

The logo for the Buffalo Sewer Authority is centered at the top of the page. It consists of the word "BUFFALO" in large, blue, sans-serif capital letters, with the "O" being a circle. Below it, the words "SEWER AUTHORITY" are written in smaller, white, sans-serif capital letters.

BUFFALO
SEWER AUTHORITY

SPDES Permit No. NY0028410

**Long Term Control Plan
Annual Post Construction Monitoring
Status Report**
Reporting Period: *July 2018 through June 2019*
Amended Administrative Order
CWA-02-2014-3033
(Amends CWA-02-2012-3024)

September 2019

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1. INTRODUCTION

The Buffalo Sewer Authority (Authority) received approval of its Long Term Control Plan (LTCP) from the United States Environmental Protection Agency (USEPA) and New York State Department of Environmental Conservation (NYSDEC) on March 18, 2014. The Authority entered into an Amended Administrative Order on April 16, 2014 (herein after referred to as the AO), with the USEPA. This AO establishes a schedule for implementation of the Authority's LTCP, approved by the USEPA and NYSDEC.

The AO in part requires that the Authority submit written Annual Post Construction Monitoring (PCM) Status Reports to the USEPA and NYSDEC to be included with the Semi-Annual Status Report.

This report covers July 2018 through June 2019 which serves as Annual PCM Report No. 3.

2. DISCUSSION OF PCM TASKS BEGUN OR COMPLETED

Post construction monitoring of the Bird and Lang RTC projects has continued in the last reporting period. The number of SPP events and volume of overflow that the structures have prevented is being monitored. The monthly performance reports for the reporting period are included in Appendix A. Note that the Lang RTC was deactivated during the months of September 2018 through December 2018 to protect the work area at the Hazelwood project upstream.

Post construction monitoring of the Smith St RTC commenced in the last reporting period. The total volume captured is being recorded. The monthly performance reports for the reporting period are included in Appendix A.

Post construction monitoring of the Hazelwood, North Bailey, and Hertel at Deer RTCs will commence in the next reporting period.

Flow metering for the model calibration project has been used for preconstruction monitoring of the Willert Park Green Infrastructure project. Meters located in the sewershed have been reinstalled for post construction monitoring of the green infrastructure project.

3. RESULTS OF PCM EFFORTS

During the reporting period, a total of 42 SPP overflow events, or approximately 49.8 million gallons of overflow, has been prevented by the Bird and Lang RTC projects. Since June 2017 a total of 97 SPP overflow events or approximately 108.5 million gallons of overflow, has been prevented by the Bird and Lang RTC projects.

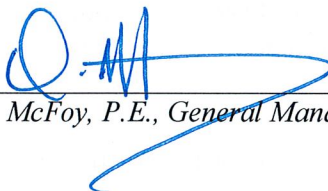
The functionality of the Smith St. RTC differs from the Bird and Lang RTCs. It intercepts flows and sends them to the interceptor rather than just storing flows in-line. Upstream of the Smith St RTC are 41 SPPs that overflow into the Smith St storage area. These flows are now sent to the South Interceptor rather than the Buffalo River. During the reporting period, a total of 828.2 million gallons of overflow was captured by the Smith St. RTC project.

4. MODEL UPDATES COMPLETED

The model calibration report has been completed and submitted for review and approval.

5. CERTIFICATION STATEMENT

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."



Oluwale A. McFoy, P.E., General Manager

26 Aug 19

Date

July 2018 Smith St. RTC KPI Report

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Smith St. RTC Monthly Performance Report

July 2018

Event Date	Volume Captured (gal)	Did a seiche occur during wet weather? (Note: if a seiche occurs during wet weather, volume captured will be slightly overestimated due to the inclusion of the seiche)	Event drain flow threshold (MGD)
7/22/2018	3,628,829	No	1.25
7/25/2018	452,901	No	1.25
7/26/2018	1,039,060	No	1.25
Total Volume Captured (gal)	5,120,790		

July 22, 2018

1

Site:	Smith RTC
Analysis Date:	09/14/2018
Event Start Date/Time:	7/22/2018 6:25
Event End Date/Time:	7/22/2018 13:50

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.6 in.
Storm Event Duration:	2.5 hr
Storm Type:	Less than one year

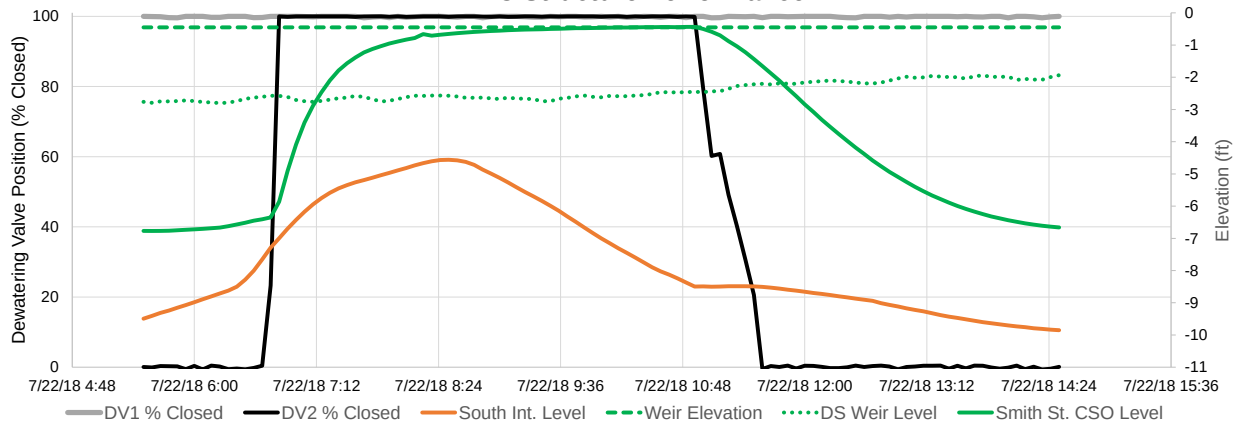
Time Lead Dewatering Valve Closed	7/22/2018 5:40
Time Lead Dewatering Valve Opened	7/22/2018 11:35
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-0.44 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	3,628,829 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

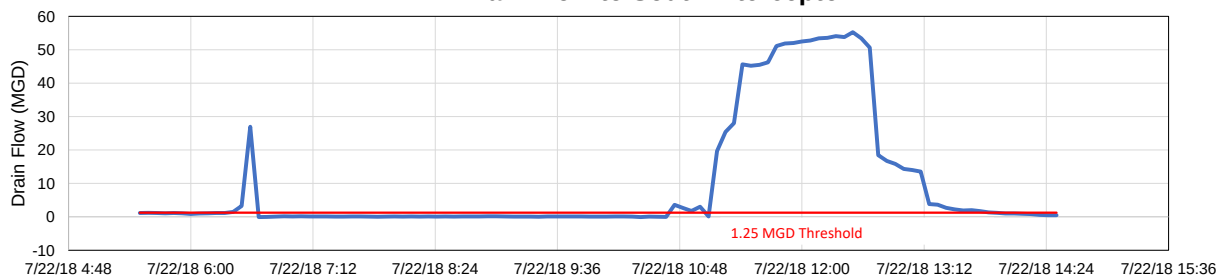
Recommended Operational Changes/Notes:

Rainfall data sourced from South Buffalo rain gauge, as provided by BSA.

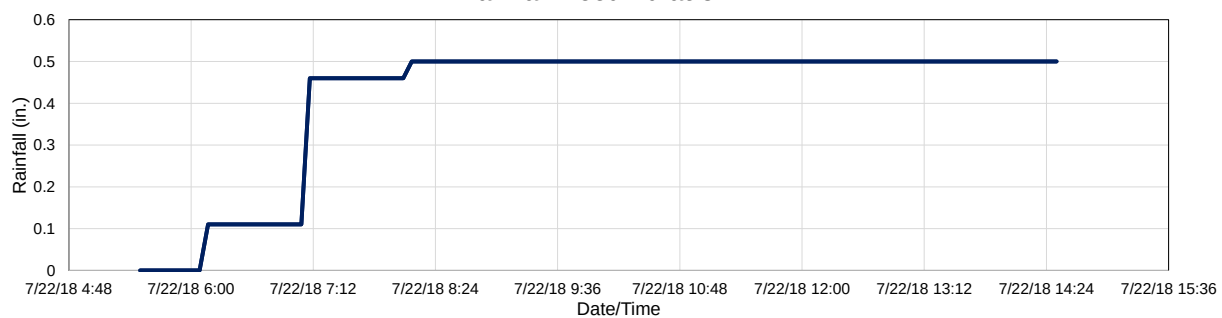
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	09/14/2018
Event Start Date/Time:	7/25/2018 7:20
Event End Date/Time:	7/25/2018 9:30

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.06 in.
Storm Event Duration:	2.5 hr
Storm Type:	Less than one year

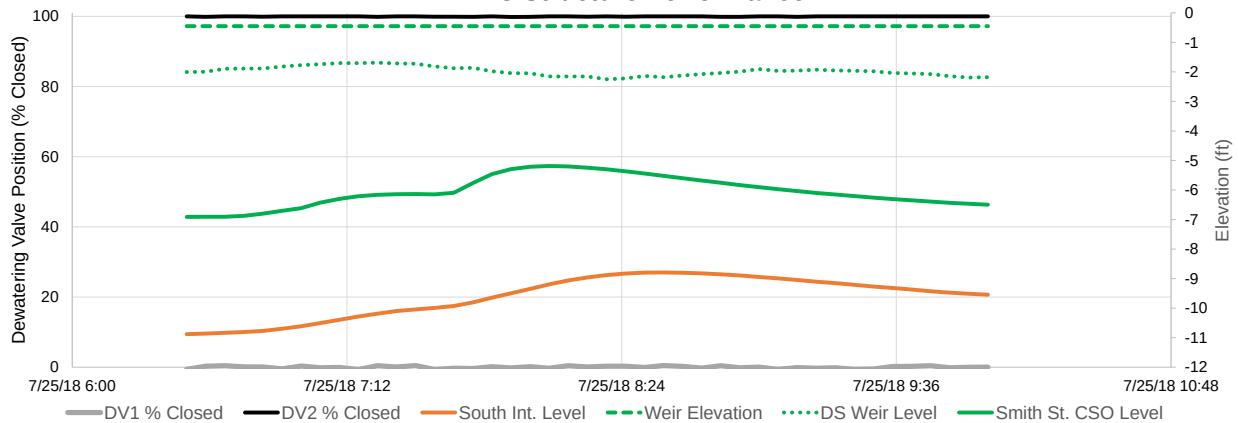
Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-5.19 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	452,901 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

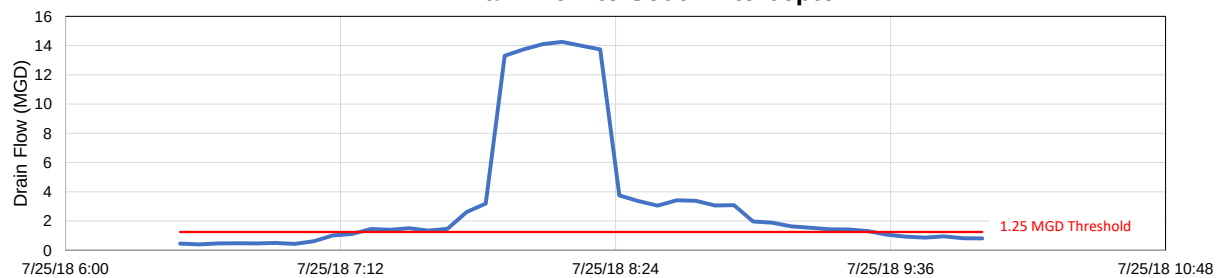
Recommended Operational Changes/Notes:

Rainfall data sourced from South Buffalo rain gauge, as provided by BSA.

