

Appendix A

City of McMinnville

Sanitary Sewer Master Plan Update

Task 16 - Flow Monitoring Plan

TO: Rich Spofford/City of McMinnville

FROM: Walt Meyer/West Yost Associates

COPIES: Ron Bittler/City of McMinnville
Mike Bissett/City of McMinnville
File

PREPARED BY: Chris Allen/CH2M HILL

REVIEWED BY: Mark Johnson/CH2M HILL

DATE: February 6, 2006

This document summarizes the flow monitoring plan associated with the City of McMinnville Sanitary Sewer Master Plan Update project. The purpose of this document is to describe the monitoring objectives and the approach used for selecting and performing a comprehensive monitoring program using a combination of temporary monitors and pump station data. The process through which a flow monitoring contractor was selected is briefly discussed, as this information was presented in detail in an earlier memo.

Introduction

The City of McMinnville's (City) collection system is divided into seven drainage sub-basins with a total service area (current and future) of approximately 10,000 acres. As of 2000, the collection system within these basins consisted of approximately 560,000 linear feet of sewer pipe in service, ranging in size from 4 to 54 inches in diameter. The majority of the system consists of separate sanitary and storm sewers.

The objective of the flow monitoring plan is to assess total wet weather flow to the City's wastewater treatment plant from individual basins and to quantify infiltration and inflow (I/I).

Methodology

The following section describes the monitoring period, contractor selection, and monitoring locations and types.

Overview

Temporary flow and rain monitoring is being conducted through a private flow monitoring contractor for a maximum period of 3 months. Monitoring will be conducted during wet weather conditions when soils are saturated, thus resulting in peak I/I conditions.

Monitoring Contractor Selection

Three flow monitoring firms (SFE Global, ADS, and Geotivity) were contacted and asked to provide a qualifications, references and cost proposal for monitoring installation and operation (maintenance, data downloads, etc.) for a duration of 3 months. All 3 firms submitted a proposal. A rating system was used to evaluate the proposals based on price, monitoring method, field work, data access and quality, and references. SFE Global was selected to perform the monitoring. Details of the evaluation of the three firms are presented in the December 8, 2005 TM entitled, "Sanitary Sewer Flow Monitoring Contractor Evaluation and Selection."

Determining Monitoring Locations and Method

A meeting was held with City, West Yost Associates, CH2M HILL, and SFE staff to present preliminary location recommendations and select appropriate monitoring locations and methods. All flow monitoring was to be done within sanitary manholes using either field fabricated weirs or flow meters (area/velocity meters). SFE's preferred monitoring method uses weirs, based on their experience that this method provides the most stable (less data scatter) flow data. The preferred monitoring location is at the most downstream portion of the basin, however, site limitations based on access, velocities, or the orientation of multiple pipes entering or leaving a manhole resulted in multiple monitors being required for three basins. Other collection system characteristics resulted in the need for multiple monitors, including a small portion of the system being combined (storm and sanitary in same pipe) and the desire to assess recent system improvements in the High School basin to reduce I/I. Following preliminary identification of monitoring locations and methods SFE and City staff field verified locations to determine if the preliminary recommendations were feasible. Table 1 summarizes the final agreed upon 11 monitoring locations and methods. SFE's field assessment of these locations is included in Attachment A. To ensure that flows from the entire collection system are accounted for the monitoring plan will also include data from three existing pump stations and one rain gauge. Table 1 includes these four locations.

TABLE 1
 Final Monitoring Plan
 City of McMinnville Sanitary Sewer Master Plan Update, 2006

SFE Site ID	City Manhole ID	Monitoring Method	Contributing Basin	Comments
1	J-7-20	Area/Velocity	Fairgrounds	
2a	J-7-48	Weir	Yamhill	
2b	J-7-44	Area/Velocity	Downtown	
3	J-7-90	Area/Velocity	Downtown	
4a	J-7-68	Area/Velocity	High School	
4b	J-7-8	Weir	High School	
5	I-7-3	Weir	High School	Monitors flow from upstream section of the basin that has been rehabilitated.
6a	H-8-102	Area/Velocity	Cozine	

TABLE 1
 Final Monitoring Plan
 City of McMinnville Sanitary Sewer Master Plan Update, 2006

SFE Site ID	City Manhole ID	Monitoring Method	Contributing Basin	Comments
6b	H-8-107	Weir	Cozine	
7a	H-8-93	Area/Velocity	Michelbrook	
7b	H-8-112	Weir	Michelbrook	
Rain Gage	NA	Not Specified	NA	Installed at the Kathleen Manor Pump Station

Pump Station/Rain Gage	Monitoring Method	Contributing Basin	Comments
3 Mile Pump Station	In-line Flow Meter(s)	Airport	Will collect data from the most downstream of these three, in-series pump stations
Raw Sewage Pump Station	In-line Flow Meter(s)	All	Flow from all basins passes through this pump station
Cozine Pump Station	In-line Flow Meter(s)	Downtown	
WWTP Rain Gage	Not Specified	NA	

Figure 1, included in the Attachment B, identifies the location of the monitors within the City's collection system.

