Please note the meeting will be held in person at the Carver County Government Center on the Wednesday, January 19, 2022. The meeting will also be available virtually using this link.

LOWER MINNESOTA RIVER WATERSHED DISTRICT

Lower Minnesota River Watershed District

7:00 PM

Wednesday January 19, 2022

Carver County Government Center

602 East Fourth Street, Chaska, MN 55318

Agenda Item	Discussion
1. Call to order	A. Roll Call
2. Approval of agenda	
3. Citizen Forum	*Citizens may address the Board of Managers about any item not contained on the regular agenda. A maximum of 15 minutes is allowed for the Forum. If the full 15 So are not needed for the Forum, the Board will continue with the agenda. The Board will take no official action on items discussed at the Forum, with the exception of referral to staff or a Board Committee for a recommendation to be brought back to the Board for discussion or action at a future meeting.*
4. Consent Agenda	*All items listed under the consent agenda are considered to be routine by the Board of Managers and will be enacted by one motion and an affirmative vote of a majority of the members present. There will be no separate discussion of these items unless a Board Member or citizen request, in which event, the items will be removed from the consent agenda and considered as a separate item in its normal sequence on the agenda.* A. Approve Minutes November 17, 2021, and December 15, 2021 Regular Meeting B. Receive and file November 2021 and December 2021 Financial reports C. Approval of Invoices for payment i. Danial Hron – November 2021 Office Rent ii. Frenette Legislative Advisors – October 2021 Legislative Services iii. US Bank Equipment Finance – Payment on copier lease iv. Naiad Consulting – May 2021 Administrative Services and expenses v. TimeSaver Off-Site Secretarial Services – preparation of September meeting minutes vi. Young Environmental Consulting Services – September 2021 services vii. D. Receive and file December 2021 Citizens Advisory Committee meeting minutes E. Designation of 2022 Official newspaper F. Designation of Data Practices Compliance Official G. Designation of official depositories H. Authorize solicitation for proposals for legal, technical, and education and outreach services I. Authorize payment to City of Shakopee for PLOC Realignment/Wetland

	Restoration Project J. Authorize execution of Joint Powers Agreement with Dakota County for monitoring services
5. Special agenda item	A. Discussion with Representative Paul Torkelson
6. New Business/ Presentations	A. There is no new business
7. Old Business	A. Lower Minnesota River East One Watershed One Plan B. Audit and Financial Accounting Services Proposals C. Scott County LIDAR Request D. Burnsville Willow Creek Ravine Stabilization E. Cost Share Application - S. Mueller, 10745 Lyndale Bluffs Trail - no new information to report F. City of Carver Levee – no new information to report G. Dredge Management i. Vernon Avenue Dredge Material Management site ii. Private Dredge Material Placement H. Watershed Management Plan I. 2022 Legislative Action J. Education & Outreach K. LMRWD Projects *(only projects that require Board action will appear on the agenda. Informational updates will appear on the Administrator Report)* i. Area #3 Eden Prairie ii. Spring Creek Update L. Permits and Project Reviews - See Administrator Report for project updates *(only projects that require Board action will appear on the agenda. Informational updates will appear on the Administrator Report)* i. I 35W Trail Realignment (LMRWD No. 2021-035) ii. Cliff Road Ramps (LMRWD No. 2021-057) iii. MAC 2022 Perimeter Gate Security Improvements (LMRWD No. 2021-058) M. MPCA Soil Reference Values - No new information since last update
8. Communications	A. Administrator Report B. President C. Managers D. Committees E. Legal Counsel F. Engineer
9. Adjourn	Next meeting of the LMRWD Board of Managers is 7:00pm Wednesday, February 16, 2022.

Upcoming meetings/Events

- UMWA monthly meeting – Thursday, January 20, 2022, meeting will be virtual, contact District Administrator to attend
- LMRWD Corridor Management Plan Focus Group Session #1 (Threats) – Thursday, January 20, 2022, 10:00 PM – 12:00 noon – Virtual
- Seminary Fen Work Group – Monday, February 7, 2022, 10:00 to 11:00 am; MS Teams
- Savage Fen Work Group – Monday, February 7, 2022, 1:00 to 2:00 pm; MS Teams

- Dakota County Fen Work Group – Monday, February 14, 2022, 9:00 to 11:00 am; MS Teams
- Lower MN River East 1W1P – Thursday, February 17, 3:00 to 5:00, LeSueur and virtual

For Information Only

- **WCA Notices**
  - City of Shakopee - PLOC Pike Lake Pond Sediment Removal Notice of Application
  - City of Shakopee – PLOC Segment 5A Wetland Delineation Notice of Decision
- **DNR Public Waters Work permits**
  - Dakota County – Request for Comments – Permanent fill in the floodplain I-35W Trail
- **DNR Water Appropriation permits**
  - City of Bloomington –– amended Water Appropriation Permit [MPARS] Permit 1986-6091 for Skywater Technology Foundry for manufacturing semi-conductors

Item 4A
LMRWD 12-15-2021

LOWER MINNESOTA RIVER WATERSHED DISTRICT

Minutes of Regular Meeting
Board of Managers
Wednesday, November 17, 2021
Carver County Government Center, 602 East 4th Street, Chaska, MN 7:00 p.m.
Approved _____

1. **CALL TO ORDER AND ROLL CALL**
   On Wednesday, November 17, 2021, at 7:00 PM CST, in the Board Room of the Carver County Government Center, 602 East 4th Street, Chaska, Minnesota, President Hartmann called to order the meeting of the Board of Managers of the Lower Minnesota River Watershed District (LMRWD).

   President Hartmann asked for roll call to be taken. The following Managers were present: Manager Laura Amundson, President Jesse Hartmann, Manager Patricia Mraz and Manager Lauren Salvato. Manager Dave Raby was absent. In addition, the following joined the meeting: Linda Loomis, Naiad Consulting, LLC, LMRWD Administrator; John Kolb, Rinke Noonan, LMRWD Legal Counsel; and Della Schall Young, Young Environmental Consulting Group, LLC, LMRWD Technical Consultant. Steve Pany, Manager from Prior Lake Spring Lake Watershed District; Jennifer Gora, Metropolitan Airport Commission; and Lisa Frenette, Frenette Legislative Advisors, LMRWD Legislative Liaison.

2. **APPROVAL OF THE AGENDA**
   Administrator Loomis stated that she had no revisions or additions to the agenda.

   President Hartmann made a motion to approve the agenda as presented. The motion was seconded by Manager Salvato. Upon a vote being taken the motion carried unanimously.

3. **CITIZEN FORUM**
   Administrator Loomis reported that she had not received communication from anyone that wished to address the Board.

4. **CONSENT AGENDA**
   President Hartmann introduced the item.

   A. Approve Minutes October 20, 2021, Regular Meeting

   B. Receive and file October 2021 financial reports

   C. Approval of Invoices for payment
      i. EFH Co. – refund of project review fee
      ii. Frenette Legislative Advisors – September legislative service
      iii. Daniel Hron – October office rent
      iv. Inter-Fluve, Inc. – final invoice for Area #3 evaluation
      v. Rinke Noonan, Attorneys at Law – August 2021 legal services

vi. Star Tribune – publication of public hearing notice for 2022 budget in August
vii. US Bank Equipment Finance – Copier lease payment
viii. Young Environmental Consulting Group, LLC – July & August 2021 Technical and Education & Outreach services

Manager Amundson made a motion to approve the Consent Agenda. The motion was seconded by President Hartmann. Upon a vote being taken the motion carried unanimously.

5. NEW BUSINESS

A. Election of Officers

This item was tabled at the October 2021 Board meeting. Administrator Loomis explained that according to the bylaws the Board elects a President, a Vice President, a Secretary, a Treasurer, and an Assistant Treasurer. The Board discussed who would be willing to hold each office. President Hartmann was nominated to continue as President. Manager Mraz was nominated to continue as Vice President. Manager Salvato was nominated to continue as Secretary and Manager Amundson was nominated to office of Treasurer. Manager Raby was nominated to the office of Assistant Treasurer.

Manager Mraz made a motion to elect the slate of officers as presented. The motion was seconded by Manager Salvato. Upon a vote being taken the motion carried unanimously.

Attorney Kolb indicated that he would communicate with Manager Raby and inform him of his election to the office of Assistant Treasurer.

6. OLD BUSINESS

A. Burnsville Willow Creek Ravine Stabilization

No new information to report.

B. Cost Share Application - S. Mueller, 10745 Lyndale Bluffs Trail

No new information to report since last update.

C. City of Carver Levee

No new information to report since last update.

D. Dredge Management

i. Vernon Avenue Dredge Material Management site

No new information to report other than what was reported in the Executive Summary.

ii. Private Dredge Material Placement

Administrator Loomis advised the Board that all payments for 2020 placement of private dredge material has been received.

President Hartmann asked how water levels in 2021 impacted navigation. Administrator Loomis reported that, because of the heat and the drought in 2021 there were more grounding along the navigation channel, although not in the Minnesota River.

E. Watershed Management Plan

Administrator Loomis stated updates to the rules have been drafted. Updates are currently being reviewed so they can bring the revisions before the Board hopefully next month. Attorney Kolb explained the nature of revisions. The most significant revision to the rules concerns administrative approvals of projects – when can staff issue a permit and when does a permit need to come to the Board for approval. The goal is to make the permit approval process more streamlined and improve customer service.

Manager Salvato asked about the vetting process for the update to the rules. Ms. Young explained the reviews that will need to be completed before the rule updates are implemented.

F. 2022 Legislative Action

Administrator Loomis explained that the Board had talked about inviting Representative Paul Torkelson to a future meeting of the LMRWD. She noted that the Board should discuss the topics they wanted to bring up with Representative Torkelson.

Ms. Frenette recommended that she and Administrator Loomis meet with Representative Hanson and Senator Ingebrigtsen to talk about Area #3 and find out about drafting legislation.

She said we should express concern to Representative Torkelson about flood hazard mitigation and that the State does not need to set new pots of money, just fund the ones that are already set up. She noted that some of the funding set up for upstream water retention was not enough and that a significant amount has already gone to BWSR to establish a new program.

Manager Salvato asked Ms. Frenette how much traction there for her recommendation regarding the funding.

President Hartman stated he thinks that meeting with Rep. Torkelson is a good idea and noted they should invite him to a Board meeting, so they are all part of the conversation.

It was the consensus of the Board to invite Rep. Torkelson to the December Board meeting to discuss, legislation for combination of watershed districts and soil and water conservation district and flood mitigation programs.

She mentioned the Environmental Quality Board wants to make flood hazard mitigation as part of the 2020 state water plan. She asked if the LMRWD wants to be a part of this conversation or just have Lisa report back what is happening.

She noted that the Minnesota House of Representatives is closed down through the legislative session (all meetings will be virtual). Attorney Kolb spoke about the resolution coming before MAWD at its annual conference and that maybe the LMRWD might want to provide support to some of the resolutions, particularly related to the open meeting laws.

G. Education and Outreach Plan

No new information to report since last update.

H. LMRWD Projects

(Only projects that require Board action will appear on the agenda. Informational updates will appear on the Administrator Report)

i. Area #3 Eden Prairie

Administrator Loomis stated she had a meeting with the City of Eden Prairie. The City wants to request state funding for the project since a large contributing factor to the problem is the impact of upstream land uses on the flow of the River. She noted that she has spoken to Lisa Frenette, the legislative liaison for the LMRWD, about how to approach the legislature to request funding. She noted staff will be meeting with Inter-Fluve next week to get a cost estimate of the project to protect the slope from failure.

Ms. Young explained the work the anticipated and the need for the LMRWD to work with the City. President Hartmann asked if a motion was needed for staff to proceed. Attorney Kolb said the Board can provide a motion when the proposal for the work comes before the Board.

I. Project/Plan Reviews
(Only projects that require Board action will appear on the agenda. Informational updates will appear on the Administrator Report)

i. Triple Crown Residences Phase II (LMRWD No. 2021-045)
Administrator Loomis provided a brief overview of this project, noting they recommend approval of the permit request. Ms. Young that this permit does not have any conditions recommended for approval.

President Hartmann made a motion to approve a permit for Triple Crown residences Phase II (LMRWD No. 2021-045). The motion was seconded by Manager Salvato. Upon a vote being taken the motion carried unanimously.

ii. 2021 Safety and Security Center Phase I (LMRWD No. 2021-022)
Administrator Loomis noted this project is set to be constructed at Minneapolis/St. Paul International Airport.

President Hartmann made a motion to conditionally approve a permit for 2021 Safety and Security Center Phase I (LMRWD No. 2021-022) subject to receipt of a copy of the NPDES permit, contact information for the contractor and the contact information for the person(s) responsible for inspection and maintenance of all erosion and sediment control features). The motion was seconded by Manager Salvato. Upon a vote being taken the motion carried unanimously.

iii. Stump Road Maintenance (LMRWD No.2021-049)
Administrator Loomis stated this project is with the City of Bloomington because the project is in the floodplain and the City didn't assume responsibly for permitting under rules provided by the Board. The Board had some questions about the location of this project. Ms. Young explained the location and intent of the City for the project and whether or not the City plans to pave the road.

Manager Salvato made a motion to approve a permit for Stump Road Maintenance (LMRWD No. 2021-049). The motion was seconded by Manager Amundson. Upon a vote being taken the motion carried unanimously.

iv. Minnesota River Greenway (LMRWD No. 2021-027)
Administrator Loomis stated this project is a trail being proposed by Dakota County will connect the trail between Lone Oak Road and Cedar Avenue between Eagan and Burnsville. She noted there is a second component to the project that consists of a bridge over the railroad tracks. She noted that approval is recommended.

Ms., Young noted that the LMRWD had some concerns about the impact this project may have on the fens and trout streams in the area. She said that in the back and forth with the proponents of the project it felt like things were scaled back intentionally to fall below the threshholds of the LMRWD rules so that mitigations was not required.

President Hartmann made a to conditionally approve a permit for Minnesota River Greenway (LMRWD No. 2021-027) subject to receipt of a copy of the NPDES Permit, contact information for the contractor and contact information for the person(s) responsible for the inspection and maintenance of all erosion control features. The motion was seconded by Manager Mraz. Upon a vote being taken the motion carried unanimously.

v. City of Shakopee Municipal Local Government Unit Permit

Administrator Loomis stated it's recommended to do a partial approval because the City of Shakopee doesn't want to assume authority for the floodplain and drainage alterations.

President Hartmann made a motion to issue a municipal LGU permit to the City of Shakopee to partially administer Rule B—Erosion and Sediment Control and Rule D—Stormwater Management and fully administer Rule F—Steep Slopes. The District will continue to permit activities triggering Rule C—Floodplain and Drainage Alteration. The motion was seconded by Manager Salvato. Upon a vote being taken the motion carried unanimously.

vi. Burnsville I 35W Trail

Administrator Loomis reminded the Board that this is the project that the City of Burnsville had asked for the LMRWD to contribute to financially. She noted this is for the Board's information and that the City will need to apply for a LMRWD permit. She noted the City is working with Young Environmental to ensure the project will meet the standards of the LMRWD.

J. MPCA Soil Reference Values - no change since last update

7. COMMUNICATIONS

A. Administrator Report: President Hartmann asked about the MN Mash project that he saw reported in the Minneapolis Star Tribune. Administrator Loomis explained that the Savage City Council approved the project, but the LMRWD has not received an application for a permit.

Manager Salvato asked about Manager Raby's last meeting and whether the County has found a replacement. Administrator Loomis explained the process Hennepin County its open appointments. She said that she had reached out to individuals that had expressed interest in the District to notify them of the open position and she had not received any response.

B. President: No report
C. Managers: No report
D. Committees: No report
E. Legal Counsel: No report
F. Engineer: No report

8. ADJOURN

At 8:04 PM, President Hartmann made a motion to adjourn the meeting. Manager Salvato seconded the motion. Upon a vote being taken the motion carried unanimously.

The next meeting of the LMRWD Board of Managers meeting will be 7:00, Wednesday, December 15, 2021, and will be held at the Carver County Government Center, 602 East 4th Street, Chaska, MN. Electronic access will also be available.

Attest: _____
Lauren Manager Salvato, Secretary

_____
Linda Administrator Loomis, Administrator

Lower Minnesota River Watershed District (UNAUDITED)
General Fund Financial Report
Fiscal Year: January 1, 2021 through December 31, 2021
Meeting Date: January 19, 2022

Item 4.B.
LMRWD 1-19-22

BEGINNING BALANCE	**31-Oct-21**			**$ 1,728,508.45**
ADD:				
General Fund Revenue:				
Payments in Lieu		$	31.15	
2019 Watershed Based Funding grant - Fens		$	47,637.07	
Project review fees		$	2,250.00	
Insurance Premium Refund		$	5.00	
Total Revenue and Transfers In				**$ 49,923.22**
DEDUCT:				
Warrants:				
433176	Daniel Hron	$	650.00	
433298	Frenette Legislative Advisors	$	1,666.67	
433324	US Bank Equipment Finance	$	168.10	
100018294	Naiad Consulting, LLC	$	11,387.70	
100018305	TimeSaver Off-Site Secretarial	$	223.00	
100018307	Young Environmental Consulting	$	44,418.99	
Total Warrants/Reductions				**$ 58,514.46**
ENDING BALANCE	**30-Nov-21**			**$ 1,719,917.21**

Lower Minnesota River Watershed District
General Fund Financial Report
Fiscal Year: January 1, 2021 through December 31, 2021
Meeting Date: December 15, 2021

FY 2021

EXPENDITURES	2021 Budget	November Actual	YTD 2021	Over (Under) Budget
Administrative expenses	$ 250,000.00	$ 25,685.07	$ 208,973.12	$ (41,026.88)
Cooperative Projects				
Eden Prairie Bank Stabilization Area #3	$ 100,000.00	$ 69.00	$ 112,663.07	$ 12,663.07
Gully Erosion Contingency Fund	$ -	$ 2,824.50	$ 2,824.50	$ 2,824.50
USGS Sediment & Flow Monitoring	$ -	$ -	$ -	$ -
Ravine Stabilization at Seminary Fen in Chaska	$ -	$ -	$ -	$ -
Riley Creek Cooperative Project with RPBCWD	$ -	$ -	$ 150,000.00	$ 150,000.00
Seminary Fen Ravine Restoration site A	$ 75,000.00	$ -	$ -	$ (75,000.00)
Seminary Fen Ravine Restoration site C-2	$ -	$ -	$ -	$ -
509 Plan Budget				
Resource Plan Implementation				
Gully Inventory	$ -	$ -	$ 48,977.93	$ 48,977.93
MN River Corridor Management Project	$ 75,000.00	$ 3,934.00	$ 40,640.00	$ (34,360.00)
TH 101 Shakopee Ravine	$ -	$ -	$ -	$ -
Assumption Creek Hydrology Restoration	$ -	$ -	$ 2,125.50	$ 2,125.50
Carver Creek Restoration	$ -	$ -	$ -	$ -
Groundwater Screening Tool Model	$ -	$ 544.00	$ 952.00	$ 952.00
MN River Floodplain Model Feasibility Study	$ -	$ -	$ -	$ -
Schroeder Acres Park SW Mgmt Project	$ -	$ -	$ -	$ -
PLOC Realignment/Wetland Restoration	$ 70,000.00	$ -	$ -	$ (70,000.00)
Spring Creek Project	$ 75,000.00	$ -	$ 4,002.50	$ (70,997.50)
West Chaska Creek	$ -	$ -	$ -	$ -
Sustainable Lakes Mgmt. Plan (Trout Lakes)	$ -	$ -	$ -	$ -
Geomorphic Assessments (Trout Streams)	$ -	$ -	$ -	$ -
Fen Stewardship Program	$ 25,000.00	$ 4,352.85	$ 27,594.32	$ 2,594.32
District Boundary Modification	$ -	$ -	$ -	$ -
E. Chaska Creek Bank Stabilization Project	$ -	$ -	$ 77,457.31	$ 77,457.31
E. Chaska Creek Treatment Wetland Project	$ -	$ -	$ -	$ -
MN River Sediment Reduction Strategy	$ -	$ -	$ -	$ -
Local Water Management Plan reviews	$ 15,000.00	$ -	$ 1,285.50	$ (13,714.50)
Project Reviews	$ 50,000.00	$ 16,670.99	$ 117,452.23	$ 67,452.23
Monitoring	$ 75,000.00	$ -	$ 19,407.00	$ (55,593.00)
Watershed Management Plan	$ 10,000.00	$ -	$ 2,846.29	$ (7,153.71)
Public Education/CAC/Outreach Program	$ 30,000.00	$ 4,434.05	$ 55,121.19	$ 25,121.19
Cost Share Program	$ 50,000.00	$ -	$ 6,434.50	$ (43,565.50)
Nine Foot Channel				
Transfer from General Fund	$ -	$ -	$ -	$ -
Dredge Site Improvements	$ 240,000.00	$ -	$ 102.00	$ (239,898.00)
Total:	$ 1,140,000.00	$ 58,514.46	$ 878,858.96	$ (261,141.04)

LOWER MINNESOTA RIVER
WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting
Wednesday, January 19, 2022

Agenda Item
Item 4. E. - Designation of Official Newspaper

Prepared By
Linda Loomis, Administrator

Summary
In accordance with Minnesota Statutes, the LMRWD must designate a newspaper of general circulation in each county of the District as the general newspaper in which all hearing notices, advertising for bids, etc. are required to be published.

Since 2016, the LMRWD has used the Star Tribune as its official newspaper. The Star Tribune is qualified to serve as the legal and official newspaper under Minnesota Statutes Section 331A.02 Subd. 1. Staff would recommend this designation again for 2022. The Board should adopt Resolution 22-01 Designation of the 2022 Official District Newspaper.

Attachments
Resolution 22-01 Designation of the 2022 Official District Newspaper

Recommended Action
Motion to adopt Resolution 22-01 Designation of the 2022 Official District Newspaper

RESOLUTION 22-01

RESOLUTION OF THELOWER MINNESOTA RIVER WATERSHED DISTRICT BOARD OF MANAGERS

DESIGNATION OF THE 2022 OFFICAL DISTRICT NEWSPAPER

Manager _____ offered the following Resolution and moved its:

WHEREAS, Minnesota Statutes 103B and 103D require the publication of various official notices in a newspaper of general circulation within the District; and

WHEREAS, there are several local newspapers with circulation within the Lower Minnesota River Watershed District (LMRWD), these have local or limited circulation throughout the LMRWD; and

WHEREAS, the only newspaper of general circulation throughout the entire District is the Minneapolis Star Tribune.

NOW, THEREFORE, BE IT RESOLVED that the Lower Minnesota River Watershed District Board of Managers hereby names the Minneapolis Star Tribune as the official newspaper of the District for 2022.

The question on the adoption of the Resolution was seconded by Manager _____ and upon a vote being taken there were 5 yeas and 0 nays as follows:

	Yea	Nay	Absent	Abstain
AMUNDSON	☐	☐	☐	☐
HARTMANN	☐	☐	☐	☐
MRAZ	☐	☐	☐	☐
RABY	☐	☐	☐	☐
SALVATO	☐	☐	☐	☐

Upon vote, the President declared the Resolution adopted.

_____

ATTEST: Jesse Hartmann, President

_____

Lauren Salvato, Secretary

I, Lauren Salvato, Secretary of the Lower Minnesota River Watershed District, do hereby certify that I have compared the above Resolution with the original thereof as the same appears of record and on file with the District and find the same to be a true and correct transcript thereof.

IN TESTIMONY WHEREOF, I hereunto set my hand this 19 day of January 2022.

_____

Lauren Salvato, Secretary

LOWER MINNESOTA RIVER
WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting
Wednesday, January 19, 2022

Agenda Item
Item 4. F. - Designation of Data Practices Compliance Official

Prepared By
Linda Loomis, Administrator

Summary
The Minnesota' s Government Data Practices Act requires that all government entities in Minnesota adopt policies regarding access to government data. The policies explain how members of the public can access government data and provide contact information for the City staff members responsible for receiving and processing data practices requests. The District must update these policies by August 1 each year. Also, Minnesota Statutes require the District to appoint an individual as the Data Practices Compliance Officer and Responsible Authority.

The LMRWD Data Practices was adopted in 2014 and can be found on the LMRWD website using this link.

In accordance with MN Statutes and the LMRWD's Data Practices Policy, the Managers should annually designate a Data Practice Compliance Official, who is responsible to respond to public requests for LMRWD Data.

In the past the LMRWD Administrator has served as the Data Practices Compliance Official. It is recommended that the Board adopt the attached Resolution 2022-02 Appointing 2022 Data Practices Compliance Official and Responsible Authority.

Attachments
Resolution 22-02 Appointing 2022 Data Practices Compliance Official and Responsible Authority

Recommended Action
Motion to adopt Resolution 22-02 Appointing 2022 Data Practices Compliance Official and Responsible Authority

RESOLUTION 22-02

RESOLUTION OF THE LOWER MINNESOTA RIVER WATERSHED DISTRICT BOARD OF MANAGERS

APPOINTING 2022 DATA PRACTICES RESPONSIBLE AUTHORITY

Manager _____ offered the following Resolution and moved its adoption:

WHEREAS, the Lower Minnesota River Watershed District (the "LMRWD") Board of Managers is the official governing body of the LMRWD; and

WHEREAS, the Minnesota Government Data Practices Act (the "Act"), requires that the Lower Minnesota River Watershed District (the "LMRWD") prepare a written data access policy; and

WHEREAS, the Act and the LMRWD Data Practices Procedures adopted September 17, 2014 require that the LMRWD Board of Managers appoint a Data Practices Compliance Official and Responsible Authority that is the individual responsible for the collection, use, and dissemination of any set of data on individuals, government data, or summary data, unless otherwise provided by state law; and

WHEREAS, the LMRWD Board of Managers shares this concern regarding the responsible use of all LMRWD data and wishes to satisfy this concern by appointing an administratively qualified Data Practices Compliance Official and Responsible Authority as required under statute.

NOW, THEREFORE, BE IT RESOLVED that the Lower Minnesota River Watershed District Board of Managers, appoints District Administrator, Linda Loomis, as the Data Practices Compliance Official and Responsible Authority for the purposes of meeting all requirements of Minnesota Statutes, chapter 13.

The question on the adoption of the Resolution was seconded by Manager _____ and upon a vote being taken there were 5 yeas and 0 nays as follows:

	Yea	Nay	Absent	Abstain
AMUNDSON	☐	☐	☐	☐
HARTMANN	☐	☐	☐	☐
MRAZ	☐	☐	☐	☐
RABY	☐	☐	☐	☐
SALVATO	☐	☐	☐	☐

Upon vote, the President declared the Resolution adopted.

_____

Jesse Hartmann, President

ATTEST:

_____

Lauren Salvato, Secretary

I, Lauren Salvato, Secretary of the Lower Minnesota River Watershed District, do hereby certify that I have compared the above Resolution with the original thereof as the same appears of record and on file with the District and find the same to be a true and correct transcript thereof.

IN TESTIMONY WHEREOF, I hereunto set my hand this 19th day of January 2022.

_____

Lauren Salvato, Secretary

LOWER MINNESOTA RIVER
WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting
Wednesday, January 19, 2022

Agenda Item
Item 4. G. – Designation of Official Depositories

Prepared By
Linda Loomis, Administrator

Summary
According to MN Statute § 118A.02, the governing body of each government entity shall designate, as a depository of its funds, one or more financial institutions. Carver County has provided financial services to the LMRWD since 2013 and LMRWD funds were co-mingled and managed with the County's. As the LMRWD transitions to a new financial services provider, it will need to set up its own bank accounts.

LMRWD staff is currently working with the new financial service provider Clifton Larson Allen (CLA) to find new banking services. To be considered financial institutions must be familiar with and able to meet the requirements of MN Statutes. In addition, the considered financial institution(s) (including the 4M Fund established by the League of Minnesota Cities) must be able to collateralize deposits above insured amounts as established by the FDIC. The total amount of collateral shall be at least 10% (or other amount required by MN Statute) more than the amount on deposit that is in excess of the federal deposit insurance. The LMRWD may alternately choose to use other forms of collateral as allowed under Statute (such as US government Treasury bills, Treasury notes or Treasury Bonds).

Financial Institutions must be able to provide the following additional services to be considered:

- Availability of funds must not be less favorable than the requirement of the office of the Comptroller of the Currency, other regulatory bodies, or other relevant laws.
- Wire transfer services
- Automated Clearing House (ACH) capabilities

To be able to move the funds expeditiously once a new depository is found, the Board may, in accordance with Statute 118A.02, "…authorize the treasurer to: (1) designate depositories of the funds; (2) make investments of funds under sections 118.01 to 118.06 or other applicable law; or both designate and make investments as provided in the subdivision." The Board should designate the Treasurer to work authorize the Treasurer to execute all related documents necessary to establish and maintain the necessary accounts with review and assistance of legal counsel.

Attachments
Resolution 22-03 Designation of Depositories of the Lower Minnesota River Watershed District

Recommended Action
Motion to adopt Resolution 22-03 Designation of Depositories of the Lower Minnesota River Watershed District

RESOLUTION 22-03

RESOLUTION OF THE LOWER MINNESOTA RIVER WATERSHED DISTRICT BOARD OF MANAGERS

DESIGNATION DEPOSITORIES OF THE LOWER MINNESOTA RIVER WATERSHED DISTRICT

Manager _____ offered the following Resolution and moved its adoption:

WHEREAS, pursuant to Minnesota Statute Chapter 469.052, all governmental entities are required to designate depositories and a governmental entity's deposits and investments must comply with Minnesota Statutes Chapter 118A.

WHEREAS, the Lower Minnesota River Watershed District (LMRWD) is seeking one or more financial institutions to designate as the official depository for LMRWD funds; and

WHEREAS, these statutes allow the Board of Managers to authorize the Treasurer or Chief Financial Officer to annually designate a bank as the official depository for the LMRWD's funds and manage collateral pledged to such funds.

NOW THEREFORE, BE IT RESOLVED, that any funds deposited on behalf of the LMRWD at a financial institution that meets the requirements of Minnesota Statutes Chapter 118A are to be insured by the appropriate United States Governmental entity (FDIC or NCUA) or collateralized in accordance with the appropriate state statute; and

BE IT FURTHER RESOLVED, that the Treasurer or his/her designee, may designate one or more financial institutions as a depository of the LMRWD's funds and make investments of funds under Sections 118A.01 to 118A.06 or other applicable laws; and

BE IT FURTHER RESOLVED, that the President or his/her designee, is hereby authorized and directed to execute all related documents necessary to establish and maintain the accounts; and

BE IT FINALLY RESOLVED, that the authority granted by this Resolution shall be effective as of January 19, 2022 and remain in effect until rescinded.

The LMRWD Administrator is authorized and directed to furnish each depository with certified copies of this resolution along with such signature documentation as is required by the depository and the authorizations set forth in all above.

The question on the adoption of the Resolution was seconded by Manager _____ and upon a vote being taken there were ___ yeas and ____ nays as follows:

	Yea	Nay	Absent	Abstain
AMUNDSON	☐	☐	☐	☐
HARTMANN	☐	☐	☐	☐
MRAZ	☐	☐	☐	☐
RABY	☐	☐	☐	☐
SALVATO	☐	☐	☐	☐

Upon vote, the President declared the Resolution adopted.

ATTEST: _____
Jesse Hartmann, President

_____
Lauren Salvato, Secretary

I, Lauren Salvato, Secretary of the Lower Minnesota River Watershed District, do hereby certify that I have compared the above Resolution with the original thereof as the same appears of record and on file with the LMRWD and find the same to be a true and correct transcript thereof.

IN TESTIMONY WHEREOF, I hereunto set my hand this 19 day of January 2022.

_____
Lauren Salvato, Secretary

LOWER MINNESOTA RIVER
WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting
Wednesday, January 19, 2022

Agenda Item
Item 4. H. - Authorize Solicitation for proposals for legal technical and education and outreach services

Prepared By
Linda Loomis, Administrator

Summary
In accordance with Minnesota Statutes Section 103B.227 Subd. 5, a watershed management organization shall at least every two years solicit interest proposals for legal, professional, or technical consultant services before retaining the services of an attorney or consultant or extending an annual services agreement. It has been two years since the LMRWD advertised for proposals.

The date proposals are due has been left blank. The deadline will be set when publication in the State Register is requested. Those interested in proposing are given 30 days from the date of first publication. The advertisement will also be posted on the LMRWD website.

Attachments
Draft language to post on LMRWD website for legal, engineering and education and outreach service

Recommended Action
Authorize staff to prepare and publish advertisement for engineering, legal and education & outreach services

PUBLIC NOTICE

OF

LOWER MINNESOTA RIVER WATERSHED DISTRICT

REQUEST FOR PROPOSALS:

FOR LEGAL SERVICES

Pursuant to MSA 103B.227, Subdivision 5, the Lower Minnesota River Watershed District hereby solicits proposals for a legal consultant for the 2022 through 2024.

The Lower Minnesota River Watershed District invites proposals from a firm or individual(s) to provide legal counsel to the District.

Proposals setting forth the experience of the firm/individual(s) who would be interested in providing legal services for the Lower Minnesota River Watershed District should be sent electronically to:

Lower Minnesota River Watershed District
Linda Loomis, District Administrator
naiadconsulting@gmail.com

Proposals must be submitted on or before the close of business _____.

Please set forth in your proposal general information about the company/individual(s), and the experience of the individual(s) who propose to perform services for the District and the resumes of staff that would assist in providing the contractual services. Rates of individuals should be provided.

For answers to questions regarding this request contact Linda Loomis at 763-545-4659 or naiadconsulting@gmail.com

The Board will review all proposals received and reserves the right to request additional information from any and all proposers, to conduct interviews of the proposers, specifically lead staff proposed to provide services, to reject any and all proposals, and to otherwise take such action as it deems in the best interest of Lower Minnesota River Watershed District.

PUBLIC NOTICE

OF

LOWER MINNESOTA RIVER WATERSHED DISTRICT

REQUEST FOR PROPOSALS:

FOR LMRWD DISTRICT ENGINEER

Pursuant to MSA 103B.227, Subdivision 5, the Lower Minnesota River Watershed District hereby solicits proposals for consulting engineering services for 2022 through 2024.

The Lower Minnesota River Watershed District invites proposals from a consultant to provide engineering and technical services to the District.

Proposals should provide general information about the company and include a list of related work/projects/clients, a list of key personnel who propose to perform services for the District and their qualifications, qualifications of other staff that would assist in providing contractual services and a current fee schedule. Please include other services or specialties that may be pertinent. Proposals should be no longer than 10 pages, excluding resumes of key personnel.

Proposals should also include a summary of qualifications and unique expertise in the following areas:

1) Watershed, Subwatershed and Water Resource Management and Planning
2) Lake, Wetland and Stream Restoration and Management
3) Hydrologic, Hydraulic, and Water Quality Modeling and Analysis
4) Urban Stormwater BMO Design and Construction Management
5) Water Resource Permitting

Proposals must be submitted electronically on or before the close of business _____ to:

Lower Minnesota River Watershed District
Linda Loomis, District Administrator
naiadconsulting@gmail.com

The Board of Managers will review all proposals received, and reserves the right to request additional information from any and all proposers, to conduct interviews of the proposers, specifically lead staff proposed to provide services, to reject any and all proposals, and to otherwise take such action as it deems in the best interest of Lower Minnesota River Watershed District.

Overview:

Lower Minnesota River Watershed District (LMRWD) engineering and technical consultant shall assist in an ongoing process of setting and implementing the water management parameters within which the District will operate by:

- Identifying the technical consequences of choices;
- Discuss alternative solutions;
- Educate the Board and staff about the technical and regulatory issues involved; and

- Inform the District Administrator or project managers of the consequences of decisions that may affect natural resources within the District.

In this function, the District engineering and technical consultant shall routinely review and assess District water management plans, studies, capital programs and procedures to consider, among other things, whether they are 1) consistent with acceptable engineering practices, 2) achieve District goals, and 3) likely to produce positive, cost effective outcomes.

Scope of Services

In addition to service identified in the overview, District engineering and technical consultant shall also provide for:

1. The preparation for and attendance at any Board or Committee meeting of the LMRWD, including the review of relevant correspondence or agenda materials in connection with said meetings and any advice and opinions rendered therein;
2. Advice or response to routine questions from Board members or staff to assure that watershed activities are carried out in accordance with sound engineering and natural resource management standards and practices.
3. Other activities as negotiated under contract.
4. Understanding of State, Regional and Local Government and Watershed Management
    a. The District Engineer will maintain a current understanding of issues relative to District policies, projects, or programs.
    b. The District Engineer will demonstrate a current understanding of watershed and natural resource management
    c. The District Engineer shall be aware of state and regional plans and priorities related to watershed and natural resource management.
    d. The District Engineer will possess a high professional regard among his/her peers.

Additional Services

Upon written request of the District Administrator or his/her designee, The District engineering and technical consultant shall provide the following additional services:

1. Review and comment of plans, studies, designs, and other documents prepared by other engineering consultants.
2. The preparation of studies, plans, and designs to implement activities identified in the RPBCWD Water Management Plan.
3. Construction and/or Project management.
4. Water quality and flow monitoring, data analysis and repair and calibration of water monitoring equipment.
5. Assist staff with permit review and compliance issues.
6. All other engineering services he/she is qualified to provide and authorized by the District Administrator.

For answers to questions regarding this request contact Linda Loomis at 763-545-4659 or naiadconsulting@gmail.com

District Policy Relating to Member Communities and Other Governmental Jurisdictions

It is the Policy of the District that District Consultants may not simultaneously represent governmental jurisdictions fully or partially located within the District without prior written approval from the District Administrator.

PUBLIC NOTICE

OF

LOWER MINNESOTA RIVER WATERSHED DISTRICT

REQUEST FOR PROPOSALS:

FOR EDUCATION & OUTREACH SERVICES

The Lower Minnesota River Watershed District (LMRWD) invites proposals for a consultant to provide Education & Outreach services to the LMRWD. The Consultant will lead education and community outreach efforts in accordance with the LMRWD Watershed Management Plan, as amended. Applicants may be a company or an individual.

Proposals setting forth the experience of the company/individual(s) who would be interested in providing Education and Outreach services to the Lower Minnesota River Watershed District should be sent electronically to:

Lower Minnesota River Watershed District
Linda Loomis, District Administrator
naiadconsulting@gmail.com

Proposals shall be submitted on or before the close of business _____.

Proposals should not exceed 10 pages (excluding resumes) and provide general information about the individual/company that proposes to perform services for the District. Include a list of related work/projects/clients, a list of key personnel who propose to perform services for the District and their qualifications, qualifications of other staff that would assist in providing contractual services and a current fee schedule. Please include other services or specialties that may be pertinent.

Overview:

Lower Minnesota River Watershed District (LMRWD) Education and Outreach Coordinator (E&OC) shall coordinate implementation of the education and outreach goals articulated in the LMRWD's Watershed Management Plan (WMP), as amended.

The E&OC will work under the direction of the District Administrator. Primary duties of the E&OC will be to (not necessarily listed in order of priority):

1. organize and manage a Citizen Advisory Committee
2. Prepare and implement an education and outreach plan aligned with the goals of the WMP
3. Manage cost share incentive and water quality rehabilitation grant program
4. Prepare articles for publication on LMRWD website, Scott County SCENE, Carver County newsletter and local newspapers
5. Develop handouts and activities to use at community events
6. Coordinate volunteer activities for Master Water Stewards

7. Work with partners to develop a network of individuals and organizations to promote the Minnesota River
8. Assist preparation of Annual Report, project reports, public communications, etc.
9. Assist with organizing events such as River Tours, community events, etc.
10. Other activities as determined in coordination with the LMRWD Administrator and the Board

For answers to questions regarding this request contact Linda Loomis at 763-545-4659 or naiadconsulting@gmail.com

LOWER MINNESOTA RIVER
WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting
Wednesday, January 19, 2022

Agenda Item
Item 4. I. – Authorize payment to City of Shakopee for PLOC Realignment/Wetland Restoration

Prepared By
Linda Loomis, Administrator

Summary
In 2019, the LMRWD along with the City of Shakopee received a grant to restore a wetland and meanders to the Prior Lake Outlet Channel (PLOC) through the Ridge Creek Park housing development. The grant was awarded under the Metro-area Watershed Based Funding Pilot Program and included funding for four projects. The total grant was for $182,042. The grant included funding as follows: $25,472 for East Chaska Creek, $71,570 for The PLOC realignment/wetland restoration, $60,000 for Schroeder Acres Park, and $25,000 for BMPs in Downtown Shakopee.

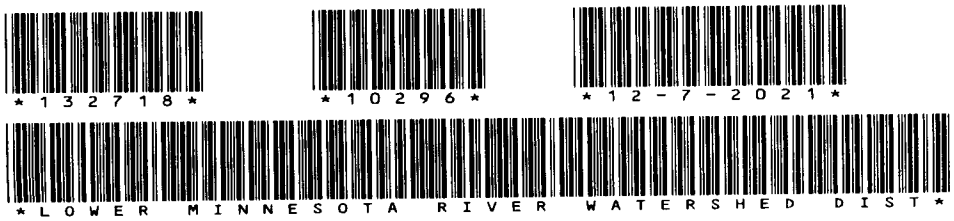
The grant was set to expire 12/31/2021. An extension of the expiration date to 12/31/2022 was granted by BWSR. The LMRWD holds the grant funds, and the City of Shakopee is responsible for implementation of the project.

The project is complete and the City is requesting the payment of the grant. The LMRWD agreed to contribute $100,000 to the project as well, and the project was included in the LMRWD Capital Improvement Program. The City provided documentation of the completed project and a request for reimbursement in December 10, 2021, too late to get on the December Board agenda.

Staff is reviewing the documentation and will advise the Board at the January meeting. In addition, staff will make sure the reporting of the grant through BWSR's elink has been completed. The request for reimbursement of the grant is 128 pages, so a link to that is included below.

Attachments
Request for Grant Reimbursement from the City of Shakopee
Request for Cost Share Reimbursement from the City of Shakopee

Recommended Action
Motion to authorize reimbursement of grant funds to City of Shakopee and authorize payment of LMRWD contribution conditioned upon satisfactory review of the documents and completion of elink reporting



Remit To:
CITY OF SHAKOPEE
485 GORMAN ST
SHAKOPEE MN 55379

INVOICE

10296

Billing Address: 132718
LOWER MN RIVER WATERSHED DIST
% LINDA LOOMIS
112 EAST 5TH ST SUITE 102
CHASKA MN 55318

Invoice Date **12/7/2021**

Due Date **1/6/2022**

Page: 1

Item	Remark	Amount
001		100,000.00
	COST SHARE REIMBURSEMENT REQUEST FOR PRIOR LAKE OUTLET CHANNEL REALIGNMENT/WETLAND RESTORATION PROJECT ANY QUESTIONS PLEASE CONTACT KIRBY TEMPLIN AT 952-233-9372	
	Total Amount Invoiced	100,000.00
	Balance Due	100,000.00

A Finance Charge of 1.50% interest will be assessed on all past due balances.
Finance charge compounded monthly

132718

CO 4020

City of Shakopee
Invoice Request Form

Invoice to: Lower Minnesota River Watershed District
Linda Loomis
112 East Fifth Street, Suite #102
Chaska, MN 55318

Date: 11/23/21

Items/Explanation	Account	Amount
Cost Share Reimbursement Request for Prior Lake	6862.6765	$ 100,000.00
Outlet Channel Realignment/Wetland		
Restoration Project		

Invoice Total $ 100,000.00

Invoice Requested by: Kirby Templin

Department Requested by: Engineering

Please return this completed form to Finance for Invoice processing.

SHAKOPEE

November 23, 2021

Linda Loomis
Lower Minnesota River Watershed District
112 East Fifth Street, Suite #102
Chaska, MN 55318

Re: Cost Share Reimbursement Request for Prior Lake Outlet Channel Realignment/Wetland Restoration Project

Dear Linda:

I am pleased to inform you the Prior Lake Outlet Channel Realignment/Wetland Restoration Project is complete. I am requesting on behalf of the City of Shakopee for reimbursement of $100,000 from the Lower Minnesota River Watershed District as outlined in Table 4-1 of the Lower Minnesota River Watershed District Comprehensive Watershed Management Plan.

The following documents are attached for this request.

- Table 4-1 from Lower Minnesota River Watershed District's Comprehensive Watershed Management Plan
- Pay Voucher 7 for Construction of the Ridge Creek Park & PLOC Improvements Project

Please do not hesitate to contact me with any questions or concerns.

Thank you and the Lower Minnesota River Watershed District for your contribution to this project.

Kind regards,

Kirby Templin,

Environmental – Water Resources Engineer
City of Shakopee
(952)233-9372
ktemplin@shakopeemn.gov

Table from Lower Minnesota River Watershed District's Comprehensive Watershed Management Plan

Table 4-1: Lower Minnesota River Watershed District - Implementation Program Budget for 2018 -2027

ACTION	Year									
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Administrative/Managerial										
General Administrative Services, Conferences, Coordination with LGUs, Stakeholders and other Project Partners, LGU Program Reviews, 9-Foot Channel, and Advisory Committees (Technical and Citizen)	$250,000	$250,000	$250,000	$250,000	$250,000	$250,000	$250,000	$250,000	$250,000	$250,000
Studies and Programs										
Cost Share Incentive and Water Quality Restoration Program	$20,000	$20,000	$20,000	$50,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000
Education and Outreach Program	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$40,000	$40,000
Fen Stewardship Program	$75,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Geomorphic Assessments (Trout Streams)	$50,000		$50,000				$50,000	$50,000		
Monitoring Program	$65,000	$65,000	$65,000	$75,000	$75,000	$75,000	$75,000	$75,000	$100,000	$100,000
Paleo-limnology Study (Floodplain Lakes)	$50,000						$50,000			
Sustainable Lake Management Plans (Trout Lakes)	$50,000		$50,000		$50,000		$50,000	$50,000		$50,000
Vegetation Management Plan		$50,000							$65,000	
Water Resources Restoration Fund			$100,000	$100,000	$120,000	$125,000	$100,000	$100,000	$160,000	$150,000
Capital Improvements										
Assumption Creek Hydrology Restoration Project		$30,000								
Carver Creek Restoration Project		$80,000	$15,000							
Minnesota River Corridor Management Project			$25,000	$75,000						
Groundwater Screening Tool Model	$50,000	$50,000	$50,000							
District Boundary Modification Project	$10,000									
Downtown Shakopee Targeted BMP Feasibility Study					$50,000					
Dredge Site Restoration Project	$240,000	$240,000								
Eagle Creek (East Branch) Project	$10,000	$10,000								
East Creek Bank Stabilization Project		$50,000								
East Creek Water Quality Treatment Project		$50,000	$25,000							
Minnesota River Assessment of Ecological and Economic Impacts of Sedimentation							$25,000	$30,000	$45,000	$50,000
Minnesota River Assessment of Water Storage Benefits and Opportunities.							$30,000	$25,000	$45,000	$50,000
Minnesota River Floodplain Model Feasibility Study		$30,000								
Minnesota River Sediment Reduction Strategy	$15,000	$25,000								
Minnesota River Study Area 3 – Bluff Stabilization Project					$100,000	$250,000				
Realignment of the Prior Lake Spring Lake Outlet Channel				$70,000	$30,000					
Riley Creek Project – Downstream of Flying Cloud Drive	$50,000	$75,000								
Schroeder's Acres Park/Savage Fen Stormwater Management Project		$39,555	$181,055							
Seminary Fen Restoration Site A				$75,000						
Seminary Fen Restoration Site B							$50,000	$25,000		
Seminary Fen Ravines Site C-2 and C-3 Studies							$20,000	$40,000		
Seminary Fen Ravines Site C-2 and C-3 Design and Construction								$55,000	$50,000	$65,000
Spring Creek Project		$45,000								
West Chaska Creek Project		$50,000								

Check #	Date	Amount	Supplier / Explanation	PO#	Doc No	Inv No	BU	Obj	Sub	Subledger	Account Description	BU Description	Co	Dept	Di
															X




152244 11/18/2021 128455 **FRATTALONE COMPANY INC**

3205 SPRUCE ST
ST PAUL MN 55117

535,933.09	146080	RDG CRK PARK PLO	6862	6765		IMPROVEMENTS/INFRASTRUCTURE	PR19-001 RIDGE CR PK- PLS		04020
		IMP #7							
535,933.09									

ESTIMATE VOUCHER

Estimate No: 7 Partial Estimate

Project Name: Ridge Creek Park & PLOC Improvements

Contract No: PR-19-001

Period Ending: August 31, 2021

Contractor: Frattalone Companies

Address: 3205 Spruce Street, St Paul, MN 55117

1	Original Contract Amount		$ 3,166,321.22
2	Change Order(s) No. ____ Thru No. ____		$ -
3	Total Funds Encumbered		$ 3,166,321.22
4	Value of Work Completed		$ 2,626,338.89
	Value of Work Remaining	$ 539,982.33	
	Percent Complete	83%	
5	Retainage (5%)		$ 131,316.95
6	Previous Payment		$ 1,959,088.85
7	Deductions or Charges		$ -
8	Total Retainage, Payments & Deductions (Line 5+6+7)		$ 2,090,405.80
	Payment Due (Line 4-8)		$ 535,933.09

CERTIFICATE OF PAYMENT

(I, We) hereby agree that the quantity and value of work shown herein is a fair estimate of the work completed to date.

