CITY OF AGOURA HILLS

SANITARY SEWER IMPROVEMENTS	Date:	6/26/2009
ENGINEER'S OPINION OF COST		
PRIORITY #1 AND #2 SUMMARY	Prepared by:	J.H.
PROJECT: SEWER SYSTEM MANAGEMENT PLAN	Checked by:	R.W.

ITEM NO.	DESCRIPTION	AMOUNT
1	SUB-TOTAL PRIORITY #1 SEWER IMPROVEMENTS	$ 550,000
2	SUB-TOTAL PRIORITY #2 SEWER IMPROVEMENTS	$ 1,420,000
3	**TOTAL[1, 2]**	**$ 1,970,000**

[1]Price taken from actual bid of District 3A Sanitary Sewer Improvement for 325 LF of 10" VCP in the City of La Canada Flintridge plus $83/LF for mobilization, traffic control, and traffic markings.

[2]Since the design professional has no control over the cost of labor, materials, equipment, or over the contractor's method of determining prices, or over competitive bidding or market conditions, his opinions of probable construction costs provided herein are to be made on the basis of his experience and qualifications. These cost opinions represent his best judgment as a design professional familiar with the construction industry. However, the design professional cannot and does not guarantee that proposals, bids, or the construction costs will not vary from opinions of probable cost prepared by him.

CITY OF AGOURA HILLS

SANITARY SEWER IMPROVEMENTS	*Date:*	6/26/2009		
ENGINEER'S OPINION OF COST				
PRIORITY #1	*Prepared by:*	J.H.		
PROJECT: SEWER SYSTEM MANAGEMENT PLAN	*Checked by:*	R.W.		

ITEM NO.	DESCRIPTION	QUANTITY	UNITS	UNIT COST	TOTAL COST
AREA 17					
1	MOBILIZATION (5%)	1	LS	$ 7,438	$ 7,438
2	12" VCP SEWER MAIN	610	LF	$ 175	$ 106,750
3	MANHOLE	6	EA	$ 7,000	$ 42,000
4	SEWER BY-PASS (20%)	1	LS	$ 29,750	$ 29,750
5	TRAFFIC CONTROL (10%)	1	LS	$ 14,875	$ 14,875
				SUBTOTAL CONSTRUCTION:	$ 200,813
	(35% of Construction) ENGINEERING, CONTRACT ADMIN, INSPECTION, AND CONTINGENCY:				$ 70,284
				AREA TOTAL:	**$ 271,097**
				SAY	**$ 271,100**
AREA 20					
1	MOBILIZATION (5%)	1	LS	$ 1,014	$ 1,014
2	18" VCP SEWER MAIN	33	LF	$ 190	$ 6,270
3	MANHOLE	2	EA	$ 7,000	$ 14,000
4	SEWER BY-PASS (20%)	1	LS	$ 4,054	$ 4,054
5	TRAFFIC CONTROL (10%)	1	LS	$ 2,027	$ 2,027
				SUBTOTAL CONSTRUCTION:	$ 27,365
	(35% of Construction) ENGINEERING, CONTRACT ADMIN, INSPECTION, AND CONTINGENCY:				$ 9,578
				AREA TOTAL:	**$ 36,942**
				SAY	**$ 36,900**
AREA 23					
1	MOBILIZATION (5%)	1	LS	$ 3,596	$ 3,596
2	12" VCP SEWER MAIN	331	LF	$ 175	$ 57,925
3	MANHOLE	2	EA	$ 7,000	$ 14,000
4	SEWER BY-PASS (20%)	1	LS	$ 14,385	$ 14,385
5	TRAFFIC CONTROL (10%)	1	LS	$ 7,193	$ 7,193
				SUBTOTAL CONSTRUCTION:	$ 97,099
	(35% of Construction) ENGINEERING, CONTRACT ADMIN, INSPECTION, AND CONTINGENCY:				$ 33,985
				AREA TOTAL:	**$ 131,083**
				SAY	**$ 131,000**

ITEM NO.	DESCRIPTION	QUANTITY	UNITS	UNIT COST	TOTAL COST
AREA 26					
1	MOBILIZATION (5%)	1	LS	$ 3,075	$ 3,075
2	15" VCP SEWER MAIN	250	LF	$ 190	$ 47,500
3	MANHOLE	2	EA	$ 7,000	$ 14,000
4	SEWER BY-PASS (20%)	1	LS	$ 12,300	$ 12,300
5	TRAFFIC CONTROL (10%)	1	LS	$ 6,150	$ 6,150
				SUBTOTAL CONSTRUCTION:	$ 83,025
	(35% of Construction) ENGINEERING, CONTRACT ADMIN, INSPECTION, AND CONTINGENCY:				$ 29,059
				AREA TOTAL:	**$ 112,084**
				SAY	**$ 112,100**
				SUB-TOTAL PRIORITY #1 SANITARY SEWER IMPROVEMENTS	**$ 551,100**
				SAY	**$ 550,000**

ITEM NO.	DESCRIPTION	QUANTITY	UNITS	UNIT COST	TOTAL COST
SANITARY SEWER IMPROVEMENTS		***Date:***	6/26/2009		
ENGINEER'S OPINION OF COST					
PRIORITY #2		***Prepared by:***	J.H.		
PROJECT: SEWER SYSTEM MANAGEMENT PLAN		***Checked by:***	R.W.		
ITEM NO.	DESCRIPTION	QUANTITY	UNITS	UNIT COST	TOTAL COST
AREA 17					
1	MOBILIZATION (5%)	1	LS	$ 2,548	$ 2,548
2	10" VCP SEWER MAIN	224	LF	$ 165	$ 36,960
3	MANHOLE	2	EA	$ 7,000	$ 14,000
4	SEWER BY-PASS (20%)	1	LS	$ 10,192	$ 10,192
5	TRAFFIC CONTROL (10%)	1	LS	$ 5,096	$ 5,096
				SUBTOTAL CONSTRUCTION:	$ 68,796
	(35% of Construction) ENGINEERING, CONTRACT ADMIN, INSPECTION, AND CONTINGENCY:				$ 24,079
				AREA TOTAL:	**$ 92,875**
				SAY	**$ 92,900**
AREA 20					
1	MOBILIZATION (5%)	1	LS	$ 3,550	$ 3,550
2	15" VCP SEWER MAIN	300	LF	$ 190	$ 57,000
3	MANHOLE	2	EA	$ 7,000	$ 14,000
4	SEWER BY-PASS (20%)	1	LS	$ 14,200	$ 14,200
5	TRAFFIC CONTROL (10%)	1	LS	$ 7,100	$ 7,100
				SUBTOTAL CONSTRUCTION:	$ 95,850
	(35% of Construction) ENGINEERING, CONTRACT ADMIN, INSPECTION, AND CONTINGENCY:				$ 33,548
				AREA TOTAL:	**$ 129,398**
				SAY	**$ 129,400**
AREA 26					
1	MOBILIZATION (5%)	1	LS	$ 2,548	$ 2,548
2	10" VCP SEWER MAIN	224	LF	$ 165	$ 36,960
3	MANHOLE	2	EA	$ 7,000	$ 14,000
4	SEWER BY-PASS (20%)	1	LS	$ 10,192	$ 10,192
5	TRAFFIC CONTROL (10%)	1	LS	$ 5,096	$ 5,096
				SUBTOTAL CONSTRUCTION:	$ 68,796
	(35% of Construction) ENGINEERING, CONTRACT ADMIN, INSPECTION, AND CONTINGENCY:				$ 24,079
				AREA TOTAL:	**$ 92,875**
				SAY	**$ 92,900**

ITEM NO.	DESCRIPTION	QUANTITY	UNITS	UNIT COST	TOTAL COST
AREA 29					
1	MOBILIZATION (5%)	1	LS	$ 14,954	$ 14,954
2	10" VCP SEWER MAIN	225	LF	$ 165	$ 37,125
3	12" VCP SEWER MAIN	326	LF	$ 175	$ 57,050
4	15" VCP SEWER MAIN	710	LF	$ 190	$ 134,900
5	MANHOLE	10	EA	$ 7,000	$ 70,000
6	SEWER BY-PASS (20%)	1	LS	$ 59,815	$ 59,815
7	TRAFFIC CONTROL (10%)	1	LS	$ 29,908	$ 29,908
				SUBTOTAL CONSTRUCTION:	$ 403,751
	(35% of Construction) ENGINEERING, CONTRACT ADMIN, INSPECTION, AND CONTINGENCY:				$ 141,313
				AREA TOTAL:	**$ 545,064**
				SAY	**$ 545,000**
AREA 30					
1	MOBILIZATION (5%)	1	LS	$ 2,284	$ 2,284
2	10" VCP SEWER MAIN	192	LF	$ 165	$ 31,680
3	MANHOLE	2	EA	$ 7,000	$ 14,000
4	SEWER BY-PASS (20%)	1	LS	$ 9,136	$ 9,136
5	TRAFFIC CONTROL (10%)	1	LS	$ 4,568	$ 4,568
				SUBTOTAL CONSTRUCTION:	$ 61,668
	(35% of Construction) ENGINEERING, CONTRACT ADMIN, INSPECTION, AND CONTINGENCY:				$ 21,584
				AREA TOTAL:	**$ 83,252**
				SAY	**$ 83,300**
AREA 31					
1	MOBILIZATION (5%)	1	LS	$ 3,431	$ 3,431
2	10" VCP SEWER MAIN	331	LF	$ 165	$ 54,615
3	MANHOLE	2	EA	$ 7,000	$ 14,000
4	SEWER BY-PASS (20%)	1	LS	$ 13,723	$ 13,723
5	TRAFFIC CONTROL (10%)	1	LS	$ 6,862	$ 6,862
				SUBTOTAL CONSTRUCTION:	$ 92,630
	(35% of Construction) ENGINEERING, CONTRACT ADMIN, INSPECTION, AND CONTINGENCY:				$ 32,421
				AREA TOTAL:	**$ 125,051**
				SAY	**$ 125,100**

ITEM NO.	DESCRIPTION	QUANTITY	UNITS	UNIT COST	TOTAL COST
AREA 35					
1	MOBILIZATION (5%)	1	LS	$ 3,192	$ 3,192
2	10" VCP SEWER MAIN	302	LF	$ 165	$ 49,830
3	MANHOLE	2	EA	$ 7,000	$ 14,000
4	SEWER BY-PASS (20%)	1	LS	$ 12,766	$ 12,766
5	TRAFFIC CONTROL (10%)	1	LS	$ 6,383	$ 6,383
				SUBTOTAL CONSTRUCTION:	$ 86,171
	(35% of Construction) ENGINEERING, CONTRACT ADMIN, INSPECTION, AND CONTINGENCY:				$ 30,160
				AREA TOTAL:	**$ 116,330**
				SAY	**$ 116,300**
AREA 41					
1	MOBILIZATION (5%)	1	LS	$ 6,473	$ 6,473
2	15" VCP SEWER MAIN	534	LF	$ 190	$ 101,460
3	MANHOLE	4	EA	$ 7,000	$ 28,000
4	SEWER BY-PASS (20%)	1	LS	$ 25,892	$ 25,892
5	TRAFFIC CONTROL (10%)	1	LS	$ 12,946	$ 12,946
				SUBTOTAL CONSTRUCTION:	$ 174,771
	(35% of Construction) ENGINEERING, CONTRACT ADMIN, INSPECTION, AND CONTINGENCY:				$ 61,170
				AREA TOTAL:	**$ 235,941**
				SAY	**$ 235,900**
				SUB-TOTAL PRIORITY #2 SANITARY SEWER IMPROVEMENTS	**$ 1,420,785**
				SAY	**$ 1,420,000**

Since the design professional has no control over the cost of labor, materials, equipment, or over the contractor's method of determining prices, or over competitive bidding or market conditions, his opinions of probable construction costs provided herein are to be made on the basis of his experience and qualifications. These costs opinions represent his best judgment as a design professional familiar with the construction industry. However, the design professional cannot and does not guarantee that proposals, bids, or the construction costs will not vary from opinions of probable cost prepared by him.

APPENDIX ‘L-2’

Sewer System Capacity Analysis
Deficient Pipes Exhibit

APPENDIX ‘L-3’

Pizer Hydra version 6.4 Hydraulic Calculations

APPENDIX ‘L-4’

Flow Monitoring Report – V&A Engineering
Report dated May 2009

SANITARY SEWER FLOW MONITORING

City of Agoura Hills

May 2009

V&A

City of Agoura Hills

SANITARY SEWER FLOW MONITORING
AND
CAPACITY ANALYSIS

Prepared for:

VENTURA REGIONAL SANITATION DISTRICT
1001 Partridge Drive, Suite 150
Ventura, CA 93003-0704

Prepared by:

V&A
8291 Aero Place, Suite 110
San Diego, CA 92123

May 2009

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TABLE OF CONTENTS

TABLES

FIGURES

APPENDIX A – Graphs, Figures and Tables

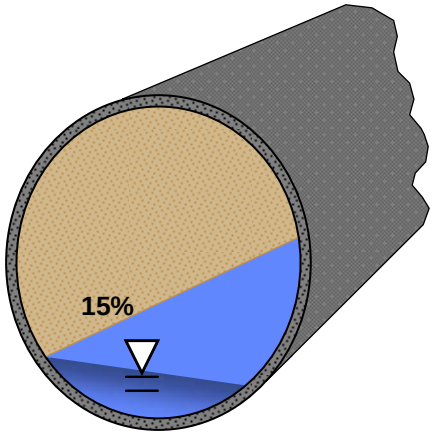
EXECUTIVE SUMMARY

V&A has completed a sanitary sewer flow monitoring and capacity study within the City of Agoura Hills, California. Nine sites were monitored for 4 weeks from March 24, 2009 to April 20, 2009. The purpose of this study was to investigate the existing flow volume through the sanitary sewer pipes at the flow monitoring locations, and identify the potential impacts on the capacity at the flow monitoring location.

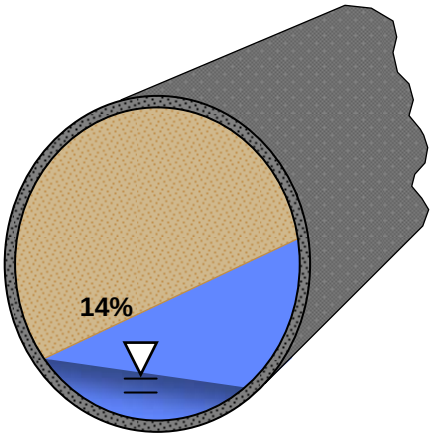
The results of the sanitary sewer flow monitoring are summarized in Table 1. Snapshots of the pipe cross-section during peak measured flows are illustrated in Figure 1. Please refer to Figure 2 for the flow monitoring site locations.

Table 1. Summary of Flow Monitoring Data

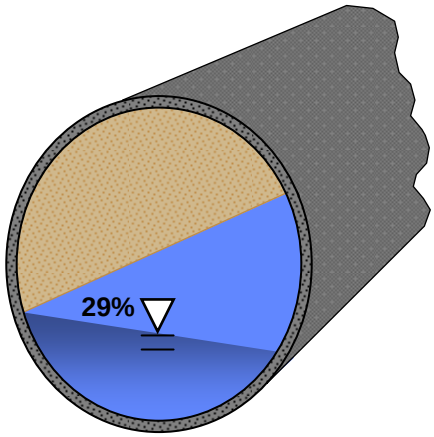
Site	Estimated 100% Capacity of Line (mgd)	ADWF			Peak Measured Flow		
		Total (mgd)	% of Capacity (by Volume)	% of Capacity (by Level)	Total (mgd)	% of Capacity (by Volume)	% of Capacity (by Level)
MH 25	9.00	0.17	1.9%	12.5%	0.26	2.9%	14.7%
MH 29	4.50	0.04	0.9%	6.7%	0.13	2.8%	13.9%
MH 33	1.90	0.09	4.7%	17.2%	0.24	12.4%	28.8%
MH 42	5.00	0.18	3.7%	16.2%	0.41	8.1%	24.0%
MH 84	4.00	0.01	0.2%	4.7%	0.04	1.1%	12.5%
MH 85	0.95	0.06	6.6%	22.5%	0.15	15.4%	33.1%
MH 178	1.10	0.09	8.0%	25.2%	0.27	24.4%	43.4%
MH 203	4.50	0.09	2.0%	11.4%	0.20	4.5%	17.1%
MH 259	1.70	0.14	8.2%	24.6%	0.35	20.7%	41.0%



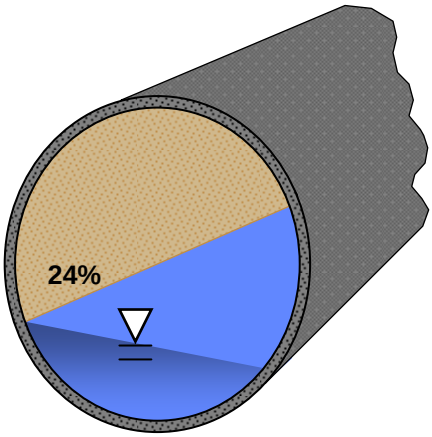
MH 25



MH 29



MH 33



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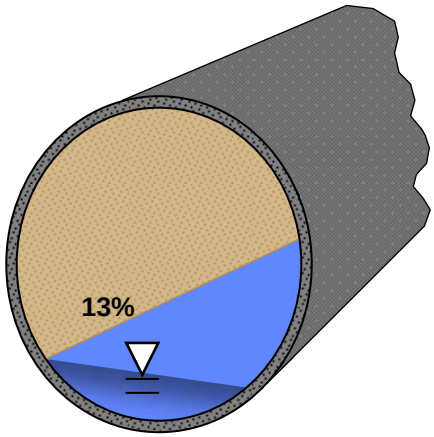

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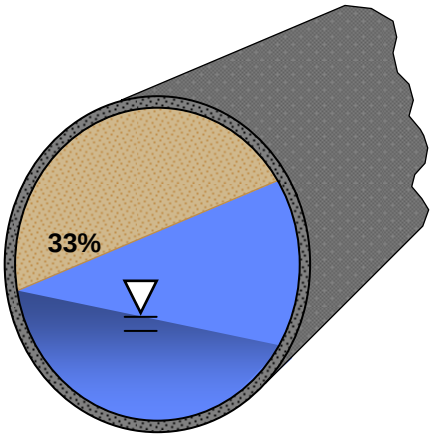

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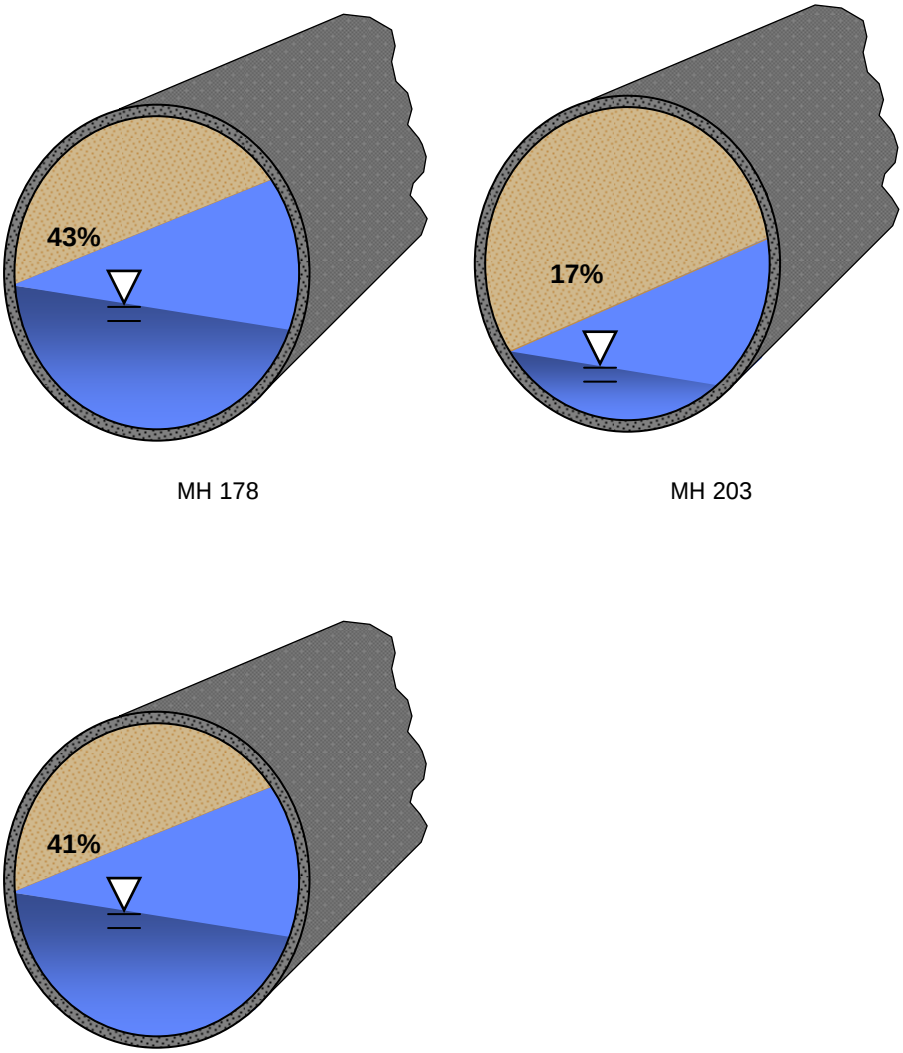


Figure 1. Peak Flow Cross-Sectional View Snapshots

INTRODUCTION

V&A was retained by the Ventura Regional Sanitation District (VRSD) to conduct a sanitary sewer flow monitoring and capacity study at nine locations within the City of Agoura Hills. The purpose of the study was to record and report the existing flow volume through the sanitary sewer pipe, and identify the potential impacts on the capacity at the flow monitoring locations. Flow monitoring was conducted over a 4-week period from March 24, 2009 to April 20, 2009. Figure 2 illustrates the location of the manholes where the flow meters were installed.

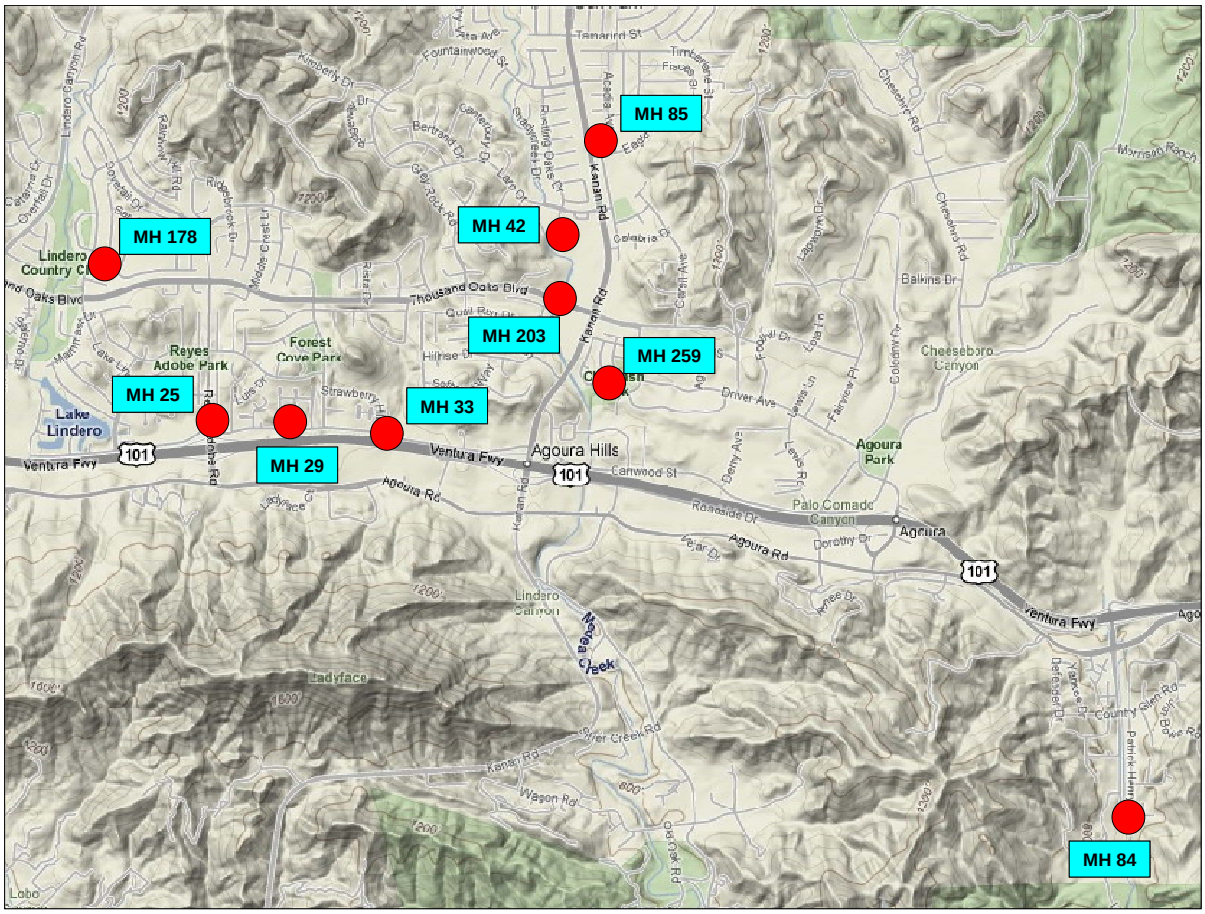


Figure 2. Map of Flow Monitoring Sites

FLOW MONITORING METHODS AND PROCEDURES

Meter Installation

Nine Isco 2150 area-velocity flow meters were installed by V&A in the sewer manholes shown in Figure 2. Isco meters use a pressure transducer to collect depth readings, and ultrasonic Doppler sensors on the probe determine the average fluid velocity. Figure 3 shows a diagram of a typical flow meter installation.

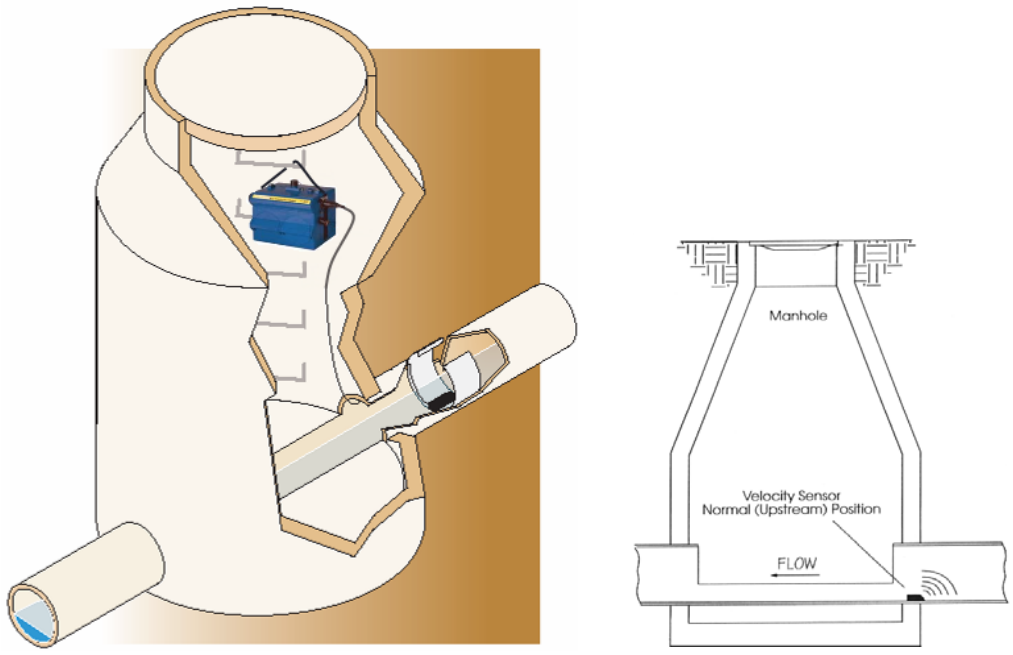


Figure 3. Flow Meter Installation Diagram

Manual level and velocity measurements were taken in the field during the flow meter installation and again when the meters were removed. These manual measurements are compared to the instantaneous level and velocity readings of the flow meters to ensure proper calibration and accuracy. The continuous depth and velocity readings were recorded by the flow meters in 15-minute increments and downloaded into a computer spreadsheet program where the data could be analyzed and made report-ready.

Explanation of Report Graphs and Definition of Terms

Flow versus time graphs are created by plotting the data recorded by the flow meters in 15-minute intervals. The graphs represent the diurnal flow curve recorded over a given monitoring period and represent the data in its rawest form. Figure 4 shows a typical diurnal flow curve and identified on this graph are the hypothetical peak, low, and average flows recorded over an example monitoring period. These graphs are useful in identifying the extreme limits of the flows being monitored, and identifying any trends that might be occurring at a particular site. The graphs for flow, level and velocity versus time for this project are provided in *Appendix A* of this report.

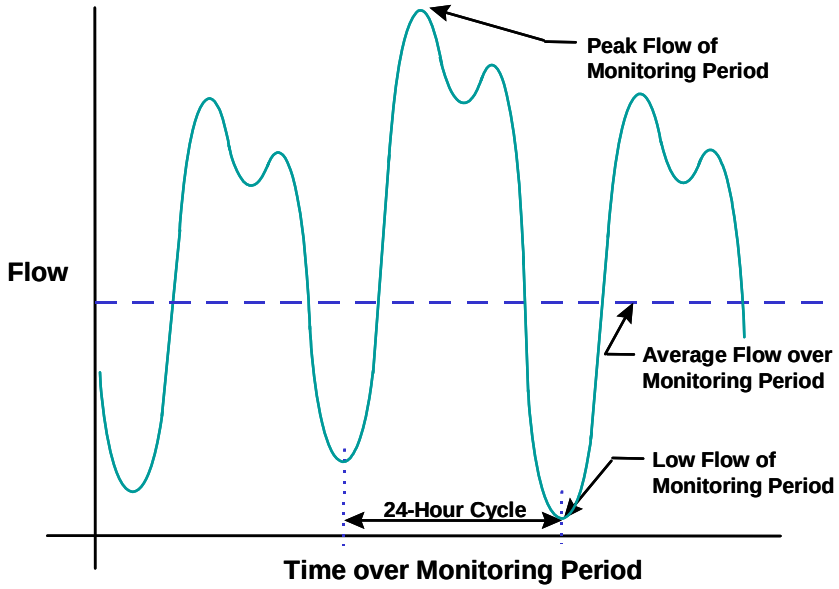


Figure 4. Diagram of Hypothetical Diurnal Flow over Monitoring Period

Dry weather flow is the flow that is caused by actual waste drainage from buildings in the area. Wet weather flow includes rain-dependent infiltration and inflow which may increase the flow through the sewer pipes. The flows recorded during this study were dry weather flows only.

