APPENDIX A

Villalobos and Associates (V&A) 2018 Flow Monitoring Program

City of South San Francisco 2017/18 Master Plan Flow Monitoring Services



Prepared for:

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Appendix A-1. Flow Monitoring Sites: Data, Graphs, Information

Abbreviations and Acronyms

Abbreviations/Acronyms	Definition
ADWF	Average Dry Weather Flow
AVG	Average
CCTV	Closed-Circuit Television
CDEC	California Data Exchange Center
CIP	Capital Improvement Program
CO	Carbon Monoxide
CWOP	Citizen Weather Observing Program
DIA	Diameter
d/D	Depth/Diameter Ratio
FT	Feet
FM	Flow Monitor
GPD	Gallons per Day
GPM	Gallons per Minute
GWI	Groundwater Infiltration
H2S	Hydrogen Sulfide
IN	Inch
1/1	Inflow and Infiltration
IDM	Inch-Diameter Mile
IDW	Inverse Distance Weighting
LEL	Lower Explosive Limit
MAX	Maximum
MGD	Million Gallons per Day
MIN	Minimum
NOAA	National Oceanic and Atmospheric Administration
N/A	Not applicable
PF	Peaking Factor
PS	Pump Station
Q	Flow Rate
RDI	Rainfall-Dependent Infiltration
RG	Rain Gauge
SSO	Sanitary Sewer Overflow
V&A	V&A Consulting Engineers, Inc.
WEF	Water Environment Federation
WRCC	Western Regional Climate Center

Terms and Definitions

Term Definition

Average dry weather flow (ADWF) Average flow rate or pattern from days without noticeable inflow or infiltration response. ADWF usage patterns for weekdays and weekends differ and must be computed separately. ADWF is expressed as a numeric average and may include the influence of normal groundwater infiltration (not related to a rain event). Basin Sanitary sewer collection system upstream of a given location (often a flow meter), including all pipelines, inlets, and appurtenances. Also refers to the ground surface area near and enclosed by pipelines. A basin may refer to the entire collection system upstream from a flow meter or exclude separately monitored basins upstream. Depth/diameter (pt/D) ratio Design storm A theoretical storm event of a given duration and intensity that aligns with historical frequency records of rainfall events. For example, a 10-year, 24-hour design storm is a storm event wherein the volume of rain that falls in a 24-hour period would historically occur once every 10 years. Design storm events are used to predict / response and are useful for modeling how a collection system will react to a given set of storm event scenarios. Infiltration and inflow (f/I) rates are calculated by subtracting the ADWF flow curve from the instantaneous flow measurements taken during and after a storm event. Flow in excess of the baseline consists of inflow, rainfall-responsive infiltration, and rainfall-dependent infiltration. Total / is the total sum in gallons of additional flow attributable to a storm event. Groundwater infiltration (GWI) is groundwater that enters the collection system through pipe defects. GWI depends on the depth of the groundwater table above the pipelines as well as the percentage of the system that is submerged. The variation of groundwater levels and subsequent groundwater infiltration rates are relatively steady and will not fluctuate greatly. Rainfal-dependent infiltration (RDI) is similar to groundwater infiltration but occurs as a result of storm water. The sto		
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downstream pipes and transport facilities to carry these peak instantaneous flows.		peak flow problem in the sewer system and often dictates the required capacity of
T Overnows are orien attributable to high inflow rates.		Overflows are often attributable to high inflow rates.
Peak Wet The highest daily flow during and immediately after a significant storm event. Includes	Peak Wet	
Weather Flow sanitary flow, infiltration and inflow.		
Peaking factor PF is the ratio of peak measured flow to average dry weather flow. This ratio expresses		
(PF) the degree of fluctuation in flow rate over the monitoring period and is used in capacity	_	
analysis.	(11)	
Surcharge When the flow level is higher than the crown of the pipe, then the pipeline is said to be in	Surcharge	
a surcharged condition. The pipeline is surcharged when the d/D ratio is greater than 1.0.	Caronargo	
	Cynthotic	
Synthetic A set of algorithms has been developed to approximate the actual I/I hydrograph. The	_	
hydrograph synthetic hydrograph is developed strictly using rainfall data and response parameters	nyarograph	
I manufactured to a consequent time and and the consequence of the con		representing response time, recession coefficient and soil saturation.

Executive Summary

Scope and Purpose

V&A Consulting Engineers Inc. (V&A) has completed sanitary sewer flow monitoring within the City of South San Francisco (City). Flow monitoring was performed over four months (three wet months and one dry month consecutively) from February 26, 2018 to June 28, 2018 at eleven open-channel flow monitoring sites. There were three general purposes of this study to support Akel Engineering Group, Inc's (Akel Engineering) update of the City master plan:

- 1. Establish the baseline sanitary flows at the flow monitoring sites
- 2. Establish the peak flow condition during the rainfall events
- 3. Quantify inflow/infiltration (I/I) at the applicable flow monitoring sites

Rainfall Monitoring

There were three rainfall events that occurred during the monitoring period. All three rainfall events were classified as less than 1-year rainfall events at the three rain gauges (RG) except for at RG South, Rain Event 1 (February 28 - March 3, 2018) and Rain Event 3 (April 5-7, 2018) were classified as a 1.5 year 12-hr and 1.5 year 2-day rain events respectively. Additionally, for the flow monitoring period (February 28 - April 7. 2018) at RG South was classified as a 2-year 45-day rainfall event.

The rainfall events were of sufficient strength to elicit an I/I response from the flow monitoring sites suitable for I/I analysis.

Monitoring Sites

The flow monitoring site locations were approved to be the same as the sites monitored in 2008 by V&A1. There was one additional site, Site 11, selected by Akel Engineering. The sites are listed in Table ES-1 and shown in Figure ES-1.



¹ V&A project no. 08-0600, "South San Francisco Sanitary Sewer Flow Monitoring" report submitted January 2009. Similar sites, often a few manholes upstream or downstream, were monitored for the 1999 study, however these sites were not located within a night of field reconnaissance. The 1999 study was "City of South San Francisco Infiltration and Inflow Study" by Carollo Engineers.

Table ES-1. List of Monitoring Sites

Monitoring Site	Pipe Diameter (in.)	Manhole #	Location
Site 1	22.5	WD2594	210 Baden Avenue, east of Linden Avenue
Site 2	33	WD2633	27 S. Linden Avenue, north of Colma Creek Canal
Site 3	27	WL2659	1460 San Mateo Avenue, north of PS.
Site 4	15	WH1494	40 Chestnut Avenue, south of Mission Road
Site 5	15	WF980	1303 Mission Avenue, north of Isabelle Way
Site 6	18	WE1489	920 Mission Road, east of Oak Avenue.
Site 7	18	WL2882	141 South Linden Avenue, northwest of Tanforan Avenue.
Site 8	12.5	WH1559	North end of Memorial Drive.
Site 9	12	WH1570	Memorial Drive and West Orange Avenue
Site 10	15	WL2651	South Linden Avenue and South Canal Street, south of Colma Creek Canal
Site 11	15	Not Given	245 South Spruce Avenue, southwest of Myrtle Avenue

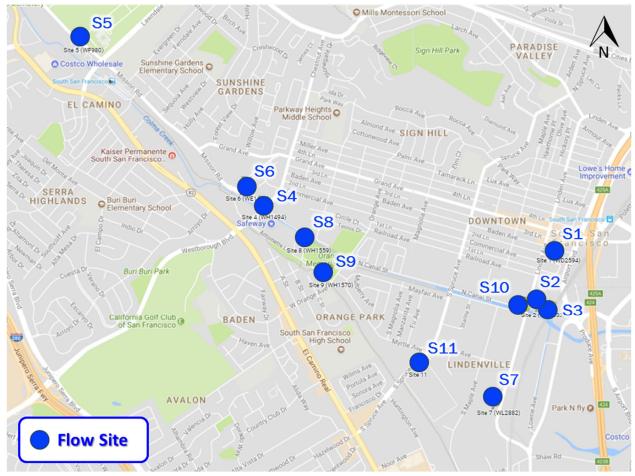


Figure ES-1. Map of Flow Monitoring Sites

Site Flow Monitoring and Capacity Results

Table ES-2 summarizes the peak recorded flows, levels, d/D ratios, and peaking factors per site during the flow monitoring period. Results of note have been shaded in RED. Capacity analysis data is presented on a site-by-site basis and represents the hydraulic conditions only at the site locations; hydraulic conditions in other areas of the collection system will differ.

- Peaking Factor: Peaking factor is defined as the peak measured flow divided by the average dry weather flow (ADWF). Peaking factors are influenced by many factors including size and topography of tributary area, flow attenuation, flow restrictions, characteristics of I/I entering the collection system, and hydraulic features such as pump stations. For this report, peaking factors are reported and peaking factors above 6 are highlighted. The City's 1999 Study referred to the WEF Manual of Practice FD-6 and ASCE Manual No. 62 suggesting typical peaking factor ratios ranging between 3 and 4, with higher values indicative pronounced I/I flows.
- d/D Ratio: The d/D ratio is the peak measured depth of flow (d) divided by the pipe diameter (D). The d/D ratio for each site was computed based on the maximum depth of flow for the study. Standards for d/D ratio vary from agency to agency, but typically range between d/D \leq $0.5 \text{ and } d/D \le 0.75.$

Table ES-2. Capacity Analysis Summary

Monitoring Basin	ADWF (mgd)	Peak Measured Flow (mgd)	Peaking Factor	Pipe Diameter, <i>D</i> (IN)	Max Depth, d (IN)	Max d/D Ratio	Surcharge above Pipe Crown (IN)
Site 1	0.685	7.103	10.4	22.5	28.12	1.25	5.6
Site 2	3.213	17.083	5.3	33	48.25	1.46	15.3
Site 3	0.078	0.835	10.7	27	28.42	1.05	1.42
Site 4	0.137	1.313	9.6	15	8.58	0.57	
Site 5	0.266	1.836	6.9	15	9.7	0.65	
Site 6	1.200	5.146	4.3	18	14.52	0.81	
Site 7	0.537	2.204	4.1	18	23.67	1.32	5.7
Site 8	0.133	0.372	2.8	12.5	12.29	0.98	
Site 9	0.084	0.768	9.2	12	7.34	0.61	-
Site 10	0.132	1.216	9.2	15	64.23	4.28	49.2
Site 11	0.347	3.059	8.8	15	53.97	3.60	39.0

Figure ES-2 illustrates a flow schematic of the peak flow condition at the flow monitoring sites. The following capacity analysis results are noted:

Peaking Factors

- More than half the sites had peaking factors greater than 6.
- Considering that Site 3 and Site 9 peaking factors may have been skewed by low ADWFs,
 Sites 1, 4, 10, and 11 had the highest peaking factors.

d/D Ratio:

- More than half the sites (6 of 11) surcharged during the flow monitoring period.
- Site 10 and 11 surcharged the most with more than 3 feet above pipe crown. Site 11 may be of concern due to the following reasons:
 - Shallow and small diameter manhole
 - Site 11 has two effluents; the main effluent was flowing at approximately 80%d/D
 - There were grease and rags, and $\frac{1}{4}$ to $\frac{1}{2}$ -inch of sediment during some site visits. See Appendix A for site and pipe photos.
 - Located on a major road (South Spruce Avenue) and close to Centennial Way Trail and a creek.

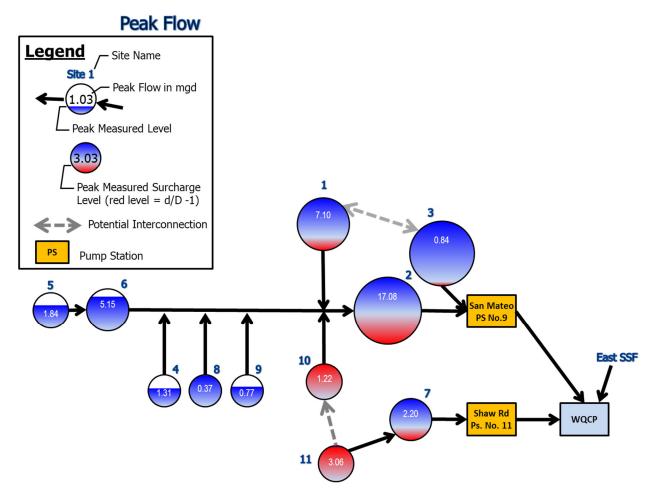


Figure ES-2. Peak Measured Flow Schematic

Infiltration and Inflow Analysis

Table ES-3 summarizes the site-by-site I/I results for this study. Results of note have been highlighted in RED. Please refer to the I/I Methods section for more information on rainfall-dependent infiltration (RDI) and inflow analysis and ranking methods.

- Basin 7 and 10 were combined for I/I analysis ranking as there is an overflow from Site 11 to Site 10 and some of the flow is diverted from Basin 7 to Basin 10.
- Site 2 is downstream of Site 10 and five additional sites; the overflow complication and subtraction uncertainties were too high to isolate Basin 2 for I/I analysis so it has been excluded.

Peak Monitoring **ADWF** Inflow **RDI Rate** Combined I/I Inflow RDI Combined Site (mgd) Rate (mgd) (gallons) Rank Ranking I/I Rank (mgd) 0.685 3.862 0.391 Basin 1 5,678,000 3 1 0.078 0.524 0.041 Basin 3 4 536,000 6 5 0.137 1.114 0.040 Basin 4 1,221,000 4 6 0.266 1.097 0.077 Basin 5 845,000 6 5 9 3.201 0.242 0.934 Basin 6 5.044,000 5 3 4 0.133 0.266 0.019 9 Basin 8 479,000 8 8 0.084 0.741 0.018 Basin 9 345,000 1 7 6 0.347 2.714 0.083 2 Basin 11 8 2,202,000 6 Basin 7 + 0.513 0.322 0.361 9 1 2 3,159,000 Basin 10

Table ES-3. I/I Analysis Summary

The following I/I analysis results are noted:

- Inflow: Basins 9, 11, and 1 had the highest normalized peak I/I rates, an indicator of high inflow within the isolated monitoring basin.
- RDI: Basins 7+10, 1, and 6 had the highest normalized RDI rates. Basin 7 and 10 may have been affected by the Site 11 overflow; inflow may have been attenuated and counted as RDI instead.
- Groundwater Infiltration: Basin 8 had abnormally high low-to-ADWF flow rates, an indicator of high GWI rate.
- Total I/I: Basins 1, 7+10, and 4 had the greatest normalized volume of total I/I.

Recommendations

V&A advises that future I/I reduction plans consider the following recommendations:

- 1. Master Plan and Model Implementation: The study results can be used to update the master plan and compare with previous model assumptions and flow monitoring results.
- 2. Verify Interconnections and Overflows: understanding the interconnections and overflows can help with the master plan, basin isolation and I/I analysis.
- 3. Capacity Analysis: Several sites surcharged during the monitoring period. The City may want to analyze the capacity constraints in the updated master plan.
 - a. There may be a bottleneck and capacity issue in the main trunk lines. V&A recommends Akel and City engineers to review the pump station data and run times.
 - b. Site 11 may be of concern as it surcharged 3.25 feet, was a shallower and smaller manhole, has two effluents (one already quite full), had grease, rags and slight sediment, and located on a major road close to a creek.
 - c. V&A had completed multiple small-scale flow monitoring capacity studies for new developments in SSF in the past years. The City may want to review the data and development flows.
- 4. Determine I/I Reduction Program: The City should examine its I/I reduction needs to determine their needs and goals for a future I/I reduction program.
 - a. If peak flows, sanitary sewer overflows, and pipeline capacity issues are of greater concern, then priority can be given to investigate and reduce sources of inflow within the basins with the higher inflow rates. Basins 9, 2, and 11 ranked highest for inflow contribution and should be prioritized for inflow reduction.
 - b. If infiltration and general pipeline deterioration are of greater concern, then the program can be weighted to investigate and reduce sources of infiltration within the basins with the higher RDI and Combined I/I rates. Basins 1, 7+10, 4 and 6 ranked highest for infiltration contribution and should be prioritized for infiltration reduction.
- 5. I/I Investigation Methods: Potential I/I investigation methods include the following:
 - a. smoke testing
 - b. mini-basin flow monitoring
 - c. night-time reconnaissance work to (1) investigate and determine direct point sources of inflow, and (2) determine the areas and/or pipe reaches responsible for high levels of infiltration contribution.
 - d. CCTV inspection
- 6. I/I Reduction Cost Effective Analysis: The City should conduct a study to determine which is more cost-effective: (1) locating the sources of inflow/infiltration and systematically rehabilitating or replacing the faulty pipelines; or (2) continued treatment of the additional rainfall dependent I/I flow.

1 Introduction

1.1 Scope and Purpose

V&A Consulting Engineers Inc. (V&A) has completed sanitary sewer flow monitoring within the City of South San Francisco (City). Flow monitoring was performed over four months (three wet months and one dry month consecutively) from February 26, 2018 to June 28, 2018 at eleven open-channel flow monitoring sites. There were three general purposes of this study to support Akel Engineering Group, Inc's (Akel) update of the City master plan:

- 1. Establish the baseline sanitary flows at the flow monitoring sites
- 2. Establish the peak flow condition during the rainfall events
- 3. Quantify inflow/infiltration (I/I) at the applicable flow monitoring sites

Flow Monitoring Sites and Sewerage Basins 1.2

The flow monitoring site locations were approved to be the same as the sites monitored in 2008 by V&A². There was one additional site, Site 11, selected by Akel Engineering. Information regarding the flow monitoring locations are listed in Table 1-1 and shown in Figure 1-1. Detailed descriptions of the individual flow monitoring sites, including photographs, are included in Appendix A.

Flow monitoring sites are identified as the manholes where the flow meters were secured and the pipelines wherein the flow sensors were placed. Capacity analysis and flow rate information is presented on a site-by-site basis.

Flow monitoring site data may include the flows of one or many drainage basins. Flow monitoring basins are localized areas of a sanitary sewer collection system upstream of a given location (often a flow meter), including all pipelines, inlets, and appurtenances. The basin refers to the ground surface area near and enclosed by the pipelines.

A basin may refer to the entire collection system upstream from a flow meter or may exclude separately monitored basins upstream, requiring basin isolation (subtraction of upstream flows). The I/I analysis results will be presented on an isolated basin basis. The basin isolation calculations are listed in Table 1-2 and the estimated isolated basins are shown in Figure 1-2.

The flow monitoring sites was selected so that the isolated basins mostly match the City basins. The flow monitoring sites may be located a few manholes upstream or downstream the basin outlet for better flow monitoring hydraulics. Additionally, due to how the pipe system was laid out, some City basins cannot be effectively isolated or are split into two, named "A" and "B".

There are still several connectivity verifications pending. There are potential interconnections between Basin 1 and Basin 3 via diversion structures, and there may be a connection to Site 10 from Site 11. There was also an overflow pipe in Site 9 MH, after the FM. The overflow connection was unknown.



² V&A project no. 08-0600, "South San Francisco Sanitary Sewer Flow Monitoring" report submitted January 2009. Similar sites, a few manholes upstream or downstream, were monitored for the 1999 study, however these sites were not located within a night of field reconnaissance. The 1999 study was "City of SSF Infiltration and Inflow Study" by Carollo Engineers.

Table 1-1. List of Flow Monitoring Locations

Monitoring Site	Pipe Diameter (in.)	Manhole #	Location	Access Details
Site 1	22.5	WD2594	210 Baden Avenue, east of Linden Avenue	
Site 2	33	WD2633	27 S. Linden Avenue, north of Colma Creek Canal	Northeast corner of Storm Pump Station #6,
Site 3	27	WL2659	1460 San Mateo Avenue, north of PS.	Pump Station #9. Enter via south gate, near railroad tracks
Site 4	15	WH1494	40 Chestnut Avenue, south of Mission Road	
Site 5	15	WF980	1303 Mission Avenue, north of Isabelle Way	
Site 6	18	WE1489	920 Mission Road, east of Oak Avenue.	Near Mission Glen Condos
Site 7	18	WL2882	141 South Linden Avenue, northwest of Tanforan Avenue.	Exit gate of AT&T yard
Site 8	12.5	WH1559	North end of Memorial Drive.	Parking lot in northwest corner of Orange Memorial Park
Site 9	12	WH1570	Memorial Drive and West Orange Avenue	Southeast corner of Orange Memorial Park
Site 10	15	WL2651	South Linden Avenue and South Canal Street, south of Colma Creek Canal	In Flyers gas station
Site 11	15	Not Given	245 South Spruce Avenue, southwest of Myrtle Avenue	Opposite of Aqua Hand wash & Gas

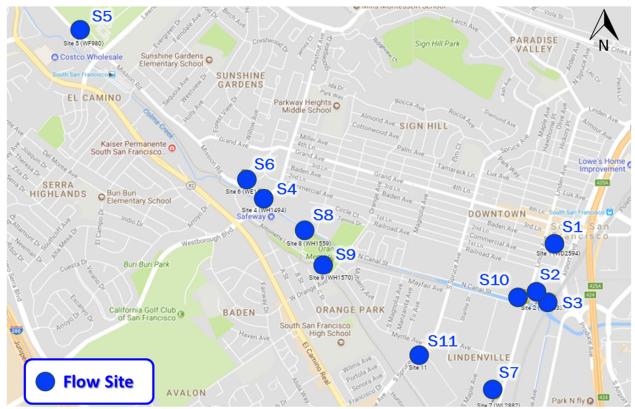


Figure 1-1. Map of Flow Monitoring Sites

Table 1-2. List of Basin Isolation Calculations

Isolated	City Basin ID	Flow Isolation Calculation	Area	Notes
Basin	City Dasiii iD	1 IOW ISOIALIOIT CAICUIALIOIT	(Acres)	Notes
Basin 1	B-7A	= Q _{site1}	298	May have interconnections with Basin 3; splits are currently being verified by the City and Akel. Split of City Basin B-7 between Basin 1 and Basin 3 was estimated
Basin 2	B-5 & B-6	= Q _{site2} - Q _{site1} - Q _{site6} - Q _{site4} - Q _{site8} - Q _{site9} - Q _{site10}	521	Too many subtractions, including subtraction of Site 10 that has an overflow upstream, for I/I analysis.
Basin 3	B-7B	= Q _{site3}	397	
Basin 4	B-3	= Q _{site4}	451	
Basin 5	B-1	= Q _{site5}	372	
Basin 6	B-2	= Q _{site6} - Q _{site5}	448	
Basin 7	B-9A	= Q _{site7} - Q _{site11}	78	There was an overflow connection to Site 10 from Site 11, bypassing Site 7. The rest of B-9 may be measured by "San Bruno meter 7".
Basin 8	B-4A	= Q _{site8}	83	
Basin 9	B-4B	= Q _{site9}	55	There was an overflow pipe in the MH, after the FM. The overflow connection was unknown.
Basin 10	B-8	= Q _{site10}	117	There is an overflow connection from Site 11
Basin 11	B-10	= Q _{site11}	500	

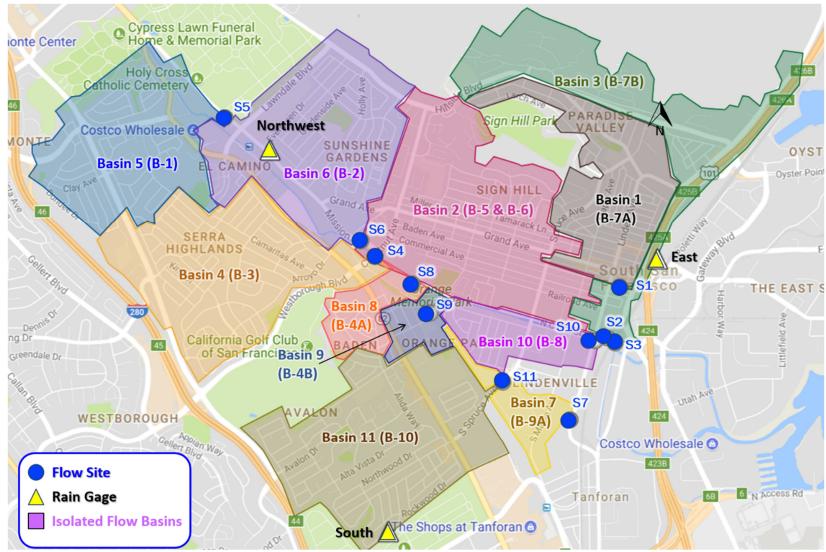


Figure 1-2. Map of Flow Monitoring Basins and Rain Gauges

2 Methods and Procedures

Confined Space Entry 2.1

A confined space (Photo 2-1) is defined as any space that is large enough and so configured that a person can bodily enter and perform assigned work, has limited or restricted means for entry or exit and is not designed for continuous employee occupancy. In general, the atmosphere must be constantly monitored for sufficient levels of oxygen (19.5% to 23.5%), and the presence of hydrogen sulfide (H₂S) gas, carbon monoxide (CO) gas, and lower explosive limit (LEL) levels. A typical confined space entry crew has members with OSHA-defined responsibilities of Entrant, Attendant and Supervisor. The Entrant is the individual performing the work. He or she is equipped with the necessary personal protective equipment needed to perform the job safely, including a personal four-gas monitor (Photo 2-2). If it is not possible to maintain line-of-sight with the Entrant, then more Entrants are required until line-of-sight can be maintained. The Attendant is responsible for maintaining contact with the Entrants to monitor the atmosphere using another four-gas monitor and maintaining records of all Entrants if there is more than one. The Supervisor is responsible for developing the safe work plan for the job at hand prior to entering.



Photo 2-1. Confined Space Entry



Photo 2-2. Typical Personal Four-Gas **Monitor**

2.2 Flow Meter Installation

V&A installed Isco 2150 and Sigma 910 area-velocity flow meters for temporary metering within the collection system. Isco 2150 and Sigma 910 meters use submerged sensors with a pressure transducer to collect depth readings and an ultrasonic Doppler sensor to determine the average fluid velocity. The ultrasonic sensor emits high-frequency (500 kHz) sound waves, which are reflected by air bubbles and suspended particles in the flow. The sensor receives the reflected signal and determines the Doppler frequency shift, which indicates the estimated average flow velocity. The sensor is typically mounted at a manhole inlet to take advantage of smoother upstream flow conditions. The sensor may be offset to one side to lessen the chances of fouling and sedimentation where these problems are expected to occur. Manual level and velocity measurements were taken during installation of the flow meters and again when they were removed and compared to simultaneous level and velocity readings from the flow meters to ensure proper calibration and accuracy. Figure 2-1 shows a typical installation for a flow meter with a submerged sensor.

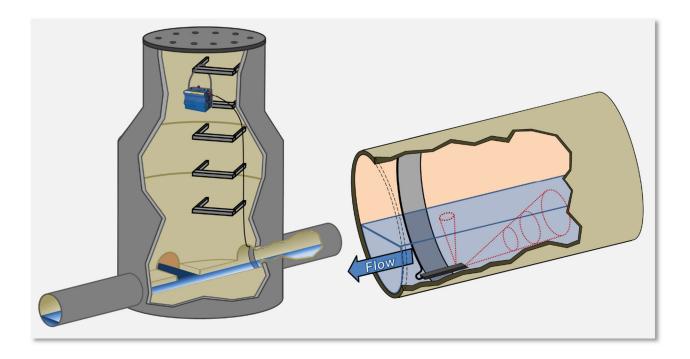


Figure 2-1. Typical Installation for Flow Meter with Submerged Sensor

Flow Calculation 2.3

Data retrieved from the flow meters was placed into a spreadsheet program for analysis. Data analysis included data comparison to field calibration measurements, as well as necessary geometric adjustments as required for sediment (sediment reduces the pipe's wetted cross-sectional area available to carry flow). Area-velocity flow metering uses the continuity equation:

$$Q = v \cdot A = v \cdot (A_T - A_S)$$

where Q: volume flow rate

v: average velocity as determined by the ultrasonic sensor

A: cross-sectional area available to carry flow

A_T: total cross-sectional area with both wastewater and sediment

As: cross-sectional area of sediment.

For circular pipe,

$$A_T = \left\lceil \frac{D^2}{4} \cos^{-1} \left(1 - \frac{2d_W}{D} \right) \right\rceil - \left\lceil \left(\frac{D}{2} - d_W \right) \left(\frac{D}{2} \right) \sin \left(\cos^{-1} \left(1 - \frac{2d_W}{D} \right) \right) \right\rceil$$

$$A_{S} = \left\lceil \frac{D^{2}}{4} \cos^{-1} \left(1 - \frac{2d_{S}}{D} \right) \right\rceil - \left\lceil \left(\frac{D}{2} - d_{S} \right) \left(\frac{D}{2} \right) \sin \left(\cos^{-1} \left(1 - \frac{2d_{S}}{D} \right) \right) \right\rceil$$

where d_W : distance between wastewater level and pipe invert

ds: depth of sediment

D: pipe diameter

2.4 Average Dry Weather Flow Determination

For this study, four distinct average dry weather flow (ADWF) curves were established for each Basin location:

- Mondays Thursdays
- Fridays
- Saturdays
- Sundays

Flows for many of the monitored Basins differ on Friday evenings compared to Mondays through Thursdays. Starting around 7 pm, the flows are often decreased (compared to Monday through Thursday). Similarly, flow patterns for Saturday and Sunday were also separated due to their unique evening flow pattern. This type of differentiation can be important when determining I/I response, especially if a rain event occurs on a Friday, Saturday or Sunday evening.

Figure 2-2 illustrates a sample of varying flow patterns within a typical week dry week3.

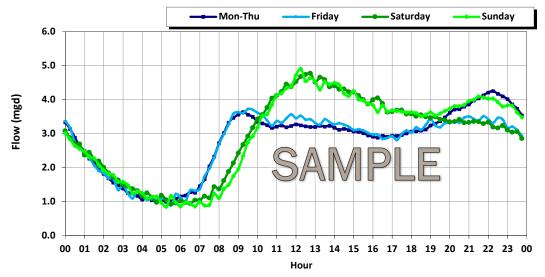


Figure 2-2. Sample ADWF Diurnal Flow Patterns

ADWF curves are taken from "Dry Days", when RDI had the least impact on the baseline flow. The overall average dry weather flow (ADWF) was calculated per the following equation:

$$ADWF = \left(ADWF_{Mon-Thu} \times \frac{4}{7}\right) + \left(ADWF_{Fri} \times \frac{1}{7}\right) + \left(ADWF_{Sat} \times \frac{1}{7}\right) + \left(ADWF_{Sun} \times \frac{1}{7}\right),$$

³ Holiday flows can be extremely variable. Christmas flows are different from Thanksgiving flows and different from MLK Day flows. V&A does not establish ADWF curves for holidays unless required for I/I analysis, which was not the case for this project. A "typical" holiday (Monday holidays like MLK Day, Presidents' Day, Memorial Day and Labor Day) can be roughly estimated as a weighted average of 80% Sunday flow and 20% Mon-Thu Flow.

2.5 Flow Attenuation

Flow attenuation in a sewer collection system is the natural process of the reduction of the peak flow rate through redistribution of the same volume of flow over a longer period of time. This occurs as a result of friction (resistance), internal storage and diffusion along the sewer pipes. Fluids are constantly working towards equilibrium. For example, a volume of fluid poured into a static vessel with no outside turbulence will eventually stabilize to a static state, with a smooth fluid surface without peaks and valleys. Attenuation within a sanitary sewer collection system is based upon this concept. A flow profile with a strong peak will tend to stabilize towards equilibrium, as shown in Figure 2-3.

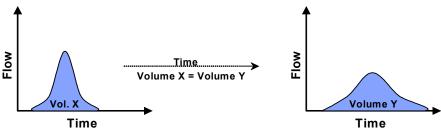


Figure 2-3. Attenuation Illustration

Within a sanitary sewer collection system, each individual basin will have a specific flow profile. As the flows from the basins combine within the trunk sewer lines, the peaks from each basin will (a) not necessarily coincide at the same time, and (b) due to the length and time of travel through the trunk sewers, peak flows will attenuate prior to reaching the treatment facility. The sum of the peak flows of the individual basins within a collection system will usually be greater than the peak flows observed at the treatment facility.

2.6 Inflow / Infiltration Analysis: Definitions and Identification

Inflow and infiltration (I/I) consists of storm water and groundwater that enter the sewer system through pipe defects and improper storm drainage connections and is defined as follows:

2.6.1 Inflow / Infiltration Analysis: Definitions and Identification

- Inflow: Storm water inflow is defined as water discharged into the sewer system, including private sewer laterals, from direct connections such as downspouts, yard and area drains, holes in manhole covers, cross-connections from storm drains, or catch basins.
- Infiltration: Infiltration is defined as water entering the sanitary sewer system through defects in pipes, pipe joints, and manhole walls, which may include cracks, offset joints, root intrusion points, and broken pipes.

Figure 2-4 illustrates the possible sources and components of I/I.

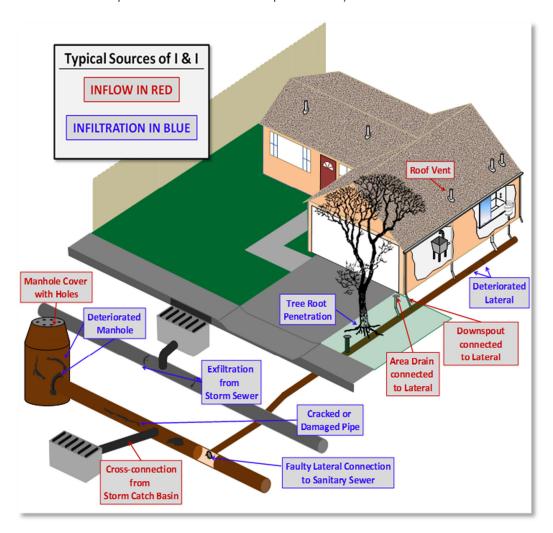


Figure 2-4. Typical Sources of Infiltration and Inflow

2.6.2 Infiltration Components

Infiltration can be further subdivided into components as follows:

- Groundwater Infiltration: Groundwater infiltration (GWI) depends on the depth of the groundwater table above the pipelines as well as the percentage of the system submerged. The variation of groundwater levels and subsequent groundwater infiltration rates is seasonal by nature. On a day-to-day basis, groundwater infiltration rates are relatively steady and will not fluctuate greatly.
- Rainfall-Dependent Infiltration: This component occurs as a result of storm water and enters the sewer system through pipe defects, as with groundwater infiltration. The storm water first percolates directly into the soil and then migrates to an infiltration point. Typically, the time of concentration for rainfall-related infiltration may be 24 hours or longer, but this depends on the soil permeability and saturation levels.
- Rainfall-Responsive Infiltration is storm water which enters the collection system indirectly through pipe defects, but normally in sewers constructed close to the ground surface such as private laterals. Rainfall-responsive infiltration is independent of the groundwater table and reaches defective sewers via the pipe trench in which the sewer is constructed, particularly if the pipe is placed in impermeable soil and bedded and backfilled with a granular material. In this case, the pipe trench serves as a conduit similar to a French drain, conveying storm drainage to defective joints and other openings in the system. This type of infiltration can have a quick response and graphically can look very similar to inflow.

Impact and Cost of Source Detection and Removal 2.6.3

- Impact: This component of I/I creates a peak flow problem in the sewer system and often dictates the required capacity of downstream pipes and transport facilities to carry these peak instantaneous flows. Because the response and magnitude of inflow is tied closely to the intensity of the storm event, the short-term peak instantaneous flows may result in surcharging and overflows within a collection system. Severe inflow may result in sewage dilution, resulting in upsetting the biological treatment (secondary treatment) at the treatment facility.
- Cost of Source Identification and Removal: Inflow locations are usually less difficult to find and less expensive to correct. These sources include direct and indirect cross-connections with storm drainage systems, roof downspouts, and various types of surface drains. Generally, the costs to identify and remove sources of inflow are low compared to potential benefits to public health and safety or the costs of building new facilities to convey and treat the resulting peak flows.

Infiltration:

- Impact: Infiltration typically creates long-term annual volumetric problems. The major impact is the cost of pumping and treating the additional volume of water, and of paying for treatment (for municipalities that are billed strictly on flow volume).
- Cost of Source Detection and Removal: Infiltration sources are usually harder to find and more expensive to correct than inflow sources. Infiltration sources include defects in deteriorated sewer pipes or manholes that may be widespread throughout a sanitary sewer system.

2.6.4 Graphical Identification of I/I

Inflow is usually recognized graphically by large-magnitude, short-duration spikes immediately following a rain event. Infiltration is often recognized graphically by a gradual increase in flow after a wet-weather event. The increased flow typically sustains for a period after rainfall has stopped and then gradually drops off as soils become less saturated and as groundwater levels recede to normal levels. Realtime flows were plotted against ADWF to analyze the I/I response to rainfall events. Figure 2-5 illustrates a sample of how this analysis is conducted and some of the measurements that are used to distinguish infiltration and inflow. Similar graphs were generated for the individual flow monitoring Basins and can be found in Appendix A.

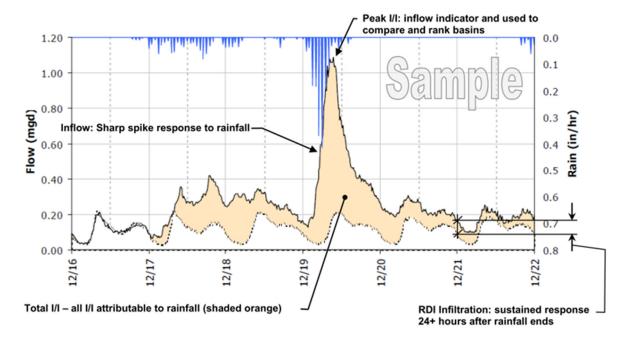


Figure 2-5. Sample Infiltration and Inflow Isolation Graph

2.6.5 Analysis Metrics

After differentiating I/I flows from ADWF flows, various calculations can be made to determine which I/I component (inflow or infiltration) is more prevalent at a particular Basin and to compare the relative magnitudes of the I/I components between drainage basins and between storm events:

- Inflow Peak I/I Flow Rate: Inflow is characterized by sharp, direct spikes occurring during a rainfall event. Peak I/I rates are used for inflow analysis.4
- Groundwater Infiltration (GWI): GWI analysis is conducted by looking at minimum dry weather flow to average dry weather flow ratios and comparing them to established standards to quantify the rate of excess groundwater infiltration.
- Rainfall-Dependent Infiltration (RDI): RDI Analysis is conducted by looking at the infiltration rates at set periods after the conclusion of a storm event. Depending on the particular collection system and the time required for flows to return to ADWF levels, different periods may be examined to determine the basins with the greatest or most sustained rainfalldependent infiltration rates.
- Total Infiltration: The total inflow and infiltration is measured in gallons per Basin and per storm event. Because it is based on total I/I volume, it is an indicator of combined inflow and infiltration and is used to identify the overall volumetric influence of I/I within the monitoring hasin

2.6.6 Normalization Methods

There are three ways to normalize the I/I analysis metrics for an "apples-to-apples" comparison amongst the different drainage basins:

- per-ADWF: The metric is divided by the established average dry weather flow rate and typically expressed as a ratio. Peaking Factors are examples of using ADWF to normalize data from different Basins.
- per-IDM: The metric is divided by length of pipe (IDM [inch-diameter mile]) contained within the upstream basin. Final units typically are gallons per day (gpd) per IDM.
- per-ACRE: The metric is divided by the acreage of the upstream basin. Final units typically are gallons per day (gpd) per ACRE.

IDM information was not available. The infiltration and inflow indicators were normalized by the per-ADWF and per-ACRE method in this report. The per-ADWF method was given a higher weighting as the basin acreage was estimated for Basin 1 and Basin 3 with interconnections and parallel pipes.

⁴ I/I flow rate is the real time flow less the estimated average dry weather flow rate. It is an estimate of flows attributable to rainfall. By using peak measured flow rates (inclusive of ADWF), the I/I flow rate would be skewed higher or lower depending on whether the storm event I/I response occurs during low-flow or high-flow hours.

⁵ The 2008 report normalized per-ADWF and the 1999 report normalized per-Acre (also known as "R-value"; ratio between the volume of wet weather flow at a particular monitoring site and the rainfall volume that falls on the upstream tributary service area.)

3 Results and Analysis

3.1 Rainfall Monitoring

3.1.1 Flow Study Rainfall Data

V&A collected rain data from three rain gauges during the flow monitoring period and quality checked the data against multiple other private weather stations (PWS)6 that were in the area. See Figure 1-2 for the location of the rain gauges. Table 3-1 and Figure 3-1 show the duration and precipitation of each rainfall event. There was minimal rain after April 18, 2018 and Figure 3-1 only shows until April 18.

Rainfall Event	Date(s)	RG Northwest (in)	RG South (in)	RG East (in)	Average Rainfall (in)
Event 1	February 28 – March 3, 2018	1.11	2.94	1.70	1.92
Event 2	March 12 - 25, 2018	2.13	4.10	2.05	2.76
Event 3	April 5 - 7, 2018	2.34	2.97	1.78	2.36
Flow Mon	nitoring Period Total:	6.38	11.72	6.42	8.11

Table 3-1. Rainfall Events Definition

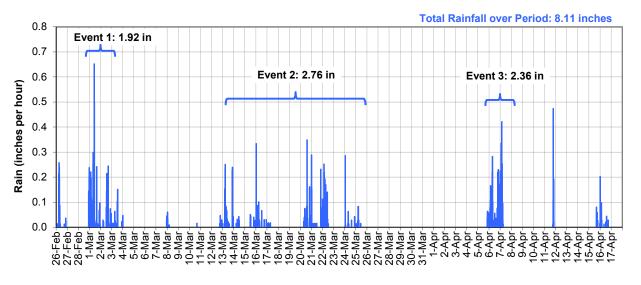


Figure 3-1. Rainfall February 26 - April 18, 2018, Average of 3 Rain Gauges

Historical rain data was taken from the two nearest WRCC stations; SF Mission Dolores and SF WSO Airport (Figure 3-2). Figure 3-3 shows the rainfall accumulation plot for the monitoring period, as well as the historical average rainfall triangulated (see Section 3.1.2.1) to the study area, during the project duration. The total rainfall measured during the monitoring period (8.11 inches) was 50% more than the historical average (5.36 inches).

⁶ National Oceanic and Atmospheric Administration (NOAA) Citizen Weather Observer Program (CWOP) members send data from their PWS to the NOAA MADIS server; the data undergoes quality checking and then is distributed. While V&A has no direct control over the rain gauges, V&A performs additional QA/QC on the data to ensure its suitability for use.



Figure 3-2. Location of Historical Rain Gauges

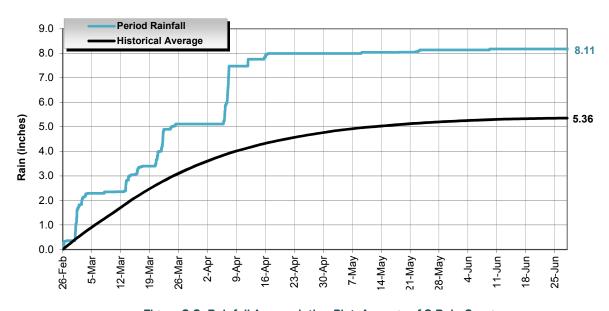


Figure 3-3. Rainfall Accumulation Plot, Average of 3 Rain Gauges

3.1.2 Regional Rainfall Event Classification

It is important to classify the relative size of a major storm event that occurs over the course of a flow monitoring period⁷ Rainfall events are classified by intensity and duration. Based on historical data, frequency contour maps for storm events of given intensity and duration have been developed by the NOAA for all areas within the continental United States (Figure 3-4).

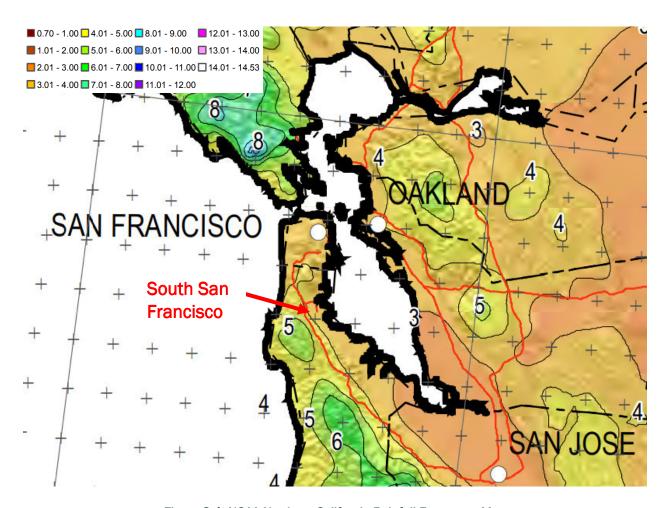


Figure 3-4. NOAA Northern California Rainfall Frequency Map

For example, the NOAA Rainfall Frequency Atlas® classifies a 10-year, 24-hour storm event in South San Francisco at the South rain gauge as **3.84** inches. This means that in any given year, at this specific location, there is a 10% chance that **3.84** inches of rain will fall in any 24-hour period.

From the NOAA frequency maps, for a specific latitude and longitude, the rainfall densities for period durations ranging from 1 hour to 20 days are known for rain events ranging from 1-year to 10-year intensities. These are plotted to develop a rain event frequency map specific to each rainfall monitoring Basin. Superimposing the peak measured densities for the rainfall events on the rain event frequency plot determines the classification of the rainfall event, shown in Figure 3-5 and Figure 3-6.

⁷ Sanitary sewers are often designed to withstand I/I contribution to sanitary flows for specific-sized "design" storm events.

⁸ NOAA Western U.S. Precipitation Frequency Maps Atlas 14, Volume 6, 2011: ftp://hdsc.nws.noaa.gov/pub/hdsc/data/sw/ca10y24h.pdf

The three rain events during the flow monitoring period were classified as less than 1-year rainfall events at the three rain gauges except for:

- Rain Event 1 at RG South: 1.5 year 12-hr rain event
- Rain Event 3 at RG South: 1.5 year 2-day rain event
- Flow Monitoring period at RG South: 2-year 45-day rainfall season

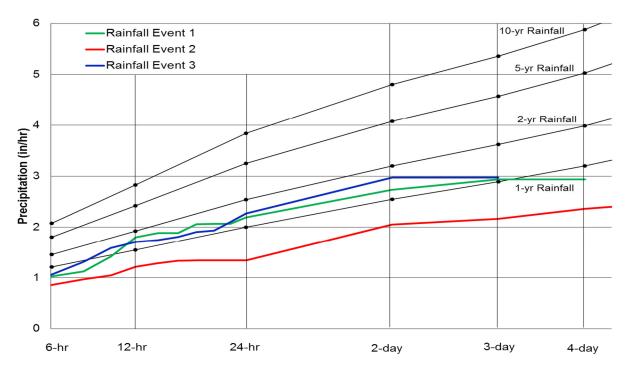


Figure 3-5. Rainfall Event Classification at RG South, 4-days

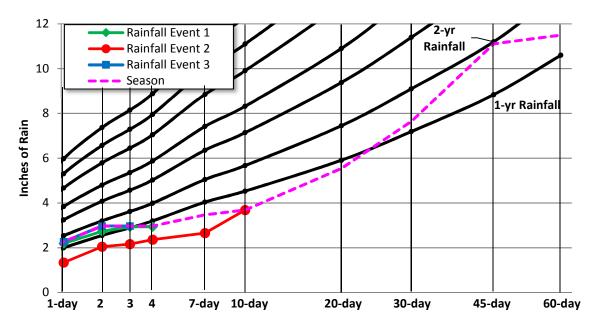


Figure 3-6. Rainfall Event Classification at RG South, 60-days

3.1.2.1 Rain Gauge Triangulation

The rainfall affecting the sanitary sewer collection system basins must be calculated based on the proximity to the rain gauge locations. The mean precipitation for each upstream basin was calculated by taking data from three local rain gauges and using the Inverse Distance Weighting (IDW) method. The IDW is an interpolation method that assumes the influence of each rain gauge location diminishes with distance. The center of an upstream basin⁹ was identified, and a weighted average was taken of the precipitation data from nearby rain gauge locations.

The IDW function is as follows:

$$weight(d) = \frac{1}{d^p}$$
, where: $d = distance$ $p = power (p > 0)$

The value of p is user defined. The most common choice for hydrological studies of watershed areas is p = 2. Figure 3-7 illustrates the IDW method (sample data).

The rain gauge distribution as calculated for each flow monitoring site is shown in Table 3-2.

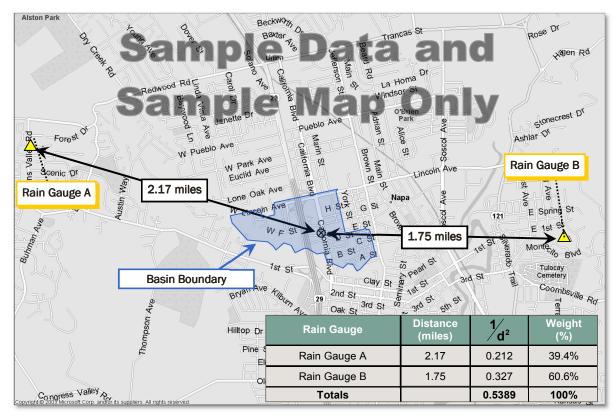


Figure 3-7. Rainfall Inverse Distance Weighting Method

⁹ Note that the full basin upstream of the site was used instead of the isolated basins as the rain data will be compared to the flow at each site

Table 3-2. Rain Gauge Distribution by Flow Monitoring Sites

Monitoring Site	Northwest RG	South RG	East RG	
Site 1	0%	0%	100%	
Site 2	91%	5%	5%	
Site 3	0%	0%	100%	
Site 4	79%	14%	7%	
Site 5	100%	0%	0%	
Site 6	100%	0%	0%	
Site 7	7%	84%	9%	
Site 8	49%	33%	18%	
Site 9	34%	38%	28%	
Site 10	15%	25%	61%	
Site 11	0%	100%	0%	

Flow Monitoring 3.2

3.2.1 Average Flow Analysis

Average dry weather flow (ADWF) curves were established during dry days when I/I had the least impact on the baseline flow. Table 3-3 summarizes the dry weather flow data measured for this study. ADWF curves for each site can be found in Appendix A. Figure 3-8 shows a flow schematic highlighting the average daily flows and levels.

Table 3-3. Dry Weather Flow

Site	Sediment (in.)	Mon-Thurs ADWF (MGD)	Friday ADWF (MGD)	Saturday ADWF (MGD)	Sunday ADWF (MGD)	Overall ADWF (MGD)		
Site 1	0	0.691	0.667	0.689	0.676	0.685		
Site 2	0	3.229	3.161	3.230	3.182	3.213		
Site 3	2.75	0.077	0.082	0.079	0.077	0.078		
Site 4	0	0.136	0.131	0.147	0.138	0.137		
Site 5	0	0.260	0.262	0.278	0.283	0.266		
Site 6	0	1.194	1.203	1.211	1.206	1.200		
Site 7	0.75	0.578	0.516	0.474	0.461	0.537		
Site 8	1.50	0.131	0.129	0.137	0.139	0.133		
Site 9	0.25	0.081	0.080	0.088	0.092	0.084		
Site 10	0.00	0.135	0.138	0.125	0.116	0.132		
Site 11	0.75	0.357	0.338	0.334	0.328	0.347		

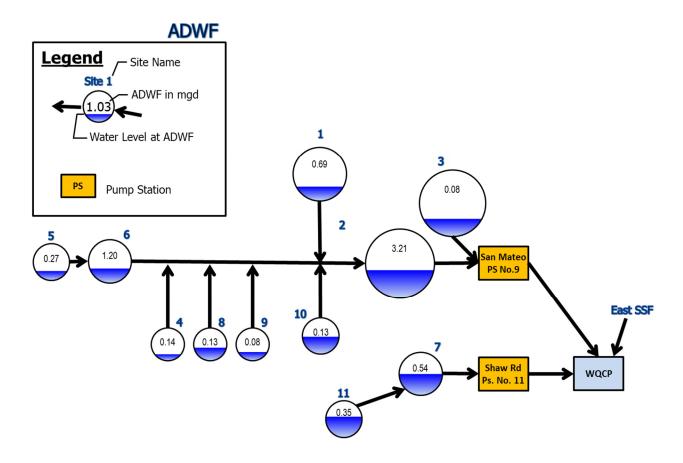


Figure 3-8. Dry Weather Flow Schematic

The following average flow analysis results are noted:

- Most sites had diurnal patterns generally consistent with residential discharge, though possibly with other sources included (commercial, industrial, agricultural, retail).
- Site 3 had constant flow of approximately 0.1 mgd except at 2am to 7am when flows reduced to near zero. This may be related to pump station activity immediately downstream.
- Site 8 typically had a small flow range of approximately 0.08 to 0.18 mgd. See Section 3.3.4 regarding minimal flow as a sign of groundwater infiltration.
- Several sites had abnormally colored flow during some site visits indicative of industrial flows; biotech research is a dominant industry in the City. The strong color had rarely been seen before and may be indicative of constituents that may be of concern. Further investigative methods such as wastewater sampling may be of use to the City.
 - Site 4: 15-inch southwest inlet monitored: pink during most of the study, especially during calibrations on April 27 and May 16, 2018 (Photo 3-1).
 - Site 4: 6-inch southeast inlet, not monitored: purple flow, especially during calibrations on April 27 and May 16, 2018 (Photo 3-2). Probably from laundromat nearby; smells like laundry detergent.
 - Site 7: 10-inch southwest drop inlet, not monitored: red flow during removal on June 26, 2018 (Photo 3-3). The lateral also had offset joints (Photo 3-4). As seen in Photo 3-4, the color was often difficult to capture. Site 7 18-inch northwest inlet, monitored line had blue flow during calibrations on April 27 and May 16, 2018, but no photos captured the color.



Photo 3-1. Site 4 Southwest Influent Monitored, Pink Flow

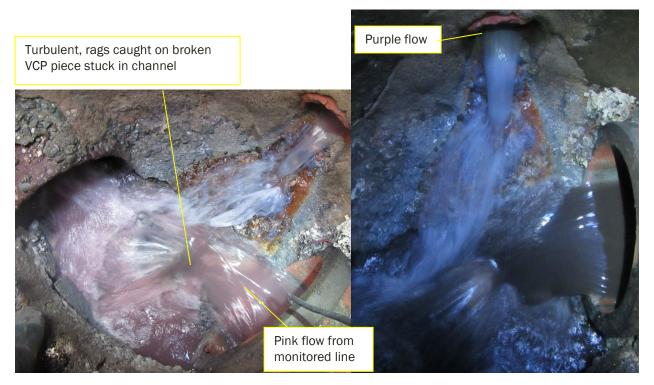


Photo 3-2. Site 4 Plan View during FM removal and installation



Photo 3-3. Site 7 southwest drop inlet, red flow

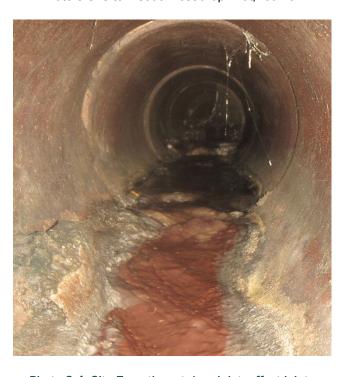


Photo 3-4. Site 7 southwest drop inlet, offset joints

3.2.2 Peak Measured Flows and Pipeline Capacity Analysis

Peak measured flows and the corresponding flow levels (depths) are important to understand the capacity limitations of a collection system. The peak flows and flow levels reported are from the peak measurements as taken across the entirety of the flow monitoring period. Peak flows and levels may not correspond to a rainfall event. The following capacity analysis terms are defined as follows:

- Peaking Factor: Peaking factor is defined as the peak measured flow divided by the ADWF. Peaking factors are influenced by many factors including size and topography of tributary area, flow attenuation, flow restrictions, characteristics of I/I entering the collection system, and hydraulic features such as pump stations. For this report, peaking factors are reported and peaking factors above 6 are highlighted. The City's 1999 Study referred to the WEF Manual of Practice FD-6 and ASCE Manual No. 62 suggesting typical peaking factor ratios ranging between 3 and 4, with higher values indicative pronounced I/I flows.
- d/D Ratio: The d/D ratio is the peak measured depth of flow (d) divided by the pipe diameter (D). Standards for d/D ratio vary from agency to agency, but typically range between d/D ≤ 0.5 and d/D ≤ 0.75. The d/D ratio for each Basin was computed based on the maximum depth of flow for the flow monitoring study.

Table 3-4 summarizes the peak recorded flows, levels, d/D ratios, and peaking factors per site during the flow monitoring period. Results of note have been shaded in RED. Figure 3-9 shows a schematic diagram of the peak measured flows with peak flow levels. Figure 3-10 and Figure 3-11 show the peaking factors and d/D ratios respectively.

Capacity analysis data are presented on a site basis and represents the hydraulic conditions only at the site locations; hydraulic conditions in other areas of the collection system will differ.

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Monitoring Basin	ADWF (mgd)	Peak Measured Flow (mgd)	Peaking Factor	Pipe Diameter, <i>D</i> (IN)	Max Depth, d (IN)	Max d/D Ratio	Surcharge above Pipe Crown (IN)
Site 1	0.685	7.103	10.4	22.5	28.12	1.25	5.6
Site 2	3.213	17.083	5.3	33	48.25	1.46	15.3
Site 3	0.078	0.835	10.7	27	28.42	1.05	1.42
Site 4	0.137	1.313	9.6	15	8.58	0.57	
Site 5	0.266	1.836	6.9	15	9.7	0.65	
Site 6	1.200	5.146	4.3	18	14.52	0.81	
Site 7	0.537	2.204	4.1	18	23.67	1.32	5.7
Site 8	0.133	0.372	2.8	12.5	12.29	0.98	
Site 9	0.084	0.768	9.2	12	7.34	0.61	
Site 10	0.132	1.216	9.2	15	64.23	4.28	49.2
Site 11	0.347	3.059	8.8	15	53.97	3.60	39.0

Table 3-4. Capacity Analysis Summary

The following capacity analysis results are noted:

Occurrence

Peak flows and peak levels occurred during Rain Event 1 or Rain Event 3 for all sites except Site 3 peak flow occurred on June 11, 2018 at 13:00. This was probably due to the downstream pump station influence. Site 3 peak level and a similar flow of 0.77 mgd occurred during Rain Event 3.

Peaking Factors

- More than half the sites had peaking factors greater than 6.
- Considering that Site 3 and Site 9 peaking factors may have been skewed by low ADWFs,
 Sites 1, 4, 10, and 11 had the highest peaking factors.

d/D Ratio:

- More than half the sites surcharged during the flow monitoring period.
- Site 10 and 11 surcharged the most with more than 3 feet above pipe crown.
- Most of the manholes were fairly deep; more than 15 feet. The shallowest manholes were Sites 7, 8, 9, and 11; approximately 8 to 15 feet.
- Site 11: V&A recommends the City check the rim-to-invert depth and any historical flow or maintenance data for Site 11. There were several items of notes regarding Site 11:
 - Site 11 has two effluents; the main effluent was flowing at approximately d/D 80%.
 - During site visits, field crew noticed there were grease and rags, the manhole was of a small diameter, and there was ¼ to ½-inch of sediment during some calibrations See Appendix A for site and pipe photos.
 - Site 11 is located on a major road (South Spruce Avenue) and close to Centennial Way Trail and a creek.

Overflow Connections

- Site 11: the other effluent/overflow would have been activated at approximately 13 inches channel flow depth. Site 11 reached 53.97 inches flow depth, so the second effluent was definitely activated. See Section 3.3.1 for more details.
- Site 9: the manhole had an overflow pipe, after the FM. The overflow connection and flow direction were unknown but was not activated during this monitoring period, at least not due to the main influent line. The max depth of the monitored main influent line was 7.34 inches, the overflow would have been activated if the flow depth reached the top of the bench at 10-inch above pipe invert. Notably the pipe channel had a gap near the overflow pipe and there was at least another 6-inches of soft sediment below the invert. This pipe channel gap could be a source of I/I, exfiltration, overflow pipe connection, or sediment buildup.



Photo 3-5. Site 9 Overflow Connection



Photo 3-6. Site 9 Pipe Channel Gap

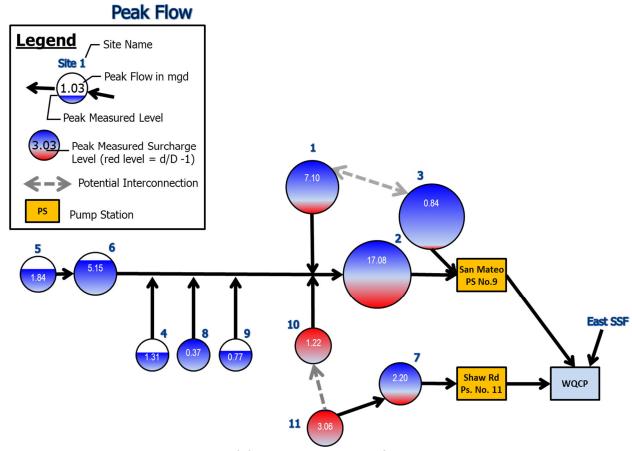


Figure 3-9. Peak Measured Flow Schematic

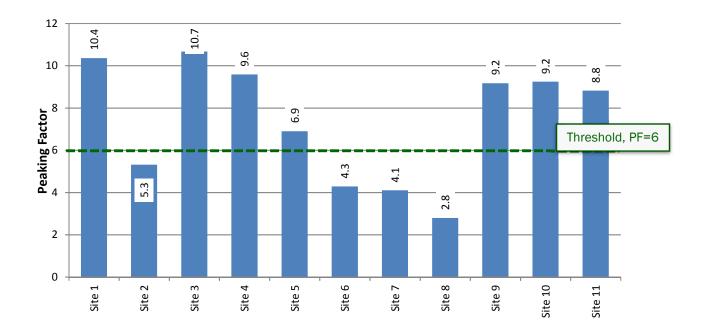


Figure 3-10. Peaking Factors

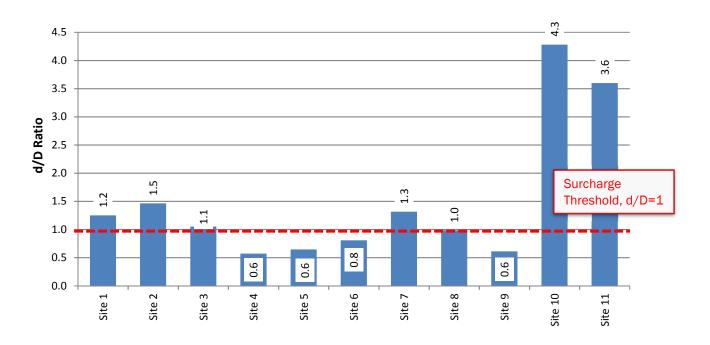


Figure 3-11. d/D Ratios

Inflow and Infiltration: Results 3.3

Preface 3.3.1

I/I analyses are presented on a Basin-by-Basin basis, whereby basins were isolated if there was an upstream flow monitoring site. Data should be used at the discretion of Akel and City engineer especially as there are uncertain interconnections and overflows to be verified. Items relevant to the analysis in this study are noted below and referenced in Figure 3-12:

- I/I Isolation: The I/I flow rate is the real-time flow less the estimated average dry weather flow rate (shown below as the RED line).
- Inflow: Inflow is usually recognized graphically by large-magnitude, short-duration spikes immediately following a rain event. The peak inflow rate is the highest spike in the isolated I/I hydrograph immediately following the evaluated rainfall event.
- RDI: RDI is typically taken as the average I/I flow rate measured approximately 24 to 36 hours after the rainfall event has concluded.
- Combined I/I: the totalized volume (in gallons) of both inflow and RDI over the course of a rainfall event (shown below as the orange area).

Interconnections:

- Site 1 and Site 3: flow shifts were not apparent between these two sites during the monitoring period. The Sites performed "regularly" throughout the monitoring period and the I/I trends were similar for small to large rain events. Diversion structures could still have been existent and active; however, Site 3 had such low flows with strong pump station influence that only a major shift would have been detected.
- Site 7, 10, and 11: at Site 11 there was one main effluent flowing at approximately 80% d/D, and another effluent/overflow that would have been activated at approximately 13 inches channel flow depth (Photo 3-7). This overflow most likely goes to Site 10 or may route back to Site 7. The flow data shows that some overflow went to Site 10; Site 7 has a truncated peak flow less than the upstream Site 11 flow (Figure 3-13). Using synthetic hydrographs of the previous and smaller rainfall I/I response makes it more apparent that this was not simply an attenuation effect and hypothesizes what Site 7 flows could have been if there was no overflow. Basin 7 and Basin 10 was combined for I/I analysis to gain insight into their I/I rankings (Figure 3-14).
- Site 2 is downstream of Site 10 and 5 additional sites; the overflow complication and subtraction uncertainties were too high to isolate Basin 2 for I/I analysis.

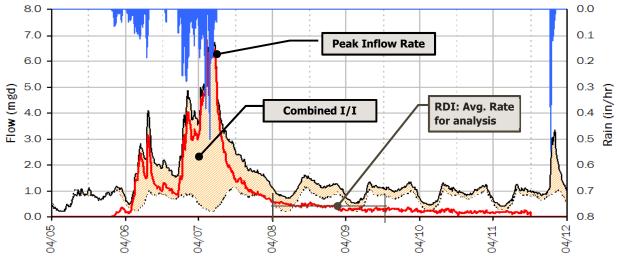


Figure 3-12. Peak Inflow and RDI Rate, Basin 11, Event 3



Photo 3-7. Site 11 Effluents

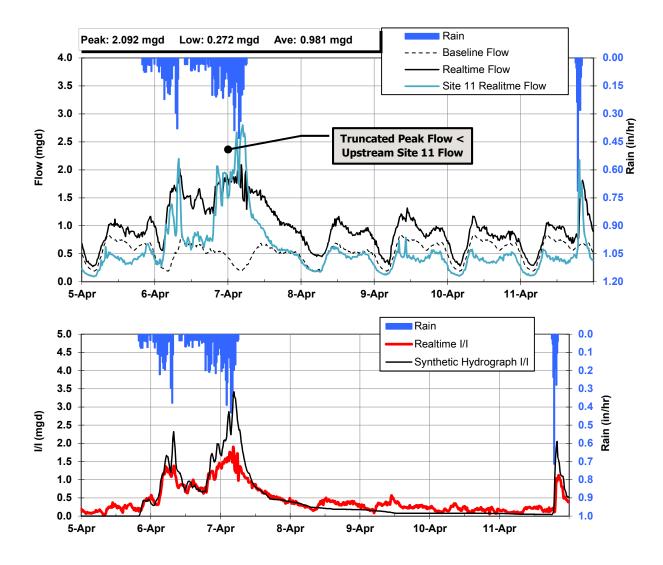


Figure 3-13. I/I Analysis, Site 7, Event 3

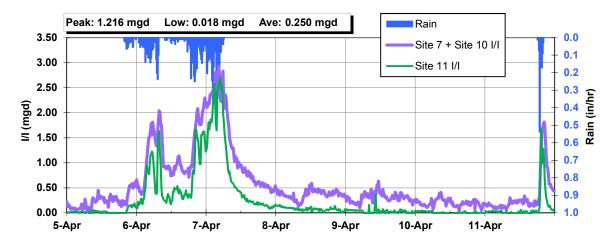


Figure 3-14. Site 7 + Site 10 I/I Analysis, Event 3

3.3.2 Inflow Results Summary

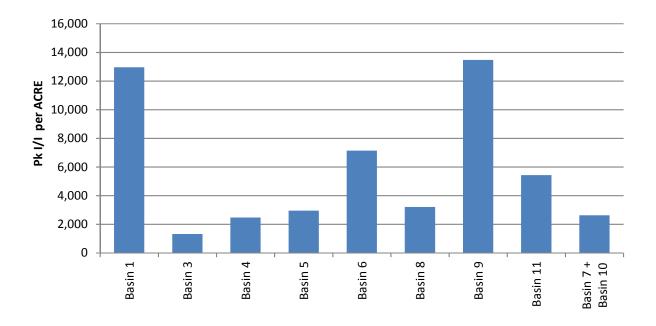
Inflow is storm water discharged into the sewer system through direct connections such as downspouts, area drains, cross-connections to catch basins, etc. These sources transport rain water directly into the sewer system and the corresponding flow rates are tied closely to the intensity of the storm. This component of I/I often causes a peak flow problem in the sewer system and often dictates the required capacity of downstream pipes and transport facilities to carry these peak instantaneous flows.

Inflow results were taken from Event 3 (April 5 - 7, 2018); this was one of the more intensive short-term rainfall event during the monitoring period and occurred when soils were saturated. Table 3-5 summarizes the peak measured inflow analysis results for the relevant flow monitoring basins. Results of note have been shaded in RED. Figure 3-15 shows the results of the per Basin inflow analysis. The following results are notes:

- Inflow: Basins 9, 11, and 1 had the highest normalized peak I/I rates, an indicator of high inflow upstream from the flow monitoring Basin.
- Only when Site 7 and Site 10 I/I were combined was the peak I/I rate higher than upstream Site 11 peak I/I rate (Figure 3-14). Basins 7 and 10 had a low inflow rate when isolated from Basin 11. If the overflow and upstream basin were not considered, Basin 10 could have been incorrectly interpreted as having a high 8.6 peak inflow per ADWF (placing 2nd).

Table 3-5. Inflow Analysis Summary

Metering Basin	ADWF (mgd)	Peak Inflow Rate (mgd)	Peak Inflow per ADWF	Peak Inflow per Basin Acre (gpd/Acre)	Inflow Rank per ADWF	Inflow Rank per Acre	Overall Inflow Rank
Basin 1	0.685	3.862	5.6	12,958	5	2	3
Basin 3	0.078	0.524	6.7	1,319	4	9	6
Basin 4	0.137	1.114	8.1	2,469	2	8	4
Basin 5	0.266	1.097	4.1	2,950	6	6	6
Basin 6	0.934	3.201	3.4	7,144	7	3	5
Basin 8	0.133	0.266	2.0	3,205	8	5	8
Basin 9	0.084	0.741	8.9	13,475	1	1	1
Basin 11	0.347	2.714	7.8	5,428	3	4	2
Basin 7 + Basin 10	0.322	0.513	1.6	2,632	9	7	9



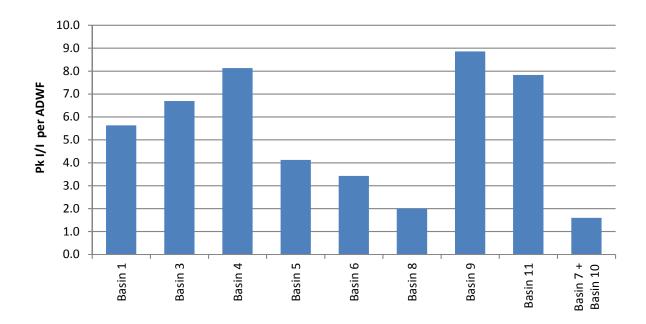


Figure 3-15. Bar Graphs: Inflow Analysis Summary

3.3.3 **RDI Results Summary**

Infiltration is defined as water entering the sanitary sewer system through defects in pipes, pipe joints, and manhole walls, which may include cracks, offset joints, root intrusion points, and broken pipes. Increased flows into the sanitary sewer system are usually tied to groundwater levels and soil saturation levels. Infiltration sources transport rain water into the system *indirectly*; flow levels in the sanitary system increase gradually. are typically sustained for a period after rainfall has stopped, and then gradually drop off as soils become less saturated and as groundwater levels recede to normal. Infiltration typically creates long-term annual volumetric problems. The major impact is the cost of pumping and treating the additional volume of water, and of paying for treatment (for municipalities that are billed strictly on flow volume).

For this study, the RDI rate used for comparative analysis was measured as the average I/I rate from April 8, 2018 at 00:00 to April 9. 2018 12:00 noon (approximately 24 hours after the conclusion of the April 5 - 7, 2018 rain Event 3.

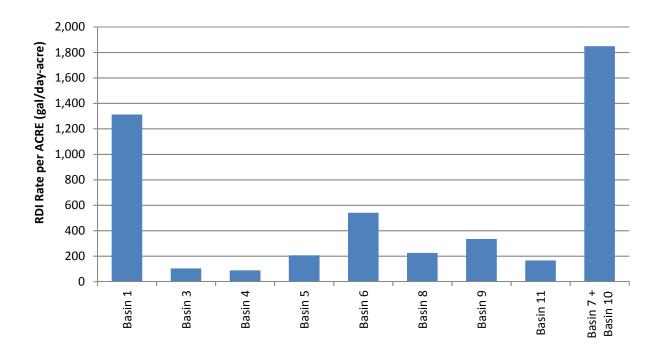
Table 3-6 summarizes the calculated RDI flow rates (refer to the I/I Analysis Methods section for more information on RDI analysis methods). Figure 3-16 shows a bar graph summary. The following RDI analysis results are noted:

- Basins 1, 7+10, and 6 ranked highest for normalized RDI contribution.
- Basin 7 and 10 may have been affected by the Site 11 overflow; the overflow may eventually route back to Site 7, increasing the attenuation time. Additionally, there seems to be a bottleneck occurring in this region that can also attenuate the peak inflow and make it count as RDI instead.

Table 3-6. Basins RDI Analysis Summary

Metering Basin	ADWF (mgd)	RDI Rate (mgd)	RDI per ADWF	RDI per Basin Acre (gpd/ Acre)	RDI Ranking per ADWF	RDI Ranking per Acre	Overall RDI Ranking A
Basin 1	0.685	0.391	0.57	1,313	2	2	2
Basin 3	0.078	0.041	0.52	103	3	8	4
Basin 4	0.137	0.040	0.29	88	4	9	6
Basin 5	0.266	0.077	0.29	207	5	6	5
Basin 6	0.934	0.242	0.26	541	6	3	3
Basin 8	0.133	0.019	0.14	225	9	5	9
Basin 9	0.084	0.018	0.22	335	8	4	7
Basin 11	0.347	0.083	0.24	166	7	7	8
Basin 7 + Basin 10	0.32	0.361	1.12	1,849	1	1	1

A Ranking of 1 represents most RDI after normalization.



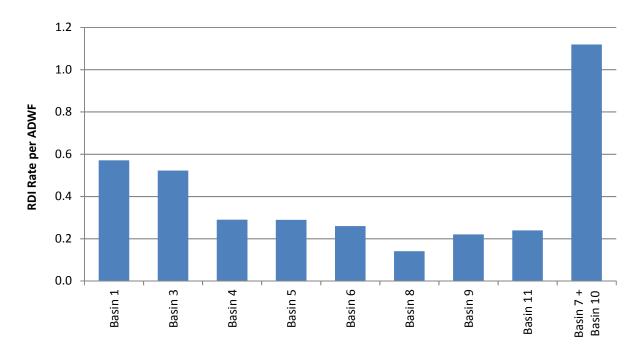


Figure 3-16. Bar Graphs: RDI Analysis Summary

3.3.4 Groundwater Infiltration Results Summary

Dry weather (ADWF) flow can be expected to have a predictable diurnal flow pattern. While each Basin is unique, experience has shown that, given a reasonable volume of flow and typical loading conditions, the daily flows fall into a predictable range when compared to the daily average flow. If a Basin has a large percentage of groundwater infiltration occurring during the periods of dry weather flow measurement, the amplitudes of the peak and low flows will be dampened 10. Figure 3-17 shows a sample of two flow monitoring Basins, both with nearly the same average daily flow, but with considerably different peak and low flows. In this sample case, Basin B1 may have a considerable volume of groundwater infiltration.

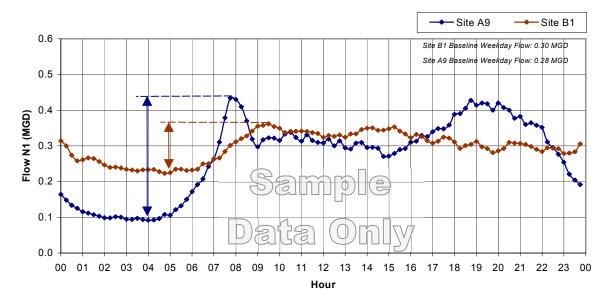


Figure 3-17. Groundwater Infiltration Sample Figure

It can be useful to compare the low-to-ADWF flow ratios for the flow metering sites. A site with abnormal ratios, and with no other reasons to suspect abnormal flow patterns (such as proximity to a pump station, treatment facilities, etc.), has a possibility of higher levels of groundwater infiltration in comparison to the rest of the collection system.

Already identified when ADWF curves were first created in Section 3.2.1, Site 8 had abnormally high low-to-ADWF flow ratios. Figure 3-18 plots the low-to-ADWF flow ratios¹¹ against the ADWF flows for the relevant flow monitoring Sites. The brown dashed line shows "typical" low-to-ADWF ratios per the Water Environment Federation (WEF).

The following GWI results are noted:

Groundwater Infiltration: Site 8 had a GWI rate higher than typical standards.

¹⁰ In an extreme case, perhaps 0.2 mgd of ADWF flow and 2.0 mgd of groundwater infiltration, the peaks and lows would be barely recognizable; the ADWF flow would be nearly a straight line.

¹¹ The Minimum to Average flow ratio is calculated by taking the minimum flow and dividing by the ADWF value (using the Mon-Thu ADWF curve).

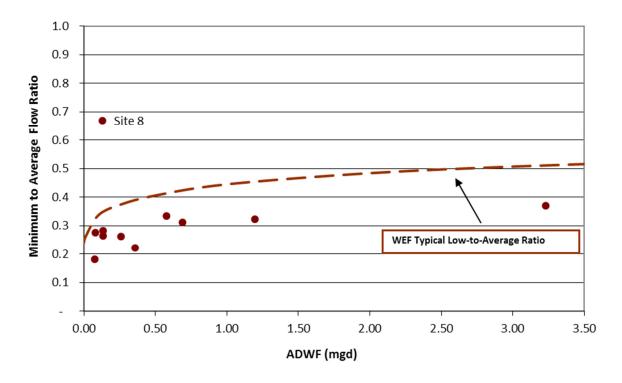
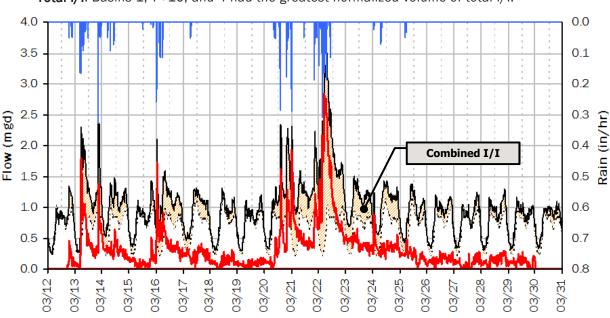


Figure 3-18. Minimum Flow Ratios vs ADWF12

 $^{^{12}}$ Due to attenuation, it should be expected that sites with larger flow volumes should not have quite the peak-to-average and low-to-average flow ratios as sites with lesser flow volumes. This is why the WEF typical trend line's slope is closer to 1.0 as the ADWF increases, as shown in the figure.

3.3.5 Combined I/I Results

Combined I/I analysis considers the totalized volume (in gallons) of both inflow and rainfall-dependent infiltration over the course of a storm event. This study used Event 2, March 12 to 25, 2018, for Combined I/I analysis as Event 2 was the longest duration and largest total rainfall during this monitoring period. Some sites had an I/I response lasting till March 30, four days after the rainfall event concluded (Figure 3-19). Table 3-7 summarizes the combined I/I flow results for Event 2. Results of note have been shaded in RED. Figure 3-20 shows a bar graph summary of the results. The following total I/I results are noted:

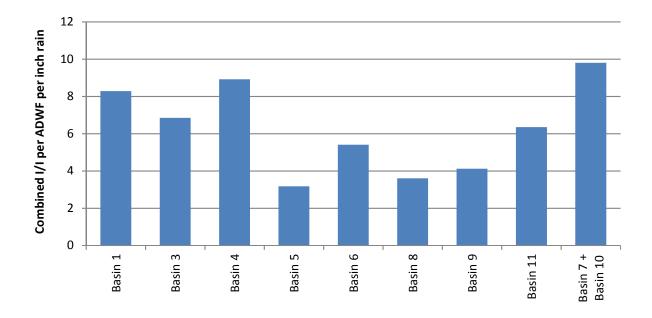


■ Total I/I: Basins 1, 7+10, and 4 had the greatest normalized volume of total I/I.

Figure 3-19. Combined I/I Analysis, Site 1, Event 2

Combined Combined R-value Combined Overall I/I per I/I Ranking **Monitoring ADWF** Combined I/I (Combined per ADWF ADWF. I/I Ranking Combined Basin (mgd) I/I per Basin (gallons) I/I Rank per R-value per inch per inch rain) rain rain 0.685 Basin 1 5,678,000 4.03 34.1% 1 1 1 Basin 3 0.078 536,000 3.33 2.4% 3 9 5 0.137 Basin 4 1,221,000 3.71 4.1% 2 6 3 7 0.266 1.49 9 Basin 5 845,000 3.9% 8 Basin 6 0.934 2.53 5 3 4 5,044,000 19.4% 0.133 Basin 8 479,000 1.31 7.7% 9 5 8 0.084 Basin 9 345.000 1.44 8.1% 8 4 6 0.347 Basin 11 2,202,000 1.56 4.0% 6 7 6 Basin 7 + 0.322 3,159,000 3.22 19.6% 4 Basin 10

Table 3-7. Combined I/I Analysis Summary (March 20-21, 2018)



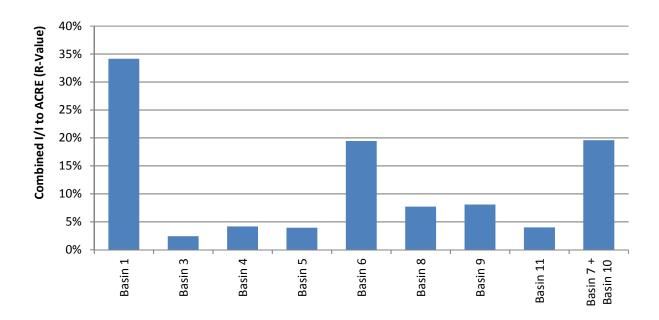


Figure 3-20. Bar Graphs: Combined I/I Analysis Summary

4 Recommendations

V&A advises that future I/I reduction plans consider the following recommendations:

- 1. Master Plan and Model Implementation: The study results can be used to update the master plan and compare with previous model assumptions and flow monitoring results.
- 2. Verify Interconnections and Overflows: understanding the interconnections and overflows can help with the master plan, basin isolation and I/I analysis.
- 3. Capacity Analysis: Several sites surcharged during the monitoring period. The City may want to analyze the capacity constraints in the updated master plan.
 - a. There may be a bottleneck and capacity issue in the main trunk lines. V&A recommends Akel and City engineers to review the pump station data and run
 - b. Site 11 may be of concern as it surcharged 3.25 feet, was a shallower and smaller manhole, has two effluents (one already quite full), had grease, rags and slight sediment, and located on a major road close to a creek.
 - c. V&A had completed multiple small-scale flow monitoring capacity studies for new developments in SSF in the past years. The City may want to review the data and development flows.
- 4. Determine I/I Reduction Program: The City should examine its I/I reduction needs to determine their needs and goals for a future I/I reduction program.
 - a. If peak flows, sanitary sewer overflows, and pipeline capacity issues are of greater concern, then priority can be given to investigate and reduce sources of inflow within the basins with the higher inflow rates. Basins 9, 11, and 1 ranked highest for inflow contribution and should be prioritized for inflow reduction.
 - b. If infiltration and general pipeline deterioration are of greater concern, then the program can be weighted to investigate and reduce sources of infiltration within the basins with the higher RDI and Combined I/I rates. Basins 1, 7+10, 4 and 6 ranked highest for infiltration contribution and should be prioritized for infiltration reduction.
- 5. I/I Investigation Methods: Potential I/I investigation methods include the following:
 - a. smoke testing
 - b. mini-basin flow monitoring
 - c. night-time reconnaissance work to (1) investigate and determine direct point sources of inflow, and (2) determine the areas and/or pipe reaches responsible for high levels of infiltration contribution.
 - d. CCTV inspection
- 6. I/I Reduction Cost Effective Analysis: The City should conduct a study to determine which is more cost-effective: (1) locating the sources of inflow/infiltration and systematically rehabilitating or replacing the faulty pipelines; or (2) continued treatment of the additional rainfall dependent I/I flow.

Appendix A Flow Monitoring Basin Reports: Data, Graphs, Information





510.903.6601, Fax

City of South San Francisco

Sanitary Sewer Flow Monitoring February 26- June 28, 2018

Monitoring Site: Site 1

Location: 210 Baden Avenue, east of Linden Avenue

Data Summary Report



Vicinity Map: Site 1

SITE 1

Site Information

MH ID: WD2594

Location: 210 Baden Avenue, east of

Linden Avenue

Coordinates: 122.4095° W, 37.6540° N

Rim Elevation (Earth): 22 feet

Pipe Diameter: 22.5 inches

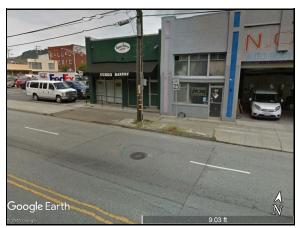
Sediment: 0.00 inches

ADWF: 0.685 mgd

Peak Measured Flow: 7.103 mgd



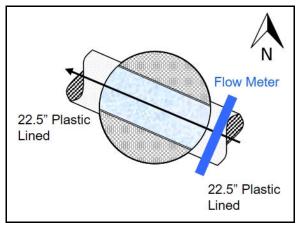
Sewer Map



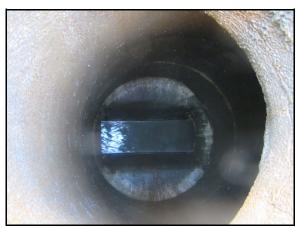
Street View



Satellite Map



Flow Sketch



Plan View

SITE 1

Additional Site Photos

Effluent Pipe



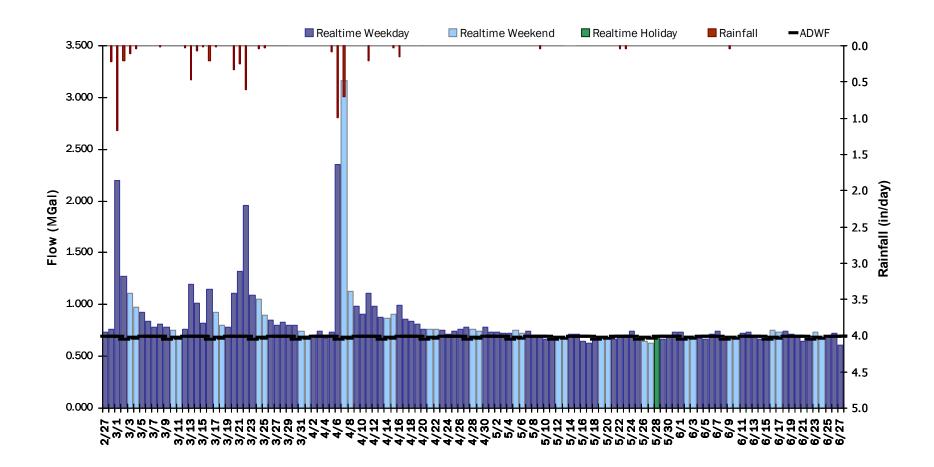
Influent Pipe



SITE 1
Period Flow Summary: Daily Flow Totals

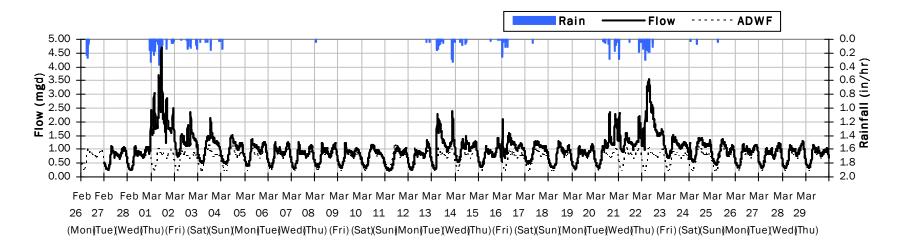
Avg Period Flow: 0.836 MGal Peak Daily Flow: 3.163 MGal Min Daily Flow: 0.604 MGal

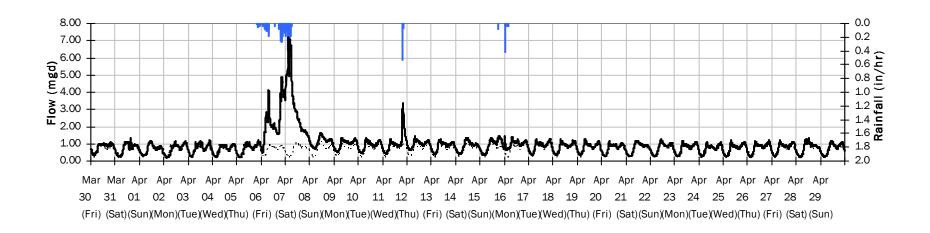
Total Period Rainfall: 6.14 inches



SITE 1 Flow Summary: 2/26/2018 to 4/29/2018

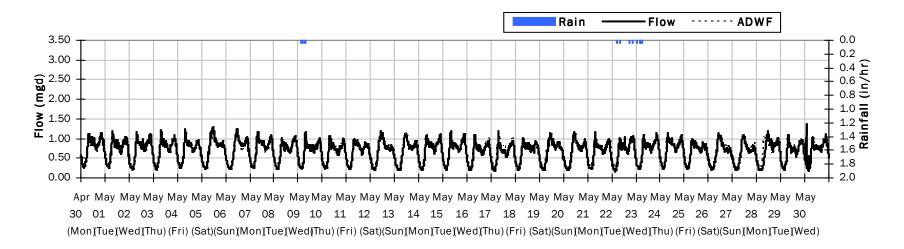
Total Period Rainfall: 6.26 inches Avg Flow: 0.971 mgd Peak Flow: 7.103 mgd Min Flow: 0.202 mgd

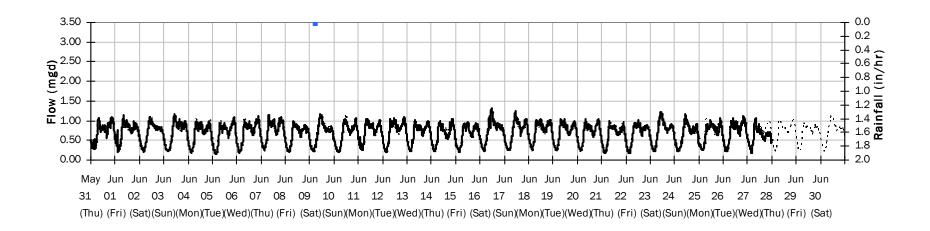




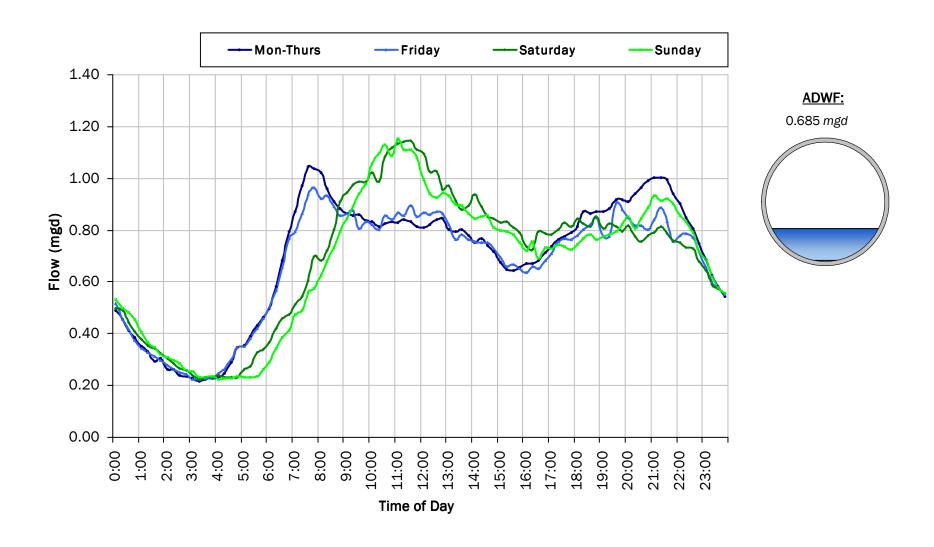
SITE 1 Flow Summary: 4/30/2018 to 6/30/2018

Total Period Rainfall: 0.16 inches Avg Flow: 0.694 mgd Peak Flow: 1.377 mgd Min Flow: 0.160 mgd

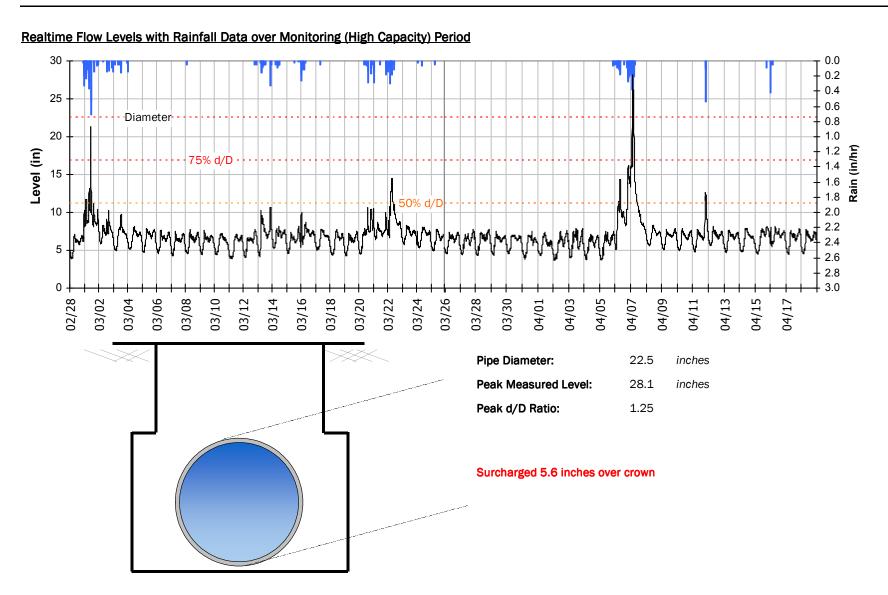




SITE 1
Average Dry Weather Flow Hydrographs

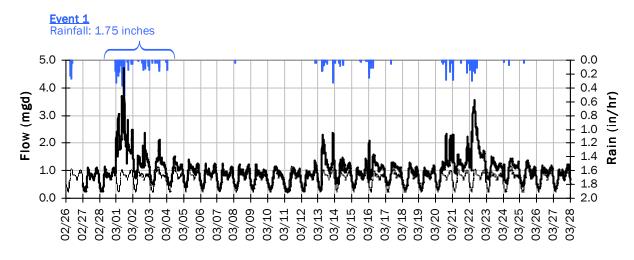


SITE 1
Site Capacity and Surcharge Summary

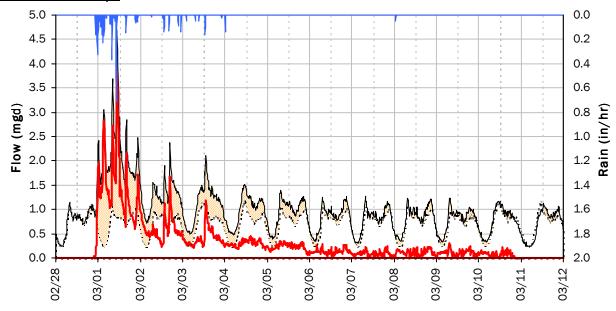


SITE 1

I/I Summary: Event 1



Event 1 Detail Graph



Storm Event I/I Analysis (Rain = 1.75 inches)

Capacity

Inflow / Infiltration

Peak Flow: 4.70 *mgd* **PF:** 6.86

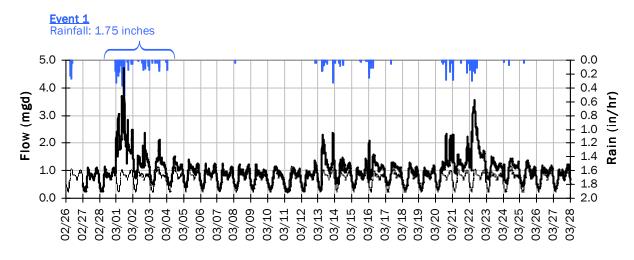
Peak I/I Rate: 3.86 mgd
Total I/I: 3,581,000 gallons

Peak Level: 21.28 *in* **d/D Ratio:** 0.95

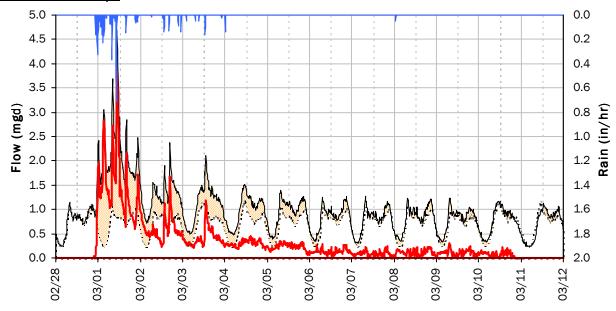


SITE 1

I/I Summary: Event 1



Event 1 Detail Graph



Storm Event I/I Analysis (Rain = 1.75 inches)

Capacity

Inflow / Infiltration

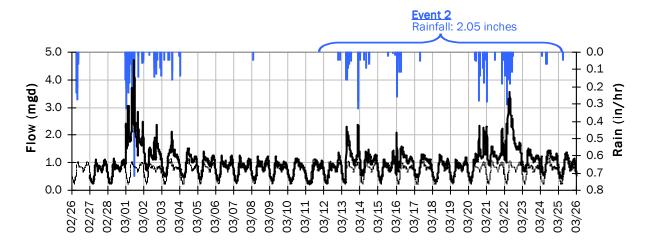
Peak Flow: 4.70 *mgd* **PF:** 6.86

Peak I/I Rate: 3.86 mgd
Total I/I: 3,581,000 gallons

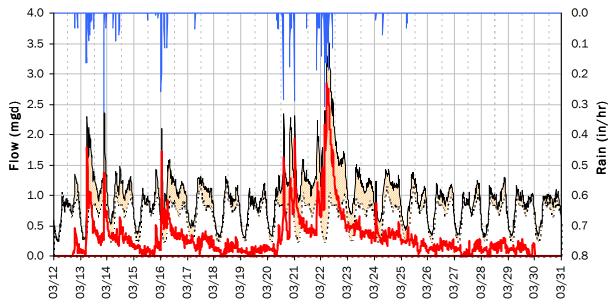
Peak Level: 21.28 *in* **d/D Ratio:** 0.95



SITE 1 I/I Summary: Event 2



Event 2 Detail Graph



Storm Event I/I Analysis (Rain = 2.05 inches)

Capacity

Inflow / Infiltration

Peak Flow: 3.56 mgd 5.19

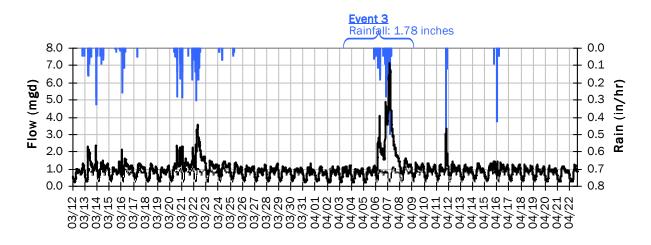
Total I/I:

Peak I/I Rate: 2.86 mgd 5,678,000 gallons

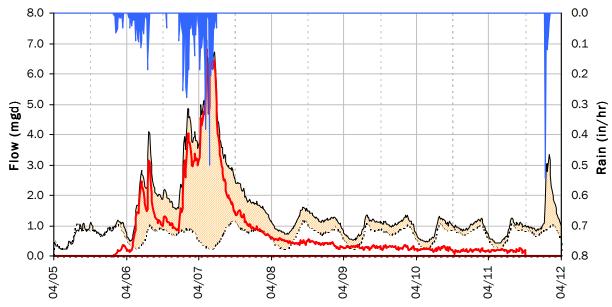
Peak Level: 14.49 in d/D Ratio: 0.64



SITE 1 I/I Summary: Event 3



Event 3 Detail Graph



Storm Event I/I Analysis (Rain = 1.78 inches)

Capacity

Inflow / Infiltration

Peak Flow: 7.10 mgd

Peak I/I Rate: 6.83 mgd

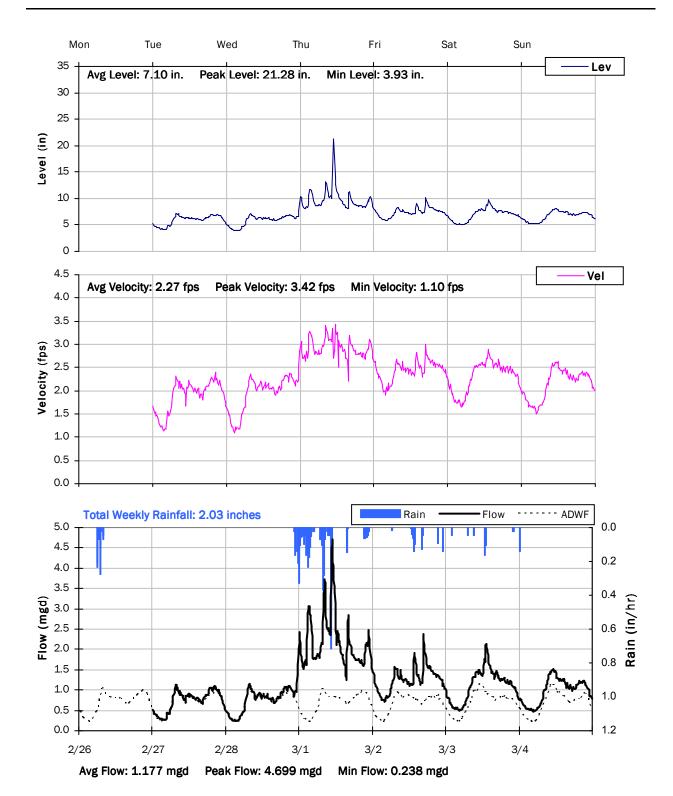
Total I/I: 5,199,000 gallons

PF: 10.36 **Peak Level:** 28.12 *in*

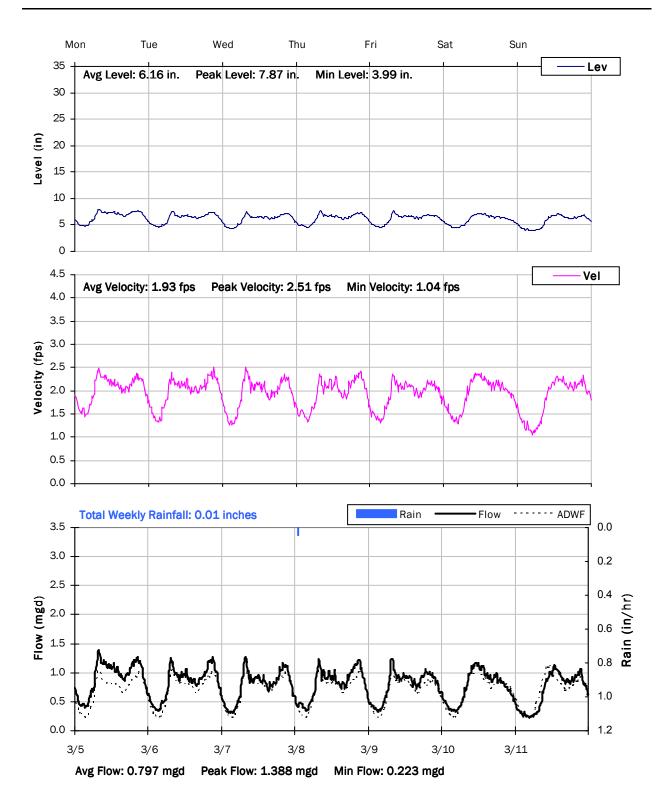
d/D Ratio: 28.12 *i*



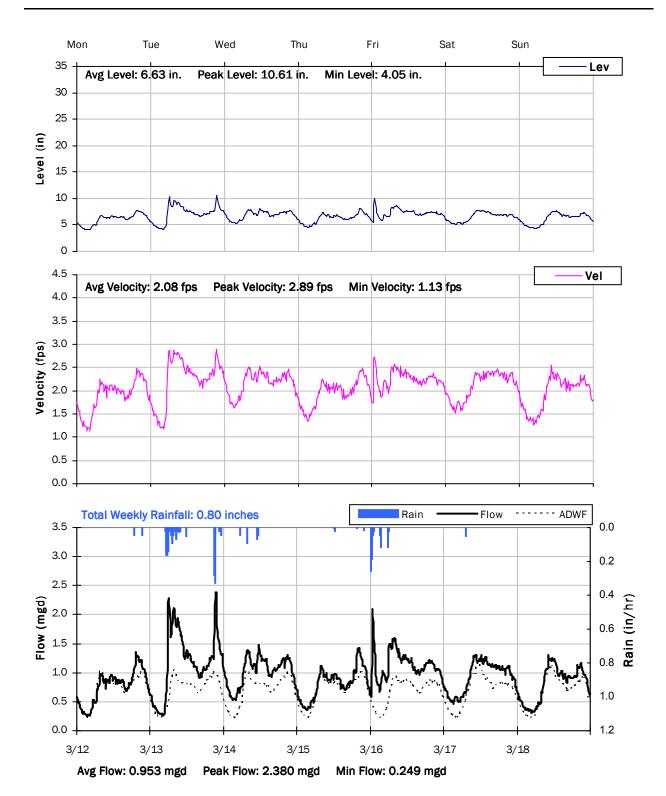
SITE 1 Weekly Level, Velocity and Flow Hydrographs 2/26/2018 to 3/5/2018



