AGENDA
REGULAR MEETING
CITY COUNCIL OF THE TOWN OF COLMA

Colma Town Hall
1198 El Camino Real
Colma, CA 94014

Wednesday, August 28, 2019
7:00 PM

PLEDGE OF ALLEGIANCE AND ROLL CALL

ADOPTION OF AGENDA

PRESENTATIONS

- Introduction of New Police Dispatcher Alejandra Gonzalez
- Introduction of New CSG Contractors
- Laura Wayman on Dementia Awareness

PUBLIC COMMENTS

Comments on the Consent Calendar and Non-Agenda Items will be heard at this time. Comments on Agenda Items will be heard when the item is called.

CONSENT CALENDAR

1. Motion to Accept the Minutes from the July 24, 2019 Regular Meeting.
2. Motion to Accept Report of Checks Paid for July 2019.
3. Motion to Adopt an Ordinance Amending Subchapter 3.10 of the Colma Municipal Code and Finding the Action to be Exempt from Environmental Review Pursuant to CEQA Guideline 15308, Relating to Green Infrastructure (second reading).
4. Motion to Approve the Final Report of the Colma Wastewater Collection System Master Plan.

NEW BUSINESS

5. **LEW EDWARDS GROUP CONTRACT AMENDMENT**

Consider: Motion to Adopt a Resolution Approving the First Amendment to Professional Services Agreement with the Lew Edwards Group.

REPORTS

Mayor/City Council
City Manager

ADJOURNMENT

The City Council Meeting Agenda Packet and supporting documents are available for review at the Colma Town Hall, 1198 El Camino Real, Colma, CA during normal business hours (Mon – Fri 8am-5pm). Persons interested in obtaining an agenda via e-mail should call Caitlin Corley at 650-997-8300 or email a request to ccorley@colma.ca.gov.

Reasonable Accommodation
Upon request, this publication will be made available in appropriate alternative formats to persons with disabilities, as required by the Americans with Disabilities Act of 1990. Any person with a disability, who requires a modification or accommodation to view the agenda, should direct such a request to Pak Lin, ADA Coordinator, at 650-997-8300 or pak.lin@colma.ca.gov. Please allow two business days for your request to be processed.

MINUTES
REGULAR MEETING
City Council of the Town of Colma
Town Hall Council Chamber, 1198 El Camino Real
Colma, CA 94014
Wednesday, July 24, 2019
7:00 PM

CALL TO ORDER

Mayor Joanne F. del Rosario called the meeting to order at 7:01 p.m.

Council Present – Mayor Joanne F. del Rosario, Vice Mayor John Irish Goodwin, Council Members Diana Colvin, Helen Fisicaro and Raquel Gonzalez were all present.

Staff Present – City Manager Brian Dossey, City Attorney Christopher Diaz, Administrative Services Director Pak Lin, Director of Public Works Brad Donohue, City Planner Michael Laughlin, Police Commander Sherwin Lum, Recreation Manager Liz Tapia, City Clerk Caitlin Corley were in attendance.

ADOPTION OF THE AGENDA

Mayor del Rosario asked if there were any changes to the agenda; none were requested. The Mayor asked for a motion to adopt the agenda.

Action: Council Member Fisicaro moved to adopt the agenda; the motion was seconded by Council Member Colvin and carried by the following vote:

Name	Voting		Present, Not Voting		Absent
	Aye	No	Abstain	Not Participating	
Joanne F. del Rosario, Mayor	✓				
John Irish Goodwin	✓				
Diana Colvin	✓				
Helen Fisicaro	✓				
Raquel Gonzalez	✓				
	5	0			

PRESENTAIONS

- Recreation Manager Liz Tapia introduced new Recreation Coordinator Dinora Navarro.
- Adalberto Padilla, consultant for TIAA Financial Solutions, gave a presentation on the Scholarshare529 College Savings Program.
- Eun-Soo Lim of the San Mateo County's Office of Sustainability gave a presentation on the county's proposed disposable food service ware ordinance.

PUBLIC COMMENTS

Mayor del Rosario opened the public comment period at 7:41 p.m. and seeing no one come forward to speak, she closed the public comment period.

CONSENT CALENDAR

1. Motion to Accept the Minutes from the July 10, 2019 Regular Meeting.
2. Motion to Adopt a Resolution Amending Subchapter 4.02 of the Colma Administrative Code, Relating to Investment Policies.

Action: Council Member Colvin moved to approve the Consent Calendar items #1 and #2; the motion was seconded by Vice Mayor Goodwin and carried by the following vote:

Name	Voting		Present, Not Voting		Absent
	Aye	No	Abstain	Not Participating	
Joanne F. del Rosario, Mayor	✓				
John Irish Goodwin	✓				
Diana Colvin	✓				
Helen Fisicaro	✓				
Raquel Gonzalez	✓				
	5	0			

PUBLIC HEARING

3. **GREEN INFRASTRUCTURE**

CSG Consultant Katherine Sheehan presented the staff report. Mayor del Rosario opened the public hearing at 7:49 p.m. and seeing no one come forward to speak, she closed the public hearing. Council discussion followed.

Action: Council Member Colvin made a Motion to Adopt a Resolution Approving the Town of Colma Green Infrastructure Plan in Accordance with Provision C.3.j. of the Municipal Regional Permit, and Finding the Action to be Exempt from Environmental Review Pursuant to CEQA Guidelines 15308; the motion was seconded by Vice Mayor Goodwin and carried by the following vote:

Name	Voting		Present, Not Voting		Absent
	Aye	No	Abstain	Not Participating	
Joanne F. del Rosario, Mayor	✓				
John Irish Goodwin	✓				
Diana Colvin	✓				
Helen Fisicaro	✓				
Raquel Gonzalez	✓				
	5	0			

Action: Vice Mayor Goodwin made a Motion to Introduce an Ordinance Amending Subchapter 3.10 of the Colma Municipal Code and Finding the Action to be Exempt From Environmental Review Pursuant to CEQA Guideline 15308, Relating to Green Infrastructure, and Waive a Second Reading; the motion was seconded by Council Member Colvin and carried by the following vote:

Name	Voting		Present, Not Voting		Absent
	Aye	No	Abstain	Not Participating	
Joanne F. del Rosario, Mayor	✓				
John Irish Goodwin	✓				
Diana Colvin	✓				
Helen Fisicaro	✓				
Raquel Gonzalez	✓				
	5	0			

STUDY SESSION

4. **GENERAL PLAN LAND USE ELEMENT**

City Planner Michael Laughlin presented the staff report. Mayor del Rosario opened the public comment period at 8:06 p.m. Residents Maureen O'Connor and citizen Patricia Simpson made comments. The Mayor closed the public comment period at 8:32 p.m. Council discussion followed.

This item was for discussion only; no action was taken at this meeting.

NEW BUSINESS

5. **SB2 PLANNING GRANT PROGRAM FUNDS**

City Planner Michael Laughlin presented the staff report. Mayor del Rosario opened the public comment period at 7:37 p.m. and seeing no one come forward to speak, she closed the public comment period. Council discussion followed.

Action: Vice Mayor Goodwin made a Motion to Adopt a Resolution Authorizing Application for and Receipt of SB 2 Planning Grant Program (PGP) Funds; the motion was seconded by Council Member Gonzalez and carried by the following vote:

Name	Voting		Present, Not Voting		Absent
	Aye	No	Abstain	Not Participating	
Joanne F. del Rosario, Mayor	✓				
John Irish Goodwin	✓				
Diana Colvin	✓				
Helen Fisicaro	✓				
Raquel Gonzalez	✓				
	5	0			

6. **VALUE-BASED CODE OF CONDUCT**

City Manager Brian Dossey presented the staff report. Mayor del Rosario opened the public comment period at 9:09 p.m. Citizen Patricia Simpson made a comment. The Mayor closed the public comment period at 9:10 p.m. Council discussion followed. Council Member Fisicaro requested that the word "fellow" on page 2 be changed to "peer."

Action: Council Member Fisicaro made a Motion to Adopt a Resolution Repealing Appendix A of Subchapter 1.02 and Adding Subchapter 1.03 to the Colma Administrative Code, Relating to the Value-Based Code of Conduct, with the requested change; the motion was seconded by Council Member Colvin and carried by the following vote:

Name	Voting		Present, Not Voting		Absent
	Aye	No	Abstain	Not Participating	
Joanne F. del Rosario, Mayor	✓				
John Irish Goodwin	✓				
Diana Colvin	✓				
Helen Fisicaro	✓				
Raquel Gonzalez	✓				
	5	0			

COUNCIL CALENDARING

The next Regular Council Meeting on Wednesday, August 14, 2019 will be cancelled.

REPORTS

City Manager Brian Dossey gave a report on the following topics:

- The Summer Concert Series begins next month; the concerts will be on August 1, 8, and 15 at 6pm at the Colma Community Center.
- National Night Out will be on Tuesday, August 6 at 5pm at Serra Center.
- Accounting Technician Cassandra Woo had her baby and has started maternity leave. Congrats Cassandra!

ADJOURNMENT

Mayor del Rosario adjourned the meeting at 9:55 p.m.

Respectfully submitted,

Caitlin Corley
City Clerk

Final Check List
Town of Colma

Bank : first TRI COUNTIES BANK

Check #	Date	Vendor		Invoice	Inv Date	Description	Amount Paid	Check Total
50110	7/1/2019	00050	CA POLICE CHIEFS ASSN	12821	5/1/2019	FY 2019-2020 K STRATTON M	440.00	440.00
50111	7/1/2019	00055	CORA	ColFY19-20	7/1/2019	FY 2019-2020 ERP SERVICES	493.00	493.00
50112	7/1/2019	00117	DELTA DENTAL OF CALIFORN	BE003468492	7/1/2019	JULY 2019 DENTAL INSURAN(	12,797.60	12,797.60
50113	7/1/2019	00334	S.B.R.P.S.T.C.	121484 REC	6/18/2019	07.25.19 J MORENO REPORT	85.00	85.00
50114	7/1/2019	00363	SMC NARCOTICS TASK FORC	FY 2019-2020 JF	6/12/2019	FY 2019-2020 SMC NARCOTI(	2,855.00	2,855.00
50115	7/1/2019	00388	SONITROL	1336933-IN	6/3/2019	JULY 2019 MO. MONITORING	1,109.81	1,109.81
50116	7/1/2019	00432	VISION SERVICE PLAN	807053061	6/19/2019	JULY 2019 VISION SERVICE F	1,054.93	1,054.93
50117	7/1/2019	00630	MAD SCIENCE OF THE BAY AI	23230	7/10/2019	07.10.19 FIRE & ICE 1:00-1:45	700.00	700.00
50118	7/1/2019	00646	ICMA	FY 2019-2020 M	6/24/2019	FY 2019-2020 MEMBERSHIP F	1,400.00	1,400.00
50119	7/1/2019	00651	SANTA CRUZ SEASIDE COMP.	183696	6/19/2019	07.17.19 46 TICKET ALL-DAY I	1,543.30	1,543.30
50120	7/1/2019	01030	STEPFORD, INC.	1901507	6/14/2019	07.01.19-06.30.22 SOPHOS 3	6,442.08	6,442.08
50121	7/1/2019	01036	MANAGED HEALTH NETWORI	PRM-040508	6/16/2019	JULY 2019 EAP FOR 40 MEME	99.20	99.20
50122	7/1/2019	01414	VERANO HOMEOWNERS ASS	7	7/1/2019	JULY 2019 VERANO H/O ASS(	320.00	320.00
50123	7/1/2019	01480	LEXIPOL, LLC	29476	6/17/2019	JULY - DEC 2019 LE UPDATE	1,800.00	1,800.00
50124	7/1/2019	01808	THIRD DEGREE COMMUNICA	7235	3/12/2019	AUG 19-21, 2019 J MORENO I	525.00	525.00
50125	7/1/2019	02224	STANDARD INSURANCE COM	July 2019	6/14/2019	JULY 2019 LIFE INSURANCE	190.00	190.00
50126	7/1/2019	02336	CONSERVATION EARTH	27150	6/26/2019	07/30/19 ANIMALS OF THE RA	495.00	495.00
50127	7/1/2019	02542	JOHNSON CONTROLS SECUF	32694729	6/8/2019	JULY - SEPT, 2019 FIRE SYST	474.42	474.42
50128	7/1/2019	02787	AECO SYSTEMS, INC.	20033	6/1/2019	JULY 2019 PD FIRE ALARM	45.00	45.00
50129	7/1/2019	02848	UNITED COACH TOURS	15756WF	6/12/2019	JULY 9, 17, & 31, 2019 56 PAS:	3,306.00	3,306.00
50130	7/1/2019	03054	BUBBLEMANIA AND COMPAN'	00016497	4/19/2019	07.16.19 2 X INDOOR/OUTDO	400.00	400.00
50131	7/1/2019	03059	DUDE SOLUTIONS, INC.	INV-49592	4/19/2019	FY 2019-2020 MOBILE311 - UF	3,131.10	3,131.10
50132	7/1/2019	03224	DECORATIVE PLANT SERVICI	0014217	7/1/2019	JULY 2019 MAINTENANCE GL	157.31	157.31
50133	7/1/2019	03271	PUBLIC AGENCY RISK MANA(	100900	5/13/2019	FY 2019-2020 PUBLIC ENTITY	150.00	150.00
72019	7/1/2019	00282	CALIFORNIA PUBLIC EMPLOY	July 2019	7/1/2019	JULY 2019	5,026.31	5,026.31
						Sub total for TRI COUNTIES BANK:		45,040.06

25 checks in this report.	Grand Total All Checks: 45,040.06

Bank : first TRI COUNTIES BANK

Check #	Date	Vendor		Invoice	Inv Date	Description	Amount Paid	Check Total
50134	7/2/2019	00003	A. S. F. ELECTRIC	7906	6/27/2019	REPLACE 4 EXISTING METAL	1,560.00	1,560.00
50135	7/2/2019	00112	DEPARTMENT OF JUSTICE	377293	6/5/2019	PD ACCOUNT #140503	932.00	932.00
50136	7/2/2019	00150	FEDERAL EXPRESS	6-590-78800	6/21/2019	SHIPPING CHARGES	35.02	35.02
50137	7/2/2019	00188	IRVINE & JACHENS INC	2828	6/28/2019	ADD TOP RIBBON TO OFFICE	38.06	38.06
50138	7/2/2019	01037	COMCAST CABLE	May 13-June 16,	6/12/2019	8155 20 022 0188769 HD TECI	193.63	193.63
50139	7/2/2019	01113	SAN DIEGO POLICE EQUIPME	638180	06-26-19 ~~7/1/2019~~	2 FED-P45HST2-CF 45ACP 23	1,893.25	1,893.25
50140	7/2/2019	01367	DUO DANCE ACADEMY	May 2019	6/24/2019	DANCE CLASSES	520.00	520.00
50141	7/2/2019	02274	FRANK AND GROSSMAN LANI	5399	6/27/2019	REPAIR SPRINKLER AT SOUT	1,244.75	1,244.75
50142	7/2/2019	02505	PERMIT SERVICES INC.	1338B SMIP Par	6/28/2019	1338B SMIP REFUND DUE TC	0.72	0.72
50143	7/2/2019	03043	WATER WORKS ENGINEERS,	9710 Final Invoic	6/30/2019	SERVICES THROUGH JUNE 3	13,028.47	13,028.47
50144	7/2/2019	03157	NEW ALPHA TWO	115730	5/31/2019	2019 Tire Change	35.00	35.00
50145	7/2/2019	03262	FEHR & PEERS	130645-2	6/18/2019	BIKE PEDESTRIAN IMPROVEI	8,355.16	8,355.16
50146	7/2/2019	03273	THE HOME DEPOT PRO	497220954	6/13/2019	METER FCT CENTRST 1.0 GF	161.43	
				498171396	6/20/2019	C.S. LO-D LNR BLK STAR 40X	112.39	273.82
50147	7/2/2019	03278	SYSTEMS & SPACE, INC.	0019663D-IN	6/25/2019	NARCOTICS EVIDENCE LOCI	4,146.73	4,146.73
							Sub total for TRI COUNTIES BANK:	32,256.61

14 checks in this report.

Grand Total All Checks: 32,256.61

Bank : first TRI COUNTIES BANK

Check #	Date	Vendor		Invoice	Inv Date	Description	Amount Paid	Check Total
50148	7/2/2019	01213	THE KELLER CENTER, MDIC F	July 8-9, 2019	6/26/2019	JULY 8-9, 2019 J WOLLMAN S	60.00	60.00
50149	7/2/2019	02965	HAPPYCAKE FACE PAINTING	0833	6/18/2019	07.03.19 FACE PAINTING 3 HF	375.00	375.00
							Sub total for TRI COUNTIES BANK:	435.00

2 checks in this report.

Grand Total All Checks: 435.00

Final Check List
Town of Colma

Bank : first TRI COUNTIES BANK

Check #	Date	Vendor		Invoice	Inv Date	Description	Amount Paid	Check Total
50150	7/5/2019	01164	STATE OF CALIFORNIA, FRAN	07052019 B	7/5/2019	STATE - WAGE GARNISHMEN	450.00	450.00
50151	7/5/2019	01340	NAVIA BENEFIT SOLUTIONS	07052019 B	7/5/2019	FLEX 125 PLAN: PAYMENT	458.84	458.84
50152	7/5/2019	01375	NATIONWIDE RETIREMENT S	07052019 B	7/5/2019	NATIONWIDE: PAYMENT	4,550.00	
				07052019 M	7/5/2019	NATIONWIDE: PAYMENT	950.00	5,500.00
50153	7/5/2019	02377	CALIFORNIA STATE DISBURSI	07052019 B	7/5/2019	WAGE GARNISHMENT: PAYM	871.38	871.38
50154	7/5/2019	03276	US DEPARTMENT OF EDUCA	07052019 B	7/5/2019	WAGE GARNISHMENT: PAYM	95.57	95.57
93966	7/5/2019	00130	EMPLOYMENT DEVELOPMEN	07052019 B	7/5/2019	CALIFORNIA STATE TAX: PAY	12,604.21	12,604.21
93967	7/5/2019	00521	UNITED STATES TREASURY	07052019 B	7/5/2019	FEDERAL TAX: PAYMENT	59,313.23	59,313.23
93968	7/5/2019	00282	CALIFORNIA PUBLIC EMPLOY	07052019 B	7/5/2019	JULY 2019 ACTIVE PREMIUM	58,754.47	58,754.47
93969	7/5/2019	00631	P.E.R.S.	07052019 B	7/5/2019	PERS - BUYBACK: PAYMENT	42,130.41	42,130.41
93970	7/5/2019	01360	VANTAGE TRANSFER AGENT	07052019 B	7/5/2019	ICMA CONTRIBUTION: PAYME	4,438.36	4,438.36
93971	7/5/2019	00068	COLMA PEACE OFFICER'S	07052019 B	7/5/2019	COLMA PEACE OFFICERS: P	638.90	638.90
93972	7/5/2019	00521	UNITED STATES TREASURY	07052019 M	7/5/2019	FEDERAL TAX: PAYMENT	911.88	911.88
93973	7/5/2019	01360	VANTAGE TRANSFER AGENT	07052019 M	7/5/2019	ICMA CONTRIBUTION: PAYME	464.42	464.42
93974	7/5/2019	00631	P.E.R.S.	07052019 M	7/5/2019	PERS MISC NON-TAX: PAYME	630.29	630.29
93975	7/5/2019	00282	CALIFORNIA PUBLIC EMPLOY	07052019 M	7/5/2019	JULY 2019 ACTIVE PREMIUM	7,348.84	7,348.84
7052019	7/5/2019	00631	P.E.R.S.	FY2019-2020 Lu	7/5/2019	FY2019-2020 LUMP SUM PRE	851,083.00	851,083.00
							Sub total for TRI COUNTIES BANK:	1,045,693.80

16 checks in this report.	Grand Total All Checks: 1,045,693.80

Bank : first TRI COUNTIES BANK

Check #	Date	Vendor		Invoice	Inv Date	Description	Amount Paid	Check Total
50155	7/10/2019	00013	ANDY'S WHEELS & TIRES	June 2019	6/30/2019	TIRE SERVICE	505.99	505.99
50156	7/10/2019	00051	CALIFORNIA WATER SERVICE	06/27/2019	6/27/2019	WATER BILL	5,579.20	5,579.20
50157	7/10/2019	00093	CITY OF SOUTH SAN FRANCI	517749	6/26/2019	TRAFFIC SIGNAL MAINTENAN	750.00	750.00
50158	7/10/2019	00112	DEPARTMENT OF JUSTICE	388623	6/30/2019	PD ACCOUNT #140503	484.00	484.00
50159	7/10/2019	00220	LC ACTION POLICE SUPPLY, I	42118	6/28/2019	2 LE6945CQB COLT SEMI AUT	2,777.88	2,777.88
50160	7/10/2019	00254	METRO MOBILE COMMUNICA	43640	6/28/2019	2 KMC-35 MOBILE RADIO MIC	119.63	119.63
50161	7/10/2019	00307	PACIFIC GAS & ELECTRIC	06/25/2019	6/25/2019	PG&E	2,190.57	2,190.57
50162	7/10/2019	00311	PITNEY BOWES INC.	3103224156	6/20/2019	#0012828896 POSTAGE METE	898.83	898.83
50163	7/10/2019	00311	PITNEY BOWES INC.	1013378153	6/25/2019	EZ SEAL, CONNECT ADHESIV	388.20	388.20
50164	7/10/2019	00364	SMC SHERIFF'S OFFICE	PS-INV103058	5/31/2019	LAB FEES	1,841.00	
				PS-INV103084	6/30/2019	LAB FEES	1,250.00	3,091.00
50165	7/10/2019	00411	TURBO DATA SYSTEMS	30442	6/30/2019	CITATION PROCESSING	407.12	407.12
50166	7/10/2019	00421	U.S. POSTAL SERVICE	#1433 Bulk Maili	6/30/2019	#1433 BULK MAILING PERMIT	2,500.00	2,500.00
50167	7/10/2019	00500	SMC CONTROLLERS OFFICE	June 2019	7/2/2019	ALLOCATION OF PARKING PE	2,743.50	2,743.50
50168	7/10/2019	00649	DAVEY TREE EXPERT COMPA	913741297	6/25/2019	LAWNDALE TREE PRUNING	4,900.00	
				93741295	6/25/2019	TOWN HALL TREE PRUNING	4,200.00	
				913741296	6/25/2019	SOUTHGATE & JSB PALM PRI	2,400.00	
				913741294	6/25/2019	LAWNDALE X MISSION PALM	1,600.00	13,100.00
50169	7/10/2019	01030	STEPFORD, INC.	1901538	6/20/2019	HOURS IN EXCESS OF CONT	1,112.50	1,112.50
50170	7/10/2019	01213	THE KELLER CENTER, MDIC F	1586	5/1/2019	OUTPATIENT SERVICES REN	700.00	700.00
50171	7/10/2019	01340	NAVIA BENEFIT SOLUTIONS	10197684	6/28/2019	SECTION 125 PARTICIPANT &	85.00	85.00
50172	7/10/2019	01367	DUO DANCE ACADEMY	June 2019	7/3/2019	DANCE CLASSES	520.00	520.00
50173	7/10/2019	01430	LSA ASSOCIATES, INC.	166217	6/17/2019	MAY 2019 MISSION RD BICYC	844.18	844.18
50174	7/10/2019	01816	QUALITY STRIPING, INC.	93501	7/1/2019	FURNISH & INSTALL THERMC	4,510.00	4,510.00
50175	7/10/2019	01995	CELESTE, MIKE L.	19-0701	7/1/2019	CARDROOM BACKGROUND	880.00	880.00
50176	7/10/2019	02144	DOMINIC A. DE LUCCA DBA DI	June 2019	7/1/2019	TAE KWON DO	900.00	900.00
50177	7/10/2019	02216	RAMOS OIL CO. INC.	618894	6/10/2019	PD GASOLINE PURCHASES 1	1,738.43	
				620442	6/20/2019	PD GASOLINE PURCHASES 1	1,582.94	
				621977	6/30/2019	PD GASOLINE PURCHASES 2	1,477.97	
				620909	6/20/2019	RECREATION GASOLINE PUF	69.53	4,868.87
50178	7/10/2019	02330	FOREMOST PROMOTIONS	475975	6/27/2019	250 EA: KIDS ID TAG KIT, PICI	675.44	
				475974	6/27/2019	JUNIOR CRIMEFIGHTER (RA(	47.50	722.94
50179	7/10/2019	02392	MIG	0059464	7/3/2019	JUNE 2019 ADA CUSTOMER S	1,000.00	1,000.00
50180	7/10/2019	02499	GE CAPITAL INFORMATION	1081352286	6/6/2019	CYAN, YELLOW, MAGENTA PI	113.00	113.00

Bank : first TRI COUNTIES BANK (Continued)

Check #	Date	Vendor		Invoice	Inv Date	Description	Amount Paid	Check Total
50181	7/10/2019	02714	MARCHETTI, DAWN	06/27/2019 Reim	6/27/2019	COMMUNITY EVENT SUPPLIE	78.24	78.24
50182	7/10/2019	02878	MENDOZA, DANIEL	June 23-28, 201	7/1/2019	JUNE 23-28, 2019 CPR/AED IN	341.06	341.06
50183	7/10/2019	02970	PRODUCTIVE PRINTING & GR	33849	6/25/2019	NOTICE OF CORRECTION (TI	121.75	121.75
50184	7/10/2019	03015	U.S. BANK CORPORATE PMT	06/24/19 Gogan	6/24/2019	CREDIT CARD PURCHASE	4,454.40	
				06/24/19 Dossey	6/24/2019	CREDIT CARD PURCHASE	2,826.31	
				06/24/19 Pfotenh	6/24/2019	CREDIT CARD PURCHASE	845.40	
				06/24/19 Gotelli	6/24/2019	CREDIT CARD PURCHASE	630.45	
				06/24/19 De Leo	6/24/2019	CREDIT CARD PURCHASE	509.41	
				06/24/19 Jordan	6/24/2019	CREDIT CARD PURCHASE	447.25	
				06/24/19 Vang	6/24/2019	CREDIT CARD PURCHASE	336.27	
				06/24/19 Corley	6/24/2019	CREDIT CARD PURCHASE	215.55	10,265.04
50185	7/10/2019	03164	EDGEWORTH INTEGRATION	I19227	11/7/2018	RELEASE RETENTION MARC	13,037.79	13,037.79
50186	7/10/2019	03184	FLYNN, FIONA	June 4-25, 2019	7/2/2019	YOGA	460.00	460.00
50187	7/10/2019	03208	AAA BUSINESS SUPPLIES & I	2083499-0	6/26/2019	SUPPLES	29.56	
				2083499-1	6/28/2019	SUPPLES	12.49	42.05
50188	7/10/2019	03257	THE LEW EDWARDS GROUP	003	6/30/2019	JUNE 2019 CONFERRED W/G	5,750.00	5,750.00
50189	7/10/2019	03259	GODBE CORPORATION	15537	6/19/2019	1-2019 COMMUNITY PRIORIT	9,500.00	9,500.00
						Sub total for TRI COUNTIES BANK:		91,388.34

35 checks in this report.

Grand Total All Checks: 91,388.34

Final Check List
Town of Colma

Bank : first TRI COUNTIES BANK

Check #	Date	Vendor		Invoice	Inv Date	Description	Amount Paid	Check Total
50190	7/10/2019	00181	IEDA	22608	7/1/2019	LABOR RELATIONS CONSUL	1,469.00	1,469.00
50191	7/10/2019	00254	METRO MOBILE COMMUNICA	190717	7/1/2019	MAINTENANCE CONTRACT	602.00	602.00
50192	7/10/2019	00774	TOWN OF ATHERTON	09.04.19 G Grah	7/2/2019	09.24.19 GORDON GRAHAM T	160.00	160.00
50193	7/10/2019	01030	STEPFORD, INC.	1901579	6/20/2019	MONTHLY SERVICE CONTRA	5,622.00	5,622.00
50194	7/10/2019	01037	COMCAST CABLE	07/02/19-08/01/1	6/27/2019	8155 20 022 0097069 INTERNI	293.33	
				06/25-07/24 427	6/20/2019	8155 20 022 0097028 427 F ST	288.33	
				06/25-07/24 Inte	6/20/2019	8155 20 022 0097051 Internet	288.33	
				06/27-07/26 XFII	6/17/2019	8155 20 022 0002770 1520 HIL	10.94	880.93
50195	7/10/2019	01431	CSAC EXCESS INSURANCE A	20150006	7/1/2019	FY 2019-2020 Primary Workers	252,882.00	
				20100036	7/1/2019	FY 2018-2019 EXCESS WORK	136,079.00	388,961.00
50196	7/10/2019	01687	UNITED SITE SERVICES OF	114-8658856	6/17/2019	STANDARD AND REGULAR SI	149.37	149.37
50197	7/10/2019	02153	NAVARRO, BEGONA	2001597.003	7/1/2019	07.01.19 DEPOSIT REFUND	225.00	225.00
50198	7/10/2019	02274	FRANK AND GROSSMAN LANI	5590	7/1/2019	REPLACE (1) 1" STUCK VALVI	299.00	299.00
50199	7/10/2019	02352	GUTIERREZ, IMELDA	2001598.003	7/1/2019	07.01.19 DEPOSIT REFUND	50.00	50.00
50200	7/10/2019	02583	CRIME SCENE CLEANERS, IN	71783	7/6/2019	CLEAN & DISINFECT, REMOV	70.00	70.00
50201	7/10/2019	02787	AECO SYSTEMS, INC.	20114	7/1/2019	FIRE ALARM MONITORING	480.00	
				20100	7/1/2019	FIRE & BURGLAR PANIC ALAI	45.00	525.00
50202	7/10/2019	02793	DITO'S MOTORS	20372	7/1/2019	SERVICE	246.55	
				20373	7/2/2019	REPLACE BATTERY	200.32	
				20386	7/3/2019	OIL & FILTER CHANGE	42.00	488.87
50203	7/10/2019	02799	WAVE	09156937	6/23/2019	RIMS INTERNET W/SSF	400.00	400.00
50204	7/10/2019	02849	U.S. BANK PARS ACCOUNT, 6	July 2019 OPEB	7/9/2019	OPEB CONTRIBUTION	134,115.00	134,115.00
50205	7/10/2019	02860	PACIS, VIVIAN	2001600.003	7/1/2019	07.01.19 DEPOSIT REFUND	200.00	200.00
50206	7/10/2019	03052	BANDWAGON INDUSTRIES, L	19211	6/27/2019	07.13.19 BANDWAGON STAGI	4,900.00	4,900.00
50207	7/10/2019	03130	BAY AREA AIR QUALITY	T102552	6/2/2019	GENERATOR RENEWAL PRO	450.00	450.00

Sub total for TRI COUNTIES BANK: 539,567.17

18 checks in this report.

Grand Total All Checks: 539,567.17

Final Check List
Town of Colma

Bank : first TRI COUNTIES BANK

Check #	Date	Vendor		Invoice	Inv Date	Description	Amount Paid	Check Total
50208	7/10/2019	01037	COMCAST CABLE	July 2019	6/26/2019	8155 20 022 0094769 TOWN C	16,068.00	16,068.00
50209	7/10/2019	01038	ALLIANT INSURANCE SERVIC	1112606	6/26/2019	FY 2019-2020 DIFFERENCE IN	109,010.00	109,010.00
50210	7/10/2019	02499	GE CAPITAL INFORMATION	102307563	7/1/2019	PD COPY MACHINE RENTAL	812.64	
				102299732	6/30/2019	REC COPY MACHINE RENTAL	601.18	1,413.82
50211	7/10/2019	03173	PLAN JPA	PLAN-2019-236	7/1/2019	GENERAL LIABILITY & PROPE	121,288.00	121,288.00
50212	7/10/2019	03279	HONDA OF SERRAMONTE	744105	7/1/2019	2019 HONDA ACCORD VIN 1H	31,370.06	31,370.06
						Sub total for TRI COUNTIES BANK:		279,149.88

5 checks in this report.

Grand Total All Checks: 279,149.88

Final Check List
Town of Colma

Bank : first TRI COUNTIES BANK

Check #	Date	Vendor		Invoice	Inv Date	Description	Amount Paid	Check Total
50213	7/16/2019	00051	CALIFORNIA WATER SERVICE	9679761976	6/28/2019	9679761976 JSB S. OF COLM/	909.70	909.70
50214	7/16/2019	00057	CINTAS CORPORATION #2	June 2019	7/10/2019	CLEANING SERVICE	1,391.62	
				June 2019	7/10/2019	OUTSIDE & INSIDE MATS AT	302.44	1,694.06
50215	7/16/2019	00174	HOME DEPOT CREDIT SERVI(	June 5 - 26, 201!	6/28/2019	PW SUPPLY PURCHASES	2,003.22	2,003.22
50216	7/16/2019	00211	KELLY-MOORE PAINTS	June 2019	6/28/2019	PAINT AND SUPPLIES	124.06	124.06
50217	7/16/2019	00307	PACIFIC GAS & ELECTRIC	0567147369-1	7/12/2019	0567147369-1 JSB S/O SERR/	162.51	162.51
50218	7/16/2019	00414	TERMINEX INTERNATIONAL L	387481619	7/12/2019	CCC & PD PEST CONTROL	209.00	
				387481620	7/12/2019	601 F ST. PEST CONTROL	59.00	268.00
50219	7/16/2019	00623	ARAMARK	June 2019	6/30/2019	UNIFORM SERVICE	431.82	431.82
50220	7/16/2019	00649	DAVEY TREE EXPERT COMPA	913761585	7/2/2019	1263-1377 MISSION ROAD TR	2,700.00	2,700.00
50221	7/16/2019	00794	GOOMBAH'S EMBROIDERY	868	6/28/2019	20 HANES HOODED SWEATS	810.10	810.10
50222	7/16/2019	00830	STAPLES BUSINESS CREDIT	1624535270	6/25/2019	OFFICE SUPPLIES	1,482.39	1,482.39
50223	7/16/2019	01238	VEGA, MARTA	2001595.003	6/24/2019	06.24.19 DEPOSIT REFUND	50.00	50.00
50224	7/16/2019	01552	FORTE PRESS CORPORATIO	I55250	6/26/2019	500 BUSINESS CARDS OFC.	228.98	228.98
50225	7/16/2019	02082	VINCE'S OFFICE SUPPLY, INC	IN-1581818	7/10/2019	OFFICE SUPPLIES	203.03	203.03
50226	7/16/2019	02118	BAY AREA NEWS GROUP	0001204540	6/30/2019	NOTICE OF PUBLIC HEARINC	385.86	385.86
50227	7/16/2019	02182	DALY CITY KUMON CENTER	June 2019	7/10/2019	TUTORING	6,260.00	6,260.00
50228	7/16/2019	02788	LUNA-SEVILLA, MARGARET-R	29	7/2/2019	ZUMBA TONING CLASSES	350.00	
				30	7/2/2019	APRIL 15 - JUNE 24, 2019 ZUI	300.00	650.00
50229	7/16/2019	02827	CORODATA SHREDDING, INC.	RS3089164	6/30/2019	STORAGE, PICKUP/DELIVER	47.17	47.17
50230	7/16/2019	02857	DE LEON, DARCY	Spring 2019 Tuiti	7/9/2019	SPRING 2019 TUITION REIME	1,000.00	1,000.00
50231	7/16/2019	02863	PLACEWORKS, INC.	69318	7/16/2019	JUNE 2019 MISSION ROAD BI	2,983.50	2,983.50
50232	7/16/2019	02985	NAVARRO, LIZA	2001592.003	6/24/2019	06.24.19 DEPOSIT REFUND	100.00	100.00
50233	7/16/2019	03015	U.S. BANK CORPORATE PMT	06/24/19 Tapia	6/24/2019	CREDIT CARD PURCHASE	3,289.24	
				06/24/19 Velasq	6/24/2019	CREDIT CARD PURCHASE	1,843.17	
				06/24/19 Lum	6/24/2019	CREDIT CARD PURCHASE	558.63	
				06/24/19 Abellan	6/24/2019	CREDIT CARD PURCHASE	83.10	5,774.14
50234	7/16/2019	03051	LOPEZ, CLAUDIA	2001594.003	6/24/2019	06.24.19 DEPOSIT REFUND	300.00	300.00
50235	7/16/2019	03173	PLAN JPA	PLAN-2019-263	7/12/2019	CLAIMS	2,324.10	2,324.10
						Sub total for TRI COUNTIES BANK:		30,892.64

23 checks in this report.

Grand Total All Checks: 30,892.64

Final Check List
Town of Colma

Bank : first TRI COUNTIES BANK

Check #	Date	Vendor		Invoice	Inv Date	Description	Amount Paid	Check Total
50236	7/16/2019	00020	ASSOCIATED SERVICES INC	119070038	7/1/2019	RENTAL	69.00	
				119070037	7/1/2019	Spring Water 5 Gal	9.00	78.00
50237	7/16/2019	00051	CALIFORNIA WATER SERVICE	06/28/2019	6/28/2019	WATER BILL	137.68	137.68
50238	7/16/2019	00054	C/CAG	14206	7/9/2019	FY 2019-2020 GENERAL FUNI	10,846.00	10,846.00
50239	7/16/2019	00222	LEAGUE OF CA CITIES	104968	6/19/2019	2019 LOCAL STREETS AND R	200.00	200.00
50240	7/16/2019	00388	SONITROL	1338269	7/2/2019	MONTHLY MONITORING	1,109.81	1,109.81
50241	7/16/2019	00412	TELECOMMUNICATIONS ENG	46080	7/10/2019	Facilities Mgmt & Maintenance	1,328.00	1,328.00
50242	7/16/2019	01414	VERANO HOMEOWNERS ASS	8	8/1/2019	VERANO OWNERS ASSOCIAT	320.00	320.00
50243	7/16/2019	01565	BAY CONTRACT MAINTENAN(	July 2019	7/10/2019	JANITORIAL SERVICES	10,663.93	10,663.93
50244	7/16/2019	02128	CA LAW ENFORCEMENT ASS(	Oct 21-25, 2019	7/12/2019	OCT 21-25, 2019 A. VELASQU	400.00	400.00
50245	7/16/2019	02793	DITO'S MOTORS	20417	7/10/2019	OIL & FILTER CHANGE	42.00	
				20418	7/10/2019	SERVICE	24.00	66.00
50246	7/16/2019	02965	HAPPYCAKE FACE PAINTING	0863	7/9/2019	JULY 13, 2019 FACE PAINTIN(	450.00	450.00
50247	7/16/2019	03052	BANDWAGON INDUSTRIES, L	19202	7/10/2019	TALENT FEES	1,200.00	1,200.00
50248	7/16/2019	03061	NORTH BAY PETROLEUM	2057878	6/30/2019	PW GAS PURCHASES	450.43	450.43
50249	7/16/2019	03092	MICROSOFT CORPORATION	E01008NGYJ	7/15/2019	PRORATED LICENSE FOR SC	20.89	20.89
50250	7/16/2019	03280	VIRAY, ZENAIDA	2001608.003	7/8/2019	07.08.19 DEPOSIT REFUND	150.00	
				2001607.003	7/8/2019	07.08.19 DEPOSIT REFUND	50.00	200.00

Sub total for TRI COUNTIES BANK: 27,470.74

15 checks in this report.

Grand Total All Checks:	27,470.74

Final Check List
Town of Colma

Bank : first TRI COUNTIES BANK

Check #	Date	Vendor		Invoice	Inv Date	Description	Amount Paid	Check Total
50251	7/16/2019	00051	CALIFORNIA WATER SERVICE	4470644444	6/28/2019	4470644444 D & CLARK ST.	1,101.30	1,101.30
50252	7/16/2019	00060	CITY OF SOUTH SAN FRANCI	FY 2019-2020 S	7/18/2019	SEWER TREATMENT	879,145.14	879,145.14
50253	7/16/2019	00272	NSMC SANITATION DISTRICT	FY 2019-2020 S	7/18/2019	SEWER TREATMENT	40,444.80	40,444.80
50254	7/16/2019	00307	PACIFIC GAS & ELECTRIC	3007220528-6	7/10/2019	3007220528-6 1199 EL CAMIN	3,065.46	3,065.46
50255	7/16/2019	01030	STEPFORD, INC.	1901624	7/11/2019	CABLES REQUIRED FOR PD	707.92	707.92
50256	7/16/2019	01037	COMCAST CABLE	07/11-08/10 601	7/7/2019	8155 20 022 0096715 601 F ST	108.42	108.42
50257	7/16/2019	01653	KAISER FOUNDATION HEALT	06/07/2018	7/9/2019	HEALTH & SAFETY SERVICES	60.00	60.00
50258	7/16/2019	02955	LITTLE EXPLORERS PETTING	8.1.19TOC-P&R	2/22/2019	08.01.19 FARM ANIMALS PET	402.50	402.50
50259	7/16/2019	03034	FLEX ADVANTAGE	August 2019	7/16/2019	HEALTH REIMBURSEMENT A	44,923.76	44,923.76
50260	7/16/2019	03281	GACHINA LANDSCAPE MANA	F169231	7/1/2019	MAINTENANCE CONTRACT	7,348.00	7,348.00
						Sub total for TRI COUNTIES BANK:		977,307.30

10 checks in this report.

Grand Total All Checks: 977,307.30

bank folder

Final Check List
Town of Colma

Bank : first TRI COUNTIES BANK

Check #	Date	Vendor		Invoice	Inv Date	Description	Amount Paid	Check Total
50261	7/19/2019	00047	C.L.E.A.	07192019 B Ben	7/19/2019	CLEA: PAYMENT	269.50	269.50
50262	7/19/2019	01164	STATE OF CALIFORNIA, FRAN	07192019 B Ben	7/19/2019	STATE - WAGE GARNISHMEN	450.00	450.00
50263	7/19/2019	01340	NAVIA BENEFIT SOLUTIONS	07192019 B Ben	7/19/2019	FLEX 125 PLAN: PAYMENT	458.84	458.84
50264	7/19/2019	01375	NATIONWIDE RETIREMENT S	07192019 B Ben	7/19/2019	NATIONWIDE: PAYMENT	4,550.00	4,550.00
50265	7/19/2019	02224	STANDARD INSURANCE COM	07192019 B Ben	7/19/2019	LIFE INSURANCE: PAYMENT	449.00	449.00
50266	7/19/2019	02377	CALIFORNIA STATE DISBURSI	07192019 B Ben	7/19/2019	WAGE GARNISHMENT: PAYM	871.38	871.38
50267	7/19/2019	03276	US DEPARTMENT OF EDUCA	07192019 B Ben	7/19/2019	WAGE GARNISHMENT: PAYM	93.91	93.91
93981	7/19/2019	00130	EMPLOYMENT DEVELOPMEN	07192019 B Ben	7/19/2019	CALIFORNIA STATE TAX: PAY	12,216.82	12,216.82
93982	7/19/2019	00521	UNITED STATES TREASURY	07192019 B Ben	7/19/2019	FEDERAL TAX: PAYMENT	57,845.83	57,845.83
93983	7/19/2019	00631	P.E.R.S.	07192019 B Ben	7/19/2019	PERS - BUYBACK: PAYMENT	43,636.03	43,636.03
93984	7/19/2019	01360	VANTAGE TRANSFER AGENT	07192019 B Ben	7/19/2019	ICMA CONTRIBUTION: PAYME	4,438.36	4,438.36
93985	7/19/2019	00068	COLMA PEACE OFFICER'S	07192019 BBen	7/19/2019	COLMA PEACE OFFICERS: P/	638.90	638.90
						Sub total for TRI COUNTIES BANK:		125,918.57

12 checks in this report.

Grand Total All Checks: 125,918.57

Final Check List
Town of Colma

Bank : first TRI COUNTIES BANK

Check #	Date	Vendor		Invoice	Inv Date	Description	Amount Paid	Check Total
50268	7/23/2019	00117	DELTA DENTAL OF CALIFORN	BE003500258	8/1/2019	AUGUST 2019 DENTAL INSUF	13,174.00	13,174.00
50269	7/23/2019	00432	VISION SERVICE PLAN	807201766	7/19/2019	AUGUST 2019 VISION SERVI(	1,054.93	1,054.93
50270	7/23/2019	02224	STANDARD INSURANCE COM	Aug 2020	7/15/2019	AUGUST 2019 LIFE INSURAN	222.00	222.00
							Sub total for TRI COUNTIES BANK:	14,450.93

3 checks in this report.

Grand Total All Checks: 14,450.93

Bank : first TRI COUNTIES BANK

Check #	Date	Vendor		Invoice	Inv Date	Description	Amount Paid	Check Total
50271	7/30/2019	00003	A. S. F. ELECTRIC	7908	7/12/2019	INSTALL DECORATIVE LIGHT	2,650.00	2,650.00
50272	7/30/2019	00004	AT&T	000013329974	7/13/2019	C3-AB-12-10-TS-01 06/13-07/1	1,606.11	1,606.11
50273	7/30/2019	00051	CALIFORNIA WATER SERVICE	6544607057	7/17/2019	6544607057 S.W. CORNER HI	890.57	
				1727052702	7/12/2019	1727052702 JUNIPERO SERR	210.78	1,101.35
50274	7/30/2019	00071	CSG CONSULTANTS, INC.	Jun 1 - 30, 2019	7/16/2019	CSG	102,998.96	102,998.96
50275	7/30/2019	00110	DEPARTMENT OF TRANSPOR	SL191052	7/10/2019	SIGNALS & LIGHTING	1,996.35	1,996.35
50276	7/30/2019	00280	OFFICE DEPOT, INC.	338495892001	7/8/2019	OFFICE SUPPLIES	83.16	83.16
50277	7/30/2019	00307	PACIFIC GAS & ELECTRIC	1918250367-2	7/18/2019	1918250367-2 1198 EL CAMIN	6,358.69	
				0512181543-4	7/11/2019	0512181543-4 STREET & HWY	1,973.46	
				0576889222-5	7/11/2019	0576889222-5 1180 EL CAMIN	186.94	
				0678090639-9	7/22/2019	0678090639-9 S/E CORNER H	62.21	
				9593452526-2	7/22/2019	9593452526-2 1500 HILLSIDE	33.98	
				0035222590-8	7/11/2019	0035222590-8 1180 EL CAMIN	19.49	8,634.77
50278	7/30/2019	00364	SMC SHERIFF'S OFFICE	FY 2018/2019	7/17/2019	CAL-ID REIMBURSEMENT FY	1,235.00	1,235.00
50279	7/30/2019	00539	FIREMASTER DEPT 1019	0000674729	7/12/2019	1500 HILLSIDE ANNUAL MAIN	324.00	
				0000674728	7/12/2019	1198 EL CAMINO ANNUAL MA	222.00	
				0000676818	7/19/2019	427 F STREET ANNUAL MAIN	150.94	696.94
50280	7/30/2019	00715	NOWDOCS INTERNATIONAL,	64470	7/9/2019	NCGB 2500 GREEN BOTTOM	183.54	183.54
50281	7/30/2019	01037	COMCAST CABLE	07/17-08/16	7/12/2019	8155 20 022 0097069 INTERNI	54.70	54.70
50282	7/30/2019	01183	BEST BEST & KRIEGER LLP	854466	7/17/2019	CITY ATTORNEY SERVICES	19,334.88	
				854468	7/17/2019	TELECOMMUNICATIONS	1,753.40	
				854467	7/17/2019	EMPLOYEE BENEFITS/TAX	683.10	21,771.38
50283	7/30/2019	01370	VERIZON WIRELESS SERVICE	9834135393	7/15/2019	CELL PHONE SERVICE	1,555.85	1,555.85
50284	7/30/2019	01430	LSA ASSOCIATES, INC.	166631	7/15/2019	JUNE 2019 PROFESSIONAL S	1,187.50	1,187.50
50285	7/30/2019	02216	RAMOS OIL CO. INC.	625046	7/20/2019	PD GASOLINE PURCHASES J	1,811.21	
				623513	7/10/2019	PD GASOLINE PURCHASES J	1,464.24	
				623979	7/10/2019	RECREATION GASOLINE PUF	54.72	3,330.17
50286	7/30/2019	02398	ADVANCED BUSINESS FORM	30735	7/12/2019	1,000 4-PT. PARKING CITATIO	335.54	
				30734	7/12/2019	1,000 3-PT MOVING CITATION	291.49	627.03
50287	7/30/2019	02499	GE CAPITAL INFORMATION	102375665	7/15/2019	1505881-1009545A8 ADMIN C	1,979.91	1,979.91
50288	7/30/2019	02607	CNOA	Aug 16, 2019 Re	7/22/2019	ROSSET, TRASK, MEDOZA - (	135.00	135.00
50289	7/30/2019	02793	DITO'S MOTORS	20534	7/26/2019	2012 FORD EXPLORER REPA	1,668.76	1,668.76
50290	7/30/2019	02935	EMCOR SERVICES-MESA ENE	013507869	7/12/2019	PD HVAC SYSTEM REPAIR	288.00	288.00
50291	7/30/2019	03262	FEHR & PEERS	130977-3	7/8/2019	PROF SRVC JUNE 2019 - ECF	14,702.12	14,702.12

Bank : first TRI COUNTIES BANK (Continued)

Check #	Date	Vendor		Invoice	Inv Date	Description	Amount Paid	Check Total
50292	7/30/2019	03273	THE HOME DEPOT PRO	501604193	7/12/2019	OFFICE/FACILITIES SUPPLIE!	444.70	
				501604201	7/12/2019	GRAFFITI REMOVER	220.87	
				501867857	7/15/2019	TURKISH RECYCLE BATH TO	102.02	
				501869865	7/15/2019	GRAFFITI REMOVER	70.73	838.32
50293	7/30/2019	03282	CREATIVE WINDOW INTERIOI	12450	7/15/2019	PROJ 190365 - TH PROJ WINI	1,560.00	1,560.00

Sub total for TRI COUNTIES BANK: 170,884.92

23 checks in this report.

Grand Total All Checks: 170,884.92

ORDINANCE NO. ____
OF THE CITY COUNCIL OF THE TOWN OF COLMA

ORDINANCE AMENDING SUBCHAPTER 3.10 OF THE COLMA MUNICIPAL CODE, AND FINDING THE ACTION TO BE EXEMPT FROM ENVIRONMENTAL REVIEW PURSUANT TO CEQA GUIDELINE 15308, RELATING TO GREEN INFRASTRUCTURE

The City Council of the Town of Colma does ordain as follows:

ARTICLE 1. RECITALS.

(a) The Town of Colma is subject to the requirements of the reissued Municipal Regional Stormwater Permit (MRP) for municipalities and agencies in the San Francisco Bay area (Order R2-2015-0049), which became effective on January 1, 2016; and

(b) Provision C.3.j, a section of the MRP, requires Permittees to develop and implement a Green Infrastructure (GI) Plan that demonstrates how each jurisdiction will gradually shift from traditional "gray" storm drain infrastructure—which channels polluted runoff directly into receiving waters without treatment—to a more resilient and sustainable storm drain system comprised of "green" infrastructure facilities by including Low Impact Development (LID) measures to capture, store and treat stormwater using specially designed landscape systems before the runoff enters the bay or ocean; and

(c) Provision C.3.j.(i).(3) requires the Town to adopt policies, ordinances, and/or other appropriate legal mechanisms to ensure implementation of the Green Infrastructure.

ARTICLE 2. INCORPORATION OF RECITALS.

The City Council hereby finds that the foregoing recitals and the staff report presented herewith are true and correct and are hereby incorporated and adopted as findings of the City Council as if fully set forth herein.

ARTICLE 3. SUBCHAPTER 3.10 AMENDED.

Subchapter 3.10 ("Stormwater Management and Discharge Control Code") of the Town of Colma Municipal Code is hereby amended to read as follows:

Subchapter 3.10: Storm Water Management and Discharge Control Code

I. TITLE, PURPOSE AND GENERAL PROVISIONS

3.10.010 Title.

This ~~Subchapter Nine~~Subchapter 3.10 shall be known as the "Town of Colma Storm Water Management and Discharge Control Code" and may be so cited. This Code may be referenced throughout as "Chapter" or Subchapter."

[History: formerly § 3.901; ORD. 465, 5/11/94; ORD. 638, 12/14/05]

3.10.020 Purpose and Intent.

The purpose of this Chapter is to ensure the future health, safety, and general welfare of Town of Colma citizens by:

(a) Eliminating non-storm water discharges to the municipal separate storm sewer.

(b) Controlling the discharge to municipal separate storm sewers from spills, dumping or disposal of materials other than storm water.

(c) Reducing pollutants in storm water discharges to the maximum extent practicable. The intent of this ~~Ordinance~~Subchapter is to protect and enhance the water quality of our watercourses, water bodies, and wetlands in a manner pursuant to and consistent with the Clean Water Act.

[History: formerly § 3.902; ORD. 465, 5/11/94; ORD. 638, 12/14/05]

3.10.030 Definitions.

~~(a)~~ Any terms defined in the Federal Clean Water Act and acts amendatory thereof or supplementary thereto, and/or defined in the regulations for the storm water discharge permitting program issued by the Environmental Protection Agency on November 16, 1990 (as may from time to time be amended) as used in this ~~Ordinance~~Subchapter shall have the same meaning as in that statute or regulations. Specifically, the definition of the following terms included in that statute or regulations are hereby incorporated by reference, as now applicable or as may hereafter be amended: discharge, illicit discharge, pollutant, and storm water. These terms and other terms presently are defined as follows:

~~(b) Discharge. (a) Any addition of any pollutant to navigable waters from any point source, or (b) any addition of any pollutant to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft.~~

~~(c) Illicit Discharge. Any discharge to the City storm sewer system that is not composed entirely of storm water except discharges pursuant to a NPDES permit and discharges resulting from fire fighting and other emergency response activities.~~

~~(d) Pollutant. Dredged soil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, wrecked or destroyed equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharge into water. sA pollutant shall also include any increment or increase in the total volume of storm water runoff resulting from any activity or development occurring after the effective date of this Ordinance unless provision is made for storm water detention so that the rate of runoff is not increased.~~

~~(e) Storm Water. Storm water runoff and surface runoff and drainage.~~

~~(f) When used in this Chapter, the following words shall have the meanings ascribed to them in this Section:~~

(a) ~~(g)~~ Authorized Enforcement Official. The City Manager or his/her designees~~ is hereby authorized to enforce the provisions of this Ordinance~~.

(b) ~~(h)~~ Best Management Practices ("BMPs"). Schedule of activities, prohibitions of practices, general good housekeeping practices, pollution prevention practices maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants directly or indirectly to "waters of the United States". BMPs also include green infrastructure, treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

(c) ~~(i)~~ City. The Town of Colma.

(d) ~~(j)~~ City Storm Sewer System. Includes but is not limited to those facilities within the City by which storm water may be conveyed to waters of the United States, including any roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels or storm drains, which ~~is~~are not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR ~~s~~§ 122.2.

(e) Construction activity. Any activity that disturbs soil, including, but not limited to, clearing, grading, paving, disturbances to ground such as stockpiling, and excavation.

(f) Discharge. (a) Any addition of any pollutant to the City storm sewer system or any water course, or (b) any addition of any pollutant to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft.

(g) Illicit Discharge. Any discharge to the City storm sewer system or any watercourse or in any location that threatens to enter the City storm sewer system or any watercourse that is not composed entirely of storm water except discharges pursuant to a NPDES permit or otherwise authorized by this Subchapter.

(h) Green Infrastructure. A range of natural and built approaches to stormwater management–such as rain gardens, bioretention, and permeable paving–that mimic natural systems by cleaning stormwater and letting it absorb back into the ground. Green infrastructure could reduce the amount of runoff that enters the traditional piped stormwater system below ground and could prevent overflows that pollute nearby water bodies. Green infrastructure elements are mandated and further defined under the Municipal Regional Permit and the City's Green Infrastructure Plan.

(i) Green Infrastructure Plan. The plan adopted by the City to implement the green infrastructure requirements in the Municipal Regional Permit.

(j) Municipal Regional Permit. The permit regulating discharges to and from the City's storm sewer system issued by the San Francisco Bay Regional Water Quality Control Board, as it currently exists or may be reissued or amended (NPDES Permit No. CAS612008, Order No. R2-2015-0049).

(k) Non-Storm Water Discharge. Any discharge that is not entirely composed of storm water except those noted within a NPDES Permit and this ~~Ordinance~~Subchapter.

(l) Pollutant. Includes, but is not limited to: total suspended solids; sediment; pathogens (e.g. bacteria, viruses, protozoa); heavy metals (e.g. copper, lead, zinc, and cadmium); petroleum products and PAHs; synthetic organics (e.g. pesticides, herbicides, and PCBs); nutrients (e.g. nitrogen and phosphorus fertilizers); oxygen-demanding substances (e.g. decaying vegetation and animal waste); and trash. A pollutant also includes any increment or increase in the total volume of storm water runoff resulting from any activity or development occurring after the effective date of this Subchapter unless provision is made for storm water detention so that the rate of runoff is not increased.

(m) ~~(l)~~ Premises. Any building, lot parcel, real estate, or land or portion of land, whether improved or unimproved, including adjacent sidewalks and parking strips.

(n) Regulated project means development and redevelopment projects defined by Provision C.3.b.ii of the Municipal Regional Permit, including projects that create or replace 10,000 square feet or more of impervious surface, and restaurants, retail gasoline outlets, auto service facilities, and uncovered parking lots (stand-alone or part of another use) that create and/or replace 5,000 square feet or more of impervious surface. Single family homes that are not part of a larger plan of development are specifically excluded.

(o) Storm Water. Storm water runoff and surface runoff and drainage.

(p) Technical Guidance Document means the "C.3 Stormwater Technical Guidance" document developed by the San Mateo Countywide Water Pollution Prevention Program, June 2016, version 5.0, or most current version.

(q) ~~(m)~~ Watercourse. A natural stream, creek, or man-made uncovered channel through which water flows continuously or intermittently.

[History: formerly § 3.903 – 3.909.27; ORD. 465, 5/11/94; ORD. 638, 12/14/05]

3.10.040 Responsibility for Administration.

This Chapter shall be administered for the City by the City Manager and his/her designees.

[History: formerly § 3.904; ORD. 465, 5/11/94; ORD. 638, 12/14/05]

3.10.050 Construction and Application.

This ~~Ordinance~~Subchapter shall be construed to assure consistency with the requirements of the Federal Clean Water Act and acts amendatory thereof or supplementary thereto, applicable implementing regulations, and NPDES Permit No. CA0029921 and any amendment, revision or reissuance thereof.

[History: formerly § 3.905; ORD. 465, 5/11/94; ORD. 638, 12/14/05]

3.10.060 Severability and Validity.

If any portion of this ~~Ordinance~~Subchapter is declared invalid, the remaining portions of this ~~Ordinance~~Subchapter are to be considered valid.

[History: formerly § 3.906; ORD. 465, 5/11/94; ORD. 638, 12/14/05]

3.10.070 Waiver Procedures.

(a) It is the intent of this ~~Ordinance~~Subchapter to protect and enhance water quality while respecting the rights of private property owners to economically viable use of land. It is not the intent of this ~~Ordinance~~Subchapter to prohibit all economically viable use of any private lands, nor to result in a confiscatory impact. Accordingly, the purpose of this Section is to provide for an administrative procedure for a waiver or modification of a particular provision of this ~~Ordinance~~Subchapter in the event the strict application of this ~~Ordinance~~Subchapter would result in the denial of all economically viable use of real property.

(b) An applicant for waiver of a provision of this ~~Ordinance~~Subchapter shall file a Waiver Application with the City Engineer on a form provided by the City Engineer identifying the provision sought to be waived or modified. The applicant shall file a complete form and shall provide all documentation and information required by the City Engineer to determine whether application of the provision in question will prohibit any economically viable use of the land in question or otherwise have an impermissible confiscatory result.

(c) The City Engineer may approve, deny or conditionally approve a Waiver Application upon making all of the following written findings:

> (1) That the strict application of the provision for which a waiver or modification is sought would result in the denial of all economically viable use of the real property in question.
>
> (2) To the maximum extent feasible, conditions have been placed upon such a waiver or modification in order to achieve the goals of this ~~Ordinance~~Subchapter as closely as possible while still allowing economically viable use of the real property in question.
>
> (3) Approval of such a waiver will not result in a public nuisance which would constitute a significant and direct threat to public health or safety.

[History: formerly § 3.907 – 3.907.3.3; ORD. 465, 5/11/94; ORD. 638, 12/14/05]

3.10.080 Fees and Charges.

The City may adopt reasonable fees to recover the cost of setting up and operating a stormwater pollution prevention program, including but not limited to fees for permit application and processing, monitoring and inspection, compliance actions, appeals, and other charges deemed necessary to carry out the requirements carried out herein. These fees relate solely to the matters covered by this Subchapter and are separate from all other fees, fines, and penalties charged by the City. Such fees shall be in amounts established by resolution of the

City Council.

(Ord. 2019-X)

II. DISCHARGE REGULATIONS AND REQUIREMENTS

~~3.10.080~~3.10.090 Discharge of Pollutants.

~~(a) The discharge of non-storm water discharges to the City storm sewer system is prohibited. All discharges of material other than storm water must be in compliance with a NPDES Permit issued for the discharge (other than NPDES Permit No. CA0029921) and this Ordinance.~~

(a) Except as otherwise authorized under Section (b) or (c), the following are prohibited:

(i) discharge of non-storm water to the City storm sewer system ~~and~~ or any water course;

(ii) placement of any solid waste at any place where it may contact or be transported to ~~a~~ the City storm sewer system or any watercourse, including a flood plain area;

(iii) cause, allow or facilitate any illicit discharge;

(iv) discharge, cause, allow or facilitate any discharge that may cause or threaten to cause a condition of pollution or nuisance as defined in Water Code Section 13050, that may cause, threaten to cause or contribute to an exceedance of any water quality standard in any Statewide Water Quality Control Plan, California Toxics Rule, or Basin Plan, or that may cause or contribute to the violation of any receiving water limitation.

(b) Exceptions to Discharge Prohibition. The following discharges are exempt from the prohibition set forth in Section (a) above~~.~~ unless the City or Regional Water Quality Control Board determines them to be a source of pollution or to cause or threaten a violation of the Municipal Regional Permit or other law or regulation:

(1) ~~The prohibition on discharges shall not apply to any~~A discharge regulated under and in compliance with a National Pollutant Discharge Elimination System (NPDES) Permit ~~used~~issued to the discharger ~~and administered by the State of California under authority of the United States Environmental Protection Agency~~, provided that the discharger is in full compliance with all requirements of the permit and other applicable laws or regulations.

(2) Flows from riparian habitat and wetlands; diverted stream flows; flows from natural springs; rising ground waters; uncontaminated and unpolluted ground water infiltration; single family homes' pumped groundwater, foundation drains, and water from crawl space pumps and footing drains; and pumped groundwater from drinking aquifers (excluding well development).

~~(2) Discharges from the following activities will not be considered a source of pollutants to waters of the United States when properly managed: water line flushing and other~~

~~discharges from potable water sources, municipal street cleaning, municipal park maintenance, landscape irrigation and lawn watering, irrigation water, diverted stream flows, rising ground waters, infiltration to separate storm drains, uncontaminated pumped ground water, foundation and footing drains, water from crawl space pumps, air conditioning condensation, springs, individual residential car washings, flows from riparian habitats and wetlands, dechlorinated swimming pool discharges, or flows from fire fighting and other emergency response activity, and accordingly are not subject to the prohibition on discharges.~~

(c) Conditionally Exempted Discharges. The following discharges are prohibited, except in compliance with the best management practices and other restrictions required by the Municipal Regional Permit or other regulations: pumped groundwater, foundation drains, and water from crawl space pumps and footing drains; condensate from air conditioning units but only if discharge to landscaped areas or the ground is not feasible; emergency discharges of potable water; discharges from pools, hot tubs, spas, and fountains; irrigation water, landscape irrigation, and lawn or garden watering.

[History: formerly § 3.908 – 3.908.1.2; ORD. 465, 5/11/94; ORD. 638, 12/14/05]

~~3.10.090~~3.10.100 Discharge in Violation of Permit.

Any discharge that would result in or contribute to a violation of ~~NPDES~~the Municipal Regional Permit ~~No. CA0029921~~, the terms of which are incorporated herein by reference, and which is on file in the office of the City Clerk, and any amendment, revision or reissuance thereof, either separately ~~considered~~ or when combined with other discharges, is prohibited. Liability for any such discharge shall be the responsibility of the person(s) causing or responsible for the discharge, and such person(s) shall defend, indemnify, and hold harmless the City in any administrative or judicial enforcement action relating to such discharge.

[History: formerly § 3.909; ORD. 465, 5/11/94; ORD. 638, 12/14/05]

~~3.10.100~~3.10.110 3.10.100 Illicit Discharge.

It is prohibited to commence or continue any illicit discharges to the City storm sewer system.

[History: formerly § 3.910; ORD. 465, 5/11/94; ORD. 638, 12/14/05]

~~3.10.110~~3.10.120 Reduction of Pollutants in Storm Water.

Any person engaged in activities which will or may result in pollutants entering the City storm sewer system shall undertake all ~~practicable measures~~ best management practices necessary to reduce such pollutants. Examples of such activities include ownership and use of facilities which may be a source of pollutants such as construction sites, parking lots, gasoline stations, industrial facilities, commercial facilities, stores fronting city streets, etc. The following ~~minimal~~ requirements ~~shall~~ apply at a minimum:

(a) Littering. No person shall throw, deposit, leave, maintain, keep, or permit to be thrown, deposited, placed, left or maintained, any refuse, rubbish, garbage, or other discarded or abandoned objects, articles, and accumulations, in or upon any street, alley, sidewalk, storm drain, inlet, catch basin, conduit or other drainage structures, business place, or upon any public or private lot of land in the City, so that the same might be or become a pollutant, except in containers or in lawfully established dumping grounds. The occupant or tenant, or in the absence of occupant or tenant, the owner, lessee, or proprietor of any real property in the ~~Town of Colma~~City in front of which there is a paved sidewalk shall maintain said sidewalk free of litter to the maximum extent practicable. No person shall throw or deposit litter in any fountain, pond, lake, stream or any other body of water in a park or elsewhere within the City.

(b) Green Infrastructure. Every regulated project must incorporate Green Infrastructure approved by the City and in accordance with all applicable City standards and requirements, including the latest edition of the City's Green Infrastructure Plan. Green infrastructure facilities shall be designed to minimize the need for maintenance.

(c) ~~(b)~~ Standard for Parking Lots and Similar Structures. Persons owing or operating a parking lot, gas station pavement or similar structure shall clean those structures as frequently and thoroughly as practicable in a manner that does not result in discharge of pollutants to the City storm sewer system.

(d) ~~(c)~~ Best Management Practices for New Developments and Redevelopments. ~~Any construction contractor performing work in the City shall endeavor, whenever possible, to provide filter materials at the catch basin to retain any debris and dirt flowing in to the City's storm sewer system.~~ The proponent of any new development or redevelopment project must address storm water runoff pollutant discharges and prevent increases in runoff flows from the new development or redevelopment project by incorporating post-construction storm water control and low impact development measures required by the current version of the Technical Guidance Document. Best management practices may include but are not limited to full trash capture devices, green infrastructure, low impact development measures, post-construction treatment controls, and hydromodification management measures. The City may establish controls on the volume and rate of storm water runoff from new developments and redevelopments as may be appropriate to minimize the discharge and transport of pollutants.

(e) Best Management Practices for Construction Activities. It is unlawful for any person to commence any construction activity without implementing all storm water and pollutant mitigation measures required by the Municipal Regional Permit, the Technical Guidance Document, and any local regulations implementing the Municipal Regional Permit. Any person performing construction activity in the City must implement best management practices that prevent the discharge of pollutants to the City's storm sewer system.

(f) Best Management Practices for Commercial and Industrial Sites. The owner and operator of any premises where pollutants from business-related activities may enter the storm water conveyance system must prevent such a discharge and must implement appropriate and effective BMPs and other pollutant controls to eliminate and prevent pollutants in runoff.

(g) ~~(d)~~ Compliance with Best Management Practices. Where best management practices guidelines or requirements have been adopted by the City for any activity, operation, or facility which may cause or contribute to storm water pollution or contamination, illicit discharges, and/or discharge of non-storm water to the storm water system, every person undertaking such activity or operation, or owning or operating such facility shall comply with such guidelines or requirements (as may be identified by the City Engineer).

(h) Maintenance Responsibility. The applicant for a regulated project that is required to install green infrastructure measures must submit a maintenance plan for and proof of maintenance responsibility to the satisfaction of the Authorized Enforcement Official. The maintenance plan must include a schedule for maintenance of the green infrastructure and must identify the person or entity responsible for ongoing maintenance, such as the owner of the property, a homeowners' or property owners' association, or the city. The person or entity responsible for ongoing maintenance must, as a condition of development, enter into an agreement with the City to the satisfaction of the Authorized Enforcement Official, which must be recorded with the County Recorder. The agreement must include provisions for the perpetual operation, maintenance, repair, and replacement of green infrastructure measures and must include a maintenance schedule for the green infrastructure measure(s).

[History: formerly § 3.911 – 3.911.4; ORD. 465, 5/11/94; ORD. 638, 12/14/05]

~~3.10.120~~3.10.130 Watercourse Protection.

Every person owning property through which a watercourse passes, or such person's lessee or tenant, shall keep and maintain that part of the watercourse within the property ~~reasonably~~ free of trash, debris, excessive vegetation, and other obstacles which would pollute, contaminate, or significantly retard the flow of water through the watercourse; shall maintain existing privately owned structures within a watercourse so that such structures will not become a hazard to the use, function, or physical integrity of the watercourse; and shall not remove healthy bank vegetation beyond that actually necessary for said maintenance, nor remove said vegetation in such a manner as to increase the vulnerability of the watercourse to erosion.

[History: formerly § 3.912; ORD. 465, 5/11/94; ORD. 638, 12/14/05]

III. INSPECTION AND ENFORCEMENT

~~3.10.130~~3.10.140 Authority to Inspect.

Whenever necessary to make an inspection to enforce any of the provisions of this Chapter, or whenever an Authorized Enforcement Official has reasonable cause to believe that there exists in any building or upon any premises any condition which constitutes a violation of the provisions of this Chapter, the Authorized Enforcement Official may enter such building or premises at all reasonable times to inspect the same or perform any duty imposed upon the Authorized Enforcement Official by this Chapter; provided that (i) if such building or premises be occupied, he or she shall first present proper credentials and request entry; and (ii) if such building premises be unoccupied, he or she shall first make a reasonable effort to locate the owner or other persons having charge or control of the building or premises and request entry.

Any such request for entry shall state that the property owner or occupant has the right to refuse entry and that in the event such entry is refused, inspection may be made only upon issuance of ~~a search~~an inspection warrant~~ by a duly authorized magistrate~~. In the event the ~~search~~property owner and/or occupant refuses entry after such request has been made, the Authorized Enforcement Official is hereby empowered to seek assistance from any court of competent jurisdiction in obtaining such entry.

Routine or area inspections shall be based upon such reasonable selection processes as may be deemed necessary to carry out the objectives of this ~~Ordinance~~Subchapter, including but not limited to random sampling and/or sampling in areas with evidence of storm water contamination, illicit discharges, discharge of non-storm water to the City storm ~~water~~sewer system, or similar factors.

[History: formerly § 3.913; ORD. 465, 5/11/94; ORD. 638, 12/14/05]

~~3.10.140~~3.10.150 Authority to Sample and Establish Devices.

The City shall have the right to establish on any property such devices as are necessary to conduct sampling or metering operations. During all inspections as provided herein, the Authorized Enforcement Official may take any samples deemed necessary to aid in the pursuit of the inquiry or in the recordation of the activities on site.

[History: formerly § 3.913.1; ORD. 465, 5/11/94; ORD. 638, 12/14/05]

~~3.10.150~~3.10.160 Notification of Spills.

As soon as any person in charge of a facility or responsible for emergency response for a facility has knowledge of any confirmed or unconfirmed release of materials, pollutants, or waste which may result in pollutants or non-storm water ~~discharges~~ entering the City storm sewer system, such person shall take all necessary steps to ensure the discovery and containment and ~~clean up~~cleanup of such release and shall notify the City of the occurrence and steps taken to contain and clean up the spill or containment by telephoning the City Engineer at City Hall, Colma, California and confirming the notification by correspondence to the City Engineer, c/o City Hall, Town of Colma, 1198 El Camino Real, Colma, California 94014.

[History: formerly § 3.913.2; ORD. 465, 5/11/94; ORD. 638, 12/14/05]

~~3.10.160~~3.10.170 Requirement to Test or Monitor.

Any Authorized Enforcement Official may request that any person engaged in any activity ~~and/~~or owning or operating any facility which may cause or contribute to storm water pollution or contamination, illicit discharges, and/or discharge of non-storm water to the City storm ~~water~~sewer system, undertake such monitoring activities and/or analyses and furnish such reports as the Authorized Enforcement Official may specify. The burden, including costs, of these activities, analyses and reports shall bear a reasonable relationship to the need for the monitoring, analyses and reports and the benefits to be obtained. The recipient of such request shall undertake and provide the monitoring, analyses and/or reports requested.

[History: formerly § 3.913.3; ORD. 465, 5/11/94; ORD. 638, 12/14/05]

~~3.10.170~~3.10.180 Violations Constituting Misdemeanors.

Unless otherwise specified~~ by Ordinance~~, the violation of any provision of this Chapter, or failure to comply with any of the mandatory requirements of this Chapter shall constitute a misdemeanor, except that notwithstanding any other provisions of this ~~Chapter~~ Subchapter, any such violation constituting a misdemeanor under this Chapter may, at the discretion of the enforcing authority, be charged and prosecuted as an infraction.

[History: formerly § 3.914; ORD. 465, 5/11/94; ORD. 638, 12/14/05]

~~3.10.180~~3.10.190 Continuing Violation.

Unless otherwise provided, a person, firm, corporation or organization, shall be deemed guilty of a separate offense for each and every day during any portion of which a violation of this Chapter is committed, continued or permitted by the person, firm, corporation or organization and shall be punishable accordingly as herein provided.

[History: formerly § 3.915; ORD. 465, 5/11/94; ORD. 638, 12/14/05]

~~3.10.190~~3.10.200 Concealment.

Causing, permitting, aiding, abetting or concealing a violation of any provision of this Chapter shall constitute a violation of such provision.

[History: formerly § 3.916; ORD. 465, 5/11/94; ORD. 638, 12/14/05]

~~3.10.200~~3.10.210 Civil Actions.

In addition to any other remedies provided in this section, any violation of this section may be enforced by civil action brought by the City. In any such action, the City may seek, and the court shall grant, as appropriate, any or all of the following remedies:

(a) A temporary and/or permanent injunction.

(b) Assessment of the violator for the costs of any investigation, inspection, or monitoring survey which led to the establishment of the violation, and for the reasonable costs of preparing and bringing legal action under this subsection.

(c) Costs incurred in removing, correcting, or terminating the adverse effects resulting from the violation, including reasonable attorney's fees and court costs.

(d) Compensatory damages for loss or destruction to water quality, wildlife, fish and aquatic life. Assessments under this subsection shall be paid to the City to be used exclusively for costs associated with monitoring and establishing storm water discharge pollution control systems and/or implementing or enforcing the provisions of this ~~Ordinance~~Subchapter.

[History: formerly § 3.917; ORD. 465, 5/11/94; ORD. 638, 12/14/05]

~~3.10.210~~3.10.220 Administrative Enforcement Powers.

In addition to the other enforcement powers and remedies established by this ~~Ordinance~~Subchapter, any Authorized Enforcement Official has the authority to utilize administrative remedies~~.~~ and is authorized to enforce the provisions of this Subchapter in accordance with the enforcement response plan(s) required by the Municipal Regional Permit. Administrative remedies include but are not limited to the following:

(a) Nuisance abatement in accordance with Subchapter 2.01;

(b) Notice of violation;

(c) Cease and desist order;

(d) Compliance order;

(e) Permit revocation and denial;

(f) Stop work order;

(g) Notice of ineligibility for land development after a hearing pursuant to Subchapter 1.12;

(h) Referral to regulatory agencies;

(i) Monetary penalties;

(j) Cost recovery

[History: formerly § 3.918; ORD. 465, 5/11/94; ORD. 638, 12/14/05]

~~3.10.220~~3.10.230 Remedies Not Exclusive.

Remedies under this ~~Article~~Subchapter are in addition to and do not supersede or limit any and all other remedies, civil or criminal. The remedies provided for herein shall be cumulative and not exclusive.

[History: formerly § 3.919; ORD. 465, 5/11/94; ORD. 638, 12/14/05]

IV. COORDINATION WITH OTHER PROGRAMS

~~3.10.230~~3.10.240 Coordination with Hazardous Materials Inventory and Response Program.

The first revision of the business plan for any facility subject to the City's hazardous materials inventory and response program shall include a program for compliance with this Chapter, including the prohibitions on non-storm water discharge and illicit discharges, and the requirements to reduce storm water pollutants to the maximum extent practicable.

[History: formerly § 3.920; ORD. 465, 5/11/94; ORD. 638, 12/14/05]

ARTICLE 4. SEVERABILITY

Each of the provisions of this Ordinance is severable from all other provisions. If any article, section, subsection, paragraph, sentence, clause or phrase of this Ordinance is for any reason held by a court of competent jurisdiction to be invalid, such decision shall not affect the validity of the remaining portions of this Ordinance.

ARTICLE 5. CEQA EXEMPTION

This project is exempt from further environmental review pursuant to Section 15308 of the State Guidelines for Implementation of the California Environmental Quality Act (CEQA), which applies to actions taken by regulatory agencies, as authorized by state or local ordinance, to assure the maintenance, restoration, enhancement, or protection of the environment where the regulatory process involves procedures for protection of the environment is found to be exempt from the environmental review requirements.

ARTICLE 6. EFFECTIVE DATE.

This ordinance, or a summary thereof prepared by the City Attorney, shall be posted on the three (3) official bulletin boards of the Town of Colma within 15 days of its passage and is to take force and effect thirty (30) days after its passage.

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Certificate of Adoption

I certify that the foregoing Ordinance No. ___ was duly introduced at a regular meeting of the City Council of the Town of Colma held on July 24, 2019 and duly adopted at a regular meeting of said City Council held on _____________, 2019 by the following vote:

Name	Voting		Present, Not Voting		Absent
	Aye	No	Abstain	Not Participating	
Joanne F. del Rosario, Mayor					
John Irish Goodwin					
Diana Colvin					
Helen Fisicaro					

Raquel Gonzalez					
Voting Tally					

Dated ________________________

____
Joanne F. del Rosario, Mayor

Attest: ______________________________
Caitlin Corley, City Clerk

STAFF REPORT

TO:	Mayor and Members of the City Council
FROM:	Brad Donohue, Director of Public Works
	Abdulkader Hashem, Project Manager
VIA:	Brian Dossey, City Manager
MEETING DATE:	August 28, 2019
SUBJECT:	Colma Wastewater Collection System Master Plan – Final Report

RECOMMENDATION

Staff recommends that the City Council adopt the following:

> MOTION TO APPROVE THE FINAL REPORT OF THE COLMA WASTEWATER COLLECTION SYSTEM MASTER PLAN

EXECUTIVE SUMMARY

Water Works Engineers, LLC completed Phase II of the Colma Wastewater Collection System Master Plan and submitted the final draft report outlining current sewer system conditions, proposed changes and enhancements to the system to accommodate future growth and build out options along with cost estimates.

The final report is the result of data collection and modeling of the existing system for current and future buildout along with discussions and input gathered from the City Council and Town Staff. Two workshops were held with Town staff on November 19, 2018 and May 3, 2019, in addition to a study session that was held with the City Council on June 12, 2019. The final report of the Colma Wastewater Collection System Master Plan is attached as Attachment A.

FISCAL IMPACT

The report itself does not have a fiscal impact. Future funding for sewer system upgrades and enhancements will be assessed and implemented into the Town's Capital Improvement Program.

BACKGROUND

Phase II of the Colma Wastewater Collection System Master Plan was awarded to Water Works Engineers in July 2018. The Wastewater Collection System Master Plan was commissioned to assess the Town of Colma's wastewater collection system and its capacity to convey flow under current situations, various future development scenarios and identify deficiencies with in the current system and future buildout, as to prevent potential sanitary sewer overflows (SSOs) or illicit discharges. Several sewer system enhancement options were developed to mitigate deficiencies within the current system.

In parallel with this work, Water Works Engineers developed a hydraulic model (a model to simulate sewer capacity issues) based on land use types from Town zoning map. Two hydraulic model scenarios were developed, the Existing Conditions (short-term) and Ultimate Buildout (UBO, long-term) Conditions, which are reflective of the Town's wastewater flow rates under current conditions and with additional planned (future) development.

Water Works Engineers substantially completed the Project along with extra work in June 2019. Following substantial completion, Water Works Engineers submitted the Final Draft of the Master Plan report with a copy of the Hydraulic Model program (Inforsewer) for the Colma sewer system.

ANALYSIS

The purpose of the Wastewater Collection System Master Plan is to provide an evaluation of the Town's existing sewer collection system and detailed analysis of its capacity to convey wastewater flow without SSO's for the near-term and long-term. As the Town explores future development opportunities, the Colma Wastewater Collection System Master Plan will be instrumental in working and negotiating with developers on the potential commercial and residential buildout.

The Town is mandated to be in compliance with the State Water Resources Control Board Order No. 2006-0003 Statewide General Waste Discharge Requirements for Sanitary Sewer System (GWDRs). To be out of compliance with GWDR, one could be subject to long-term state oversight and sever financial penalties. Currently the Town's sewer system is in compliance with the State, but any build out or large development could tip the scale and put the Town in a vulnerable position of being out of compliance.

The Colma Wastewater Collection System Master Plan provides the Town the tools to put a plan together to correct current deficiencies as well as preparing a plan for the future to assist in development opportunities, future capital projects and development of the Town's Sanitary Sewer Enterprise Fund.

Water Works Engineers completed the scope of work plus extra work added by the First Amendment to the Professional Services Agreement.

Council Adopted Values

The recommendation is consistent with the Council value of ***responsibility,*** improving the Town's sewer system to accommodate future developments within the various commercial districts while complying with the mandates and requirements set forth by the State of California State Water Resources Control Board.

Alternatives

There is not a logical alternative, not accepting the study and the findings within the study would put the Town in vulnerable place as the Town pursues future development opportunities and compliance to the Statewide General Waste Discharge Requirements for Sanitary Sewer Systems.

CONCLUSION

Staff has reviewed the completed work and recommends that the City Council approve the Final draft of the "Colma Wastewater Collection System Master Plan".

ATTACHMENTS

A. Colma Wastewater Collection System Master Plan – Final Report

TOWN OF COLMA

COLMA

AUGUST 5, 1924

CALIFORNIA

Attachment A

FINAL

Town of Colma Wastewater Collection System Master Plan

PREPARED BY:

WATERWORKS ENGINEERS
2260 Douglas Blvd, Ste. 105
Roseville, CA, 95661

REGISTERED PROFESSIONAL ENGINEER
ANTHONY BALTAZAR
No. C87494
CIVIL
STATE OF CALIFORNIA

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GLOSSARY

ADWF	Average Dry Weather Flow; not influenced by rainfall; does not include RDII or GWI, averaged across single day
Basin	smallest unit of sewer system isolated by an individual flow meter
CIP	Capital Improvement Project
design storm	Standard precipitation event to calibrate hydraulic model; specified depth, duration, and probabilistic return period
DIA	nominal diameter
Diurnal Flow	Daily Hydrograph
DWF	Sewer Dry Weather Flow; not influenced by rainfall; does not include RDII or GWI
EX / EXST	Existing
FAR	Floor to Area Ratio; building floor space to at-grade parcel area ratio
Force main	Pressurized sewer pipeline that is pumped from lift station
GIS	ESRI ArcGIS (Geographical Information System) software or data
gpd	gallons per day
gpm	gallons per minute (694.44 gpm per 1.00 mgd)
GWDR	SWRCB Order No. 2006-0003 Statewide General Waste Discharge Requirements
GWI	Groundwater Infiltration; seasonal; constant underlying baseflow
hydrograph	Graph of sewer flow vs time
I/I	Inflow and Infiltration; includes RDII and GWI
Invert	Lowest flow line of sewer pipe
K	Ratio of Time Recession; RTK method
Land Use	Supersedes zoning; applied to wastewater generation rates
Lateral	Lateral service gravity line (typically 4")
Main	City owned gravity sewer main (typically 6" to 24" DIA)
MGD	million gallons per day
MH	Manhole
NOAA	U.S. Department of Commerce: National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
PDWF	Peak Dry Weather Flow; peak instantaneous dry weather flow; ADWF after multiplied by peaking factor
LS	Sewer Lift Station
R	Fraction of rainfall volume entering sewer system as RDII; see RTK method
RDII	Rain Derived Inflow and Infiltration; sewer flow from surface (inflow) or below-grade groundwater (infiltration)
RTK	Triangular synthetic unit hydrograph to characterize RDII response to rainfall event
SCS	Soil Conservation Service

SSCO	Sanitary Sewer Cleanout; private or public; provides delineation between private and public pipe; location to service lateral service line
SSMH	Sanitary Sewer Manhole; manhole
SSMP	Sanitary Sewer Master Plan; official municipal document mandated by SWRCB
SSO	Sanitary Sewer Overflow
SSOAP	U.S. Environmental Protection Agency (EPA) Sanitary Sewer Overflow and Analysis Program Software
SWRCB	State Water Resources Control Board
Synthetic Unit Hydrograph	Summation of unit hydrographs resulting in common hydrograph from specified precipitation
T	Time to Peak; equivalent to Time of Concentration; see RTK method
The Town	The Town of Colma
UBO	Ultimate Build-out
Unit Hydrograph	Theoretical hydrograph resulting from a unit of precipitation
Wet Weather Flow	Wet Weather Flow; influenced by rainfall; may include GWI, RDII
WW Generation Rate	Average sewer flow applied to parcels with specific land use to produce ADWF
WWE	Water Works Engineers
Zoning	Planning department zone delineation for individual City parcel

EXECUTIVE SUMMARY

The purpose of this Wastewater Collection System Master Plan is to assess the Town of Colma's (Town) wastewater collection system and its capacity to convey flow during a design storm without sanitary sewer overflows (SSOs) for the near-term and long-term (ultimate build-out conditions) in compliance with the State Water Resources Control Board Order No. 2006-0003 Statewide General Waste Discharge Requirements for Sanitary Sewer Systems (GWDRs). This Executive Summary summarizes the development of the GIS-based (Geographical Information System) sewer network and hydraulic model and the findings and recommendations based on the results of the hydraulic modeling effort.

ES.1 Wastewater Flows

Flow monitoring conducted in January and February of 2017, by Total Flow Monitoring Inc. (Total Flow), informed the dry weather and wet weather wastewater flowrates. Total Flow, in coordination with City engineering staff input, analyzed the physical layout of the sewer network and delineated the collection system into 10 sewer basins. Total Flow installed flow monitoring equipment at 10 locations throughout the system which generally mirrored the delineated sewer basins. Flow data from each of these sites was logged and analyzed to produce dry weather (no rain event) and wet weather (during rain event) flow averages and peaks. From this data dry and wet weather peaking factors for each basin were evaluated.

In parallel with this work, Water Works Engineers (Water Works or WWE) developed the physical geometry and applied wastewater flow generation loadings to a hydraulic model (Innovyze InfoSewer) based on land use types (e.g., residential, commercial, cemetery, other) from the Town of Colma Zoning Map. Two hydraulic model scenarios were developed, the Existing Conditions (short-term) and Ultimate Buildout (UBO, long-term) Conditions, which are reflective of the Town's wastewater flow rates under current conditions and with additional planned (future) developments.

For existing conditions, unique wastewater generation rates by land use type were developed and calibrated against the observed dry weather flow (DWF) from the flow monitoring analysis. Water Works further refined the dry weather generation rates for existing conditions by developing, applying and refining diurnal curves, which define loading patterns over the course of a day, to calibrate the hydraulic model peak dry weather flow (PDWF) to observed flow monitoring results.

For UBO conditions, the 2014 Land Use and Urban Design Strategy document was used to refine the dry weather wastewater flowrates of future development. Parcels identified as Opportunity Sites, which are areas likely to undergo construction of new development, were assigned a wastewater generation rate based on the land use type described in the Town's general planning documentation. The addition of these opportunity sites as well as an increase in commercial wastewater generation rates expected for master planning efforts, comprises the UBO conditions scenario during DWF conditions.

For wet weather flow, rain derived inflow and infiltration (RDII) response of the system was applied to the hydraulic model and calibrated to the largest storm event during the flow monitoring period, which occurred on January 21st, 2017. Calibration of the modeled system response to the observed (via flow monitoring) storm event was completed using the U.S. Environmental Protection Agency (EPA) Sanitary

Sewer Overflow and Analysis Program (SSOAP) Software. The peak Rain Derived Inflow and Infiltration (RDII) was based on a 10-year return, 24-hour duration, and 3.95-inch total precipitation “design storm” listed in NOAA Atlas 14, Volume 6, Version 2 for the region consistent with the Town of Colma geographic location. The peak RDII for each basin was applied in addition to the DWF loads in the hydraulic model to simulate wet weather flow. In accordance with industry standard, Water Works employed a “peak on peak” to complete the wet weather capacity analysis of the Town’s wastewater collection system (i.e. the time of the maximum storm response flow resultant from the “design storm” RDII was adjusted to coincide with the maximum PDWF to quantify peak wet weather flow (PWWF). Water Works modeled PWWF for both existing conditions and UBO. The Town of Colma wastewater collection system average and peak dry and wet weather flows (ADWF, PDWF, AWWF, and PWWF) produced by the hydraulic model under existing and UBO conditions are shown in **Figure ES- 1** and **Figure ES- 2.**

ES.2 Sewer Network and Hydraulic Model Capacity Assessment

The Town of Colma discharges wastewater flows to Daly City and City of South San Francisco (SSF), with the collection of basins discharging to each neighboring agency operating independently of one another. As the Town did not have a pre-existing physical model, WWE developed a sewer network based on the Town’s GIS data representative of the independent systems discharging to the two points. A third discharge location from a small basin with limited connections was not modeled as part of this study. The geometry of the network inclusive of pipes and manholes was developed using as-builts, CAD drawings, Town staff knowledge, and other available information. The collection system map was used to assign pipe diameter, pipe slope, invert elevations, manhole rim elevation, and pipe and manhole IDs. The collection system map rounded the invert elevations to the nearest whole number. To create the physical model with more accuracy the following assumptions were made:

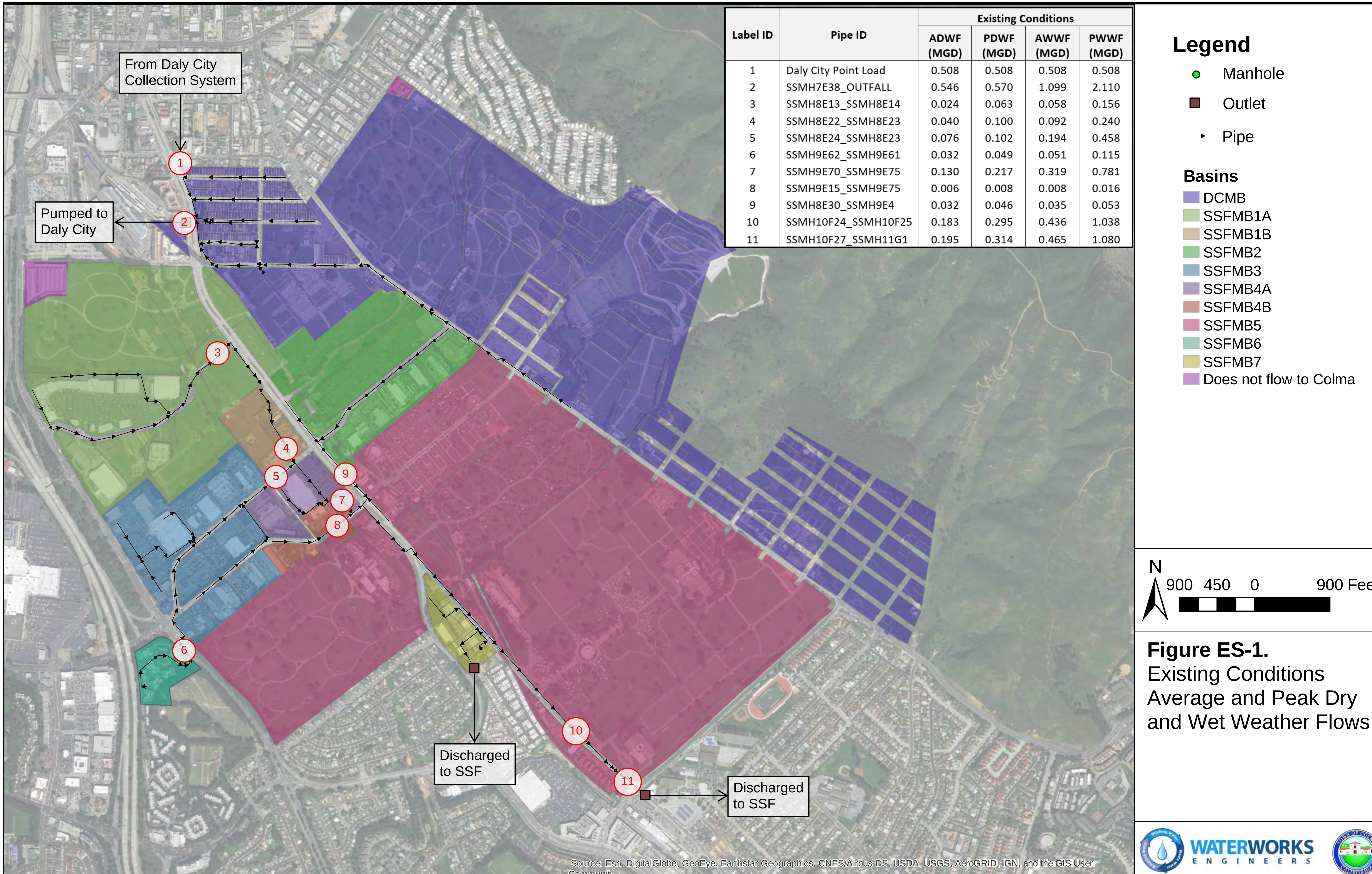
- Pipe slope percentages in the collection system map were used in coordination with the pipe length in the GIS network to estimate the elevation drop across the pipe
- Industry accepted minimum slopes for given pipe diameters were assigned to pipes missing slopes
- The resultant physical model geometry (with above assumptions) was evaluated against the collection system map for major deviations and unreasonable invert elevations to ensure that these errors did not propagate to the downstream network

The GIS-based network was used to create a hydraulic model, which simulated PDWF and PWWF for the Existing and Ultimate Build-out Conditions scenarios. The hydraulic model simulation(s) for all scenarios were analyzed against capacity deficiency criteria, the results of which are illustrated by the following figures:

Figure ES- 3 Capacity Assessment Results under Existing Conditions Peak Dry Weather Flow
Figure ES- 4 Capacity Assessment Results under Existing Conditions Peak Wet Weather Flow
Figure ES- 5 Capacity Assessment Results under UBO Conditions Peak Dry Weather Flow
Figure ES- 6 Capacity Assessment Results under UBO Conditions Peak Wet Weather Flow

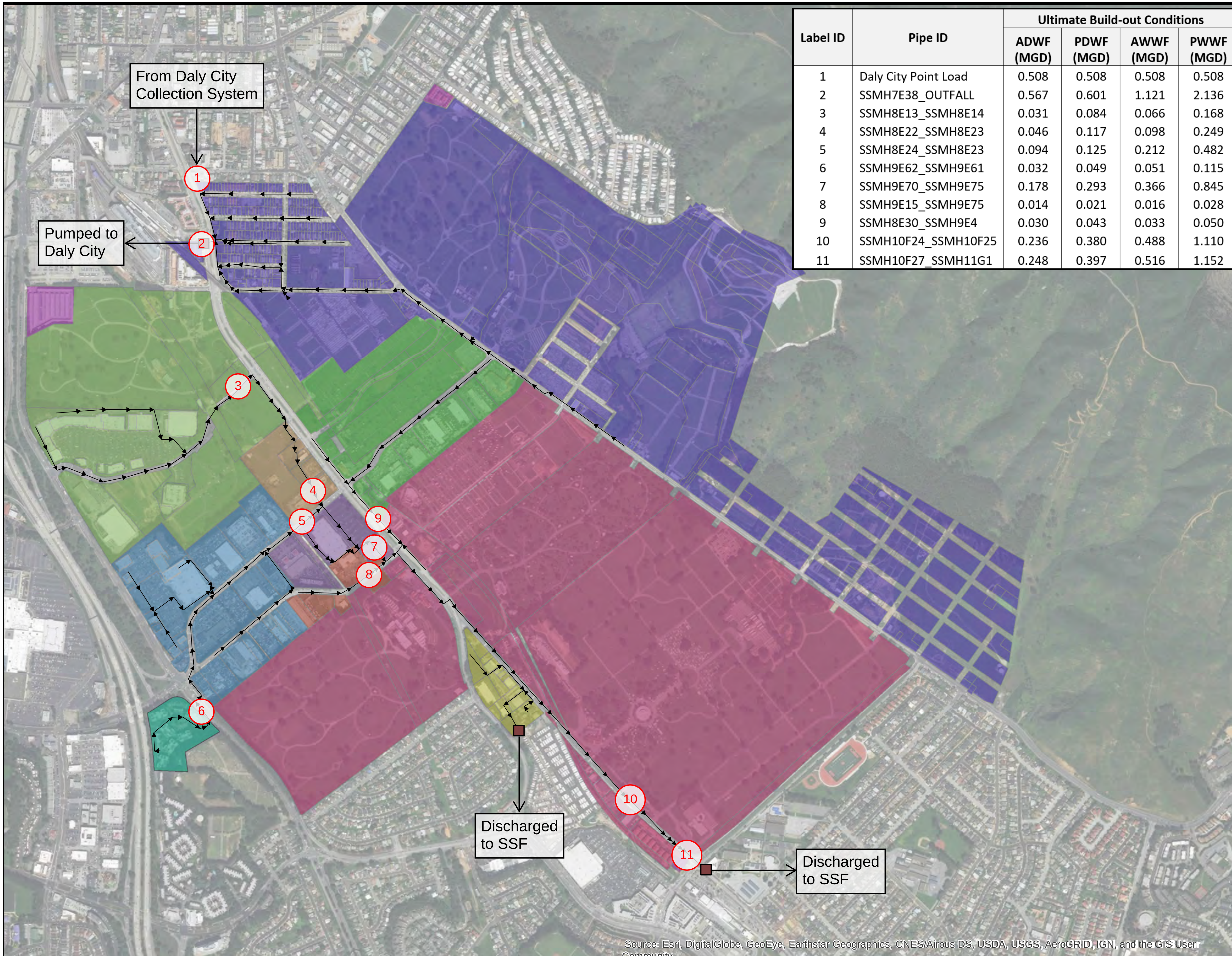
The 10 identifiable basins are also delineated on these figures.

For the Existing Conditions and UBO Conditions PDWF scenarios, simulation results did not show potential SSOs nor surcharging pipes. For the Existing Conditions PWWF scenario, no potential SSOs were modeled. However, model results did include manholes that surcharged to within 3 feet of the rim elevation, as well as a number of surcharging pipes. For the UBO Conditions PWWF scenario, simulation results showed one potential SSO along El Camino Real. Analysis also indicated a number of surcharging pipes and several manholes that surcharged to within 3 feet of the rim elevation throughout the system.



Label ID	Pipe ID	Existing Conditions			
		ADWF (MGD)	PDWF (MGD)	AWWF (MGD)	PWWF (MGD)
1	Daly City Point Load	0.508	0.508	0.508	0.508
2	SSMH7E38_OUTFALL	0.546	0.570	1.099	2.110
3	SSMH8E13_SSMH8E14	0.024	0.063	0.058	0.156
4	SSMH8E22_SSMH8E23	0.040	0.100	0.092	0.240
5	SSMH8E24_SSMH8E23	0.076	0.102	0.194	0.458
6	SSMH9E62_SSMH9E61	0.032	0.049	0.051	0.115
7	SSMH9E70_SSMH9E75	0.130	0.217	0.319	0.781
8	SSMH9E15_SSMH9E75	0.006	0.008	0.008	0.016
9	SSMH8E30_SSMH9E4	0.032	0.046	0.035	0.053
10	SSMH10F24_SSMH10F25	0.183	0.295	0.436	1.038
11	SSMH10F27_SSMH11G1	0.195	0.314	0.465	1.080

Figure ES-1. Existing Conditions Average and Peak Dry and Wet Weather Flows



Label ID	Pipe ID	Ultimate Build-out Conditions			
		ADWF (MGD)	PDWF (MGD)	AWWF (MGD)	PWWF (MGD)
1	Daly City Point Load	0.508	0.508	0.508	0.508
2	SSMH7E38_OUTFALL	0.567	0.601	1.121	2.136
3	SSMH8E13_SSMH8E14	0.031	0.084	0.066	0.168
4	SSMH8E22_SSMH8E23	0.046	0.117	0.098	0.249
5	SSMH8E24_SSMH8E23	0.094	0.125	0.212	0.482
6	SSMH9E62_SSMH9E61	0.032	0.049	0.051	0.115
7	SSMH9E70_SSMH9E75	0.178	0.293	0.366	0.845
8	SSMH9E15_SSMH9E75	0.014	0.021	0.016	0.028
9	SSMH8E30_SSMH9E4	0.030	0.043	0.033	0.050
10	SSMH10F24_SSMH10F25	0.236	0.380	0.488	1.110
11	SSMH10F27_SSMH11G1	0.248	0.397	0.516	1.152

Legend

- Manhole
- Outlet
- Pipe

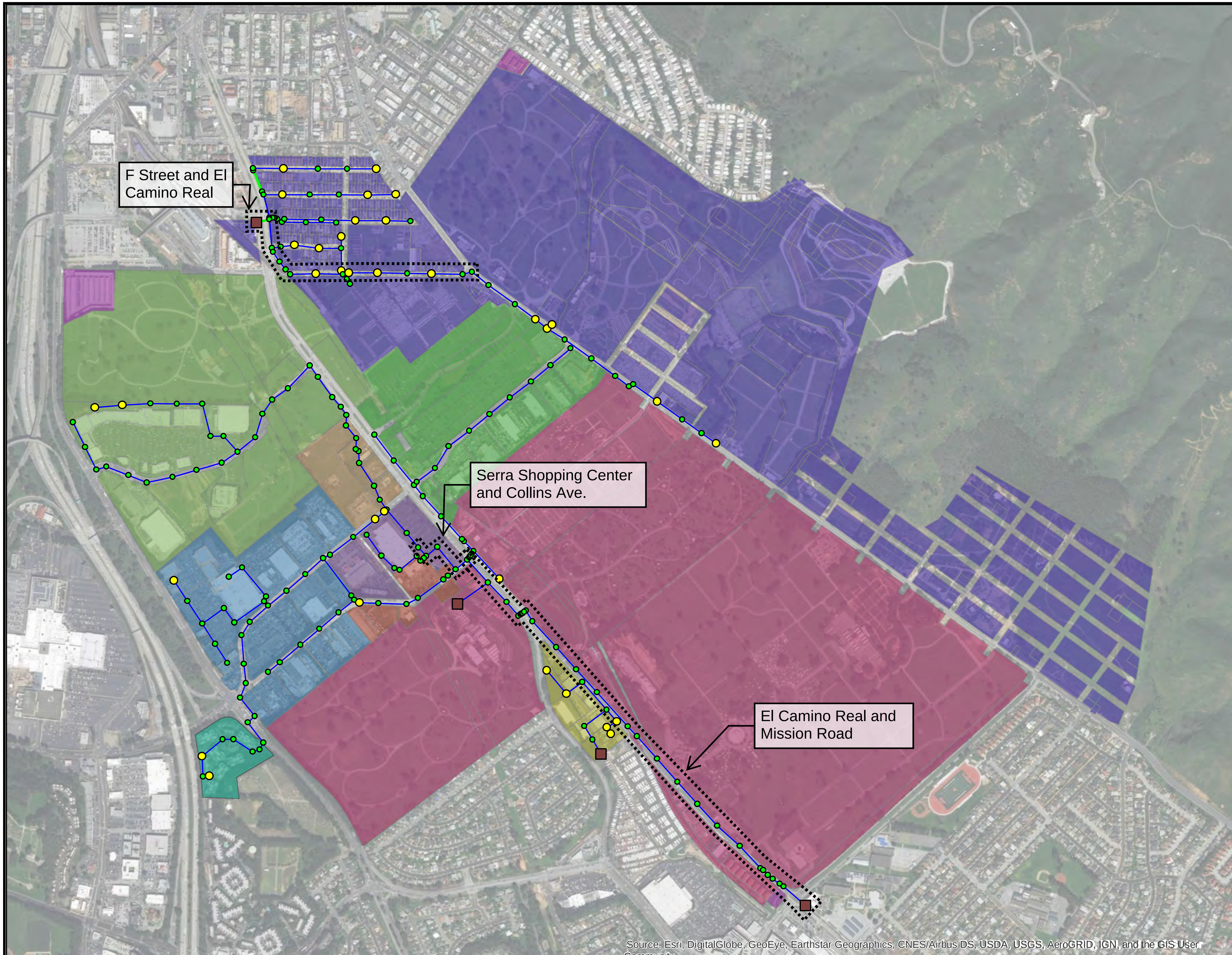
Basins

- DCMB
- SSFMB1A
- SSFMB1B
- SSFMB2
- SSFMB3
- SSFMB4A
- SSFMB4B
- SSFMB5
- SSFMB6
- SSFMB7
- Does not flow to Colma

N
900 450 0 900 Feet

Figure ES-2.
Ultimate Build-out Average and Peak Dry and Wet Weather Flows

WATERWORKS ENGINEERS



Legend

Manhole Unfilled Depth
- Potential SSO
- 0 - 3 Feet
- 3 - 5 Feet
- > 5 Feet

Outlet
- Active

Pipe Max "d/D" Ratio
- Less than 0.5
- 0.5~0.75
- 0.75~0.99
- Greater than 0.99

Basins
- DCMB
- SSFMB1A
- SSFMB1B
- SSFMB2
- SSFMB3
- SSFMB4A
- SSFMB4B
- SSFMB5
- SSFMB6
- SSFMB7
- Does not flow to Colma

N
800 400 0 800 Feet

Figure ES-3: Capacity Assessment Results Under Existing Conditions Peak Dry Weather Flow

WATERWORKS ENGINEERS

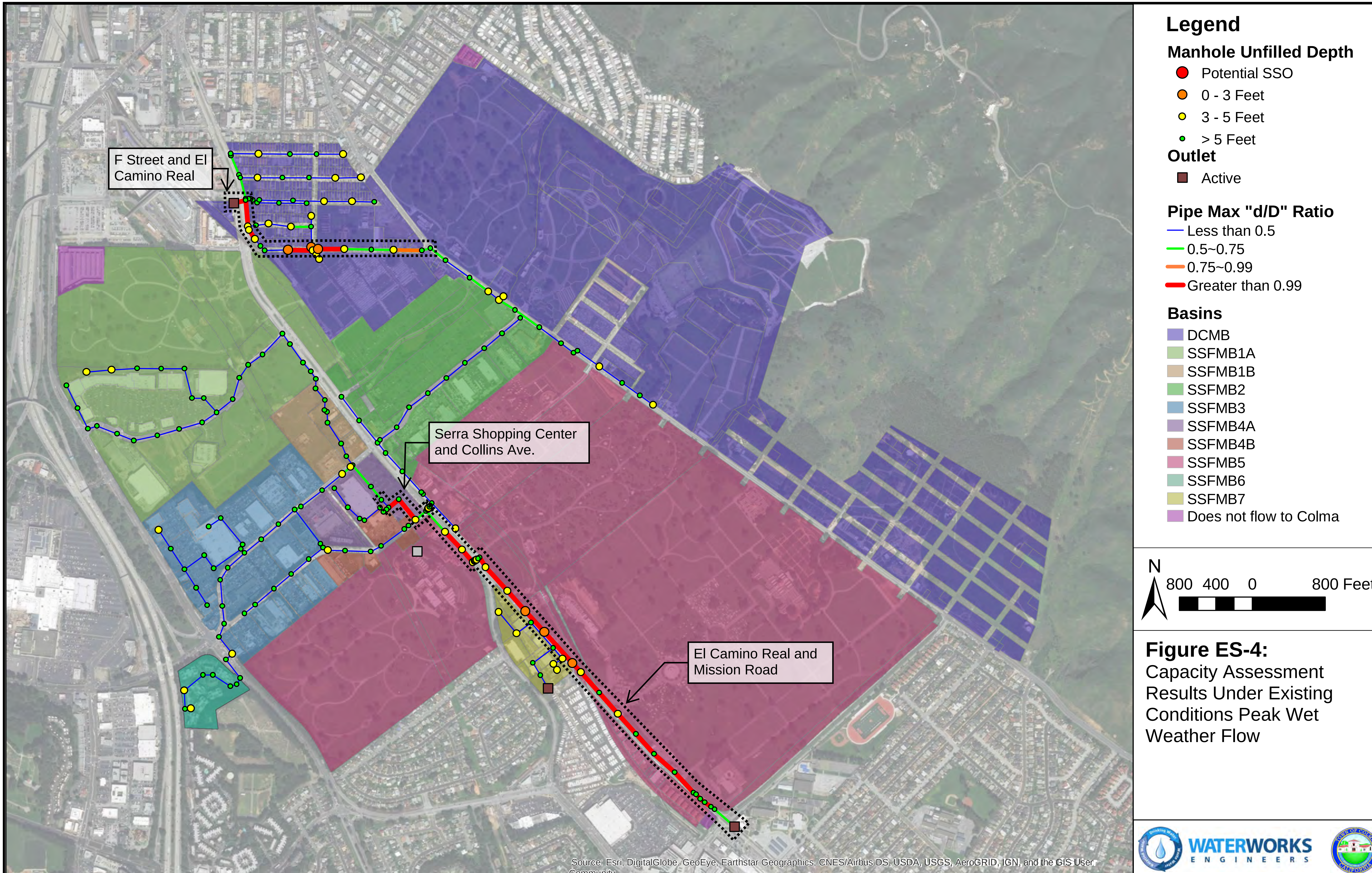


Figure ES-4: Capacity Assessment Results Under Existing Conditions Peak Wet Weather Flow

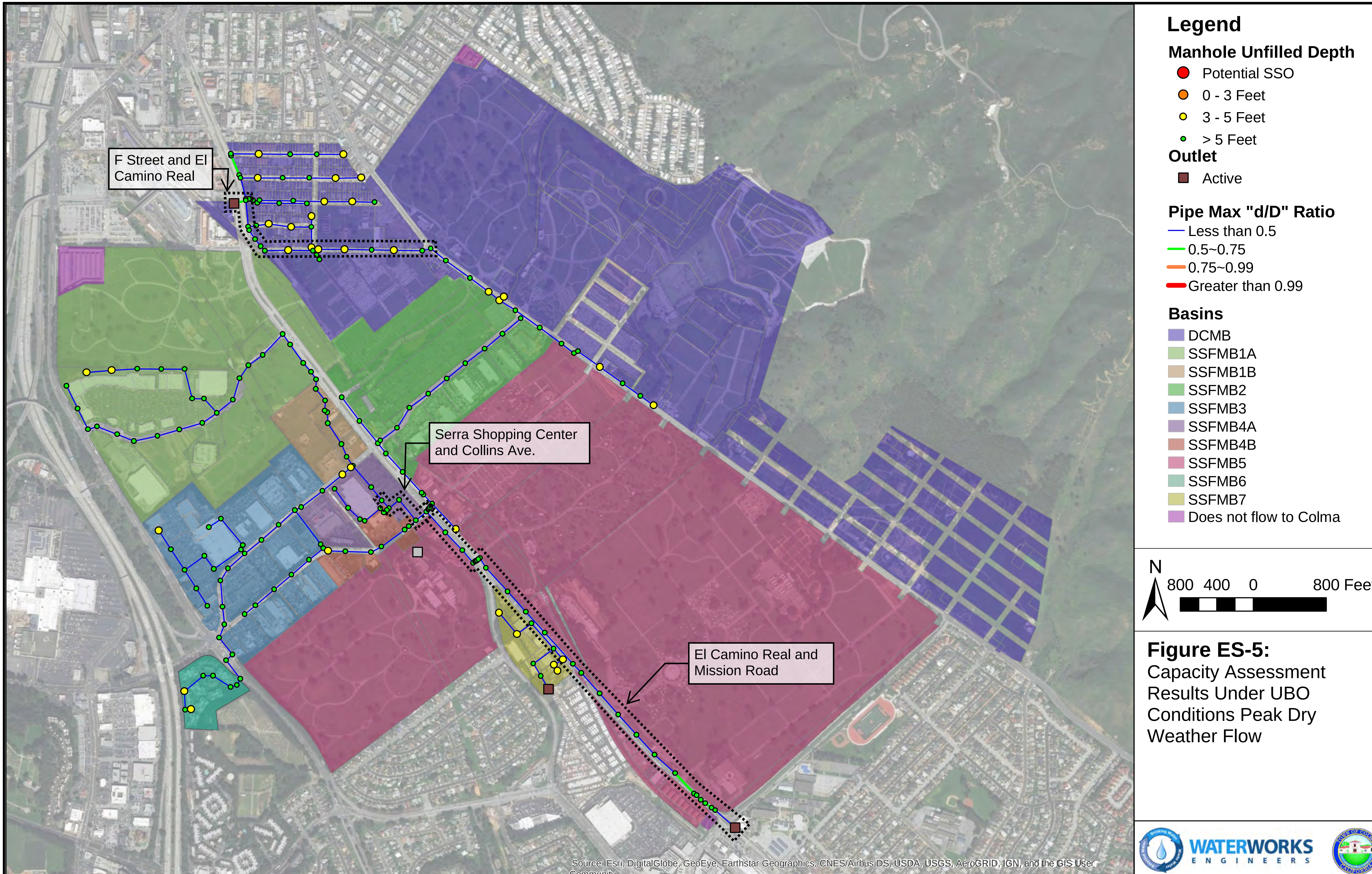


Figure ES-5: Capacity Assessment Results Under UBO Conditions Peak Dry Weather Flow

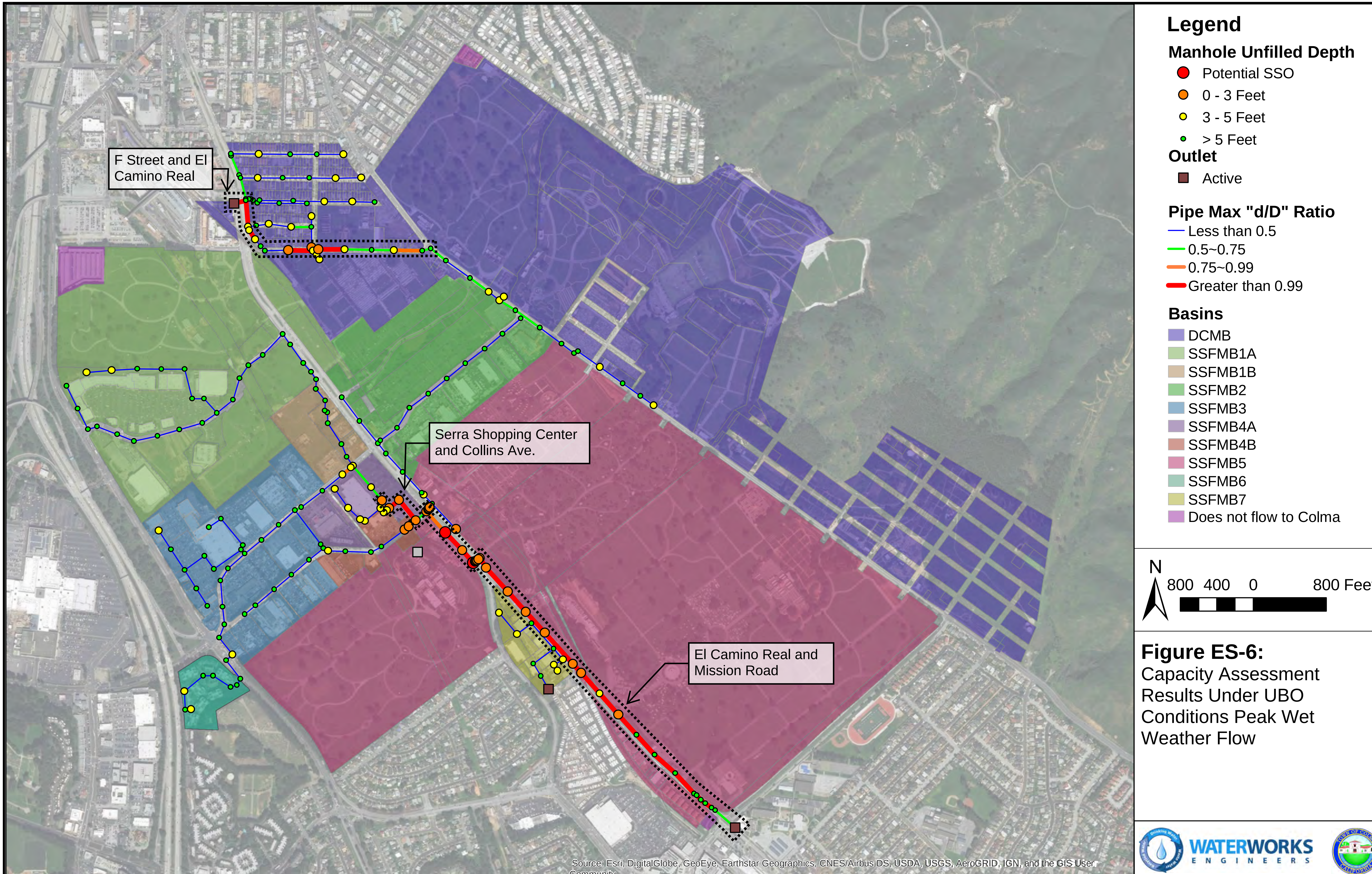


Figure ES-6: Capacity Assessment Results Under UBO Conditions Peak Wet Weather Flow

ES.3 Recommendations and Capital Improvement Projects

To meet regulatory requirements to provide adequate capacity to convey existing and future wastewater flows while mitigating potential SSOs, it is recommended that the Town implement a Capital Improvement Project (CIP) to increase capacity in the sanitary sewer system where deficiencies are modeled, in particular upstream of the SSF connection. The existing 10" pipe along El Camino Real/Mission Road, which eventually discharges to SSF's system at the intersection of Mission Road and Lawndale Blvd, experiences numerous surcharging pipes and two potential SSOs under the UBO Conditions PWWF model scenario (refer to **Figure ES- 6** above). However, this same section of piping experiences surcharging under the Existing Conditions PWWF model scenario as well. While there were no potential SSOs modeled under the Existing Conditions PWWF model scenario, certain manholes did experience surcharging to within 3 feet of the ground surface. Therefore, modeling results indicate that in order to sufficiently convey projected growth in wastewater contributions into the future, as well as mitigate surcharging during a design storm under existing conditions, the Town should move forward with the implementation of a CIP to address the capacity deficiency found in the 10" pipeline along El Camino Real/Mission Road. Modeling results indicate an additional 0.3 MGD of capacity will mitigate modeled SSOs and excessive surcharging. The following CIP alternatives provide the required 0.3 MGD of capacity:

- **Alternative 1**: An 8/10" parallel gravity main on Mission Road approximately 4,300 linear feet and would be installed at a depth of 4-12 feet from the surface and discharge into the SSF outlet. A 10" siphon overflow pipe segment would also be installed above the existing Caltrans box culvert from SSMH9F13_S to SSMH9F14_S in order to provide conveyance redundancy to mitigate conveyance issues should a blockage/constriction develop in the existing siphon.
- **Alternative 2**: A 10" gravity main that would be located on El Camino Real, in Cal Trans right of way, that would be approximately 3,300 linear feet installed at a depth ranging from 7-35 feet below the surface and would discharge into an SSF manhole located on El Camino Real
- **Alternative 3A**: A pre-fabricated lift station and 4" force main located on Mission Road and installed at a depth of 4-5 feet that would discharge into the SSF outlet
- **Alternative 3B**: A pre-fabricated lift station and 4" force main installed on El Camino Real at a depth of 4-5 feet that would discharge to a manhole located on El Camino Real
- **Alternative 4**: Upsize approximately 4,100 linear feet of the existing gravity main directly upstream of the SSF outlet by Replace-in-Place method

In addition to designing and constructing a CIP to provide sufficient capacity for projected wastewater flows, another strategy that is recommended for implementation by the Town is a Rain Derived Inflow and Infiltration (RDII) Reduction Program. RDII can be described as rainfall runoff that enters a closed sewer collection system through pipe and/or manhole defects, manhole lids, and cleanouts. There are various strategies that are commonly utilized to identify areas within the wastewater collection system that exhibit relatively significant RDII response. These strategies can include: Closed Circuit Television (CCTV) inspections, smoke testing, dye tracing, and micromonitoring. After these system assessment strategies have been implemented, rehabilitation projects can be developed for the specific areas found to exhibit high RDII response. Typical rehabilitation projects include the following:

- Lining of mains, side sewers, and laterals can reduce the volume of infiltration that enters through cracks in the pipes

- Lining and structural grouts in manholes reduce the volume of infiltration by covering and sealing the cracks
- Improving the seal between the frame and cover of the manhole can reduce the volume of inflow that enters the system during a storm event
- Eliminating illegal/ illicit cross-connections can greatly reduce the volume of inflow to the sanitary sewer system

An RDII reduction analysis was performed for the Town's system and various basins. In order to compare the basins, the volume of RDII per inch-diameter mile of pipe within the particular basin was determined. The comparison allows the Town to effectively rank each basin relative to each other, thereby focusing initial RDII reduction efforts on the basins representing the largest response to a storm event. Table ES - 1 below lists the results of the RDII analysis for each basin, along with their relative rankings.

Table ES - 1. RDII by Basin

Basin	RDII Area (Acres)	Peak RDII (MGD)	Peak RDII/idm (gpd/idm)	Ranking
SSFMB1A	72	0.125	16,184	6
SSFMB1B	22	0.055	23,309	4
SSFMB2	72	0.014	2,649	9
SSFMB3	71	0.294	34,927	3
SSFMB4A	21	0.049	14,399	7
SSFMB4B	12	0.010	3,453	8
SSFMB5	190	0.224	18,595	5
SSFMB6	9	0.094	60,200	2
DCMB	200	1.578	107,488	1

Figure ES- 7 displays the RDII analysis results for each basin within the Town.

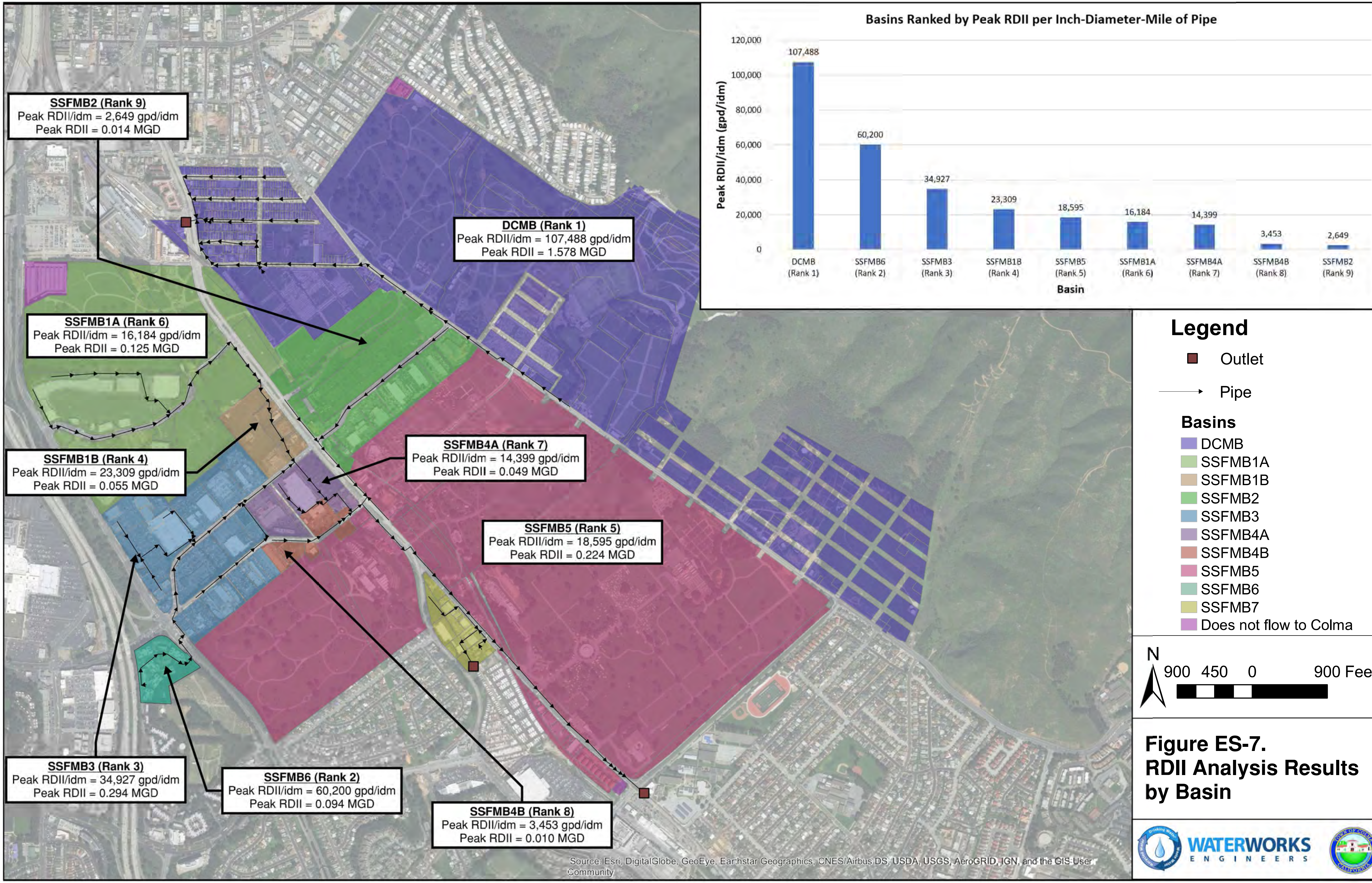


Figure ES-7. RDII Analysis Results by Basin

Given modeled (and flow meter data corroborated) variation between PWWF and PDWF, it is recommended that an RDII reduction program be implemented on basins SSFMB6 and SSFMB3 in conjunction with one of the presented CIP alternatives. While the RDII reduction analysis shows that enough wastewater flow could potentially be reduced from basins SSFMB6 and SSFMB3 to mitigate surcharging and potential SSOs along the Mission Road pipeline, it is not the recommendation of WWE that the RDII Reduction Program be implemented in place of a CIP. However, it is good practice for the Town to continually aim for RDII reduction throughout the collection system to mitigate capacity concerns for downstream systems and treatment plants.

Planning level cost estimates and potential effectiveness (likelihood of success in mitigating capacity deficiency within regulatorily defensible timeframe) of each alternative and the recommended I&I program are listed in Table ES - 2.

Table ES - 2. Cost Estimates and Effectiveness of the CIP Alternatives and the RDII Reduction Program

Project	Labor, Materials, & Equipment ($)	Design/ Construction Contingencies (%)	Total Construction Cost ($)	Administrative/ Construction Management (%)	Total Project Cost Estimate ($)	Short-Term/ Long-term Effectiveness
Alternative 1: Parallel Gravity Main Mission Road	1.15 Million	30/10	1.61 Million	5/10	**1.9 Million**	High/High
Alternative 2: Gravity Main El Camino Real	1.80 Million	30/10	2.47 Million	5/10	**3.0 Million**	High/High
Alternative 3A: Lift Station and Force Main Mission Road*	1.18 Million	30/10	1.65 Million	5/10	**1.9 Million**	High/Medium
Alternative 3B: Lift Station and Force Main El Camino Real*	1.18 Million	30/10	1.65 Million	5/10	**2.0 Million**	High/Medium
Alternative 4: Replace-in-Place Existing Main on Mission Road	1.83 Million	30/10	2.56 Million	5/10	**2.9 Million**	High/High
RDII Reduction Program	1.20 Million	30/10	1.67 Million	5/10	**1.9 Million**	Low/Medium
*Cost estimates for these alternatives do not include potential land acquisition costs for the lift station						

1 INTRODUCTION

1.1 Project Background

Water Works Engineers, LLC (Water Works or WWE) is under contract with the Town of Colma (Town) to develop the Town of Colma Wastewater Collection System Master Plan (Master Plan). The intent of the Master Plan is to prevent sanitary sewer overflows (SSOs) by identifying system hydraulic capacity deficiencies under existing and future conditions and to develop Capital Improvement Plans (CIP) to mitigate those deficiencies. To identify the deficiencies in the system, WWE created a GIS-based wastewater collection system hydraulic model. The Master Plan and hydraulic model are necessary efforts with the objective of meeting State Water Resources Control Board Order No. 2006-0003 Statewide General Waste Discharge Requirements for Sanitary Sewer Systems (GWDRs).

1.2 Project Objective

The general objective of this project is to evaluate the collection system's capacity and to develop potential CIPs to address capacity deficiencies. A summary of the steps involved in this project can be found below:

- Reviewed available as-builts, CAD data, County parcel data, and satellite imagery to develop GIS-based sewer network for the hydraulic model.
- Produced parcel-by-parcel sewer loads calibrated to existing dry weather flow monitoring data, which were then subsequently scaled up to represent Ultimate Build-out (UBO) development scenarios.
- Built new Innovyze InfoSewer hydraulic model and calibrated it with dry/wet weather flow monitoring and rainfall data.
- Simulated peak dry weather flow (PDWF) peak wet weather flow (PWWF) model scenarios based on a chosen design storm.
- Conducted capacity assessment and sensitivity analysis (by loading model with increasing design storms) and stressing the collection system model to identify modeled capacity deficiencies.
- Developed CIPs into discrete groups with planning level cost estimates for the different stages of development.

1.3 Description of Service Area

The Town of Colma, located in San Mateo County, borders Daly City to the north and west and City of South San Francisco to the south. The Town owns and operates a sewer collection system, which is comprised of close to 8 miles of gravity sewer pipe ranging in diameter from 4" to 12". The sewer collection system encompasses a service area of approximately 1,145 acres. Unique among municipalities, most land usage in Colma is used for local cemeteries and mortuaries which contribute little to no major sewer flows. The Town does not own or operate any wastewater treatment facilities. The Town discharges wastewater flows generated in the northeast region of town to Daly City and wastewater flow generated in the southwest region of town to City of South San Francisco (SSF).

2 GROWTH SCENARIO DEVELOPMENT

2.1 Existing and Ultimate Build-out Conditions Scenario

WWE took the approach of developing and simulating two land use scenarios as part of this study, the Existing Conditions scenario and the UBO Conditions scenario. To produce these two scenarios, planning documents were studied to understand and represent the Town of Colma at different stages of development. The applicable information gathered from these documents is presented in the following section. Previously the UBO Conditions scenario was based on more outdated sources of planning information but has been updated to reflect the most recent planning analysis. The previous UBO conditions can be found in Appendix A.

2.2 Sources of Land Use Information

WWE incorporated existing land use data and development projections for this study. Future land use planning assumptions were agreed upon by WWE and the Town of Colma Public Works & Engineering Department during several meetings and a presentation at the Town Hall (November 19, 2018).

2.2.1 Town of Colma Zoning Map

The Town zoning map shown in **Figure 2-1** was used as the basis for delineating the land use of each parcel under existing conditions which was inclusive of Residential, Commercial, Cemetery, and Other (e.g., open space) land use types. The total acres by land use type are presented in **Table 2-1** below.

Table 2-1: Existing Land Usage in Colma

Acres by Land Use Type				
Residential	Other	Cemetery	Commercial	Total
37	36	930	142	1145

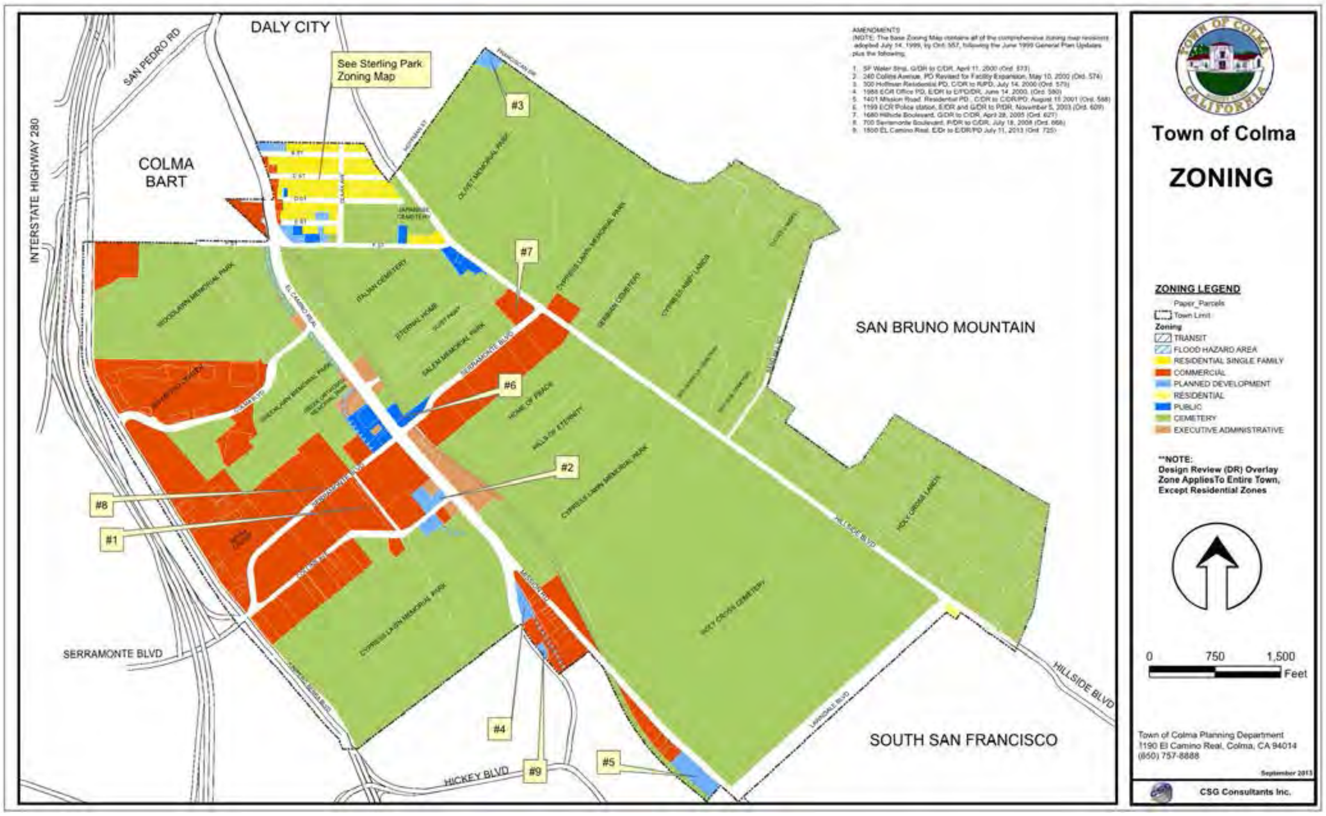


Figure 2-1: Town of Colma Zoning Map (Accessed 2018)

2.2.2 2014 Town of Colma Land Use and Urban Design Strategy

The Town's Land Use and Urban Design Strategy document, completed in October 2014, was the primary resource used to develop the UBO scenario. This document was completed in advance of the General Plan update, which is currently being prepared, and will inform and be integrated into the General Plan update. The land use designations for the UBO scenario were assigned according to a map in the Land Use and Urban Design Strategy which presents the future land use framework (**Figure 2-2**).

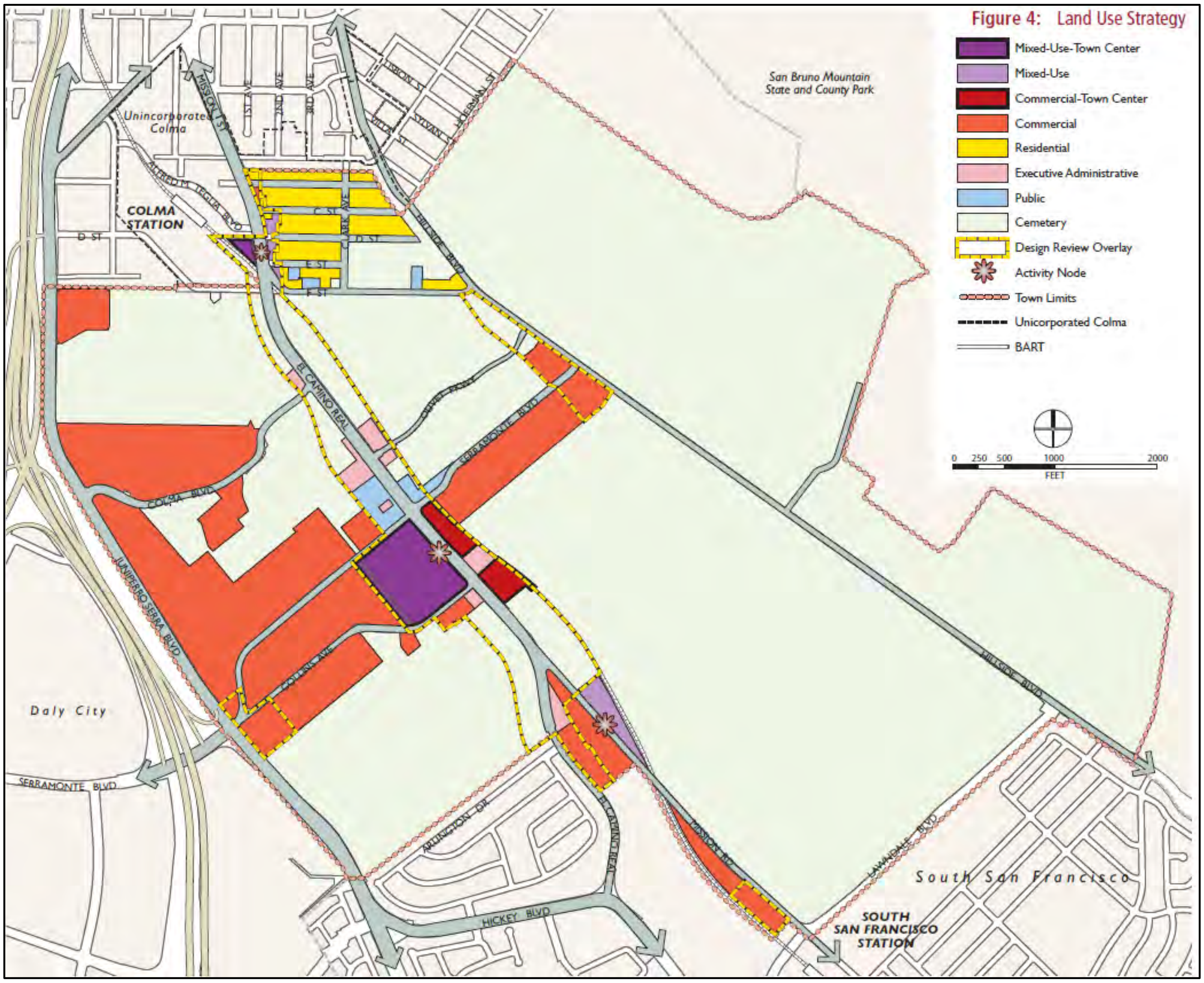


Figure 2-2: Land Use Strategy Map (Excerpt from Town of Colma Land Use and Urban Design Strategy)

For the purposes of this study, some of the land use types were combined when conducting the analysis. The resultant land use types for the UBO scenario are shown in **Table 2-2**.

Table 2-2: Ultimate Build-out Conditions Scenario Land Use Categories

Original Land Use Type	Resultant Land Use Type
Residential	Residential
Cemetery	Cemetery
Mixed-Use-Town Center	Mixed-Use
Mixed-Use	
Commercial-Town Center	Commercial/ Office
Commercial	
Public	
Executive Administrative	
	Executive Administrative*
*Only select parcels designated executive administrative land use type by Figure 2-2 retained that land use type. Further explanation provided herein.	

Additionally, the Land Use and Urban Design Strategy identified 18 opportunity sites, which are parcels likely to undergo a land use or intensity change. Inclusion of the opportunity sites is the primary difference between the Existing Conditions and UBO Conditions scenarios. All opportunity sites identified in the Land Use and Urban Design Strategy are described in **Table 2-3**. Note that additional land use types beyond those presented in **Table 2-2** were utilized to provide a more comprehensive analysis of the opportunity sites.

Table 2-3: Opportunity Sites Identified by 2014 Land Use and Urban Design Strategy

Opportunity Sites				
Site	Location	Description/ Tenant(s)	Planned Land Use	Size (ac.)
1	3601 Junipero Serra	Extra Space Storage site	Commercial	5.3
2	Colma BART station area	Bocci site, Sandblaster site, and Prime Auto Detail site	Commercial/ Mixed-Use*	1.3
3	1160 El Camino Real	Vacant site adjacent to Art in Stone Memorials, portion east of Colma Creek only	Executive Administrative	0.2
4	Corner of Olivet Pkwy. and El Camino Real	Parcels in the north side and south side of Olivet Pkwy.	Medical Office	1.6
5	600 Serramonte, portion along Serramonte Blvd.	Serramonte Certified Used car sales	Commercial	1.6
6	Northwest corner of El Camino Real and Serramonte	Town Hall	Executive Administrative	1.8
7	1500 Collins Avenue at Junipero Serra	Hyundai Serramonte Site	Commercial	3.7

8	600, 650, and 900 Collins Ave.	Parking lots and Uniake Construction	Commercial	2.8
9	735 Serramonte Blvd.	Dollar Tree site	Commercial	2
10	248 Collins Ave.	Standard Plumbing Site	Commercial	0.7
11	South West Corner of El Camino Real and Serramonte Blvd.	Kohl's site and adjacent parcels	Mixed-Use	13.1
12	Southeast corner of El Camino Real and Serramonte Blvd.	Vacant office building and surface parking	Commercial	2.4
13	401 Serramonte Blvd.	CarMax Store	Commercial	8.8
14	1299 El Camino Real, southern portion	Vacant parts of Hills of Eternity along El Camino Real	Commercial	2.3
15	Northern portion of Mission Road corridor	The Y intersection between Mission Road and El Camino Real	Commercial	4.9
16	1670-1692 Mission Rd.	The triangle-shaped parcel across Mission Road and El Camino Real	Mixed-Use	3.2
17	1545/1595 Mission Rd.	Site with historic structure in southern portion of Mission Rd. corridor	Commercial	0.4
18	27 Colma Blvd.	West half of 280 Metro Center	Commercial	Approx. 11
***** Only the Bocci Site is designated mixed use, Sandblaster and Prime Auto Detail sites are designated commercial land use type.				

Five of the eighteen opportunity sites were further identified as focus areas, for which overall build-out data and conceptual site plans were provided either by the Land Use and Urban Design Strategy or by Public Works & Engineering Department staff. The additional data for the focus areas were used to further develop wastewater generation planning assumptions under the UBO Conditions scenario, explained in detail in **Chapter 5**. **Table 2-4** summarizes available focus area data and **Figure 2-3** visually displays the focus areas as well as all other opportunity sites.

Table 2-4: Opportunity Sites Designated as Focus Areas

Focus Areas			
Opp. Site	Land Use Type	Dwelling Units/ Patient Beds	Commercial/ Office Area (SQFT)
2	Mixed-Use	42	8,500
4*	Medical Office	30	-
11	Mixed-Use	240	160,000
16	Mixed-Use	66	18,000
18	Commercial	-	110,000
*The northern portion of opportunity site 4 is to be a dialysis center per communications with Public Works & Engineering Department staff.			

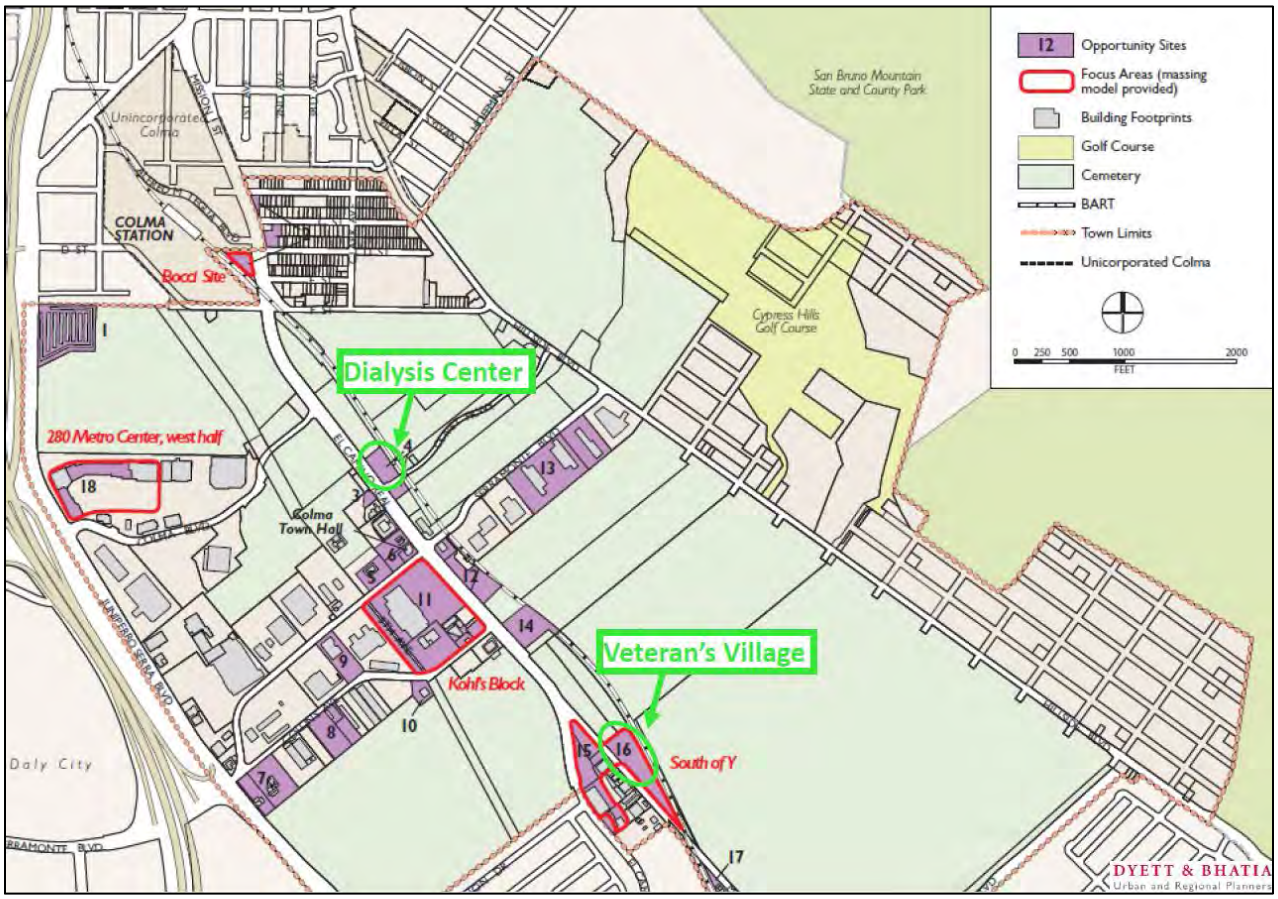


Figure 2-3. Opportunity Sites (Modified from Town of Colma Land Use and Urban Design Strategy)

2.3 Existing and Ultimate Build-out Scenarios Development

2.3.1 Existing Conditions Scenario

The purpose of the Existing Conditions scenario was to simulate operation of the sewer collection system calibrated to the available flow monitoring data to ensure an accurate representation of the collection system. The approach for the Existing Conditions scenario included the following parameters:

Existing Conditions Scenario:

- Land use types are consistent with the Town of Colma Zoning Map
- Average household size consistent with Town of Colma 2015 Housing Element at 3.05 persons
- Accounted for existing vacancies

2.3.2 Ultimate Build-Out Scenario

The purpose of the UBO scenario was to simulate the sewer collection system with increased densification of existing development and maximize infill development. This UBO scenario is intended to identify capacity deficiencies to inform future discussions and facilitate densification within existing city limits. The approach for the UBO Scenario included the following parameters:

Ultimate Buildout Scenario:

- Land use types are consistent with the Land Use Strategy map, opportunity sites and focus area data
- A floor to area ratio (FAR) of 1:1 was assumed for all opportunity sites, with the exception of the 5 focus areas
- The 5 focus areas identified among the opportunity sites were further developed to take into consideration the available data regarding building square footage and number of dwelling units
- Average household size was kept consistent with the Town of Colma 2015 Housing Element
- The density of all commercial parcels not identified as opportunity sites was increased by 5% from the Existing Conditions Scenario to represent typically conservative growth patterns utilized in hydraulic modeling/ master planning

3 PHYSICAL MODEL DEVELOPMENT

3.1 Sources of Physical Model

The Town did not have a pre-existing physical model; therefore, WWE developed a new GIS-based sewer network using available resources. The Town provided WWE with as-builts/CAD drawings/etc. of the Town's wastewater collection system and WWE formed the physical model geometry consisting of all pipes and manholes in the collection system. The methodology for how these resources were used is summarized below.

The collection system map was reviewed for all applicable information regarding collection system attributes (i.e. pipe and manhole IDs, pipe diameters, pipe slopes, pipe inverts, manhole rim elevations). These pieces of data were used as a starting point for the process of determining the final pipe inverts elevations and manhole rim elevations. One important point to note about the provided system maps is that the elevations provided are all seemingly rounded to the nearest whole number. Therefore, the following approach to pipe inverts was taken in order to create a physical model that most accurately represents a typical gravity sewer collection system.

- Where possible, the pipe slope percentages provided on the collection system maps are used in conjunction with the GIS-measured pipe lengths to determine the approximate elevation drop across that pipe segment.
- In most instances where pipe slopes are not provided, that particular pipe segment's slope was assumed to be the typical industry-wide minimum design slope for the pipe's diameter. This assumption was employed to ensure the Town's hydraulic model did not overstate a pipe segment's available conveyance capacity, thereby keeping the model "conservative" in its simulation of collection system performance.

An overarching objective of this process was to take a global view of the surrounding sewer system's invert elevations and make educated decisions for individual pipe segment attribute calculations such that localized discrepancies did not propagate through to the rest of the collection system. The various instances where deviations from the aforementioned pipe-slope approach were applied are explained below:

- Where two pipe segments have a common downstream manhole, and only one of the pipe segments is provided with a slope, the downstream invert elevations of both pipes are assumed to be the same (i.e. the downstream invert elevation of the pipe segment that was provided a slope value).
- In certain instances when utilizing the given pipe slope to calculate invert elevations resulted in an abnormally high or low invert elevation, an invert elevation closer to the map invert was used. This was done to prevent pipe segments located further downstream from also being abnormally high or low.

4 HYDRAULIC MODEL DEVELOPMENT

The hydraulic model is based on the newly formed GIS sewer network and was simulated using Innovyze's InfoSewer modeling software. The InfoSewer software was used to simulate dry-weather and wet-weather flow quasi-dynamically in 15-minute increments. The development of the model depended on flow meter data and rainfall data, calibrated dry and wet weather flows, and a chosen design storm. This methodology is explained in the subsequent sections and **Chapter 5**.

4.1 Flow Meter Data

The Town obtained the services of Total Flow Inc. for the rental, installation, procurement, and analysis of temporary flow meter data across January and February 2017. The results and monitoring methodology are presented in Appendix B**,** the Town of Colma Flow Monitoring Services Report completed by Total Flow Inc. in collaboration with WWE. The flow monitoring data was used to calibrate dry and wet weather flow by sewer basin.

4.2 System Configuration

The Town's sanitary sewer system can be characterized as including ten identifiable sewer basins, which generally correspond with the flow meter locations utilized by Total Flow Inc. during monitoring in early 2017. The approximate acreage of each basin is displayed in **Table 4-1**.

Table 4-1: Basin Acreages

Basin	Total Acres
DCMB	408
SSFMB1A	138
SSFMB1B	14
SSFMB2	60
SSFMB3	59
SSFMB4A	15
SSFMB4B	8
SSFMB5	424
SSFMB6	9
SSFMB7	10
Total	1145

4.3 Hydraulic Loading

The hydraulic model wastewater loading was accomplished via a point load to a manhole node from individual parcels. The wastewater flow from each parcel was assigned to the closest downstream manhole. Each parcel was assigned an average dry weather flow and wet weather flow with corresponding peaking factors.

5 DRY WEATHER MODEL DEVELOPMENT

5.1 Average Dry Weather Flow

Average dry-weather flow (ADWF) is an essential component of a hydraulic model and can be characterized as the diurnal or daily wastewater flow from a parcel that is not influenced by groundwater level changes or rainfall effects. The theoretical ADWF was calculated for each parcel based on land use and typical wastewater generation rates and was then calibrated to the observed flow meter data produced by Total Flow Inc.

5.1.1 January 2017 DWF Analysis

The methodology of estimating wastewater generation rates was an iterative approach that was calibrated to observed flow meter ADWF. The observed average weekday and weekend flows are shown on **Table 5-1**.

Table 5-1: Daily Average Flows by Flow Meter

Flow Meter	Average Weekday (MGD)	Average Weekend (MGD)
1	0.190	0.166
2	0.033	0.037
3N	0.139	0.132
3W	0.007	0.006
4	0.031	0.033
5	0.516	0.544
6	0.635	0.658
7	0.032	0.028
8N	0.044	0.043
8W	0.041	0.040

5.1.2 Average Dry Weather Flow Calibration

Average dry weather flow for the Existing Conditions scenario was calculated to closely match the flow of each basin presented in Table 5-1. This was done by assigning different wastewater generation rates for each of the land use types, residential, commercial, cemetery and other. The iterative approach began by assigning a typical per capita sewage flow to residential parcels and multiplying this by the house hold size. The remaining flow for each basin was apportioned predominately to commercial, while a small amount of wastewater flow was assigned to cemetery land use parcels that contained buildings. The values for residential and commercial wastewater generation rates were adjusted for each basin until the calculated ADWF approximated the flows in **Table 5-1**. The land use type "Other" was predominately open space. As open space land use parcels typically are not significant contributors of wastewater flow, they were consequently excluded from the calibration process. The resultant wastewater generation rates by basin are summarized in **Table 5-2.**

Table 5-2: Existing Wastewater Generation Rates Calculated to Flow Meter Data

Existing Wastewater Generation Rates			
Basin	Residential (gpd/person)	Commercial (gpd/acre)	Cemetery (gpd/bldg.)
DCMB	65	1500	480
SSFMB1A	55	1050	
SSFMB1B	55	3300	
SSFMB2	55	1450	
SSFMB3	55	675	
SSFMB4A	60	3600	
SSFMB4B	55	1250	
SSFMB5	60	1500	
SSFMB6	60	1500	
SSFMB7	55	1500	

5.2 Wastewater Generation Rates

To model the UBO scenario the wastewater flow was increased to reflect the potential increase in both residential and commercial development. This was accomplished by increasing wastewater generation rates as well as incorporating opportunity sites.

For the UBO scenario the commercial wastewater generation rate increased by 5% reflecting an assumed increase in densification (**Table 5-3**).

Table 5-3: Commercial Wastewater Generation Rates for Each Basin

Commercial		
Basin	Existing Flow (gpd/acre)	Ultimate Build-out Flow (gpd/acre)
DCMB	1500	1575
SSFMB1A	1050	1102.5
SSFMB1B	3300	3465
SSFMB2	1450	1522.5
SSFMB3	675	708.75
SSFMB4A	3600	3780
SSFMB4B	1250	1312.5
SSFMB5	1500	1575
SSFMB6*	1500	0
SSFMB7	1500	1575

***Basin SSFMB6 is entirely composed of residential parcels and so was assigned a wastewater generation rate of 0 gpd/acre.**

5.2.1 Opportunity Site Wastewater Generation Rates

To develop ADWF for the UBO Conditions Scenario wastewater generation rates for the 18 opportunity sites were integrated into the Existing Conditions scenario. The 5 focus areas and the remaining 13 opportunity sites were calculated differently from one another because of the varying degree of data available.

The land use types for the 13 opportunity sites not identified as focus areas were determined to be either commercial or executive administrative based on the most current parcel GIS shapefile that is publicly available through San Mateo County. The wastewater generation rates of 1,000 gpd/acre and 1,200 gpd/acre were assigned to commercial and executive administrative land use types respectively.

The available data for the focus areas in **Table 2-4** were used to calculate the wastewater flow rates for the focus areas. The different land use types mixed-use, medical office and commercial each had unique methods for wastewater flow calculation summarized below.

Commercial:

- Wastewater generation rate of 1,000 gpd/acre
- Only total building area and not total parcel area was used to calculate acreage

Mixed-use:

- Sum of residential and commercial flow rates
- Each dwelling unit had a house hold size of 3.05 persons
- The residential wastewater generation rate for each dwelling unit was assigned according to the UBO Flow in **Table 5-1** for the corresponding basin
- The commercial flow for each site was calculated using a wastewater generation rate of 1,000 gpd/acre, only building acreage was taken into consideration for calculation

Medical Office:

- Wastewater flow calculation was driven by the number of patient beds
- Assumed 60 gpd of wastewater would be produced for each patient bed

5.3 Peaking Factors

The observed hourly peaking factors (diurnal curves) measured at each flow meter are applied to ADWF in the hydraulic model by basin to allow for real-time dynamic hydraulic modeling. The peaking factors for each flow meter are displayed graphically in **Figure 5-1**, and the peaking factors are listed for each basin in **Table 5-4.** The minimum and maximum flows occur approximately at 4AM and 3PM respectively. The PDWF is determined by multiplying the average dry weather flow by the corresponding hourly peaking factor (PF).

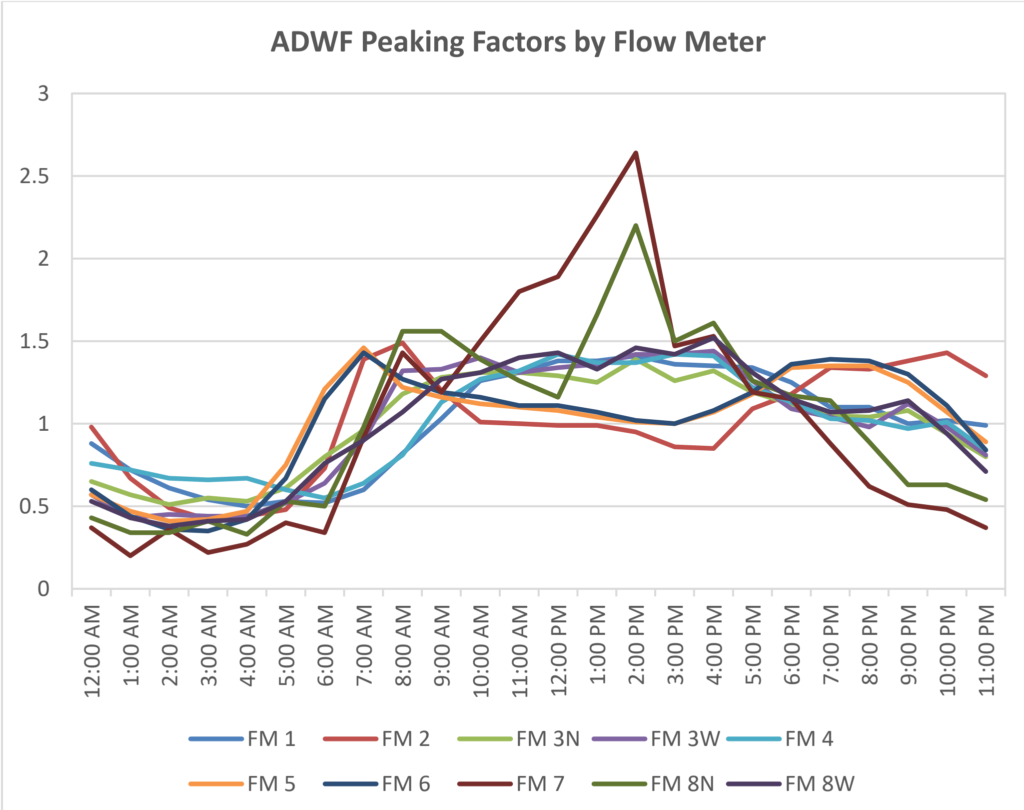


Figure 5-1. Dry Weather Flow Hourly Peaking Factors by Flow Meter

Table 5-4: Dry Weather Flow Hourly Peaking Factors by Basin

Basin	Peaking Factor (ADWF to PDWF)
SSFMB1A	2.64
SSFMB1B	2.2
SSFMB2	1.42
SSFMB3	1.52
SSFMB4A	1.39
SSFMB4B	1.44
SSFMB5	1.41
SSFMB6	1.49
DCMB	1.43

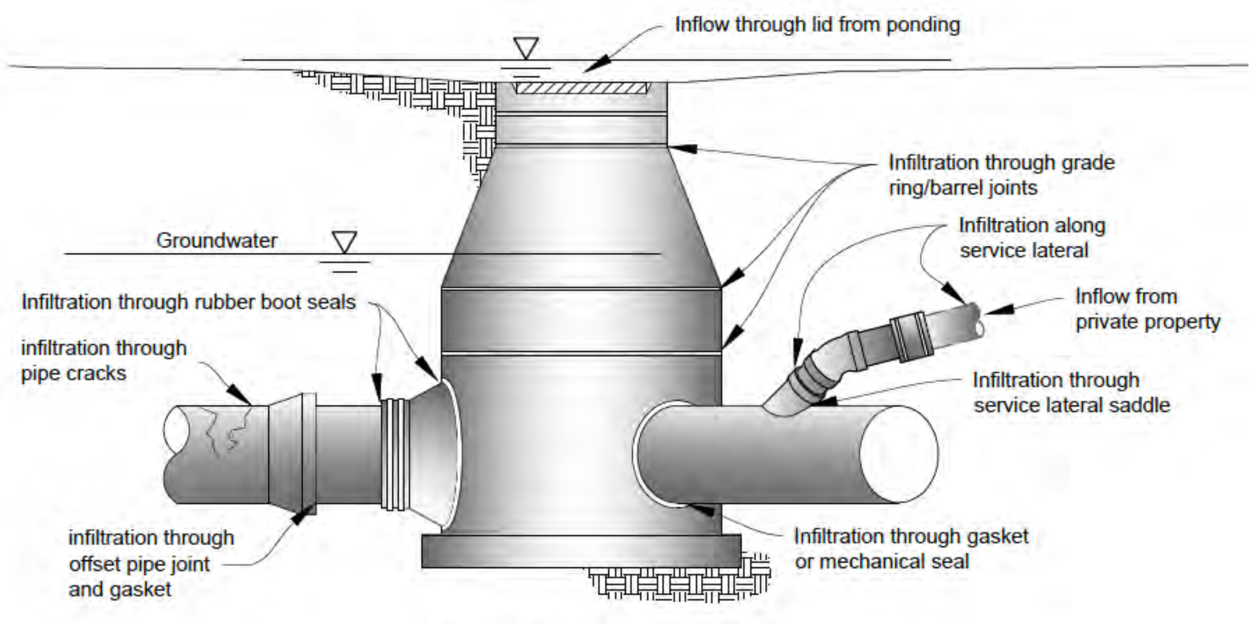
6 WET WEATHER MODEL DEVELOPMENT

6.1 Wastewater Flow Characterization

The hydraulic model simulates PWWF given a design storm hyetograph (rainfall over time) and a calibrated theoretical system response to that rainfall. PWWF is collectively made up of PDWF and Rainfall-Derived Inflow and Infiltration.

6.1.1 Rainfall-Derived Inflow and Infiltration

Rainfall-Derived Inflow and Infiltration (RDII) is rainfall runoff that enters a closed sewer collection system through manhole and pipe defects, manhole lids and clean-outs, and is visually represented in **Figure 6-1**. The relative magnitude of the RDII is often correlated with the age of the collection system. High intensity inflows typically dissipate soon after rainfall stops as opposed to low intensity groundwater infiltration (GWI) that can stay at elevated levels for many days after a storm, as evident in a sample hydrograph displayed in **Figure 6-2.**



Common Sources of Inflow and Infiltration

Figure 6-1: Common Sources of RDII

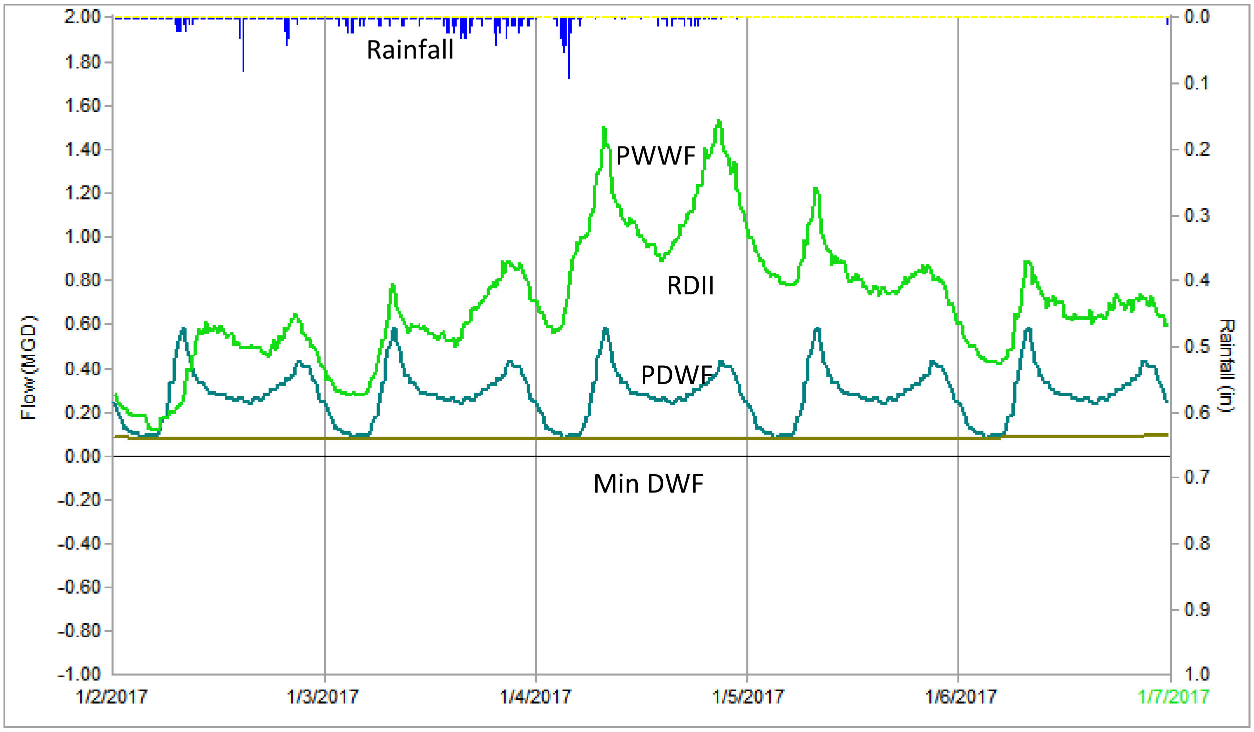


Figure 6-2: PWWF, PDWF, RDII

The flow meter data used to generate the design storm for the hydraulic model PWWF analysis occurred in late February 2017. The rainfall data was in the middle of the 2017 Water Year (October 1, 2016 to September 30, 2017), which was a record wet year for California and in many areas ended drought conditions that had persisted for 5 years prior. As such it was assumed that antecedent moisture conditions were relatively high before and after the February 2017 storm, which conservatively affects the hydraulic model by maximizing RDII responsiveness and measured peak flows. Comparatively, a storm earlier in the Water Year might have had low antecedent moisture conditions and a higher soil capacity that could attenuate any RDII responses.

RDII was applied in the hydraulic model by calculating the total for each basin, and then applying it equally across each basin manhole.

6.2 Calculation of Peak Wet Weather Design Flows

6.2.1 Rainfall Data Source and Calibration

The rainfall data used to develop the model RDII response to storm events was derived from the temporary 5-minute increment wet weather flow station located at the Town Hall. The single high-resolution rain gauge was applied equally across the City Basins for calibration purposes. The largest storm during the monitoring period was on February 20th, totaling 1.61" and was used as the design storm benchmark to calibrate the wet weather flow model.

The three main components of a design storm are the total depth, duration, and probabilistic return period or frequency of that storm. This study incorporated a 10-year return, 24-hour duration, and 3.95-inch total precipitation storm listed in NOAA Atlas 14, Volume 6, Version 2 for the Colma Region. The temporal distribution of the storm was developed via the Natural Resources Conservation Service (NRCS) Soil Conservation Service (SCS) Type 1A rainfall distribution method, which is the typical rainfall distribution method used in the Bay Area region surrounding Colma. The specific rainfall distribution methods typically employed in various parts of the country are displayed in **Figure 6-3.** The resultant rainfall hyetograph is displayed in **Figure 6-4**.

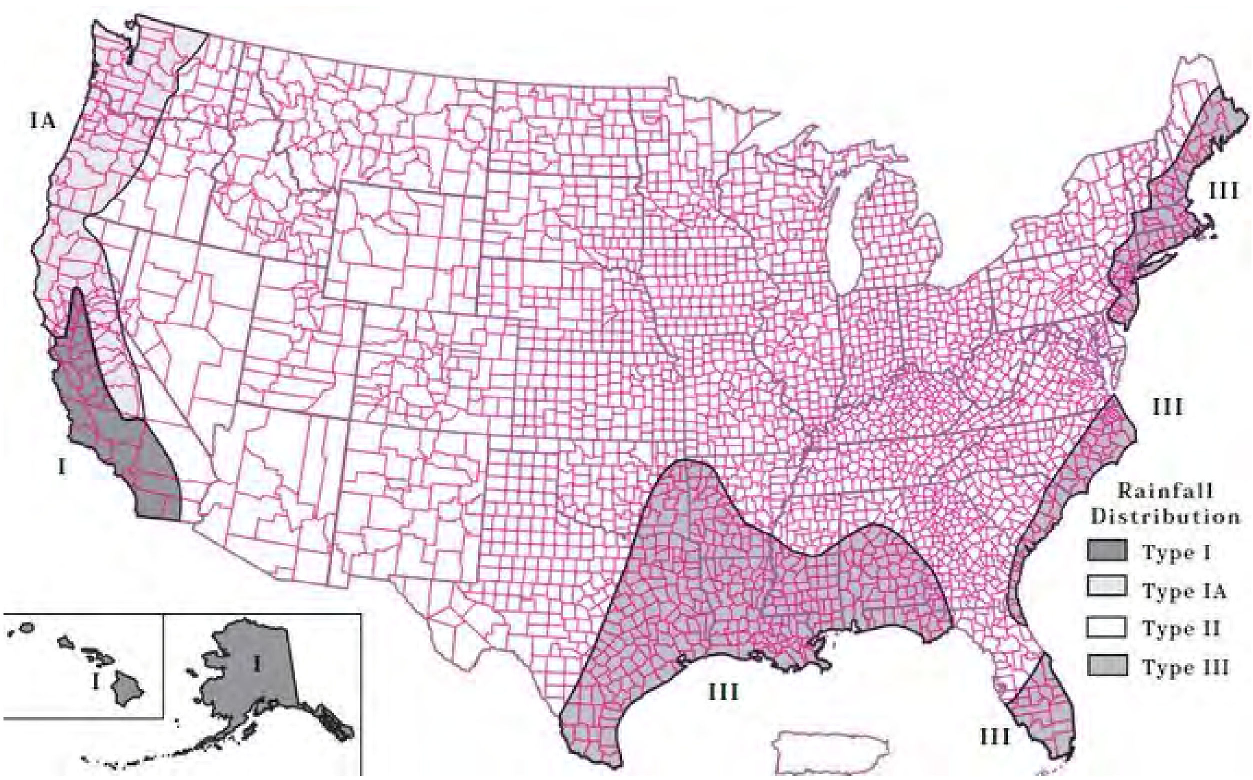


Figure 6-3: NRCS SCS Rainfall Patterns

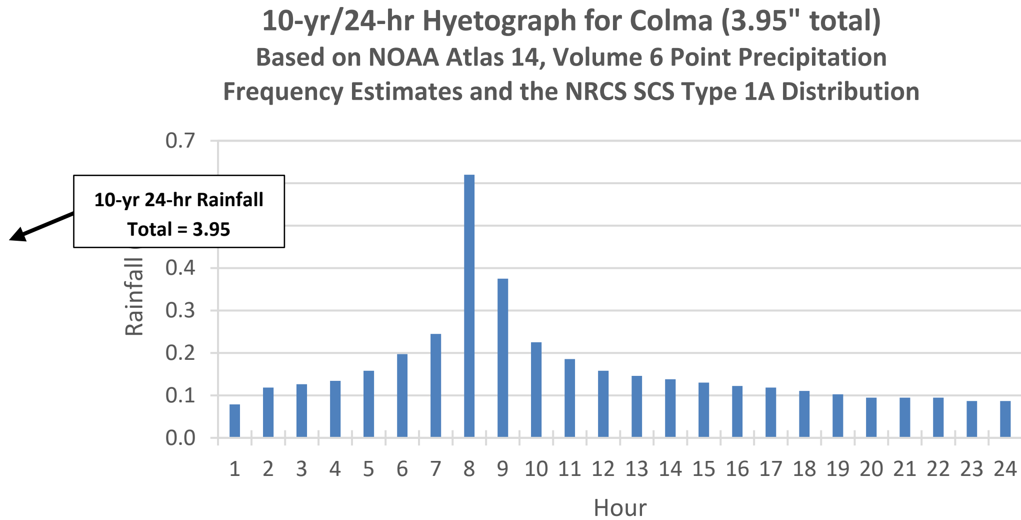


Figure 6-4: NRCS SCS 10-yr/ 24-hr Type 1A Hyetograph

6.2.2 RDII Synthetic Unit Hydrograph Development

The rainfall and flow meter data, along with the chosen 10-yr/24-hr design storm hyetograph, were inputted into the EPA's Sanitary Sewer Overflow Analysis and Planning (SSOAP) Toolbox Software. Within the software, basin-specific 10-yr/24-hr theoretical unit RDII hydrographs were produced (i.e., theoretical RDII response curves). The process is based on modifying specific triangular unit hydrograph parameters (R, T, and K values) to best fit the observed storm response during the storm event. Where R is the fraction of RDII rainfall volume entering the system, T is the time to peak, and K is the ratio of time of recession to T. As many as three triangular unit hydrographs can be fit to an observed RDII hydrograph corresponding to a single rain event.

