

Willow Creek Watershed Study – Amendment #2

This document details changes to the project scope of work and budget for the referenced project to add work tasks for the following additional study components:

- Evaluation of runoff conditions at the southwest corner of Resurrection Cemetery to determine whether runoff from the Lake Wingra watershed may occasionally bypass stormwater runoff to the Willow Creek Watershed.
- Re-solving the existing conditions calibrated model using up to 65 unique rainfall hyetographs for the October 2018 flood event.
- Design alternatives analyses regarding the storm sewer system to be modified as part of the ongoing design of University Avenue being conducted by another consulting engineering firm.

Project Cost

Modifications to the project cost include an increase in total fees of \$18,100

Project Schedule

There is no proposed change to the project schedule relative to the terms of the original contract.

Scope of Work

The following Tasks and Activities will be added to MSA's current scope of work, including previous Amendment #1 for Volume Control: Distributed Green Infrastructure Analysis.

Task 402 – Resurrection Cemetery/Lake Wingra Watershed Bypass Evaluation

Activity #1 – Expand limits of 2D model.

MSA will expand the limits of the 2D domain of the calibrated existing conditions XP-SWMM model to include an additional area of approximately 35 acres west of Larkin Street and North of Hammersly Avenue. Appropriate 2D model input including topography, surface roughness, impervious area extents, and pervious area infiltration rates will be added to the model so as to create a working 2D model. A free outfall from the 2D model will be applied at/near the intersection of S. Franklin Ave, Speedway Rd, and Hammersley Ave, downstream of the existing inlets to the stormsewer system.

Activity #2 – Expand limits of the 1D model

MSA will add additional 1D elements to the expanded 2D domain described in the previous task to describe the existing storm sewer system along South Franklin Drive. The length of storm sewer to be added will extend from its northernmost point at the area inlet on the west side of S. Franklin Ave. between Hillcrest Dr. and Zerg Dr. and will extent south to Speedway Road, including the inlets at the intersection of S. Franklin Ave, Speedway Rd, and Hammersley Ave. The 1D model network will include the first leg of the 36" storm sewer pipe running southwest along Speedway Road. A free outfall will be applied at the end of this leg.

Activity #3 – Technical Memo

MSA will prepare a short technical memo (anticipated to be no more than 2 pages long, not including maps) documenting the findings of this evaluation specific to documenting the conditions where overflows into Resurrection Cemetery might occur and the details of these overflows (peak flow rate, runoff volume, hydrographs).

Task 403 – 2018 Event Simulation

Activity #1 – Re-Solve October 2018 Event

MSA will re-solve the existing conditions calibrated model using up to 65 unique rainfall hyetographs for the October 2018 flood event provided by the City of Madison

Activity #2 – Re-create October 2018 Flood Event Inundation Maps

MSA will re-process model output data from the 2018 event and will reprint the following maps:

- The large-scale Willow Creek watershed map
- The focus group area maps (7 maps)
- The map of surveyed high water marks

Task 602 – University Avenue Storm Sewer Evaluation

MSA will revise the calibrated existing conditions XP-SWMM model of the Willow Creek watershed to create the following revised versions of the model:

Activity #1 – Developed ‘Revised’ Existing Conditions model

- Add Existing Inlets on University (<18” leads)
 - Add inlet off Bruce Ct.
 - Add Schmidt Pl branch.
 - Add stub from parking lot between Schmidt and Ridge.
 - Add stub from parking lot east of Ridge.
 - Add stub from parking lot east of Farley Avenue.
 - Add inlet lead (branches) off Campus Drive
- Solve model for 5- and 100-yr 24-hr rainfall events
- Itemize flood conditions at comparison points
 - Portion of 25 points along University
 - Flows at box at University/Midvale
 - Flows at split (N/E) at Shorewood Blvd
 - Flows at split at 96” and Box
- Prepare short summary to City Engineering department describing model results including comparative flood elevations and flow rates and inundation mapping as appropriate.

Activity #2 – Improved Condition #1 – Blackhawk/Grand

- Incorporate upsized connection at Blackhawk to existing box culvert
 - Provide sketch of proposed connection (for documentation of modeling geometry)
- Incorporate improved connection at 96” and box culvert at Grand Avenue
 - Provide sketch of proposed connection (for documentation of modeling geometry)
- Solve model for 5- and 100-yr 24-hr rainfall events
- Itemize flood conditions at comparison points as described previously

Activity #3 – Improved Condition #2 - Shorewood Blvd Connection

- Add new 96” RCP along University as proposed in KL plans
- Replace connection to north with 42” HERCP at angle (smooth-ish) transition and connect to remainder of fish-hook.
- Solve model for 5- and 100-yr 24-hr rainfall events
- Itemize flood conditions at comparison points as described previously
- Prepare short summary to City Engineering department describing model results including comparative flood elevations and flow rates and inundation mapping as appropriate.

Activity #4 – Improved Condition #3 - Midvale Connection

- Restore bricked off connection at Midvale
- Solve model for 5- and 100-yr 24-hr rainfall events
- Itemize flood conditions at comparison points as described previously
- Prepare short summary to City Engineering department describing model results including comparative flood elevations and flow rates and inundation mapping as appropriate.

Activity #5 –Improved Condition #4 - Re- Evaluate Shorewood Blvd Connection

- Same as Step 2, except replace connection to north with 42" HERCP at angle (smooth-ish) running all the way to RR Track Box. Inclusive of Step 3.
- Solve model for 5- and 100-yr 24-hr rainfall events
- Itemize flood conditions at comparison points as described previously
- Prepare short summary to City Engineering department describing model results including comparative flood elevations and flow rates and inundation mapping as appropriate.

Activity #6 – Comparison to Existing Conditions.

- Run all design events
- Itemize flood conditions at comparison points as described previously
- Prepare short summary to City Engineering department describing model results including comparative flood elevations and flow rates and inundation mapping as appropriate.

Meetings – The scope of work above includes attendance by two (2) MSA representatives at up to five (5) virtual (ZOOM) meetings with City engineering staff. Meetings are anticipated to last no more than one (1) hour.