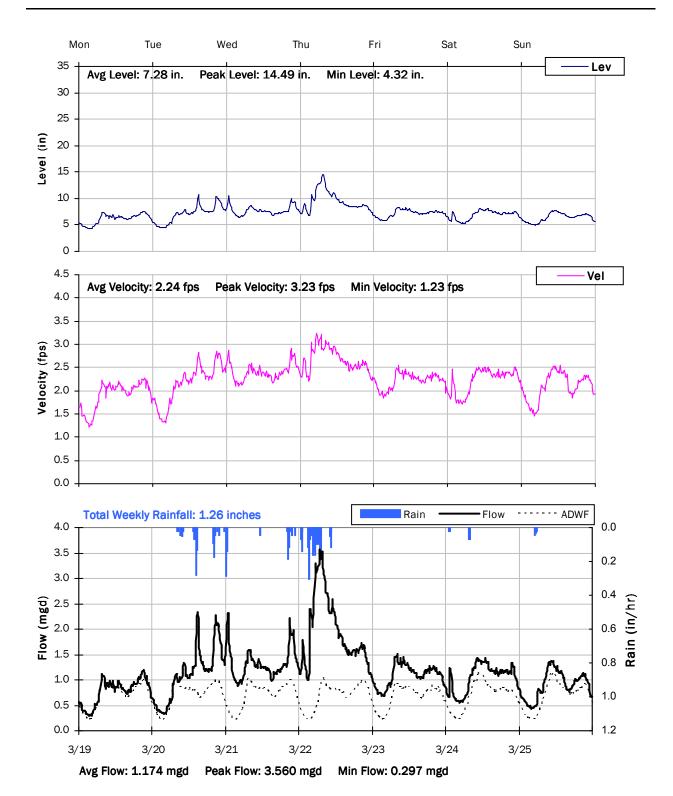
SITE 1 Weekly Level, Velocity and Flow Hydrographs 3/5/2018 to 3/12/2018



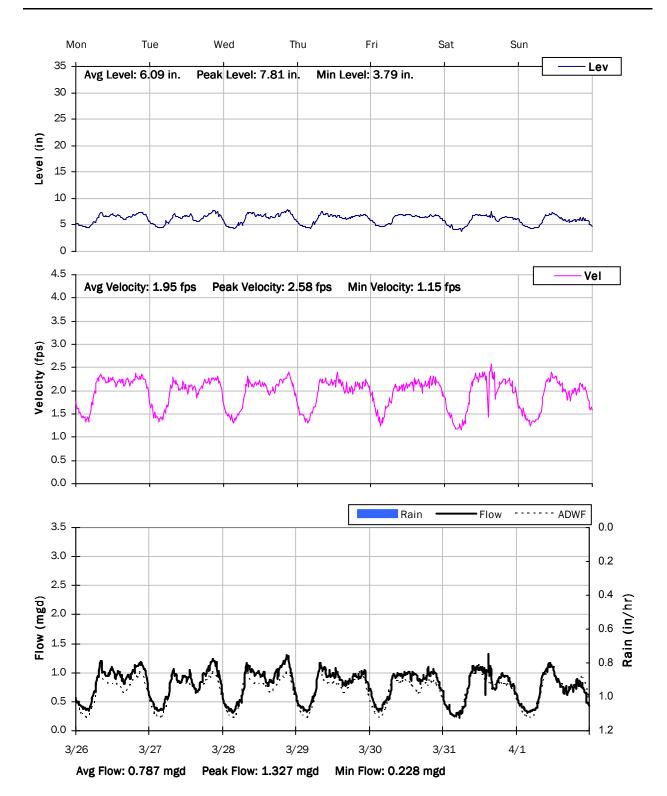
SITE 1 Weekly Level, Velocity and Flow Hydrographs 3/12/2018 to 3/19/2018



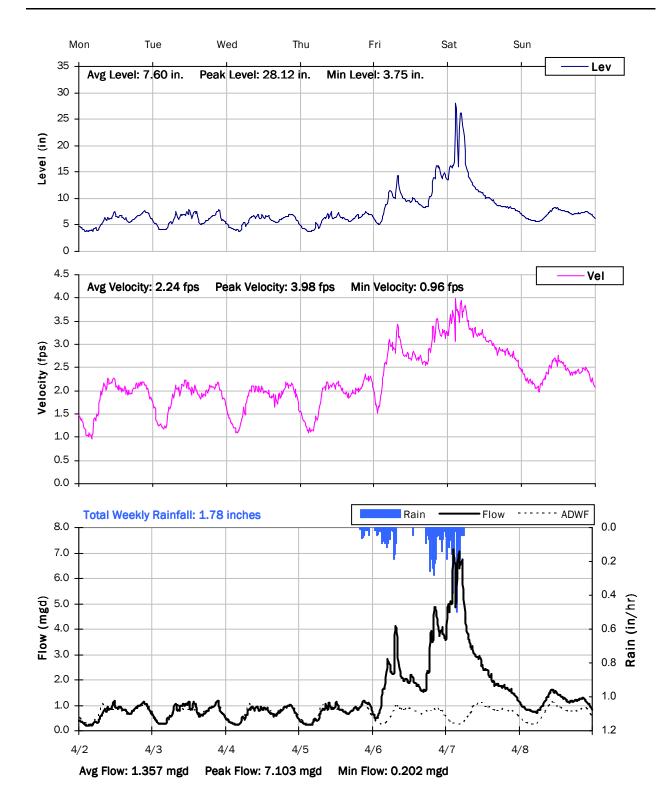
SITE 1 Weekly Level, Velocity and Flow Hydrographs 3/19/2018 to 3/26/2018



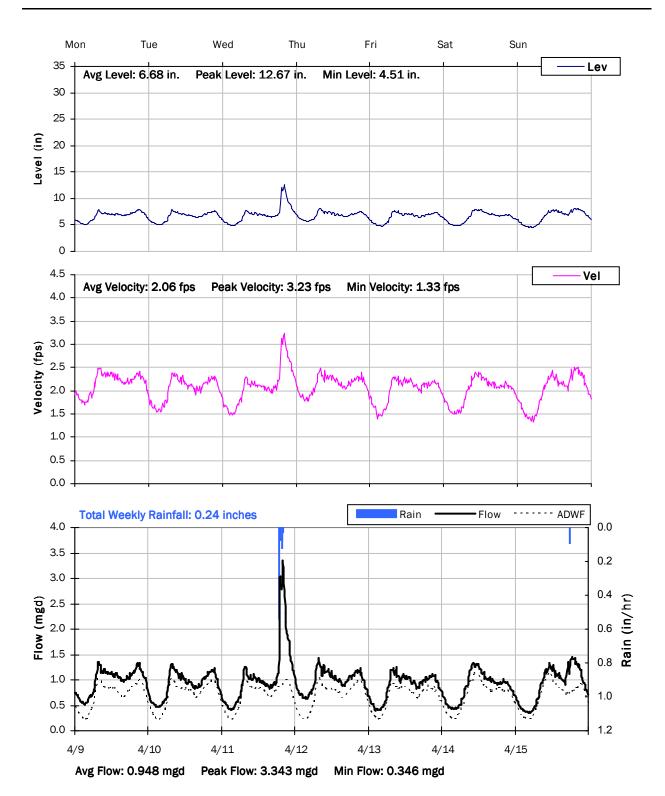
SITE 1 Weekly Level, Velocity and Flow Hydrographs 3/26/2018 to 4/2/2018



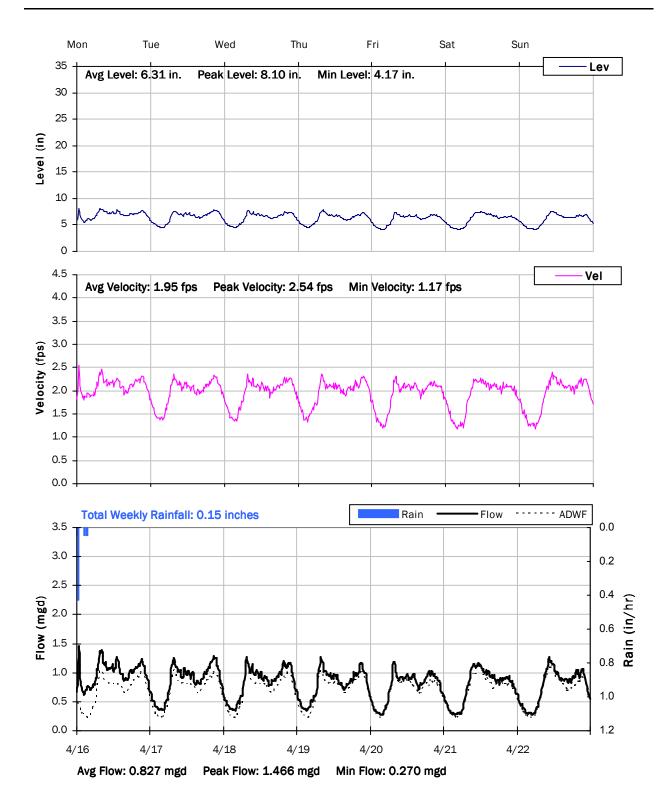
SITE 1 Weekly Level, Velocity and Flow Hydrographs 4/2/2018 to 4/9/2018



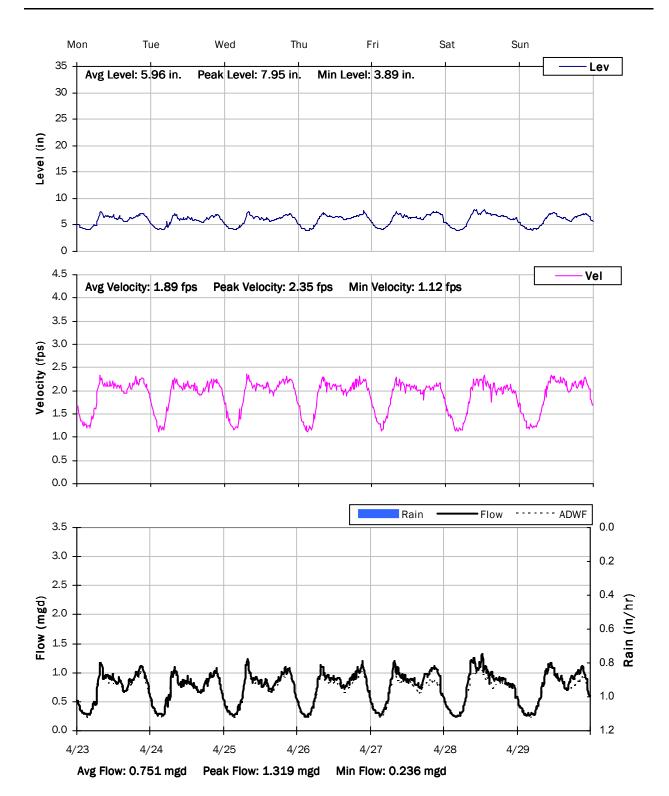
SITE 1 Weekly Level, Velocity and Flow Hydrographs 4/9/2018 to 4/16/2018



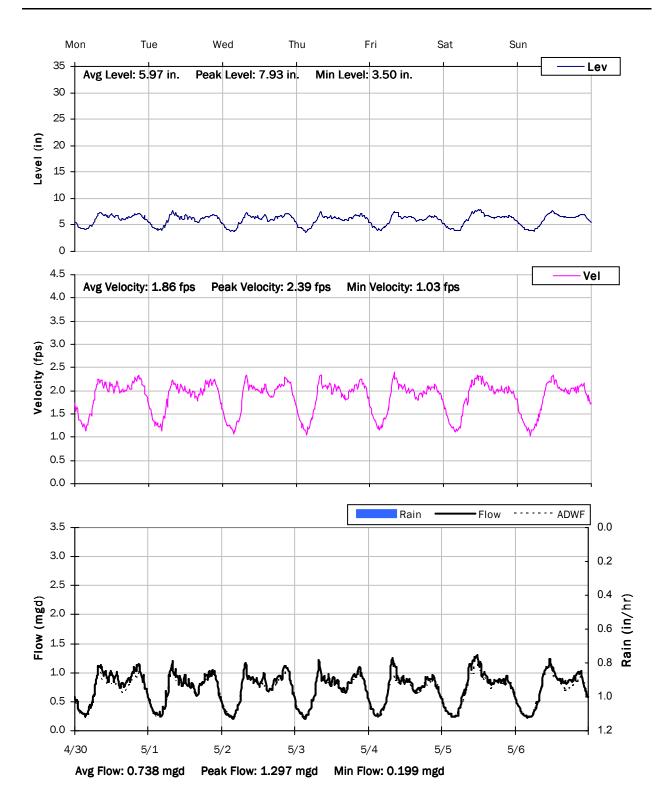
SITE 1 Weekly Level, Velocity and Flow Hydrographs 4/16/2018 to 4/23/2018



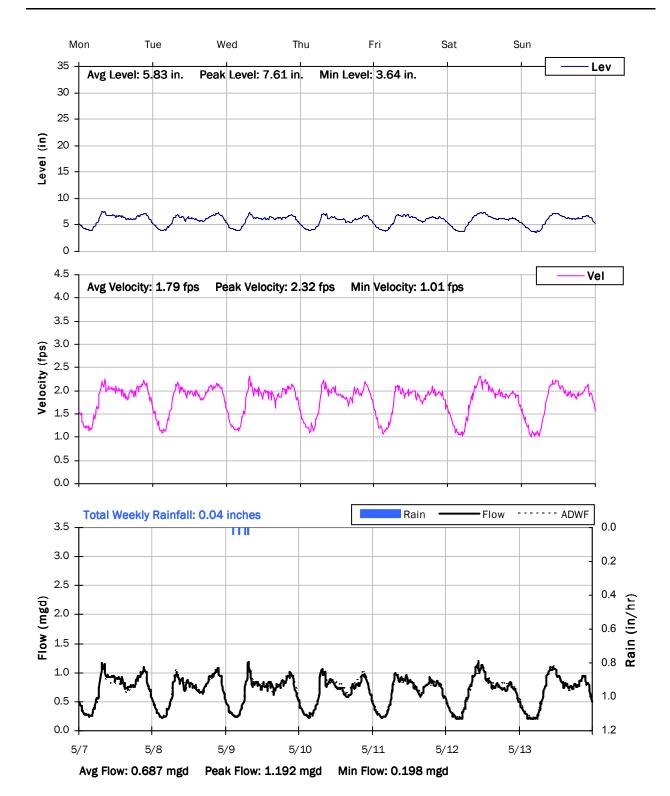
SITE 1 Weekly Level, Velocity and Flow Hydrographs 4/23/2018 to 4/30/2018



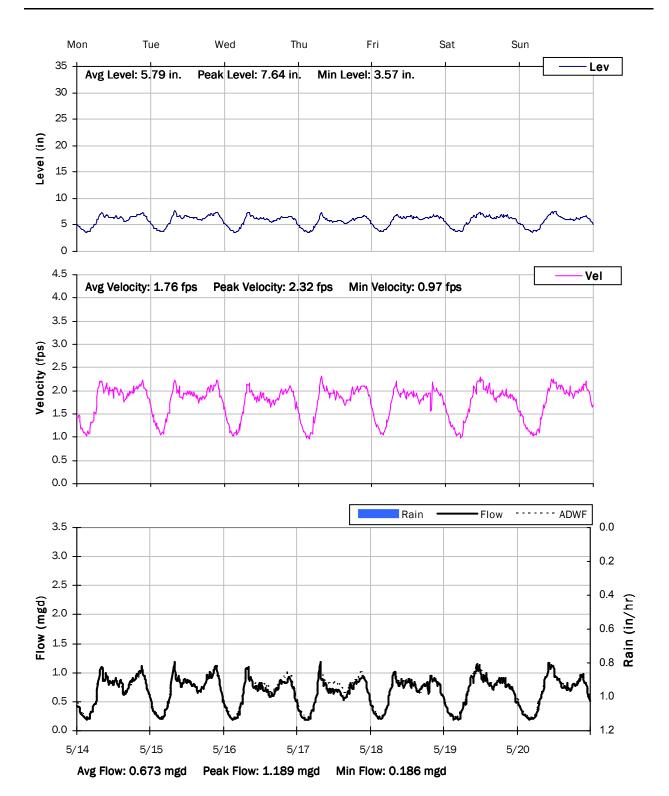
SITE 1 Weekly Level, Velocity and Flow Hydrographs 4/30/2018 to 5/7/2018



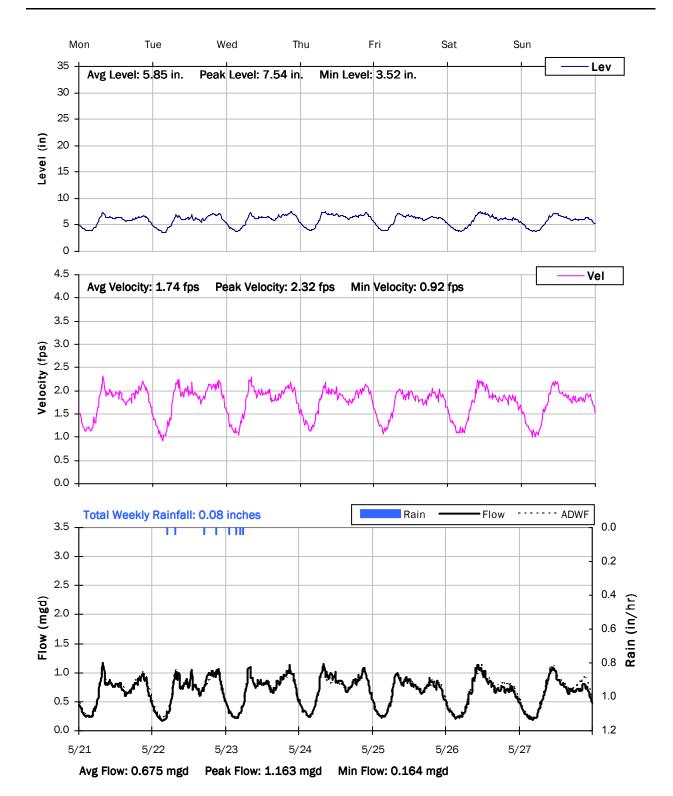
SITE 1 Weekly Level, Velocity and Flow Hydrographs 5/7/2018 to 5/14/2018



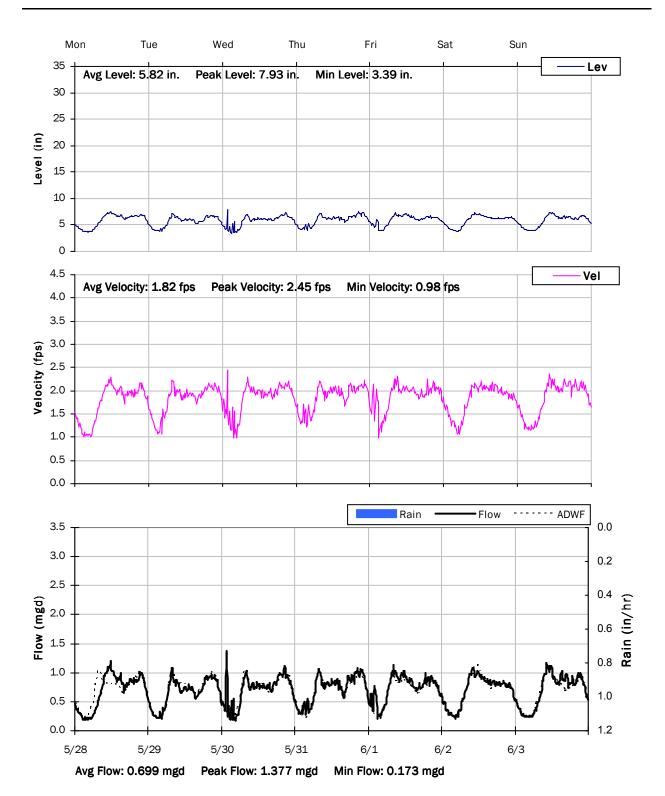
SITE 1 Weekly Level, Velocity and Flow Hydrographs 5/14/2018 to 5/21/2018



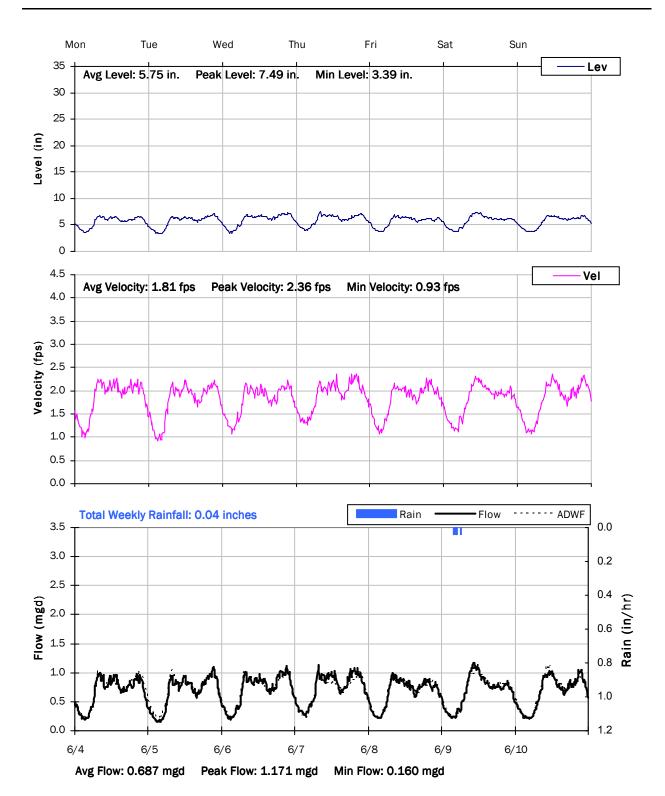
SITE 1 Weekly Level, Velocity and Flow Hydrographs 5/21/2018 to 5/28/2018



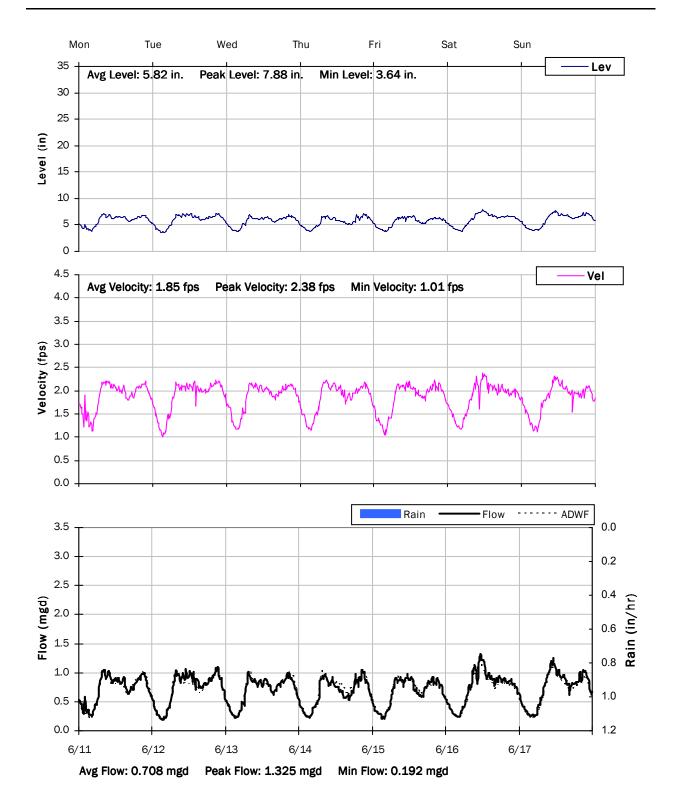
SITE 1 Weekly Level, Velocity and Flow Hydrographs 5/28/2018 to 6/4/2018



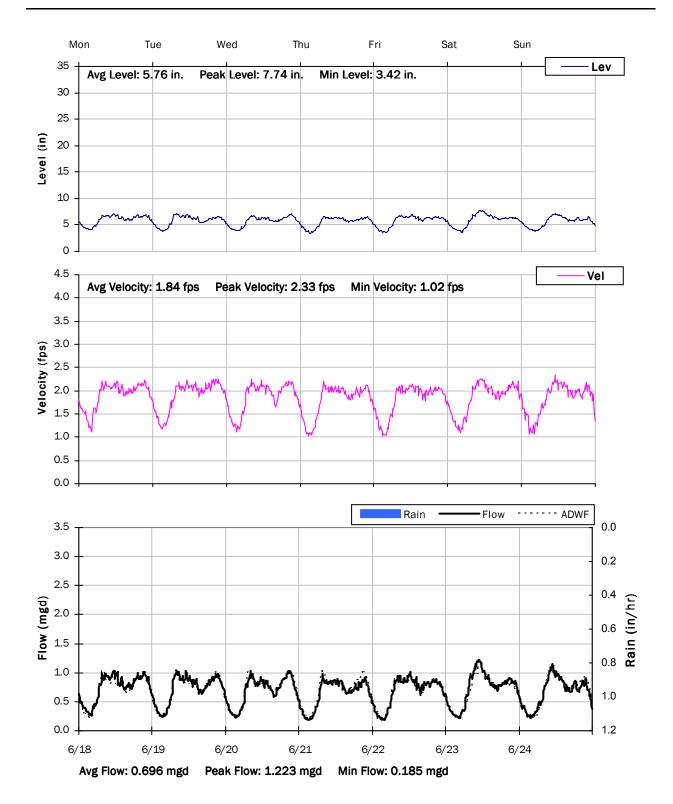
SITE 1 Weekly Level, Velocity and Flow Hydrographs 6/4/2018 to 6/11/2018



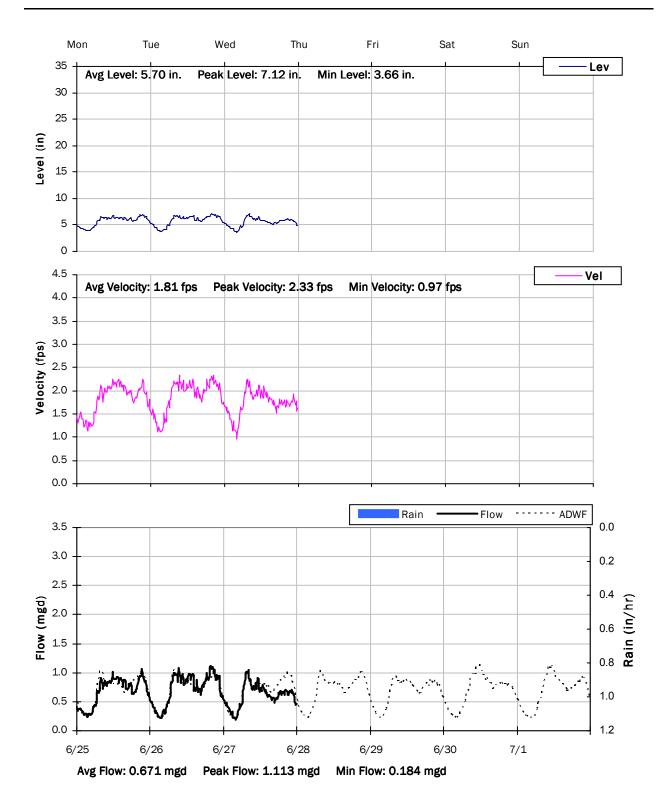
SITE 1 Weekly Level, Velocity and Flow Hydrographs 6/11/2018 to 6/18/2018



SITE 1 Weekly Level, Velocity and Flow Hydrographs 6/18/2018 to 6/25/2018



SITE 1 Weekly Level, Velocity and Flow Hydrographs 6/25/2018 to 7/2/2018



City of South San Francisco

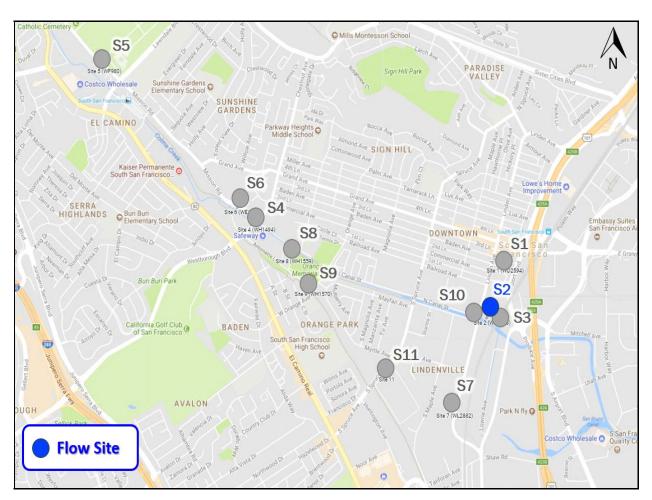
Sanitary Sewer Flow Monitoring February 26- June 28, 2018

Monitoring Site: Site 2

Location: Northeast corner of Storm Pump Station #6, 27 S. Linden

Ave.

Data Summary Report



Vicinity Map: Site 2

SITE 2

Site Information

MH ID: WD2633

Location: Northeast corner of Storm Pump

Station #6, 27 S. Linden Ave.

Coordinates: 122.4107° W, 37.6502° N

Rim Elevation (Earth): 14 feet

Pipe Diameter: 33 inches

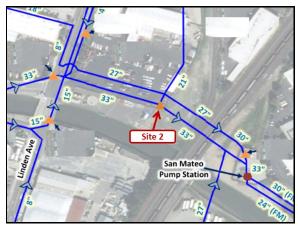
Sediment: 0.00 inches

ADWF: 3.213 mgd

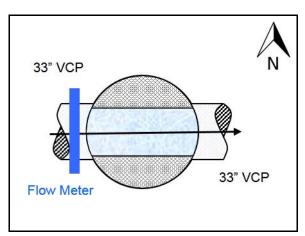
Peak Measured Flow: 17.083 mgd



Satellite Map



Sewer Map



Flow Sketch



Street View

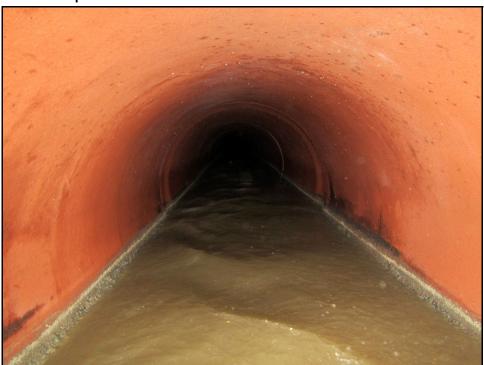


Plan View

SITE 2

Additional Site Photos

Effluent Pipe



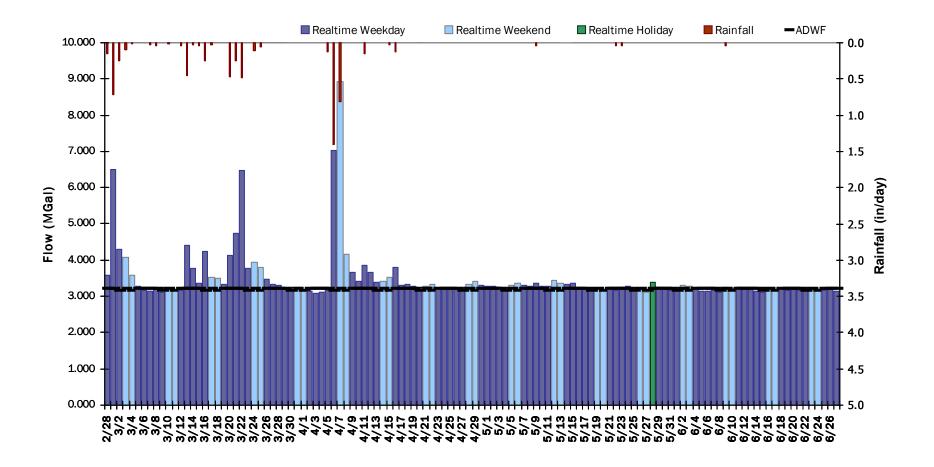
Influent Pipe



SITE 2
Period Flow Summary: Daily Flow Totals

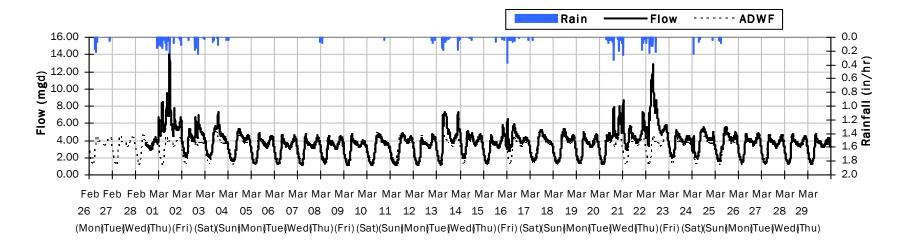
Avg Period Flow: 3.481 MGal Peak Daily Flow: 8.935 MGal Min Daily Flow: 3.073 MGal

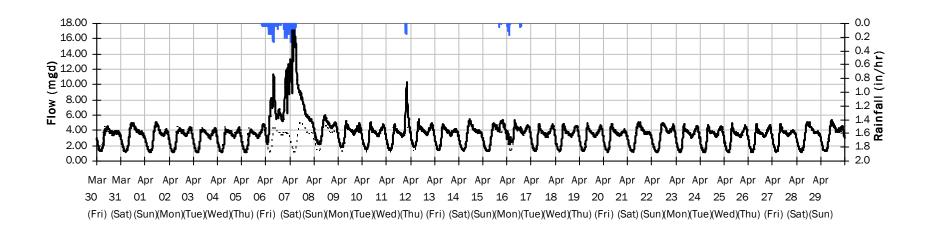
Total Period Rainfall: 6.34 inches



SITE 2 Flow Summary: 2/26/2018 to 4/29/2018

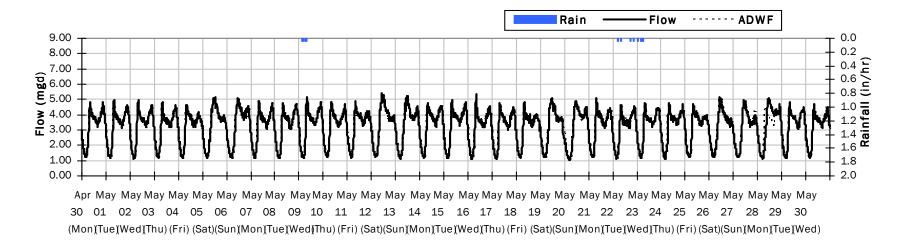
Total Period Rainfall: 6.47 inches Avg Flow: 3.726 mgd Peak Flow: 17.083 mgd Min Flow: 1.120 mgd

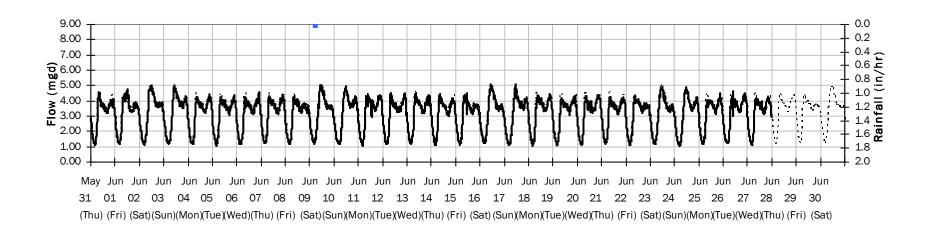




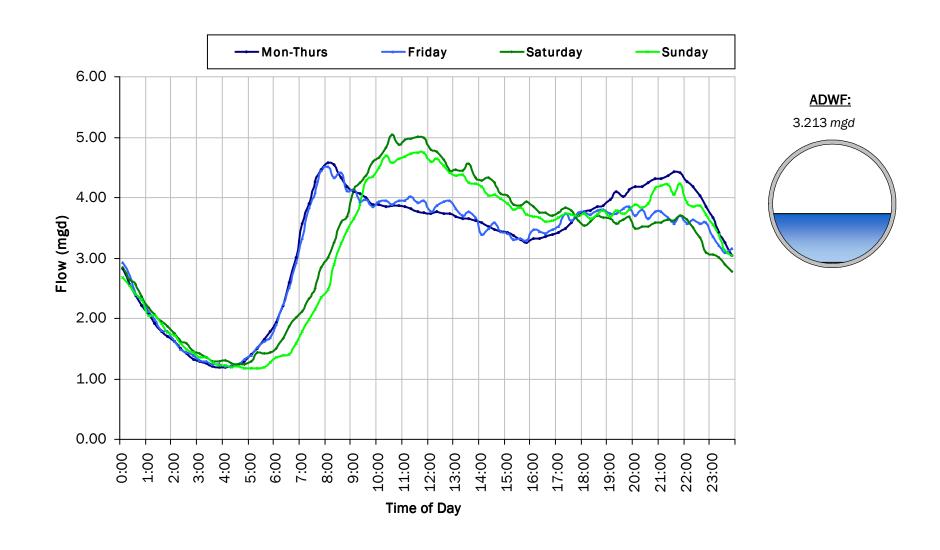
SITE 2 Flow Summary: 4/30/2018 to 6/30/2018

Total Period Rainfall: 0.16 inches Avg Flow: 3.229 mgd Peak Flow: 5.382 mgd Min Flow: 1.034 mgd

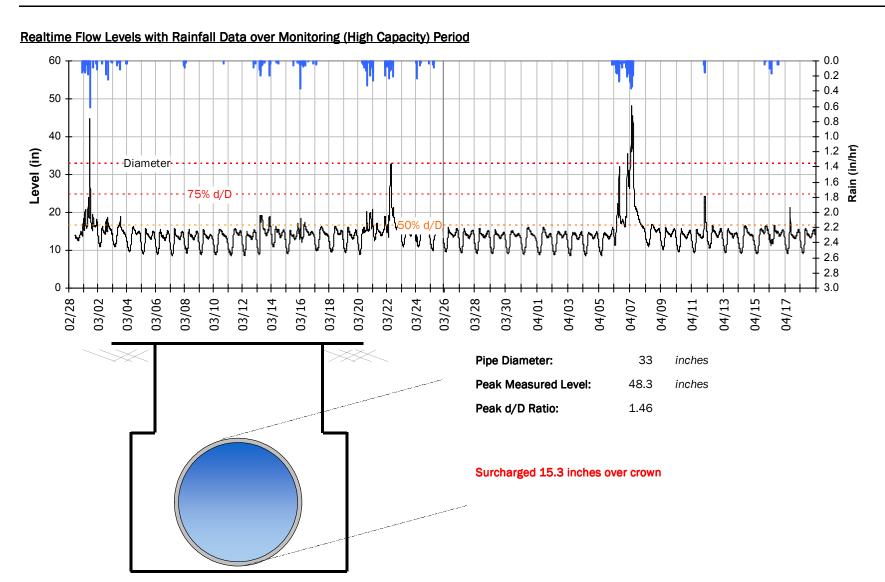




SITE 2
Average Dry Weather Flow Hydrographs

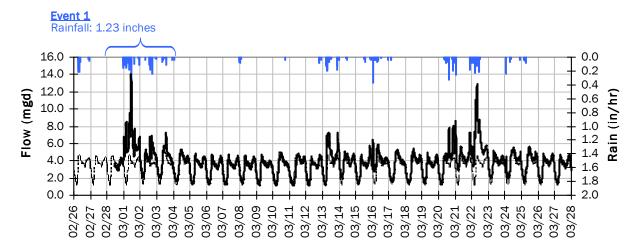


SITE 2
Site Capacity and Surcharge Summary

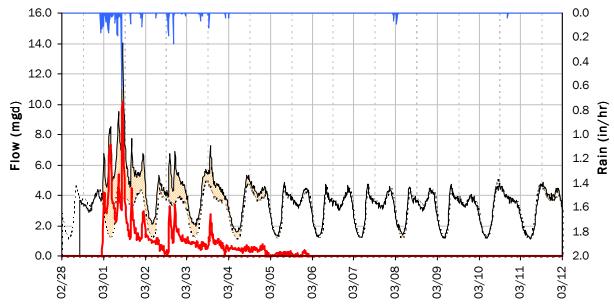


SITE 2 I/I Summary: Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Event 1 Detail Graph



Storm Event I/I Analysis (Rain = 1.23 inches)

Capacity

Inflow / Infiltration

Peak Flow: 14.02 *mgd* **PF:** 4.37

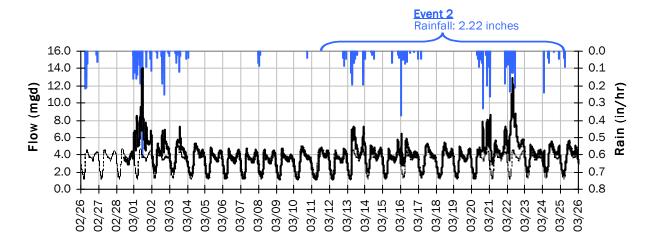
 Peak I/I Rate:
 10.18 mgd

 Total I/I:
 5,773,000 gallons

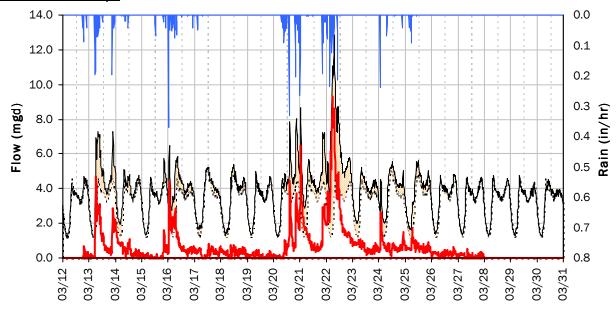
Peak Level: 44.83 *in* **d/D Ratio:** 1.36

SITE 2 I/I Summary: Event 2

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Event 2 Detail Graph



Storm Event I/I Analysis (Rain = 2.22 inches)

Capacity

Inflow / Infiltration

Peak Flow: 12.88 *mgd* **PF:** 4.01

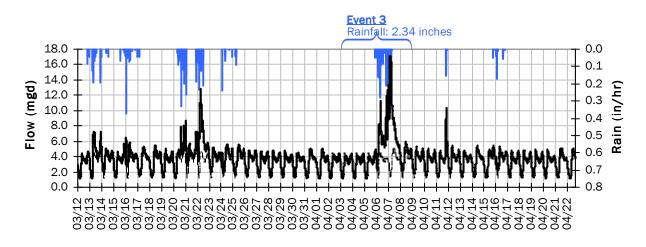
 Peak I/I Rate:
 9.27 mgd

 Total I/I:
 11,696,000 gallons

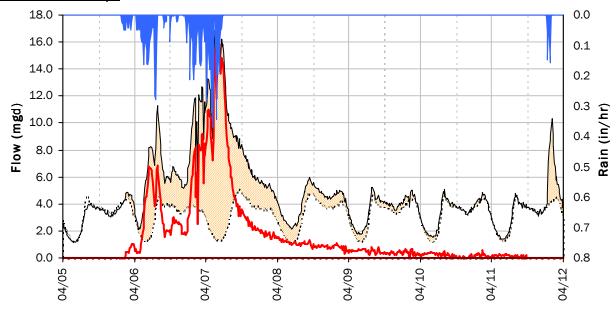
Peak Level: 32.80 *in* **d/D Ratio:** 0.99

SITE 2 I/I Summary: Event 3

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Event 3 Detail Graph



Storm Event I/I Analysis (Rain = 2.34 inches)

Capacity

Inflow / Infiltration

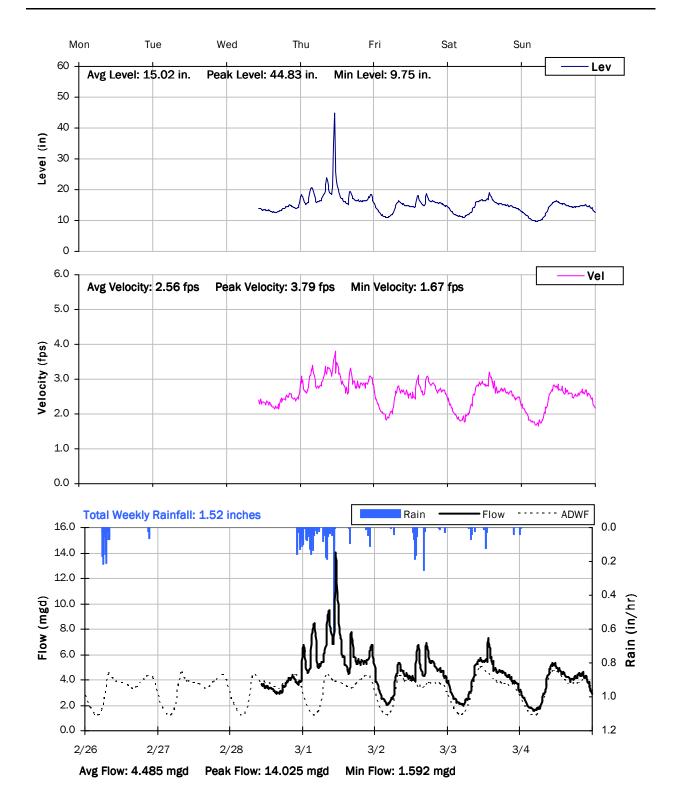
Peak Flow: 17.08 *mgd* **PF:** 5.32

 Peak I/I Rate:
 15.85 mgd

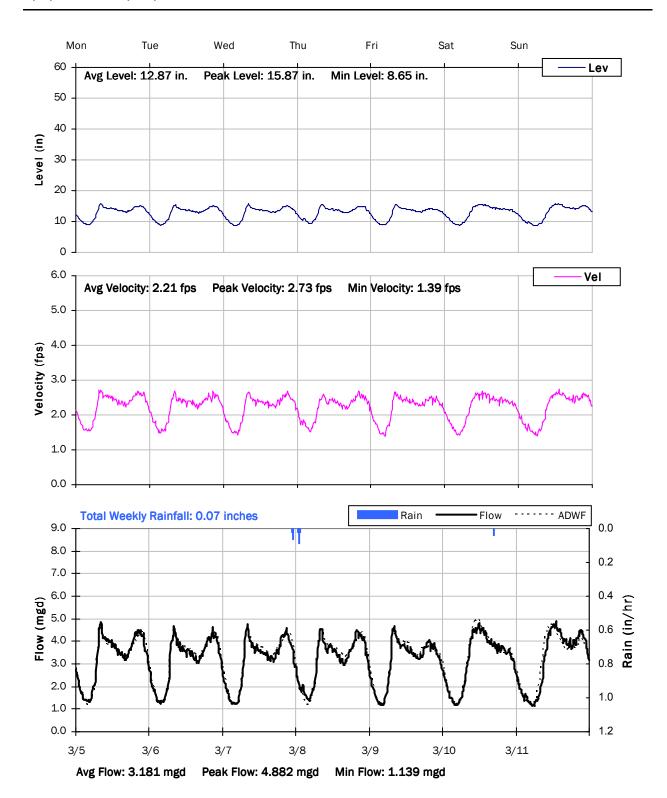
 Total I/I:
 11,304,000 gallons

Peak Level: 48.25 *in* **d/D Ratio:** 1.46

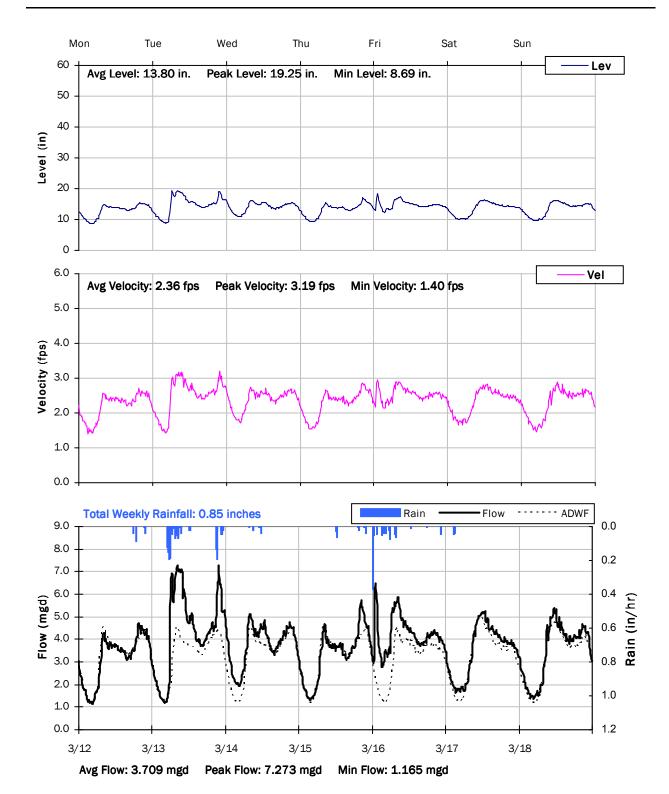
SITE 2 Weekly Level, Velocity and Flow Hydrographs 2/26/2018 to 3/5/2018



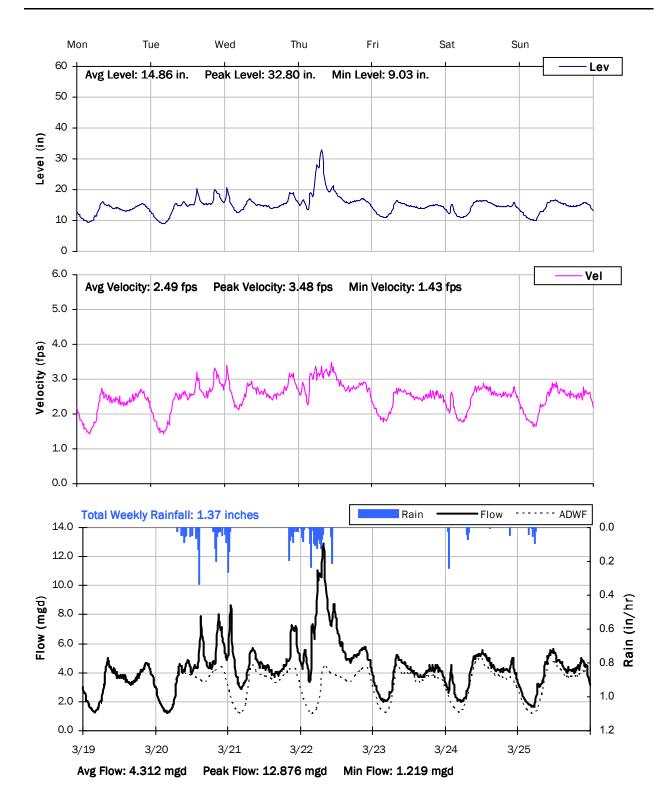
SITE 2 Weekly Level, Velocity and Flow Hydrographs 3/5/2018 to 3/12/2018



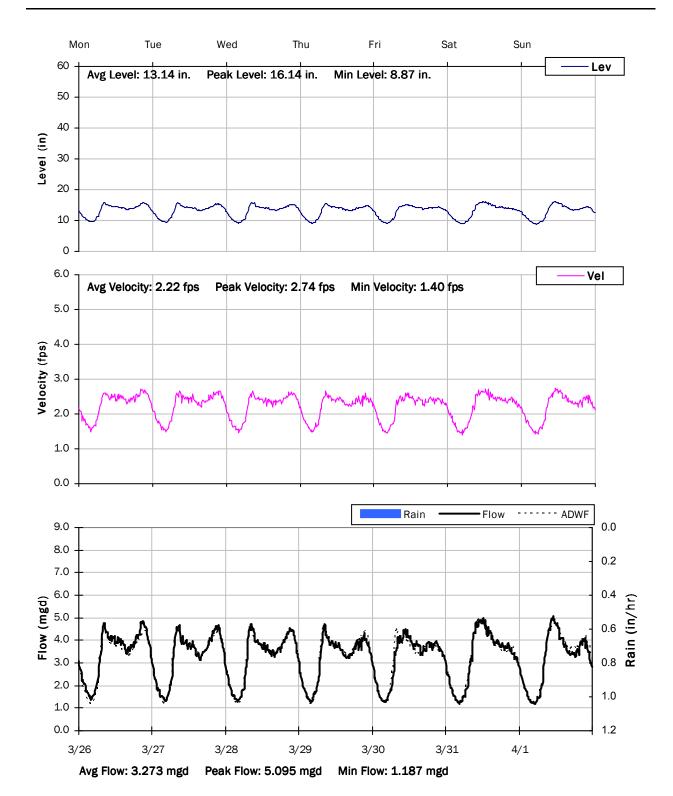
SITE 2 Weekly Level, Velocity and Flow Hydrographs 3/12/2018 to 3/19/2018



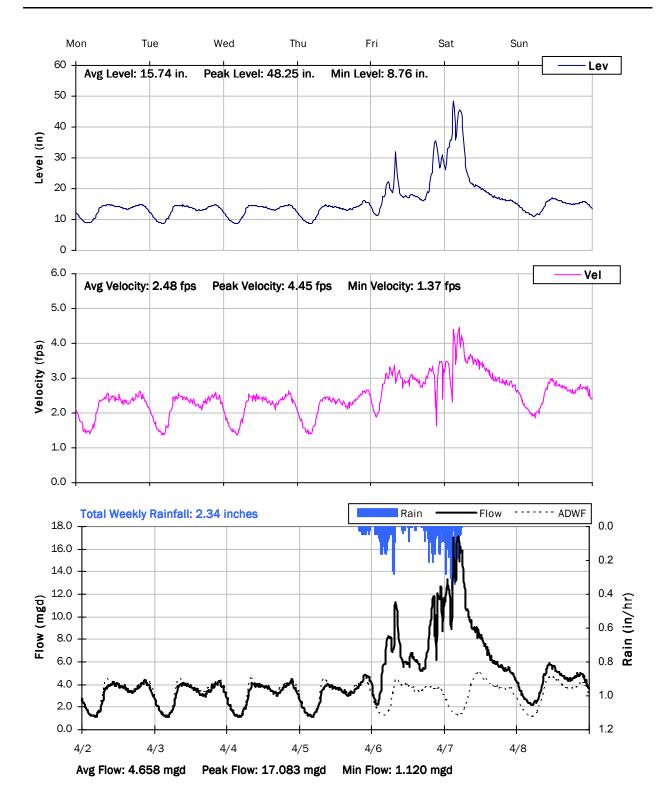
SITE 2 Weekly Level, Velocity and Flow Hydrographs 3/19/2018 to 3/26/2018



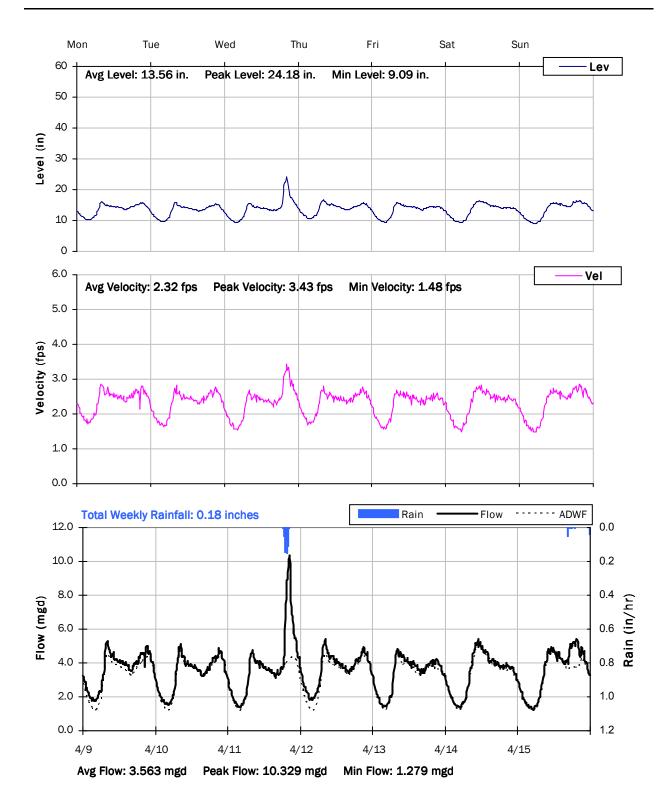
SITE 2 Weekly Level, Velocity and Flow Hydrographs 3/26/2018 to 4/2/2018



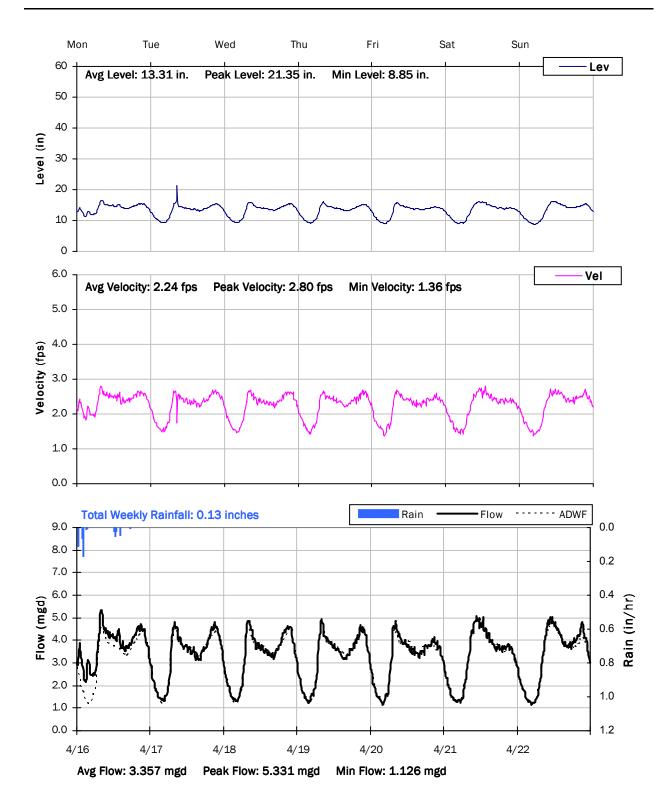
SITE 2 Weekly Level, Velocity and Flow Hydrographs 4/2/2018 to 4/9/2018



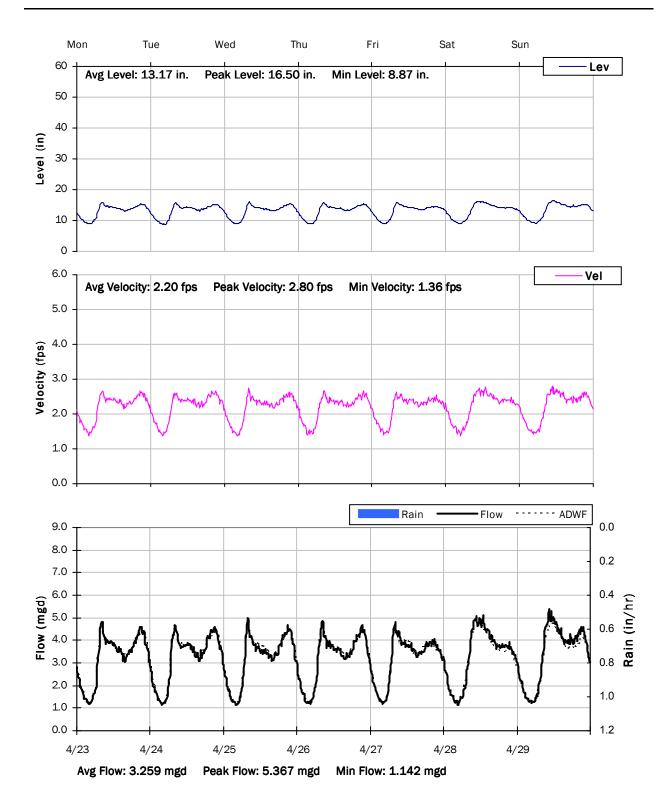
SITE 2 Weekly Level, Velocity and Flow Hydrographs 4/9/2018 to 4/16/2018



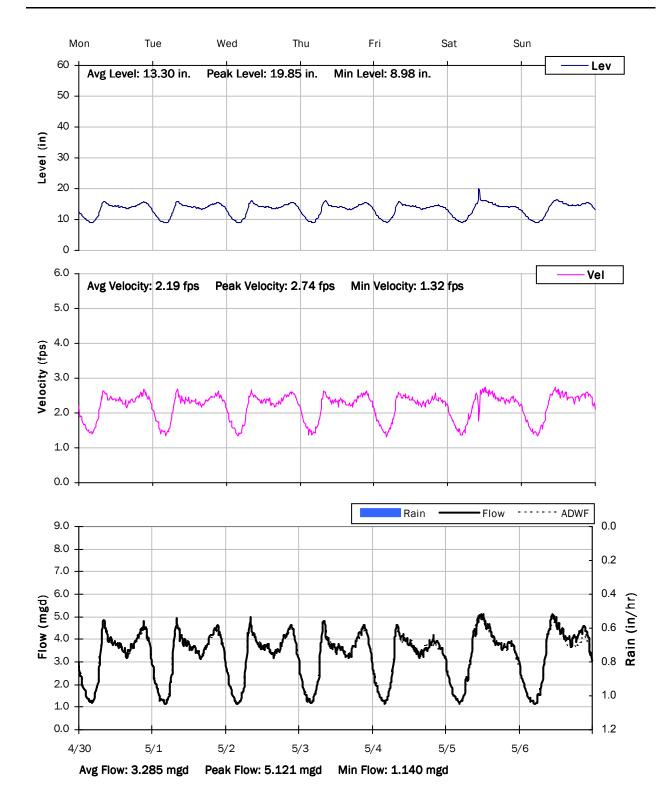
SITE 2 Weekly Level, Velocity and Flow Hydrographs 4/16/2018 to 4/23/2018



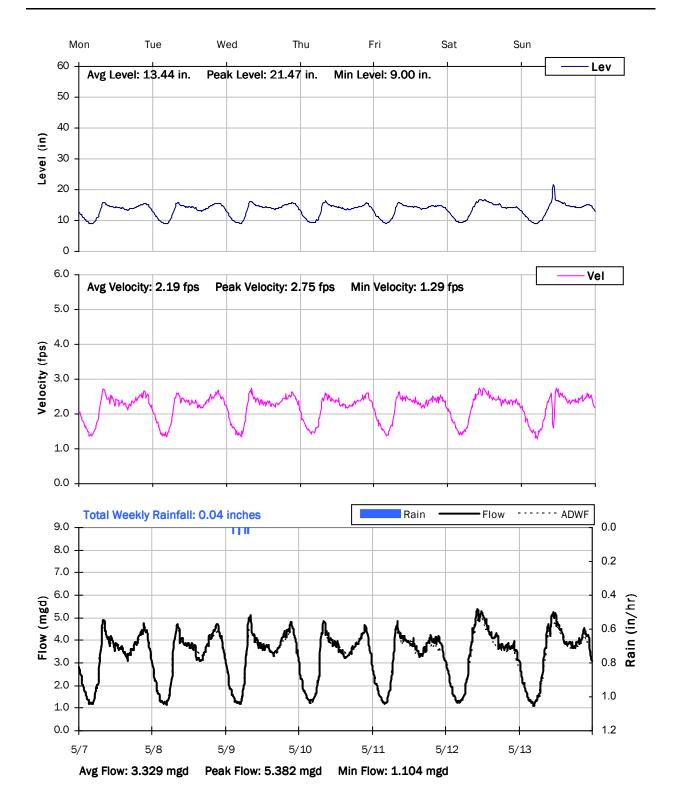
SITE 2 Weekly Level, Velocity and Flow Hydrographs 4/23/2018 to 4/30/2018



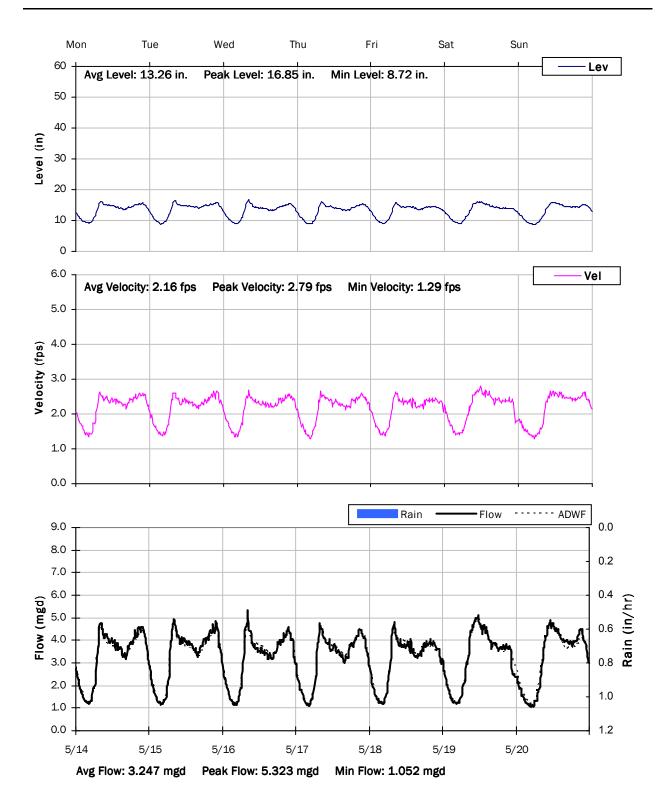
SITE 2 Weekly Level, Velocity and Flow Hydrographs 4/30/2018 to 5/7/2018



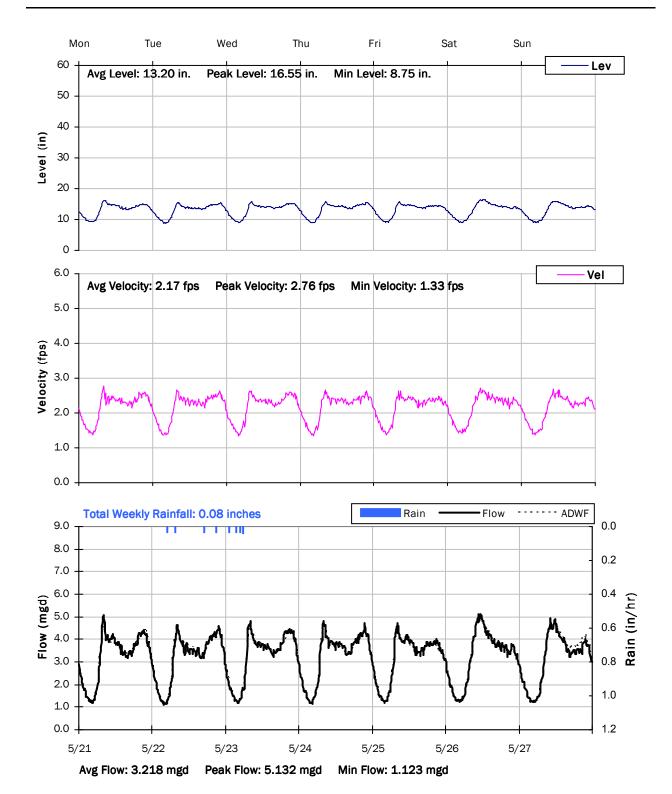
SITE 2 Weekly Level, Velocity and Flow Hydrographs 5/7/2018 to 5/14/2018



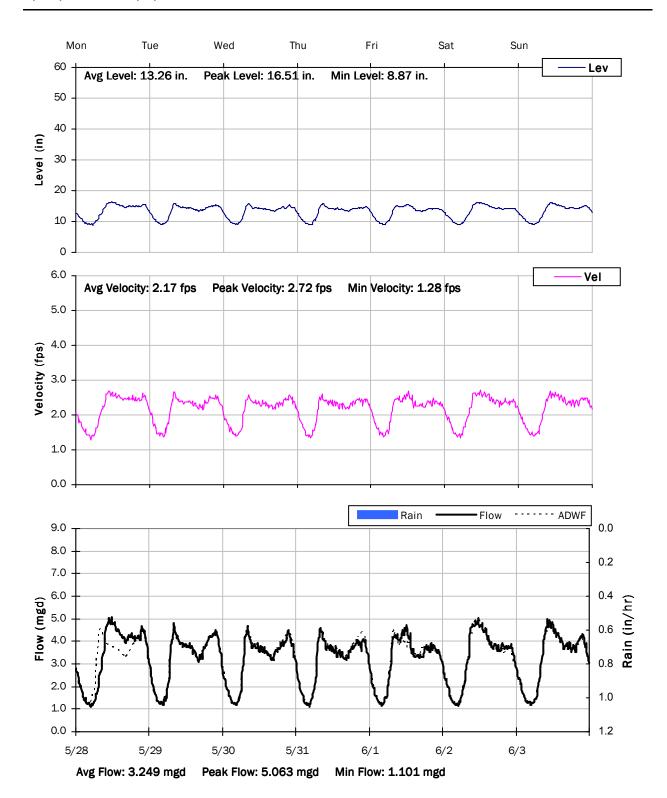
SITE 2 Weekly Level, Velocity and Flow Hydrographs 5/14/2018 to 5/21/2018



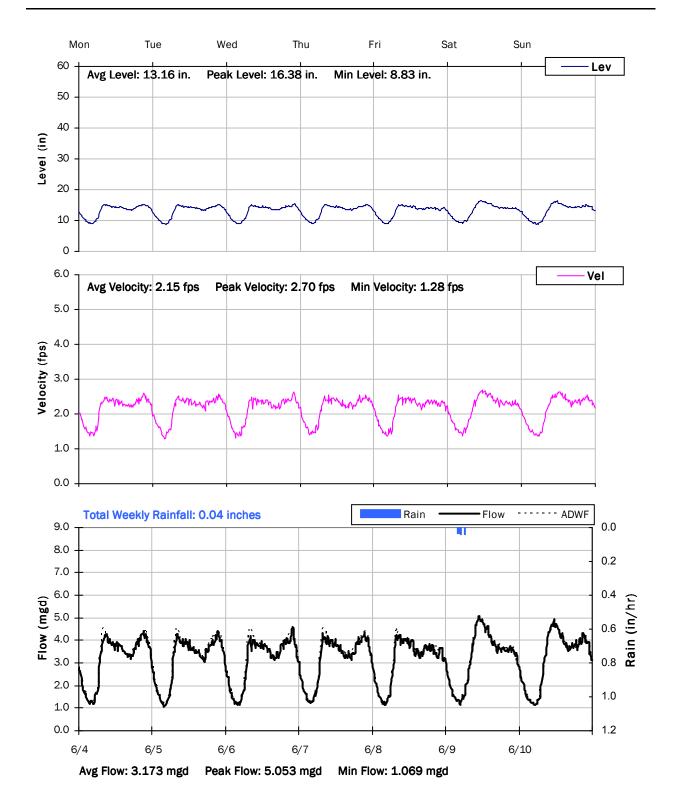
SITE 2 Weekly Level, Velocity and Flow Hydrographs 5/21/2018 to 5/28/2018



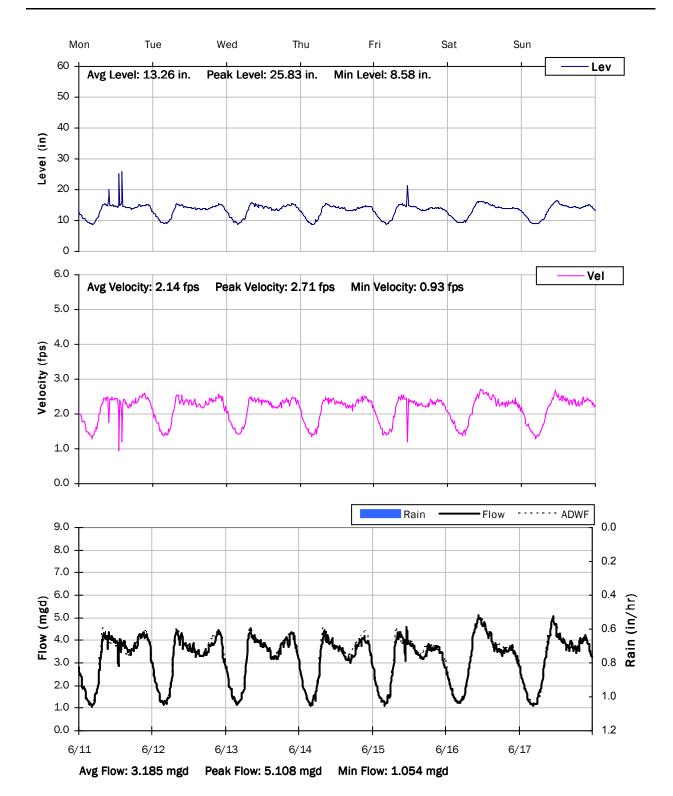
SITE 2 Weekly Level, Velocity and Flow Hydrographs 5/28/2018 to 6/4/2018



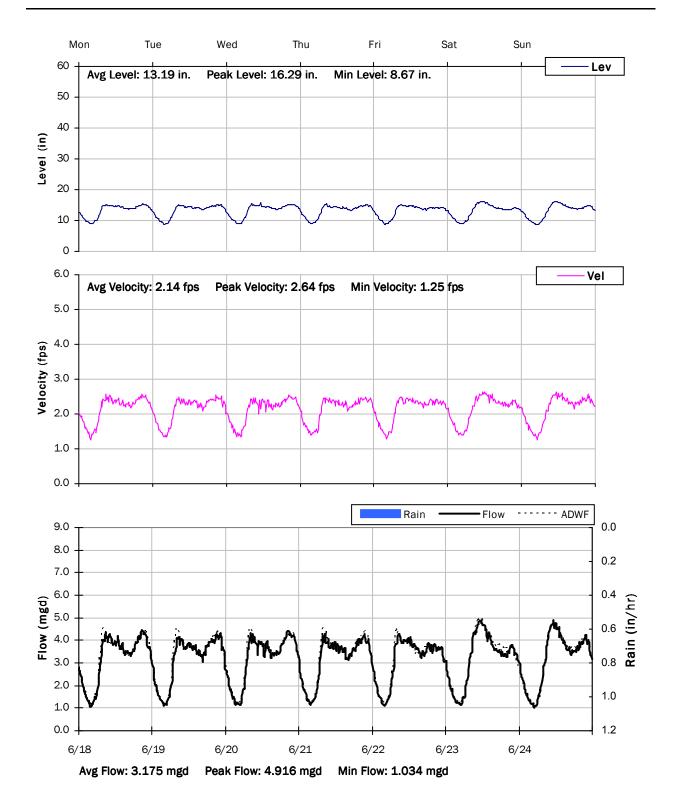
SITE 2 Weekly Level, Velocity and Flow Hydrographs 6/4/2018 to 6/11/2018



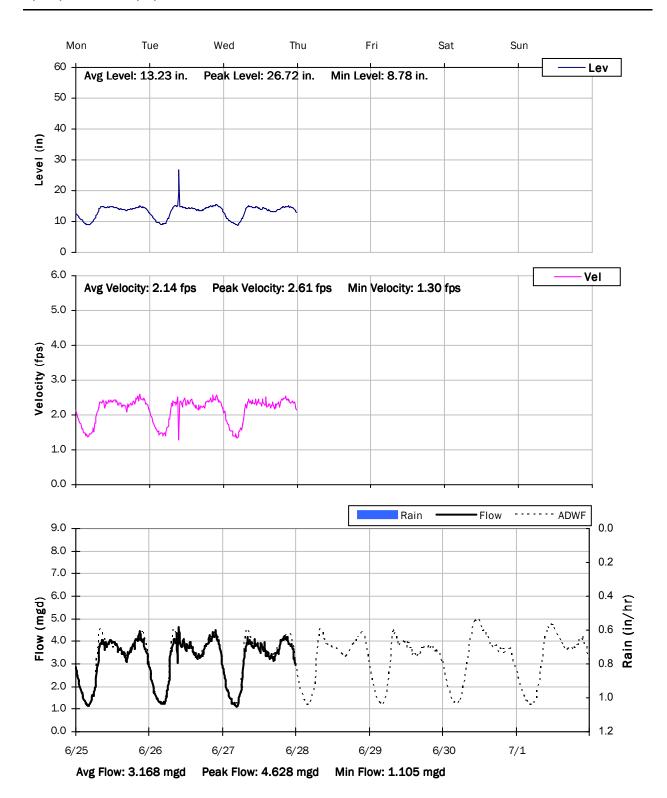
SITE 2 Weekly Level, Velocity and Flow Hydrographs 6/11/2018 to 6/18/2018



SITE 2 Weekly Level, Velocity and Flow Hydrographs 6/18/2018 to 6/25/2018



SITE 2 Weekly Level, Velocity and Flow Hydrographs 6/25/2018 to 7/2/2018



City of South San Francisco

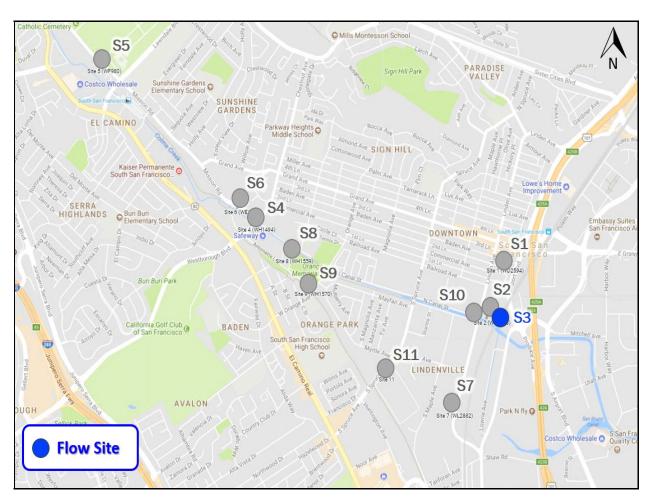
Sanitary Sewer Flow Monitoring February 26- June 28, 2018

Monitoring Site: Site 3

Location: Pump Station #9 1460 San Mateo Ave. Enter via south gate,

near railroad tracks

Data Summary Report



Vicinity Map: Site 3

SITE 3

Site Information

MH ID: WL2659

Location: Pump Station #9 1460 San

Mateo Ave. Enter via south gate,

near railroad tracks

Coordinates: 122.4099° W, 37.6499° N

Rim Elevation (Earth): 11 feet

Pipe Diameter: 27 inches

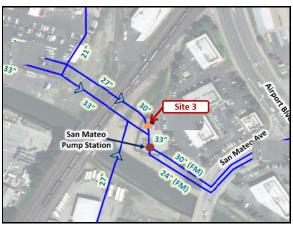
Sediment: 2.75 inches

ADWF: 0.078 mgd

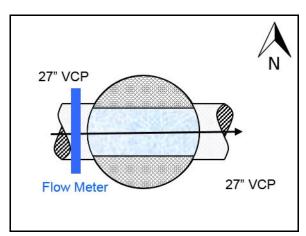
Peak Measured Flow: 0.835 mgd



Satellite Map



Sewer Map



Flow Sketch



Street View



Plan View

SITE 3

Additional Site Photos

Effluent Pipe



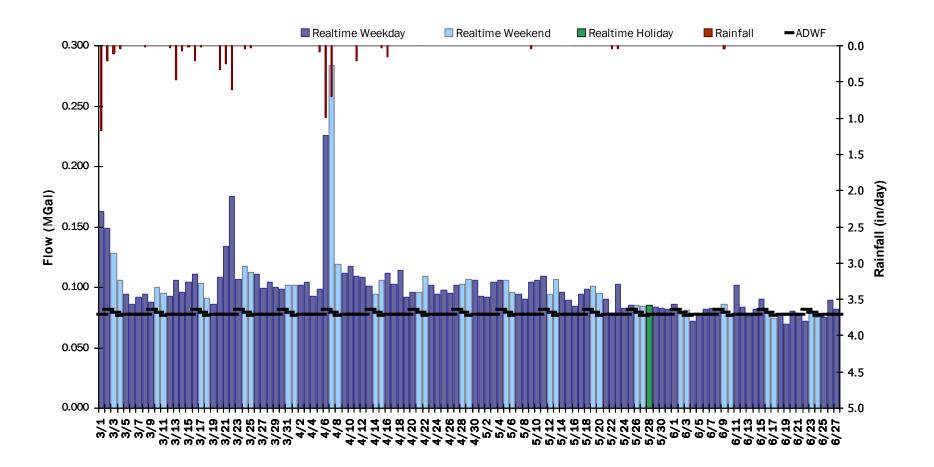
Influent Pipe



SITE 3
Period Flow Summary: Daily Flow Totals

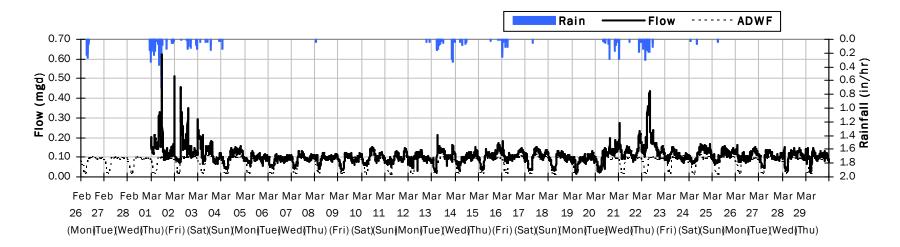
Avg Period Flow: 0.099 MGal Peak Daily Flow: 0.283 MGal Min Daily Flow: 0.069 MGal

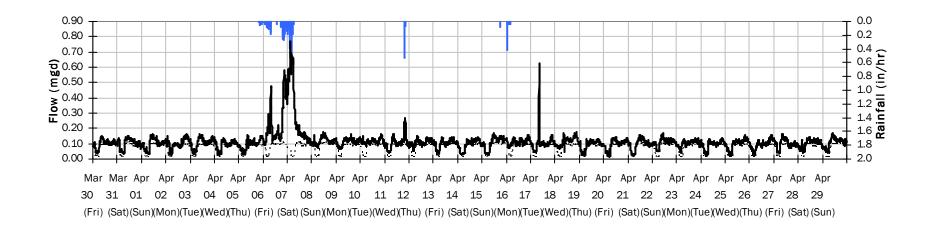
Total Period Rainfall: 5.92 inches



SITE 3 Flow Summary: 2/26/2018 to 4/29/2018

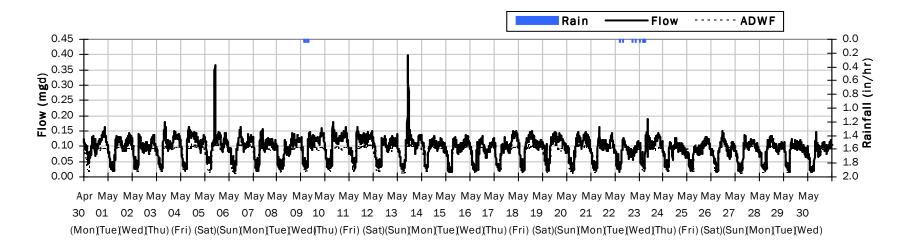
Total Period Rainfall: 6.26 inches Avg Flow: 0.111 mgd Peak Flow: 0.767 mgd Min Flow: 0.014 mgd

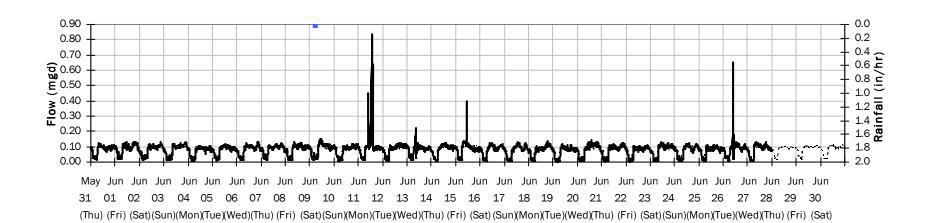




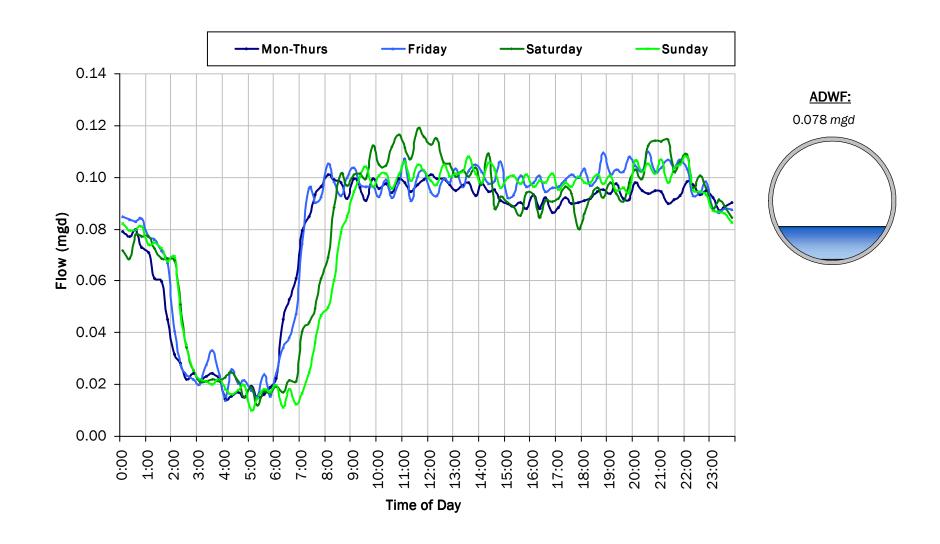
SITE 3 Flow Summary: 4/30/2018 to 6/30/2018

Total Period Rainfall: 0.16 inches Avg Flow: 0.088 mgd Peak Flow: 0.835 mgd Min Flow: 0.003 mgd

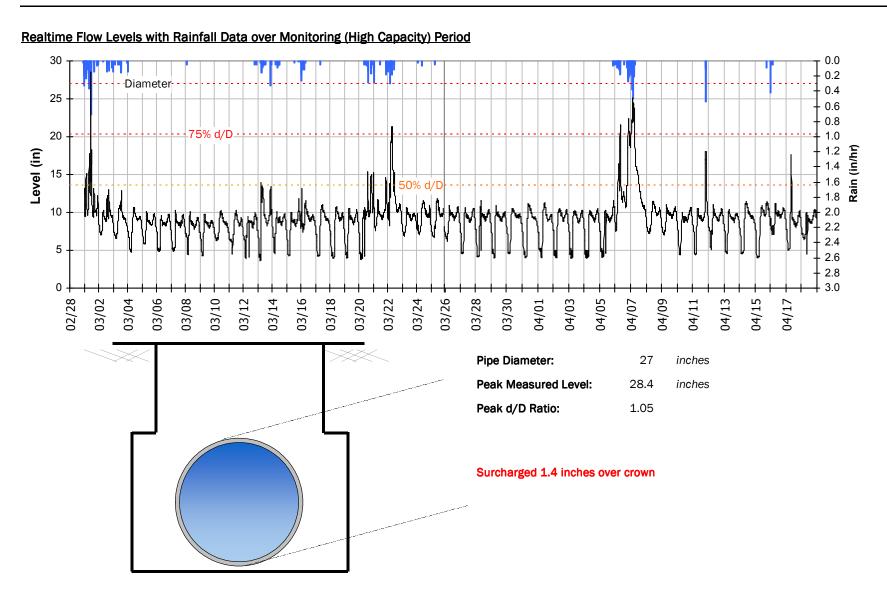




SITE 3
Average Dry Weather Flow Hydrographs

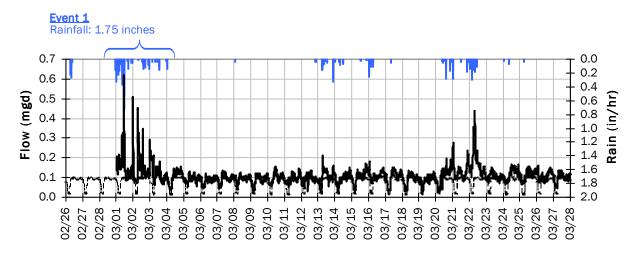


SITE 3
Site Capacity and Surcharge Summary

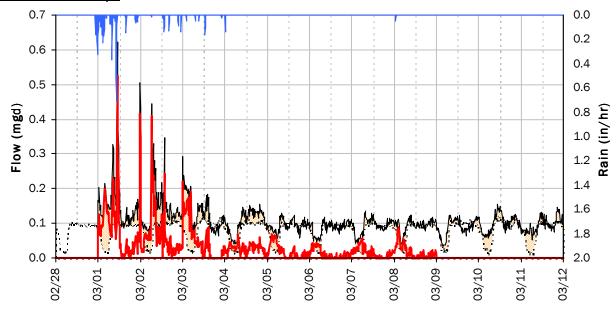


SITE 3 I/I Summary: Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Event 1 Detail Graph



Storm Event I/I Analysis (Rain = 1.75 inches)

Capacity

Inflow / Infiltration

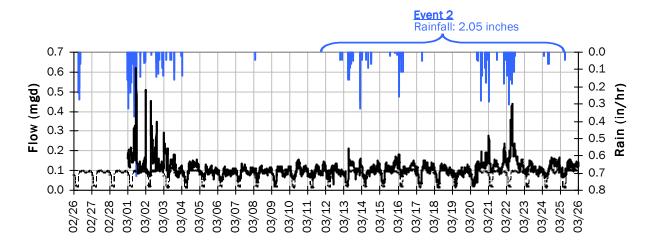
Peak Flow: 0.62 *mgd* **PF:** 7.94

Peak I/I Rate: Total I/I: 0.52 mgd 285,000 gallons

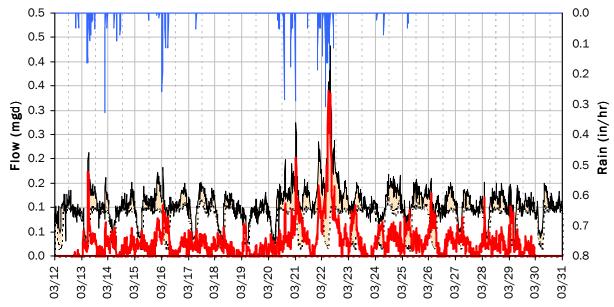
Peak Level: 28.42 *in* **d/D Ratio:** 1.05

SITE 3 I/I Summary: Event 2

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Event 2 Detail Graph



Storm Event I/I Analysis (Rain = 2.05 inches)

Capacity

Inflow / Infiltration

Peak Flow: 0.43 mgd 5.51

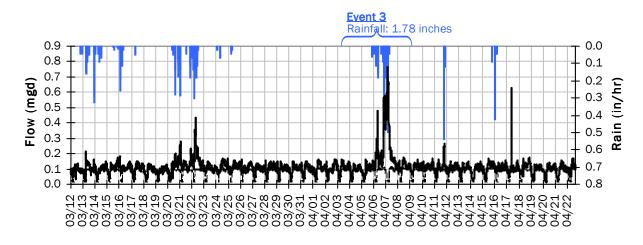
Peak I/I Rate:

0.34 mgd Total I/I: 536,000 gallons

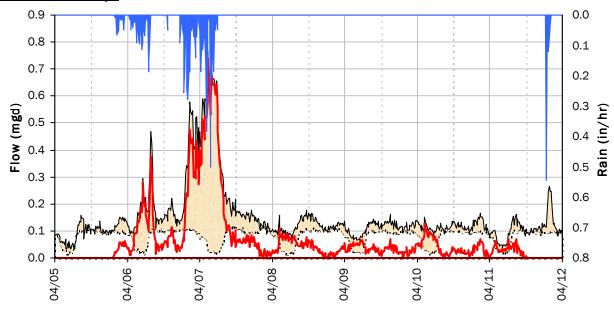
Peak Level: 21.38 in d/D Ratio: 0.79

SITE 3 I/I Summary: Event 3

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Event 3 Detail Graph



Storm Event I/I Analysis (Rain = 1.78 inches)

Capacity

Peak Flow: 0.77 *mgd* **PF:** 9.80

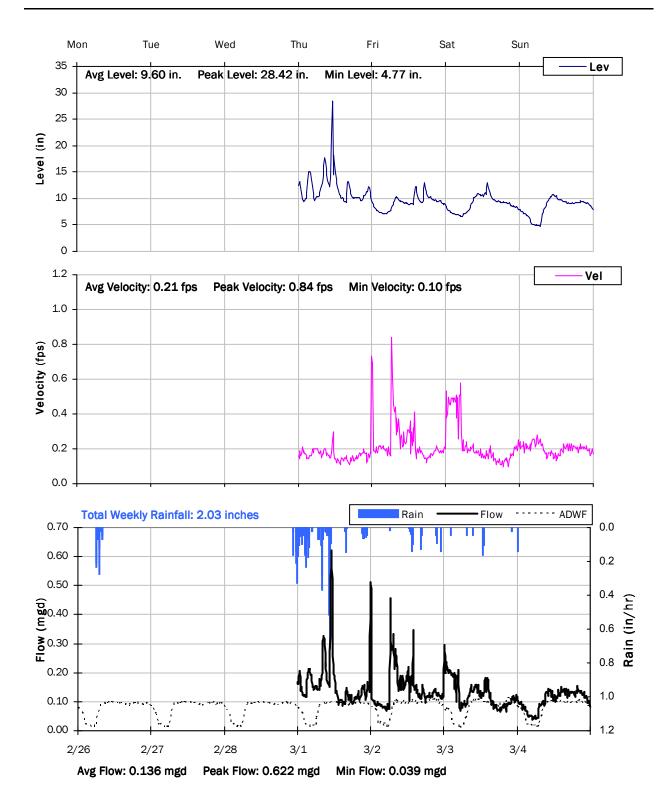
Peak Level: 25.13 *in* **d/D Ratio:** 0.93

Inflow / Infiltration

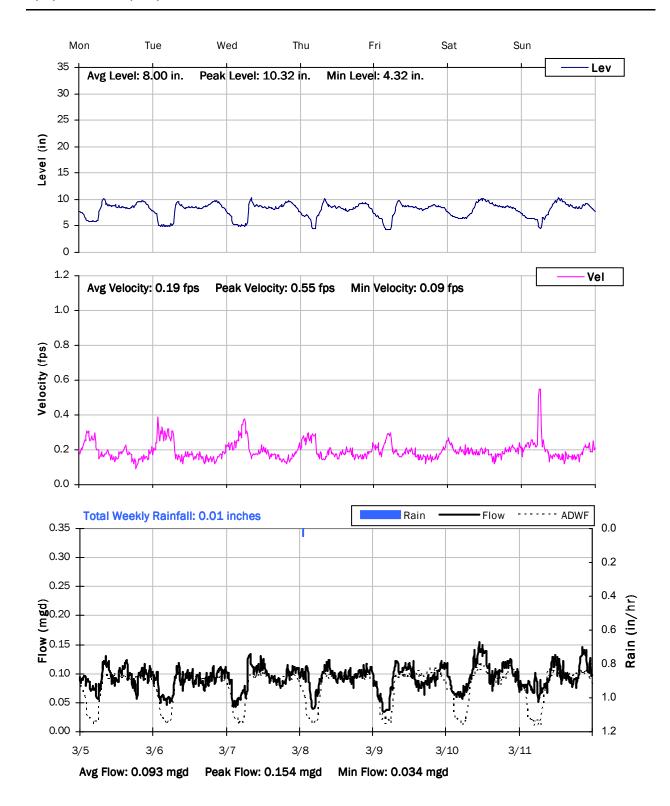
 Peak I/I Rate:
 0.74 mgd

 Total I/I:
 486,000 gallons

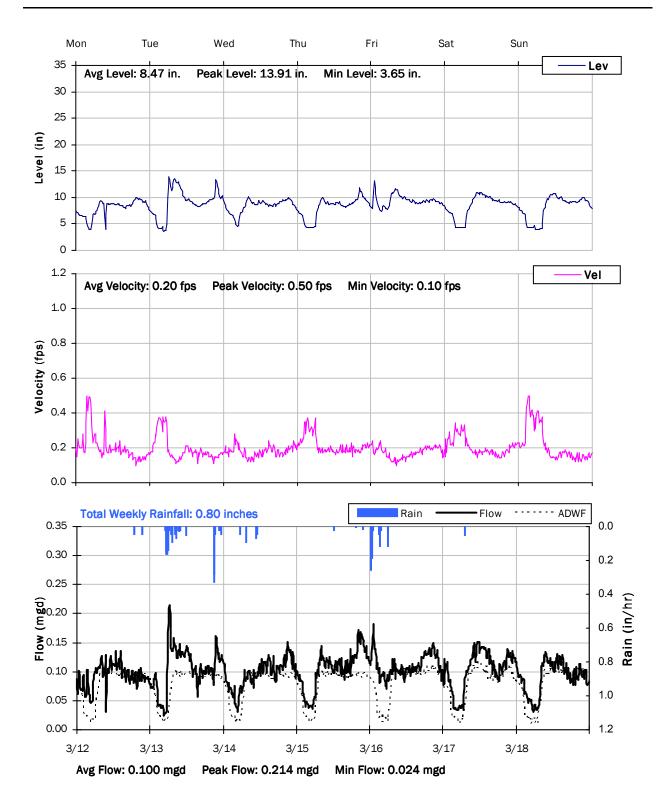
SITE 3
Weekly Level, Velocity and Flow Hydrographs 2/26/2018 to 3/5/2018



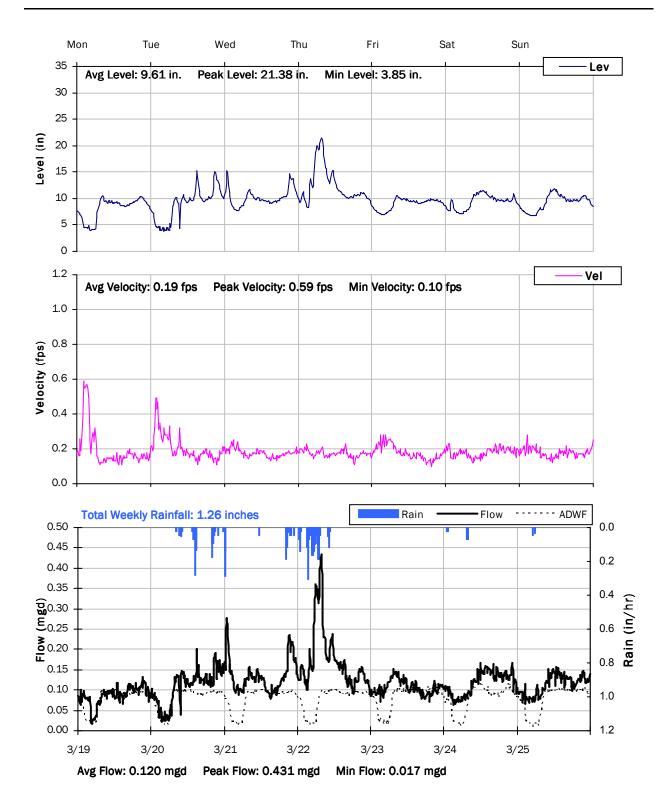
SITE 3
Weekly Level, Velocity and Flow Hydrographs 3/5/2018 to 3/12/2018



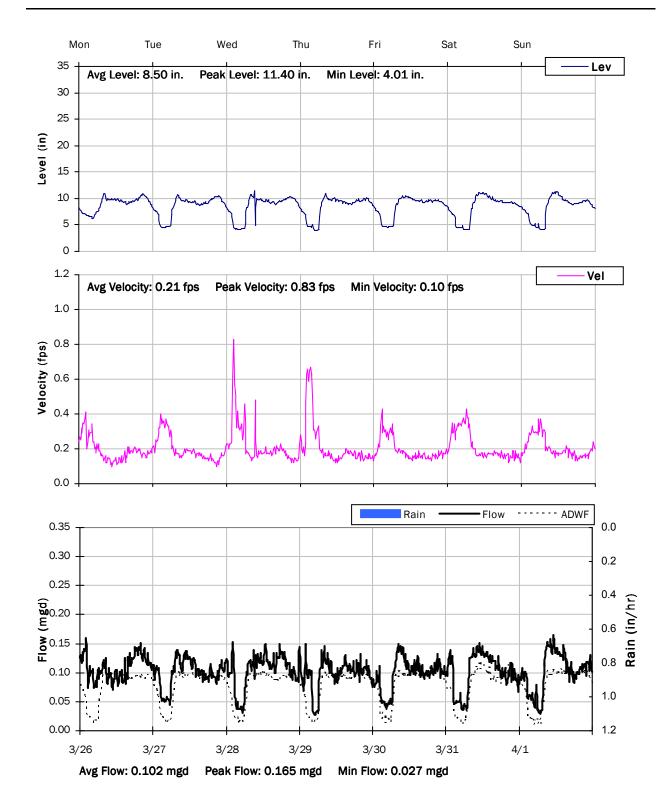
SITE 3 Weekly Level, Velocity and Flow Hydrographs 3/12/2018 to 3/19/2018



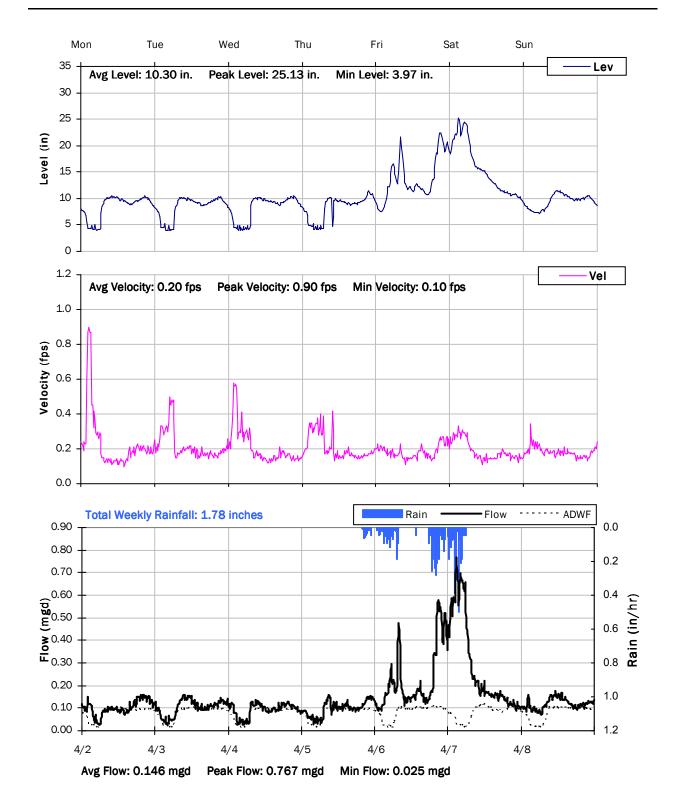
SITE 3 Weekly Level, Velocity and Flow Hydrographs 3/19/2018 to 3/26/2018



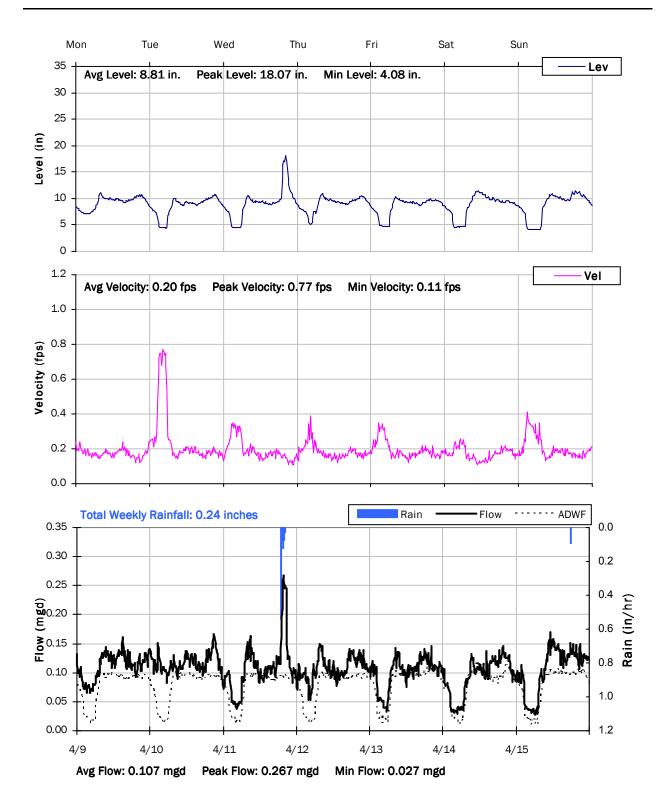
SITE 3
Weekly Level, Velocity and Flow Hydrographs 3/26/2018 to 4/2/2018