Frattalone Companies — CONTRACTOR NAME

Scott Burke — PRINT NAME

Project Manager — TITLE

SIGNATURE

CITY OF SHAKOPEE APPROVAL

SIGNATURE (PROJECT ENGINEER)

11-9-21 — DATE

Steven L. Lillehaug 11/9/2021

SIGNATURE (CITY ENGINEER)

City of Shakopee, MN
RIDGE CREEK PARK & PLOC IMPROVEMENTS
PROJECT: PR-19-001

Period Ending **8/31/2021**

ESTIMATE NO: 7			FRATTALONE COMPANIES, INC			COMPLETED THIS PERIOD		COMPLETED TO DATE	
ITEM #	ITEM DESCRIPTION	UNITS	ESTIMATED QUANTITY	UNIT PRICE	EXTENDED TOTAL	QUANTITY	EXTENDED TOTAL	QUANTITY	EXTENDED TOTAL
1	MOBILIZATION	LS	1	$172,040 00	$172,040 00	0 2	$34,408.00	0 9	$154,836 00
2	CLEARING	LS	1	$5,190 00	$5,190 00		$0 00	1	$5,190 00
3	CLEARING	TREE	15	$207 50	$3,112 50		$0 00	93	$19,297 50
4	GRUBBING	TREE	15	$207 50	$3,112 50		$0.00	79	$16,392 50
5	REMOVE BARBED WIRE FENCE	LF	374	$3 40	$1,271 60	374	$1,271 60	374	$1,271 60
6	SAWING CONCRETE PAVEMENT (FULL DEPTH)	LF	28	$11 60	$324 80	28	$324.80	28	$324 80
7	SAWING BITUMINOUS PAVEMENT (FULL DEPTH)	LF	30	$9 25	$277 50	30	$277.50	30	$277 50
8	REMOVE SEWER PIPE STORM	LF	43	$35 25	$1,515 75	120	$4,230.00	183	$6,450 75
9	REMOVE BITUMINOUS PAVEMENT	SY	350	$3 25	$1 137 50		$0 00	0	$0 00
10	REMOVE CONCRETE WALK	SF	1393	$0 69	$961 17	1430	$986 70	1430	$986 70
11	REMOVE WOODEN WEIR	LS	1	$2,310 00	$2,310 00	1	$2,310.00	1	$2,310 00
12	GEOTEXTILE FABRIC TYPE 6	SY	4465	$2 50	$11,162 50	2017	$5,042.50	2017	$5,042 50
13	COMMON EXCAVATION (OFFSITE) (P)	CY	22900	$12 10	$277,090 00		$0 00	22900	$277,090 00
14	SUBGRADE EXCAVATION	CY	3285	$15 90	$52,231 50	2500	$39,750 00	2500	$39,750 00
15	SELECT GRANULAR BORROW (CV)	CY	2738	$22 25	$60,920 50	2000	$44,500 00	2000	$44,500 00
16	DEWATERING	LS	1	$64,380 00	$64,380 00	0.25	$16,095.00	1	$64,380 00
17	COMMON EMBANKMENT (CV)	CY	1575	$8 10	$12,757 50		$0 00	0	$0 00
18	SUBGRADE PREPARATION	RDST	34	$576 00	$19,584 00	32	$18,432 00	32	$18,432 00
19	AGGREGATE BASE (CLASS V)	TON	953	$25 00	$23,825 00	1238	$30,950 00	1238	$30,950 00
20	BITUMINOUS PATCHING MIXTURE	CY	1	$980 50	$980 50		$0 00	0	$0 00
21	TYPE SP 9 5 WEAR CRS MIX (2-1 5" LIFTS)	SY	3716	$15 20	$56,483 20		$0 00	0	$0 00
22	CORN CRIB OVERLOOK	EACH	1	$75,240 00	$75,240 00		$0.00	0	$0 00
23	WOOD BOARDWALK	SF	20723	$32 00	$663,136 00		$0.00	18001	$576,032 00
24	CONCRETE HEADER (OVERLOOK TRANSITION)	EACH	2	$5,280 00	$10,560 00		$0 00	0	$0 00
25	CONCRETE HEADER (8'W)	EACH	7	$2 900 00	$20,300 00		$0 00	6	$17,400 00
26	12 X 7 PRECAST CONCRETE BOX CULVERT END SECTION	EACH	4	$14 650 00	$58,600 00	4	$58,600 00	4	$58,600 00
27	12 X 6 PRECAST CONCRETE BOX CULVERT END SECTION	EACH	6	$13,150 00	$78,900 00		$0.00	6	$78,900 00
28	12 X 3 PRECAST CONCRETE BOX CULVERT END SECTION	EACH	4	$8,220 00	$32,880 00	2	$16,440.00	4	$32,880 00
29	12 X 7 PRECAST CONCRETE BOX CULVERT	LF	144	$906 50	$130,536 00	144	$130,536.00	144	$130,536 00
30	12 X 6 PRECAST CONCRETE BOX CULVERT	LF	96	$916 00	$87,936 00		$0.00	96	$87,936 00
31	12 X 3 PRECAST CONCRETE BOX CULVERT	LF	48	$782 00	$37,536 00	24	$18,768 00	48	$37,536 00
32	HELICAL PILES, 20 FT LONG	EACH	625	$743 50	$464,687 50		$0.00	589	$437,921 50
33	STRUCTURAL CONCRETE	CY	5 6	$10,370 00	$58,072 00		$0 00	0	$0 00
34	36" RC PIPE APRON	EACH	1	$1,990 00	$1,990 00	1	$1,990 00	1	$1,990 00
35	24" RC PIPE APRON	EACH	1	$1,240 00	$1,240 00	1	$1,240 00	1	$1,240 00
36	15" RC PIPE APRON	EACH	1	$1,150 00	$1,150 00	1	$1,150.00	1	$1,150 00
37	36" RC PIPE SEWER DES 3006 CL III	LF	8	$302 50	$2,420 00	8	$2,420.00	8	$2,420 00
38	24" RC PIPE SEWER DES 3006 CL III	LF	458	$76 25	$34 922 50	458	$34,922.50	458	$34,922 50
39	15" RC PIPE SEWER DES 3006 CL III	LF	15	$144 00	$2,160 00	15	$2,160.00	15	$2,160 00
40	RECONSTRUCT DRAINAGE STRUCTURE	LS	1	$1,710 00	$1,710 00	1	$1,710.00	1	$1,710 00
41	CONST DRAINAGE STRUCTURE DES 72-4020	EACH	1	$6,540 00	$6,540 00	1	$6,540.00	1	$6,540 00
42	CONST DRAINAGE STRUCTURE DES 60-4020	EACH	1	$5 030 00	$5,030 00	1	$5,030.00	1	$5,030 00
43	CONST DRAINAGE STRUCTURE DES 48-4020	EACH	4	$3,760 00	$15,040 00	4	$15,040.00	4	$15,040 00
44	BOULDER VANE	LF	390	$133 50	$52,065 00		$0 00	390	$52,065 00
45	RANDOM RIPRAP, CLASS II (FIELDSTONE)	TON	160	$78 75	$12,600 00		$0 00	0	$0 00
46	RANDOM RIPRAP, CLASS III (FIELDSTONE)	TON	2175	$72 50	$157,687 50	321	$23,272.50	3196	$231 710 00
47	4" CONCRETE WALK	SF	1500	$10 50	$15,750 00	1970	$20,685 00	1970	$20,685 00
48	CONCRETE CURB & GUTTER DES SURMOUNTABLE	LF	18	$181 50	$3,267 00	20	$3,630.00	20	$3,630 00
49	TRUNCATED DOMES	SF	8	$316 50	$2,532 00	24	$7,596.00	24	$7,596 00
50	OVERLOOK STRUCTURE LIGHTING & ELECTRICAL	LS	1	$12,440 00	$12,440 00		$0 00	0	$0 00
51	CUSTOM SKIGARD FENCING (TYPE A)	LF	108	$254 00	$27,432 00		$0 00	0	$0 00
52	CUSTOM SKIGARD FENCING (TYPE B)	LF	271	$264 00	$71,544 00		$0 00	0	$0 00
53	TRAFFIC CONTROL	LS	1	$5 190 00	$5,190 00	0.3	$1,557.00	0 88	$4,567 20
54	DECIDUOUS TREE (ACER SACCHARUM, 3" CAL , B&B)	TREE	8	$710 50	$5,684 00		$0 00	0	$0 00
55	DECIDUOUS TREE (BETULA NIGRA, 12' HT , B&B)	TREE	11	$643 00	$7,073 00		$0 00	0	$0 00
56	DECIDUOUS TREE (QUERCUS BICOLOR, 3" CAL , B&B)	TREE	11	$721 00	$7,931 00		$0 00	0	$0 00
57	DECIDUOUS TREE (QUERCUS MACROCARPA, 3" CAL , B&B)	TREE	8	$710 50	$5,684 00		$0 00	0	$0 00
58	DECIDUOUS TREE (TILIA AMERICANA, 3" CAL , B&B)	TREE	7	$731 50	$5,120 50		$0 00	0	$0 00
59	DECIDUOUS TREE (POPULUS TREMULOIDES, 12' HT , B&B)	TREE	6	$648 50	$3,891 00		$0 00	0	$0 00
60	DECIDUOUS TREE (SALX DISCOLOR, 6' HT , B&B)	TREE	36	$378 50	$13,626 00		$0 00	0	$0 00
61	DECIDUOUS SHRUB (CORYLUS AMERICANA, 7 GAL CG)	SHRUB	2	$150 50	$301 00		$0 00	0	$0 00
62	DECIDUOUS SHRUB (DIERVILLA LONICERA, 7 GAL , CG)	SHRUB	20	$150 50	$3,010 00		$0 00	0	$0 00
63	DECIDUOUS SHRUB (RIBES AMERICANUM, 7 GAL , CG)	SHRUB	10	$150 50	$1,505 00		$0 00	0	$0 00
64	DECIDUOUS SHRUB (VIBURNUM LENTAGO, 7 GAL , CG)	SHRUB	9	$150 50	$1,354 50		$0 00	0	$0 00
65	DORMANT LIVE STAKE ZONE (50 RED OSIER DOGWOOD, 33 SANDBAR WILLOW, 17 COMMON ELDER BERRY)	EACH	7	$981 50	$6,870 50		$0 00	2	$1,963 00
66	STABILIZED CONSTRUCTION EXIT	LS	1	$24,550 00	$24,550 00	0 5	$12,275.00	1	$24,550 00
67	STORM DRAIN INLET PROTECTION	EACH	21	$453 00	$9,513 00		$0.00	12	$5,436 00
68	SILT FENCE, TYPE MS	LF	1196	$1 70	$2,033 20		$0 00	1242	$2,111 40
69	SEDIMENT CONTROL LOG, TYPE B, D, OR F	LF	12150	$2 60	$31,590 00		$0 00	10108	$26,280 80
70	FILTER BERM, TYPE ROCK SPECIAL	EACH	1	$868 00	$868 00		$0.00	0	$0 00
71	SOIL BED PREPARATION	AC	14 2	$1,380 00	$19,596 00		$0.00	0	$0 00

72	TOPSOIL BORROW	TON	30	$49 50	$1,485 00		$0.00	0	$0.00
73	EROSION CONTROL BLANKET, CATERGORY 3N	SY	630	$1 45	$913 50		$0.00	2734	$3,964 30
74	MULCH MATERIAL, TYPE 3	SY	23000	$0 21	$4,830 00		$0.00	12804	$2,688 84
75	TURF REINFORCEMENT MAT	SY	250	$19 20	$4,800 00		$0.00	0	$0 00
76	SEED MIXTURE 25-131	LB	190	$3 20	$608 00		$0.00	0	$0 00
77	SEED MIXTURE 34-181	LB	5	$249 00	$1,245 00		$0.00	2	$498 00
78	SEED MIXTURE 34-271	LB	150	$98 50	$14,775 00		$0.00	60	$5,910 00
79	SEED MIXTURE 35-641	LB	43	$27 50	$1,182 50		$0.00	12	$330 00
80	ROOT WAD	EACH	17	$207 50	$3,527 50		$0.00	17	$3 527 50
81	BN-1 BENCH	EACH	10	$4,090 00	$40,900 00		$0.00	0	$0 00
82	TR-1 TRASH RECEPTACLE	EACH	4	$2,870 00	$11,480 00		$0.00	0	$0 00
83	BR-1 BIKE RACK	EACH	15	$441 00	$6,615 00		$0.00	0	$0 00
84	BL-1 BOLLARD	EACH	5	$399 50	$1,997 50		$0.00	0	$0 00
	TOTALS				$3,166,321.22		$564,140.10		$2,614,938.89

ALTERNATE 1

						COMPLETED THIS PERIOD		COMPLETED TO DATE	
Item No.	Item Description	Units	Total	UNIT PRICE	EXTENDED TOTAL	QUANTITY	EXTENDED TOTAL	QUANTITY	EXTENDED TOTAL
1	REPLACE WOOD DECKING AND RAILING WITH COMPOSITE DECKING AND RAILING	SF	20723	$ (8.00)	$ (165,784 00)				

						COMPLETED THIS PERIOD		COMPLETED TO DATE	
NO.	WORK ORDER CHANGES	UNITS	ESTIMATED QUANTITY	UNIT PRICE	EXTENDED TOTAL	QUANTITY	EXTENDED TOTAL	QUANTITY	EXTENDED TOTAL
1	WORK ORDER #1	LS	1	$ 2,530 00	$ 2,530 00		$ -	1	$ 2,530 00
2	WORK ORDER #2	LS	1	$ 8,870 00	$ 8,870 00		$ -	1	$ 8,870 00
GRAND TOTALS							$564,140.10		$2,626,338.89

RESOLUTION R2020-135

A Resolution awarding a Contract in the amount of $3,166,321.22 to Frattalone Companies for the Ridge Creek Park and PLOC Improvements, Project PR-19-001

WHEREAS, pursuant to an advertisement for bids for the Ridge Creek Park and PLOC Improvements Project, PR-19-001, bids were received, opened on October 30, 2020 and tabulated according to law, and the following bids were received complying with the advertisement:

Bidder	Base Bid	Bid Alternate
FRATTALONE COMPANIES	$3,166,321.22	-$165,784.00
PETERSON COMPANIES	$3,235,806.22	$694,220.50
VEIT & COMPANY, INC.	$3,564,110.81	$103,615.00
S.M. HENTGES & SONS, INC.	$3,630,406.15	-$41,446.00
LINNCO, INC.	$3,692,645.60	$414,460.00
JTS CONSTRUCTION	$3,922,939.00	$549,159.50
MAX STEININGER, INC.	$3,934,316.94	-$55,952.10
STANDARD CONTRACTING, INC.	$3,949,584.86	-$49,735.20
SUNRAM CONSTRUCTION, INC.	$3,974,040.00	-$176,145.50
ROSTI CONSTRUCTION	$4,170,513.40	$20,723.00
RAMSEY COMPANIES	$5,623,303.10	-$362,652.50
BLACKSTONE CONSTRUCTION	$5,982,313.35	-$49,735.20

WHEREAS, Frattalone Companies, 3205 Spruce Street, St Paul, MN 55117, is the lowest responsive bidder for the Ridge Creek Park and PLOC Improvements Project;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF SHAKOPEE, MINNESOTA, THAT:

1. The appropriate City officials are hereby authorized and directed to enter into a contract with Frattalone Companies in the name of the City of Shakopee for the Ridge Creek Park and PLOC Improvements Project according to the plans and specifications therefore approved by the City Council and on file in the office of the City Clerk.

2. The City Clerk is hereby authorized and directed to return forthwith to all bidders the deposits made with their bids, except that the deposits of the successful bidder and the next lowest bidder shall be retained until a contract has been signed.

Adopted in regular session of the City Council of the City of Shakopee,

Minnesota, held this 17th day of November, 2020.

Mayor of the City of Shakopee

ATTEST:

City Clerk

Laserfiche History Report (generated using the Reporting Agent)
Vendor Number: 128455
Vendor Name: FRATTALONE COMPANY INC
Payment Number: 152244
Payment Date: 11/18/2021
Invoice Number: RDG CRK PARK PLO IMP #7
Invoice Date: 08/31/2021
Invoice Total Amount: $535933.09
JDE Doc Number: 146080
PID: 817826
Comments:

Activity Name	User	Proxy User	Beg Date	End Date
GL Coding	CNASCENE	CNASCENE	11/09/2021	11/10/2021
Approval	SLILLEHAUG	SLILLEHAUG	11/10/2021	11/15/2021
City Man Approval	BREYNOLDS	BREYNOLDS	11/15/2021	11/15/2021
Finance Review	KMACKLIN		11/15/2021	11/18/2021

LOWER MINNESOTA RIVER
WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting
Wednesday, January 19, 2022

Agenda Item
Item 4. J. – Authorize execution of Joint Powers Agreement with Dakota County for Monitoring Services

Prepared By
Linda Loomis, Administrator

Summary
At the December 15, 2021 meeting of the Board of Managers, the Board approved the work plan for monitoring services by the Dakota County Soil & Water Conservation District. The Joint Powers Agreement (JPA) was approved by the Board of Supervisors of the Dakota SWCD and is attached for the Board's information. This agreement is similar in form to agreements between the SWCD and the LMRWD in past years.

The Board should authorize its execution by the President.

Attachments
Joint Powers Agreement Between the Dakota County Soil & Water Conservation District and the Lower Minnesota River Watershed District for 2022 Technical Assistance Services

Recommended Action
Motion to authorize execution of JPA by LMRWD Board President

JOINT POWERS AGREEMENT BETWEEN
THE DAKOTA COUNTY SOIL AND WATER CONSERVATION DISTRICT AND
THE LOWER MINNESOTA RIVER WATERSHED DISTRICT
FOR 2022 TECHNICAL ASSISTANCE SERVICES

THE PARTIES TO THIS AGREEMENT are the Dakota County Soil and Water Conservation District (SWCD) and the Lower Minnesota River Watershed District (LMRWD), both political subdivisions of the State of Minnesota and "governmental units" as that term is defined in Minn. Stat. § 471.59. This Agreement is made pursuant to the authority conferred upon the parties by Minn. Stat. § 471.59.

NOW THEREFORE, the parties, in joint and mutual exercise of their powers, agree as follows:

1. PURPOSE. This Agreement will define the responsibilities and obligations of the SWCD and the LMRWD for technical assistance services to be provided by the SWCD to the LMRWD as more fully described herein.

2. TERM. Notwithstanding the dates of signatures of the parties, this Agreement shall be in effect as of January 1, 2022 and shall remain in effect until December 31, 2022, or until completion by the parties of their respective obligations under this Agreement, whichever occurs first, unless earlier terminated by law or according to the provisions of this Agreement.

3. SCOPE OF SERVICES. SWCD agrees to provide LMRWD with the following services: Fen well monitoring services from March 1, 2022, until December 31, 2022, as expressed in the *2022 Dakota County Soil and Water Conservation District Work Plan* attached and incorporated into this Agreement as Exhibit 1.

   In the event of a conflict between the terms of this Agreement and Exhibit 1, the terms of this Agreement shall govern.

4. TOTAL COST. The total amount to be paid by the LMRWD for all services provided pursuant to this Agreement shall not exceed $22,620.00. The LMRWD shall pay SWCD for purchased services at the rates set out in Exhibit 1.

5. TIME OF PAYMENT. The LMRWD shall make payment to the SWCD within 35 days of the date on which an itemized invoice is received. If an invoice is incorrect, defective, or otherwise improper, the LMRWD shall notify the SWCD within 10 days of receiving the incorrect invoice. Upon receiving the corrected invoice, the LMRWD shall make payment within 35 days.

6. PAYMENT FOR UNAUTHORIZED CLAIMS. The LMRWD may refuse to pay any claim that is not specifically authorized by this Agreement. Payment of a claim shall not preclude the LMRWD from questioning the propriety of the claim. The LMRWD reserves the right to offset any overpayment or disallowance of claim by reducing future payments.

7. PAYMENT UPON EARLY TERMINATION. In the event this Agreement is terminated before the completion of services, the LMRWD shall pay the SWCD for services provided in a satisfactory manner, in a pro-rated sum of the rates set forth in Exhibit 1 based upon actual time spent. In no case shall such payments exceed the LMRWD's total cost under this Agreement.

8. COMPLIANCE WITH LAWS/STANDARDS. SWCD shall abide by all federal, state or local statutes, ordinances, rules and regulations now in effect or hereafter adopted pertaining to this Agreement or to the facilities, programs and staff for which SWCD is responsible.

9. INDEPENDENT CONTRACTOR STATUS. Nothing in this Agreement is intended or should be construed as creating the relationship of a partnership, joint venture or employer-employee relationship between the parties. Officers, employees or agents of one party shall not be considered officers, employees or agents of the other party.

10. SUBCONTRACTING/ASSIGNMENT. A party shall not enter into any subcontract for the performance of the services contemplated under this Agreement nor assign any interest in this Agreement without prior written consent of the other party and subject to such conditions and provisions as are deemed necessary. The subcontracting or assigning party shall be responsible for the performance of its subcontractors or assignees unless otherwise agreed.

11. LIABLE FOR OWN ACTS. Each party to this Agreement shall be liable for the acts of their own officers, employees and/or agents and the results thereof to the extent authorized by law and shall not be responsible for the acts of the other party, its officers, employees and/or agents. It is understood and agreed that the provisions of the Municipal Tort Claims Act, Minn. Stat. ch. 466, and other applicable laws govern liability arising from a party's acts or omissions. In the event of any claims or actions asserted or filed against either party, nothing in this Agreement shall be construed to allow a claimant to obtain separate judgments or separate liability caps from the individual parties. Each party warrants that it has an insurance or self-insurance program and that it has minimum coverage consistent with the liability limits contained in Minn. Stat. ch. 466.

12. AUTHORIZED REPRESENTATIVES. The following named persons are designated the authorized representatives of parties for purposes of this Agreement. These persons have authority to bind the party they represent and to consent to modifications and subcontracts, except that, the authorized representatives shall have only the authority specifically or generally granted by its respective Board. Notification required to be provided pursuant to this Agreement shall be provided to the following named persons and addresses unless otherwise stated in this Agreement, or in a modification of this Agreement.

To SWCD:
Brian Watson, Director
Dakota County SWCD
4100 220th Street West, Suite 102
Farmington, MN 55024
Telephone: (651) 480-7778

To LMRWD:
Linda Loomis, District Adminstrator
Lower Minnesota River Watershed District
112 E. 5th St.
Chaska, MN 55318
Telephone: (763) 545-4659

13. LIAISONS. To assist the parties in the day-to-day performance of this Agreement and to develop service, ensure compliance and provide ongoing consultation, a liaison shall be designated by SWCD and the LMRWD. The parties shall keep each other continually informed, in writing, of any change in the designated liaison. At the time of execution of this Agreement, the following persons are the designated liaisons:

SWCD Liaison:	Lindsey Albright, Water Resource Specialist
Telephone:	(651) 480-7783
Email:	lindsey.albright@co.dakota.mn.us
LMRWD Liaison:	Linda Loomis, District Administrator
Telephone:	(763) 545-4659
Email:	niadconsulting@gmail.com

14. DEFAULT: FORCE MAJEURE. Neither party shall be liable to the other party for any loss or damage resulting from a delay or failure to perform due to unforeseeable acts or events outside the defaulting party's reasonable control, providing the defaulting party gives notice to the other party as soon as possible. Acts and events may include acts of God, acts of terrorism, war, fire, flood, epidemic, acts of civil or military authority, and natural disasters.

15. DATA PRIVACY. All data created, collected, received, stored, used, maintained, or disseminated in the performance of this Agreement is subject to the requirements of the Minnesota Government Data Practices Act, Minn. Stat. ch. 13 and the Minnesota Rules implementing the Act now in force or hereafter adopted as well as the federal laws on data privacy.

16. OWNERSHIP OF WORK PRODUCT. If SWCD uses LMRWD's copyrighted material in performing work for this Agreement, SWCD will protect LMRWD's right, title and interest in the copyrighted material.

Before using a third party's copyrighted material SWCD will get permission from the third-party. Where applicable, work products created by SWCD under this Agreement are "works made for hire" as defined in the U.S. Copyright Act. LMRWD owns the copyright interests in the work product. LMRWD may use, copy and make derivative works of the same, with no duty for an accounting to SWCD. SWCD may use portions or excerpts from the materials prepared under this Agreement.

17. RECORDS DISCLOSURE/RETENTION. Bonds, records, documents, papers, accounting procedures and practices, and other evidences relevant to this Agreement are subject to the examination, duplication, transcription and audit by each party to this Agreement and either the Legislative or State Auditor, pursuant to Minn. Stat. § 16C.05, Subd. 5. Such evidences are also subject to review by the Comptroller General of the United States, or a duly authorized representative, if federal funds are used for any work under this Agreement. Each governmental unit agrees to maintain such evidences for a period of six years from the date services or payment were last provided or made or longer if any audit in progress requires a longer retention period.

18. TERMINATION. Either party may terminate this Agreement for cause by giving seven days' written notice or without cause by giving 30 days' written notice, of its intent to terminate, to the other party. Such notice to terminate for cause shall specify the circumstances warranting termination of this Agreement. Cause shall mean a material breach of this Agreement and any supplemental agreements or amendments thereto. Notice of Termination shall be made by certified mail or personal delivery to the authorized representative of the other party. Termination of this Agreement shall not discharge any liability, responsibility or other right of any party, which arises from the performance of or failure to adequately perform the terms of this Agreement prior to the effective date of termination.

Notwithstanding any provision of this Agreement to the contrary, either party may immediately terminate this Agreement if it does not obtain funding from the Minnesota Legislature, Minnesota Agencies, or other funding source, or if its funding cannot be continued at a level sufficient to allow payment of the amounts due under this Agreement.

19. MODIFICATIONS. Any alterations, variations, modifications, or waivers of the provisions of this Agreement shall only be valid when they have been reduced to writing and signed by the authorized representatives of the parties.

20. MINNESOTA LAW TO GOVERN. This Agreement shall be governed by and construed in accordance with the substantive and procedural laws of the State of Minnesota, without giving effect to the principles of conflict of laws. All proceedings related to this Agreement shall be venued in the County of Dakota, State of Minnesota.

21. SEVERABILITY. The provisions of this Agreement shall be deemed severable. If any part of this Agreement is rendered void, invalid, or unenforceable, such rendering shall not affect the validity and enforceability of the remainder of this Agreement unless the part or parts that are void, invalid or otherwise unenforceable shall substantially impair the value of the entire Agreement with respect to either party.

22. DISPOSITION OF PROPERTY. Any property purchased with LMRWD money to perform services under this Agreement is owned by LMRWD and will be returned by the SWCD to LMRWD at the termination of this Agreement.

23. FINAL AGREEMENT. This Agreement is the final expression of the agreement of the parties and the complete and exclusive statement of the terms agreed upon, and shall supersede all prior negotiations, understandings or agreements. There are no representations, warranties, or stipulations, either oral or written, not contained in this Agreement.

24. SURVIVORSHIP. The following provisions under this Agreement survive after the termination date of this Agreement: Sections 11 (Liable for Own Acts), 14 (Force Majeure), 15 (Data Privacy), 16

(Ownership of Work Product), 17 (Records Disclosure/Retention), 20 (Minnesota Law to Govern), and 22 (Disposition of Property).

IN WITNESS WHEREOF, the parties hereto have executed this Agreement on the date(s) indicated below.

LOWER MINNESOTA RIVER WATERSHED DISTRICT

By_____
Jesse Hartmann, President, or successor
Date of Signature_____

DAKOTA COUNTY SOIL AND WATER CONSERVATION DISTRICT

By Laura Zanmiller
Laura Zanmiller, Chair, or successor
Date of Signature 1/13/22

Approved as to Form:

/s/ Helen R. Brosnahan 1/10/22
Assistant Dakota County Attorney/Date
KS-22-30
SWCD Board Motion No.21.142

EXHIBIT 1

2022 Dakota County SWCD Work Plan and Budget
Prepared for the
Lower Minnesota River Watershed District

TASK – FEN WELL MONITORING (March – December)	COST ESTIMATE
Fen Well Monitoring	10 monitoring trips x 5 hrs/trip 50 hours @ $85/hour = $4,250
Data Management, Reporting and Administration	40 hours @ $85/hour = $3,400
Site Maintenance	10 hours @ $85/hour = $850
Supplies	Chalk, rags, batteries, tools = $100
Subtotal	**$8,600**

TASK – EDUCATION AND COMMUNITY ENGAGEMENT	COST ESTIMATE
Landscaping for Clean Water Program – 100% virtual in 2022 (classes and design assistance) • Create promotional materials for classes in partnership with Dakota County Cities and Watershed Orgs, organize course materials, and coordinate with partners. • Push social media posts to promote classes, attend community events to promote classes.	12 hours @ $85/hour = $1,020
Subtotal	**$1,020**

TASK - TECHNICAL ASSISTANCE & PROJECT IMPLEMENTATION	COST ESTIMATE
Cost Share Program – Landscaping for Clean Water • SWCD staff time for technical assistance for participants • Provide cost share to landowners for up to **6** Landscaping for Clean Water projects including raingardens, native plantings and shoreline stabilization projects consistent with SWCD cost share policies.	Technical Assistance = $3,000 Landowner Incentives: $250/project x 6 projects = $1,500
Technical Assistance As Requested • SWCD staff time for technical assistance for projects *Only as requested by Lower Minnesota River WD*	100 hours @$85/hour = $8,500
Subtotal	**$13,000**

TOTAL AGREEMENT NOT TO EXCEED - $22,620

EXHIBIT 1

GENERAL INFORMATION REGARDING THE FEN WELL MONITORING PLAN

The Dakota County Soil and Water Conservation District (SWCD) shall conduct well monitoring activities at various fens located within the Lower Minnesota River Watershed District (LMRWD) from March 1, 2022 through December 31, 2022.

Well Monitoring Activities

Twenty eight piezometers of interest are located within the LMRWD (Table 1). The SWCD shall take water level measurements at each of the piezometers described in this project. Measurements will be made using a hand-cranked steel tape graduated in feet, tenths of feet, and hundredths of feet or an electronic water level meter. The equipment for measuring water level will be provided by the SWCD. Results shall be recorded manually and transferred to the Minnesota Department of Natural Resources (MN DNR) well monitoring database following all in-field measurements.

All piezometers will be monitored on a monthly basis, beginning March 2022 through December 2022.

Table 1. Fen Monitoring Locations

Location	Total Number of Piezometers to be Monitored
Fort Snelling Fen	13
Quarry Island Fen	2
Nichols Fen	13
Total	28

Data Analysis and Project Reporting

At the conclusion of the annual well monitoring effort, the SWCD shall provide the LMRWD District Administrator a report summarizing the findings resulting from annual monitoring activities. Monitoring data will be made available on the MN DNR Groundwater Level Data website
http://www.dnr.state.mn.us/waters/groundwater_section/obwell/waterleveldata.html

LOWER MINNESOTA RIVER
WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting
Wednesday, January 19, 2022

Agenda Item
Item 5. A. – Special Agenda Item: Discussion with Representative Paul Torkelson

Prepared By
Linda Loomis, Administrator

Summary
Representative Torkelson was not able to attend the December meeting with the Board because of weather related issues. He is scheduled to meet with the Managers at the January meeting. Discussion topics listed below are from the December Executive Summary for this agenda item.

"One item was the idea of combining watershed districts and soil & water conservation districts. A report was prepared in 2007 by the office of the State Auditor that looked at the complexities of water management in the State of Minnesota. While some things have changed since the report was prepared much has not. I believe those advocating for combining SWCDs and watershed districts are simply trying to simplify the management of waters in the state. A link to the report is attached below.

The second issue concerns the Water Storage Initiative that was passed by the legislature in 2021 and the use of the $2 million that was appropriated. There needs to be additional funding from the state and funds should be spent implementing projects, not more study or capacity building.

At the MAWD conference there was a lot of discussion about the use of funds from the Clean Water Legacy program. The concerns of the MAWD members in attendance for the business meeting was that CWF were being used for capacity building for SWCDs. This came up in the discussion of one of the resolutions proposed. The consensus of the membership present was that MAWD adopt the resolution that CWF not be used for capacity building of any level of government.

Lastly, an update provided by the MAWD Executive Director stated that MAWD had signed on to support federal legislation – the Mississippi River Restoration and Resilience Initiative. It was reported that this legislation would organize the Mississippi River Water Management Organization like the Red River Basin Commission. This may be a topic that we want to discuss with Representative Torkelson. I have included a link below to the federal bill."

Additionally, the LMRWD should keep Representative Torkelson advised items the District is partnering with cities, such as the Carver Levee, Shakopee River Bank Stabilizations and Area #3 in Eden Prairie.

Attachments
No attachments

Recommended Action
No action recommended

LOWER MINNESOTA RIVER
WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting
Wednesday, January 19, 2022

Agenda Item
Item 7. A. – Lower Minnesota River East One Watershed One Plan

Prepared By
Linda Loomis, Administrator

Summary
The first meeting of the Policy Committee for the development of the Lower Minnesota River East 1W1P was held on December 16, 2021. Manager Amundson attended and has provided notes from the meeting. Her notes follow:

Lower Minnesota River East 1W1P Policy Committee Informational Meeting Notes

Draft Memorandum of Agreement (MOA)
Discussion of the MOA focused on organization structure. The Steering Committee will consist of LGU and BWSR staff; the Advisory Committee will consist of LGU, State Agencies, Tribes, municipalities, and the Metropolitan Council. The Policy Committee will consist of elected or appointed officials. Scott Soil and Water Conservation District will act as the fiscal agent and Le Sueur County will act as the grant administrator for the purposes of the agreement. There will be a consultant team hired to write the bulk of the plan. The MOA is under County attorney's review.
The roles and responsibilities of the policy committee include:

- Show up prepared and participate
- Set the vision for the plan
- High level review of the plan
- Update respective boards and report their feedback
- Keep their alternate member in the loop

Draft Budget & Timeline
The planning grant budget is $235K. The rough timeline for the planning process is summer 2022 through spring 2023 with plan review taking place spring 2023 through spring 2024. The work this winter will include a public kickoff of the effort, scope development and RFP/RFQ process for hiring the consultant, development of draft bylaws and election of officers. It was noted that 3/4 of the state has undertaken this planning process and many watersheds are complete so this effort can capitalize on best practices lessons learned for operating procedures and plan contents.

Meeting Schedule
The policy committee will start meeting monthly and then transition to every other month. The meetings will be on the third Thursday of the month from 3-5 pm in Le Sueur with virtual attendance possible. The February

meeting will be the next meeting (February 17) and will focus on the process of hiring the consultant. The timeline for bringing the consultant on board is May and the goal for the MOA and grant agreement is March/April.

Manager Amundson requested that the Draft Memorandum of Agreement be provided to the Board. It is attached and should be reviewed by legal counsel for the LMRWD.

The next meeting of the Policy Committee is scheduled for 3:00 to 5:00 pm, Thursday, February 17, 2022. Meetings will be held in Le Sueur and can also be joined virtually.

Attachments
Draft Memorandum of Agreement

Recommended Action
No action recommended

MEMORANDUM OF AGREEMENT

This agreement (Agreement) is made and entered into by and between:

The Counties of Le Sueur, Rice, and Scott by and through their respective County Board of Commissioners, and

The Le Sueur, Rice, and Scott Soil and Water Conservation Districts, by and through their respective Soil and Water Conservation District (SWCD) Board of Supervisors, and

The Lower Minnesota River Watershed District (LMRWD), by and through their respective Board of Managers, and

The Scott Watershed Management Organization (SWMO), by and through their respective Board of Managers,

Collectively referred to as the "Parties."

WHEREAS, the Counties of this Agreement are political subdivisions of the State of Minnesota, with authority to carry out environmental programs and land use controls, pursuant to Minnesota Statutes Chapter 375 and as otherwise provided by law; and

WHEREAS, the Soil and Water Conservation Districts (SWCDs) of this Agreement are political subdivisions of the State of Minnesota, with statutory authority to carry out erosion control and other soil and water conservation programs, pursuant to Minnesota Statutes Chapter 103C and as otherwise provided by law; and

WHEREAS, the Watershed Districts and Watershed Management Organizations of this Agreement are political subdivisions of the State of Minnesota, with statutory authority to carry out conservation of the natural resources of the state by land use controls, flood control, and other conservation projects for the protection of the public health and welfare and the provident use of the natural resources, pursuant to Minnesota Statutes Chapters 103B, 103D and as otherwise provided by law; and

WHEREAS, the parties to this Agreement have a common interest and statutory authority to prepare, adopt, and assure implementation of a comprehensive watershed management plan in *Lower Minnesota River East* Watershed to conserve soil and water resources through the implementation of practices, programs, and regulatory controls that effectively control or prevent erosion, sedimentation, siltation and related pollution in order to preserve natural resources, ensure continued soil productivity, protect water quality, reduce damages caused by floods, preserve wildlife, protect the tax base, and protect public lands and waters; and

WHEREAS, with matters that relate to coordination of water management authorities pursuant to Minnesota Statutes Chapters 103B, 103C, and 103D with public drainage systems pursuant to Minnesota Statutes Chapter 103E, this Agreement does not change the rights or obligations of the public drainage system authorities.

WHEREAS, the Parties have formed this Agreement for the specific goal of developing a plan pursuant to Minnesota Statutes § 103B.801, Comprehensive Watershed Management Planning, also known as *Lower Minnesota River East One Watershed, One Plan*.

NOW, THEREFORE, the Parties hereto agree as follows:

1. **Purpose:** The Parties to this Agreement recognize the importance of partnerships to plan and implement protection and restoration efforts for the Lower Minnesota River East Watershed *(see Attachment A with a map of the planning area)*. The purpose of this Agreement is to collectively develop and adopt, as local government units, a coordinated watershed management plan for implementation per the provisions of the Plan. Parties signing this agreement will be collectively referred to as Lower Minnesota River East Watershed Partnership.

2. **Term:** This Agreement is effective upon signature of all Parties in consideration of the Board of Water and Soil Resources (BWSR) Operating Procedures for One Watershed, One Plan; and will remain in effect until 1-year after the term of the BWSR One Watershed, One Plan Planning Grant Agreement, unless canceled according to the provisions of this Agreement or earlier terminated by law.

3. **Adding Additional Parties:** A qualifying party within Lower Minnesota River East Watershed desiring to become a member of this Agreement shall indicate its intent by adoption of a board resolution prior to a date that is six months from the BWSR One Watershed, One Plan Planning Grant Agreement execution. The party agrees to abide by the terms and conditions of the Agreement; including but not limited to the bylaws, policies and procedures adopted by the Policy Committee.

4. **Withdrawal of Parties:** A party desiring to leave the membership of this Agreement shall indicate its intent in writing to the Policy Committee in the form of an official board resolution. Notice must be made at least 30 days in advance of leaving the Agreement. BWSR has identified the following parties as required parties for this agreement: Le Sueur County and Le Sueur SWCD. If one of the required Parties according to the BWSR Operating Procedures for One Watershed One Plan withdraws from this agreement, it does not make this MOA null and void. Should this occur, the remaining Parties will hold discussions with BWSR representatives regarding the reallocation of reassignment of duties, grant funds, and future projection of the project as a whole.

5. **General Provisions**:

    a. **Compliance with Laws/Standards:** The Parties agree to abide by all federal, state, and local laws; statutes, ordinances, rules and regulations now in effect or hereafter adopted pertaining to this Agreement or to the facilities, programs, and staff for which the Agreement is responsible.

    b. **Indemnification:** Each party to this Agreement shall be liable for the acts of its officers, employees or agents and the results thereof to the extent authorized or limited by law and shall not be responsible for the acts of any other party, its officers, employees or agents. The provisions of the Municipal Tort Claims Act, Minnesota Statute Chapter 466 and other applicable laws govern liability of the Parties. To the full extent permitted by law, actions by the Parties, their respective officers, employees, and agents pursuant to this Agreement are intended to be and shall be construed as a "cooperative activity." It is the intent of the Parties that they shall be deemed a "single governmental unit" for the purpose of liability, as set forth in Minnesota Statutes § 471.59, subd. 1a(a). For purposes of Minnesota Statutes § 471.59, subd. 1a(a) it is the

intent of each party that this Agreement does not create any liability or exposure of one party for the acts or omissions of any other party.

c. **Records Retention and Data Practices:** The Parties agree that records created pursuant to the terms of this Agreement will be retained in a manner that meets their respective entity's records retention schedules that have been reviewed and approved by the State in accordance with Minnesota Statutes § 138.17. The Parties further agree that records prepared or maintained in furtherance of the agreement shall be subject to the Minnesota Government Data Practices Act. At the time this agreement expires, all records will be turned over to the Fiscal Agent for continued retention.

d. **Timeliness:** The Parties agree to perform obligations under this Agreement in a timely manner and keep each other informed about any delays that may occur.

e. **Extension:** The Parties may extend the termination date of this Agreement upon agreement by all Parties.

f. **Termination:** The parties anticipate that this Agreement will remain in full force and effect through the term of the grant agreement with BWSR and until canceled by all parties, unless otherwise terminated in accordance with law or other provisions of this Agreement. The parties acknowledge their respective and applicable obligations, if any, under Minn. Stat. Section 471.59, Subd. 5 after the purpose of the Agreement have been completed.

g. **Amendment**: The Parties may modify this Agreement upon approval by the majority. Any amendment to this Agreement shall be in writing, adopted by each party in the same manner as the original Agreement.

h. This is a collaborative effort by the Parties and as such, no employees shall be hired as part of this planning project.

6. **Administration:**

a. **Establishment of Committees for Development of the Plan.** The Parties agree to designate one representative, who must be an elected or appointed member of the governing board, to a Policy Committee for development of the watershed-based plan and may appoint of one or more technical representatives to an Advisory Committee for development of the plan in consideration of the BWSR Operating Procedures for One Watershed, One Plan.

i. The Policy Committee will meet as needed to decide on the content of the plan, serve as a liaison to their respective boards, and act on behalf of their Board. Each representative shall have one vote.

ii. Each governing board may choose one alternate to serve on the Policy Committee as needed in the absence of the designated member.

iii. The Policy Committee will establish bylaws by within 6-months of the date of the BWSR One Watershed, One Plan Planning Grant Agreement to describe the functions and operations of the committee(s).

iv. The Advisory Committee will meet monthly or as needed to assist and provide technical support and make recommendations to the Policy Committee on the development and content of the plan. Members of the Advisory Committee may not be a current board member of any of the Parties.

b. **Submittal of the Plan.** The Policy Committee will recommend the plan to the Parties of this agreement. The Policy Committee will be responsible for initiating a formal review process for the watershed-based plan conforming to Minnesota Statutes Chapters 103B and 103D, including public hearings. Upon completion of local review and comment, and approval of the plan for submittal by each party, the Policy Committee will submit the watershed-based plan jointly to BWSR for review and approval.

c. **Adoption of the Plan.** The Parties agree to adopt and begin implementation of the plan within 120 days of receiving notice of state approval, and provide notice of plan adoption pursuant to Minnesota Statutes Chapters 103B and 103D.

7. **Fiscal Agent:** Scott Soil and Water Conservation District will act as the fiscal agent for the purposes of this Agreement and agrees to:

   a. Accept all responsibilities associated with the implementation of the BWSR grant agreement for developing a watershed-based plan.

   b. Perform financial transactions as part of grant agreement and contract implementation.

   c. Annually provide a full and complete audit report.

   d. Provide the Policy Committee with the records necessary to describe the financial condition of the BWSR grant agreement.

   e. Retain fiscal records consistent with the agent's records retention schedule until termination of the agreement (at that time, records will be turned over to *(Fiscal Agent)*.

   f. Administration of the grant with BWSR for the purposes of developing a watershed-based plan, including reporting, process oversight, consistent planning and update meetings with BWSR staff, and overall coordination of the process.

8. **Grant Administration**: Le Sueur County will act as the grant administrator for the purposes of this Agreement and agrees to provide the following services:

   a. Accept all day-to-day responsibilities associated with the implementation of the BWSR grant agreement for developing a watershed-based plan, including being the primary BWSR contact for

the *One Watershed, One Plan* Grant Agreement and being responsible for BWSR reporting requirements associated with the grant agreement.

b. Provide the Policy Committee with the records necessary to describe the planning condition of the BWSR grant agreement.

c. Coordination and facilitation of Steering Team meetings including establishing date, location, time, space, technology needs, taking meeting notes and sending out meeting minutes, and any necessary accommodations such as refreshments.

d. Retain fiscal records consistent with the Day-to-Day agent's records retention schedule until termination of the agreement (at that time, records will be turned over to *(Fiscal Agent)*.

9. The following parties agree to provide the following services to the Lower Minnesota River East Watershed Partnership:

    a. Additional work tasks and responsibilities will be identified in the work plan and sub agreements.

10. **Authorized Representatives:** The following persons will be the primary contacts for all matters concerning this Agreement:

<u>Le Sueur County</u>
Joseph Martin or successor
County Administrator
88 South Park Ave
Le Center, MN 56057
Telephone: (507) 357-8220

<u>Le Sueur Soil and Water Conservation District</u>
Michael Schultz or successor
District Manager
181 W Minnesota Street
Le Center, MN 56057
Telephone: (507) 419-0365

<u>Rice County</u>
Sara Folsted or successor
County Administrator
320 Third Street NW
Faribault, MN 55021
Telephone: (507) 332-6100

<u>Rice County Soil and Water Conservation District</u>
Steve Pahs or successor
District Manager
1810 30th Street NW
Faribault, MN 55021
Telephone: (507) 332-5408

<u>Scott County</u>
Lezlie Vermillion
County Administrator
200 4th Avenue W
Shakopee, MN 55379
Telephone: (952) 496-8100

<u>Scott Soil and Water Conservation District</u>
Troy Kuphal or successor
District Director
7151 W 190th Street Suite 125
Jordan, MN 55352
Telephone: (952) 492-5425

Lower Minnesota River Watershed District
Jesse Hartmann or successor
Watershed District President
112 E 5th Street #102
Chaska, MN 55318
Telephone: (952) 856-5880

Scott Watershed Management Organization
Virgil Pint or successor
Water Management Organization Chair
200 4th Avenue W
Shakopee, MN 55379
Telephone: (952) 496-8177

IN TESTIMONY WHEREOF the Parties have duly executed this agreement by their duly authorized officers.

PARTNER: **Lower Minnesota River Watershed District**

APPROVED:

BY: _____

President of the Watershed District Board Date

BY: _____

Secretary of the Watershed District Board Date

Attachment A

(insert map of planning area)

LOWER MINNESOTA RIVER
WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting
Wednesday, January 19, 2022

Agenda Item
Item 7. B. – Audit and Financial Accounting Services Proposals

Prepared By
Linda Loomis, Administrator

Summary
At the December meeting, the Board accepted proposals for audit services from Global Portfolio Consulting, LLC and from CliftonLarsonAllen LLP (CLA) for accounting services and directed that the Administrator enter into contracts with the review and assistance of legal counsel. Contracts have been reviewed by legal counsel and executed by the Administrator. Contracts are attached for the Board's information.

Several conversations have been held with CLA to begin the transition. Initial tasks to complete are to determine which general ledger software to choose and to find a financial institution for LMRWD finds. We have discussed using Quickbooks or Intacct. Both are cloud based general ledger programs. CLA is preparing an analysis of the cost differential between the two. No financial institutions have been contacted yet.

The Letter of Engagement was just recently executed. The next step for the 2021 audit will be to have a meeting between all the parties – auditor, Carver County Finance and the LMRWD.

Attachments
Letter of Engagement between the LMRWD and Global Portfolio, LLC
Master Services Agreement from ClitonLarsonAllen LLP
Outsourcing Preparation Statement of Work from Clifton:arsonAllen LLP

Recommended Action
No action recommended

CPA Global Portfolio Consulting C.A., LLC.

To the appropriate representative of those charged with governance of

LOWER MINNESOTA RIVER WATERSHED DISTRICT (LMRWD)

****

The objective and scope of the audit

You have requested that we audit the financial statements of the governmental activities and each major fund of **LOWER MINNESOTA RIVER WATERSHED DISTRICT (LMRWD)** for the fiscal years ending on December 31, 2021, and 2022, and the related notes to the financial statements pursuant to Minnesota Statutes Section 103B.227, Subd.5. We are pleased to confirm our acceptance and our understanding of this audit engagement by means of this letter.

The objectives of our audit are to obtain reasonable assurance about whether the financial statements, as a whole, are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance but is not absolute assurance and therefore is not a guarantee that an audit conducted in accordance with auditing standards generally accepted in the United States of America (GAAS) will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if there is a substantial likelihood that, individually or in the aggregate, they would influence the judgment made by a reasonable user based on the financial statements.

The responsibilities of the auditor

We will conduct our audit in accordance with GAAS as set forth by the American Institute of Certified Public Accountants and the standards of financial audits set forth in the U.S. General Accounting Office's Government Auditing Standards. As part of an audit in accordance with GAAS, we exercise professional judgment and maintain professional skepticism throughout the audit. We also identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

Because of the inherent limitations of an audit, together with the inherent limitations of internal control, an unavoidable risk that some material misstatements may not be detected exists, even though the audit is properly planned and performed in accordance with GAAS.

The responsibilities of management and identification of the applicable financial reporting framework

Our audit will be conducted on the basis that management and, when appropriate, those charged with governance acknowledge and understand that they have responsibility:

- for the preparation and fair presentation of the financial statements in accordance with accounting principles generally accepted in the United States of America.

- for the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error; and
- to provide us with
  - access to all information of which management is aware that is relevant to the preparation and fair presentation of the financial statements such as records, documentation, and other matters,
  - additional information that we may request from management for the purpose of the audit; and
  - unrestricted access to persons within the entity from whom we determine it necessary to obtain audit evidence.

As part of our audit process, we will request from management and, when appropriate, those charged with governance, written confirmation concerning representations made to us in connection with the audit.

Other relevant Information (Fees and Payment)

Our fee for this engagement will be Thirty-Five Thousand Six Hundred and Eighty-two dollars ($35,682) and Twenty-Seven Thousand Five Hundred Forty-Eight dollars ($27,548) for the fiscal year 2021 and 2022 audit respectively. Our fees are payable in two equal payments; the first payment at the beginning of the engagement for the year and the second payment when the final report is submitted.

Reporting

We will issue a written report upon completion of our audit of **LOWER MINNESOTA RIVER WATERSHED DISTRICT (LMRWD)** financial statements. Our report will be addressed to the Board of Managers of **LOWER MINNESOTA RIVER WATERSHED DISTRICT (LMRWD)**. Circumstances may arise in which our report may differ from its expected form and content based on the results of our audit. Depending on the nature of these circumstances, it may be necessary for us to modify our opinion, add an emphasis-of-matter paragraph or other-matter paragraph to our auditor's report, or if necessary, withdraw from the engagement.

Please sign and return the attached copy of this letter to indicate your acknowledgment of, and agreement with, the arrangements for our audit of the financial statements including our respective responsibilities.

LOWER MINNESOTA RIVER WATERSHED DISTRICT (LMRWD)

Acknowledged and agreed on behalf of **LOWER MINNESOTA RIVER WATERSHED DISTRICT (LMRWD)** by:

Signed:

Name and Title: Linda Loomis, Administrator

Date: 1-12-2022

Master Services Agreement

Lower Minnesota River Watershed District
112 E 5th St #102, Chaska, MN 55318
MSA Date: December 21, 2021

This master service agreement ("MSA") documents the terms, objectives, and the nature and limitations of the services CliftonLarsonAllen LLP ("CLA," "we," "us," and "our") will provide for Lower Minnesota River Watershed District ("you," or "your"). The terms of this MSA will apply to the initial and each subsequent statement of work ("SOW"), unless the MSA is changed in a communication that you and CLA both sign or is terminated as permitted herein.

1. Scope of Professional Services

CLA will provide services as described in one or more SOW that will reference this MSA. The SOW will describe the scope of professional services; the nature, limitations, and responsibilities related to the specific services CLA will provide; and the fees for such services.

If modifications or changes are required during CLA's performance of requested services, or if you request that we perform any additional services, we will provide you with a separate SOW for your signature. Such SOW will advise you of the additional fee and time required for such services to facilitate a clear understanding of the services.

Our services cannot be relied upon to disclose all errors, fraud, or noncompliance with laws and regulations. Except as described in the scope of professional services section of this MSA or any applicable SOW, we have no responsibility to identify and communicate deficiencies in your internal controls as part of any services.

2. Management responsibilities

You acknowledge and understand that our role is to provide the services identified in an SOW and that management, and any other parties engaging CLA, have responsibilities that are fundamental to our undertaking to perform the identified services.

3. Fees and terms

See the applicable SOW for the fees for the services.

Work may be suspended if your account becomes 90 days or more overdue and will not be resumed until your account is paid in full. If we elect to terminate our services for nonpayment, our engagements will be deemed to have been completed even if we have not completed the services. You will be obligated to compensate us for all time expended and to reimburse us for all out-of-pocket expenditures through the date of termination.

