

## Memorandum

**To:** Randy Anhorn, Nine Mile Creek Watershed District  
**From:** Janna Kieffer  
**Subject:** Lake Cornelia Water Quality Improvement Project- Feasibility Study/Preliminary Engineering Scope of Work  
**Date:** ~~September 12, 2019~~ Revised October 8, 2019  
**c:** Keith Pilgrim, Barr Engineering Co.

The Nine Mile Creek Watershed District (NMCWD) recently completed a Use Attainability Analysis (UAA) for Lake Cornelia (updated from 2010) and Lake Edina (first version) to assess the water quality and prescribe management activities to improve lake water quality. The study concluded that the primary sources of phosphorus to Lake Cornelia during the summer months are stormwater runoff, internal loading from lake sediments, and mid-season die-off of invasive curly-leaf pondweed. An over-abundance of bottom-feeding fish (e.g., carp, goldfish, and bullhead) also contributes to poor water quality in Lake Cornelia. For Lake Edina, the primary sources of phosphorus are stormwater runoff and inflows from upstream Lake Cornelia.

As part of the UAA study, several potential projects were recommended to help improve lake water quality, including the following:

- Alum treatment of Lake Cornelia
- Stormwater treatment- specifically a spent lime stormwater treatment system in Rosland Park to remove additional phosphorus from stormwater flowing through the Swimming Pool pond prior to discharge into Lake Cornelia
- Curly-leaf pondweed management in Lake Cornelia & Lake Edina (as needed)
- Installation of a winter oxygen injection system in Lake Cornelia to minimize winter kill of predator fish and reduce recruitment of bottom-feeding fish
- Other fishery management strategies, including potential removal of goldfish and other bottom-feeding fish in Lake Cornelia and upstream hydraulically-connected waterbodies

One of the recommendations of the study, conducting an alum treatment of Lake Cornelia to minimize release of phosphorus from lake bottom sediments, is being completed by NMCWD in the fall of 2019. This proposed scope of work is to conduct a preliminary engineering study to evaluate the feasibility of the other recommended management activities. Work under this scope will include a report summarizing the feasibility analysis for each of the management practices, including evaluation of design options and quantification of cost-benefit (when feasible) to provide additional scientific information upon which the managers can make prudent decisions about proceeding to full project implementation. Work required for final design, permitting, preparation of bid documents and construction support services, will be covered under a future scope of work.

## Scope of Work

The following proposed scope of work is split into several tasks representing the various proposed management activities that were recommended in the UAA study and/or suggested by the NMCWD Board of Managers and other stakeholders, including 1) stormwater treatment BMP in Rosland Park, 2) other stormwater treatment/phosphorus reduction BMPs in the Lake Cornelia and/or Lake Edina watershed, 3) curly-leaf pondweed management, and 4) fishery management to reduce the negative impacts from goldfish and other bottom-feeding species. Results of the feasibility analyses will be summarized in a brief report, unless otherwise noted.

This proposed feasibility analysis and preliminary engineering study will include stormwater BMPs and other lake management practices that incorporate new and/or innovative methods. Therefore, it is essential that the Board of Managers, NMCWD staff, and interested stakeholders understand the potential effectiveness and the unknowns/risks related to each BMP. As part of the feasibility analysis, Barr will seek to identify the pros and cons of evaluated options, including highlighting the unknowns and risks of new and innovative practices. Because several of the projects being evaluated are located on city of Edina property it is critical to obtain city support of the design concept(s) before proceeding. Therefore, several meetings with City of Edina staff have been included as part of the scope of work.

### Task 1. Stormwater Treatment BMP in Rosland Park

The UAA study included a preliminary conceptual design of a treatment cell with spent lime or CC17 media to treat a portion of the flows from Swimming Pool Pond prior to discharge to Lake Cornelia. This conceptual design was recommended in the UAA due to the cost-effectiveness in reducing phosphorus loading to Cornelia and downstream Lake Edina. The preliminary engineering study will evaluate the feasibility of the spent lime/CC17 stormwater BMP, as well as other innovative BMPs (up to three) that could be installed within Rosland Park to increase phosphorus removal.