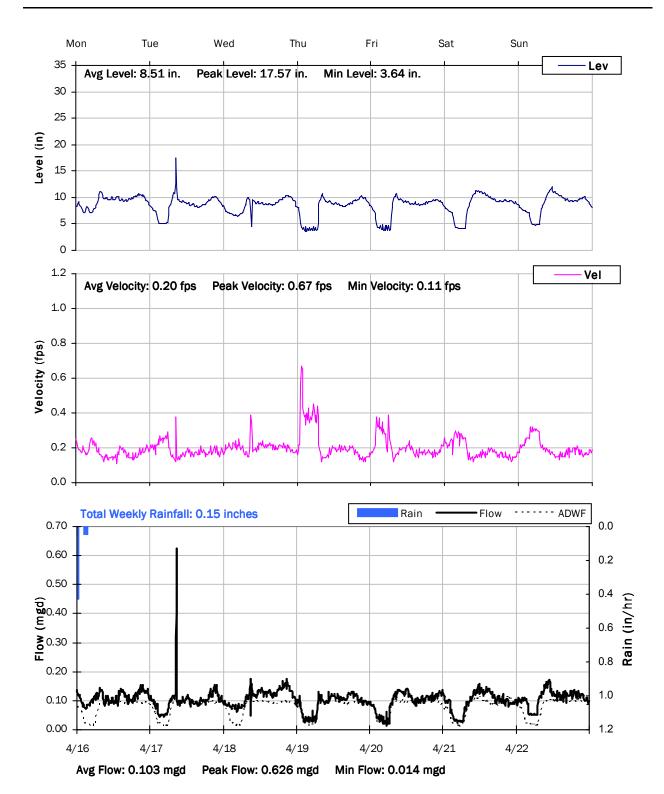
SITE 3 Weekly Level, Velocity and Flow Hydrographs 4/2/2018 to 4/9/2018



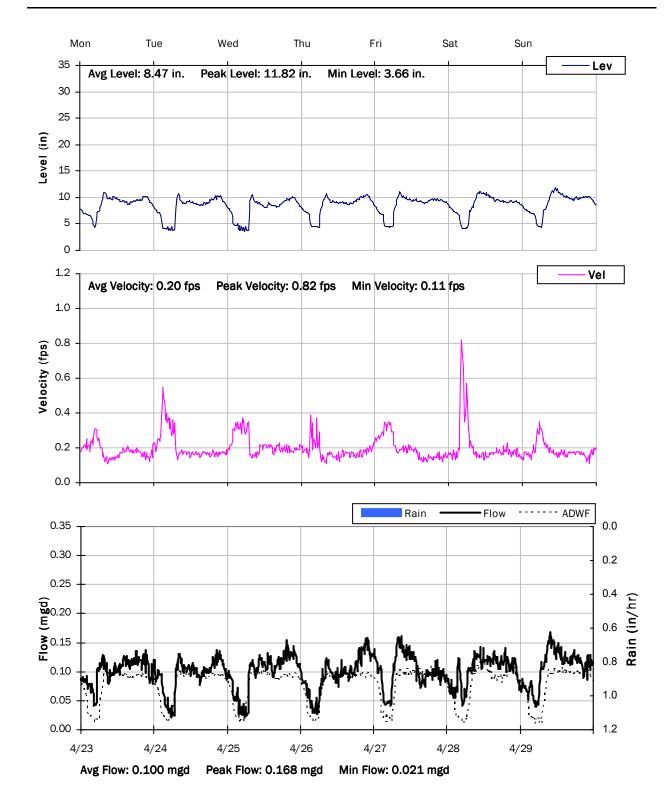
SITE 3 Weekly Level, Velocity and Flow Hydrographs 4/9/2018 to 4/16/2018



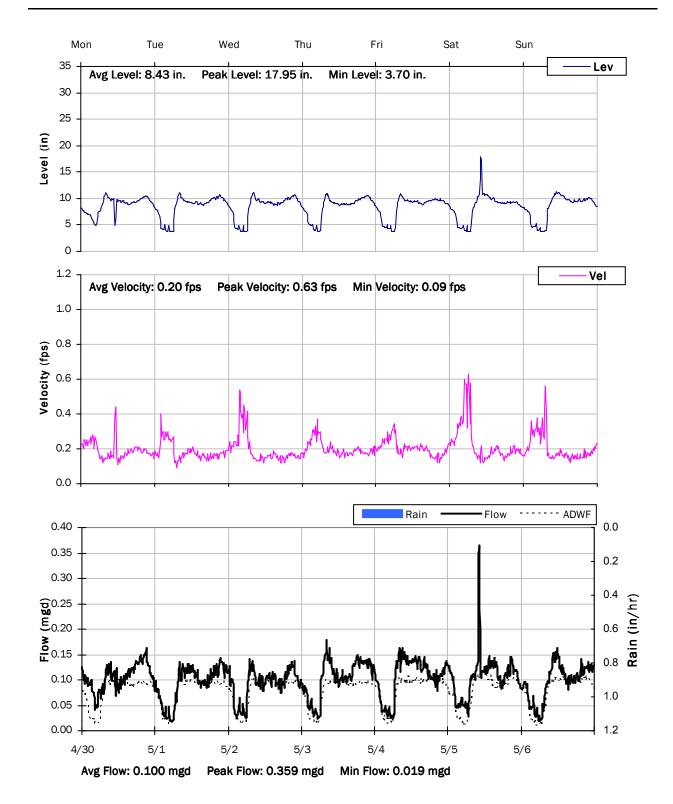
SITE 3 Weekly Level, Velocity and Flow Hydrographs 4/16/2018 to 4/23/2018



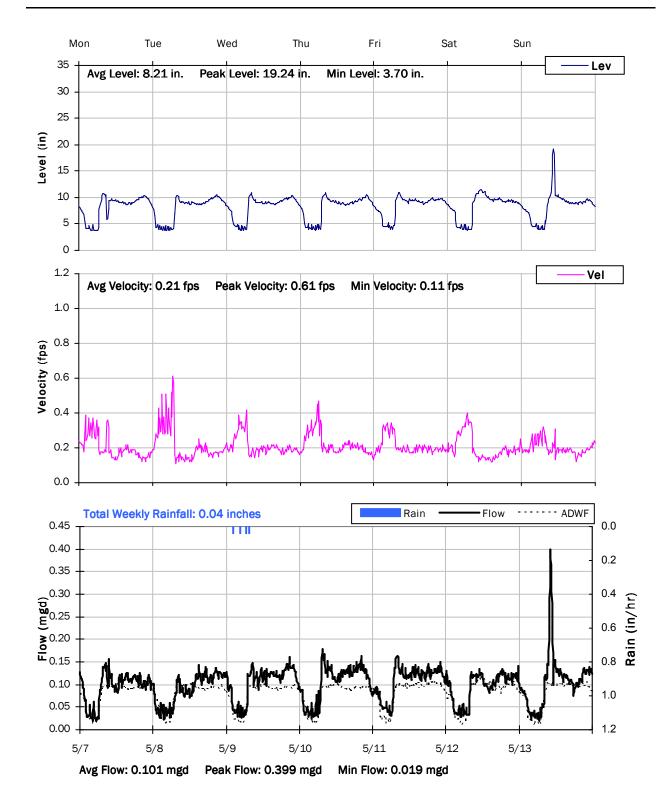
SITE 3 Weekly Level, Velocity and Flow Hydrographs 4/23/2018 to 4/30/2018



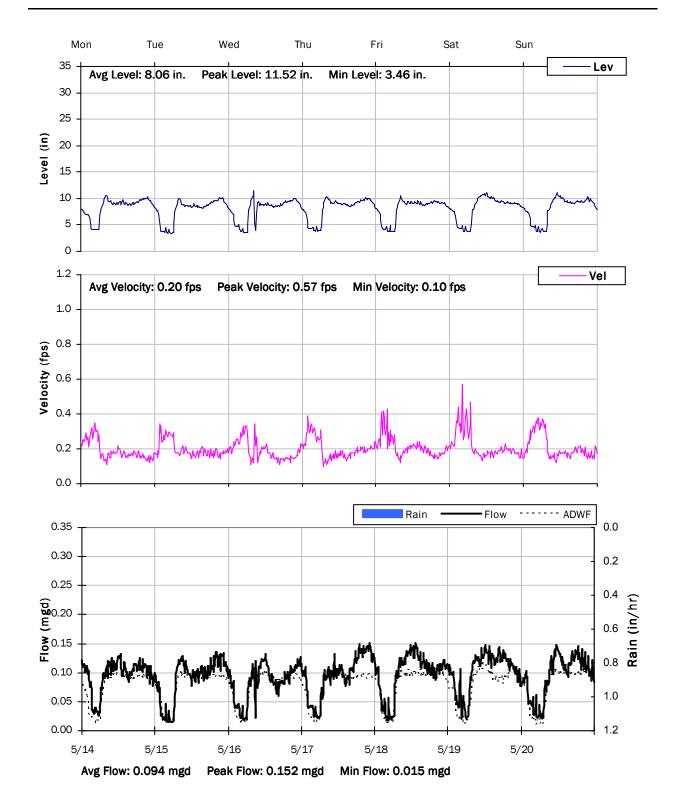
SITE 3 Weekly Level, Velocity and Flow Hydrographs 4/30/2018 to 5/7/2018



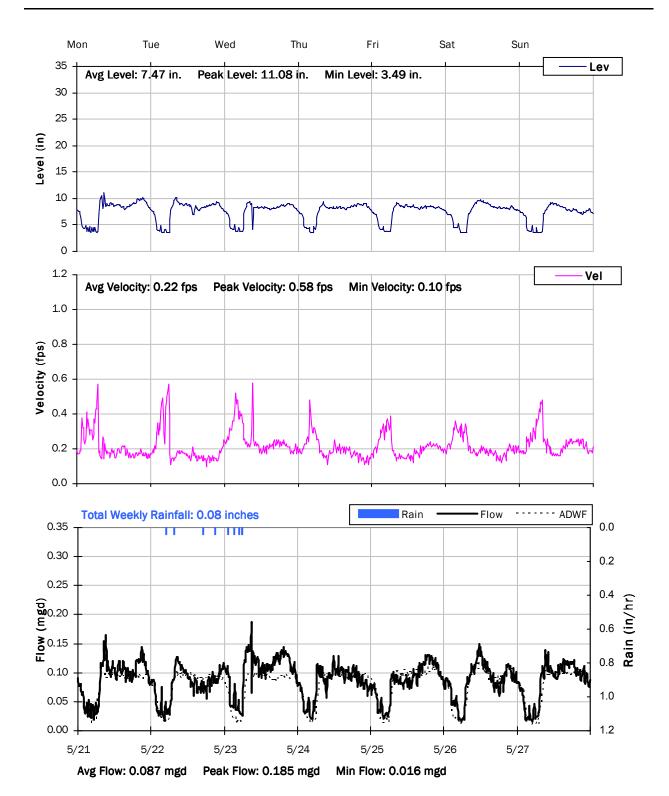
SITE 3 Weekly Level, Velocity and Flow Hydrographs 5/7/2018 to 5/14/2018



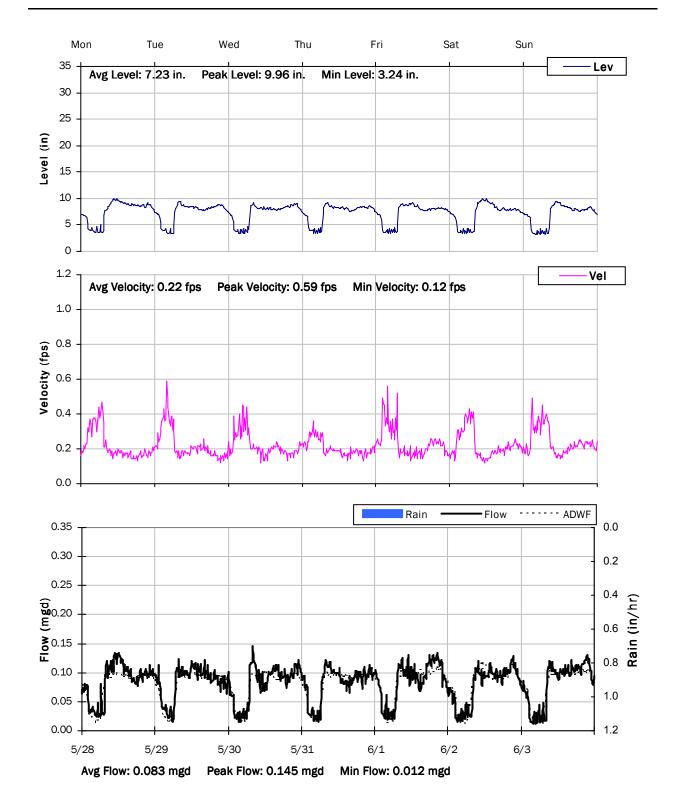
SITE 3
Weekly Level, Velocity and Flow Hydrographs
5/14/2018 to 5/21/2018



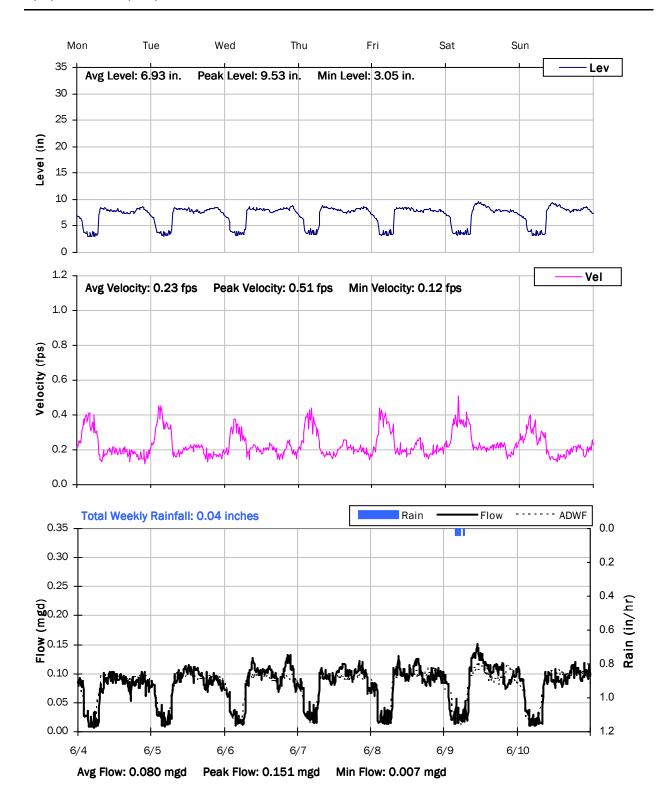
SITE 3
Weekly Level, Velocity and Flow Hydrographs
5/21/2018 to 5/28/2018



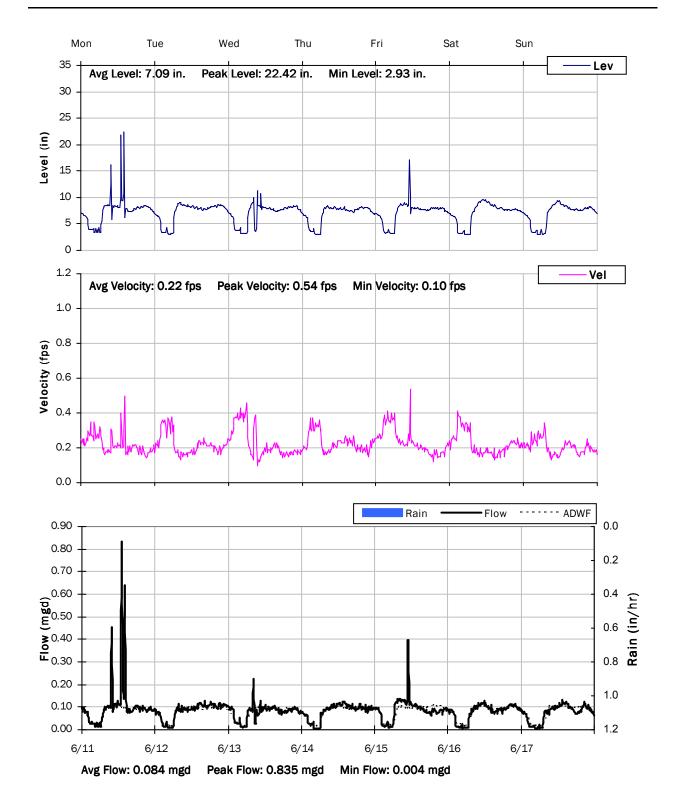
SITE 3 Weekly Level, Velocity and Flow Hydrographs 5/28/2018 to 6/4/2018



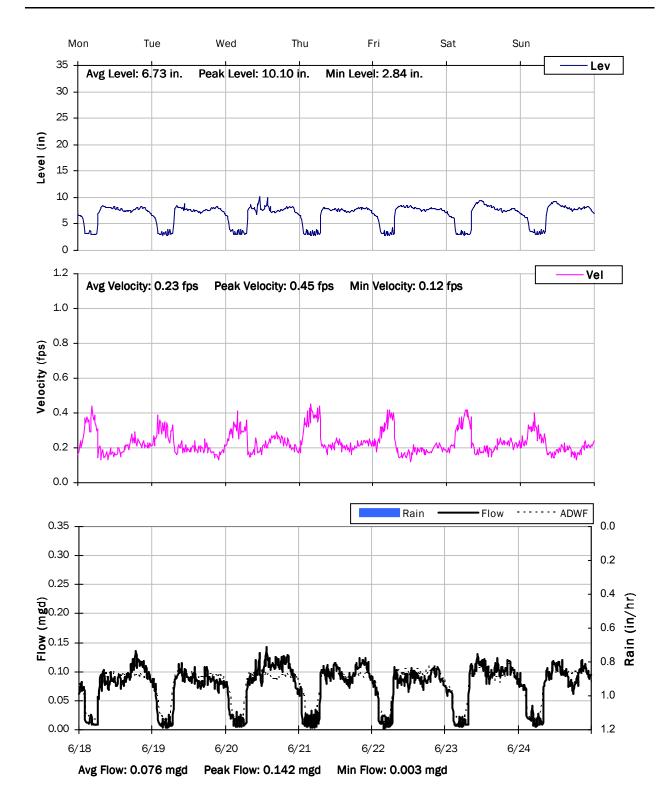
SITE 3
Weekly Level, Velocity and Flow Hydrographs
6/4/2018 to 6/11/2018



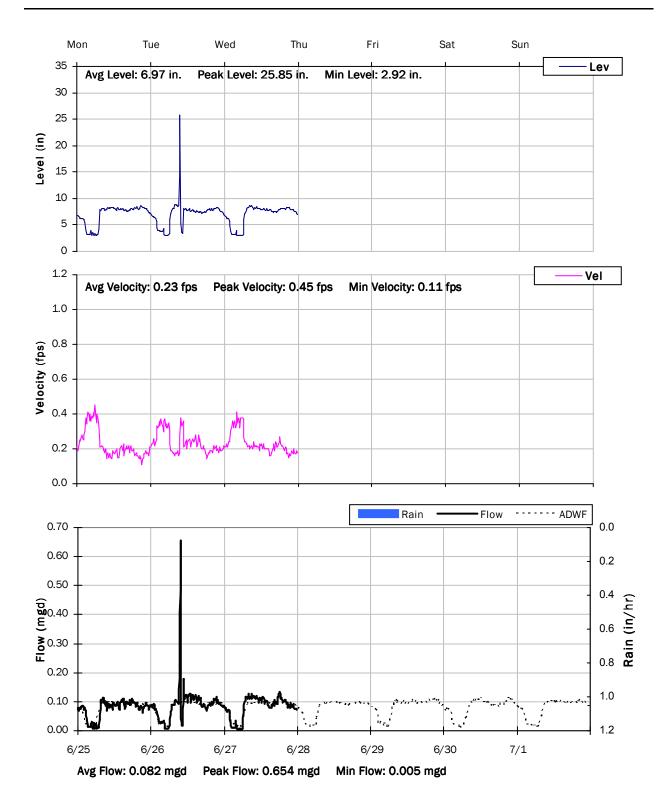
SITE 3 Weekly Level, Velocity and Flow Hydrographs 6/11/2018 to 6/18/2018



SITE 3 Weekly Level, Velocity and Flow Hydrographs 6/18/2018 to 6/25/2018



SITE 3
Weekly Level, Velocity and Flow Hydrographs
6/25/2018 to 7/2/2018



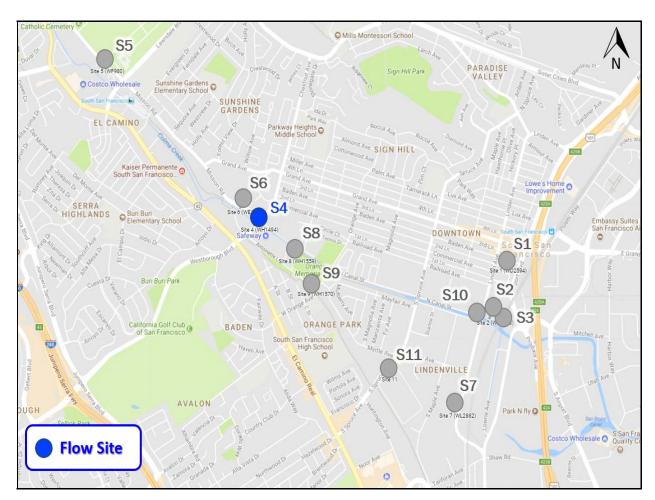
City of South San Francisco

Sanitary Sewer Flow Monitoring February 26- June 28, 2018

Monitoring Site: Site 4

Location: 40 Chestnut Avenue, south of Mission Road

Data Summary Report



Vicinity Map: Site 4

SITE 4

Site Information

MH ID: WH1494

Location: 40 Chestnut Avenue, south of

Mission Road

Coordinates: 122.4323° W, 37.6562° N

Rim Elevation (Earth): 40 feet

Pipe Diameter: 15 inches

Sediment: 0.00 inches

ADWF: 0.137 mgd

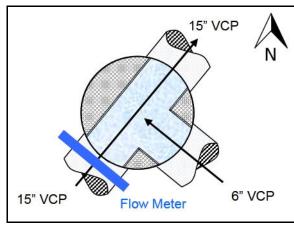
Peak Measured Flow: 1.313 mgd



Satellite Map



Sewer Map



Flow Sketch



Street View



Plan View

SITE 4
Additional Site Photos

Effluent Pipe



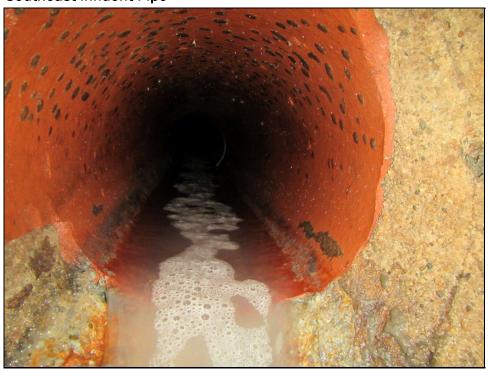
Southwest Influent Pipe



SITE 4

Additional Site Photos

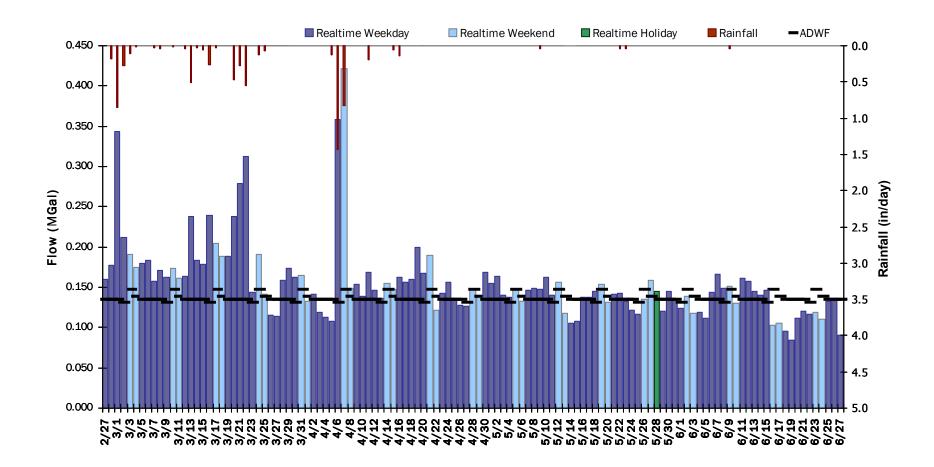
Southeast Influent Pipe



SITE 4
Period Flow Summary: Daily Flow Totals

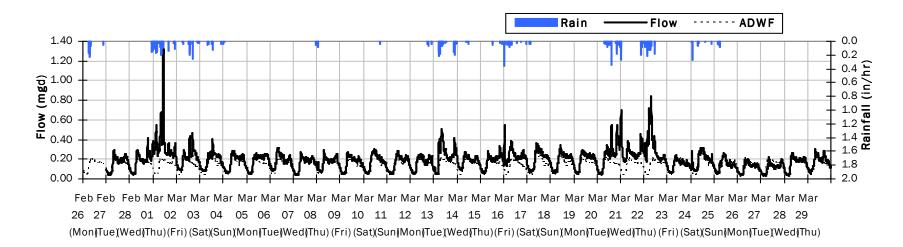
Avg Period Flow: 0.156 MGal Peak Daily Flow: 0.421 MGal Min Daily Flow: 0.084 MGal

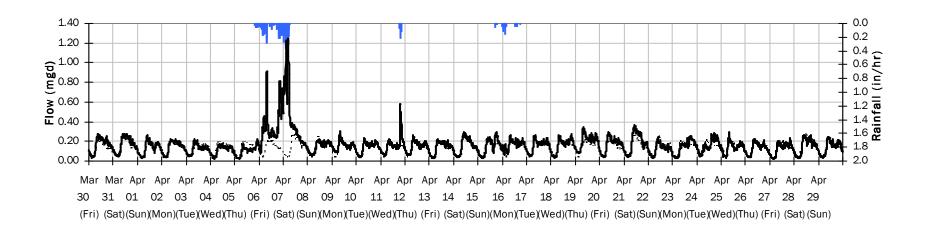
Total Period Rainfall: 6.83 inches



SITE 4 Flow Summary: 2/26/2018 to 4/29/2018

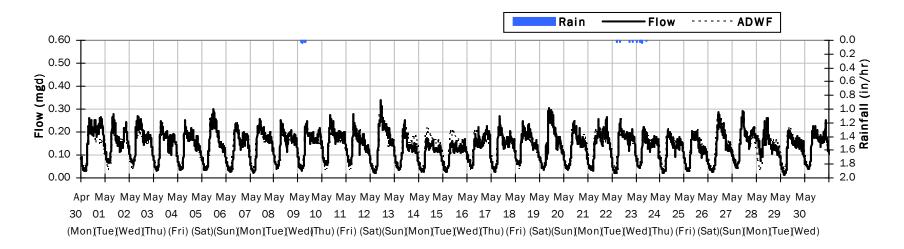
Total Period Rainfall: 6.98 inches Avg Flow: 0.177 mgd Peak Flow: 1.313 mgd Min Flow: 0.024 mgd

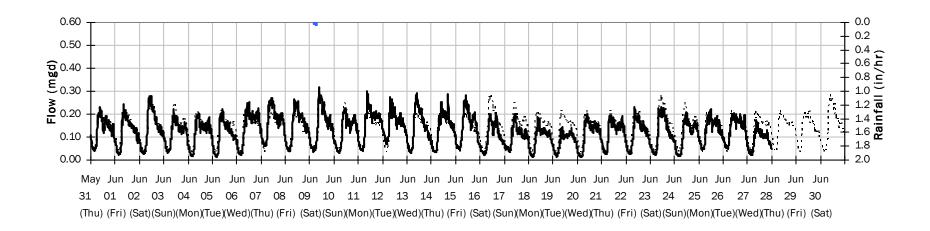




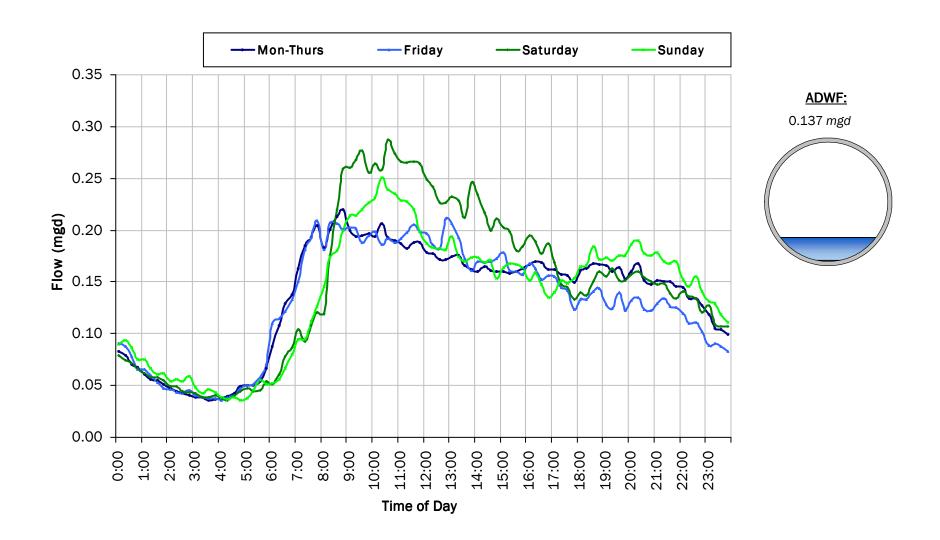
SITE 4 Flow Summary: 4/30/2018 to 6/30/2018

Total Period Rainfall: 0.17 inches Avg Flow: 0.134 mgd Peak Flow: 0.339 mgd Min Flow: 0.013 mgd

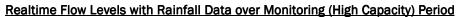


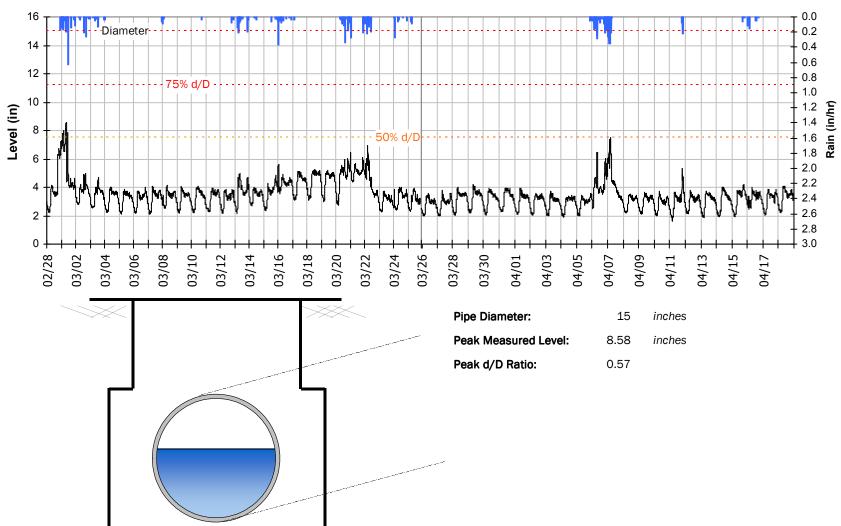


SITE 4
Average Dry Weather Flow Hydrographs



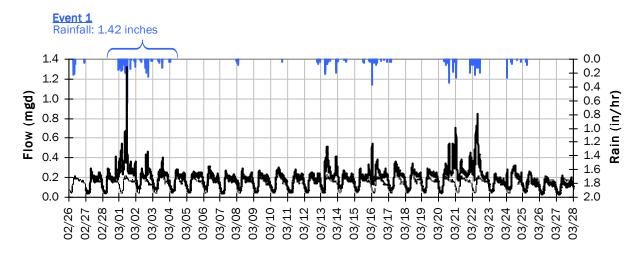
SITE 4
Site Capacity and Surcharge Summary



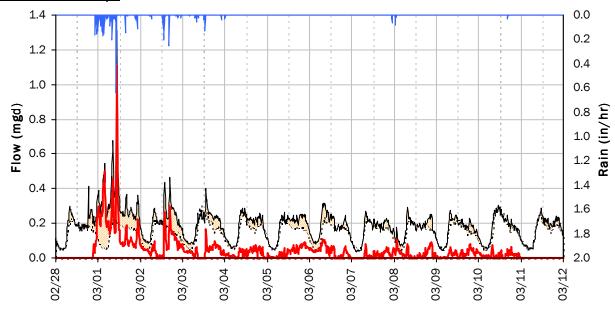


SITE 4 I/I Summary: Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Event 1 Detail Graph



Storm Event I/I Analysis (Rain = 1.42 inches)

Capacity

Inflow / Infiltration

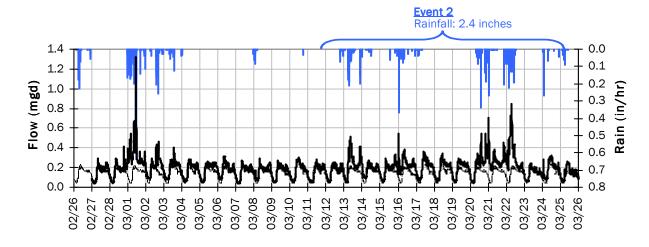
Peak Flow: 1.31 *mgd* **PF:** 9.59

Peak I/I Rate: Total I/I: 1.11 mgd 486,000 gallons

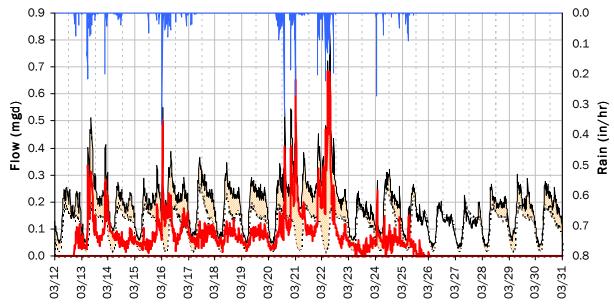
Peak Level: 8.58 *in* **d/D Ratio:** 0.57

SITE 4 I/I Summary: Event 2

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Event 2 Detail Graph



Storm Event I/I Analysis (Rain = 2.40 inches)

Capacity

Inflow / Infiltration

Peak Flow: 0.85 mgd 6.17

Peak I/I Rate: 0.69 mgd Total I/I: 1,221,000 gallons

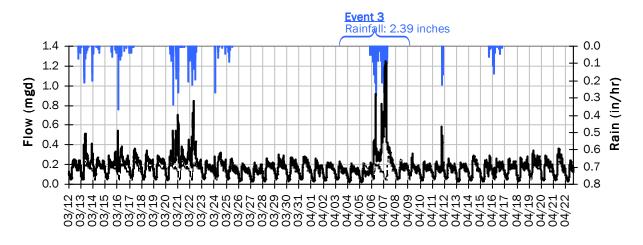
Peak Level: 6.97 in

d/D Ratio: 0.46

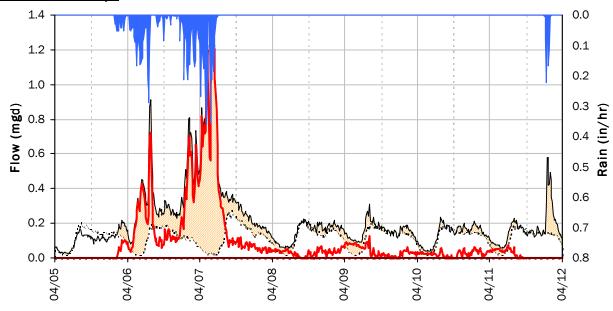


SITE 4 I/I Summary: Event 3

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Event 3 Detail Graph



Storm Event I/I Analysis (Rain = 2.39 inches)

Capacity

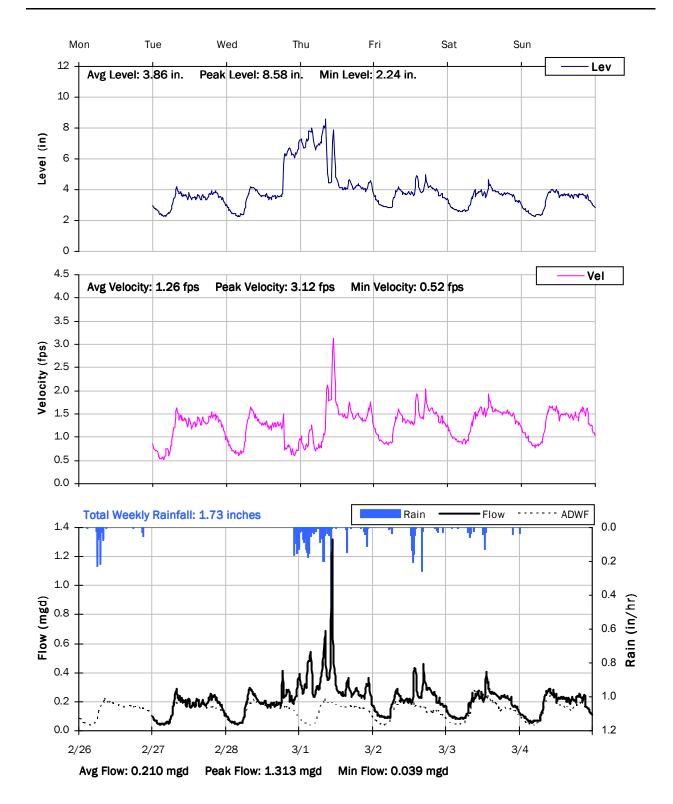
Inflow / Infiltration

Peak Flow: 1.25 *mgd* **PF:** 9.11

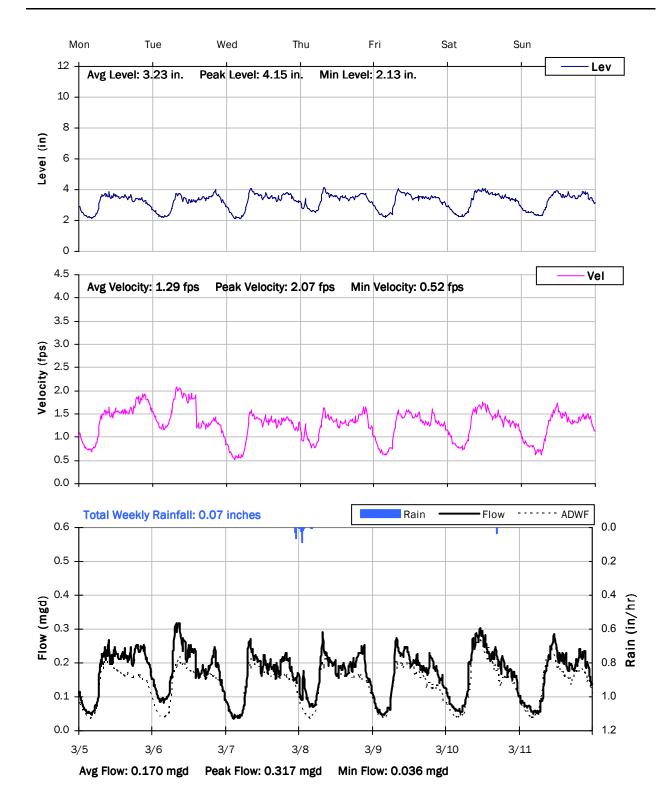
Peak I/I Rate: 1.23 mgd
Total I/I: 660,000 gallons

Peak Level: 7.51 *in* **d/D Ratio:** 0.50

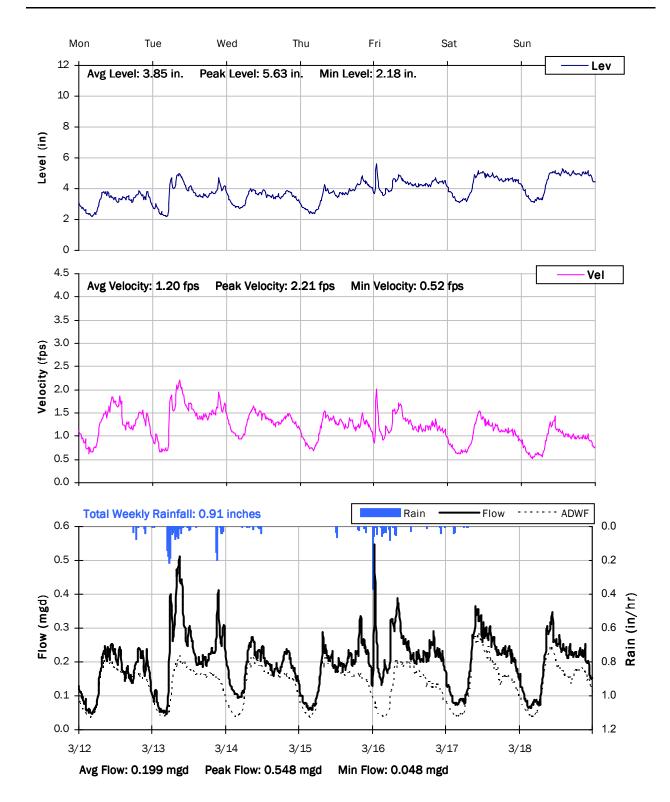
SITE 4
Weekly Level, Velocity and Flow Hydrographs 2/26/2018 to 3/5/2018



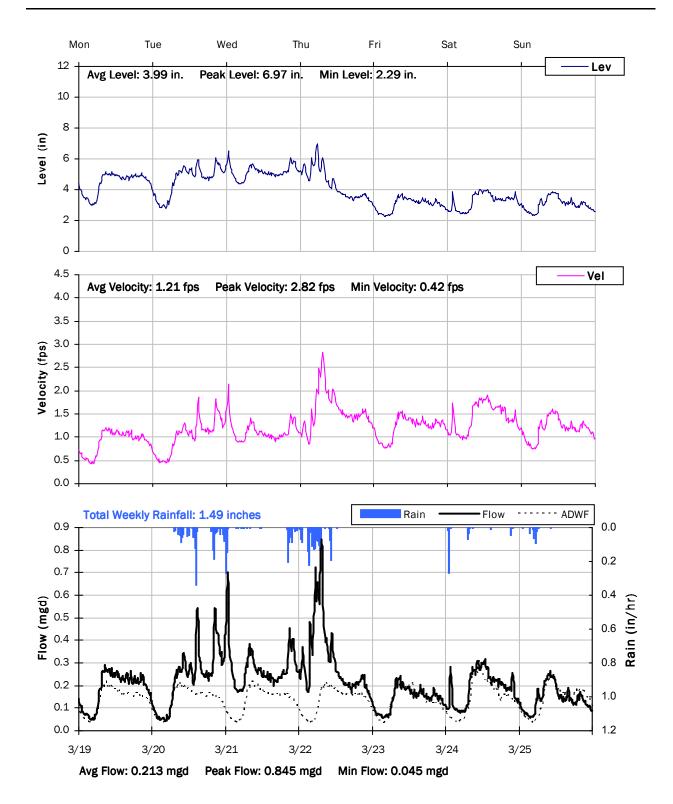
SITE 4
Weekly Level, Velocity and Flow Hydrographs 3/5/2018 to 3/12/2018



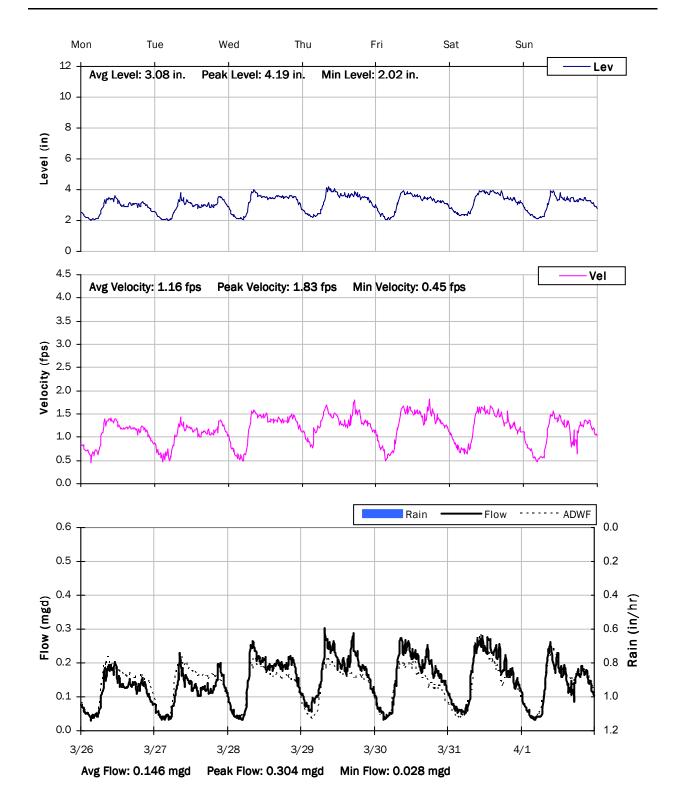
SITE 4
Weekly Level, Velocity and Flow Hydrographs 3/12/2018 to 3/19/2018



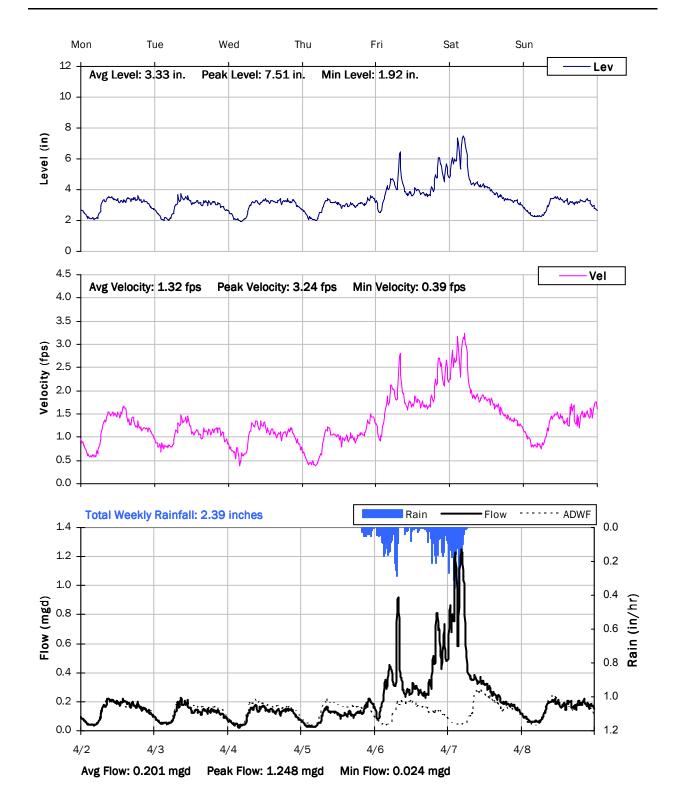
SITE 4
Weekly Level, Velocity and Flow Hydrographs 3/19/2018 to 3/26/2018



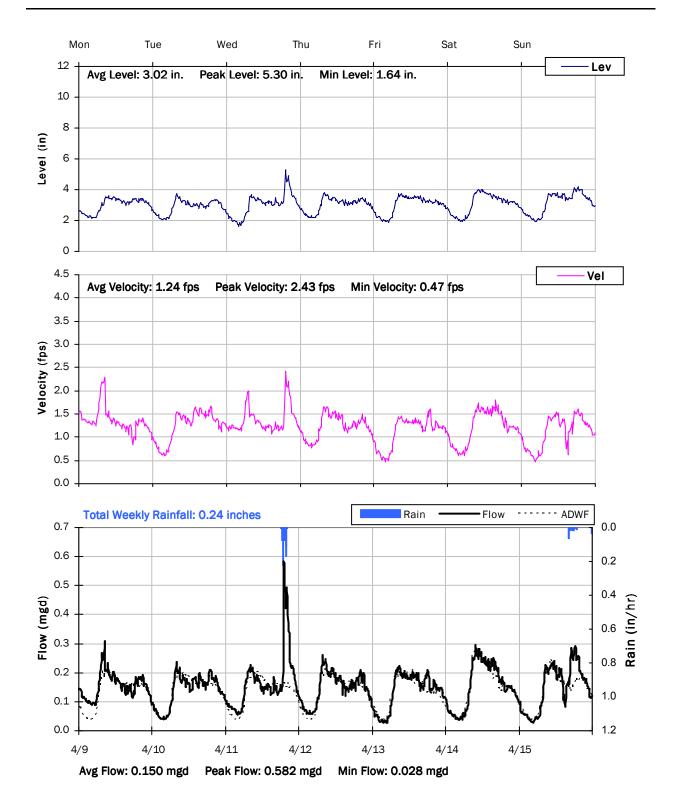
SITE 4
Weekly Level, Velocity and Flow Hydrographs 3/26/2018 to 4/2/2018



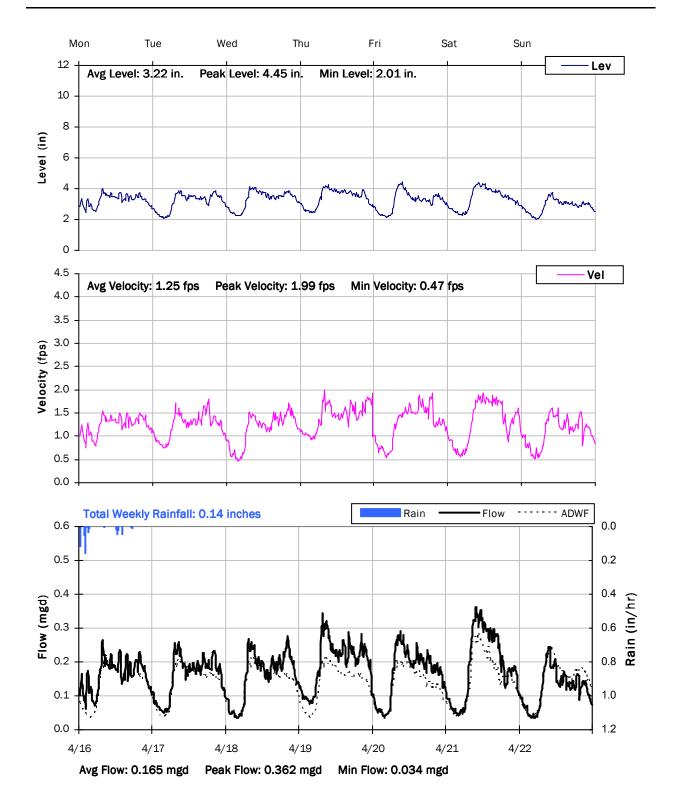
SITE 4
Weekly Level, Velocity and Flow Hydrographs
4/2/2018 to 4/9/2018



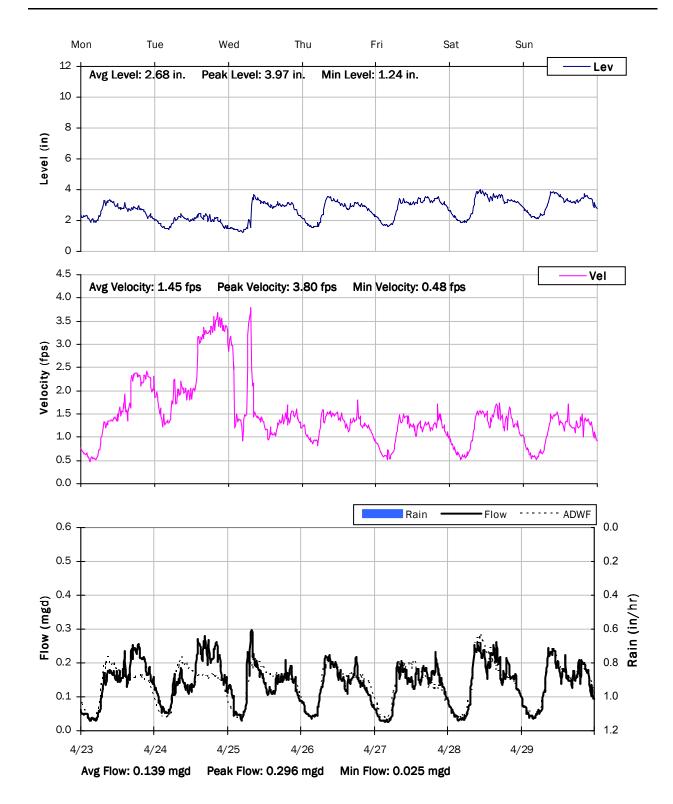
SITE 4
Weekly Level, Velocity and Flow Hydrographs
4/9/2018 to 4/16/2018



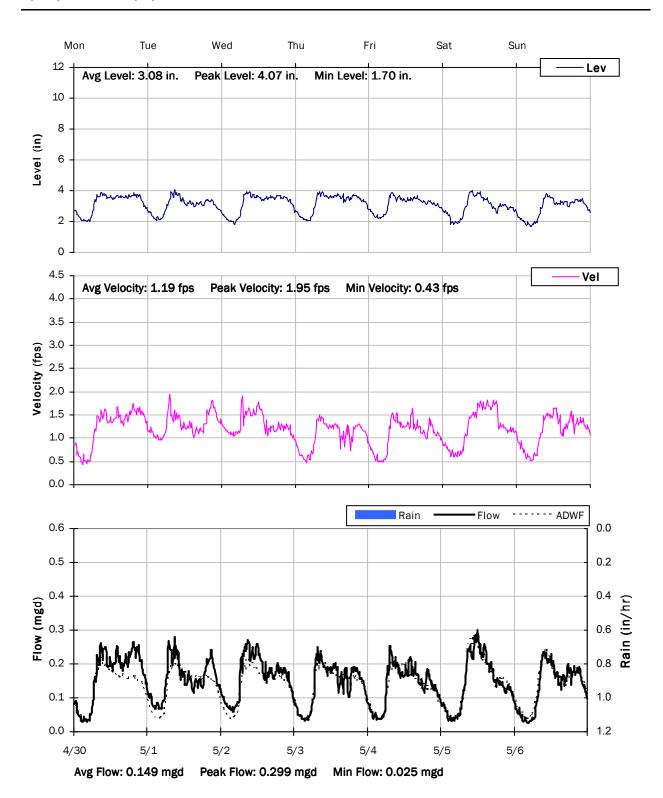
SITE 4
Weekly Level, Velocity and Flow Hydrographs
4/16/2018 to 4/23/2018



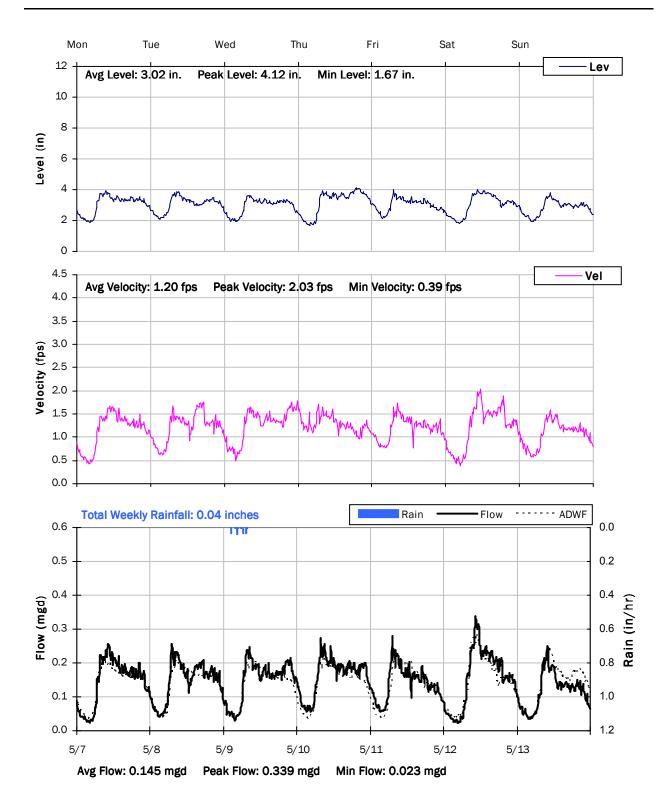
SITE 4
Weekly Level, Velocity and Flow Hydrographs
4/23/2018 to 4/30/2018



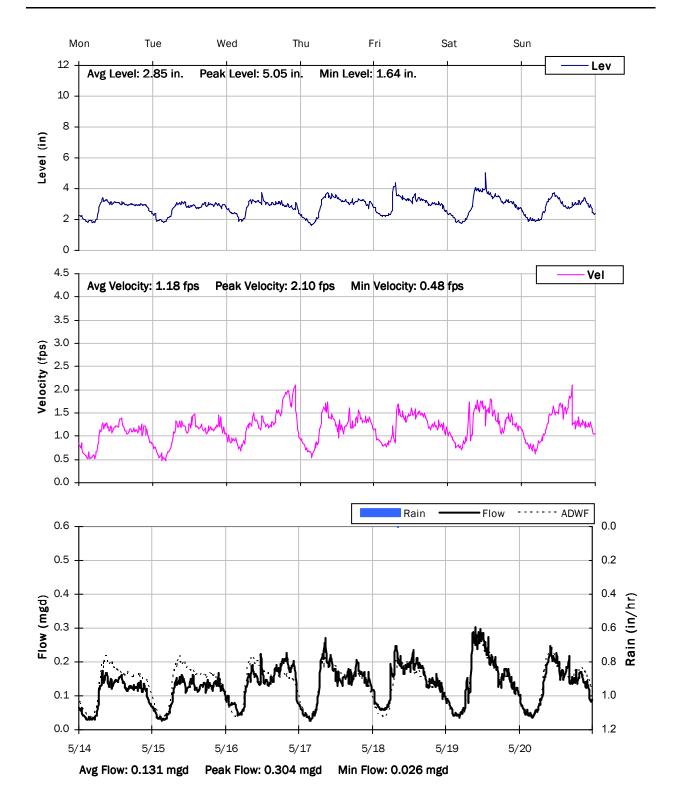
SITE 4
Weekly Level, Velocity and Flow Hydrographs
4/30/2018 to 5/7/2018



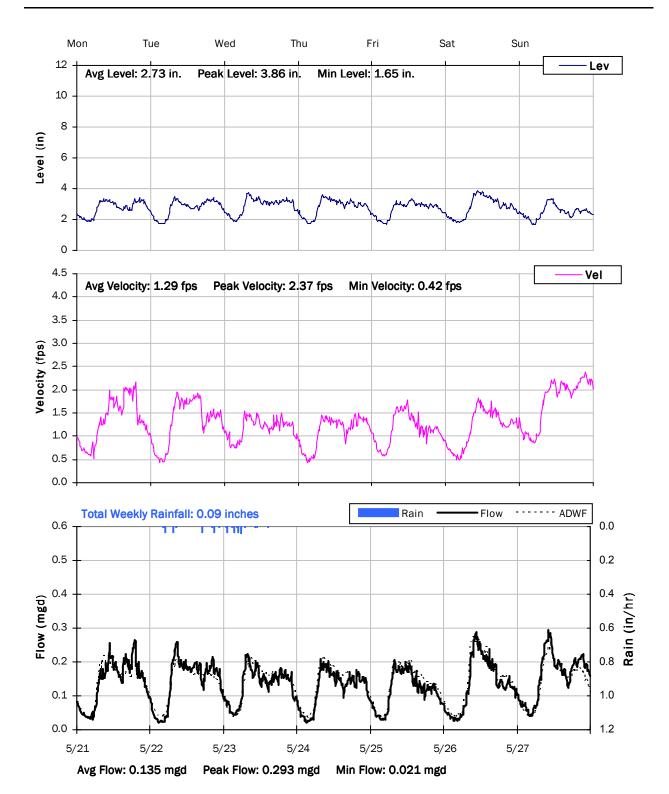
SITE 4
Weekly Level, Velocity and Flow Hydrographs 5/7/2018 to 5/14/2018



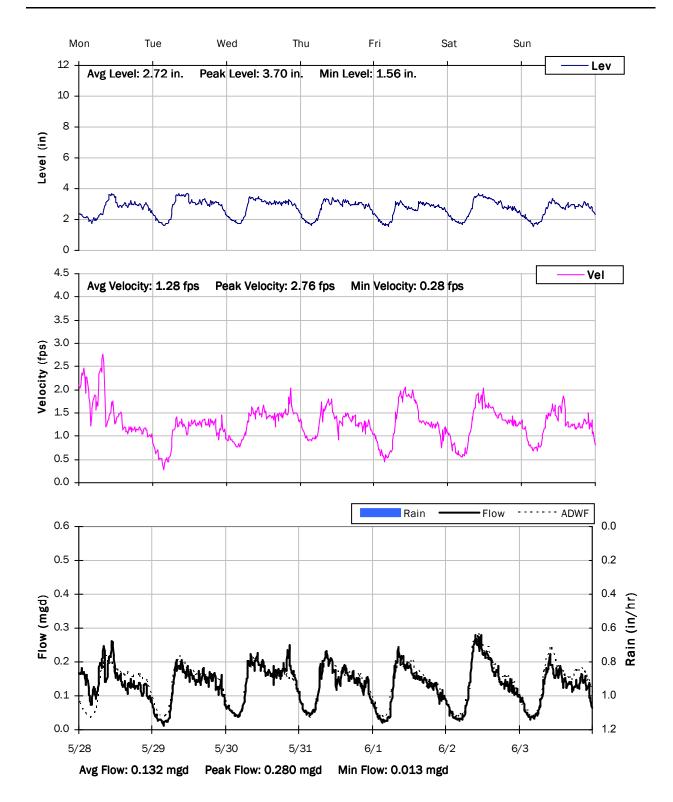
SITE 4
Weekly Level, Velocity and Flow Hydrographs
5/14/2018 to 5/21/2018



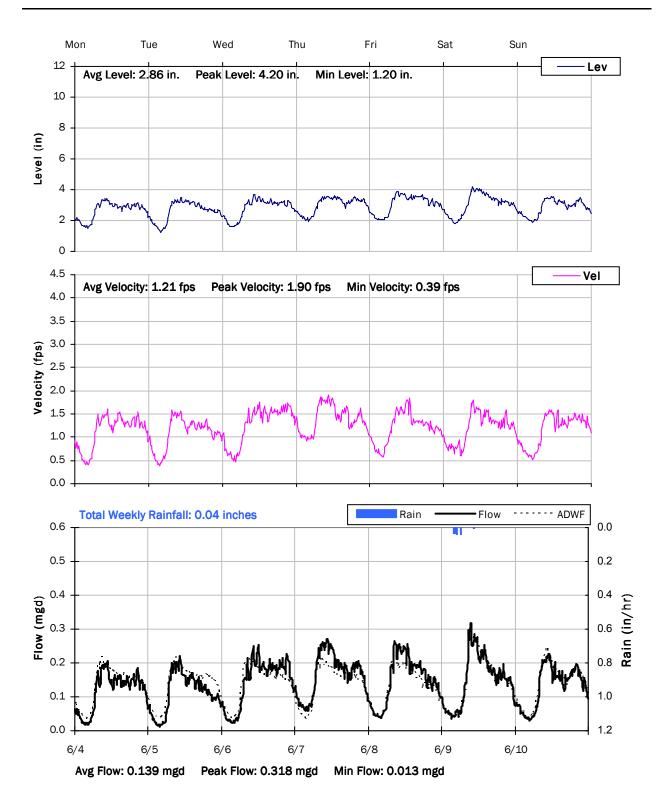
SITE 4
Weekly Level, Velocity and Flow Hydrographs
5/21/2018 to 5/28/2018



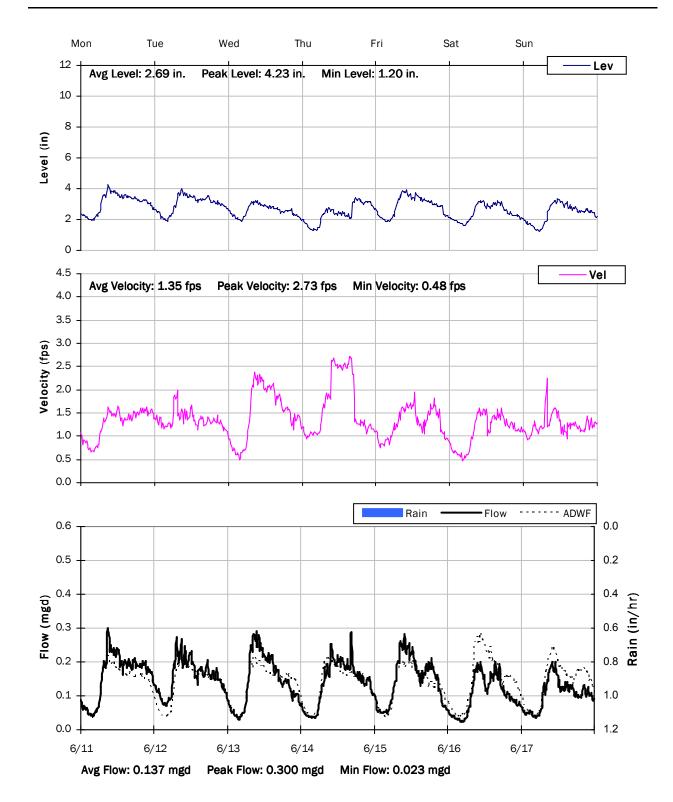
SITE 4
Weekly Level, Velocity and Flow Hydrographs
5/28/2018 to 6/4/2018



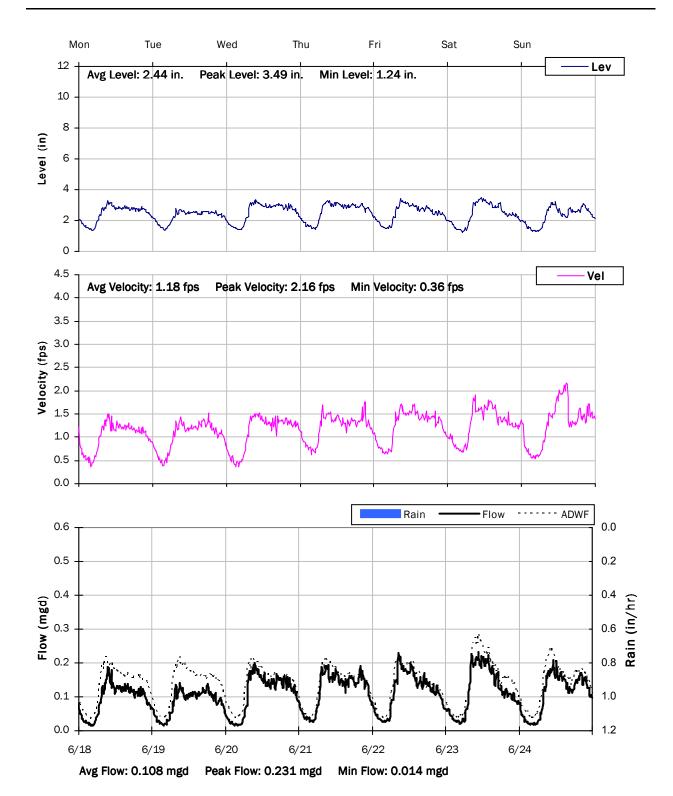
SITE 4
Weekly Level, Velocity and Flow Hydrographs
6/4/2018 to 6/11/2018



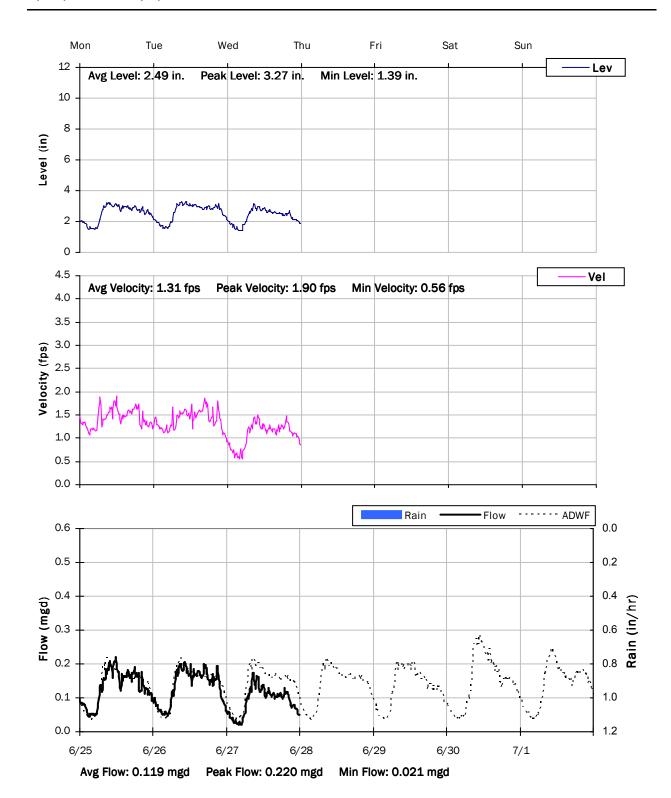
SITE 4
Weekly Level, Velocity and Flow Hydrographs
6/11/2018 to 6/18/2018



SITE 4
Weekly Level, Velocity and Flow Hydrographs
6/18/2018 to 6/25/2018



SITE 4
Weekly Level, Velocity and Flow Hydrographs
6/25/2018 to 7/2/2018



City of South San Francisco

Sanitary Sewer Flow Monitoring February 26- June 28, 2018

Monitoring Site: Site 5

Location: 1303 Mission Avenue, north of Isabelle Way

Data Summary Report



Vicinity Map: Site 5

SITE 5

Site Information

MH ID: WF980

Location: 1303 Mission Avenue, north of

Isabelle Way

Coordinates: 122.4462° W, 37.6665° N

Rim Elevation (Earth): 83 feet

Pipe Diameter: 15 inches

Sediment: 0.00 inches

ADWF: 0.266 mgd

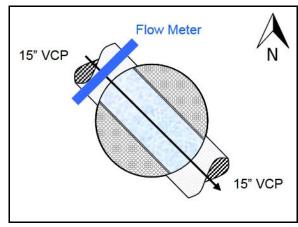
Peak Measured Flow: 1.836 mgd



Satellite Map



Sewer Map



Flow Sketch



Street View



Plan View

SITE 5

Additional Site Photos

Effluent Pipe



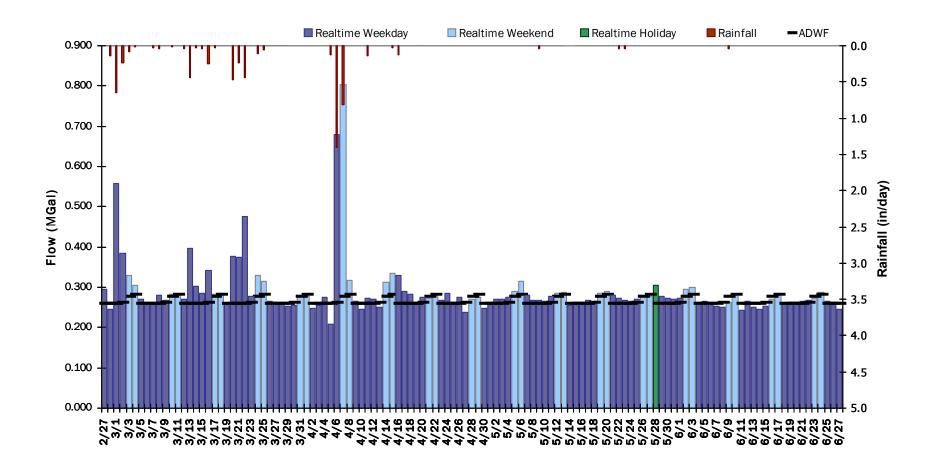
Influent Pipe



SITE 5
Period Flow Summary: Daily Flow Totals

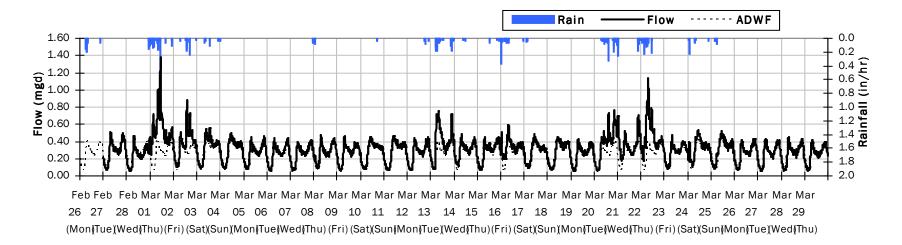
Avg Period Flow: 0.289 MGal Peak Daily Flow: 0.804 MGal Min Daily Flow: 0.209 MGal

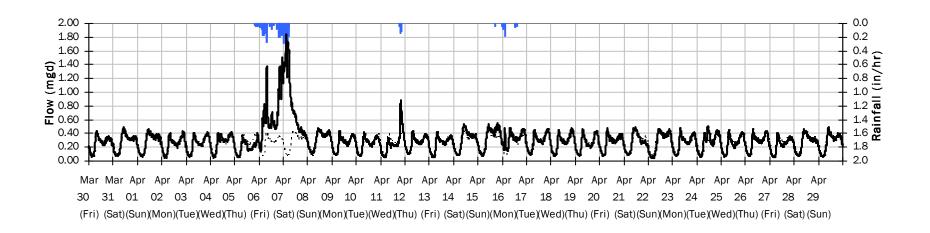
Total Period Rainfall: 6.11 inches



SITE 5 Flow Summary: 2/26/2018 to 4/29/2018

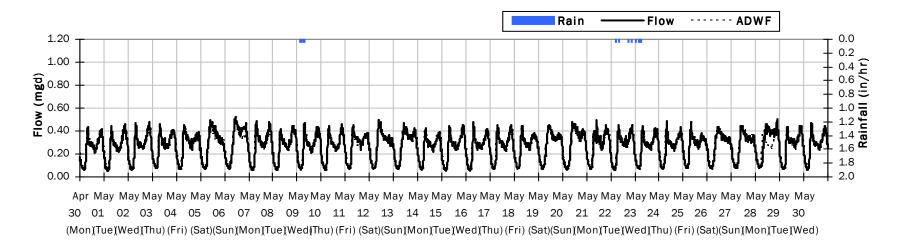
Total Period Rainfall: 6.22 inches Avg Flow: 0.307 mgd Peak Flow: 1.836 mgd Min Flow: 0.041 mgd

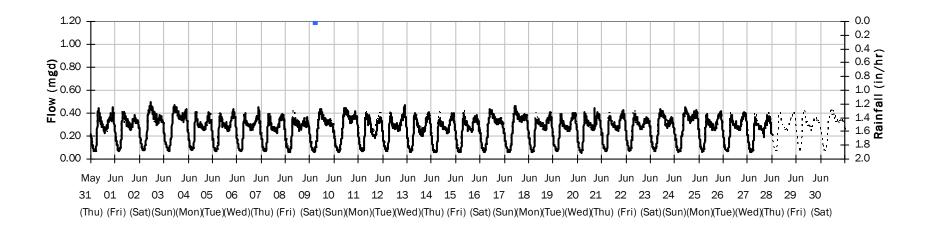




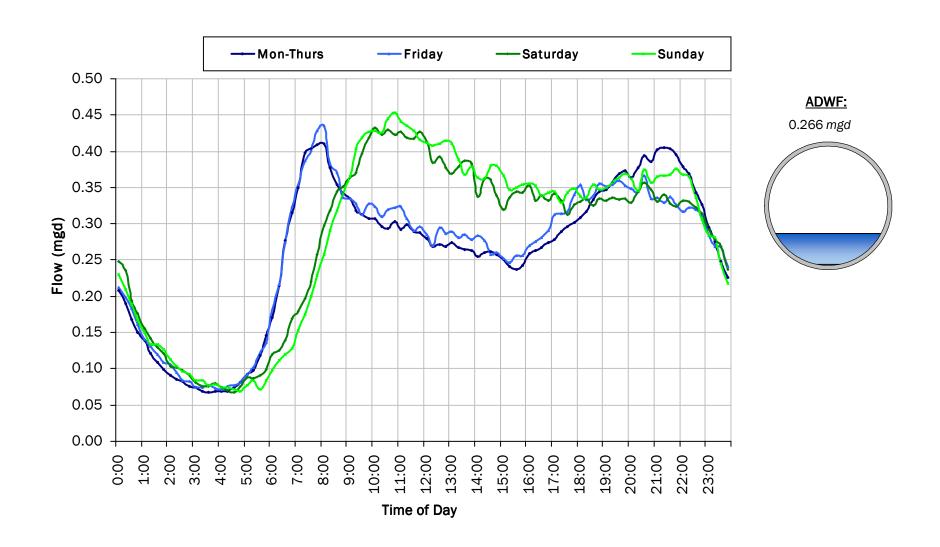
SITE 5 Flow Summary: 4/30/2018 to 6/30/2018

Total Period Rainfall: 0.16 inches Avg Flow: 0.270 mgd Peak Flow: 0.520 mgd Min Flow: 0.049 mgd



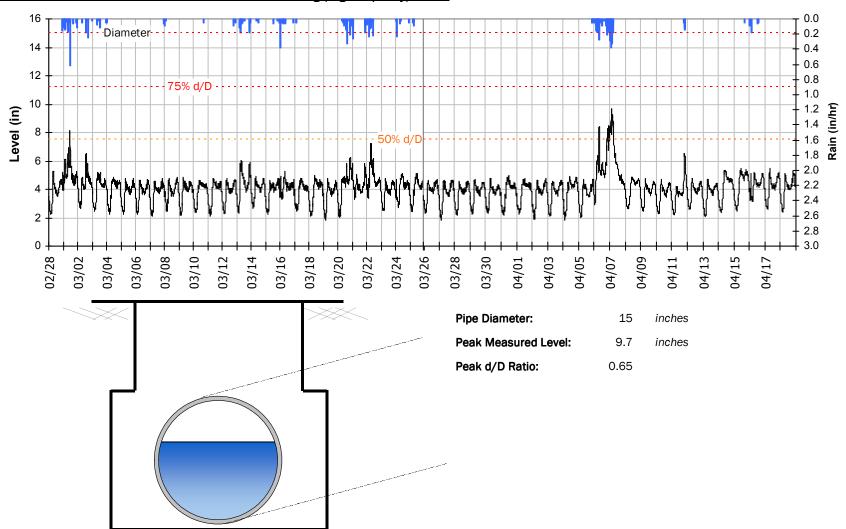


SITE 5
Average Dry Weather Flow Hydrographs

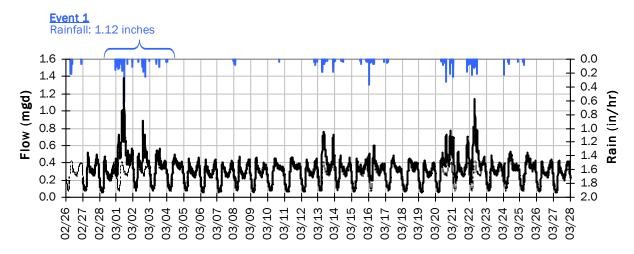


SITE 5
Site Capacity and Surcharge Summary

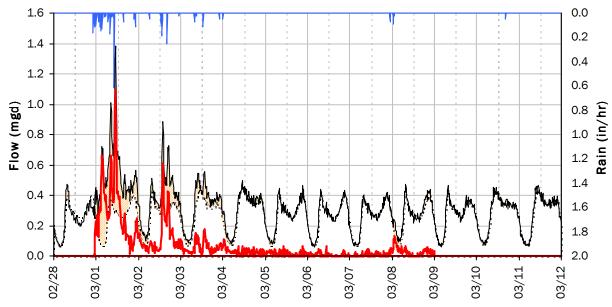
Realtime Flow Levels with Rainfall Data over Monitoring (High Capacity) Period



SITE 5
I/I Summary: Event 1



Event 1 Detail Graph



Storm Event I/I Analysis (Rain = 1.12 inches)

Capacity

Inflow / Infiltration

Peak Flow: 1.38 *mgd* **PF:** 5.20

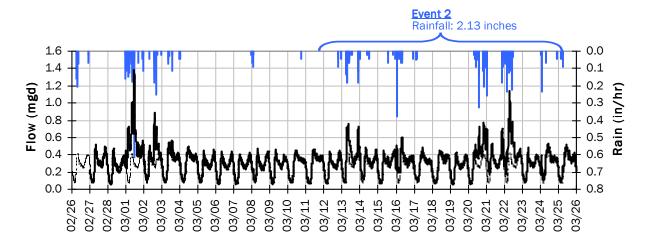
Peak I/I Rate: 1.10 mgd

Total I/I: 567,000 gallons

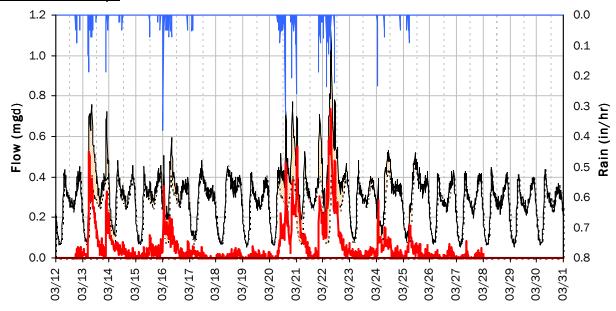
Peak Level: 8.13 *in* **d/D Ratio:** 0.54



SITE 5 I/I Summary: Event 2



Event 2 Detail Graph



Storm Event I/I Analysis (Rain = 2.13 inches)

Capacity

Inflow / Infiltration

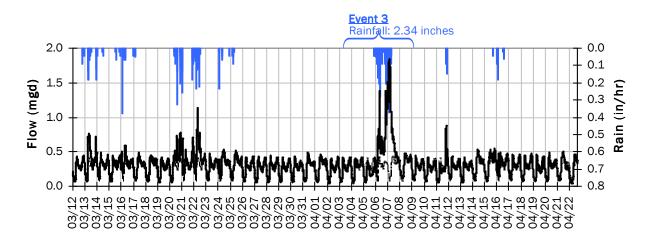
Peak Flow: 1.14 *mgd* **PF:** 4.27

 Peak I/I Rate:
 0.74 mgd

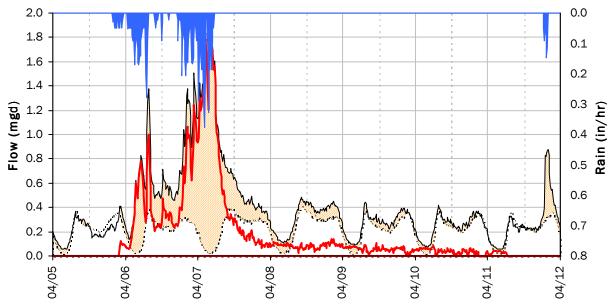
 Total I/I:
 845,000 gallons

Peak Level: 7.25 *in* **d/D Ratio:** 0.48

SITE 5 I/I Summary: Event 3



Event 3 Detail Graph



Storm Event I/I Analysis (Rain = 2.34 inches)

Capacity

Inflow / Infiltration

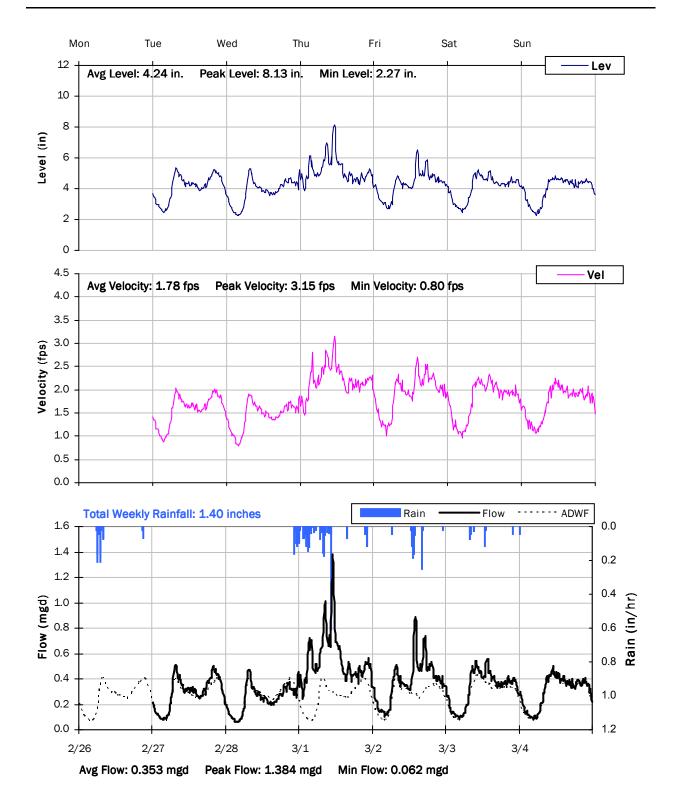
Peak Flow: 1.84 *mgd* **PF:** 6.90

Peak I/I Rate: 1.79 mgd

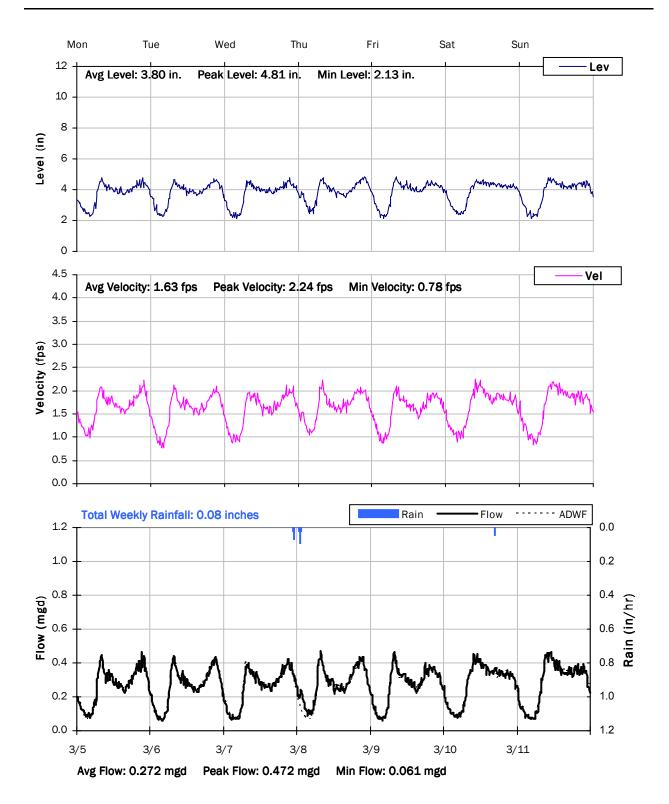
Total I/I: 1,235,000 gallons

Peak Level: 9.70 *in* **d/D Ratio:** 0.65

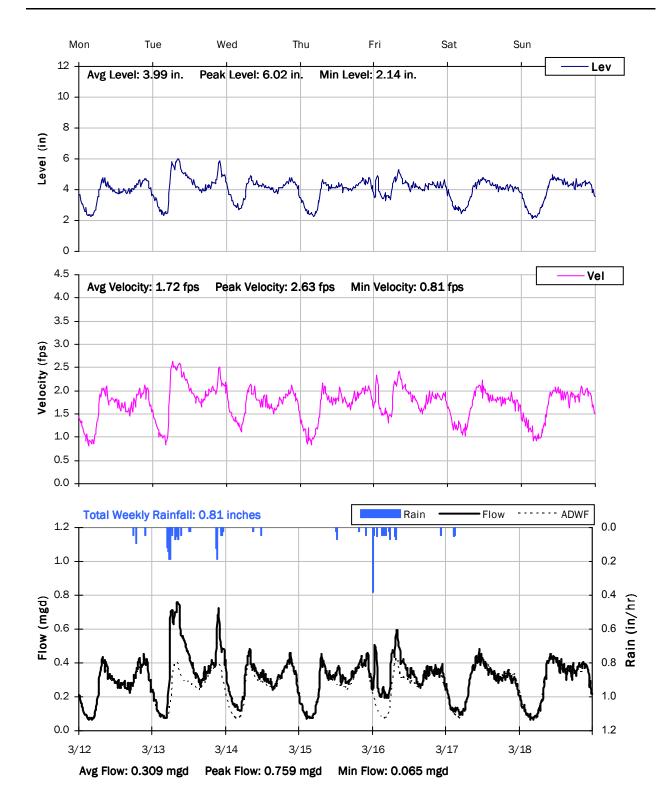
SITE 5 Weekly Level, Velocity and Flow Hydrographs 2/26/2018 to 3/5/2018



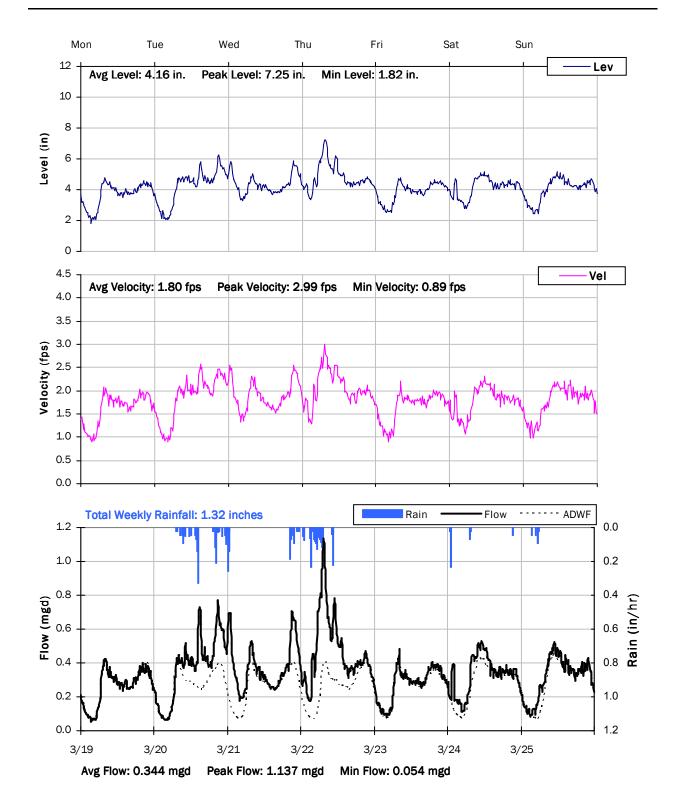
SITE 5
Weekly Level, Velocity and Flow Hydrographs 3/5/2018 to 3/12/2018



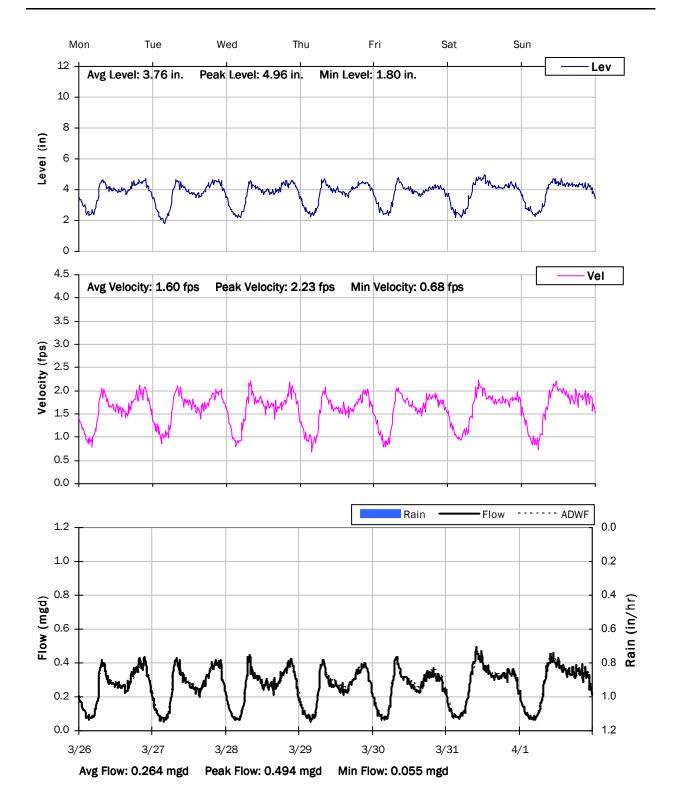
SITE 5
Weekly Level, Velocity and Flow Hydrographs 3/12/2018 to 3/19/2018



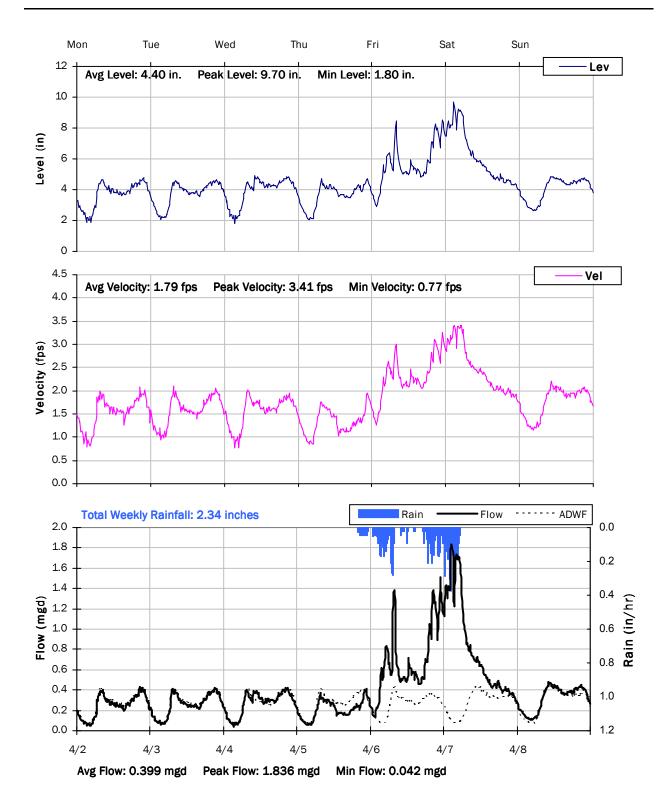
SITE 5
Weekly Level, Velocity and Flow Hydrographs 3/19/2018 to 3/26/2018



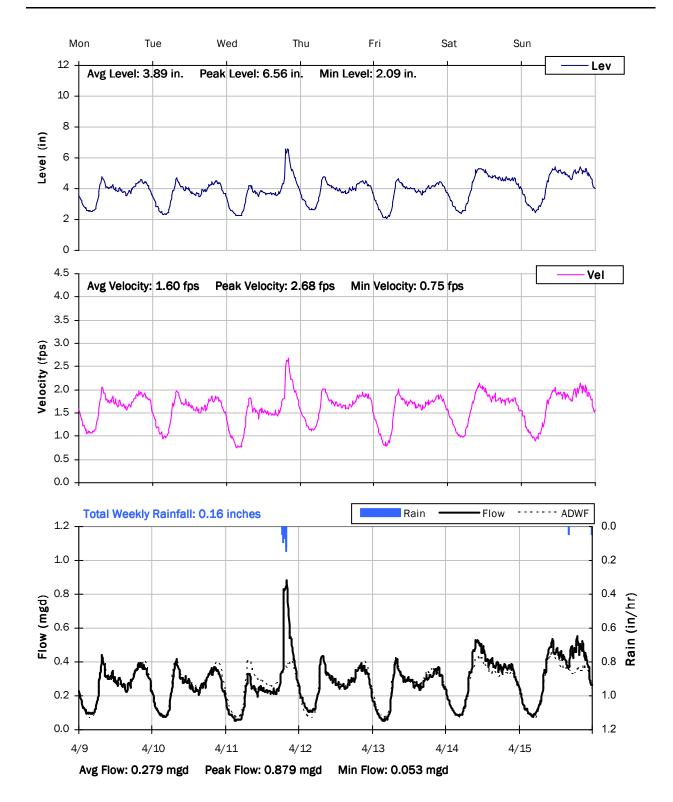
SITE 5 Weekly Level, Velocity and Flow Hydrographs 3/26/2018 to 4/2/2018



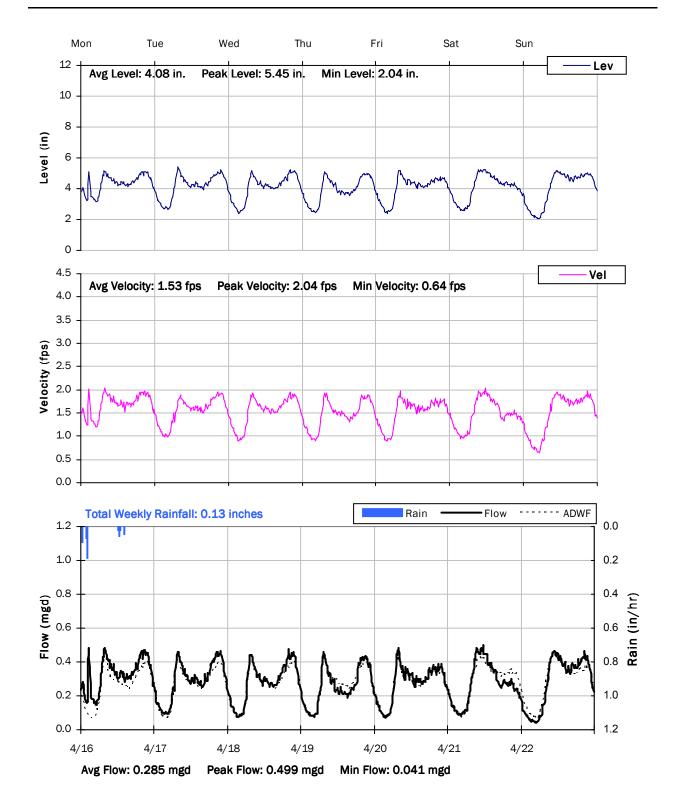
SITE 5
Weekly Level, Velocity and Flow Hydrographs 4/2/2018 to 4/9/2018



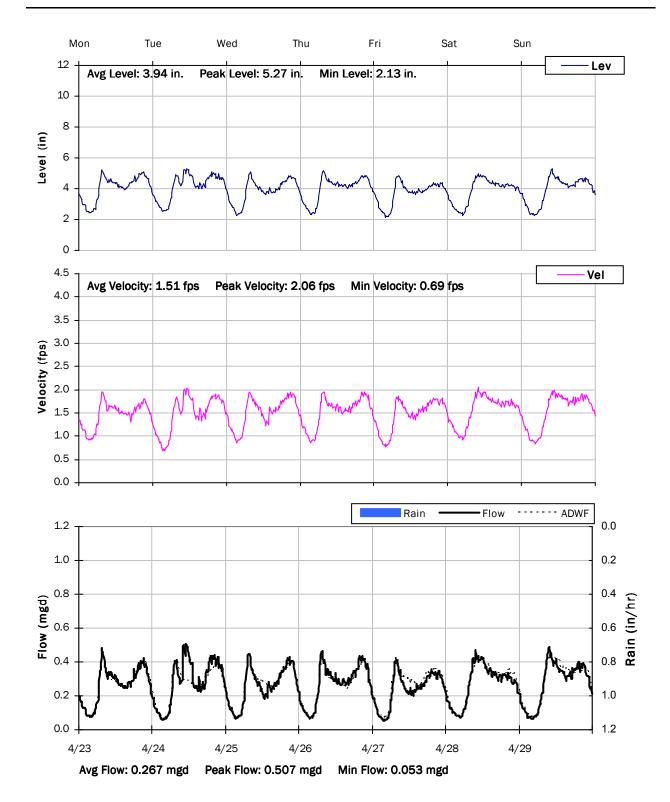
SITE 5 Weekly Level, Velocity and Flow Hydrographs 4/9/2018 to 4/16/2018



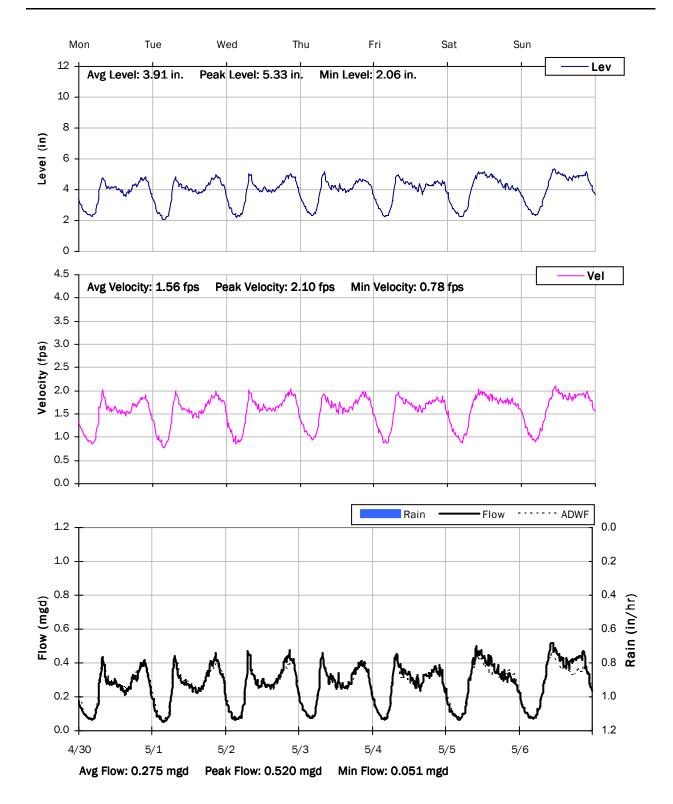
SITE 5 Weekly Level, Velocity and Flow Hydrographs 4/16/2018 to 4/23/2018



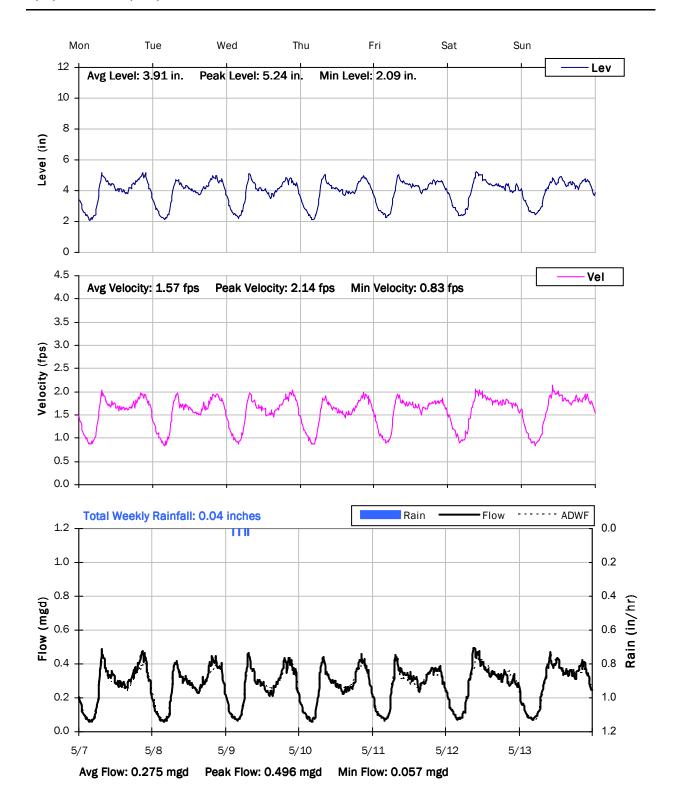
SITE 5 Weekly Level, Velocity and Flow Hydrographs 4/23/2018 to 4/30/2018



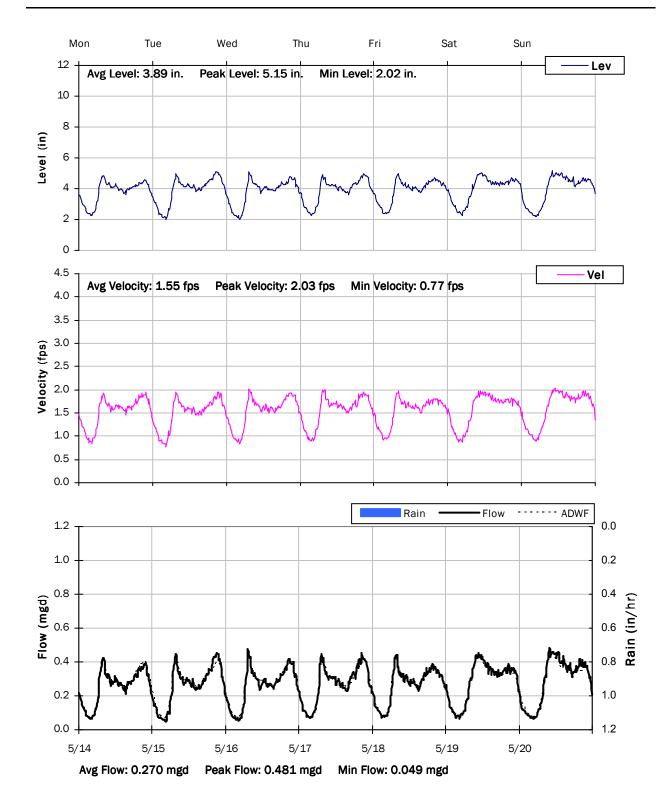
SITE 5 Weekly Level, Velocity and Flow Hydrographs 4/30/2018 to 5/7/2018



