue Lake BMP Assessment and Construction | Isanti, MN | Project Manager and Lead Design Engineer
The assessment included water quality review, wetland review, hydrologic and hydraulic modeling, site assessments, and surveying which lead to the construction a dual-cell settling basin to reduce both TSS and phosphorus to Blue Lake using Clean Water Funds.

CHRIS MEEHAN

PE, CFM

QA/QC LEAD

Chris has more than 23 years of experience in watershed planning, water quantity and quality modeling, environmental review, stream restoration, and construction management. He has served more than 12 watershed management organizations, three of them as District Engineer. Chris is responsible for leading 80 water professionals focused on developing targeted solutions to clients throughout the Upper Midwest. His team was responsible for completing more than 146 projects in 2022/2023 including a wide variety of services ranging from watershed management, floodplain modeling, climate adaptation, stormwater BMPs, groundwater, water resources, funding solutions, and ecological restoration. In addition, Chris is the District Engineer for Minnehaha Creek Watershed District, working with the District on 54 projects, ranging from watershed-wide model updates for FEMA to wetland restorations.

EDUCATION

MBA, University of Minnesota, Minneapolis, Minnesota

MCE, University of Minnesota, Minneapolis, Minnesota

BSCE, University of Minnesota, Minneapolis, Minnesota

REGISTRATIONS

Professional Engineer: Minnesota

Certified Floodplain Manager: Minnesota

RELEVANT EXPERIENCE

MCWD Greenway Study | Minneapolis, MN | Client Manager
Stantec identified potential best management practice locations along the Minnehaha Creek Corridor from the confluence of the Mississippi River to France Avenue. The goal of project was to identify locations to optimize total phosphorus reduction in terms of dollars per pound removed. Project involved site screening and analysis, rough grading plans, and preliminary cost estimating.

Lilleberg Grassed Waterway | Spicer, MN | Project Manager
Chris was responsible for the oversight of the design of a 1400-foot grassed waterway to address erosion concerns near the Middle Fork Crow River. Duties included site surveying, hydrologic and hydraulic modeling, generation of plans and specifications, cost estimate preparation, O&M plan preparation, bidding assistance, and construction oversight.

Pike Creek Channel Restoration Design | Maple Grove, MN | Lead Project Engineer
Chris served as lead project engineer for the $0.5 million Pike Creek Channel stabilization project. As lead project engineer he completed survey assistance, feasibility design, bid package preparation, and construction oversight.

Arden Park | Edina, MN | Project Manager
The City of Edina and Minnehaha Creek Watershed District partnered together to improve the creek, park, and trail system at Arden Park. The project aimed to improve water quality, restore stream health and habitat, provide a new park shelter and playground, and expand the trail system with paved, gravel, and boardwalk pathways to enhance the park user experience. The stormwater design included new underground stormwater pre-treatment structures and a series of six biofiltration cells to remove trash, sediment, and other pollutants before ultimately discharging into Minnehaha Creek. The new trail system included 250 lineal feet of boardwalk, 2300 lineal feet of bituminous and concrete trails/walks, 750 lineal feet of gravel nature trail, as well as retaining walls and treated timber stairs.

Plymouth Creek | Plymouth, MN | Project Manager
Chris was the project manager working for the Minnehaha Creek Watershed where the team worked with District Staff and FEMA to assess six streams for flood damage. Working with District staff, each stream was investigated and assessed for flood damage. GIS figures, coordinates, pictures, and an engineering estimation of each of the damage sites was presented to FEMA to procure over $1M of funds to use in stream restoration and mitigation projects.

Sauk River (GUS) – Turbidity TMDL Study | Sauck Centre, MN | Project Manager
The project included the development of a SWAT model to assess non-point source TSS loading for three tributaries in the upper Sauk River Watershed. The model was used to identify high-priority areas of upland sediment loss, inputs from in-channel erosion and the fate and transport of sediment through the channel networks. The results of the modeling were leveraged as input into the first EPA approved TMDL for the watershed district.

Coon Creek Watershed District | Minneapolis, MN | Lead Project Engineer
Chris has completed design and construction management oversight for stream bank repair projects—ranging from 100 feet to 1,000 feet in length.

ED MATTHIESEN

PE

ENVIRONMENTAL ENGINEERING AND EROSION ASSESSMENT LEAD

Ed has more than 43 years of 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.

EDUCATION

MBA, College of Saint Thomas, Saint Paul, Minnesota

MCE, University of Minnesota, Minneapolis, Minnesota

BA, Biology, Luther College, Decorah, Iowa

REGISTRATIONS

Professional Engineer: Minnesota and Wisconsin

RELEVANT EXPERIENCE

Coon Creek Watershed District | Twin Cities, MN | Project Manager
Annually support the District in the development of several small scale ($20,000-$50,000) bank stabilization plans and bid documents to solicit bids and help administer construction from pre-bid to final acceptance.

Shingle Creek and West Mississippi Watershed Districts | Twin Cities, MN | Engineer
Ed is providing stream restoration design to Hennepin County for a reach between Noble Ave and Brookdale Park and a second reach near Brooklyn Center City Hall. An earlier project prepared a corridor plan for the entire length of Shingle Creek using GIS and field reconnaissance to complete a concept.

Lower Minnesota River Watershed District | Eden Prairie, MN | Senior Reviewer
Ed is the senior reviewer for the stabilization of a 50 feet escarpment along 1200 feet of the Minnesota River in Eden Prairie. The work involves the preparation of a HEC-RAS model to predict erosive flow forces, the installation of two inclinometers, and selecting methods for temporary and permanent bank protection.

Minnehaha Creek Watershed District | Twin Cities, MN | Senior Review Engineer
Ed served as the senior review engineer for the design and construction of a detention pond as part of the Minnehaha Creek Watershed District's Gleason Lake Improvement Project. The project involved pond excavation, outlet construction, bank protection, channel cleanout, and modeling of flood elevation changes. Ed also designed and installed stream bank monitoring on Minnehaha Creek near the falls.