The R value depends on the actual area that contributes RDII (i.e., an area that conceivably drains towards manholes). To that end, the RDII contributing areas of the large cemetery parcels were significantly reduced given the existing site conditions to local sewer. The resultant SSOAP hourly RDII by basin is shown in **Figure 6-5**.

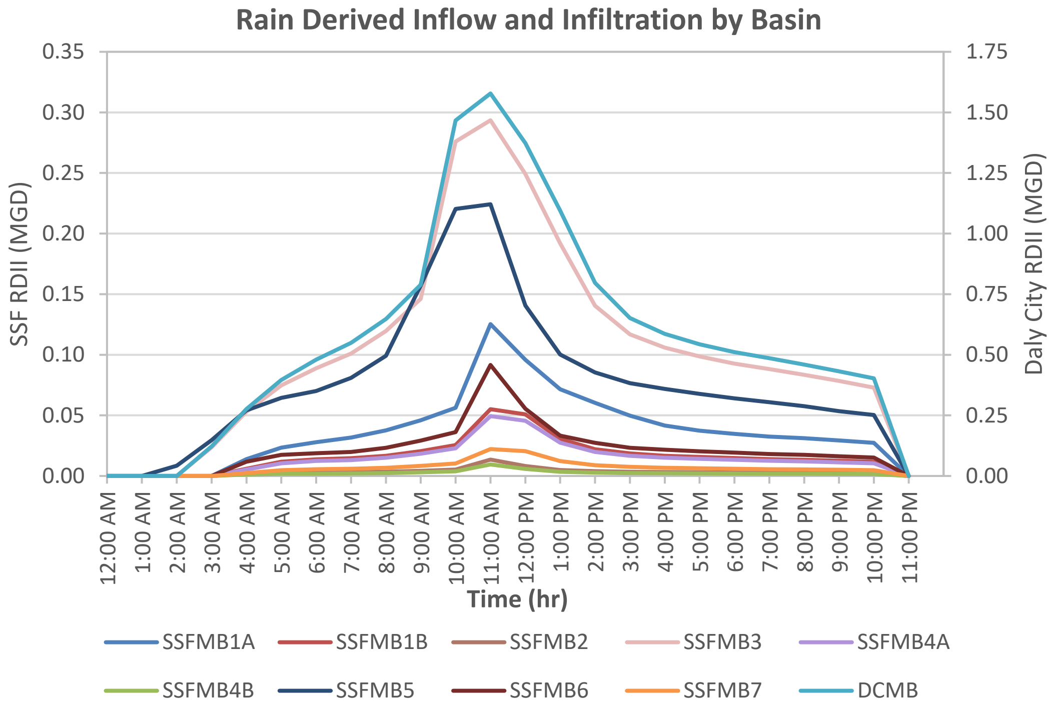


Figure 6-5: Theoretical RDII Hydrographs by Basin for 10-yr/24-hr Type 1A Storm

6.2.3 InfoSewer Hydraulic Model

The average dry weather flow, peaking factors, and RDII were all incorporated into the hydraulic model as separate variables. The Existing Conditions Scenario and UBO Conditions Scenario were simulated using the Innovyze InfoSewer software. The results of the model simulations for the two scenarios are summarized in the following section.

7 MODEL RESULTS

7.1 Capacity Criteria

The objective of the model was to assess the capacity of the system under Existing and UBO Conditions and identify capacity deficiencies. This report defines a capacity deficiency as any location where surcharging of a manhole occurs due to a downstream restriction in flow and where surcharging of a pipe occurs. To assess the potential for surcharging of manholes and pipes the maximum unfilled manhole depths and maximum pipe depth to diameter ratios (d/D) were grouped into discrete categories, summarized in **Table 7-1** and **Table 7-2**.

Table 7-1: Manhole Capacity Criteria

Manhole Capacity Categories		
Maximum Unfilled Depth (ft)	**Color Code**	**Description**
Potential SSO	Red	Above capacity, likely spilling at ground level
0 - 3 Feet	Orange	Nearing capacity, within 3 feet of ground level
3 - 5 Feet	Yellow	Sufficient freeboard capacity
> 5 Feet	Green	Sufficient freeboard capacity

Table 7-2: Pipe Capacity Criteria

Pipe Capacity Categories		
Maximum d/D	**Color Code**	**Description**
> 0.99	Red	At capacity, surcharged by depth and flow
0.75 - 0.99	Orange	Nearing capacity, may be acceptable for short periods during design storm
0.50 - 0.75	Green	Sufficient capacity
0.00 - 0.49	Blue	Extra capacity available

7.2 Existing System Results

7.2.1 PDWF Existing Results

For the Existing Conditions scenario, model simulations were performed for PDWF and PWWF conditions. The PDWF model simulations provide an approximation of how the collection system responds to the wastewater that enters the system for a typical day. The PDWF results are shown in **Appendix C.1**. No SSOs resulted from the PDWF simulation and the maximum unfilled manhole depth was within 3-5 feet of the rim elevation. There were two instances of pipe surcharging, one on Collins Street and a section of pipe intersecting El Camino Real. However, surcharging in these locations was a result of the siphons located there and not because the pipe diameters are undersized. Under Existing Conditions, the collection system is adequately sized to convey the PDWF to the Daly City and South San Francisco collection systems.

7.2.2 PWWF Existing Results

The PWWF model simulation results are shown in **Appendix C.2**. In contrast to the PDWF results the PWWF scenario had many areas of pipe that were surcharging as well as manhole unfilled depths that were less than 3 feet below the rim elevation. Three areas of concern were identified; along F Street and El Camino Real, Serra Shopping Center and Collins Avenue, and El Camino Real and Mission Road. The capacity assessment for the three areas of concern are summarized below.

F Street and El Camino Real

- The HGL profiles for this area are shown in **Appendix C.3**
- Unfilled manhole depths for SSMH7E72, SSMH7E49, and SSMH7E83 were less than 3 feet from the rim elevation. This is partially due to the shallowness of the manholes which are only 3-5 feet deep.
- The following pipe segments had a d/D greater than 1: SSMH7E73-SSMH7E49, SSMH7E82-SSMH7E83, SSMH7E86-SSMH7E87, and SSMH7E43 to the Daly City outlet.
- Some pipes also showed a d/D between 0.75-0.99

Serra Shopping Center and Collins Avenue

- The HGL profiles for this area are shown in **Appendix C.4**.
- For this area, the model did not show any potential SSOs. All manholes were at least 3 feet below the rim elevation or deeper.
- All pipes in this area had a d/D greater than 1.

El Camino Real and Mission Road

- The HGL profiles are shown in **Appendix C.5**.
- There were no potential SSOs modeled in this area, however manholes SSMH9F17, SSMH9F18, and SSMH10F19 were less than 3 feet below the rim elevation.
- The siphon structure located in between manholes SSMH9F13_S and SSMH9F14_S is utilized to provide sufficient vertical clearance from an overhead storm drain. The siphon inherently flows full and effectively creates a submerged/pressure condition in the siphon piping, thereby increasing the total dynamic head which subsequently raises the upstream HGL.
- From manhole SSMH9E2 to SSMH10F26 the d/D is greater than 1, which encompasses nearly the entire pipe length for this area.

While no SSOs were shown for the Existing Conditions scenario for either PDWF or PWWF the model assumes no obstructions in pipes or manholes, which is unlikely to be the case in the actual collection system. As such manholes that are not overflowing but are within 3 feet of the rim elevation are also of concern.

The Existing Conditions PWWF hydrographs for the Daly City and South San Francisco outlets are shown in **Figure 7-1**. The maximum flow modeled at the Daly City and SSF outlets were 2.11 MGD and 1.086 MGD respectively.

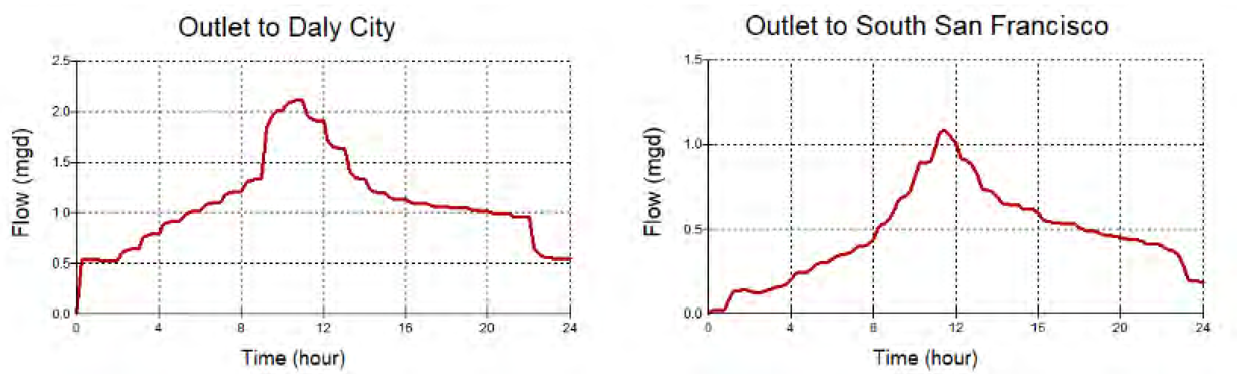


Figure 7-1. Existing Conditions 10-yr/ 24-hr PWWF hydrographs

7.3 Ultimate Build-out System Results

7.3.1 UBO PDWF Results

The model results for PDWF for the UBO Conditions scenario are shown in **Appendix D.1**. The UBO PDWF results were very similar to the Existing Conditions PDWF results. All unfilled manhole depths were at least 3 feet from the rim elevation. The only surcharging pipes were again on Collins Street and intersecting El Camino Real where the siphons are located. Additionally, from manholes SSMH10F25-SSMH10F27 the d/D was between 0.5 to 0.75. Under UBO conditions the collection system is adequately sized for PDWF.

7.3.2 UBO PWWF Results

The model results for UBO Conditions during PWWF are shown in **Appendix D.2**. The PWWF model results for the UBO Conditions scenario resulted in a few SSOs and various instances of pipe surcharging. The three areas of concern previously detailed for the Existing Conditions PWWF scenario remain the predominant areas of concern for the UBO Conditions PWWF scenario. A summary of the capacity assessment for all three areas of concern follows below.

F Street and El Camino Real

- The HGL profiles for this area are shown in **Appendix D.3**.
- Unfilled manhole depths for SSMH7E72, SSMH7E49, and SSMH7E83 were within 3 feet of the rim elevation. As noted in **Section 7.2** above this is in part due to the inherit shallowness of the manholes.
- All other manholes were 3 feet or more from the rim elevation.
- The pipes from manhole SSMH7E73 to SSMH7E49, manhole SSMH7E82 to SSMH7E83, manhole SSMH7E86 to SSMH7E87, SSMH7E43 the outlet, and SSMH7E97 to SSMH7E38 had d/D values greater than 1.

Serra Shopping Center and Collins Avenue

- The HGL profiles are shown in **Appendix D.4**.

- All manholes in this area from manhole SSMH9E6 to manhole SSMH9E12 were within 3 feet of the rim elevation.
  All pipes from manhole SSMH9E6 to manhole SSMH9E12 were surcharged.

El Camino Real and Mission Road

- The HGL profiles are shown in **Appendix D.5**.
- Manholes SSMH9F20 and SSMH9F13 were potential SSOs.
- Manholes SSMH9F21, SSMH9F13_S, SSMH9F14, SSMH9F15, SSMH9F16, SSMH9F17, SSMH9F18, SSMH10F19, SSMH10F20, and SSMH10F21 were all within 3 feet of the rim elevation.
- Flow performance is again negatively impacted by the siphon structure located between SSMH9F13_S and SSMH9F14_S, which flows full creating a submerged pressure condition and raises the upstream HGL.
- All pipes from manhole SSMH9E2 through SSMH10F26 had a d/D greater than 1.

The many manholes that are within 3 feet of the rim elevation, numerous surcharging pipes, and two potential SSOs demonstrate that the system is currently undersized to meet future demand during wet weather conditions. In order to accommodate the planned development of the UBO condition under PWWF an additional 0.3 MGD of capacity is required in the system to convey the flow to South San Francisco while maintaining a d/D less than 1.

The UBO Conditions PWWF hydrographs for Daly City and South San Francisco are shown in **Figure 7-2**. The maximum flows modeled at the Daly City and SSF outlets were 2.136 and 1.158 respectively. The UBO Conditions scenario maximum flows are only slightly higher than those of the Existing Conditions scenario from Section **7.2**. This is because the difference in dry weather flow is minimal relative to the volume of RDII that enters the collection system for the 10-yr/24-hr Type 1A design storm.

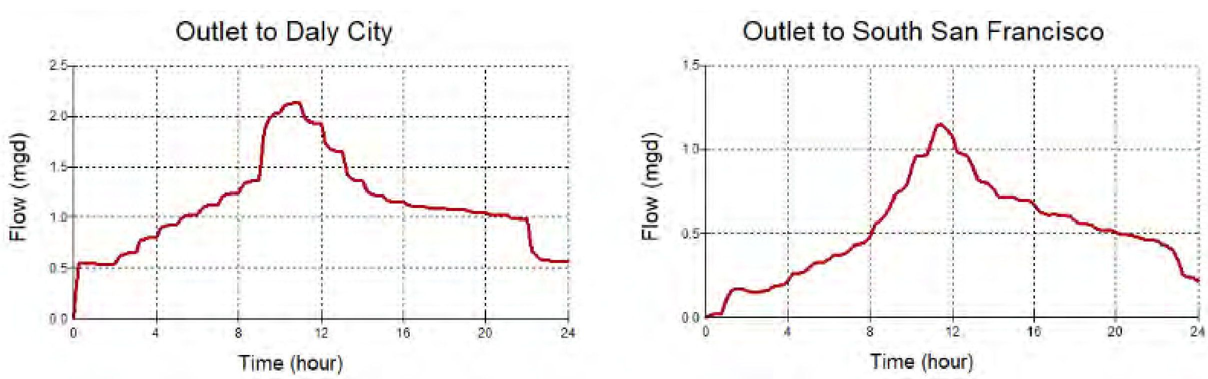


Figure 7-2. UBO Conditions 10-yr/24-hr PWWF hydrographs

8 RDII REDUCTION

Many social, environmental, and economic benefits are attributed to reducing RDII. Excessive RDII in urban areas can hinder the potential for growth by reducing the available capacity of the sanitary sewer system facilities. A system that is inadequate to convey and treat the RDII puts the health of the public at risk through sewer backups and basements flooding. Additionally, the health of tributary streams may be impacted if the RDII is significant enough to reduce groundwater levels. Considerable increases in ratepayer cost for conveying and treating wastewater as well as heightened maintenance and operation of supporting facilities can result from excessive RDII [U.S. Environmental Protection Agency, 2014 and Federation of Canadian Municipalities and National Research Council, 2003]

The goal of an RDII reduction program for the Town would be to reduce the PWWF to aid in eliminating all potential SSOs and surcharging pipes. Major elements of an RDII reduction program include:

- Flow monitoring
- Sanitary sewer assessment and analysis
- System improvement plan development
- System improvement plan implementation

General flow monitoring is necessary for determining basins in which the RDII response was pronounced. Thereafter, several strategies including closed circuit television inspection, smoke and dye testing, micro monitoring, and point-of-sale ordinances can be utilized to further identify smaller sub-basins or segments of pipe that exhibit a significant RDII response. Description of these methods can be found below:

- Closed Circuit Television (CCTV) Inspection has been widely used in assessing sewer pipes. CCTV inspection produces a video and field log documenting problems on the interior of the pipes and manholes. CCTV can be used to identify structural issues, locate leaking joints, blockages, root intrusion, and dropped joints. Point repairs for identified high severity structural pipe defects have been found to effectively reduce RDII contributions.
- Smoke testing can be used to locate the sources of RDII in the sewer main and service laterals. Smoke testing involves blowing smoke into a manhole and through an isolated segment of pipe. If the sewer pipe is in good condition the smoke will emerge at the downstream manhole or vents on the roof of a house. Smoke emerging from cracks in sidewalks or through resident’s yards is an indication that a sewer pipe is in poor condition.
- Dye tracing is often used as a compliment to smoke testing if the results of smoke testing are inconclusive. Dye testing can be used to confirm whether or not a connection is a source of RDII.
- Micromonitoring can be used to monitor the flow of upstream pipes with small diameters with relatively low flow. Micromonitors are placed upstream of a conventional flow monitor and are used to pinpoint the areas which are primary RDII contributors .
- Point-of-sale ordinances have been implemented to require the rehabilitation/replacement of the sewer upper lateral upon the sale of a residential house, commercial property, etc. It is typical for a public agency to only own/maintain the lower lateral serving a building (i.e. the portion of the sewer lateral from the cleanout to the connection point at the main sewer pipeline), thus

rendering it relatively difficult to properly assess/maintain the upper lateral. Upper laterals could contain illegal cross-connections and/or significant structural defects, thus having an ordinance within the pertinent municipal code in place that provides an opportunity for upper lateral rehabilitation activities could be a beneficial strategy within an agency's RDII reduction program.

Following a system assessment, rehabilitation projects can be formed and implemented in the areas where defects and false plumbing connections are found. Typical rehabilitation projects are described below:

- Lining of mains, side sewers, and laterals can reduce the volume of infiltration that enters through cracks in the pipes
- Lining and structural grouts in manholes reduce the volume of infiltration by covering and sealing the cracks
- Improving the seal between the frame and cover of the manhole can reduce the volume of inflow that enters the system during a storm event
- Eliminating illegal/ illicit cross-connections can greatly reduce the volume of inflow to the sanitary sewer system

8.1 RDII Reduction Program (SSFMB6 and SSFMB3)

Industry experience has shown that the outcome of RDII reduction programs tends to be much less than what is expected. This is because it is difficult to find and address the many areas where RDII is entering the system. Additionally, private building laterals typically are major contributors to RDII and assessing and rehabbing private property can be a very difficult and costly process, especially without cooperation of the community [Federation of Canadian Municipalities and National Research Council, 2003]. Due to the variability of the outcome of RDII reduction programs they are not intended to be a sole solution to addressing capacity deficiencies, rather they should be ongoing and used as a preventative measure.

8.1.1 Major RDII Contributing Basins

The costs associated with RDII reduction efforts can be greatly reduced by developing a targeted RDII reduction program; additionally, this generally improves the efficiency of the RDII reduction efforts. This can be done by first identifying the basins that have the greatest negative impacts to the sanitary sewer system in regard to RDII. In order to compare the basins, the amount of RDII with considerations to total pipe length and diameter for each basin were calculated, the relative magnitude of RDII per inch of diameter per mile (idm) of sewer piping for each basin are displayed in **Table 8-1**. Also presented in **Table 8-1** are the basins ranked relative to each other, with the basin ranked #1 representing the largest response to the storm event (I.e., the "leakiest basin").

Table 8-1. RDII by Basin

Basin	RDII Area (Acres)	Peak RDII (MGD)	Peak RDII/idm (gpd/idm)	Ranking
SSFMB1A	72	0.125	16,184	6
SSFMB1B	22	0.055	23,309	4
SSFMB2	72	0.014	2,649	9
SSFMB3	71	0.294	34,927	3
SSFMB4A	21	0.049	14,399	7
SSFMB4B	12	0.010	3,453	8
SSFMB5	190	0.224	18,595	5
SSFMB6	9	0.094	60,200	2
DCMB	200	1.578	107,488	1

While **Table 8-1** ranks the basins in order of which have the greatest RDII response, the locations of the basins relative to the capacity deficiencies identified in **Chapter 7** must also be considered. The basins that are ranked higher for greatest RDII response and are located upstream of the major capacity deficiencies should be prioritized when developing a plan for system improvements. **Table 8-2** presents the basins ranked by priority, with #1 representing the basin that should undergo system improvements first. Basins that did not receive a ranking exhibit a minimal RDII reduction response; consequently, under the current state of the system it is not recommended that these basins undergo improvements to reduce RDII.

Table 8-2. Sanitary System Improvement Plan

Basin	Recommended Prioritization	Comments
SSFMB1A		Minimal RDII response
SSFMB1B	4	Addresses El Camino Real and Mission Rd
SSFMB2		Minimal RDII response
SSFMB3	2	Addresses El Camino Real and Mission Rd
SSFMB4A		Minimal RDII response
SSFMB4B		Minimal RDII response
SSFMB5	5	Addresses El Camino Real and Mission Rd
SSFMB6	1	Addresses El Camino Real and Mission Rd
DCMB	3	Addresses F Street and El Camino Real

In **Table 8-1** Basin DCMB is ranked as #1 but addressing the substantial RDII response in DCMB would have no effect on the major capacity deficiencies modeled on El Camino Real and Mission Road. Additionally, no potential SSOs are modeled in DCMB, the most significant response are manholes that surcharge to within 3 feet of the rim elevation, but this is largely due to the inherent shallowness of the manholes. Consequently, DCMB is not the recommended basin with which to begin implementation of system improvements. Instead it is recommended that basin SSFMB6 and SSFMB3 be the first and second basins respectively on which efforts for system improvements are focused. SSFMB6 and SSFMB3 exhibited the highest Peak RDII/idm and are located upstream of the capacity deficiencies on El Camino Real and Mission Road (see **Figure 8-1** below). After efforts are made to reduce the RDII responses which impact El

Camino Real and Mission Road, DCMB can then be targeted if reduced PWWF to be discharged to Daly City is desired.

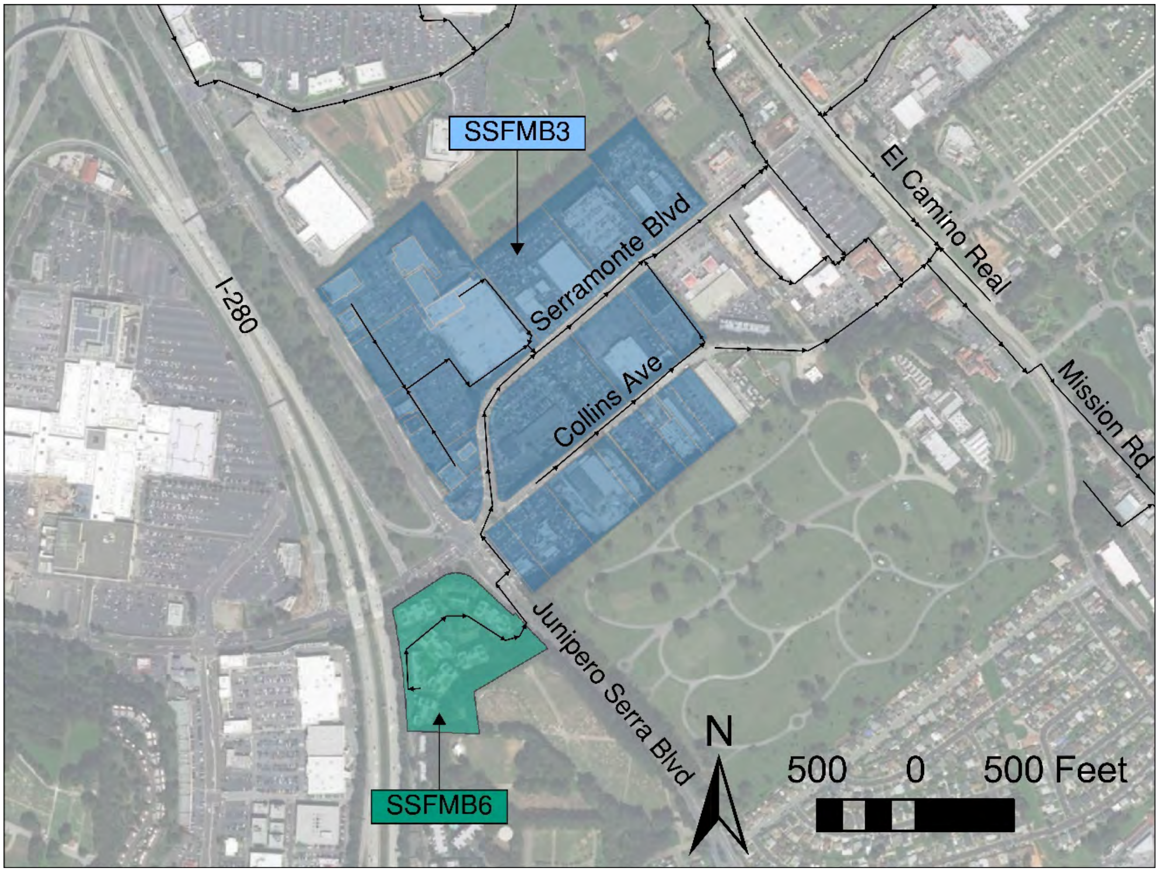


Figure 8-1. RDII Reduction Program Basins (SSFMB3 & SSFMB6)

8.1.2 Potential Volume of RDII Reduction

While the exact volume of RDII reduction cannot be determined, assumptions based on industry experience and professional opinion were made to estimate the potential volume of RDII that could be reduced for the proposed RDII reduction program.

The characteristics of the basins must be considered when estimating how effective selected RDII rehabilitation methods will be. Both SSFMB6 and SSFMB3 are predominantly impervious as they consist of a large apartment complex and mostly parking lots for the accompanying shopping centers and businesses. For impervious land types, where the effects of surface runoff are more significantly felt by the collection system, the proportion of RDII stemming from inflow is increased. To determine the individual infiltration and inflow percentages of the RDII response, the approximate base GWI first needs to be known. However, because the flow monitoring conducted by Total Flow Monitoring Inc. was only conducted across the wet months of January and February 2017, the base GWI would have been difficult to determine without making significant assumptions regarding the Town's wet and dry seasons. The determination of base GWI requires flow monitoring data of dry weather flows across both the wet and dry seasons in order to assess the seasonal variance of groundwater infiltration's effects on the Town's collection system. Therefore, the range of infiltration/inflow proportions shown in **Table 8-3** were used to reflect basins with differing sources of RDII. The infiltration and inflow percentages of the GWI Basin type are representative of a typical system. The percentages of the Inflow Basin represent a basin with increased inflow, which can in part be a result of more impervious area, ponding at manholes, or illegal/illicit cross-connections. The Inflow Heavy Basin represents a basin that exhibits a very pronounced inflow response, likely where a significant cross-connection is known.

Table 8-3. Infiltration to Inflow Proportions

Basin Type	Infiltration	Inflow
GWI Basin	80%	20%
Inflow Basin	70%	30%
Inflow Heavy Basin	50%	50%

As previously mentioned RDII reduction efforts are often variable and cannot remove 100% of the RDII. Some rehabilitation methods used for reducing RDII are more effective than others. The proposed rehabilitation methods for this RDII reduction program and their anticipated effectiveness at reducing infiltration and inflow follow in **Table 8-4**.

Table 8-4. Percent Reduction of Infiltration and Inflow for the Different Rehabilitation Methods

RDII Rehabilitation Method Percent Reduction		
Rehabilitation Method	Infiltration	Inflow
Pipe & Lateral Lining	75%	0%
SSMH Lid Seal	0%	20%
Structural Grout & Liner	15%	20%
Illegal/Illicit Cross-Connection	0%	40%

The resulting volume of RDII removed using the values of **Table 8-3** and **Table 8-4** for basins SSFMB6 and SSFMB3 individually and combined are shown in **Table 8-5**. The values shown in **Table 8-5** do not include the elimination of illegal/illicit cross-connections as this rehab method is difficult to accomplish and the success of this rehab method is highly dependent on the degree of community involvement. If the Town desires to further reduce the volume of RDII through the elimination of illegal/ illicit cross-connections, then a program which engages the community and can procure the cooperation of private property owners is necessary.

The total RDII percent reduction for the GWI Basin, Inflow Basin, and Inflow Heavy Basin are 80%, 75%, and 65% respectively. The percent reduction decreases as the proportion of RDII consisting of inflow increases because reduction of inflow is less effective than the reduction of infiltration. Basins SSFMB6 and SSFMB3 likely reflect either the GWI basin or Inflow Basin and not the Inflow Heavy Basin as no significant illegal/illicit cross-connection that skews the proportion of RDII towards inflow is known. As such it is estimated that a potential RDII reduction volume ranging from 0.291-0.310 MGD could be achieved for basins SSFMB6 and SSFMB3, as shown in **Table 8-5**.

Table 8-5. RDII Reduction for basins SSFMB6 and SSFMB3 at Varying Proportions of Infiltration/Inflow

SSFMB6 and SSFMB3 RDII Volume Reduced (MGD)			
Basin	GWI Basin	Inflow Basin	Inflow Heavy Basin
SSFMB6	0.075	0.071	0.061
SSFMB3	0.235	0.221	0.191
Total	**0.310**	**0.291**	**0.252**

The **UBO PWWF Results** section states that the Mission Road line upstream of the SSF discharge point is undersized by 0.3 MGD and while 0.31 MGD of RDII flow could potentially be reduced from SSFMB6 and SSFMB3 collectively, it is not the recommendation of WWE that the RDII reduction program be implemented in place of a CIP. There is substantial statistical variation associated with the RDII reduction program and it does not guarantee that the necessary volume of reduction would be achieved. However, because of the many benefits associated with reducing RDII it is recommended that the proposed RDII reduction program be implemented in coordination with one of the CIP alternatives presented **below**. Cost estimates for the RDII reduction program are provided in **Table 8-6**.

Table 8-6. RDII Reduction Program Cost Estimate

Pipe Lining					
Basin	Pipe Length for 6" Dia. (LF)	Unit Cost 6" ($/LF)	Pipe Length for 8" Diameter (LF)	Unit Cost 8" ($/LF)	Cost
SSFMB6	1,374	$90	0	$120	$123,660
SSFMB3	5,366		1,531		$666,660
Subtotal (rounded to the nearest $1,000)					$790,000
Lateral Connection Rehab					
Basin	Number of Connections*		Unit	Unit Cost	Cost
SSFMB6	26		Connection	$5,000	$130,000
SSFMB3	32		Connection	$5,000	$160,000
Subtotal (rounded to the nearest $1,000)					$290,000
SSMH Lid Seal					
Basin	Number of Manholes		Unit	Unit Cost	Cost
SSFMB6	10		Manhole	$250	$2,500
SSFMB3	32		Manhole	$250	$8,000
Subtotal (rounded to the nearest $1000)					$11,000
SSMH Structural Grout & Liner					
Basin	Number of Manholes		Unit	Unit Cost	Cost
SSFMB6	10		Manhole	$2,500	$25,000
SSFMB3	32		Manhole	$2,500	$80,000
Subtotal (rounded to the nearest $1,000)					$105,000
Total Labor Materials and Equipment					$1,196,000
30% Design and 10% Construction Contingency					$478,400
5% Administrative and 10% Construction Management					$179,400
Total Project Cost (rounded to the nearest $1,000)					**$1,854,000**
*Total number of connections for each basin were estimated based on number of buildings with considerations made to the size of each building					

9 RECOMMENDED CAPITAL IMPROVEMENT PROJECTS

As noted in **Section 7.3.2** to mitigate all surcharging of pipes and potential sanitary sewer overflows an additional 0.3 MGD of capacity is needed to convey the PWWF of the UBO scenario to the City of South San Francisco's system. The downstream capacity in the City of South San Francisco was considered when developing CIPs to address the deficiencies. The following sections cover an analysis of the available capacity in the City of South San Francisco and several CIP alternatives.

9.1 Downstream Capacity, City of South San Francisco

On behalf of the City of South San Francisco, Akel Engineering Group, Inc. (Akel Engineering) provided an analysis of SSF's system downstream of the Town's system, the complete analysis package is provided in Appendix E. The analysis package documented two potential points of discharge, as identified by WWE, shown on **Figure 9-1** and **Figure 9-2**. The potential discharge point identified as Hickey Blvd and El Camino Real on **Figure 9-1** connects to an existing 15" diameter sanitary sewer pipe. The potential discharge point identified as Mission Road and Lawndale Blvd on **Figure 9-2** connects to an existing 18" diameter sanitary sewer pipe.

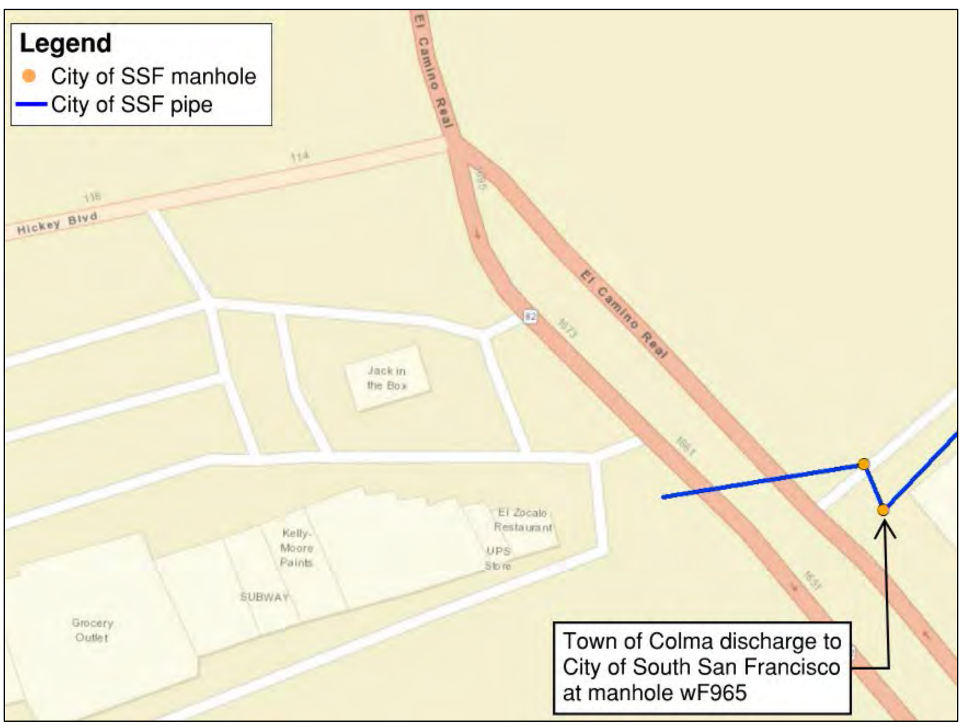


Figure 9-1. Town of Colma Potential Discharge Point to City of SSF at Hickey Blvd. and El Camino Real

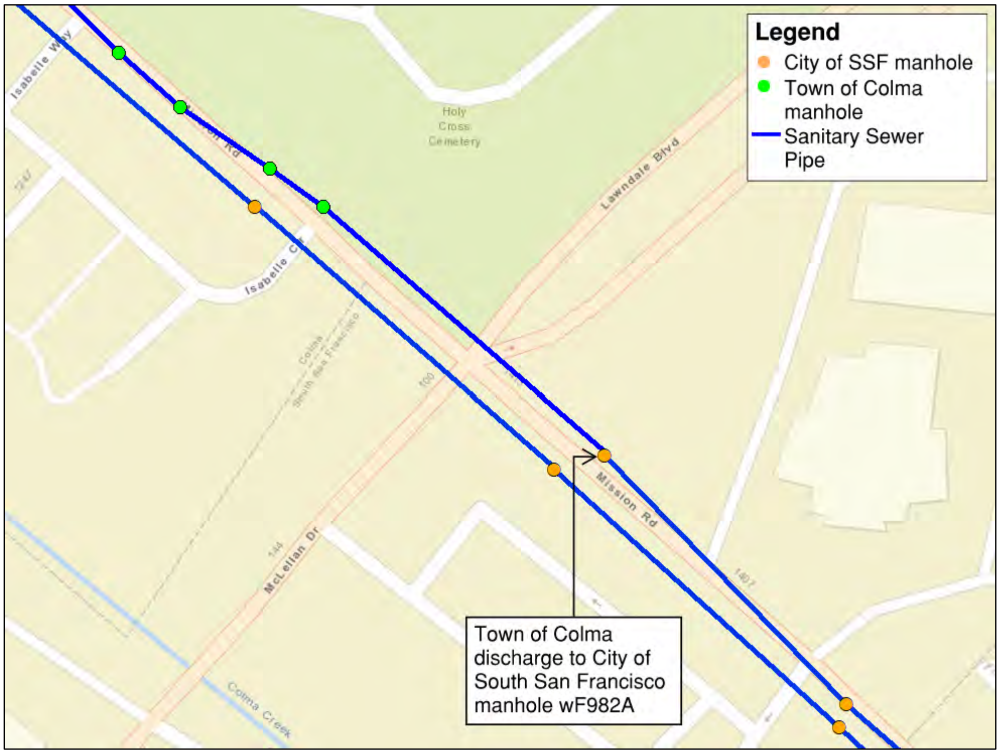


Figure 9-2. Town of Colma Potential Discharge Point to City of SSF at Mission Road and Lawndale Blvd.

Akel Engineering modeled SSF's existing PDWF and existing PWWF just downstream of both of the potential discharge points. The model results were only reflective of flows from SSF and did not include any wastewater flows from Colma or Daly City. Scenarios including potential future SSF flow projections stemming from planning developments were not modeled. The theoretical maximum allowable discharge for PDWF and PWWF was determined for the downstream pipe segments of both of the discharge points.

For PDWF, the theoretical maximum allowable discharge is the point at which the d/D in the trunk reaches 0.9, per the SSF Sanitary Sewer Master Plan (SSMP). The maximum allowable discharge for PWWF is met when the HGL is within one foot of the rim elevation, a criterion indicated by Akel Engineering. The PWWF scenario was based on a 10-yr/ 24-hr storm event (3.85 in) obtained from NOAA Atlas 14. **Table 9-1** summarizes the resultant model flows for both discharge points. Note that the remaining capacity is the difference between the theoretical maximum capacity and the discharge for the existing system. The theoretical remaining capacity is the capacity available to accept waste water flows from potential future development of SSF, flows form Daly city and flows from Colma. However, no information was provided as to how much of the capacity is designated to be used by the Town.

Table 9-1. South San Francisco model results for the potential discharge points

South San Francisco Model Results				
Modeling Scenario	Hickey & El Camino Real		Mission & Lawndale	
	Max PDWF (MGD)	Max PWWF (MGD)	Max PDWF (MGD)	Max PWWF (MGD)
Existing System*	0.432	2.736	1.044	5.652
Theoretical Maximum Capacity	0.540	3.744	3.564	8.100
Remaining Capacity	0.108	1.008	2.520	2.448
*Flows included only reflect SSF and not Colma or Daly City				

As shown in Appendix C.1 and Appendix D.1 during PDWF for the Town's Existing and UBO scenarios respectively there are no capacity deficiencies and all pipes, with the exception of the siphons, meet the SSF SSMP maximum d/D criteria. As shown in **Figure 7-2** the PWWF discharged to SSF is 1.158 MGD which is less than the remaining 2.448 MGD of capacity at the Mission and Lawndale discharge point. As discussed in the following sections the potential maximum discharge to Hickey and El Camino Real discharge point during PWWF would be 0.3 MGD which is less than the remaining 1.08 MGD of capacity. This analysis informed the CIP alternatives and was utilized to ensure that all CIP alternatives were viable options.

9.2 CIP Alternatives

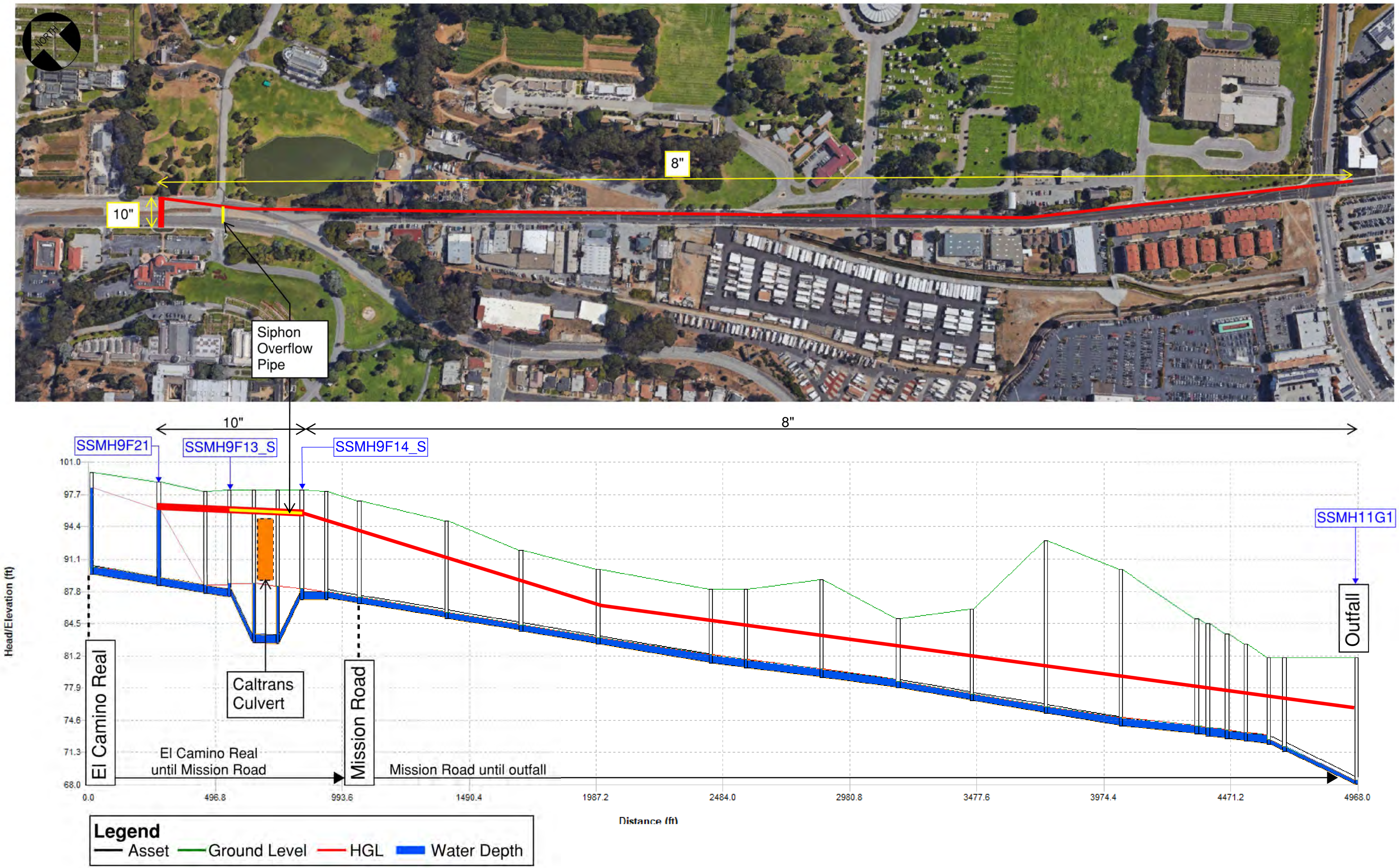
As stated **above** to eliminate all instances of surcharging on El Camino Real and Mission Road an additional 0.3 MGD of capacity is required. Several CIP alternatives were developed that would provide the additional required capacity and are described in the following subsections.

9.2.1 Alternative 1: Parallel Gravity Main Mission Road

One method to gain additional capacity and reduce the total PWWF discharge in the surcharging El Camino and Mission Road line would be to divert 0.3 MGD onto a parallel gravity main on Mission road as shown in plan and profile view in **Figure 9-3**. A high flow relief line would divert the surcharging flow during times of wet weather flow to the proposed gravity main. The gravity main would begin at manhole SSMH9F21 just upstream of a Caltrans box culvert. Spanning the box culvert the gravity main would need to be installed at a shallow depth with a flatter slope resulting in the need for a 10" diameter pipe. After the box culvert, beginning at manhole SSMH9F14_S, the gravity main could be installed at a shallower depth with a steeper slope and only an 8" diameter pipe would be required throughout the line up to the discharge point to the SSF system at manhole SSMH11G1. Additionally, a 10" overflow pipe for the Town's existing siphon shown in Figure 9-3 is recommended for inclusion in this CIP alternative. The siphon overflow pipe would be installed above the existing Caltrans box culvert (i.e. from SSMH9F13_S to SSMH9F14_S), and would provide conveyance redundancy in the event that a blockage/constriction occurs in the existing siphon piping section.

A benefit to this alternative is that construction would take place in Mission Road which is the Town's right of way. However, due to existing parallel utilities the construction corridor would be tight. Additionally, Mission Road is a heavily trafficked street and efforts to minimize traffic impacts could limit construction to night work.

Figure 9-3. Alternative 1: Parallel Gravity Main on Mission Road Plan and Profile Views



9.2.2 Alternative 2: Gravity Main El Camino Real

Similar to Alternative 1, Alternative 2 is a high flow relief line that would divert 0.3 MGD during wet weather flow but would instead be located on El Camino Real. The proposed gravity main is shown on **Figure 9-4**. The gravity main would start on Mission road at manhole SSMH9F13 located at the intersection of El Camino Real and Cypress Avenue and end at the SSF discharge point in manhole wF965 on El Camino Real near Hickey Blvd. The gravity main would need to be 10" in diameter and have an approximate 8' drop to satisfy minimum slope requirements. Because of the surface elevation at some points, the gravity main would need to be installed at a depth as great as 30', in contrast to the approximate maximum depth of 12' for Alternative 1.

The construction corridor for this alternative would be located in Caltrans right of way, making construction more difficult as it would require permitting and likely would be restricted to night-time work. Additionally, this alternative would have higher excavation costs than Alternative 1 because portions of the gravity main would need to be installed at a much greater depth.

Figure 9-4. Alternative 2: Gravity Main on El Camino Real Plan and Profile Views

9.2.3 Alternative 3A and 3B

Alternative 3A and 3B both consist of diverting the requisite 0.3 MGD of flow off of the existing 10” main on Mission Road through a lift station and 4” force main, which would be located on Mission Road and El Camino Real respectively. A list of recommended preliminary parameters for a pre-fabricated lift station follows:

- Sized for a flow rate of 0.504 MGD
- Precast wet well to have an approximate internal diameter of 6’
- Hatch and top slab of wet well to be H-20 traffic rated with a cast-in vent
- Two 5 HP submersible pumps (1 duty 1 standby), which should be explosion proof for wastewater application
- Precast valve vault assembly, which should include top slab with hatch and be H-20 traffic rated
- Level control system
- Lift station control panel

Alternative 3A: Lift Station and Force Main Mission Road

Alternative 3A, shown on **Figure 9-5**, is to be located on Mission Road and would begin near manhole SSMH9F14_S with the prefabricated lift station. A 4” force main after the lift station would be installed at a depth of 4-5 feet until manhole SSMH10F25 thereafter it would break to an 8” gravity main until the SSF discharge point at manhole SSMH11G1.

Alternative 3B: Lift Station and Force Main El Camino Real

Alternative 3B, shown on **Figure 9-6**, is to be located on El Camino Real and the lift station would begin on the intersection of El Camino Real and Cypress Avenue near manhole SSMH9F13. The 4” force main would be installed at a depth of 4-5 feet up until the high point along the alignment is reached, at which point the force main would break to a gravity main. As this alternative would be located in Caltrans right of way, recent experience with Caltrans has resulted in their requirement that all pressurized pipelines installed in Caltrans right of way need to be installed within a steel casing pipe.

The benefits and drawbacks of working on either Mission Road and El Camino Real previously stated for Alternatives 1 and 2 are also applicable to Alternatives 3A and 3B respectively. Additionally, a benefit of a force main is that the cost of construction is greatly reduced when compared to a gravity main as excavation is less costly and complex at shallower depths. A drawback however, would be the added operation and maintenance of the lift station, which would include electrical costs and any necessary cleaning or replacement of parts.

Figure 9-5. Alternative 3A: Lift Station and Force Main on Mission Road Plan and Profile Views

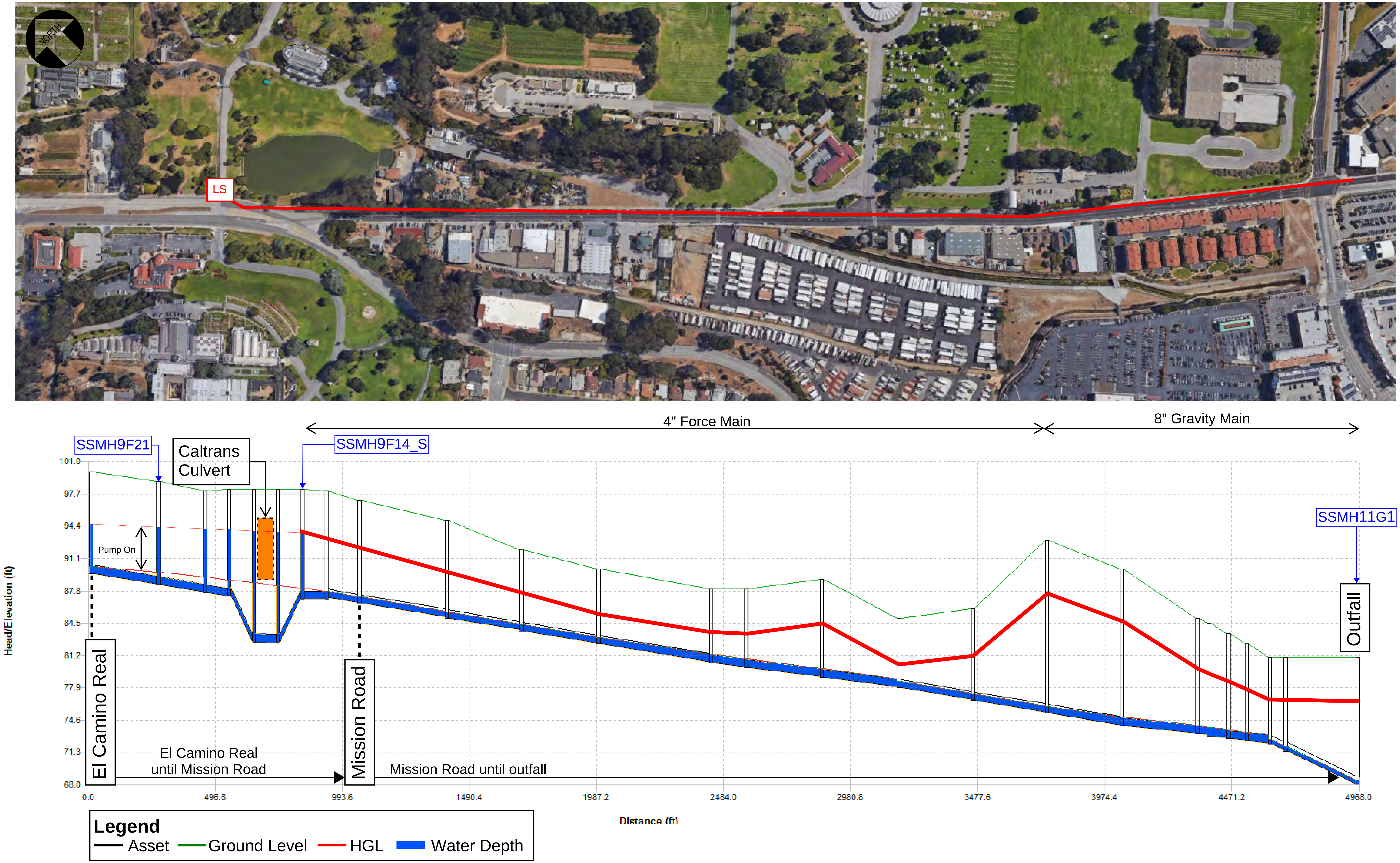


Figure 9-6. Alternative 3B: Lift Station and Force Main on El Camino Real Plan and Profile Views

9.2.4 Alternative 4: Replace-in-Place Existing Main on Mission Road

Upsizing of the existing 10” main on Mission Road to a 15” diameter pipe by the replace-in-place method would provide the needed 0.3 MGD of additional capacity. As stated for Alternatives 1 and 3A construction on Mission Road is desirable as it is in the Town’s right of way. Because the pipe would be replaced in place the tight construction corridor on Mission Road would pose less of an issue during construction when compared with Alternative 1 and 3A.

9.3 Cost Estimates for Alternatives

Cost estimates of each alternative as well as the proposed RDII reduction program, which is recommended to be implemented as a compliment to one of the CIP alternatives, are shown in **Table 9-2**.

Table 9-2. Cost estimates for CIP alternatives

Alternative	Labor, Materials, & Equipment ($)	Design/ Construction Contingencies (%)	Total Construction Cost ($)	Administrative/ Construction Management (%)	Total Project Cost Estimate ($)	Alignment Length (LF) / Min-Max Depth (VF)
1: Parallel Gravity Main Mission Road	1.15 Million	30/10	1.61 Million	5/10	**1.9 Million**	4300 / 4-12
2: Gravity Main El Camino Real	1.80 Million	30/10	2.47 Million	5/10	**3.0 Million**	3300 / 7-35
3A: Lift Station and Force Main Mission Road *	1.18 Million	30/10	1.65 Million	5/10	**1.9 Million**	4100 / 4-5
3B: Lift Station and Force Main El Camino Real *	1.18 Million	30/10	1.65 Million	5/10	**2.0 Million**	3300 / 4-5
4: Replace-in-Place Existing Main on Mission Road	1.83 Million	30/10	2.56 Million	5/10	**2.9 Million**	4100 /8-16
*Cost estimates for these alternatives do not include potential land acquisition costs for the lift station						

All CIP alternatives would eliminate instances of surcharging during the Existing and UBO PWWF scenario. It is recommended that the Town choose one of the CIP alternatives and move forward with the implementation of the CIP as soon as possible as the Existing PWWF scenario shows extensive surcharging of the pipes and manholes within 3 feet of the rim elevation. To facilitate the Town’s selection of a CIP alternative the different alternatives are ranked by estimated cost and the short-term and long-term effectiveness are shown in **Table 9-3**. The short-term effectiveness is the ability of a project alternative to address current capacity deficiencies within two years; given that the project would need to be designed, bid, and built within this time frame. Whereas the long-term effectiveness is the ability of a project alternative to address capacity deficiencies of the UBO PWWF conditions, in addition to mitigation of potential SSOs beyond the 10-yr/24-hr Type 1A storm modeled. The short-term and long-term effectiveness categories were assigned either a Low, Medium, or High ranking, which represent 25%, 50%, and 99% confidence intervals for the likelihood of a project alternative meeting the criterion stated for the two categories.

Note that the RDII reduction program is also presented in **Table 9-3** but is not included as a ranked alternative as it is not recommended that the RDII reduction program take the place of a CIP as discussed in **Section 8.1.2**.

Table 9-3. Short- and Long-Term Effectiveness of CIPs and RDII Reduction Program

Alternative	Cost ($)	Short-Term Effectiveness	Long Term Effectiveness
1: Parallel Gravity Main Mission Road	1.9 Million	High	High
3A: Lift Station and Force Main Mission Road	1.9 Million	High	Medium
3B: Lift Station and Force Main El Camino Real	2.0 Million	High	Medium
4: Replace-in-Place Existing Main Mission Road	2.9 Million	High	High
2: Gravity Main El Camino Real	3.0 Million	High	High
RDII Reduction Program	1.9 Million	Low	Medium

10 REFERENCES

U.S. Environmental Protection Agency (2014). *Guide for Estimating Infiltration and Inflow*. Retrieved from https://www3.epa.gov/region1/sso/pdfs/Guide4EstimatingInfiltrationInflow.pdf

Federation of Canadian Municipalities and National Research Council (2003) *Infiltration/Inflow Control/Reduction for Wastewater Collection Systems.* Retrieved from https://www.grandriver.ca/en/our-watershed/resources/Documents/Water_Wastewater_Optimization_InfraguideInflow.pdf

11 APPENDICES

Appendix A. Town of Colma Wastewater Collection System Hydraulic Model Report (Water Works, June 2018)

TOWN OF COLMA
AUGUST 5, 1924
CALIFORNIA

Town of Colma

WASTEWATER COLLECTION SYSTEM HYDRAULIC MODEL REPORT

FINAL PROJECT REPORT

REGISTERED PROFESSIONAL ENGINEERS
MICHAEL J. FISHER
No. C67194
Exp: 09/30/2018
CIVIL
STATE OF CALIFORNIA

Michael J. Fisher

Date: June 2018

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Drinking Water
Waste Water
Recycled Water
WATERWORKS ENGINEERS
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0 EXECUTIVE SUMMARY

The Town of Colma contracted Water Works Engineers to develop a new hydraulic model of the existing sanitary sewer system utilizing available GIS, land use, zoning, and flow monitoring data. The hydraulic model's wastewater flow loading is calibrated to the available flow monitoring data to ensure an accurate representation of the collection system to allow for a capacity analysis to identify potential capital improvement projects that shall alleviate any capacity deficiencies found.

The following scenarios are simulated within the hydraulic model:

- Existing Conditions: Average Dry Weather Flow (ADWF)
- Existing Conditions: Peak Wet Weather Flow (PWWF)
- Ultimate Buildout: ADWF
- Ultimate Buildout: PWWF

The Existing Conditions ADWF scenario contains the results of the aforementioned calibration effort, with Table 0-1 below listing the average modeled flow rates against the actual monitored flow rates at each flow meter site.

Table 0-1: Average Flow Rate Comparison by Flow Meter Site

FM Site	Manhole ID	Actual Average Flow Rate Monitored (MGD)*	Modeled Average Flow Rate (MGD)
1	10F25	0.190	0.184
2	9F61	0.033	0.032
3N	9E75	0.139	0.131
3W	9E75	0.007	0.006
4	9E04	0.031	0.032
5	7E19	0.516	0.508
6	E07-39	0.635	0.546
7	8E14	0.032	0.024
8N	8E23	0.044	0.040
8W	8E23	0.041	0.076

*These flow rate values are taken from the Town of Colma Flow Monitoring Service Report completed by Total Flow Inc. in cooperation with Water Works Engineers.

The Ultimate Buildout scenario is a theoretical development scenario based on a combination of General Plan population projections and planned improvements.

Each of the PWWF scenarios (Existing Conditions and Ultimate Buildout) include the simulation of a standard 5-year return, 24-hour duration, and 3.25-inch total precipitation storm listed in NOAA Atlas 14, Volume 6, Version 2 for the Colma region. The modeling results for both simulations are discussed below.

The Existing Conditions PWWF simulation shows no sanitary sewer overflows (SSOs), however surcharging of pipelines is modeled in multiple locations. The 10" pipeline that runs southeast along Mission Road is under capacity according to the model, with flow performance negatively impacted by a siphon structure. Also, this scenario shows that there is significant local sewer capacity in the Daly City MiniBasin, however the confluence of flows from Daly City at El Camino Real and Albert Tegla Blvd effectively block the local upstream capacity from being utilized without surcharging into the low-lying Colma manholes SSMH7E43 and SSMH7E87.

The Ultimate Buildout PWWF simulation shows no SSOs, however a number of manholes are modeled to be within 5 feet of overflowing. Surcharging of pipelines is also modeled in multiple locations. The 10" pipeline that runs southeast along Mission Road is again negatively impacted by a siphon structure, however the simulated surcharging conditions are worse when compared to the Existing Conditions PWWF scenario. Also, the same conditions are simulated for the Daly City MiniBasin as previously described for the Existing Conditions PWWF scenario.

The peak flow rates modeled at each of the flow meter sites for the Existing Conditions and Ultimate Buildout PWWF scenarios are summarized in Table 0-2 below.

Table 0-2: Peak Modeled Flow Rates by Flow Meter Site

FM Site	Manhole ID	Existing Conditions Scenarios Peak Flow Rates (MGD)		Ultimate Buildout Scenarios Peak Flow Rates (MGD)	
		No RDII	RDII	No RDII	RDII
1	10F25	0.297	0.865	0.372	0.928
2	9F61	0.048	0.158	0.053	0.162
3N	9E75	0.217	0.733	0.278	0.782
3W	9E75	0.008	0.021	0.009	0.022
4	9E04	0.045	0.059	0.054	0.067
5*	7E19	0.508	2.05	0.508	2.05
6	E07-39	0.57	2.265	0.626	2.336
7	8E14	0.063	0.08	0.068	0.086
8N	8E23	0.1	0.231	0.109	0.233
8W	8E23	0.104	0.469	0.129	0.493

*Flow Meter Site 5 was installed to measure flows from Daly City. Because Daly City's sewer collection system is not included in the hydraulic model, no assumptions about future growth were made. This results in the same peak flow rates between the Existing Conditions and Ultimate Buildout scenarios.

The peaking factors by sewer basin are presented in Table 0-3 below. The sewer basins are listed in descending order according to the ADWF to PWWF peaking factor. This ranked list of highest to lowest "peaking conditions" could be utilized to represent those basins that are candidates for additional analysis, identification of defects, and potential capital improvements to mitigate the defects.

Table 0-3: Sewer Basins Ranked by Peaking Factor (ADWF to PWWF)

Basin	Existing Conditions Scenario Peaking Factors		Ultimate Buildout Scenario Peaking Factors	
	ADWF to PDWF	ADWF to PWWF	ADWF to PDWF	ADWF to PWWF
SSFMB3	1.55	7.00	1.77	6.75
SSFMB1B	2.50	5.78	2.48	5.30
SSFMB6	1.45	4.79	1.47	4.50
SSFMB4A	1.36	4.58	1.57	4.42
SSFMB5	1.27	3.70	1.37	3.42
DCMB	1.02	3.52	1.64	3.97
SSFMB4B	1.33	3.50	1.29	3.14
SSFMB1A	2.74	3.48	2.72	3.44
SSFMB2	1.41	1.84	1.13	1.40

The Existing PWWF Scaled 1.3x scenario is a model simulation where the 5yr/24hr design storm is uniformly scaled up to increase modeled rain-derived infiltration and inflow (RDII). A sensitivity analysis was performed, which found that the first SSO was encountered when the storm RDII response was scaled up to an approximate 10yr/24hr storm event (i.e. 3.25" increased to 3.85" total rainfall). The Mission Road 10" pipeline again sees worse surcharging conditions when compared to both of the aforementioned model scenarios, with manhole 9F20 coming within 1 foot of an SSO. Also, the same conditions are simulated for the Daly City MiniBasin as previously described for the Existing Conditions and Ultimate Buildout PWWF scenarios.

It is recommended that the Town of Colma move forward with the development of a Capital Improvement Project (CIP) Plan and an overall System Evaluation and Capacity Assurance Plan (SECAP). The CIP Plan aims to alleviate each identified hydraulic deficiency found in the modelling results, and would be included as a part of the overall SECAP. Another goal of the SECAP is to provide the Town of Colma with proper guidance on how to prepare and plan for future developments that impact the Town's ability to ensure system capacity for customers.

1 INTRODUCTION

1.1 Project Background

Water Works Engineers, LLC (WWE) is under contract with the Town of Colma (Town) to prepare a new hydraulic model of the existing sanitary sewer system to determine the capacity of the system under various development scenarios and identify potential improvements.

1.2 Description of Service Area

The Town is a small municipality located between Daly City and City of South San Francisco (Cities) that owns and operates a sanitary sewer collection system encompassing a service area of 1152 acres. Unique among municipalities, most of land usage in Colma is for local cemeteries and mortuaries, which contribute relatively little to no major sewer flows.

1.3 Physical Model Development

A new GIS-based sewer network was developed for the hydraulic model based off available as-builts, CAD data, and satellite imagery. In some instances, missing or inaccurate data attributes such as manhole rim elevations, pipe inverts, and pipe diameters were interpolated and modified to ensure accurate system representation within the hydraulic model. For instance, some manhole rim elevations were verified against San Mateo County elevation data and satellite imagery. Another example of a common modification was interpolating the slope of a pipe segment based on upstream and downstream pipe segments or listing it under a minimum slope given the line size.

Multiple figures that show the layout of the system with manhole identification numbers can be found in Appendix A.

1.4 Development Scenarios

Land Use Information

The Town zoning map in Figure 1 below was used as the basis for delineating the land use (LU) of each parcel which was inclusive of Residential, Commercial, Cemetery, and Other (i.e., open space) land use types. The total acres by LU type are presented in Table 1-1 below.

Table 1-1: Land Usage in Colma

Acres by LU type				
RESIDENTIAL	OTHER	CEMETERY	COMMERCIAL	TOTAL
37	36	930	142	1145

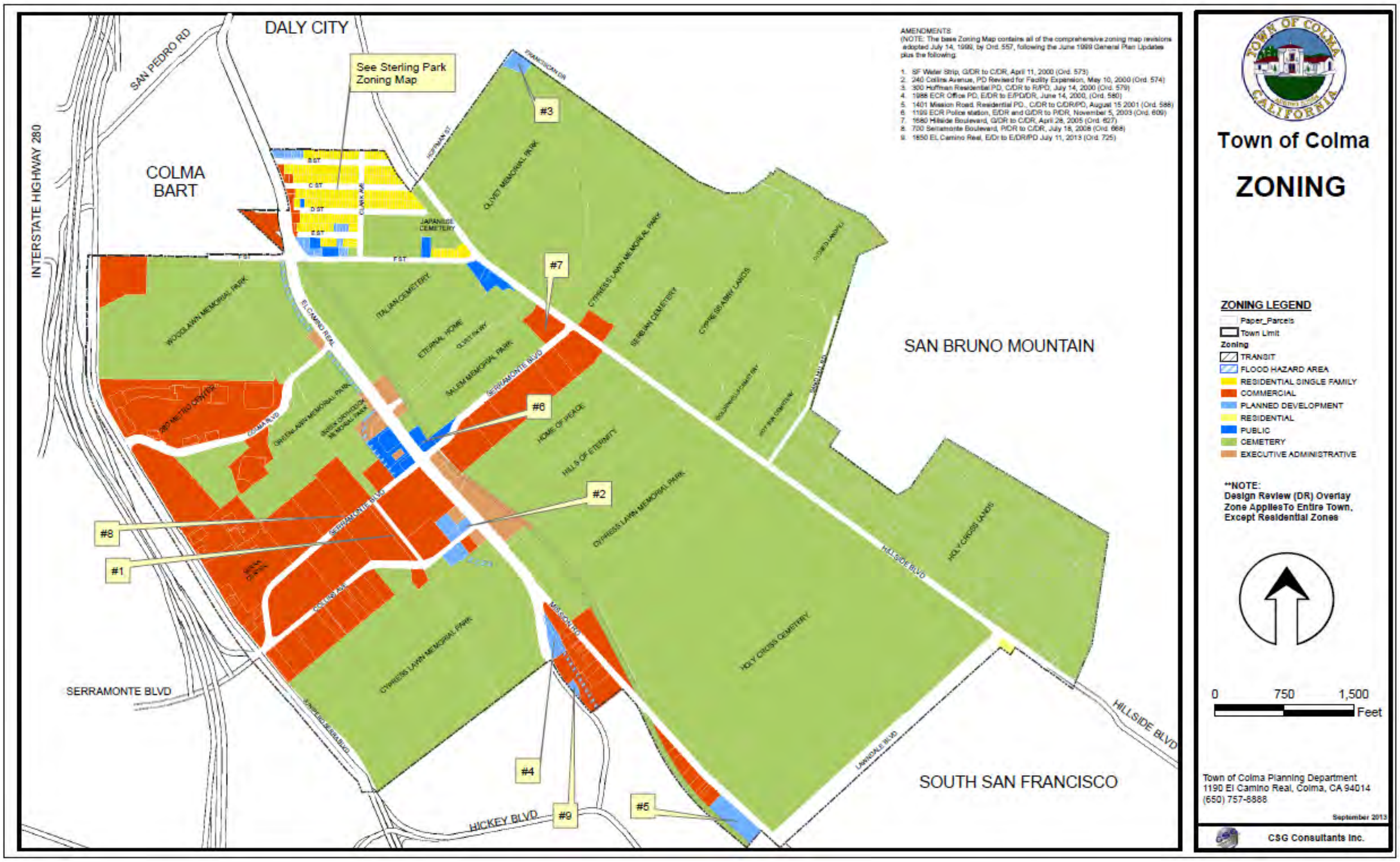


Figure 1: Town of Colma Zoning Map (Accessed June 2017)

Existing Scenario

The existing development scenario is based on current date zoning and land use data, and is intended to closely match existing conditions.

Ultimate Buildout Scenario

The ultimate buildout scenario is a theoretical development scenario based on a combination of General Plan (GP) population projections (roughly 10% after accounting for residential developments) and planned improvements.

Household Size: Increased from 3.05 to 3.355 for 10% population increase.

Commercial Utilization: The wastewater generation rates (flow per acre) were increased by 10% from calibrated existing values to represent increased commercial utilization. This is presented in more detail below.

Planned Developments: Planned developments listed in updated planning documents were modeled in the UBO scenario, and are listed below:

- <u>Potential Housing Developments *(adapted from General Plan)*</u>

Table H-44: Sterling Park Single Family Detached Development Potential

APN	Location	Designation & Zone	Acres	Dev. Pot.	Density Allowed	Constraints
008-126-100	C Street (southside)	Residential (R)	0.1	2	13 units/ acre	None, infra-structure capacity exists
008-126-040	B Street (southside)	Residential (R)	0.7	9		
008-125-180	B Street (northside)	Residential (R)	0.11	1		
Total			***0.91***	***12 units***		

Table H-45: El Camino Real Parcels Multi-Family Development Potential

APN	Location	Designation & Zone	Acres	Dev. Pot.	Density Allowed	Constraints
008-127-020 (Sandblaster)	El Camino Real	Residential/ Commercial (Mixed Use) - (R/C)	0.53	13	30 units/acre	Topography, possible ground surface contamination
008-141-080 (Bocci)	El Camino Real	Commercial (Mixed-Use) - (C)	0.6	24	30 units/acre	Utility Easement, Triangular Shape
Total			***1.13 ac***	***37 units***		

- Other listed Planned Developments (note, some of these projects have been built, and were included in the existing scenario, while others are assumed to develop in the UBO scenario) *(Adapted from zoning map)*

AMENDMENTS
(NOTE: The base Zoning Map contains all of the comprehensive zoning map revisions adopted July 14, 1999, by Ord. 557, following the June 1999 General Plan Updates plus the following:

1. SF Water Strip, G/DR to C/DR, April 11, 2000 (Ord. 573)
2. 240 Collins Avenue, PD Revised for Facility Expansion, May 10, 2000 (Ord. 574)
3. 300 Hoffman Residential PD, C/DR to R/PD, July 14, 2000 (Ord. 579)
4. 1988 ECR Office PD, E/DR to E/PD/DR, June 14, 2000, (Ord. 580)
5. 1401 Mission Road. Residential PD., C/DR to C/DR/PD, August 15 2001 (Ord. 588)
6. 1199 ECR Police station, E/DR and G/DR to P/DR, November 5, 2003 (Ord. 609)
7. 1680 Hillside Boulevard, G/DR to C/DR, April 28, 2005 (Ord. 627)
8. 700 Serramonte Boulevard, P/DR to C/DR, July 18, 2008 (Ord. 668)
9. 1850 EL Camino Real, E/Dr to E/DR/PD July 11, 2013 (Ord. 725)

Ultimate Buildout Changes to Wastewater Generation Rates (WWGR)

#1) SF Water Strip (no change made)
#2) 240 Collins Ave (police station WWGR increased from 3960gpd to 7920gpd)
#3) 300 Hoffman Residential (already included in model for Existing Scenario; this parcel does not contribute to Colma sewer system)
#4) 1988 ECR Office PD (WWGR increased from 1500gpd to 3960gpd)
#5) 1401 Mission Rd Residential (already included in model for Existing Scenario)
#6) 119 ECR Police Station (WWGR increased from 1450gpd to 3960gpd)
#7) 1680 Hillside Blvd (WWGR increased from 1450gpd to 3960gpd)
#8) 700 Serramonte Blvd (WWGR increased from 675gpd to 3960gpd)
#9) 1850 El Camino Real (WWGR increased from 1500gpd to 3960gpd)
#10) APN 008127020 changed from 1 home to 13 homes per Town GP
#11) APN 008141080 changed from commercial to residential with 24 homes per Town GP
#12) APN 008126100 changed from 1 home to 2 homes per Town GP
#13) APN 008126040 changed from 1 home to 9 homes per Town GP

2 HYDRAULIC MODEL DEVELOPMENT

The hydraulic model is based off the newly formed GIS sewer network and was simulated via the Innovyze InfoSewer software plugin which is a quasi-dynamic modeling package that simulates peak wet weather flow in 15-minute increments. The development of the model depends on flow meter and rainfall data, calibrated dry and wet weather flows, and a chosen design storm. This methodology is explained below.

2.1 Flow Meter Data

The Town obtained the services of Total Flow Inc. for the rental, installation, procurement, and analysis of temporary flow meter data across January and February 2017. The results and monitoring methodology are presented in the Town of Colma Flow Monitoring Services Report completed by Total Flow Inc. in collaboration with WWE. The flow monitoring data was used to calibrate dry and wet weather flow by sewer basin and is explained in depth in proceeding sections.

2.2 System Configuration

The Town sanitary sewer system can be characterized as including ten identifiable sewer basins, which correspond with the flow meter locations utilized by Total Flow Inc. during monitoring in early 2017. The approximate acreage of each basin in acres is displayed in **Table 2-1** below.

Table 2-1: Basin Acreages

Basin	Total Acres
DCMB	408
SSFMB1A	138
SSFMB1B	14
SSFMB2	60

SSFMB3	59
SSFMB4A	15
SSFMB4B	8
SSFMB5	424
SSFMB6	9
SSFMB7	10
Total	1145

2.3 Dry Weather Flow Development

Average Dry Weather Flow

Average dry weather flow (ADWF) is the primary component of a hydraulic model and can be characterized as the diurnal or daily wastewater flow from a parcel that is not influenced by groundwater level changes or rainfall effects. Typical Colma minimum flows occur approximately at 4AM, with peak flows approximately occurring at 3PM. This corresponds with Peak Dry Weather Flow (PDWF), which is determined by multiplying the ADWF by an hourly peaking factor (PF). Theoretical ADWF is calculated from each parcel based on land use/population/density and wastewater generation rates, and is then calibrated to observed flow meter data.

Wastewater Generation Rates & Calibration

The methodology of estimating wastewater generations rates (the basis for theoretical ADWF) was an iterative approach that was calibrated to observed flow meter data ADWF.

Table 2-2: Wastewater Gen Rate (residential)

Residential			
Basin	EXST Flow (gpd/unit)	UBO Flow (gpd/unit)	Unit
DCMB	65	Same as Existing	Person
SSFMB1A	55		
SSFMB1B	55		
SSFMB2	55		
SSFMB3	55		
SSFMB4A	60		
SSFMB4B	55		
SSFMB5	60		
SSFMB6	60		
SSFMB7	55		

Table 2-3: Wastewater Generation Rates (non-residential)

Non-Residential				
Land Use Type	Basin	EXST Flow (gpd/unit)	UBO* Flow (gpd/unit)	Unit
CEMETERY/MORTUARY	All Basins	480	480	Building
COMMERCIAL	DCMB	1500	1650	Acre
	SSFMB1A	1050	1155	
	SSFMB1B	3300	3630	
	SSFMB2	1450	1595	
	SSFMB3	675	743	
	SSFMB4A	3600	3960	
	SSFMB4B	1250	1375	
	SSFMB5	1500	1650	
	SSFMB6	1500	1650	
	SSFMB7	1500	1650	

*UBO commercial wastewater generation rates were increased by 10%

Diurnal Patterns

The diurnal patterns applied to ADWF to calculate PDWF were obtained for each flow meter site and are displayed graphically in Figure 2.

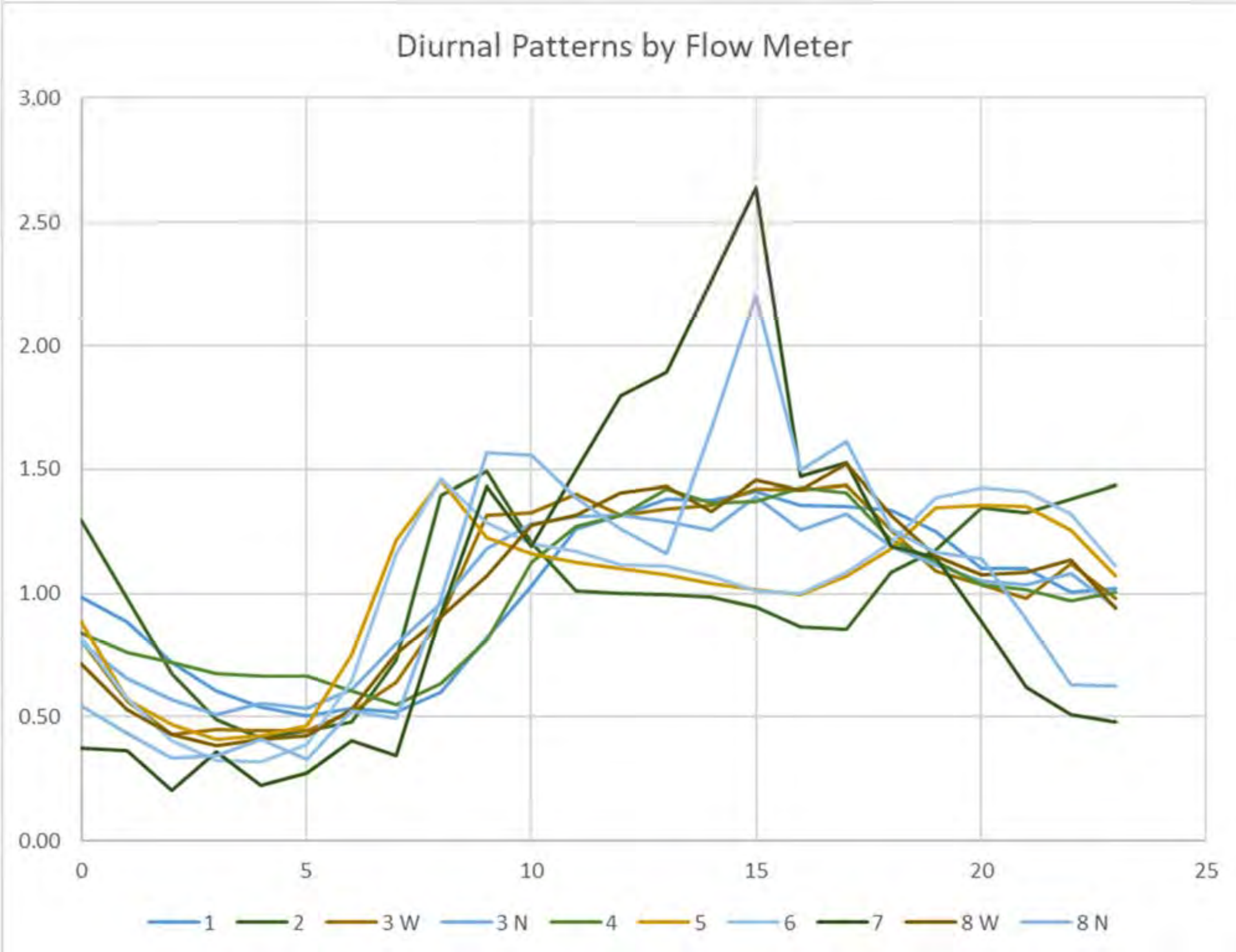


Figure 2: Diurnal Patterns by Flow Meter

2.4 Wet Weather Flow Development

The hydraulic model simulates Peak Wet Weather Flow (PWWF) given a particular design storm hyetograph (rainfall over time) and a calibrated theoretical system response to that rainfall. PWWF is made up of PDWF and Rain Derived Inflow and Infiltration (RDII). This is graphically displayed in Figure 3 below.

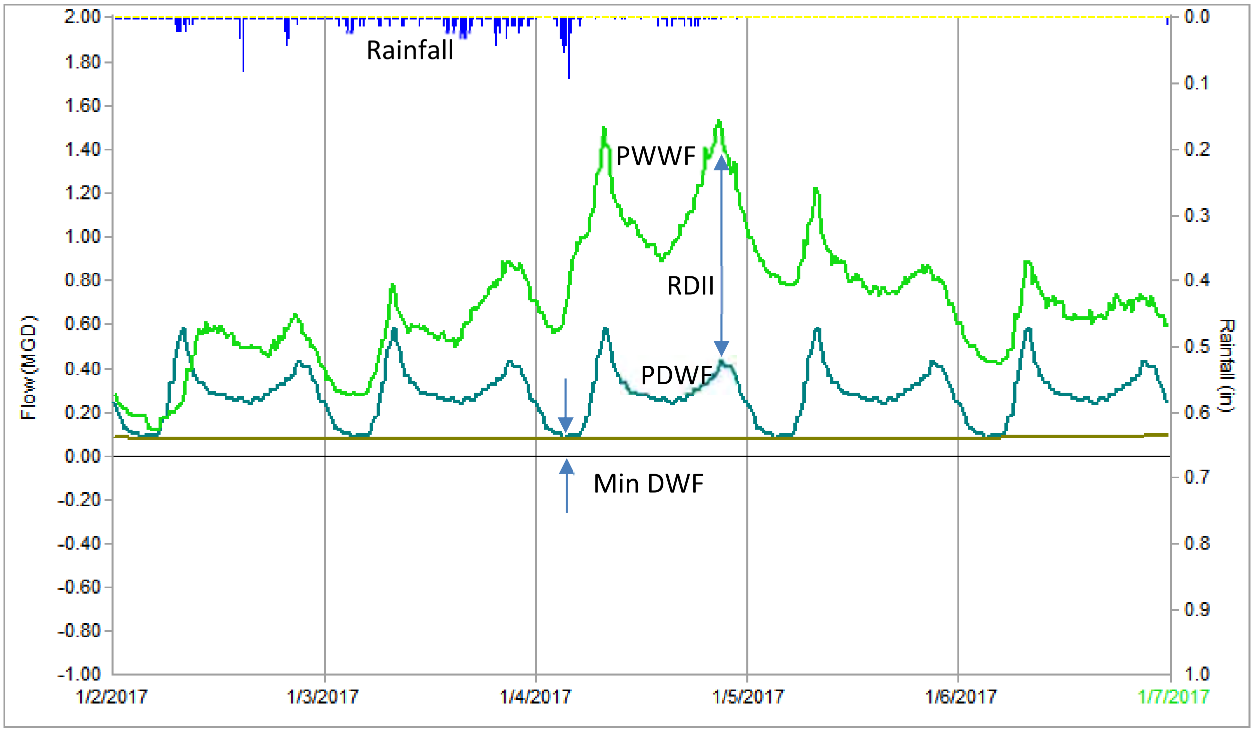


Figure 3: PWWF, PDWF, and RDII

2.5 Rain Derived Inflow and Infiltration

Rainfall Dependent Infiltration and Inflow (RDII) is rainfall runoff that enters a closed sewer collection system through manhole/pipe defects, manhole lids and clean-outs and is visually represented in Figure 4. The relative magnitude of the RDII is often correlated with the age of the collection system. High intensity inflows typically dissipate soon after rainfall stops as opposed to low intensity groundwater infiltration that can stay at elevated levels for many days after a storm, as evident in a sample hydrograph displayed in Figure 3.

The design storm used for the PWWF analysis occurred in late February 2017, in the middle of a notable wet winter for California. As such, it was assumed that antecedent moisture conditions were very high before and after the storm, which conservatively affects the hydraulic model by maximizing RDII responsiveness and peak flow. In comparison, a storm earlier in the winter season might have had low antecedent moisture conditions and a higher soil capacity that could attenuate any RDII response.

RDII was applied in the hydraulic model by calculating the average for each basin and then applying it equally across each basin manhole.

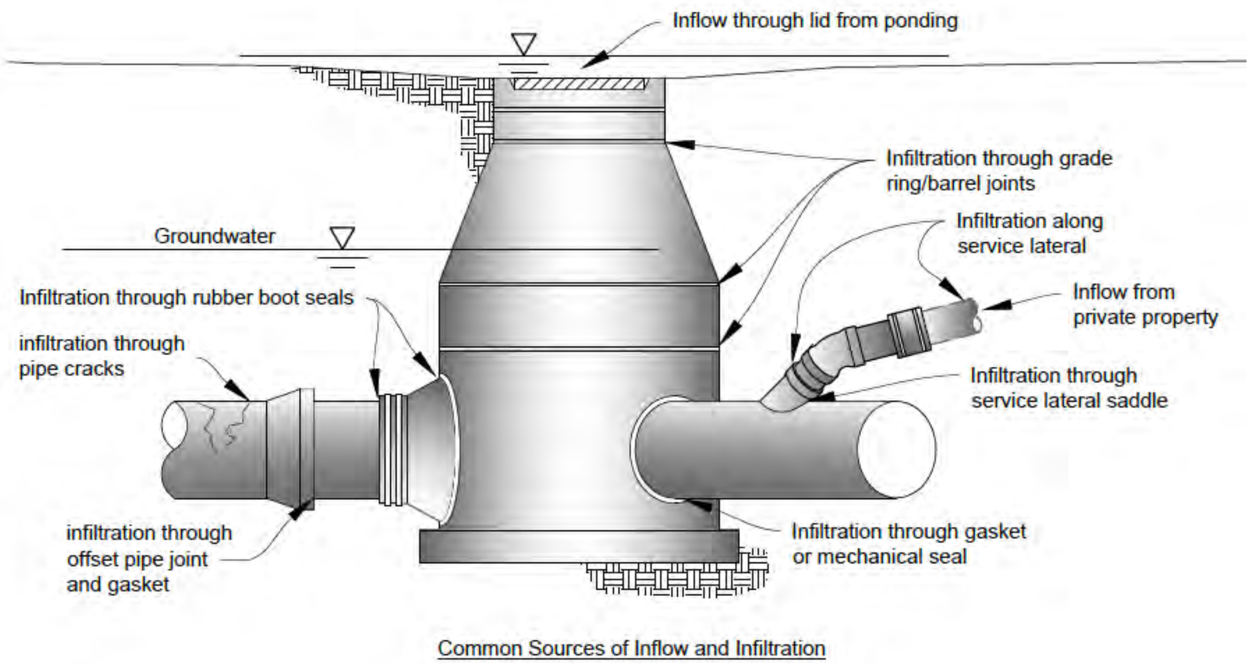


Figure 4: Common Sources of I&I

2.6 Rainfall & Design Storm Hyetograph

The rainfall data used to develop the hydraulic model RDII response was in 5-minute increments from a temporary weather station located at the Town Hall. The single high-resolution rain gauge was applied equally across the City basins for calibration purposes. The largest storm during the monitoring period was on February 20th, totaling 1.61”, and was used as the sole design storm benchmark for calibrating the wet weather flow model.

The three main components of a design storm are the total depth, duration, and probabilistic return period or frequency of that storm. This study incorporated a standard 5-year return, 24-hr duration, and 3.25-in total precipitation storm listed in NOAA Atlas 14, Volume 6, Version 2 for the Colma region. The temporal distribution of the storm was developed via the NRCS SCS Type 1 rainfall distribution method in which the Colma region falls. This is displayed in Figure 5 below and the resultant hyetograph is displayed in Figure 6.

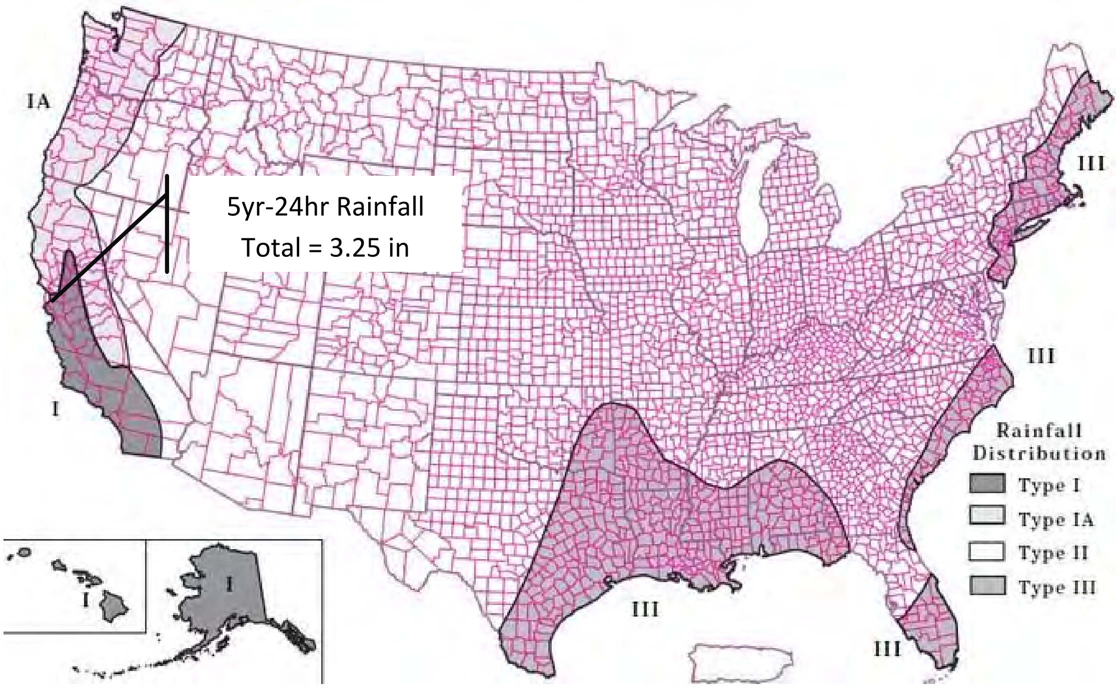


Figure 5: NRCS SCS Rainfall Patterns

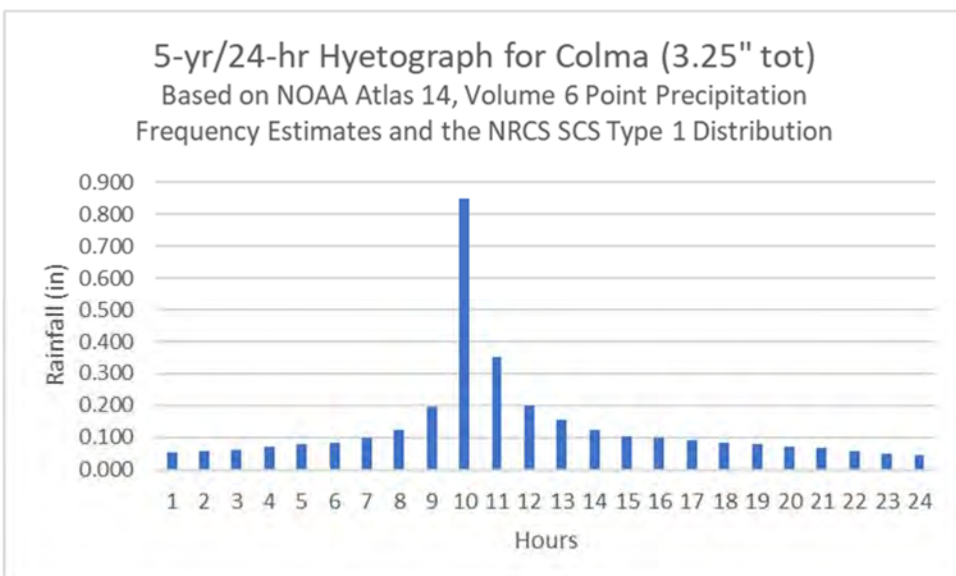


Figure 6: Colma 5-yr/24-hr Hyetograph

2.7 RDII Synthetic Unit Hydrograph Development

The rainfall, flowmeter, and system data along with the chosen 5-yr/24-hr design storm hyetograph was inputted into the EPA's Sanitary Sewer Overflow Analysis and Planning (SSOAP) Toolbox software. Within the software, FM basin specific 5-yr/24-hr theoretical unit RDII hydrographs were produced (i.e., theoretical RDII response curves). The process is based on modifying specific triangular unit hydrographs parameters (R, T, and K values) to best fit the observed storm response during. The R value, or fraction of rainfall volume that is estimated to enter the sewer system as RDII depends on the actual area that contributes RDII (i.e., an area that conceivably drains towards manholes). To that end, the RDII contributing areas of the large cemetery parcels were reduced significantly given the existing site conditions and distance to local sewer. The results of the SSOAP analysis are shown below in Table 2-4.

Table 2-4: SSOAP Existing 5yr-24hr RDII results

Basin	RDII Acres	In*dia*mi	Pk RDII (MGD)	Pk RDII / In*dia*mi (gpd/in*dia*mi)
SSFMB6	8.9	1.56	0.1256	80,513
SSFMB1B	22	2.35	0.1492	63,489
SSFMB3	75	8.37	0.2589	30,932
DCMB	200	14.68	0.165	11,240
SSFMB4B	12.35	1.41	0.0131	9,291
SSFMB1A	72.4	7.72	0.0353	4,573
SSFMB4A	17.1	2.94	0.0136	4,626
SSFMB2	71.7	5.24	0.0185	3,531
SSFMB5	189	10.93	0.0297	2,717

A sample theoretical RDII hydrograph for Flowmeter #5 given a 5yr/24hr storm is displayed in Figure 7 below.

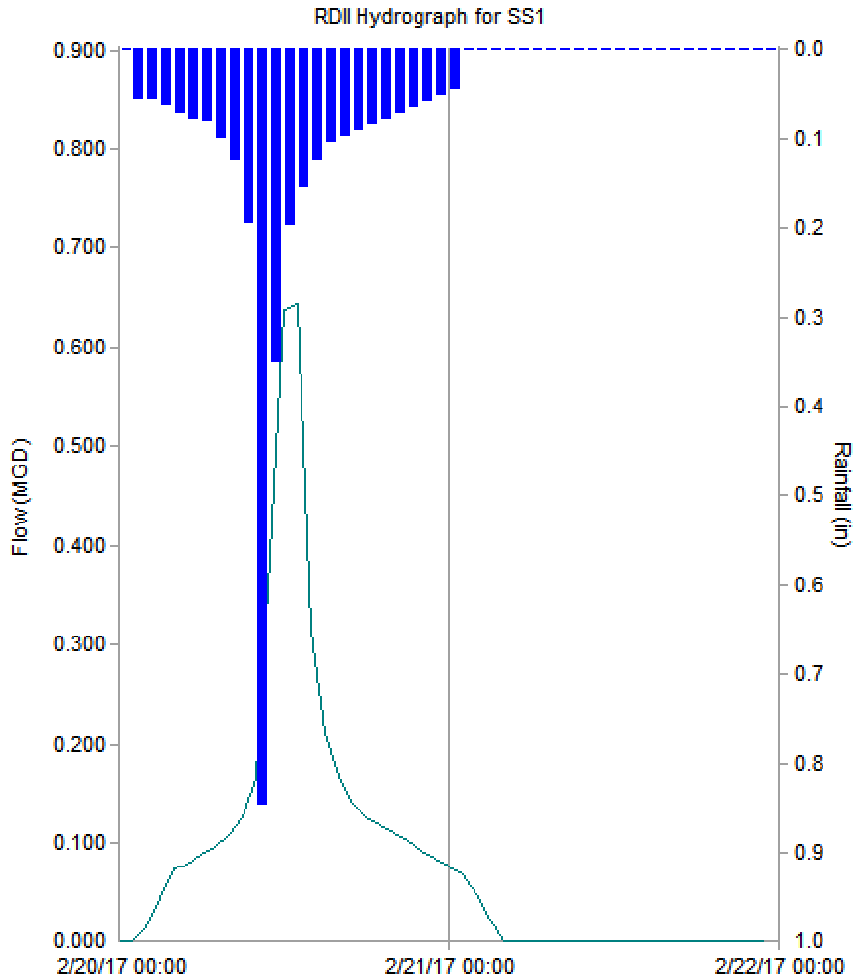


Figure 7: Sample RDII Hydrograph

3 HYDRAULIC MODEL RESULTS

The InfoSewer ADWF and PWWF hydraulic model results are presented below for the existing scenario and UBO scenario. In addition, a sensitivity analysis or "stress" test was conducted where the 5-yr/24-hr RDII response was uniformly scaled up until a sanitary sewer overflow (SSO) was observed in the system.

The peak flow rates modeled at each of the flow meter sites for the Existing Conditions and Ultimate Buildout scenarios are summarized in **Table 3-1** below.

Table 3-1: Peak Flow Rates by Flow Meter Site

FM Site	Manhole ID	Existing Conditions Scenarios Peak Flow Rates (MGD)		Ultimate Buildout Scenarios Peak Flow Rates (MGD)	
		No RDII	RDII	No RDII	RDII
1	10F25	0.297	0.865	0.372	0.928
2	9F61	0.048	0.158	0.053	0.162
3N	9E75	0.217	0.733	0.278	0.782
3W	9E75	0.008	0.021	0.009	0.022
4	9E04	0.045	0.059	0.054	0.067
5*	7E19	0.508	2.05	0.508	2.05
6	E07-39	0.57	2.265	0.626	2.336
7	8E14	0.063	0.08	0.068	0.086
8N	8E23	0.1	0.231	0.109	0.233
8W	8E23	0.104	0.469	0.129	0.493

*Flow Meter Site 5 was installed to measure flows from Daly City. Because Daly City's sewer collection system is not included in the hydraulic model, no assumptions about future growth were made. This results in the same peak flow rates between the Existing Conditions and Ultimate Buildout scenarios.

3.1 Existing System Results

The results of the 5yr/24hr PWWF Existing Conditions simulation did not produce any SSOs. Surcharging was modeled, however, in several locations. The main result to highlight is that the 10" mainline that runs southeast along Mission Road is under capacity. See Appendix B for a figure that contains the "Existing PWWF Scenario" results for depth to diameter (d/D) pipe ratios and manhole unfilled depth (i.e. how close a particular manhole is to producing an SSO) for the entire collection system.

Mission Road

Surcharging (d/D > 1)

Approx. Capacity = 0.8 – 1.0 mgd

Approx. Max Modeled Flow = 0.85 mgd

Discussion: flow performance is negatively impacted by a siphon structure which is utilized to provide sufficient vertical clearance from an overhead storm drain. The siphon flows full and effectively creates a submerged/pressure condition and increases total dynamic head which subsequently raises the upstream hydraulic grade line (HGL). See Appendix C for a figure that contains the Mission Road pipe profile at the time of peak "stress" on the line resulting from the Existing PWWF scenario.

DCMB

There is significant local sewer capacity in DCMB (e.g., main line along F St and Hillside Blvd) but the confluence of flows from Daly City at El Camino Real and Albert Tegla Blvd, effectively block the local upstream capacity from being utilized without surcharging into the low-lying Colma manhole on F street.

3.2 Ultimate Buildout Results

The results of the 5yr/24hr PWWF UBO simulation did not produce any SSOs, but a portion of the system manholes are within 5 feet of the overflowing. Surcharging was modeled in several locations. This simulation is a theoretical, "what-if" scenario, and is a useful way to highlight areas with long-term, systemic issues. See Appendix D for a figure that contains the "Ultimate Buildout PWWF Scenario" results for d/D pipe ratios and manhole unfilled depth (i.e. how close a particular manhole is to producing an SSO) for the entire collection system.

Mission Road

Surcharging (d/D > 1)

Approx. Capacity = 0.8 – 1.0 mgd

Approx. Max Modeled Flow = 0.92 mgd

Discussion: flow performance is once again negatively impacted by a siphon structure which is utilized to provide sufficient vertical clearance from an overhead storm drain. The siphon flows full and effectively creates a submerged/pressure condition and increases total dynamic head which subsequently raises the upstream hydraulic grade line (HGL). However, the Mission Road line is observed to have worse surcharging conditions when compared to the Existing PWWF Scenario. See Appendix E for a figure that contains the Mission Road pipe profile at the time of peak "stress" on the line resulting from the Ultimate Buildout PWWF scenario.

DCMB

There is significant local sewer capacity in DCMB (e.g., main line along F St and Hillside Blvd) but the confluence of flows from Daly City at El Camino Real and Albert Tegla Blvd, effectively block the local upstream capacity from being utilized without surcharging into the low-lying Colma manhole on F street.

3.3 Sensitivity Analysis Results

The sensitivity analysis conducted on the 5yr/24hr Existing Conditions hydraulic model is a method to uniformly scale up the 5yr/24hr storm and subsequently increase modeled RDII. Based on the sensitivity analysis, the first SSO was encountered when the storm RDII response was scaled up to an approximate 10yr-24hr storm event (3.25” increased to 3.85” total rainfall). This can be seen in Appendix F, a figure that contains the “Existing PWWF Scaled 1.3x Scenario” results for d/D pipe ratios and manhole unfilled depth (i.e. how close a particular manhole is to producing an SSO) for the entire collection system.

Mission Road

The Mission Road line once again sees worse surcharging conditions when compared to both of the aforementioned model scenarios. In particular, the Mission Road line comes within 1 foot of an SSO at MH 9F20. See Appendix G for a figure that contains the Mission Road pipe profile at the time of peak “stress” on the line resulting from the Existing PWWF Scaled 1.3x scenario.

DCMB

There is significant local sewer capacity in DCMB (e.g., main line along F St and Hillside Blvd) but the confluence of flows from Daly City at El Camino Real and Albert Tegla Blvd, effectively block the local upstream capacity from being utilized without surcharging into the low-lying Colma manhole on F street.

3.4 Resultant Peaking Factors

The peaking factors observed from the various model scenario results can be seen in **Table 3-2** below. Peaking factors are presented for each sewer basin in the following fashion:

- Peaking Factor for ADWF to PDWF (both Existing and UBO)
- Peaking Factor for ADWF to PWWF (both Existing and UBO)

Table 3-2: Peaking Factors by Sewer Basin

Basin	Existing Conditions Scenario Peaking Factors		Ultimate Buildout Scenario Peaking Factors	
	ADWF to PDWF	ADWF to PWWF	ADWF to PDWF	ADWF to PWWF
SSFMB5	1.27	3.70	1.37	3.42
SSFMB6	1.45	4.79	1.47	4.50
SSFMB4A	1.36	4.58	1.57	4.42
SSFMB4B	1.33	3.50	1.29	3.14
SSFMB2	1.41	1.84	1.13	1.40
DCMB	1.02	3.52	1.64	3.97
SSFMB1A	2.74	3.48	2.72	3.44
SSFMB1B	2.50	5.78	2.48	5.30
SSFMB3	1.55	7.00	1.77	6.75

3.5 Siphon Analysis

Table 3-3 below presents the modeled velocities for the two existing siphons in Colma's collection system.

Table 3-3: Siphon Velocities

			Siphon @ El Camino Real & Collins	Siphon @ Mission & Cypress
Down Pipe	ADWF	Min Velocity (fps)	2.15	3.89
		Max Velocity (fps)	2.86	5.76
	PWWF	Max velocity (fps)	3.12	7.85
Flat Pipe	ADWF	Min Velocity (fps)	0.58	0.89
		Max Velocity (fps)	0.77	1.25
	PWWF	Max velocity (fps)	0.83	2.39
Up Pipe	ADWF	Min Velocity (fps)	0.06	0.22
		Max Velocity (fps)	0.16	0.82
	PWWF	Max velocity (fps)	0.21	2.40

4 NEXT STEPS

4.1 Capital Improvement Projects (CIPs)

It is recommended that the Town move forward with the development of Capital Improvement Projects (CIPs) aimed at alleviating each of the identified hydraulic capacity deficiencies found in the modelling results. The development of each CIP is assumed to include the completion of the following tasks:

- Identify the hydraulic capacity deficiency that the CIP will address.
- Develop and describe the mitigation improvement. Examples include:
  - New pipeline alignment
  - Upsizing of existing pipeline(s)
  - Pump Station
  - Basin flow transfer(s)
- Utilize the newly developed hydraulic model to simulate the new CIP's effect on the collection system for each pertinent scenario. Confirm the new CIP resolves the identified deficiency.
- Determine "trigger points" for the CIP based on flow and/or growth parameters.
- Develop recommendations for approximate construction timeframes for the CIP.
- Develop appropriate figures and conceptual level cost estimates that depict the recommended CIP and the "trigger points" associated with growth parameters.
- Prioritize the developed CIPs to address the existing collection system deficiencies.

The CIP Plan would then be included in an overall System Evaluation and Capacity Assurance Plan (SECAP or Master Plan), which is described in more detail in the next section of this report.

4.2 System Evaluation and Capacity Assurance Plan (SECAP or Master Plan)

It is recommended that the Town also move forward with the development of a SECAP that is aimed at preventing sanitary sewer overflows by identifying collection system hydraulic deficiencies and developing and implementing CIPs to mitigate those deficiencies. Another goal of the SECAP is to provide the Town with proper guidance on how to prepare and plan for future developments that impact the Town's ability to ensure system capacity for customers.

The SECAP is assumed to include the following items:

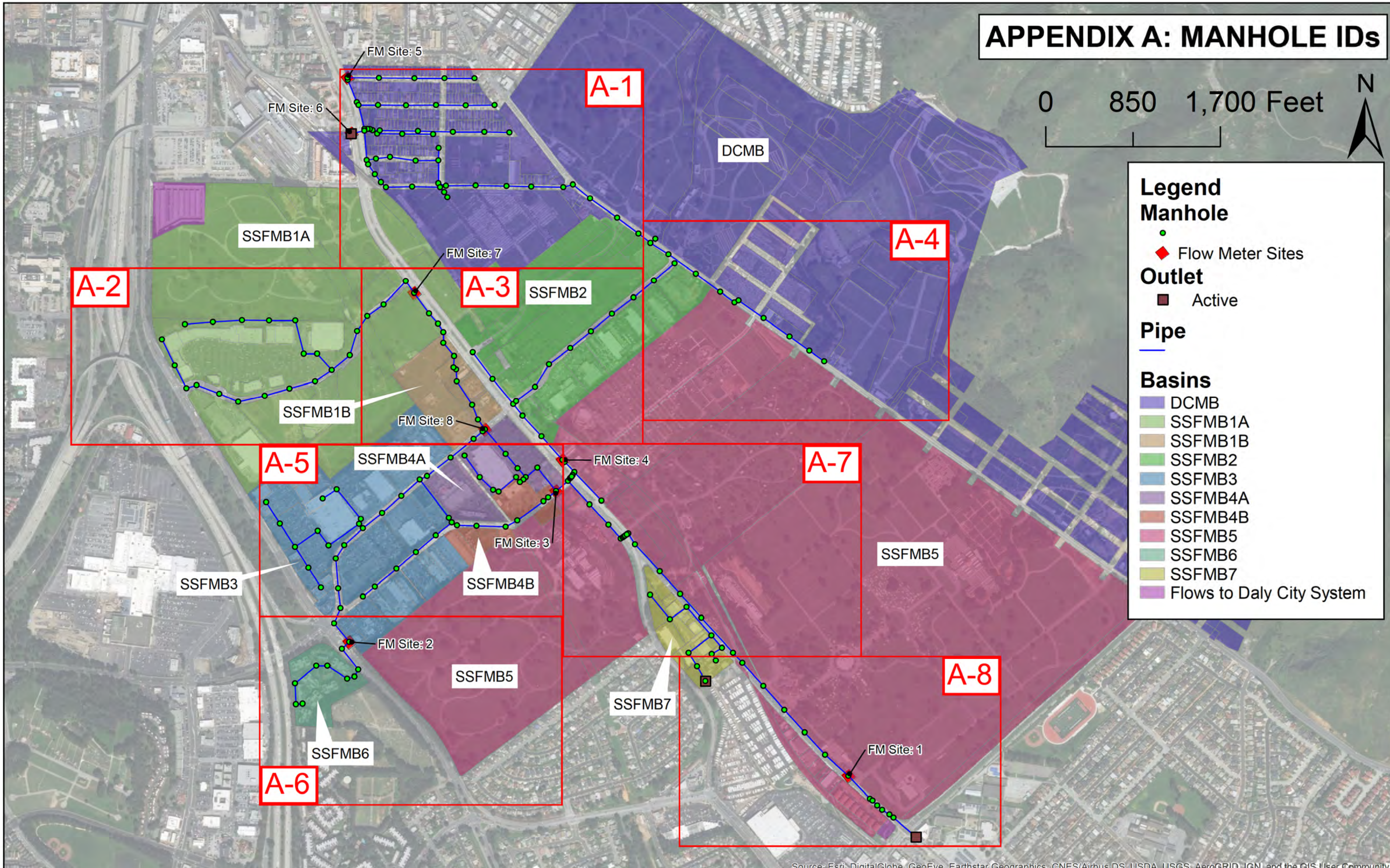
- Introduction and project overview.
- Summary of Town's compliance with provision D.13.viii of the Sanitary Sewer System General Waste Discharge Requirement Sewer System Management Plan requirements.
- Town General Plan summary and Town growth scenario(s).
- Summary of hydraulic model development and calibration efforts.
- Summary of capacity analysis and the evaluation criteria utilized.
- Summary of developed CIPs that address capacity deficiencies found from capacity analysis.
  - Project descriptions

    - Cost estimates
    - Priority of CIP implementation with "trigger point(s)" description
- Appendices of supporting documentation/data

The SECAP can be updated periodically by the Town (every five years at a minimum) to incorporate any conditions that could impact the collection system capacity. As an example, any changes to the physical collection system, such as pipe replacements, repairs, rehabilitation, and/or new infrastructure, can be implemented in the hydraulic model to provide a more accurate representation of the system. In addition, the Town can periodically calibrate the hydraulic model with any new flow monitoring data collected to maintain modelling accuracy.

Appendices

Appendix A: Manhole IDs



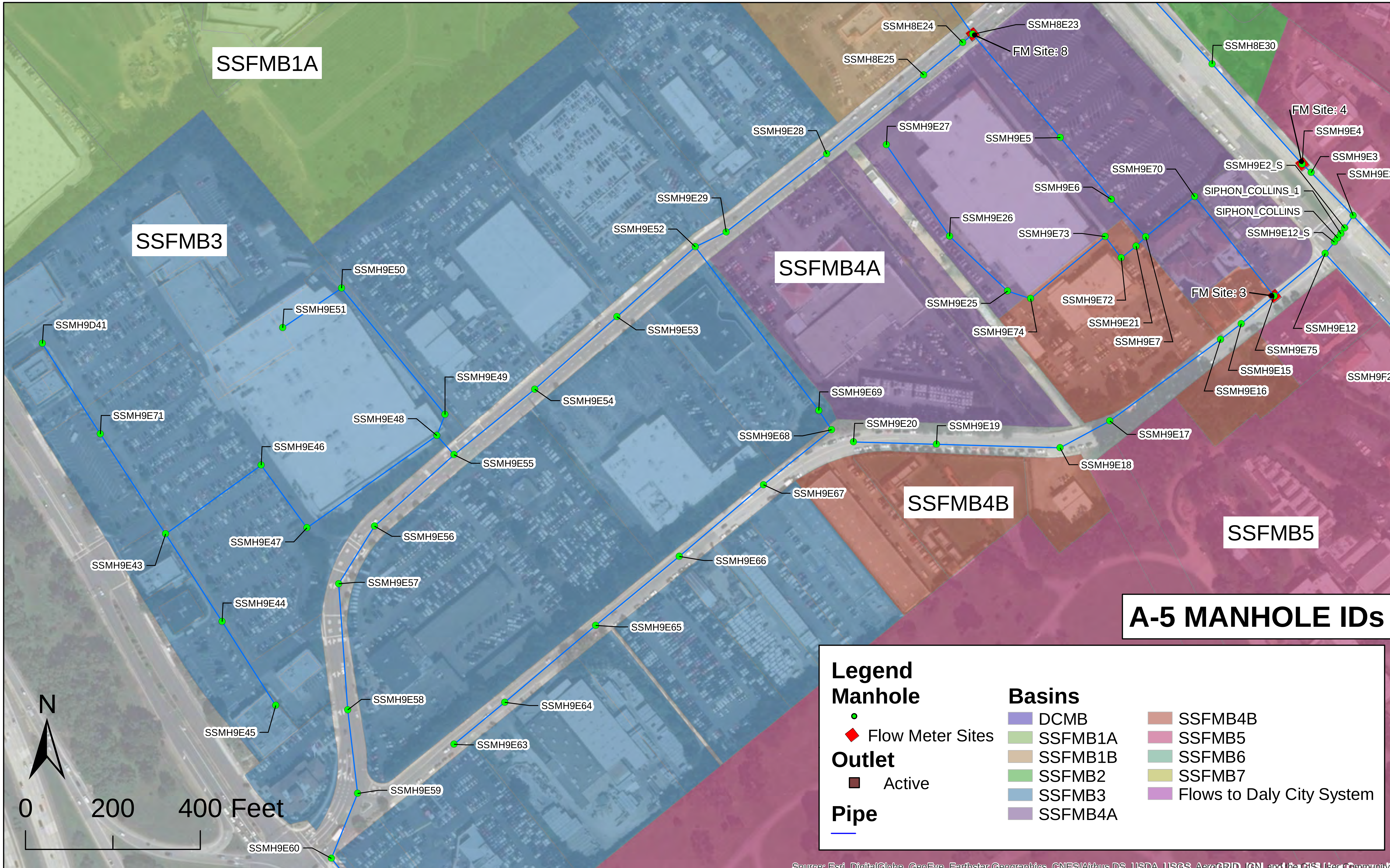
APPENDIX A: MANHOLE IDs
0 850 1,700 Feet
N
Legend
Manhole
Flow Meter Sites
Outlet
Active
Pipe
Basins
DCMB
SSFMB1A
SSFMB1B
SSFMB2
SSFMB3
SSFMB4A
SSFMB4B
SSFMB5
SSFMB6
SSFMB7
Flows to Daly City System
A-1
A-2
A-3
A-4
A-5
A-6
A-7
A-8
FM Site: 1
FM Site: 2
FM Site: 3
FM Site: 4
FM Site: 5
FM Site: 6
FM Site: 7
FM Site: 8
DCMB
SSFMB1A
SSFMB1B
SSFMB2
SSFMB3
SSFMB4A
SSFMB4B
SSFMB5
SSFMB5
SSFMB6
SSFMB7
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

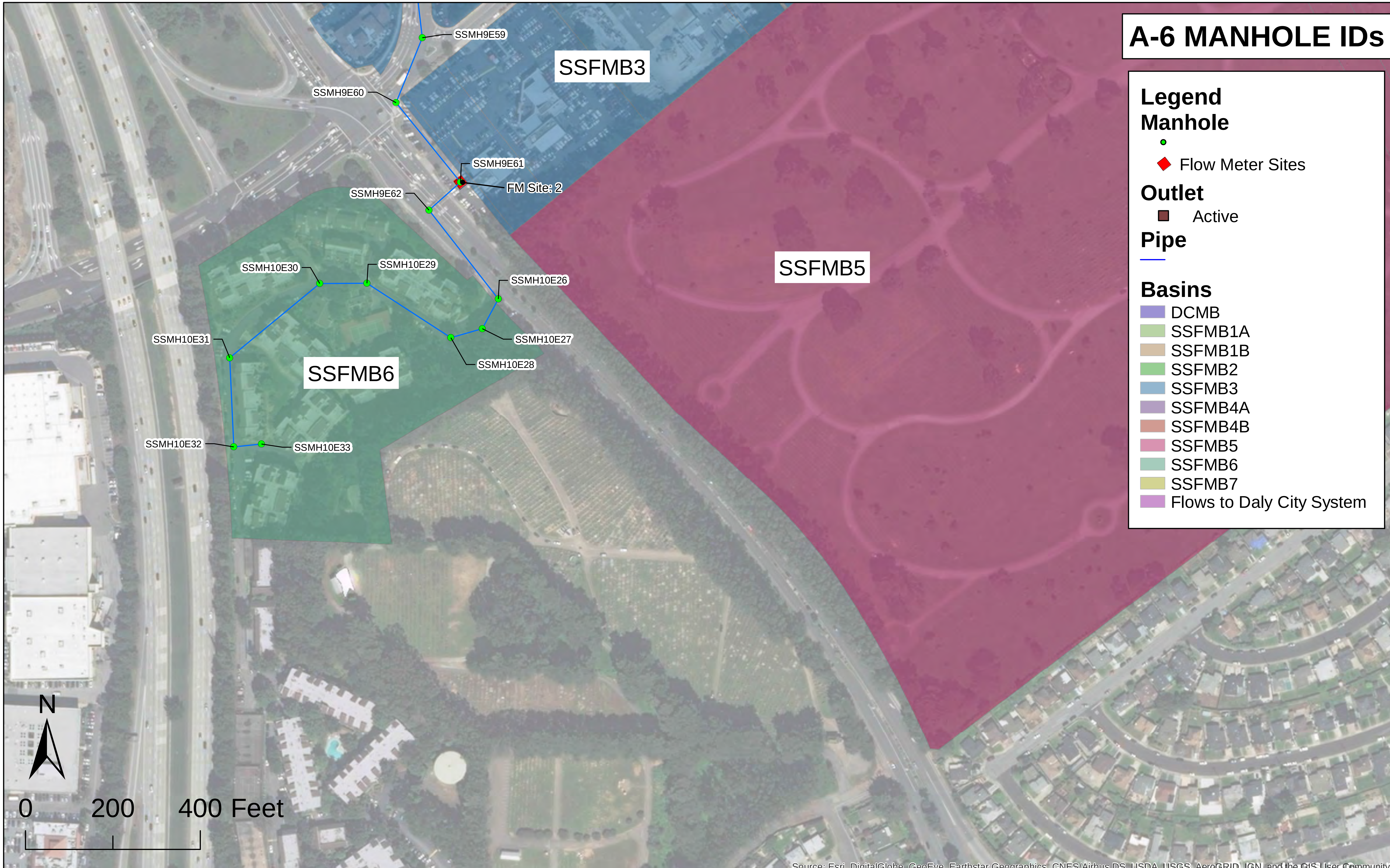

A-1 MANHOLE IDs
Legend
Manhole
Flow Meter Sites
Outlet
Active
Pipe
Basins
DCMB
SSFMB1A
SSFMB1B
SSFMB2
SSFMB3
SSFMB4A
SSFMB4B
SSFMB5
SSFMB6
SSFMB7
Flows to Daly City System
FM Site: 5
FM Site: 6
SSMH7E19
SSMH7E18
SSMH7E17
SSMH7E16
SSMH7E15
SSMH7E95
SSMH7E96
SSMH7E24
SSMH7E25
SSMH7E26
SSMH7E27
SSMH7E28
SSMH7E23
SSMH7E98
SSMH7E99
SSMH7E37
SSMH7E97
SSMH7E35
SSMH7E34
SSMH7E33
SSMH7E31
SSMH7E30
SSMH7E29
SSMH7E36
SSMH7E32
SSMH7E38
SSMH7E47
SSMH7E44
SSMH7E45
SSMH7E46
SSMH7E43
SSMH7E48
SSMH7E87
SSMH7E86
SSMH7E49
SSMH7E85
SSMH7E72
SSMH7E73
SSMH7E74
SSMH7E75
SSMH7E76
SSMH7E77
SSMH7E84
SSMH7E83
SSMH7E82
SSMH7E81
SSMH7E80
SSMH7F3
SSMH7F2
SSMH8F11
SSMH7F1
SSMH8F1
DCMB
SSFMB1A
SSFMB2
N
0
200
400 Feet
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

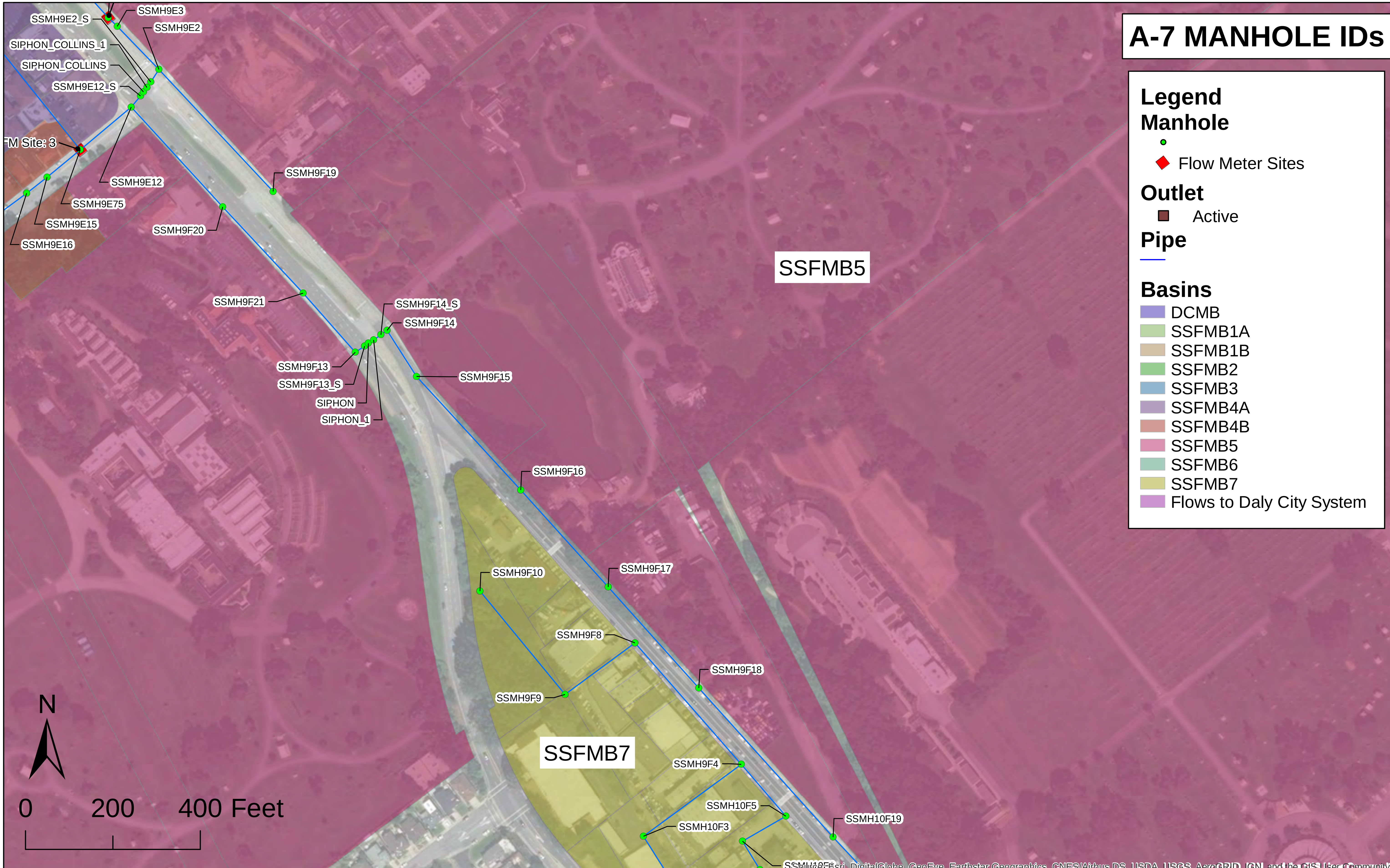

A-2 MANHOLE IDs
Legend
Manhole
Outlet
Active
Pipe
Basins
DCMB
SSFMB1A
SSFMB1B
SSFMB2
SSFMB3
SSFMB4A
SSFMB4B
SSFMB5
SSFMB6
SSFMB7
Flows to Daly City System
SSFMB1A
SSFMB3
SSMH8D35
SSMH8D36
SSMH8D37
SSMH8D38
SSMH8E11
SSMH8E1
SSMH8E2
SSMH8E3
SSMH8E4
SSMH8E5
SSMH8E6
SSMH8E7
SSMH8E9
SSMH8E10
SSMH8D29
SSMH8D28
SSMH8D30
SSMH8D31
SSMH8D32
SSMH8D33
SSMH8D34
N
0 200 400 Feet
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

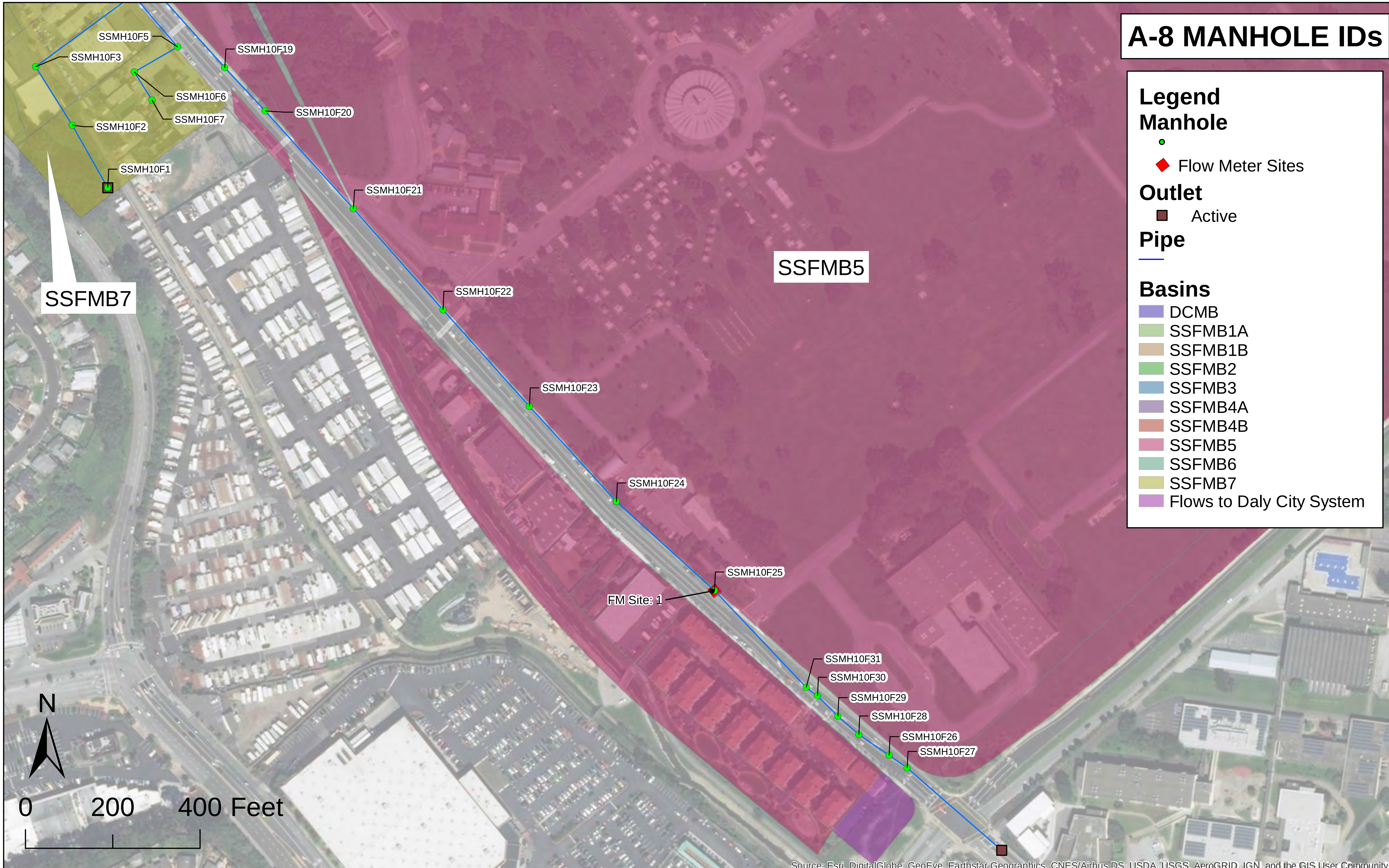
A-3 MANHOLE IDs
DCMB
SSFMB2
SSFMB1A
SSFMB1B
SSFMB3
SSFMB4A
SSFMB5
SSMH8E13
SSMH8E14
FM Site: 7
SSMH8E1
SSMH8E2
SSMH8E3
SSMH8E4
SSMH8E15
SSMH8E38
SSMH8E16
SSMH8E17
SSMH8E18
SSMH8E19
SSMH8E37
SSMH8E20
SSMH8E21
SSMH8E22
SSMH8E23
SSMH8E24
FM Site: 8
SSMH8E25
SSMH8E26
SSMH8E27
SSMH8E28
SSMH8E29
SSMH8E30
SSMH8E31
SSMH8E32
SSMH8E33
SSMH8E34
SSMH8F13
SSMH8F14
SSMH8F15
SSMH8F16
SSMH9E28
SSMH9E27
SSMH9E5
SSMH9E6
SSMH9E70
SSMH9E2_S
SSMH9E4
SSMH9E3
SSMH9E2
FM Site: 4
Legend
Manhole
Flow Meter Sites
Outlet
Active
Pipe
Basins
DCMB
SSFMB1A
SSFMB1B
SSFMB2
SSFMB3
SSFMB4A
SSFMB4B
SSFMB5
SSFMB6
SSFMB7
Flows to Daly City System
N
0
200
400 Feet
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


A-4 MANHOLE IDs
Legend
Manhole
Outlet
Active
Pipe
Basins
DCMB
SSFMB1A
SSFMB1B
SSFMB2
SSFMB3
SSFMB4A
SSFMB4B
SSFMB5
SSFMB6
SSFMB7
Flows to Daly City System
DCMB
SSFMB2
SSFMB5
SSMH7F1
SSMH8F11
SSMH8F1
SSMH8F2
SSMH8F3
SSMH8F12
SSMH8F13
SSMH8F14
SSMH8F4
SSMH8F6
SSMH8F5
SSMH8F7
SSMH8F8
SSMH8F9
SSMH8F10
N
0
200
400 Feet
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


A-5 MANHOLE IDs
SSFMB1A
SSFMB3
SSFMB4A
SSFMB4B
SSFMB5
SSMH8E24
SSMH8E23
FM Site: 8
SSMH8E25
SSMH8E30
SSMH9E28
SSMH9E27
SSMH9E5
FM Site: 4
SSMH9E4
SSMH9E3
SSMH9E2_S
SSMH9E2
SSMH9E70
SSMH9E6
SIPHON_COLLINS_1
SIPHON_COLLINS
SSMH9E12_S
SSMH9E29
SSMH9E52
SSMH9E26
SSMH9E73
SSMH9E50
SSMH9E51
SSMH9D41
SSMH9E53
SSMH9E25
SSMH9E72
SSMH9E74
SSMH9E21
SSMH9E7
FM Site: 3
SSMH9E12
SSMH9E75
SSMH9E15
SSMH9E16
SSMH9F20
SSMH9E49
SSMH9E54
SSMH9E69
SSMH9E71
SSMH9E48
SSMH9E68
SSMH9E20
SSMH9E19
SSMH9E17
SSMH9E46
SSMH9E55
SSMH9E18
SSMH9E67
SSMH9E47
SSMH9E56
SSMH9E43
SSMH9E66
SSMH9E57
SSMH9E44
SSMH9E65
SSMH9E58
SSMH9E64
SSMH9E45
SSMH9E63
SSMH9E59
SSMH9E60
N
0
200
400 Feet
Legend
Manhole
Flow Meter Sites
Outlet
Active
Pipe
Basins
DCMB
SSFMB1A
SSFMB1B
SSFMB2
SSFMB3
SSFMB4A
SSFMB4B
SSFMB5
SSFMB6
SSFMB7
Flows to Daly City System
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


A-6 MANHOLE IDs
Legend
Manhole
Flow Meter Sites
Outlet
Active
Pipe
Basins
DCMB
SSFMB1A
SSFMB1B
SSFMB2
SSFMB3
SSFMB4A
SSFMB4B
SSFMB5
SSFMB6
SSFMB7
Flows to Daly City System
SSFMB3
SSFMB5
SSFMB6
SSMH9E59
SSMH9E60
SSMH9E61
FM Site: 2
SSMH9E62
SSMH10E30
SSMH10E29
SSMH10E26
SSMH10E31
SSMH10E27
SSMH10E28
SSMH10E32
SSMH10E33
N
0
200
400 Feet
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

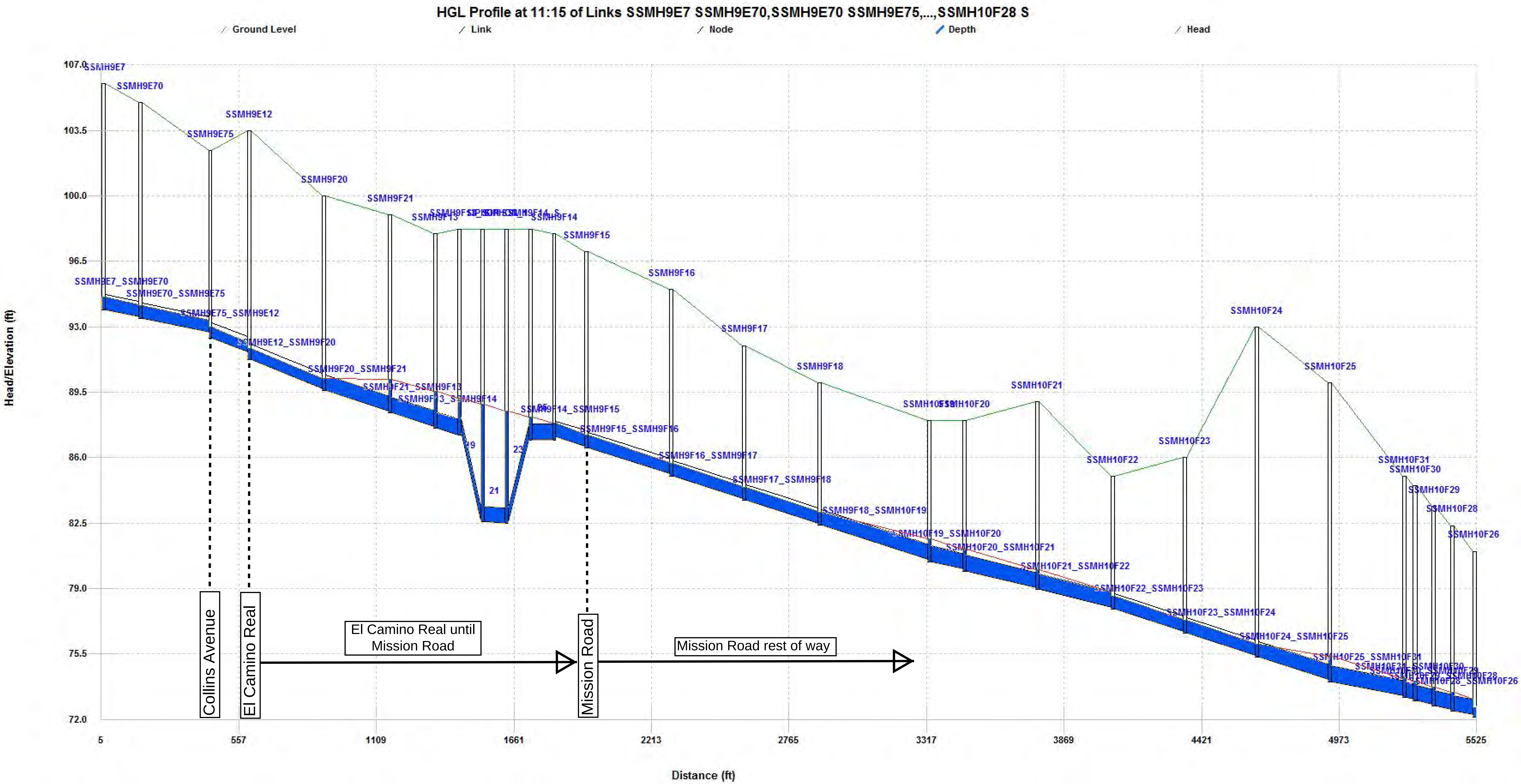

A-7 MANHOLE IDs
Legend
Manhole
Flow Meter Sites
Outlet
Active
Pipe
Basins
DCMB
SSFMB1A
SSFMB1B
SSFMB2
SSFMB3
SSFMB4A
SSFMB4B
SSFMB5
SSFMB6
SSFMB7
Flows to Daly City System
SSFMB5
SSFMB7
SSMH9E3
SSMH9E2_S
SSMH9E2
SIPHON_COLLINS_1
SIPHON_COLLINS
SSMH9E12_S
FM Site: 3
SSMH9E12
SSMH9E75
SSMH9E15
SSMH9E16
SSMH9F19
SSMH9F20
SSMH9F21
SSMH9F14_S
SSMH9F14
SSMH9F13
SSMH9F13_S
SIPHON
SIPHON_1
SSMH9F15
SSMH9F16
SSMH9F17
SSMH9F10
SSMH9F8
SSMH9F18
SSMH9F9
SSMH9F4
SSMH10F5
SSMH10F3
SSMH10F19
N
0
200
400 Feet
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


A-8 MANHOLE IDs
Legend
Manhole
Flow Meter Sites
Outlet
Active
Pipe
Basins
DCMB
SSFMB1A
SSFMB1B
SSFMB2
SSFMB3
SSFMB4A
SSFMB4B
SSFMB5
SSFMB6
SSFMB7
Flows to Daly City System
SSFMB5
SSFMB7
SSMH10F5
SSMH10F3
SSMH10F19
SSMH10F6
SSMH10F7
SSMH10F2
SSMH10F20
SSMH10F1
SSMH10F21
SSMH10F22
SSMH10F23
SSMH10F24
SSMH10F25
FM Site: 1
SSMH10F31
SSMH10F30
SSMH10F29
SSMH10F28
SSMH10F26
SSMH10F27
N
0
200
400 Feet
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Appendix B: Existing PWWF Scenario Results Figure

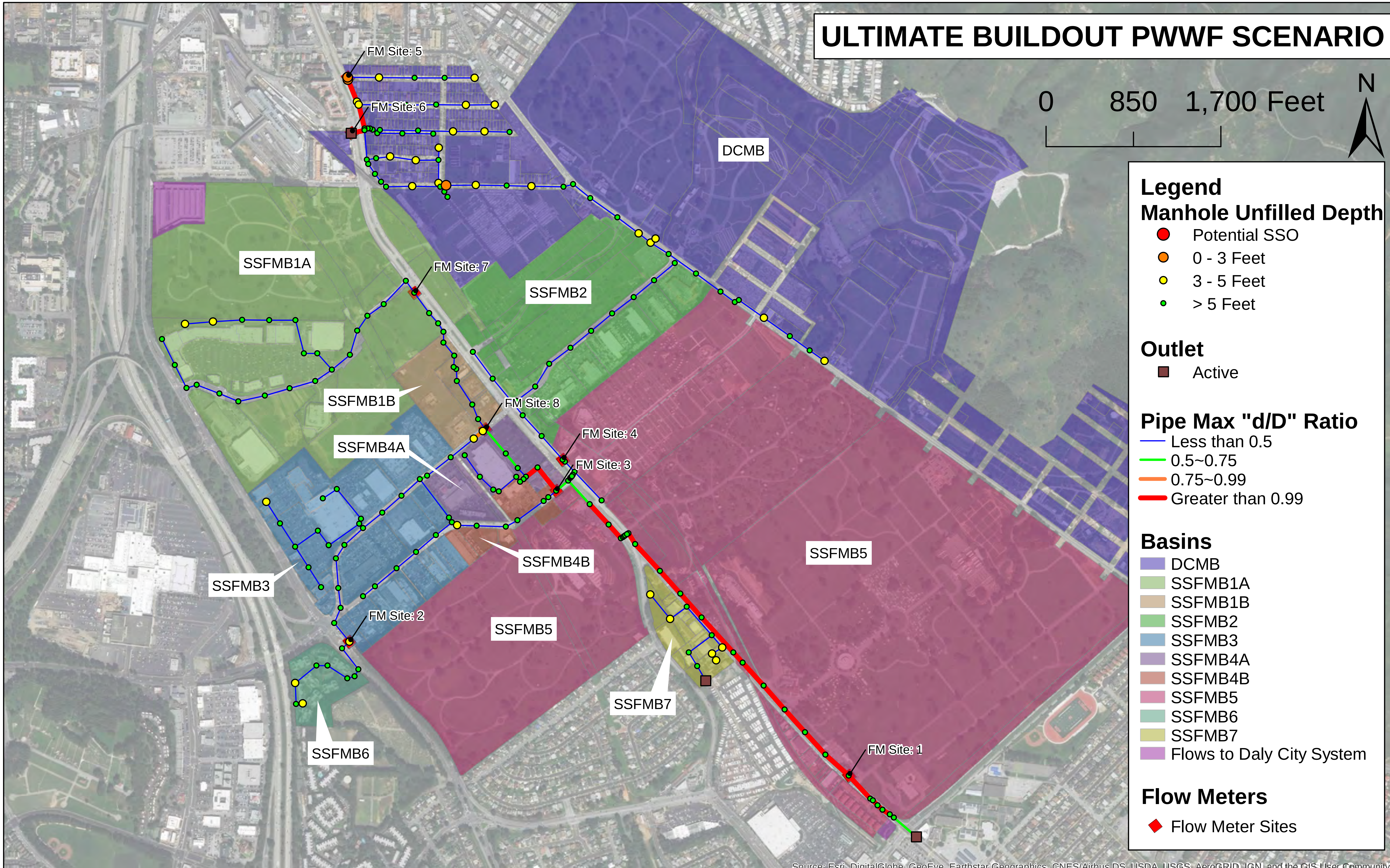

EXISTING PWWF SCENARIO
0 850 1,700 Feet
N
Legend
Manhole Unfilled Depth
Potential SSO
0 - 3 Feet
3 - 5 Feet
> 5 Feet
Outlet
Active
Pipe Max "d/D" Ratio
Less than 0.5
0.5~0.75
0.75~0.99
Greater than 0.99
Basins
DCMB
SSFMB1A
SSFMB1B
SSFMB2
SSFMB3
SSFMB4A
SSFMB4B
SSFMB5
SSFMB6
SSFMB7
Flows to Daly City System
Flow Meters
Flow Meter Sites
FM Site: 5
FM Site: 6
FM Site: 7
FM Site: 8
FM Site: 4
FM Site: 3
FM Site: 2
FM Site: 1
DCMB
SSFMB1A
SSFMB2
SSFMB1B
SSFMB4A
SSFMB3
SSFMB4B
SSFMB5
SSFMB5
SSFMB7
SSFMB6
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Appendix C: Mission Road Pipe Profile for Existing PWWF Scenario



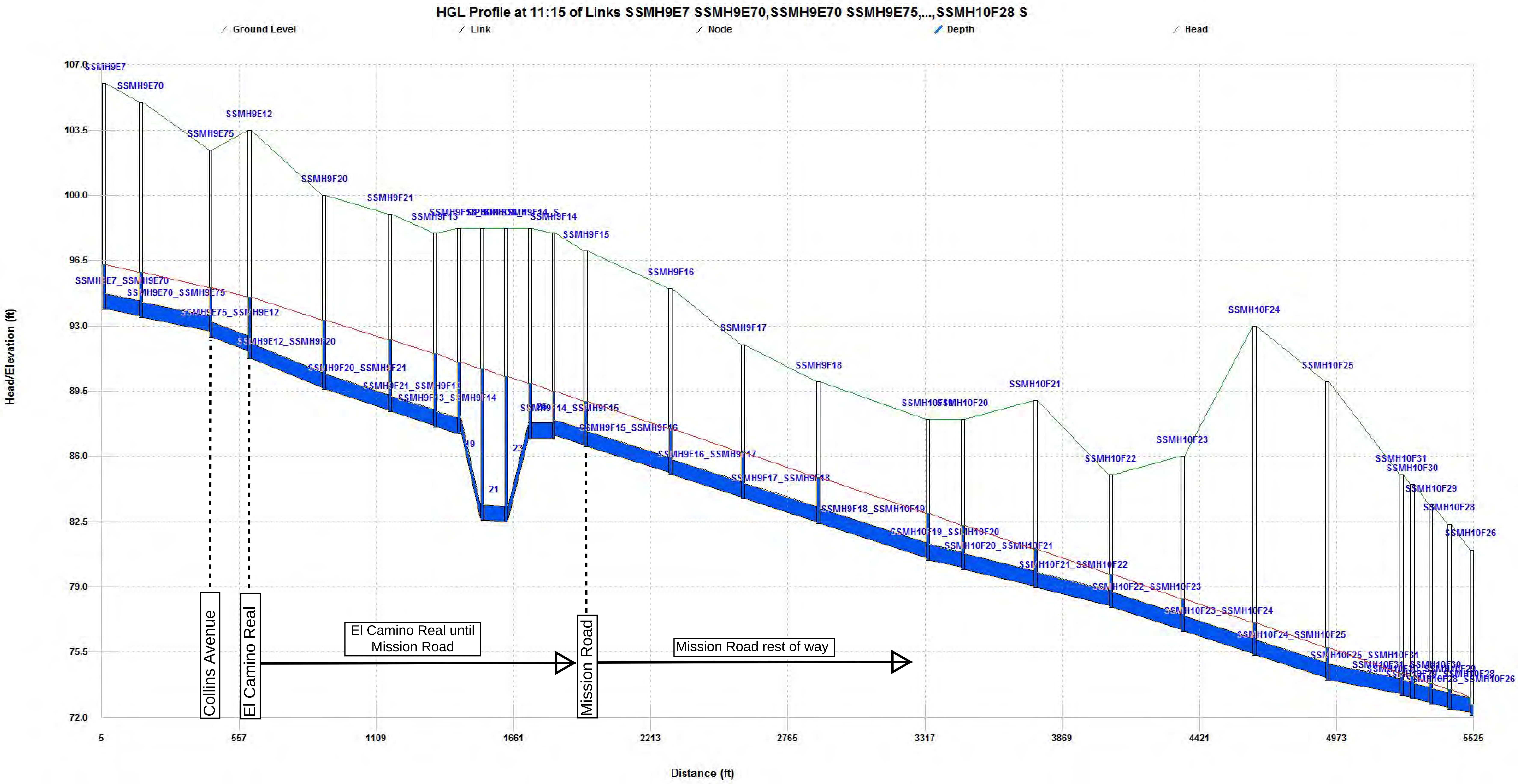
HGL Profile at 11:15 of Links SSMH9E7 SSMH9E70,SSMH9E70 SSMH9E75,...,SSMH10F28 S
Ground Level
Link
Node
Depth
Head
Head/Elevation (ft)
Distance (ft)
Collins Avenue
El Camino Real
El Camino Real until Mission Road
Mission Road
Mission Road rest of way
SSMH9E7
SSMH9E70
SSMH9E75
SSMH9E12
SSMH9F20
SSMH9F21
SSMH9F13
SSMH9F14
SSMH9F15
SSMH9F16
SSMH9F17
SSMH9F18
SSMH10F20
SSMH10F21
SSMH10F22
SSMH10F23
SSMH10F24
SSMH10F25
SSMH10F31
SSMH10F30
SSMH10F29
SSMH10F28
SSMH10F26

Appendix D: Ultimate Buildout PWWF Scenario Results Figure

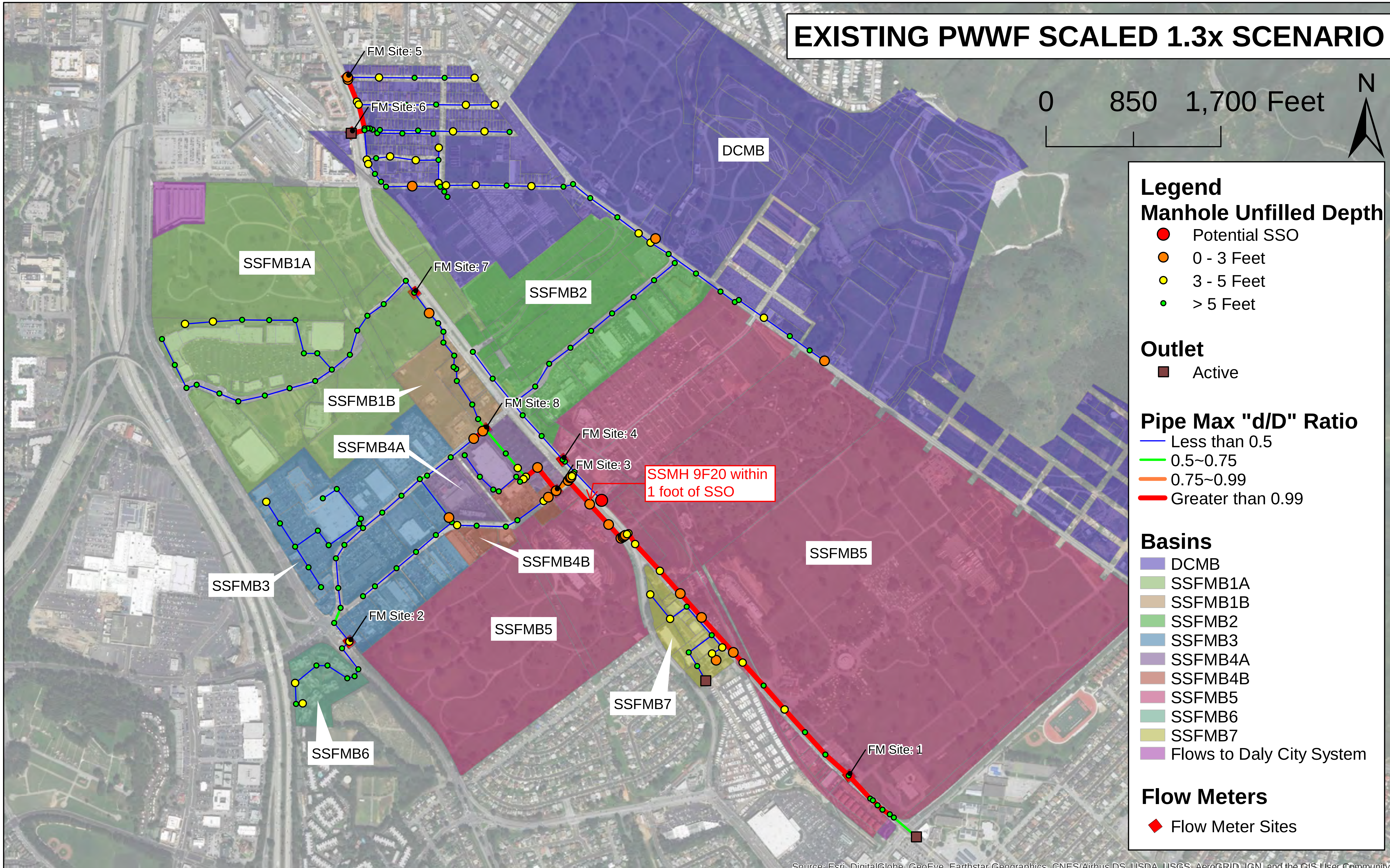


ULTIMATE BUILDOUT PWWF SCENARIO
0
850
1,700 Feet
N
Legend
Manhole Unfilled Depth
Potential SSO
0 - 3 Feet
3 - 5 Feet
> 5 Feet
Outlet
Active
Pipe Max "d/D" Ratio
Less than 0.5
0.5~0.75
0.75~0.99
Greater than 0.99
Basins
DCMB
SSFMB1A
SSFMB1B
SSFMB2
SSFMB3
SSFMB4A
SSFMB4B
SSFMB5
SSFMB6
SSFMB7
Flows to Daly City System
Flow Meters
Flow Meter Sites
FM Site: 5
FM Site: 6
FM Site: 7
FM Site: 8
FM Site: 4
FM Site: 3
FM Site: 2
FM Site: 1
DCMB
SSFMB1A
SSFMB2
SSFMB1B
SSFMB4A
SSFMB4B
SSFMB3
SSFMB5
SSFMB5
SSFMB7
SSFMB6
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

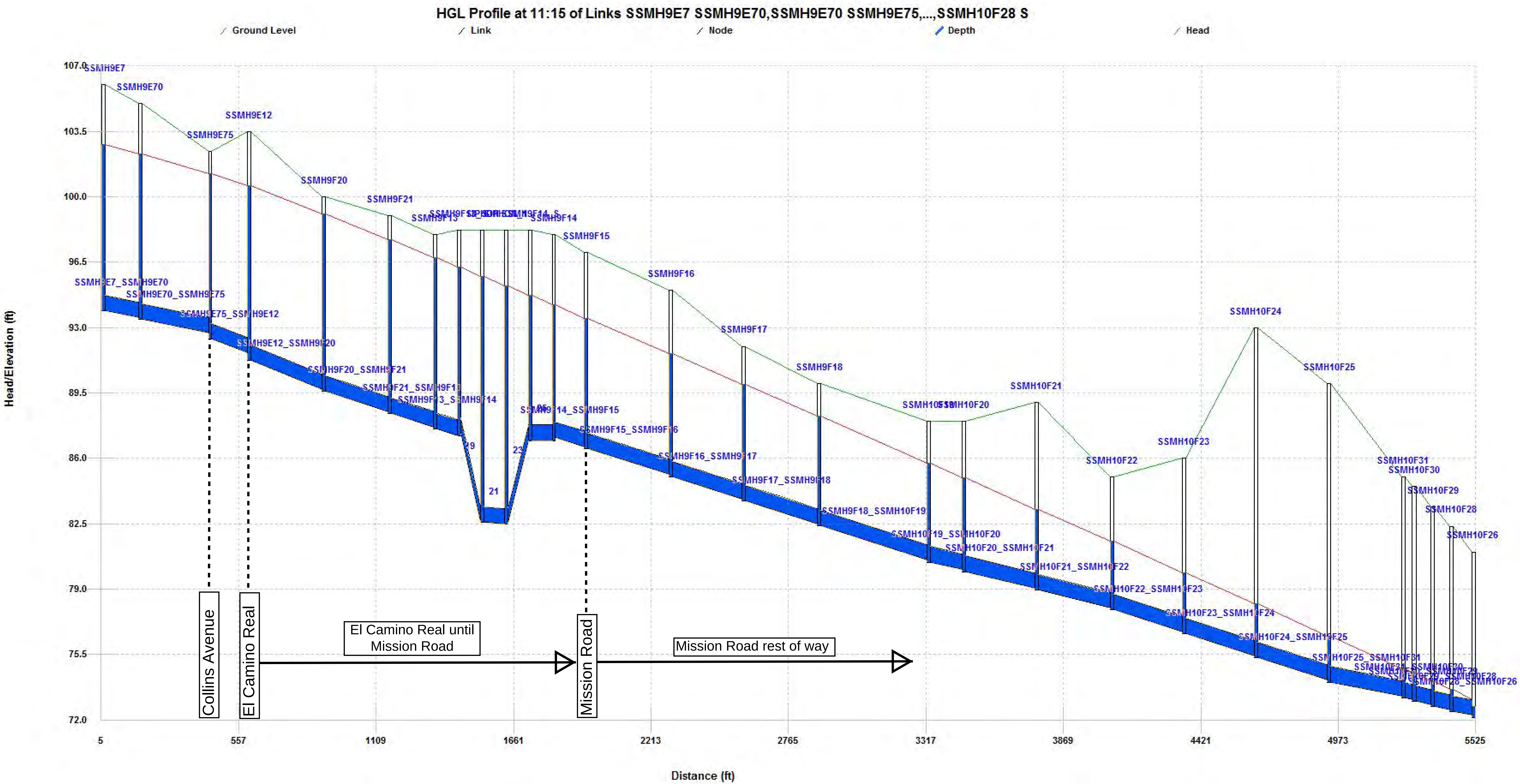
Appendix E: Mission Road Pipe Profile for Ultimate Buildout PWWF Scenario


HGL Profile at 11:15 of Links SSMH9E7 SSMH9E70,SSMH9E70 SSMH9E75,...,SSMH10F28 S
Ground Level
Link
Node
Depth
Head
Head/Elevation (ft)
Distance (ft)
107.0
103.5
100.0
96.5
93.0
89.5
86.0
82.5
79.0
75.5
72.0
5
557
1109
1661
2213
2765
3317
3869
4421
4973
5525
SSMH9E7
SSMH9E70
SSMH9E75
SSMH9E12
SSMH9F20
SSMH9F21
SSMH9F13
SSMH9F14
SSMH9F15
SSMH9F16
SSMH9F17
SSMH9F18
SSMH10F20
SSMH10F21
SSMH10F22
SSMH10F23
SSMH10F24
SSMH10F25
SSMH10F31
SSMH10F30
SSMH10F29
SSMH10F28
SSMH10F26
SSMH9F15_SSMH9F16
SSMH9F18_SSMH10F19
SSMH10F20_SSMH10F21
SSMH10F21_SSMH10F22
SSMH10F22_SSMH10F23
SSMH10F23_SSMH10F24
SSMH10F24_SSMH10F25
SSMH10F25_SSMH10F31
Collins Avenue
El Camino Real
El Camino Real until Mission Road
Mission Road
Mission Road rest of way

Appendix F: Existing PWWF Scaled 1.3x Scenario Results Figure


EXISTING PWWF SCALED 1.3x SCENARIO
0 850 1,700 Feet
N
Legend
Manhole Unfilled Depth
Potential SSO
0 - 3 Feet
3 - 5 Feet
> 5 Feet
Outlet
Active
Pipe Max "d/D" Ratio
Less than 0.5
0.5~0.75
0.75~0.99
Greater than 0.99
Basins
DCMB
SSFMB1A
SSFMB1B
SSFMB2
SSFMB3
SSFMB4A
SSFMB4B
SSFMB5
SSFMB6
SSFMB7
Flows to Daly City System
Flow Meters
Flow Meter Sites
FM Site: 5
FM Site: 6
FM Site: 7
FM Site: 8
FM Site: 4
FM Site: 3
FM Site: 2
FM Site: 1
SSMH 9F20 within
1 foot of SSO
DCMB
SSFMB1A
SSFMB2
SSFMB1B
SSFMB4A
SSFMB3
SSFMB4B
SSFMB5
SSFMB5
SSFMB7
SSFMB6
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Appendix G: Mission Road Pipe Profile for Existing PWWF Scaled 1.3x Scenario



HGL Profile at 11:15 of Links SSMH9E7 SSMH9E70,SSMH9E70 SSMH9E75,...,SSMH10F28 S
Ground Level
Link
Node
Depth
Head
Head/Elevation (ft)
Distance (ft)
Collins Avenue
El Camino Real
El Camino Real until Mission Road
Mission Road
Mission Road rest of way

Appendix B. Town of Colma Flow Monitoring Services Performed (Total Flow Inc., April 2018)

Total Flow Inc.

23520 Foley St.
Unit B
Hayward Ca 94545
Tel: (510) 774-9223
Jeff.Blum@totalflowinc.com

April 6, 2018

Abdulkader Hashem Associate Engineer
Town of Colma Public Works
1188 El Camino Real
Colma CA, CA 94104

Re: Town of Colma Flow Monitoring Services

Dear Mr. Hashem

On behalf of Total Flow, Inc. (TFI), I am pleased to submit two copies of the Revised Town of Colma Flow Monitoring Services report. This report covers the work performed during the between January 2017 to February 2017 It also includes a follow up investigation October-December 2017.

I would like to thank you for giving us the opportunity to serve you. Please feel free to call me at (510) 774-9223 or e-mail me at jeff.blum@TotalFlowInc.com with any comments or questions, at your convenience

Sincerely,

Jeff Blum
Project Manager

cc: File

EXECUTIVE SUMMARY

Total Flow Inc. conducted temporary flow monitoring at eight manholes in the Town of Colma's sanitary sewer collection system. The flow monitoring program covered about 1 month from the end of January to the end of February 2017. The program's objective was to measure the magnitude of wastewater flows that are contributed by Colma residents, businesses, and the multitude of cemeteries.

A Marsh-McBirney Model 2000 portable electromagnetic velocity meter was utilized to record velocity measurements, while depth measurements were conducted by hand during weekly site visits to the flow meters. One tipping bucket rain gauge was placed at the City Hall Portable roof to continuously record rainfall data for the program. These weekly site visits served the purpose of comparing the depth and velocity measured values to the monitored values collected by the Hach brand flow meters that collection the same two types of data.

The results section of this report details the daily average flows and RDII volumes for each flow meter for the storm event occurring from February 19 to February 22. This section also discusses the resultant peaking factors seen from the hydraulic model analysis performed by Water Works Engineers (WWE).

A concern arose regarding flow meter site #1 at the southern end of Colma's collection system on Mission Road. While the flow values observed as a part of this flow monitoring program closely matched flow values from previous Colma flow monitoring projects (roughly around 0.1 MGD), WWE's subsequent hydraulic model development found that the cumulative flows at this flow meter site should theoretically be larger than the monitored values. This observation leads WWE to believe that there might be an unknown diversion upstream of this site that is reducing the monitored values at site #1. Investigation into this area of the collection system might be worthwhile for the Town of Colma to perform to determine exactly how flows are routed throughout.

Total Flow (TFI) was also concerned about this discrepancy in flow and performed a follow up investigation. TFI completed localized dye testing at the manholes for Sites 3 and 4. TFI then followed up by checking parallel and adjacent storm lines for evidence of a cross connection, however none were found. While checking for dye, TFI took spot flow points in the downstream sewer manholes going toward Site 1. Flows were found to be consistent among the observed manholes. TFI did not feel the discrepancy had yet been resolved, so TFI installed flow meters back in Site 1 and in MH 10F20 in December 2017. Flows at MH 10F20 were consistent with the combined flows of Sites 3 and 4, with data available in the Appendix. There seems to be no cross connection(s) in the reaches between manholes 10F20 and 10F25. TFI then took a real close look at the flow development at MH 10F25 (Site 1). TFI discovered that there was a sharp reduction in velocity at the opening of the inlet pipe at MH 10F25 (Site 1). When comparing velocity just up in the inlet pipe against velocity in the manhole pipe channel / outlet pipe, the velocity was nearly double in the inlet pipe. TFI believes there is a hydraulic jump that caused the depth to go up slightly with this reduction of recorded velocity. TFI took this new calibration information and applied it to the data to get a new flow which does line up with the flows at Sites 3 and 4. Revised data can be found in the Appendix.

Total Flow Inc. observed surcharge conditions at flow meter sites #5 and #6 during storm events. The crew that performed the weekly site visit during a storm event near these sites believe that there could be a restriction in flow between SSMH7E23 and SSMH7E97. Another possibility is the downstream "F Street Lift Station" operational conditions affecting the pipelines near flow meter sites #5 and #6.

INTRODUCTION

This report presents the results of the flow monitoring program conducted during the period of January 22, 2017 to February 27, 2017. The report is prepared in accordance with the agreement to provide flow monitoring services for Town of Colma. A total of 8 flow monitors for 10 pipes and one rain gauge installed for this project.

This report contains the following sections:

- Project Description -- Discussion of flow components, monitoring and rain gauge equipment and locations
- Equipment and Site Calibration -- Discussion of field calibration routine, manhole inspection, and flow isolation field procedures
- Flow Analysis -- Discussion of flow monitor calibration and data analysis techniques
- Results -- Discussion of the flow and rainfall monitoring results and data problems
- Appendix FLOW -- Flow monitor site descriptions, site photographs, manhole inspection forms, site calibration data, plots of hourly flow and rainfall data, and a flow summary table.

PROJECT DESCRIPTION

Flow monitoring was conducted to measure the magnitude and components of flow that enter the wastewater collection system. Wastewater flow is comprised of the following components:

- Sanitary Flow (SF) -- Normal sewage flow from residential, commercial, and industrial sources.

Dry weather flow (DWF) periods contain only the SF and GWI components. Wet weather flow (WWF) periods include the RDI/I component in addition to DWF. The relative percentage contributed by each component of DWF and WWF will vary from one area to another as social, environmental, and physical conditions change over time.

FLOW MONITORS

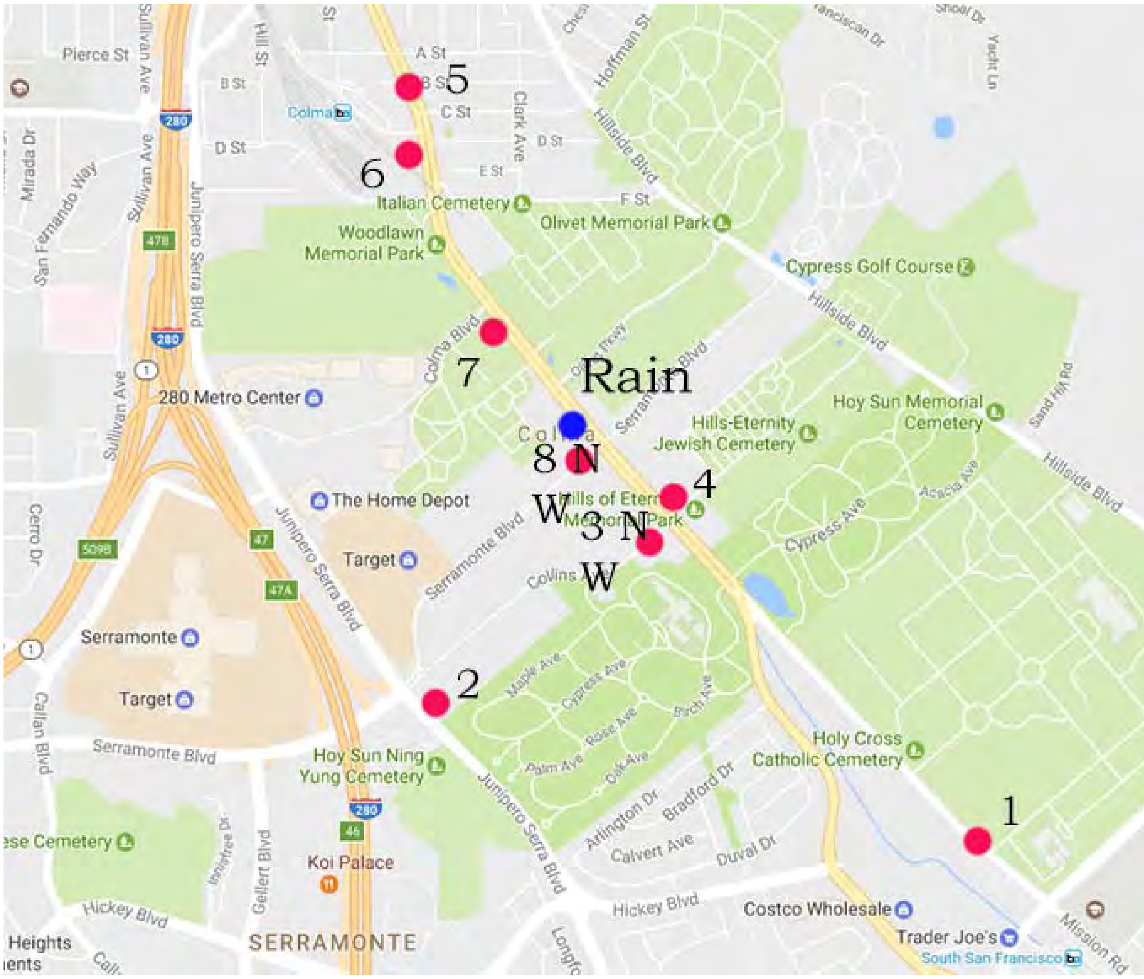
Flow monitors were deployed from January 17, 2017 to February 23, 2017. Monitoring sites were selected by Dave Bishop and were based on reconnaissance by

Total Flow, Inc. (TFI). A flow monitoring plan was prepared to determine proper locations for equipment installation. The table below shows the site locations.

Table 1
Town of Colma Flow Meter Site

	Site SSMH#	Location	Pipe Size (inches)	Meter Type	Monitor Acres	Basin Acres
1	10F25	1427 Mission St	10”	FL904Submerged	469.2	189.6
2	9F61	Junipero Serra Blvd	6”	FL904 FloDar	9	9
3	9E76	205 Collins	N 10” W 10”	FL904Submerged	N 195.5 W 12.4	N 17.1 W 12.4
4	9E4	El Camino Real North of Collins	8”	FL904Submerged	71.7	71.7
5	7E19	El Camino Real at B St.	10”	FL904Submerged	500~	
6	E07-39	El Camino Real at Albert M Teglia Blvd	12”	FL904Submerged	702.2	200.2
7	8E14	El Camino Real South of Colma Blvd on side Rd.	8”	Fl900 FloDar	72.5	72.5
8	8E23	Serramonte Blvd West of El Camino Real	N 8” W 8”	FL904Submerged	N 94.4 W 84	N 21.9 W 75
Rain Gauge		City Hall				

Figure 1 Map of flow meters and rain gauge locations



Hach FL900 Flow Meters were used at all the flow monitoring sites. The Hach depth and velocity meters automate the data collection requirements associated with flow monitoring. Data was collect and stored on the loggers in 5 minute intervals. Flow information is stored in solid-state memory units that are quickly and easily retrieved through a notebook computer during routine data collection.

The Fl900 AV meter uses a FloDar sensor. FloDar has an ultrasonic depth senor and a microwave velocity sensor

The Fl900 AV meter also use a submerged pressure transducer to measure depth if the pipe becomes surcharged. The probe is mounted in the FloDar meter and the pressure at the probe varies proportionately with the level of the flow once the sensor is submerged. The submerged pressure transducer is ideal for surcharging conditions.

EQUIPMENT AND SITE CALIBRATION

FLOW MONITORING

Maintenance of the pipeline flow monitors involved weekly site visits to check on the operating status, collect recorded data, and obtain calibration information. During visits to the monitor sites, depth and velocity of sewage flow were measured by hand with a carpenter's ruler and recorded along with corresponding observed instantaneous monitor values. Depth was measured by hand, and velocity was measured with a Marsh-McBirney Model 2000 portable electromagnetic velocity meter.

Due to the normal diurnal variation of sewage flow, the sites were visited at various hours of the day to obtain measured and metered values corresponding throughout each site's flow range.

The measured and monitor values were compared in the field to verify monitor accuracy. Equipment showing significant deviation from measured values was recalibrated. The measured and metered values were later analyzed in the office to determine offsets for flow processing and analysis.

RAIN GAUGES

Onset one-channel HOBO event recorder and tipping bucket rain gauges were used to continuously record rainfall data for the flow-monitoring program. Tipping bucket rain gauges are designed to close a mercury switch with each 0.01-inch of rainfall, allowing the data pod to record the time of the event. The rain gauge was located at City Hall Portable roof

- Accessibility for installation, data retrieval, maintenance, and removal
- Adequate distance from objects such as high structures and trees that could distort rainfall measurements
- Security

FLOW ANALYSIS

A brief description of the flow analysis performed on the field data is presented in this section.

PIPELINE MONITOR SITES

The Hach monitors collected both flow depth and velocity information. The first step in processing the flow monitor data is to calculate flow by entering the data into a computer for processing. From this point, two methods were used to calculate flow, the depth-versus-flow curve, and area and velocity calculation.

The depth-versus-flow method utilizes the calibration depth and velocity data to develop a best-fit relationship between depth and velocity. This method allows the user to determine flow from depth data alone. In developing the curve, the method does not rely on estimates or guesses at site-specific factors affecting flow. These factors include debris, pipe roughness, localized pipe slope, and any other condition which can affect the depth-versus-flow relationship.

Typically, a curve is obtained that matches the field calibration measurements with a correlation coefficient of 95 percent or better. The curve was used to accurately generate a continuous flow hydrograph for each site. Hourly flows were calculated from hourly flow depth data using the specific depth-versus-flow equation.

The area and velocity calculation was used to process hourly flow based on the continuity equation:

$Q = A \times V$

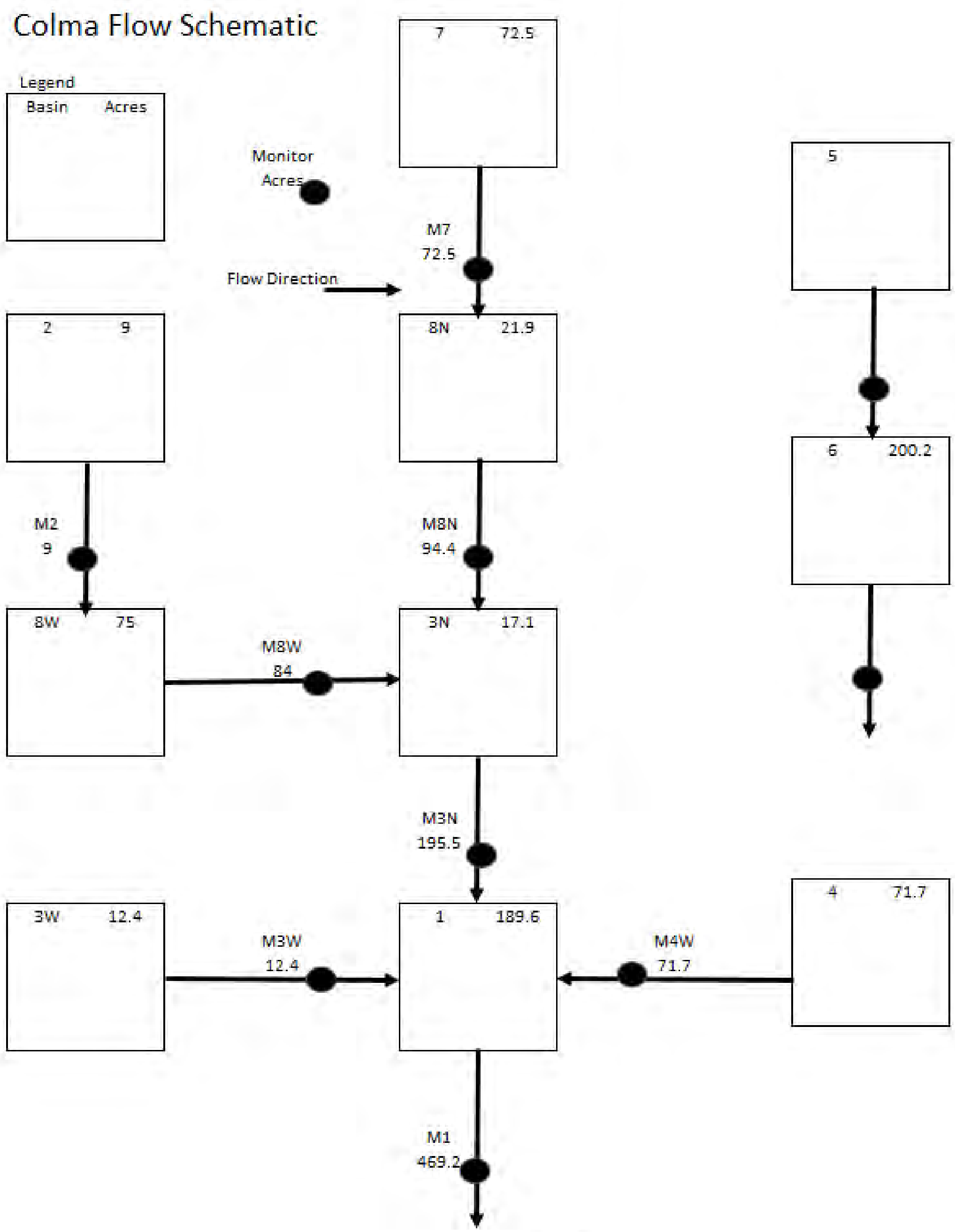
where:

Q =	Flow
A =	Cross-sectional area of flow based upon pipe diameter and recorded depth, including any offset adjustments for sediment that may be required.
V =	Average velocity calculated from recorded velocity.

