LOWER MINNESOTA RIVER
WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting
Wednesday, April 20, 2022

Agenda Item
Item 6. K. – LMRWD Projects

Prepared By
Linda Loomis, Administrator

Summary.

i. **Area #3**

LMRWD has updated the workplan based on recommendations that resulted from previous work the LMRWD developed on this project. LMRWD staff asks the Board to review the updated workplan, approve and authorize staff to begin work on the workplan.

Attachments
Minnesota River Area 3: 2022 Comprehensive Design Development Workplan dated April 15, 2022

Recommended Action
Motion to approve workplan and authorize staff to begin work.

LOWER MINNESOTA RIVER WATERSHED DISTRICT

Minnesota River Area 3: 2022 Comprehensive Design Development

WORKPLAN—April 15, 2022

The Lower Minnesota River Watershed District (LMRWD or District) has been studying and collaborating with the City of Eden Prairie (City) to monitor the erosion occurring along the north bank of the Minnesota River since 2011.

In 2020 the continued erosion of the riverbank and subsequent failure of the bluff slope above it was estimated to had caused approximately 100,000 tons of soil and sediment to enter the river at a rate of 5,000 tons per year, contributing to the increased turbidity and excess nutrients within the lower Minnesota River.

In 2021, after 10 years of collecting monitoring data, the District was ready to move forward with a design to stabilize the riverbank and prevent future erosion of the bluff toe and further contributions to the excess sediment and nutrient loadings to the river. Inter-Fluve was contracted by the LMRWD to develop design plans for when the District acquired funds for construction; however, during the development of the preliminary plans, Inter-Fluve determined that the City stormwater pond had direct impacts to the stability of Area 3. At that time, the LMRWD decided to coordinate with the City and move forward with a comprehensive project to address the upper slope stability, riverbank erosion, and removal of the City stormwater pond.

This workplan considers the previous work done, Barr Engineering's (Barr) recommendations on the upper slope, and Inter-Fluve's recommendations on the riverbank and consolidates them into one comprehensive design package. The goal of this workplan is to take the design to 90 percent completeness until the District and City have obtained funding to remove the pond, stabilize the riverbank, and construct a new and stable outfall from the City stormwater system.

Summary

Outcome:	Field data collection for upper slope, 60 and 90 percent construction plans, specifications, and engineer's estimate for riverbank stabilization and stormwater pond removal
Project stakeholders:	City of Eden Prairie, Hennepin County
Timeline for completion of project:	April 2022–October 2022 (estimated)
Total project budget[1]:	$212,172–$228,682 (LMRWD: $69,400–$79,400; Barr: $40,400–$46,910; Inter-Fluve: $102,372)

[1] Where referenced, LMRWD staff consists of the District's administrator and technical consultants' budget.

Objective 1. Project Management

This objective consists of managing the project scope, submittals, schedule, and budget and providing periodic communications from Inter-Fluve and Barr to LMRWD staff via email and phone and from staff to the Board.

Task 1-1: Project Coordination Meetings: Project coordination meetings to maintain communication with stakeholders will be necessary. The following meetings are planned:

- Kickoff meeting with LMRWD, Inter-Fluve, and Barr Engineering
- Field Data Results meeting with LMRWD, Inter-Fluve, and Barr Engineering
- Stormwater Pond Removal Conceptual Design Review meeting
- Design Review meeting, following 60 percent design
- Regulatory Agencies Review meeting, following 60 percent design
- Design Review Meeting, following 90 percent design
- Monthly coordination meetings

Task 1-2: *Board updates*: LMRWD staff will provide update memos to the Board summarizing the field data results and again following the 60 and 90 percent design review meetings and will provide project schedule updates as necessary.

Timeline for completion: April 2022–October 2022

Deliverables: Invoices, meeting agendas and summaries, Board update memos

Estimated budget: $29,208–$31,108 (LMRWD: $11,700–$12,900; Barr: $4,000-$4,700; Inter-Fluve: $13,508)

Objective 2. Field Data Collection

This objective consists of managing the existing inclinometers on the upper slope as well as collecting new data to evaluate the elevation of groundwater in the upper slope area and monitor the erosion of the scarp.

Task 2-1: Piezometers and Soil Borings: As part of the 2021 slope stability analysis, Barr recommended confirming the soil types and groundwater elevations at Area 3. The analysis relied on one soil boring that was nearby the failure site. If the actual conditions at Area 3 are different than assumed, this could significantly change Barr's slope recommendations. Barr will install two vibrating wire piezometers and collect soil borings along the upper slope to confirm the 2021 slope stability analysis assumptions.