Coon Creek Watershed District | Twin Cities, MN | District Engineer
Ed has been the District Engineer for the Coon Creek Watershed District for the past 20 years. Ed has prepared plans and specifications for the repair and improvement of Sand Creek and Coon Creek. These repairs have included such materials as cable concrete, riprap, vegetation enhancement, gabions, and grouted riprap. He assisted the District in developing the stream bank program that constructs $50,000 worth of stabilization projects per year using a cost-effective construction procurement.

Shingle Creek Restoration Phase 1 and 2 | Brooklyn Park, MN | Project Manager
Project manager for the Shingle Creek Phase 1 between Brooklyn Blvd and Hampshire Avenue and Phase II between Hampshire Avenue and Candlewood Avenue. This project used bioengineering techniques for the stabilization and narrowing of ¼ mile of creek and used native material to narrow and stabilize the channel.

Additional Stream and River Restoration Projects:

- Pike Creek Channel Restoration | Maple Grove, MN | Project Manager
- Hardwood Creek/JD-2 Bank Stabilization | Minnesota, MN | Project Manager
- Ravine #2 Stabilization | Chanhassen, MN | Senior Designer
- Riley Creek Stream Stabilization | Eden Prairie, MN | Project Manager
- Clearwater River Stabilization | Annandale, MN | Project Manager
- Plymouth Creek | Plymouth, MN | Senior Design Engineer
- Applewood Road Gully Stabilization | Shorewood, MN | Project Manager
- Hurst Woods Gully Stabilization | Rockford, MN | Project Manager
- Shorewood Lane Channel Stabilization | Shorewood, MN | Project Manager

JORDAN WOCHENSKE

EIT

WATERSHED PLANNING AND ENGINEERING SUPPORT

Jordan's water resources experience includes stormwater best management practice (BMP) design, regulatory review, hydraulic and hydrology modeling, stream restoration and stabilization design, floodplain analysis, and stormwater management. His field experience includes erosion and sediment control inspections, BMP inspections, construction observation, MS4 illicit discharge inspections and sampling, and stormwater pond sampling and analysis. Jordan is proficient in XP-SWMM, PC-SWMM, HydroCAD, HEC-RAS, MIDS, Win-SLAMM, and AutoCAD Civil 3D software/modeling programs.

EDUCATION

BS, Biology, University of Wisconsin, Madison, Wisconsin

MS, Civil and Environmental Engineering, University of Wisconsin, Madison, Wisconsin

REGISTRATIONS

Engineer-In-Training, Wisconsin

RELEVANT EXPERIENCE

Coon Creek Watershed District XP-SWMM Model | Ham Lake, MN | Modeling Assistant
Assisted with the comprehensive hydrologic and hydraulic model in XP-SWMM of the district wide model for the Coon Creek Watershed. The comprehensive model encompasses approximately 70,000 acres and includes over 10 public ditch systems and numerous private ones. Assists with continual updates to the model to account for changes in land use/zoning to assess potential upstream and downstream impacts of potential projects. The project results are being used by MnDNR for HUC8 Study.

Biochar and Iron-Enhanced Sand Filters | Fridley, MN | Assistant Design Engineer
Assistant design engineer for two innovative, large-scale iron-enhanced sand filters (IESFs) with biochar to target the removal of Phosphorus and bacteria (E. Coli) from stormwater and runoff. The two filters were constructed in 2022-2023 for the Coon Creek Watershed District and the City of Fridley and have shown to be as effective at removing phosphorus and more effective at removing E. coli than a standard IESF.

Coon Creek Watershed District Permit Reviews | Ham Lake, MN | Permit Review
Provides permit application review for linear projects and developments to make sure project plans are in compliance with Coon Creek Watershed District requirements. Reviews include volume management, floodplain impacts, regional impacts, erosion control plans, water quality impacts, and rate and volume control requirements. Make sure Coon Creek Watershed District stormwater regulations meet any additional state, federal and other local requirements.

Coon Creek Watershed District Erosion and Sediment Control Inspections | Ham Lake, MN | Inspection
Performed erosion and sediment control inspections for the Coon Creek Watershed District. The duties associated with the inspections included project site analysis for stormwater BMPs, on-site structure inspection along with inspection photos, and inspection report drafting.

Minnesota MS4 General Permit and SWPPP | MN | Assistant Design Engineer
Assisted in providing support to multiple Municipal Separate Storm Sewer Systems (MS4) entities in Minnesota to achieve the requirements of the current Minnesota MS4 General Permit and the City's Stormwater Pollution Prevention Plan (SWPPP). Tasks included pond/BMP assessments, monthly site MS4 inspections, hosting educational outreach events, and leading training for institution staff.

Construction Observation Projects | Fox Valley, WI | Construction Observation
Projects included utility construction, private lateral installation on private homes and businesses, stormwater pond and biofilter construction, as well as road construction projects. Jordan's duties included detailed daily logs and photos of construction, troubleshooting field corrections, verification that the project meets the engineering specifications, and verifying proposed project quantities.

TOM BENEKE

WATERSHED ANALYSIS AND HYDROLOGIC, HYDRAULIC, AND POLLUTANT MODELING

Tom specializes in water quality assessment, geospatial data analysis and mapping, and water quality modeling. He recently worked on a team to develop the most recent release of EPA's Recovery Potential Screening tool, which is a state-specific analysis tool that allows users to comparatively evaluate watershed health by selecting from a suite of over 300 indicators of watershed health. For EPA's Creating Resilient Water Utilities (CRWU) program, he led the development of a utility-focused streamflow projection mapping application; this project required translating raw point-based projections to interpretable hydrography-based projections, creating a map application for visualizing multiple climate projection scenarios, and facilitating a positive user experience.

Tom is an expert in modeling and development, having developed watershed models in New York, Puerto Rico, and Wisconsin. He recently completed his most sophisticated hydrologic model to date in northeastern Wisconsin to create a highly sophisticated and efficient model.

