220 East Buffalo Street
Suite 201
Milwaukee, WI 53202

March 31, 2025
Re: Schoonmaker Creek Watershed Modeling and Design

Task List

1. **Project Management**

   MSA's designated project manager will have overall responsibility for coordination, management, and reporting of the modeling and design team activities to the City. The project manager will be responsible for controlling the project schedule, satisfaction of contract scope items, and budget. MSA will provide monthly documentation that satisfies both the City of Wauwatosa and MMSD in regard to progress billing, change orders and separation of scope between the City and MMSD. The project manager will be the primary point of contact for invoicing/billing/contractual issues. The project manager, along with MSA's designated QA/QC coordinator will be responsible for assuring the quality of MSA's deliverables.

2. **Project Review Meetings & Coordination**

   a. MSA will participate in monthly project coordination meetings (one per month) with the City of Wauwatosa. Meetings will be a hybrid with both in-person and virtual attendance by MSA staff. It is anticipated that two (2) MSA staff will attend each meeting. Meetings are anticipated to last two (2) hours.

   b. MSA will participate in monthly project coordination meetings (one per month) between the City of Wauwatosa and MMSD. Meetings will be a hybrid with both in-person and virtual attendance by MSA staff. It is anticipated that two (2) MSA staff will attend each meeting. Meetings are anticipated to last two (2) hours.

3. **Hydrologic and Hydraulic Modeling Activities**

   a. **PC-SWMM/XP-SWMM:** MSA will convert the current PC-SWMM model of the Schoonmaker Creek Watershed to XP-SWMM. Note, it is anticipated that the current XP-SWMM model of area generally north of Center Street will remain as a rain-on-grid model. XP-SWMM was determined to be the appropriate model platform so as to comply with FEMA requirements.

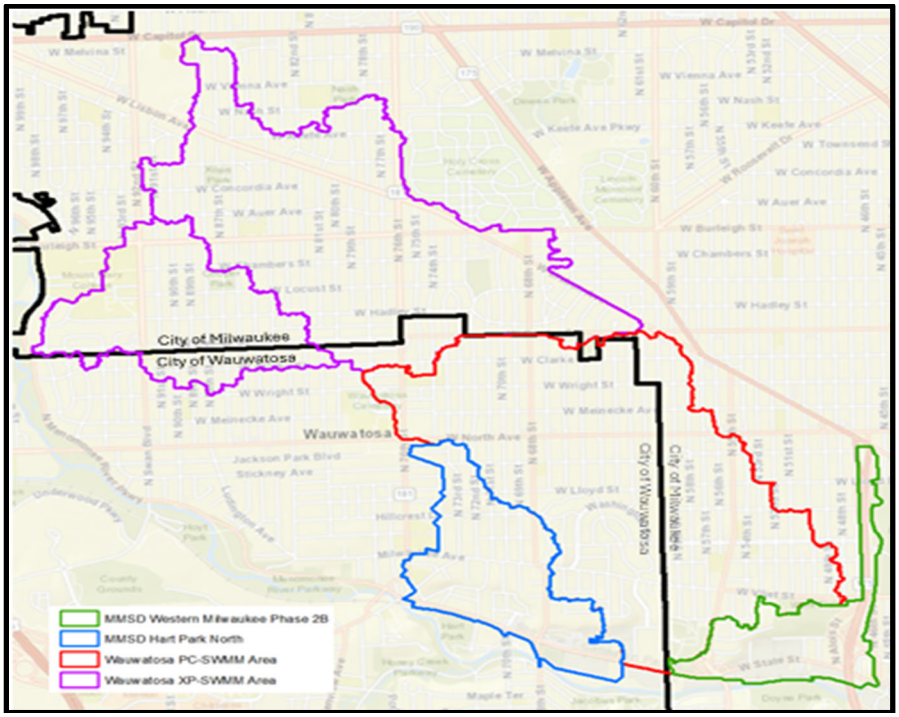
   b. **Comprehensive Schoonmaker Creek Watershed Model:** The City's current model area will be expanded to include adjacent areas that may drain toward the Schoonmaker Creek outfall or which may be affected by accumulation of flows at/near the Schoonmaker Creek outfall. Model development will be informed by model data provided by MMSD; however, it is anticipated that the level of detail will be increased to be comparable to the level of detail included in MSA's previous work for the Schoonmaker Creek Watershed.