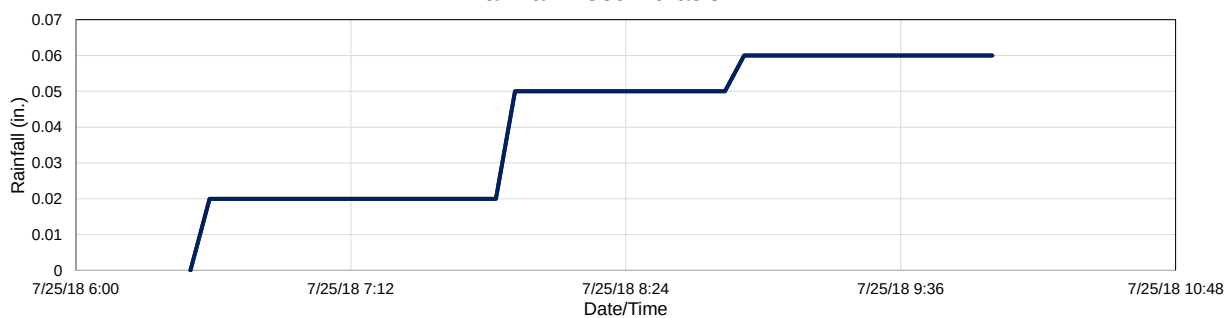
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	09/14/2018
Event Start Date/Time:	7/26/2018 22:30
Event End Date/Time:	7/27/2018 2:25

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

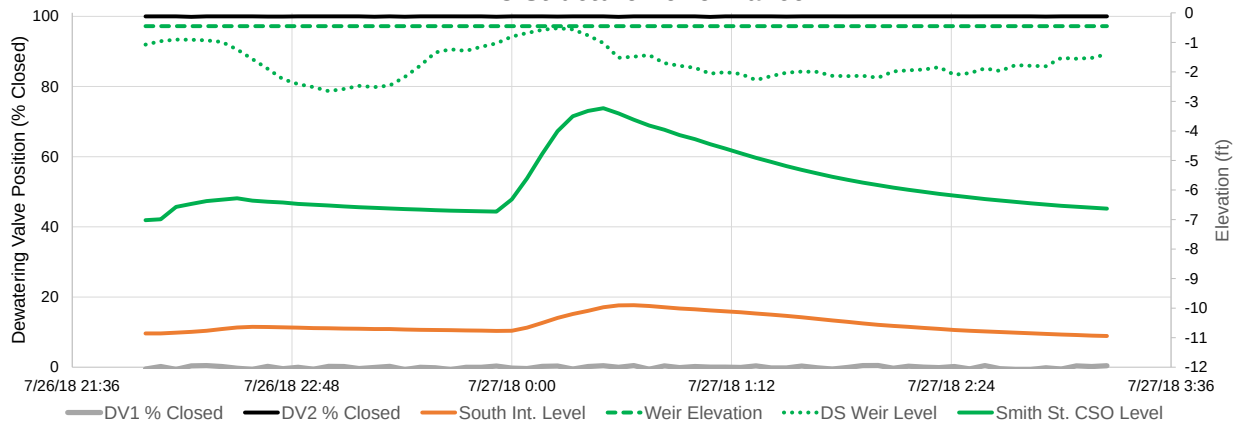
Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-3.23 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	1,039,060 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

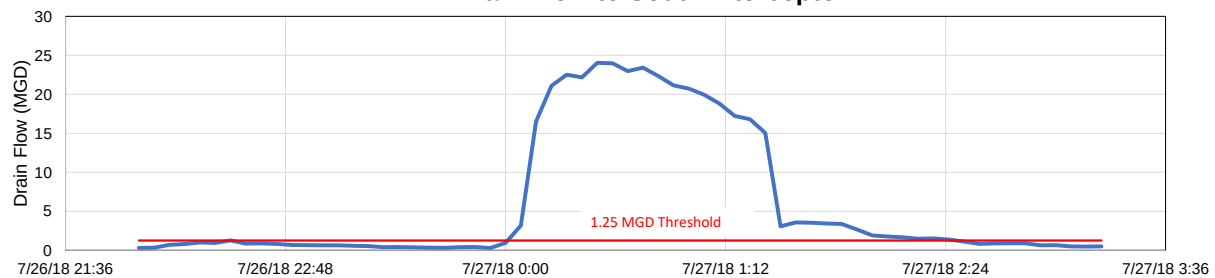
Recommended Operational Changes/Notes:

This event was caused by a localized rainfall event that was not recorded by rain gauge stations at South Buffalo, Amherst Quarry, and airport.

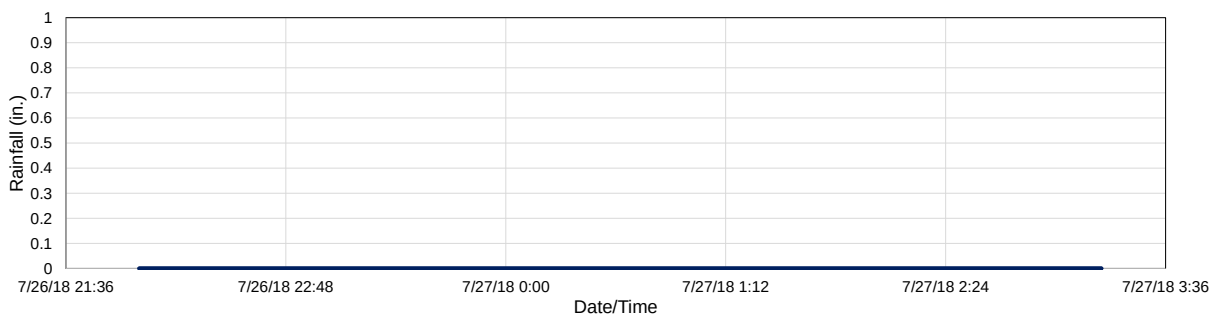
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



August 2018 Smith St. RTC KPI Report

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Smith St. RTC Monthly Performance Report

August 2018

Event Date	Volume Captured (gal)	Did a seiche occur during wet weather? (Note: if a seiche occurs during wet weather, volume captured will be slightly overestimated due to the inclusion of the seiche)	Event drain flow threshold (MGD)
8/7/2018	2,287,321	No	1.25
8/7/2018	3,383,584	No	1.25
8/8/2018	3,413,925	No	1.25
8/18/2018	3,408,990	No	1.25
Total Volume Captured (gal)	12,493,820		

Site:	Smith RTC
Analysis Date:	09/14/2018
Event Start Date/Time:	8/7/2018 4:25
Event End Date/Time:	8/7/2018 7:20

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.11 in.
Storm Event Duration:	2 hr.
Storm Type:	Less than one year

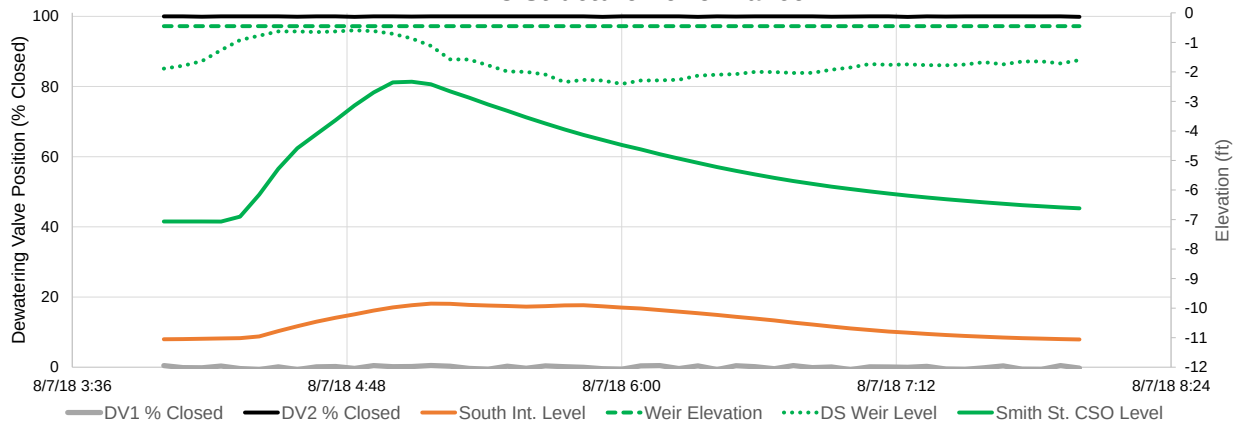
Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-2.33 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	2,287,321 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

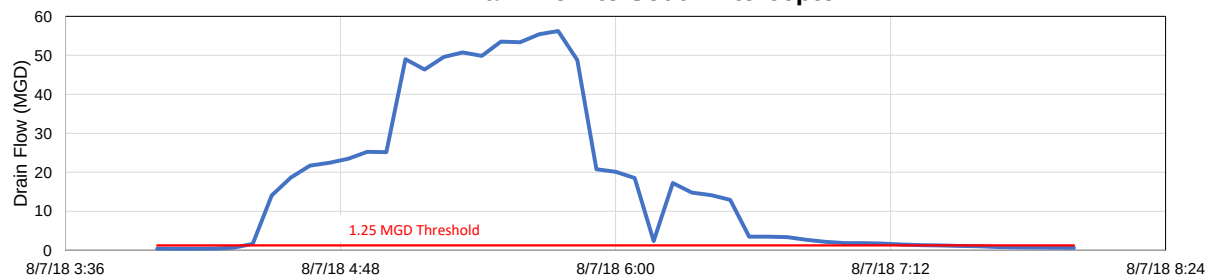
Recommended Operational Changes/Notes:

Rainfall data sourced from South Buffalo rain gauge, as provided by BSA. Rainfall data is updated on an hourly basis in BSA's system, and therefore drain flow graph shows threshold exceedance before rain data is recorded.

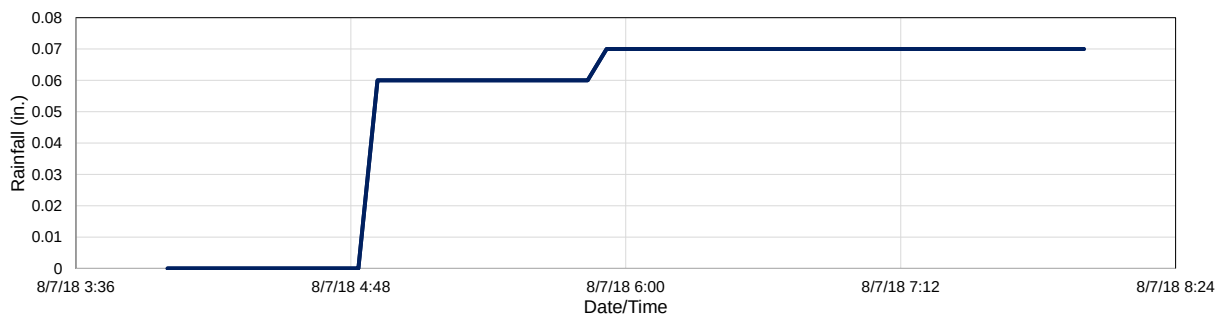
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	09/18/2018
Event Start Date/Time:	8/7/2018 9:50
Event End Date/Time:	8/7/2018 11:45

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.38 in.
Storm Event Duration:	2 hr.
Storm Type:	Less than one year

Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-5.32 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	3,383,584 Gal.
Did seiche occur during wet weather?	No

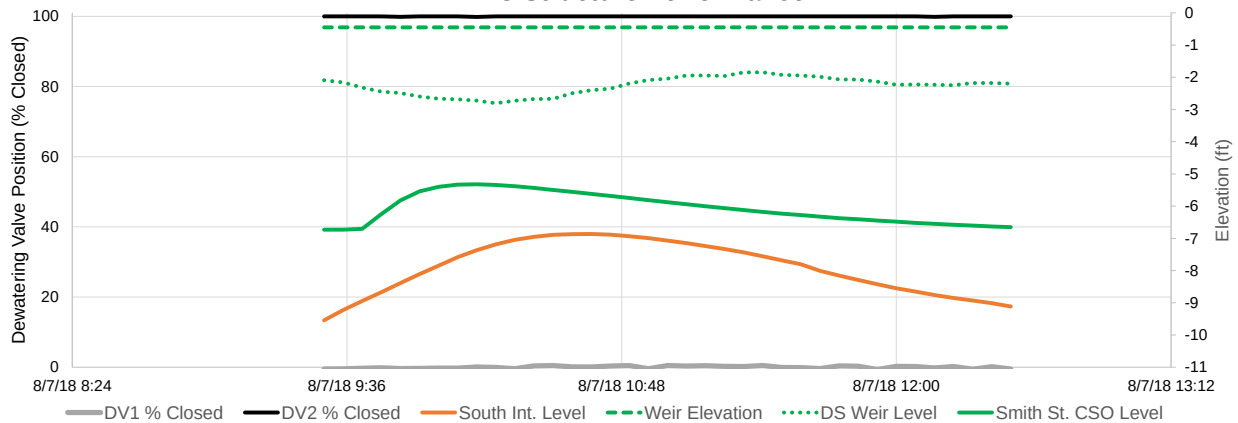
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

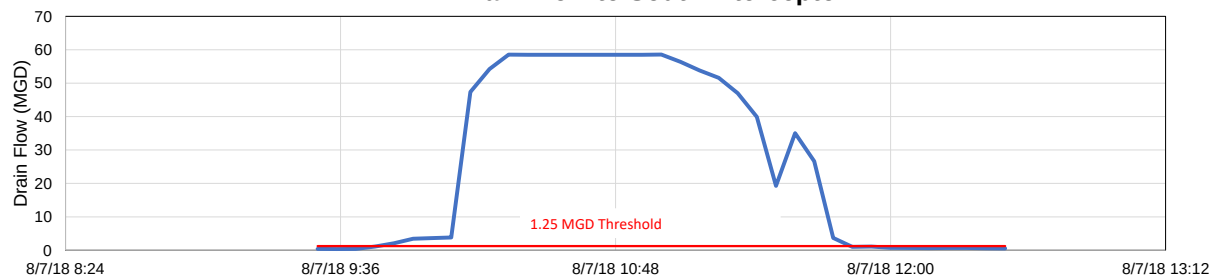
Erroneous drain flow data, up to ~32,000 MGD, was recorded for a half an hour period between 10:25 a.m. and 10:55 a.m.

