EVALUATION PANEL REPORT

Project(s): Starkweather and Olbrich Gardens Watershed Study
Location: Starkweather Watershed North and East Side of Madison
Aldermanic District: 3, 12, 15, 16, 17, 18
RFP: 14028-0-2025-BG
Date: 6/23/2025

This Evaluation has been reviewed and approved by a Principal Architect 2, Principal Engineer 2, Deputy City Engineer, Deputy Division Manager, or the City Engineer. ☒ Yes ☐ No

A. Project Details

1. Background Information

Following the August 2018 storm event, the City of Madison embarked on a comprehensive, citywide watershed study program. Twenty-one of the twenty-two watershed studies are underway with the eight of the watershed studies fully complete.

The study (Starkweather Creek and Olbrich Gardens Watershed Study) described in this Evaluation Panel Report is anticipated to be the final (twenty-second) study to be completed as part of the program. See Figure A for the locations of the watersheds.

The Starkweather Creek and Olbrich Gardens Watershed Study was originally put out to RFP to consultants in 2021. An engineering consulting team was selected for the work through the City's typical competitive process for a contract amount of $469,930 and began work in the Spring of 2021 with a contract end data of December 31, 2023. During the contract period the consultant built a set of models of the "existing conditions" of watershed per the City's specifications described in the original RFP. The project schedule was delayed multiple times due to staff changes at the City and within the consultant's team and due to the complexity of the watershed. The contract was amended for an additional $52,336 in 2023 due to unanticipated limitations of the modeling software and to extend the contract period by one year to December 31, 2024. During the additional period the consultant was unable to achieve a calibration of the models that met the City's stated criteria and the decision was made to allow the contract to expire without moving to later phases and the consultant delivered the uncalibrated models to the city for evaluation. The total amount paid on the initial contract was $309,537 of the total potential $522,266. City Engineering City reissued the RFP referenced in this review panel report in May 2025, for consultants to take the models that were developed by the previous consultant, fix any identified errors, calibrate them to City specifications, map existing flood conditions, and develop flood mitigation solutions within the watershed.

The Starkweather Creek and Olbrich Gardens watersheds are located on the north and east side of Madison. The watershed study area drains to Starkweather Creek and the eastern side of Lake Monona. This study area is approximately 15,500 acres, the largest study area within the watershed study program, and hydraulically complex. Starkweather Creek itself drains into Lake Monona at Olbrich Park south of Atwood Ave, going upstream the creek splits south of Milwaukee St and S Fair Oaks Ave into the East and West Branches. The watershed study area very roughly extends from Lake Monona and roughly Packers Ave on the east, Buckeye Rd on the South, areas east of I 39-90 and Reiner Rd on the East, and just north of Hoepker Rd on the north. Major land uses within the watershed area of the creek includes the Dane County Regional Airport, East Towne Mall, the American Center Business Park, residential development, and undeveloped wetlands and farm fields.

Most of the watershed is within the City of Madison Municipal limits, there are areas of the study that encompass the Town of Burke, City of Sun Prairie, and Town of Blooming Grove. The watershed's conveyance system varies widely with urban curb and gutter and storm sewer, open channel ditches, and perennial waterways. The age of the infrastructure varies and data regarding the infrastructure size, materials.

The proposal review and selection process has followed the approach established in the selection of engineering consultants for previous studies.

2. Role of Watershed Studies

The watershed studies are complex hydrologic and hydraulic analysis that help identify the causes of flooding and identify potential solutions to reduce flood risk. All watershed studies include an extensive public outreach effort.

The scope of work is consistent with the scopes of all the other watershed study efforts.

The watershed study main webpage is found here: https://www.cityofmadison.com/flooding/city-initiatives/watershed-studies

B. Purchasing Details

1. Guidelines for RFP Evaluation

The watershed study projects require highly technical staff with expertise in hydrologic and hydraulic modeling, geographic information systems (GIS), and public outreach and education techniques. As such, Engineering utilizes the City's Competitive Selection process.

The projects will be more than $100,000 and last longer than 1 year, therefore the competitive process outlined in the Purchasing Guidelines (https://www.cityofmadison.com/employeenet-finance/documents/PurchasingGuidelines.pdf), *Greater than 5 calendar/budget years or 1-5 years and averaging more than $100,000 per year – PO, RFP, Purchase of Services Contract, and Council Resolution*, was used.

The City of Madison solicited proposals from qualified vendors through a Request for Proposals (RFP) process. The RFP and associated materials were posted on the City's webpage and two distribution networks, VendorNet and DemandStar, on Tuesday, May 13, 2025. Prospective RFP respondents could submit questions about the RFP, due by Friday May 23 to be responded to by Wednesday, May 28, 2025. RFP responses were due to Purchasing on Wednesday, June 11, 2025.

Section B5. Evaluation Structure and Scoring describes the process used to select the consultant team for each watershed study.

2. RFP Respondents

The list below shows the consultant teams that proposed for the study.

Firm A – Carollo Engineers, Inc
Firm B –MSA Professional Services
Firm C – Baxter and Woodman Consulting Engineers

3. Disqualifications

No firms were disqualified.

4. Evaluation Panel

The evaluation panel for each study was composed of three City Staff from the Engineering Division Storm Section and one member outside of Engineering from the Water Utility. The evaluation panel was – Ryan Stenjem, Alaina Baker, Phil Gaebler, and Peter Braselton. The three Storm Section Staff on the panel bring previous experience in the watershed program, including watershed study project management, extensive watershed modeling experience, previous RFP review, and stormwater project design. Peter from the Water Utility, has experience in utility planning and modeling, data management, GIS analysis and management.

5. Evaluation Structure and Scoring

Per instruction within the Request for Proposals (attached to this document in Appendix A), respondents were asked to provide a proposal to be evaluated by the evaluation panel. Proposals were initially provided to a Purchasing Agent whom facilitated the review process.

Panelists followed City Purchasing Guidelines when evaluating the proposals. A maximum of 100 points were available. Cost was assigned a weight of 30%, Local Preference was assigned a weight of 5% per Resolution #05943, Project Understanding and Approach was assigned a weight of 25%, Project Team was assigned a weight of 20%, and Relevant Project Experience was assigned a weight of 20%. Please note the RFP provided detailed instruction and grading scales to each evaluated category.

Each member of the review panel first reviewed and scored each proposal for each study independently for technical content only (Approach, Team, and Relevant Project Experience), with costs removed. Scores were submitted to the Purchasing Agent

for compiling. Following completion of the individual review, the Review Panel met to discuss the proposals and at that time were provided the costs and local preference scores for each proposal. Following the meeting reviewers were allowed to review the detailed cost breakdowns and revise their technical scores if they wanted.

Additional email questions were sent to Firms B and C regarding the number of assumed solutions for the scope of work under Task 6 – Evaluate Flood Mitigation Alternatives. The RFP did not require a specific approach for estimating the proposed flood mitigation solutions, only Firm A clearly stated an assumed number of proposed solutions to be developed. There was concern that the Firm B and C may not have sufficient budget under Task 6 to meet the anticipated needs of the project given that Starkweather is the largest watershed in the city. Requesting the additional information allowed for more direct cost comparisons among the firms. After the additional correspondence; a total of $42,905 was added to the Firm B Task 6 budget, for a total project budget of $337,045; and a total of $50,000 was added to the Firm C Task 6 budget, for a total project budget of $294,896. It was determined that including these cost changes in the final scoring would not have significantly changed the final scores and the relative rankings would be the same.

Evaluations were documented through a quantifiable scoring mechanism – see Section C of this document. The evaluation was conducted in a structured manner that facilitated object comparison between proposals. Individual scores of each panel member were averaged to create the Combined Score for each Proposer for each Watershed Study.

Section C1 shows the proposal scoring for each watershed study.

All proposals are available for review. Due to the large size of the documents, there were not included with this Evaluation Panel Report.

6. Evaluation Timeline

May 13, 2025	– RFP issued
May 23, 2025	– Questions from Consultants due
May 28, 2025	– Answers to Consultant questions and Addendum 1 posted
June 11, 2025	– Proposals due
June 11, 2025	– Distribute proposals to evaluation panel for review and scoring prior to evaluation meeting
June 16, 2025	- Preliminary Technical Scores due to Purchasing
June 18, 2025	– Evaluation panel meets to discuss proposals and scores
June 23, 2025	– Review of Evaluation by Managing Engineers and revisions based on review
June 24, 2025	– Notify selected team of Intent to Award
June 24, 2025	– Notify teams not selected; results posted

C. Summary of Evaluation Panel Findings

1. Evaluation and Scoring

The selection process was competitive as three qualified proposals were received and multiple respondents have extensive knowledge or worked on watershed studies in the past. There was a wide range of costs across the three proposals representing three relatively different approaches to meeting the stated performance targets.

The combined scoring of the panel can be found in the table below.

		Baxter & Woodman					Carollo					MSA				
Criteria	Weight					Weighted Average					Weighted Average					Weighted Average
Project Understanding and Approach	25	4.00	6.00	8.00	4.00	13.75	6.00	8.00	7.00	7.00	17.50	10.00	6.00	9.00	8.00	20.63
Team Composition, Performance and Key Persc	20	5.00	7.00	9.00	5.00	13.00	9.00	8.00	9.00	6.00	16.00	9.00	5.00	8.00	7.00	14.50
Relevant Project Experience	20	7.00	8.00	8.00	6.00	14.50	6.00	8.00	7.00	7.00	14.00	8.00	5.00	7.00	8.00	14.00
Total	**65**					**41.3**					**47.5**					**49.1**

Criteria	Weight	Baxter & Woodman	Carollo	MSA
Technical score	65	41.30	47.50	49.10
Cost score	30	30.00	15.21	24.98
Local Vendor Preference	5	0.00	0.00	0.00
Total score	**100**	**71.3**	**62.7**	**74.1**

Notes:

1. Proposal review is the primary basis for evaluating the respondents (based on response to the RFP guidelines in Section 4)
2. Discussion among the panelists was held to share perspectives noted from the proposals during review and to deliberate over selecting a firm to recommend.
3. A full description of requested material and grading weights can be found in this resolution's associated RFP documents.

2. Fee Breakdown

The table below shows the fee break down for each firm.

Criteria		Baxter & Woodman	Carollo	MSA
Task 1 - Review Existing Watershed Models		$ 21,406	$ 84,000	$ 20,260
Task 2 - Develop and Calibrate Existing Conditions Models		$ 37,307	$ 93,100	$ 68,530
Task 3 - Evaluate Olbrich Gardens Sub-watershed Preliminary Storm Sewer Sizing		$ 13,683	$ 16,100	$ 15,520
Task 4 - Execute Existing Conditions Models		$ 13,898	$ 31,900	$ 27,520
Task 5 - Public Engagement 2				
Task 2 - PIM #1		$ 12,450	$ 4,000	$ 3,290
Task 2 - Focus Group or Stakeholder Meetings		$ 13,183	$ 8,500	$ 9,525
Phase 1 Subtotal		**111,927**	**237,600**	**144,645**
Task 6 - Evaluate Flood Mitigation Alternatives		72,538	189,000	85,220
Task 7 - Public Engagement 3				
Task 5 -PIM #2		12,450	5,200	3,290
Task 5 - Focus Group or Stakeholder Meetings				* optional 9525
Phase 2 Subtotal		**84,988**	**194,200**	**88,510**
Phase 3 - Task 8 - Final Report		22,464	19,900	21,150
Task 9 - Progress and Coordination Meetings		25517	31200	39835
Other Fees and Expenses			3900	
Total Cost		**$ 244,896**	**$ 482,900**	**$ 294,140**
Cost Points	30	30.00	15.09	24.98
Local Vendor Preference	5	-	-	-

Comments:

MSA and Baxter Woodman were asked to provide a budget estimate under Task 6 assuming that they evaluted 50 problem flooding areas for solutions to better meet the anticipated needs of the project. Carollo stated in their proposal that they assumed 50 problem areas would be evaluted. This would increase the total project contract costs for MSA by $42,905 and Baxter and Woodman by $50,000

Cost per Progress Meeting	$1,800.00	$830.00	$1,425.00
Cost per Public Information Meeting	$13,000.00	$5,200.00	$3,290.00
Cost per Focus Group or Stakeholder Meeting	$1,400.00	$850.00	$952.50

Additional Task 1	$9,000.00		
Additional Task 2	$45,000.00		
Additional Task 3			

3. Local Preference

The City of Madison has adopted a local preference purchasing policy granting a scoring preference to local suppliers. Only suppliers who meet the criteria and are registered as of the bid's due date will receive preference. www.cityofmadison.com/business/localPurchasing

Was the outcome of this bid changed by the local purchasing ordinance? ☐ Yes ☒ No

4. Recommendation

Firm B

Based on the evaluation, scoring, and discussion, the evaluation panel recommends that MSA Professional Services be approved as the consultant for the professional services required for the Starkweather Creek and Olbrich Gardens Watershed Study. Based on the questions and follow up with the Firms it is also recommended that the total contract amount for MSA be $337,045.

5. Additional Proposal Discussion

All members of the review team felt Firm B would be able to deliver a successful project. They provided a thorough and comprehensive project approach and more clearly identified solutions to fix the issues with the models built by the previous consultant than other proposers. They had a well-qualified project team, and extensive relevant experience. Their team has strong top to bottom experience using the desired modeling software and has previous experience completing watershed studies within the City of Madison. While they were not the absolute lowest cost proposer the review panel had concerns about the technical approach of the lowest cost proposal since it would be drastically different than what has been done in the 21 other watershed studies in progress or completed.

Appendix A – 2025 Starkweather Creek and Olbrich Gardens Watershed Study RFP

CITY OF MADISON

REQUEST FOR PROPOSALS

RFP #: 14028-0-2025-BG

Title: Starkweather Creek and Olbrich Gardens Watershed Models Calibration and Flood Mitigation Modeling

City Agency: Engineering Division

Due Date: Wednesday, June 11th, 2025
2:00 PM Central Time

Our Madison – Inclusive, Innovative, & Thriving

1 OPPORTUNITY AND WELCOME

Thank you for your interest in bidding on a City of Madison (City) contract opportunity. The City's mission is to provide the highest quality service for the common good of our residents and visitors.

The City of Madison Engineering Division is seeking proposals from firms or teams (Consultant) for advanced watershed modeling and planning services for Starkweather Creek and Olbrich Gardens Watershed Models Calibration and Flood Mitigation Moldeling.

Thank you for considering this opportunity to work with the City and further our mission!

1.1 Background

The City of Madison, like many communities, has seen a recent increase in extreme flood events. This increase has occurred most notably in Madison since 2016, when a large and intense rain event in late July caused extensive flooding of public and private property on Madison's west side. Large events in July 2017 and June 2018 caused similar flooding, again largely focused on Madison's west side.

On August 20, 2018, Dane County experienced an unusual precipitation event that caused flooding in excess of that seen in any of the prior events mentioned. Rain gages monitoring that event registered between 3-4" of precipitation on Madison's east side and 8-10" of precipitation on its west side over (approximately) a 12-hr period. Many of Madison's west side neighborhoods experienced flash flooding, resulting in millions of dollars in property damage.

In response to the damage incurred due to recent extreme rainfall events, as well as the likely increasing frequency of such events due to global climate change, the Madison Common Council authorized the City of Madison Engineering Division (City Engineering) to develop watershed models and plans for watersheds of greatest concern in the Madison area. Specific watershed information is included in Exhibits 1a-1b.

1.2 Summary of Services Requested

This Request for Proposals (RFP) is intended to solicit information from interested firms including qualifications of project team and key personnel, project understanding and potential challenges, previous related project experience, level of effort, and schedule of services. City of Madison Engineering staff will use submitted RFP responses to select the Consultant to complete the watershed modeling and planning work.

The City of Madison Engineering Division is developing actionable mitigation measures in each watershed to meet the City's goals of reducing damages associated with flooding events, prioritizing for flood mitigation projects and providing enough guidance to budget for the construction of projects identified in the watershed plans. Phase 1 is for model development and analysis of existing conditions. Phase 2 is anticipated to cover conceptual development of flood mitigation solutions and detailed modeling of preferred mitigation measures, providing cost-benefit information and design feasibility analyses. Phase 3 is anticipated to cover final modeling, mitigation alternative refinement, and report documentation.

The City has a set of five (5) XPSWMM models of the Starkweather Creek and Olbrich Gardens Watersheds Study Area constructed by others under a previous contract. However, these models have not achieve a satisfactory level of calibration. Additional work is needed to bring these models up to the standards needed to meet the City's Watershed Study Program objectives. The selected Consultant will review the existing models, identify and resolve model instabilities or errors, and calibrate the models using monitoring data provided by the City. The Consultant will then evaluate existing stormwater flooding conditions and develop a set of mitigation solutions in accordance with the City's Watershed Study Program and Scope of work described herein.

The City requests that work on the Olbrich Gardens sub-watershed be prioritized ahead of the remaining sub-watersheds in the study area. Additional details regarding this requirement are provided in the scope of work in Section 5.

The City has budgeted $250,000-$300,000 for the scope of work described.

1.1 Project Area

The watersheds included in this RFP process are listed below. Additional specific watershed information is found in:

Exhibit 1: Starkweather Creek and Olbrich Gardens

It is expected that the CONSULTANT will complete site investigations to become familiar with the watershed.

2 IMPORTANT INFORMATION

DEADLINE FOR PROPOSALS: Wednesday, June 11th, 2025 at 2:00 PM Central Time.

The City will not accept late proposals. Any changes to the deadlines will be posted as an addendum on the bid distribution websites listed below. See Section 3.1 for instructions for using these websites.

RFP NAME: Starkweather Creek and Olbrich Gardens Watershed Models Calibration and Flood Mitigation Modeling	
DEADLINE FOR QUESTIONS:	The deadline for questions is Friday, May 23rd, 2025 at 2:00 PM Central Time. Questions and/or inquiries must be submitted by email.
CITY'S ANSWERS POSTED BY:	The City's answers to your questions will be posted as an addendum by Wednesday, May 28th, 2025. You must check the bid distribution websites for any addendums.
DUE DATE FOR PROPOSALS:	Wednesday, June 11th, 2025 2:00 PM Central Time
BID DISTRIBUTION WEBSITES:	https://vendornet.wi.gov/Bids.aspx https://www.demandstar.com/
CONTACT INFORMATION:	Brittany Garcia Purchasing Services 210 Martin Luther King, Jr. Blvd. Room 407 City-County Building Madison, WI 53703-3346 Phone: (608) 608-243-0529 Email: bids@cityofmadison.com

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Exhibit 3: City of Madison Modeling Guidance

Exhibit 4: Final Report Outline and Deliverables Format XPSWMM models and Geodata available by FTP link

3 HOW TO FIND RFP DOCUMENTS AND CONTACT THE CITY OF MADISON

3.1 Official Bid Distribution Websites – IMPORTANT

The City of Madison posts all requests for proposals (RFPs), addendums, updates, awards, and announcements on two websites: VendorNet and DemandStar. Both sites are free to register for City of Madison bids.

These two websites are the only places to get the official RFP and updates to the RFP.

Updates and addendums will only be posted on these websites. It is your responsibility to check the websites for updates and "addendums." An addendum is a document that answers questions from bidders. It could make important changes to the RFP. **If the addendum requires a response, and you fail to respond to it, you could be disqualified.**

State of Wisconsin VendorNet System	State of Wisconsin and local government bid network. Registration is free. Search for City of Madison in the Agency search field.
VendorNet link	https://vendornet.wi.gov/Bids.aspx
DemandStar by Onvia	National bid network. Free subscription is available. Sign up for the free "Basic Plan" and select Wisconsin Association for Public Procurement (WAPP) as the agency to access City of Madison RFPs.
DemandStar link	https://www.demandstar.com/app/agencies/wisconsin/city-of-madison-purchasing-services/procurement-opportunities/573ff565-ce2b-4c75-86ec-401cd5abf736/
Register on DemandStar	www.demandstar.com/app/registration

3.2 Contact Information

City of Madison Purchasing Contact (Buyer)	Brittany Garcia City of Madison Engineering Division 210 Martin Luther King, Jr. Blvd. Room 407 City-County Building Madison, WI 53703-3346 PH: (608) 608-243-0529 bids@cityofmadison.com
Questions about Affirmative Action Plans	Contract Compliance, Department of Civil Rights 210 Martin Luther King, Jr. Blvd. Room 523 City-County Building Madison, WI 53703 PH: (608) 266-4910 dcr@cityofmadison.com
Email note	Some email to the City gets lost in "spam." If you send the City an email and you do not hear back within 3 days, please call the Buyer at (608) 608-243-0529.

4 OUR PURCHASING VALUES

4.1 Local Preference Purchasing Policy

The City of Madison gives preference to local vendors and suppliers. You must be registered with the City as a local vendor by the RFP due date to get preference points. Learn more and register at the City of Madison website: www.cityofmadison.com/finance/purchasing/local-businesses/register-business/

If you are a local vendor, be sure to complete the Local Vendor section on Form C.

4.2 Equity in Contracting

The mission of the City of Madison is to provide the highest quality service for the common good of our residents and visitors. The City's values include

- Equity - fairness, justice and equal outcomes for all, and
- Shared prosperity - where all are able to achieve economic success and social mobility.

It is our goal to spend money equitably among businesses owned by women, people of color, and small businesses. Our contractors should reflect shared dedication to equity in their work and employment practices, and we invite you to become part of this mission!

4.3 Equitable Hiring & Affirmative Action Plan

Affirmative Action Plan The City of Madison values diversity in hiring and contracting. We expect our contractors to do the same. Contractors with 15 or more employees and more than $50,000 in annual contracts with the City (each calendar year) must submit an **Affirmative Action Plan.**

Information about the Affirmative Action Plan and how to comply is found here: https://www.cityofmadison.com/civil-rights/contract-compliance/affirmative-action-plan/vendors-suppliers

Or call the Affirmative Action Division at (608) 266-4910.

See **Section 13. B. of the Sample Contract** for Affirmative Action Plan requirements.

Job Openings in Dane County You must notify the City of openings for jobs in Dane County, Wisconsin if you have 15 or more employees. You must agree to interview candidates that we refer to you through our Referrals and Interviews for Sustainable Employment (RaISE) program. Information is here: http://www.cityofmadison.com/civil-rights/programs/referrals-and-interviews-for-sustainable-employment-raise-program

The job posting requirement is found in **Section 13 A. of the Sample Contract.**

4.4 Limitations on Nuclear Weapons Producers

It is the City's policy not to make purchases from companies that produce nuclear weapons, or their subsidiaries. See Common Council Resolution 79719 for more information.

4.5 Sweatfree Purchasing

It is the City's policy not to purchase apparel (clothes made from textiles, shoes, footwear) from vendors who source their materials from sweatshops, where labor practices are inconsistent with international standards of human rights. See Madison General Ordinances Section 4.25 (https://library.municode.com/wi/madison/codes/code_of_ordinances?nodeId=COORMAWIVOICH1--10_CH4FI_4.25PRITAP) for more information.

5 SCOPE OF WORK AND REQUIRED INFORMATION

5.1 Scope of Work

The Starkweather Creek and Olbrich Gardens Watershed Study Area is the largest watershed study area in the City of Madison (Exhibit 1b). The City already has five (5) existing 1D/2D computer models covering the containing the entire study area built in XPSWMM 2020.2 by others. The CONSULTANT will evaluate the models and find the most effective way to develop flood inundation mapping for the entire study area in accordance with the City's Watershed Study Program. Whether utilizing the existing models or developing a new model or multiple models. It is the City's desire to develop and maintain 2D flood mapping at grid dimension of approximately 10-15 ft. Documentation of issues known to the City with the existing models and configuration are provided in Exhibit 1c to this RFP. This information may not be comprehensive of all errors or deficiencies in the modeling.