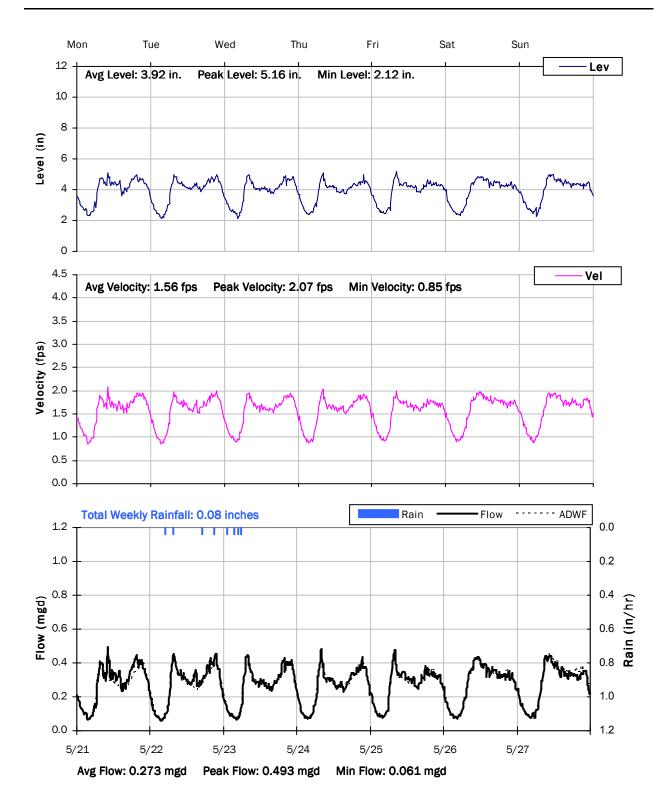
SITE 5
Weekly Level, Velocity and Flow Hydrographs
5/7/2018 to 5/14/2018



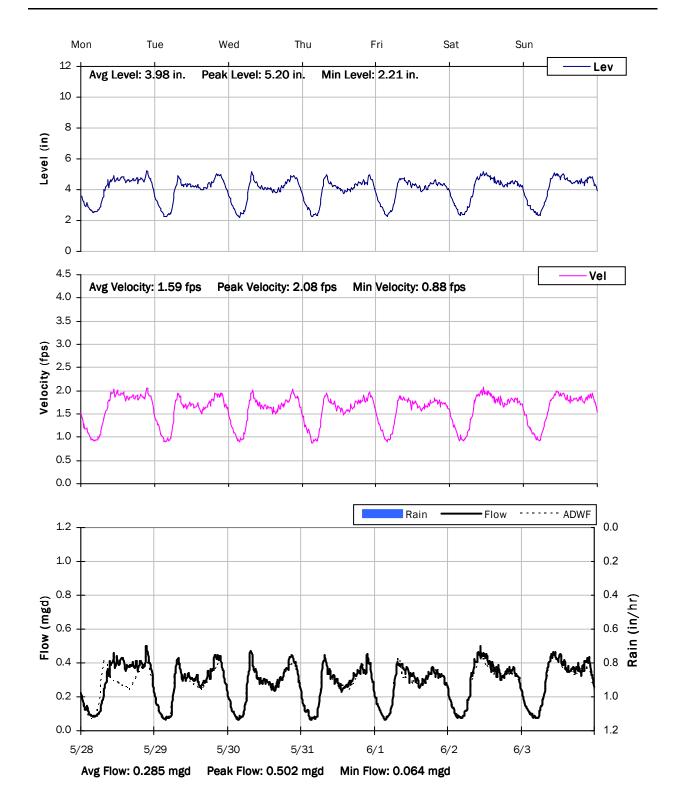
SITE 5 Weekly Level, Velocity and Flow Hydrographs 5/14/2018 to 5/21/2018



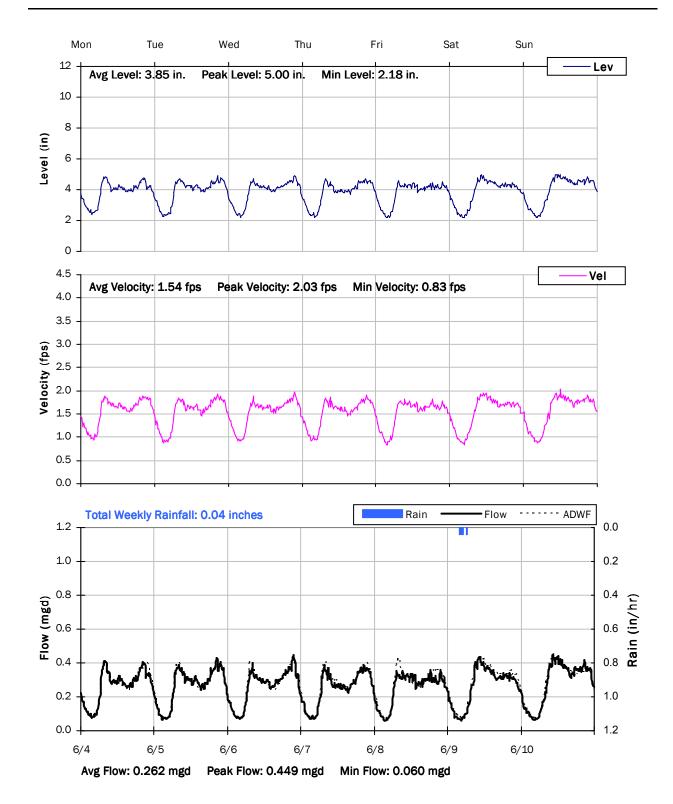
SITE 5
Weekly Level, Velocity and Flow Hydrographs 5/21/2018 to 5/28/2018



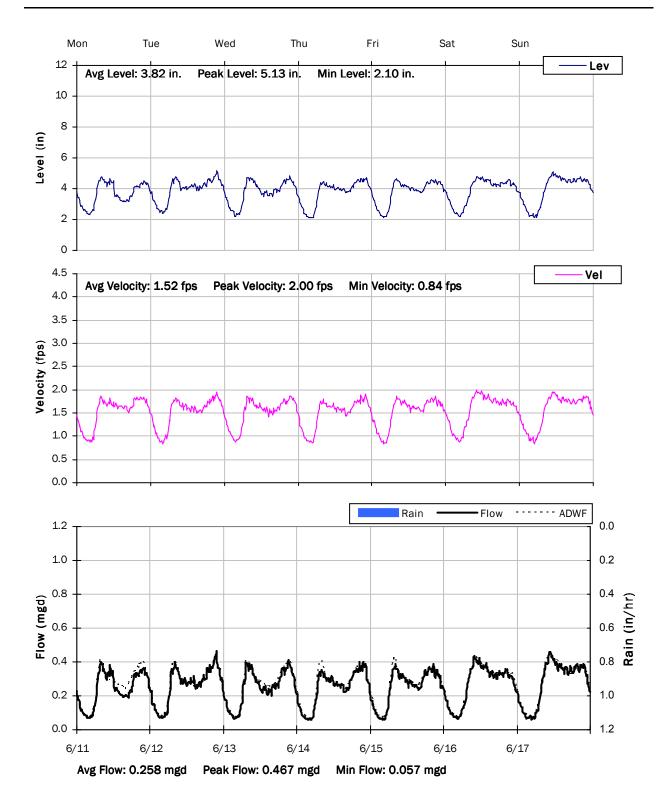
SITE 5
Weekly Level, Velocity and Flow Hydrographs 5/28/2018 to 6/4/2018



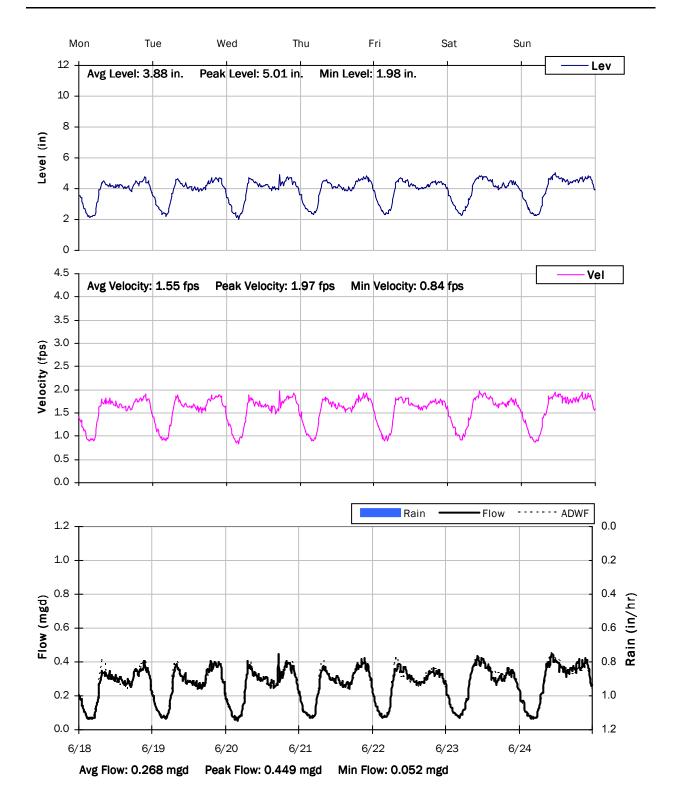
SITE 5
Weekly Level, Velocity and Flow Hydrographs
6/4/2018 to 6/11/2018



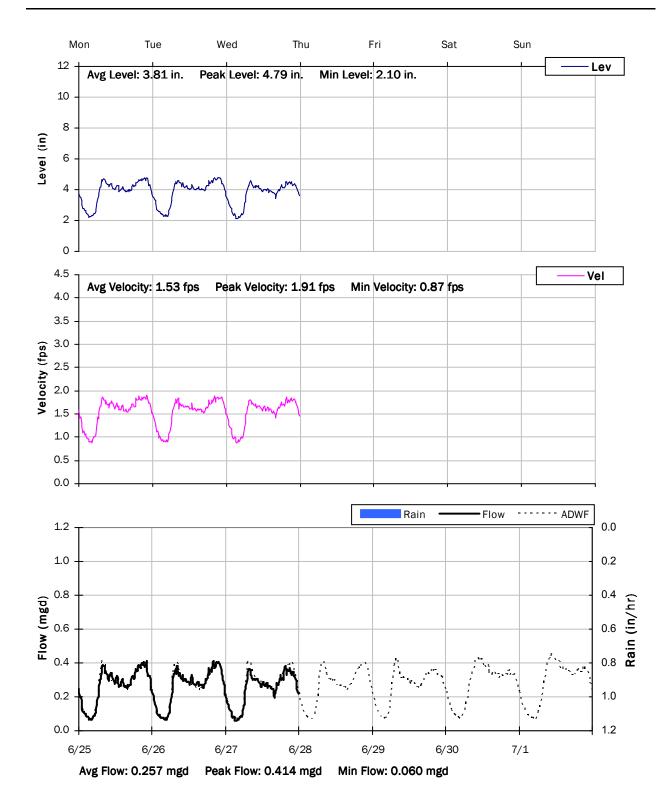
SITE 5 Weekly Level, Velocity and Flow Hydrographs 6/11/2018 to 6/18/2018



SITE 5 Weekly Level, Velocity and Flow Hydrographs 6/18/2018 to 6/25/2018



SITE 5
Weekly Level, Velocity and Flow Hydrographs
6/25/2018 to 7/2/2018



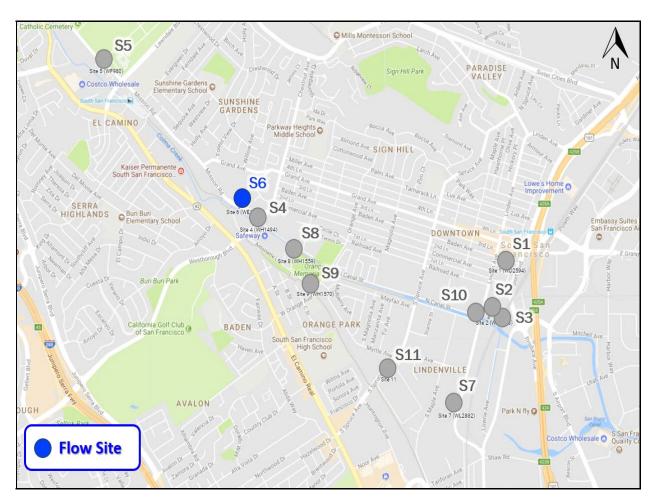
City of South San Francisco

Sanitary Sewer Flow Monitoring February 26- June 28, 2018

Monitoring Site: Site 6

Location: 920 Mission Road, near Mission Glen Condos

Data Summary Report



Vicinity Map: Site 6

SITE 6

Site Information

MH ID: WE1489

Location: 920 Mission Road, near Mission

Glen Condos

Coordinates: 122.4336° W, 37.6574° N

Rim Elevation (Earth): 39 feet

Pipe Diameter: 18 inches

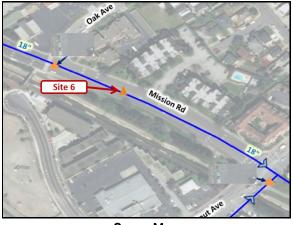
Sediment: 0.00 inches

ADWF: 1.200 mgd

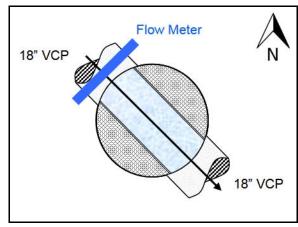
Peak Measured Flow: 5.146 mgd



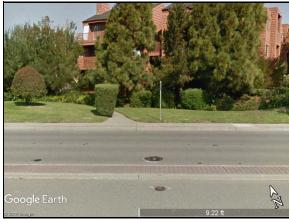
Satellite Map



Sewer Map



Flow Sketch



Street View



Plan View

SITE 6

Additional Site Photos

Effluent Pipe



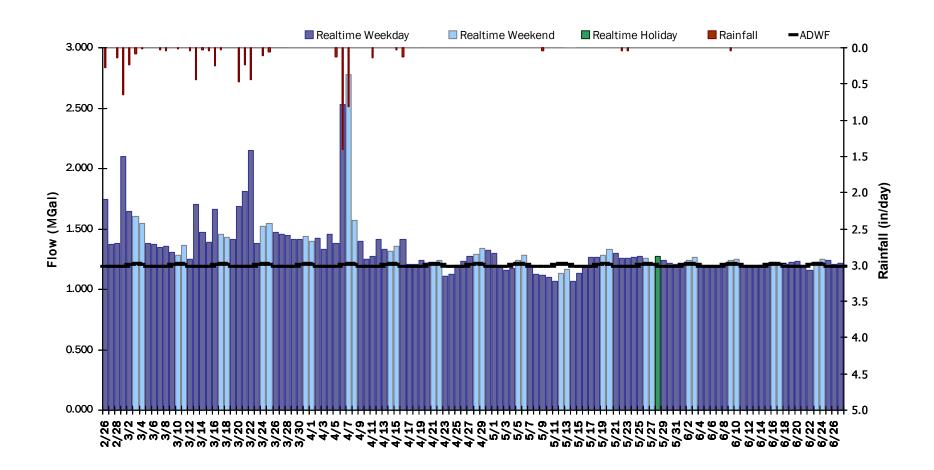
Influent Pipe



SITE 6
Period Flow Summary: Daily Flow Totals

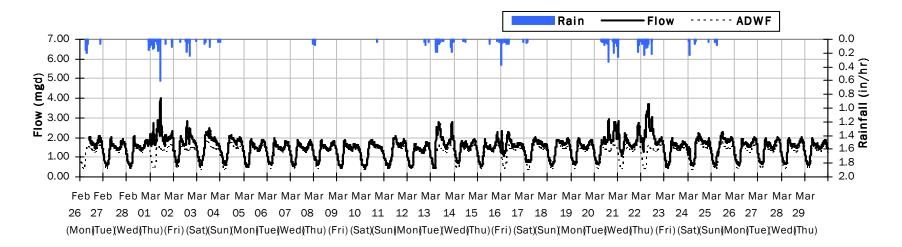
Avg Period Flow: 1.338 MGal Peak Daily Flow: 2.775 MGal Min Daily Flow: 1.062 MGal

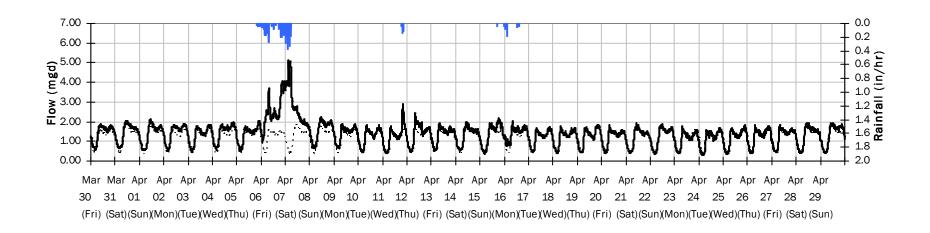
Total Period Rainfall: 6.13 inches



SITE 6 Flow Summary: 2/26/2018 to 4/29/2018

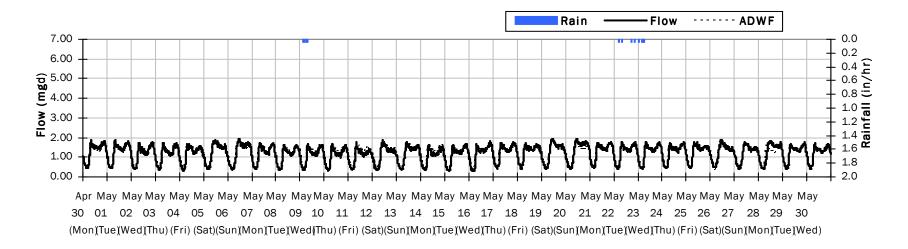
Total Period Rainfall: 6.22 inches Avg Flow: 1.455 mgd Peak Flow: 5.146 mgd Min Flow: 0.313 mgd

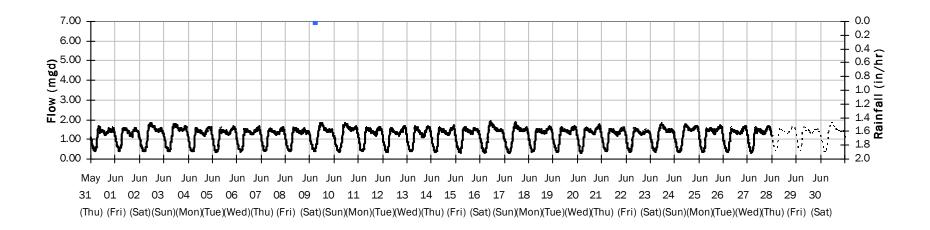




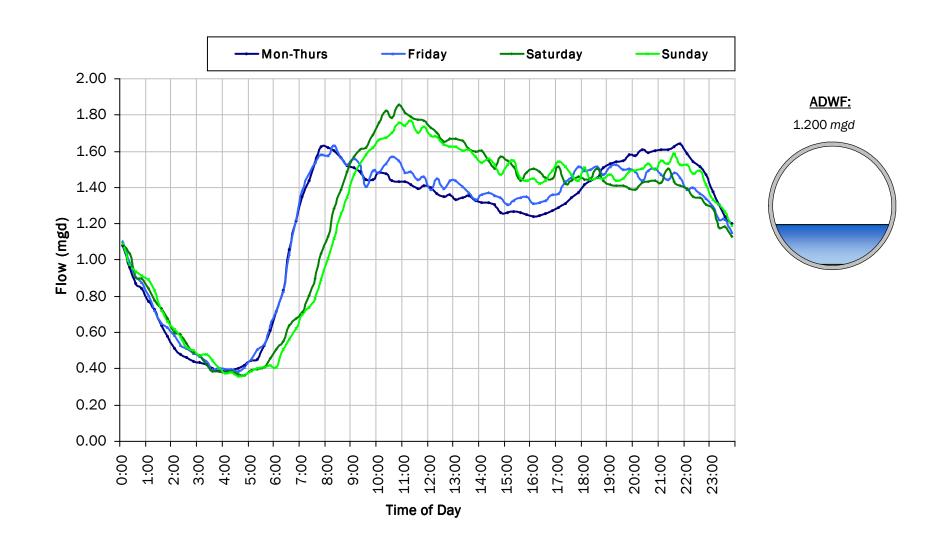
SITE 6 Flow Summary: 4/30/2018 to 6/30/2018

Total Period Rainfall: 0.16 inches Avg Flow: 1.212 mgd Peak Flow: 1.942 mgd Min Flow: 0.296 mgd



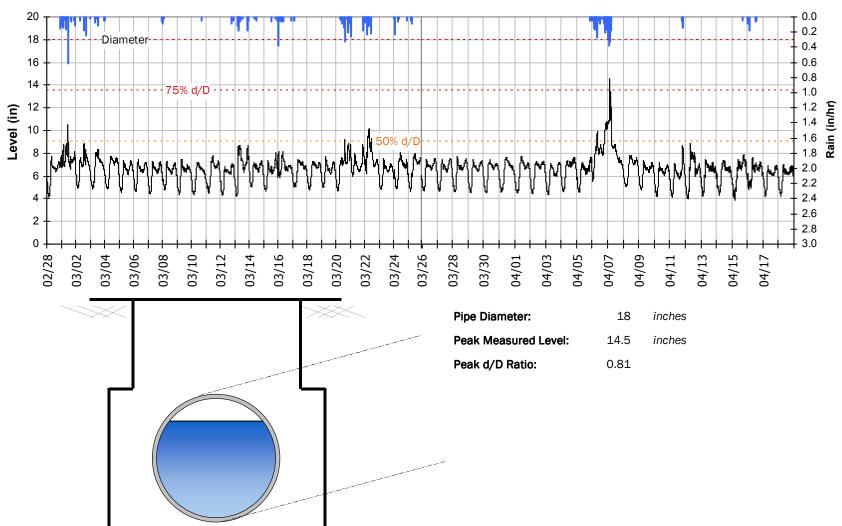


SITE 6
Average Dry Weather Flow Hydrographs

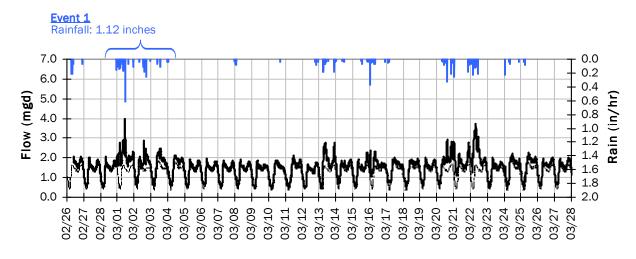


SITE 6
Site Capacity and Surcharge Summary

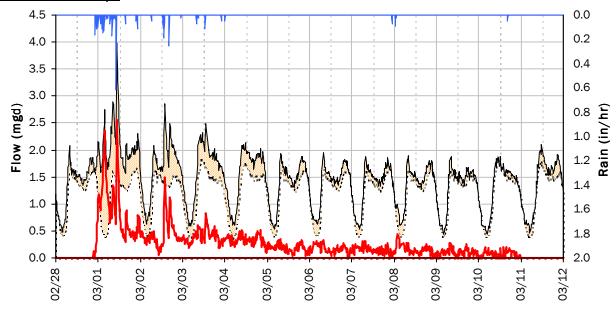
Realtime Flow Levels with Rainfall Data over Monitoring (High Capacity) Period



SITE 6 I/I Summary: Event 1



Event 1 Detail Graph



Storm Event I/I Analysis (Rain = 1.12 inches)

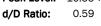
Capacity

Inflow / Infiltration

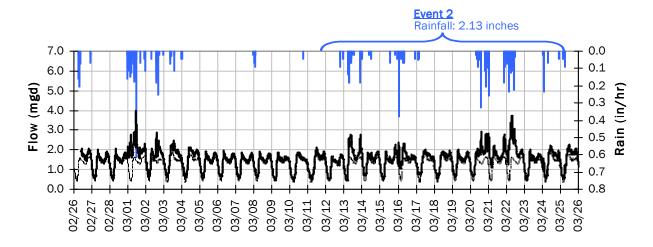
Peak Flow: 3.99 mgd 3.32

Peak I/I Rate: 2.56 mgd Total I/I: 2,940,000 gallons

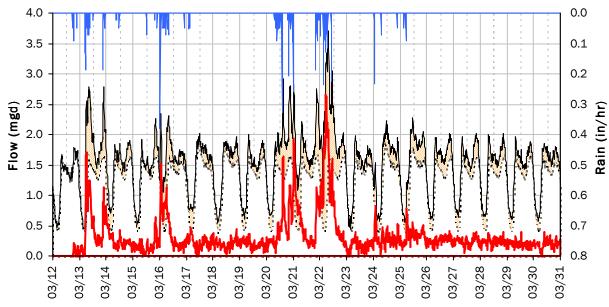
Peak Level: 10.55 in



SITE 6 I/I Summary: Event 2



Event 2 Detail Graph



Storm Event I/I Analysis (Rain = 2.13 inches)

Capacity

Inflow / Infiltration

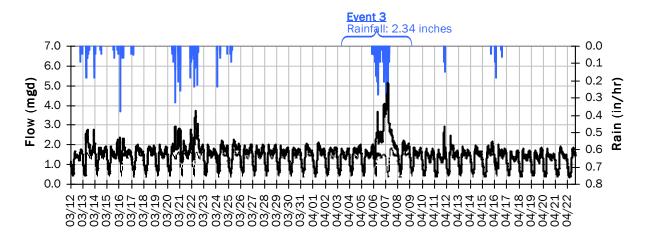
Peak Flow: 3.70 mgd Peak I/I Rate:

3.09

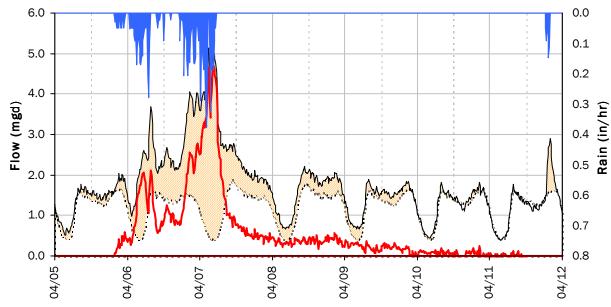
2.65 mgd Total I/I: 5,889,000 gallons

Peak Level: 10.21 in d/D Ratio: 0.57

SITE 6 I/I Summary: Event 3



Event 3 Detail Graph



Storm Event I/I Analysis (Rain = 2.34 inches)

<u>Capacity</u>

Inflow / Infiltration

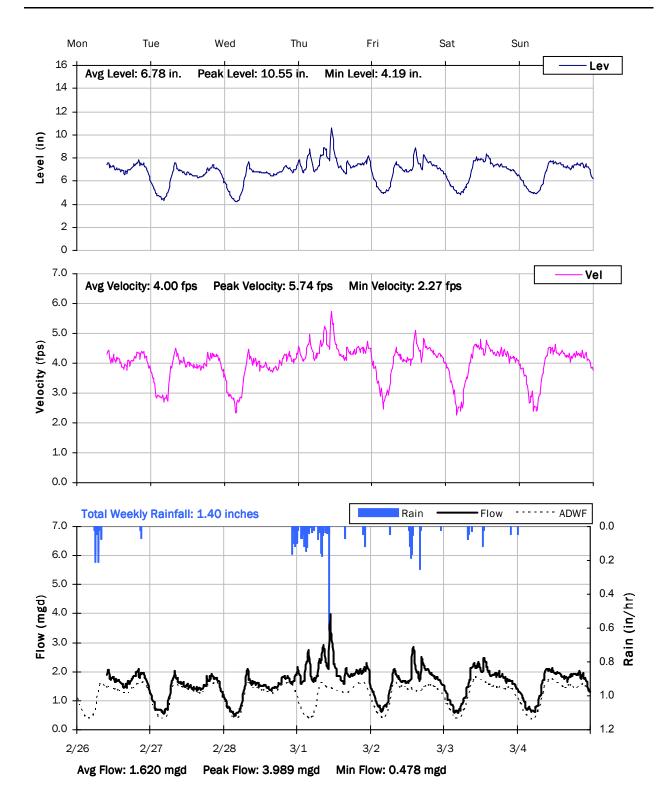
Peak Flow: 5.15 *mgd* **PF:** 4.29

 Peak I/I Rate:
 4.70 mgd

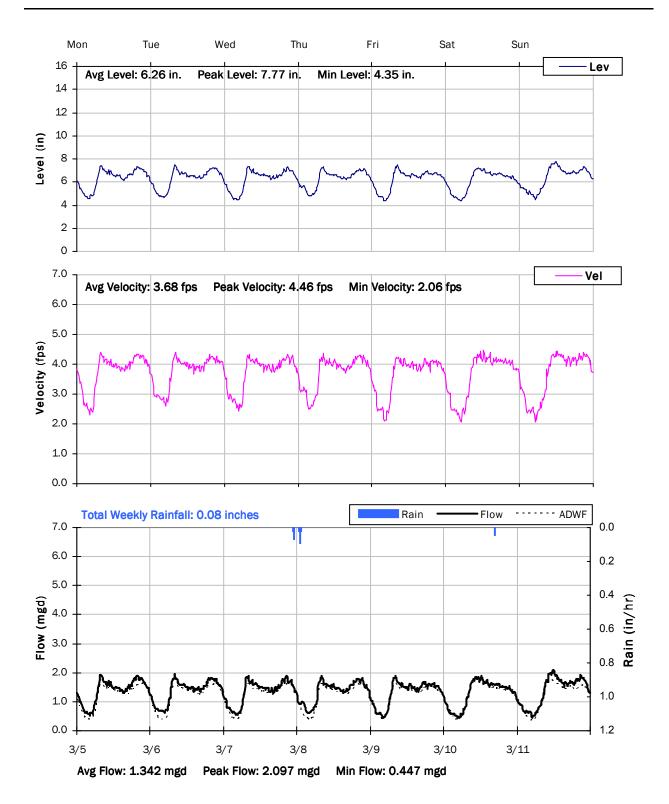
 Total I/I:
 3,563,000 gallons

Peak Level: 14.52 *in* **d/D Ratio:** 0.81

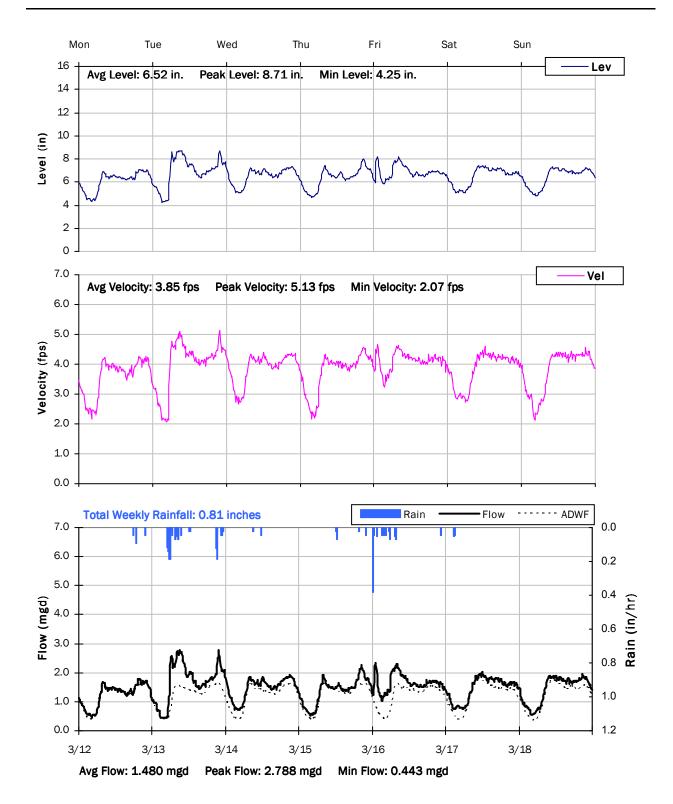
SITE 6 Weekly Level, Velocity and Flow Hydrographs 2/26/2018 to 3/5/2018



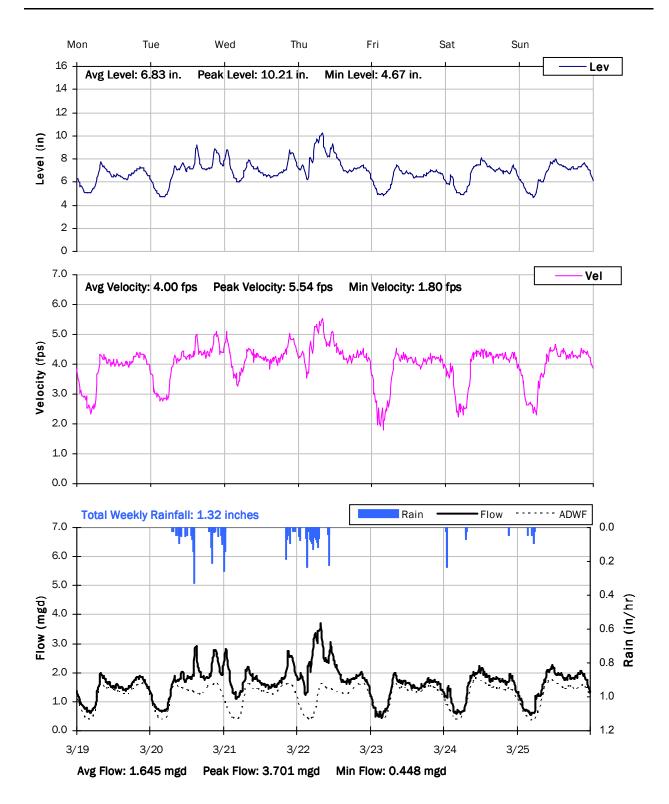
SITE 6
Weekly Level, Velocity and Flow Hydrographs 3/5/2018 to 3/12/2018



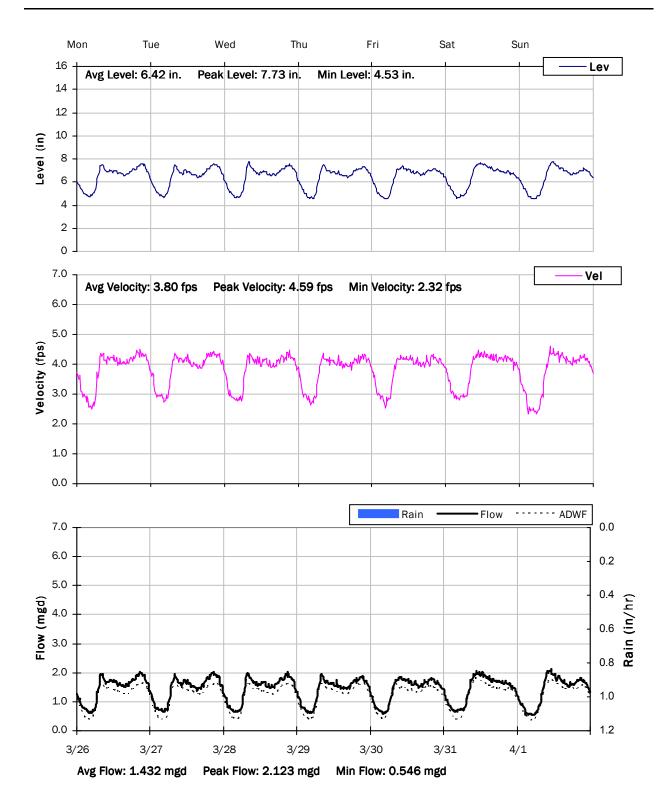
SITE 6
Weekly Level, Velocity and Flow Hydrographs 3/12/2018 to 3/19/2018



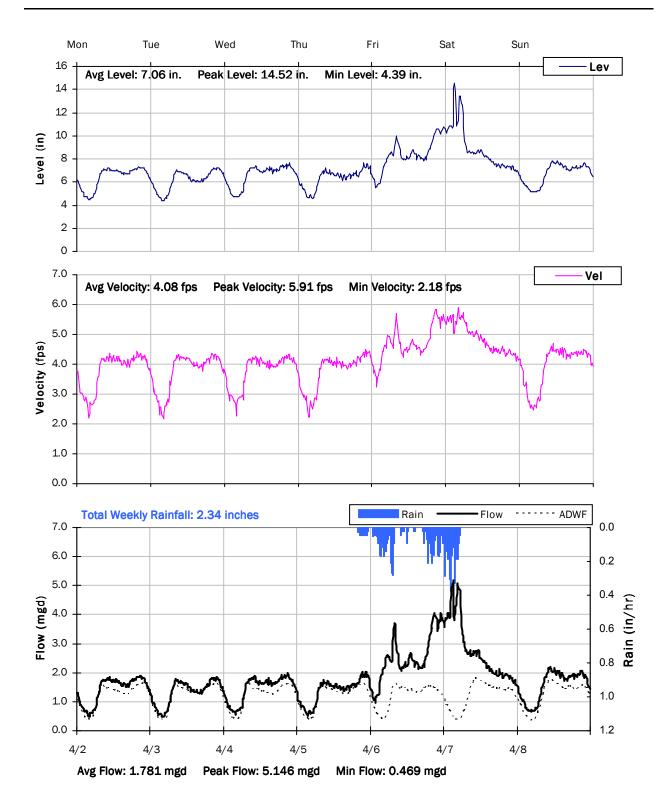
SITE 6
Weekly Level, Velocity and Flow Hydrographs 3/19/2018 to 3/26/2018



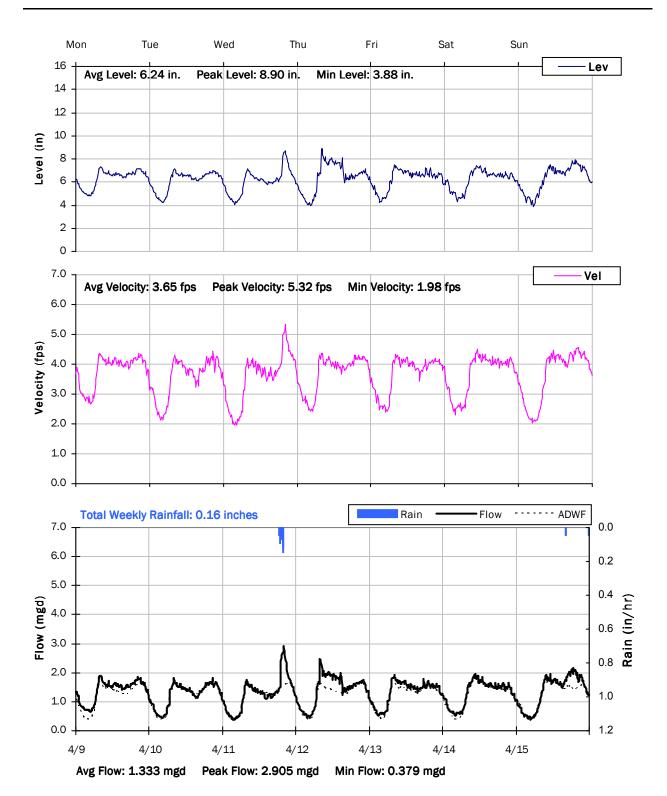
SITE 6
Weekly Level, Velocity and Flow Hydrographs 3/26/2018 to 4/2/2018



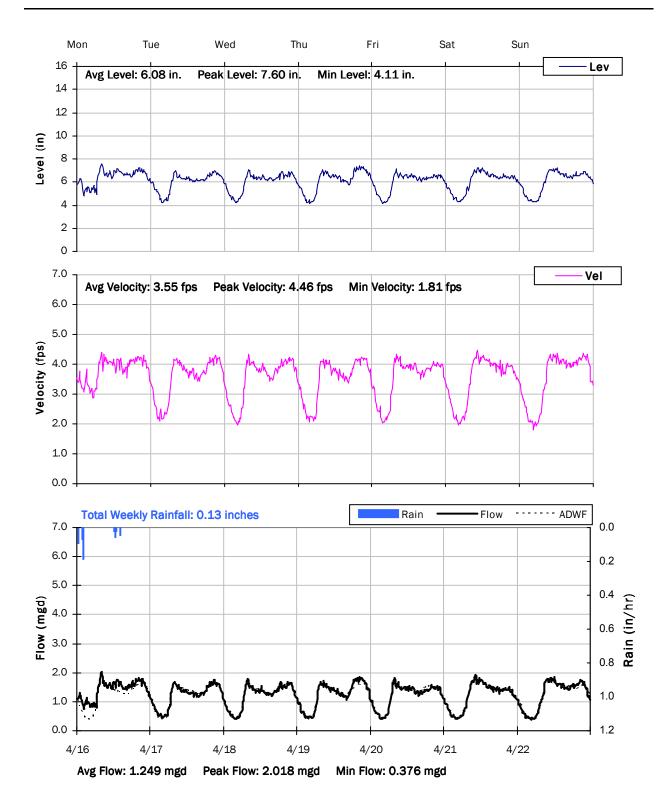
SITE 6 Weekly Level, Velocity and Flow Hydrographs 4/2/2018 to 4/9/2018



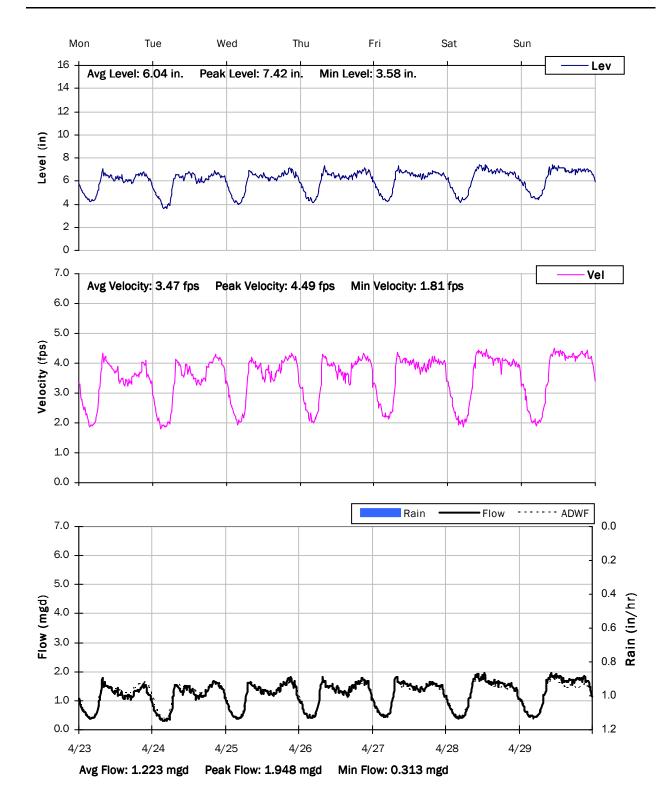
SITE 6 Weekly Level, Velocity and Flow Hydrographs 4/9/2018 to 4/16/2018



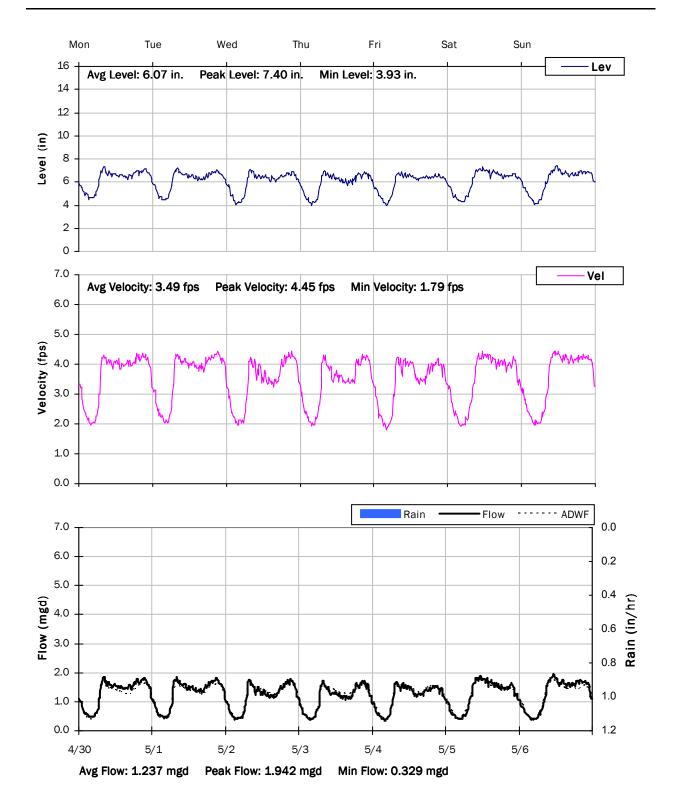
SITE 6 Weekly Level, Velocity and Flow Hydrographs 4/16/2018 to 4/23/2018



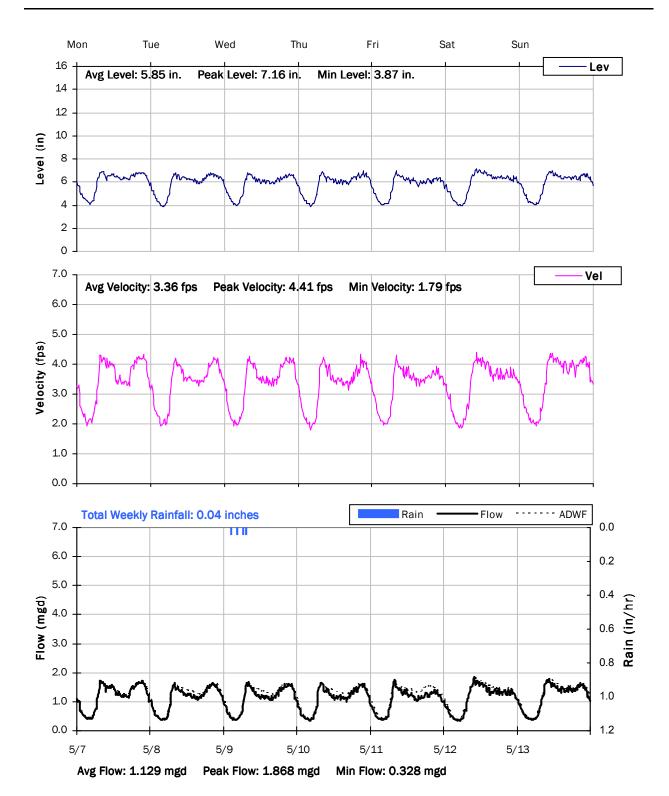
SITE 6 Weekly Level, Velocity and Flow Hydrographs 4/23/2018 to 4/30/2018



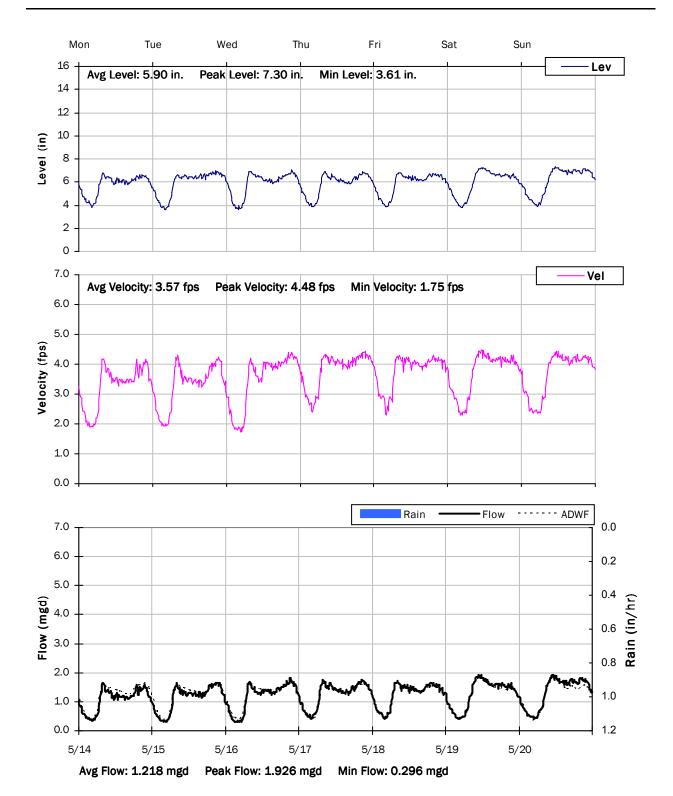
SITE 6 Weekly Level, Velocity and Flow Hydrographs 4/30/2018 to 5/7/2018



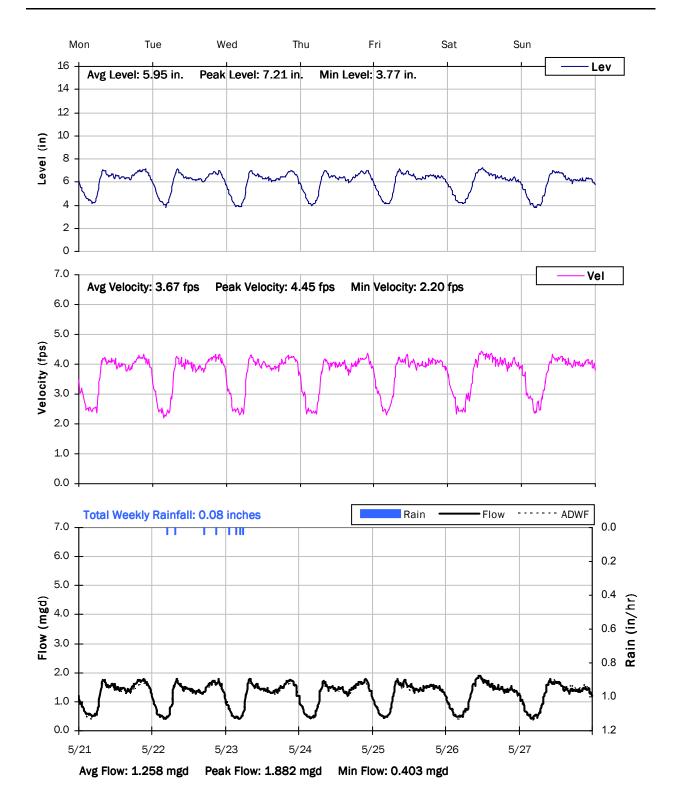
SITE 6 Weekly Level, Velocity and Flow Hydrographs 5/7/2018 to 5/14/2018



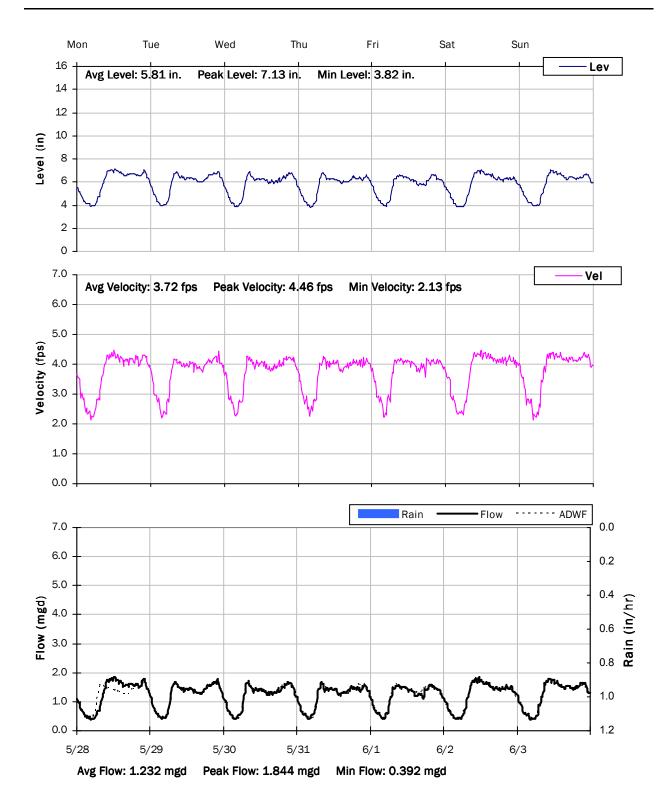
SITE 6
Weekly Level, Velocity and Flow Hydrographs 5/14/2018 to 5/21/2018



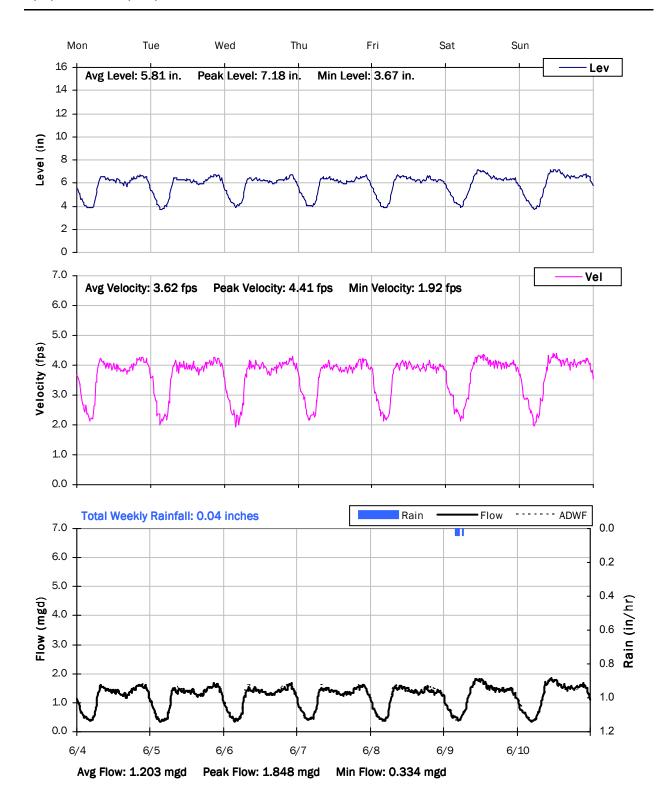
SITE 6
Weekly Level, Velocity and Flow Hydrographs 5/21/2018 to 5/28/2018



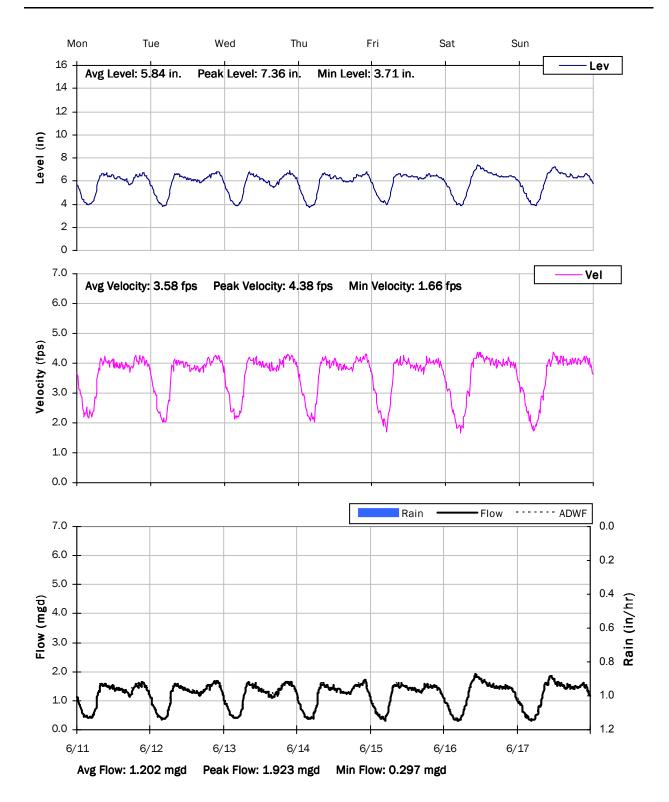
SITE 6 Weekly Level, Velocity and Flow Hydrographs 5/28/2018 to 6/4/2018



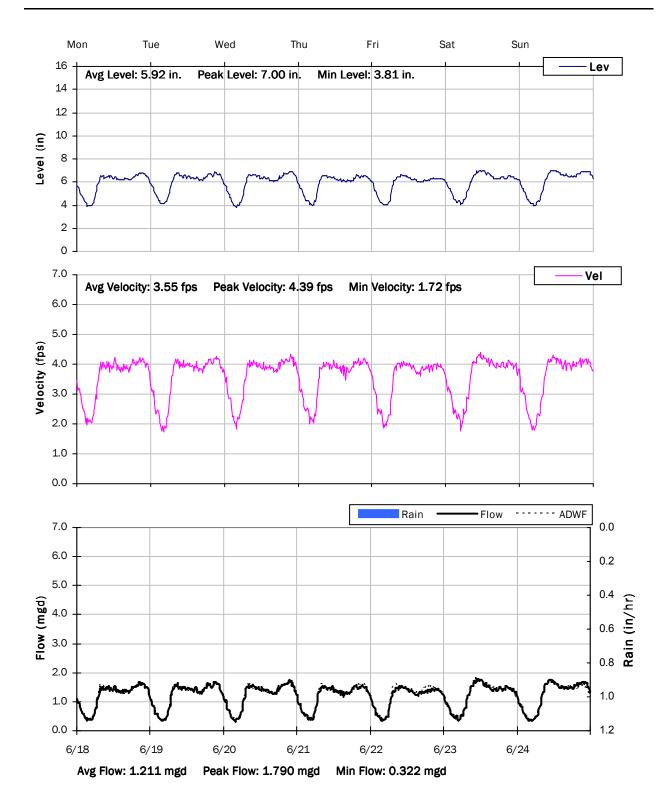
SITE 6 Weekly Level, Velocity and Flow Hydrographs 6/4/2018 to 6/11/2018



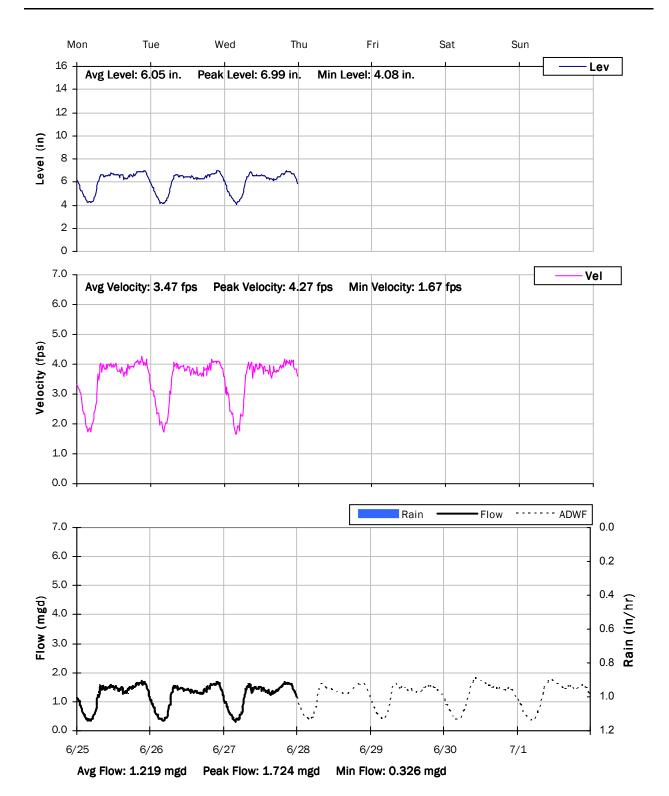
SITE 6 Weekly Level, Velocity and Flow Hydrographs 6/11/2018 to 6/18/2018



SITE 6 Weekly Level, Velocity and Flow Hydrographs 6/18/2018 to 6/25/2018



SITE 6 Weekly Level, Velocity and Flow Hydrographs 6/25/2018 to 7/2/2018



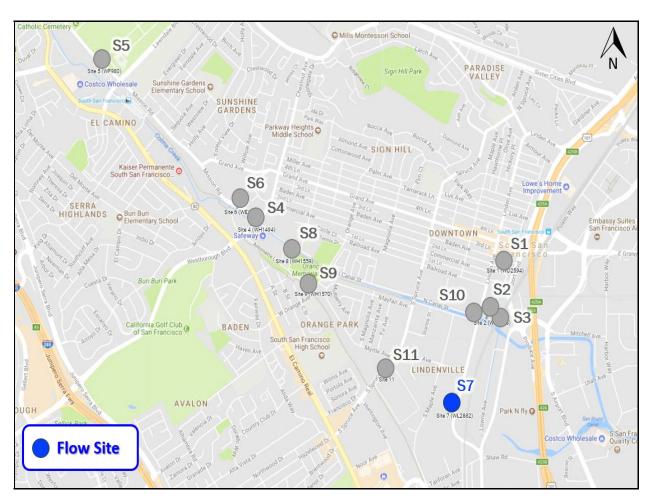
City of South San Francisco

Sanitary Sewer Flow Monitoring February 26- June 28, 2018

Monitoring Site: Site 7

Location: 141 South Linden Avenue, exit gate of AT&T yard

Data Summary Report



Vicinity Map: Site 7

SITE 7

Site Information

MH ID: WL2882

Location: 141 South Linden Avenue, exit

gate of AT&T yard

Coordinates: 122.4141° W, 37.6442° N

Rim Elevation (Earth): 12 feet

Pipe Diameter: 18 inches

Sediment: 0.75 inches

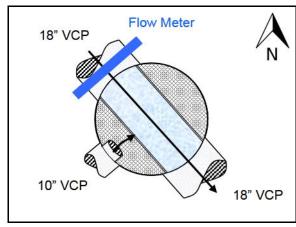
ADWF: 0.537 mgd

Peak Measured Flow: 2.204 mgd





Sewer Map



Flow Sketch



Street View



Plan View

SITE 7

Additional Site Photos

Effluent Pipe



Northwest Influent Pipe



SITE 7

Additional Site Photos

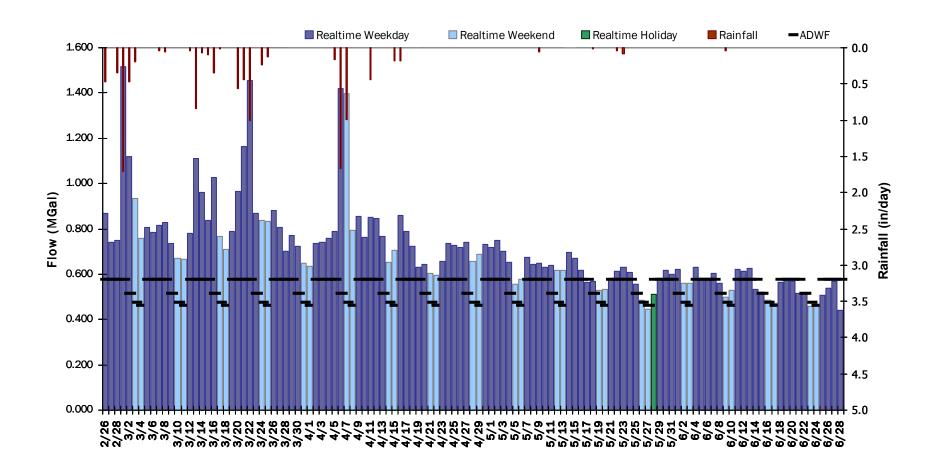
Southwest Influent Pipe



SITE 7
Period Flow Summary: Daily Flow Totals

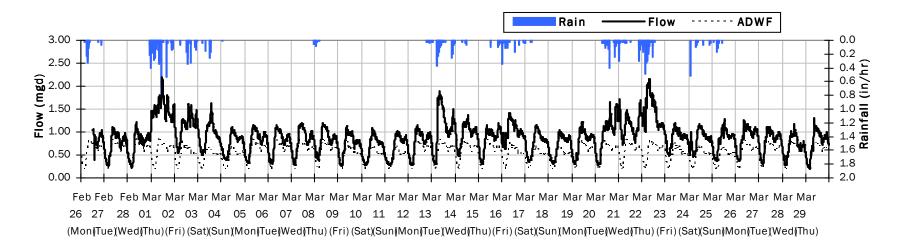
Avg Period Flow: 0.707 MGal Peak Daily Flow: 1.515 MGal Min Daily Flow: 0.441 MGal

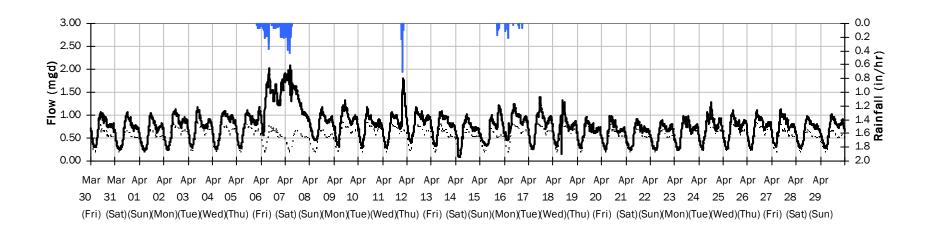
Total Period Rainfall: 10.46 inches



SITE 7
Flow Summary: 2/26/2018 to 4/29/2018

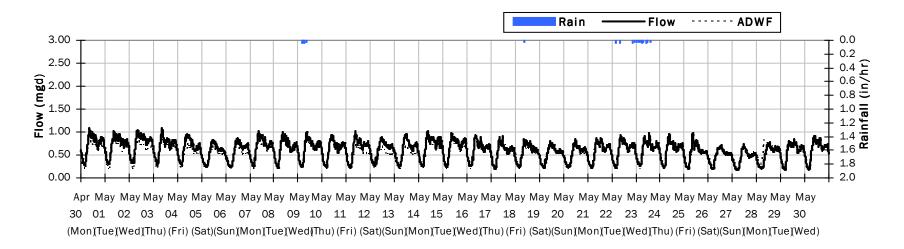
Total Period Rainfall: 10.68 inches Avg Flow: 0.827 mgd Peak Flow: 2.204 mgd Min Flow: 0.095 mgd

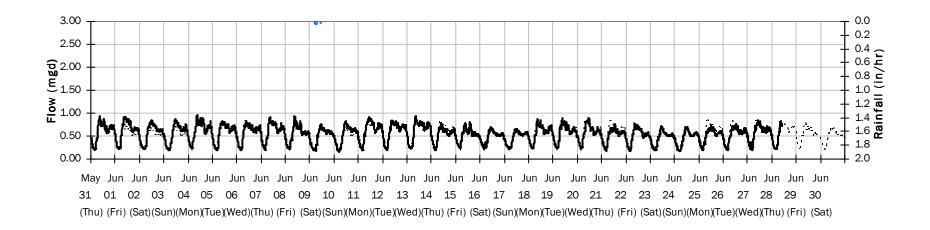




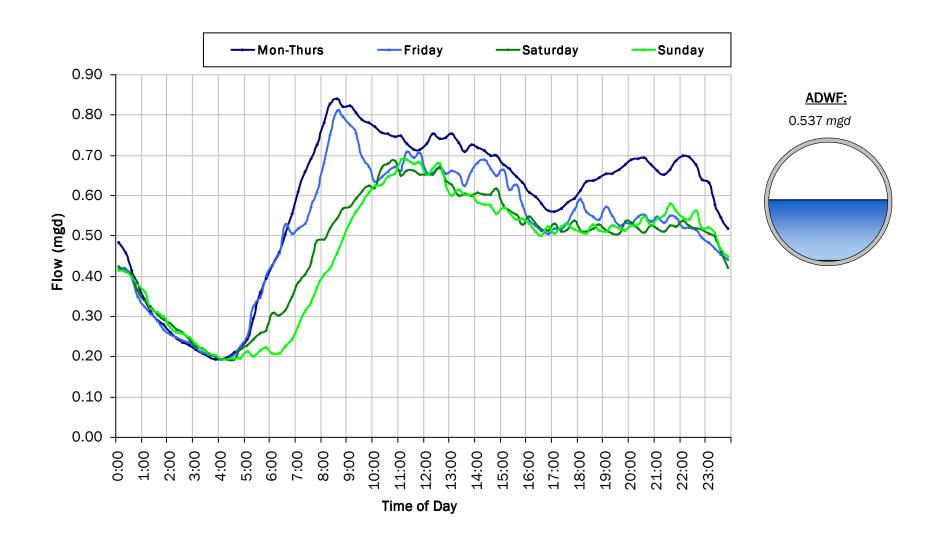
SITE 7
Flow Summary: 4/30/2018 to 6/30/2018

Total Period Rainfall: 0.22 inches Avg Flow: 0.583 mgd Peak Flow: 1.082 mgd Min Flow: 0.158 mgd

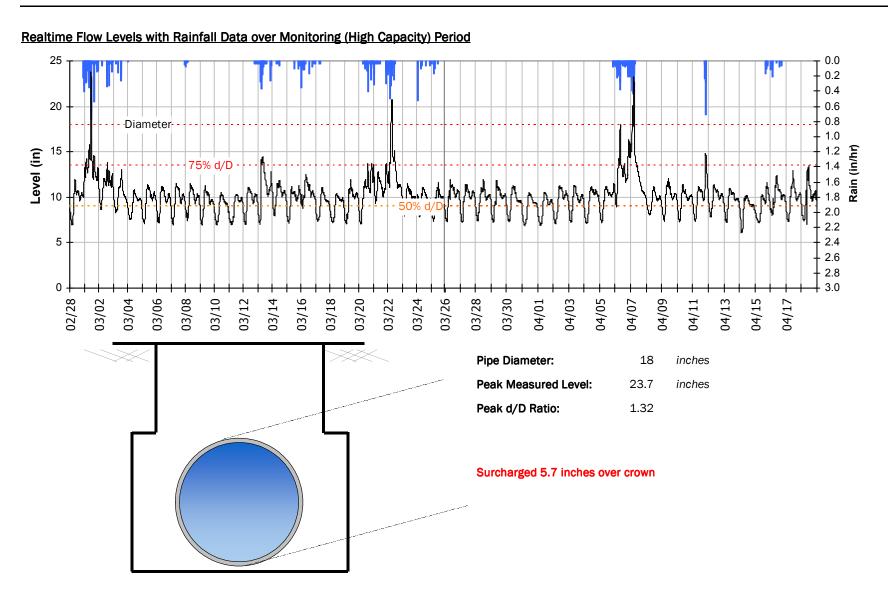




SITE 7
Average Dry Weather Flow Hydrographs

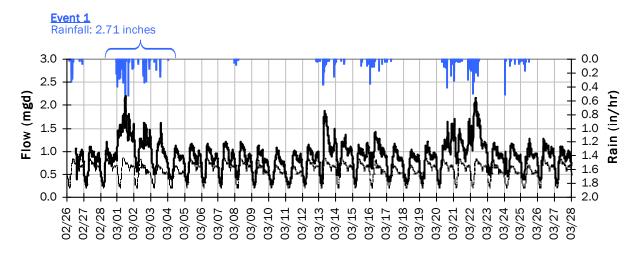


SITE 7
Site Capacity and Surcharge Summary

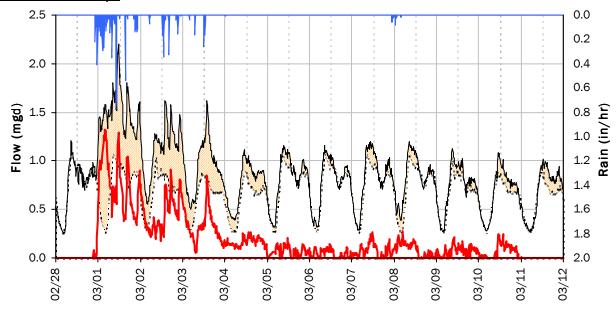


SITE 7 I/I Summary: Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Event 1 Detail Graph



Storm Event I/I Analysis (Rain = 2.71 inches)

Capacity

Inflow / Infiltration

Peak Flow: 2.20 mgd

Peak I/I Rate: 1.32 mgd

Total I/I: 2,111,000 gallons

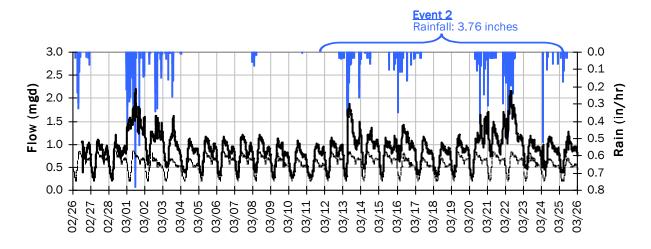
PF: 4.10 **Peak Level:** 23.67 *in*

d/D Ratio: 1.32

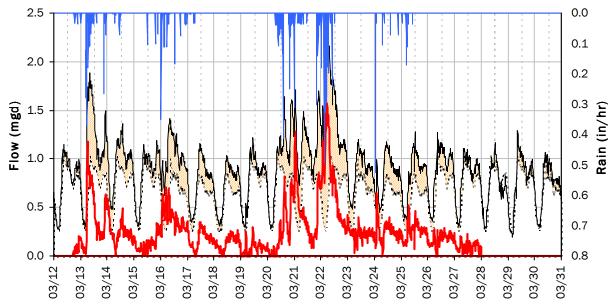


SITE 7 I/I Summary: Event 2

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Event 2 Detail Graph



Storm Event I/I Analysis (Rain = 3.76 inches)

Capacity

Inflow / Infiltration

Peak Flow: 2.16 *mgd* **PF:** 4.02

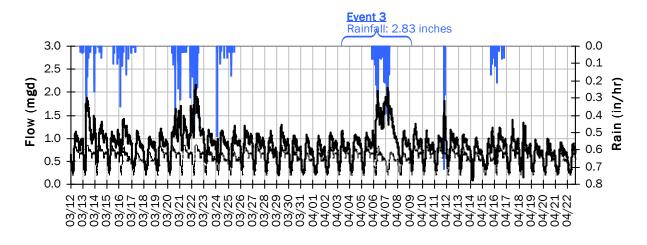
Peak I/I Rate: 1.58 mgd
Total I/I: 4,017,000 gallons

Peak Level: 20.71 *in* **d/D Ratio:** 1.15

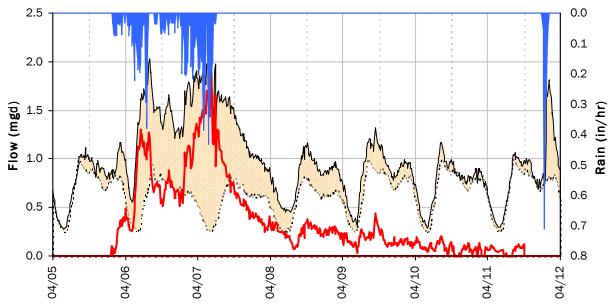


SITE 7 I/I Summary: Event 3

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Event 3 Detail Graph



Storm Event I/I Analysis (Rain = 2.83 inches)

Capacity

Inflow / Infiltration

Peak Flow: 2.09 *mgd* **PF:** 3.89

Peak I/I Rate: 1.85 mgd

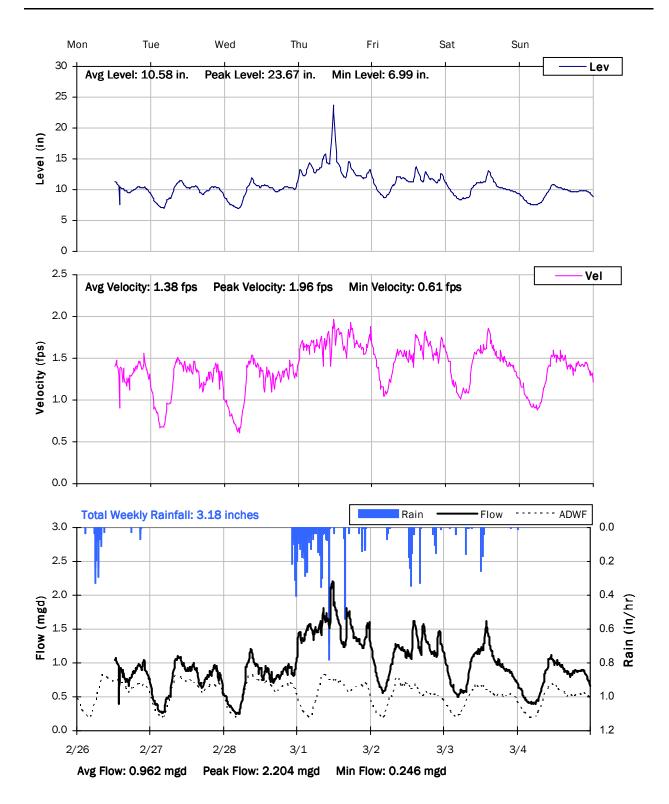
Total I/I: 2,201,000 gallons

Peak Level: 23.28 in

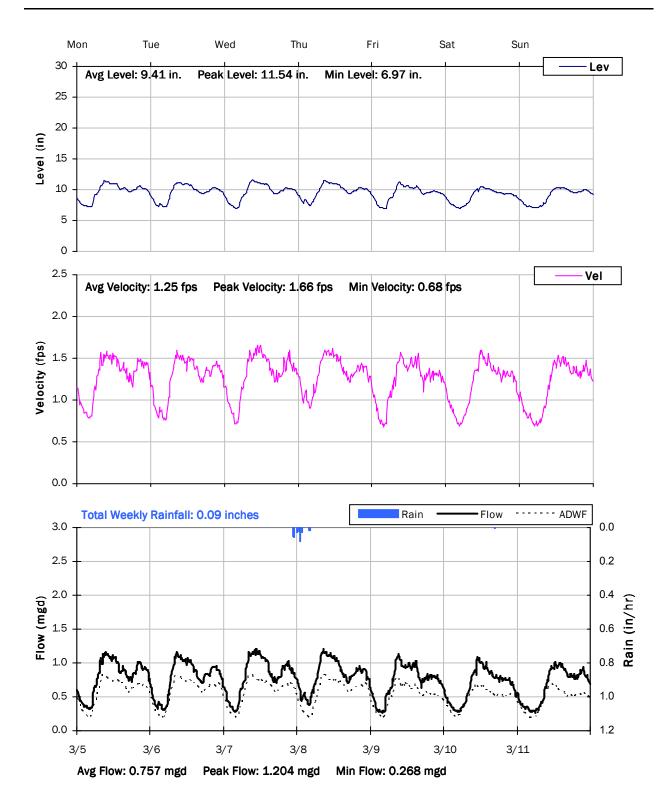
d/D Ratio: 1.29



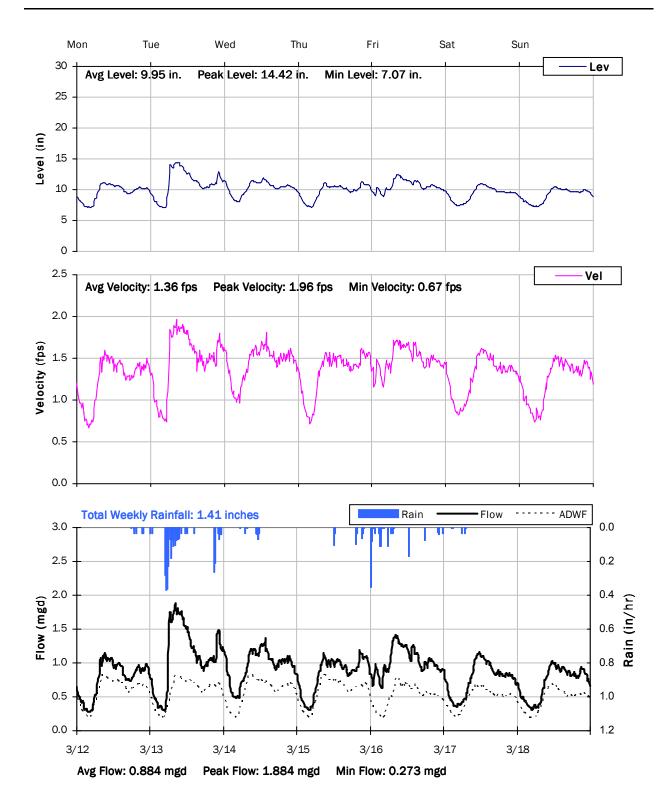
SITE 7
Weekly Level, Velocity and Flow Hydrographs 2/26/2018 to 3/5/2018



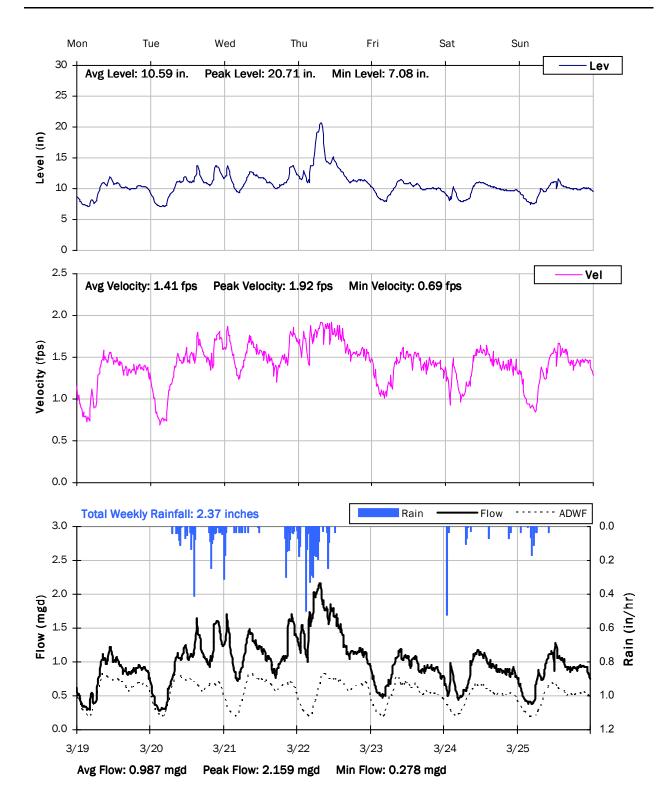
SITE 7
Weekly Level, Velocity and Flow Hydrographs 3/5/2018 to 3/12/2018



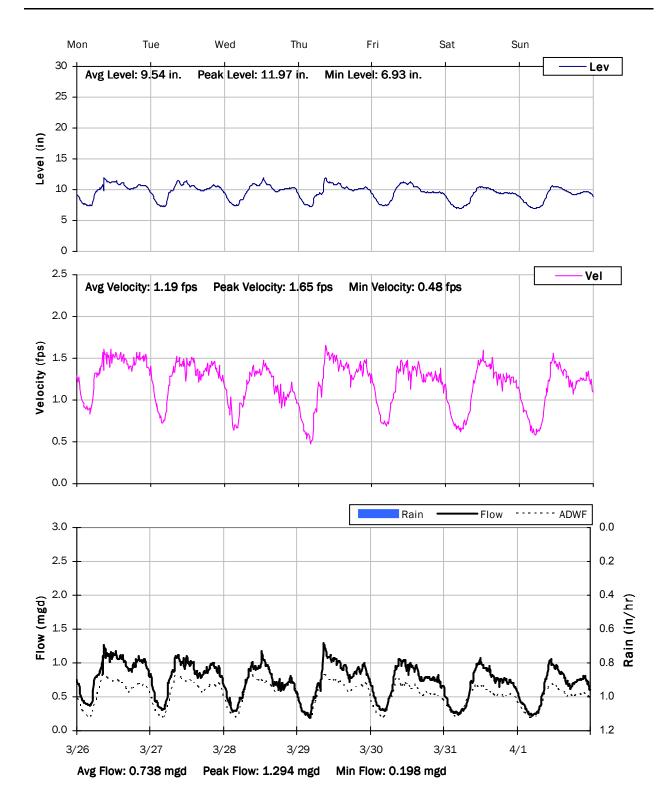
SITE 7
Weekly Level, Velocity and Flow Hydrographs 3/12/2018 to 3/19/2018



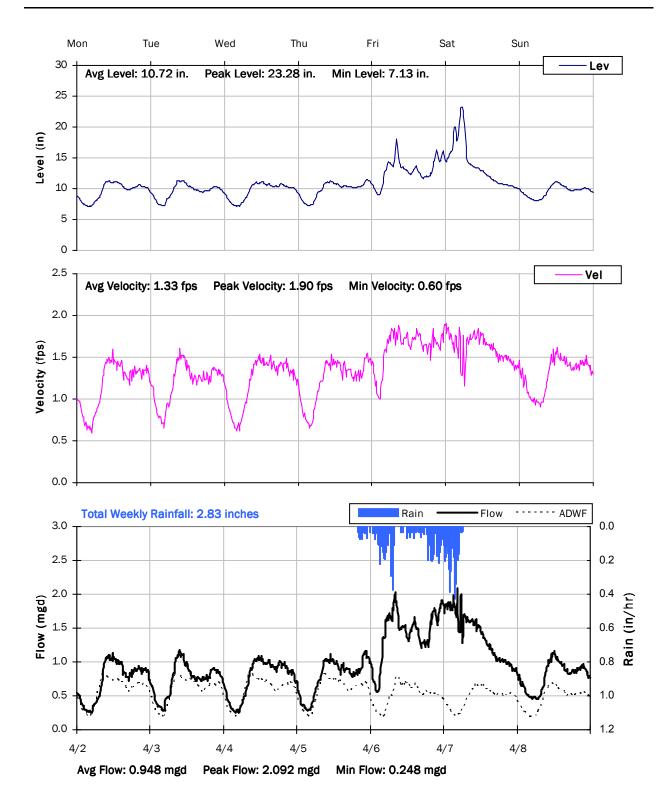
SITE 7
Weekly Level, Velocity and Flow Hydrographs 3/19/2018 to 3/26/2018



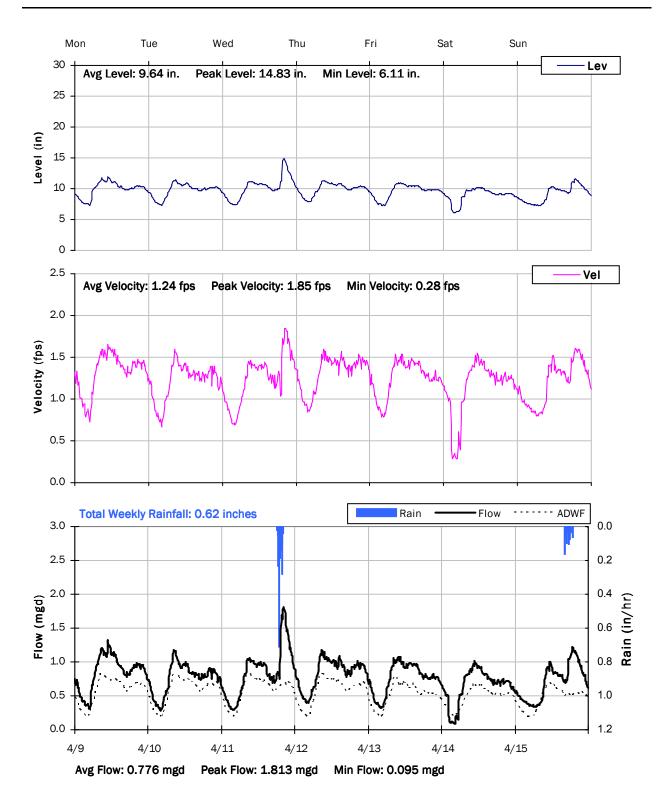
SITE 7
Weekly Level, Velocity and Flow Hydrographs 3/26/2018 to 4/2/2018



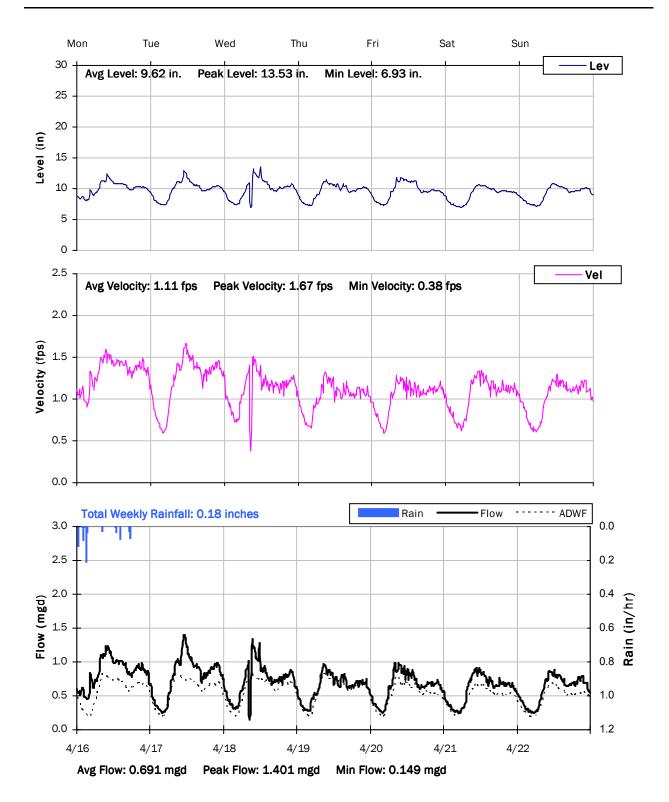
SITE 7
Weekly Level, Velocity and Flow Hydrographs 4/2/2018 to 4/9/2018



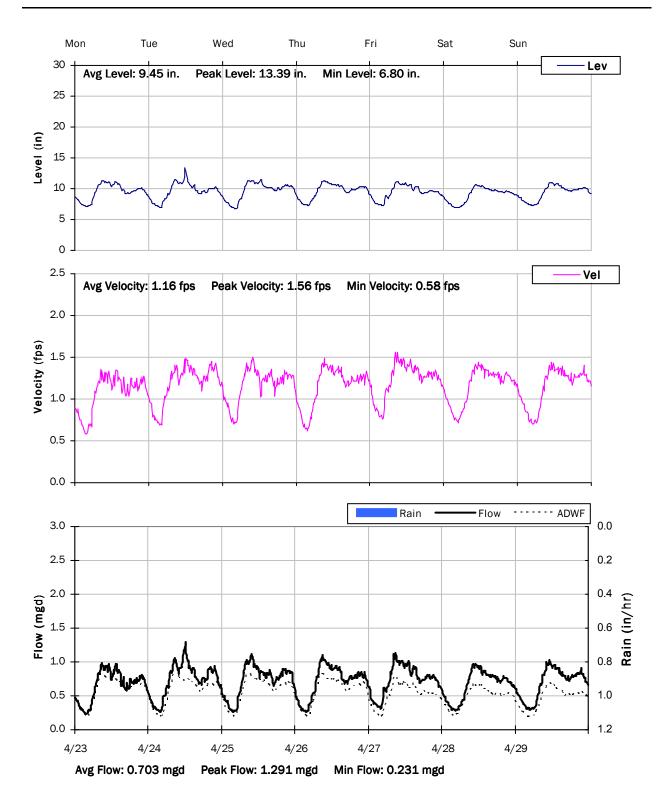
SITE 7
Weekly Level, Velocity and Flow Hydrographs 4/9/2018 to 4/16/2018



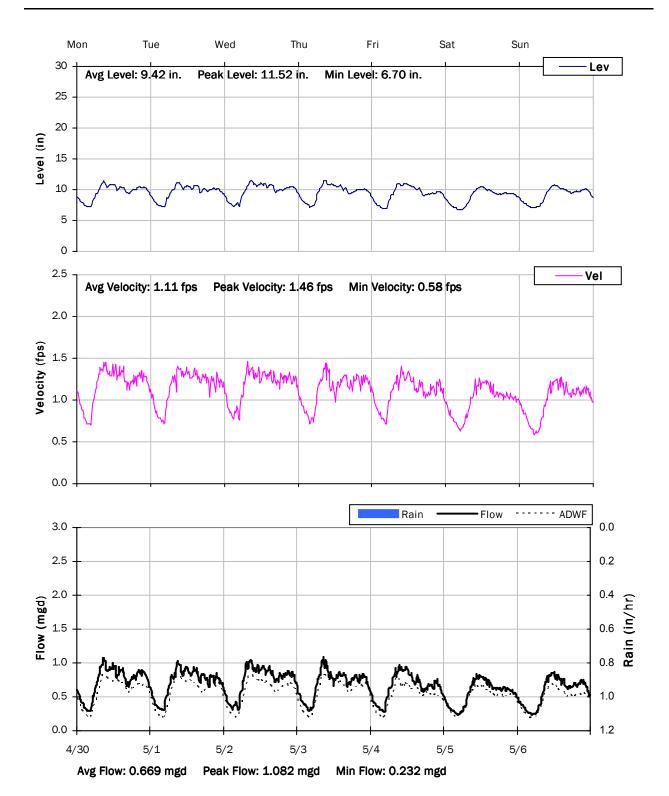
SITE 7
Weekly Level, Velocity and Flow Hydrographs 4/16/2018 to 4/23/2018



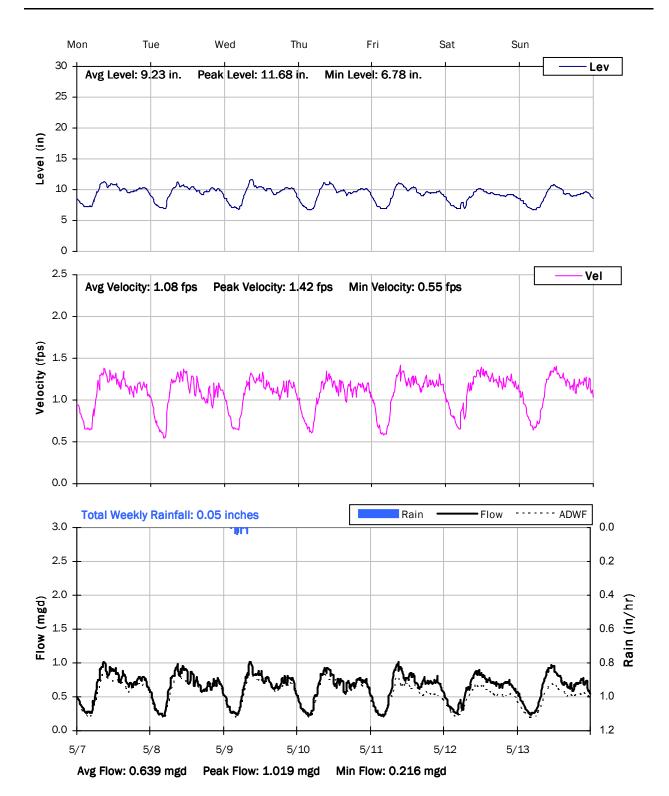
SITE 7
Weekly Level, Velocity and Flow Hydrographs 4/23/2018 to 4/30/2018



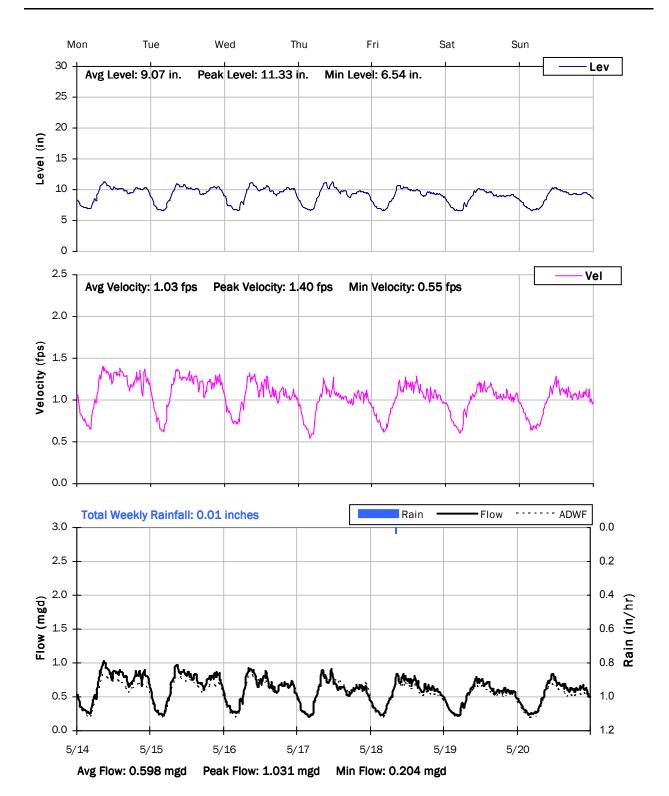
SITE 7
Weekly Level, Velocity and Flow Hydrographs 4/30/2018 to 5/7/2018



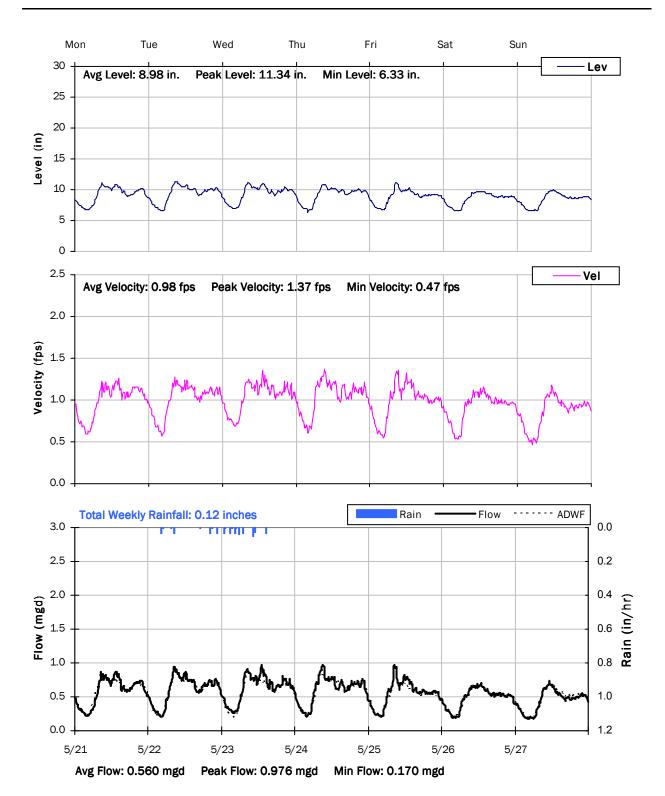
SITE 7
Weekly Level, Velocity and Flow Hydrographs 5/7/2018 to 5/14/2018



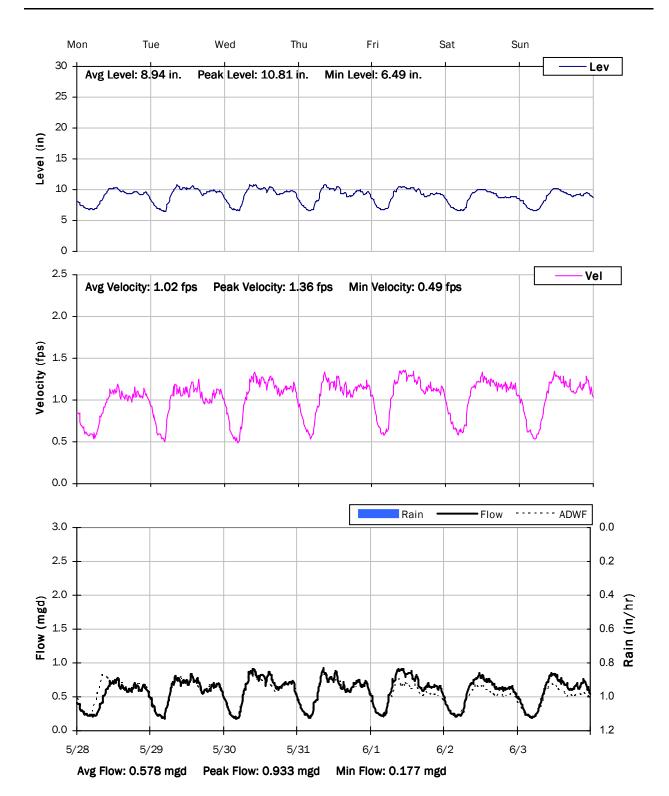
SITE 7
Weekly Level, Velocity and Flow Hydrographs 5/14/2018 to 5/21/2018



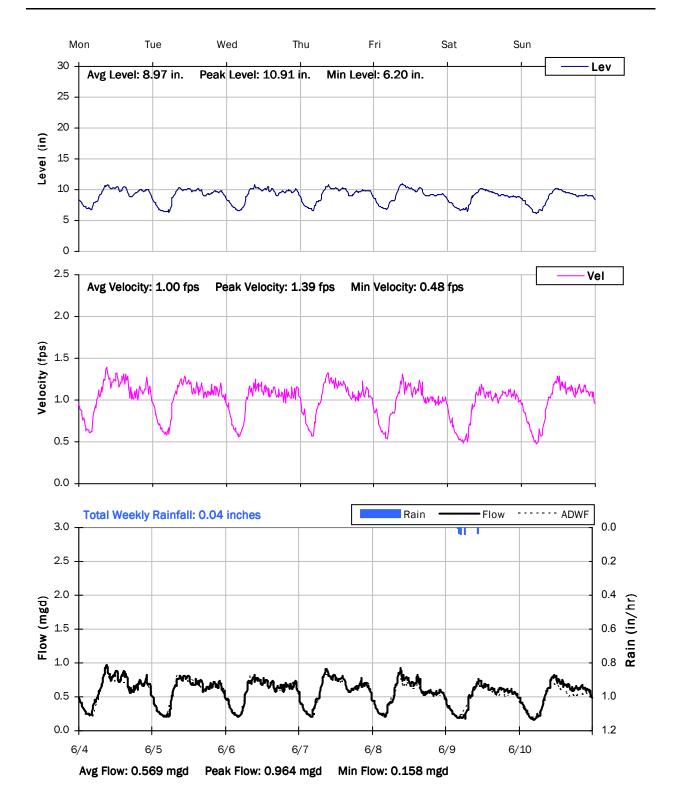
SITE 7
Weekly Level, Velocity and Flow Hydrographs 5/21/2018 to 5/28/2018



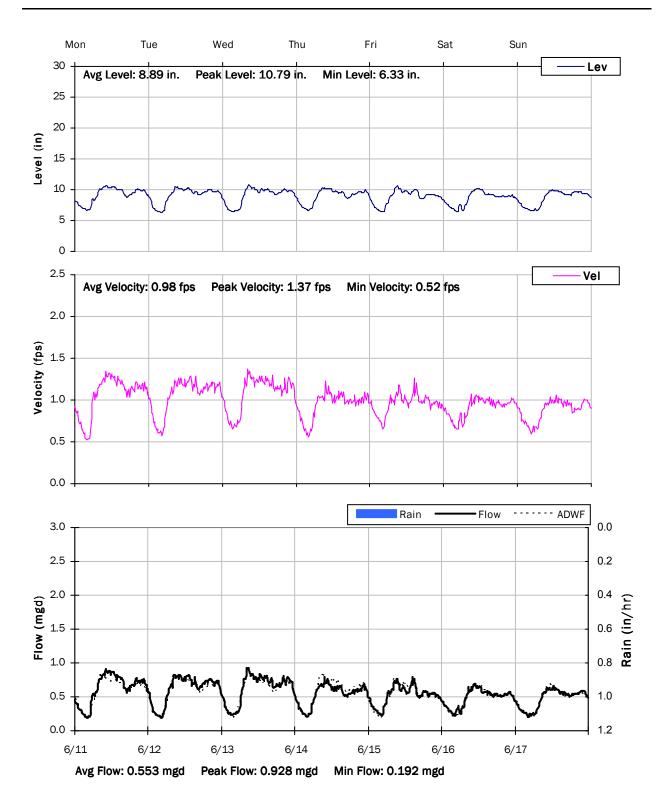
SITE 7
Weekly Level, Velocity and Flow Hydrographs 5/28/2018 to 6/4/2018



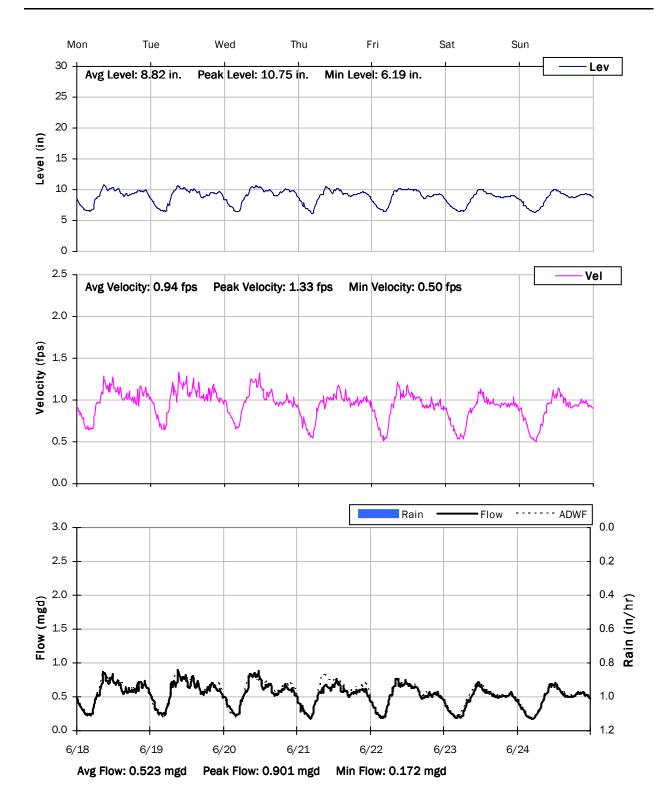
SITE 7
Weekly Level, Velocity and Flow Hydrographs 6/4/2018 to 6/11/2018