Drain flow data was adjusted to 58.5 MGD for this time period, as indicated in Attachment A of this report.

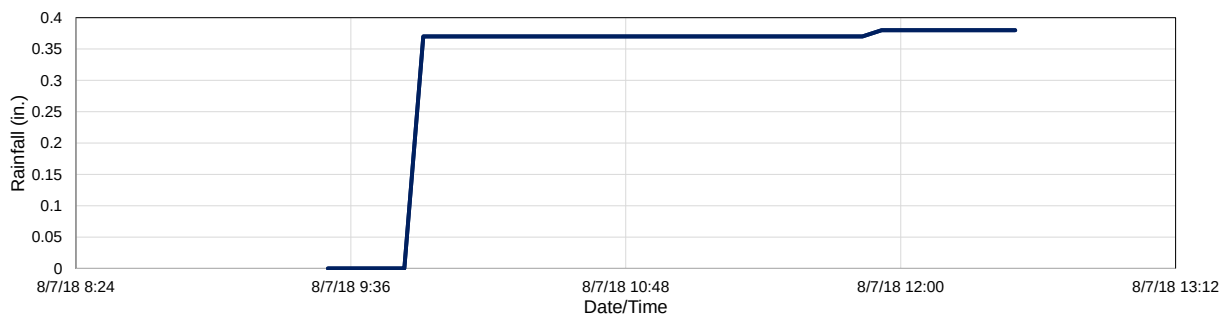
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	09/14/2018
Event Start Date/Time:	8/8/2018 9:10
Event End Date/Time:	8/8/2018 18:05

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.73 in.
Storm Event Duration:	5 hr.
Storm Type:	Less than one year

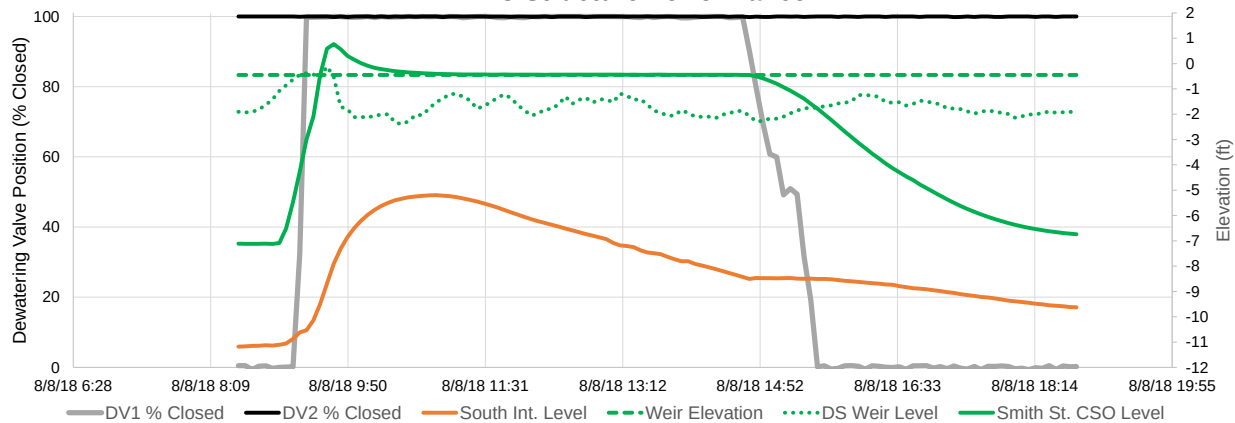
Time Lead Dewatering Valve Closed	8/8/2018 9:15
Time Lead Dewatering Valve Opened	8/8/2018 15:35
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	0.77 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	3,413,925 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

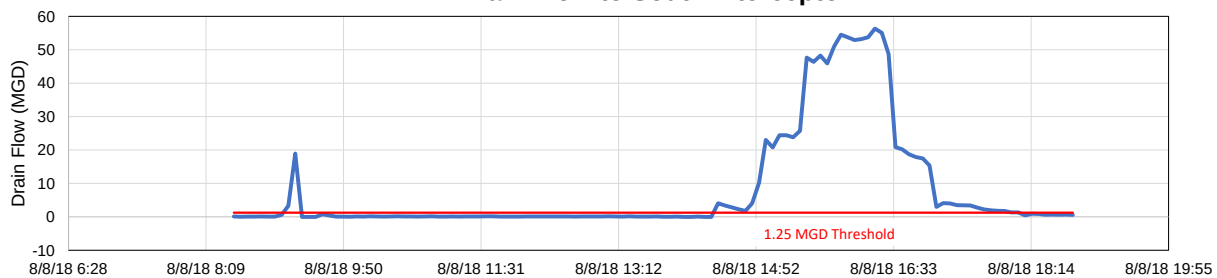
Recommended Operational Changes/Notes:

Rainfall data sourced from South Buffalo rain gauge, as provided by BSA. Rainfall data is updated on an hourly basis in BSA's system, and therefore drain flow graph shows threshold exceedance before rain data is recorded.

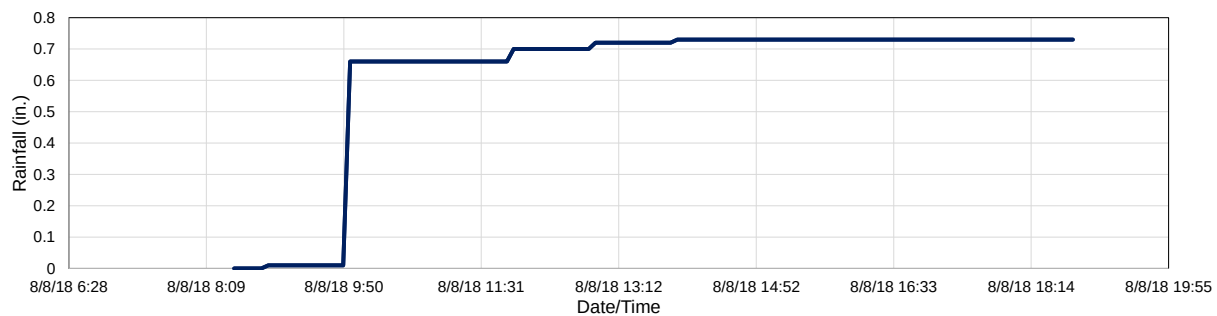
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	09/14/2018
Event Start Date/Time:	8/18/2018 0:10
Event End Date/Time:	8/18/2018 14:35

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	1.85 in.
Storm Event Duration:	9 hr.
Storm Type:	Less than five year

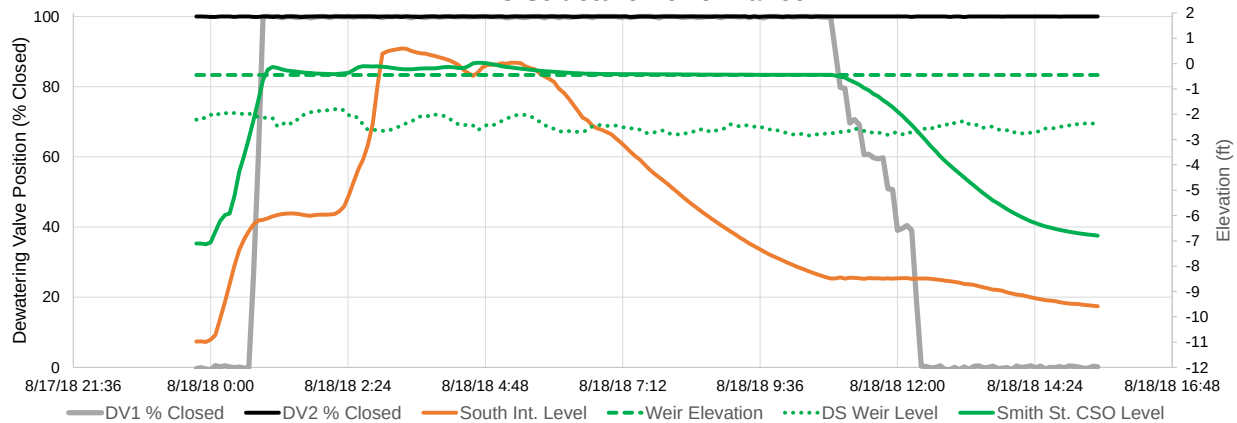
Time Lead Dewatering Valve Closed	8/18/2018 0:45
Time Lead Dewatering Valve Opened	8/18/2018 12:25
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	0.03 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	3,408,990 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

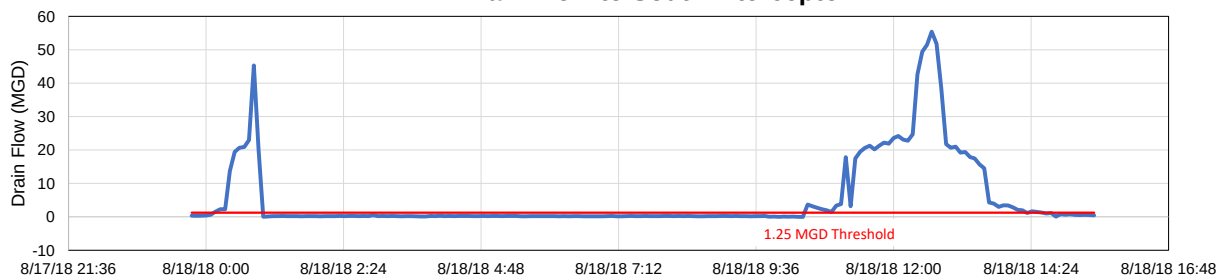
Recommended Operational Changes/Notes:

Rainfall data sourced from South Buffalo rain gauge, as provided by BSA.