EDUCATION

MS, Water Resources Management, University of Wisconsin, Madison, Wisconsin

BA, Environmental Studies, Lawrence University, Appleton, Wisconsin

RELEVANT EXPERIENCE

Nutrient and Sediment Modeling for Northeast Lakeshore TMDL* | WI | Modeler
For EPA Region 5 and Wisconsin DNR, completed watershed modeling for phosphorus and sediment TMDLs for nearshore watersheds draining to Lake Michigan in northeastern Wisconsin. Completed model setup and calibration using the Soil and Water Assessment Tool (SWAT) watershed model; the model was calibrated to 22 sites with observed data for streamflow, sediment, and phosphorus across a 2,000 mi2 study area. Used innovative methods to reduce model input complexity and optimize model execution time while maintaining data integrity. Summarized methods and results in a report that detailed model setup, model calibration/validation, and model results.

Diamond Lake Sediment BMP Assessment | Montezuma, IA | Technical Lead
Led the conceptualization of a pollutant (phosphorus and sediment) delivery study in the Diamond Lake watershed in central, agricultural Iowa. A primary component of this project was estimating watershed pollutant loading while capturing reductions from current and future BMPs within the watershed. Stantec developed an approach estimating pollutant loading using the SWAT and applying literature-based BMP reductions. The resulting pollutant loads were routed through ponds in a spreadsheet tool to predict pollutant loads delivered to different areas of the watershed.

Lake Independence Sediment and Phosphorus Modeling | Hennepin County, MN | Technical Lead
Tom is building a Soil and Water Assessment Tool (SWAT) model for the Lake Independence Watershed which has required developing the model from the conceptualization stage to model setup, calibration, and validation. Simulating phosphorus (TP) and total suspended solids (TSS) delivered to Lake Independence from a complex network of sources, including agricultural land, urban areas, livestock, channel degradation, and groundwater phosphorus. Model conceptualization has required thoughtful consideration of TMDL development datasets.

Lake Mallalieu Desktop Sediment Delivery Analysis | St. Croix County, WI | Technical Lead
Led the conceptualization of assessing sediment delivery to Lake Mallalieu following a planned dam removal, and subsequent temporary dam failure. Project required using limited publicly available datasets to estimate total phosphorus and total suspended sediments loads delivered to Lake Mallalieu pre- and post-dam disturbance. Developed sophisticated methodology for accurately estimating loads using a combination of multiple years of satellite imagery/aerial photography, and nearby USGS stream gage station data.

Auburn Wetland Phosphorus Transport Study | Carver County, MN | Technical Support
Analyzed water quality data in a small through-wetland to determine the cause of an increase in water column phosphorus concentrations coming out of the wetland. Worked with specialists across multiple disciplines (limnology, geology, and biochemistry) to determine the most likely causes of phosphorus increase based on variability of measure phosphorus concentrations throughout the wetland in the context of hydrogeologic and biotic factors.

**denotes projects completed with other firms*

GRACE NEUMILLER

WATERSHED ANALYSIS SUPPORT

Grace is a water resources environmental scientist with a passion for limnology, water quality monitoring, freshwater and marine ecology, and statistical data analyses in R. She has synthesized water quality datasets across the Twin Cities Metro to understand drivers of water quality trends in over 1200 urban lakes and water bodies.

At Stantec, Grace has expanded her water quality field techniques and analytical skills through P8 watershed runoff modeling, aquatic vegetation statistical analyses, infiltration testing, fisheries surveys, water quality monitoring and sediment coring, storm water sampling, and more.

EDUCATION

BA, Environmental Science and English, Colby College, Waterville, Maine

RELEVANT EXPERIENCE

Shingle Creek and West Mississippi Routine Monitoring | New Hope, MN | Field and Analytical Support
Grace currently serves as field support for the Shingle Creek Watershed Management Commission (WMC) and West Mississippi WMC routine monitoring programs. Located in east-central Hennepin County, these watersheds cover over 67 square miles across 10 municipalities. The Commissions routinely collect stream and lake water quality data, including macroinvertebrate and phytoplankton and zooplankton sampling. Grace has conducted routine water quality sampling of both lakes and streams for the past year. These efforts involve launching a boat, navigating the lake, and using water quality sampling devices such as the Van Dorn and water quality sonde.

Twin Cities Lake Water Quality Data Synthesis* | Twin Cities, MN | Researcher
Using R statistical analysis software and ArcGIS Pro, Grace synthesized long term water quality datasets for over 300 Twin Cities metropolitan area (TCMA) lakes into a centralized database. Grace harmonized the datasets using R tidyverse tools including dplyr, tidyr, and lubridate through database formatting, batch processing, and querying. Through the synthesis of diverse lake monitoring datasets, Grace evaluated landscape-level climate change drivers of water quality trends to better inform urban stormwater best management practices (BMP) to improve urban lake water quality. Grace also created a summary database of over 2000 TCMA lakes including data on BMPs, aquatic invasive species, water quality, location, physiology, biology, and watershed characteristics.

Submerged Aquatic Vegetation Statistics and Reporting | Plymouth, MN | Field and Analytical Support
Stantec works with Shingle Creek Watershed Management Commission and South Washington Watershed District to monitor lakes for invasive aquatic vegetation. Grace analyzed early and late season submerged aquatic vegetation (SAV) survey data in R to calculate SAV statistical parameters such as Shannon Diversity Indices, Aquatic Macrophyte Community Indices, and the Simpson's Community Index in 10 different lakes. She also assisted with project reporting for the watershed commission and district.

**denotes projects completed with other firms*

ROB MONK

PE

EROSION ASSESSMENT AND HYDROLOGIC, HYDRAULIC, AND POLLUTANT MODELING

Rob is a water resources engineer with more than 15 years of experience 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 also has experience with stream assessment, streambank stabilization, ravine restoration, and wetland banking projects throughout Minnesota.