#### Task 1A. Conceptual Design Evaluation

##### Subtask 1A-1 Brainstorming high-level conceptual designs for stormwater BMPs within Rosland Park

This task will begin with compiling available GIS data for the Rosland Park area, including topography, soils, public utilities, and imagery, and preparing a working map. Barr will develop ~~up to four~~two (2) high-level conceptual stormwater BMP designs to be located within Rosland Park, including an underground spent lime/CC17 stormwater treatment system (as identified in the UAA study). Development of the conceptual designs will include a rough hand sketch for each BMP.

##### Subtask 1A-2. High-level conceptual design meeting with NMCWD and Edina staff

A meeting will be held with NMCWD and city of Edina staff to present the high-level conceptual designs developed in Task 1A-1. At the meeting, the high-level BMP designs will be presented and discussed. The desired outcome of this meeting will be to ~~narrow down the number of~~solicit feedback on the conceptual designs ~~to three (3) based on preliminary feedback~~ from City of Edina staff (from

Parks and Recreation and Engineering departments) and NMCWD staff; desired feedback includes use of specific areas within the park and operation and maintenance requirements of the conceptual BMPs, among other factors.

#### **Subtask 1A-3. Refinement of conceptual designs**

The conceptual designs for up to threetwo (32) stormwater BMPs will be further refined based on feedback from the meeting with NMCWD and city staff. This task will include further evaluation into high-level feasibility, refinement of hand sketches, estimates of size/footprint, development of planning-level ranges of costs, development of BMP performance estimates (ranges), description of maintenance requirements, and a summary of pros and cons for each conceptual design. The deliverable will be a brief summary presentation.

#### **Subtask 1A-4. 2nd conceptual design meeting with NMCWD and Edina staff**

A meeting will be held with NMCWD and city of Edina staff to share the refined conceptual designs and supporting information developed in Task 1A-3. The desired outcome of this meeting will be to receive feedback on the conceptual designs, including design preferences, prior to presenting the designs and supporting information to the NMCWD Board of Managers.

#### **Subtask 1A-5. Prepare summary memo and present to NMCWD Board of Managers**

A brief memo will be developed to summarize the information generated as part of Task 1A-3 and refined as follow-up to the 2nd meeting with NMCWD and Edina staff. The technical memo will be distributed to NMCWD staff and the Board of Managers. The information will be presented to the Board, with the desired outcome for the Board to select one of the conceptual designs for a more detailed feasibility analysis.

### **Task 1B. Feasibility Analysis/Preliminary Design**

Upon selection of a preferred conceptual BMP design, a more detailed feasibility analysis will be completed. We anticipate there will be design factors and potential site and permitting constraints that may affect performance, maintenance, longevity, and cost. Therefore, the feasibility analysis will include up to three (3) design alternatives for the selected conceptual design. The design alternatives may include design factors such as flow characteristics, type of filtration media used, and system size, among others.

#### **Subtask 1B-1. Site characterization**

Site characterization will include gathering information near the location of the proposed BMP. Barr staff will compile and review available public utility information, asbuilt plans for outlet control structures, and GIS topographic and soils information, field verify diameters of stormwater pipes (as needed), collect photographs of the site, collect tree data (as needed), and review available water quality monitoring data. Information collected during the site characterization will be considered in the preliminary design of stormwater BMP(s) for the site.

To minimize project expenditures at the feasibility stage of analysis, we assume soil borings will not be collected as part of this scope of work. However, depending on the selected BMP(s), and associated functionality and location, collection of soil borings may be advised as part of the feasibility analysis to better estimate BMP cost and effectiveness. If deemed necessary, the addition of soil borings to the project scope will be discussed with NMCWD staff prior to proceeding.

This scope of work assumes a wetland delineation will not be completed. If deemed necessary, the addition of conducting a wetland delineation to the project scope will be discussed with NMCWD staff prior to proceeding.

#### **Subtask 1B-2. Hydraulics Review and Analysis**

The hydraulics of the proposed stormwater BMP(s) will require careful consideration and design. We anticipate that the selected BMP design(s) will likely include diversion of flows from the Swimming Pool Pond for treatment to remove phosphorus prior to discharge to Lake Cornelia. Due to existing flood risk in areas upstream of Swimming Pool Pond, evaluation of the hydraulics will be especially important to avoid increasing flood risk in the area. Therefore, the applicable portion of the City of Edina's XP-SWMM hydrologic and hydraulic model will be reviewed and updated, as needed, to evaluate the stormwater BMP design alternatives (upon receiving permission from the City of Edina).