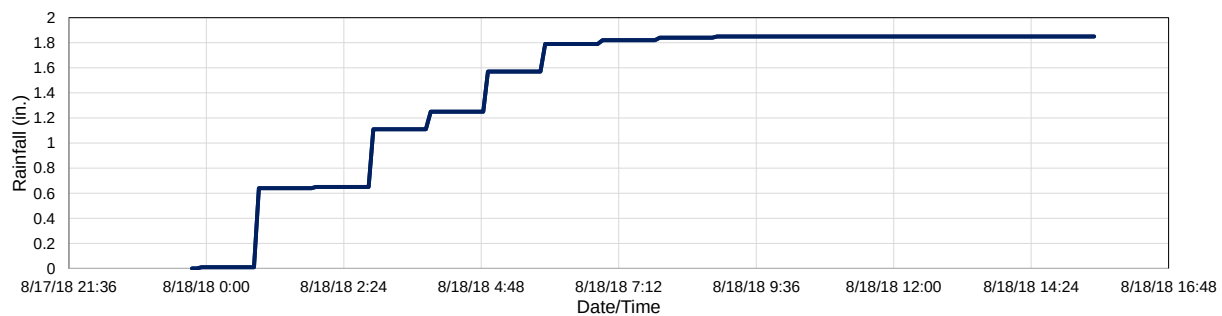
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



ATTACHMENT A

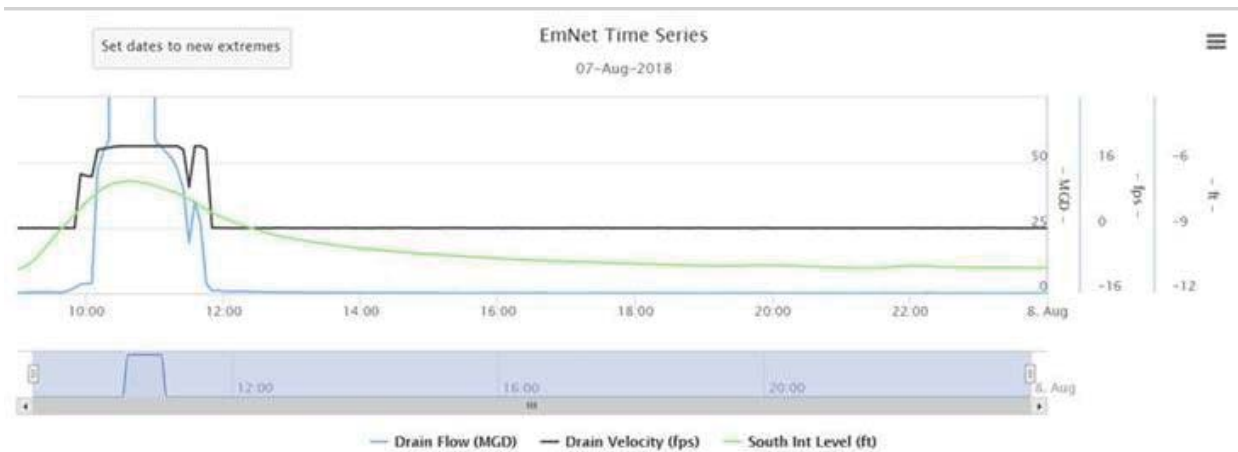
Communication Regarding Event on August 7, 2018



From: Maria Krug <mkrug@emnet.net>
Sent: Tuesday, September 18, 2018 1:49 PM
To: Hintz, Angela <Angela.Hintz@arcadis.com>
Cc: Tim Ruggaber <truggaber@emnet.net>
Subject: RE: BSA RTC KPI - Smith Reports

Thanks, Angela. We looked into the August 7th event – it looks like the drain velocity remains constant when the drain flow spikes so high. The drain flow is at 58.54 MGD before the spike and returns to 58.57 MGD after the spike (with the velocity constant). Since the velocity and South Int. level readings are reasonable for an event during this time period, we think that it would be best to change the drain flow data to remain constant at 58.5 MGD for the time period with the impossible flow reading. Can you please make this change and include the event on the summary sheet, with an explanation included in the “notes” section of the event sheet?

Thanks,
Maria



Maria Krug
Project Manager



Real Time Intelligence & Optimization

EmNet LLC

121 S. Niles Ave.
Suite #22
South Bend, IN 46617

Office: 574.855.1012 ext. 124

Email: mkrug@emnet.net

From: Hintz, Angela <Angela.Hintz@arcadis.com>

Sent: Friday, September 14, 2018 5:47 PM

To: Maria Krug <mkrug@emnet.net>

Cc: Tim Ruggaber <truggaber@emnet.net>

Subject: BSA RTC KPI - Smith Reports

Hi Maria and Tim – Here are the Smith Street KPI reports. Overall, they look relatively ok, but the event on August 7th resulted in an impossible volume retained because of the drain level measured. We have included a sheet for the event, but we have not included that event on the summary sheet. You may want to take a look at this – we are not sure why the data was off for this event, it appeared to be okay on the following day.

Thanks and have a good weekend,
Angela

Angela M. Hintz, PE, CEM, CEA, ENV SP | Senior Environmental Engineer | angela.hintz@arcadis.com

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Professional Registration/PE-NY, Certified Energy Manager - AEE, Certified Energy Auditor – AEE

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September 2018 Smith St. RTC KPI Report

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Smith St. RTC Monthly Performance Report

September 2018

Event Date	Volume Captured (gal)	Did a seiche occur during wet weather? (Note: if a seiche occurs during wet weather, volume captured will be slightly overestimated due to the inclusion of the seiche)	Event drain flow threshold (MGD)
9/10/2018	4,738,147	No	1.25
9/21/2018	65,385	No	1.25
9/25/2018	5,950,720	No	1.25
9/26/2018	2,678,360	No	1.25
Total Volume Captured (gal)	13,432,612		

Site:	Smith RTC
Analysis Date:	10/16/2018
Event Start Date/Time:	9/10/2018 5:20
Event End Date/Time:	9/10/2018 16:00

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	1.0 in.
Storm Event Duration:	4 hr.
Storm Type:	Less than one year

Time Lead Dewatering Valve Closed	9/10/2018 5:45
Time Lead Dewatering Valve Opened	9/10/2018 13:45
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	0.04 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	4,738,147 Gal.
Did seiche occur during wet weather?	No

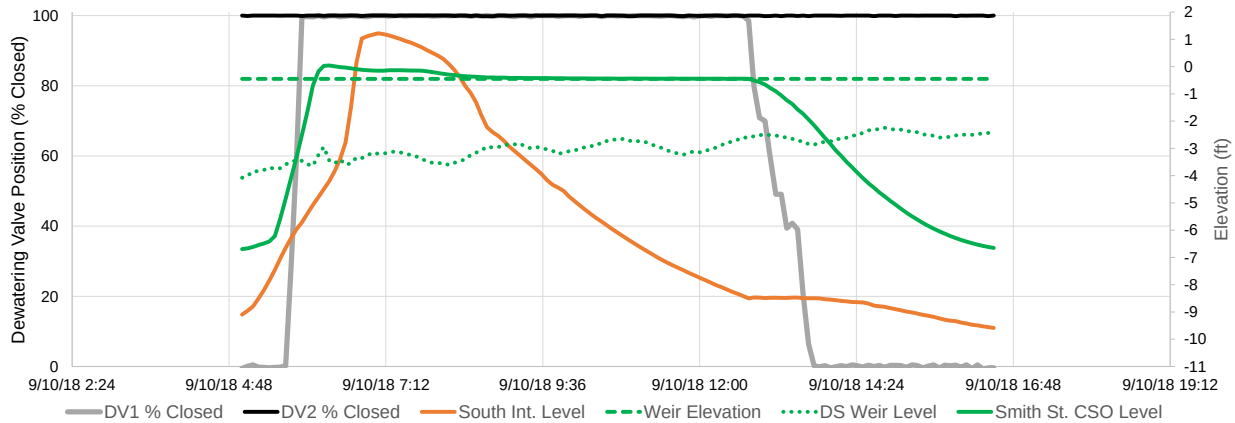
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

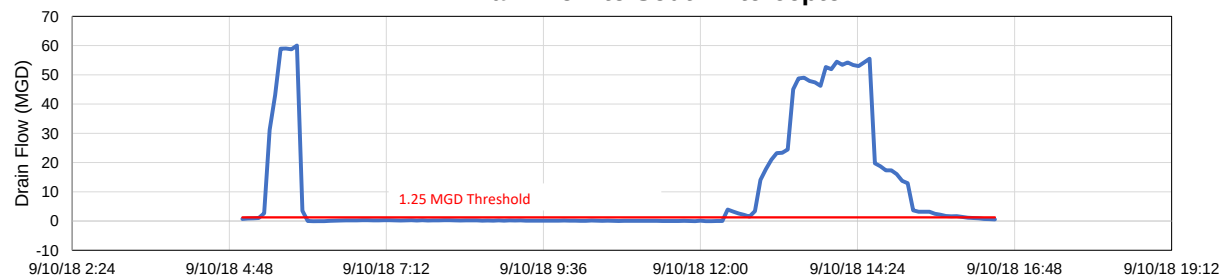
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

Erroneous data indicates drain flow increasing to 32,766 MGD at 05:40 A.M. Drain flow values at 05:35 A.M. and 05:45 A.M. are 58.95 MGD and 58.71 MGD respectively. Therefore, 59 MGD was used as drain flow value at 05:40 A.M.

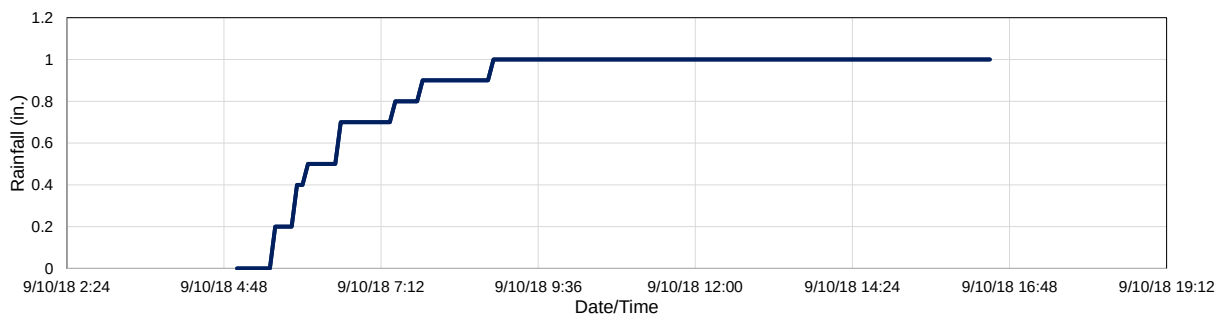
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	10/16/2018
Event Start Date/Time:	9/21/2018 18:35
Event End Date/Time:	9/21/2018 19:05

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.1 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-6.65 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	65,385 Gal.
Did seiche occur during wet weather?	No

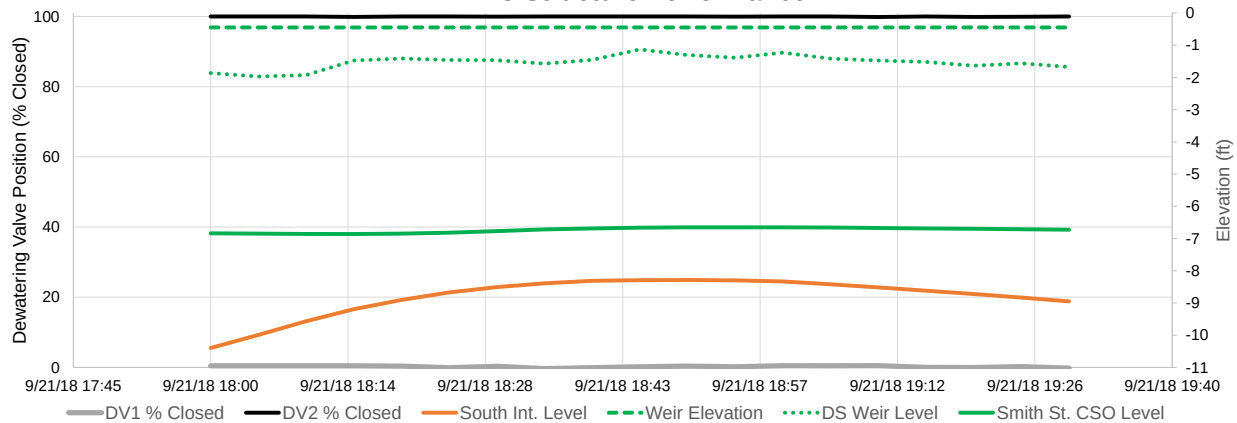
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

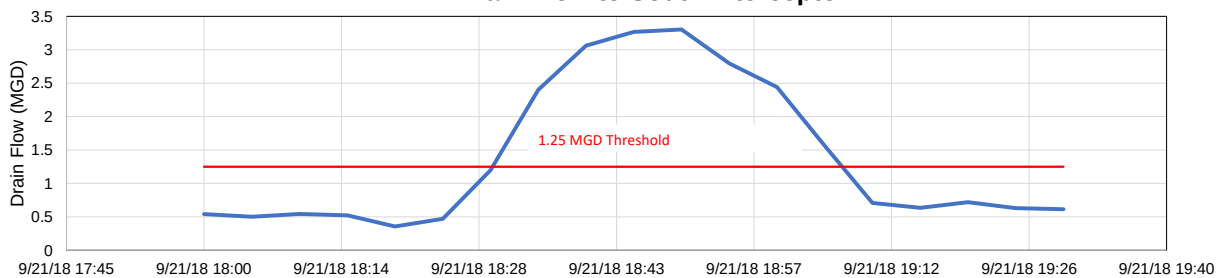
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

*0.1-inch rainfall was recorded an hour prior to the event, and therefore is not reflected in the rainfall accumulation graph below.