Task 2-2: Topographic Survey: This task includes collection of additional topographic survey data in the vicinity of the City stormwater pond and downstream area. Inter-Fluve will collect these data to support design development and updates to the hydraulic model and will also collect data in front of the City stormwater pond and throughout the area surveyed in 2021 to

support design and evaluate changing subsurface conditions since the previous survey. Additionally, Inter-Fluve will also collect new drone imagery of the project site. Inter-Fluve and Young Environmental will meet on-site to coordinate data collection and discuss preliminary stormwater outlet designs.

Timeline for completion: April 2022–June 2022 (weather dependent)

Deliverables: Locations of scarp monitoring stakes and initial measurements, installation of piezometers, soil borings logs and report, and updated topography at the City stormwater pond

Estimated budget: $45,668–$50,378 (LMRWD: $5,800–$6,700; Barr: $25,400-$29,210; Inter-Fluve: $14,468)

Objective 3. Sixty Percent Design

Task 3-1: 60 percent design development: This task includes design and analysis to support the development of the 60 percent design deliverables and will be based on the final conceptual design sketch for the stormwater pond removal and the launchable rock toe (from the 2021 conceptual design). Young Environmental will complete the design for the new stormwater pond outlet structure. This task includes the development of design plans, a technical design memorandum, Engineer's Opinion of Probable Construction Costs (EOPCC), and an updated permit matrix with estimated timelines and submittal needs.

Task 3-2: Hydraulic Modeling: Inter-Fluve will update the previously developed 2-D HEC-RAS hydraulic modeling of existing conditions with the 2022 topographic and bathymetric data to extend the model area downstream through the City stormwater pond to verify the river hydraulics. Because the 2D model is not accepted by FEMA for no-rise permitting, Young Environmental will develop a separate 1D model to confirm that no impact to water surface elevations will occur because of the proposed stabilization.

Task 3-2: 60 percent design package review: Inter-Fluve will provide LMRWD staff with the 60 percent design package, including construction plans, the design memorandum, the permitting matrix, and a comment log to track comments on the 60 percent design plans. Inter-Fluve will also share this design package with Barr Engineering to confirm compatibility with the upper slope assumptions. LMRWD staff will review the package and compile comments in the comment resolution log for Inter-Fluve.

Timeline for completion: June–July 2022 (may be affected by data collection efforts in Objective 2)

Deliverables: 60 percent design package, technical design memorandum, hydraulic modeling, EOPCC, permit matrix, and comment log; Board update memo

Estimated budget: $67,444–$72,144 (LMRWD: $23,500–$27,100; Barr: $5,500-$6,600; Inter-Fluve: $38,444)

Objective 4. Permitting

Task 4-1: *Pre-permit meetings:* Using the 60 percent plans, LMRWD staff will independently confirm the permit matrix by coordinating with the identified agencies to present the project and confirm specific permit requirements and timelines. Permits will likely be needed from the MnDNR, USACE, LMRWD, City of Eden Prairie, US Coast Guard, MPCA, Environmental Quality Board, Minnesota State Historic Preservation Office, and other agencies.

Task 4-2: *Specialty permitting:* LMRWD Staff will complete a Phase 1 analysis for historic and cultural resources and threatened and endangered species. LMRWD will use this information for the joint permit application. Additional work may be necessary, depending on the results of the Phase 1 analysis, but it has not been included in this workplan.

Task 4-3: *Permit applications:* LMRWD staff will draft permit applications based on the 60 percent plans Inter-Fluve provided and apply for applicable permits, including an LRMWD permit, the joint permit application for the MnDNR and USACE, and public waters permit. LMRWD staff will compile agency review comments and provide them to Inter-Fluve for incorporation into the 90 percent design package in Objective 5.

Timeline for completion: June–August 2022

Deliverables: Permit applications, Phase 1 analysis and summary

Estimated budget: $13,900–$16,000 (LMRWD: $13,900–$16,000; Barr: $0; Inter-Fluve: $0)

Objective 5. 90 Percent Design Review

Task 5-1: *90 percent design development*: Inter-Fluve will develop 90 percent design plans based on the comments provided at the end of Tasks 3-2 and 4-3. The plan set will be updated by Inter-Fluve to incorporate these comments, update the technical memorandum and EOPCC, and provide technical specifications for review. Note that because of the unknown construction date, the Division 0 specifications will not be prepared at this time and will need to be completed with the future construction phase.