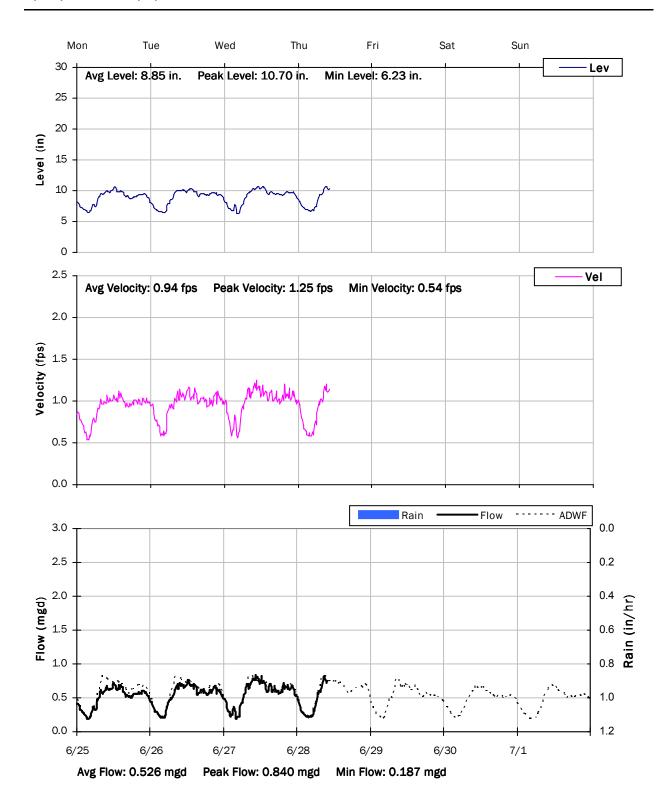
SITE 7
Weekly Level, Velocity and Flow Hydrographs
6/11/2018 to 6/18/2018



SITE 7
Weekly Level, Velocity and Flow Hydrographs 6/18/2018 to 6/25/2018



SITE 7
Weekly Level, Velocity and Flow Hydrographs 6/25/2018 to 7/2/2018



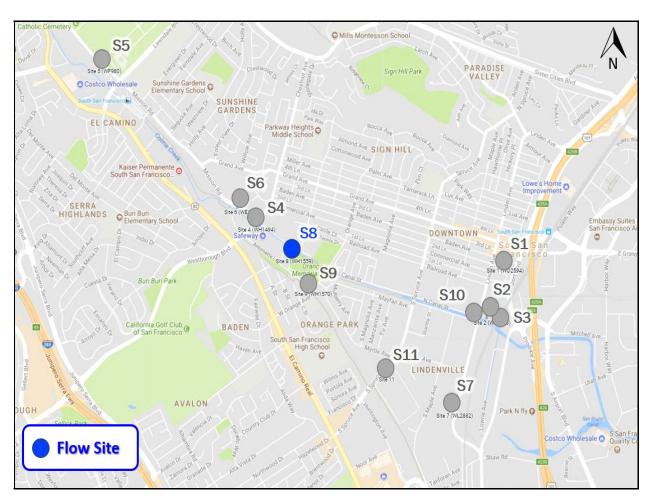
City of South San Francisco

Sanitary Sewer Flow Monitoring February 26- June 28, 2018

Monitoring Site: Site 8

Location: Parking lot in northwest corner of Orange Memorial Park

Data Summary Report



Vicinity Map: Site 8

SITE 8

Site Information

MH ID: WH1559

Location: Parking lot in northwest corner

of Orange Memorial Park

Coordinates: 122.4288° W, 37.6542° N

Rim Elevation (Earth): 29 feet

Pipe Diameter: 12.5 inches

Sediment: 1.50 inches

ADWF: 0.133 mgd

Peak Measured Flow: 0.372 mgd



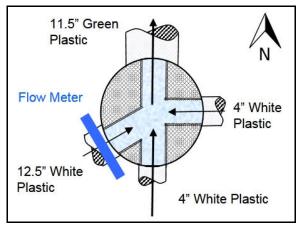
Sewer Map



Street View



Satellite Map



Flow Sketch

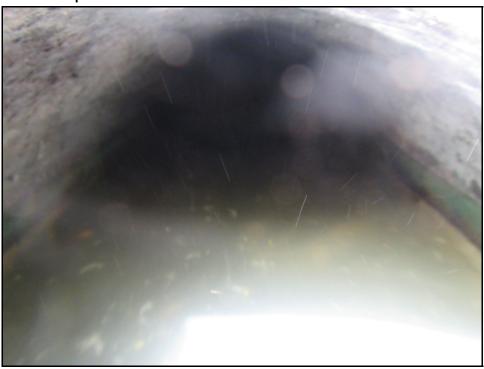


Plan View

SITE 8

Additional Site Photos

Effluent Pipe



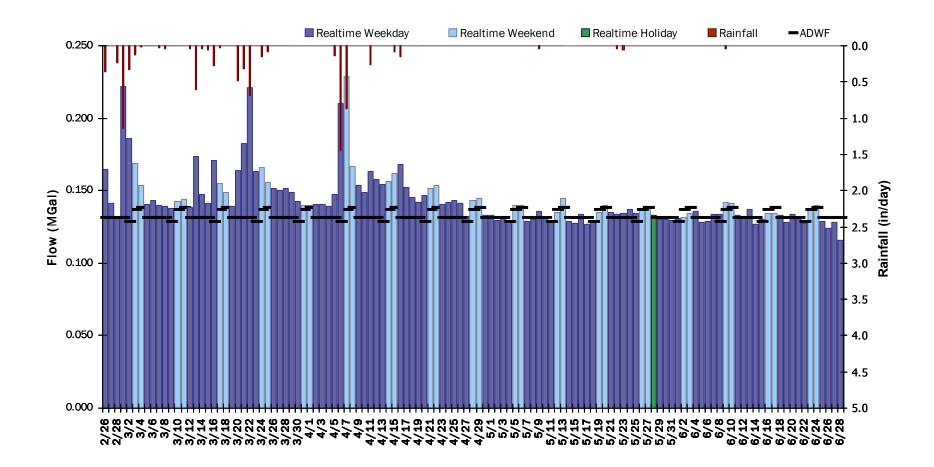
Influent Pipe



SITE 8
Period Flow Summary: Daily Flow Totals

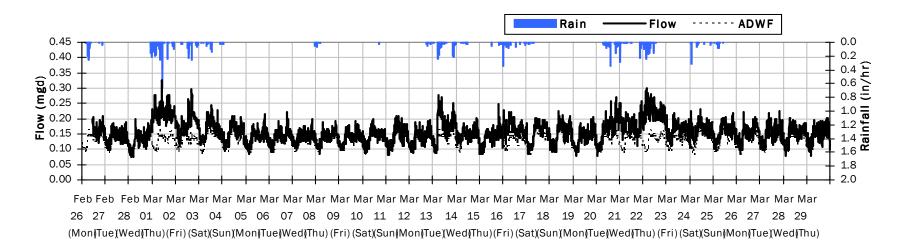
Avg Period Flow: 0.144 MGal Peak Daily Flow: 0.228 MGal Min Daily Flow: 0.116 MGal

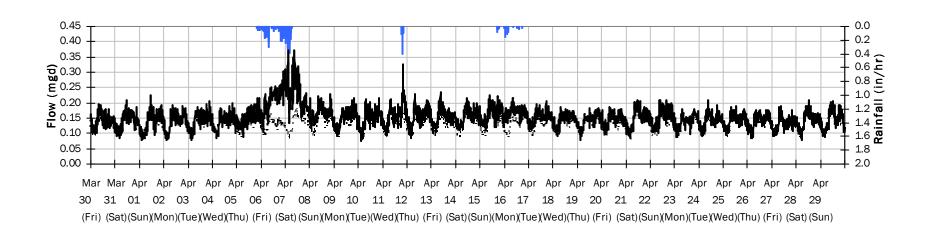
Total Period Rainfall: 7.82 inches



SITE 8 Flow Summary: 2/26/2018 to 4/29/2018

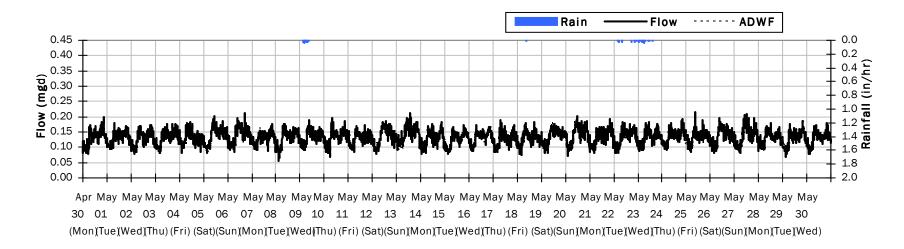
Total Period Rainfall: 7.96 inches Avg Flow: 0.155 mgd Peak Flow: 0.372 mgd Min Flow: 0.075 mgd

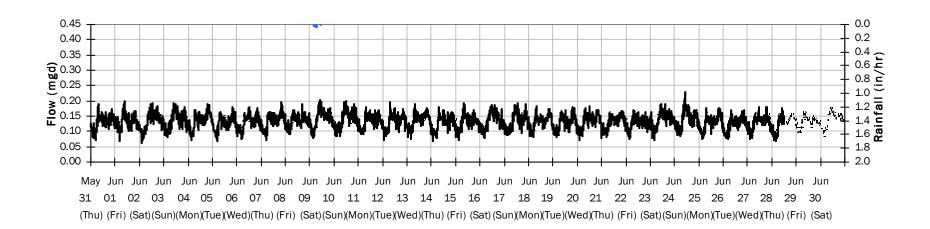




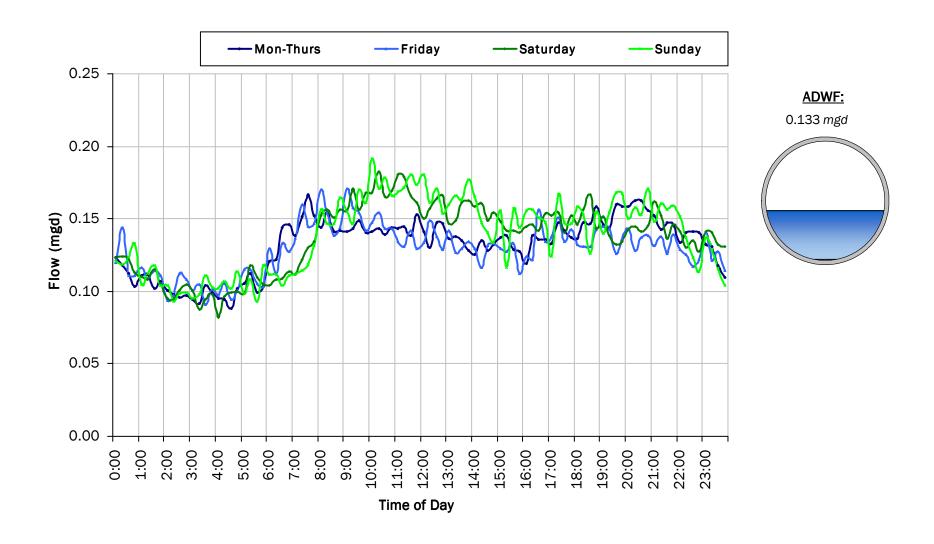
SITE 8
Flow Summary: 4/30/2018 to 6/30/2018

Total Period Rainfall: 0.18 inches Avg Flow: 0.133 mgd Peak Flow: 0.229 mgd Min Flow: 0.055 mgd



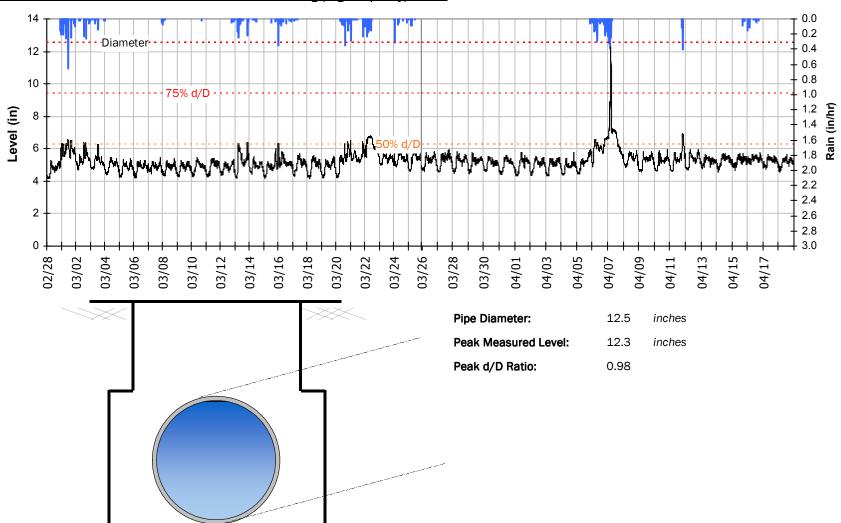


SITE 8
Average Dry Weather Flow Hydrographs



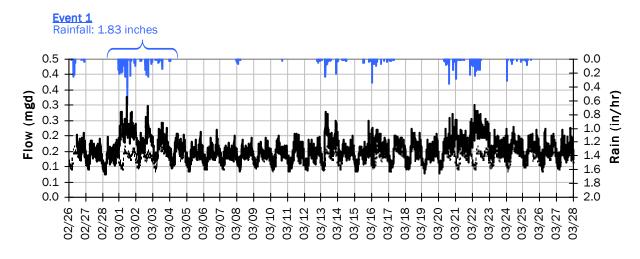
SITE 8
Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Monitoring (High Capacity) Period

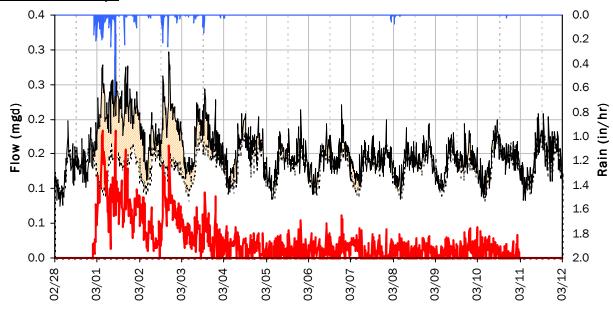


SITE 8 I/I Summary: Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Event 1 Detail Graph



Storm Event I/I Analysis (Rain = 1.83 inches)

Capacity

Inflow / Infiltration

Peak Flow: 0.32 mgd Peak I/I Rate:

2.43

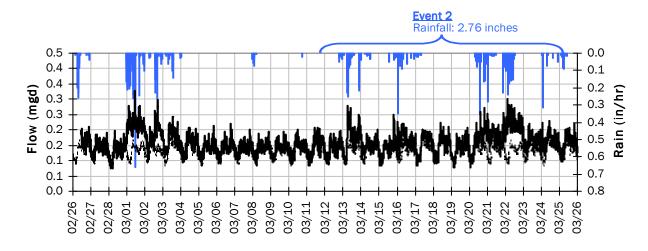
0.18 mgd Total I/I: 248,000 gallons

Peak Level: 6.59 in d/D Ratio: 0.53

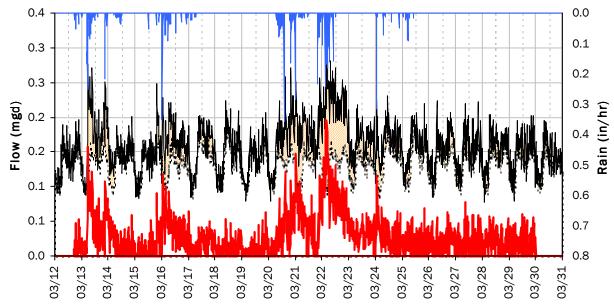


SITE 8 I/I Summary: Event 2

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Event 2 Detail Graph



Storm Event I/I Analysis (Rain = 2.76 inches)

Capacity

Inflow / Infiltration

Peak Flow: 0.30 *mgd* **PF:** 2.26

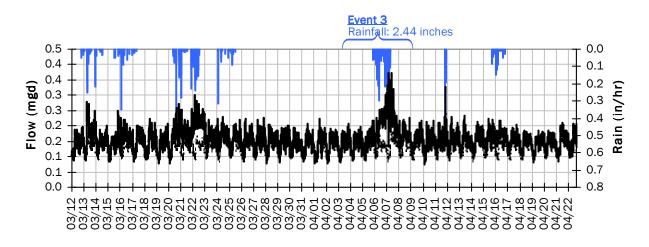
Peak I/I Rate: Total I/I: 0.20 mgd 479,000 gallons

Peak Level: 6.81 *in* d/D Ratio: 0.54

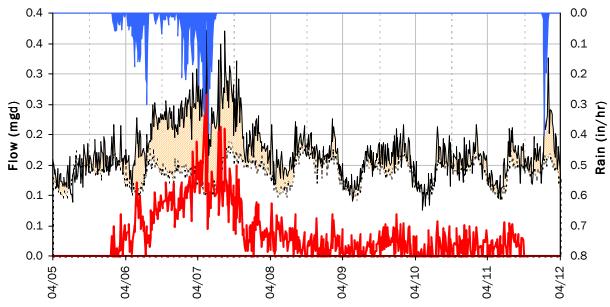


SITE 8 I/I Summary: Event 3

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Event 3 Detail Graph



Storm Event I/I Analysis (Rain = 2.44 inches)

Capacity

Inflow / Infiltration

Peak Flow: 0.37 mgd 2.80

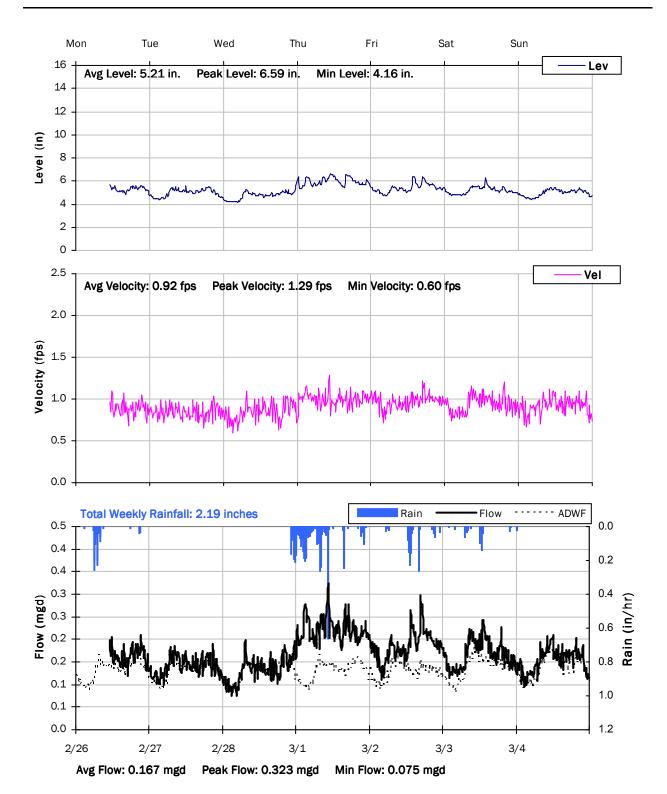
Peak I/I Rate: Total I/I:

Peak Level: 12.29 in d/D Ratio: 0.98

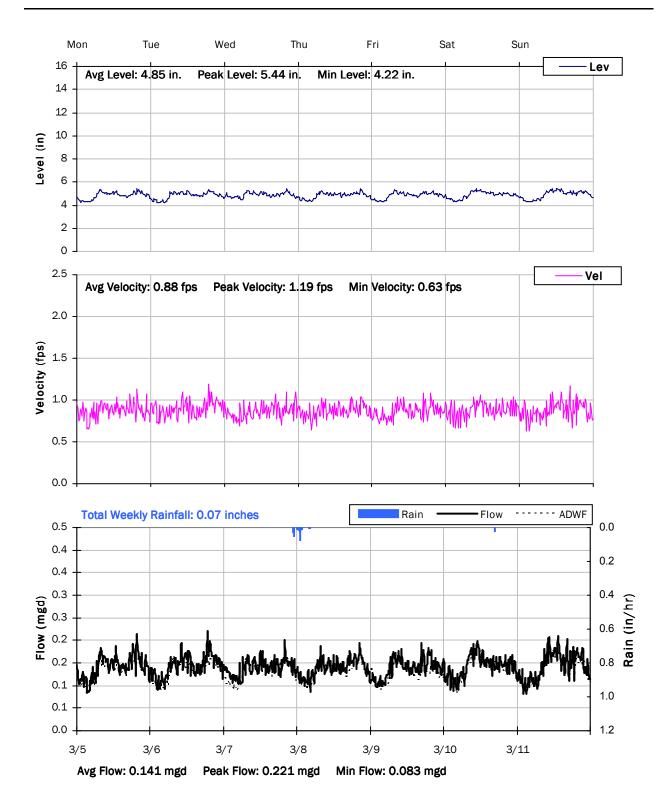
0.27 mgd 227,000 gallons



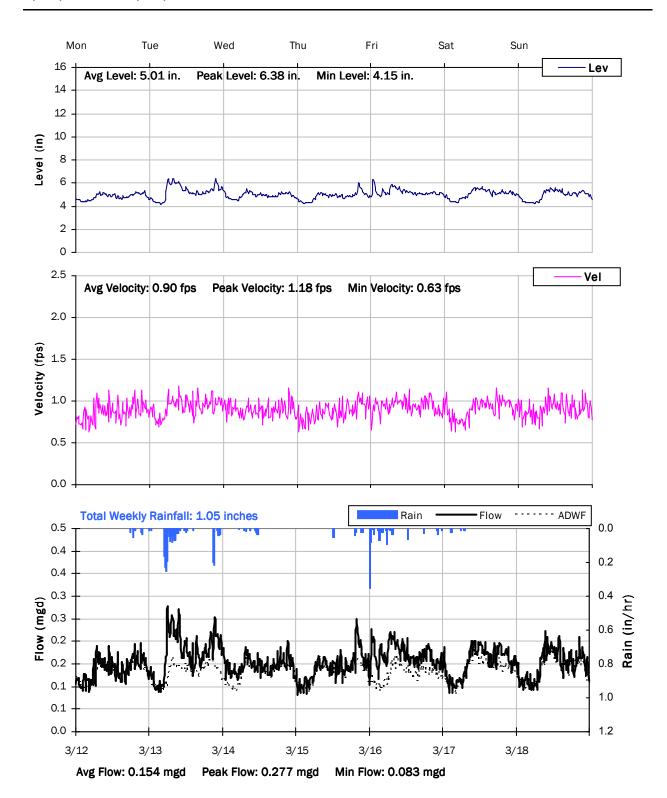
SITE 8
Weekly Level, Velocity and Flow Hydrographs 2/26/2018 to 3/5/2018



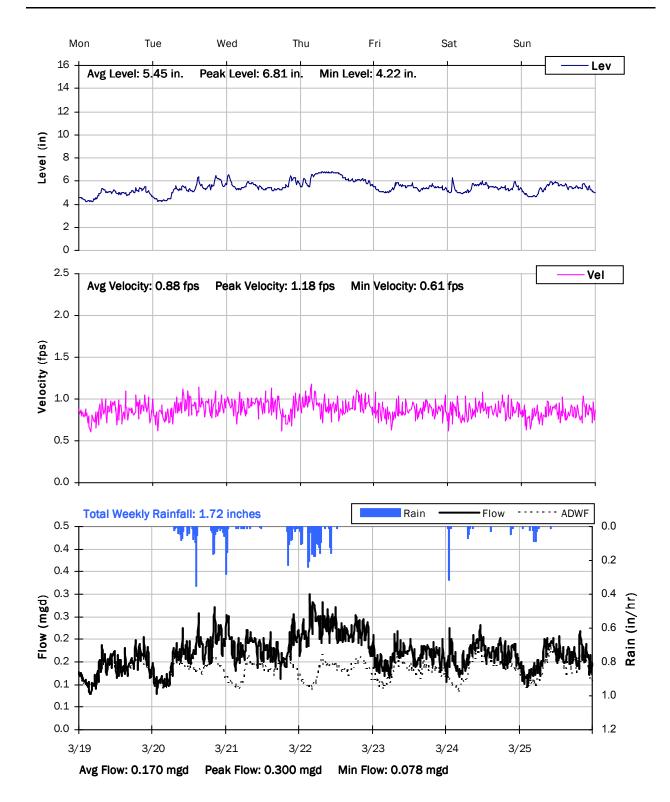
SITE 8
Weekly Level, Velocity and Flow Hydrographs 3/5/2018 to 3/12/2018



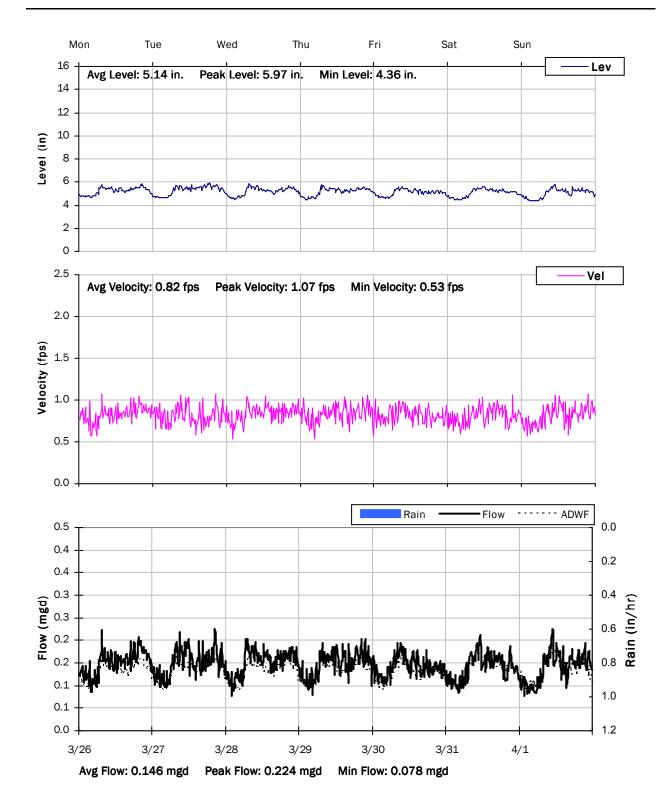
SITE 8
Weekly Level, Velocity and Flow Hydrographs 3/12/2018 to 3/19/2018



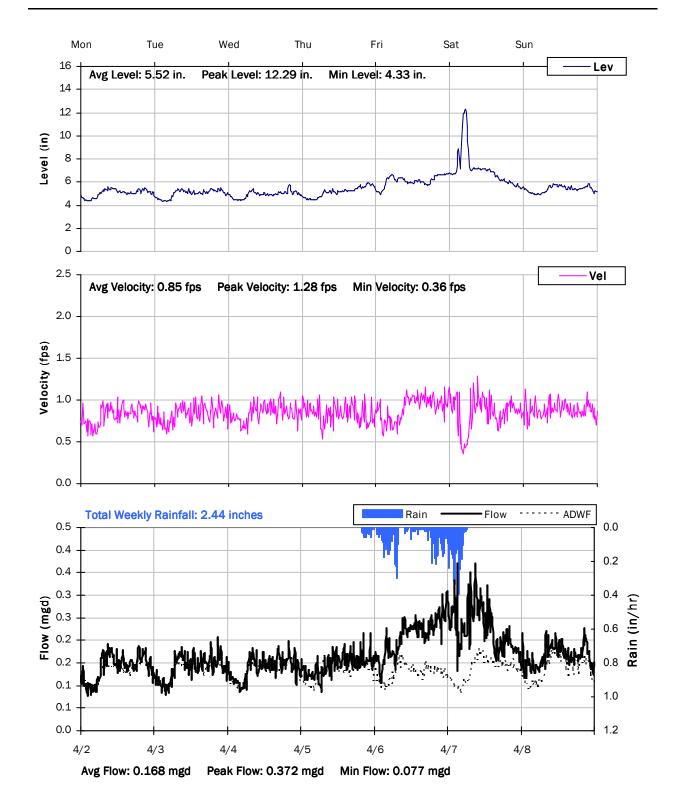
SITE 8
Weekly Level, Velocity and Flow Hydrographs 3/19/2018 to 3/26/2018



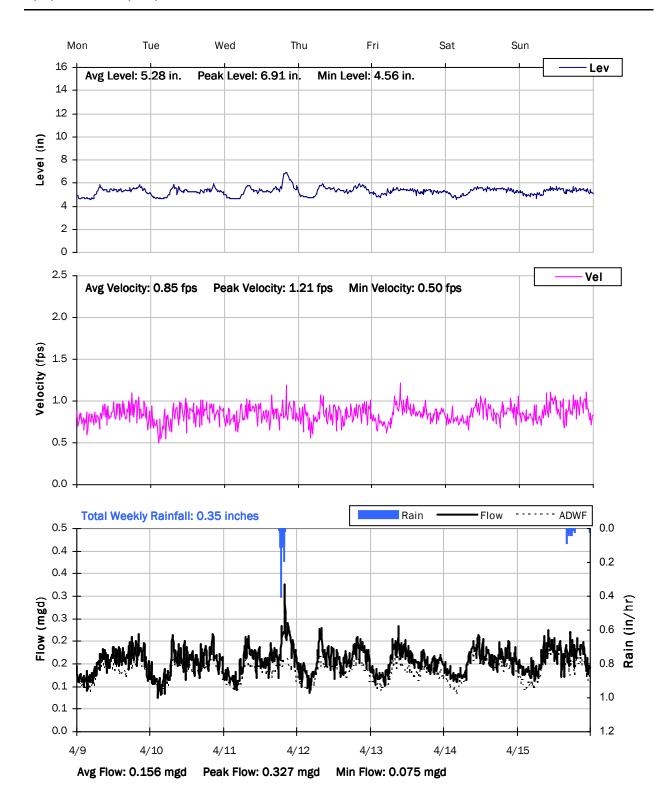
SITE 8
Weekly Level, Velocity and Flow Hydrographs 3/26/2018 to 4/2/2018



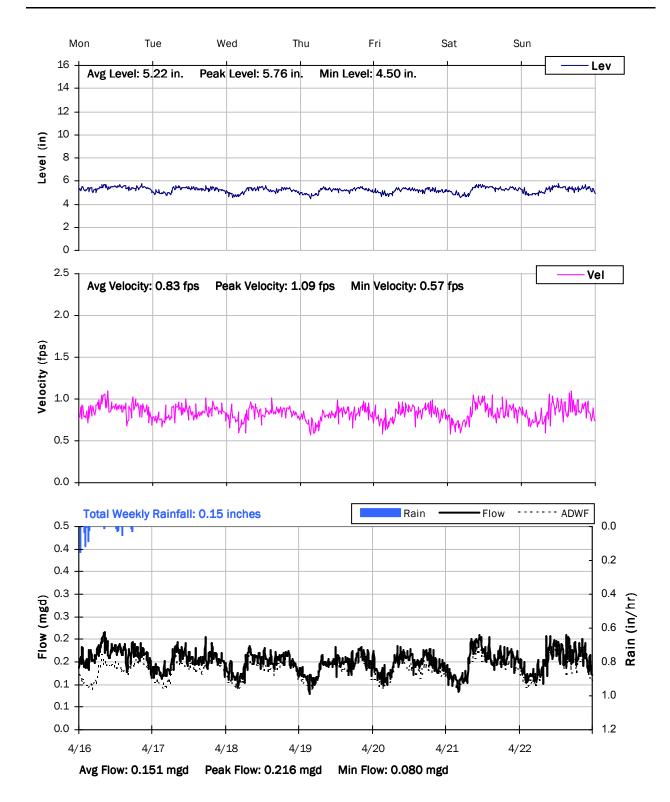
SITE 8
Weekly Level, Velocity and Flow Hydrographs
4/2/2018 to 4/9/2018



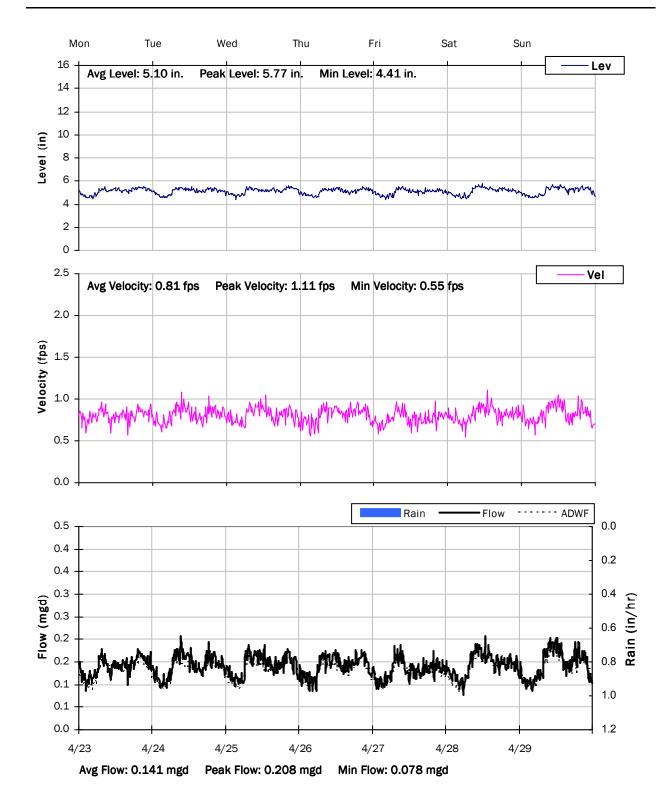
SITE 8
Weekly Level, Velocity and Flow Hydrographs
4/9/2018 to 4/16/2018



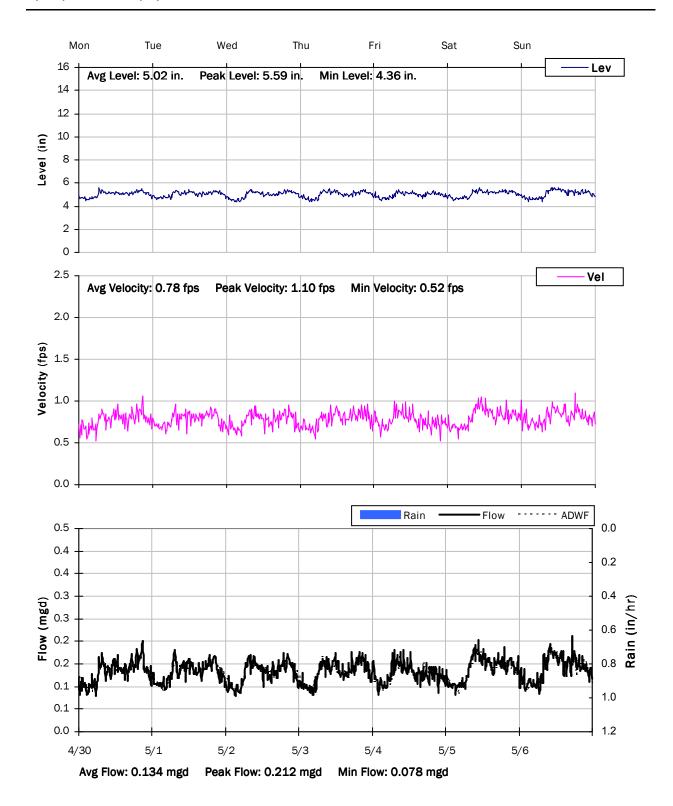
SITE 8
Weekly Level, Velocity and Flow Hydrographs
4/16/2018 to 4/23/2018



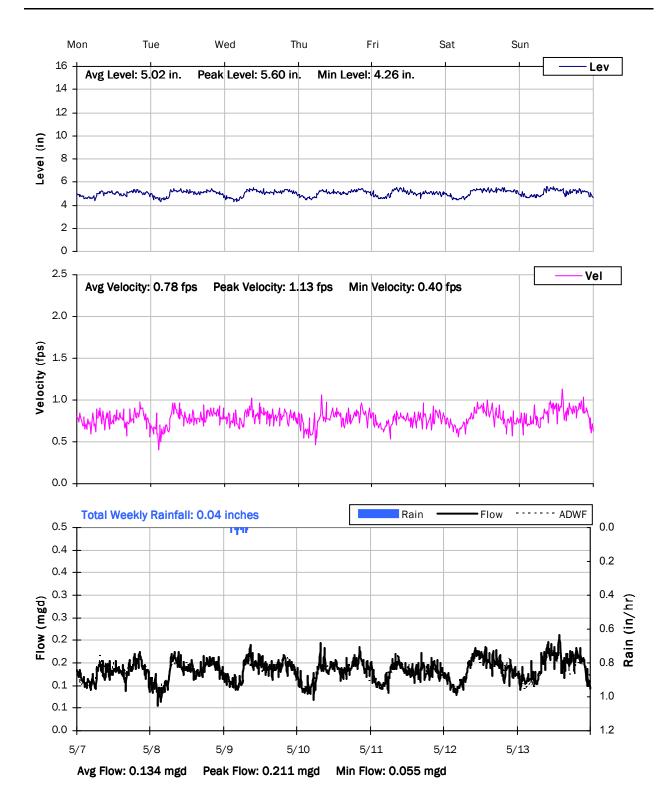
SITE 8
Weekly Level, Velocity and Flow Hydrographs
4/23/2018 to 4/30/2018



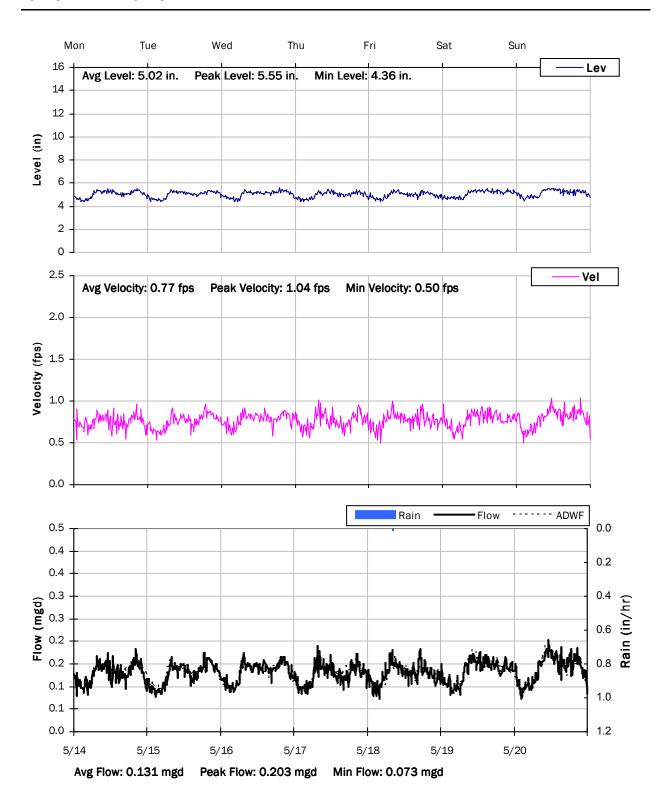
SITE 8
Weekly Level, Velocity and Flow Hydrographs
4/30/2018 to 5/7/2018



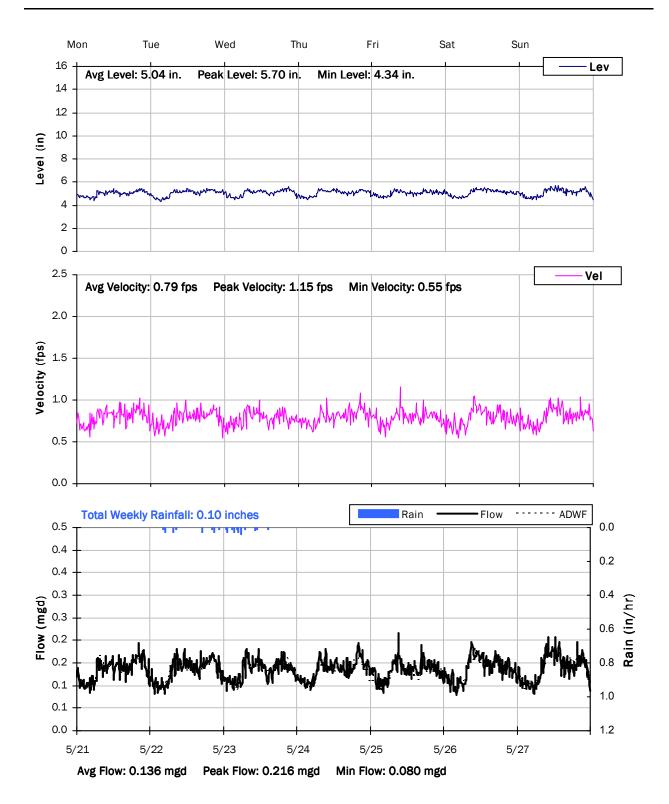
SITE 8
Weekly Level, Velocity and Flow Hydrographs
5/7/2018 to 5/14/2018



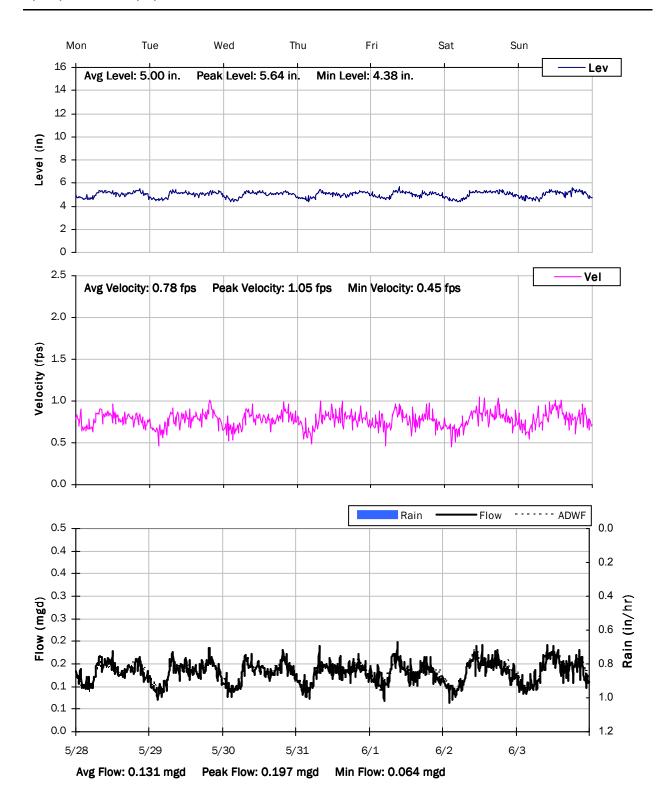
SITE 8
Weekly Level, Velocity and Flow Hydrographs
5/14/2018 to 5/21/2018



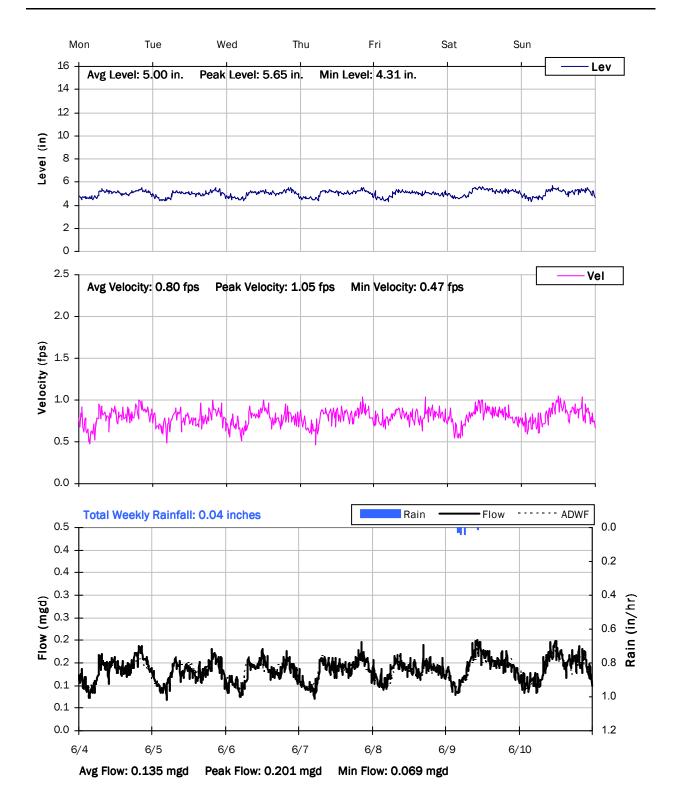
SITE 8
Weekly Level, Velocity and Flow Hydrographs
5/21/2018 to 5/28/2018



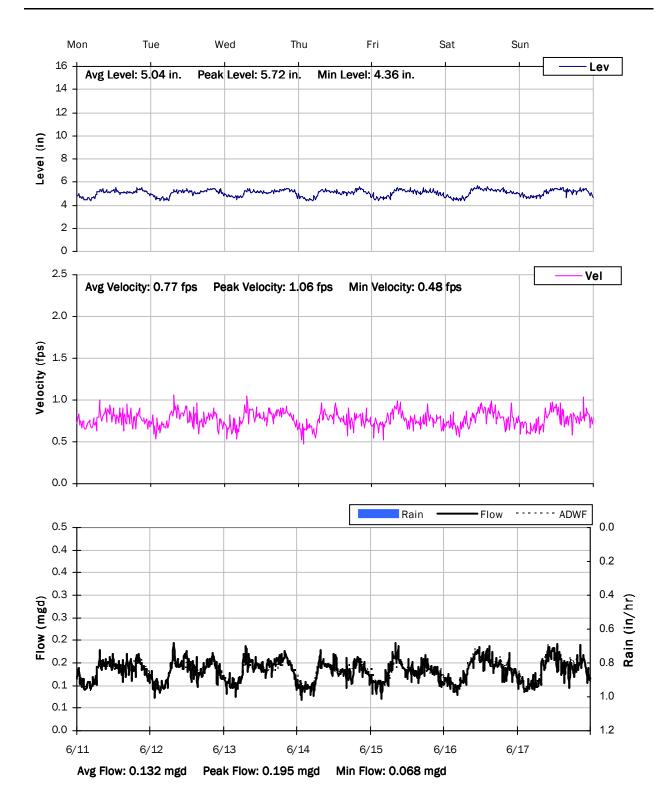
SITE 8
Weekly Level, Velocity and Flow Hydrographs
5/28/2018 to 6/4/2018



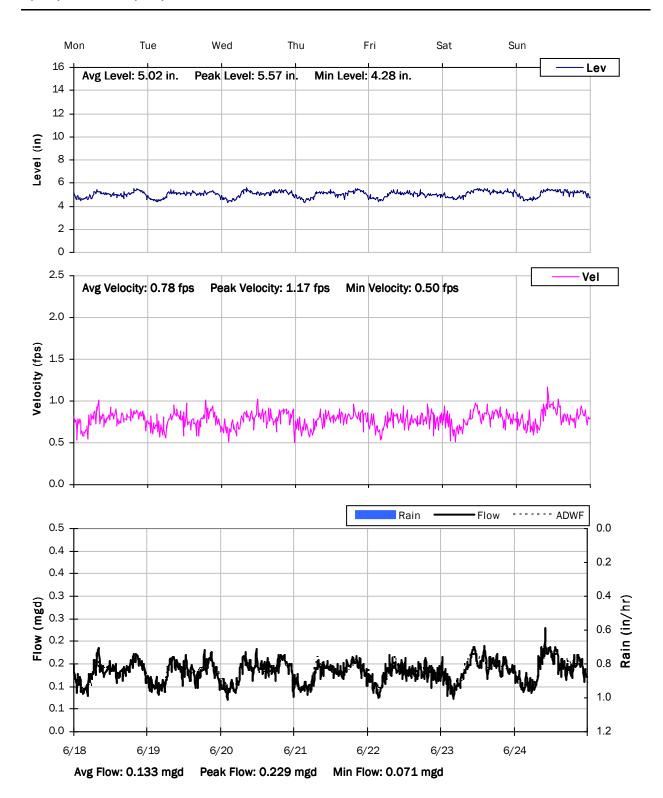
SITE 8
Weekly Level, Velocity and Flow Hydrographs
6/4/2018 to 6/11/2018



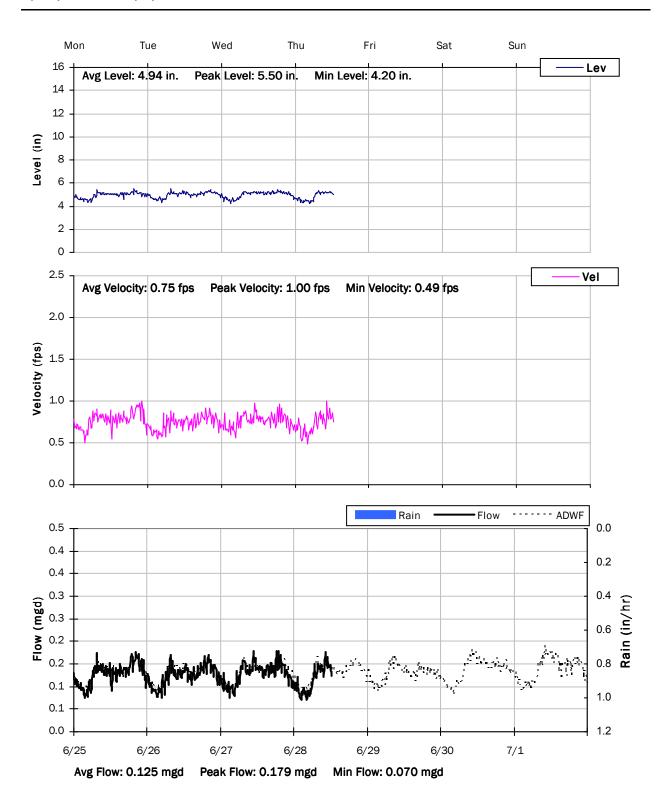
SITE 8
Weekly Level, Velocity and Flow Hydrographs
6/11/2018 to 6/18/2018



SITE 8
Weekly Level, Velocity and Flow Hydrographs
6/18/2018 to 6/25/2018



SITE 8
Weekly Level, Velocity and Flow Hydrographs
6/25/2018 to 7/2/2018



City of South San Francisco

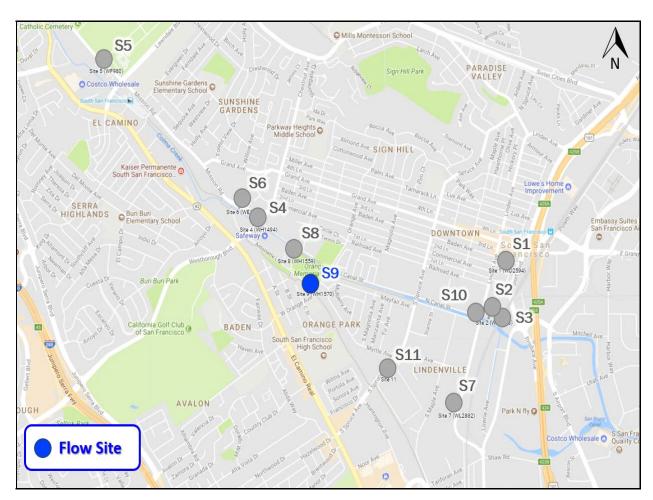
Sanitary Sewer Flow Monitoring February 26- June 28, 2018

Monitoring Site: Site 9

Location: Memorial Drive and West Orange Avenue, souitheast corner

of Orange Memorial Park

Data Summary Report



Vicinity Map: Site 9

SITE 9

Site Information

MH ID: WH1570

Location: Memorial Drive and West Orange

Avenue, souitheast corner of Orange Memorial Park

Coordinates: 122.4271° W, 37.6521° N

Rim Elevation (Earth): 27 feet

Pipe Diameter: 12 inches

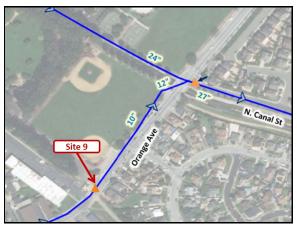
Sediment: 0.25 inches

ADWF: 0.084 mgd

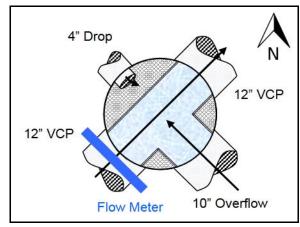
Peak Measured Flow: 0.768 mgd



Satellite Map



Sewer Map



Flow Sketch



Street View



Plan View

SITE 9

Additional Site Photos

Effluent Pipe



Northwest Influent Pipe



SITE 9

Additional Site Photos

Northeast Influent Pipe



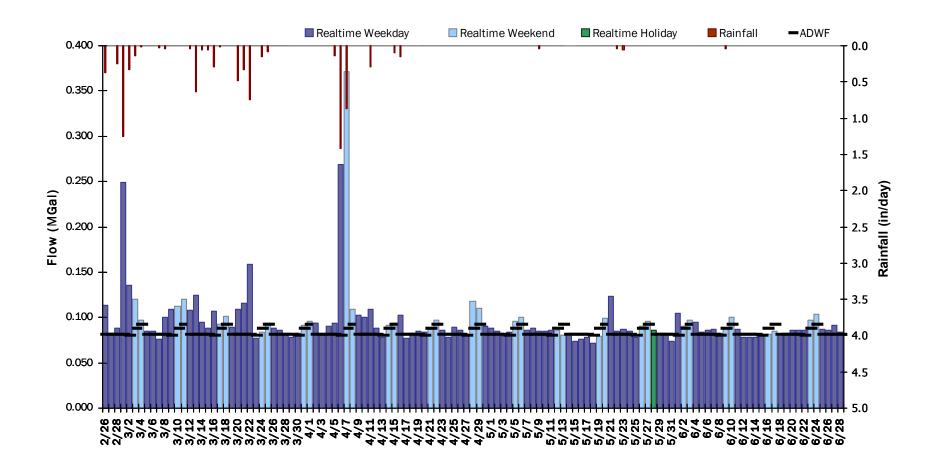
Southwest Influent Pipe



SITE 9
Period Flow Summary: Daily Flow Totals

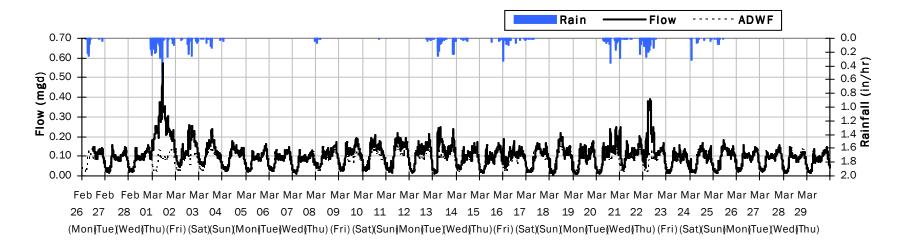
Avg Period Flow: 0.096 MGal Peak Daily Flow: 0.371 MGal Min Daily Flow: 0.072 MGal

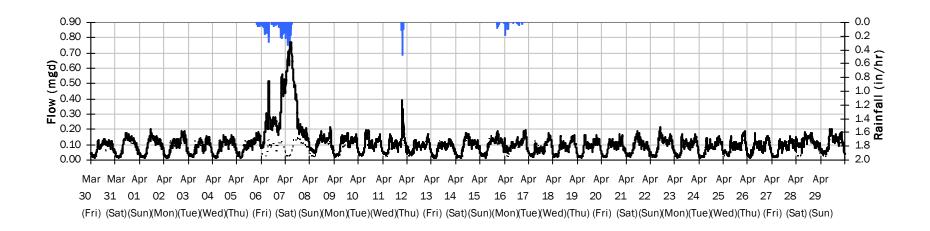
Total Period Rainfall: 8.10 inches



SITE 9 Flow Summary: 2/26/2018 to 4/29/2018

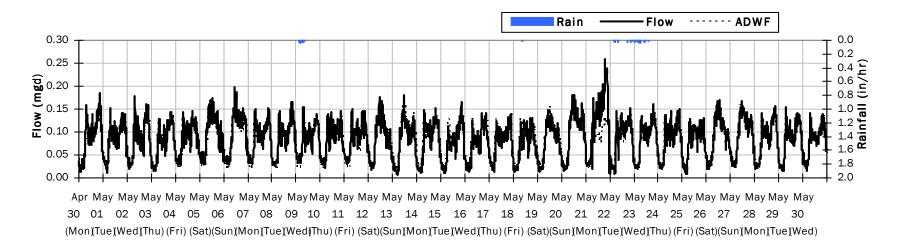
Total Period Rainfall: 8.26 inches Avg Flow: 0.106 mgd Peak Flow: 0.768 mgd Min Flow: 0.007 mgd

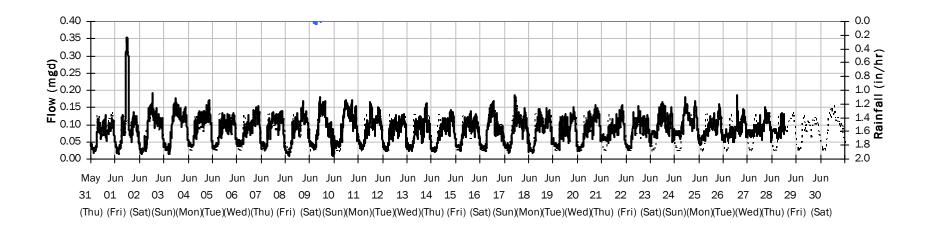




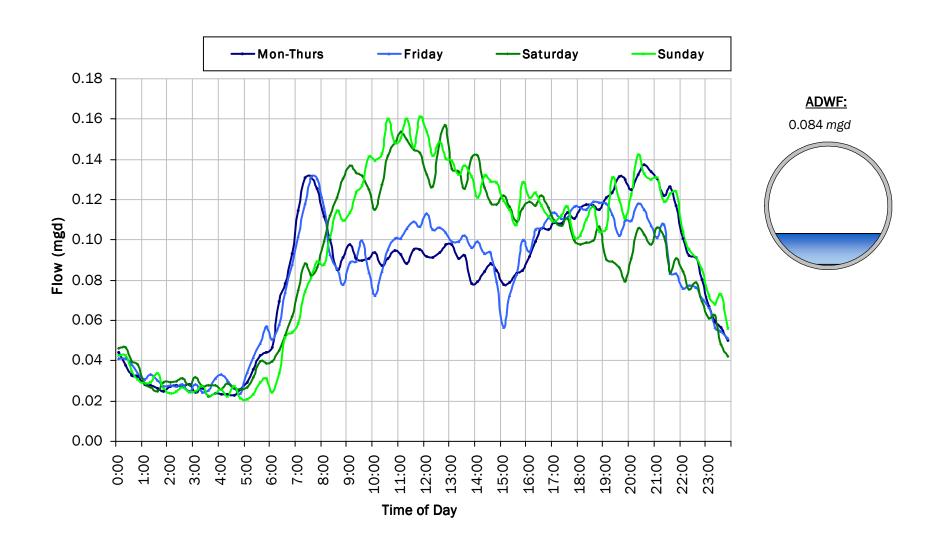
SITE 9 Flow Summary: 4/30/2018 to 6/30/2018

Total Period Rainfall: 0.19 inches Avg Flow: 0.087 mgd Peak Flow: 0.355 mgd Min Flow: 0.007 mgd



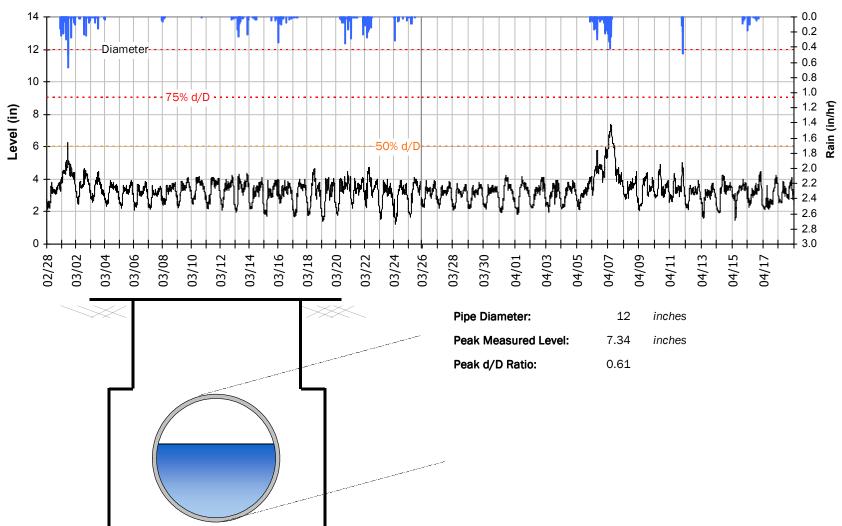


SITE 9
Average Dry Weather Flow Hydrographs



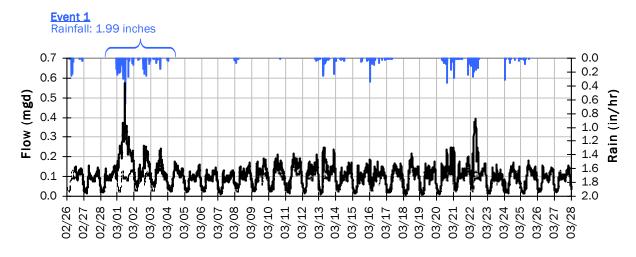
SITE 9
Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Monitoring (High Capacity) Period

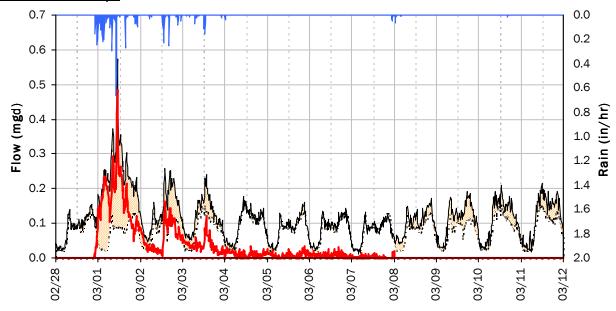


SITE 9
I/I Summary: Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Event 1 Detail Graph



Storm Event I/I Analysis (Rain = 1.99 inches)

Capacity

Inflow / Infiltration

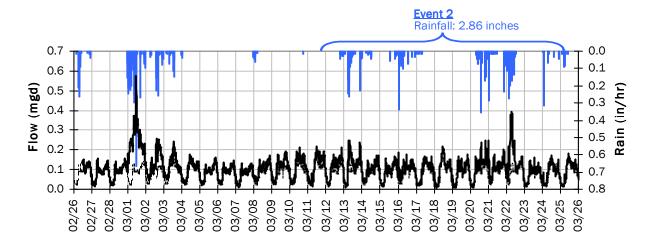
Peak Flow: 0.57 *mgd* **PF:** 6.85

Peak I/I Rate: Total I/I: 0.49 mgd 300,000 gallons

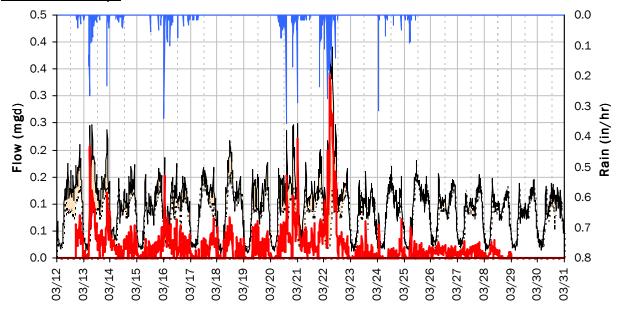
Peak Level: 6.24 *in* **d/D Ratio:** 0.52

SITE 9 I/I Summary: Event 2

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Event 2 Detail Graph



Storm Event I/I Analysis (Rain = 2.86 inches)

Capacity

Inflow / Infiltration

Peak Flow: 0.39 mgd 4.68

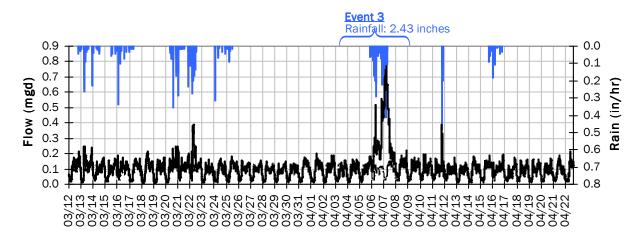
Peak I/I Rate:

0.34 mgd Total I/I: 345,000 gallons

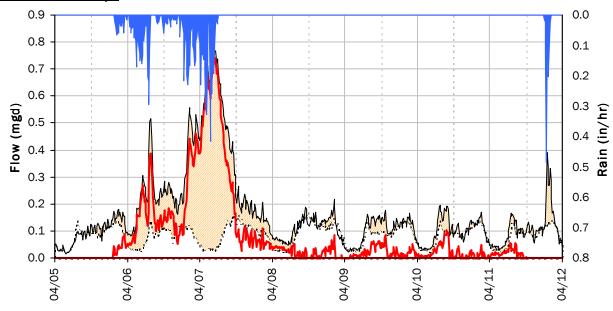
Peak Level: 4.72 in d/D Ratio: 0.39

SITE 9 I/I Summary: Event 3

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Event 3 Detail Graph



Storm Event I/I Analysis (Rain = 2.43 inches)

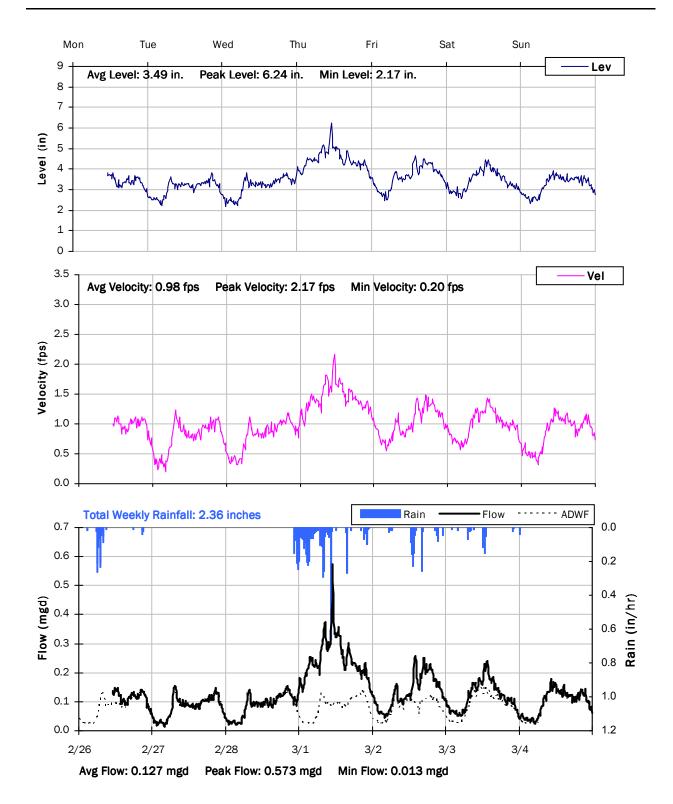
Capacity Inflow / Infiltration

 Peak Flow:
 0.77 mgd
 Peak I/I Rate:
 0.74 mgd

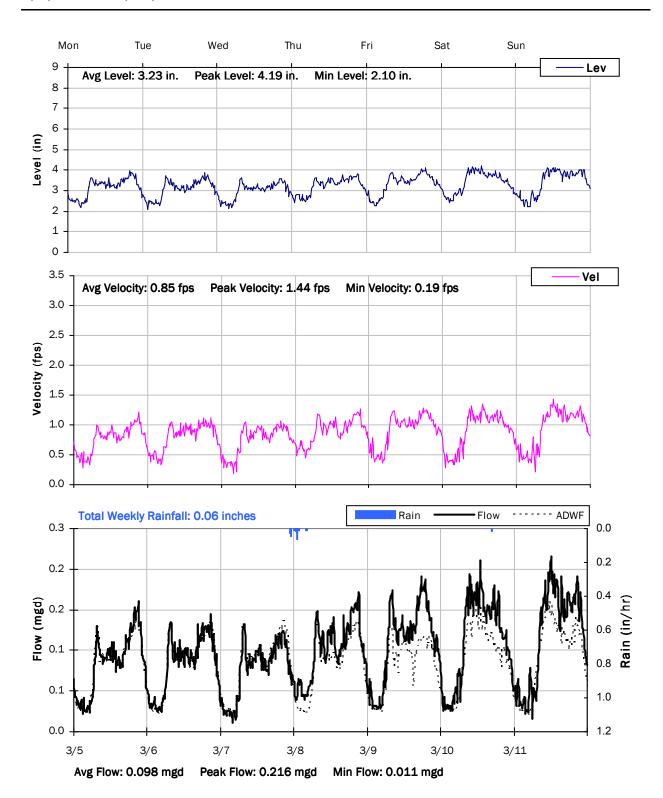
 PF:
 9.17
 Total I/I:
 546,000 gallons

Peak Level: 7.34 *in* **d/D Ratio:** 0.61

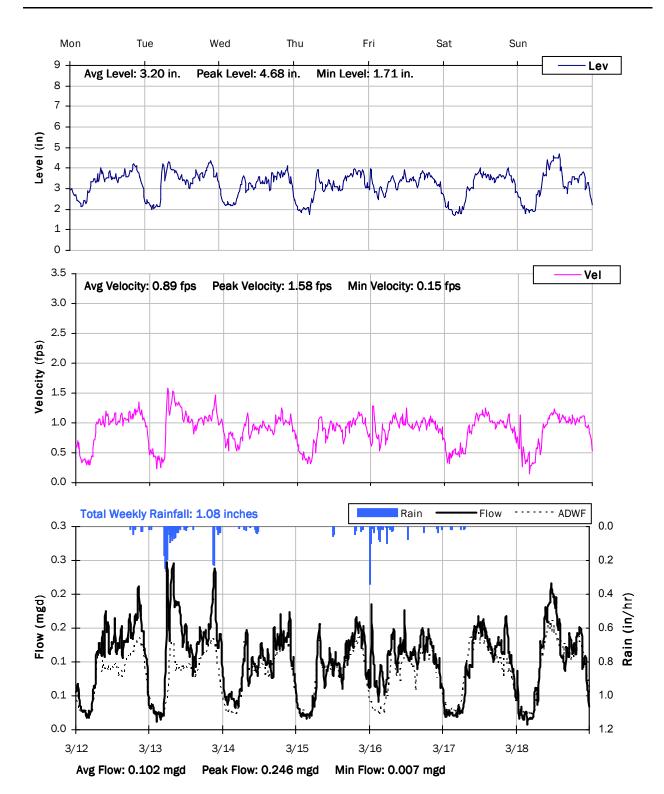
SITE 9
Weekly Level, Velocity and Flow Hydrographs 2/26/2018 to 3/5/2018



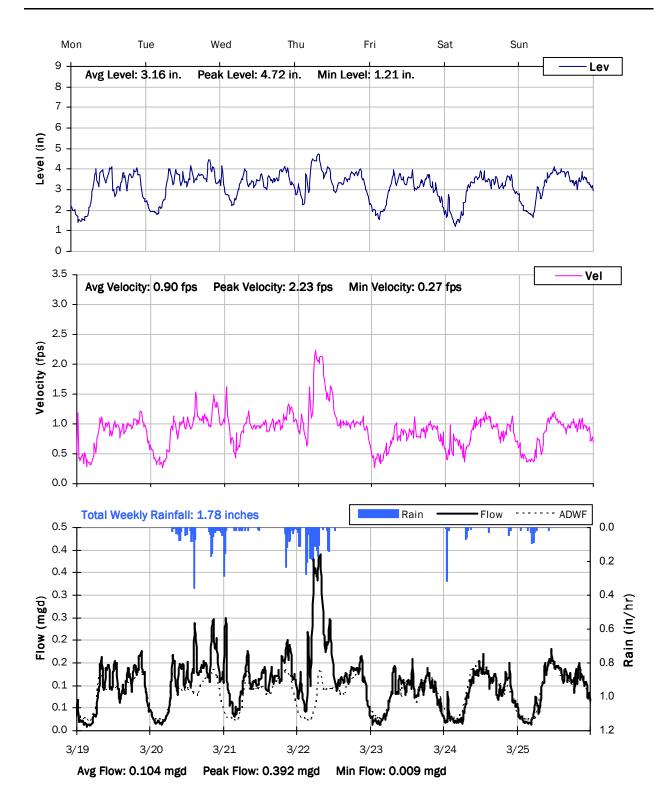
SITE 9
Weekly Level, Velocity and Flow Hydrographs 3/5/2018 to 3/12/2018



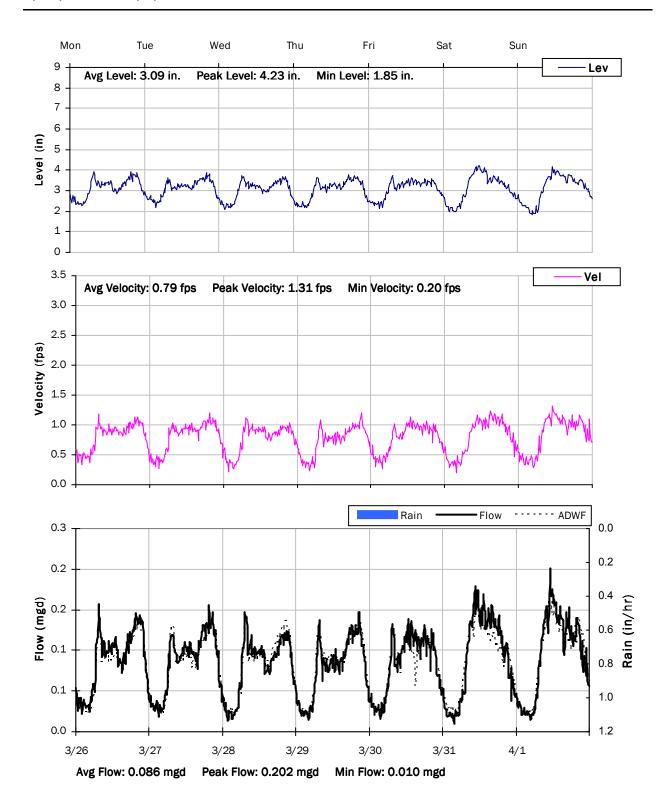
SITE 9 Weekly Level, Velocity and Flow Hydrographs 3/12/2018 to 3/19/2018



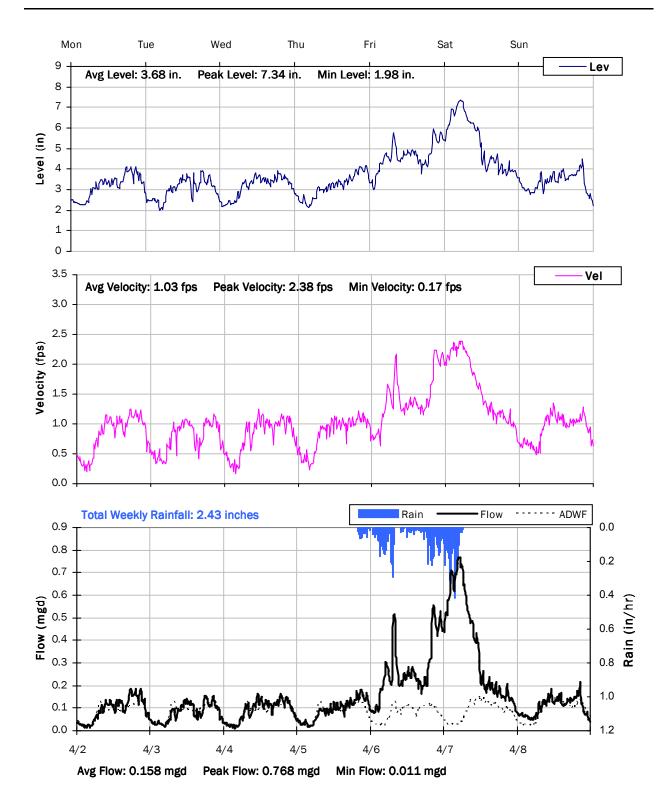
SITE 9
Weekly Level, Velocity and Flow Hydrographs 3/19/2018 to 3/26/2018



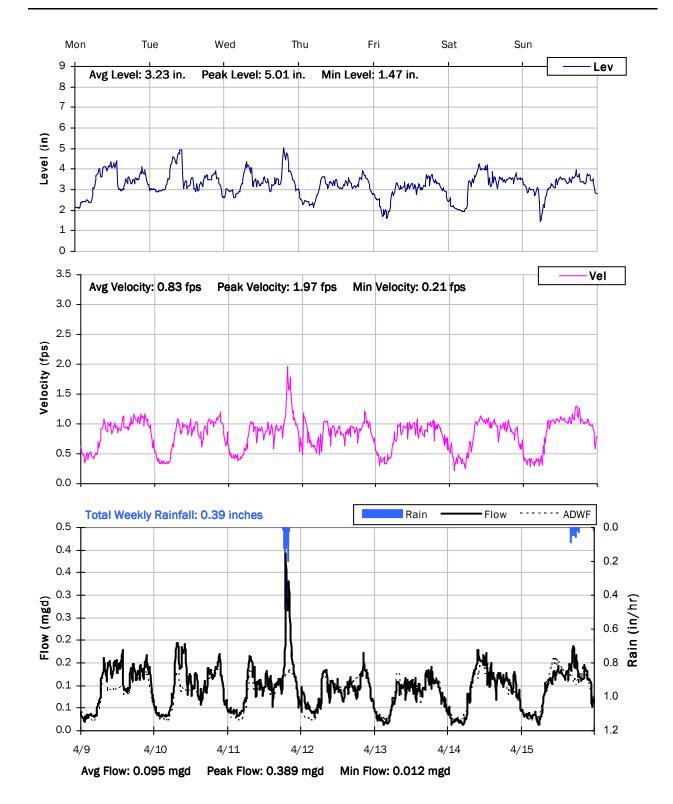
SITE 9
Weekly Level, Velocity and Flow Hydrographs 3/26/2018 to 4/2/2018



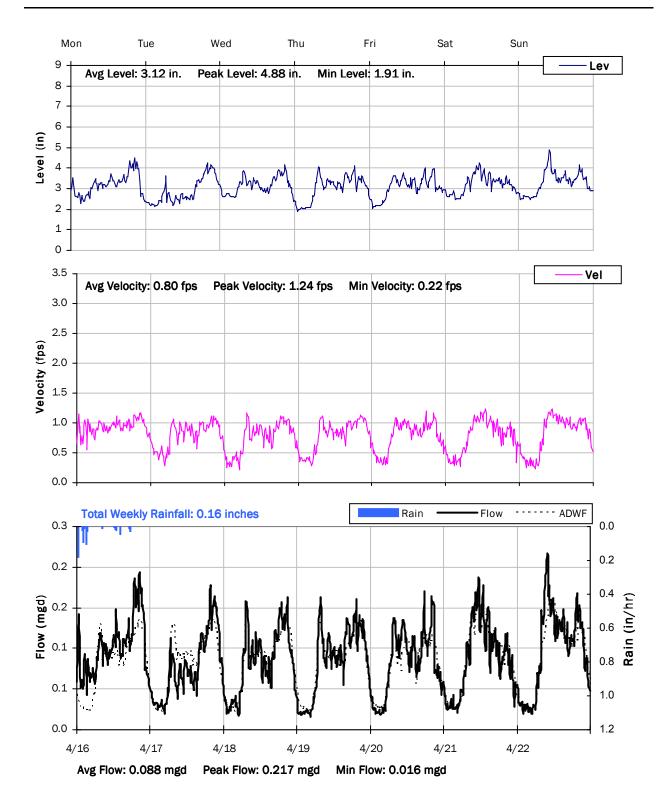
SITE 9
Weekly Level, Velocity and Flow Hydrographs
4/2/2018 to 4/9/2018



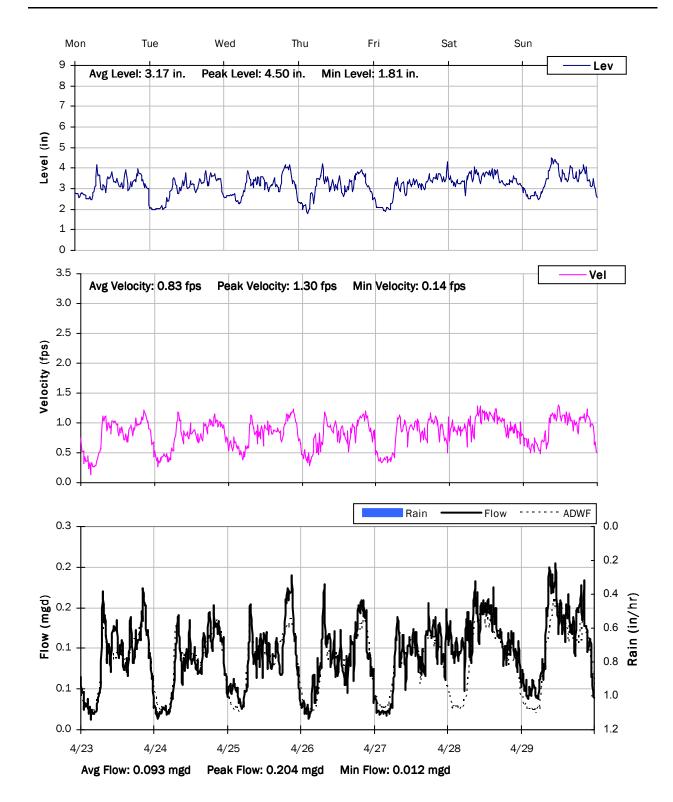
SITE 9 Weekly Level, Velocity and Flow Hydrographs 4/9/2018 to 4/16/2018



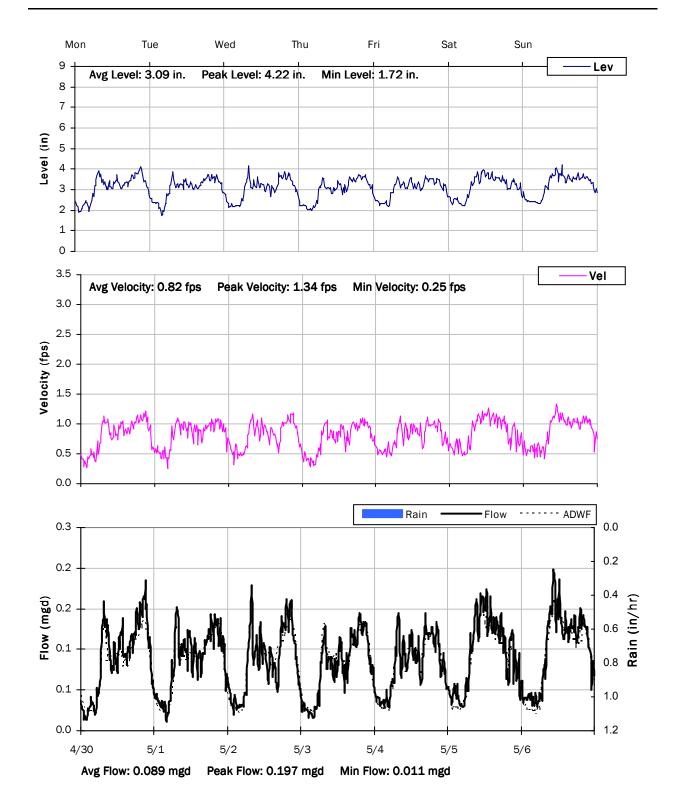
SITE 9 Weekly Level, Velocity and Flow Hydrographs 4/16/2018 to 4/23/2018



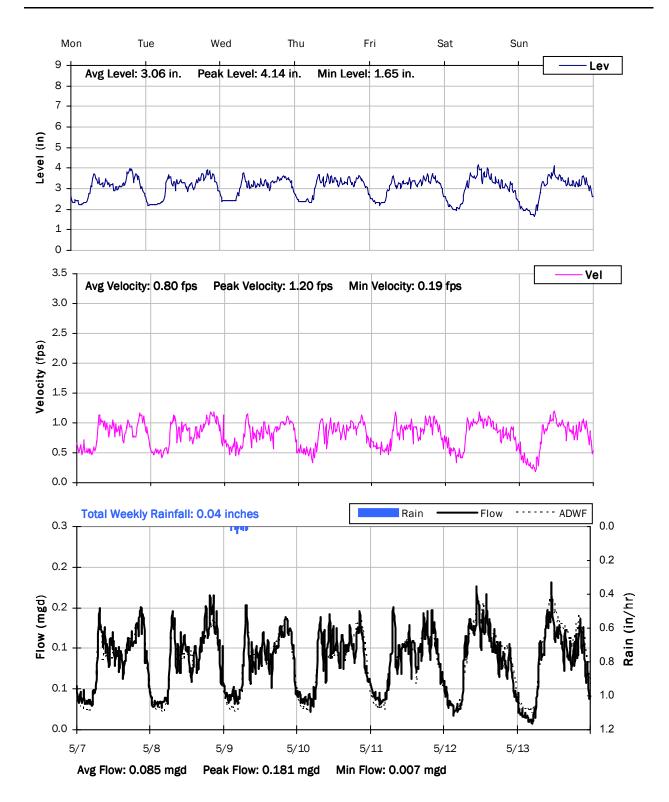
SITE 9
Weekly Level, Velocity and Flow Hydrographs
4/23/2018 to 4/30/2018



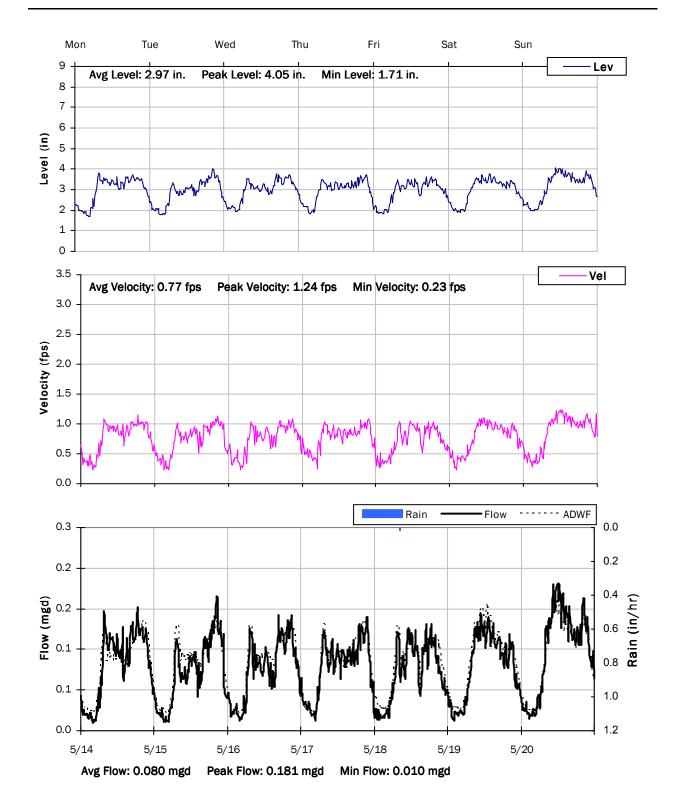
SITE 9
Weekly Level, Velocity and Flow Hydrographs 4/30/2018 to 5/7/2018



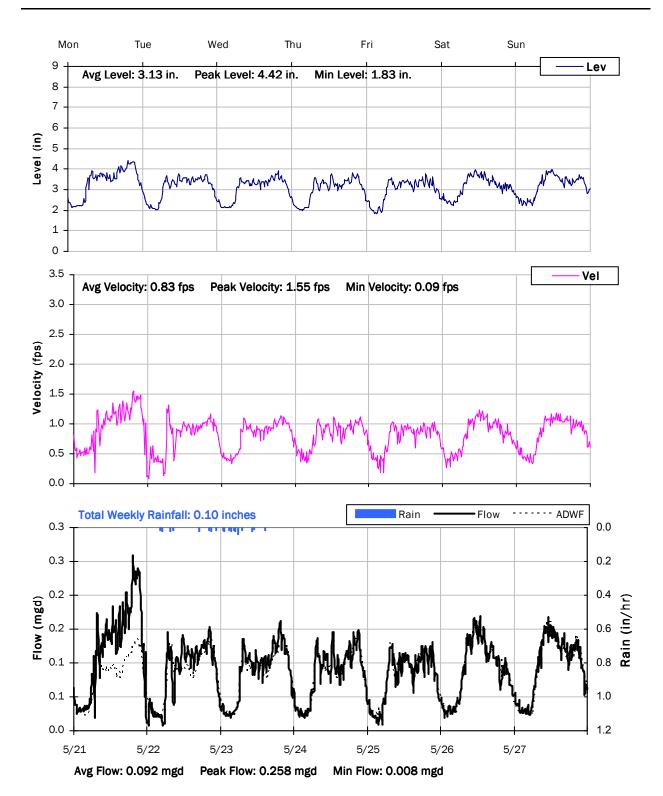
SITE 9 Weekly Level, Velocity and Flow Hydrographs 5/7/2018 to 5/14/2018



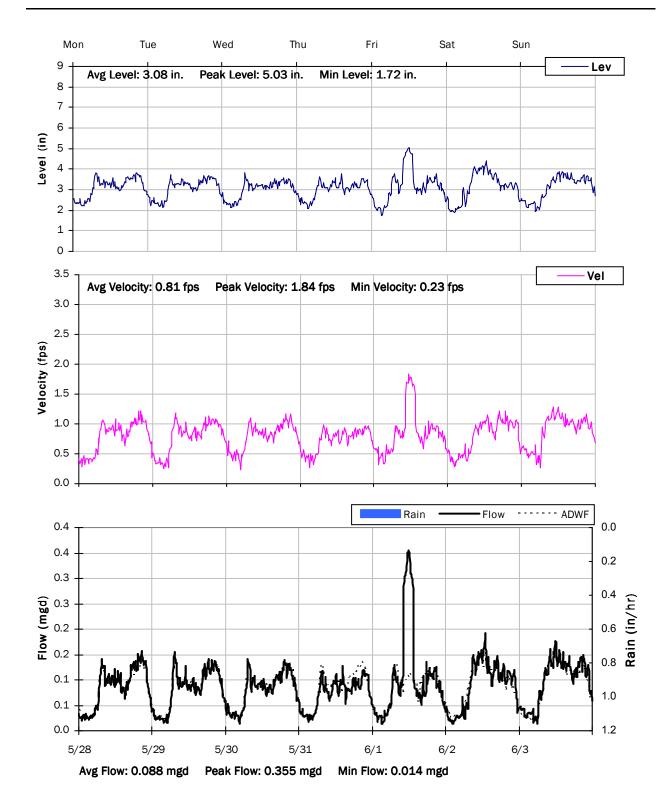
SITE 9
Weekly Level, Velocity and Flow Hydrographs 5/14/2018 to 5/21/2018



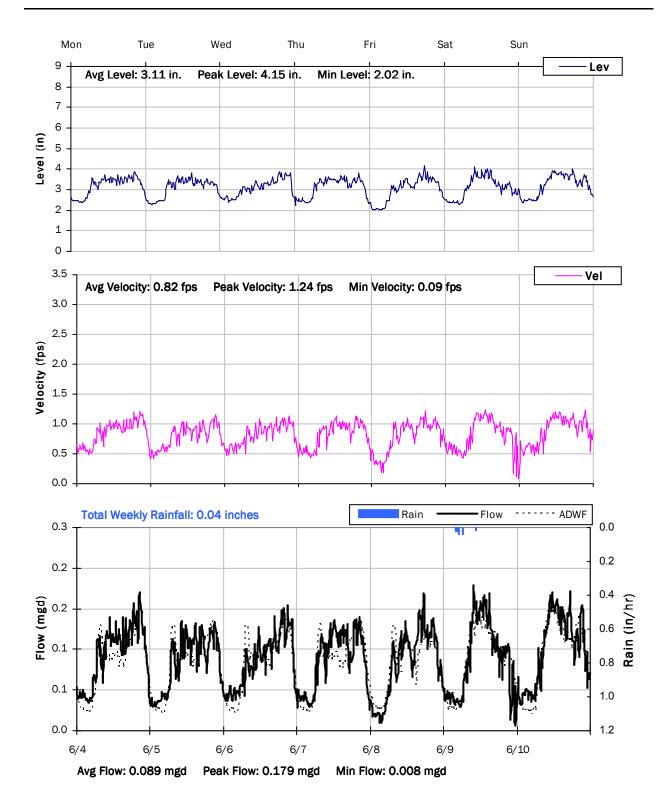
SITE 9
Weekly Level, Velocity and Flow Hydrographs
5/21/2018 to 5/28/2018



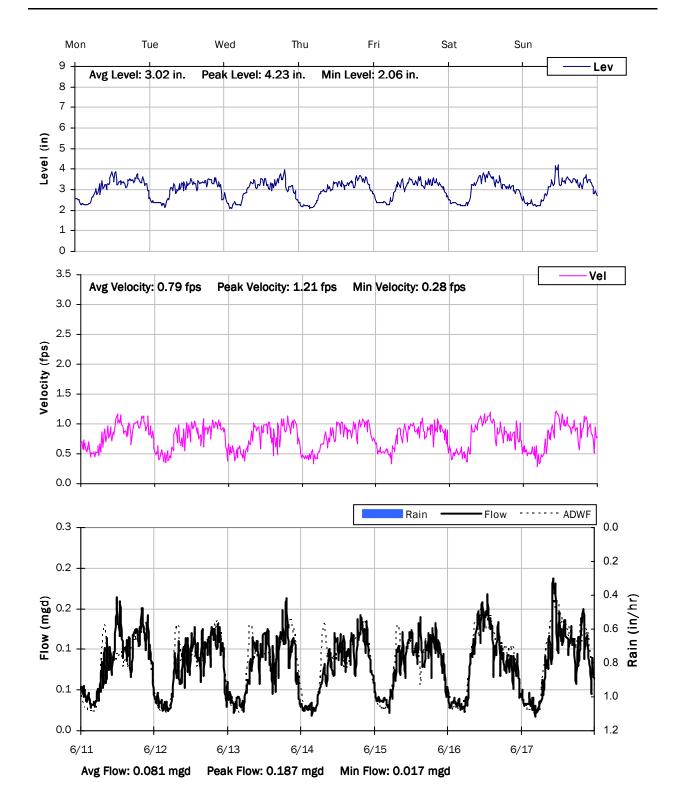
SITE 9
Weekly Level, Velocity and Flow Hydrographs
5/28/2018 to 6/4/2018



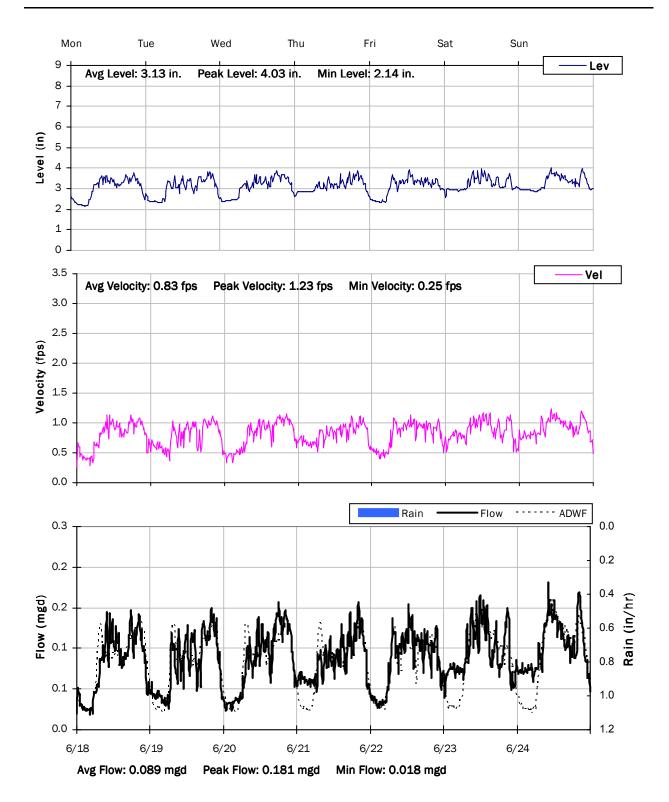
SITE 9
Weekly Level, Velocity and Flow Hydrographs
6/4/2018 to 6/11/2018



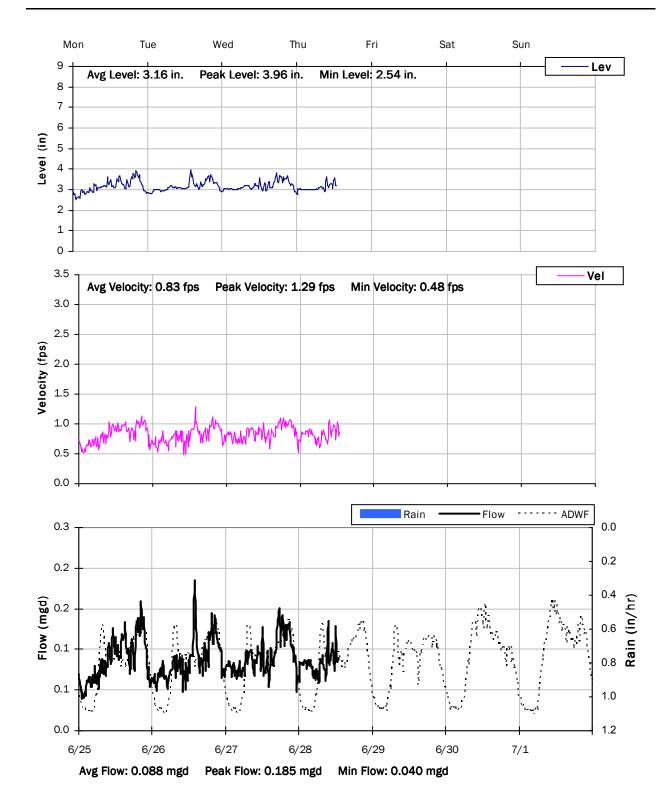
SITE 9
Weekly Level, Velocity and Flow Hydrographs
6/11/2018 to 6/18/2018



SITE 9 Weekly Level, Velocity and Flow Hydrographs 6/18/2018 to 6/25/2018



SITE 9
Weekly Level, Velocity and Flow Hydrographs
6/25/2018 to 7/2/2018



City of South San Francisco

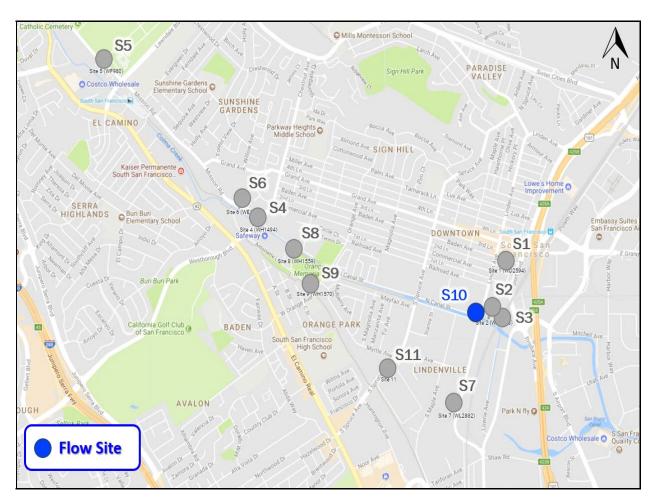
Sanitary Sewer Flow Monitoring February 26- June 28, 2018

Monitoring Site: Site 10

Location: South Linden Avenue and South Canal Street, in Flyers gas

station

Data Summary Report



Vicinity Map: Site 10

Site Information

MH ID: WL2651

Location: South Linden Avenue and South

Canal Street, in Flyers gas station

Coordinates: 122.4118° W, 37.6500° N

Rim Elevation (Earth): 14 feet

Pipe Diameter: 15 inches

Sediment: 0.00 inches

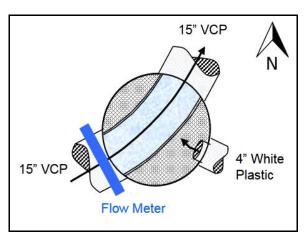
ADWF: 0.132 mgd

Peak Measured Flow: 1.216 mgd

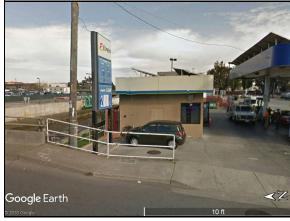




Sewer Map



Flow Sketch



Street View



Plan View

SITE 10

Additional Site Photos

Effluent Pipe



Southwest Influent Pipe



Additional Site Photos

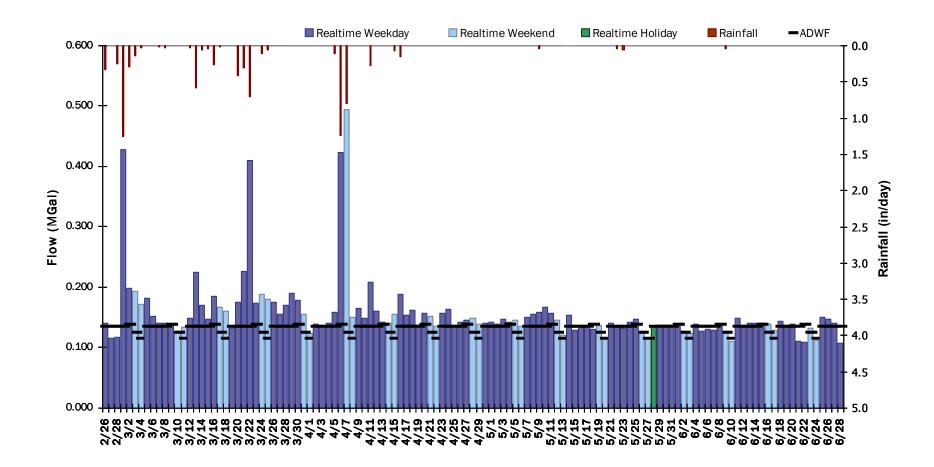
Southeast Influent Pipe



SITE 10
Period Flow Summary: Daily Flow Totals

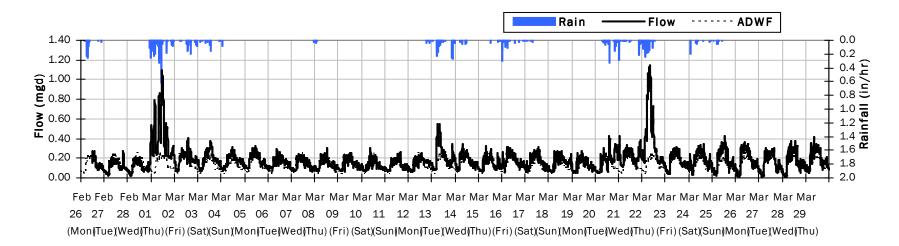
Avg Period Flow: 0.156 MGal Peak Daily Flow: 0.494 MGal Min Daily Flow: 0.108 MGal

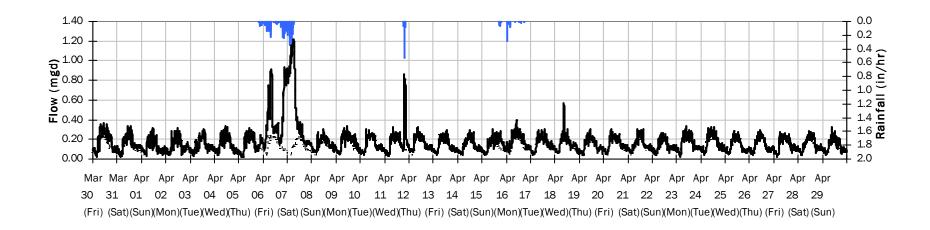
Total Period Rainfall: 7.40 inches



SITE 10 Flow Summary: 2/26/2018 to 4/29/2018

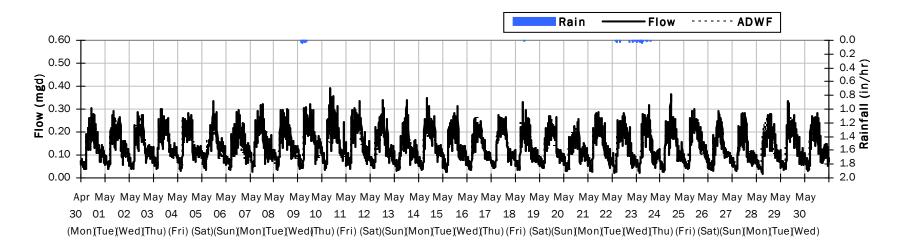
Total Period Rainfall: 7.55 inches Avg Flow: 0.176 mgd Peak Flow: 1.216 mgd Min Flow: 0.011 mgd