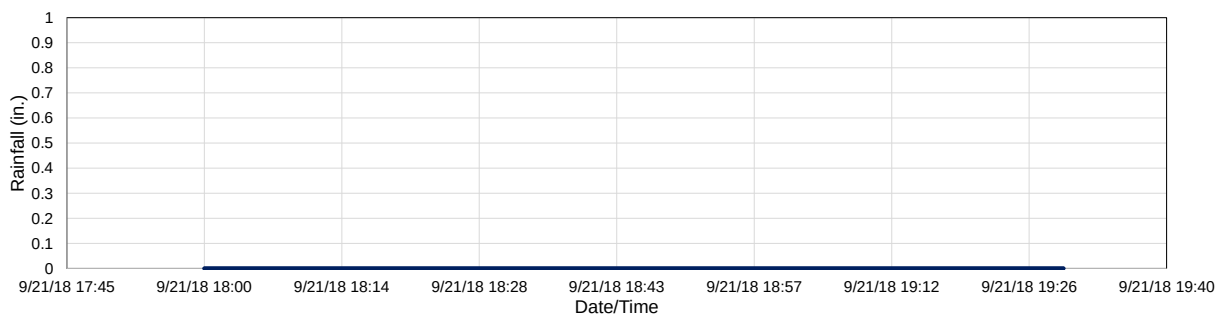
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	10/16/2018
Event Start Date/Time:	9/25/2018 22:20
Event End Date/Time:	9/26/2018 2:35

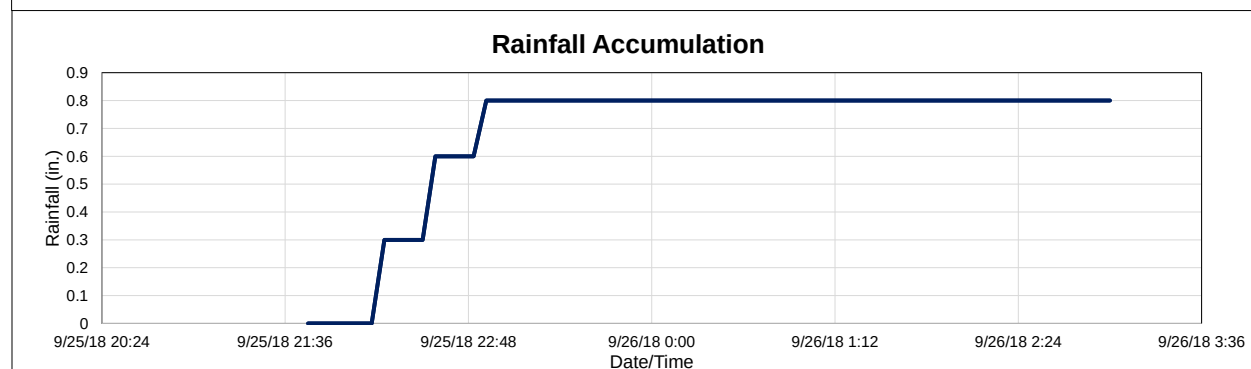
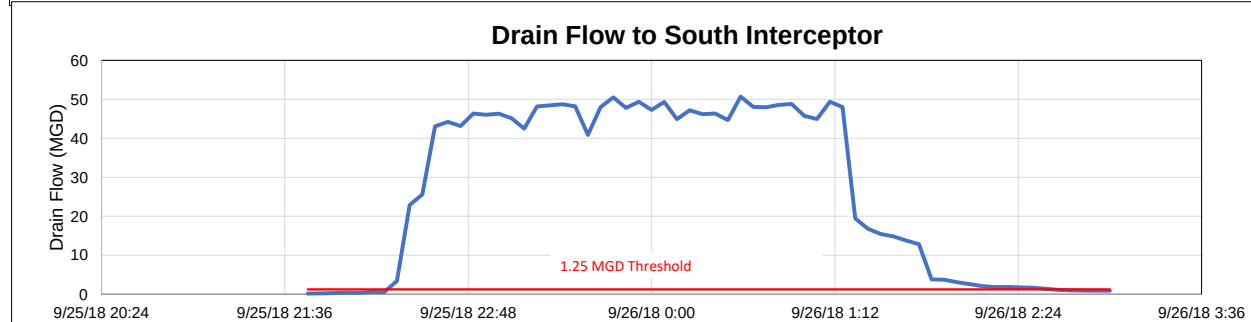
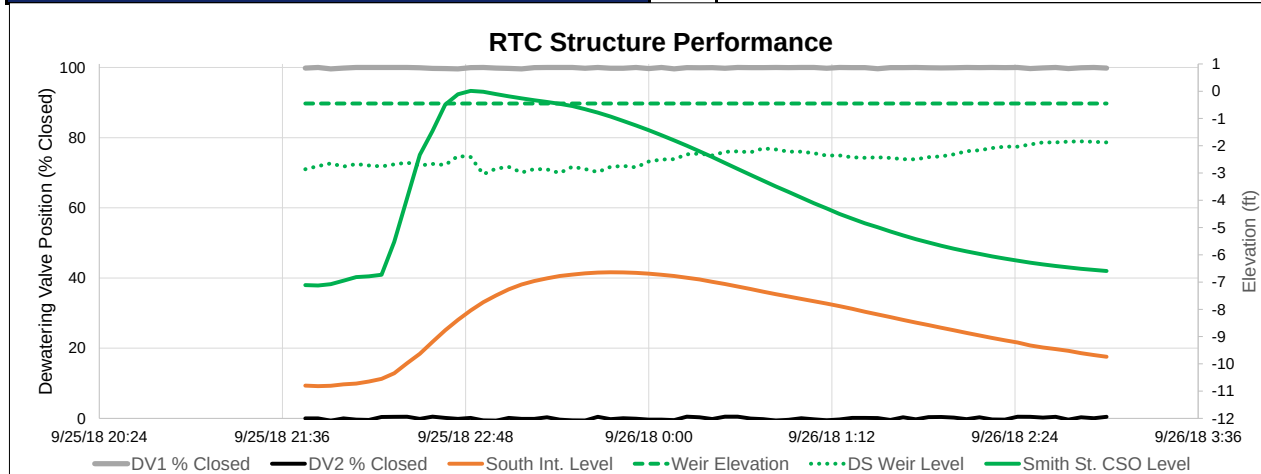
Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.8 in.
Storm Event Duration:	1 hr.
Storm Type:	One year

Time Lead Dewatering Valve Closed	9/25/2018 21:45
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	0.01 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	5,950,720 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.



Site:	Smith RTC
Analysis Date:	10/16/2018
Event Start Date/Time:	9/26/2018 11:10
Event End Date/Time:	9/26/2018 13:00

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.2 in. *
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-5.64 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	2,678,360 Gal.
Did seiche occur during wet weather?	No

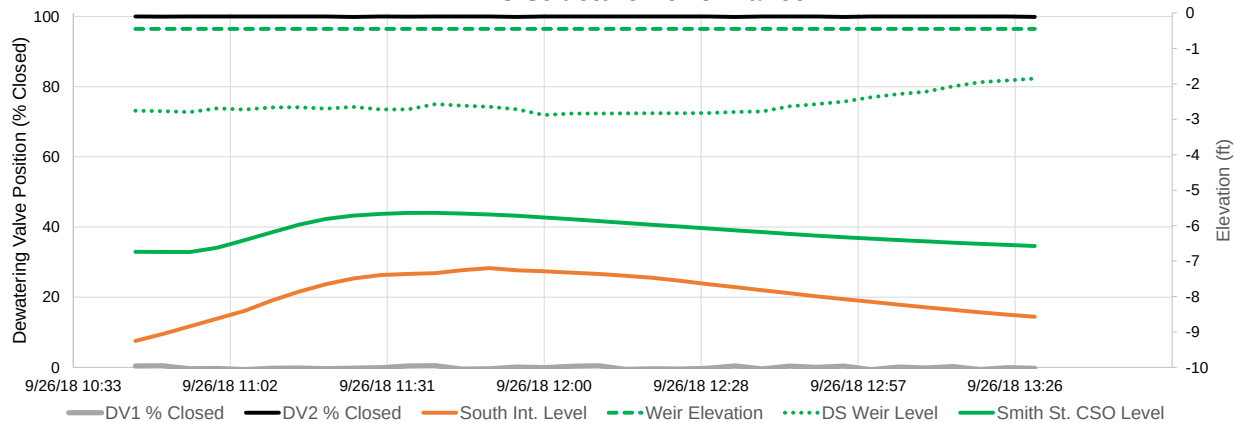
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

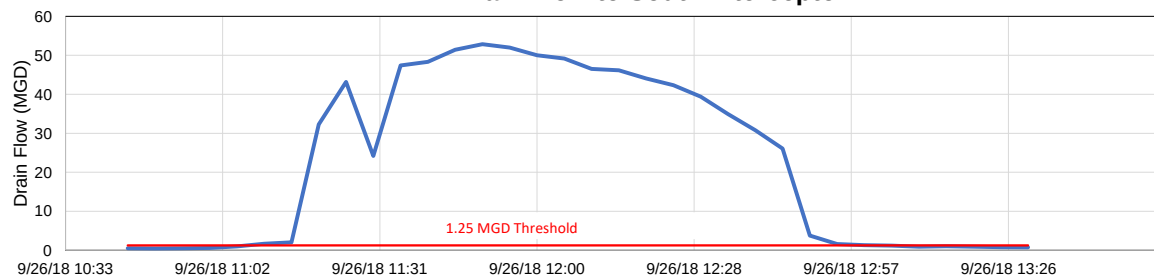
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

*0.2-inch rainfall was recorded an hour prior to the event, and therefore is not reflected in the rainfall accumulation graph below.

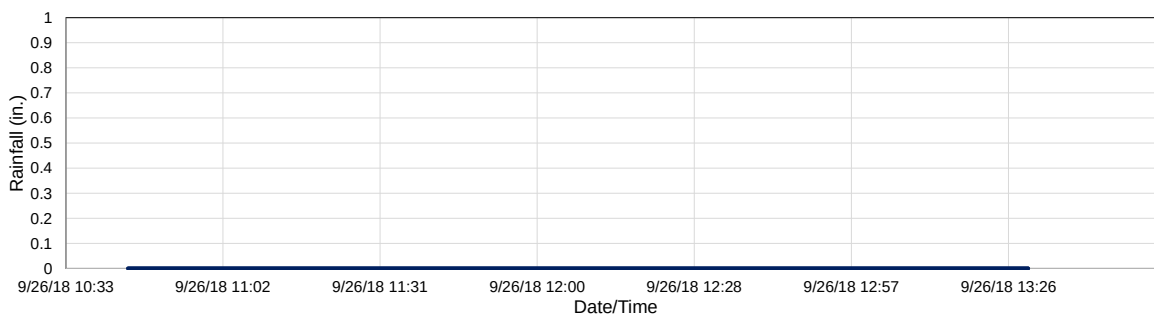
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



October 2018 Smith St. RTC KPI Report

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Smith St. RTC Monthly Performance Report

October 2018

Event Date	Volume Captured (gal)	Did a seiche occur during wet weather? (Note: if a seiche occurs during wet weather, volume captured will be slightly overestimated due to the inclusion of the seiche)	Event drain flow threshold (MGD)
10/2/2018	2,761,449	No	1.25
10/4/2018	2,530,313	No	1.25
10/6/2018	4,302,377	No	1.25
10/6/2018	229,074	No	1.25
10/11/2018	3,947,588	No	1.25
10/15/2018	3,145,107	No	1.25
10/16/2018	129,060	No	1.25
10/17/2018	262,508	No	1.25
10/20/2018	6,335,146	No	1.25
10/20/2018	49,526	No	1.25
10/27/2018	50,242	No	1.25
10/31/2018	9,119	No	1.25
Total Volume Captured (gal)	23,751,509		