Specific tasks for this RFP have been identified below, along with the required deliverables per task. All cost estimates shall refer to the specific task number or sub-task component as outlined in the **Cost Proposal** document, included with the RFP.

Consultants are encouraged to review in detail the preferred scope of work described herein and may propose deviations or alternative approaches that, in their professional judgment, will better achieve the project objectives. Any such deviations or alternatives must be clearly documented and justified within the proposal. The City will review all proposed deviations during the selection process, and, if accepted, they will be incorporated into the final contract scope of services.

To address the City's desire for expedited analysis and project development in the Olbrich Gardens sub-watershed, the CONSULTANT shall treat Olbrich Gardens as a priority work package within this contract. All modeling, calibration, analysis, and reporting tasks for Olbrich Gardens shall be completed and delivered to the City prior to commencing equivalent tasks for the remaining sub-watersheds within the Starkweather Creek Study Area. This approach is intended to allow the City to advance project development and potential implementation in Olbrich Gardens ahead of the broader study area.

For each task in Phases 1 and 2, the CONSULTANT shall first complete all work for the Olbrich Gardens sub-watershed and submit deliverables and then move on to subsequent tasks for the sub-watershed. All other sub-watersheds in the study area shall progress through the study tasks together.

Please note, the Scope of Services outlined below is distinct to the Starkweather Creek and Olbrich Gardens Watershed Study. It is the responsibility of the CONSULTANT to read and understand differences in the Scope of Services from past RFP issuances.

PHASE 1 Existing Conditions

TASK 1 Review Existing Watershed Models

The City will provide the consultant with all five (5) existing models within the study area. Additionally, available GIS supporting data used in constructing the models will be provided including storm pipes, storm structures, and subbasin areas.

The methodology for establishing boundary conditions between the models have not yet been established and will need to be determined by the CONSULTANT (except for the outlet boundary to Lake Monona). The CONSULTANT shall describe how they will incorporate appropriate boundary conditions and inflow hydrographs, as well as, how the watershed-wide inundation mapping will be created.

All work described in this task shall be completed for the Olbrich Gardens sub-watershed as a first priority.

1.1 CONSULTANT shall first review the existing model(s) for the Olbrich Gardens sub-watershed, meet with the City and discuss findings and a modeling approach. The consultant then may proceed to Task 2 within the Olbrich Gardens sub-watershed only and proceed with work under Task 1 for the remaining sub-watersheds.

1.2 CONSULTANT will review the existing set of five (5) XP-SWMM 1D/2D watershed models provided by the City for the Starkweather Creek watershed. The review shall include, but not be limited to,

assessment of model construction, identification of errors, consistency with the City's most recent modeling guidance documentation, and evaluation of model stability.

1.1 CONSULTANT will systematically identify and document model construction errors, including but not limited to:

- Incorrect or missing connectivity between model elements
- Data entry errors (e.g., invert elevations, pipe sizes, structure attributes)
- Incomplete or inconsistent representation of physical features, particularly bridges or other 1D/2D connections
- Issues with model geometry or network configuration

1.2 CONSULTANT will evaluate model stability for each of the five models, identifying sources of instability such as excessive continuity errors or convergence issues.

1.3 CONSULTANT will document all identified stability issues and model construction errors and propose corrective actions. All corrections and modifications shall be documented in a summary memorandum, including rationale for changes.

1.4 CONSULTANT will propose and develop a methodology for establishing appropriate boundary conditions to ensure proper linkage between the models during calibration and design storm simulations. The proposed methodology shall consider the following:

- Accuracy, consistency, and stability of model results near the boundary.
- Justification of boundary condition selection (e.g., flow, stage, rating curve)
- Available data sources
- Procedures for updating and linking models at shared boundaries for various design storms under existing and proposed conditions
- Recommendations for any additional data collection or analysis needed to support boundary condition development
- The Lake Monona boundary condition for design storm analysis shall be 1 ft over the Summer Target Maximum, established by the WI DNR operating order. (Unless otherwise directed by the project manager prior to the modeling of design storms).
- The Lake Monona boundary condition for calibration storms shall be set based on Lake Monona gage location maintained by USGS (USGS 05429000), unless otherwise agreed to by the city.

TASK 1 Deliverables:

1) Meeting with City Staff to discuss review findings of the Olbrich Gardens sub-watershed model and recommendations for model improvement.
2) For all sub-watersheds, a technical memorandum summarizing:
    1. Model construction errors, stability issues, and any recommended corrective actions to be taken.
    2. Proposed methodology for upstream and downstream boundary conditions, including supporting documentation and recommendations
3) Meeting with City staff to review findings and proposed approach for all sub-watersheds

TASK 2 Develop and Calibrate Existing Conditions Models

CONSULTANT will conduct hydrologic and hydraulic modeling as described in this project using Innovyze's/Autodesk's XP-SWMM 1D and 2D software. The version of the software will be explicitly agreed to in writing by the City prior to beginning model calibration. The modeling version shall not change after the model is determined by the City to be calibrated.

CONSULTANT will also use ArcGIS as-needed for the project; where the City is on a different version of ArcGIS than the CONSULTANT, CONSULTANT will save files to version the City is in. City is currently utilizing ArcGIS v10.8.

All work described in this task shall be completed for the Olbrich Gardens sub-watershed as a first priority.

2.1 CONSULTANT shall implement watershed model modifications to improve model stability and connectivity identified in TASK 1. This may include constructing new models if CONSULTANT determines that is the preferred approach.

2.2 The CONSULTANT shall develop and submit Non-calibrated Olbrich Gardens model input and output for City review and acceptance prior to commencing equivalent work for the remaining sub-watersheds

Once the City has accepted the Olbrich Gardens Non-calibrated model work on the Olbrich Gardens sub-watershed may progress to TASK 3 for the Olbrich Gardens sub-watershed only, unless otherwise agreed to by the City.

2.3 A Modeling Guidance document has been created for the Watershed Studies to provide for consistency in modeling among watersheds. It is understood this document will evolve as modeling tools and data change. The CONSULTANT will coordinate with City and other Consultants to update the Modeling Guidance document where appropriate for these watershed studies (*see Exhibit 3*). Coordination may be done via email or phone.

The Modeling Guidance document will be updated and maintained to reflect group decisions on the modeling source documents, naming conventions, standardized coordinate systems, modeling input parameters, and other factors to maximize the consistency among the models being developed for all watersheds.

The Modeling Guidance document will include documentation of modeling parameters and agreed-upon changes to parameters with a log of dates,

The Modeling Guidance document will include documentation of all other agreed-upon changes by the City and CONSULTANT.

The City will have final veto authority over any and all changes to the Modeling Guidance document.

2.4 For the purpose of this contract, the level of effort required shall be reflected in the assumptions made within the Modeling Guidance document, dated May 8, 2025 and provided with this RFP. Any further assumptions or changes to the Modeling Guidance document that will result in a measurable increase in the level of effort will be consulted with the City and adjustments to the contract cost will be determined prior to proceeding.

2.5 If the CONSULTANT considers the level of effort outlined in the Modeling Guidance to be insufficient to meet the City's flood mitigation goals (as outlined in the Modeling Guidance document) in some or all of the proposed model area, they are encouraged to address that in their response to this RFP.

2.6 If the CONSULTANT considers the level of effort outlined in the Modeling Guidance to be sufficient to meet the City's flood mitigation goals, but would recommend increased level of effort in some or all parts of the model to meet a different standard, they are encouraged to scope the proposal to the level of effort outlined in the Modeling Guidance document. Discussion of the increased level of effort, and its associated costs, should be included with this submittal as an Additional Task or Service in the Attachments/Appendices section of the CONSULTANT's response to this RFP (see Section 5.3 of this RFP).

2.7 *Exhibit 1* identifies areas of concern and known areas of flooding. Additional model detail is anticipated for the identified areas. The level of detail is dependent upon the specific area. **CONSULTANT TO PROVIDE AN APPROACH AND SCOPE FOR THE APPROPRIATE LEVEL OF DETAIL BASED ON THEIR PROFESSIONAL JUDGEMENT.**

2.8 Applicable portions of the private conveyance system may be included; the expectation is that private systems and private properties will be analyzed to the extent necessary to build and calibrate the models. This effort is not intended to result in solutions to solve flooding on private property but it may be necessary in order to accurately build and calibrate the model. If additional work beyond the assumptions are required on a case by case basis, that should be noted and provided to the City for consideration of additional compensation.

2.9 Following the review and refinement of the existing conditions model, the CONSULTANT will calibrate the model with available data.

2.10 The City of Madison monitored key locations within the watershed in accordance with the joint USGS-City of Madison monitoring plan for the watershed. Monitoring began in the Spring of 2020 and continued until Fall of 2021. Monitoring data will be provided to the CONSULTANT in spreadsheet format for the locations within the watershed.

2.11 CONSULTANT will review the calibration data and identify suitable calibration events based on rainfall measurements and collected monitoring data. A total of six (6) locations had water level or flow monitoring equipment installed during the monitoring period. CONSULTANT shall attempt to identify calibration storms with high quality data at all locations. The final number of locations considered for use in calibration shall be based on the actual number of locations successfully monitored by the USGS with qualifying rain events.

2.12 Calibration will consider applicable rainfall data collected and damage information from August 20, 2018 storm if available. It will also consider anecdotal information collected during PIM #1 or Focus Groups, debris line surveys, or other pertinent information provided by the City or the public.

2.13 CONSULTANT will complete field verification, site visits, and evaluations as necessary to verify the existing conditions model.

2.14 Calibration will be attempted for no more than three (3) 2020-2021-monitored storm events. The three (3) events will be selected by City and CONSULTANT(s). If suitable events cannot be identified, CONSULTANT and City will agree on revised schedule for both monitoring and remainder of modeling.

2.15 For purposes of this project, the model will be considered to be calibrated if the overall average model bias for water surface elevations is within +/- 5% with reasonable effort made to minimize the largest absolute error while at the same time balancing that effort with the relative importance of the model results at each monitoring site location. The largest absolute error at each monitored location is defined as +/- 25%. It is understood that there may be some circumstances where calibration at this level cannot be accomplished. If calibration cannot be accomplished, CONSULTANT and the City will discuss and decide on an acceptable course of action.

2.16 CONSULTANT will apply calibration parameters determined for the study area to the Olbrich Gardens model. Based on the anticipated sequence of work the calibration adjustment for Olbrich will take place after completion of work on TASK 3.

2.17 CONSULTANT will participate in one (1) meeting (virtual or in person) with City staff to discuss the calibration methodology prior to creation of the existing conditions model. This may be done in conjunction with the monthly progress meetings. Calibration parameters will be discussed and agreed upon prior to proceeding with following tasks.

2.18 CONSULTANT will complete field verification, site visits, and evaluations as necessary to complete and verify the existing conditions model.

TASK 2 Deliverables:

1) Non-Calibrated Existing Conditions Model input files
    a. Olbrich Gardens
    b. Other sub-watersheds
2) Non-Calibrated Existing Conditions Model output files
    a. Olbrich Gardens
    b. Other sub-watersheds
3) GIS shapefiles and feature classes including (if revised from what city provided in TASK 1):
    a. Subbasins
    b. Flow paths
    c. Modeled conveyance network (pipes, structures, greenways, etc)
4) Tables and graphs to illustrate calibration
5) Calibrated Existing Conditions Model Input
6) Calibrated Existing Conditions Model Output
7) Calibration Memo describing calibrations and pre-and post-calibrated parameters

TASK 3 Evaluate Olbrich Gardens Sub-watershed Preliminary Storm Sewer Sizing

The City has developed preliminary storm sewer sizing for several proposed areas within the Olbrich Gardens sub-watershed to as part of near-term street reconstruction projects. The City would like to understand the performance of the proposed improvements ahead of the remaining watershed study.

3.1 CONSULTANT shall execute the Non-calibrated Olbrich Gardens model for the 1-, 2-, 5-, 10-, 25-, 100-, 200-, and 500-yr, 24hr storm events.

3.2 CONSULTANT shall input City's preliminary pipe sizing into the un-calibrated Olbrich Gardens Watershed Model and execute the model for the storm events listed in Section 3.1.

3.3 CONSULTANT shall evaluate the performance of the City's preliminary storm sewer pipe sizing against the City's flood mitigation targets.

3.4 CONSULTANT shall prepare maps of the Existing Conditions and Proposed Conditions maximum extent flood inundation for the 1-, 2-, 5-, 10-, 25-, 100-, 200-, and 500-yr, 24 hour storm events and meet with the City to discuss the findings of the analysis. At this point the consultant should pause and meet with the City to determine if/where additional pipe sizing or mitigations solutions should be evaluated should be investigated.

3.5 If the City determines the preliminary pipe sizing is insufficient, CONSULTANT shall provide recommendations for alternative pipe sizing or configurations, or detention.

TASK 3 Deliverables

1) Non-calibrated existing conditions Olbrich Gardens sub-watershed model.
2) Non-calibrated proposed conditions Olbrich Gardens sub-watershed model.
3) Color figures showing maximum extent of flooding in the Olbrich Gardens sub-watershed under existing conditions.
4) Meeting to discuss findings of analysis of City's preliminary storm sewer pipe sizing.
5) Color Figures showing proposed pipe sizing, or other flood mitigation measures, if the City's pipe sizing is determined to be insufficient.

TASK 4 Execute Existing Conditions Models

4.1 CONSULTANT will run the calibrated model for the 1-, 2-, 5-, 10-, 25-, 100-, 200-, and 500-yr, 24-hr design events using the MSE4 rainfall distribution and the rainfall depths provided by the City in the Modeling Guidance document.

4.2 CONSULTANT shall also run one long-duration (>24-hr) event as described in the Modeling Guidance document for the existing conditions model.

4.3 CONSULTANT will review model results with City Engineering staff. This meeting shall be face-to-face and may be done in conjunction with the monthly progress meetings.

4.4 The City will provide information on the preferred symbology for inundation depth mapping.

4.5 CONSULTANT will prepare a Draft Watershed Existing Conditions Report and provide draft documents for City staff review. The City has developed an outline for the report and will provide it to the CONSULTANT. The report shall include the following:

1) Introduction
2) Description of existing conditions.
3) Current land uses and assumptions
4) Land use maps
5) Soils maps
6) Major storm infrastructure networks
7) Calibration methodology, approach, and results
8) Maximum extent of flooding figures / inundation mapping under the 1-, 2-, 5-, 10-, 25-, 100-, 200-, and 500-yr, 24-hr design events
9) Modeling Guidance documentation (if revised for any reason).

10) Compiled feedback from Focus Groups and PIMs #1 and #2.

TASK 4 Deliverables:

1) Color figures showing the maximum extent of flooding during each storm event. The figures shall be color coded to show depth of flooding (typical ranges utilized are: 0.01'-0.25', 0.25'-0.5', 0.5'-1.0', and greater than 1').
2) Table noting the flooding depth for up to 25 locations for each design storm. Locations will be determined through coordination with City staff.
3) Table and figure showing structures flooded during the 100-yr storm event.
4) Table and figure showing streets not meeting 10-year goal.
5) Draft report for existing conditions.
6) Model files and documentation.
7) GIS files generated for model development. All files shall be delivered to the City on an external hard drive.

TASK 5 Public Engagement 2 (Present Existing Conditions Results and Get Feedback from Stakeholders)

The first Public Information Meeting (PIM #1) for the study area has already been held. CONSULTANT will not be responsible for additional outreach prior to PIM#2

5.1 CONSULTANT will provide information materials and three (3) staff people to help conduct Public Information Meeting #2 (PIM #2). The purpose of PIM #2 is to present the existing conditions modeling results and ask for public feedback regarding the results.

5.2 PIM #2 will be held following the calibration of the existing conditions model. City has prepared a PIM #2 template that will be provided. CONSULTANT will create supplemental materials including in the PowerPoint presentation and a map showing the project area. CONSULTANT shall provide draft PowerPoint presentation to the City and work with City staff to finalize the presentation.

5.3 CONSULTANT will provide one (1) staff person and facilitate up to ten (10) focus group or stakeholder meetings, as authorized and organized by the City, with affected residents or neighborhoods. The purpose of the meetings will be to gather additional information and gain input regarding flooding impacts in specific locations.

5.4 The City will identify the group(s) for each meeting, arrange for a suitable location, and notify residents of the meeting. CONSULTANT will provide the materials created for PIM #2 as well as 11x17" figures of each focus group/stakeholder's area of interest.

5.5 CONSULTANT will conduct the listening session and document the citizen comments.

TASK 5 Deliverables:

1) Public feedback from implemented public outreach and engagement plan
2) PIM #2 presentation in PowerPoint format.
3) Other PIM#2 presentation materials as necessary.
4) 11"x17" focus group area figures.
5) Compile feedback and responses to questions from PIM#2 and focus groups and provide report to the City. This report shall include an executive summary that can be posted to the City website.
6) Specific focus group deliverables include:
    - Bulleted summary of information provided by focus group attendees
    - Point shapefile/feature class showing locations that were visited during focus group
    - If reasonable, August 2018 flood extent sketch for each focus group
    -

PHASE 2 Develop Recommended Flood Mitigation Solutions

CONSULTANT shall not move on to Phase 2 without express direction by the City. All comments and changes as identified by the City in Phase 1 and any respective modeling, calibration and draft report modifications shall be addressed prior to starting the mitigation alternative analysis.

TASK 6 Evaluate Flood Mitigation Alternatives

6.1 Peak Flow Control

For purposes of this watershed study, Peak Flow Control (PFC) is considered any stormwater control measure that can store or convey water but is not intended to infiltrate water. These types of stormwater control measures could be referred to as Grey Infrastructure.

This Task has subtasks. First, the Consultant will identify possible causes of flooding in Task 6.1.1. Then, in Task 6.1.2, the Consultant will identify potential locations for solutions. Task 6.1.3 will combine Tasks 6.1.1 and 6.1.2 to develop and evaluation solutions to mitigate the potential causes.

6.1.1 Identify Causes of Flooding

The objective of this subtask is to identify the major causes of flooding, but not necessarily solve them. This will:

- Guide later sections of this scope
- Provide big picture causes such that if the solutions presented in the final report cannot be implemented, then other options targeting the issue can be developed at a later date

General causes include but are not limited to:

- Undersized surface storage – insufficient above-ground storage capacity (ponds, etc)
- Insufficient surface-to-underground conveyance capacity – insufficient inlet/pond discharge/etc. capacity to allow water to exit the above-ground system and enter the below-ground system
- Restrictions in underground system – undersized trunk line conveyance
- High tailwater at discharge point

Use the inundation maps and flooding locations table generated in TASK 4, Deliverables 1 and 2 in the Scope of Work to identify problem flooding areas throughout the watershed.

Using professional judgement and drainage network properties (including but not limited to contributing area and existing storm infrastructure), identify locations where flooding occurs and the identified reason(s) for flooding throughout the watershed for the 10-yr, 25-yr, and 100-yr, 24-hour MSE4 storm events. It is understood that locations may vary in meeting the City's Goals based on the storm event.

The Consultant should use the City of Madison Flood Mitigation Goals in the Modeling Guidance Document to guide selection of the locations.

Prior to finalizing the selection of locations, the CONSULANT should meet with City staff to review locations and discuss the identified reasons for flooding.

Deliverables for this step shall include:

1) Color map of watershed with selected locations clearly identified for each storm event.
2) For each selected point, a brief description of why that point was selected for further study.

6.1.2 Develop Solutions for PFC

The City's preferred approach to developing a set up flood mitigation solutions is provided below. If the CONSULTANT prefers an alternate approach it shall be documented in writing and approved by the City prior to proceeding.

Step 1: Create a Model with All Potential Peak Flow Control Infrastructure.

This step creates a theoretical scenario to understand what the outcome would be if all available Peak Flow Control Infrastructure (PFCI) were implemented.

The first part of Step 1 will be to meet with City staff for a brainstorming session. Consultants should be prepared with high-level, idyllic solutions to solve flooding. For

example, a solution that could solve flooding would be to install 6' x 10' box culverts under every street in a watershed. Although this could solve flooding, it may not be feasible for a particular watershed. During this meeting, high-level, idyllic solutions will be discussed and guidance will be given to the consultant on which to further evaluate.

Using the information from the meeting, maximize a PFCI in each watershed. These solutions may "oversolve" the flooding; this is okay for this step as it will be refined in subsequent steps.

Solutions offered shall not make conditions worse downstream (worse is defined as increased peak water surface elevations), unless the upstream solution is paired with a downstream solution that mitigates the worsened condition.

For this step, assume solutions may not increase peak flows to a downstream municipality.

A solution may solve flooding at multiple locations or there may be a solution for each identified location.

This model will be called the *Maximum PFCI Model*. Run the model for the 10-yr, 25-yr, 100-yr and 500-yr, 24-hour MSE4 storm events. Note: solutions do not need to be provided for the 500-year, 24-hour event. The purpose of the model run is to understand the effect the solutions have on that storm.

Deliverables for this step shall include:

1) A spreadsheet or list for each PFCI that includes rough sizing/dimensions where applicable (approximate storage volume required, increase in pipe size, diversion pipe size, etc.).
2) Color figures showing the maximum extent of flooding during each storm event. The figures shall be color coded to show depth of flooding (typical ranges utilized are: 0.01'-0.25', 0.25'-0.5', 0.5'-1.0', and greater than 1').
3) Table noting the flooding depth for the locations identified during Task 4 for each design storm.
4) Table and figure showing structures flooded and removed during the 100-yr storm event.
5) Model files and documentation.
6) GIS files generated for model development. All files shall be delivered to the City on an external hard drive.

At this point, Consultants will pause on proposed tasks while City conducts internal meetings with City agencies including, but not limited to, the Parks, Forestry and Streets Departments and the Office of the Mayor. Consultants are not expected to attend these meetings.

Step 2: Develop PFC Solutions Model
Using the information identified in Task 6.1.1and the information the City collects during its internal meetings, develop "feasible" solutions to solve the identified causes of flooding. Solutions could include:

- Above-ground detention basins
- Additional inlets
- Underground storage
- Enlarged greenways and pipes
- Pumping
- Locations to purchase property that is repeatedly flooded

- Other solutions the consultant deems sound

It is expected that one (1) holistic set of solutions will be developed for the watershed.

The consultant shall develop conceptual solutions to meet the goals of the watershed studies as outlined in the Modeling Guidance. The holistic set of solutions should include conceptual solutions to meet all City Goals in all areas of the watershed unless a location(s) is explicitly discussed with City staff and removed from the solutions set.

Conceptual solutions should consider:
- Utility conflicts (using available data)
- Topographic relief (if pumps are required to get stormwater runoff to/from PFCI)
- Downstream flood impacts
- Environmental concerns (using available data including CARPC info, wetland indicators, etc)
- Permitting concerns

This model will be called the *PFC Solutions Model.* Run the model for the 2-yr, 5-yr, 10-yr, 25-yr, 100-yr and 500-yr, 24-hour MSE4 storm events. The purpose of the model run is to understand the effect the solutions have on each incremental storm event.

Develop conceptual (30%) cost estimates for each proposed PFCI included in the *PFC Solutions Model*.