Payments may be made utilizing checks, Bill.com, your online banking platform, CLA's electronic payment platform, or any other client initiated payment method approved by

CLA. CLA's electronic online bill pay platform claconnect.com/billpay accepts credit card and Automated Clearing House (ACH) payments. Instructions for you to make direct bank to bank wire transfers or ACH payments will be provided upon request.

4. Other Fees

You also agree to compensate us for any time and expenses, including time and expenses of legal counsel, we may incur in responding to discovery requests or participating as a witness or otherwise in any legal, regulatory, or other proceedings that we are asked to respond to on your behalf.

5. Finance charges and collection expenses

You agree that if any statement is not paid within 30 days from its billing date, the unpaid balance shall accrue interest at the monthly rate of one and one-quarter percent (1.25%), which is an annual percentage rate of 15%. In the event that any collection action is required to collect unpaid balances due us, reasonable attorney fees and expenses shall be recoverable.

6. Dispute Resolution

Any disagreement, controversy, or claim ("Dispute") that may arise out of any aspect of our services or relationship with you shall be submitted to non-binding mediation by written notice ("Mediation Notice") to the other party. In mediation, we will work with you to resolve any differences voluntarily with the aid of an impartial mediator.

The mediation will be conducted as specified by the mediator and agreed upon by the parties (i.e., you and CLA). The parties agree to discuss their differences in good faith and to attempt, with the assistance of the mediator, to reach an amicable resolution of the Dispute.

Each party will bear its own costs in the mediation. The fees and expenses of the mediator will be shared equally by the parties.

7. Limitation of remedies

These limitation of remedies provisions are not applicable for any audit or examination services provided to you.

Our role is strictly limited to the services described in an SOW, and we offer no assurance as to the results or ultimate outcomes of any services or of any decisions that you may make based on our communications with you. You agree that it is appropriate to limit the liability of CLA, its partners, principals, directors, officers, employees, and agents (each a "CLA party").

You further agree that you will not hold CLA or any other CLA party liable for any claim, cost, or damage, whether based on warranty, tort, contract, or other law, arising from or related to this MSA, the services provided under an SOW, the work product, or for any plans, actions, or results of an SOW, except to the extent authorized by this MSA. In no event shall any CLA party be liable to you for any indirect, special, incidental, consequential, punitive, or exemplary damages, or for loss of profits or loss of goodwill, costs, or attorney fees.

The exclusive remedy available to you shall be the right to pursue claims for actual damages that are directly caused by acts or omissions that are breaches by a CLA party of

our duties owed under this MSA and the specific SOW thereunder, but any recovery on any such claims shall not exceed the fees actually paid by you to CLA pursuant to the SOW that gives rise to the claim.

8. Governing Laws, Jurisdiction, and Venue

The MSA is made under and shall be governed by the laws of the state of Minnesota, without giving effect to choice of law principles. This includes dispute resolution and limitation of remedies.

9. Time limitations

The nature of our services makes it difficult, with the passage of time, to gather and present evidence that fully and fairly establishes the facts underlying any dispute that may arise between you and any CLA party. The parties (you and CLA) agree that, notwithstanding any statute or law of limitations that might otherwise apply to a dispute, including one arising out of this MSA or the services performed under an SOW, for breach of contract or fiduciary duty, tort, fraud, misrepresentation or any other cause of action or remedy, any action or legal proceeding by you against any CLA party must be commenced as provided below, or you shall be forever barred from commencing a lawsuit or obtaining any legal or equitable relief or recovery. An action to recover on a dispute shall be commenced within these periods ("Limitation Period"), which vary based on the services provided, and may be modified as described in the following paragraph:

Service	Time after the date we deliver the services or work product*
Tax Consulting Services	36 months
Tax Return Preparation	36 months
Examination, compilation, and preparation services related to prospective financial statements	12 months
Audit, review, examination, agreed-upon procedures, compilation, and preparation services other than those related to prospective financial information	24 months
All Other Services	12 months

* pursuant to the SOW on which the dispute is based

If the MSA is terminated or your ongoing relationship with CLA is terminated, then the applicable Limitation Period is the lesser of the above periods or 12 months after termination of MSA or your ongoing relationship with CLA. The applicable Limitation Period applies and begins to run even if you have not suffered any damage or loss, or have not become aware of the existence or possible existence of a dispute.

10. Confidentiality

Except as permitted by the "Consent" section of this MSA, CLA will not disclose any of your confidential, proprietary, or privileged information to any person or party, unless you authorize us to do so, it is published or released by you, it becomes publicly known or available other than through disclosure by us, or disclosure is required by law, regulation or professional standard. This confidentiality provision does not prohibit us from disclosing your information to one or more of our affiliated companies in order to provide services that you have requested from us or from any such affiliated company. Any such

affiliated company shall be subject to the same restrictions on the use and disclosure of your information as apply to us.

The Internal Revenue Code contains a limited privilege for confidentiality of tax advice between you and our firm. In addition, the laws of some states likewise recognize a confidentiality privilege for some accountant-client communications. You understand that CLA makes no representation, warranty or promise, and offers no opinion with respect to the applicability of any confidentiality privilege to any information supplied or communications you have with us, and, to the extent that we follow instructions from you to withhold such information or communications in the face of a request from a third party (including a subpoena, summons or discovery demand in litigation), you agree to hold CLA harmless should the privilege be determined not to apply to particular information or communications.

The workpapers and files supporting the services we perform are the sole and exclusive property of CLA and constitute confidential and proprietary information. We do not provide access to our workpapers and files to you or anyone else in the normal course of business. Unless required by law or regulation to the contrary, we retain our workpapers and files in accordance with our record retention policy that typically provides for a retention period of seven years. After this period expires, our workpapers and files will be destroyed. Furthermore, physical deterioration or catastrophic events may shorten the time our records are available. The workpapers and files of our firm are not a substitute for your records.

Pursuant to authority given by law, regulation or professional standards we may be requested to make certain workpapers and files available to a regulator for its regulatory oversight purposes. We will notify you of any such request, if permitted by law. Access to the requested workpapers and files will be provided to the regulator under the supervision of CLA personnel and at a location designated by our firm. Furthermore, upon request, we may provide copies of selected workpapers and files to such regulator. The regulator may intend, or decide, to distribute the copies or information contained therein to others, including other governmental agencies.

11. Other provisions

You agree that CLA will not be assuming any fiduciary responsibility on your behalf during the course of this MSA, except as may be assumed in an SOW.

CLA may, at times, utilize external web applications to receive and process information from our clients; however, any sensitive data, including protected health information and personally identifiable information, must be redacted by you to the maximum extent possible prior to uploading the document or file. In the event that you are unable to remove or obscure all sensitive data, please contact us to discuss other potential options for transmitting the document or file.

CLA and certain owners of CLA are licensed by the California State Board of Accountancy. However, CLA has owners not licensed by the California State Board of Accountancy who may provide services under this MSA. If you have any questions regarding licensure of the personnel performing services under this MSA, please do not hesitate to contact us.

During the course of the engagement, there may be communication via fax or email. You are responsible to ensure that communications received by you or your personnel are

secured and not shared with unauthorized individuals.

12. Consent to use financial information

We regularly aggregate anonymized client data and perform a variety of analyses using that aggregated data. Some of these analyses are published to clients or released publicly. However, we are always careful to preserve the confidentiality of the separate information that we obtain from each client, as required by the AICPA Code of Professional Conduct and various laws. Your acceptance of this MSA will serve as your consent to our use of Lower Minnesota River Watershed District anonymized data in performing and reporting on these cost comparison, performance indicator and/or benchmarking analyses.

Unless authorized by law or the client consents, we cannot use a client's tax return information for purposes other than the preparation and filing of the client's tax return. By signing and dating this MSA, you authorize CLA to use any and all information furnished to CLA for or in connection with the preparation of the tax returns under this MSA, for a period of up to six (6) years from the date of this MSA, in connection with CLA's preparation of the types of reports described in the foregoing paragraph.

13. Consent to send you publications and other materials

For your convenience, CLA produces a variety of publications, hard copy and electronic, to keep you informed about pertinent business and personal financial issues. This includes published articles, invitations to upcoming seminars, webinars and webcasts, newsletters, surveys, and press releases. To determine whether these materials may be of interest to you, CLA will need to use your tax return information. Such tax information includes your name and address as well as the business and financial information you provided to us.

By signing and dating this MSA, you authorize CLA to use the information that you provide to CLA during the preparation of your tax returns to determine whether to offer you relevant materials. Your consent is valid until further notice.

14. Subcontractors

CLA may, at times, use subcontractors to perform services under this MSA, and they may have access to your information and records. Any such subcontractors will be subject to the same restrictions on the use of such information and records as apply to CLA under this MSA.

15. Technology

CLA may, at times, use third-party software applications to perform services under this MSA. You authorize CLA to sign on your behalf any vendor agreements applicable to such software applications. CLA can provide a copy of the application agreement at your request. You acknowledge the software vendor may have access to your data.

16. Termination of MSA

This MSA shall continue for five years from December 21, 2021, unless terminated earlier by giving appropriate notice. Either party may terminate this MSA at any time by giving 30 days written notice to the other party.

Upon termination of the MSA, the provisions of this MSA shall continue to apply to all services rendered prior to termination.

17. Agreement

We appreciate the opportunity to be of service to you and believe this MSA accurately summarizes the significant terms of our relationship. This MSA, along with the applicable addendum(s) and SOW(s), constitute the entire agreement regarding services to be performed and supersedes all prior agreements (whether oral or written), understandings, negotiations, and discussions between you and CLA. If you have any questions, please let us know. If you agree with the terms of our relationship as described in this MSA, please sign, date, and return.

CliftonLarsonAllen LLP
Christopher Knopik, CPA
Principal
612-397-3266
christopher.knopik@claconnect.com

Response:

This MSA correctly sets forth the understanding of Lower Minnesota River Watershed District

CLA	**Client**
CliftonLarsonAllen LLP	Lower Minnesota River Watershed District
Christopher G. Knopik	Linda R. Loomis
Christopher Knopik, CPA , Principal	Linda Loomis, Administrator
SIGNED 12/21/2021, 2:12:24 PM CST	**SIGNED** 12/31/2021, 1:26:58 PM CST

ADDENDUM - A

This addendum ("Addendum A") to the Master Services Agreement dated December 21, 2021 (the "MSA") is entered into by and between CliftonLarsonAllen LLP and Lower Minnesota River Watershed District and amends and modifies the MSA between the parties. Terms used herein and not defined shall have the meanings ascribed to such terms in the MSA. The parties agree to amend and modify the MSA effective as of the Effective Date as follows:

For the services described in Outsourcing SOW, you agree to indemnify and hold harmless CLA, its
successors and affiliates, officers, employees, and agents from any claims brought or asserted by any other person, third party, or governmental body for any loss, damages, liabilities, remedies, or cause of action, and from any reasonable expenses incurred in defending against any such claims or actions (including attorney fees) arising from or relating to the services performed by any CLA party.

You agree that during the term and for a period of one year after the expiration or termination date of the MSA, you will not solicit, hire, contract with, or engage the services of any person providing services to you on behalf of CLA without the prior written consent of CLA. If you breach this non-solicitation provision, you shall pay $100,000 to CLA as liquidated damages within two weeks of the date on which the former CLA employee or consultant begins his or her new employment with you.

CLA's relationship with you shall be solely that of an independent contractor and nothing in the MSA shall be construed to create or imply any relationship of employment, agency, partnership, or any relationship other than an independent contractor.

We will be responsible for our own property and casualty, general liability, and workers compensation insurance, taxes, professional training, and other personnel costs related to the operation of our business.

Certificate of completion

Master Services Agreement	Pages: 8	Status: Done
Parties: 2	Variables: 38	Secrets: 0
Certificate pages: 1	Audit log pages: 0	Attachments: 0
TimeZone: America/Chicago	Outlaw ID: -MrNS27zGeZWLIHFP-pL	

Client (Party)	Signature	Timestamp
Linda Loomis	IP Address: 24.118.81.89	Viewed: 12/31/2021, 1:26:20 PM CST
naiadconsulting@gmail.com	Signing location: On platform	Signed: 12/31/2021, 1:26:20 PM CST
User ID: OWjqH9UWAxd82gJBNT9Oej1ymNz1		

Electronic record and signature disclosure

CLA (Party)	Signature	Timestamp
Christopher Knopik, CPA	IP Address: 38.126.168.22	Viewed: 12/21/2021, 2:11:46 PM CST
christopher.knopik@claconnect.com	Signing location: On platform	Signed: 12/21/2021, 2:11:46 PM CST
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Electronic record and signature disclosure

CliftonLarsonAllen LLP
https://www.claconnect.com

Outsourcing Preparation Statement of Work Copy

Date: December 21, 2021

This agreement constitutes a Statement of Work ("SOW") to the Master Service Agreement ("MSA") made by and between CliftonLarsonAllen LLP ("CLA," "we," "us," and "our") and Lower Minnesota River Watershed District (you" and "your") dated December 21, 2021. The purpose of this SOW is to outline certain services you wish us to perform in connection with that agreement.

Scope of professional services
Christopher Knopik, CPA is responsible for the performance of the preparation engagement and other services identified in this agreement. They may be assisted by one or more of our authorized signers in the performance of the preparation engagement.

Bill Conboy is responsible for the implementation activities of the engagement. He will determine the proper additional resources to include subsequent to implementation.

Initial project services:

- Anticipated time period of 1 to 3 months:
  - Set up QuickBooks Online Plus, chart of accounts and associated reports
  - Transition as much historical data from Carver County's general ledger system as possible
  - Set up and transition the District to an online payment platform (www.bill.com)
  - Planning meetings and transition of knowledge with Carver County staff
  - Set up accounting processes, procedures and communicate to constituents
  - Set up payment card processes and expense report management, as applicable
  - Assist as requested or required - ad hoc

Ongoing normal accounting services - Daily/Weekly/Monthly:

- Outsourced accounting functions - accountant
  - Monthly accounts payable and check processing
  - Reconciling and tracking credit cards

- Record receipts
- Bank account reconciliations, management and preparation of monthly schedule of cash position
- Record adjusting journal entries
- Provide cash flow projection as necessary
- Maintenance of accounting records
- Preparation, coordination and filing of annual budget and tax levy
- Assistance with grant reporting and tracking

• Outsourced accounting functions -principal/reviewer

- Review and approve monthly reconciliations and journal entries prepared by staff
- Prepare the monthly financial reports
- Attendance at monthly committee/board/other meetings, as requested

Ongoing normal accounting services - Quarterly/Annual

- Complete annual reporting requirements
- Financial reporting form to the Office of the State Auditor, Property Tax Levy Report to MN Department of Revenue, Sales tax returns, as applicable, Prepare outstanding indebtedness form with counties, Prepare Local Government Lobbying Report
- Assist with annual budget preparation
- Prepare annual 1099's
- Preparation of annual audit schedules
- Prepare sales tax return, as applicable

- Keep district informed of changes to accounting standards

CLA shall be authorized to the following cash access services:

- Prepare checks and/or electronic funds transfers (EFT, ACH, wire, etc.) to be drawn upon your bank account(s).

- Obtain administrator access to your bank accounts for purposes of performing the duties documented in our SOW identified above.

Preparation services - financial statements

You have requested that we prepare the monthly financial statements of Lower Minnesota River Watershed District, which comprise the financial statements identified below in accordance with Modified Cash (financial reporting framework).

Financial statements:

General Fund Financial Report
Budget to Actual Variance Report
Cash Balance Report

The financial statements will not include the related notes to the financial statements.

Management has requested the financial statements be prepared without substantially all disclosures, which is a departure from the financial reporting framework. The financial statements will identify these departures.

Any supplementary information accompanying the financial statements, if requested, will be prepared and presented for purposes of additional analysis and is not a required part of the basic financial statements.

Preparation services – prospective financial information (i.e., unexpired budget information)

You have requested that we prepare the financial forecast of Lower Minnesota River Watershed District☐ ☒which comprises the forecasted financial statements identified below.

Financial statements:

General Fund Financial Report
Budget to Actual Variance Report

A financial forecast presents, to the best of management's knowledge and belief, the entity's expected financial position, results of operations, and cash flows for the forecast period. It is based on management's assumptions reflecting conditions it expects to exist and the course of action it expects to take during the forecast period.

The financial forecast will omit substantially all of the disclosures required by the guidelines for presentation of a financial forecast established by the American Institute of Certified Public

Accountants (AICPA presentation guidelines) other than those related to the significant assumptions. The financial forecast will identify this departure.

Management has requested the financial forecast be prepared without substantially all disclosures, which is a departure from the AICPA presentation guidelines. The financial forecast will identify these departures.

The supplementary information accompanying the financial forecast will be prepared and presented for purposes of additional analysis and is not a required part of the basic financial forecast.

References to financial statements in the remainder of this SOW are to be taken as a reference to also include the prospective financial information, where applicable.

Engagement objectives and our responsibilities

The objective of our engagement is to prepare financial statements in accordance with the financial reporting framework based on information provided by you and information generated through our outsourced accounting services.

The objective of our engagement is also to prepare a financial forecast in accordance with the guidelines for the presentation of a financial forecast established by the American Institute of Certified Public Accountants (AICPA presentation guidelines) based on information provided by you.

We will conduct our preparation engagement in accordance with Statements on Standards for Accounting and Review Services (SSARSs) promulgated by the Accounting and Review Services Committee of the American Institute of Certified Public Accountants (AICPA) and comply with the AICPA's Code of Professional Conduct, including the ethical principles of integrity, objectivity, professional competence, and due care.

Engagement limitations

We are not required to, and will not, verify the accuracy or completeness of the information you will provide to us for the engagement or otherwise gather evidence for the purpose of expressing an opinion or a conclusion. Accordingly, we will not express an opinion, a conclusion, nor provide any assurance on the financial statements and the supplementary information.

Our engagement cannot be relied upon to identify or disclose any financial statement misstatements, including those caused by fraud or error, or to identify or disclose any wrongdoing within the entity or noncompliance with laws and regulations. We have no responsibility to identify and communicate deficiencies in your internal control as part of this engagement. You agree that we shall not be responsible for any misstatements in the entity's financial statements that we may not identify as a result of misrepresentations made to us by you.

No assurance statement

The financial statements will not be accompanied by a report. However, management agrees that each page of the financial statements will include a statement clearly indicating that no

assurance is provided on them.

There will usually be differences between the forecasted and actual results, because events and circumstances frequently do not occur as expected, and those differences may be material. Management agrees that the introduction to the summary of the significant assumptions will include a caveat to that effect.

Our firm cannot be associated with any financial statements you file with the U.S. Securities and Exchange Commission (SEC) and accordingly, the name of our firm cannot be included in any of Lower Minnesota River Watershed District□ s□public filings.

Management responsibilities

The engagement to be performed is conducted on the basis that you (management and, when appropriate, those charged with governance) acknowledge and understand that our role is to prepare financial statements in accordance with the financial reporting framework.

We are required by professional standards to identify management's responsibilities in this agreement. Those standards require that you acknowledge and understand that management, and those charged with governance, as appropriate, have the following overall responsibilities that are fundamental to our undertaking the engagement to prepare your financial statements in accordance with SSARSs:

a. The selection of the financial reporting framework to be applied in the preparation of the financial statements and the use of the AICPA presentation guidelines in the preparation of the forecast.

b. The design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error, and the development of assumptions that reflect your plans and expectations regarding events and circumstances for the forecast period.

c. The prevention and detection of fraud.

d. To ensure that the entity complies with the laws and regulations applicable to its activities.

e. The accuracy and completeness of the records, documents, explanations, and other information, including significant judgments, you provide to us for the engagement to prepare financial statements.

f. To provide us with the following:

i. Access to all information relevant to the preparation and fair presentation of the financial statements, such as records, documentation, and other matters.

ii. Additional information that may be requested for the purpose of the engagement.

iii. Unrestricted access to persons within the entity with whom we determine it necessary to communicate.

We understand that you are engaging us to make recommendations and perform services to help you meet your responsibilities relevant to the preparation and fair presentation of the financial statements (items a and b).

The AICPA presentation guidelines require a summary of significant assumptions. We will assist management in the development of the assumptions for the financial forecast; however, management acknowledges that it is responsible for the assumptions (including review and approval of the assumptions) and for the preparation and fair presentation of a financial forecast that presents, to the best of management's knowledge and belief, the entity's expected financial position, results of operations, and cash flows for the financial forecast period, based on management's assumptions and reflecting conditions management expects to exist and the course of action management expects to take during the forecast period assuming the hypothetical assumptions.

For all accounting services we may provide to you, including the preparation of your financial statements, management agrees to assume all management responsibilities; oversee the services evaluate the adequacy and results of the services; and accept responsibility for the results of the services.

Management responsibilities relevant to CLA's access to your cash
Someone with management authority is responsible for the processes below. All approvals listed must be documented in writing, either electronically or manually:

- Approve all invoices and check payments.
- Approve all new vendors and customers added to the accounting system.
- Approve all electronic funds transfers (EFT, ACH, wire, etc.) to external parties.
- Review and approve (or delegate to the CLA consulting controller if applicable) all bank statements and affiliated monthly reconciliations.
- All requests or approvals received via email, text or IM will be confirmed via phone.

Fees, time estimates, and terms

The professional fees (guaranteed through December 31, 2024) for these services are attached at Exhibit A.

Included in the fixed fees are meetings and phone calls to discuss operations, business matters, and accounting matters of the entity. While the fixed fees entitle the entity to consultations with us, if organizational conditions change or the scope of the work requires substantial additional effort beyond what has been defined in this agreement, CLA agrees to perform the additional work at a mutually agreed upon price.

Out-of-pocket expenses such as out-of-town travel, meals, and lodging will be billed at cost and are not included in the fees quoted above. The fee estimates are based on anticipated cooperation from your personnel and their assistance with preparing requested schedules. If the requested items are not available on the dates required or are not accurate, the estimated fees will likely be higher. If unexpected circumstances require significant additional time, we will advise you before undertaking work that would require a substantial increase in the fee

estimate.

Use of financial statements
The financial statements we prepare are for management's use. If you intend to reproduce and publish the financial statements, they must be reproduced in their entirety.

Addendum A
The MSA Addendum A dated December 21, 2021 applies to services under this SOW.

Agreement
We appreciate the opportunity to provide the services described in this SOW related to the MSA. All terms and provisions of the MSA shall apply to these services. If you agree with the terms of this SOW, please sign below and return a signed copy to us by email or U.S. mail to indicate your acknowledgment and understanding of, and agreement with, this SOW.

CliftonLarsonAllen LLP
Christopher Knopik, CPA
Principal
(612) 397-3266
christopher.knopik@claconnect.com

Response
This SOW correctly sets forth the understanding of Lower Minnesota River Watershed District☐ ☒nd is accepted by:

CLA

CliftonLarsonAllen LLP

Christopher Knopik, CPA, Principal

SIGNED 12/21/2021, 2:13:55 PM CST

Client

Lower Minnesota River Watershed District☐ ☐

Linda Loomis, Administrator

SIGNED 12/31/2021, 1:28:52 PM CST

Certificate of completion

Outsourcing Preparation Statement of Work Copy

Parties: 2
Certificate pages: 1
Certificate pages:

TimeZone: America/Chicago

Pages: 8

Variables: 55

Audit log pages: 0

Outlaw ID: -MrNw1Ths2qvGjX7Zre7

Status: Done

Secrets: 0

Attachments: 1

Client (Party)	Signature	Timestamp
Linda Loomis	IP Address: 24.118.81.89	Viewed: 12/30/2021, 1:56:37 PM CST
naiadconsulting@gmail.com	Signing location: On platform	Signed: 12/30/2021, 1:56:37 PM CST
User ID: OWjqH9UWAxd82gJBNT9Oej1ymNz1		

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CLA (Party)	Signature	Timestamp
Christopher Knopik, CPA	IP Address: 38.126.168.22	Viewed: 12/21/2021, 2:13:25 PM CST
christopher.knopik@claconnect.com	Signing location: On platform	Signed: 12/21/2021, 2:13:25 PM CST
User ID: XBStOTheBKTmVCBxFniU4Rg6iFz2		

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LOWER MINNESOTA RIVER
WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting
Wednesday, January 19, 2022

Agenda Item
Item 7. C. – Scott County LIDAR Request

Prepared By
Linda Loomis, Administrator

Summary
This item was on the December 15, 2021, meeting agenda. Scott County asked the LMRWD to contribute to a project to update Lidar for Central Mississippi River block of the Minnesota Lidar Plan. Scott County's required financial contribution to the plan was $57,000. The County asked the LMRWD to contribute $5,000 to the County.

There was concern that contributing to Scott County was inequitable as the LMRWD extends into three other Counties and should the LMRWD contribute to each of the Counties. The item was tabled, and staff was asked to determine the value of Lidar to the LMRWD. It was suggested that if contributions were to be made to all the counties that it be apportioned using the same formula used to determine the levy.

Since the December Board meeting, I have found that Carver, Hennepin, and Dakota County do not intend to request funds from other governmental units. Scott County has moved forward and would appreciate any contribution the LMRWD is willing to make. The data will be available for the LMRWD to use regardless of a contribution. Since no other County intends to request contributions, staff is recommending that no contribution be made to Scott County.

Attachments
No attachments

Recommended Action
No action recommended

LOWER MINNESOTA RIVER
WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting
Wednesday, January 19, 2022

Agenda Item
Item 7. H. – Watershed Management Plan

Prepared By
Linda Loomis, Administrator

Summary
Staff continues work on updating its rules. The hold-up is how to address administrative approvals; what kinds of projects can be approved by staff without the need to come to a Board meeting for approval; the Board would be advised of the approval.

Staff will update the Board at the meeting of the schedule.

Attachments
No attachments

Recommended Action
No action recommended

LOWER MINNESOTA RIVER
WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting
Wednesday, January 19, 2022

Agenda Item
Item 7. I. – 2022 Legislative Action

Prepared By
Linda Loomis, Administrator

Summary
On December 21, 2021, Lisa Frenette and I met virtually with Senator Ingebrigtsen. We discussed Area #3 and the possibility of state funding for the project. The Senator requested additional information, which was sent to him the following week.

Lisa Frenette has been trying to set up a meeting with Representative Rick Hanson and to date we have not been able get a meeting with the Representative. Last week Lisa informed us of last week of the most recent plans for meeting with elected officials at the Capitol. The House id not allowing any direct meetings. The Senate is more flexible, but still is not back to normal.

Attachments
No attachments

Recommended Action
No action recommended

LOWER MINNESOTA RIVER
WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting
Wednesday, January 19, 2022

Agenda Item
Item 7. J. - Education and Outreach

Prepared By
Linda Loomis, Administrator

Summary
Mark Nemeth from DNR Fisheries met with the CAC in January to speak about the importance of the Minnesota River to fish in Minnesota. It was a very informative presentation. Brooke Asleson from the MPCA is scheduled to speak to the CAC at its February meeting about Chloride pollution. Planned Q1 2022 Social Media Posts

Planned Social Media Posts for the first quarter of 2022 is attached for the Board's information. Please feel free to provide staff with suggestions.

Attachments
Q1 2022 Social Media Planned posts

Recommended Action
No action recommended

Week	Dates	Topic	Platform	Post
1	Jan 4	CAC	Facebook Twitter Instagram	It's a new year! Do you want to make a difference in your community? The LMRWD is seeking residents to join its Citizen Advisory Committee. You do not need to be an expert to apply; all you need is an interest in and concern for our shared #water and #NaturalResources. Applications can be found here: https://docs.google.com/forms/d/e/1FAIpQLSdiVKORBf68-MUxUBzZRKpvqr6HsGhIA5hnTUMGct95our52g/viewform?usp=sf_link #volunteer
	Jan 5	National Bird Day	Facebook Twitter Instagram	It's #NationalBirdDay! No matter where you are, you are bound to find a bird flying by, nesting, or looking for its next meal. Take time today (and every day) to enjoy the beauty of birds. https://www.audubon.org/birding https://www.fws.gov/refuge/Minnesota_Valley/ @MNvalleyNWR @USFWSMidwest
2	Jan 10	Activities For Kids	Facebook Twitter Instagram	Are you looking for activities to keep the kids busy this winter? Check out the Just for Kids page on the @MNvalleyNWR. https://www.fws.gov/refuge/Minnesota_Valley/visit/just_for_kids.html?blm_aid=17523713
	Jan 12	LMRWD Board Meeting	Facebook Twitter Instagram	Please join the @LowerMinn at its upcoming board meeting. Board meetings are held at the Carver County Government Center on the third Wednesday of the month, beginning at 7:00 p.m. unless otherwise noted. http://lowermnriverwd.org/meetings
3	Jan 18	Metro Children's Water Festival	Facebook Twitter Instagram	Are you a 4th grade teacher looking fun and engaging lessons on water and the environment? Look no further! The Metro Children's Water Festival website has got you covered! https://metrocwf.org/
	Jan 20	Construction Permit	Facebook Twitter Instagram	Are you starting a construction project? Visit the @LowerMinn website to check if you need a permit: https://lowermnriverwd.org/rules/individual-permit
4	Jan 24	Snow and Ice Removal	Facebook Twitter Instagram	Do you have the right tools for winter's snow and ice? Using a shovel, snowblower, or plow can be more effective than putting down salt. It is also a great way to prevent salt pollution in local waterways. https://www.cleanwatermn.org/wp-content/uploads/AaD_TipsCard_Salt_v2.pdf https://www.wisaltwise.com/Take-Action/Salt-Awareness-Week
	Jan 26	Landscaping for Clean Water	Facebook Twitter Instagram	When the snowblower is broken and the plow dumps a foot of snow at the end of your driveway, you may want to skip winter and plan for spring—you can! Check out the Landscaping for Clean Water workshops in Dakota County. Visit www.dakotaswcd.org or call (651) 480-7777.
5	Jan 31	Adopt a Drain	Facebook Twitter Instagram	Even in the winter, it is important to keep your storm drains clear of snow. Water from storm drains goes directly into our local waterways, so remove snow with tools like a shovel. Never use salt! @AdoptaDrainMN
	Feb 2	World Wetlands Day	Facebook Twitter Instagram	Part of the @LowerMinn's mission is to protect and preserve wetlands. Wetlands improve water quality, provide flood storage, reduce shoreline erosion, and so much more! Simple actions like reducing pesticide and fertilizer use, removing nonnative and invasive species, and picking up after your pet can make a huge difference in protecting our wetlands. #WorldWetlandsDay

Week	Dates	Topic	Platform	Post
6	Feb 7	Pick Up After Your Pet	Facebook Twitter Instagram	Avoid a mess in your yard this spring. Make sure to pick up your pet's waste this winter. Pet waste contains bacteria that can wash into storm drains and local waterbodies when thesnow melts in the spring.
	Feb 9	LMRWD Board Meeting	Facebook Twitter Instagram	Please join the @LowerMinn at its upcoming board meeting. Board meetings are held at the Carver County Government Center on the third Wednesday of each month, beginning at 7:00 p.m. unless otherwise noted. http://lowermnriverwd.org/meetings
7	Feb 15	Tree Pruning	Facebook Twitter Instagram	Mid to late winter is a great time for tree pruning! For all you need to know about tree pruning, visit https://extension.umn.edu/planting-and-growing-guides/pruning-trees-and-shrubs.
	Feb 17	Chloride	Facebook Twitter Instagram	On any given "warm" Minnesota winter day, the line at the local car wash can stretch down the street. If you are anxious to wash winter salt and grime off your car, patience is a necessary virtue! Stay calm and know you are protecting MN waters by using a facility where dirty water will be treated before entering our shared waters. For more information on chloride, visit https://www.pca.state.mn.us/water/chloride-101
8	Feb 22	Social Media Anniversary	Facebook Twitter Instagram	Today is our 1-year social media anniversary! Thanks to all who follow and like—we love sharing with you! @LowerMinn #SocialMedia #Anniversary #Followers
	Feb 25	SCWEP Workshops	Facebook Twitter Instagram	The @SCWEP provides educational workshops to inform residents on ways to improve water quality in our lakes and rivers throughout the year. Check them out @ https://www.scottswcd.org/education. #CleanWaterStartsWithMe
9	Feb 28	National Invasive Species Week	Facebook Twitter Instagram	We've seen the images of massive goldfish in area lakes. During National #InvasiveSpecies Week, remember nonnative plants and animals can damage the economy, environment, andeven human health. Learn how to prevent their spread at https://www.nisaw.org/learn/
	Mar 3	World Wildlife Day	Facebook Twitter Instagram	World Wildlife Day reminds us of our reliance on wildlife and biodiversity-based resources to meet Our needs. Currently, more than 38,500 species are threatened with extinction according to the IUCN Red List of Threatened Species. Engage in the conversation about reversing the fate of endangered species, restoring their habitats, and promoting sustainability. https://wildlifeday.org/content/get_involved
10	Mar 7	National Groundwater Awareness Week	Facebook Twitter Instagram	#DidYouKnow about 75% of Minnesotans rely on groundwater for their drinking water? We rely On this "invisible" resource for our daily needs, but our actions can easily pollute the water we need. What can you do? Reduce pesticide and fertilizer use and reduce or eliminate salt on winter sidewalksand driveways. Also, upgrade or repair failing septic systems and limit outdoor turf irrigation. #ProtectOurWater
	Mar 9	LMRWD Board Meeting	Facebook Twitter Instagram	Please join the @LowerMinn at its upcoming board meeting. Board meetings are held at the Carver County Government Center on the third Wednesday of each month, beginning at 7:00 p.m. unless otherwise noted. http://lowermnriverwd.org/meetings
	Mar 15	Cost Share Grants	Facebook Twitter Instagram	Are you planning a spring project? The @LowerMinn has cost share grants for projects that protect and improve water and natural resources. Find out if your project is eligible! https://lowermnriverwd.org/resources/grants-cost-sharing

Week	Dates	Topic	Platform	Post
11	Mar 17	Fix a Leak Week	Facebook Twitter Instagram	Did you know household leaks waste nearly 1 trillion gallons of water annually nationwide? That's a lot of water! Chase down those leaks to save water and money! https://www.epa.gov/watersense/fix-leak-week. Kids can check out the fun learning activities! https://www.epa.gov/watersense/watersense-kids
12	Mar 20	First Day of Spring	Facebook Twitter Instagram	It's the #FirstDayofSpring! Get out and enjoy your @LowerMinn Watershed. Looking for a place to go? Check out our map. https://www.google.com/maps/d/u/0/viewer?mid=1kxhl0Cwod9iau7o8Z-nyw8SAqRk&ll=44.83136385987546%2C-93.44524844855783&z=11
	Mar 22	World Water Day	Facebook Twitter Instagram	Valuing water means different things to different people. What does water mean to you? Is it important for your family life or work? Maybe it is a cultural connection. Celebrate all the ways water benefits our lives and act to protect it now and for the future. The @LowerMinn has cost share grants available for projects that protect and improve water quality. Find out more at https://lowermnriverwd.org/resources/grants-cost-sharing. #WorldWaterDay
13	Mar 29	Compost Bin and Rain Barrels	Facebook Twitter Instagram	It's time to order your rain barrels and compost bins! Rain barrels catch fresh water as it pours from your downspouts. That water would otherwise be wasted and make its way into storm sewers. Compost bins are an easy way to discard food and yard waste. You can keep those items out of the solid waste stream and turn them into rich soil for your plants and garden. https://recycleminnesota.org/work/compost-bins-rain-barrels/
	Mar 30	National Take a Walk in the Park Day	Facebook Twitter Instagram	It's National #TakeAWalkInThePark day . . . so why don't you celebrate? There are lots of great places to visit in the @LowerMinn!

LOWER MINNESOTA RIVER
WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting
Wednesday, January 19, 2022

Agenda Item
Item 7. K. - LMRWD Projects

Prepared By
Linda Loomis, Administrator

Summary

i. Eden Prairie Area #3

At the December 15, 2021 Board meeting the Board approved a contract with Inter-Fluve to continue work on Area #3. On December 30, 2021, a meeting was held with Inter-Fluve to discuss the new direction of the project. Staff has also begun to look for historical information regarding the stormwater pond. The MPCA has been contacted to discuss the possibility of relocating the pond and to get historical information from the MPCA regarding the placement of the pond. Staff plans to meet again with Inter-Fluve at 1:00 pm on Friday, January 21, 2022.

ii. Spring Creek Update

The LMRWD has been investigating erosion along Spring Creek in the City of Carver. Residents in the area reached out to the LMRWD because of impacts to private property. The Carver Soil & Water Conservation District prepared plans for two properties to stabilize the creek bank. The properties could be eligible for Cost Share projects, however the cost of stabilizing the properties would exceed the limits of the Cost Share Program. The City of Carver has expressed interest in assessing the hydrology of Spring Creek and impacts of land use changes within the Spring Creek watershed. The LMRWD Board of Managers authorized staff to prepare a more in-depth study of the Spring Creek Watershed. Staff has prepared a review of all the studies, which is attached for the Board's information.

Recommendations are made in the review. An update to the Capital Implementation Program (CIP) is scheduled for 2022. The Board should provide direction to staff as to whether to include any of the recommendations in the CIP.

Attachments
Spring Creek Hydrology Review dated January, 15, 2022

Recommended Action
Provide direction to staff

Young Environmental Consulting Group, LLC

Technical Memorandum

To: Linda Loomis, Administrator
Lower Minnesota River Watershed District

From: Kaci Fisher, Environmental Specialist
Katy Thompson, PE, CFM
Della Schall Young, PMP, CPESC

Date: January 15, 2022

Re: Spring Creek Hydrology Review

The Spring Creek Project (Project) consists of two properties (Site 1: 112 5th Street West and Site 2: 404 Broadway Street) in the city of Carver in Carver County, as shown in Figure 1. The owners raised concerns about erosion issues on their properties caused by Spring Creek, and Carver Soil and Water Conservation District (SWCD) designed a concept plan to stabilize both sites. Young Environmental Consulting Group (Young Environmental) visited the site along with Barr Engineering Co. (Barr Engineering) on June 21, 2019 (Attachment 1). From this site visit, Barr Engineering provided the following recommendations:

1) Per the Carver SWCD, remove fallen trees, armor eroded banks with riprap, and revegetate with deep-rooted species.
2) Complete an assessment of the hydrology to better understand historic changes and look to future conditions to help design stabilization measures.
3) Consider cross-vanes and additional grading to stabilize the channel profile and reconnect the channel to the former floodplain.
4) Consider restoring the channel to its previous alignments at Sites 1 and 2.

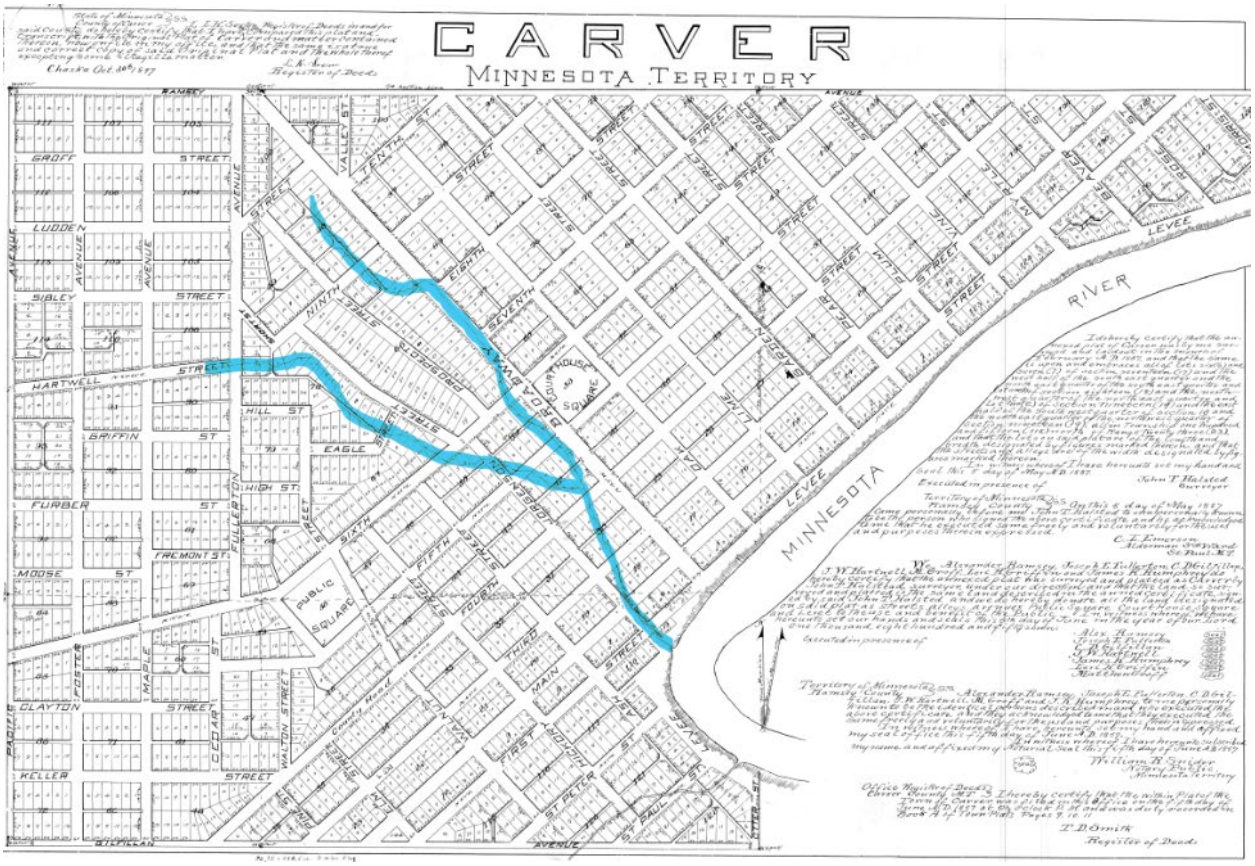
As recommended by Barr, Lower Minnesota River Watershed District (LMRWD) managers authorized Young Environmental to complete an assessment of the hydrology to better understand historic changes and look to future conditions to help design stabilization measures. Young Environmental has completed the assessment, which is documented in the following sections.

Figure 1. Spring Creek Project Location Map

Spring Creek History

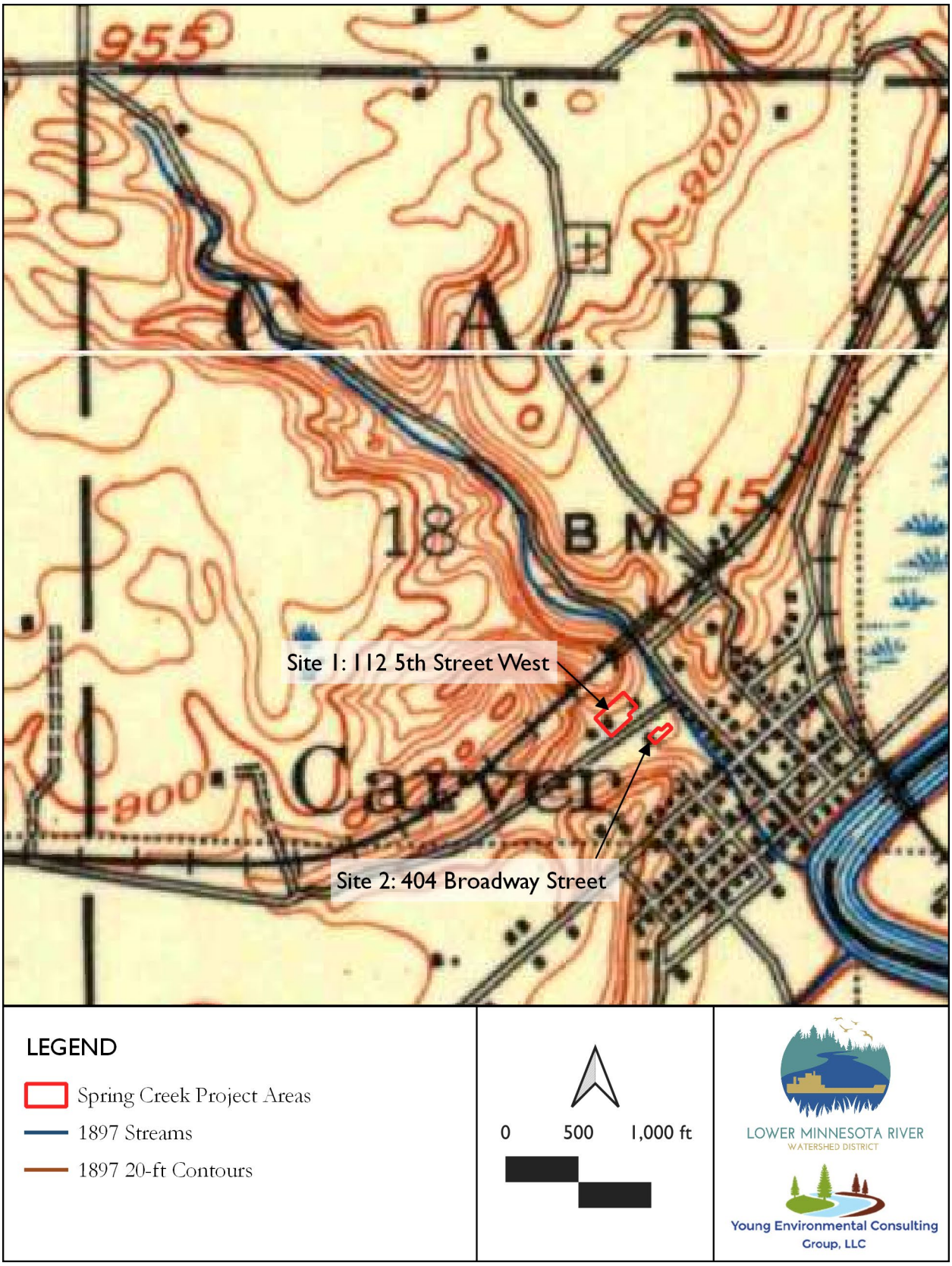
In 1854, the Carver Land Company founded the Village of Carver, which experienced exponential growth as an essential trade town along the Minnesota River. Because of its proximity to the river, the Village of Carver experienced widespread flooding which repeatedly damaged the river town. Today, the former Village of Carver now makes up the historic downtown district of the city of Carver and is listed on the National Register of Historic Places. Because of its private development, the village was platted before settlement and its early growth as a successful river town created near full development by the 1880s (City of Carver 2020). The 1857 land plat available from Carver County shows the former Village of Carver in great detail, including the alignment of Spring Creek (Figure 2). The numerous lots platted show no regard for the existing steep topography or natural features, and by 1897 Spring Creek was confined by multiple crossings and the downtown development, and was deeply incised into the river bluffs (Figure 3).

Figure 2. Spring Creek, highlighted in blue, as shown on Carver land plat[1]



[1] Carver County, *Carver, Minnesota Territory Plat* (Chaska, 1857).

Figure 3. City of Carver 1897 Topography



Aerial photos from the University of Minnesota's Minnesota Historic Aerial Photographs Online (MHAPO) website show that in 1937 the downtown area was much the same as in 1897, with agriculture lands dominating the landscape outside of the historic district. New and sizable gullies are shown creeping into agricultural lands upstream from the downtown district and are easily identifiable by the lack of vegetation within the channel (Figure 4).

By 1945, it appeared that these gullies had begun to stabilize. There were signs of vegetation establishment at the head cuts and within the gullies themselves. Between 1945 and 1964, the agricultural fields became more contoured, with elaborate drain tile systems and the gullies became more forested, however, the general top of the ravine boundary does not appear to have changed significantly, indicating that the system had reached a new equilibrium after the initial development in the 1850s (Figure 5).

The landscape remained somewhat stabilized until the 1997 aerial (Figure 6) which captured the 1997 flood on the Minnesota River and the conversion of agricultural lands to residential subdivisions. The gullies were still heavily vegetated and, excepting the western branches of Spring Creek, appeared to have stabilized. The western branches appeared to have widened between 1964 and 1997, but the upstream migration had halted because of barriers such as road crossings. One major change in the 1997 photograph is the absence of the Carver High Trestle bridge, which was constructed by the Chicago, Milwaukee & St. Paul Railway in 1899. The railway abandoned the track in 1978, and the bridge was removed in 1981.[2] By 2020, Spring Creek was almost entirely bounded by residential subdivisions and roads (Figure 7).

With the development of the agricultural landscape into a suburban residential landscape, it would be expected that the stormwater runoff from the watershed entering Spring Creek would increase, which in turn would also increase bank erosion and gully formation as the creek attempts to reach a new equilibrium, similar to what occurred after the initial development of the watershed at the beginning of the 20th century. The 2020 Gully Inventory and Condition Assessment noted ninety-one individual gullies forming within the Spring Creek watershed, of which forty were deemed high priority to correct.

Throughout all this development, while the watershed changed, the Spring Creek alignment generally remained the same, but on a local level, there were significant changes. At the two sites, the confluence with the Spring Creek west branch migrated upstream approximately 360 feet from its location in 1857 at 4th Street to upstream of 5th Street in 2011 (Figure 8). Additionally, the two sites are located in an area where the naturally steep topography begins to flatten and meet the Minnesota River floodplain,

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[2] Vern, Wigfield, John Hill, and Carver on the Minnesota, *Carver High Trestle* (2021).

creating a relatively dynamic system where channels may migrate over time. However, the creek is fixed upstream and downstream by culvert crossings at 6th and 4th Streets, which have been in place since the 1880s.[3]

[3] John von Walter, *Carver Historic* District (2016).