#### **Subtask 1B-3. Preliminary Design/Feasibility Analysis**

This task includes developing conceptual designs and associated schematics for the BMP alternatives. It is assumed that up to three schematics (i.e., one for each BMP alternatives) will be prepared. In addition, an engineer's opinion of probable cost will be developed for each design to aid in assessing the cost effectiveness of the various design alternatives. Permitting requirements will also be identified as part of this task.

#### **Subtask 1B-4. Pollutant Removal Effectiveness Estimates**

Pollutant removal effectiveness of the three design alternatives will be evaluated by refining the P8 model from the UAA study or using other well-suited modeling methods, depending on the selected conceptual BMP design. The pollutant removal effectiveness will be reported in annual pounds of phosphorus removed.

#### **Subtask 1B-5. Preliminary Design Stakeholder Meeting and Design Refinements**

A preliminary design meeting will be held with NMCWD and city of Edina staff and other key stakeholders identified during the preliminary engineering study. Barr staff will present results of the feasibility analysis for the three design alternatives. Barr staff will use comments from this meeting to refine the preliminary design of the stormwater BMPs.

### **Task 2. High-level evaluation of other stormwater treatment/phosphorus reduction BMPs in the Lake Cornelia and/or Lake Edina watershed**

Feedback from the NMCWD Board of Managers (Board) during discussion of the 2019 UAA study indicated a preference for additional evaluation of watershed management BMP options throughout the

Lake Cornelia and Lake Edina watersheds. The 2010 and 2019 UAA studies included evaluation of several potential BMPs in the Lake Cornelia watershed, including construction of a stormwater pond, watershed-wide infiltration, street sweeping, construction of an alum treatment facility, and iron-enhanced filtration. Task 2 includes summarizing previously-evaluated watershed BMPs and brainstorming additional watershed BMPs for further consideration by the NMCWD Board.

#### **Subtask 2A-1. Summarizing stormwater BMPs evaluated during 2010 and 2019 UAA studies**

The 2010 and 2019 UAA studies included evaluation of several potential BMPs in the Lake Cornelia watershed, including construction of a stormwater pond, watershed-wide infiltration, street sweeping, construction of an alum treatment facility and iron-enhanced filtration. These BMPs will be summarized as part of a presentation, including a high-level summary of costs, general effectiveness, and other pros and cons, based on previously developed information.

#### **Subtask 2A-2. Brainstorming additional stormwater treatment/phosphorus reduction BMPs**

Barr will brainstorm and conduct a high-level evaluation of other potential stormwater BMPs throughout the Lake Cornelia and Lake Edina watersheds, including but not limited to modified street sweeping, evaluation of ponds upstream of Lake Cornelia to reduce potential sources of phosphorus, and implementing infiltration-based BMPs on publicly-owned property in the Lake Edina watershed. A preliminary list and map of potential BMPs will be generated after an initial brainstorming session. Up to four (4) BMPs will be selected from this list for further evaluation based on feedback from NMCWD staff and other stakeholders, as desired. Further evaluation will include hand sketches or maps, high-level characterization of costs and effectiveness (rough estimates), and other pros and cons. Results of the high-level evaluation for up to four (4) BMPs will be summarized in a presentation.

#### **Subtask 2A-3. Present results to NMCWD Board of Managers**

A summary of previously-evaluated stormwater BMPs and the high-level evaluation of additional BMPs will be presented to the Board, with the desired outcome for the Board to decide if they would like to pursue refinement of the conceptual designs and/or a more detailed feasibility analysis for any of the identified BMPs. If so, the work scope for this study could be amended to include the additional analysis.