Deliverables for this step shall include:
1) A spreadsheet or list for each PFCI that includes rough sizing/dimensions where applicable (approximate storage volume required, increase in pipe size, diversion pipe size, etc.).
2) Conceptual (30%) drawings (1 per PFCI) showing (if applicable):
    a. The footprint and inlet/outlet information for storage or greenway modifications
    b. Tie-in and required changes (increased size, decreased size, abandonment, etc) to existing storm sewer system
    c. Locations of additional inlets
    d. Location of pump station, pump station footprint, and inlet/outlet pipes
    e. Locations of properties to be purchased
    f. Utility conflicts from existing available GIS data
    g. Known wetlands/FEMA floodplains/environmental areas of concern
3) Conceptual (30%) cost estimates utilizing unit costs provided by the City for items identified by the Consultant.
4) Color figures showing the maximum extent of flooding during each storm event. The figures shall be color coded to show depth of flooding (typical ranges utilized are: 0.01'-0.25', 0.25'-0.5', 0.5'-1.0', and greater than 1').
5) Table noting the flooding depth for the 25 locations identified during TASK 4.
6) Table and figure showing number of structures flooded and removed from flooding during the 100-year event.
7) Figure showing streets meeting and still not meeting goal during the 10-year storm event.
8) Model files and documentation.
9) GIS files generated for model development. All files shall be delivered to the City on an external hard drive.

6.1.3 Assess the 500-yr Storm and Potential Upgrades

The purpose of this subtask is to further understand where it may be practical to purchase property and/or where PFCI could be maximized to achieve additional flood control benefits. In

some cases this may not be practical or feasible, therefore solution is considered partially theoretical.

Using the model from Task 6.1.2, Step 2 (PFC Solutions Model) as a base, increase the capacity of all conveyance, storage, and/or pumps in the model to relieve as much flooding as possible for the 500-yr event while staying within the ownership boundaries of the PFC devices. For example, if a PFCI is going to be proposed for an open lot owned by the City of Madison, maximize the PFCI on the land owned by the City but do not go outside those boundaries. This model is called the *Upsized PFC Solutions Model.*

The solutions may involve increase infrastructure upstream and/or downstream of the solutions identified in Task 6.1.2, Step 2, as long the solution stays within the ownership boundaries.

Run the *PFC Solutions Model* from Task 6.1.2, Step 2 for the 500-yr event. Compare the results from this model to the results of the *Upsized PFC Solutions Model* run for the 500-yr storm.

As part of the comparison, identify the location and number of buildings that are no longer inundated with the upsized PFCI. For purposes of this analysis, inundation will be identified as water touching a structure.

Prepare a conceptual (30%) cost estimate for upsized PFCI identified in Task 6.1.2.

Deliverables

1) Comparison of infrastructure costs between the *PFC Solutions Model* and the *Upsized PFC Solutions Model* for the 500-yr event
2) Count of buildings inundated in *PFC Solutions Model* compared to the *Upsized PFC Solutions Model* during the 500-yr event
3) Model files and documentation

6.2 Draft Watershed Proposed Solutions Report:

CONSULTANT will provide a draft document for the proposed mitigation alternatives to be reviewed by the City.

The report shall include the following:

1) Overview and description of the modeling approach and selection of solution locations.
2) Proposed solutions for deficiencies.
3) Maximum extent of flooding/inundation maps comparing existing and proposed alternatives.
4) Critical elevations in areas where structural flooding is occurring for the 500-year flood extent.
    a. Critical elevations for structures will be based on available data provided by the City and/or from field survey work conducted by the survey firm under City contract.

TASK 6 Deliverables

1) Color figures showing the maximum extent of flooding during each storm event for each alternative. The figures shall be color coded to show depth of flooding (typical ranges utilized are: 0.01'- 0.25', 0.25'-0.5', 0.5'-1.0', and greater than 1.0').
2) Table noting the flooding depth for up to 25 locations identified during Task 4 for each design storm.
3) Table and figure showing number of structures flooded and removed from flooding during the 100-year event.
4) Figure showing streets meeting and still not meeting goal during the 10-year storm event.
5) Draft Watershed Proposed Solutions Report.

TASK 7 Public Engagement 3 (Present Mitigation Alternatives)

7.1 CONSULTANT will provide information materials and three (3) staff people to help conduct Public Information Meeting #3 (PIM #3). The purpose of PIM #3 is to present the proposed conditions selected alternative scenario and solicit public feedback.

7.2 PIM #3 will be held after the completion of the proposed conditions modeling. CONSULTANT will create materials including a PowerPoint presentation and a map showing the project area. CONSULTANT shall provide draft PowerPoint presentation to the City and work with City staff to finalize the presentation.

7.3 If authorized by the City, additional public informational meeting may be required based on feedback from the City, policy makers or the public. Additional meetings are not budgeted under the initial contract. A contract amendment for additional meetings will be executed by the City if additional meetings are requested.

TASK 7 Deliverables:

1) Public feedback from implemented public outreach and engagement plan.
2) PIM#3 Presentation in PowerPoint format.
3) Other PIM#3 presentation materials as necessary.
4) Compile feedback and responses to questions from PIM#3 and provide report to the City. This report shall include an executive summary that can be posted to the City website.

PHASE 3 FINAL REPORT

CONSULTANT shall not move on to Phase 3 without express direction by the City. All comments and changes as identified by the City in both Phase 1 and Phase 2 and the respective modeling, alternative analysis and draft report shall be addressed prior to final preparation of the final deliverables in Task 8.

TASK 8 Prepare Detailed Written Report and Deliver Model

CONSULTANT will prepare a detailed Watershed Report that includes the existing conditions report, modeling results, maximum extent of flooding/inundation maps, and proposed mitigation alternatives, as detailed in TASK 4 and TASK 6.

The report shall also include an executive summary that identifies and prioritizes the recommended improvements and, if necessary, identifies improvements that would need to be completed in a specific order. A draft report will be prepared for City review, and a final report will be prepared based on City review comments.

The final report will also refine cost estimates as identified in TASK 6 for the improvements identified in the summary. The cost refinements will be based upon updated unit cost information provided by the City. The report will also include response to QA/QC comments as identified in TASK 7.

TASK 8 Deliverables:

Reports will be provided to the City as follows:

1) One (1) copy of a colored, bound hard copy report, including all necessary maps, exhibits, etc. as identified in the Scope of Services.
2) One (1) digital copy of the document in the software in which it was prepared.
3) One (1) digital copy of the document in PDF format.

CONSULTANT will also provide:

1) The final model(s), fully QA/QC'ed, to the City including the existing conditions models for the respective storms as identified in Task 4 and all alternative analyses or scenarios as identified in Task 6. The model(s) shall be provided to the City on a hard drive.
2) All related files used in the creation of the model shall be provided to the City as part of the final deliverables, including but not limited to GIS, CADD, topographic surveys, Access database, or Excel files.

PHASE 4 PROJECT COORDINATION

TASK 9 Progress Meetings and Coordination

CONSULTANT will attend the kick-off meeting and up to eighteen (18) additional virtual or in-person monthly progress meetings as requested by the City. CONSULTANT shall provide an agenda prior to progress meetings and prepare meeting minutes summarizing the discussions held during the meetings.

CONSULTANT will attend up to five (5) additional progress meetings via conference call as-needed and participate in preparing meeting minutes summarizing the discussions held during the meetings.

CONSULTANT should expect to coordinate with other CONSULTANTs working on other watershed studies within the City of Madison.

TASK 9 Deliverables:

1) Cooperation and Coordination by phone or email with the City and other consultants as needed.
2) Meeting agendas prior to progress meetings.
3) Meeting minutes or summaries within 3 days of each meeting.

SEQUENCE of WORK

A sequence of work and deliverables has been developed based on the scope of work described and is provided below. CONSULTANT may proposed modifications to the sequence. Modifications may be approved at the City's discretion as long as the overall study objectives and timeline are met.

Sequence	Task	Sub-watershed	Work Deliverable
1	1	Olbrich Gardens	Task 1, Deliverable 1 – Review existing Olbrich Gardens model for instabilities and errors, meet with City to discuss
2	2	Olbrich Gardens	Task 2, Deliverables 1a and 2a – make recommended modifications to Olbrich Gardens model and provided non-calibrated model input/output to the City
3	3	Olbrich Gardens	Task 3, Deliverables 1-4 – Evaluate City preliminary storm sewer sizing
4	1	Other sub-watersheds	Task 1, Deliverables 2 and 3 – Review remaining existing conditions models and provide city with recommendations for improvements.
5	2	Other sub-watersheds	Deliverables 1b, 2b, and 3-7 – make recommended modifications to remaining sub-watershed models, review monitoring data, calibrate models, and provide non-calibrated and calibrated model input/output to the City and prepare calibration memo.
6	4	All sub-watersheds	Task 4, All deliverables - Execute existing conditions models and provide results to the City
7	5	All sub-watersheds	Task 5, All deliverables – Public Engagement (Public Information Meeting #2 and Focus Groups)
8	6	All sub-watersheds	Task 6, All deliverables – Develop flood mitigation recommendations and
9	7	All sub-watersheds	Task 7, All deliverables – Public Engagement (Public Information Meeting #3 and Focus Groups)
10	8	All-sub watersheds	Task 8, All deliverables – Final Written Report
-	9	All – sub watersheds	Task 9, All deliverables – Progress meetings and project coordination. Ongoing throughout project.

5.2 Anticipated Project Timeline

An anticipated project timeline for issuance of the RFP, Proposal Review, major project phases, and some intermediate stages. The dates provided below may be adjusted during the course of the study based on unanticipated opportunities or challenges that arise. However, proposing firms shall confirm that they are able to meet the desired timeline or propose modifications. Overall, the anticipated project timeline will be 18-24 months.

ANTICIPATED TIMELINE	
RFP released	May 14, 2025
Submission deadline	June 11, 2025
Selection of Consultant(s)	before June 24, 2025
Anticipated Project Start/Project Kick off Meeting	August 1, 2025
Anticipated Completion of Olbrich Gardens Tasks 1-3	October 31, 2025
Public Information Meeting #2	Spring 2026
Anticipated Completion of Phase 1 work for all sub-watersheds	June 30, 2026
Public Information Meeting #3	Winter 2026/27
Project Completed by	June 30, 2027

		2025					2026												2027					
Phase	TASK	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Phase 1	Kick off Meeting																							
	1																							
	2																							
	3																							
	4																							
	5								PIM #2															
Phase 2	6																							
	7																	PIM #3						
Phase 3	8																							
Phase 4	9																							

5.3 Basis for Selection

Responses to this RFP will be reviewed by a Selection Committee chosen by the City Engineer based on the appropriateness of the Proposal, budget, and ability to meet the proposed timeline.

If necessary, the City Selection Committee may elect to interview a subset of respondents to this RFP to better understand differing proposed approaches to the projects. Each interview will be scheduled by the City following submission of all proposals. The City reserves the right to interview any subset of respondents the Selection Committee chooses for further review.

There are no page limits for the Proposal submission. Please keep responses clear and concise. Proposals should not only include information regarding complex hydrologic and hydraulic modeling, but also the design of both green (volume control) and grey (peak flow control) infrastructure.

Evaluation Criteria

Scoring will be weighted as follows:

1. 25% for Project Understanding and Approach
2. 20% for Team Composition, Performance, and Key Personnel
3. 20% for Relevant Project Experience
4. 5% for Local Vendor Preference
5. 30% for Cost

5.4 Required Information and Content of Proposals

Below is a detailed list of items required in each submittal section.

1. Cover Letter
    a. Lead Consultant name and mailing address
    b. Contact person's name, title, phone number, and email address
    c. Signature of the individual(s) authorized to negotiate and bind the Consultant contractually

2. Project Understanding and Approach (25%)
    a. Describe the Team's understanding of the unique conditions in the watershed and how they will be accounted for.
    b. Describe the Team's approach for reviewing and completing QA/QC of models.
    c. Describe the Team's anticipated approach for establishing upstream and downstream boundary conditions within adjacent watershed models.
    d. Describe the opportunities related to the anticipated work, including challenges or unique issues related to specific watershed conditions.
    e. Describe how your team will ensure Racial Equity and Social Justice is a core principle throughout the duration of this project. Further explain strategies and techniques intended to encourage inclusive stakeholder engagement, just decisions making processes, and equitable environmental planning.
    f. Describe Team's understanding of scope of work. This scope is similar to that of the watershed studies currently underway.
        i. If Consultant proposes to follow scope of work as stated, there is not a need to reiterate scope.
        ii. If comments are provided on the proposed scope of work, organize comments by task number as identified in the Scope of Services.
        iii. If the proposed scope or work sequence differs from what is identified in this RFP the Consultant shall identify any areas in the scope that they do not intend to follow and provide reasoning.
        iv. Any additional scope items should be summarized in a separate section in the Attachments/Appendices Section.

3. Team Composition, Performance, and Key Personnel (20%)
    a. Summarize the Consultant Team's background and focus.
    b. Provide a Team organizational chart that identifies a project manager and the relationship among consulting team members, including sub-consultants.
    c. Briefly summarize the Key Personnel's role for this project.
    d. Where a proposal is being submitted for more than one watershed study, provide documentation showing adequate staff capacity to complete the work within the proposed schedule.

4. Relevant Project Experience (20%)
    a. Provide up to 5 relevant projects, including Client and Project information, Team's responsibility in the projects, the challenges presented by each project, and the results. Include which Key Personnel were involved.
    b. Limit project examples to those completed within the last 10 years.
    c. List the project year(s), Key Personnel, and Client contact person and telephone number for each.

5. Local Vendor Preference (5%)
   See Section 4.1

6. Schedule, Level of Effort, and Costs (30%)
   a. Include schedule for completion by Task.
   b. Provide information showing Team can meet schedule outlined in this RFP. For example, include percent availability for Key Personnel.
   c. Complete attached Cost Proposal and include with submittal.
   d. Costs to include:
      i. List proposed costs by Main Task (1-9)
      ii. Provide unit costs for meetings
         1. Public information meetings
         2. Stake holder or focus group meetings
         3. Monthly progress meetings with City staff
      iii. Provide a total not-to exceed dollar value for any reimbursable expenses associated with each individual task, including the type of expense, such as mileage, printing expenses, etc.
      iv. Provide detailed project budget, estimated hours by position title per task, and billing rates for all personnel to be assigned to the project.

7. Attachments/Appendices
   a. Resumes (suggested length: 2 pages maximum per resume)
   b. References: Provide three references for the consultant team. Include the reference contact's name, address, phone number and relationship to the firm/team.
   c. Additional Tasks or Services: Consultants may offer suggestions for additional tasks to be conducted during the watershed study. Provide a summary of the tasks that were not identified in the provide Scope of Work, along with a separate line item with costs for those services they wish the City to consider.

6 HOW TO SUBMIT YOUR PROPOSAL

6.1 Proposal Checklist

Required Documents to Submit:		
Your Technical Proposal		
Cost Proposal Form		
Required Forms to Submit:		
Form A: Price Proposal and Signature Affidavit		
Form B: References		
Form C: Vendor Profile		
RFP ADDENDUM Check the bid websites for any addendum. See Section 3.1. • You can use the area below to track addendums. • An addendum might require you to submit additional documents. Make sure to read it carefully and send any additional documents.		
Addendum # (if any)	Have you read it?	Have you submitted any documents required by the addendum?
Addendum # _____		
Addendum # _____		

6.2 Submit your Proposal by the Deadline

Submit your proposal by email to City of Madison Purchasing Services by Wednesday, June 11th, 2025 at 2:00 PM Central Time.

- Make sure your proposal is complete (see checklist above) and readable.
- **Include RFP 14028-0-2025-BG in the email subject line.**
- **Email proposals to:** bids@cityofmadison.com
- Do not send your proposal to any other City email or agency
- If you cannot send your proposal by email, please contact the Buyer at (608) 608-243-0529

You must include RFP 14028-0-2025-BG on your proposal and all other communication to the City. **For email, include RFP 14028-0-2025-BG in the subject line.**

For example, an email subject line could read: RFP 14028-0-2025-BG Starkweather Creek and Olbrich Gardens Watershed Models Calibration and Flood Mitigation Moldeling Questions

6.3 Format

- **Electronic** – proposals are submitted electronically. Exceptions can be made for paper submittals but you must contact the Buyer ahead of time to make those arrangements.
- **Legible and readable** – if not the City might reject it.
- **Simple** – not necessary to include elaborate/ high tech/ expensive graphics or similar features.
- **Complete** – your proposal must include all required sections and forms. See checklist.

6.4 Questions

You can ask questions about the RFP until the **deadline for questions of Friday, May 23rd, 2025 at 2:00 PM Central Time.**

Email questions to Brittany Garcia at bgarcia@cityofmadison.com. Remember to include RFP 14028-0-2025-BG in the subject line.

We post answers to bidder questions as an **addendum** on the bid websites. Check the websites regularly.

6.5 Addendum (Changes or Clarifications to this RFP)

RFP addendums make clarifications, answer bidder questions, make changes to RFP timeline, and provide other important information. Addendums are posted on the bid websites listed in Section 3.1.

IMPORTANT: It is your responsibility to check for addendums. An addendum might require you to submit additional information. Your proposal could be disqualified if you do not:

- **Check the bid websites regularly during the posting period**
- **Read all addendum**
- **Follow the instructions in the addendum**

6.6 Multiple Proposals

You may submit more than one proposal if you are proposing more than one way to fulfill the scope requested by this RFP. If so, each proposal must meet the requirements of the RFP. Clearly label each proposal by number (Proposal #1, Proposal #2) and submit each separately.

6.7 Changing or Withdrawing your Proposal

You may make changes to your proposal before the due date of Wednesday, June 11th, 2025 at 2:00 PM Central Time.

You may withdraw your proposal before the due date. After the due date, no proposals may be withdrawn for 90 days or as otherwise provided by law.

6.8 Correcting Errors in your Proposal after the Due Date

The City will notify you if we believe you made an error in your proposal and may allow you to correct the error. The City will decide if correcting the error is in the City's best interest, is fair to the other bidders, and preserves competition. The City will decide whether an error can be corrected and will notify you.

6.9 No Exceptions from Bidders

Exceptions to this RFP are not permitted. The City of Madison reserves the right to reject bids that take exceptions or don't follow the requirements of this RFP. If you ask to change the requirements, specifications, sample contract, or legal terms, that is considered an "exception." A statement that you will not or cannot comply with any part of this RFP or the sample contract will also be considered an "exception." *(If this RFP allows substitutions or alternate solutions, the Scope of Services (Section 5) will make this clear, and that is not considered an "exception.")*

6.10 You are Responsible for all of your Costs in Making a Proposal

You participate in this RFP at your own expense. You may be asked to attend virtual or in-person meetings, make presentations, give demonstrations, inspect City locations, or make your facilities available for a site inspection. The City will not pay any costs incurred in your preparation of bids, even if this RFP is changed or cancelled.

6.11 Public Records and Trade Secrets

Your response to this RFP is a public record. Wisconsin and other public records laws may require the City to share your proposal or the resulting contract if someone makes a public records request. If a public records request is made, the City's Records Custodian applies the law to decide whether the record must be disclosed, or if any part of the record can be redacted or not disclosed. There are very few exceptions to disclosure under Wisconsin law. One exception is for "trade secrets" as defined by sec. 134.90(1)(c) of the Wisconsin Statutes. It is your responsibility to research trade secrets as defined by Wisconsin law if you think any part of your proposal might be a "trade secret." The City cannot give private legal advice to you. Most things will NOT meet this exception.

You may label items you believe meet this definition as a "trade secret" and submit them separately from the rest of your proposal, **but the City cannot guarantee that information will be treated as a trade secret or confidential.**

Things that are not considered confidential: your proposal or bid in its entirety, price proposal, pricing information, references, or the resulting contract. This is not a complete list.

Preserving competition: To the extent permitted by law, the City intends to withhold proposals under this RFP from public view until competitive or bargaining reasons no longer require it, in the City's opinion. At that time, all proposals will be available for review in accordance with public records laws.

The City will not provide advance notice to bidders prior to releasing any requested public record.

7 RULES FOR THE SELECTION PROCESS

This RFP does not commit the City to award a contract. The City can cancel this RFP at any time. There is no guarantee that the City will award any contract as a result of this RFP. While the City considers this procurement important to City operations, the circumstances could change.

The City might make a partial award. By submitting a proposal you are willing to accept an order for all or part of the items/services. Note in your proposal if you do not agree to accept a partial award.

The City reserves the right to make changes to this RFP. Any changes will be made with an Addendum. Changes could impact due dates or specifications, or could require additional information from all bidders.

The City reserves the right to reject any proposal. We can reject all or part of a proposal without explaining the reason. Proposals could be rejected if they are missing information (non-responsive) or fail to demonstrate that the bidder is responsible and capable of doing the work (not responsible.)

The City may negotiate with finalists or the selected vendor. One or more bidders may need to submit additional technical proposals, best and final price proposals, or other changes to their bids.

Federal or State Laws may apply to this RFP (such as federal regulations or procurement policies that apply to grant funding). Those laws will apply over any conflicting procedure in this RFP.

Responsible and Responsive Bidders You should read the Scope of Work (Section 5) carefully to determine your ability to perform and complete the work required. This contract will only be awarded to a bidder who is “responsible” and “responsive” and whose bid is most advantageous to the City, with price and other factors considered. This RFP is designed to help the City select responsive and responsible bidders.

“Responsive” means that your proposal responds to all parts of this RFP – it is complete, not missing any information, and addresses all of the required work. Failure to provide all of the information requested in this RFP could result in being considered “not responsive.”

A “Responsible” bidder has demonstrated the ability to perform successfully under the terms of the proposed contract. This includes having adequate financial resources or the ability to obtain them; can perform and deliver on time, delivery taking into account other business commitments; has a satisfactory performance record; has a satisfactory record of integrity and business ethics; and has the necessary organization, experience and technical skills. A bidder that cannot demonstrate these things may be considered “not responsible.”

Contractors with past problems with the City The City reserves the right to refuse to accept any bid from any person, firm or corporation who

- owes the City money
- is in default to the City
- has been debarred through an official process such as through the Department of Civil Rights
- has had performance or other problems on past contracts with the City

Such bidders may be deemed “not responsible.”

8 LEGAL CONTRACT REQUIREMENTS

8.1 Sample Contract

You must review the Sample Contract attached to the end of this RFP. This contract* will be used for the work resulting from this RFP.

By submitting a proposal, you are willing to enter into a contract with the terms found in the Sample Contract. **Exceptions to the legal terms are not allowed and may result in your proposal being rejected. The City does not negotiate legal terms prior to award.**

**While the City strives to provide the most appropriate sample contracts, the City reserves the right to modify the form for any contract resulting from this RFP.*

8.2 Affirmative Action Requirements for Contractors

City contractors must show they hire and promote employees equitably and make their best efforts to have a diverse workforce.

Affirmative Action Plan: Bidders with 15 or more employees that will earn $50,000 or more in total contracts with the City in the calendar year must file an Affirmative Action Plan (AA plan) with the City. Submit your AA plan online using the form provided by the City. See the sample AA plan for "vendors and suppliers" at: https://www.cityofmadison.com/civil-rights/contract-compliance/affirmative-action-plan/vendors-suppliers

Exemptions: Bidders who have fewer than 15 employees or will earn less than $50,000 in total contracts with the City in the calendar year will be exempt from filing a full AA plan. You will need to fill out a request for exemption form. If you have 15 or more employees, you must complete an exemption form, provide some workforce statistics, and participate in the "RaISE" program.

Release of Payment: The City cannot make any payments under a contract until the Affirmative Action plan or request for exemption form are completed.

Referrals and Interviews for Sustainable Employment (RaISE) Program: The RaISE program is designed to match qualified people to employment. If you have 15 or more employees and are awarded the contract, you must let the City know about all external job openings in Dane County, Wisconsin. You must also agree to interview candidates the City refers to you. See this link for information and instructions: https://www.cityofmadison.com/civil-rights/programs/referrals-and-interviews-for-sustainable-employment-raise-program

The City has a **Small Business Enterprise program** described here: https://www.cityofmadison.com/civil-rights/contract-compliance/targeted-business-enterprise-programs. You will be encouraged to provide opportunities for small business enterprises (SBE) to compete for any subcontracts allowed in the contract.

