Section 4

Observations for Going Forward

4.1 Correlation with LTCP Recommended Plan

The 2013 flow metering data confirmed that the majority of combined sewer overflows in the City occur through the Cemetery Brook overflow (74%). The modeled CSO statistics presented in the March 2010 Revised Long-Term CSO Control Plan (LTCP) showed the same high percent of overflows through the Cemetery Brook overflow. Further, the Cemetery Brook overflow yielded the most activations (64), with Bridge Street, an interconnecting drainage basin, second most active (54) for 2013.

The 2013 flow metering program supports the recommended plan from the March 2010 LTCP. A major part of the recommended plan from the LTCP was a $65M investment toward removal of Cemetery Brook and $73M investment towards sewer separation of all the contributing catchment areas to the Cemetery Brook Interceptor. The City of Manchester and CDM Smith stand behind the recommended plan and the financial commitment set forth to further reduce CSOs, improve water quality in the Merrimack River and provide environmental benefit.

4.2 Comparison of Meter Data and LTCP Model Results

In the interest of furthering the pursuit of CSO control in the city as well as validating past planning efforts, specifically the March 2010 Revised Long-Term CSO Control Plan (LTCP), the existing model was run using the recently collected 2013 rain data to compare metered and modeled overflow activations and volumes. To ensure the spatial variation of rainfall events, the 15-minute rain data from each of the three installed gauges was spatially assigned to the most appropriate CSO basin while dry weather flow and infiltration rate assumptions were consistent with the recent modeling efforts completed as part of the March 2010 LTCP.

Table 4-1 includes a summary of the 2013 continuous monitoring data as well as the results of the SWMM simulations which utilized the 2013 rainfall data.

NPDES #	Name	2013 Metered Activations	2013 Metered Volume (MG)	2013 SWMM Simulation Activations	2013 SWMM Simulation Volume (MG)
CSO 011	Schiller St	0	0	0	0
CSO 018	Ferry St	4	0.0	0	0
CSO 031	Stark Brook	46	17.1	40	14.3
CSO 039	Third St	2	0.0	0	0
CSO 043	Tannery Brook	0	0	0	0
CSO 044	Cemetery Brook	64	201.2	70	219.1
CSO 045	Granite St	30	0.6	2	0.0
CSO 046	Bridge St	54	9.5	6	0.8
CSO 047	Penacook St	46	12.6	44	15.1
CSO 050	MH1	26	16.2	10	1.1
CSO 051	West Side Pump Station	0	0	0	0
CSO 052	MH2	25	13.9	8	1.0
CSO 053	West Pennacook St	0	0	0	0
CSO 054	Ray Brook	9	0.6	28	1.9
CSO 055	Dunbar St	10	0.1	1	0.3
		Total	272		254

Table 4-1
Comparison of 2013 Meter and SWMM Model Simulation

A few notable observations when comparing the data include the following:

- The annualized total overflow volume resulting from the model simulations was within 7 percent of the actual metered total. This minimal deviation is considered by the City to be well within the level of inherent inaccuracies (±10%) resulting from the application of open channel flow metering technology for CSO monitoring;
- The model matched the observation that the Schiller Street, Tannery Brook, West Side Pump Station, and West Penacook Street CSOs did not experience any CSO activations in 2013;
- The model matched well the outfalls at Cemetery Brook (9% deviation), Penacook Street (4% deviation) and Stark Brook (13% deviation). These three basins represent the largest remaining combined sewer tributary areas and, based on 2013 data, represent 85 percent of the CSO volume discharged by the city's combined sewer system;
- Though the model did experience deviation in the Bridge Street and Granite Street CSO location, it should be noted that these two basins contain significant interconnections with the Cemetery Brook basin and it is possible that the modeling of some upstream interconnections require further refinement during future phases of preliminary design work in these areas. Further, the total overflow volume metered (211 MG) and predicted by the SWMM model (220 MG) were less than 5% from each other; and
- The model appears to under predict 2013 activations at Manhole No. 1 and Manhole No. 2. It is surmised that this variation is related to the model assumptions (that assumed a fixed flow entering the WWTP) as compared to actual operations at the Crescent Road pump station which can vary between rainfall events..

4.3 Future Flow Monitoring

The City has taken an additional step to further verify CSO overflow volumes and activations by continuing the CSO flow monitoring for the 2014 calendar year. The goal for flow monitoring a second year is to provide additional validation of overflows and supporting data for the recommended March 2010 Revised LTCP. The City's recommended 20-year plan as outlined in the March 2010 LTCP represents a major financial ($165M) and environmental commitment.

4.4 Other Beneficial Projects

The City is currently under construction for aeration upgrades at the Wastewater Treatment Plant (WWTP) that will increase flow capacity from 65 mgd to 85 mgd at the plant. The plant upgrades will allow greater wet weather treatment capacity and help lower CSO volumes and reduce wet weather bypassing. This project, expected for completion in early 2016, was part of the $20M in improvements at the WWTP included in the March 2010 LTCP recommended plan.

The City is also underway with a two phased sewer separation project in the Chestnut Street Area. This project was included in the March 2010 LTCP recommended plan and provides immediate local flooding and sewer backup relief for area residents, the City's largest Fire Station and several other key stakeholders.

The City expects to move forward with another March 2010 LTCP recommended plan initiative, system optimization. The 2013 flow monitoring data revealed some CSO locations with very low activations and volumes that could potentially be reduced with minimal costs. The system optimizations may include raising weir walls and modifying MHs to allow for less frequent overflows.