### **Task 3. Curly-leaf Pondweed Management**

The UAA study concluded that mid-season die-off of invasive curly-leaf pondweed is one of the primary sources of phosphorus to Lake Cornelia. In recent years, the City of Edina has been conducting herbicide treatments to manage the amount of curly-leaf pondweed in the lake. As part of this feasibility study, Barr will evaluate several methods to manage curly-leaf pondweed, including 1) continued city-led herbicide treatments, 2) conducting a lake drawdown to freeze lake sediments and kill curly-leaf pondweed turions, and 3) a combined approach of lake drawdown and herbicide treatment.

### **Subtask 3A-1. Feasibility Analysis/Preliminary Design**

Barr will evaluate the feasibility of up to three (3) potential curly-leaf pondweed management approaches. An engineer's opinion of probable cost will be developed for each evaluated management approach to aid in comparing the cost effectiveness of the various curly-leaf management approaches. Permitting requirements will also be identified as part of this task.

### **Subtask 3A-2. Preliminary Design/Feasibility Analysis Meeting**

A preliminary design meeting will be held with NMCWD and City of Edina staff and other key stakeholders identified during the preliminary engineering study. Barr staff will present the results of the preliminary design/feasibility analysis (Task 3A-1) and solicit feedback on the potential curly-leaf management approaches. Barr staff will use comments from this meeting to refine the results of the feasibility analysis and preliminary engineering.

## **Task 4. Fishery Management**

The UAA study indicated that the large population of goldfish and other bottom-feeding fish in Lake Cornelia may be decreasing water quality in the lake. Through discussions with MnDNR staff, University of Minnesota research staff, and Barr's fishery expert, the primary opportunities to reduce the negative effects of goldfish and other bottom-feeding fish on water quality include 1) promoting a healthy predator fish population through minimizing winterkill and potential fish stocking, 2) removing a portion of the existing bottom-feeding fish population, and 3) disrupting reproductive success of the goldfish through installation of fish barrier(s). As part of this feasibility study, each of these fishery management strategies will be further evaluated.

For some of these fishery management activities, such as minimizing winterkill of predator fish through installation of a winter oxygenation system, the scope of this study will include feasibility analysis and preliminary design of options. For other fishery management activities, such as removing a portion of the existing goldfish population or disrupting reproductive success, the scope of this study will be more investigative in nature, as there is currently little known about the detailed life history and reproductive patterns of feral goldfish and goldfish-carp hybrids (as found in Lake Cornelia) and detailed information characterizing the Lake Cornelia goldfish population and their movement throughout Lake Cornelia and the upstream waterbodies has not yet been collected. For these latter strategies, the anticipated outcome of the feasibility study will be a short-term and long-term monitoring plan that identifies recommended monitoring activities and associated management decisions to help guide future fishery management efforts in Lake Cornelia.

### **Task 4A. Promoting a Healthy Predator Fish Population**

#### **Subtask 4A-1. Feasibility analysis/preliminary design of winter oxygenation system**

The UAA study evaluated a direct oxygen injection system to be installed to provide winter oxygenation, with a goal to increase winter survival of predator fish. Barr, with assistance from a subcontractor, will conduct a more detailed feasibility analysis of a direct oxygen injection system in

Lake Cornelia (north and south basins), including developing a planning-level design, evaluating operation and maintenance requirements, and developing an engineer's opinion of probable cost for the direct oxygen system. Barr will also evaluate up to one (1) additional oxygenation or aeration system for comparison with the direct oxygen injection system.

#### **Subtask 4A-2. Evaluation of potential fish stocking**

This task encompasses evaluation of fish stocking to improve the population of predator fish and therefore help manage the goldfish population. The task will also include planning-level costs and timing recommendations for potential fish stocking efforts.

### **Task 4B. Evaluating Other Fishery Management Strategies**

In addition to promoting a healthy predator fish population through minimizing winterkill and potential fish stocking (see Task 4A), potential goldfish management strategies include removing a portion of the existing bottom-feeding fish population and disrupting reproductive success of the goldfish through installation of fish barrier(s). Collection of additional information will be necessary to further investigate the need for and feasibility of these two strategies in Lake Cornelia. Through the following tasks, a short-term and long-term monitoring plan will be developed to evaluate these management strategies.