      The purpose of the model expansion is not to revisit or redesign improvements previously approved by MMSD but instead to assess conditions that may occur if design conditions selected by the City exceed the capacity of previously approved improvements and to design additional improvements at/near the Schoonmaker Creek outfall.

The comprehensive model will incorporate:

- **i.** Western Milwaukee Phase 2B areas (additional areas beyond that of the Schoonmaker Creek watershed already modeled). This area has been recently modeled by MMSD using PC-SWMM. This model will be used as a reference to expand the Wauwatosa XP-SWMM model for Schoonmaker Creek.
- **ii.** Hart Park North System. This area has been recently modeled by MMSD using PC-SWMM. This model will be used as a reference to expand the Wauwatosa XP-SWMM model for Schoonmaker Creek.
- **iii.** Confirmation of 'closure' conditions on the land-side of the levee for the agreed-upon 100-yr design storm duration.
- iv. Additional detail will be added to the model in the vicinity of Hawthorne Glen Outdoor Education Center. Specifically, the following refinements will be made:

    1. Additional subwatershed delineations will be completed along W. McKinley Avenue at N. 60th Street, N 59th Street, and N. 58th Street.
    2. Additional detail will be added to the hydraulic model to more accurately portray existing storm sewer capacity at W. McKinley Avenue and N. 60th Street
    3. Additional subwatershed delineations will be completed along the east side of the N. 60th Street ROW to differentiate stormwater runoff generated within the City of Wauwatosa from runoff generated in the City of Milwaukee (it is noted that the common city limits line is at the centerline of N. 60th Street).



c. **Alternate Statistical Storm Evaluation:** The City of Wauwatosa has identified that the statistical rain storm to be used for purposes of the design of new drainage infrastructure will be the 100-yr 24-hr rainfall event with an MSE3 intensity distribution.

Analysis of up to three larger storms (anticipated to be the 200-yr, 500-yr, and 1000-yr storm, with durations and intensity distributions matching the selected design storm) will be solved for proposed conditions.

For purposes of understanding differences in event severity and for providing a comparison to prior studies, MSA will also solve the models for the 1-hr, 3-hr, 6-hr, 12-hr, 24-hr and 48-hr duration events utilizing a SEWRPC intensity distribution. These storms will be simulated for existing conditions, MMSD-design conditions for land-side levee drainage, and proposed conditions within the Schoonmaker Creek watershed. Note that for each scenario, these storms will be modeled only once.

For reference: SEWRPC's prior study was completed using a 100-yr 3-hour design storm and the SEWRPC rainfall intensity distribution. MMSD's May 2023 'closure analysis report' appears to have been based on the 100-yr 1-hour design event and the SEWRPC rainfall intensity distribution. The City's October 2024 Schoonmaker Creek Watershed Preliminary Engineering Analysis was based on the 100-yr 24-hr event and the MSE3 rainfall intensity distribution.

d. **Menomonee River Analysis:**

i. **Tailwater Analysis.** MSA will conduct modeling analysis to evaluate what effects a tailwater condition on the Menomonee River has on the function of storm sewers draining the land-side of the river levee. Note, it is assumed that MSA can be provided, by others, 10-yr and 100-yr tailwater elevations in the Menomonee River for each outfall within MSA's modeled area to be evaluated.

Modeling will be completed as follows:

- 100-yr watershed simulations will apply a 10-yr tailwater condition for the Menomonee River
- 10-yr watershed simulations will apply a 100-yr tailwater condition for the Menomonee River
- Analysis of up to three larger storms (anticipated to be the 200-yr, 500-yr, and 1000-yr storm, with durations and intensity distributions matching the selected design storm) will be solved for proposed conditions with a tailwater condition as agreed upon by the City of Wauwatosa and MMSD.

ii. **Cumulative Flow Analysis.** Not included. It is assumed that documentation of development of the HSPF model of the Menomonee River model will be sufficient to confirm that modifications to the Schoonmaker Creek watershed drainage system will have no quantifiable impact on Menomonee River Flows under flood conditions.

e. **30% Design Modeling North of Lloyd Street:** MSA will continue to refine the Schoonmaker Creek Watershed Preliminary Engineering Analysis model to determine necessary system improvements to achieve the City's flood risk reduction goals.