See the Sample Contract, section 13, for all requirements for the City's Affirmative Action program for contractors. Call the Contract Compliance Specialist at (608) 266-4910 with questions.

8.3 Insurance

All City contractors must provide a Certificate of Insurance. You must carry the insurance policies required by section 27 of the **Sample Contract.** This includes general liability insurance, workers compensation, and could include automobile and professional liability insurance. Please see the instructions and section 27 of the Sample Contract for the insurance requirements.

INSTRUCTIONS FOR CONTRACTOR

DO NOT ATTACH TO CONTRACT

Your contract MUST include the following information, or it will not be signed by the City.

- ☐ Check one box at top of Page 1 for the type of business entity.
- ☐ Sections 3 & 4 will be completed by the City and should be complete before you sign.
- ☐ Put a name in Sec. 7.A. – person responsible for administering the contract.
- ☐ **Affirmative Action:** Check the appropriate box in Sec. 13.B., Article IV and complete the appropriate online form for the box you have checked:

  All contractors:
  Access the online forms for Affirmative Action compliance at this link: www.cityofmadison.com/civil-rights/contract-compliance/affirmative-action-plan/vendors-suppliers. If you do not already have an approved, current Affirmative Action Plan on file with the City of Madison, read the "*Instructions for Completing City of Madison Affirmative Action Plan*" at the above link. This will direct you to register for an account. If you already have an account you may click on the link for "*Affirmative Action Plan for Vendors and Suppliers*" to proceed. If you have never filed a plan or request for exemption, you must create an account in our online system. If you are exempt under Article IV, Sections C or D you will still need to create an account and go through some steps to confirm your exemption. Register for an account here: https://elam.cityofmadison.com/citizenaccess.

  Affirmative Action Questions? Contact Dept. of Civil Rights, Contract Compliance: (608) 266-4910.
- ☐ Complete Sec. 15 – Official Notices. This is the name/job title/address of the person at your organization to receive legal notices under the contract.
- ☐ Signature line. A person with authority to bind the organization should sign, date, and print name and job title where shown on the signature page. Contractor signs first, City signs last.
- ☐ Use any electronic method to sign where indicated, and email signed PDF to your agency contact, unless otherwise instructed.
  - Make sure all exhibits/attachments are labeled and attached to the PDF after the signature page, unless otherwise instructed.
  - City will sign last, and will email you an electronic signed copy unless otherwise requested.
- ☐ Enclose CERTIFICATE OF INSURANCE (C.O.I.) showing proof of insurance required by Sec. 27.
  Insurance Instructions:

  Certificate Holder: City of Madison
  Attn: Risk Manager
  210 Martin Luther King Jr. Blvd. Room 406
  Madison, WI 53703

Proof of all insurance required in the contract must be shown. Use City's certificate at this link: https://www.cityofmadison.com/finance/documents/certinsurance.pdf

Insurance delivery options: (a) enclose hard copy of certificate with hard copies of contract mailed to the address in Section 15 of the contract, or (b) email certificate to City Risk Manager Eric Veum at: eveum@cityofmadison.com and cc: your City contact person on the email. Call Eric Veum at (608) 266-5965 with insurance questions.

Failure to complete these steps will result in contract not being signed.

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Exhibit A - City of Madison
CONTRACT FOR PURCHASE OF SERVICES

1. **PARTIES.**
This is a Contract between the City of Madison, Wisconsin, hereafter referred to as the "City" and _____ hereafter referred to as "Contractor."

The Contractor is a: ☐ Corporation ☐ Limited Liability Company ☐ General Partnership ☐ LLP
(to be completed by contractor) ☐ Sole Proprietor ☐ Unincorporated Association ☐ Other:_____
_____.

2. **PURPOSE.**
The purpose of this Contract is as set forth in Section 3.

3. **SCOPE OF SERVICES AND SCHEDULE OF PAYMENTS.**
Contractor will perform the following services and be paid according to the following schedule(s) or attachment(s):

List all attachments here by name, and attach and label them accordingly.

Order of Precedence: In the event of a conflict between the terms of this Contract for Purchase of Services and the terms of any document attached or incorporated herein, the terms of this Contract for Purchase of Services shall control and supersede any such conflicting term.

4. **TERM AND EFFECTIVE DATE.**
This Contract shall become effective upon execution by the Mayor, (or the Purchasing Agent, if authorized) on behalf of the City of Madison, unless another effective date is specified in the Attachment(s) incorporated in Section 3, however in no case shall work commence before execution by the City of Madison. The term of this Contract shall be insert dates or reference attachments as needed.

5. **ENTIRE AGREEMENT.**
This Contract for Purchase of Services, including any and all attachments, exhibits and other documents referenced in Section 3 (hereafter, “Agreement” or “Contract”) is the entire Agreement of the parties and supersedes any and all oral contracts and negotiations between the parties. If any document referenced in Section 3 includes a statement that expressly or implicitly disclaims the applicability of this Contract for Purchase of Services, or a statement that such other document is the “entire agreement,” such statement shall be deemed rejected and shall not apply to this Contract.

6. **ASSIGNABILITY/SUBCONTRACTING.**
Contractor shall not assign or subcontract any interest or obligation under this Contract without the City's prior written approval. All of the services required hereunder will be performed by Contractor and employees of Contractor.

7. **DESIGNATED REPRESENTATIVE.**
Contractor designates _____ as Contract Agent with primary responsibility for the performance of this Contract. If the Contract Agent resigns, is replaced, or is no longer acting as Contract Agent for any reason, Contractor will notify the City in writing of the change, and propose a replacement Contract Agent within seven (7) calendar days. The City may accept another person as the Contract Agent or may terminate this Contract under Section 25, at its option.

8. **PROSECUTION AND PROGRESS.**
   A. Services under this Agreement shall commence upon written order from the City to the Contractor, which order will constitute authorization to proceed; unless another date for commencement is specified elsewhere in this Contract including documents incorporated in Section 3.
   B. The Contractor shall complete the services under this Agreement within the time for completion specified in Section 3, the Scope of Services, including any amendments. The Contractor's services are completed when the City notifies the Contractor in writing that the services are complete and are acceptable. The time for completion shall not be extended because of any delay attributable to

the Contractor, but it may be extended by the City in the event of a delay attributable to the City, or in the event of unavoidable delay caused by war, insurrection, natural disaster, or other unexpected event beyond the control of the Contractor. If at any time the Contractor believes that the time for completion of the work should be extended because of unavoidable delay caused by an unexpected event, or because of a delay attributable to the City, the Contractor shall notify the City as soon as possible, but not later than seven (7) calendar days after such an event. Such notice shall include any justification for an extension of time and shall identify the amount of time claimed to be necessary to complete the work.

C. Services by the Contractor shall proceed continuously and expeditiously through completion of each phase of the work.

D. Progress reports documenting the extent of completed services shall be prepared by the Contractor and submitted to the City with each invoice under Section 24 of this Agreement, and at such other times as the City may specify, unless another procedure is specified in Section 3.

E. The Contractor shall notify the City in writing when the Contractor has determined that the services under this Agreement have been completed. When the City determines that the services are complete and are acceptable, the City will provide written notification to the Contractor, acknowledging formal acceptance of the completed services.

9. **AMENDMENT.**

This Contract shall be binding on the parties hereto, their respective heirs, devisees, and successors, and cannot be varied or waived by any oral representations or promise of any agent or other person of the parties hereto. Any other change in any provision of this Contract may only be made by a written amendment, signed by the duly authorized agent or agents who executed this Contract.

10. **EXTRA SERVICES.**

The City may require the Contractor to perform extra services or decreased services, according to the procedure set forth in Section 24. Extra services or decreased services means services which are not different in kind or nature from the services called for in the Scope of Services, Section 3, but which may increase or decrease the quantity and kind of labor or materials or expense of performing the services. Extra services may not increase the total Contract price, as set forth in Section 23, unless the Contract is amended as provided in Section 9 above.

11. **NO WAIVER.**

No failure to exercise, and no delay in exercising, any right, power or remedy hereunder on the part of the City or Contractor shall operate as a waiver thereof, nor shall any single or partial exercise of any right, power or remedy preclude any other or further exercise thereof or the exercise of any other right, power or remedy. No express waiver shall affect any event or default other than the event or default specified in such waiver, and any such waiver, to be effective, must be in writing and shall be operative only for the time and to the extent expressly provided by the City or Contractor therein. A waiver of any covenant, term or condition contained herein shall not be construed as a waiver of any subsequent breach of the same covenant, term or condition.

12. **NONDISCRIMINATION.**

During the term of this Contract, the Contractor agrees not to discriminate against any employee or applicant for employment because of race, religion, marital status, age, color, sex, handicap, national origin or ancestry, income level or source of income, arrest record or conviction record, less than honorable discharge, physical appearance, sexual orientation, gender identity, political beliefs or student status. Contractor further agrees not to discriminate against any subcontractor or person who offers to subcontract on this Contract because of race, religion, color, age, disability, sex, sexual orientation, gender identity or national origin.

13. **AFFIRMATIVE ACTION.**

A. The following language applies to all contractors employing fifteen (15) or more employees (MGO 39.02(9)(c):

The Contractor agrees that, within thirty (30) days after the effective date of this Contract, Contractor will provide to the City of Madison Department of Civil Rights (the “Department”), certain workforce utilization statistics, using a form provided by the City.

If the Contract is still in effect, or if the City enters into a new Agreement with the Contractor, within one year after the date on which the form was required to be provided, the Contractor will provide updated workforce information using a second form, also to be furnished by the City. The second form will be submitted to the Department no later than one year after the date on which the first form was required to be provided.

The Contractor further agrees that, for at least twelve (12) months after the effective date of this Contract, it will notify the Department of each of its job openings at facilities in Dane County for which applicants not already employees of the Contractor are to be considered. The notice will include a job description, classification, qualifications, and application procedures and deadlines, shall be provided to the City by the opening date of advertisement and with sufficient time for the City to notify candidates and make a timely referral. The Contractor agrees to interview and consider candidates referred by the Department, or an organization designated by the Department, if the candidate meets the minimum qualification standards established by the Contractor, and if the referral is timely. A referral is timely if it is received by the Contractor on or before the date stated in the notice.

The Department will determine if a contractor is exempt from the above requirements (Sec. 13.A.) at the time the Request for Exemption in 13.B.(2) is made.

B. Articles of Agreement, Request for Exemption, and Release of Payment:
The "ARTICLES OF AGREEMENT" beginning on the following page, apply to all contractors, unless determined to be exempt under the following table and procedures:

NUMBER OF EMPLOYEES	LESS THAN $50,000 Aggregate Annual Business with the City*	$50,000 OR MORE Aggregate Annual Business with the City*
14 or less	Exempt**	Exempt**
15 or more	Exempt**	Not Exempt

*As determined by the Finance Director **As determined by the Department of Civil Rights

(1) Exempt Status: In this section, "Exempt" means the Contractor is exempt from the Articles of Agreement in section 13.B.(5) of this Contract and from filing an Affirmative Action plan as required by Section IV of the Articles of Agreement. The Department of Civil Rights ("Department") makes the final determination as to whether a contractor is exempt. If the Contractor is not exempt, sec. 13.B.(5) shall apply and Contractor shall select option A. or B. under Article IV therein and file an Affirmative Action Plan.

(2) Request for Exemption – Fewer Than 15 Employees: (MGO 39.02(9)(a)2.) Contractors who believe they are exempt based on number of employees shall submit a Request for Exemption on a form provided by the Department within thirty (30) days of the effective date of this Contract.

(3) Exemption – Annual Aggregate Business: (MGO 39.02(9)(a)c.): The Department will determine, at the time this Contract is presented for signature, if the Contractor is exempt because it will have less than $50,000 in annual aggregate business with the City for the calendar year in which the contract is in effect. CONTRACTORS WITH 15 OR MORE EMPLOYEES WILL LOSE THIS EXEMPTION AND BECOME SUBJECT TO SEC. 13.B.(5) UPON REACHING $50,000 OR MORE ANNUAL AGGREGATE BUSINESS WITH THE CITY WITHIN THE CALENDAR YEAR, BEGINNING IN 2019.

(4) Release of Payment: (MGO 39.02(9)(e)1.b.) All non-exempt contractors must have an approved Affirmative Action plan meeting the requirements of Article IV below on file with the Department within thirty (30) days of the effective date of this Contract and prior to release of payment by the City. Contractors that are exempt based on number of employees agree to file a Request for Exemption with the Department within thirty (30) days of the effective date and prior to release of payment by the City.

(5) Articles of Agreement:

ARTICLE I

The Contractor shall take affirmative action in accordance with the provisions of this Contract to ensure that applicants are employed, and that employees are treated during employment without regard to race, religion, color, age, marital status, disability, sex, sexual orientation, gender identity or national origin and that the employer shall provide harassment-free work environment for the realization of the potential of each employee. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation and selection for training including apprenticeship insofar as it is within the control of the Contractor. The Contractor agrees to post in conspicuous places available to employees and applicants notices to be provided by the City setting out the provisions of the nondiscrimination clauses in this Contract.

ARTICLE II

The Contractor shall in all solicitations or advertisements for employees placed by or on behalf of the Contractors state that all qualified or qualifiable applicants will be employed without regard to race, religion, color, age, marital status, disability, sex, sexual orientation, gender identity or national origin.

ARTICLE III

The Contractor shall send to each labor union or representative of workers with which it has a collective bargaining Agreement or other Contract or understanding a notice to be provided by the City advising the labor union or workers representative of the Contractor's equal employment opportunity and affirmative action commitments. Such notices shall be posted in conspicuous places available to employees and applicants for employment.

ARTICLE IV

(This Article applies to non-public works contracts.)

The Contractor agrees that it will comply with all provisions of the Affirmative Action Ordinance of the City of Madison (MGO 39.02) including the Contract compliance requirements. The Contractor warrants and certifies that one of the following paragraphs is true **(check one):**

☐ A. Contractor has prepared and has on file an affirmative action plan that meets the format requirements of Federal Revised Order No, 4, 41 CFR part 60-2, as established by 43 FR 51400 November 3, 1978, including appendices required by City of Madison ordinances or it has prepared and has on file a model affirmative action plan approved by the Madison Common Council.

☐ B. Within thirty (30) days after the effective date of this Contract, Contractor will complete an affirmative action plan that meets the format requirements of Federal Revised Order No. 4, 41 CFR Part 60-2, as established by 43 FR 51400, November 3, 1978, including appendices required by City of Madison ordinance or within thirty (30) days after the effective date of this Contract, it will complete a model affirmative action plan approved by the Madison Common Council.

☐ C. Contractor believes it is exempt from filing an affirmative action plan because it has fewer than fifteen (15) employees and has filed, or will file within thirty (30) days after the effective date of this Contract, a form required by the City to confirm exempt status based on number of employees. If the City determines that Contractor is not exempt, the Articles of Agreement will apply.

☐ D. Contractor believes it is exempt from filing an affirmative action plan because its annual aggregate business with the City for the calendar year in which the contract is in effect is less than fifty thousand dollars ($50,000), or for another reason listed in MGO 39.02(9)(a)2. If the City determines that Contractor is not exempt, the Articles of Agreement will apply.

ARTICLE V

(This Article applies only to public works contracts.)

The Contractor agrees that it will comply with all provisions of the Affirmative Action Ordinance of the City of Madison, including the Contract compliance requirements. The Contractor agrees to submit the model affirmative action plan for public works Contractors in a form approved by the Director of Affirmative Action.

ARTICLE VI

The Contractor will maintain records as required by Section **39.02**(9)(f) of the Madison General Ordinances and will provide the City's Department of Affirmative Action with access to such records and to persons who have relevant and necessary information, as provided in Section **39.02**(9)(f). The City agrees to keep all such records confidential, except to the extent that public inspection is required by law.

ARTICLE VII

In the event of the Contractor's or subcontractor's failure to comply with the Equal Employment Opportunity and Affirmative Action provisions of this Contract or Sections 39.03 and **39.02** of the Madison General Ordinances, it is agreed that the City at its option may do any or all of the following:

A. Cancel, terminate or suspend this Contract in whole or in part.
B. Declare the Contractor ineligible for further City contracts until the Affirmative Action requirements are met.
C. Recover on behalf of the City from the prime Contractor 0.5 percent of the Contract award price for each week that such party fails or refuses to comply, in the nature of liquidated damages, but not to exceed a total of five percent (5%) of the Contract price, or ten thousand dollars ($10,000), whichever is less. Under public works contracts, if a subcontractor is in noncompliance, the City may recover liquidated damages from the prime Contractor in the manner described above. The preceding sentence shall not be construed to prohibit a prime Contractor from recovering the amount of such damage from the noncomplying subcontractor.

ARTICLE VIII

(This Article applies to public works contracts only.)

The Contractor shall include the above provisions of this Contract in every subcontract so that such provisions will be binding upon each subcontractor. The Contractor shall take such action with respect to any subcontractor as necessary to enforce such provisions, including sanctions provided for noncompliance.

ARTICLE IX

The Contractor shall allow the maximum feasible opportunity to small business enterprises to compete for any subcontracts entered into pursuant to this Contract. (In federally funded contracts the terms "DBE, MBE, and WBE" shall be substituted for the term "small business" in this Article.)

14. **SEVERABILITY.**

It is mutually agreed that in case any provision of this Contract is determined by any court of law to be unconstitutional, illegal or unenforceable, it is the intention of the parties that all other provisions of this Contract remain in full force and effect.

15. **NOTICES.**
All notices to be given under the terms of this Contract shall be in writing and signed by the person serving the notice and shall be sent registered or certified mail, return receipt requested, postage prepaid, or hand delivered to the addresses of the parties listed below:

FOR THE CITY:

(Department or Division Head)

FOR THE CONTRACTOR:

16. **INDEPENDENT CONTRACTOR AND TAX INFORMATION.**
It is agreed that Contractor is an independent contractor and not an employee of the City, and any persons who the Contractor utilizes or provides for services under this Contract not employees of the City of Madison.

Contractor shall provide its taxpayer identification number (or social security number) to the Finance Director, 210 Martin Luther King Jr. Blvd, Room 406, Madison, WI 53703, prior to payment. The Contractor is informed that as an independent contractor, Contractor may have a responsibility to make estimated tax returns, file tax returns, pay income taxes and make social security payments on the amounts received under this Contract. No amounts will be withheld by the City for these purposes and payment of taxes and making social security payments are solely the responsibility and obligation of the Contractor. The Contractor is further informed that they may be subject to civil and/or criminal penalties if they fail to properly report income and pay taxes and social security taxes on the amount received under this Contract.

17. **GOODWILL.**
Any and all goodwill arising out of this Contract inures solely to the benefit of the City; Contractor waives all claims to benefit of such goodwill.

18. **THIRD PARTY RIGHTS.**
This Contract is intended to be solely between the parties hereto. No part of this Contract shall be construed to add, supplement, amend, abridge or repeal existing rights, benefits or privileges of any third party or parties, including but not limited to employees of either of the parties.

19. **AUDIT AND RETAINING OF DOCUMENTS.**
The Contractor agrees to provide all reports requested by the City including, but not limited to, financial statements and reports, reports and accounting of services rendered, and any other reports or documents requested. Financial and service reports shall be provided according to a schedule (when applicable) to be included in this Contract. Any other reports or documents shall be provided within five (5) working days after the Contractor receives the City's written requests, unless the parties agree in writing on a longer period. Payroll records and any other documents relating to the performance of services under the terms of this Contract shall be retained by the Contractor for a period of three (3) years after completion of all work under this Contract, in order to be available for audit by the City or its designee.

20. **CHOICE OF LAW, VENUE, AND FORUM SELECTION.**
This Contract shall be governed by and construed, interpreted, and enforced in accordance with the laws of the State of Wisconsin, without regard to conflict of law principles. For any claim or suit or other dispute relating to this Contract that cannot be mutually resolved informally, the venue shall be Dane County, Wisconsin, and the parties agree to submit themselves to the jurisdiction of a court of competent jurisdiction in said venue, to the exclusion of any other forum that may have jurisdiction over such a dispute according to any law.

21. **COMPLIANCE WITH APPLICABLE LAWS.**
The Contractor shall become familiar with, and shall at all times comply with and observe all federal, state, and local laws, ordinances, and regulations which in any manner affect the services or conduct of the Contractor and its agents and employees.

22. **CONFLICT OF INTEREST.**
A. The Contractor warrants that it and its agents and employees have no public or private interest, and will not acquire directly or indirectly any such interest, which would conflict in any manner with the performance of the services under this Agreement.
B. The Contractor shall not employ or Contract with any person currently employed by the City for any services included under the provisions of this Agreement.

23. **COMPENSATION.**
It is expressly understood and agreed that in no event will the total compensation under this Contract exceed $_____.

24. **BASIS FOR PAYMENT.**
A. GENERAL.
(1) The City will pay the Contractor for the completed and accepted services rendered under this Contract on the basis and at the Contract price set forth in Section 23 of this Contract. The City will pay the Contractor for completed and approved "extra services", if any, if such "extra services" are authorized according to the procedure established in this section. The rate of payment for "extra services" shall be the rate established in this Contract. Such payment shall be full compensation for services rendered and for all labor, material, supplies, equipment and incidentals necessary to complete the services.
(2) The Contractor shall submit invoices, on the form or format approved by the City and as may be further specified in Section 3 of this Contract. The City will pay the Contractor in accordance with the schedule, if any, set forth in Section 3. The final invoice, if applicable, shall be submitted to the City within three months of completion of services under this Agreement.
(3) Should this Agreement contain more than one service, a separate invoice and a separate final statement shall be submitted for each individual service.
(4) Payment shall not be construed as City acceptance of unsatisfactory or defective services or improper materials.
(5) Final payment of any balance due the Contractor will be made upon acceptance by the City of the services under the Agreement and upon receipt by the City of documents required to be returned or to be furnished by the Contractor under this Agreement.
(6) The City has the equitable right to set off against any sum due and payable to the Contractor under this Agreement, any amount the City determines the Contractor owes the City, whether arising under this Agreement or under any other Agreement or otherwise.
(7) Compensation in excess of the total Contract price will not be allowed unless authorized by an amendment under Section 9, AMENDMENT.
(8) The City will not compensate for unsatisfactory performance by the Contractor.
B. SERVICE ORDERS, EXTRA SERVICE, OR DECREASED SERVICE.
(1) Written orders regarding the services, including extra services or decreased services, will be given by the City, using the procedure set forth in Section 15, NOTICES.
(2) The City may, by written order, request extra services or decreased services, as defined in Section 10 of this Contract. Unless the Contractor believes the extra services entitle it to extra compensation or additional time, the Contractor shall proceed to furnish the necessary labor, materials, and professional services to complete the services within the

time limits specified in the Scope of Services, Section 3 of this Agreement, including any amendments under Section 9 of this Agreement.

(3) If in the Contractor's opinion the order for extra service would entitle it to extra compensation or extra time, or both, the Contractor shall not proceed to carry out the extra service, but shall notify the City, pursuant to Section 15 of this Agreement. The notification shall include the justification for the claim for extra compensation or extra time, or both, and the amount of additional fee or time requested.

(4) The City shall review the Contractor's submittal and respond in writing, either authorizing the Contractor to perform the extra service, or refusing to authorize it. The Contractor shall not receive additional compensation or time unless the extra compensation is authorized by the City in writing.