EDUCATION

BS, Environmental Engineering, University of Wisconsin, Platteville, Wisconsin

BS, Watershed Hydrology and Management, University of Wisconsin, Stevens Point, Wisconsin

REGISTRATIONS

Professional Engineer: Minnesota

CERTIFICATIONS AND TRAINING

Erosion and Stormwater Management Certification

Dave Rosgen, River Assessment andMonitoring Training, Level III

Dave Rosgen and MnDNR, River Morphology and Applications Training, Level II

Dave Rosgen and MnDNR, Applied Fluvial Geomorphology Training, Level I

RELEVANT EXPERIENCE

Elm Fork of the Trinity River | Dallas, TX | Team Member
Team member for the geomorphic assessment of a section of the Elm Fork River upstream of the California Dam. Assessment objectives were to determine if a meander bend is actively eroding toward an existing 90" sanitary sewer and a proposed 96" sewer.

East Branch Beaver Creek | Silver Bay, MN | Team Member
The East Branch Beaver River is a designated trout stream located between the communities of Beaver Bay and Silver Bay, Minnesota. The project involves the realignment of the reach of the existing River to mimic the natural segment that is upstream of the project. Rob worked as part of a team to complete a geomorphic assessment for over 2,000 feet of East Branch Beaver River through the project area.

Sandpiper and Line 3 Pipeline Geomorphic Stream Assessments | MN | Team Member
In support of permitting efforts for the Sandpiper and Line 3 Pipeline Projects, Stantec performed an existing conditions geomorphic survey for each of sixty (60) proposed Minnesota stream and river crossings locations, using DL Rosgen developed methodology. The proposed crossings included both wadeable and non-wadeable streams and rivers across the State. Rob assisted in performing Rosgen Level II and Level III geomorphic stream surveys which included the following tasks: wadeable and non-wadeable stream survey, survey control, health and safety coordination, bankfull stage identification and analysis, longitudinal profile survey, plan form measurements, cross-section surveys, bed material characterization, site sketch maps, photo log, and report creation.

Lilydale Park Improvements | Saint Paul, MN | Hydraulics Lead
Rob worked in coordination with LHB to complete hydraulic analysis of various capping scenarios using HEC-RAS, a hydraulic modeling computer program. The analysis was used to complete a No-Rise Certificate for the City of Saint Paul. The project, designed by LHB, Inc., upgraded Lilydale Park along the Mississippi River through the addition of walking and biking trails and a pavilion/common area. Also included the creation of a 4' cap over a former dump site to meet MPCA standards.

King Island Channel Restoration | Anoka, MN | H&H Lead
This project involved the restoration of habitat within a 5000-linear foot side channel of the Mississippi River. The channel meandered through a floodplain forest within Kings Island in the City of Anoka. The project involved: the removal of two land bridges and culverts that crossed the channel and were causing channel sedimentation, excavation to re-establish channel depths, and removal of a sediment blockage to restore fish passage and develop pool habitat, as well as installation of root wads along the channel at select locations for fishery habitat. Rob worked as part of the design team and led hydrologic and hydraulic modeling efforts to estimate both minimum and peak flow levels through the channel.

AARON HYAMS

SSIT

GIS

Aaron is a soil scientist and GIS analyst experienced in stormwater management projects, wetland delineations, soil reclamation projects, as well as a variety of other GIS-based projects relating to environmental services. Aaron has experience supporting hydraulic modeling efforts in XP-SWMM (1D, 2D), HydroCAD, HEC-RAS, P8, and many other programs. He is proficient in developing GIS files and tools to support modeling efforts and inspection applications using a combination of Survey123 and ArcGIS Desktop.

EDUCATION

BS, Environmental Sciences, University of Minnesota, Minneapolis, Minnesota

RELEVANT EXPERIENCE

Minnehaha Creek Watershed District 2D Model | Minnetonka, MN | GIS Analyst
Aaron assisted Stantec engineers in adapting GIS stormwater network data layers for the Cities of Edina and Victoria to meet the MetroGIS data standards. Stormwater network data was collated and subsequentially reproduced into the MetroGIS data standard. The purpose of these efforts was to support the development of a watershed-wide 2D hydraulic model. Project deliverables included updates to the stormwater network GIS data using up-to-date and planned development layers in the form of a file geodatabase.

Diamond Lake SWA | Dayton, MN | GIS Analyst
Aaron worked as the GIS Analyst for the Diamond Lake Subwatershed Assessment project, which looked at identifying BMPs, both location and type, to reduce nutrient pollution to the lake in the form of total phosphorous (TP) and total suspended solids (TSS) reductions. Aaron utilized the USDA's Agricultural Conservation Planning Framework (ACPF) toolset within ArcGIS to identify and prioritize BMPs within the Diamond Lake Subwatershed, which is located within the Elm Creek Watershed District. BMPs were created and their relative nutrient removals were estimated, allowing for the creation of a prioritization list based on nutrient removal rates as well as total cost. Figures were generated using these datasets for the final report deliverable, and all GIS layers and shapefiles were packaged and exported to the client.

Eden Prairie Basin Analysis | Eden Prairie, MN | GIS Analyst
Aaron led efforts to collect and subsequently process data in the field both within and around the City of Eden Prairie's stormwater basins. The primary goal of this project was to identify the status of the City's stormwater basins by determining the relative accumulated sediment within each basin. To accomplish this, field staff collected stormwater asset data around each basin using survey grade GPS units, and relative sediment depths were captured within the basins using a combination of handheld GPS units and ESRI FieldMaps/Survey123 products. Aaron collected, processed, and analyzed all the data, producing a tabular output of basins prioritized by their relative accumulative sediment percentage. Figures were generated using these datasets for the final report deliverable, and all GIS layers and shapefiles were packaged and exported to the client.

HUC-8 FEMA Update | Anoka County, MN | GIS Analyst
Aaron ran hydrologic model outputs through a GIS-developed model which output flood event inundation polygons to provide a spatial representation of flooding. This project was in partnership with Coon Creek Watershed District and looked to update the FEMA Floodplain layer within the watershed district. Aaron produced GIS results from XPSWMM model data which were used in report figures. Final GIS layers and shapefiles were provided to the watershed district as well as the Minnesota Department of Natural Resources for the purpose of updating the FEMA flood hazard layer.