Velocity values were correlated with depth values within the computer program in order to establish a site-specific, measured depth-versus-velocity relationship over a wide range of depth values. This relationship accounts for site-specific debris, local slope, and roughness conditions.

Figure 2 is a basin flow schematic to help visual how the flow from each meter effects the downstream meters

Figure 2



RDI/I SEPARATION

As discussed earlier, measured flows consist of SF, GWI, and RDI/I. The amount of RDI/I entering the District's sanitary sewer system was determined for the Districts flow monitoring sites. The RDI/I separation performed for this project consists of identifying base flow, calculating the difference between the base flow and total flow, and then calculating the RDI/I return ratio. The steps of the analysis process are discussed in the following sections.

BASEFLOW

The average base flow (ABF) at each monitor was developed by analyzing monitored flow data from a dry period during the monitoring period. An ABF hydrograph, composed of SF and GWI, was determined from reviewing the flow patterns before and after storm events. Base flow hydrographs for weekdays and weekends were developed for each site.

RDI/I SUBTRACTION

The storm events captured during the monitoring period were analyzed to determine the RDI/I response in the monitoring area. Wet weather flow data are analyzed from the beginning of the rain event to an end point where it appears that the hydrograph consists of only base flow, indicating the RDI/I have receded from the collection system. The volume of RDI/I for each discrete storm event is calculated by subtracting the ABF hydrograph from the monitored flow hydrograph.

RDI/I QUANTITY

The result of the RDI/I subtraction is an RDI/I hydrograph. The quantity of RDI/I determined from the subtraction can be thought of as the amount of rainfall that entered the sanitary sewer system. This value is expressed as a return ratio, R, expressed as a percentage. The value of R can be used to measure how the sewer basin responds to a rainfall event.

The amount of rainfall falling in each monitor area was determined from the gathered rainfall data and the monitor service area. For the monitoring period covered in this report, the project area experienced a moderately wet season. Nine distinct storm events occurred within the monitor period. These events were generally separated by dry days that allowed the flows to return to normal winter levels. The R-values for the monitor are summarized in the appendix. The plots of each RDI/I separation summary listings of the R- values are also included in the appendix.

RESULTS

FLOW MONITORING DATA

The flow meters were installed in January 2017 and removed in February 2017. The initial period was over 38 days with 19 days of rain. During the installed period, there were 9 days of rain over .5 of an inch with a season average total of 10.77 inches.

The detailed results of flow monitoring sites are presented in the Appendix. The site reports are separated by dividers. The data include monitor site sheets, site photographs, plots of flow and depth data, and a table listing the average daily flow and daily minimum and peak flows. The hydrographs cover a 24-hour period beginning at 0000 hours and ending at 2300 hours. Hourly flow averages and rainfall sums are included as a separate sheet within the site MS Excel© workbook. In addition, base flow and RDI/I were performed at all sites. Five separate storms were analyzed. Base flow plots, R% tables and RDI/I separation plots are in the appendix with each site.

Table 2 presents the Daily average flows RDI/I Volume for storm 2/19/17through 2/22/17, rain for that storm and the average of the highest 3 peak R%.

Table 2 Town of Colma Monitor RDI and Base Flow Summary

Site	MH#	Pipe Size (inches)	Monitor Acres	Average Weekday MGD	Average Weekend MGD	RDI/I Volume 2/19-22/17 MG	Ave. Rain for RDI Volume Inches	Ave Top 3 R%
1	10F25	10	469.2	0.190	0.166	0.236	1.88	0.8%
2	9F61	6	9	0.033	0.037	0.011	1.81	2.90%
3N	9E76	10	195.5	0.139	0.132	0.097	1.81	1.01%
3W	9E76	10	12.4	0.007	0.006	0.005	1.81	1.18%
4	9E04	8	71.7	0.031	0.033	0.017	1.81	1.22%
5	7E19	10	500	0.516	0.544	0.548	1.81	2.24%
6	E07-39	12	702.2	0.635	0.658	0.39	1.81	1.38%
7	8E14	8	72.5	0.032	0.028	0.032	1.81	1.80%
8N	8E23	8	94.4	0.044	0.043	0.047	1.81	1.13%
8W	8E23	8	84	0.041	0.04	0.04	1.81	1.10%

Table 3 presents peaking factors for each flow meter site and sewer basin for the following modeling scenarios completed by WWE:

- Existing Conditions Scenario

- Peaking Factor: Average Dry Weather Flow (ADWF) to Peak Dry Weather Flow (PDWF)
- Peaking Factor: ADWF to Peak Wet Weather Flow (PWWF)

- Ultimate Buildout Scenario
  - Peaking Factor: ADWF to PDWF
  - Peaking Factor: ADWF to PWWF

Table 3 Peaking Factors by Flow Meter Site

Site	Associated Basin	Existing Conditions Scenario Peaking Factors		Ultimate Buildout Scenario Peaking Factors	
		ADWF to PDWF	ADWF to PWWF	ADWF to PDWF	ADWF to PWWF
1	SSFMB5	1.27	3.70	1.37	3.42
2	SSFMB6	1.45	4.79	1.47	4.50
3N	SSFMB4A	1.36	4.58	1.57	4.42
3W	SSFMB4B	1.33	3.50	1.29	3.14
4	SSFMB2	1.41	1.84	1.13	1.40
5*	N/A	N/A	N/A	N/A	N/A
6	DCMB	1.02	3.52	1.64	3.97
7	SSFMB1A	2.74	3.48	2.72	3.44
8N	SSFMB1B	2.50	5.78	2.48	5.30
8W	SSFMB3	1.55	7.00	1.77	6.75

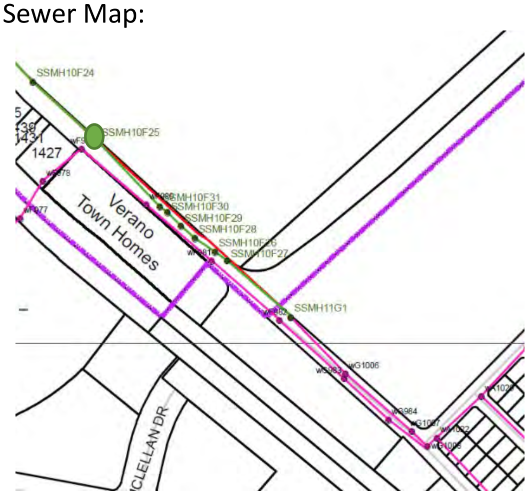
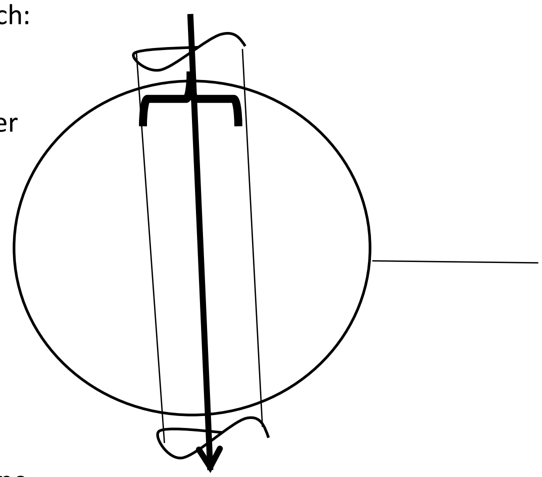
*Flow Meter Site 5 was installed to measure flows from Daly City, and because Daly City's sewer system is not included in the hydraulic model by WWE, peaking factors for this site are not provided.

WWE had questions about flow during rain events at locations that were not monitored. The flows coming from the Trailer Park off Mission and the flows from the top of F St. including a lot of cemetery area. The crew went during the Storm on 2/20/17. The flows on F street looked very similar to dry days about ¼ of an inch flowing about .5 ft./sec. The flows coming from the Trailer Park should a significant increase. It is a 6" pipe with about 1 inch of flow at over 9 ft. per sec., about .13 mgd. On a dry day, it was about half this amount.

Site 7 shows spikes during rain events which maybe from a sump pump on an upstream property.

Site 5 and 6 both had surcharge occurrences during storm events. Site 5 had more sever capacity issues. The crew check manhole between sites 5 and 6 during the storm on February 20, to try to determine the location of a restriction in flow. The manhole at the intersection of El Camino and C St was partially surcharge and the crew believes there is a restriction in flow somewhere between C St. and D St. MH-E07-023 and MH E07-097.

APPENDIX A

Site Information Report	Flow Monitor Site: 1 MH 10F25
Manhole Number SSMH Location: 1427 Mission St. MH Depth ~16’ Diameter: 10” Safety: Ok Traffic: Medium Gas: Ok Rungs: Yes Meter Type: Hach FL900 Depth: Pressure 3” Velocity: Doppler 1.5 ft./sec Meter Type Submerged	Ariel View: 
City Sewer Map:  	Flow Sketch: Flow Meter  10-inch Pipe
Surface View: 	Invert View: 

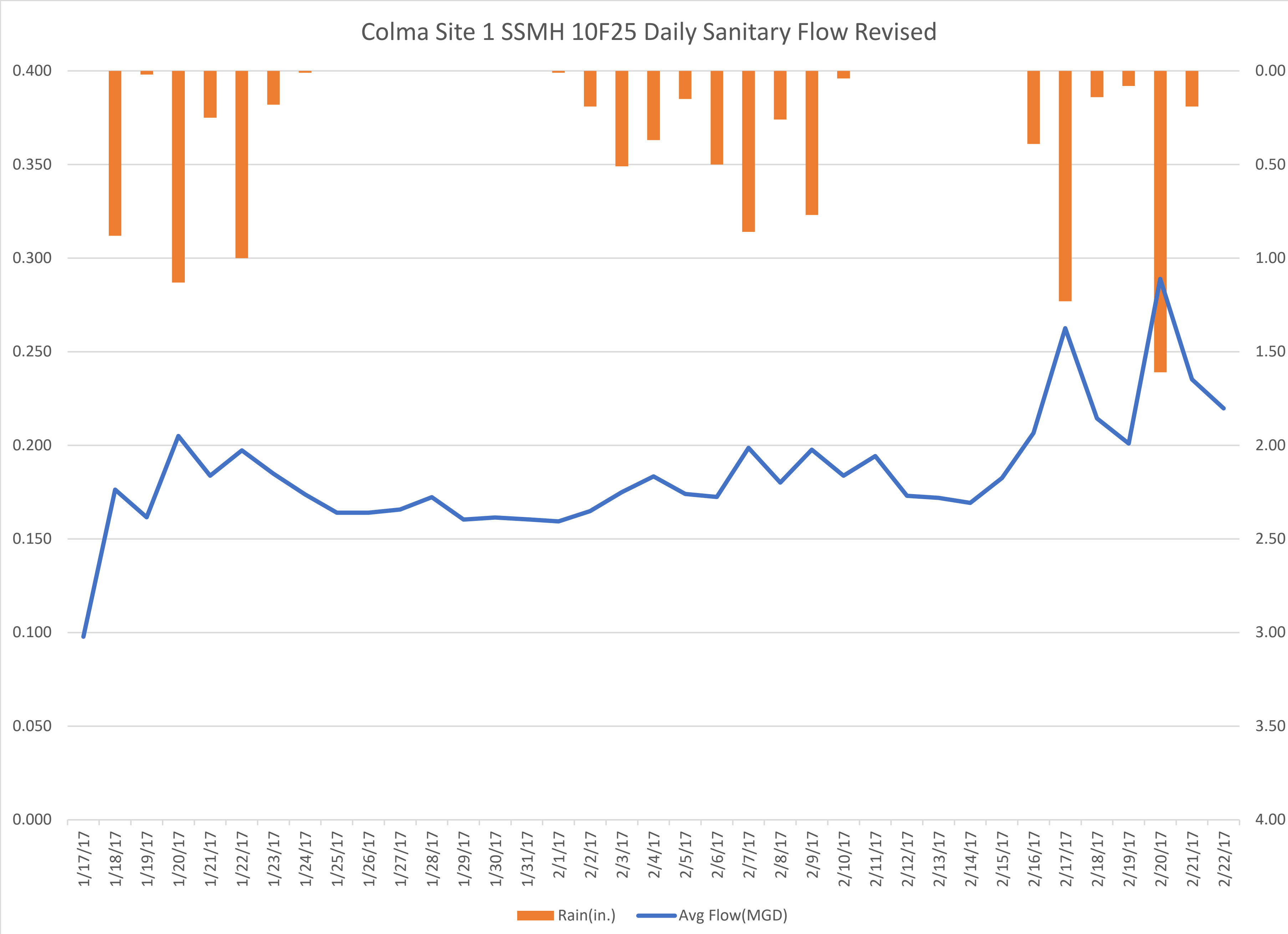
Outlet Pipe:	Inlet Pipe:
	

Colma Site 1 SSMH 10F25 Sanitary Flow Revised

Daily Summary

Date	Day	Avg Flow(MGD)	Min Flow(MGD)	Max Flow(MGD)	Max Depth(in.)	Rain(in.)
1/17/17	Tuesday	0.098	0.000	0.296	3.575	0.00
1/18/17	Wednesday	0.176	0.053	0.543	4.389	0.88
1/19/17	Thursday	0.162	0.055	0.288	3.452	0.02
1/20/17	Friday	0.205	0.090	0.909	5.864	1.13
1/21/17	Saturday	0.184	0.074	0.375	3.910	0.25
1/22/17	Sunday	0.197	0.102	0.526	4.402	1.00
1/23/17	Monday	0.185	0.077	0.463	4.117	0.18
1/24/17	Tuesday	0.174	0.061	0.515	4.447	0.01
1/25/17	Wednesday	0.164	0.064	0.508	4.369	0.00
1/26/17	Thursday	0.164	0.062	0.412	3.983	0.00
1/27/17	Friday	0.166	0.058	0.394	3.863	0.00
1/28/17	Saturday	0.172	0.070	0.352	3.655	0.00
1/29/17	Sunday	0.160	0.050	0.342	3.611	0.00
1/30/17	Monday	0.161	0.065	0.422	4.102	0.00
1/31/17	Tuesday	0.161	0.058	0.475	4.244	0.00
2/1/17	Wednesday	0.159	0.062	0.373	3.891	0.01
2/2/17	Thursday	0.165	0.070	0.353	3.781	0.19
2/3/17	Friday	0.175	0.062	0.432	4.227	0.51
2/4/17	Saturday	0.183	0.076	0.411	4.077	0.37
2/5/17	Sunday	0.174	0.071	0.330	3.636	0.15
2/6/17	Monday	0.172	0.065	0.349	3.749	0.50
2/7/17	Tuesday	0.199	0.096	0.452	4.192	0.86
2/8/17	Wednesday	0.180	0.080	0.385	4.027	0.26
2/9/17	Thursday	0.198	0.076	0.442	4.200	0.77
2/10/17	Friday	0.184	0.076	0.381	4.177	0.04
2/11/17	Saturday	0.194	0.086	0.417	4.271	0.00
2/12/17	Sunday	0.173	0.092	0.291	3.712	0.00
2/13/17	Monday	0.172	0.073	0.333	3.766	0.00
2/14/17	Tuesday	0.169	0.066	0.304	3.772	0.00
2/15/17	Wednesday	0.183	0.072	0.339	3.871	0.00
2/16/17	Thursday	0.207	0.077	0.405	4.006	0.39
2/17/17	Friday	0.263	0.093	0.525	4.748	1.23
2/18/17	Saturday	0.214	0.098	0.388	4.282	0.14
2/19/17	Sunday	0.201	0.103	0.371	4.240	0.08
2/20/17	Monday	0.289	0.138	0.644	5.058	1.61
2/21/17	Tuesday	0.235	0.133	0.413	4.361	0.19
2/22/17	Wednesday	0.220	0.103	0.362	4.331	0.00

Average Flow	0.186	MGD
Max Depth	5.86	Inches
Total Rain	10.77	Inches


Colma Site 1 SSMH 10F25 Daily Sanitary Flow Revised
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
1/17/17
1/18/17
1/19/17
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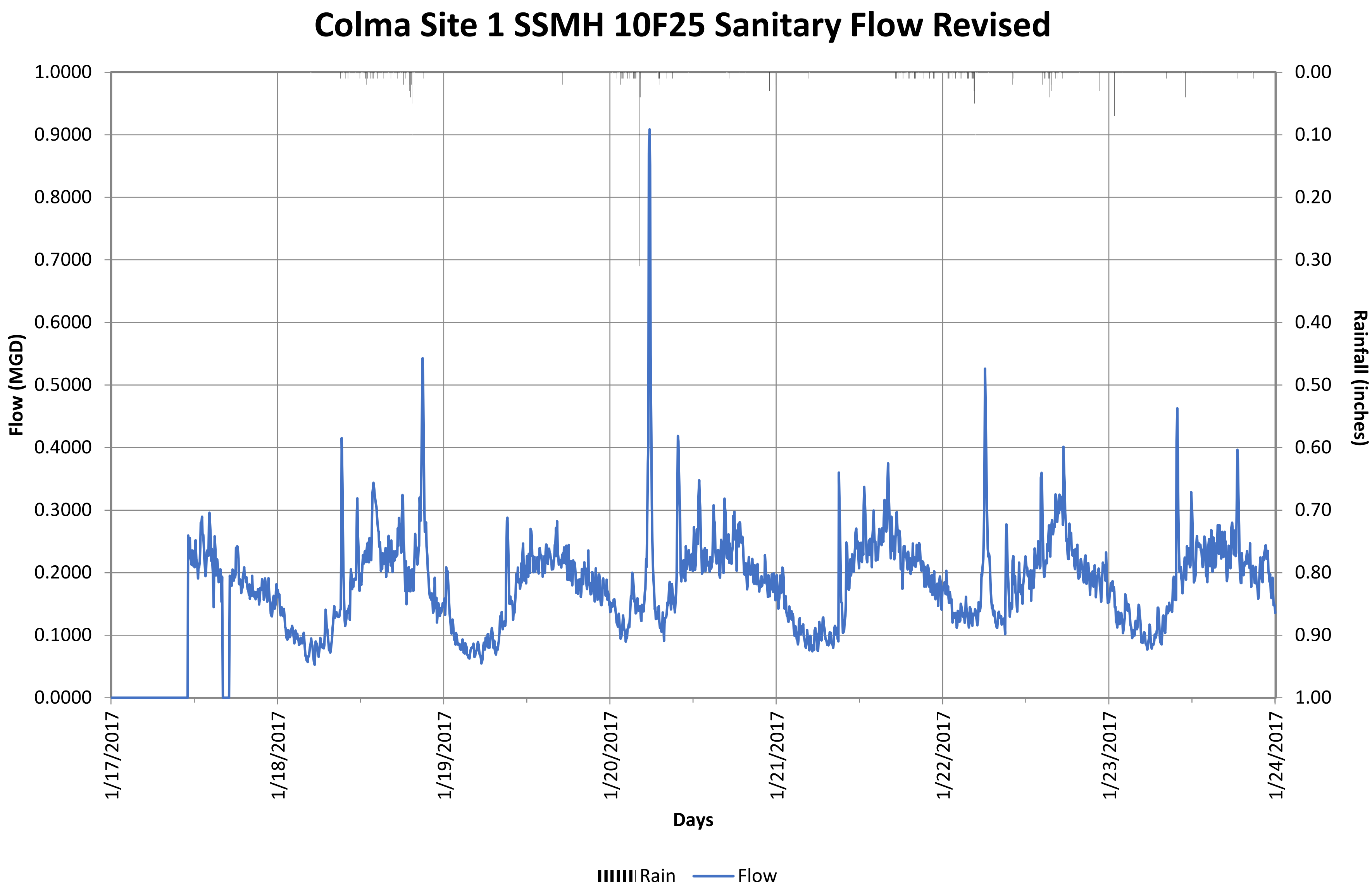
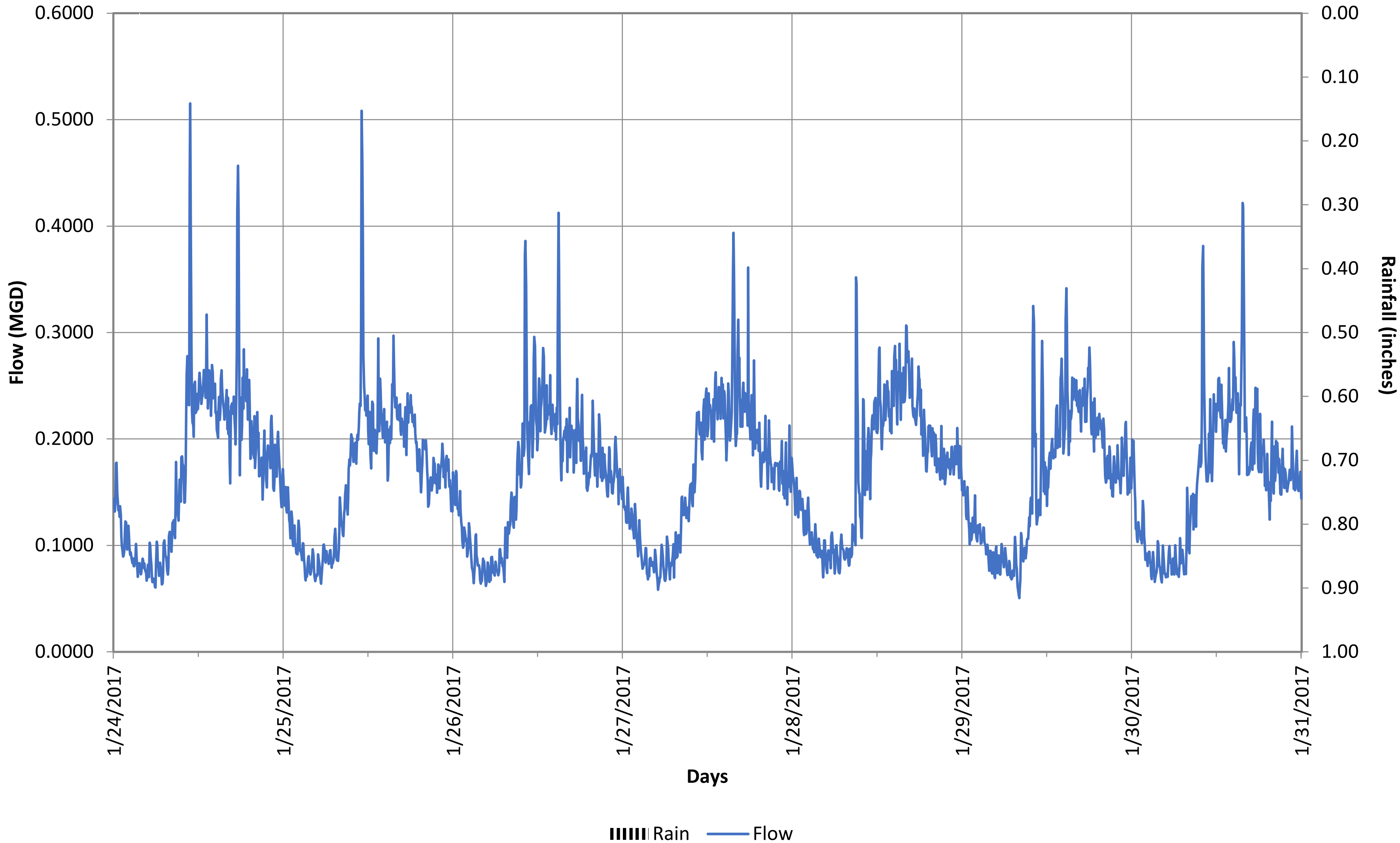
Rain(in.)
Avg Flow(MGD)



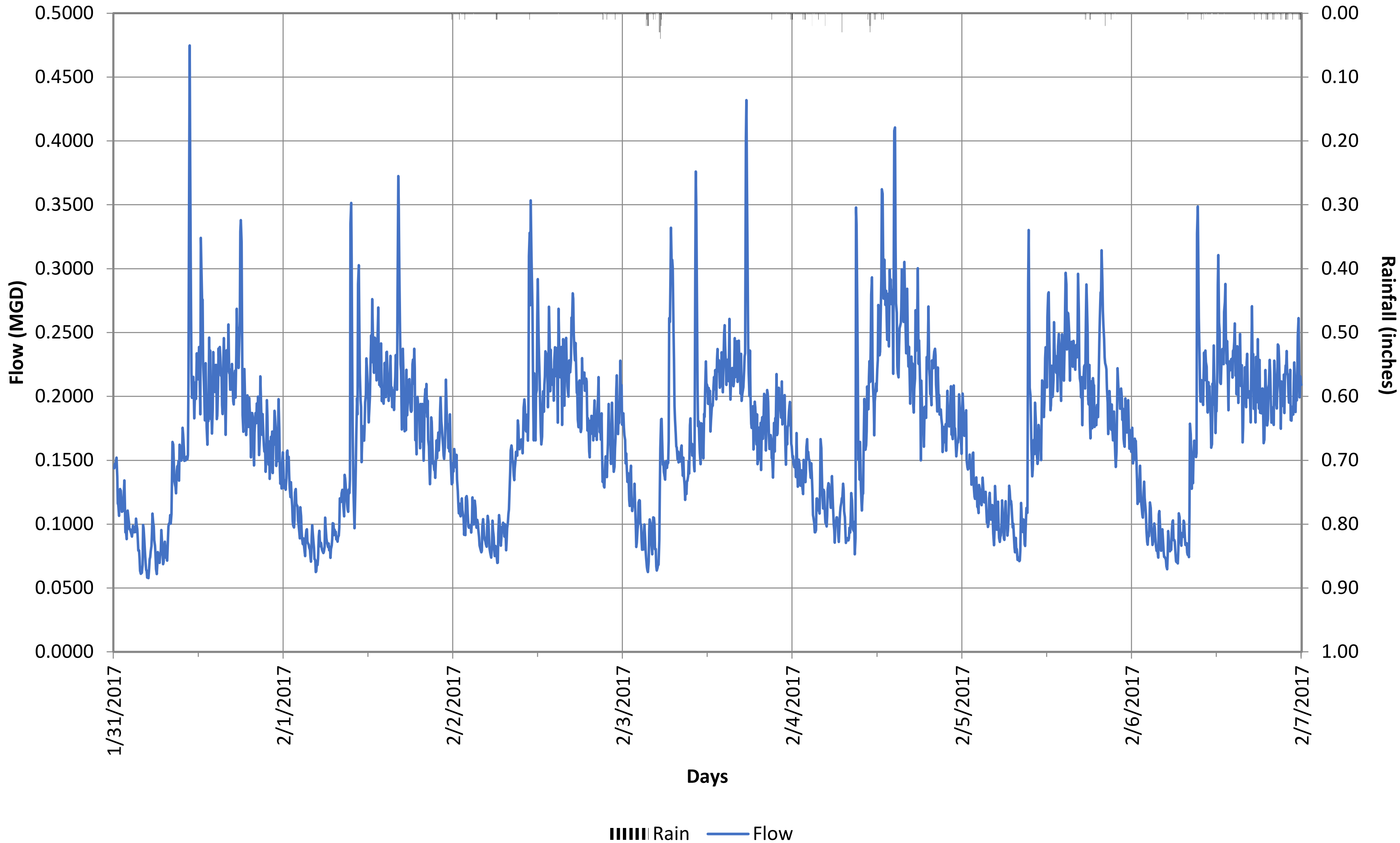
	1/17/2017(Tue)	1/18/2017(Wed)	1/19/2017(Thu)	1/20/2017(Fri)	1/21/2017(Sat)	1/22/2017(Sun)	1/23/2017(Mon)
Maximum	0.296	0.543	0.288	0.909	0.375	0.526	0.463
Average	0.098	0.176	0.162	0.205	0.184	0.197	0.185
Minimum	0.000	0.053	0.055	0.090	0.074	0.102	0.077
Rain (inches)	0.00	0.88	0.02	1.13	0.25	1.00	0.18

Colma Site 1 SSMH 10F25 Sanitary Flow Revised



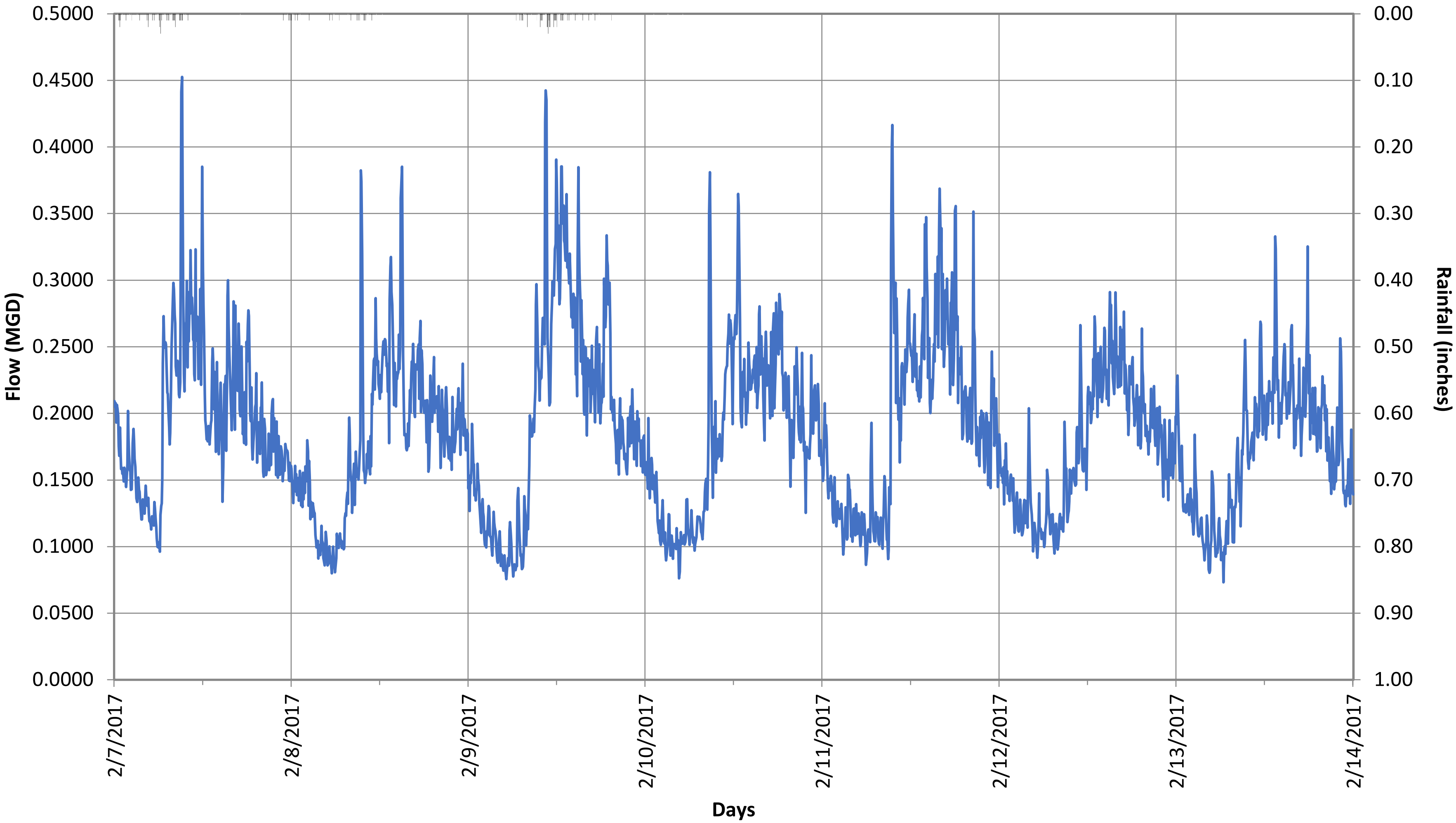
	1/24/2017(Tue)	1/25/2017(Wed)	1/26/2017(Thu)	1/27/2017(Fri)	1/28/2017(Sat)	1/29/2017(Sun)	1/30/2017(Mon)
Maximum	0.515	0.508	0.412	0.394	0.352	0.342	0.422
Average	0.174	0.164	0.164	0.166	0.172	0.160	0.161
Minimum	0.061	0.064	0.062	0.058	0.070	0.050	0.065
Rain (inches)	0.01	0.00	0.00	0.00	0.00	0.00	0.00

Colma Site 1 SSMH 10F25 Sanitary Flow Revised



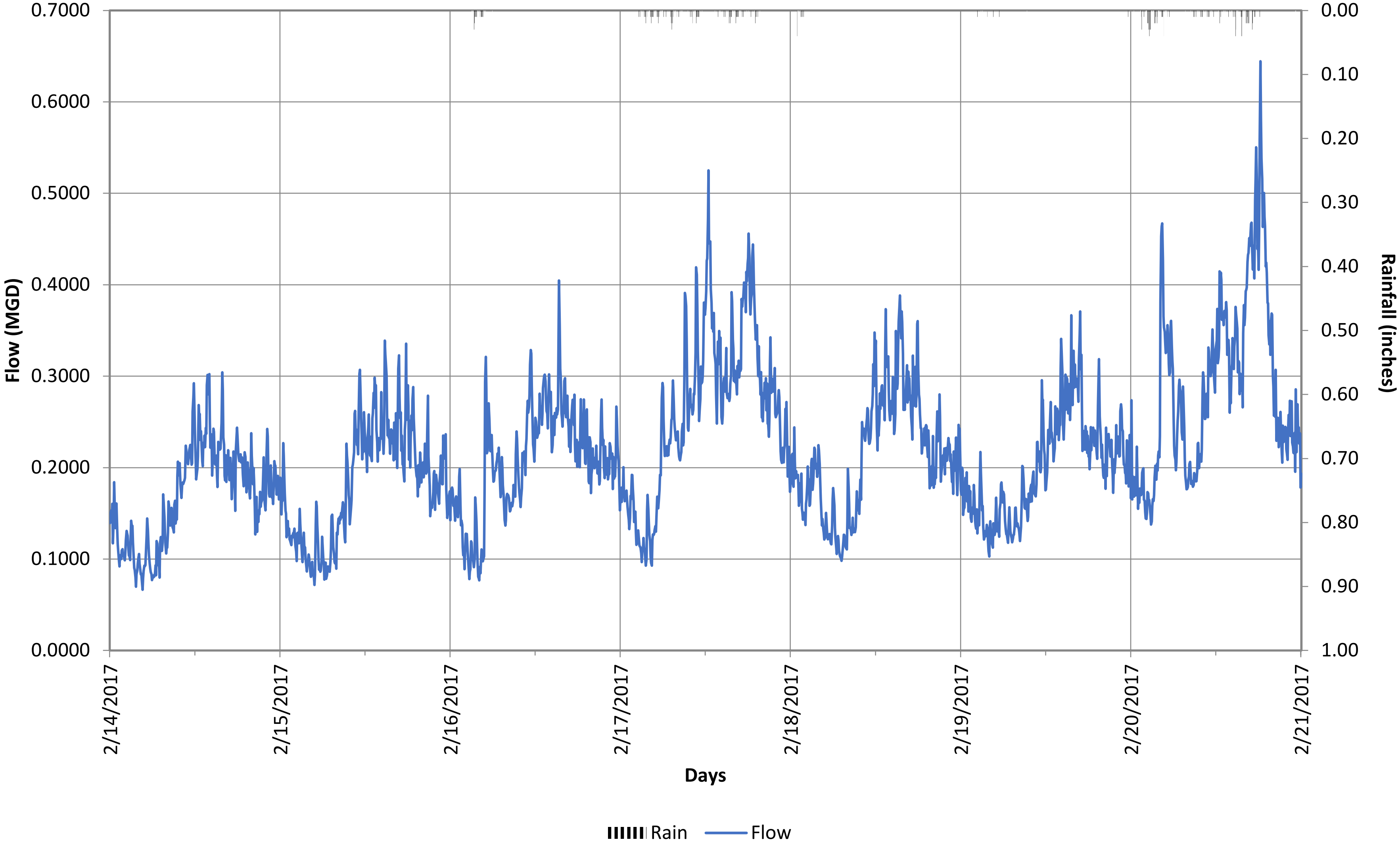
	1/31/2017(Tue)	2/1/2017(Wed)	2/2/2017(Thu)	2/3/2017(Fri)	2/4/2017(Sat)	2/5/2017(Sun)	2/6/2017(Mon)
Maximum	0.475	0.373	0.353	0.432	0.411	0.330	0.349
Average	0.161	0.159	0.165	0.175	0.183	0.174	0.172
Minimum	0.058	0.062	0.070	0.062	0.076	0.071	0.065
Rain (inches)	0.00	0.01	0.19	0.51	0.37	0.15	0.50

Colma Site 1 SSMH 10F25 Sanitary Flow Revised



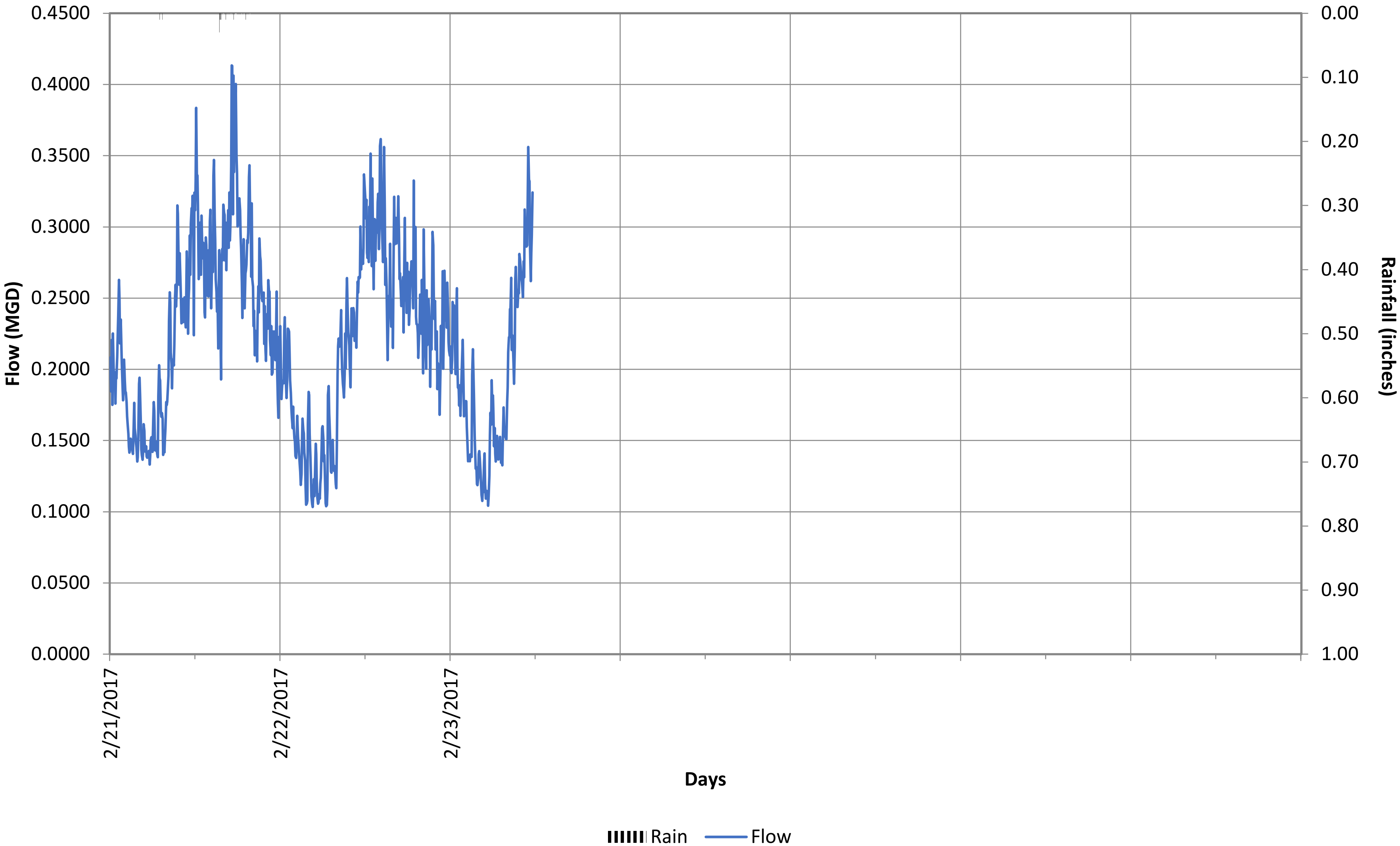
	2/7/2017(Tue)	2/8/2017(Wed)	2/9/2017(Thu)	2/10/2017(Fri)	2/11/2017(Sat)	2/12/2017(Sun)	2/13/2017(Mon)
Maximum	0.452	0.385	0.442	0.381	0.417	0.291	0.333
Average	0.199	0.180	0.198	0.184	0.194	0.173	0.172
Minimum	0.096	0.080	0.076	0.076	0.086	0.092	0.073
Rain (inches)	0.86	0.26	0.77	0.04	0.00	0.00	0.00

Colma Site 1 SSMH 10F25 Sanitary Flow Revised



	2/14/2017(Tue)	2/15/2017(Wed)	2/16/2017(Thu)	2/17/2017(Fri)	2/18/2017(Sat)	2/19/2017(Sun)	2/20/2017(Mon)
Maximum	0.304	0.339	0.405	0.525	0.388	0.371	0.644
Average	0.169	0.183	0.207	0.263	0.214	0.201	0.289
Minimum	0.066	0.072	0.077	0.093	0.098	0.103	0.138
Rain (inches)	0.00	0.00	0.39	1.23	0.14	0.08	1.61

Colma Site 1 SSMH 10F25 Sanitary Flow Revised

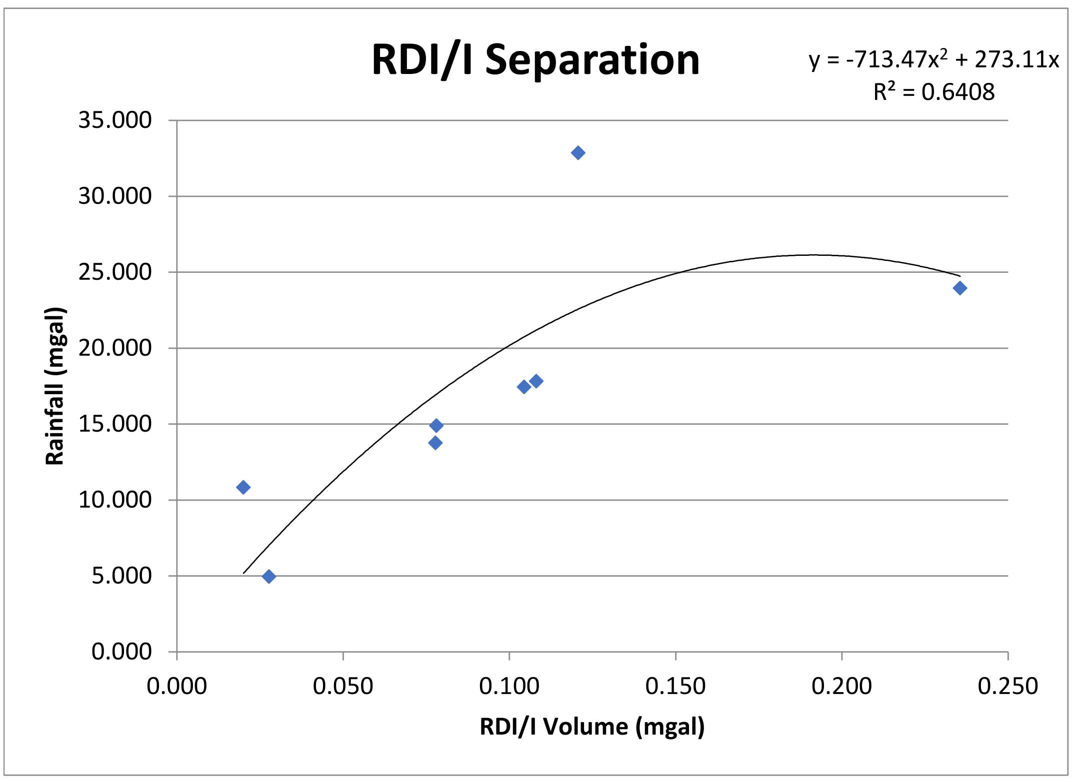


	2/21/2017(Tue)	2/22/2017(Wed)					
Maximum	0.413	0.362					
Average	0.235	0.220					
Minimum	0.133	0.103					
Rain (inches)	0.19	0.00					

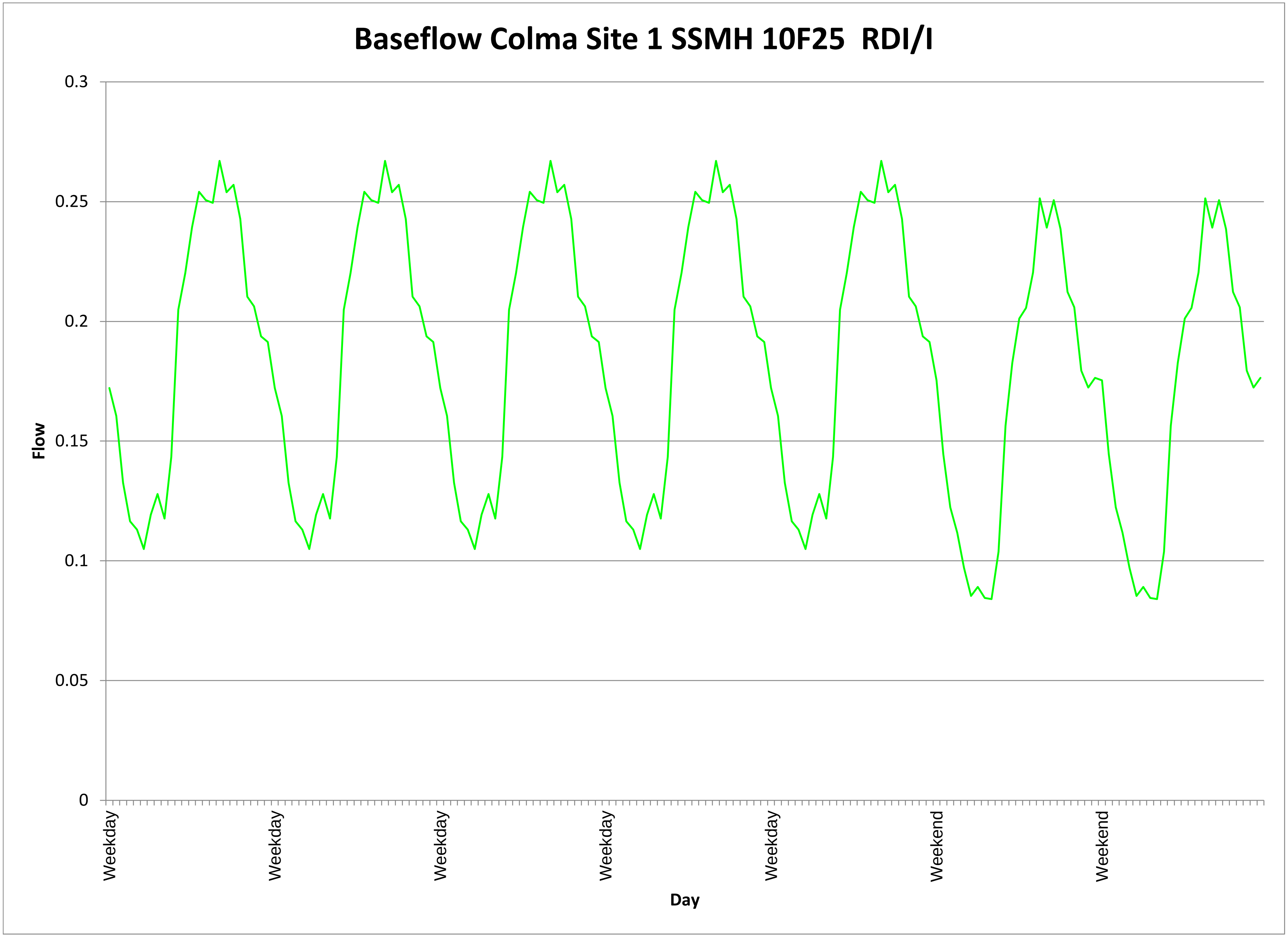
Colma Site 1 SSMH 10F25 RDI/I

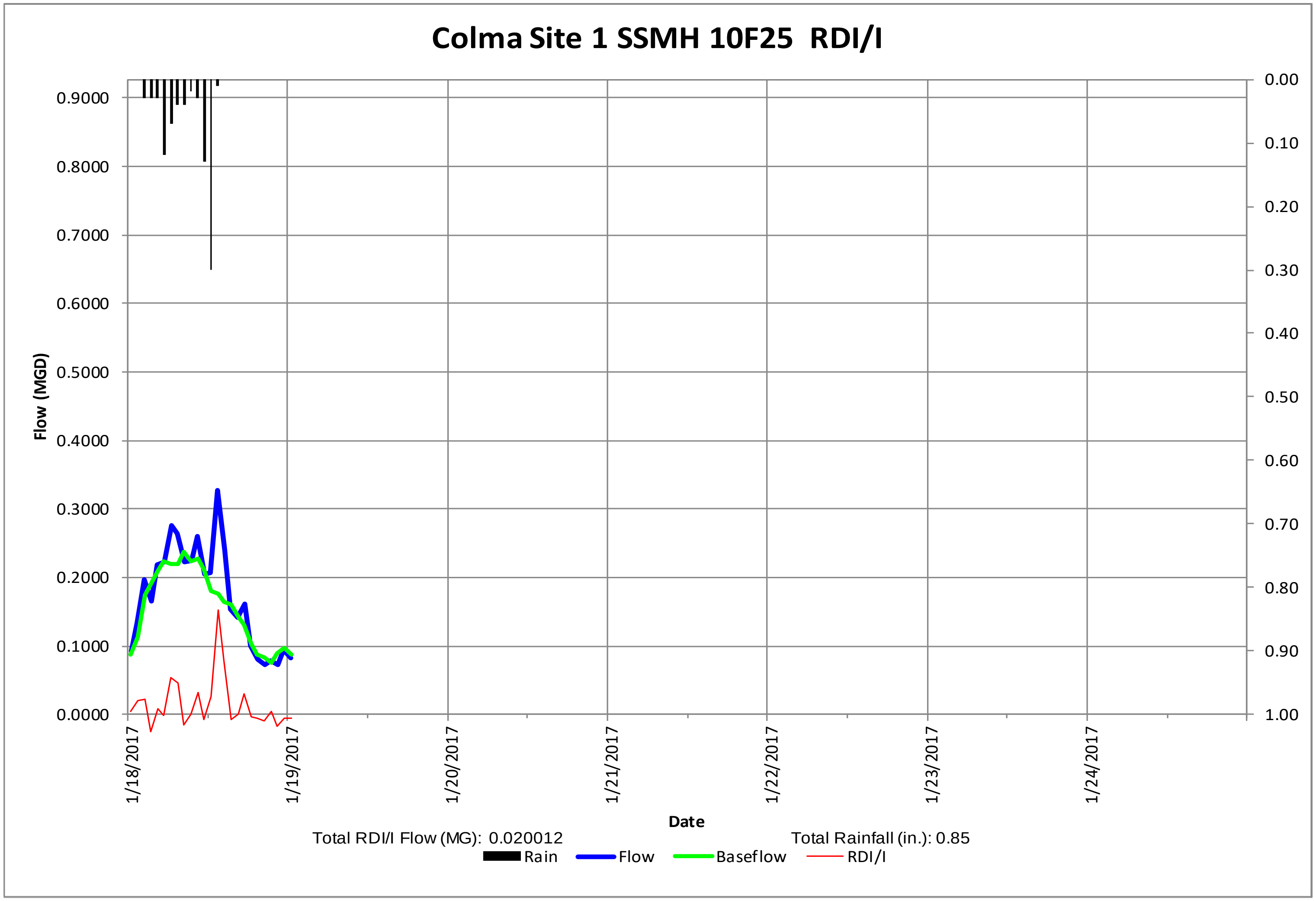
RDI/I Analysis, Monitor Return Ratio Summary

Storm Start (Date)	RDI/I Volume (mgal)	Monitor Area (acres)	Rainfall (mgal)	Return Ratio (%)
1/18/2017	0.020	469.2	10.829	0.18%
1/20/2017	0.078	469.2	14.906	0.52%
1/21/2017	0.108	469.2	17.836	0.61%
2/2/2017	0.078	469.2	13.759	0.57%
2/5/2017	0.121	469.2	32.869	0.37%
2/16/2017	0.028	469.2	4.969	0.56%
2/17/2017	0.104	469.2	17.454	0.60%
2/19/2017	0.236	469.2	23.951	0.98%
Average R%				0.55%
Average R% of top 3 R%				0.79%

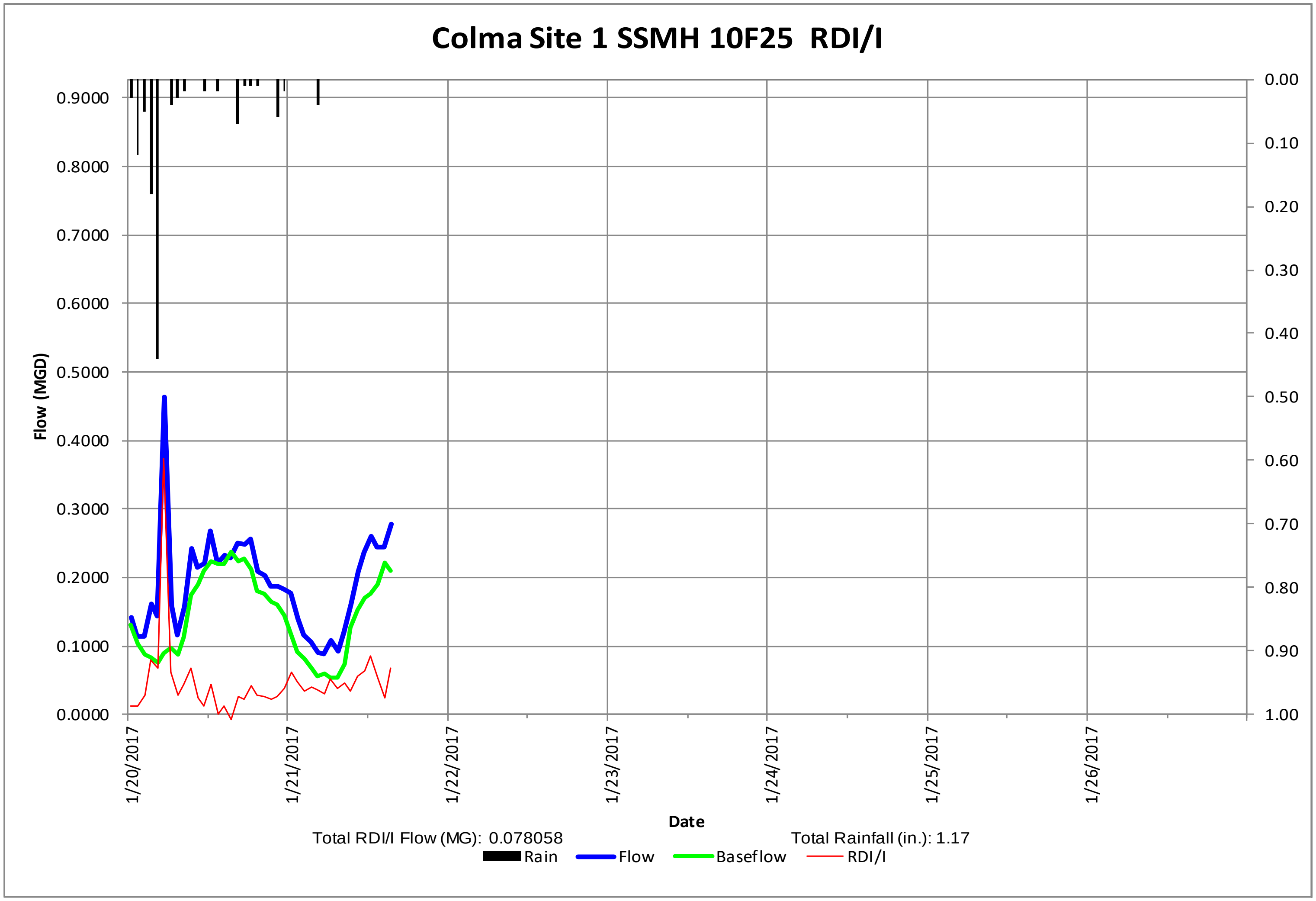


Baseflows	Weekend	Weekday
Max	0.251	0.267
Avg	0.166	0.190
Min	0.084	0.105

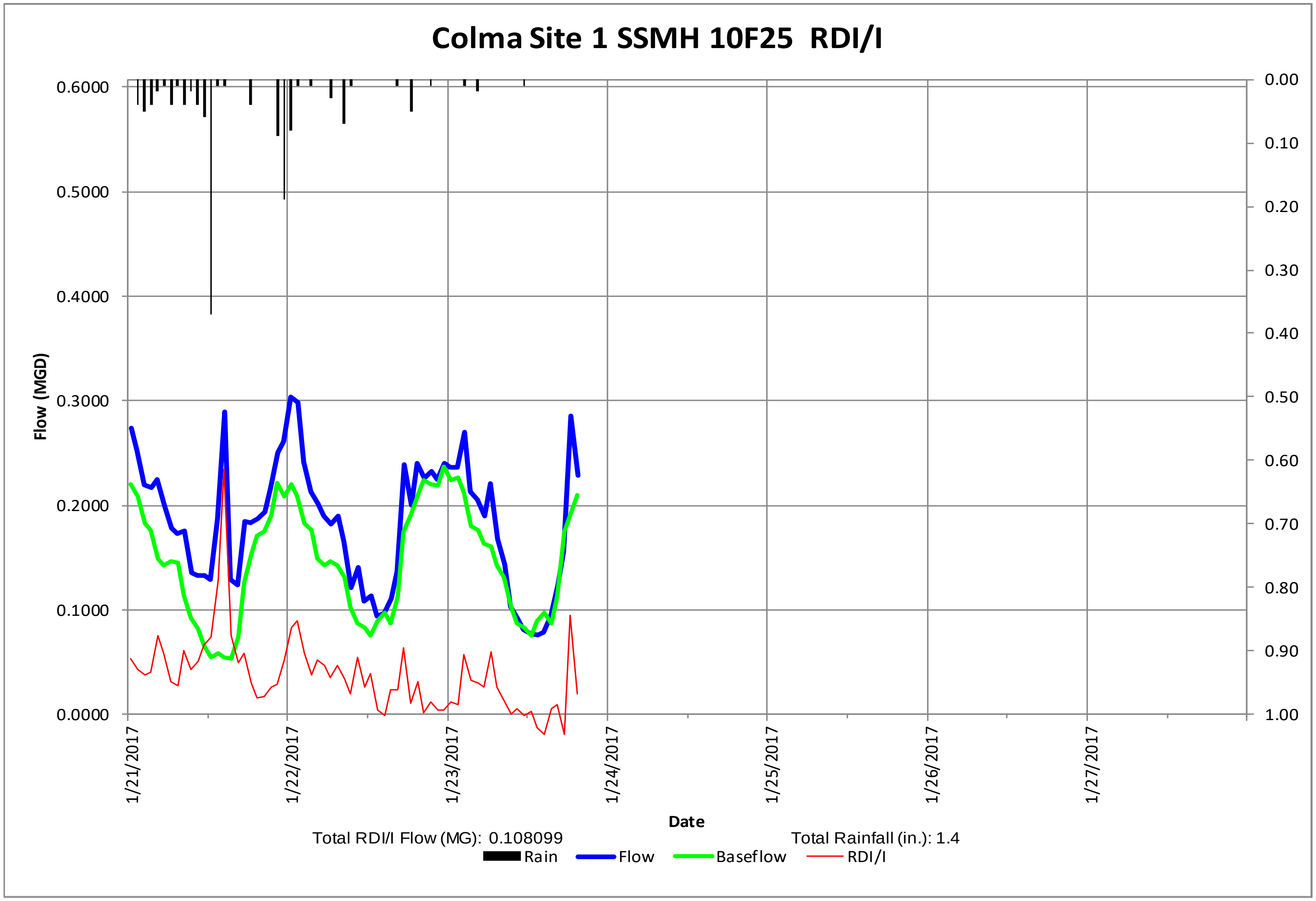

Baseflow Colma Site 1 SSMH 10F25 RDI/I
Flow
0.3
0.25
0.2
0.15
0.1
0.05
0
Weekday
Weekday
Weekday
Weekday
Weekday
Weekend
Weekend
Day



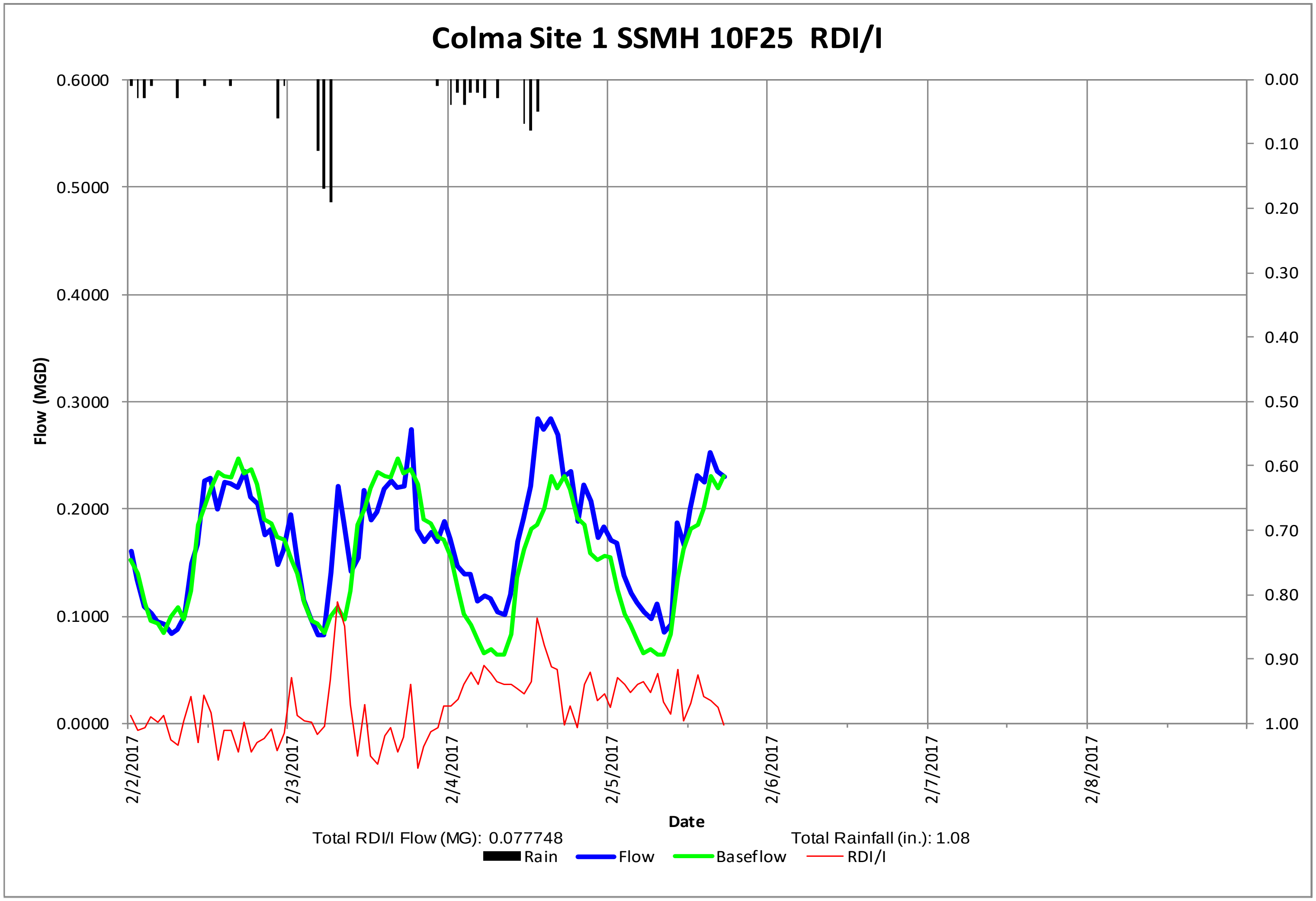
Storm of 1/18/2017



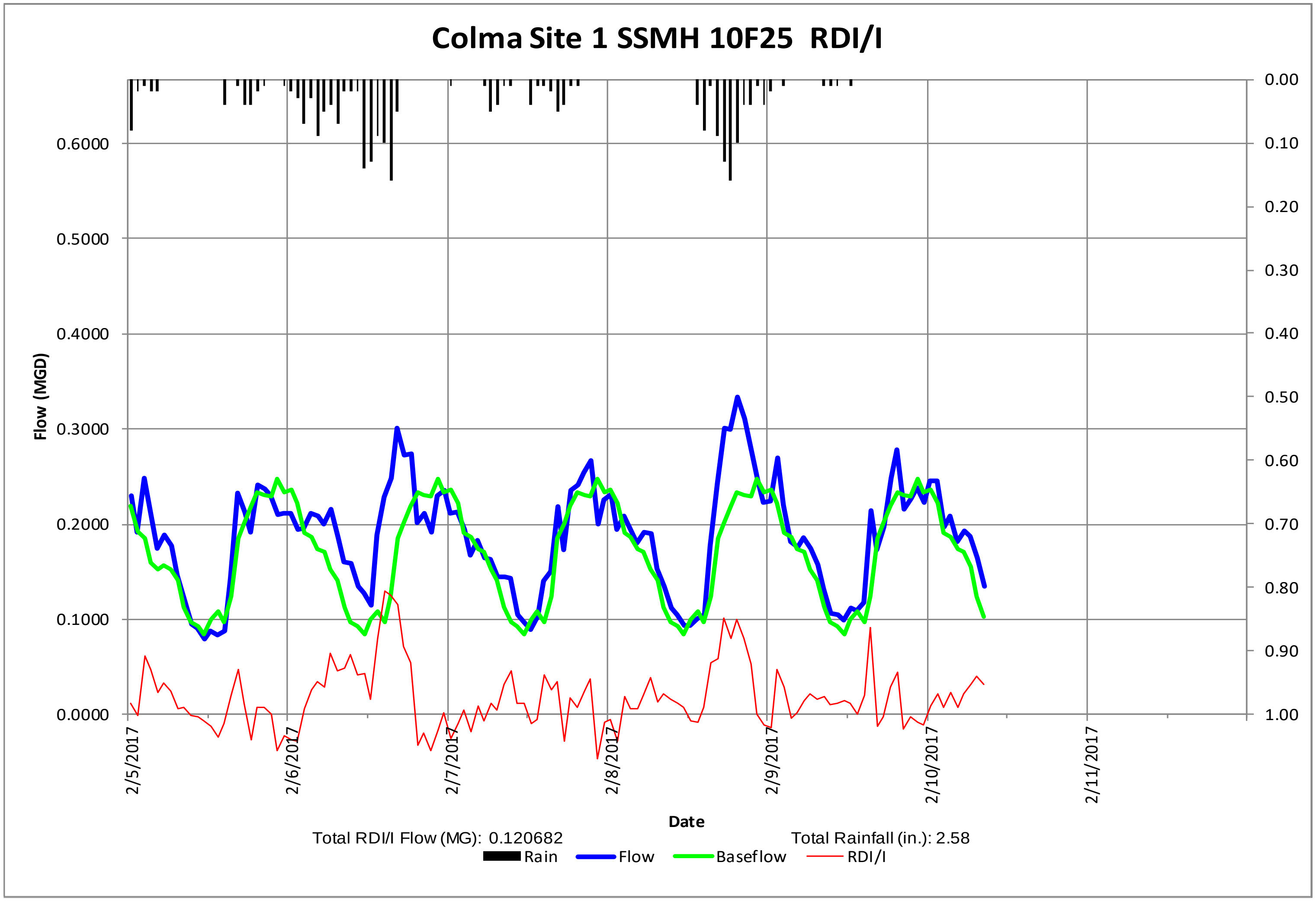
Storm of 1/20/2017



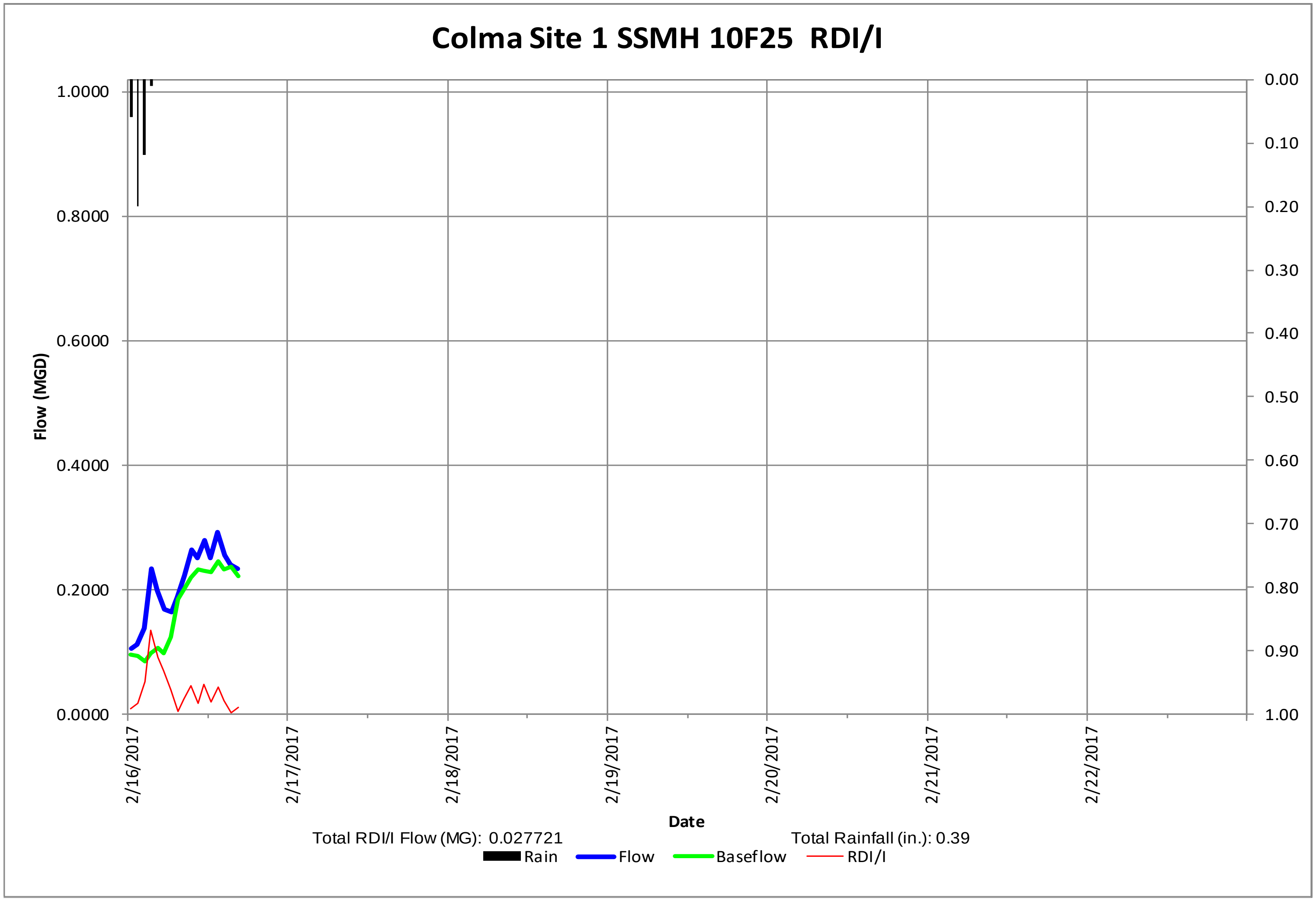
Storm of 1/21/2017



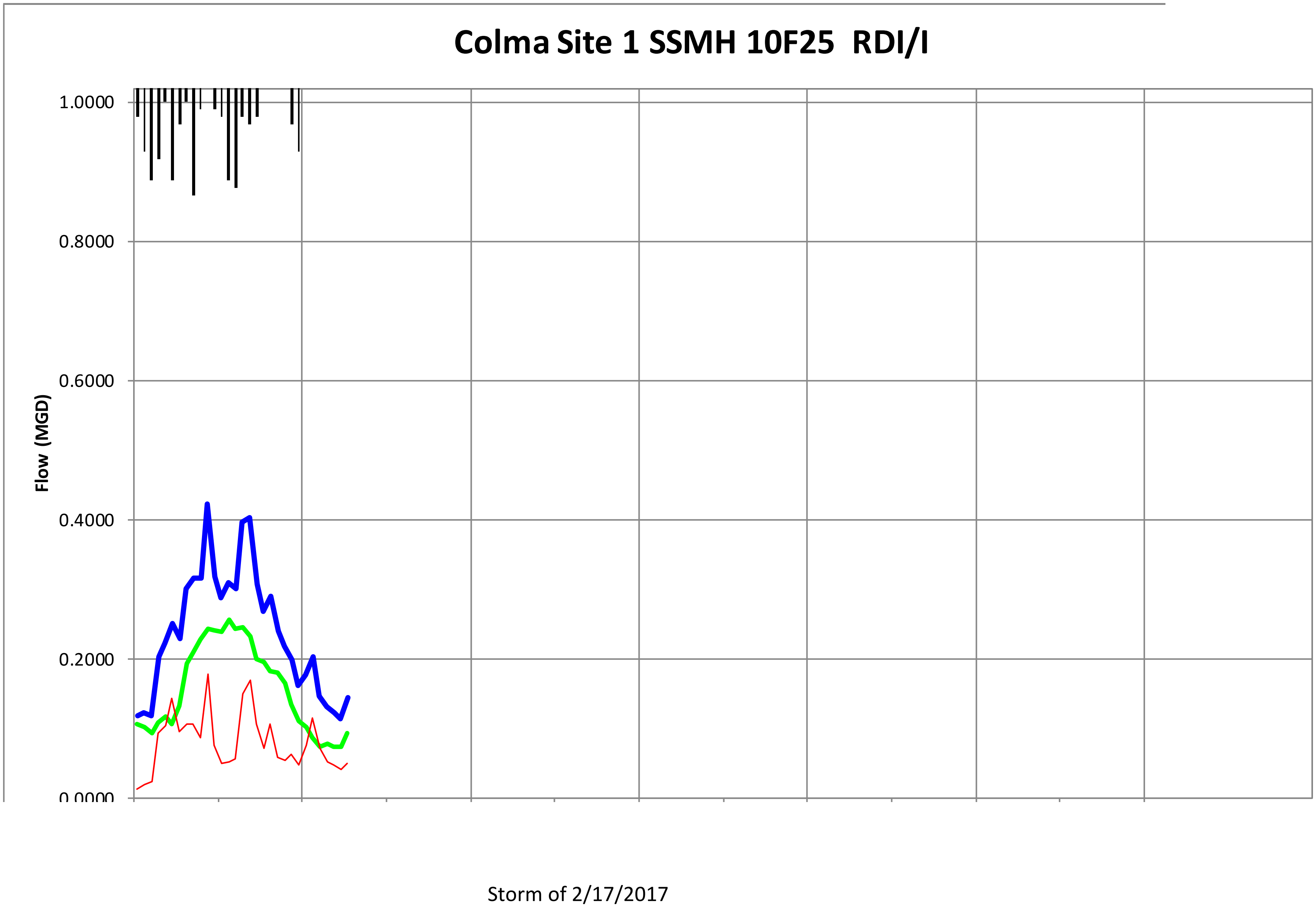
Storm of 2/2/2017



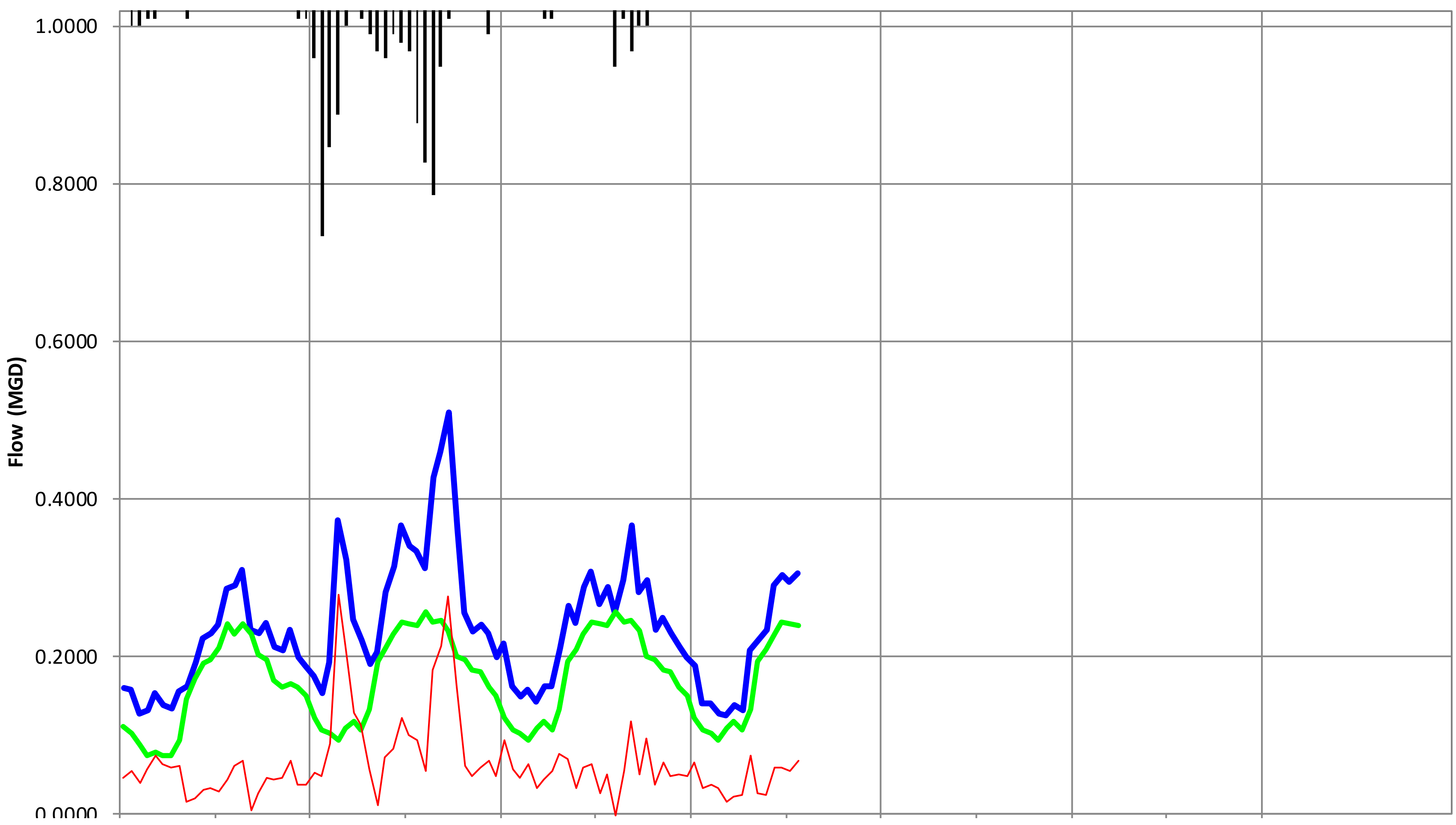
Storm of 2/5/2017



Storm of 2/16/2017


Colma Site 1 SSMH 10F25 RDI/I
1.0000
0.8000
0.6000
0.4000
0.2000
0.0000
Flow (MGD)
Storm of 2/17/2017

Colma Site 1 SSMH 10F25 RDI/I



Storm of 2/19/2017

Site Information Report

Flow Monitor Site: 2

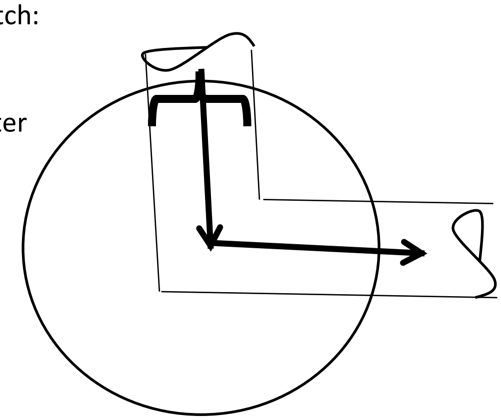
Manhole Number SSMH 9F61
Location: Junipero Serra Blvd. MH Depth ~4'
Diameter: 6"
Safety: Ok
Traffic: None
Gas: Ok
Rungs: No
Meter Type: Hach FL900
Depth: 0.75"
Velocity: Doppler 3 ft./sec
Meter Type FloDar

Ariel View:

City Sewer Map:

Flow Sketch:

Flow Meter



6-inch Pipe

Surface View:

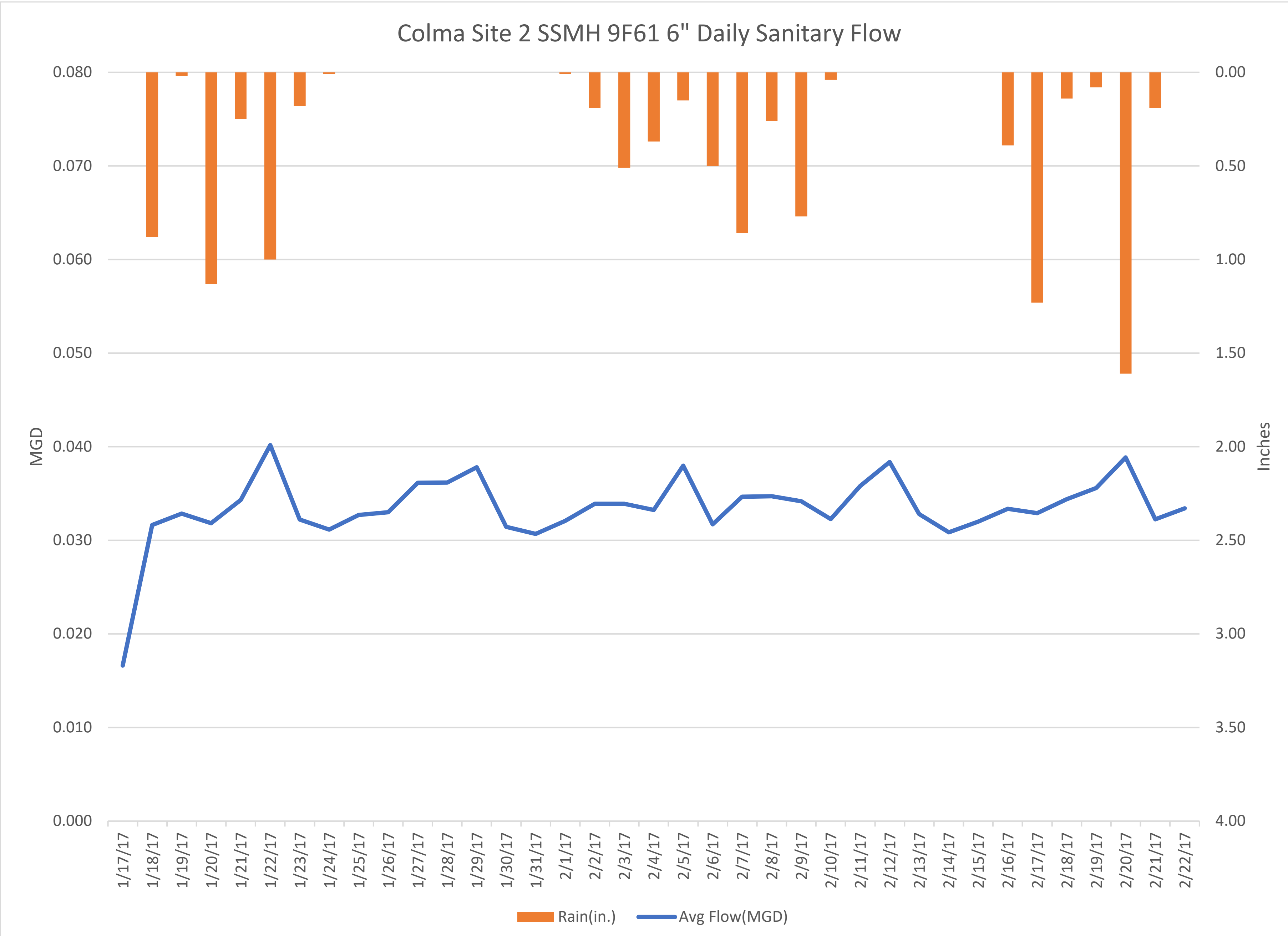
Invert View:

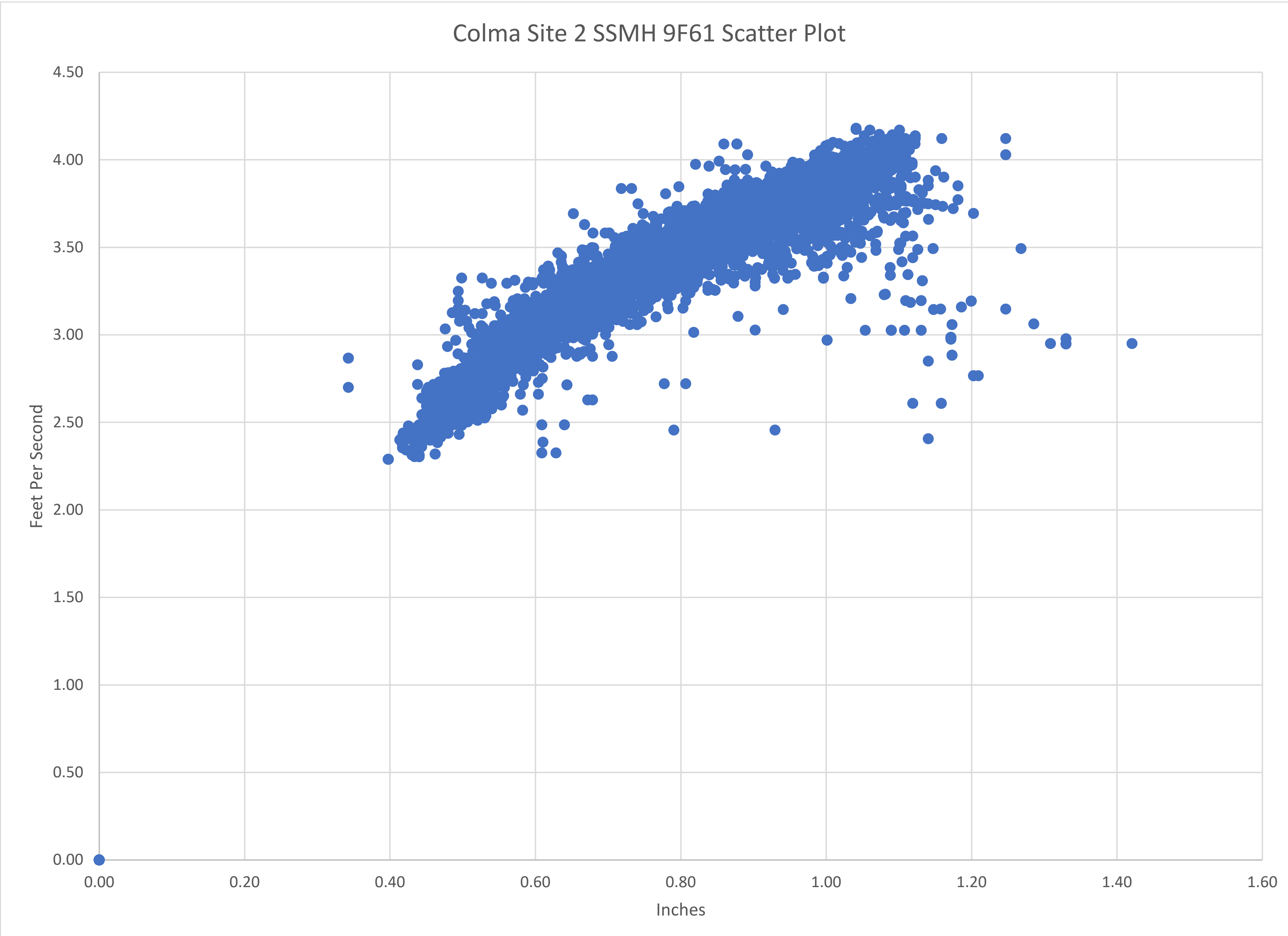
Outlet Pipe:	Inlet Pipe:
	

Colma Site 2 SSMH 9F61 6" Sanitary Flow

Daily Summary

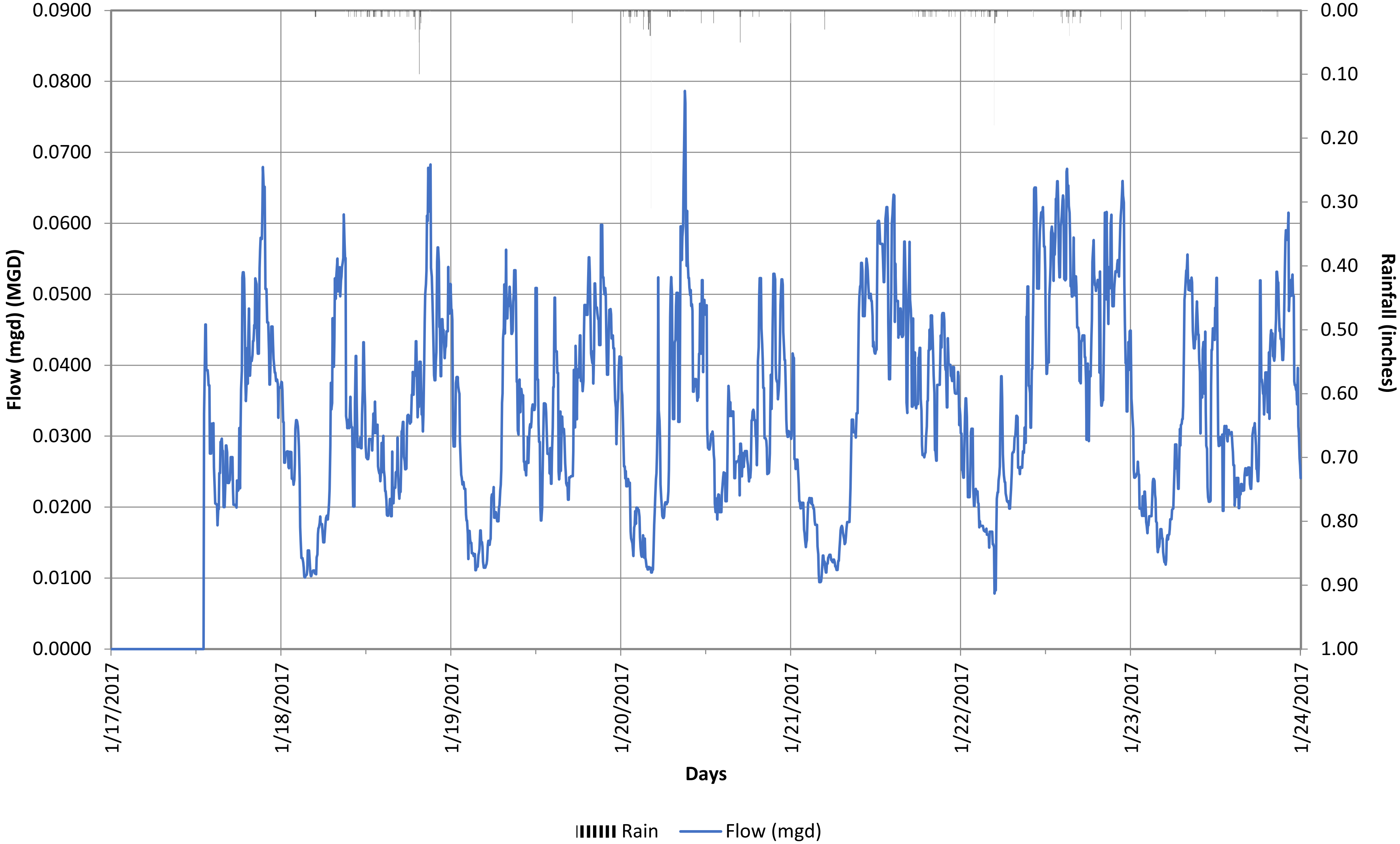
Day	Date	Avg Flow(MGD)	Min Flow(MGD)	Max Flow(MGD)	Max Depth(in.)	Rain(in.)
Tuesday	1/17/17	0.017	0.000	0.068	1.123	0.00
Wednesday	1/18/17	0.032	0.010	0.068	1.421	0.88
Thursday	1/19/17	0.033	0.011	0.060	1.051	0.02
Friday	1/20/17	0.032	0.011	0.079	1.247	1.13
Saturday	1/21/17	0.034	0.009	0.064	1.103	0.25
Sunday	1/22/17	0.040	0.008	0.068	1.172	1.00
Monday	1/23/17	0.032	0.012	0.061	1.199	0.18
Tuesday	1/24/17	0.031	0.008	0.057	1.043	0.01
Wednesday	1/25/17	0.033	0.012	0.062	1.147	0.00
Thursday	1/26/17	0.033	0.012	0.067	1.150	0.00
Friday	1/27/17	0.036	0.011	0.060	1.054	0.00
Saturday	1/28/17	0.036	0.012	0.066	1.109	0.00
Sunday	1/29/17	0.038	0.011	0.065	1.186	0.00
Monday	1/30/17	0.031	0.012	0.060	1.046	0.00
Tuesday	1/31/17	0.031	0.011	0.063	1.132	0.00
Wednesday	2/1/17	0.032	0.010	0.067	1.209	0.01
Thursday	2/2/17	0.034	0.012	0.065	1.141	0.19
Friday	2/3/17	0.034	0.009	0.064	1.106	0.51
Saturday	2/4/17	0.033	0.010	0.057	1.052	0.37
Sunday	2/5/17	0.038	0.012	0.067	1.114	0.15
Monday	2/6/17	0.032	0.008	0.059	1.065	0.50
Tuesday	2/7/17	0.035	0.014	0.063	1.119	0.86
Wednesday	2/8/17	0.035	0.010	0.064	1.111	0.26
Thursday	2/9/17	0.034	0.010	0.063	1.080	0.77
Friday	2/10/17	0.032	0.011	0.060	1.062	0.04
Saturday	2/11/17	0.036	0.010	0.067	1.119	0.00
Sunday	2/12/17	0.038	0.009	0.067	1.122	0.00
Monday	2/13/17	0.033	0.011	0.062	1.080	0.00
Tuesday	2/14/17	0.031	0.009	0.057	1.045	0.00
Wednesday	2/15/17	0.032	0.011	0.059	1.055	0.00
Thursday	2/16/17	0.033	0.009	0.057	1.040	0.39
Friday	2/17/17	0.033	0.011	0.058	1.071	1.23
Saturday	2/18/17	0.034	0.009	0.065	1.091	0.14
Sunday	2/19/17	0.036	0.009	0.067	1.103	0.08
Monday	2/20/17	0.039	0.015	0.068	1.181	1.61
Tuesday	2/21/17	0.032	0.011	0.059	1.047	0.19
Wednesday	2/22/17	0.033	0.012	0.057	1.031	0.00


Colma Site 2 SSMH 9F61 6" Daily Sanitary Flow
MGD
Inches
0.080
0.070
0.060
0.050
0.040
0.030
0.020
0.010
0.000
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
1/17/17
1/18/17
1/19/17
1/20/17
1/21/17
1/22/17
1/23/17
1/24/17
1/25/17
1/26/17
1/27/17
1/28/17
1/29/17
1/30/17
1/31/17
2/1/17
2/2/17
2/3/17
2/4/17
2/5/17
2/6/17
2/7/17
2/8/17
2/9/17
2/10/17
2/11/17
2/12/17
2/13/17
2/14/17
2/15/17
2/16/17
2/17/17
2/18/17
2/19/17
2/20/17
2/21/17
2/22/17
Rain(in.)
Avg Flow(MGD)



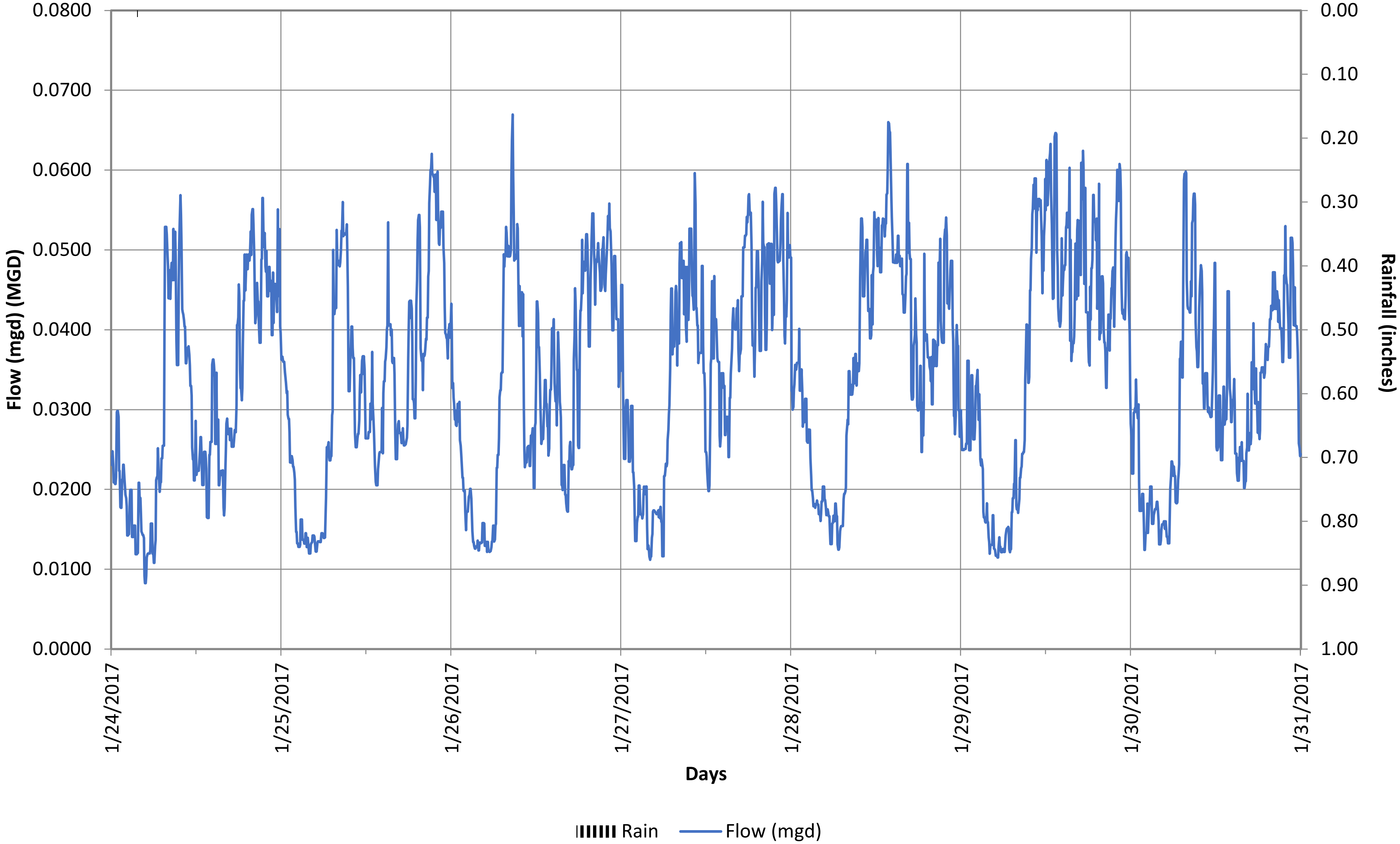
Colma Site 2 SSMH 9F61 Scatter Plot
Feet Per Second
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
1.60
Inches

Colma Site 2 SSMH 9F61 6" Sanitary Flow

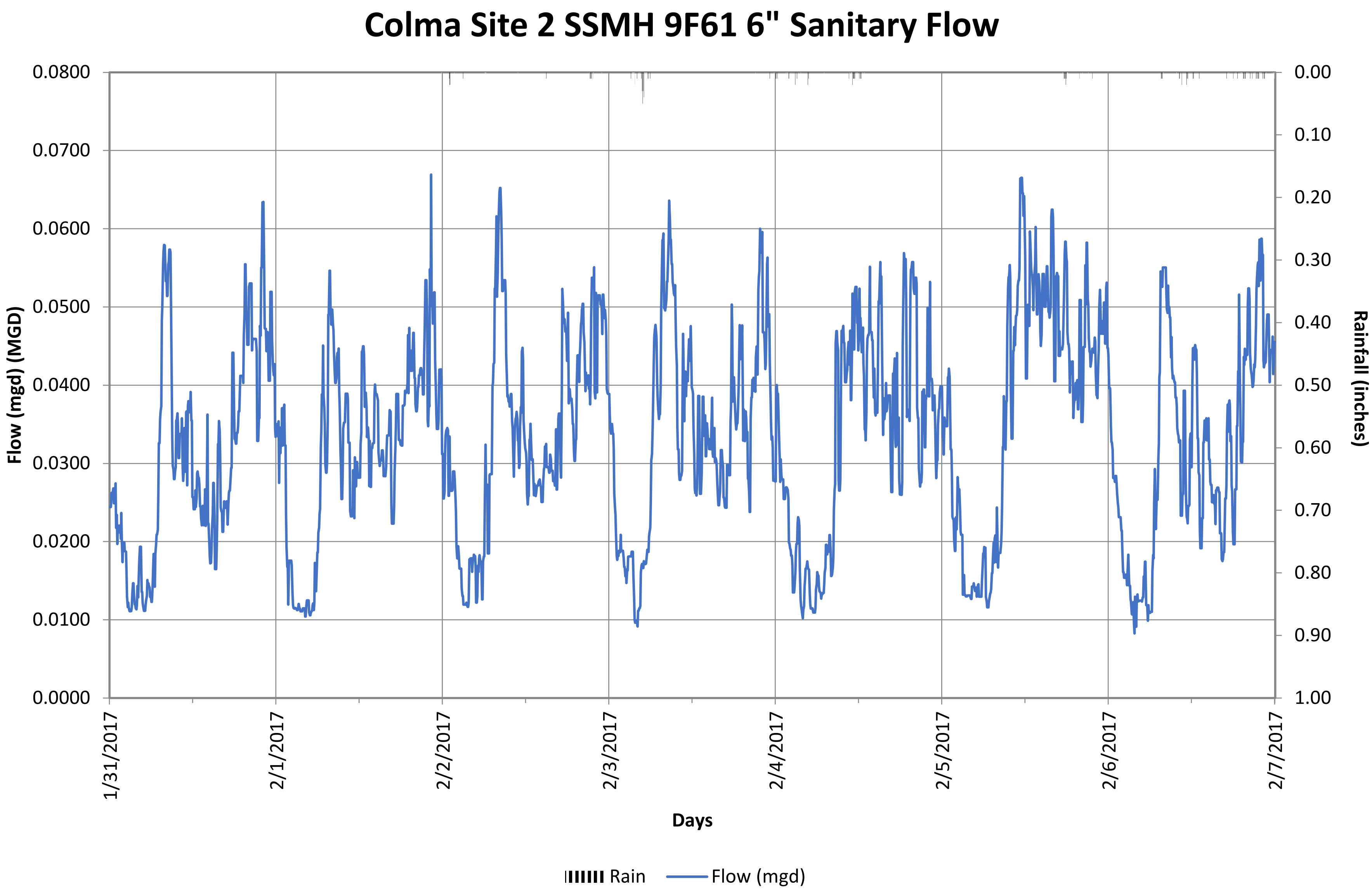


	1/17/2017(Tue)	1/18/2017(Wed)	1/19/2017(Thu)	1/20/2017(Fri)	1/21/2017(Sat)	1/22/2017(Sun)	1/23/2017(Mon)
Maximum	0.068	0.068	0.060	0.079	0.064	0.068	0.061
Average	0.017	0.032	0.033	0.032	0.034	0.040	0.032
Minimum	0.000	0.010	0.011	0.011	0.009	0.008	0.012
Rain (inches)	0.00	0.88	0.02	1.13	0.25	1.00	0.18

Colma Site 2 SSMH 9F61 6" Sanitary Flow

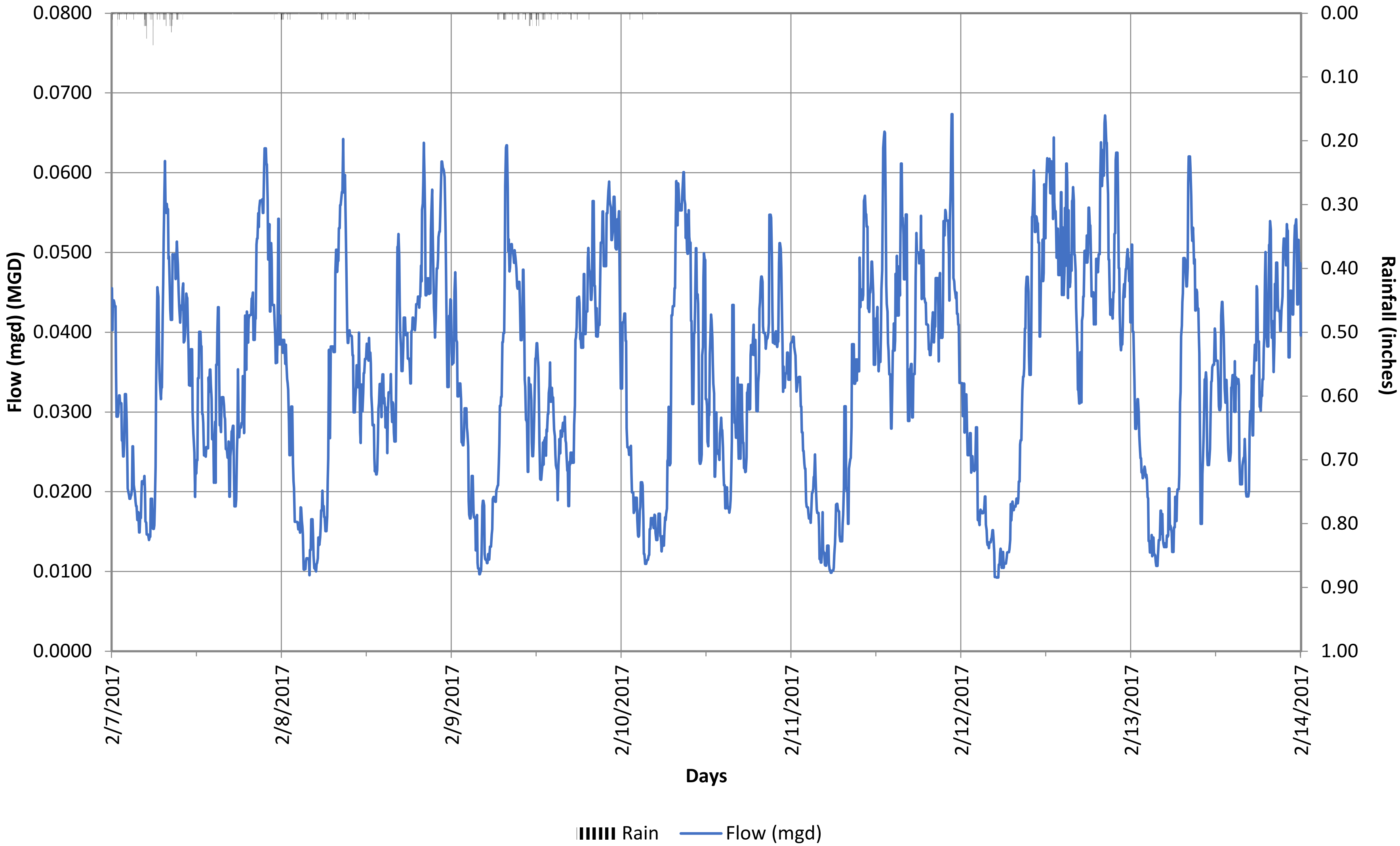


	1/24/2017(Tue)	1/25/2017(Wed)	1/26/2017(Thu)	1/27/2017(Fri)	1/28/2017(Sat)	1/29/2017(Sun)	1/30/2017(Mon)
Maximum	0.057	0.062	0.067	0.060	0.066	0.065	0.060
Average	0.031	0.033	0.033	0.036	0.036	0.038	0.031
Minimum	0.008	0.012	0.012	0.011	0.012	0.011	0.012
Rain (inches)	0.01	0.00	0.00	0.00	0.00	0.00	0.00



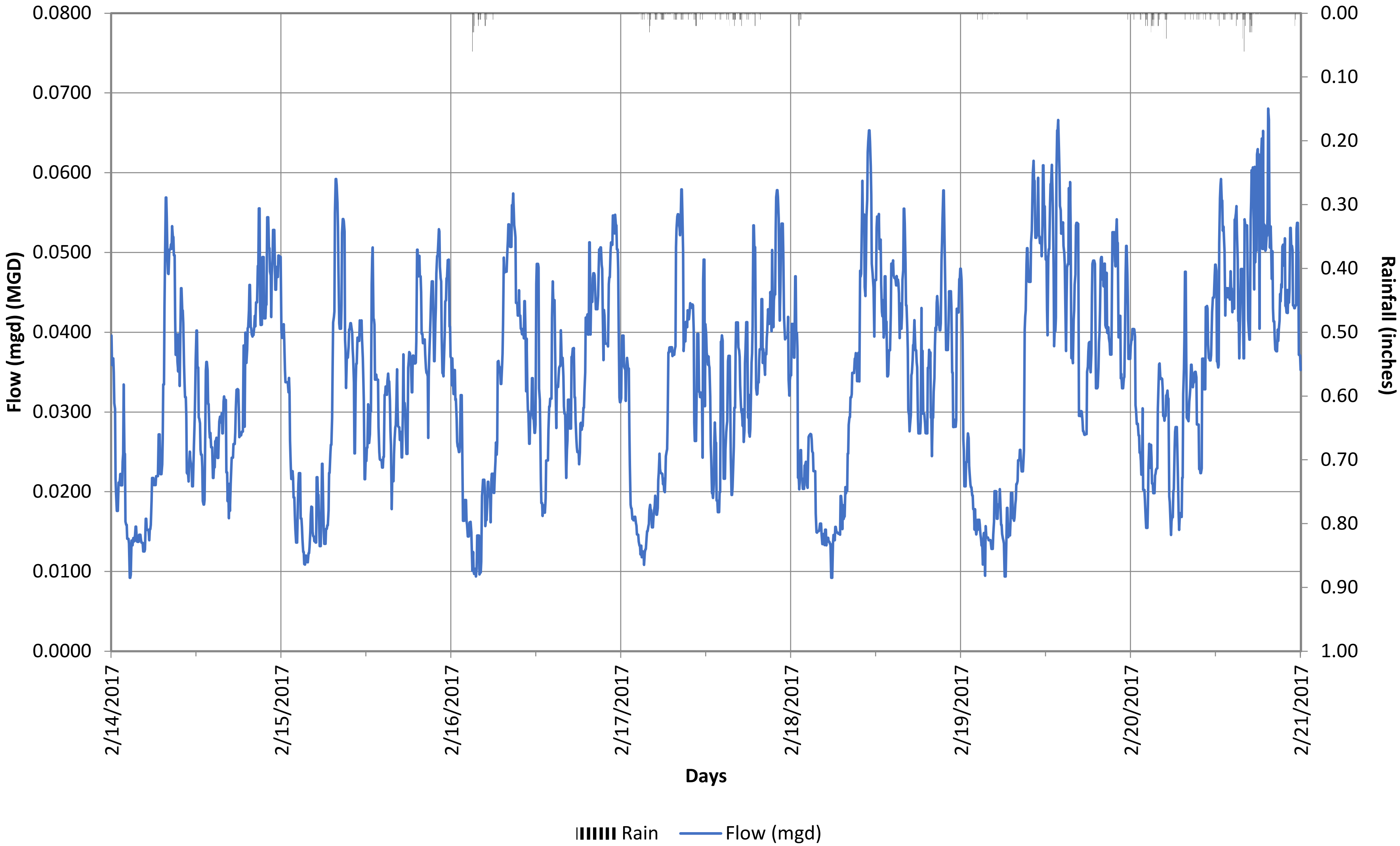
	1/31/2017(Tue)	2/1/2017(Wed)	2/2/2017(Thu)	2/3/2017(Fri)	2/4/2017(Sat)	2/5/2017(Sun)	2/6/2017(Mon)
Maximum	0.063	0.067	0.065	0.064	0.057	0.067	0.059
Average	0.031	0.032	0.034	0.034	0.033	0.038	0.032
Minimum	0.011	0.010	0.012	0.009	0.010	0.012	0.008
Rain (inches)	0.00	0.01	0.19	0.51	0.37	0.15	0.50

Colma Site 2 SSMH 9F61 6" Sanitary Flow

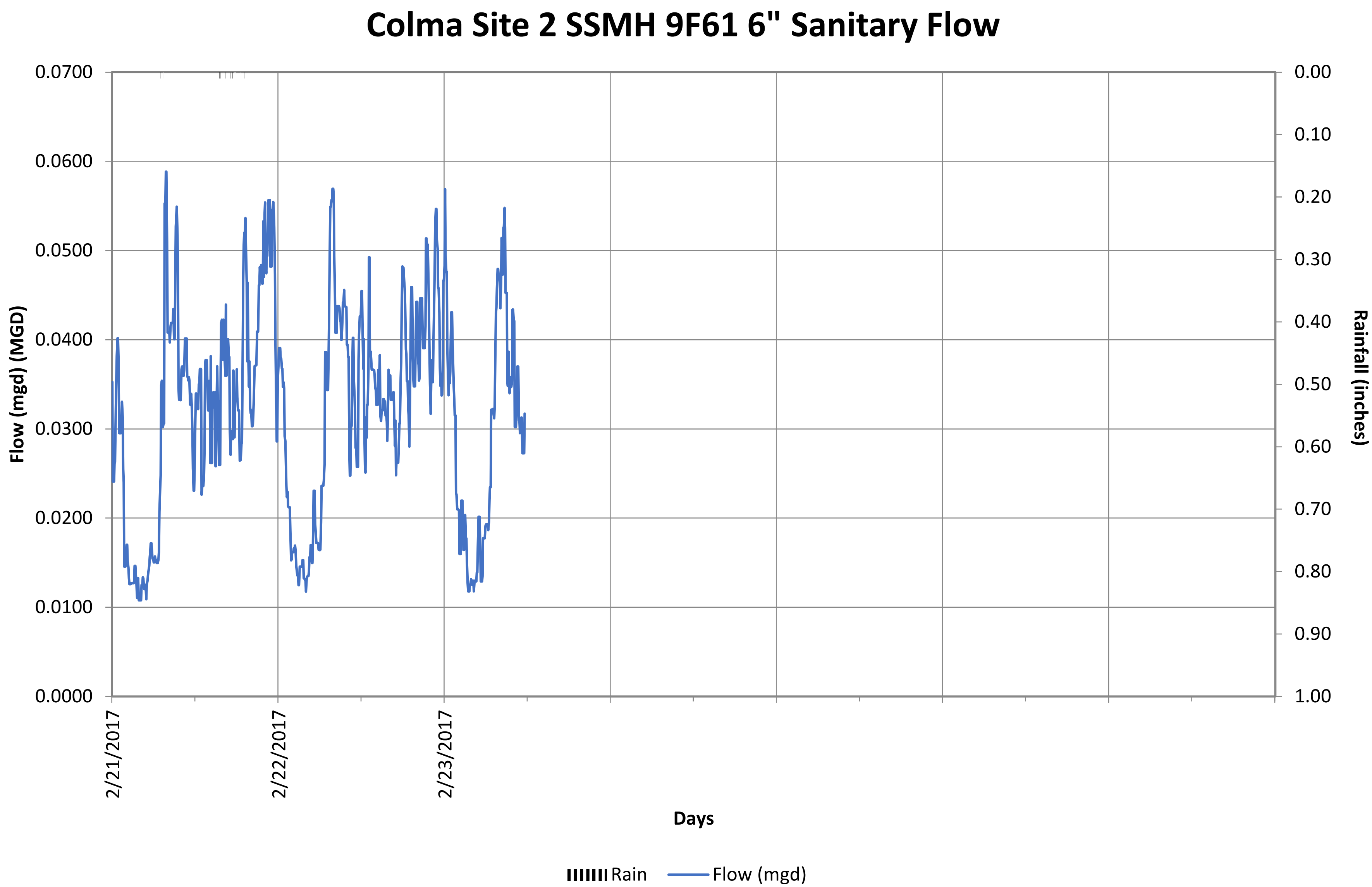


	2/7/2017(Tue)	2/8/2017(Wed)	2/9/2017(Thu)	2/10/2017(Fri)	2/11/2017(Sat)	2/12/2017(Sun)	2/13/2017(Mon)
Maximum	0.063	0.064	0.063	0.060	0.067	0.067	0.062
Average	0.035	0.035	0.034	0.032	0.036	0.038	0.033
Minimum	0.014	0.010	0.010	0.011	0.010	0.009	0.011
Rain (inches)	0.86	0.26	0.77	0.04	0.00	0.00	0.00

Colma Site 2 SSMH 9F61 6" Sanitary Flow



	2/14/2017(Tue)	2/15/2017(Wed)	2/16/2017(Thu)	2/17/2017(Fri)	2/18/2017(Sat)	2/19/2017(Sun)	2/20/2017(Mon)
Maximum	0.057	0.059	0.057	0.058	0.065	0.067	0.068
Average	0.031	0.032	0.033	0.033	0.034	0.036	0.039
Minimum	0.009	0.011	0.009	0.011	0.009	0.009	0.015
Rain (inches)	0.00	0.00	0.39	1.23	0.14	0.08	1.61

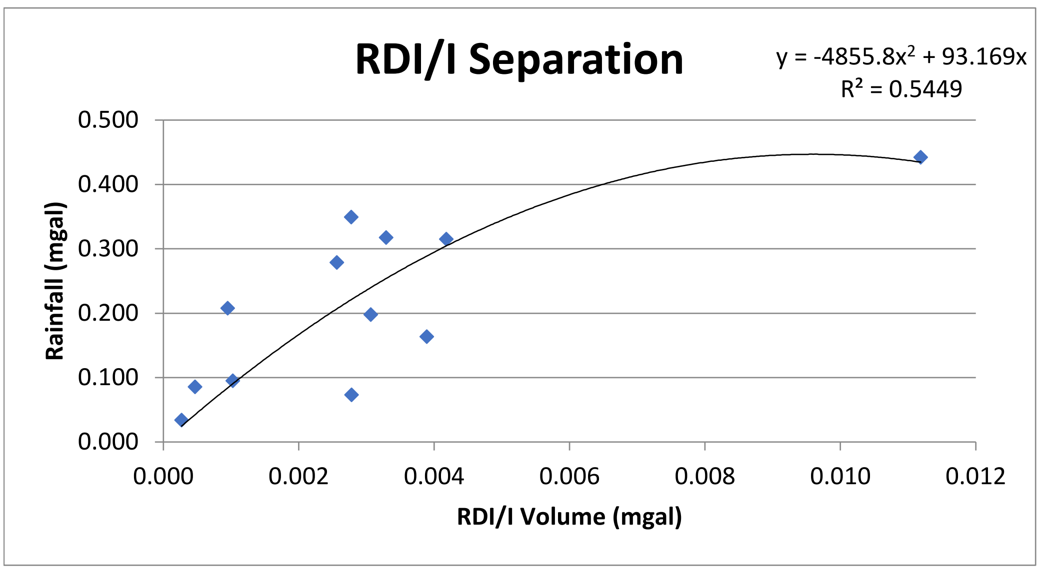


	2/21/2017(Tue)	2/22/2017(Wed)				
Maximum	0.059	0.057				
Average	0.032	0.033				
Minimum	0.011	0.012				
Rain (inches)	0.19	0.00				

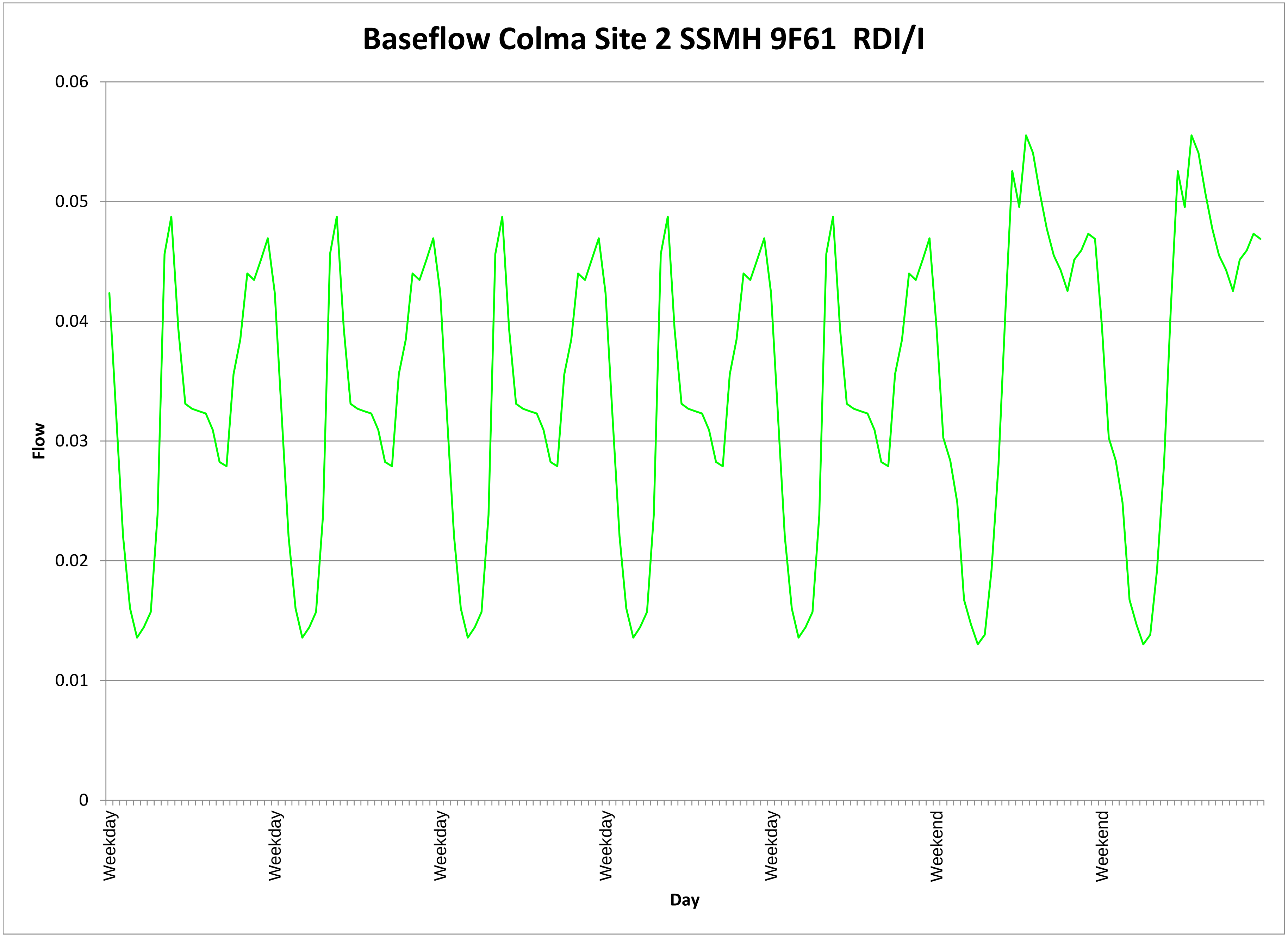
Colma Site 2 SSMH 9F61 RDI/I

RDI/I Analysis, Monitor Return Ratio Summary

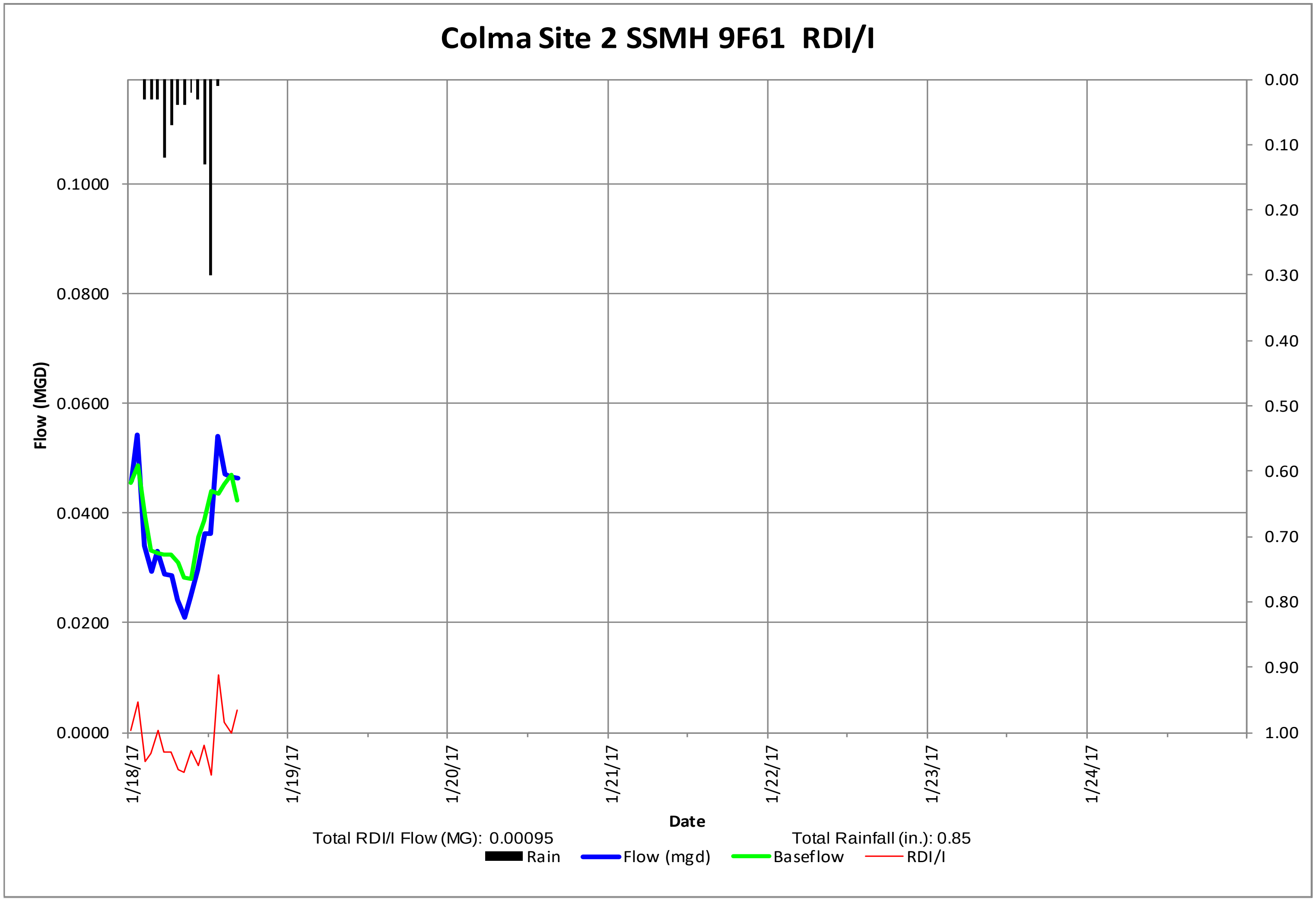
Storm Start (Date)	RDI/I Volume (mgal)	Monitor Area (acres)	Rainfall (mgal)	Return Ratio (%)
1/18/2017	0.001	9.0	0.208	0.46%
1/20/2017	0.003	9.0	0.279	0.92%
1/21/2017	0.004	9.0	0.315	1.33%
2/2/2017	0.004	9.0	0.164	2.38%
2/4/2017	0.000	9.0	0.086	0.55%
2/5/2017	0.000	9.0	0.034	0.79%
2/6/2017	0.003	9.0	0.318	1.03%
2/7/2017	0.003	9.0	0.073	3.79%
2/9/2017	0.003	9.0	0.198	1.55%
2/16/2017	0.001	9.0	0.095	1.07%
2/17/2017	0.003	9.0	0.349	0.79%
2/20/2017	0.011	9.0	0.442	2.53%
Average R%				1.43%
Average Top 3 Storms R%				2.90%



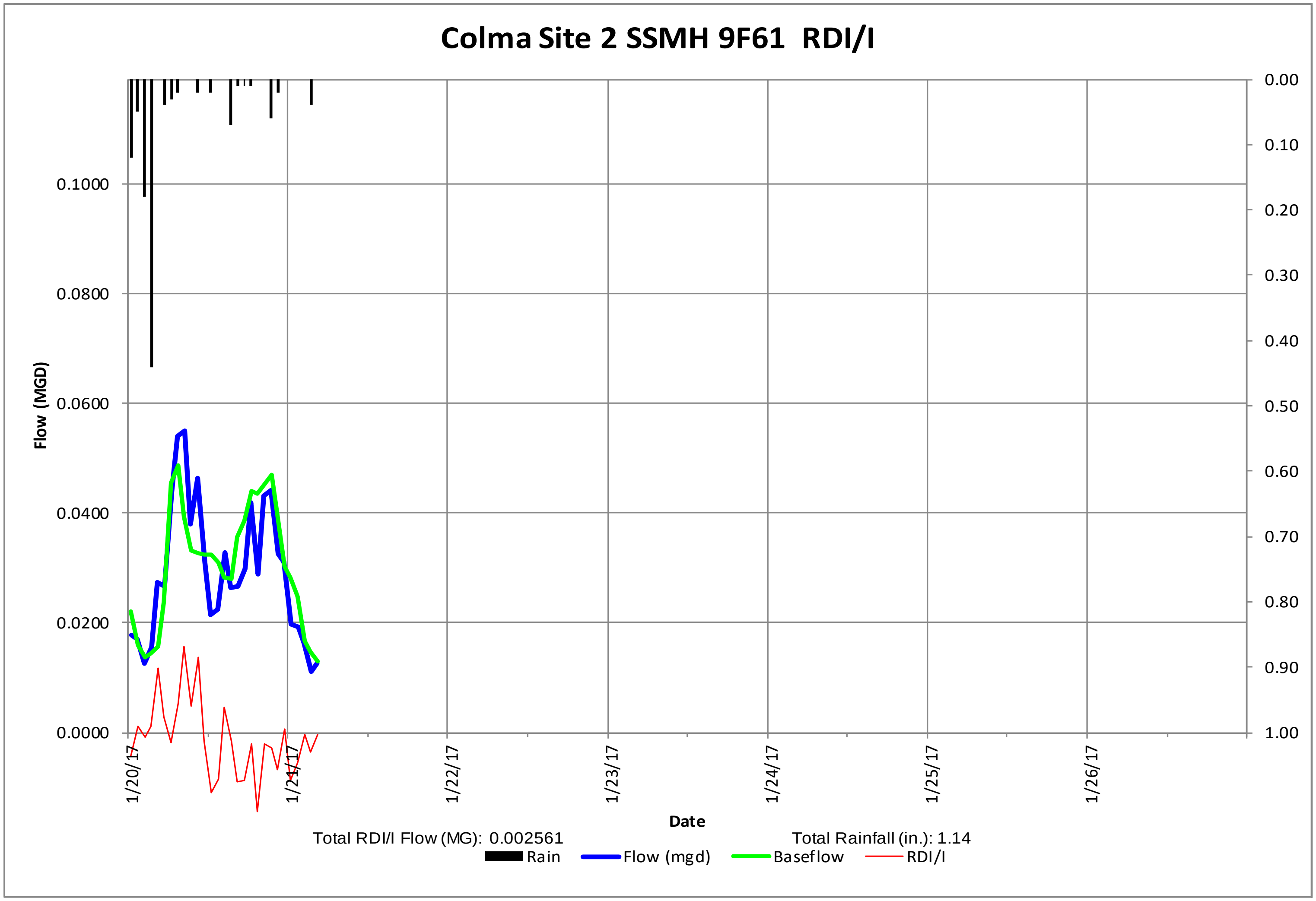
Baseflows	Weekend	Weekday
Max	0.056	0.049
Avg	0.037	0.033
Min	0.013	0.014



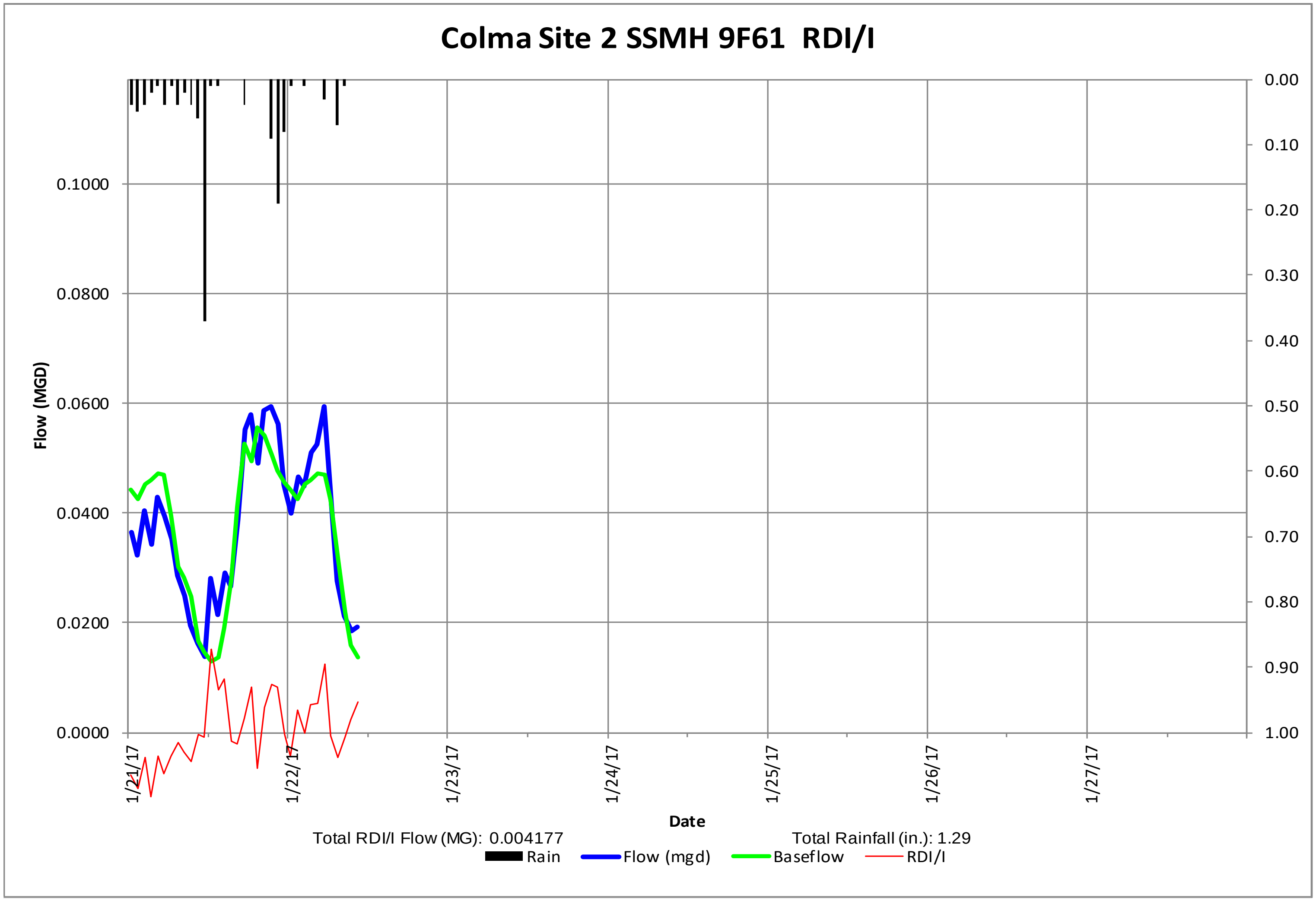
Baseflow Colma Site 2 SSMH 9F61 RDI/I
0.06
0.05
0.04
0.03
0.02
0.01
0
Flow
Weekday
Weekday
Weekday
Weekday
Weekday
Weekend
Weekend
Day



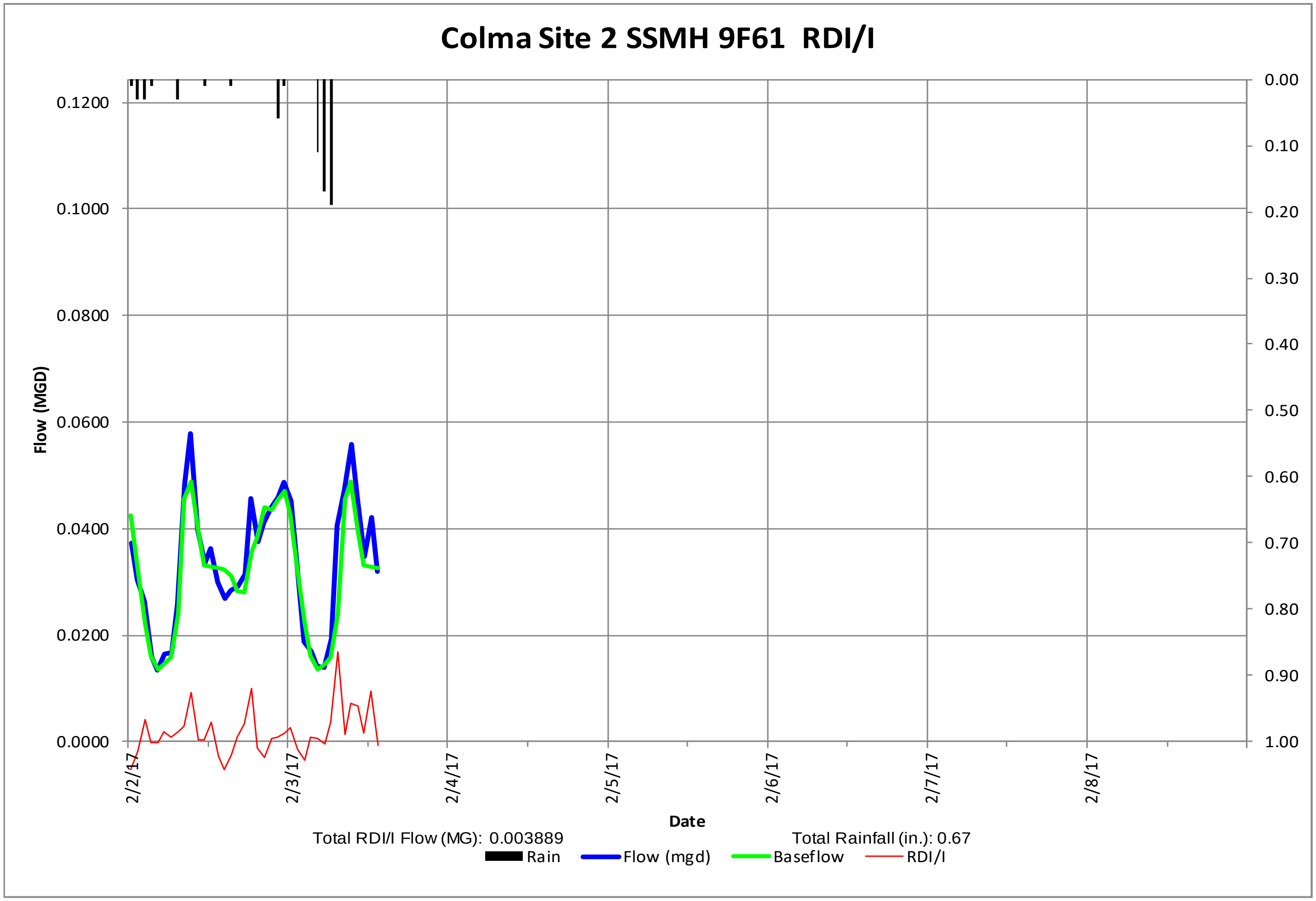
Storm of 1/18/2017



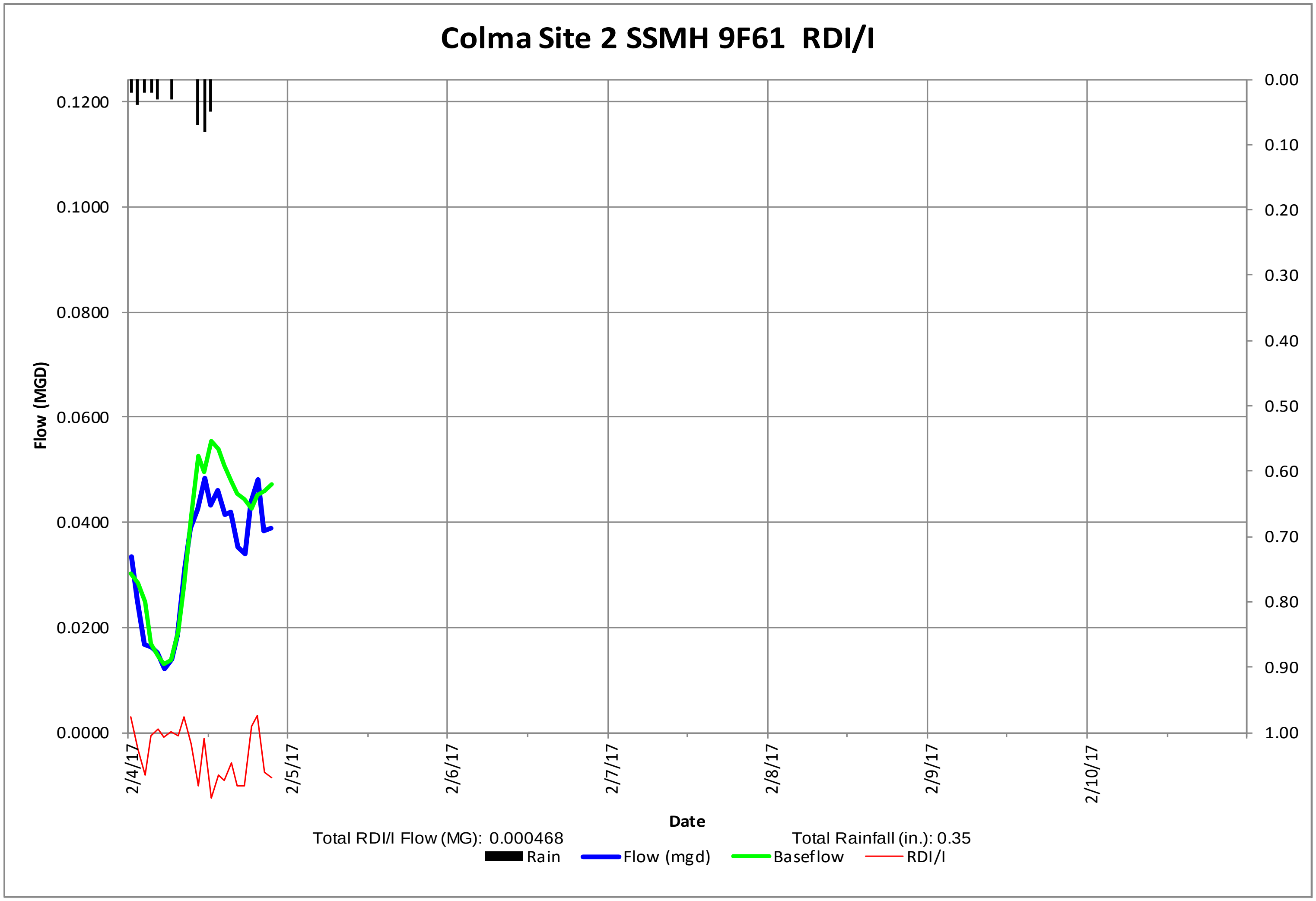
Storm of 1/20/2017



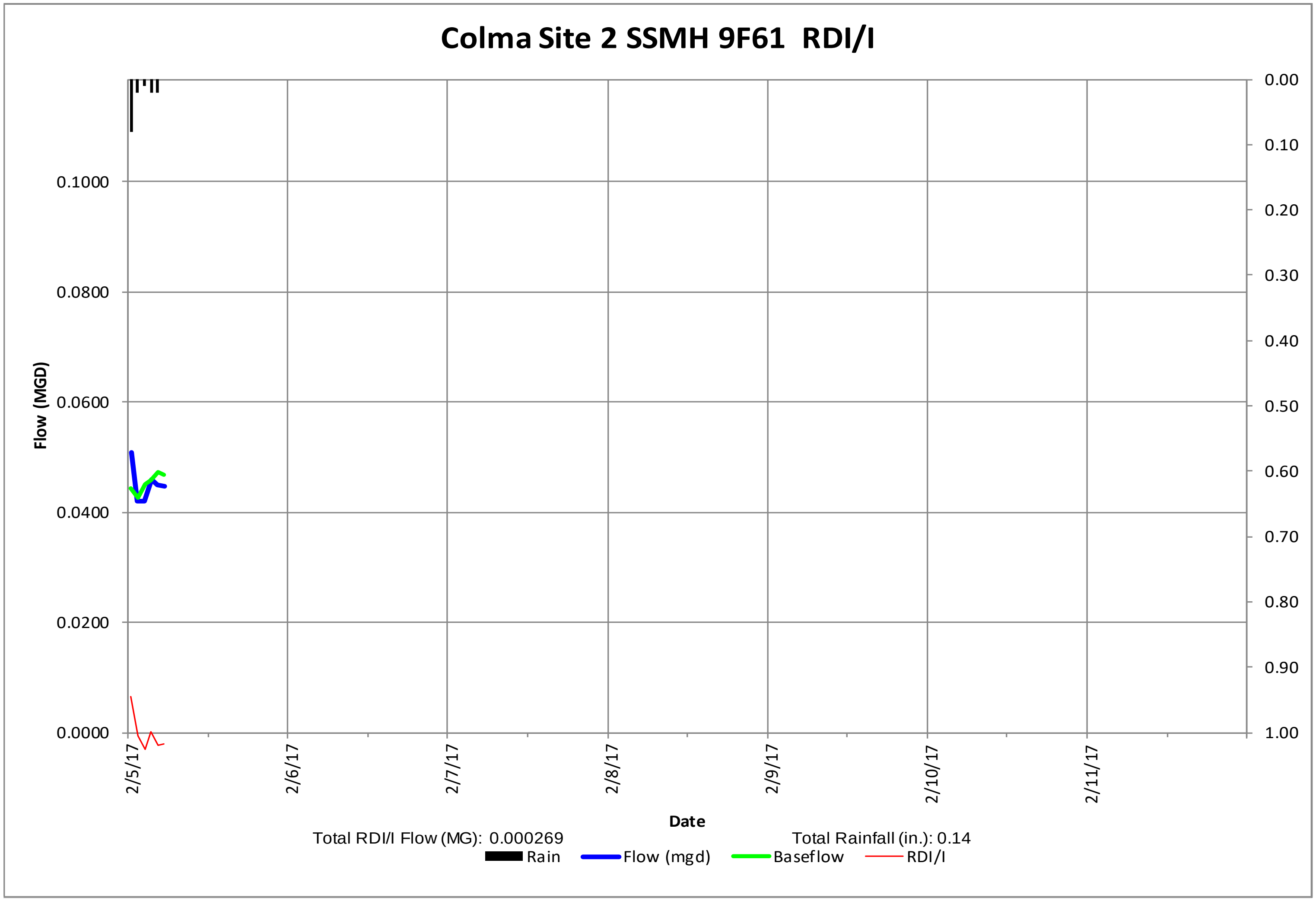
Storm of 1/21/2017



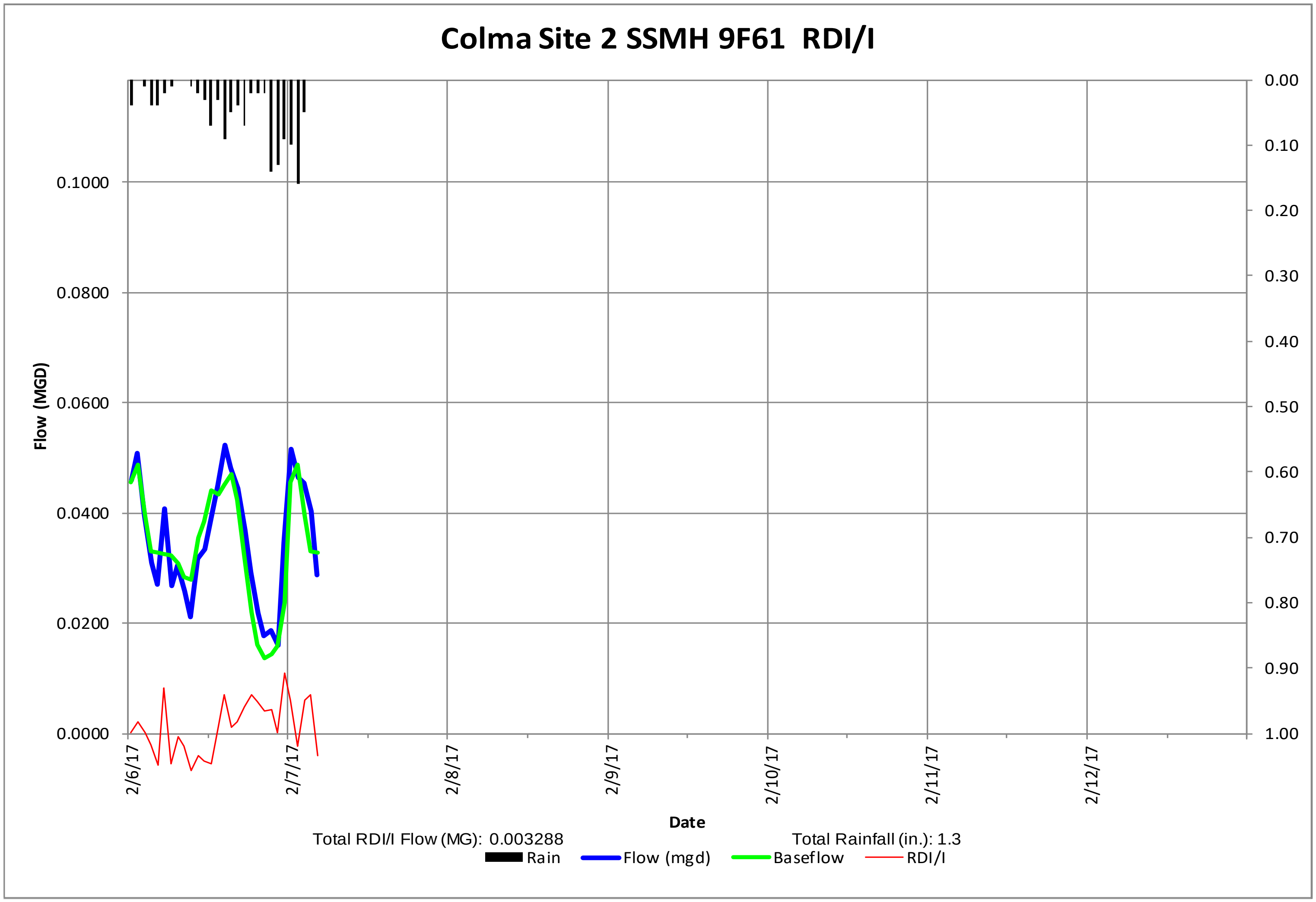
Storm of 2/2/2017



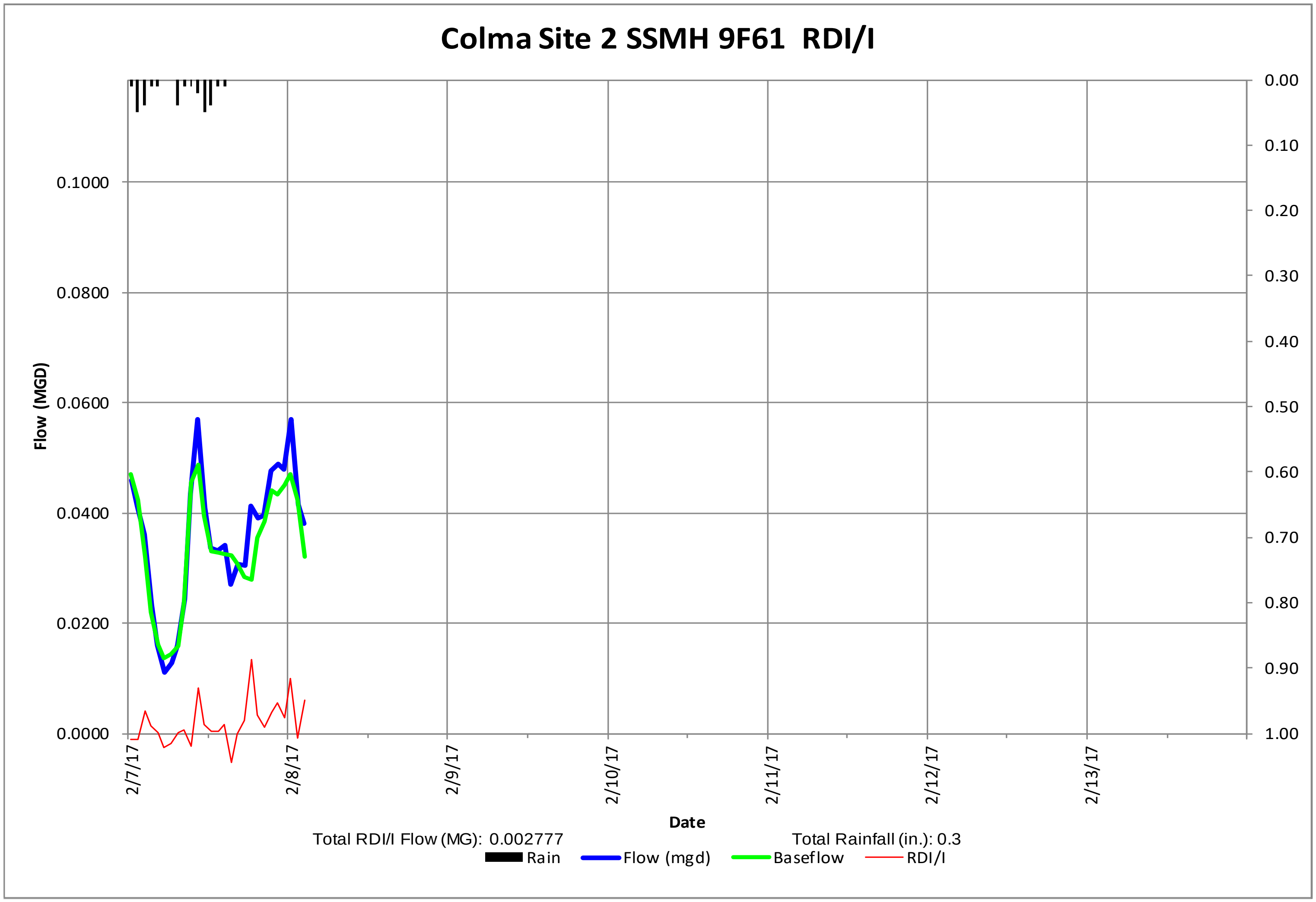
Storm of 2/4/2017



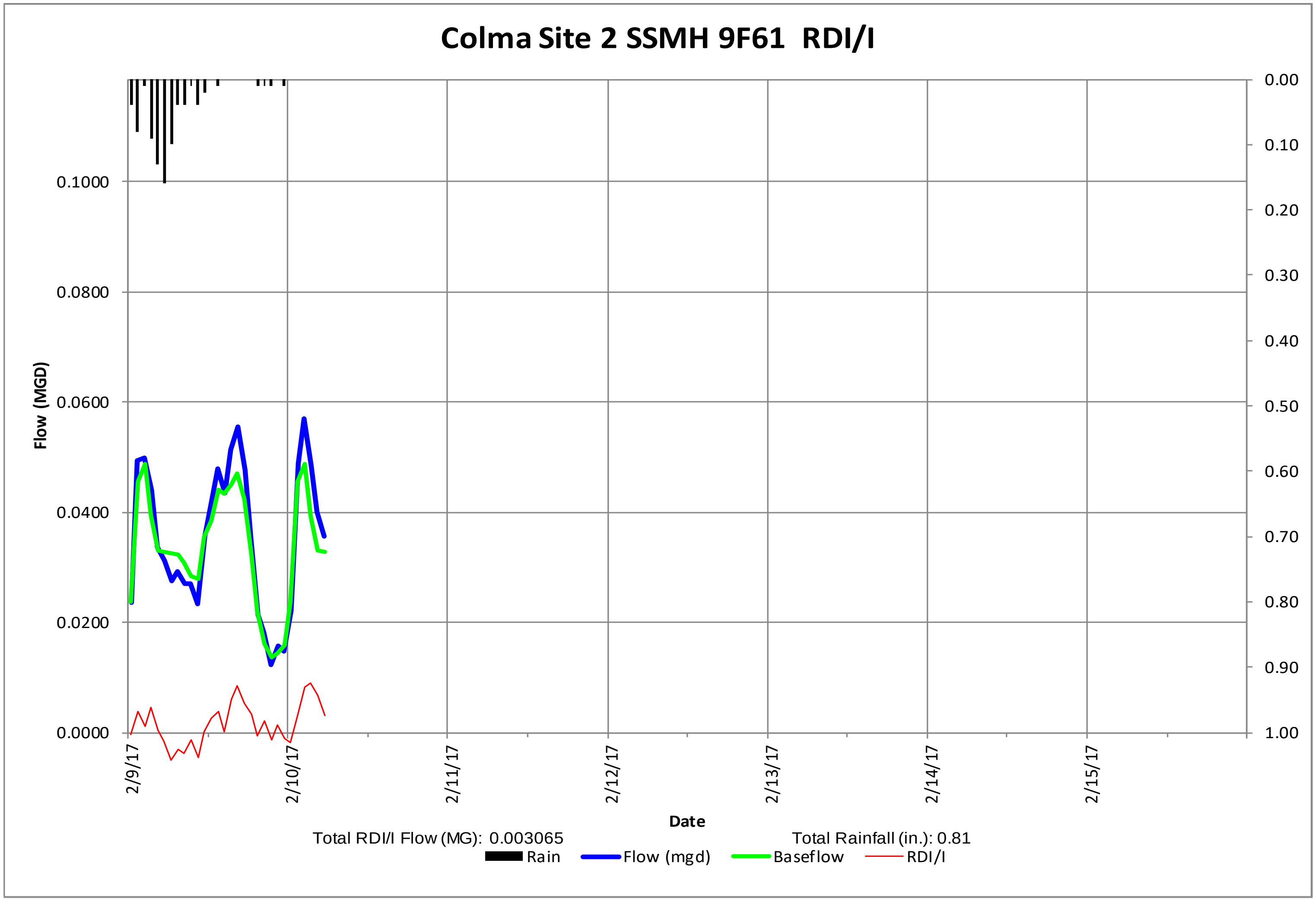
Storm of 2/5/2017



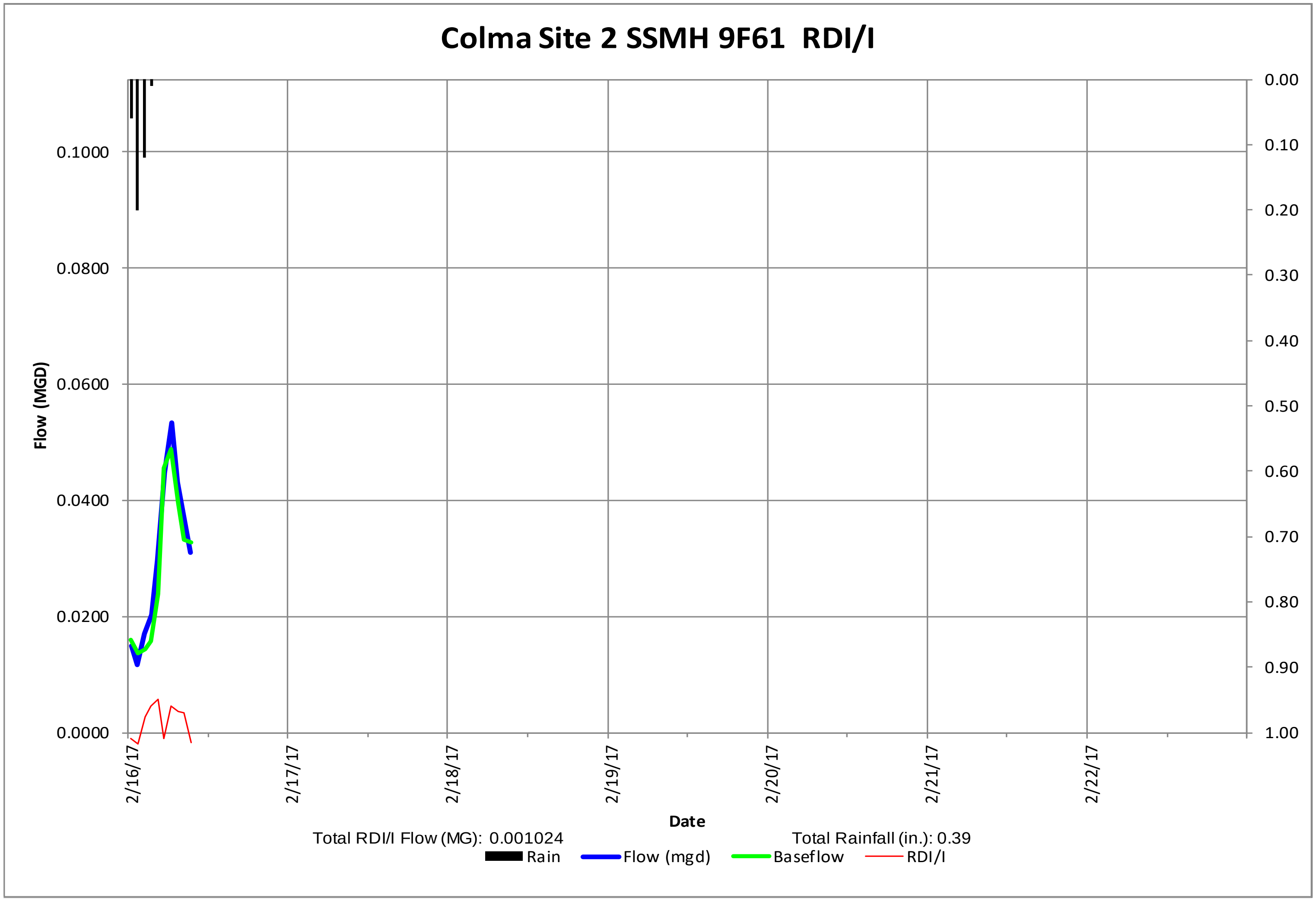
Storm of 2/6/2017



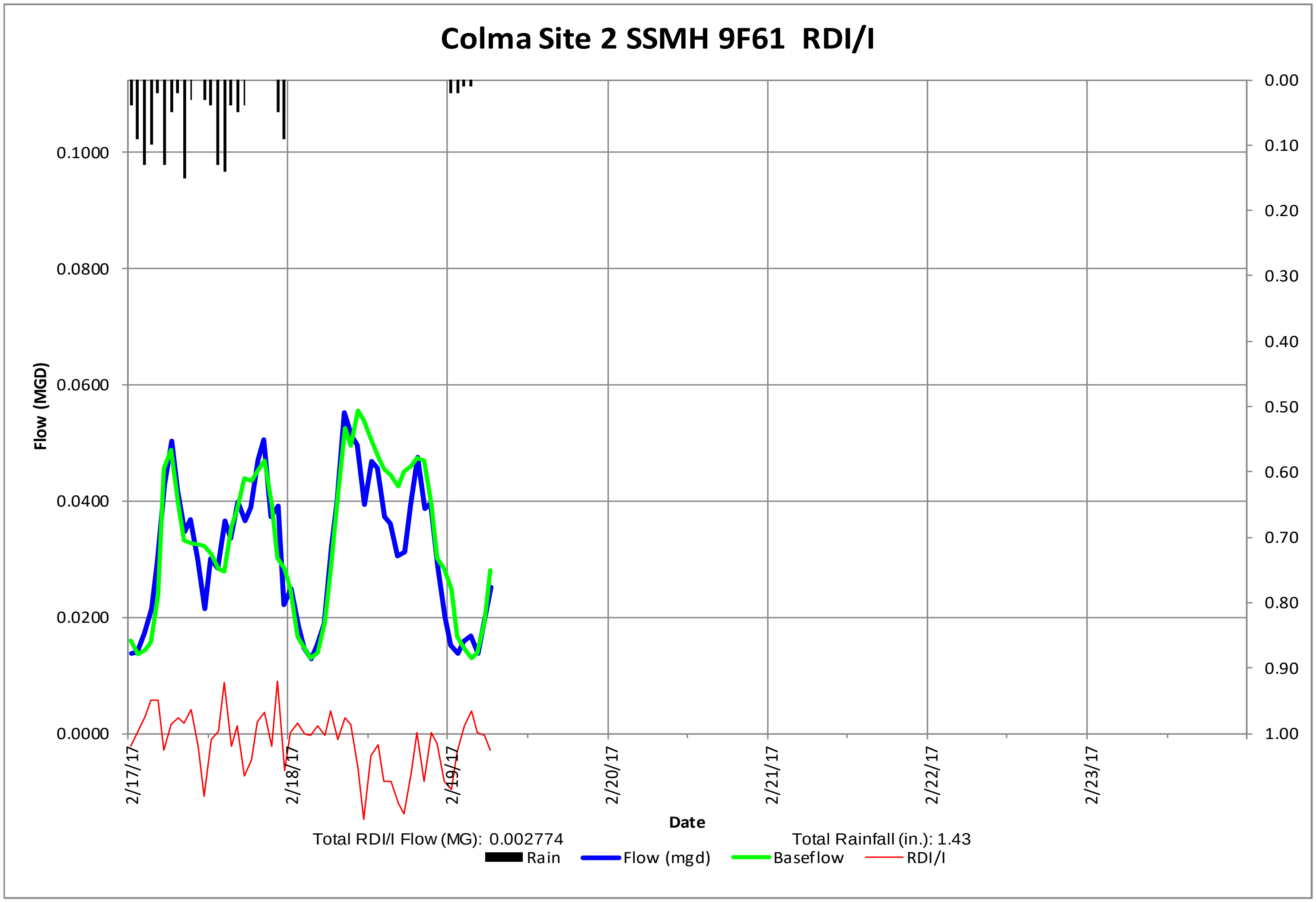
Storm of 2/7/2017



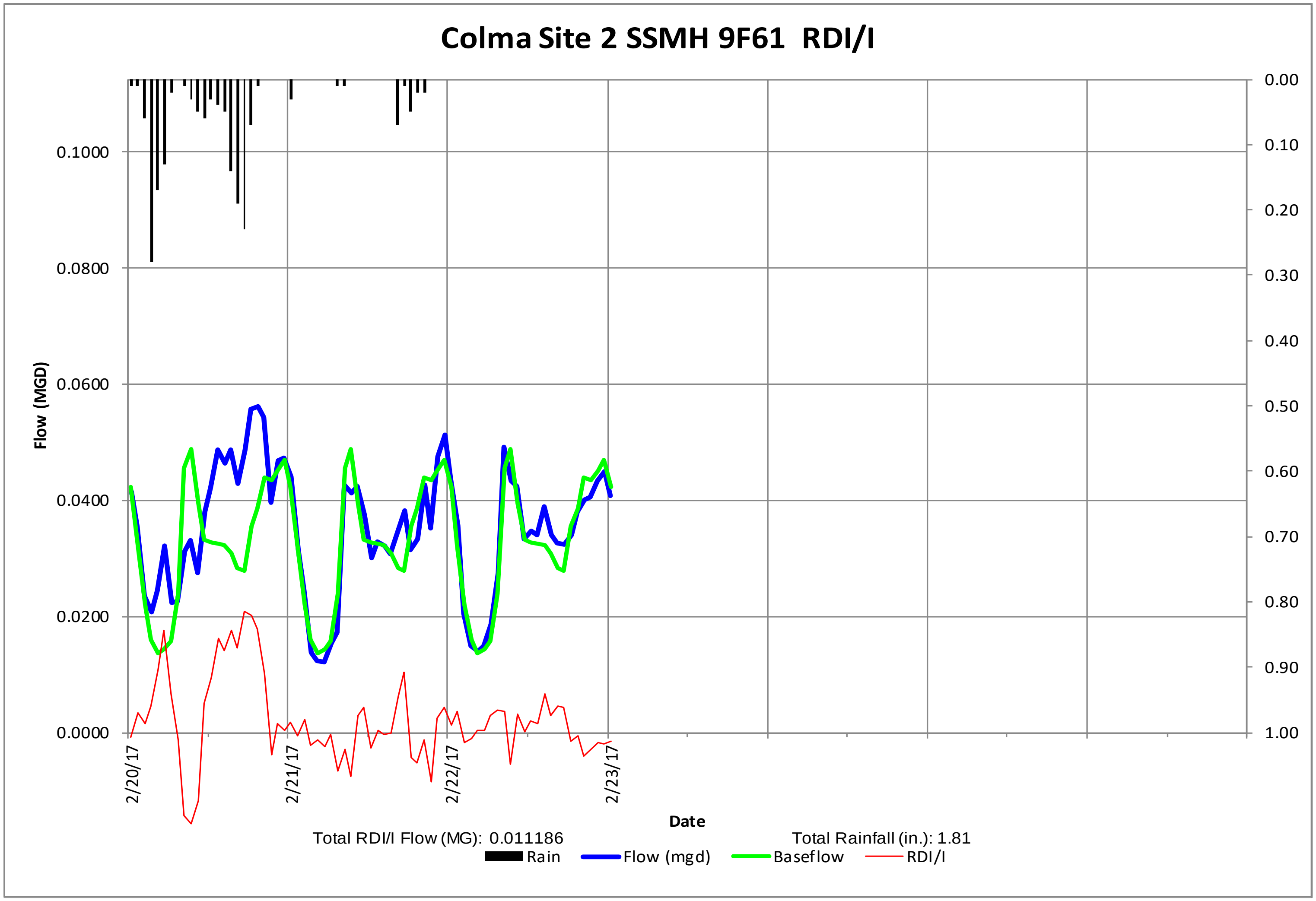
Storm of 2/9/2017



Storm of 2/16/2017



Storm of 2/17/2017



Storm of 2/20/2017

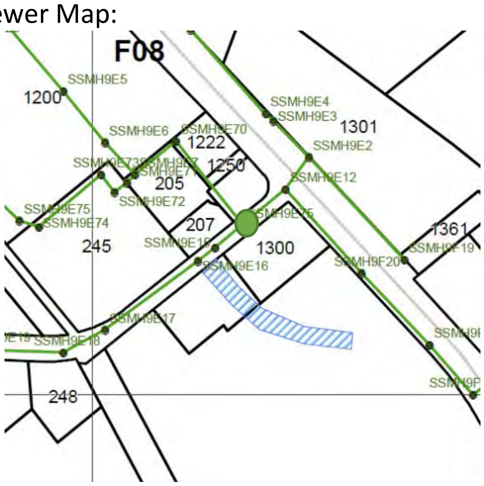
Site Information Report

Flow Monitor Site: 3

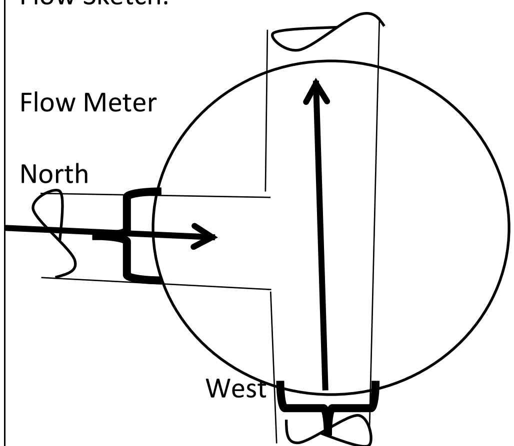
Manhole Number SSMH 9E76
Location205 Collins West of the El Camino
MH Depth ~8’
Diameter: 10” and 10”
Safety: OK
Traffic: Light
Gas: Ok
Rungs no
Meter Type: Hach FL900 2 Submerged AV
Depth: Pressure 4”
Velocity: Doppler 1.25 ft./sec

Ariel View:

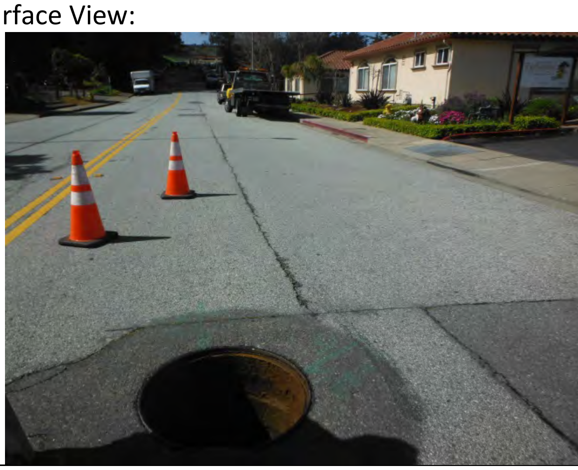
City Sewer Map:



Flow Sketch:



Surface View:



Invert View:

Outlet Pipe: P0

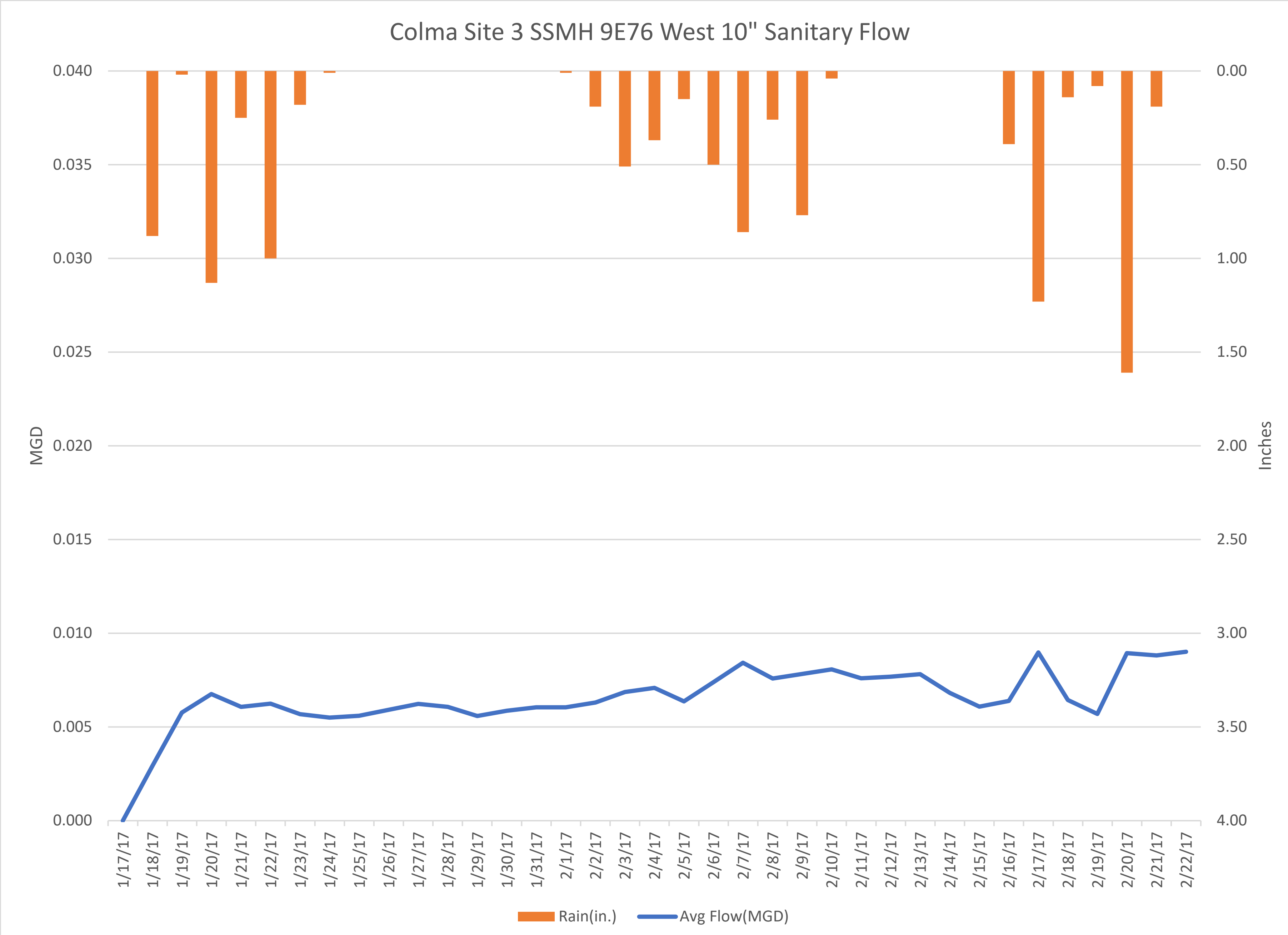
Inlet Pipe: P1

Inlet Pipe: P2

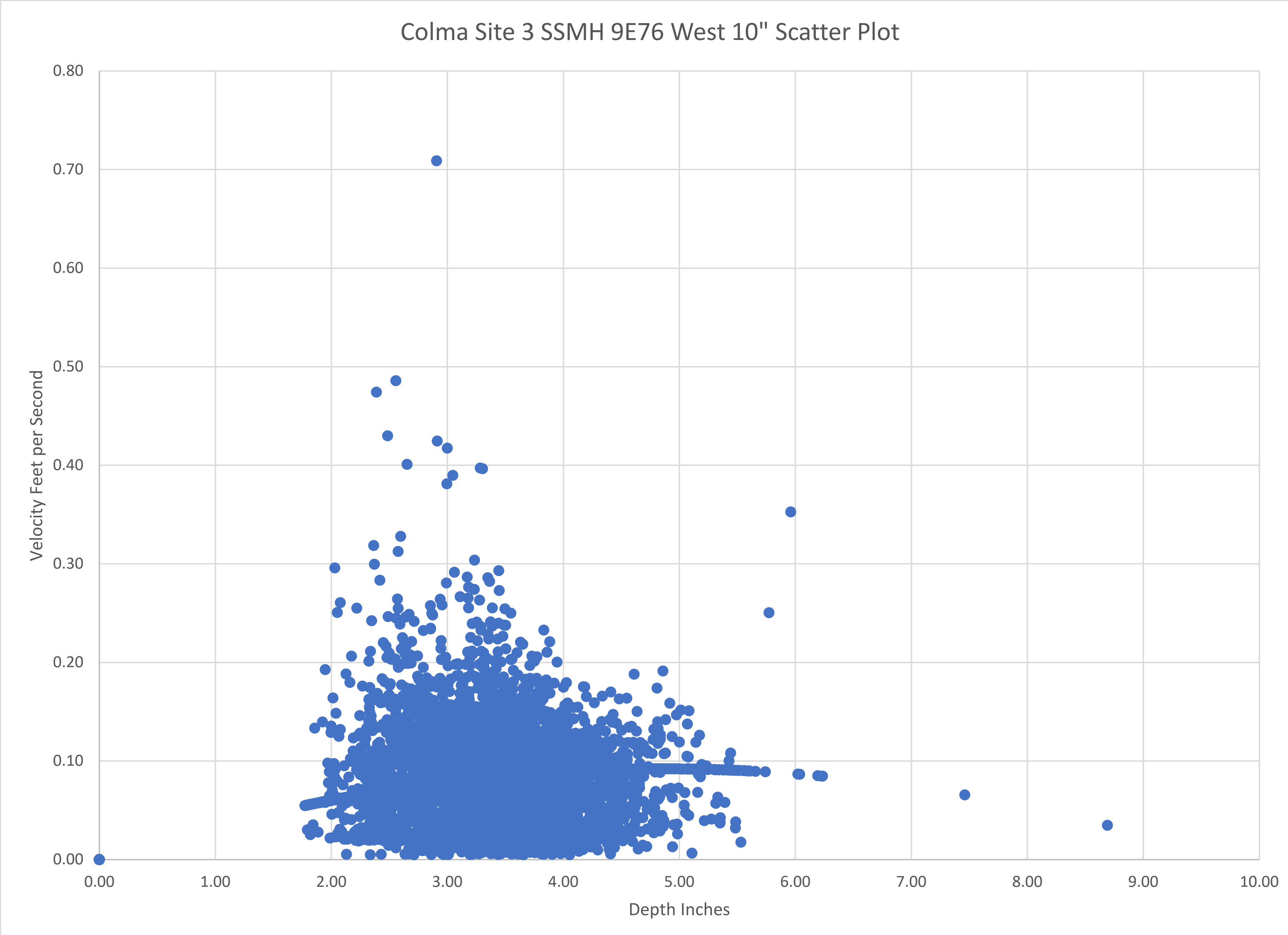
Colma Site 3 SSMH 9E76 West 10" Sanitary Flow

Daily Summary

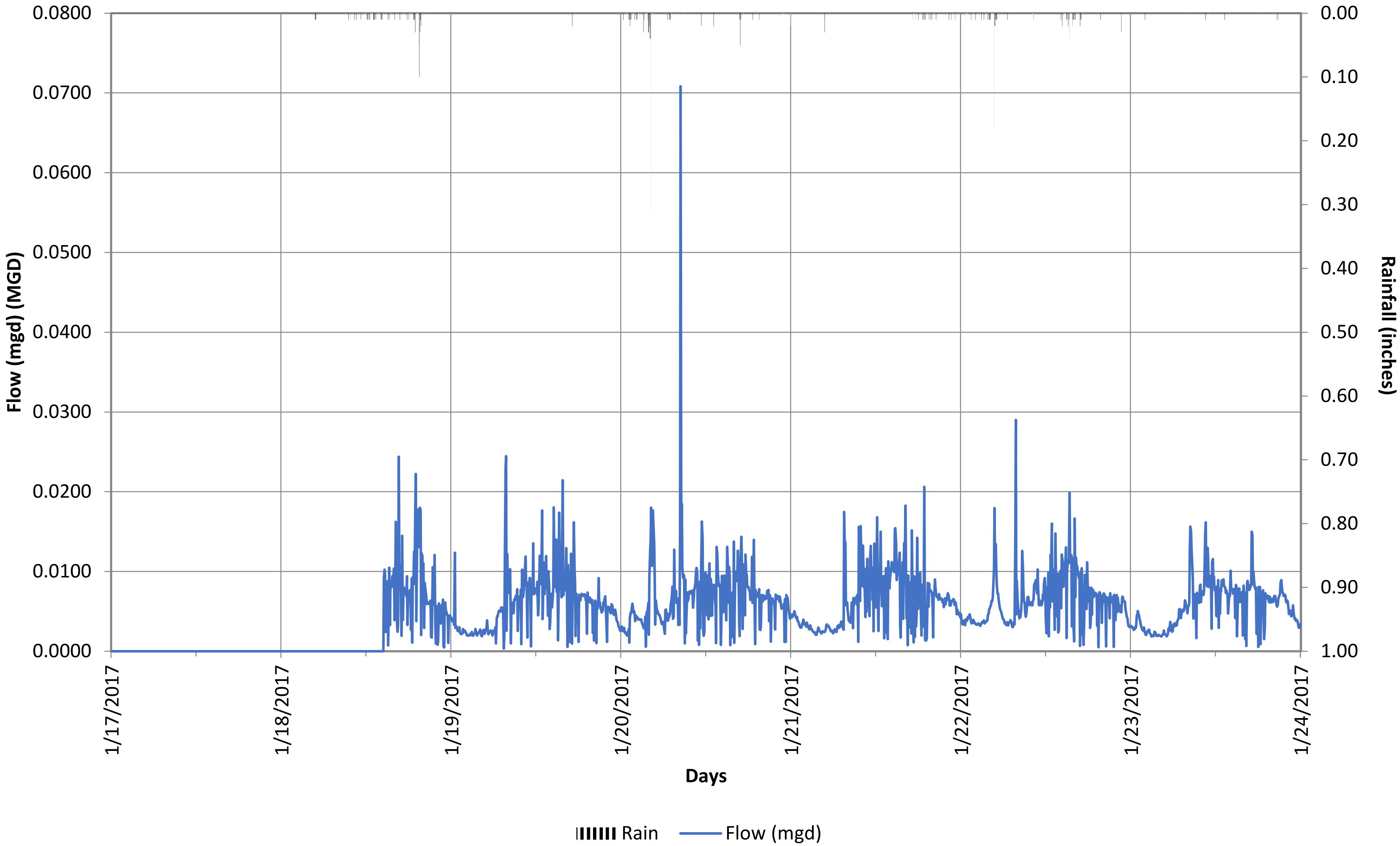
Day	Date	Avg Flow(MGD)	Min Flow(MGD)	Max Flow(MGD)	Max Depth(in.)	Rain(in.)
Tuesday	1/17/17	0.000	0.000	0.000	0.000	0.00
Wednesday	1/18/17	0.003	0.000	0.024	6.228	0.88
Thursday	1/19/17	0.006	0.000	0.024	4.974	0.02
Friday	1/20/17	0.007	0.001	0.071	8.691	1.13
Saturday	1/21/17	0.006	0.001	0.021	5.239	0.25
Sunday	1/22/17	0.006	0.000	0.029	6.192	1.00
Monday	1/23/17	0.006	0.001	0.016	5.297	0.18
Tuesday	1/24/17	0.006	0.001	0.018	5.559	0.01
Wednesday	1/25/17	0.006	0.000	0.020	5.483	0.00
Thursday	1/26/17	0.006	0.000	0.021	5.368	0.00
Friday	1/27/17	0.006	0.001	0.047	5.598	0.00
Saturday	1/28/17	0.006	0.001	0.019	4.867	0.00
Sunday	1/29/17	0.006	0.000	0.023	4.951	0.00
Monday	1/30/17	0.006	0.000	0.018	5.582	0.00
Tuesday	1/31/17	0.006	0.000	0.033	5.554	0.00
Wednesday	2/1/17	0.006	0.001	0.025	5.335	0.01
Thursday	2/2/17	0.006	0.001	0.019	5.335	0.19
Friday	2/3/17	0.007	0.001	0.048	5.772	0.51
Saturday	2/4/17	0.007	0.001	0.033	5.485	0.37
Sunday	2/5/17	0.006	0.001	0.029	4.801	0.15
Monday	2/6/17	0.007	0.001	0.022	5.081	0.50
Tuesday	2/7/17	0.008	0.000	0.024	5.656	0.86
Wednesday	2/8/17	0.008	0.001	0.024	5.441	0.26
Thursday	2/9/17	0.008	0.000	0.021	5.464	0.77
Friday	2/10/17	0.008	0.000	0.026	5.215	0.04
Saturday	2/11/17	0.008	0.001	0.018	4.931	0.00
Sunday	2/12/17	0.008	0.001	0.019	4.772	0.00
Monday	2/13/17	0.008	0.000	0.026	4.665	0.00
Tuesday	2/14/17	0.007	0.000	0.022	4.545	0.00
Wednesday	2/15/17	0.006	0.001	0.022	4.402	0.00
Thursday	2/16/17	0.006	0.000	0.022	4.220	0.39
Friday	2/17/17	0.009	0.001	0.021	5.247	1.23
Saturday	2/18/17	0.006	0.000	0.020	4.449	0.14
Sunday	2/19/17	0.006	0.001	0.016	4.505	0.08
Monday	2/20/17	0.009	0.001	0.026	5.741	1.61
Tuesday	2/21/17	0.009	0.000	0.024	5.000	0.19
Wednesday	2/22/17	0.009	0.001	0.022	5.065	0.00



Colma Site 3 SSMH 9E76 West 10" Sanitary Flow
MGD
Inches
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
1/17/17
1/18/17
1/19/17
1/20/17
1/21/17
1/22/17
1/23/17
1/24/17
1/25/17
1/26/17
1/27/17
1/28/17
1/29/17
1/30/17
1/31/17
2/1/17
2/2/17
2/3/17
2/4/17
2/5/17
2/6/17
2/7/17
2/8/17
2/9/17
2/10/17
2/11/17
2/12/17
2/13/17
2/14/17
2/15/17
2/16/17
2/17/17
2/18/17
2/19/17
2/20/17
2/21/17
2/22/17
Rain(in.)
Avg Flow(MGD)

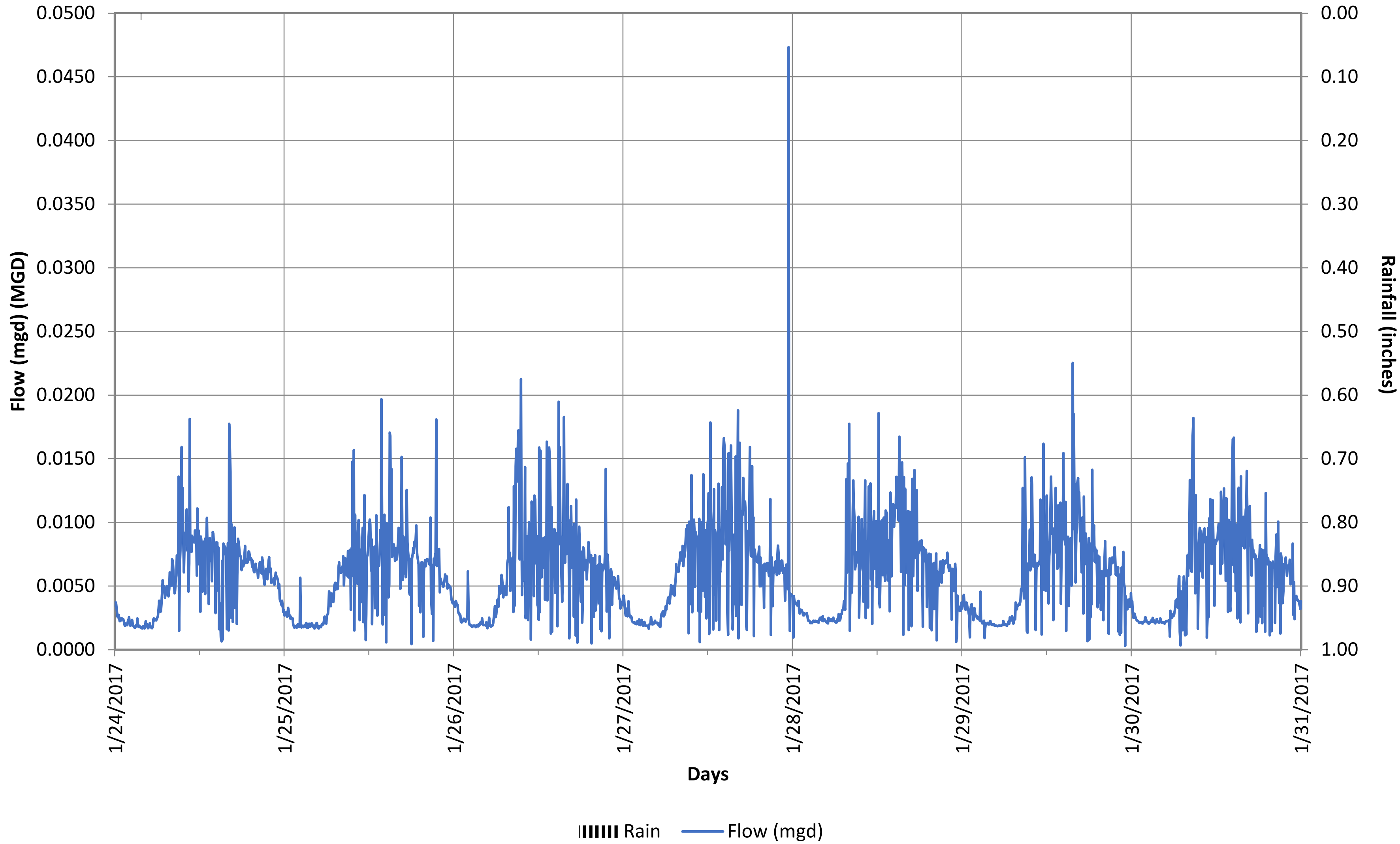

Colma Site 3 SSMH 9E76 West 10" Scatter Plot
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
Velocity Feet per Second
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
Depth Inches

Colma Site 3 SSMH 9E76 West 10" Sanitary Flow



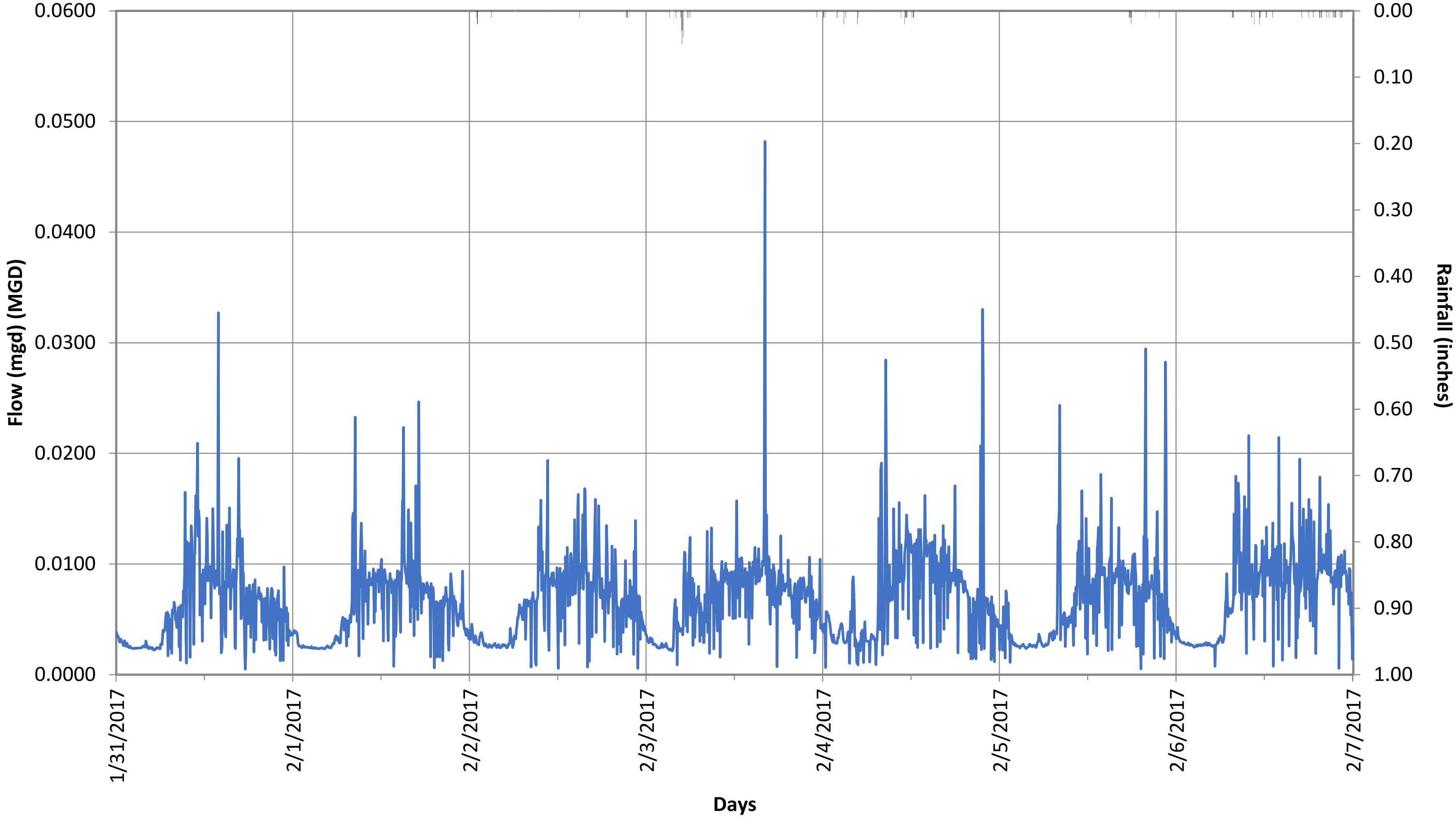
	1/17/2017(Tue)	1/18/2017(Wed)	1/19/2017(Thu)	1/20/2017(Fri)	1/21/2017(Sat)	1/22/2017(Sun)	1/23/2017(Mon)
Maximum	0.000	0.024	0.024	0.071	0.021	0.029	0.016
Average	0.000	0.003	0.006	0.007	0.006	0.006	0.006
Minimum	0.000	0.000	0.000	0.001	0.001	0.000	0.001
Rain (inches)	0.00	0.88	0.02	1.13	0.25	1.00	0.18

Colma Site 3 SSMH 9E76 West 10" Sanitary Flow



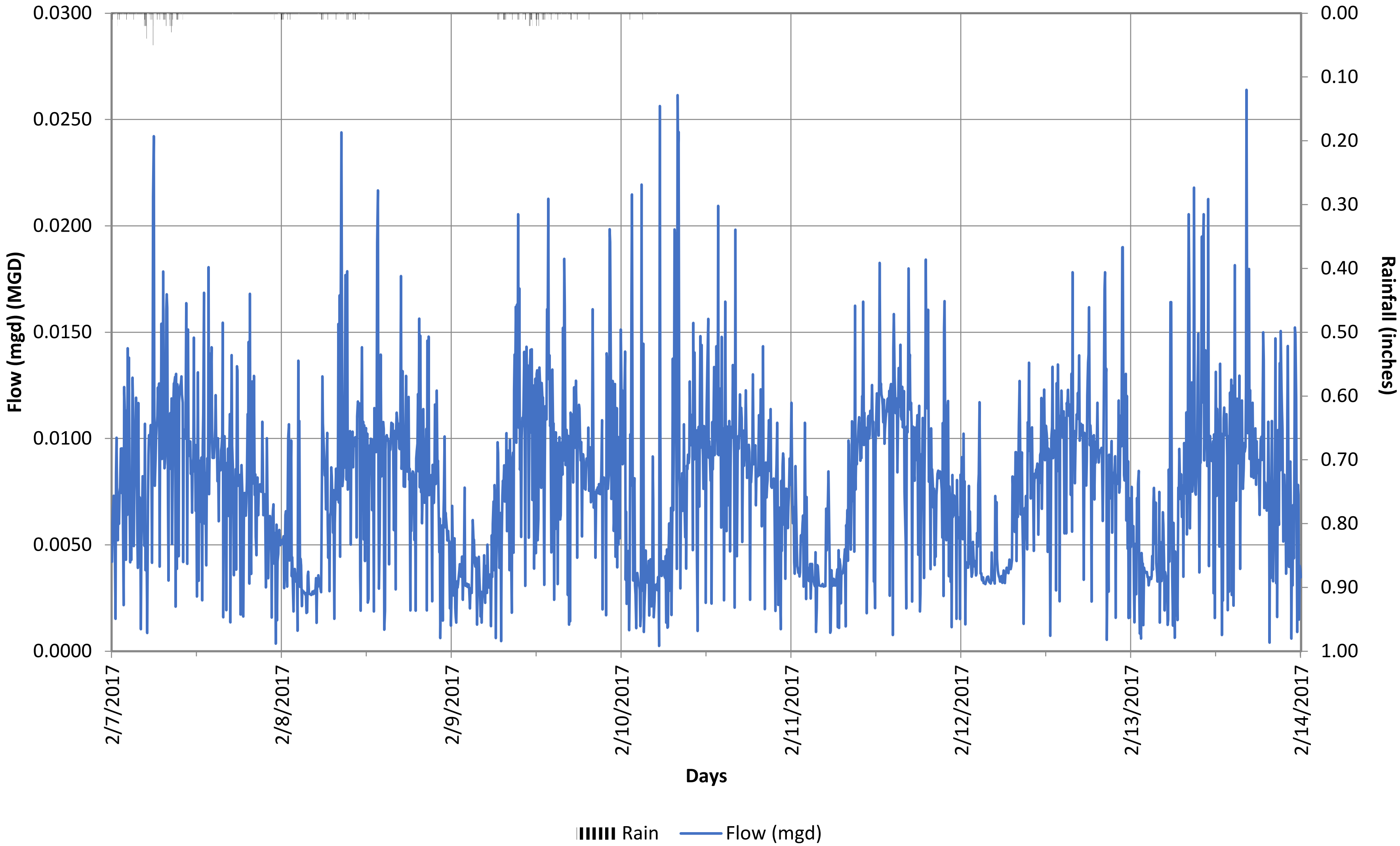
	1/24/2017(Tue)	1/25/2017(Wed)	1/26/2017(Thu)	1/27/2017(Fri)	1/28/2017(Sat)	1/29/2017(Sun)	1/30/2017(Mon)
Maximum	0.018	0.020	0.021	0.047	0.019	0.023	0.018
Average	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Minimum	0.001	0.000	0.000	0.001	0.001	0.000	0.000
Rain (inches)	0.01	0.00	0.00	0.00	0.00	0.00	0.00

Colma Site 3 SSMH 9E76 West 10" Sanitary Flow

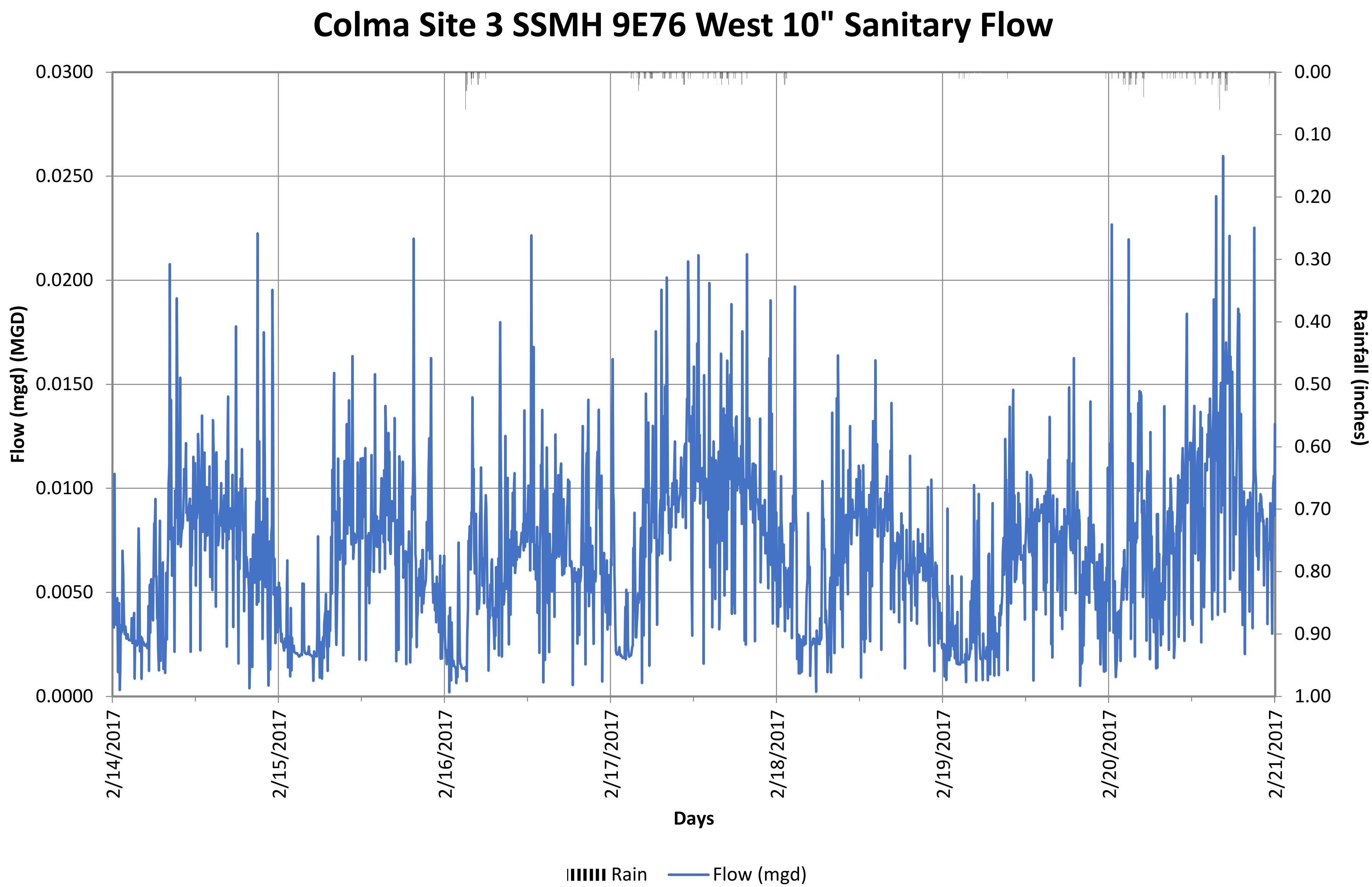


	1/31/2017(Tue)	2/1/2017(Wed)	2/2/2017(Thu)	2/3/2017(Fri)	2/4/2017(Sat)	2/5/2017(Sun)	2/6/2017(Mon)
Maximum	0.033	0.025	0.019	0.048	0.033	0.029	0.022
Average	0.006	0.006	0.006	0.007	0.007	0.006	0.007
Minimum	0.000	0.001	0.001	0.001	0.001	0.001	0.001
Rain (inches)	0.00	0.01	0.19	0.51	0.37	0.15	0.50

Colma Site 3 SSMH 9E76 West 10" Sanitary Flow

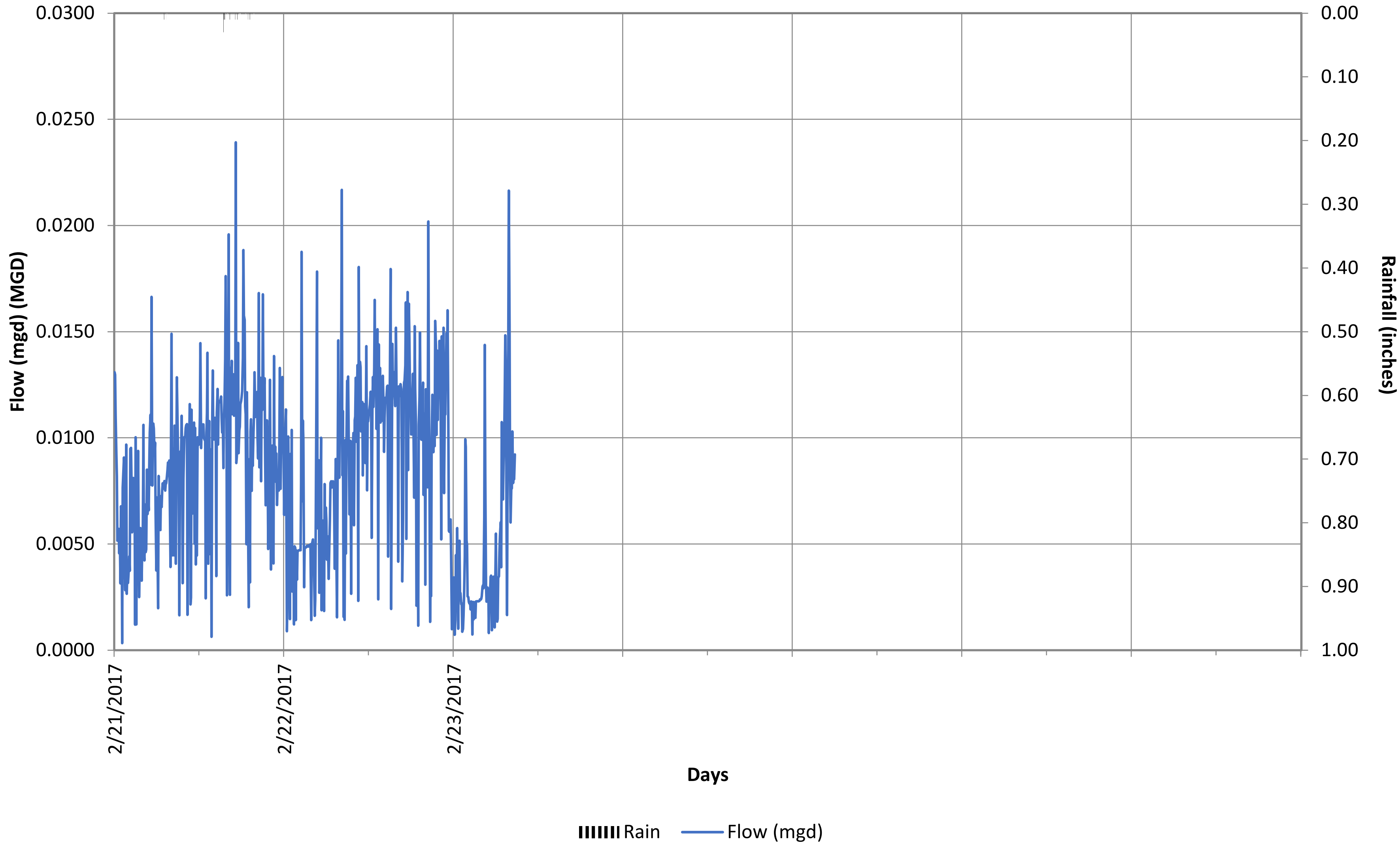


	2/7/2017(Tue)	2/8/2017(Wed)	2/9/2017(Thu)	2/10/2017(Fri)	2/11/2017(Sat)	2/12/2017(Sun)	2/13/2017(Mon)
Maximum	0.024	0.024	0.021	0.026	0.018	0.019	0.026
Average	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Minimum	0.000	0.001	0.000	0.000	0.001	0.001	0.000
Rain (inches)	0.86	0.26	0.77	0.04	0.00	0.00	0.00



	2/14/2017(Tue)	2/15/2017(Wed)	2/16/2017(Thu)	2/17/2017(Fri)	2/18/2017(Sat)	2/19/2017(Sun)	2/20/2017(Mon)
Maximum	0.022	0.022	0.022	0.021	0.020	0.016	0.026
Average	0.007	0.006	0.006	0.009	0.006	0.006	0.009
Minimum	0.000	0.001	0.000	0.001	0.000	0.001	0.001
Rain (inches)	0.00	0.00	0.39	1.23	0.14	0.08	1.61

Colma Site 3 SSMH 9E76 West 10" Sanitary Flow

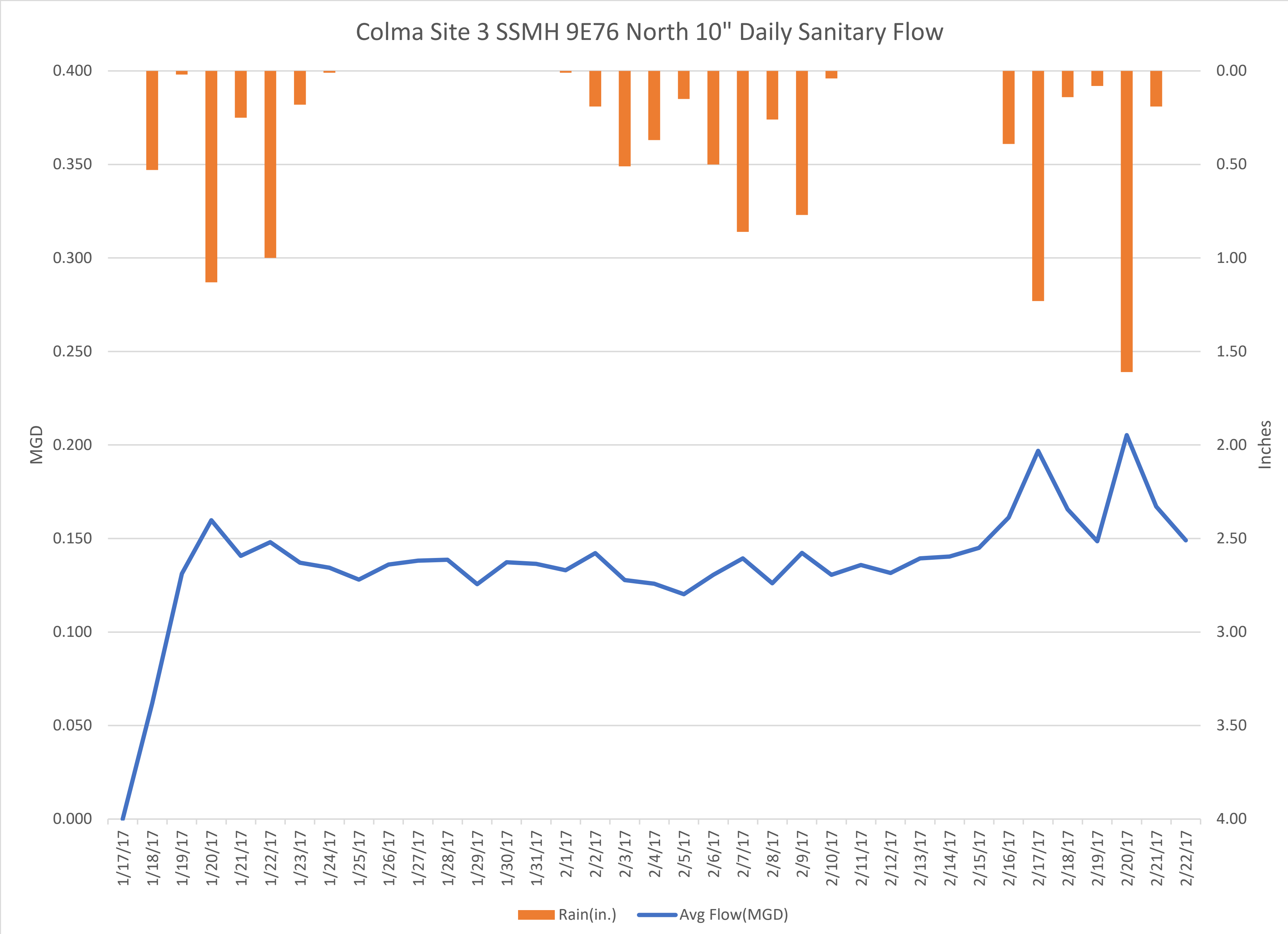


	2/21/2017(Tue)	2/22/2017(Wed)					
Maximum	0.024	0.022					
Average	0.009	0.009					
Minimum	0.000	0.001					
Rain (inches)	0.19	0.00					

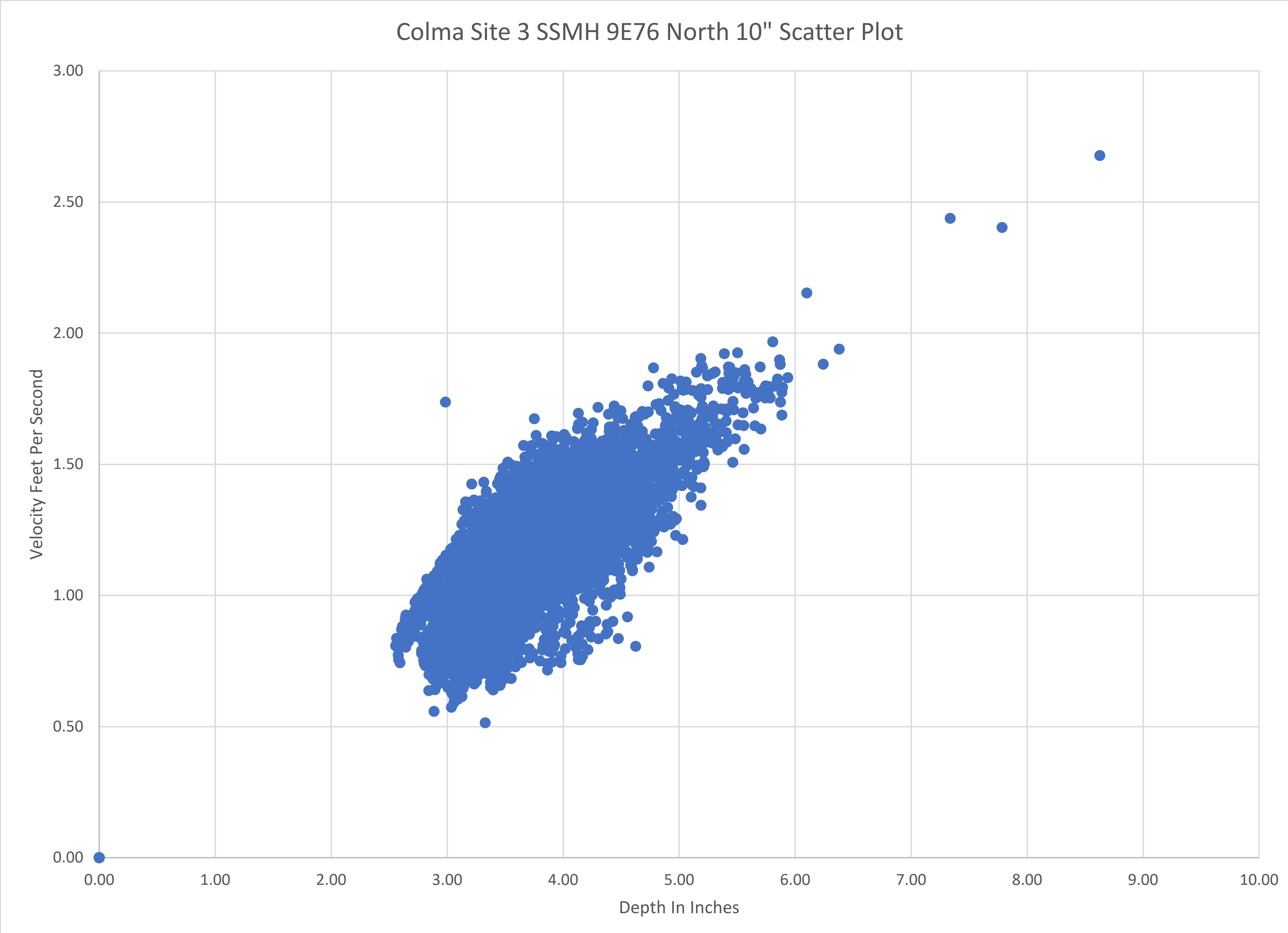
Colma Site 3 SSMH 9E76 North 10" Sanitary Flow

Daily Summary

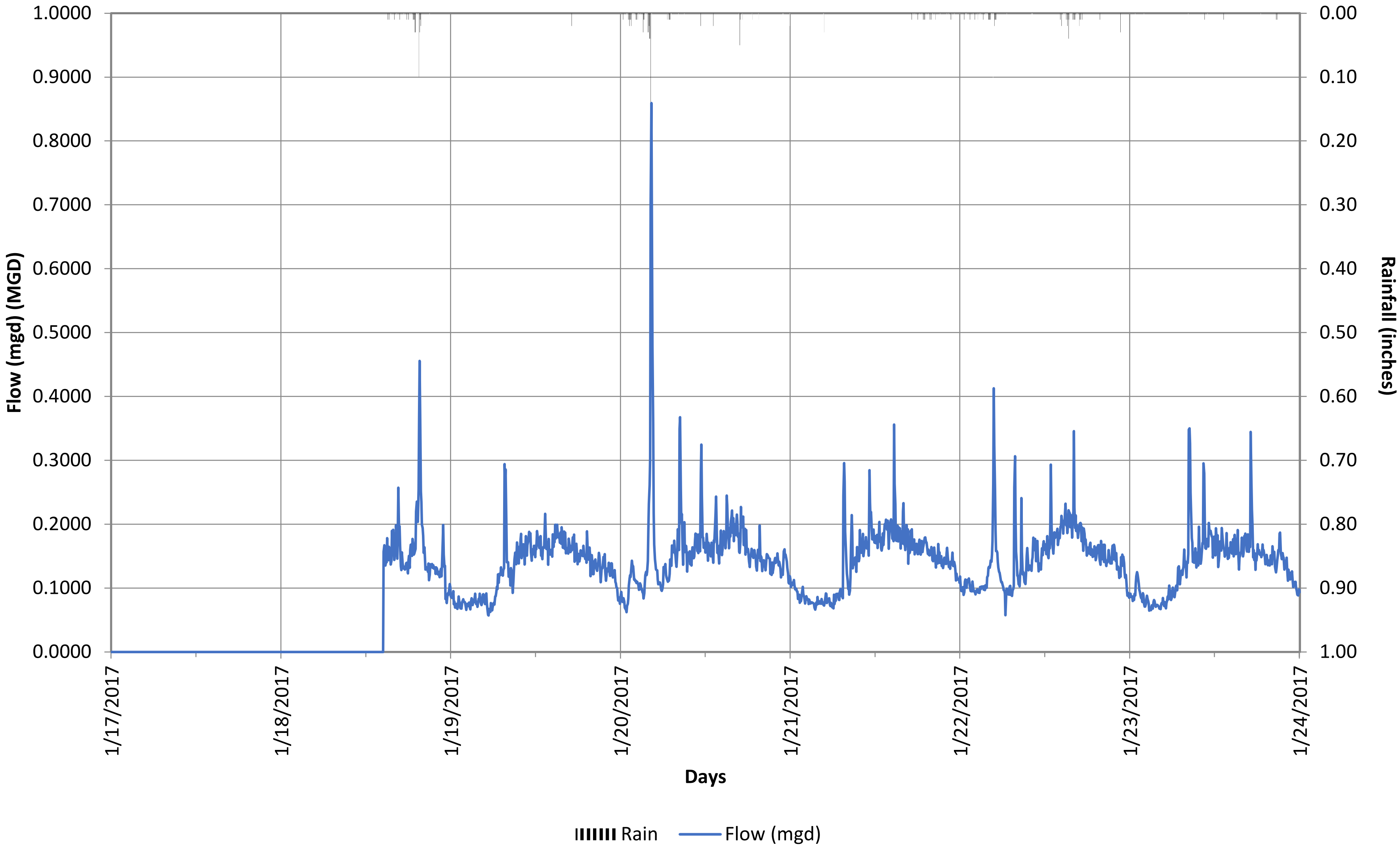
Day	Date	Avg Flow(MGD)	Min Flow(MGD)	Max Flow(MGD)	Max Depth(in.)	Rain(in.)
Tuesday	1/17/17	0.000	0.000	0.000	0.000	0.00
Wednesday	1/18/17	0.062	0.000	0.456	6.381	0.53
Thursday	1/19/17	0.131	0.057	0.294	5.038	0.02
Friday	1/20/17	0.160	0.062	0.859	8.626	1.13
Saturday	1/21/17	0.141	0.066	0.356	5.466	0.25
Sunday	1/22/17	0.148	0.057	0.413	5.807	1.00
Monday	1/23/17	0.137	0.065	0.350	5.448	0.18
Tuesday	1/24/17	0.134	0.058	0.384	5.766	0.01
Wednesday	1/25/17	0.128	0.061	0.362	5.490	0.00
Thursday	1/26/17	0.136	0.051	0.378	5.503	0.00
Friday	1/27/17	0.138	0.056	0.403	5.872	0.00
Saturday	1/28/17	0.139	0.062	0.313	5.075	0.00
Sunday	1/29/17	0.126	0.058	0.320	5.060	0.00
Monday	1/30/17	0.137	0.062	0.368	5.728	0.00
Tuesday	1/31/17	0.137	0.046	0.386	5.873	0.00
Wednesday	2/1/17	0.133	0.058	0.371	5.563	0.01
Thursday	2/2/17	0.142	0.067	0.343	5.557	0.19
Friday	2/3/17	0.128	0.062	0.315	5.201	0.51
Saturday	2/4/17	0.126	0.056	0.295	4.963	0.37
Sunday	2/5/17	0.120	0.050	0.275	4.734	0.15
Monday	2/6/17	0.131	0.053	0.295	5.005	0.50
Tuesday	2/7/17	0.139	0.072	0.362	5.550	0.86
Wednesday	2/8/17	0.126	0.052	0.319	5.116	0.26
Thursday	2/9/17	0.142	0.060	0.368	5.574	0.77
Friday	2/10/17	0.131	0.064	0.317	5.196	0.04
Saturday	2/11/17	0.136	0.066	0.294	5.015	0.00
Sunday	2/12/17	0.132	0.068	0.284	5.135	0.00
Monday	2/13/17	0.139	0.064	0.265	4.837	0.00
Tuesday	2/14/17	0.140	0.067	0.294	5.125	0.00
Wednesday	2/15/17	0.145	0.064	0.288	5.124	0.00
Thursday	2/16/17	0.161	0.067	0.287	5.100	0.39
Friday	2/17/17	0.197	0.052	0.395	5.938	1.23
Saturday	2/18/17	0.166	0.088	0.295	5.333	0.14
Sunday	2/19/17	0.149	0.073	0.281	5.091	0.08
Monday	2/20/17	0.205	0.101	0.431	6.242	1.61
Tuesday	2/21/17	0.167	0.096	0.318	5.297	0.19
Wednesday	2/22/17	0.149	0.070	0.268	5.154	0.00



Colma Site 3 SSMH 9E76 North 10" Daily Sanitary Flow
MGD
Inches
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
1/17/17
1/18/17
1/19/17
1/20/17
1/21/17
1/22/17
1/23/17
1/24/17
1/25/17
1/26/17
1/27/17
1/28/17
1/29/17
1/30/17
1/31/17
2/1/17
2/2/17
2/3/17
2/4/17
2/5/17
2/6/17
2/7/17
2/8/17
2/9/17
2/10/17
2/11/17
2/12/17
2/13/17
2/14/17
2/15/17
2/16/17
2/17/17
2/18/17
2/19/17
2/20/17
2/21/17
2/22/17
Rain(in.)
Avg Flow(MGD)

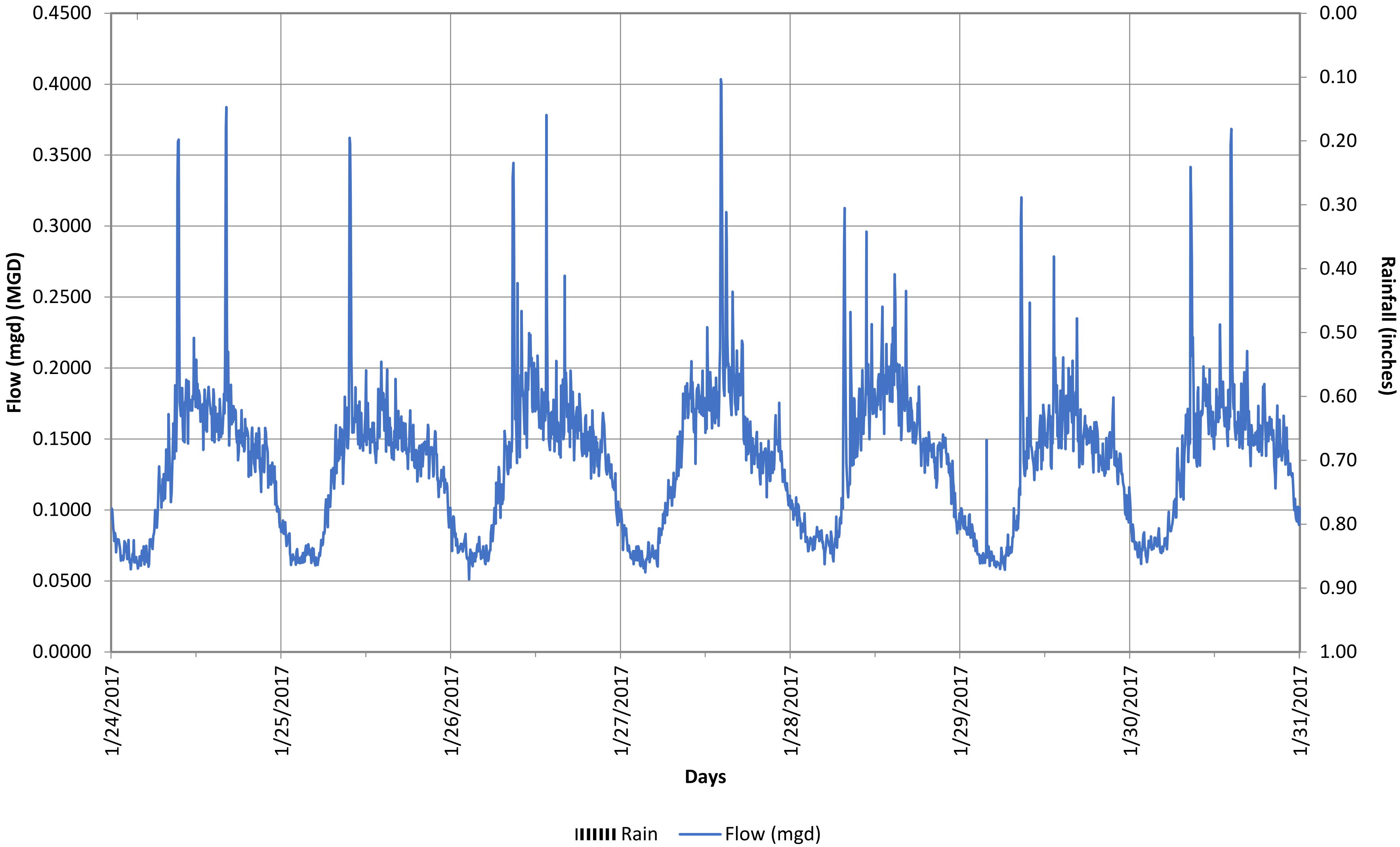

Colma Site 3 SSMH 9E76 North 10" Scatter Plot
Velocity Feet Per Second
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
Depth In Inches

Colma Site 3 SSMH 9E76 North 10" Sanitary Flow

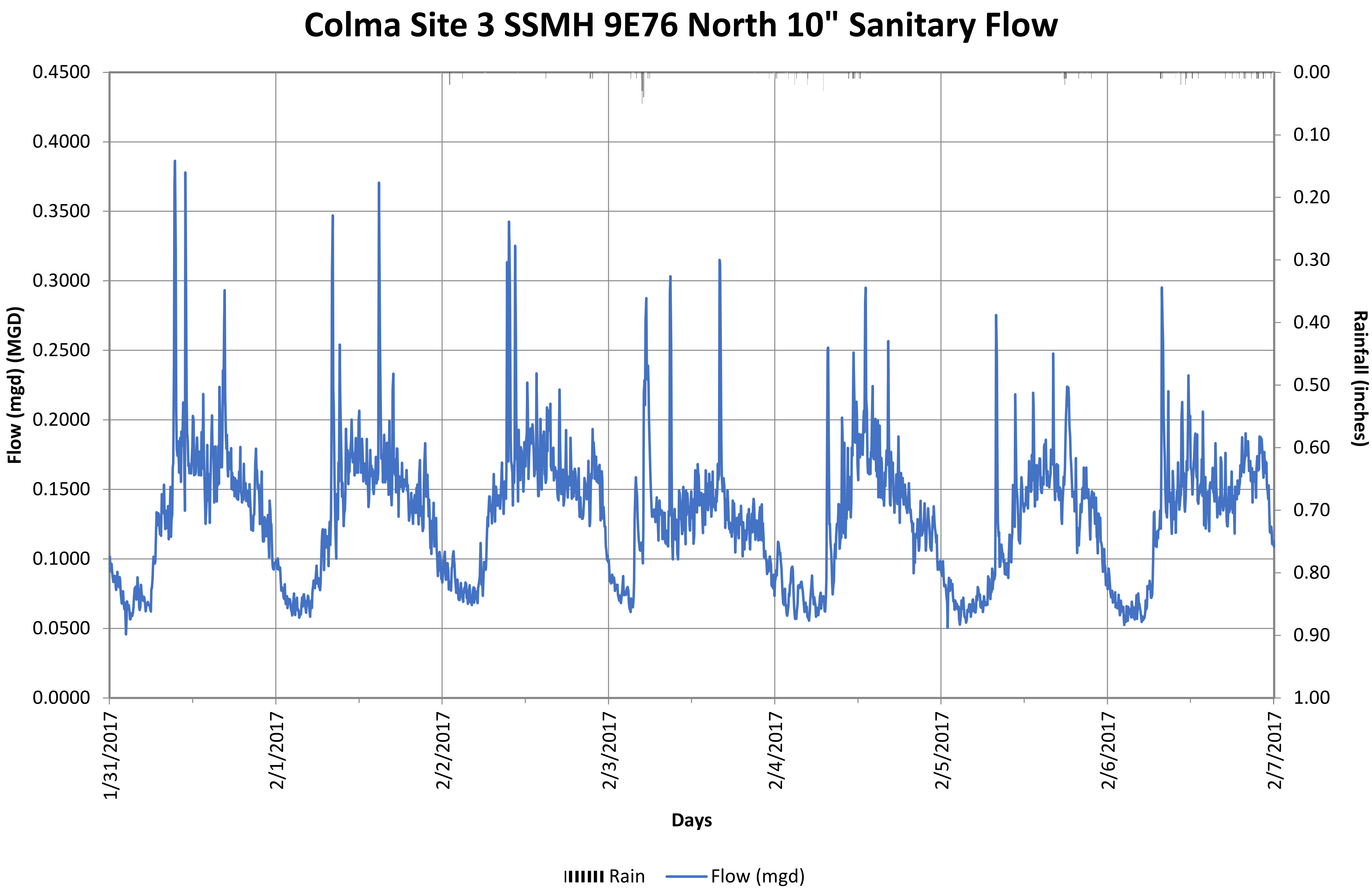


	1/17/2017(Tue)	1/18/2017(Wed)	1/19/2017(Thu)	1/20/2017(Fri)	1/21/2017(Sat)	1/22/2017(Sun)	1/23/2017(Mon)
Maximum	0.000	0.456	0.294	0.859	0.356	0.413	0.350
Average	0.000	0.062	0.131	0.160	0.141	0.148	0.137
Minimum	0.000	0.000	0.057	0.062	0.066	0.057	0.065
Rain (inches)	0.00	0.53	0.02	1.13	0.25	1.00	0.18

Colma Site 3 SSMH 9E76 North 10" Sanitary Flow

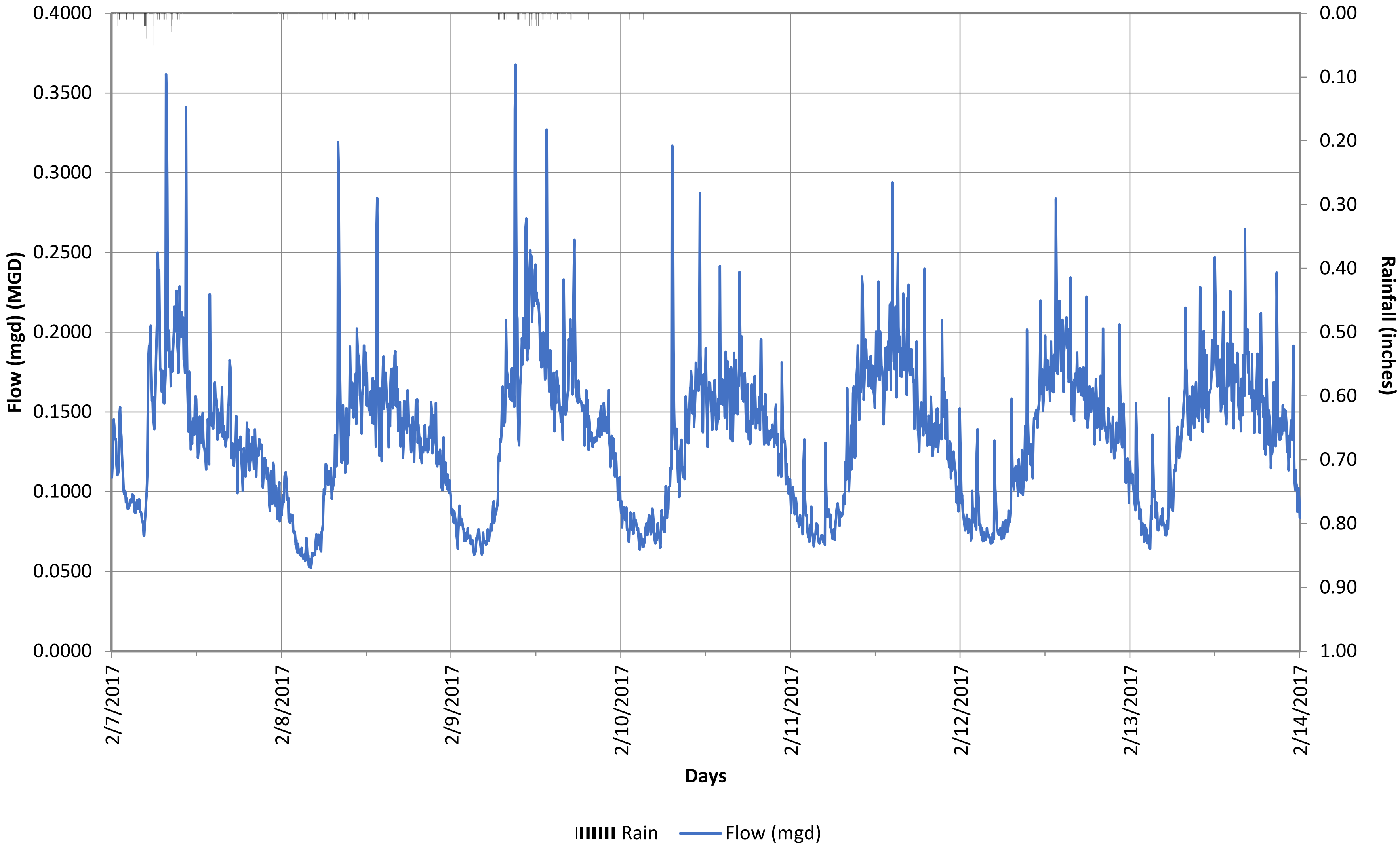


	1/24/2017(Tue)	1/25/2017(Wed)	1/26/2017(Thu)	1/27/2017(Fri)	1/28/2017(Sat)	1/29/2017(Sun)	1/30/2017(Mon)
Maximum	0.384	0.362	0.378	0.403	0.313	0.320	0.368
Average	0.134	0.128	0.136	0.138	0.139	0.126	0.137
Minimum	0.058	0.061	0.051	0.056	0.062	0.058	0.062
Rain (inches)	0.01	0.00	0.00	0.00	0.00	0.00	0.00

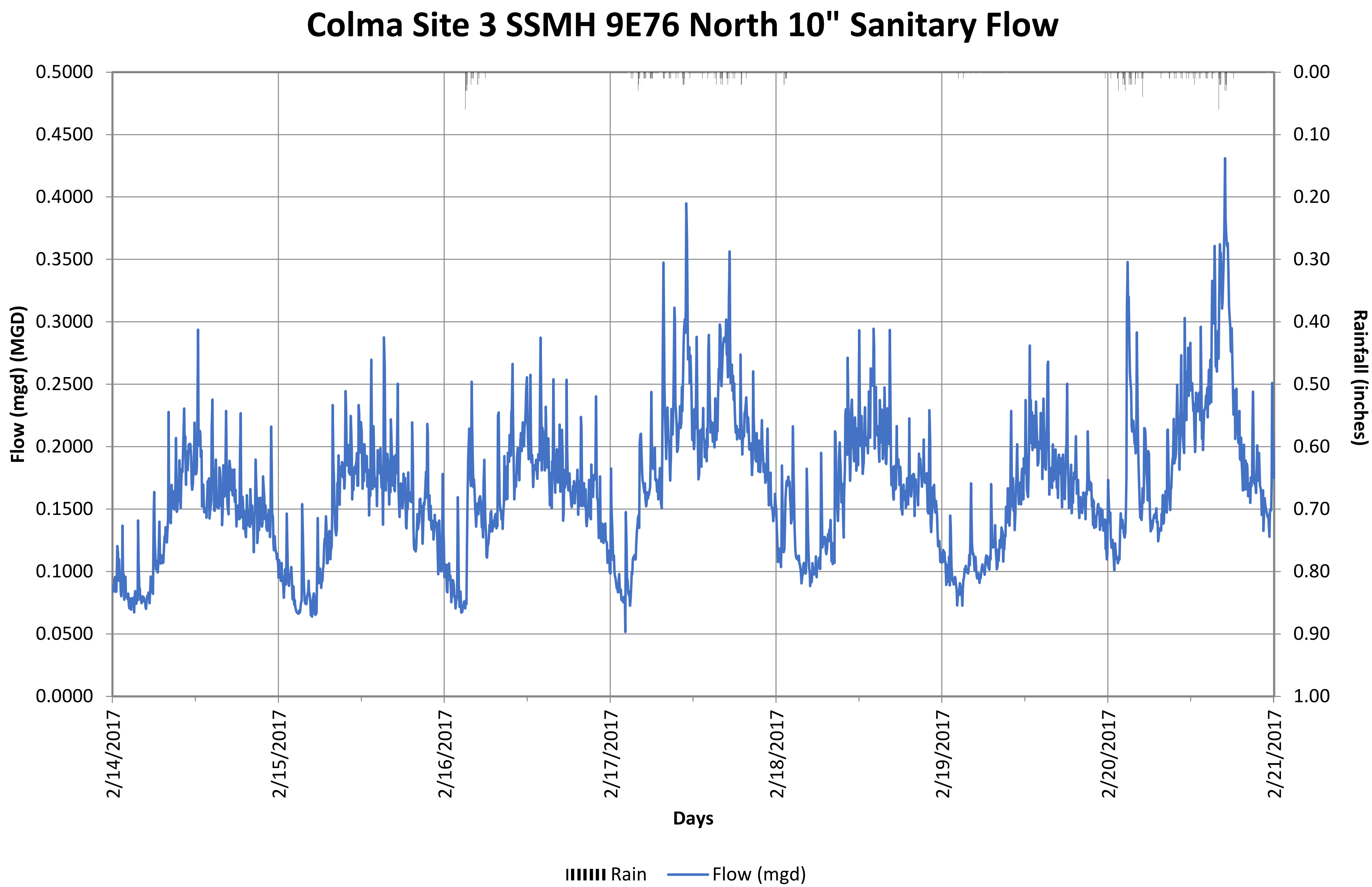


	1/31/2017(Tue)	2/1/2017(Wed)	2/2/2017(Thu)	2/3/2017(Fri)	2/4/2017(Sat)	2/5/2017(Sun)	2/6/2017(Mon)
Maximum	0.386	0.371	0.343	0.315	0.295	0.275	0.295
Average	0.137	0.133	0.142	0.128	0.126	0.120	0.131
Minimum	0.046	0.058	0.067	0.062	0.056	0.050	0.053
Rain (inches)	0.00	0.01	0.19	0.51	0.37	0.15	0.50

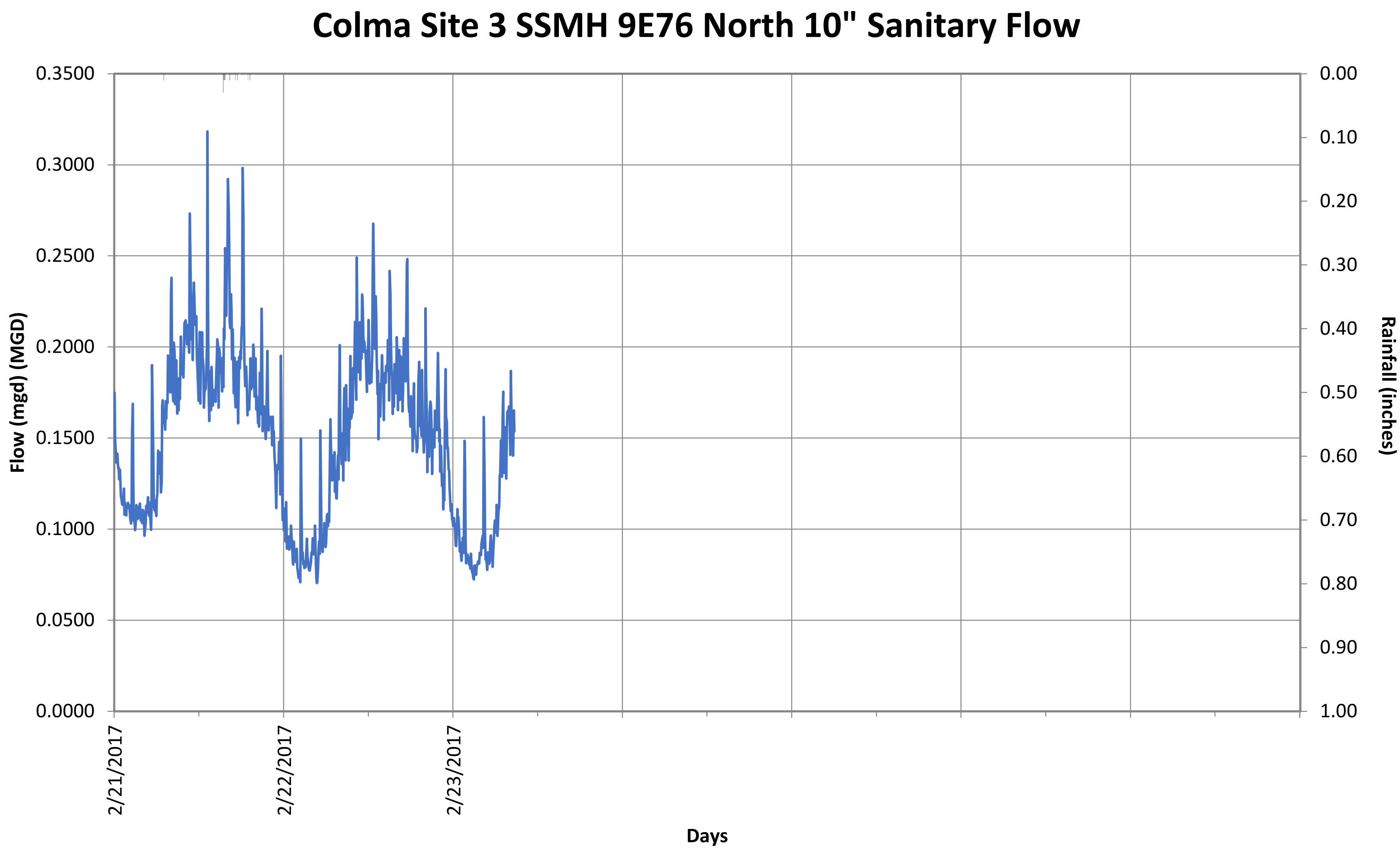
Colma Site 3 SSMH 9E76 North 10" Sanitary Flow



	2/7/2017(Tue)	2/8/2017(Wed)	2/9/2017(Thu)	2/10/2017(Fri)	2/11/2017(Sat)	2/12/2017(Sun)	2/13/2017(Mon)
Maximum	0.362	0.319	0.368	0.317	0.294	0.284	0.265
Average	0.139	0.126	0.142	0.131	0.136	0.132	0.139
Minimum	0.072	0.052	0.060	0.064	0.066	0.068	0.064
Rain (inches)	0.86	0.26	0.77	0.04	0.00	0.00	0.00



	2/14/2017(Tue)	2/15/2017(Wed)	2/16/2017(Thu)	2/17/2017(Fri)	2/18/2017(Sat)	2/19/2017(Sun)	2/20/2017(Mon)
Maximum	0.294	0.288	0.287	0.395	0.295	0.281	0.431
Average	0.140	0.145	0.161	0.197	0.166	0.149	0.205
Minimum	0.067	0.064	0.067	0.052	0.088	0.073	0.101
Rain (inches)	0.00	0.00	0.39	1.23	0.14	0.08	1.61

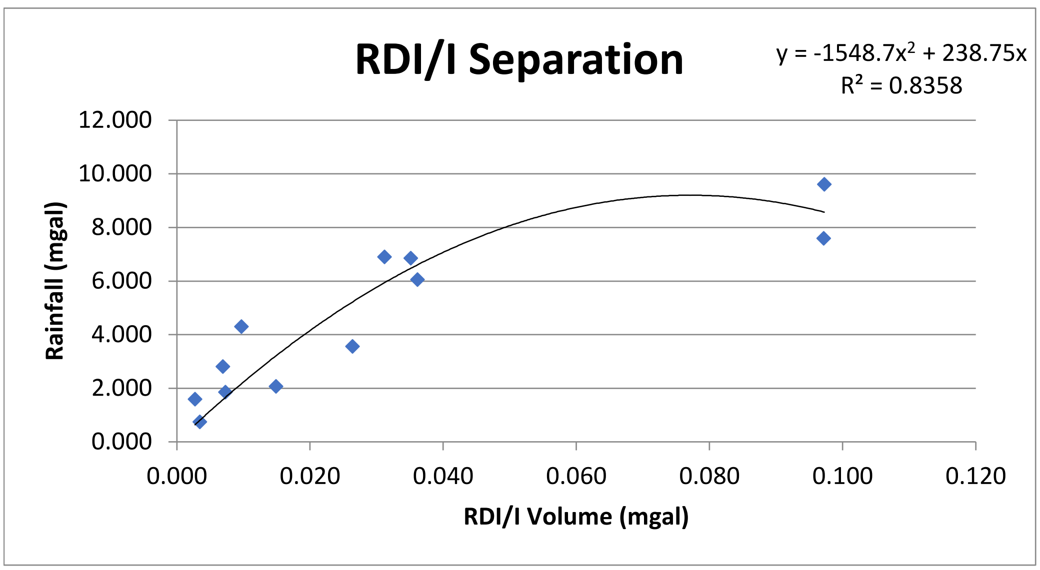


	2/21/2017(Tue)	2/22/2017(Wed)					
Maximum	0.318	0.268					
Average	0.167	0.149					
Minimum	0.096	0.070					
Rain (inches)	0.19	0.00					

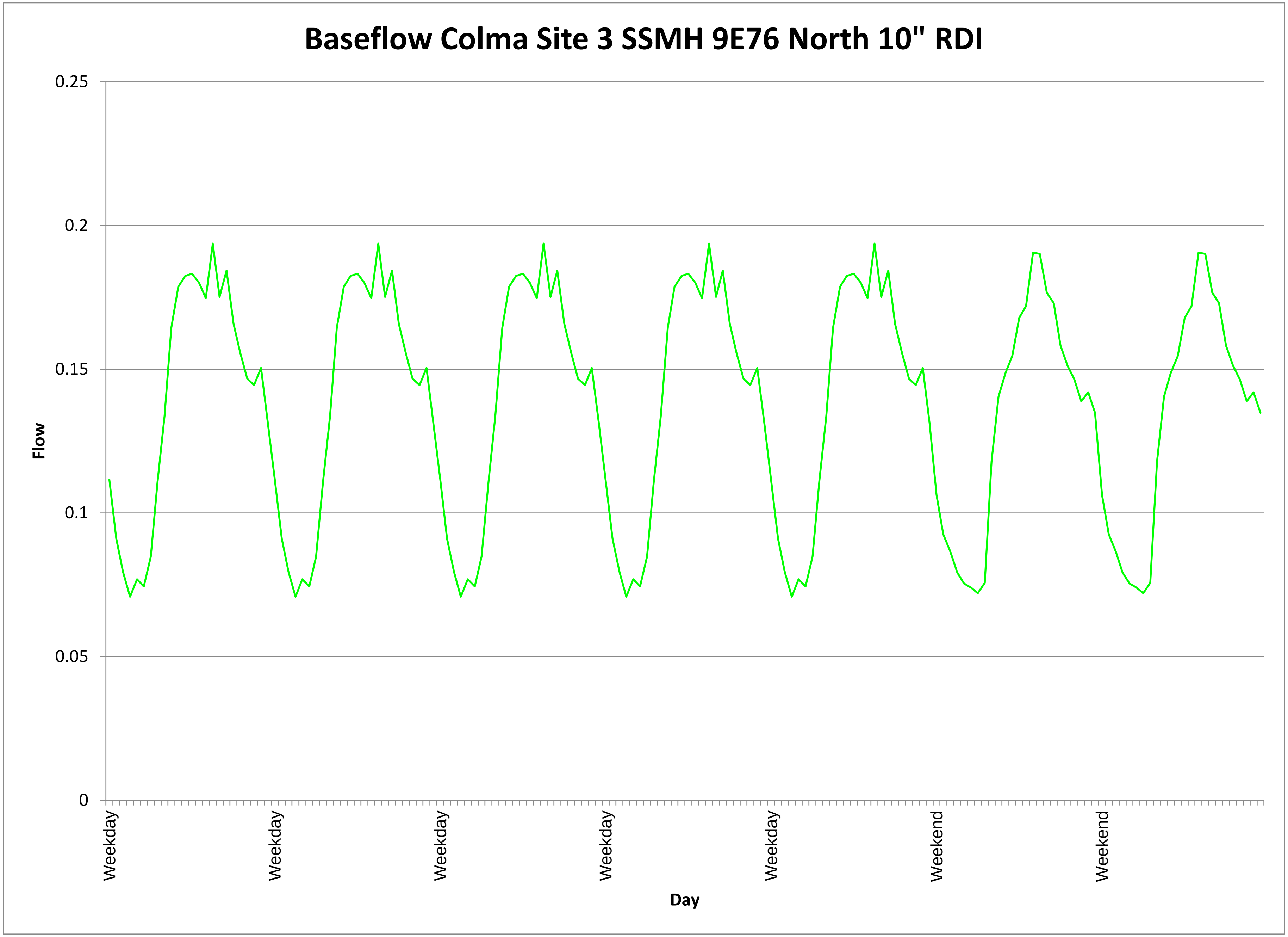
Colma Site 3 SSMH 9E76 North 10" RDI

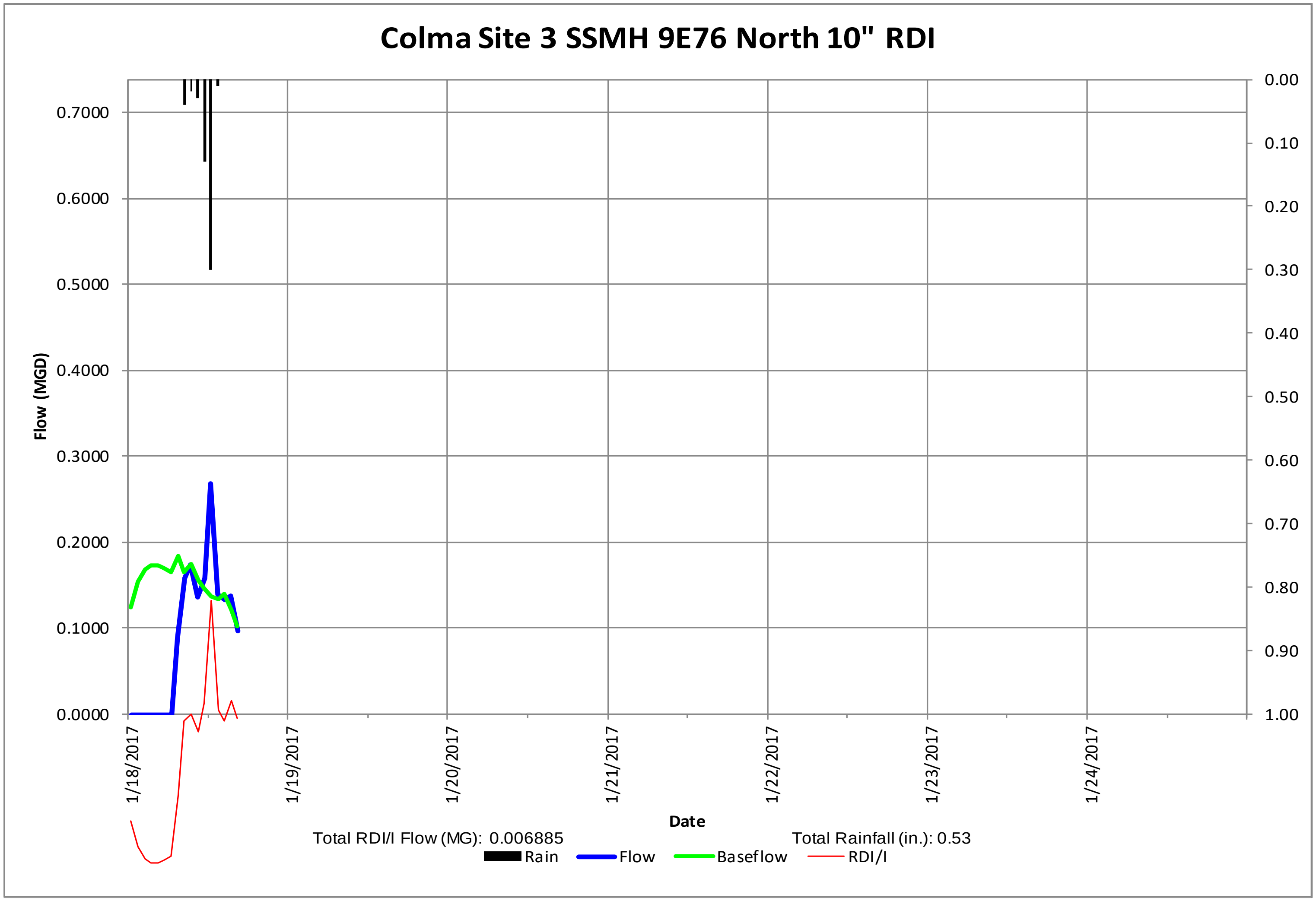
RDI/I Analysis, Monitor Return Ratio Summary

Storm Start (Date)	RDI/I Volume (mgal)	Monitor Area (acres)	Rainfall (mgal)	Return Ratio (%)
1/18/2017	0.007	195.5	2.813	0.24%
1/20/2017	0.036	195.5	6.051	0.60%
1/21/2017	0.035	195.5	6.848	0.51%
2/2/2017	0.026	195.5	3.557	0.74%
2/4/2017	0.007	195.5	1.858	0.39%
2/5/2017	0.003	195.5	0.743	0.46%
2/6/2017	0.031	195.5	6.901	0.45%
2/7/2017	0.003	195.5	1.592	0.17%
2/9/2017	0.010	195.5	4.300	0.23%
2/16/2017	0.015	195.5	2.070	0.72%
2/17/2017	0.097	195.5	7.591	1.28%
2/20/2017	0.097	195.5	9.608	1.01%
Average R%				0.57%
Average top 3 storms				1.01%



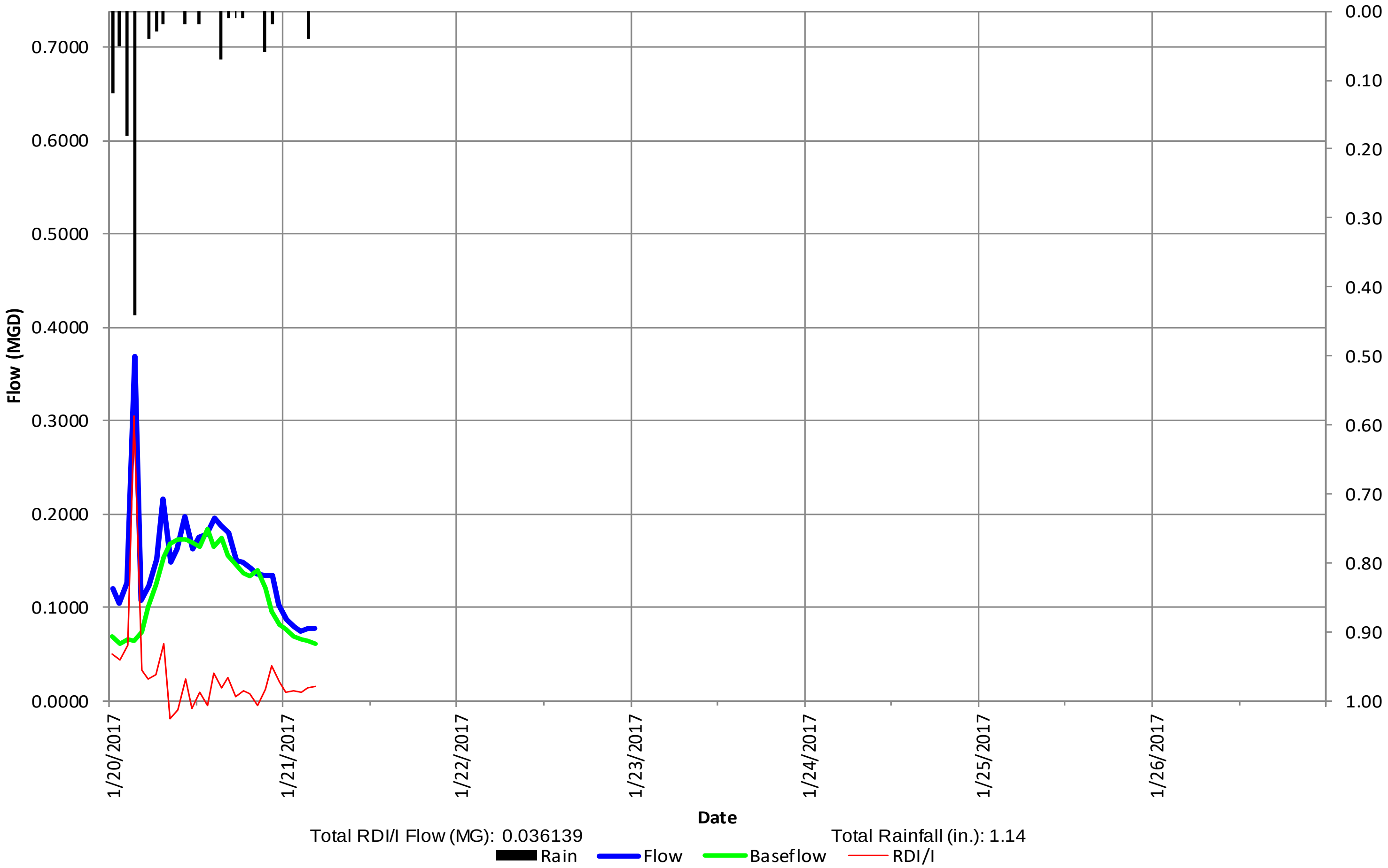
Baseflows	Weekend	Weekday
Max	0.191	0.194
Avg	0.132	0.139
Min	0.072	0.071


Baseflow Colma Site 3 SSMH 9E76 North 10" RDI
0.25
0.2
0.15
0.1
0.05
0
Flow
Weekday
Weekday
Weekday
Weekday
Weekday
Weekend
Weekend
Day

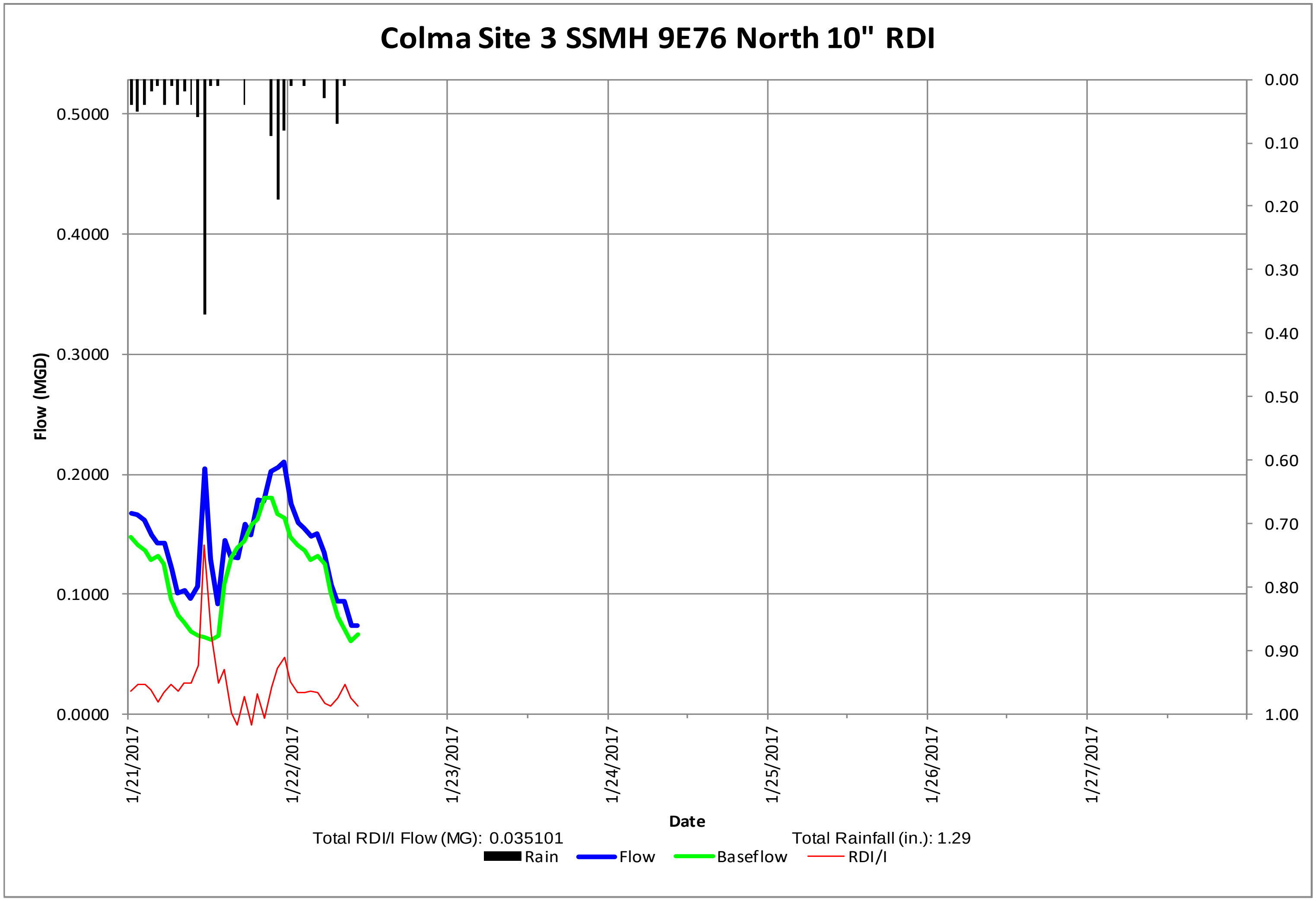


Storm of 1/18/2017

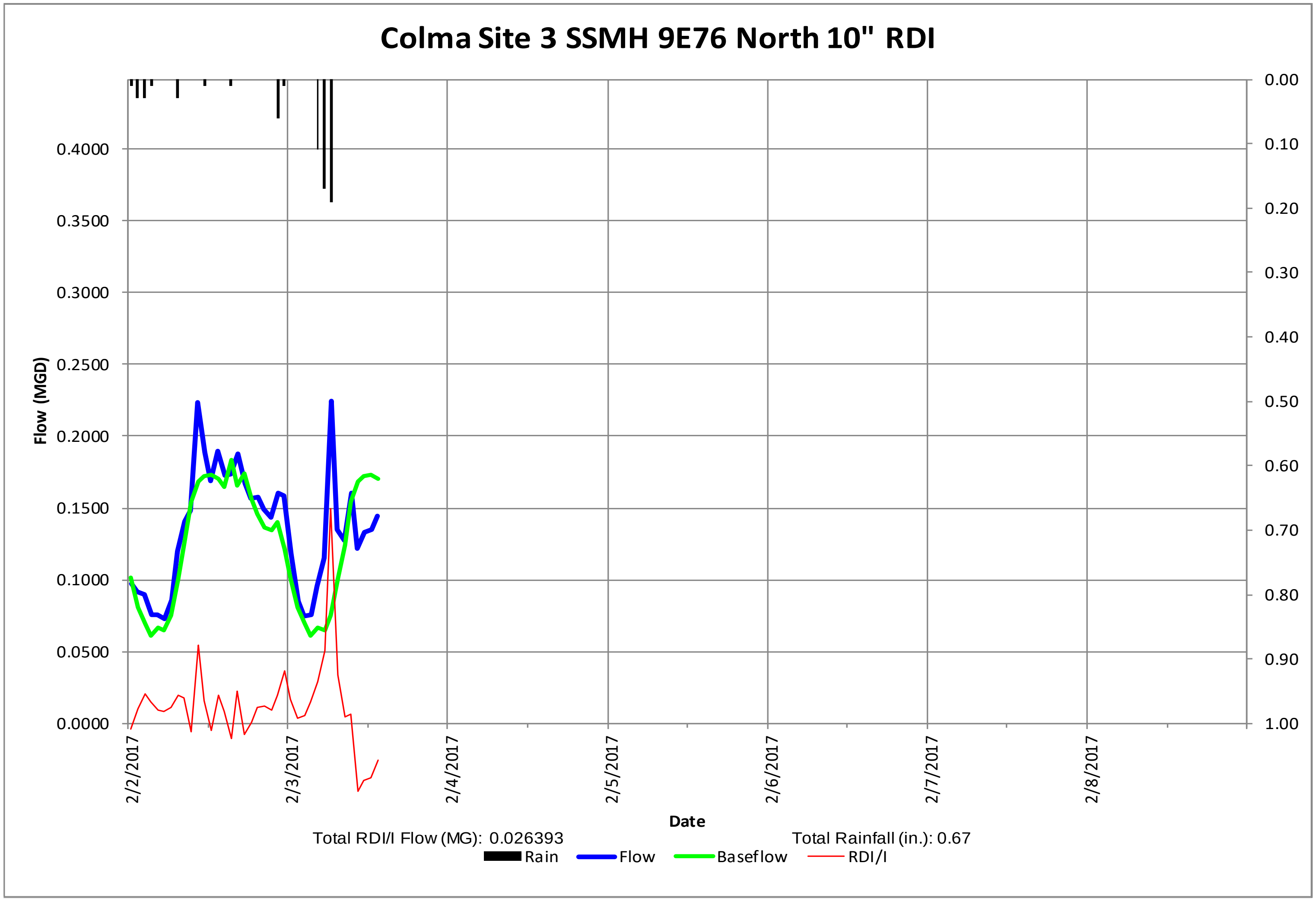
Colma Site 3 SSMH 9E76 North 10" RDI



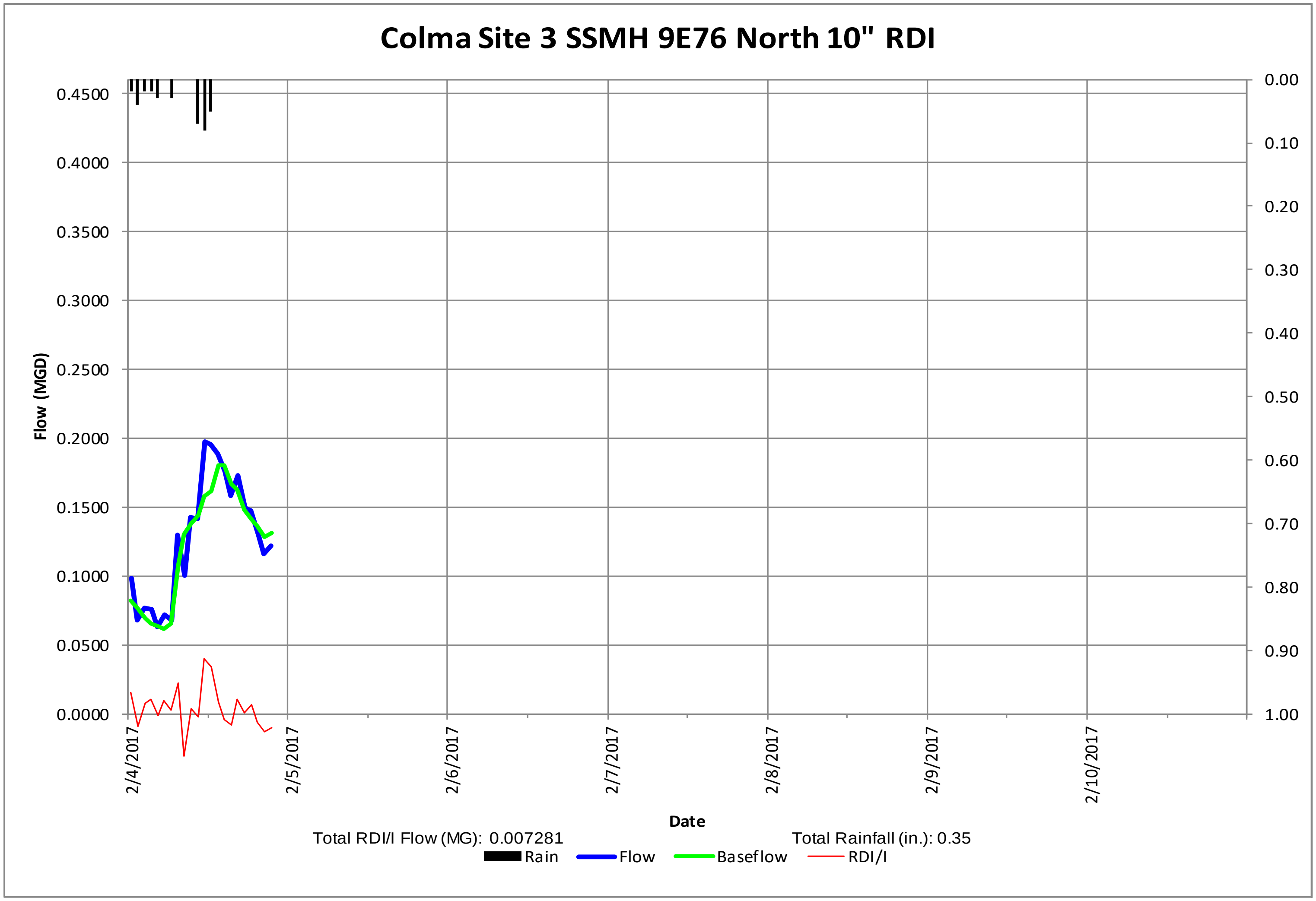
Storm of 1/20/2017



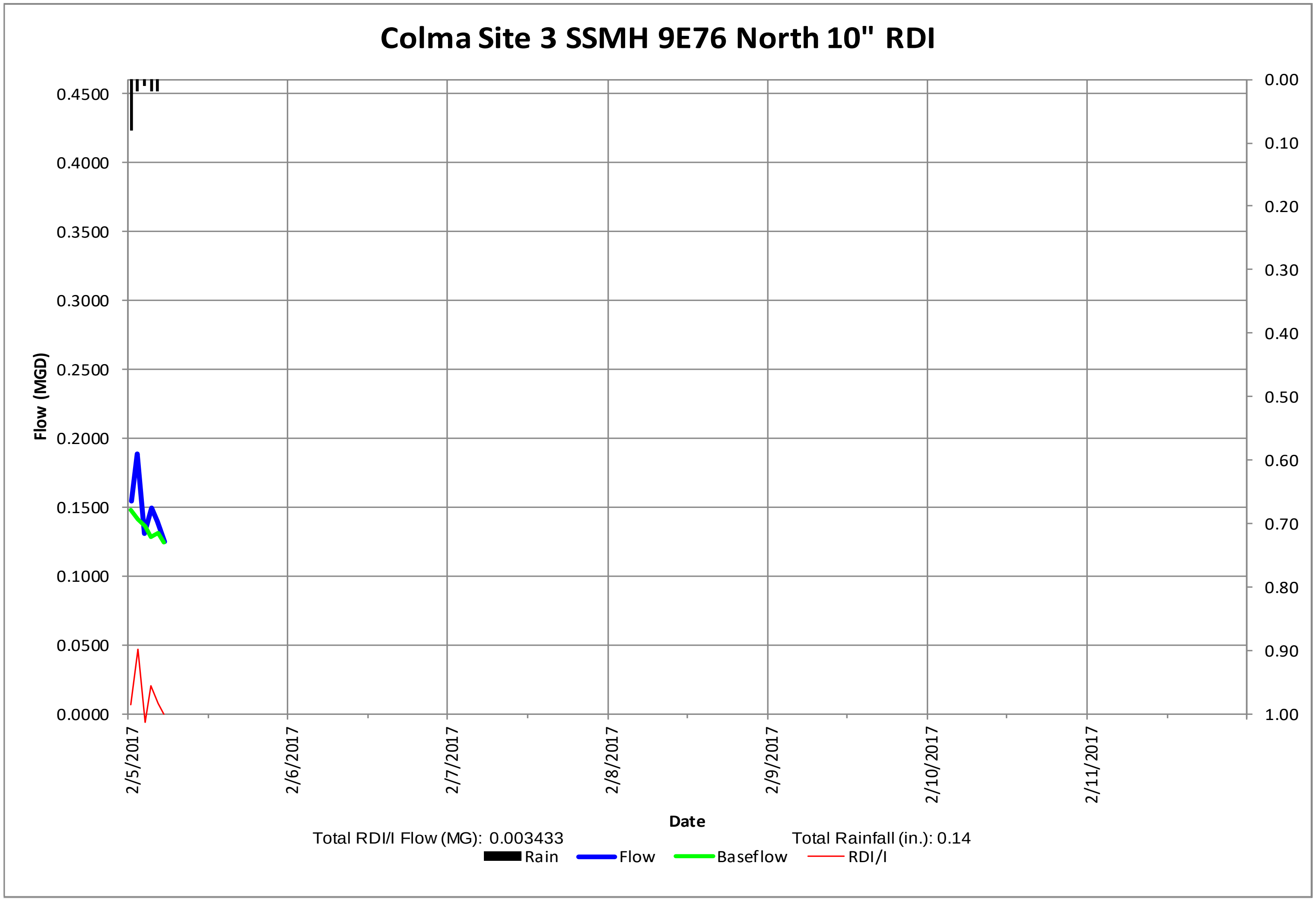
Storm of 1/21/2017



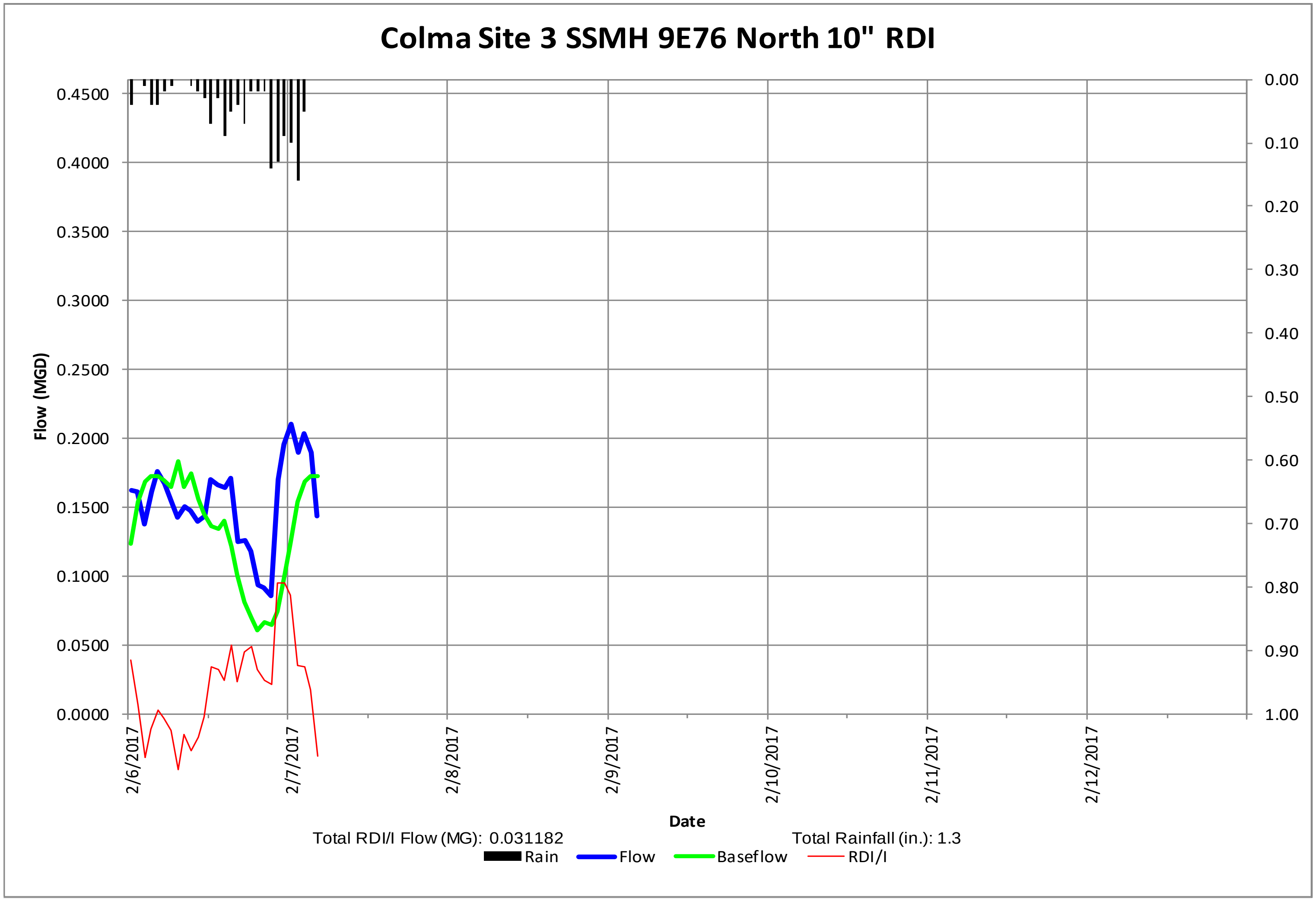
Storm of 2/2/2017



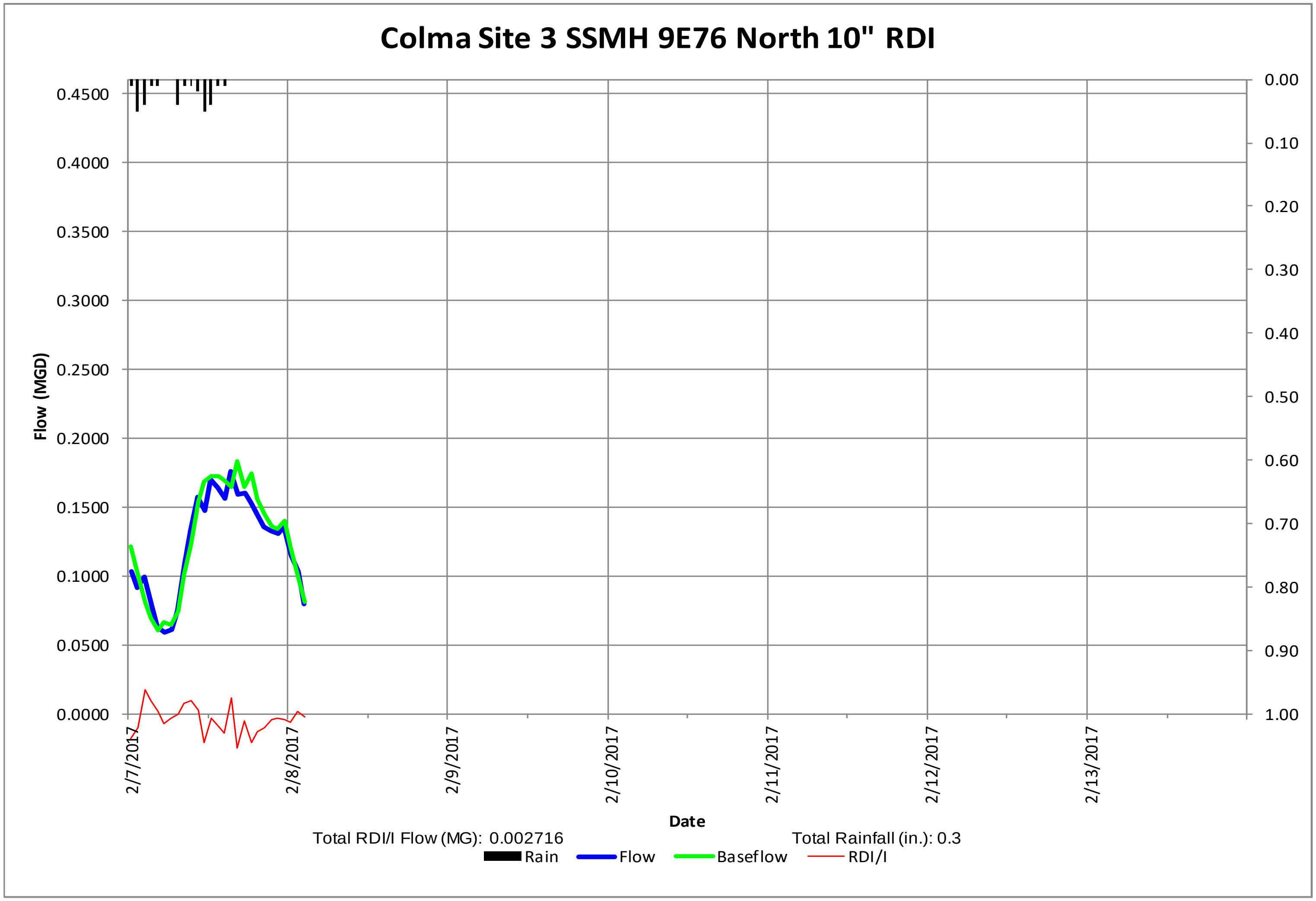
Storm of 2/4/2017



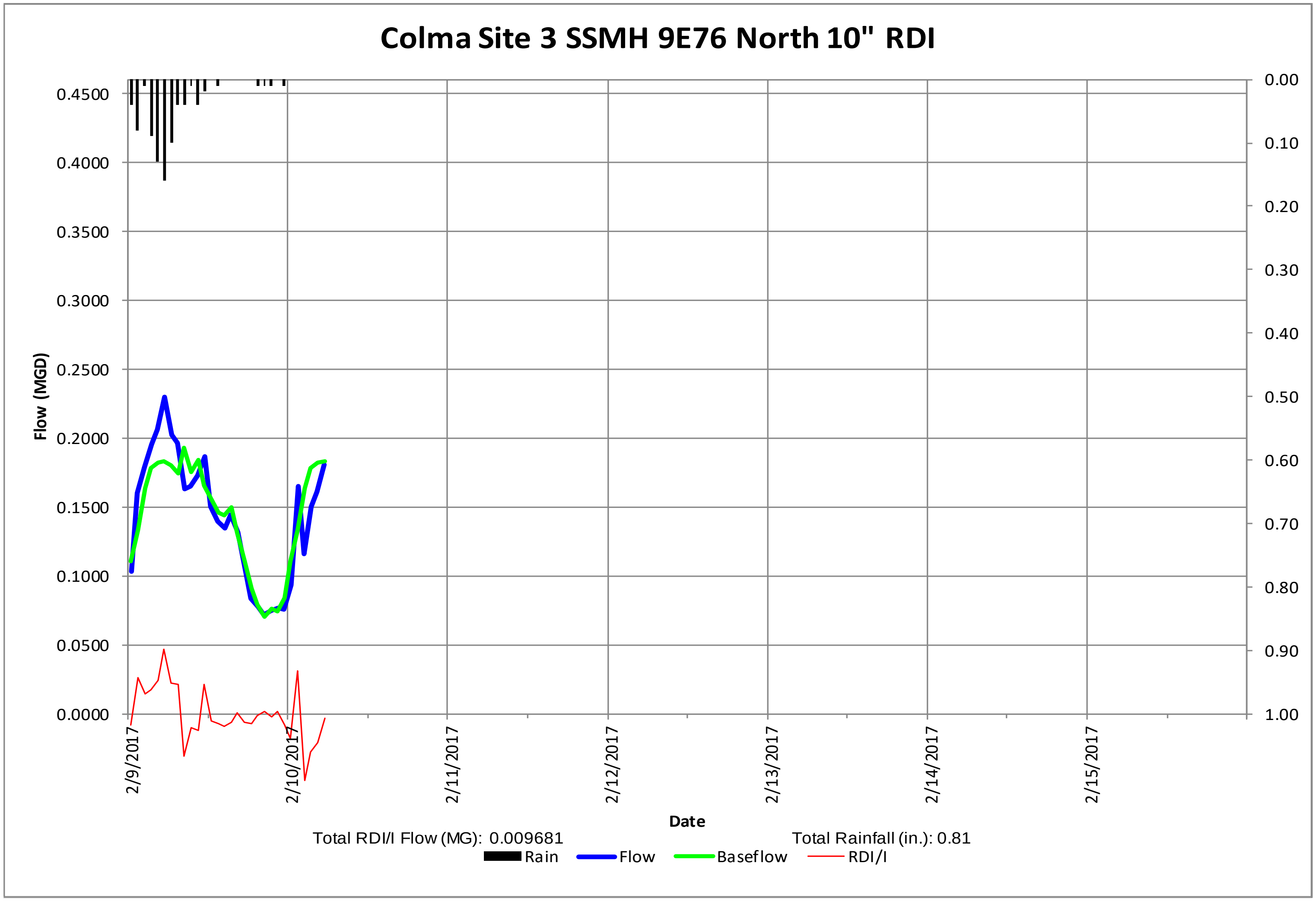
Storm of 2/5/2017



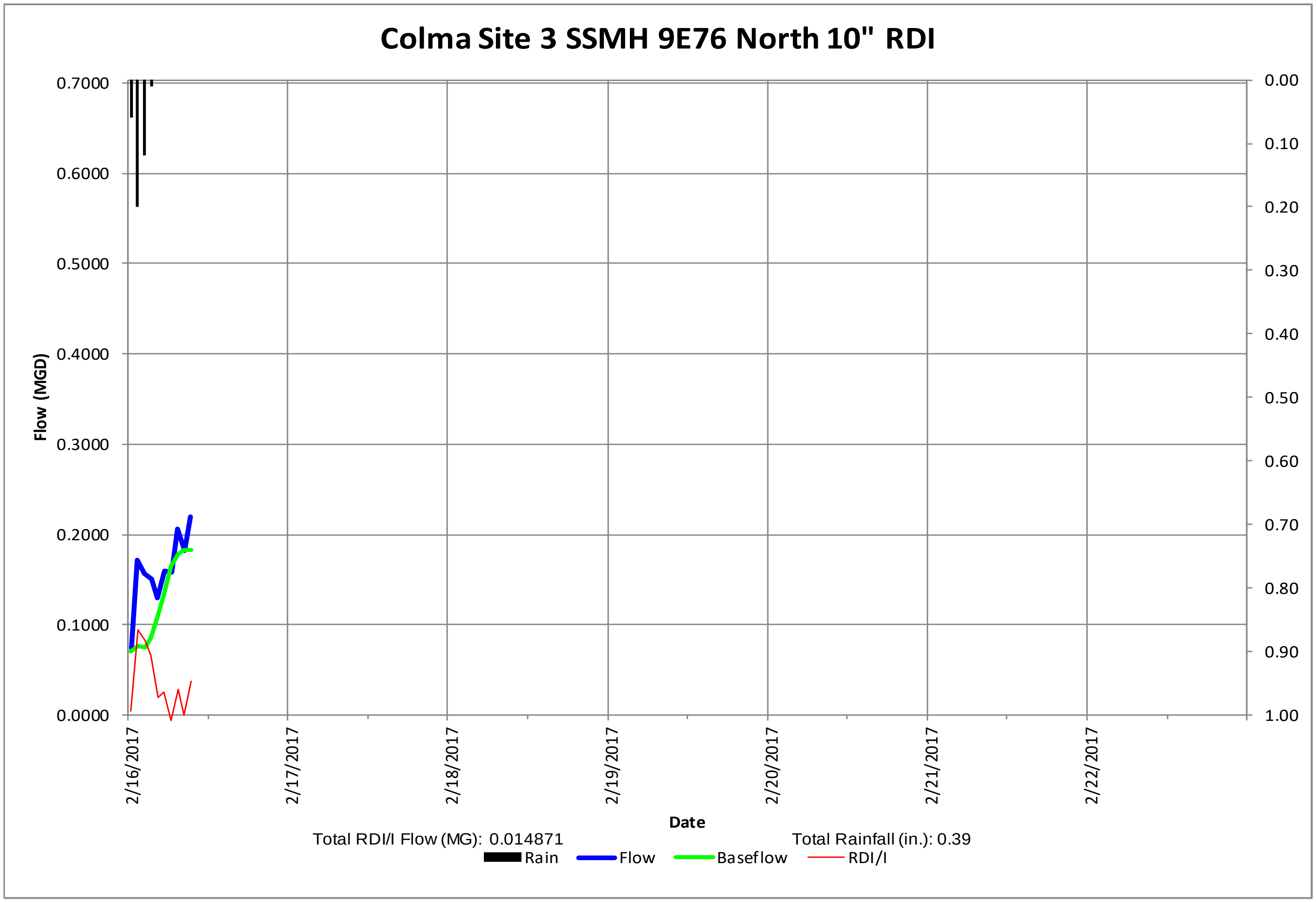
Storm of 2/6/2017



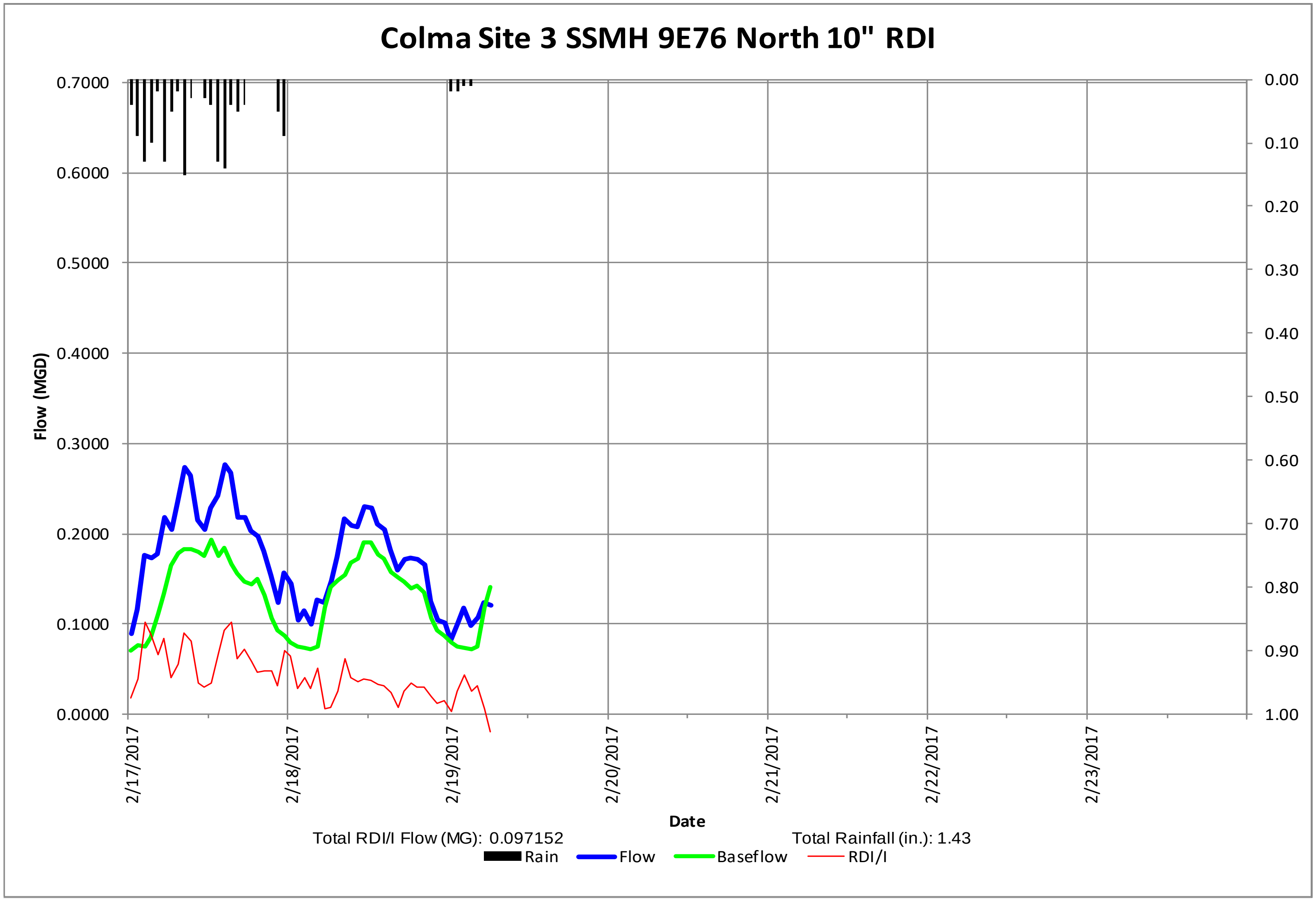
Storm of 2/7/2017



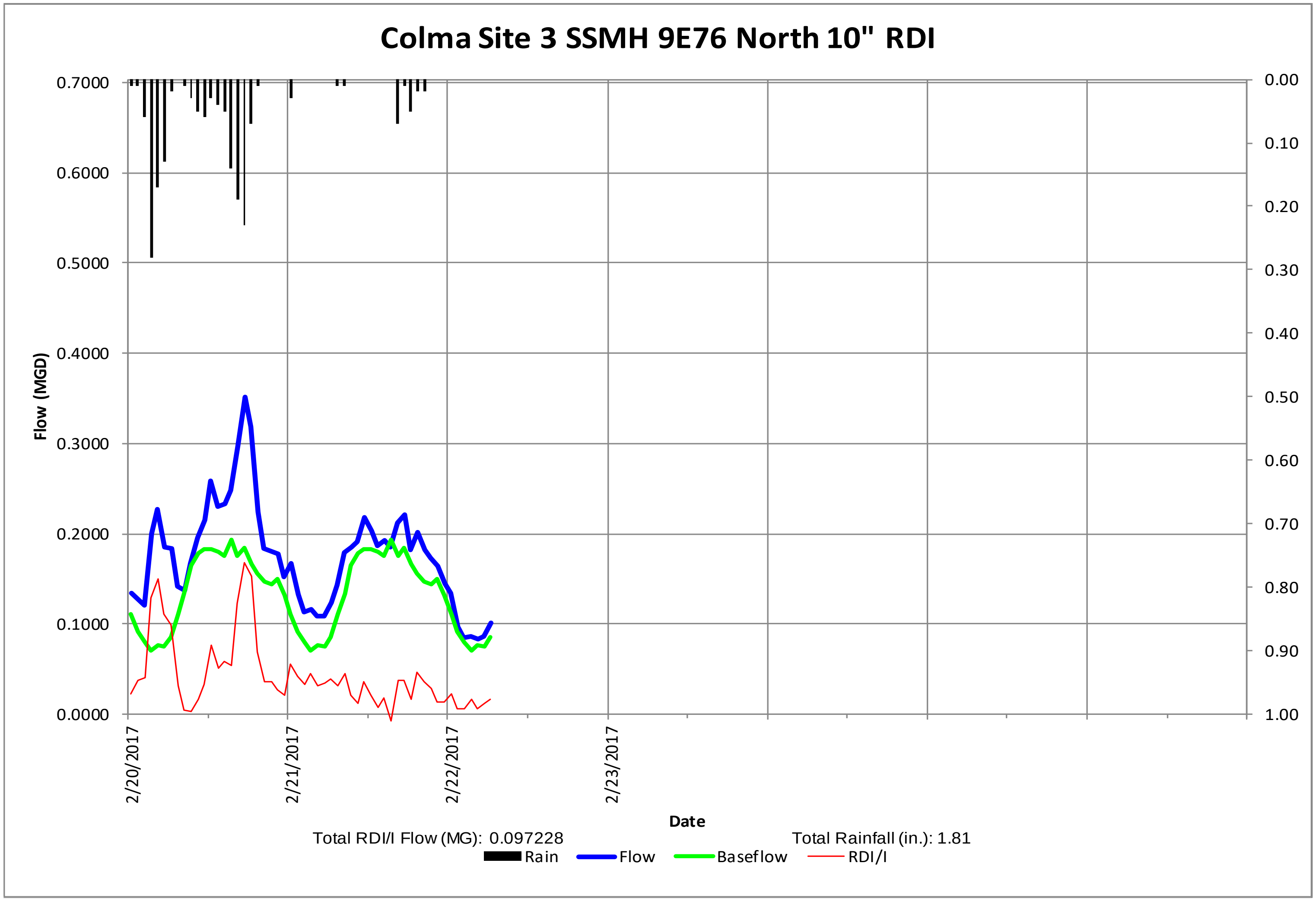
Storm of 2/9/2017



Storm of 2/16/2017



Storm of 2/17/2017

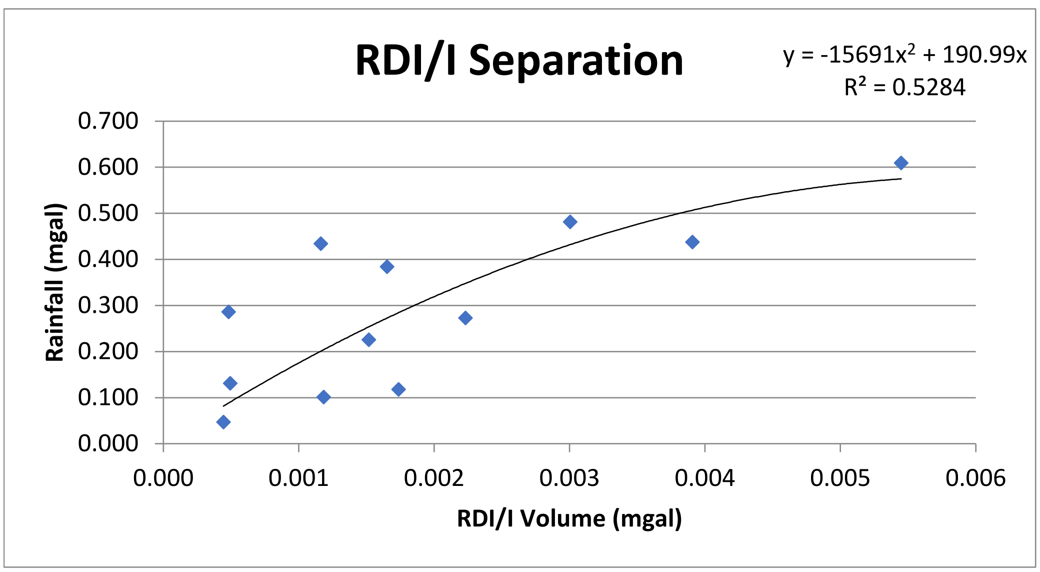


Storm of 2/20/2017

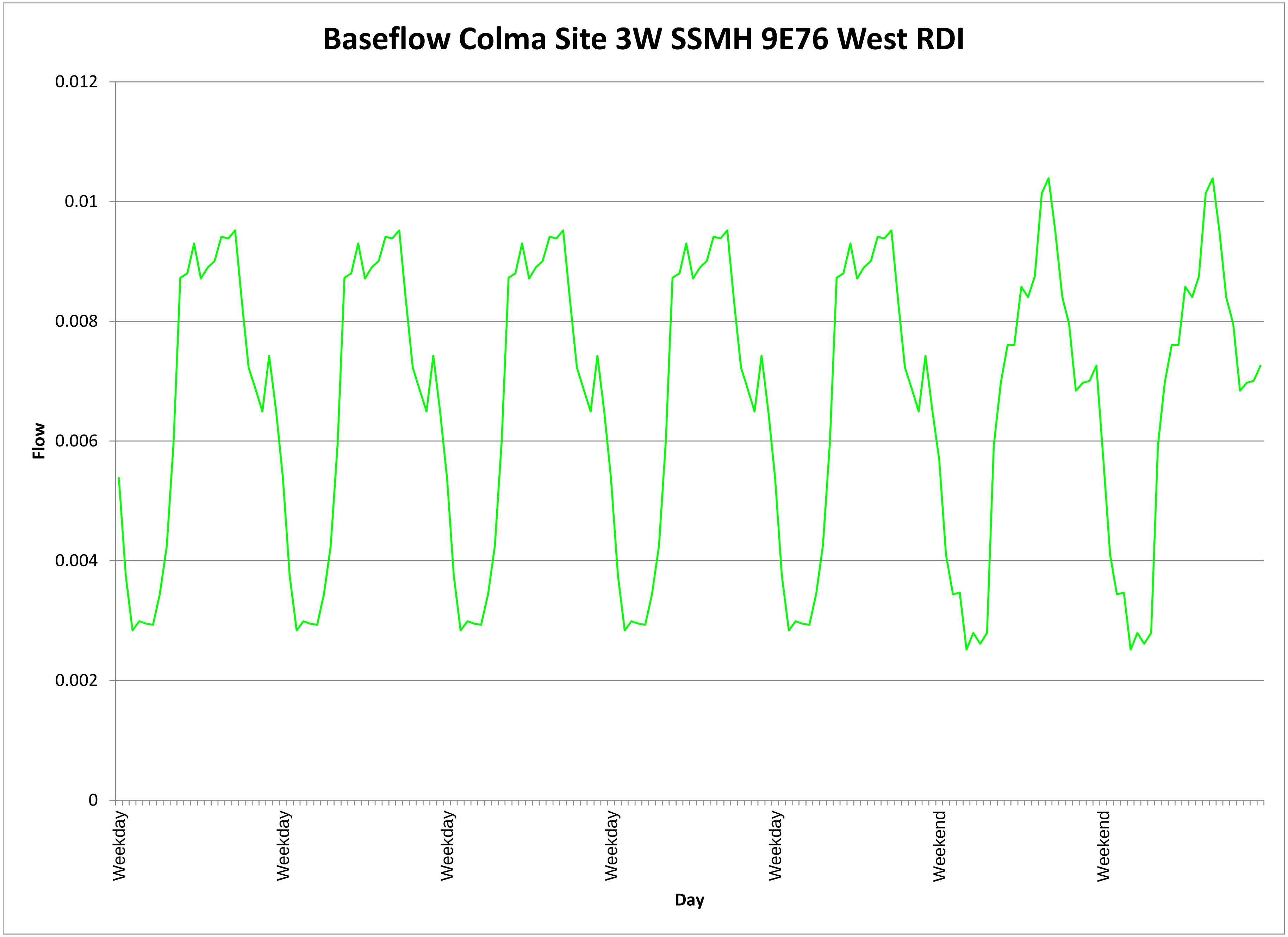
Colma Site 3W SSMH 9E76 West RDI

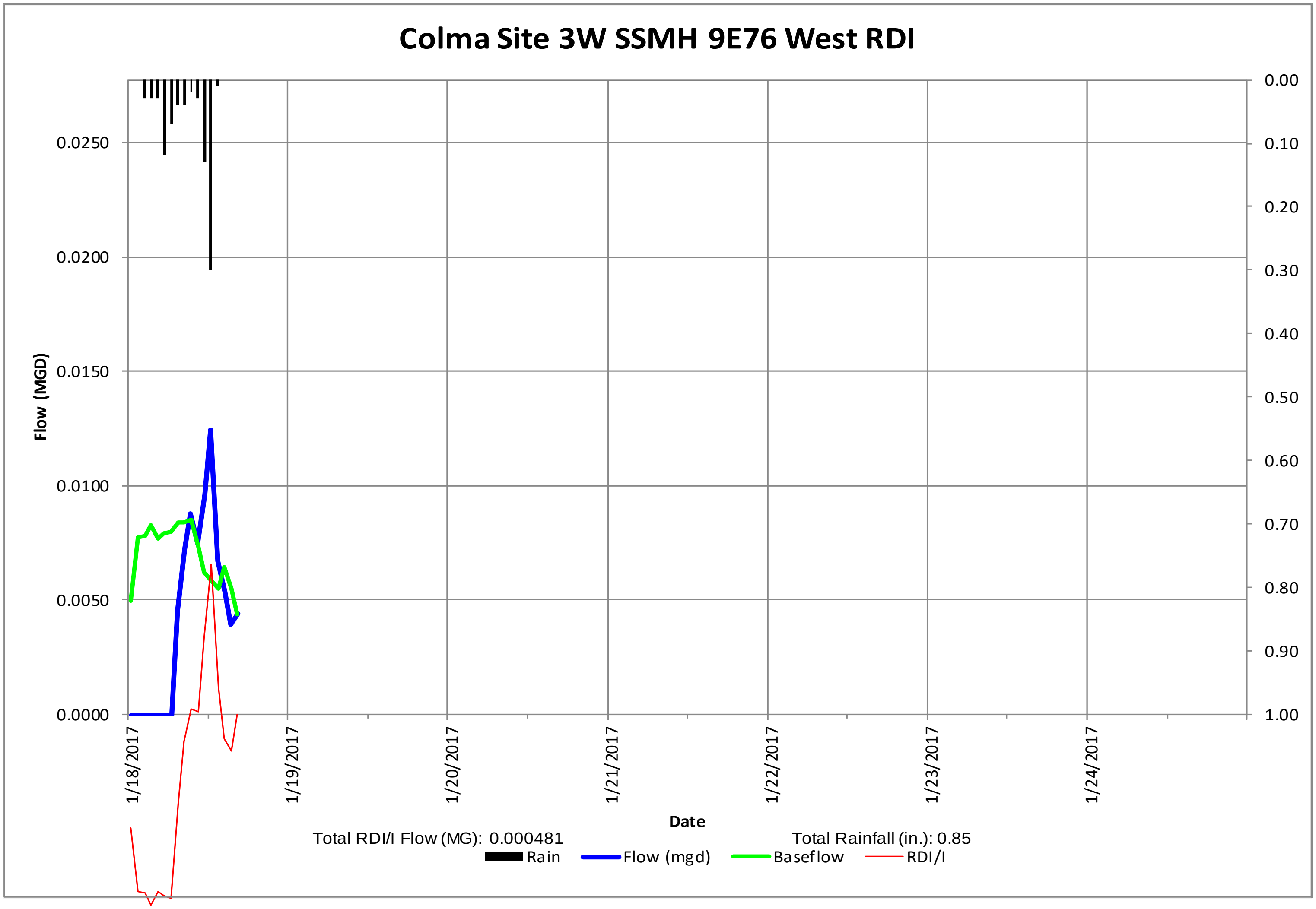
RDI/I Analysis, Monitor Return Ratio Summary

Storm Start (Date)	RDI/I Volume (mgal)	Monitor Area (acres)	Rainfall (mgal)	Return Ratio (%)
1/18/2017	0.000	12.4	0.286	0.17%
1/20/2017	0.002	12.4	0.384	0.43%
1/21/2017	0.001	12.4	0.434	0.27%
2/2/2017	0.002	12.4	0.226	0.67%
2/4/2017	0.002	12.4	0.118	1.47%
2/5/2017	0.000	12.4	0.047	0.94%
2/6/2017	0.004	12.4	0.438	0.89%
2/7/2017	0.001	12.4	0.101	1.17%
2/9/2017	0.002	12.4	0.273	0.82%
2/16/2017	0.000	12.4	0.131	0.38%
2/17/2017	0.003	12.4	0.481	0.62%
2/20/2017	0.005	12.4	0.609	0.89%
Average R%				0.73%
Average Top 3 Storms				1.18%

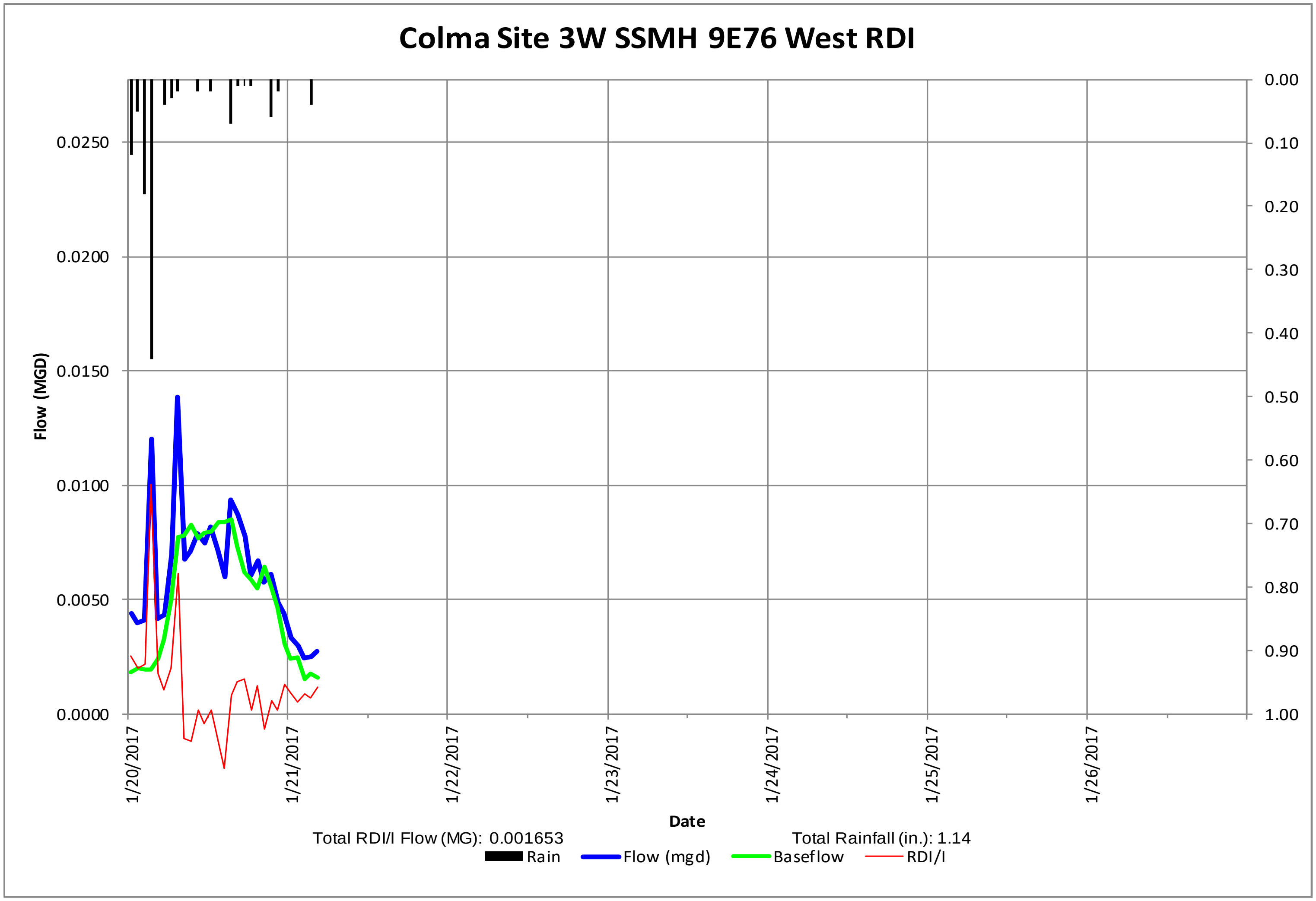


Baseflows	Weekend	Weekday
Max	0.010	0.010
Avg	0.006	0.007
Min	0.003	0.003

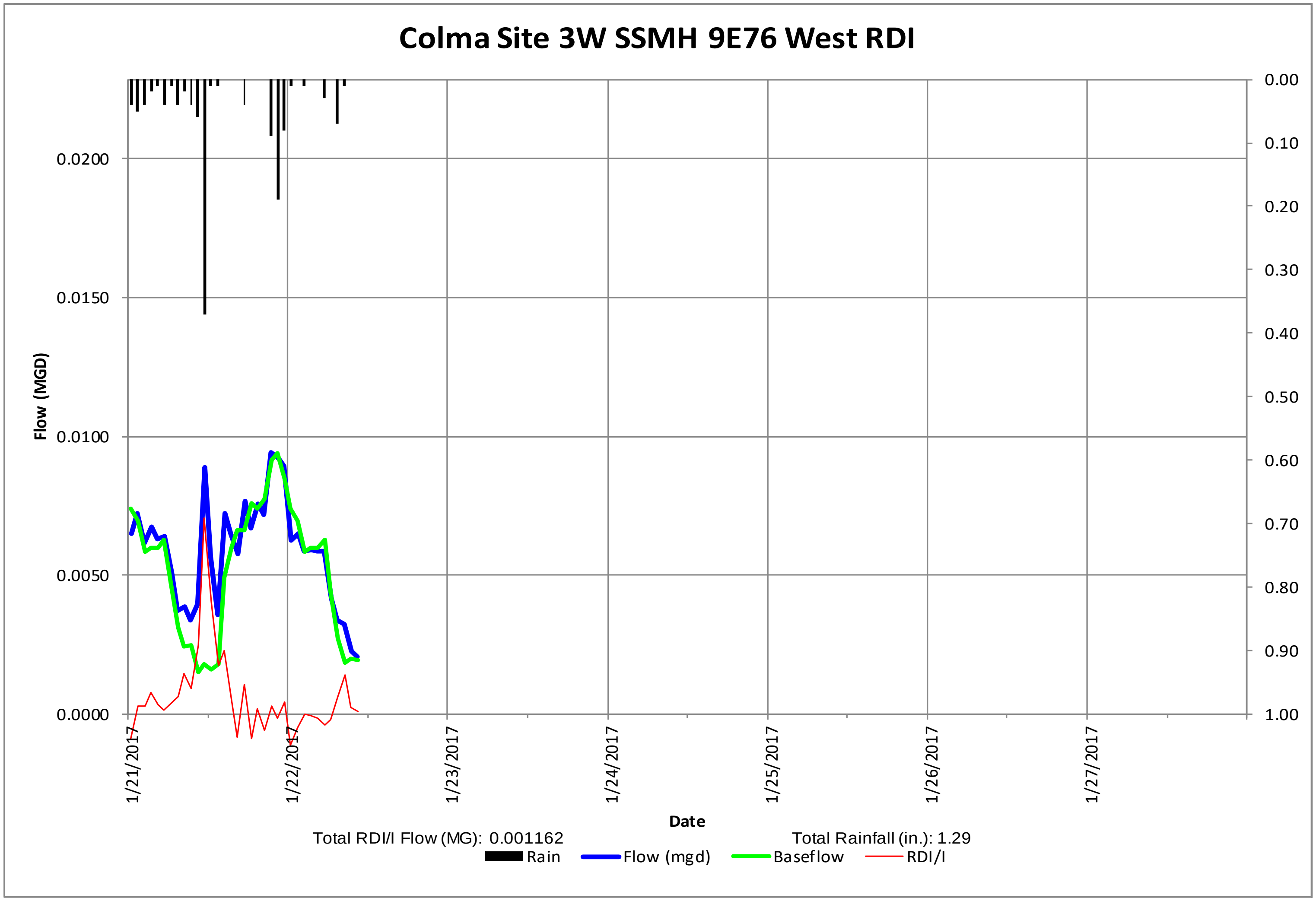

Baseflow Colma Site 3W SSMH 9E76 West RDI
0.012
0.01
0.008
0.006
0.004
0.002
0
Flow
Weekday
Weekday
Weekday
Weekday
Weekday
Weekend
Weekend
Day



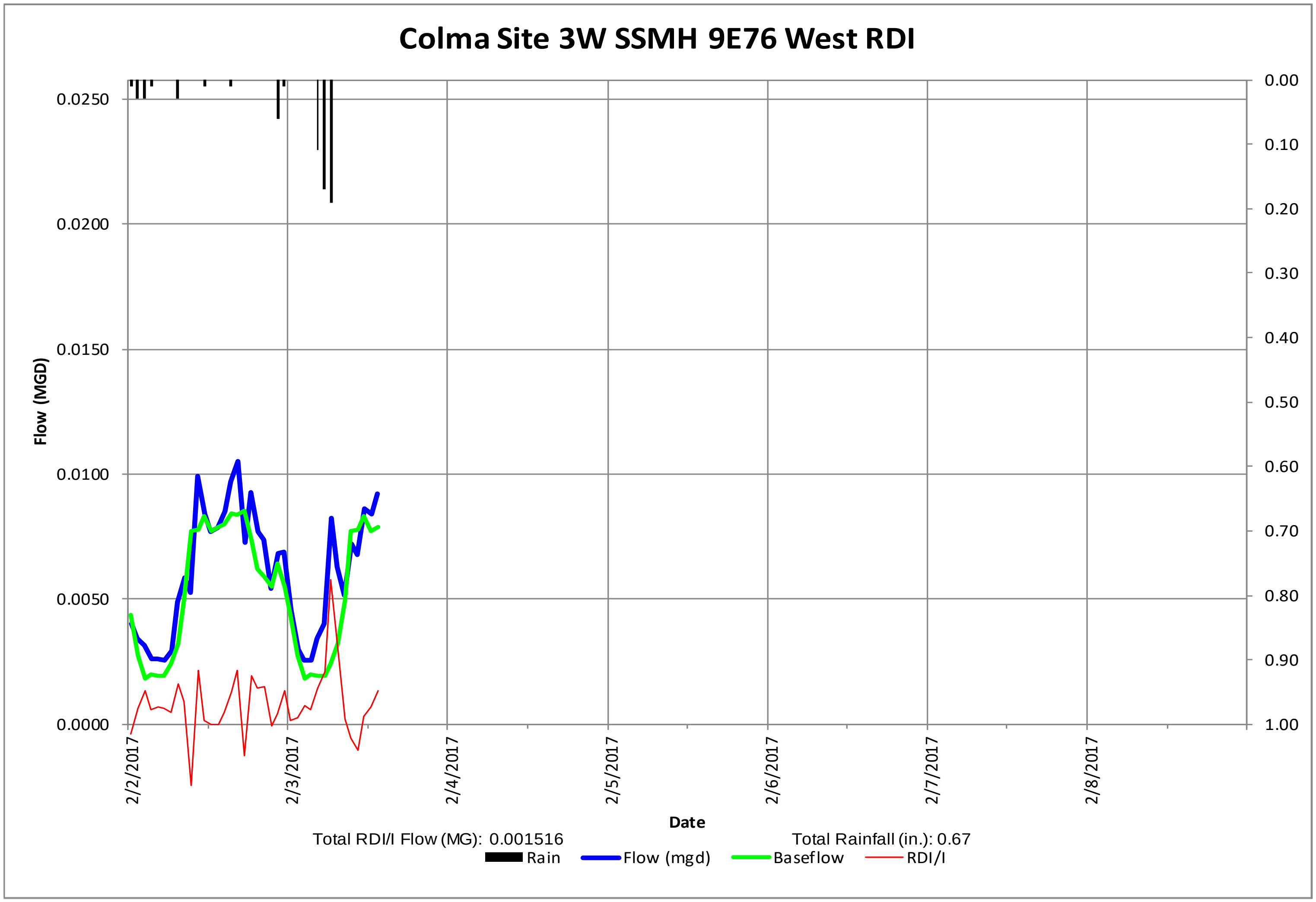
Storm of 1/18/2017



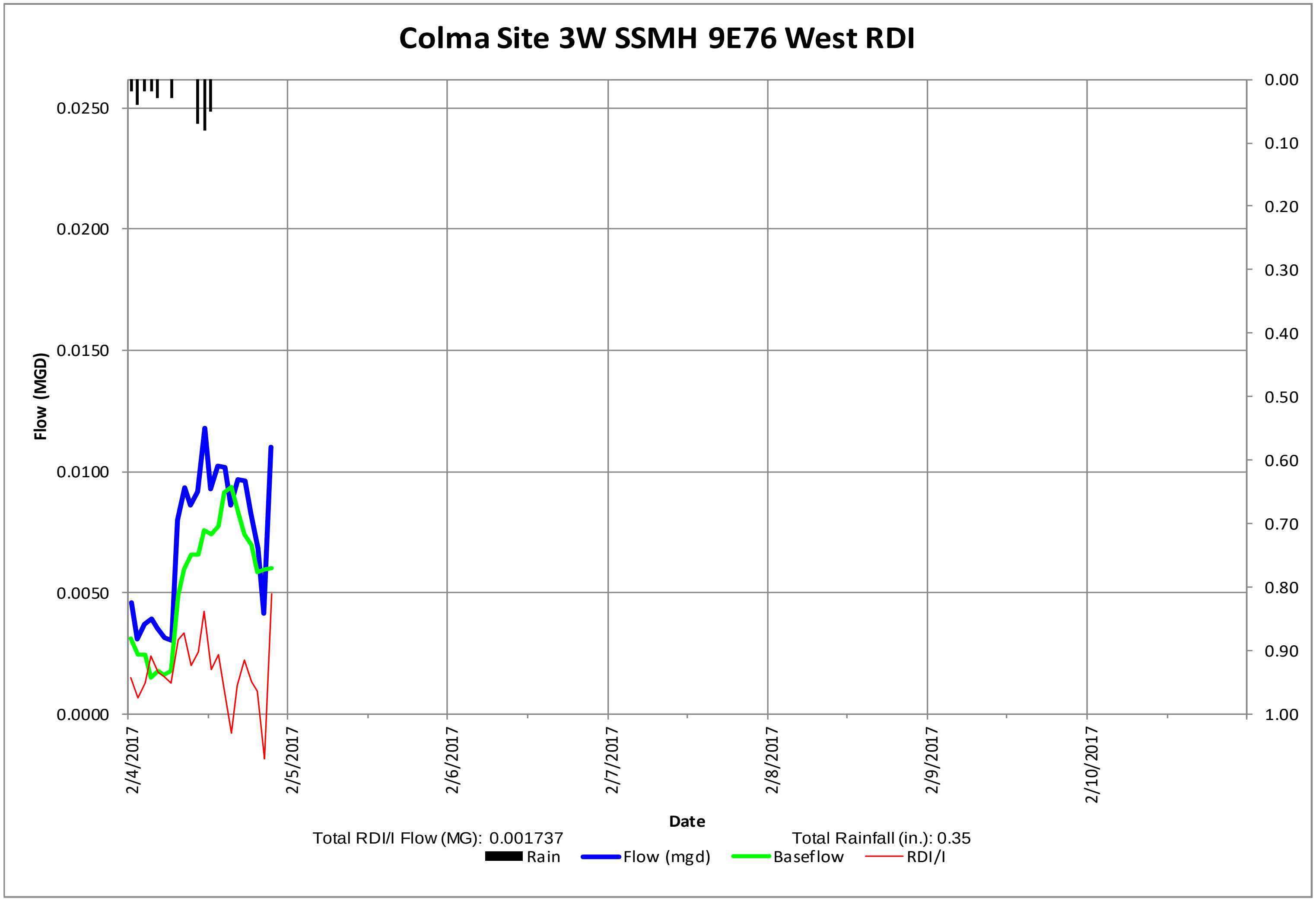
Storm of 1/20/2017



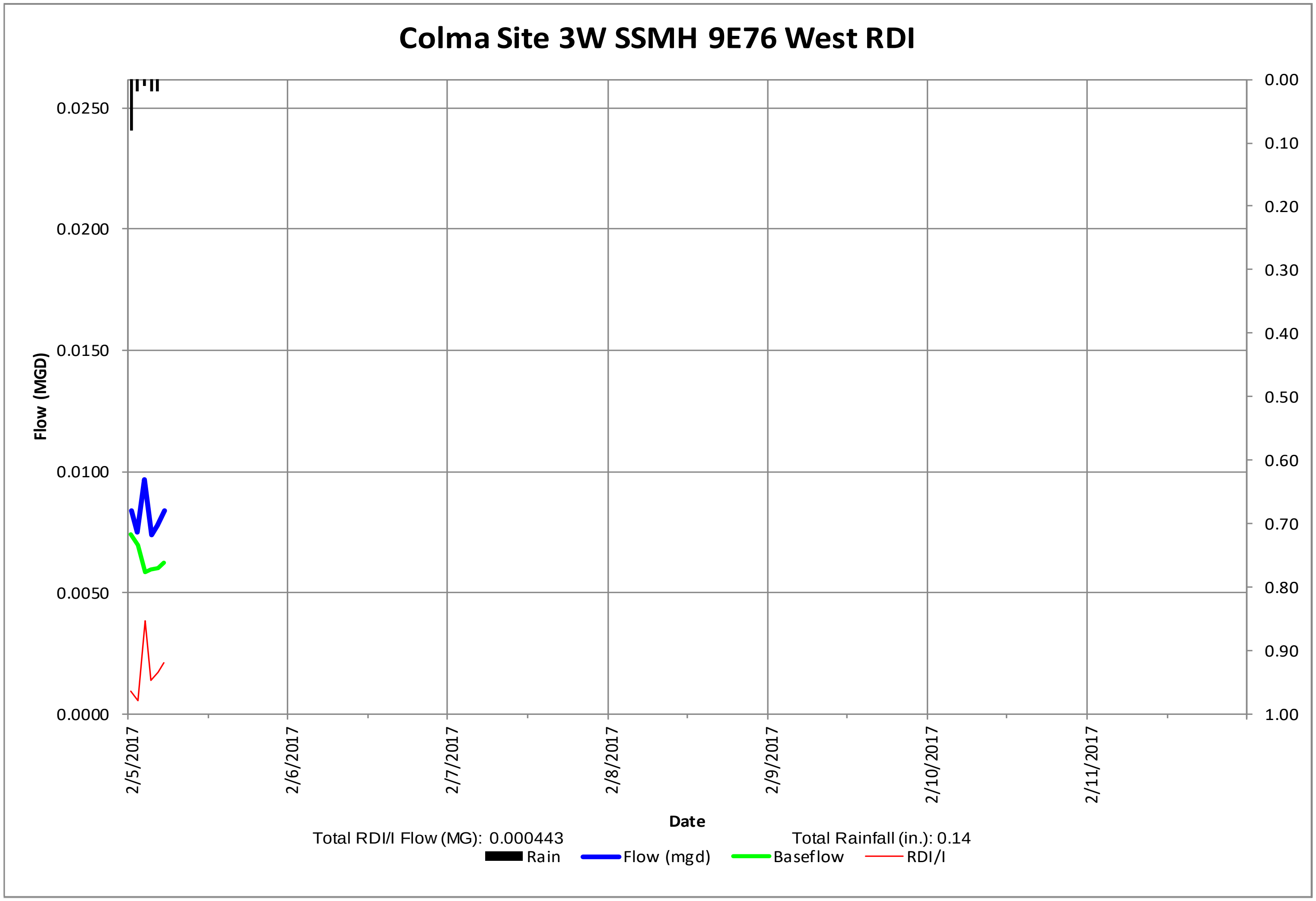
Storm of 1/21/2017



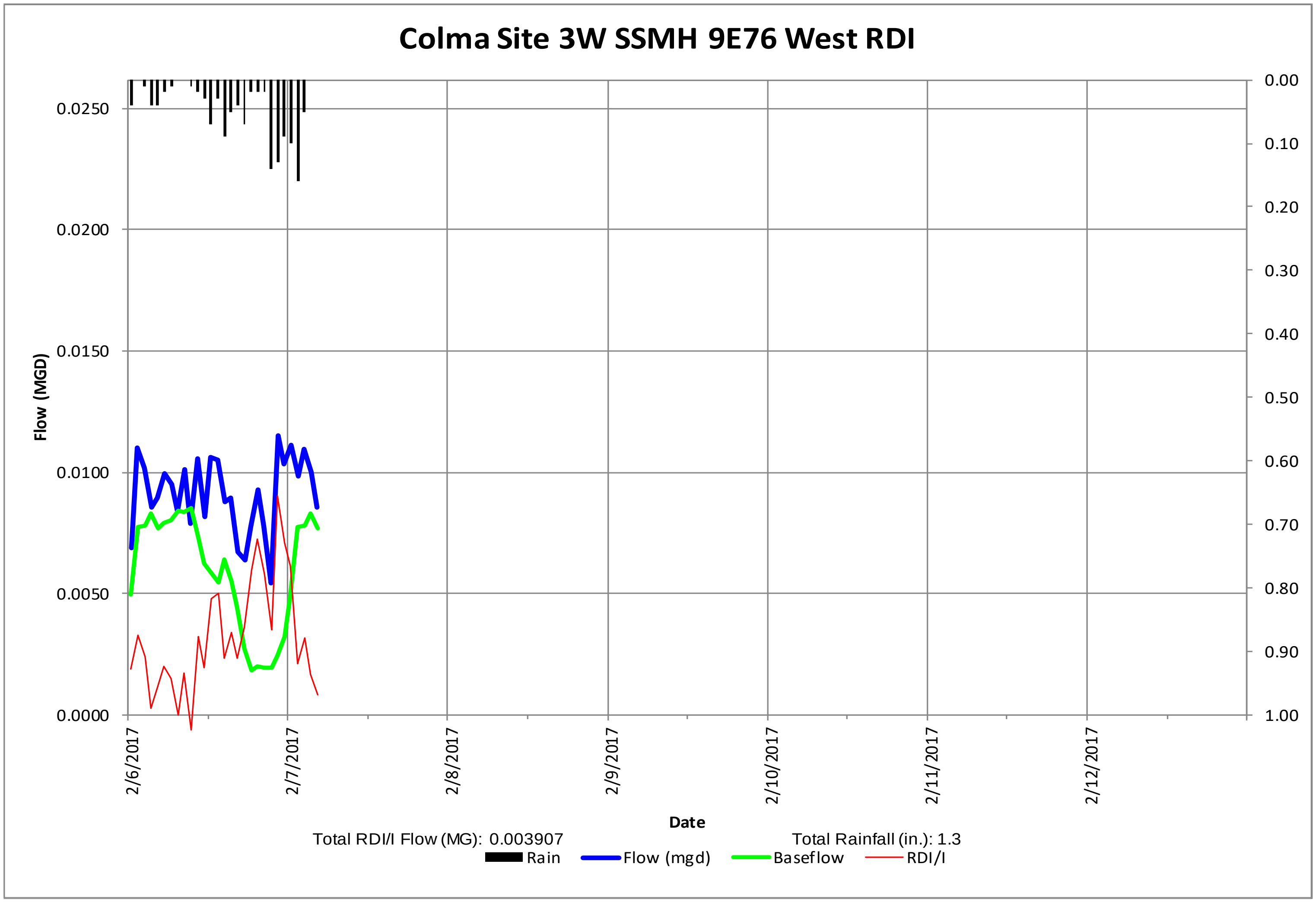
Storm of 2/2/2017



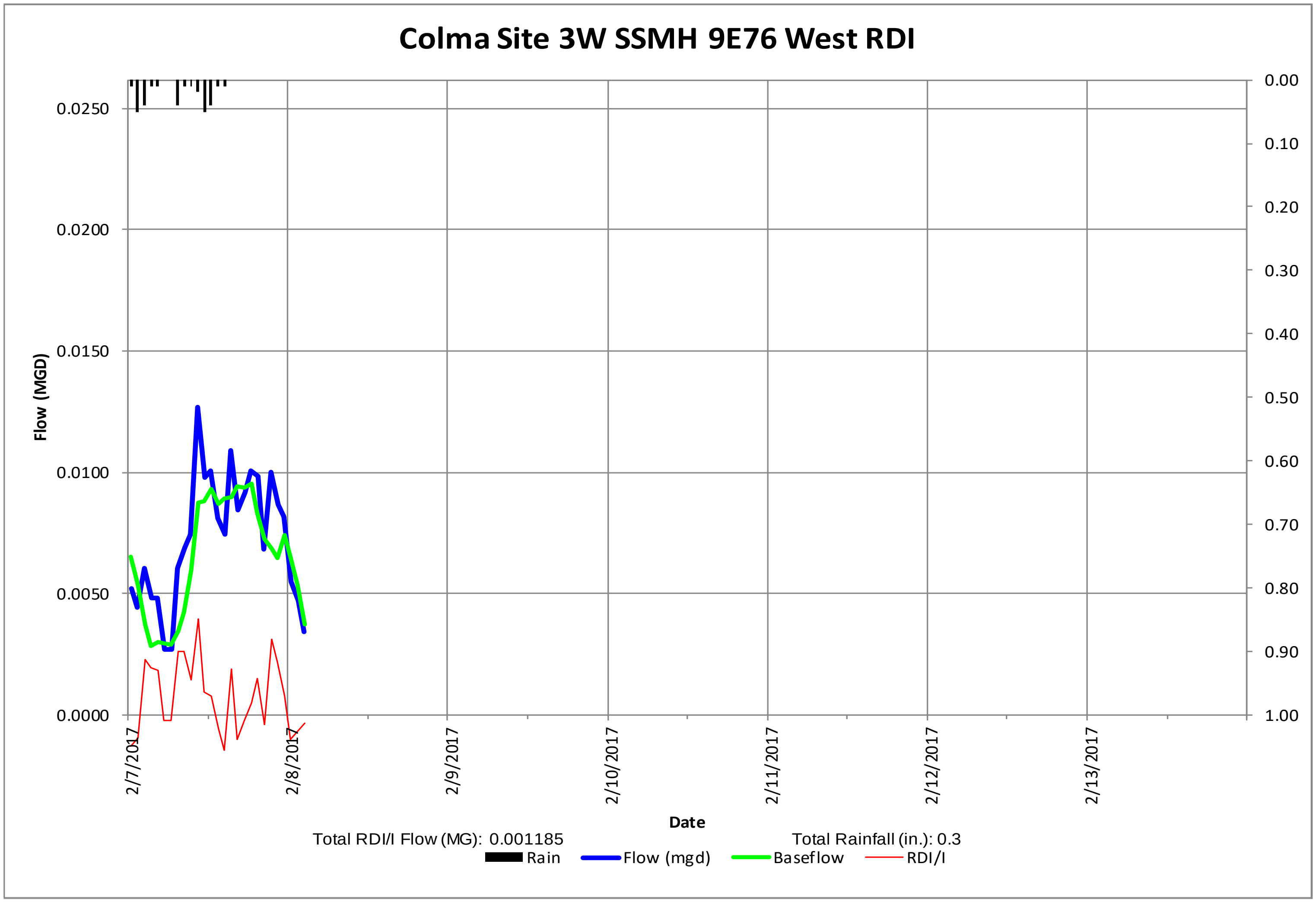
Storm of 2/4/2017



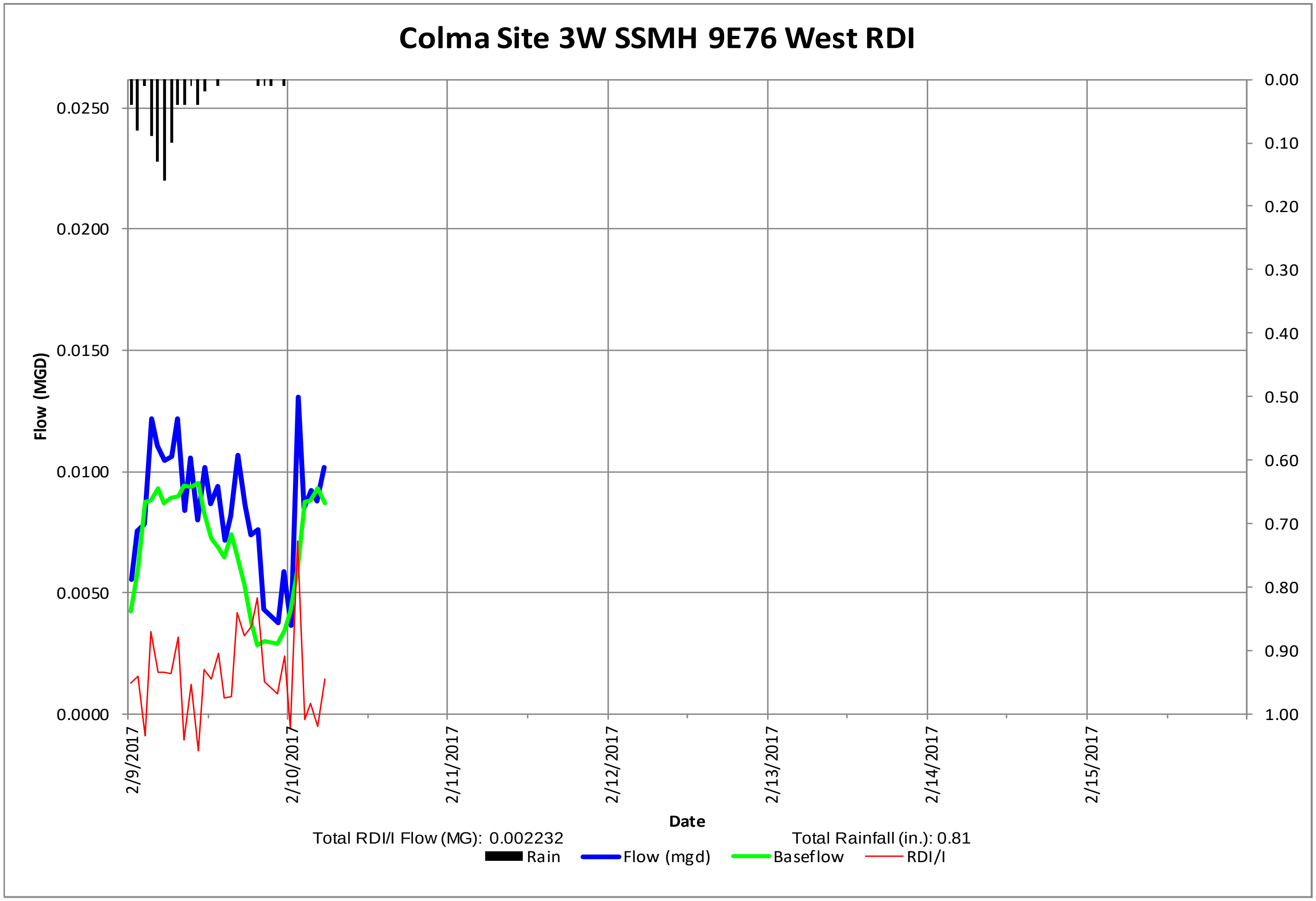
Storm of 2/5/2017



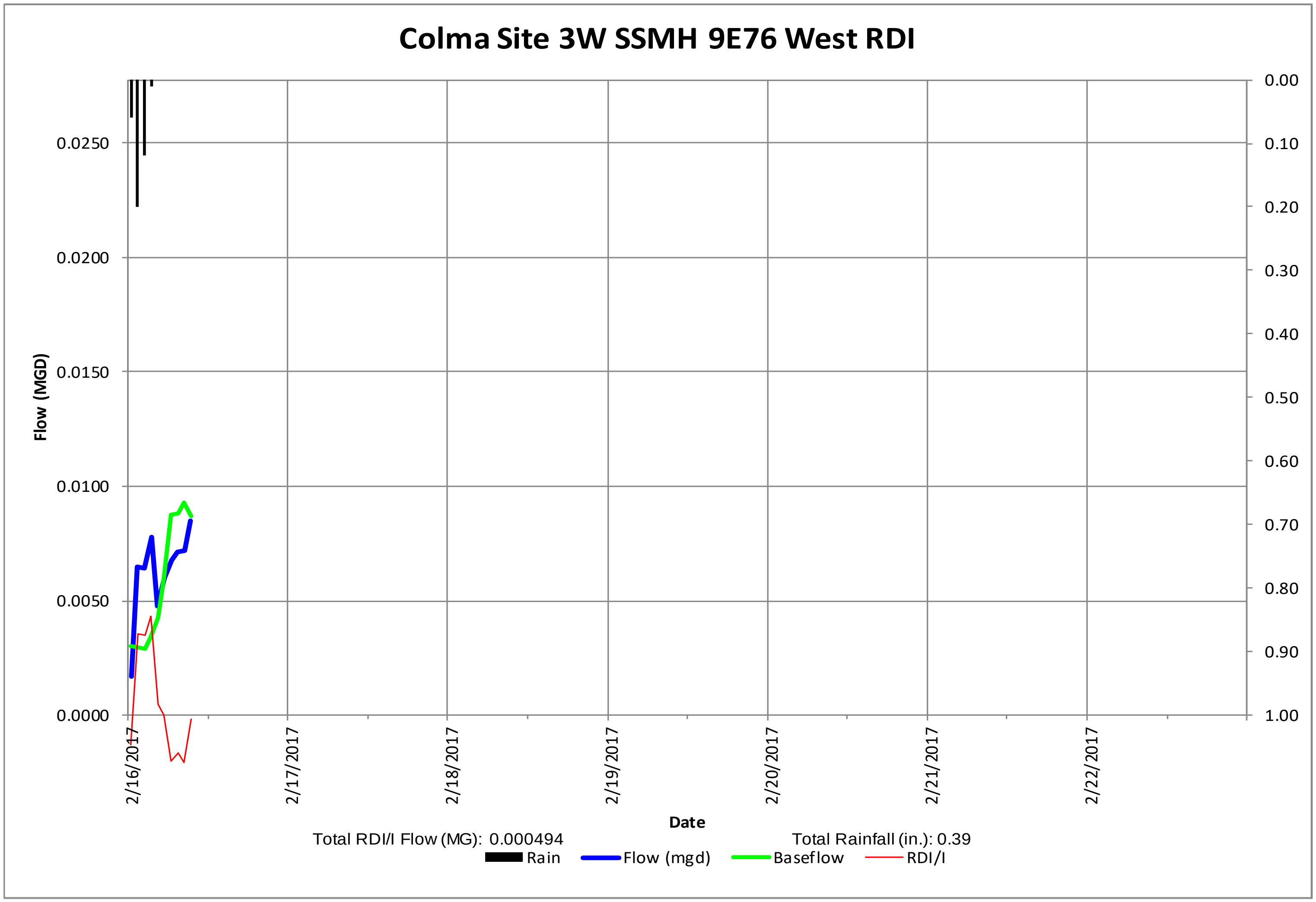
Storm of 2/6/2017



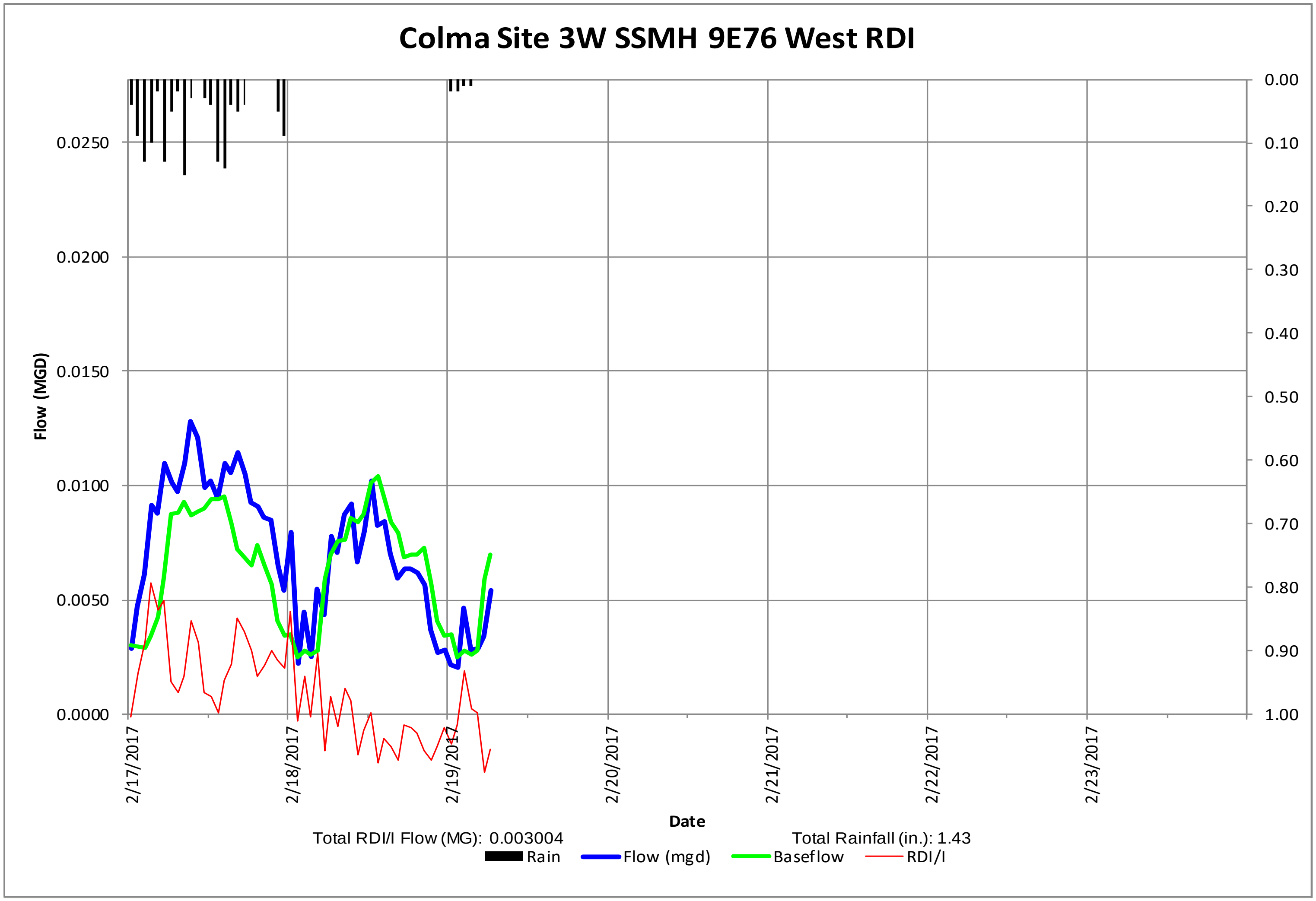
Storm of 2/7/2017



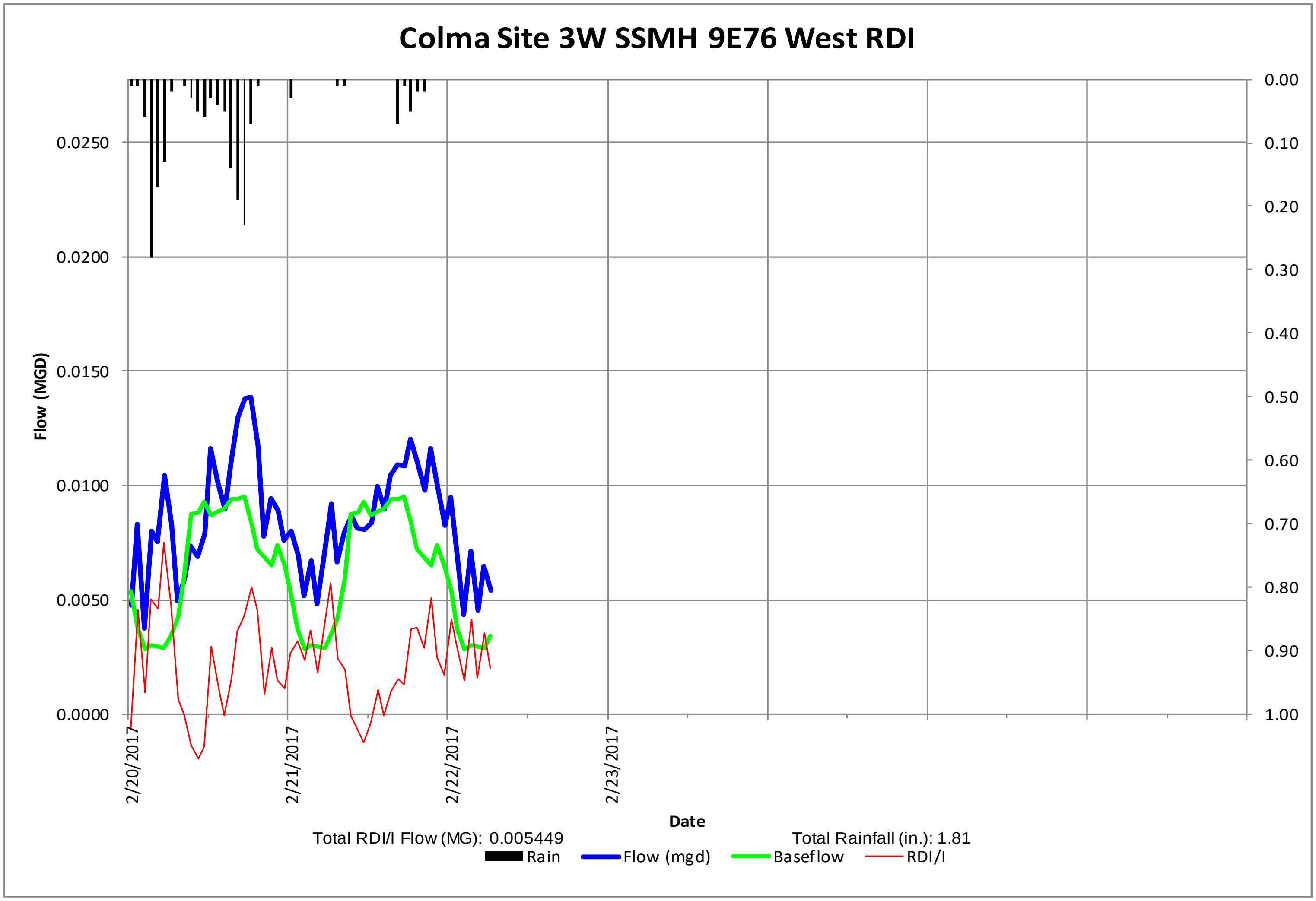
Storm of 2/9/2017



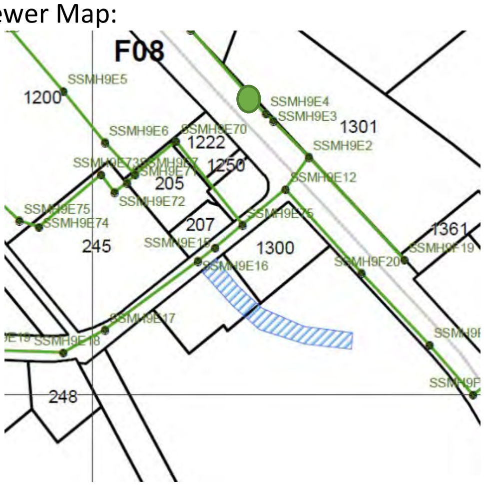
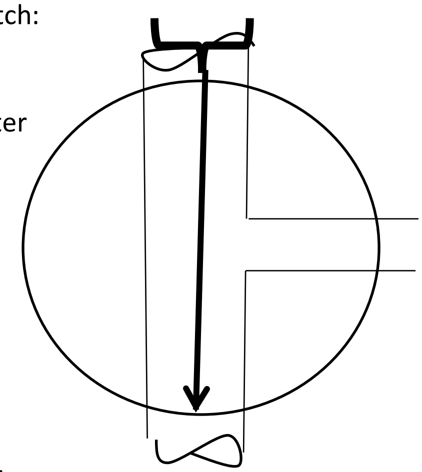
Storm of 2/16/2017