Monitoring Installation/Removal and Data Monitoring

A two-person field crew from SFE began monitor installation on January 28th, 2006 and completed installation on January 31st, 2006. Manholes identified for monitor installation had been previously marked by City staff for the SFE installers. Weirs were field fabricated for each manhole utilizing this monitoring method.

For the 3 month flow monitoring duration SFE will visit each site bi-weekly to download data and perform required maintenance, if necessary. Data reporting from SFE will include spreadsheet flow data, hydrographs, and any maintenance performed. Upon completion of the monitoring SFE will remove the monitors and provide a final flow monitoring report.

Conclusion

The temporary flow monitoring and rainfall data, coupled with data from pump stations within the system, will provide the data set from which to calibrate the sanitary sewer model (to be developed later in the Master Plan Update project) and to evaluate the affects that I/I has on the collection system.

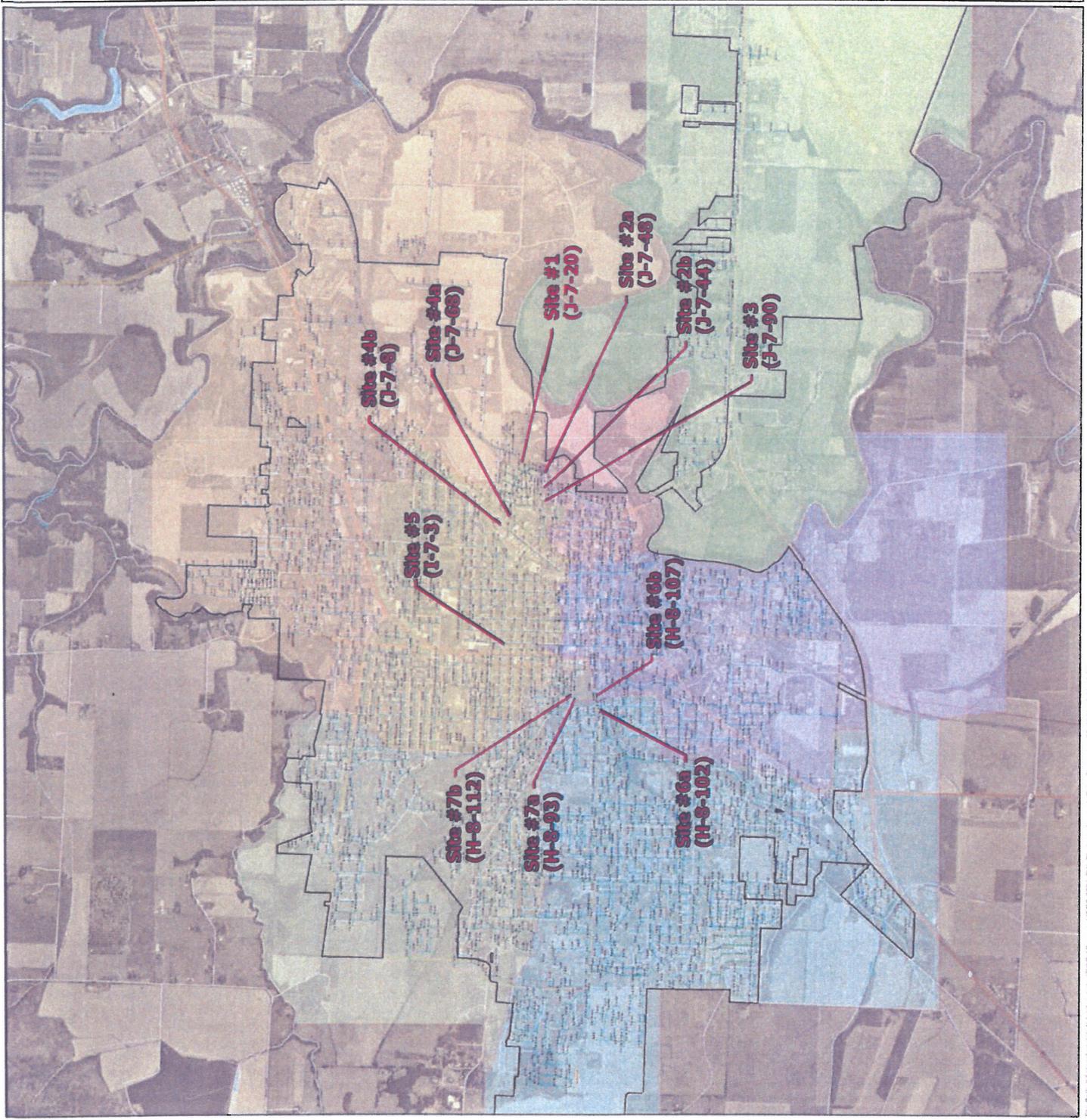
McMinnville Sewer System

Figure 1
Sewer System
and Manholes
McMinnville, Oregon

- Legend**
- Sanitary Sewer Manholes
 - Sanitary Sewer
 - City Limits
 - Limited Access
 - Highway
 - Major Road
 - Local Road
 - Basins
 - AIRPORT
 - COZINE
 - DOWNTOWN
 - FAIRGROUNDS
 - HIGH SCHOOL
 - MICHELBOOK
 - YAMHILL



0 0.4 0.8 Miles



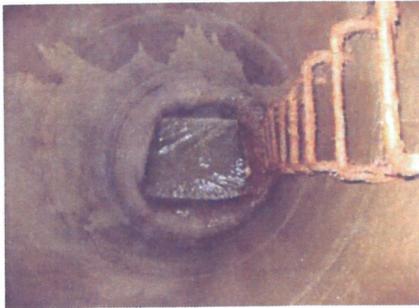
The City of McMinnville, Oregon, is not responsible for the accuracy of the data shown on this map. The data was last updated on December 27, 2004, 10:11:16 AM.