25. **DEFAULT/TERMINATION.**

A. In the event Contractor shall default in any of the covenants, agreements, commitments, or conditions herein contained, and any such default shall continue unremedied for a period of ten (10) days after written notice thereof to Contractor, the City may, at its option and in addition to all other rights and remedies which it may have at law or in equity against Contractor, including expressly the specific enforcement hereof, forthwith have the cumulative right to immediately terminate this Contract and all rights of Contractor under this Contract.

B. Notwithstanding paragraph A., above, the City may in its sole discretion and without any reason terminate this Agreement at any time by furnishing the Contractor with ten (10) days' written notice of termination. In the event of termination under this subsection, the City will pay for all work completed by the Contractor and accepted by the City.

26. **INDEMNIFICATION.**

The Contractor shall be liable to and hereby agrees to indemnify, defend and hold harmless the City of Madison, and its officers, officials, agents, and employees against all loss or expense (including liability costs and attorney's fees) by reason of any claim or suit, or of liability imposed by law upon the City or its officers, officials, agents or employees for damages because of bodily injury, including death at any time resulting therefrom, sustained by any person or persons or on account of damages to property, including loss of use thereof, arising from, in connection with, caused by or resulting from the Contractor's and/or Subcontractor's acts or omissions in the performance of this Agreement, whether caused by or contributed to by the negligence of the City, its officers, officials, agents, or its employees.

27. **INSURANCE.**

The Contractor will insure, and will require each subcontractor to insure, as indicated, against the following risks to the extent stated below. The Contractor shall not commence work under this Contract, nor shall the Contractor allow any Subcontractor to commence work on its Subcontract, until the insurance required below has been obtained and corresponding certificate(s) of insurance have been approved by the City Risk Manager.

Commercial General Liability

The Contractor shall procure and maintain during the life of this Contract, Commercial General Liability insurance including, but not limited to bodily injury, property damage, personal injury, and products and completed operations (unless determined to be inapplicable by the Risk Manager) in an amount not less than $1,000,000 per occurrence. This policy shall also provide contractual liability in the same amount. Contractor’s coverage shall be primary and non-contributory and list the City of Madison, its officers, officials, agents and employees as additional insureds. Contractor shall require all subcontractors under this Contract (if any) to procure and maintain insurance meeting the above criteria, applying on a primary basis and listing the City of Madison, its officers, officials, agents and employees as additional insureds.

Automobile Liability

The Contractor shall procure and maintain during the life of this Contract Business Automobile Liability insurance covering owned, non-owned and hired automobiles with limits of not less than $1,000,000 combined single limit per accident. Contractor shall require all subcontractors under this Contract (if any) to procure and maintain insurance covering each subcontractor and meeting the above criteria.

Worker’s Compensation

The Contractor shall procure and maintain during the life of this Contract statutory Workers' Compensation insurance as required by the State of Wisconsin. The Contractor shall also carry Employers Liability limits of at least $100,000 Each Accident, $100,000 Disease – Each Employee, and $500,000 Disease – Policy Limit. Contractor shall require all subcontractors under this Contract (if any) to procure and maintain such insurance, covering each subcontractor.

Professional Liability

The Contractor shall procure and maintain professional liability insurance with coverage of not less than $1,000,000. If such policy is a "claims made" policy, all renewals thereof during the life of the Contract shall include "prior acts coverage" covering at all times all claims made with respect to Contractor's work performed under the Contract. This Professional Liability coverage must be kept in force for a period of six (6) years after the services have been accepted by the City.

Acceptability of Insurers. The above-required insurance is to be placed with insurers who have an A.M. Best rating of no less than A- (A minus) and a Financial Category rating of no less than VII.

Proof of Insurance, Approval. The Contractor shall provide the City with certificate(s) of insurance showing the type, amount, effective dates, and expiration dates of required policies prior to commencing work under this Contract. Contractor shall provide the certificate(s) to the City's representative upon execution of the Contract, or sooner, for approval by the City Risk Manager. If any of the policies required above expire while this Contract is still in effect, Contractor shall provide renewal certificate(s) to the City for approval. Certificate Holder language should be listed as follows:

City of Madison
ATTN: Risk Management, Room 406
210 Martin Luther King, Jr. Blvd.
Madison, WI 53703

The Contractor shall provide copies of additional insured endorsements or insurance policies, if requested by the City Risk Manager. The Contractor and/or Insurer shall give the City thirty (30) days advance written notice of cancellation, non-renewal or material changes to any of the above-required policies during the term of this Contract.

28. **OWNERSHIP OF CONTRACT PRODUCT.**

All of the work product, including, but not limited to, documents, materials, files, reports, data, including magnetic tapes, disks of computer-aided designs or other electronically stored data or information (the "Documents"), which the Contractor prepares pursuant to the terms and conditions of this Contract are the sole property of the City. The Contractor will not publish any such materials or use them for any research or publication, other than as expressly required or permitted by this Contract, without the prior written permission of the City. The grant or denial of such permission shall be at the City's sole discretion.

The Contractor intends that the copyright to the Documents shall be owned by City, whether as author (as a Work Made For Hire), or by assignment from Contractor to City. The parties expressly agree that the Documents shall be considered a Work Made For Hire as defined by Title 17, United States Code, Section 101(2).

As further consideration for the City entering into this Contract, the Contractor hereby assigns to City all of the Contractor's rights, title, interest and ownership in the Documents, including the right to procure the copyright therein and the right to secure any renewals, reissues and extensions of any such copyright in any foreign country. The City shall be entitled to the sole and exclusive benefit of the Documents, including the copyright thereto, and whenever required by the City, the Contractor shall at no additional compensation, execute all documents of assignment of the full and exclusive benefit and copyright thereof to the City. Any subcontractors and other independent contractors who prepare portions of the Documents shall be required by the Contractor to execute an assignment of ownership in favor of the City before commencing work.

29. **BAN THE BOX - ARREST AND CRIMINAL BACKGROUND CHECKS.** (Sec. 39.08, MGO. Applicable to contracts exceeding $25,000.)

A. DEFINITIONS.

For purposes of this section, "Arrest and Conviction Record" includes, but is not limited to, information indicating that a person has been questioned, apprehended, taken into custody or detention, held for investigation, arrested, charged with, indicted or tried for any felony, misdemeanor or other offense pursuant to any law enforcement or military authority.

"Conviction record" includes, but is not limited to, information indicating that a person has been convicted of a felony, misdemeanor or other offense, placed on probation, fined, imprisoned or paroled pursuant to any law enforcement or military authority.

"Background Check" means the process of checking an applicant's arrest and conviction record, through any means.

B. REQUIREMENTS. For the duration of this Contract, the Contractor shall:

(1) Remove from all job application forms any questions, check boxes, or other inquiries regarding an applicant's arrest and conviction record, as defined herein.

(2) Refrain from asking an applicant in any manner about their arrest or conviction record until after conditional offer of employment is made to the applicant in question.

(3) Refrain from conducting a formal or informal background check or making any other inquiry using any privately or publicly available means of obtaining the arrest or conviction record of an applicant until after a conditional offer of employment is made to the applicant in question.

(4) Make information about this ordinance available to applicants and existing employees, and post notices in prominent locations at the workplace with information about the ordinance and complaint procedure using language provided by the City.

(5) Comply with all other provisions of Sec. 39.08, MGO.

C. EXEMPTIONS: This section does not apply when:

(1) Hiring for a position where certain convictions or violations are a bar to employment in that position under applicable law, or

(2) Hiring a position for which information about criminal or arrest record, or a background check is required by law to be performed at a time or in a manner that would otherwise be prohibited by this ordinance, including a licensed trade or profession where the licensing authority explicitly authorizes or requires the inquiry in question.

To be exempt under sec. C.(1) or (2) above, Contractor must demonstrate to the City that there is a law or regulation that requires the hiring practice in question. If so, the contractor is exempt from this section for the position(s) in question.

30. **WEAPONS PROHIBITION.**

Contractor shall prohibit, and shall require its subcontractors to prohibit, its employees from carrying weapons, including concealed weapons, in the course of performance of work under this Contract, other than while at the Contractor's or subcontractor's own business premises. This requirement shall apply to vehicles used at any City work site and vehicles used to perform any work under this Contract, except vehicles that are an employee's "own motor vehicle" pursuant to Wis. Stat. sec. 175.60(15m).

31. **IT NETWORK CONNECTION POLICY.**

If this Contract includes services such as software support, software maintenance, network services, and/or system development services and will require a Network Connection the City Network (as defined in the following link), the City's Network Connection Policy found at this link: https://www.cityofmadison.com/attorney/documents/posNetworkConnection.docx is hereby incorporated and made a part of this Contract and Contractor agrees to comply with all of its requirements.

32. **AUTHORITY.**

Contractor represents that it has the authority to enter into this Contract. If the Contractor is not an individual, the person(s) signing on behalf of the Contractor represents and warrants that they have been duly authorized to bind the Contractor and sign this Contract on the Contractor's behalf.

33. **COUNTERPARTS, ELECTRONIC SIGNATURE AND DELIVERY.**

This Contract may be signed in counterparts, each of which shall be taken together as a whole to comprise a single document. Signatures on this Contract may be exchanged between the parties by facsimile, electronic scanned copy (.pdf) or similar technology and shall be as valid as original; and this

Contract may be converted into electronic format and signed or given effect with one or more electronic signature(s) if the electronic signature(s) meets all requirements of Wis. Stat. ch. 137 or other applicable Wisconsin or Federal law. Executed copies or counterparts of this Contract may be delivered by facsimile or email and upon receipt will be deemed original and binding upon the parties hereto, whether or not a hard copy is also delivered. Copies of this Contract, fully executed, shall be as valid as an original.

IN WITNESS WHEREOF, the parties hereto have set their hands at Madison, Wisconsin.

CONTRACTOR:

_____
(Type or Print Name of Contracting Entity)

By: _____
(Signature)

_____
(Print Name and Title of Person Signing)

Date: _____

CITY OF MADISON, WISCONSIN
a municipal corporation:

By: _____
Satya Rhodes-Conway, Mayor

Date: _____

Approved:

_____
David P. Schmiedicke, Finance Director

Date: _____

By: _____
Michael Haas, Acting City Clerk

Date: _____

Approved as to Form:

_____
Eric T. Veum, Risk Manager

Date: _____

_____
City Attorney

Date: _____

For City Use Only: SIGNATURE INSTRUCTIONS FOR CONTRACTS SIGNED BY MAYOR/CLERK: Obtain contractor's signature first. Route this contract & all of its attachments for City signatures using the City Clerk's Contract Routing Database. Include 1 copy of authorizing resolution & 1 copy of the Certificate of Insurance.

NOTE: Certain service contracts may be executed by the designee of the Finance Director on behalf of the City of Madison:

By: _____
Mary Richards, Procurement Supervisor

Date: _____

MGO 4.26(3) and (5) authorize the Finance Director or designee to sign purchase of service contracts when all of the following apply:

(a) The funds are included in the approved City budget.
(b) An RFP or competitive process was used, or the Contract is exempt from competitive bidding under 4.26(4)(a).
(c) The City Attorney has approved the form of the Contract.
(d) The Contract complies with other laws, resolutions and ordinances.
(e) The Contract is for a period of 1 year or less, OR not more than 5 years AND the average cost is not more than $100,000 per year, AND was subject to competitive bidding. (If over $50,000 and exempt from bidding under 4.26(4)(a), regardless of duration of the Contract, the Common Council must authorize the Contract by resolution and the Mayor and City Clerk must sign, per 4.26(5)(b).)

Emergency Service contracts may also be signed by the designee of the Finance Director if the requirements of MGO 4.26(3)(c) are met.

For City Use Only: SIGNATURE INSTRUCTIONS FOR CONTRACT TO BE SIGNED BY FINANCE (PURCHASING):
Obtain contractor's signature first. Attach the contractor-signed contract with all attachments/exhibits and the certificate of insurance to the requisition in MUNIS.

Form A: Price Proposal and Signature Affidavit

RFP #: 14028-0-2025-BG

This form must be returned with your response.

PRICE PROPOSAL

Prepare your price proposal as follows:

- **All Inclusive** – Your price proposal must cover all direct and indirect necessary expenses including but not limited to; travel, telephone, copying, and other out-of-pocket expenses.

- **Not To Exceed** – The actual fees must not exceed the amount specified in your price proposal.

- **Fixed Fee** – All prices outlined in your proposal must remain fixed and valid for the entire length of the contract and any/all renewals.

- **Unit Pricing, where applicable** - For any given item, the quantity multiplied by the unit price establishes the extended price. If an apparent mistake exists in the extended price, the unit price will be used in the bid/proposal evaluation.

- **FOB (Free on Board) Destination Freight Prepaid and Allowed** – If goods are included, you are responsible for the cost of delivering all goods to our location, including handling, delivery, transportation, and insurance charges. Failure to bid FOB Destination Freight Prepaid and Allowed may disqualify your proposal.

- **Do not include sales tax in your proposal.** The City of Madison is exempt from federal excise taxes and State of Wisconsin taxes per section 77.54(9a) of the Wisconsin Statutes.
  - CES No. 008-1020421147-08
  - Wisconsin Department of Revenue Form S-211: https://www.cityofmadison.com/finance/purchasing/vendor-resources/letter-of-credit/wisconsin-department-of-revenue-form-s-211.

COMPANY NAME

Form A: Price Proposal and Signature Affidavit

RFP #: 14028-0-2025-BG

SIGNATURE AFFIDAVIT

Proposer's Certification:

By submitting this proposal, we certify that:

- This entire proposal, including the Price Proposal, has been developed independently and not in collusion with other proposers or anyone competing for the award of this RFP.
- We have not knowingly disclosed the contents of this proposal to any other proposer, anyone competing for the award of this RFP.
- We have not taken any action that would interfere with free competition on this RFP.
- We have not violated any laws in the submission of this proposal or participation this RFP.
- All information in this proposal is true and accurate to the best of our knowledge.

Agreement to comply with all terms of RFP: By submitting this proposal, we agree to comply with all of the terms, conditions, and specifications of this RFP, the sample contract, and any contract awarded under this RFP.

_____

COMPANY NAME

_____ _____

SIGNATURE DATE

_____ _____

NAME OF PERSON SIGNING TITLE OF PERSON SIGNING

Form A Price Proposal - Watershed Study - Starkweather Creek and Olbrich Gardens		
	Task or Item	**Cost**
PHASE 1	**Task 1 - Review Existing Watershed Models**	$
	Task 2 - Develop and Calibrate Existing Conditions Models	$
	Task 3 - Evaluate Olbrich Gardens Sub-watershed Preliminary Storm Sewer Sizing	$
	Task 4 - Execute Existing Conditions Models	$
	Task 5 - Public Engagement 2	
	Task 2 - PIM #1	$
	Task 2 - Focus Group or Stakeholder Meetings	$
PHASE 2	**Task 6 - Evaluate Flood Mitigation Alternatives**	$
	Task 7 - Public Engagement 3	
	Task 5 - PIM #2	$
	Task 5 - Focus Group or Stakeholder Meetings	$
PHASE 3	**Task 8 - Final Report**	$
Task - 9 Progress and Coordination Meetings		$
TOTAL COST		$

Unit Costs	**Cost per Progress Meeting**	
	Cost per Public Information Meeting	
	Cost per Focus Group or Stakeholder Meeting	

Additional Tasks	**Additional Task 1**	$
	Additional Task 2	$
	Additional Task 3	$

Form B: References

RFP #: 14028-0-2025-BG

This form must be returned with your response.

Please list three references that are **NOT** from the City of Madison. If you wish to highlight any additional work experience for the City of Madison, please list it on a separate page.

REFERENCE #1 – CLIENT INFORMATION	
ORGANIZATION/COMPANY NAME	PROJECT MANAGER
TELEPHONE NUMBER	EMAIL
PROJECT START DATE	PROJECT END DATE
PROJECT DESCRIPTION	

REFERENCE #2 – CLIENT INFORMATION	
ORGANIZATION/COMPANY NAME	PROJECT MANAGER
TELEPHONE NUMBER	EMAIL
PROJECT START DATE	PROJECT END DATE
PROJECT DESCRIPTION	

REFERENCE #3 – CLIENT INFORMATION	
ORGANIZATION/COMPANY NAME	PROJECT MANAGER
TELEPHONE NUMBER	EMAIL
PROJECT START DATE	PROJECT END DATE
PROJECT DESCRIPTION	

Form C: Vendor Profile

RFP #: 14028-0-2025-BG

This form must be returned with your response.

COMPANY INFORMATION

COMPANY NAME (Make sure to use your complete, legal company name.)			
FEIN	(If FEIN is not applicable, SSN collected upon award)		
CONTACT NAME (Able to answer questions about proposal.)	TITLE		
TELEPHONE NUMBER	EMAIL		
ADDRESS	CITY	STATE	ZIP

AFFIRMATIVE ACTION CONTACT

If the selected contractor employs 15 or more employees and does aggregate annual business with the City of $50,000 or more, the contractor will be required to file an Affirmative Action Plan and comply with the City of Madison Affirmative Action Ordinance, Section 39.02(9)(e), within thirty (30) days contract signature. Vendors who believe they are exempt based on number of employees or annual aggregate business must file a request for exemption. Link to information and applicable forms: https://www.cityofmadison.com/civil-rights/contract-compliance/affirmative-action-plan/vendors-suppliers

CONTACT NAME	TITLE		
TELEPHONE NUMBER	EMAIL		
ADDRESS	CITY	STATE	ZIP

ORDERS/BILLING CONTACT

Address where City purchase orders/contracts are to be mailed and person the department contacts concerning orders and billing.

CONTACT NAME	TITLE		
TELEPHONE NUMBER	EMAIL		
ADDRESS	CITY	STATE	ZIP

LOCAL VENDOR STATUS

The City of Madison has adopted a local preference purchasing policy granting a scoring preference to local suppliers. Only suppliers registered as of the bid's due date will receive preference. Learn more and register at the City of Madison website. https://www.cityofmadison.com/finance/purchasing/local-businesses/register-business/

CHECK ONLY ONE:

☐ **Yes,** we are a local vendor ***and*** have registered on the City of Madison website under the following category:_____

☐ **No,** we are not a local vendor or have not registered.

Department of Public Works
Engineering Division
James M. Wolfe, P.E., City Engineer

City-County Building, Room 115
210 Martin Luther King, Jr. Boulevard
Madison, Wisconsin 53703
Phone: (608) 266-4751
Fax: (608) 264-9275
engineering@cityofmadison.com
www.cityofmadison.com/engineering

Assistant City Engineer
Bryan Cooper, AIA
Gregory T. Fries, P.E.
Chris Petykowski, P.E.

Deputy Division Manager
Kathleen M. Cryan

Principal Architect
Amy Loewenstein Scanlon, AIA

Principal Engineer 2
Janet Schmidt, P.E.

Principal Engineer 1
Kyle Frank, P.E.
Mark D. Moder, P.E.
Fadi El Musa Gonzalez, P.E.
Andrew J. Zwieg, P.E.

Financial Manager
Steven B. Danner-Rivers

DATE: May 12, 2025

TO: Consultants Submitting Proposals for the Starkweather Creek and Olbrich Gardens Watersheds Study

FROM: James M. Wolfe, P.E., City Engineer

SUBJECT: **Request for Proposals**

The City of Madison Engineering Division is requesting consultant proposals for watershed modeling for the Starkweather Creek and Olbrich Gardens Watersheds. Please refer to the RFPs for pertinent information and dates. The following items are included with the RFPs and considered part of it:

Appendix A: Contract for Purchase of Services
Exhibit 1: Watershed Specific Information
Exhibit 2: Data provided by City
Exhibit 3: City of Madison Modeling Guidance
Exhibit 4: Final Report Outline and Deliverables Format
XPSWMM models and Geodata available by FTP link

The RFP responses for both watersheds are due in in pdf format via email to the buyer as described in the RFP, by 2:00 p.m., June 11, 2025. The selection is anticipated to be made before June 24, 2024.

Questions regarding this project shall be directed to City as described in the RFP document. Please submit any questions by May 23, 2025 at 2:00 PM.

Sincerely,

James M. Wolfe, P.E., City Engineer

cc: Janet Schmidt, City

EXHIBIT 1 – STARKWEATHER CREEK AND OLBRICH GARDENS WATERSHED SPECIFIC INFORMATION AND AREAS OF INTEREST

The Starkweather Creek Watershed is approximately 15,494 acres located in northeast Madison (see Figure 1b). The Olbrich Gardens Watershed is approximately 242 acres also located in northeast Madison, just south of the Starkweather Creek Watershed. The both have a mixture of development and are composed of several land uses including residential, commercial, and agricultural. For purposes of this study, the watershed discharge point for both is where they discharge to Lake Monona.

Information and Key Locations (See Figure 1b):

1. A series of enclosed depressions are present on Johns Street just north of Atwood Avenue. Recent reconstruction completed for Atwood Avenue was meant to reduce the reoccurring flooding in the enclosed depressions. As-built drawings and GIS records are available for the area.
2. Silver Road has a history of recurring flooding. A solution to reduce flooding has been implemented. A box culvert has been installed from Hargrove Street and Walter Street to Schenk Street and Richard Street with the intent of continuing to extend it to Silver Road and Richard Street. The consultant shall confirm that this improvement is included in the model. As-built drawings are available for the area.
3. A grassed drainage way is present from future Cityview Drive under I-90/94 then under Lien Road and to Sycamore Avenue. This drainage way has a current HEC-RAS model. The City would like this drainage way included in the watershed study. The LiDAR for this drainage way is not be accurate due to the height of the vegetation. There are culverts along the drainage way installed as part of an access road that are not part of the current HEC-RAS model. A survey was completed as part of initial model construction. Consultant to review model and survey data. Collect additional survey if needed. As-built drawings for the new culverts under Cityview are available for the projects.
4. The Jacobson-Furey Pond was constructed in 2019 to alleviate flooding. As-built drawings and GIS records are available.
5. Sherry OB Park has greenspace adjacent to Starkweather Creek. City of Madison Parks may fill a portion of the park to create a pet exercise area. Recent studies indicate this project is not proceeding.
6. Lexington Avenue has reoccurring flooding and has to be closed to traffic. The City would like detailed analysis of this area to determine the cause. A survey was completed as part of initial model construction. Consultant to review model and survey data. Collect additional survey if needed. Starkweather Creek should be included as part of the analysis as well as necessary survey of Starkweather Creek and immediate downstream culverts.
7. A channel exists along the railroad. The City would like detailed analysis of the channel and culvert crossings from Royster Avenue to Walter Street.
8. A drainage way is present through Anderson Street and Wright Street. The culverts crossing Anderson Street north-south have poor records. A survey was completed as part of initial model construction. Consultant to review model and survey data. Collect additional survey if needed.
9. Everett Street experiences recurring flooding causing private property damage. The City would like a detailed analysis of this area.
10. A new bike path bridge is proposed to be constructed across Starkweather Creek.
11. An existing bike path bridge across the East Branch of Starkweather Creek.
12. There are three 60-inch CMP culverts in the East Branch of Starkweather Creek where a railroad spur use to be located. The culverts are mostly clogged with debris from the creek.
13. Enclosed depressions with frequent flooding are found in the watershed. These are identified as known areas of concern for the watershed study.
14. Buckeye Road was rebuilt in 2019 and paved in 2020 from Monona Drive to Stoughton Road. As-built drawings and GIS records are available.
15. The Major Avenue area was reconstructed in 2019 - 2021. As-built drawings and GIS records are available.