Storm of 2/17/2017



Storm of 2/20/2017

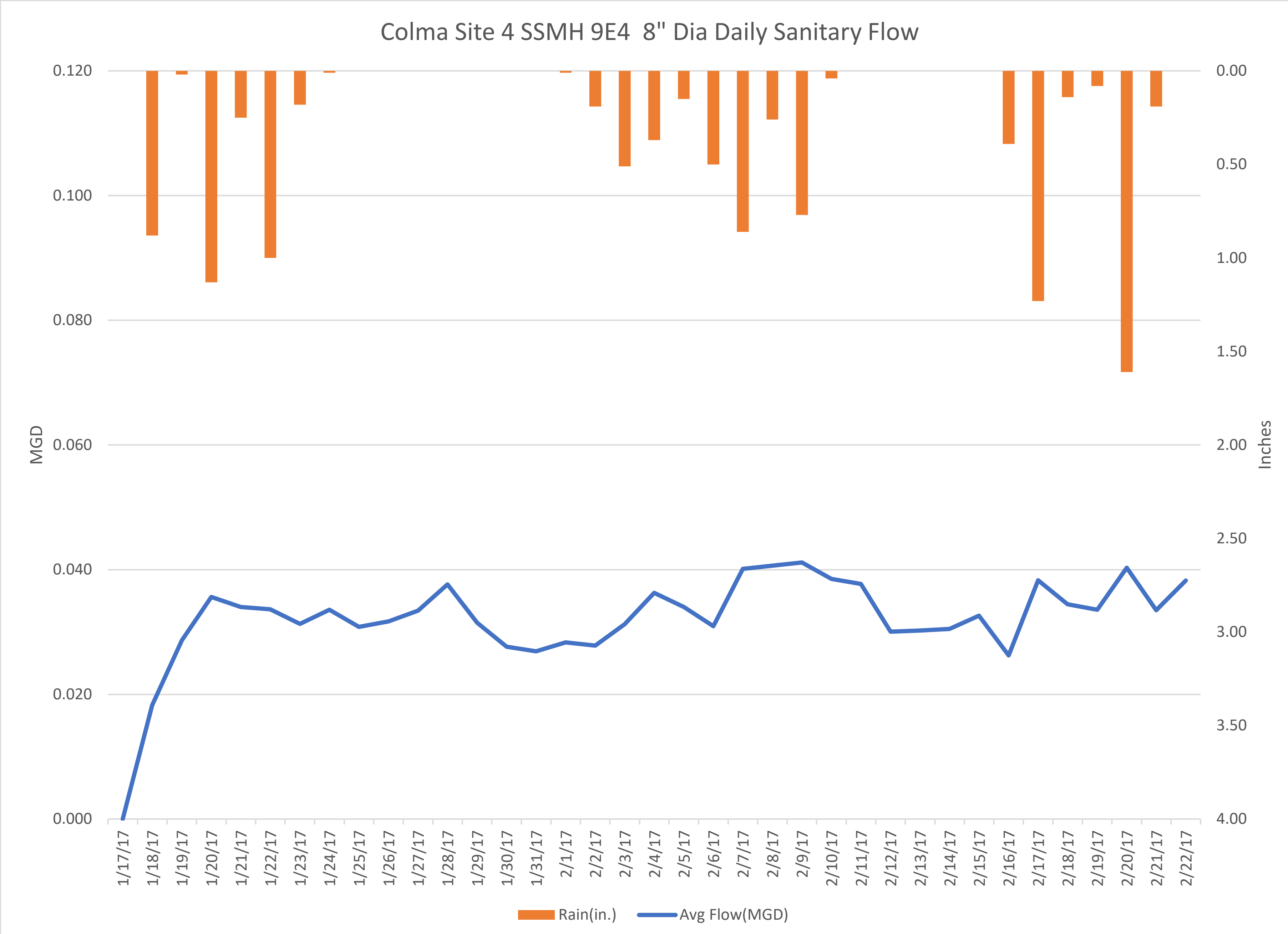
Site Information Report	Flow Monitor Site: 4
Manhole Number SSMH 9E4 Location: El Camino North of Collins MH Depth ~8’ Diameter: 8” Safety: Ok Traffic: Medium Gas: Ok Rungs: No Meter Type: Hach FL900 Depth: Pressure 1” Velocity: Doppler 2 ft./sec Sensor type Flo Dar	Ariel View: 
City Sewer Map:  	Flow Sketch: Flow Meter  8”-inch Pipes
Surface View: 	Invert View: 

<table>
<tr><td>Outlet Pipe: P0
</td><td>Inlet Pipe: P1
</td></tr>
<tr><td>Inlet Pipe: P2
</td><td></td></tr>
</table>

Colma Site 4 SSMH 9E4 8" Dia Sanitary Flow

Daily Summary

Day	Date	Avg Flow(MGD)	Min Flow(MGD)	Max Flow(MGD)	Max Depth(in.)	Rain(in.)
Tuesday	1/17/17	0.000	0.000	0.000	0.000	0.00
Wednesday	1/18/17	0.018	0.000	0.090	1.809	0.88
Thursday	1/19/17	0.029	0.014	0.050	1.135	0.02
Friday	1/20/17	0.036	0.019	0.061	1.216	1.13
Saturday	1/21/17	0.034	0.012	0.056	1.193	0.25
Sunday	1/22/17	0.034	0.017	0.060	1.258	1.00
Monday	1/23/17	0.031	0.010	0.054	1.247	0.18
Tuesday	1/24/17	0.034	0.011	0.062	1.306	0.01
Wednesday	1/25/17	0.031	0.015	0.055	1.208	0.00
Thursday	1/26/17	0.032	0.012	0.056	1.228	0.00
Friday	1/27/17	0.033	0.012	0.058	1.229	0.00
Saturday	1/28/17	0.038	0.015	0.072	1.391	0.00
Sunday	1/29/17	0.031	0.014	0.058	1.286	0.00
Monday	1/30/17	0.028	0.007	0.048	1.195	0.00
Tuesday	1/31/17	0.027	0.012	0.042	1.031	0.00
Wednesday	2/1/17	0.028	0.008	0.043	1.054	0.01
Thursday	2/2/17	0.028	0.016	0.047	1.077	0.19
Friday	2/3/17	0.031	0.013	0.053	1.155	0.51
Saturday	2/4/17	0.036	0.017	0.056	1.204	0.37
Sunday	2/5/17	0.034	0.011	0.053	1.231	0.15
Monday	2/6/17	0.031	0.006	0.051	1.392	0.50
Tuesday	2/7/17	0.040	0.016	0.064	1.427	0.86
Wednesday	2/8/17	0.041	0.016	0.088	1.776	0.26
Thursday	2/9/17	0.041	0.012	0.081	1.586	0.77
Friday	2/10/17	0.039	0.016	0.081	1.532	0.04
Saturday	2/11/17	0.038	0.013	0.131	1.841	0.00
Sunday	2/12/17	0.030	0.016	0.049	1.171	0.00
Monday	2/13/17	0.030	0.007	0.062	1.425	0.00
Tuesday	2/14/17	0.031	0.012	0.048	1.133	0.00
Wednesday	2/15/17	0.033	0.015	0.053	1.161	0.00
Thursday	2/16/17	0.026	0.006	0.052	1.203	0.39
Friday	2/17/17	0.038	0.021	0.065	1.290	1.23
Saturday	2/18/17	0.034	0.019	0.058	1.267	0.14
Sunday	2/19/17	0.034	0.021	0.083	1.492	0.08
Monday	2/20/17	0.040	0.017	0.090	1.615	1.61
Tuesday	2/21/17	0.034	0.009	0.067	1.335	0.19
Wednesday	2/22/17	0.038	0.011	0.071	1.387	0.00


Colma Site 4 SSMH 9E4 8" Dia Daily Sanitary Flow
MGD
Inches
0.120
0.100
0.080
0.060
0.040
0.020
0.000
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
1/17/17
1/18/17
1/19/17
1/20/17
1/21/17
1/22/17
1/23/17
1/24/17
1/25/17
1/26/17
1/27/17
1/28/17
1/29/17
1/30/17
1/31/17
2/1/17
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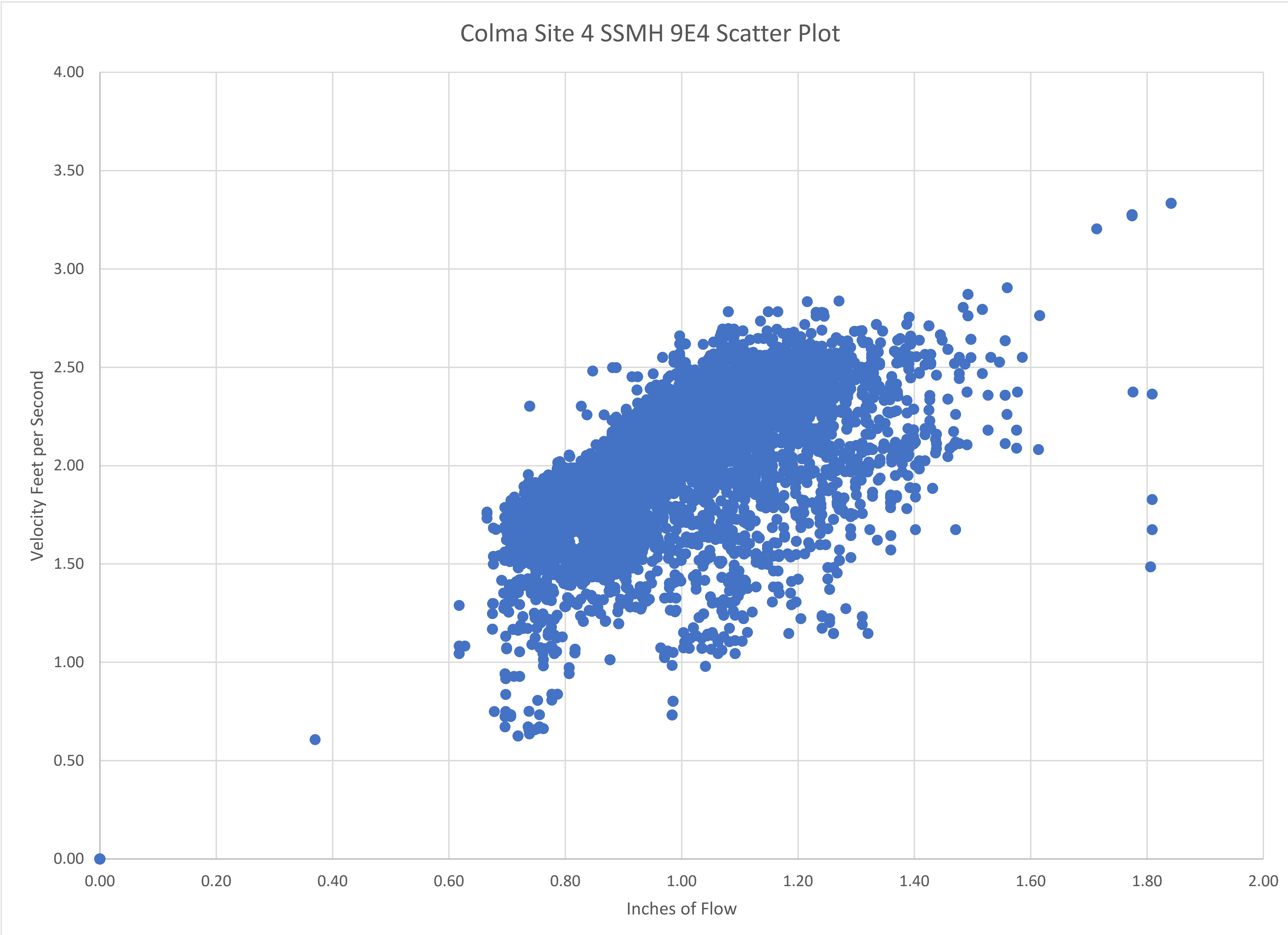
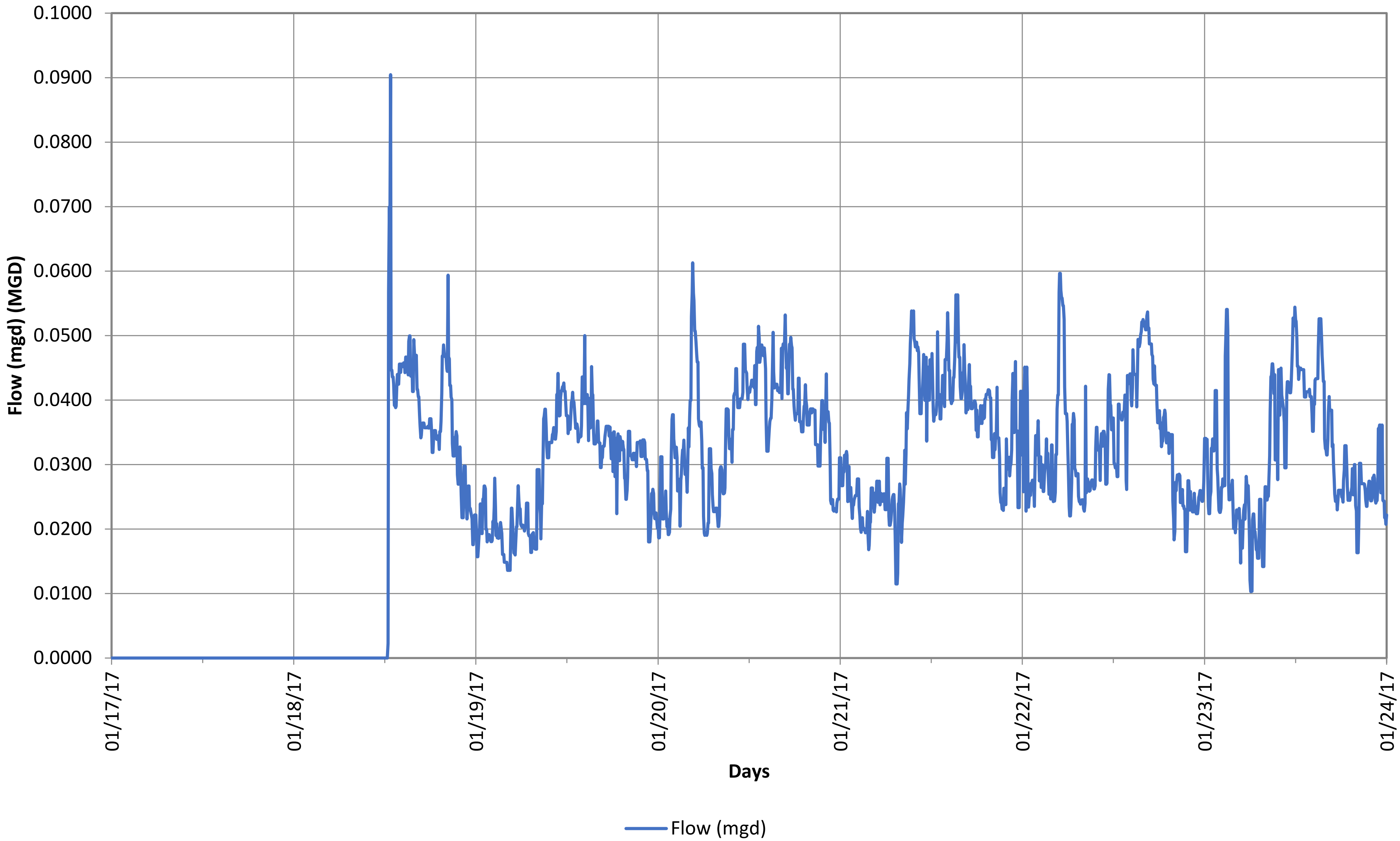
2/3/17
2/4/17
2/5/17
2/6/17
2/7/17
2/8/17
2/9/17
2/10/17
2/11/17
2/12/17
2/13/17
2/14/17
2/15/17
2/16/17
2/17/17
2/18/17
2/19/17
2/20/17
2/21/17
2/22/17
Rain(in.)
Avg Flow(MGD)


Colma Site 4 SSMH 9E4 Scatter Plot
Velocity Feet per Second
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
1.60
1.80
2.00
Inches of Flow

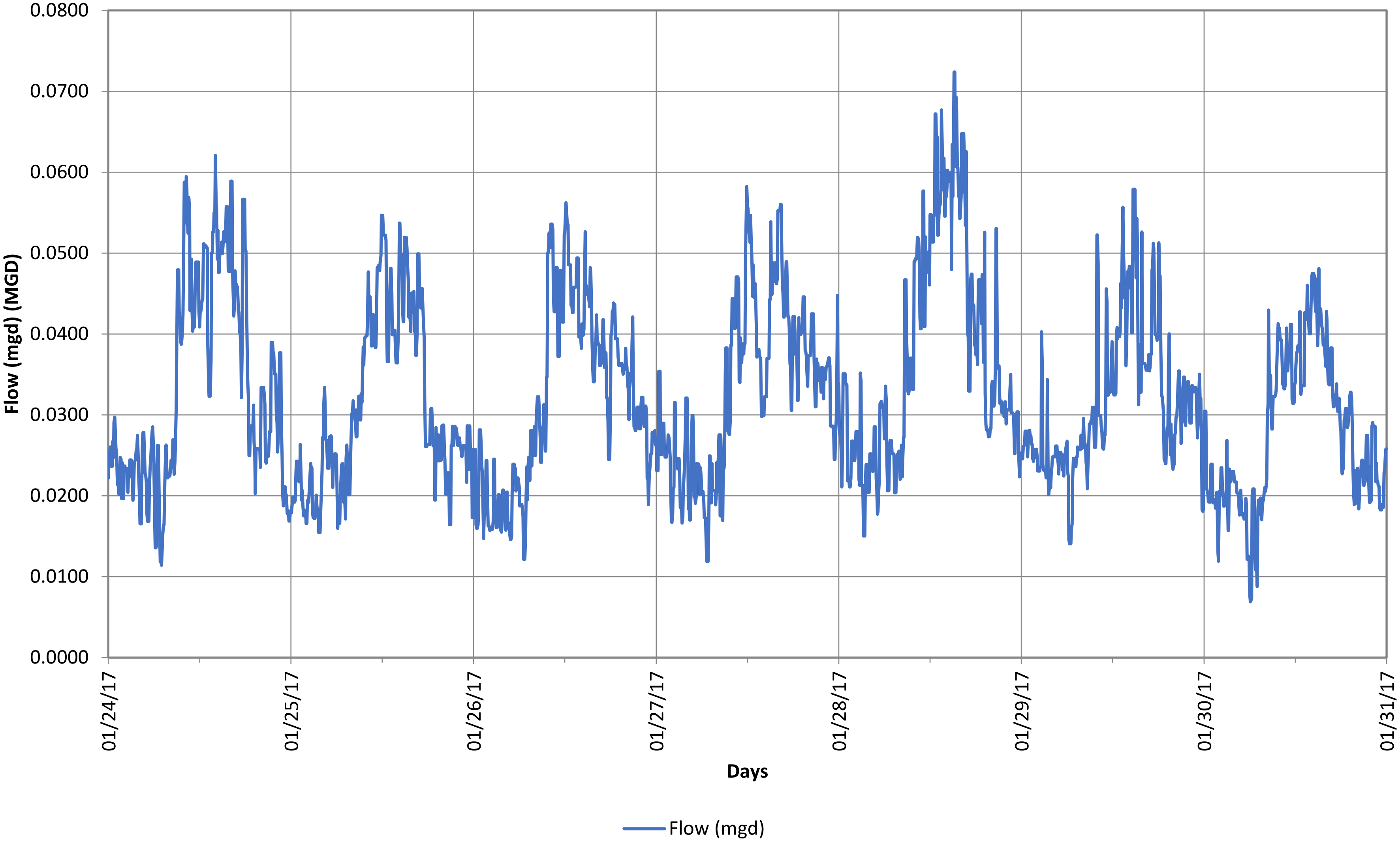
Colma Site 4 SSMH 9E4 8" Dia Sanitary Flow



	1/17/2017 11:55:00 PM(	/2017 11:55:00 PM(	/2017 11:55:00 PM(	/2017 11:55:00 PM(	1/2017 11:55:00 PM(	/2017 11:55:00 PM(	2017 11:55:00 PM(
Maximum	0.000	0.090	0.050	0.061	0.056	0.060	0.054
Average	0.000	0.018	0.029	0.036	0.034	0.034	0.031
Minimum	0.000	0.000	0.014	0.019	0.012	0.017	0.010
Rain (inches)	0.00	0.88	0.02	1.13	0.25	1.00	0.18

Mon)

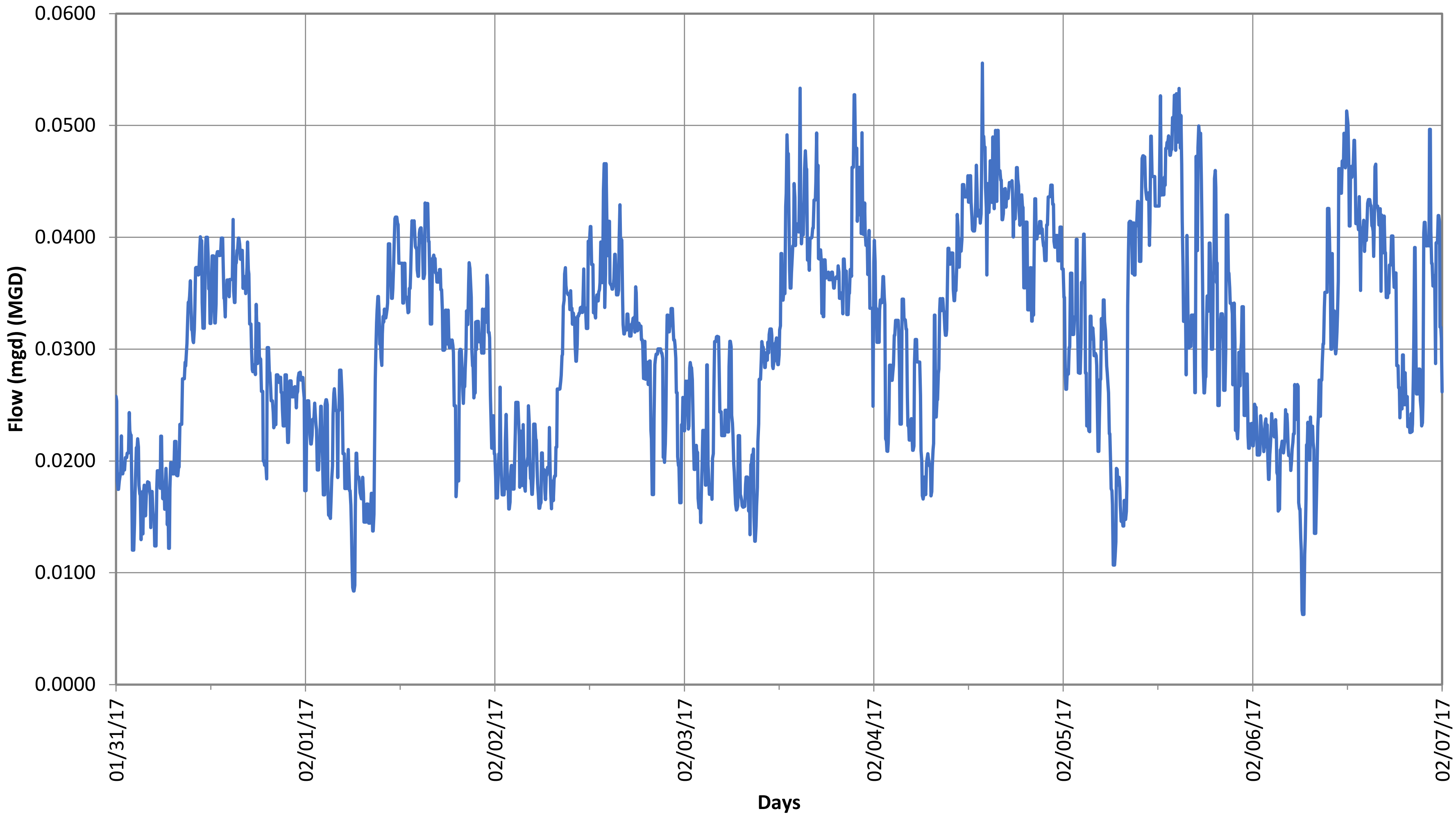
Colma Site 4 SSMH 9E4 8" Dia Sanitary Flow



	1/24/2017 11:55:00 PM(	'/2017 11:55:00 PM(	\/2017 11:55:00 PM(	'/2017 11:55:00 PM(	3/2017 11:55:00 PM(	/2017 11:55:00 PM(	'2017 11:55:00 PM(M
Maximum	0.062	0.055	0.056	0.058	0.072	0.058	0.048
Average	0.034	0.031	0.032	0.033	0.038	0.031	0.028
Minimum	0.011	0.015	0.012	0.012	0.015	0.014	0.007
Rain (inches)	0.01	0.00	0.00	0.00	0.00	0.00	0.00

Mon)

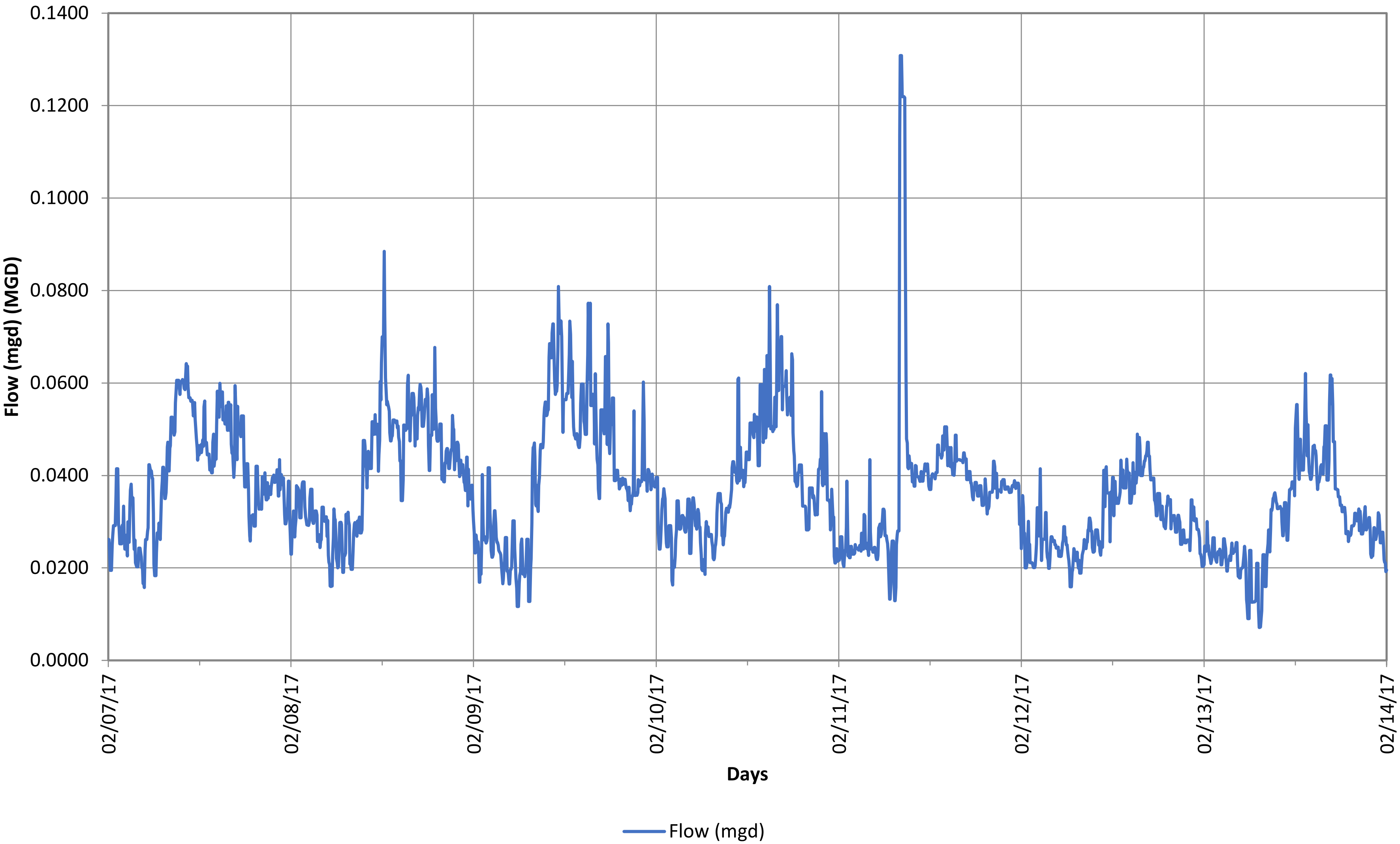
Colma Site 4 SSMH 9E4 8" Dia Sanitary Flow



	1/31/2017 11:55:00 PM(T	2017 11:55:00 PM(W	2017 11:55:00 PM(T	/2017 11:55:00 PM(	/2017 11:55:00 PM(S	2017 11:55:00 PM(S	2017 11:55:00 PM(M
Maximum	0.042	0.043	0.047	0.053	0.056	0.053	0.051
Average	0.027	0.028	0.028	0.031	0.036	0.034	0.031
Minimum	0.012	0.008	0.016	0.013	0.017	0.011	0.006
Rain (inches)	0.00	0.01	0.19	0.51	0.37	0.15	0.50

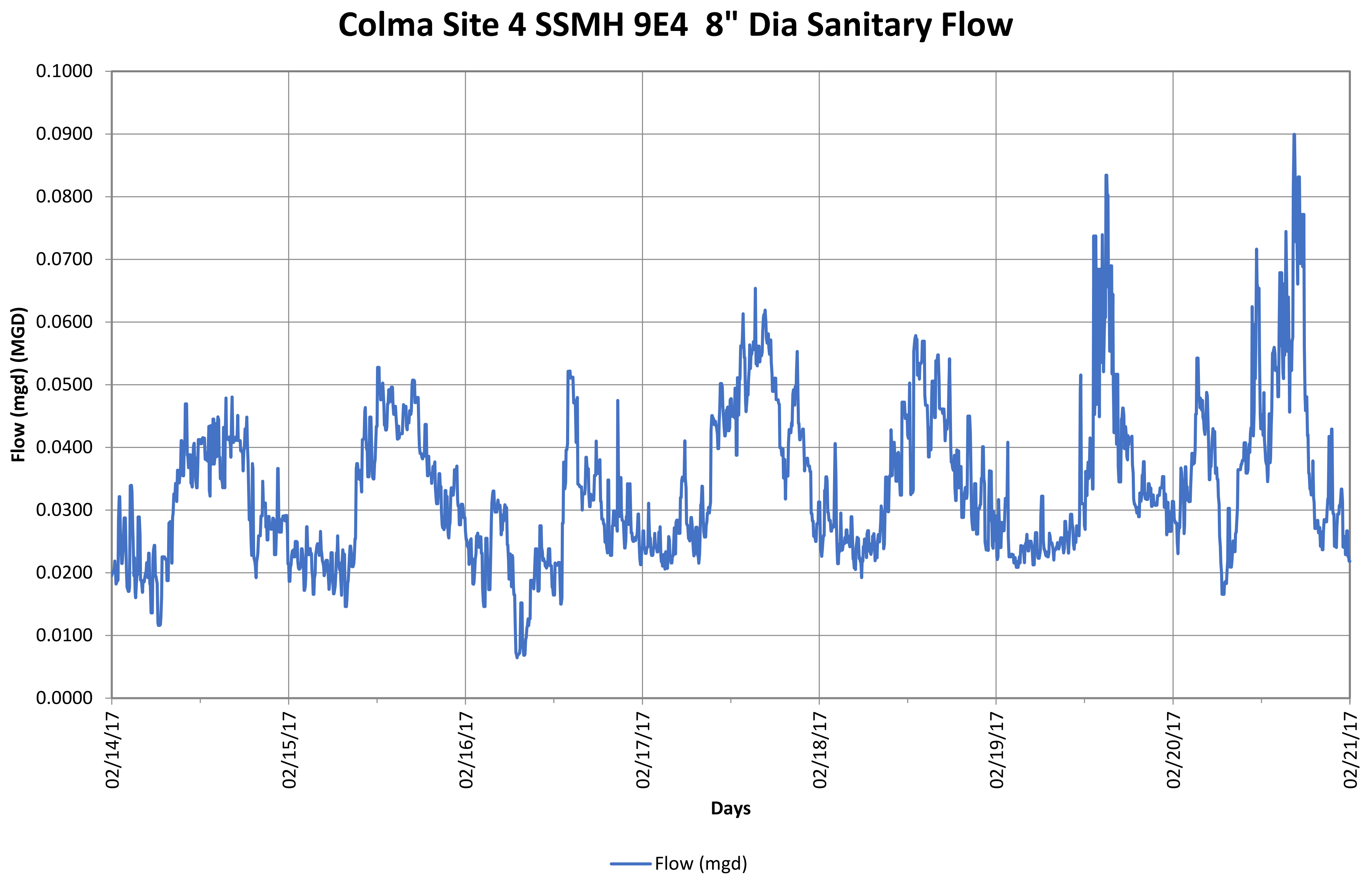
Mon)

Colma Site 4 SSMH 9E4 8" Dia Sanitary Flow



	2/7/2017 11:55:00 PM(T	2017 11:55:00 PM(V	2017 11:55:00 PM(T	/2017 11:55:00 PM(	1/2017 11:55:00 PM(	/2017 11:55:00 PM(	2017 11:55:00 PM(N
Maximum	0.064	0.088	0.081	0.081	0.131	0.049	0.062
Average	0.040	0.041	0.041	0.039	0.038	0.030	0.030
Minimum	0.016	0.016	0.012	0.016	0.013	0.016	0.007
Rain (inches)	0.86	0.26	0.77	0.04	0.00	0.00	0.00

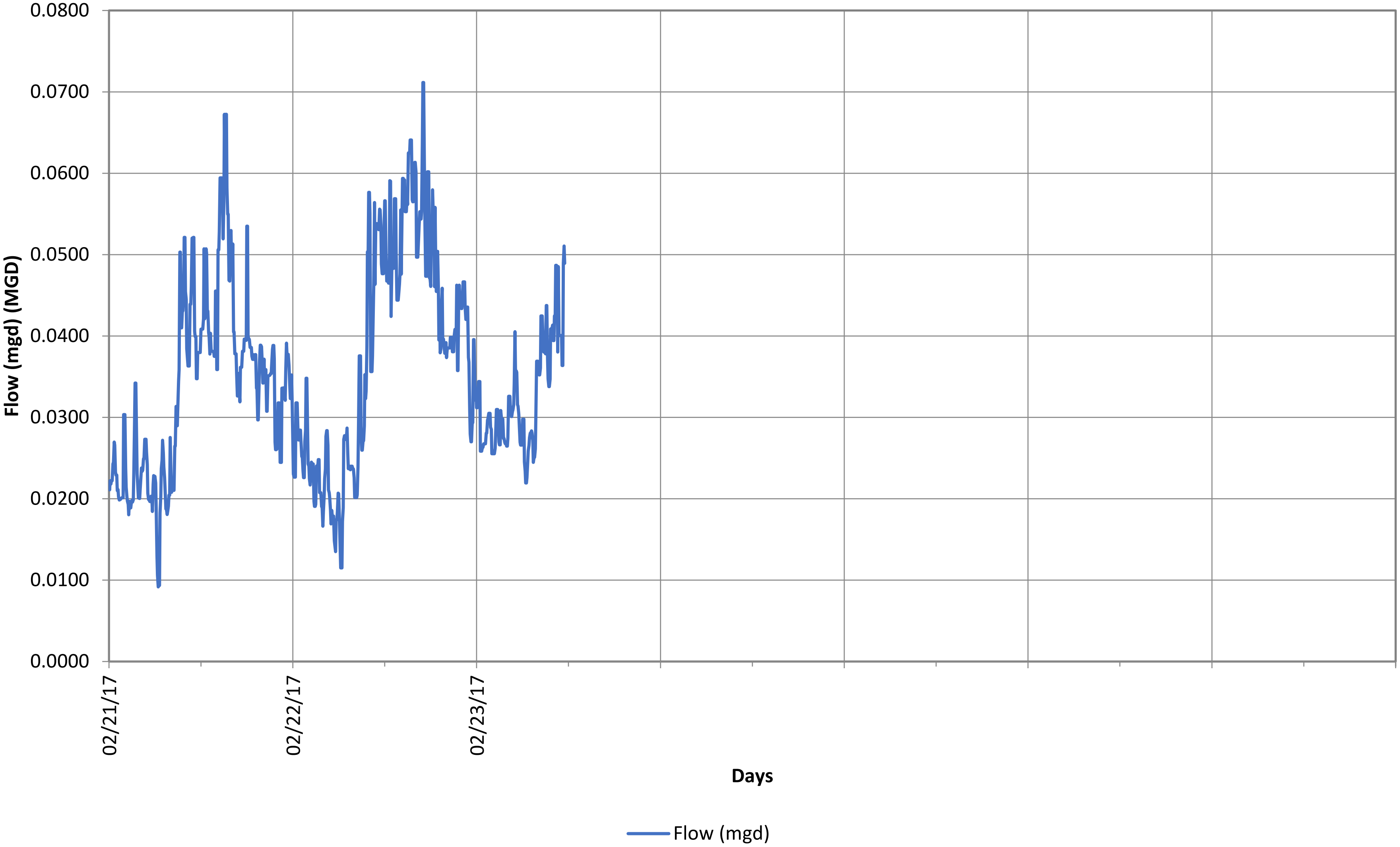
Mon)



	2/14/2017 11:55:00 PM(	'/2017 11:55:00 PM(	\/2017 11:55:00 PM(	'/2017 11:55:00 PM(	3/2017 11:55:00 PM(	/2017 11:55:00 PM(	'2017 11:55:00 PM(
Maximum	0.048	0.053	0.052	0.065	0.058	0.083	0.090
Average	0.031	0.033	0.026	0.038	0.034	0.034	0.040
Minimum	0.012	0.015	0.006	0.021	0.019	0.021	0.017
Rain (inches)	0.00	0.00	0.39	1.23	0.14	0.08	1.61

Mon)

Colma Site 4 SSMH 9E4 8" Dia Sanitary Flow

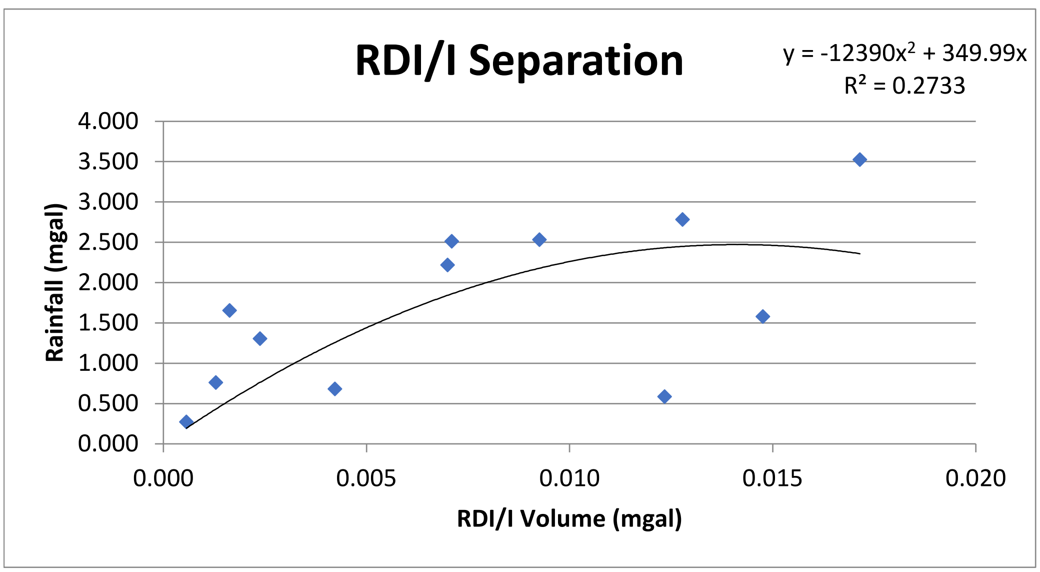


	2/21/2017 11:55:00 PM(	'/2017 11:55:00 PM(Wed)					
Maximum	0.067	0.071					
Average	0.034	0.038					
Minimum	0.009	0.011					
Rain (inches)	0.19	0.00					

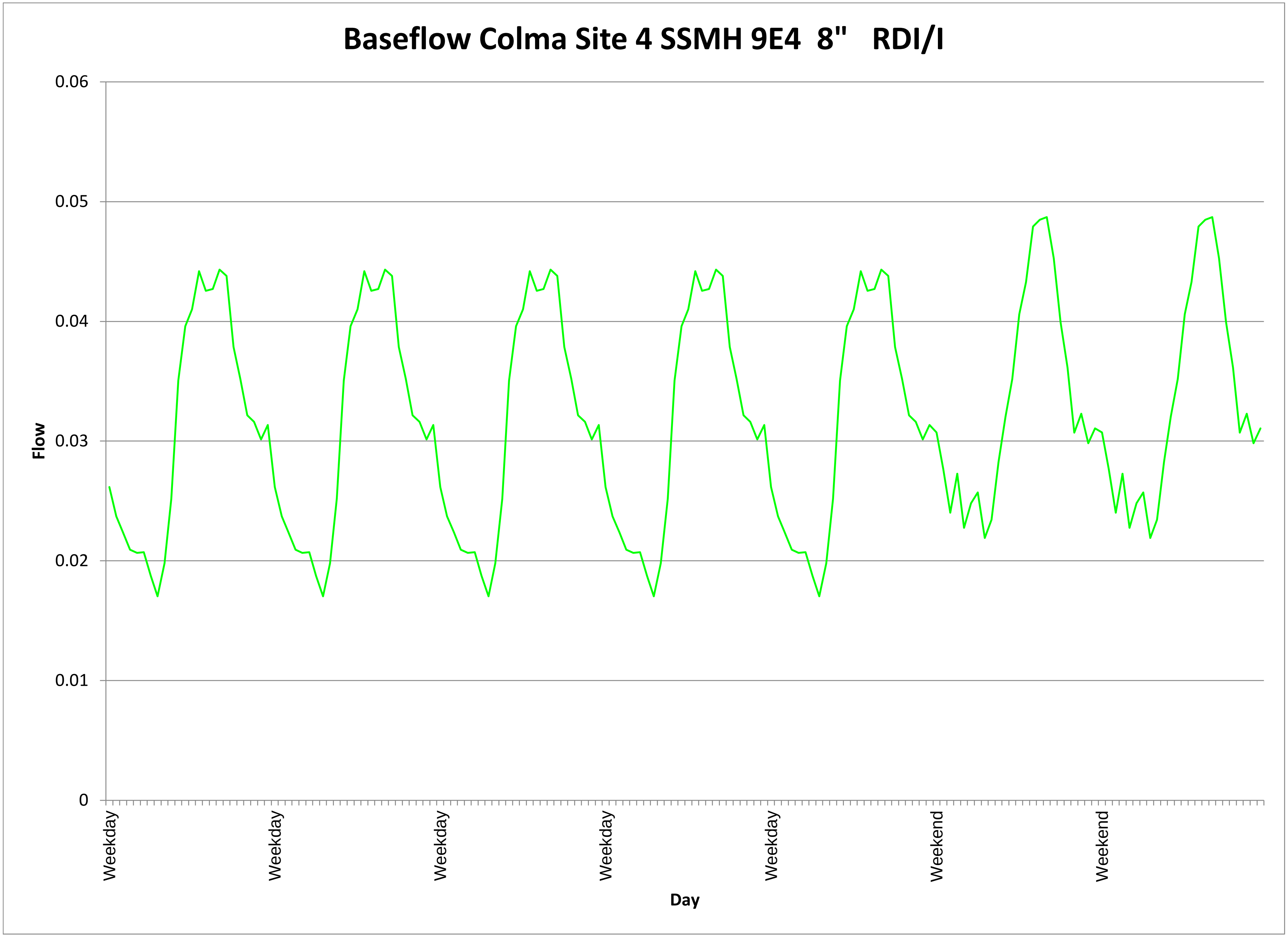
Colma Site 4 SSMH 9E4 8" RDI/I

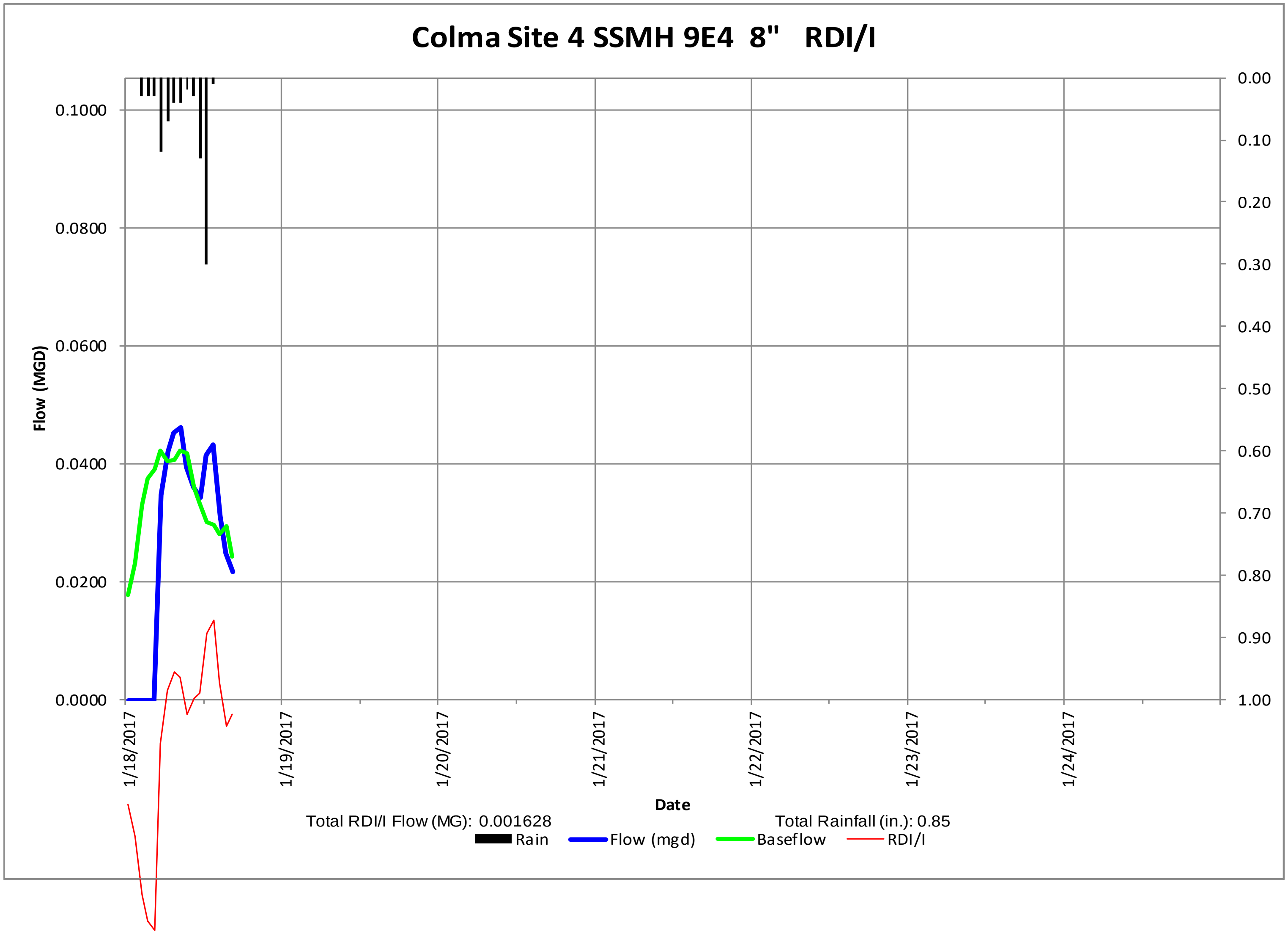
RDI/I Analysis, Monitor Return Ratio Summary

Storm Start (Date)	RDI/I Volume (mgal)	Monitor Area (acres)	Rainfall (mgal)	Return Ratio (%)
1/18/2017	0.002	71.7	1.655	0.10%
1/20/2017	0.007	71.7	2.219	0.32%
1/21/2017	0.007	71.7	2.511	0.28%
2/2/2017	0.002	71.7	1.304	0.18%
2/4/2017	0.004	71.7	0.681	0.62%
2/5/2017	0.001	71.7	0.273	0.21%
2/6/2017	0.009	71.7	2.531	0.37%
2/7/2017	0.012	71.7	0.584	2.11%
2/9/2017	0.015	71.7	1.577	0.94%
2/16/2017	0.001	71.7	0.759	0.17%
2/17/2017	0.013	71.7	2.784	0.46%
2/20/2017	0.017	71.7	3.524	0.49%
Average R%				0.52%
Average Top 3 Storms				1.22%

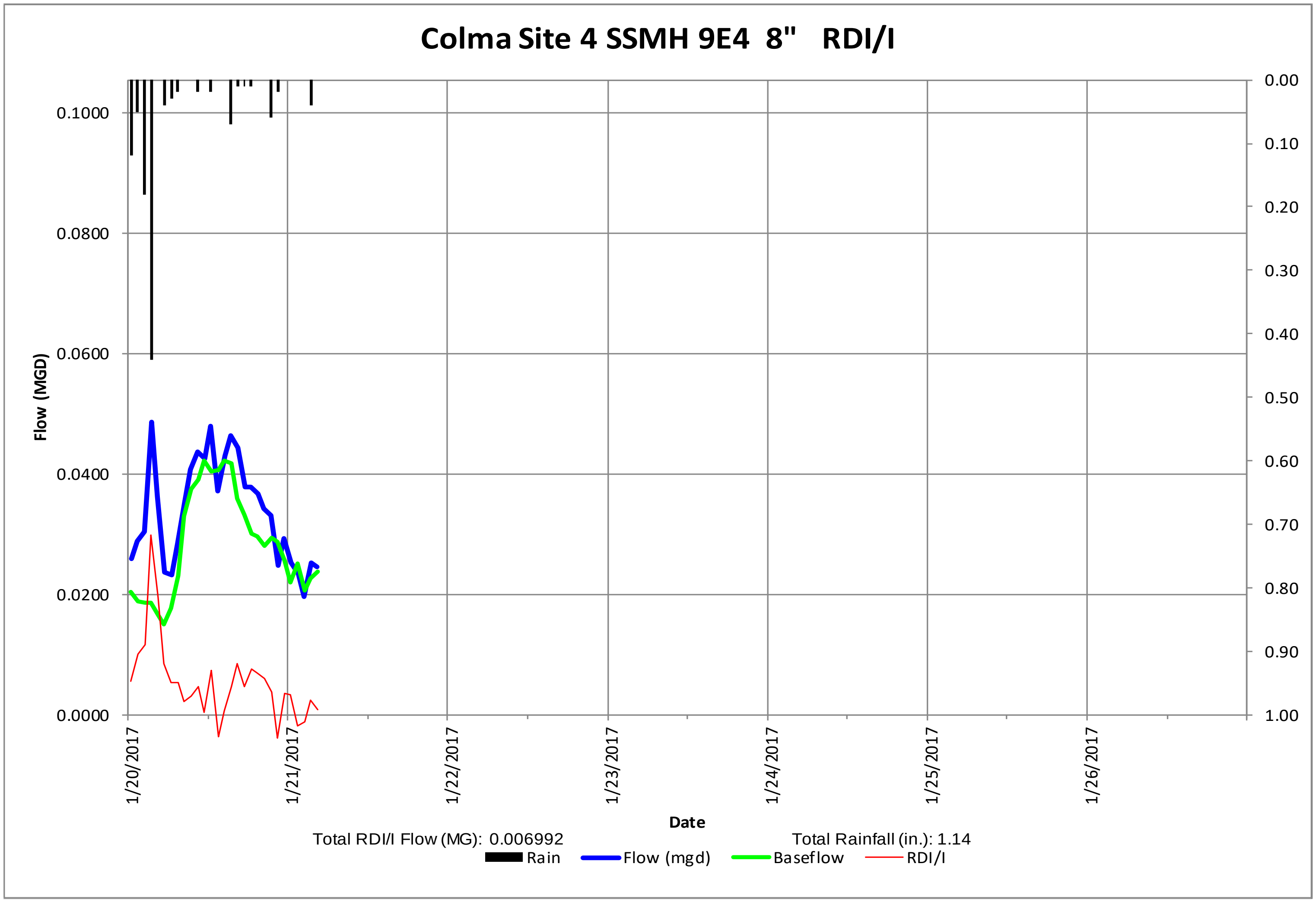


Baseflows	Weekend	Weekday
Max	0.049	0.044
Avg	0.033	0.031
Min	0.022	0.017

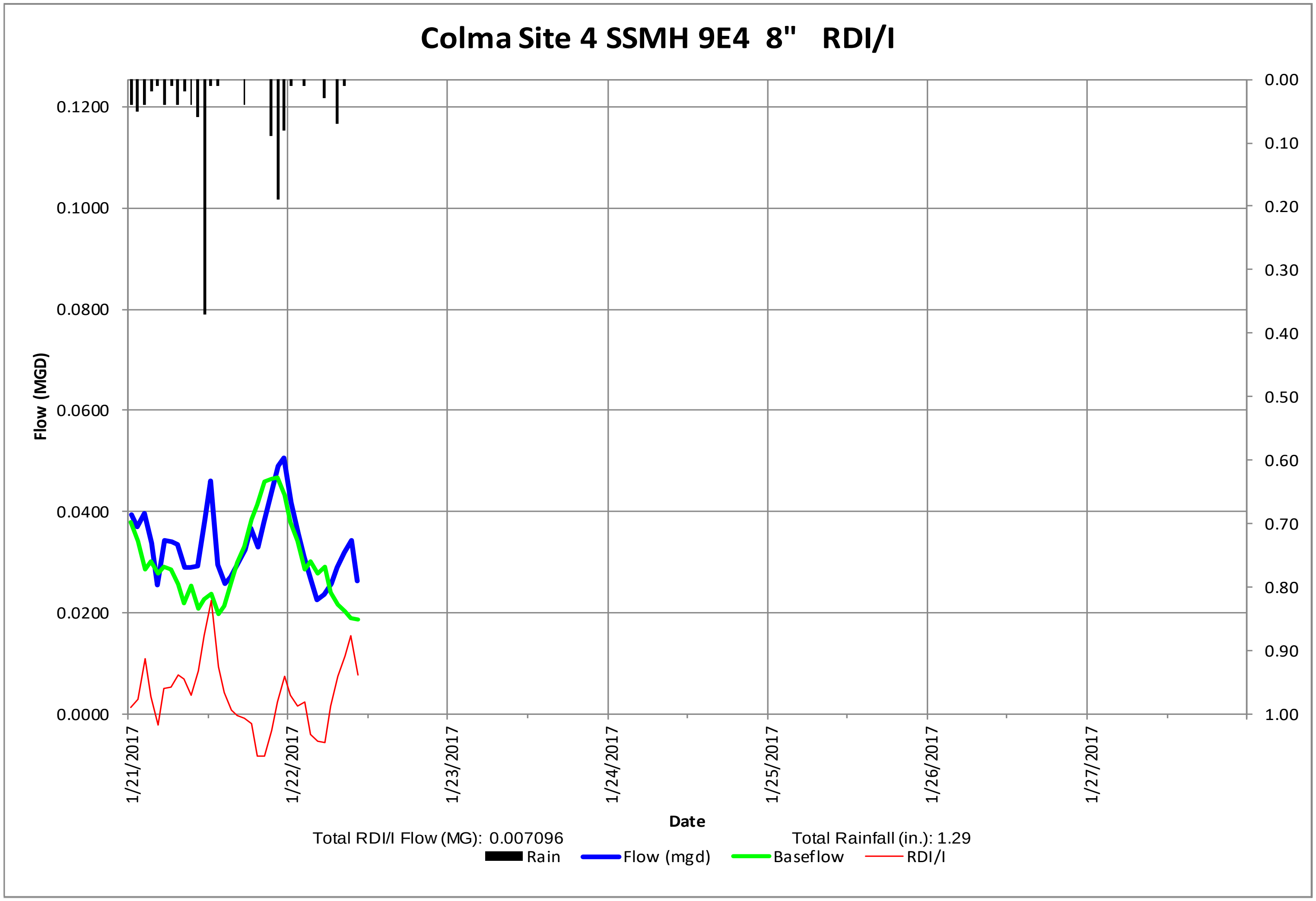

Baseflow Colma Site 4 SSMH 9E4 8" RDI/I
Flow
0.06
0.05
0.04
0.03
0.02
0.01
0
Weekday
Weekday
Weekday
Weekday
Weekday
Weekend
Weekend
Day



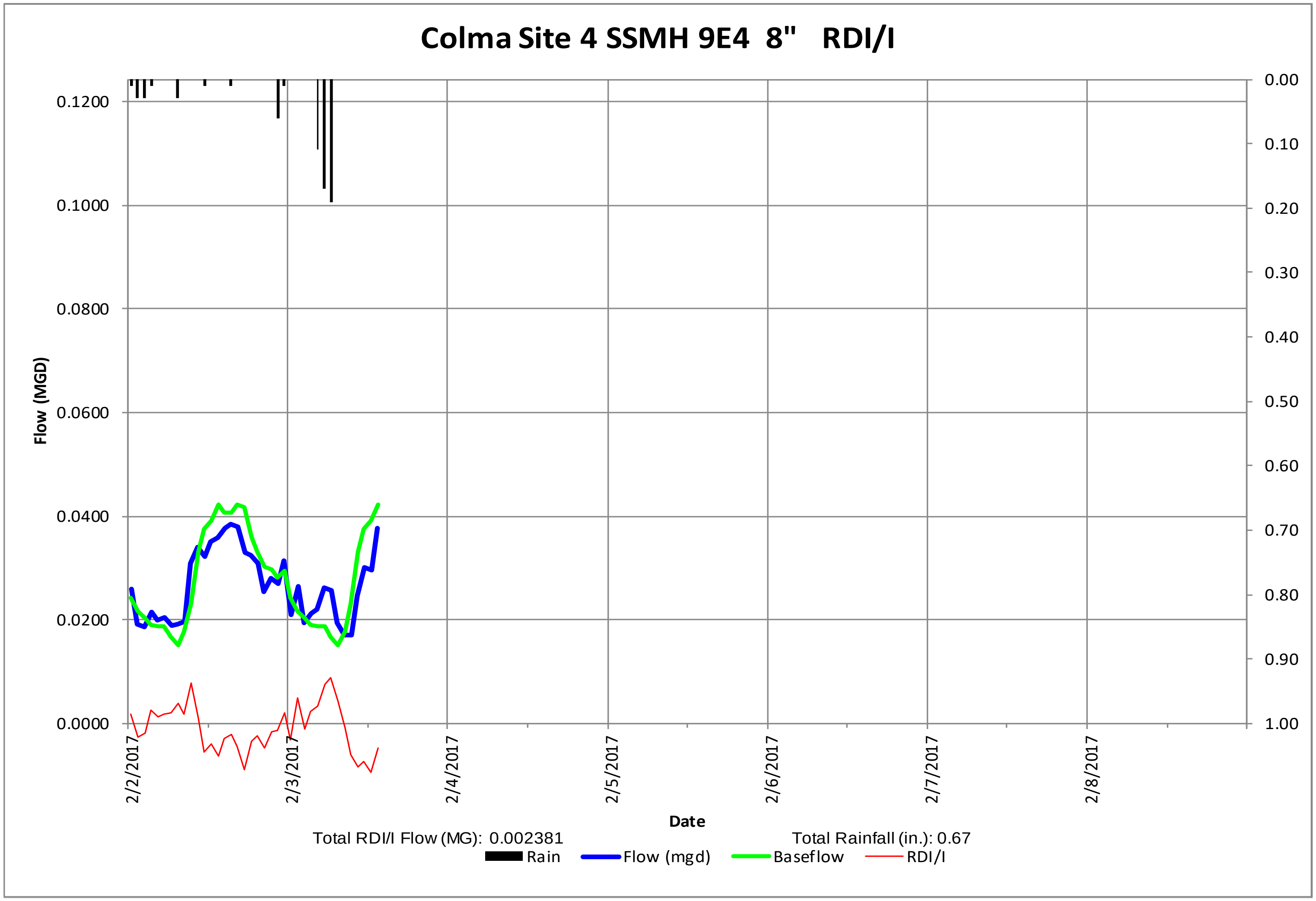
Storm of 1/18/2017



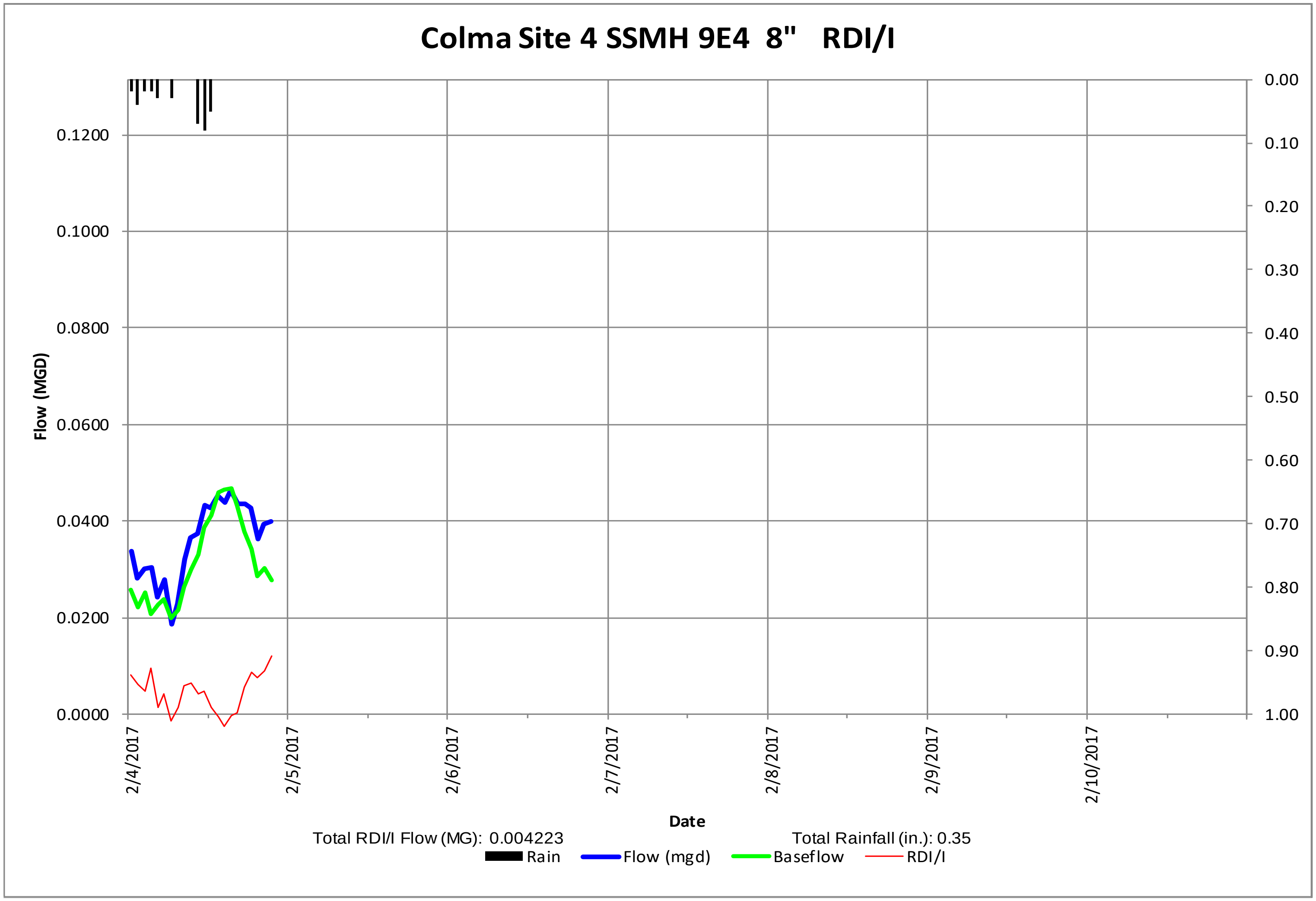
Storm of 1/20/2017



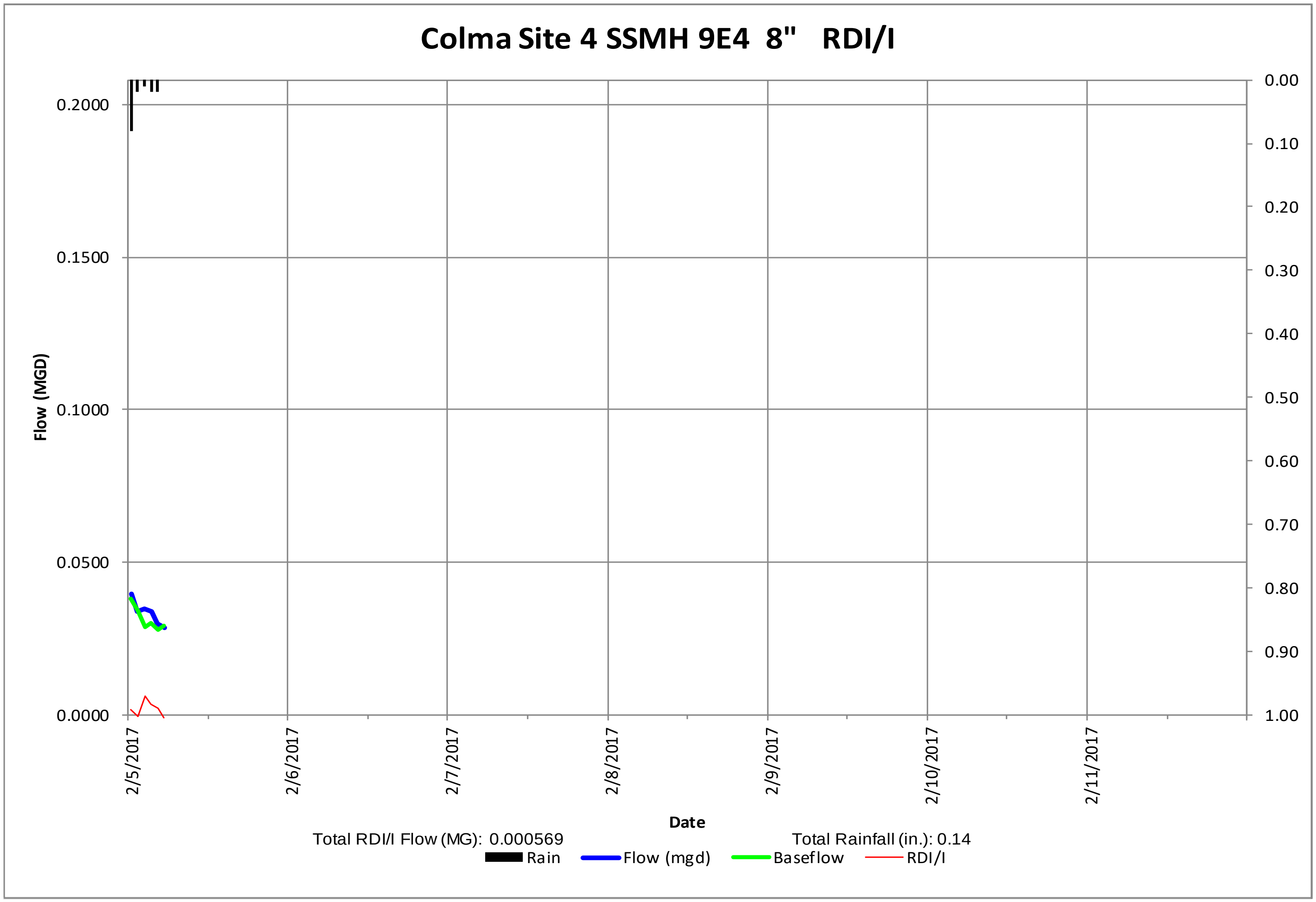
Storm of 1/21/2017



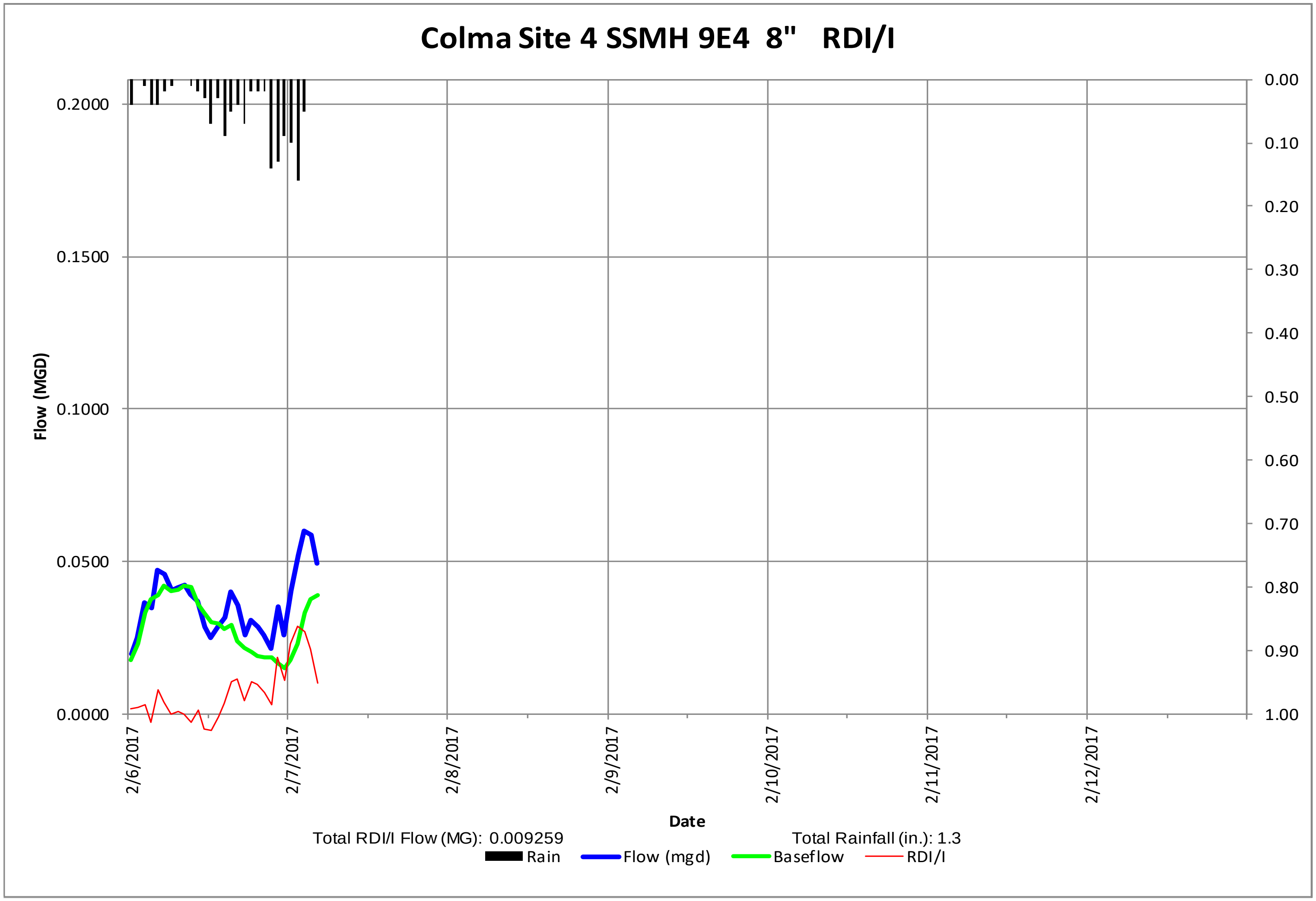
Storm of 2/2/2017



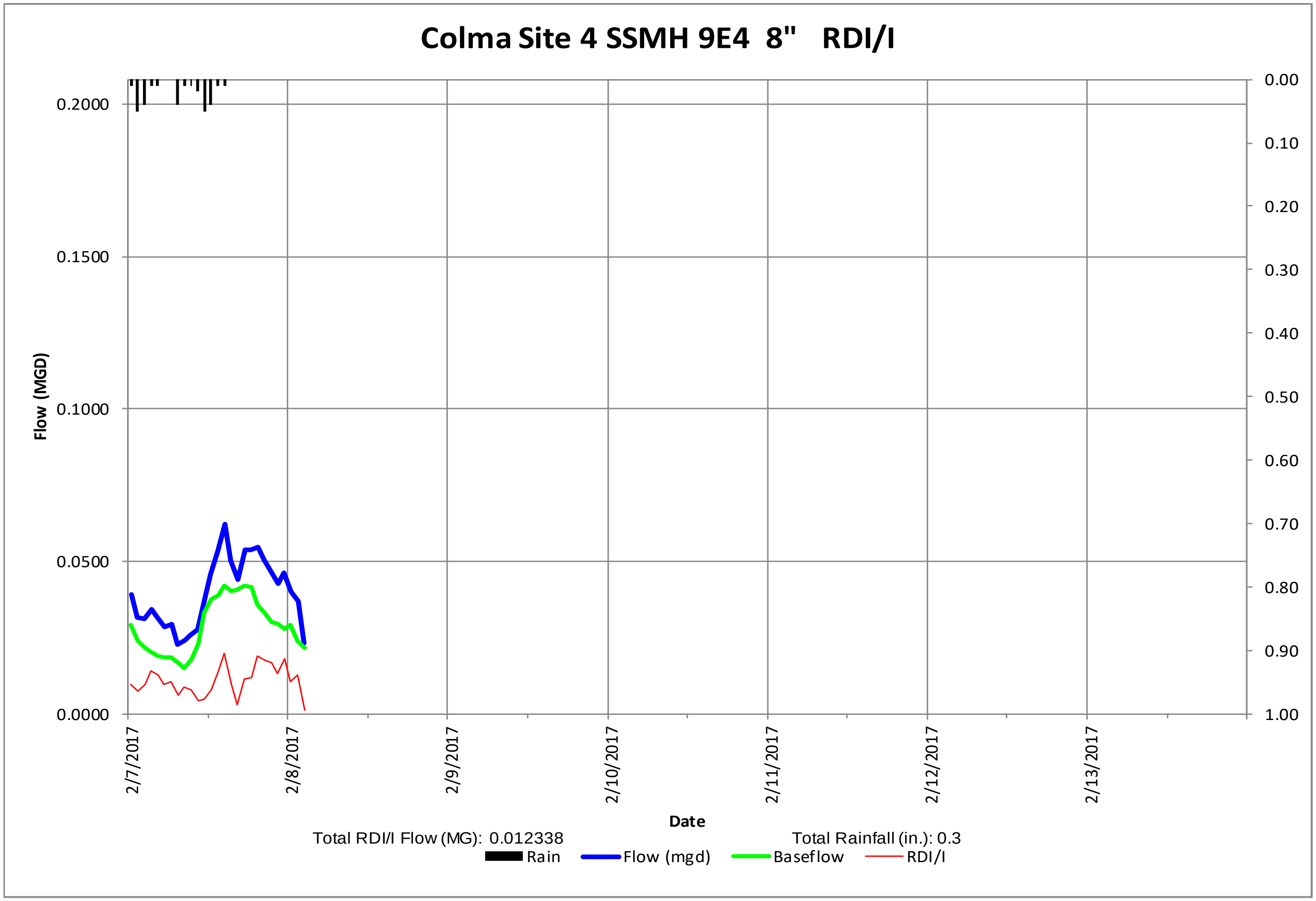
Storm of 2/4/2017



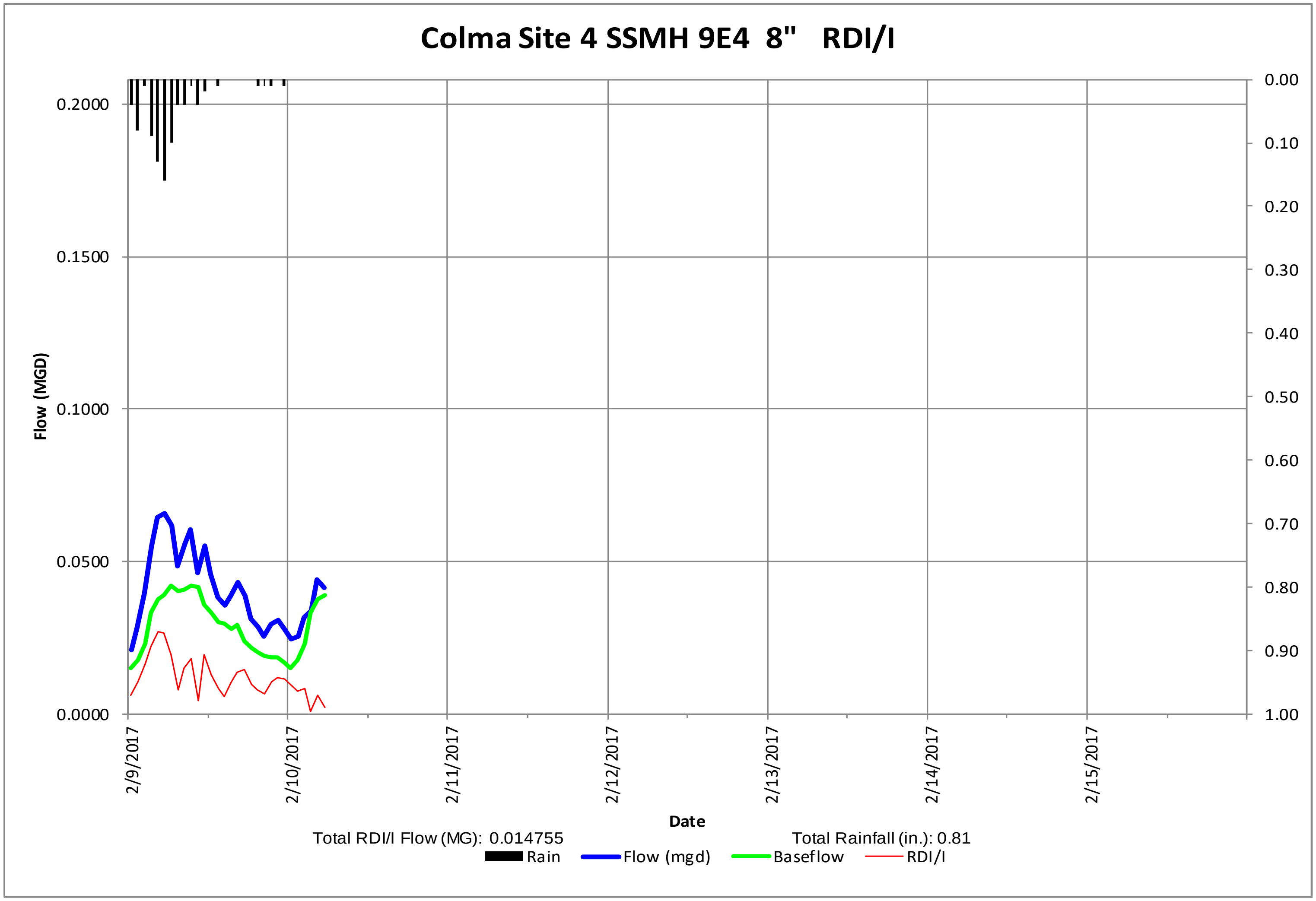
Storm of 2/5/2017



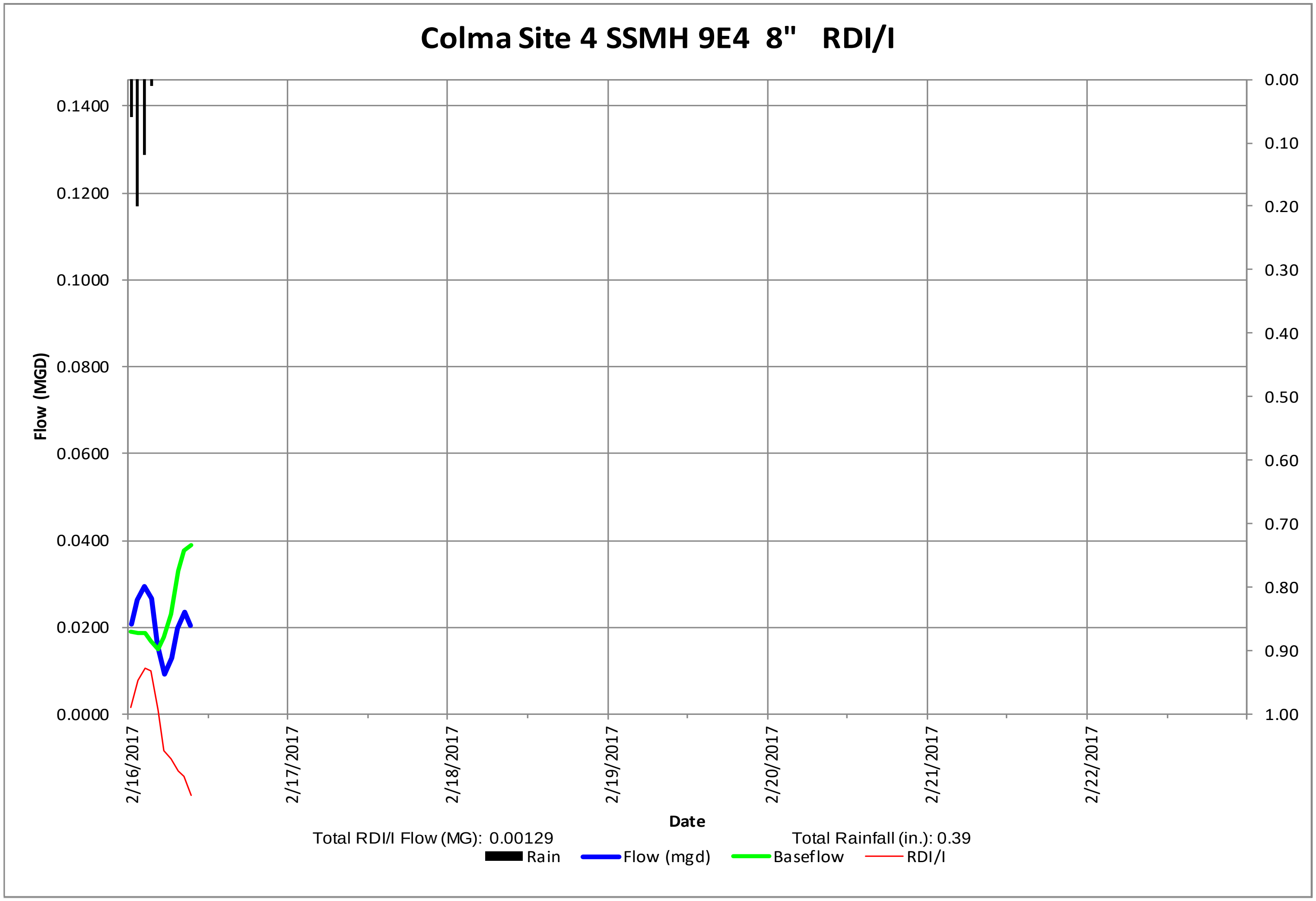
Storm of 2/6/2017



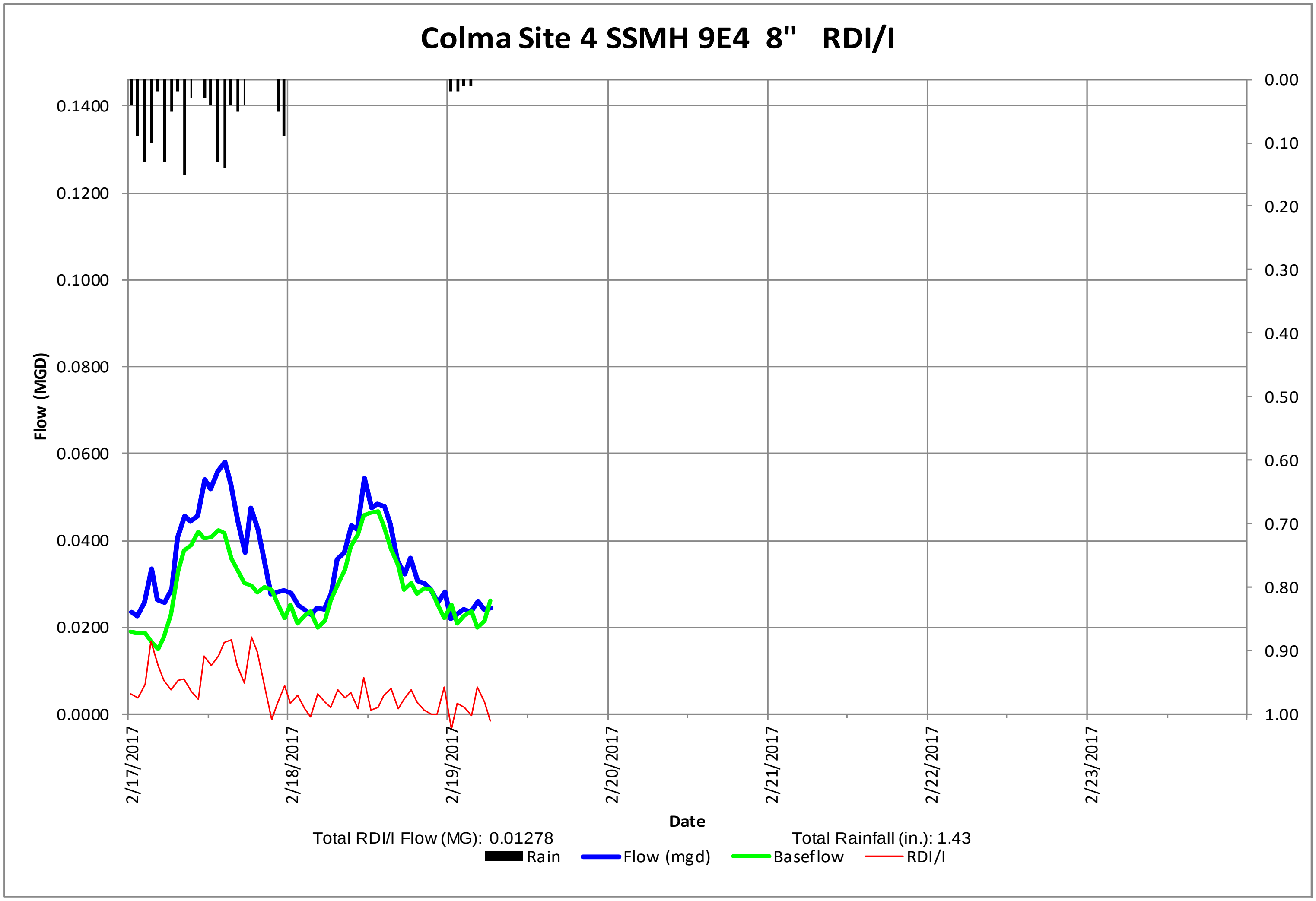
Storm of 2/7/2017



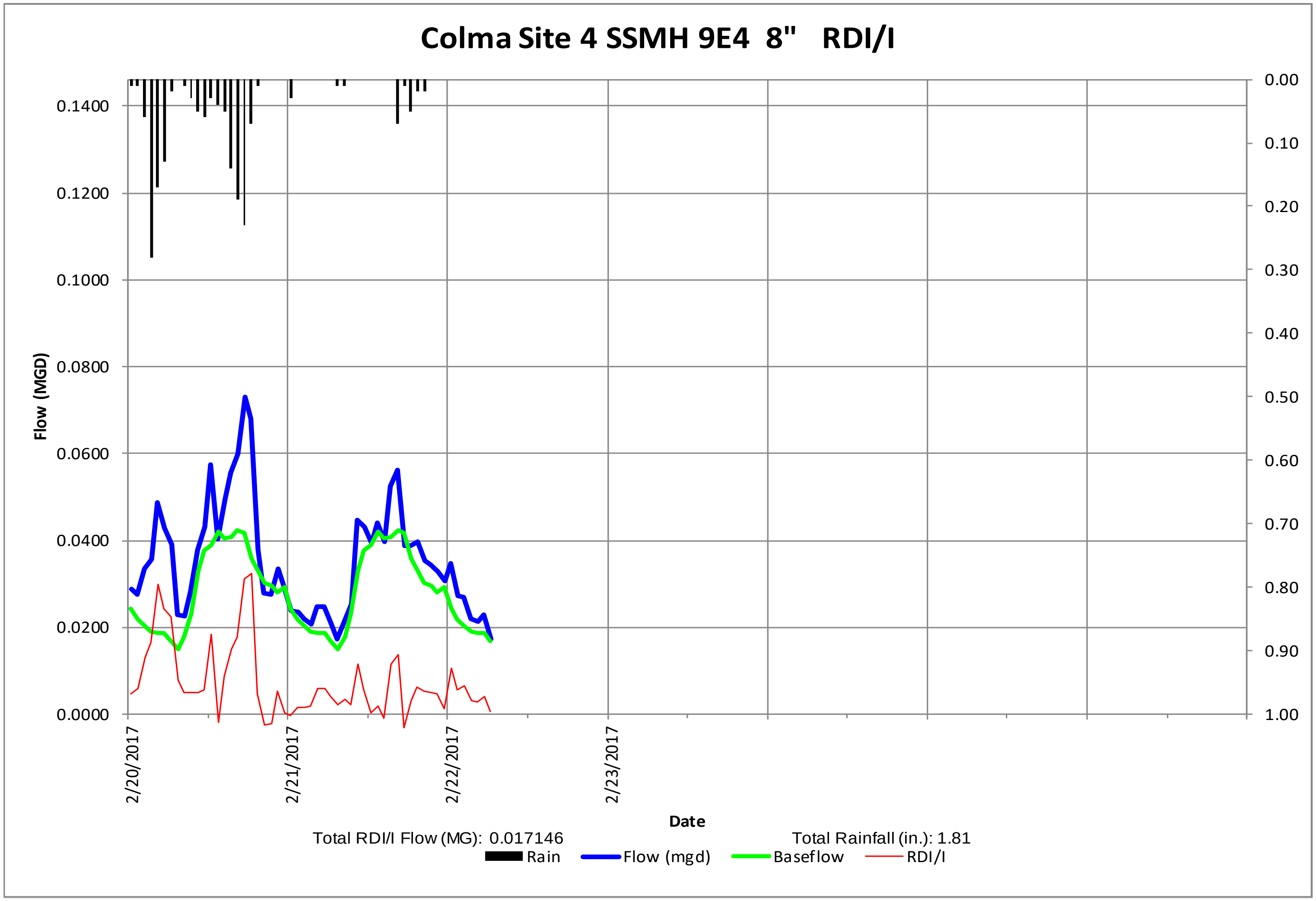
Storm of 2/9/2017



Storm of 2/16/2017



Storm of 2/17/2017



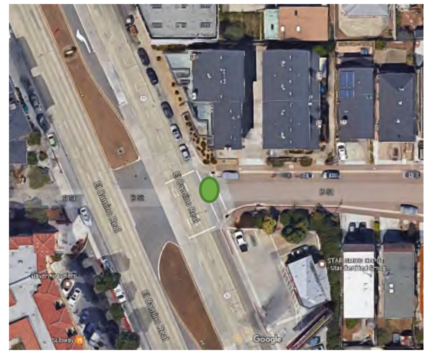
Storm of 2/20/2017

Site Information Report

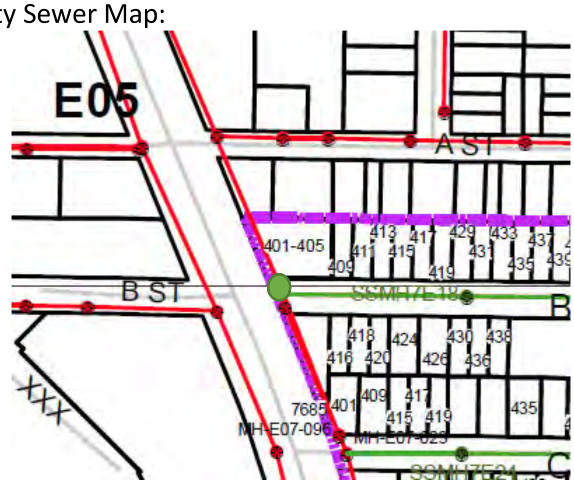
Flow Monitor Site: 5

Manhole Number SSMH B St.
Location: El Camino at B St.
MH Depth ~6.5’
Diameter: 10” to 12”
Safety: OK
Traffic: Medium
Gas: Ok
Rungs: No
Meter Type: Hach FL900
Depth: Pressure 4”
Velocity: Doppler 5 ft./sec
Sensor Type Submerged

Ariel View:



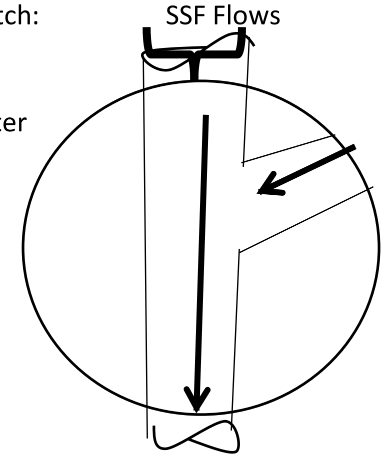
City Sewer Map:



Flow Sketch:

SSF Flows

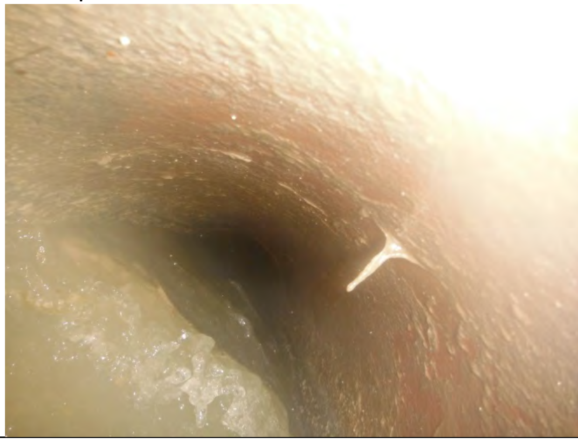
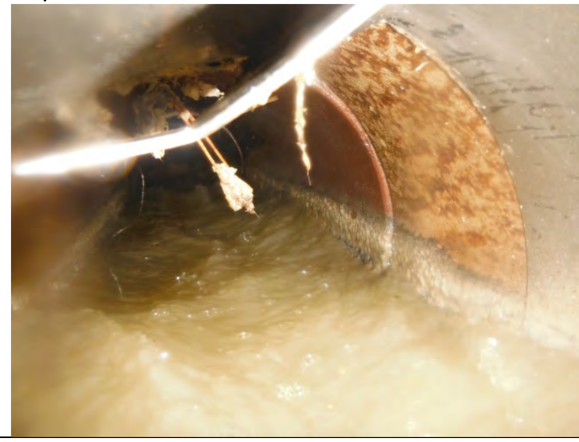
Flow Meter



10”-inch Pipes

Surface View:

Invert View:

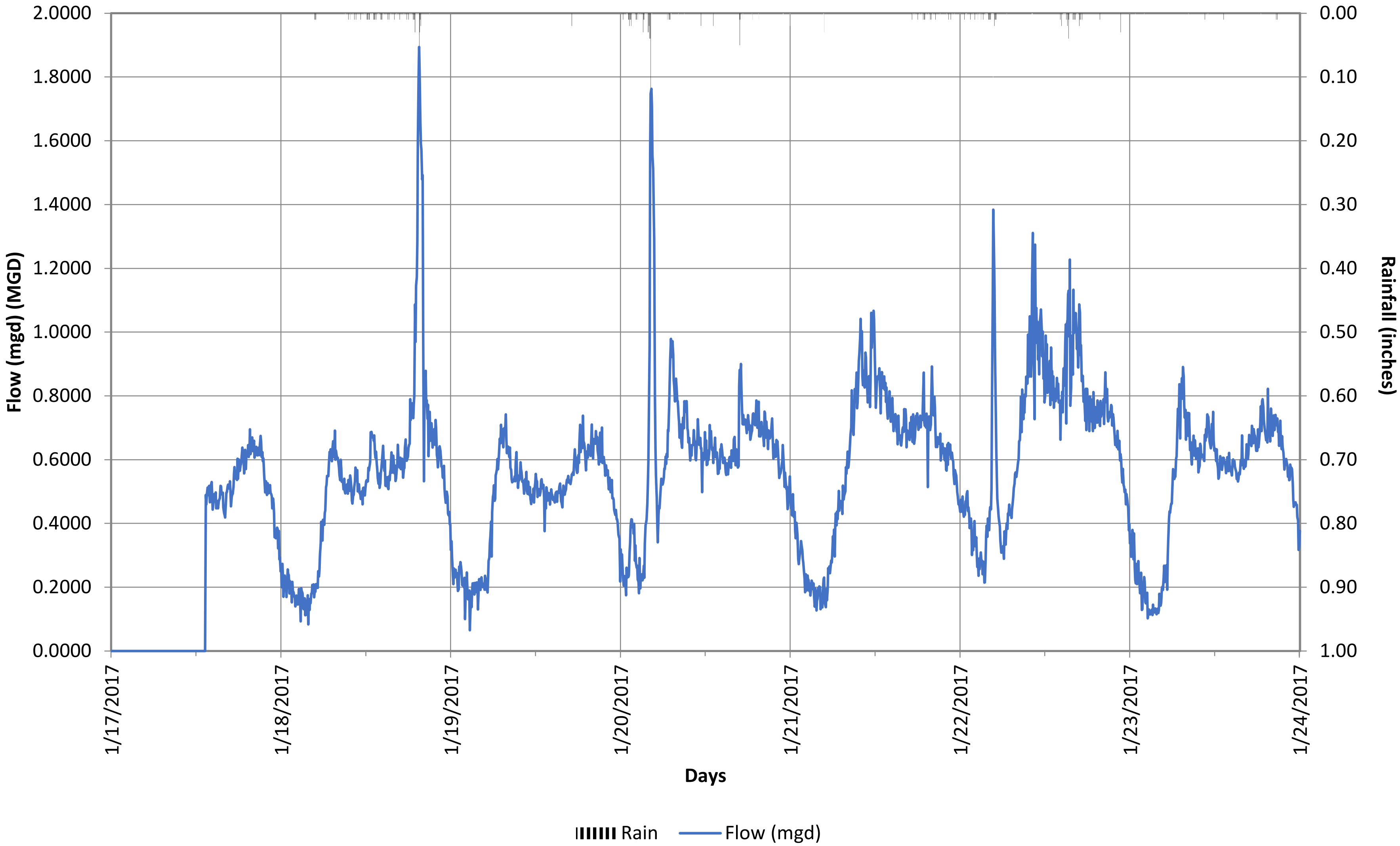
Outlet Pipe: 	Inlet Pipe: 
Inlet Pipe: P2 	Inlet Pipe: P3 

Colma Site 5 SSMH B St. 10" Sanitary Flow

Daily Summary

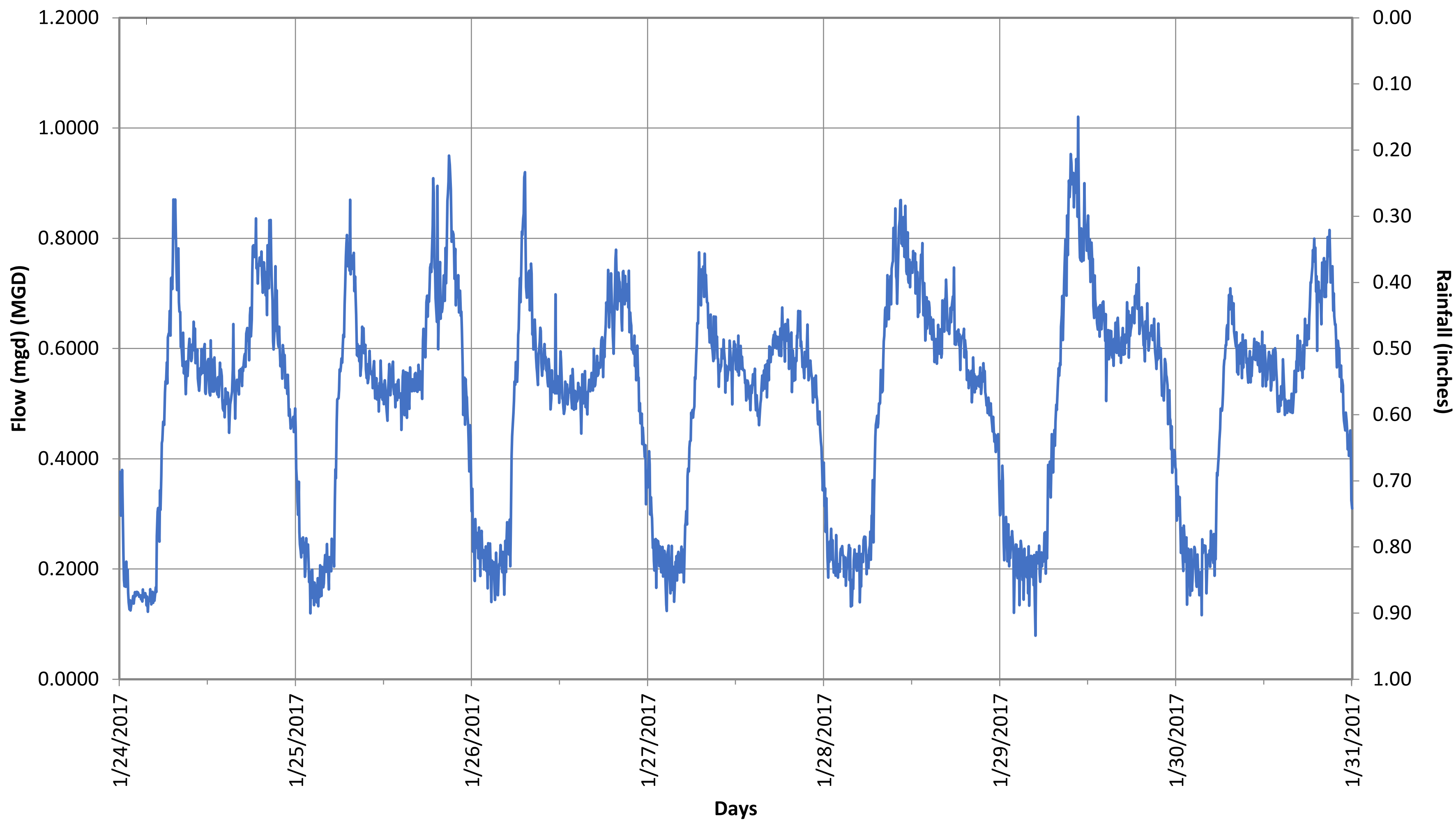
Day	Date	Avg Flow(MGD)	Min Flow(MGD)	Max Flow(MGD)	Max Depth(in.)	Rain(in.)
Tuesday	1/17/17	0.233	0.000	0.695	4.222	0.00
Wednesday	1/18/17	0.531	0.083	1.894	77.665	0.88
Thursday	1/19/17	0.470	0.065	0.742	4.372	0.02
Friday	1/20/17	0.623	0.175	1.763	72.950	1.13
Saturday	1/21/17	0.589	0.127	1.067	5.831	0.25
Sunday	1/22/17	0.687	0.214	1.384	46.791	1.00
Monday	1/23/17	0.530	0.103	0.891	5.000	0.18
Tuesday	1/24/17	0.503	0.122	0.871	5.024	0.01
Wednesday	1/25/17	0.522	0.120	0.950	5.284	0.00
Thursday	1/26/17	0.506	0.140	0.920	5.191	0.00
Friday	1/27/17	0.496	0.124	0.774	4.497	0.00
Saturday	1/28/17	0.512	0.132	0.869	5.034	0.00
Sunday	1/29/17	0.528	0.079	1.021	5.552	0.00
Monday	1/30/17	0.505	0.116	0.815	4.695	0.00
Tuesday	1/31/17	0.509	0.093	0.836	4.799	0.00
Wednesday	2/1/17	0.510	0.121	0.937	5.307	0.01
Thursday	2/2/17	0.510	0.113	0.885	5.082	0.19
Friday	2/3/17	0.532	0.017	1.285	14.686	0.51
Saturday	2/4/17	0.566	0.102	1.230	6.645	0.37
Sunday	2/5/17	0.542	0.120	1.088	6.175	0.15
Monday	2/6/17	0.572	0.019	1.083	5.776	0.50
Tuesday	2/7/17	0.610	0.147	1.323	12.967	0.86
Wednesday	2/8/17	0.553	0.177	0.897	5.054	0.26
Thursday	2/9/17	0.584	0.138	0.969	12.053	0.77
Friday	2/10/17	0.522	0.134	0.943	5.278	0.04
Saturday	2/11/17	0.564	0.141	0.910	5.195	0.00
Sunday	2/12/17	0.587	0.147	1.079	5.952	0.00
Monday	2/13/17	0.521	0.145	0.835	4.878	0.00
Tuesday	2/14/17	0.519	0.128	0.889	5.127	0.00
Wednesday	2/15/17	0.521	0.154	0.998	5.643	0.00
Thursday	2/16/17	0.568	0.127	0.861	5.001	0.39
Friday	2/17/17	0.658	0.139	1.196	15.821	1.23
Saturday	2/18/17	0.672	0.128	1.078	5.913	0.14
Sunday	2/19/17	0.594	0.208	0.935	5.370	0.08
Monday	2/20/17	0.770	0.231	1.396	35.436	1.61
Tuesday	2/21/17	0.612	0.266	0.952	5.536	0.19
Wednesday	2/22/17	0.554	0.239	0.884	5.040	0.00

Colma Site 5 SSMH B St. 10" Sanitary Flow

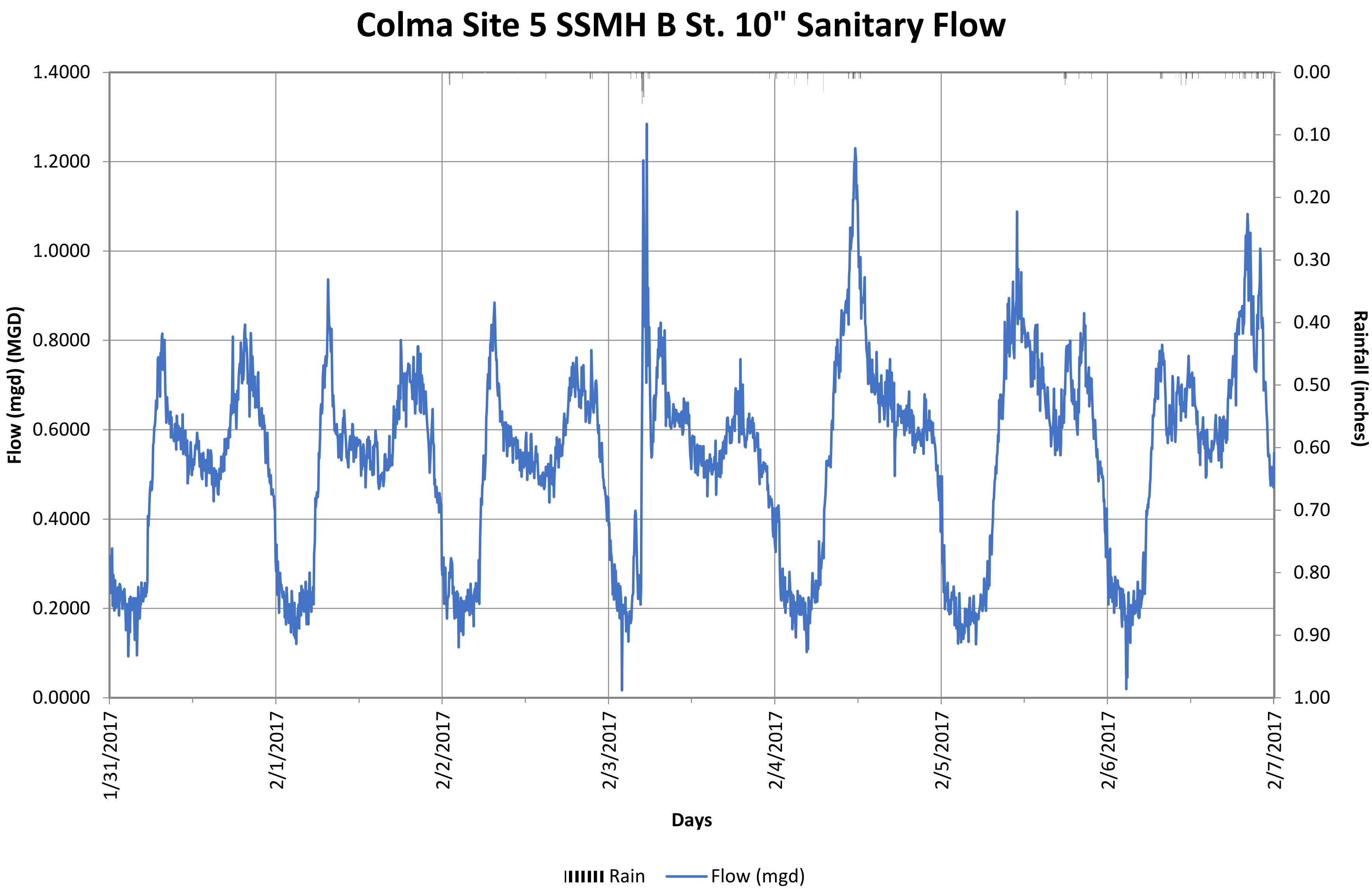


	1/17/2017(Tue)	1/18/2017(Wed)	1/19/2017(Thu)	1/20/2017(Fri)	1/21/2017(Sat)	1/22/2017(Sun)	1/23/2017(Mon)
Maximum	0.695	1.894	0.742	1.763	1.067	1.384	0.891
Average	0.233	0.531	0.470	0.623	0.589	0.687	0.530
Minimum	0.000	0.083	0.065	0.175	0.127	0.214	0.103
Rain (inches)	0.00	0.88	0.02	1.13	0.25	1.00	0.18

Colma Site 5 SSMH B St. 10" Sanitary Flow

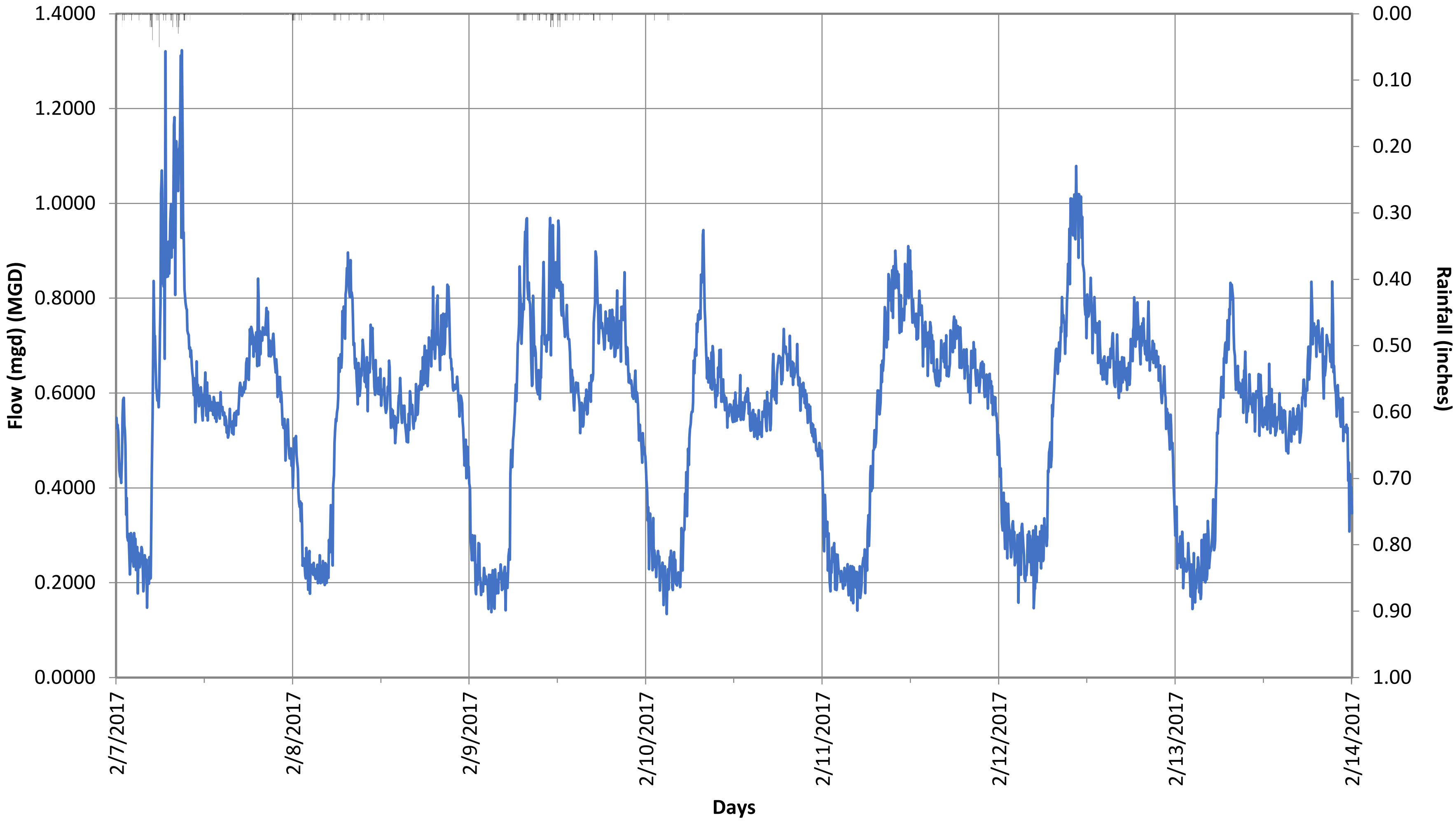


	1/24/2017(Tue)	1/25/2017(Wed)	1/26/2017(Thu)	1/27/2017(Fri)	1/28/2017(Sat)	1/29/2017(Sun)	1/30/2017(Mon)
Maximum	0.871	0.950	0.920	0.774	0.869	1.021	0.815
Average	0.503	0.522	0.506	0.496	0.512	0.528	0.505
Minimum	0.122	0.120	0.140	0.124	0.132	0.079	0.116
Rain (inches)	0.01	0.00	0.00	0.00	0.00	0.00	0.00



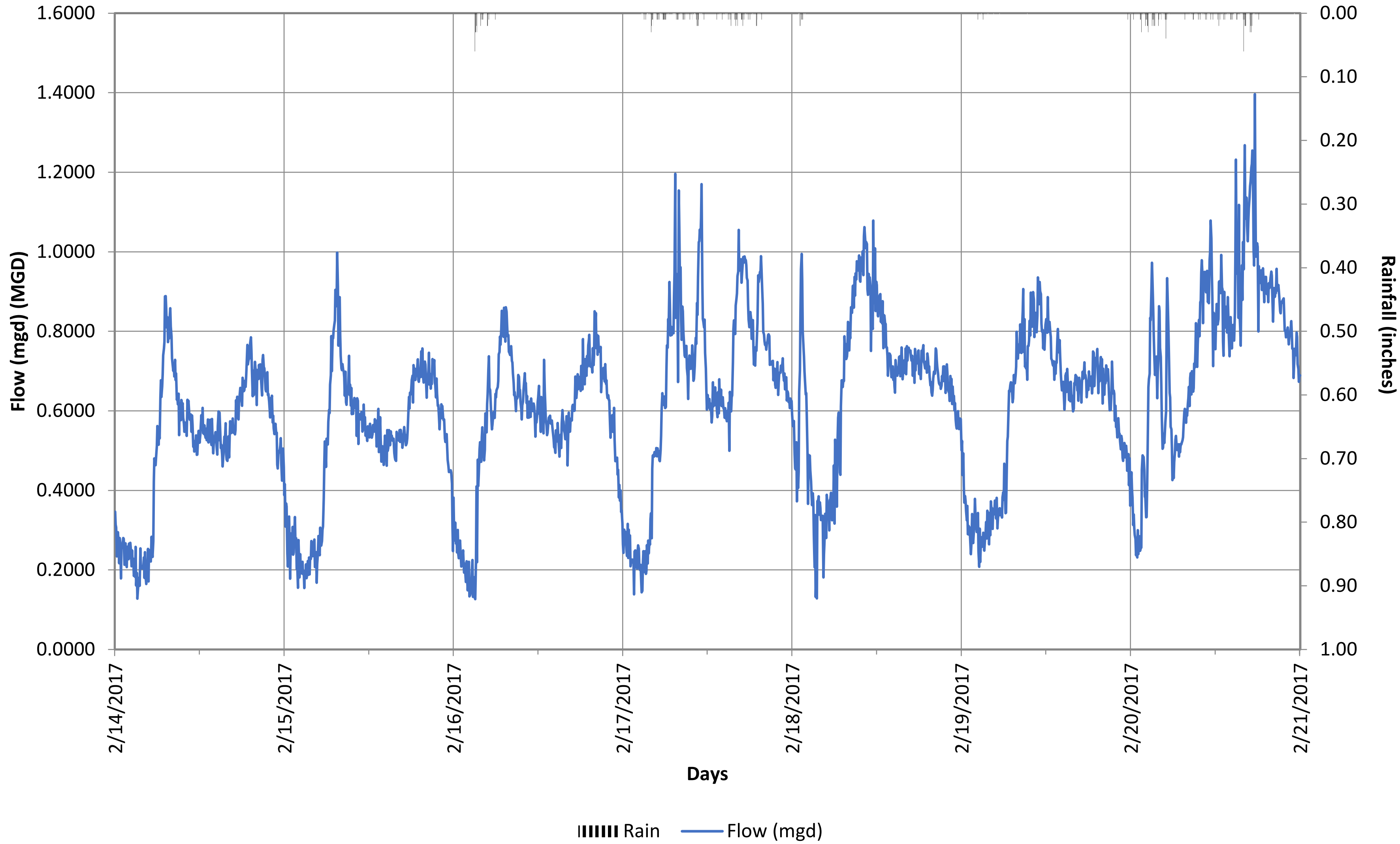
	1/31/2017(Tue)	2/1/2017(Wed)	2/2/2017(Thu)	2/3/2017(Fri)	2/4/2017(Sat)	2/5/2017(Sun)	2/6/2017(Mon)
Maximum	0.836	0.937	0.885	1.285	1.230	1.088	1.083
Average	0.509	0.510	0.510	0.532	0.566	0.542	0.572
Minimum	0.093	0.121	0.113	0.017	0.102	0.120	0.019
Rain (inches)	0.00	0.01	0.19	0.51	0.37	0.15	0.50

Colma Site 5 SSMH B St. 10" Sanitary Flow



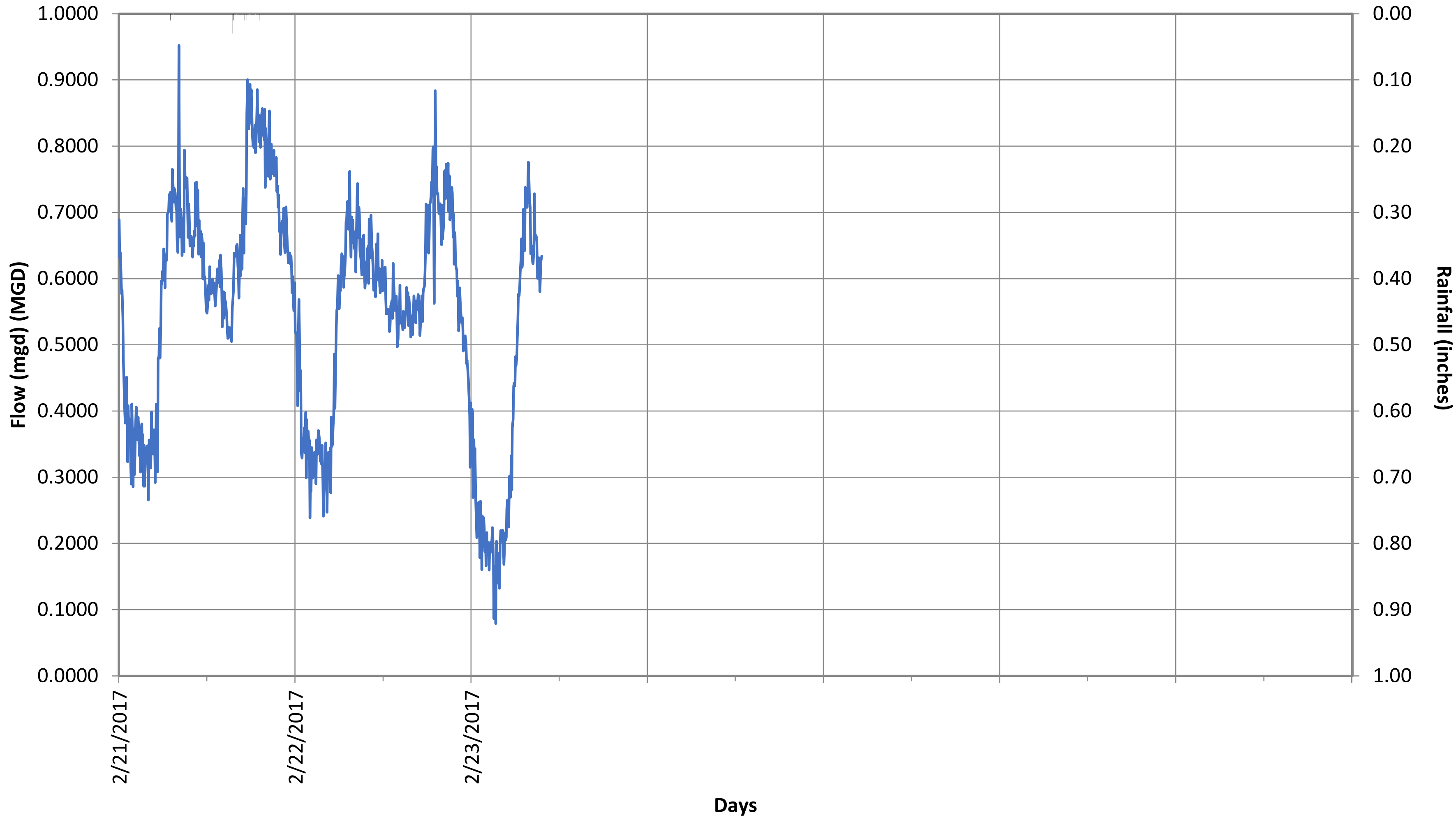
	2/7/2017(Tue)	2/8/2017(Wed)	2/9/2017(Thu)	2/10/2017(Fri)	2/11/2017(Sat)	2/12/2017(Sun)	2/13/2017(Mon)
Maximum	1.323	0.897	0.969	0.943	0.910	1.079	0.835
Average	0.610	0.553	0.584	0.522	0.564	0.587	0.521
Minimum	0.147	0.177	0.138	0.134	0.141	0.147	0.145
Rain (inches)	0.86	0.26	0.77	0.04	0.00	0.00	0.00

Colma Site 5 SSMH B St. 10" Sanitary Flow



	2/14/2017(Tue)	2/15/2017(Wed)	2/16/2017(Thu)	2/17/2017(Fri)	2/18/2017(Sat)	2/19/2017(Sun)	2/20/2017(Mon)
Maximum	0.889	0.998	0.861	1.196	1.078	0.935	1.396
Average	0.519	0.521	0.568	0.658	0.672	0.594	0.770
Minimum	0.128	0.154	0.127	0.139	0.128	0.208	0.231
Rain (inches)	0.00	0.00	0.39	1.23	0.14	0.08	1.61

Colma Site 5 SSMH B St. 10" Sanitary Flow

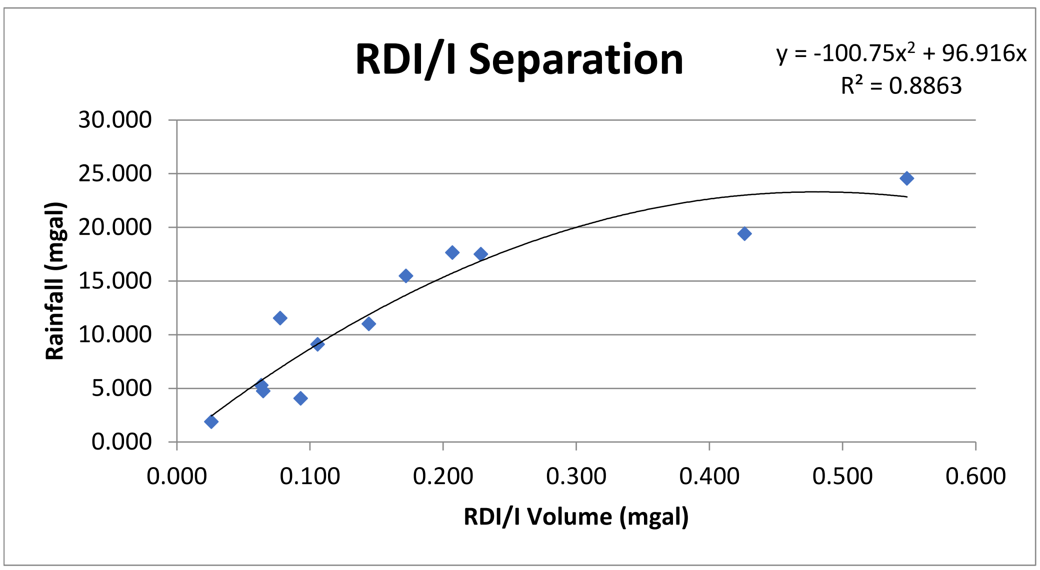


	2/21/2017(Tue)	2/22/2017(Wed)				
Maximum	0.952	0.884				
Average	0.612	0.554				
Minimum	0.266	0.239				
Rain (inches)	0.19	0.00				

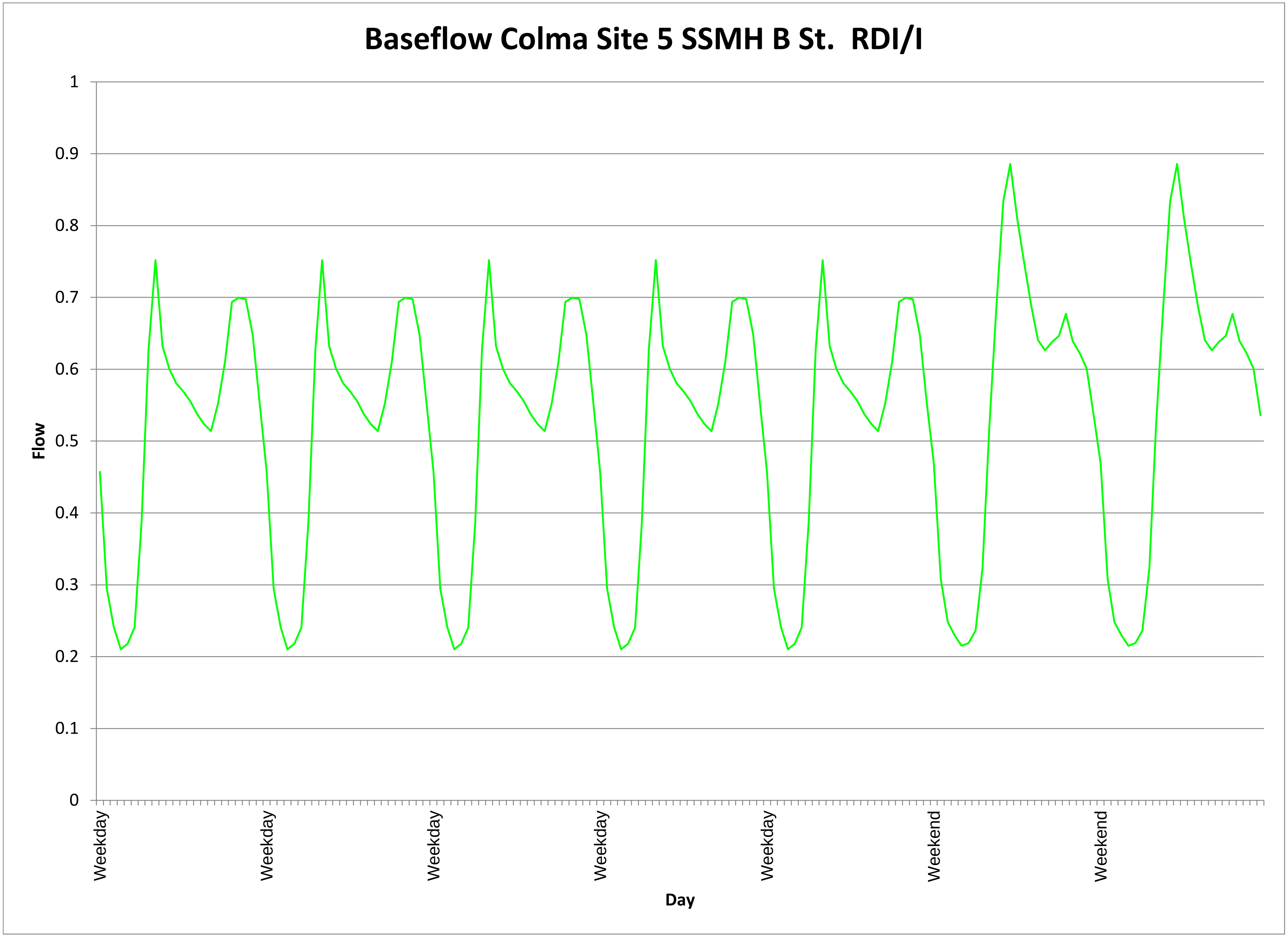
Colma Site 5 SSMH B St. RDI/I

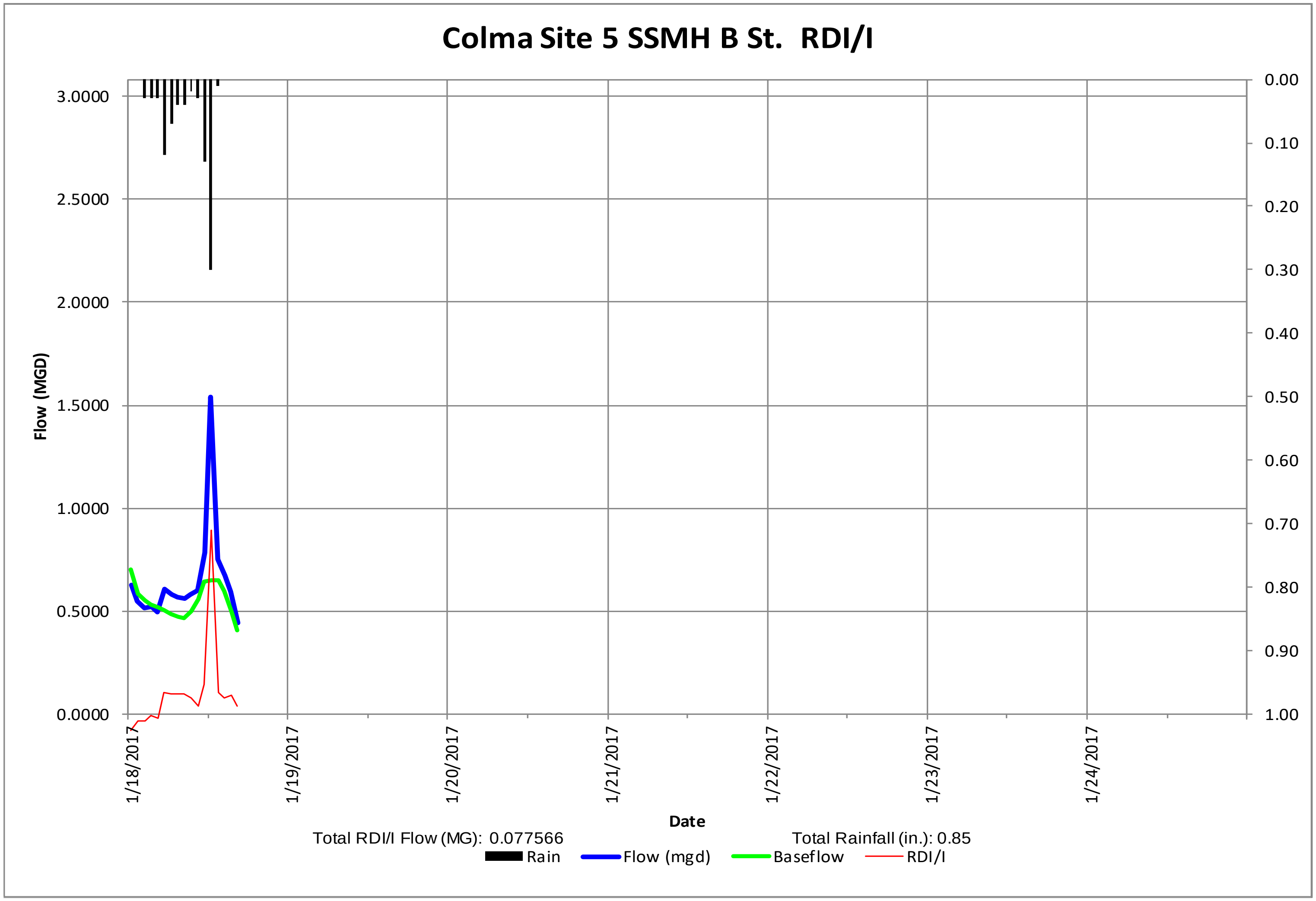
RDI/I Analysis, Monitor Return Ratio Summary

Storm Start (Date)	RDI/I Volume (mgal)	Monitor Area (acres)	Rainfall (mgal)	Return Ratio (%)
1/18/2017	0.078	500.0	11.540	0.67%
1/20/2017	0.172	500.0	15.477	1.11%
1/21/2017	0.228	500.0	17.513	1.30%
2/2/2017	0.106	500.0	9.096	1.16%
2/4/2017	0.065	500.0	4.752	1.36%
2/5/2017	0.026	500.0	1.901	1.36%
2/6/2017	0.207	500.0	17.649	1.17%
2/7/2017	0.093	500.0	4.073	2.28%
2/9/2017	0.144	500.0	10.997	1.31%
2/16/2017	0.063	500.0	5.295	1.20%
2/17/2017	0.426	500.0	19.414	2.20%
2/20/2017	0.548	500.0	24.573	2.23%
Average R%				1.45%
Average Top 3 Storms				2.24%

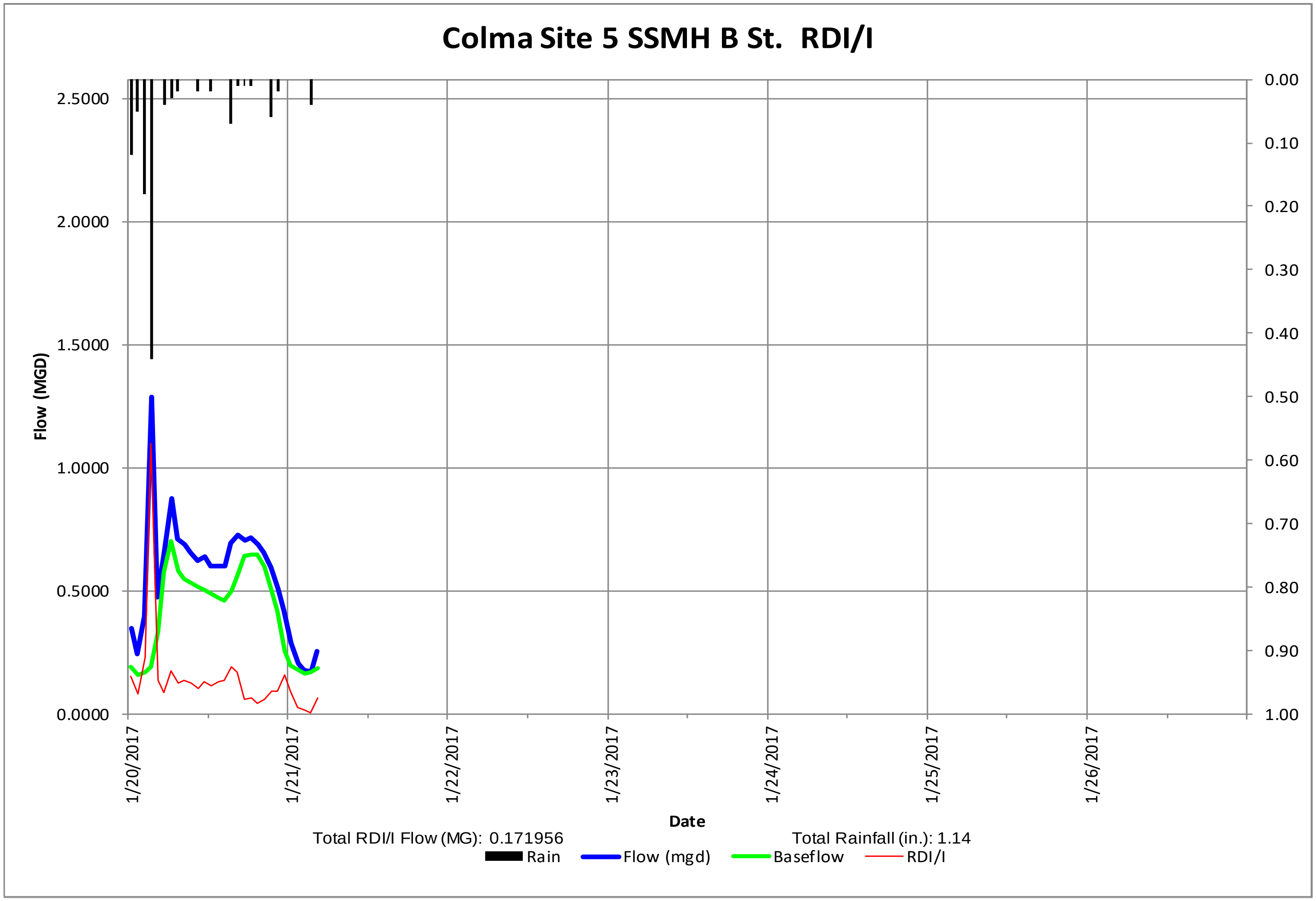


Baseflows	Weekend	Weekday
Max	0.886	0.752
Avg	0.544	0.516
Min	0.215	0.210

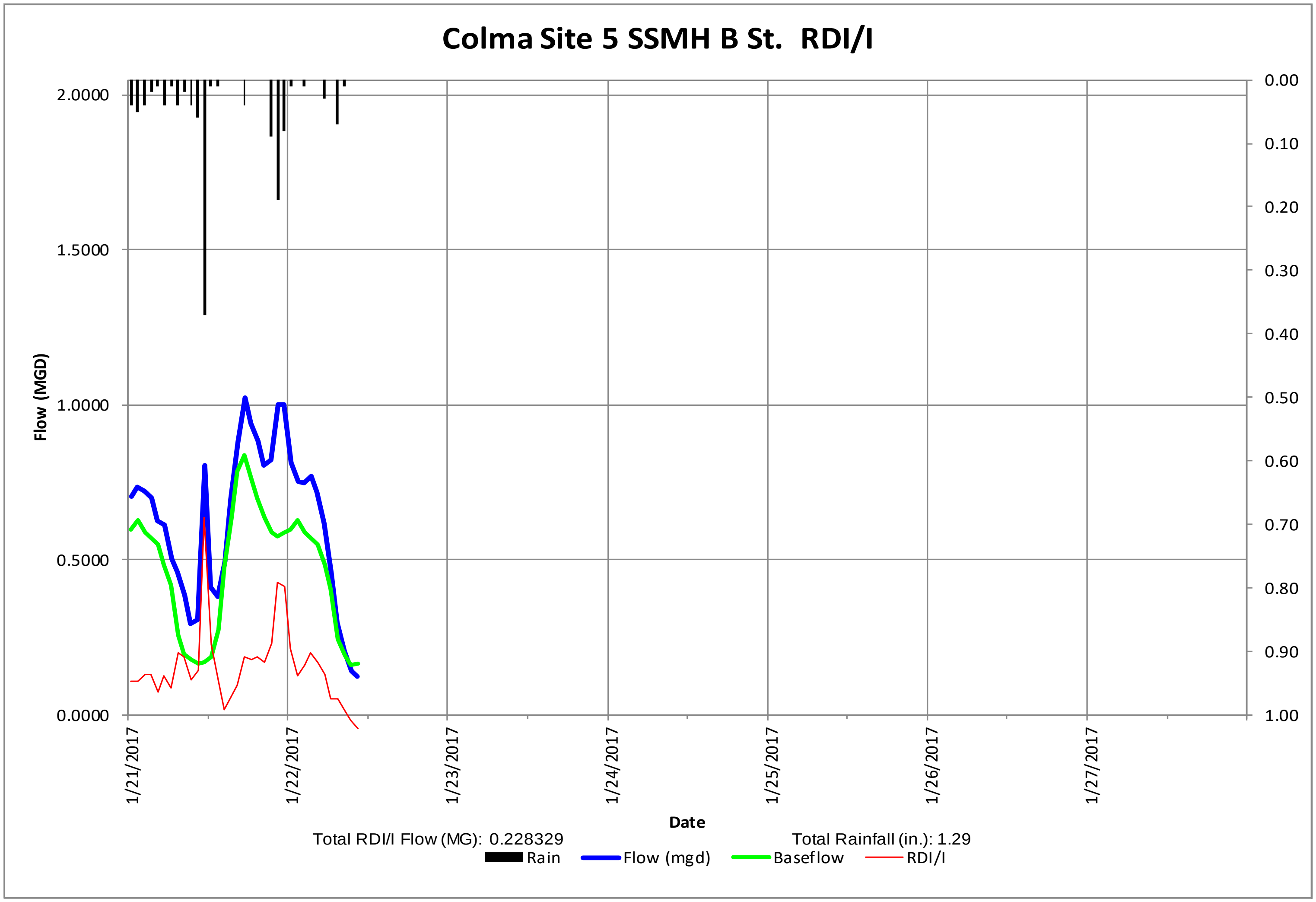

Baseflow Colma Site 5 SSMH B St. RDI/I
Flow
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Weekday
Weekday
Weekday
Weekday
Weekday
Weekend
Weekend
Day



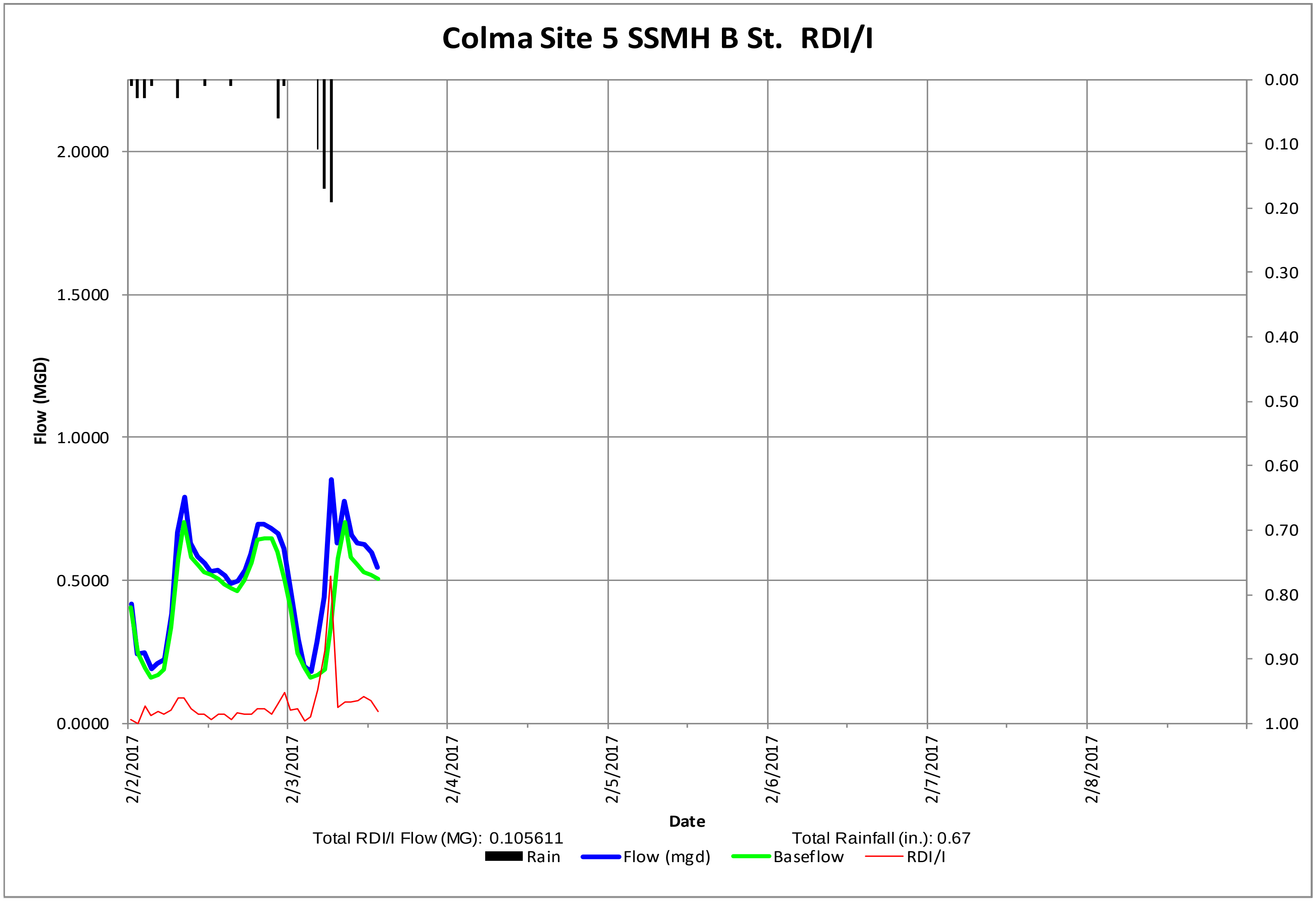
Storm of 1/18/2017



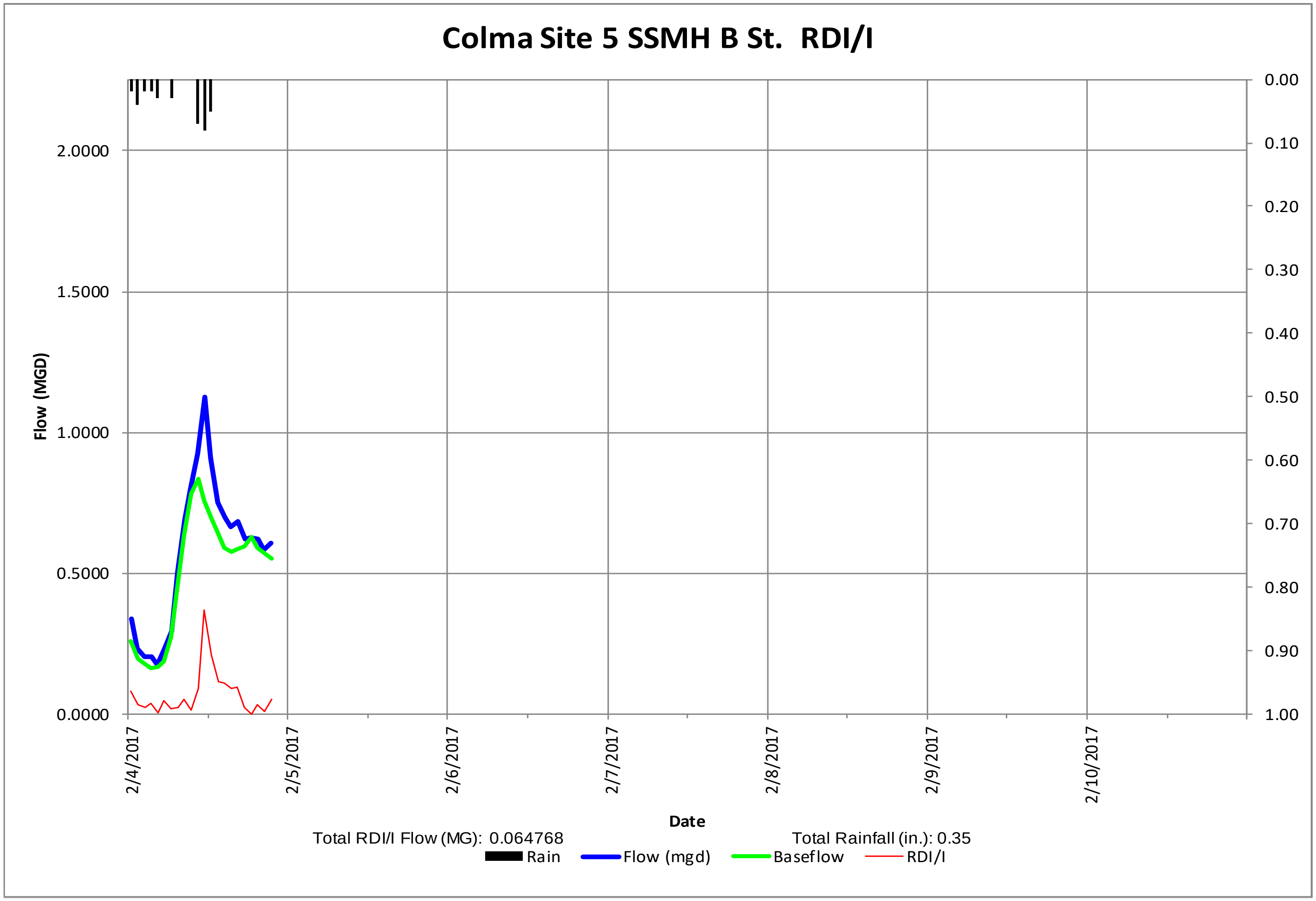
Storm of 1/20/2017



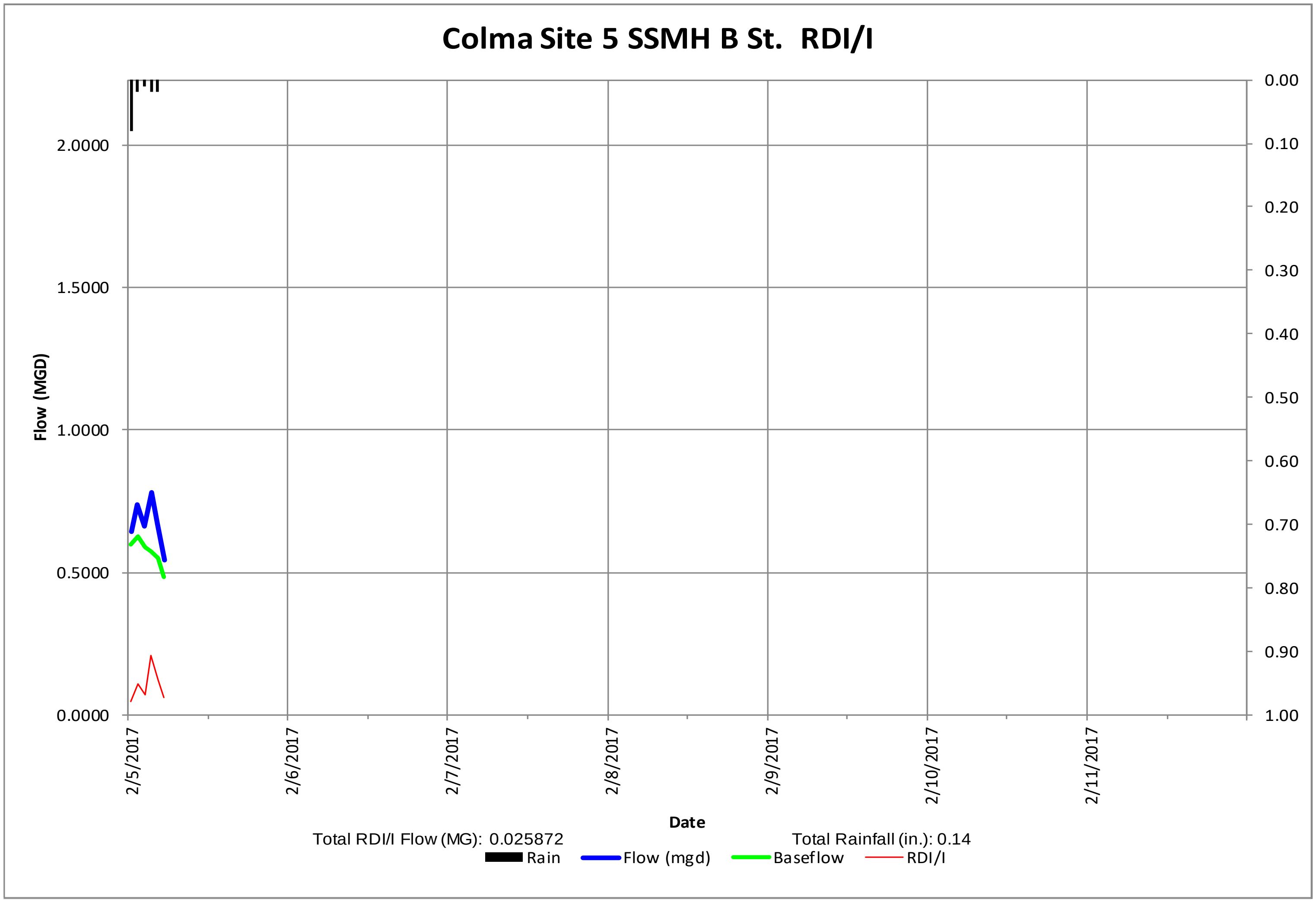
Storm of 1/21/2017



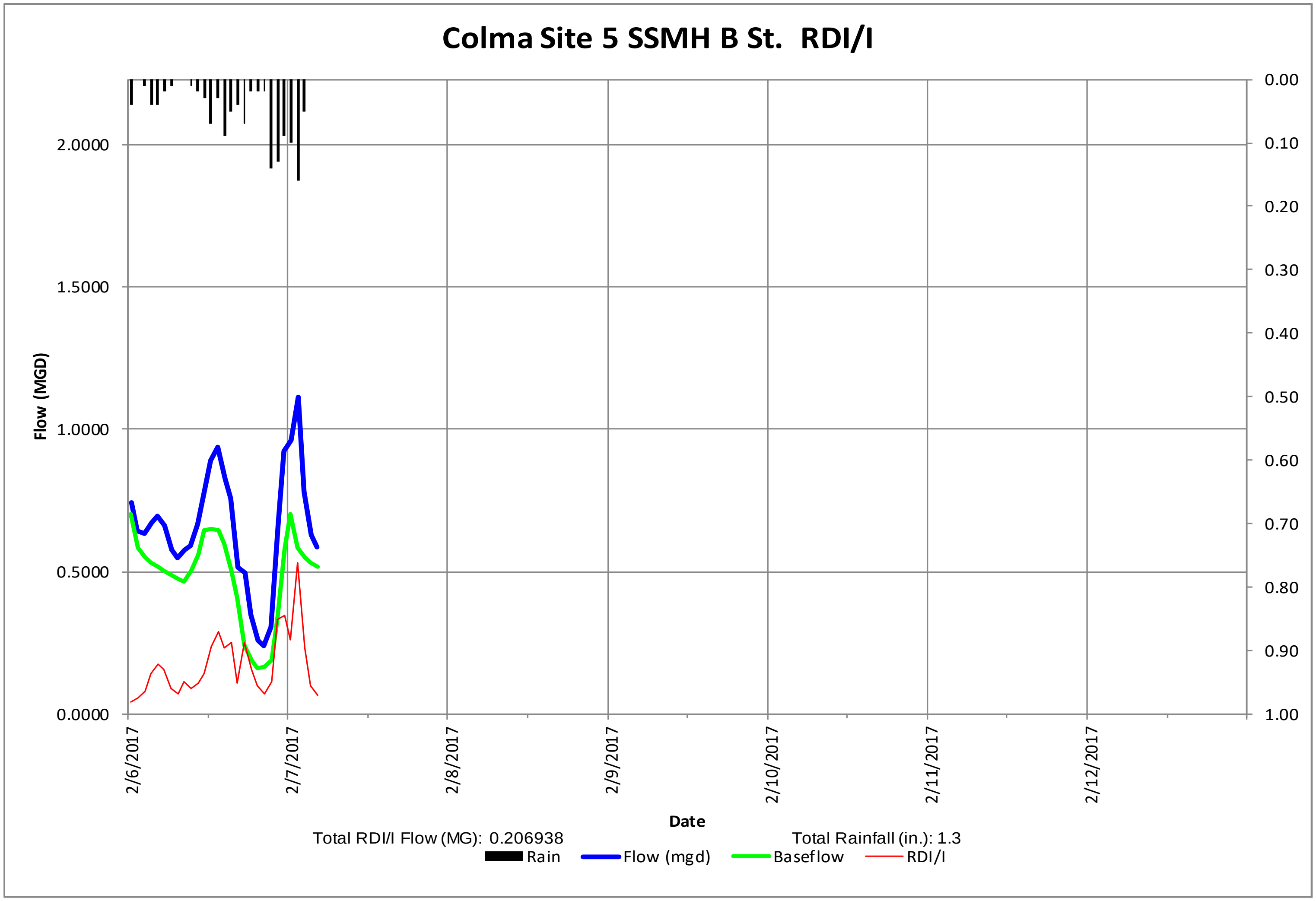
Storm of 2/2/2017



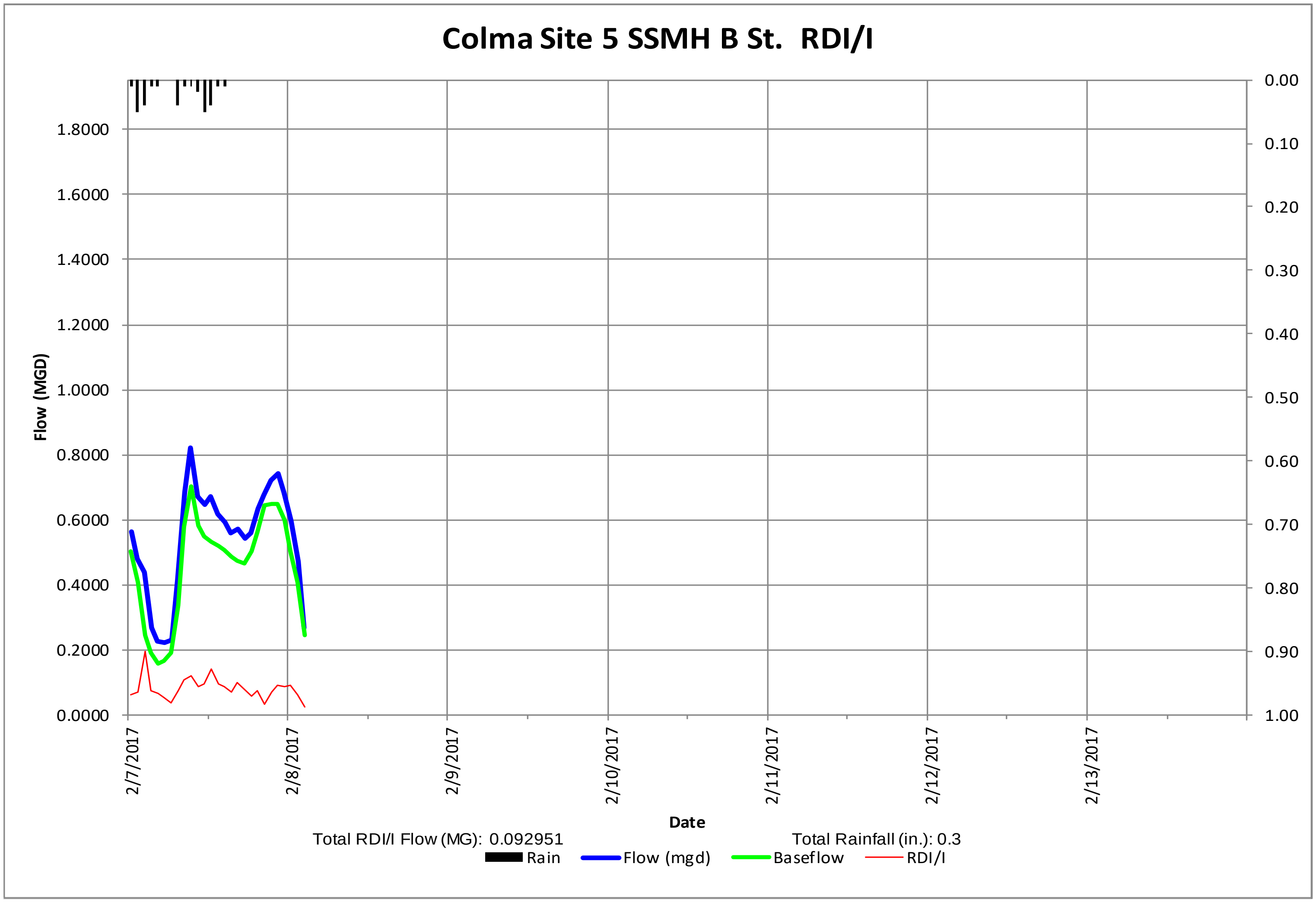
Storm of 2/4/2017



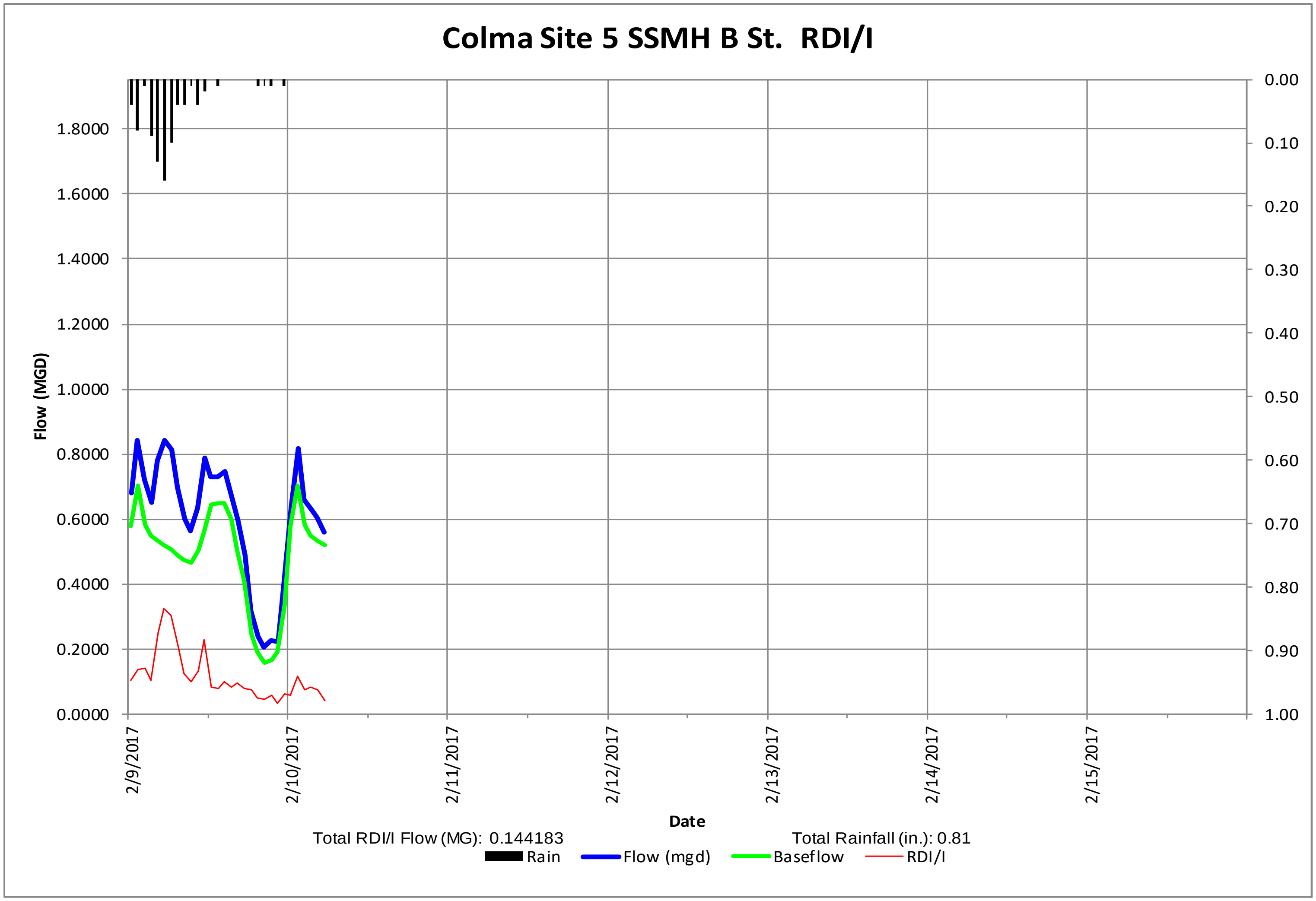
Storm of 2/5/2017



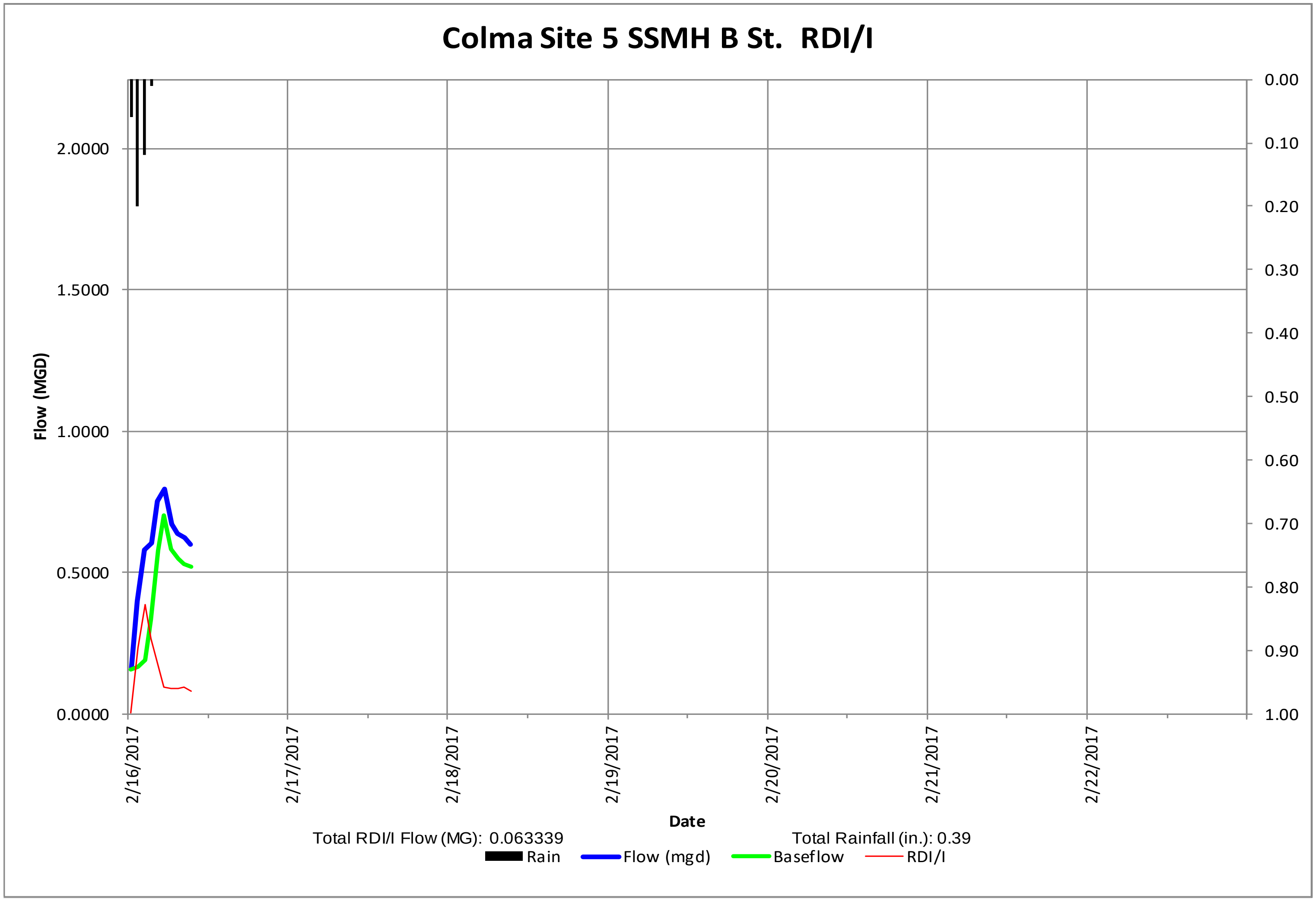
Storm of 2/6/2017



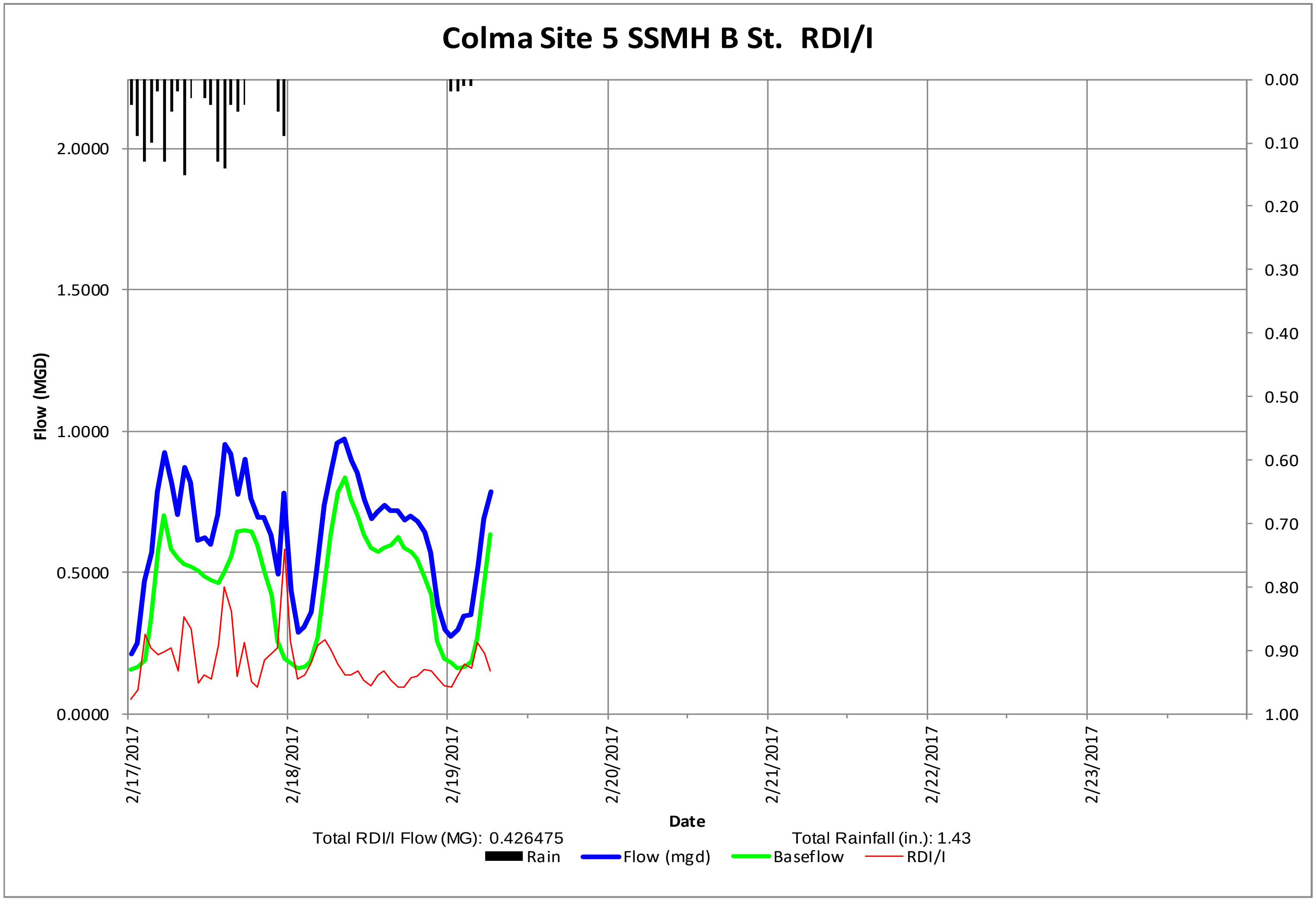
Storm of 2/7/2017



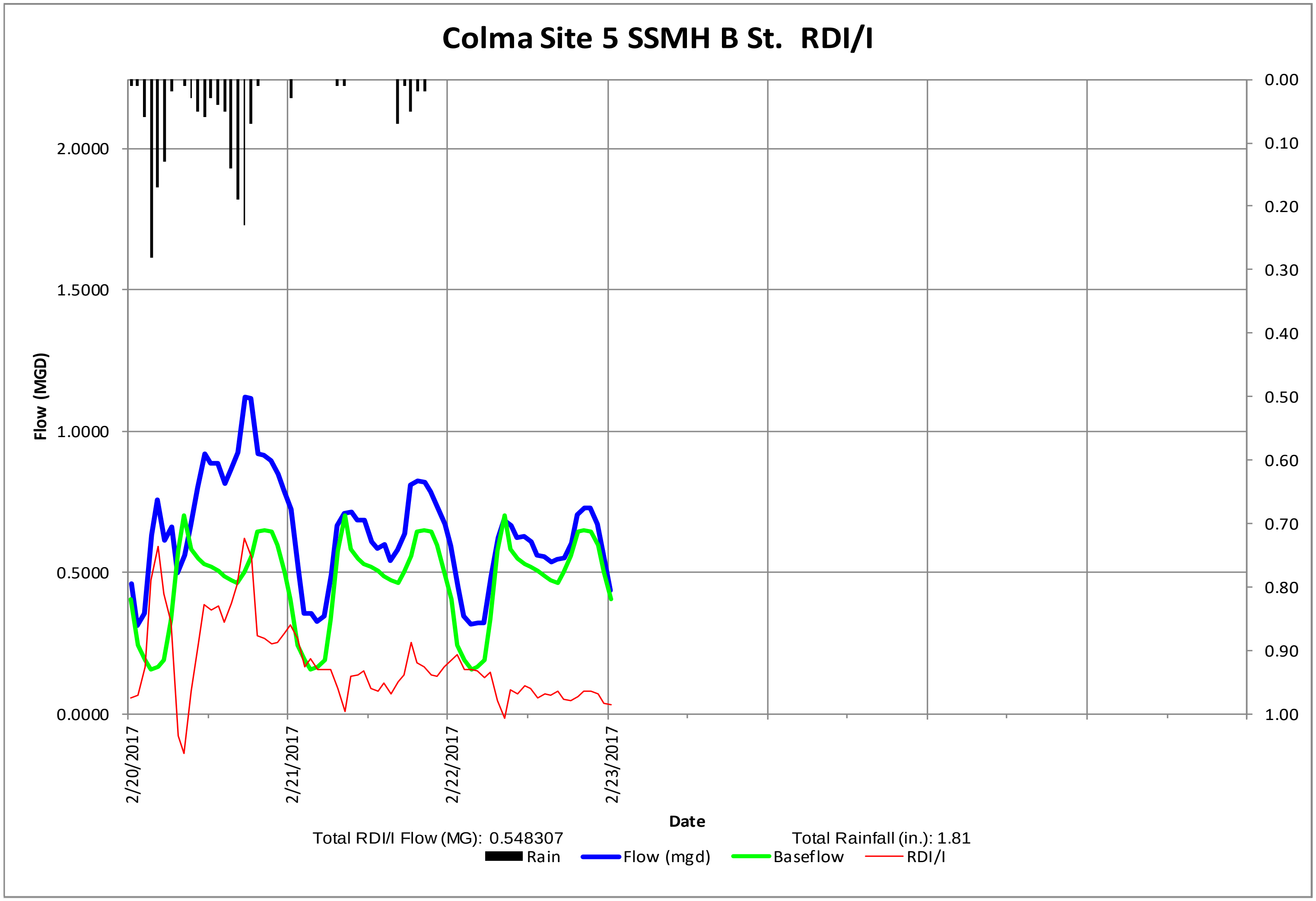
Storm of 2/9/2017



Storm of 2/16/2017



Storm of 2/17/2017



Storm of 2/20/2017

Site Information Report

Flow Monitor Site: 6

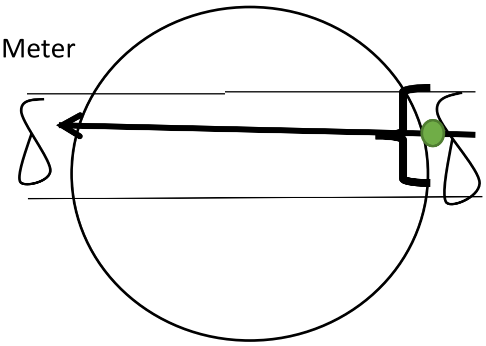
Manhole Number SSMH E07-39
Location: El Camino at Albert M Teglia Blvd.
MH Depth ~12'
Diameter: 12"
Safety: OK
Traffic: Medium
Gas: Ok
Rungs: Yes
Meter Type: Hach FL900 Submerged
Depth: Pressure 7"
Velocity: Doppler 2.25 ft./sec