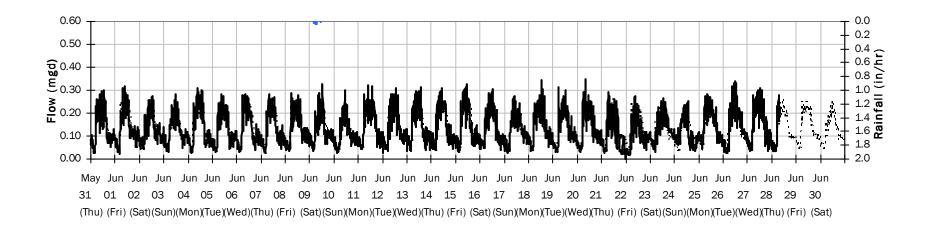




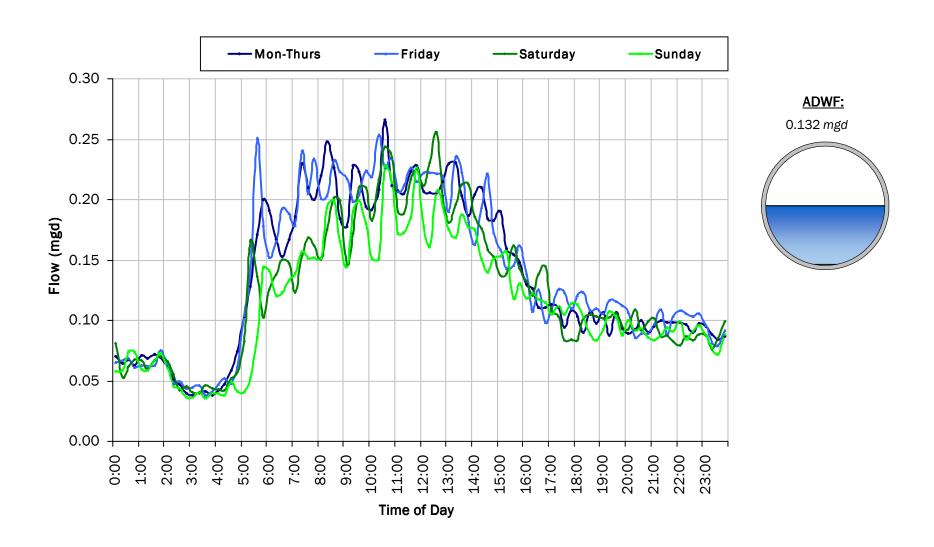
SITE 10 Flow Summary: 4/30/2018 to 6/30/2018

Total Period Rainfall: 0.18 inches Avg Flow: 0.136 mgd Peak Flow: 0.393 mgd Min Flow: 0.000 mgd



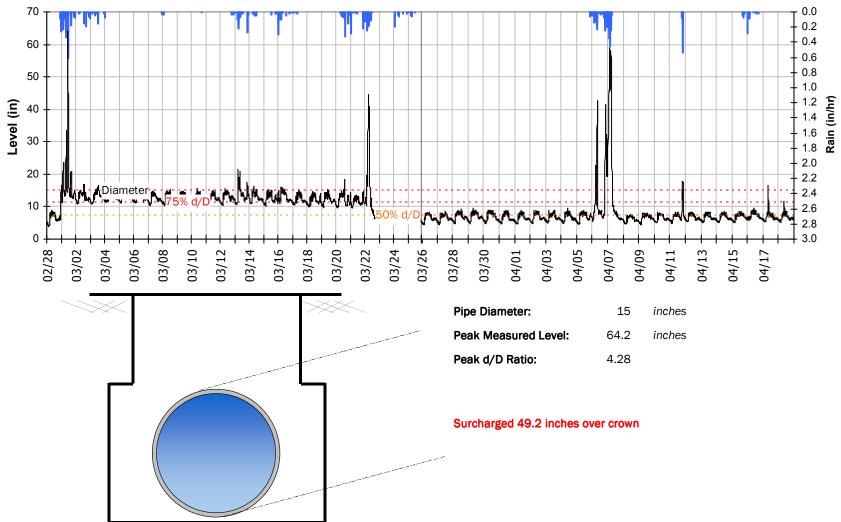


SITE 10
Average Dry Weather Flow Hydrographs



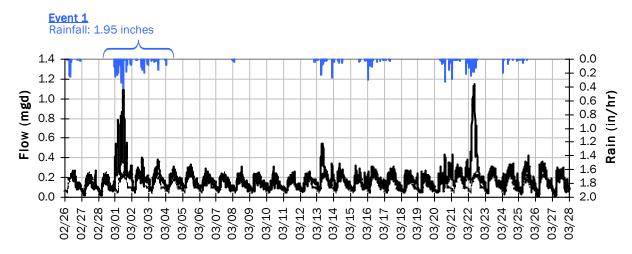
SITE 10
Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Monitoring (High Capacity) Period

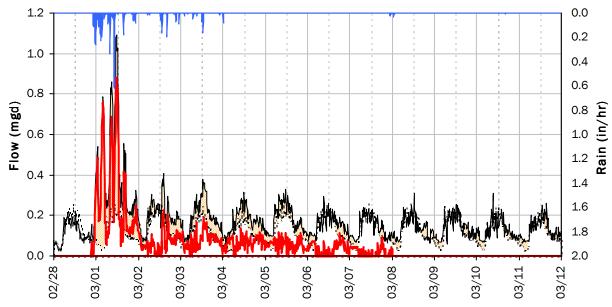


SITE 10 I/I Summary: Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Event 1 Detail Graph



Storm Event I/I Analysis (Rain = 1.95 inches)

0.88 mgd

Capacity

Inflow / Infiltration

Peak Flow: 1.09 *mgd* **PF:** 8.30

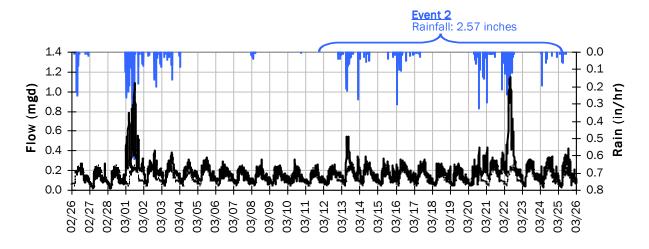
Peak I/I Rate:
Total I/I: 62

Peak Level: 64.23 *in* **d/D Ratio:** 4.28

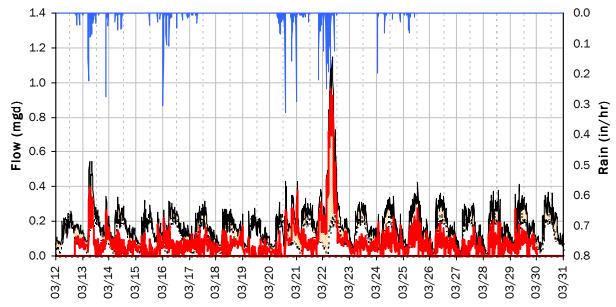
Total I/I: 622,000 gallons

SITE 10 I/I Summary: Event 2

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Event 2 Detail Graph



Storm Event I/I Analysis (Rain = 2.57 inches)

Capacity

Inflow / Infiltration

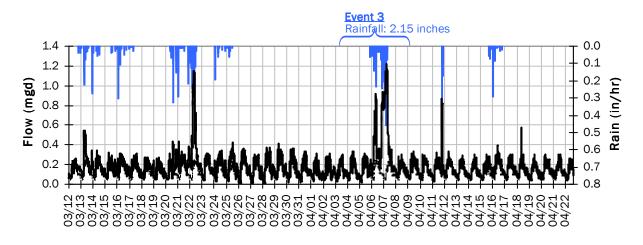
Peak Flow: 1.15 mgd Peak I/I Rate: Total I/I:

0.96 mgd 1,344,000 gallons

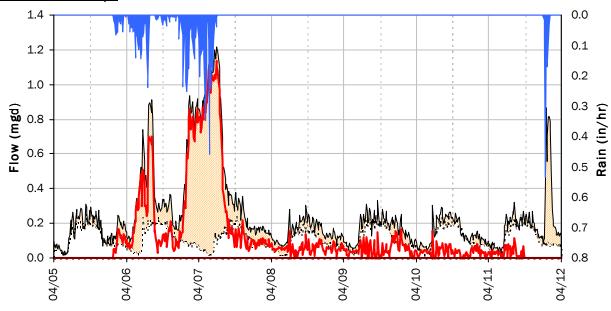
Peak Level: 44.51 in d/D Ratio: 2.97

SITE 10 I/I Summary: Event 3

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Event 3 Detail Graph



Storm Event I/I Analysis (Rain = 2.15 inches)

Capacity

Inflow / Infiltration

 Peak Flow:
 1.22 mgd

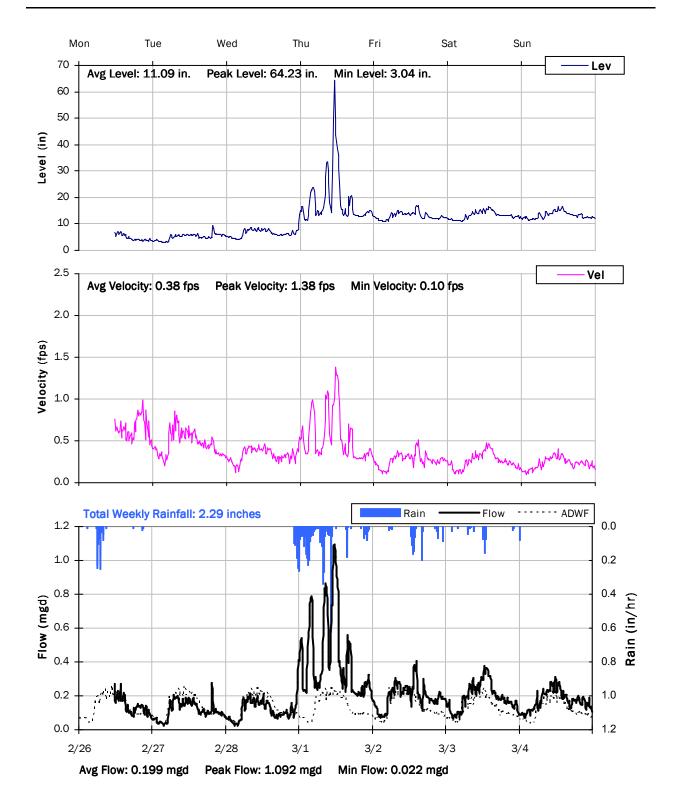
 PF:
 9.25

Peak I/I Rate: 1.13 mgd
Total I/I: 867,000 gallons

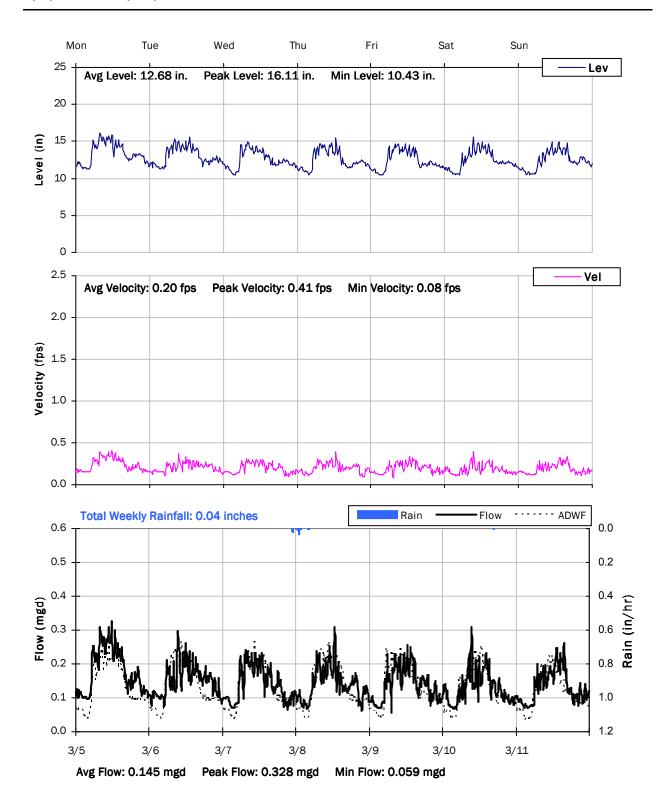
Peak Level: 58.82 *in* d/D Ratio: 3.92



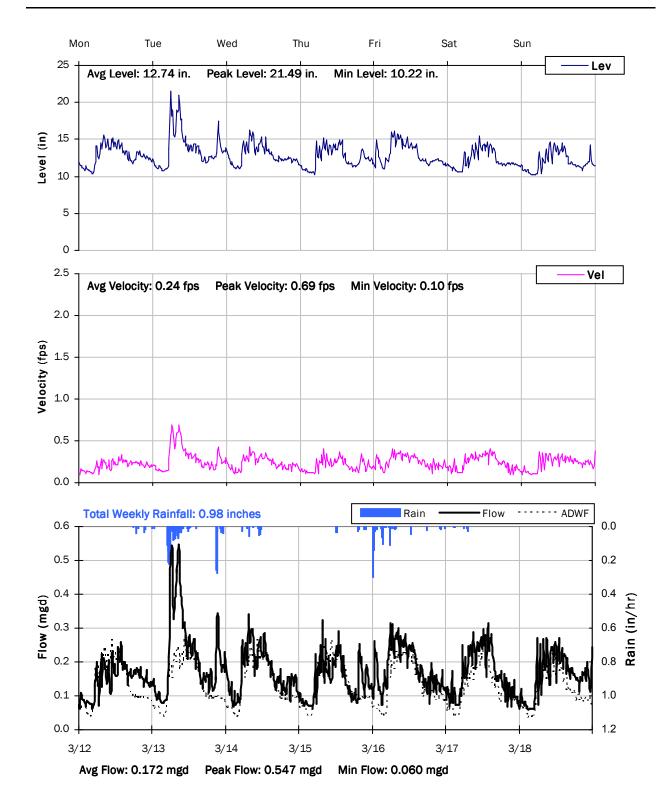
SITE 10 Weekly Level, Velocity and Flow Hydrographs 2/26/2018 to 3/5/2018



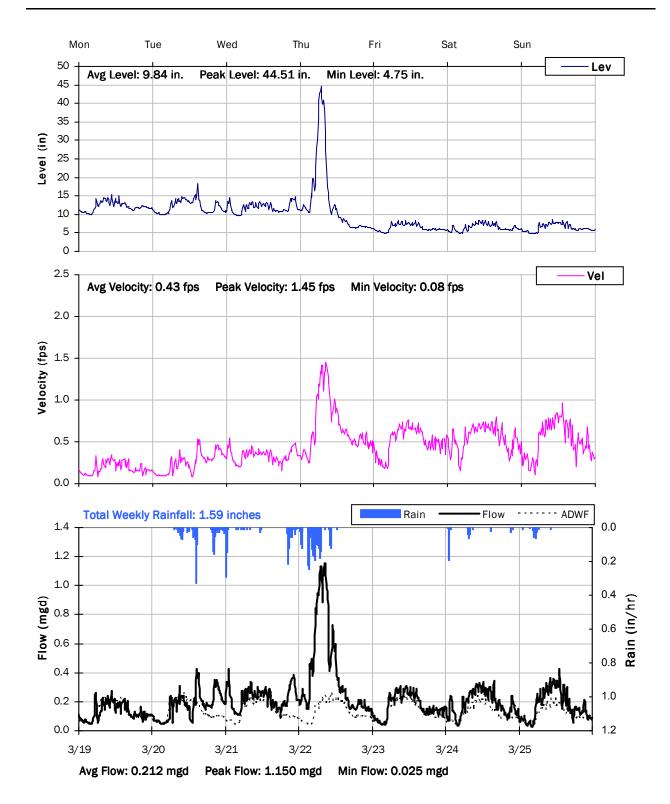
SITE 10 Weekly Level, Velocity and Flow Hydrographs 3/5/2018 to 3/12/2018



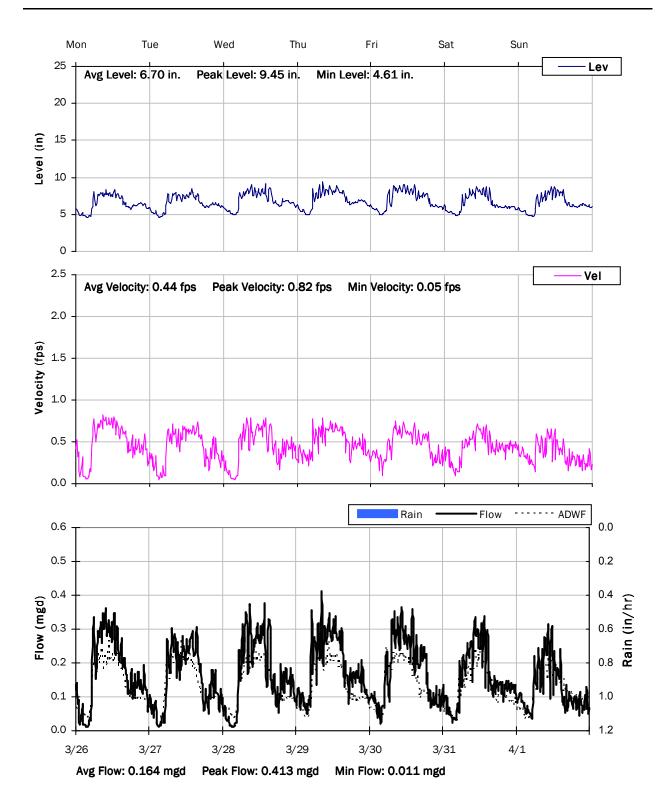
SITE 10 Weekly Level, Velocity and Flow Hydrographs 3/12/2018 to 3/19/2018



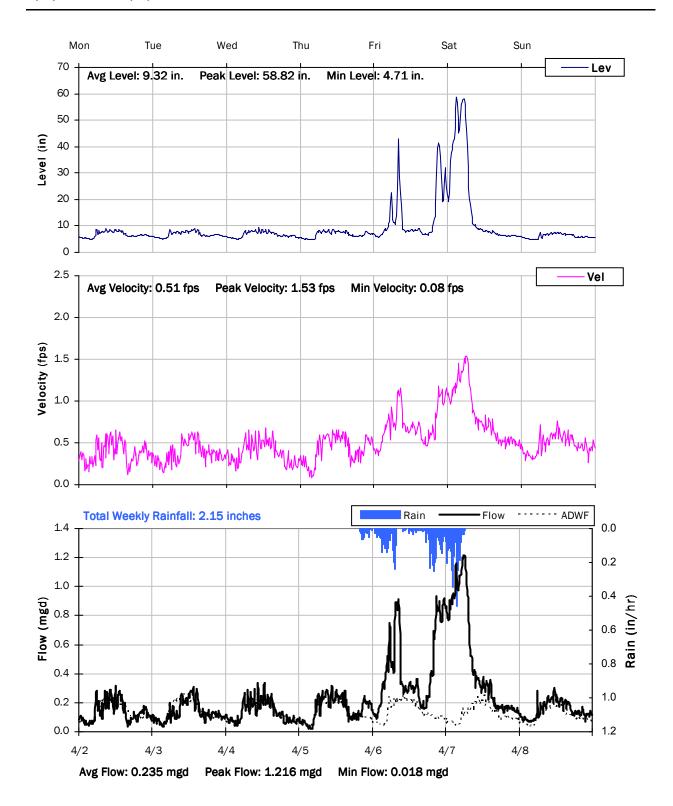
SITE 10 Weekly Level, Velocity and Flow Hydrographs 3/19/2018 to 3/26/2018



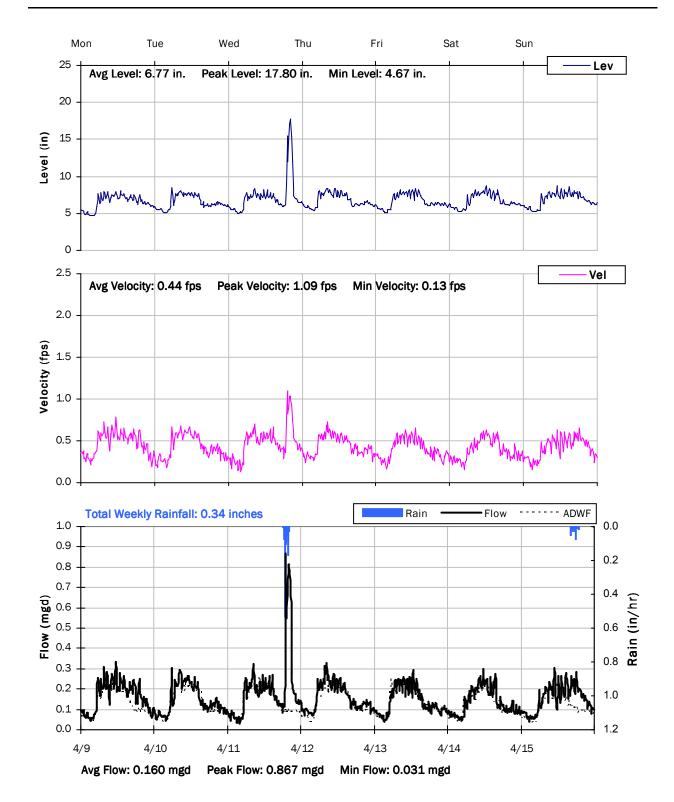
SITE 10 Weekly Level, Velocity and Flow Hydrographs 3/26/2018 to 4/2/2018



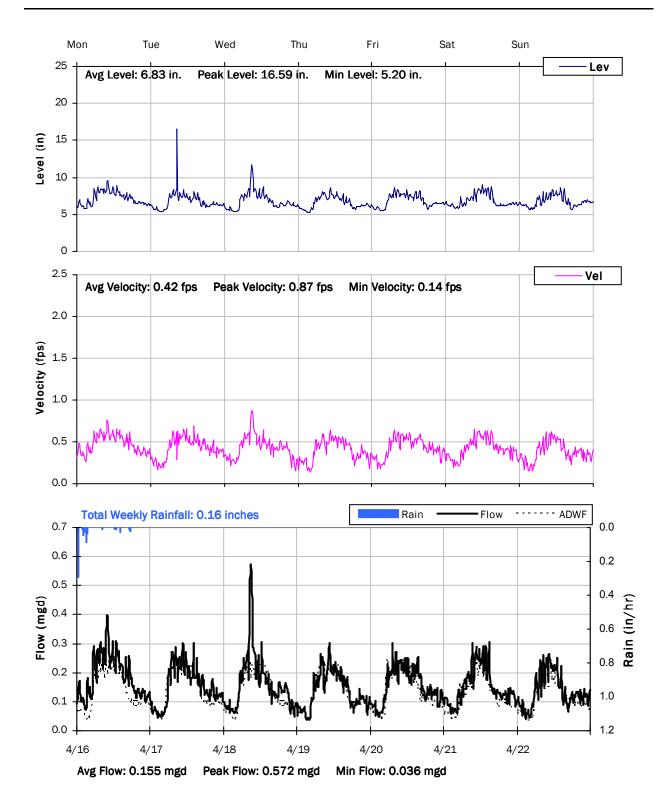
SITE 10 Weekly Level, Velocity and Flow Hydrographs 4/2/2018 to 4/9/2018



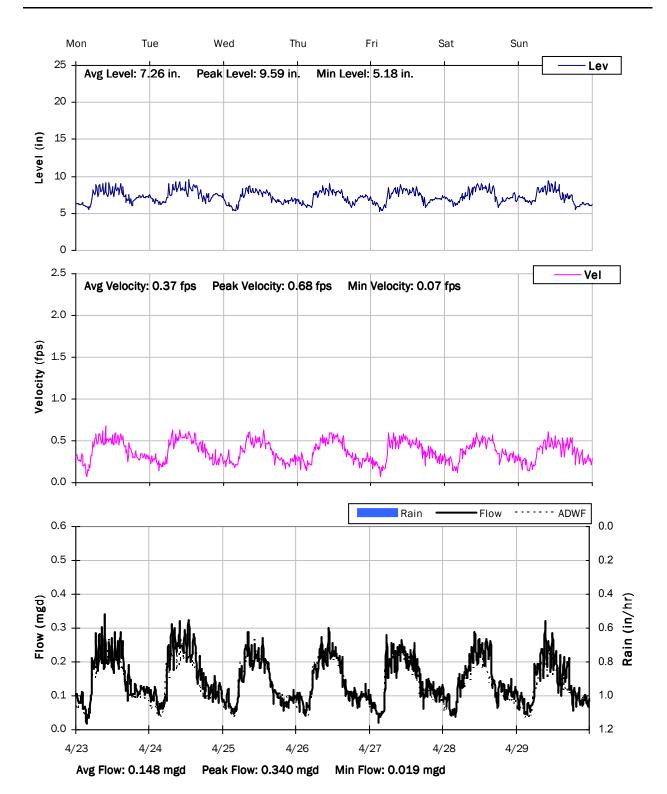
SITE 10 Weekly Level, Velocity and Flow Hydrographs 4/9/2018 to 4/16/2018



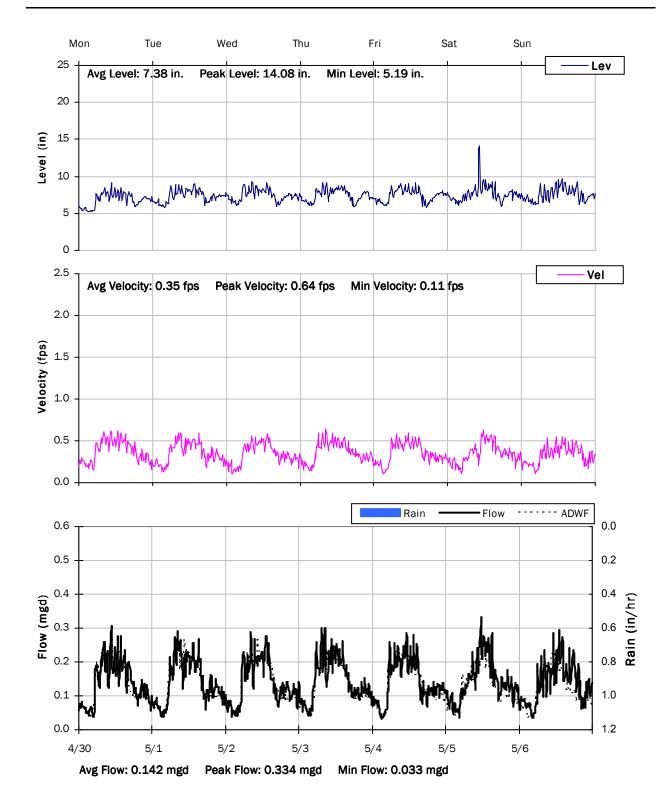
SITE 10 Weekly Level, Velocity and Flow Hydrographs 4/16/2018 to 4/23/2018



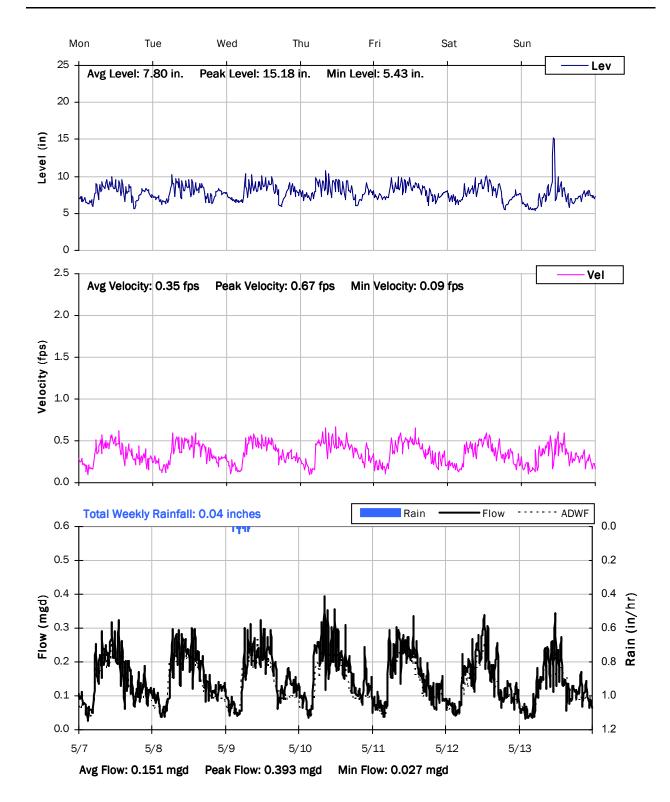
SITE 10 Weekly Level, Velocity and Flow Hydrographs 4/23/2018 to 4/30/2018



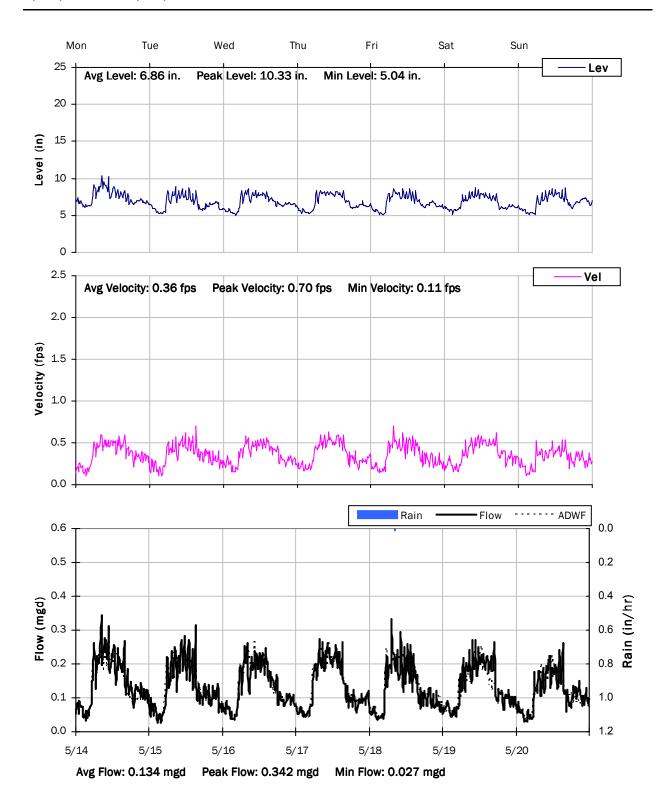
SITE 10 Weekly Level, Velocity and Flow Hydrographs 4/30/2018 to 5/7/2018



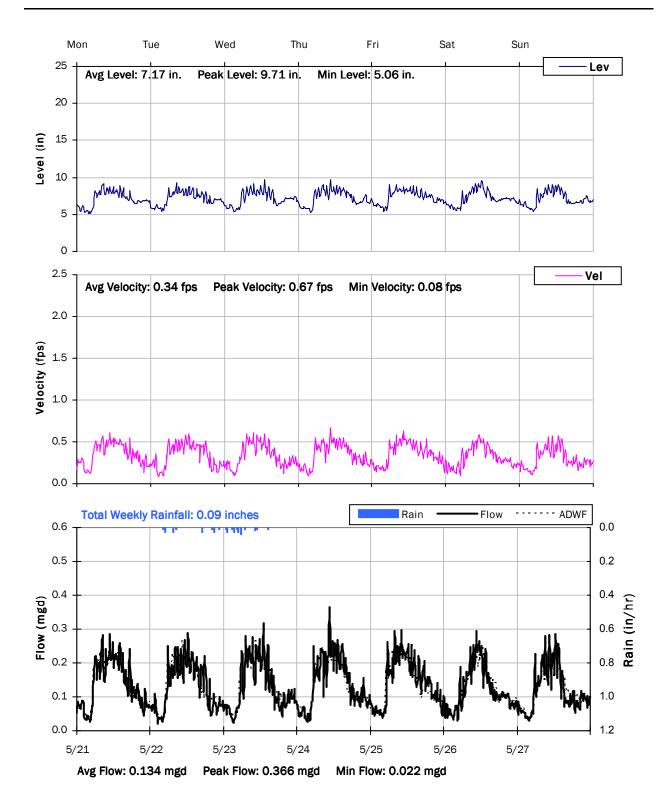
SITE 10 Weekly Level, Velocity and Flow Hydrographs 5/7/2018 to 5/14/2018



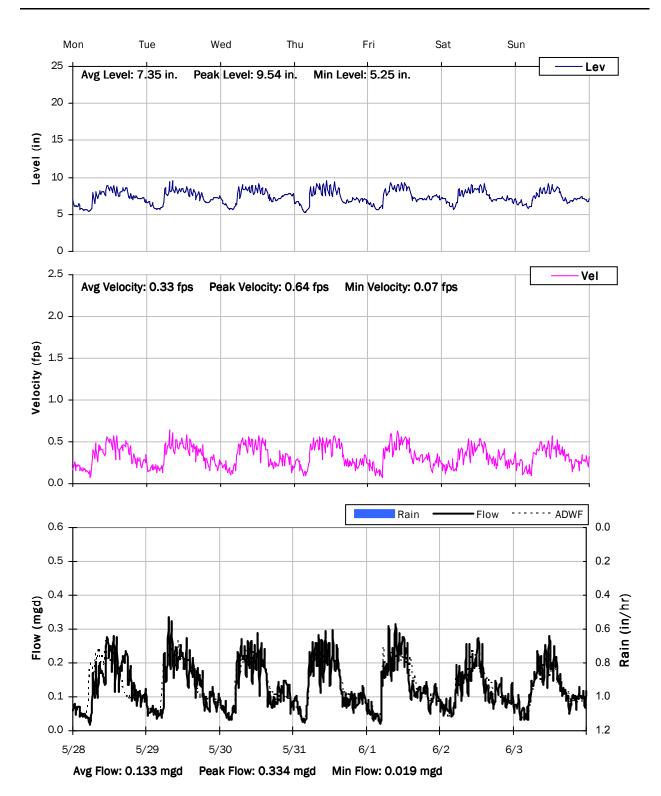
SITE 10 Weekly Level, Velocity and Flow Hydrographs 5/14/2018 to 5/21/2018



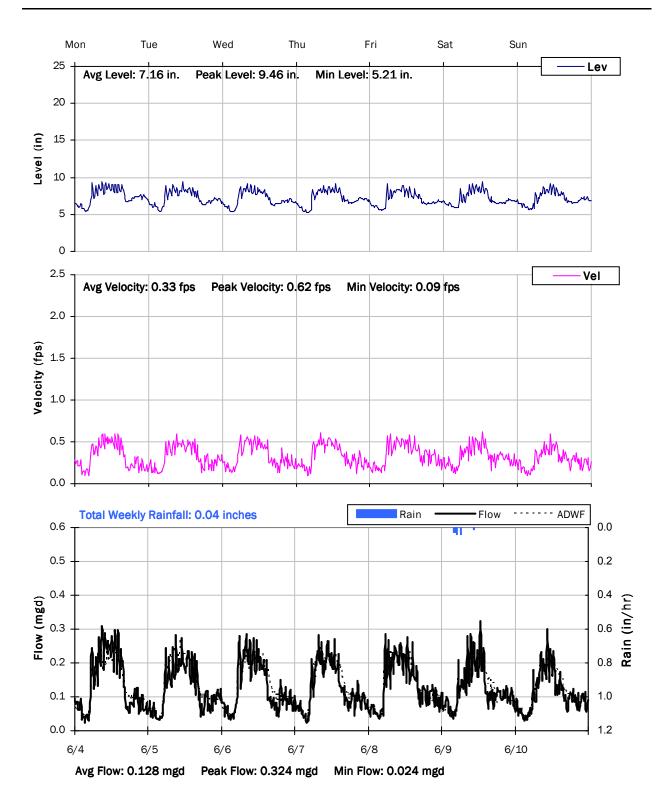
SITE 10 Weekly Level, Velocity and Flow Hydrographs 5/21/2018 to 5/28/2018



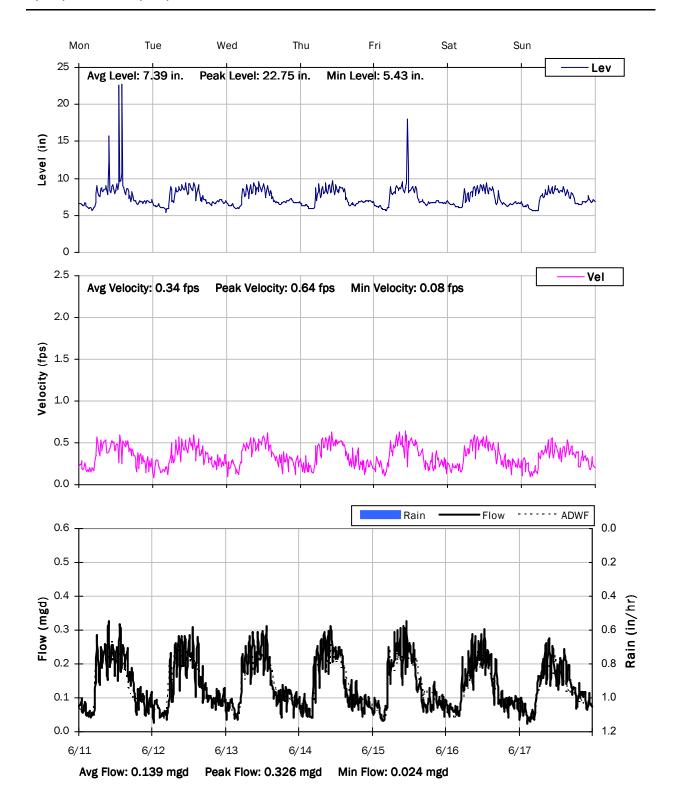
SITE 10 Weekly Level, Velocity and Flow Hydrographs 5/28/2018 to 6/4/2018



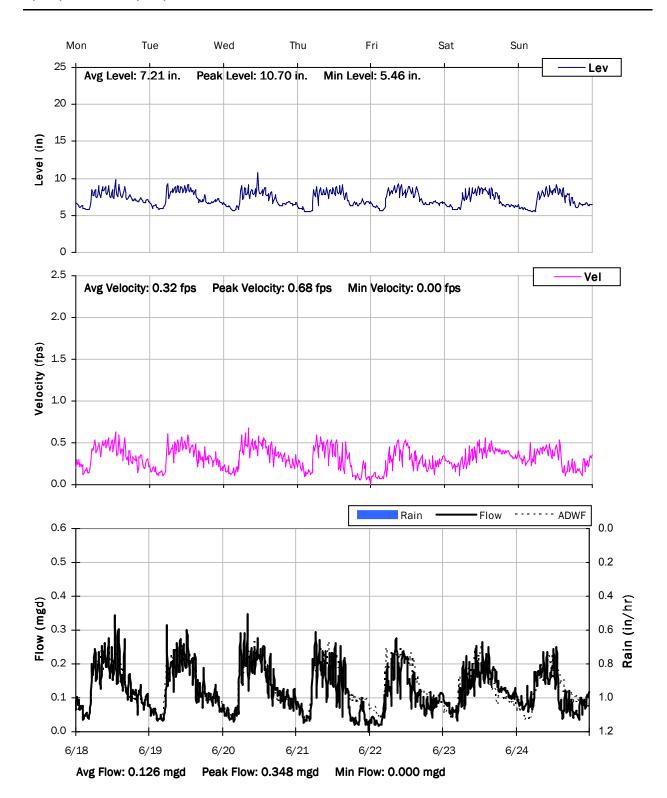
SITE 10 Weekly Level, Velocity and Flow Hydrographs 6/4/2018 to 6/11/2018



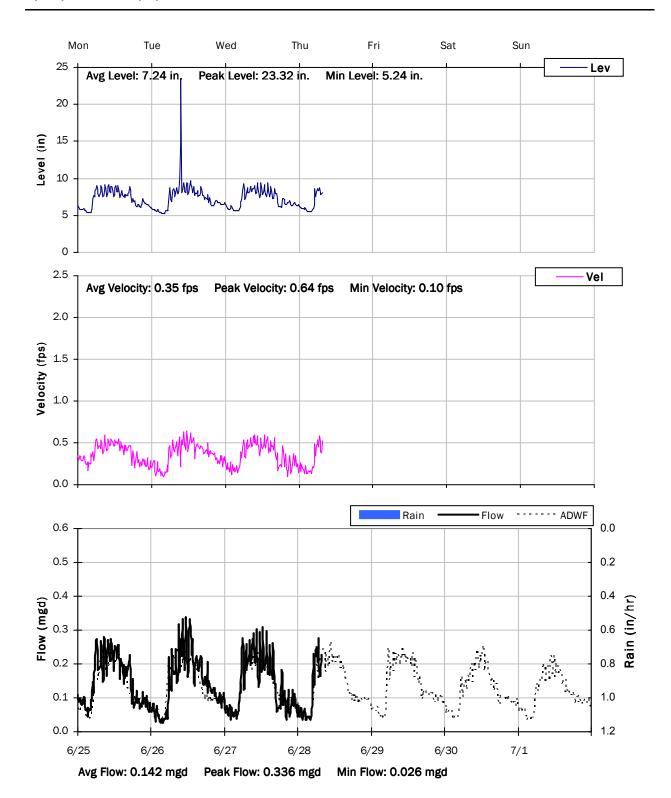
SITE 10 Weekly Level, Velocity and Flow Hydrographs 6/11/2018 to 6/18/2018



SITE 10 Weekly Level, Velocity and Flow Hydrographs 6/18/2018 to 6/25/2018



SITE 10 Weekly Level, Velocity and Flow Hydrographs 6/25/2018 to 7/2/2018



City of South San Francisco

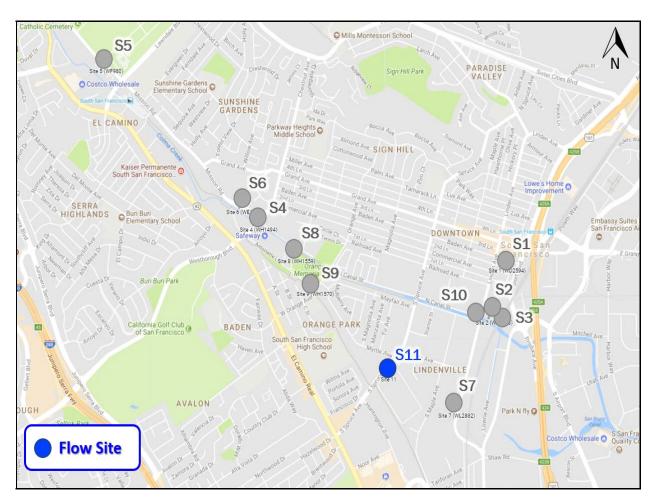
Sanitary Sewer Flow Monitoring February 26- June 28, 2018

Monitoring Site: Site 11

Location: 245 South Spruce Avenue, opposite of Aqua Handwash &

Gas

Data Summary Report



Vicinity Map: Site 11

Site Information

MH ID: Not Given

Location: 245 South Spruce Avenue,

opposite of Aqua Handwash &

Gas

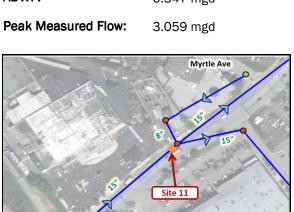
Coordinates: 122.4204° W, 37.6470° N

Rim Elevation (Earth): 19 feet

Pipe Diameter: 15 inches

Sediment: 0.75 inches

ADWF: 0.347 mgd



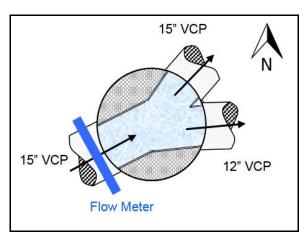
Sewer Map



Street View



Satellite Map



Flow Sketch



Plan View

Additional Site Photos

Northeast Effluent Pipe



Influent Pipe



Additional Site Photos

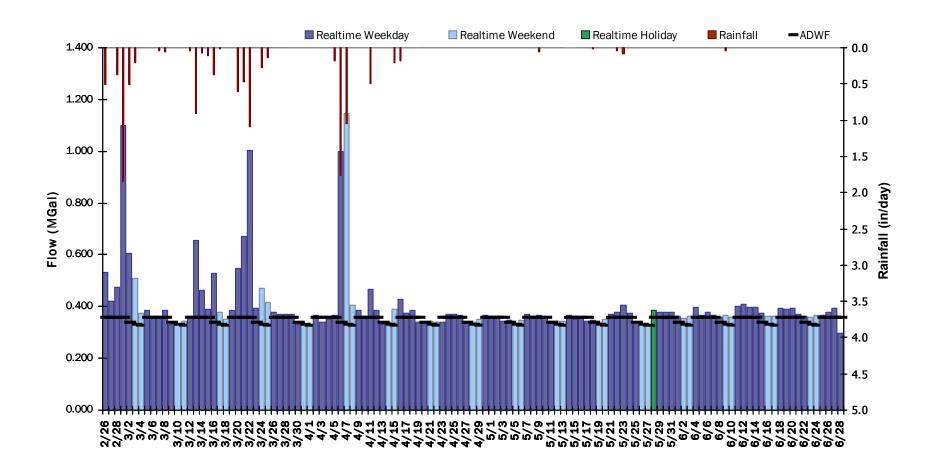
North Effluent Pipe



SITE 11
Period Flow Summary: Daily Flow Totals

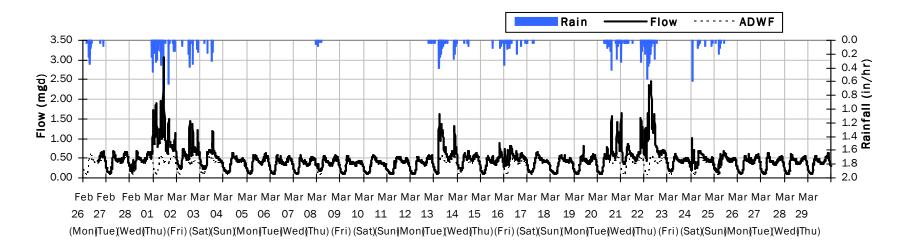
Avg Period Flow: 0.403 MGal Peak Daily Flow: 1.145 MGal Min Daily Flow: 0.297 MGal

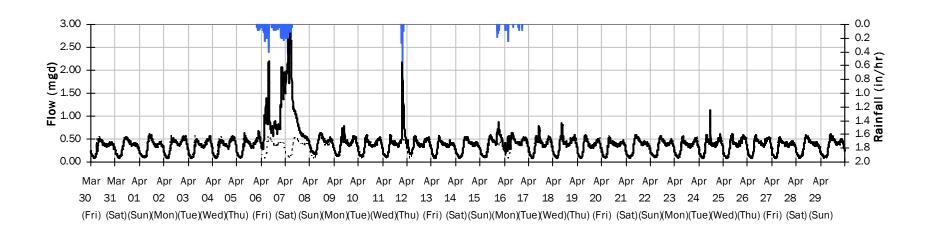
Total Period Rainfall: 11.25 inches



SITE 11 Flow Summary: 2/26/2018 to 4/29/2018

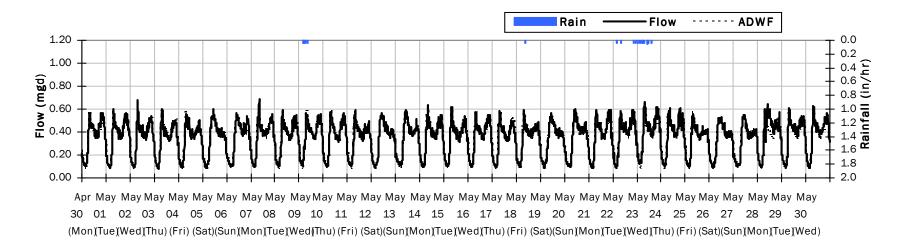
Total Period Rainfall: 11.50 inches Avg Flow: 0.438 mgd Peak Flow: 3.059 mgd Min Flow: 0.086 mgd

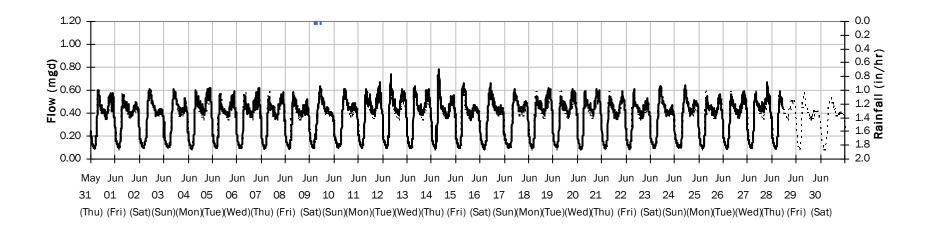




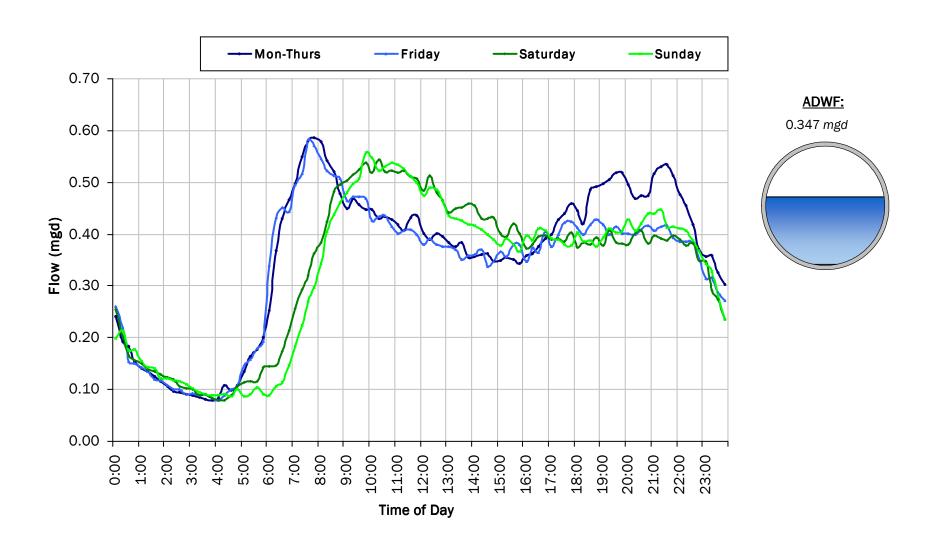
SITE 11 Flow Summary: 4/30/2018 to 6/30/2018

Total Period Rainfall: 0.23 inches Avg Flow: 0.366 mgd Peak Flow: 0.780 mgd Min Flow: 0.081 mgd

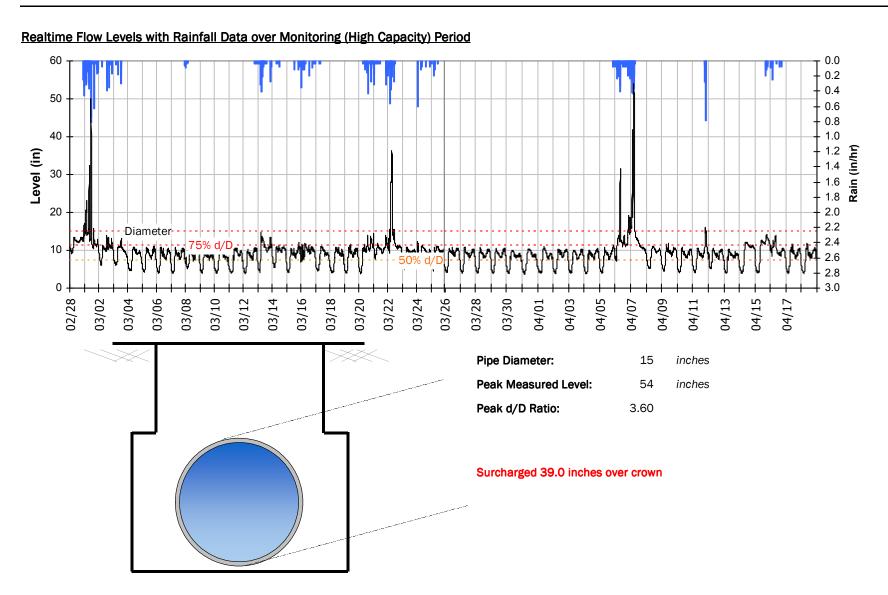




SITE 11
Average Dry Weather Flow Hydrographs

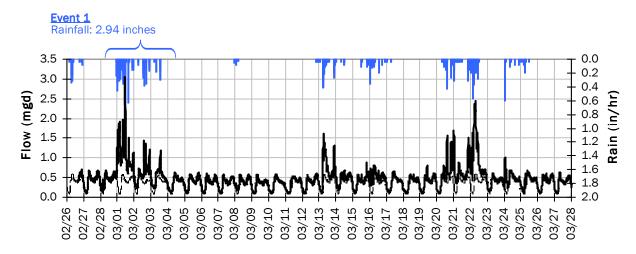


SITE 11
Site Capacity and Surcharge Summary

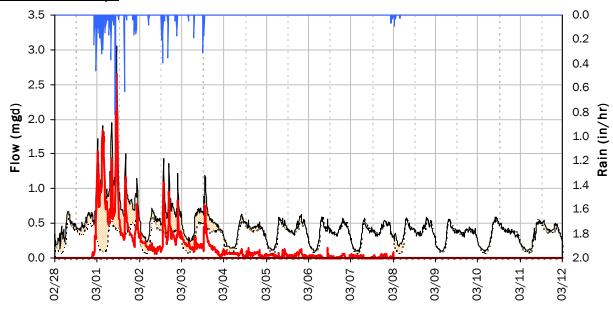


SITE 11 I/I Summary: Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Event 1 Detail Graph



Storm Event I/I Analysis (Rain = 2.94 inches)

Capacity

Inflow / Infiltration

Peak Flow: 3.06 *mgd* **PF:** 8.82

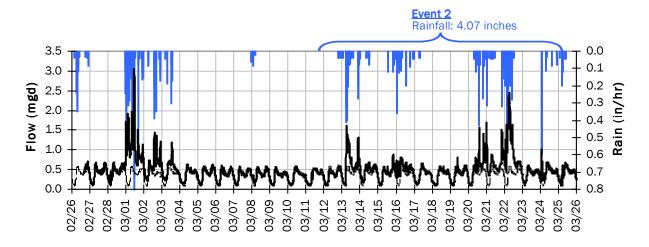
 Peak I/I Rate:
 2.65 mgd

 Total I/I:
 1,357,000 gallons

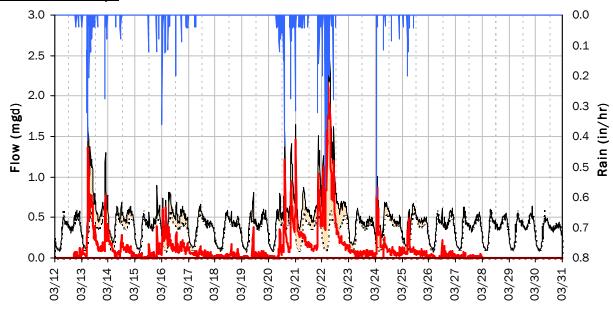
Peak Level: 49.97 *in* **d/D Ratio:** 3.33

SITE 11 I/I Summary: Event 2

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Event 2 Detail Graph



Storm Event I/I Analysis (Rain = 4.07 inches)

Capacity

Inflow / Infiltration

Peak Flow: 2.45 mgd Peak I/I Rate: 2.18 mgd Total I/I: 2,202,000 gallons

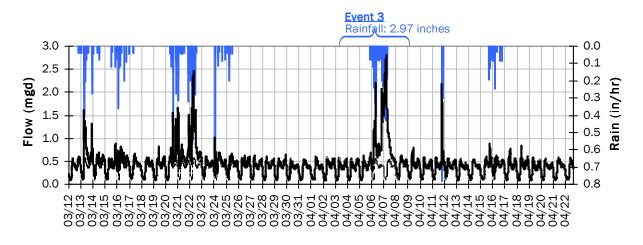
7.08

Peak Level: 36.28 in

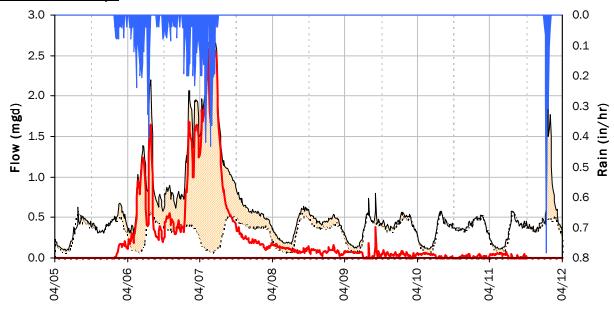
d/D Ratio: 2.42

SITE 11 I/I Summary: Event 3

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Event 3 Detail Graph



Storm Event I/I Analysis (Rain = 2.97 inches)

Capacity

Inflow / Infiltration

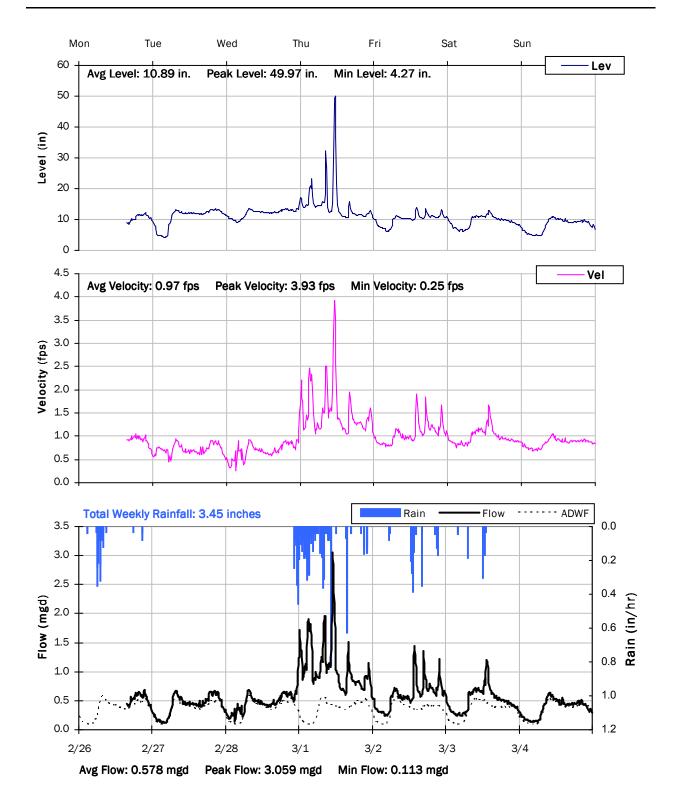
Peak Flow: 2.80 *mgd* **PF:** 8.07

 Peak I/I Rate:
 2.71 mgd

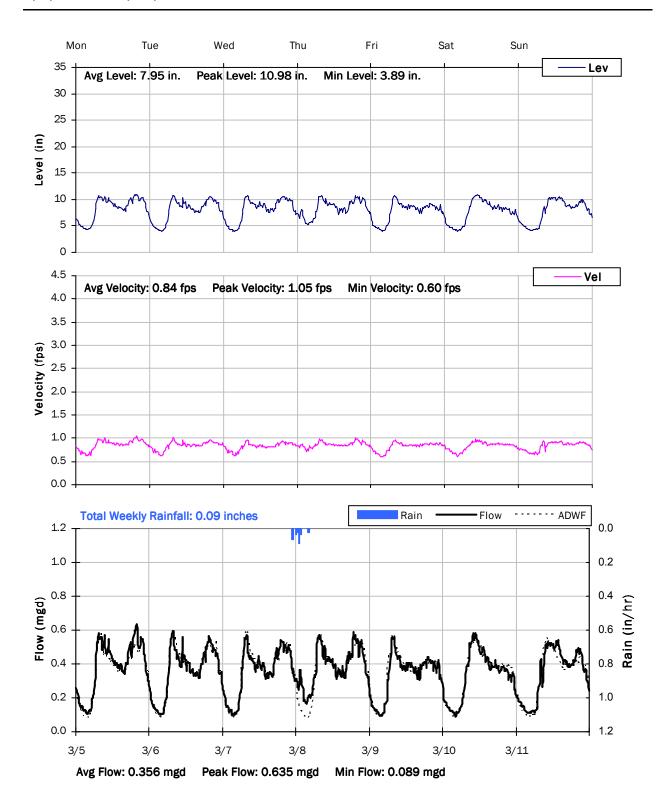
 Total I/I:
 1,705,000 gallons

Peak Level: 53.97 *in* **d/D Ratio:** 3.60

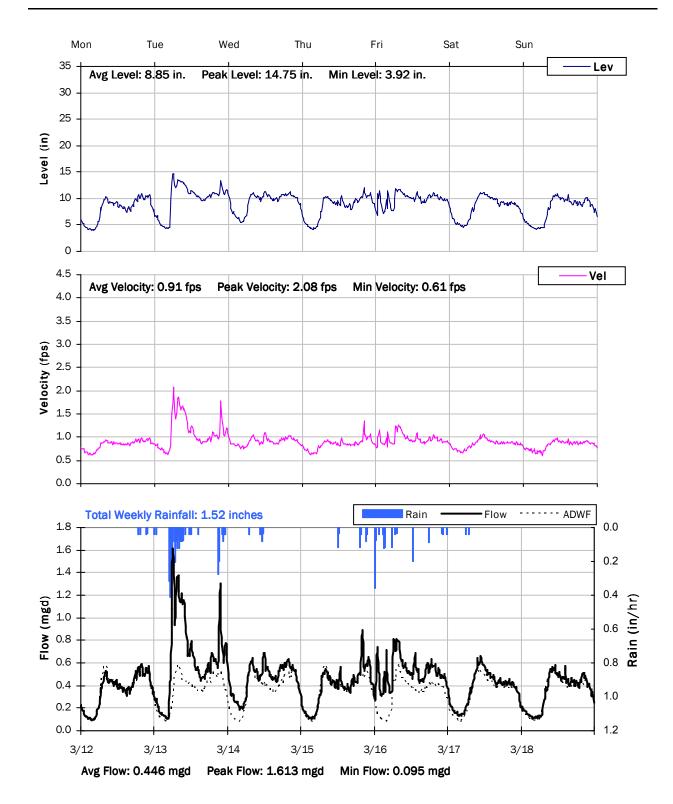
SITE 11 Weekly Level, Velocity and Flow Hydrographs 2/26/2018 to 3/5/2018



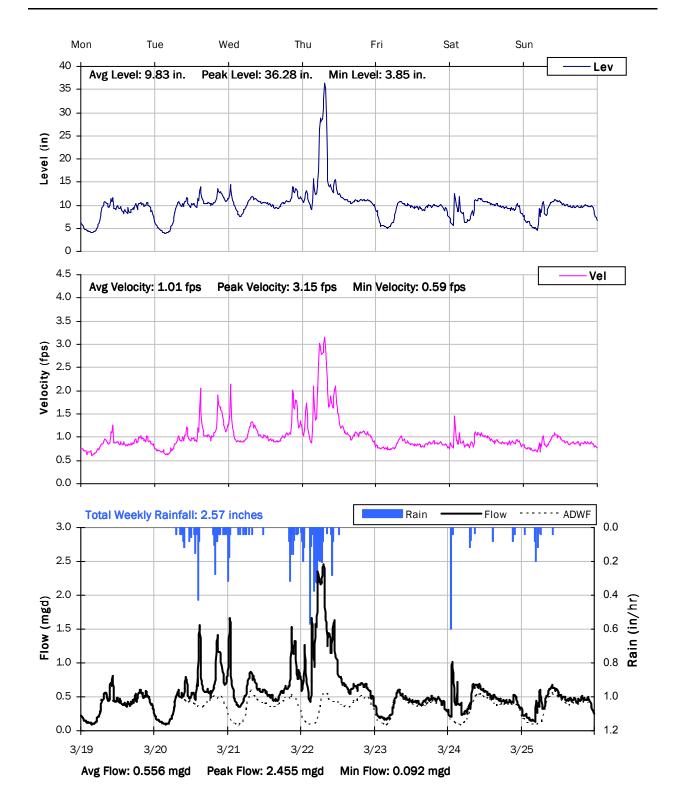
SITE 11 Weekly Level, Velocity and Flow Hydrographs 3/5/2018 to 3/12/2018



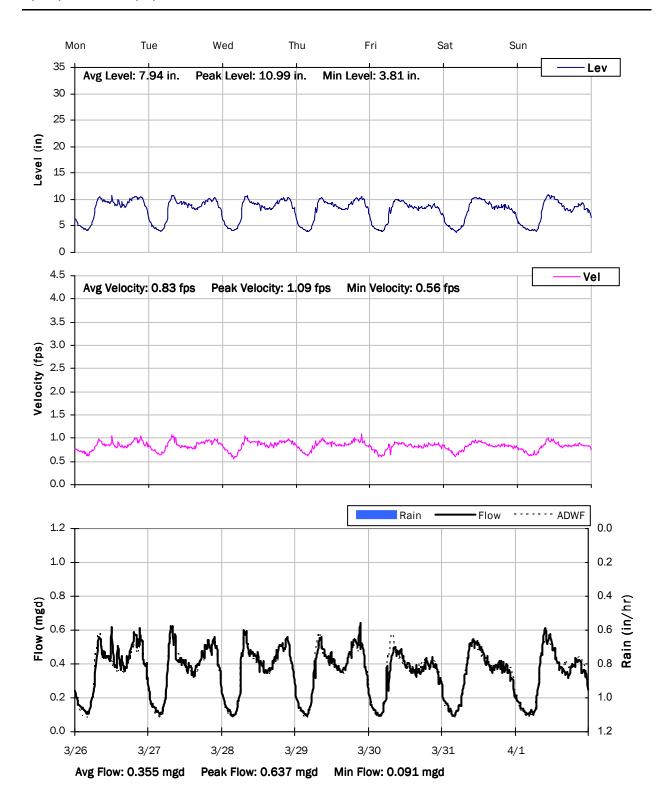
SITE 11 Weekly Level, Velocity and Flow Hydrographs 3/12/2018 to 3/19/2018



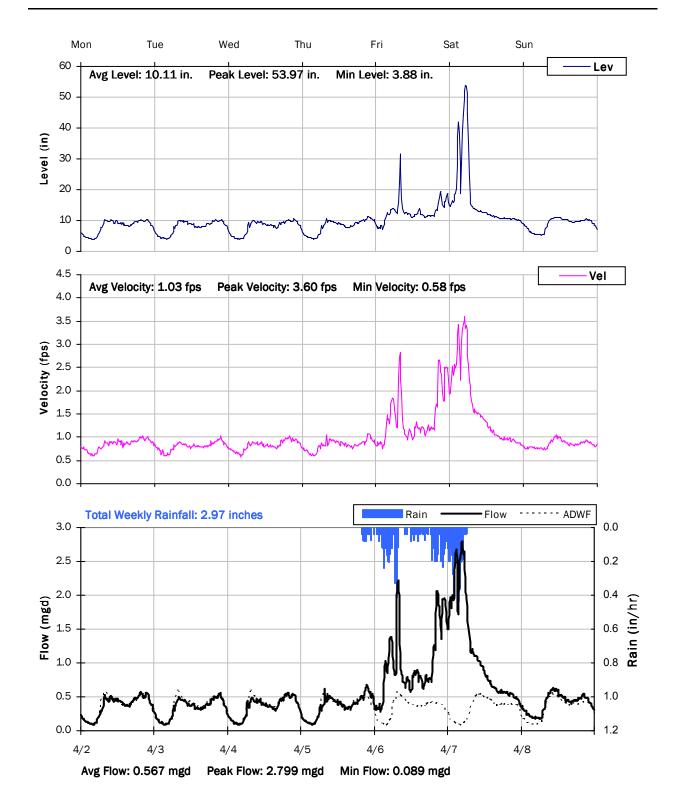
SITE 11 Weekly Level, Velocity and Flow Hydrographs 3/19/2018 to 3/26/2018



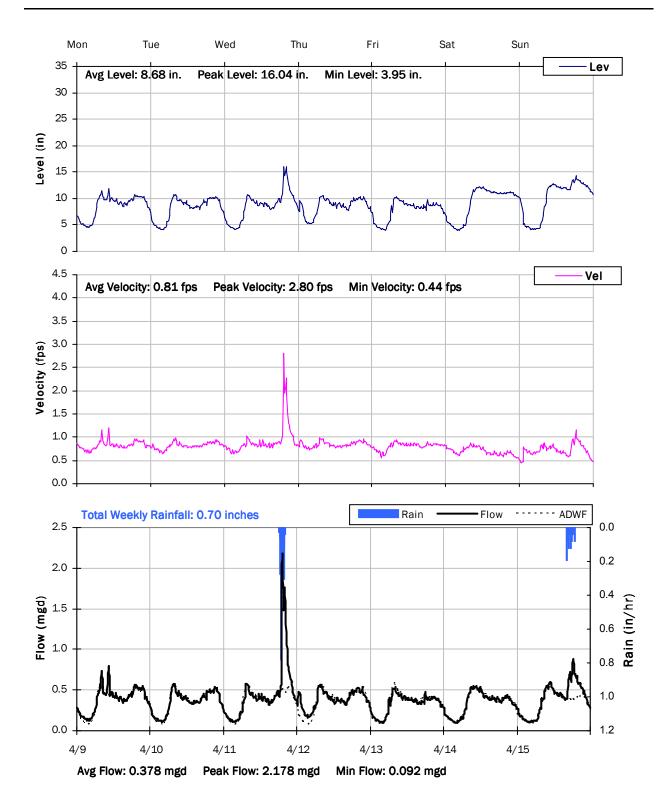
SITE 11 Weekly Level, Velocity and Flow Hydrographs 3/26/2018 to 4/2/2018



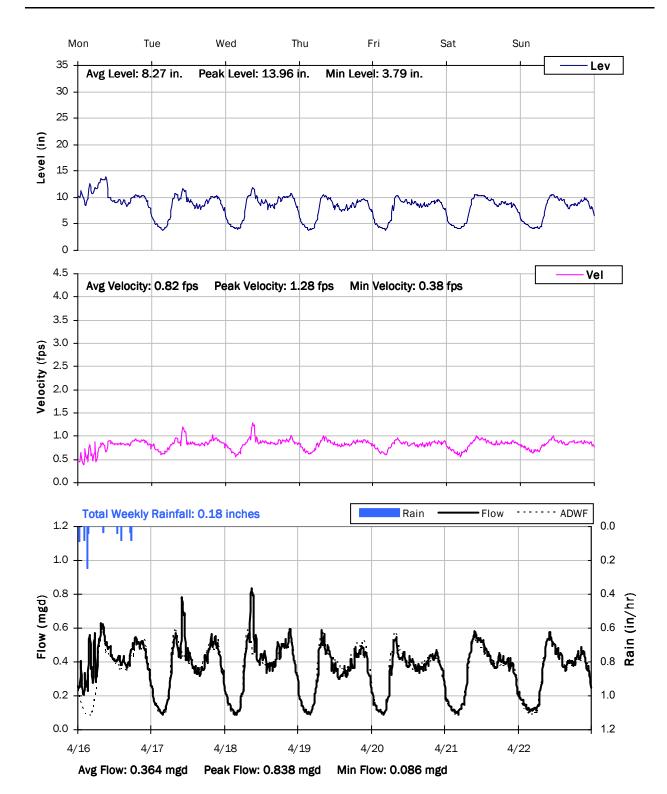
SITE 11 Weekly Level, Velocity and Flow Hydrographs 4/2/2018 to 4/9/2018



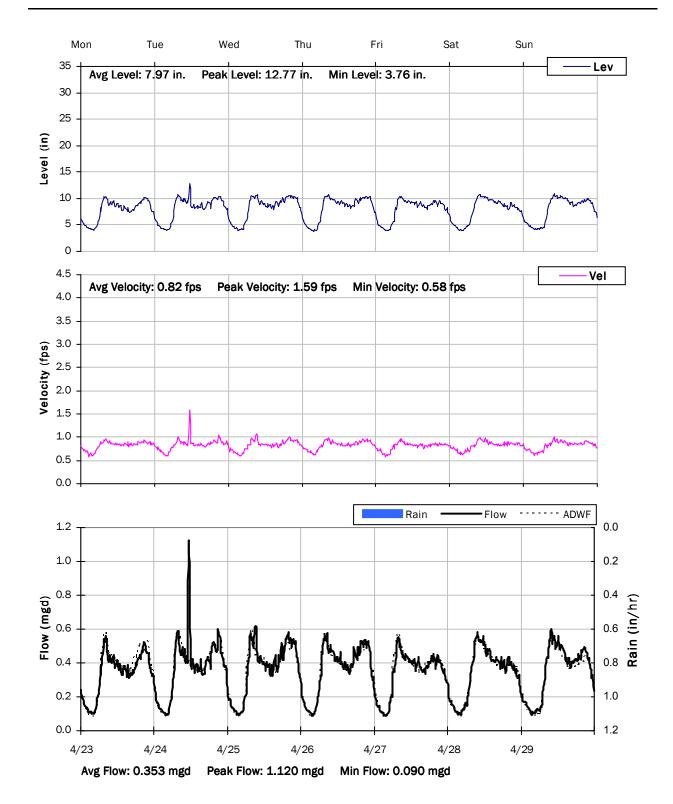
SITE 11 Weekly Level, Velocity and Flow Hydrographs 4/9/2018 to 4/16/2018



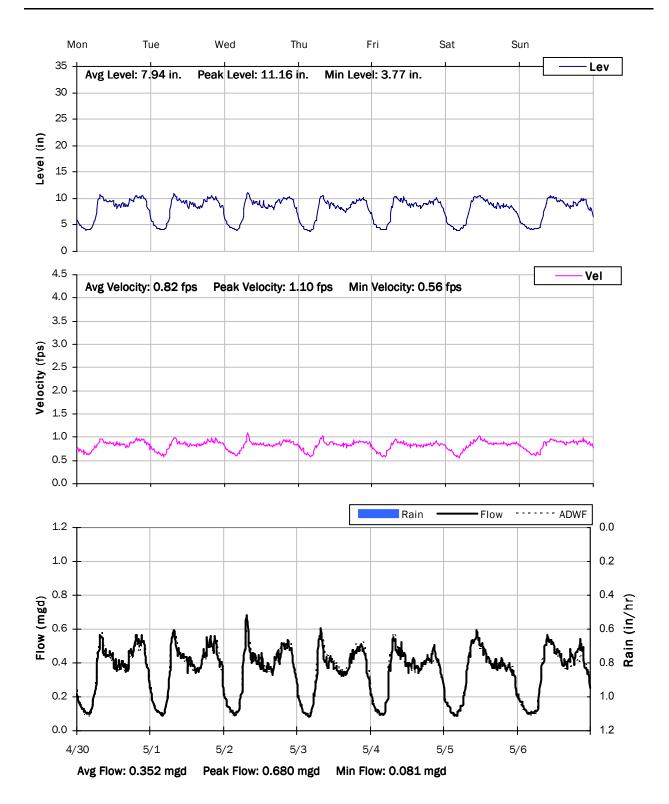
SITE 11 Weekly Level, Velocity and Flow Hydrographs 4/16/2018 to 4/23/2018



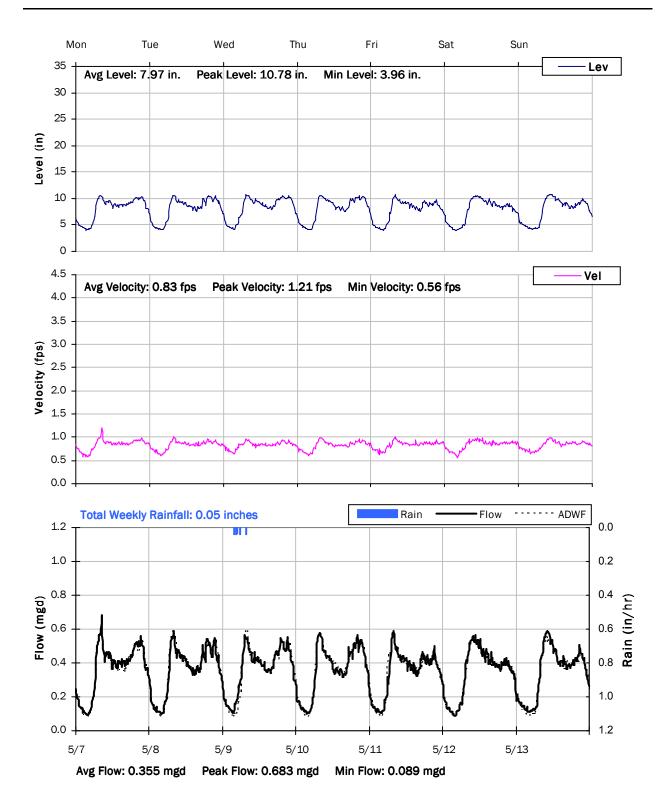
SITE 11 Weekly Level, Velocity and Flow Hydrographs 4/23/2018 to 4/30/2018



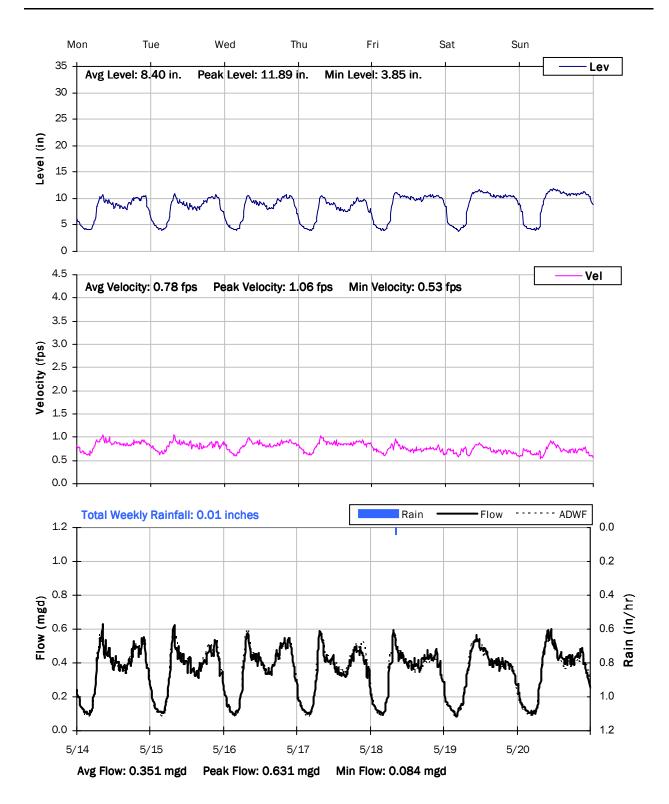
SITE 11 Weekly Level, Velocity and Flow Hydrographs 4/30/2018 to 5/7/2018



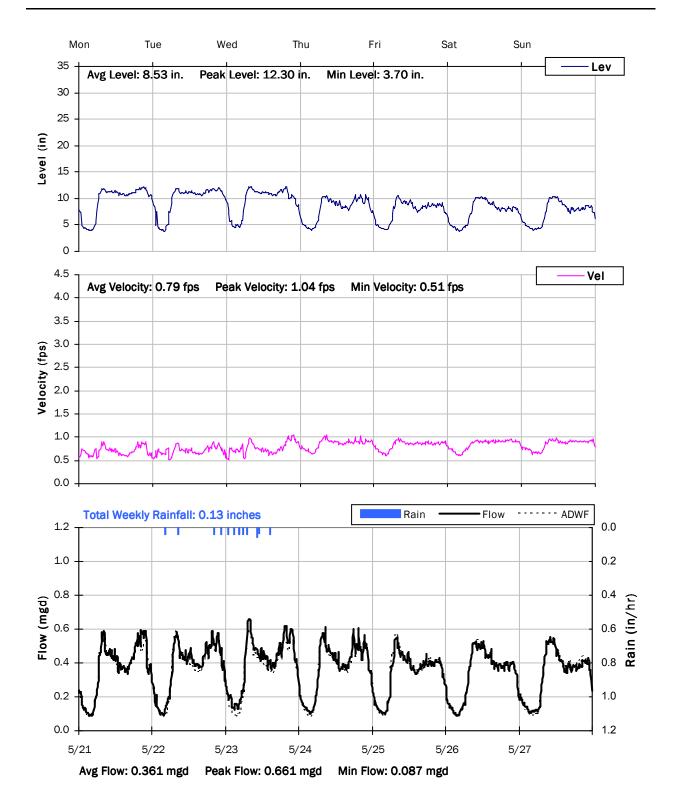
SITE 11 Weekly Level, Velocity and Flow Hydrographs 5/7/2018 to 5/14/2018



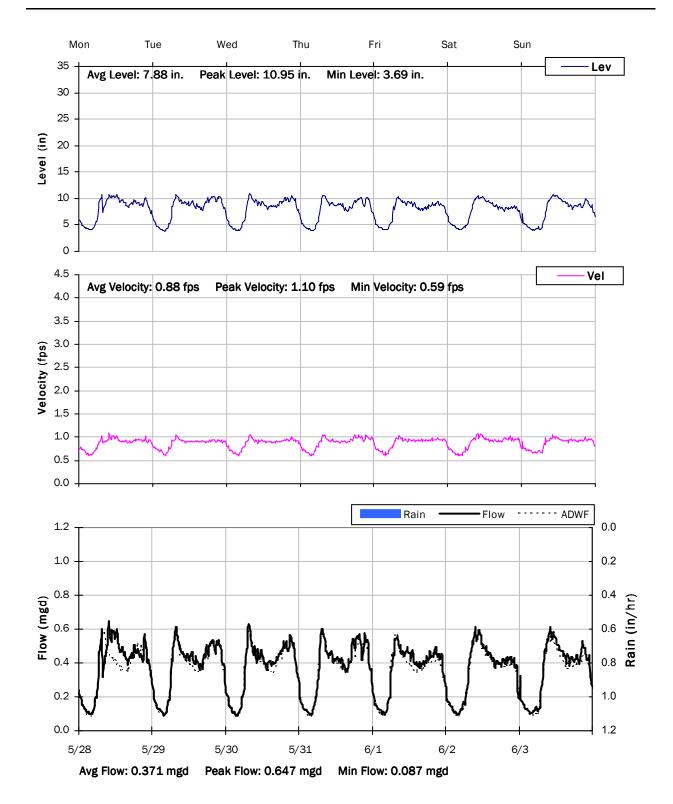
SITE 11 Weekly Level, Velocity and Flow Hydrographs 5/14/2018 to 5/21/2018



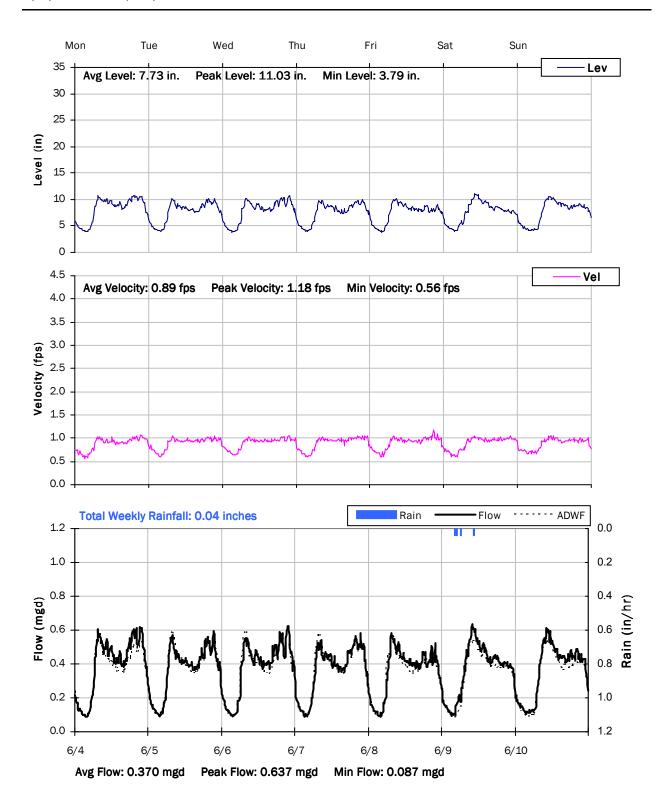
SITE 11 Weekly Level, Velocity and Flow Hydrographs 5/21/2018 to 5/28/2018



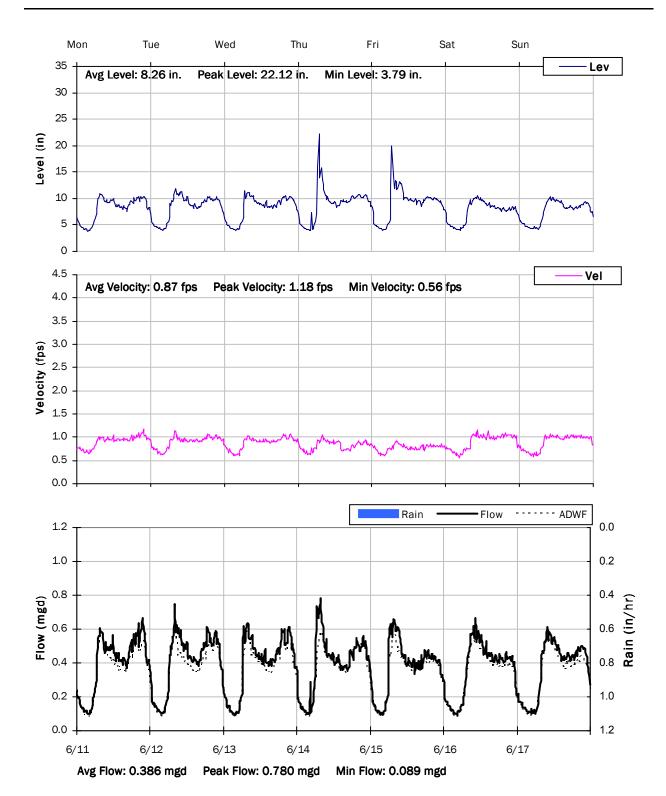
SITE 11 Weekly Level, Velocity and Flow Hydrographs 5/28/2018 to 6/4/2018



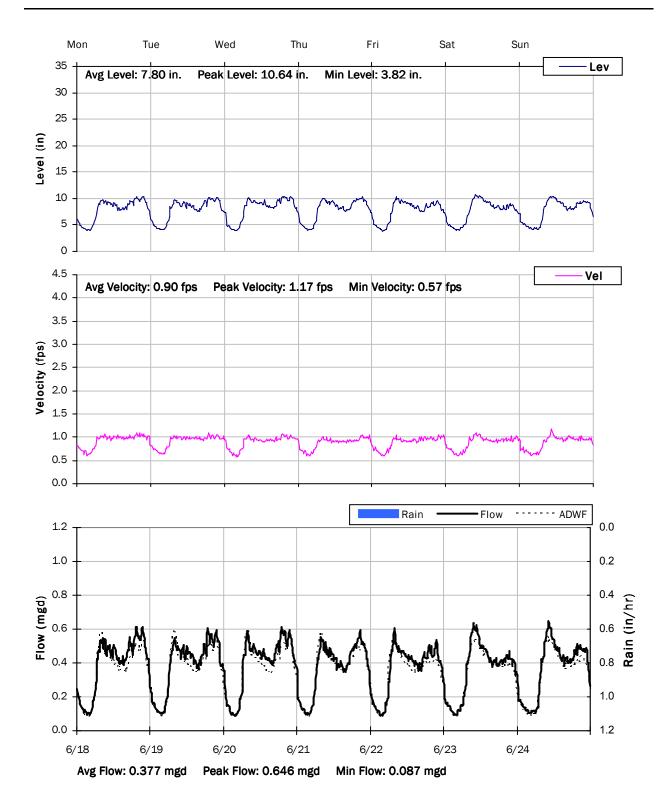
SITE 11 Weekly Level, Velocity and Flow Hydrographs 6/4/2018 to 6/11/2018



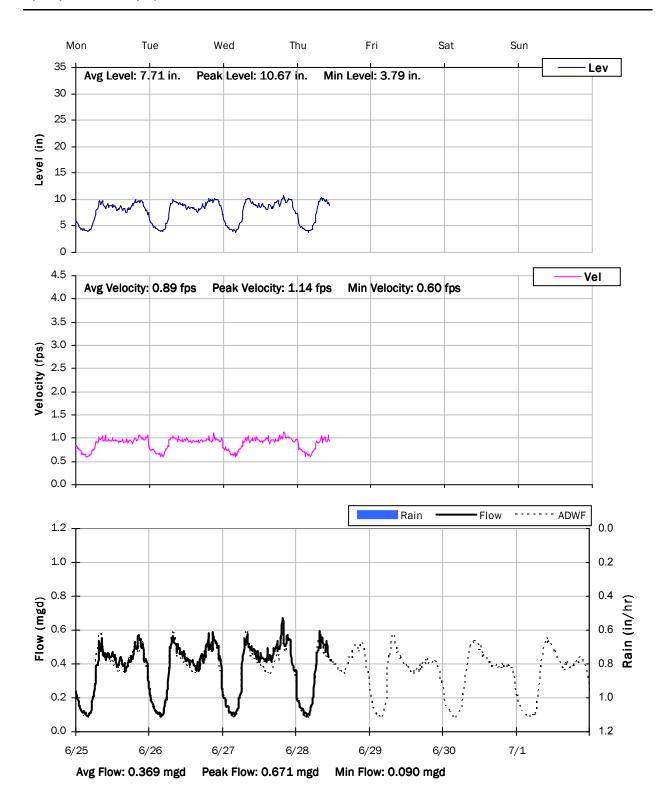
SITE 11 Weekly Level, Velocity and Flow Hydrographs 6/11/2018 to 6/18/2018



SITE 11 Weekly Level, Velocity and Flow Hydrographs 6/18/2018 to 6/25/2018



SITE 11 Weekly Level, Velocity and Flow Hydrographs 6/25/2018 to 7/2/2018



APPENDIX B

Manhole Survey Program

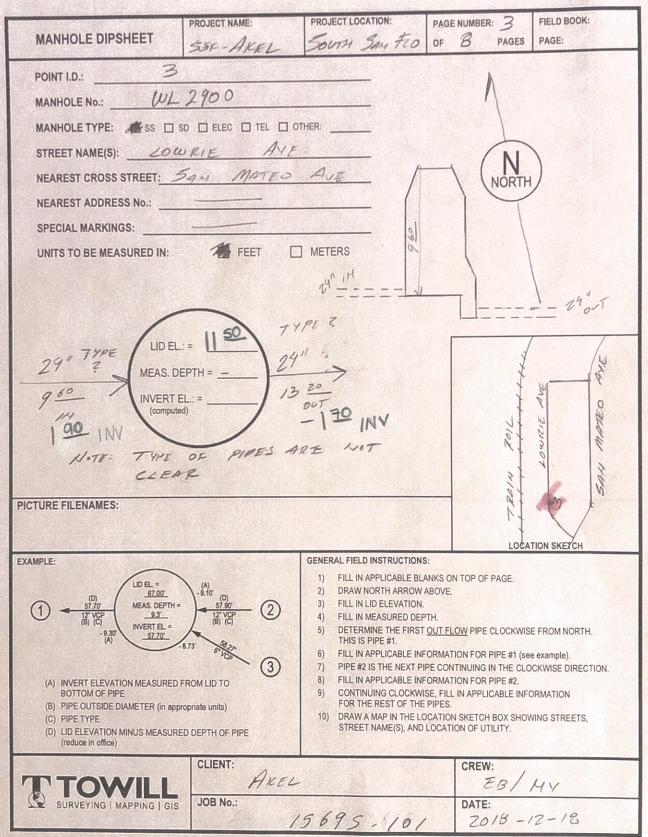
MANHOLE DIPSHEET	PROJECT NAME:	PROJECT LOCATION:	PAGE NUMBER: 7 OF PAGES	FIELD BOOK:
POINT I.D.: MANHOLE No.: MANHOLE TYPE: SS EPSE STREET NAME(S): NEAREST CROSS STREET: NEAREST ADDRESS No.: SPECIAL MARKINGS: UNITS TO BE MEASURED IN:	FEET	OTHER:S	NEED VO	
<i>[</i>	PTH =			
(A) INVERT ELEVATION MEASURED FR BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in approp	OM LID TO priate units) DEPTH OF PIPE	2) DRAW NORTH ARROW 3) FILL IN LID ELEVATION. 4) FILL IN MEASURED DEI 5) DETERMINE THE FIRST THIS IS PIPE #1. 6) FILL IN APPLICABLE INI 7) PIPE #2 IS THE NEXT P 8) FILL IN APPLICABLE INI 9) CONTINUING CLOCKW FOR THE REST OF THE 10) DRAW A MAP IN THE LO	S: ANKS ON TOP OF PAGE. ABOVE. PTH. OUT FLOW PIPE CLOCKWIS FORMATION FOR PIPE #1 (so IPE CONTINUING IN THE CLO FORMATION FOR PIPE #2. SE, FILL IN APPLICABLE INF IPIPES. DICATION SKETCH BOX SHO LOCATION OF UTILITY.	ee example). OCKWISE DIRECTION. ORMATION
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POINT I.D.:					
MANHOLE No.: WL2	683			ļ	
MANHOLE TYPE: 🗖 ss 🗆 s	D C ELEC TEL CO	THER:		Ď	
STREET NAME(S): 5, L	INDEN NE				
NEAREST CROSS STREET: 설	. CANAL ST.			(NC	NORTH)
NEAREST ADDRESS No.: 4	8 S. LINDEN	₩ €		(,,,	
SPECIAL MARKINGS: "C)	TY OF SAH MA	TEO"			
UNITS TO BE MEASURED IN: -75 LID EL.:	FEET D	METERS			<i>N</i> . 6
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in the second se					VOCATION SKETCH
EXAMPLE:		GENERAL FIEL	D INSTRUCTIONS		<u>Patrio de de la compansación de la</u>
(D) 57.70' MEAS. DEPTH =	(A) -9.10' (D) -57.90' (B) (C) 12' VCP (B) (C)	2) DRAW 3) FILL IN 4) FILL IN 5) DETER THIS IS 6) FILL IN	NORTH ARROW A LID ELEVATION. MEASURED DEPT MINE THE FIRST (E PIPE #1. APPLICABLE INFO	TH. OUT FLOW PIPE CLOC DRMATION FOR PIPE	CKWISE FROM NORTH.
 (A) INVERT ELEVATION MEASURED FF BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in approj (C) PIPE TYPE (D) LID ELEVATION MINUS MEASURED (reduce in office) 	8) FILL IN 9) CONTI FOR TI 10) DRAW	APPLICABLE INFO NUING CLOCKWIS HE REST OF THE F A MAP IN THE LOO	ORMATION FOR PIPE : E, FILL IN APPLICABLI PIPES. CATION SKETCH BOX OCATION OF UTILITY.	#2. E INFORMATION SHOWING STREETS,	
	CLIENT:			CREW:	1 00
'S'IOWILL	JOB No.:	so, sp		DATE:	/ CP
SURVEYING MAPPING GIS	15695-1	01			8-12-28

MANHOLE DIPSHEET	PROJECT NAME:	PROJECT LOCAT		PAGE NUMBER:	43	FIELD BOOK:
MANITOLL DII GIILLE	AKEL	33, 3, ,	, L r	OF	PAGES	PAGE:
POINT I.D.:			ı			
MANHOLE No.: WL 2714	4		ı			
MANHOLE TYPE: ☑ SS 🗆 S	SD _ ELEC _ TEL _ (OTHER:			4	
STREET NAME(S):	NON RD-					\
NEAREST CROSS STREET:	Control of the Contro			(_N	IN IORTH	
NEAREST ADDRESS No.:)24 MISION RD	>				/
SPECIAL MARKINGS:	SANITARY SEWER	11				
UNITS TO BE MEASURED IN:	, 3 FEET C	METERS				
(E) 18"						
-7-						
IS" LIDEL.	:= 4250					Country
2540 MEAS. DE	EPTH = <u>- 8°</u>				\ *	OFFICE
INVERT E	EL.: = 34 ⁵⁰					# 1024_
(computed	:11) #	3 CLAY				
	1	∽			18	
	,	ωσ <u>-</u> ν				
DIOTI IDE EU EN ANTO.		.8º 34 <u>50</u>	IN7		,	100
PICTURE FILENAMES:						
					LOCAT	TION SKETCH
EXAMPLE:		GENERAL FIELD IN			~==	
(D) LID EL. = 67.00°	-9.10° (D)	2) DRAW NOT	RTH ARROW A	ANKS ON TOP OF PA ABOVE.	√GE.	
57.70' MEAS, DEPTH = 12' VCP 9.3') 57,90' 2	4) FILL IN ME	DELEVATION. EASURED DEP			
-9.30' 57.70'		THIS IS PIP	PE #1.	OUT FLOW PIPE CLO		
	8.73	7) PIPE #2 IS	THE NEXT PIF	ORMATION FOR PIP PE CONTINUING IN T	THE CLOC	
(A) INVERT ELEVATION MEASURED F BOTTOM OF PIPE		9) CONTINUIN	ING CLOCKWIS	ORMATION FOR PIP SE, FILL IN APPLICA		RMATION
(B) PIPE OUTSIDE DIAMETER (in appro (C) PIPE TYPE	opriate units)	FOR THE R	REST OF THE I MAP IN THE LO	PIPES. CATION SKETCH BC	X SHOWI	
(D) LID ELEVATION MINUS MEASUREI (reduce in office)	D DEPTH OF PIPE	STREET NA	AME(S), AND L	LOCATION OF UTILIT	ľY.	
	CLIENT:	~	_	CREW:	1	2 F
TOWILL	CITY	/ OF So. 3	SF) M /	CY
SURVEYING MAPPING GIS	JOB No.: 15695	- 101		DATE: 2	018/	12/28

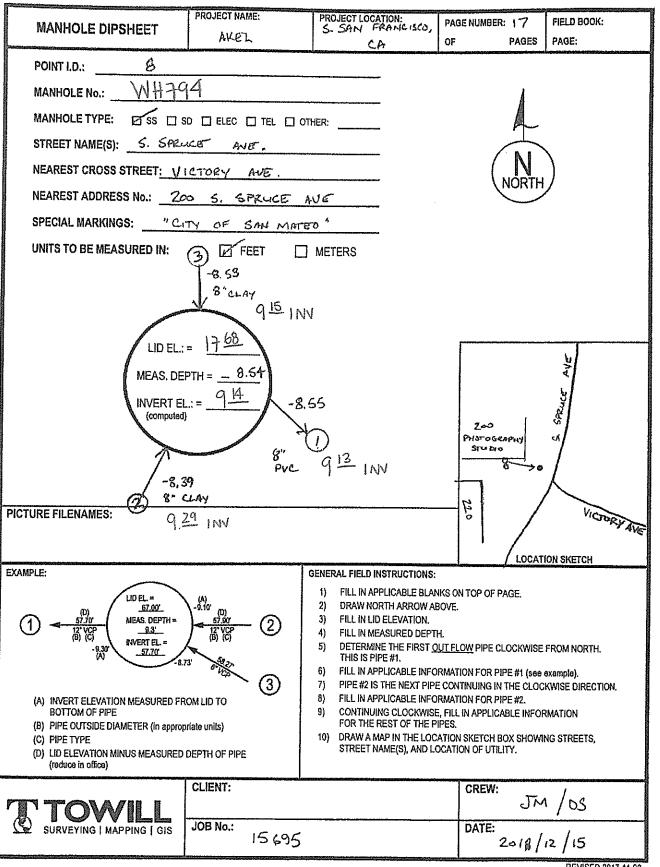
MANHOLE DIPSHEET	PROJECT NAME: AKEL	PROJECT LOCATION:	PAGE NUMBER: 44 OF PAGES	FIELD BOOK: PAGE:	
POINT I.D.:				ANCESCO CONTRACTOR OF THE STATE	
MANHOLE No.: WLZ74	4				
MANHOLE TYPE: SS 🗆 SI	D CELEC TEL OT	HER:	A		
STREET NAME(S): M	ON RD.	-		\	
NEAREST CROSS STREET:					
NEAREST ADDRESS No.: 102	4 MISSION RD	<u>. </u>	NORTH		
SPECIAL MARKINGS: "SAN	ITARY SEWER "				
UNITS TO BE MEASURED IN:	FEET [METERS			
CLM 35 INV LID EL.: MEAS. DEI INVERT EL (computed) 8'' CLAY 2 - 6 - F PICTURE FILENAMES: 36 35	PTH = -74 = 35	35 ³⁵ IW		TION SKETCH	
EXAMPLE:		GENERAL FIELD INSTRUCTIONS		TION SKETCH	
(A) INVERT ELEVATION MEASURED FF BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in approject) (C) PIPE TYPE (D) LID ELEVATION MINUS MEASURED (reduce in office)	OM LID TO	THIS IS PIPE #1. 6) FILL IN APPLICABLE INF. 7) PIPE #2 IS THE NEXT PIF. 8) FILL IN APPLICABLE INF. 9) CONTINUING CLOCKWIS FOR THE REST OF THE.	ABOVE. TH. OUT FLOW PIPE CLOCKWIS ORMATION FOR PIPE #1 (se PE CONTINUING IN THE CLO ORMATION FOR PIPE #2. SE, FILL IN APPLICABLE INFO PIPES. CATION SKETCH BOX SHOW	e example). OCKWISE DIRECTION. ORMATION	
	CLIENT:	5 SO. SF	CREW:	100	
SURVEYING MAPPING GIS	JOB No.: 15695		DATE: 2018	/cp /12/28	

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MANHOLE DIPSHEET	PROJECT NAME:	PROJECT LOCATION: So.SF, CA	PAGE NUMBER: 9	FIELD BOOK:
	// ~	30.57, 414	OF PAGES	PAGE:
POINT I.D.: 2	- C			
MANHOLE No.: WL26	.99		á	
MANHOLE TYPE: SS SS	ELEC TEL OTI	HER:	4	
STREET NAME(S): S. LIA	IDEN AVE			\
NEAREST CROSS STREET: S.	CANAL ST.		(NORTH)
NEAREST ADDRESS No.:	69 S. LINDEN	445		/
SPECIAL MARKINGS: "	S ''	***************************************		
UNITS TO BE MEASURED IN:	FEET	METERS		
	6	TULL OF		
LID EL.:	= 914 WA	TER. PLUGGED?		1 7
MEAS. DEP	PTH = 6 ²		S. C.Wa. S.	. /
INIVEDT EI	:= 204		# P	L //w D BT.Y. A V.E.
(computed)			10 vi	18
			"PENSKE" V	;
				/ इ.८३
			<i></i>	
PICTURE FILENAMES:			<u> </u>	10
			<i> </i>	/
				ION SKETCH
EXAMPLE:		GENERAL FIELD INSTRUCTIONS: 1) FILL IN APPLICABLE BLA		
(D) LID EL. = 67.00'	(A) -9.10' (D)	2) DRAW NORTH ARROW A		
57.70' MEAS. DEPTH = 9.3') = 10 (D) 57.90' 12' VCP (B) (C)	3) FILL IN LID ELEVATION.4) FILL IN MEASURED DEPT	н.	
9.30' (A) NVERT EL. =		5) DETERMINE THE FIRST (THIS IS PIPE #1.	DUT FLOW PIPE CLOCKWISE	FROM NORTH.
.0,1	° 1/2	6) FILL IN APPLICABLE INFO	DRMATION FOR PIPE #1 (see	example). :KWISE DIRECTION.
(A) INVERT ELEVATION MEASURED FROM LID TO 7) PIPE #2 IS THE NEXT PIPE CONTINUING IN THE CLOCKWISE DIRECTIO 8) FILL IN APPLICABLE INFORMATION FOR PIPE #2.				
BOTTOM OF PIPE 9) CONTINUING CLOCKWISE, FILL IN APPLICABLE INFORMATION (B) PIPE OUTSIDE DIAMETER (in appropriate units) FOR THE REST OF THE PIPES.				
(C) PIPE TYPE (D) LID ELEVATION MINUS MEASURED DEPTH OF PIPE 10) DRAW A MAP IN THE LOCATION SKETCH BOX SHOWING STREETS, STREET NAME(S), AND LOCATION OF UTILITY.				
(reduce in office)	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
	CLIENT:	S.m.	JM/CD	
', 'IOWILL	CITY OF SO	. <i>U</i> r	DATE:	
SURVEYING MAPPING GIS	15695-101		2018-12	- 28