#### **Subtask 4B-1. Conduct literature review of goldfish in lake systems**

Unlike the common carp in Minnesota, there is currently little known about the detailed life history and reproductive patterns of feral goldfish and goldfish-carp hybrids found in Lake Cornelia. A literature review will be conducted to better understand the characteristics of these species and their role and movement patterns within lake systems. Findings from the literature review will be briefly summarized in a technical memo.

#### **Subtask 4B-2. Characterize connectedness of upstream waterbodies**

There are several waterbodies upstream of Lake Cornelia that are connected via a series of stormwater pipes or culverts. The connectivity of these waterbodies will be mapped to help evaluate the ability of goldfish and other fish species to move throughout these waterbodies under existing conditions. This information will also be used to help evaluate the potential for use of fish barrier(s), if warranted. The map of the waterbodies will include a summary of the sizes and elevations of the connecting pipes.

#### **Subtask 4B-3. Develop monitoring plan**

Barr will work with a local fisheries expert as a subcontractor to develop a monitoring plan for Lake Cornelia and the upstream hydraulically-connected waterbodies. The primary objectives of the monitoring will be to:

- Characterize/verify the existing fish communities in Lake Cornelia and the upstream waterbodies
- Obtain refined population and aging estimates of goldfish (and other bottom-feeding species)
- Better understand goldfish migration patterns and ability to capture and remove a substantial portion of the existing goldfish population



- Better understand goldfish recruitment (frequency and location) and the

The monitoring plan will identify short-term monitoring efforts (to be completed in 2020-2021, outside of this scope of work), describe the decision process upon results of the various monitoring efforts, and identify long-term monitoring efforts to help measure the effectiveness of various fishery management efforts implemented by NMCWD and its partners and gauge the need for additional management.

## **Task 5. Final Report, Presentation, and Public Hearing**

### **Subtask 5A. Feasibility Study/Preliminary Engineering Report**

A report will be prepared summarizing the results of Tasks 1 - 4. The report will summarize the recommended design approaches for each management activity, alternative design approaches considered, design constraints, and design assumptions. The report will also present a comparison of estimated costs for the various management practices, and will include discussion regarding potential grant opportunities corresponding to the various management activities. This scope of work assumes one round of review comments from NMCWD and city of Edina staff and one round of review comments from the Board.

### **Subtask 5B. Public Hearing and Presentation to NMCWD Board**

Barr will develop a presentation summarizing the recommendations from Tasks 1 – 4. Barr will present the information to the Board of Managers at a NMCWD monthly meeting and at a public hearing for the project.

## **Project Management**

Project management will be required in all phases as careful project management will help to ensure the work meets the expectations of NMCWD staff, the Board of Managers, and other stakeholders, and that it is completed in a satisfactory manner, within the project timeline and within the agreed-upon budget. Accordingly, time (and cost) for project management has been built into each of the tasks identified above. In general, project management activities comprise approximately 10% of total task/project cost.

A project kickoff meeting will be scheduled with NMCWD staff following authorization by the Board to proceed with the preliminary engineering. The meeting purpose will be to define project roles and responsibilities, clarify expectations, scope, schedule, and administrative procedures. This information will be used to develop a project-specific client service plan (funded by Barr). This meeting will also provide an opportunity to discuss the participation of other key stakeholders, such as the City of Edina, and decide when stakeholder meetings should be scheduled.

Throughout the project, Barr will provide updates to NMCWD staff that document project progress and coordinate tasks. We will provide monthly progress reports and budget status updates. We will solicit feedback from you on an ongoing basis to ensure clear and timely communication.



## Estimated Cost

The total estimated cost to complete Tasks 1-5 is ~~\$114,600~~109,000. Table 1 summarizes the estimated costs associated with each task described in the scope of work. A more detailed table identifying cost per subtask is also provided as an attachment.