Ariel View:

City Sewer Map:

Flow Sketch:

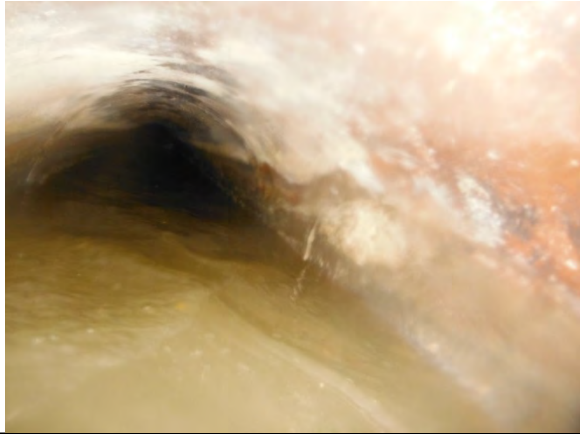
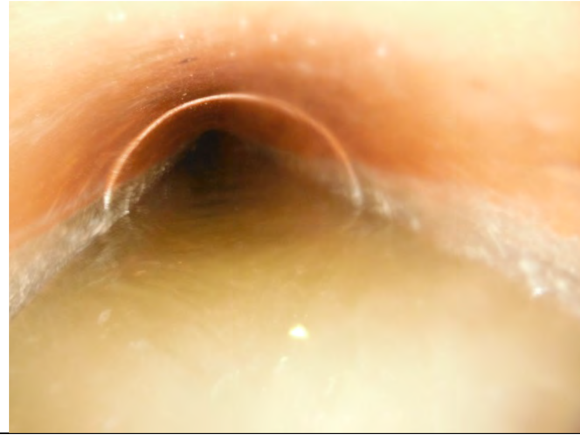
Flow Meter



12"-inch Pipes

Surface View:

Invert View:

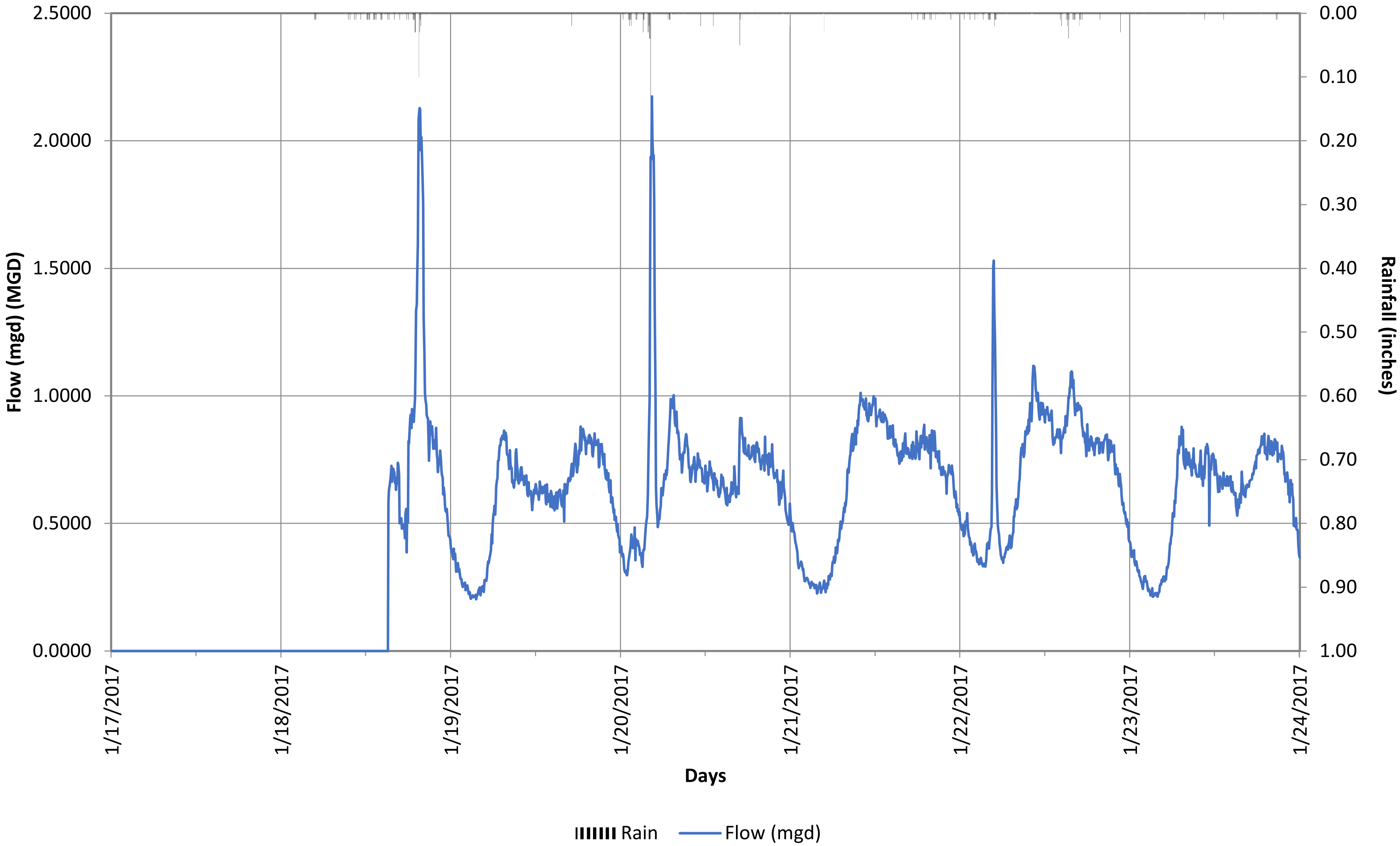
Outlet Pipe:	Inlet Pipe:
	

Colma Site 6 SSMH E07-39 12" Sanitary Flow

Daily Summary

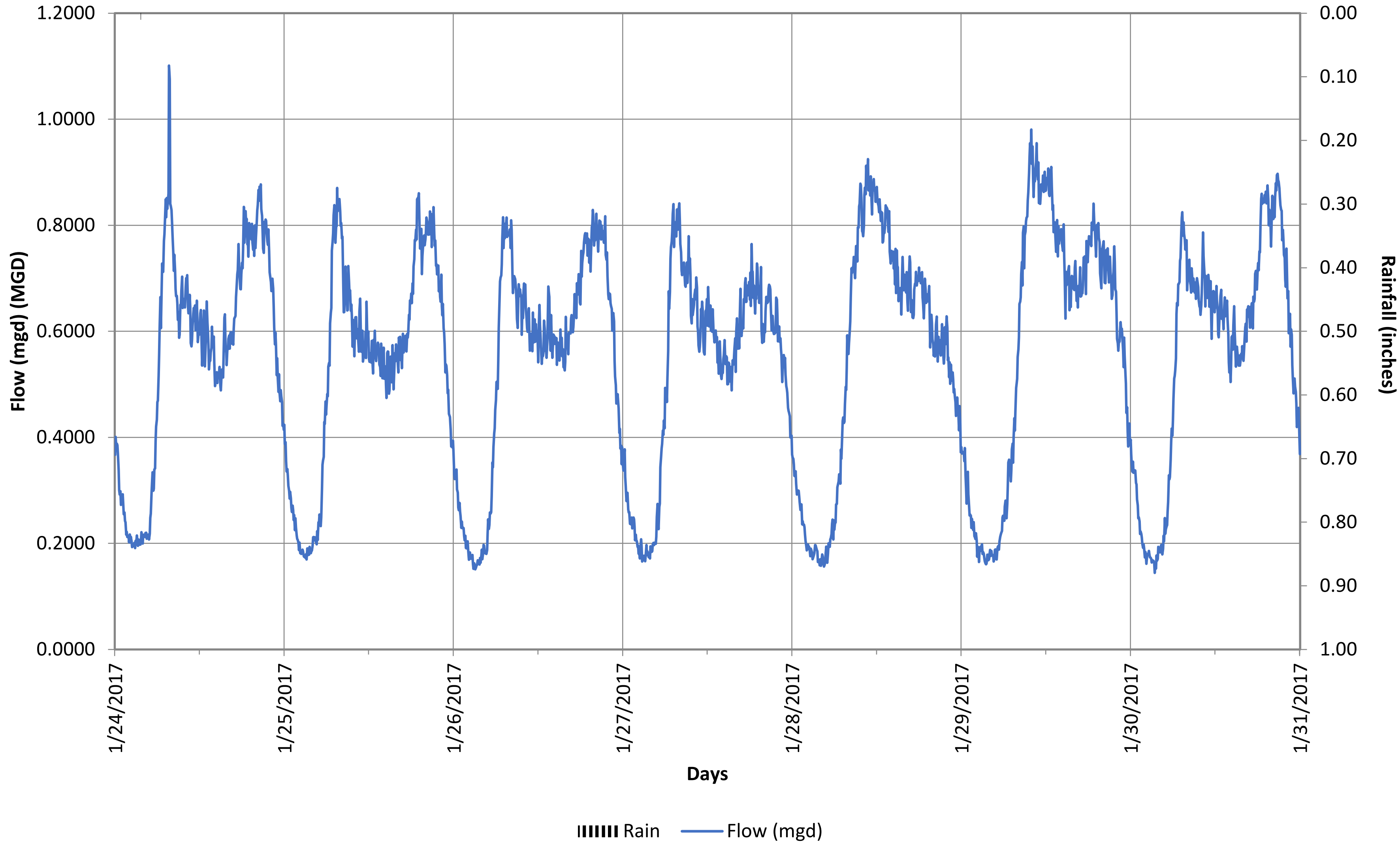
Day	Date	Avg Flow(MGD)	Min Flow(MGD)	Max Flow(MGD)	Max Depth(in.)	Rain(in.)
Tuesday	1/17/17	0.000	0.000	0.000	0.000	0.00
Wednesday	1/18/17	0.315	0.000	2.128	21.726	0.88
Thursday	1/19/17	0.585	0.203	0.880	8.118	0.02
Friday	1/20/17	0.700	0.297	2.174	20.203	1.13
Saturday	1/21/17	0.657	0.225	1.012	8.767	0.25
Sunday	1/22/17	0.720	0.331	1.530	11.947	1.00
Monday	1/23/17	0.598	0.212	0.878	8.395	0.18
Tuesday	1/24/17	0.561	0.191	1.101	9.765	0.01
Wednesday	1/25/17	0.539	0.170	0.870	7.966	0.00
Thursday	1/26/17	0.545	0.151	0.829	7.648	0.00
Friday	1/27/17	0.529	0.166	0.841	7.620	0.00
Saturday	1/28/17	0.547	0.156	0.925	8.093	0.00
Sunday	1/29/17	0.579	0.161	0.981	8.337	0.00
Monday	1/30/17	0.565	0.145	0.897	7.859	0.00
Tuesday	1/31/17	0.539	0.147	0.904	8.068	0.00
Wednesday	2/1/17	0.531	0.132	0.844	7.744	0.01
Thursday	2/2/17	0.571	0.167	0.884	7.976	0.19
Friday	2/3/17	0.634	0.179	1.235	10.524	0.51
Saturday	2/4/17	0.611	0.192	1.068	9.656	0.37
Sunday	2/5/17	0.592	0.163	0.944	8.677	0.15
Monday	2/6/17	0.602	0.177	1.017	9.110	0.50
Tuesday	2/7/17	0.658	0.232	1.120	10.057	0.86
Wednesday	2/8/17	0.607	0.218	0.893	8.393	0.26
Thursday	2/9/17	0.636	0.181	1.063	9.547	0.77
Friday	2/10/17	0.551	0.200	0.907	8.226	0.04
Saturday	2/11/17	0.593	0.172	0.955	8.662	0.00
Sunday	2/12/17	0.589	0.168	1.015	8.916	0.00
Monday	2/13/17	0.556	0.151	0.888	8.078	0.00
Tuesday	2/14/17	0.561	0.163	0.879	8.285	0.00
Wednesday	2/15/17	0.550	0.161	0.858	8.365	0.00
Thursday	2/16/17	0.584	0.155	0.905	8.172	0.39
Friday	2/17/17	0.703	0.183	1.195	10.162	1.23
Saturday	2/18/17	0.609	0.209	1.008	8.913	0.14
Sunday	2/19/17	0.542	0.202	0.873	8.403	0.08
Monday	2/20/17	0.758	0.272	1.419	11.849	1.61
Tuesday	2/21/17	0.614	0.230	0.892	8.133	0.19
Wednesday	2/22/17	0.584	0.198	0.878	7.986	0.00

Colma Site 6 SSMH E07-39 12" Sanitary Flow



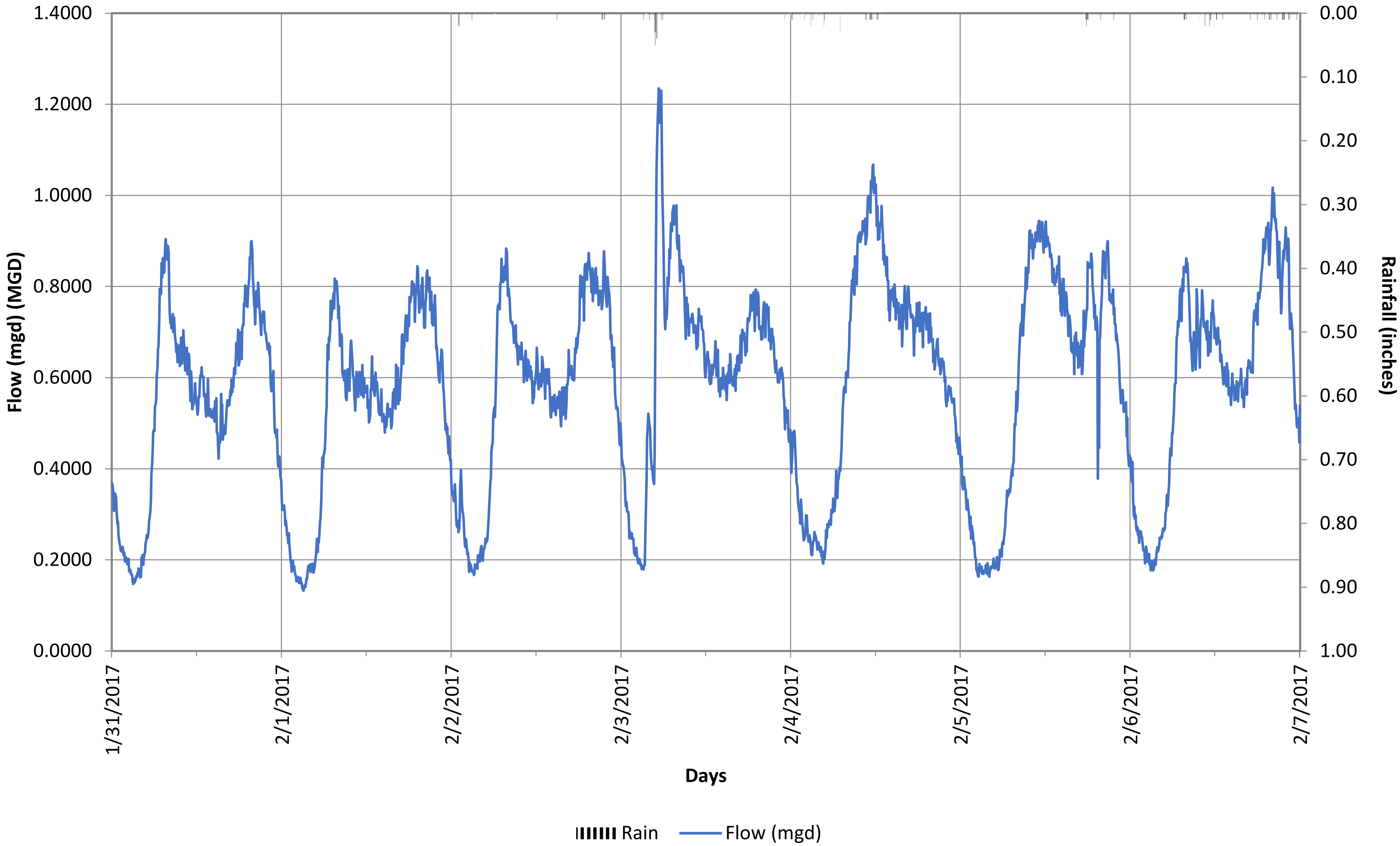
	1/17/2017(Tue)	1/18/2017(Wed)	1/19/2017(Thu)	1/20/2017(Fri)	1/21/2017(Sat)	1/22/2017(Sun)	1/23/2017(Mon)
Maximum	0.000	2.128	0.880	2.174	1.012	1.530	0.878
Average	0.000	0.315	0.585	0.700	0.657	0.720	0.598
Minimum	0.000	0.000	0.203	0.297	0.225	0.331	0.212
Rain (inches)	0.00	0.88	0.02	1.13	0.25	1.00	0.18

Colma Site 6 SSMH E07-39 12" Sanitary Flow



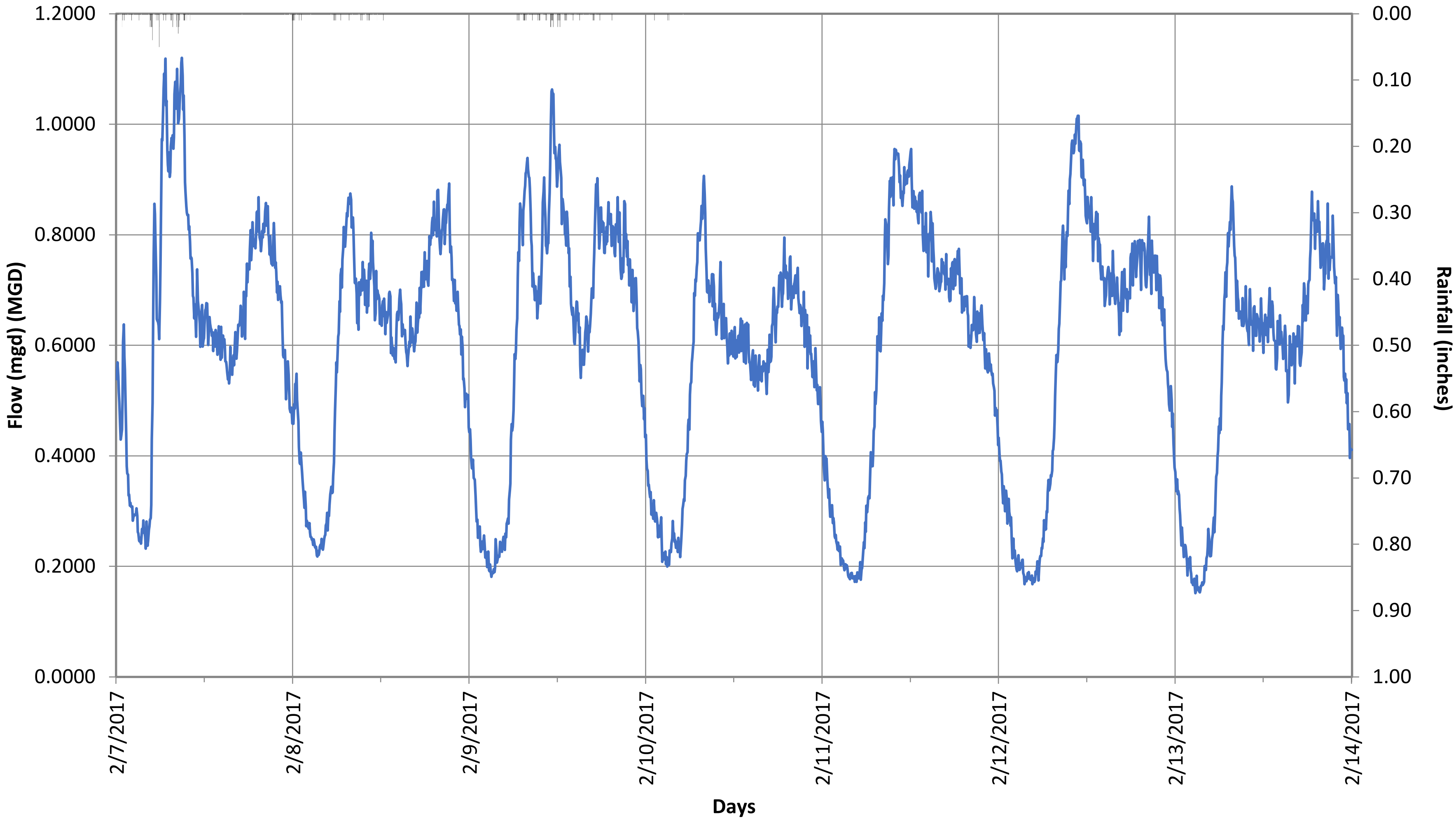
	1/24/2017(Tue)	1/25/2017(Wed)	1/26/2017(Thu)	1/27/2017(Fri)	1/28/2017(Sat)	1/29/2017(Sun)	1/30/2017(Mon)
Maximum	1.101	0.870	0.829	0.841	0.925	0.981	0.897
Average	0.561	0.539	0.545	0.529	0.547	0.579	0.565
Minimum	0.191	0.170	0.151	0.166	0.156	0.161	0.145
Rain (inches)	0.01	0.00	0.00	0.00	0.00	0.00	0.00

Colma Site 6 SSMH E07-39 12" Sanitary Flow



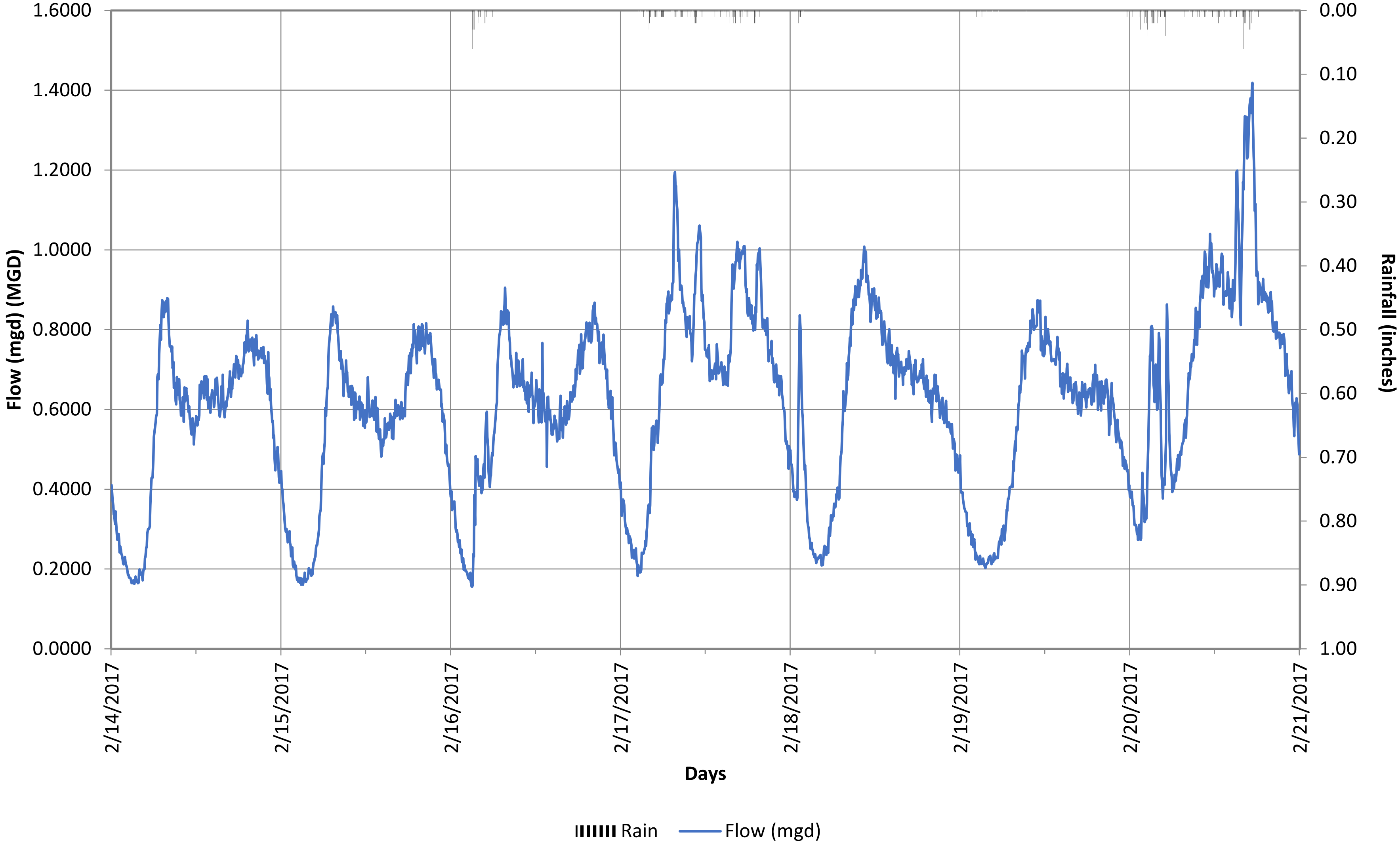
	1/31/2017(Tue)	2/1/2017(Wed)	2/2/2017(Thu)	2/3/2017(Fri)	2/4/2017(Sat)	2/5/2017(Sun)	2/6/2017(Mon)
Maximum	0.904	0.844	0.884	1.235	1.068	0.944	1.017
Average	0.539	0.531	0.571	0.634	0.611	0.592	0.602
Minimum	0.147	0.132	0.167	0.179	0.192	0.163	0.177
Rain (inches)	0.00	0.01	0.19	0.51	0.37	0.15	0.50

Colma Site 6 SSMH E07-39 12" Sanitary Flow



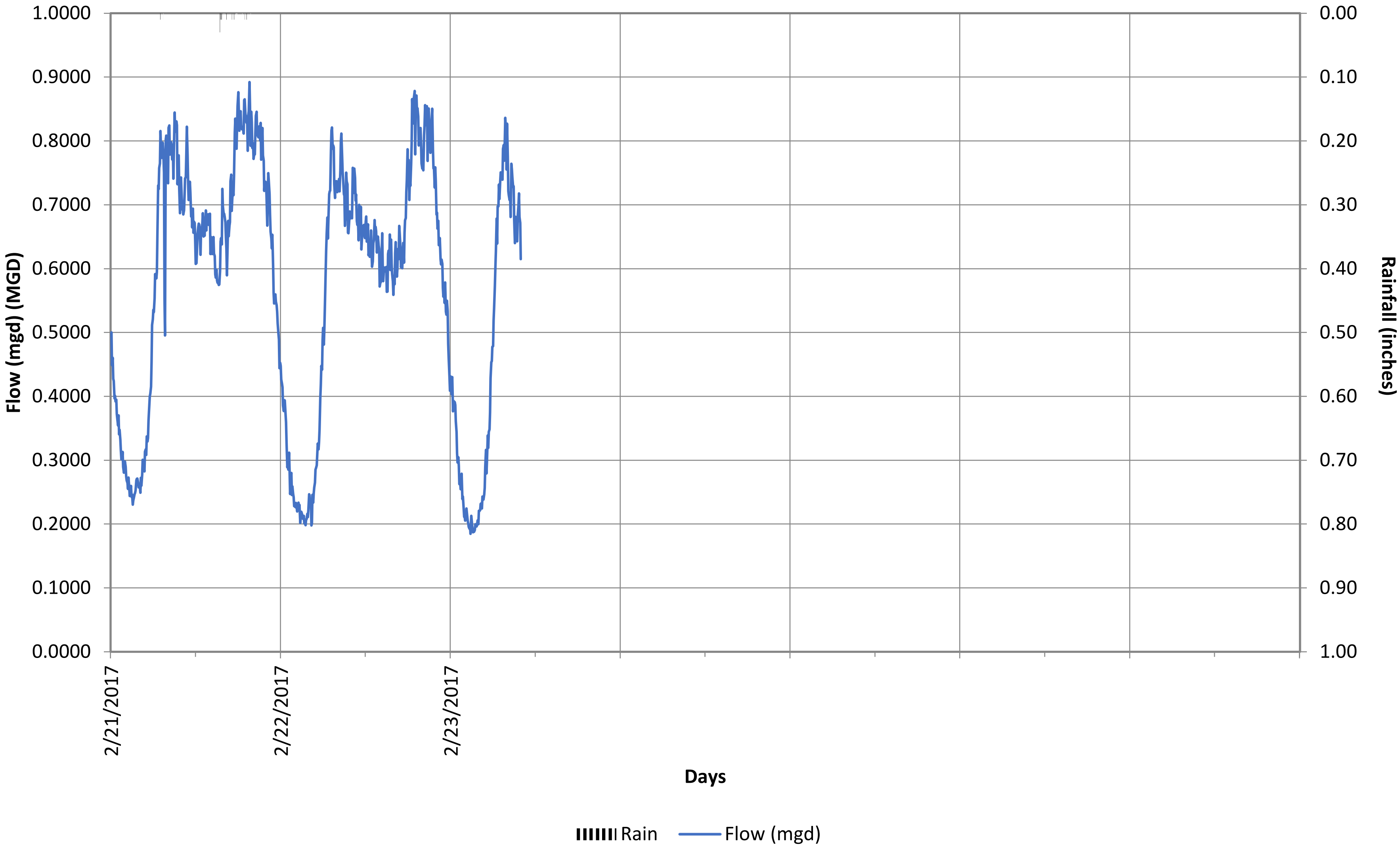
	2/7/2017(Tue)	2/8/2017(Wed)	2/9/2017(Thu)	2/10/2017(Fri)	2/11/2017(Sat)	2/12/2017(Sun)	2/13/2017(Mon)
Maximum	1.120	0.893	1.063	0.907	0.955	1.015	0.888
Average	0.658	0.607	0.636	0.551	0.593	0.589	0.556
Minimum	0.232	0.218	0.181	0.200	0.172	0.168	0.151
Rain (inches)	0.86	0.26	0.77	0.04	0.00	0.00	0.00

Colma Site 6 SSMH E07-39 12" Sanitary Flow



	2/14/2017(Tue)	2/15/2017(Wed)	2/16/2017(Thu)	2/17/2017(Fri)	2/18/2017(Sat)	2/19/2017(Sun)	2/20/2017(Mon)
Maximum	0.879	0.858	0.905	1.195	1.008	0.873	1.419
Average	0.561	0.550	0.584	0.703	0.609	0.542	0.758
Minimum	0.163	0.161	0.155	0.183	0.209	0.202	0.272
Rain (inches)	0.00	0.00	0.39	1.23	0.14	0.08	1.61

Colma Site 6 SSMH E07-39 12" Sanitary Flow

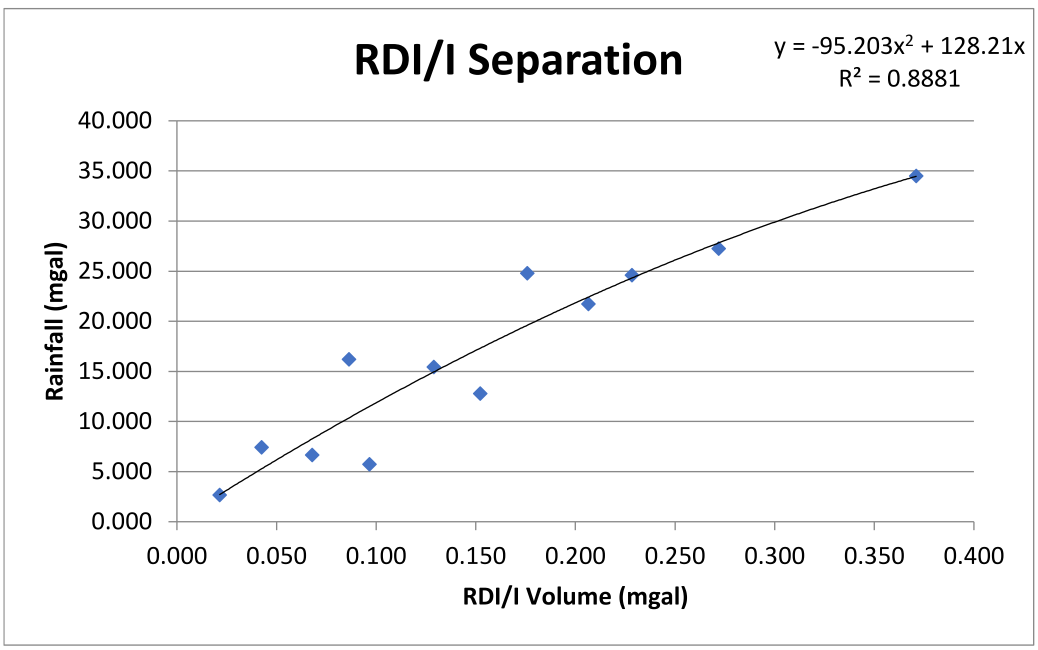


	2/21/2017(Tue)	2/22/2017(Wed)					
Maximum	0.892	0.878					
Average	0.614	0.584					
Minimum	0.230	0.198					
Rain (inches)	0.19	0.00					

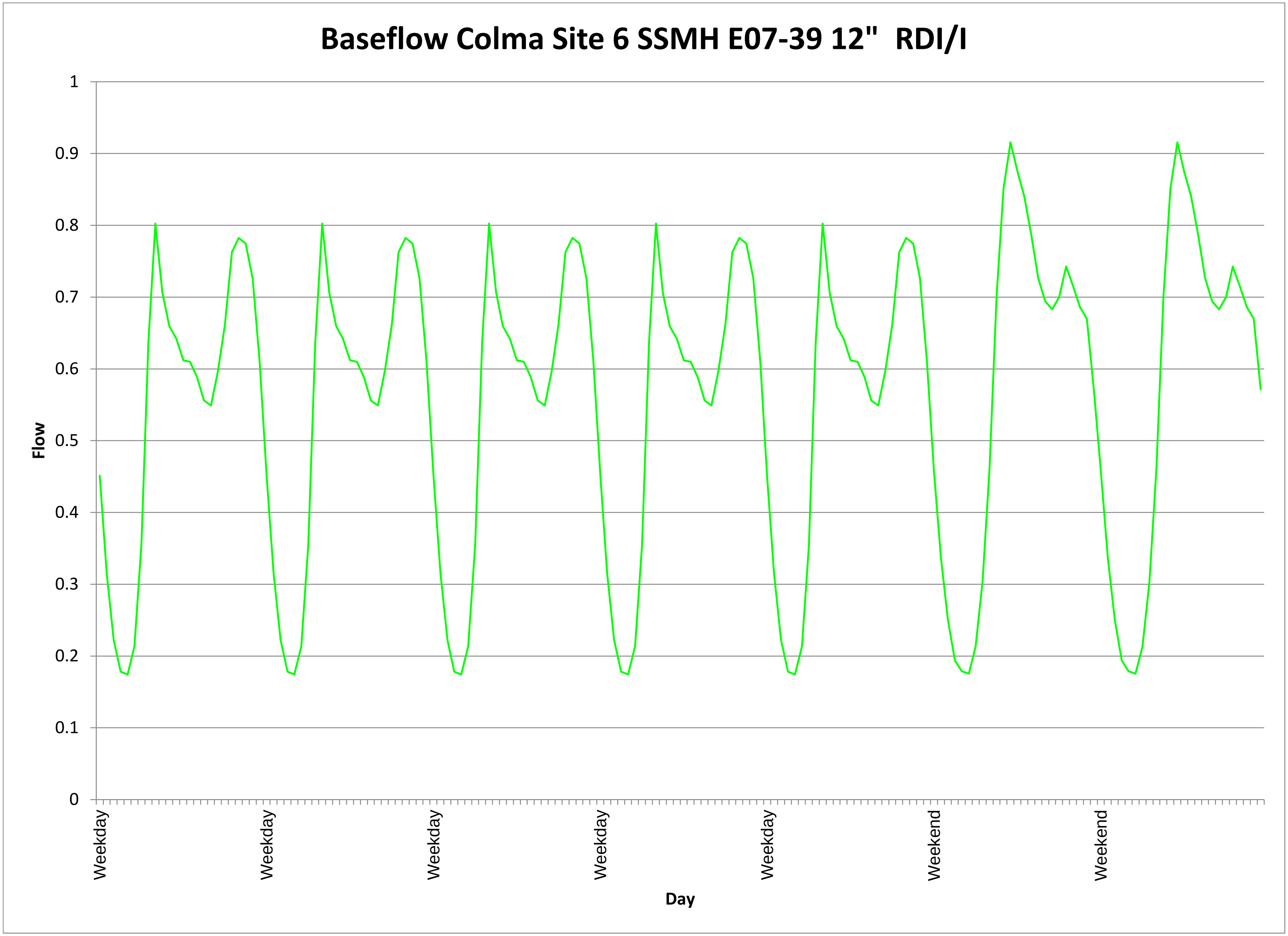
Colma Site 6 SSMH E07-39 12" RDI/I

RDI/I Analysis, Monitor Return Ratio Summary

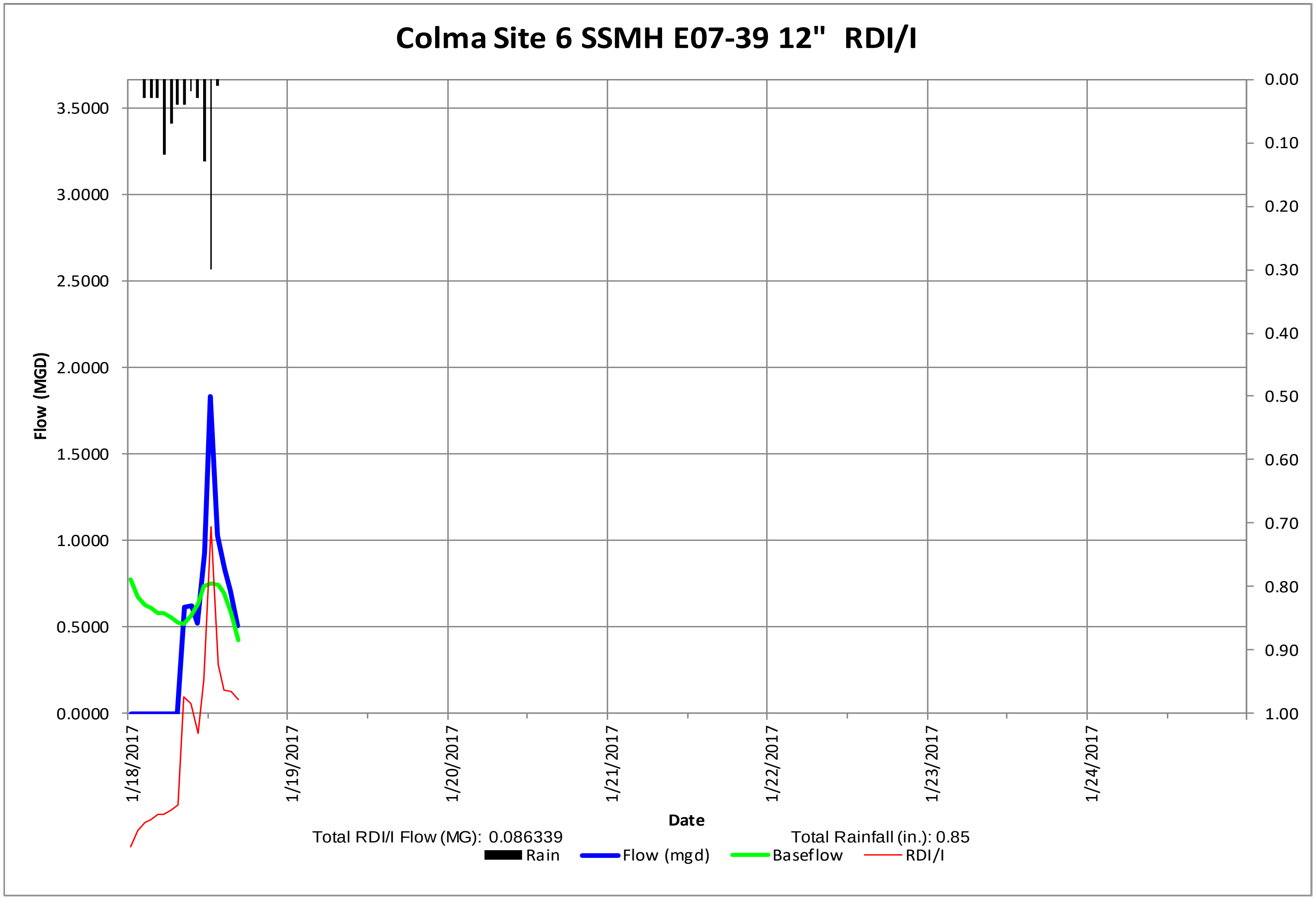
Storm Start (Date)	RDI/I Volume (mgal)	Monitor Area (acres)	Rainfall (mgal)	Return Ratio (%)
1/18/2017	0.086	702.2	16.206	0.53%
1/20/2017	0.207	702.2	21.736	0.95%
1/21/2017	0.228	702.2	24.596	0.93%
2/2/2017	0.152	702.2	12.774	1.19%
2/4/2017	0.068	702.2	6.673	1.02%
2/5/2017	0.021	702.2	2.669	0.80%
2/6/2017	0.176	702.2	24.786	0.71%
2/7/2017	0.097	702.2	5.720	1.69%
2/9/2017	0.129	702.2	15.444	0.84%
2/16/2017	0.043	702.2	7.436	0.57%
2/17/2017	0.272	702.2	27.265	1.00%
2/20/2017	0.371	702.2	34.510	1.08%
Average R%				0.94%
Average Top 3 Storms				1.32%



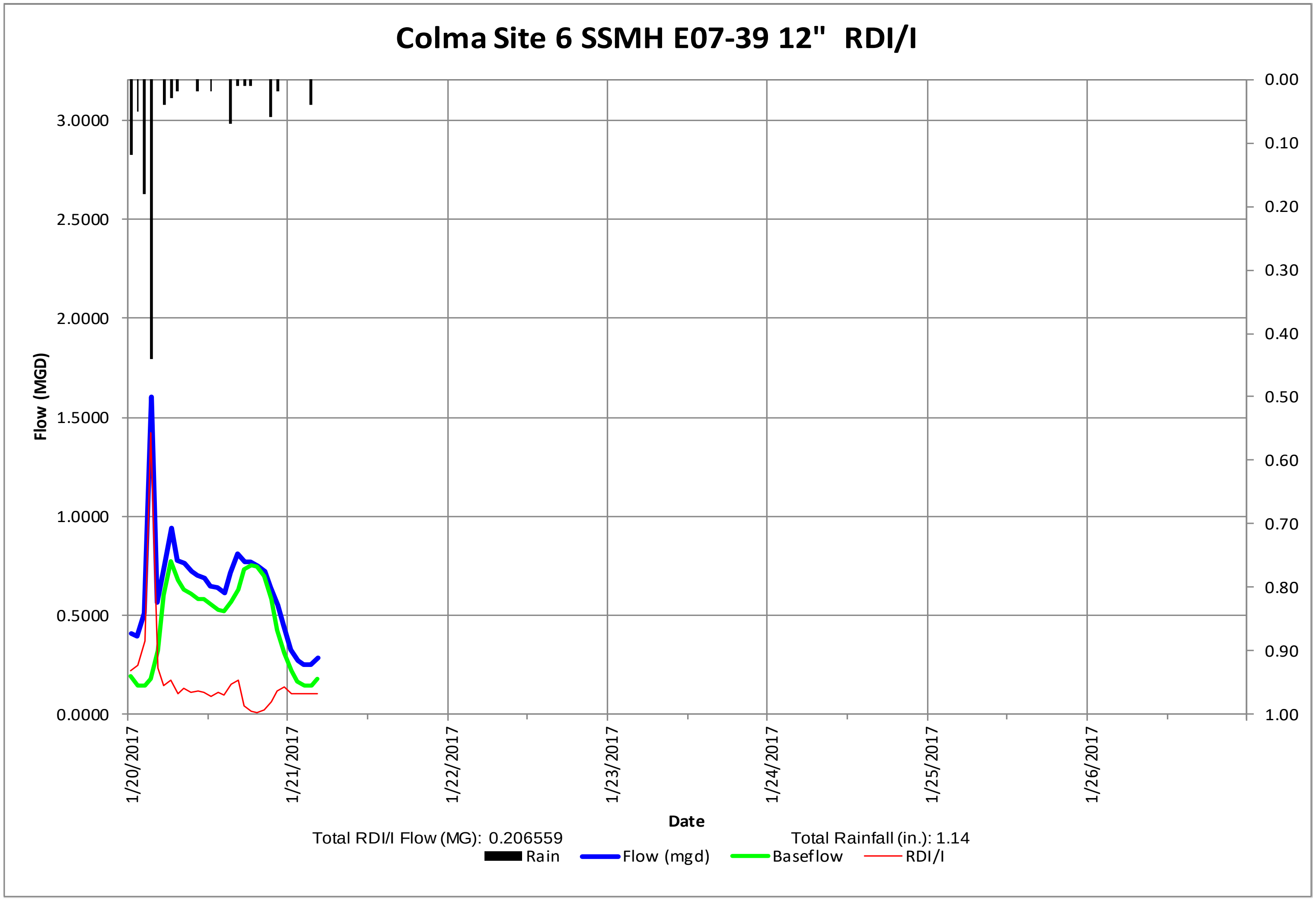
Baseflows	Weekend	Weekday
Max	0.916	0.802
Avg	0.572	0.549
Min	0.176	0.174



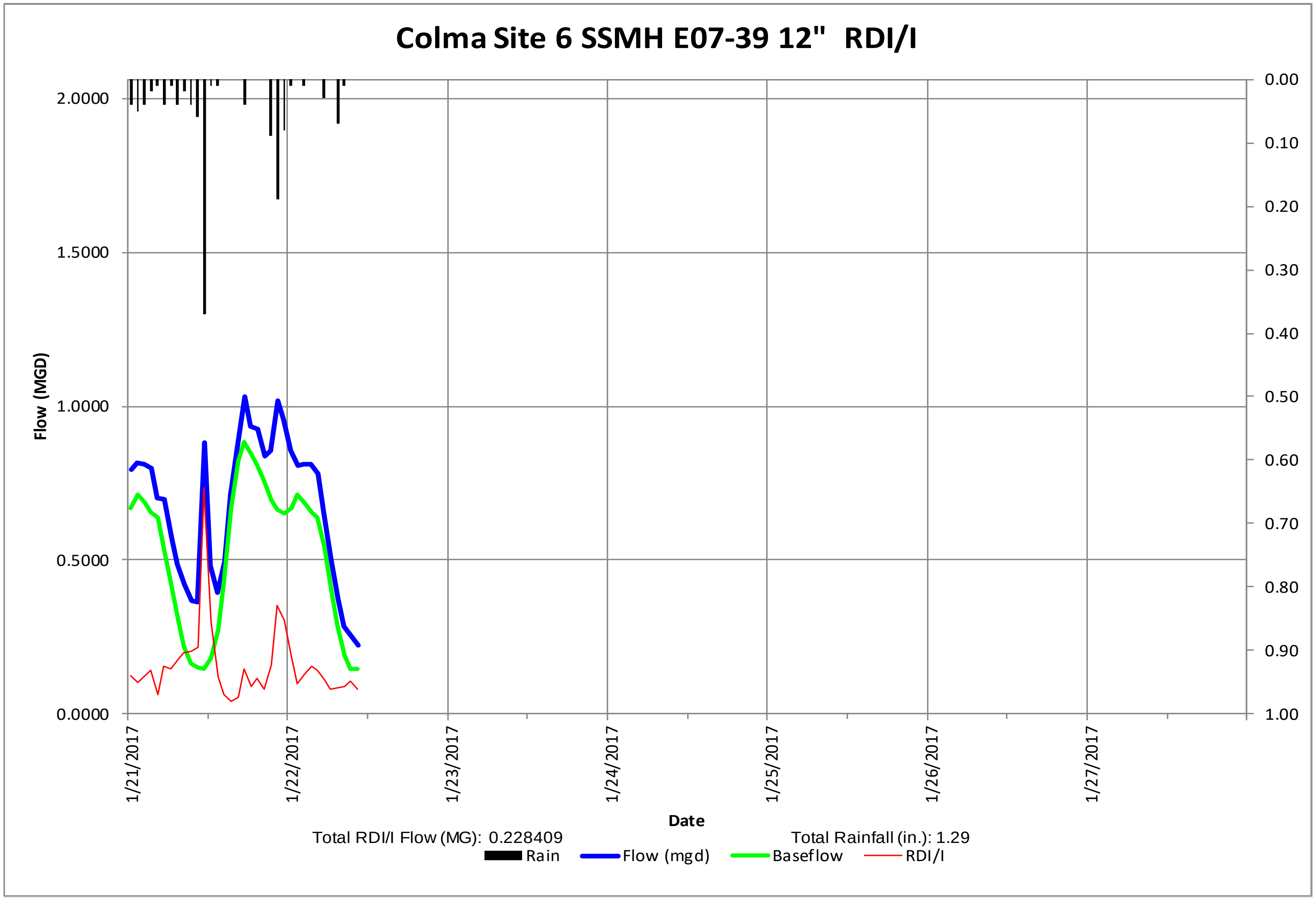
Baseflow Colma Site 6 SSMH E07-39 12" RDI/I
Flow
Day
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Weekday
Weekday
Weekday
Weekday
Weekday
Weekend
Weekend



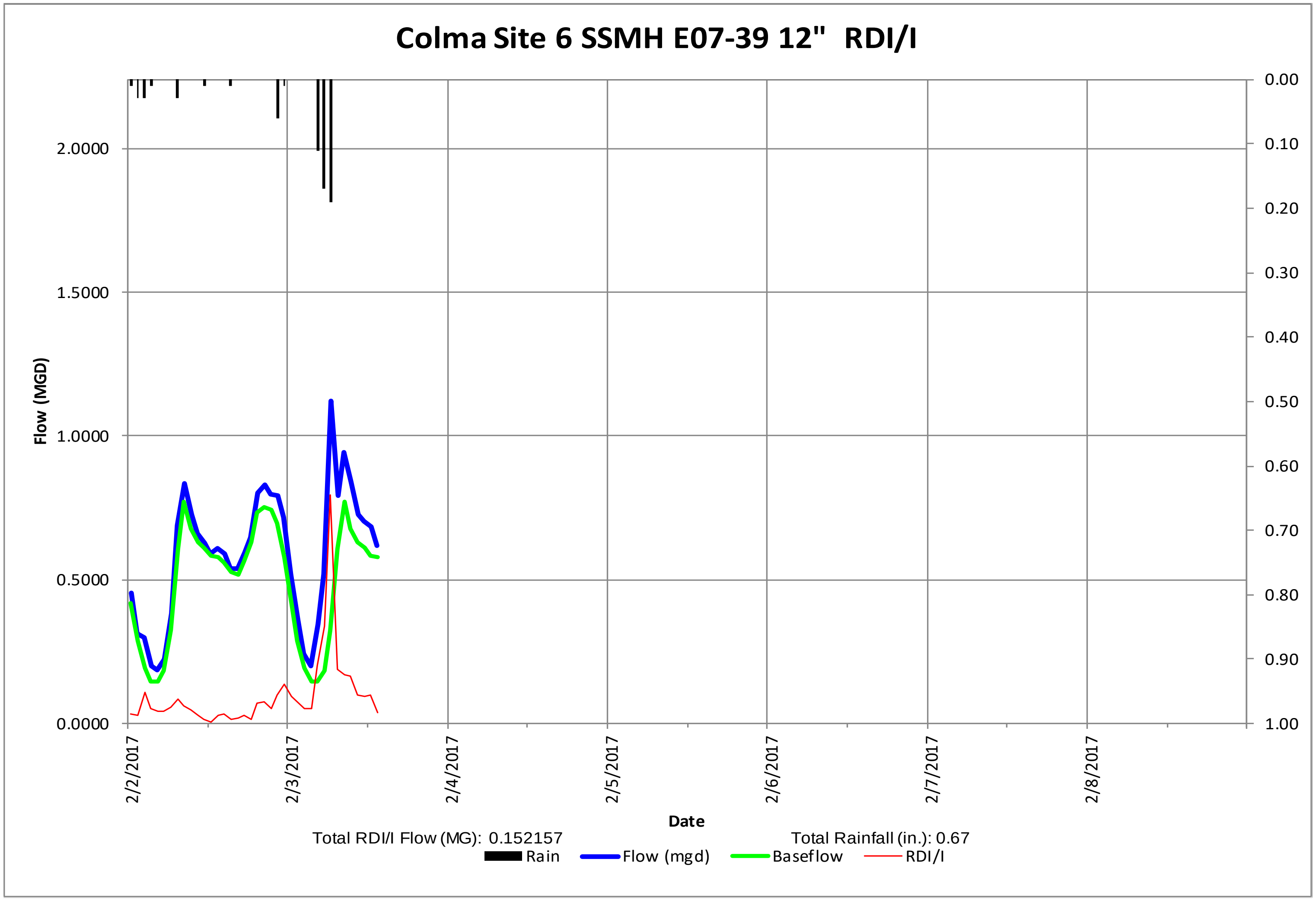
Storm of 1/18/2017



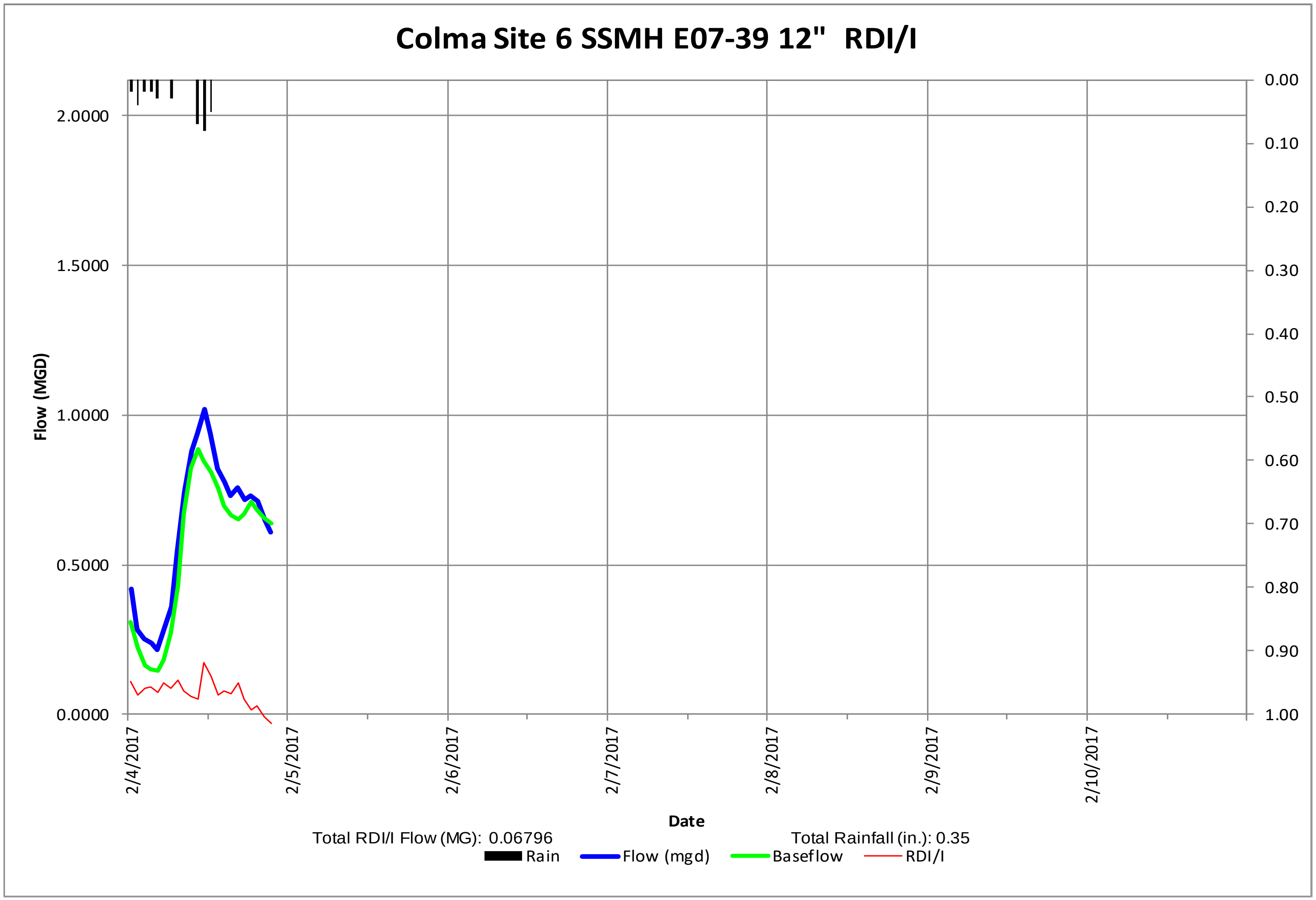
Storm of 1/20/2017



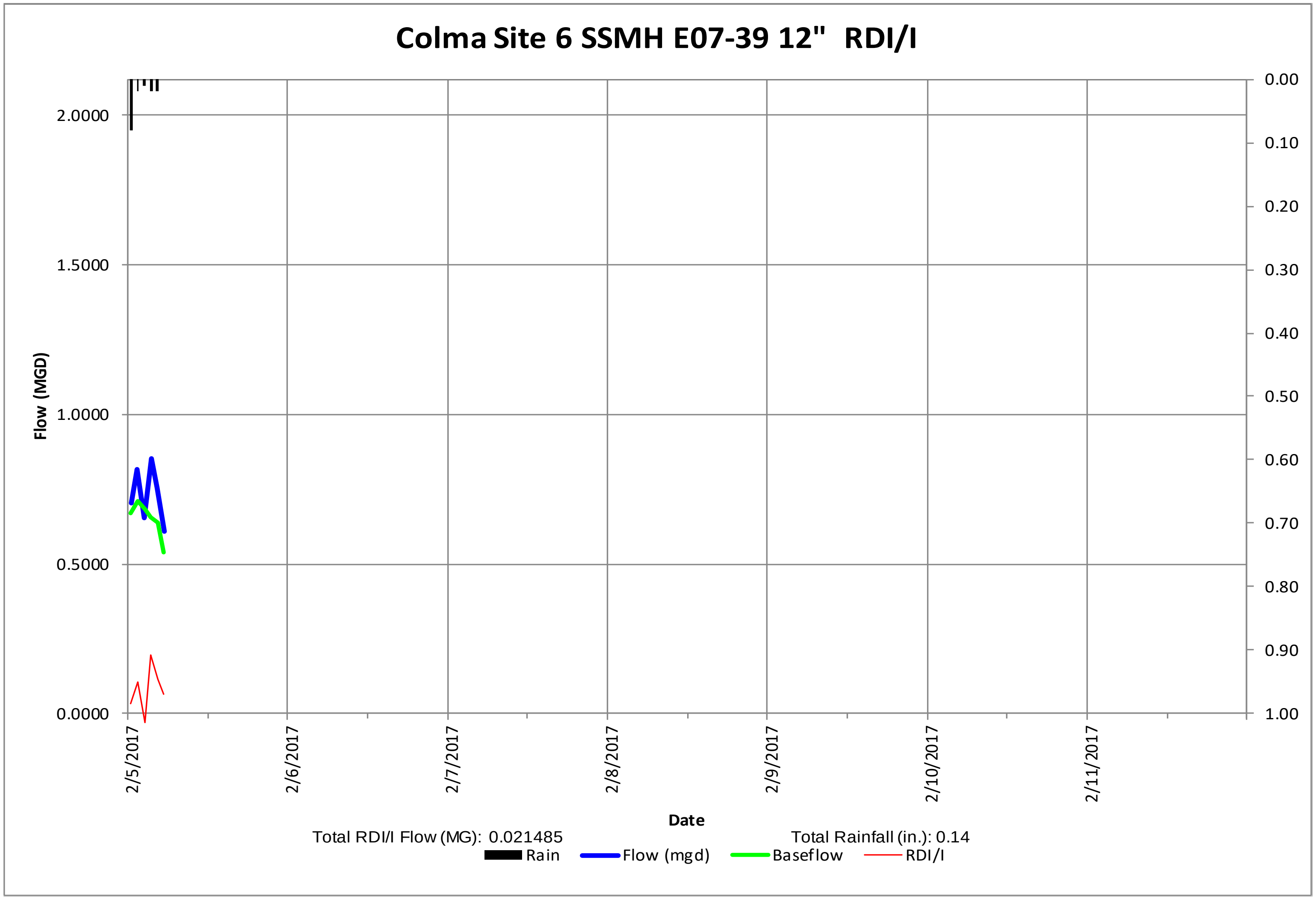
Storm of 1/21/2017



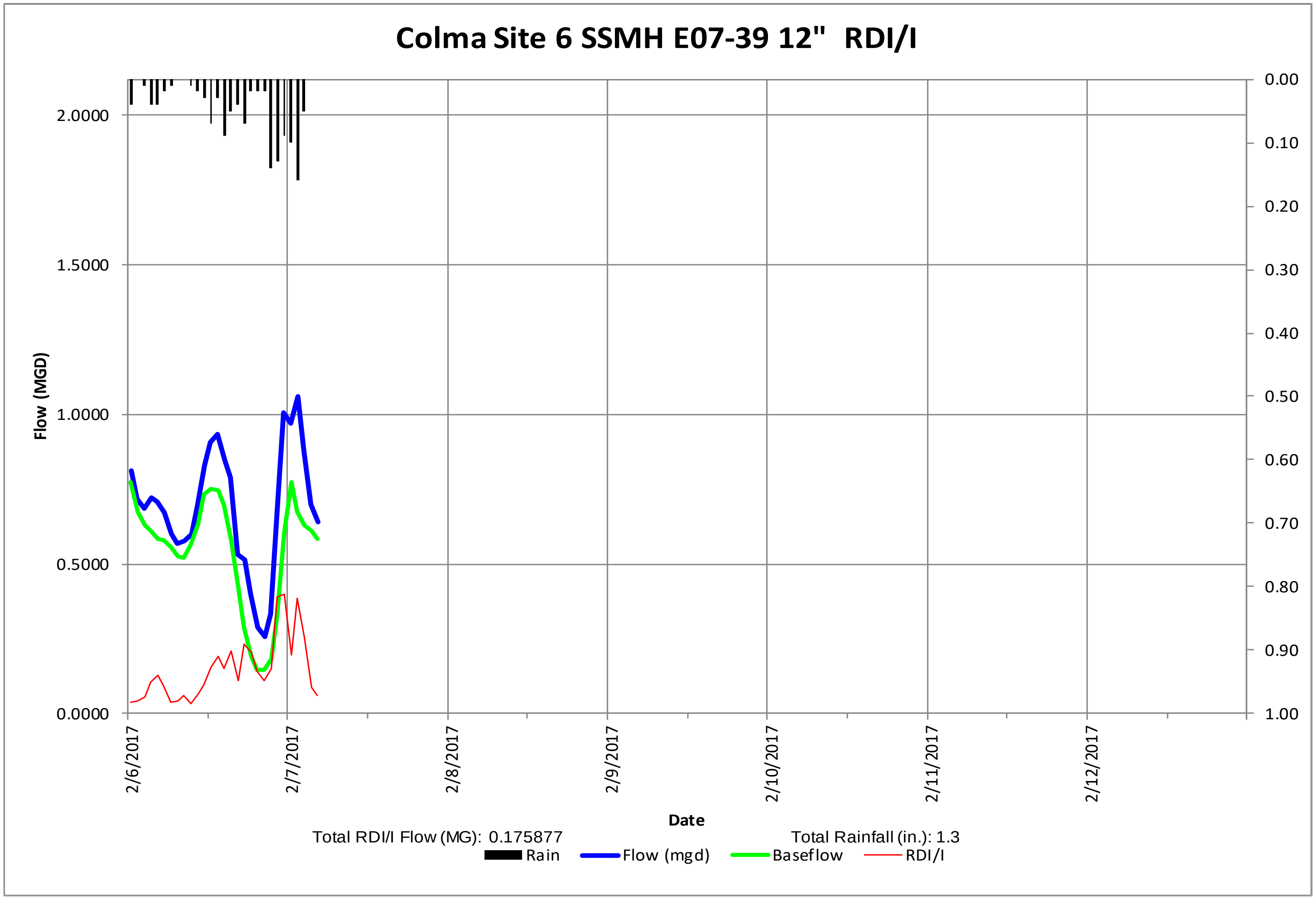
Storm of 2/2/2017



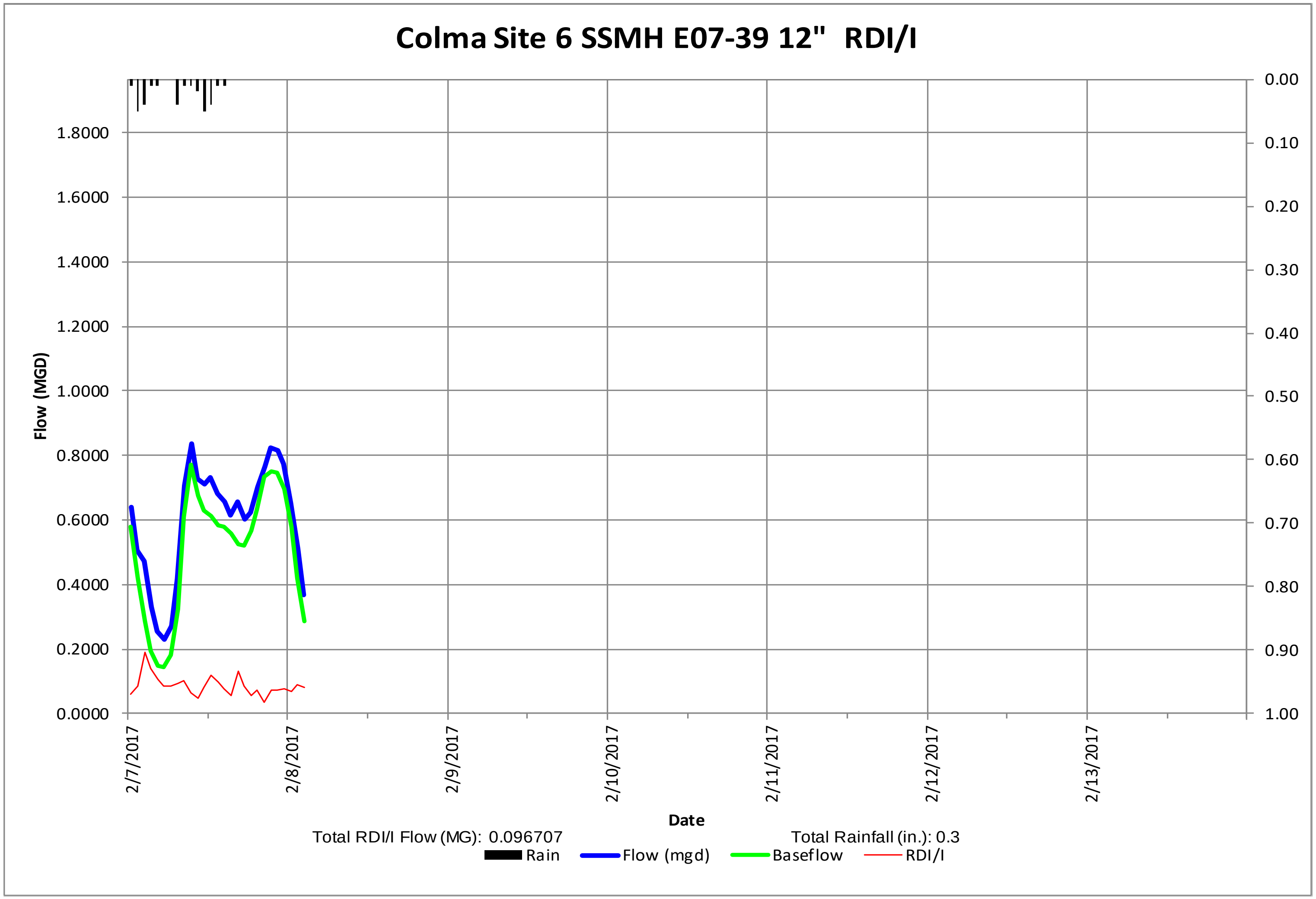
Storm of 2/4/2017



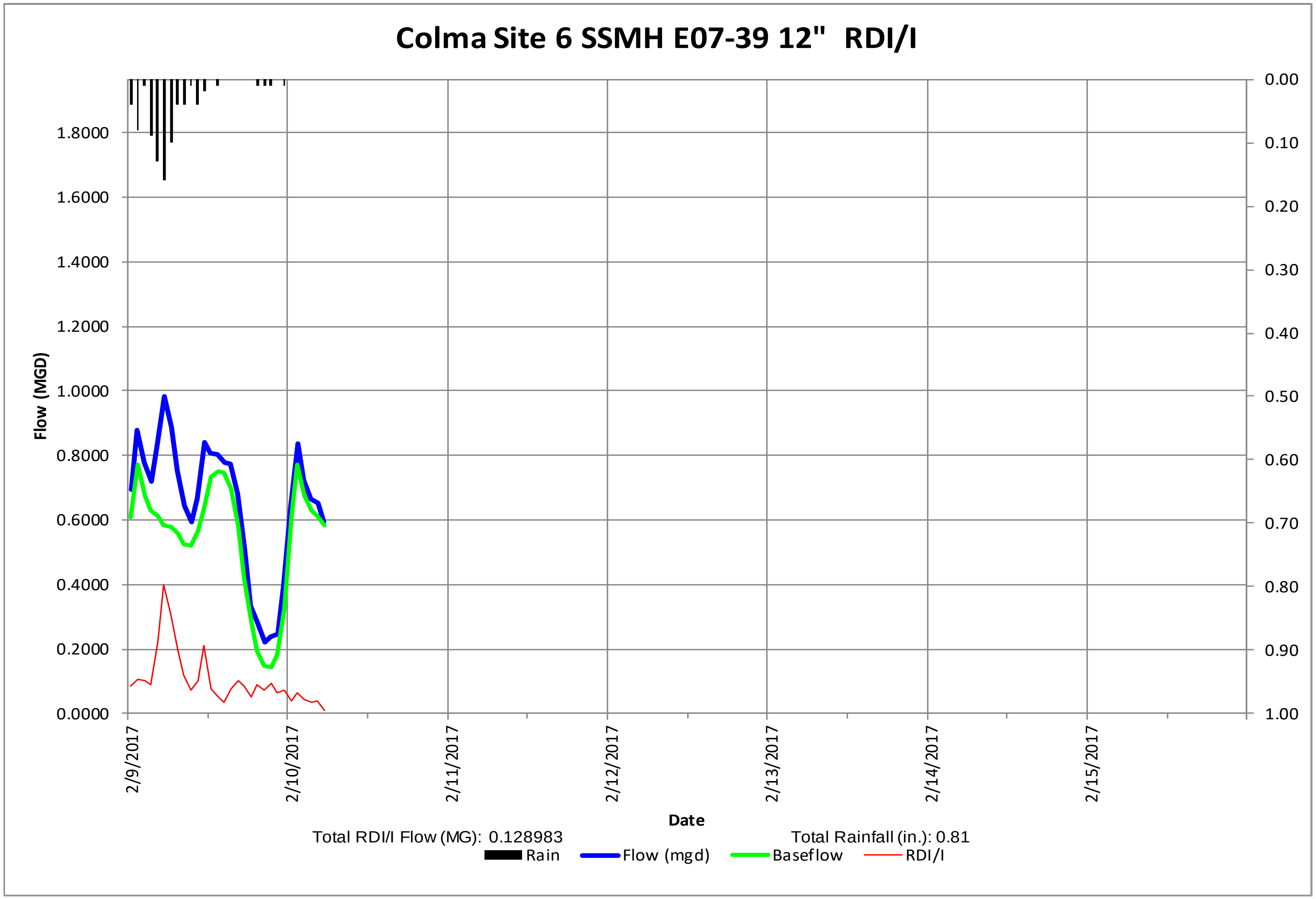
Storm of 2/5/2017



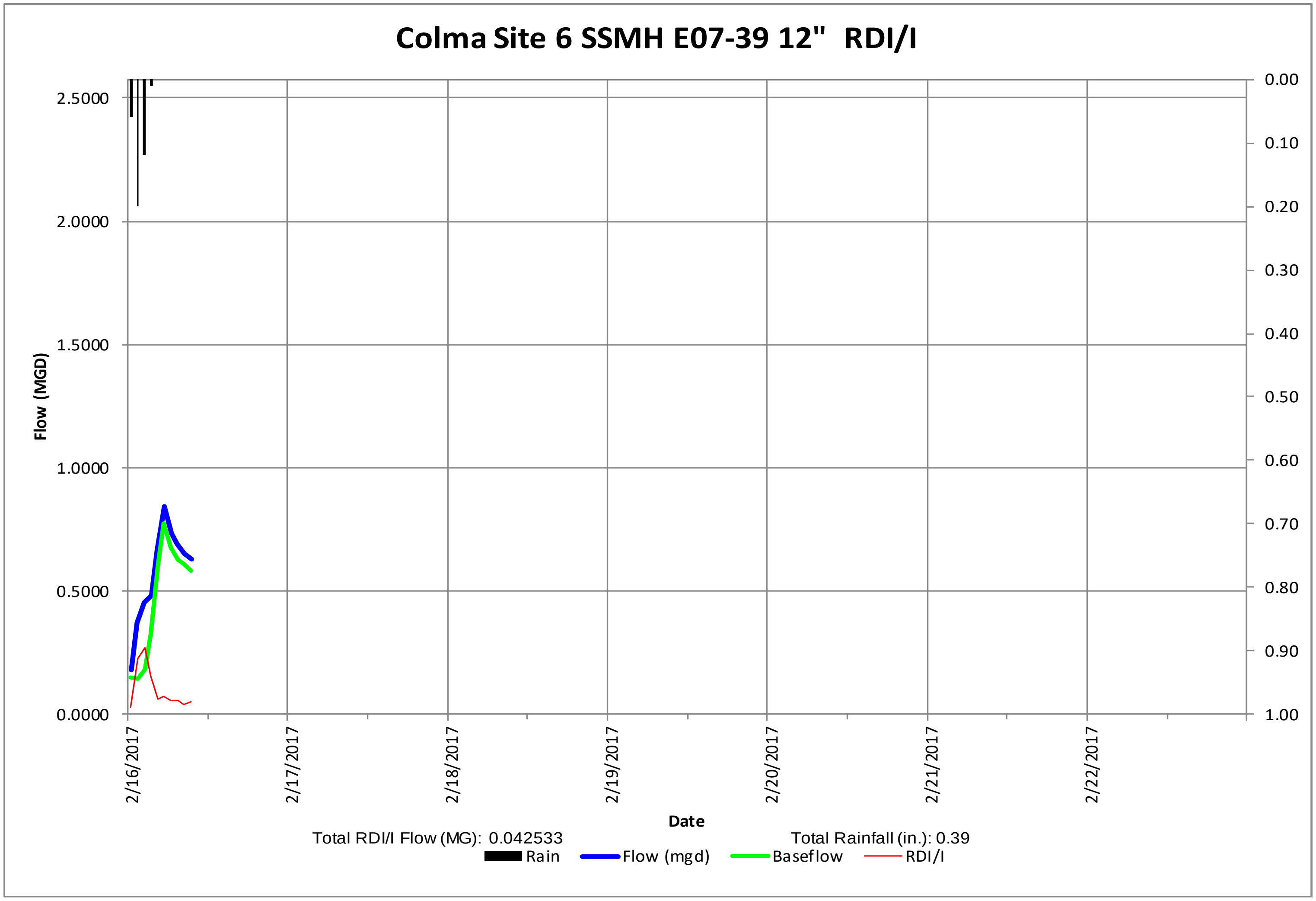
Storm of 2/6/2017



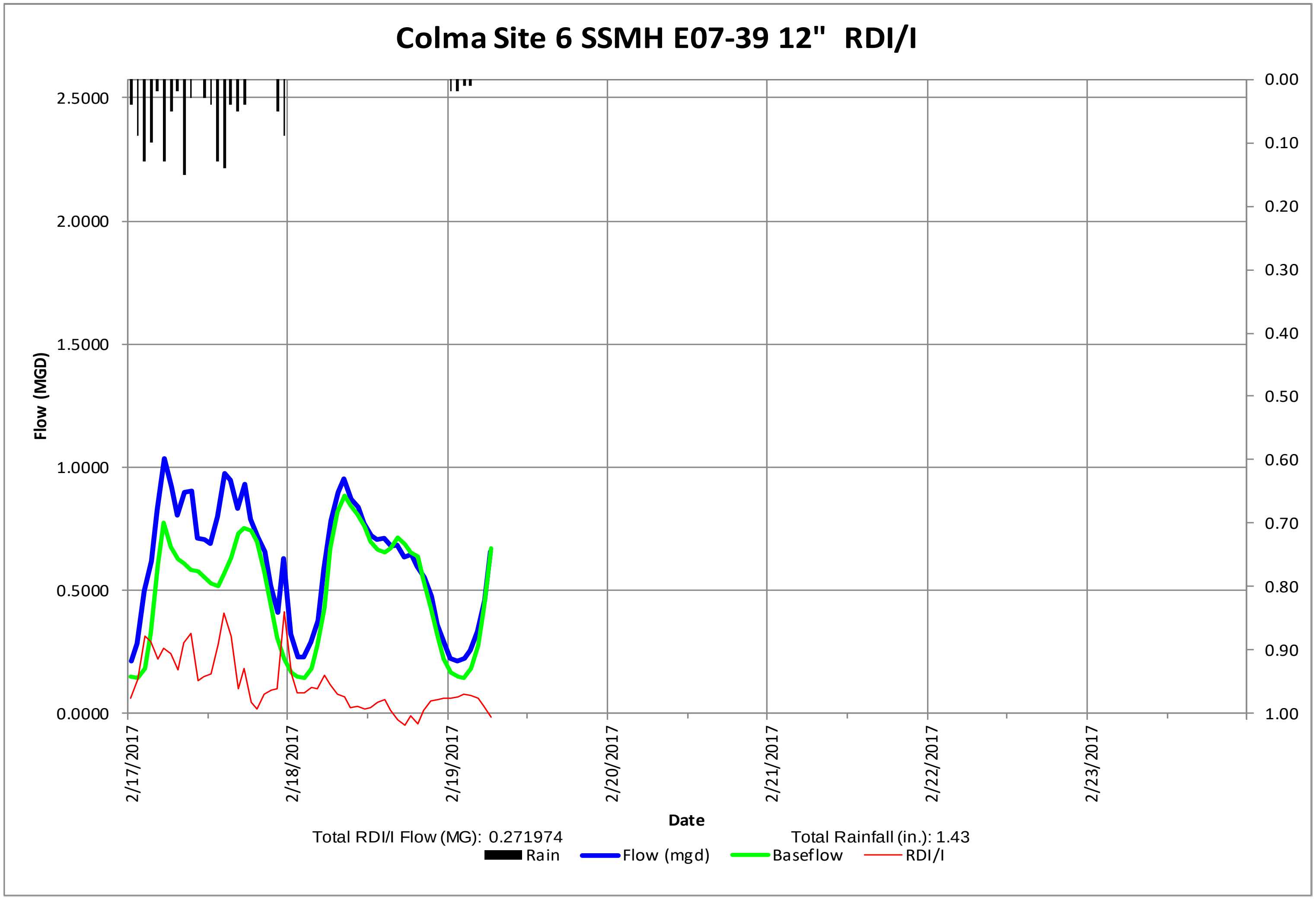
Storm of 2/7/2017



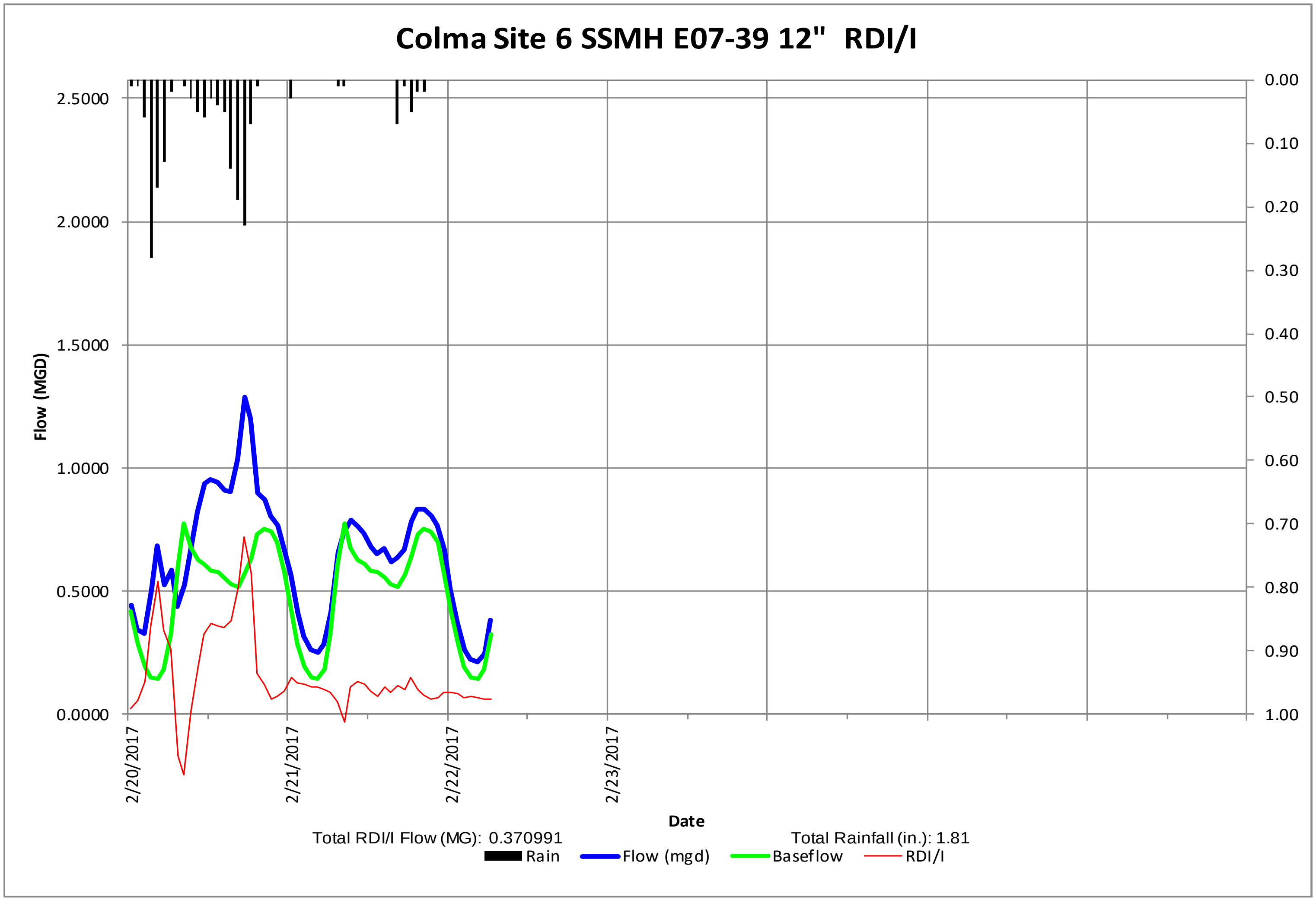
Storm of 2/9/2017



Storm of 2/16/2017



Storm of 2/17/2017



Storm of 2/20/2017

Site Information Report

Flow Monitor Site: 7

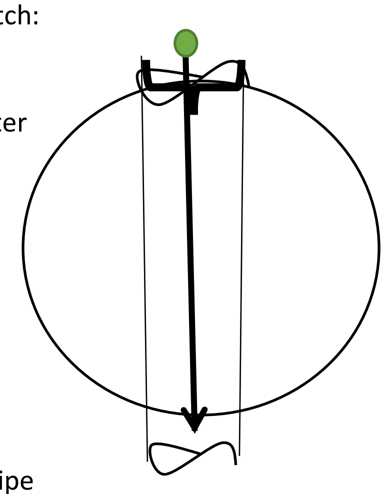
Manhole Number SSMH 8E14
Location: El Camino South of Colma Blvd on side rd.
MH Depth ~8’
Diameter: 8”
Safety: Ok
Traffic: Light
Gas: Ok
Rungs no
Meter Type: Hach FL900 Submerge
Depth: Pressure 1”
Velocity: Doppler 1.5 ft./sec

Ariel View:

City Sewer Map:

Flow Sketch:

Flow Meter



8”-inch Pipe

Surface View:

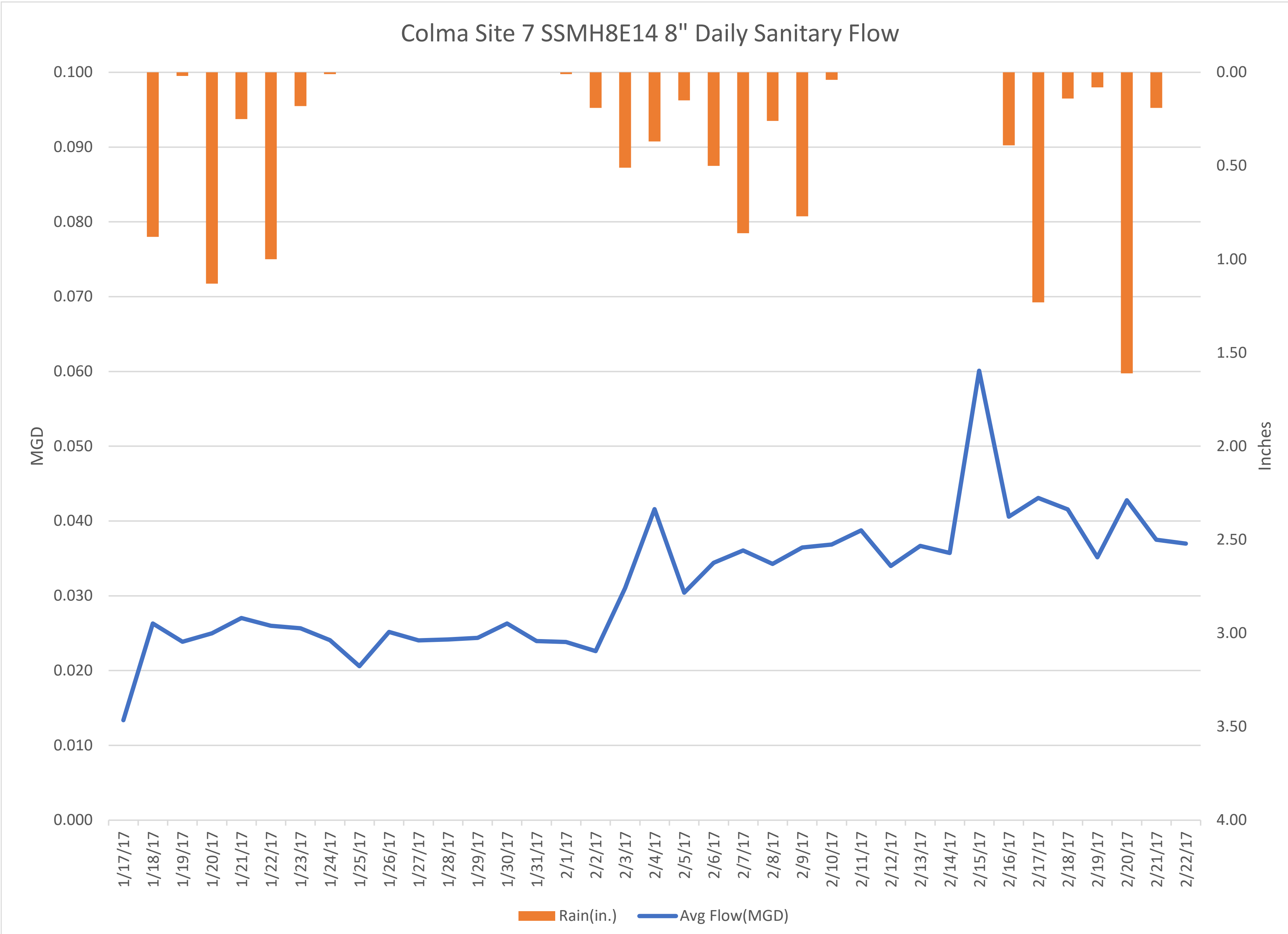
Invert View:

Outlet Pipe:	Inlet Pipe:
	

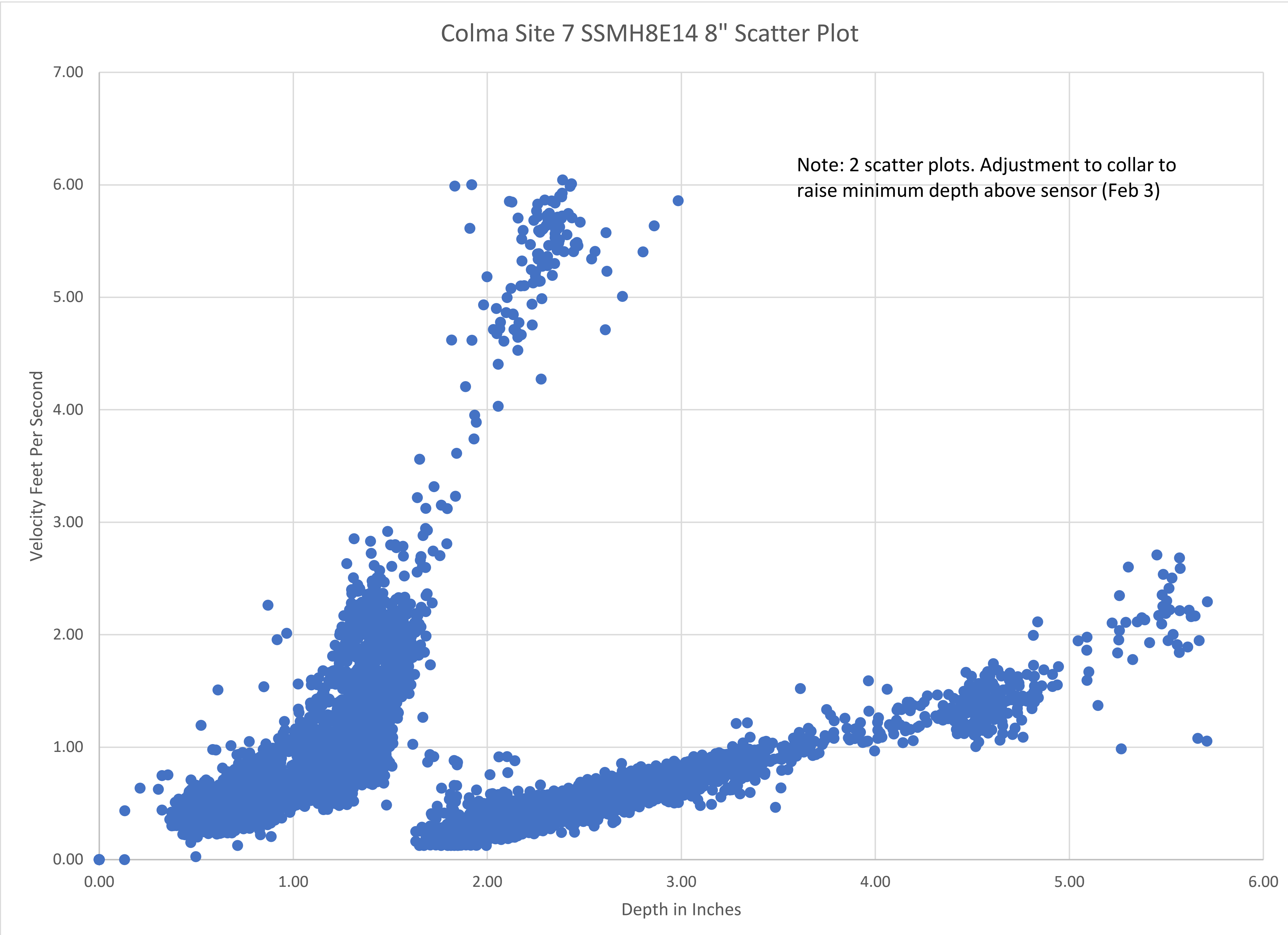
Colma Site 7 SSMH8E14 8" Sanitary Flow

Daily Summary

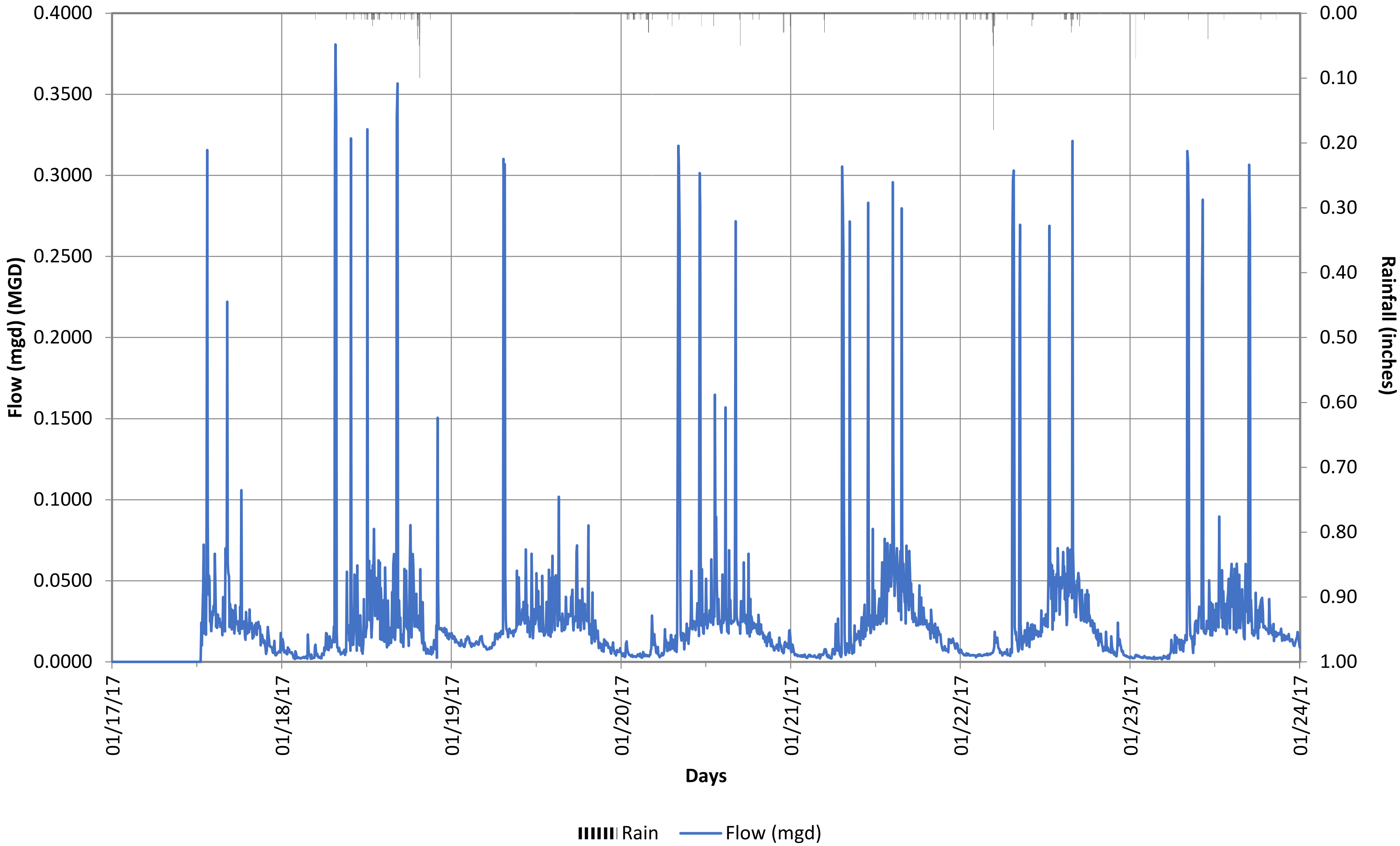
Day	Date	Avg Flow(MGD)	Min Flow(MGD)	Max Flow(MGD)	Max Depth(in.)	Rain(in.)
Tuesday	1/17/17	0.013	0.000	0.316	2.444	0.00
Wednesday	1/18/17	0.026	0.002	0.381	3.614	0.88
Thursday	1/19/17	0.024	0.004	0.310	2.395	0.02
Friday	1/20/17	0.025	0.002	0.318	2.411	1.13
Saturday	1/21/17	0.027	0.002	0.305	2.349	0.25
Sunday	1/22/17	0.026	0.002	0.321	2.383	1.00
Monday	1/23/17	0.026	0.002	0.315	2.372	0.18
Tuesday	1/24/17	0.024	0.003	0.330	2.452	0.01
Wednesday	1/25/17	0.021	0.002	0.337	2.479	0.00
Thursday	1/26/17	0.025	0.002	0.346	2.427	0.00
Friday	1/27/17	0.024	0.001	0.332	2.437	0.00
Saturday	1/28/17	0.024	0.001	0.330	2.373	0.00
Sunday	1/29/17	0.024	0.001	0.312	2.320	0.00
Monday	1/30/17	0.026	0.002	0.449	2.984	0.00
Tuesday	1/31/17	0.024	0.001	0.342	2.388	0.00
Wednesday	2/1/17	0.024	0.001	0.309	2.372	0.01
Thursday	2/2/17	0.023	0.000	0.335	2.696	0.19
Friday	2/3/17	0.031	0.000	0.444	5.502	0.51
Saturday	2/4/17	0.042	0.005	0.450	5.568	0.37
Sunday	2/5/17	0.030	0.004	0.418	5.514	0.15
Monday	2/6/17	0.034	0.005	0.434	5.571	0.50
Tuesday	2/7/17	0.036	0.007	0.369	5.610	0.86
Wednesday	2/8/17	0.034	0.005	0.417	5.669	0.26
Thursday	2/9/17	0.036	0.005	0.395	5.712	0.77
Friday	2/10/17	0.037	0.005	0.371	5.647	0.04
Saturday	2/11/17	0.039	0.005	0.283	4.816	0.00
Sunday	2/12/17	0.034	0.005	0.243	4.868	0.00
Monday	2/13/17	0.037	0.004	0.215	4.713	0.00
Tuesday	2/14/17	0.036	0.005	0.218	4.659	0.00
Wednesday	2/15/17	0.060	0.005	0.284	5.709	0.00
Thursday	2/16/17	0.041	0.008	0.232	5.147	0.39
Friday	2/17/17	0.043	0.006	0.232	4.827	1.23
Saturday	2/18/17	0.042	0.005	0.251	4.943	0.14
Sunday	2/19/17	0.035	0.005	0.203	4.807	0.08
Monday	2/20/17	0.043	0.005	0.199	4.820	1.61
Tuesday	2/21/17	0.037	0.006	0.220	4.733	0.19
Wednesday	2/22/17	0.037	0.006	0.223	4.798	0.00



Colma Site 7 SSMH8E14 8" Daily Sanitary Flow
MGD
Inches
0.100
0.090
0.080
0.070
0.060
0.050
0.040
0.030
0.020
0.010
0.000
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
1/17/17
1/18/17
1/19/17
1/20/17
1/21/17
1/22/17
1/23/17
1/24/17
1/25/17
1/26/17
1/27/17
1/28/17
1/29/17
1/30/17
1/31/17
2/1/17
2/2/17
2/3/17
2/4/17
2/5/17
2/6/17
2/7/17
2/8/17
2/9/17
2/10/17
2/11/17
2/12/17
2/13/17
2/14/17
2/15/17
2/16/17
2/17/17
2/18/17
2/19/17
2/20/17
2/21/17
2/22/17
Rain(in.)
Avg Flow(MGD)

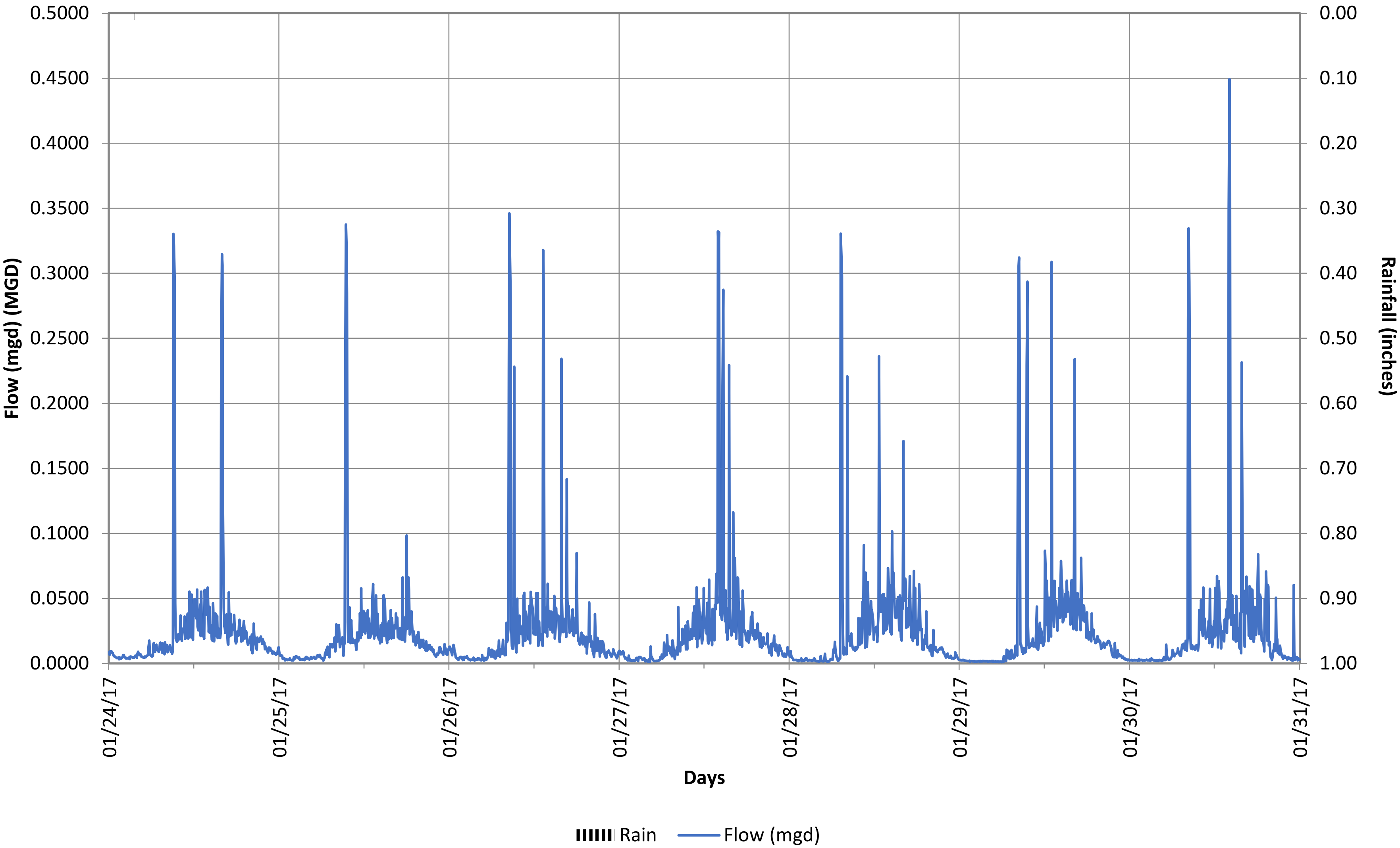

Colma Site 7 SSMH8E14 8" Scatter Plot
Note: 2 scatter plots. Adjustment to collar to raise minimum depth above sensor (Feb 3)
Velocity Feet Per Second
Depth in Inches
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0.00
1.00
2.00
3.00
4.00
5.00
6.00

Colma Site 7 SSMH8E14 8" Sanitary Flow

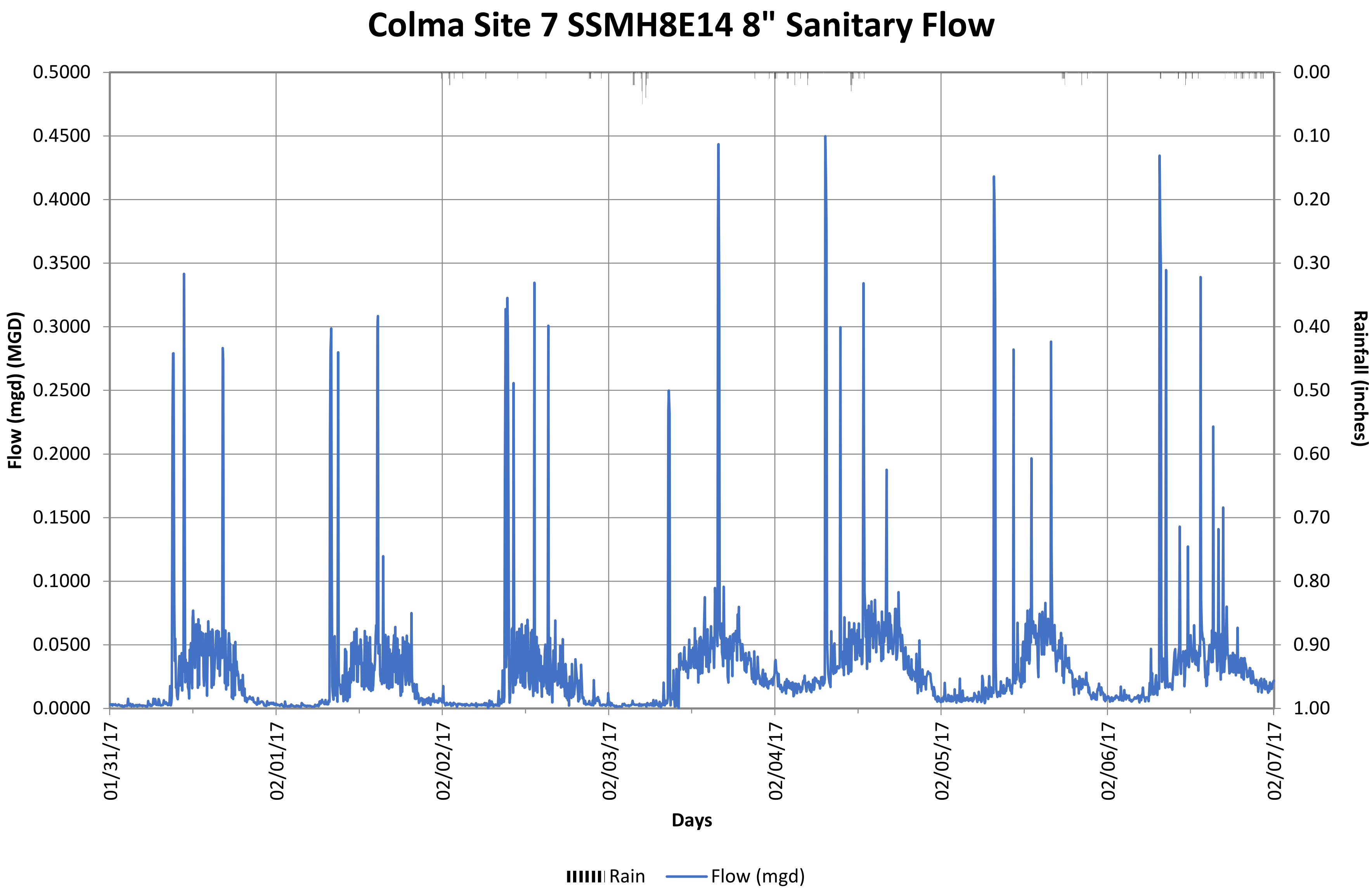


	1/17/2017 11:55:00 PM(	2017 11:55:00 PM(	2017 11:55:00 PM(	2017 11:55:00 PM	/2017 11:55:00 PM(	2017 11:55:00 PM	2017 11:55:00 PM(Mon)
Maximum	0.316	0.381	0.310	0.318	0.305	0.321	0.315
Average	0.013	0.026	0.024	0.025	0.027	0.026	0.026
Minimum	0.000	0.002	0.004	0.002	0.002	0.002	0.002
Rain (inches)	0.00	0.88	0.02	1.13	0.25	1.00	0.18

Colma Site 7 SSMH8E14 8" Sanitary Flow

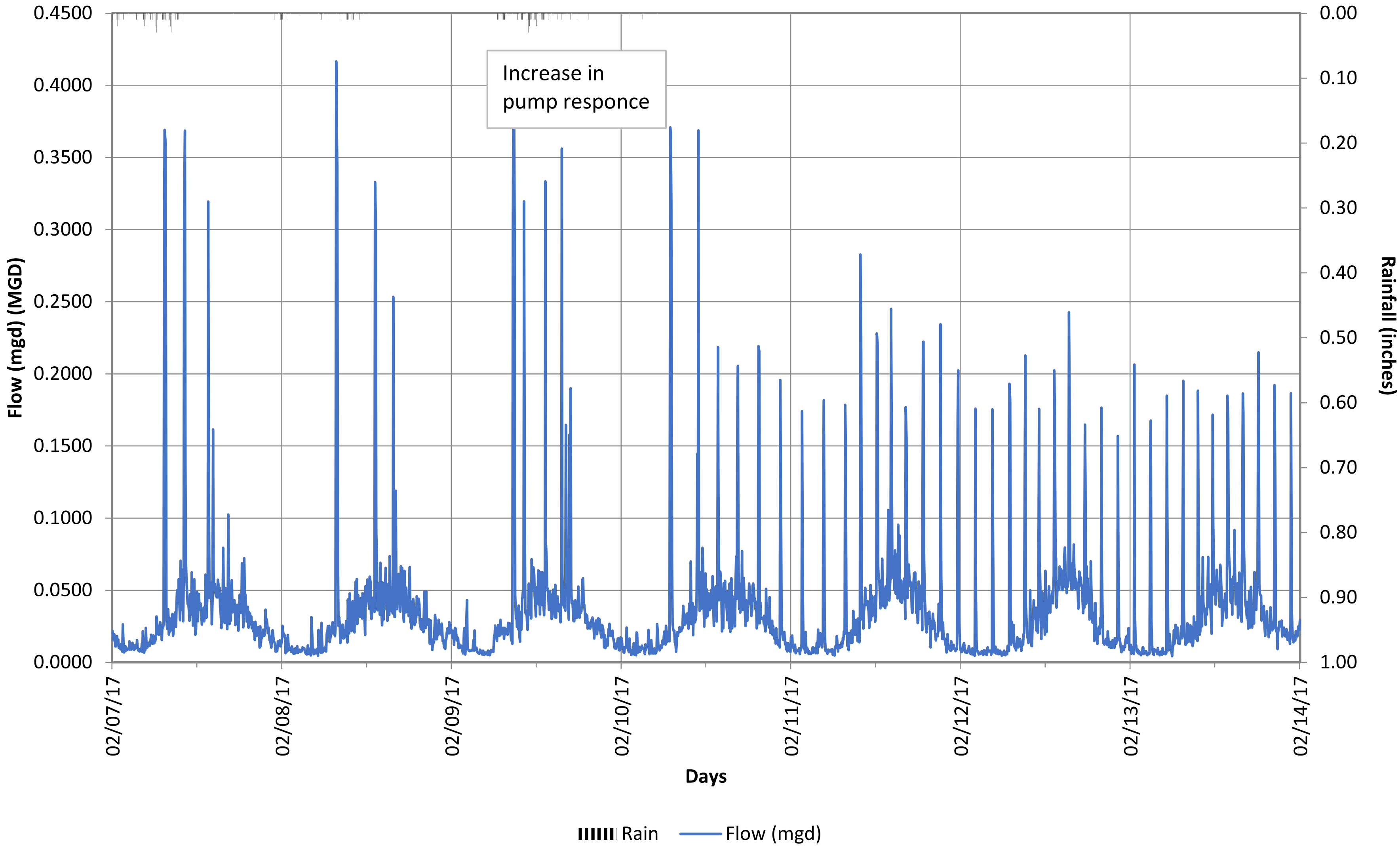


	1/24/2017 11:55:00 PM(	2017 11:55:00 PM(	2017 11:55:00 PM(	2017 11:55:00 PM	/2017 11:55:00 PM(	2017 11:55:00 PM	2017 11:55:00 PM(Mon)
Maximum	0.330	0.337	0.346	0.332	0.330	0.312	0.449
Average	0.024	0.021	0.025	0.024	0.024	0.024	0.026
Minimum	0.003	0.002	0.002	0.001	0.001	0.001	0.002
Rain (inches)	0.01	0.00	0.00	0.00	0.00	0.00	0.00



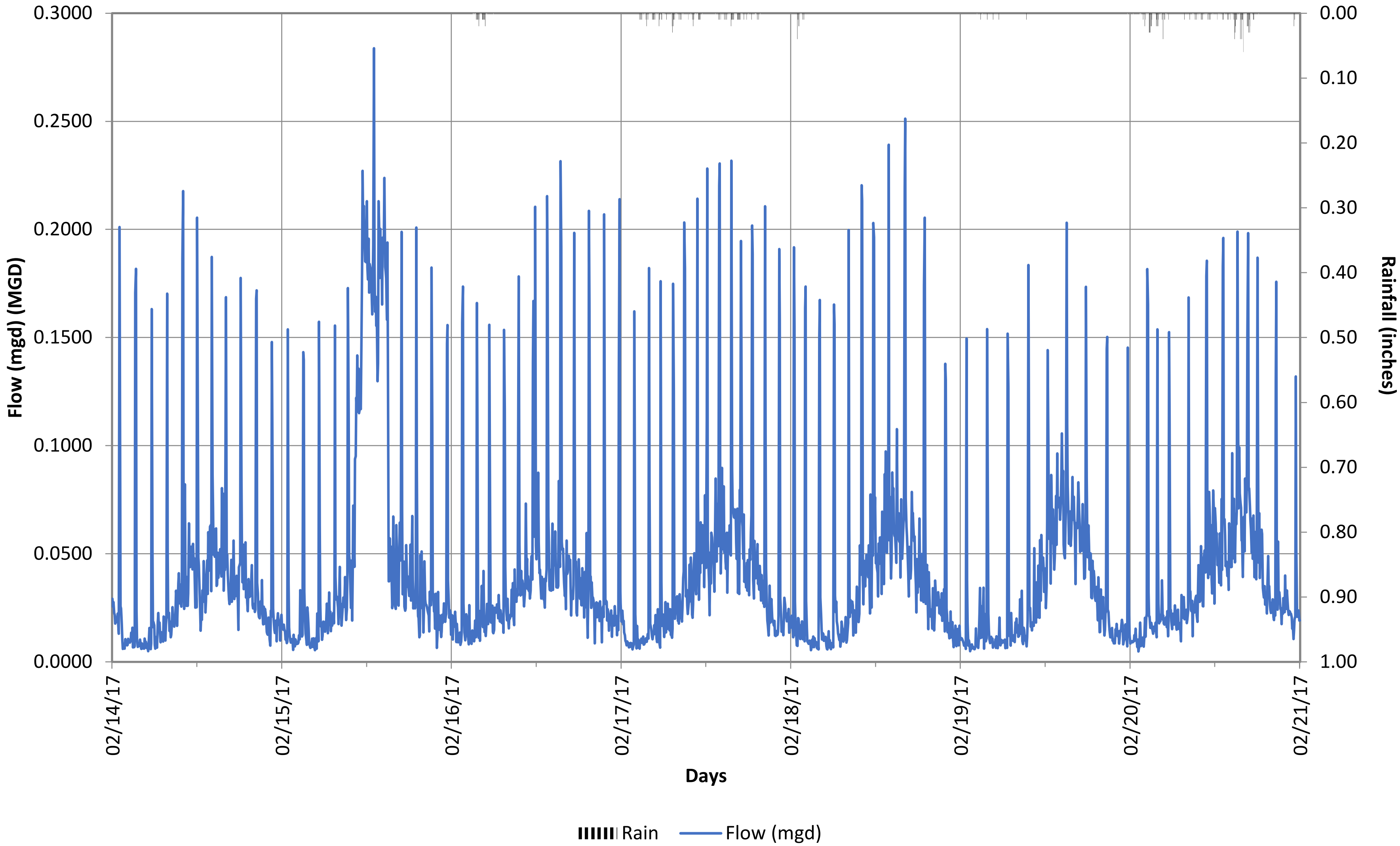
	1/31/2017 11:55:00 PM(	017 11:55:00 PM(	2017 11:55:00 PM(	2017 11:55:00 PM(	2017 11:55:00 PM(	2017 11:55:00 PM(	017 11:55:00 PM(Mon)
Maximum	0.342	0.309	0.335	0.444	0.450	0.418	0.434
Average	0.024	0.024	0.023	0.031	0.042	0.030	0.034
Minimum	0.001	0.001	0.000	0.000	0.005	0.004	0.005
Rain (inches)	0.00	0.01	0.19	0.51	0.37	0.15	0.50

Colma Site 7 SSMH8E14 8" Sanitary Flow

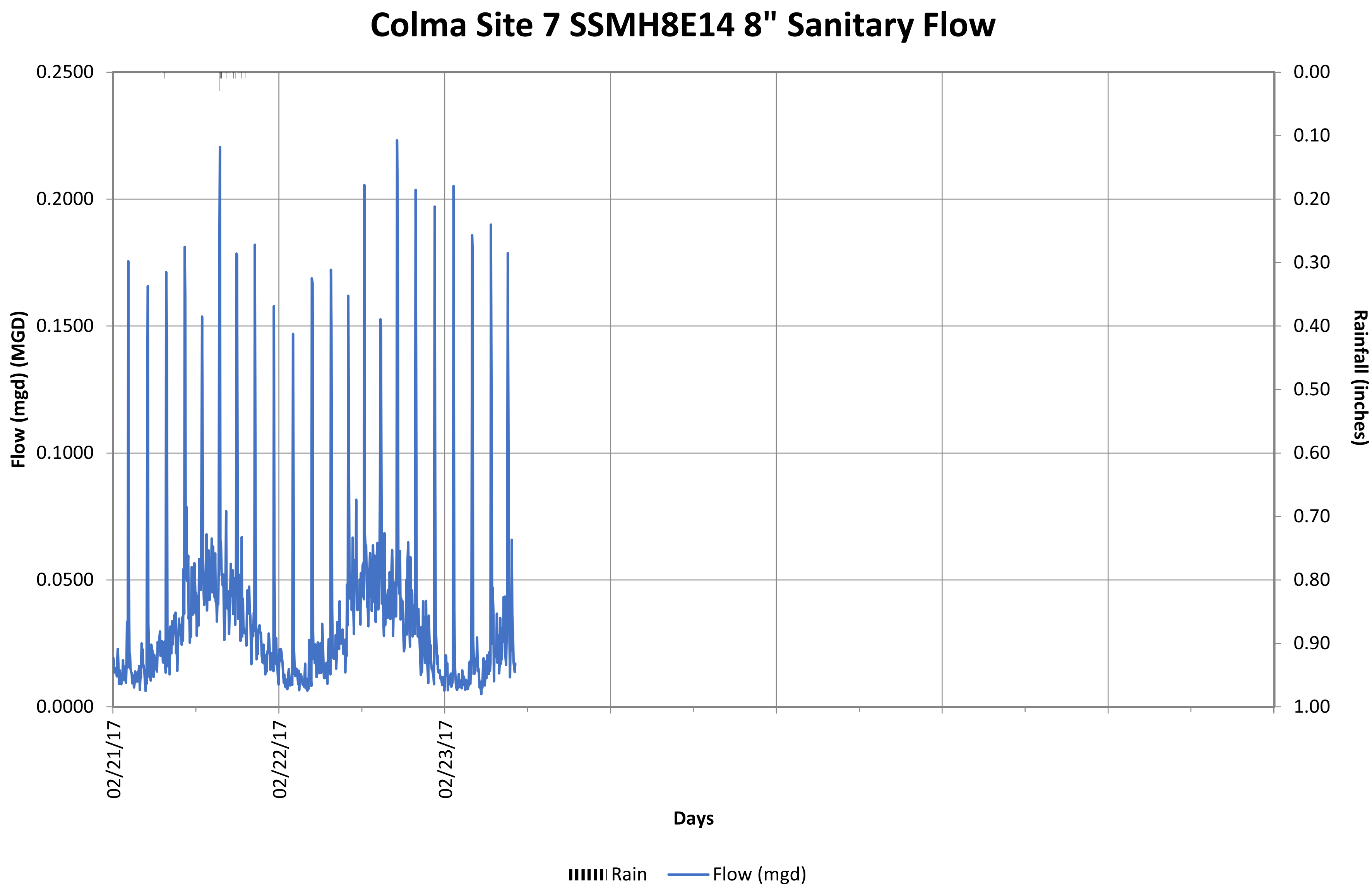


	2/7/2017 11:55:00 PM(	017 11:55:00 PM(	2017 11:55:00 PM(	/2017 11:55:00 PM	/2017 11:55:00 PM(	2017 11:55:00 PM	2017 11:55:00 PM(Mon)
Maximum	0.369	0.417	0.395	0.371	0.283	0.243	0.215
Average	0.036	0.034	0.036	0.037	0.039	0.034	0.037
Minimum	0.007	0.005	0.005	0.005	0.005	0.005	0.004
Rain (inches)	0.86	0.26	0.77	0.04	0.00	0.00	0.00

Colma Site 7 SSMH8E14 8" Sanitary Flow



	2/14/2017 11:55:00 PM(	2017 11:55:00 PM(	2017 11:55:00 PM(	2017 11:55:00 PM	/2017 11:55:00 PM(	2017 11:55:00 PM	2017 11:55:00 PM(Mon)
Maximum	0.218	0.284	0.232	0.232	0.251	0.203	0.199
Average	0.036	0.060	0.041	0.043	0.042	0.035	0.043
Minimum	0.005	0.005	0.008	0.006	0.005	0.005	0.005
Rain (inches)	0.00	0.00	0.39	1.23	0.14	0.08	1.61

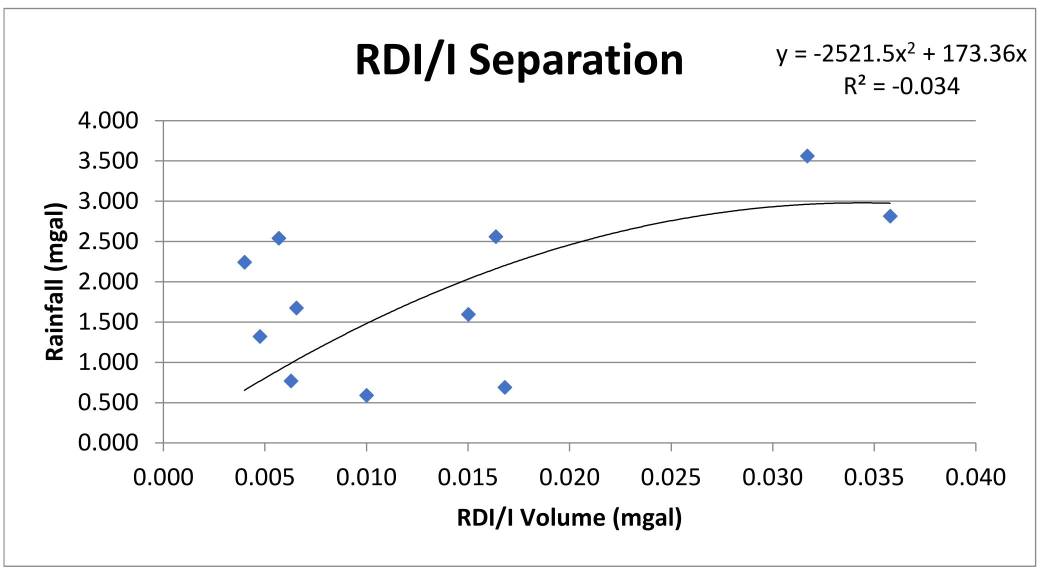


	2/21/2017 11:55:00 PM(	2017 11:55:00 PM(Wed)					
Maximum	0.220	0.223					
Average	0.037	0.037					
Minimum	0.006	0.006					
Rain (inches)	0.19	0.00					

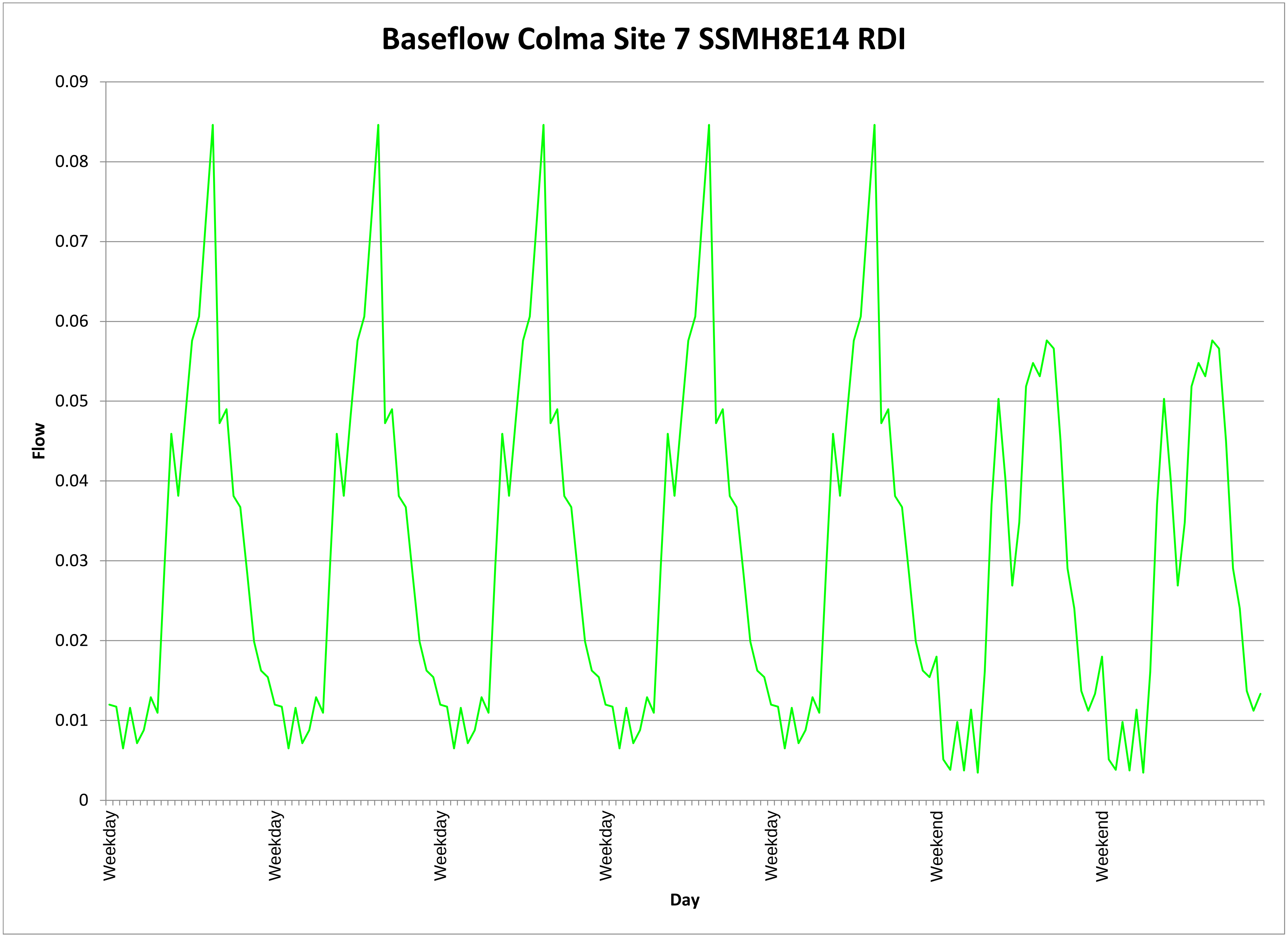
Colma Site 7 SSMH8E14 RDI

RDI/I Analysis, Monitor Return Ratio Summary

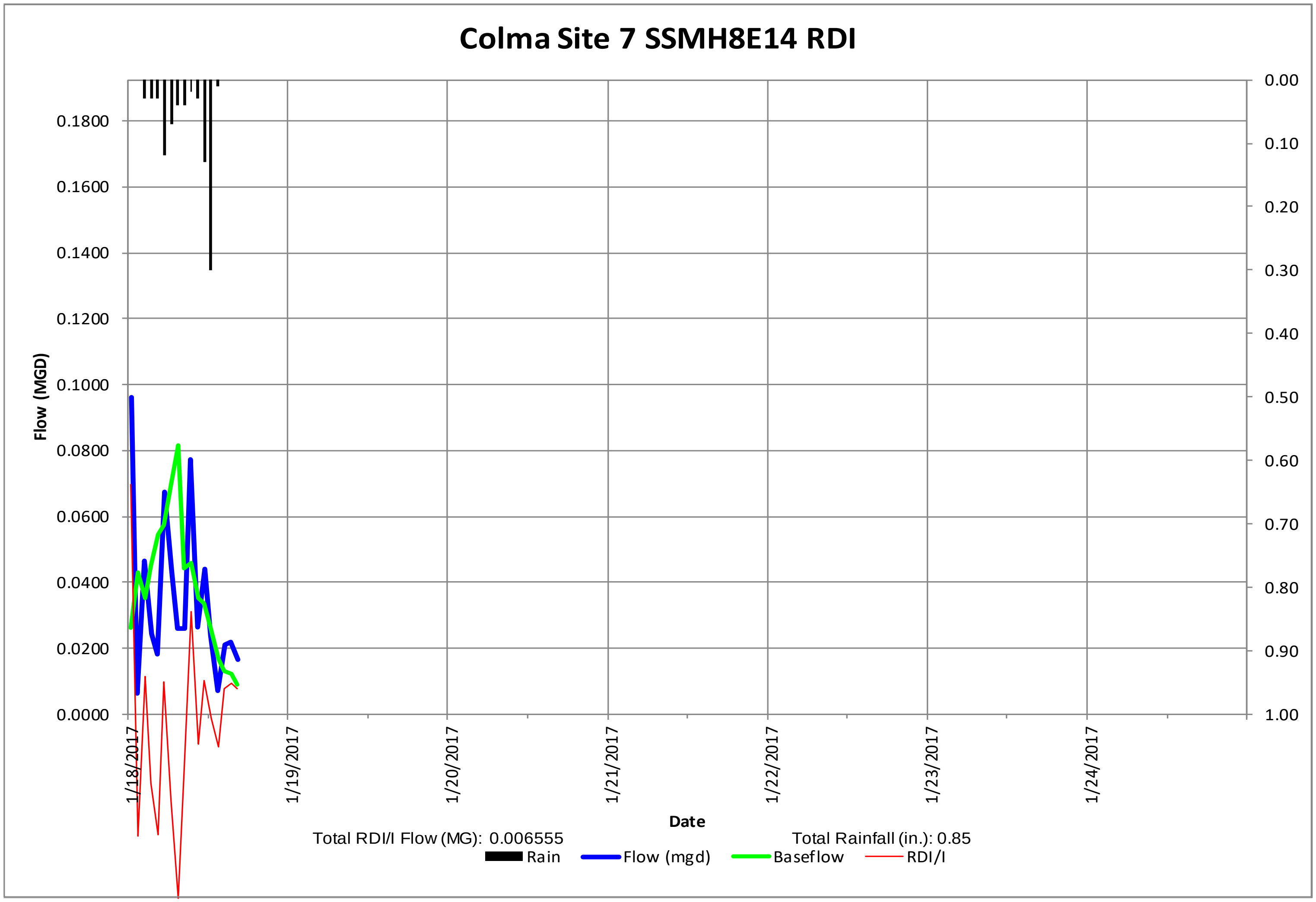
Storm Start (Date)	RDI/I Volume (mgal)	Monitor Area (acres)	Rainfall (mgal)	Return Ratio (%)
1/18/2017	0.007	72.5	1.673	0.39%
1/20/2017	0.004	72.5	2.244	0.18%
1/21/2017	0.006	72.5	2.539	0.22%
2/2/2017	0.005	72.5	1.319	0.36%
2/4/2017	0.017	72.5	0.689	2.44%
2/6/2017	0.016	72.5	2.559	0.64%
2/7/2017	0.010	72.5	0.591	1.69%
2/9/2017	0.015	72.5	1.595	0.94%
2/16/2017	0.006	72.5	0.768	0.82%
2/17/2017	0.036	72.5	2.815	1.27%
2/20/2017	0.032	72.5	3.563	0.89%
Average R%				0.90%
Average top 3 Storms				1.80%



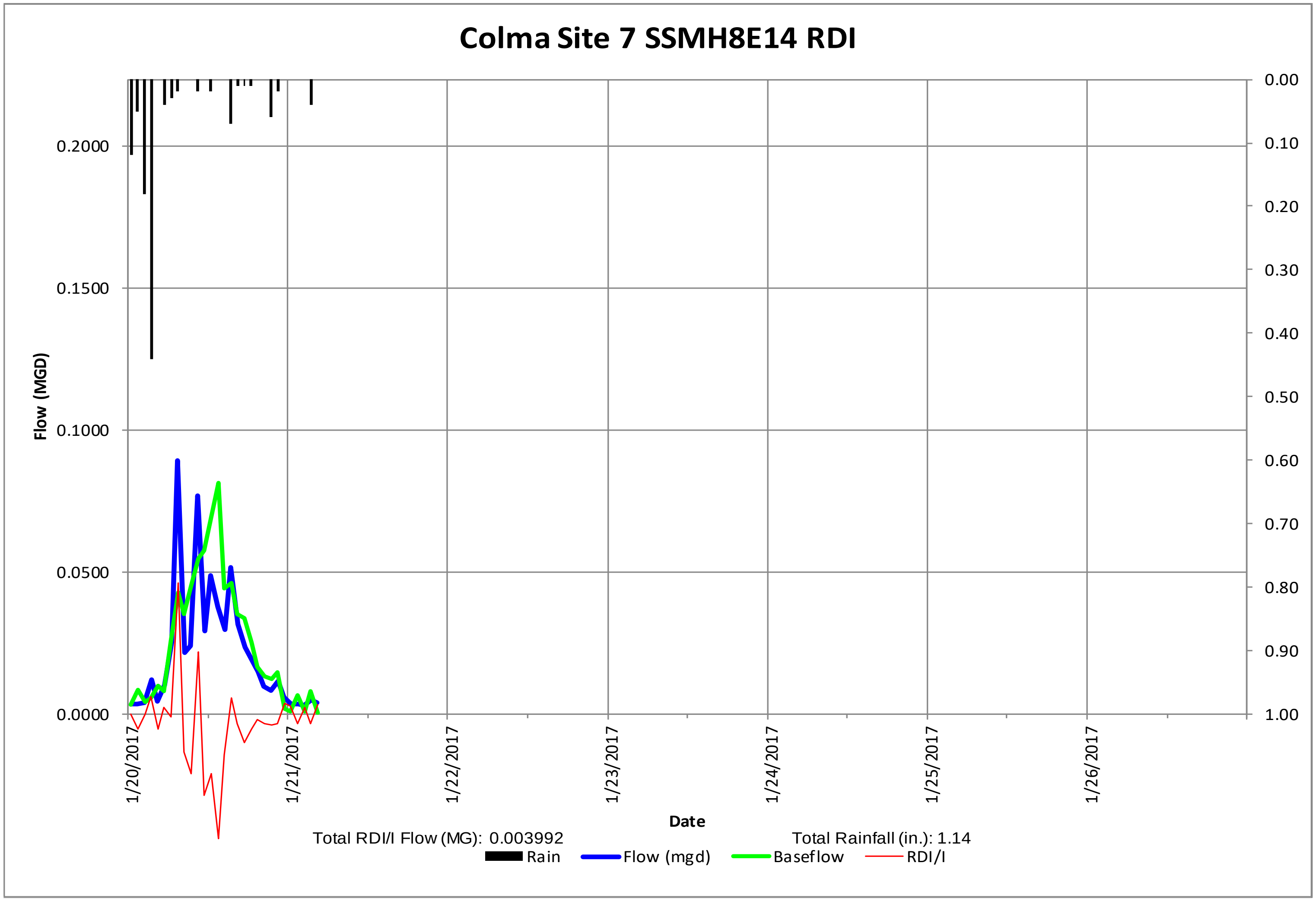
Baseflows	Weekend	Weekday
Max	0.058	0.085
Avg	0.028	0.032
Min	0.003	0.006



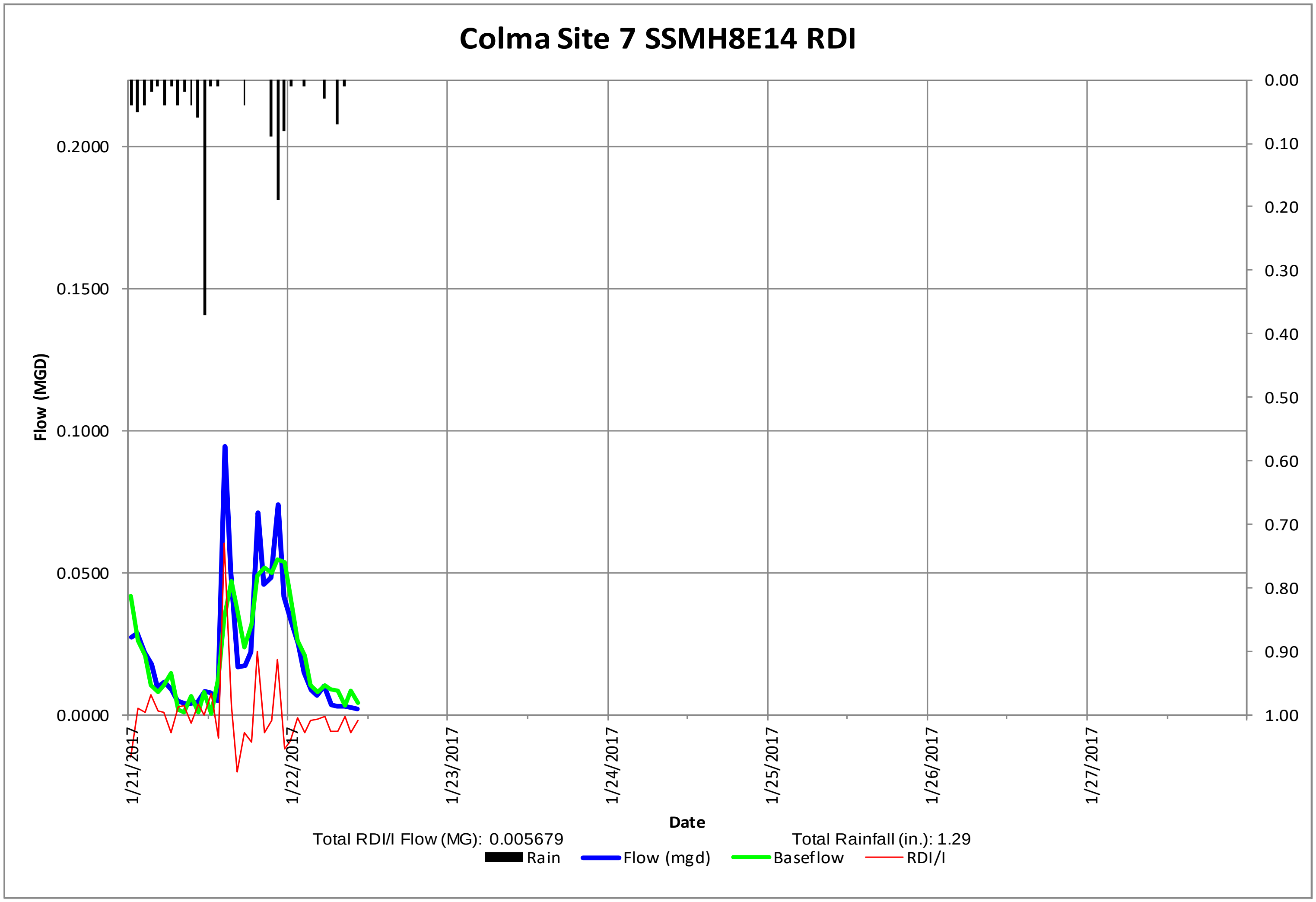
Baseflow Colma Site 7 SSMH8E14 RDI
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Flow
Weekday
Weekday
Weekday
Weekday
Weekday
Weekend
Weekend
Day



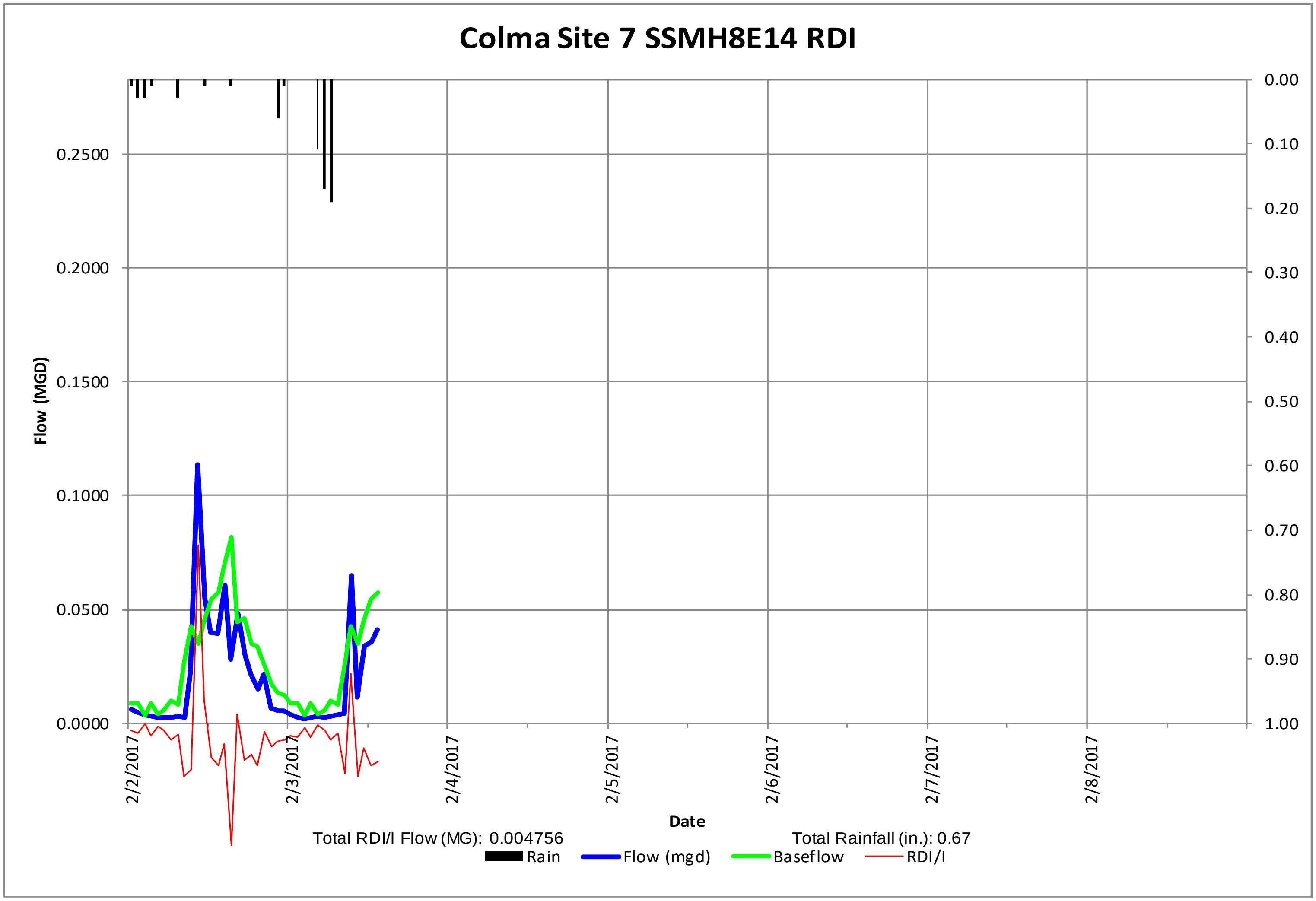
Storm of 1/18/2017



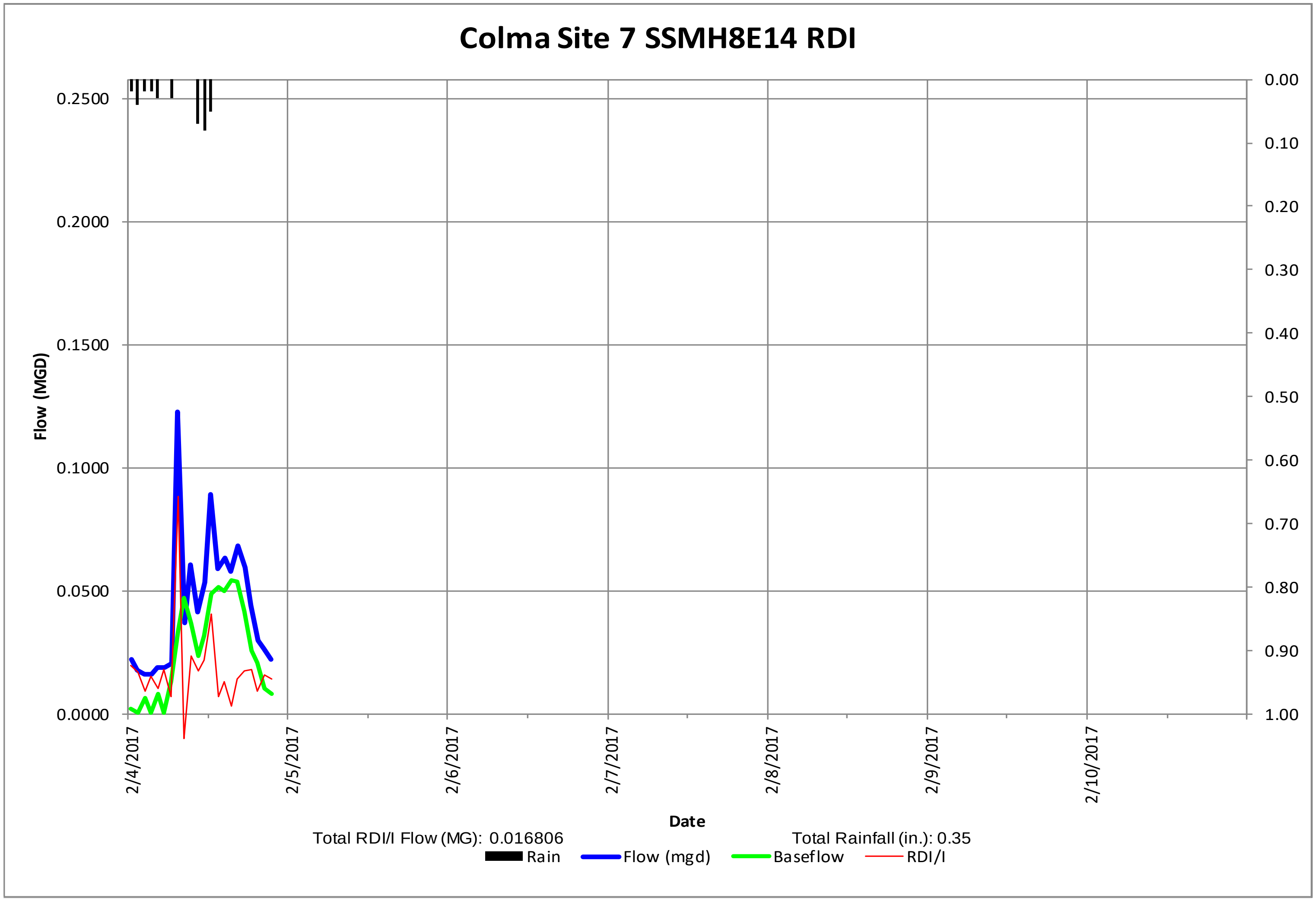
Storm of 1/20/2017



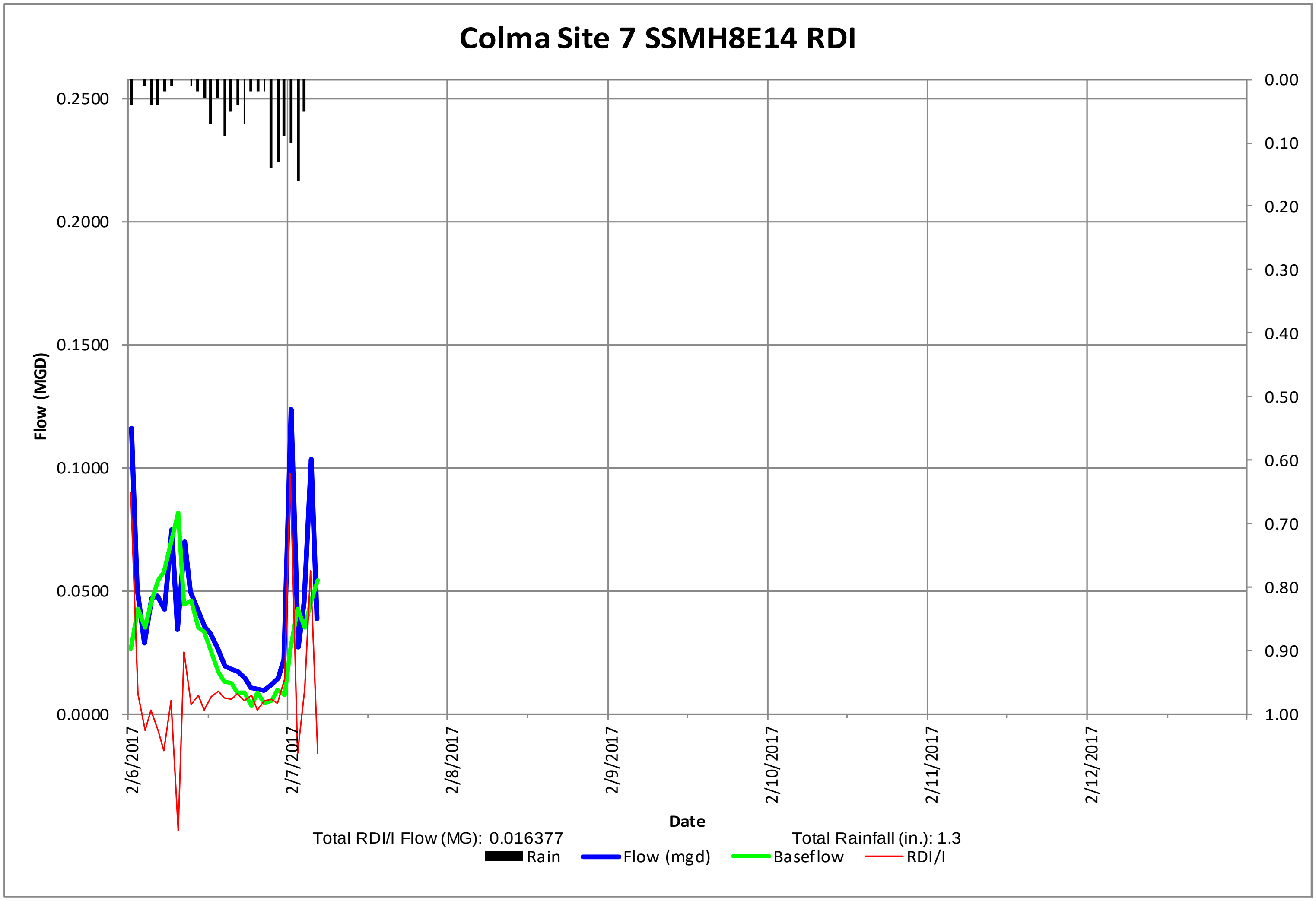
Storm of 1/21/2017



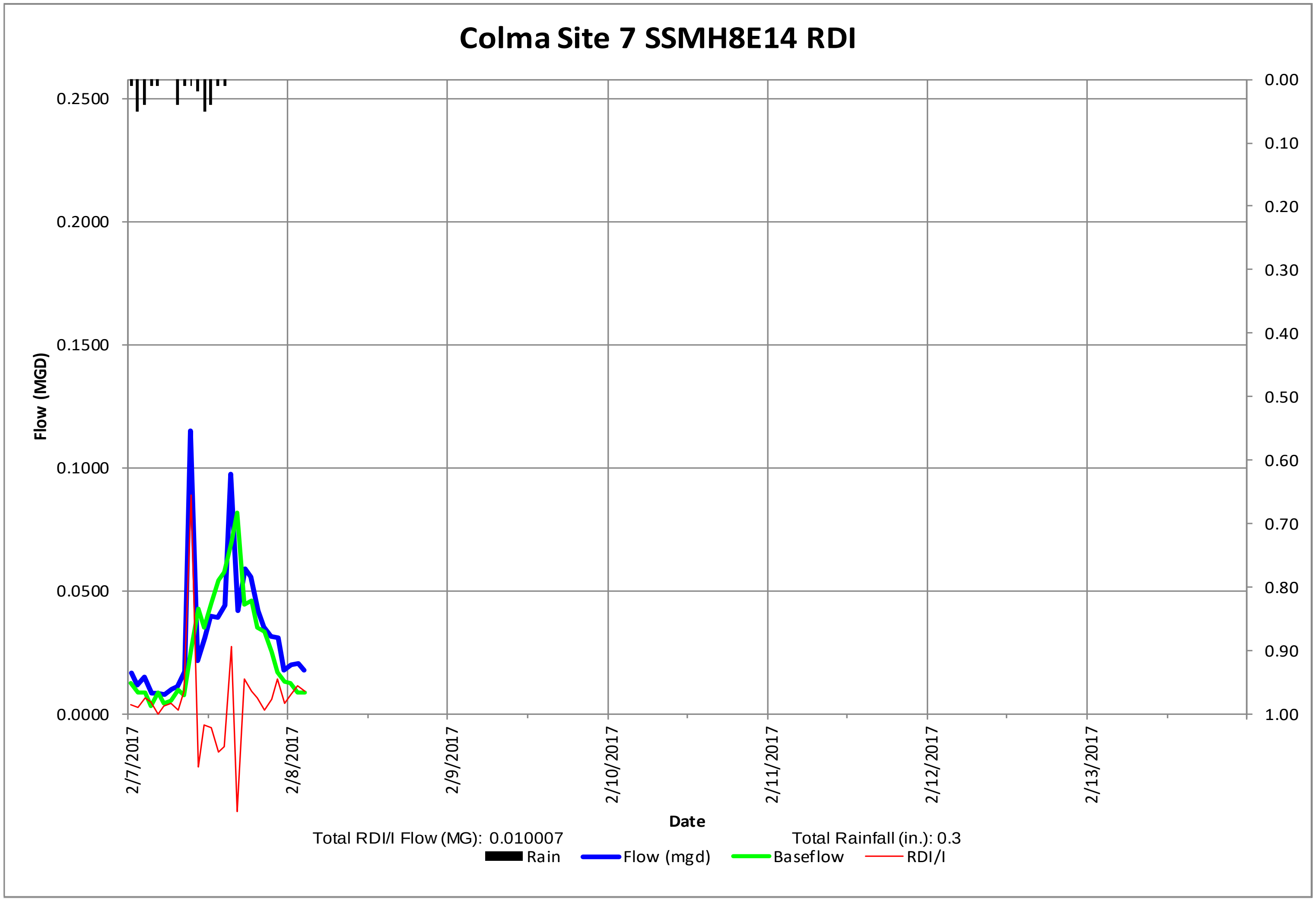
Storm of 2/2/2017



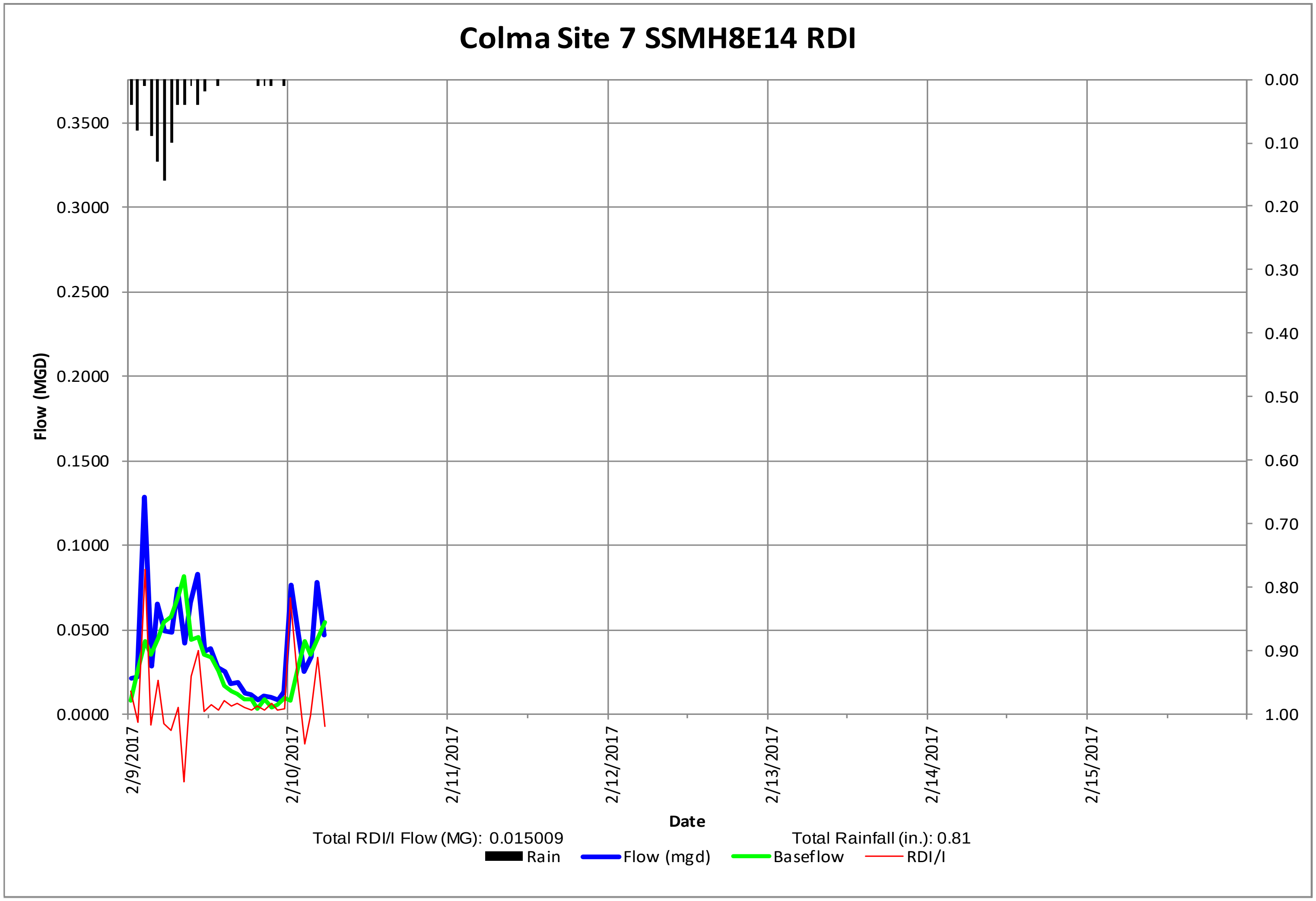
Storm of 2/4/2017



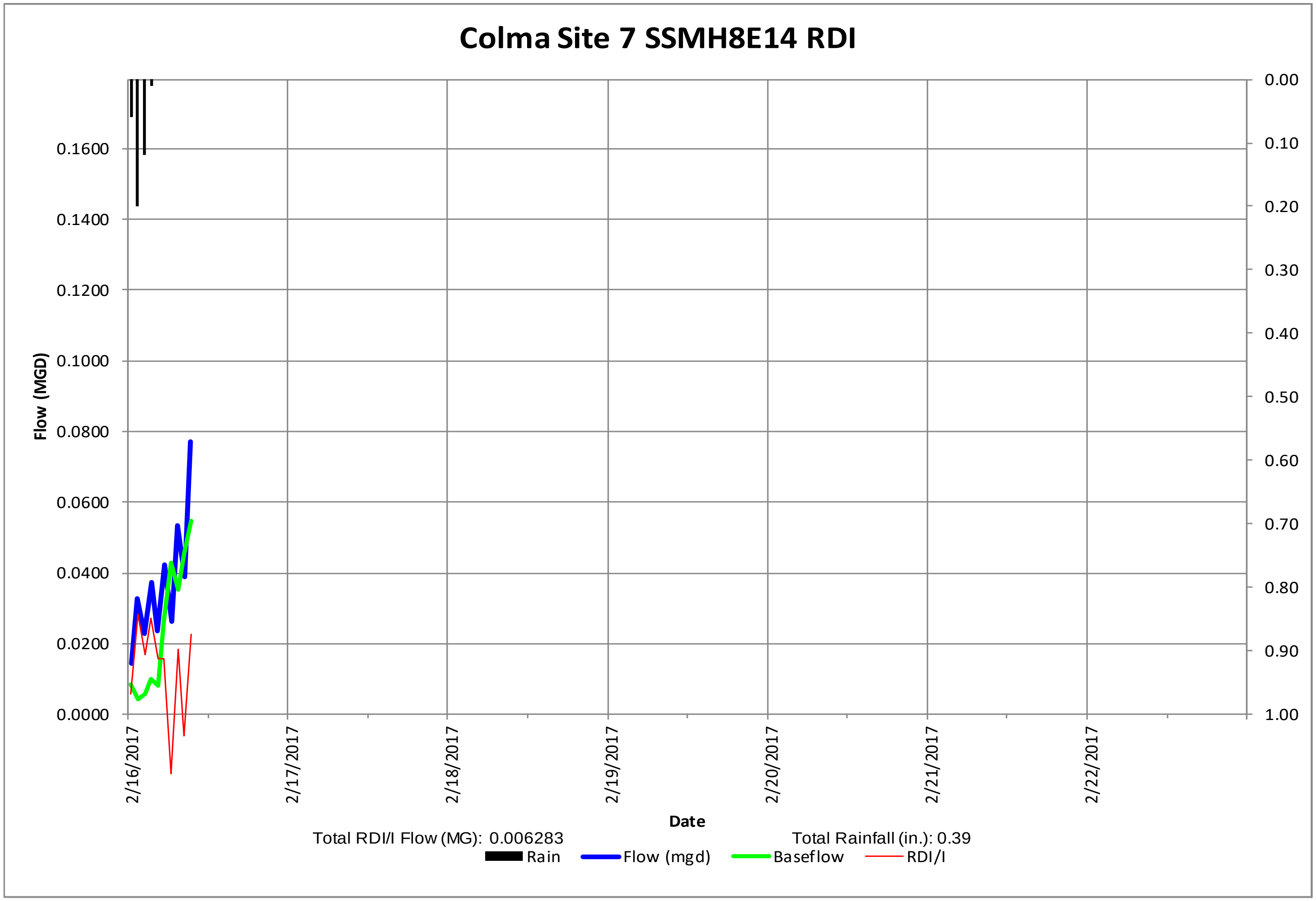
Storm of 2/6/2017



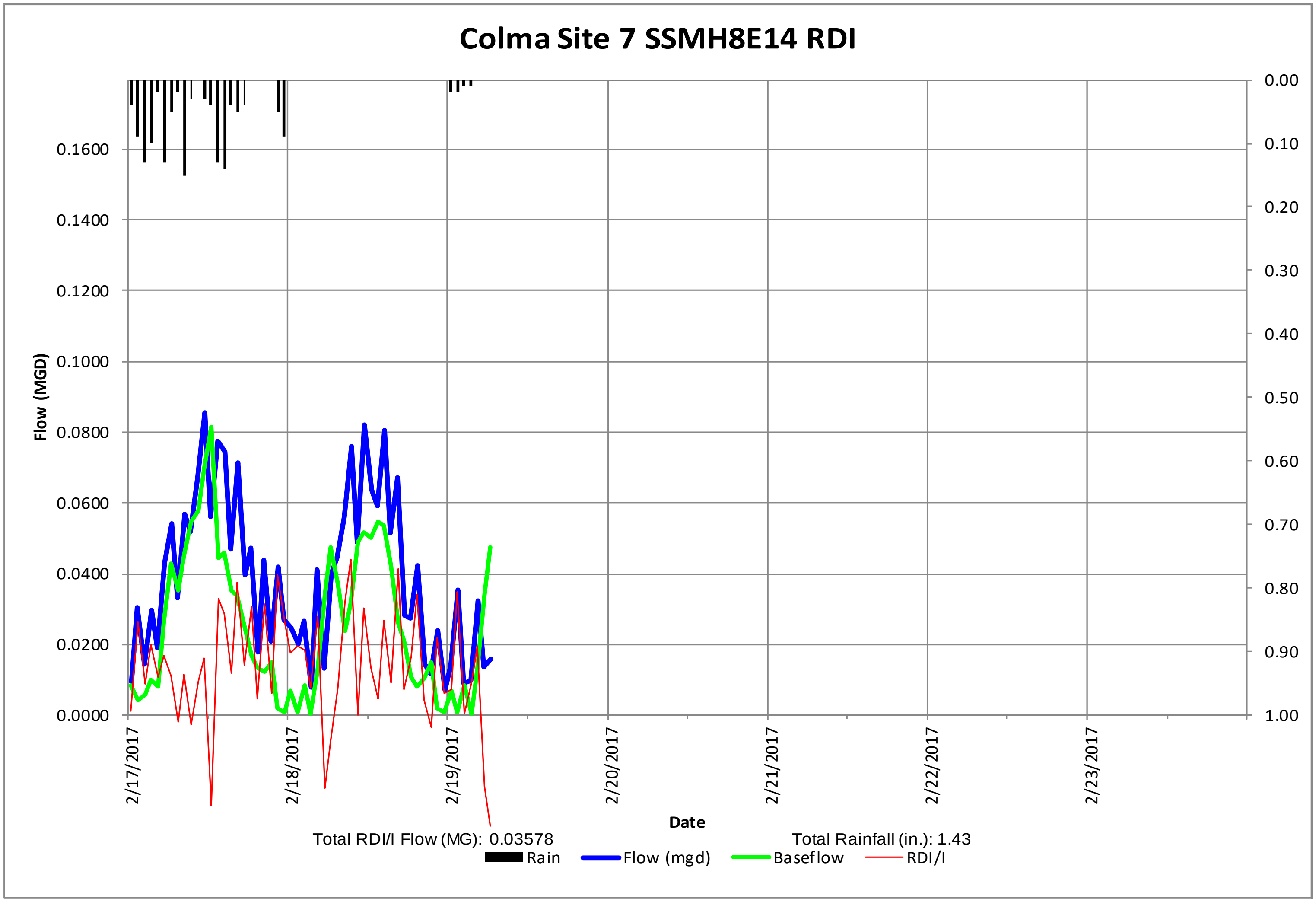
Storm of 2/7/2017



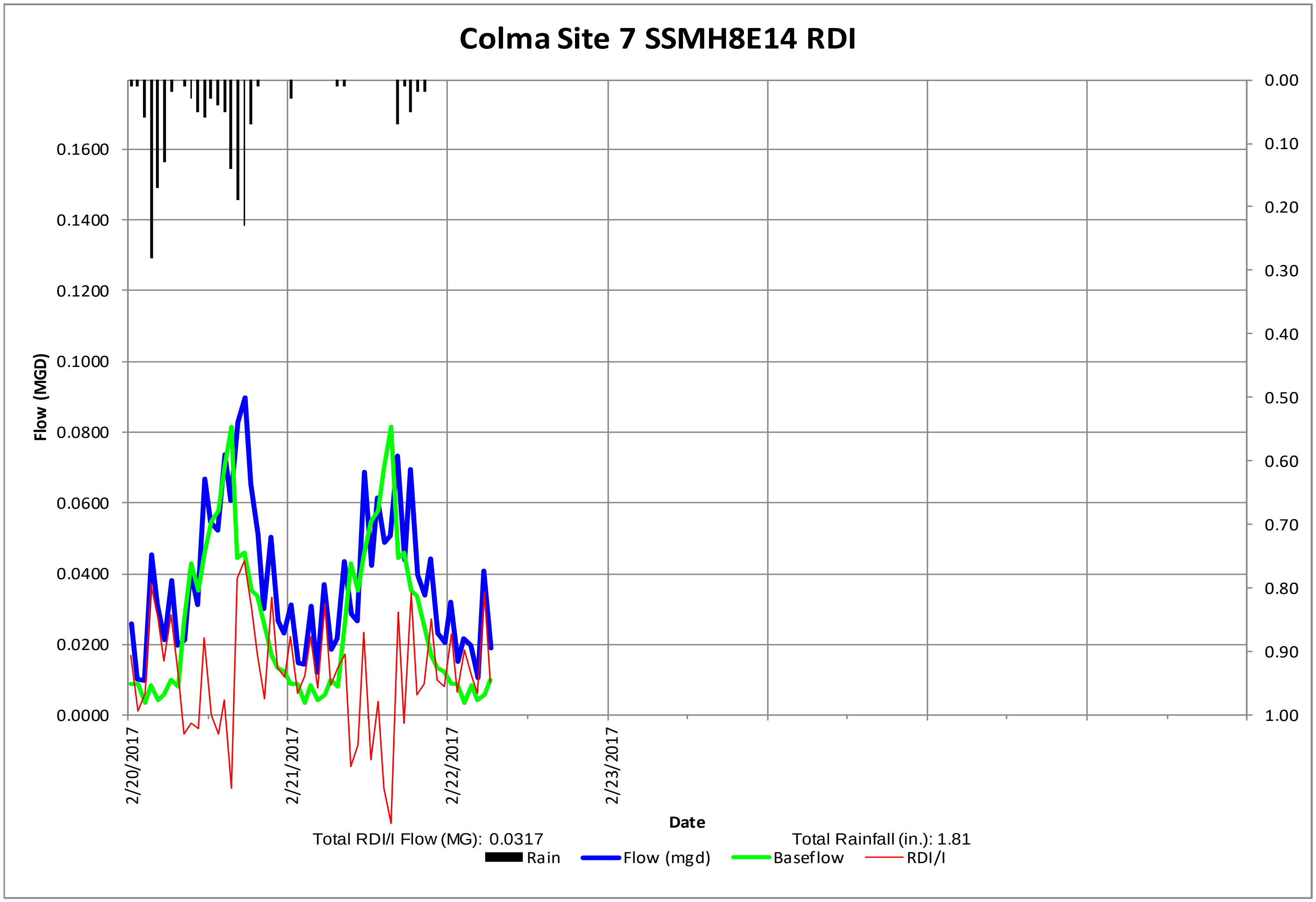
Storm of 2/9/2017



Storm of 2/16/2017



Storm of 2/17/2017



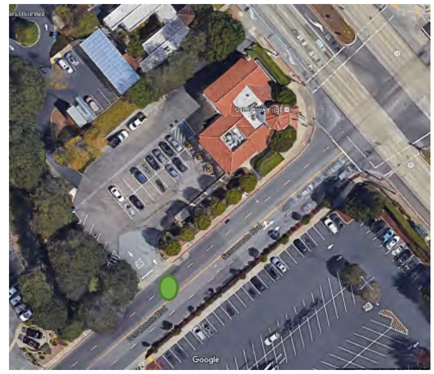
Storm of 2/20/2017

Site Information Report

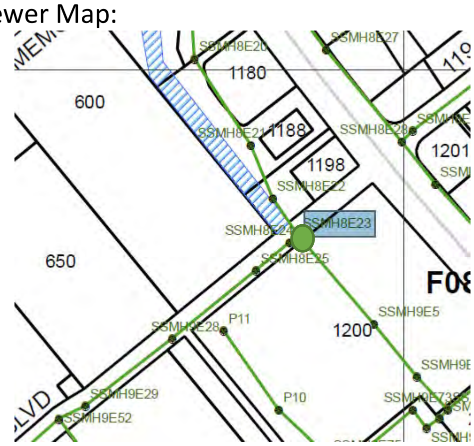
Flow Monitor Site: 8

Manhole Number SSMH 8E23
Location: Serramonte Blvd west of El Camino
MH Depth ~9’
Diameter: 8”
Safety: Ok
Traffic: Medium
Gas: Ok
Rungs: No
Meter Type: Hach FL900 2 submerged
Depth: Pressure 3.75”
Velocity: Doppler 0.5 ft./sec