North Creek Lakeville SWA | Lakeville, MN | GIS Analyst
Aaron utilized county parcel data, soils data, slope data derived from LiDAR, as well as other datasets to identify prime locations to place BMPs. Final project deliverables included GIS figures and all GIS layers and shapefiles generated for the project.

JOEL THOMPSON

PG

GROUNDWATER AND HYDROGEOLOGY

Joel's expertise includes groundwater flow and contaminant transport modeling, quantitative analysis of hydrogeologic systems, industrial contaminant site investigations, vadose zone contaminant fate and transport, and groundwater monitoring system design. As a technical adviser, Joel develops and reviews hydrogeologic programs, and has provided support on numerous projects throughout the United States and abroad. He has thorough knowledge of hydrogeologic aspects of municipal well field management, quantitative hydrogeology, and contaminant characterization and transport.

He has extensive experience in groundwater flow and contaminant transport in fractured bedrock karst, alluvial deposits, and other complex geologic environments. Project experience includes landfill design and siting, site conceptual models, groundwater flow and contaminant transport modeling, third-party review, remediation system evaluation, remedial design and maintenance, and statistical analysis of geologic and groundwater chemistry data.

EDUCATION

BA, Bachelor of Arts, Geology, University of Wisconsin, Madison, Wisconsin

REGISTRATIONS

Professional Geologist: Minnesota, Texas

RELEVANT EXPERIENCE

Limestone Quarry | NJ | Peer Reviewer
Performed peer review of Conceptual Site Model and numerical groundwater flow model constructed to evaluate the potential influence of quarry dewatering project on ecologically sensitive surface water features proximal to the facility. Key elements of conducting the project were development of a complete conceptual model, construct ion, calibration and simulation of the model, and evaluation of potential surface water impacts. The calibrated model supported development of data acquisition strategy and site operations planning.

Former Manufacturing Facility | Springfield, MO | Lead Hydrogeologist
Served as lead hydrogeologist on a chlorinated solvent plume investigation and remediation project. Chlorinated solvents sourced from the historic operations of a manufacturing facility impacted groundwater in a deep aquifer utilized for water supply. Project activities included vertical profiling of contaminants, geophysical characterization of existing water supply well, and modification the water supply well to optimize remediation efforts. Managed a large scale groundwater extraction and/or treatment systems intended to protect adjacent local public water supplies. Project activities included development of a Site Conceptual Model and groundwater flow model, design of remediation systems, characterization of groundwater resources, and reporting to satisfy state and federal requirements.

Groundwater Contamination Superfund Site | San Bernardino, CA | Hydrogeologist
Provided a range of services to SBMWD pertaining to both the Newmark Groundwater Contamination Superfund Site and with respect to water resources evaluations. As part of the federally mandated remedial action for the NGCSS, a barrier groundwater extraction and treatment system incorporating municipal supply wells has been installed to inhibit downgradient migration of PCE and TCE impacted groundwater over an area approximately 2 miles in width. The system we installed introduced hydraulic controls that prevented the further migration of impacted groundwater into the water supply, and the discharge of treated water into the City water supply grid reestablished the water supply production capacity lost to the unidentified third party impacts.

Large-scale Contaminated Site | Denver, CO | Senior Hydrogeologist
As senior hydrogeologist, directed various activities related to investigation and remediation for a complex, large-scale site in Denver. The scope of the investigation portion of the project involved investigation and delineation of chlorinated solvent contaminants in unsaturated soils and unconsolidated and bedrock aquifers. The scope of investigation included installation of recovery and performance monitoring wells, the performance and analysis of groundwater extraction tests, and groundwater injection and tracer tests. Remediation activities included performance of hydraulic fracturing to improve performance of wells and facilitate delivery of in-situ remediation fluids in a low permeability environment.

Project Understanding

Stantec has assembled a local team of professionals experienced in watershed planning, stormwater management, and ravine stabilization. Our team can efficiently analyze and prioritize stormwater management and stabilization projects throughout the project area to help LMRWMO and its partners conceptually develop projects and set up your team for future funding sources.

Based on the tasks and goals identified in the RFP, our approach is proposed as follows.

STRATEGIC OPPORTUNITY PROCESS

1. Develop a common understanding of natural resource issues and drivers.
2. Understand local priorities by assessing partner and stakeholder existing plans and policies.
3. Integrate natural resource goals with local plans and policies.
4. Develop a strategic implementation and investment framework.

Work Plan

TASK 1: PROJECT KICKOFF

Before a formal project kickoff meeting, Stantec will compile the relevant shapefiles and existing information to identify data gaps that LMRWMO and its partner cities can help fill. Stantec will compile a GIS database containing publicly available information as well as any analysis that the LMRWMO and its cities are aware of, including but not limited to sub-watershed boundaries, storm sewers, other municipal utilities, contaminated sites, soils, LIDAR, seeps, city stormwater (H&H and WQ) models), land use layers, and defined growth goals. Stantec will also leverage the cities' local water management plans to use their delineations and models.

Stantec assumes data gaps could be filled by City staff. Stantec may look to fill gaps once priority areas are identified as part of field reconnaissance, or assumptions in the modeling could be made to address the data gaps.

Before scheduling the kickoff meeting, Stantec will also compile and map the following information from LMRWMO and its partners to have a productive kickoff meeting:

- Concern/issue areas from cities, to include in a preliminary issue map.
- Any known parcels of interest, based on public ownership and municipal growth/development plans.
- Any Key watersheds to target, presumably greater than 10 acres as these size watersheds typically benefit more from regional stormwater BMPs–allowing us to create more focus at the kickoff meeting.

After reviewing and compiling the identified data, Stantec will schedule a kickoff meeting with LMRWMO, City staff, and other stakeholders to talk through data gaps, project approach and assumptions to gain buy-in and create a general understanding of the areas to focus on our watershed analysis.

Our approach is to have the kickoff meeting be a focused working meeting which allows partners to better understand the landscape for potential stormwater BMPs and focused ravine analysis. We expect to send our compiled information out to partners a week before the kickoff meeting to give them time to review our initial data and project areas. Our goal is to have partners come to the kickoff meeting ready to discuss where the potential for implementation is the highest.