FINDINGS

Flow Monitoring Results

The recorded flows showed diurnal flow patterns with peaks in the early morning and late afternoon hours. Figure 5 plots the average daily weekday and weekend flow for Manhole 33. Table 2 summarizes the flow monitoring data at the monitoring sites during the monitoring period. Additional plots and tables summarizing the flows at the monitoring sites are shown in *Appendix A.*

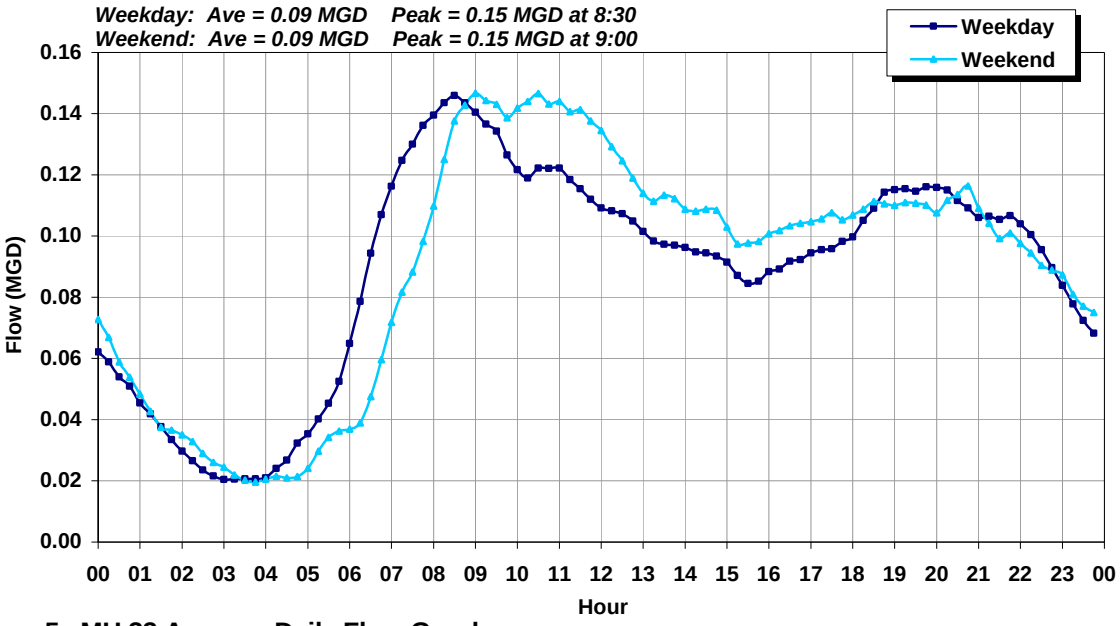


Figure 5. MH 33 Average Daily Flow Graph

Table 2. Flow Monitoring Results

Location	Weekday Average Flow (mgd)	Weekend Average Flow (mgd)	ADWF** (mgd)	Weekend to Weekday Ratio	Peak Measured Flow (mgd)	Peak to ADWF Ratio
MH 25	0.17	0.17	0.17	1.00	0.26	1.51
MH 29	0.04	0.04	0.04	0.89	0.13	3.20
MH 33	0.09	0.09	0.09	1.01	0.24	2.65
MH 42	0.18	0.19	0.18	0.99	0.41	2.20
MH 84	0.01	0.01	0.01	1.06	0.04	7.16
MH 85	0.06	0.06	0.06	0.98	0.15	2.34
MH 178	0.09	0.09	0.09	1.10	0.27	3.05
MH 203	0.09	0.09	0.09	1.01	0.20	2.21
MH 259	0.14	0.14	0.14	1.12	0.35	2.51

**ADWF calculated as (5*weekday+2*weekend)/7

[A] The ADWF graph is generated by averaging each 15-minute period for the weekday/weekend days of this study. The peak flows shown in this graph are not the same as peak measured flow, but a "typical expected" peak flow for an average day.

Pipeline Capacity

The pipeline capacity is estimated based on the measured data from the flow metering sites. The metered flow data is plotted over the Manning's Equation flow curve and extrapolated to a full-flow scenario, as shown in Figure 6 for Manhole 259.

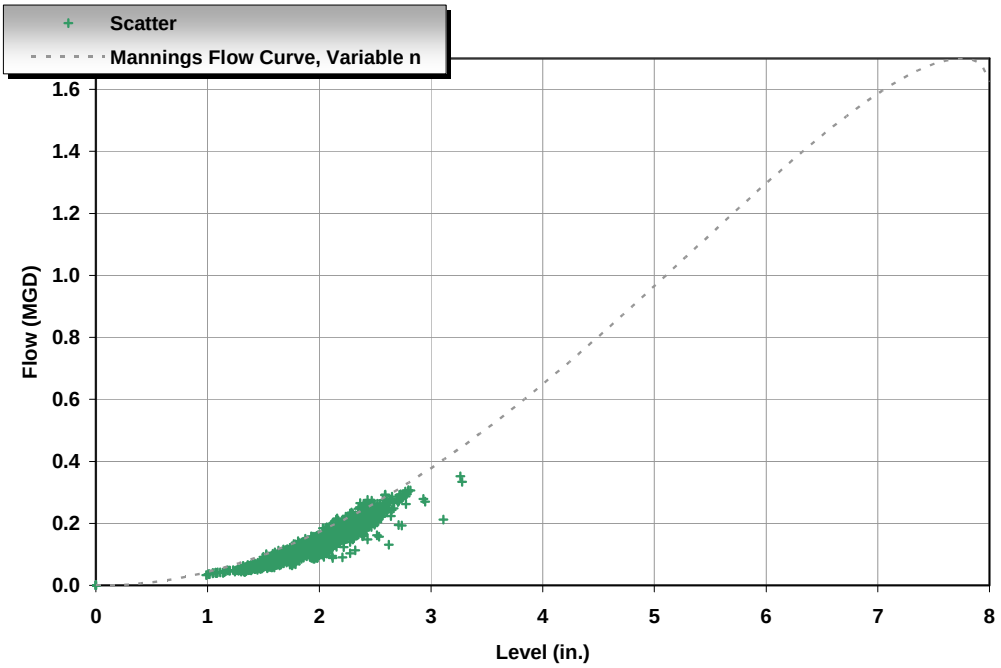


Figure 6. MH 259 Stage Curve

Table 3 summarizes the capacity data including the average dry weather flow and peak measured flow as a percent of the pipe capacity. Figure 7 shows the cross-sectional snapshots of these conditions.

Table 3. Average Dry Weather Flow and Peak Measured Flow as Percent of Capacity

Site	100% Capacity of Line (mgd)	ADWF (mgd)	ADWF as % of Capacity (by Volume)	ADWF as % of Capacity (by Level)	Peak Measured Flow (mgd)	Peak Flow as % of Capacity (by Volume)	Peak Flow as % of Capacity (by Level)
MH 25	9.00	0.17	1.9%	12.5%	0.26	2.9%	14.7%
MH 29	4.50	0.04	0.9%	6.7%	0.13	2.8%	13.9%
MH 33	1.90	0.09	4.7%	17.2%	0.24	12.4%	28.8%
MH 42	5.00	0.18	3.7%	16.2%	0.41	8.1%	24.0%
MH 84	4.00	0.01	0.2%	4.7%	0.04	1.1%	12.5%
MH 85	0.95	0.06	6.6%	22.5%	0.15	15.4%	33.1%
MH 178	1.10	0.09	8.0%	25.2%	0.27	24.4%	43.4%
MH 203	4.50	0.09	2.0%	11.4%	0.20	4.5%	17.1%
MH 259	1.70	0.14	8.2%	24.6%	0.35	20.7%	41.0%

ADWF = Average Dry Weather Flow

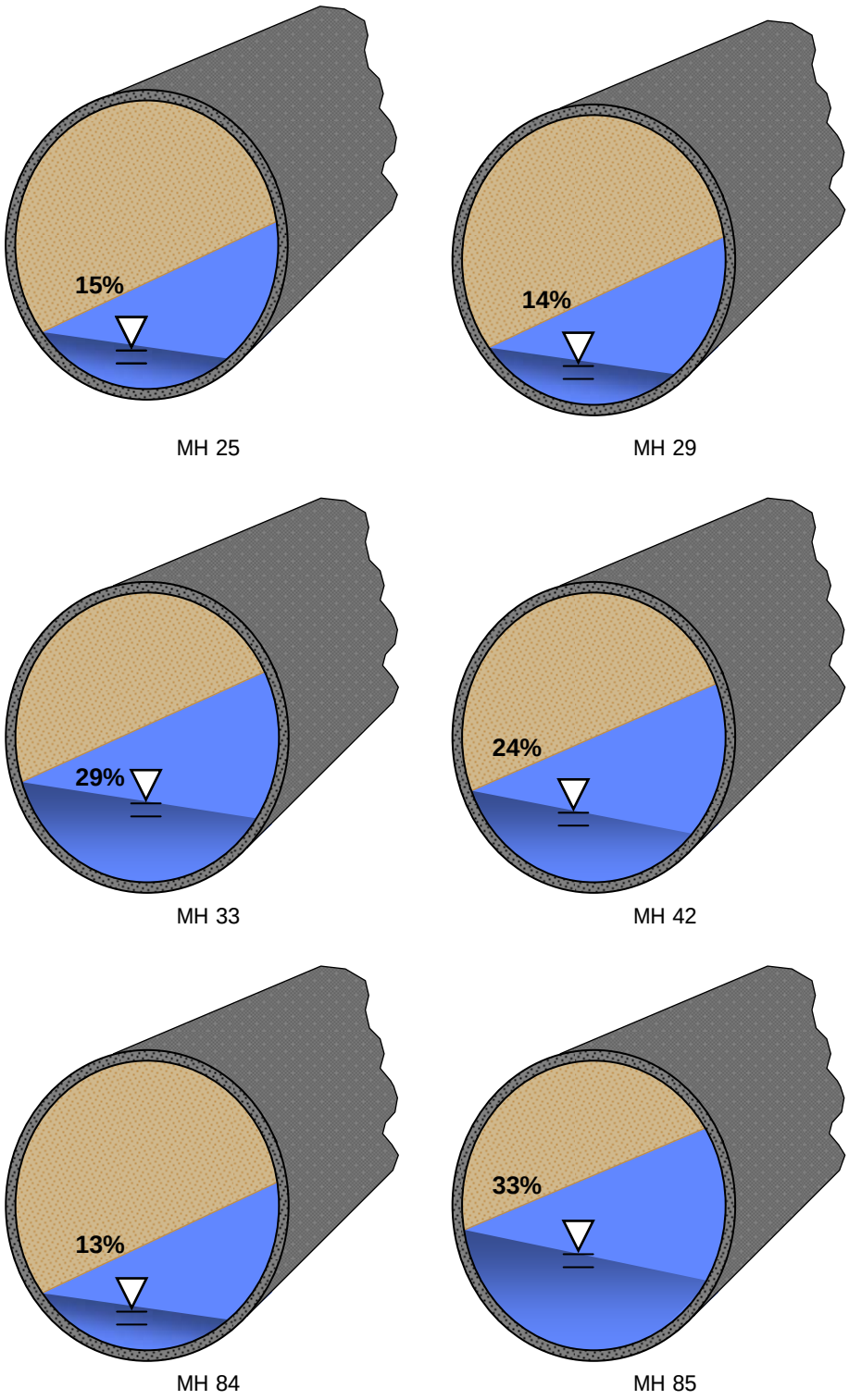


Figure 7. Peak Flow Cross-Sectional View Snapshots

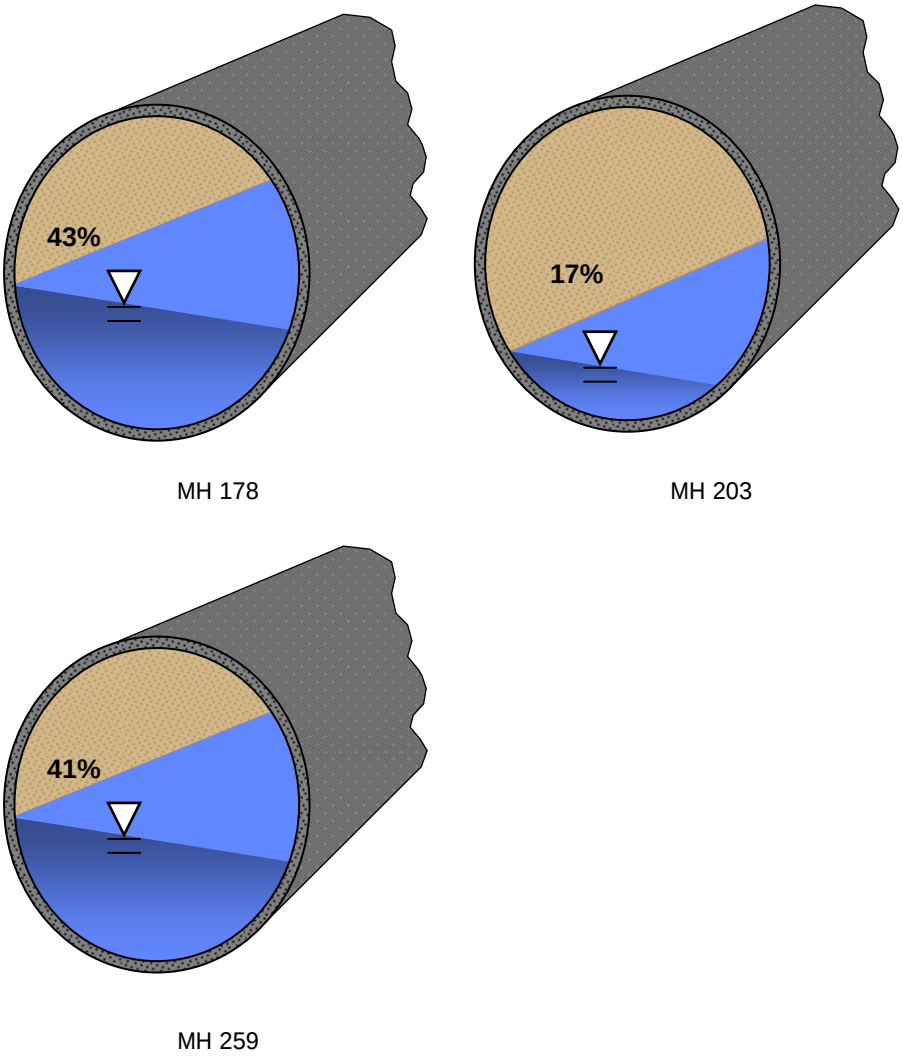


Figure 7. Peak Flow Cross-Sectional View Snapshots (cont.)

APPENDIX A

FLOW MONITORING SITE: GRAPHS, FIGURES & TABLES

Temporary Flow Monitoring Study

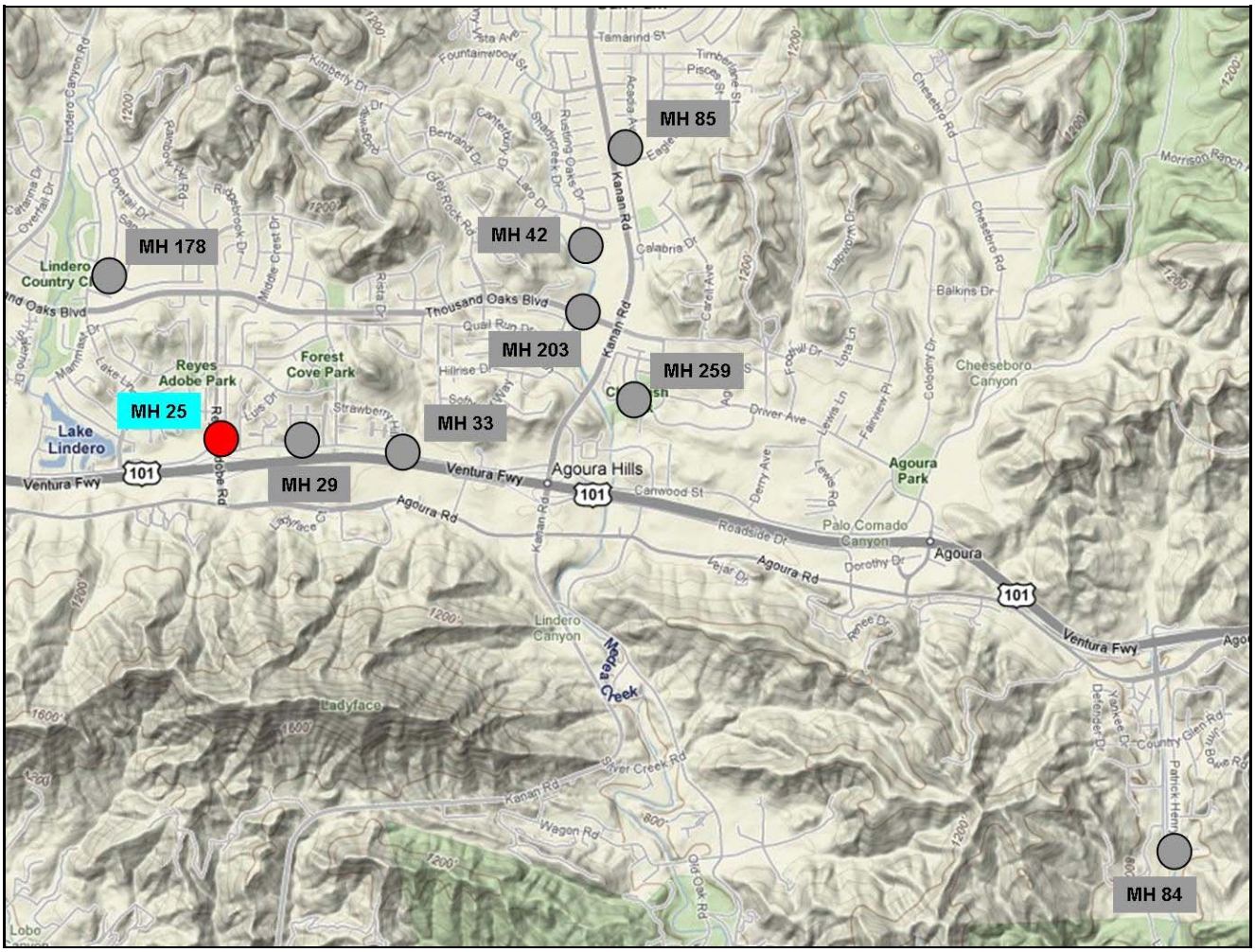
Sanitary Sewer Collection System

Monitoring Site: MH 25

Location: Canwood Street and Reyes Adobe Road

Size / Type Line: 10-inch Sanitary Sewer Pipe

Data Summary Report



Site Information Report

Monitoring Site: MH 25

Location: Canwood Street and Reyes Adobe Road

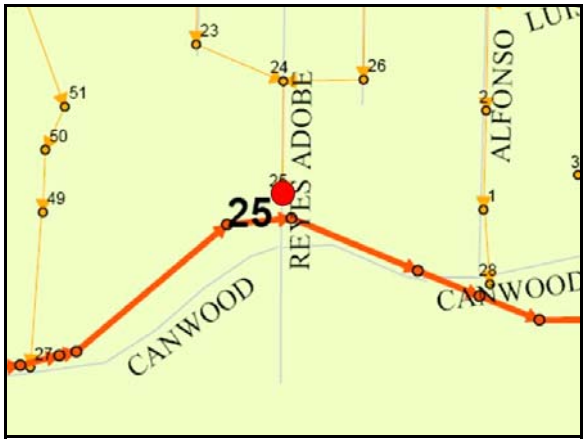
Diameter: 10 inches

Average Dry Weather Flow: 0.17 *mgd*

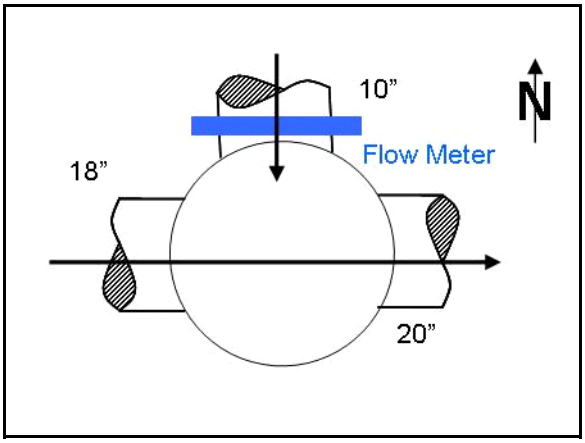
Peak Measured Flow: 0.26 *mgd*

Satellite Map

Sanitary Map



Flow Sketch



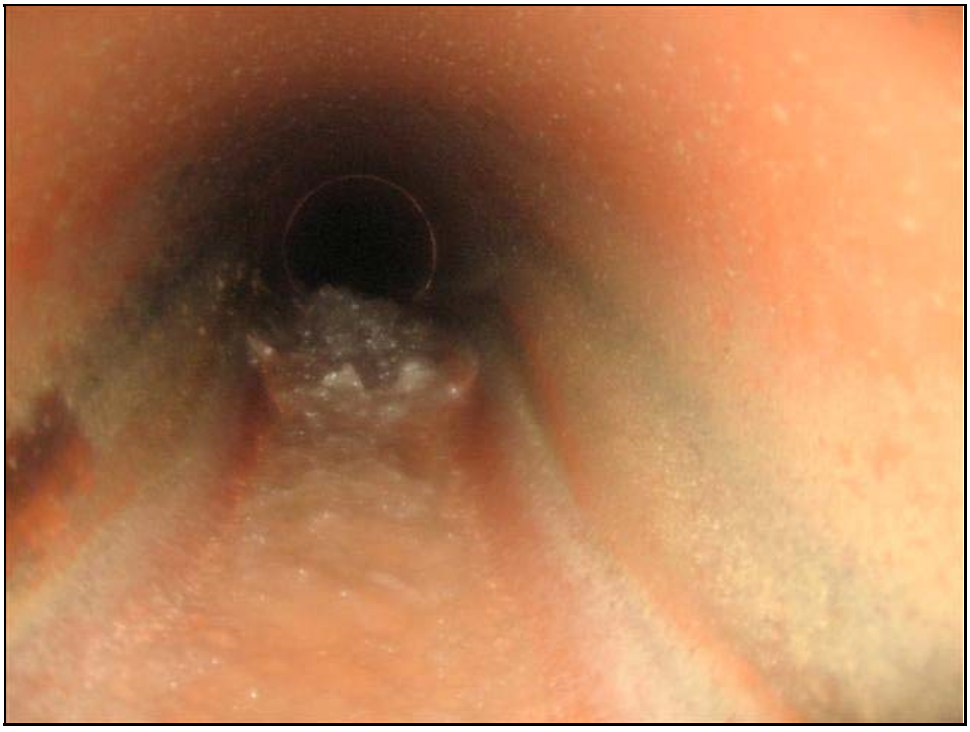
Street View Photo

Plan View Photo

	Site Information Report Photos	**Monitoring Site:** MH 25

Manhole Lid

East Inlet



	Site Information Report Photos	**Monitoring Site:** MH 25

North Inlet

West Outlet

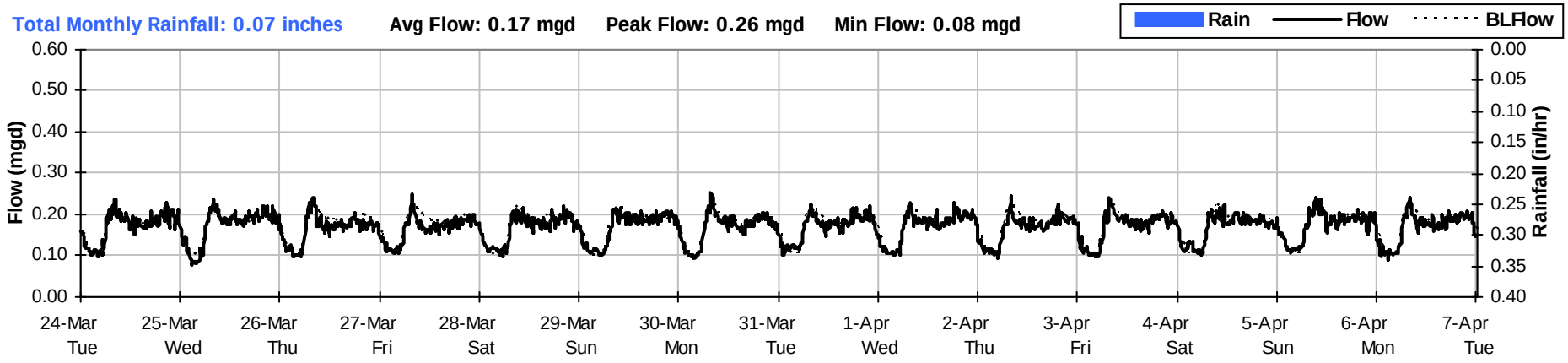
Period Flow Summary

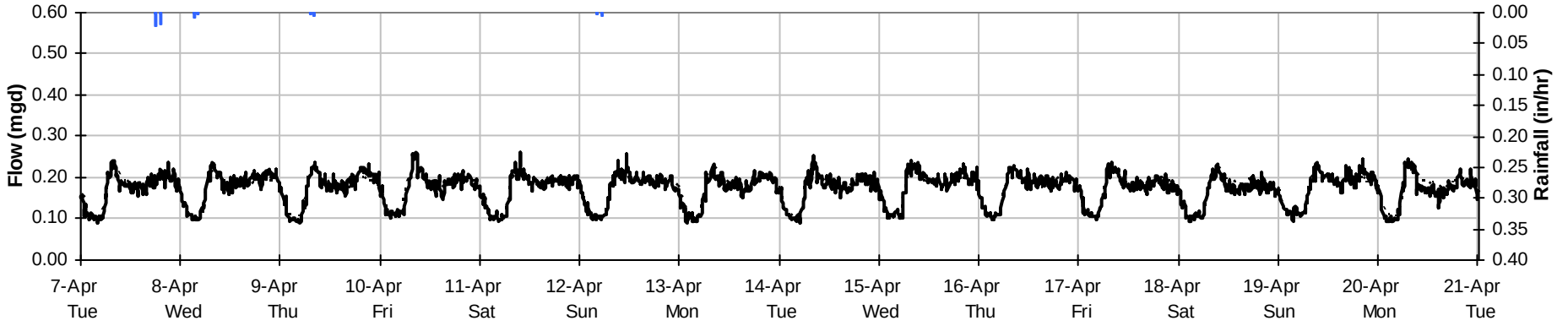
March 24, 2009 to April 21, 2009

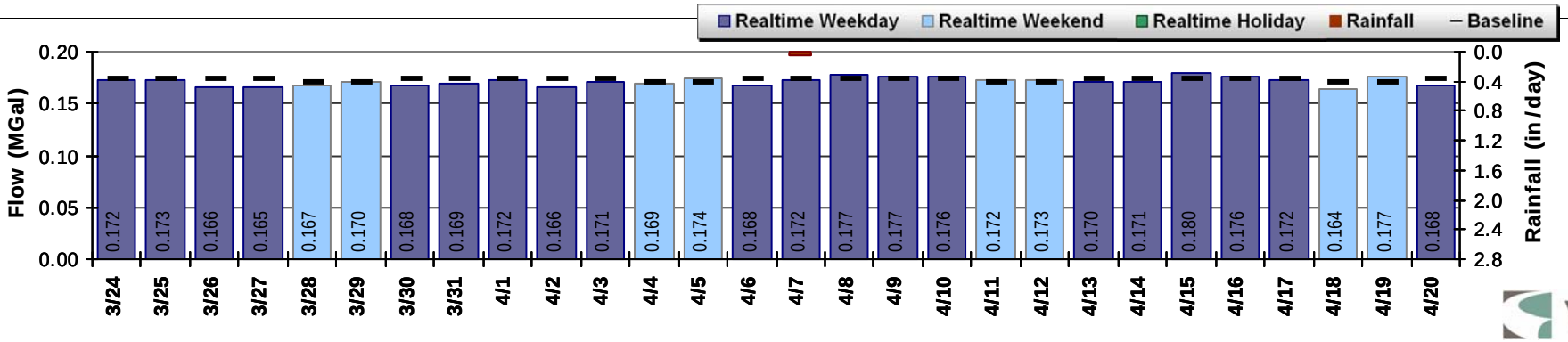
Monitoring Site:

MH 25

Total Monthly Rainfall: 0.07 inches **Avg Flow: 0.17 mgd** **Peak Flow: 0.26 mgd** **Min Flow: 0.08 mgd**

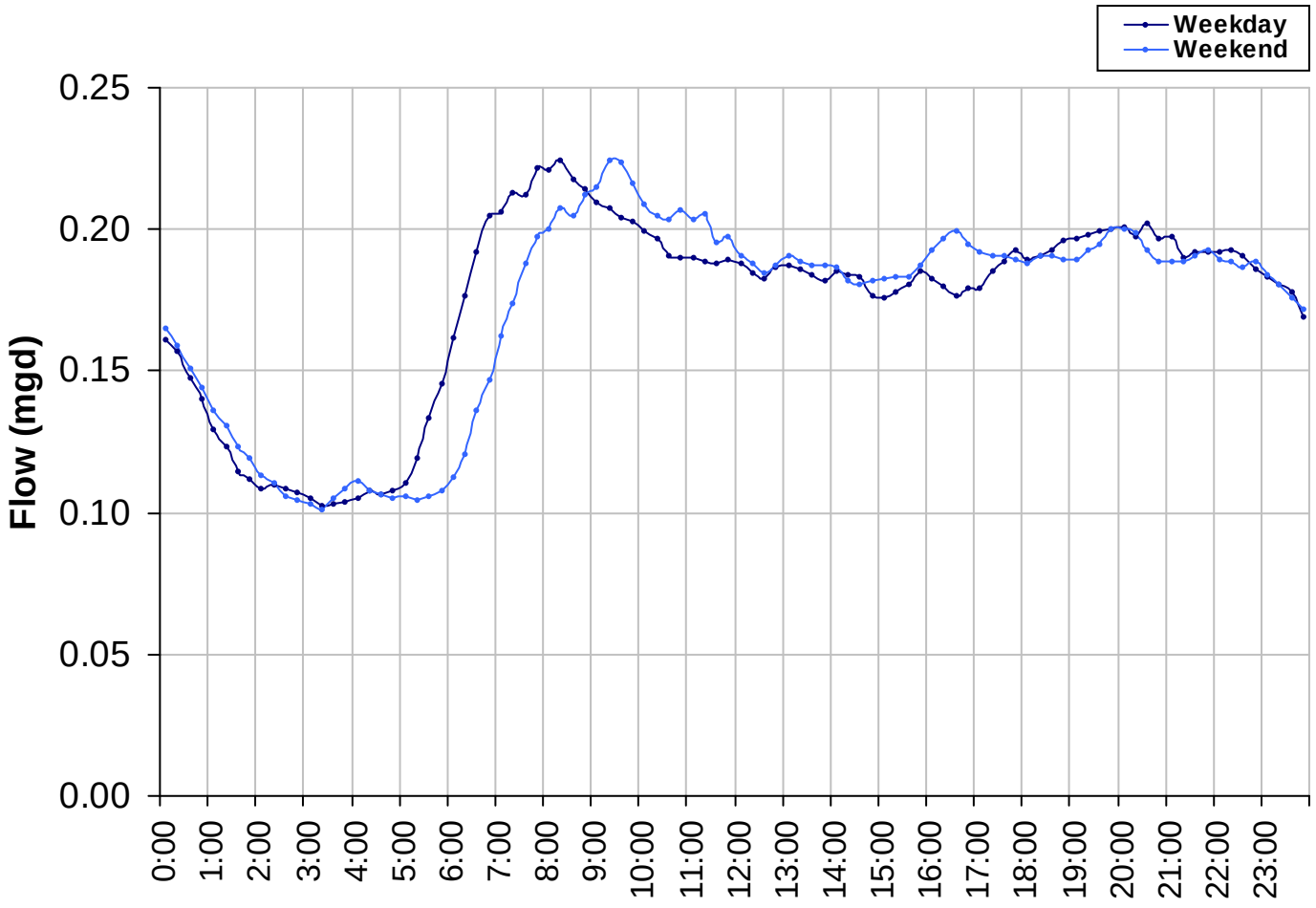






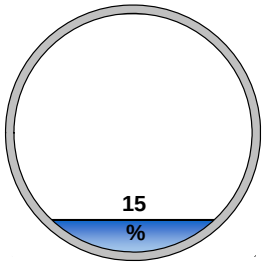
Average Dry Weather Flow

Monitoring Site:
MH 25



Peak Measured Flow:

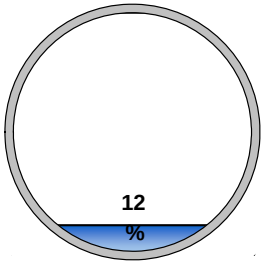
0.26 *mgd*



Peak measured flow shown in weekly graphs on following pages

Average Dry Weather Flow:

0.17 *mgd*

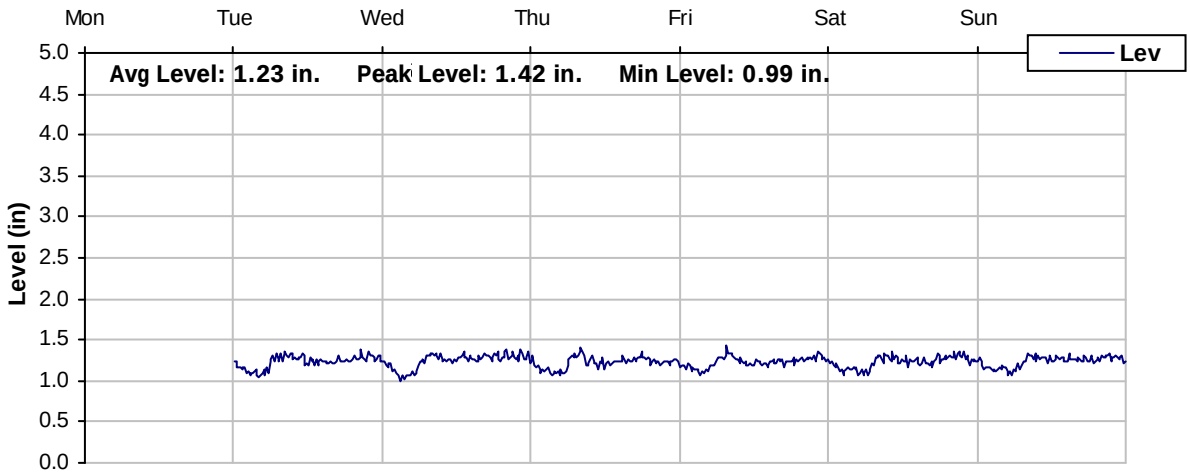


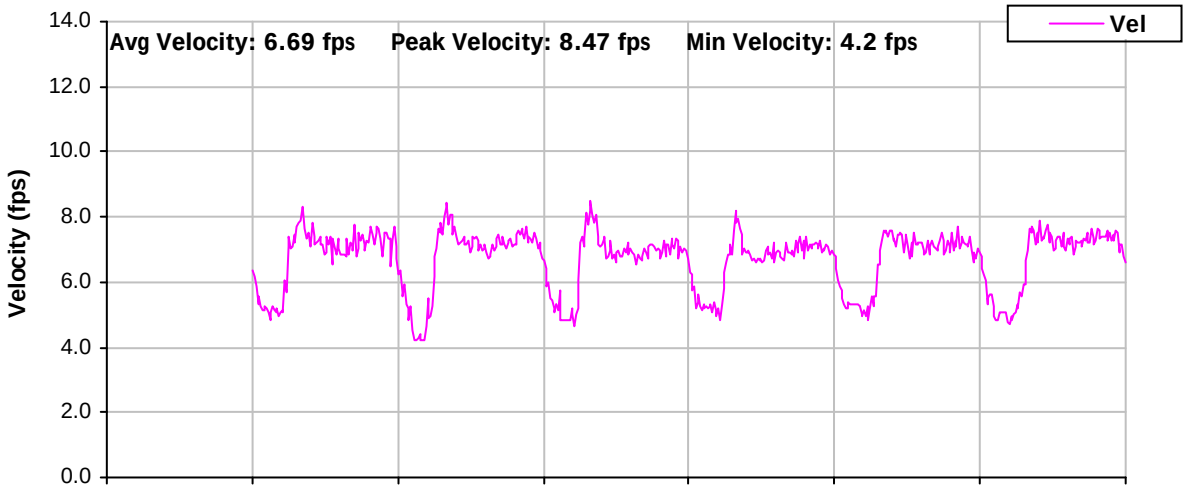
Level, Velocity and Flow

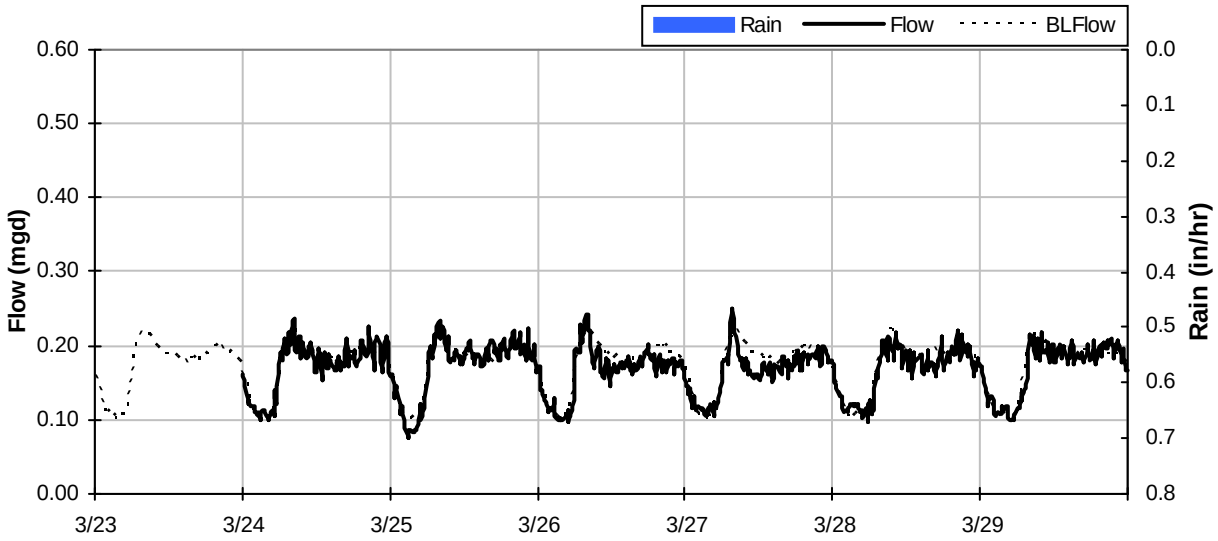
From 3/23/2009 to 3/30/2009

Monitoring Site:

MH 25







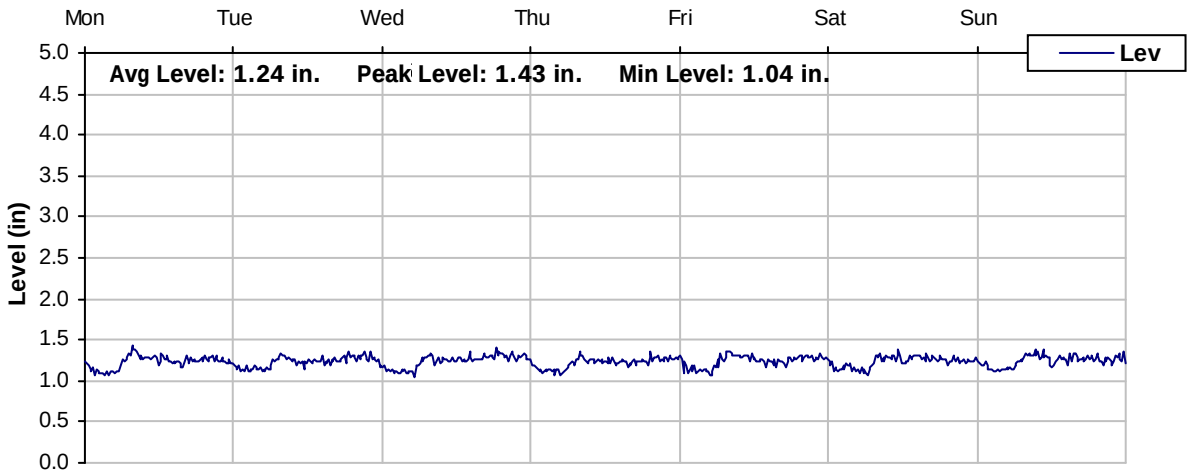
Avg Flow: 0.169 mgd **Peak Flow: 0.25 mgd** **Min Flow: 0.076 mgd**

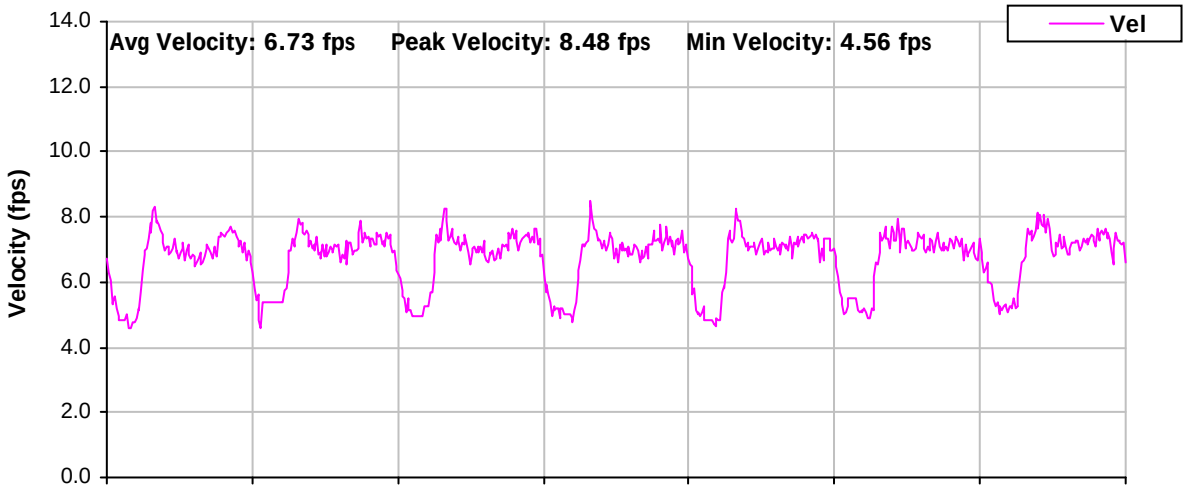
Level, Velocity and Flow

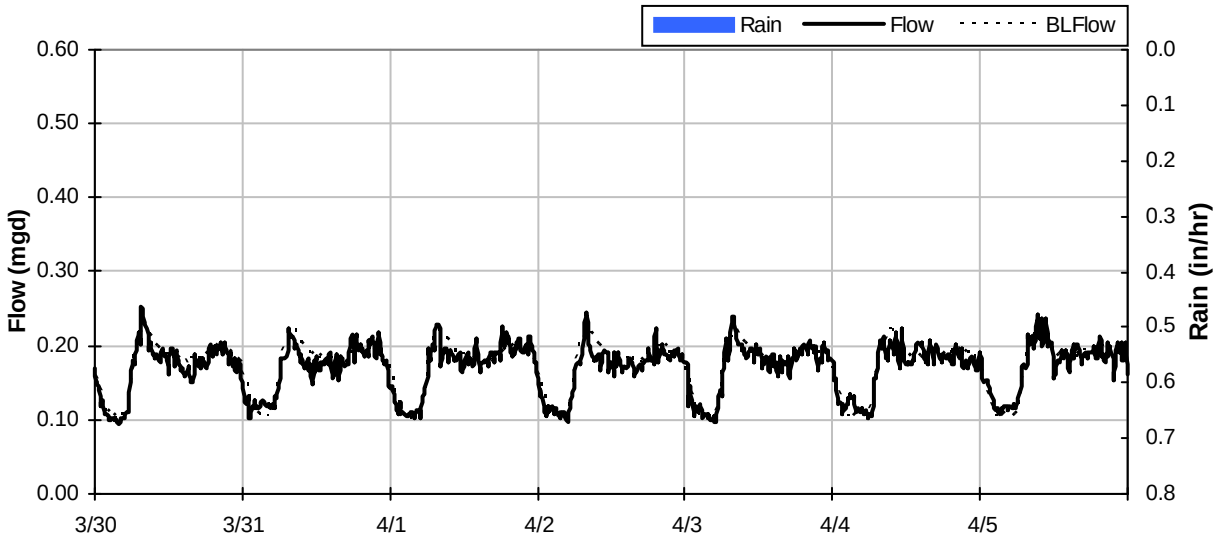
From 3/30/2009 to 4/6/2009

Monitoring Site:

MH 25







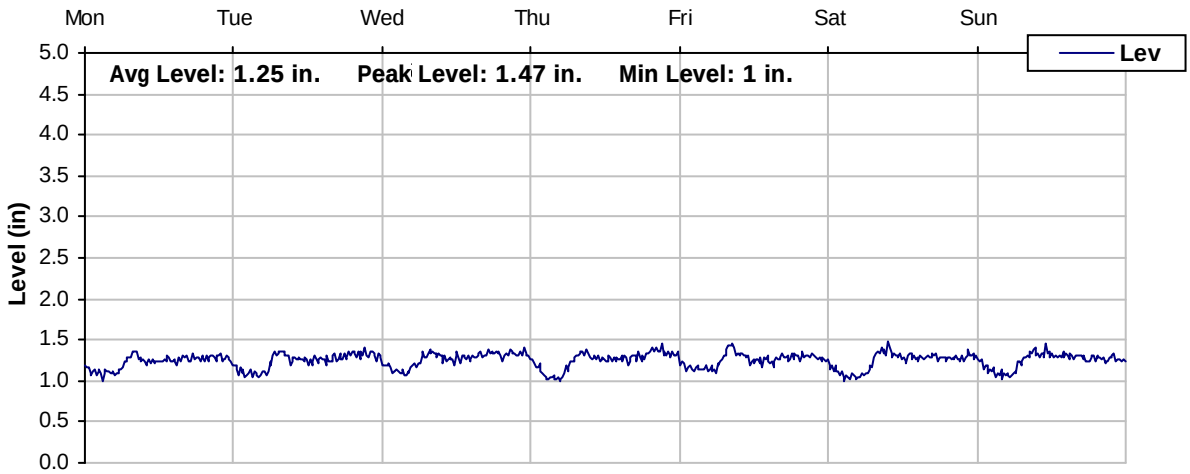
Avg Flow: 0.17 mgd **Peak Flow: 0.253 mgd** **Min Flow: 0.094 mgd**

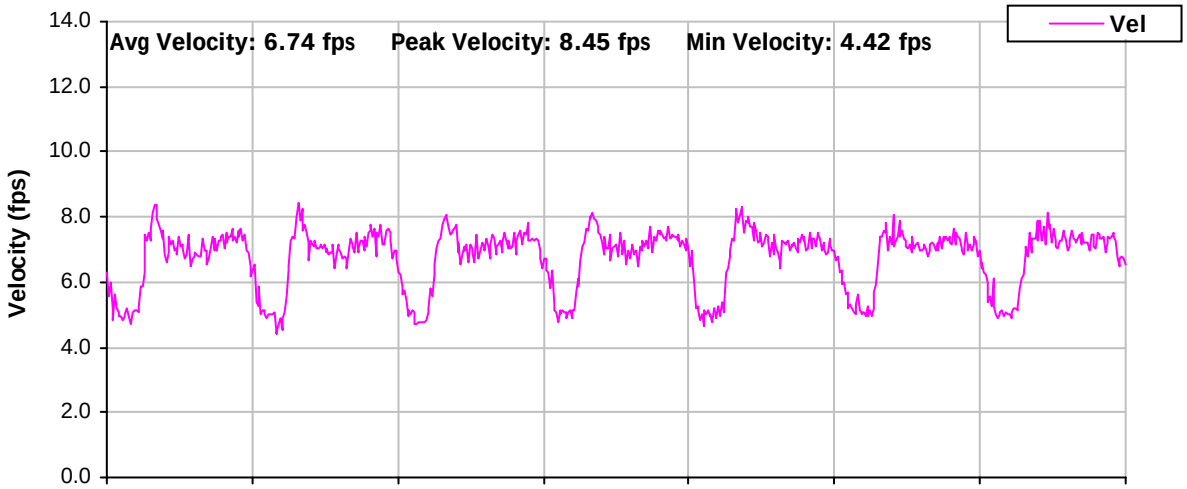
Level, Velocity and Flow

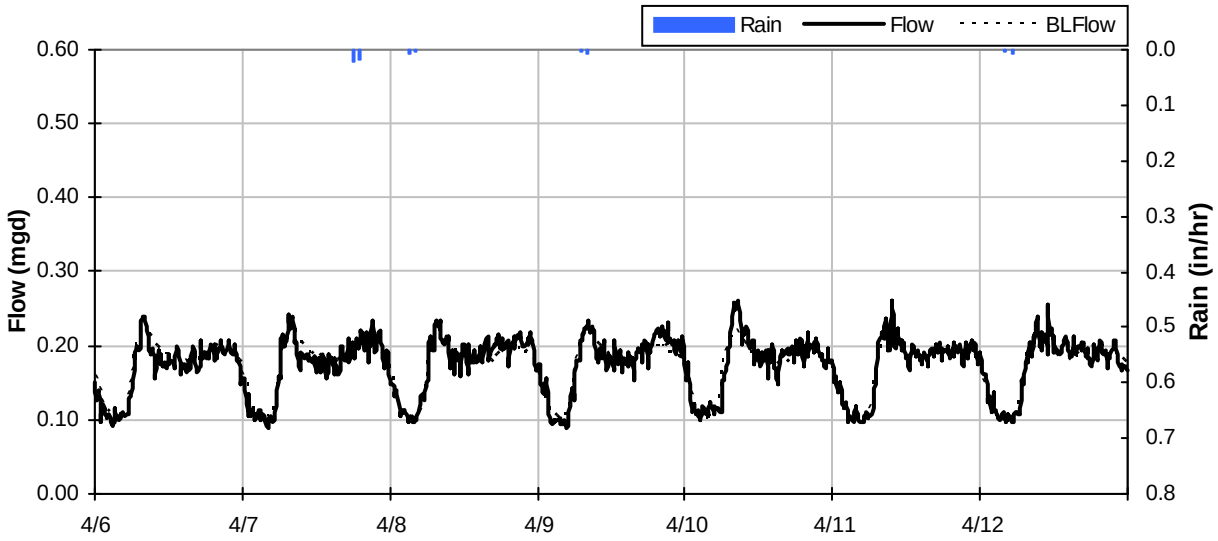
From 4/6/2009 to 4/13/2009

Monitoring Site:

MH 25







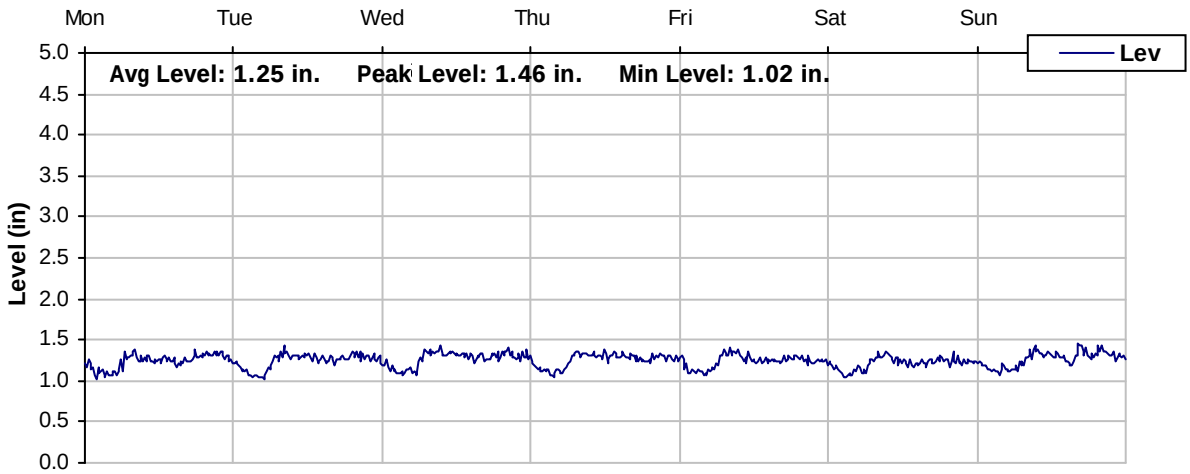
Avg Flow: 0.174 mgd **Peak Flow: 0.261 mgd** **Min Flow: 0.088 mgd**

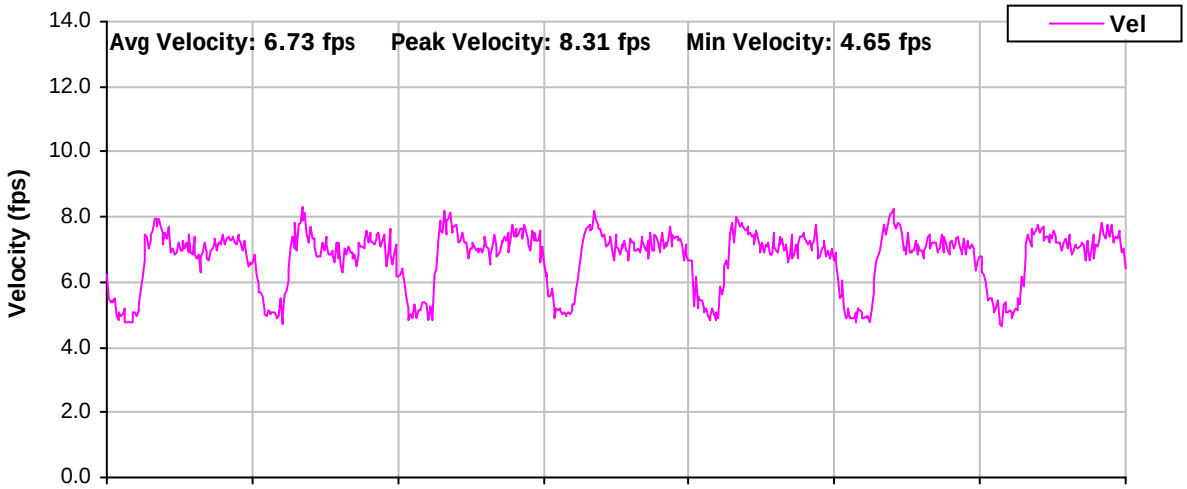
Level, Velocity and Flow

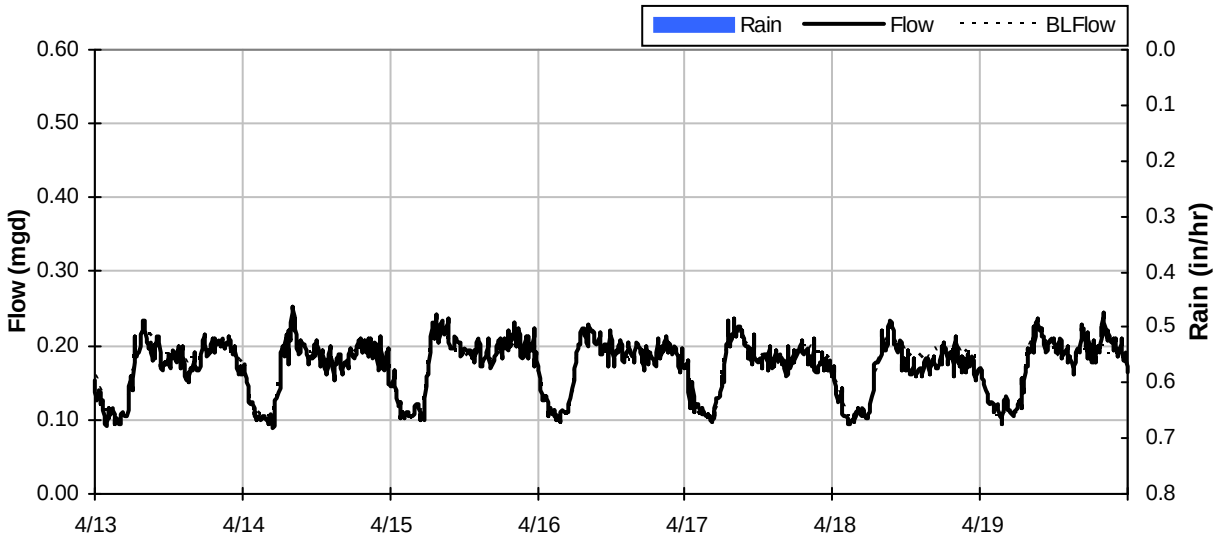
From 4/13/2009 to 4/20/2009

Monitoring Site:

MH 25







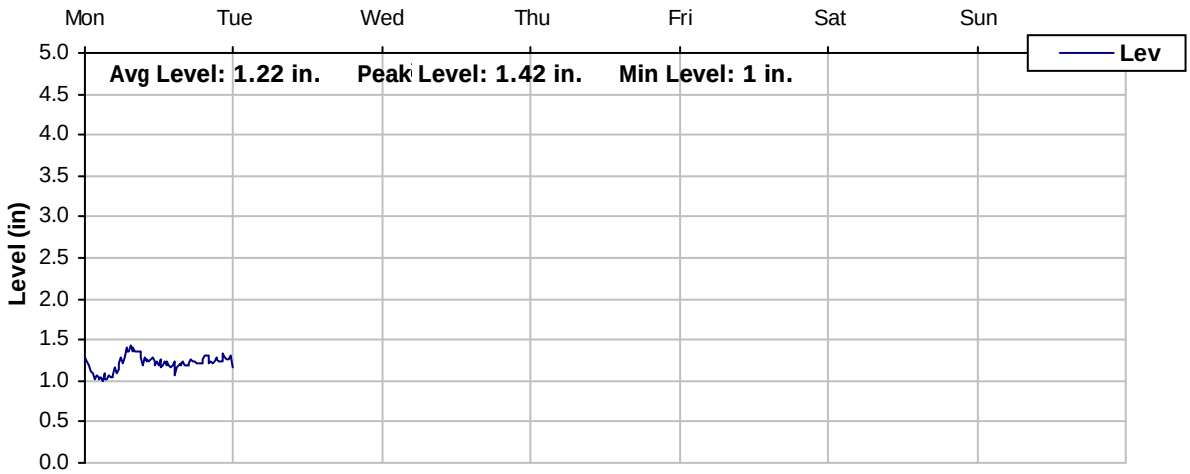
Avg Flow: 0.173 mgd **Peak Flow: 0.253 mgd** **Min Flow: 0.09 mgd**

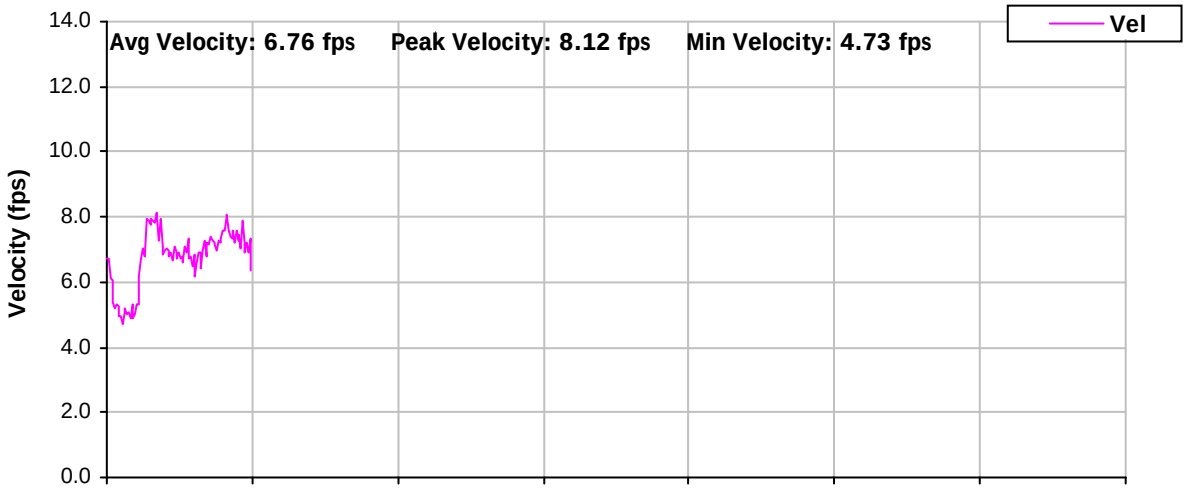
Level, Velocity and Flow

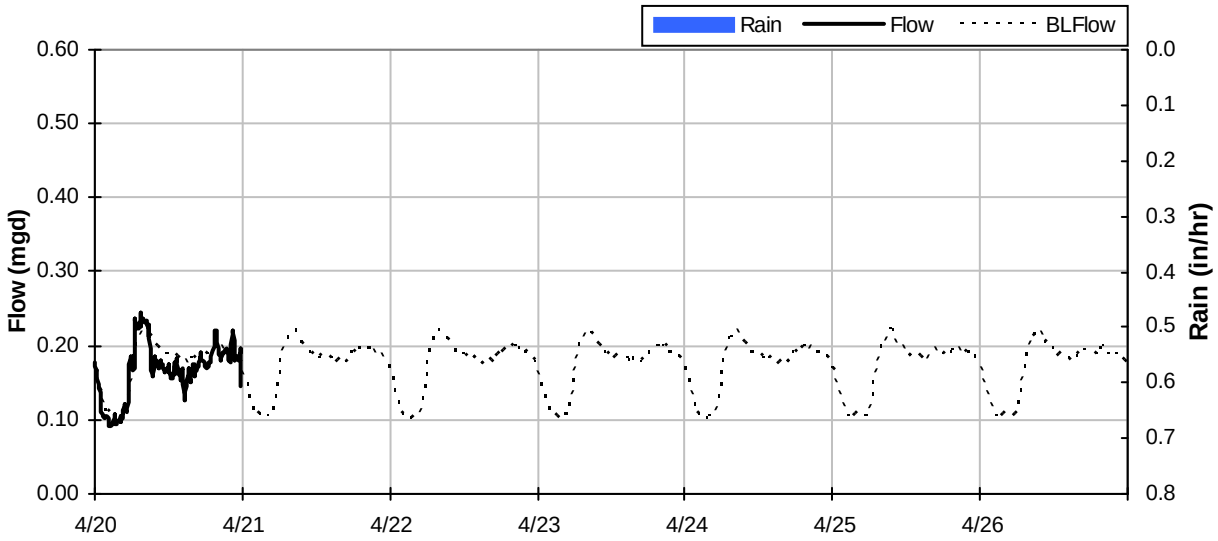
From 4/20/2009 to 4/27/2009

Monitoring Site:

MH 25







Avg Flow: 0.168 mgd **Peak Flow: 0.244 mgd** **Min Flow: 0.092 mgd**

Temporary Flow Monitoring Study

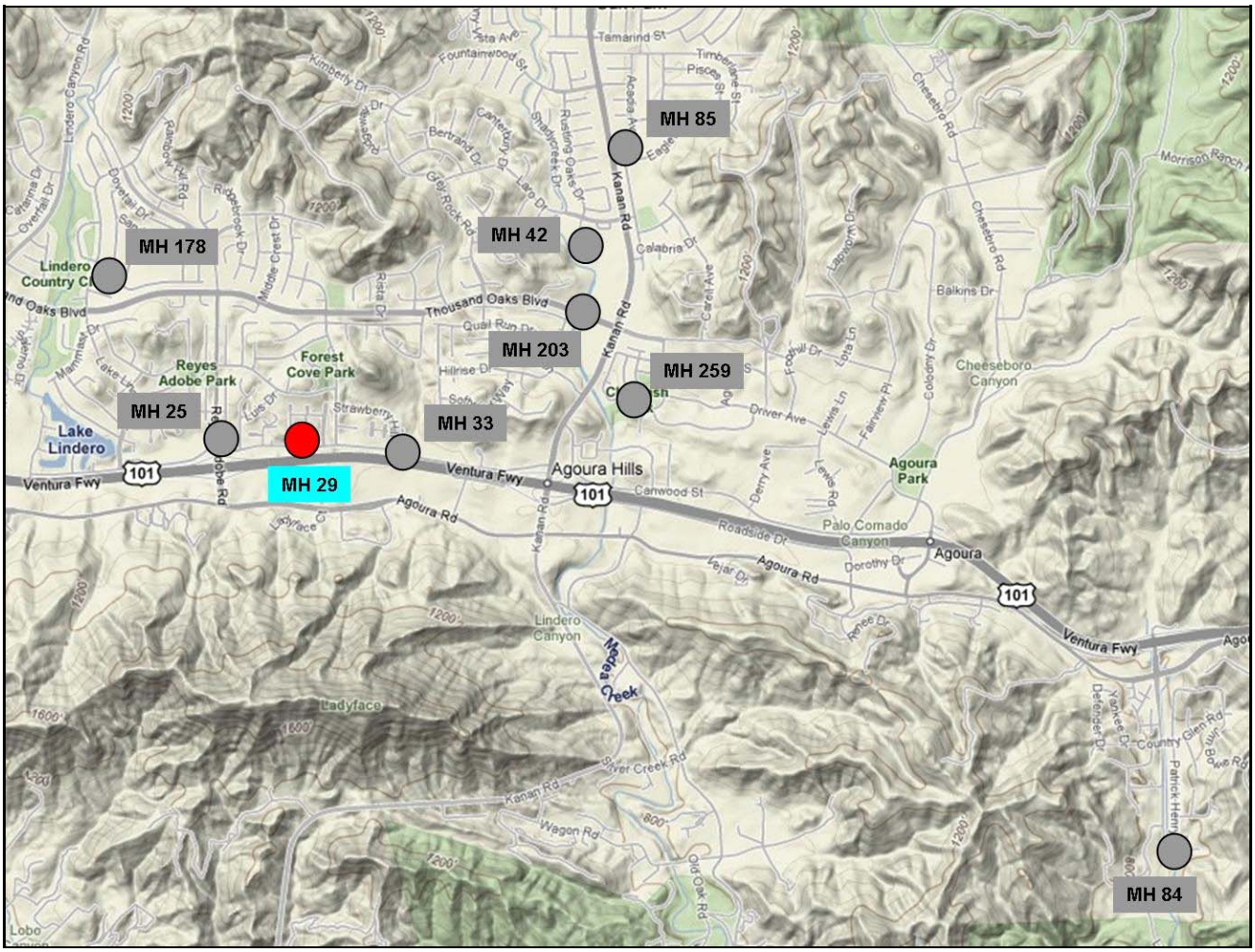
Sanitary Sewer Collection System

Monitoring Site: MH 29

Location: Canwood Street and Christian Court

Size / Type Line: 8-inch Sanitary Sewer Pipe

Data Summary Report



Site Information Report

Monitoring Site: MH 29

Location: Canwood Street and Christian Court

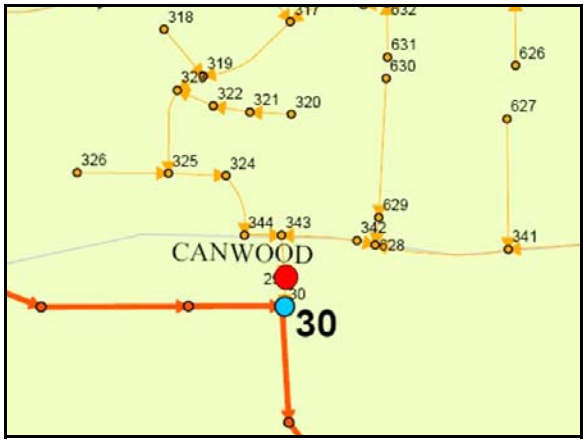
Diameter: 8 inches

Average Dry Weather Flow: 0.04 *mgd*

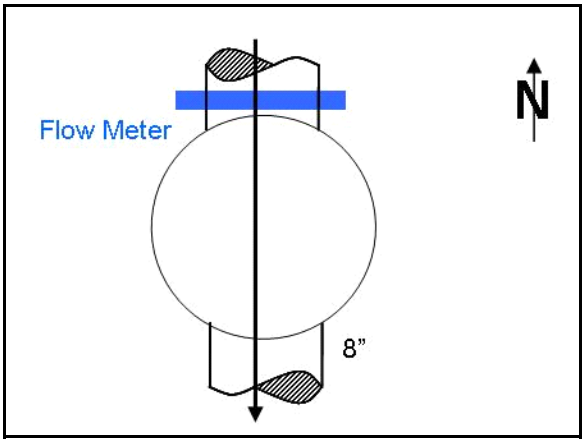
Peak Measured Flow: 0.13 *mgd*

Satellite Map

Sanitary Map

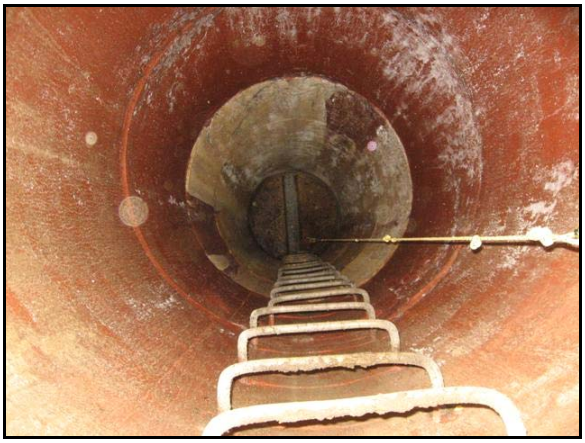


Flow Sketch



Street View Photo

Plan View Photo



	Site Information Report Photos	**Monitoring Site:** MH 29

North Inlet

North Inlet

	Site Information Report Photos	**Monitoring Site:** MH 29

South Oulet

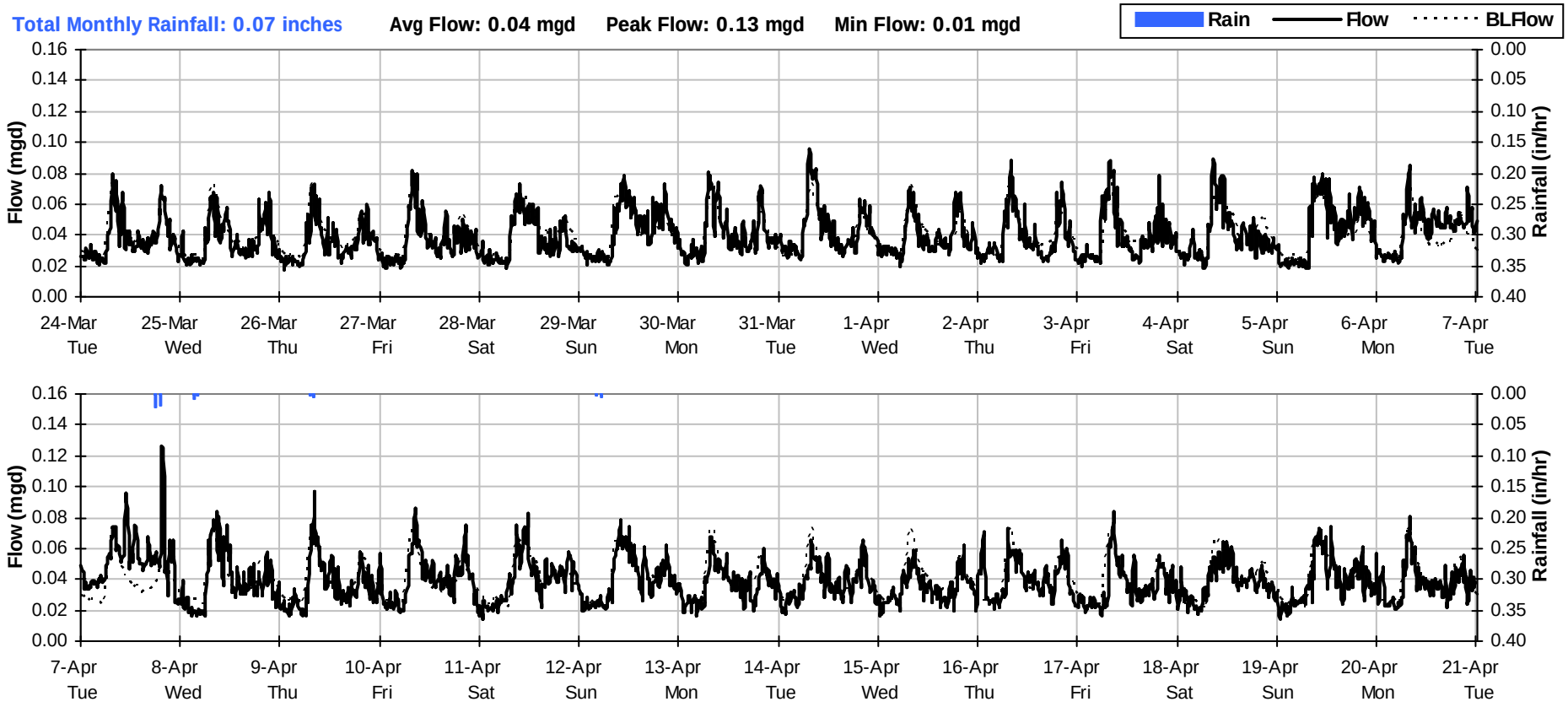
Period Flow Summary

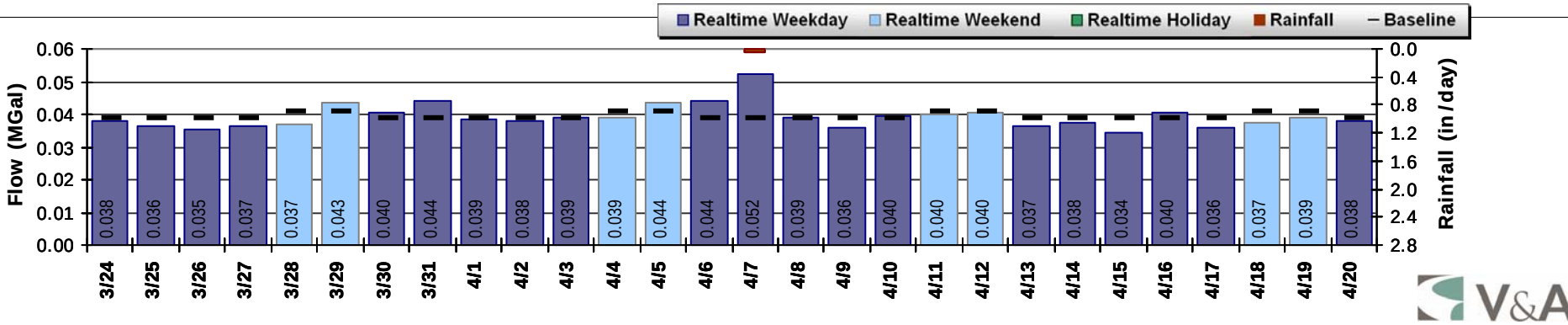
March 24, 2009 to April 21, 2009

Monitoring Site:

MH 29

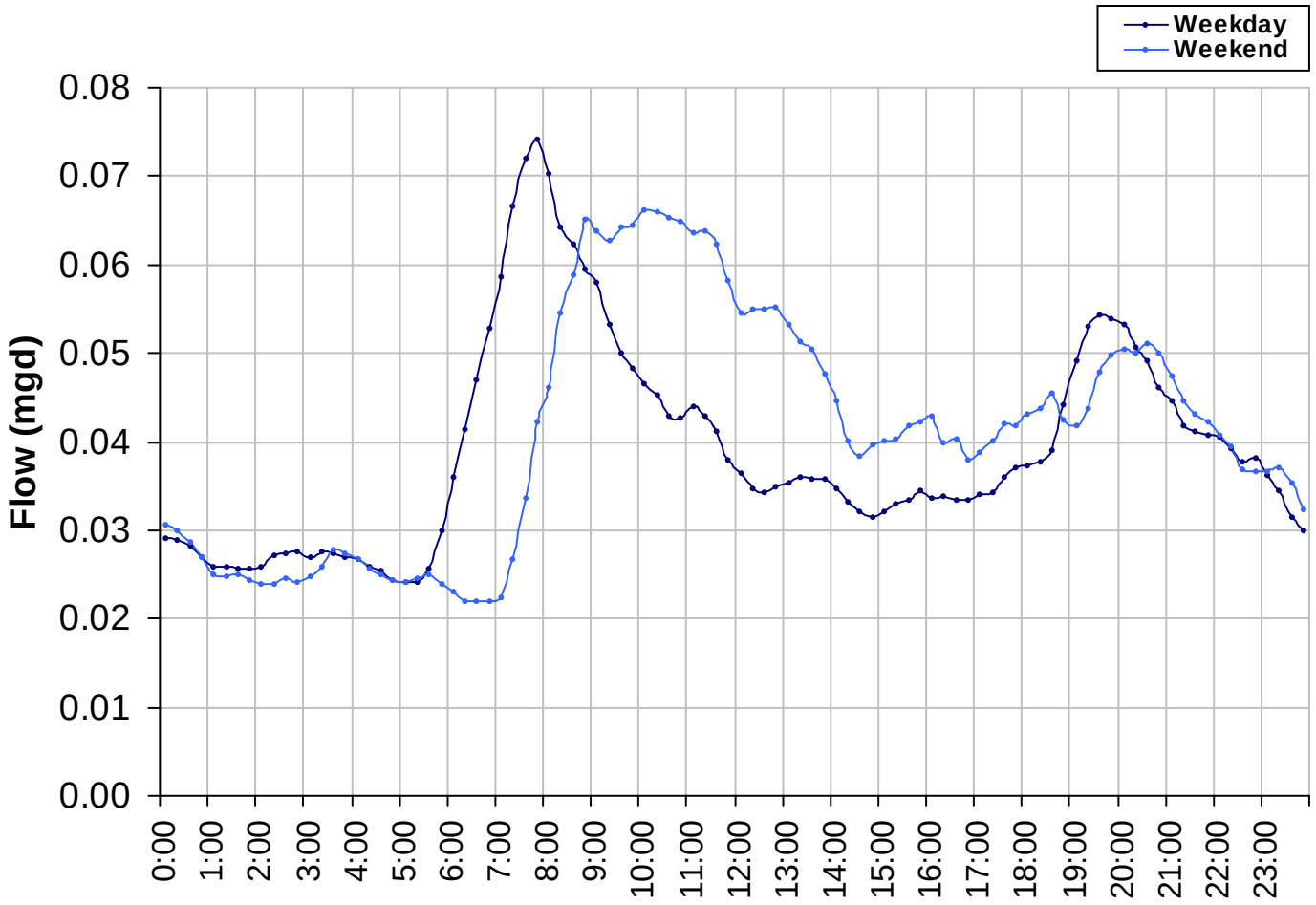
Total Monthly Rainfall: 0.07 inches **Avg Flow: 0.04 mgd** **Peak Flow: 0.13 mgd** **Min Flow: 0.01 mgd**





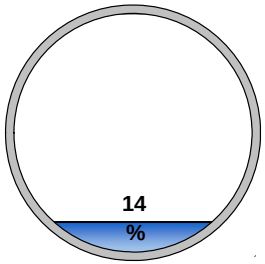
Average Dry Weather Flow

Monitoring Site:
MH 29



Peak Measured Flow:

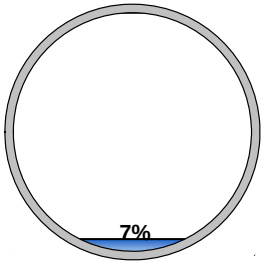
0.13 *mgd*



Peak measured flow shown in weekly graphs on following pages

Average Dry Weather Flow:

0.04 *mgd*

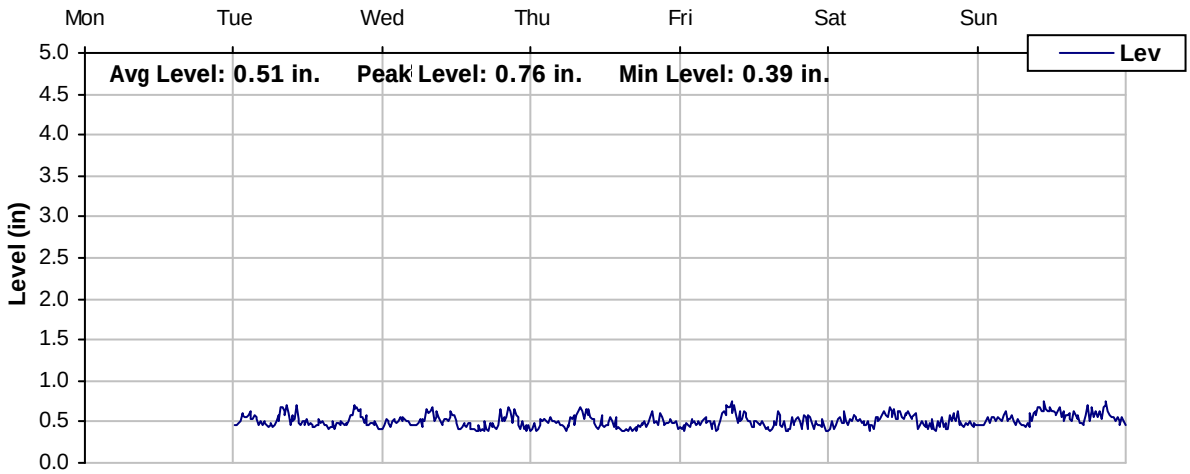


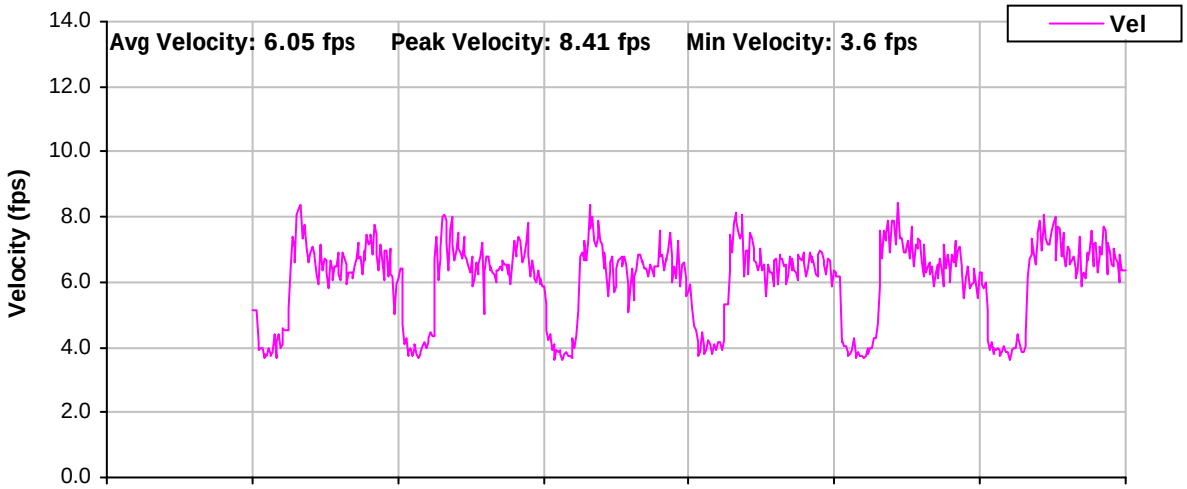
Level, Velocity and Flow

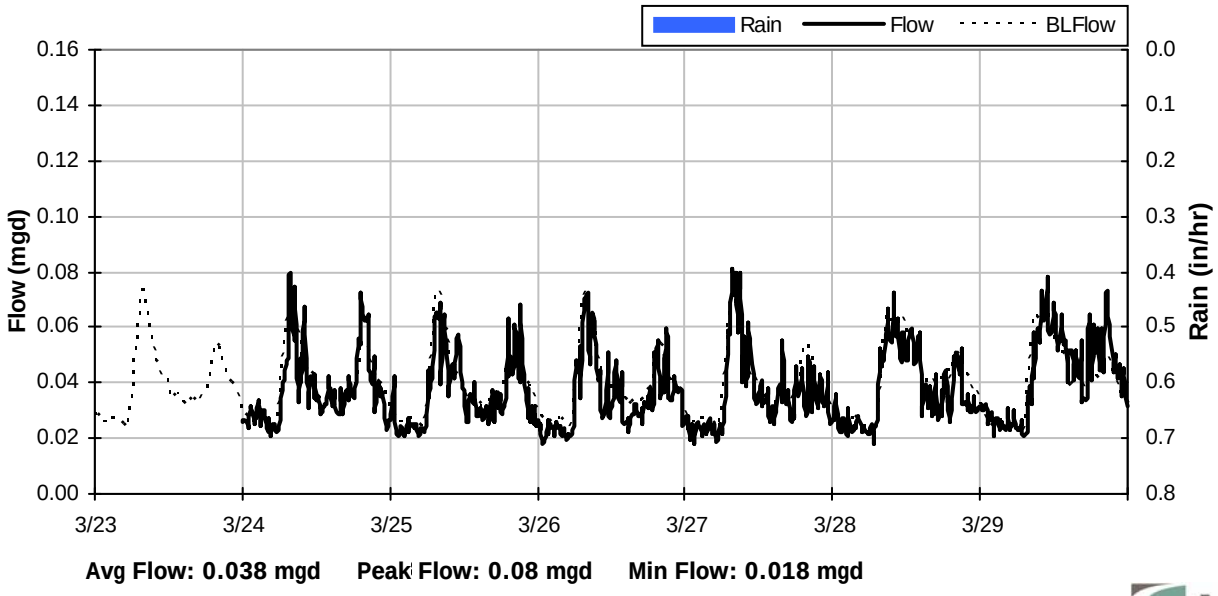
From 3/23/2009 to 3/30/2009

Monitoring Site:

MH 29







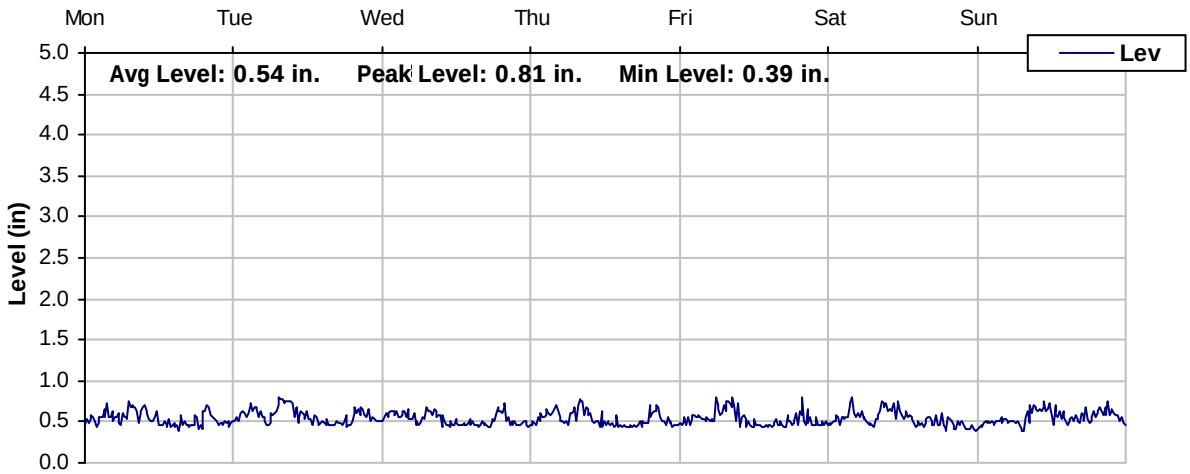
Avg Flow: 0.038 mgd **Peak Flow: 0.08 mgd** **Min Flow: 0.018 mgd**

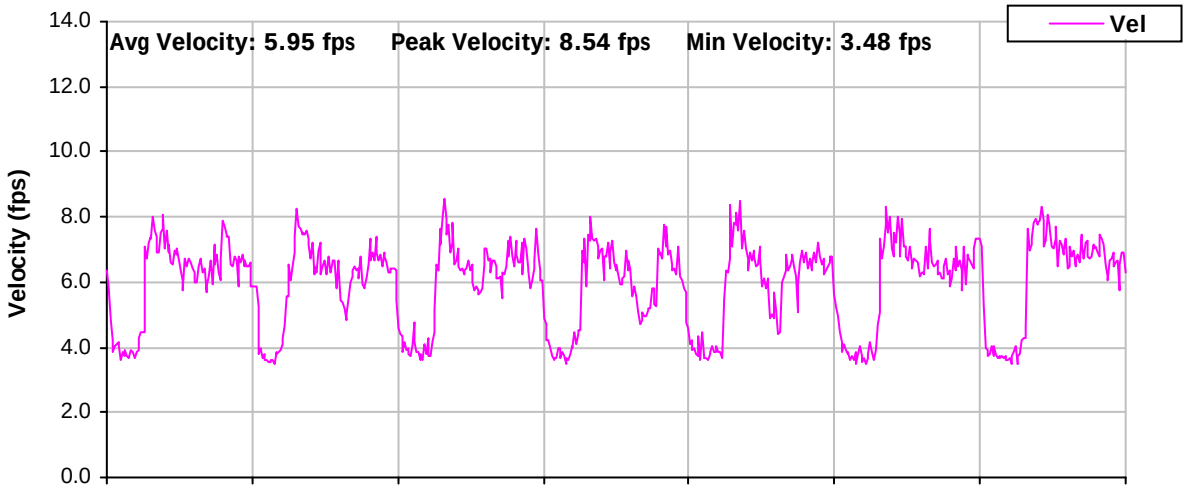
Level, Velocity and Flow

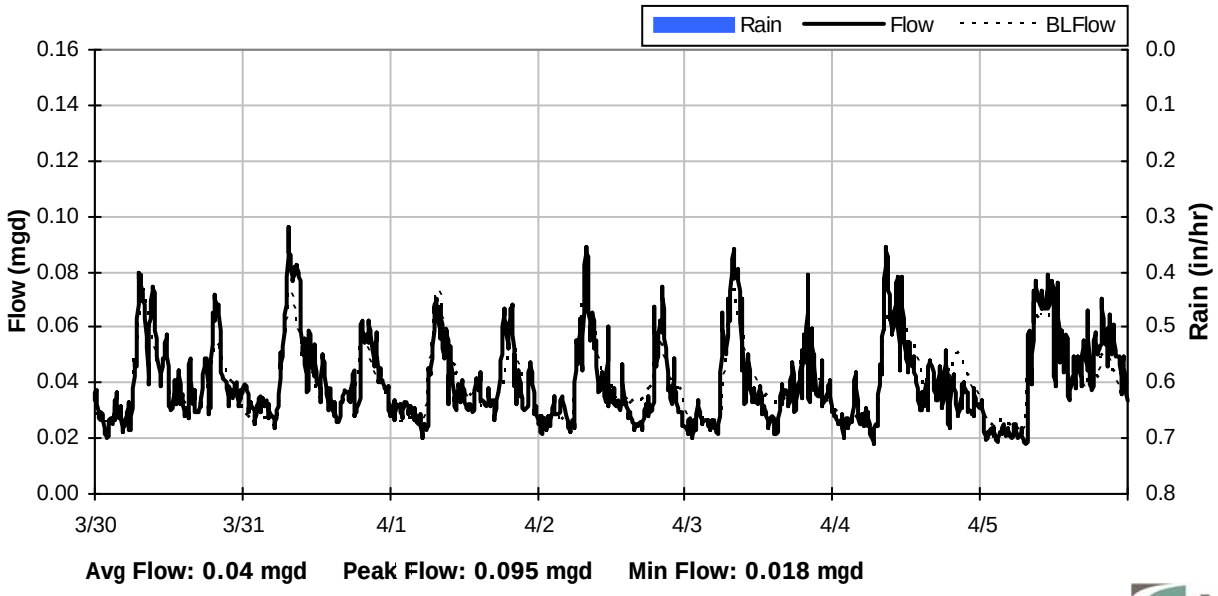
From 3/30/2009 to 4/6/2009

Monitoring Site:

MH 29







Avg Flow: 0.04 mgd **Peak Flow: 0.095 mgd** **Min Flow: 0.018 mgd**

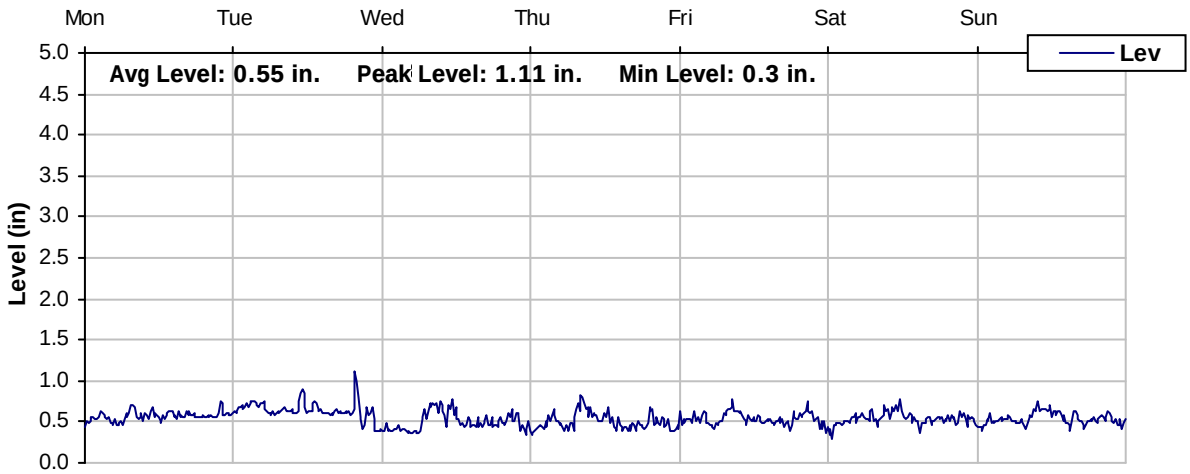
V&A

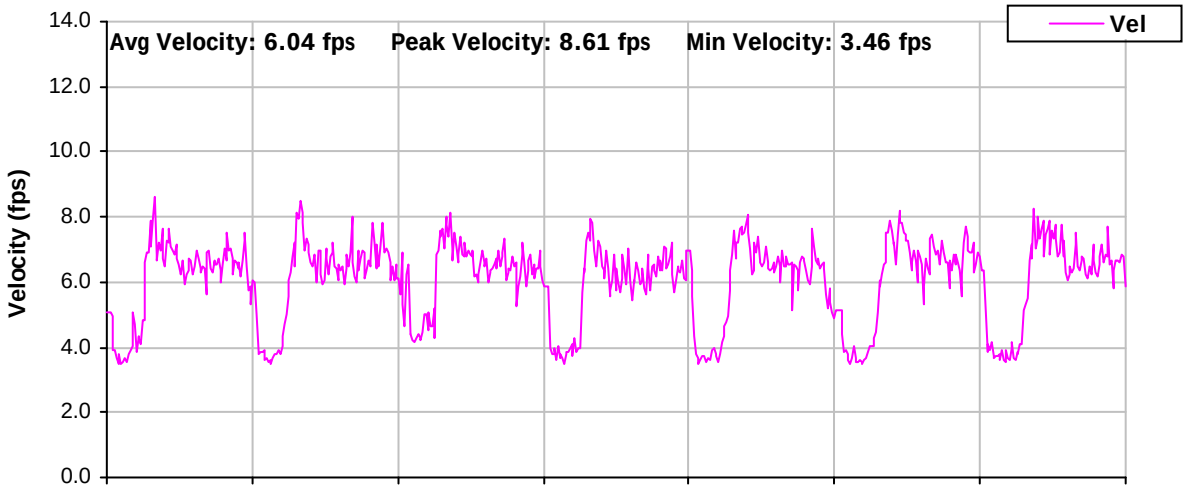
Level, Velocity and Flow

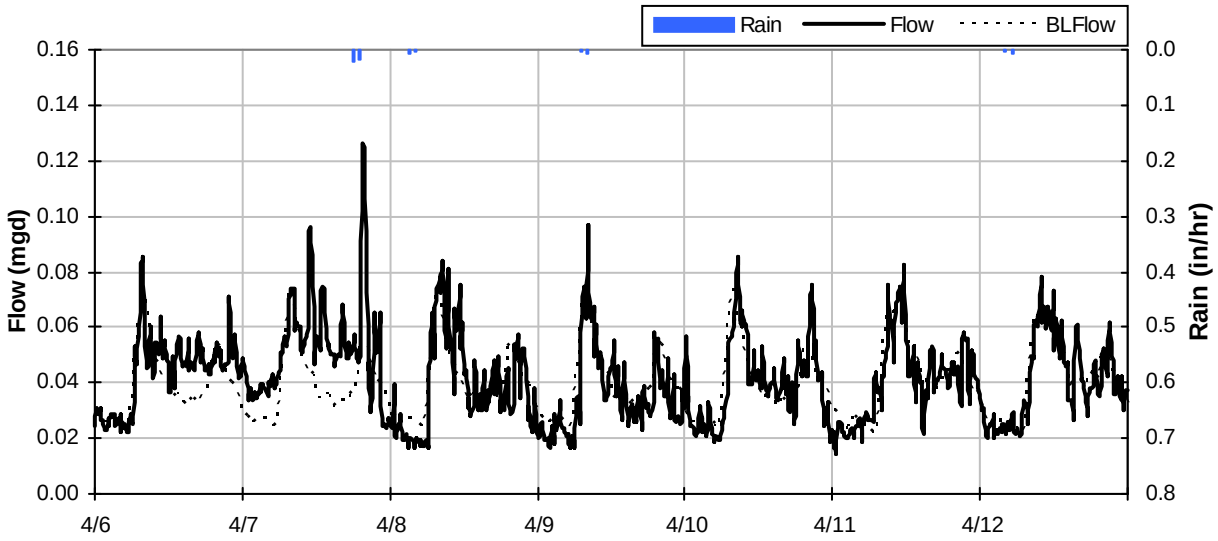
From 4/6/2009 to 4/13/2009

Monitoring Site:

MH 29







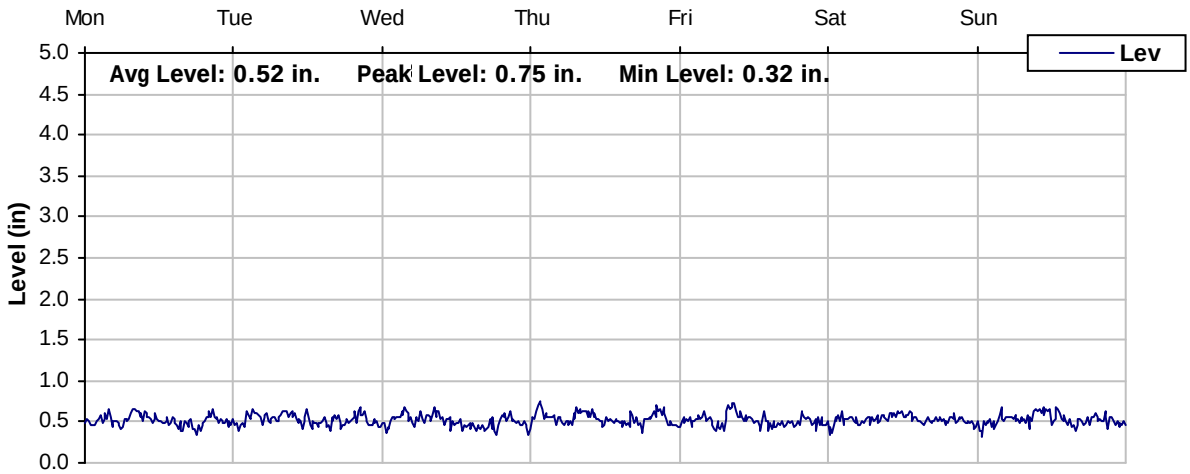
Avg Flow: 0.042 mgd **Peak Flow: 0.127 mgd** **Min Flow: 0.014 mgd**

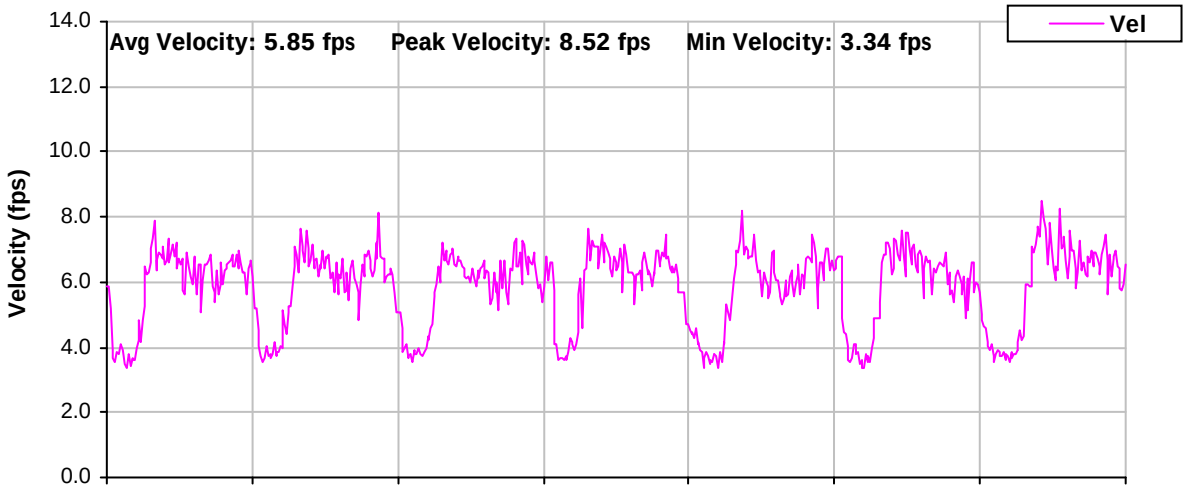
Level, Velocity and Flow

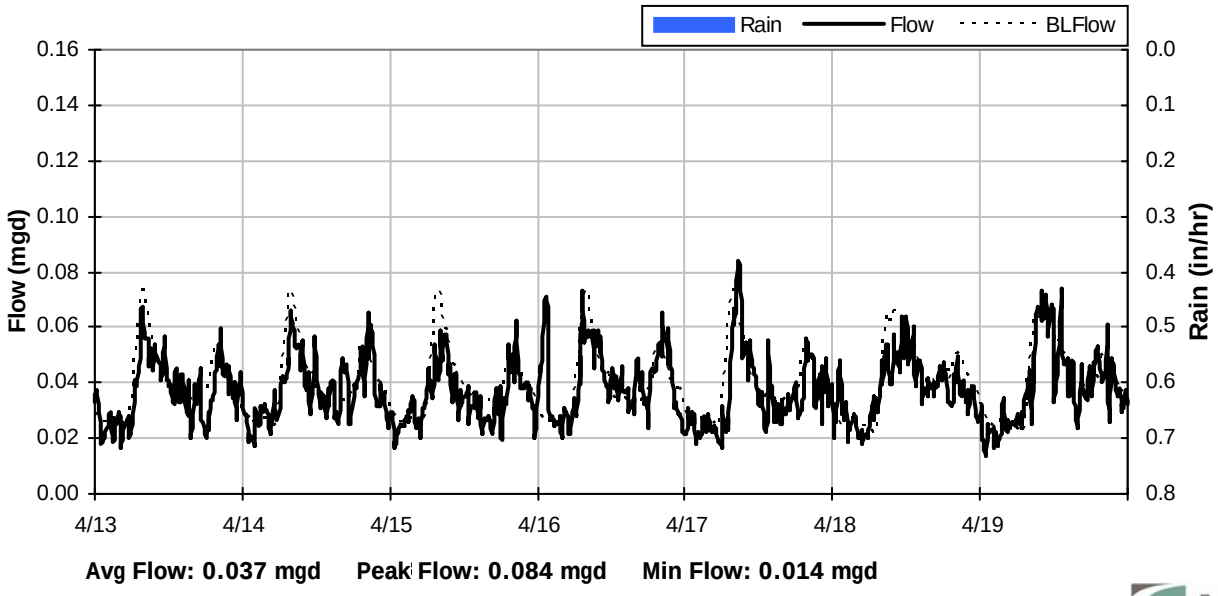
From 4/13/2009 to 4/20/2009

Monitoring Site:

MH 29







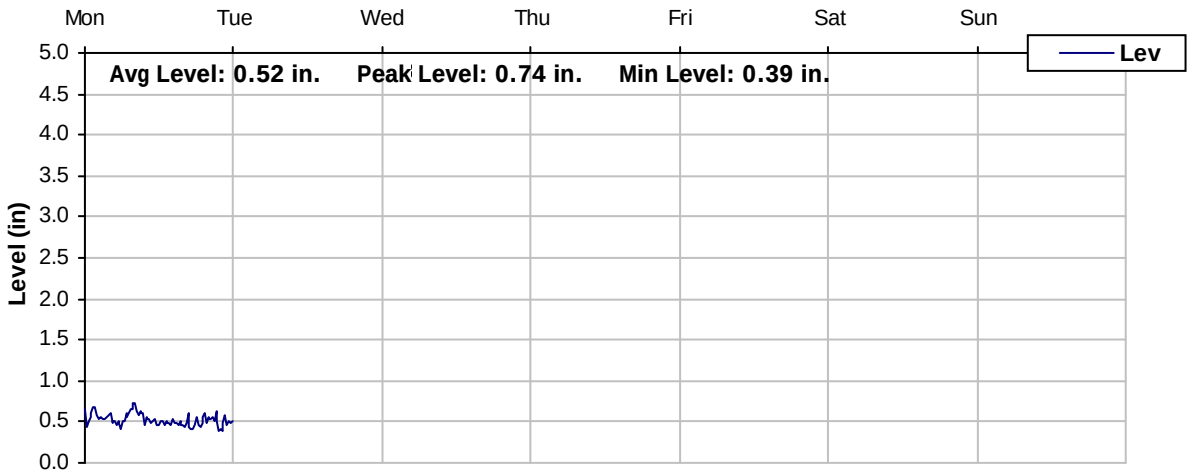
Avg Flow: 0.037 mgd **Peak Flow: 0.084 mgd** **Min Flow: 0.014 mgd**

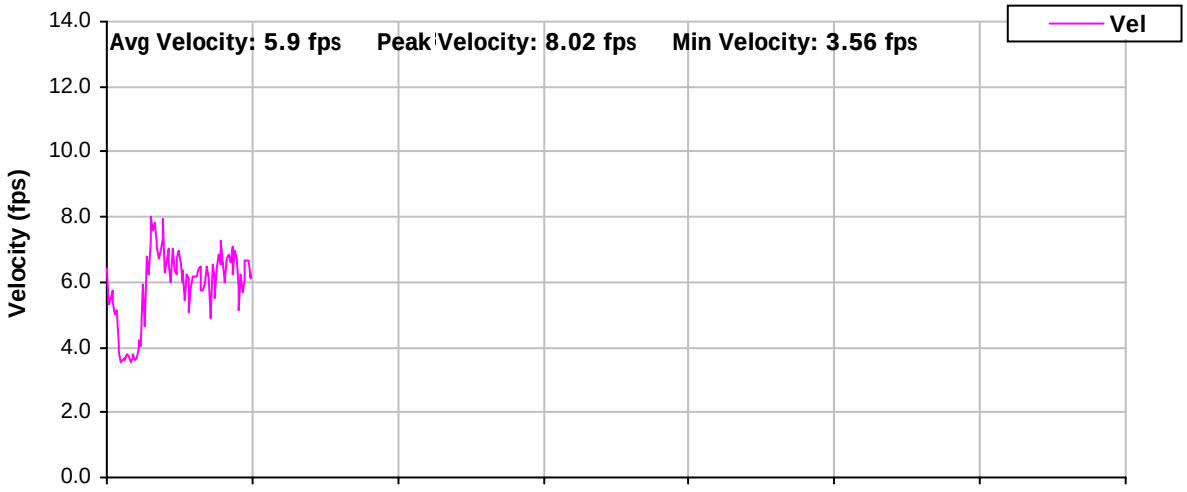
Level, Velocity and Flow

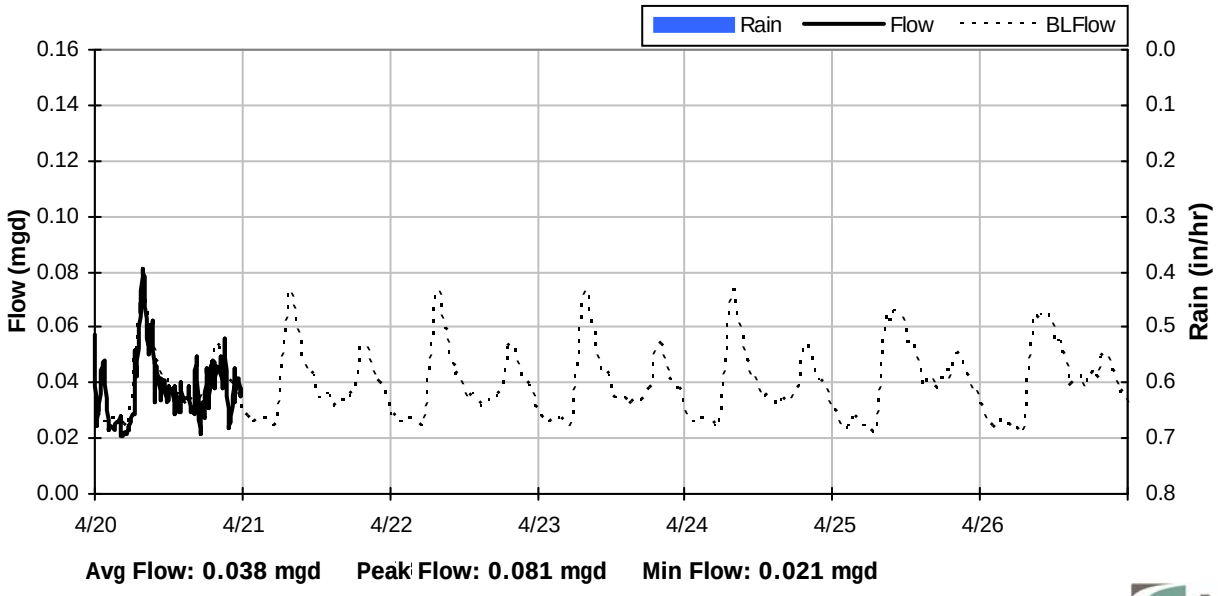
From 4/20/2009 to 4/27/2009

Monitoring Site:

MH 29







Avg Flow: 0.038 mgd **Peak Flow: 0.081 mgd** **Min Flow: 0.021 mgd**

Temporary Flow Monitoring Study

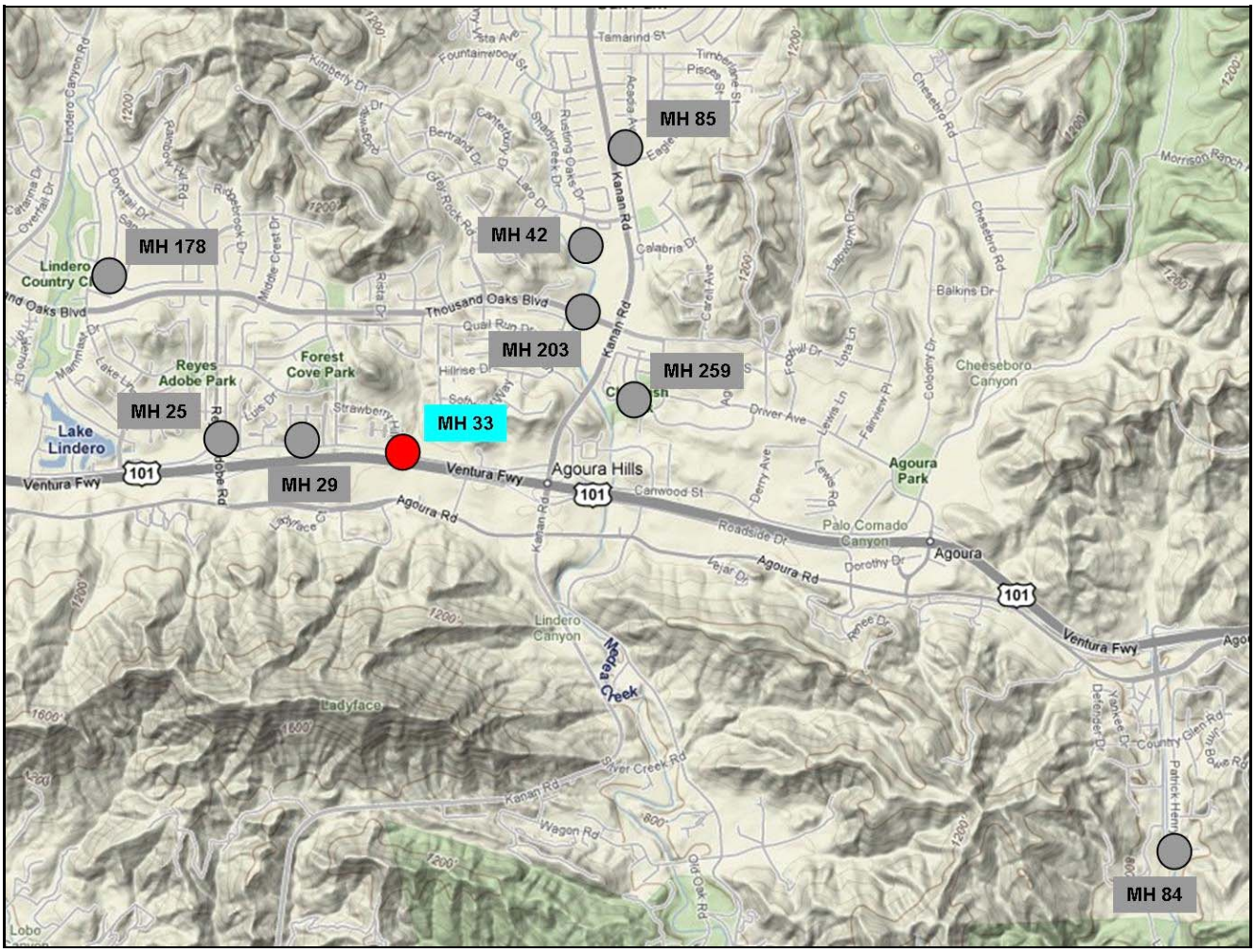
Sanitary Sewer Collection System

Monitoring Site: MH 33

Location: Canwwod Street, east of Strawberry Hill Drive

Size / Type Line: 8-inch Sanitary Sewer Pipe

Data Summary Report



Site Information Report

Monitoring Site: MH 33

Location: Canwwod Street, east of Strawberry Hill Drive

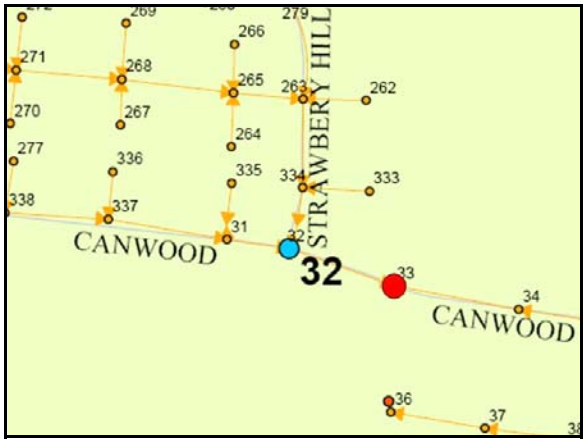
Diameter: 8 inches

Average Dry Weather Flow: 0.09 *mgd*

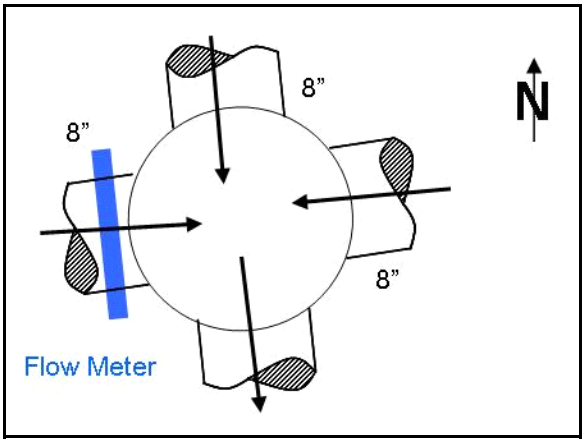
Peak Measured Flow: 0.24 *mgd*

Satellite Map

Sanitary Map

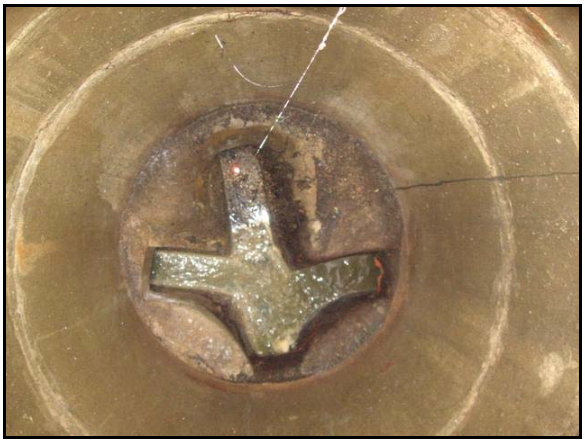


Flow Sketch



Street View Photo

Plan View Photo



	Site Information Report Photos	**Monitoring Site:** MH 33

Manhole Lid

East Inlet

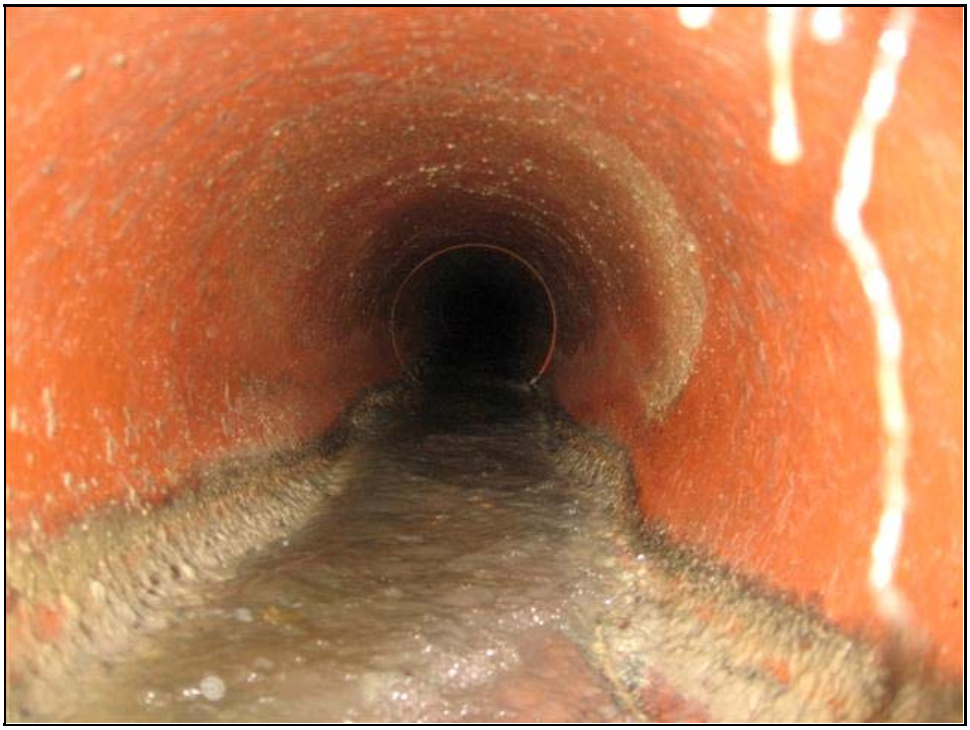
	Site Information Report Photos	**Monitoring Site:** MH 33

North Inlet

West Inlet

	Site Information Report Photos	**Monitoring Site:** MH 33

South Outlet



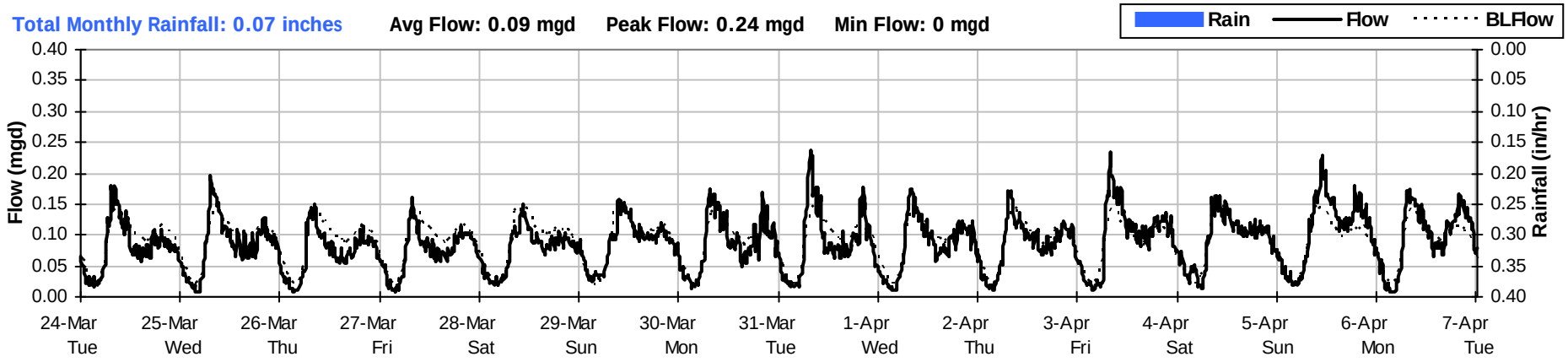
Period Flow Summary

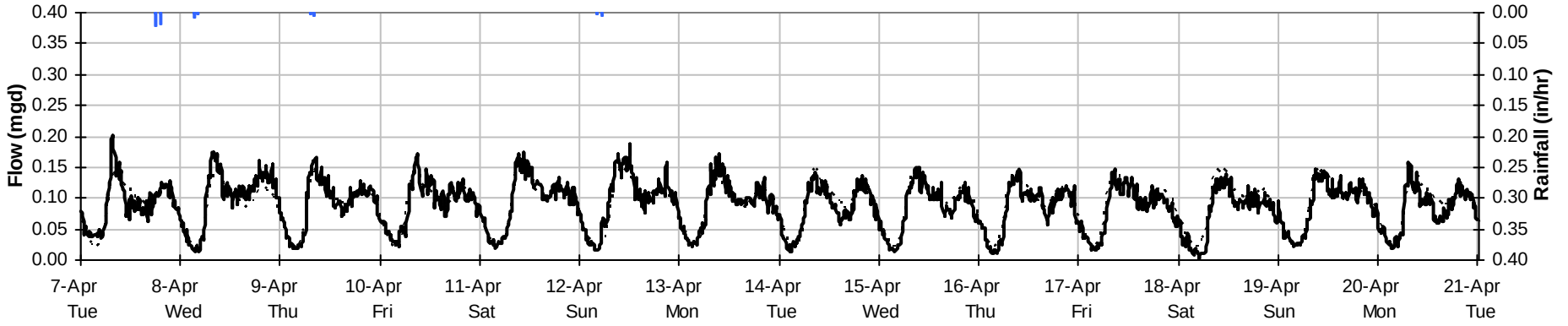
March 24, 2009 to April 21, 2009

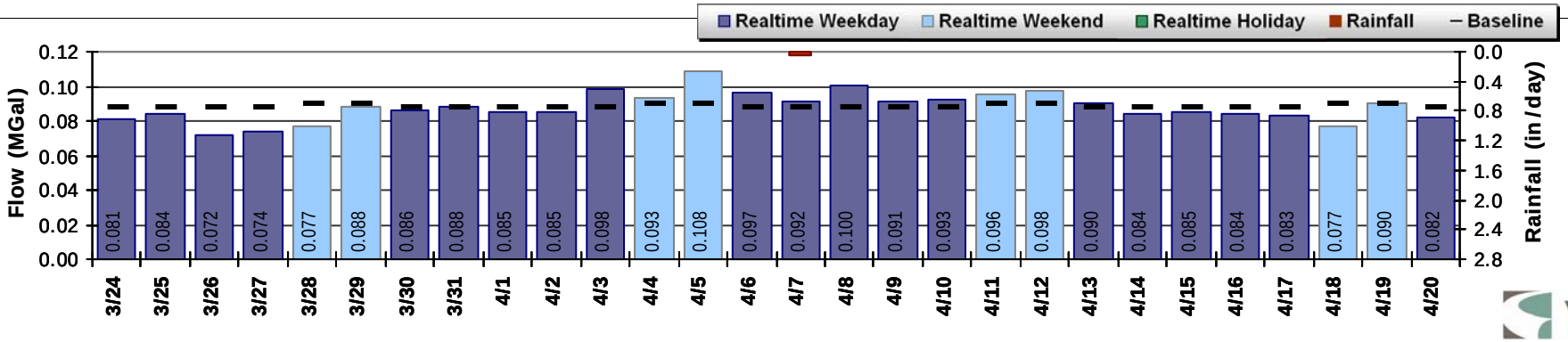
Monitoring Site:

MH 33

Total Monthly Rainfall: 0.07 inches **Avg Flow: 0.09 mgd** **Peak Flow: 0.24 mgd** **Min Flow: 0 mgd**

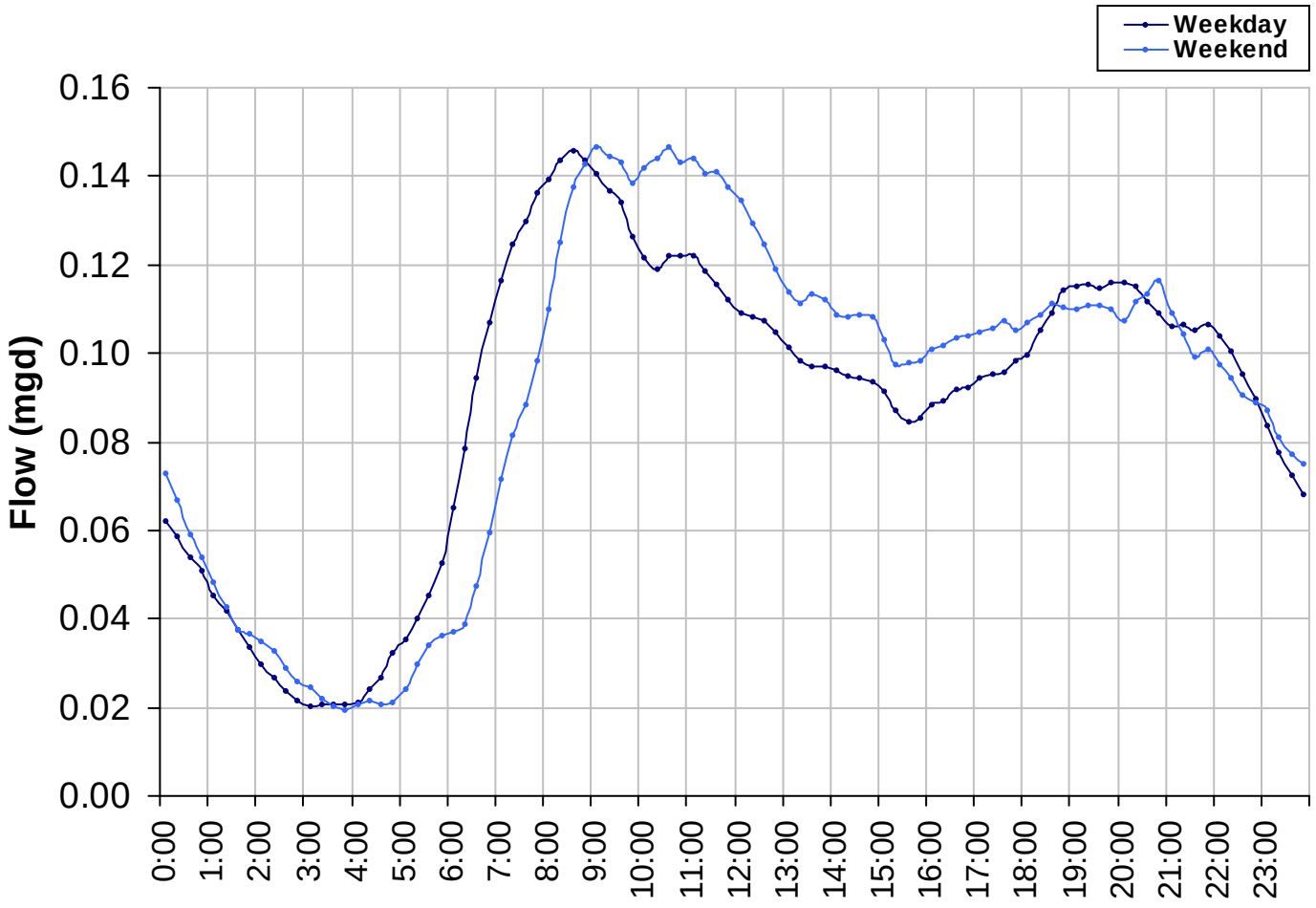






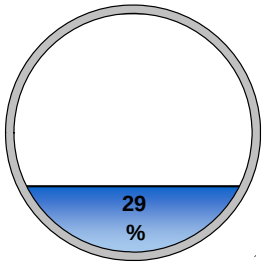
Average Dry Weather Flow

Monitoring Site:
MH 33



Peak Measured Flow:

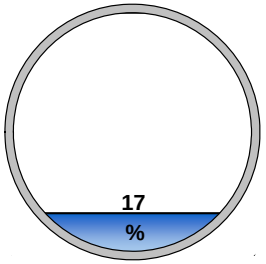
0.24 *mgd*



Peak measured flow shown in weekly graphs on following pages

Average Dry Weather Flow:

0.09 *mgd*

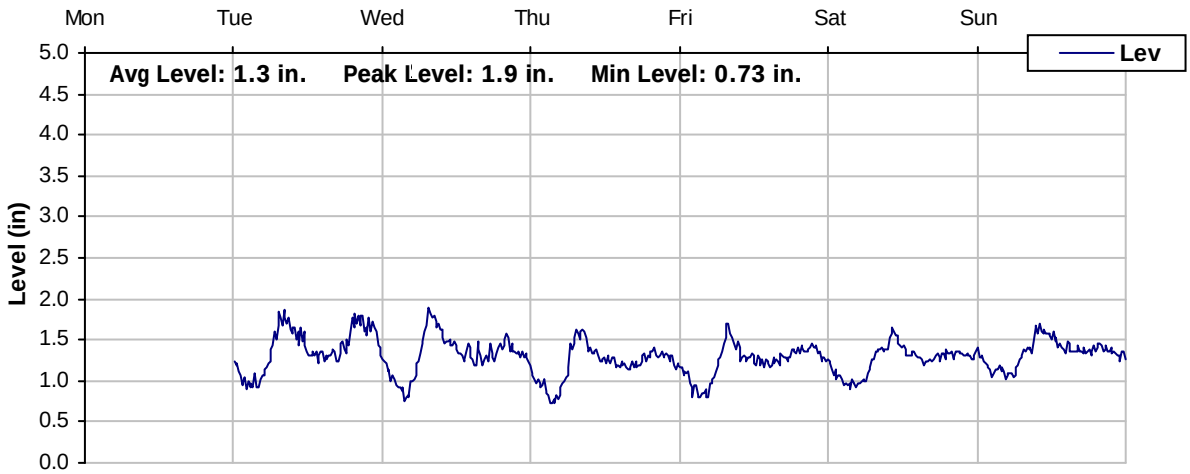


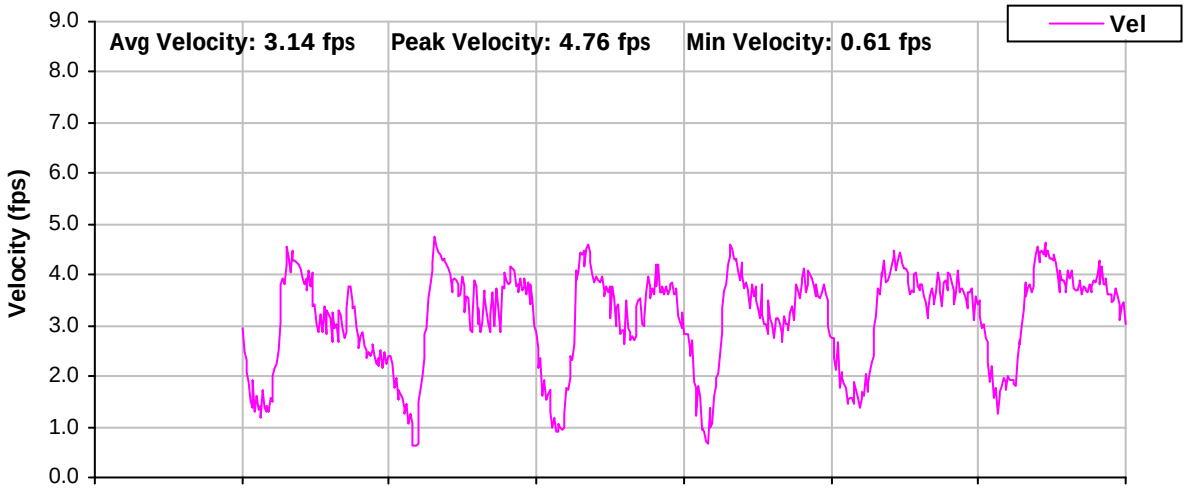
Level, Velocity and Flow

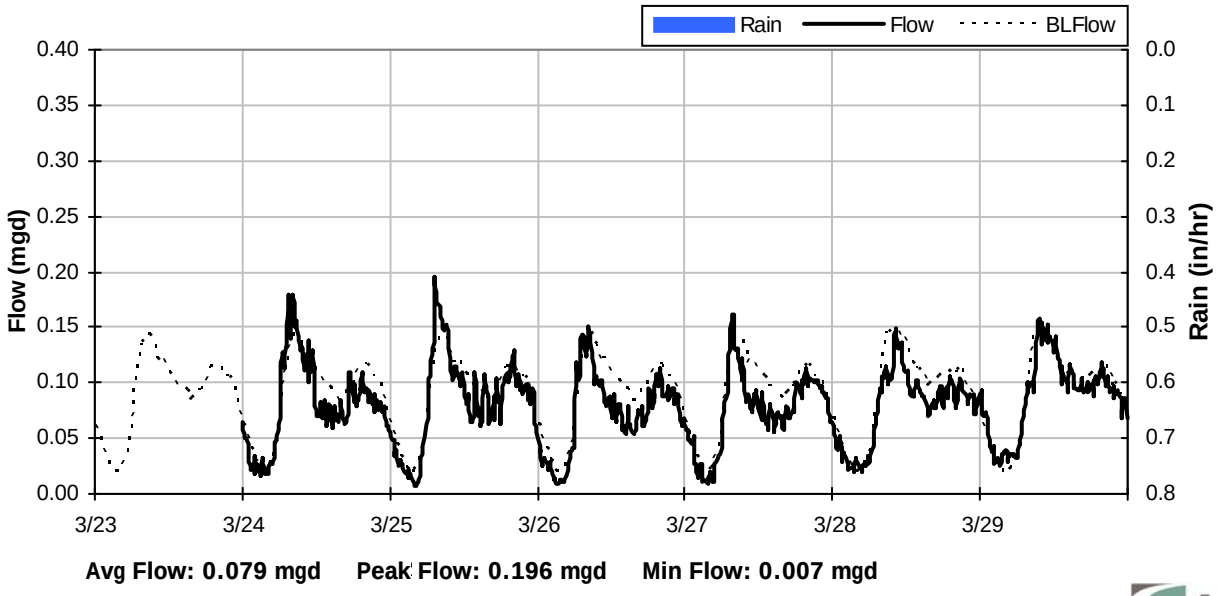
From 3/23/2009 to 3/30/2009

Monitoring Site:

MH 33







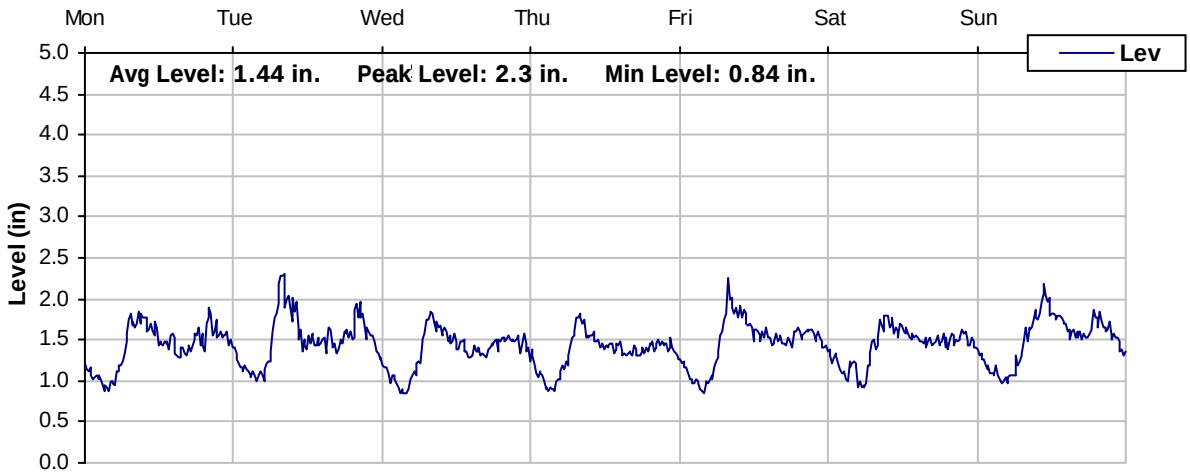
Avg Flow: 0.079 mgd **Peak Flow: 0.196 mgd** **Min Flow: 0.007 mgd**

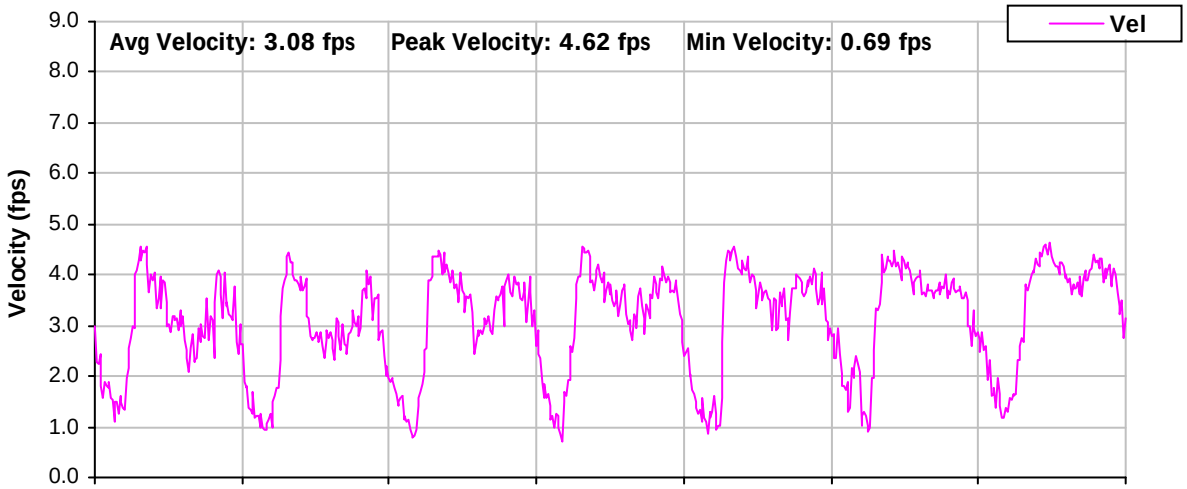
Level, Velocity and Flow

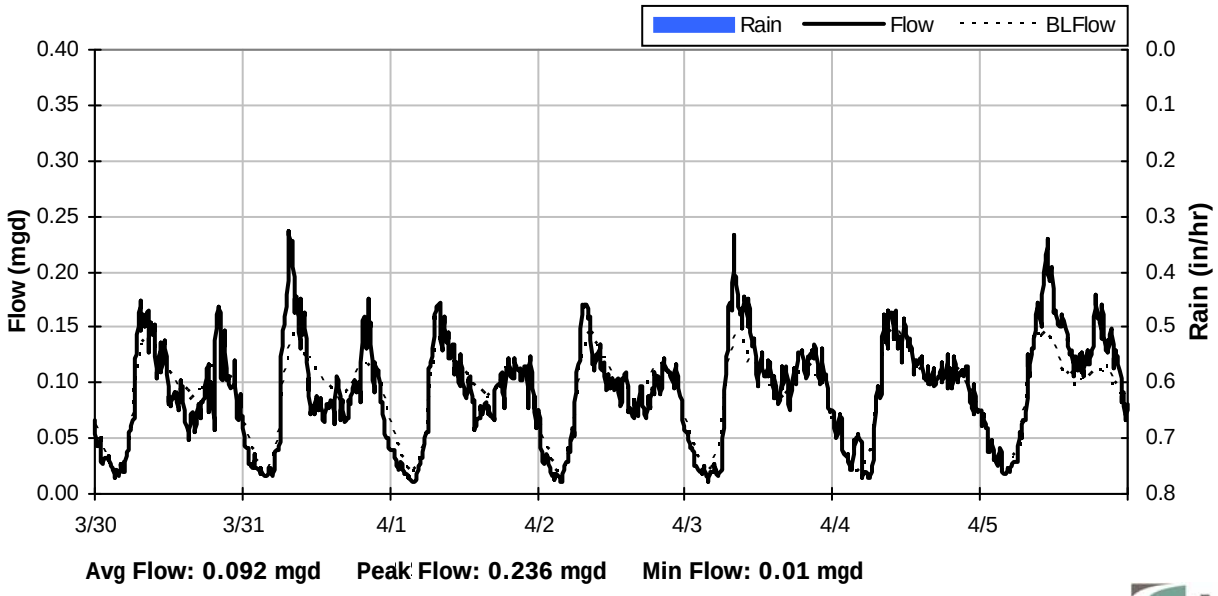
From 3/30/2009 to 4/6/2009

Monitoring Site:

MH 33







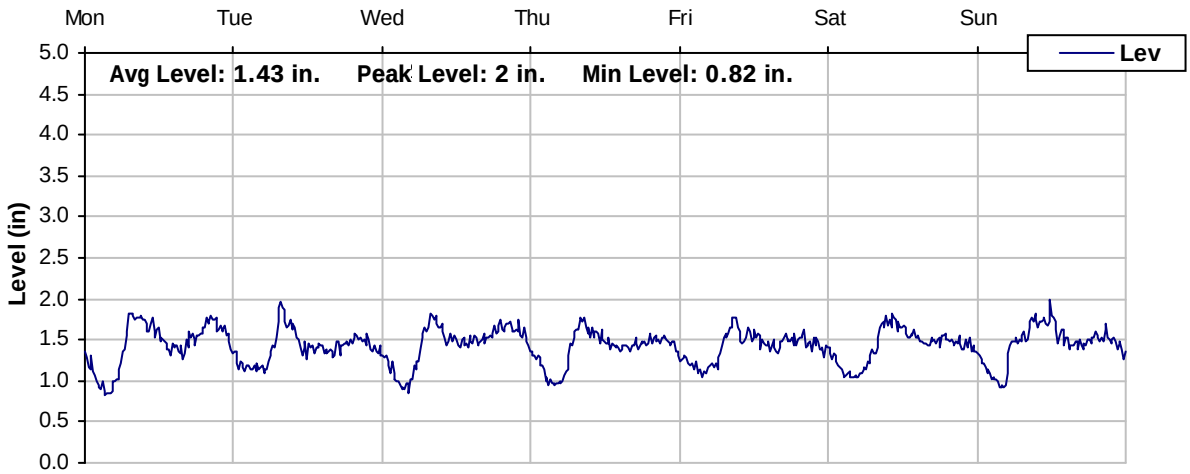
Avg Flow: 0.092 mgd **Peak Flow: 0.236 mgd** **Min Flow: 0.01 mgd**

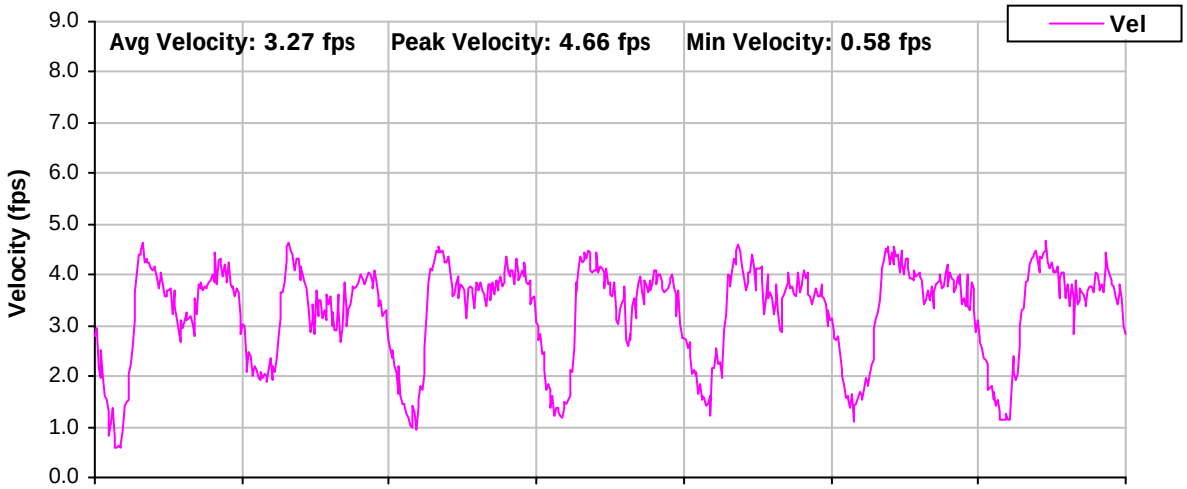
Level, Velocity and Flow

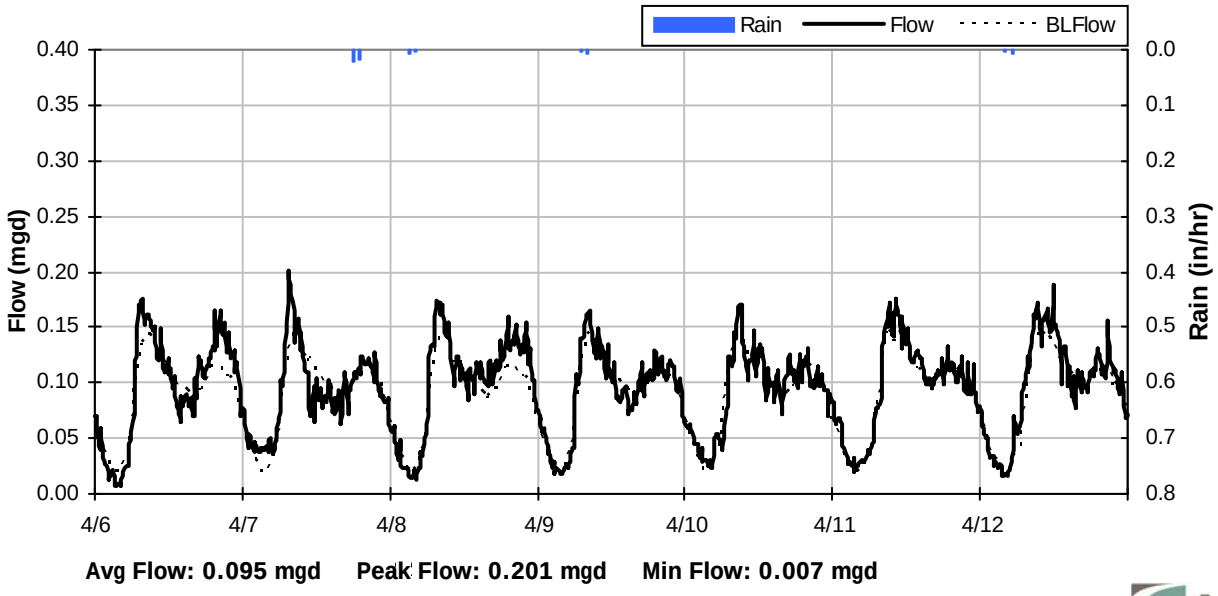
From 4/6/2009 to 4/13/2009

Monitoring Site:

MH 33







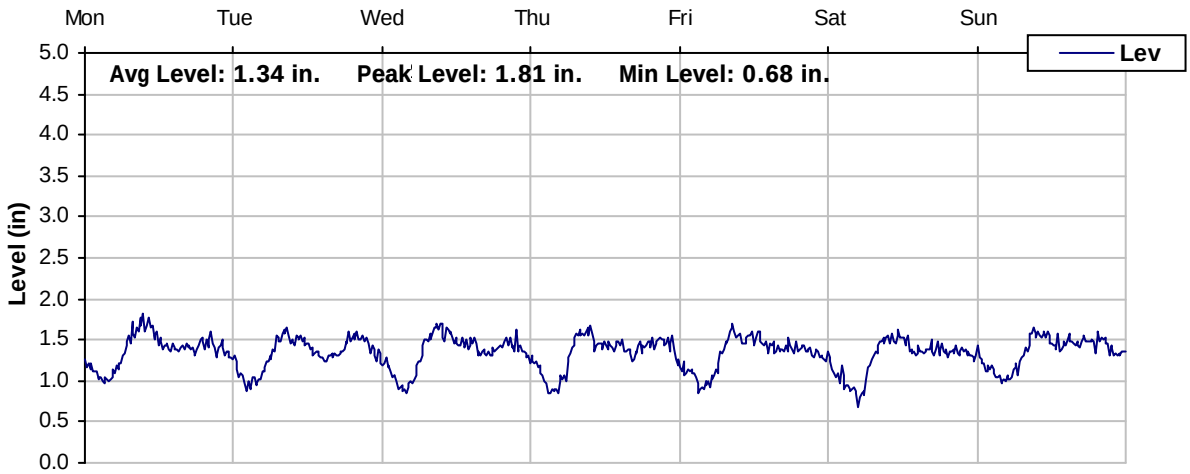
Avg Flow: 0.095 mgd **Peak Flow: 0.201 mgd** **Min Flow: 0.007 mgd**

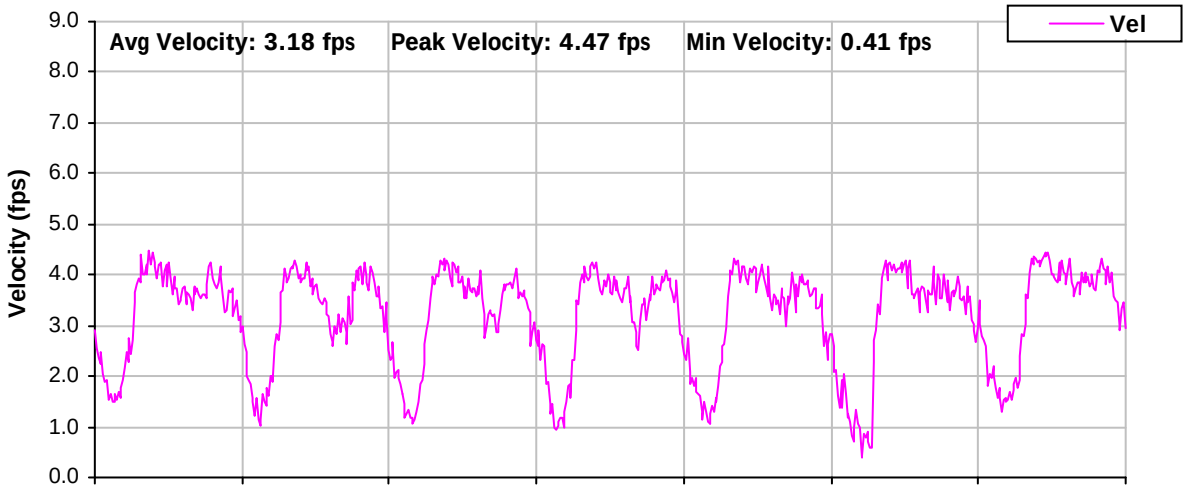
Level, Velocity and Flow

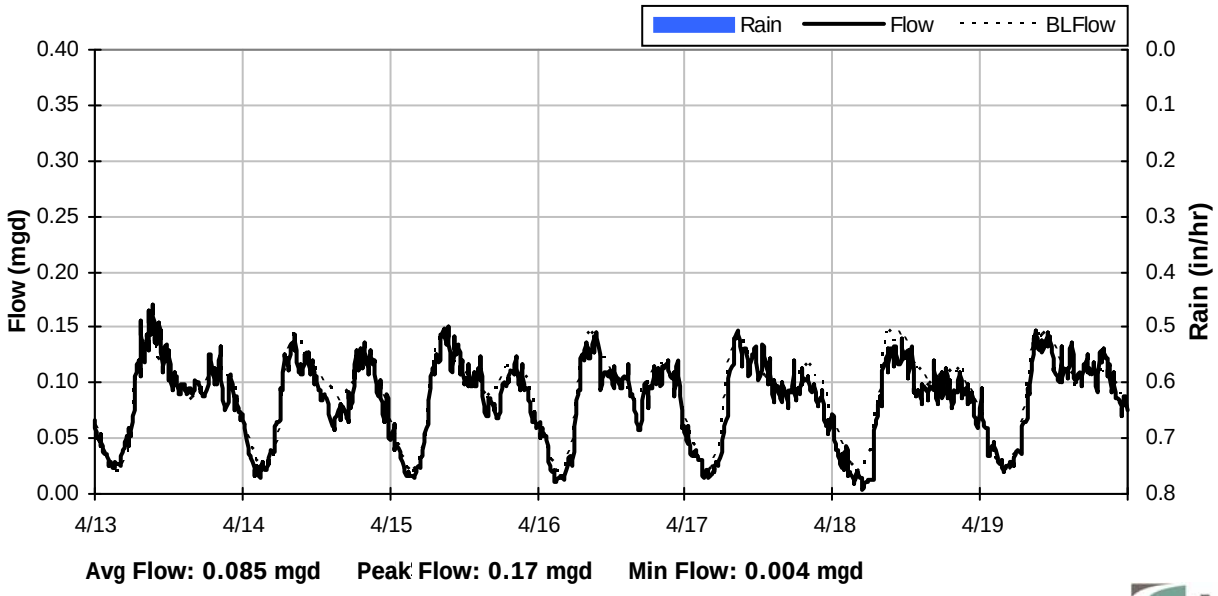
From 4/13/2009 to 4/20/2009

Monitoring Site:

MH 33







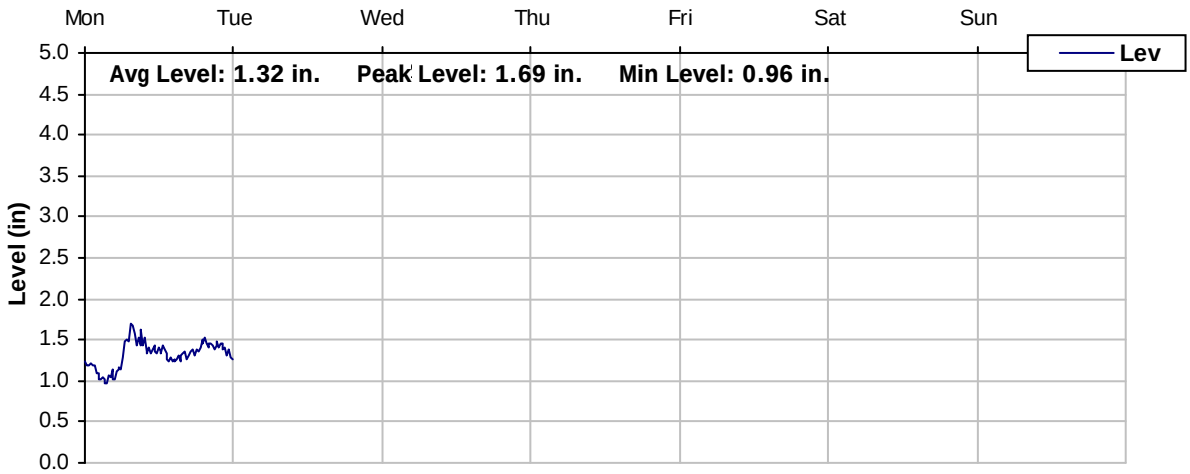
Avg Flow: 0.085 mgd **Peak Flow: 0.17 mgd** **Min Flow: 0.004 mgd**

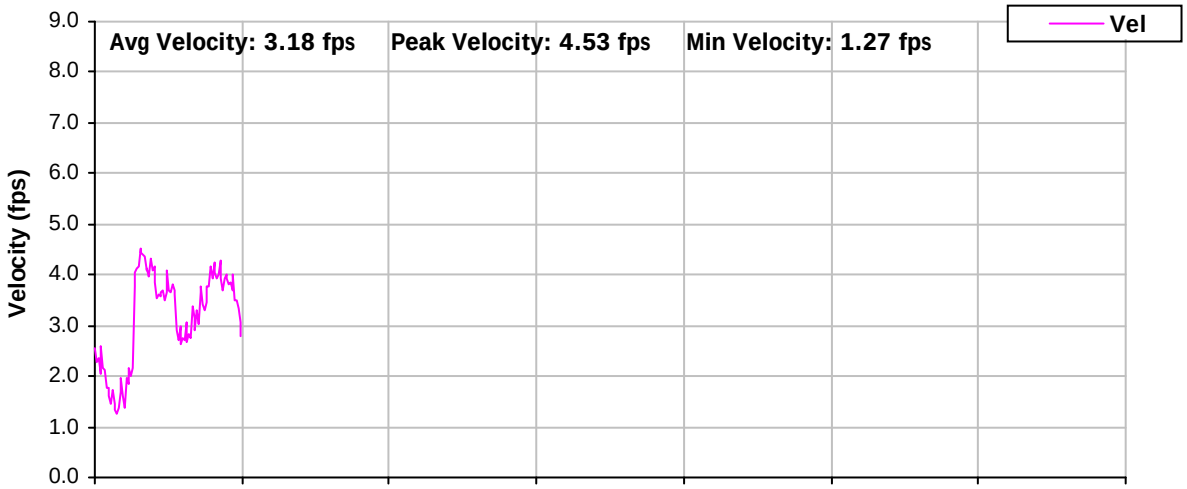
Level, Velocity and Flow

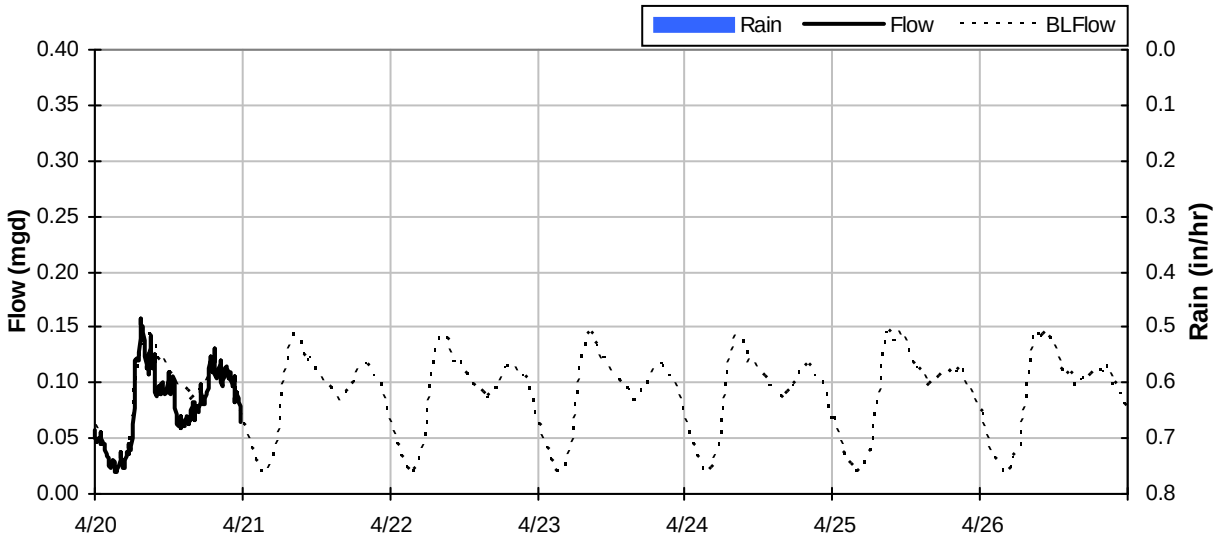
From 4/20/2009 to 4/27/2009

Monitoring Site:

MH 33







Avg Flow: 0.082 mgd **Peak Flow: 0.157 mgd** **Min Flow: 0.02 mgd**

Temporary Flow Monitoring Study

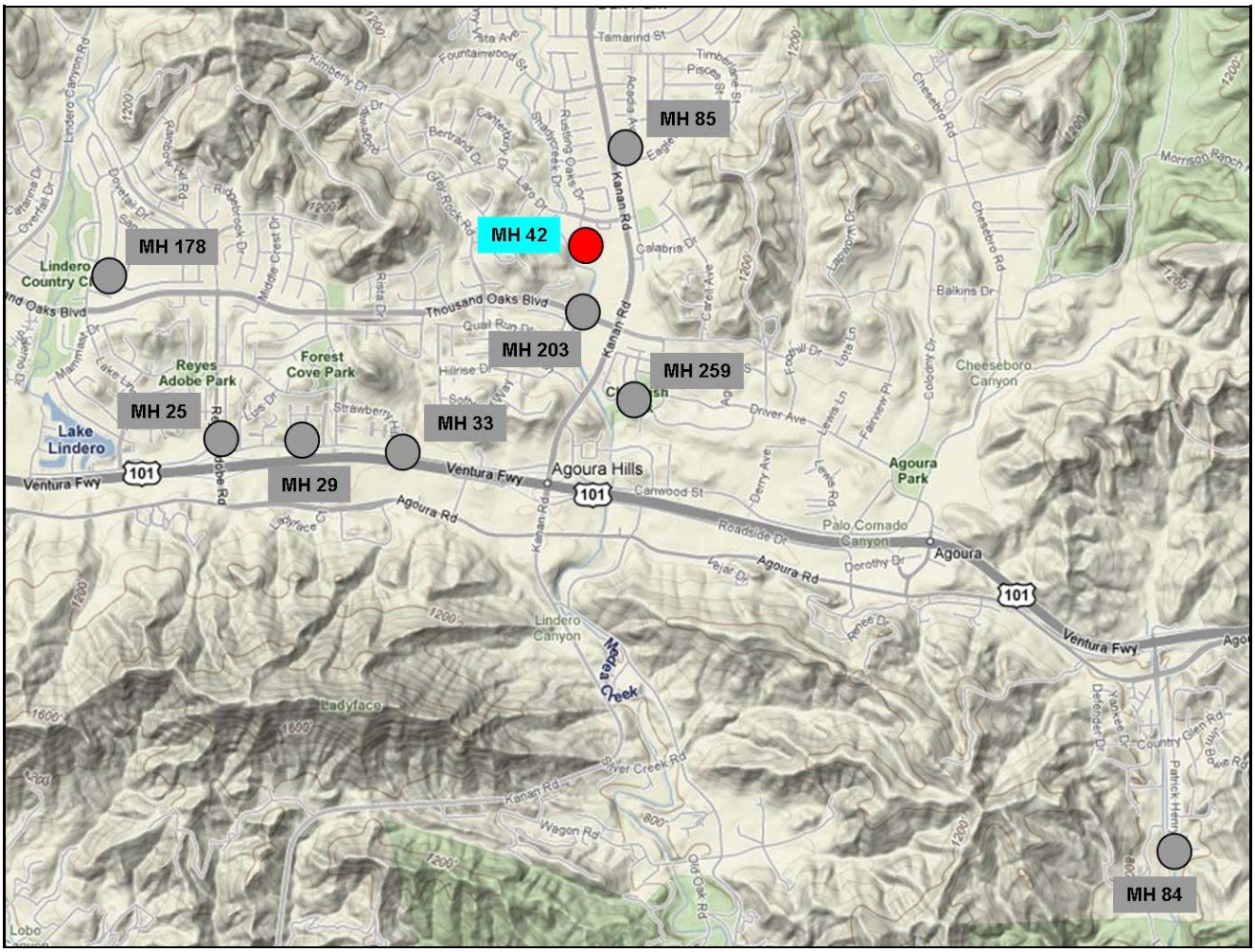
Sanitary Sewer Collection System

Monitoring Site: MH 42

Location: Rustling Oaks Drive, south of Laro Drive

Size / Type Line: 12-inch Sanitary Sewer Pipe

Data Summary Report



Site Information Report

Monitoring Site: MH 42

Location: Rustling Oaks Drive, south of Laro Drive

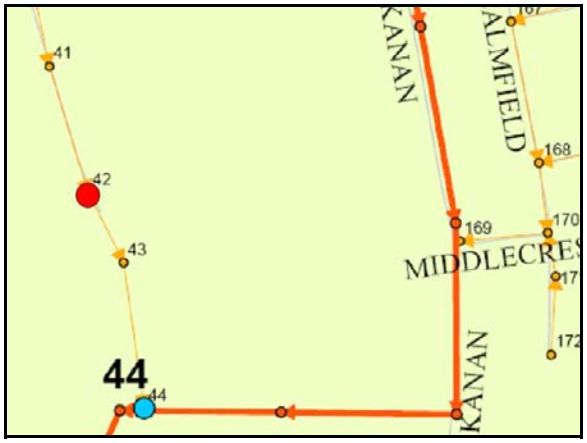
Diameter: 12 inches

Average Dry Weather Flow: 0.18 *mgd*

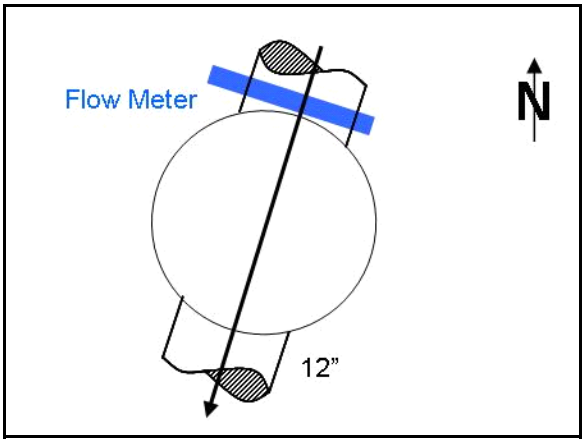
Peak Measured Flow: 0.41 *mgd*

Satellite Map

Sanitary Map



Flow Sketch



Street View Photo

Plan View Photo

V&A

	Site Information Report Photos	**Monitoring Site:** MH 42

Manhole Lid

North Inlet

	Site Information Report Photos	**Monitoring Site:** MH 42

South Outlet

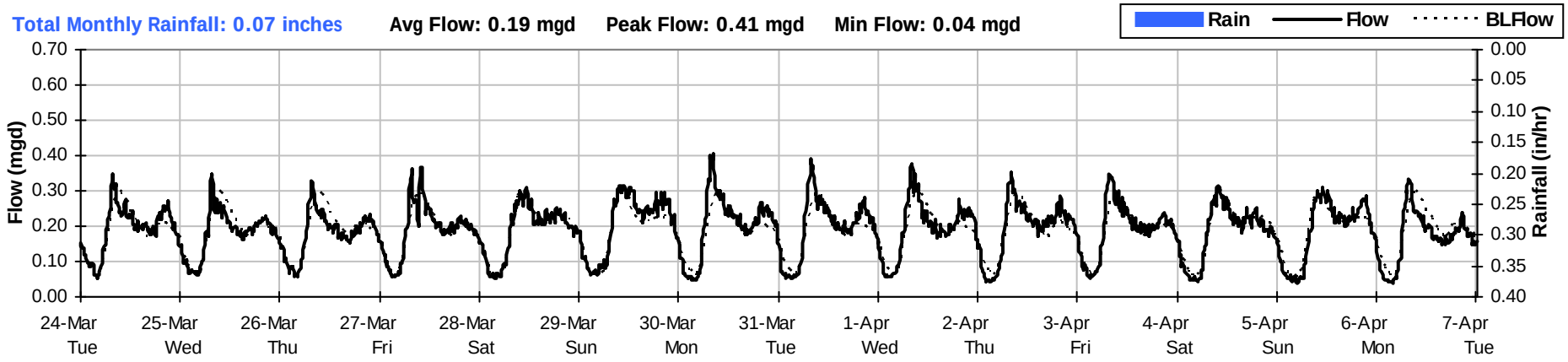
Period Flow Summary

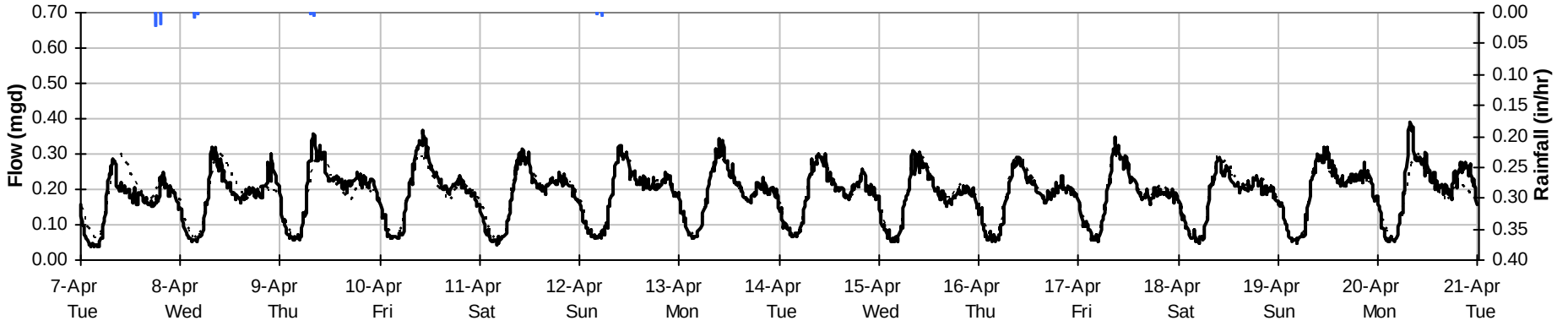
March 24, 2009 to April 21, 2009

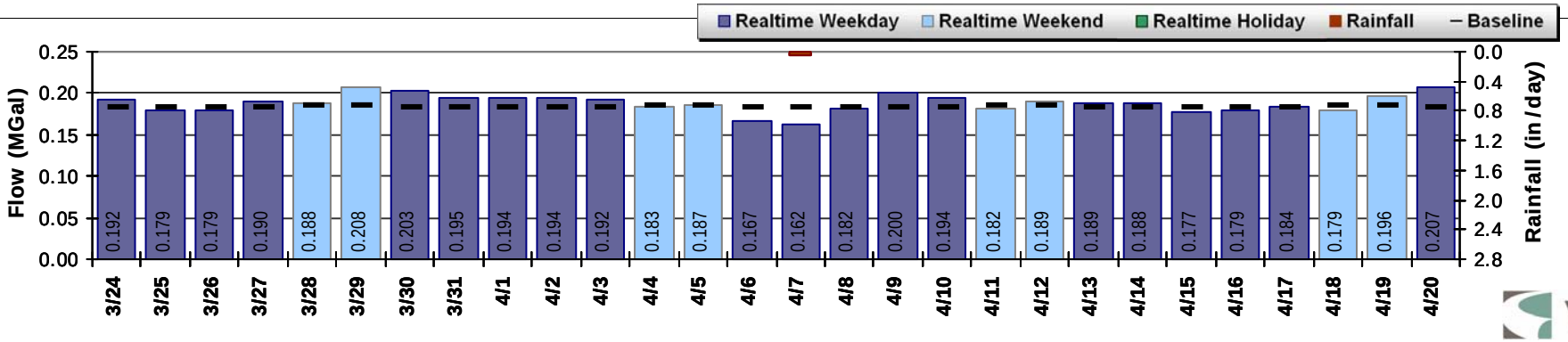
Monitoring Site:

MH 42

Total Monthly Rainfall: 0.07 inches **Avg Flow: 0.19 mgd** **Peak Flow: 0.41 mgd** **Min Flow: 0.04 mgd**

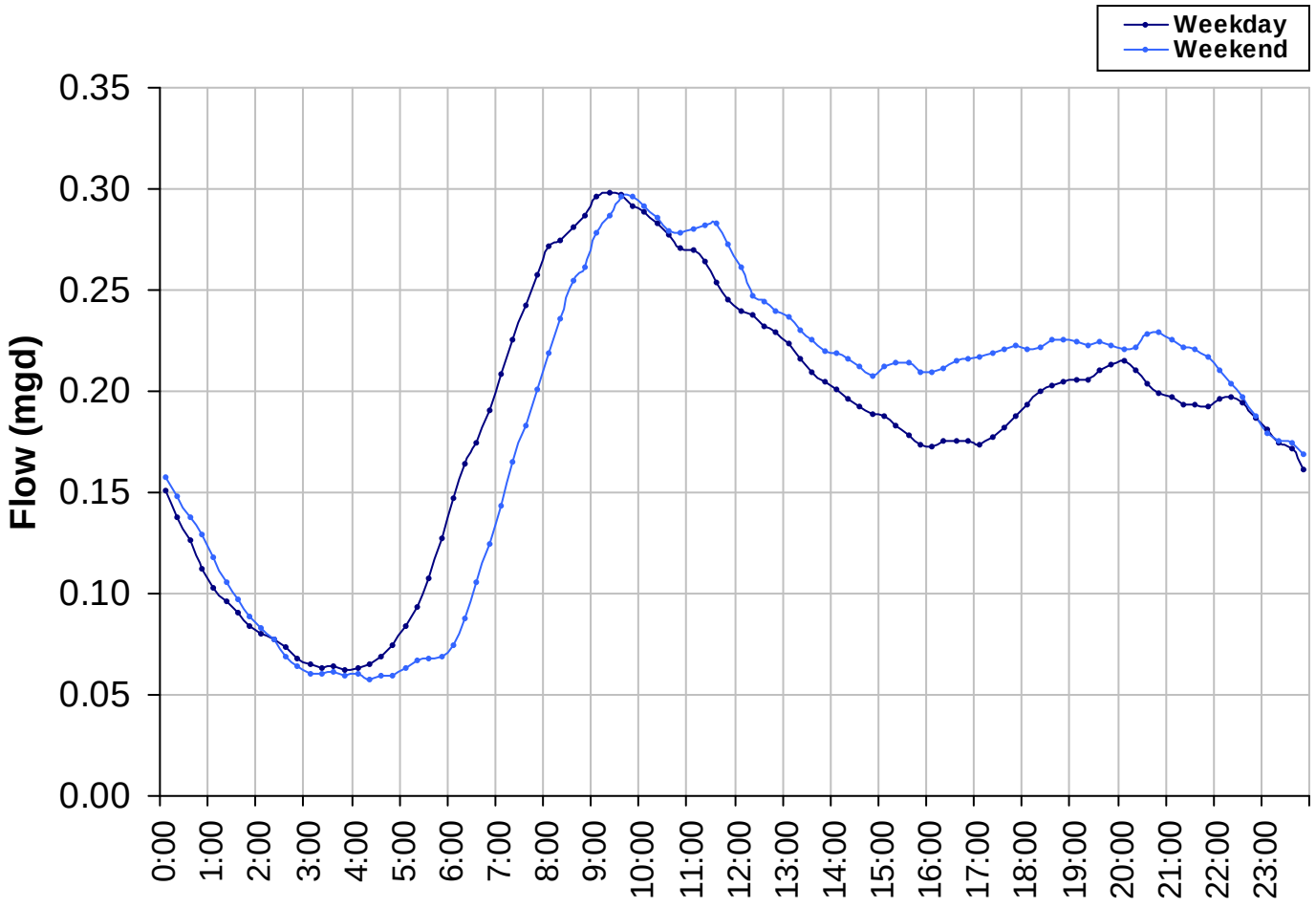






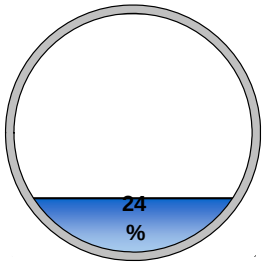
Average Dry Weather Flow

Monitoring Site:
MH 42



Peak Measured Flow:

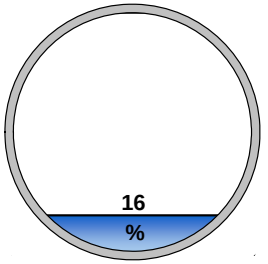
0.41 *mgd*



Peak measured flow shown in weekly graphs on following pages

Average Dry Weather Flow:

0.18 *mgd*

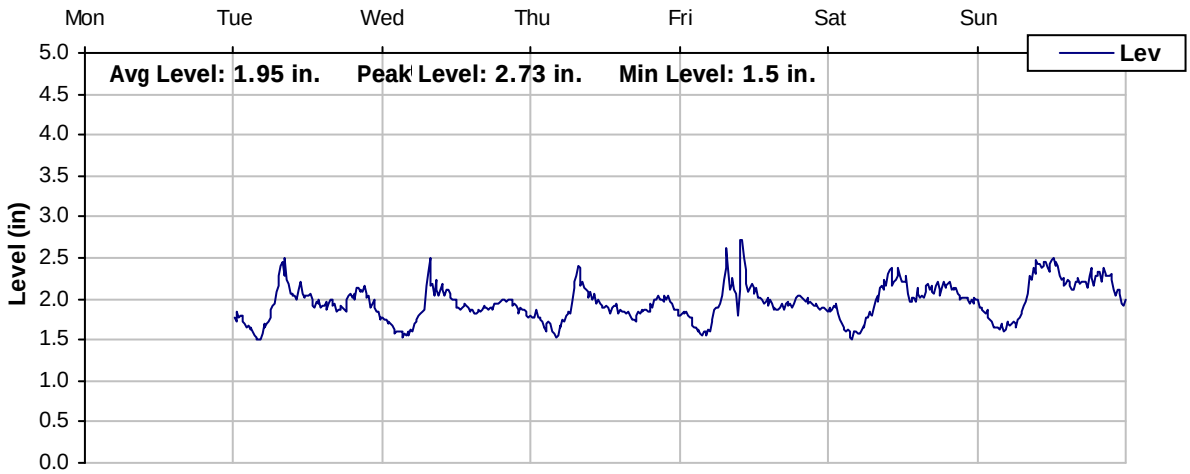


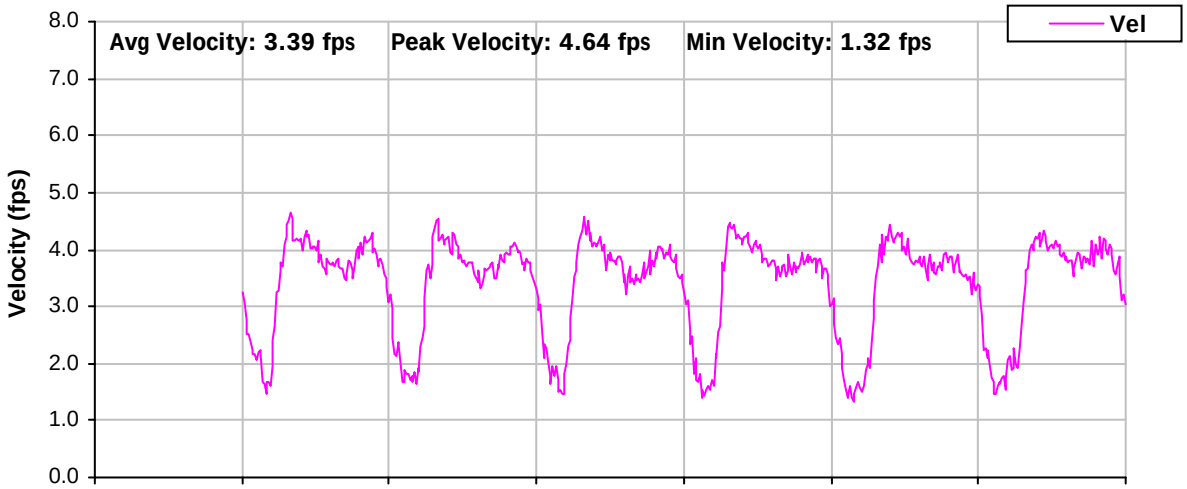
Level, Velocity and Flow

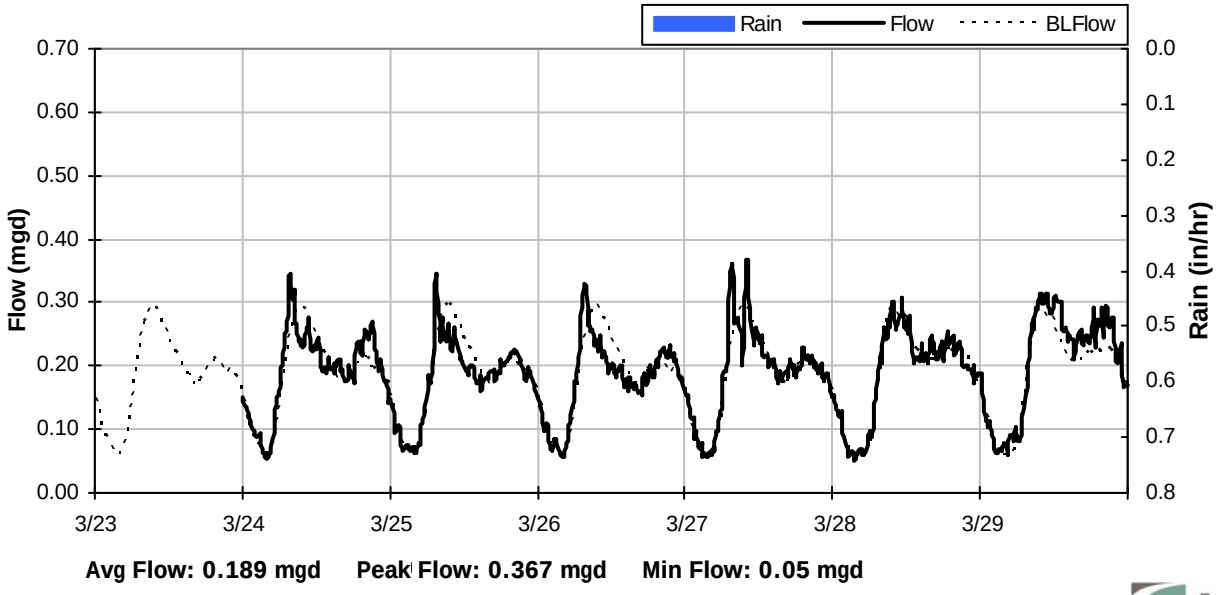
From 3/23/2009 to 3/30/2009

Monitoring Site:

MH 42







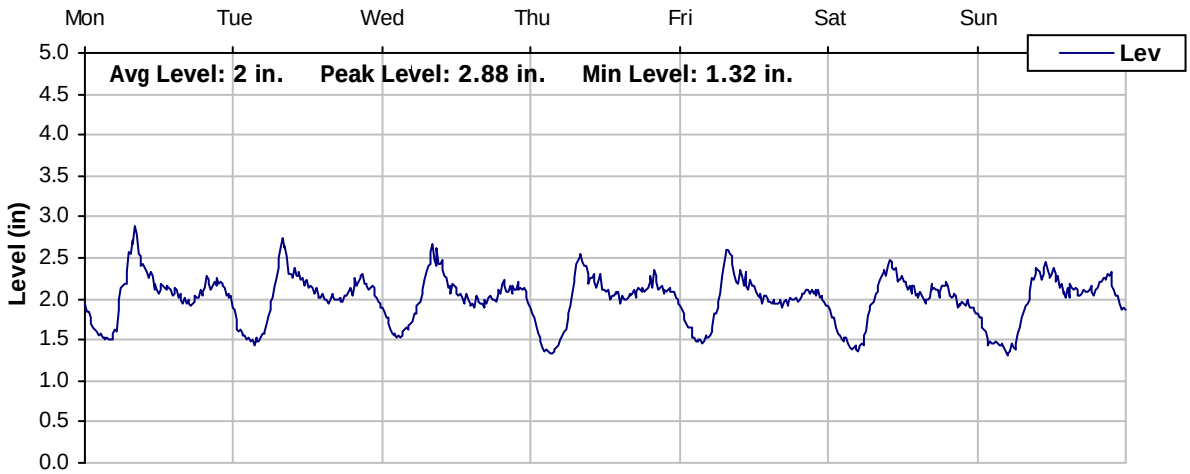
Avg Flow: 0.189 mgd **Peak Flow: 0.367 mgd** **Min Flow: 0.05 mgd**

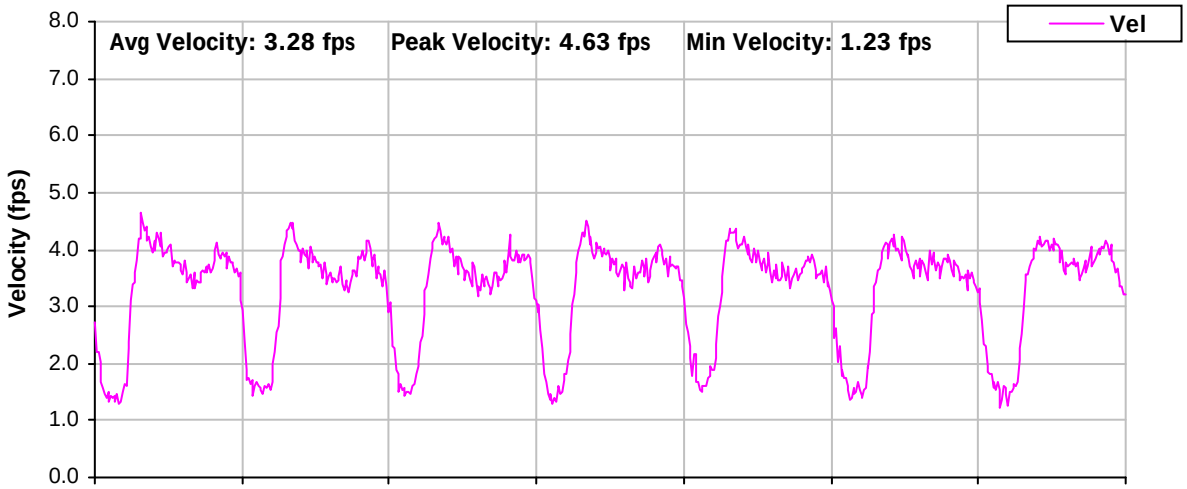
Level, Velocity and Flow

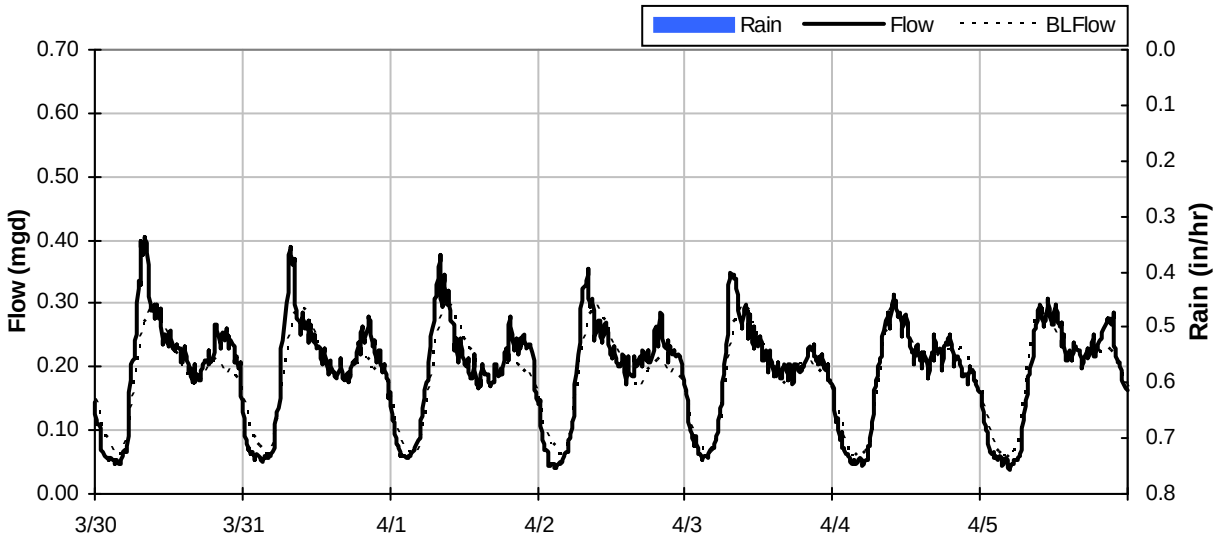
From 3/30/2009 to 4/6/2009

Monitoring Site:

MH 42







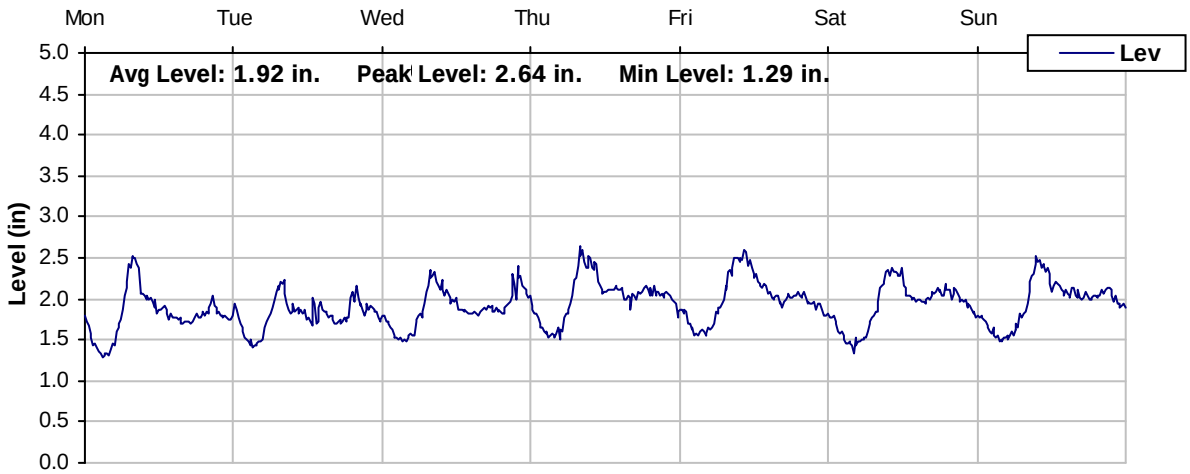
Avg Flow: 0.193 mgd **Peak Flow: 0.406 mgd** **Min Flow: 0.039 mgd**

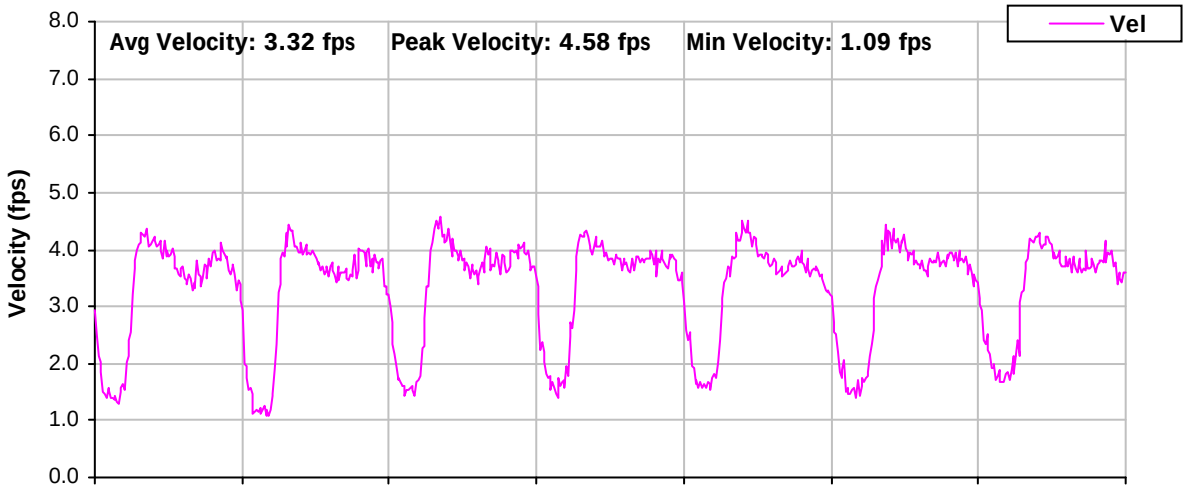
Level, Velocity and Flow

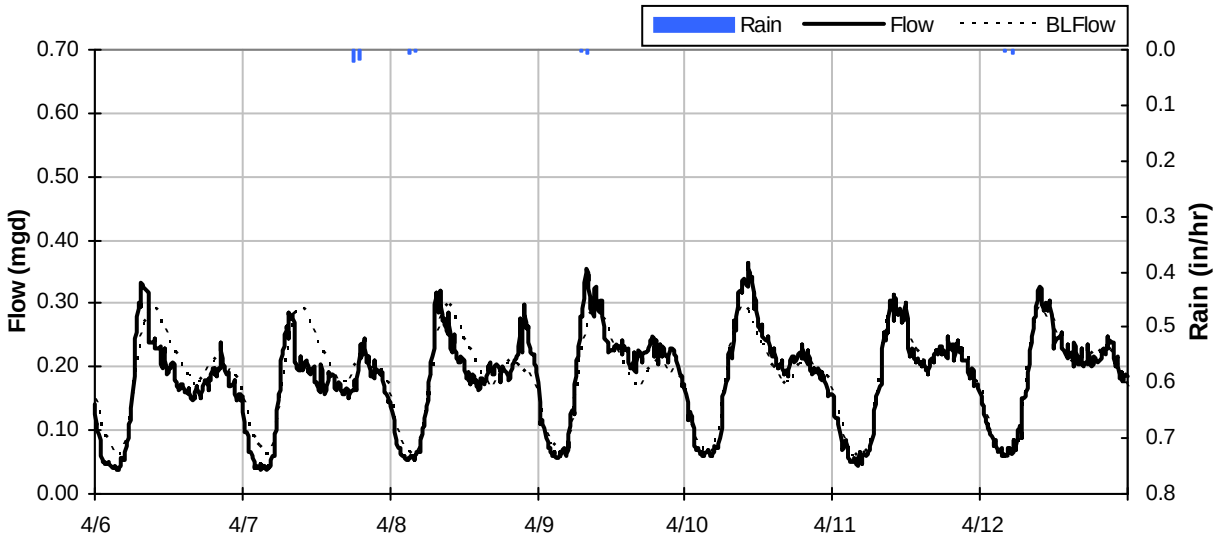
From 4/6/2009 to 4/13/2009

Monitoring Site:

MH 42







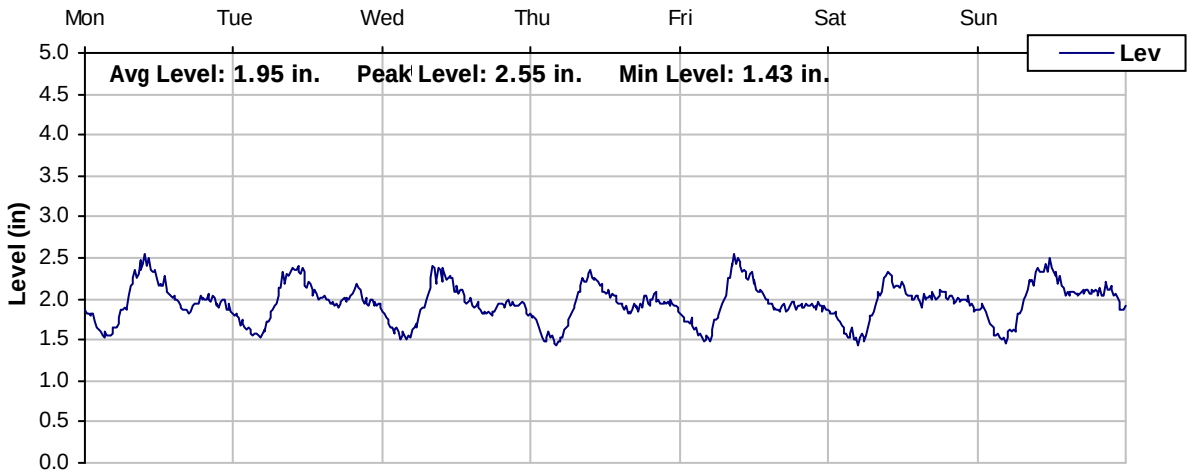
Avg Flow: 0.182 mgd **Peak Flow: 0.364 mgd** **Min Flow: 0.038 mgd**