Ariel View:



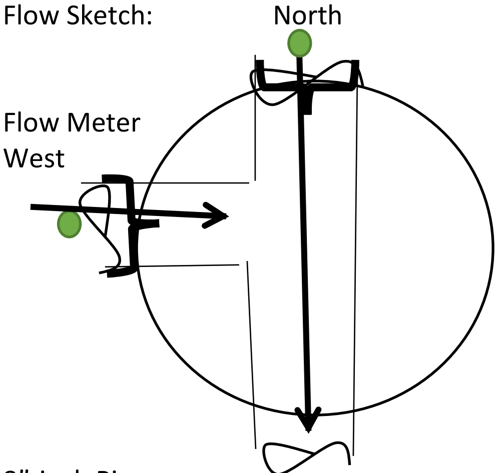
City Sewer Map:



Flow Sketch:

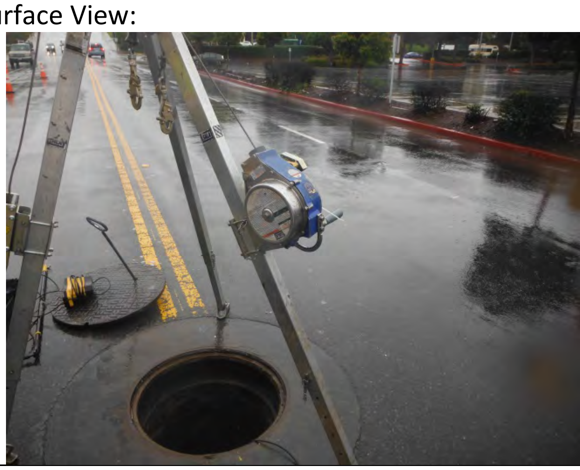
North

Flow Meter
West

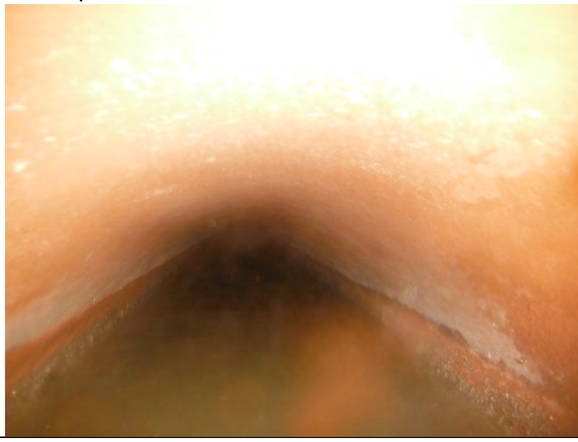


8”-inch Pipes

Surface View:



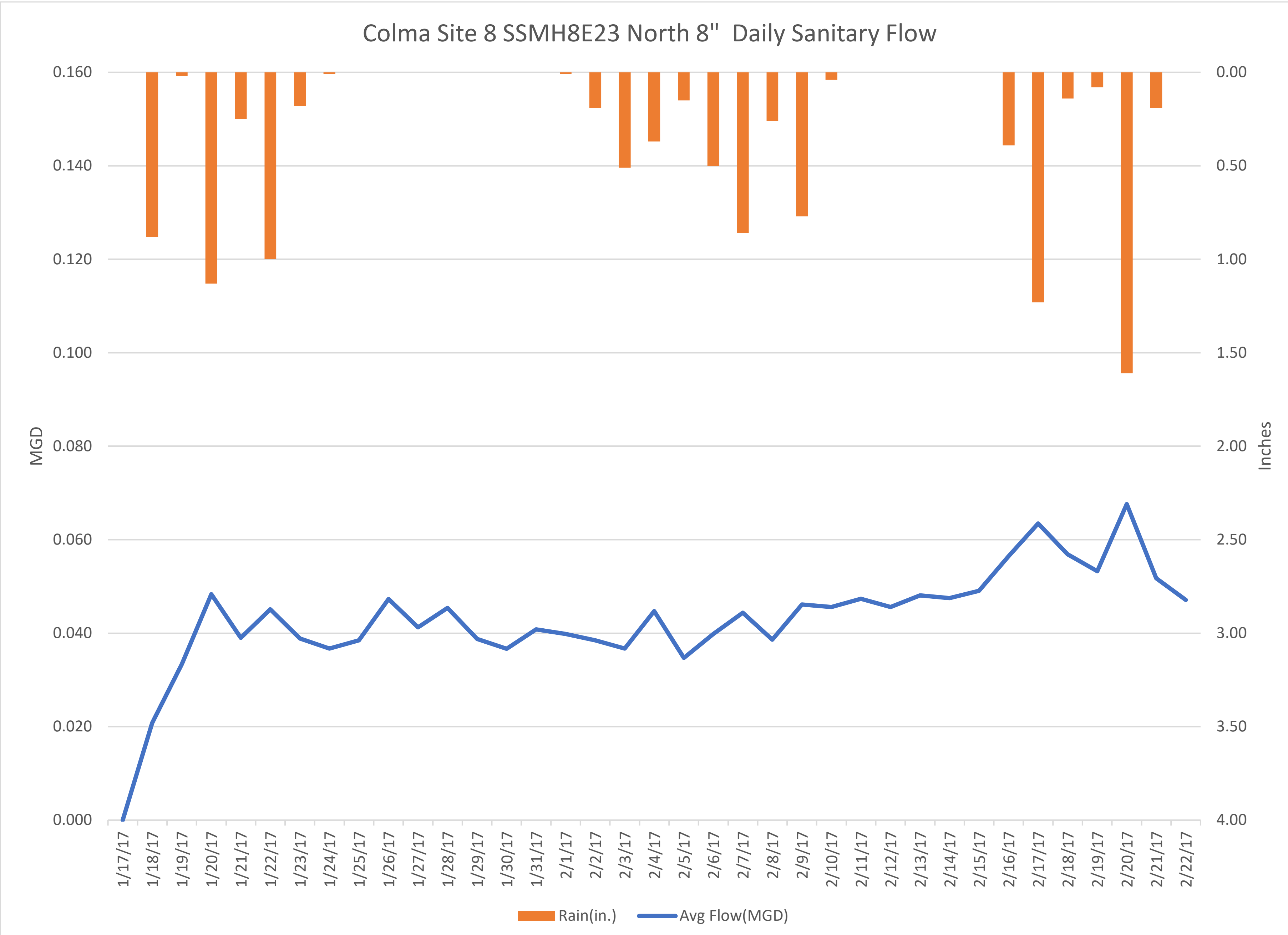
Invert View:

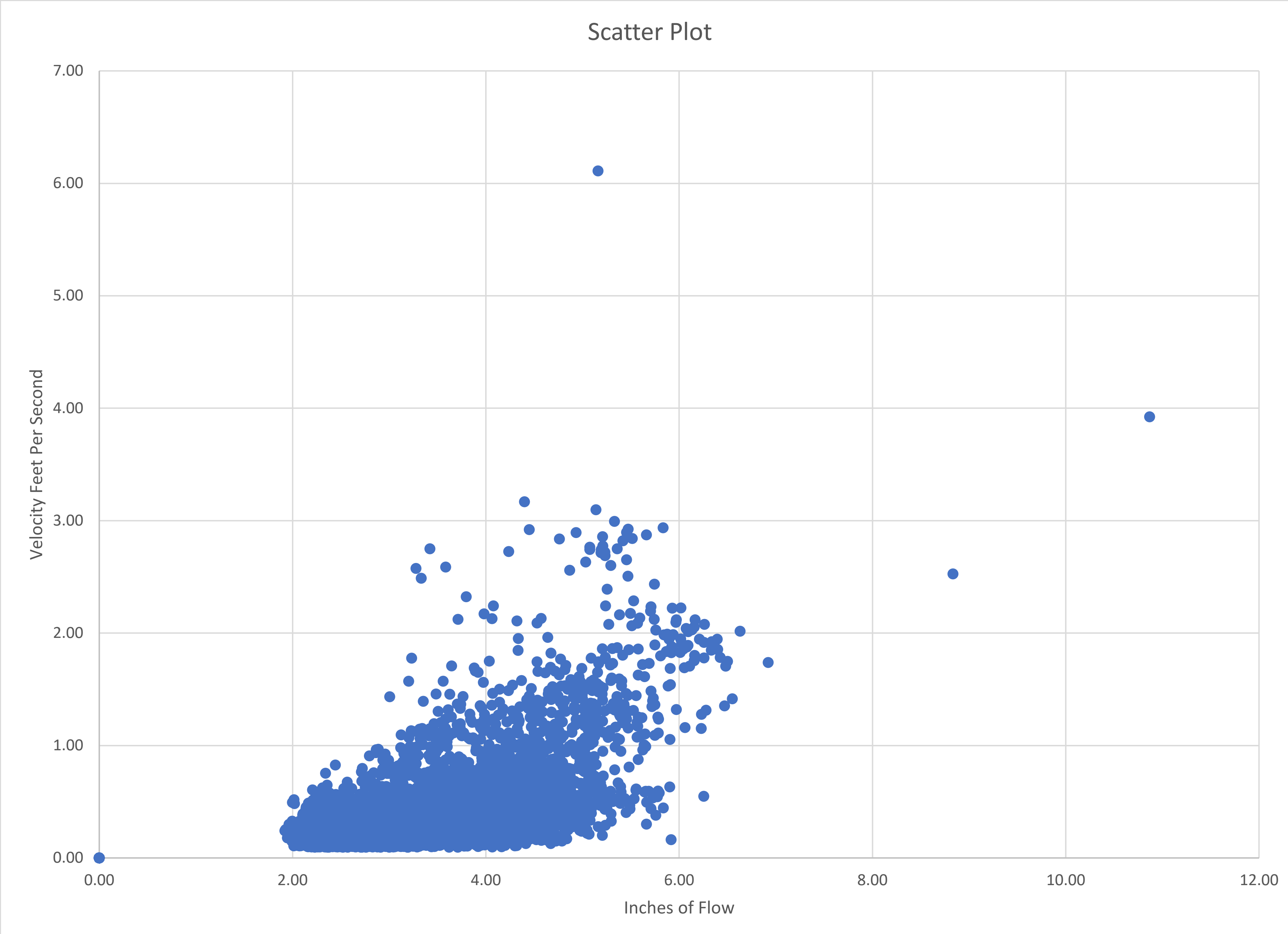
Outlet Pipe: P0	Inlet Pipe: P1
	
Inlet Pipe: P2	
	

Colma Site 8 SSMH8E23 North 8" Sanitary Flow

Daily Summary

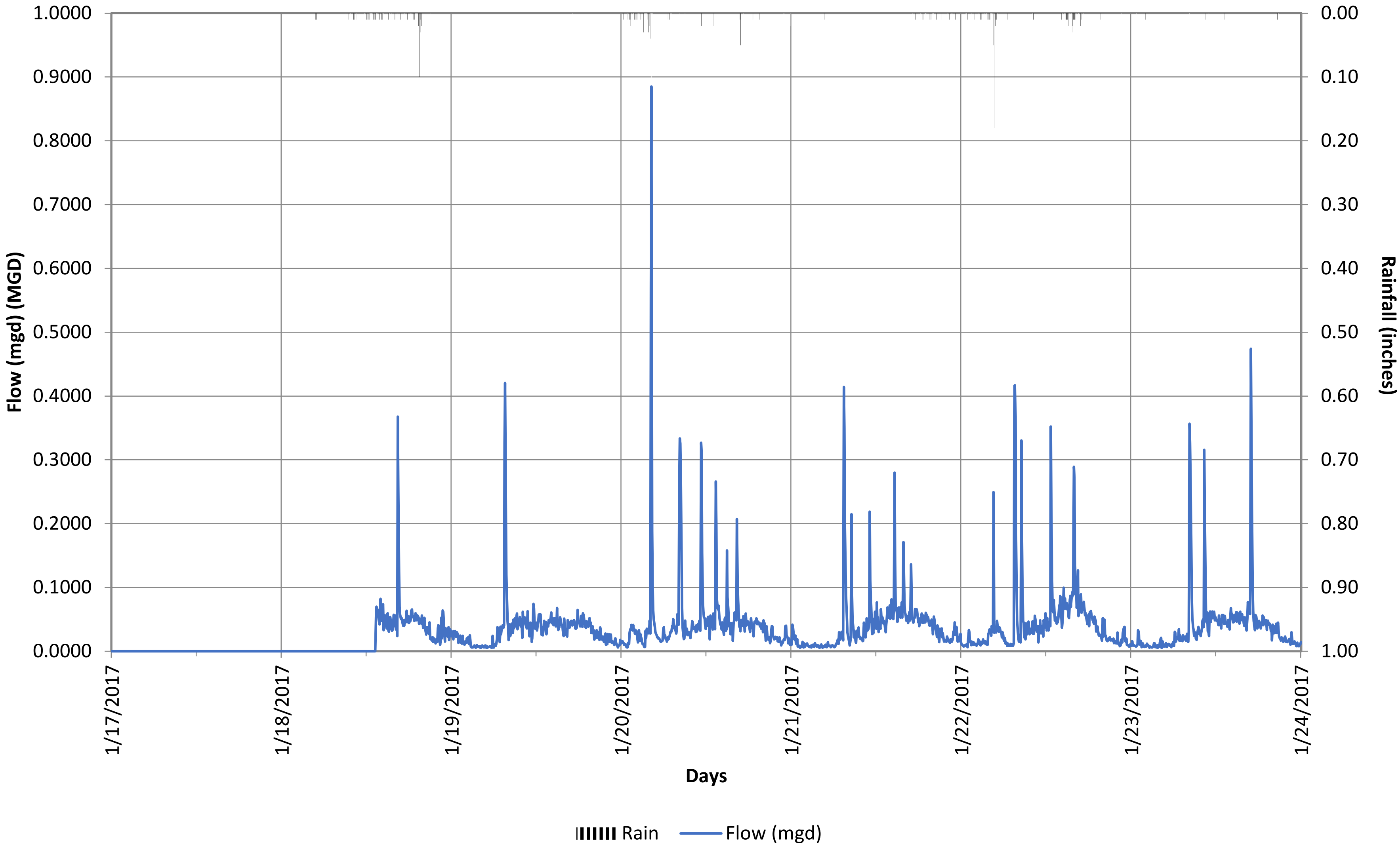
Day	Date	Avg Flow(MGD)	Min Flow(MGD)	Max Flow(MGD)	Max Depth(in.)	Rain(in.)
Tuesday	1/17/17	0.000	0.000	0.000	0.000	0.00
Wednesday	1/18/17	0.021	0.000	0.368	5.742	0.88
Thursday	1/19/17	0.033	0.005	0.421	5.270	0.02
Friday	1/20/17	0.048	0.006	0.885	10.868	1.13
Saturday	1/21/17	0.039	0.005	0.414	6.551	0.25
Sunday	1/22/17	0.045	0.006	0.417	6.277	1.00
Monday	1/23/17	0.039	0.005	0.474	5.938	0.18
Tuesday	1/24/17	0.037	0.005	0.394	6.262	0.01
Wednesday	1/25/17	0.038	0.005	0.412	6.631	0.00
Thursday	1/26/17	0.047	0.007	0.475	6.332	0.00
Friday	1/27/17	0.041	0.007	0.378	6.379	0.00
Saturday	1/28/17	0.045	0.006	0.459	5.620	0.00
Sunday	1/29/17	0.039	0.005	0.481	5.472	0.00
Monday	1/30/17	0.037	0.006	0.444	6.092	0.00
Tuesday	1/31/17	0.041	0.005	0.405	6.397	0.00
Wednesday	2/1/17	0.040	0.006	0.518	6.482	0.01
Thursday	2/2/17	0.038	0.007	0.432	6.080	0.19
Friday	2/3/17	0.037	0.005	0.383	6.921	0.51
Saturday	2/4/17	0.045	0.007	0.425	6.256	0.37
Sunday	2/5/17	0.035	0.005	0.425	5.479	0.15
Monday	2/6/17	0.040	0.005	0.471	5.530	0.50
Tuesday	2/7/17	0.044	0.006	0.385	6.257	0.86
Wednesday	2/8/17	0.039	0.005	0.490	6.010	0.26
Thursday	2/9/17	0.046	0.006	0.422	6.130	0.77
Friday	2/10/17	0.046	0.007	0.422	5.568	0.04
Saturday	2/11/17	0.047	0.007	0.940	5.595	0.00
Sunday	2/12/17	0.046	0.006	0.279	5.390	0.00
Monday	2/13/17	0.048	0.006	0.275	5.371	0.00
Tuesday	2/14/17	0.047	0.008	0.248	5.403	0.00
Wednesday	2/15/17	0.049	0.008	0.244	5.614	0.00
Thursday	2/16/17	0.056	0.008	0.243	5.649	0.39
Friday	2/17/17	0.063	0.009	0.241	6.061	1.23
Saturday	2/18/17	0.057	0.014	0.241	5.903	0.14
Sunday	2/19/17	0.053	0.008	0.259	5.780	0.08
Monday	2/20/17	0.068	0.013	0.264	6.469	1.61
Tuesday	2/21/17	0.052	0.014	0.243	5.576	0.19
Wednesday	2/22/17	0.047	0.007	0.228	5.455	0.00


Colma Site 8 SSMH8E23 North 8" Daily Sanitary Flow
MGD
Inches
0.160
0.140
0.120
0.100
0.080
0.060
0.040
0.020
0.000
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
1/17/17
1/18/17
1/19/17
1/20/17
1/21/17
1/22/17
1/23/17
1/24/17
1/25/17
1/26/17
1/27/17
1/28/17
1/29/17
1/30/17
1/31/17
2/1/17
2/2/17
2/3/17
2/4/17
2/5/17
2/6/17
2/7/17
2/8/17
2/9/17
2/10/17
2/11/17
2/12/17
2/13/17
2/14/17
2/15/17
2/16/17
2/17/17
2/18/17
2/19/17
2/20/17
2/21/17
2/22/17
Rain(in.)
Avg Flow(MGD)



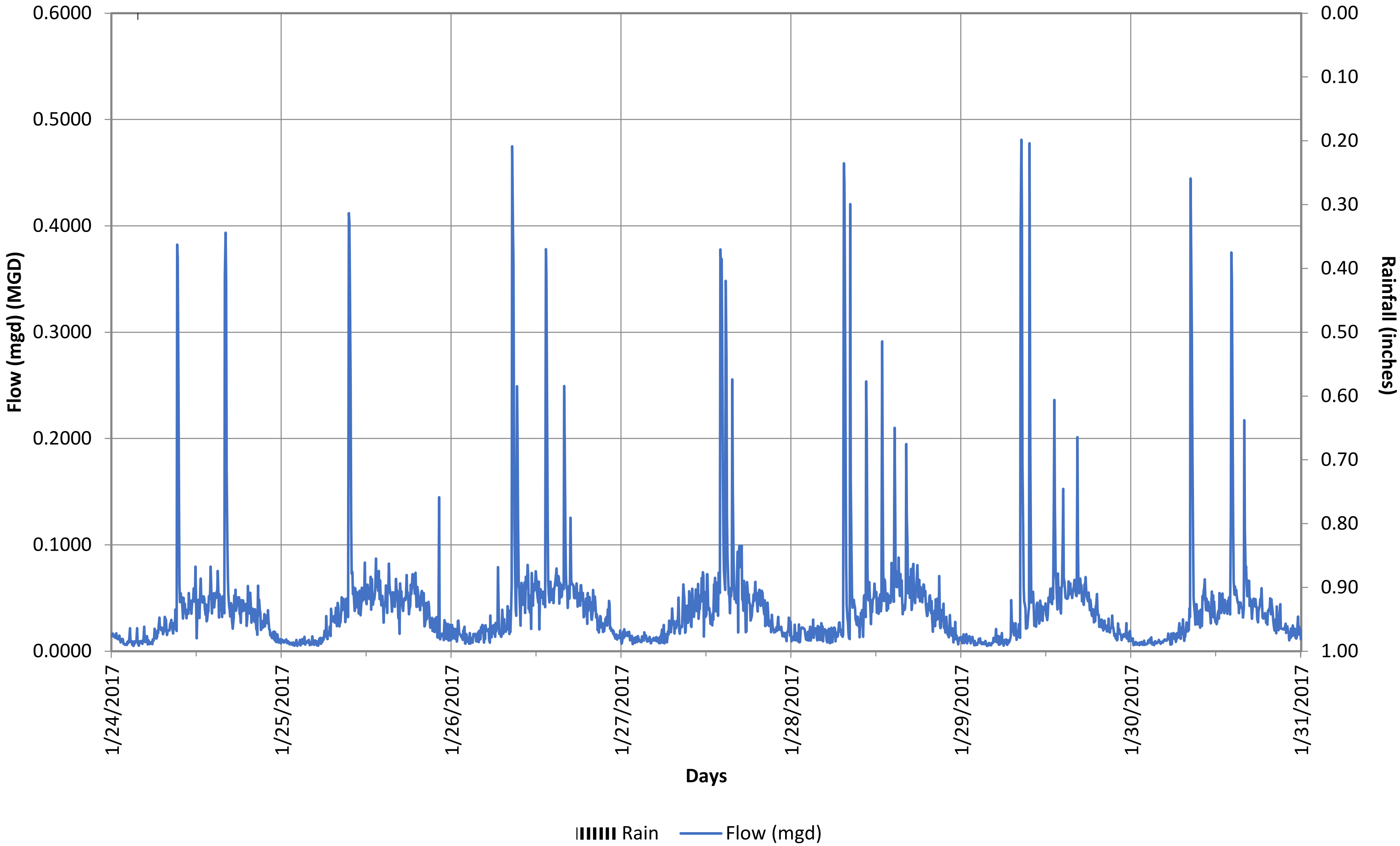
Scatter Plot
Velocity Feet Per Second
Inches of Flow
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00

Colma Site 8 SSMH8E23 North 8" Sanitary Flow



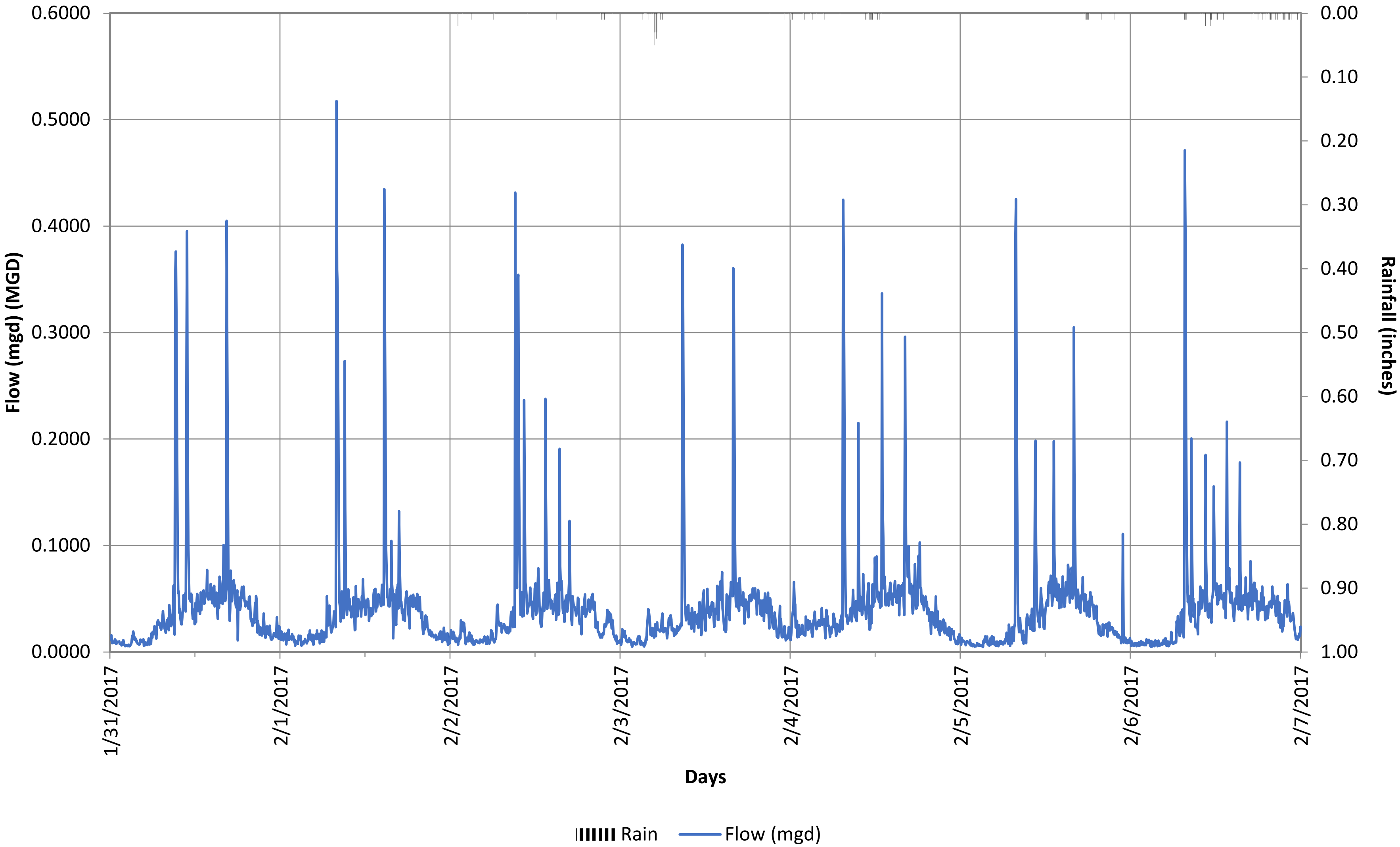
	1/17/2017(Tue)	1/18/2017(Wed)	1/19/2017(Thu)	1/20/2017(Fri)	1/21/2017(Sat)	1/22/2017(Sun)	1/23/2017(Mon)
Maximum	0.000	0.368	0.421	0.885	0.414	0.417	0.474
Average	0.000	0.021	0.033	0.048	0.039	0.045	0.039
Minimum	0.000	0.000	0.005	0.006	0.005	0.006	0.005
Rain (inches)	0.00	0.88	0.02	1.13	0.25	1.00	0.18

Colma Site 8 SSMH8E23 North 8" Sanitary Flow



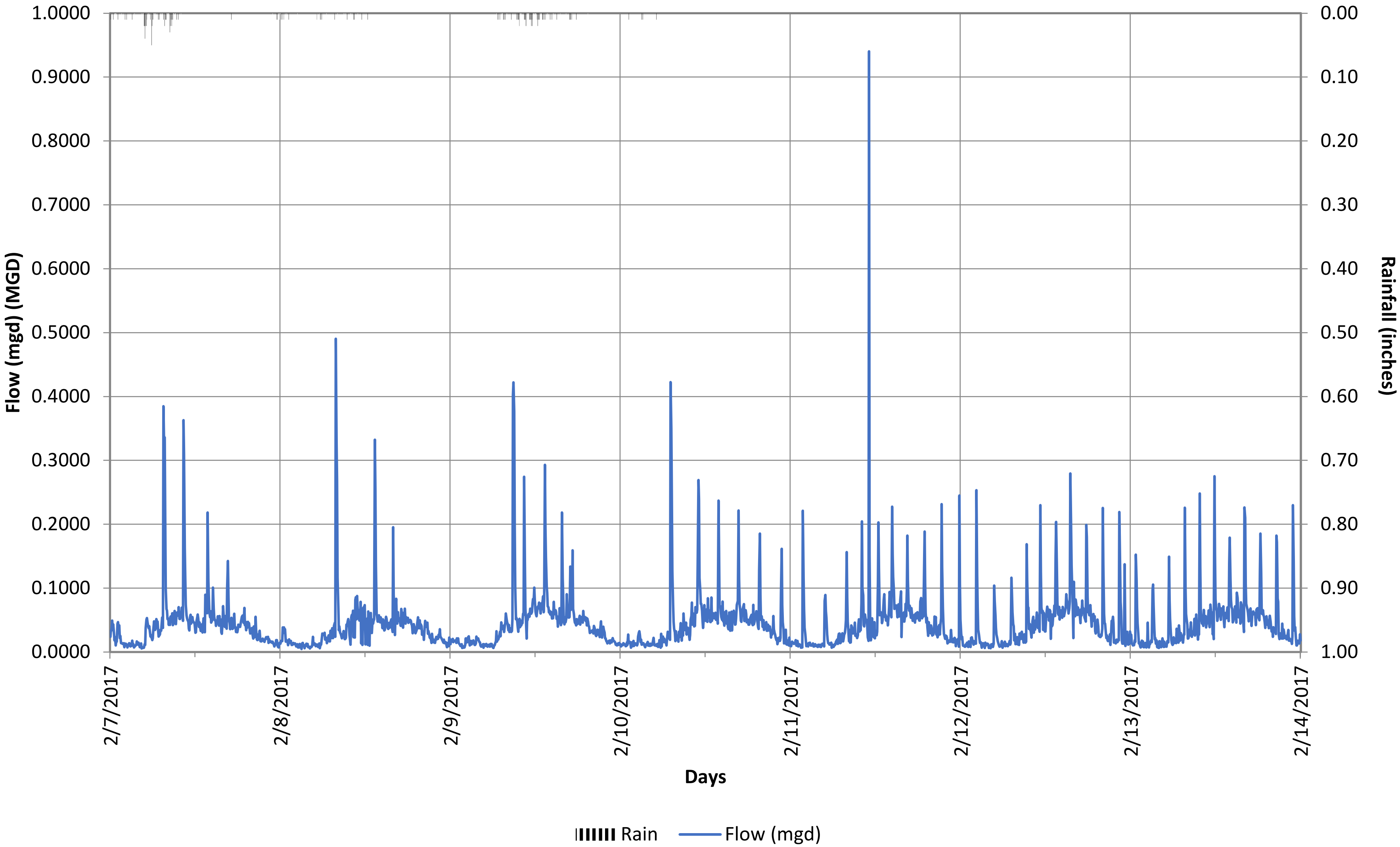
	1/24/2017(Tue)	1/25/2017(Wed)	1/26/2017(Thu)	1/27/2017(Fri)	1/28/2017(Sat)	1/29/2017(Sun)	1/30/2017(Mon)
Maximum	0.394	0.412	0.475	0.378	0.459	0.481	0.444
Average	0.037	0.038	0.047	0.041	0.045	0.039	0.037
Minimum	0.005	0.005	0.007	0.007	0.006	0.005	0.006
Rain (inches)	0.01	0.00	0.00	0.00	0.00	0.00	0.00

Colma Site 8 SSMH8E23 North 8" Sanitary Flow



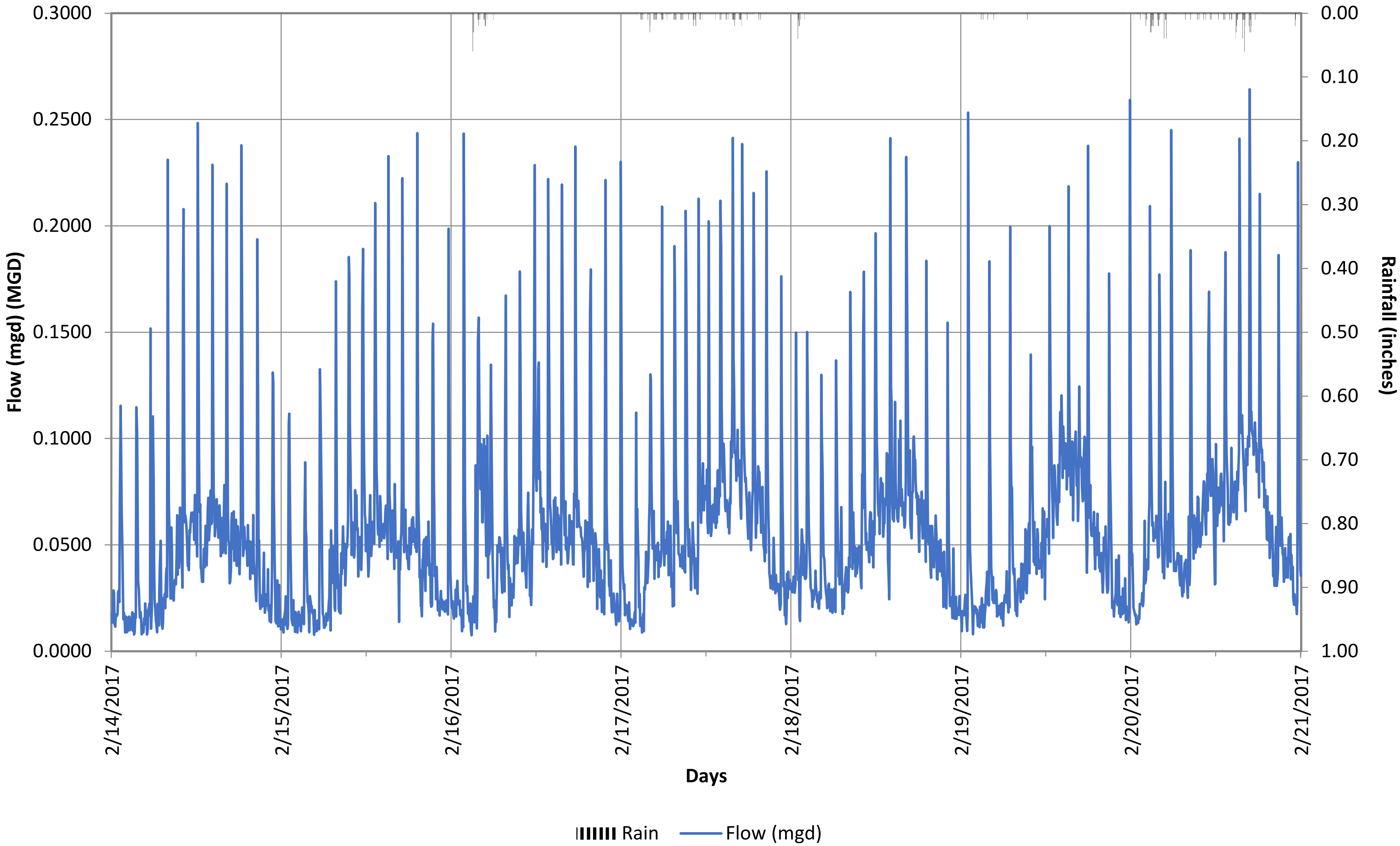
	1/31/2017(Tue)	2/1/2017(Wed)	2/2/2017(Thu)	2/3/2017(Fri)	2/4/2017(Sat)	2/5/2017(Sun)	2/6/2017(Mon)
Maximum	0.405	0.518	0.432	0.383	0.425	0.425	0.471
Average	0.041	0.040	0.038	0.037	0.045	0.035	0.040
Minimum	0.005	0.006	0.007	0.005	0.007	0.005	0.005
Rain (inches)	0.00	0.01	0.19	0.51	0.37	0.15	0.50

Colma Site 8 SSMH8E23 North 8" Sanitary Flow



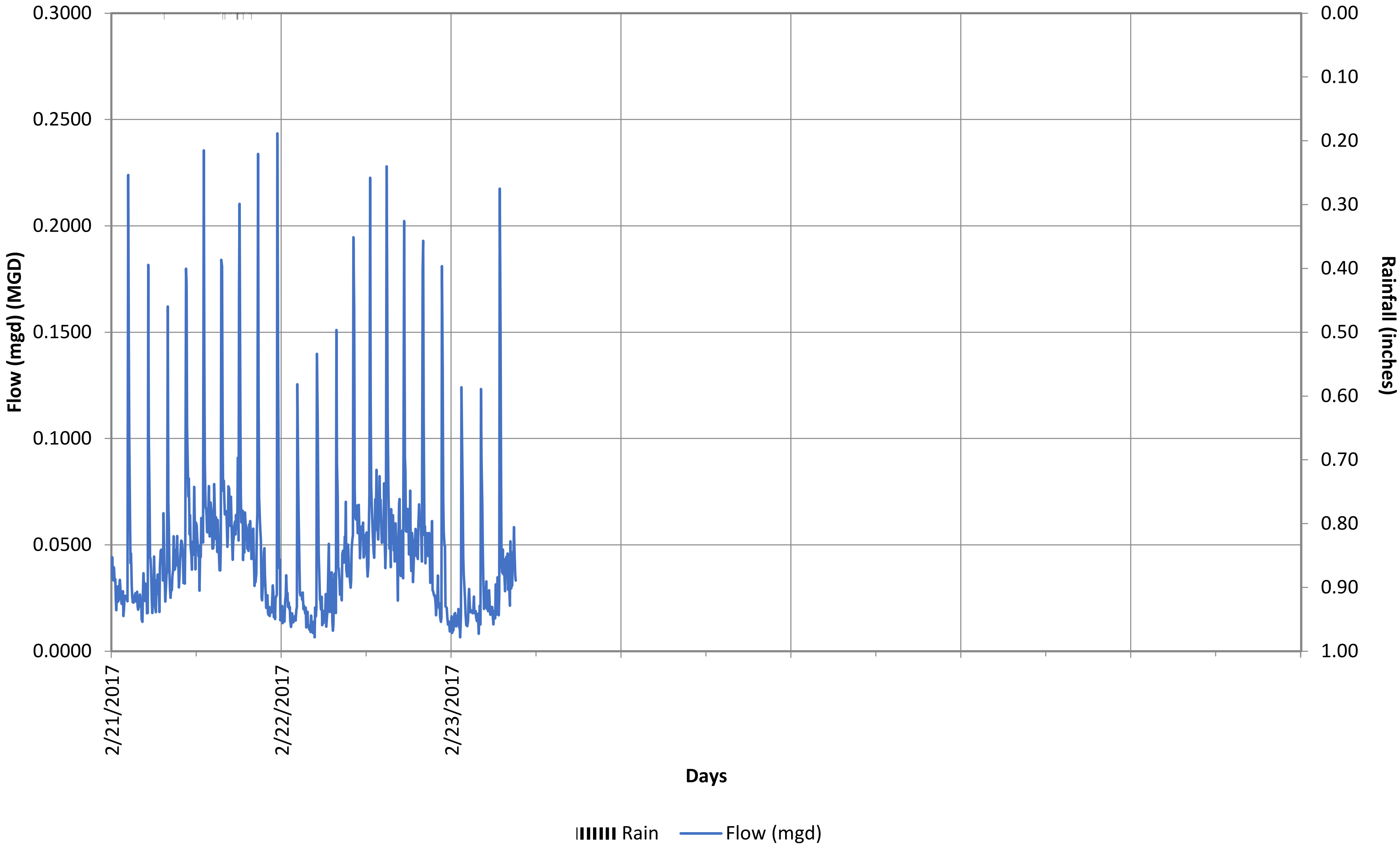
	2/7/2017(Tue)	2/8/2017(Wed)	2/9/2017(Thu)	2/10/2017(Fri)	2/11/2017(Sat)	2/12/2017(Sun)	2/13/2017(Mon)
Maximum	0.385	0.490	0.422	0.422	0.940	0.279	0.275
Average	0.044	0.039	0.046	0.046	0.047	0.046	0.048
Minimum	0.006	0.005	0.006	0.007	0.007	0.006	0.006
Rain (inches)	0.86	0.26	0.77	0.04	0.00	0.00	0.00

Colma Site 8 SSMH8E23 North 8" Sanitary Flow



	2/14/2017(Tue)	2/15/2017(Wed)	2/16/2017(Thu)	2/17/2017(Fri)	2/18/2017(Sat)	2/19/2017(Sun)	2/20/2017(Mon)
Maximum	0.248	0.244	0.243	0.241	0.241	0.259	0.264
Average	0.047	0.049	0.056	0.063	0.057	0.053	0.068
Minimum	0.008	0.008	0.008	0.009	0.014	0.008	0.013
Rain (inches)	0.00	0.00	0.39	1.23	0.14	0.08	1.61

Colma Site 8 SSMH8E23 North 8" Sanitary Flow

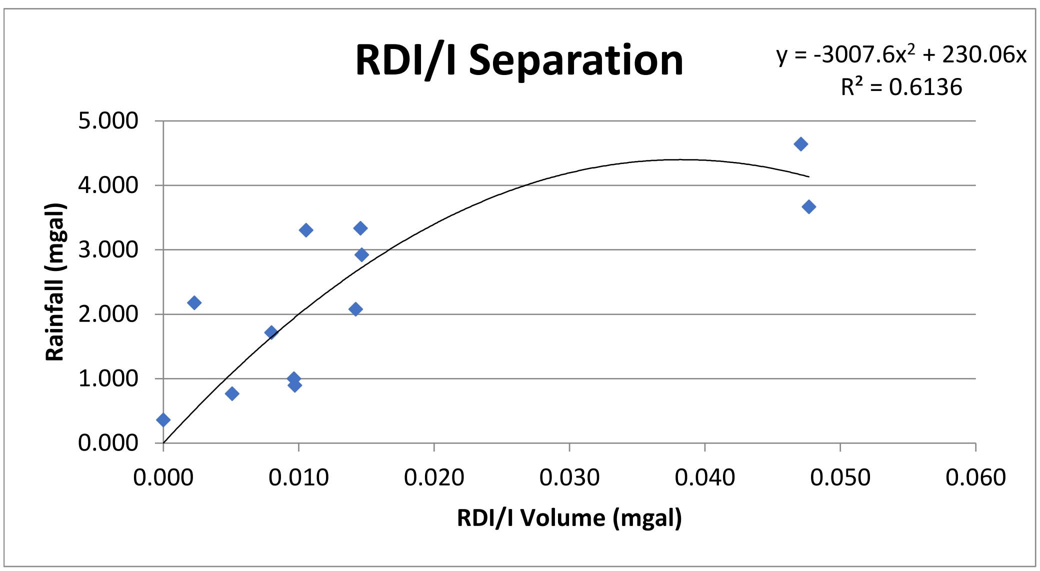


	2/21/2017(Tue)	2/22/2017(Wed)				
Maximum	0.243	0.228				
Average	0.052	0.047				
Minimum	0.014	0.007				
Rain (inches)	0.19	0.00				

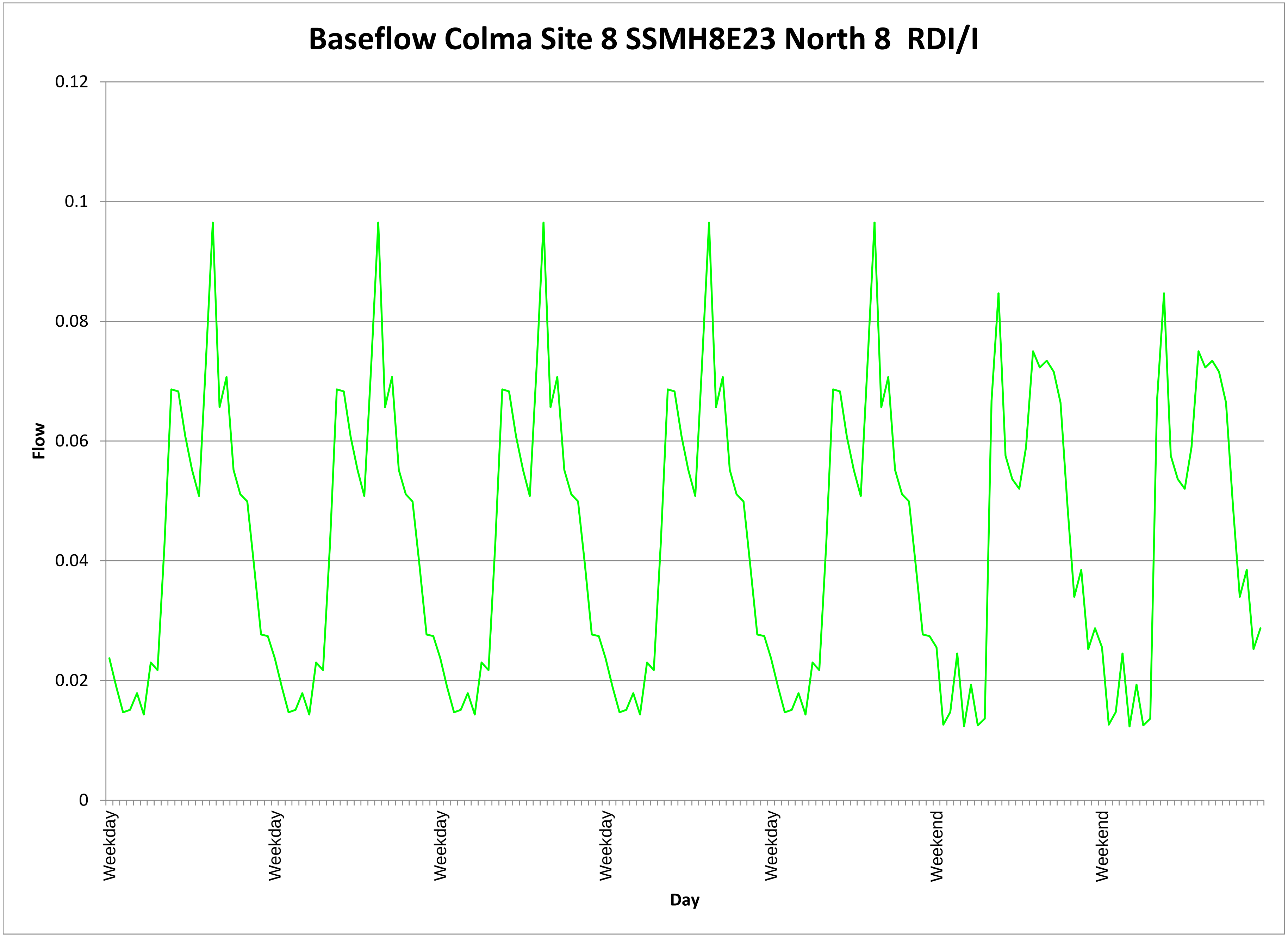
Colma Site 8 SSMH8E23 North 8 RDI/I

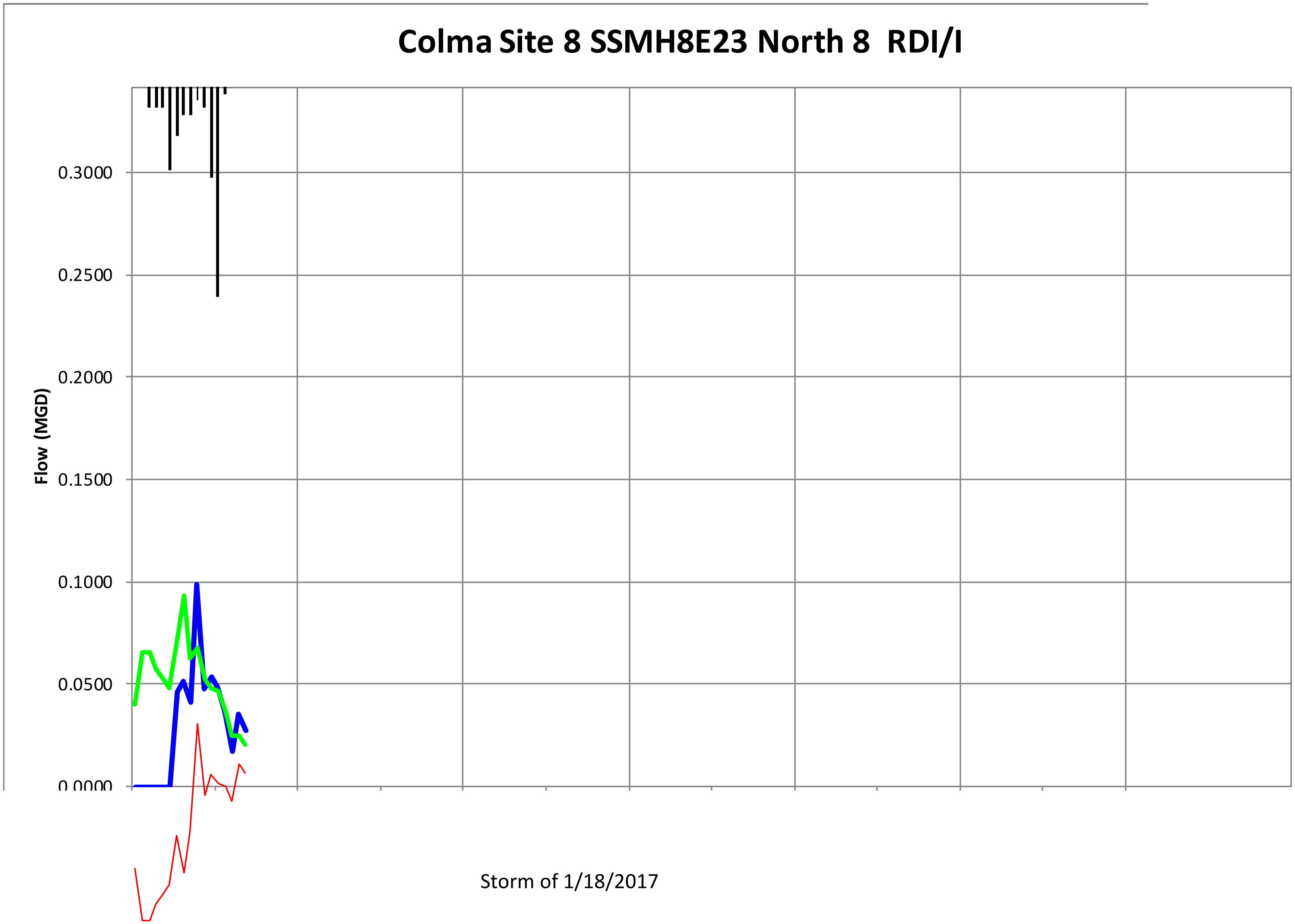
RDI/I Analysis, Monitor Return Ratio Summary

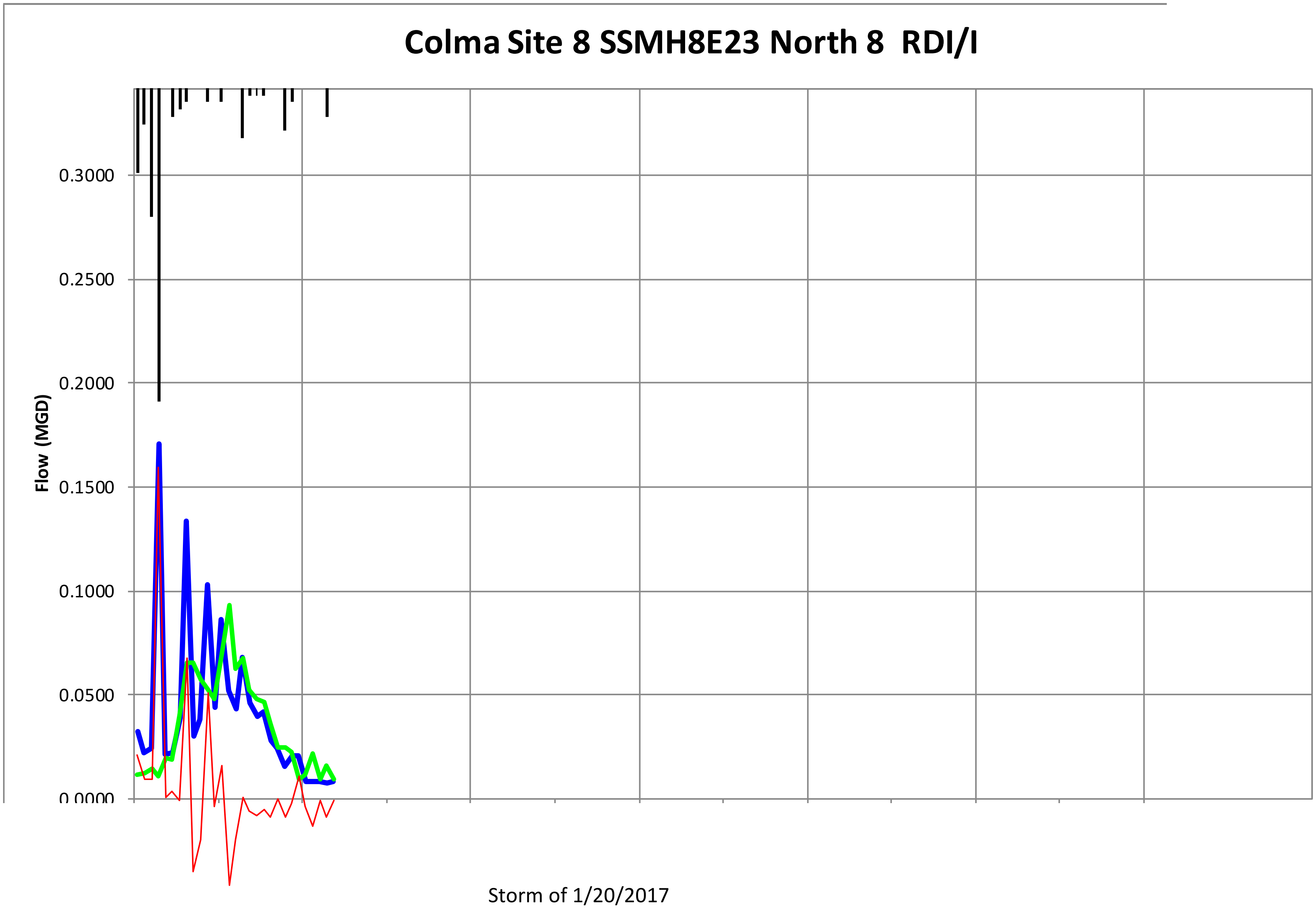
Storm Start (Date)	RDI/I Volume (mgal)	Monitor Area (acres)	Rainfall (mgal)	Return Ratio (%)
1/18/2017	0.002	94.4	2.179	0.11%
1/20/2017	0.015	94.4	2.922	0.50%
1/21/2017	0.011	94.4	3.307	0.32%
2/2/2017	0.008	94.4	1.717	0.47%
2/4/2017	0.010	94.4	0.897	1.08%
2/5/2017	0.000	94.4	0.359	0.00%
2/6/2017	0.015	94.4	3.332	0.44%
2/7/2017	0.005	94.4	0.769	0.66%
2/9/2017	0.014	94.4	2.076	0.68%
2/16/2017	0.010	94.4	1.000	0.96%
2/17/2017	0.048	94.4	3.665	1.30%
2/20/2017	0.047	94.4	4.639	1.01%
Average R%				0.63%
Average Top 3 Storms				1.13%

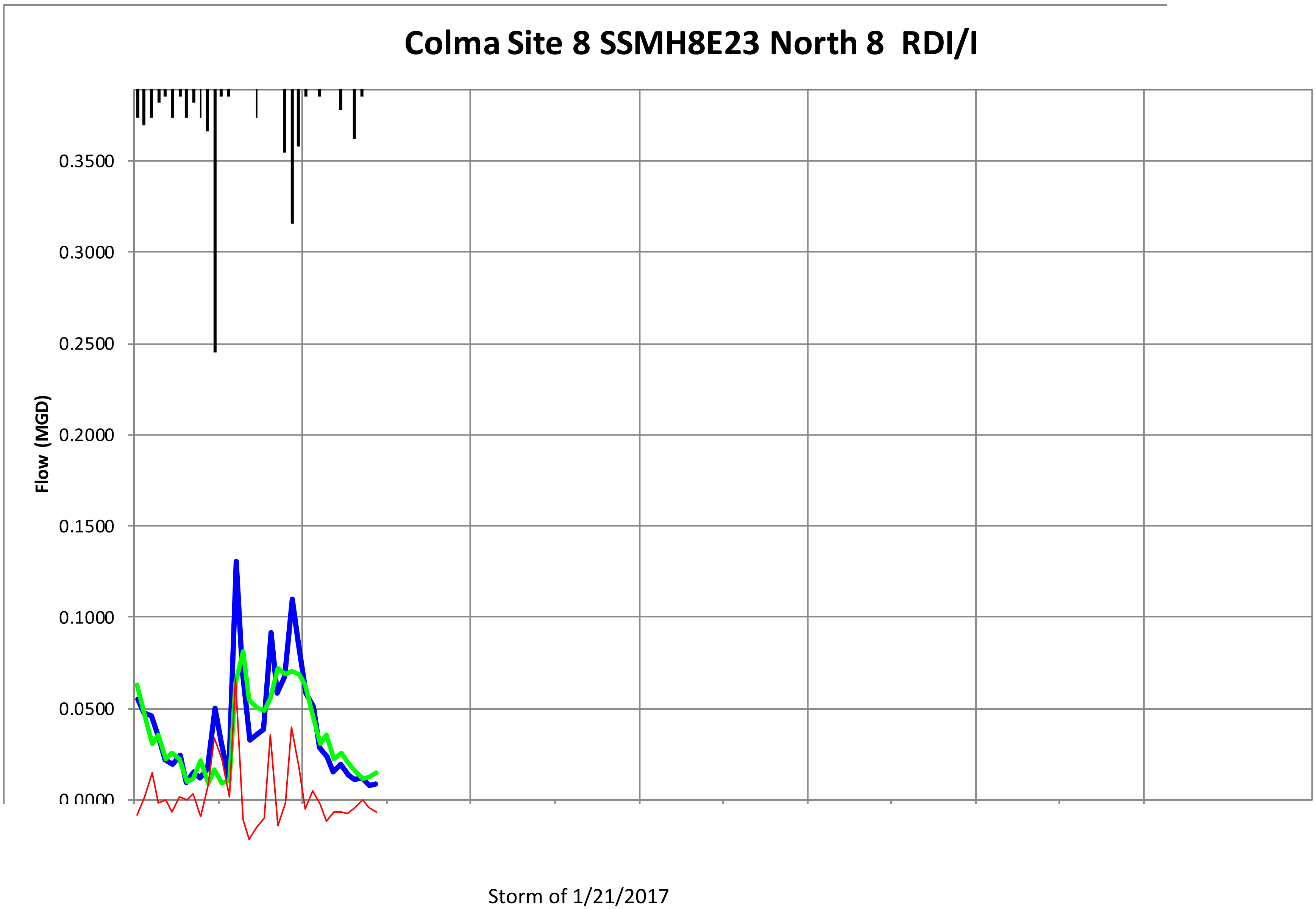


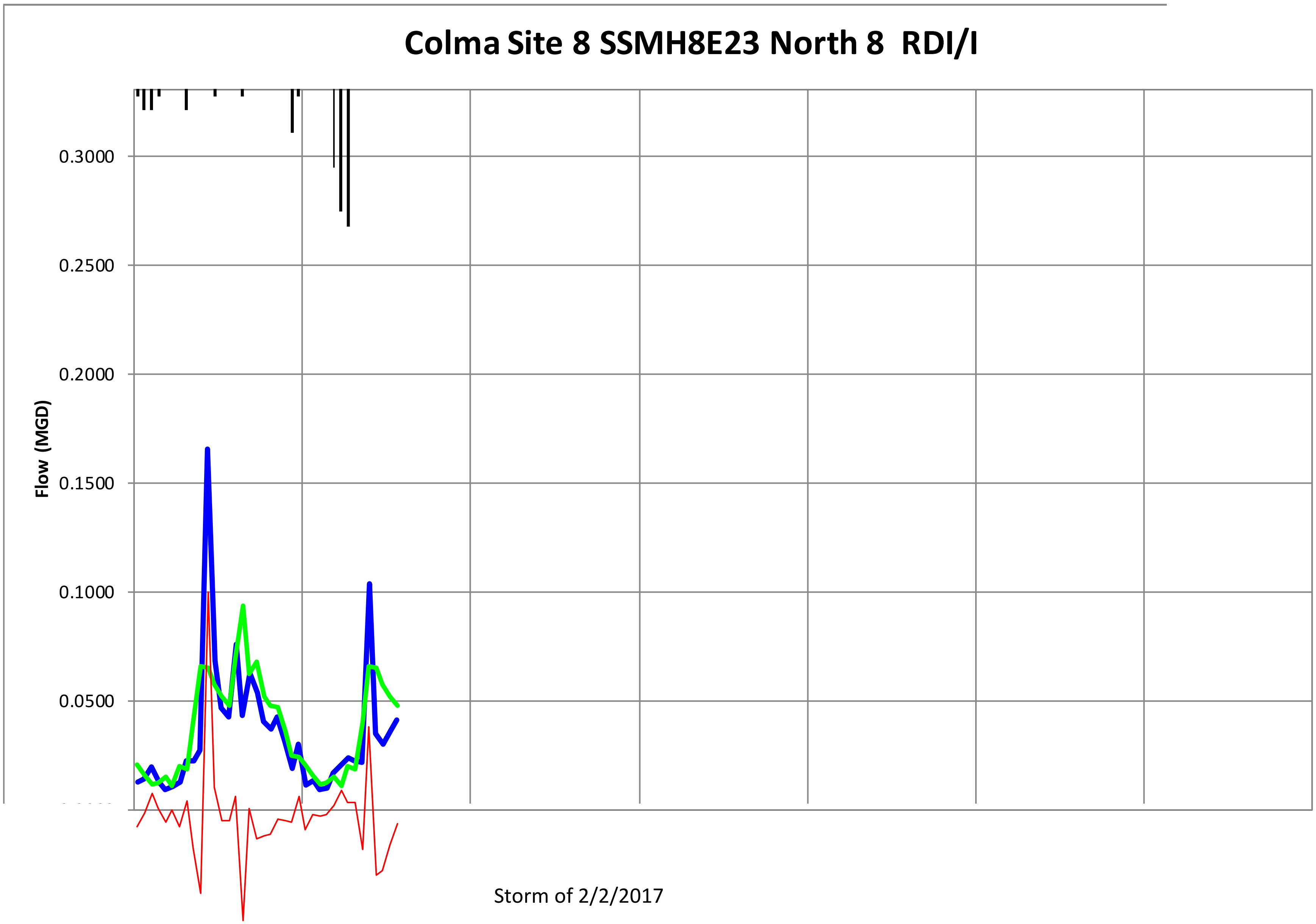
Baseflows	Weekend	Weekday
Max	0.085	0.097
Avg	0.043	0.044
Min	0.012	0.014


Baseflow Colma Site 8 SSMH8E23 North 8 RDI/I
0.12
0.1
0.08
0.06
0.04
0.02
0
Flow
Weekday
Weekday
Weekday
Weekday
Weekday
Weekend
Weekend
Day

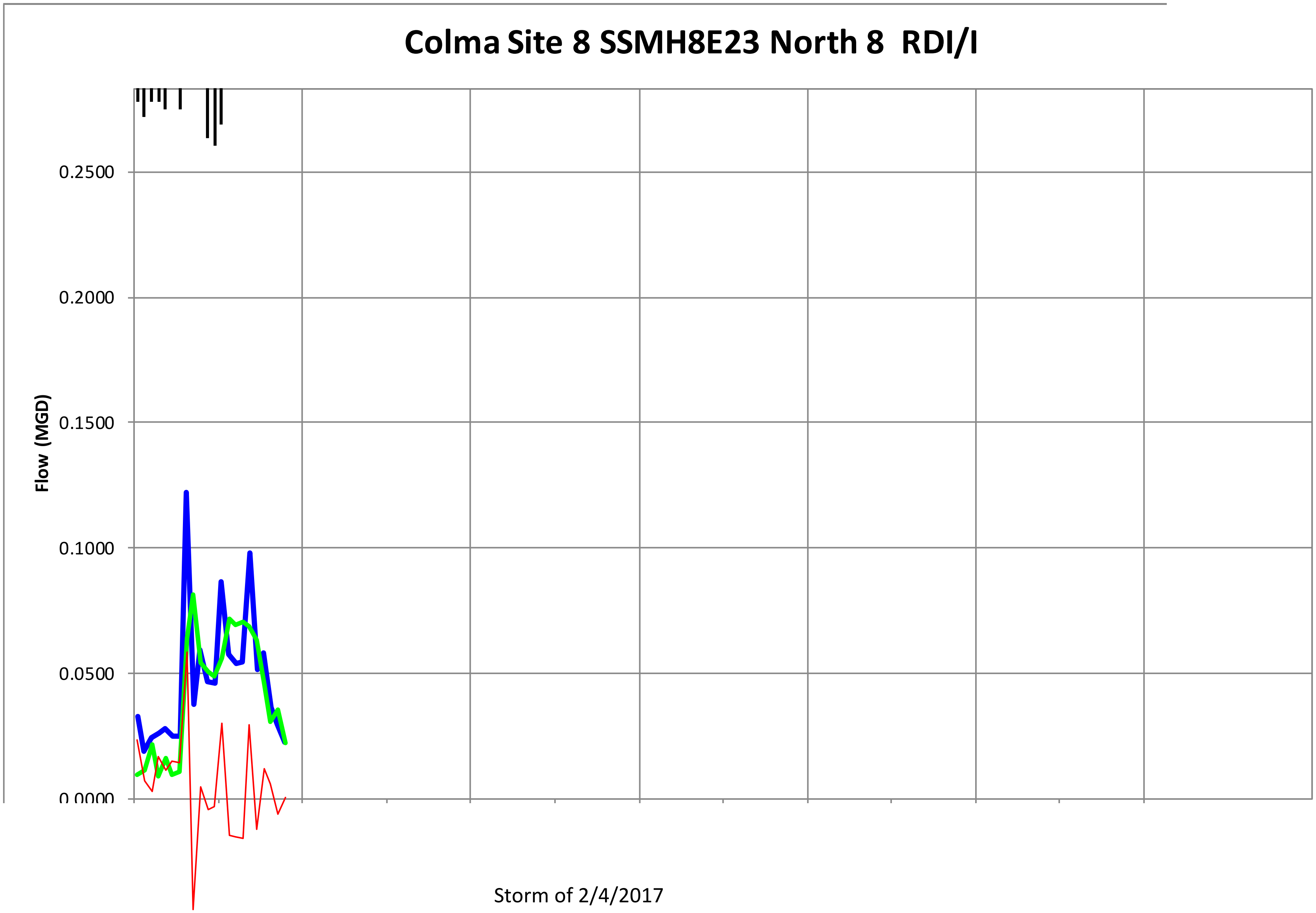

Colma Site 8 SSMH8E23 North 8 RDI/I
Flow (MGD)
0.3000
0.2500
0.2000
0.1500
0.1000
0.0500
0.0000
Storm of 1/18/2017


Colma Site 8 SSMH8E23 North 8 RDI/I
Flow (MGD)
0.3000
0.2500
0.2000
0.1500
0.1000
0.0500
0.0000
Storm of 1/20/2017

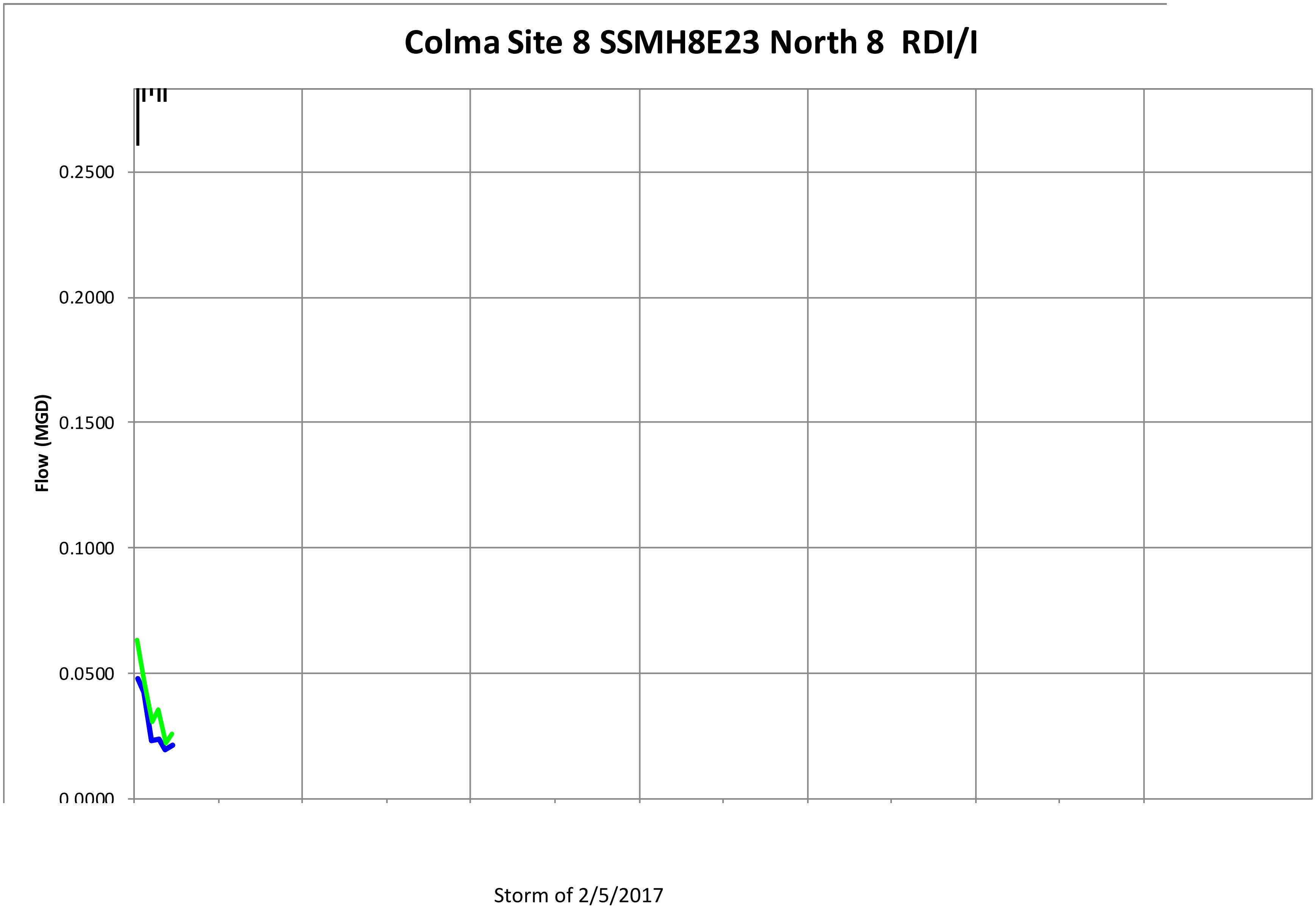

Colma Site 8 SSMH8E23 North 8 RDI/I
Flow (MGD)
0.3500
0.3000
0.2500
0.2000
0.1500
0.1000
0.0500
0.0000
Storm of 1/21/2017

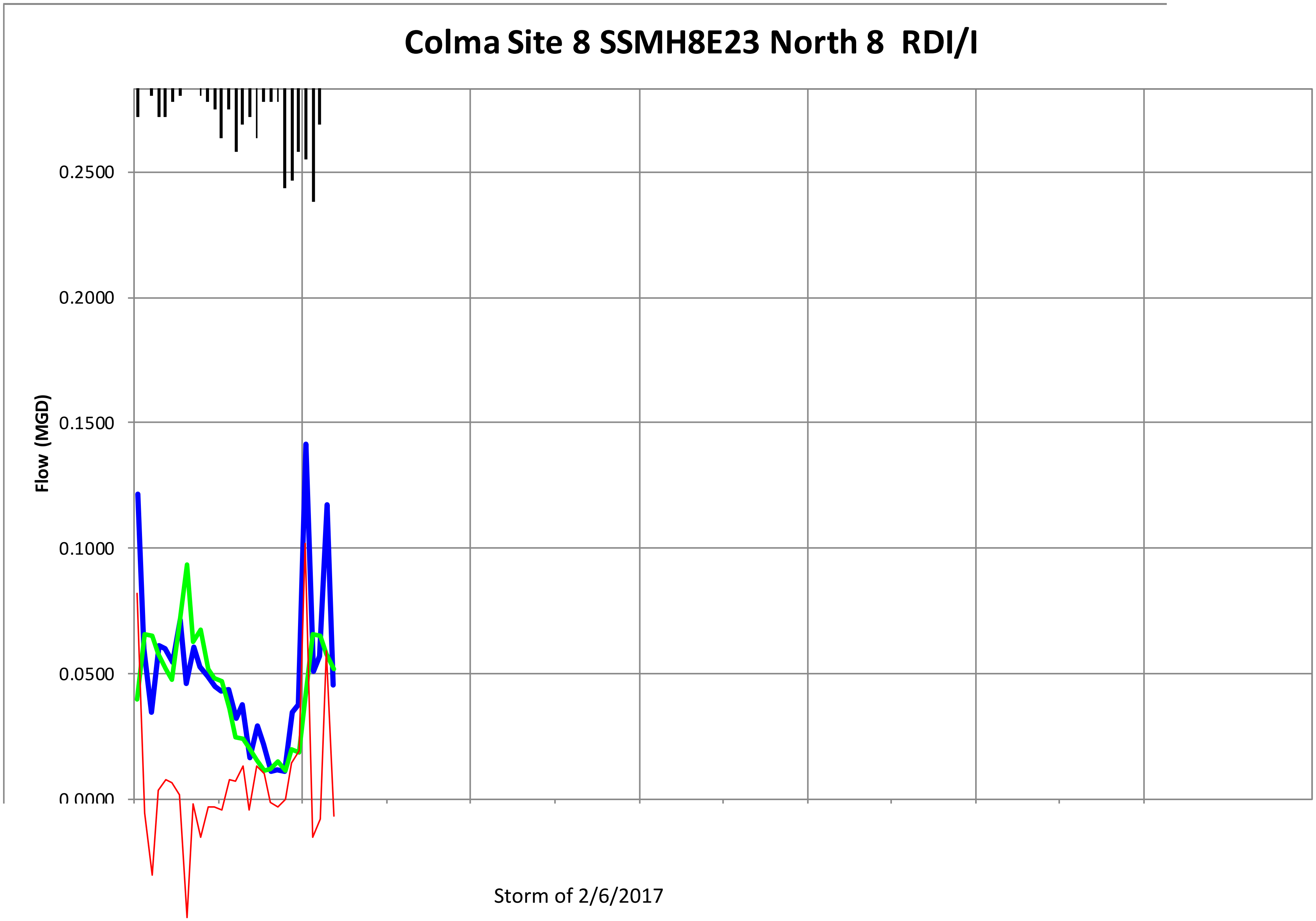


Colma Site 8 SSMH8E23 North 8 RDI/I
0.3000
0.2500
0.2000
0.1500
0.1000
0.0500
Flow (MGD)
Storm of 2/2/2017

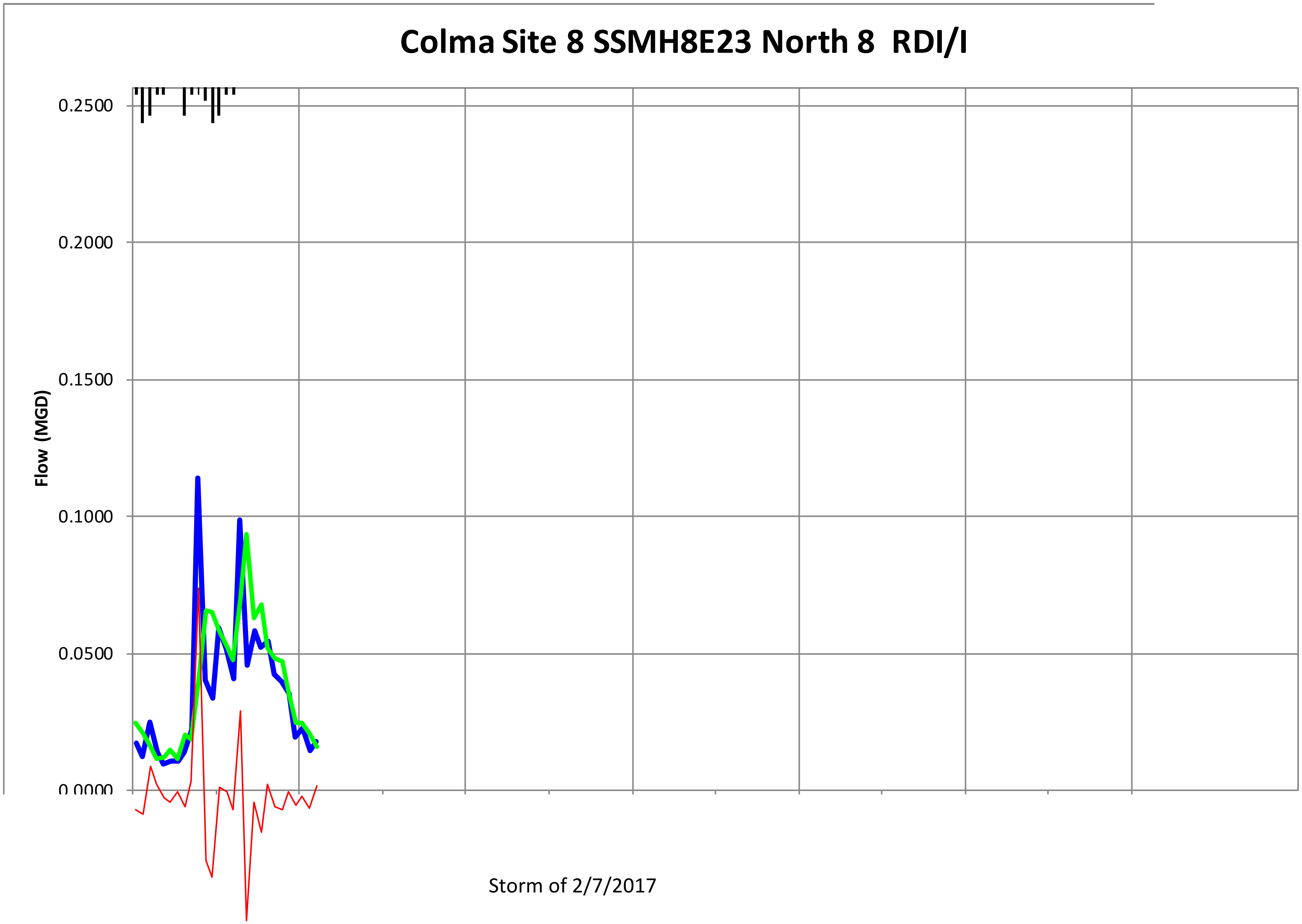


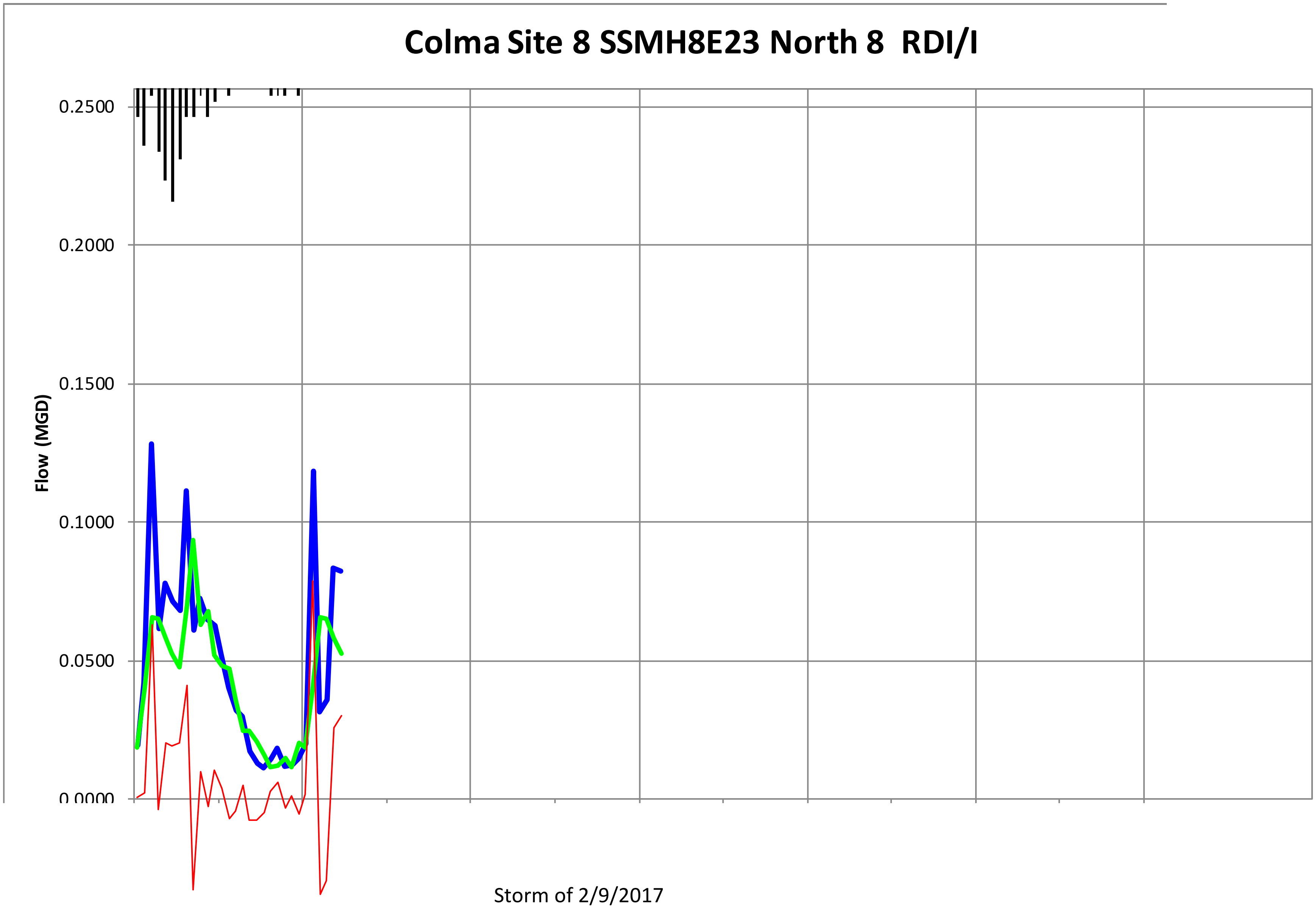
Colma Site 8 SSMH8E23 North 8 RDI/I
Flow (MGD)
0.2500
0.2000
0.1500
0.1000
0.0500
0.0000
Storm of 2/4/2017


Colma Site 8 SSMH8E23 North 8 RDI/I
Flow (MGD)
0.2500
0.2000
0.1500
0.1000
0.0500
0.0000
Storm of 2/5/2017

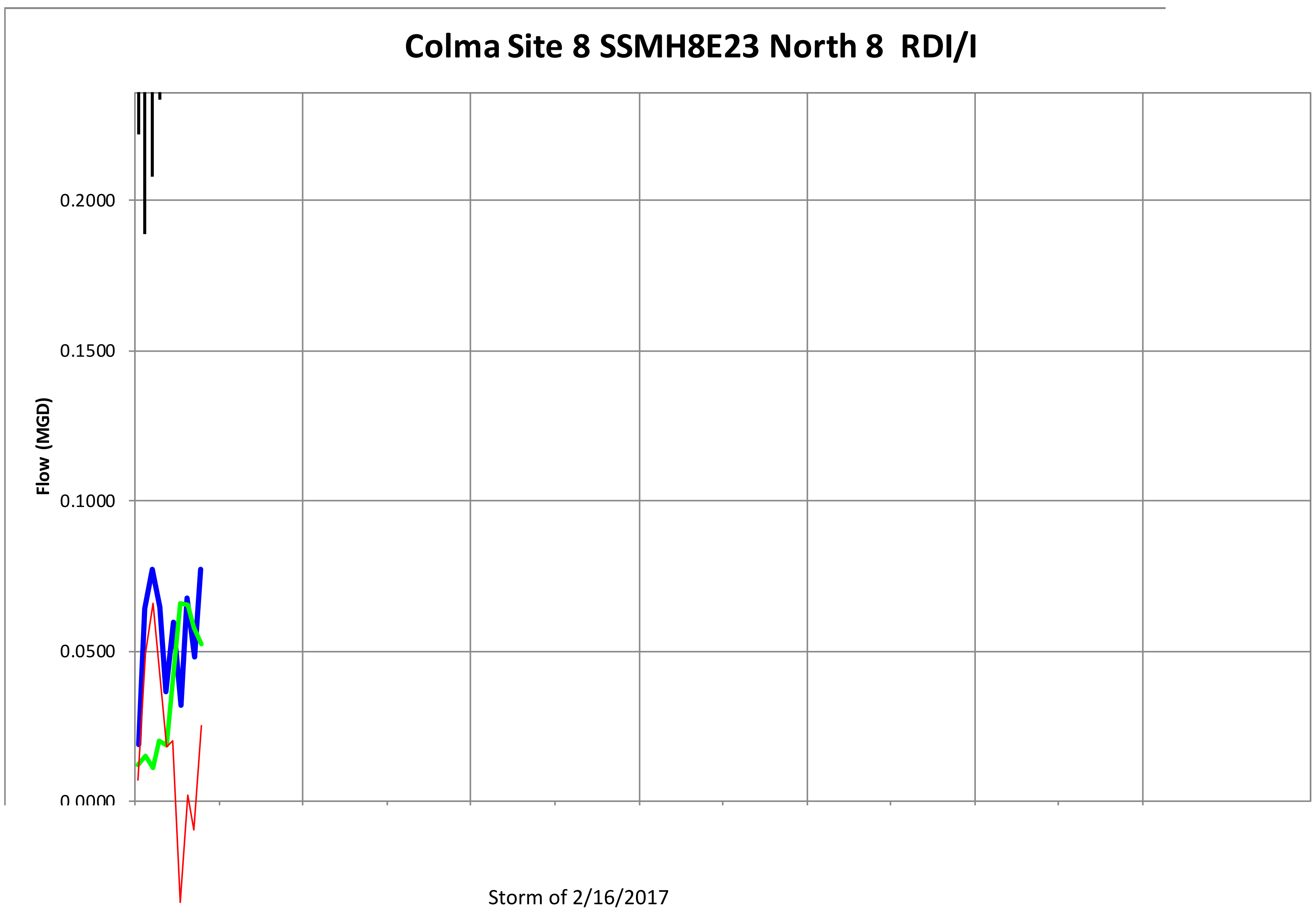


Colma Site 8 SSMH8E23 North 8 RDI/I
0.2500
0.2000
0.1500
0.1000
0.0500
0.0000
Flow (MGD)
Storm of 2/6/2017

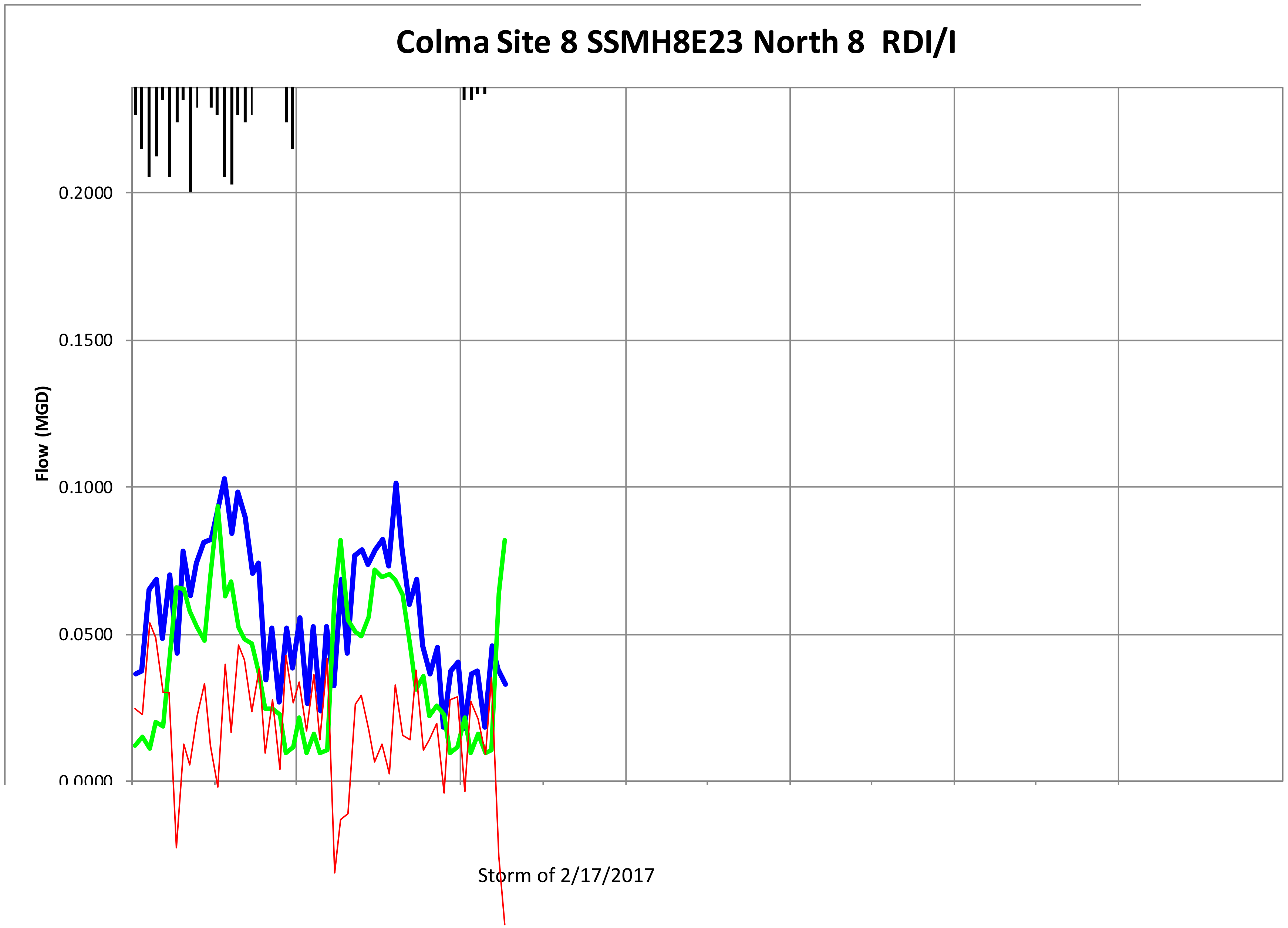

Colma Site 8 SSMH8E23 North 8 RDI/I
0.2500
0.2000
0.1500
0.1000
0.0500
0.0000
Flow (MGD)
Storm of 2/7/2017



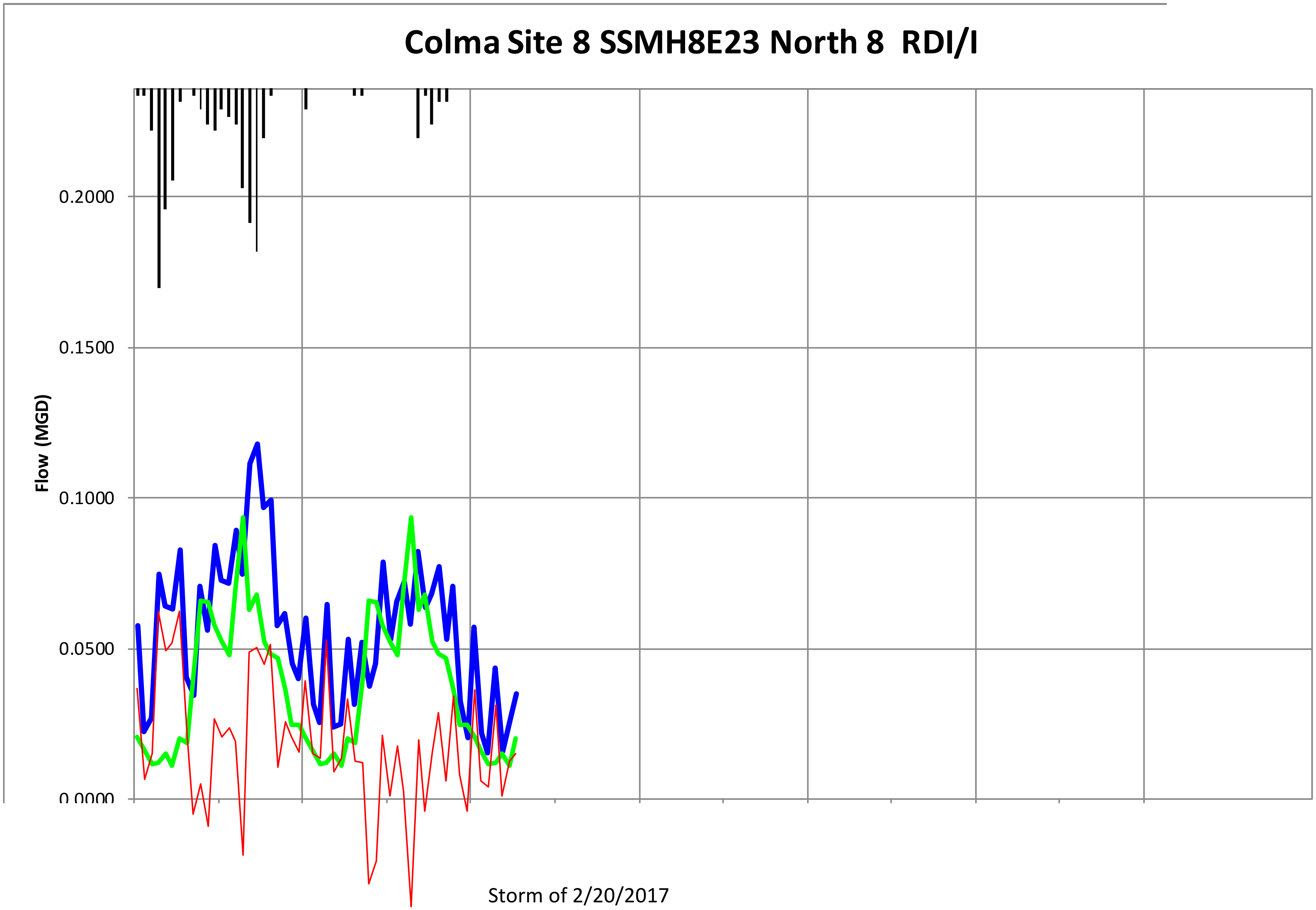
Colma Site 8 SSMH8E23 North 8 RDI/I
0.2500
0.2000
0.1500
0.1000
0.0500
0.0000
Flow (MGD)
Storm of 2/9/2017



Colma Site 8 SSMH8E23 North 8 RDI/I
0.2000
0.1500
0.1000
0.0500
0.0000
Flow (MGD)
Storm of 2/16/2017



Colma Site 8 SSMH8E23 North 8 RDI/I
0.2000
0.1500
0.1000
0.0500
0.0000
Flow (MGD)
Storm of 2/17/2017



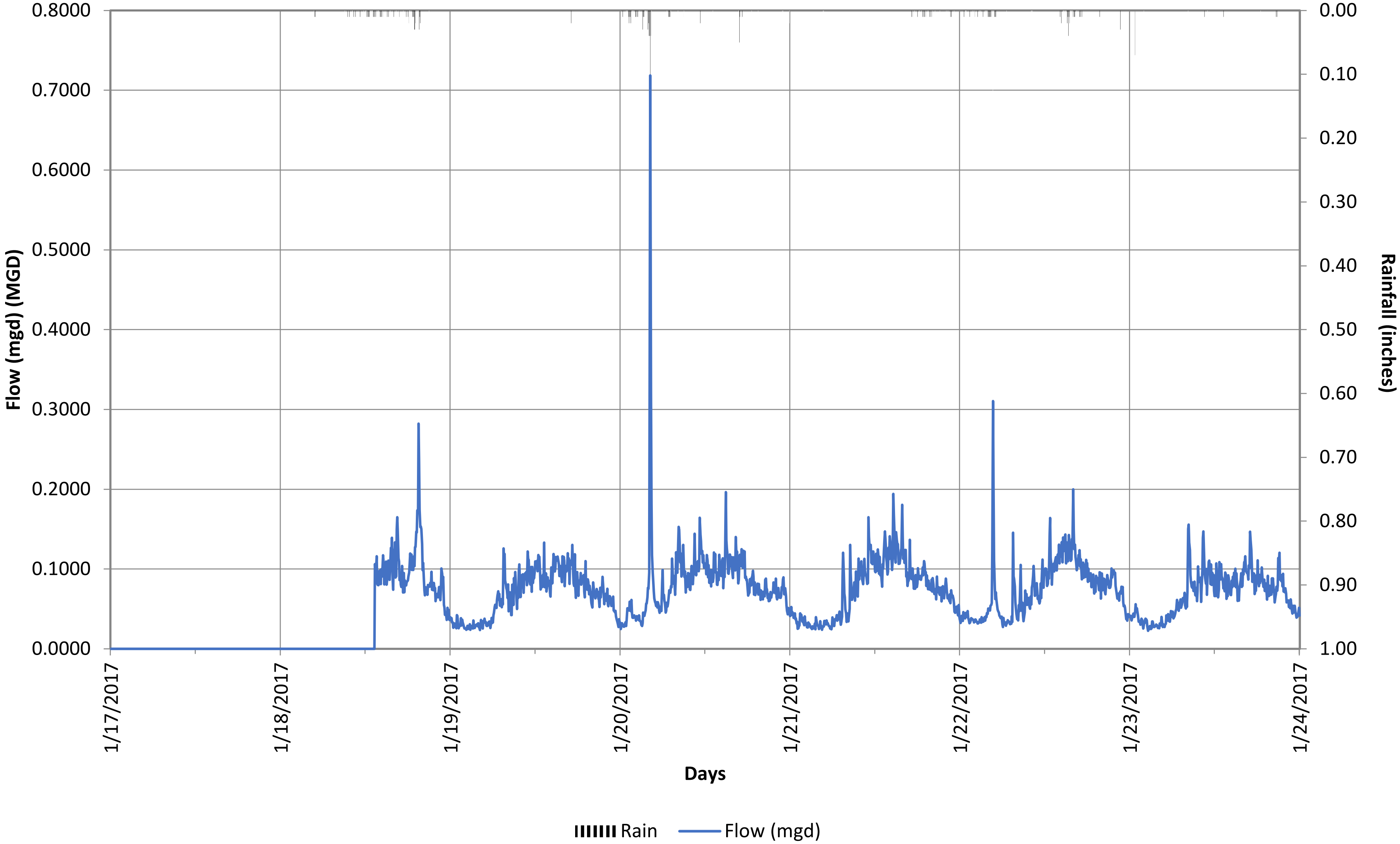
Colma Site 8 SSMH8E23 North 8 RDI/I
Flow (MGD)
0.2000
0.1500
0.1000
0.0500
0.0000
Storm of 2/20/2017

Colma Site 8 SSMH8E23 West 8" Sanitary Flow

Daily Summary

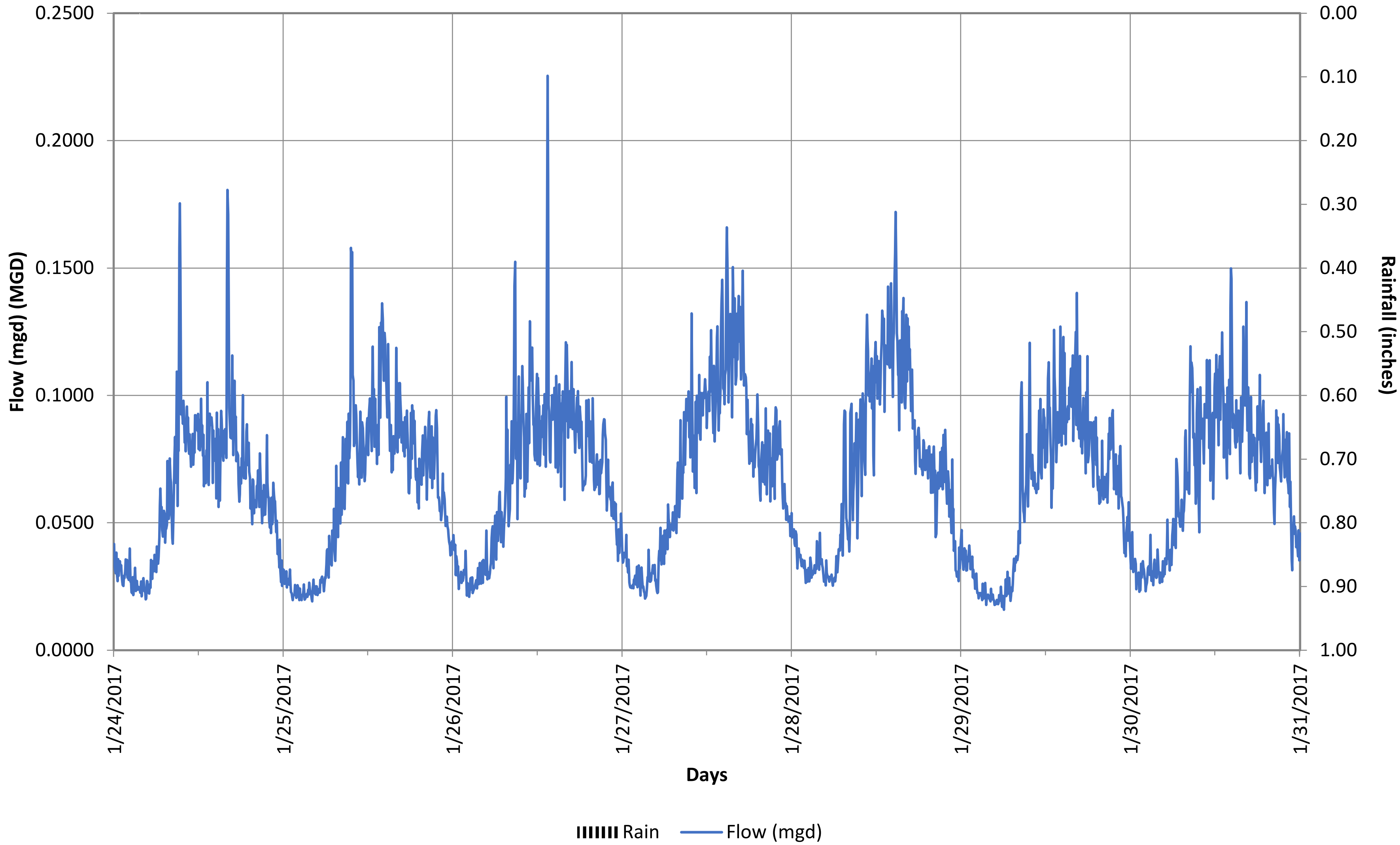
Day	Date	Avg Flow(MGD)	Min Flow(MGD)	Max Flow(MGD)	Max Depth(in.)	Rain(in.)
Tuesday	1/17/17	0.000	0.000	0.000	0.000	0.00
Wednesday	1/18/17	0.042	0.000	0.282	4.655	0.88
Thursday	1/19/17	0.068	0.024	0.133	4.676	0.02
Friday	1/20/17	0.085	0.025	0.719	10.068	1.13
Saturday	1/21/17	0.073	0.024	0.194	5.843	0.25
Sunday	1/22/17	0.075	0.027	0.310	5.446	1.00
Monday	1/23/17	0.068	0.023	0.156	5.197	0.18
Tuesday	1/24/17	0.062	0.020	0.181	5.355	0.01
Wednesday	1/25/17	0.064	0.019	0.158	5.190	0.00
Thursday	1/26/17	0.068	0.021	0.225	5.139	0.00
Friday	1/27/17	0.073	0.020	0.166	5.162	0.00
Saturday	1/28/17	0.071	0.025	0.172	4.347	0.00
Sunday	1/29/17	0.061	0.016	0.140	4.451	0.00
Monday	1/30/17	0.068	0.023	0.150	5.193	0.00
Tuesday	1/31/17	0.066	0.019	0.166	5.160	0.00
Wednesday	2/1/17	0.067	0.018	0.180	5.467	0.01
Thursday	2/2/17	0.071	0.023	0.178	5.165	0.19
Friday	2/3/17	0.077	0.019	0.229	5.930	0.51
Saturday	2/4/17	0.077	0.021	0.209	5.438	0.37
Sunday	2/5/17	0.064	0.018	0.140	4.500	0.15
Monday	2/6/17	0.069	0.018	0.138	4.743	0.50
Tuesday	2/7/17	0.080	0.030	0.223	5.345	0.86
Wednesday	2/8/17	0.072	0.019	0.147	5.112	0.26
Thursday	2/9/17	0.077	0.018	0.186	5.293	0.77
Friday	2/10/17	0.069	0.018	0.144	4.802	0.04
Saturday	2/11/17	0.074	0.022	0.183	4.455	0.00
Sunday	2/12/17	0.068	0.022	0.180	4.247	0.00
Monday	2/13/17	0.069	0.025	0.152	4.101	0.00
Tuesday	2/14/17	0.069	0.023	0.149	4.180	0.00
Wednesday	2/15/17	0.071	0.021	0.160	4.497	0.00
Thursday	2/16/17	0.076	0.021	0.156	4.191	0.39
Friday	2/17/17	0.092	0.020	0.192	4.878	1.23
Saturday	2/18/17	0.081	0.024	0.193	4.679	0.14
Sunday	2/19/17	0.072	0.021	0.162	4.485	0.08
Monday	2/20/17	0.108	0.037	0.262	5.172	1.61
Tuesday	2/21/17	0.075	0.026	0.159	4.391	0.19
Wednesday	2/22/17	0.068	0.017	0.170	4.295	0.00

Colma Site 8 SSMH8E23 West 8" Sanitary Flow



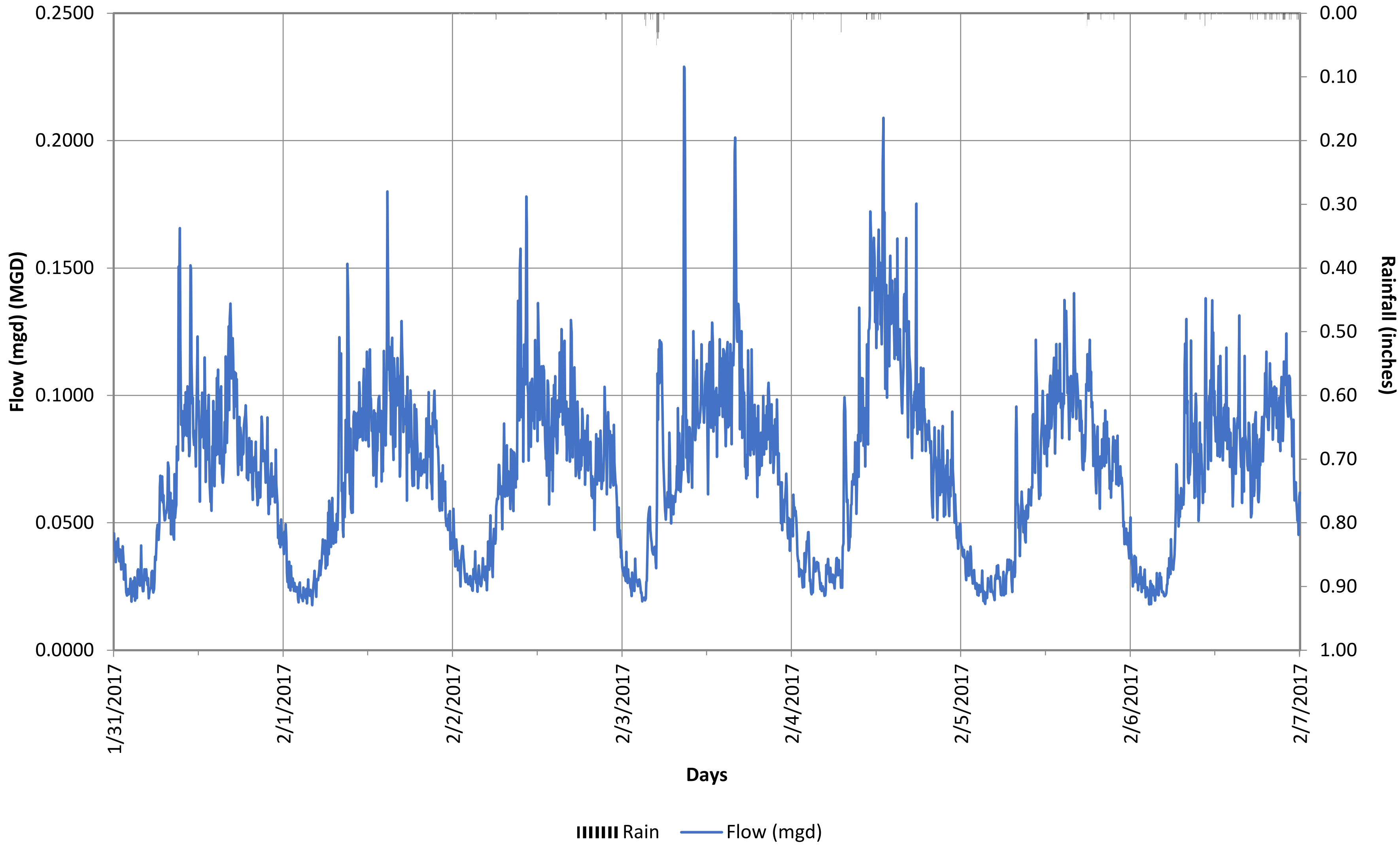
	1/17/2017 11:55:00 PM	(2017 11:55:00 PM	(2017 11:55:00 PM	(/2017 11:55:00 PM	/2017 11:55:00 PM	2017 11:55:00 PM	2017 11:55:00 PM(Mon)
Maximum	0.000	0.282	0.133	0.719	0.194	0.310	0.156
Average	0.000	0.042	0.068	0.085	0.073	0.075	0.068
Minimum	0.000	0.000	0.024	0.025	0.024	0.027	0.023
Rain (inches)	0.00	0.88	0.02	1.13	0.25	1.00	0.18

Colma Site 8 SSMH8E23 West 8" Sanitary Flow



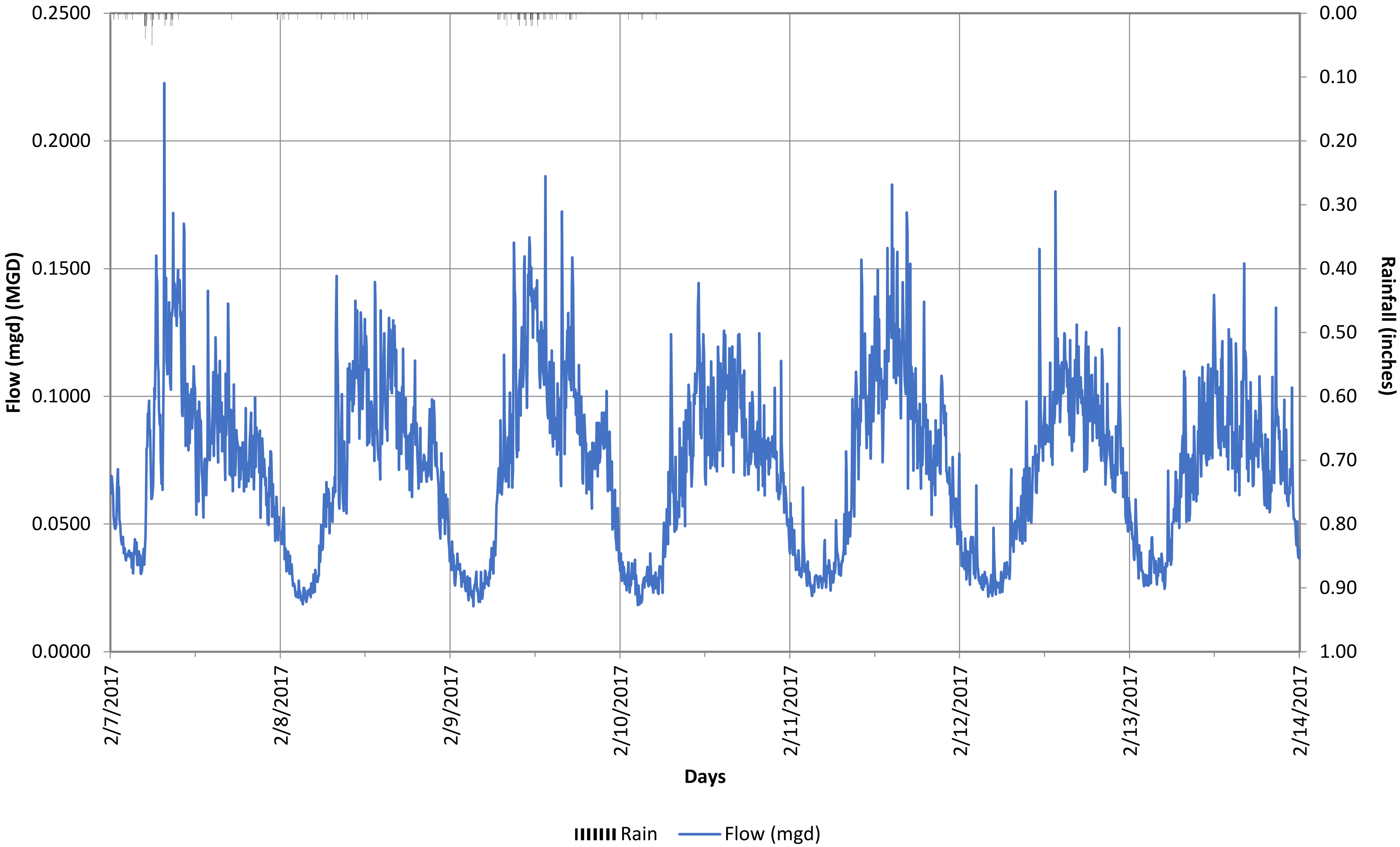
	1/24/2017 11:55:00 PM(	2017 11:55:00 PM(	2017 11:55:00 PM(	/2017 11:55:00 PM	/2017 11:55:00 PM	2017 11:55:00 PM	2017 11:55:00 PM(Mon)
Maximum	0.181	0.158	0.225	0.166	0.172	0.140	0.150
Average	0.062	0.064	0.068	0.073	0.071	0.061	0.068
Minimum	0.020	0.019	0.021	0.020	0.025	0.016	0.023
Rain (inches)	0.01	0.00	0.00	0.00	0.00	0.00	0.00

Colma Site 8 SSMH8E23 West 8" Sanitary Flow



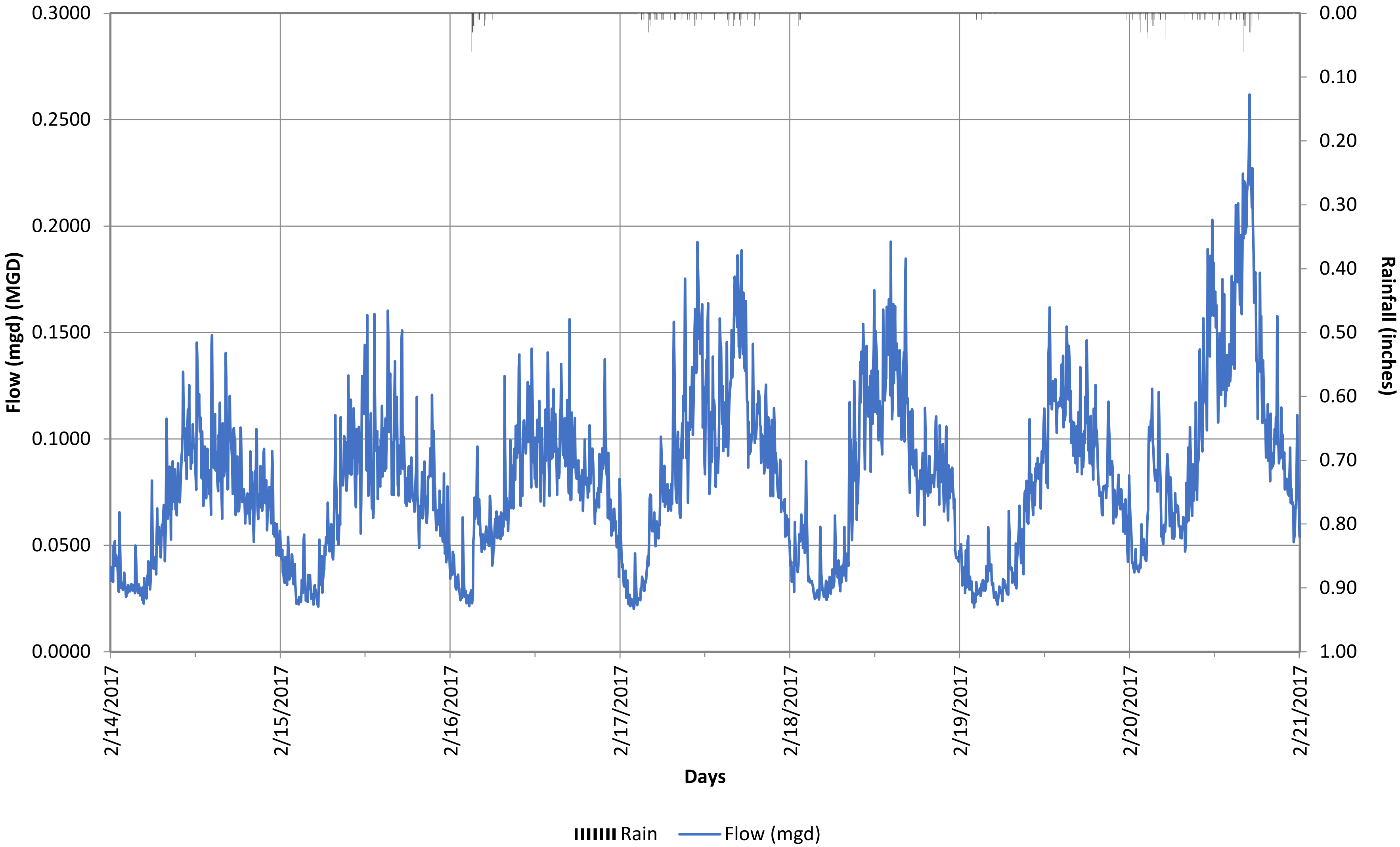
	1/31/2017 11:55:00 PM(	017 11:55:00 PM(	2017 11:55:00 PM(	2017 11:55:00 PM(	2017 11:55:00 PM(	2017 11:55:00 PM(	017 11:55:00 PM(Mon)
Maximum	0.166	0.180	0.178	0.229	0.209	0.140	0.138
Average	0.066	0.067	0.071	0.077	0.077	0.064	0.069
Minimum	0.019	0.018	0.023	0.019	0.021	0.018	0.018
Rain (inches)	0.00	0.01	0.19	0.51	0.37	0.15	0.50

Colma Site 8 SSMH8E23 West 8" Sanitary Flow



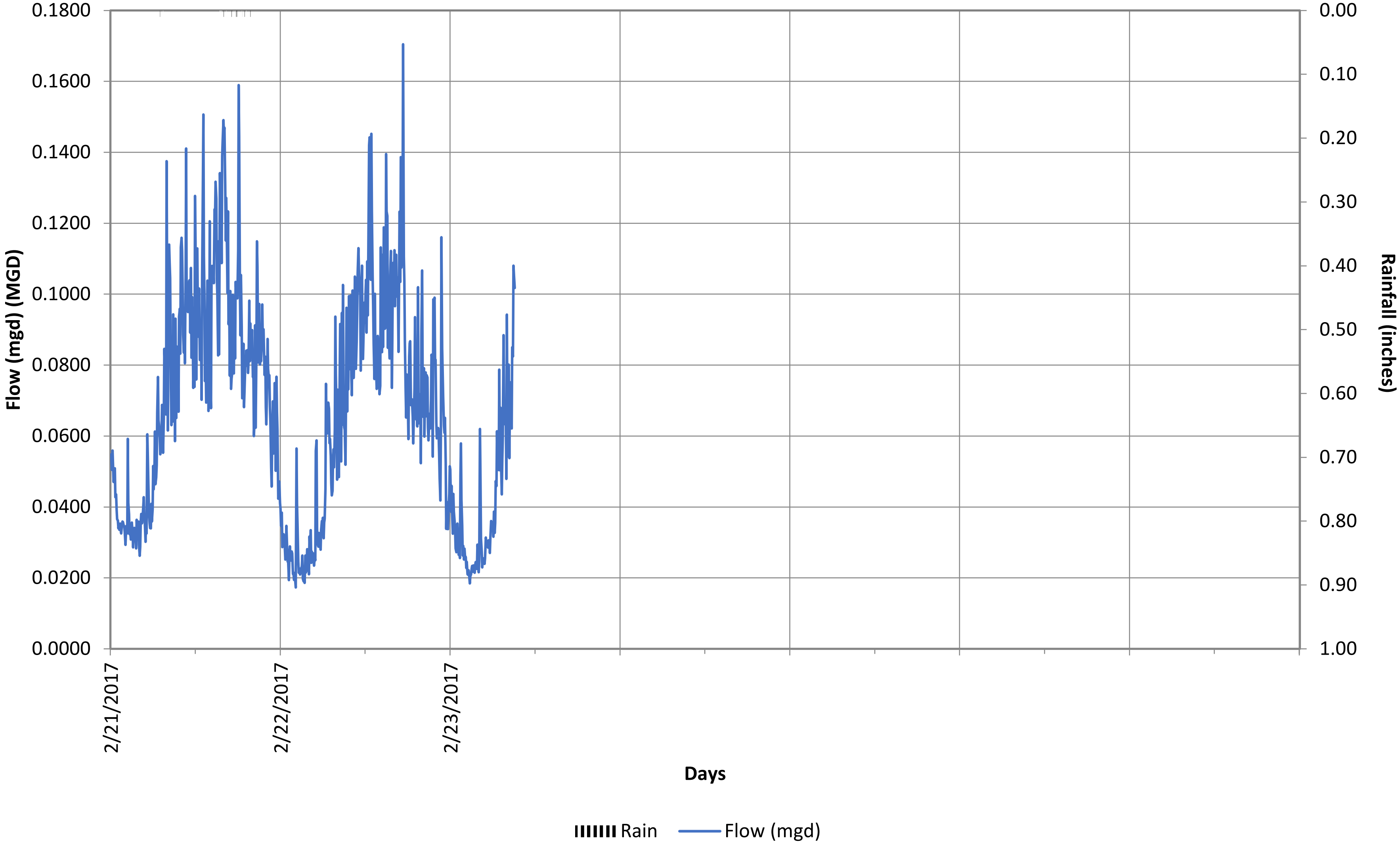
	2/7/2017 11:55:00 PM(	017 11:55:00 PM(	2017 11:55:00 PM(	/2017 11:55:00 PM	/2017 11:55:00 PM	2017 11:55:00 PM	2017 11:55:00 PM(Mon)
Maximum	0.223	0.147	0.186	0.144	0.183	0.180	0.152
Average	0.080	0.072	0.077	0.069	0.074	0.068	0.069
Minimum	0.030	0.019	0.018	0.018	0.022	0.022	0.025
Rain (inches)	0.86	0.26	0.77	0.04	0.00	0.00	0.00

Colma Site 8 SSMH8E23 West 8" Sanitary Flow



	2/14/2017 11:55:00 PM(	2017 11:55:00 PM(	2017 11:55:00 PM(	/2017 11:55:00 PM	/2017 11:55:00 PM	2017 11:55:00 PM	2017 11:55:00 PM(Mon)
Maximum	0.149	0.160	0.156	0.192	0.193	0.162	0.262
Average	0.069	0.071	0.076	0.092	0.081	0.072	0.108
Minimum	0.023	0.021	0.021	0.020	0.024	0.021	0.037
Rain (inches)	0.00	0.00	0.39	1.23	0.14	0.08	1.61

Colma Site 8 SSMH8E23 West 8" Sanitary Flow

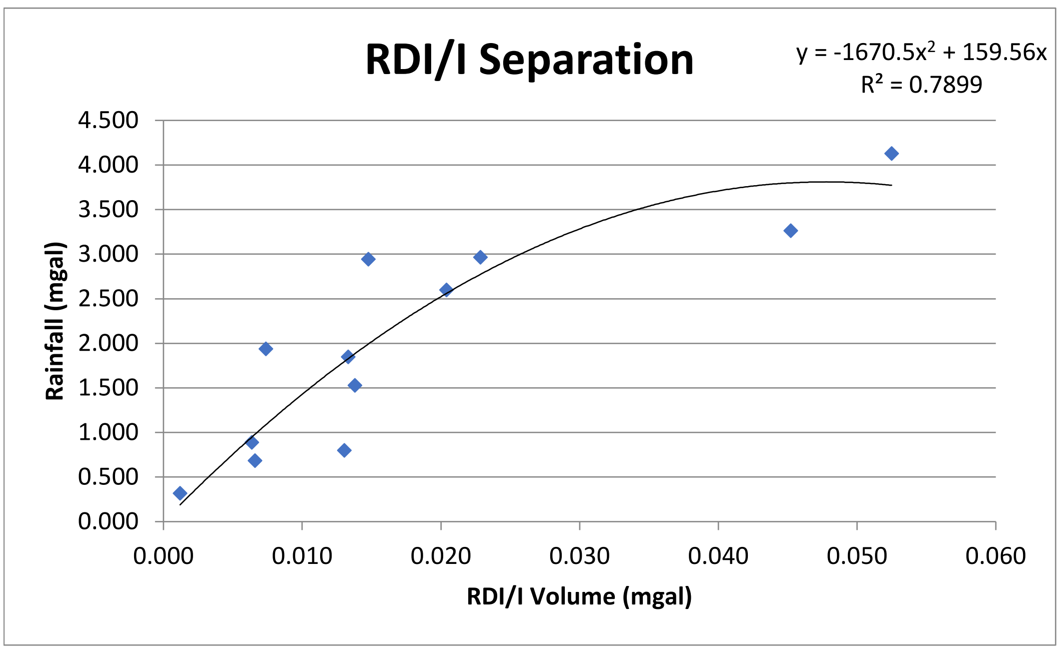


2/21/2017 11:55:00 PM(	2017 11:55:00 PM(Wed)						
Maximum	0.159	0.170					
Average	0.075	0.068					
Minimum	0.026	0.017					
Rain (inches)	0.19	0.00					

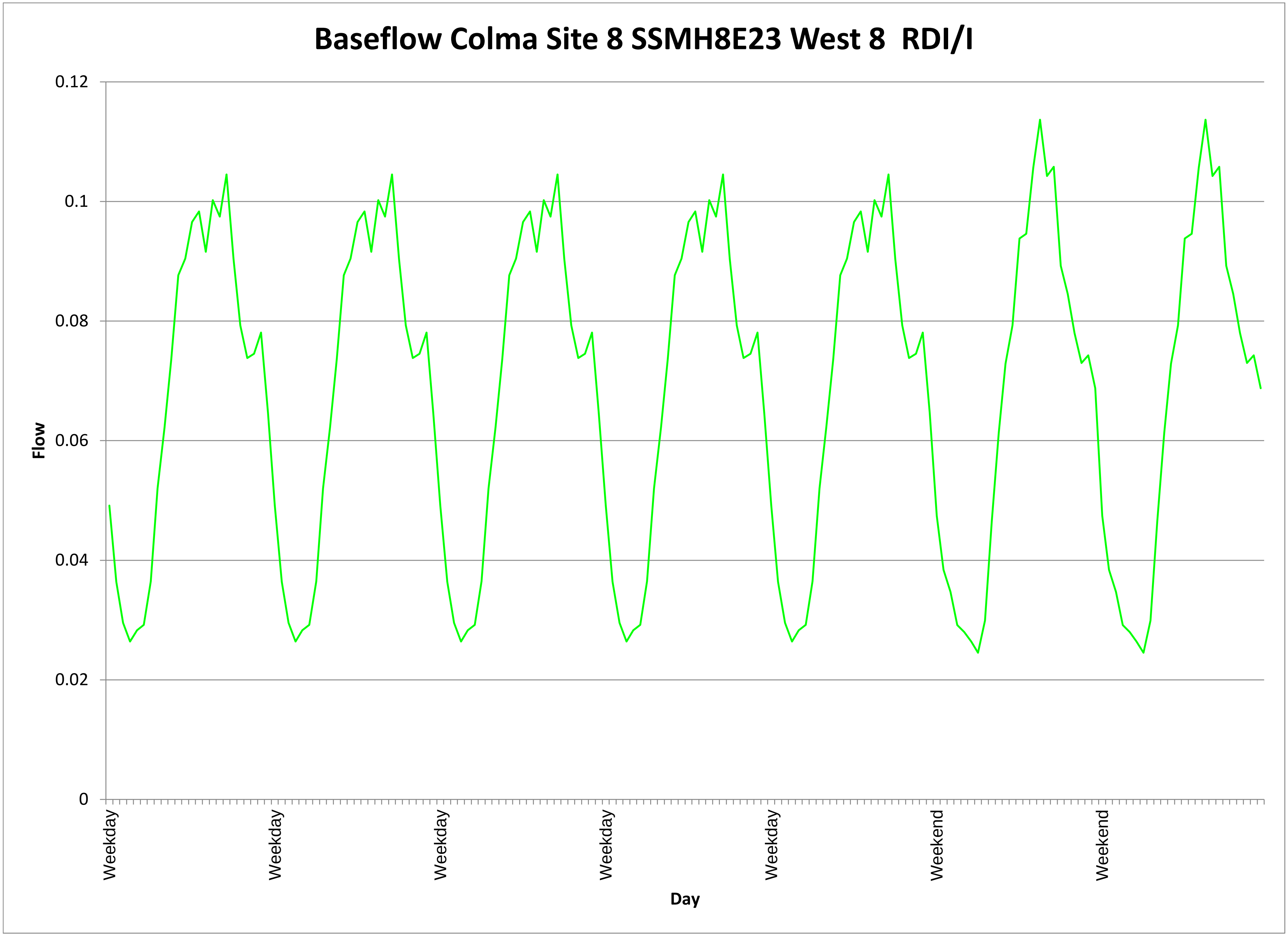
Colma Site 8 SSMH8E23 West 8 RDI/I

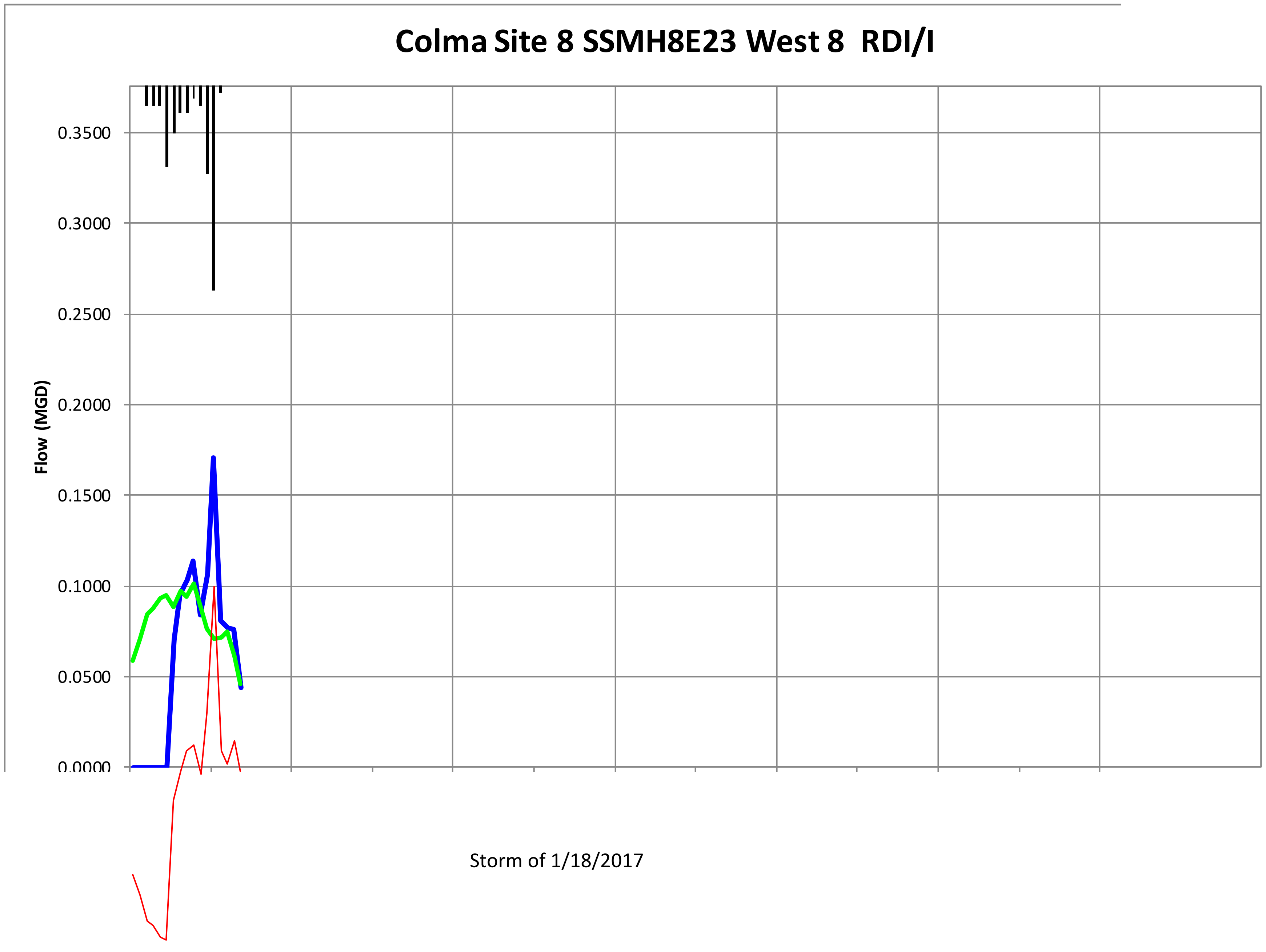
RDI/I Analysis, Monitor Return Ratio Summary

Storm Start (Date)	RDI/I Volume (mgal)	Monitor Area (acres)	Rainfall (mgal)	Return Ratio (%)
1/18/2017	0.007	84.0	1.939	0.38%
1/20/2017	0.020	84.0	2.600	0.78%
1/21/2017	0.015	84.0	2.942	0.50%
2/2/2017	0.014	84.0	1.528	0.90%
2/4/2017	0.013	84.0	0.798	1.63%
2/5/2017	0.001	84.0	0.319	0.37%
2/6/2017	0.023	84.0	2.965	0.77%
2/7/2017	0.007	84.0	0.684	0.96%
2/9/2017	0.013	84.0	1.847	0.72%
2/16/2017	0.006	84.0	0.890	0.72%
2/17/2017	0.045	84.0	3.262	1.39%
2/20/2017	0.052	84.0	4.128	1.27%
Average R%				0.87%
Average Top 3 Sorms				1.43%

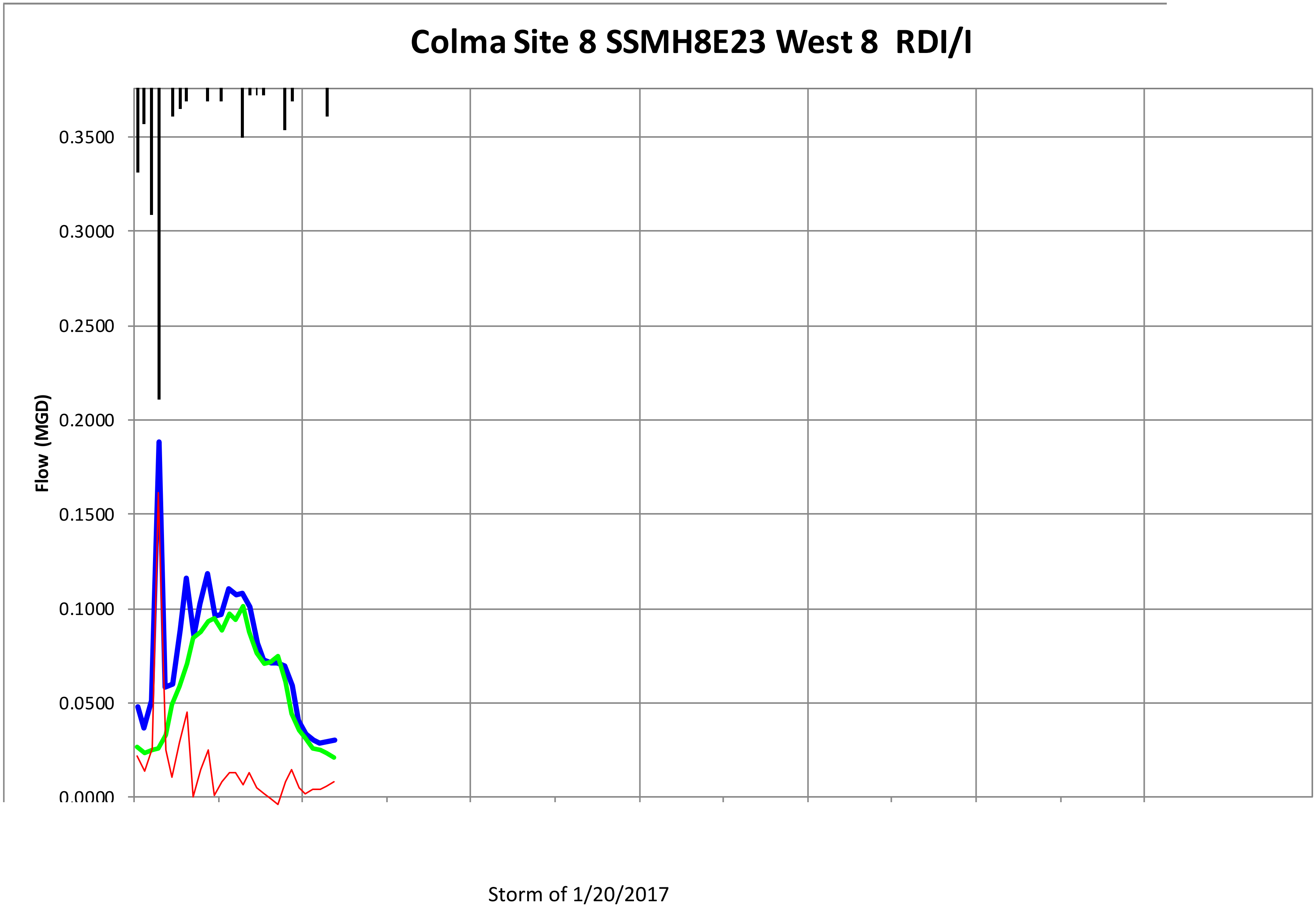


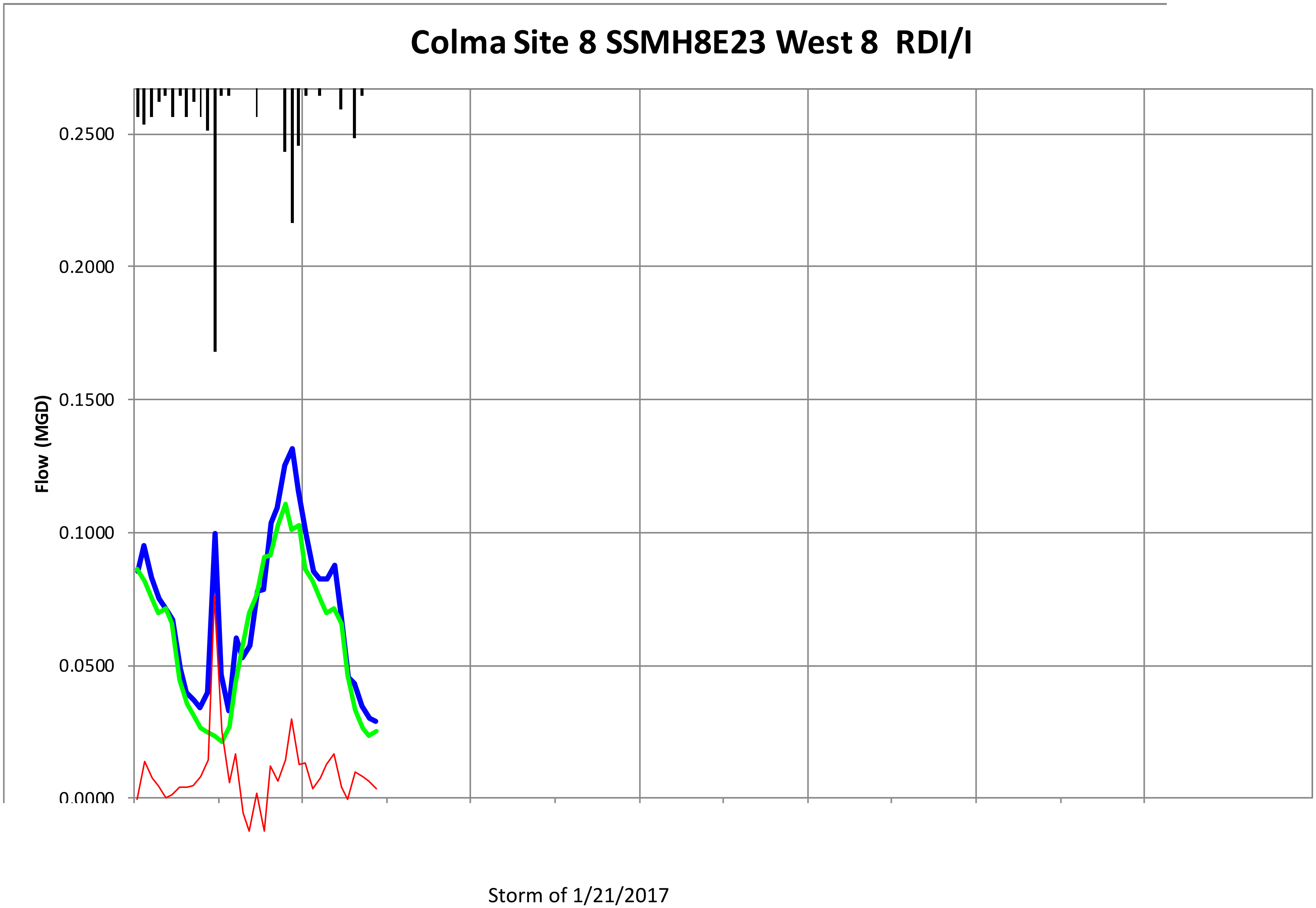
Baseflows	Weekend	Weekday
Max	0.114	0.105
Avg	0.067	0.069
Min	0.025	0.026


Baseflow Colma Site 8 SSMH8E23 West 8 RDI/I
Flow
0.12
0.1
0.08
0.06
0.04
0.02
0
Weekday
Weekday
Weekday
Weekday
Weekday
Weekend
Weekend
Day

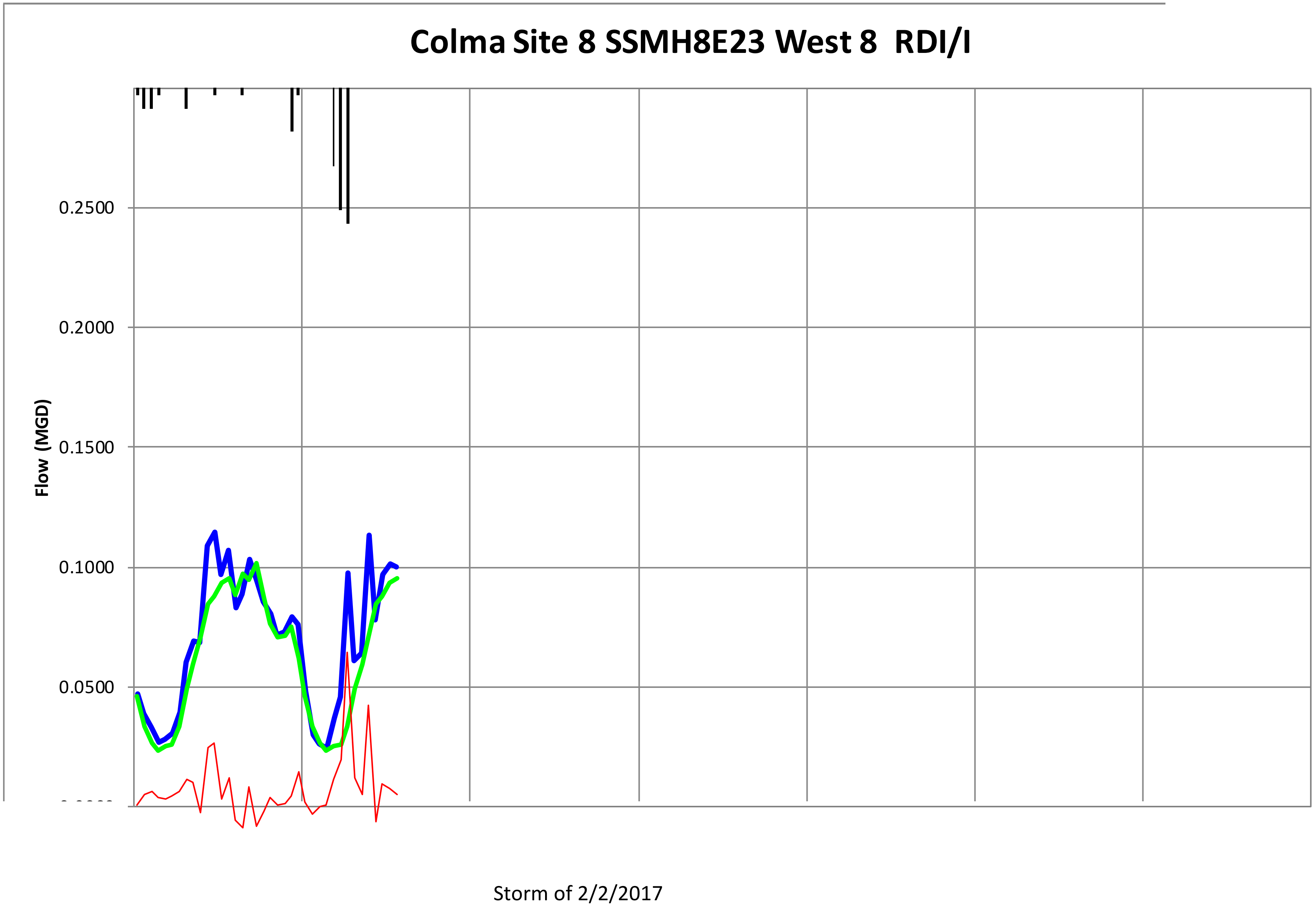


Colma Site 8 SSMH8E23 West 8 RDI/I
Flow (MGD)
0.3500
0.3000
0.2500
0.2000
0.1500
0.1000
0.0500
0.0000
Storm of 1/18/2017

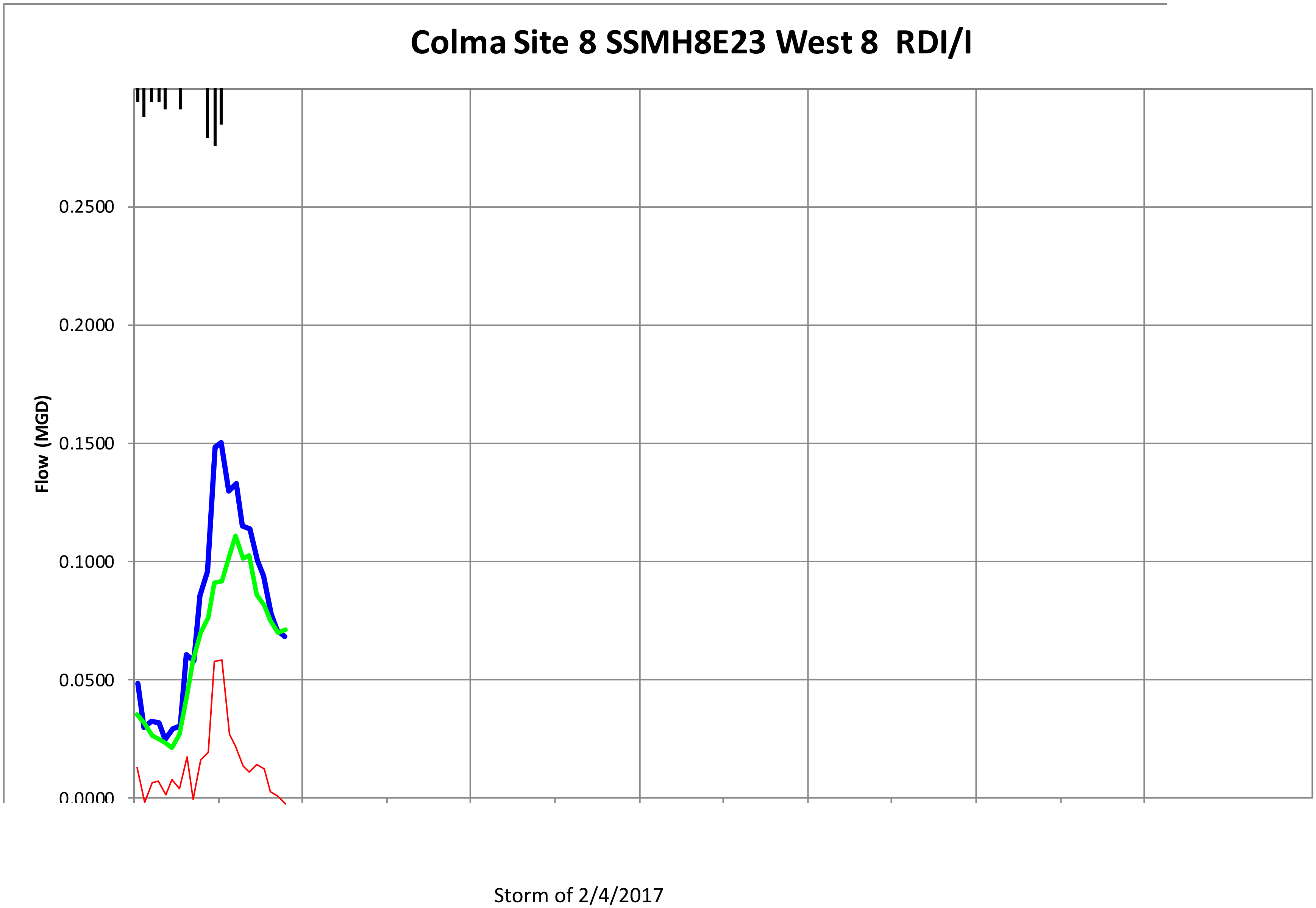

Colma Site 8 SSMH8E23 West 8 RDI/I
Flow (MGD)
0.3500
0.3000
0.2500
0.2000
0.1500
0.1000
0.0500
0.0000
Storm of 1/20/2017



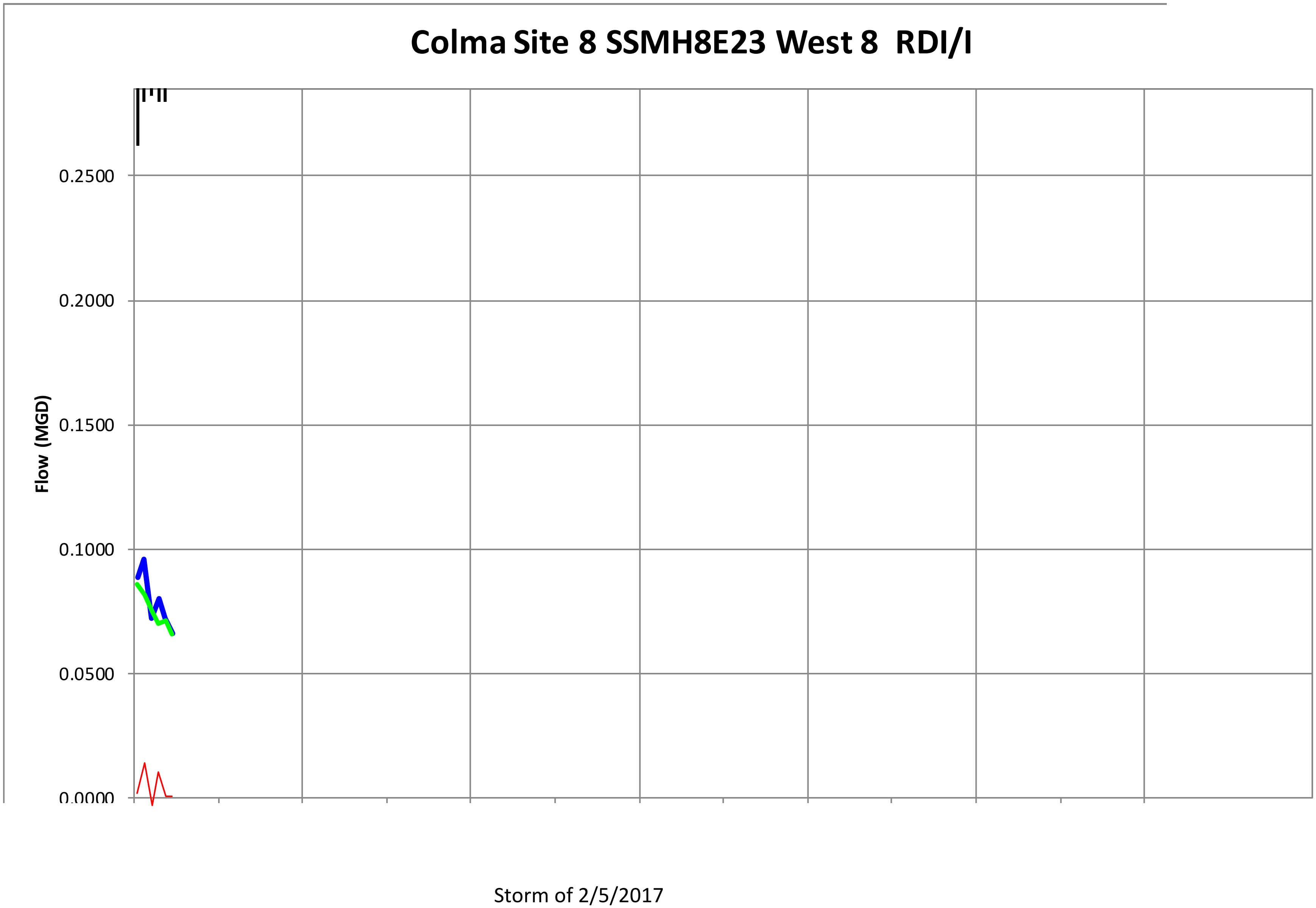
Colma Site 8 SSMH8E23 West 8 RDI/I
0.2500
0.2000
0.1500
0.1000
0.0500
0.0000
Flow (MGD)
Storm of 1/21/2017



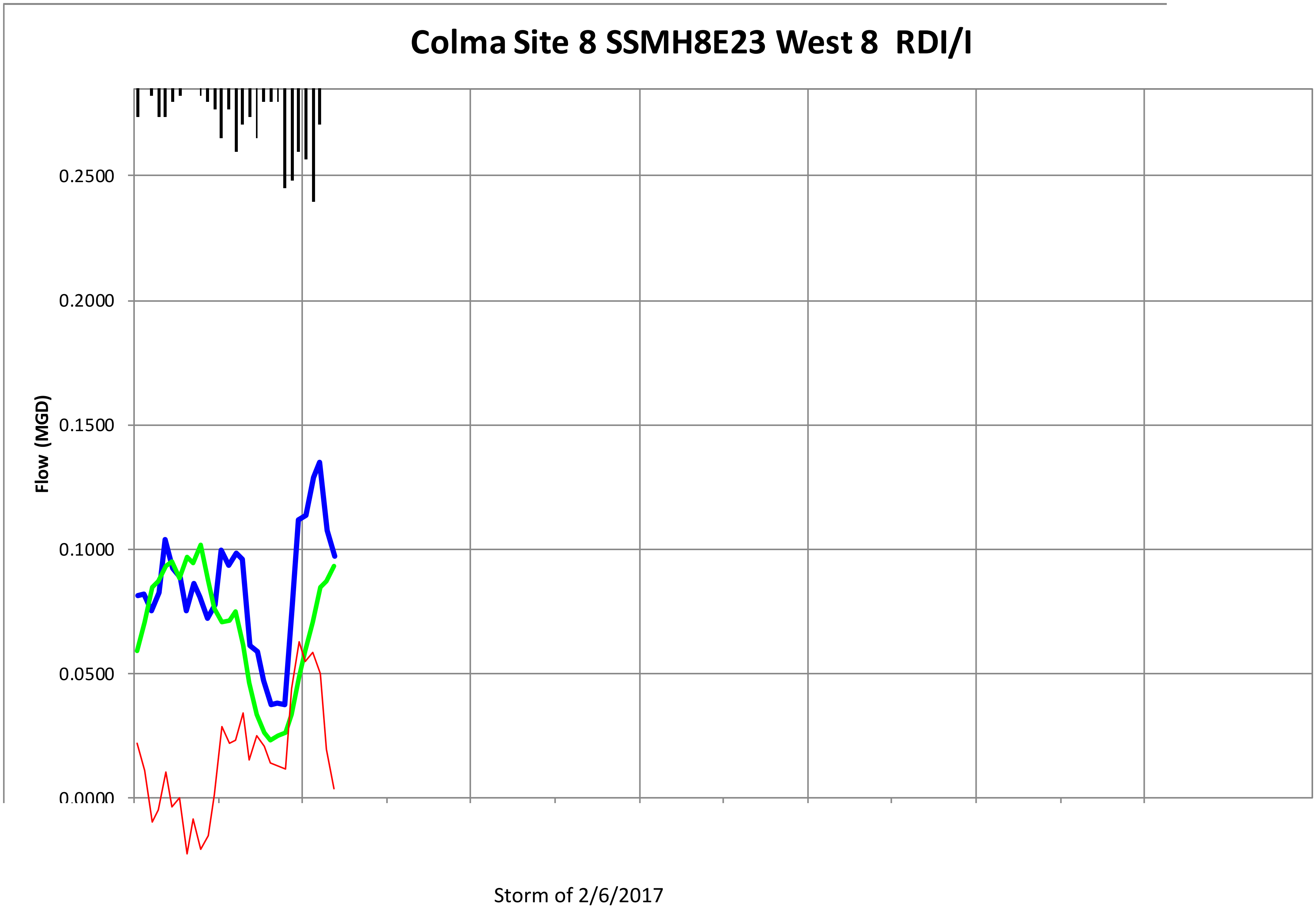
Colma Site 8 SSMH8E23 West 8 RDI/I
0.2500
0.2000
0.1500
0.1000
0.0500
Flow (MGD)
Storm of 2/2/2017

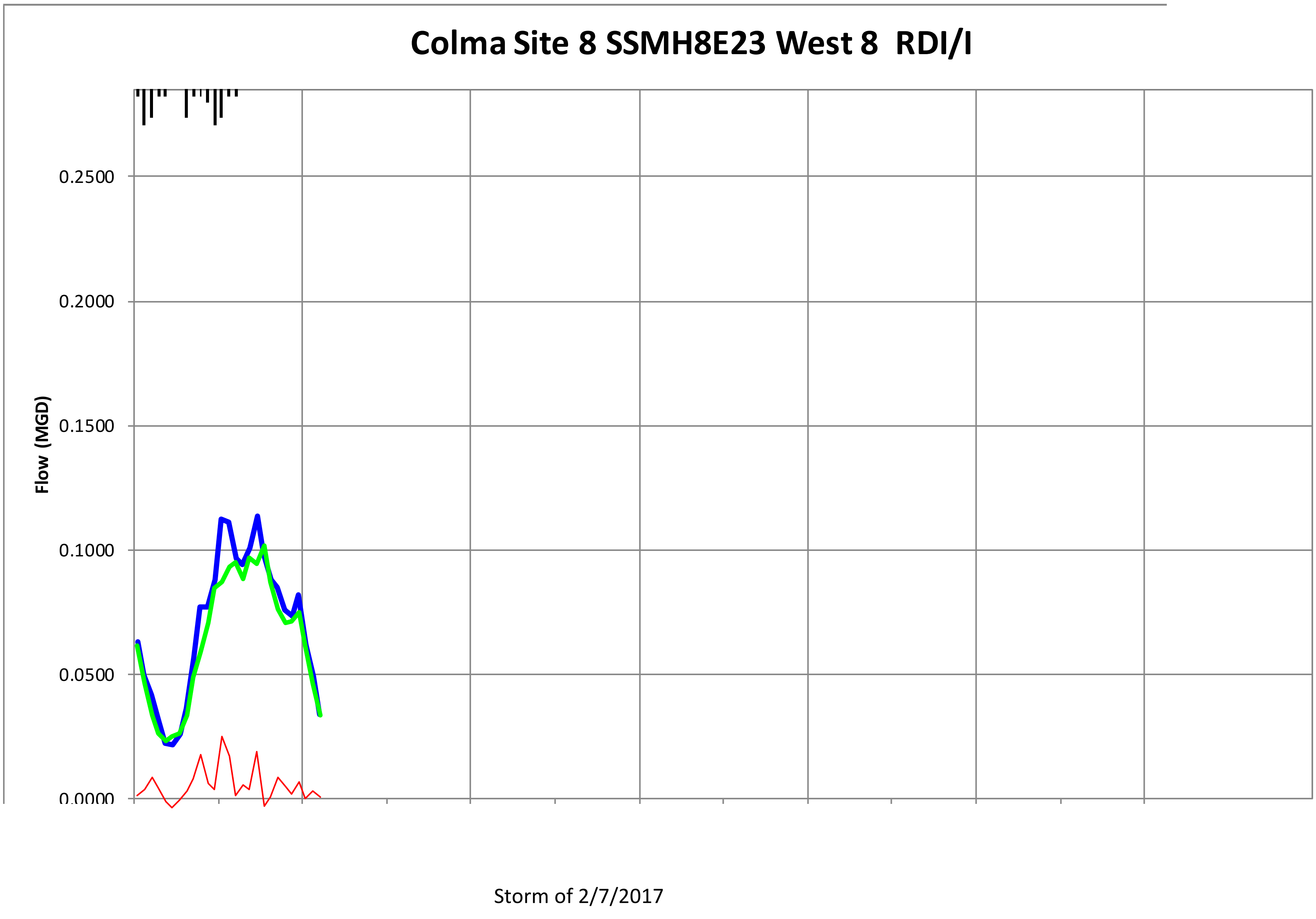


Colma Site 8 SSMH8E23 West 8 RDI/I
Flow (MGD)
0.2500
0.2000
0.1500
0.1000
0.0500
0.0000
Storm of 2/4/2017

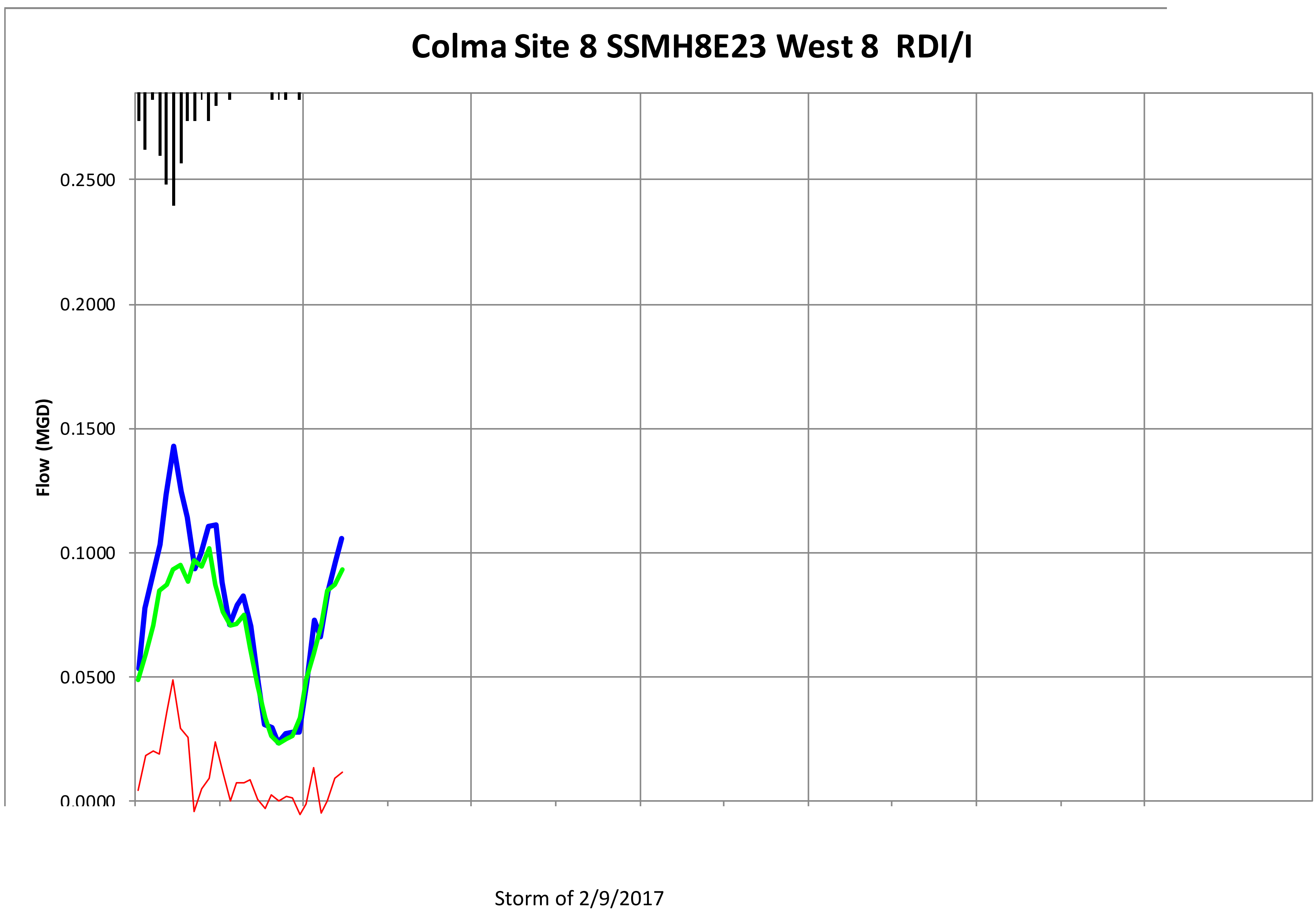


Colma Site 8 SSMH8E23 West 8 RDI/I
Flow (MGD)
0.2500
0.2000
0.1500
0.1000
0.0500
0.0000
Storm of 2/5/2017