The final report for this project will include a log of data sources used in the study, gaps identified, and methods used to fill those gaps, along with key watersheds and areas for focus in the watershed and ravine analysis. As noted in Task 5, the GIS data will become part of the electronic information library provided to the LMRWMO at the end of the project.

TASK 2: WATERSHED DESKTOP ANALYSIS

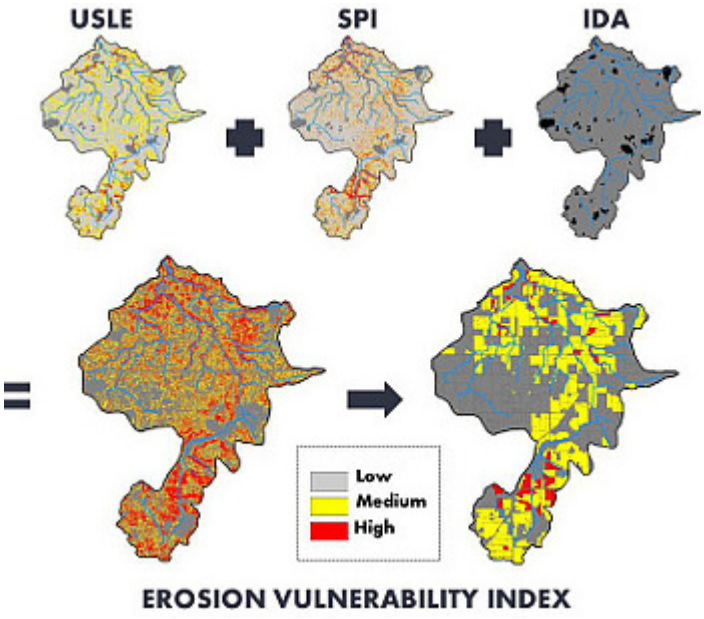
Stantec will begin our watershed analysis by incorporating watershed hot spots and areas of concern discussed at the kickoff meeting. From there, Stantec will use the Erosion Vulnerability Assessment for Agricultural Lands (EVAAL) toolset to evaluate probabilistic erosivity within the project area, and the results will be used to make prioritization determinations to supplement outputs and input from Task 1.

We would like to note that while the EVAAL tool was originally developed for targeting agricultural erosion potential, the fundamental principles for evaluation can be applied in both agricultural and non-agricultural landscapes given appropriate requisite input data.

The EVAAL tool prescribes a vetted workflow for preparing the underlying datasets for a desktop estimation of erosivity by:

1. Conditioning the LiDAR Digital Elevation Model (DEM).
2. Isolating internally drained areas (i.e. not hydrologically connected).
3. Calculating the Stream Power Index (SPI).
4. Estimating erosion using the Universal Soil Loss Equation (USLE) from a selected land cover dataset.

These spatial products are combined to generate a normalized Erosion Vulnerability Index (EVI) across the defined project area(s), providing a straightforward numerical basis for comparison across varied landscapes.



↑ *The EVAAL program layers critical data layers to help prioritize key ravines and watersheds.*

Image Source: WiDNR

Stantec will use the results of this analysis to make spatial determinations of highly erosive areas (i.e., ravines with high erosion potential) and the outputs and input from Task 1 from LMRWMO and partners. Stantec will then develop a prioritized subset of ravines and regional stormwater BMP opportunities for field verification and remediation.

In this Task, Stantec will also review the existing H&H and water quality models available to see what inputs could be validated at, or near the priority sites to ensure identified improvements could be adequately quantified.

TASK 3: FIELD RECONNAISSANCE

Before Stantec begins the field reconnaissance, it will be beneficial to have a meeting with LMRWMO and partner cities to review the results of Task 2 and get concurrence on the top 10 priority areas for stormwater management and ravine stabilization.

Stantec will spend a day doing a windshield analysis of our top 15-20 locations to confirm the 10 that we propose at this meeting align with the outputs of Task 2. It will be more efficient to have this meeting before collecting the field data as the field time is going to be a large portion of the overall project cost.

After getting concurrence from LMRWMO and the partner cities on the top 10 priority areas, Stantec will collect additional field data at the priority sites to help confirm and quantify erosion, water quality loads, and hydrologic and hydraulic characteristics. For our project budget, we assumed the top 10 priority areas would include approximately 5 priority ravines and five locations where we may be able to implement a regional stormwater BMP.

For the Ravine sites, we plan to collect pictures, notes, and surveys to develop conceptual designs. Stantec will also collect enough information to use the BWSR Water Erosion Pollution Reduction Estimator 2.0 to quantify the TSS and TP Loads due to erosion. Stantec will also prepare a Bank Erosion Hazard Index (BEHI) Map for up to five ravines to estimate the stabilization practices in Task 5. **An example of a BEHI map is below.**

North America Funding Program

Helping turn your plans into projects by simplifying a complex and competitive process.

150+
Stantec funding experts across North America

100+
Funding Programs leveraged to advance critical community projects

$300M+
Secured grants and loan funding for our clients with a success rate of more than 90% with EPA Brownfield grants

100+
Secured and/or implemented EPA grants in more than 20 states throughout 8 EPA regions

$6B+
Secured in grant and loan funding for our clients

$130M+
USDA Rural Development Community Facilities and Water/Waste Grants and Loans

↑ *As part of the analysis (Task 4), our team will bring in Stantec's North America Funding team to help identify funding programs for each of the alternatives and to help paint a vision for a pathway forward to implementation. Learn more.*

For the priority areas, Stantec will also document current conditions and potential impacts to stabilizing the ravine (adjacent properties and current natural resources in the area).For the regional stormwater BMP sites, we will collect pictures and get spot survey elevations of critical stormwater infrastructure and soil probes to quantify the sites' soil and hydrologic conditions which will be used to validate some of the H&H and water quality modeling in Task 4.

Based on field reconnaissance, we will discuss results and potential stabilization techniques and BMP implementation with the partners. At this meeting, we will come prepared with a preferred approach for cost and benefit quantification.