Task 5-2: *90 percent design package review:* LMRWD staff will review the 90 percent design package, including revisions to construction plans, the design memorandum, and the permitting matrix. LMRWD staff will conduct a complete review of the draft technical specifications and preliminary engineer's estimate and will finish the comment resolution log for the selected consultant.

Timeline for completion: September–October 2022

Deliverables: 90 percent design package, updated technical design memorandum and EOPCC, permit matrix, and comment log; technical specifications (Divisions 1 and 2 and Special Provisions only); Board update memo

Estimated budget: $55,952–$59,052 (LMRWD: $14,500–$16,700; Barr: $5,500-$6,400; Inter-Fluve: $35,952)

Attachments

- Barr Engineering February 2022 Estimate
- Inter-Fluve March 2022 Draft Workplan and Estimate

Area 3
Cost Estimate for Soil Borings and Piezometer Installation
by B. Theroux
2/11/2022

Attachment 1 - Barr Engineering February 2022 Estimate

ITEM	COST
Instrumentation Equipment • 2 vibrating wire piezometers • 2 protective covers at surface • 280 feet of cable length	$ 1,700
Drilling • 1 boring with truck rig at residential property to 150 feet depth • 1 boring with all-terrain rig to 100 feet depth downslope of residential property boundary • 3-4 days of drilling • SPT sampling every 5 feet	$ 16,000
Lab Testing • 13 moisture content • 13 gradations	$ 1,700
Barr Labor • Drilling and lab testing coordination • Field oversight during drilling • Boring logs, installation logs, other documentation	$ 6,000
Total	$ 25,400
Contingency	15%
Total w/contingency	$ 29,210

Notes

Does not include coordination efforts to gain right of entry through non-public property.
Does not include dataloggers at piezometer locations. Assumes piezometer readings are collected manually in the field.
Periodic field trips to collect piezometer data are not included.
Does not include survey of boring locations.

Area 3 Project
Design for Launchable Toe and Stormwater Pond Removal

This document serves as a project work plan detailing Inter-Fluve's scope of services, assumptions, deliverables, and schedule for 90% design for the Area 3 Minnesota Riverbank Stabilization Project involving Stormwater Pond Removal and Launchable Toe.

Project Scope of Services

Task 1: Project Management

This task includes monthly project invoicing, monthly 30-minute project update phone calls with the LMRWD Project Manager, and the following virtual meetings:

- Kickoff meeting with LMRWD and Young Environmental
- Stormwater Pond Removal Conceptual Design Review Meeting
- Design Review Meeting following 60% Design
- Design Review Meeting following 90% Design

Deliverables:

- Meeting agenda (provided one week in advance) and meeting minutes
- Monthly invoices

Assumptions:

- All meetings will be held virtually
- Geotechnical review of the slopes is being completed by Barr Engineering. It is assumed that Barr's findings will not change their current recommendations that no action is necessary relative to geotechnical slope stability. Should Barr's recommendations change, the scope for this project will need to be updated and coordinated with any necessary slope stability design.

Task 2: Data Collection, Conceptual Design for Stormwater Pond Removal, and Stormwater Outlet Coordination

This task includes collection of onsite data, conceptual design for the stormwater pond removal, and coordination with Young Environmental regarding the design of the stormwater outlet. Topographic survey data in the vicinity of the City stormwater pond and downstream area will be collected to support design development and updates to the hydraulic model. Bathymetric data will be collected in front of the City Stormwater pond and throughout the area surveyed in 2021 to support design and to evaluate changing subsurface conditions since the previous survey. Additionally, new drone imagery will be collected of the project site.

This task includes an onsite meeting with Young Environmental to discuss the concept design for stormwater pond removal and stormwater outlet design. Following the onsite meeting, a draft conceptual sketch (planimetric rendering) for stormwater pond removal design will be prepared and discussed at the Stormwater Pond Removal Conceptual Design Review Meeting. Following the meeting, a final conceptual design sketch will be developed for use in 60% design. Inter-Fluve will coordinate with Young Environmental regarding the stormwater outlet design throughout this task.