Site:	Smith RTC
Analysis Date:	11/13/2018
Event Start Date/Time:	10/2/2018 7:15
Event End Date/Time:	10/2/2018 10:05

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.6 in.
Storm Event Duration:	2 hr.
Storm Type:	Less than one year

Time Lead Dewatering Valve Closed	10/2/2018 10:00
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-4.69 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	2,761,449 Gal.
Did seiche occur during wet weather?	No

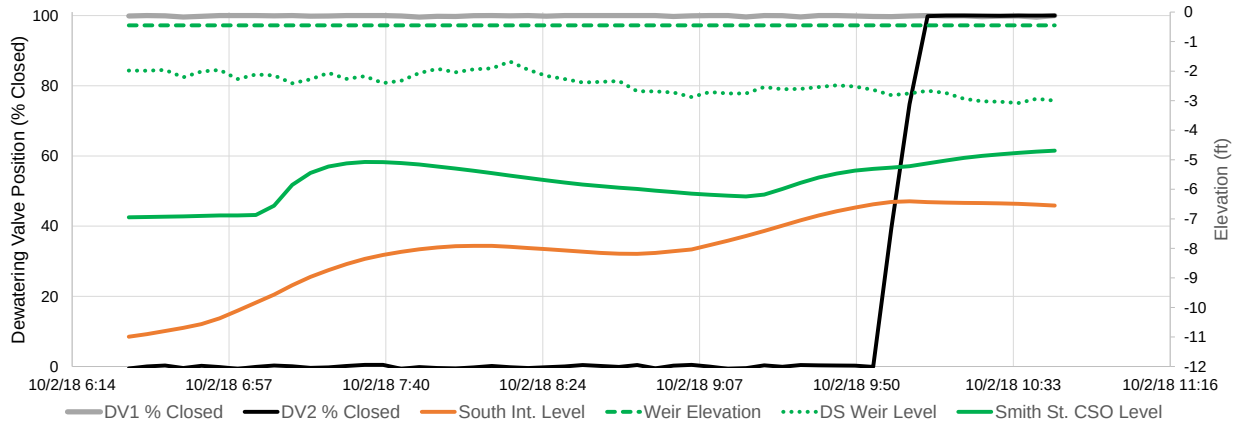
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

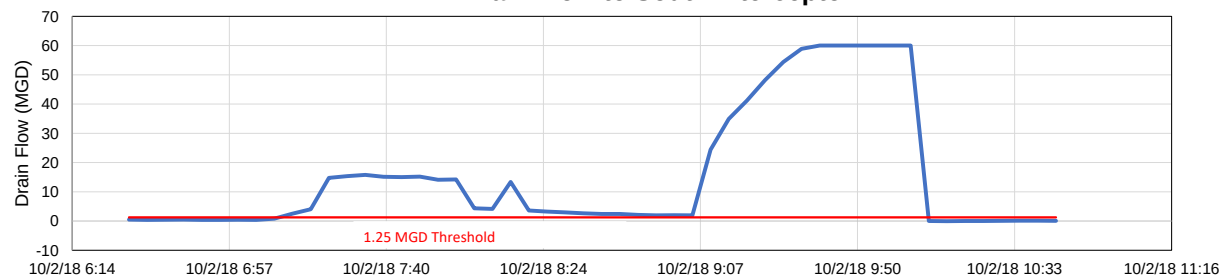
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

Drain flow values over 60 MGD were adjusted to 60 MGD per EmNet's guidance. See Attachment A for correspondence details.

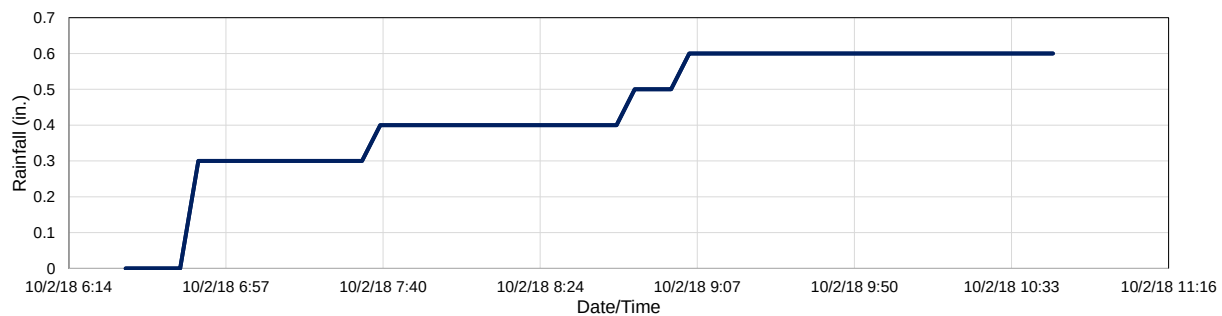
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	11/13/2018
Event Start Date/Time:	10/4/2018 8:10
Event End Date/Time:	10/4/2018 10:00

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.4 in.
Storm Event Duration:	1.5 hr.
Storm Type:	Less than one year

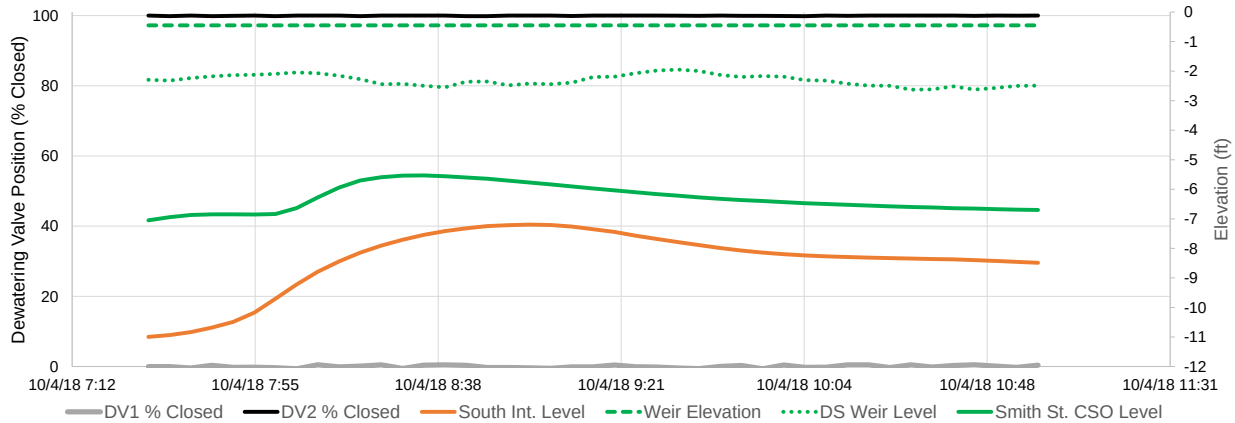
Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-5.53 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	2,530,313 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

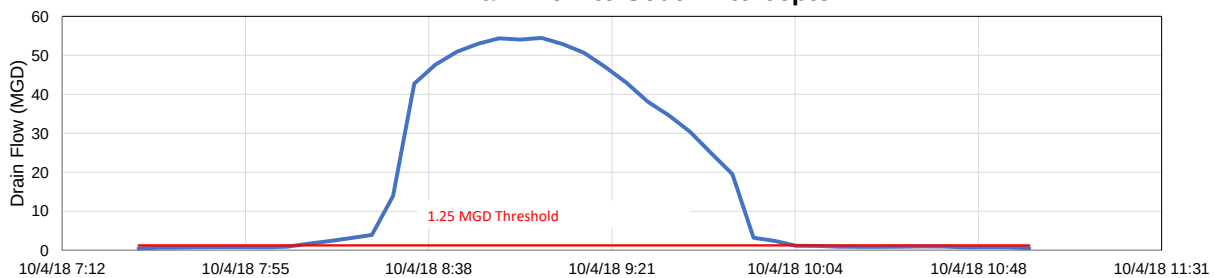
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

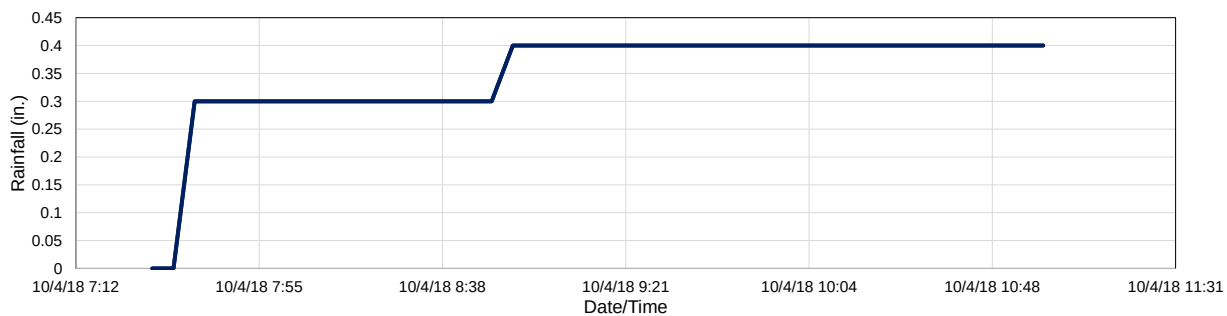
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	11/13/2018
Event Start Date/Time:	10/6/2018 8:15
Event End Date/Time:	10/6/2018 16:35

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.4 in.
Storm Event Duration:	0.5 hr.
Storm Type:	Less than one year

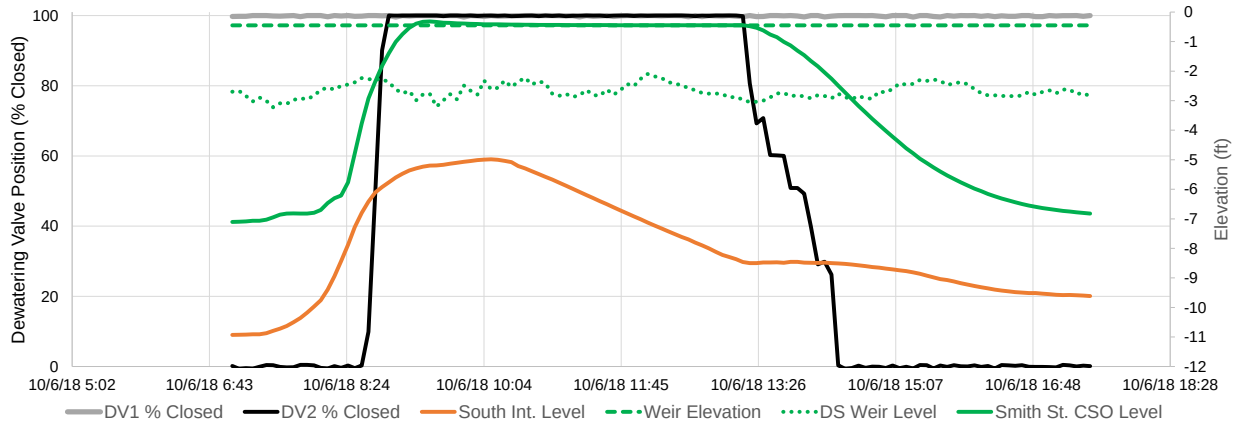
Time Lead Dewatering Valve Closed	10/6/2018 8:40
Time Lead Dewatering Valve Opened	10/6/2018 14:25
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-0.32 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	4,302,377 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

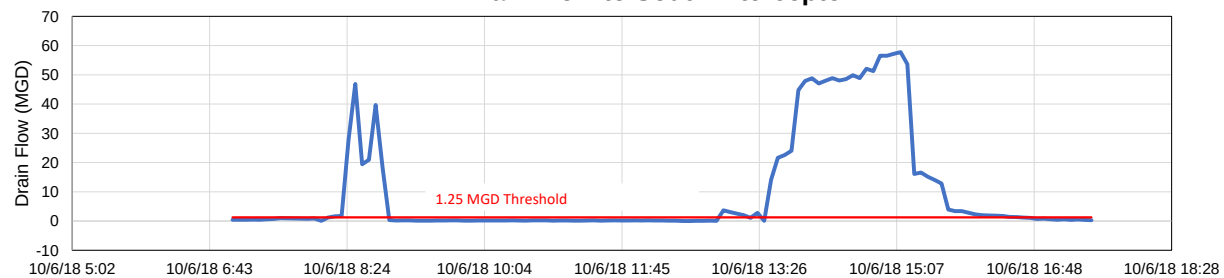
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