TASK 4: ANALYSIS AND PRIORITIZATION

This study's purpose is to identify, quantify, conceptually design, and prioritize regional stormwater BMP and ravine stabilization opportunities. With the top opportunities highlighted in Task 2 and the data collected in Task 3, Stantec will build out concept-level design sketches with typical details and cost estimates. Stantec will also complete water quality improvement calculations for the top 5 regional stormwater BMPs and top 5 ravine improvements using MN Board of Water and Soil Resources (BWSR) accepted pollutant reduction/water quality benefit estimation tools.

For the regional BMP sizing and water quality calculations, Stantec will leverage existing city H&H and water quality models to provide design parameters for the proposed improvements. Through that analysis, we will also evaluate the resiliency capacity of the improvements for future conditions.

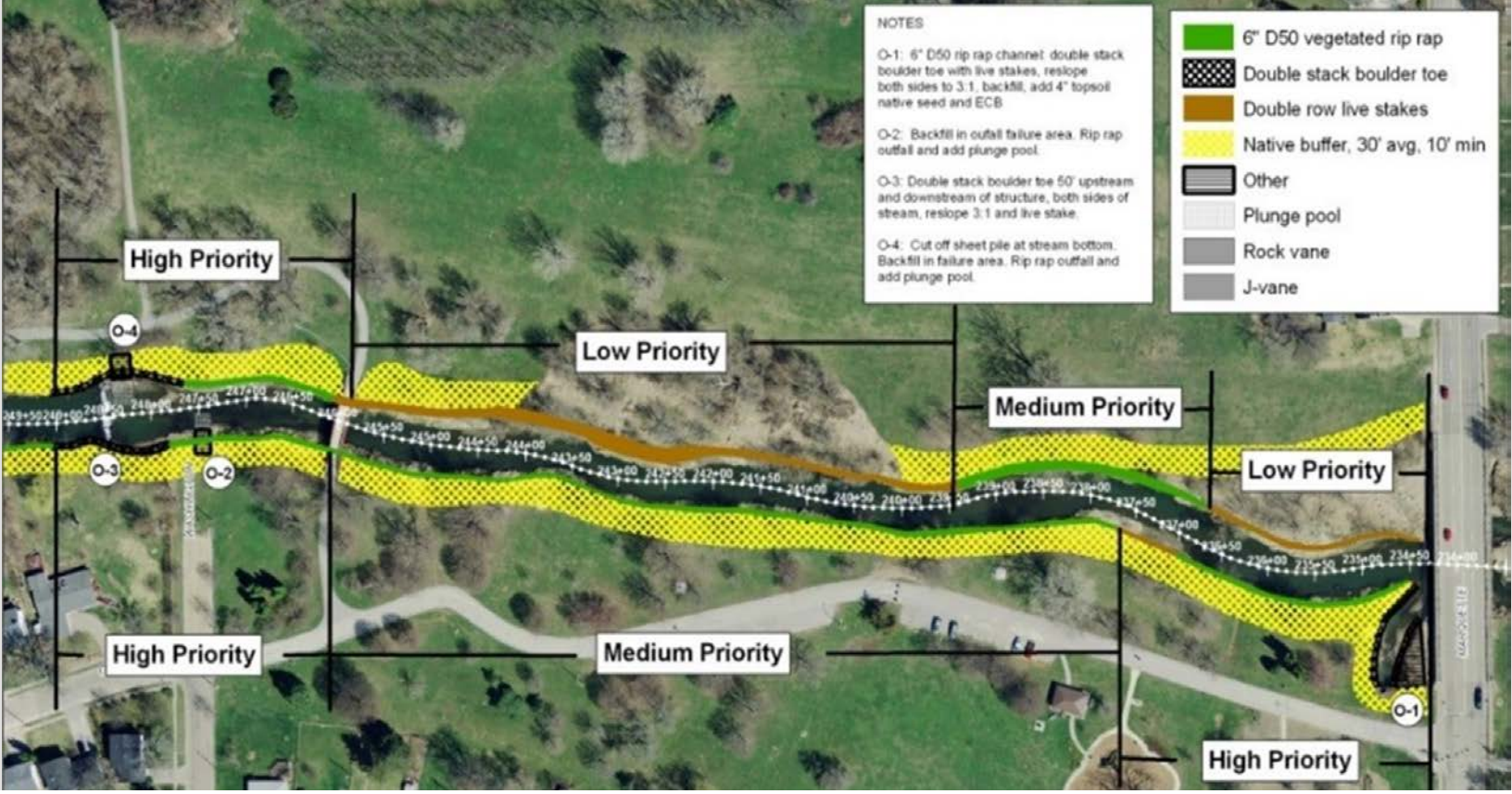
Where there are gaps in the H&H and WQ models, Stantec will use a combination of stream stats, HydroCAD, Manning's calculations, MIDS, and **Simple Method** calculations to estimate preliminary stormwater rates, velocities, volumes, pollutant loads, and footprint sizing.

To guide the development of the cost-benefit analysis, Stantec will first prepare a benefits matrix. This matrix will act as a blueprint for the analysis, meaning that the reader will be able to look at the matrix and understand how each priority area weighs against the goals of the LMRWMO and partners. The basis of the matrix will be a planning-level cost measured against the pollutant load (Total Phosphorus and Total Suspended Solids) reductions. Stantec has also helped partners create a more advanced cost/benefit matrices. The advanced matrix could take the form of a table with the below column headings—building off cost-benefit planning level estimates:

- **Benefit #**: 1, 2, 3, etc.
- **Merit Criteria**: safety, environmental sustainability, quality of life, economic competitiveness, partnership, collaboration, and innovation. Tying each benefit to one (or more) of the top 10 priority areas, clarifying how each benefit contributes to the larger project and may give LMRWMO a head start on implementation.
- **Benefit Description**: a short description of the benefit, for example, "reduced maintenance costs" or "greater community access and improvement".
- **Benefit Rationale**: further clarification as to why we anticipate the benefit to materialize, for example, "the project will limit trash removal" or "leverages nature based solution reducing overall life-cycle cost".