**Table 1. Estimated Project Costs, by task**

<b>Task</b>	<b>Description of Task</b>	<b>Amount</b>
<b>1A</b>	Stormwater Treatment BMP in Rosland Park- Conceptual Design Evaluation	<del>\$23,000</del> <u>17,400</u>
<b>1B</b>	Stormwater Treatment BMP in Rosland Park- Feasibility Analysis/Preliminary Design	\$32,000
<b>2A</b>	High-level Evaluation of Other Stormwater Treatment/Phosphorus Reduction BMPs in the Lake Cornelia and/or Lake Edina Watershed	\$9,000
<b>3</b>	Curly-leaf Pondweed Management	\$9,000
<b>4A</b>	Promoting a Healthy Predator Fish Population	\$10,000
<b>4B</b>	Evaluating Other Fishery Management Strategies	\$8,300
<b>5</b>	Final Report, Presentation, and Public Hearing	\$23,300
<b>Total Estimated Cost</b>		<del>\$114,600</del> <u>109,000</u>

Project expenditures will be billed on a time and expense basis, not to exceed ~~\$114,600~~109,000 without prior authorization by you. Time will be billed using rates previously approved by the NMCWD Board. No mark-up will be applied to subcontracted work.

## Schedule

Table 2 summarizes a tentative project schedule, assuming authorization to proceed at the September 18, 2019 NMCWD regular board meeting. The tentative schedule outlined in Table 2 is a fairly aggressive, based on beginning construction in late-2020. Many factors may impact the actual schedule, including permitting, Board review/discussion timeline, potential environmental review preferences, stakeholder time or site constraints, etc.

Thank you for the opportunity to prepare this scope of work for the Lake Cornelia Water Quality Improvements project. Please note that this scope of work has been developed based on discussions with NMCWD staff, the Board of Managers, and other project stakeholders. The scope can be modified, as desired, to better reflect NMCWD preferences and/or priorities, which may include removing and/or modifying the level of effort for given subtasks.

Table 2. Lake Cornelia Water Quality Improvement Project- Tentative Schedule

Tasks	July 2019	August 2019 Week Ending				September 2019 Week Ending				October 2019 Week Ending				November 2019 Week Ending				Dec 2019	Jan 2020	Feb 2020	March 2020	April 2020	May 2020	June 2020	July 2020	August 2020	Sept 2020	Oct 2020	Nov 2020	Dec 2020	Jan - June 2021
	8/9	8/16	8/23	8/30	9/6	9/13	9/20	9/27	10/4	10/11	10/18	10/25	11/1	11/8	11/15	11/22	11/29														
<b>UAA Update Accepted by NMCWD Board</b>	*																														
<b>Alum Treatment</b>																															
Feasibility Study Submitted to NMCWD Board	*																														
Public Hearing/Order Project				*																											
Prepare Contract Documents																															
Distribute Request for Quotes																															
Authorize Contract								*																							
Conduct Alum Treatment																															
<b>Feasibility Study for Other Management Practices</b>																															
Watershed Best Management Practices (BMPs)																															
Task 1A- Stormwater Treatment BMP in Rosland Park- Conceptual Design Evaluation								*									*														
Task 1B- Stormwater Treatment BMP in Rosland Park- Feasibility Analysis/Preliminary Design																															
Task 2A- High-level Evaluation of Other Stormwater Treatment/Phosphorus Reduction BMPs in the Lake Cornelia and/or Lake Edina Watershed								*									*														
Task 3. Curly-leaf Pondweed Management								*																							
Task 4A. Promoting a Healthy Predator Fish Population								*																							
Task 4B. Evaluating Other Fishery Management Strategies								*																							
Task 5. Report and presentation to NMCWD Board																				*											
<b>Optional- solicit comments from agencies (BWSR, DNR, other?)</b>																															
<b>Public Hearing/Order Project (part of Task 5)</b>																					*										
<b>Permitting</b>																															
<b>Begin Implementing Fishery Management Monitoring Program (Tentative Schedule)</b>																															
<b>Prepare Construction Documents (Tentative Schedule)</b>																															
<b>Advertise for Bids and Award Bid (Tentative Schedule)</b>																											*				
<b>Begin Construction/Implementation (Tentative Schedule)</b>																															

■ = task completion  
 \* = Board action likely required



Project Name: Lake Cornelia WQ Improvements  
 Client Name: Nine Mile Creek Watershed District  
 Date: ~~September 12, 2019~~ Revised October 8, 2019