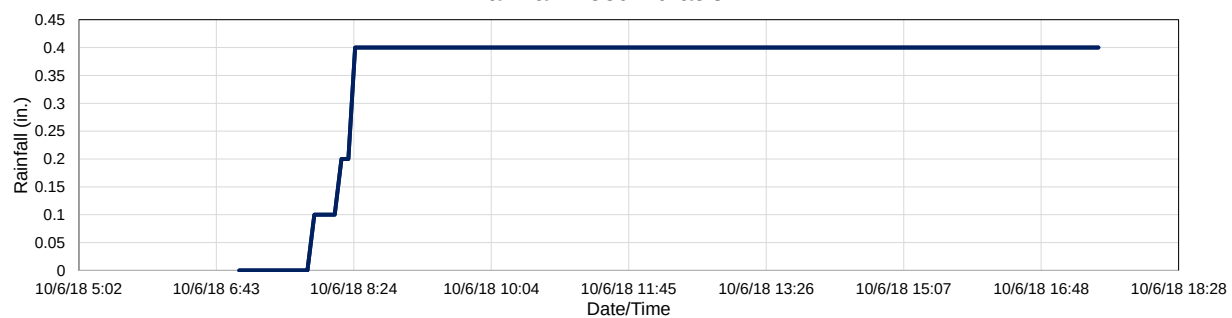
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	11/13/2018
Event Start Date/Time:	10/6/2018 23:50
Event End Date/Time:	10/7/2018 4:20

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.1 in.
Storm Event Duration:	0.5 hr.
Storm Type:	Less than one year

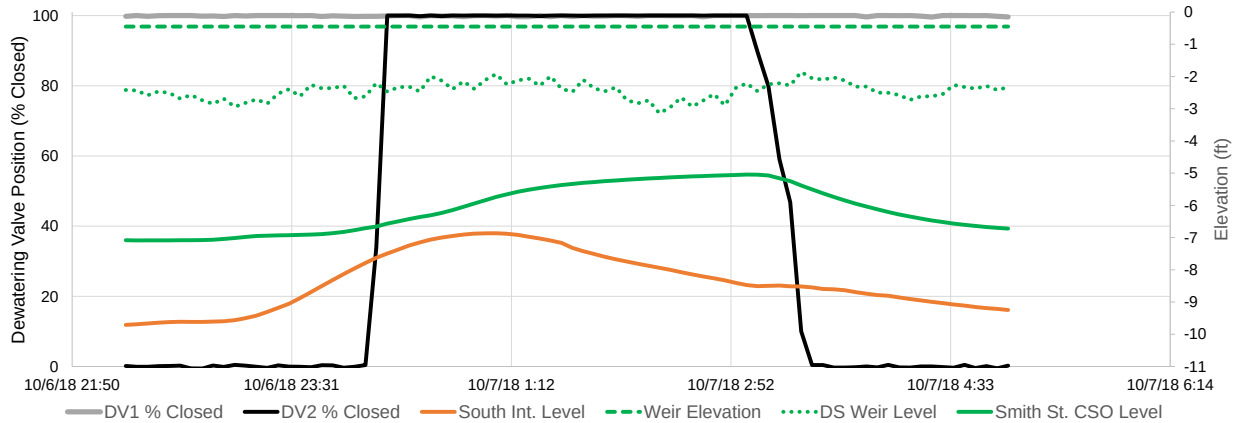
Time Lead Dewatering Valve Closed	10/7/2018 0:10
Time Lead Dewatering Valve Opened	10/7/2018 3:30
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-5.04 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	229,074 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

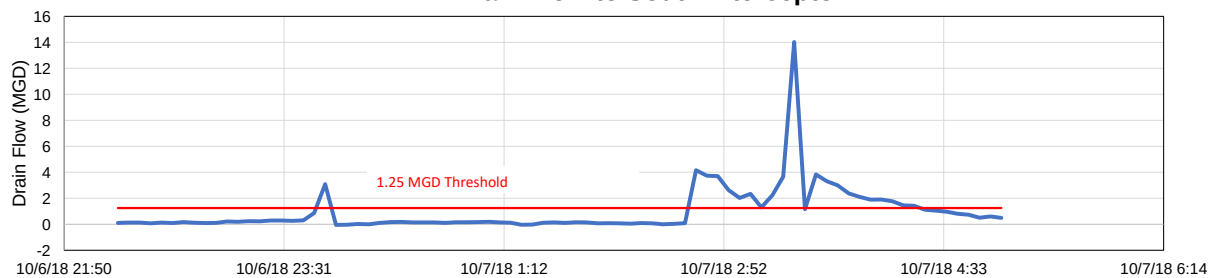
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

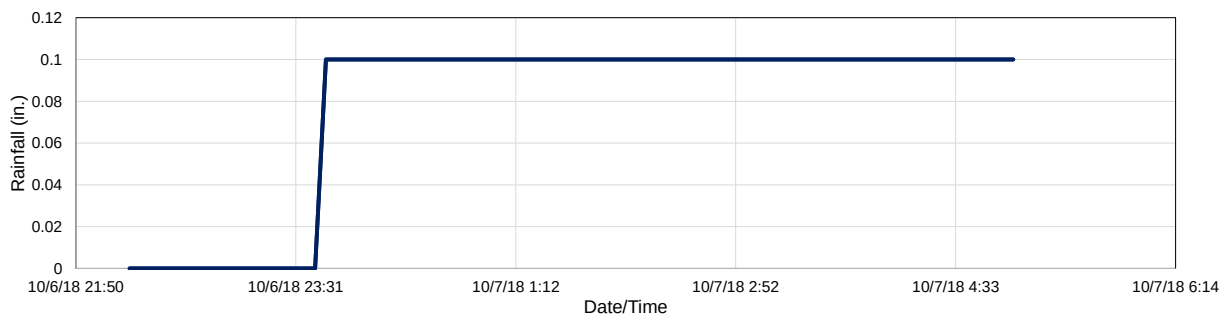
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	11/13/2018
Event Start Date/Time:	10/11/2018 12:35
Event End Date/Time:	10/11/2018 16:45

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Time Lead Dewatering Valve Closed	10/11/2018 12:40
Time Lead Dewatering Valve Opened	10/11/2018 13:45
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	1.12 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	3,947,588 Gal.
Did seiche occur during wet weather?	No

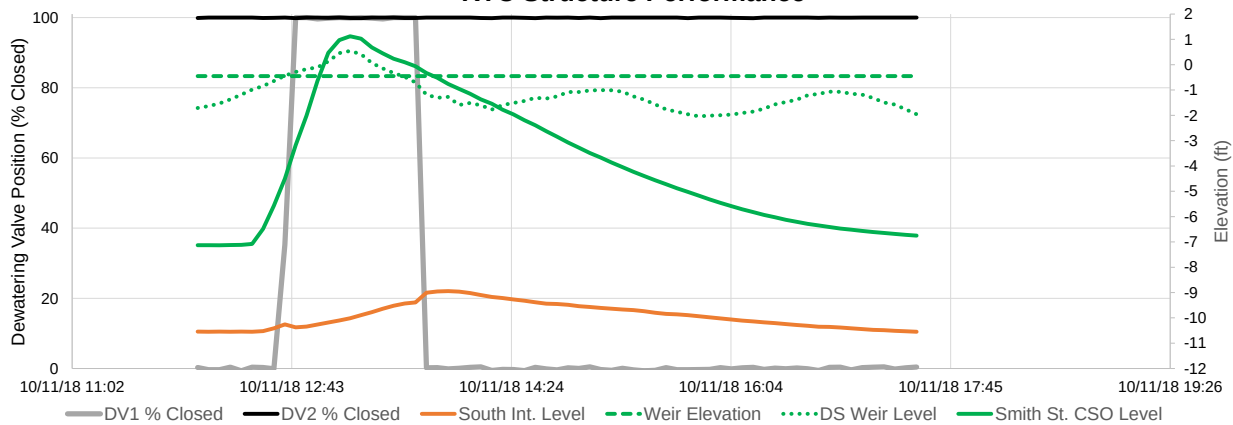
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

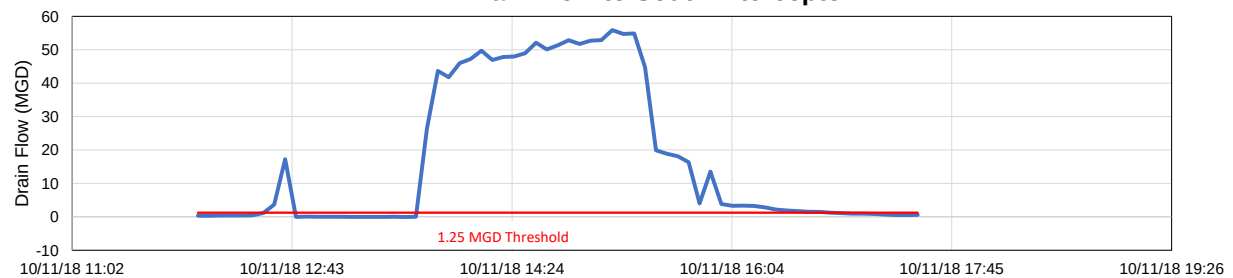
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

No rainfall recorded at the airport. The event was likely caused by a localized storm.

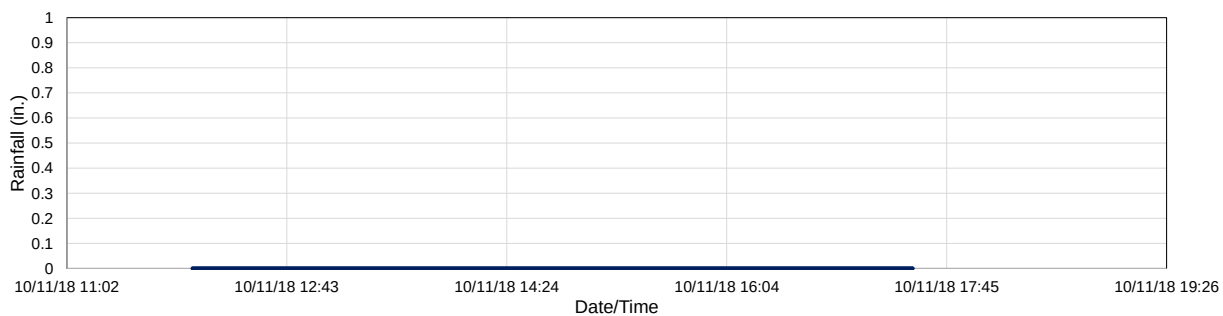
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	11/13/2018
Event Start Date/Time:	10/15/2018 13:55
Event End Date/Time:	10/15/2018 18:35

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-2.28 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	3,145,107 Gal.
Did seiche occur during wet weather?	No

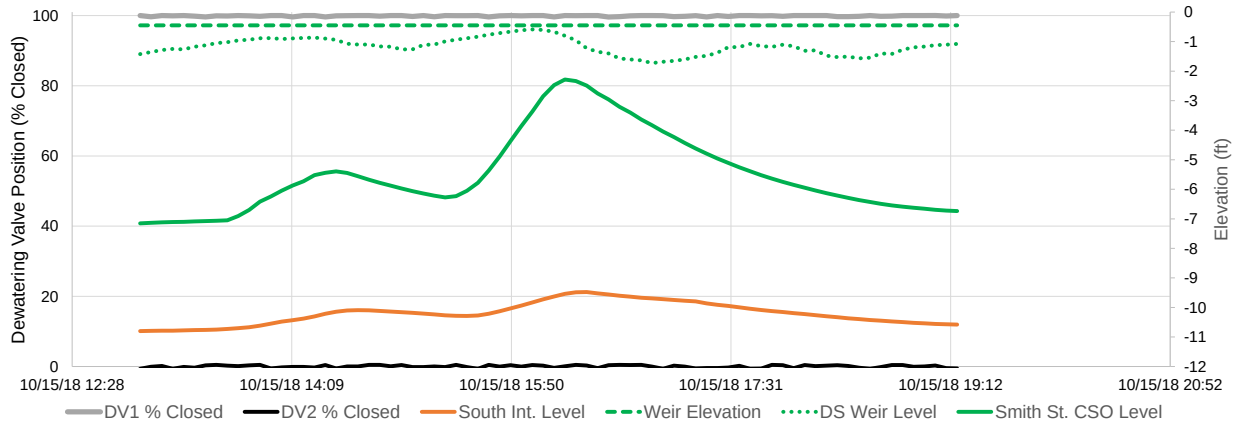
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

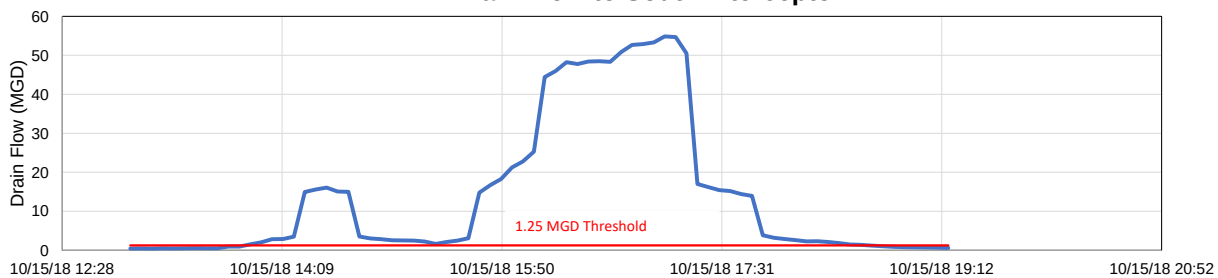
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

No rainfall recorded at the airport. The event was likely caused by a localized storm.

