LOWER MINNESOTA RIVER WATERSHED DISTRICT

Lower Minnesota River Floodplain Modeling

Workplan—December 1, 2022

The District will coordinate with project partners to collect recent urban development information and survey data that can be incorporated into USACE's 2004 HEC-RAS model of the Lower Minnesota River to create revised floodplain mapping to allow for better predictions of flood stages within the LMRWD and evaluate the effects of urban development and climate change on the river's hydrology.

Summary

Outcome:	Updated Lower Minnesota River HEC-RAS model
Project partners:	Minnesota Department of Natural Resources (MnDNR), US Army Corps of Engineers (USACE), Minnesota Department of Transportation (MnDOT), Dakota County, Carver County, Scott County, Hennepin County, and the fourteen LMRWD Partner Cities
Timeline for completion:	January 2023 to September 2023
Total project budget:	$85,632

Objective 1. Project Management

Task 1-1: *Project plan development and project management*. Finalize the workplan, assign project tasks, determine whether additional resources are needed, set dates for deliverables, and generate and maintain project schedule and monthly invoices.

Task 1-2: Project Kickoff Meeting. Young Environmental will host a project kickoff meeting with the MnDNR, USACE, and LMRWD to introduce the project team, share the project schedule and objectives, and review the preliminary data needs. Project partners can share projects that are underway that may complement the floodplain modeling effort, and Young Environmental will modify the scope of work as necessary. Young Environmental also will develop the meeting agenda and summary.

Deliverables: Project approach and schedule, meeting agendas and summaries, and invoices

Estimated budget: $3,794

Objective 2. Data Collection and Review

Task 2-1: Gather LiDAR. Review available LiDAR data, download DEM data for the Lower Minnesota River, and convert to .tif file for use in the HEC-RAS model.

Task 2-2: Gather Development Information. Identify the date of the most recent LiDAR and collect development information after that date through coordination (email and phone correspondence) with LMRWD counties and municipalities. The relevant developments will be based on information provided in the Lower Minnesota River Floodplain Model Feasibility Study and include approximately 38 developments identified through LMRWD project reviews and 16 developments identified through FEMA LOMCs. Request as-built survey information for each development. If as-builts are unavailable, municipalities will be contacted to determine if a collecting survey is required, but a collecting survey is not part of this scope. This task includes reviewing the collected development information for accuracy and deciding what is necessary for inclusion in the model.

Task 2-3: Gather Bridge Information. This task includes gathering MnDOT bridge data to verify the 2004 HEC-RAS model has updated bridge information. Additionally, Young Environmental will coordinate with cities,

counties, and/or private landowners to collect the most recent bridge information for the remaining bridges that cross the Minnesota River. Bridge data includes bridge deck elevation, abutment shape and elevation, and pier shape and location as well as any other flow obstructions associated with the bridges. This task includes reviewing the collected bridge data for accuracy and deciding what is necessary for inclusion in the model.

Timeline for completion: February to March 2023

Deliverables: DEM, floodplain development as-builts and survey data, and bridge data

Estimated budget: $14,212

Objective 3. Update Hydrology

Task 3-1: Statistical Analysis. Review the USGS Jordan gage and complete a statistical analysis using HEC-SSP to include the most recent peak flow data from 2001 to present to quantify updated flows for inclusion in the 2004 model.

Task 3-2: Future Conditions Analysis. Conduct a literature review to determine an appropriate method for estimating future conditions based on the USGS Jordan gage data. Determine future conditions peak discharges to estimate impacts of climate change.

Task 3-3: Coordination with Project Partners. Young Environmental will host and facilitate a coordination meeting with project partners to communicate project progress, discuss the hydrologic modeling approach and issues encountered, and develop potential solutions. This task includes developing the meeting agenda and summary.

Timeline for completion: March to April 2023

Deliverables: Lower Minnesota River existing and future peak discharges

Estimated budget: $9,411

Objective 4. Update Hydraulic Model

Task 4-1: Update Hydraulic Model Geometry. Using information collected as part of Objective 2, Young Environmental will update the 2004 HEC-RAS model that is currently being used by the District and other entities to evaluate floodplain impacts. Updates include incorporating new development survey elevations, DEM elevations based on more recent LiDAR, and latest bridge data. The update also will include converting the current model to the most recent and appropriate version of HEC-RAS.

Task 4-2: Update Hydraulic Model Flow File. Using the hydrologic modeling and analysis from Objective 3, Young Environmental will update the HEC-RAS flow file to represent the most recent peak flow data. Based on the hydrologic analysis, the flow file will include present day flows as well as future conditions flows.

Task 4-3: Coordination with Project Partners. Young Environmental will host and facilitate a coordination meeting with project partners to communicate project progress, discuss the hydraulic modeling approach and issues encountered, and develop potential solutions. This task includes developing the meeting agenda and summary.

Timeline for completion: April to June 2023

Deliverables: Lower Minnesota River hydraulic model (HEC-RAS model)

Estimated budget: $22,473

Objective 5. Documentation and Review

Task 5-1: *Draft technical memorandum.* Develop a draft technical memorandum to document methods, assumptions, procedures, results, and recommendations. Submit draft report to the District for written feedback.

Task 5-2: Model Quality Control Review. Young Environmental will provide the updated HEC-RAS model and draft technical memorandum to an engineering firm from the LMRWD pool for review and written feedback. This task includes preparing the HEC-RAS model for sharing, coordination with project reviewer on questions, and updating the HEC-RAS model as deemed necessary by Young Environmental based on the quality control feedback.

Task 5-3: Model Review with Project Partners. Young Environmental will host and facilitate a meeting with project partners to discuss the floodplain model development process and results, including data sharing methods for tracking future floodplain development. The meeting will provide a collaborative space for project partners to provide feedback, address modeling concerns, and develop a path forward. This task includes responding to all participant comments by either incorporating comments into the final floodplain model or tabling comments for future discussion and resolution.

Task 5-4: Finalize the report. Finalize the technical memorandum by incorporating written feedback from project partners, district administrator, and managers.

Timeline for completion: June to August 2023

Deliverables: Draft technical memorandum and final technical memorandum

Estimated budget: $35,742