- **i.** It is assumed that modeling will be of the anticipated entire trunk storm sewer system north of Lloyd Street. This will include the pipe system identified as the '4x system' north of Lloyd Street and branches running east and west as presented in the Schoonmaker Creek Watershed Preliminary Engineering Analysis.
  - **1.** The portion of the existing trunk system running between Clarke St and Lloyd Street that is generally located in back yards will be unmodified. The portion within public rights of way will be increased in capacity (replaced) as necessary to achieve flood risk reduction goals.
  - **2.** Modeling to support 20% design plans will extend west of the trunk line to the first roadway intersection east of the Schoonmaker Creek watershed boundary.
  - **3.** Modeling to support 20% design plans will extend approximately one block east of the trunk line to support the establishment of connection points for future branches. It is anticipated that additional conceptual level modeling will be conducted east of the trunk line to determine the routes and capacities of future storm sewer branches as necessary to achieve flood risk reduction goals for the watershed north of Lloyd Street.
- **ii.** The proposed trunk system will be extended to reach the low spot at the intersection of 74th Street and Center Street.
- **iii.** The design of the trunk storm sewer system will be based on an intention to satisfy the following conditions:
  - **1.** Center Street, North Avenue, and Lloyd Street will remain passable under 100-yr design conditions.
  - **2.** All other streets will contain accumulated 100-yr design flows to within the public rights-of-way.
- **iv.** Modeling will be completed for existing and proposed conditions (2 scenarios).

f. **Impacts to Infrastructure within MMSD's jurisdictional reach of the Schoonmaker Creek:** Efforts associated with modeling of proposed conditions for areas south of Lloyd are limited to the evaluation of the selected design storm alternative.

i. Optimization of the 'Option B' proposed relief storm sewer presented in the Schoonmaker Creek Watershed Preliminary Engineering Analysis is anticipated to be conducted as follows:

1. A proposed new and/or revised storm sewer branch will be evaluated for installation between Martha Washington Drive and Upper Parkway (north of Washington Blvd) to provide additional flood risk reduction to the one (1) home currently still predicted to flood from as shown in the Schoonmaker Creek Watershed Preliminary Engineering Analysis modeling.

2. The proposed relief storm sewer between Lloyd Street and Milwaukee Avenue will be adjusted in size as necessary and as able to convey flows

necessary to achieve flood risk reduction goals north of Lloyd St., with modeled improvements north of Lloyd St., while not increasing flows within the open channel portion of Schoonmaker Creek.

3. The proposed relief storm sewer between Milwaukee Avenue and the Menomonee River will be adjusted in size as necessary and as able to provide additional flood risk reduction to the one (1) commercial property at the southwest quadrant of 62nd Street and 62nd Street as well as to of Hawthorne Glen Outdoor Education Center as described in the subsequent paragraph. Improvements may include enlargement of the currently proposed relief storm sewer or construction of new and/or revised storm sewer branches serving the local area.

   The above-described activities will include alternatives analyses including the following:

   - Adjustment in the size of the trunk bypass storm sewer to achieve project goals.
   - Expansion/extension of existing storm sewer branches to provide improved drainage/flood risk reduction to areas further from the alignment of the trunk bypass storm sewer.
   - Adjustment of street cross-section and/or elevation to provide greater conveyance capacity at lower elevations within the ROW.
   - Construction of minor earthworks to prevent overflow from leaving the ROW under extreme event conditions (this last item anticipated for the south side of Martin Drive at the terminus of Martha Washington Drive).

ii. Analysis will be completed to determine proposed conditions improvements sufficient to prevent stormwater runoff originating within the City of Wauwatosa from exiting the 60th Street ROW and entering the land affiliated with Hawthorne Glen Outdoor Education Center.

iii. Additional detail will be added to the model where the Schoonmaker Creek outfall crosses State Street. An inverted siphon will be explored as an alternative to connect drainage infrastructure west of the outfall to infrastructure east of the outfall to improve land-side drainage conditions to provide additional flood risk reduction to the two businesses still predicted to be at 100-yr flood risk even after MMSD-designed drainage improvements.