Figure 4. Spring Creek in 1937 (MHAPO)

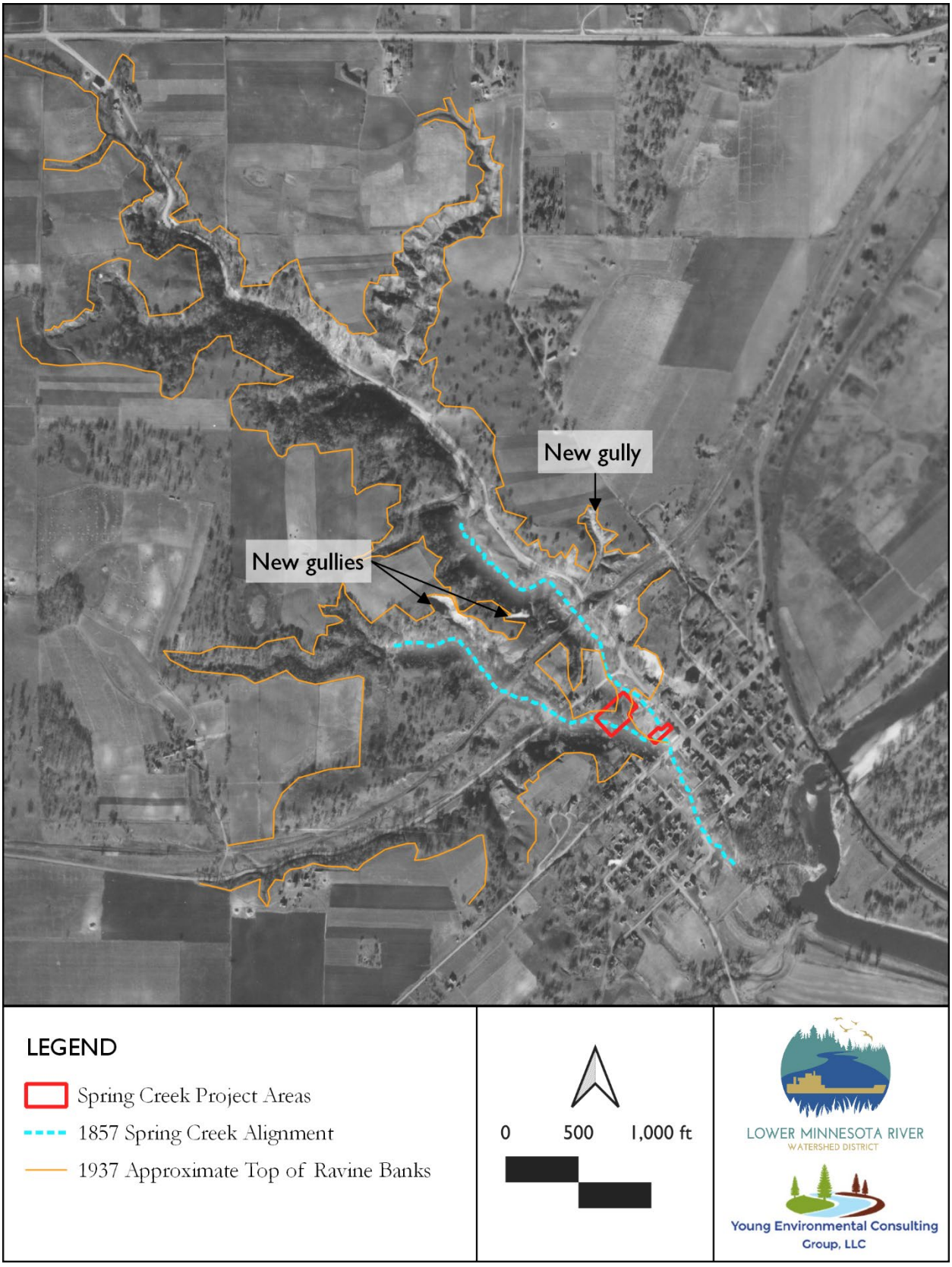


Figure 5. Spring Creek in 1964 (MHAPO)

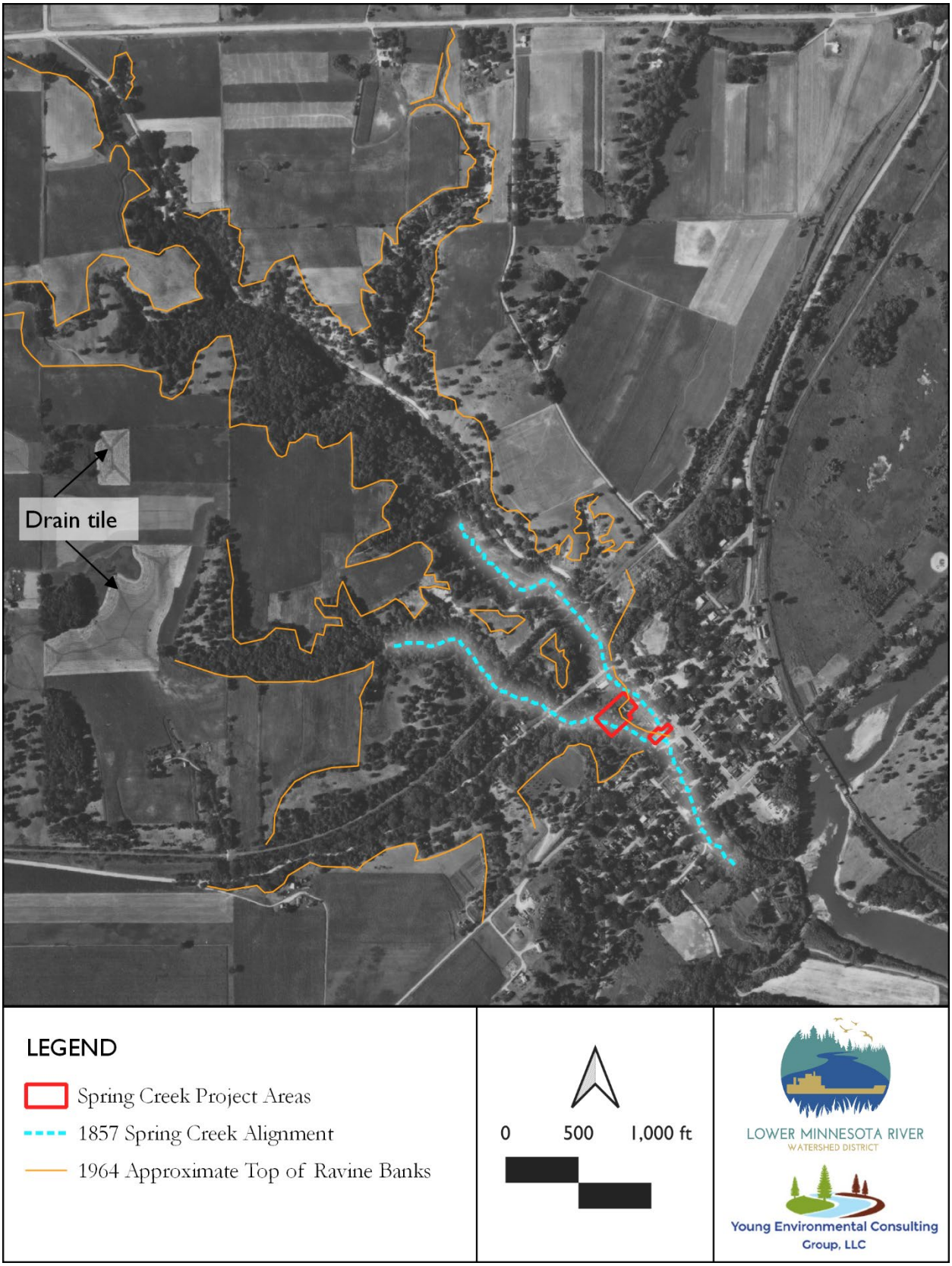


Figure 6. Spring Creek in 1997 (Minnesota Geospatial Commons)

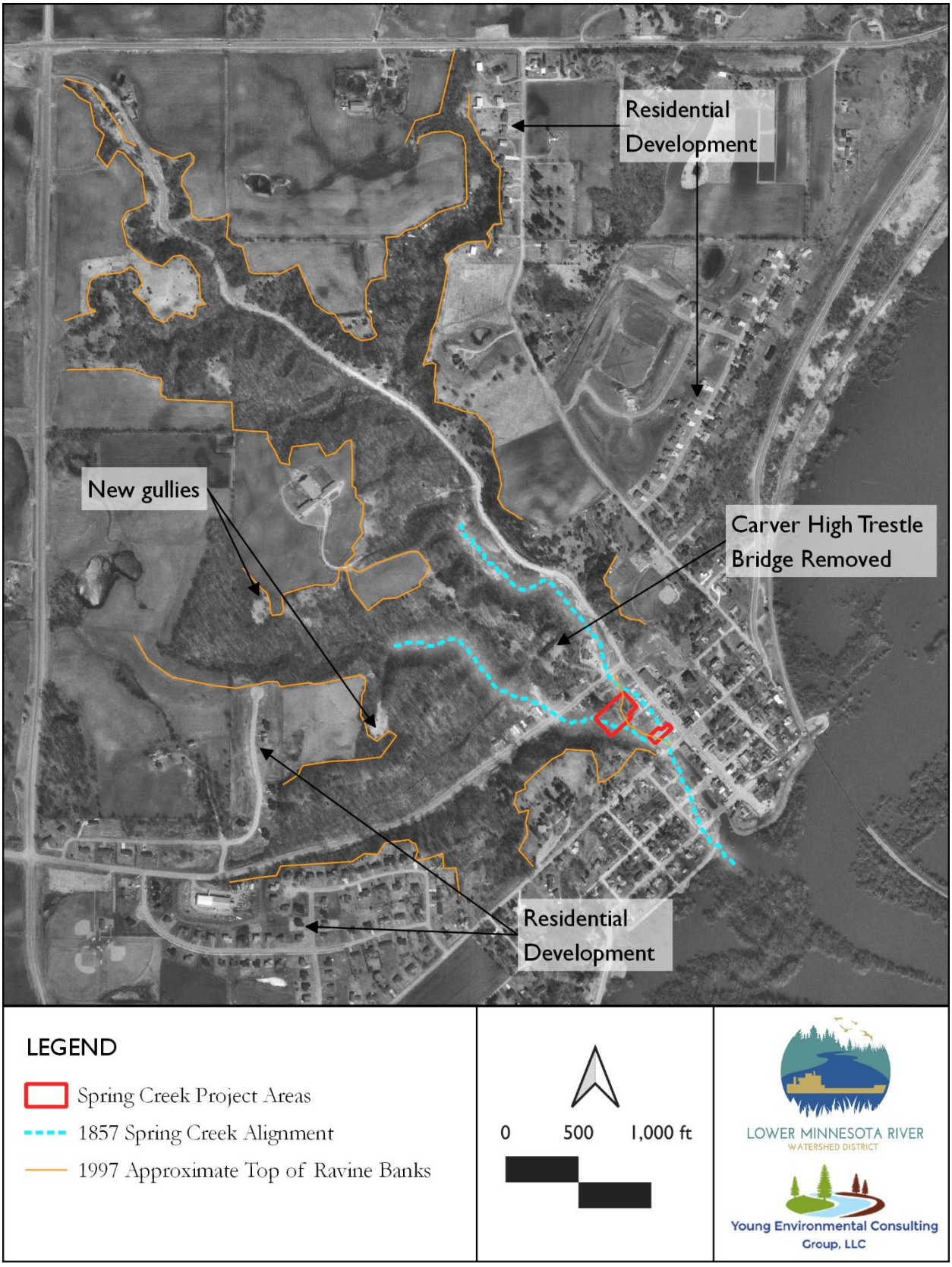


Figure 7. Spring Creek in 2020 (Minnesota Geospatial Commons)

Figure 8. Change in Spring Creek Alignment

2021 Field Visit

Young Environmental staff visited the two sites on May 28, 2021, walking along the left bank of Spring Creek from 520 Broadway to 404 Broadway, stopping at several locations (shown in Figure 9), and noting erosion concerns and previous restoration attempts.

At Site 1 (112 5th Street), we observed the left bank (when looking downstream) to be near vertical with some evidence of slope movement shown by trees leaning into the channel (Figure 10) and pistol-butted (or curved) tree trunks on the left bank itself (Figure 11). The right bank also showed some signs of slope sliding and erosion (Figure 11). In 2019, the resident was concerned because they observed the creek had moved approximately 30 feet from its previous alignment in the 1990s and is now closer to their residence. The historic imagery and the sediment deposits along the left bank near the confluence with the west branch seem to support the resident's claims; however, while both banks show signs of moderate to severe erosion, the creek does not appear to be threatening infrastructure currently, and downstream the channel appears to be stable (Figure 12).

Gregg Witt, the property owner of 104 6th Street and 420 Broadway, approached staff and discussed the Spring Creek erosion issues. Mr. Witt talked about landowners dumping debris within the channel to prevent the creek from meandering. At the time of the site visit, we observed riprap at the end of 5th Street (Figure 13), as well as construction debris, an old mattress and box spring, and a large recycling trash bin in the channel near 420 Broadway (Figure 14). He also pointed out an old wooden fence that used to be at the channel bank and had now fallen into the channel. Then he noted that the bluff across the bank (at 400 4th Street West) was eroding to such a degree that the driveway at the top of the bluff appeared to show signs of undercutting (Figures 15 and 16).

Walking further south to 404 Broadway, it is evident that the stream has caused significant erosion at Site 2, nearly undercutting an accessory structure in the property's backyard. The creek has several sharp meanders in this short stretch starting immediately upstream from 404 Broadway (Figure 17). The resident has placed logs and pallets along the left bank in an attempt to protect the structure (Figure 18). The creek makes two nearly 90-degree bends before entering the 4th Street culvert and appears to have caused failure of a retaining wall at 402 Broadway.

We should also note that there did not appear to be an appreciable difference in erosion appearances in 2021 compared to the photos taken in 2019 and 2018 (Attachment 1). In fact, many of the same leaning and fallen trees in the 2019 photos were observed in the field at the same locations, indicating that the rate of erosion may have slowed.

While the creek is extremely close to the accessory structure at Site 2, without survey

information, it is difficult to determine the rate of bank erosion. However, many of the same trees and banks appear to be in the same locations. Given the amount of vegetation present in this reach, it may be that the stream seems to have found an equilibrium with the remaining in-water structures. The driveway at 200 4th Street West (Site 3 and Figures 15 and 16) appears to be of greater concern because the creek has undercut the toe of the bank, creating a near vertical bank that is more than twenty feet tall.

Figure 9. Locations of 2021 Site Photos and Areas of Erosion

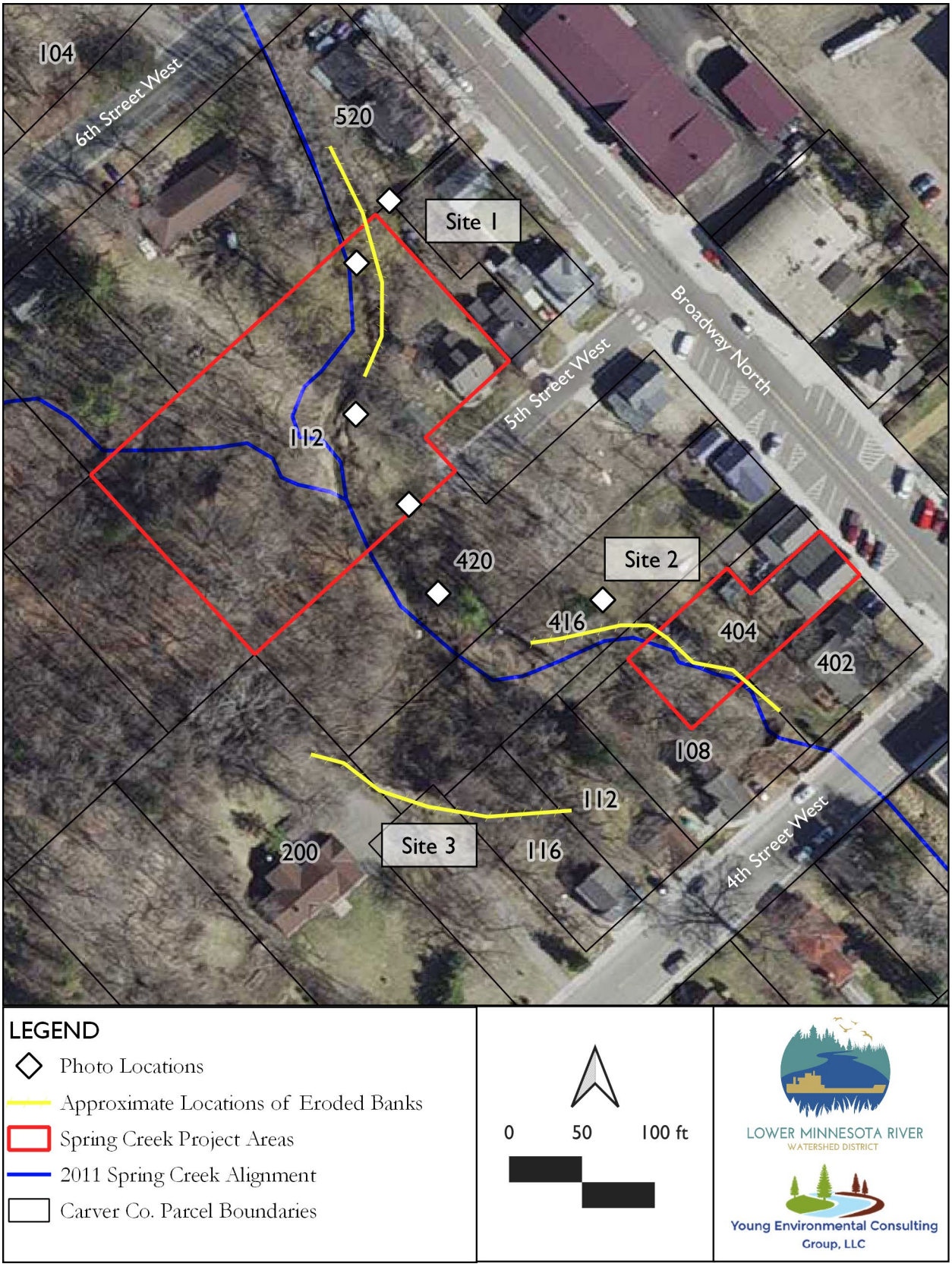


Figure 10. Spring Creek looking upstream from 520 Broadway at the 6th Street culvert crossing; note leaning trees on the left bank.

Figure 11.Spring Creek looking downstream from 112 5th Street (Site 1); note the near-vertical left bank and pistol-butted trees, indicating slow slope movement; erosion and slope instability are also present on the opposite right bank.

Figure 12. Spring Creek looking downstream from 112 5th Street (Site 1).

Figure 13. Looking upstream at riprap bank protection and stormwater outfall at the end of 5th Street West.

Figure 14. Riprap and debris placed on left bank at 420 and 416 Broadway.

Figure 15. Spring Creek looking downstream and up at right bank bluff erosion at 200 4th Street West (Site 3) from 416 Broadway. The approximate edge of the driveway and top of bluff is highlighted in orange below.

Figure 16. Spring Creek right bank and undercut bluff near 116 and 112 4th Street West (Site 3) from 416 Broadway; the approximate top of the bluff is highlighted in orange.

Figure 17. Looking upstream at Spring Creek from 416 Broadway (Site 2).

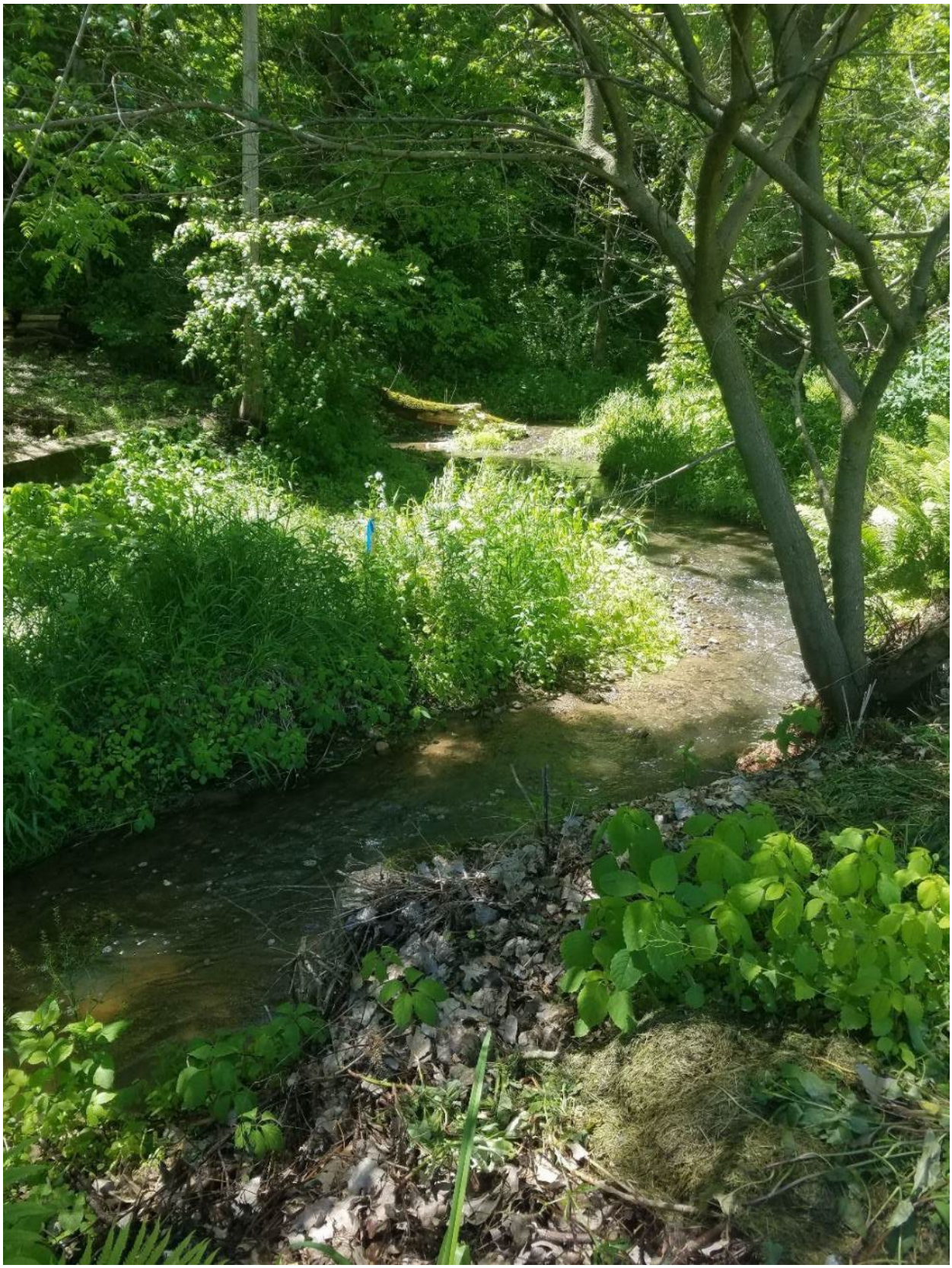


Figure 18. Spring Creek looking downstream at 404 Broadway accessory structure and debris pile on the left bank.

Figure 19. Spring Creek looking downstream at a failed retaining wall in the channel.

Hydrology Updates

We developed a HydroCAD model to ascertain the impacts of development on the flows in the creek. We collected soils data from the Natural Resources Conservation Service and obtained land use data from the Metropolitan Council for current (2016) and future conditions, while presettlement conditions were obtained from the Minnesota Department of Natural Resources Marschner Presettlement Vegetation GIS coverage. We ran the HydroCAD model using rainfall estimates from the National Oceanic and Atmospheric Administration (NOAA) from Technical Paper 40 (TP-40), developed in 1961, which provides an estimate of rainfall depths based on monitoring data. We used the TP-40 rainfall data to approximate the presettlement rainfall depths. The more current NOAA Atlas 14 rainfall depths provide a better estimate of rainfall depths today and we used them in the current (2016) condition analysis (Table 1). The flow results from the HydroCAD modeling are presented in Tables 2 and 3 below, and in Attachment 2.

Table 1. Precipitation Depths in Inches Used in Spring Creek Analysis

	Presettlement (NOAA TP-40)	Current (NOAA Atlas 14)
1-year	2.3	2.49
2-year	2.8	2.85
10-year	4.2	4.23
100-year	6.0	7.30

Table 2. Presettlement Conditions—Peak Flow Rates in Cubic Feet Per Second (cfs)

	Drainage Area (acres)	1-Year (cfs)	2-Year (cfs)	10-Year (cfs)	100-Year (cfs)
Main Branch North at Confluence	291.8	24	54	185	405
West Branch at Confluence	256.5	39	95	342	768
Main Branch South to Minnesota River	573.3	40	97	351	792

Table 3. Current Conditions—Peak Flow Rates

	Drainage Area (acres)	1-Year (cfs)	2-Year (cfs)	10-Year (cfs)	100-Year (cfs)
Main Branch North at Confluence	291.8	113	160	369	917
West Branch at Confluence	256.5	128	179	403	978
Main Branch South to Minnesota River	573.3	239	335	771	1,904

Looking at the presettlement discharge rates (Table 2) compared to the 2016 current conditions (Table 3), there has been a 154% increase in the 100-year 24-hour discharge rates, but a 461% increase in the 1-year 24-hour discharge rate. This indicates that while stormwater runoff to the creek has increased, it has done so the most during the most frequent events. The 10-year presettlement event may now be today's 2-year event. Channel sizes are often defined by these high-frequency, but low-flow events, so with the significant increase in the 1-year event, it is not surprising that there has also been significant erosion within the channel as the channel adjusts to these larger storms.

Finally, we based our evaluation of future conditions on the *Third National Climate Assessment*, which states that the upper Midwest experienced a 37% increase in heavy downpours between 1958 and 2012.[4] If climate change continues at that same pace, by 2050 it is possible that the Midwest could experience a 26% increase in rainfall. To estimate these flows in the HydroCAD model, we multiplied the NOAA Atlas 14 data by 26% and the results are shown in Table 4.

[4] John Walsh and Donald Wuebbles, *Fourth National Climate Assessment* (U.S. Global Change Research Program, 2014).

Table 4. Estimated Future Condition Peak Flow Rates

	Drainage Area (acres)	1-Year (cfs)	2-Year (cfs)	10-Year (cfs)	100-Year (cfs)
Main Branch North at Confluence	291.8	288	379	714	1,528
West Branch at Confluence	256.5	339	439	797	1,655
Main Branch South to Minnesota River	573.3	624	816	1,511	3,187

Hydraulics

The City of Carver is currently developing designs to improve the levee system around Spring Creek and the Minnesota River. The city developed a HEC-RAS model to evaluate their designs and has shared this model with Young Environmental for use in this study. The HEC-RAS model extends from the confluence with the Minnesota River upstream to the 6th Street crossing. It includes only the main branch of Spring Creek and all the constructed crossings that have been in place since the early 1900s. The City's HEC-RAS model was used to evaluate the proposed SWCD stabilization designs for Sites 1 and 2.

The SWCD has proposed vegetated riprap and Bio-D block walls with native plantings along the left bank at Site 1 to prevent Spring Creek from further eastward migration (Figure 20), at a cost of approximately $75,000. For Site 2, the SWCD recommended a more robust combination of riprap, Bio-D block, native plantings, and removal of the failing concrete walls (Figure 21), at a cost of approximately $88,000.

Figure 20. Carver SWCD 2019 proposed design for Site 1 (112 5th Street West)

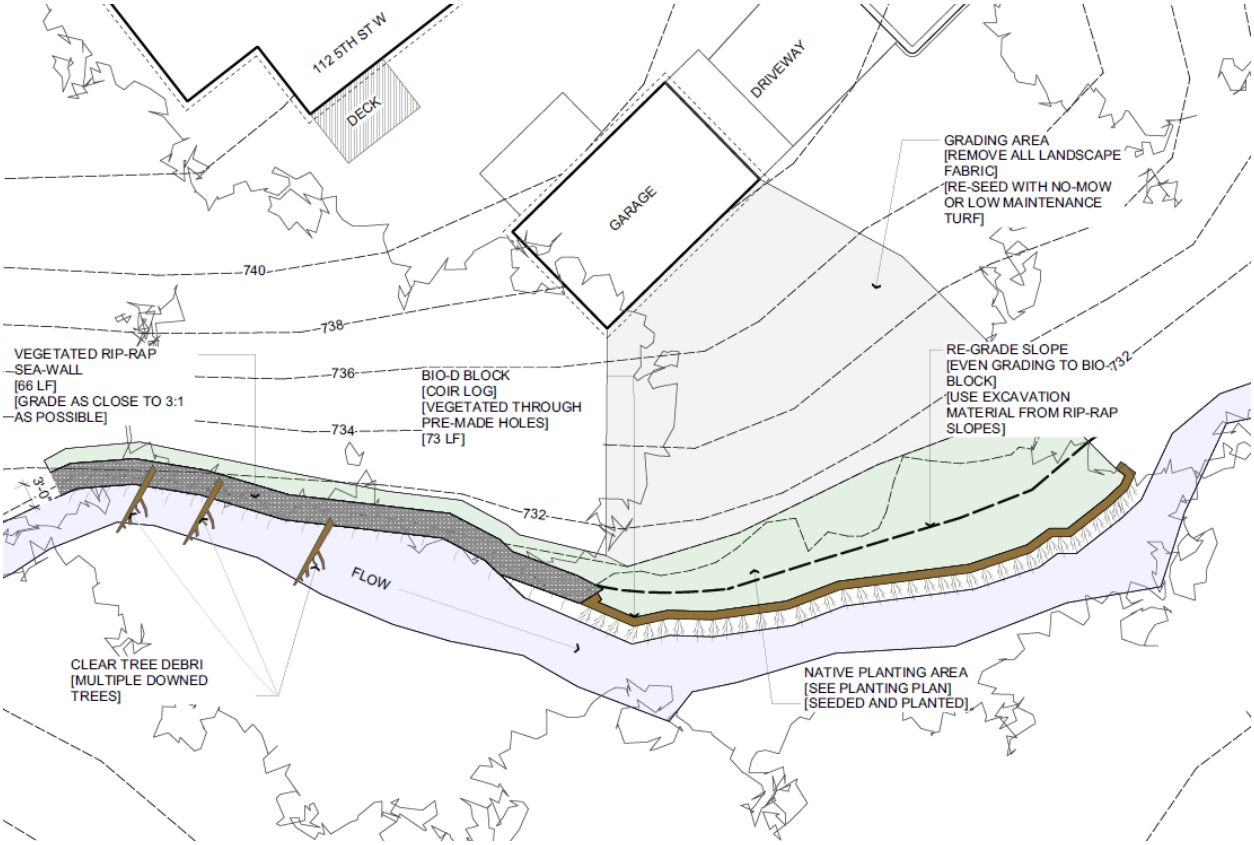
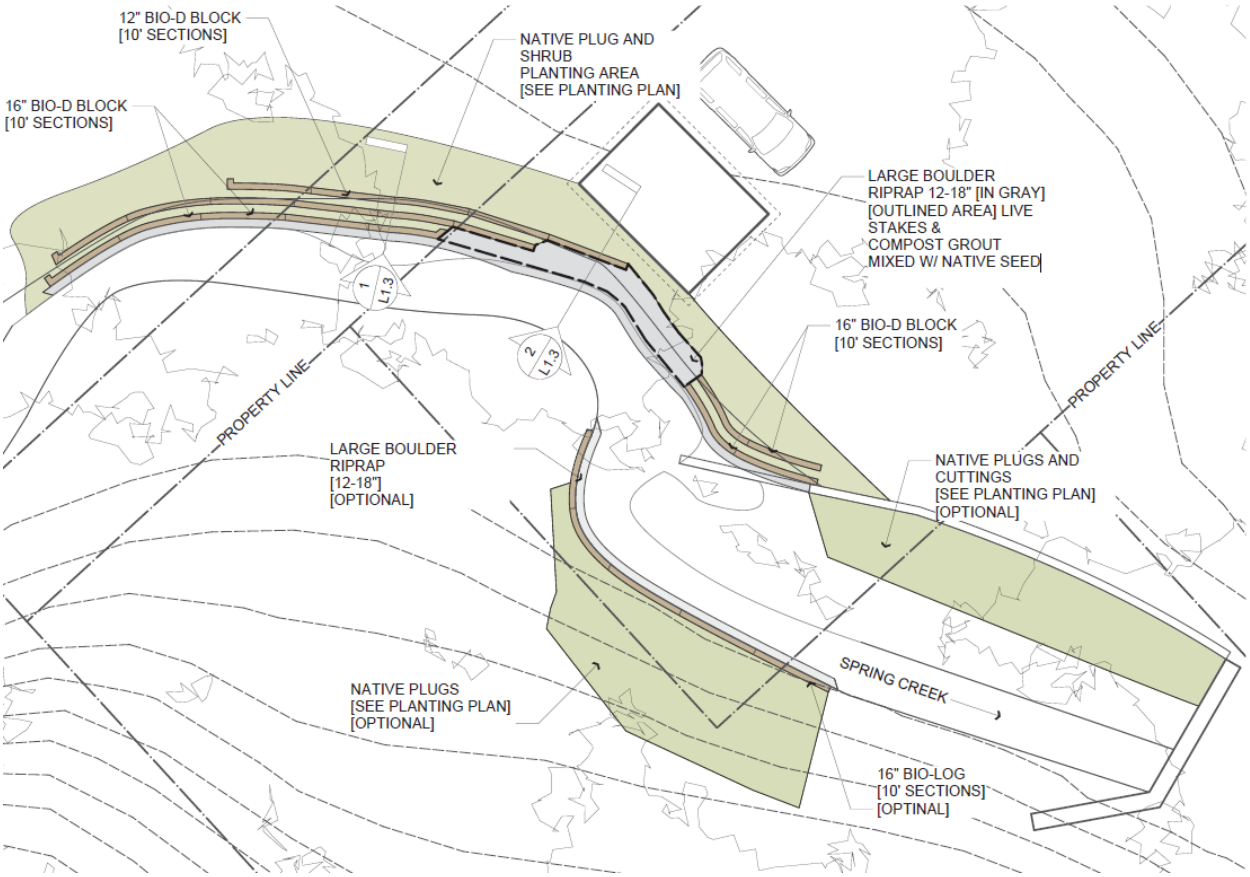


Figure 21. Carver SWCD 2019 proposed design for Site 2 (404 Broadway)



Bio-D block walls, similar to coir logs and mats, have an assumed permissible shear strength of four to eight pounds per square foot (lbs/sf), while riprap has a permissible shear strength of five to eight lbs/sf.[5] The maximum permissible shear stress and velocities assumed for the Carver SWCD design are provided in Table 5.

Table 5. Assumed Shear Stress and Velocities for Spring Creek Designs (adopted from Fischenich 2001)

	Permissible Velocities (feet per second [fps])	Permissible Shear Stress (lbs/sf)
Sandy Loam Soil	1.75	0.03
Long Native Grasses	5.0	1.5
Short Native and Bunch Grass	3.0	0.8
Bio-D Block Wall	9.5	5.0
Riprap	12.0	6.0

Barr Engineering reviewed the SWCD designs in 2019 and made additional

[5] Craig Fischenich, *Stability Thresholds for Stream Restoration Materials*, (Ecosystem Management and Restoration Research Program, May 2001).

recommendations which included evaluating past, present, and future hydrology and hydraulics to aid in the channel stabilization design; reconnecting the channel to its floodplain through grade control measures; and realigning the stream to its former alignment (Attachment 1).

To determine if the 2019 SWCD will be suitable for the site, we ran the HEC-RAS model with the presettlement, existing conditions, and 2050 estimated flows to determine the high-water elevations, velocities, and potential shear stress at each site (Tables 6 through 14, and Attachment 3). For reference, the garage at Site 1 is at elevation 737 and the garage at Site 2 is at elevation 725.45 per Carver SWCD.

Table 6. High Water Elevations (HWL) (NAVD88) at Spring Creek Project Sites—Presettlement Conditions

	Site 1 HWL (RS 1834.33)	Site 1 Garage Inundated	Site 2 HWL (RS 1389)	Site 2 Garage Inundated
1-Year	729.3	No	721.4	No
2-Year	729.5	No	722.1	No
10-Year	730.4	No	725.3	No
100-Year	731.2	No	730.6	Yes

Table 7. Total Velocity (fps) at Spring Creek Project Sites—Presettlement Conditions (assumes that long native grasses comprise the creek banks)

	Site 1 Total Velocity (RS 1834.33)	Site 1 Stable	Site 2 Total Velocity (RS 1389)	Site 2 Stable
1-Year	3.6	Yes	1.17	Yes
2-Year	5.5	No	1.76	Yes
10-Year	7.9	No	1.97	Yes
100-Year	10.1	No	1.21	Yes

Table 8. Total Shear Stress (lbs/sq ft) at Spring Creek Project Sites—Presettlement Conditions (assumes that long native grasses comprise the creek banks)

	Site 1 Total Shear (RS 1834.33)	Site 1 Stable	Site 2 Total Shear (RS 1389)	Site 2 Stable
1-Year	0.7	Yes	0.06	Yes
2-Year	1.6	No	0.12	Yes
10-Year	2.7	No	0.10	Yes
100-Year	3.6	No	0.04	Yes

Under presettlement conditions, assuming that Spring Creek comprised the underlying sandy loam and was vegetated with long native grasses, both sites would have been relatively stable in terms of velocities and total shear stresses during small, channel-forming events. Additionally, for Site 1, floodwaters would not have encroached upon the elevation of the garage. For Site 2, the garage is still below the 100-year flood elevation and would have been inundated even if the watershed was returned to its presettlement conditions. This indicates the location of the garage at 404 Broadway was potentially always within the floodplain.

Table 9. High Water Elevations (HWL) (NAVD88) at Spring Creek Project Sites—Existing Conditions

	Site 1 HWL (RS 1834.33)	Site 1 Garage Inundated	Site 2 HWL (RS 1389)	Site 2 Garage Inundated
1-Year	730.0	No	722.8	No
2-Year	730.2	No	723.4	No
10-Year	731.1	No	726.0	Yes
100-Year	732.4	No	733.2	Yes

Table 10. Total Velocity (fps) at Spring Creek Project Sites—Existing Conditions (assumes that short native and bunch grasses comprise the creek banks)

	Site 1 Total Velocity (RS 1834.33)	Site 1 Stable	Site 2 Total Velocity (RS 1389)	Site 2 Stable
1-Year	6.9	No	1.67	Yes
2-Year	7.6	No	1.80	Yes
10-Year	9.8	No	1.96	Yes
100-Year	12.5	No	0.93	Yes

Table 11. Total Shear Stress (lbs/sq ft) at Spring Creek Project Sites—Existing Conditions (assumes that short native and bunch grasses comprise the creek banks)

	Site 1 Total Shear Stress (RS 1834.33)	Site 1 Stable	Site 2 Total Shear Stress (RS 1389)	Site 2 Stable
1-Year	2.2	No	0.09	Yes
2-Year	2.5	No	0.10	Yes
10-Year	3.5	No	0.08	Yes
100-Year	4.3	No	0.02	Yes

Similar to the presettlement conditions, floodwaters at Site 1 are not expected to encroach upon the garage under the current Spring Creek hydrology; but at Site 2 the garage can expected to be flooded from the 10- and 100-year events.

Still assuming the same underlying sandy loam soils comprise the creek banks but are vegetated with short native and bunch grasses as was observed in the field, Site 2 is stable, however Site 1 would be expected to show signs of erosion (as it does currently). The proposed SWCD designs of Bio-D block walls and riprap should be sufficient to withstand the expected velocities and stresses under the current conditions. We recommend evaluating the size of the riprap to ensure it can withstand the expected velocities at Site 1.

Table 12. High Water Elevations (HWL) (NAVD88) at Spring Creek Project Sites—2050 Conditions

	Site 1 HWL (RS 1834.33)	Site 1 Garage Inundated	Site 2 HWL (RS 1389)	Site 2 Garage Inundated
1-Year	730.8	No	725.3	No
2-Year	731.1	No	726.4	Yes
10-Year	731.9	No	731.1	Yes
100-Year	733.5	No	734.9	Yes

Table 13. Total Velocity (fps) at Spring Creek Project Sites—2050 Conditions (assumes that short native and bunch grasses comprise the creek banks)

	Site 1 Total Velocity (RS 1834.33)	Site 1 Stable	Site 2 Total Velocity (RS 1389)	Site 2 Stable
1-Year	9.0	No	1.97	Yes
2-Year	9.9	No	1.93	Yes
10-Year	12.0	No	1.13	Yes
100-Year	13.2	No	1.21	Yes

Table 14. Total Shear Stress (lbs/sq ft) at Spring Creek Erosion Sites—2050 Conditions (assumes short native and bunch grasses comprise the creek banks)

	Site 1 Total Shear Stress (RS 1834.33)	Site 1 Stable	Site 2 Total Shear Stress (RS 1389)	Site 2 Stable
1-Year	3.2	No	0.10	Yes
2-Year	3.6	No	0.08	Yes
10-Year	4.1	No	0.03	Yes
100-Year	4.7	No	0.04	Yes

Similar to the other hydrology scenarios we evaluated, floodwaters at Site 1 are not expected to encroach upon the garage under the projected 2050 Spring Creek hydrology; but at Site 2 the garage will likely be flooded from regular rainfall events (2.89 inches of rainfall).

In terms of velocities and shear stresses, the existing short native and bunch grasses would not be expected to withstand future hydrologic conditions at Site 1, but Site 2 could remain relatively stable if the vegetation remains healthy and in place. The proposed SWCD designs for both sites would appear to be adequate, but the placement, gradation, and size of the riprap should be refined based on the hydraulic modeling to ensure that it can withstand the expected velocities and shear stresses of large events in the future.

Discussion

Unsurprisingly, the increase in rainfall runoff directly increases the water surface elevations in the above scenarios. Interestingly, there is not as clear a correlation between flow rates and the total channel shear stress. Given the sandy nature of the watershed's soils, the creek will be prone to channel incision and bank erosion without the added protection of adequate vegetation. Site 1 experiences the highest shear stresses and the greatest velocities of five to fifteen fps in this reach, making it more active than Site 2. Site 2 has average velocities between one and six fps and very low shear stresses, indicating that while the creek has experienced significant erosion, it may have reached an equilibrium. Both sites would benefit from the proposed SWCD designs; however, based on this analysis, Site 1 appears to be the more active reach at this time.

Complicating this project is the fact that the entire channel is privately owned by multiple

landowners. While individual landowners can and should work to prevent erosion of their streambanks, in a case like this, the causes of erosion are being driven by the larger landscape changes and are somewhat out of the individual's control. It also makes it unlikely that spot repairs like those proposed by the SWCD would be successful in the long-term without addressing the underlying causes of erosion.

During the annual LMRWD coordination meeting with the city of Carver on May 11, 2021, the city indicated that it would be interested in a large-scale project but cannot get involved on an individual scale because it only benefits two landowners. A successful restoration would review the project wholistically and work with all affected landowners so that a restoration on one property does not cause issues for a neighbor and benefits the entire neighborhood. The hydraulic analysis indicates that portions of the entire reach between 4th and 6th Streets would benefit from stabilization measures to prevent the channel from further migrating and causing damage to property, as well as causing increased sediment to enter the Minnesota River. The existing vegetation and native soils are unlikely to withstand the current and future velocities and shear stresses.

Recommendations

Spring Creek is a dynamic system which has been experiencing and adapting to a changing environment since the 1800s and will continue to do so, as evidenced by the number of gullies still forming within the watershed. Based on the data we reviewed, we recommend the following management strategies for Spring Creek (these are summarized in Table 15):

- While the Carver SWCD designs appear to be appropriate with slight modifications to the riprap sizes, rather than embark upon single restorations for these individual landowners, we recommend that the District reach out to all Spring Creek landowners in this reach to determine if there is interest for a larger project and how long and where this erosion has been occurring.
- With landowner interest, we recommend conducting routine monitoring of this reach to establish erosion rates and quantify the amount of sediment that is entering the Minnesota River annually from Spring Creek. This would include establishing monitoring cross-sections to be surveyed annually and conducting a biannual channel profile or thalweg survey to objectively measure changes in the creek.
- Vegetation management, particularly in the floodplain and channel banks, should be explored with the property owners. Removing invasive species and establishing native plantings would improve the riparian corridor's resilience to erosion.
- Site 2 and 116 4th Street West (Site 3) are the most at risk in terms of erosion from Spring Creek. These two locations should be prioritized for stabilization measures to prevent further erosion and potential property damage:
    - The SWCD design for Site 2 is appropriate with an increase in riprap size

combined with a standard gradation.
    - Stabilization designs for 112, 116, and 200 4th Street West (Site 3) have not yet been developed. We recommend reaching out to the property owner and Carver SWCD to conduct a site survey and determine the level of interest for a valley stabilization effort first, then complete a feasibility study to determine the best approach.
- The structures at Site 1 do not appear to be under immediate threat from Spring Creek. We recommend reevaluating the need for stabilization pending the results of the monitoring and vegetation management study.
- This is a complicated reach, further complicated by the city of Carver's proposal to construct a new levee downstream which would further alter the hydrology and hydraulics of Spring Creek. We recommend continued coordination with the city to evaluate the proposed designs and the potential impacts to the erosion of Spring Creek.

Table 15. Spring Creek Recommendations

No.	Recommendation	Type	Year	Estimated Cost
1	Landowner Outreach	Data Collection	2022	$3,000
2	Spring Creek Monitoring and Surveys	Data Collection	2022–2025	$5,000–$10,000 annually
3	Site 3 (116 4th Street West) Feasibility Study	Study	2022–2023	$30,000
4	Site 2 (404 Broadway Street) Stabilization	Construction	2022–2023	$100,000–$150,000
5	Vegetation Management	Study	2024	$40,000
6	Reevaluate Site 1 (112 5th Street) Stabilization Needs	Potential Construction	2026	$75,000–$120,000
7	Coordination with City	Data Collection	Ongoing	$2,000 annually

Attachments

- Barr Engineering Co. Spring Creek Assessment Summary, September 6, 2019
- Spring Creek HydroCAD Models
- Spring Creek HEC-RAS Model Result Tables

Attachment 1—Barr Engineering Co. Spring Creek Assessment Summary, September 6, 2019

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Technical Memorandum

To: Della Schall Young, Young Environmental Consulting Group
From: Jeff Weiss and Kallie Doeden, Barr Engineering
Subject: Spring Creek Assessment Summary
Date: September 6, 2019
Project: 23101028.05

Introduction

Young Environmental Consulting Group contracted with Barr Engineering (Barr) to conduct a site assessment of the stream bank stabilization and erosion at two properties along Spring Creek in Carver, MN. Residents at the two properties (112 5th Street West and 404 Broadway Street; Figure 1) have raised awareness about erosion issues on their properties, and the Carver Soil and Water Conservation District (SWCD) has developed concept plans to stabilize each site. The purpose of this assessment was to develop an additional understanding of the erosion issues; estimate erosion extents and causes; and comment on the Carver SWCD concept plans.

Site Assessment

The two residential properties impacted by the stream bank erosion are located along Spring Creek in Carver, MN in Carver County and within the boundaries of the Lower Minnesota River Watershed District. Staff from Young Environmental Consulting Group and Barr visited the two properties located at 112 5th Street West and 404 Broadway Street on June 21, 2019. The concept plans completed by Carver SWCD are attached to this memorandum.

112 5th Street West

Site Visit

Barr and Young Environmental Consulting Group staff met with the homeowners from the 112 5th Street West property, who showed staff around and explained the stream changes they have seen over the years. Barr and Young Environmental Consulting Group staff inspected the upstream and downstream portions of the main stem of the creek that flows along the property. The homeowners report that the stream path of Spring Creek has moved approximately 25 feet closer to their home in recent years and that the channel is a few feet lower than it used to be. An abandoned stream bed was apparent where the residents said the stream was previously located. It has filled in significantly with sediment and the vegetation does not contain any woody species in the old channel. Homeowners are especially concerned with the rate of erosion and the proximity to the back of their garage. Photos 1 through 6 show several areas along this creek section.

Photo 1: Upstream section unaffected by significant stream bank instability. Structure is approximately 50-feet from the channel.

Photo 2: Stream section facing upstream directly behind garage (sudden drop-off on the right caused by recent erosion, new plant growth on the left, and a previously fallen tree caused by stream bank instability)

Photo 3: Downstream section of creek (new growth is on the right, eroded bank is on the left, and the stream path is relatively new). Barr staff in photo.

Photo 4: Area of stream path changes (from the left flows the incoming fork, to the right is the main stem of the creek, and in the center is the new growth and old stream path). Young Environmental Consulting Group staff, Barr staff, and residents in photo.

Photo 5: Small headcuts causing the stream to become incised.

Photo 6: Bank erosion looking towards the residence at 112 5th Street West. Bank is approximately 40 feet from the structure.

The active bank erosion area is approximately 50-60 feet long, with bank heights between 3-4 feet. The stream gradient in this area is rather steep; however, a survey was not completed to quantify the gradient. The homeowners have stated that flows have increased to the site in recent years, and attribute the increase to development within the watershed. Additional future development within the watershed has been proposed, so they are concerned that the flows will continue to increase.

Evidence observed in the field supports the residents' claim that the stream has moved and become lower. As noted above, an old channel is located nearby, and the channel within the erosion area has tall banks and lacks a sufficient connection to the floodplain. This is evidence that that stream has downcut. Barr and Young Environmental Consulting Group staff did not observe a "smoking gun" of a headcut in the area, but there were several small drops in the stream both within the area in question and in the steep channel upstream of the site.

The erosion observed is likely to continue if stabilization measures are not installed. The erosion does not appear to pose an immediate threat to any structures; however, given the changes the residents have reported in recent years, the system has been changing relatively quickly. Given the recent changes to the system, this site has a moderate level of urgency, meaning that the site should be examined at least once per year and, if possible, visit the site shortly after significant rainfall events to develop a better understanding of the magnitude of flows and velocities at this location. Additional stabilization measures should be installed within five years to minimize the risk of additional erosion; however, installing stabilization measures sooner than five years would be preferable.

Carver SWCD Concept Plan Assessment

The Carver SWCD concept plan includes removing fallen trees, using riprap to armor the channel were banks are eroding, and revegetating with deep rooted species. Barr concurs with the general concept with the following considerations:

1) Additional assessment of the hydrology should be completed to better understand potential changes that have already occurred and may occur into the future, and to help design stabilization measures.
2) Cross vanes should also be installed to provide additional grade control. They may also be used to elevate the stream bed to reconnect the stream to the former floodplain.
3) If the cross vanes cannot completely restore a floodplain connection, then additional grading should be considered to create a floodplain.

A rough estimate for this concept is $75,000, including construction costs, a 30% contingency on construction costs, engineering and design, and the considerations listed above. It would be reasonable to expect the cost to range between -25% and +40% of the estimate above, resulting in an approximate range of $55,000 to $105,000.

Alternative consideration

In a situation like this where the channel has moved, restoring the channel to the previous alignment is often a potential solution. It may be possible in this location; however, it is likely to cost more than the concept developed by Carver SWCD or otherwise stabilizing the channel in place. To restore the channel to the previous alignment, a relatively sharp meander would need to be restored in the midst of the steep channel slope. Flow energy in the channel is likely high due to the steep slope, so the banks would need to be armored in the meander. Furthermore, a significant amount of sediment has already been eroded from the new channel alignment. It is unlikely that accumulated sediment in the old channel would be sufficient to fill the new channel, therefore, additional fill may be necessary to fill the relatively new channel. If the new channel is not completely filled, then it may remain a preferential flow path during high flow events.

A rough estimate for this concept is $114,000, including construction costs, a 30% contingency on construction costs, engineering and design, and the considerations listed above. The main difference between the two estimates is the additional excavation needed to move the channel, plus the additional clearing and restoration that would be required. It would be reasonable to expect the cost to range between -25% and +40% of the estimate above, resulting in an approximate range of $86,000 to $160,000.

404 Broadway Street

Site Visit

The residents from the 404 Broadway Street property were not available, so Barr and Young Environmental Consulting Group staff inspected the portion of Spring Creek that flows along the property. The stream path of Spring Creek has made significant changes, as is evident by the damage to the existing retaining wall and erosion along the stream banks. It is unknown when the retaining wall was breeched and erosion began to pose an immediate threat to the garage; however Google Earth imagery suggests the stream has been moving closer to the garage since 2012. Photos 7 through 10 show several areas of along this creek section.