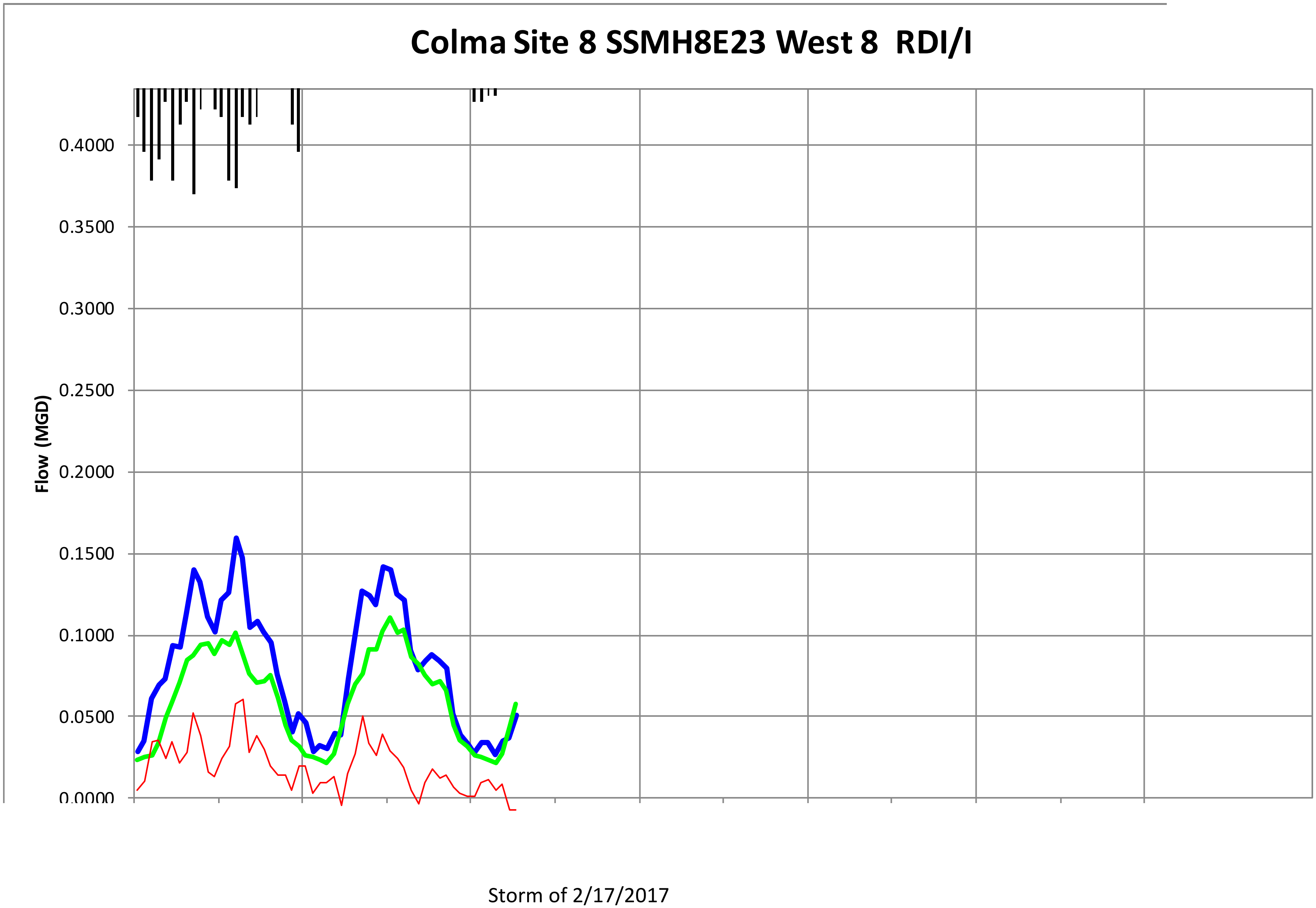

Colma Site 8 SSMH8E23 West 8 RDI/I
Flow (MGD)
0.2500
0.2000
0.1500
0.1000
0.0500
0.0000
Storm of 2/6/2017

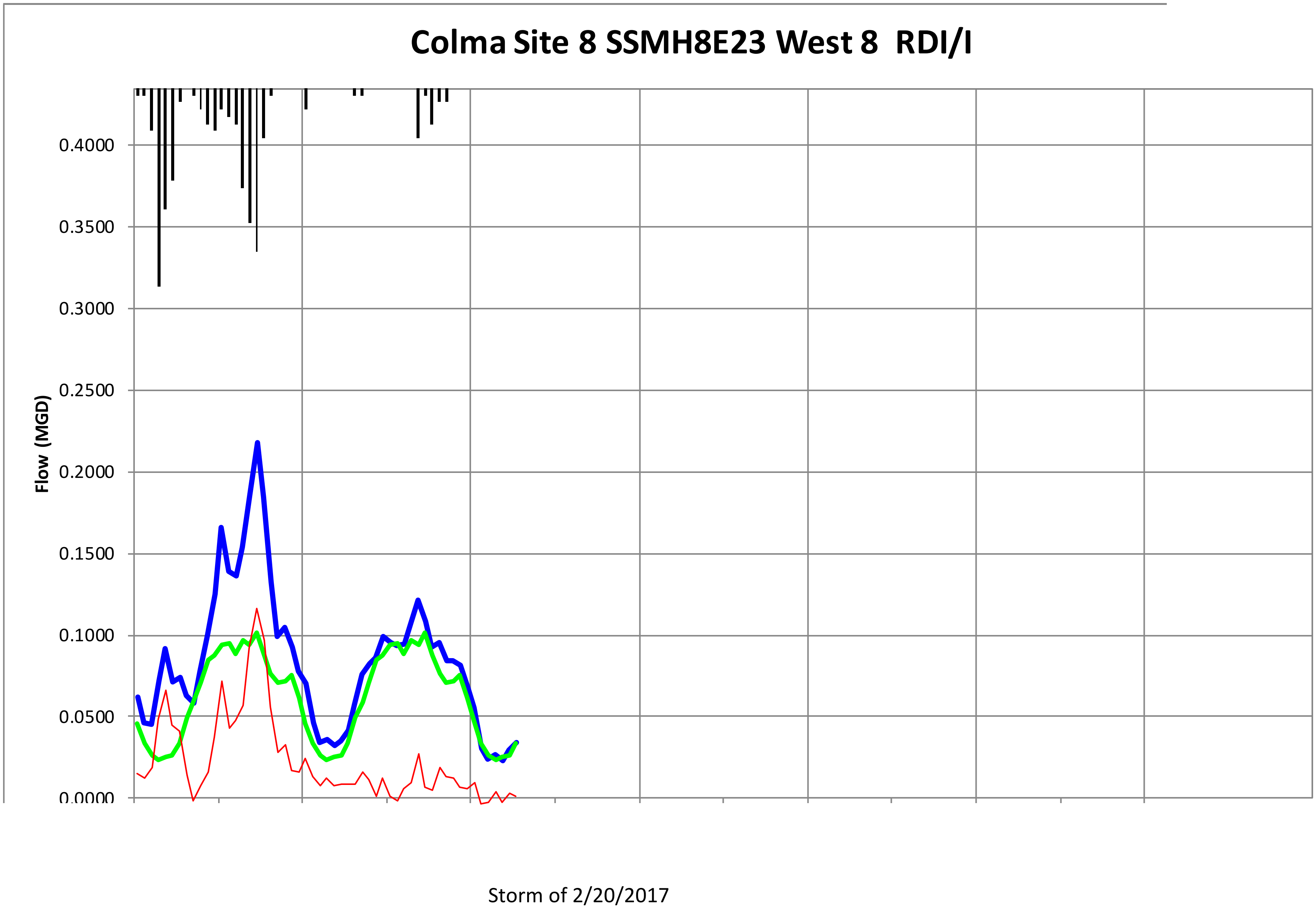


Colma Site 8 SSMH8E23 West 8 RDI/I
Flow (MGD)
0.2500
0.2000
0.1500
0.1000
0.0500
0.0000
Storm of 2/7/2017


Colma Site 8 SSMH8E23 West 8 RDI/I
Flow (MGD)
0.2500
0.2000
0.1500
0.1000
0.0500
0.0000
Storm of 2/9/2017

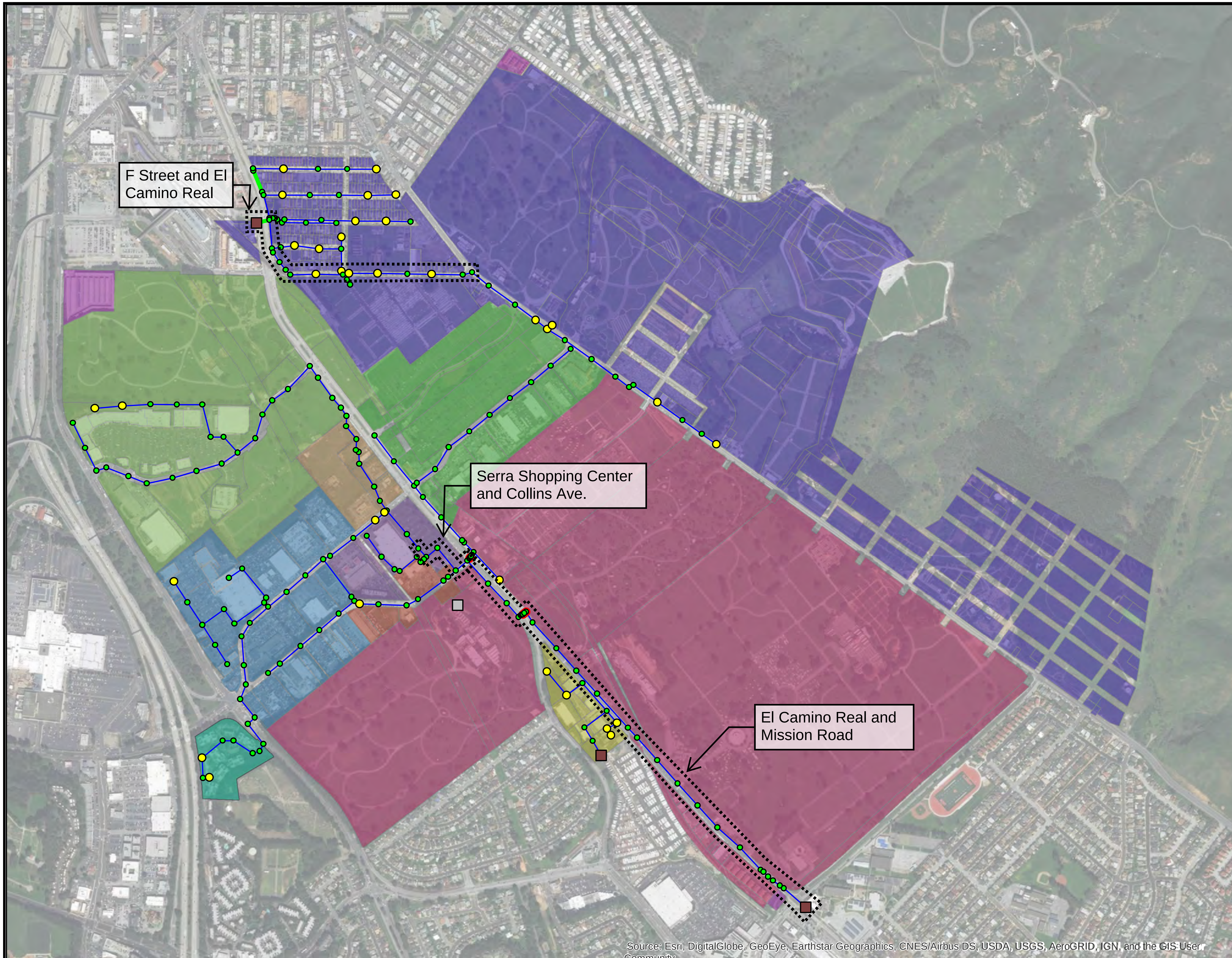

Colma Site 8 SSMH8E23 West 8 RDI/I
Flow (MGD)
0.4000
0.3500
0.3000
0.2500
0.2000
0.1500
0.1000
0.0500
0.0000
Storm of 2/16/2017


Colma Site 8 SSMH8E23 West 8 RDI/I
0.4000
0.3500
0.3000
0.2500
0.2000
0.1500
0.1000
0.0500
0.0000
Flow (MGD)
Storm of 2/17/2017



Colma Site 8 SSMH8E23 West 8 RDI/I
0.4000
0.3500
0.3000
0.2500
0.2000
0.1500
0.1000
0.0500
0.0000
Flow (MGD)
Storm of 2/20/2017

Appendix C.1 Existing Conditions Dry Weather Flow Results Figure



Legend

Manhole Unfilled Depth
- Potential SSO
- 0 - 3 Feet
- 3 - 5 Feet
- > 5 Feet

Outlet
- Active

Pipe Max "d/D" Ratio
- Less than 0.5
- 0.5~0.75
- 0.75~0.99
- Greater than 0.99

Basins
- DCMB
- SSFMB1A
- SSFMB1B
- SSFMB2
- SSFMB3
- SSFMB4A
- SSFMB4B
- SSFMB5
- SSFMB6
- SSFMB7
- Does not flow to Colma

N

800 400 0 800 Feet

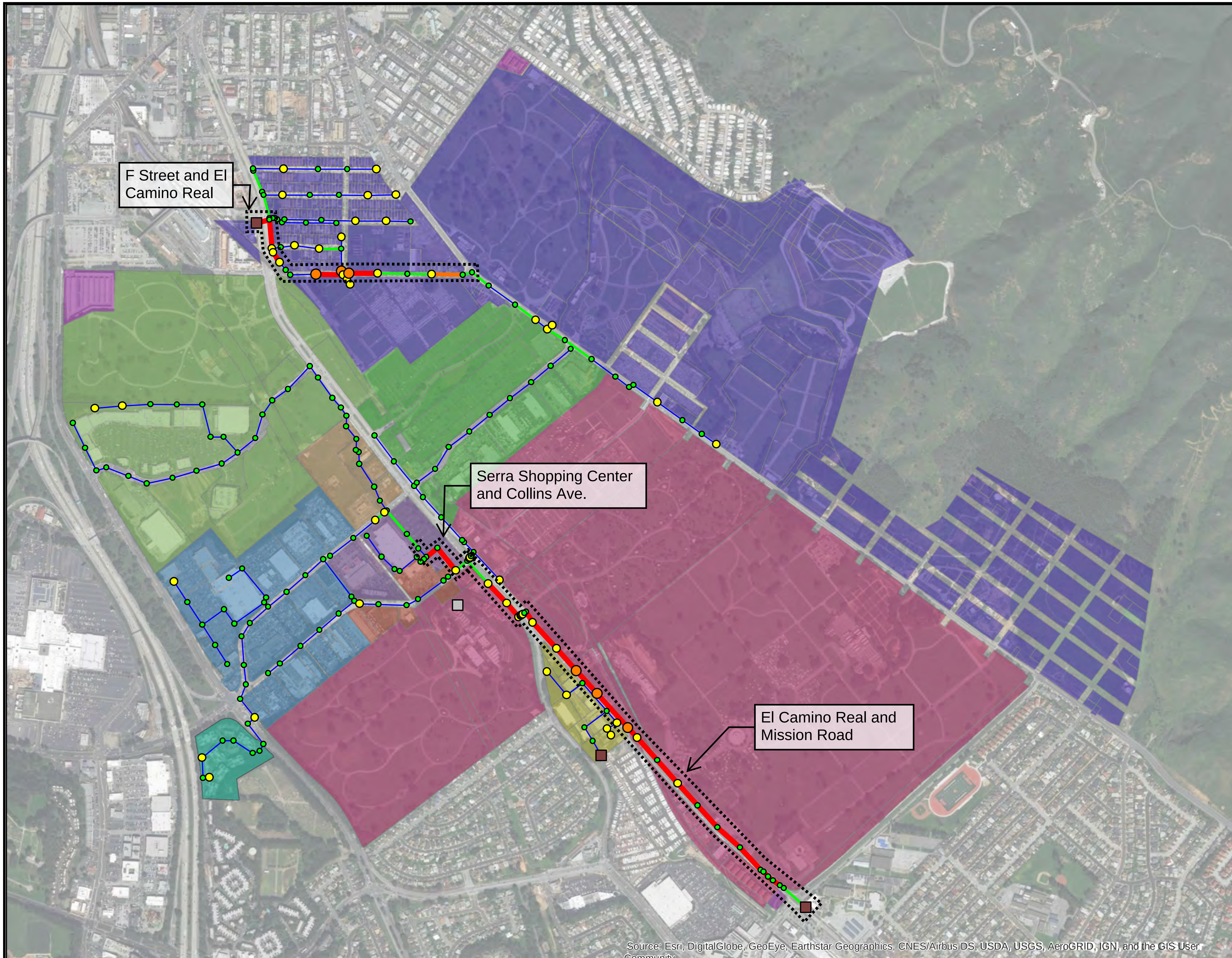
Appendix C.1

Existing Conditions Dry Weather Flow Results Figure*

*Refer to Appendix C.3, C.4, and C.5 for manhole IDs

WATERWORKS ENGINEERS

Appendix C.2 Existing Conditions Dry Weather Flow Results Figure



Legend

Manhole Unfilled Depth
- Potential SSO
- 0 - 3 Feet
- 3 - 5 Feet
- > 5 Feet

Outlet
- Active

Pipe Max "d/D" Ratio
- Less than 0.5
- 0.5~0.75
- 0.75~0.99
- Greater than 0.99

Basins
- DCMB
- SSFMB1A
- SSFMB1B
- SSFMB2
- SSFMB3
- SSFMB4A
- SSFMB4B
- SSFMB5
- SSFMB6
- SSFMB7
- Does not flow to Colma

N

800 400 0 800 Feet

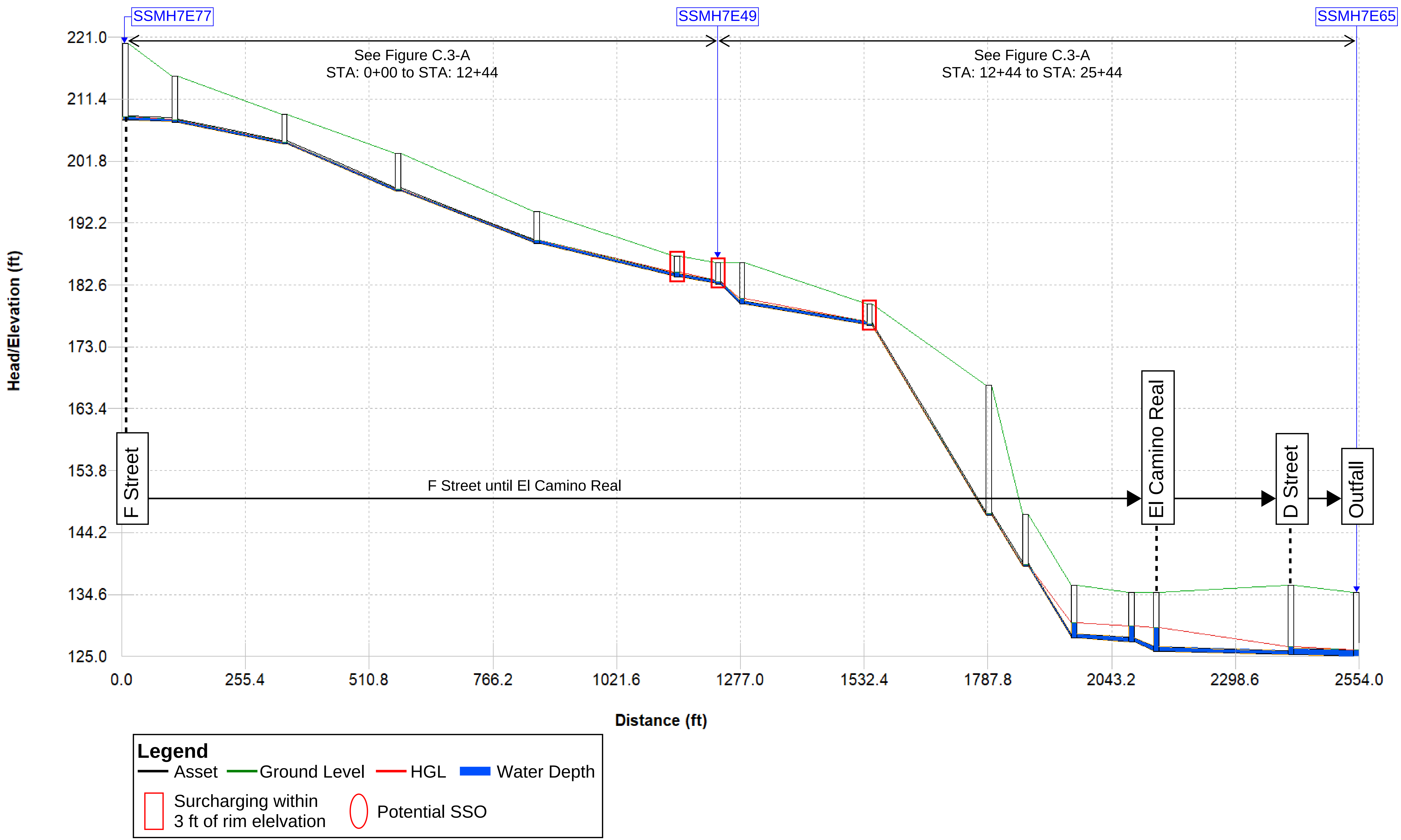
Appendix C.2
Existing Conditions Wet Weather Flow Results Figure*

*Refer to Appendix C.3, C.4, and C.5 for manhole IDs

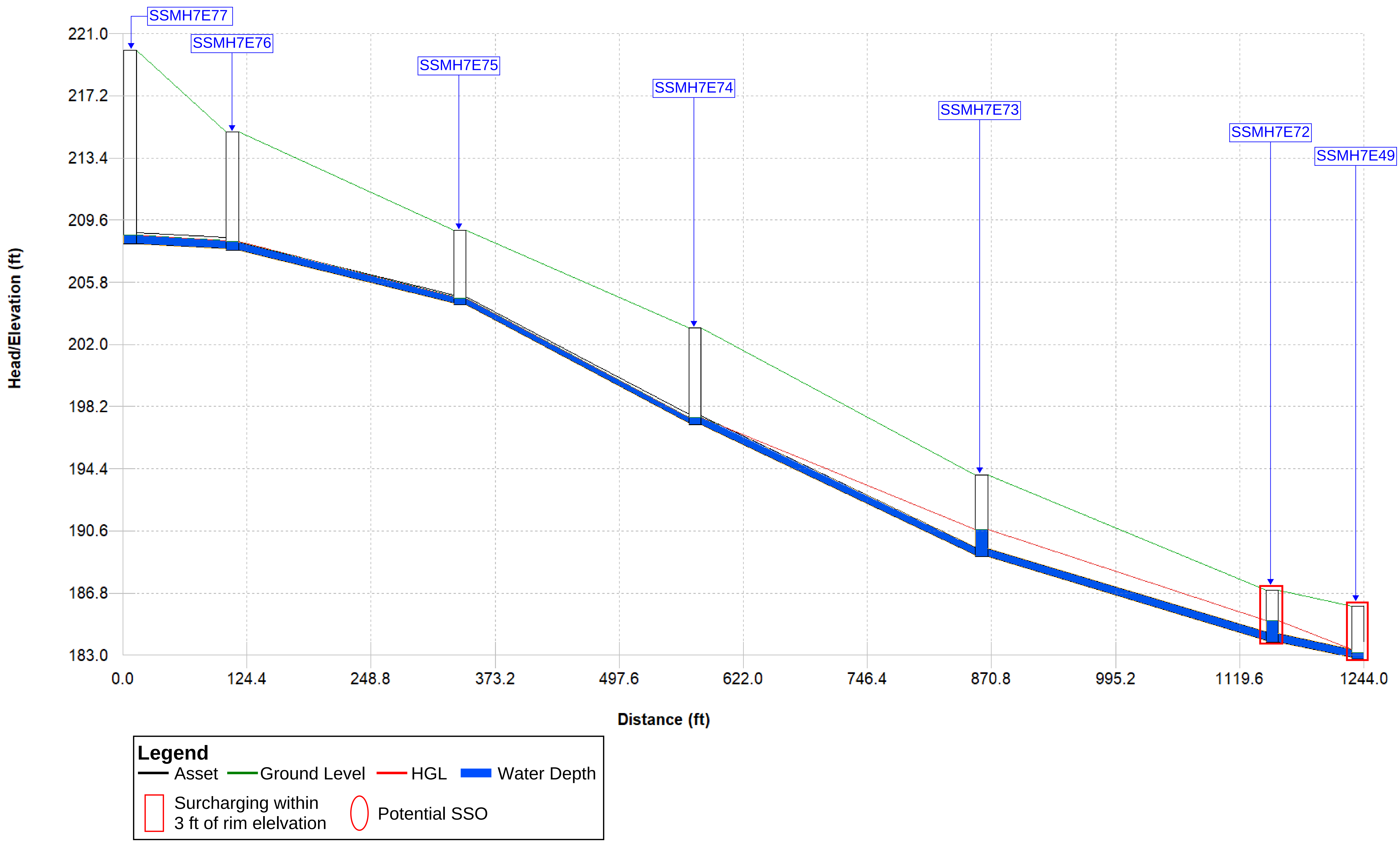
WATERWORKS ENGINEERS

Appendix C.3 HGL Profile of F Street and El Camino Real Modeled Capacity Deficiency under Existing Conditions 10-yr/ 24-hr Type 1A Storm

APPENDIX C.3
HGL Profile of F Street and El Camino Real Modeled Capacity Deficiency under Existing Conditions 10-yr/ 24-hr Type 1A Storm

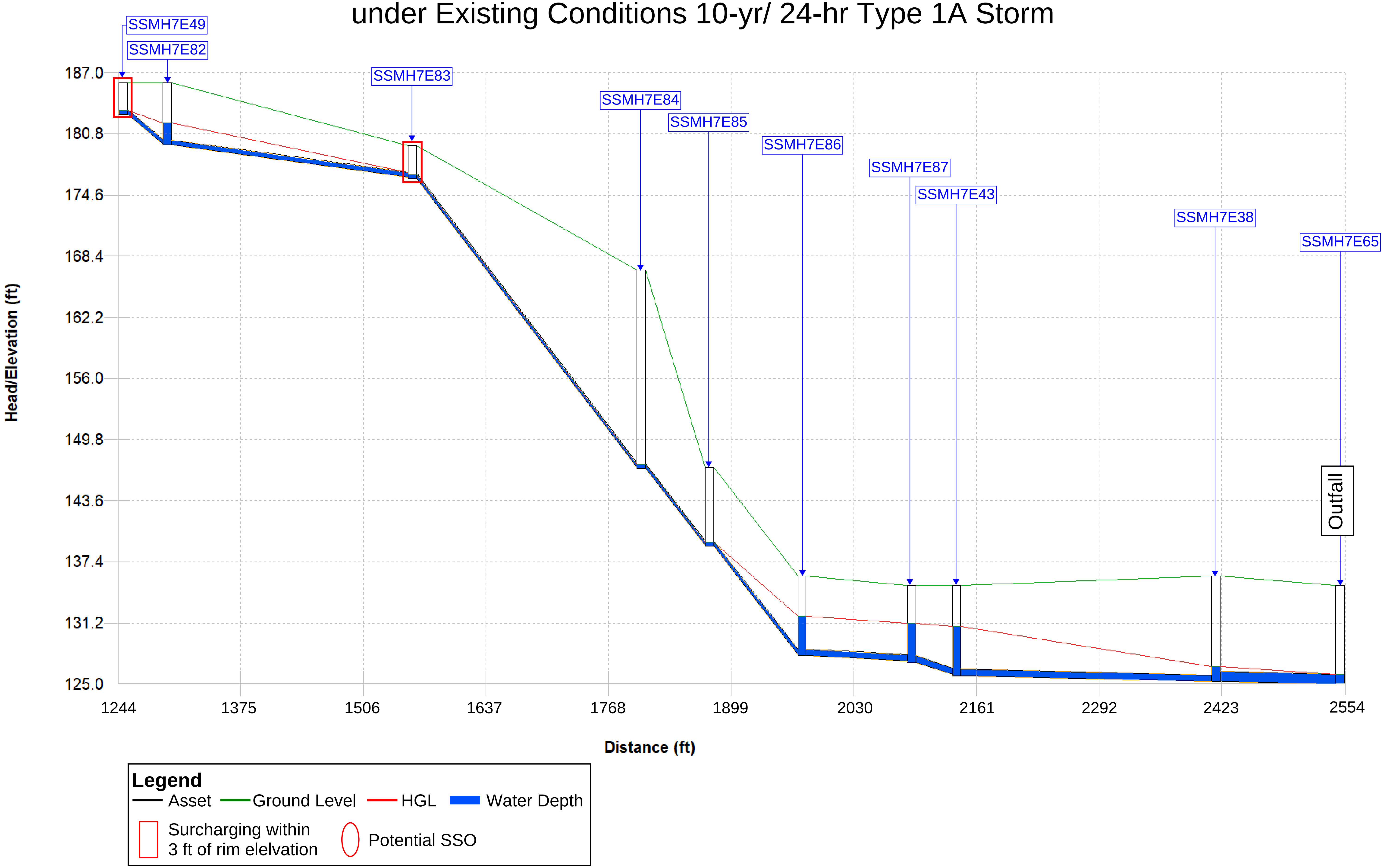


APPENDIX C.3-A
HGL Profile of F Street and El Camino Real Modeled Capacity Deficiency under Existing Conditions 10-yr/ 24-hr Type 1A Storm



APPENDIX C.3-B

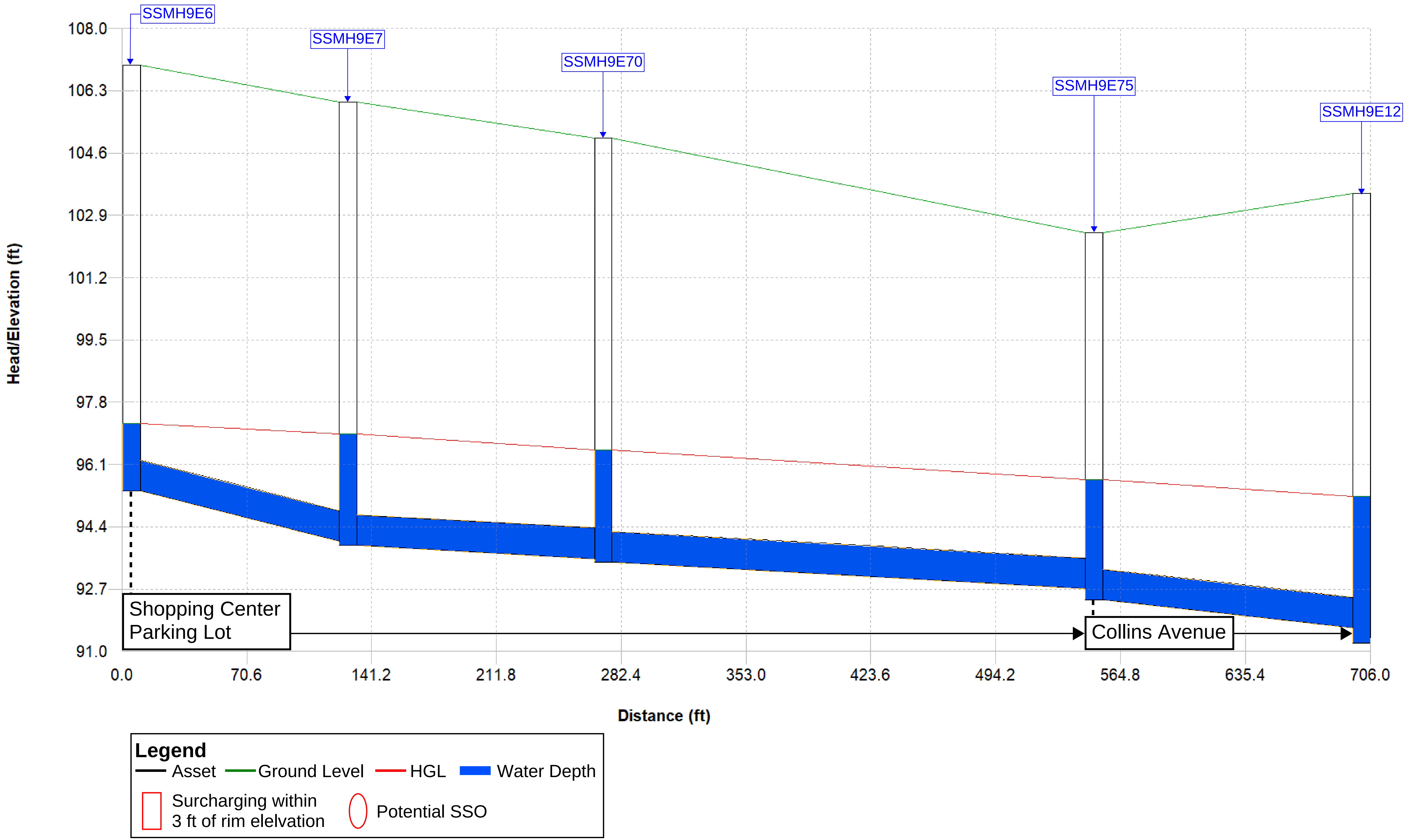
HGL Profile of F Street and El Camino Real Modeled Capacity Deficiency under Existing Conditions 10-yr/ 24-hr Type 1A Storm



Appendix C.4 HGL Profile of Serra Shopping Center and Collins Avenue Modeled Capacity Deficiency under Existing Conditions 10-yr/ 24-hr Type 1A Storm

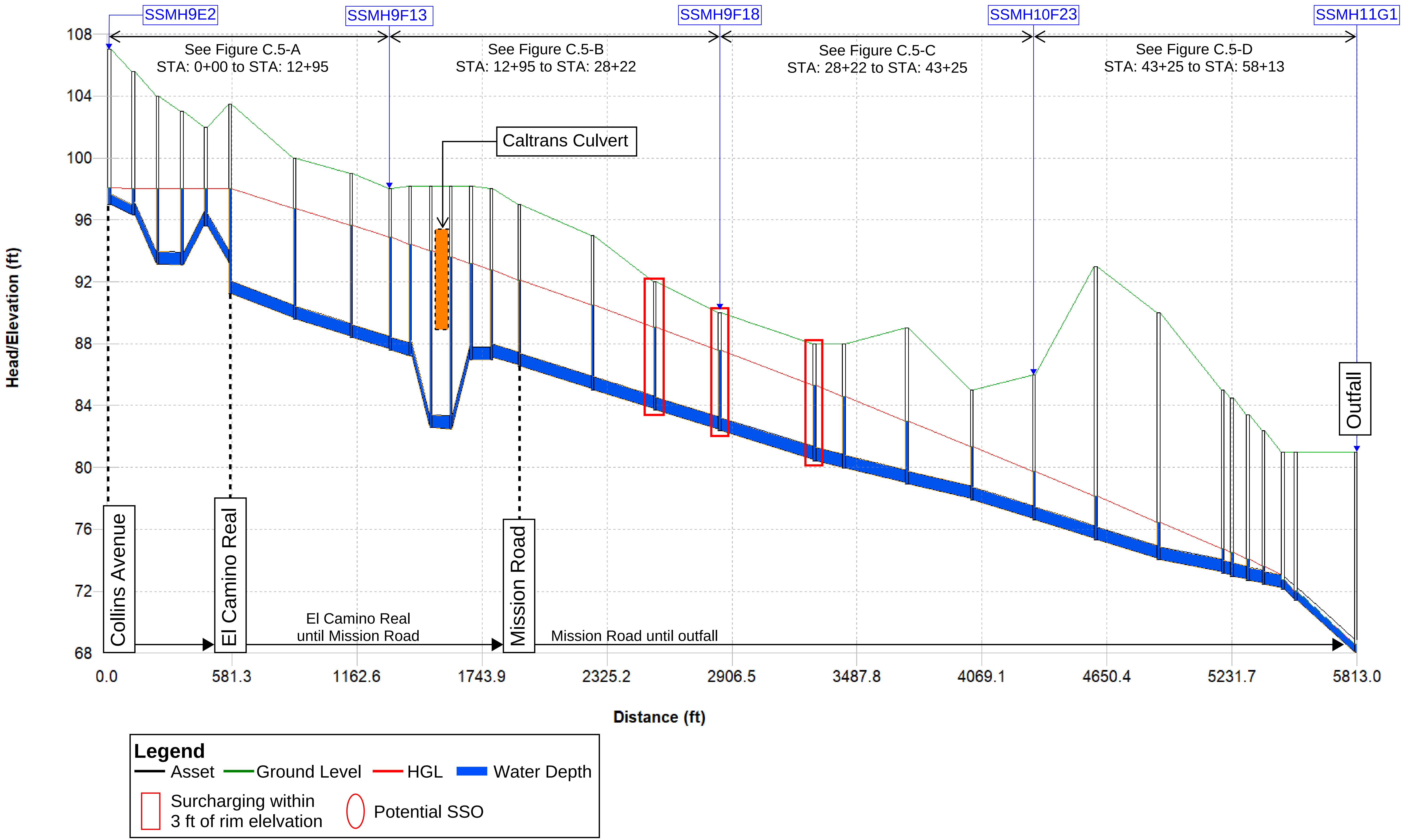
APPENDIX C.4

HGL Profile of Serra Shopping Center and Collins Avenue Modeled Capacity Deficiency under Existing Conditions 10-yr/ 24-hr Type 1A Storm

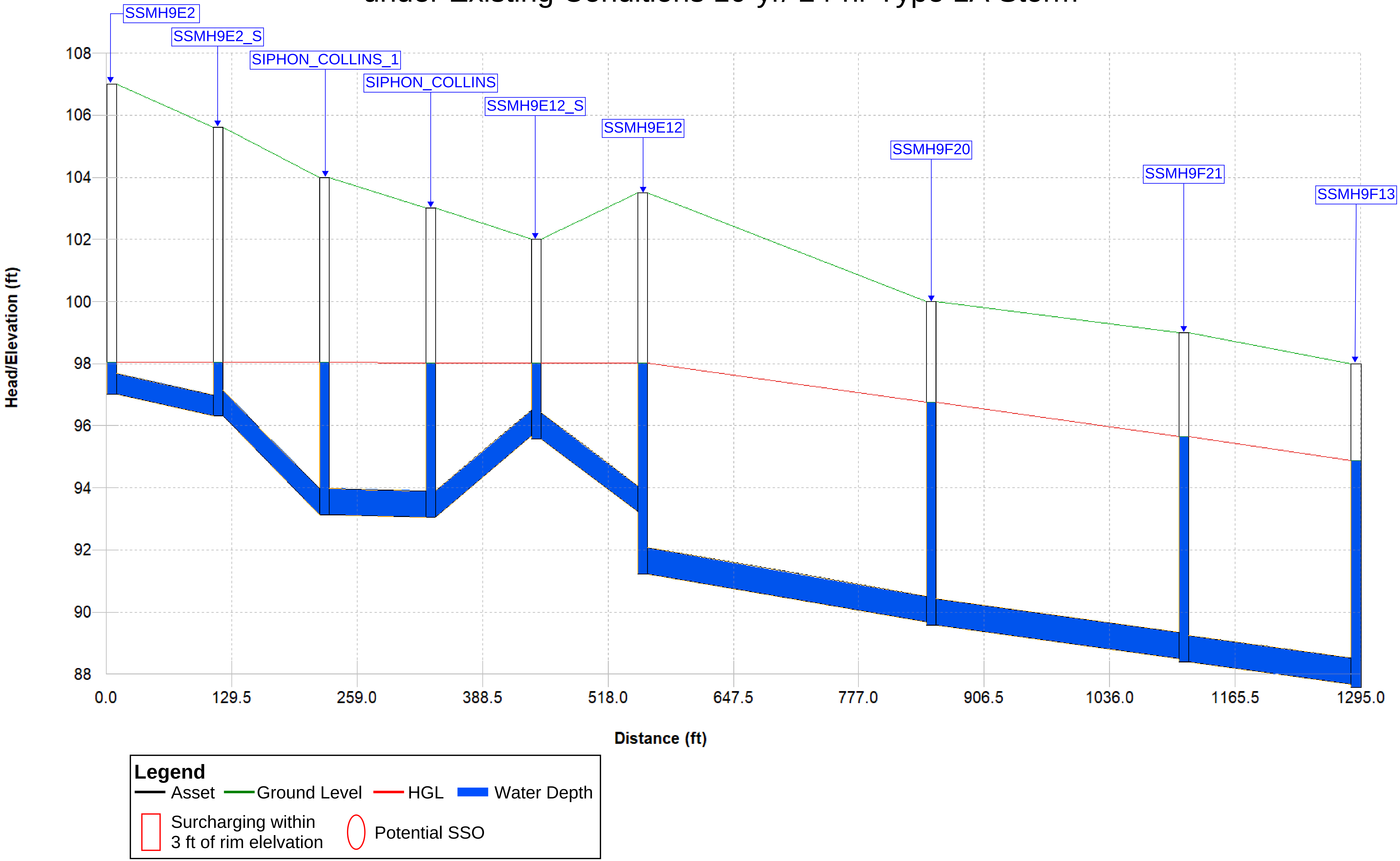


Appendix C.5 HGL Profile of El Camino Real and Mission Road Modeled Capacity Deficiency under Existing Conditions 10-yr/ 24-hr Type 1A Storm

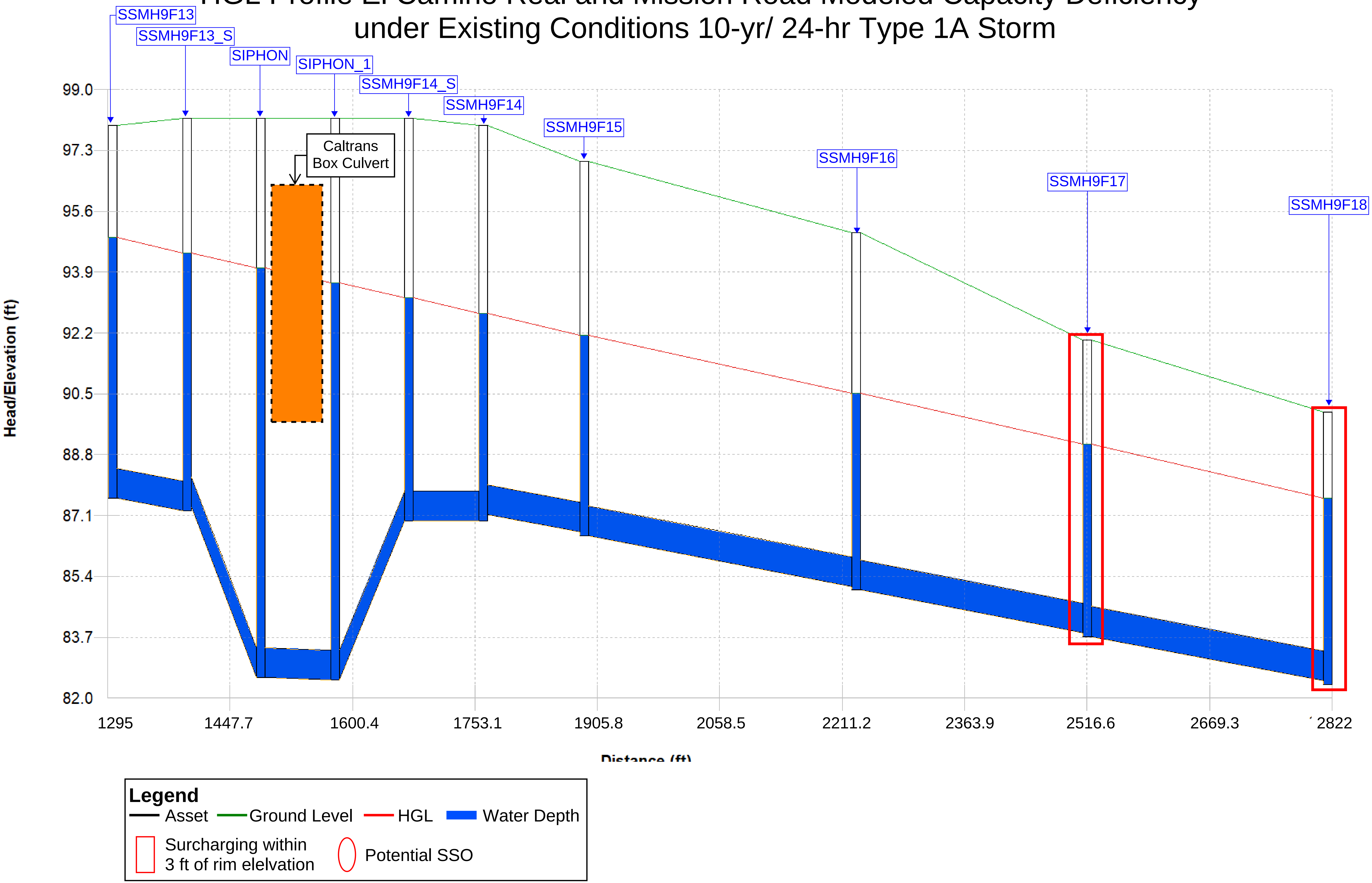
Appendix C.5
HGL Profile El Camino Real and Mission Road Modeled Capacity Deficiency under Existing Conditions 10-yr/ 24-hr Type 1A Storm



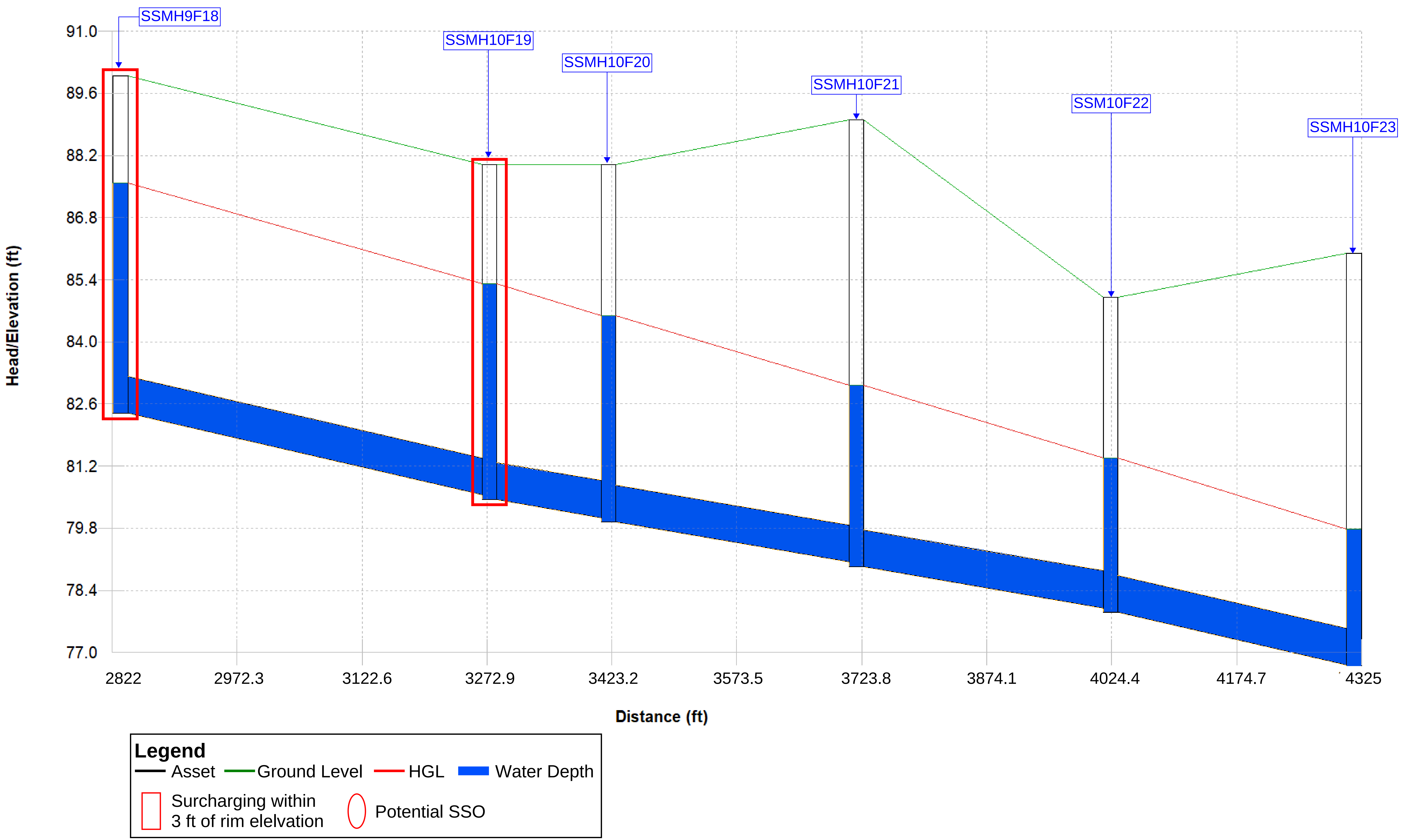
Appendix C.5-A
HGL Profile El Camino Real and Mission Road Modeled Capacity Deficiency under Existing Conditions 10-yr/ 24-hr Type 1A Storm



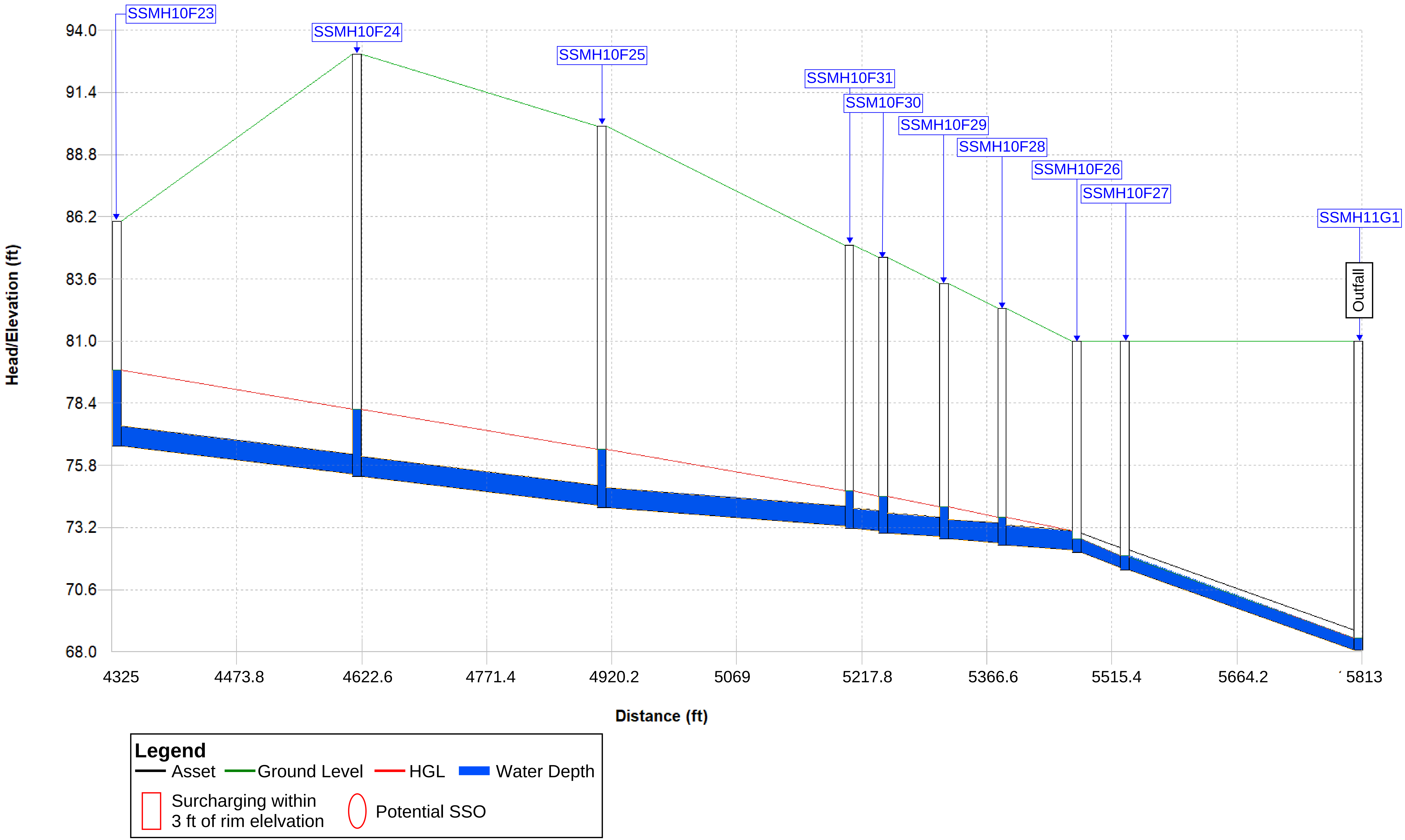
Appendix C.5-B
HGL Profile El Camino Real and Mission Road Modeled Capacity Deficiency under Existing Conditions 10-yr/ 24-hr Type 1A Storm



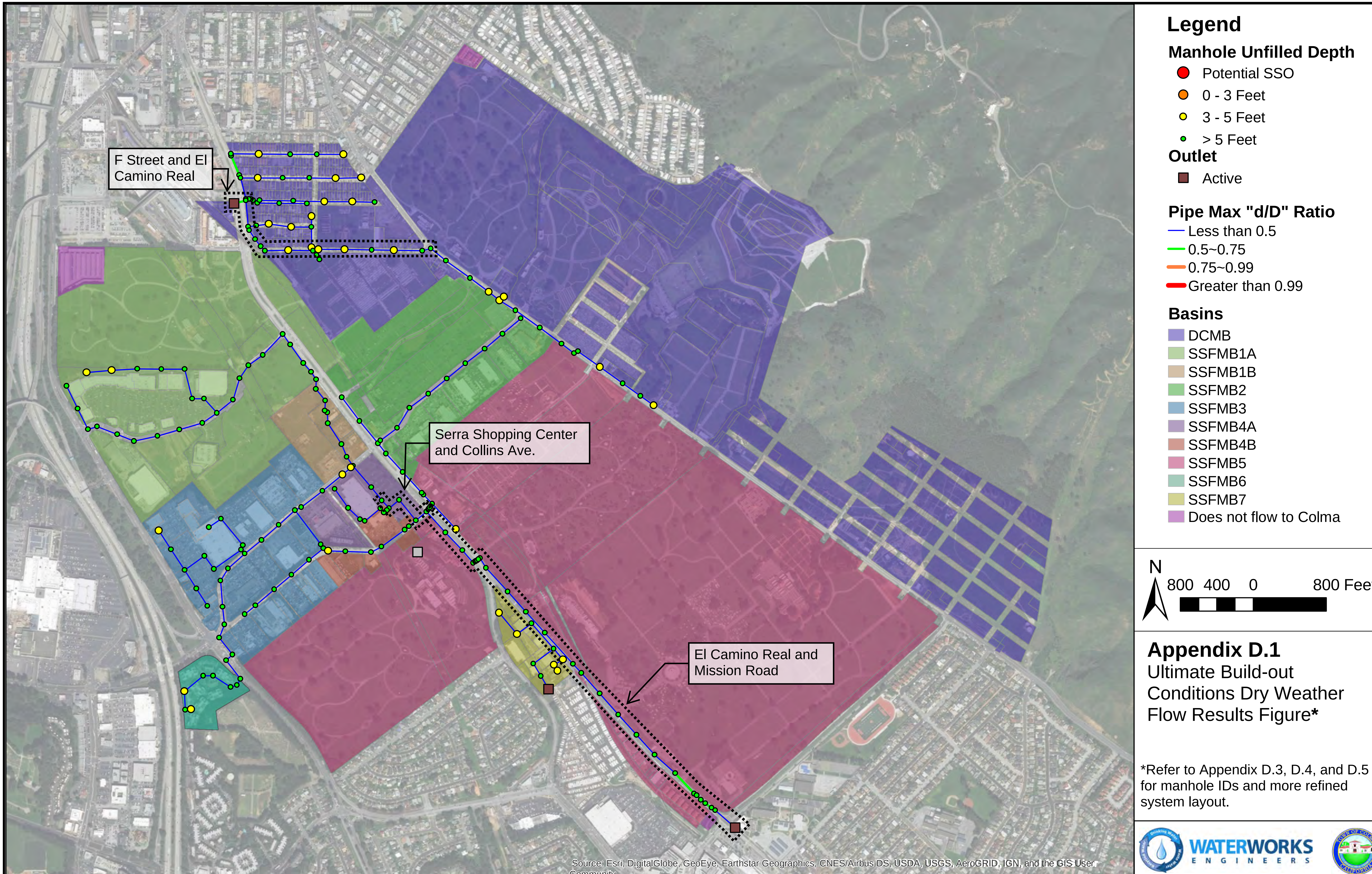
Appendix C.5-C
HGL Profile El Camino Real and Mission Road Modeled Capacity Deficiency under Existing Conditions 10-yr/ 24-hr Type 1A Storm



Appendix C.5-D
HGL Profile El Camino Real and Mission Road Modeled Capacity Deficiency under Existing Conditions 10-yr/ 24-hr Type 1A Storm



Appendix D.1 Ultimate Build-out Conditions Dry Weather Flow Results Figure

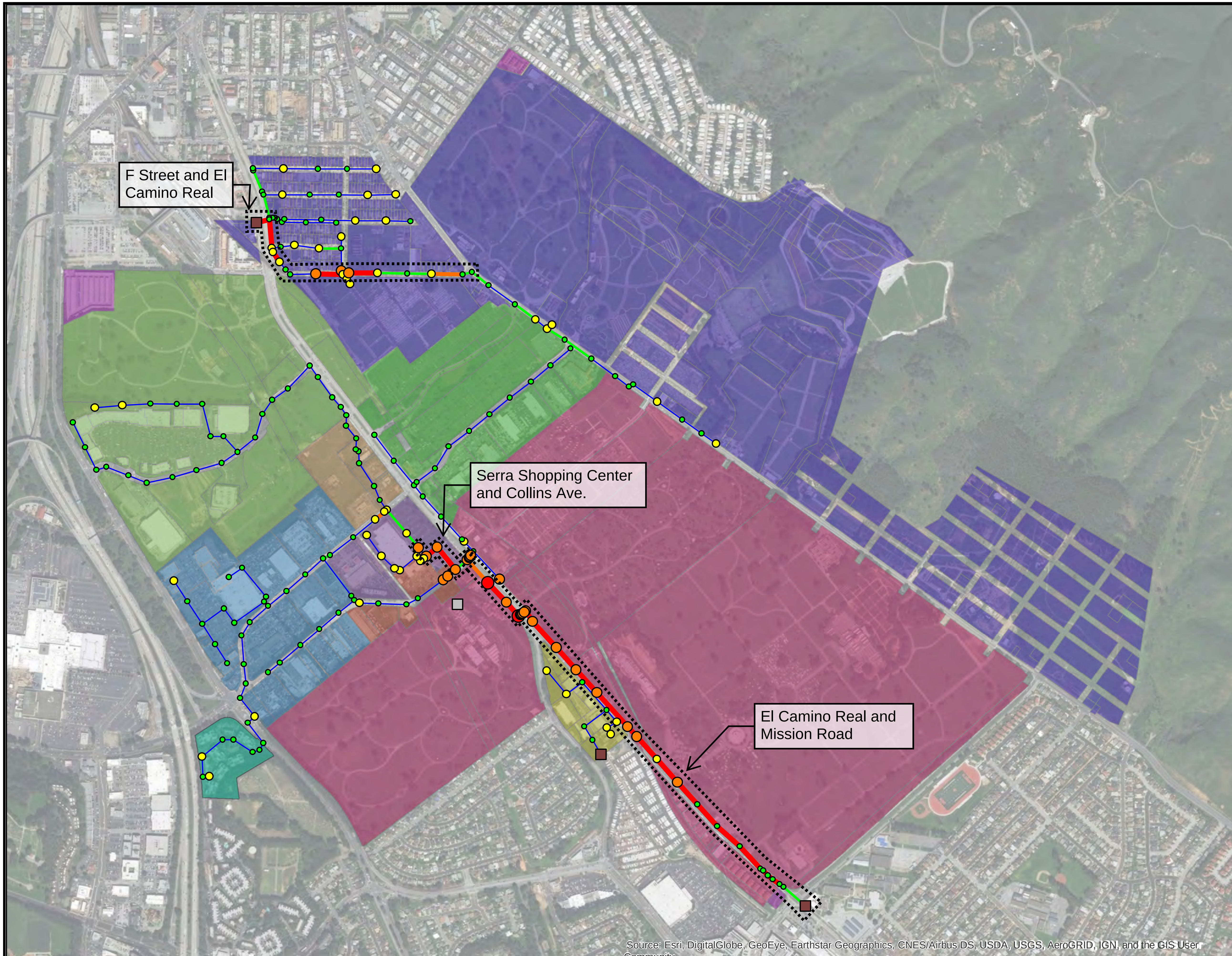


Appendix D.1
Ultimate Build-out Conditions Dry Weather Flow Results Figure*

*Refer to Appendix D.3, D.4, and D.5 for manhole IDs and more refined system layout.

WATERWORKS ENGINEERS

Appendix D.2 Ultimate Build-out Conditions Wet Weather Flow Results Figures



Legend

Manhole Unfilled Depth
- Potential SSO
- 0 - 3 Feet
- 3 - 5 Feet
- > 5 Feet

Outlet
- Active

Pipe Max "d/D" Ratio
- Less than 0.5
- 0.5~0.75
- 0.75~0.99
- Greater than 0.99

Basins
- DCMB
- SSFMB1A
- SSFMB1B
- SSFMB2
- SSFMB3
- SSFMB4A
- SSFMB4B
- SSFMB5
- SSFMB6
- SSFMB7
- Does not flow to Colma

N
800 400 0 800 Feet

Appendix D.2

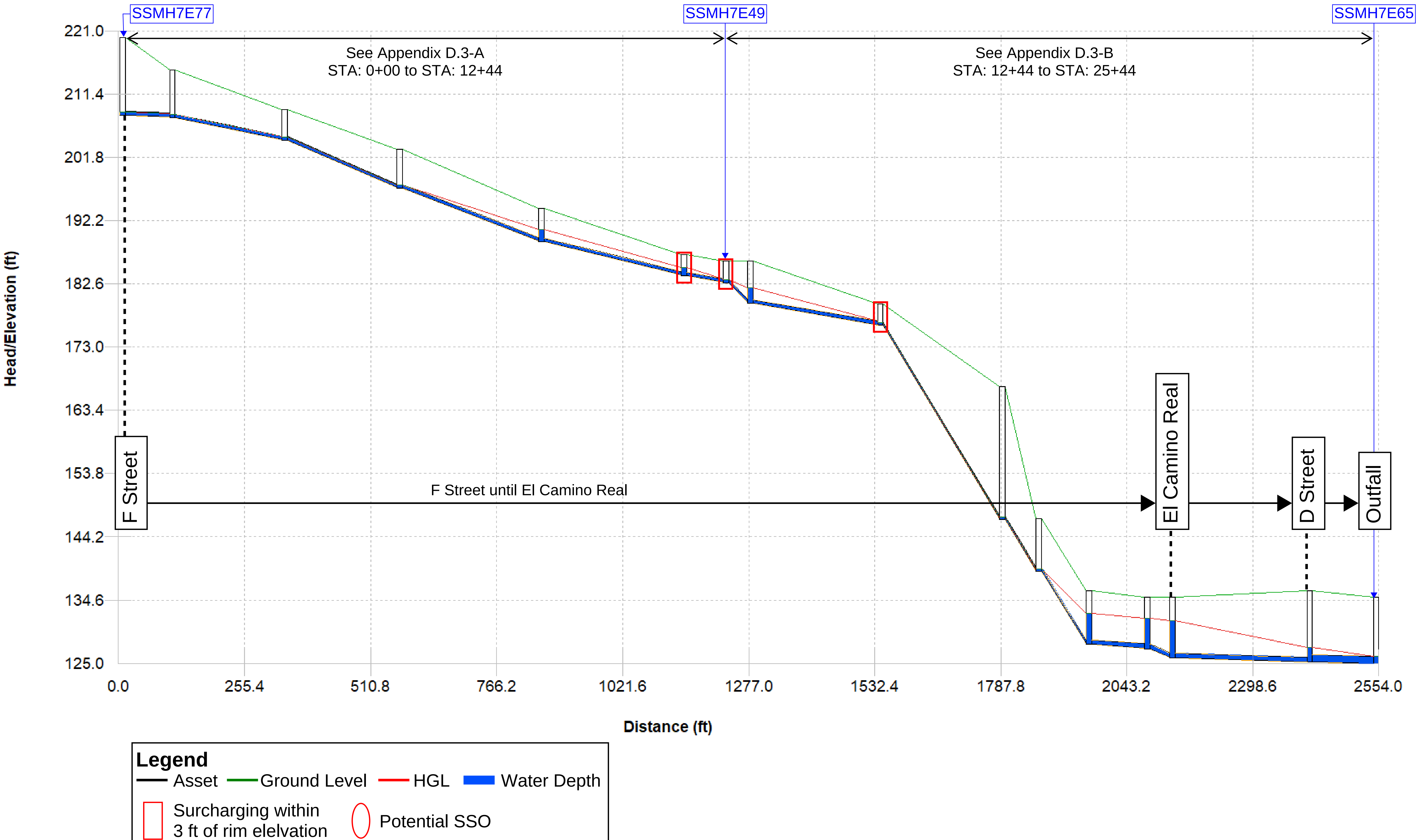
Ultimate Build-out Conditions Wet Weather Flow Results Figure*

*Refer to Appendix D.3, D.4, and D.5 for manhole IDs and more refined system layout.

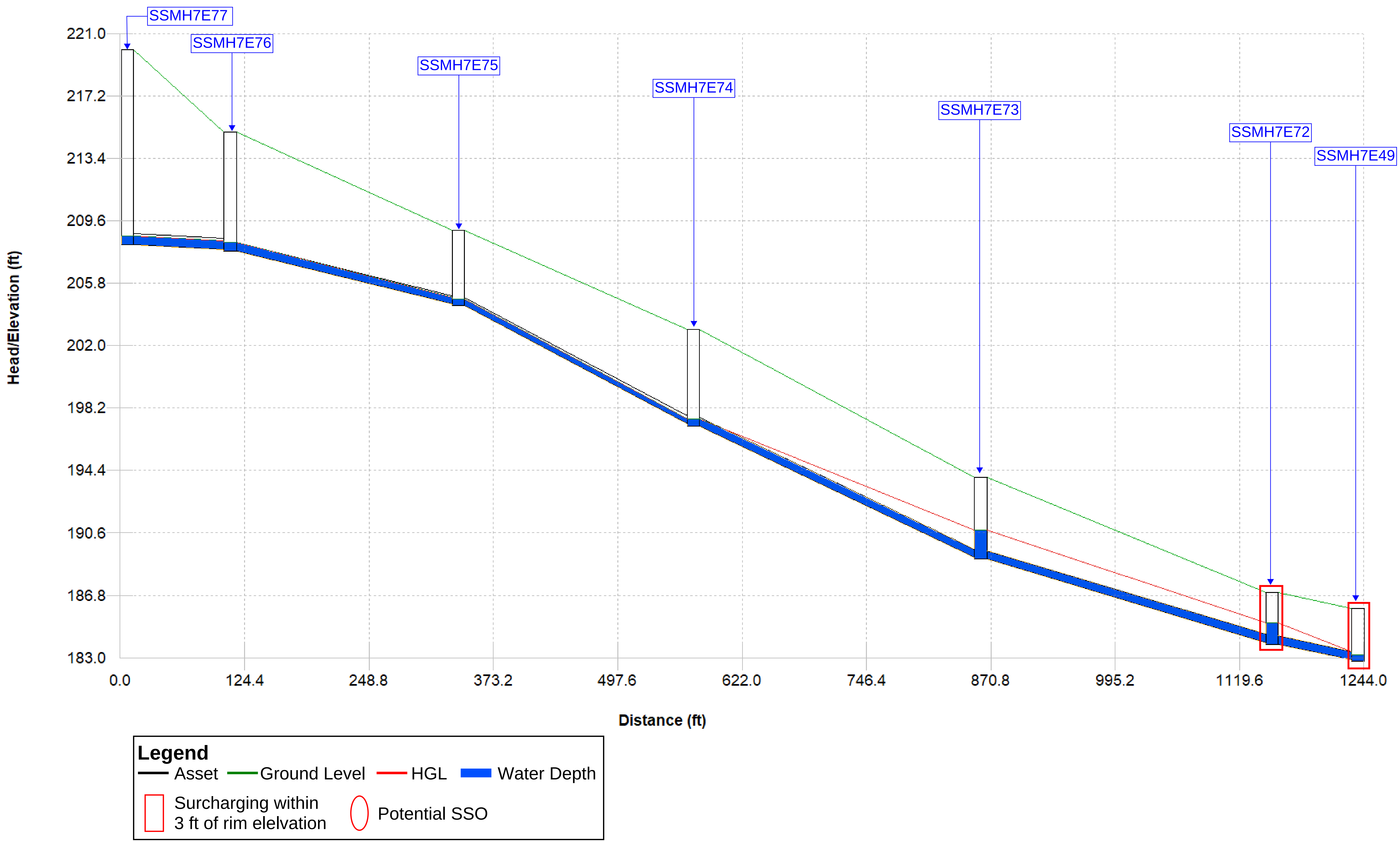
WATERWORKS ENGINEERS

Appendix D.3 HGL Profile of F Street and El Camino Real Modeled Capacity Deficiency under Ultimate Build-out Conditions 10-yr/ 24-hr Type 1A Storm

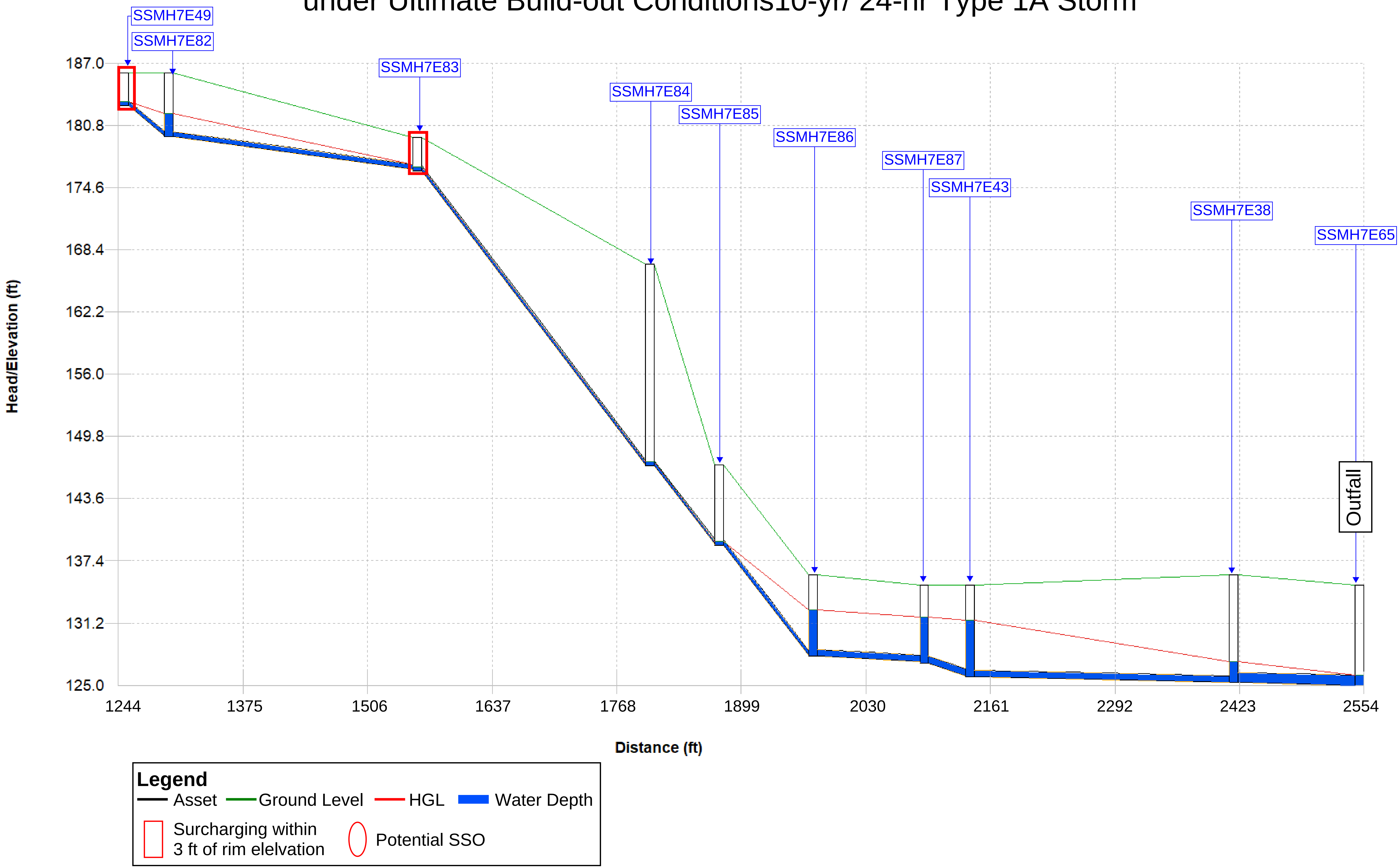
Appendix D.3
HGL Profile F Street and El Camino Real Modeled Capacity Deficiency under Ultimate Build-out Conditions10-yr/ 24-hr Type 1A Storm



Appendix D.3-A
HGL Profile F Street and El Camino Real Modeled Capacity Deficiency under Ultimate Build-out Conditions10-yr/ 24-hr Type 1A Storm

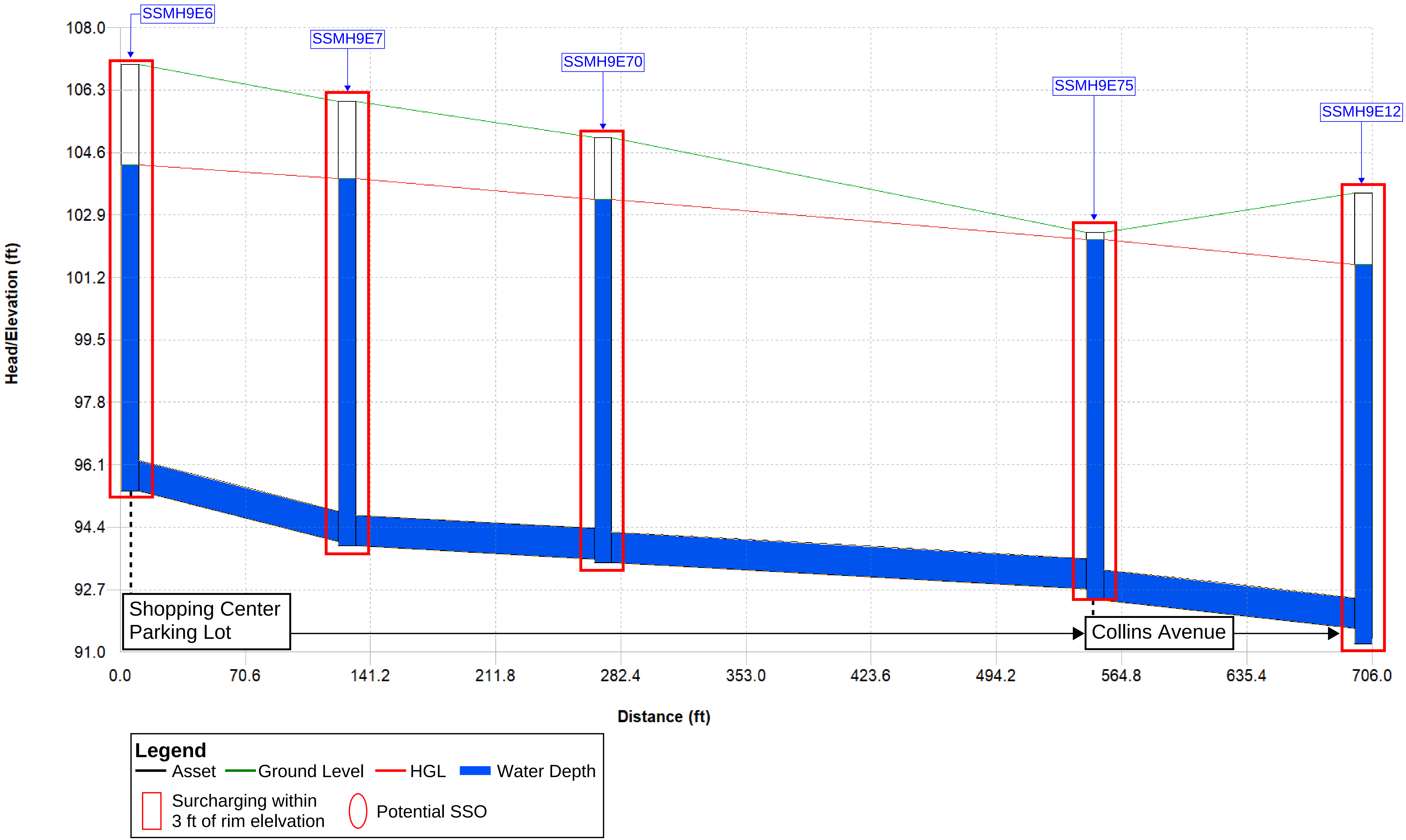


Appendix D.3-B
HGL Profile F Street and El Camino Real Modeled Capacity Deficiency under Ultimate Build-out Conditions10-yr/ 24-hr Type 1A Storm



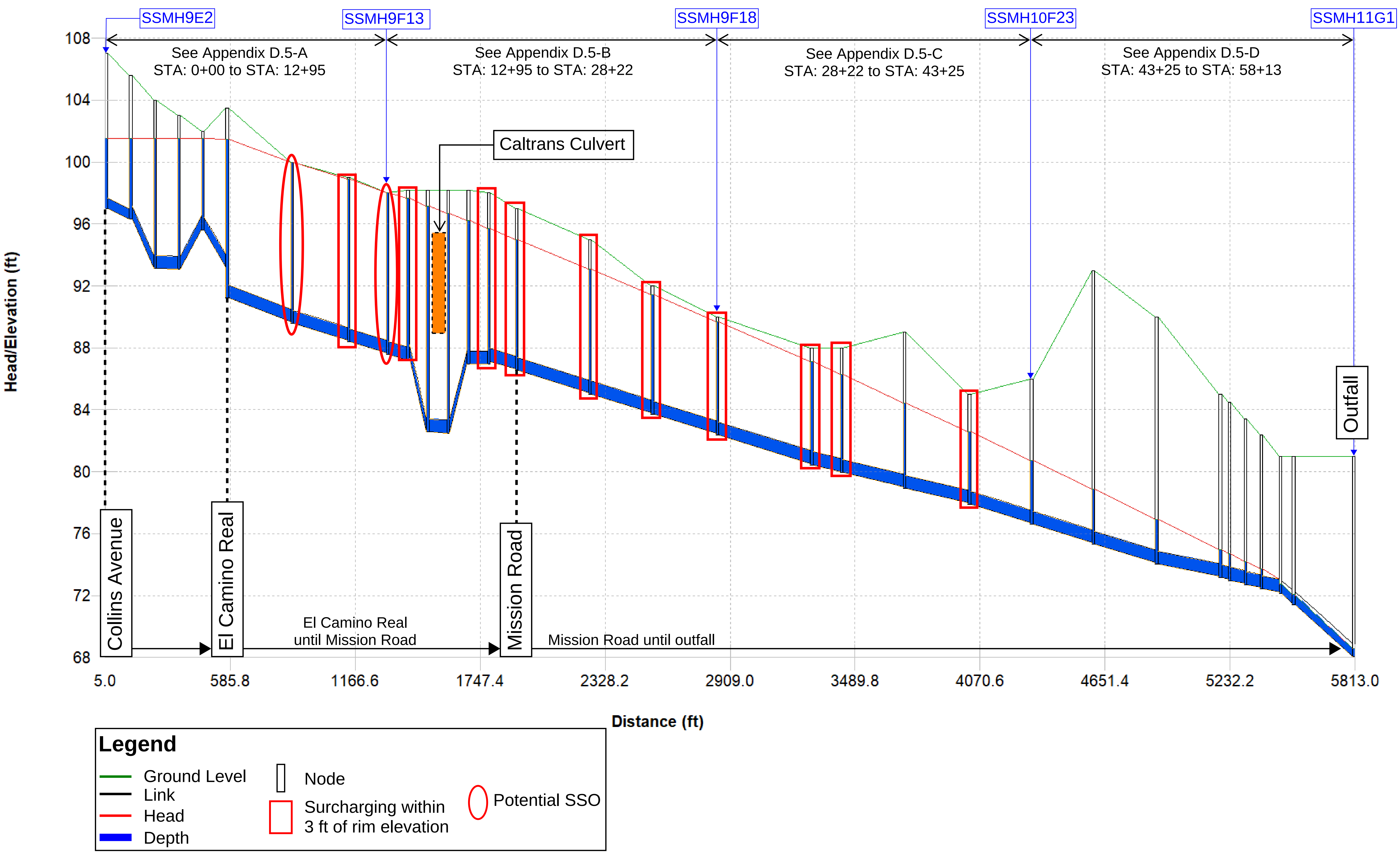
Appendix D.4 HGL Profile of Serra Shopping Center and Collins Avenue Modeled Capacity Deficiency under Ultimate Build-out Conditions 10-yr/ 24-hr Type 1A Storm

Appendix D.4
HGL Profile of Serra Shopping Center and Collins Avenue Modeled Capacity Deficiency under Ultimate Build-out Conditions 10yr 24hr Type 1A Storm

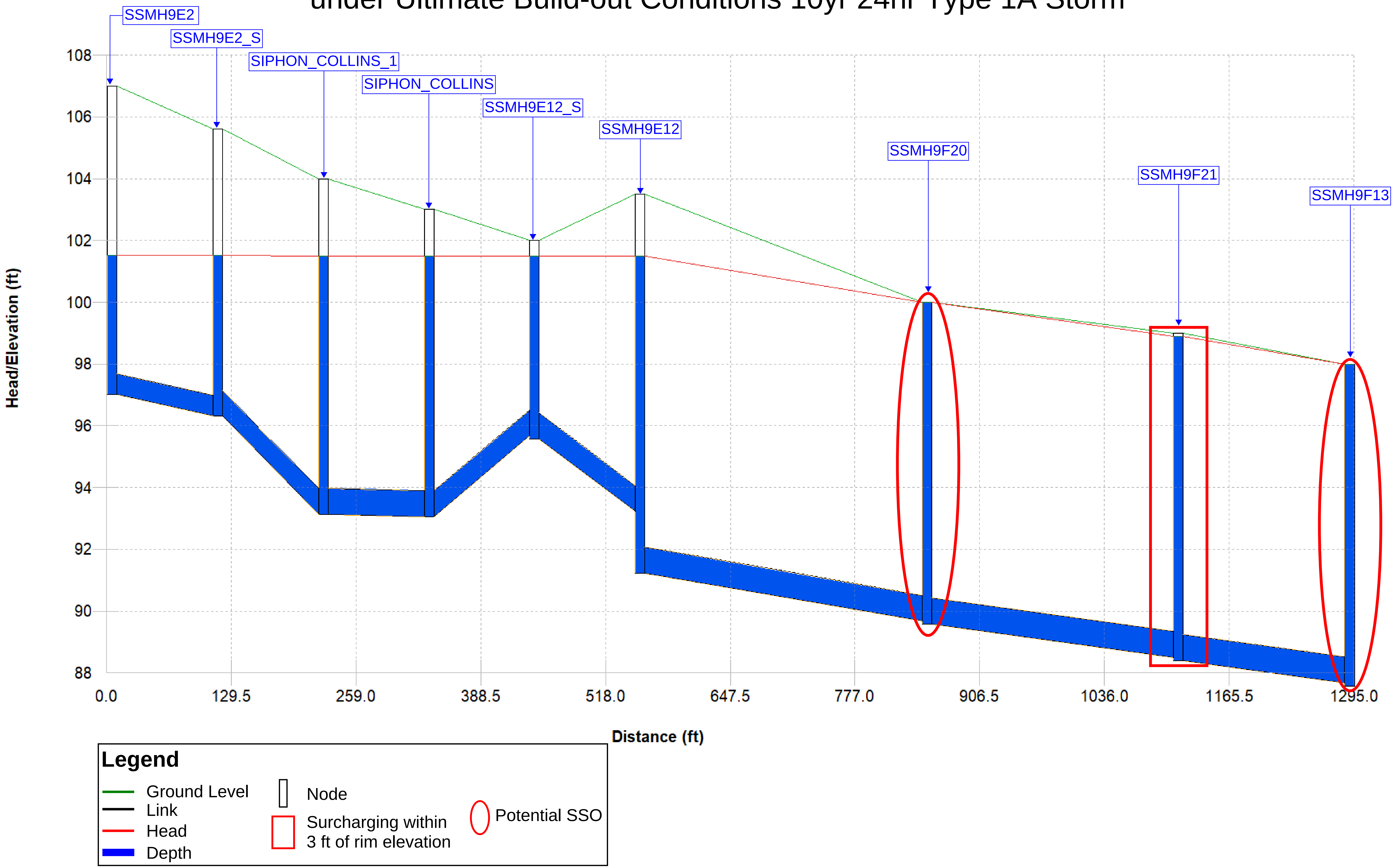


Appendix D.5 HGL Profile of El Camino Real and Mission Road Modeled Capacity Deficiency under Ultimate Build-out Conditions 10-yr/ 24-hr Type 1A Storm

Appendix D.5
HGL Profile of El Camino Real and Mission Road Modeled Capacity Deficiency under Ultimate Build-out Conditions 10yr 24hr Type 1A Storm

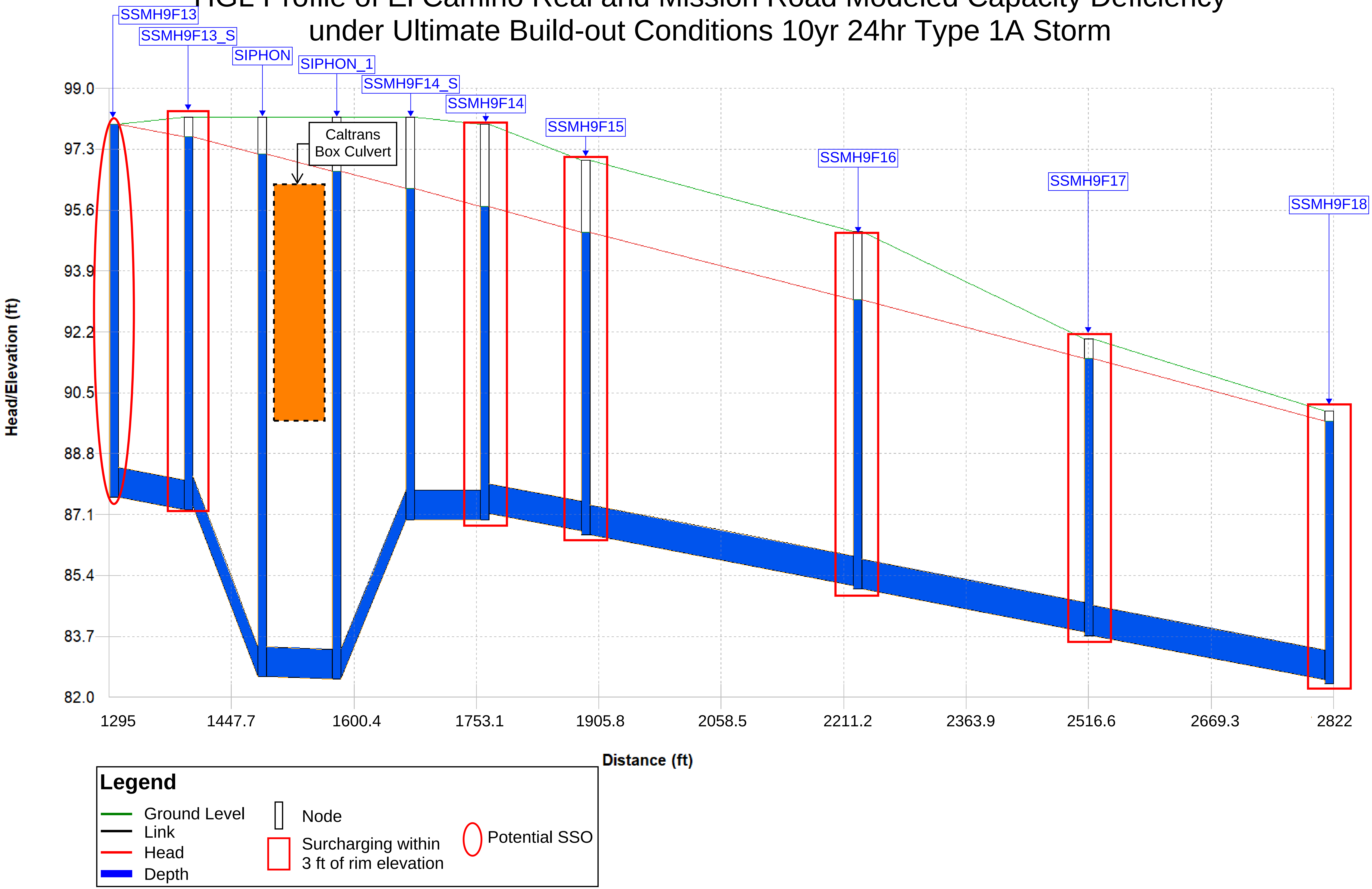


Appendix D.5-A
HGL Profile of El Camino Real and Mission Road Modeled Capacity Deficiency under Ultimate Build-out Conditions 10yr 24hr Type 1A Storm

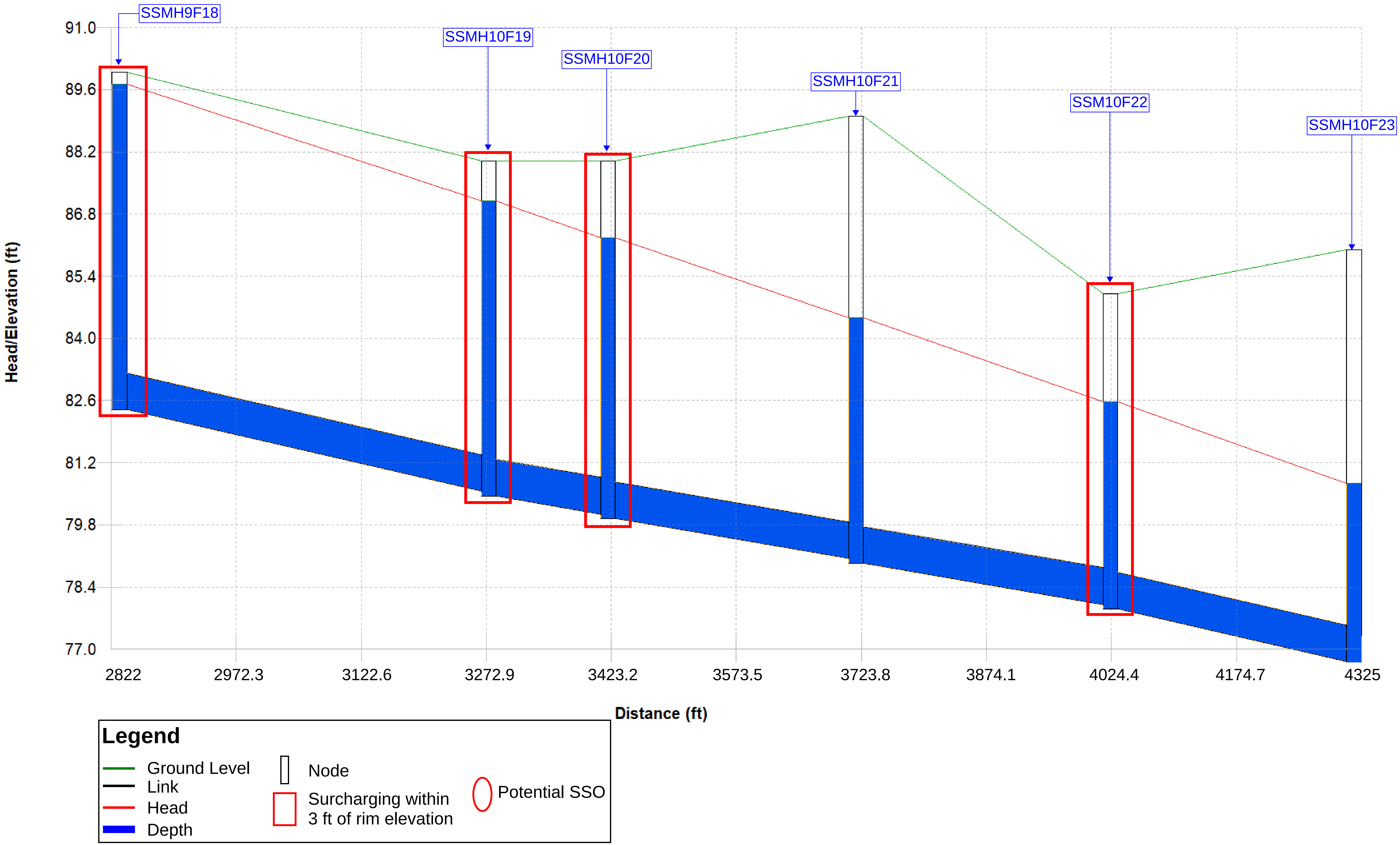


Appendix D.5-B

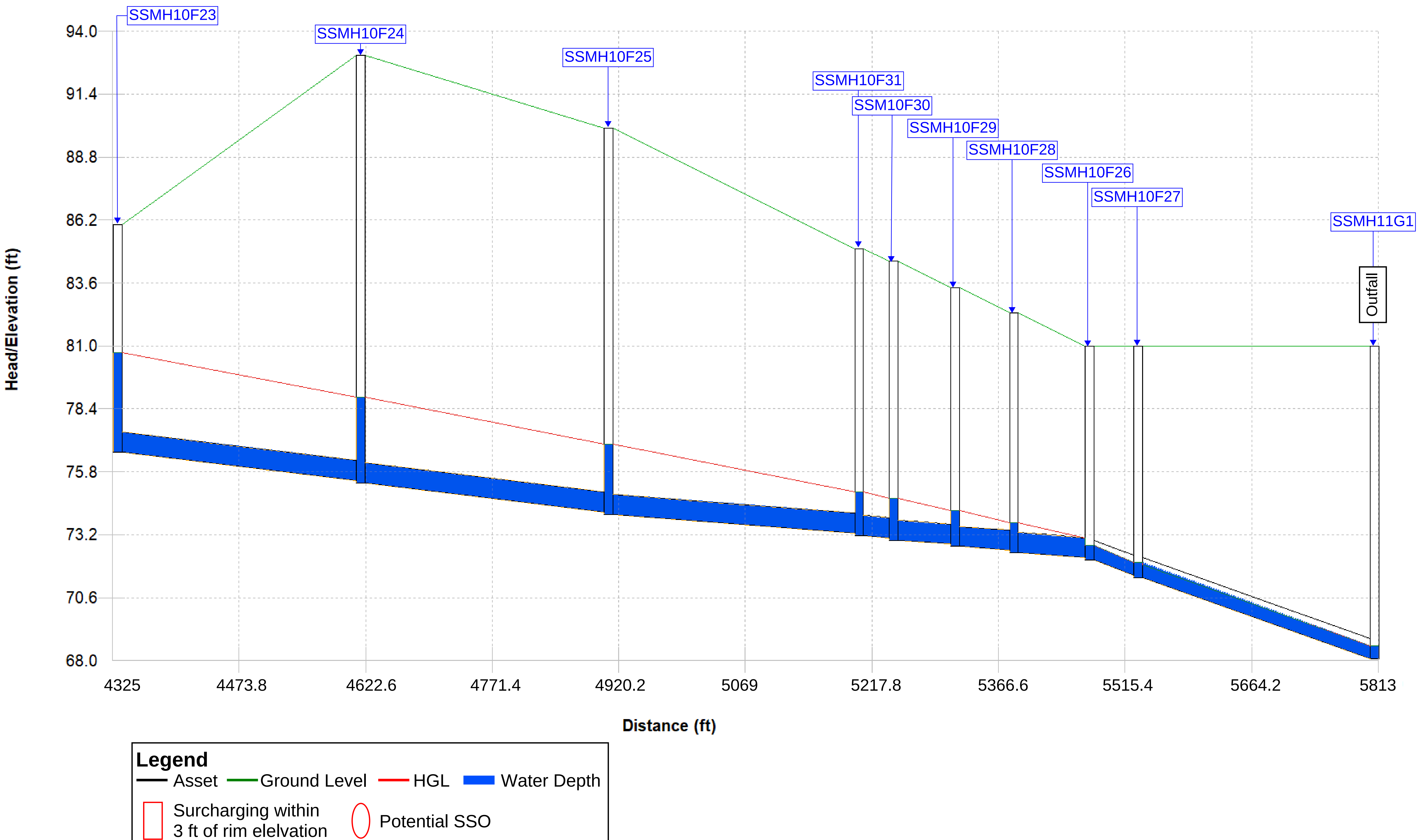
HGL Profile of El Camino Real and Mission Road Modeled Capacity Deficiency under Ultimate Build-out Conditions 10yr 24hr Type 1A Storm



Appendix D.5-C
HGL Profile of El Camino Real and Mission Road Modeled Capacity Deficiency under Ultimate Build-out Conditions10yr 24hr Type 1A Storm



Appendix D.5-D
HGL Profile of El Camino Real and Mission Road Modeled Capacity Deficiency under Ultimate Build-out Conditions10yr 24hr Type 1A Storm



Appendix E. City of South San Francisco Wastewater Collection System Capacity Analysis Package (Akel Engineering Group, Inc., January 2019)

LEGEND

- Existing Modeled Pipeline
- Existing Modeled Manhole
- 18" Existing Pipeline Diameter

PRELIMINARY

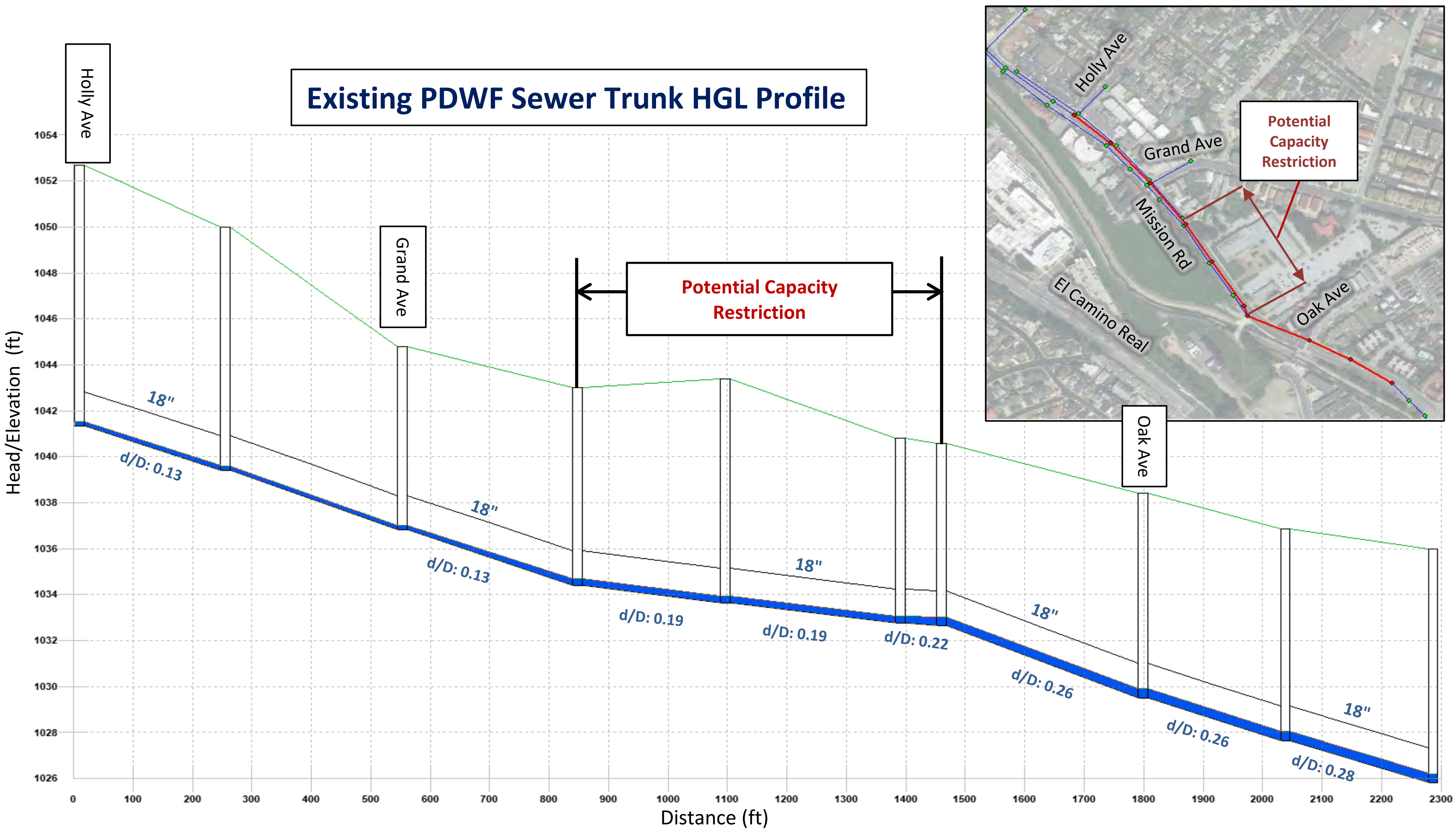
January 31, 2019

Figure 1

Mission Rd HGL Profile Study Area

City of South San Francisco

AKEL ENGINEERING GROUP, INC.



Notes:

PRELIMINARY

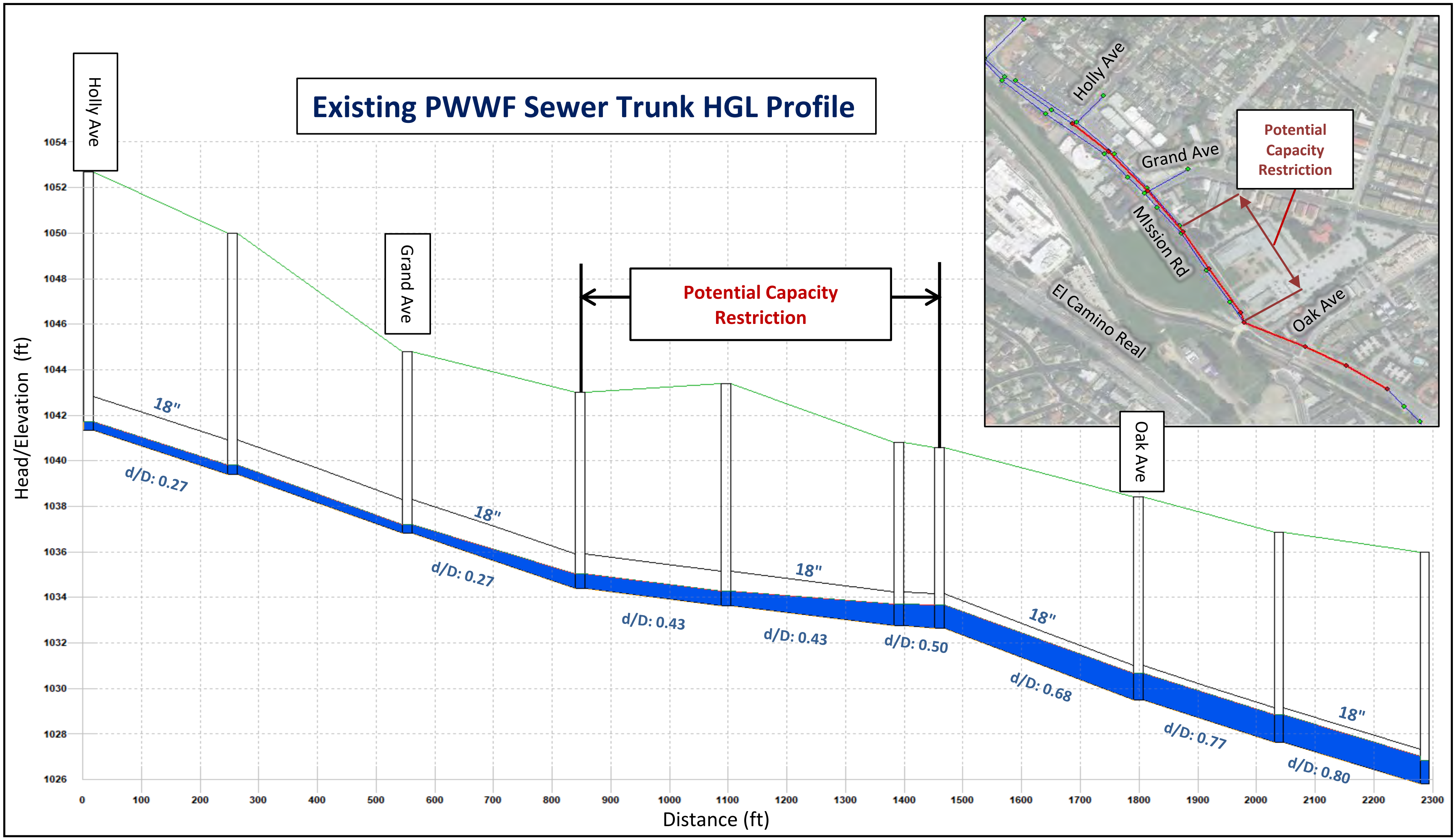
1. Flows are based on peak dry weather flows
2. Peak flow observed in sewer trunk: 725 gpm
3. Allocated flow based on Unit Flow Factor Analysis and Land Use for Basin B1 and B2
4. PDWF is equal to ADWF for Basin B1 and B2 and reflects historical flows at the WPCP and diurnal curve extracted from V&A Flow Monitoring Analysis.
5. 2018 SSMP Criteria: Sewer trunk d/D to be under 90% capacity
6.This analysis does not include flows downstream of Mission Road and Chestnut Avenue. This analysis was limited to the upstream portion of the sewer trunk where Colma flows enter the system. Additional analysis will be completed once the hydraulic model is calibrated.
7. Flows included in the hydraulic model reflect City of South San Francisco only, and do not include Colma or Daly City.

January 31, 2019

Figure 2

Mission Rd HGL Profile
Existing PDWF
City of South San Francisco

AKEL
ENGINEERING GROUP, INC.



Notes:

PRELIMINARY

1. Flows are based on peak dry weather flows
2. Peak flow observed in sewer trunk: 3,925 gpm
3. Allocated flow based on Unit Flow Factor Analysis and Land Use for Basin B1 and B2
4. PDWF is equal to ADWF for Basin B1 and B2 and reflects historical flows at the WPCP and diurnal curve extracted from V&A Flow Monitoring Analysis.
5. 2018 SSMP Criteria: Sewer trunk d/D to be under 90% capacity
6.This analysis does not include flows downstream of Mission Road and Chestnut Avenue. This analysis was limited to the upstream portion of the sewer trunk where Colma flows enter the system. Additional analysis will be completed once the hydraulic model is calibrated.
7. Flows included in the hydraulic model reflect City of South San Francisco only, and do not include Colma or Daly City.
8. PWWF based on 10-year 24-hour storm event (3.85 in) obtained from NOAA Atlas 14.

January 31, 2019

Figure 3

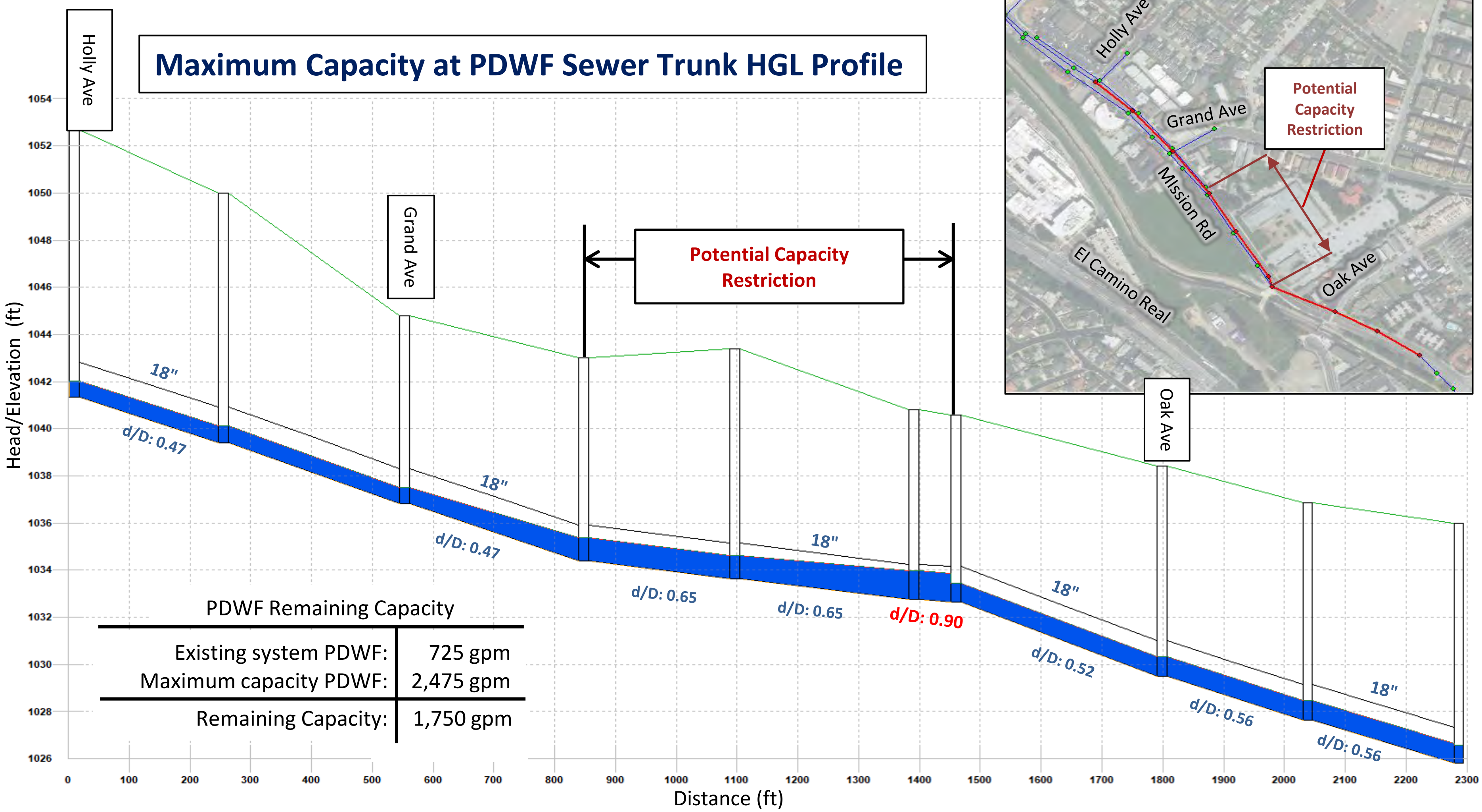
Mission Rd HGL Profile

Existing PWWF

City of South San Francisco

AKEL ENGINEERING GROUP, INC.

Maximum Capacity at PDWF Sewer Trunk HGL Profile



PDWF Remaining Capacity

Existing system PDWF:	725 gpm
Maximum capacity PDWF:	2,475 gpm
Remaining Capacity:	1,750 gpm

Notes:

PRELIMINARY

1. Flows and remaining capcity are based on peak dry weather flows
2. Allocated flow based on Unit Flow Factor Analysis and Land Use for Basin B1 and B2
3. PDWF is equal to ADWF for Basin B1 and B2 and reflects historical flows at the WPCP and diurnal curve extracted from V&A Flow Monitoring Analysis.
4. 2018 SSMP Criteria: Sewer trunk d/D to be under 90% capacity
5.This analysis does not include flows downstream of Mission Road and Chestnut Avenue. This analysis was limited to the upstream portion of the sewer trunk where Colma flows enter the system. Additional analysis will be completed once the hydraulic model is calibrated.
6. Flows included in the hydraulic model reflect City of South San Francisco only, and do not include Colma or Daly City.

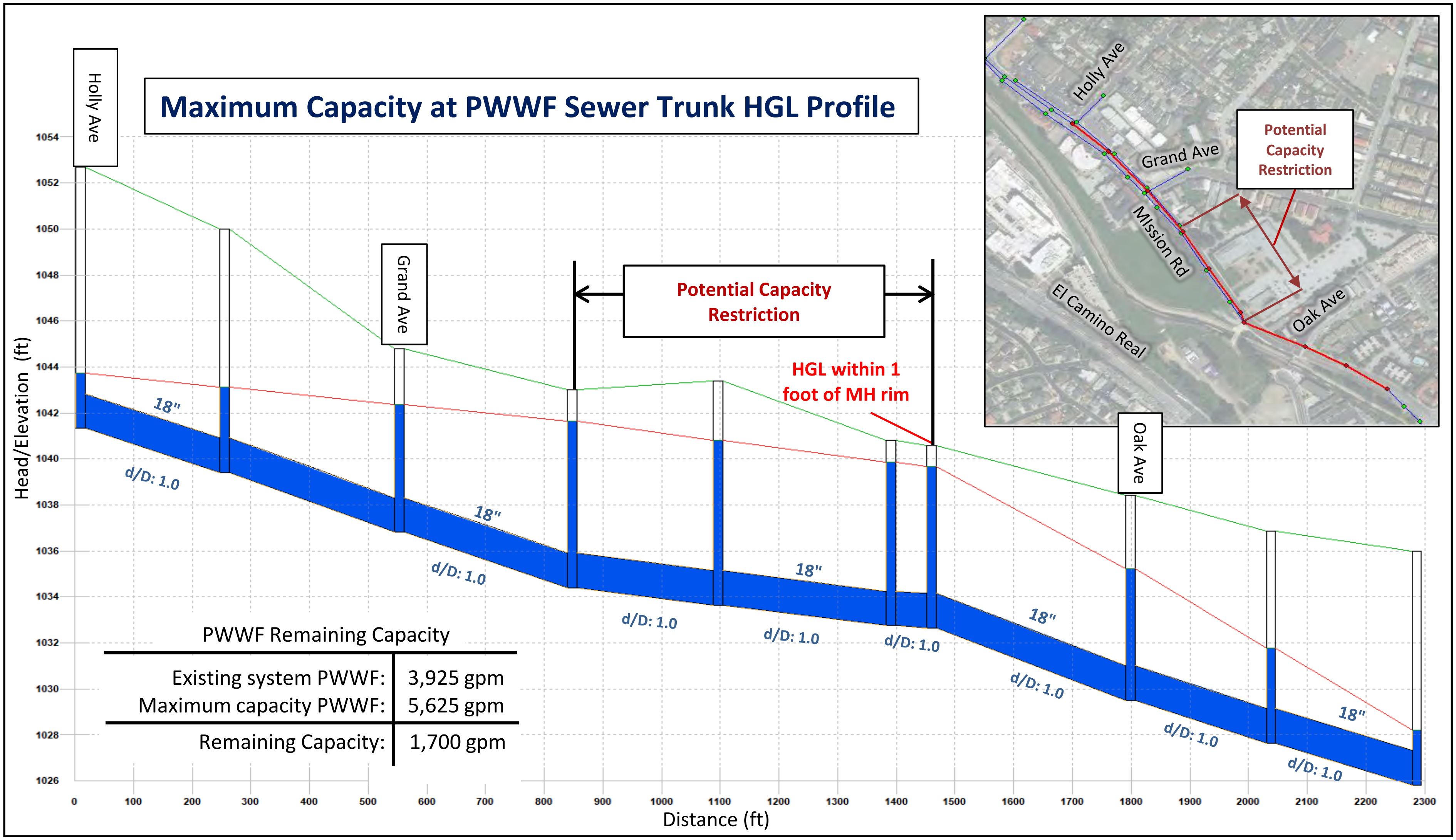
January 31, 2019

Figure 4

Mission Rd HGL Profile at Max Capacity (PDWF)

City of South San Francisco

AKEL ENGINEERING GROUP, INC.



PWWF Remaining Capacity

Existing system PWWF:	3,925 gpm
Maximum capacity PWWF:	5,625 gpm
Remaining Capacity:	1,700 gpm

Notes:

PRELIMINARY

1. Flows and remaining capcity are based on peak dry weather flows
2. Allocated flow based on Unit Flow Factor Analysis and Land Use for Basin B1 and B2
3. PDWF is equal to ADWF for Basin B1 and B2 and reflects historical flows at the WPCP and diurnal curve extracted from V&A Flow Monitoring Analysis.
4. 2018 SSMP Criteria: Sewer trunk d/D to be under 90% capacity
5. This analysis does not include flows downstream of Mission Road and Chestnut Avenue. This analysis was limited to the upstream portion of the sewer trunk where Colma flows enter the system. Additional analysis will be completed once the hydraulic model is calibrated.
6. Flows included in the hydraulic model reflect City of South San Francisco only, and do not include Colma or Daly City.
7. PWWF based on 10-year 24-hour storm event (3.85 in) obtained from NOAA Atlas 14.

January 31, 2019

Figure 5
Mission Rd HGL Profile at Max Capacity (PWWF)
City of South San Francisco

AKEL ENGINEERING GROUP, INC.

LEGEND

- Existing Modeled Pipeline
- Existing Modeled Manhole
- 18" Existing Pipeline Diameter

PRELIMINARY

Figure 6

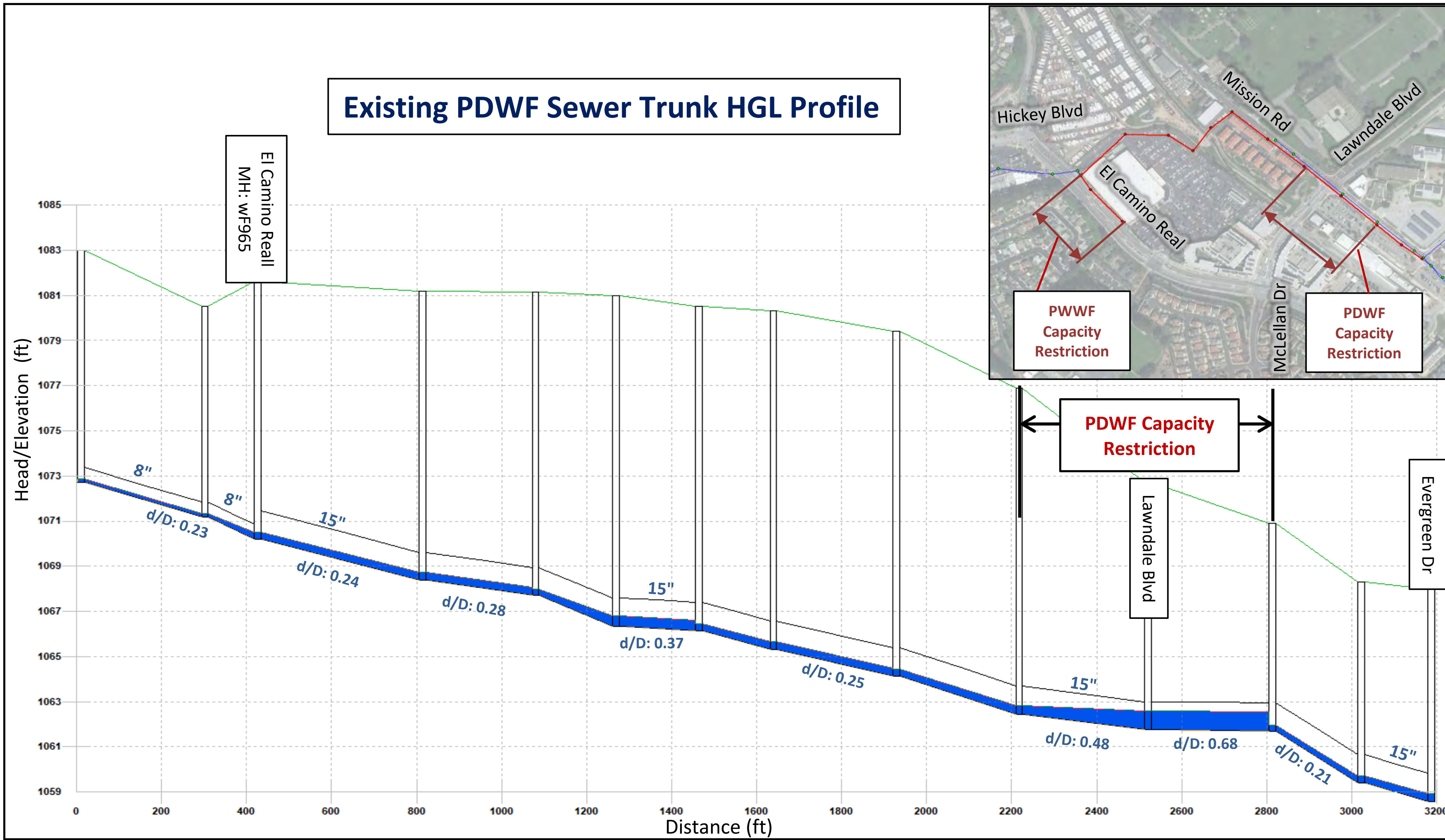
Hickey Blvd HGL Profile Study Area

City of South San Francisco

January 31, 2019

AKEL ENGINEERING GROUP, INC.

Existing PDWF Sewer Trunk HGL Profile



Notes:

PRELIMINARY

1. Flows are based on peak dry weather flows
2. Peak flow observed in sewer trunk: 300 gpm
3. Allocated flow based on Unit Flow Factor Analysis and Land Use for Basin B1 and B2
4. PDWF is equal to ADWF for Basin B1 and B2 and reflects historical flows at the WPCP and diurnal curve extracted from V&A Flow Monitoring Analysis.
5. 2018 SSMP Criteria: Sewer trunk d/D to be under 90% capacity
6. This analysis does not include flows downstream of Mission Road and Chestnut Avenue. This analysis was limited to the upstream portion of the sewer trunk where Colma flows enter the system. Additional analysis will be completed once the hydraulic model is calibrated.
7. Flows included in the hydraulic model reflect City of South San Francisco only, and do not include Colma or Daly City.

February 11, 2019

Figure 7

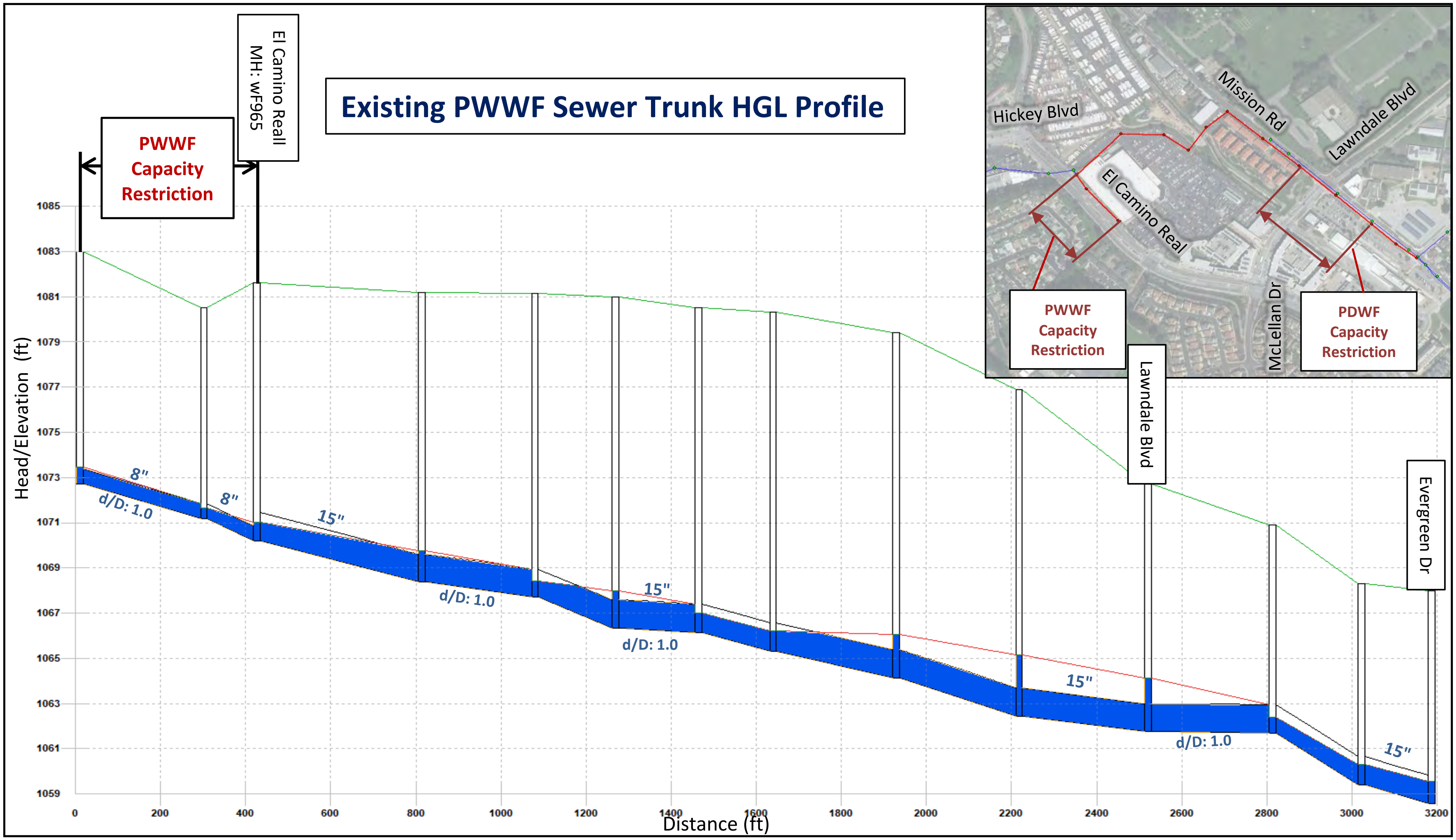
Hickey Blvd HGL Profile

Existing PDWF

City of South San Francisco

AKEL

ENGINEERING GROUP, INC.



Notes:

PRELIMINARY

1. Flows are based on peak dry weather flows
2. Peak flow observed in sewer trunk: 1,900 gpm
3. Allocated flow based on Unit Flow Factor Analysis and Land Use for Basin B1 and B2
4. PDWF is equal to ADWF for Basin B1 and B2 and reflects historical flows at the WPCP and diurnal curve extracted from V&A Flow Monitoring Analysis.
5. 2018 SSMP Criteria: Sewer trunk d/D to be under 90% capacity
6. This analysis does not include flows downstream of Mission Road and Chestnut Avenue. This analysis was limited to the upstream portion of the sewer trunk where Colma flows enter the system. Additional analysis will be completed once the hydraulic model is calibrated.
7. Flows included in the hydraulic model reflect City of South San Francisco only, and do not include Colma or Daly City.
8. PWWF based on 10-year 24-hour storm event (3.85 in) obtained from NOAA Atlas 14.

February 11, 2019

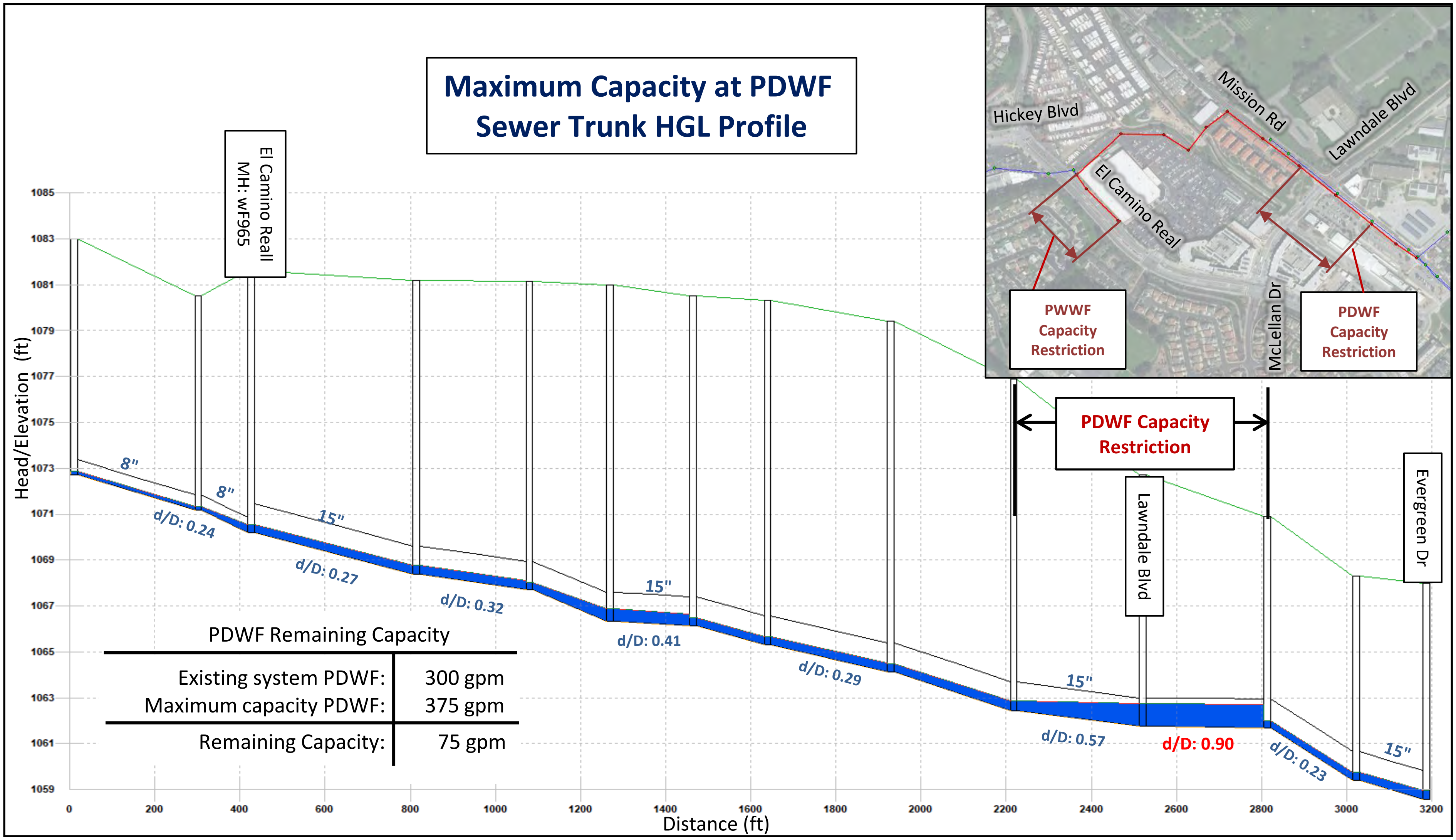
Figure 8

Hickey Blvd HGL Profile

Existing PWWF

City of South San Francisco

AKEL ENGINEERING GROUP, INC.



PDWF Remaining Capacity

Existing system PDWF:	300 gpm
Maximum capacity PDWF:	375 gpm
Remaining Capacity:	75 gpm

Notes:

PRELIMINARY

1. Flows and remaining capcity are based on peak dry weather flows
2. Allocated flow based on Unit Flow Factor Analysis and Land Use for Basin B1 and B2
3. PDWF is equal to ADWF for Basin B1 and B2 and reflects historical flows at the WPCP and diurnal curve extracted from V&A Flow Monitoring Analysis.
4. 2018 SSMP Criteria: Sewer trunk d/D to be under 90% capacity
5. This analysis does not include flows downstream of Mission Road and Chestnut Avenue. This analysis was limited to the upstream portion of the sewer trunk where Colma flows enter the system. Additional analysis will be completed once the hydraulic model is calibrated.
6. Flows included in the hydraulic model reflect City of South San Francisco only, and do not include Colma or Daly City.

February 11, 2019

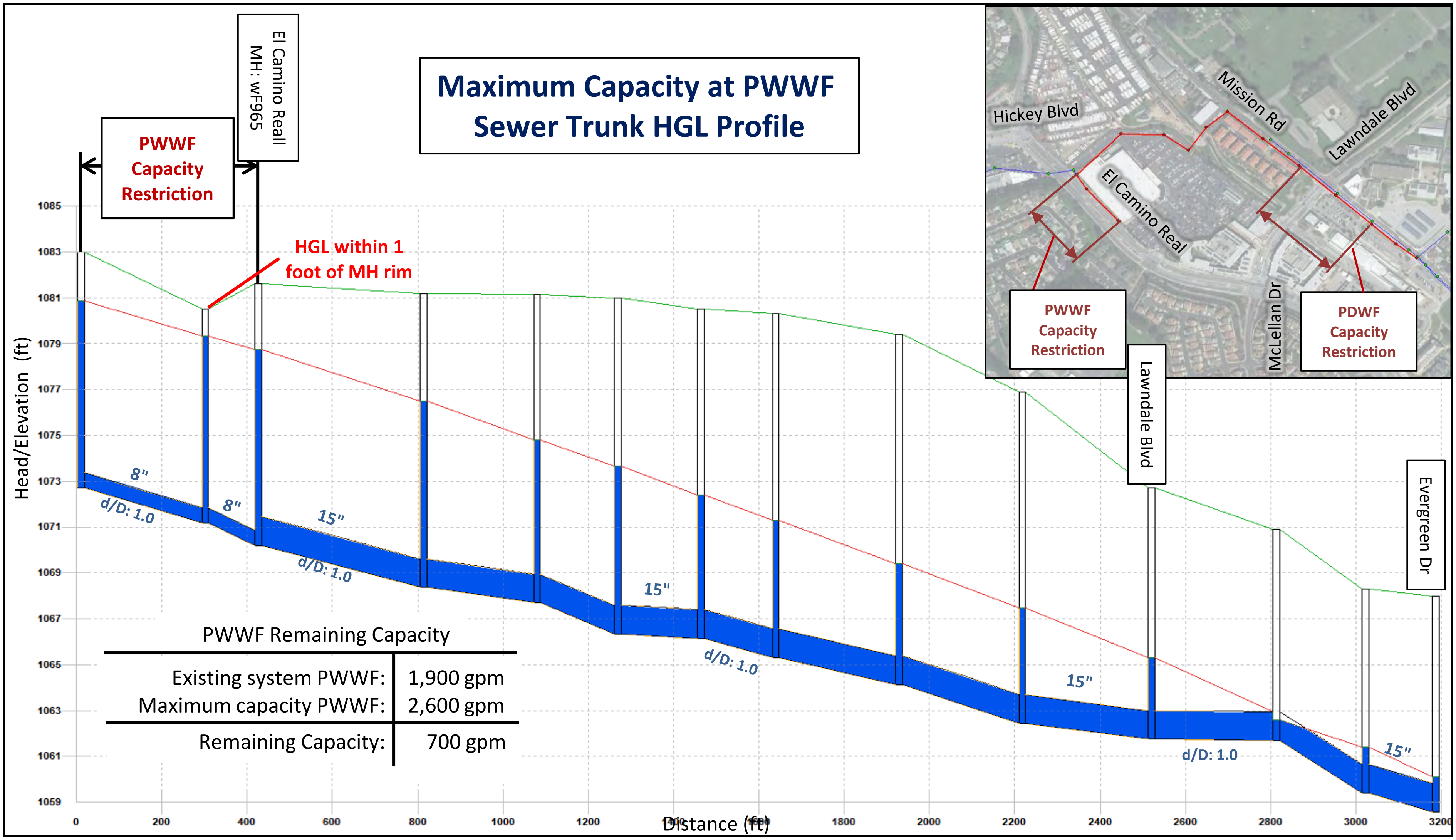
Figure 9

Hickey Blvd HGL Profile at Max Capacity (PDWF)

City of South San Francisco

AKEL ENGINEERING GROUP, INC.

Maximum Capacity at PWWF Sewer Trunk HGL Profile



PWWF Remaining Capacity

Existing system PWWF:	1,900 gpm
Maximum capacity PWWF:	2,600 gpm
Remaining Capacity:	700 gpm

Notes:

PRELIMINARY

1. Flows and remaining capcity are based on peak dry weather flows
2. Allocated flow based on Unit Flow Factor Analysis and Land Use for Basin B1 and B2
3. PDWF is equal to ADWF for Basin B1 and B2 and reflects historical flows at the WPCP and diurnal curve extracted from V&A Flow Monitoring Analysis.
4. 2018 SSMP Criteria: Sewer trunk d/D to be under 90% capacity
5.This analysis does not include flows downstream of Mission Road and Chestnut Avenue. This analysis was limited to the upstream portion of the sewer trunk where Colma flows enter the system. Additional analysis will be completed once the hydraulic model is calibrated.
6. Flows included in the hydraulic model reflect City of South San Francisco only, and do not include Colma or Daly City.
7. PWWF based on 10-year 24-hour storm event (3.85 in) obtained from NOAA Atlas 14.

February 11, 2019

Figure 10

Hickey Blvd HGL Profile at Max Capacity (PWWF)

City of South San Francisco

AKEL ENGINEERING GROUP, INC.

TOWN OF COLMA

AUGUST 5, 1924

CALIFORNIA

STAFF REPORT

TO: Mayor and Members of the City Council

FROM: Brian Dossey, City Manager

MEETING DATE: August 28, 2019

SUBJECT: Lew Edwards Group Contract Amendment

RECOMMENDATION

Staff recommends the City Council adopt the following:

RESOLUTION APPROVING THE FIRST AMENDMENT TO PROFESSIONAL SERVICES AGREEMENT WITH THE LEW EDWARDS GROUP

EXECUTIVE SUMMARY

In April 2019 the Town of Colma entered into an agreement (Attachment B) with the Lew Edwards Group to facilitate an opinion research study and independently review the results of the study. One of the takeaways from the study was that Colma residents have a very favorable impression (86.6%) of how the Town provides it services.

The scope of work in the agreement between the Lew Edwards Group and the Town has been completed; however staff is recommending that the City Council approve the First Amendment to extend the agreement (Attachment C) and modify the scope of services to include further resident engagement, expansion of community awareness of city services and seek additional community input.

The proposed extension of the contract is through October 31, 2020; however, the agreement can be terminated by the Town on 10 days written notice with or without cause. See, Section 16 of the agreement. Consultant can also terminate the agreement but only for cause and upon 30 day notice to the Town.

FISCAL IMPACT

The cost to extend the agreement is $5,500 per month, not to exceed $77,000.

BACKGROUND

Over the past several months economic indicators are predicting a slowdown in the economy or even a recession in the near future. During the budget study sessions in April, May and June of this year, staff presented a future financial outlook in the event of a slowdown or recession and how it would impact the general fund and city services.

The financial outlook showed that if there were a significant slowdown or even a recession, annual operating expenditures could exceed annual revenues as early as fiscal year 2021-22 and possibly remain that way for the next ten years. This would cause the Town to not only make significant changes to the level of services it provides to the community but, also cause the Town to significantly draw down the financial reserves.

Therefore, the Town contracted with the Lew Edwards Group as well as Godbe Research to conduct a Public Opinion Survey identifying resident priorities as they pertain to Town services, giving staff a barometer as to what services residents value the most. The results from the survey was very informative; as stated above Colma residents have a very favorable impression (86.6%) of how the Town provides its services. Residents were also very clear on how they prioritized Town services with pothole repair, maintaining police patrols and attracting and retaining local businesses as their top preferences. The results from the survey will help the City Council and staff in making future decisions on Town services in the event of an economic slowdown or recession.

Staff, therefore, is recommending that the City Council amend the Contract with the Lew Edwards group extending their schedule and scope of work so we can continue to educate and engage the public on Town services and how the economy affects the budget, and the Town's ability to maintain services.

ANALYSIS

The proposed contract amendment with the Lew Edwards Group will assist the Town in developing a strategy that educates the community through resident engagement with a focus on city service priorities and future budget updates. Through consistent messaging the Lew Edwards group will also assist in communicating how the economy affects the Town's ability to provide high quality services to the community.

The engagement and communications will take place in the form of meetings, mailings, website, newsletter, social media, and presentations at community events and programs. The engagement may also include additional community surveys and review.

Through the community engagement and strategic communication efforts the Lew Edwards Group and Town staff will work with the community to develop solutions to potential future budget shortfalls by evaluating resident priorities and the need to maintain city services.

Over the duration of the project the Lew Edwards group will consistently analyze and provide feedback which will help guide the Town to make recommendations on how to meet and maintain city services during any potential slowdown in the economy or recession.

Upon completion of the project, the Town will have a very clear picture as to what the communities priorities are when it comes to Town services which will help make future budget decisions during an economic downturn and potentially provide solutions on how to continue to maintain city services.

The proposed scope and schedule can be found in Attachment C, Exhibit A-1 and C.

If at any time over the course of the agreement the City Council or Town staff feel that this project has run its course, the Town can terminate the agreement on 10 days written notice with or without cause.

Council Adopted Values

The City Council is acting ***responsibly*** by extending the agreement with the Lew Edwards Group, engaging the community and seeking public input on the Town future fiscal solvency and city service priorities.

CONCLUSION

Staff recommends the City Council adopt the resolution approving the First Amendment to the Professional Services Agreement with the Lew Edwards Group.

ATTACHMENTS

A. Resolution
B. Lew Edwards Group Contract
C. First Amendment to the Lew Edwards Group Contract

RESOLUTION NO. 2019-__
OF THE CITY COUNCIL OF THE TOWN OF COLMA

RESOLUTION APPROVING FIRST AMENDMENT TO PROFESSIONALS SERVICES AGREEMENT WITH THE LEW EDWARDS GROUP

The City Council of the Town of Colma does hereby resolve:

1. Background.

(a) On April 22, 2019, the Town entered into a professional services agreement with the Lew Edwards Group to provide consulting services with regard to determining resident priorities of services and to analyze funding priorities.

(b) The Town would now like to continue the professional services provided by the Lew Edwards Group by extending the term of the agreement and modifying the scope of services to provide additional consulting services to the Town.

2. Findings.

(a) The City Council finds that entering into the First Amendment is consistent with the Town's Purchasing Ordinance in that the services to be provided are professional services where demonstrated competence, the professional qualifications necessary for the satisfactory performance of the required services, and fair and reasonable prices to the Town of Colma, shall control the arrangement under Colma Municipal Code 1.06.200. Separately, the City Council also finds that even if the competitive process had been utilized, it would have likely not been in the best interests of the Town based on the unique experience and knowledge of the Lew Edwards Group in assisting cities and towns throughout the State of California.

3. Order.

(a) The First Amendment to the professional services agreement between the Town of Colma and the Lew Edwards Group, a copy of which is on file with the City Clerk, is approved by the City Council of the Town of Colma.

(b) The Mayor is authorized to execute said contract on behalf of the Town of Colma, with such technical amendments as may be deemed appropriate by the City Manager and the City Attorney.

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Certification of Adoption

I certify that the foregoing Resolution No. 2019-__ was duly adopted at a regular meeting of said City Council held on August 28, 2019 by the following vote:

Name	Voting			Present, Not Voting	
	Aye	No	Abstain	Present, Recused	Absent
Raquel "Rae" Gonzalez, Mayor	X				
Joanne F. del Rosario	X				
John Irish Goodwin	X				
Diana Colvin	X				
Helen Fisicaro	X				
Voting Tally	5	0			

Dated ______________________

____
Joanne F. del Rosario, Mayor

Attest: ____________________________
Caitlin Corley, City Clerk

TOWN OF COLMA
PROFESSIONAL SERVICES AGREEMENT

This Agreement is made and entered into as of April 22nd, 2019 by and between the Town of Colma, a municipal corporation organized and operating under the laws of the State of California with its principal place of business at 1198 El Camino Real, Colma, CA 94014 ("Town"), and The Lew Edwards Group, a [California Corporation with its principal place of business at 5454 Broadway, Oakland, California 94618 (hereinafter referred to as "Consultant"). Town and Consultant are sometimes individually referred to as "Party" and collectively as "Parties" in this Agreement.

RECITALS

A. Town is a public agency of the State of California and is in need of professional services for the following project:

Initial Consulting Services: Customer Satisfaction/Local Funding Viability (hereinafter referred to as "the Project").

B. Consultant has the necessary qualifications to provide such services.

C. The Parties desire by this Agreement to establish the terms for Town to retain Consultant to provide the services described herein.

AGREEMENT

NOW, THEREFORE, IT IS AGREED AS FOLLOWS:

1. Services.

Consultant shall provide the Town with the services described in the Scope of Services attached hereto as Exhibit "A."

2. Compensation.

a. Subject to paragraph 2(b) below, the Town shall pay for such services in accordance with the Schedule of Charges set forth in Exhibit "B."

b. In no event shall the total amount paid for services rendered by Consultant under this Agreement exceed the sum of $18,000. Periodic payments shall be made within 30 days of receipt of an invoice which includes a description of the work performed that is satisfactory to the Town. Payments to Consultant for work performed will be made on a monthly billing basis.

3. Additional Work.

If changes in the work seem merited by Consultant or the Town, and informal consultations with the other party indicate that a change is warranted, it shall be processed in the following manner: a letter outlining the changes shall be forwarded to the Town by Consultant with a statement of estimated changes in fee or time schedule. An amendment to this Agreement shall be prepared by the Town and executed by both Parties before performance of such services, or the Town will not be required to pay for the changes in the scope of work. Such amendment shall not render ineffective or invalidate unaffected portions of this Agreement.

4. Maintenance of Records.

Books, documents, papers, accounting records, and other evidence pertaining to costs incurred shall be maintained by Consultant and made available at all reasonable times during the contract period and for four (4) years from the date of final payment under the contract for inspection by Town.

5. Time of Performance.

Consultant shall perform its services in a prompt and timely manner and shall commence performance upon receipt of written notice from the Town to proceed ("Notice to Proceed"). Consultant shall complete the services required hereunder by July 15. The Notice to Proceed shall set forth the date of commencement of work.

6. Delays in Performance.

a. Neither Town nor Consultant shall be considered in default of this Agreement for delays in performance caused by circumstances beyond the reasonable control of the non-performing party. For purposes of this Agreement, such circumstances include but are not limited to, abnormal weather conditions; floods; earthquakes; fire; epidemics; war; riots and other civil disturbances; strikes, lockouts, work slowdowns, and other labor disturbances; sabotage or judicial restraint.

b. Should such circumstances occur, the non-performing party shall, within a reasonable time of being prevented from performing, give written notice to the other party describing the circumstances preventing continued performance and the efforts being made to resume performance of this Agreement.

7. Compliance with Law.

a. Consultant shall comply with all applicable laws, ordinances, codes and regulations of the federal, state and local government, including Cal/OSHA requirements.

b. If required, Consultant shall assist the Town, as requested, in obtaining and maintaining all permits required of Consultant by federal, state and local regulatory agencies.

c. If applicable, Consultant is responsible for all costs of clean up and/ or removal of hazardous and toxic substances spilled as a result of his or her services or operations performed under this Agreement.

8. Standard of Care

Consultant's services will be performed in accordance with generally accepted professional practices and principles and in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions.

9. Assignment and Subconsultant

Consultant shall not assign, sublet, or transfer this Agreement or any rights under or interest in this Agreement without the written consent of the Town, which may be withheld for any reason. Any attempt to so assign or so transfer without such consent shall be void and without legal effect and shall constitute grounds for termination. Subcontracts, if any, shall contain a provision making them subject to all provisions stipulated in this Agreement. Nothing contained herein shall prevent Consultant from employing independent associates, and subconsultants as Consultant may deem appropriate to assist in the performance of services hereunder.

10. Independent Consultant

Consultant is retained as an independent contractor and is not an employee of Town. No employee or agent of Consultant shall become an employee of Town. The work to be performed shall be in accordance with the work described in this Agreement, subject to such directions and amendments from Town as herein provided.

11. Insurance. Consultant shall not commence work for the Town until it has provided evidence satisfactory to the Town it has secured all insurance required under this section. In addition, Consultant shall not allow any subcontractor to commence work on any subcontract until it has secured all insurance required under this section.

a. Commercial General Liability

(i) The Consultant shall take out and maintain, during the performance of all work under this Agreement, in amounts not less than specified herein, Commercial General Liability Insurance, in a form and with insurance companies acceptable to the Town.

(ii) Coverage for Commercial General Liability insurance shall be at least as broad as the following:

(1) Insurance Services Office Commercial General Liability coverage (Occurrence Form CG 00 01) or exact equivalent.

(iii) Commercial General Liability Insurance must include coverage for the following:

(1) Bodily Injury and Property Damage
(2) Personal Injury/Advertising Injury (within Consultant's Professional Liability coverage)
(3) Premises/Operations Liability
(4) Products/Completed Operations Liability (within Consultant's Professional Liability coverage)
(5) Aggregate Limits that Apply per Project
(6) Explosion, Collapse and Underground (UCX) exclusion deleted
(7) Contractual Liability with respect to this Contract
(8) Broad Form Property Damage
(9) Independent Consultants Coverage

(iv) The policy shall contain no endorsements or provisions limiting coverage for (1) contractual liability; (2) cross liability exclusion for claims or suits by one insured against another; (3) products/completed operations liability; or (4) contain any other exclusion contrary to the Agreement.

(v) The policy shall give Town, its officials, officers, employees, agents and Town designated volunteers additional insured status using ISO endorsement forms CG 20 10 10 01 and 20 37 10 01, or endorsements providing the exact same coverage.

(vi) The general liability program may utilize either deductibles or provide coverage excess of a self-insured retention, subject to written approval by the Town, and provided that such deductibles shall not apply to the Town as an additional insured.

b. Automobile Liability

(i) At all times during the performance of the work under this Agreement, the Consultant shall maintain Automobile Liability Insurance for bodily injury and property damage including coverage for owned, non-owned and hired vehicles, in a form and with insurance companies acceptable to the Town.

(ii) Coverage for automobile liability insurance shall be at least as broad as Insurance Services Office Form Number CA 00 01 covering automobile liability (Coverage Symbol 1, any auto).

(iii) The policy shall give Town, its officials, officers, employees, agents and Town designated volunteers additional insured status.

(iv) Subject to written approval by the Town, the automobile liability program may utilize deductibles, provided that such deductibles shall not apply to the Town as an additional insured, but not a self-insured retention.

c. Workers' Compensation/Employer's Liability

(i) Consultant certifies that he/she is aware of the provisions of Section 3700 of the California Labor Code which requires every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and he/she will comply with such provisions before commencing work under this Agreement.

(ii) To the extent Consultant has employees at any time during the term of this Agreement, at all times during the performance of the work under this Agreement, the Consultant shall maintain full compensation insurance for all persons employed directly by him/her to carry out the work contemplated under this Agreement, all in accordance with the "Workers' Compensation and Insurance Act," Division IV of the Labor Code of the State of California and any acts amendatory thereof, and Employer's Liability Coverage in amounts indicated herein. Consultant shall require all subconsultants to obtain and maintain, for the period required by this Agreement, workers' compensation coverage of the same type and limits as specified in this section.

d. Professional Liability (Errors and Omissions)

At all times during the performance of the work under this Agreement the Consultant shall maintain professional liability or Errors and Omissions insurance appropriate to its profession, in a form and with insurance companies acceptable to the Town and in an amount indicated herein. This insurance shall be endorsed to include contractual liability applicable to this Agreement and shall be written on a policy form coverage specifically designed to protect against acts, errors or omissions of the Consultant. "Covered Professional Services" as designated in the policy must specifically include work performed under this Agreement. The policy must "pay on behalf of" the insured and must include a provision establishing the insurer's duty to defend.

e. Minimum Policy Limits Required

(i) The following insurance limits are required for the Agreement:

	Combined Single Limit
Commercial General Liability	$1,000,000 per occurrence/ $2,000,000 aggregate for bodily injury, personal injury, and property damage
Automobile Liability	$1,000,000 per occurrence for bodily injury and property damage
Employer's Liability	$1,000,000 per occurrence
Professional Liability	$1,000,000 per claim and aggregate (errors and omissions)

(ii) Defense costs shall be payable in addition to the limits.

(iii) Requirements of specific coverage or limits contained in this section are not intended as a limitation on coverage, limits, or other requirement, or a waiver of any coverage normally provided by any insurance. Any available coverage shall be provided to the parties required to be named as Additional Insured pursuant to this Agreement.

f. Evidence Required

Prior to execution of the Agreement, the Consultant shall file with the Town evidence of insurance from an insurer or insurers certifying to the coverage of all insurance required herein. Such evidence shall include original copies of the ISO CG 00 01 (or insurer's equivalent) signed by the insurer's representative and Certificate of Insurance (Acord Form 25-S or equivalent), together with required endorsements. All evidence of insurance shall be signed by a properly authorized officer, agent, or qualified representative of the insurer and shall certify the names of the insured, any additional insureds, where appropriate, the type and amount of the insurance, the location and operations to which the insurance applies, and the expiration date of such insurance.

g. Policy Provisions Required

(i) Consultant shall provide the Town at least thirty (30) days prior written notice of cancellation of any policy required by this Agreement, except that the Consultant shall provide at least ten (10) days prior written notice of cancellation of any such policy due to non-payment of premium. If any of the required coverage is cancelled or expires during the term of this Agreement, the Consultant shall deliver renewal certificate(s) including the General Liability Additional Insured Endorsement to the Town at least ten (10) days prior to the effective date of cancellation or expiration.

(ii) The Commercial General Liability Policy and Automobile Policy shall each contain a provision stating that Consultant's policy is primary insurance and that any insurance, self-insurance or other coverage maintained by the Town or any named insureds shall not be called upon to contribute to any loss.

(iii) The retroactive date (if any) of each policy is to be no later than the effective date of this Agreement. Insurance must be maintained and evidence of insurance must be provided for through at least the end of the 2020-2021 policy period, and if Consultant renews such policy for additional periods, the coverage will continue to be applicable for at least three years from the date of completion of Consultant's services.

(iv) All required insurance coverages, except for the professional liability coverage, shall contain or be endorsed to waiver of subrogation in favor of the Town, its officials, officers, employees, agents, and volunteers or shall specifically allow Consultant or others providing insurance evidence in compliance with these specifications to waive their right of recovery prior to a loss. Consultant hereby waives its own right of recovery against Town, and shall require similar written express waivers and insurance clauses from each of its subconsultants.

(v) The limits set forth herein shall apply separately to each insured against whom claims are made or suits are brought, except with respect to the limits of liability. Further the limits set forth herein shall not be construed to relieve the Consultant from liability in excess of such coverage, nor shall it limit the Consultant's indemnification obligations to the Town and shall not preclude the Town from taking such other actions available to the Town under other provisions of the Agreement or law.

h. Qualifying Insurers

(i) All policies required shall be issued by acceptable insurance companies, as determined by the Town, which satisfy the following minimum requirements:

(1) Each such policy shall be from a company or companies with a current A.M. Best's rating of no less than A:VII and admitted to transact in the business of insurance in the State of California, or otherwise allowed to place insurance through surplus line brokers under applicable provisions of the California Insurance Code or any federal law.

i. Additional Insurance Provisions

(i) The foregoing requirements as to the types and limits of insurance coverage to be maintained by Consultant, and any approval of said insurance by the Town, is not intended to and shall not in any manner limit or qualify the liabilities and obligations otherwise assumed by the Consultant pursuant to this Agreement, including but not limited to, the provisions concerning indemnification.

(ii) If at any time during the life of the Agreement, any policy of insurance required under this Agreement does not comply with these specifications or is canceled and not replaced, Town has the right but not the duty to obtain the insurance it deems necessary and any premium paid by Town will be promptly reimbursed by Consultant or Town will withhold amounts sufficient to pay premium from Consultant payments. In the alternative, Town may cancel this Agreement.

(iii) The Town may require the Consultant to provide complete copies of all insurance policies in effect for the duration of the Project.

(iv) Neither the Town nor any of its officials, officers, employees, agents or volunteers shall be personally responsible for any liability arising under or by virtue of this Agreement.

j. Subconsultant Insurance Requirements. Consultant shall not allow any subcontractors or subconsultants to commence work on any subcontract until they have provided evidence satisfactory to the Town that they have secured all insurance required under this section. Policies of commercial general liability insurance provided by such subcontractors or subconsultants shall be endorsed to name the Town as an additional insured using ISO form CG 20 38 04 13 or an endorsement providing the exact same coverage. If requested by Consultant, Town may approve different scopes or minimum limits of insurance for particular subcontractors or subconsultants.

12. Indemnification.

a. To the fullest extent permitted by law, Consultant shall defend (with counsel reasonably approved by the Town), indemnify and hold the Town, its officials, officers, employees, agents and volunteers free and harmless from any and all claims, demands, causes of action, suits, actions, proceedings, costs, expenses, liability, judgments, awards, decrees, settlements, loss, damage or injury of any kind, in law or equity, to property or persons, including wrongful death, (collectively, "Claims') in any manner arising out of, pertaining to, or incident to any alleged acts, errors or omissions, or willful misconduct of Consultant, its officials, officers, employees, subcontractors, consultants or agents in connection with the performance of the Consultant's services, the Project or this Agreement, including without limitation the payment of all consequential damages, expert witness fees and attorneys' fees and other related costs and expenses. Notwithstanding the foregoing, to the extent Consultant's services are subject to Civil Code Section 2782.8, the above indemnity shall be limited, to the extent required by Civil Code Section 2782.8, to Claims that arise out of, pertain to, or relate to the negligence, recklessness, or willful misconduct of the Consultant. Consultant's obligation to indemnify shall not be restricted to insurance proceeds, if any, received by the Town, its officials, officers, employees, agents or volunteers.

b. Additional Indemnity Obligations. Consultant shall defend, with counsel of Town's choosing and at Consultant's own cost, expense and risk, any and all Claims covered by this section that may be brought or instituted against the Town, its officials, officers, employees, agents or volunteers. Consultant shall pay and satisfy any judgment, award or decree that may be rendered against the Town, its officials, officers, employees, agents or volunteers as part of any such claim, suit, action or other proceeding. Consultant shall also reimburse Town for the cost of any settlement paid by the Town, its officials, officers, employees, agents or volunteers as part of any such claim, suit, action or other proceeding. Such reimbursement shall include payment for the Town's attorney's fees and costs, including expert witness fees. Consultant shall reimburse the Town, its officials, officers, employees, agents and volunteers, for any and all legal expenses and costs incurred by each of them in connection therewith or in enforcing the indemnity herein provided. Consultant's obligation to indemnify shall not be restricted to insurance proceeds, if any, received by the Town, its officials, officers, employees, agents and volunteers.

13. California Labor Code Requirements.

a. Consultant is aware of the requirements of California Labor Code Sections 1720 et seq. and 1770 et seq., which require the payment of prevailing wage rates and the performance of other requirements on certain "public works" and "maintenance" projects. If the services are being performed as part of an applicable "public works" or "maintenance" project, as defined by the Prevailing Wage Laws, and if the total compensation is $1,000 or more, Consultant agrees to fully comply with such Prevailing Wage Laws, if applicable. Consultant shall defend, indemnify and hold the Town, its officials, officers, employees and agents free and harmless from any claims, liabilities, costs, penalties or interest arising out of any failure or alleged failure to comply with the Prevailing Wage Laws. It shall be mandatory upon the Consultant and all subconsultants to comply with all California Labor Code provisions, which include but are not limited to prevailing wages, employment of apprentices, hours of labor and debarment of contractors and subcontractors.

b. If the services are being performed as part of an applicable "public works" or "maintenance" project, then pursuant to Labor Code Sections 1725.5 and 1771.1, the Consultant and all subconsultants performing such Services must be registered with the Department of Industrial Relations. Consultant shall maintain registration for the duration of the Project and require the same of any subconsultants, as applicable. This Project may also be subject to compliance monitoring and enforcement by the Department of Industrial Relations. It shall be Consultant's sole responsibility to comply with all applicable registration and labor compliance requirements.

14. Verification of Employment Eligibility.

By executing this Agreement, Consultant verifies that it fully complies with all requirements and restrictions of state and federal law respecting the employment of undocumented aliens, including, but not limited to, the Immigration Reform and Control Act of 1986, as may be amended from time to time, and shall require all subconsultants and sub-subconsultants to comply with the same.

15. Laws and Venue.

This Agreement shall be interpreted in accordance with the laws of the State of California. If any action is brought to interpret or enforce any term of this Agreement, the action shall be brought in a state or federal court situated in the County of San Mateo, State of California.

16 Termination or Abandonment

a. Town has the right to terminate or abandon any portion or all of the work under this Agreement by giving ten (10) calendar days written notice to Consultant. In such event, Town shall be immediately given title and possession to all final work product field notes, drawings and specifications, written reports and other documents produced or developed for that portion of the work completed and/or being abandoned. This provision specifically excludes Consultant's work notes and drafts, which will continue to be owned by Consultant. Town shall pay Consultant the reasonable value of services rendered for any portion of the work completed prior to termination. If said termination occurs prior to completion of any task for the Project for which a payment request has not been received, the charge for services performed during such task shall be the reasonable value of such services, based on an amount mutually agreed to by Town and Consultant of the portion of such task completed but not paid prior to said termination. Town shall not be liable for any costs other than the charges or portions thereof which are specified herein.

Consultant shall not be entitled to payment for unperformed services, and shall not be entitled to damages or compensation for termination of work.

b. Consultant may terminate its obligation to provide further services under this Agreement upon thirty (30) calendar days' written notice to Town only in the event of substantial failure by Town to perform in accordance with the terms of this Agreement through no fault of Consultant, or by mutual agreement of the parties.

17. Documents. Except as otherwise provided in "Termination or Abandonment," above, all final work product field notes, written reports, Drawings and Specifications and other documents, produced or developed for the Project shall, upon payment in full for the services described in this Agreement, be furnished to and become the property of the Town. Consultant's work notes and drafts are specifically excluded from this provision and will be owned by Consultant.

18. Organization

Consultant shall assign Catherine Lew as Lead Strategist and Rohnda Ammouri as Project Manager. Assigned Project personnel set forth above shall not be removed from the Project or reassigned without the prior written consent of the Town.

19. Limitation of Agreement.

This Agreement is limited to and includes only the work included in the Project described above.

20. Notice

Any notice or instrument required to be given or delivered by this Agreement may be given or delivered by depositing the same in any United States Post Office, certified mail, return receipt requested, postage prepaid, addressed to:

TOWN:
Town of Colma
1198 El Camino Real
Colma, CA 94014
Attn: Brian Dossey

CONSULTANT:
Lloyd A. Edwards, Secretary-Treasurer
PO Box 21215, Oakland CA 94620

and shall be effective upon receipt thereof.

21. Third Party Rights

Nothing in this Agreement shall be construed to give any rights or benefits to anyone other than the Town and the Consultant.

22. Equal Opportunity Employment.

Consultant represents that it is an equal opportunity employer and that it shall not discriminate against any employee or applicant for employment because of race, religion, color, national origin, ancestry, sex, age or other interests protected by the State or Federal Constitutions. Such non-discrimination shall include, but not be limited to, all activities related to initial employment, upgrading, demotion, transfer, recruitment or recruitment advertising, layoff or termination.

23. Entire Agreement

This Agreement, with its exhibits, represents the entire understanding of Town and Consultant as to those matters contained herein, and supersedes and cancels any prior or contemporaneous oral or written understanding, promises or representations with respect to those matters covered hereunder. Each party acknowledges that no representations, inducements, promises or agreements have been made by any person which are not incorporated herein, and that any other agreements shall be void. This Agreement may not be modified or altered except in writing signed by both Parties hereto. This is an integrated Agreement.

24. Severability

The unenforceability, invalidity or illegality of any provision(s) of this Agreement shall not render the provisions unenforceable, invalid or illegal.

25. Successors and Assigns

This Agreement shall be binding upon and shall inure to the benefit of the successors in interest, executors, administrators and assigns of each party to this Agreement. However, Consultant shall not assign or transfer by operation of law or otherwise any or all of its rights, burdens, duties or obligations without the prior written consent of Town. Any attempted assignment without such consent shall be invalid and void.

26. Non-Waiver

None of the provisions of this Agreement shall be considered waived by either party, unless such waiver is specifically specified in writing.

27. Time of Essence

Time is of the essence for each and every provision of this Agreement.

28. Town's Right to Employ Other Consultants

Town reserves its right to employ other consultants, including engineers, in connection with this Project or other projects.

29. Prohibited Interests

Consultant maintains and warrants that it has not employed nor retained any company or person, other than a bona fide employee working solely for Consultant, to solicit or secure this Agreement. Further, Consultant warrants that it has not paid nor has it agreed to pay any company or person, other than a bona fide employee working solely for Consultant, any fee, commission, percentage, brokerage fee, gift or other consideration contingent upon or resulting from the award or making of this Agreement. For breach or violation of this warranty, Town shall have the right to rescind this Agreement without liability. For the term of this Agreement, no director, official, officer or employee of Town, during the term of his or her service with Town, shall have any direct interest in this Agreement, or obtain any present or anticipated material benefit arising therefrom.

[SIGNATURES ON FOLLOWING PAGE]

SIGNATURE PAGE FOR PROFESSIONAL SERVICES AGREEMENT BETWEEN THE TOWN OF COLMA AND THE LEW EDWARDS GROUP

IN WITNESS WHEREOF, the Parties have executed this Agreement as of the date first written above.

TOWN OF COLMA

By: ______________________
Name: BRIAN DOSSEY
Title: City MANAGER

THE LEW EDWARDS GROUP

By: ______________________
Its: President
Printed Name: Catherine Lew

ATTEST:

By: ______________________
City Clerk

APPROVED AS TO FORM:

By: ______________________
City Attorney

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EXHIBIT A

Scope of Services

In consultation with Town of Colma staff, The Lew Edwards Group shall provide Services that include the following:

- Review current Town, budget, demographic, and policy information
- Review Town background materials and archival information
- Review and analyze current media clips and other information in the public arena about Town
- Participate in initial planning teleconferences
- Facilitate efforts of Town's designated Opinion Research Professional to create an opinion research study
- Independently review opinion research results and provide Strategic Recommendations to Town
- Provide additional strategic advice as needed

Legal advice is not within Consultant's scope of services. This Scope of Work is effective April 22nd, 2019 through July 15, 2019. Should services extend beyond that date, additional fees shall apply.

EXHIBIT B

Schedule of Charges/Payments

Consultant will invoice Town on a monthly cycle at the rate of Five Thousand, Seven Hundred Dollars ($5,750) per month:

- April and July will be prorated at $2875 per payment.
- May and June will be charged at $5750 per month.

Consultant will include with each invoice a description of services provided. Consultant will inform Town regarding any out-of-scope work being performed by Consultant.

EXHIBIT C

Recommended Activity Schedule

Week of April 22nd:	Conduct Team Kick Off Call
Week of April 29t:h	Review draft survey draft
Week of May 6th:	Finalize legal review/approval of conceptual ballot question
Mid-May:	Provide survey protocol memorandum to City Council Launch survey interviews
Through first half of June:	Complete survey interviews
Mid-June:	Analyze results
By end of June:	Update City Staff on Strategic Recommendations Reach consensus on approach/deployment moving forward
Early July:	Debrief City Council

**FIRST AMENDMENT TO
PROFESSIONAL SERVICES AGREEMENT WITH
THE LEW EDWARDS GROUP**

This First Amendment to the Professional Services Agreement with the Lew Edwards Group ("First Amendment") is made and entered into this ____ day of August, 2019 by and between the Town of Colma, a California municipal corporation ("Town"), and the Lew Edwards Group, a California corporation with its principal place of business at 5454 Broadway, Oakland California 94618 (hereinafter referred to as "Consultant"). Town and Consultant are sometimes individually referred to as "Party and collectively as "Parties" in this Agreement.

RECITALS

A. Town and Consultant previously entered into a professional services agreement dated April 22, 2019 (the "Agreement").

B. Town and Consultant now desire to amend the Agreement to increase the compensation amount and modify the scope of services.

FIRST AMENDMENT

NOW, THEREFORE, IN CONSIDERATION OF THE MUTUAL PROMISES SET FORTH IN THIS FIRST AMENDMENT AND OTHER VALUABLE CONSIDERATION, THE PARTIES AGREE AS FOLLOWS:

1. Section 1, "Services" is hereby amended as follows:

"1. Services.

Consultant shall provide the Town with the services described in the Scope of Services attached to the Agreement as Exhibit "A" and the Scope of Services attached hereto as Exhibit "A-1"from September 1, 2019 – October 31, 2020."

2. Section 2, "Compensation" is hereby amended as follows:

a. Subject to paragraph 2(b) below, the Town shall pay for such services in accordance with the Schedule of Charges set forth in Exhibit "B" attached to the Agreement, and the Schedule of Charges attached hereto as Exhibit B-1 from September 1, 2019 – October 31, 2020.

b. In no event shall the total amount paid for services rendered by Consultant under this first amendment exceed the sum of $77,000. Periodic payments shall be made within 30 days of receipt of an invoice which includes a description of the work performed that is satisfactory to the Town. Payments to Consultant for work performed will be made on a monthly billing basis.

3. Exhibit C "Activity Schedule" to the Agreement is hereby modified by Exhibit C to this First Amendment.

[SIGNATURES ON FOLLOWING PAGE]

SIGNATURE PAGE TO FIRST AMENDMENT TO PROFESSIONAL SERVICES AGREEMENT WITH THE LEW EDWARDS GROUP

IN WITNESS WHEREOF, the Parties have executed this first amendment to the Agreement as of the date written below.

TOWN OF COLMA

By: ____________________________
Joanne F. del Rosario
Mayor

ATTEST:

By: __________________________
City Clerk

APPROVED AS TO FORM:

By: __________________________
City Attorney

THE LEW EDWARDS GROUP

By: ________________________________

Its: ________________________________

Printed Name:__________________________

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8/14/19

EXHIBIT A-1

Scope of Services

The Lew Edwards Group (LEG) will perform the following services:

- Project-facilitate and continuously update a coordinated strategy and timeline for City staff and other professionals/consultants assigned to the Project.
- Work with City staff on methods to engage constituents, expand community awareness of city service/fiscal needs and solicit additional community input on service priorities. Recommend to staff methods of engaging/informing constituents about Project in City communications vehicles, such as newsletters, guest columns, website, and social media. Consultant will update and refine community input content and informational messaging as needed. Advise and train City staff on informational community outreach activities.
- Recommend methods to conduct informational outreach with community networks and organizations in the City to solicit feedback on City planning, provide information and advise City staff on the best manner of responding to questions from the public. Consultant will update and refine concise, user-friendly messaging content.
- Work with City's designated Opinion Research Professional to update opinion research study/s, independently analyze results and provide strategic recommendations based on LEG's analysis.
- Recommend a plan for informational mailings and/or paid social media/engagement, and draft content copy for these vehicles. Content copy will be approved by the City Manager's office and City Attorney. City to facilitate its own graphics, printing, mail house, social media and postage needs with its own vendors at its own expense, outside of this Agreement.
- Consultant will review earned (non-paid) local media and/or Internet media opportunities with City staff as a method for disseminating necessary information and assist with rapid response needs from media or the community as necessary to correct misinformation or clarify confusing information. Consultant does not function as a paid spokesperson for the City.
- Confer with the City Attorney on the ballot question or other revenue measure materials. Work with City staff on related budget and staff reports and measure development.

The parties expressly acknowledge and agree that legal services or advice are not within Consultant's scope of services. This Scope of Work is effective May 1, 2019 through October 31, 2020. NO partisan activities shall be provided within this scope of services.

EXHIBIT B-1

Schedule of Charges/Payments

Consultant will invoice Town on a monthly cycle at the rate of Five Thousand Five Hundred Dollars ($5,500) per month. Consultant will include with each invoice a description of services work performed that is satisfactory to the Town. Consultant will inform Town regarding any out-of-scope work being performed by Consultant.

Professional fees do not include the following hard project costs: opinion research, graphic design, printing, bulk postage, advertising, or mail house processing fees, which will be budgeted for separately by the City throughout the project.

EXHIBIT C

Activity Schedule

TOWN OF COLMA **RECOMMENDED PROJECT SCHEDULE** *As of 8/16/19* *This is a recommended schedule subject to revision based on project needs and the agreement of the parties.*	
MAY-JULY 2019	**PHASE ONE: CONDUCT ASSESSMENT, DEVELOP STRATEGIC PLAN** ✓ Retain consulting team (Town) ✓ Review Town's Archival Election Results and current demographics, policies and media information ✓ Convene Team Kick Off Planning Meeting -Discuss Best Practices ✓ Conduct Customer Satisfaction/Community Priorities Survey -Assess ballot measure viability -Provide Strategic Recommendations ✓ Develop Recommended Communications/Engagement Plan/Timeline ❑ Refine/update Opinion Leader database (Town) ✓ Update City Council ❑ Receive direction to proceed and authorization of continued investment/planning for the next phase of project (Town)
SEPT-DEC 2019	**LAUNCH COMMUNITY ENGAGEMENT WITH FOCUS ON CITY PRIORITIES/BUDGET UPDATES** ❑ Develop and recommend Communications/Engagement Collaterals (LEG) o Draft Initial Information Documents/Engagement Tools for use in routine Town communications vehicles, such as Bill Stuffers, Town newsletter, Town website, and social media o Develop Informational Speakers' Bureau Toolkit o Conduct Informational Message Training for City Staff o Contact Community Groups for engagement presentations (Town) ❑ Implement community presentations (Town) ❑ Copywrite Opinion Leader updates (LEG) ❑ Continue to update Town website and other communications vehicles (Town) with informational message points developed by LEG

	❑ Develop answers for community questions, continue to update communications/engagement materials (LEG) ❑ Assess community responses (LEG/Town) ❑ Continue to copy write information for such sources as Earned Media/New Media/Social Media opportunities (LEG) ❑ Update Engagement/Communications Plan for 2020 (LEG)
JANUARY – JUNE 2020	**CONTINUE TO ENGAGE THE COMMUNITY, WITH FOCUS ON POTENTIAL REVENUE GENERATION** ❑ Continue to implement community presentations (Town) ❑ Copy write additional Opinion Leader updates (LEG) ❑ Continue to update City website and other communications vehicles (Town) with updated informational message points developed by LEG ❑ Continue to update answers for community questions (LEG) ❑ Continue to copy write information for such sources as Earned Media/New Media/Social Media opportunities (LEG) ❑ Conceive and produce two informational mailings to solicit input and report back to the community (LEG to provide content copy/sample for Town's layout/production at Town's cost)
JULY 2020	**DEVELOP BALLOT MEASURE** ❑ Assist with staff reports and measure preparation (LEG/Town) ❑ Assist in preparing for Council adoption vote (LEG/Town) o Community participation
AUGUST 2020	**POST-ADOPTION ACTIVITIES** ❑ Update Town's website and all communications vehicles (Town) with updated Measure information prepared by LEG ❑ Issue final Opinion Leader Update written by LEG announcing placement of the measure on the ballot (Town) ❑ Continue informational Speakers' Bureau presentations (Town) ❑ Implement Earned Media/Internet Communications (Town) ❑ Address Rapid Response Needs as necessary (Town/LEG) *The Town of Colma can continue its factual, informational efforts following placement of a measure on the ballot but cannot engage in any partisan activities.*

SEPT-OCT 2020	❑ Draft media and social media content (LEG)

	❑ Issue three informational mailings (Town w/content from LEG) ❑ Address rapid response needs (LEG/Town) ❑ Continue Speakers Bureau Presentations (Town) ❑ Provide two-way media comments (LEG) ❑ Thank the community (Town)