1313 E. Maple Street – Suite 201 #408
Bellingham, Washington 98225
Ph (425) 688-0265 Fx (425) 688-0298
Toll Free Ph 1-866-332-9876

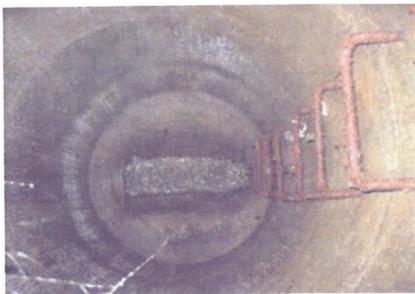
City of McMinnville – Sanitary Sewer Flow Monitoring Program.

Site 1 - M/H # J-7-20 - 1652 Riverside (Old WWTP)



- Approx 27"
- Evidence of Surcharge
- Installed AV Meter

Site 2a – M/H # J-7-48 – 1900 Riverside (Old WWTP)



- Approx 18"
- No Evidence of Surcharge
- Installed Weir

Site 2b – M/H # J-7-44 – 1610 10th Street



- Approx 30"
- No Evidence of Surcharge
- Installed AV Meter

Site 3 – M/H # J-7-90 – 1516 10th Street



- Approx 48"
- No Evidence of Surcharge
- Installed AV Meter

Site 4a – M/H # J-7-68 – Lafayette & 12th



- Approx 48"
- Evidence of Surcharge
- Installed AV Meter

Site 4b – M/H # J-7-8 – 12th & Alpine

Picture Not Yet Available

- Approx 12"
- No Evidence of Surcharge
- Installed Weir

Site 5 – M/H # I-7-3 – 11th & Cowls



- Approx 30"
- No Evidence of Surcharge
- Installed Weir

Site 6a – M/H H-8-102 – 247 SW 2nd



- Approx 36"
- No Evidence of Surcharge
- Installed AV Meter

Site 6b – M/H H-8-107 – 123 SW Elmwood



- Approx 12"
- No Evidence of Surcharge
- Installed Weir

Site 7a – M/H H-8-93 – North side of park – Northwest Park Drive



- Approx 36"
- No Evidence of Surcharge
- Installed AV Meter

Site 7b – M/H H-8-112 – South side of park – Northwest Park Drive



- Approx 12"
- No Evidence of Surcharge
- Installed Weir

Rain Gage Site – 1783 SW Alexandria