Photo 7: Upstream section with noticeable change in stream path

Photo 8: Downstream section of stream with significant erosion encroaching on the garage and damaged retaining wall

Photo 9: Close-up of recent erosion that is within a foot or two of the homeowner's garage

Photo 10: Close-up of damaged retaining wall most likely caused by stream path change

The upstream resident at 112 5th Street noted increased flows in recent years. If true, then the increased flows could be contributing to the increased erosion rate at this property as well. Stream also appears to

have been straightened at some point in the past, likely when the retaining wall was installed. Some of the cause of erosion may be attributed to the stream attempting to recreate a meander pattern. Fresh sand bars were also observed in this area, which could be eroded material from upstream. The stream gradient is noticeably less steep in this area, so it would be a location for sediment to deposit. The sediment deposition may be exacerbating the channel movement.

The erosion has already encroached to within a few feet of the garage, so the garage is under an immediate threat of damage if erosion continues. Stabilization work at this site should be implemented as soon as possible.

Carver SWCD Concept Plan Assessment

The Carver SWCD concept plan includes using riprap to armor the channel were banks are eroding, installing coir blocks in other areas with less stress, and revegetating with deep rooted species. Barr concurs with the general concept with the following considerations:

1) Additional assessment of the hydrology should be completed to better understand potential changes that have already occurred and may occur into the future.

A rough estimate for this concept is $88,000, including construction costs, a 30% contingency on construction costs, engineering and design, and the considerations listed above. It would be reasonable to expect the cost to range between -25% and +40% of the estimate above, resulting in an approximate range of $66,000 to $124,000.

Alternative consideration

In a situation like this where the channel has moved, restoring the channel to the previous alignment is often a potential solution. It may be possible in this location; and even though it would likely restore an artificially straightened channel, it would also reduce the risk of additional erosion in the newly created meander on the bank opposite of the garage.. Similar to the upstream property, additional fill would be necessary to restore all banks, so the cost would likely be more than the Carver SWCD concept.

A rough estimate for this concept is $99,000, including construction costs, a 30% contingency on construction costs, engineering and design, and the considerations listed above. It would be reasonable to expect the cost to range between -25% and +40% of the estimate above, resulting in an approximate range of $75,000 to $139,000.

Conclusions and Recommendations

Per the site assessment and review of the proposed plans, Barr has the following recommendations:

- Complete an assessment of the hydrology, including potential future changes. This information will be important for the design of stabilization measures at both locations. Given the urgency of implementing stabilization at the 404 Broadway site, the design and hydrologic analysis could be done concurrently.

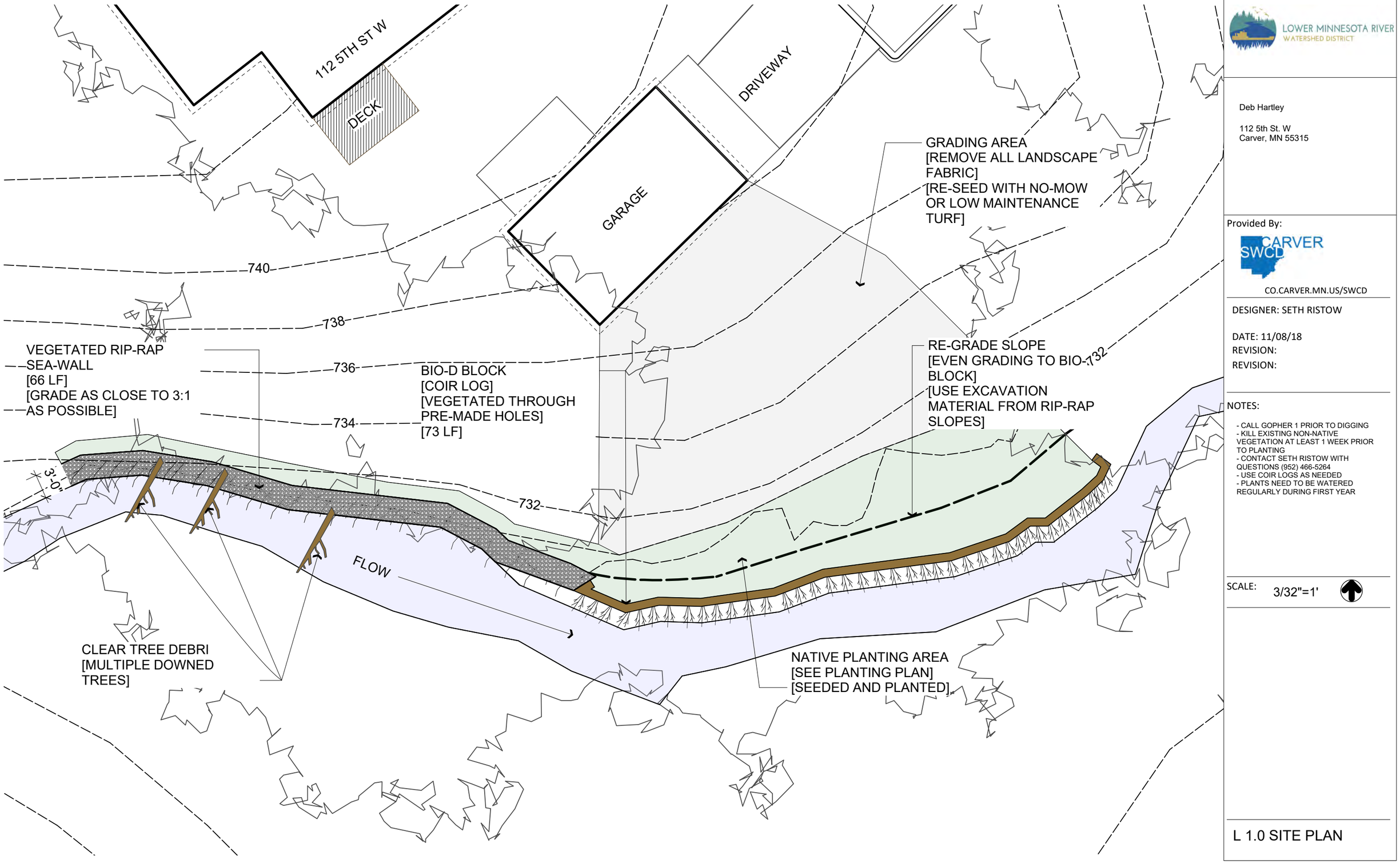
- At 404 Broadway, restore the channel to the previous alignment, which will provide additional space between the garage and the creek.
- Restore the previous channel alignment at 112 5th Street, with consideration of the modified hydrology draining to this location.

Barr Footer: ArcGIS 10.6, 2019-09-06 12:46 File: I:\Client\LowerMinnesotaWD\Work_Orders\2019_Spring_Creek\Maps\Spring Creek base.mxd User: jdw

BARR

SPRING CREEK
EROSION SITES
Carver, MN
Lower Minnesota River
Watershed District

FIGURE 1



LOWER MINNESOTA RIVER WATERSHED DISTRICT

Deb Hartley

112 5th St. W
Carver, MN 55315

Provided By:

CARVER SWCD

CO.CARVER.MN.US/SWCD

DESIGNER: SETH RISTOW

DATE: 11/08/18
REVISION:
REVISION:

NOTES:

- CALL GOPHER 1 PRIOR TO DIGGING
- KILL EXISTING NON-NATIVE VEGETATION AT LEAST 1 WEEK PRIOR TO PLANTING
- CONTACT SETH RISTOW WITH QUESTIONS (952) 466-5264
- USE COIR LOGS AS NEEDED
- PLANTS NEED TO BE WATERED REGULARLY DURING FIRST YEAR

SCALE: 3/32"=1'

L 1.0 SITE PLAN

Quantity	Common Name	Latin Name
10	Bush Honeysuckle	Diervilla lonicera
3	Nannyberry	Viburnum lentago
11	Pussy Willow	Salix discolor
1	Chokecherry	Prunus virginiana
45	Tufted Hair Grass	Deschampsia caespitosa
43	Ostrich Fern	Matteuccia struthiopteris
5	Buttonbush	Cephalanthus occidentalis
3	Blackhaw Viburnum	Viburnum prunifolium
3	Ninebark	Physocarpus opulifolius
7	Prairie Cordgrass	Spartina pectinata
7	Culver's Root	Veronicastrum
5	Queen of the Prairie	Filipendula rubra
6	Joe-Pye Weed	Eupatorium purpureum
6	Marsh Blazing Star	Liatris spicata
7	Switchgrass	Panicum virgatum
6	Canadian Anemone	Anemone canadensis

15-Tufted Hair Grass
43-Ostrich Fern
3-Marsh Blazing Star
3-Marsh Blazing Star
1-Chokecherry
3-Nannyberry
eysuckle
3-Canadian Anemone
7-Switchgrass
3-Canadian Anemone
5-Queen of the Prairie
16-Tufted Hair Grass
14-Tufted Hair Grass
5-Pussy Willow
3-Blackhaw Viburnum
5-Buttonbush
7-Culver's Root
7-Bush Honeysuckle
5-Pussy Willow
6-Joe-Pye Weed
3-Ninebark
7-Prairie Cordgrass

LOWER MINNESOTA RIVER WATERSHED DISTRICT

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SCALE: 3/32"=1'

L 1.0 PLANTING PLAN

CARVER SWCD
MATERIAL & COST ESTIMATE

Hartley

Streambank Stabilization

LF: 140
SF: NA
Date: 21-Nov-18

Materials: Streambank Stabilization

Item	Qty	Unit	Unit Cost	Amount	Potential Source
Twice-Shredded Hardwood Mulch (3" depth)	8.0	cu-yd	$ 30.00	$ 240.00	Hedberg, Frador, Local Supplier
Non-Woven Geotextile (Geotex 401, Mirfani 140N, or equal)	200	sq-ft	$ 0.07	$ 14.00	Brock White, (651) 647-0950
C125BN (6.5' x 108.5')	1,390	sq-ft	$ 0.22	$ 305.80	Brock White, (651) 647-0950
Bio D Block 12 (10')	8	each	$ 126.00	$ 1,008.00	Rolanka
Wood Stakes (2" x 4" x 48" - hardwood)	40	each	$ 1.00	$ 40.00	Brock White, (651) 647-0950
Aggregate: Buff Limestone (18"-24")	15.0	Tons	$ 30.00	$ 450.00	Hedberg, Frador, Local Supplier
			Materials Subtotal	$ 2,057.80	

Plants: Streambank Stabilization

Item	Qty	Unit	Unit Cost	Amount	Potential Source
Native Plant: Plug	132	each	$ 2.00	$ 264.00	Native Plant Supplier
Native Shrub: 1 Gallon	36	each	$ 15.00	$ 540.00	Native Plant Supplier
Native Seed (Moist Meadow) 1/4LB	1.00	each	$ 125.00	$ 125.00	Native Plant Supplier
No Mow Seed	2.00	lb	$ 7.00	$ 14.00	Native Plant Supplier
			Plants Subtotal	$ 943.00	

Labor: Streambank Stabiliza

Mobilization	1.00	job	$ 250.00	$ 250.00	Landscape/Excavation Contractor
Deliveries (Mulch, Plants, Rock, Soil, etc)	2	job	$ 150.00	$ 300.00	Suppliers/Contractors
Disposal	1.00	job	$ 500.00	$ 500.00	Landscape/Excavation Contractor
Grading (Tracked Equipment Only - no wheeled vehicles in excavation area)	5	hrs	$ 85.00	$ 425.00	Landscape/Excavation Contractor
Material Installation (4 person crew/ 10hr day)	4.50	job	$ 2,500.00	$ 11,250.00	Landscape/Excavation Contractor
			Subtotal	$ 12,725.00	

Project Total: Raingarden #4

Materials Estimate:	$	2,057.80
Plants Estimate:	$	943.00
Labor Estimate:	$	12,725.00
Project Estimate:	$	15,725.80
:-10%	$	14,153.22
:+10%	$	17,298.38

AREA OF EROSION

X[725.7]

EXISTING CONCRETE
DEBRI
[REMOVE]

PROPERTY LINE

GARAGE

X[723.03]

X[722.13]

X[722.06]

SPRING CREEK

X[725.45]

X[721.71]

PROPERTY LINE

X[722.85]

TOP OF BANK

X[724.3]

EXISTING CONCRETE
WALL
[REMOVE AT JOINT]

PROPERTY LINE

EXISTING CONCRETE
WALL
[KEEP]

EXISTING CONCRETE
WALL
[REMOVE]

FLOW

AREA OF EROSION

BRIDGE

4TH ST. E

LOWER MINNESOTA RIVER
WATERSHED DISTRICT

SPRING CREEK [CITY OF CARVER]

404 BROADWAY ST.
CARVER, MN 55315

Provided By:

CARVER SWCD

CO.CARVER.MN.US/SWCD

DESIGNER: SETH RISTOW

DATE: 02/12/19
REVISION:
REVISION:

NOTES:

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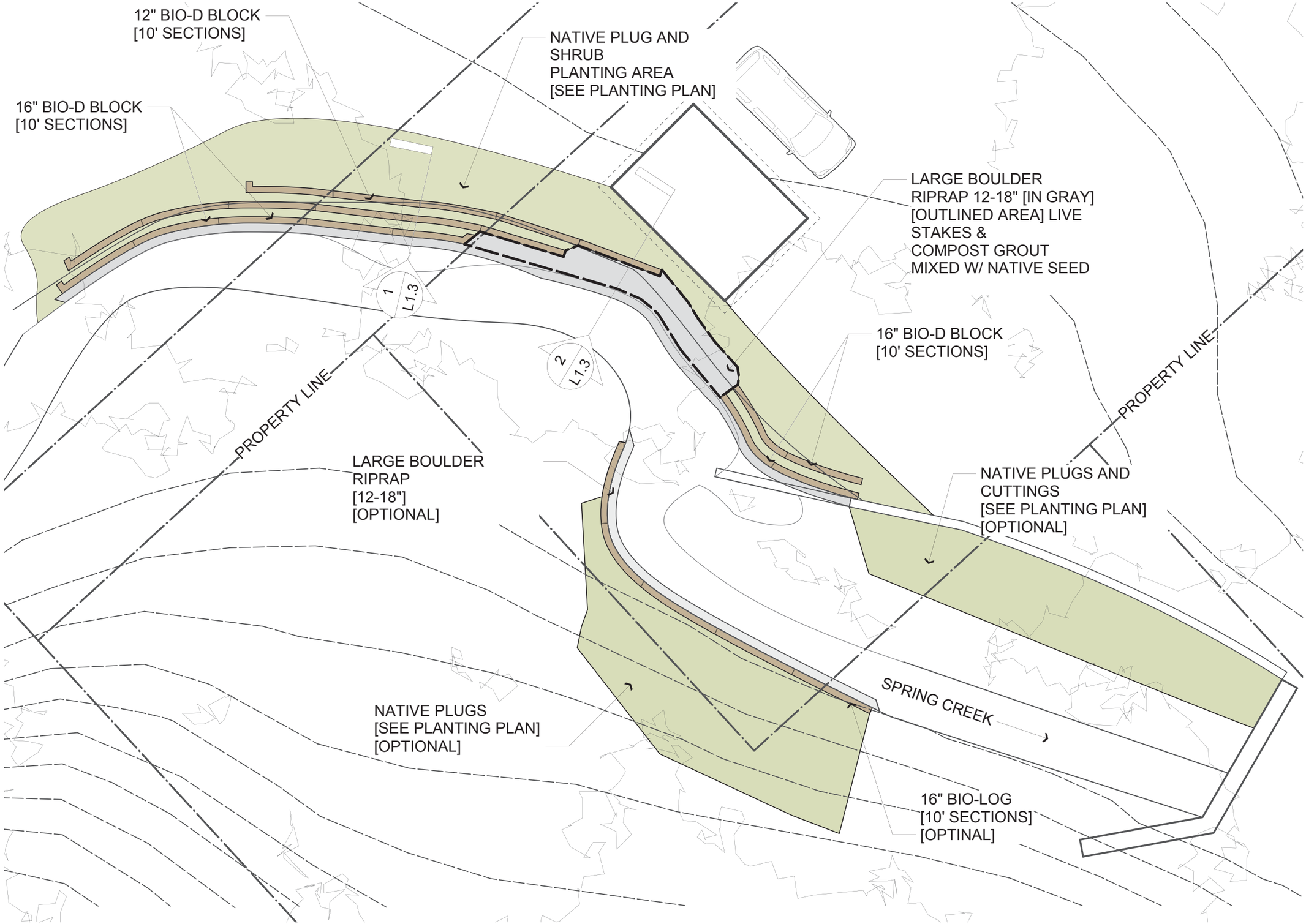
SCALE: 3/32"=1'

L 1.0 EXISTING SITE



LOWER MINNESOTA RIVER WATERSHED DISTRICT

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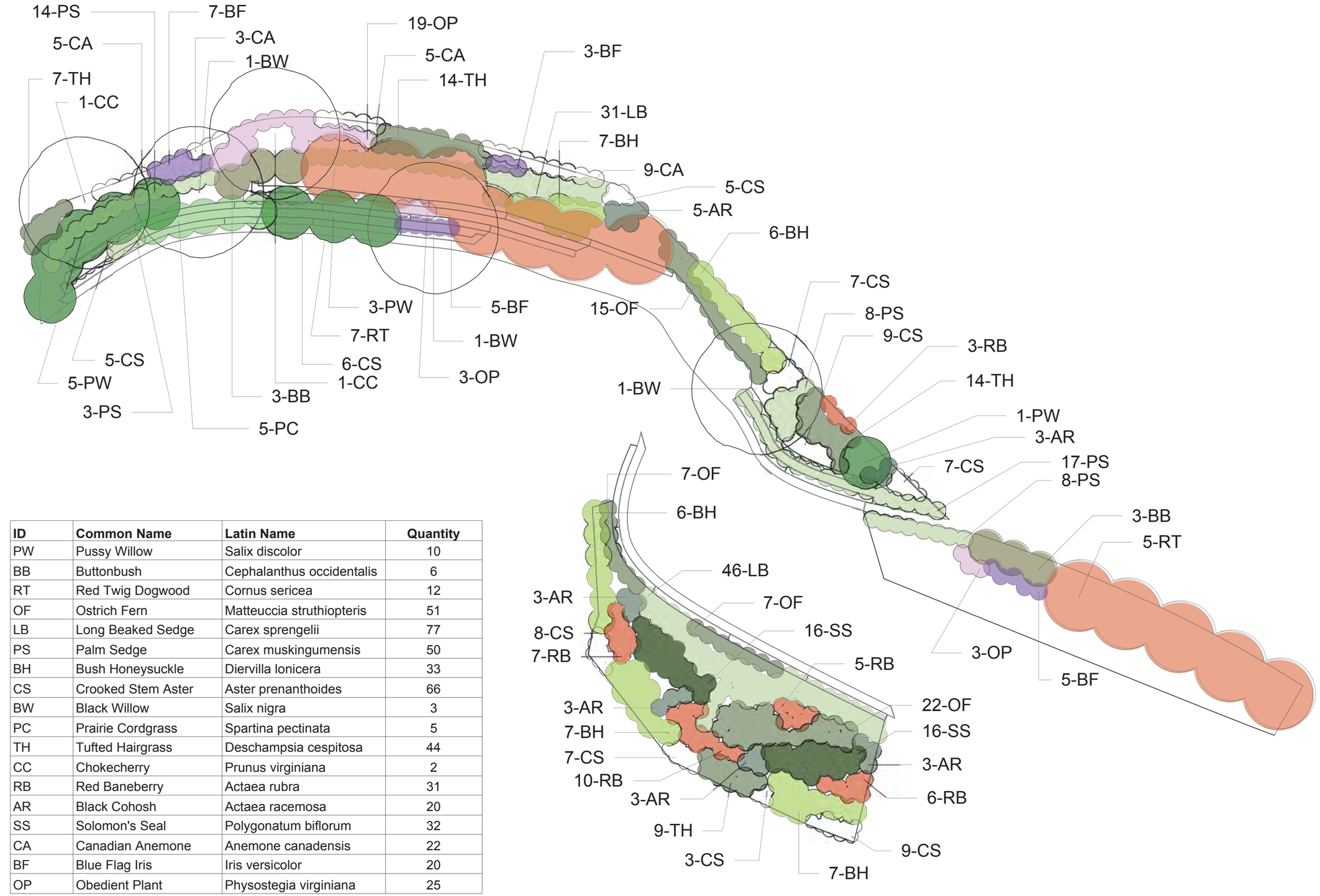
L 1.1 SITE PLAN



ID	Common Name	Latin Name	Quantity
PW	Pussy Willow	Salix discolor	10
BB	Buttonbush	Cephalanthus occidentalis	6
RT	Red Twig Dogwood	Cornus sericea	12
OF	Ostrich Fern	Matteuccia struthiopteris	51
LB	Long Beaked Sedge	Carex sprengelii	77
PS	Palm Sedge	Carex muskingumensis	50
BH	Bush Honeysuckle	Diervilla lonicera	33
CS	Crooked Stem Aster	Aster prenanthoides	66
BW	Black Willow	Salix nigra	3
PC	Prairie Cordgrass	Spartina pectinata	5
TH	Tufted Hairgrass	Deschampsia cespitosa	44
CC	Chokecherry	Prunus virginiana	2
RB	Red Baneberry	Actaea rubra	31
AR	Black Cohosh	Actaea racemosa	20
SS	Solomon's Seal	Polygonatum biflorum	32
CA	Canadian Anemone	Anemone canadensis	22
BF	Blue Flag Iris	Iris versicolor	20
OP	Obedient Plant	Physostegia virginiana	25

LOWER MINNESOTA RIVER WATERSHED DISTRICT

SPRING CREEK [CITY OF CARVER]

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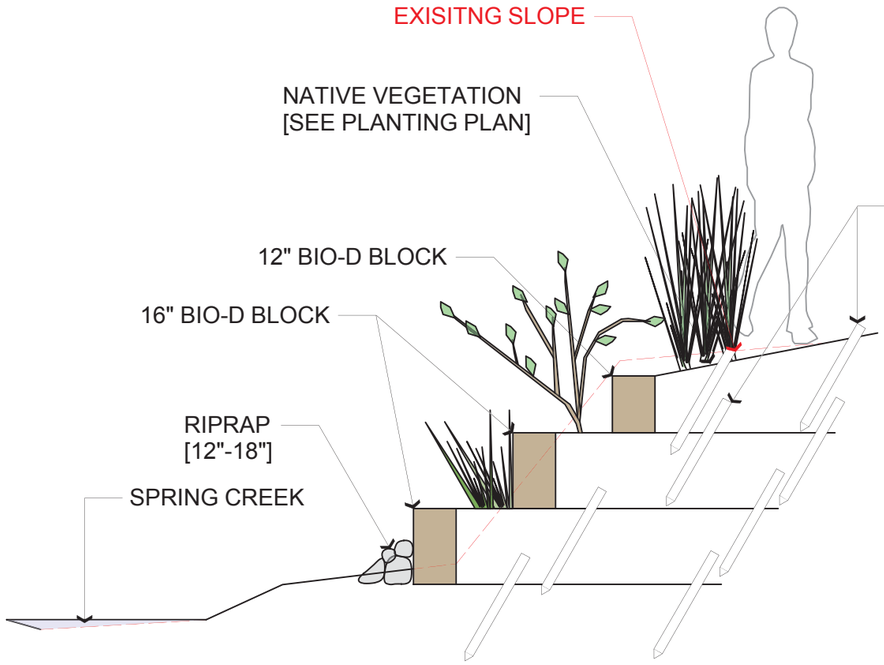
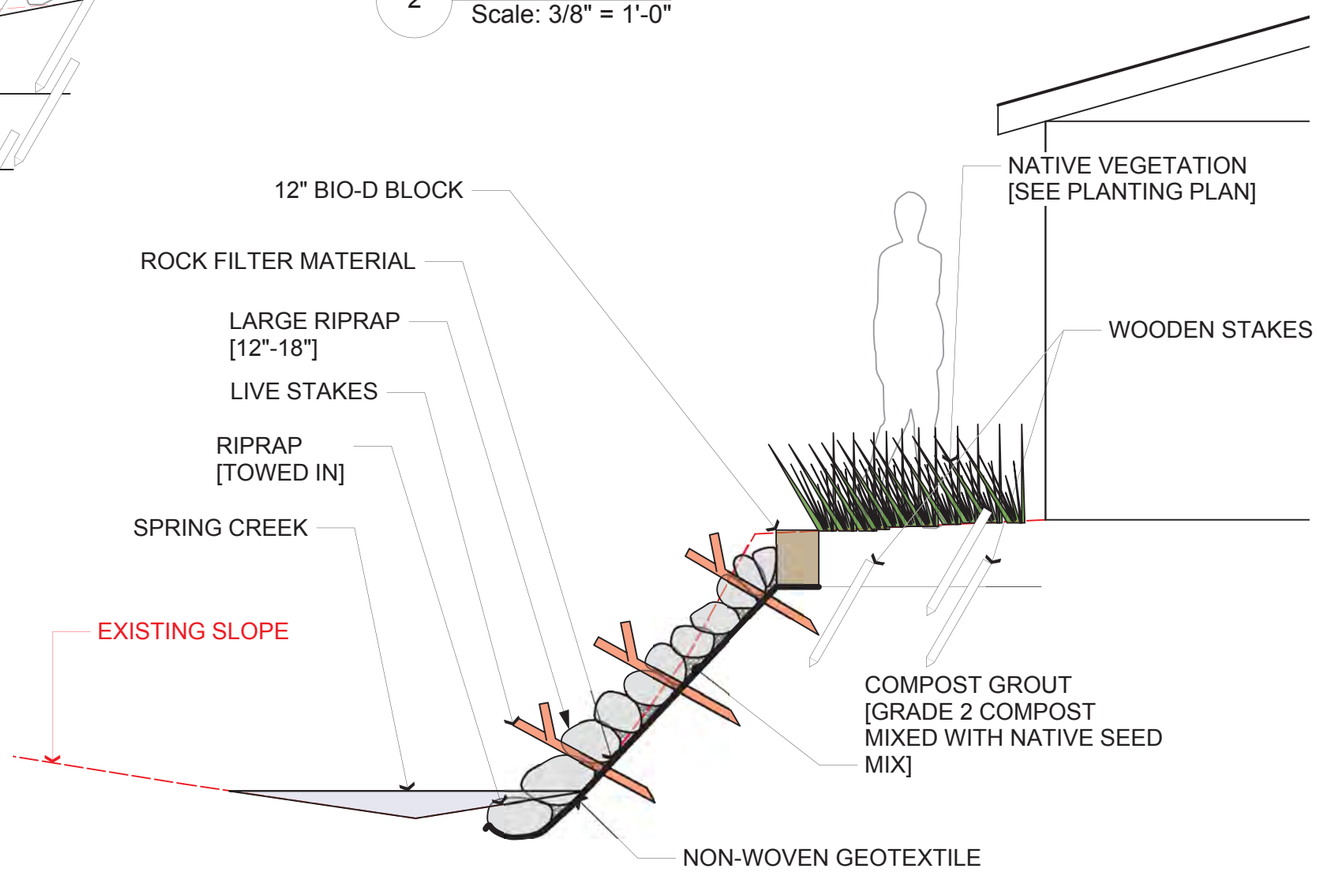
SCALE: 3/32"=1'

L 1.2 PLANTING PLAN

1 SECTION 1
Scale: 3/8" = 1'-0"



2 SECTION 2
Scale: 3/8" = 1'-0"



LOWER MINNESOTA RIVER WATERSHED DISTRICT

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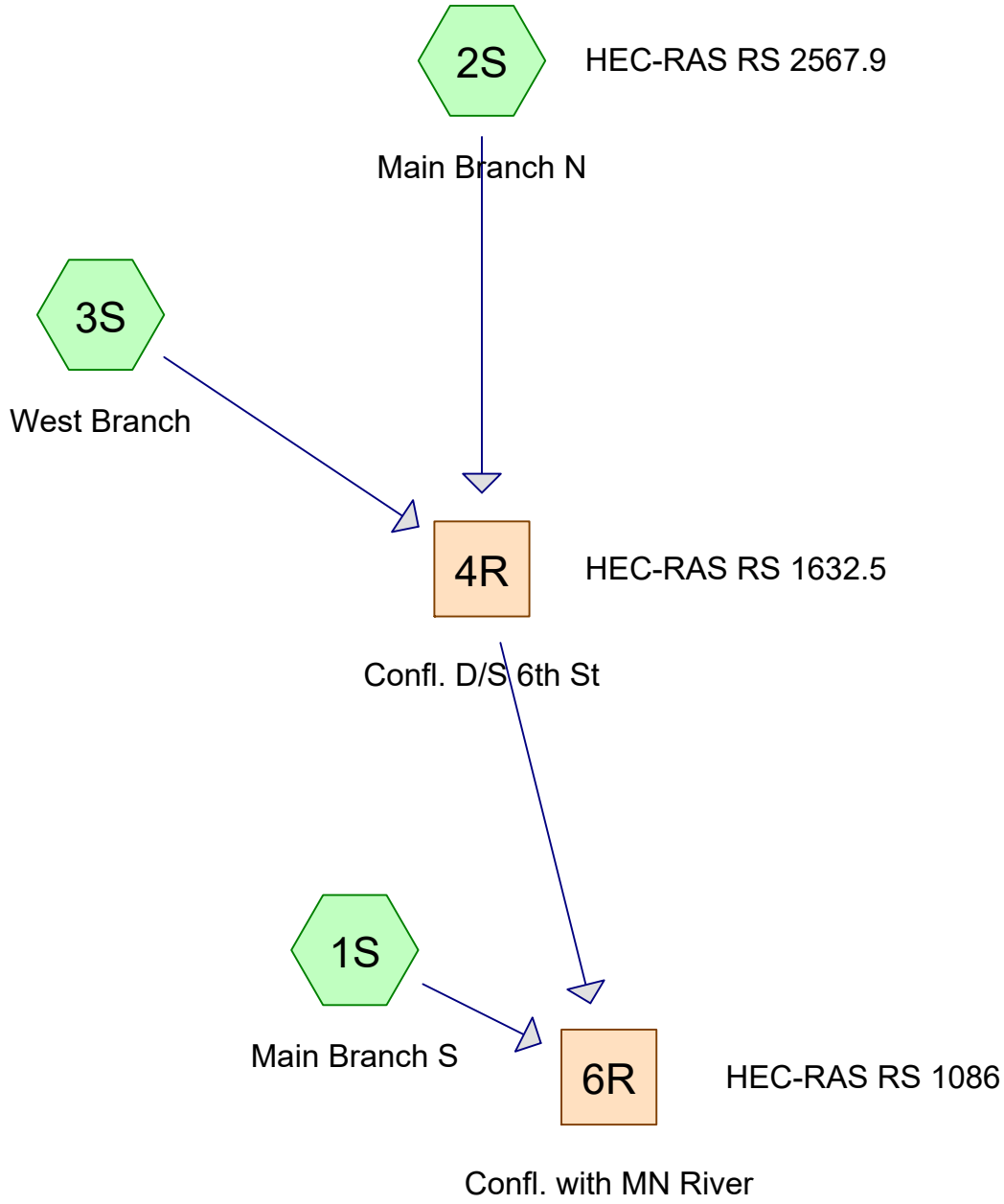
SCALE: 3/32"=1'

L 1.3 SECTIONS

Attachment 2—Spring Creek HydroCAD Models

Pre-Settlement Conditions



Subcat Reach Pond Link

Routing Diagram for SpringCk_PreSettlement_v1
Prepared by {enter your company name here}, Printed 12/15/2021

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-YR	Type II 24-hr		Default	24.00	1	2.30	2
2	2-YR	Type II 24-hr		Default	24.00	1	2.80	2
3	10-YR	Type II 24-hr		Default	24.00	1	4.20	2
4	100-YR	Type II 24-hr		Default	24.00	1	6.00	2

Summary for Subcatchment 1S: Main Branch S

Runoff = 0.88 cfs @ 12.45 hrs, Volume= 0.293 af, Depth= 0.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-YR Rainfall=2.30"

	Area (ac)	CN	Description
*	24.956	61	
	24.956		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.0	2,593	0.1571	1.49		**Lag/CN Method,**

Summary for Subcatchment 2S: Main Branch N

Runoff = 23.64 cfs @ 12.71 hrs, Volume= 6.106 af, Depth= 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-YR Rainfall=2.30"

	Area (ac)	CN	Description
*	291.836	66	
	291.836		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
52.2	7,373	0.1994	2.35		**Lag/CN Method,**

Summary for Subcatchment 3S: West Branch

Runoff = 16.07 cfs @ 12.60 hrs, Volume= 4.340 af, Depth= 0.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-YR Rainfall=2.30"

	Area (ac)	CN	Description
*	256.495	64	
	256.495		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
42.8	4,622	0.1556	1.80		**Lag/CN Method,**

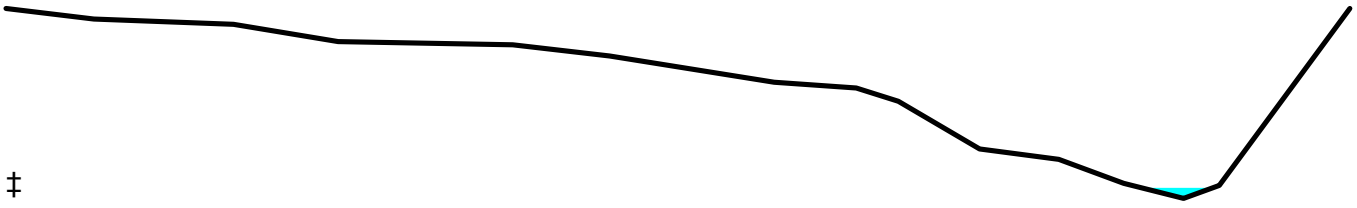
Summary for Reach 4R: Confl. D/S 6th St

Inflow Area = 548.331 ac, 0.00% Impervious, Inflow Depth = 0.23" for 1-YR event
Inflow = 39.30 cfs @ 12.66 hrs, Volume= 10.446 af
Outflow = 39.27 cfs @ 12.69 hrs, Volume= 10.446 af, Atten= 0%, Lag= 1.8 min

Routing by Muskingum-Cunge method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Reference Flow= 29.47 cfs Estimated Depth= 1.26' Velocity= 2.67 fps
m= 1.333, c= 3.56 fps, dt= 3.0 min, dx= 412.0' / 1 = 412.0', K= 1.9 min, X= 0.382
Max. Velocity= 4.10 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 3.56 fps, Avg. Travel Time= 1.9 min

Peak Storage= 4,543 cf @ 12.68 hrs
Average Depth at Peak Storage= 1.27' , Surface Width= 17.25'
Bank-Full Depth= 22.91' Flow Area= 2,801.7 sf, Capacity= 42,244.13 cfs

Custom cross-section, Length= 412.0' Slope= 0.0097 '/' (112 Elevation Intervals)
Constant n= 0.040
Inlet Invert= 726.00', Outlet Invert= 722.00'



‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	746.53	0.00
21.36	745.26	1.27
55.32	744.62	1.91
80.79	742.54	3.99
123.24	742.14	4.39
146.82	740.79	5.74
186.80	737.63	8.90
206.79	736.93	9.60
217.02	735.34	11.19
236.78	729.59	16.94
256.03	728.33	18.20
271.84	725.43	21.10
286.39	723.62	22.91
295.06	725.18	21.35
326.81	746.53	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)	m
0.00	0.0	0.0	0.0	0	0.00	1.333
1.56	16.5	21.4	21.2	6,816	50.94	1.333
1.81	22.1	23.9	23.6	9,123	77.00	1.362
4.71	119.7	45.2	43.7	49,332	839.27	1.394
5.97	188.1	66.7	64.8	77,508	1,374.15	1.280
11.72	642.3	97.6	93.1	264,644	8,256.18	1.419
13.31	800.5	110.8	105.7	329,789	10,948.28	1.386
14.01	881.8	132.1	126.8	363,319	11,445.31	1.346
17.17	1,353.0	177.8	171.5	557,453	19,158.29	1.290
18.52	1,601.8	203.9	197.0	659,932	23,171.24	1.262
18.92	1,689.2	247.1	240.1	695,951	22,274.71	1.345
21.00	2,218.3	276.3	268.6	913,935	32,554.33	1.360
21.64	2,401.4	311.5	303.6	989,375	34,307.23	1.324
22.91	2,801.7	335.1	326.8	1,154,293	42,244.13	1.329

Summary for Reach 6R: Confl. with MN River

Cross-section from HEC-RAS RS 1086; outflow from this node used to set D/S boundary conditions in HEC-RAS model

---

[61] Hint: Exceeded Reach 4R outlet invert by 0.78' @ 12.70 hrs

Inflow Area = 573.287 ac, 0.00% Impervious, Inflow Depth = 0.22" for 1-YR event
Inflow = 40.06 cfs @ 12.69 hrs, Volume= 10.738 af
Outflow = 40.05 cfs @ 12.73 hrs, Volume= 10.738 af, Atten= 0%, Lag= 2.5 min

Routing by Muskingum-Cunge method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs / 2
Reference Flow= 30.04 cfs Estimated Depth= 0.86' Velocity= 5.48 fps
m= 1.507, c= 8.26 fps, dt= 1.5 min, dx= 1,240.0' / 2 = 620.0', K= 1.3 min, X= 0.478
Max. Velocity= 10.11 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 8.27 fps, Avg. Travel Time= 2.5 min

Peak Storage= 6,008 cf @ 12.71 hrs
Average Depth at Peak Storage= 0.78' , Surface Width= 7.35'
Bank-Full Depth= 20.00' Flow Area= 700.0 sf, Capacity= 21,848.71 cfs

5.00' x 20.00' deep channel, n= 0.030
Side Slope Z-value= 1.5 '/' Top Width= 65.00'
Length= 1,240.0' Slope= 0.0210 '/'
Inlet Invert= 722.00', Outlet Invert= 696.00'

Summary for Subcatchment 1S: Main Branch S

Runoff = 3.29 cfs @ 12.34 hrs, Volume= 0.608 af, Depth= 0.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=2.80"

	Area (ac)	CN	Description
*	24.956	61	
	24.956		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.0	2,593	0.1571	1.49		**Lag/CN Method,**

Summary for Subcatchment 2S: Main Branch N

Runoff = 54.02 cfs @ 12.64 hrs, Volume= 11.005 af, Depth= 0.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=2.80"

	Area (ac)	CN	Description
*	291.836	66	
	291.836		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
52.2	7,373	0.1994	2.35		**Lag/CN Method,**

Summary for Subcatchment 3S: West Branch

Runoff = 42.26 cfs @ 12.52 hrs, Volume= 8.215 af, Depth= 0.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=2.80"

	Area (ac)	CN	Description
*	256.495	64	
	256.495		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
42.8	4,622	0.1556	1.80		**Lag/CN Method,**

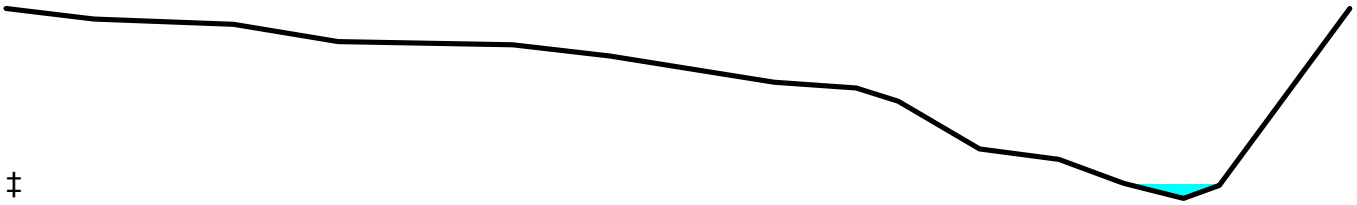
Summary for Reach 4R: Confl. D/S 6th St

Inflow Area = 548.331 ac, 0.00% Impervious, Inflow Depth = 0.42" for 2-YR event
Inflow = 95.04 cfs @ 12.59 hrs, Volume= 19.220 af
Outflow = 94.92 cfs @ 12.61 hrs, Volume= 19.220 af, Atten= 0%, Lag= 1.5 min

Routing by Muskingum-Cunge method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Reference Flow= 71.28 cfs Estimated Depth= 1.76' Velocity= 3.39 fps
m= 1.356, c= 4.60 fps, dt= 3.0 min, dx= 412.0' / 1 = 412.0', K= 1.5 min, X= 0.338
Max. Velocity= 5.10 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 4.60 fps, Avg. Travel Time= 1.5 min

Peak Storage= 8,500 cf @ 12.60 hrs
Average Depth at Peak Storage= 1.74' , Surface Width= 22.95'
Bank-Full Depth= 22.91' Flow Area= 2,801.7 sf, Capacity= 42,244.13 cfs

Custom cross-section, Length= 412.0' Slope= 0.0097 '/' (112 Elevation Intervals)
Constant n= 0.040
Inlet Invert= 726.00', Outlet Invert= 722.00'



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Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	746.53	0.00
21.36	745.26	1.27
55.32	744.62	1.91
80.79	742.54	3.99
123.24	742.14	4.39
146.82	740.79	5.74
186.80	737.63	8.90
206.79	736.93	9.60
217.02	735.34	11.19
236.78	729.59	16.94
256.03	728.33	18.20
271.84	725.43	21.10
286.39	723.62	22.91
295.06	725.18	21.35
326.81	746.53	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)	m
0.00	0.0	0.0	0.0	0	0.00	1.333
1.56	16.5	21.4	21.2	6,816	50.94	1.333
1.81	22.1	23.9	23.6	9,123	77.00	1.362
4.71	119.7	45.2	43.7	49,332	839.27	1.394
5.97	188.1	66.7	64.8	77,508	1,374.15	1.280
11.72	642.3	97.6	93.1	264,644	8,256.18	1.419
13.31	800.5	110.8	105.7	329,789	10,948.28	1.386
14.01	881.8	132.1	126.8	363,319	11,445.31	1.346
17.17	1,353.0	177.8	171.5	557,453	19,158.29	1.290
18.52	1,601.8	203.9	197.0	659,932	23,171.24	1.262
18.92	1,689.2	247.1	240.1	695,951	22,274.71	1.345
21.00	2,218.3	276.3	268.6	913,935	32,554.33	1.360
21.64	2,401.4	311.5	303.6	989,375	34,307.23	1.324
22.91	2,801.7	335.1	326.8	1,154,293	42,244.13	1.329

Summary for Reach 6R: Confl. with MN River

Cross-section from HEC-RAS RS 1086; outflow from this node used to set D/S boundary conditions in HEC-RAS model

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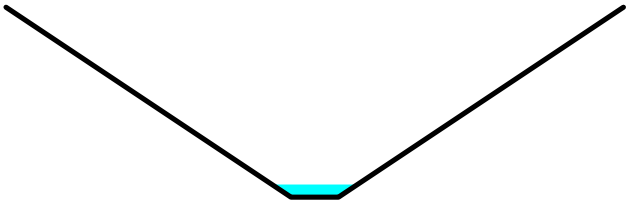
[61] Hint: Exceeded Reach 4R outlet invert by 1.32' @ 12.60 hrs

Inflow Area = 573.287 ac, 0.00% Impervious, Inflow Depth = 0.42" for 2-YR event
Inflow = 97.22 cfs @ 12.61 hrs, Volume= 19.828 af
Outflow = 96.98 cfs @ 12.64 hrs, Volume= 19.828 af, Atten= 0%, Lag= 2.0 min

Routing by Muskingum-Cunge method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs / 2
Reference Flow= 72.92 cfs Estimated Depth= 1.42' Velocity= 7.18 fps
m= 1.460, c= 10.48 fps, dt= 1.5 min, dx= 1,240.0' / 1 = 1,240.0', K= 2.0 min, X= 0.481
Max. Velocity= 18.29 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 10.52 fps, Avg. Travel Time= 2.0 min

Peak Storage= 11,482 cf @ 12.62 hrs
Average Depth at Peak Storage= 1.32' , Surface Width= 8.97'
Bank-Full Depth= 20.00' Flow Area= 700.0 sf, Capacity= 21,848.71 cfs

5.00' x 20.00' deep channel, n= 0.030
Side Slope Z-value= 1.5 '/' Top Width= 65.00'
Length= 1,240.0' Slope= 0.0210 '/'
Inlet Invert= 722.00', Outlet Invert= 696.00'



Summary for Subcatchment 1S: Main Branch S

Runoff = 16.57 cfs @ 12.27 hrs, Volume= 1.905 af, Depth= 0.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.20"

	Area (ac)	CN	Description
*	24.956	61	
	24.956		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.0	2,593	0.1571	1.49		**Lag/CN Method,**

Summary for Subcatchment 2S: Main Branch N

Runoff = 184.65 cfs @ 12.58 hrs, Volume= 29.363 af, Depth= 1.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.20"

	Area (ac)	CN	Description
*	291.836	66	
	291.836		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
52.2	7,373	0.1994	2.35		**Lag/CN Method,**

Summary for Subcatchment 3S: West Branch

Runoff = 163.01 cfs @ 12.45 hrs, Volume= 23.231 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.20"

	Area (ac)	CN	Description
*	256.495	64	
	256.495		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
42.8	4,622	0.1556	1.80		**Lag/CN Method,**

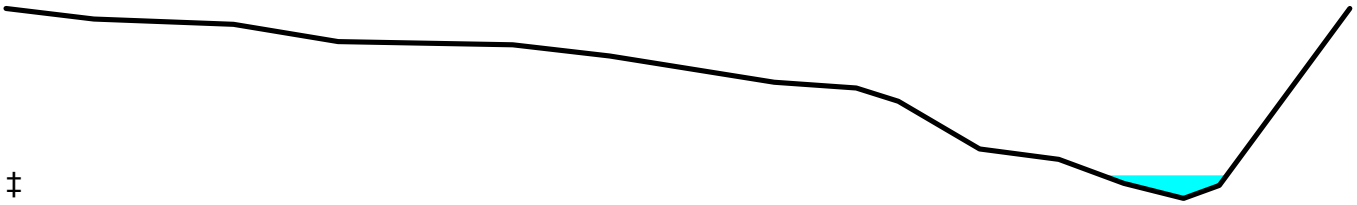
Summary for Reach 4R: Confl. D/S 6th St

Inflow Area = 548.331 ac, 0.00% Impervious, Inflow Depth = 1.15" for 10-YR event
Inflow = 342.01 cfs @ 12.51 hrs, Volume= 52.594 af
Outflow = 341.66 cfs @ 12.53 hrs, Volume= 52.594 af, Atten= 0%, Lag= 1.0 min

Routing by Muskingum-Cunge method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Reference Flow= 256.51 cfs Estimated Depth= 2.87' Velocity= 5.02 fps
m= 1.414, c= 7.10 fps, dt= 3.0 min, dx= 412.0' / 1 = 412.0', K= 1.0 min, X= 0.247
Max. Velocity= 7.49 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 7.10 fps, Avg. Travel Time= 1.0 min

Peak Storage= 19,831 cf @ 12.52 hrs
Average Depth at Peak Storage= 2.77' , Surface Width= 30.28'
Bank-Full Depth= 22.91' Flow Area= 2,801.7 sf, Capacity= 42,244.13 cfs

Custom cross-section, Length= 412.0' Slope= 0.0097 '/' (112 Elevation Intervals)
Constant n= 0.040
Inlet Invert= 726.00', Outlet Invert= 722.00'



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Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	746.53	0.00
21.36	745.26	1.27
55.32	744.62	1.91
80.79	742.54	3.99
123.24	742.14	4.39
146.82	740.79	5.74
186.80	737.63	8.90
206.79	736.93	9.60
217.02	735.34	11.19
236.78	729.59	16.94
256.03	728.33	18.20
271.84	725.43	21.10
286.39	723.62	22.91
295.06	725.18	21.35
326.81	746.53	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)	m
0.00	0.0	0.0	0.0	0	0.00	1.333
1.56	16.5	21.4	21.2	6,816	50.94	1.333
1.81	22.1	23.9	23.6	9,123	77.00	1.362
4.71	119.7	45.2	43.7	49,332	839.27	1.394
5.97	188.1	66.7	64.8	77,508	1,374.15	1.280
11.72	642.3	97.6	93.1	264,644	8,256.18	1.419
13.31	800.5	110.8	105.7	329,789	10,948.28	1.386
14.01	881.8	132.1	126.8	363,319	11,445.31	1.346
17.17	1,353.0	177.8	171.5	557,453	19,158.29	1.290
18.52	1,601.8	203.9	197.0	659,932	23,171.24	1.262
18.92	1,689.2	247.1	240.1	695,951	22,274.71	1.345
21.00	2,218.3	276.3	268.6	913,935	32,554.33	1.360
21.64	2,401.4	311.5	303.6	989,375	34,307.23	1.324
22.91	2,801.7	335.1	326.8	1,154,293	42,244.13	1.329

Summary for Reach 6R: Confl. with MN River

Cross-section from HEC-RAS RS 1086; outflow from this node used to set D/S boundary conditions in HEC-RAS model

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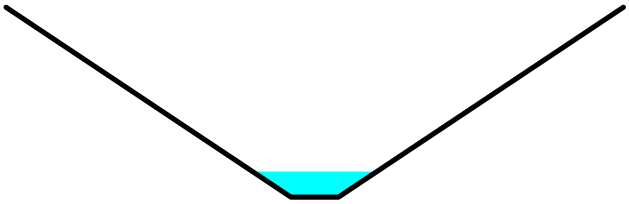
[61] Hint: Exceeded Reach 4R outlet invert by 2.70' @ 12.55 hrs

Inflow Area = 573.287 ac, 0.00% Impervious, Inflow Depth = 1.14" for 10-YR event
Inflow = 352.17 cfs @ 12.52 hrs, Volume= 54.500 af
Outflow = 351.17 cfs @ 12.54 hrs, Volume= 54.500 af, Atten= 0%, Lag= 1.5 min

Routing by Muskingum-Cunge method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs / 2
Reference Flow= 264.13 cfs Estimated Depth= 2.80' Velocity= 10.25 fps
m= 1.399, c= 14.34 fps, dt= 1.5 min, dx= 1,240.0' / 1 = 1,240.0', K= 1.4 min, X= 0.462
Max. Velocity= 16.12 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 14.32 fps, Avg. Travel Time= 1.4 min

Peak Storage= 30,385 cf @ 12.53 hrs
Average Depth at Peak Storage= 2.70' , Surface Width= 13.11'
Bank-Full Depth= 20.00' Flow Area= 700.0 sf, Capacity= 21,848.71 cfs

5.00' x 20.00' deep channel, n= 0.030
Side Slope Z-value= 1.5 '/' Top Width= 65.00'
Length= 1,240.0' Slope= 0.0210 '/'
Inlet Invert= 722.00', Outlet Invert= 696.00'



Summary for Subcatchment 1S: Main Branch S

Runoff = 41.57 cfs @ 12.25 hrs, Volume= 4.171 af, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=6.00"

	Area (ac)	CN	Description
*	24.956	61	
	24.956		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.0	2,593	0.1571	1.49		**Lag/CN Method,**

Summary for Subcatchment 2S: Main Branch N

Runoff = 404.74 cfs @ 12.55 hrs, Volume= 59.345 af, Depth= 2.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=6.00"

	Area (ac)	CN	Description
*	291.836	66	
	291.836		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
52.2	7,373	0.1994	2.35		**Lag/CN Method,**