MANHOLE DIPSHEET	PROJECT NAME: AKEL	PROJECT LOCA		PAGE NUMBER: 10 OF PAGES	FIELD BOOK: PAGE:	
POINT I.D.: 5				Î		
MANHOLE No.: WL 811						
MANHOLE TYPE: 🗹 ss 🗆 si	D C ELEC TEL OT	HER:		4		
STREET NAME(S): S. N	MAPLE AVE			, NI		
NEAREST CROSS STREET: V	ICTORY AVE.	×į		(NORTH	₁)	
NEAREST ADDRESS No.: 263	S. MAPLE A	18.			7	
SPECIAL MARKINGS:	5"					
UNITS TO BE MEASURED IN:	▼ FEET □	METERS				
	-					
		ull of Water.				
LID EL.:	= 142	_				
MEAS. DEI	DTU 050 18	racced ;			1 32	
INVERT FI	:= <u>597</u>	ibno s			1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	
(computed)						
					/	
				1 / 2 5:	a Duy	
				- And Market	263	
PICTURE FILENAMES:				1/2	(Converce) of	
				/ /		
EXAMPLE:		GENERAL FIELD I	NSTRUCTIONS		TION SKETCH	
LID EL.=				NKS ON TOP OF PAGE.		
(D) 67.00' 57.70' MEAS. DEPTH =	-9.10' (D) 57.90' (2)	•	ORTH ARROW A DELEVATION.	BOVE.		
12 VCP (B) (C) 12 NVERT EL. =	57.90' 12'VCP (6) (C)	•	EASURED DEPT		T FLOW PIPE CLOCKWISE FROM NORTH.	
-9.30° 57.70° -8	73' 6" 27.	THIS IS P	IPE #1.	ORMATION FOR PIPE #1 (se		
	3	7) PIPE #2 IS	THE NEXT PIP	E CONTINUING IN THE CLO		
BOTTOM OF PIPE 9) CONTI			ING CLOCKWIS	ORMATION FOR PIPE #2. E, FILL IN APPLICABLE INFO	DRMATION	
(C) PIPE TYPE 10) DRAW			REST OF THE I MAP IN THE LO	CATION SKETCH BOX SHOV	VING STREETS,	
(D) LID ELEVATION MINUS MEASURED (reduce in office)	DEPTH OF PIPE	STREET	IAME(S), AND L	OCATION OF UTILITY.		
	CLIENT:		•	CREW: ,		
TTOWILL	CITY OF	විත. SF		JM/e		
SURVEYING MAPPING GIS	JOB No.: 15695-1	01		DATE: 2018/1		

MANHOLE DIPSHEET	PROJECT NAME: AKEL	PROJECT LOCATION:	PAGE NUMBER: 29	FIELD BOOK:	
	PRIME to		OF PAGES	PAGE:	
POINT I.D.:					
MANHOLE No.: WL795)				
MANHOLE TYPE: FS S S	D C ELEC TEL C	THER:	7		
STREET NAME(S): VIC	tory and	······································	NI		
NEAREST CROSS STREET: 5	. SPRUCE AND	-	(NORT	н)	
NEAREST ADDRESS No.: 2d		7			
SPECIAL MARKINGS:	NA				
UNITS TO BE MEASURED IN:	FEET 🗆	METERS			
3) 18"CLAY					
865 INV LIDEL					
LID EL.:	= 15 =			/ /	
MEAS. DE	$PTH = \underline{-6^{\frac{5}{2}}}$				
INVERT E	L:= 866	-6 ⁸		· · · · · · · · · · · · · · · · · · ·	
(computed		€ 8 36 IW			
MIGHT BE MOTHER 13		→ 0		Vic-	
"14".	2	'T SEE	OK S. L. C.	VICTORY AVE	
CAN SEE.	((2)	PE, UNDER COLL		S	
PICTURE FILENAMES:			// vi/		
			100	TACK IN THE BOX	
EXAMPLE:		GENERAL FIELD INSTRUCTION			
LID EL =	(A) -9.10' (7))	FILL IN APPLICABLE DRAW NORTH ARRO	BLANKS ON TOP OF PAGE. DW ABOVE.		
(0) 67.00' MEAS. DEPTH =	67.90	3) FILL IN LID ELEVATION. 4) FILL IN MEASURED DEPTH. 5) DETERMINE THE FIRST <u>OUT FLOW</u> PIPE CLOCKWISE FROM NORTH.			
12° VCP (B) (C) -9.30° INVERT EL. = -57.70°	[18 YOP]				
(A)	(3)	THIS IS PIPE #1. 6) FILL IN APPLICABLE 7) PIPE #2 IS THE NEX	INFORMATION FOR PIPE#1 (see example).	
(A) IMMERT ELEMATION MENCHOLO E	T PIPE CONTINUING IN THE C INFORMATION FOR PIPE #2.				
BOTTOM OF PIPE 9) CONTINUING C			KWISE, FILL IN APPLICABLE IN THE PIPES.		
(B) PIPE OUTSIDE DIAMETER (in appro (C) PIPE TYPE		10) DRAW A MAP IN THE	ELOCATION SKETCH BOX SHO ND LOCATION OF UTILITY.	OWING STREETS,	
(D) LID ELEVATION MINUS MEASURED (reduce in office)	DEPTH OF PIPE	2			
	CLIENT:	c. ^2	CREW:	lap	
	CITY OF	5a, SP	JM /		
TOWILL Surveying, Mapping	JOB No.: 15695 - 1	101	2018	12 /28	



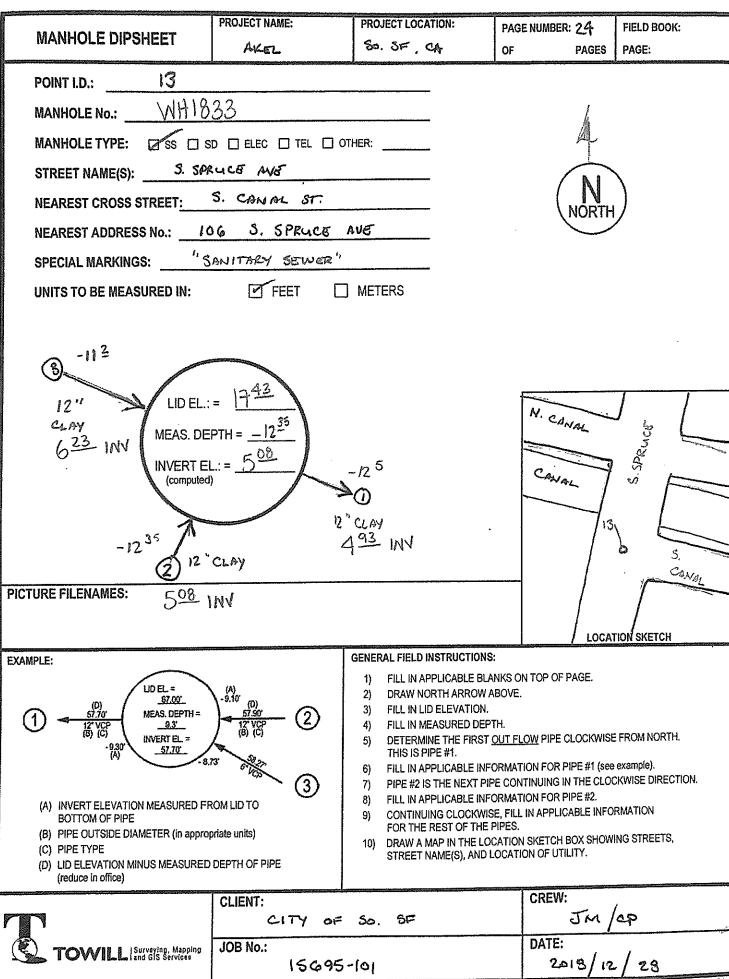
A CONTRACTOR OF THE PROPERTY O				
MANHOLE DIPSHEET	PROJECT NAME:	PROJECT LOCATION:	PAGE NUMBER: 28 OF PAGES	FIELD BOOK: PAGE:
POINT I.D.: 9			enemeleki kiriliyi iki kirili mashara sasansa yarra ca cirin ku ma'isha mismalari	
MANHOLE No.: WL790)		1	
MANHOLE TYPE: SS SS SI		HER:	4	
STREET NAME(S): S. SPR	uce		N	\
NEAREST CROSS STREET: V	CTORY AVE	<u></u>	(NORTH	1)
NEAREST ADDRESS No.: 245	s. spenes and	· · · · · · · · · · · · · · · · · · ·		
SPECIAL MARKINGS:	S"			
MEAS. DEI INVERT EL (computed) -87	$= \frac{18^{23}}{948}$ $= \frac{18^{23}}{953}$ $= \frac{953}{18}$	CAN'T PETERMINE PIPE SIZES (RECESSE APPETAS TO BE REDUCED TO A SMALLER DIA DUNI STREAM.	TO EL J COMINO REPL	YICTORY YICTORY TON SKETCH
EXAMPLE:		GENERAL FIELD INSTRUCTIONS	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	HON GILLION
(A) INVERT ELEVATION MEASURED FR BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in approp	OM LID TO	THIS IS PIPE #1. 6) FILL IN APPLICABLE INFO 7) PIPE #2 IS THE NEXT PIF 8) FILL IN APPLICABLE INFO 9) CONTINUING CLOCKWIS FOR THE REST OF THE I	TH. OUT FLOW PIPE CLOCKWIS ORMATION FOR PIPE #1 (See THE CONTINUING IN THE CLO ORMATION FOR PIPE #2. IE, FILL IN APPLICABLE INFO	e example). CKWISE DIRECTION. DRMATION
(C) PIPE TYPE (D) LID ELEVATION MINUS MEASURED	DEPTH OF PIPE	10) DRAW A MAP IN THE LOG STREET NAME(S), AND L	OCATION OF UTILITY.	
(reduce in office)	l cuent.		CREW:	
	CLIENT: CITY OF SO	s. SF	JM /	<u>.</u>
TOWILL Surveying, Mapping and GIS Bervices	JOB No.: 15695-1	01	DATE: 20/8 / 1	2/28

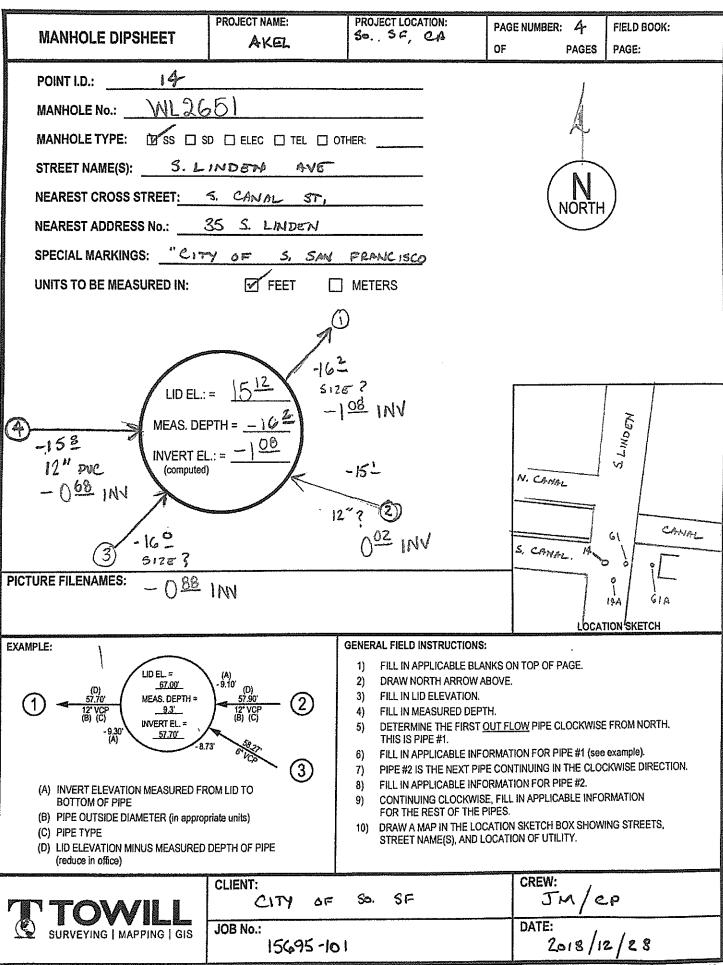
MANHOLE DIPSHEET	PROJECT NAME:	PROJECT LOCATION:	PAGE NUMBER:	FIELD BOOK:
	AKEL	5. 3/74 PENNETO	OF PAGES	PAGE:
POINT I.D.: 10	<u>Q</u>			
MANHOLE No.: WH 77		****		
MANHOLE TYPE: ☑ S □ S		HER:		
STREET NAME(S): S. SPRU			NI	
NEAREST CROSS STREET:			(NORTH	1)
NEAREST ADDRESS No.:		•		
SPECIAL MARKINGS:	ATAX FOUNDRY"			
, a	$PTH = \frac{7.66}{24}$ $A = \frac{12}{2}$	METERS PE?) INV	Aic	1281
EXAMPLE; (D) (D) (Example) (D) (D) (Example) (D) (Example) (Example) (D) (Example) (Exa	-9.10' (D) -57.80' (D) -12' VOP (B) (C)	ENERAL FIELD INSTRUCTIONS: 1) FILL IN APPLICABLE BLAN 2) DRAW NORTH ARROW AB 3) FILL IN LID ELEVATION. 4) FILL IN MEASURED DEPTH 5) DETERMINE THE FIRST OF THIS IS PIPE #1.	IKS ON TOP OF PAGE. OVE.	
(A) INVERT ELEVATION MEASURED FR BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in approp (C) PIPE TYPE (D) LID ELEVATION MINUS MEASURED (reduce in office)	OM LID TO riate units)	6) FILL IN APPLICABLE INFO 7) PIPE #2 IS THE NEXT PIPE 8) FILL IN APPLICABLE INFO 9) CONTINUING CLOCKWISE FOR THE REST OF THE PI 10) DRAW A MAP IN THE LOCK STREET NAME(S), AND LO	I, FILL IN APPLICABLE INFO PES. ATION SKETCH BOX SHOW	CKWISE DIRECTION. RMATION
	CLIENT:		CREW:	1-0
SURVEYING MAPPING GIS	JOB No.: 15 695		DATE: 2018 /1"	2/15

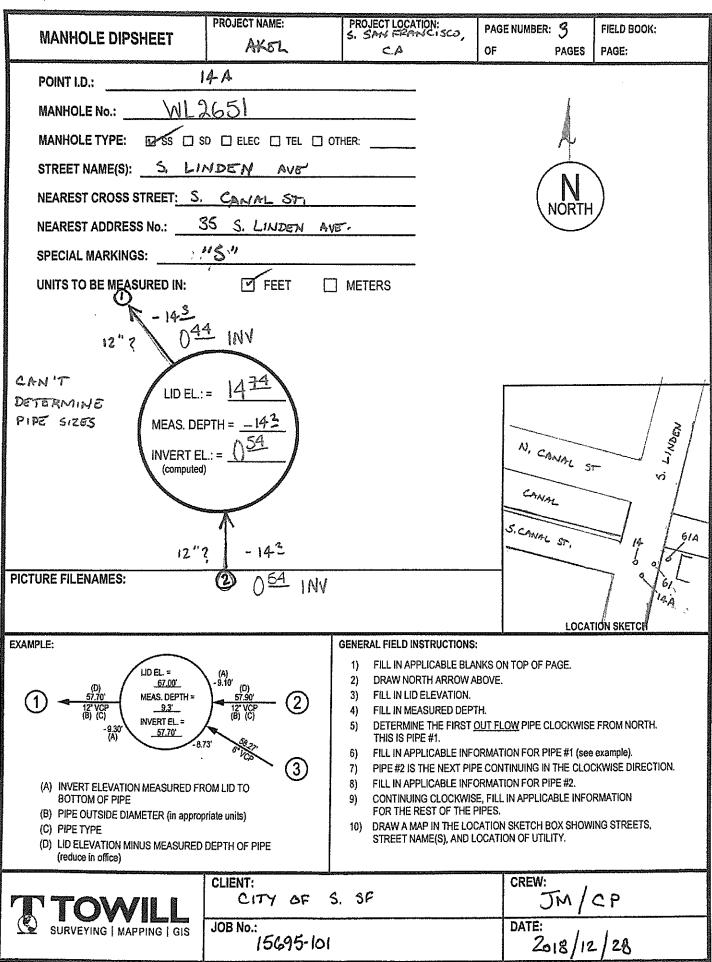
MANHOLE DIPSHEET	PROJECT NAME:	PROJECT LOCATION:	PAGE NUMBER: 2% OF PAGES	FIELD BOOK:
POINT I.D.:			1000	I Adia.
MANHOLE No.: WH6	70	****	1.	
	D	HER:		
STREET NAME(S): HAZE	ZWOOD DE.			
NEAREST CROSS STREET: No	RTHWOOD DR.			
NEAREST ADDRESS No.: 24	9 KENWOOD WA	<u> </u>	NORTH	<i>'</i>
SPECIAL MARKINGS: 10/1	-			
UNITS TO BE MEASURED IN:	FEET 🗆	METERS		
INVERT EI (computed 2 - 7 9 36 39 INV	$= \frac{43^{\frac{79}{4}}}{36}$ $PTH = -\frac{79}{36}$ $L := \frac{36^{\frac{79}{4}}}{36}$	79 IW	HAZZ WOOD DE	SMARTE
(A) INVERT ELEVATION MEASURED FIRE BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in approfice) (C) PIPE TYPE (D) LID ELEVATION MINUS MEASURED (reduce in office)	(A) (D) (D) (ST.90' (E) (C) (E) (C) (E) (C) (C) (C) (C) (C) (C) (C) (C) (C) (C	THIS IS PIPE #1. 6) FILL IN APPLICABLE INF 7) PIPE #2 IS THE NEXT PI 8) FILL IN APPLICABLE INF 9) CONTINUING CLOCKWII FOR THE REST OF THE	ANKS ON TOP OF PAGE. ABOVE. PTH. OUT FLOW PIPE CLOCKWISI ORMATION FOR PIPE #1 (See PE CONTINUING IN THE CLOC ORMATION FOR PIPE #2. SE, FILL IN APPLICABLE INFO PIPES. ECATION SKETCH BOX SHOW	e example). CKWISE DIRECTION. PRMATION
	CLIENT:		CREW:	
TOWILL Surveying, Mapping and GIS Services	CITY OF JOB No.: 15695-		DATE: 2018 /1/	ep 2/28

	PROJECT NAME:	PROJECT LOCATION:	PAGE NUMBER: 6	FIELD BOOK:
MANHOLE DIPSHEET	AKEL	S. SAN FRANCISCO, CA	OF PAGES	PAGE:
POINT I.D.: 12				
MANHOLE No.: WH 75	3			_
MANHOLE TYPE: E SS C	SD BLEC TEL OT	HER:	_	1
STREET NAME(S):			N. I	₹. \
NEAREST CROSS STREET:	FRANCISCO PR		(NOTE	.)
NEAREST ADDRESS No.:	346 EL CORTEZ	<u>A</u> VE	NORTH	
SPECIAL MARKINGS:	'S''	20 1 211		
UNITS TO BE MEASURED IN:	g FEET □	METERS		
PICTURE FILENAMES:	PTH = -6.19	34 INV	ELCATES CHIMAS TO COLUMN TO THE COLUMN TO TH	ION SKETCH
EXAMPLE:	G (A) (D) (D) (12' VCP (2)	ENERAL FIELD INSTRUCTIONS: 1) FILL IN APPLICABLE BLANK	(S ON TOP OF PAGE	
(A) INVERT ELEVATION MEASURED FROM BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in appropriate type) (C) PIPE TYPE (D) LID ELEVATION MINUS MEASURED IN (reduce in office)	2) DRAW NORTH ARROW ABOVE. 3) FILL IN LID ELEVATION. 4) FILL IN MEASURED DEPTH. 5) DETERMINE THE FIRST <u>OUT FLOW</u> PIPE CLOCKWISE FITHIS IS PIPE #1. 6) FILL IN APPLICABLE INFORMATION FOR PIPE #1 (see ex.) 7) PIPE #2 IS THE NEXT PIPE CONTINUING IN THE CLOCK 8. 8) FILL IN APPLICABLE INFORMATION FOR PIPE #2. 9) CONTINUING CLOCKWISE, FILL IN APPLICABLE INFORM FOR THE REST OF THE PIPES. 10) DRAW A MAP IN THE LOCATION SKETCH BOX SHOWING STREET NAME(S), AND LOCATION OF UTILITY.		example), KWISE DIRECTION. MATION	
PARTICIPATED INTERNATIONAL TO A STATE OF THE	CLIENT:		CREW:	
SURVEYING MAPPING GIS	JOB No.: 15695		DATE: 2018/12	./15

MANHOLE DIPSHEET	PROJECT NAME:	PROJECT LOCATION:	PAGE NUMBER: 7 OF PAGES	FIELD BOOK: PAGE:	
POINT I.D.: 12 A - (NEED TO SHOOT?) SHOT / MANHOLE NO.: WH753 MANHOLE TYPE: SS SD SD SELEC TEL OTHER: STREET NAME(S): EL CORTEZ AVE NEAREST CROSS STREET: FRANCISCO DR. NEAREST ADDRESS No.: 348 EL CORTEZ AVE SPECIAL MARKINGS: NJA UNITS TO BE MEASURED IN: FEET METERS					
LID EL.: = 2528 MEAS. DEPTH = _5.89 INVERT EL.: = 1939 (computed) 1 1933 INV PICTURE FILENAMES:					
EXAMPLE: (D) (D) (F) (B) (C) (B) (C) (A) LID EL = (67.00' MEAS. DEPTH = (9.3') (NVERT EL = (57.70' -8.7') -8.7'	(A) -9.10' (D) -57.50' (Z) -12' VCP (B) (C) 3' (A) -9.10' (Z) -12' VCP (B) (C) 3' (A) -9.10' (Z) -12' VCP (B) (C) 3' (A) -12' VCP (B) (C) -13' (A) -13' (A)	THIS IS PIPE #1. 6) FILL IN APPLICABLE INFO 7) PIPE #2 IS THE NEXT PIPE	IKS ON TOP OF PAGE. BOVE. H. <u>UT FLOW</u> PIPE CLOCKWISE RMATION FOR PIPE #1 (see 6 E CONTINUING IN THE CLOCK	example).	
(A) INVERT ELEVATION MEASURED FR 80TTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in approp (C) PIPE TYPE (D) LID ELEVATION MINUS MEASURED I (reduce in office)	9) CONTINUING CLOCKWISE FOR THE REST OF THE P	E, FILL IN APPLICABLE INFOR IPES. ATION SKETCH BOX SHOWIN			
TOWILL SURVEYING MAPPING GIS	CLIENT: JOB No.: 15695		CREW: JM/C DATE: 2018-12	- 15	







PROJECT NAME: PROJECT LOCATION: FIELD BOOK: PAGE NUMBER: 6 **MANHOLE DIPSHEET** So. SF, CA AKEL **PAGES** PAGE: POINT I.D.: 15 MANHOLE No.: WD 2638 MANHOLE TYPE: SS SD SD SELEC TEL OTHER: STREET NAME(S): 5. LINDEN NEAREST CROSS STREET: N. CANAL NEAREST ADDRESS No.: 26 S. LINDEN AVE SPECIAL MARKINGS: UNITS TO BE MEASURED IN: √ FEET LID EL.: = WALK MOT MEAS. DEPTH = SHOT INVERT EL.: = " corte. 36" (computed) 188 IM 15 78 INV W. CANAL PICTURE FILENAMES: LOCATION SKETCH **EXAMPLE: GENERAL FIELD INSTRUCTIONS:** FILL IN APPLICABLE BLANKS ON TOP OF PAGE. LID EL. = 2) DRAW NORTH ARROW ABOVE. 67.00 MEAS, DEPTH = 3) FILL IN LID ELEVATION. 9.3' FILL IN MEASURED DEPTH. 4) INVERTEL. = DETERMINE THE FIRST <u>OUT FLOW</u> PIPE CLOCKWISE FROM NORTH. 57.70 THIS IS PIPE #1. FILL IN APPLICABLE INFORMATION FOR PIPE #1 (see example). 6) PIPE #2 IS THE NEXT PIPE CONTINUING IN THE CLOCKWISE DIRECTION. 7) FILL IN APPLICABLE INFORMATION FOR PIPE #2. 8) (A) INVERT ELEVATION MEASURED FROM LID TO BOTTOM OF PIPE CONTINUING CLOCKWISE, FILL IN APPLICABLE INFORMATION (B) PIPE OUTSIDE DIAMETER (in appropriate units) FOR THE REST OF THE PIPES. DRAW A MAP IN THE LOCATION SKETCH BOX SHOWING STREETS. (C) PIPE TYPE STREET NAME(S), AND LOCATION OF UTILITY. (D) LID ELEVATION MINUS MEASURED DEPTH OF PIPE (reduce in office) **CLIENT:** CREW: JM /CP CITY OF So. SF JOB No.: SURVEYING | MAPPING | GIS 2018/12/28 15695

MANHOLE DIPSHEET	PROJECT NAME:	PROJECT LOCATION:	PAGE NUMBER: 19	FIELD BOOK:	
INANNOLE DIFOREE!	AMEL	30. SF, CA	OF PAGES	PAGE:	
POINT I.D.: 15 A					
MANHOLE No.: WD 26	38		A		
	D	THER:			
STREET NAME(S):S.		·		_	
NEAREST CROSS STREET:				,)	
NEAREST ADDRESS No.: 20			NORTH	7	
SPECIAL MARKINGS: "S	AN ITARY SONOR	,			
UNITS TO BE MEASURED IN: -12	2 37 FEET [2 24" 236 N'	METERS √			
LID EL.: = 1456 MEAS. DEPTH = INVERT EL.: = (computed) 56 NV -13 \frac{4}{56} NV \frac{16}{16} NV			26 S. LINEOLN ANE N. 15 CAMPL ST.	S. LINCOLN AVE S. LINCOLN AVE S. LINC	
PICTURE FILENAMES:			CANAL /	<i>!</i>	
			LOCA	ATION SKETCH	
(A) INVERT ELEVATION MEASURED FROM LID TO BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in appropriate units) (A) DEL = (A) (A) (D) (D) (D) (D) (D) (D) (D) (D) (D) (D		 DRAW NORTH ARROW A FILL IN LID ELEVATION. FILL IN MEASURED DEP DETERMINE THE FIRST THIS IS PIPE #1. FILL IN APPLICABLE INF PIPE #2 IS THE NEXT PIE FILL IN APPLICABLE INF CONTINUING CLOCKWIS FOR THE REST OF THE 	S: ANKS ON TOP OF PAGE. ABOVE. TH. OUT FLOW PIPE CLOCKWIS ORMATION FOR PIPE #1 (se PE CONTINUING IN THE CLO ORMATION FOR PIPE #2. SE, FILL IN APPLICABLE INFO PIPES. CATION SKETCH BOX SHOV	EE FROM NORTH. e example). DCKWISE DIRECTION. DRMATION	
	CLIENT:	3 <i>C</i>	CREW:	↑ ρ	
SURVEYING MAPPING GIS	CITY OF 30. JOB No.: 15695-101	JF	JAN / 0 DATE: 20/8 /	12/28	

	PROJECT NAME:	PROJECT LOCATION:	PAGE NUMBER: 23	FIELD BOOK:
MANHOLE DIPSHEET	AKEL	50. 5F, CA	OF PAGES	PAGE:
POINT I.D.: 16			,	
MANHOLE No.: WE182	8	,	1	
MANHOLE TYPE: SS SS SI	ELEC TEL OT	HER:	A	
STREET NAME(S): S. SF	PRINCE			
NEAREST CROSS STREET: N. CAN HL ST. (NORTH)				
NEAREST ADDRESS No.: 90 S. SPORUER ST				
SPECIAL MARKINGS: A	/4			
UNITS TO BE MEASURED IN:	FEET 🗆	METERS	,	
14.2 LID EL.:	PTH = _14º	4 °5 20 CLAY 1NV		A8 N.CAMAZ
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(A) INVERT ELEVATION MEASURED FF BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in appro (C) PIPE TYPE (D) LID ELEVATION MINUS MEASURED (reduce in office)	priate units)	8) FILL IN APPLICABLE INF 9) CONTINUING CLOCKWI FOR THE REST OF THE	FORMATION FOR PIPE #2. SE, FILL IN APPLICABLE INF PIPES. DCATION SKETCH BOX SHOW	ORMATION
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TOWILL Surveying, Mapping	JOB No.: 15695-		DATE: 2018 / 12	-

MANHOLE DIPSHEET	PROJECT NAME: AV-EL	PROJECT LO Sa. SF		PAGE NUMBER: 33 OF PAGES	FIELD BOOK: PAGE:
POINT I.D.: 17					
MANHOLE No.: WD2580	· 0			,	
MANHOLE TYPE: SS SS		HER:		4	
STREET NAME(S): AIR	PORT BLVD.				\
NEAREST CROSS STREET: G	FRAND AVE			(NORTH	,)
NEAREST ADDRESS No.: 3	S ARPORT BL	D.		North	7
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-8.7		6) FILL II	N APPLICABLE INF	ORMATION FOR PIPE #1 (se	
(A) INVERT ELEVATION MEASURED FR	ROM LID TO	8) FILL I	N APPLICABLE INF	PE CONTINUING IN THE CLO ORMATION FOR PIPE #2.	
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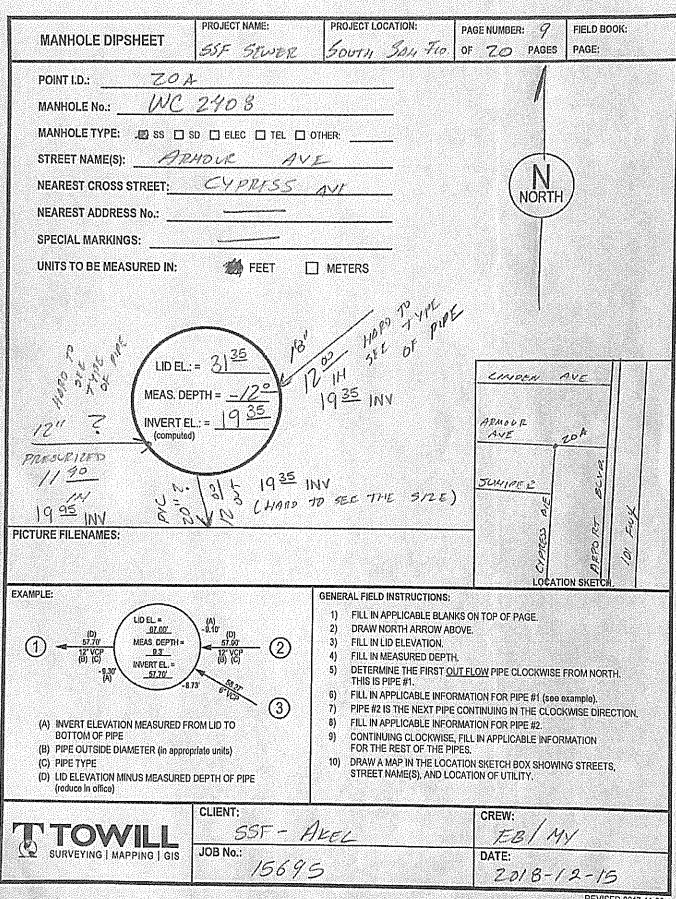
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POINT I.D.: 18				
MANHOLE No.: WC	2913			
MANHOLE TYPE: 🦚 SS 🖂	SD C ELEC C TEL C	лнек:		
STREET NAME(S):			, ,	
NEAREST CROSS STREET:	AIRPORT B.	eve	(N)	
NEAREST ADDRESS No.:	75/ 1128085	1 304 0	(NORTH)	
SPECIAL MARKINGS:	Section 1 and 1 an			
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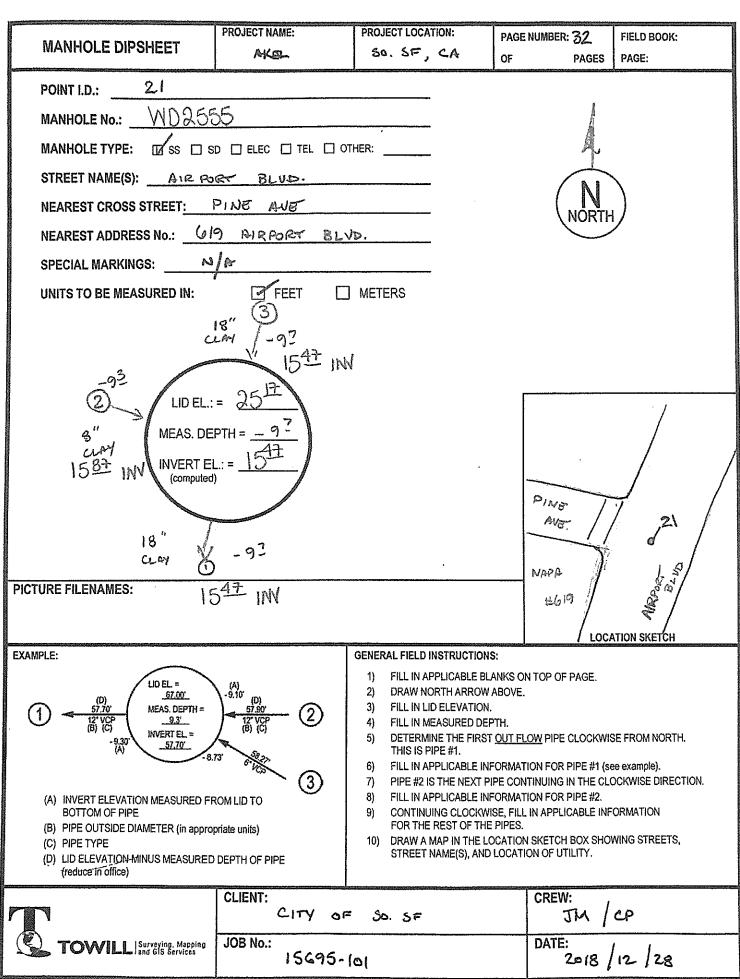
	PROJECT NAME:	PROJECT LOCATION:	PAGE NUMBER: 12	FIELD BOOK:
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STREET NAME(S):	CYPRESS AV	<u>Æ</u>	AI	\
NEAREST CROSS STREET:	PNE. A	<u>VE</u>	(NORTH	1)
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MANHOLE DIPSHEET	PROJECT NAME:	PROJECT LOCATION: South Say Fra	PAGE NUMBER: //	
POINT I.D.: 197 MANHOLE No.: 197 MANHOLE TYPE: 衛ss 衛s	2554			PACE
NEAREST CROSS STREET: PIME AVE NEAREST ADDRESS No.:				
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EXAMPLE:	\-(A)	GENERAL FIELD INSTRUCTIONS: 1) FILL IN APPLICABLE BLAN	KS ON TOP OF PAGE.	ION SKETCH
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MANHOLE DIPSHEET	SSF SEWER	SOUTH JAN Fro. OI	F ZO PAGES PAGE:	
POINT I.D.:			100	
MANHOLE No.: <u>W 1</u>	<u> 2554 </u>	MANAGEMENT AND		
MANHOLETYPE: 🚜 ss 🗆	SD C ELEC TEL CO	HER:		
STREET NAME(S): <u></u> ピソ	PRESS AV		(AI)	
NEAREST CROSS STREET:	PINE AV	<u> </u>	(NORTH)	
NEAREST ADDRESS No.:			\mathcal{A}	
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l e	AREST CROSS STREET:			_	NORTH	1)
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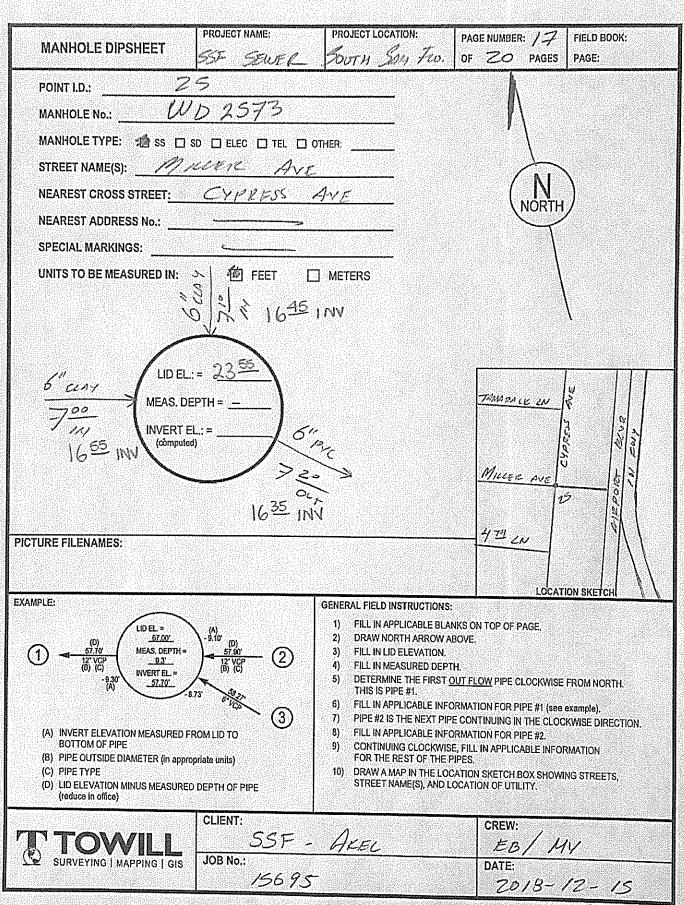




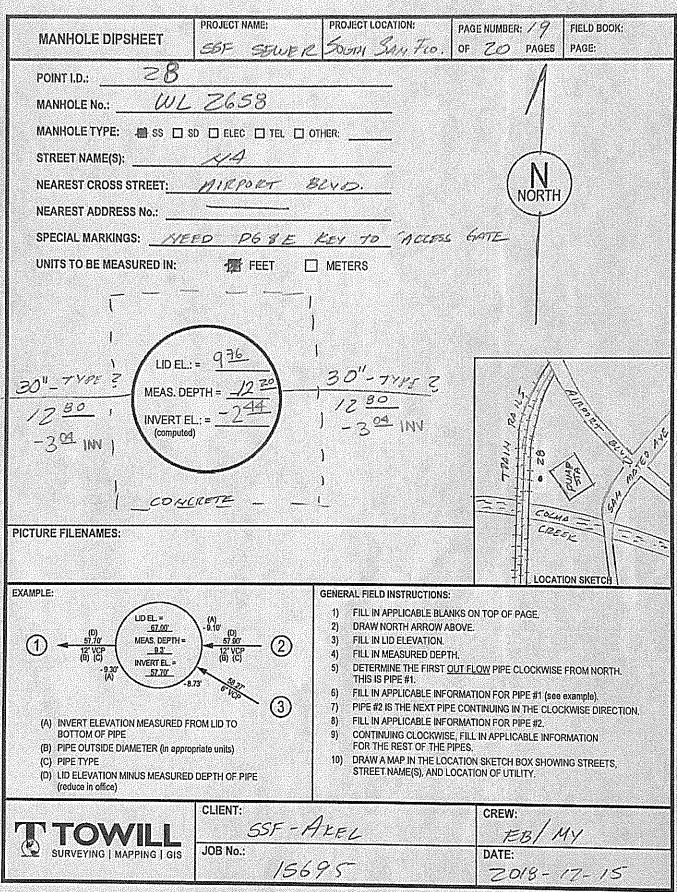
MANHOLE DIPSHEET	PROJECT NAME:	PROJECT LOCATION:	PAGE NUMBER: 15	FIELD BOOK:
MANHOLE DIPSHEET POINT I.D.: ZZ MANHOLE No.: W MANHOLE TYPE: SS SS STREET NAME(S): U NEAREST CROSS STREET: NEAREST ADDRESS No.: SPECIAL MARKINGS: UNITS TO BE MEASURED IN:	D 2563 D □ ELEC □ TEL □ OT X AVE CYPRESS	AYE METERS		PAGE:
25. A.	= 24 <u>63</u> PTH =		LOX AVE	
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NEAREST CROSS STREET:	CYPRTSS A	<u>140</u>	(IN NORTH /)
NEAREST ADDRESS No.:			\mathcal{A}	
SPECIAL MARKINGS:				
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1 467	L::= 2480 DEPTH = EL::= ted): 67-034 1810 IN	GENERAL FIELD INSTRUCTIONS		CHICOGOLA SCALA
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MANHOLE DIPSHEET	PROJECT NAME:	PROJECT LOCATION:	PAGE NUMBER: 13	
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POINT I.D.: 29 MANHOLE No.: WD	0 < 24			
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	**** <u>3</u>	7) PIPE #2 IS THE NEXT PIP	ORMATION FOR PIPE #1 (se PE CONTINUING IN THE CLO	
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(B) PIPE OUTSIDE DIAMETER (in app. (C) PIPE TYPE			CATION SKETCH BOX SHOV	VING STREETS,
(D) LID ELEVATION MINUS MEASURE (reduce in office)				
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MANHOLE DIPSHEET	PROJECT NAME:	PROJECT LOCATION: SOUTH SAN FOO	PAGE NUMBER: 16 OF ZO PAGES	FIELD BOOK: PAGE:
MANHOLE No.: UD MANHOLE TYPE: SS SS STREET NAME(S): NEAREST CROSS STREET: NEAREST ADDRESS No.: SPECIAL MARKINGS: UNITS TO BE MEASURED IN:	25 A 2573 D ELEC TEL 00 100 ERC TEL 00 100 ERC 100 100 ERC 100	IHER: METERS INV Application of the second of th	Prince as an	
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MANHOLE DIPSHEET	PROJECT NAME:	PROJECT LOC	— 1. ** ** ** ** ** ** ** ** ** ** ** ** **	PAGE NUMBER: ZE	FIELD BOOK:	
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POINT I.D.: 30						
MANHOLE No.: WL 2660						
MANHOLE TYPE: 🏚 ss 🗆 s		eri a lista di grego				
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NEAREST CROSS STREET:	HIRPORT BE	10		(NORT	H)	
NEAREST ADDRESS No.:	da 40 februário e la capita est apopular el estador de la colo di			T		
SPECIAL MARKINGS:	ro 花/E /石 値 FEET / ロ	医电影电影 医电路管内	A CCESS	GATE		
LID EL: = 114Z 16Z 1NV MEAS, DEPTH = -1/30 (nomputed) NOTE: SEEUS LIKE IS CLOGED (SEE PICTURES) PICTURE FILENAMES:						
EXAMPLE: (D) (D) (Example: (A) (B) (C) (B) (C) (A) (A) (A) (A) (A) (A) (A) (A) (A) (A	FROM LID TO	2) DRAW N 3) FILL IN L 4) FILL IN N 5) DETERN THIS IS 6) FILL IN N 7) PIPE #2 8) FILL IN N 9) CONTIN FOR TH 10) DRAW A	APPLICABLE BLA IORTH ARROW A IORTH ARROW A MEASURED DEP MINE THE FIRST PIPE #1. APPLICABLE INF APPLICABLE INF UING CLOCKWIS E REST OF THE MAP IN THE LO	NKS ON TOP OF PAGE. BOVE. TH. OUT FLOW PIPE CLOCKW ORMATION FOR PIPE #1 (1) PE CONTINUING IN THE CI ORMATION FOR PIPE #2. SE, FILL IN APPLICABLE IN	see example). OCKWISE DIRECTION. FORMATION	
TOWILL SURVEYING MAPPING GIS	CLIENT: SSF - 1/ JOB No.: 156	AKIEL OC		CREW: EB / DATE:	/4y 3-12-15	

MANHOLE DIPSHEET	PROJECT NAME:	PROJECT LOCATION: SOUTH SAY FLO	PAGE NUMBER: / OF B PAGES	FIELD BOOK: PAGE:
POINT I.D.; MANHOLE No.:	1		1	
MANHOLE TYPE: 🕸 SS 🗆				
STREET NAME(S): 200			NI	\
NEAREST CROSS STREET:	EAH MATEO	AYE	NORTH	4)
NEAREST ADDRESS No.:		The Property of the Control of the C	4	
SPECIAL MARKINGS:	1953 (1954) 1954 (1954) 1954 (1954)			
UNITS TO BE MEASURED IN:	100 -04			
LID EL.	= 969		1	
MEAS. DE INVERT E (compute)	EPTH =	-061 IM	1,000	BAVE AVE
PICTURE FILENAMES:	ANI FO	-061 IM	NI DE LA PERENTA	LOWRIE M
			LOCA	ATION SKETCH
(A) INVERT ELEVATION MEASURED F BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in approximately produced in office)	opriate units) D DEPTH OF PIPE	6) FILL IN APPLICABLE IN 7) PIPE #2 IS THE NEXT F 8) FILL IN APPLICABLE IN 9) CONTINUING CLOCKW FOR THE REST OF TH 10) DRAW A MAP IN THE L	IS: LANKS ON TOP OF PAGE. ABOVE. PTH. T <u>OUT FLOW</u> PIPE CLOCKWIS FORMATION FOR PIPE #1 (see PIPE CONTINUING IN THE CLO FORMATION FOR PIPE #2. ISE. FILL IN APPLICABLE INE.	SE FROM NORTH. SE example). DCKWISE DIRECTION. ORMATION
TOWILL SURVEYING MAPPING GIS	CLIENT: 55 F - A JOB No.: 15 6 9 5	TOP THE WHOLE THE WORKSHIP TO	CREW: EB / J DATE: 2018 - 12	44

	PROJECT NAME:	PROJECT LOCATION:	PAGE NUMBER:	Z	FIELD BOOK:
MANHOLE DIPSHEET	SSF-AKEL	Sound Son Fro.	OF 8	PAGES	PAGE:
	2890 SD ELEC TEL DO PRIE AVE	THER: AVE AVE METERS NV		N	Son more one
(A) INVERT ELEVATION MEASURED BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in app. (C) PIPE TYPE (D) LID EL. = 67.00′ MEAS DEPTH 9.3′ INVERT EL. = 57.70′ MEASURED BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in app. (C) PIPE TYPE (D) LID ELEVATION MINUS MEASUR (reduce in office)	FROM LID TO propriate units)	GENERAL FIELD INSTRUCTIONS 1) FILL IN APPLICABLE BL. 2) DRAW NORTH ARROW. 3) FILL IN LID ELEVATION. 4) FILL IN MEASURED DEF 5) DETERMINE THE FIRST THIS IS PIPE #1. 6) FILL IN APPLICABLE INF 7) PIPE #2 IS THE NEXT PI 8) FILL IN APPLICABLE INF 9) CONTINUING CLOCKWI FOR THE REST OF THE 10) DRAW A MAP IN THE LC STREET NAME(S), AND	ANKS ON TOP OF PABOVE. TH. OUT FLOW PIPE COORMATION FOR PIPE CONTINUING IN ORMATION FOR PIPES. FILL IN APPLICATION SKETCH BLOCATION OF UTIL	LOCKWISE IPE #1 (see I THE CLOC IPE #2. ABLE INFO	example). CKWISE DIRECTION.
TOWILL SURVEYING MAPPING GIS	55F - H	95-101	DATE:	8-1	144 12-18

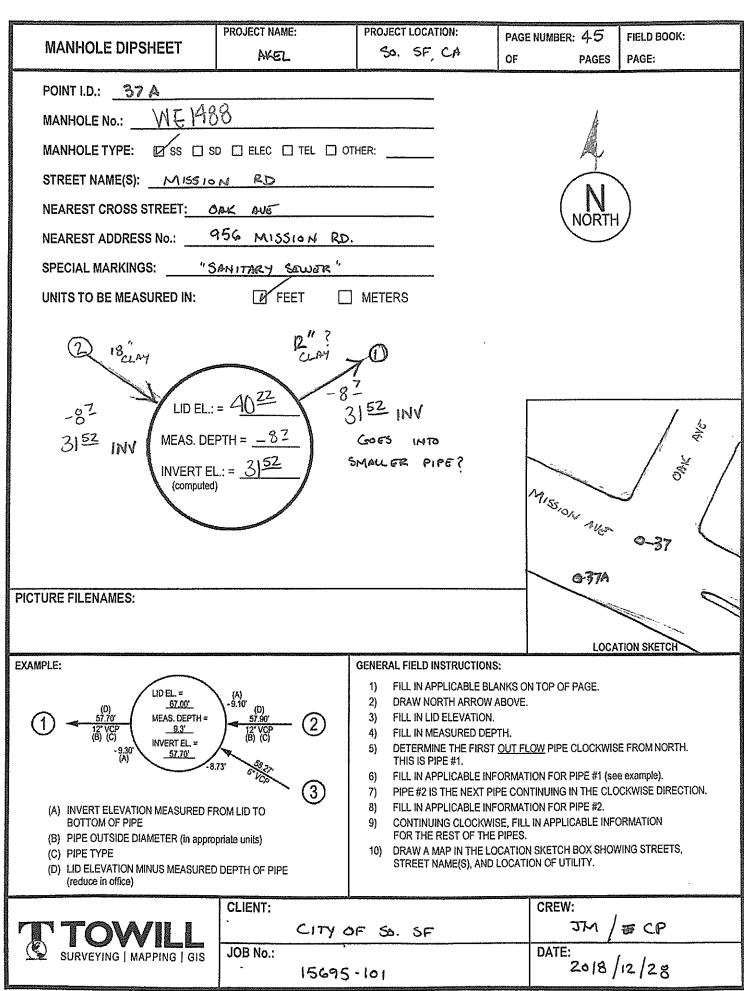
MANHOLE DIPSHEET	PROJECT NAME: A-KEL	PROJECT LOCATION: S. SAM (=PANCISCO, C.A.	PAGE NUMBER: 9 OF PAGES	FIELD BOOK: PAGE:			
POINT I.D.: 34-							
MANHOLE No.: NS/A MH-I							
MANHOLE TYPE: SS SS SD SD SD SELEC STEL STOTHER:							
STREET NAME(S): EUCA	STREET NAME(S): EUCALY PTUS AVE						
NEAREST CROSS STREET:	TENNIS De.		(N NORTH	1)			
NEAREST ADDRESS No.: 281	TENNIS DR	(PARK)					
SPECIAL MARKINGS: N	(/A						
UNITS TO BE MEASURED IN:	FEET []	METERS					
G -5.82 23-11	(5) -10.52 14 24" cup	1					
240	1841	- 111/					
24" MEAS. DE	$= 28 \frac{93}{11.25}$ $= 17.68$		ANG.	TENNIS DR			
PICTURE FILENAMES:	-10, 48 24" CLAY	-11.3 24" CLAY 17 63 IN	Euch yours	ORANGE MEMORIAL PARK			
TOTORE FEEDVALLED.	1845 INV		CREEK LOCK	FION SKETCH			
EXAMPLE:		GENERAL FIELD INSTRUCTIONS:					
(D) (D) (E) (E) (E) (E) (E) (E) (E) (E) (E) (E	(A) (D) (D) (D) (D) (D) (D) (D) (D) (D) (D	THIS IS PIPE #1. 6) FILL IN APPLICABLE INFO	BOVE. TH. <u>DUT FLOW</u> PIPE CLOCKWISE DRMATION FOR PIPE #1 (see	example).			
(A) INVERT ELEVATION MEASURED FROM LID TO BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in appropriate units) (C) PIPE TYPE (D) LID ELEVATION MINUS MEASURED DEPTH OF PIPE (reduce in office) (A) INVERT ELEVATION MEASURED FROM LID TO BOTTOM OF PIPE #2 IS THE NEXT PIPE CONTINUING IN THE CLOCKWISE DIRECTION. (B) PIPE #2 IS THE NEXT PIPE CONTINUING IN THE CLOCKWISE DIRECTION. (C) PIPE TYPE (CONTINUING CLOCKWISE, FILL IN APPLICABLE INFORMATION FOR THE REST OF THE PIPES. (D) LID ELEVATION MINUS MEASURED DEPTH OF PIPE (reduce in office)							
	CLIENT:		CREW:				
SURVEYING MAPPING GIS	JOB No.: 15695		JM/t DATE: 2018-12-				

			inggy on the simulation in the simulation of the	
MANHOLE DIPSHEET	PROJECT NAME:	PROJECT LOCATION: So. SF, CA	PAGE NUMBER: 40	FIELD BOOK:
WANTIOLL DITORILL	AKEL	30. 3r, Cr	OF PAGES	PAĞE:
POINT I.D.: 35			P.	
MANHOLE No.: WE 149	3			
MANHOLE TYPE: 🗹 ss 🔲 s	D	OTHER:		
STREET NAME(S): CHEST	NUT AVE	<u> </u>		\
NEAREST CROSS STREET: N	MISSION RD.		(NORTH	,)
NEAREST ADDRESS No.:	30 CHESTNUT A	IE.		
SPECIAL MARKINGS: "5A	NITARY SOWER"			
UNITS TO BE MEASURED IN:	FEET [] METERS		
3				
- 15!				
2402 Jahl	= 3912			
LID EL.:			Missian	
SI R	PTH =15\(\frac{15\(\frac{1}{2}\)}{202}\)			Po Caretain
INVERT EL (computed	_i = <u>24⁰²</u> / 1	5 ?		CHE SHE
		<i>.</i>		
15	24"	0 92 IW		_ /
34°2 IN	J.S-	1144		35
PICTURE FILENAMES:	V			
EVANDIE.		GENERAL FIELD INSTRUCTIONS		TION SKETCH
EXAMPLE:		FILL IN APPLICABLE BLA		
(D) 67.00' 57.70' MEAS, DEPTH =	(A) -9.10' (D) -57.90'	 DRAW NORTH ARROW A FILL IN LID ELEVATION. 	ABOVE.	
12° VCP 9.3' (B) (C) INVERTIEL =	∫ < 57.90' (2) 12 VCP (8) (C) (2)	4) FILL IN MEASURED DEP	TH. <u>OUT FLOW</u> PIPE CLOCKWISE	F FROM NORTH.
-9.30' <u>57.70'</u> -8.	73 827	THIS IS PIPE #1.	ORMATION FOR PIPE #1 (see	
	⁷² 3	7) PIPE #2 IS THE NEXT PI	PE CONTINUING IN THE CLO	
(A) INVERT ELEVATION MEASURED FROM LID TO 8) FILL IN APPLICABLE INFORMA BOTTOM OF PIPE 9) CONTINUING CLOCKWISE, FIL			SE, FILL IN APPLICABLE INFO	RMATION
(B) PIPE OUTSIDE DIAMETER (in appropriate units) (C) PIPE TYPE 10) DRAW A MAP IN THE LOCATION OF THE PIPES			CATION SKETCH BOX SHOW	ING STREETS,
(D) LID ELEVATION MINUS MEASURED (reduce in office)	DEPTH OF PIPE	STREET NAME(S), AND	LOCATION OF UTILITY.	
	CLIENT:		CREW:	
TOWILL	CITY OF	So. SF	JM/CF)
SURVEYING MAPPING GIS	JOB No.: 15695 - 1	101	DATE: 2018 /15	z /zg

	PROJECT NAME:	PROJECT LOCATION:	PAGE NUMBER: /	FIELD BOOK:				
MANHOLE DIPSHEET	SSF-AKEL	SOUTH SANTED	OF 6 PAGES	PAGE:				
POINT I.D.: 36								
MANHOLE No.: WG 1325								
MANHOLETYPE: 🝂 ss 🗆 si	D C ELEC C TEL C	OTHER:						
	STREET NAME(S): ARROYO DR							
NEAREST CROSS STREET:	A REPORT OF THE PROPERTY.		/(N					
NEAREST ADDRESS No.:	application of National Experience		NORTH					
SPECIAL MARKINGS: 887		IC AND PARKING	6 107					
	The sufference of the sufferen							
ž /2/3		-						
3 %	원 등 52의	N						
58° MY	↑ # FEET C							
12" RCP LIDEL:	The second secon	12" PVC		l v				
MEAS, DE	PTH =/320		1					
13 CO INVERTE	L.= 52 ³	13 20		() ()				
52 ⁴¹ INV Computed		E2 31 1N	St. Contraction	0 30				
		J.Z	PREOSO DE.					
			Hickory					
PICTURE FILENAMES:				100				
			LOCA	ATION SKETCH				
EXAMPLE:		GENERAL FIELD INSTRUCTION	S:					
UD EL.= 67.00	\.(A)0 m	FILL IN APPLICABLE BL DRAW NORTH ARROW	ANKS ON TOP OF PAGE. ABOVE.					
1) = 57.70 MEAS, DEPTH = 17.70 MEAS, DEPTH = 19.10 MARSET ED = 19.) = 67.90° (2) - 12. VCP (3) (C)	3) FILL IN LID ELEVATION 4) FILL IN MEASURED DEI						
(A) INVERT EL =			OUT FLOW PIPE CLOCKWI	SE FROM NORTH.				
	3		FORMATION FOR PIPE #1 (s IPE CONTINUING IN THE CL					
(A) INVERT ELEVATION MEASURED F BOTTOM OF PIPE		8) FILL IN APPLICABLE IN	FORMATION FOR PIPE #2.					
(B) PIPE OUTSIDE DIAMETER (in appn	opriate units)	FOR THE REST OF THE		•				
(C) PIPE TYPE (D) LID ELEVATION MINUS MEASURE	D DEPTH OF PIPE	10) DRAW A MAP IN THE L STREET NAME(S), AND	LOCATION SKETCH BOX SHO LOCATION OF UTILITY.	INNING STREETS,				
(reduce in office)	CLIENT:		L CDEW					
	AKEL		CREW:	1/55				
SURVEYING MAPPING GIS	JOB No.:		DATE:					
	15695	-10/	2018	12-06 REVISED 2017-11-02				

PROJECT NAME: PROJECT LOCATION: PAGE NUMBER: 41 FIELD BOOK: MANHOLE DIPSHEET So. SF, CA AKEL OF **PAGES** PAGE: POINT I.D.: 37 MANHOLE No.: WE 1488 MANHOLE TYPE: SS SD SD SELEC TEL STHER: STREET NAME(S): MISSIGH RD. NEAREST CROSS STREET: OAK AVE. 956 MISSION RD. NEAREST ADDRESS No.: SPECIAL MARKINGS: "SANITARY SEWER" FEET UNITS TO BE MEASURED IN: 18" 312 IN MEAS. DEPTH = MISSION INVERT EL.: RD. (computed) 12 9 37 0 37A PICTURE FILENAMES: **LOCATION SKETCH GENERAL FIELD INSTRUCTIONS:** EXAMPLE: FILL IN APPLICABLE BLANKS ON TOP OF PAGE. 11 LID EL. = 2) DRAW NORTH ARROW ABOVE, 67.00 3) FILL IN LID ELEVATION. MEAS, DEPTH = 9.3' FILL IN MEASURED DEPTH. 4) INVERTEL. = DETERMINE THE FIRST <u>OUT FLOW</u> PIPE CLOCKWISE FROM NORTH. 5) 57.70 THIS IS PIPE #1. FILL IN APPLICABLE INFORMATION FOR PIPE #1 (see example). 6) PIPE #2 IS THE NEXT PIPE CONTINUING IN THE CLOCKWISE DIRECTION. 7) FILL IN APPLICABLE INFORMATION FOR PIPE #2. 81 (A) INVERT ELEVATION MEASURED FROM LID TO CONTINUING CLOCKWISE, FILL IN APPLICABLE INFORMATION **BOTTOM OF PIPE** 9) FOR THE REST OF THE PIPES. (B) PIPE OUTSIDE DIAMETER (in appropriate units) DRAW A MAP IN THE LOCATION SKETCH BOX SHOWING STREETS. (C) PIPE TYPE STREET NAME(S), AND LOCATION OF UTILITY. (D) LID ELEVATION MINUS MEASURED DEPTH OF PIPE (reduce in office) CREW: CLIENT:

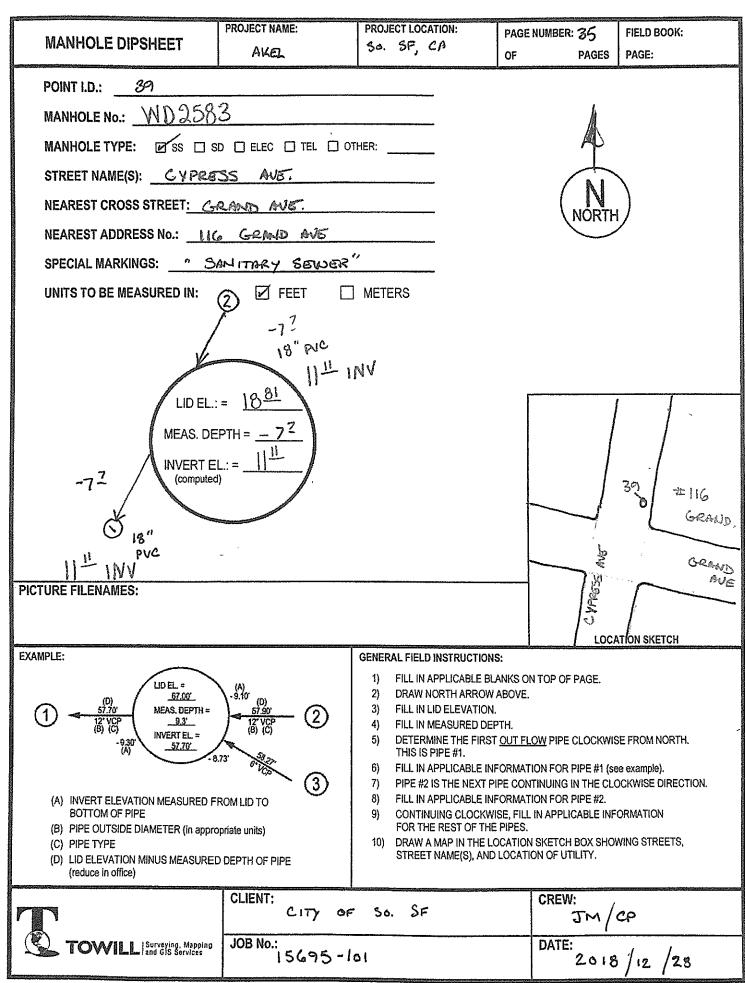
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SURVEYING MAPPING GIS	JOB No.: 15695-101	DATE: 2018/12/28

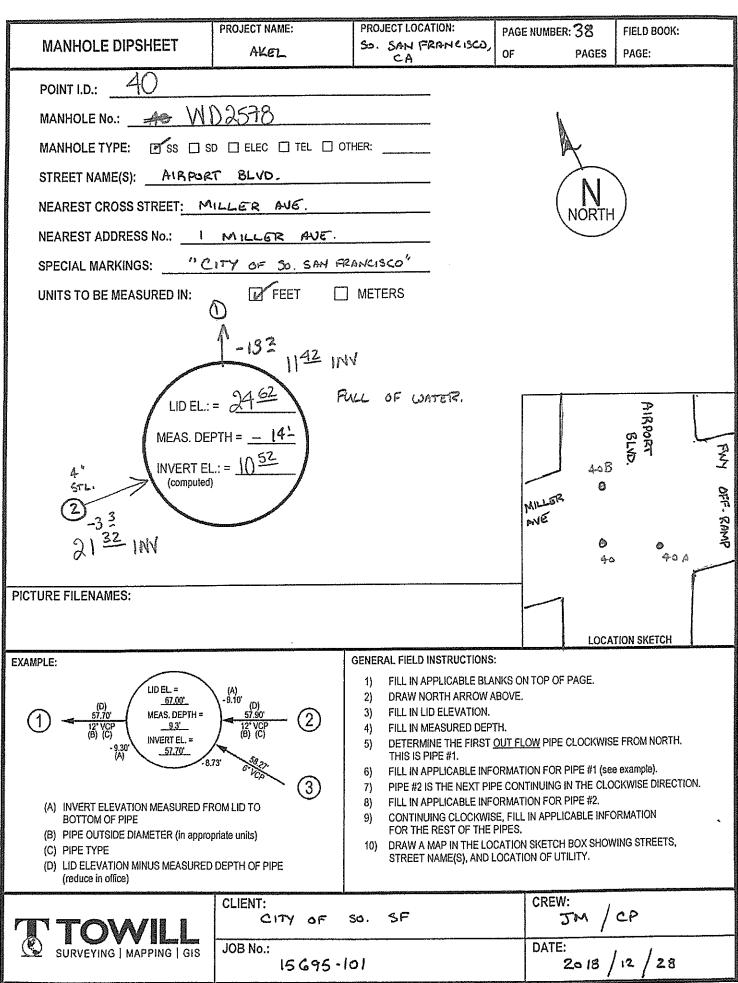


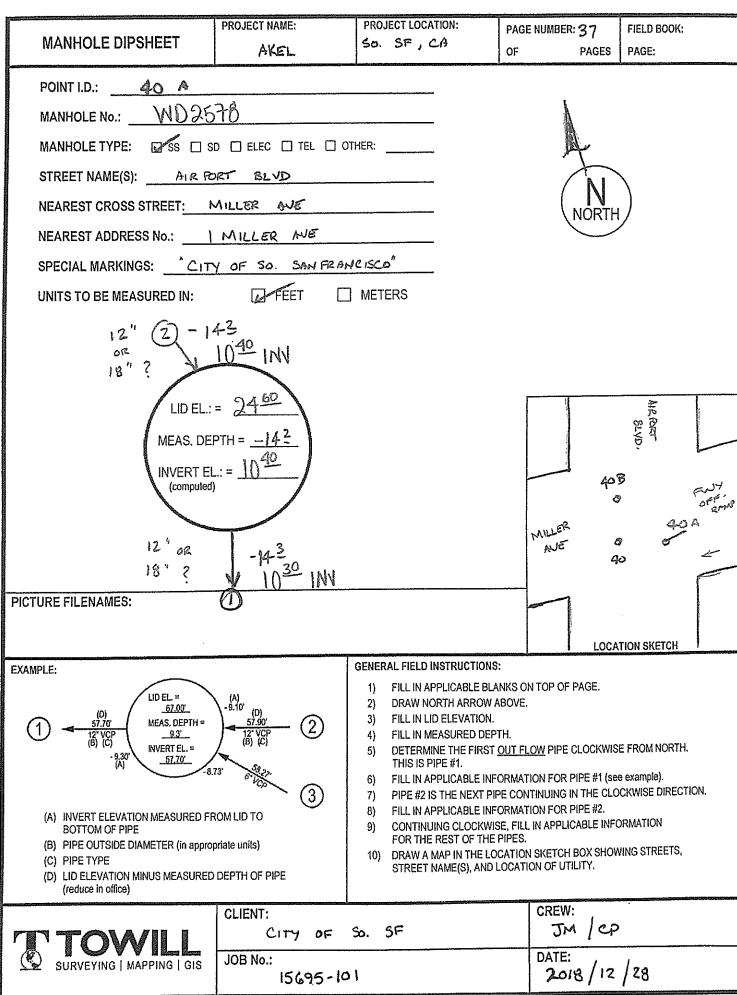
MANHOLE DIPSHEET	PROJECT NAME: AKEL	PROJECT LOCATION:	PAGE NUMBER: O	FIELD BOOK: S PAGE:
POINT I.D.: 38 MANHOLE No.: N/A MANHOLE TYPE: SS SS SS STREET NAME(S): CHEST NEAREST CROSS STREET: EZ NEAREST ADDRESS No.:	WLZGTT DELEC DIEL DOTE NUT AVE CAMINO RETAL 975 EL CAMINO S" FEET D -9.68 12" CLAY 355	REAL	OF PAGE	тн
MEAS. DEP	TH = <u>-9.48</u> := <u>35⁴⁴</u>		TRI CAUNTI BANK	SANK OF AMERICA
(A) INVERT ELEVATION MEASURED FRO BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in appropria (C) PIPE TYPE (D) LID ELEVATION MINUS MEASURED D (reduce in office)	-9.10° (D)	1) FILL IN APPLICABLE BLAN 2) DRAW NORTH ARROW AB 3) FILL IN LID ELEVATION. 4) FILL IN MEASURED DEPTI 5) DETERMINE THE FIRST Q THIS IS PIPE #1. 6) FILL IN APPLICABLE INFO 7) PIPE #2 IS THE NEXT PIPE 8) FILL IN APPLICABLE INFO 9) CONTINUING CLOCKWISE FOR THE REST OF THE PI 10) DRAW A MAP IN THE LOCK STREET NAME(S), AND LO	IKS ON TOP OF PAGE, IOVE. H. UT FLOW PIPE CLOCKW RMATION FOR PIPE #1 (E CONTINUING IN THE C RMATION FOR PIPE #2. E, FILL IN APPLICABLE IN IPES. ATION SKETCH BOX SHI DCATION OF UTILITY.	see example). .OCKWISE DIRECTION. FORMATION
TTOWILL	JOB No.: 15695		CREW: JM DATE: 2018	/ DS 112 /15

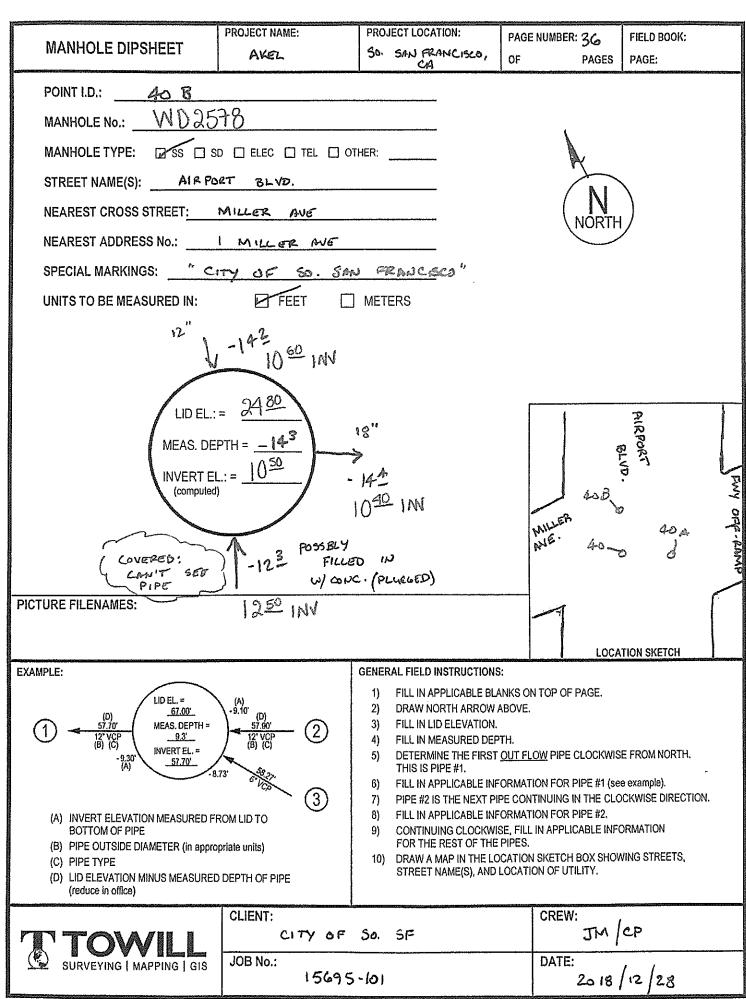
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MANHOLE DIPSHEET	PROJECT NAME:	PROJECT LOCATION: S. SAN PRANCISCO, CA	PAGE NUMBER: 5 OF PAGES	FIELD BOOK: PAGE:
POINT I.D.: 38 A- MANHOLE No.:	NEEDS TO BE SET (2) WOR	SHOT (UNDER C	AWNIAG)	
MANHOLE TYPE: ☑ SS ☐ S	D CELEC TEL CON	HER:	4	
STREET NAME(S):ELCH	INO RITH			`
NEAREST CROSS STREET:	CHESTNUT AVS	·	(NORTH	
NEAREST ADDRESS No.:	775 BL CAMINO	REAL	Non	/
SPECIAL MARKINGS:	" SANITARY SI	ener"		
UNITS TO BE MEASURED IN:	FEET PTH = _ 9.25 -9.27 12"	METERS →①	KINIK- SEZN. TRI- COUNTI ET BANK	CHECKANIO BANK BANK OF ANTERICA ON SKETCH
EXAMPLE:	G	ENERAL FIELD INSTRUCTIONS:		ON ONLIGH
(D) (D) (EL = .67.00 MEAS. DEPTH = .9.30 (A) (A) (A)	"Post	THIS IS PIPE #1. 6) FILL IN APPLICABLE INFOR	OVE. I. <u>IT FLOW</u> PIPE CLOCKWISE I RMATION FOR PIPE #1 (see e	xample).
(A) INVERT ELEVATION MEASURED FR BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in approp (C) PIPE TYPE (D) LID ELEVATION MINUS MEASURED (reduce in office)	niate units) DEPTH OF PIPE	FILL IN APPLICABLE INFOF CONTINUING CLOCKWISE, FOR THE REST OF THE PIE	FILL IN APPLICABLE INFOR PES. TION SKETCH BOX SHOWIN	MATION
TOMI	CLIENT:		CREW:	os
SURVEYING MAPPING GIS	JOB No.: 156,95		DATE: 2018/12	115





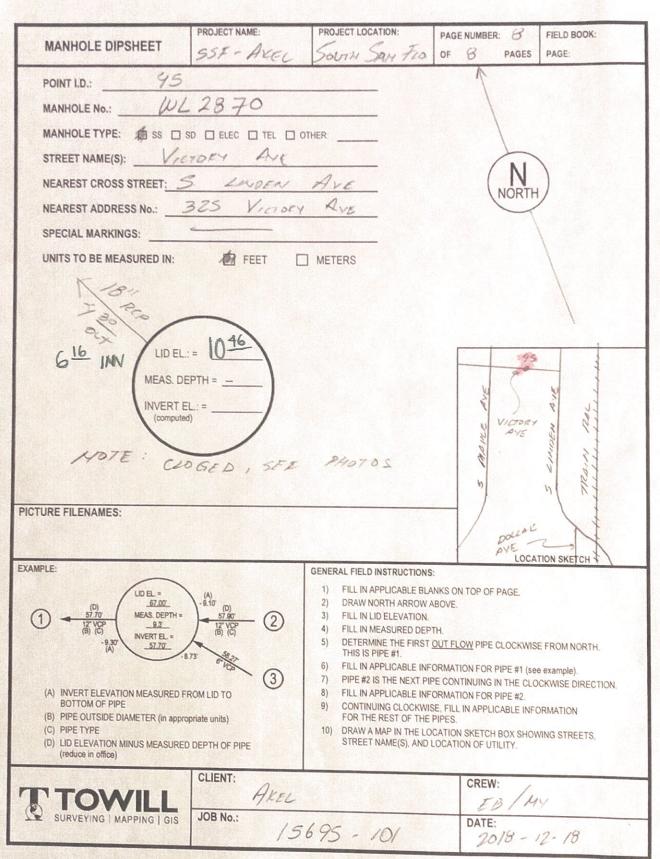




	PROJECT NAME:	PROJECT LOCATION:	PAGE NUMBER: 18	FIELD BOOK:
MANHOLE DIPSHEET	SSF SEWER	Soury Soution	OF ZO PAGES	PAGE:
POINT I.D.:				
MANHOLE TYPE: 🧌 ss 🗆	ada ada atau da da atau da	HER:		
STREET NAME(S):	化性溶液 建硫化合物 化氯甲基甲酚 化二氯甲基甲酚 化二氯甲基甲酚二氯甲基甲酚			
NEAREST CROSS STREET:	Control of a first recover to the entire control of the control of		$\left(\begin{array}{c} N \\ NOST \end{array} \right)$	
NEAREST ADDRESS No.:			NORTH	/
SPECIAL MARKINGS:			$igg \}$	
	2019 8世 110 2019 8世 110	METERS V		
MEAS, DE INVERT E (computer	i)	0" 572 <u>4 50</u> 8 <u>21</u> INV	BADEN AVE.	TO FUY
R	1 2 8 01 IN		2 <u>MB</u> LN 91	AIRPORT
			LOCATI	ON SKETCH
GENERAL FIELD INSTRUCTIONS: 1) FILL IN APPLICABLE BLANKS ON TOP OF PAGE. 2) DRAW NORTH ARROW ABOVE. 3) FILL IN LID ELEVATION. 4) FILL IN MEASURED DEPTH. 5) DETERMINE THE FIRST <u>OUT FLOW PIPE</u> CLOCKWISE FROM NORTH. THIS IS PIPE #1. 6) FILL IN APPLICABLE INFORMATION FOR PIPE #1 (see example). 7) PIPE #2 IS THE NEXT PIPE CONTINUING IN THE CLOCKWISE DIRECTION. 8) FILL IN APPLICABLE INFORMATION FOR PIPE #2. 9) CONTINUING CLOCKWISE, FILL IN APPLICABLE INFORMATION FOR THE REST OF THE PIPES. 10) DRAW A MAP IN THE LOCATION SKETCH BOX SHOWING STREETS, STREET NAME(S), AND LOCATION OF UTILITY.				
TOWILL SURVEYING MAPPING GIS	CLIENT: 5SF - 1569	IKEL S	CREW: E3 / M; DATE: 2018-12	183

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MANHOLE DIPSHEET	PROJECT NAME: AKEL	PROJECT LOCATION:	PAGE NUMBER: 14-	FIELD BOOK:
			OF PAGES	PAGE:
POINT I.D.: 42	* A		a.	
MANHOLE No.: WD36	43	· · · · · · · · · · · · · · · · · · ·		
MANHOLE TYPE: 🗹 🕏 SS 🗀 SS	ELEC TEL O	THER:		
STREET NAME(S): N. CA	VAL ST.		N.	\
NEAREST CROSS STREET:	S. LINDEN ALE		(NORTH	,)
NEAREST ADDRESS No.:	26 S. LINDEN	, aus	Mortin	9
SPECIAL MARKINGS: "5A	VITARY SEWER)		
UNITS TO BE MEASURED IN:	FEET [] METERS		
/		-> 0 127 154 INV	680	N. CANAL ST.
EXAMPLE:		GENERAL FIELD INSTRUCTIONS		HONGREICH
(A) THIS IS PIPE #1. 6) FILL IN APPLICABLE INFORM 7) PIPE #2 IS THE NEXT PIPE (8) FILL IN APPLICABLE INFORM 8) FILL IN APPLICABLE INFORM 1			ABOVE. TH. OUT FLOW PIPE CLOCKWIS ORMATION FOR PIPE #1 (seingler per continuing in the cloud ormation for PIPE #2. SE, FILL IN APPLICABLE INFORMERS. CATION SKETCH BOX SHOW	e example). CKWISE DIRECTION. DRMATION
	CLIENT:	f &U SF	CREW:	CP CP
SURVEYING MAPPING GIS	JOB No.: 15696-	*	DATE: 2018	

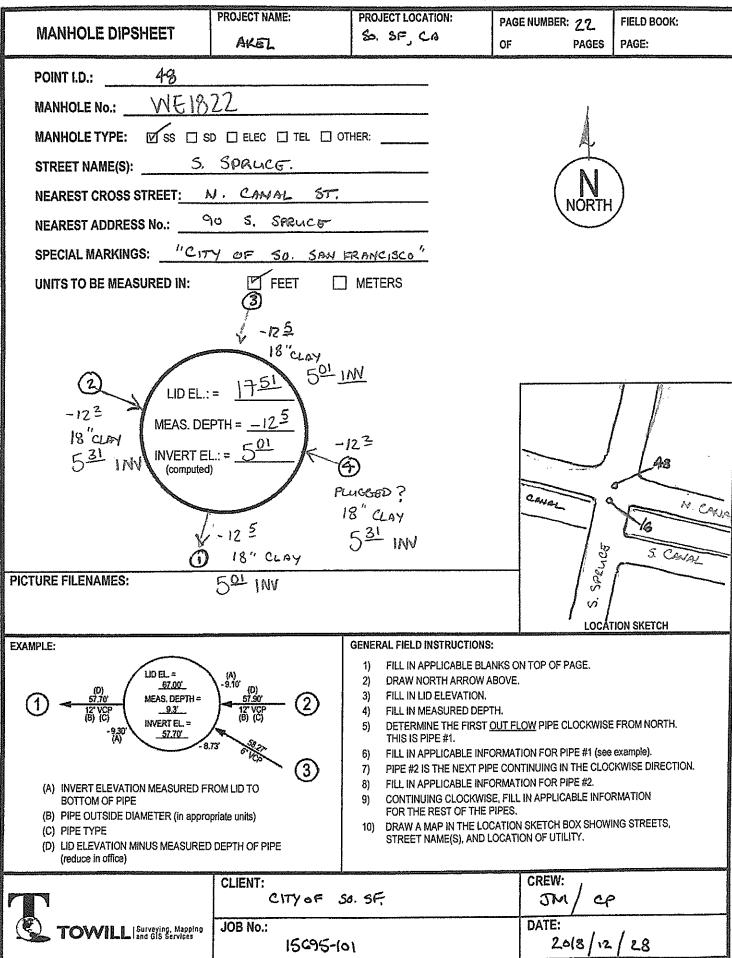
	PROJECT NAME:	PROJECT LOCATION:	PAGE NUMBER: 7	FIELD BOOK:
MANHOLE DIPSHEET	SSE-AKEL	SOUTH SAM 700.	OF 8 PAGES	PAGE:
POINT I.D.: 4	4		N	
MANHOLE TYPE: 🏇 SS 🗆				
STREET NAME(S):			(N	
NEAREST ADDRESS No.:	And the second s	to the second	NORTH	7
SPECIAL MARKINGS:				
UNITS TO BE MEASURED IN:	FEET [METERS		
MEAS. D INVERT (comput	CLOGED, 5 PHOTOS.	S.F.E	DOULD SYE LOCA	THOM TON
(A) INVERT ELEVATION MEASURED BOTTOM OF PIPE	FROM LID TO	THIS IS PIPE #1. 6) FILL IN APPLICABLE INF 7) PIPE #2 IS THE NEXT PI 8) FILL IN APPLICABLE INF 9) CONTINUING CLOCKWI	ANKS ON TOP OF PAGE. ABOVE. PTH. OUT FLOW PIPE CLOCKWIS CORMATION FOR PIPE #1 (se PE CONTINUING IN THE CLO CORMATION FOR PIPE #2. SE, FILL IN APPLICABLE INF	e example). OCKWISE DIRECTION.
(B) PIPE OUTSIDE DIAMETER (in app (C) PIPE TYPE (D) LID ELEVATION MINUS MEASURI (reduce in office)	ED DEPTH OF PIPE CLIENT:	FOR THE REST OF THE 10) DRAW A MAP IN THE LC STREET NAME(S), AND	CATION SKETCH BOX SHOWN LOCATION OF UTILITY.	
TOWILL SURVEYING MAPPING GIS	JOB No.:	695-101	EB/ DATE: 2018	MY -12 - 18



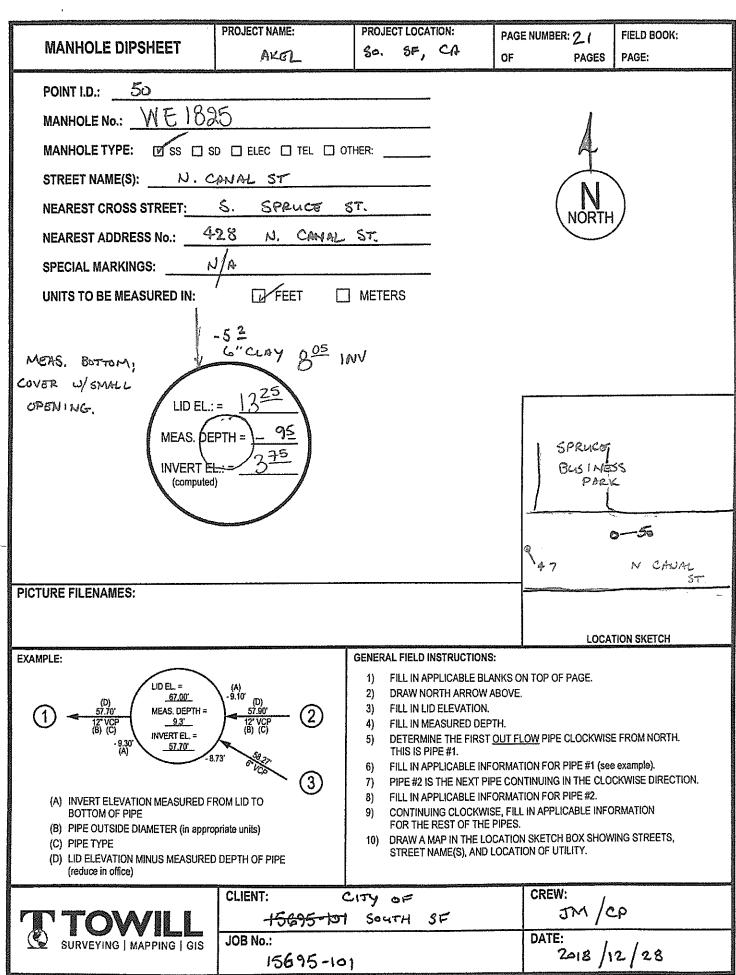
MANHOLE DIPSHEET	PROJECT NAME: AKEL	PROJECT LOCATION: S. SAM PRANCISCO, CA	PAGE NUMBER: \(\(\)	FIELD BOOK: PAGE:
POINT I.D.: 46 MANHOLE NO.: VETT MANHOLE TYPE: ESS STREET NAME(S): N. CAN NEAREST CROSS STREET: 1 NEAREST ADDRESS NO.: 80 SPECIAL MARKINGS: 1 UNITS TO BE MEASURED IN: 7 89 RX.	38 DELECTIEL OTT AL ST. DLE WOOD DR. I DLE WOOD DR. SANITARY SENER' FEET D 3.15 9.0 8" PIC 12 04 IN	HER:	OF PAGES	PAGE:
LID EL.: MEAS. DE INVERT EI (computed) PICTURE FILENAMES:	$PTH = \frac{-48}{6}$ = $\frac{24}{6}$)(i)	AGA N. CANAL ST	ION SKETCH
(A) INVERT ELEVATION MEASURED FR BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in approp	-9.10' (D)	THIS IS PIPE #1. 6) FILL IN APPLICABLE INFO 7) PIPE #2 IS THE NEXT PIPE 8) FILL IN APPLICABLE INFO 9) CONTINUING CLOCKWISE FOR THE REST OF THE PI	KS ON TOP OF PAGE. OVE. H. UT FLOW PIPE CLOCKWISE RMATION FOR PIPE #1 (SOO RMATION FOR PIPE #2. I, FILL IN APPLICABLE INFOR PES. ATION SKETCH BOX SHOWI	FROM NORTH. example). KWISE DIRECTION. RMATION
TOWIL SURVEYING MAPPING GIS	CLIENT: JOB No.: 1569	15	CREW: JM DATE: 2018/1	/DS 2 /15

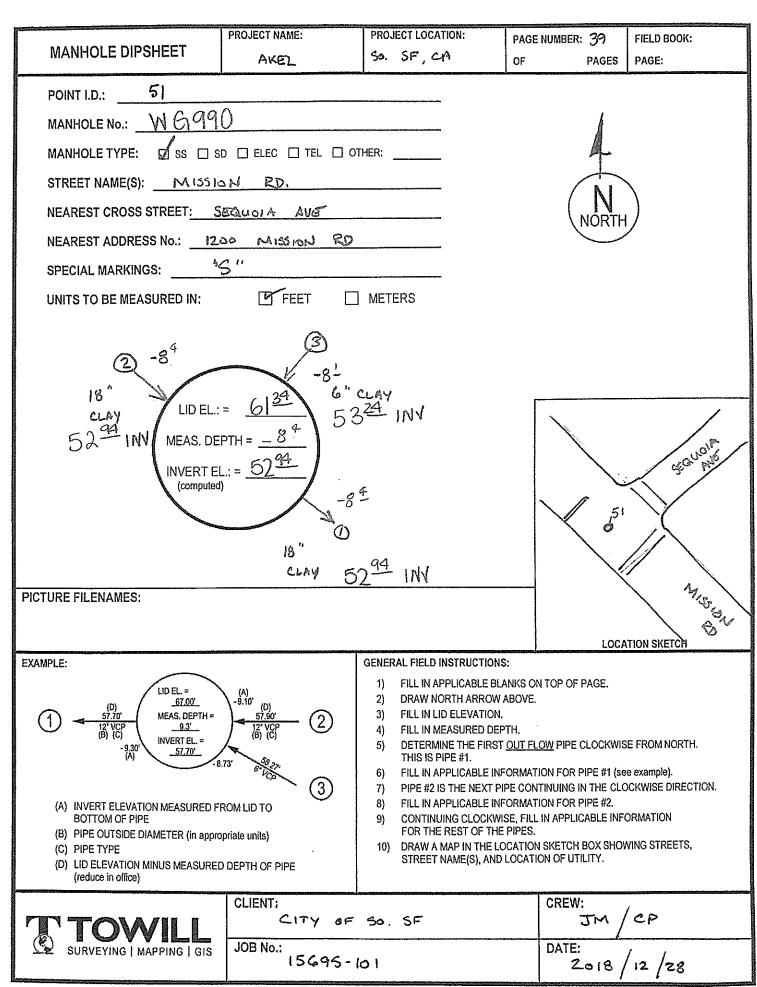
MANHOLE DIPSHEET	PROJECT NAME: AIGEL	PROJECT LOCATION: S. SAH FRANCISCO,	PAGE NUMBER: 4	FIELD BOOK:	
POINT I.D.: 46 A . MCOD TO SHOOT ? SHOT MANHOLE NO.: WE 738 MANHOLE TYPE: SS SD ELEC TEL OTHER: STREET NAME(S): NO. CANAL ST. NEAREST CROSS STREET: IDELAND DR. NEAREST ADDRESS NO.: 89 IDLEWOOD PR. SPECIAL MARKINGS: "SANITARY SEWER" UNITS TO BE MEASURED IN: PEET METERS					
PICTURE FILENAMES: LID EL: = $\frac{2}{3!}$ LID EL: = $\frac{2}{3!}$ MEAS. DEPTH = $\frac{14.85}{46}$ NVERT EL.: = $\frac{46}{6!}$ NVERT EL.: = $\frac{46}{6!}$ NVERT EL.: = $\frac{3}{46}$ NVERT EL.: = $\frac{46}{6!}$ NV					
(A) INVERT ELEVATION MEASURED FR BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in approp	OM LID TO riate units) DEPTH OF PIPE	THIS IS PIPE #1. 6) FILL IN APPLICABLE INFO 7) PIPE #2 IS THE NEXT PIPE 8) FILL IN APPLICABLE INFO 9) CONTINUING CLOCKWISE FOR THE REST OF THE PI	IKS ON TOP OF PAGE. 10. 1. UT FLOW PIPE CLOCKWISE RMATION FOR PIPE #1 (see E CONTINUING IN THE CLOC RMATION FOR PIPE #2. FILL IN APPLICABLE INFOI PES. ATION SKETCH BOX SHOWLOCATION OF UTILITY.	example). KWISE DIRECTION. RMATION	
TOWIL SURVEYING MAPPING GIS	CLIENT: JOB No.: 15495		CREW: JM / DATE: 2018/1		

MANHOLE DIPSHEET	PROJECT NAME: AKEL	PROJECT LOCATION:	PAGE NUMBER: 20	FIELD BOOK:
	MIDL	Ss. SF, CA	OF PAGES	PAGE:
POINT I.D.: 47	1	<u> </u>		
MANHOLE No.: WE 183				
MANHOLE TYPE: ☑ SS ☐ S	D	OTHER:	4	
STREET NAME(S): N. C	ANAL ST	M. P. J. Mar.		\
NEAREST CROSS STREET:	S. Spruce		(NORTH	
NEAREST ADDRESS No.: 44	O N. CANAL S	Action .		
SPECIAL MARKINGS: N	/A			
UNITS TO BE MEASURED IN: ઉ	FEET [3]] METERS		
	PTH = 10\(\frac{10}{2}\)	30"CLAY -10'5 273 INV	TO S. SARU	© 47
PICTURE FILENAMES:				
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(reduce in office)	oe. mo. rue			
	CLIENT:		CREW:	
TOWILL	JOB No.:	= 50. SF	DATE:	
SURVEYING MAPPING GIS	15695	j- 101	2018/1	2 28



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MANHOLE DIPSHEET	PROJECT NAME: AKEL	PROJECT LOCA		PAGE NUM OF	BER: 26 PAGES	FIELD BOOK: PAGE:
POINT I.D.: 49						
MANHOLE No.: WH 79	MANHOLE No.: WH792					
MANHOLE TYPE: SS SD SD SELEC TEL OTHER:						
STREET NAME(S): WYR	7.5		_		NI NI	\
NEAREST CROSS STREET:	o. SPRUCE		_		NORTH	
NEAREST ADDRESS No.: 23	0 s. sprice a	/E	•		(MOXIII)	7
SPECIAL MARKINGS:	ITY OF SAN M	ATEO "				
UNITS TO BE MEASURED IN:	FEET 🗆	METERS	·			
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	A. 55	BND				
LID EL.:						····
	PTH =56			٨	1/2	
. INVERT EL (computed)	_:= <u>12⁹⁵</u>				yang o	
(compared)					49	//
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10	- IM				:) B. E.
			WATOWATIONS		LOCÁ	TION SKETCH
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(D) LIO EL 57.00' S7.70' MEAS. DEPTH	\.9.10' (D) 	2) DRAW NO	ORTH ARROW A D ELEVATION.			
12 VOP (8) (C) (NEAS, DEPTH = 3.5" (S) (C) (NVERTEL =) = \frac{57.80^{\circ}}{127 VCP} (2) \ \ \(\begin{array}{c} \begin{array}{c} \circ \\ \begin{array}{c} \begin{array}{c} \circ \\ arr	4) FILL IN M	EASURED DEP	TH.	IPF CLOCKWIS	E FROM NORTH.
-830 5770 -83		THIS IS P				
,	3)	7) PIPE #2 IS	S THE NEXT PIF	PE CONTINUI	NG IN THE CLO	CKWISE DIRECTION.
(A) INVERT ELEVATION MEASURED FR BOTTOM OF PIPE		9) CONTINU	PPLICABLE INF	SE, FILL IN AF	PLICABLE INFO	ORMATION
(B) PIPE OUTSIDE DIAMETER (in approp (C) PIPE TYPE	oriate units)	10) DRAWAI	REST OF THE MAP IN THE LO	CATION SKET	CH BOX SHOW	/ING STREETS,
(D) LID ELEVATION MINUS MEASURED (reduce in office)	DEPTH OF PIPE	STREET	NAME(S), AND I	LOCATION OF	· UILLIII.	
(Lengue Jir Onivo)	CLIENT:		anni i i da sunta anna anna anna anna ann ann a	CR	EW:	
	CITY OF	So. 8F			JM/	<u>e</u> p
TOWILL Surveying, Mapping and GIS Services	JOB No.: 15695-10)(DA	TE: 2018/	12/28





MANHOLE DIPSHEET	PROJECT NAME:	PROJECT LOCATION:	PAGE NUMBER: 3	FIELD BOOK:			
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POINTILD:: 5Z							
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MANHOLETYPE: 👛 88 🗆 8	44 (# 8 - 4) 1 1 1 1 1 1 1 1 1	ACCORDING TO A STATE OF THE STA					
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NEAREST ADDRESS No.:	URI BURI LI	OUDE STORE					
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in the transfer of the first of the first and the first of the first o	= <u>VI</u> РТН = <u>-/0⁷⁵</u>		Accord				
10 15 INVERTEL	研算が目的なAssi の数 り 中/ 日 かり、ことすじ						
(computed)			30				
			32				
PICTURE FILENAMES:			WEST 8000064	\\$			
			. 1	N SKETCH			
EXAMPLE:	G	ENERAL FIELD INSTRUCTIONS:					
UD EL. F	\ \(\bigcirc \frac{(A)}{0.8.10} \\ \ \cdot \frac{(B)}{0.01} align*	FILL IN APPLICABLE BLANK DRAW NORTH ARROW ABO					
(f) (g) (heat et a 12 year et a 12 et) = 57.90 17.900 (6) (C) (2)	3) FILL IN LID ELEVATION. 4) FILL IN MEASURED DEPTH.					
-9.70 51.70 (W) 51.70		IMIS IS PIPE #1,	TFLOW PIPE CLOCKWISE F				
	*\ 3	7) PIPE #2 IS THE NEXT PIPE	MATION FOR PIPE #1 (see ex CONTINUING IN THE CLOCK	ample). WISE DIRECTION.			
(A) INVERTIELEVATION MEASURED FROM LID TO 8) FILL IN APPLICABLE INFORMATION FOR PIPE #2, 9) CONTINUING CLOCKWISE, FILL IN APPLICABLE INFORMATION							
(B) PIPE OUTSIDE DIAMETER (in approp (C) PIPE TYPE		FOR THE REST OF THE PIP 10) DRAW A MAP IN THE LOCA	TION SKETCH BOX SHOWING	STREETS			
(D) LID ELEVATION MINUS MEASURED I (reduce in office)	DEPTH OF PIPE	STREET NAME(S), AND LOC	ATION OF UTILITY.				
	CLIENT:		CREW:				
'U'TOWILL	JOB No.:		EB/JL/	55			
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	PROJECT NAME:			
MANHOLE DIPSHEET	AKEL	PROJECT LOCATION:	PAGE NUMBER: 13	FIELD BOOK;
POINT I.D.: 5'3			OF PAGES	PAGE:
MANHOLE No.: WG/2) 89			
MANHOLE TYPE: ☑ SS ☐ S		HER:	A	
STREET NAME(S): ARROYO				
NEAREST CROSS STREET:		•	(N)	
NEAREST ADDRESS No.: //c			NORTH	
SPECIAL MARKINGS:				
UNITS TO BE MEASURED IN:	FEET D	METERS		No. of the state o
	(D		
	13.05			Book Alexander
	7 4	VMI PFP		
LID EL.:	= 6874		4	_
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INVERT EL (computed)	:= 49 81		D' Reg	SA SA
Computed				
	Constitution of the last of th			- 13 Eg
2) 18 % ouc	83 INV		\delta \.	Sign
PICTURE FILENAMES:	1144		Mas to Am	
EVANDE.		ACHENI PER BUTTUATIONS	LOCAT	TION SKETCH
EXAMPLE:		GENERAL FIELD INSTRUCTIONS: 1) FILL IN APPLICABLE BLAN	NKS ON TOP OF PAGE.	
(D) G7.00' MEAS. DEPTH =	-9.10' (D) -57.90' (2)	 DRAW NORTH ARROW AS FILL IN LID ELEVATION. 		
12*VCP B3'-) = 57.90° 12°VCP (ii) (c) (2)	4) FILL IN MEASURED DEPT	= -	
-9.30 <u>51.70</u>	13' 642	THIS IS PIPE #1.	<u>OUT FLOW</u> PIPE CLOCKWISE	
	" ²⁵ 3	7) PIPE #2 IS THE NEXT PIPI	RMATION FOR PIPE#1 (see E CONTINUING IN THE CLO	
(A) INVERT ELEVATION MEASURED FF BOTTOM OF PIPE	i	8) FILL IN APPLICABLE INFO9) CONTINUING CLOCKWISI	E, FILL IN APPLICABLE INFO	RMATION
(B) PIPE OUTSIDE DIAMETER (in approp (C) PIPE TYPE	oriate units)	FOR THE REST OF THE PIPES. 10) DRAW A MAP IN THE LOCATION SKETCH BOX SHOWING STREETS,		
(D) LID ELEVATION MINUS MEASURED DEPTH OF PIPE STREET NAME(S), AND LOCATION OF UTILITY. (reduce in office)				
	CLIENT:		CREW:	/
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SURVEYING MAPPING GIS	JOB No.: 15695		DATE: 2018 /	12/15
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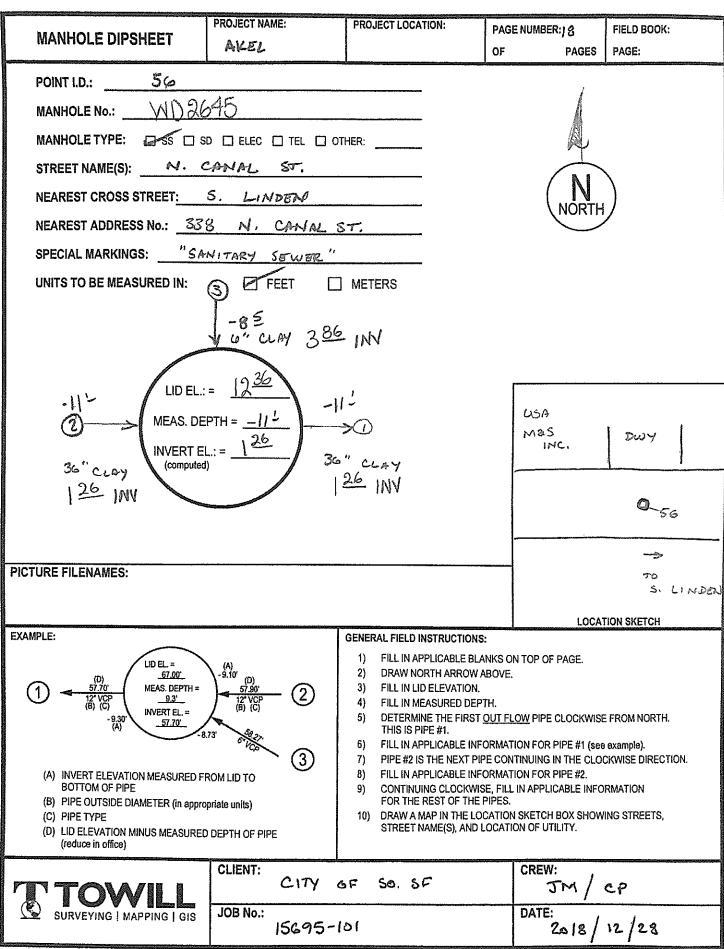
MANHOLE DIPSHEET	PROJECT NAME;	PROJECT LOCATION: S SAN FRANCISCO, CA	PAGE NUMBER: 14- OF PAGES	FIELD BOOK: PAGE:	
POINT I.D.: 53 A MANHOLE NO.: WG 1289 MANHOLE TYPE: SS SS SD SELEC STEL STREET NAME(S): ARROYO DR. NEAREST CROSS STREET: EL CAMINO REAL NORTH					
NEAREST ADDRESS No.: 110 SPECIAL MARKINGS: '1 SE		KEAL			
SPECIAL MARKINGS:					
(A) INVERT ELEVATION MEASURED FR BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in approp	GENERAL FIELD INSTRUCTIONS: 1) FILL IN APPLICABLE BLANKS ON TOP OF PAGE. 2) DRAW NORTH ARROW ABOVE. 3) FILL IN LID ELEVATION. 4) FILL IN MEASURED DEPTH. 5) DETERMINE THE FIRST <u>OUT FLOW</u> PIPE CLOCKWISE FROM NORTH. THIS IS PIPE #1. 6) FILL IN APPLICABLE INFORMATION FOR PIPE #1 (see example). 7) PIPE #2 IS THE NEXT PIPE CONTINUING IN THE CLOCKWISE DIRECTION. 8) FILL IN APPLICABLE INFORMATION FOR PIPE #2. 9) CONTINUING CLOCKWISE, FILL IN APPLICABLE INFORMATION FOR THE REST OF THE PIPES. 10) DRAW A MAP IN THE LOCATION SKETCH BOX SHOWING STREETS, STREET NAME(S), AND LOCATION OF UTILITY.		e example). CKWISE DIRECTION. DRMATION		
TOWILL SURVEYING MAPPING GIS	CLIENT: JOB No.: 1569	5	DATE:	/ DS /12/15	

MANHOLE DIPSHEET SSF - Out	PROJECT LOCATION: South San Fa	PAGE NUMBER: 4	FIELD BOOK:
POINTLD: SY		· LOF 6 PAGES	PAGE:
MANHOLE No.: WE 1716		A	
MANHOLE TYPE: 🎓 SS 🗆 SD 🗀 ELEC 🗀 TEL 🖂	I OTHER		
STREET NAME(S): ORGANGE AVE		1	
NEAREST CROSS STREET: CIRCUS C	the state of the s	(N)	
NEAREST ADDRESS No.:		NORTH	/
SPECIAL MARKINGS:			
UNITS TO BE MEASURED IN: A A A A A A A A A	METERS (8 ae) (1) oo OUT 1425 INN	CIRCLE CO.	JOTT ZAJ
		LOCATION)N SKETCH
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TOWIL JOB No.: 15695	- (0)	CREW: E8 / 5 2 DATE: 20/8-	

