Unique Solution: Bending Weir Solves Overflow & Basement Flooding Problem

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Project Goal: Mitigate the CSO for the TYS to comply with Consent Order

WWMP stipulated the necessity and goal of this project

Reevaluation of WWMP combined with deadline and site constraints led to interesting solution
100 acre project area to be evaluated to meet the goal of the project. 
Original project plan was to redirect inflow.
Definitions

• Typical Year Storm (TYS)
• 10-Year Storm Flow Recurrence
• Existing Conditions
• Proposed Conditions
Design Constraints

• Original solution in WWMP called for Inflow Redirection, however:
  – Narrow rights-of-way in project area
  – Existing large sewers are brick and in excess of 100 years old
  – Existing utilities crowd the R/W and are located above and below sewers
  – Concurrent ODOT project affects traffic flow in our area
  – Increased flow from larger impervious area

• An “out of the box” solution was necessary
Reevaluate!

Flow modeling for our project was initiated (3 sewersheds)

Sewer connectivity was field verified via CCTV.

CCTV files were reviewed for large scale inflow.
Sewershed Flow Modeling

Computed vs. Observed Depth at Cherry/4th Manhole

Computed vs. Observed Flow at Peter’s Run Meter
Existing Conditions Peak HGL & Overflow Rate

Cherry/4th Regulator Manhole during TYS

Cherry/4th Regulator Manhole during 10-year Storm Flow Recurrence
Computed HGL & Overflow during 10-year Flow Recurrence
WIB Analysis

City maintains a Complaint Database

Backflow analysis was performed

HGLs were assigned to each MH based on H&H model.

WIB analysis was performed for 4 scenarios:

- Existing Conditions TYS
- Existing Conditions 10-year
- Proposed TYS
- Proposed 10-year recurrence
Solution: Capture & Convey

Existing structure and overflow

Proposed structure and overflow
A BENDING WEIR

Regulator Structure

Bending Weir Detail
Bending Weir Operation

Dry weather flow and flows up to the TYS are conveyed into the Peter’s Run sewer.

Overflow in excess of the TYS flow is conveyed to the Market Mohawk storm sewer via the effluent 60” pipe.
Computed HGL & Overflow during 10-year Flow Recurrence
Despite extensive efforts to locate utilities during design, they were still problematic during construction. The construction documents required additional vacuum excavations prior to ordering materials for project completion.
Adjustments during Construction

Proposed Regulator

Adjusted Regulator

60” SEWER

60” SEWER

30” SEWER

BENDING WEIR

8’-3” WEIR LENGTH

60” DIA PIPE

8’-3” (WEIR LENGTH)

30” DIA PIPE

60” DIA PIPE
Regulator Structure Installed
Regulator Installed – Duct Banks/Existing Brick Sewer
Effluent Pipes Installed
Effluent Pipes Installed – Close Up
Bending Weir Installation
Bending Weir Installation
Bending Weir Installation
Summary

• Revaluation of the WWMP (“new” existing condition) is important as the watershed effects of the completion of other projects cannot be predicted.

• Always return to the goal of the project- an unconventional solution that solves the problem is still a solution

• Verify that the solution you have designed meets that goal
Questions?

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