Summary for Subcatchment 3S: West Branch

Runoff = 376.81 cfs @ 12.42 hrs, Volume= 48.379 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=6.00"

	Area (ac)	CN	Description
*	256.495	64	
	256.495		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
42.8	4,622	0.1556	1.80		**Lag/CN Method,**

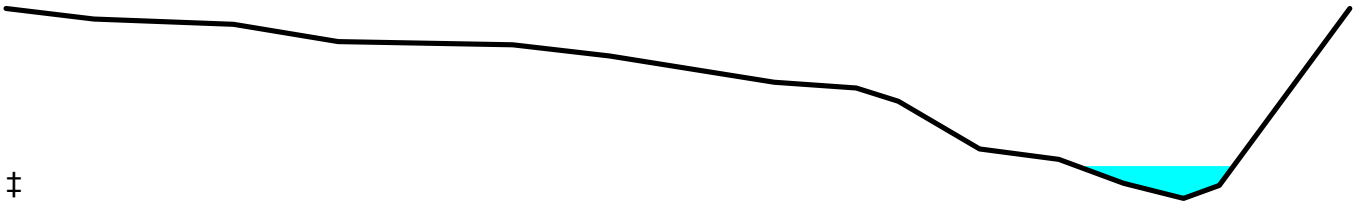
Summary for Reach 4R: Confl. D/S 6th St

Inflow Area = 548.331 ac, 0.00% Impervious, Inflow Depth = 2.36" for 100-YR event
Inflow = 768.42 cfs @ 12.48 hrs, Volume= 107.724 af
Outflow = 768.07 cfs @ 12.49 hrs, Volume= 107.724 af, Atten= 0%, Lag= 0.8 min

Routing by Muskingum-Cunge method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Reference Flow= 576.31 cfs Estimated Depth= 4.01' Velocity= 6.32 fps
m= 1.403, c= 8.87 fps, dt= 3.0 min, dx= 412.0' / 1 = 412.0', K= 0.8 min, X= 0.142
Max. Velocity= 9.10 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 8.87 fps, Avg. Travel Time= 0.8 min

Peak Storage= 35,678 cf @ 12.49 hrs
Average Depth at Peak Storage= 3.90' , Surface Width= 38.09'
Bank-Full Depth= 22.91' Flow Area= 2,801.7 sf, Capacity= 42,244.13 cfs

Custom cross-section, Length= 412.0' Slope= 0.0097 '/' (112 Elevation Intervals)
Constant n= 0.040
Inlet Invert= 726.00', Outlet Invert= 722.00'



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Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	746.53	0.00
21.36	745.26	1.27
55.32	744.62	1.91
80.79	742.54	3.99
123.24	742.14	4.39
146.82	740.79	5.74
186.80	737.63	8.90
206.79	736.93	9.60
217.02	735.34	11.19
236.78	729.59	16.94
256.03	728.33	18.20
271.84	725.43	21.10
286.39	723.62	22.91
295.06	725.18	21.35
326.81	746.53	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)	m
0.00	0.0	0.0	0.0	0	0.00	1.333
1.56	16.5	21.4	21.2	6,816	50.94	1.333
1.81	22.1	23.9	23.6	9,123	77.00	1.362
4.71	119.7	45.2	43.7	49,332	839.27	1.394
5.97	188.1	66.7	64.8	77,508	1,374.15	1.280
11.72	642.3	97.6	93.1	264,644	8,256.18	1.419
13.31	800.5	110.8	105.7	329,789	10,948.28	1.386
14.01	881.8	132.1	126.8	363,319	11,445.31	1.346
17.17	1,353.0	177.8	171.5	557,453	19,158.29	1.290
18.52	1,601.8	203.9	197.0	659,932	23,171.24	1.262
18.92	1,689.2	247.1	240.1	695,951	22,274.71	1.345
21.00	2,218.3	276.3	268.6	913,935	32,554.33	1.360
21.64	2,401.4	311.5	303.6	989,375	34,307.23	1.324
22.91	2,801.7	335.1	326.8	1,154,293	42,244.13	1.329

Summary for Reach 6R: Confl. with MN River

Cross-section from HEC-RAS RS 1086; outflow from this node used to set D/S boundary conditions in HEC-RAS model

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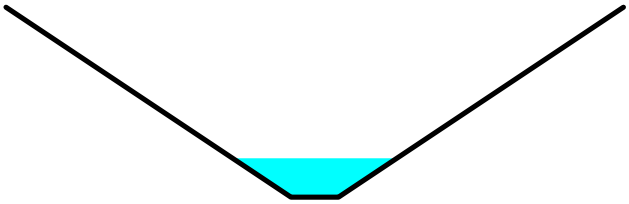
[62] Hint: Exceeded Reach 4R OUTLET depth by 0.19' @ 12.50 hrs

Inflow Area = 573.287 ac, 0.00% Impervious, Inflow Depth = 2.34" for 100-YR event
Inflow = 794.06 cfs @ 12.48 hrs, Volume= 111.895 af
Outflow = 792.15 cfs @ 12.50 hrs, Volume= 111.895 af, Atten= 0%, Lag= 1.3 min

Routing by Muskingum-Cunge method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs / 2
Reference Flow= 595.54 cfs Estimated Depth= 4.18' Velocity= 12.66 fps
m= 1.373, c= 17.38 fps, dt= 1.5 min, dx= 1,240.0' / 1 = 1,240.0', K= 1.2 min, X= 0.441
Max. Velocity= 19.61 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 17.36 fps, Avg. Travel Time= 1.2 min

Peak Storage= 56,564 cf @ 12.49 hrs
Average Depth at Peak Storage= 4.09' , Surface Width= 17.28'
Bank-Full Depth= 20.00' Flow Area= 700.0 sf, Capacity= 21,848.71 cfs

5.00' x 20.00' deep channel, n= 0.030
Side Slope Z-value= 1.5 '/' Top Width= 65.00'
Length= 1,240.0' Slope= 0.0210 '/'
Inlet Invert= 722.00', Outlet Invert= 696.00'



Events for Subcatchment 1S: Main Branch S

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-YR	2.30	0.88	0.293	0.14
2-YR	2.80	3.29	0.608	0.29
10-YR	4.20	16.57	1.905	0.92
100-YR	**6.00**	**41.57**	**4.171**	**2.01**

Events for Subcatchment 2S: Main Branch N

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-YR	2.30	23.64	6.106	0.25
2-YR	2.80	54.02	11.005	0.45
10-YR	4.20	184.65	29.363	1.21
100-YR	**6.00**	**404.74**	**59.345**	**2.44**

Events for Subcatchment 3S: West Branch

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-YR	2.30	16.07	4.340	0.20
2-YR	2.80	42.26	8.215	0.38
10-YR	4.20	163.01	23.231	1.09
100-YR	**6.00**	**376.81**	**48.379**	**2.26**

Events for Reach 4R: Confl. D/S 6th St

Event	Inflow (cfs)	Outflow (cfs)	Elevation (feet)	Storage (cubic-feet)
1-YR	39.30	39.27	727.27	4,543
2-YR	95.04	94.92	727.74	8,500
10-YR	342.01	341.66	728.77	19,831
100-YR	**768.42**	**768.07**	**729.90**	**35,678**

Events for Reach 6R: Confl. with MN River

Event	Inflow (cfs)	Outflow (cfs)	Elevation (feet)	Storage (cubic-feet)
1-YR	40.06	40.05	722.78	6,008
2-YR	97.22	96.98	723.32	11,482
10-YR	352.17	351.17	724.70	30,385
100-YR	**794.06**	**792.15**	**726.09**	**56,564**

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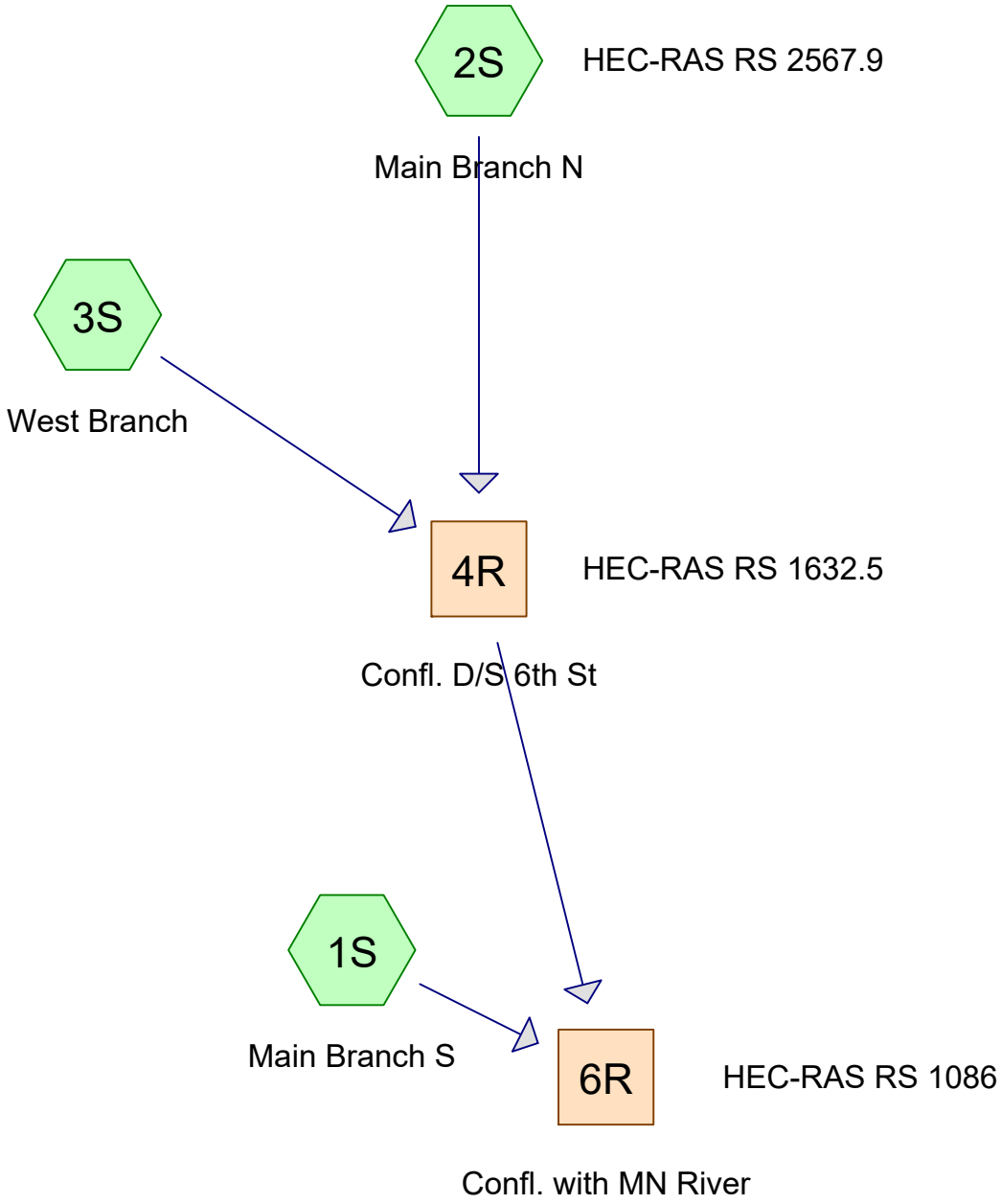
Existing Conditions



Subcat Reach Pond Link

Routing Diagram for SpringCk_2016_v1
Prepared by {enter your company name here}, Printed 12/15/2021

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-YR	MSE 24-hr	3	Default	24.00	1	2.49	2
2	2-YR	MSE 24-hr	3	Default	24.00	1	2.85	2
3	10-YR	MSE 24-hr	3	Default	24.00	1	4.23	2
4	100-YR	MSE 24-hr	3	Default	24.00	1	7.30	2

Summary for Subcatchment 1S: Main Branch S

Runoff = 9.32 cfs @ 12.40 hrs, Volume= 0.937 af, Depth= 0.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-YR Rainfall=2.49"

	Area (ac)	CN	Description
*	24.956	70	
	24.956		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.9	2,593	0.1571	1.88		**Lag/CN Method,**

Summary for Subcatchment 2S: Main Branch N

Runoff = 113.11 cfs @ 12.66 hrs, Volume= 14.656 af, Depth= 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-YR Rainfall=2.49"

	Area (ac)	CN	Description
*	291.836	74	
	291.836		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
42.0	7,373	0.1994	2.92		**Lag/CN Method,**

Summary for Subcatchment 3S: West Branch

Runoff = 128.38 cfs @ 12.50 hrs, Volume= 13.780 af, Depth= 0.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-YR Rainfall=2.49"

	Area (ac)	CN	Description
*	256.495	75	
	256.495		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.8	4,622	0.1556	2.42		**Lag/CN Method,**

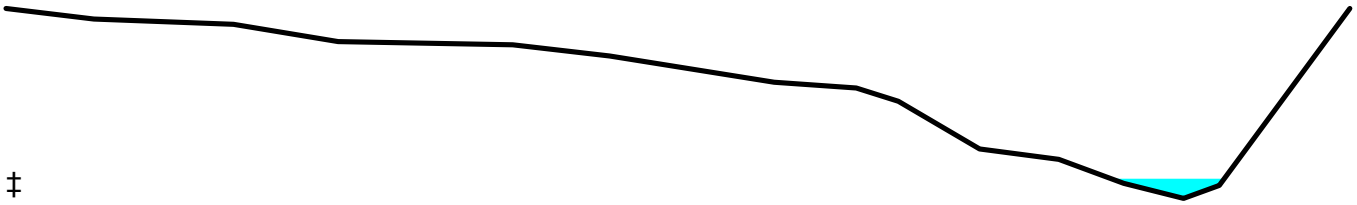
Summary for Reach 4R: Confl. D/S 6th St

Inflow Area = 548.331 ac, 0.00% Impervious, Inflow Depth = 0.62" for 1-YR event
Inflow = 232.69 cfs @ 12.56 hrs, Volume= 28.436 af
Outflow = 232.35 cfs @ 12.58 hrs, Volume= 28.436 af, Atten= 0%, Lag= 1.2 min

Routing by Muskingum-Cunge method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Reference Flow= 174.52 cfs Estimated Depth= 2.46' Velocity= 4.48 fps
m= 1.410, c= 6.32 fps, dt= 3.0 min, dx= 412.0' / 1 = 412.0', K= 1.1 min, X= 0.282
Max. Velocity= 6.64 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 6.32 fps, Avg. Travel Time= 1.1 min

Peak Storage= 15,147 cf @ 12.58 hrs
Average Depth at Peak Storage= 2.38' , Surface Width= 27.55'
Bank-Full Depth= 22.91' Flow Area= 2,801.7 sf, Capacity= 42,244.13 cfs

Custom cross-section, Length= 412.0' Slope= 0.0097 '/' (112 Elevation Intervals)
Constant n= 0.040
Inlet Invert= 726.00', Outlet Invert= 722.00'



‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	746.53	0.00
21.36	745.26	1.27
55.32	744.62	1.91
80.79	742.54	3.99
123.24	742.14	4.39
146.82	740.79	5.74
186.80	737.63	8.90
206.79	736.93	9.60
217.02	735.34	11.19
236.78	729.59	16.94
256.03	728.33	18.20
271.84	725.43	21.10
286.39	723.62	22.91
295.06	725.18	21.35
326.81	746.53	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)	m
0.00	0.0	0.0	0.0	0	0.00	1.333
1.56	16.5	21.4	21.2	6,816	50.94	1.333
1.81	22.1	23.9	23.6	9,123	77.00	1.362
4.71	119.7	45.2	43.7	49,332	839.27	1.394
5.97	188.1	66.7	64.8	77,508	1,374.15	1.280
11.72	642.3	97.6	93.1	264,644	8,256.18	1.419
13.31	800.5	110.8	105.7	329,789	10,948.28	1.386
14.01	881.8	132.1	126.8	363,319	11,445.31	1.346
17.17	1,353.0	177.8	171.5	557,453	19,158.29	1.290
18.52	1,601.8	203.9	197.0	659,932	23,171.24	1.262
18.92	1,689.2	247.1	240.1	695,951	22,274.71	1.345
21.00	2,218.3	276.3	268.6	913,935	32,554.33	1.360
21.64	2,401.4	311.5	303.6	989,375	34,307.23	1.324
22.91	2,801.7	335.1	326.8	1,154,293	42,244.13	1.329

Summary for Reach 6R: Confl. with MN River

Cross-section from HEC-RAS RS 1086; outflow from this node used to set D/S boundary conditions in HEC-RAS model

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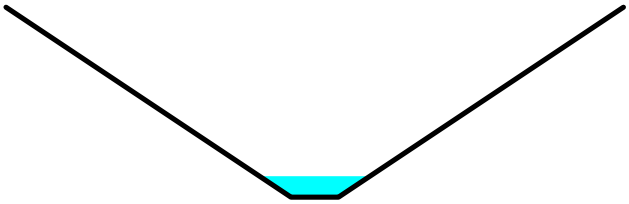
[61] Hint: Exceeded Reach 4R outlet invert by 2.20' @ 12.60 hrs

Inflow Area = 573.287 ac, 0.00% Impervious, Inflow Depth = 0.61" for 1-YR event
Inflow = 239.35 cfs @ 12.58 hrs, Volume= 29.373 af
Outflow = 238.55 cfs @ 12.61 hrs, Volume= 29.373 af, Atten= 0%, Lag= 1.7 min

Routing by Muskingum-Cunge method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs / 2
Reference Flow= 179.52 cfs Estimated Depth= 2.30' Velocity= 9.23 fps
m= 1.416, c= 13.07 fps, dt= 1.5 min, dx= 1,240.0' / 1 = 1,240.0', K= 1.6 min, X= 0.469
Max. Velocity= 14.15 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 13.06 fps, Avg. Travel Time= 1.6 min

Peak Storage= 22,645 cf @ 12.59 hrs
Average Depth at Peak Storage= 2.20' , Surface Width= 11.60'
Bank-Full Depth= 20.00' Flow Area= 700.0 sf, Capacity= 21,848.71 cfs

5.00' x 20.00' deep channel, n= 0.030
Side Slope Z-value= 1.5 '/' Top Width= 65.00'
Length= 1,240.0' Slope= 0.0210 '/'
Inlet Invert= 722.00', Outlet Invert= 696.00'



Summary for Subcatchment 1S: Main Branch S

Runoff = 14.15 cfs @ 12.38 hrs, Volume= 1.315 af, Depth= 0.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-YR Rainfall=2.85"

	Area (ac)	CN	Description
*	24.956	70	
	24.956		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.9	2,593	0.1571	1.88		**Lag/CN Method,**

Summary for Subcatchment 2S: Main Branch N

Runoff = 159.53 cfs @ 12.64 hrs, Volume= 19.809 af, Depth= 0.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-YR Rainfall=2.85"

	Area (ac)	CN	Description
*	291.836	74	
	291.836		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
42.0	7,373	0.1994	2.92		**Lag/CN Method,**

Summary for Subcatchment 3S: West Branch

Runoff = 178.66 cfs @ 12.49 hrs, Volume= 18.470 af, Depth= 0.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-YR Rainfall=2.85"

	Area (ac)	CN	Description
*	256.495	75	
	256.495		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.8	4,622	0.1556	2.42		**Lag/CN Method,**

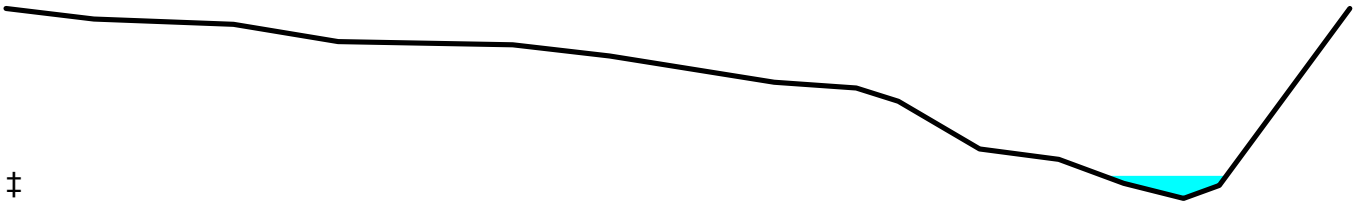
Summary for Reach 4R: Confl. D/S 6th St

Inflow Area = 548.331 ac, 0.00% Impervious, Inflow Depth = 0.84" for 2-YR event
Inflow = 326.53 cfs @ 12.55 hrs, Volume= 38.279 af
Outflow = 326.25 cfs @ 12.57 hrs, Volume= 38.279 af, Atten= 0%, Lag= 1.0 min

Routing by Muskingum-Cunge method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Reference Flow= 244.90 cfs Estimated Depth= 2.81' Velocity= 4.96 fps
m= 1.414, c= 7.01 fps, dt= 3.0 min, dx= 412.0' / 1 = 412.0', K= 1.0 min, X= 0.251
Max. Velocity= 7.29 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 7.01 fps, Avg. Travel Time= 1.0 min

Peak Storage= 19,181 cf @ 12.56 hrs
Average Depth at Peak Storage= 2.72' , Surface Width= 29.92'
Bank-Full Depth= 22.91' Flow Area= 2,801.7 sf, Capacity= 42,244.13 cfs

Custom cross-section, Length= 412.0' Slope= 0.0097 '/' (112 Elevation Intervals)
Constant n= 0.040
Inlet Invert= 726.00', Outlet Invert= 722.00'



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Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	746.53	0.00
21.36	745.26	1.27
55.32	744.62	1.91
80.79	742.54	3.99
123.24	742.14	4.39
146.82	740.79	5.74
186.80	737.63	8.90
206.79	736.93	9.60
217.02	735.34	11.19
236.78	729.59	16.94
256.03	728.33	18.20
271.84	725.43	21.10
286.39	723.62	22.91
295.06	725.18	21.35
326.81	746.53	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)	m
0.00	0.0	0.0	0.0	0	0.00	1.333
1.56	16.5	21.4	21.2	6,816	50.94	1.333
1.81	22.1	23.9	23.6	9,123	77.00	1.362
4.71	119.7	45.2	43.7	49,332	839.27	1.394
5.97	188.1	66.7	64.8	77,508	1,374.15	1.280
11.72	642.3	97.6	93.1	264,644	8,256.18	1.419
13.31	800.5	110.8	105.7	329,789	10,948.28	1.386
14.01	881.8	132.1	126.8	363,319	11,445.31	1.346
17.17	1,353.0	177.8	171.5	557,453	19,158.29	1.290
18.52	1,601.8	203.9	197.0	659,932	23,171.24	1.262
18.92	1,689.2	247.1	240.1	695,951	22,274.71	1.345
21.00	2,218.3	276.3	268.6	913,935	32,554.33	1.360
21.64	2,401.4	311.5	303.6	989,375	34,307.23	1.324
22.91	2,801.7	335.1	326.8	1,154,293	42,244.13	1.329

Summary for Reach 6R: Confl. with MN River

Cross-section from HEC-RAS RS 1086; outflow from this node used to set D/S boundary conditions in HEC-RAS model

---

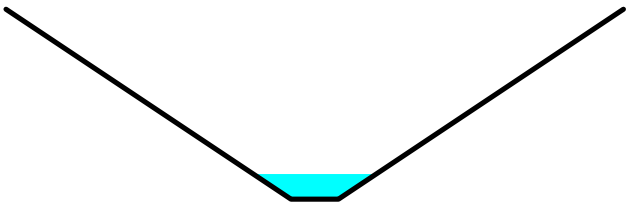
[61] Hint: Exceeded Reach 4R outlet invert by 2.63' @ 12.60 hrs

Inflow Area = 573.287 ac, 0.00% Impervious, Inflow Depth = 0.83" for 2-YR event
Inflow = 336.64 cfs @ 12.56 hrs, Volume= 39.594 af
Outflow = 335.28 cfs @ 12.59 hrs, Volume= 39.594 af, Atten= 0%, Lag= 1.5 min

Routing by Muskingum-Cunge method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs / 2
Reference Flow= 252.48 cfs Estimated Depth= 2.74' Velocity= 10.12 fps
m= 1.401, c= 14.18 fps, dt= 1.5 min, dx= 1,240.0' / 1 = 1,240.0', K= 1.5 min, X= 0.462
Max. Velocity= 15.25 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 14.16 fps, Avg. Travel Time= 1.5 min

Peak Storage= 29,340 cf @ 12.58 hrs
Average Depth at Peak Storage= 2.64' , Surface Width= 12.92'
Bank-Full Depth= 20.00' Flow Area= 700.0 sf, Capacity= 21,848.71 cfs

5.00' x 20.00' deep channel, n= 0.030
Side Slope Z-value= 1.5 '/' Top Width= 65.00'
Length= 1,240.0' Slope= 0.0210 '/'
Inlet Invert= 722.00', Outlet Invert= 696.00'



Summary for Subcatchment 1S: Main Branch S

Runoff = 37.19 cfs @ 12.35 hrs, Volume= 3.089 af, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-YR Rainfall=4.23"

	Area (ac)	CN	Description
*	24.956	70	
	24.956		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.9	2,593	0.1571	1.88		**Lag/CN Method,**

Summary for Subcatchment 2S: Main Branch N

Runoff = 368.79 cfs @ 12.61 hrs, Volume= 42.975 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-YR Rainfall=4.23"

	Area (ac)	CN	Description
*	291.836	74	
	291.836		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
42.0	7,373	0.1994	2.92		**Lag/CN Method,**

Summary for Subcatchment 3S: West Branch

Runoff = 402.51 cfs @ 12.47 hrs, Volume= 39.352 af, Depth= 1.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-YR Rainfall=4.23"

	Area (ac)	CN	Description
*	256.495	75	
	256.495		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.8	4,622	0.1556	2.42		**Lag/CN Method,**

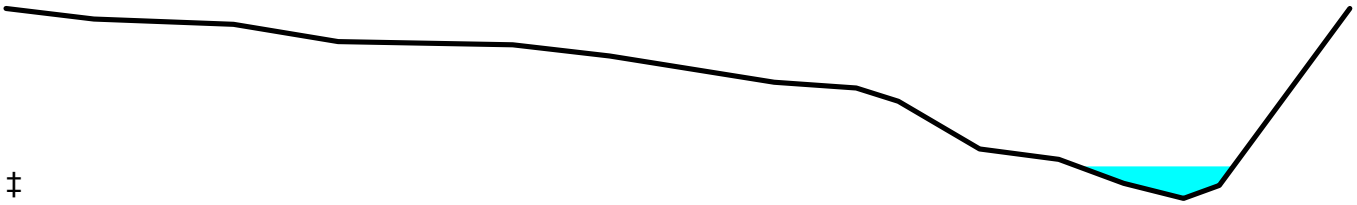
Summary for Reach 4R: Confl. D/S 6th St

Inflow Area = 548.331 ac, 0.00% Impervious, Inflow Depth = 1.80" for 10-YR event
Inflow = 747.17 cfs @ 12.53 hrs, Volume= 82.328 af
Outflow = 746.64 cfs @ 12.54 hrs, Volume= 82.328 af, Atten= 0%, Lag= 0.8 min

Routing by Muskingum-Cunge method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Reference Flow= 560.37 cfs Estimated Depth= 3.97' Velocity= 6.27 fps
m= 1.403, c= 8.80 fps, dt= 3.0 min, dx= 412.0' / 1 = 412.0', K= 0.8 min, X= 0.147
Max. Velocity= 9.05 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 8.81 fps, Avg. Travel Time= 0.8 min

Peak Storage= 34,936 cf @ 12.54 hrs
Average Depth at Peak Storage= 3.85' , Surface Width= 37.76'
Bank-Full Depth= 22.91' Flow Area= 2,801.7 sf, Capacity= 42,244.13 cfs

Custom cross-section, Length= 412.0' Slope= 0.0097 '/' (112 Elevation Intervals)
Constant n= 0.040
Inlet Invert= 726.00', Outlet Invert= 722.00'



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Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	746.53	0.00
21.36	745.26	1.27
55.32	744.62	1.91
80.79	742.54	3.99
123.24	742.14	4.39
146.82	740.79	5.74
186.80	737.63	8.90
206.79	736.93	9.60
217.02	735.34	11.19
236.78	729.59	16.94
256.03	728.33	18.20
271.84	725.43	21.10
286.39	723.62	22.91
295.06	725.18	21.35
326.81	746.53	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)	m
0.00	0.0	0.0	0.0	0	0.00	1.333
1.56	16.5	21.4	21.2	6,816	50.94	1.333
1.81	22.1	23.9	23.6	9,123	77.00	1.362
4.71	119.7	45.2	43.7	49,332	839.27	1.394
5.97	188.1	66.7	64.8	77,508	1,374.15	1.280
11.72	642.3	97.6	93.1	264,644	8,256.18	1.419
13.31	800.5	110.8	105.7	329,789	10,948.28	1.386
14.01	881.8	132.1	126.8	363,319	11,445.31	1.346
17.17	1,353.0	177.8	171.5	557,453	19,158.29	1.290
18.52	1,601.8	203.9	197.0	659,932	23,171.24	1.262
18.92	1,689.2	247.1	240.1	695,951	22,274.71	1.345
21.00	2,218.3	276.3	268.6	913,935	32,554.33	1.360
21.64	2,401.4	311.5	303.6	989,375	34,307.23	1.324
22.91	2,801.7	335.1	326.8	1,154,293	42,244.13	1.329

Summary for Reach 6R: Confl. with MN River

Cross-section from HEC-RAS RS 1086; outflow from this node used to set D/S boundary conditions in HEC-RAS model

---

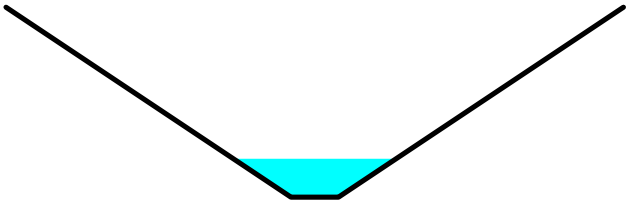
[62] Hint: Exceeded Reach 4R OUTLET depth by 0.19' @ 12.60 hrs

Inflow Area = 573.287 ac, 0.00% Impervious, Inflow Depth = 1.79" for 10-YR event
Inflow = 773.33 cfs @ 12.53 hrs, Volume= 85.417 af
Outflow = 770.76 cfs @ 12.55 hrs, Volume= 85.417 af, Atten= 0%, Lag= 1.3 min

Routing by Muskingum-Cunge method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs / 2
Reference Flow= 580.00 cfs Estimated Depth= 4.12' Velocity= 12.57 fps
m= 1.373, c= 17.27 fps, dt= 1.5 min, dx= 1,240.0' / 1 = 1,240.0', K= 1.2 min, X= 0.442
Max. Velocity= 18.53 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 17.25 fps, Avg. Travel Time= 1.2 min

Peak Storage= 55,401 cf @ 12.54 hrs
Average Depth at Peak Storage= 4.04' , Surface Width= 17.12'
Bank-Full Depth= 20.00' Flow Area= 700.0 sf, Capacity= 21,848.71 cfs

5.00' x 20.00' deep channel, n= 0.030
Side Slope Z-value= 1.5 '/' Top Width= 65.00'
Length= 1,240.0' Slope= 0.0210 '/'
Inlet Invert= 722.00', Outlet Invert= 696.00'



Summary for Subcatchment 1S: Main Branch S

Runoff = 100.31 cfs @ 12.34 hrs, Volume= 8.047 af, Depth= 3.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-YR Rainfall=7.30"

	Area (ac)	CN	Description
*	24.956	70	
	24.956		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.9	2,593	0.1571	1.88		**Lag/CN Method,**

Summary for Subcatchment 2S: Main Branch N

Runoff = 916.62 cfs @ 12.58 hrs, Volume= 104.690 af, Depth= 4.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-YR Rainfall=7.30"

	Area (ac)	CN	Description
*	291.836	74	
	291.836		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
42.0	7,373	0.1994	2.92		**Lag/CN Method,**

Summary for Subcatchment 3S: West Branch

Runoff = 977.46 cfs @ 12.45 hrs, Volume= 94.365 af, Depth= 4.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-YR Rainfall=7.30"

	Area (ac)	CN	Description
*	256.495	75	
	256.495		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.8	4,622	0.1556	2.42		**Lag/CN Method,**

Summary for Reach 4R: Confl. D/S 6th St

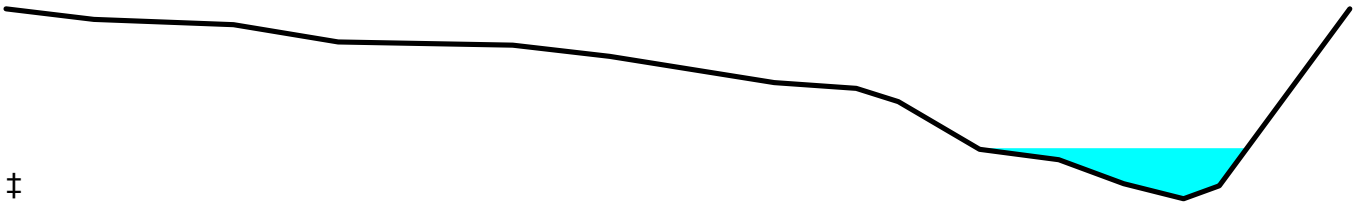
[97] Warning: Factor X out of range

Inflow Area = 548.331 ac, 0.00% Impervious, Inflow Depth = 4.36" for 100-YR event
Inflow = 1,839.47 cfs @ 12.51 hrs, Volume= 199.055 af
Outflow = 1,838.75 cfs @ 12.52 hrs, Volume= 199.055 af, Atten= 0%, Lag= 0.7 min

Routing by Muskingum-Cunge method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Reference Flow= 1,379.60 cfs Estimated Depth= 5.98' Velocity= 7.31 fps
m= 1.281, c= 9.37 fps, dt= 3.0 min, dx= 412.0' / 1 = 412.0', K= 0.7 min, X= 0.000
Max. Velocity= 9.37 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 9.37 fps, Avg. Travel Time= 0.7 min

Peak Storage= 80,858 cf @ 12.52 hrs
Average Depth at Peak Storage= 6.09' , Surface Width= 65.45'
Bank-Full Depth= 22.91' Flow Area= 2,801.7 sf, Capacity= 42,244.13 cfs

Custom cross-section, Length= 412.0' Slope= 0.0097 '/' (112 Elevation Intervals)
Constant n= 0.040
Inlet Invert= 726.00', Outlet Invert= 722.00'



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Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	746.53	0.00
21.36	745.26	1.27
55.32	744.62	1.91
80.79	742.54	3.99
123.24	742.14	4.39
146.82	740.79	5.74
186.80	737.63	8.90
206.79	736.93	9.60
217.02	735.34	11.19
236.78	729.59	16.94
256.03	728.33	18.20
271.84	725.43	21.10
286.39	723.62	22.91
295.06	725.18	21.35
326.81	746.53	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)	m
0.00	0.0	0.0	0.0	0	0.00	1.333
1.56	16.5	21.4	21.2	6,816	50.94	1.333
1.81	22.1	23.9	23.6	9,123	77.00	1.362
4.71	119.7	45.2	43.7	49,332	839.27	1.394
5.97	188.1	66.7	64.8	77,508	1,374.15	1.280
11.72	642.3	97.6	93.1	264,644	8,256.18	1.419
13.31	800.5	110.8	105.7	329,789	10,948.28	1.386
14.01	881.8	132.1	126.8	363,319	11,445.31	1.346
17.17	1,353.0	177.8	171.5	557,453	19,158.29	1.290
18.52	1,601.8	203.9	197.0	659,932	23,171.24	1.262
18.92	1,689.2	247.1	240.1	695,951	22,274.71	1.345
21.00	2,218.3	276.3	268.6	913,935	32,554.33	1.360
21.64	2,401.4	311.5	303.6	989,375	34,307.23	1.324
22.91	2,801.7	335.1	326.8	1,154,293	42,244.13	1.329

Summary for Reach 6R: Confl. with MN River

Cross-section from HEC-RAS RS 1086; outflow from this node used to set D/S boundary conditions in HEC-RAS model

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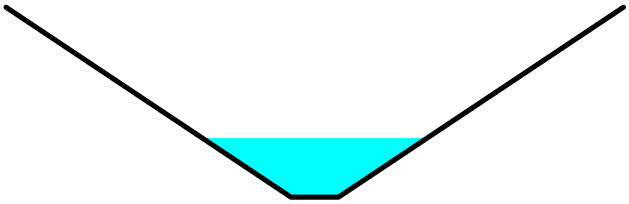
[62] Hint: Exceeded Reach 4R OUTLET depth by 0.12' @ 12.50 hrs

Inflow Area = 573.287 ac, 0.00% Impervious, Inflow Depth = 4.34" for 100-YR event
Inflow = 1,910.63 cfs @ 12.51 hrs, Volume= 207.101 af
Outflow = 1,904.21 cfs @ 12.52 hrs, Volume= 207.101 af, Atten= 0%, Lag= 1.0 min

Routing by Muskingum-Cunge method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs / 2
Reference Flow= 1,432.97 cfs Estimated Depth= 6.28' Velocity= 15.82 fps
m= 1.353, c= 21.41 fps, dt= 1.5 min, dx= 1,240.0' / 1 = 1,240.0', K= 1.0 min, X= 0.411
Max. Velocity= 22.80 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 21.39 fps, Avg. Travel Time= 1.0 min

Peak Storage= 110,402 cf @ 12.52 hrs
Average Depth at Peak Storage= 6.22' , Surface Width= 23.65'
Bank-Full Depth= 20.00' Flow Area= 700.0 sf, Capacity= 21,848.71 cfs

5.00' x 20.00' deep channel, n= 0.030
Side Slope Z-value= 1.5 '/' Top Width= 65.00'
Length= 1,240.0' Slope= 0.0210 '/'
Inlet Invert= 722.00', Outlet Invert= 696.00'



Events for Subcatchment 1S: Main Branch S

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-YR	2.49	9.32	0.937	0.45
2-YR	2.85	14.15	1.315	0.63
10-YR	4.23	37.19	3.089	1.49
100-YR	**7.30**	**100.31**	**8.047**	**3.87**

Events for Subcatchment 2S: Main Branch N

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-YR	2.49	113.11	14.656	0.60
2-YR	2.85	159.53	19.809	0.81
10-YR	4.23	368.79	42.975	1.77
100-YR	**7.30**	**916.62**	**104.690**	**4.30**

Events for Subcatchment 3S: West Branch

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-YR	2.49	128.38	13.780	0.64
2-YR	2.85	178.66	18.470	0.86
10-YR	4.23	402.51	39.352	1.84
100-YR	**7.30**	**977.46**	**94.365**	**4.41**

Events for Reach 4R: Confl. D/S 6th St

Event	Inflow (cfs)	Outflow (cfs)	Elevation (feet)	Storage (cubic-feet)
1-YR	232.69	232.35	728.38	15,147
2-YR	326.53	326.25	728.72	19,181
10-YR	747.17	746.64	729.85	34,936
100-YR	**1,839.47**	**1,838.75**	**732.09**	**80,858**

Events for Reach 6R: Confl. with MN River

Event	Inflow (cfs)	Outflow (cfs)	Elevation (feet)	Storage (cubic-feet)
1-YR	239.35	238.55	724.20	22,645
2-YR	336.64	335.28	724.64	29,340
10-YR	773.33	770.76	726.04	55,401
100-YR	**1,910.63**	**1,904.21**	**728.22**	**110,402**

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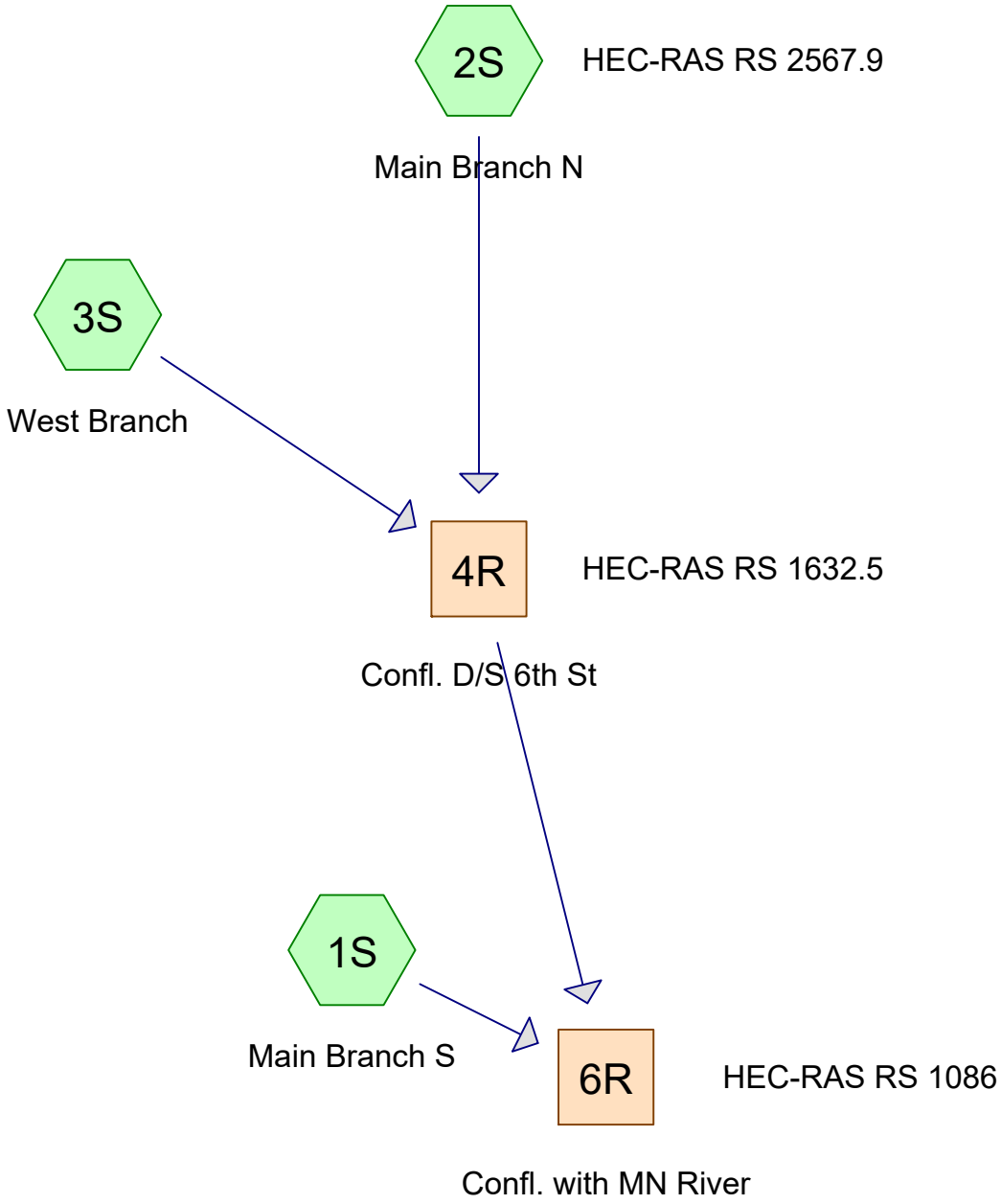
Future (2050)
Conditions



Subcat Reach Pond Link

Routing Diagram for SpringCk_2050_v1
Prepared by {enter your company name here}, Printed 12/15/2021

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-YR	MSE 24-hr	3	Default	24.00	1	3.10	2
2	2-YR	MSE 24-hr	3	Default	24.00	1	3.60	2
3	10-YR	MSE 24-hr	3	Default	24.00	1	5.30	2
4	100-YR	MSE 24-hr	3	Default	24.00	1	9.20	2

Summary for Subcatchment 1S: Main Branch S

Runoff = 39.53 cfs @ 12.27 hrs, Volume= 2.757 af, Depth= 1.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-YR Rainfall=3.10"

	Area (ac)	CN	Description
*	24.956	80	
	24.956		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.2	2,593	0.1571	2.52		**Lag/CN Method,**

Summary for Subcatchment 2S: Main Branch N

Runoff = 287.87 cfs @ 12.53 hrs, Volume= 30.694 af, Depth= 1.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-YR Rainfall=3.10"

	Area (ac)	CN	Description
*	291.836	79	
	291.836		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.3	7,373	0.1994	3.39		**Lag/CN Method,**

Summary for Subcatchment 3S: West Branch

Runoff = 338.60 cfs @ 12.40 hrs, Volume= 29.728 af, Depth= 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-YR Rainfall=3.10"

	Area (ac)	CN	Description
*	256.495	81	
	256.495		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.6	4,622	0.1556	2.90		**Lag/CN Method,**

Summary for Reach 4R: Confl. D/S 6th St

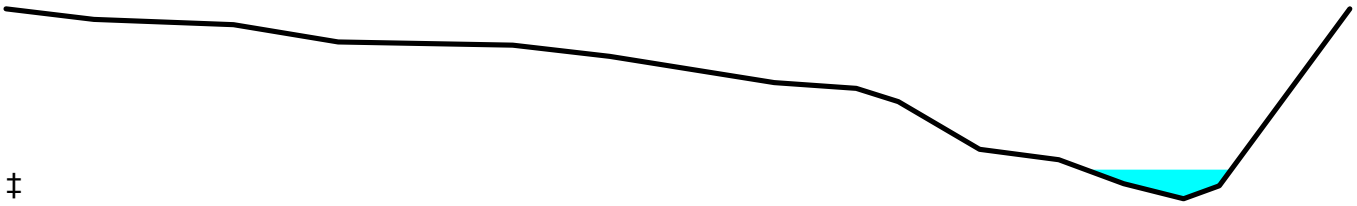
[97] Warning: Factor X out of range

Inflow Area = 548.331 ac, 0.00% Impervious, Inflow Depth = 1.32" for 1-YR event
Inflow = 604.54 cfs @ 12.45 hrs, Volume= 60.422 af
Outflow = 602.95 cfs @ 12.46 hrs, Volume= 60.422 af, Atten= 0%, Lag= 0.9 min

Routing by Muskingum-Cunge method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs / 2
Reference Flow= 453.40 cfs Estimated Depth= 3.63' Velocity= 5.92 fps
m= 1.408, c= 8.33 fps, dt= 1.5 min, dx= 412.0' / 3 (preset) = 137.3', K= 0.3 min, X= 0.000
Max. Velocity= 8.83 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 8.33 fps, Avg. Travel Time= 0.8 min

Peak Storage= 29,825 cf @ 12.46 hrs
Average Depth at Peak Storage= 3.51' , Surface Width= 35.40'
Bank-Full Depth= 22.91' Flow Area= 2,801.7 sf, Capacity= 42,244.13 cfs

Custom cross-section, Length= 412.0' Slope= 0.0097 '/' (112 Elevation Intervals)
Constant n= 0.040
Inlet Invert= 726.00', Outlet Invert= 722.00'



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Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	746.53	0.00
21.36	745.26	1.27
55.32	744.62	1.91
80.79	742.54	3.99
123.24	742.14	4.39
146.82	740.79	5.74
186.80	737.63	8.90
206.79	736.93	9.60
217.02	735.34	11.19
236.78	729.59	16.94
256.03	728.33	18.20
271.84	725.43	21.10
286.39	723.62	22.91
295.06	725.18	21.35
326.81	746.53	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)	m
0.00	0.0	0.0	0.0	0	0.00	1.333
1.56	16.5	21.4	21.2	6,816	50.94	1.333
1.81	22.1	23.9	23.6	9,123	77.00	1.362
4.71	119.7	45.2	43.7	49,332	839.27	1.394
5.97	188.1	66.7	64.8	77,508	1,374.15	1.280
11.72	642.3	97.6	93.1	264,644	8,256.18	1.419
13.31	800.5	110.8	105.7	329,789	10,948.28	1.386
14.01	881.8	132.1	126.8	363,319	11,445.31	1.346
17.17	1,353.0	177.8	171.5	557,453	19,158.29	1.290
18.52	1,601.8	203.9	197.0	659,932	23,171.24	1.262
18.92	1,689.2	247.1	240.1	695,951	22,274.71	1.345
21.00	2,218.3	276.3	268.6	913,935	32,554.33	1.360
21.64	2,401.4	311.5	303.6	989,375	34,307.23	1.324
22.91	2,801.7	335.1	326.8	1,154,293	42,244.13	1.329

Summary for Reach 6R: Confl. with MN River

Cross-section from HEC-RAS RS 1086; outflow from this node used to set D/S boundary conditions in HEC-RAS model

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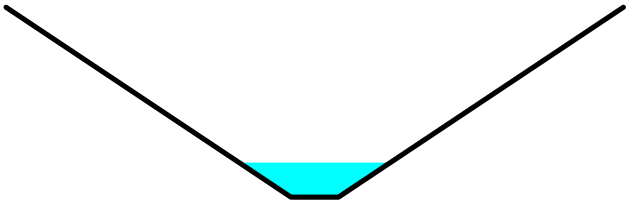
[62] Hint: Exceeded Reach 4R OUTLET depth by 0.13' @ 12.50 hrs

Inflow Area = 573.287 ac, 0.00% Impervious, Inflow Depth = 1.32" for 1-YR event
Inflow = 626.98 cfs @ 12.45 hrs, Volume= 63.178 af
Outflow = 624.11 cfs @ 12.47 hrs, Volume= 63.178 af, Atten= 0%, Lag= 1.3 min

Routing by Muskingum-Cunge method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs / 2
Reference Flow= 470.24 cfs Estimated Depth= 3.73' Velocity= 11.91 fps
m= 1.379, c= 16.43 fps, dt= 1.5 min, dx= 1,240.0' / 1 = 1,240.0', K= 1.3 min, X= 0.448
Max. Velocity= 17.79 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 16.41 fps, Avg. Travel Time= 1.3 min

Peak Storage= 47,158 cf @ 12.46 hrs
Average Depth at Peak Storage= 3.64' , Surface Width= 15.91'
Bank-Full Depth= 20.00' Flow Area= 700.0 sf, Capacity= 21,848.71 cfs

5.00' x 20.00' deep channel, n= 0.030
Side Slope Z-value= 1.5 '/' Top Width= 65.00'
Length= 1,240.0' Slope= 0.0210 '/'
Inlet Invert= 722.00', Outlet Invert= 696.00'



Summary for Subcatchment 1S: Main Branch S

Runoff = 51.51 cfs @ 12.27 hrs, Volume= 3.569 af, Depth= 1.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-YR Rainfall=3.60"

	Area (ac)	CN	Description
*	24.956	80	
	24.956		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.2	2,593	0.1571	2.52		**Lag/CN Method,**

Summary for Subcatchment 2S: Main Branch N

Runoff = 379.33 cfs @ 12.52 hrs, Volume= 39.983 af, Depth= 1.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-YR Rainfall=3.60"

	Area (ac)	CN	Description
*	291.836	79	
	291.836		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.3	7,373	0.1994	3.39		**Lag/CN Method,**

Summary for Subcatchment 3S: West Branch

Runoff = 438.48 cfs @ 12.39 hrs, Volume= 38.258 af, Depth= 1.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-YR Rainfall=3.60"

	Area (ac)	CN	Description
*	256.495	81	
	256.495		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.6	4,622	0.1556	2.90		**Lag/CN Method,**