POINT I.D.: 54 A MANHOLE NO.: N/A WEITO MANHOLE TYPE: CLASC SO CLEC CT NEAREST CROSS STREET: CLASC ANC NEAREST ADDRESS NO.: 70-9- SPECIAL MARKINGS: SELIT ARY SCHARZ UNITS TO BE MEASURED IN: FEET CHART MEAS. DEPTH =IO, 4-	MANHOLE DIPSHEET	PROJECT NAME: AKEL	PROJECT LOCATION: S. SAM FRANCISCO, C.A	PAGE NUMBER: 8	FIELD BOOK: PAGE:
MANHOLE TYPE: [] -8 S O ELEO TEL OTHER STREET NAME(S): C.12-C.E.G. AT NEAREST CROSS STREET: OF A ANGE ANGE NEAREST ADDRESS NO.: 7-04- SPECIAL MARKINGS: S-4-17 ARY SS-NETR UNITS TO BE MEASURED IN: FEET METERS -6 : 8 G' C.F.AY 18 1 INV LID EL: = 24 97 INVERT EL: MEAS. DEPTH = -10, A INVERT EL: MEAS. DEPTH = -10, A INVERT EL: MEAS. DEPTH = -10, A INVERT EL: MEAS. DEPTH MEAS. DEPTH MEAS. DEPTH ARY SENSE INVERT ELE: MEAS. DEPTH MEAS. DEPTH ARY SENSE INVERT ELE: MEASURED DEPTH ARY SENSE INVERT ELE: MEASURED DEPTH ARY MASS. DEPTH ARY SENSE INVERT ELEVATION MEASURED FROM LID TO BOTTOM OF PIPE (I) OR OBSTRUCTIONS INVERT ELEVATION MEASURED FROM LID TO BOTTOM OF PIPE (I) OR OBSTRUCTION SET IN MEASURED DEPTH OF PIPE (I) OP PIPE (I) OTHER MESS. THE REST OF PIPE AND	POINT I.D.: 54 A				
STREET NAME(S): C12CLE AT MEAREST CROSS STREET: OR A PAGE AVC NEAREST ADDRESS No.: 7-04- SPECIAL MARKINGS: SPAIT A 27 SENETY UNITS TO BE MEASURED IN: FEET METERS -6.8 6 CLAY INVERT EL: 45T (OURDING) MEAS. DEPTH = 10.4 1 INVERT EL: 45T (COMPUNE) PICTURE FILENAMES: EXAMPLE: OENERAL FIELD INSTRUCTIONS: INV OENERAL FIELD INSTRUCTIONS: INV INVERT EL: 45T (OUR WORTH ARROW ABOVE.) PIL IN DELEVATION MEASURED FROM LID TO BOTTOM OF PIPE (I) HE WAS PIPE OUTSIDE DIMETER (in appropriate units) (C) PIPE TIPE IS THE NEXT PIPE CONTINUING IN THE CLOWN'SE DIRECTION. PIL IN APPLICABLE INFORMATION FOR PIPE RI (one sample). PIL IN APPLICABLE INFORMATION FOR PIPE RI (on	MANHOLE No.: W/A	ME1316			
NEAREST CROSS STREET: OR ANGLE AND NEAREST ADDRESS No.: 709- SPECIAL MARKINGS: SANIT ARY SENSER UNITS TO BE MEASURED IN: FEET METERS - 6. 8 6 CLAY 18 17 NVERT EL:: 45 51 (computed) PICTURE FILENAMES: EXAMPLE: (A) MARKE DEPTH = 10.4 1	MANHOLE TYPE: ☐ 55 ☐ SI	ELEC TEL OT	HER:	L	
NEAREST ADDRESS No.: 7-04- SPECIAL MARKINGS: SENSTR UNITS TO BE MEASURED IN: FEET METERS -6. 8 6 CLAY 18 1-1	STREET NAME(S): CIRCL	ea	Made de la constant d		\
NEAREST ADDRESS No.: 704 SPECIAL MARKINGS: SANIT ARY SENGTR UNITS TO BE MEASURED IN: FEET METERS LID EL:: 24 97 INVERT EL:: 451 INVERT EL:: 451 INVERT EL:: 552 INVERT EL	NEAREST CROSS STREET:	OR ANGE ANE		(NORTH	
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PICTURE FILENAMES: EXAMPLE: (A) LOCATION SKETCH DEL ST.20 MEAS. GEPTH - ST.20 MEAS. GEPT	9 1	14	55 INV	CIRC.	
PICTURE FILENAMES: Standard	14 88 INV (computed)			C.	
PICTURE FILENAMES: Cocation Sketch Cocation Sketch					RAILROAD
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2) DRAW NORTH ARROW ABOVE. 3) FILL IN LID ELEVATION. 4) FILL IN MEASURED DEPTH. 57.70' MEAS. DEPTH = .9.3' NOVERT EL = .9.30' NOVERT EL = .9.30' NOVERT EL = .9.30' NOVERT EL = .9.30' NOVERT ELEVATION MEASURED FROM LID TO BOTTOM OF PIPE (A) INVERT ELEVATION MEASURED FROM LID TO BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in appropriate units) (C) PIPE TYPE (D) LID ELEVATION MINUS MEASURED DEPTH OF PIPE (C) LID ELEVATION MINUS MEASURED DEPTH OF PIPE (C) CLIENT: DRAW NORTH ARROW ABOVE. 3) FILL IN LID ELEVATION. 4) FILL IN MEASURED DEPTH. 5) DETERMINE THE FIRST OUT FLOW PIPE CLOCKWISE FROM NORTH. THIS IS PIPE #1. 6) FILL IN APPLICABLE INFORMATION FOR PIPE #12. 9) CONTINUING CLOCKWISE, FILL IN APPLICABLE INFORMATION FOR THE REST OF THE PIPES. 10) DRAW A MAP IN THE LOCATION SKETCH BOX SHOWING STREETS. 5) STREET NAME(S), AND LOCATION OF UTILITY. CREW: JM/ DS LOB No.:	EXAMPLE:	4			
4) FILL IN MEASURED DEPTH. (B) (C) (C) (C) (C) (C) (C) (C) (C) (C) (C	87.00	1 (0)	2) DRAW NORTH ARROW A		en e
5) DETERMINE THE FIRST <u>OUT FLOW</u> PIPE CLOCKWISE FROM NORTH. THIS IS PIPE #1. 6) FILL IN APPLICABLE INFORMATION FOR PIPE #1 (see example). 7) PIPE #2 IS THE NEXT PIPE CONTINUING IN THE CLOCKWISE DIRECTION. 8) FILL IN APPLICABLE INFORMATION FOR PIPE #2. 9) CONTINUING CLOCKWISE, FILL IN APPLICABLE INFORMATION FOR THE REST OF THE PIPES. 10) DRAW A MAP IN THE LOCATION SKETCH BOX SHOWING STREETS, STREET NAME(S), AND LOCATION OF UTILITY. CREW: JM / DS CLIENT: CREW: JM / DS JOB No:	U izver es) = \frac{57.90^{\text{*}}}{12^{\text{*}}\VCP} (2)	4) FILL IN MEASURED DEPT		
(A) INVERT ELEVATION MEASURED FROM LID TO BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in appropriate units) (C) PIPE TYPE (D) LID ELEVATION MINUS MEASURED DEPTH OF PIPE (reduce in office) (A) INVERT ELEVATION MEASURED FROM LID TO BOTTOM OF PIPE (In appropriate units) (C) PIPE TYPE (D) LID ELEVATION MINUS MEASURED DEPTH OF PIPE (reduce in office) (C) PIPE TYPE (TO LID ELEVATION MINUS MEASURED DEPTH OF PIPE (TO LID ELEVATION MINUS MEASURED DEPTH OF PIPE (TO LID ELEVATION MINUS MEASURED DEPTH OF PIPE (D) LID ELEVATION MINUS MEASURED DEPTH OF PIPE (TO LID ELEVATION MINUS MEASURED DEPTH OF PIPE (D) LI	-9,30 <u>57,70'</u>		THIS IS PIPE #1.		
(A) INVERT ELEVATION MEASURED FROM LIB TO BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in appropriate units) (C) PIPE TYPE (D) LID ELEVATION MINUS MEASURED DEPTH OF PIPE (reduce in office) (C) PIPE TYPE (reduce in office) (C) CLIENT: (C) CREW: CREW: CREW: CREW: CREW: DATE:		3	7) PIPE #2 IS THE NEXT PIP	E CONTINUING IN THE CLOC	
(B) PIPE OUTSIDE DIAMETER (in appropriate units) (C) PIPE TYPE (D) LID ELEVATION MINUS MEASURED DEPTH OF PIPE (reduce in office) CLIENT: CREW: JM / DS JOB No:		ROM LID TO	9) CONTINUING CLOCKWIS	E, FILL IN APPLICABLE INFOR	RMATION
(PO) LID ELEVATION MINUS MEASURED DEPTH OF PIPE CREW: JM / DS JOB No: DATE:	* * * * * * * * * * * * * * * * * * * *	oriate units)	10) DRAW A MAP IN THE LOC	CATION SKETCH BOX SHOW	NG STREETS,
TOWILL JOB NO: DATE:	(D) LID ELEVATION MINUS MEASURED	DEPTH OF PIPE	STREET NAME(S), AND L	OCATION OF CILLIT.	
TOWIL JOB No.: JOB No.: JOB No.: 15695 DATE: 2018/12/15		CLIENT:		CREW:	~ a
SURVEYING MAPPING GIS 15695 2018/12/15	TOWILL	IOB No :	, , , , , , , , , , , , , , , , , , ,	DATE:	<i>,</i>
	SURVEYING MAPPING GIS	15695		2018/	12/15

	PROJECT NAME:	PROJECT LOCATION:	PAGE NUMBER: /	FIELD BOOK:
MANHOLE DIPSHEET	SSF- ALEL	Sony Soute		PAGE:
POINT LO.: 55	an a	en en de mante en	in with Andrew and the interest of the second section of the section of the second section of the section of the second section of the	в населения по на на него на
MANHOLE No.: 10E	1528	dendrig offenne villen en vor trost och som med priprimen som dendrigsproduser		
MANHOLETYPE: W ss []	SO CLEC CTEL CL	OTHER:		
STREET NAME(S):		The state of the s		
NEAREST CROSS STREET:			2 (N	And the second s
NEAREST ADDRESS No.:		All the state of t	NORTH	
SPECIAL MARKINGS:	The second secon	MANATOR (N. N. P. P. SOCIETY AND SOCIETY AND		
UNITS TO BE MEASURED IN:	B FEET [] METERS		
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	52		(C. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6.	
	山河		THE	3
PICTURE FILENAMES:		<u>N</u>		000
			egosine egosin	
EXAMPLE:		GENERAL FIELD INSTRUCTIONS:		ON SKETCH
WBL.	NA IA	1) FILL IN APPLICABLE BLAN	KS ON TOP OF PAGE	CONTROL CONTRO
(1) ST NY MEAS DEPTH.	(A) 9.810 9.7100 12.7000 (2)	 DRAW NORTH ARROW AT FILL IN LID ELEVATION. 		
WENT LE	L SKI	 FILL IN MEASURED DEPT DETERMINE THE FIRST OF 	H. <u>PUT FLOW</u> PIPE CLOCKWISE I	FROMMORTH
	IN PARTY	6) FILL IN APPLICABLE INFO	RMATION FOR PIPE #1 (see e	(xamole)
(A) INVERTELEVATION MEASURED F	ROM LID TO	 PIPE #2 IS THE NEXT PIPI FILL IN APPLICABLE INFO 	E CONTINUING IN THE CLOCK	(WISE DIRECTION.
BOTTOM OF PEPE (B) PIPE OUTSIDE DIAMETER (in appro	i kanala da i	9) CONTINUING CLOCKWISE FOR THE REST OF THE P	E. FILL IN APPLICABLE INFOR	MOITAM
(C) PIPE TYPE (D) LID ELEVATION MINUS MEASURE!	441.3	10) DRAW A MAP IN THE LOC STREET NAME(S), AND LO	ATION SKETCH BOX SHOWN	IG STREETS,
(reduce in office)				
	CLIENT:		CREW:	52/55.
SURVEYING MAPPING GIS	JOB No.:	- 101	DATE:	5L / 5S.
	15695	- 101	2018-1.	2-06



MANHOLE DIPSHEET	PROJECT NAME: AKEL	PROJECT LOCA		PAGE NUMBER: OF	25 Pages	FIELD BOOK: PAGE:
POINT I.D.: 57			•	darramorra (1914) ilminim mendik dara dara dara dara dara dara dara dar		
MANHOLE No.: WL188	2		_		Į.	
MANHOLE TYPE: 🗹 ss 🗆 si	ELEC TEL OT	THER:	-		4	
STREET NAME(S):SCA	val St.		-			\
NEAREST CROSS STREET:	TARLITE ST.		-	(_N	IN IORTH	
NEAREST ADDRESS No.: 4	57 S. CANAL ST	•	•			/
SPECIAL MARKINGS: "SAN	inpey sewer"		-			
UNITS TO BE MEASURED IN:	12 " CLAY 3 13 1NV	METERS				
LID EL.: MEAS. DEI INVERT EL (computed)	$PTH = \frac{-855}{242}$ $A = \frac{342}{2}$	2" alay 33° INV			57	
3" CAI -71				NEWPORT EISH CO #457		CANAL S
PICTURE FILENAMES: 487	INV				15	JORTEX TION SKETCH
EXAMPLE:		GENERAL FIELD	INSTRUCTIONS	•		
(D) EL = 57.00' MEAS. DEPTH = -9.30' INVERT EL = -57.70' -9.31' -9.30' -	(A) -9.10' (D) -57.50' (Z) -17 VCP (B) (C) 3	2) DRAW NO 3) FILL IN LI 4) FILL IN M 5) DETERM THIS IS F 6) FILL IN A	ORTH ARROW A ID ELEVATION. IEASURED DEP INE THE FIRST PIPE #1. PPLICABLE INF	TH. <u>OUT FLOW</u> PIPE CL ORMATION FOR PIF	.OCKWISI PE#1 (see	
 (A) INVERT ELEVATION MEASURED FR BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in approp (C) PIPE TYPE (D) LID ELEVATION MINUS MEASURED (reduce in office) 	OM LID TO priate units) DEPTH OF PIPE	8) FILL IN A 9) CONTINU FOR THE 10) DRAW A	PPLICABLE INF JING CLOCKWIS REST OF THE MAP IN THE LO	ORMATION FOR PIF SE, FILL IN APPLICA	PE #2. \BLE INFO OX SHOW	DRMATION
	CLIENT: CITY OF 50	. San Fran	Cisco.	CREW:	JM /	CP
TOWILL Surveying, Mapping and GIS Services	JOB No.: 15695-1	o _l	·	DATE:	2018)	12/28

	PROJECT NAME:	PROJECT LOCATION:	t de la companya del companya de la companya del companya de la companya del la companya de la c	
MANHOLE DIPSHEET	AKEL	So. SF, CA	PAGE NUMBER: 12 OF PAGES	FIELD BOOK: PAGE:
POINT I.D.: 58				
MANHOLE No.: WLS	1874		1	
	D [] ELEC [] TEL [] OT	HER:		
STREET NAME(S): SETWEE			ory	
NEAREST CROSS STREET: 5				
NEAREST ADDRESS No.: 23	S S. MAPLE AVE		NORTH	
	NITARY SEWER	ł ₃		
UNITS TO BE MEASURED IN:	FEET []	METERS		
-5 ^g (2)	<u> </u>			
6"57-	1-7- 12" CLAY			
6 ⁶ INV	E 37	NV		
LID EL.:	= 1247			1511
MEAS. DE	PTH = <u>-7'5</u>		8L0(# 39	Wind House
INVERT EI				
(computed	,		WARD HOUSE Duy D	- /
12"			2007 3	58
casy V-	7 <u>2</u> - 27		8200	58
PICTURE FILENAMES:	5º INV		- to /	/
				ATION SKETCH
EXAMPLE:	:	GENERAL FIELD INSTRUCTIONS 1) FILL IN APPLICABLE BLA		
(D) LID EL. = <u>67.00'</u> MEAS, DEPTH =	(A) -9.10' (D) -57.90'	 DRAW NORTH ARROW A FILL IN LID ELEVATION. 	ABOVE.	
12"VCP 9.3" (B) (C) (NVERT EL. =	57.90' 12' VCP (B) (C)	4) FILL IN MEASURED DEP	TH. <u>OUT FLOW</u> PIPE CLOCKWIS	EE EDOM NODTH
-9.30'	13' 6" O.	THIS IS PIPE #1.	ORMATION FOR PIPE #1 (se	
	`(3)	7) PIPE #2 IS THE NEXT PI	PE CONTINUING IN THE CLO	
(A) INVERT ELEVATION MEASURED FI BOTTOM OF PIPE		9) CONTINUING CLOCKWIS	ORMATION FOR PIPE #2. SE, FILL IN APPLICABLE INF	ORMATION
(B) PIPE OUTSIDE DIAMETER (in appro (C) PIPE TYPE		FOR THE REST OF THE 10) DRAW A MAP IN THE LO	CATION SKETCH BOX SHO	WING STREETS,
(D) LID ELEVATION MINUS MEASURED (reduce in office)	DEPTH OF PIPE	STREET NAME(S), AND	LOOAHON OF UHLIEF.	
	CLIENT:		CREW:	
TOWILL	JOB No.:	మ. క్	DATE:	CP
SURVEYING MAPPING GIS	15695	-101		12/28

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MANHOLE DIPSHEET	PROJECT NAME: AVEL	PROJECT LOCATION: So. 8 F, CA	PAGE NUMBER: 11	FIELD BOOK:
	FFV Co.	Marie Commission Commi	OF PAGES	PAGE:
POINT I.D.: 58 A	¬ A			
MANHOLE No.: WL28	+4			
MANHOLE TYPE: 🗹 SS 🗆 S	D	THER:	A.	
STREET NAME(S): BTWN S.	MAPLE S. LINDEN;	S. OF VICTORY		
NEAREST CROSS STREET: S.	MAPLE AVE		(NORTH	٦)
NEAREST ADDRESS No.: 233	S, MAPLE AVE		Non	7
SPECIAL MARKINGS:	RM			
	$= 13\frac{78}{1}$ $= 13\frac{78}{2}$ $= -7\frac{8}{2}$ $= 5\frac{98}{2}$ $= -2\frac{3}{2}$	METERS 47- 1158 INV 4"STL 58 INV	DWY WAREHOUSE/ DWY WAREHOUSE/ DFFICE \$20	58 AMA O 58
EXAMPLE:		GENERAL FIELD INSTRUCTION		ATION SKETCH
(A) INVERT ELEVATION MEASURED F BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in appro	opriate units) D DEPTH OF PIPE	2) DRAW NORTH ARRO 3) FILL IN LID ELEVATIO 4) FILL IN MEASURED D 5) DETERMINE THE FIR THIS IS PIPE #1. 6) FILL IN APPLICABLE 7) PIPE #2 IS THE NEXT 8) FILL IN APPLICABLE 9) CONTINUING CLOCK FOR THE REST OF T 10) DRAW A MAP IN THE	ON. SEPTH. ST <u>OUT FLOW</u> PIPE CLOCKWI INFORMATION FOR PIPE #1 (s PIPE CONTINUING IN THE CL INFORMATION FOR PIPE #2. WISE, FILL IN APPLICABLE INI	ee example). OCKWISE DIRECTION. FORMATION
	CLIENT:	of So. Sf	CREW:	leo
SURVEYING MAPPING GIS	JOB No.:	-1. Ju. 0F	DATE:	/
, and the poly	N N N N N N N N N N N N N N N N N N N	15-101	1	8/12/29

MANHOLE DIPSHEET	PROJECT NAME:	PROJECT LOC		PAGE NUMBER: 9	FIELD BOOK:
POINT I.D.: MANHOLE No.: WL2 MANHOLE TYPE: \$\frac{1}{2}\$ SS \$\square\$ STREET NAME(S): \$\frac{1}{2}\$ NEAREST CROSS STREET:	DELEC TEL OT	THER:		N	
NEAREST ADDRESS No.: 3	S LINDEN	AVE		NORTH	
	L:= 7	PCP BO BO INV	>	VICTORY AS	TROIN PROSE
PICTURE FILENAMES:				LOCATI	ION SKETCH
(A) INVERT ELEVATION MEASURED F BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in approach of the pipe of	priate units)	2) DRAW N 3) FILL IN L 4) FILL IN N 5) DETERM THIS IS F 6) FILL IN A 7) PIPE #2 I 8) FILL IN A 9) CONTINL FOR THE	PPLICABLE BLAN ORTH ARROW AB ID ELEVATION. BEASURED DEPTH INE THE FIRST OF PIPE #1. PPLICABLE INFOI S THE NEXT PIPE PPLICABLE INFOI INING CLOCKWISE EREST OF THE PI MAP IN THE LOCK	KS ON TOP OF PAGE. OVE. I. UT FLOW PIPE CLOCKWISE RMATION FOR PIPE #1 (see a CONTINUING IN THE CLOCK RMATION FOR PIPE #2. FILL IN APPLICABLE INFOR	FROM NORTH. example). KWISE DIRECTION. RMATION
TOWILL SURVEYING MAPPING GIS	JOB No.: 15 695			CREW: EB /MY DATE: 20 18 - 1	

	PROJECT NAME:	PROJECT LOCATION:	gyanarin gana tarang sang nang nang nalawa na kadahari kanada nang nang nang na	
MANHOLE DIPSHEET	AKEL	S. SAN PRANCISCO,	PAGE NUMBER: (FIELD BOOK: PAGE:
	PAREA		OF PAGES	PAGE:
POINT I.D.: 61	-			
MANHOLE No.: WL26	550			
MANHOLE TYPE: ☑ SS 🗆 S	SD 🗆 ELEC 🗆 TEL 🗀 C	THER:	A	
STREET NAME(S): S. レル	NDEN		NI	
NEAREST CROSS STREET: '		· · · · · · · · · · · · · · · · · · ·	(NORTH	, <i>)</i>
NEAREST ADDRESS No.: <u>35</u>	. S. LINDEN	Ave		/
SPECIAL MARKINGS: ん	<u> </u>			
UNITS TO BE MEASURED IN:	FEET [] METERS		
CAN'T				
DETERMINE LIDEL.	= 14=2			
PIDE INV'S		,70		J 56
@ 30TTOM MEAS. DE	PTH =	4" 1002 INV	N. CANAL	- 3 &
INVERT E	L.: = 3 ¹²	4 10 - INV	57	S. LINDEN
(compared				CAWAL
	6"		S. CAHAL	4 18 5
ø	CLAY -6.4 DE CONC.			9 G, 61A
PICTURE FILENAMES:	832 INV			144
	0		**************************************	The state of the s
EXAMPLE:		GENERAL FIELD INSTRUCTIONS		TION SKETCH
		1) FILL IN APPLICABLE BLA		
(D) LID EL. =	(A) -9.10' (D) -57.90' (2)	 DRAW NORTH ARROW A FILL IN LID ELEVATION. 	BOVE.	
57.70' MEAS, DEPTH = 9.3' (B) (C) MASS TEL =	57.90' 12' VCP (8) (C)	4) FILL IN MEASURED DEPT		
-9.30 THIS IS PIPE #1.			<u>DUT FLOW</u> PIPE CLOCKWISE	FROM NORTH.
.8.	73' 8%	6) FILL IN APPLICABLE INFO	ORMATION FOR PIPE #1 (see	example).
7) PIPE #2 IS THE NEXT PIPE CONTINUING IN THE CLOCKWISE DIRECTION (A) INVERT ELEVATION MEASURED FROM LID TO 8) FILL IN APPLICABLE INFORMATION FOR PIPE #2.				
BOTTOM OF PIPE	•	9) CONTINUING CLOCKWIS FOR THE REST OF THE P	E, FILL IN APPLICABLE INFO	RMATION
(B) PIPE OUTSIDE DIAMETER (in approp (C) PIPE TYPE	priate units)	10) DRAW A MAP IN THE LO	CATION SKETCH BOX SHOW	ING STREETS,
(D) LID ELEVATION MINUS MEASURED (reduce in office)	DEPTH OF PIPE	STREET NAME(S), AND L	OCATION OF CITELLET.	
fragger in Ameri	CLIENT:		CREW:	
TAMIII	1	30. 5F	JM/C DATE: 2018/12	P
SURVEYING MAPPING GIS	JOB No.:		DATE:	1
	15695-10	1	2018/12	128

	PROJECT NAME:	PROJECT LOCATION:	PAGE NUMBER: 2	FIELD BOOK:
MANHOLE DIPSHEET	AVEL	30. SF, CA	OF PAGES	PAGE:
MANHOLE DIPSHEET POINT I.D.: GA- MANHOLE No.: WL26 MANHOLE TYPE: SS SS STREET NAME(S): S. LIM NEAREST CROSS STREET: S NEAREST ADDRESS No.: 35 SPECIAL MARKINGS:	50 D ELEC TEL OT V DEN AVE. S. CANAL ST. S. LINDEN AU	THER:	OF PAGES	
UNITS TO BE MEASURED IN:	FEET	METERS		
CAN'T DETERMINE PIPE INV'S @ BOTTOM LIDEL.: MEAS. DE INVERT EI (computed)	$\frac{1}{163}$ L:= $\frac{-2^{12}}{2}$	-3? +/- 4" 5TL 10 ⁴⁸ INV	S. CANAL ST.	CANAL S. LINDEN
PICTURE FILENAMES:				GIA
				TIONSKETCH
(A) INVERT ELEVATION MEASURED FIBOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in appro	opriate units) O DEPTH OF PIPE	THIS IS PIPE #1. 6) FILL IN APPLICABLE INFO 7) PIPE #2 IS THE NEXT PIF 8) FILL IN APPLICABLE INFO 9) CONTINUING CLOCKWIS FOR THE REST OF THE I	NKS ON TOP OF PAGE. ABOVE. TH. OUT FLOW PIPE CLOCKWISE ORMATION FOR PIPE #1 (see PE CONTINUING IN THE CLOI ORMATION FOR PIPE #2. BE, FILL IN APPLICABLE INFO PIPES. CATION SKETCH BOX SHOW LOCATION OF UTILITY.	e example). CKWISE DIRECTION. DRMATION
TOWILL SURVEYING MAPPING GIS	CLIENT: CITY OF S. JOB No.: 15695-101	\$ <i>F</i>	DATE:	

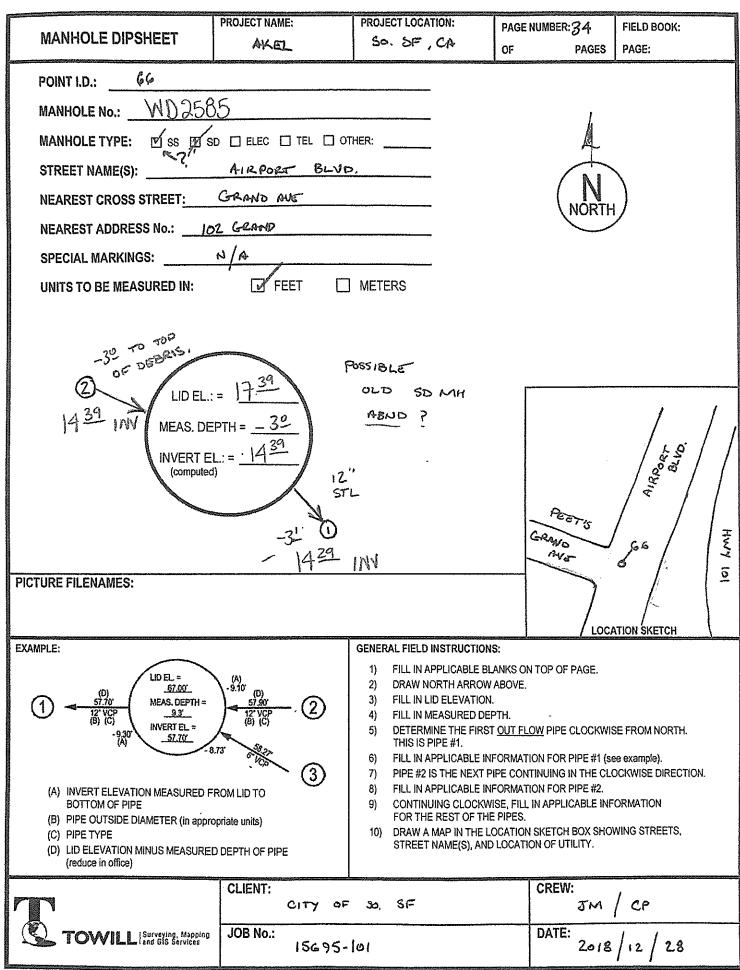
MANHOLE DIPSHEET	PROJECT NAME:	PROJECT LOCATION: So. SF, CA	PAGE NUMBER: 5 OF PAGES	FIELD BOOK: PAGE:
POINT I.D.: 62				
MANHOLE No.: WD2	649		i	
MANHOLE TYPE: De SS 🗆 S		HER:	L	
STREET NAME(S): STREET NAME	LINDEN AVE	***************************************	N.I.	`
NEAREST CROSS STREET:	N. CANAL ST.		(NORTH	,)
NEAREST ADDRESS No.: 7,	S. LINDEN AV	<u> </u>	(North	7
SPECIAL MARKINGS: "5"				
UNITS TO BE MEASURED IN:	☐ FEET □	METERS		
Can't see				
INA, Q DRE 10				
"COLLAR"	-1/37			ļ
OBSTRUCT ING VIEW LIDEL .:	= 10			
MEAS, DE	PTH = <u>-169</u>		N. CANAL	1
INVERT EL			ST	,
(computed)				62 Caus
			S, LINDEN	62 CANAL
			37.	
PICTURE FILENAMES:				LINDEN
			1	17.6
			LOCA	TION SKETCH
EXAMPLE:		GENERAL FIELD INSTRUCTION 1) FILL IN APPLICABLE BL	S: ANKS ON TOP OF PAGE.	
(D) LID EL. = 67.00' 57.70' MEAS. DEPTH =	(A) -9.10' (D) -57.90'	DRAW NORTH ARROW FILL IN LID ELEVATION	ABOVE.	
57.70 MEAS. DEPTH = 9.3' (B) (C) INVERT EL. =	57.90° 12° VCP (B) (C)	4) FILL IN MEASURED DE		E EROM NORTH
-9.30' 57.70'	73' 257	THIS IS PIPE #1.	FORMATION FOR PIPE #1 (see	
	3	7) PIPE #2 IS THE NEXT P	IPE CONTINUING IN THE CLO FORMATION FOR PIPE #2.	CKWISE DIRECTION.
(A) INVERT ELEVATION MEASURED FF BOTTOM OF PIPE		8) FILL IN APPLICABLE IN9) CONTINUING CLOCKW FOR THE REST OF THE	ISE, FILL IN APPLICABLE INFO	PRMATION
(B) PIPE OUTSIDE DIAMETER (in approp (C) PIPE TYPE	oriate units)	10) DRAW A MAP IN THE LO	OCATION SKETCH BOX SHOW LOCATION OF UTILITY.	ING STREETS,
(D) LID ELEVATION MINUS MEASURED (reduce in office)	DEPTH OF PIPE	CITEL HAMELON AND		
	CLIENT:	So. SF	CREW:	100
TOWILL	CITY OF JOB No.:	30. DF	DATE:	/CP
SURVEYING MAPPING GIS	15695-1	10	DATE: 2018/12	./28

	PROJECT NAME:	PROJECT LOCATION:	1-10-1111-2	LEIGI DOOK
MANHOLE DIPSHEET		so. Sf, ca	PAGE NUMBER: 15 OF PAGES	FIELD BOOK: PAGE:
	AKEL			
POINT I.D.: 63	· 41		,	
MANHOLE No.: WD 20				
MANHOLE TYPE: SS S	6D C ELEC TEL C	OTHER:	1	
STREET NAME(S): N. CA	HAL ST.		N	
NEAREST CROSS STREET:	. LIHDEN		NORTH	ı <i>)</i>
NEAREST ADDRESS No.:	2			
SPECIAL MARKINGS: ム人	<u> </u>			
UNITS TO BE MEASURED IN:	FEET [METERS		
LID EL.: MEAS. DE INVERT E (computed) 24" OR 18"? CLAY 335 INV PICTURE FILENAMES:	PTH =10 \(\frac{7}{3\frac{15}{5}} \)	OR 18. ?	63 0 MI 0	26. S. LINDEN N. CANRL ST N. CANRL ST TO 3. TION SKETCH
(A) INVERT ELEVATION MEASURED FR BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in appro) (C) PIPE TYPE (D) LID EL =	priate units)	2) DRAW NORTH ARROW 3) FILL IN LID ELEVATION. 4) FILL IN MEASURED DEF 5) DETERMINE THE FIRST THIS IS PIPE #1. 6) FILL IN APPLICABLE INF 7) PIPE #2 IS THE NEXT PI 8) FILL IN APPLICABLE INF	S: ANKS ON TOP OF PAGE. ABOVE. PTH. OUT FLOW PIPE CLOCKWIS FORMATION FOR PIPE #1 (see IPE CONTINUING IN THE CLO FORMATION FOR PIPE #2. SE, FILL IN APPLICABLE INFO I PIPES. DICATION SKETCH BOX SHOW	E FROM NORTH. e example). CKWISE DIRECTION. DRMATION
	CLIENT:		CREW:	1
TOWILL	CITY OF	So. SF	DATE:	CP
SURVEYING MAPPING GIS	JOB No.: 15G95	-101	Zo18-1	2-28

MANHOLE DIPSHEET	PROJECT NAME:		PAGE NUMBER:	FIELD BOOK:
	Superior and the contract of t	BOUTH SON FRO	OF ZO PAGES	PAGE:
POINT I.D.: MANHOLE No.: MANHOLE TYPE: SS DS STREET NAME(S): NEAREST CROSS STREET: NEAREST ADDRESS No.: SPECIAL MARKINGS: UNITS TO BE MEASURED IN:	29/4 29/4 BO ELEC TEL OT PRHOUR ANE 9/124011-7 BL	HER:	NORTH	
MEAS. DE		4 <u>INV</u>	ARMOUR STORMERS	
(A) INVERT ELEVATION MEASURED F BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in appropriate to produce in office)	opriale units)	THIS IS PIPE #1. 6) FILL IN APPLICABLE INF 7) PIPE #2 IS THE NEXT PIF 8) FILL IN APPLICABLE INF 9) CONTINUING CLOCKWIS FOR THE REST OF THE	INKS ON TOP OF PAGE. ABOVE. TH. OUT FLOW PIPE CLOCKWIS ORMATION FOR PIPE #1 (see PE CONTINUING IN THE CLO ORMATION FOR PIPE #2. SE, FILL IN APPLICABLE INFO PIPES. CATION SKETCH BOX SHOV	E FROM NORTH. 6 example). CKWISE DIRECTION. DRMATION
TOWILL SURVEYING MAPPING GIS	CLIENT: 55F - 1/1 JOB No.: 15 6 9	<i>FEL</i> 5	CREW: TEB DATE: 20/8-	9V -/2-/5 REVISED 2017-11-02

MANHOLE DIPSHEET	PROJECT NAME: SSF SEWER	PROJECT LOCATION: SOLFFLY SOLY FLO.	PAGE NUMBER: 6	FIELD BOOK; PAGE:
POINT I.D.: 69 / MANHOLE No.: 000	4		<u> </u>	
MANHOLE TYPE: Ø ss □ s STREET NAME(s);	D [] ELEC [] TEL [] OTI MOVE AVE	HER:	A	
NEAREST CROSS STREET: NEAREST ADDRESS No.:	Himilian värneteri-lene ele lene e	<u> 32vb.</u>	NORTH	
SPECIAL MARKINGS: UNITS TO BE MEASURED IN: 0		METERS		
100	18 2046 INV	: 1M PHOTOS : ZO"		
LID EL.: : MEAS, DEF	= 2896 (w)	10176 318F) 1164 IN PHOTOS	LINVEN AVE	
INVERTEL (computed)	:=		A PHOLY AVE	
# ansi	JOHO 2026 11		5 CHUPER	Take.
PICTURE FILENAMES:			LOCATIO	N SKETCH
(D) LID EL =	-9,10° (D) -57,90° (D) -12° VCP (B) (C)	inis is Pipe #1.	DVE. <u>T FLOW</u> PIPE CLOCKWISE FI	
(A) INVERT ELEVATION MEASURED FRO BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in appropri (C) PIPE TYPE (D) LID ELEVATION MINUS MEASURED D (reduce in office)	ate units)	6) FILL IN APPLICABLE INFOR 7) PIPE #2 IS THE NEXT PIPE (8) FILL IN APPLICABLE INFOR 9) CONTINUING CLOCKWISE, FOR THE REST OF THE PIP 10) DRAW A MAP IN THE LOCA STREET NAME(S), AND LOC	MATION FOR PIPE #2. FILL IN APPLICABLE INFORM ES. FION SKETCH BOX SHOWING	MISE DIRECTION. NATION
TOWILL	CLIENT: 55F - 1 JOB No.: 15695	AKEL	CREW: EB/ 1 DATE: 2018-1	44 2-15

	PROJECT NAME:	PROJECT LOCATION:	PAGE NUMBER: Z	FIELD BOOK:
MANHOLE DIPSHEET	SSF-AREL	Soun San Sto		PAGE:
POINT I.D.; 6 MANHOLE No.; WG	55 1323			
MANHOLE TYPE: 🍵 ss 🖂		THER:		
STREET NAME(S):	rpoyo Diz		VNI	
NEAREST CROSS STREET:	DEL MONTE	1/5	NORTH)
NEAREST ADDRESS No.:	113 ARMYO	<u>Dr</u>		
SPECIAL MARKINGS:				
UNITS TO BE MEASURED IN:	, ↑ ♣ FEET □	METERS		
51 ⁴² N	FEET D	TYPE OF PY	RE 15 NOT	- CEAR)
LID EI	= 7 <u>0≅</u> _\			
MEAS. [DEPTH =123°		188	
O" OC INVERT	EL:= <u>57-81</u>		1 20	CAMARITAS AVE
(compu	led)			
12" MC INVERTION (COMPUTED TO 1) 1/1 85 (NV)				
PICTURE FILENAMES:			DEL MONTE AVE	1,66
EXAMPLE:		GENERAL FIELD INSTRUCTIONS:	111 114 104 104 104 104 104 104 104 104	ON SKETCH
LDEL:	\	1) FILL IN APPLICABLE BLAI	NKS ON TOP OF PAGE.	
(D) (D) (MEAS DEPTH) 12 VOP (MEAS DEPTH)	· 1-50 0	2) DRAW NORTH ARROW A 3) FILL IN LID ELEVATION.		
(9) (1) (9) (1) (9) (1) (9) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1		 4) FILL IN MEASURED DEPT 6) DETERMINE THE FIRST OF THIS IS PIPE #1. 	H. D <mark>UT FLOW</mark> PIPE CLOCKWISE	FROM NORTH.
	(3)	6) FILL IN APPLICABLE INFO	ORMATION FOR PIPE #1 (see E CONTINUING IN THE CLOC	example).
(A) INVERT ELEVATION MEASURED BOTTOM OF PIPE		8) FILL IN APPLICABLE INFO	E CONTINUING IN THE CLOC PRMATION FOR PIPE #2. E, FILL IN APPLICABLE INFOR	
(B) PIPE OUTSIDE DIAMETER (in ap (C) PIPE TYPE	propriate units)	FOR THE REST OF THE P	E, FICE IN AITPEICABLE INFOR PIPES PATION SKETCH BOX SHOW!	
(D) LID ELEVATION MINUS MEASUF (reduce in office)	RED DEPTH OF PIPE	STREET NAME(S), AND L	OCATION OF UTILITY.	outella,
Contribution of presentations and the Historian design	CLIENT:			
	April April 11 1	台灣美國語記述中 日 2006年2月2日	CREW:	
TTOWILL	AKEL		CREW: EB /50	/55
TOWILL SURVEYING MAPPING GIS	AKEL	/0/	1 1	원인 사용생활



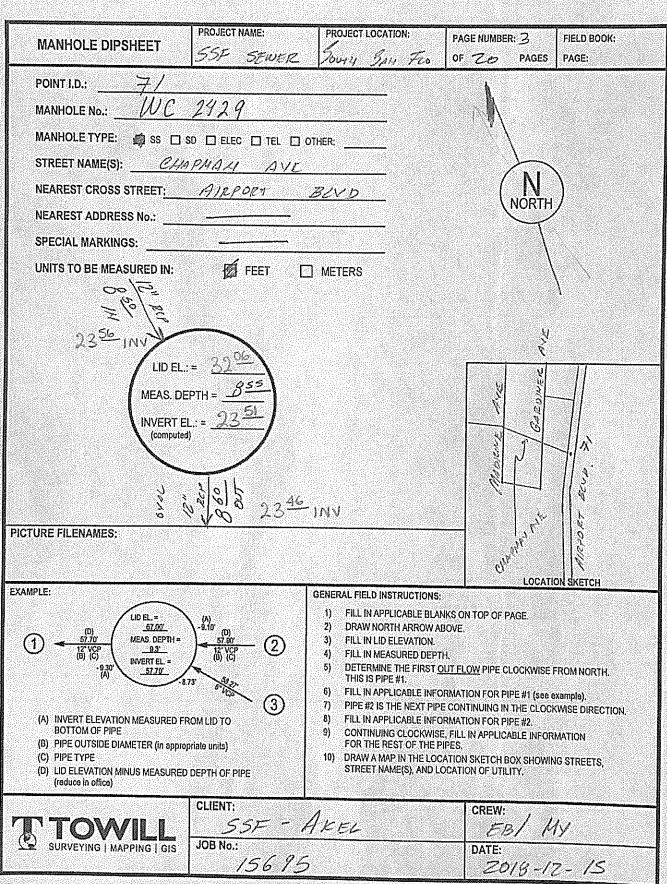
MANHOLE DIPSHEET	PROJECT NAME:	PROJECT LOCATION: S. SAN FRANCISCO, C 12	PAGE NUMBER: 2_ OF PAGES	FIELD BOOK: PAGE:
POINT I.D.: 67 AMMANHOLE No.: WH 183 MANHOLE TYPE: SS SS STREET NAME(S): 5. AMMANHOLE TYPE: SS STREET: NEAREST CROSS STREET: NEAREST ADDRESS No.: 60 SPECIAL MARKINGS: "SAMMUNITS TO BE MEASURED IN:	D ELEC TEL OTT NAGHOLIA AUE MAYFAIR AUE DO MAYFAIR AUE	HER:	NORTH	
LID EL.: NEAS. DEI NVERT EL (computed)	PTH = -10.00 $0.00 = 0.00$ $0.00 = 0.00$	0,00 810 INV	21	CRETK G7B VE ION SKETCH
(a) INVERT ELEVATION MEASURED FROM DIPE TYPE (b) (c) PIPE TYPE (d) LID EL. = 67.00' MEAS. DEPTH = 9.3' INVERT EL. = 57.70' 8.7' (A) INVERT ELEVATION MEASURED FROM DIAMETER (in appropriate to the pipe outside diameter (in appropriate to the pipe	1.0° (D)	THIS IS PIPE #1. 6) FILL IN APPLICABLE INFO 7) PIPE #2 IS THE NEXT PIPE 8) FILL IN APPLICABLE INFO	IKS ON TOP OF PAGE, 10VE. 4. UT FLOW PIPE CLOCKWISE RMATION FOR PIPE #1 (\$60 to continuing in the cloc remation for PIPE #2. FILL IN APPLICABLE INFOF PES. ATION SKETCH BOX SHOWILD CATION OF UTILITY.	FROM NORTH. example), KWISE DIRECTION. RMATION
TOWILL SURVEYING MAPPING GIS	CLIENT: JOB No.: 15495		CREW: JM/DS DATE: 2018/1	2/15

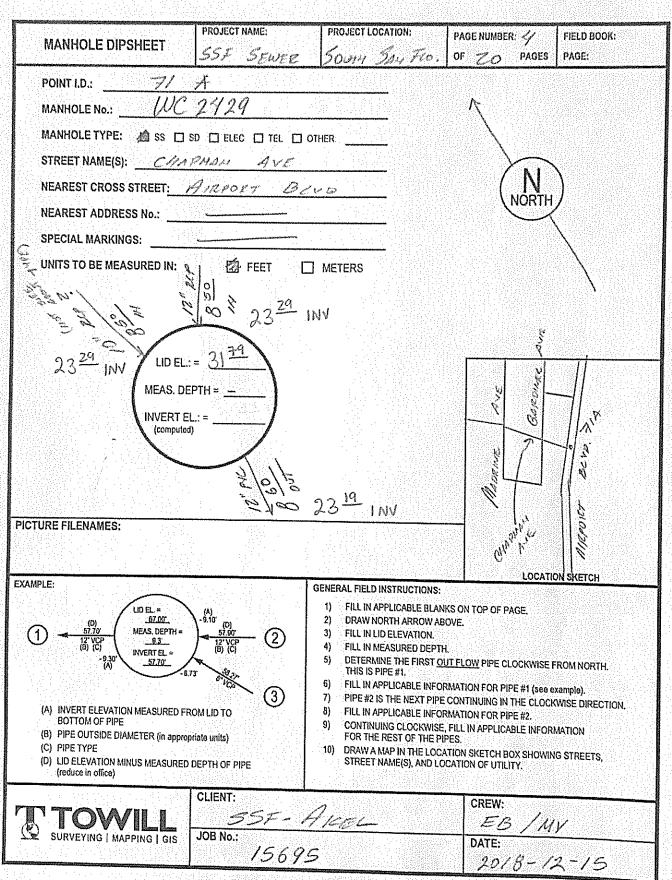
MANHOLE DIPSHEET	PROJECT NAME: AKEL	PROJECT LOCATION: S. SAN FRANCISCO, CA	PAGE NUMBER: 3	FIELD BOOK: PAGE:	
POINT I.D.: 67 B MANHOLE No.: WH18	36				
MANHOLE TYPE: ☐ SS ☐ S	D CELEC TEL COT	HER:	4		
STREET NAME(S): S. M.	ACMORIA MAE				
NEAREST CROSS STREET:	MAYFAIR AUT		(N NORTH)		
NEAREST ADDRESS No.: 60	O MAYEAIR AVE	•	North		
SPECIAL MARKINGS:					
UNITS TO BE MEASURED IN:	9-6.80 8" CLM 9" CLM	METERS			
No PIPE LIDEL .:	172 PIPE	BEDKEN OFF			
INVERT EL (computed)			COLMA CA	^l ečk	
-7.25 ? (DIRECTION) (2)? (TYPE)			67A	678	
PICTURE FILENAMES:	10 ⁴ INV		LOCATI	MAYFAIR ALL	
EXAMPLE:	0	ENERAL FIELD INSTRUCTIONS:			
1) FILL IN APPLICABLE BLANKS ON 2 (D) ST.70' MEAS. DEPTH - 9.3' INVERT EL = 57.70' (B) (C) -9.30' NVERT EL			IOVE. 1. <u>UT FLOW</u> PIPE CLOCKWISE I RMATION FOR PIPE #1 (see e	example).	
(A) INVERT ELEVATION MEASURED FROM LID TO BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in appropriate units) (C) PIPE TYPE (D) LID ELEVATION MINUS MEASURED DEPTH OF PIPE (reduce in office) (8) FILL IN 9) CONTIN FOR TH 10) DRAW. STREE		FILL IN APPLICABLE INFO CONTINUING CLOCKWISE FOR THE REST OF THE PI DRAW A MAP IN THE LOCA	2 IS THE NEXT PIPE CONTINUING IN THE CLOCKWISE DIRECTION. APPLICABLE INFORMATION FOR PIPE #2. NUING CLOCKWISE, FILL IN APPLICABLE INFORMATION HE REST OF THE PIPES. A MAP IN THE LOCATION SKETCH BOX SHOWING STREETS, IT NAME(S), AND LOCATION OF UTILITY.		
TTTONA/III I	CLIENT:		CREW:		
SURVEYING MAPPING GIS	JOB No.: 15695		DATE: 2018 / 12		

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MANHOLE DIPSHEET	PROJECT NAME:	PROJECT LOCATION: 5. SAN FRANCISCO,	PAGE NUMBER: 15	FIELD BOOK:
	128-70-7	C.A.	OF PAGES	PAGE:
POINT I.D.: 68	_2			
MANHOLE No.: MH		10-10-10-10-10-10-10-10-10-10-10-10-10-1		
MANHOLE TYPE: ☐ SS ☐ S		OTHER:	4	
STREET NAME(S): ARROY			NI	\
NEAREST CROSS STREET:			(NORTH)
NEAREST ADDRESS No.: 3	3 Arroyo Dr			,
SPECIAL MARKINGS: "SA	NITARY SEWER	rs		
UNITS TO BE MEASURED IN:	FEET] METERS		
LID EL.:	= 67.56 12°5	2 <u>56</u> INV		/b
MEAS. DEI	PTH = <u>- 15.00</u> : = <u>52 ⁵⁶</u>		The same	CARRAIN TO CORRECT S. S.F. MUNI
PICTURE FILENAMES:			** R20 to	BLDC+,
EXAMPLE:		GENERAL FIELD INSTRUCTIONS:		ON SIGION
1) FILL IN APPLICABLE BLANKS ON TOP OF PAGE. 1) FILL IN APPLICABLE BLANKS ON TOP OF PAGE. 2) DRAW NORTH ARROW ABOVE. 3) 'FILL IN LID ELEVATION. 4) FILL IN MEASURED DEPTH. 57.70' 8.73' 8.73' 8.73' 3) 'FILL IN APPLICABLE BLANKS ON TOP OF PAGE. 1) FILL IN APPLICABLE BLANKS ON TOP OF PAGE. 2) DRAW NORTH ARROW ABOVE. 3) 'FILL IN LID ELEVATION. 4) FILL IN MEASURED DEPTH. 5) DETERMINE THE FIRST OUT FLOW PIPE CLOCKWISE FROM N THIS IS PIPE #1. 6) FILL IN APPLICABLE INFORMATION FOR PIPE #1 (see example) 7) PIPE #2 IS THE NEXT PIPE CONTINUING IN THE CLOCKWISE D			example).	
(A) INVERT ELEVATION MEASURED FROBOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in approp.) (C) PIPE TYPE (D) LID ELEVATION MINUS MEASURED In office)	7) PIPE#2 IS THE NEXT PIPE CONTINUING IN THE CLOCKWISE DIRECTION. 8) FILL IN APPLICABLE INFORMATION FOR PIPE #2. 9) CONTINUING CLOCKWISE, FILL IN APPLICABLE INFORMATION FOR THE REST OF THE PIPES. 10) DRAW A MAP IN THE LOCATION SKETCH BOX SHOWING STREETS, STREET NAME(S), AND LOCATION OF UTILITY.			
TOWILL SURVEYING MAPPING GIS	JOB No.: 15695		DATE: 20/8 / 12	/ DS / 15

MANHOLE DIPSHEET	PROJECT NAME:	PROJECT LOCATION: S. SAM FRANCISCE CA) PAGES	FIELD BOOK: PAGE:
POINT I.D.: 69			101	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
MANHOLE No.: MH-2					
MANHOLE TYPE: ☑ SS 🔲 S	SD	HER:	ı	4	
STREET NAME(S): AREA	YO DR.			$\widehat{\mathbf{N}}$	\
NEAREST CROSS STREET:	ALTA LOMA DR.		(NORTH)		
NEAREST ADDRESS No.:	58 ARROYO DR				
SPECIAL MARKINGS: ":	Sanitary Sewer	5			
UNITS TO BE MEASURED IN:		METERS			
MEAS. DE	$PTH = \frac{12.22}{53^{\frac{3}{12}}}$ = $\frac{53^{\frac{3}{12}}}{}$	53 36 INV	St. Co. Co. Co. Co. Co. Co. Co. Co. Co. Co	SET SE	69 SLVO.
EXAMPLE:	G	ENERAL FIELD INSTRUCTIONS:		 	ON SKETCH
(A) INVERT ELEVATION MEASURED FR BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in approp (C) PIPE TYPE (D) LID EL. = 67.00 MEAS. DEPTH =	2) DRAW NORTH ARROW AE 3) FILL IN LID ELEVATION. 4) FILL IN MEASURED DEPTI 5) DETERMINE THE FIRST O THIS IS PIPE #1. 6) FILL IN APPLICABLE INFO 7) PIPE #2 IS THE NEXT PIPE 8) FILL IN APPLICABLE INFO 9) CONTINUING CLOCKWISE FOR THE REST OF THE PI 10) DRAW A MAP IN THE LOCK	ELEVATION. ASURED DEPTH. E THE FIRST <u>OUT FLOW</u> PIPE CLOCKWISE FROM NORTH. E #1. PLICABLE INFORMATION FOR PIPE #1 (see example). THE NEXT PIPE CONTINUING IN THE CLOCKWISE DIRECTION. PLICABLE INFORMATION FOR PIPE #2. IG CLOCKWISE, FILL IN APPLICABLE INFORMATION			
	CLIENT:		CREW:	/	
SURVEYING MAPPING GIS	JOB No.: 15495		JM , DATE: 2018 /	/DS /12/	15

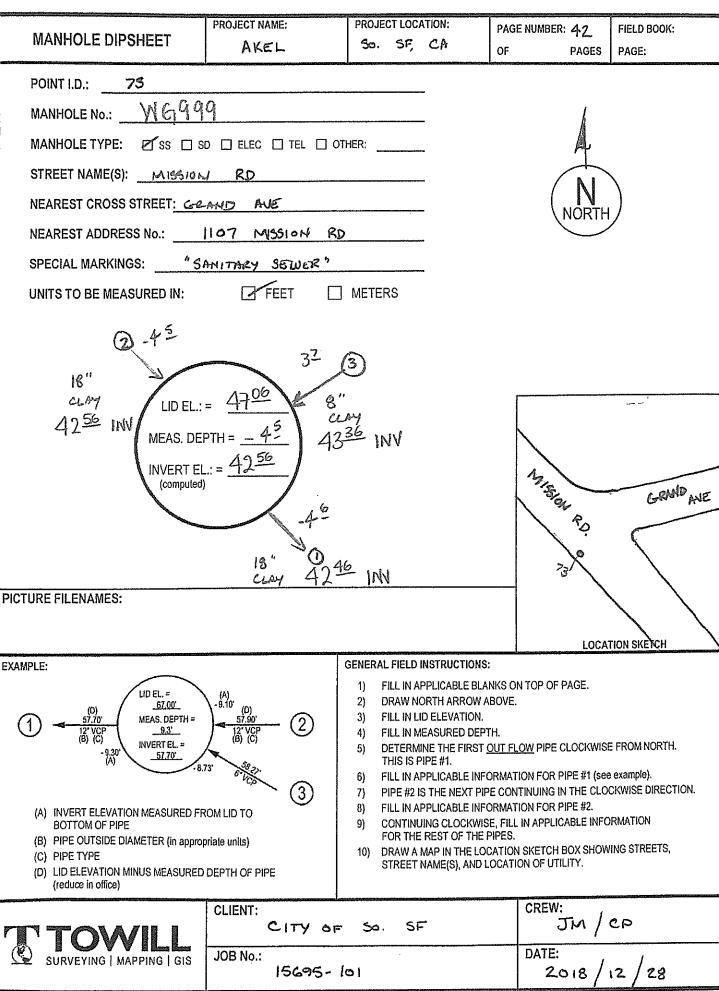
MANHOLE DIPSHEET	PROJECT NAME;	PROJECT LOCATION:	PAGE NUMBER: Z	FIELD BOOK:	
POINT I.D.: 70 MANHOLE No.: WC			a o man	TAGE	
MANHOLE TYPE: SS SS STREET NAME(S):	arori Buro		N		
NEAREST CROSS STREET: NEAREST ADDRESS No.;			North		
	第 FEET □ 228子 II				
MEAS. DE	$= 32^{02}$ PTH = -92^{2} $= 32^{85}$ $= 32^{85}$ $= 32^{85}$ $= 32^{85}$ $= 32^{85}$ $= 32^{85}$ $= 32^{85}$ $= 32^{85}$ $= 32^{85}$ $= 32^{85}$ $= 32^{85}$ $= 32^{85}$ $= 32^{85}$ $= 32^{85}$ $= 32^{85}$ $= 32^{85}$ $= 32^{85}$ $= 32^{85}$ $= 32^{85}$		Marine Col	Kr deche So	
PICTURE FILENAMES:				DN SKETCH	
(A) INVERT ELEVATION MEASURED FR BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in approp	(A) 9.10 (B) 57.50 12 VOP (B) (C) 3 OM LID TO riate units)	GENERAL FIELD INSTRUCTIONS: 1) FILL IN APPLICABLE BLANKS ON TOP OF PAGE. 2) DRAW NORTH ARROW ABOVE. 3) FILL IN LID ELEVATION. 4) FILL IN MEASURED DEPTH. 5) DETERMINE THE FIRST <u>OUT FLOW PIPE CLOCKWISE FROM NORTH.</u> THIS IS PIPE #1. 6) FILL IN APPLICABLE INFORMATION FOR PIPE #1 (FROM NORTH).			
TOWILL SURVEYING MAPPING GIS	CLIENT: 5SF - Ak JOB No.: 15695	EL	CREW: EB/ A DATE: Z018-	12-15	



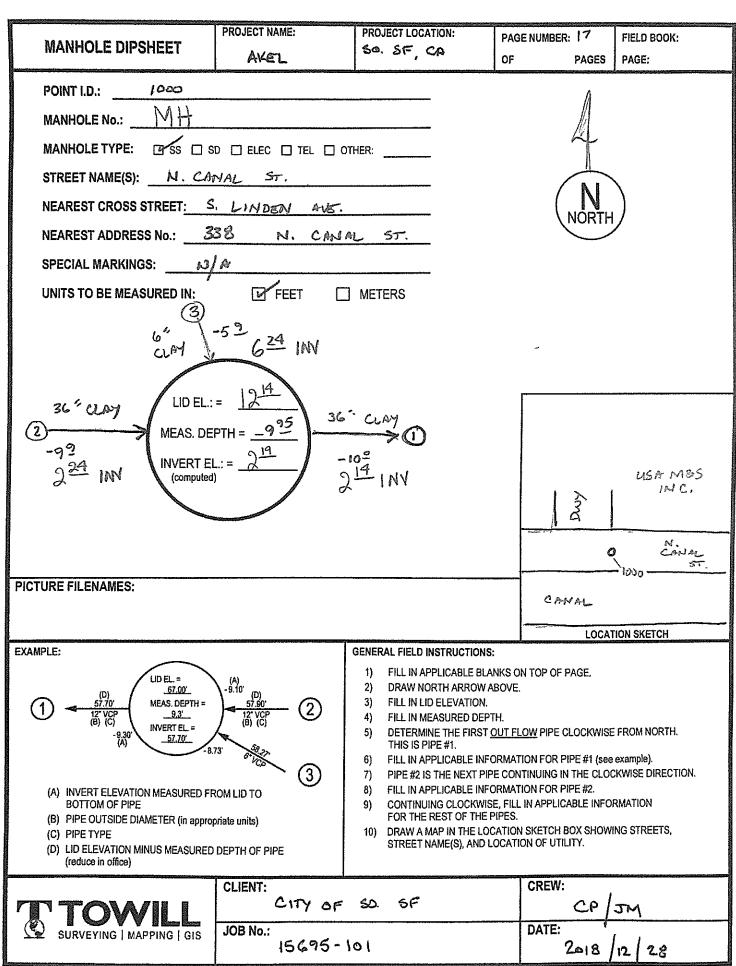


MANHOLE DIPSHEET	PROJECT NAME:	PROJECT LOCATION		PAGE NUMBER	7: S PAGES	FIELD BOOK: PAGE:
POINT I.D.: MANHOLE NO.: WC MANHOLE TYPE: STREET NAME(S): NEAREST CROSS STREET: NEAREST ADDRESS No.: SPECIAL MARKINGS: UNITS TO BE MEASURED IN:	Olamon	AVE METERS	meter de anterior actual de la companya de la compa		NORTH	
Dai inv/				Ch. Malline Doll	TANDER OF THE PARTY OF THE PART	ON SKETCH
(A) INVERT ELEVATION MEASURED FOR BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in appro	priale units) DEPTH OF PIPE	8) FILL IN APPLICA 9) CONTINUING CI FOR THE REST 10) DRAW A MAP IN	ABLE BLAM ARROW AE VATION. RED DEPTI E FIRST O BLE INFO NEXT PIPE BLE INFO OCKWISE OF THE PI THE LOG	OVE. -I. -I. -I. -I. -I. -I. -I. -	PAGE. LOCKWISE: IPE #1 (see continue) I THE CLOCK IPE #2. ABLE INFOR	FROM NORTH, example). KWISE DIRECTION. EMATION
TOWILL SURVEYING MAPPING GIS	CLIENT:	AKEL 35		DATE:	E13 /	1 My

MANHOLE DIPSHEET	PROJECT NAME:	PROJECT LOCATION: S. SAN FRANCISCO, CA	PAGE NUMBER: 17_OF PAGES	FIELD BOOK: PAGE:		
POINT I.D.: 72			<u> </u>	<u> </u>		
MANHOLE No.: WG	_100გ	***				
MANHOLE TYPE: IB \$5 □ 5	SD	OTHER:	A			
STREET NAME(S):	510N RD,			\		
NEAREST CROSS STREET:	Evergreen dr	*	· (N			
NEAREST ADDRESS No.: 1	289 MISSION ED.		NOMI	/		
SPECIAL MARKINGS: _ "Cin	OF S. SAN FR	MICISCO "				
UNITS TO BE MEASURED IN:	D FEET [] METERS				
3		A				
P. 7. 12. 24		0 6122 INV				
CA LID EL.: 6) 08 INV MEAS. DE	= 7132 /200	0 61 <u>55</u> INV	<u> </u>			
61 08 INV			EL CA	אי אס		
ł K	PTH = 10.33		HIG Sc	-H 400L		
INVERT EI (computed	= 60 1		TANKS OT	Ect &		
2) 10.10 ch ch char (1) 60 82 IN			E E	B. S. C.		
2) 10.10 M Charl Charles (1) 60 82 IN				72		
6 61=) 	Baken				
PICTURE FILENAMES:		Samon				
				N SKETCH		
EXAMPLE:		GENERAL FIELD INSTRUCTIONS:				
UD EL. = 67.00	\-(A) \-9.10' (D)	FILL IN APPLICABLE BLANS DRAW NORTH ARROW ABO				
(b) (c) MEAS. DEPTH = 9.37 (c) (d) (d) (d) (d) (d) (d) (d) (d) (d) (d) = 57.90° (D) (S) (C) (D) (D)	3) FILL IN LID ELEVATION. 4) FILL IN MEASURED DEPTH.				
-9.30	The same of the sa	5) DETERMINE THE FIRST <u>OUT FLOW</u> PIPE CLOCKWISE FROM NORTH. THIS IS PIPE #1.				
-8.7	MATION FOR PIPE #1 (see ex CONTINUING IN THE CLOCKY					
(A) INVERT ELEVATION MEASURED FR BOTTOM OF PIPE	OM LID TO	8) FILL IN APPLICABLE INFOR	APPLICABLE INFORMATION FOR PIPE #2. UING CLOCKWISE, FILL IN APPLICABLE INFORMATION			
(B) PIPE OUTSIDE DIAMETER (in approp (C) PIPE TYPE	FOR THE REST OF THE PIP 10) DRAW A MAP IN THE LOCA	PES.				
(D) LID ELEVATION MINUS MEASURED DEPTH OF PIPE (reduce in office) STREET NAME(S), AND LOCATION OF UTILITY.						
	CLIENT:		CREW:			
TOWILL	IOD M.		DATE: 2018/11	S		
SURVEYING MAPPING GIS	JOB No.: 15695	,	DATE: 2018/11	2/15		

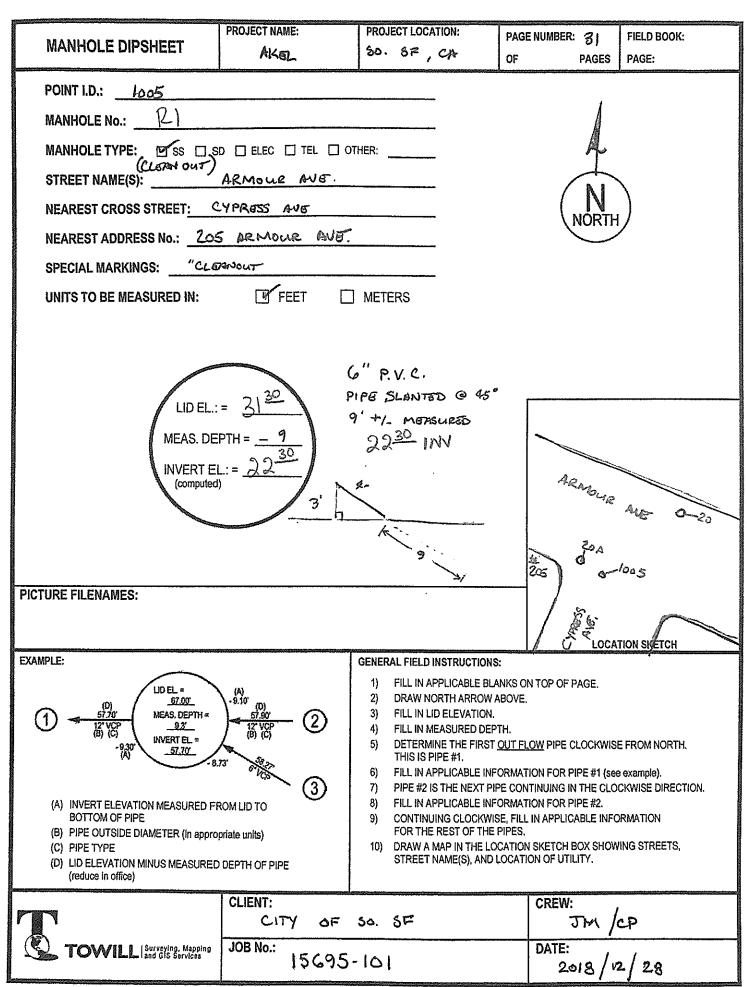


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MANHOLE DIPSHEET	PROJECT NAME:	PROJECT LOCATION	'	PAGE NUMBER:	• –	FIELD BOOK:
	AKEL	100. 01 ,04] (OF	PAGES	PAGE:
POINT I.D.: 74	567			,		
MANHOLE No.: W6102	0					
MANHOLE TYPE: 🗹 ss 🗆 si	D	THER:			4	
STREET NAME(S): MISS	ION RD.					\
NEAREST CROSS STREET: GRAND AVE				()	IV VORTH)
NEAREST ADDRESS No.: 1680	MISSION RA					
SPECIAL MARKINGS: <u>"Sani</u>	TARY SEWER"					
MEAS. DEF	$= 45^{65}$ PTH = -9^{1} = 36^{55}	METERS NV 65 INV		With large		(52 PMD) # 1080 MASSION
EXAMPLE:		GENERAL FIELD INS	STRUCTIONS:	J	LOCAT	TION SKETCH
(A) INVERT ELEVATION MEASURED FROM LID TO BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in appropriate units) (A) INVERT YPE (B) PIPE TYPE (C) PIPE TYPE (A) INVERT EL = (A) (B) (C) (D) (D) (D) (D) (D) (D) (D) (D) (D) (D			PPLICABLE BLANKS ON TOP OF PAGE. DETH ARROW ABOVE. DELEVATION. EASURED DEPTH. NE THE FIRST <u>OUT FLOW</u> PIPE CLOCKWISE FROM NORTH. IPE #1. PPLICABLE INFORMATION FOR PIPE #1 (see example). S THE NEXT PIPE CONTINUING IN THE CLOCKWISE DIRECTION. PPLICABLE INFORMATION FOR PIPE #2. ING CLOCKWISE, FILL IN APPLICABLE INFORMATION REST OF THE PIPES. MAP IN THE LOCATION SKETCH BOX SHOWING STREETS, NAME(S), AND LOCATION OF UTILITY.			
			CREW:	<u> </u>		
TOWILL	JOB No.:	So, SF		DATE:	M/C	<u> </u>
SURVEYING MAPPING GIS	15695-1	01			18/12	/28



MANHOLE DIPSHEET	PROJECT NAME: 35F - AKEL	PROJECT LOCATION: SOLT H SOM FLOO	PAGE NUMBER: 5 OF 8 PAGES	FIELD BOOK: PAGE:
POINT LD.: / OO / MANHOLE No.: MANHOLE TYPE: A SS STREET NAME(S): STREET NAME(S): STREET: NEAREST CROSS STREET: NEAREST ADDRESS No.:	SS DELEC DIEL DOT MORM AME DOCLAR A	MH HER:	North	
SPECIAL MARKINGS:UNITS TO BE MEASURED IN:	FEET	METERS		
18" PCP LID EL: MEAS. DE INVERT EI (computed) 4 25 INV	PTH =	60 7 00T 415 WV	VICTORY 3/4 3740M	TEAM PONS
PICTURE FILENAMES:			/	ATION SKETCH
(A) INVERT ELEVATION MEASURED F BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in approach of the pipe of	priate units)	THIS IS PIPE #1. 6) FILL IN APPLICABLE IN 7) PIPE #2 IS THE NEXT P 8) FILL IN APPLICABLE IN 9) CONTINUING CLOCKW FOR THE REST OF THE 10) DRAW A MAP IN THE L	ANKS ON TOP OF PAGE. ABOVE. PTH. TOUT FLOW PIPE CLOCKWIS FORMATION FOR PIPE #1 (se IPE CONTINUING IN THE CLO FORMATION FOR PIPE #2. ISE, FILL IN APPLICABLE INF	ee example). DCKWISE DIRECTION. ORMATION
TOWILL SURVEYING MAPPING GIS	JOB No.: 156	95-101	CREW: #8/ DATE: 2018 -	12-18

	PROJECT NAME:	PROJECT LOCATION:	PAGE NUMBER: 6	FIELD BOOK:
MANHOLE DIPSHEET	SSF - AKEL	50014 SA4 FED		PAGE:
MANHOLE No.: MANHOLE TYPE: SS S STREET NAME(S): NEAREST CROSS STREET: NEAREST ADDRESS No.:	SSM BO DELEC DIEL DOT LINDEN AND DOLLAR Y	HER:	N	
SPECIAL MARKINGS:				
10	18 294 18 20 3 EPTH = 3 E 3 E 3 E 3 E 3 E 3 E 3 E 3 E 3	BO DUT 14 INV	VICTORY 312	TRAIN PAIL
			DOLLAR AVE	N
(A) INVERT ELEVATION MEASURED F BOTTOM OF PIPE (B) PIPE OUTSIDE DIAMETER (in approfice of the product of the p	(A) 9.10' (D) 57.90' 12' VCP (B) (C) ROM LID TO ppriate units)	6) FILL IN APPLICABLE INFO 7) PIPE #2 IS THE NEXT PIP 8) FILL IN APPLICABLE INFO	NKS ON TOP OF PAGE. BOVE. TH. DUT FLOW PIPE CLOCKWISE DRMATION FOR PIPE #1 (see IE CONTINUING IN THE CLOC DRMATION FOR PIPE #2. E, FILL IN APPLICABLE INFOR IPES. CATION SKETCH BOX SHOWI	example). KWISE DIRECTION.
TOWILL SURVEYING MAPPING GIS	CLIENT: AREC JOB No.: 15 695	- 101	CREW: EB / M DATE: 2018 - 1	'Y 12-18

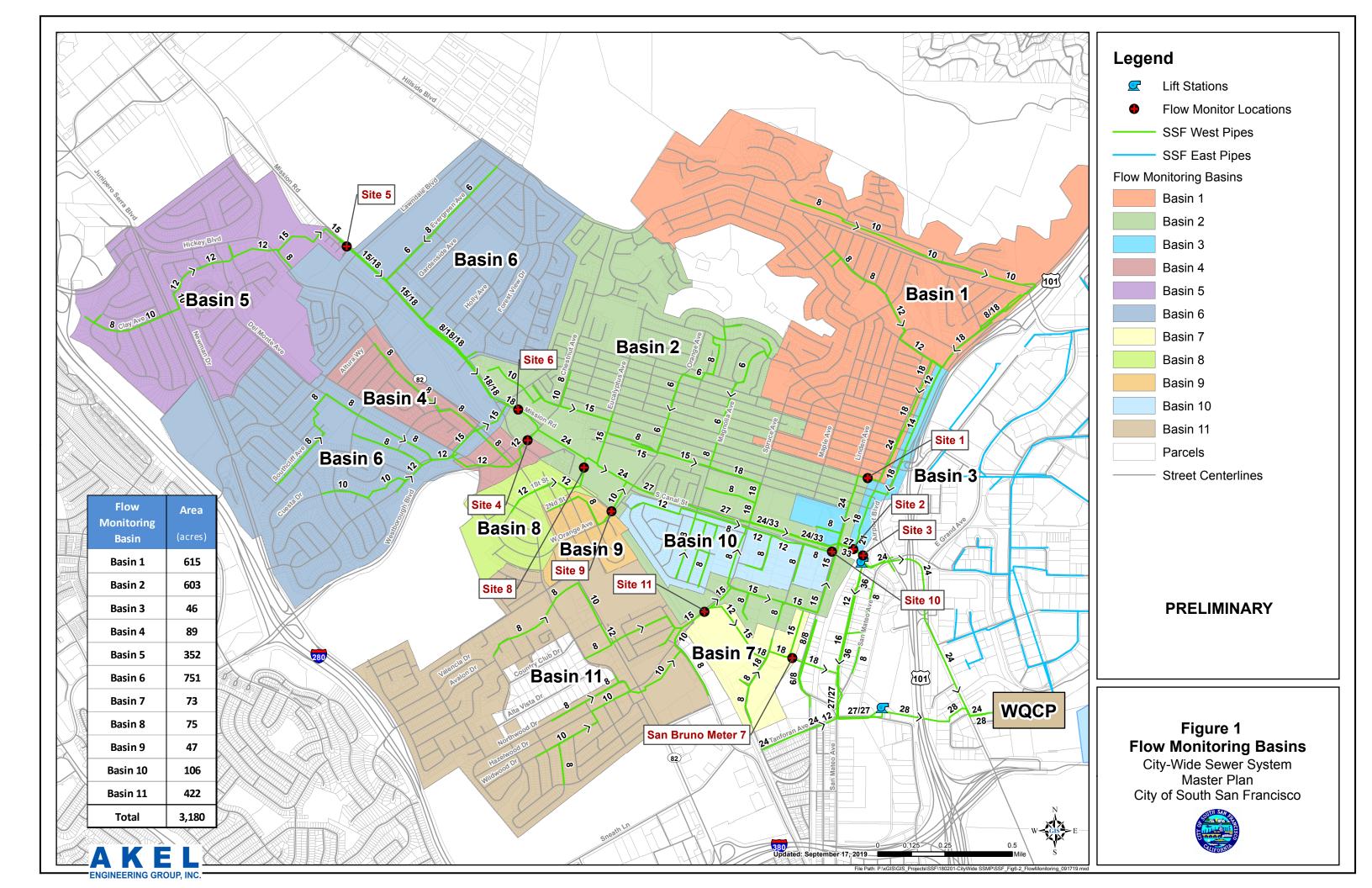


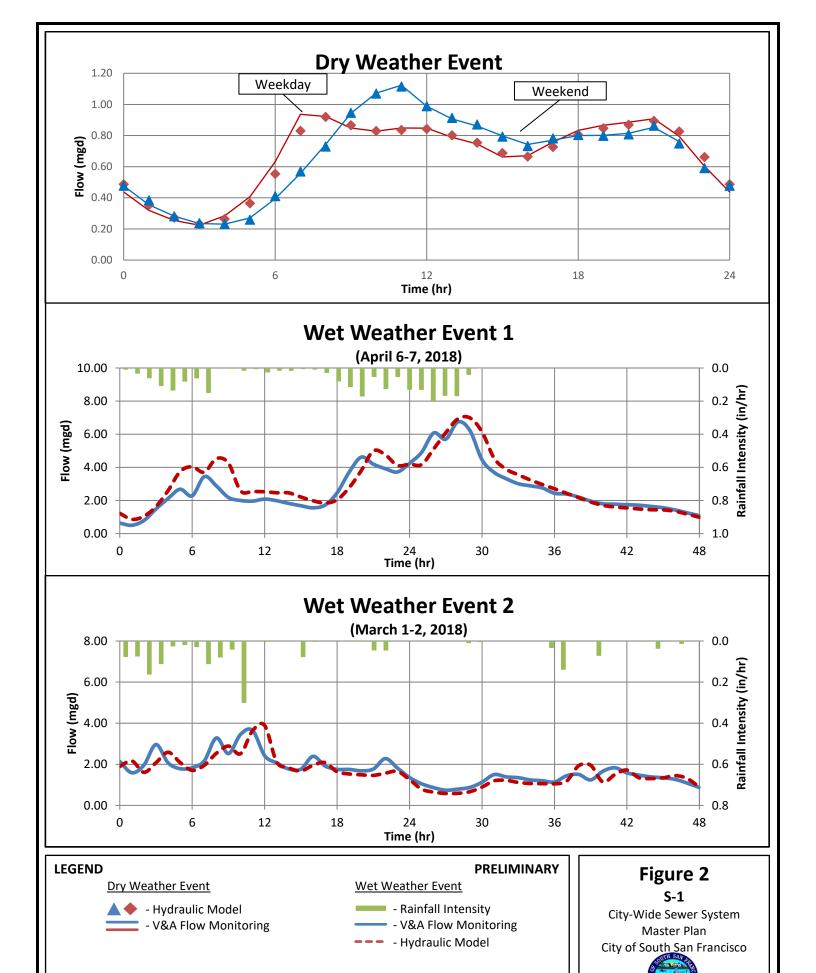
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MANHOLE DIPSHEET	AVEL	PROJECT LOCATION: S. SAN FRANCISCO, CA	PAGE NUMBER:	FIELD BOOK:			
<i>t</i> : 1. 1. 11		<u> </u>	OF PAGES	PAGE:			
POINT I.D.: "MH"							
MANHOLE No.:							
MANHOLE TYPE: SS SS SI	DELEC TEL OT	HER:	件				
STREET NAME(S): N. CAN	AL ST.		NI NI	\			
NEAREST CROSS STREET:	i. LINDEN NE.		(NORTH	(NORTH)			
NEAREST ADDRESS No.:	26 S. LINDEN .	eve;	Non				
SPECIAL MARKINGS:N	'A						
UNITS TO BE MEASURED IN:	FEET	METERS					
		PLUGGED !!?		!			
		NO WATER					
LID EL.:	= 1407	MOVING	<u></u>	e 3om/			
MEAS DE	PTH = 12_25		2.9	DAY N. CANAL			
		3	1021				
(computed)	2	1" / OR 18"?					
24" OR 18"? CUPY			2	63 MH			
187 INV			63				
1 1000			MI	•			
PICTURE FILENAMES:	P41	5 LNDEN					
			CANAL -	5. L. 1840 -			
EXAMPLE:	***************************************	GENERAL FIELD INSTRUCTIONS	i i i i i i i i i i i i i i i i i i i	TION SKETCH			
LID EL. =		FILL IN APPLICABLE BLA					
(D) 67.00' 57.70' MEAS. DEPTH =	(A) -9.10' (D) - 57.90'	2) DRAW NORTH ARROW ABOVE. 3) FILL IN LID ELEVATION. 4) FILL IN MEASURED DEPTH. 5) DETERMINE THE FIRST <u>OUT FLOW PIPE CLOCKWISE FROM NORTH.</u>					
12° VCP 9.3'	57.90° 12°VCP (B) (C)						
-9.30'	73' 8" 27"	THIS IS PIPE #1.					
	PE CONTINUING IN THE CLO	WATION FOR PIPE #1 (see example). CONTINUING IN THE CLOCKWISE DIRECTION.					
(A) INVERT ELEVATION MEASURED FROM LID TO 8) FILL IN APPLICABLE INFOR 8) CONTINUING CLOCKWISE,			FILL IN APPLICABLE INFORMATION				
(B) PIPE OUTSIDE DIAMETER (in appropriate units) FOR THE REST OF THE PIPE (C) PIPE TYPE 10) DRAW A MAP IN THE LOCAT			CATION SKETCH BOX SHOV	ON SKETCH BOX SHOWING STREETS,			
(D) LID ELEVATION MINUS MEASURED DEPTH OF PIPE (reduce in office) STREET NAME(S), AND LOCATION OF UTILITY.							
	CLIENT:		CREW:				
TOWILI	CITY OF	50. SF	JM/	CP			
SURVEYING MAPPING GIS	JOB No.: 15695-	-101	DATE: 2018/	12/28			

PROJECT NAME: PROJECT LOCATION: PAGE NUMBER: 13 FIELD BOOK: **MANHOLE DIPSHEET** 5: SAN FRANCISCO, AKEL OF **PAGES** PAGE: "MI" POINT I.D.: MANHOLE No.: ___ MANHOLE TYPE: SS SS SD SD ELEC TEL OTHER: STREET NAME(S): N. CANAL NEAREST CROSS STREET: 5. LINDEN 26 S. LINDEN NEAREST ADDRESS No.: SPECIAL MARKINGS: UNITS TO BE MEASURED IN: FEET ■ METERS LID EL.: = 30 CLAY 20 5, 2 IMDEN MEAS. DEPTH = INVERT EL.: = (computed) **PICTURE FILENAMES:** CANAL . LOCATION SKETCH EXAMPLE: **GENERAL FIELD INSTRUCTIONS:** FILL IN APPLICABLE BLANKS ON TOP OF PAGE. LID EL. = DRAW NORTH ARROW ABOVE, 2) 67.00 3) FILL IN LID ELEVATION. MEAS. DEPTH = 9.3' FILL IN MEASURED DEPTH. 4) INVERT EL. = DETERMINE THE FIRST OUT FLOW PIPE CLOCKWISE FROM NORTH. 5) 57.70 THIS IS PIPE #1. FILL IN APPLICABLE INFORMATION FOR PIPE #1 (see example). 6) PIPE #2 IS THE NEXT PIPE CONTINUING IN THE CLOCKWISE DIRECTION. 7) FILL IN APPLICABLE INFORMATION FOR PIPE #2. 8) (A) INVERT ELEVATION MEASURED FROM LID TO CONTINUING CLOCKWISE, FILL IN APPLICABLE INFORMATION BOTTOM OF PIPE FOR THE REST OF THE PIPES. (B) PIPE OUTSIDE DIAMETER (in appropriate units) 10) DRAW A MAP IN THE LOCATION SKETCH BOX SHOWING STREETS. (C) PIPE TYPE STREET NAME(S), AND LOCATION OF UTILITY. (D) LID ELEVATION MINUS MEASURED DEPTH OF PIPE (reduce in office) CLIENT: CITY OF CREW: SF So. JM /CP JOB No.: SURVEYING | MAPPING | GIS 2018/12/28 15695-101

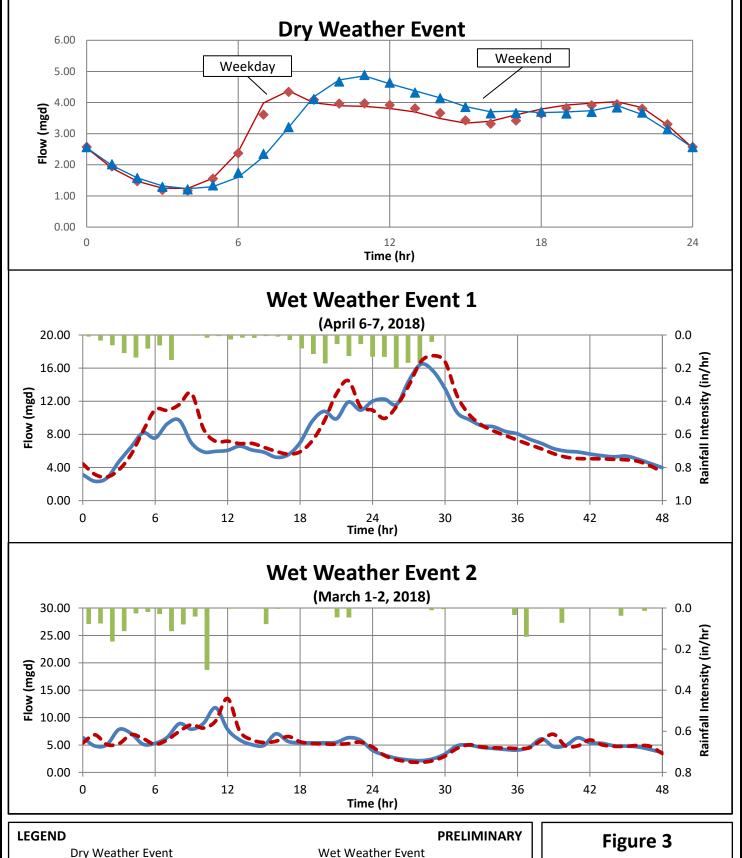
APPENDIX C

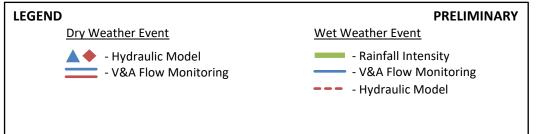
Hydraulic Model Calibration Exhibit





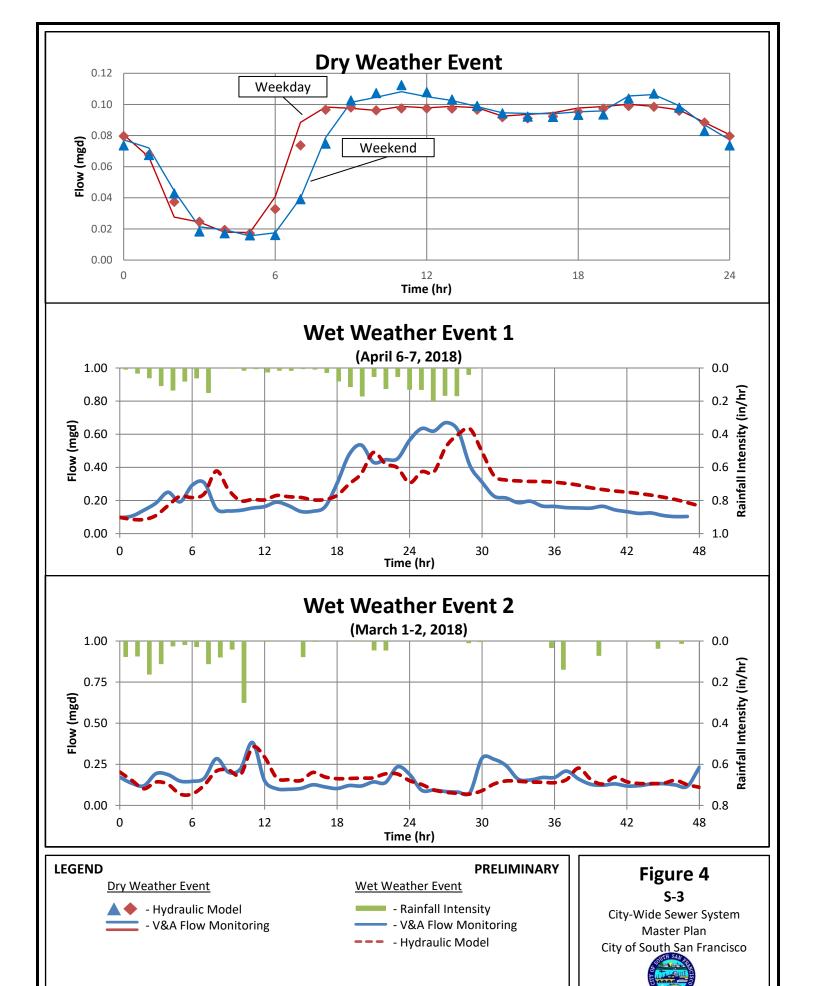


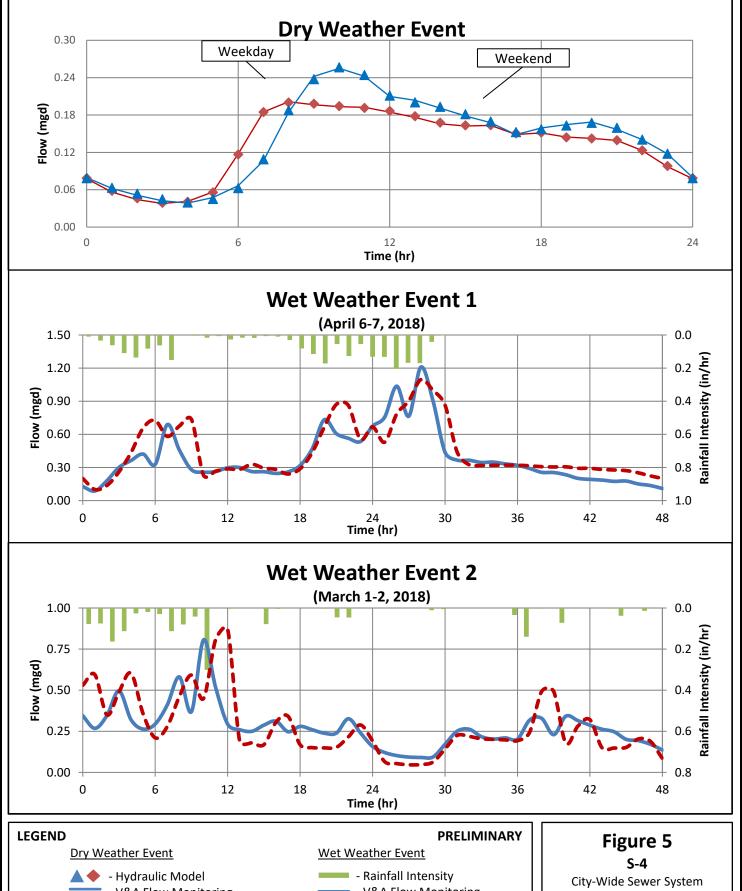


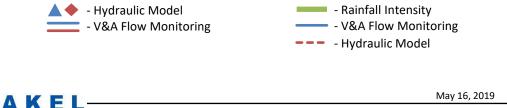


S-2
City-Wide Sewer System
Master Plan
City of South San Francisco







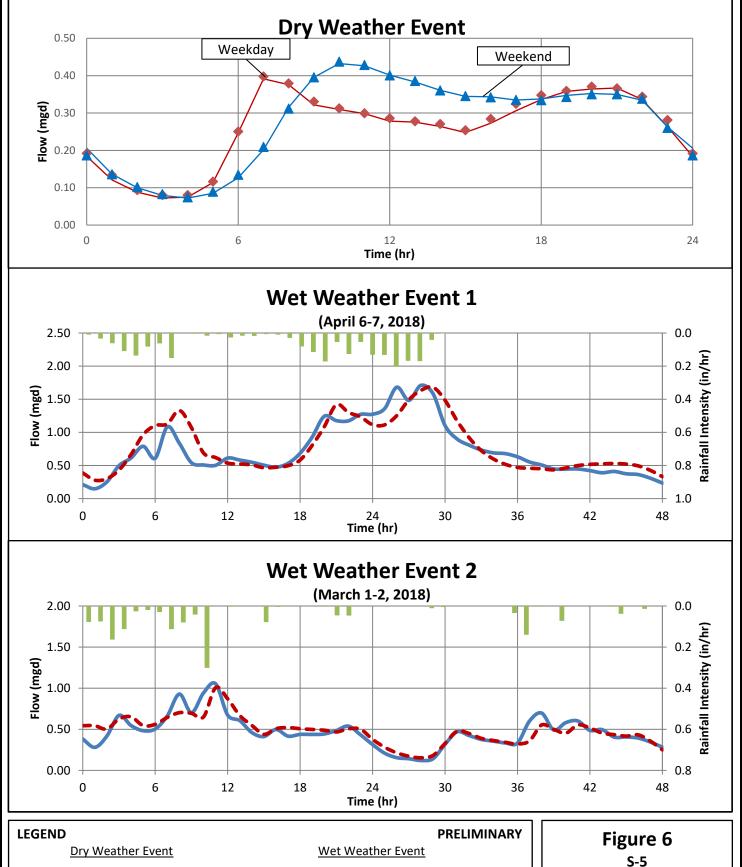


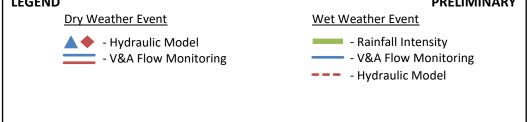
City-Wide Sewer System

Master Plan

City of South San Francisco



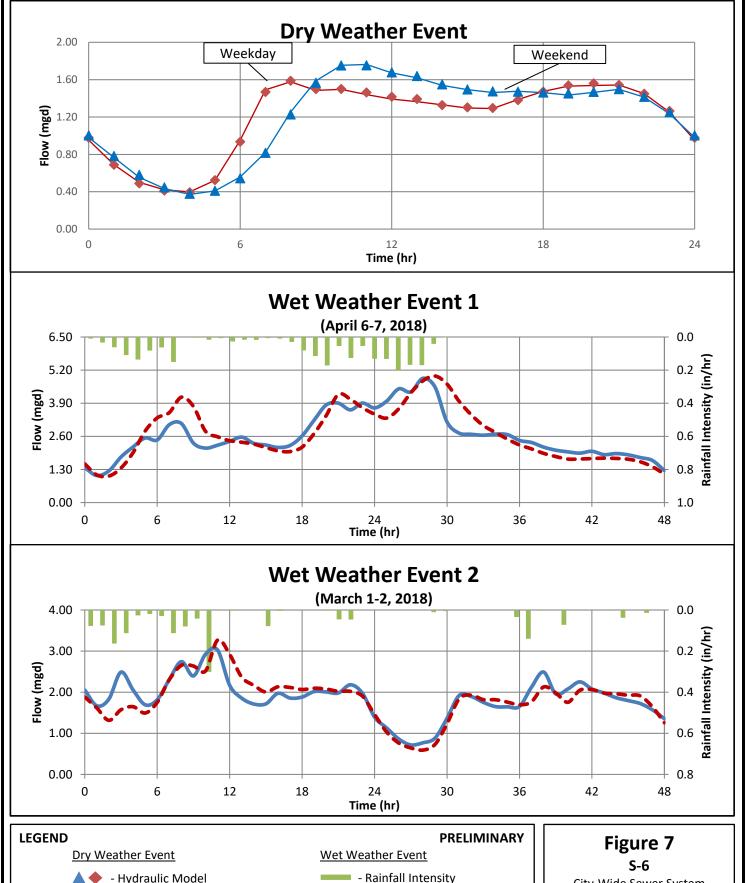




S-5
City-Wide Sewer System
Master Plan
City of South San Francisco

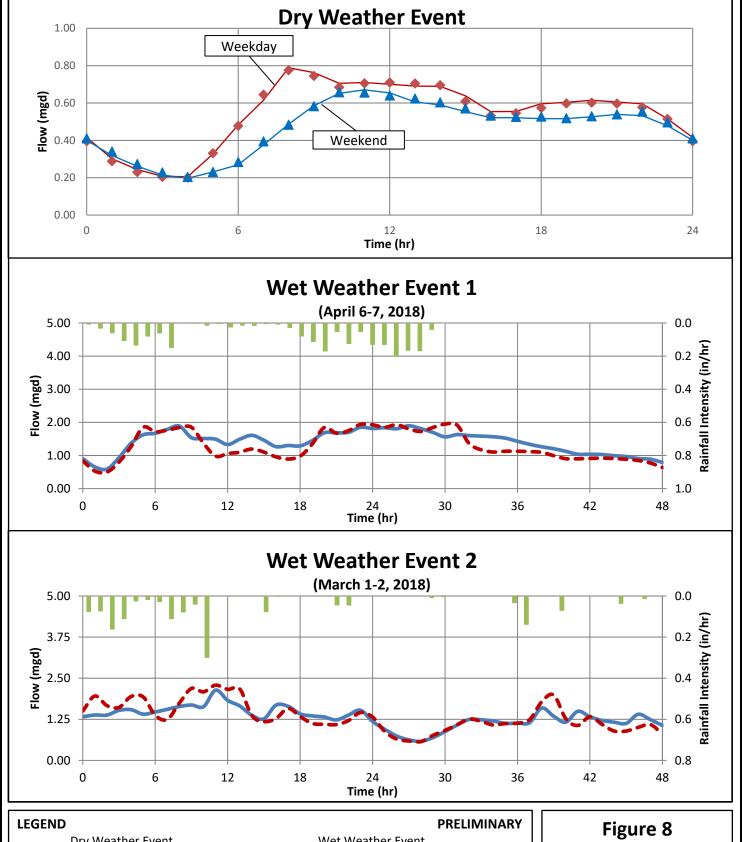








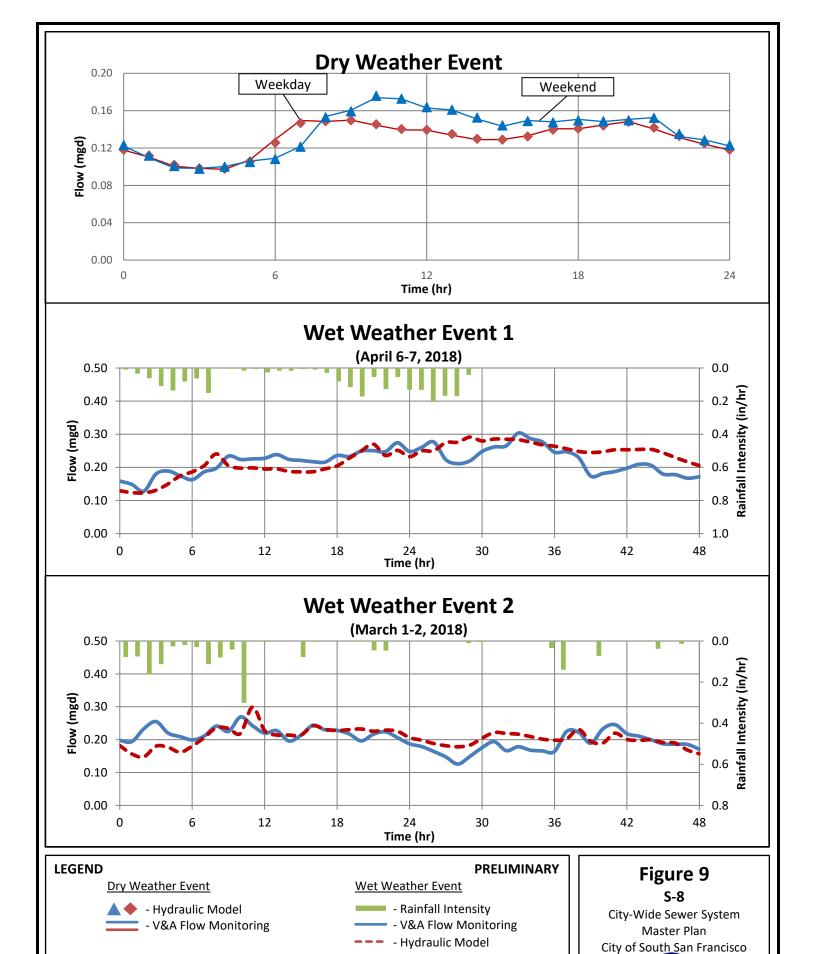
S-6 City-Wide Sewer System Master Plan City of South San Francisco



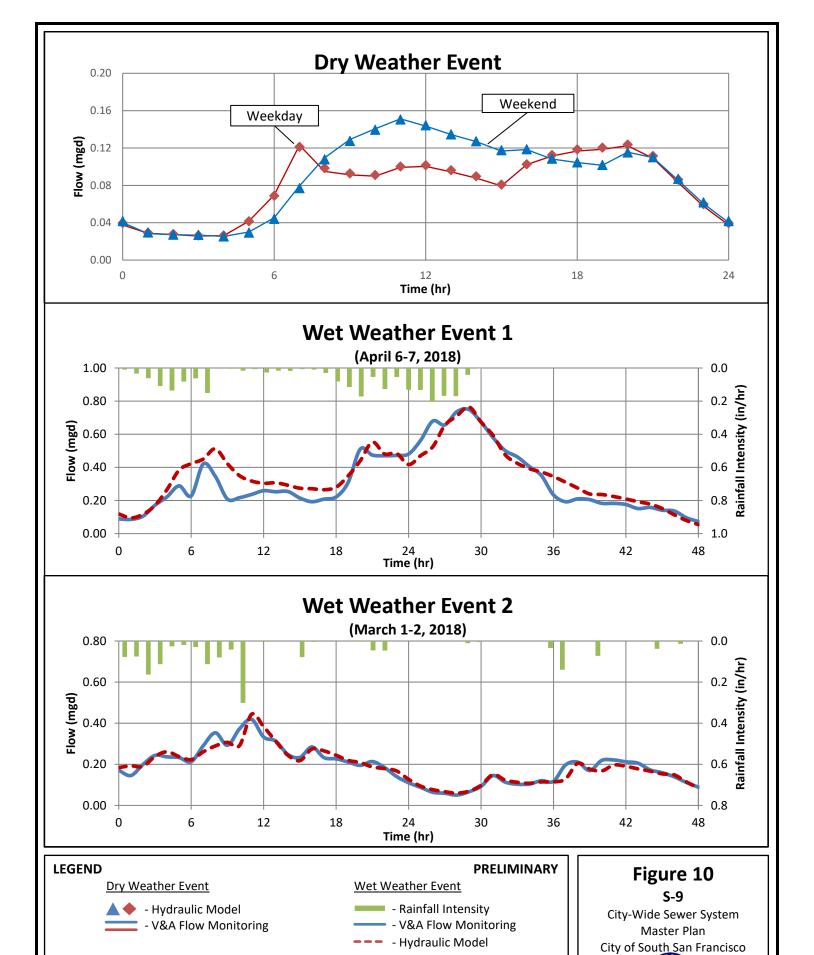


S-7
City-Wide Sewer System
Master Plan
City of South San Francisco

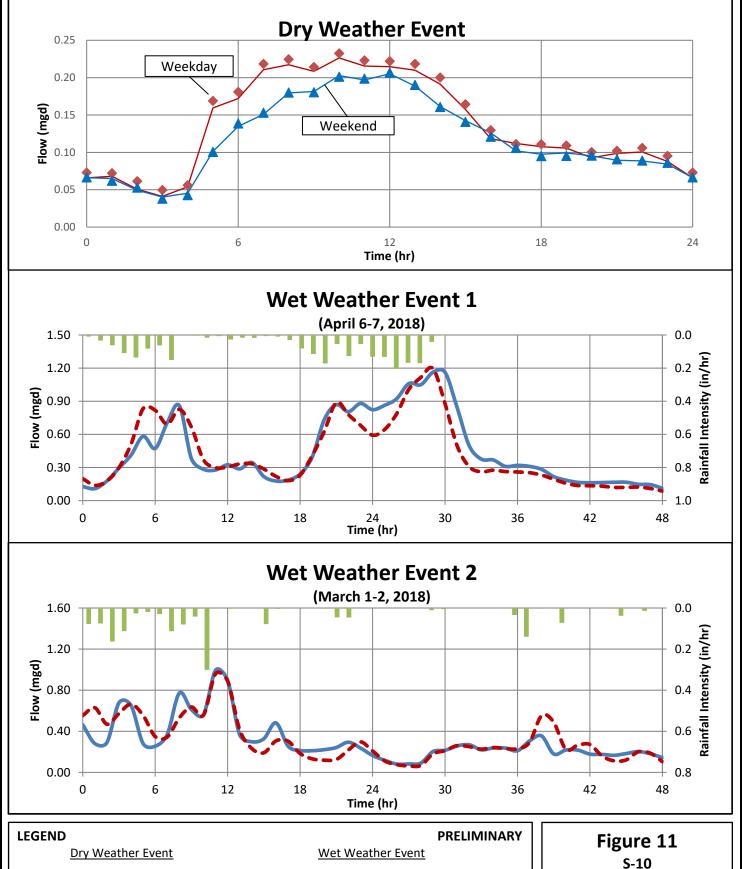












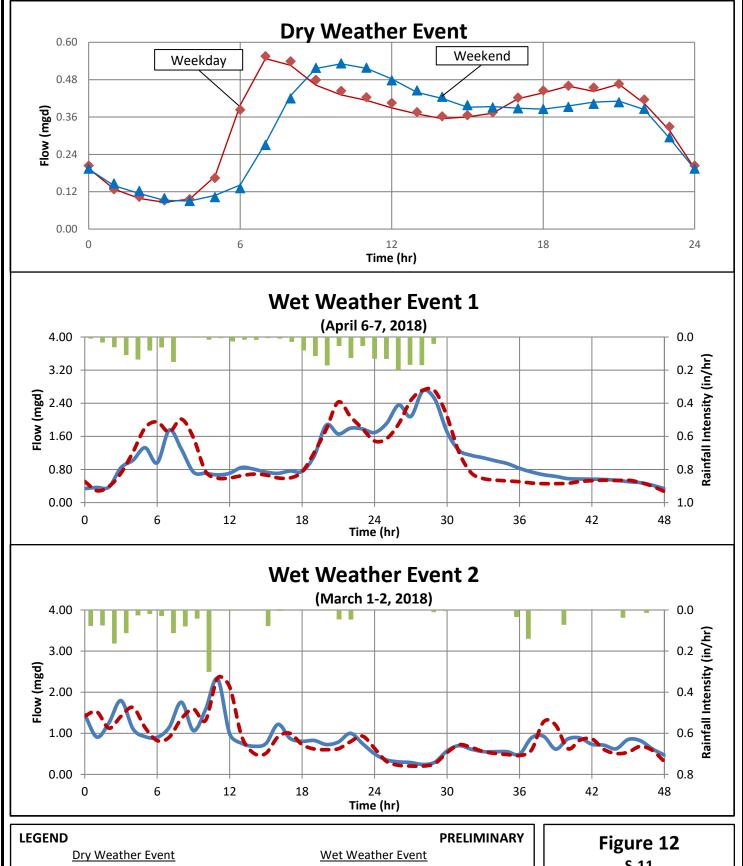


City-Wide Sewer System

Master Plan

City of South San Francisco







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