Pending the outcomes of our discussion, information gathering along with the development of the benefits matrix, and your feedback, our team may have residual data requests for LMRWMO moving forward with the benefit-cost modeling.

At the conclusion of this Task 4, a draft version of the technical report will be provided to LMRWMO and partners for comments and input.



↑ *A reach improvement schematic for a subreach of Duck Creek in Davenport, Iowa.*

TASK 5: ANALYSIS AND PRIORITIZATION

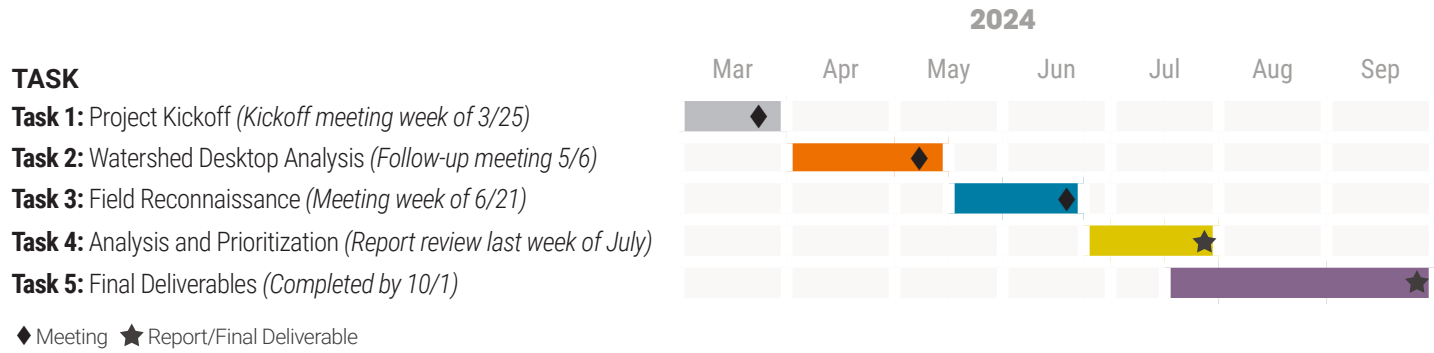
The work performed for this analysis will be delivered in a technical report that summarizes the project goals and objectives—clearly detailing methods and findings.

We expect that the bulk of this streamlined user-friendly report will consist of a series of figures showing our analyses from Tasks 2 through 4 including:

1. Existing conditions, recommended improvements by priority area.
2. Figures showing the locations of recommended priority BMPs and their potential footprint on the landscape.
3. Tables of those recommended actions by cost-effectiveness and priority.

PROJECT SCHEDULE

We have provided a preliminary project schedule with the timeline for each task, meetings, report review, and final deliverable.



PROJECT BUDGET

We have provide a detailed budget that includes a breakdown for each task and subtask with our key personnel's hourly rates, number of hours per task, cost per task, and total project cost.

	Project Team	Chris Meehan	Ed Matthiesen	Erik Megow	Rob Monk	Tom Beneke	Aaron Hyams	Grace Neumiller	Jordan Wochenske	TASK COST
	Rates	*$236*	*$212*	*$181*	*$165*	*$169*	*$140*	*$133*	*$140*	
TASK 1: PROJECT KICKOFF										
1.1	Data gathering			2		2	10			
1.2	Data gaps			4		4				
1.3	Identify initial areas of concern			4		4	4			
1.4	Parcel review and identification			4		4	8			
1.5	Parcel prioritization			4		4	4			
1.6	Project meeting	2		3		3				
	Task 1 Hour and Cost Totals	**2**	**0**	**21**	**0**	**21**	**26**	**0**	**0**	**$11,462**
TASK 2: WATERSHED ANALYSIS										
2.1	Hot spot review and determination (EVAAL)			4		4	10	4		
2.2	Review City stormwater management data/input to define priority ravine drainage areas			4		4				
2.3	Identify top 5 large scale/regional project BMPs	4		6		4	8			
2.4	Identify top 5 ravines			6		4				
	Task 2 Hour and Cost Totals	**4**	**0**	**20**	**0**	**16**	**18**	**4**	**0**	**$10,320**
TASK 3: FIELD RECONNAISSANCE										
3.1	Windshield analysis	2		4	4					
3.2	Meeting (discuss top 10 priority areas)	2		2		2				
3.3	Field walk through(s) of 10 locations (5 BMPs and 5 Ravines)		44		44					
3.4	Document current conditions and potential impacts to stabilizing ravine			2	38					
	Task 3 Hour and Cost Totals	**4**	**44**	**8**	**86**	**2**	**0**	**0**	**0**	**$26,873**
TASK 4: ANALYSIS AND PRIORITIZATION										
4.1	H&H model review to establish 2-, 10-, and 100-yr flows			8					20	
4.2	Develop concept level plans with typical details and cost estimates	2	2	5					40	
4.3	Water quality improvement calculations		2	8					20	
4.4	Ranking of projects using cost benefit matrix to present to the watershed	2		8					10	
4.5	Optional review meeting for proposed designs/cost/estimates and potential funding sources	1		2						
	Task 4 Hour and Cost Totals	**5**	**4**	**31**	**0**	**0**	**0**	**0**	**90**	**$20,239**

PROJECT BUDGET CONTINUED

	Project Team	Chris Meehan	Ed Matthiesen	Erik Megow	Rob Monk	Tom Beneke	Aaron Hyams	Grace Neumiller	Jordan Wochenske	TASK COST
TASK 5: FINAL DELIVERABLE										
5.1	Draft report	1		6		8		34	10	
5.2	Final report with all supporting electronic files and data (including maps, costs, and photos)	1		4		4		10		
	Task 5 Hour and Cost Totals	**2**	**0**	**10**	**0**	**12**	**0**	**44**	**10**	**$11,562**

	Total Project Hours	17	48	90	86	51	44	48	100	
									Stantec Labor	**$79,831**
									Expenses	**$625**
									Total Cost	**$80,456**

6 CONFLICT OF INTEREST

Our team has no conflict of interest for providing the services contained in the RFP.

Design with community in mind