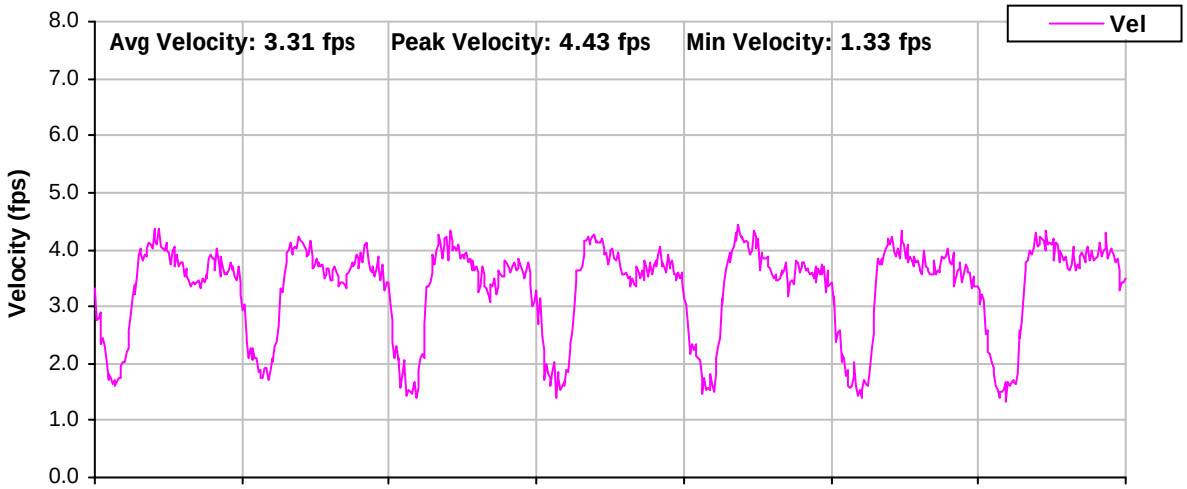
Level, Velocity and Flow

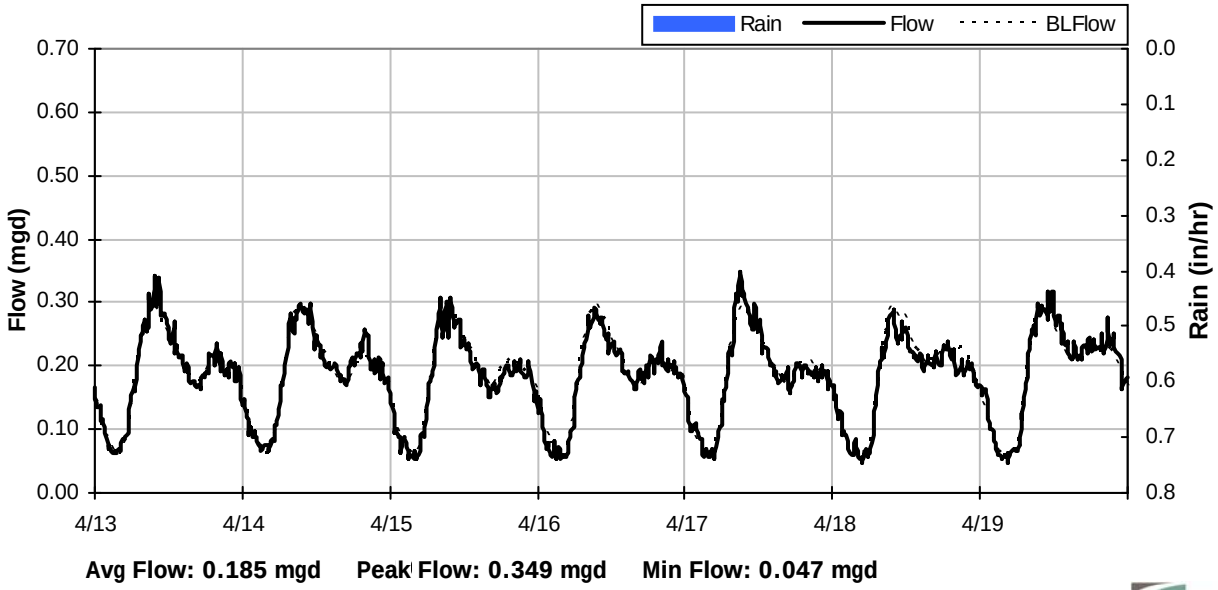
From 4/13/2009 to 4/20/2009

Monitoring Site:

MH 42







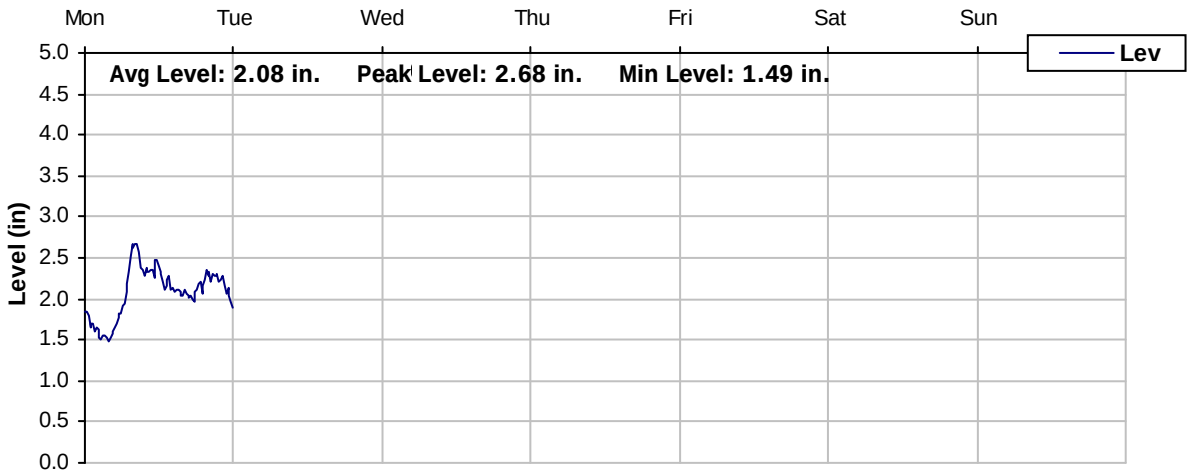
Avg Flow: 0.185 mgd **Peak Flow: 0.349 mgd** **Min Flow: 0.047 mgd**

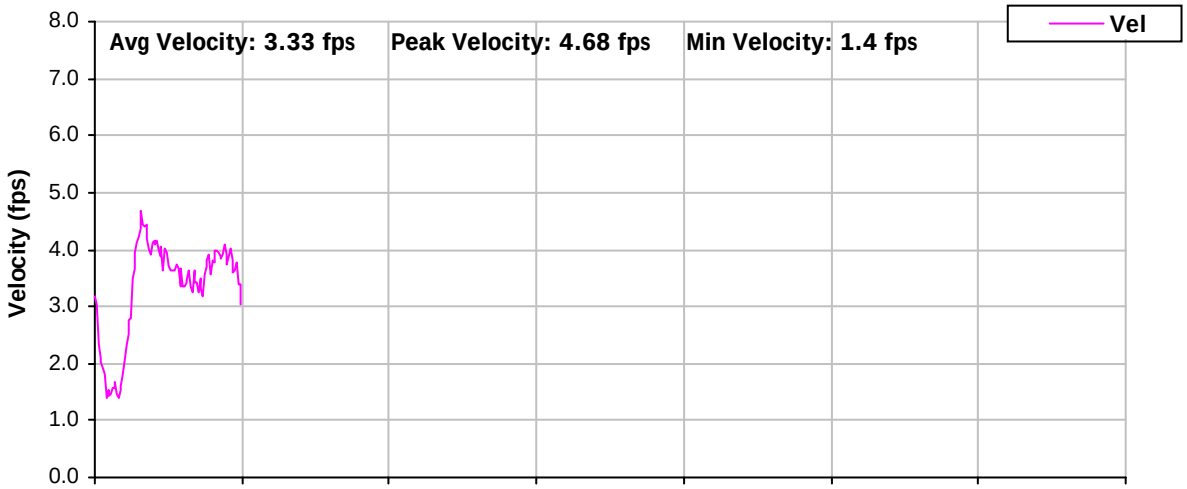
Level, Velocity and Flow

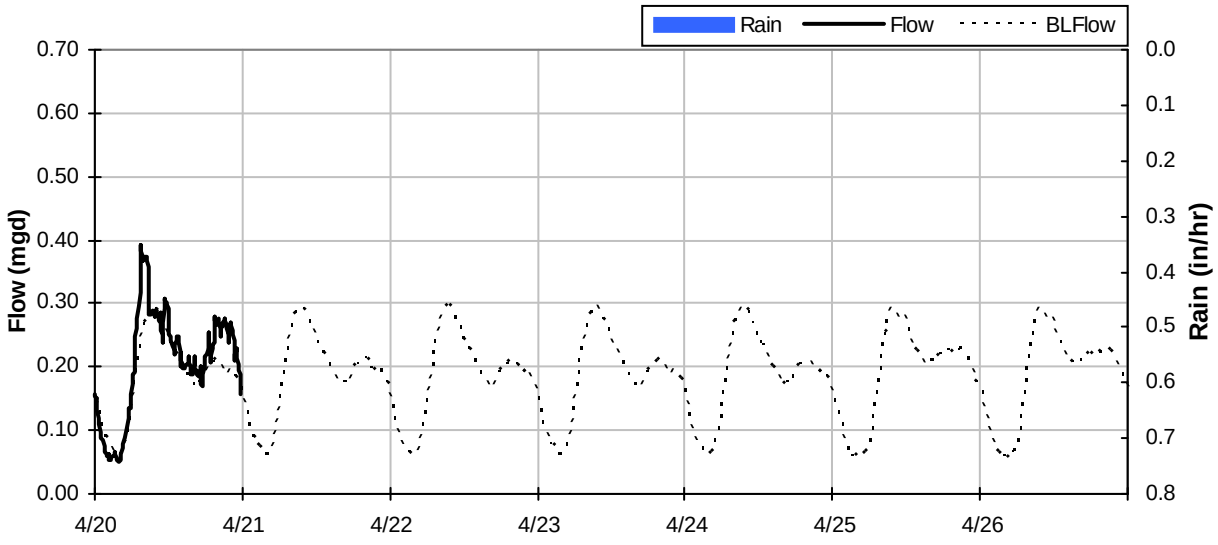
From 4/20/2009 to 4/27/2009

Monitoring Site:

MH 42







Avg Flow: 0.207 mgd **Peak Flow: 0.392 mgd** **Min Flow: 0.051 mgd**

Temporary Flow Monitoring Study

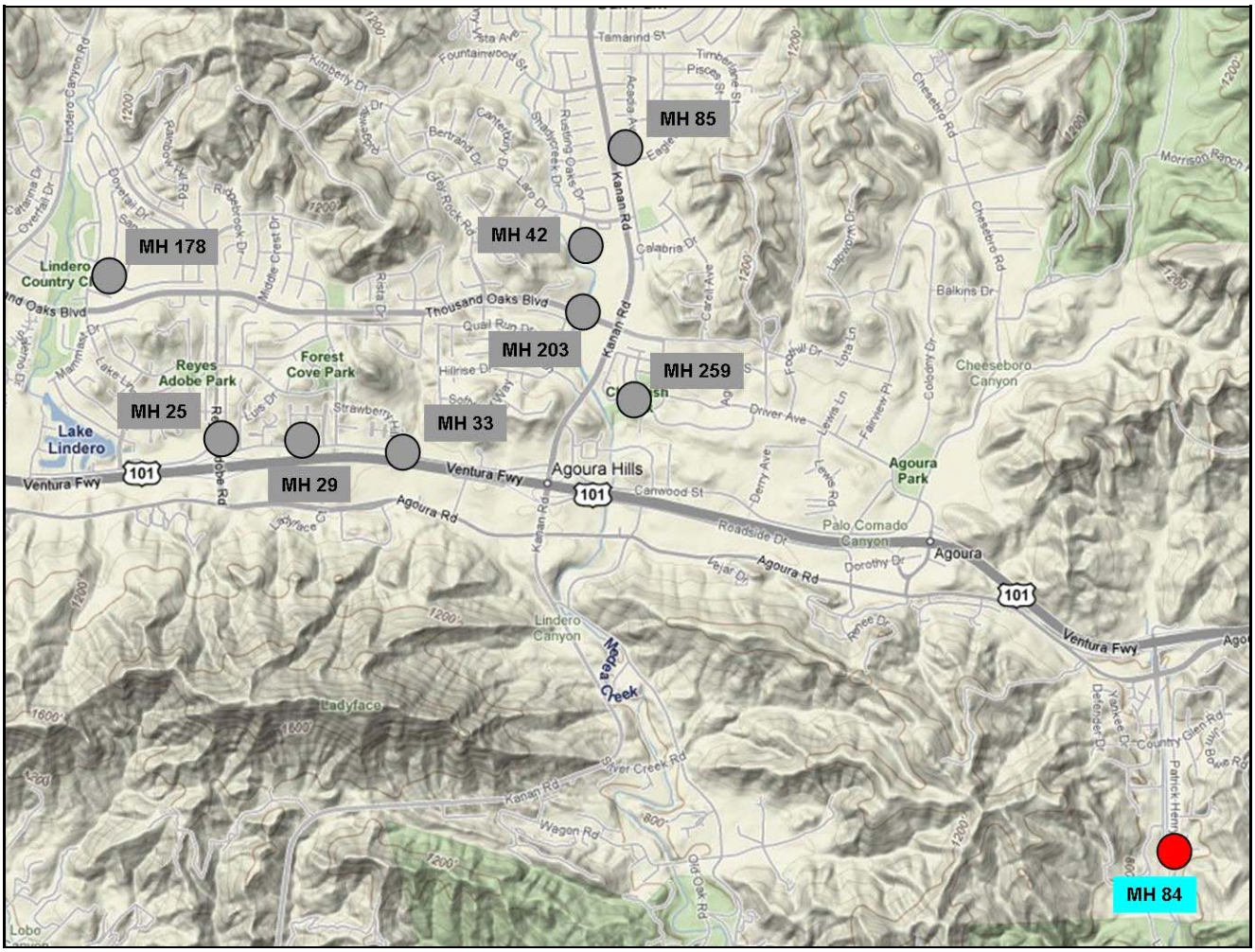
Sanitary Sewer Collection System

Monitoring Site: MH 84

Location: Park Vista Road and Patrick Henry Place

Size / Type Line: 8-inch Sanitary Sewer Pipe

Data Summary Report



Site Information Report

Monitoring Site: MH 84

Location: Park Vista Road and Patrick Henry Place

Diameter: 8 inches

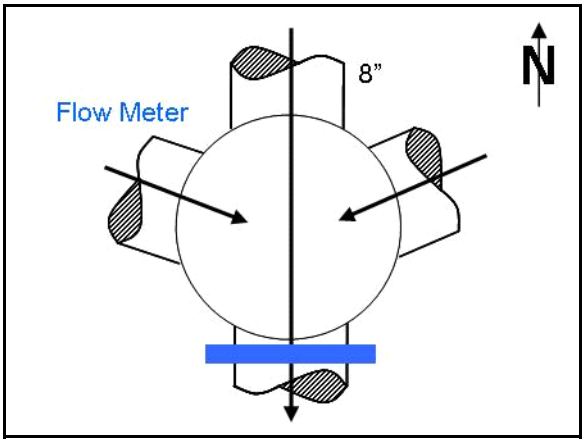
Average Dry Weather Flow: 0.01 *mgd*

Peak Measured Flow: 0.04 *mgd*

Satellite Map

Sanitary Map

Flow Sketch



Street View Photo

Plan View Photo

	Site Information Report Photos	**Monitoring Site:** MH 84

Manhole Lid

East Inlet

	Site Information Report Photos	**Monitoring Site:** MH 84

North Inlet

South Inlet

	Site Information Report Photos	**Monitoring Site:** MH 84

West Outlet

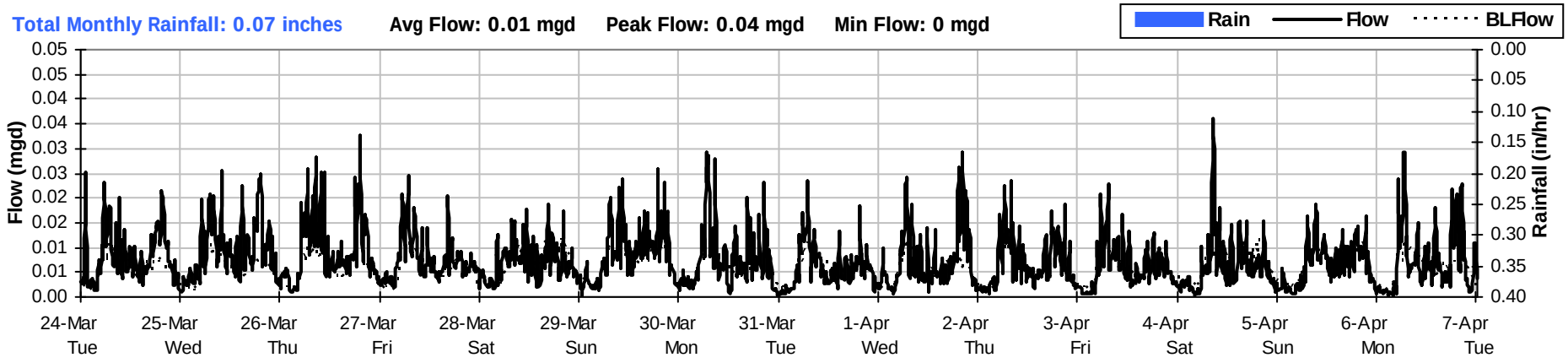
Period Flow Summary

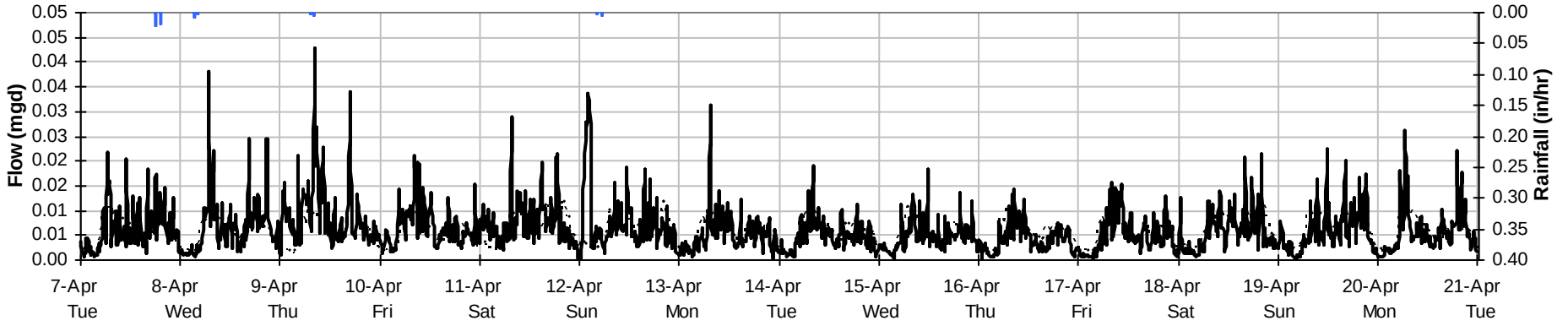
March 24, 2009 to April 21, 2009

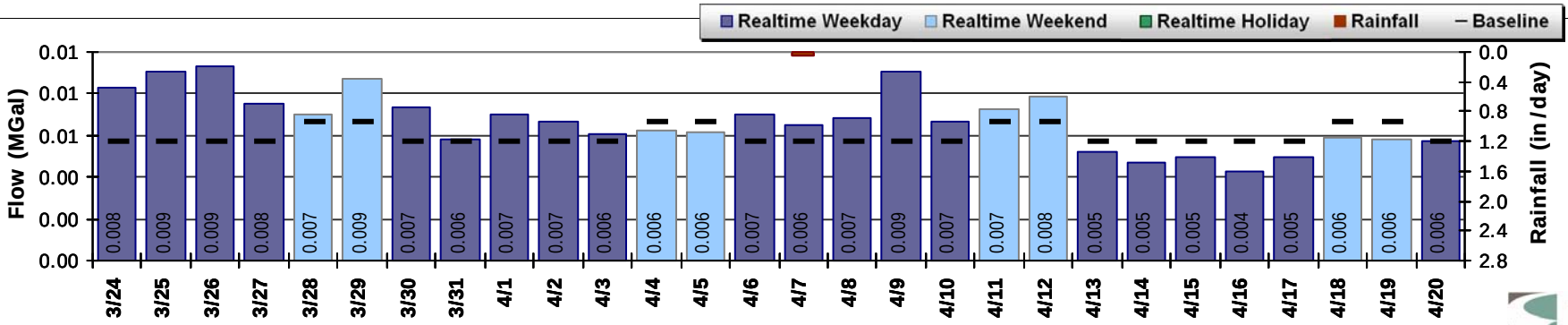
Monitoring Site:

MH 84

Total Monthly Rainfall: 0.07 inches **Avg Flow: 0.01 mgd** **Peak Flow: 0.04 mgd** **Min Flow: 0 mgd**



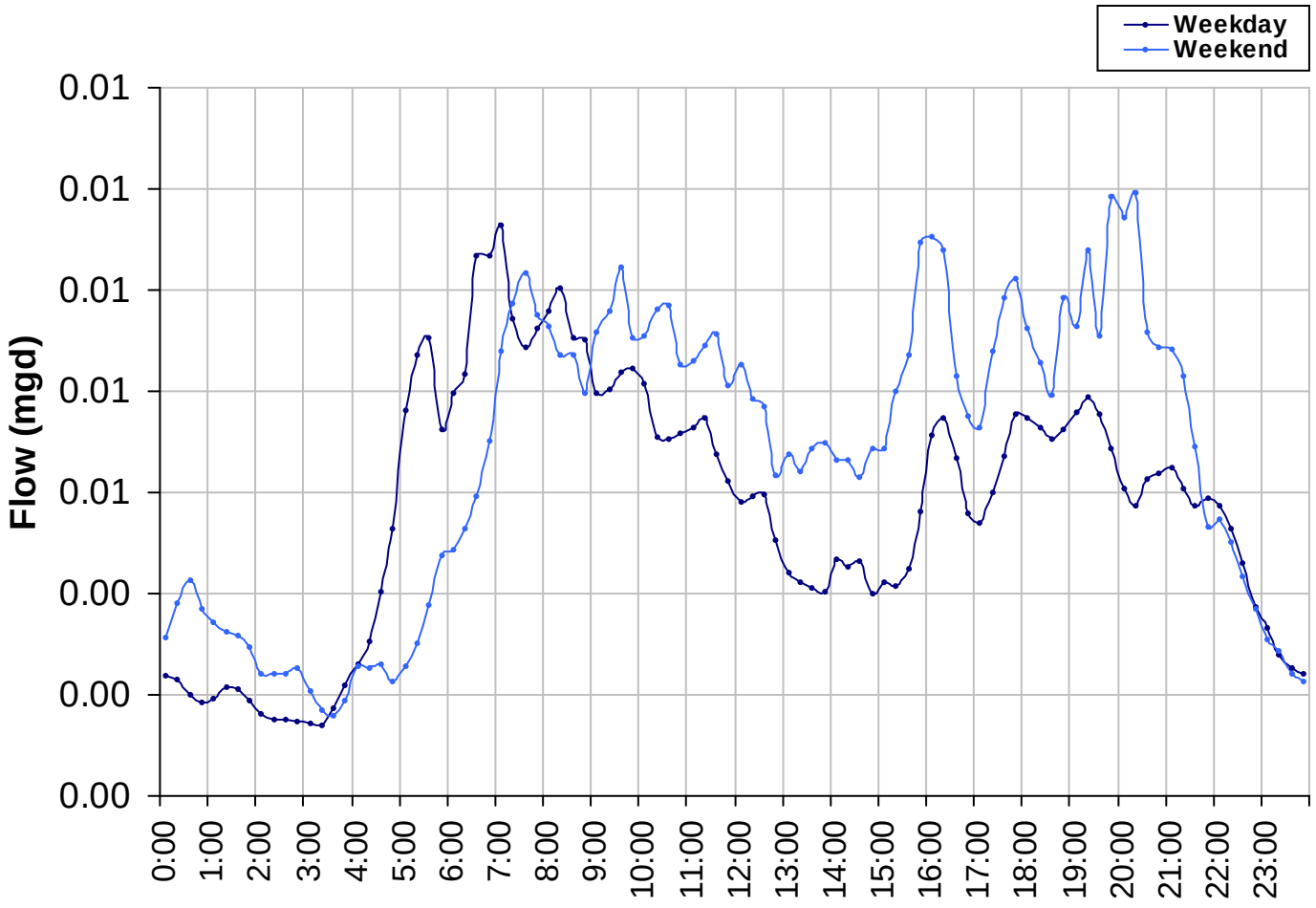




V&A

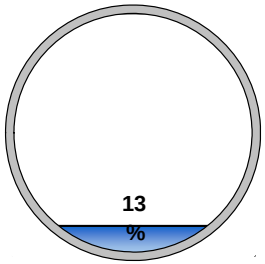
Average Dry Weather Flow

Monitoring Site:
MH 84



Peak Measured Flow:

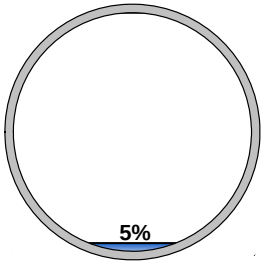
0.04 *mgd*



Peak measured flow shown in weekly graphs on following pages

Average Dry Weather Flow:

0.01 *mgd*

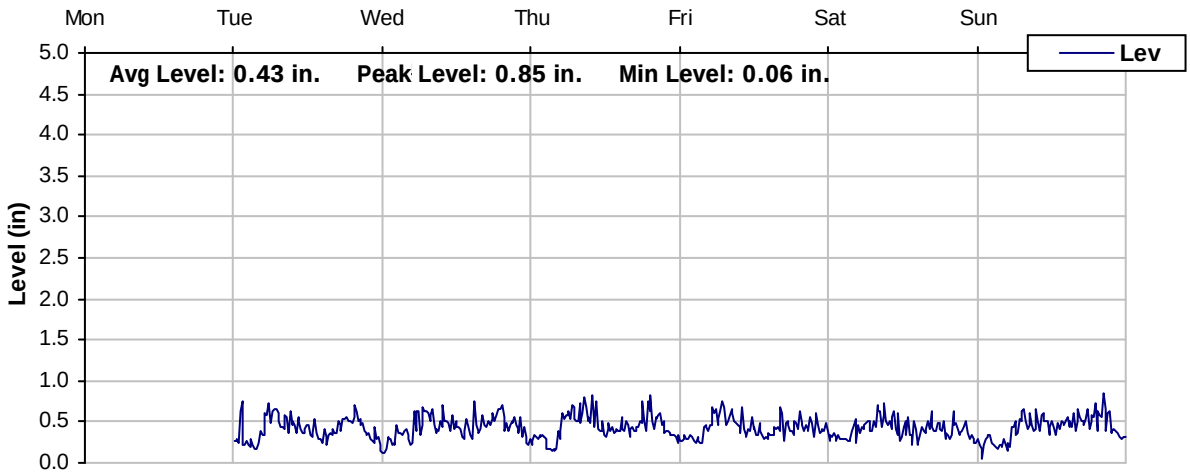


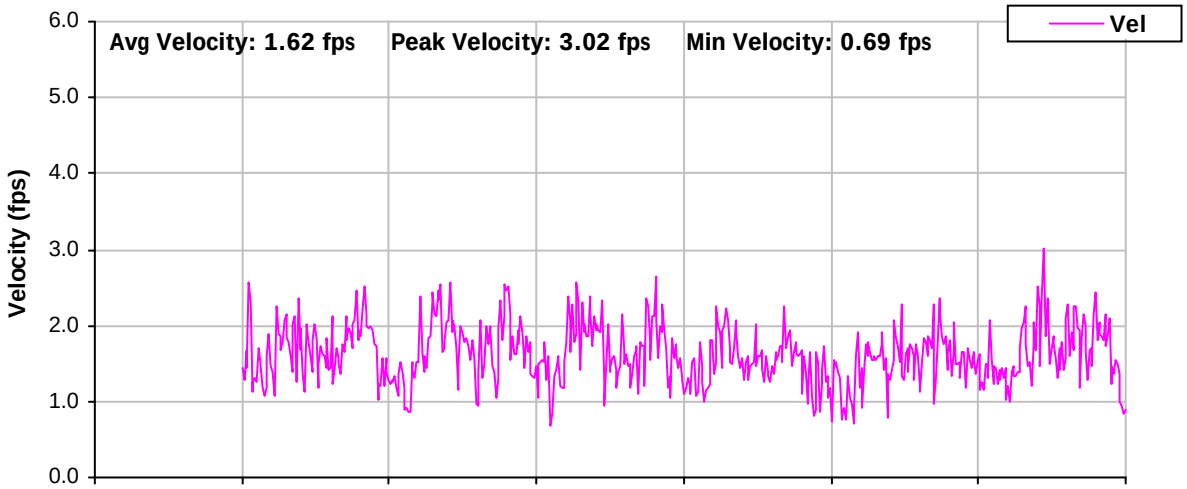
Level, Velocity and Flow

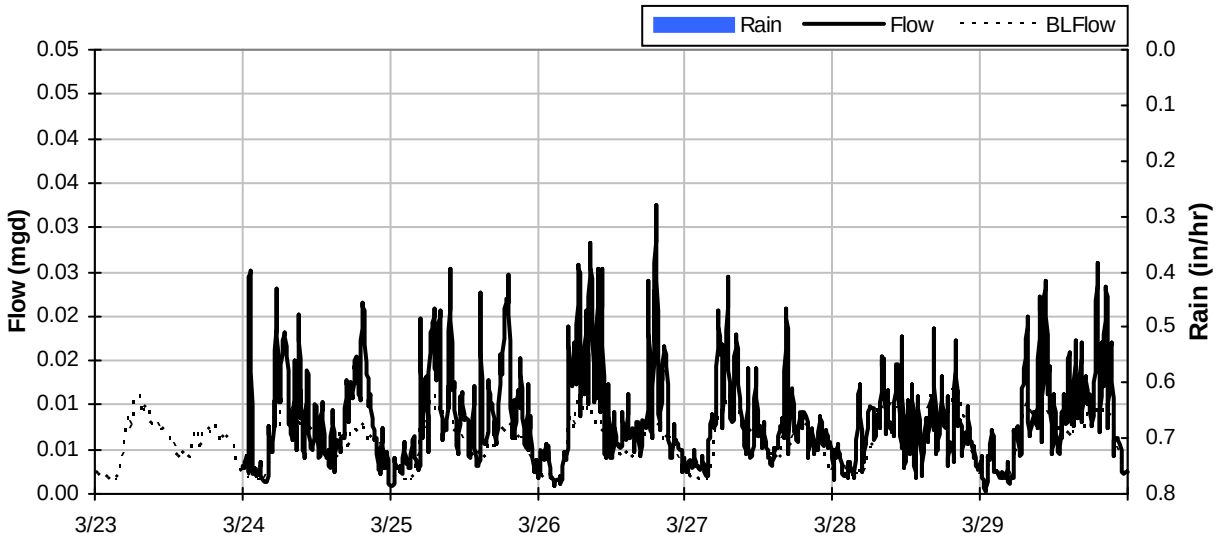
From 3/23/2009 to 3/30/2009

Monitoring Site:

MH 84







Avg Flow: 0.008 mgd **Peak Flow: 0.033 mgd** **Min Flow: 0 mgd**

Level, Velocity and Flow

From 3/30/2009 to 4/6/2009

Monitoring Site:

MH 84