Deliverables:

- Survey data (csv format)
- Aerial imagery
- Conceptual design sketch for stormwater pond removal (DRAFT and FINAL)

Assumptions:

- Topographic survey will be conducted during leaf off in ice- and snow-free conditions. Bathymetric survey will be conducted during low-flow ice-free conditions.
- The survey will consist of a topographic and bathymetric survey within the limits of the proposed project area using an RTK GPS and hydrone-mounted RTK GPS.
- The LMRWD will coordinate and arrange access to all properties required for completion of the survey.
- This task does not include redesign work.
- Young Environmental will complete the design for the new stormwater pond outlet.

Task 3: Preliminary Design (60%)

This task includes design and analysis to support the development of the 60% design deliverables, and will be based on the final conceptual design sketch for the stormwater pond removal and the launchable rock toe (from the previous conceptual design efforts.) Young Environmental will complete the design for the new stormwater pond outlet structure.

This task includes updating of the previously developed 2-D HEC-RAS hydraulic modeling of existing conditions with new topographic and bathymetric data, and development of a 2-D proposed conditions hydraulic model. It also includes development of design plans (estimated at approximately 12 sheets), a technical design memorandum, EOPCC (Engineer's Opinion of Probable Construction Costs) and an updated permit matrix with estimated timelines and submittal needs. The team will develop a comment log to track comments on the 60% design plans.

Deliverables:

- 60% design plans
    - Estimated at 12 sheets including: title sheet, general layout (existing utilities and removals), grading plan, tabulations, staging plans, stormwater pollution prevention plan, erosion and sediment control plan, proposed conditions plan sheets, proposed conditions cross-sections, and typical details.
- Technical Design Memorandum
    - The technical design memorandum will reference previous conceptual design and data collection efforts, and will summarize newly collected onsite data, hydraulic model setup and analysis, proposed design elements, and design calculations and assumptions. This document will serve as a record of engineering due diligence for the project.
- Hydraulic Modeling

        - The 2-D HEC-RAS model of existing conditions will be updated with newly collected data and a proposed conditions model will be built. Model results will inform proposed bank stabilization design and configuration as well as material sizing.
    - Engineer's Opinion of Probable Construction Cost (EOPCC)
        - Approximate opinion of construction costs for mobilization, access, site preparation and cleanup, and construction time and materials will be provided. This EOPCC will be developed using recent bid prices from recent Inter-Fluve projects within the region as well as publicly available bids for similar projects within the region.
    - Permit Matrix document
        - Inter-Fluve will update the previously developed matrix document to identify the necessary permits, approvals, reviews, submittal needs, and timeline.
    - Comment log
        - Comment log will be developed to track stakeholder comments received on the 60% deliverable for revisions at the 90% design stage.

Assumptions:

- LMRWD team will consolidate comments from staff and stakeholders to submit to Inter-Fluve
- Inter-Fluve will develop supporting documentation and calculations necessary for permitting applications, which will be developed and submitted by LMRWD.
- This scope does not include development of a 1-D hydraulic model for supporting permit applications.
- Young Environmental will be developing and stamping the stormwater outlet design plan sheets to be integrated via PDF into the Inter-Fluve plans.

Task 4: Final Design (90%)

This task includes the development of a 90% construction document set (estimated at approximately 20 sheets), an updated EOPCC, specifications, and an updated technical memorandum to capture the final design decisions and analysis.

Deliverables:

- 90% design plans
- Updated EOPCC
- Specifications (Division 1 and Division 2+ Technical Specification Sections)
- Updated technical design memorandum
- Updates to the comment log (to be addressed in a future design phase)
- Updated permit submittal matrix with estimated approval timelines based on feedback from LMRWD's conversations with permitting staff.

Assumptions:

- Specifications will be developed in CSI format. LMRWD will provide information to support development of Division 0 and Division 1 specification sections, as appropriate. .
- Young Environmental will be developing the stormwater outlet design plans.
- Young Environmental will be responsible for communication with permitting staff within each agency.

Project Schedule

We propose a 6 month schedule for this work with Tasks 2, 3, and 4 each taking approximately 2 months. The final project schedule will be agreed upon prior to finalizing the contract and will consider review time necessary for the LMRWD.

Project Budget

Task	Fee
1: Project Management	$13,508
2: Data Collection, Conceptual Design, and Coordination	$14,468
3: Preliminary Design (60%)	$38, 444
4: Final Design (90%)	$35,952
Total:	$102, 372