	Subtotal Labor	Sub Contractors	Project Total	Percentage of Total
<b>Task 1A. Stormwater Treatment BMP in Rosland Park- Conceptual Design Evaluation</b>				
1A-1. Brainstorming high-level conceptual designs for stormwater BMPs within Rosland Park	\$ 3,225.00		\$ 3,225.00	
1A-2. High-level conceptual design meeting with NMCWD and Edina staff	\$ 1,755.00		\$ 1,755.00	
1A-3. Refinement of conceptual designs (up to 2)	\$ 7,215.00		\$ 7,215.00	
1A-4. 2nd conceptual design meeting with NMCWD and Edina staff	\$ 1,755.00		\$ 1,755.00	
1A-5. Prepare summary memo and present to NMCWD Board of Managers	\$ 3,500.00		\$ 3,500.00	
<b>Subtotal</b>	\$ 17,450.00	\$ -	\$ 17,450.00	<b>16%</b>
<b>Task 1B-1. Stormwater Treatment BMP in Rosland Park- Feasibility Analysis/Preliminary Design</b>				
1B-1. Site characterization	\$ 2,230.00		\$ 2,230.00	
1B-2. Hydraulics Review and Analysis	\$ 4,455.00		\$ 4,455.00	
1B-3. Preliminary Design/Feasibility Analysis (1 selected BMP with up to 3 design alternatives)	\$ 19,865.00		\$ 19,865.00	
1B-4. Pollutant Removal Effectiveness Estimates	\$ 2,875.00		\$ 2,875.00	
1B-5. Preliminary Design Stakeholder Meeting	\$ 2,250.00		\$ 2,250.00	
<b>Subtotal</b>	\$ 31,675.00	\$ -	\$ 31,675.00	<b>29%</b>
<b>Task 2A. High-level Evaluation of Other Stormwater Treatment/Phosphorus Reduction BMPs in the Lake Cornelia and/or Lake Edina Watershed</b>				
2A-1. Summarizing stormwater BMPs evaluated during 2010 and 2019 UAA studies	\$ 1,965.00		\$ 1,965.00	
2A-2. Brainstorming additional stormwater treatment/phosphorus reduction BMPs	\$ 5,870.00		\$ 5,870.00	
2A-3. Present results to NMCWD Board of Managers	\$ 1,195.00		\$ 1,195.00	
<b>Subtotal</b>	\$ 9,030.00	\$ -	\$ 9,030.00	<b>8%</b>
<b>Task 3A. Curly-leaf Pondweed Management</b>				
3A-1. Feasibility Analysis/Preliminary Design	\$ 7,145.00		\$ 7,145.00	
3A-2. Preliminary Design/Feasibility Analysis Meeting	\$ 1,860.00		\$ 1,860.00	
<b>Subtotal</b>	\$ 9,005.00	\$ -	\$ 9,005.00	<b>8%</b>
<b>Task 4A. Promoting a Healthy Predator Fish Population</b>				
4A-1. Feasibility analysis/preliminary design of winter oxygenation system	\$ 3,840.00	\$ 4,500.00	\$ 8,340.00	
4A-2. Evaluation of potential fish stocking	\$ 2,125.00		\$ 2,125.00	
<b>Subtotal</b>	\$ 5,965.00	\$ 4,500.00	\$ 10,465.00	<b>10%</b>
<b>Task 4B. Evaluating Other Fishery Management Strategies</b>				
4B-1. Conduct literature review of goldfish in lake systems	\$ 2,515.00		\$ 2,515.00	
4B-2. Characterize connectedness of upstream waterbodies	\$ 1,050.00		\$ 1,050.00	
4B-3. Develop monitoring plan	\$ 2,230.00	\$ 2,500.00	\$ 4,730.00	
<b>Subtotal</b>	\$ 5,795.00	\$ 2,500.00	\$ 8,295.00	<b>8%</b>
<b>Task 5. Final Report, Presentation, and Public Hearing</b>				
5A. Feasibility Study/Preliminary Engineering Report (summarizing Tasks 1-4)	\$ 20,365.00		\$ 20,365.00	
5B. Public Hearing and Presentation to NMCWD Board	\$ 2,970.00		\$ 2,970.00	
<b>Subtotal</b>	\$ 23,335.00	\$ -	\$ 23,335.00	<b>21%</b>
<b>Project Total</b>			\$ 109,255.00	