16. A storm sewer pipe stubbed near the intersection of Buckeye Road and East Lakeview Avenue during the reconstruction of Buckeye Road. The purposes is to eventually connect the storm sewer pipe that currently drains through the backyards northwest of E Lakeview Avenue southwest to Buckeye Road.
17. During the reconstruction of Buckeye Road, the storm sewer under Quaker Circle was reconstructed to now drain to Buckeye Road.
18. The Hegg Avenue area has unimproved streets (no curb and gutter or storm sewer) and typically has poor drainage during storm events.
19. Future transportation improvement projects important to the watershed study are identified. Detailed analysis should be conducted in this areas.
20. The redevelopment site previously had some contamination that was mitigated during re-development. There may be some possible residual contamination that would need to be accounted for it stormwater control measures are proposed in this area.
21. This was once a detention basin built with the interchange, however the documentation was lost. Over time, the detention basin has filled in and it is now categorized as a WDNR regulatory wetland.
22. As the wetland fills with sediment, the storm water entering the wetland can back-up onto Atlas Avenue causing icy roads in the winter.
23. Cottage Grove Road east of USH 51 floods during larger storm events.
24. This was once a detention basin built with the interchange, however the documentation was lost. Over time, the detention basin has filled in and it is now categorized as a WDNR regulatory wetland.
25. The discharge into the pond was constructed in 2020. As-built drawings and GIS records available.
26. The storm sewer along City View Drive will be constructed in 2021. As-built drawings and GIS records are available.
27. Additional storm sewer has been constructed for the Village of Autumn Lake that is not included in the current GIS data. As-built drawings and GIS records are available.
28. A pond is present at the end of Cross Hill Drive. As-built drawings and GIS records are available.
29. Sycamore pond has no designed 1% change storm event overflow. The City has been exploring conceptual alternatives for an overflow.
30. The Ridgeway Avenue area has historically poor drainage. Consultant should evaluate potential for improvements.
31. The Moland Street area was built on a filled wetland. It has relatively low backyard and internally drained areas that contribute to poor drainage.
32. The Starkweather Plat is in the planning and approval stages. The consultant should plan to incorporate design data for the area during the study period.
33. Construction years for storm sewer pipes installed in 2020 or after are shown. Consultant should anticipate reviewing as-built drawings and GIS records to confirm that pipes installed from 2020-2022 are properly incorporate into the current models. For pipes installed after 2022 it is anticipated that the consultant will need to add these pipes to the existing models.
34. Recent and future projects in the Transportation Improvement Plan (TIP) are identified on the map. Consultant should anticipate additional effort in these areas: • City will provide preliminary pipe sizing for upcoming projects within the Olbrich Gardens Sub-watershed (Maher Ave, Davidson St, Drexel Ave, Gary St) for consultant to evaluate • For projects recently completed, if storm sewer improvements were included, City will provide as-built drawings to incorporate designs into models. • Future projects identified near flood prone areas should be prioritized for evaluation. Not all projects may be built on the schedule shown. City, will work to provide consultant priority project areas at the time of flood mitigation solutions development.

Exhibit 1b: Starkweather Creek and Olbrich Gardens Watershed Study Area

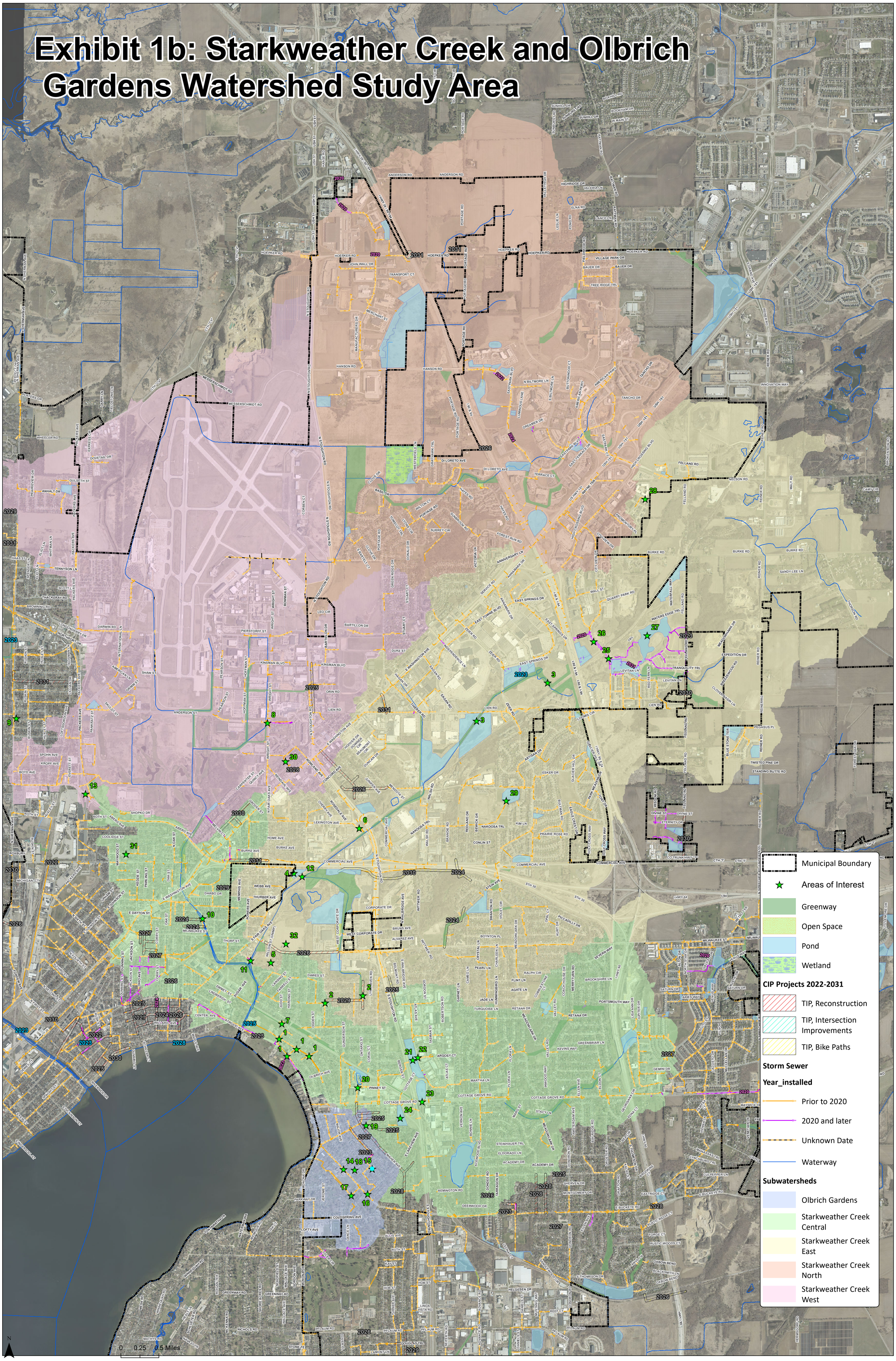


Exhibit 1c - Starkweather XPSWMM Models Initial QC

* Preliminary QC to gage the level of challenges present in the models, does not represent a comprehensive review

Watershed Wide Issues
- Building areas are not inactive in 2D
- Surfaces may need to be regenerated.
- 2D Inactive Areas potentially not functioning (Issue with central model, possibly watershed wide)
- Starkweather Creek modeling issues: 1D/ 2D connections, bridges, calibration, sub-watershed delineation

Not Evaluated
- Accuracy of pipe network (sizes, inverts, etc.) compared against current City GIS records.
-Accuracy of pond stage/storage and outlet structures compared to City records.

North Issues
- 1D weir modeled incorrectly, in 1D and 2D with DS node set to none type
- Base Scenario and Calibration Scenarios don't match

Starkweather Creek Generalized Network
- Based on standing water present in ortho image
- Modeled almost entirely in 2D, except for 2 small 1D areas about a city block in length each.

East Issues
- None type node present where connection to 2D surface is needed
- Half of 2D Landuse polygons possibly missing

Central Issues
- Model is likely corrupted and needs to be rebuilt.
- Infiltration not set per guidance

Olbrich Issues
- Pipe Entrance/Exit Loss coefficients not to guidance
- A few none type nodes present where connection to 2D surface is needed, including main pipes discharging to lake

West Issues
-100 and 500 yr rainfall set up incorrectly
- Base Scenario and Calibration Scenarios don't match

Starkweather Creek North
Starkweather Creek West
Starkweather Creek East
Starkweather Creek Central
Olbrich Gardens

I 39-90-94 (EB)
I 39-90-94 (WB)
I 39-90 (EB)
I 39-90 (WB)
I 94 (WB)
N STOUGHTON RD/USH 51 (NB)
S STOUGHTON RD/USH 51 (SB)
N STOUGHTON RD/USH 51 (SB)
S STOUGHTON RD/USH 51 (NB)
E WASHINGTON AVE (NB)
E WASHINGTON AVE (SB)
E WASHINGTON AVE
AMERICAN PKWY
JACKS LN
NELSON RD
PACKERS AVE
CTH CV
ANDERSON ST
ABERG AVE
ABERG AVE (EB)
ABERG AVE (WB)
N FAIR OAKS AVE
S FAIR OAKS AVE
STH 30 (WB)
STH 30 (EB)
COMMERCIAL AVE
MILWAUKEE ST
COTTAGE GROVE RD
LIEN RD
WATERS EDGE TRL
WATERFALL WAY
WOOD SORREL ST DR
FIREFLY
REINER RD
BUCKEYE RD

Model Links
Sub-Watershed Boundaries
Generalized Creek Network

Exhibit 2: Data Provided by City

City of Madison XPSWMM Models, and GIS and Related Data for
Starkweather Creek and Olbrich Gardens Watersheds

The following data are provided to the consultants for use in responding to the RFPs and developing watershed models under contract with the City. The consultant shall not use these data for any other purpose or share this data with anyone else.

The available data is not a complete dataset. The City is in process of updating and consolidating data. This document describes much of what is currently available. Updated data will be supplied to the consultant as it becomes available during the studies.

Data are stored in two locations.

1. Some can be downloaded from the City's Open Data (https://cityofmadison.maps.arcgis.com/home/index.html) portal via links shown with each dataset.
2. Others are only available via visiting the City's File Sharing (FTP) site (including the existing XPSWMM models). Link: https://sftp.cityofmadison.com:443/ui/#/syncplify/share?N=zEno36Wee4zFndeJ58mexA

Where applicable, data for other municipalities within the watersheds will need to be obtained from that municipality.

Existing Starkweather and Olbrich Gardens Models

Existing XPSWMM models - to be used as the basis of this study are provided on the FTP Site at the following location: *FTP/ExisitingXPSWMM*

Subwatershed	XPSWMM Model location	Model DEM
North	*/North_Strkwthr.zip*	/starkdem_20241015_north_1000ft.zip
Central	*/Central.zip*	/starkdem_20240416_central.zip
East	*/East.zip*	/starkdem_20241111_east_1000ft.zip
West	*/West.zip*	/starkdem_20240428_west_1000ft.zip
Olbrich	*/Olbrich.zip*	/starkDEM_20220110_olbrich.zip

Notes: The Model DEM files have been modified from the base level 2022 citywide 1ft LiDAR DEM.

FTP/ExistingXPSWMM/GIS.zip
Includes geodata used in developing of the existing, existing conditions XPSWMM models. Datasets include modifications/additions to the city records necessary to construct the models.

Name	Description
/Storm_Pipes.zip	Public storm sewer pipes
/Storm_Pipes_Private.zip	Private storm sewer pipes
/Storm_Struct_Private.zip	Private storm sewer structures
/Storm_Structures.zip	Public storm sewer structures
/Subwatersheds.zip	Sub catchments modeled in XPSWMM. Does not include hydrologic parameters.

City Ownership and Geo Data

City does have rest services available for some datasets: https://maps.cityofmadison.com/arcgis/rest/services/Public/

- **EngineeringOpenData.lyr** is also hosted as a rest service: *Public/OPEN_DATA_ENGR2*
- **TaxParcels Feature Class** *(FTP/Geodata in FloodStudies_2025.gdb)* is hosted as an ArcGIS rest service here: https://maps.cityofmadison.com/arcgis/rest/services/Public/Property_Lookup/MapServer
- **City Owned_Draft.lyr** *(FTP/Watershed Studies Folder)*
    - Source File TaxParcels, definition query on property owned by various City of Madison agencies. Symbology based on ReportName1 field.
- **Park_Land_polygons Feature Class** *(FTP/Geodata in FloodStudies_2025.gdb)*
- **Eng_Parks_MOU_Areas Feature Class** *(FTP/Geodata in FloodStudies_2025.gdb)*
    - Draft Memorandum of Understanding regarding public property that has multiple functionality as a combination of either right of way, park use or stormwater use.

Pond and Greenway Data

- **Pond_Contours Feature Class** *(FTP/Geodata in FloodStudies_2025.gdb)*
    - Stage/storage information for all City ponds included in the TMDL permit. New ponds are based on as-built information, while older ponds are based on construction plans, pond survey information, or rules of thumb.
- **Pond_Greenway Feature Class** *(FTP/Geodata in FloodStudies_2025.gdb)*
    - Ponds and greenways polygons in layer as Type This includes official pond name, year built, node number, etc. The node number is how the City tracks pond data, therefore specific data is stored in folders titled per pond node. Parcel_owner of MAD-C generally identifies that this pond is under the jurisdiction of the City of Madison Engineering Division or Parks Division. Maintenance responsibilities and deed restrictions are generally noted, but require further investigation.
- **Pond As-Built Information**
    - Data can be retrieved from the City upon request as-needed when consultant is selected.

Watershed/Outfall Data

- **Subcatchments** *(FTP/Geodata in FloodStudies_2025.gdb)*
    - Subcatchments is the City's most up-to-date subcatchment basin information.This information can be dissolved to treatment basins, HH model watershed boundaries, and watershed boundaries. These recently were merged to drain to the first treatment device.
    - The City anticipates the Consultant will use the subcatchments previously delinated and used in the existing models, however, if consultant uses an alternate approach the newly delineated subcatchments will need to match existing subcatchments from adjoining watershed studies for the model.
- Historic watershed studies/watershed information
    - Historic watershed study information, primarily water quality focused, organized per watershed

Storm Pipe and Structure Data

- **Storm_Pipes** *(FTP/Geodata/WatershedStudies_2025.gdb and downloadable as a shapefile on City of Madison Open Data website)*
    - Citywide Storm pipes are mapped by the City of Madison's mapping division. The invert data is based on as-built information. Due to an updated process in 2005, the City has the most confidence in data from 2005 forward.
        - The City Surveyors started using GPS (Global Positioning System- Survey Grade) to set Control for the 2005 construction Season. This system provided uniform elevations all over the City of Madison. Prior to 2005 Hydrants were used as benchmark elevations for projects; hydrant elevations came from a variety of sources and were inconsistent over the City.

        - The City is modifying its data per the schema that is downloadable from the Open Data portal. Based on available data, consultants may need to infer elevations or request survey for important locations within the modeled conveyance system.
- **Storm_Structures** *(FTP/Geodata/WatershedStudies_2025.gdb and downloadable as a shapefile on City of Madison Open Data website)*
    - Storm structures are mapped by the City of Madison's mapping division. The invert data is based on as-built information. Due to an updated process in 2005, the City has the most confidence in data from 2005 forward.
        - The City Surveyors started using GPS (Global Positioning System- Survey Grade) to set Control for the 2005 construction Season. This system provided uniform elevations all over the City of Madison. Prior to 2005 Hydrants were used as benchmark elevations for projects; hydrant elevations came from a variety of sources and were inconsistent over the City.
- **Storm_Pipes_Private** *(FTP/Geodata/WatershedStudies_2025.gdb)*
    - Citywide Data was mapped where private storm connects into the public storm sewer. This data is from parking lot construction plans from private development and does not always reflect what was built
- **Storm_Struct_Private** *(FTP/Geodata/WatershedStudies_2025.gdb)*
    - Citywide Data was mapped from parking lot construction plans from private development and does not always reflect what was built

STO_Modeling_Impervious (FTP/*Geodata/ FloodStudies_2025.gdb*)

- This citywide data was created in 2022 and represents the land cover and connectedness of impervious surfaces in the city based on 2020 aerial imagery

Aerial Photograph, DEM, Contours, LiDAR

- **2022 imagery** (and older images) hosted as an image server by Dane County here: https://dcimapapps.countyofdane.com/arcgisimg/rest/services

Flooding Data *(FTP/Geodata in Flood_Data.gdb)*

Feature Class Name	Description
FEMA_Reported_Aug20_Public	Public flood damage locations reported to FEMA. Codes: ○ A-Debris Removal ○ B- Emergency Protective Measures ○ C-Roads and Bridges ○ D-Water Control Facilities ○ E-Buildings and Equipment ○ F-Utilities ○ G-Parks, Recreation, Other
FEMA_CityDamage_Aug20	Public infrastructure damaged in the flood with repair reimbursements submitted to FEMA. Some overlap with FEMA public reported points.
OtherCollected_FloodPts_Aug20	Locations of issues received (emails/calls) by City Engineering staff as a result of the August 20, 2018 flood event (some overlap with FEMA reported points).
Official_Flood_Report_Pts	Locations of issues received via the City's online flood reporting form; date attached to feature class is the date that the data was pulled from the flood report form.
Historic_FloodPts	Intersections, points, and areas that have been noted over the years as having some flood/drainage related issue; includes 911 calls from June 16, 2018 event; attribute data is variable
Operations_FloodPts	Locations generated from City of Madison Operations work orders and calls received requiring flood/drainage related maintenance issues over the years.

Feature Class Name	Description
Priority_Inlets	City Engineering Operations priority inlets for maintenance.
BI_FloodPts_Aug20_Private	2-1-1 and Building Inspection collected private damage information from Aug 20th storm damage. BI used this data to create preliminary damage estimates based on FEMA's flood damage calculator.
Street_Flooding	Layer generated manually by looking at historic data points to determine streets that have had flooding issues, plus institutional knowledge.
Business_FloodPts_Aug20	Businesses that had direct impact on their properties from the August 20, 2018 flooding

MODELING GUIDANCE

Version 2024_01_28(DRAFT)

Version Revision	Purpose	Changes	Author
V2024_02_19	Issued round 7 RFP (Nine Springs, Pennito Creek)	Added Item 10.c. under "Modeling Parameters"	RSS
V2028_01_28	Updating for issuing Starkweather and Olbrich RFP to complete existing conditions modeling and develop solutions	Added item 14.e.i	RSS

Round 8 Watershed Studies

The City recognizes that an important aspect of modeling is professional judgement; and it will be up to the Consultant to appropriately define parameters, variables, and methodology. However, it is in the City's best interest to have relative uniformity amongst City models. This guidance document was developed to provide uniformity. Where inputs and assumptions differ from those outlined in this document, the Consultant will be expected to justify and document the differences and reasons for the differences.

The purpose of the watershed modeling is to construct planning-level models of the watershed to identify locations with significant conveyance system deficiencies. The identified solutions will be conceptual solutions, not design-level solutions.

City of Madison Flooding Level of Service Goals

1. 10-year design storm event:
    a. No surcharging onto the street for up to the 10-year design storm; water shall be contained within the pipes and structures.
        i. When using rain-on-grid hydrology, the goal is met if there is less than 0.25' of curb depth using the FHA method.
    b. There are locations within the City where low points exist that pond water; these low points are excluded from this goal and will be addressed as streets are redesigned.
    c. For locations limited by known inlet capacity, allow no more than 0.5 feet of water above storm sewer inlet rim.
2. 25-year design storm event:
    a. Street to remain passable for emergency vehicles during 25-year design storm.
        i. This is defined as no more than 0.5 feet of water on the centerline of the street for a length of 100-feet using the depth raster.
        ii. To define the centerline of street, the County's centerline data (Dane County SDE – GISdw.DCL.RoadCenterline) should be used.
    b. Note that the Watershed Study modeling approach will not explicitly account for cross flow conditions where more gutter flow on one side of the street can overtop the crown.
3. 100-year design storm event:
    a. No home or business will be flooded during the 100-year design storm.
        i. This is defined as no more than 0.5 feet of water at the 5-foot buffer around a structure.
    b. Enclosed depressions to be served to the 100-year design storm (which can include safe overland flow within street, easements, greenways or other public lands).
        i. For purposes of the watershed studies, enclosed depressions are defined as depressions in public right-of-way where stormwater needs to reach private property to overflow from the depression.
        ii. Solutions will also be developed for enclosed depressions where the stormwater collected is solely from private property. In these cases, the solutions may be

implemented thru public-private cooperation or solely by the private property owners.

   c. Greenway crossings at streets to be served to the 100-year design storm.
4. 500-year design storm event:
   a. Safely convey stormwater; i.e. limited impact on private property.
   b. Limited impact is defined as no more than 0.5 feet of water at the 5-foot buffer around a structure.
5. Provide flooding solutions that do not negatively impact downstream properties.

Due to the inherent variability and complexity of stormwater conveyance systems, it is understand it may not be practical to meet the above level of service goals in all areas of the City.

Guidance for Solutions

1. For the purpose of the watershed studies "deficiencies" in the system shall be defined as existing infrastructure, drainage capacity, or system limitations that fail to meet the goals stated in 1-5 above.
2. Watershed deficiencies will be reviewed, and solutions will be provided up to, the 100-yr design storm.
3. In areas where flooding occurs in events exceeding the 100-year storm, those areas will not be prioritized for engineering solutions, but will be identified in existing conditions model for 500-year event storms.
4. Proposed solutions will be identified for only the publicly owned drainage system.
5. Drainage issues that are private (water from the public infrastructure such as streets, greenways, ponds and/or easements is not the cause of the drainage issue) will not require modeling solutions but should be noted, where possible, in the existing conditions analysis so staff may work with property owners if necessary. (See Also Hydraulics section of Modeling Guidance for discussion on private system existing conditions modeling.)

Emergency Vehicle Allowable Flood Depths (email from Fleet on 5/12/2020)

1. SUVs – up to 6-inches
2. Large Trucks – up to 3-feet
3. Ambulances, vans, and pick-up trucks – between 6-inches and 3-feet

MODELING PARAMETERS:

Initial model parameters are the following items:

1. Include storm sewers and culvert segments for the trunk line drainage system and major conveyance to that system. Additional conveyance components may be included if felt necessary by the modeler to understand the conveyance system drainage.
2. Inlet capacity will not be included in the model. It is assumed that sufficient inlets are present accommodate stormwater. In areas where there is known chronic flooding that has been reported to Engineering, additional detail may be requested.
3. Incorporate significant existing storm water management facilities (public and private) into the model.
4. Subdivide provided outfall basins into smaller watersheds as needed in order to properly execute the model.
5. Coordinate System and Vertical Datum
   a. Horizontal Coordinate System: NAD 1983 HARN WISCRS Dane County Feet (WKID 103412).
   b. Vertical Datum: NAVD88 (pre 2007 adjustment) ft (City of Madison Datum + 845.6)
   c. Various data sources have different horizontal and vertical datums, check datum for each data source prior to use.
   d. When setting up PC-SWMM Models, the default coordinate system that looks like it matches the City's preferred coordinate system is not the same. PC-SWMM's default coordinate system is State Plane and the exact coordinate system the City uses is not in

PC-SWMM's database. To create a PC-SWMM model with the same coordinate system:

i. Open up a new, blank model.
ii. Add one of the City's shapefiles with the preferred coordinate system.
iii. Then, in PC-SWMM, select that coordinate system as the default.