Summary for Reach 4R: Confl. D/S 6th St

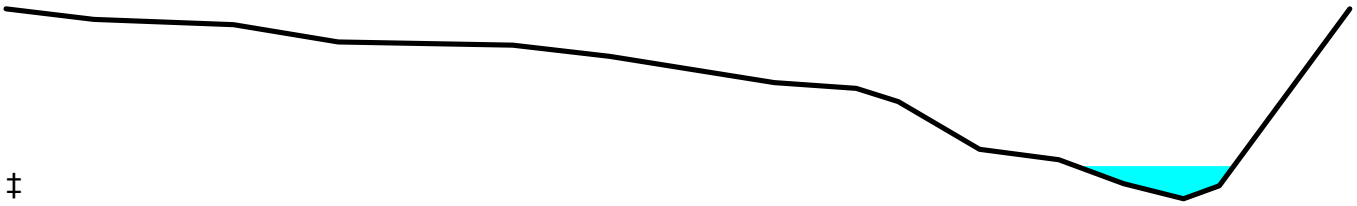
[97] Warning: Factor X out of range

Inflow Area = 548.331 ac, 0.00% Impervious, Inflow Depth = 1.71" for 2-YR event
Inflow = 790.30 cfs @ 12.44 hrs, Volume= 78.241 af
Outflow = 788.26 cfs @ 12.45 hrs, Volume= 78.241 af, Atten= 0%, Lag= 0.8 min

Routing by Muskingum-Cunge method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs / 2
Reference Flow= 592.73 cfs Estimated Depth= 4.06' Velocity= 6.37 fps
m= 1.402, c= 8.94 fps, dt= 1.5 min, dx= 412.0' / 3 (preset) = 137.3', K= 0.3 min, X= 0.000
Max. Velocity= 9.44 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 8.94 fps, Avg. Travel Time= 0.8 min

Peak Storage= 36,334 cf @ 12.45 hrs
Average Depth at Peak Storage= 3.94' , Surface Width= 38.38'
Bank-Full Depth= 22.91' Flow Area= 2,801.7 sf, Capacity= 42,244.13 cfs

Custom cross-section, Length= 412.0' Slope= 0.0097 '/' (112 Elevation Intervals)
Constant n= 0.040
Inlet Invert= 726.00', Outlet Invert= 722.00'



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Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	746.53	0.00
21.36	745.26	1.27
55.32	744.62	1.91
80.79	742.54	3.99
123.24	742.14	4.39
146.82	740.79	5.74
186.80	737.63	8.90
206.79	736.93	9.60
217.02	735.34	11.19
236.78	729.59	16.94
256.03	728.33	18.20
271.84	725.43	21.10
286.39	723.62	22.91
295.06	725.18	21.35
326.81	746.53	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)	m
0.00	0.0	0.0	0.0	0	0.00	1.333
1.56	16.5	21.4	21.2	6,816	50.94	1.333
1.81	22.1	23.9	23.6	9,123	77.00	1.362
4.71	119.7	45.2	43.7	49,332	839.27	1.394
5.97	188.1	66.7	64.8	77,508	1,374.15	1.280
11.72	642.3	97.6	93.1	264,644	8,256.18	1.419
13.31	800.5	110.8	105.7	329,789	10,948.28	1.386
14.01	881.8	132.1	126.8	363,319	11,445.31	1.346
17.17	1,353.0	177.8	171.5	557,453	19,158.29	1.290
18.52	1,601.8	203.9	197.0	659,932	23,171.24	1.262
18.92	1,689.2	247.1	240.1	695,951	22,274.71	1.345
21.00	2,218.3	276.3	268.6	913,935	32,554.33	1.360
21.64	2,401.4	311.5	303.6	989,375	34,307.23	1.324
22.91	2,801.7	335.1	326.8	1,154,293	42,244.13	1.329

Summary for Reach 6R: Confl. with MN River

Cross-section from HEC-RAS RS 1086; outflow from this node used to set D/S boundary conditions in HEC-RAS model

---

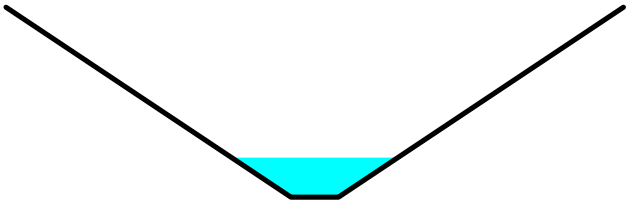
[62] Hint: Exceeded Reach 4R OUTLET depth by 0.22' @ 12.50 hrs

Inflow Area = 573.287 ac, 0.00% Impervious, Inflow Depth = 1.71" for 2-YR event
Inflow = 819.63 cfs @ 12.45 hrs, Volume= 81.809 af
Outflow = 815.96 cfs @ 12.47 hrs, Volume= 81.809 af, Atten= 0%, Lag= 1.2 min

Routing by Muskingum-Cunge method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs / 2
Reference Flow= 614.72 cfs Estimated Depth= 4.24' Velocity= 12.76 fps
m= 1.372, c= 17.51 fps, dt= 1.5 min, dx= 1,240.0' / 1 = 1,240.0', K= 1.2 min, X= 0.441
Max. Velocity= 18.85 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 17.50 fps, Avg. Travel Time= 1.2 min

Peak Storage= 57,865 cf @ 12.46 hrs
Average Depth at Peak Storage= 4.15' , Surface Width= 17.46'
Bank-Full Depth= 20.00' Flow Area= 700.0 sf, Capacity= 21,848.71 cfs

5.00' x 20.00' deep channel, n= 0.030
Side Slope Z-value= 1.5 '/' Top Width= 65.00'
Length= 1,240.0' Slope= 0.0210 '/'
Inlet Invert= 722.00', Outlet Invert= 696.00'



Summary for Subcatchment 1S: Main Branch S

Runoff = 94.75 cfs @ 12.26 hrs, Volume= 6.564 af, Depth= 3.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-YR Rainfall=5.30"

	Area (ac)	CN	Description
*	24.956	80	
	24.956		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.2	2,593	0.1571	2.52		**Lag/CN Method,**

Summary for Subcatchment 2S: Main Branch N

Runoff = 713.99 cfs @ 12.51 hrs, Volume= 74.457 af, Depth= 3.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-YR Rainfall=5.30"

	Area (ac)	CN	Description
*	291.836	79	
	291.836		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.3	7,373	0.1994	3.39		**Lag/CN Method,**

Summary for Subcatchment 3S: West Branch

Runoff = 797.33 cfs @ 12.38 hrs, Volume= 69.508 af, Depth= 3.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-YR Rainfall=5.30"

	Area (ac)	CN	Description
*	256.495	81	
	256.495		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.6	4,622	0.1556	2.90		**Lag/CN Method,**

Summary for Reach 4R: Confl. D/S 6th St

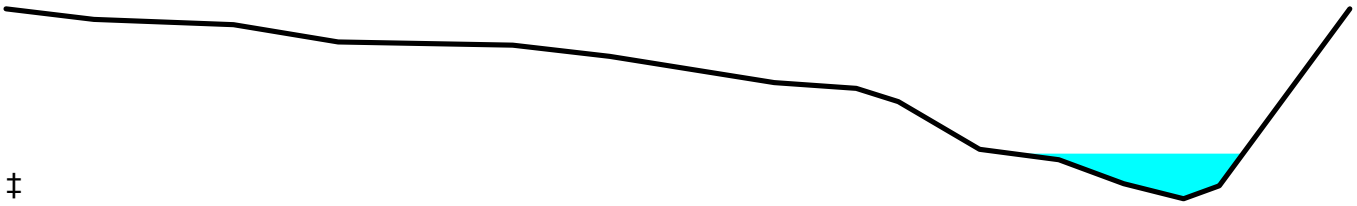
[97] Warning: Factor X out of range

Inflow Area = 548.331 ac, 0.00% Impervious, Inflow Depth = 3.15" for 10-YR event
Inflow = 1,463.97 cfs @ 12.43 hrs, Volume= 143.965 af
Outflow = 1,460.04 cfs @ 12.44 hrs, Volume= 143.965 af, Atten= 0%, Lag= 0.8 min

Routing by Muskingum-Cunge method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs / 2
Reference Flow= 1,097.98 cfs Estimated Depth= 5.41' Velocity= 7.10 fps
m= 1.315, c= 9.34 fps, dt= 1.5 min, dx= 412.0' / 3 (preset) = 137.3', K= 0.2 min, X= 0.000
Max. Velocity= 9.84 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 9.34 fps, Avg. Travel Time= 0.7 min

Peak Storage= 64,377 cf @ 12.44 hrs
Average Depth at Peak Storage= 5.44' , Surface Width= 55.97'
Bank-Full Depth= 22.91' Flow Area= 2,801.7 sf, Capacity= 42,244.13 cfs

Custom cross-section, Length= 412.0' Slope= 0.0097 '/' (112 Elevation Intervals)
Constant n= 0.040
Inlet Invert= 726.00', Outlet Invert= 722.00'



‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	746.53	0.00
21.36	745.26	1.27
55.32	744.62	1.91
80.79	742.54	3.99
123.24	742.14	4.39
146.82	740.79	5.74
186.80	737.63	8.90
206.79	736.93	9.60
217.02	735.34	11.19
236.78	729.59	16.94
256.03	728.33	18.20
271.84	725.43	21.10
286.39	723.62	22.91
295.06	725.18	21.35
326.81	746.53	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)	m
0.00	0.0	0.0	0.0	0	0.00	1.333
1.56	16.5	21.4	21.2	6,816	50.94	1.333
1.81	22.1	23.9	23.6	9,123	77.00	1.362
4.71	119.7	45.2	43.7	49,332	839.27	1.394
5.97	188.1	66.7	64.8	77,508	1,374.15	1.280
11.72	642.3	97.6	93.1	264,644	8,256.18	1.419
13.31	800.5	110.8	105.7	329,789	10,948.28	1.386
14.01	881.8	132.1	126.8	363,319	11,445.31	1.346
17.17	1,353.0	177.8	171.5	557,453	19,158.29	1.290
18.52	1,601.8	203.9	197.0	659,932	23,171.24	1.262
18.92	1,689.2	247.1	240.1	695,951	22,274.71	1.345
21.00	2,218.3	276.3	268.6	913,935	32,554.33	1.360
21.64	2,401.4	311.5	303.6	989,375	34,307.23	1.324
22.91	2,801.7	335.1	326.8	1,154,293	42,244.13	1.329

Summary for Reach 6R: Confl. with MN River

Cross-section from HEC-RAS RS 1086; outflow from this node used to set D/S boundary conditions in HEC-RAS model

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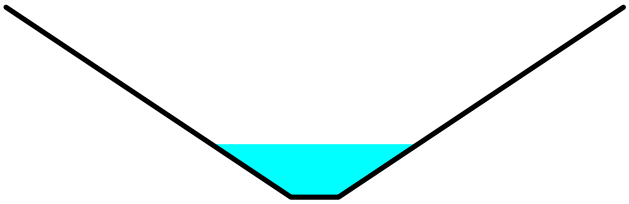
[62] Hint: Exceeded Reach 4R OUTLET depth by 0.14' @ 12.50 hrs

Inflow Area = 573.287 ac, 0.00% Impervious, Inflow Depth = 3.15" for 10-YR event
Inflow = 1,517.91 cfs @ 12.43 hrs, Volume= 150.528 af
Outflow = 1,511.23 cfs @ 12.45 hrs, Volume= 150.528 af, Atten= 0%, Lag= 1.1 min

Routing by Muskingum-Cunge method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs / 2
Reference Flow= 1,138.43 cfs Estimated Depth= 5.65' Velocity= 14.93 fps
m= 1.357, c= 20.26 fps, dt= 1.5 min, dx= 1,240.0' / 1 = 1,240.0', K= 1.0 min, X= 0.420
Max. Velocity= 21.81 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 20.25 fps, Avg. Travel Time= 1.0 min

Peak Storage= 92,587 cf @ 12.45 hrs
Average Depth at Peak Storage= 5.58' , Surface Width= 21.75'
Bank-Full Depth= 20.00' Flow Area= 700.0 sf, Capacity= 21,848.71 cfs

5.00' x 20.00' deep channel, n= 0.030
Side Slope Z-value= 1.5 '/' Top Width= 65.00'
Length= 1,240.0' Slope= 0.0210 '/'
Inlet Invert= 722.00', Outlet Invert= 696.00'



Summary for Subcatchment 1S: Main Branch S

Runoff = 198.13 cfs @ 12.26 hrs, Volume= 14.054 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-YR Rainfall=9.20"

	Area (ac)	CN	Description
*	24.956	80	
	24.956		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.2	2,593	0.1571	2.52		**Lag/CN Method,**

Summary for Subcatchment 2S: Main Branch N

Runoff = 1,528.00 cfs @ 12.49 hrs, Volume= 161.336 af, Depth= 6.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-YR Rainfall=9.20"

	Area (ac)	CN	Description
*	291.836	79	
	291.836		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.3	7,373	0.1994	3.39		**Lag/CN Method,**

Summary for Subcatchment 3S: West Branch

Runoff = 1,655.08 cfs @ 12.37 hrs, Volume= 147.098 af, Depth= 6.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-YR Rainfall=9.20"

	Area (ac)	CN	Description
*	256.495	81	
	256.495		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.6	4,622	0.1556	2.90		**Lag/CN Method,**

Summary for Reach 4R: Confl. D/S 6th St

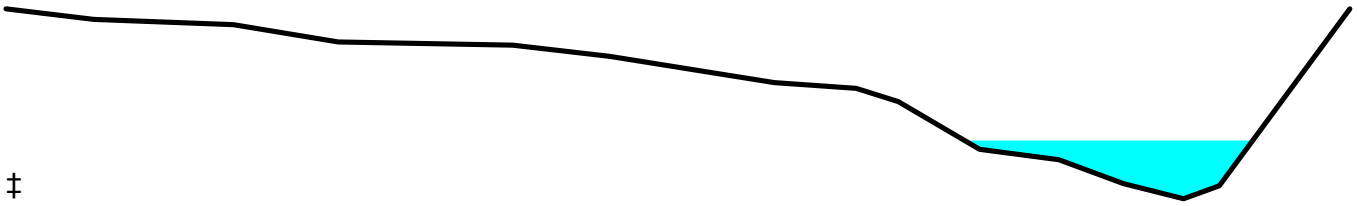
[97] Warning: Factor X out of range

Inflow Area = 548.331 ac, 0.00% Impervious, Inflow Depth = 6.75" for 100-YR event
Inflow = 3,090.67 cfs @ 12.42 hrs, Volume= 308.435 af
Outflow = 3,078.14 cfs @ 12.43 hrs, Volume= 308.435 af, Atten= 0%, Lag= 0.7 min

Routing by Muskingum-Cunge method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs / 2
Reference Flow= 2,318.00 cfs Estimated Depth= 7.13' Velocity= 8.69 fps
m= 1.367, c= 11.88 fps, dt= 1.5 min, dx= 412.0' / 3 (preset) = 137.3', K= 0.2 min, X= 0.000
Max. Velocity= 12.61 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 11.88 fps, Avg. Travel Time= 0.6 min

Peak Storage= 106,749 cf @ 12.43 hrs
Average Depth at Peak Storage= 7.02' , Surface Width= 70.02'
Bank-Full Depth= 22.91' Flow Area= 2,801.7 sf, Capacity= 42,244.13 cfs

Custom cross-section, Length= 412.0' Slope= 0.0097 '/' (112 Elevation Intervals)
Constant n= 0.040
Inlet Invert= 726.00', Outlet Invert= 722.00'



‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	746.53	0.00
21.36	745.26	1.27
55.32	744.62	1.91
80.79	742.54	3.99
123.24	742.14	4.39
146.82	740.79	5.74
186.80	737.63	8.90
206.79	736.93	9.60
217.02	735.34	11.19
236.78	729.59	16.94
256.03	728.33	18.20
271.84	725.43	21.10
286.39	723.62	22.91
295.06	725.18	21.35
326.81	746.53	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)	m
0.00	0.0	0.0	0.0	0	0.00	1.333
1.56	16.5	21.4	21.2	6,816	50.94	1.333
1.81	22.1	23.9	23.6	9,123	77.00	1.362
4.71	119.7	45.2	43.7	49,332	839.27	1.394
5.97	188.1	66.7	64.8	77,508	1,374.15	1.280
11.72	642.3	97.6	93.1	264,644	8,256.18	1.419
13.31	800.5	110.8	105.7	329,789	10,948.28	1.386
14.01	881.8	132.1	126.8	363,319	11,445.31	1.346
17.17	1,353.0	177.8	171.5	557,453	19,158.29	1.290
18.52	1,601.8	203.9	197.0	659,932	23,171.24	1.262
18.92	1,689.2	247.1	240.1	695,951	22,274.71	1.345
21.00	2,218.3	276.3	268.6	913,935	32,554.33	1.360
21.64	2,401.4	311.5	303.6	989,375	34,307.23	1.324
22.91	2,801.7	335.1	326.8	1,154,293	42,244.13	1.329

Summary for Reach 6R: Confl. with MN River

Cross-section from HEC-RAS RS 1086; outflow from this node used to set D/S boundary conditions in HEC-RAS model

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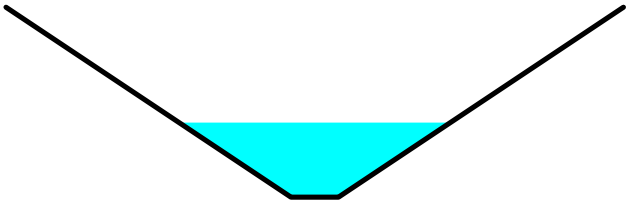
[62] Hint: Exceeded Reach 4R OUTLET depth by 0.83' @ 12.45 hrs

Inflow Area = 573.287 ac, 0.00% Impervious, Inflow Depth = 6.75" for 100-YR event
Inflow = 3,204.32 cfs @ 12.42 hrs, Volume= 322.489 af
Outflow = 3,187.04 cfs @ 12.44 hrs, Volume= 322.489 af, Atten= 1%, Lag= 0.9 min

Routing by Muskingum-Cunge method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs / 2
Reference Flow= 2,403.24 cfs Estimated Depth= 7.91' Velocity= 18.01 fps
m= 1.346, c= 24.24 fps, dt= 1.5 min, dx= 1,240.0' / 1 = 1,240.0', K= 0.9 min, X= 0.387
Max. Velocity= 25.65 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 24.23 fps, Avg. Travel Time= 0.9 min

Peak Storage= 163,232 cf @ 12.43 hrs
Average Depth at Peak Storage= 7.85' , Surface Width= 28.55'
Bank-Full Depth= 20.00' Flow Area= 700.0 sf, Capacity= 21,848.71 cfs

5.00' x 20.00' deep channel, n= 0.030
Side Slope Z-value= 1.5 '/' Top Width= 65.00'
Length= 1,240.0' Slope= 0.0210 '/'
Inlet Invert= 722.00', Outlet Invert= 696.00'



Events for Subcatchment 1S: Main Branch S

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-YR	3.10	39.53	2.757	1.33
2-YR	3.60	51.51	3.569	1.72
10-YR	5.30	94.75	6.564	3.16
100-YR	**9.20**	**198.13**	**14.054**	**6.76**

Events for Subcatchment 2S: Main Branch N

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-YR	3.10	287.87	30.694	1.26
2-YR	3.60	379.33	39.983	1.64
10-YR	5.30	713.99	74.457	3.06
100-YR	**9.20**	**1,528.00**	**161.336**	**6.63**

Events for Subcatchment 3S: West Branch

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-YR	3.10	338.60	29.728	1.39
2-YR	3.60	438.48	38.258	1.79
10-YR	5.30	797.33	69.508	3.25
100-YR	**9.20**	**1,655.08**	**147.098**	**6.88**

Events for Reach 4R: Confl. D/S 6th St

Event	Inflow (cfs)	Outflow (cfs)	Elevation (feet)	Storage (cubic-feet)
1-YR	604.54	602.95	729.51	29,825
2-YR	790.30	788.26	729.94	36,334
10-YR	1,463.97	1,460.04	731.44	64,377
100-YR	**3,090.67**	**3,078.14**	**733.02**	**106,749**

Events for Reach 6R: Confl. with MN River

Event	Inflow (cfs)	Outflow (cfs)	Elevation (feet)	Storage (cubic-feet)
1-YR	626.98	624.11	725.64	47,158
2-YR	819.63	815.96	726.15	57,865
10-YR	1,517.91	1,511.23	727.58	92,587
100-YR	**3,204.32**	**3,187.04**	**729.85**	**163,232**

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Attachment 3—Spring Creek HEC-RAS Model Result Tables

Spring Creek Pre-Settlement Conditions HEC-RAS Model Results

HEC-RAS Plan: 1800s River: Spring Creek Reach: Spring Creek

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Vel Chnl	Vel Left	Vel Right	Vel Total	Top Width	Shear Chan	Shear LOB	Shear ROB	Shear Total	
			(cfs)	(ft)	(ft)	(ft/s)	(ft/s)	(ft/s)	(ft/s)	(ft)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	
Spring Creek	2567.9	1	24.00	745.20	745.93	4.18			4.18	10.72	0.98			0.98	
Spring Creek	2567.9	2	54.00	745.20	746.33	5.13			5.13	13.12	1.29			1.29	
Spring Creek	2567.9	10	185.00	745.20	747.28	7.18		0.70	7.13	20.67	2.11		0.15	1.89	
Spring Creek	2567.9	100	405.00	745.20	748.13	9.30		2.10	8.30	33.75	3.10		0.77	2.19	
Spring Creek	2137.7	1	24.00	734.49	736.21	1.48			1.48	17.11	0.10			0.10	
Spring Creek	2137.7	2	54.00	734.49	736.77	2.04	0.29	0.12	2.01	21.66	0.17	0.02	0.01	0.15	
Spring Creek	2137.7	10	185.00	734.49	738.13	3.38	1.01	0.85	2.95	30.41	0.37	0.14	0.11	0.28	
Spring Creek	2137.7	100	405.00	734.49	740.47	3.62	1.18	1.13	2.73	42.99	0.35	0.15	0.14	0.23	
Spring Creek	2120.5	1	24.00	734.67	735.84	4.40			4.40	9.20	1.05			1.05	
Spring Creek	2120.5	2	54.00	734.67	736.29	5.26			5.26	12.33	1.35			1.35	
Spring Creek	2120.5	10	185.00	734.67	737.34	7.23	0.72	1.26	7.11	18.02	2.04	0.15	0.35	1.80	
Spring Creek	2120.5	100	405.00	734.67	740.24	5.04	1.55	1.47	3.96	33.25	0.71	0.28	0.26	0.47	
Spring Creek	2087.7		Culvert												
Spring Creek	2011.1	1	24.00	732.64	733.60	6.70			6.70	6.70	2.55			2.55	
Spring Creek	2011.1	2	54.00	732.64	734.22	5.99			5.99	10.72	1.75			1.75	
Spring Creek	2011.1	10	185.00	732.64	734.74	12.12			12.12	13.12	6.44			6.44	
Spring Creek	2011.1	100	405.00	732.64	735.53	15.09			15.09	16.23	8.91			8.91	
Spring Creek	1948.00*	1	24.00	731.14	732.38	3.88			3.88	9.59	0.80			0.80	
Spring Creek	1948.00*	2	54.00	731.14	732.79	5.02			5.02	12.49	1.21			1.21	
Spring Creek	1948.00*	10	185.00	731.14	733.82	7.10			7.10	17.01	2.02			2.02	
Spring Creek	1948.00*	100	405.00	731.14	734.92	8.71	1.01	0.12	8.70	20.16	2.65	0.16		2.58	
Spring Creek	1884.90*	1	24.00	729.63	730.76	4.30			4.30	10.00	1.03			1.03	
Spring Creek	1884.90*	2	54.00	729.63	731.18	5.13			5.13	13.27	1.30			1.30	
Spring Creek	1884.90*	10	185.00	729.63	732.05	7.70			7.70	17.55	2.45			2.45	
Spring Creek	1884.90*	100	405.00	729.63	732.88	10.17	0.61		10.17	20.46	3.82	0.09		3.78	
Spring Creek	1834.33*	1	24.00	728.13	729.29	3.63			3.63	11.90	0.73			0.73	112 5th Street
Spring Creek	1834.33*	2	54.00	728.13	729.53	5.52			5.52	13.95	1.57			1.57	* Garage El. 73
Spring Creek	1834.33*	10	185.00	728.13	730.36	7.91			7.91	18.45	2.65			2.65	
Spring Creek	1834.33*	100	405.00	728.13	731.18	10.16	1.12	0.72	10.13	22.74	3.84	0.23	0.17	3.58	* Residence El. 74
Spring Creek	1758.70*	1	24.00	726.63	727.75	3.37			3.37	13.57	0.64			0.64	
Spring Creek	1758.70*	2	54.00	726.63	728.07	4.56			4.56	16.04	1.05			1.05	
Spring Creek	1758.70*	10	185.00	726.63	729.04	5.66		1.19	4.41	60.50	1.31		0.29	0.66	
Spring Creek	1758.70*	100	405.00	726.63	730.75	3.91	1.06	1.63	2.61	70.78	0.48	0.12	0.30	0.35	
Spring Creek	1695.60*	1	24.00	725.12	726.10	3.82			3.82	14.51	0.88			0.88	
Spring Creek	1695.60*	2	54.00	725.12	726.42	4.77			4.77	16.62	1.18			1.18	
Spring Creek	1695.60*	10	185.00	725.12	727.76	4.51	0.83	1.00	3.86	44.61	0.77	0.11	0.19	0.48	
Spring Creek	1695.60*	100	405.00	725.12	730.74	2.62	0.92	1.06	1.77	71.15	0.19	0.07	0.11	0.13	
Spring Creek	1632.5	1	39.00	723.62	724.87	3.12			3.12	17.97	0.50			0.50	
Spring Creek	1632.5	2	95.00	723.62	725.37	4.20		0.45	4.20	22.98	0.81		0.07	0.80	
Spring Creek	1632.5	10	342.00	723.62	726.29	7.68	1.82	1.74	7.39	28.39	2.18	0.46	0.54	1.85	
Spring Creek	1632.5	100	768.00	723.62	730.52	4.24	1.46	1.27	2.97	73.41	0.45	0.17	0.17	0.25	
Spring Creek	1509	1	39.00	722.24	723.17	3.41			3.41	17.73	0.61			0.61	
Spring Creek	1509	2	95.00	722.24	723.71	3.84			3.84	30.14	0.72			0.72	
Spring Creek	1509	10	342.00	722.24	725.43	3.74	1.65	0.69	3.13	55.06	0.47	0.25	0.09	0.36	
Spring Creek	1509	100	768.00	722.24	730.61	1.76	0.76	0.48	1.08	151.00	0.07	0.04	0.02	0.04	
Spring Creek	1455.5	1	39.00	720.68	721.91	4.59			4.59	13.27	1.12			1.12	
Spring Creek	1455.5	2	95.00	720.68	722.46	5.48			5.48	18.93	1.41			1.41	
Spring Creek	1455.5	10	342.00	720.68	725.18	4.42	0.83	1.54	3.84	35.22	0.59	0.09	0.28	0.40	
Spring Creek	1455.5	100	768.00	720.68	730.58	2.32	0.84	0.68	1.24	146.90	0.12	0.05	0.04	0.06	
Spring Creek	1389	1	39.00	719.94	721.42	1.17			1.17	30.20	0.06			0.06	404 Broadway
Spring Creek	1389	2	95.00	719.94	722.10	1.76	0.07	0.06	1.76	31.26	0.12			0.12	* Garage El. 725.4
Spring Creek	1389	10	342.00	719.94	725.29	2.15	0.43	0.66	1.97	41.88	0.13	0.02	0.05	0.10	
Spring Creek	1389	100	768.00	719.94	730.58	1.85	0.61	0.42	1.21	129.26	0.07	0.03	0.02	0.04	
Spring Creek	1319	1	39.00	719.82	721.26	2.11			2.11	17.72	0.20			0.20	
Spring Creek	1319	2	95.00	719.82	721.82	3.30			3.30	18.75	0.44			0.44	
Spring Creek	1319	10	342.00	719.82	725.08	3.69	0.63	0.48	3.63	21.28	0.38	0.04	0.03	0.32	
Spring Creek	1319	100	768.00	719.82	730.39	3.67	1.52	0.61	3.33	52.84	0.30	0.11	0.04	0.21	
Spring Creek	1282.2		Culvert												
Spring Creek	1243.2	1	39.00	719.14	719.71	6.92			6.92	12.28	3.58			3.58	
Spring Creek	1243.2	2	95.00	719.14	720.69	4.91			4.91	15.90	1.31			1.31	
Spring Creek	1243.2	10	342.00	719.14	722.72	6.14	3.30	1.76	5.89	23.82	1.50	0.69	0.35	1.29	
Spring Creek	1243.2	100	768.00	719.14	724.72	7.99	5.34	3.26	7.36	31.80	2.16	1.38	0.87	1.81	
Spring Creek	1206	1	39.00	717.25	718.62	5.29			5.29	8.41	1.71			1.71	
Spring Creek	1206	2	95.00	717.25	719.36	6.60			6.60	10.56	2.32			2.32	
Spring Creek	1206	10	342.00	717.25	721.19	8.86			8.86	15.89	3.49			3.49	
Spring Creek	1206	100	768.00	717.25	723.05	10.50			10.50	21.32	4.39			4.39	
Spring Creek	1177	1	39.00	716.11	717.83	4.13			4.13	9.12	0.99			0.99	
Spring Creek	1177	2	95.00	716.11	718.68	5.15			5.15	11.96	1.36			1.36	
Spring Creek	1177	10	342.00	716.11	720.71	6.90			6.90	18.74	2.05			2.05	
Spring Creek	1177	100	768.00	716.11	723.01	7.55			7.55	26.40	2.18			2.18	

HEC-RAS Plan: 1800s River: Spring Creek Reach: Spring Creek (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Vel Chnl	Vel Left	Vel Right	Vel Total	Top Width	Shear Chan	Shear LOB	Shear ROB	Shear Total
			(cfs)	(ft)	(ft)	(ft/s)	(ft/s)	(ft/s)	(ft/s)	(ft)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)
Spring Creek	1149	1	39.00	715.72	717.41	3.98			3.98	8.94	0.90			0.90
Spring Creek	1149	2	95.00	715.72	718.26	5.13			5.13	11.59	1.34			1.34
Spring Creek	1149	10	342.00	715.72	720.20	7.31			7.31	17.66	2.30			2.30
Spring Creek	1149	100	768.00	715.72	722.73	7.56			7.56	25.58	2.17			2.17
Spring Creek	1131	1	39.00	715.61	717.05	4.38			4.38	9.05	1.13			1.13
Spring Creek	1131	2	95.00	715.61	717.64	6.40			6.40	10.85	2.18			2.18
Spring Creek	1131	10	342.00	715.61	719.42	8.78			8.78	16.22	3.43			3.43
Spring Creek	1131	100	768.00	715.61	722.60	7.25			7.25	25.86	1.98			1.98
Spring Creek	1120	1	39.00	715.11	716.38	4.82			4.82	11.14	1.53			1.53
Spring Creek	1120	2	95.00	715.11	716.98	6.21			6.21	13.08	2.19			2.19
Spring Creek	1120	10	342.00	715.11	718.28	10.08			10.08	15.55	4.76			4.76
Spring Creek	1120	100	768.00	715.11	722.57	6.32			6.32	26.89	1.49			1.49
Spring Creek	1110	1	39.00	713.68	714.26	10.78			10.78	9.67	9.30			9.30
Spring Creek	1110	2	95.00	713.68	714.66	12.23			12.23	10.90	9.74			9.74
Spring Creek	1110	10	342.00	713.68	718.33	5.45			5.45	18.63	1.21			1.21
Spring Creek	1110	100	768.00	713.68	722.76	4.48			4.48	31.38	0.70			0.70
Spring Creek	1086	1	40.00	713.00	714.56	5.55			5.55	7.55	1.85			1.85
Spring Creek	1086	2	97.00	713.00	715.37	6.76			6.76	10.08	2.42			2.42
Spring Creek	1086	10	351.00	713.00	717.29	8.88			8.88	16.08	3.50			3.50
Spring Creek	1086	100	792.00	713.00	722.70	4.62			4.62	32.71	0.74			0.74
Spring Creek	1038	1	40.00	712.14	713.82	3.06			3.06	10.49	0.51			0.51
Spring Creek	1038	2	97.00	712.14	714.65	4.27			4.27	12.83	0.89			0.89
Spring Creek	1038	10	351.00	712.14	716.73	6.33			6.33	18.67	1.67			1.67
Spring Creek	1038	100	792.00	712.14	722.69	3.66			3.66	35.36	0.44			0.44
Spring Creek	990.8	1	40.00	711.97	712.92	4.97			4.97	10.50	1.57			1.57
Spring Creek	990.8	2	97.00	711.97	713.55	6.41			6.41	11.74	2.23			2.23
Spring Creek	990.8	10	351.00	711.97	716.16	6.59			6.59	17.90	1.82			1.82
Spring Creek	990.8	100	792.00	711.97	722.64	3.60	0.85	0.56	3.54	34.60	0.41	0.06	0.04	0.36
Spring Creek	945		Culvert											
Spring Creek	911.5	1	40.00	711.50	712.79	2.61			2.61	15.48	0.40			0.40
Spring Creek	911.5	2	97.00	711.50	713.56	3.50			3.50	16.64	0.61			0.61
Spring Creek	911.5	10	351.00	711.50	715.28	6.00			6.00	19.25	1.50			1.50
Spring Creek	911.5	100	792.00	711.50	718.46	6.22			6.22	24.06	1.38			1.38
Spring Creek	877	1	40.00	711.07	712.28	3.69			3.69	12.11	0.82			0.82
Spring Creek	877	2	97.00	711.07	713.01	4.65			4.65	15.45	1.14			1.14
Spring Creek	877	10	351.00	711.07	714.87	6.15			6.15	23.33	1.64			1.64
Spring Creek	877	100	792.00	711.07	718.36	4.83			4.83	38.07	0.84			0.84
Spring Creek	842.6	1	40.00	710.61	711.85	3.40			3.40	12.01	0.68			0.68
Spring Creek	842.6	2	97.00	710.61	712.55	4.62			4.62	14.39	1.10			1.10
Spring Creek	842.6	10	351.00	710.61	714.20	7.10			7.10	19.98	2.20			2.20
Spring Creek	842.6	100	792.00	710.61	718.20	5.06			5.06	33.88	0.91			0.91
Spring Creek	795	1	40.00	709.80	710.84	4.87			4.87	11.08	1.52			1.52
Spring Creek	795	2	97.00	709.80	711.46	6.18			6.18	13.17	2.10			2.10
Spring Creek	795	10	351.00	709.80	713.24	7.88			7.88	19.20	2.77			2.77
Spring Creek	795	100	792.00	709.80	718.15	4.42			4.42	35.76	0.68			0.68
Spring Creek	753.9	1	40.00	709.09	710.38	2.21			2.21	18.18	0.28			0.28
Spring Creek	753.9	2	97.00	709.09	711.33	2.59			2.59	22.37	0.33			0.33
Spring Creek	753.9	10	351.00	709.09	713.52	3.61			3.61	32.14	0.53			0.53
Spring Creek	753.9	100	792.00	709.09	718.22	2.96			2.96	52.41	0.26			0.26
Spring Creek	731.9		Culvert											
Spring Creek	684.9	1	40.00	708.10	708.86	6.03			6.03	12.70	2.64			2.64
Spring Creek	684.9	2	97.00	708.10	709.31	7.43			7.43	15.47	3.43			3.43
Spring Creek	684.9	10	351.00	708.10	710.93	8.12	1.28	1.30	8.04	22.50	3.02	0.29	0.37	2.77
Spring Creek	684.9	100	792.00	708.10	712.27	10.91	3.28	2.86	10.17	28.58	4.63	1.17	1.20	3.63
Spring Creek	613	1	40.00	705.55	706.47	4.19			4.19	18.49	1.25			1.25
Spring Creek	613	2	97.00	705.55	706.91	5.33			5.33	20.45	1.71			1.71
Spring Creek	613	10	351.00	705.55	707.67	10.13	0.72	1.60	10.04	23.42	5.09	0.23	0.76	4.80
Spring Creek	613	100	792.00	705.55	708.78	13.20	2.51	3.22	12.49	27.78	7.25	1.43	2.07	6.03
Spring Creek	585	1	40.00	704.61	705.44	3.72			3.72	18.78	0.96			0.96
Spring Creek	585	2	97.00	704.61	705.97	4.55			4.55	20.82	1.19			1.19
Spring Creek	585	10	351.00	704.61	707.30	6.85	1.00	1.24	6.73	25.86	2.09	0.28	0.38	1.87
Spring Creek	585	100	792.00	704.61	707.82	12.42	2.34	2.66	11.94	27.89	6.38	1.24	1.50	5.44
Spring Creek	545	1	40.00	703.45	704.96	2.62			2.62	18.87	0.42			0.42
Spring Creek	545	2	97.00	703.45	705.58	3.36			3.36	25.12	0.62			0.62
Spring Creek	545	10	351.00	703.45	707.26	4.45	1.36	1.66	4.24	38.30	0.82	0.16	0.22	0.67
Spring Creek	545	100	792.00	703.45	709.03	5.50	2.28	2.29	4.75	56.71	1.06	0.33	0.33	0.70
Spring Creek	533		Bridge											
Spring Creek	521	1	40.00	703.22	704.30	4.57			4.57	13.23	1.38			1.38
Spring Creek	521	2	97.00	703.22	704.86	5.64	0.65		5.64	17.20	1.82	0.08		1.79
Spring Creek	521	10	351.00	703.22	706.23	8.07	3.32	2.74	7.47	26.20	2.83	0.87	0.65	2.16

HEC-RAS Plan: 1800s River: Spring Creek Reach: Spring Creek (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Vel Chnl	Vel Left	Vel Right	Vel Total	Top Width	Shear Chan	Shear LOB	Shear ROB	Shear Total
			(cfs)	(ft)	(ft)	(ft/s)	(ft/s)	(ft/s)	(ft/s)	(ft)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)
Spring Creek	521	100	792.00	703.22	707.81	9.64	4.14	4.16	7.99	40.52	3.40	1.12	1.13	2.11
Spring Creek	423	1	40.00	699.94	701.28	2.84			2.84	14.25	0.47			0.47
Spring Creek	423	2	97.00	699.94	701.94	3.98			3.98	16.92	0.82			0.82
Spring Creek	423	10	351.00	699.94	702.49	10.21			10.21	19.23	5.02			5.02
Spring Creek	423	100	792.00	699.94	703.77	13.17	1.45	2.28	12.73	24.72	7.02	0.75	1.48	5.83
Spring Creek	297	1	40.00	699.41	700.24	2.52			2.52	21.73	0.41			0.41
Spring Creek	297	2	97.00	699.41	700.76	3.48			3.48	25.19	0.68			0.68
Spring Creek	297	10	351.00	699.41	702.07	5.34			5.34	32.43	1.30			1.30
Spring Creek	297	100	792.00	699.41	703.44	6.98	0.79	0.89	6.88	39.62	1.91	0.21	0.26	1.73
Spring Creek	232.6	1	40.00	698.67	699.30	3.25			3.25	22.86	0.75			0.75
Spring Creek	232.6	2	97.00	698.67	699.69	4.48			4.48	24.63	1.21			1.21
Spring Creek	232.6	10	351.00	698.67	700.76	6.95			6.95	29.44	2.33			2.33
Spring Creek	232.6	100	792.00	698.67	701.88	9.29	1.36	0.91	9.16	34.48	3.57	0.59	0.32	3.26

Spring Creek Current Conditions HEC-RAS Model Results

HEC-RAS Plan: Existing River: Spring Creek Reach: Spring Creek

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Vel Chnl	Vel Left	Vel Right	Vel Total	Top Width	Shear Chan	Shear LOB	Shear ROB	Shear Total	
			(cfs)	(ft)	(ft)	(ft/s)	(ft/s)	(ft/s)	(ft/s)	(ft)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	
Spring Creek	2567.9	1	113.00	745.20	746.86	6.16			6.16	16.42	1.68			1.68	
Spring Creek	2567.9	2	160.00	745.20	747.15	6.82		0.34	6.82	18.81	1.95		0.05	1.87	
Spring Creek	2567.9	10	369.00	745.20	748.01	9.03		1.95	8.20	31.75	2.97		0.69	2.14	
Spring Creek	2567.9	100	917.00	745.20	749.33	11.95		4.25	9.81	39.72	4.52		2.22	3.52	
Spring Creek	2137.7	1	113.00	734.49	737.49	2.78	0.71	0.54	2.56	26.87	0.27	0.08	0.06	0.21	
Spring Creek	2137.7	2	160.00	734.49	737.92	3.20	0.91	0.76	2.83	29.41	0.34	0.12	0.09	0.26	
Spring Creek	2137.7	10	369.00	734.49	740.06	3.64	1.17	1.12	2.81	41.01	0.36	0.15	0.14	0.24	
Spring Creek	2137.7	100	917.00	734.49	747.61	2.62	0.91	0.89	1.58	78.76	0.14	0.07	0.06	0.08	
Spring Creek	2120.5	1	113.00	734.67	736.85	6.28		0.40	6.28	15.28	1.71		0.06	1.69	
Spring Creek	2120.5	2	160.00	734.67	737.19	6.91	0.35	1.05	6.86	16.91	1.93	0.05	0.26	1.79	
Spring Creek	2120.5	10	369.00	734.67	739.82	5.18	1.54	1.48	4.17	31.30	0.77	0.29	0.27	0.52	
Spring Creek	2120.5	100	917.00	734.67	747.57	3.23	1.08	0.95	1.85	78.23	0.21	0.09	0.08	0.11	
Spring Creek	2087.7		Culvert												
Spring Creek	2011.1	1	113.00	732.64	734.33	11.12			11.12	11.38	5.91			5.91	
Spring Creek	2011.1	2	160.00	732.64	734.62	11.69			11.69	12.64	6.13			6.13	
Spring Creek	2011.1	10	369.00	732.64	735.43	14.67			14.67	15.81	8.52			8.52	
Spring Creek	2011.1	100	917.00	732.64	738.41	11.32	3.17	2.04	10.84	24.29	3.71	0.77	0.66	3.01	
Spring Creek	1948.00*	1	113.00	731.14	733.32	6.30			6.30	14.92	1.72			1.72	
Spring Creek	1948.00*	2	160.00	731.14	733.66	6.85			6.85	16.45	1.92			1.92	
Spring Creek	1948.00*	10	369.00	731.14	734.76	8.53	0.63		8.53	19.78	2.59	0.08		2.56	
Spring Creek	1948.00*	100	917.00	731.14	735.97	13.54	3.31	2.14	13.19	23.46	5.66	1.01	0.83	4.84	
Spring Creek	1884.90*	1	113.00	729.63	731.66	6.45			6.45	15.93	1.84			1.84	
Spring Creek	1884.90*	2	160.00	729.63	731.92	7.32			7.32	17.09	2.26			2.26	
Spring Creek	1884.90*	10	369.00	729.63	732.78	9.75			9.75	20.22	3.56			3.56	
Spring Creek	1884.90*	100	917.00	729.63	734.03	13.80	3.36	2.59	11.53	49.41	6.03	1.11	1.14	3.21	
Spring Creek	1834.33*	1	113.00	728.13	729.97	6.89			6.89	16.63	2.18			2.18	112 5th Street
Spring Creek	1834.33*	2	160.00	728.13	730.24	7.58			7.58	17.89	2.49			2.49	* Garage El. 73
Spring Creek	1834.33*	10	369.00	728.13	731.08	9.79	0.77	0.37	9.79	21.78	3.64	0.13	0.06	3.52	* Residence El. 74
Spring Creek	1834.33*	100	917.00	728.13	732.36	13.75	3.57	2.93	12.49	33.84	5.98	1.28	1.36	4.25	
Spring Creek	1758.70*	1	113.00	726.63	728.51	5.79		0.38	5.76	22.09	1.51		0.06	1.28	
Spring Creek	1758.70*	2	160.00	726.63	728.92	5.55		0.98	4.60	53.75	1.28		0.22	0.64	
Spring Creek	1758.70*	10	369.00	726.63	729.39	8.10	1.06	2.40	5.77	64.07	2.50	0.20	0.93	1.47	
Spring Creek	1758.70*	100	917.00	726.63	733.23	4.10	1.35	1.92	2.65	83.55	0.43	0.14	0.32	0.33	
Spring Creek	1695.60*	1	113.00	725.12	726.84	6.00			6.00	19.57	1.66			1.66	
Spring Creek	1695.60*	2	160.00	725.12	726.97	7.41			7.41	20.55	2.47			2.47	
Spring Creek	1695.60*	10	369.00	725.12	727.94	7.97	1.69	1.93	6.55	48.86	2.33	0.40	0.64	1.42	
Spring Creek	1695.60*	100	917.00	725.12	733.21	3.35	1.13	1.46	2.12	92.69	0.27	0.09	0.18	0.17	
Spring Creek	1632.5	1	128.00	723.62	725.53	4.84	0.41	0.72	4.82	24.15	1.02	0.05	0.14	0.98	
Spring Creek	1632.5	2	179.00	723.62	725.82	5.39	0.95	1.02	5.31	25.67	1.18	0.16	0.23	1.08	
Spring Creek	1632.5	10	403.00	723.62	726.39	8.59	2.09	1.99	8.21	29.07	2.67	0.59	0.69	2.24	
Spring Creek	1632.5	100	978.00	723.62	733.19	3.15	1.33	0.96	2.08	84.42	0.22	0.11	0.08	0.14	
Spring Creek	1509	1	128.00	722.24	723.90	4.16	0.64	0.17	4.00	44.56	0.79	0.09		0.57	
Spring Creek	1509	2	179.00	722.24	724.03	5.08	1.14	0.39	4.72	46.59	1.13	0.22	0.06	0.82	
Spring Creek	1509	10	403.00	722.24	726.11	3.32	1.42	0.70	2.63	80.70	0.34	0.12	0.08	0.20	
Spring Creek	1509	100	978.00	722.24	733.23	1.43	0.66	0.42	0.86	171.87	0.04	0.02	0.02	0.03	
Spring Creek	1455.5	1	128.00	720.68	722.67	5.94	0.68	0.35	5.92	21.16	1.58	0.11	0.05	1.51	
Spring Creek	1455.5	2	179.00	720.68	723.20	5.51	1.12	1.20	5.31	24.53	1.19	0.20	0.28	1.02	
Spring Creek	1455.5	10	403.00	720.68	725.90	4.19	0.76	1.37	3.25	62.56	0.49	0.07	0.22	0.23	
Spring Creek	1455.5	100	978.00	720.68	733.22	1.80	0.72	0.60	0.94	174.48	0.07	0.03	0.03	0.03	
Spring Creek	1389	1	128.00	719.94	722.79	1.69	0.24	0.28	1.67	34.80	0.10	0.01	0.02	0.09	404 Broadway
Spring Creek	1389	2	179.00	719.94	723.40	1.87	0.33	0.42	1.80	37.41	0.11	0.02	0.03	0.10	* Garage El. 725.4
Spring Creek	1389	10	403.00	719.94	725.99	2.20	0.33	0.70	1.96	52.89	0.13	0.01	0.05	0.08	
Spring Creek	1389	100	978.00	719.94	733.21	1.61	0.56	0.41	0.93	178.70	0.05	0.02	0.01	0.02	
Spring Creek	1319	1	128.00	719.82	722.61	2.92	0.23		2.91	19.53	0.30	0.01		0.30	
Spring Creek	1319	2	179.00	719.82	723.21	3.21	0.39		3.21	19.89	0.34	0.02		0.33	
Spring Creek	1319	10	403.00	719.82	725.78	3.77	0.71	0.52	3.68	21.91	0.38	0.04	0.04	0.31	
Spring Creek	1319	100	978.00	719.82	733.02	3.66	0.88	0.77	2.98	91.43	0.27	0.04	0.05	0.12	
Spring Creek	1282.2		Culvert												
Spring Creek	1243.2	1	128.00	719.14	720.27	9.83			9.83	14.26	5.76			5.76	
Spring Creek	1243.2	2	179.00	719.14	721.52	5.33	1.50	0.77	5.28	19.17	1.33	0.23	0.11	1.23	
Spring Creek	1243.2	10	403.00	719.14	723.07	6.44	3.69	1.98	6.12	25.14	1.59	0.81	0.42	1.34	
Spring Creek	1243.2	100	978.00	719.14	725.93	8.02	5.66	3.81	7.35	36.34	2.02	1.40	1.02	1.75	
Spring Creek	1206	1	128.00	717.25	719.69	7.08			7.08	11.53	2.56			2.56	
Spring Creek	1206	2	179.00	717.25	720.13	7.66			7.66	12.80	2.85			2.85	
Spring Creek	1206	10	403.00	717.25	722.80	5.92			5.92	20.60	1.42			1.42	
Spring Creek	1206	100	978.00	717.25	725.75	6.89			6.89	29.68	1.70			1.70	
Spring Creek	1177	1	128.00	716.11	719.06	5.52			5.52	13.22	1.50			1.50	
Spring Creek	1177	2	179.00	716.11	719.54	5.97			5.97	14.84	1.67			1.67	
Spring Creek	1177	10	403.00	716.11	722.86	4.13			4.13	25.89	0.65			0.65	
Spring Creek	1177	100	978.00	716.11	725.85	5.16			5.16	35.65	0.91			0.91	