   Additional alternatives including the investigation of further modification of the storm sewer system west of the Schoonmaker Creek Outfall extending to the locations of the two remaining flooded buildings as indicated in the MMSD levee closure analysis will be included. Additionally, as determined feasible, adjustments to the cross-section and/or vertical profile of State Street will be evaluated in the vicinity of the proposed siphon to determine if there are additional flood risk reduction benefits to be gained.

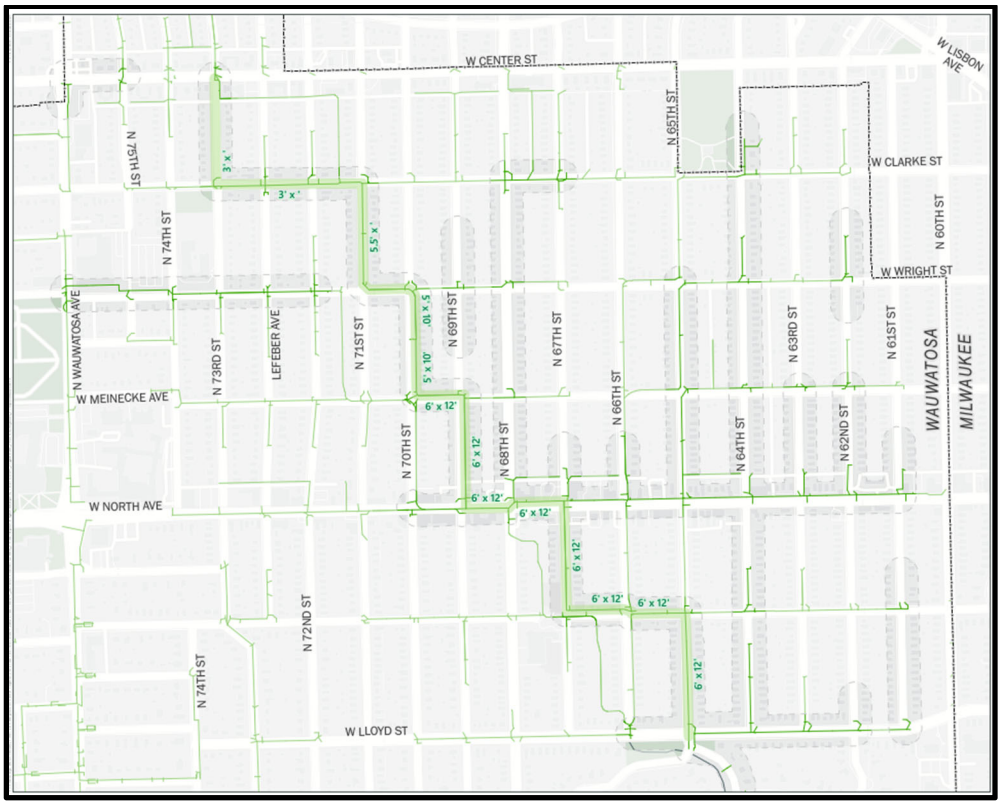
It is noted that improvements designed/approved by MMSD for levee land-side drainage appears to have been based on the 100-yr 1-hour design event and the SEWRPC rainfall intensity distribution. It is expected that flood conditions predicted using the 100-yr 24-hr rainfall event and MSE3 rainfall distribution will be substantially different. The effectiveness of current planned/approved improvements in this area to meet flood risk reduction goals is unknown. Alternatives involving improved infrastructure capacity may not be able to achieve all goals.

iv. As part of the analysis of whether the additional/improved infrastructure alternatives listed above meet all the District's flood risk reduction goals, cost estimates to acquire properties with structures that remain at flood risk for each alternative scenario will be developed and factored into the final recommended plan.

4. <u>Limited Engineering Design to Support Modeling Efforts</u>

MSA will prepare schematic or approximately 15-20% design level plans for purposes of identifying conflicts. Plans will include schematic horizontal layout and where conflicts may be identified, plans will include plan and profile information of the existing and proposed utilities. Conflicts will be identified but relocation of existing utilities will not be included in this scope. Dry utilities, street lights, trees or curb and gutter or street profiles are not anticipated to be evaluated unless requested by the City. 20% engineering designs will be completed in the following two areas:

a. **Trunk Line North of Lloyd Street:** MSA completed a desktop analysis of the area north of Lloyd Street as part of the Schoonmaker Creek Watershed Preliminary Engineering Analysis. This area generally included the area from 60th Street to the east, Lloyd Street to the south, Wauwatosa Avenue to the west and Center Street to the north. The desktop analysis identified existing utilities including water, sanitary and storm sewer from City of Wauwatosa GIS records as well as identifying street improvements including reconstruction of pavement, curb and gutter, street lighting using a combination of GIS data and WISLR data. This analysis was very preliminary, and upsizing of utilities was based on a combination of previous studies from other consultants, preliminary planning documents from the City of Wauwatosa and preliminary stormwater modeling from MSA. The storm trunk line alignment identified below extending from Lloyd Street to Center Street will be evaluated. Connecting streets east and west will not be evaluated at this time.



b. **State Street and Levee Land-Side Drainage**: Evaluation of modifications to storm sewer systems along State Street to improve levee land-side drainage (notably the construction of an inverted siphon below the Schoonmaker Creek outfall storm sewer).

30% Preliminary engineering plans were developed as part of the Schoonmaker Creek Watershed Preliminary Engineering Analysis report in 2024. Refinements to those plans to incorporate modeling updates from this scope of work will be completed as part of this task in the following areas:

c. **Optimization of the 'Option B' Relief Storm Sewer-Lloyd Street to Milwaukee Avenue:** MSA will refine the size of the proposed relief storm sewer between Lloyd Street and Milwaukee Avenue to provide the desired capacity necessary to achieve flood goals north of Lloyd Street while not increasing flows within the open channel portion of the Schoonmaker Creek.

d. **Optimization of the 'Option B' Relief Storm Sewer-Milwaukee Avenue to Menomonee River:** MSA will refine the size as necessary and as able of the proposed relief storm sewer between Milwaukee Avenue and the river. This task will also evaluate engineering design opportunities and challenges with roadway elevations to prevent overflow from leaving City rights-of-way onto private property and the Hawthorne Glen Outdoor Education Center.

5. **Technical Report**

MSA will prepare a final report with sections on model development and findings, including existing conditions assessment and recommendations for proposed capacity improvements to achieve system capacity goals. The report will summarize the results and assumptions of the limited engineering design efforts for areas both north and south of Lloyd Street. Cost estimates will also be included in the final report.

The final section of the report will include a technical memorandum informing MMSD's Watercourse Management Plan. The report will document anticipated flood risk reduction improvements necessary to achieve the goals of the project as described in this scope of work along the Schoonmaker Creek within MMSD's jurisdictional reach (including open channel and enclosed channel reaches).

DELIVERABLES

- Electronic copies of existing and proposed XP-SWMM models
- Electronic copies of GIS data developed to support XP/PC-SWMM models
- Technical memorandum describing model development, existing conditions findings, and recommended flood improvement alternatives selection in pdf format.
- Electronic set of limited engineering design plans in pdf format

PROJECT SCHEDULE

MSA anticipates the following estimated project schedule:

Date	**Milestone**
April 2025	City approves Professional Services Agreement Amendment with MSA
May 2025	Phase 2 Kickoff Meeting
May 2025 – February 2026	Monthly Progress Meetings, Coordination with MMSD, Hydraulic Analysis and Limited Engineering Design
TBD	Technical Report

OWNER'S RESPONSIBILITIES

- Owner will provide GIS, LiDAR and survey data of project corridor. Field surveying may be required at specific intersections.
- Owner is responsible for accuracy and completeness of the information provided to MSA.
- Owner will provide MSA with full information as to Owner's requirements for the project.
- Owner will provide timely responses to questions and review of engineering submittals.
- Owner will provide available lowest adjacent grade survey information (MMSD database)
- Owner will provide design and/or survey data describing the storm sewer system serving McKinley Avenue at 60th Street to a point downstream such that concerns for accurately accounting for local system hydraulics are addressed.

WORK PLAN - Schoonmaker Creek Watershed Modeling and Design	
MSA Professional Services	**Cost**
Task 1 - Project Management	$17,000
Task 2 - Project Review Meetings	$71,000
Task 3- Hydrologic and Hydraulic Modeling	$207,500
Task 4 - Limited Engineering Design to Support Modeling Efforts	$78,500
Task 5- Technical Report	$26,000
TOTAL:	**$400,000**