6. Monitoring Data Time Zone: Different sources of monitoring data use different time zones. Also, some adjust for daylight savings time whereas others do not. When using the monitoring data, check both the time zone and if the data is adjusted for daylight savings time.
7. Monitoring Data Review: Familiarize yourself with the location of the monitoring gage at each site. Also, visit the monitoring site following a rain event to review the site conditions for things that would impact the measurements. For example, is there debris clogging anything?
8. Naming convention
    a. Names are limited to 20 characters where possible. Both PC-SWMM and XP-SWMM can take lengthy names but both indicate shorter is better for avoiding truncating names.
    b. Subcatchments:
        i. Begin with Subcatchments naming convention provided by the City in the Outfall Basin feature class.
            1. Add a three-digit designator to the end of the name, beginning with 000
            2. As subcatchments are subdivided, increase the added designator by 1.
            3. Example: ME04-A-0014-H *(Provided by City)* → ME04-A-0014-H-MAD-C-000 *(For the original basin)* → ME04-A-0014-H-001 *(For first subdivision)*
        ii. Final outfall basin feature class file, including supporting files used to compute runoff timing and volume parameters shall be part of the deliverables provided to the City of Madison.
        iii. Note first downstream stormwater control practice as attribute in subcatchment feature class.
    c. Structures and Junctions:
        i. Node (Junction/Storage/Outfall) names for existing structures shall retain the asset identification provided by the City.
        ii. Proposed Structure names are to be determined by the Consultant but shall be given a "logical" name that reflects general location, function, or other.
        iii. For junctions that need to be added that are storm sewer tees as constructed, use the downstream manhole / structure with "_01" added in increasing order moving from downstream to upstream. For example, the first junction added for a tee upstream of MI3350-001 would be MI3350-001_01
    d. Pipes:
        i. Conduit names for existing pipes shall retain the asset identification provided by the City, except that:
            1. The first two letters (i.e AE, IN, etc) can be removed
            2. Leads with an asset ID that takes up all 20 characters can be shortened to the corresponding assigned ID. For example, IN3350-032_AS3350-007_3350-001 can be changed to 3350-032_3350-001_001
        ii. Proposed Pipe names are to be determined by the Consultant but shall be named in a manner similar to the City pipe naming convention, which includes the upstream and downstream structure names.
    e. Channel/Street Flow Segments:
        i. Conduit names for drainage-ways shall be named in a manner that identifies the greenway segment it represents by Greenway Node Number and the distance from the upstream end. Example: GR7541-062_125 would represent a channel segment that begins 125 feet into the North Door Creek Greenway – Sprecher Road Section.
        ii. Conduit names for streets shall be named with "Rd_"[US_Node_Name]_[DS_Node_Name] and remove the first two letters in the node name similar to how pipes are named.
    f. Natural Channels:
        i. Natural channel transects shall be named with the same ID as the conduit name.
        ii. Street models as natural channels shall be named in a manner that is easily

identifiable for the street or street type it represents.

iii. A shapefile shall be created documenting where natural channel transects are cut.

g. Other SWMM Features (Weirs, orifices, etc)
   i. Other SWMM features shall have readily identifiable names corresponding to the type of feature they are trying to model. For example, an orifice for a detention pond should have an ID that is "<Detention Pond ID>_ORIF_01", keeping within a 20 character limit.

h. Ponds
   i. Use the pond name identifier from GT-Viewer combined with a common name. For example, the ponds at Odana Hills Golf Course would be "PD3461-001_OdanaHills"
   ii. Use abbreviation of name if unofficial full name creates a model name longer than 20 characters.

i. Non-City owned infrastructure
   i. Consultant may choose name if consistent naming convention is not created by entity that owns infrastructure
   ii. If Consultant chooses name, all infrastructure owned by another entity shall start with the same few characters. For example, DOT infrastructure could all start with "DOT-" or Fitchburg owned infrastructure could start with "Fit-"

9. Data Notation

The GIS data describing the conveyance system is not complete. In some instances the modeler will be able to make assumptions based on available data. In other locations, the data will require survey. The City is tracking the accuracy of the data with the ultimate goal of having a complete record.

When the modeling is creating the GIS data describing the structures and pipes, they shall create a new attribute in their GIS data and categorize the data as the following:

a. Structures:
   - Source_IE
   - Source_Rim

b. Pipes:
   - Source_ToIE
   - Source_FromIE

c. Private:
   - Notes

d. Source –enter Number and text in bold in attribute
   0. **Converted:** legacy EI's taken from the structure, all EI's received the structures outgoing EI by default when converted in 2020. *This does not mean this data is *__better__* than the survey data, if it looks suspect, you should investigate and try to clarify the source (especially for pre-2005 data, or structures/pipes within ponds/gwys)*
   1. **Survey:** Survey data (current)
   2. **AsBuilt >2004:** As-Builts (2005-present) since City used GPS-Survey Grade to set control improving consistency citywide
   3. **AsBuilt pre-2005:** As-Builts (pre-2005)
   4. **ConstPlan**: Construction plans
   5. **GTV**: GTV in-line text, no plans to support
   6. **Interpolate:** interpolated (saddled structure had inverts on either side and interpolated—should eventually be surveyed)
   7. **Inferred:** best guess, (can't get survey now or is pulled from LiDAR, but should eventually be surveyed)
   8. **No data:** Needs survey (searched and unable to find—should eventually be surveyed, but a higher priority)

e. When creating a model, Engineers will verify/update:
   i. Structures:
      - Source_IE
      - Source_Rim

- Project_No

ii. Pipes:
- Source_ToIE
- Source_FromIE
- Project_No

iii. Private:
- Notes
  - PLP_address
  - GTV
  - Survey (survey will need to confirm all fields)

10. Rainfall
    a. MSE4 24-hour Distribution and NOAA Atlas 14 Depths

Recurrence Interval (years)	Rainfall Depth (inches)
1	2.49
2	2.84
5	3.45
10	4.09
25	5.02
50	5.74
100	6.66
200	7.53
500	8.94

    b. Long-Duration Storm – Two 24-hour, 100-year MSE4 storm events with the time between peak rainfalls shorted from 24 hours to 12 hours.
    c. When using the MSE Rainfall distribution the timestep used for representing the distribution within the model shall be 0.1 hours (or 6 minutes).

11. Hydrology (SWMM Method with Horton Infiltration) (References: A, B, C, J, L)
- Parameters listed are default parameters and may need to be adjusted based on calibration data.

    a. Subcatchment Detail for Street Drainage
        i. Contributing area to the existing storm sewer system that is to be modeled (Determined on a watershed by watershed basis)
    b. SWMM Routing Parameters (if calibration is not available to adjust parameters)
        i. Percent Impervious:
            1. In areas where impervious areas are delineated:
                a. Use impervious/Pervious areas from City provided feature class.
            2. In areas where Impervious areas are not delineated:
                a. Use City provided WinSLAMM land use file and the "HowTo_CalculateCN" Document.
                b. Areas not delineated in City Provided WinSLAMM land use file shall defer to Dane County Land Use Map.
                c. Match WinSLAMM land uses with Dane County Land Use.
            3. Note: The City had a set of surface cover data built off the 2018 ortho image. The deliverables from Task 4 are the easiest to utilize in models. The impervious type is defined in a domain and to use it you may need to "Export a table to include domain descriptions and coded values"
        ii. DCIA
            1. In areas where impervious areas are delineated:
                a. Use impervious/Pervious areas from City provided feature class.
            2. In areas where Impervious areas are not delineated:

a. Reference WinSLAMM Standard Land Use DCIA Spreadsheet

iii. Width – Estimated based on subcatchment shape. Estimation methodology shall be documented.
A single width shall be calculated for the entire subcatchment and used for all three sub-areas.
It is expected Width is one of the first calibration parameters for peak flow.

iv. Slope – Computed manually or estimated based on LiDAR. Computation or estimation methodology shall be documented.

v. In XP-SWMM, each subcatchment is to be split into area of (1) DCIA, (2) non-DCIA, and (3) pervious area. Within the model, the non-DCIA shall be routed to the pervious area.

vi. In PC-SWMM, indicate the percent being routed to pervious in the subcatchment attribute.

c. Horton Infiltration

i. For typical urban pervious area (Based on range of values for different soil types, moisture conditions, and vegetation conditions found in Reference A):

HSG Group[a]	Max Infil. Rate (in/hr)	Min Infil. Rate (in/hr)	Decay Rate (1/hr)	Dry Days[b]	Maximum Infiltration Volume (in)
A	4.0	1.0	4.0	3.1	
B	2.0	0.5	4.0	4.4	
C	1.0	0.2	4.0	7.0	
D	0.5	0.1	4.0	9.9	
Water	0	0	0	0	

[a]For HSG listed as A/D, B/D, C/D, the default approach will be to assume the HSG associated with the lower infiltration rate (HSG D).
[b]Use equation 4-12, pg 99, SWMM Reference Manual Volume 1 – Hydrology (Revised), January 2016

ii. Impervious Manning's n – 0.016

iii. Pervious Manning's n – 0.20

iv. Depression Storage for Impervious – 0.05 inches

v. Depression Storage for Pervious – 0.15 inches

vi. Zero Depression Storage – 25 percent

vii. Factors for adjusting (L)
1. Forest – Multiply max and min infiltration rates by 2.
2. Farmland (row crops) – Multiply max and min infiltration rates by 1.2.
3. Farmland (close crops) - Multiply max and min infiltration rates by 1.8.
4. Other land uses – discuss with City staff

viii. Area-weight the Horton Infiltration parameters for each subcatchment based on the area of each soil type within a subcatchment. Remove impervious area from area-weighting.

ix. It is understood the NRCS/SCS updates the soil mapping at various times. The project teams will identify a date the soils data will be downloaded and that will be the data used for the duration of the project.

d. Evaporation: Turn off evaporation from calibration and design storm event runs.

12. Hydrology (SCS CN Hydrology – ONLY USE WHERE DESIGNATED BY CITY) (References B, K)

a. Runoff Curve number, Percent Impervious, Directly Connected impervious Area

i. In areas where impervious areas are delineated:
1. Use impervious/Pervious areas from City provided shapefile.
2. Impervious areas shall use a runoff curve number of 98.
3. Urban pervious areas that are mowed and maintained can assume the area is Open Space in good condition listed in Table 4-9 of Reference B.
4. All other pervious land uses shall match descriptions listed in Table 4-9 of Reference B.
5. Create a composite subbasin runoff curve number that incorporates both

impervious and pervious areas.

ii. In areas where Impervious areas are not delineated:
    1. Use City provided WinSLAMM land use file and the "HowTo_CalculateCN" Document.
    2. Areas not delineated in City Provided WinSLAMM land use file shall defer to Dane County Land Use Map.
    3. Match WinSLAMM land uses with Dane County Land Use and repeat item "i." of this section.
    4. Impervious areas shall use a runoff curve number of 98.
    5. Urban pervious areas that are mowed and maintained can assume Open Space in good condition listed in Table 4-9 of Reference B.
    6. All other pervious land uses shall match descriptions listed in Table 4-9 of Reference B.
    7. Create a composite subbasin runoff curve number that incorporates both impervious and pervious areas.

b. Routing Parameters
    i. Width - In PC-SWMM only, Estimated based on subbasin shape. Estimation methodology shall be documented. It is expected that width is one of the first calibration parameters to be adjust for peak flow.
    ii. Slope - In PC-SWMM only, computed manually or estimated based on LiDAR. Computation or estimation methodology shall be documented.
    iii. Time of Concentration - In XP-SWMM only, calculate each watershed time of concentration based on equations listed in SCS Urban Hydrology for Small Watershed, 2nd Ed., (TR-55), June 1986 (Reference K). The max flow length for sheet flow is 75 feet in urban areas and 150 feet in agricultural/natural areas.
    iv. In XP-SWMM and PC-SWMM, the percent impervious shall be zero and the composite runoff curve number shall incorporate impervious and pervious areas.

13. 1D Hydraulics (References: A, B, D, E, F, G)
- Dynamic mode with constant / variable timestep sufficient to model system accurately.
- Conduit lengthening shall not be used unless prior approval from City on reason.
- Parameters are default parameters and may need to be adjusted based on calibration data.
- This list is not intended to be exhaustive.

a. System to be Modeled
    i. Public
        1. Standard: Trunk line and major conveyance components to trunk line.
        2. Process for Exceptions: Provide justification for conveyance components not included.
        3. Use engineering judgement for inclusion of additional detail beyond this standard.
    ii. Private
        1. Standard: Not included
        2. Process for requiring inclusion of private pipes:
            a. Stormwater management detention facilities providing significant detention.
            b. When necessary to understand the functioning of the public system. For example, the West Towne Mall parking lot drainage system.
    iii. Greenways and major surface drainages
    iv. Significant stormwater detention facilities (public and private).
        1. Private systems may be simplified if serving a single site.
        2. Provide justification for detention facilities not included.

b. Loss Coefficients (see drawing at end of document)
    i. Entry
        1. Culverts – Select Inlet Type based on the Help File or HEC-RAS Hydraulic Reference Manual

2. Storm Sewer (internal at MHs) = 0.05
3. Storm Drainage Structures (MH) at 45 degree bend = 0.25
4. Storm Drainage Structures (MH) at 90 degree bend = 0.5
5. For culverts and entrances to storm sewer from an open channel or pond, both the energy loss coefficient and the inlet control (culvert code) shall be used.

ii. Exit
1. Culverts –
a. Exit closed conduit to open channel = 0.5
b. Exit closed conduit to lake or pond = 1.0
2. Storm Sewer (internal at MHs) = 0.05
3. Storm Drainage Structures (MH) at 45 degree bend = 0.25
4. Storm Drainage Structures (MH) at 90 degree bend = 0.5

c. Coefficient of Discharge
i. Weirs
1. Sharp Crested – 3.0
2. Roadway embankment – 2.6
3. Flatter overflow – Use engineering judgment
ii. Orifices
1. 0.6

d. Manning's n
i. Pipes
1. Concrete Pipe: 0.013
2. Other n values shall be chosen within generally acceptable ranges.
ii. Channels
1. Use Chow's Open Channel Hydraulics, Reference E
iii. Bank Flow, including developed urban areas
1. Use Chow's Open Channel Hydraulics, Reference E

e. Transect Placement and Modifiers
i. Splitting long open channels
1. Changes in cross section
2. Significant changes in slope and roughness
3. Overflow points
ii. Segment Lengths
iii. Channel Geometry
iv. Provide shapefile where natural channel transects are selected along with XS Identifier

f. Tailwater Conditions:
i. Lake Mendota: one foot over Summer Maximum
1. NGVD 29 Datum: 851.10
2. NAVD 88 (1991) Datum: 850.9
ii. Lake Monona: one foot over Summer Maximum
1. NGVD 29 Datum: 846.2
2. NAVD 88 (1991) Datum: 846.0
iii. Lake Wingra (100-year WSE): 848.0
iv. Yahara River between Lakes Mendota and Monona: TBD

g. Inlet Clogging Factors
i. Continuous Slopes
1. Street slope < 1% - 25% Clogging
2. Street slope >= 1% - No Clogging
ii. Sags – 50% Clogging

14. 2D Data (References: A, G, H, I)
a. Surface Roughness – The average Manning's n may vary by land cover / land use. Referencing TR-55, the following roughness can be used for sheet flow conditions. Choose based on professional judgement and document in the report.

i. Impervious areas - 0.1
ii. Turf grass areas - 0.24
iii. Wooded – 0.4
iv. Prairie – 0.15
v. Other – reference TR-55

b. Channel Roughness - Where the 2D surface experiences channel flow, rather than sheet flow, utilize the Manning's n values for open channels
c. Impervious Area/Inactive Areas - The City had a set of surface cover data built off the 2018 ortho image. The deliverables from Task 4 are the easiest to utilize in models. The impervious type is defined in a domain and to use it you may need to "Export a table to include domain descriptions and coded values"
    i. Average the roughness within the ROW based impervious and pervious area.
d. Blocked Obstructions – enter roofs as Inactive Areas in XP-SWMM and Obstructions in PC-SWMM
    i. Non-residential – use City impervious area data for roofs
    ii. Residential – use Dane County roof layer
e. Grid cell/mesh size: Use size that balances model run time and sufficient 2D overland flow detail.
    i. Consultant shall confer with City prior to utilizing a variable grid mesh size. City does not currently have an XPSWMM license that supports that capability.
f. Grid/mesh orientation: Where possible, align grid/mesh with major channel flow direction. If not practical, then use orientation that minimizes run time.

15. Rain-on-Grid Analysis (Do not use without discussion with City)
    a. Hydrology
    For a full study area Rain-on-Grid model, no nodes or pipes should be active within the Runoff Mode.
        i. Rainfall - All runoff is generated using Rainfall / Flow Area layers. Individual layers shall be created for each rainfall event, with only the applicable one active during each scenario. Rainfall distributions stated above in Section 9 shall be used.
        ii. Landuse – Layers for the following land uses must be created: Buildings, Impervious, Turf Grass, Wooded, Prairie, Water and any other applicable layers. Land use layers for Turf Grass, Wooded, Prairie, and any other pervious land coverage, shall be additionally divided up into Hydrologic Soil Groups A, B, C, and D. These layers should cover the entire study area. Under the Land use data tab, inputs for Manning's Roughness, Rainfall Abstraction, and Infiltration must be completed.
            1. Manning's Roughness:
                a. Buildings – Variable roughness must be used. A Depth-Roughness relationship as follows is appropriate:

Depth (ft)	Roughness
0.00	0.01
0.30	0.01
0.31	0.1
10.0	0.3

                b. Impervious – A constant roughness of 0.016
                c. Turf Grass, Prairie, Wooded, and other Pervious – Variable roughness must be used to account for sheet flow at low flow depths. The consultant shall use roughness coefficients stated above in Sections 10.c and 12.a to develop these roughness curves.
                d. Water – A constant roughness of 0.01.
            2. Rainfall Abstraction:
                a. Buildings and Impervious – Initial Abstraction of 0.04 inches (XP-SWMM Default). Continuing loss should remain 0.0.

b. Pervious - This shall remain unchecked, as Initial and Continuing losses will be accounted for via the Horton Infiltration parameters.

3. Infiltration:
    a. Buildings and Impervious – This shall remain unchecked
    b. Pervious – Horton Infiltration as described above in Section 10.c shall be created for each pervious land use layer.

b. 2D Model Settings
    i. Grid extent shall cover the entire study area.
    ii. Default area type shall be set to Active Area. There should not be any inactive areas within the model.
    iii. Default land use should be set to one of the pervious layers (suggested to use layer with largest total area). However, this should not have any impact on the modeling if there is full coverage of land use layers.
    iv. Head boundaries shall be set anywhere where surface flow is able to leave the study area.

c. 1D Model Network
    i. The 1D storm sewer network shall be extensive enough to include enough inlets throughout the watershed so that surface water can adequately pass from the 2D surface into the 1D model. Multiple inlets at the same location may be combined to a single node. Inlets either side of the street shall remain separate nodes.
    ii. Each inlet node must have Link Spill Crest to 2D checked. Each culvert inlet/outlet must have Link Invert to 2D checked. If calibration shows not enough flow is entering each inlet node, Spill Crest elevations may be lowered below the 2D cell elevation (0.5 ft is an acceptable initial lowering value)

d. 1D/2D Interface Lines at Intersections
    i. In steeper watersheds, the water on the grid may not enter the pipe due to the limitations of the xp2d grid module. Pipes should be reviewed after a simulation for this occurrence. Where this occurs, add 1D/2D interface lines to connect the flow at appropriate intersections to the 1D node.

16. Suggested Proposed Solutions Organization
    a. The Proposed Solutions simulations should be set up in the following way (unless discussed with City staff first). The purpose is to have a model with just the proposed storm sewer improvements, just the regional improvements, and then both.
        i. Add the proposed storm sewer to the Existing Conditions Model as a Scenario.
        ii. Once complete, save the model file with a new name. Add the regional solutions in the Base Scenario, keeping the proposed storm sewer as a scenario.

17. Non-Modeling Data
    a. When utilizing XP-SWMM, provide attributed describing the source of data in the representative GIS feature classes
    b. When utilizing PC-SWMM, also add attributes to the entities describing their data sources.

18. Solutions
    a. Analysis – what are the underlying causes of flooding in:
        i. Areas reported in the “Flood Download” from City staff
        ii. Other flooded areas in the modeling not identified in the “Flood Download”
            1. If more than 10 total areas, work with City staff to prioritize locations to evaluate
        iii. City to identify suggested solutions and provide to Consultant for consideration
        iv. Consultant to identify solutions independently and take lead on overall solutions for watershed
    b. Prioritize Solutions
        i. Property Damage
        ii. Major arterials where emergency vehicles cannot get through
        iii. More criteria - TBD

c. Displaying solutions/Order of solutions
    i. Show each solution independently and then combined
    ii. Order
        1. Property/pipe owned by Stormwater Utility
        2. Pipe size needed to solve remainder of issues
        3. Other public properties
            a. Janet will provide areas where there are non-starters in Parks
        4. Private properties
    iii. Show structures removed from the 100-yr event
        1. Intersect the flood raster with the building outlines
        2. Buffer buildings by 5-feet to account for in accuracies of building footprint layer
        3. Any building outline that intersects the buildings is considered "flooded" if depth of intersection is 6 inches or greater.
d. In SWU-owned land all proposed grading must have the following conditions for maintenance access:
    i. be offset from the property line on 1 side by 15 feet (parallel to channel flow, from Pond access to pond outlet)
        1. Shall be extended to reach all priority inlets or sanitary access structures within greenway
    ii. All proposed berms must be 10 feet wide @ top of berm
    iii. Slopes no steeper than 4:1
e. Overlay TIP map with inundation mapping to understand where immediate future project opportunities are
f. Freeboard – City does not have a minimum freeboard requirement
g. Properties adjacent to greenway and new greenway crossings – Current ordinance states property low building opening must be 4' above invert of downstream greenway street structure crossing. Therefore, may need to make structures wider, instead of deeper, to not flood upstream properties

19. Water that overflows Watershed Study Boundaries
    a. There may be locations along a watershed study boundary where water overflows that boundary and enters an adjacent watershed. When this occurs
        i. 2D outflow boundaries should be drawn in the locations to allow the water to leave the model as it would normally.
        ii. A 2D flow recording line should be added in this location, just upstream of the 2D outflow boundary.
        iii. The model should be run for all design storm events.
            1. If flow is found to be significant, hydrographs should be exported from the model and provided to the City Project Manager so they can be inserted into the adjacent watershed study model.
            2. If flow is not found to be significant, the flow can be ignored.
        iv. The watershed should report should include a section showing the locations of the overflow. Text and tables in the report should briefly describe the magnitude of the overflow and the duration.

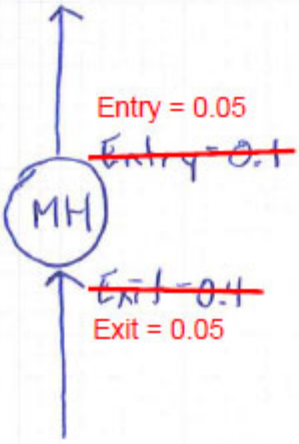
REFERENCES

A. Model Help Files and User Forums
B. Storm Water Management Model version 5.1 User's Manual. (Available at: https://www.epa.gov/water-research/storm-water-management-model-swmm-version-51-users-manual)
C. SWMM reference manual volume I – hydrology (Available at: https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100NYRA.txt)
D. SWMM reference manual volume volume II – hydraulics (Available at: https://nepis.epa.gov/Exe/ZyPDF.cgi/P100S9AS.PDF?Dockey=P100S9AS.PDF)

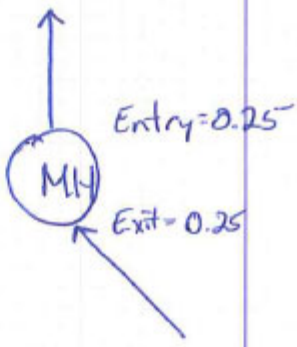
E. Chow, Open Channel Hydraulics, 1959
F. HEC-RAS Hydraulic Reference Manual. (Available at: https://www.hec.usace.army.mil/software/hec-ras/documentation/HEC-RAS%205.0%20Reference%20Manual.pdf)
G. ASCE Two-Dimensional Modeling Using HEC-RAS, Lecture 8 – Troubleshooting and Reviewing, Page 31; 2017.
H. Australian Rainfall & Runoff Revision Projects, Project 15: Two Dimensional Modeling in Urban and Rural Floodplains, November 2012.
I. FLO-2D Reference Manual, FLO-2D Software, 2012.
J. ASCE Manual of Engineering Practice No 28.
K. SCS Urban Hydrology for Small Watershed, 2nd Ed., (TR-55), June 1986
L. Found during calibration in the Pheasant Branch Watershed. Area underlain with Prairie du Chein geology. Areas with other geology will need to select appropriate multipliers.