HEC-RAS Plan: Existing River: Spring Creek Reach: Spring Creek (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Vel Chnl	Vel Left	Vel Right	Vel Total	Top Width	Shear Chan	Shear LOB	Shear ROB	Shear Total
			(cfs)	(ft)	(ft)	(ft/s)	(ft/s)	(ft/s)	(ft/s)	(ft)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)
Spring Creek	1149	1	128.00	715.72	718.63	5.57			5.57	12.74	1.51			1.51
Spring Creek	1149	2	179.00	715.72	719.09	6.13			6.13	14.19	1.76			1.76
Spring Creek	1149	10	403.00	715.72	722.80	3.90			3.90	25.79	0.57			0.57
Spring Creek	1149	100	978.00	715.72	725.78	5.04			5.04	35.12	0.86			0.86
Spring Creek	1131	1	128.00	715.61	717.94	7.03			7.03	11.75	2.52			2.52
Spring Creek	1131	2	179.00	715.61	718.37	7.60			7.60	13.05	2.81			2.81
Spring Creek	1131	10	403.00	715.61	722.78	3.65			3.65	26.39	0.50			0.50
Spring Creek	1131	100	978.00	715.61	725.75	4.83			4.83	35.62	0.79			0.79
Spring Creek	1120	1	128.00	715.11	717.47	5.82			5.82	13.97	1.75			1.75
Spring Creek	1120	2	179.00	715.11	718.31	5.20			5.20	15.60	1.27			1.27
Spring Creek	1120	10	403.00	715.11	722.77	3.17			3.17	27.62	0.37			0.37
Spring Creek	1120	100	978.00	715.11	725.75	4.33			4.33	38.56	0.64			0.64
Spring Creek	1110	1	128.00	713.68	717.75	2.45			2.45	17.47	0.25			0.25
Spring Creek	1110	2	179.00	713.68	718.50	2.72			2.72	18.96	0.30			0.30
Spring Creek	1110	10	403.00	713.68	722.81	2.33			2.33	31.54	0.19			0.19
Spring Creek	1110	100	978.00	713.68	725.81	3.57	0.94	0.75	3.48	40.77	0.39	0.06	0.06	0.33
Spring Creek	1086	1	239.00	713.00	716.60	8.22			8.22	13.93	3.16			3.16
Spring Creek	1086	2	335.00	713.00	717.21	8.78			8.78	15.81	3.44			3.44
Spring Creek	1086	10	771.00	713.00	722.51	4.66			4.66	32.13	0.76			0.76
Spring Creek	1086	100	1904.00	713.00	725.04	7.42			7.42	39.89	1.79			1.79
Spring Creek	1038	1	239.00	712.14	715.93	5.78			5.78	16.41	1.47			1.47
Spring Creek	1038	2	335.00	712.14	716.60	6.30			6.30	18.32	1.67			1.67
Spring Creek	1038	10	771.00	712.14	722.51	3.67			3.67	34.84	0.45			0.45
Spring Creek	1038	100	1904.00	712.14	725.03	6.21			6.21	41.80	1.20			1.20
Spring Creek	990.8	1	239.00	711.97	714.81	7.60			7.60	14.41	2.67			2.67
Spring Creek	990.8	2	335.00	711.97	715.99	6.67			6.67	17.45	1.89			1.89
Spring Creek	990.8	10	771.00	711.97	722.45	3.60	0.82	0.52	3.55	34.12	0.41	0.05	0.03	0.36
Spring Creek	990.8	100	1904.00	711.97	724.84	6.54	2.01	1.62	6.23	40.41	1.23	0.25	0.23	0.97
Spring Creek	945		Culvert											
Spring Creek	911.5	1	239.00	711.50	714.70	5.01			5.01	18.37	1.10			1.10
Spring Creek	911.5	2	335.00	711.50	715.22	5.85			5.85	19.15	1.44			1.44
Spring Creek	911.5	10	771.00	711.50	718.29	6.25			6.25	23.81	1.40			1.40
Spring Creek	911.5	100	1904.00	711.50	722.04	8.35	1.92	1.78	7.92	45.70	2.18	0.28	0.33	1.57
Spring Creek	877	1	239.00	711.07	714.18	5.70			5.70	20.41	1.49			1.49
Spring Creek	877	2	335.00	711.07	714.81	6.02			6.02	23.07	1.58			1.58
Spring Creek	877	10	771.00	711.07	718.19	4.89			4.89	37.35	0.87			0.87
Spring Creek	877	100	1904.00	711.07	722.01	5.78			5.78	52.35	1.07			1.07
Spring Creek	842.6	1	239.00	710.61	713.53	6.50			6.50	17.70	1.95			1.95
Spring Creek	842.6	2	335.00	710.61	714.28	6.56			6.56	20.26	1.87			1.87
Spring Creek	842.6	10	771.00	710.61	718.03	5.12			5.12	33.22	0.94			0.94
Spring Creek	842.6	100	1904.00	710.61	721.79	6.30			6.30	47.27	1.27			1.27
Spring Creek	795	1	239.00	709.80	712.92	6.22			6.22	18.08	1.77			1.77
Spring Creek	795	2	335.00	709.80	713.95	5.68			5.68	21.59	1.36			1.36
Spring Creek	795	10	771.00	709.80	717.96	4.46			4.46	35.15	0.70			0.70
Spring Creek	795	100	1904.00	709.80	721.73	5.79			5.79	47.88	1.05			1.05
Spring Creek	753.9	1	239.00	709.09	713.06	2.88			2.88	30.10	0.35			0.35
Spring Creek	753.9	2	335.00	709.09	714.08	2.89			2.89	34.57	0.33			0.33
Spring Creek	753.9	10	771.00	709.09	718.04	2.95			2.95	51.72	0.27			0.27
Spring Creek	753.9	100	1904.00	709.09	721.78	4.64	0.43	0.38	4.00	380.59	0.65	0.02	0.02	0.12
Spring Creek	731.9		Culvert											
Spring Creek	684.9	1	239.00	708.10	710.10	8.99			8.99	18.78	4.23			4.23
Spring Creek	684.9	2	335.00	708.10	710.52	9.59		0.69	9.59	20.69	4.53		0.17	4.46
Spring Creek	684.9	10	771.00	708.10	712.20	10.85	3.22	2.81	10.15	28.27	4.61	1.15	1.18	3.64
Spring Creek	684.9	100	1904.00	708.10	715.12	12.95	5.13	4.77	10.78	41.06	5.34	2.05	2.32	3.82
Spring Creek	613	1	239.00	705.55	707.58	7.33	0.32	1.05	7.29	23.05	2.73		0.35	2.60
Spring Creek	613	2	335.00	705.55	707.80	8.93	0.88	1.56	8.82	23.93	3.86	0.28	0.67	3.57
Spring Creek	613	10	771.00	705.55	708.74	13.09	2.46	3.17	12.41	27.60	7.16	1.38	2.02	5.99
Spring Creek	613	100	1904.00	705.55	710.97	16.64	3.86	4.86	14.19	37.56	9.45	2.50	3.53	6.70
Spring Creek	585	1	239.00	704.61	706.35	8.11			8.11	22.25	3.47			3.47
Spring Creek	585	2	335.00	704.61	707.23	6.76	0.93	1.18	6.65	25.60	2.05	0.25	0.36	1.86
Spring Creek	585	10	771.00	704.61	707.79	12.26	2.28	2.61	11.80	27.76	6.24	1.19	1.45	5.34
Spring Creek	585	100	1904.00	704.61	709.73	17.01	4.32	4.53	15.06	35.28	10.05	3.04	3.28	7.51
Spring Creek	545	1	239.00	703.45	706.62	4.07	0.81	1.23	4.00	33.58	0.76	0.08	0.15	0.67
Spring Creek	545	2	335.00	703.45	707.18	4.40	1.30	1.61	4.21	37.67	0.81	0.15	0.21	0.67
Spring Creek	545	10	771.00	703.45	708.96	5.46	2.25	2.26	4.73	56.05	1.05	0.32	0.33	0.70
Spring Creek	545	100	1904.00	703.45	711.29	7.45	3.52	3.39	5.81	83.69	1.70	0.64	0.61	0.99
Spring Creek	533		Bridge											
Spring Creek	521	1	239.00	703.22	705.71	7.26	2.64	1.84	6.97	22.81	2.49	0.64	0.37	2.05
Spring Creek	521	2	335.00	703.22	706.17	7.93	3.23	2.61	7.38	25.85	2.76	0.84	0.61	2.12
Spring Creek	521	10	771.00	703.22	707.75	9.58	4.06	4.12	7.96	40.16	3.38	1.09	1.12	2.10

HEC-RAS Plan: Existing River: Spring Creek Reach: Spring Creek (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Vel Chnl	Vel Left	Vel Right	Vel Total	Top Width	Shear Chan	Shear LOB	Shear ROB	Shear Total
			(cfs)	(ft)	(ft)	(ft/s)	(ft/s)	(ft/s)	(ft/s)	(ft)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)
Spring Creek	521	100	1904.00	703.22	710.31	11.01	5.73	3.66	7.43	95.49	3.76	1.66	0.85	1.58
Spring Creek	423	1	239.00	699.94	702.88	5.70	0.14	0.50	5.69	20.78	1.48		0.11	1.42
Spring Creek	423	2	335.00	699.94	703.29	6.67	0.62	0.93	6.58	22.28	1.91	0.16	0.29	1.73
Spring Creek	423	10	771.00	699.94	703.71	13.10	1.50	2.22	12.71	24.11	7.00	0.79	1.43	5.94
Spring Creek	423	100	1904.00	699.94	706.24	15.59	4.18	3.64	11.89	43.99	8.06	3.27	2.66	5.32
Spring Creek	297	1	239.00	699.41	701.58	4.74			4.74	29.80	1.09			1.09
Spring Creek	297	2	335.00	699.41	702.00	5.27			5.27	32.08	1.28			1.28
Spring Creek	297	10	771.00	699.41	703.39	6.90	0.76	0.85	6.82	39.38	1.88	0.20	0.24	1.71
Spring Creek	297	100	1904.00	699.41	705.81	9.37	1.80	1.68	8.30	60.27	2.86	0.70	0.63	1.94
Spring Creek	232.6	1	239.00	698.67	700.36	6.12			6.12	27.62	1.93			1.93
Spring Creek	232.6	2	335.00	698.67	700.71	6.85			6.85	29.20	2.28			2.28
Spring Creek	232.6	10	771.00	698.67	701.83	9.23	1.32	0.86	9.12	34.23	3.55	0.56	0.29	3.26
Spring Creek	232.6	100	1904.00	698.67	704.05	12.17	2.23	2.41	10.97	48.67	5.05	1.16	1.30	3.64

Spring Creek 2050 Conditions HEC-RAS Model Results

HEC-RAS Plan: 2050 River: Spring Creek Reach: Spring Creek

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Vel Chnl	Vel Left	Vel Right	Vel Total	Top Width	Shear Chan	Shear LOB	Shear ROB	Shear Total	
			(cfs)	(ft)	(ft)	(ft/s)	(ft/s)	(ft/s)	(ft/s)	(ft)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	
Spring Creek	2567.9	1	288.00	745.20	747.72	8.34		1.60	7.89	26.76	2.64		0.51	2.06	
Spring Creek	2567.9	2	379.00	745.20	748.04	9.11		1.99	8.23	32.32	3.01		0.71	2.15	
Spring Creek	2567.9	10	714.00	745.20	748.92	11.02		3.62	9.22	38.23	4.01		1.75	3.05	
Spring Creek	2567.9	100	1528.00	745.20	750.32	14.29	1.65	5.61	11.34	43.78	5.92	0.54	3.37	4.56	
Spring Creek	2137.7	1	288.00	734.49	739.16	3.66	1.17	1.06	2.98	35.71	0.39	0.16	0.14	0.28	
Spring Creek	2137.7	2	379.00	734.49	740.18	3.63	1.17	1.12	2.79	41.58	0.36	0.15	0.14	0.24	
Spring Creek	2137.7	10	714.00	734.49	744.60	2.99	1.04	1.00	1.94	63.41	0.20	0.09	0.09	0.12	
Spring Creek	2137.7	100	1528.00	734.49	748.82	3.88	1.25	1.32	2.23	90.77	0.29	0.12	0.13	0.16	
Spring Creek	2120.5	1	288.00	734.67	738.81	5.61	1.45	1.51	4.85	26.71	0.99	0.30	0.32	0.71	
Spring Creek	2120.5	2	379.00	734.67	739.94	5.13	1.54	1.48	4.10	31.86	0.75	0.29	0.27	0.51	
Spring Creek	2120.5	10	714.00	734.67	744.51	3.83	1.30	1.13	2.47	55.47	0.33	0.15	0.12	0.19	
Spring Creek	2120.5	100	1528.00	734.67	748.69	5.02	1.54	0.88	2.52	139.91	0.49	0.19	0.08	0.17	
Spring Creek	2087.7		Culvert												
Spring Creek	2011.1	1	288.00	732.64	735.16	13.64			13.64	14.77	7.64			7.64	
Spring Creek	2011.1	2	379.00	732.64	735.46	14.78			14.78	15.93	8.63			8.63	
Spring Creek	2011.1	10	714.00	732.64	736.01	20.41			20.41	17.53	15.38			15.38	
Spring Creek	2011.1	100	1528.00	732.64	740.13	12.95	4.32	3.05	11.62	30.12	4.34	1.17	1.15	3.11	
Spring Creek	1948.00*	1	288.00	731.14	734.39	7.95			7.95	18.77	2.35			2.35	
Spring Creek	1948.00*	2	379.00	731.14	734.81	8.54	0.77		8.54	19.90	2.58	0.10		2.54	
Spring Creek	1948.00*	10	714.00	731.14	735.94	10.65	2.58	1.66	10.38	23.35	3.51	0.62	0.50	3.01	
Spring Creek	1948.00*	100	1528.00	731.14	737.31	15.88	4.81	3.32	14.65	28.93	6.97	1.72	1.55	5.20	
Spring Creek	1884.90*	1	288.00	729.63	732.49	8.98			8.98	19.15	3.13			3.13	
Spring Creek	1884.90*	2	379.00	729.63	732.81	9.88	0.25		9.88	20.28	3.64			3.63	
Spring Creek	1884.90*	10	714.00	729.63	733.63	12.72	2.63	1.88	11.60	39.09	5.36	0.77	0.71	3.19	
Spring Creek	1884.90*	100	1528.00	729.63	734.69	17.67	4.96	4.73	13.52	52.83	9.27	2.10	2.98	5.41	
Spring Creek	1834.33*	1	288.00	728.13	730.80	9.03			9.03	20.40	3.23			3.23	112 5th Street
Spring Creek	1834.33*	2	379.00	728.13	731.10	9.91	0.87	0.47	9.90	22.03	3.71	0.16	0.09	3.55	* Garage El. 73
Spring Creek	1834.33*	10	714.00	728.13	731.92	12.68	2.86	2.30	12.00	29.72	5.36	0.93	0.96	4.09	* Residence El. 74
Spring Creek	1834.33*	100	1528.00	728.13	733.45	16.05	4.85	4.15	13.19	44.54	7.37	1.97	2.24	4.66	
Spring Creek	1758.70*	1	288.00	726.63	729.27	7.07	0.67	1.91	5.15	63.44	1.95	0.10	0.63	1.10	
Spring Creek	1758.70*	2	379.00	726.63	729.41	8.21	1.10	2.46	5.83	64.14	2.56	0.21	0.97	1.51	
Spring Creek	1758.70*	10	714.00	726.63	731.12	5.92	1.70	2.56	3.93	72.70	1.06	0.28	0.70	0.78	
Spring Creek	1758.70*	100	1528.00	726.63	734.87	4.94	1.60	2.34	3.10	96.04	0.58	0.18	0.44	0.41	
Spring Creek	1695.60*	1	288.00	725.12	727.63	7.74	1.21	1.55	6.85	41.67	2.34	0.25	0.48	1.49	
Spring Creek	1695.60*	2	379.00	725.12	727.98	8.01	1.73	1.98	6.54	49.38	2.34	0.41	0.67	1.43	
Spring Creek	1695.60*	10	714.00	725.12	731.08	4.22	1.36	1.73	2.81	75.40	0.47	0.15	0.29	0.32	
Spring Creek	1695.60*	100	1528.00	725.12	734.86	4.21	1.37	1.87	2.54	111.91	0.39	0.13	0.27	0.24	
Spring Creek	1632.5	1	339.00	723.62	726.26	7.73	1.82	1.74	7.44	28.20	2.21	0.47	0.55	1.89	
Spring Creek	1632.5	2	439.00	723.62	726.60	8.42	2.17	2.03	7.94	30.52	2.49	0.60	0.68	2.02	
Spring Creek	1632.5	10	797.00	723.62	731.01	3.91	1.43	1.18	2.69	75.48	0.37	0.15	0.14	0.22	
Spring Creek	1632.5	100	1655.00	723.62	734.80	4.20	1.82	1.29	2.70	92.59	0.37	0.19	0.15	0.23	
Spring Creek	1509	1	339.00	722.24	725.40	3.76	1.66	0.69	3.15	54.89	0.47	0.25	0.09	0.37	
Spring Creek	1509	2	439.00	722.24	726.46	3.32	1.03	0.74	2.37	98.67	0.33	0.10	0.08	0.17	
Spring Creek	1509	10	797.00	722.24	731.09	1.67	0.73	0.46	1.02	155.10	0.06	0.03	0.02	0.04	
Spring Creek	1509	100	1655.00	722.24	734.88	1.95	0.91	0.58	1.16	184.82	0.08	0.04	0.03	0.05	
Spring Creek	1455.5	1	339.00	720.68	725.15	4.43	0.84	1.54	3.86	34.68	0.59	0.09	0.28	0.41	
Spring Creek	1455.5	2	439.00	720.68	726.29	4.03	0.90	1.22	2.92	69.79	0.44	0.09	0.17	0.20	
Spring Creek	1455.5	10	797.00	720.68	731.07	2.18	0.80	0.66	1.15	153.44	0.10	0.04	0.04	0.05	
Spring Creek	1455.5	100	1655.00	720.68	734.86	2.38	0.99	0.83	1.23	187.16	0.11	0.05	0.05	0.06	
Spring Creek	1389	1	339.00	719.94	725.26	2.15	0.42	0.66	1.97	41.78	0.13	0.02	0.05	0.10	404 Broadway
Spring Creek	1389	2	439.00	719.94	726.37	2.23	0.36	0.72	1.93	60.57	0.13	0.02	0.05	0.08	* Garage El. 725.4
Spring Creek	1389	10	797.00	719.94	731.06	1.80	0.58	0.41	1.13	143.84	0.07	0.02	0.02	0.03	
Spring Creek	1389	100	1655.00	719.94	734.85	2.18	0.79	0.61	1.21	199.38	0.09	0.04	0.03	0.04	
Spring Creek	1319	1	339.00	719.82	725.05	3.68	0.63	0.48	3.62	21.25	0.38	0.04	0.03	0.32	
Spring Creek	1319	2	439.00	719.82	726.15	3.84	0.58	0.54	3.71	25.74	0.39	0.03	0.04	0.28	
Spring Creek	1319	10	797.00	719.82	730.88	3.61	1.55	0.64	3.27	58.00	0.28	0.11	0.04	0.20	
Spring Creek	1319	100	1655.00	719.82	734.44	5.39	0.71	1.22	3.34	281.11	0.57	0.04	0.11	0.08	
Spring Creek	1282.2		Culvert												
Spring Creek	1243.2	1	339.00	719.14	722.70	6.13	3.28	1.75	5.88	23.74	1.50	0.69	0.35	1.29	
Spring Creek	1243.2	2	439.00	719.14	723.41	6.35	3.81	2.06	5.98	26.34	1.50	0.82	0.43	1.25	
Spring Creek	1243.2	10	797.00	719.14	725.76	6.75	4.73	3.15	6.18	35.63	1.44	0.99	0.71	1.25	
Spring Creek	1243.2	100	1655.00	719.14	727.39	10.79	7.91	5.65	9.87	50.60	3.42	2.51	2.00	3.03	
Spring Creek	1206	1	339.00	717.25	721.17	8.83			8.83	15.85	3.47			3.47	
Spring Creek	1206	2	439.00	717.25	723.17	5.78			5.78	21.70	1.32			1.32	
Spring Creek	1206	10	797.00	717.25	725.63	5.76			5.76	29.27	1.19			1.19	
Spring Creek	1206	100	1655.00	717.25	727.19	8.84	1.28	0.98	8.81	34.28	2.61	0.17	0.15	2.45	
Spring Creek	1177	1	339.00	716.11	721.02	6.09			6.09	19.79	1.56			1.56	
Spring Creek	1177	2	439.00	716.11	723.23	4.08			4.08	27.13	0.63			0.63	
Spring Creek	1177	10	797.00	716.11	725.69	4.33			4.33	35.14	0.65			0.65	
Spring Creek	1177	100	1655.00	716.11	727.39	6.66	0.52		6.63	48.76	1.46	0.04		1.25	

HEC-RAS Plan: 2050 River: Spring Creek Reach: Spring Creek (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Vel Chnl	Vel Left	Vel Right	Vel Total	Top Width	Shear Chan	Shear LOB	Shear ROB	Shear Total
			(cfs)	(ft)	(ft)	(ft/s)	(ft/s)	(ft/s)	(ft/s)	(ft)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)
Spring Creek	1149	1	339.00	715.72	720.80	5.85			5.85	19.53	1.42			1.42
Spring Creek	1149	2	439.00	715.72	723.18	3.87			3.87	26.98	0.56			0.56
Spring Creek	1149	10	797.00	715.72	725.64	4.21			4.21	34.70	0.61			0.61
Spring Creek	1149	100	1655.00	715.72	727.27	6.62	0.71		6.57	48.33	1.42	0.06		1.17
Spring Creek	1131	1	339.00	715.61	720.69	5.46			5.46	20.08	1.23			1.23
Spring Creek	1131	2	439.00	715.61	723.15	3.64			3.64	27.57	0.49			0.49
Spring Creek	1131	10	797.00	715.61	725.63	4.02			4.02	35.22	0.55			0.55
Spring Creek	1131	100	1655.00	715.61	727.23	6.44	0.87	1.04	6.40	40.24	1.31	0.08	0.13	1.20
Spring Creek	1120	1	339.00	715.11	720.68	4.42			4.42	20.49	0.78			0.78
Spring Creek	1120	2	439.00	715.11	723.15	3.19			3.19	29.00	0.37			0.37
Spring Creek	1120	10	797.00	715.11	725.62	3.61			3.61	38.08	0.44			0.44
Spring Creek	1120	100	1655.00	715.11	727.25	5.76	0.10	0.25	5.76	44.22	1.08		0.02	1.06
Spring Creek	1110	1	339.00	713.68	720.79	2.93			2.93	25.36	0.32			0.32
Spring Creek	1110	2	439.00	713.68	723.19	2.37			2.37	32.69	0.19			0.19
Spring Creek	1110	10	797.00	713.68	725.66	2.96	0.76	0.61	2.89	40.32	0.27	0.04	0.04	0.23
Spring Creek	1110	100	1655.00	713.68	727.32	5.04	1.04	1.29	4.75	54.61	0.73	0.08	0.15	0.50
Spring Creek	1086	1	624.00	713.00	720.21	6.26			6.26	25.07	1.49			1.49
Spring Creek	1086	2	816.00	713.00	722.91	4.58			4.58	33.34	0.72			0.72
Spring Creek	1086	10	1511.00	713.00	725.23	5.72			5.72	40.45	1.06			1.06
Spring Creek	1086	100	3187.00	713.00	724.97	12.56			12.56	39.66	5.13			5.13
Spring Creek	1038	1	624.00	712.14	720.21	4.54			4.54	28.43	0.74			0.74
Spring Creek	1038	2	816.00	712.14	722.90	3.64			3.64	35.95	0.44			0.44
Spring Creek	1038	10	1511.00	712.14	725.22	4.80			4.80	42.30	0.72			0.72
Spring Creek	1038	100	3187.00	712.14	724.92	10.54			10.54	41.52	3.48			3.48
Spring Creek	990.8	1	624.00	711.97	720.10	4.34			4.34	28.08	0.67			0.67
Spring Creek	990.8	2	816.00	711.97	722.85	3.60	0.89	0.61	3.54	35.14	0.40	0.06	0.04	0.35
Spring Creek	990.8	10	1511.00	711.97	725.11	5.03	1.57	1.28	4.77	41.33	0.72	0.15	0.14	0.56
Spring Creek	990.8	100	3187.00	711.97	722.47	14.83	3.41	2.16	14.64	34.17	6.97	0.90	0.60	6.18
Spring Creek	945		Culvert											
Spring Creek	911.5	1	624.00	711.50	717.12	6.47			6.47	22.03	1.57			1.57
Spring Creek	911.5	2	816.00	711.50	718.65	6.18			6.18	24.35	1.35			1.35
Spring Creek	911.5	10	1511.00	711.50	721.88	6.78	1.49	1.37	6.48	44.32	1.45	0.17	0.20	1.06
Spring Creek	911.5	100	3187.00	711.50	722.68	12.75	3.42	3.05	11.73	52.56	4.95	0.81	0.89	3.31
Spring Creek	877	1	624.00	711.07	716.94	5.46			5.46	32.05	1.15			1.15
Spring Creek	877	2	816.00	711.07	718.56	4.75			4.75	38.90	0.81			0.81
Spring Creek	877	10	1511.00	711.07	721.86	4.70			4.70	51.78	0.71			0.71
Spring Creek	877	100	3187.00	711.07	722.64	8.78			8.78	54.74	2.42			2.42
Spring Creek	842.6	1	624.00	710.61	716.71	5.67			5.67	28.44	1.21			1.21
Spring Creek	842.6	2	816.00	710.61	718.41	4.99			4.99	34.62	0.88			0.88
Spring Creek	842.6	10	1511.00	710.61	721.73	5.05			5.05	47.04	0.82			0.82
Spring Creek	842.6	100	3187.00	710.61	721.76	10.60			10.60	47.14	3.61			3.61
Spring Creek	795	1	624.00	709.80	716.61	4.87			4.87	30.57	0.87			0.87
Spring Creek	795	2	816.00	709.80	718.35	4.37			4.37	36.46	0.66			0.66
Spring Creek	795	10	1511.00	709.80	721.69	4.62			4.62	47.76	0.67			0.67
Spring Creek	795	100	3187.00	709.80	721.49	10.02			10.02	47.10	3.17			3.17
Spring Creek	753.9	1	624.00	709.09	716.71	2.94			2.94	46.27	0.28			0.28
Spring Creek	753.9	2	816.00	709.09	718.42	2.96			2.96	53.17	0.26			0.26
Spring Creek	753.9	10	1511.00	709.09	721.72	3.74	0.28	0.27	3.33	376.92	0.42	0.01	0.01	0.07
Spring Creek	753.9	100	3187.00	709.09	721.64	8.02	0.39	0.44	7.53	371.88	1.96	0.03	0.04	0.33
Spring Creek	731.9		Culvert											
Spring Creek	684.9	1	624.00	708.10	711.75	10.26	2.71	2.43	9.82	26.14	4.33	0.90	0.97	3.57
Spring Creek	684.9	2	816.00	708.10	712.36	10.93	3.34	2.91	10.14	28.98	4.61	1.20	1.23	3.59
Spring Creek	684.9	10	1511.00	708.10	714.36	12.08	4.47	3.93	10.25	38.22	4.85	1.68	1.74	3.40
Spring Creek	684.9	100	3187.00	708.10	717.09	15.32	7.38	6.72	12.57	46.41	6.83	3.51	3.85	5.29
Spring Creek	613	1	624.00	705.55	708.40	12.19	2.04	2.76	11.75	26.26	6.51	1.06	1.66	5.62
Spring Creek	613	2	816.00	705.55	708.83	13.33	2.57	3.28	12.59	27.98	7.35	1.48	2.13	6.09
Spring Creek	613	10	1511.00	705.55	710.24	15.83	3.62	4.46	13.99	33.75	9.02	2.34	3.20	6.75
Spring Creek	613	100	3187.00	705.55	712.93	18.81	4.86	5.87	14.70	46.77	10.79	3.36	4.46	7.06
Spring Creek	585	1	624.00	704.61	707.50	11.14	1.84	2.18	10.86	26.63	5.35	0.85	1.10	4.71
Spring Creek	585	2	816.00	704.61	707.88	12.54	2.41	2.72	12.03	28.11	6.46	1.29	1.55	5.48
Spring Creek	585	10	1511.00	704.61	709.07	15.93	3.81	4.06	14.51	32.72	9.28	2.57	2.83	7.20
Spring Creek	585	100	3187.00	704.61	711.56	19.53	4.79	5.60	15.70	47.85	11.86	3.41	4.31	7.55
Spring Creek	545	1	624.00	703.45	708.49	5.10	2.01	2.03	4.53	51.08	0.95	0.28	0.28	0.66
Spring Creek	545	2	816.00	703.45	709.10	5.54	2.31	2.32	4.77	57.51	1.07	0.34	0.34	0.71
Spring Creek	545	10	1511.00	703.45	710.84	6.54	3.02	2.96	5.19	78.05	1.34	0.49	0.48	0.80
Spring Creek	545	100	3187.00	703.45	709.22	20.94	8.79	8.84	17.92	58.73	15.17	4.83	4.87	9.93
Spring Creek	533		Bridge											
Spring Creek	521	1	624.00	703.22	707.23	9.36	3.90	3.83	8.07	34.92	3.38	1.06	1.04	2.23
Spring Creek	521	2	816.00	703.22	707.87	9.73	4.22	4.22	8.04	40.87	3.45	1.16	1.15	2.14
Spring Creek	521	10	1511.00	703.22	709.74	10.46	5.41	3.03	7.39	84.80	3.51	1.53	0.64	1.45

HEC-RAS Plan: 2050 River: Spring Creek Reach: Spring Creek (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Vel Chnl	Vel Left	Vel Right	Vel Total	Top Width	Shear Chan	Shear LOB	Shear ROB	Shear Total
			(cfs)	(ft)	(ft)	(ft/s)	(ft/s)	(ft/s)	(ft/s)	(ft)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)
Spring Creek	521	100	3187.00	703.22	712.79	9.41	4.89	4.38	6.00	125.16	2.46	1.08	0.92	1.18
Spring Creek	423	1	624.00	699.94	703.32	12.27	1.18	1.75	12.09	22.39	6.44	0.56	1.01	5.79
Spring Creek	423	2	816.00	699.94	703.85	13.22	0.98	2.34	12.70	28.62	7.02	0.41	1.53	5.11
Spring Creek	423	10	1511.00	699.94	705.32	15.51	3.52	3.42	12.48	41.29	8.48	2.69	2.56	5.46
Spring Creek	423	100	3187.00	699.94	709.49	14.88	3.90	2.49	8.94	96.40	6.28	2.47	1.26	2.71
Spring Creek	297	1	624.00	699.41	702.98	6.41	0.47	0.52	6.39	37.36	1.70	0.10	0.12	1.61
Spring Creek	297	2	816.00	699.41	703.51	7.03	0.83	0.94	6.92	39.96	1.93	0.23	0.27	1.73
Spring Creek	297	10	1511.00	699.41	705.03	8.77	1.55	1.46	8.14	51.28	2.64	0.57	0.52	1.98
Spring Creek	297	100	3187.00	699.41	705.40	17.07	3.15	2.92	15.52	55.52	9.76	2.26	2.02	6.94
Spring Creek	232.6	1	624.00	698.67	701.50	8.54	0.98	0.39	8.50	32.75	3.18	0.36	0.09	3.03
Spring Creek	232.6	2	816.00	698.67	701.92	9.43	1.41	0.96	9.30	34.65	3.67	0.62	0.35	3.33
Spring Creek	232.6	10	1511.00	698.67	703.39	11.27	2.11	2.04	10.51	42.64	4.54	1.08	1.02	3.57
Spring Creek	232.6	100	3187.00	698.67	706.83	11.33	2.18	1.69	6.50	202.03	3.76	0.93	0.63	1.21

LOWER MINNESOTA RIVER
WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting
Wednesday, January 19, 2022

Agenda Item
Item 7. L. – Permits & Projects Reviews

Prepared By
Linda Loomis, Administrator

Summary

i. I 35W Trail Realignment (LMRWD No. 2021-035)

This project will re-align the connection of the trail along the Minnesota River to the new I 35W Bridge pedestrian access. The Board may remember the City invited the LMRWD to contribute to these improvements. The city has prepared plans for the trail and applied for a LMRWD permit. Young Environmental Consulting Group has reviewed the documents provided on behalf of the LMRWD and recommends conditional approval of the project subject to receipt of the NPDES permit, contact information for the contractor and the name and contact information of the person(s) responsible for erosion and sediment control.

Attachments
I-35W Trail Realignment (LMRWD No. 2021-025) Technical Memorandum dated January 12, 2022

Recommended Action
Motion to conditionally approve a permit for I-35W Trail Realignment (LMRWD No. 2021-025) subject to receipt of the NPDES permit, contact information for the contractor and the name and contact information of the person(s) responsible for erosion and sediment control

ii. Cliff Road Ramps (LMRWD No. 2021-057)

The City of Burnsville proposes to make improvement to the I 35W off ramps at Cliff Road. The City has provide site plans for the project and applied for a LMRWD permit. Young Environmental Consulting Group has reviewed the documentation on behalf of the LMRWD and recommends conditional approval of the project subject to receipt of the NPDES permit, contact information for the contractor and the name and contact information of the person(s) responsible for erosion and sediment control.

Attachments
Cliff Road Ramps (LMRWD No. 2021-057) Technical Memorandum dated January 12, 2022

Recommended Action
Motion to conditionally approve a permit for Cliff Road Ramps (LMRWD No. 2021-057) subject to receipt of the NPDES permit, contact information for the contractor and the name and contact information of the person(s) responsible for erosion and sediment control

iii. MAC 2022 Perimeter Gate Security Improvements (LMRWD No. 2021-058)

The Metropolitan Airport Commission (MAC) has applied for a LMRWD permit to make perimeter gate security improvements. The Minneapolis/St. Paul Airport is located in an unincorporated area of the LMRWD and therefore requires a LMRWD permit. MAC has its own MS4 (Municipal Separate Storm Sewer System) permit. Young Environmental Consulting Group has reviewed the documentation on behalf of the LMRWD and recommends conditional approval of the project subject to receipt of the NPDES permit, contact information for the contractor and the name and contact information of the person(s) responsible for erosion and sediment control.

Attachments

MAC 2022 Perimeter Gate Security Improvements (LMRWD No. 2021-058) Technical Memorandum dated January 12, 2022

Recommended Action

Motion to conditionally approve a permit for MAC 2022 Perimeter Gate Security Improvements (LMRWD No. 2021-058) subject to receipt of the NPDES permit, contact information for the contractor and the name and contact information of the person(s) responsible for erosion and sediment control

Young Environmental Consulting Group, LLC

Technical Memorandum

To: Linda Loomis, Administrator
Lower Minnesota River Watershed District

From: Kaci Fisher, Environmental Scientist
Katy Thompson, PE, CFM

Date: January 12, 2022

Re: I-35W Trail Realignment (LMRWD No. 2021-035)

The City of Burnsville (the applicant) has applied for an individual project permit from the Lower Minnesota River Watershed District (LMRWD) to realign a trail segment adjacent to the east side of the I-35W highway within the City of Burnsville (City), as shown in Figure 1. The applicant's engineer, SEH, has provided site plans for the I-35W Trail Realignment Project (Project) along with the permit application.

The Project consists of constructing a new 10-foot-wide pedestrian trail immediately adjacent to the northbound I-35W exit ramp to Black Dog Road. The proposed trail will be part of a larger regional trail system from Burnsville to Lilydale. The current trail is prone to flooding and frequent closures due to high water elevations in the Minnesota River. To reduce trail closures, the proposed trail will be moved higher and within the existing Minnesota Department of Transportation right-of-way, and the existing trail and fill will be removed, with the area restored with topsoil and native seeding. The Project will disturb approximately 1.73 acres, create 0.39 acres of new impervious surfaces, and remove 0.40 acres of existing impervious surfaces. The Project is located within the Black Dog Lake Fen High Value Resource Area (HVRA) and the Minnesota River 100-year floodplain, but it is not within the Steep Slopes Overlay District.

Because the City does not have its LMRWD municipal LGU permit, this Project requires an LMRWD individual permit and, as such, is subject to an LMRWD permitting review.

Summary

Project Name:	I-35W Trail Realignment

Purpose:	Recreational trail
Project Size:	1.73 acres disturbed; 0.40 acres existing impervious; 0.39 acres proposed impervious; net decrease of 0.01 acres new impervious
Location:	Adjacent to east side of I-35W south of Lower Minnesota River, Burnsville, MN 55337
LMRWD Rules:	Rule B—Erosion and Sediment Control Rule C—Floodplain and Drainage Alteration
Recommended Board Action:	Conditional approval

Discussion

The District received the following documents for review:

- LMRWD online permit application; received December 15, 2021
- 100-year High Water Level map by SEH; dated December 15, 2021; received December 15, 2021
- No-Rise Certification by SEH; dated November 24, 2021; received December 15, 2021
- Preliminary construction plans by SEH; dated December 13, 2021; received December 15, 2021

The application was deemed complete on December 22, 2021, and the documents received provide the minimum information necessary for permit review.

Rule B—Erosion and Sediment Control

The District regulates land-disturbing activities that affect 5,000 square feet or more within the HVRA and one acre or more in the general district under Rule B. The proposed Project would disturb approximately 1.73 acres within the LMRWD boundary and approximately 7,000 square feet within the HVRA. The applicant has provided an erosion and sediment control plan and a Stormwater Pollution Prevention Plan and generally complies with Rule B. However, before a final permit can be issued, a copy of the NPDES permit and contact information for the contractor and person(s) responsible for all erosion and sediment control will need to be submitted to the District.

Rule C—Floodplain and Drainage Alteration

The Project is located in the Minnesota River floodway and floodplain, which is shown on the Dakota County Flood Insurance Rate Map Panel 27037C0070E (effective

December 2, 2011). The 100-year flood elevation is 715.1 feet through the Project area. The existing trail and fill will be removed, creating some floodplain storage, and the proposed trail will be located at a higher elevation to minimize the frequency of inundation. The proposed trail has crown elevations around 702 feet; although still below the 100-year flood elevation, it is higher than the existing trail that has a low point at 696 feet. Because the trail is being moved to a higher elevation and the old trail will be removed, the Project may benefit the river hydraulics, and the overall effect on the Minnesota River appears to be a slight reduction in water surface elevations for the 100-year event. The applicant provided a no-rise certification and HEC-RAS results, which demonstrates that the Project complies with Rule C.

Recommendations

Staff recommends conditional approval of the Project, conditioned on the receipt of the following:

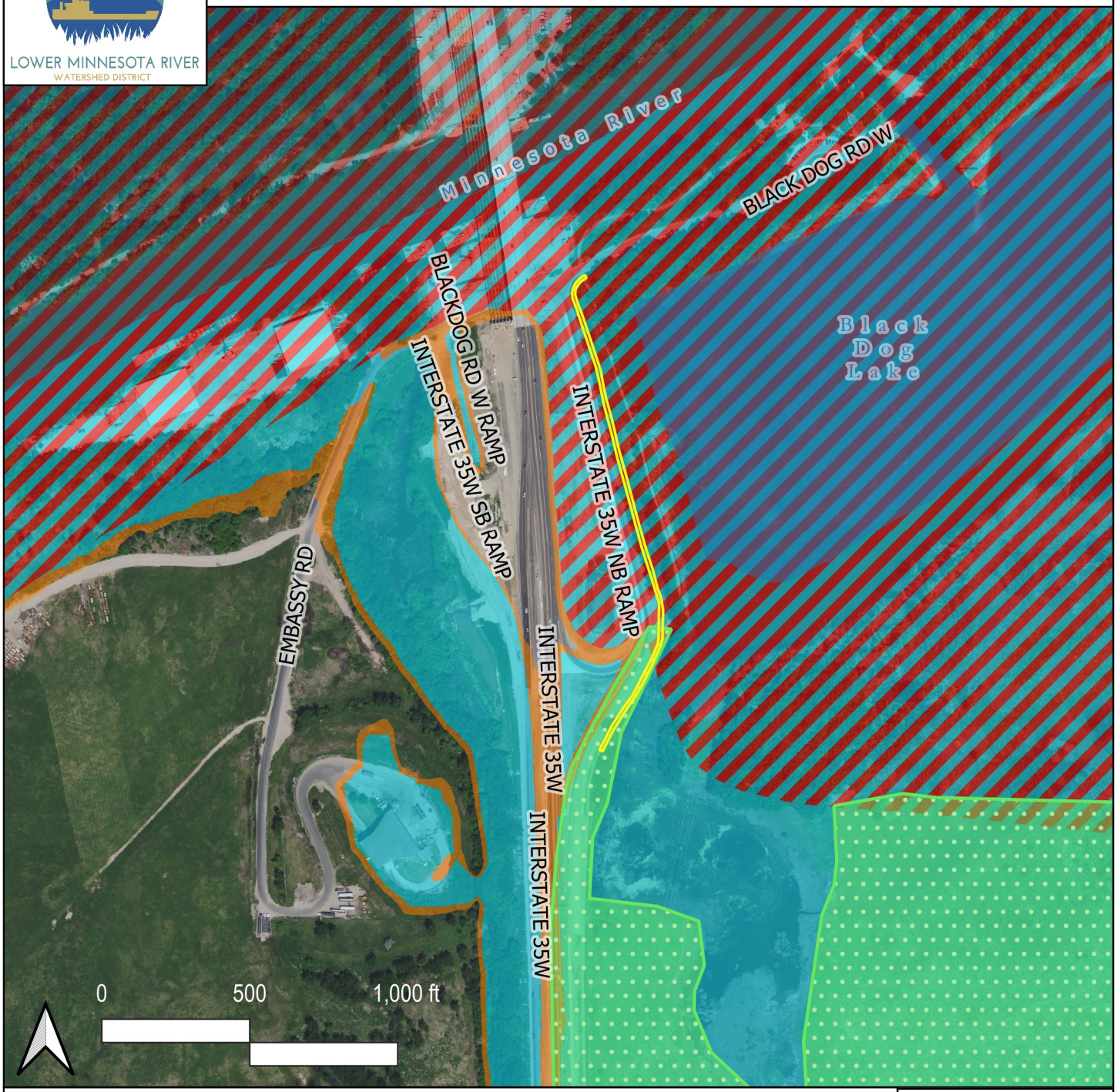
- Copy of the NPDES permit
- Contact information for the contractor
- Contact information for the person(s) responsible for erosion and sediment control

Attachments

- Figure 1 – I-35W Trail Project Location Map

LOWER MINNESOTA RIVER
WATERSHED DISTRICT

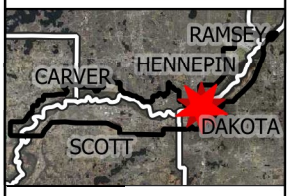
Figure 1: I35W Trail Project Location



LEGEND

- Project Location
- I35W Trail
- Public Waterways
- Public Waterbodies
- High Value Resource Area
- Calcareous Fens
- Trout Streams
- Steep Slopes Overlay District
- 100-yr Floodplain
- Floodway
- 500-yr Floodplain
- County Boundaries
- LMRWD Boundary

LMRWD Watershed Location Map



Young Environmental Consulting Group, LLC

Young Environmental Consulting Group, LLC

Technical Memorandum

To: Linda Loomis, Administrator
Lower Minnesota River Watershed District

From: Kaci Fisher, Environmental Scientist
Katy Thompson, PE, CFM

Date: January 12, 2022

Re: Cliff Road at I-35 Ramp Realignment (LMRWD No. 2021-057)

The City of Burnsville (the Applicant) has applied for an individual project permit from the Lower Minnesota River Watershed District (LMRWD) for a linear project in the City of Burnsville (City), as shown in Figure 1. The Applicant's engineer, Bolton & Menk, has provided site plans for the Cliff Road at I-35 Ramp Realignment project (Project) along with the LMRWD individual project permit application.

The Project consists of constructing a roundabout at the Cliff Road and I-35W off-ramp intersection, realigning Cliff Road, and reconstructing Dupont Avenue. The Project would disturb approximately seven acres, create 0.3 acres of new impervious surfaces, and reconstruct three acres of existing impervious area. The site is not located within the High Value Resource Area, the Steep Slopes Overlay District, or the Minnesota River floodplain. The Applicant proposes to commence construction on March 1, 2022.

Because the City does not have its LMRWD municipal LGU permit, the Project requires an LMRWD individual permit and thus is subject to an LMRWD permitting review.

Summary

Project Name:	Cliff Road at I-35 Ramp Realignment
Purpose:	Road construction and reconstruction
Project Size:	7 acres disturbed; 3 acres existing impervious; 0.3 acres proposed new impervious

Location:	I-35W and Cliff Road, Burnsville, MN 55377
LMRWD Rules:	Rule B—Erosion and Sediment Control
Recommended Board Action:	Conditional approval, see Recommendations

Discussion

The District received the following documents for review:

- LMRWD online permit application, received December 14, 2021
- Project map by Bolton & Menk, dated October 7, 2021, and received December 14, 2021
- Plan sheets by Bolton & Menk, dated October 7, 2021, and received December 14, 2021

The application was deemed complete on January 4, 2022, and the documents received provide the minimum information necessary for permit review.

Rule B—Erosion and Sediment Control

The District regulates land-disturbing activities that affect one or more acres under Rule B. The Project would disturb approximately seven acres within the LMRWD boundary. The Applicant has provided an erosion and sediment control plan and a Stormwater Pollution Prevention Plan and generally complies with Rule B. However, before the District can issue a final permit, the Applicant will need to submit to the District a copy of the NPDES permit and contact information for the contractor and person(s) responsible for all erosion and sediment control.

Recommendations

Staff recommends conditional approval of the Project, dependent on the receipt of the following:

- Copy of the NPDES permit
- Contact information for the contractor
- Contact information for the person(s) responsible for erosion and sediment control

Attachments

- Figure 1—Cliff Road at I-35 Ramp Realignment Project Location Map

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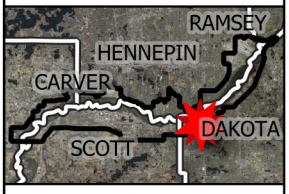
WATERSHED DISTRICT

Figure 1: Cliff Road at I-35 Ramp Realignment Project Location

LEGEND

- Project Location
- Cliff Road Ramp
- Ramp Realignment
- Public Waterways
- Public Waterbodies
- High Value Resource Area
- Calcareous Fens
- Trout Streams
- Steep Slopes Overlay District
- 100-yr Floodplain
- Floodway
- 500-yr Floodplain
- Parcel Boundaries
- County Boundaries
- LMRWD Boundary

LMRWD Watershed Location Map



Young Environmental Consulting Group, LLC

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Technical Memorandum

To: Linda Loomis, Administrator
Lower Minnesota River Watershed District

From: Kaci Fisher, Environmental Scientist
Katy Thompson, PE, CFM

Date: January 12, 2022

Re: 2022 Perimeter Gate Security Improvements (LMRWD No. 2021-058)

Metropolitan Airports Commission (MAC, the applicant) has applied for an individual project permit from the Lower Minnesota River Watershed District (LMRWD) for an improvement project within the Minneapolis–Saint Paul Airport, as shown in Figure 1. The applicant's engineer, TKDA, has provided site plans for the 2022 Perimeter Gate Security Improvements Project (Project) along with the permit application.

The proposed Project consists of constructing paved parking, a paved access roadway, utilities, a security gate building, and a stormwater basin. The Project would disturb approximately 4.89 acres and create 2.55 acres of new paved impervious surfaces while removing 2.68 acres of existing impervious and compacted surfaces. The Project is not located within the High Value Resource Area, Steep Slopes Overlay District, or 100-year floodplain.

Because it is located in an unincorporated area, this Project requires an LMRWD individual permit and, as such, is subject to an LMRWD permitting review.

Summary

Project Name:	2022 Perimeter Gate Security Improvements
Purpose:	Security gate building, parking, road, and utility improvements
Project Size:	4.89 acres disturbed; 2.68 acres existing impervious; 2.55 acres proposed impervious

Location:	Southwest quadrant of Minneapolis–Saint Paul Airport
LMRWD Rules:	Rule B—Erosion and Sediment Control Rule D—Stormwater Management
Recommended Board Action:	Conditional approval

Discussion

The District received the following documents for review:

- LMRWD individual project permit application; dated December 2, 2021; received December 15, 2021
- Memorandum by TKDA; dated December 3, 2021; received December 15, 2021
- Location map; received December 15, 2021
- Proposed and existing drainage areas by TKDA; dated November 1, 2021; received December 15, 2021
- Hydrologic soil group map; dated November 23, 2021; received December 15, 2021
- Geotechnical Exploration Services by Element Materials Technology St. Paul Inc.; dated August 23, 2021; received December 15, 2021
- HydroCAD; dated December 2, 2021; received December 15, 2021
- MIDS; dated December 2, 2021; received December 15, 2021
- Ninety percent design plans by TKDA; dated November 1, 2021; received December 15, 2021

The application was deemed complete on January 10, 2022, and the documents received provide the minimum information necessary for permit review.

Rule B—Erosion and Sediment Control

The District regulates land-disturbing activities that affect one acre or more under Rule B. The proposed project would disturb approximately 4.89 acres within the LMRWD boundary. The applicant has provided an erosion and sediment control plan and generally complies with Rule B. However, before a final permit can be issued, a copy of the NPDES permit (either stormwater construction or individual) and contact information for the contractor and person(s) responsible for all erosion and sediment control are needed.

Rule D—Stormwater Management

The District regulates land-disturbing activities that create new impervious areas greater

than one acre. The Project proposes 2.55 acres of new impervious surfaces. The existing site consists of a paved parking lot; a paved access roadway; and a contractor laydown area for construction staging, which consists of compacted gravel, bare soil, pavement, and vegetation. Most of the contractor laydown area and existing access road will be removed, as will a portion of the existing parking lot. A screening facility/security gate building and a new access road will be constructed, and the existing parking lot will be expanded to the west. A filtration basin is also proposed to treat the stormwater.

Section 4.4.1. of Rule D requires that applicants demonstrate no increase in proposed runoff rates. The applicant submitted a HydroCAD analysis demonstrating the proposed infiltration basin will provide rate control for the new impervious surfaces. Pretreatment for the infiltration basin will include a rock weeper at the storm sewer inlet, and the basin will also include an underdrain system to prevent water from ponding in case the soils become clogged. The infiltration basin has a one-foot ponded depth with an overflow structure and orifice plate for rate control. The existing and proposed rates are provided in Table 1 and meet the District's rate control requirements.

Table 1. Rate Control Summary

Design Event	Existing Rates (cfs)	Proposed Rates (cfs)	Change (cfs)
2-year/24-hour	10.3	7.2	3.1
10-year/24-hour	22.7	12.9	9.8
100-year/24-hour	46.0	24.7	21.3

Section 4.4.2. of Rule D requires stormwater runoff volume retention on-site to be equivalent to one inch of runoff from impervious surfaces. For this Project, the required volume retention is 9,276 cubic feet, and the applicant is proposing 12,200 cubic feet of volume retention. The Project meets the volume reduction requirement.

Section 4.4.3. of Rule D requires a no net increase from existing conditions in total phosphorus (TP) and total suspended solids (TSS) to receiving water bodies. The applicant provided MIDS calculations, which are summarized in Table 2. The Project meets the water quality requirements.

Table 2. Water Quality MIDS Summary

Parameter	Existing Load (lb/yr)	Proposed Load (lb/yr)	Change (lb/yr)
TP	10.3	5.8	4.5
TSS	1,869	1,056	813

The Project meets all of Rule D's requirements.

Recommendations

Staff recommends conditional approval of the Project, conditioned on the receipt of the following:

- A copy of the NPDES permit
- Contact information for the contractor
- Contact information for the person(s) responsible for erosion and sediment control

Attachments

- Figure 1—2022 Perimeter Gate Security Improvements Location Map

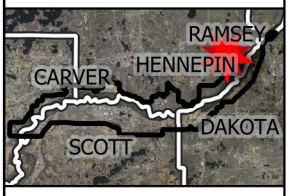
LOWER MINNESOTA RIVER
WATERSHED DISTRICT

Figure 1: 2022 Perimeter Gate Security Improvements Location

LEGEND

- Project Location
- Perimeter Gate
- Access Road
- Paved Parking
- Screening Facility
- Stormwater Basin
- Public Waterways
- Public Waterbodies
- High Value Resource Area
- Calcareous Fens
- Trout Streams
- Steep Slopes Overlay District
- Floodway
- 100-yr Floodplain
- 500-yr Floodplain
- Parcel Boundaries
- County Boundaries
- LMRWD Boundary

LMRWD Watershed Location Map



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