References/Notes

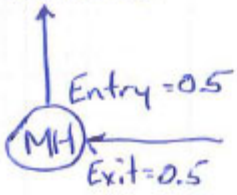
Straight-Through Manhole



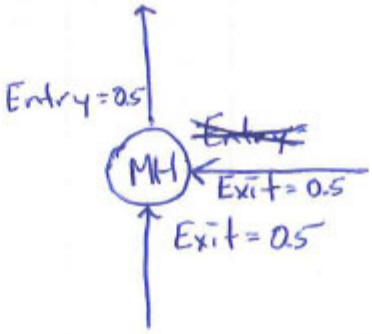
45° Bend Manhole



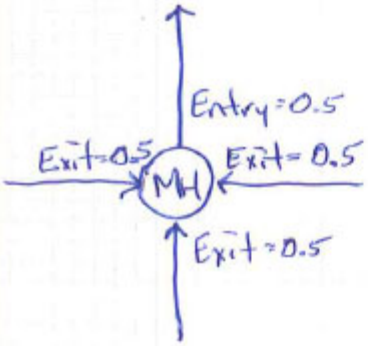
90° Bend Manhole

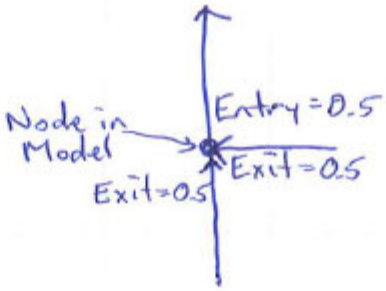


TEE Manhole



TEE (No Manhole)





Version 2025_05_08

Revision	Purpose	Changes	Author
V2025_05_08	Issued round 8 RFP (Starkweather Creek and Olbrich Gardens)	Added Section headings. Added final bullet under Final Report, General Notes. Minor revisions to Appendices and Figures Lists. Minor updates to the GIS Deliverable section. Revised "Soils" section of "Required Data".	RSS

This document may be revised and resent to consultants working on active studies prior to the submittal of the Draft Final Report by the Consultant to the City.

Final Report

General Notes

- On Front Cover: Note "The City makes no representation about the accuracy of these records and shall not be liable for any damages" (disclaimer may be modified by City)
- Where deviated from Model Guidance, include assumptions in items Model Development text
- Expand discussion specific to assumptions
- Use "resident" as opposed to "citizen" and "property owner" for commercial areas
- Volume control infrastructure – note "being analyzed separately" with no further information
- Water Quality components – only for purposes of data entry into WinSLAMM if solution gets some water quality benefit
- Prioritization Matrix – only note that it is being done by City to develop implementation order
- Hyperlink table of contents to sections in report
- Examples of previous reports can be found on the City's Watershed Study Website (https://www.cityofmadison.com/flooding/city-initiatives/watershed-studies) within specific project pages or provided by the city.
- Wherever possible use concise language and formatting such as bulleted lists rather than extensive narratives.

Report Content

1. Executive Summary (objective is to keep to a 2-3 page maximum for Mayor's office, but may be longer if it is very clear and easy to read)
    a. Quantify where we didn't reach flood goals
        i. U% of U sewers surcharge during 10-yr event
        ii. W% of W inlets are under capacity
        iii. X% and X greenway crossings of Y total greenway crossings
        iv. Y% of Y arterial streets
        v. Z% of Z structures flood
        vi. Other applicable data
    b. Maps (see example)
        i. Briefly explain how model is used to see if flood goals are met
    c. Summary of proposed solutions and costs
    d. Quantify where flood goals are after all solutions are implemented
        i. U% of U sewers surcharge during 10-yr event
        ii. W% of W inlets are under capacity

iii. X% and X greenway crossings of Y total greenway crossings
iv. Y% of Y arterial streets
v. Z% of Z structures flood
vi. Other applicable data

2. Introduction
    a. Project Background and Purpose
    b. Scope of Study
    c. Historic Flooding in Watershed
        i. Flood Reports
        ii. Areas reported by City staff
    d. Summary of Past Studies (if applicable)
        i. Report Name, Date, Author, Location (if known)
3. Water Resources Inventory
    a. Study Setting
    b. Watershed
    c. Topography
    d. Drainage Systems
        i. Natural System
        ii. Constructed System
    e. Runoff Conditions
        i. Land Use
        ii. Impervious Area
        iii. Soil Types
        iv. Wetlands
4. Guidance and Data Sources
    a. Reference Model Guidance Document
    b. List Data Sources
5. Model Development
    a. Modeling Software
    b. Rainfall Files
        i. Design Rain Events
        ii. Measured Rain Events
            1. Explain monitoring background and more clearly explain why/how events were chosen.
    c. Hydrologic Model Development
        i. **PCSWMM Models**
            1. The City of Madison has identified issues with PCSSWMM's 1983_HARN_WISCRS_Dane_County_Feet projection. Prior to beginning work, the consultant shall work with the City of Madison to determine the best projection for the model and corresponding GIS data
        ii. SWMM Runoff Description (brief and why being used)
        iii. Subwatershed Input Data (Summary, details in Appendix)
            1. Area
            2. Impervious Area (Directly Connected and Disconnected)
            3. Width

4. Slope
5. Soils
6. Infiltration Parameters
7. Antecedent Runoff Conditions
8. Depressional Storage
9. Internally Drained Areas
10. Runoff routing – to surface node, directly to storm sewer, etc

d. 1D Hydraulic Model Development
   i. Hydraulic conveyance system analysis
      1. Open Channel
      2. Closed Conduit – Storm sewers and culverts
   ii. Inlet capacity analysis
      1. Clearly explain process, assumptions, and how associated figure was developed.
      2. Where inlet capacity not done (Round 2 plus studies), state that and why – limitations of software in 2D plus effort to do accurately cause analysis to be unreasonable. And, that during calibration/verification process, individual areas where flooding occurs, but modeling is not showing, were revised to show inlet restrictions in those individual areas. Note: a proposed solution of additional inlets should then be added to the Proposed Conditions solutions in these areas.
   iii. Detention pond analysis
   iv. Open Water/Backwater Effects
e. 2D Hydraulic Model Development
   i. Description of areas modeled in 2D (if entire watershed is not modeled in 2D)
   ii. Topographic Data
   iii. 2D Grid
   iv. 2D Land Use and Roughness Values
   v. Inactive Areas
   vi. 1D/2D Interface
   vii. 2D Boundary Conditions
f. Special Conditions (example – Spring Harbor discharge to McKenna/Greentree; Other municipalities that are part of the watershed, etc)
g. Existing Conditions Non-Calibrated Model Results

6. Model Calibration
   a. Baseflow Conditions
   b. Recorded Rainfall and Flow Data
   c. Selected Runoff Events
      i. Graphs at monitoring locations showing pre-calibrated and post-calibrated hydrographs (stage, flow, etc) for each calibration event
      ii. Add approximate recurrence interval for each of events in table as % chance, and describe approach you used to determine it
   d. Calibration Results
      i. Repeat metrics from scope & if you didn't meet them explain why. Note where you did meet them. We want this to be very thorough.

7. Results Evaluation
    a. Go into detail of where we are meeting flood goals and where we aren't and how the stats from the executive summary were created
        i. process & assumptions in creating maps and statistics
    b. Add technical description of process used to determine which structures were flooded/which roads did not meet goals
        i. include details on computer models and LiDAR data – accuracy, calculations/process used, etc
        ii. Note – not absolute – only valuable as a comparison from model to model
    c. Add all limitations (including over-predicting)
        i. Discuss recommendations to address limitations in designed solutions (where model is over/under predicting—where flow goes super critical)
    d. Review areas reported by City staff in watershed and say whether or not model shows this & if it doesn't, provide an explanation.
    e. Reference existing conditions mapping
8. Public Engagement
    a. Public Information Meetings
    b. Focus Groups
9. Recommended Solutions Development (*Also see "Solutions Documentation section of this document below*)
    a. Overall process used:
        i. Consultant and City Data Review
            1. Description of land use types/ownership types where solutions cannot be implemented - railroads, utility corridors, cemeteries, historic places, etc that would preclude potential solutions from being implemented
        ii. Consultant and City Brainstorming
        iii. Consultant Modeling/calculations
        iv. Meetings with City Engineering staff to discuss ideas/modeling/calculations
        v. Convergence of solution to share with City Agencies
        vi. City Agency meetings (refer to appendix with notes)
        vii. Finalization of solutions following meetings with City Agencies
        viii. Mention of Peer Review #3
        ix. Draft reports going to all City Agencies to add their solution specific comments (Consultants will get comments to incorporate into Final Report)
    b. <u>Brief</u> description of all solutions reviewed
        i. Solutions reviewed but not ultimately included and reasons why
        ii. Solutions reviewed and selected, including iterations done
10. Recommended Alternatives
    a. Include following paragraph at the beginning of this section somewhere that fits with the flow of the text:
    " It should be noted that the improvements documented in this report are not meant to be full design-level efforts; they are conceptual solutions that help the City's Engineering Division understand the magnitude of solution needed in a given area to meet the targets. As projects are looked at further, and if they move to the point they are contemplated for programming, then projects will then go into a more

detailed design phase. This project phase collects detailed data needed for design and looks at refined design, permitting, and environmental issues associated with the particular project."

b. Detailed description of solutions including figures, tables, text
c. Include information detailed in **Recommended Solutions** Document at the end of this Document
d. How proposed alternative reducing flooding for
    i. Flood Reporting Locations
    ii. Areas reported by City staff
    iii. Focus Groups
e. Water quality information (all data listed below to be provided for EACH RECOMMENDED SOLUTION)
    i. Will solution have a WQ impact (Y/N)?
        1. All further information to be provided only if answer to above is "Y"
    ii. Solution name
    iii. Solution type (wet pond, infiltration, etc)
    iv. Solution description (new SCM, retrofit, replacement of existing SCM, etc)
    v. Contributing drainage area (to be provided as a polygon shapefile/GIS feature class)
    vi. For wet/dry pond solution
        1. Stage-storage relationship (from bottom elevation to top containment elevation) (provided in ft AMSL)
        2. Permanent pool elevation (ft AMSL)
        3. Outlet description for ALL outlets
            a. Outlet type (culvert, orifice, pump, weir)
            b. Outlet size/dimensions
            c. Outlet elevation (ft AMSL)
    vii. For infiltration solution
        1. All information required for wet/dry ponds
        2. Infiltration information
            a. Native soil infiltration rate
            b. Proposed fill description (type, infiltration rate)
    viii. For other solution type that consultant determines may have WQ impact
        1. Discuss with City PM to determine appropriate information to provide

11. Areas targets cannot be met
    a. Describe theoretical scenario used to determine additional capacity/volume needed and why that doesn't "fit"
        i. Oversized pipes to free outfall
        ii. 6 inches of water against a structure
        iii. No figures, discussion only (do not want residents to confuse theoretical analysis for something that can be built)
    b. Add note in final report document the goals were strived for but in some areas are only reachable thru property acquisition
12. Climate Resilience Analysis
    a. 0.2% Chance analysis

b. Infrastructure modifications

13. Cost estimate
    a. City provided unit costs, consultants adjusted based on project specifics and information from City
14. Recommended Implementation Order
    a. Technical
        i. Regional solutions that have to go in for localized solutions to meet criteria – so if projects are related, note relationships
        ii. Practices that would be nice to be constructed before others
        iii. Which solutions work together to reduce flooding
        iv. Other special notes for long-term project implementation purposes so Engineering doesn't forget
    b. Citywide Priority – City will provide text
        i. RESJI process/Prioritization Matrix
        ii. Opportunities from other Agency Projects
        iii. Each solution will have an individual public information process
15. Next Steps
    a. Internal – sharing with City design staff
    b. Internal – sharing with Council and City agencies
    c. External – sharing with stakeholders such as friends' groups, developers, etc

Appendices

Appendix A: Modeling Guidance Document
Appendix B: Hydrology Input Parameters per Subbasin
Appendix C: Hydraulic Input Parameters (Links, Nodes)
Appendix D: Flooding depth and duration for up to 25 locations for each design storm
Appendix E: Inlet Capacity Analysis Documentation
Appendix F: Focus Group Summary or Public Outreach Summary (Not Resident-Specific) – Summary in words (see previous reports for example)
    A. PIM2 and focus group feedback
Appendix G: Peer Review #1 Summary (if applicable)
Appendix H: Additional Calibration Information
Appendix I: Peer Review #2 Summary (if applicable)
Appendix J: Peer Review #3 Summary (if applicable)

Appendix K: Table of 25 locations and how solutions reduce flooding at those locations

List of Figures (Maximum Size 11x17)

1. Watershed and Subcatchments
2. Land Use (original land use mapping)
3. Impervious Area (connected and disconnected)
4. 2D Land Use (if different than that in Figure 2)
5. Surface Roughness Values
6. Model Network (can be put in Appendices)
7. Flooding Report Locations (can be moved to Figure 1)

8. Historic Flooding Locations (from City flood download)
9. Focus Group Locations-include maps with comments (see examples)
10. Map of Locations for Analysis (25 locations)
11. Inundation Mapping
12. Inlet Capacity
13. Pipe Capacity for 10 year Map
14. Summary of flood goals maps (see examples)
15. Watershed map showing areas where solutions cannot be implemented (cemeteries, historic landmarks, non-city lands that we can't acquire, etc)
16. Locations of Solutions
17. Conceptual Layouts of each Solution (City will provide template for figures)
    a. Grading – existing and proposed contours
    b. Pipes/culverts – design flow, size at that design flow, head at design flow, inverts
    c. Greenways – inverts, maximum design elevation for 100-yr, elevation at which structure flooding will occur
    d. Storage areas - footprint , volume required (peak storage), maximum design elevation for 100-yr (peak elevation), elevation at which structure flooding will occur, normal water elevation, outlet structure configuration
    e. Potential land acquisition/easement areas
    f. Major utility corridors – MMSD, ATC, MGE Transmission, Gas mains
    g. Areas that preclude us from implementing solutions (cemeteries, historical land marks, railroad corridors, non-city lands that cannot be acquired, etc)
18. Inundation Mapping as a result of solutions

List of Tables
List of Abbreviations

Solutions Documentation

Information to Document in Report regarding Solution, Permitability, and Constructability
V2020_02_25

Each proposed solution should have the following information documented in the Final Report

Proposed Solution Description
- Narrative describing the characteristics of the solution (footprint/alignment/cross section, inlet, outlet, relevant peak water surface elevations/flows, pump station, etc). This information should be the basic physical information someone would use to start designing the solution.
- Flood mitigation goals targeted with proposed solution
- Flood improvement from proposed solution (reduction in targeted peak water surface elevation, number of structures removed, number of miles of streets where storm sewer is not surcharged, etc)

Current land ownership for all aspects of project – Use layer provided by City
- Project site
- Relevant connections to/from project site
- Land ownership types
    - City of Madison
        - Park
        - Street right-of-way
        - Stormwater Utility
    - County
    - Federal
    - Madison Metropolitan School District
    - Madison Metropolitan Sewerage District
    - Private
    - Railroad
    - Other

Known utility conflicts
- Other storm sewer
- Sanitary sewer
- Water main
- Large gas mains/high-pressure gas mains
- High power electric distribution lines
- Other

Other known concerns
- Archeology Concerns (data to be provided by City)
- Cemeteries
- Conservation parks
- Considered a Bridge?
- Distance to nearest well - if in wellhead protection zone

- FEMA flood zones
- High bedrock
- High groundwater
- Landmark Concerns and Historic properties
- Landfills
- Plans (City will get comments from Planning following drafting of report)
- Tree impacts
- Wellhead protection zone from Madison Water Utility
- Within 400’ of well
- Wetland indicators
- Wetland delineations (if available)
- Other

Anticipated permits

- City of Madison Erosion Control
- Artificial Wetland Permit
- Wisconsin DNR Construction Site Disturbance (WRAPP)
- Wisconsin DNR/USACE Permit for Wetland Disturbance
- Wisconsin DNR/USACE Permit for Dredging a Navigable Waterway
- Wisconsin DNR/USACE Permit for Stream Realignment
- Wisconsin DNR/UASCE Permit for Streambank Stabilization
- Wisconsin DNR Permit for Culvert
- Other

Other Deliverables

On External Hard Drive:

- Photos taken during Focus Groups, Resident specific information (name, address, anecdotal flooding, etc)
- Model Input and Output Files
- GIS Files including parcels where structures are impacted
- xptin and terrain file used to create xptin
- ANSI E-size Inundation Maps (only on USB)

GIS Deliverables

All final data shall be submitted in a format readable by ArcGIS 10.8.1. City is in the process of converting to ArcPro, but not all staff and agencies have converted yet. Work with project manager to ensure interim deliverables are in the appropriate format.

Consultants shall submit final GIS data in geodatabase format for soils, subcatchments, flow paths, proposed solutions. Consultants may submit rasters as individual .tif files. Map packages are acceptable, as supplements original geodatabases and raster files.

All GIS data include metadata. This shall include a summary explaining the general purpose of the data. Credits indicating what company, department, persons who created data, use limitations or disclaimers.

City will provide template for the Reccomended Solutions Figures and feature class development.

Spatial Reference

XPSWMM Models

Digital data proved to the City of Madison shall be in North American Datum 1983_HARN_WISCRS_Dane_County_Feet
WKID: 8193 Authority: EPSG

Projection: Lambert_Conformal_Conic
False_Easting: 811000.0
False_Northing: 480943.886
Central_Meridian: 89.42222222222223
Standard_Parallel_1: 43.0695160375
Scale_Factor: 1.0000384786
Latitude_Of_Origin: 43.0695160375
Linear Unit: Foot_US (0.3048006096012192)

Geographic Coordinate System: GCS_North_American_1983_HARN
Angular Unit: Degree (0.0174532925199433)
Prime Meridian: Greenwich (0.0)
Datum: D_North_American_1983_HARN
Spheroid: GRS_1980
  Semimajor Axis: 6378137.0

Semiminor Axis: 6356752.314140356
Inverse Flattening: 298.257222101

PCSWMM Models

The City of Madison has identified issues with PCSSWMM's 1983_HARN_WISCRS_Dane_County_Feet projection. Prior to beginning work, the consultant shall work with the City of Madison to determine the best projection for the model and corresponding GIS data deliverables.

Topology

All data developed and submitted to the City of Madison shall be in a compatible version of ERSI's file geodatabase. All data submitted must be topologically correct. Minimum topology rules are:

- Features will not be duplicated.
- Coincident boundaries will be corrected within a feature dataset (features that share boundaries with features in other feature classes in the dataset)
- Linear features will not overlap
- Linear features will maintain correct arc directionality for any data set with flow directions (draw from upstream to downstream)
- Polygons must be closed
- Polygons will have no overshoots or dangles
- Polygons will not overlap
- Polygons sharing edges will not have gaps
- Pipe and structure data will be snapped to point and line feature

Required Data

Depth Inundation Rasters

The consultant shall submit individual rasters for both the existing conditions and the proposed conditions for the 1, 2, 5, 10, 25, 50, 100, 100 back to back, 200 and 500 year inundation rasters. Each raster shall be submitted in GeoTiff format with proper coordinate system.

For models developed with a single grid size, raster data shall be provided at the same cell size as the model grid. For models developed with variable cell sizes, the consultant shall coordinate with the city to determine the raster cell size format. All rasters shall be submitted excluding zero or null values.

For rasters that are developed with rain on grid watershed modeling, the consultant shall submit both the original raster and the "cleaned raster" that meets the following criteria:

- Removes inundation areas where small rain event and large rain events are large enough to produce the same amount of inundation depth (+/- .02'), but keeps inundation kept for any area greater than .5'
- Removes any inundation depths that are negative.

Raster shall be submitted in a geodatabase.

Water Surface Elevation Rasters

The consultant shall submit individual water surface elevation rasters for both the existing conditions and the proposed conditions for the 100 and 500 year event flood. Each raster shall be submitted in GeoTiff format in proper coordinate system.

For models developed with a single grid cell size, raster data shall be provided at the same cell size as the model grid. For models developed with variable cell sizes, the consultant shall coordinate with the city to determine the raster cell size format.

For rasters that are developed with rain on grid watershed modeling, the consultant shall submit both the original raster and the "cleaned raster" that meets the following criteria:

- Removes all water surface elevations outside of the "cleaned" raster.

Flow Paths

The consultant shall provide a flow path feature class using the City of Madison template. Automated raster flow paths may be allowed as approved by the City.
Internal file location: M:\Maps\Storm\Watershed Studies\Consultant Templates\Flow Paths.gdb

Soils

The consultant shall provide a feature class used in the development of the model hydrologic parameters.

Storm Sewer

The City will provide existing stormwater sewer data that includes pipe sizes, types, inverts, rim elevations, etc. During the modeling process, the consultant is required to evaluate this data. Any changes in this data based on the consultants review shall be submitted to the city and flagged with a new field identifying the changed data with notes on the changes.

Subcatchments

The consultant shall provide a subcatchment feature class using the City of Madison template.
Internal file location: M:\Maps\Storm\Watershed Studies\Consultant Templates\Subcatchments.gdbSubcatchments that internally drain should be labelled "Internally Drain" under the watershed field. Very if PM definition of Internally Drained prior to categorizing.

Subcatchments geometry shall not include slivers or overlaps. Feature classes that have gaps in subcatchment delineations or overlaps shall be rejected.

Watershed Solutions Geodatabase

The consultant shall provide completed feature classes using the City of Madison template for each of the following:

- Proposed_Notes
- Proposed_Inlets_NoPipe
    - Map only additional inlets required to fill existing pipe capacity. Additional inlets required as part of new pipe construction are implied in the Proposed_Pipes Feature Class.
- Proposed_Pipes

    - Inlets required as part of new pipe construction to fill proposed pipe are implied and not identified in this data or any other separate dateset.
- Proposed_Contours (based on regional solutions)
- Proposed_Regional Solutions

Watershed Analysis Geodatabase

The consultant shall provide the completed feature classes using the City of Madison template for each of the following:

- Existing Street Flooding
    - This must be submitted as a polyline feature class.
    - As defined as flooding greater than .5' for greater than 100' along the street centerline during the 25 year storm event.
- Existing Structure Flooding
    - This must be submitted as a polygon feature class.
    - As defined as flooding greater than .5' within 5' of the building during the 100 year storm event. Structures that are flooded should be identified including their 5' buffer.
- Proposed Street Flooding
    - This must be submitted as a polyline feature class.
    - As defined as flooding above .5' for greater than 100' along the street centerline during the 100 year storm event.
- Proposed Structure Flooding
    - This must be submitted as a polygon feature class.
    - As defined as flooding greater than .5' within 5' of the building during the 25 year storm event. Structures that are flooded should be identified including their 5' buffer.

GIS Python Scripts or Model Builders

The Consultant shall submit all python scrips/model builders used to develop these analysis. Scripts and/or model builders must be delivered in ArcGIS 10.8.1 and Python 2.7.