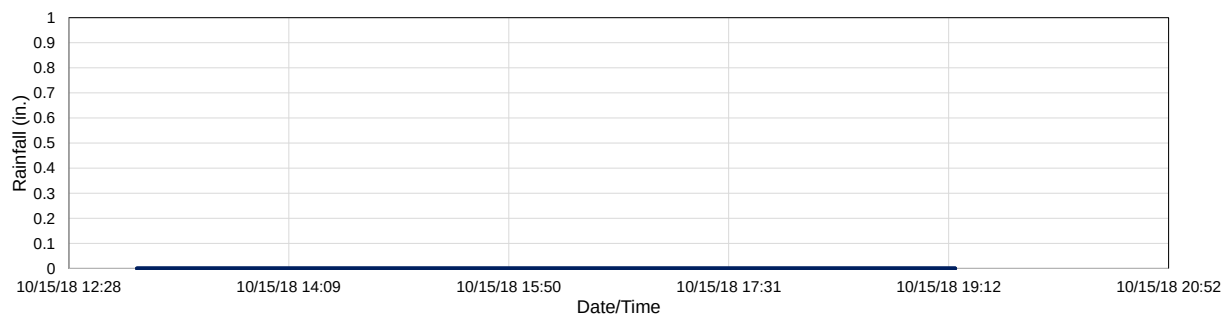
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	11/13/2018
Event Start Date/Time:	10/16/2018 15:10
Event End Date/Time:	10/16/2018 16:20

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-5.67 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	129,060 Gal.
Did seiche occur during wet weather?	No

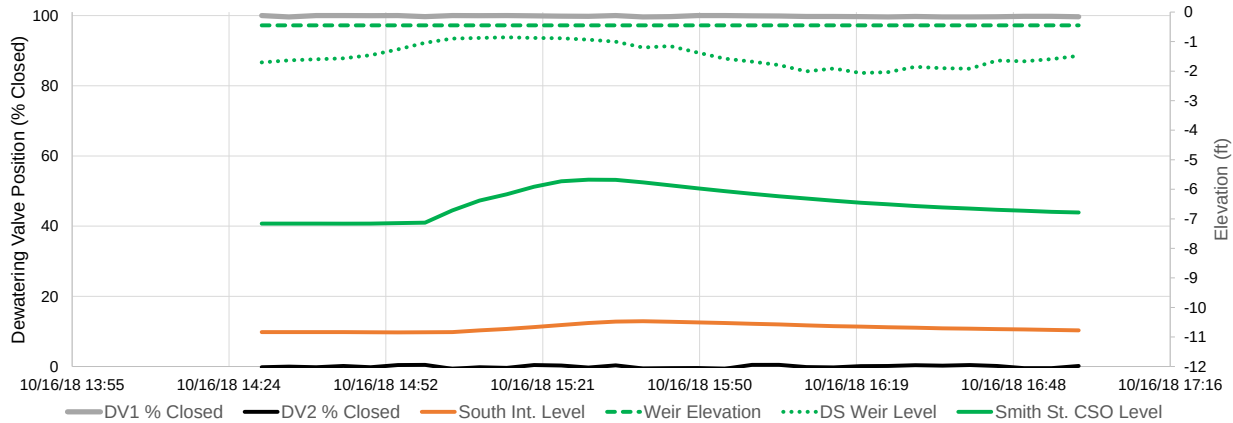
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

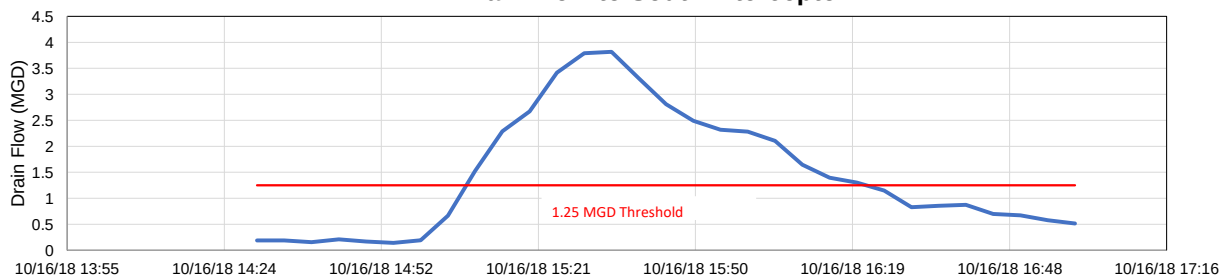
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

No rainfall recorded at the airport. The event was likely caused by a localized storm.

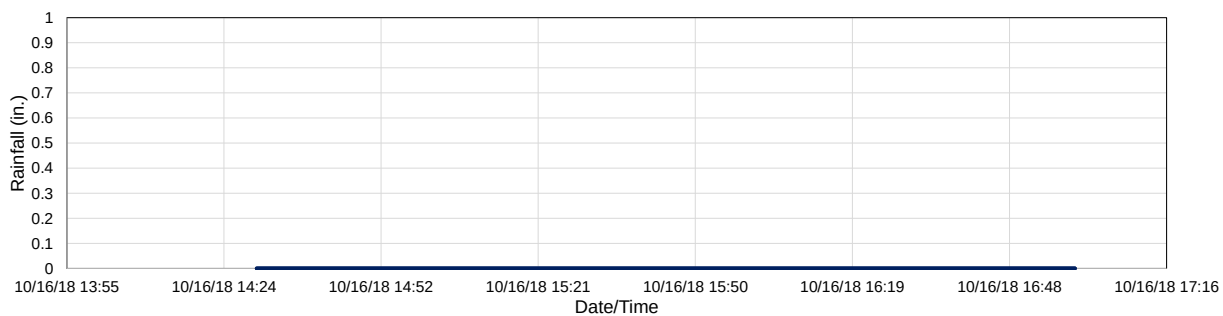
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	11/13/2018
Event Start Date/Time:	10/17/2018 2:35
Event End Date/Time:	10/17/2018 3:55

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-5.48 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	262,508 Gal.
Did seiche occur during wet weather?	No

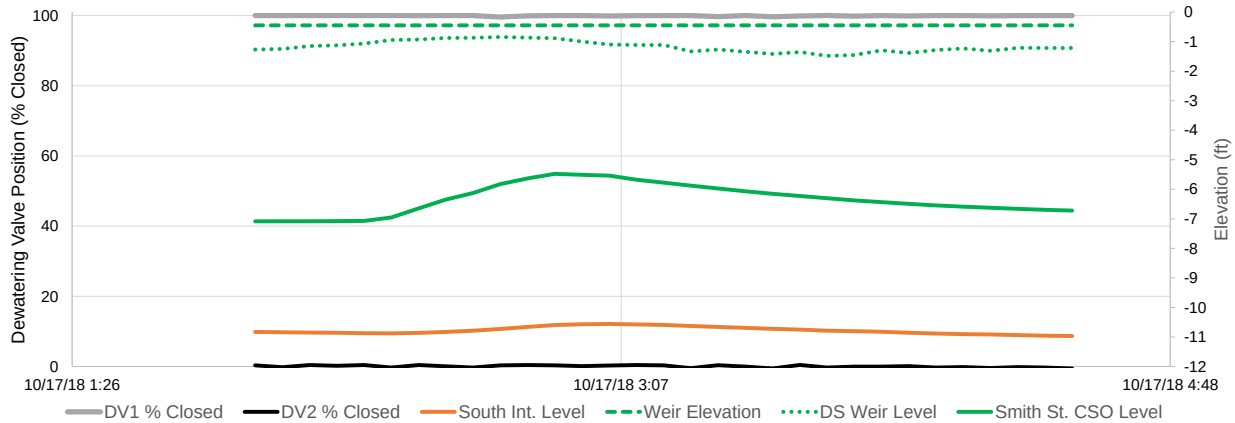
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

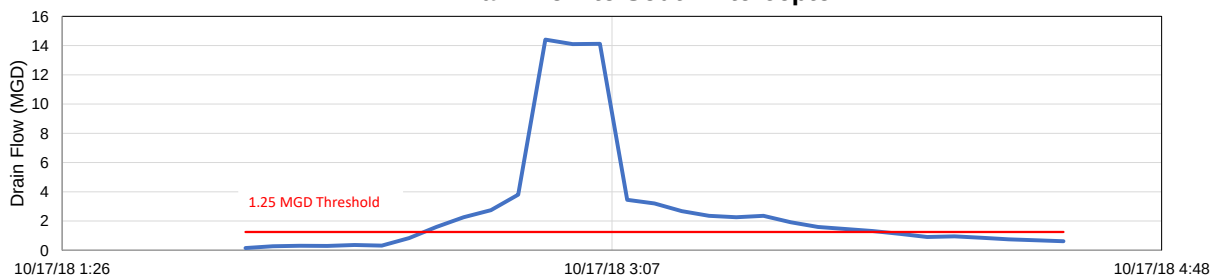
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

No rainfall recorded at the airport. The event was likely caused by a localized storm.

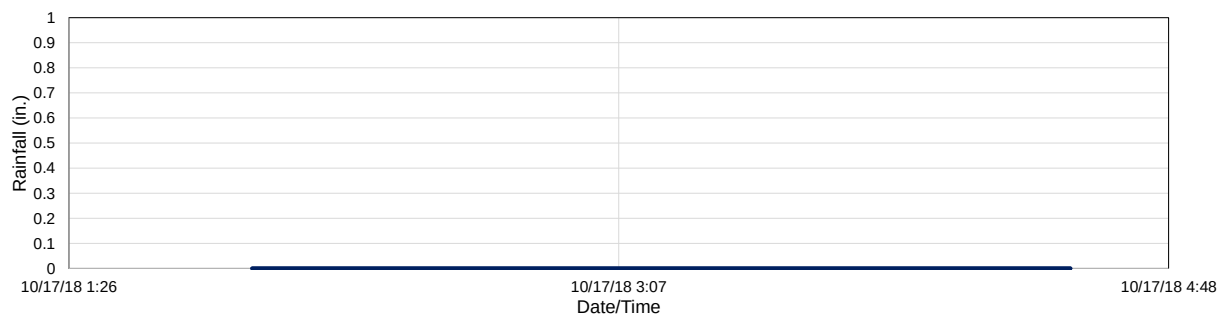
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	11/13/2018
Event Start Date/Time:	10/20/2018 0:55
Event End Date/Time:	10/20/2018 7:35

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.2 in.
Storm Event Duration:	1.5 hr.
Storm Type:	Less than one year

Time Lead Dewatering Valve Closed	10/20/2018 1:20
Time Lead Dewatering Valve Opened	10/20/2018 3:50
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	0.64 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	6,335,146 Gal.
Did seiche occur during wet weather?	No

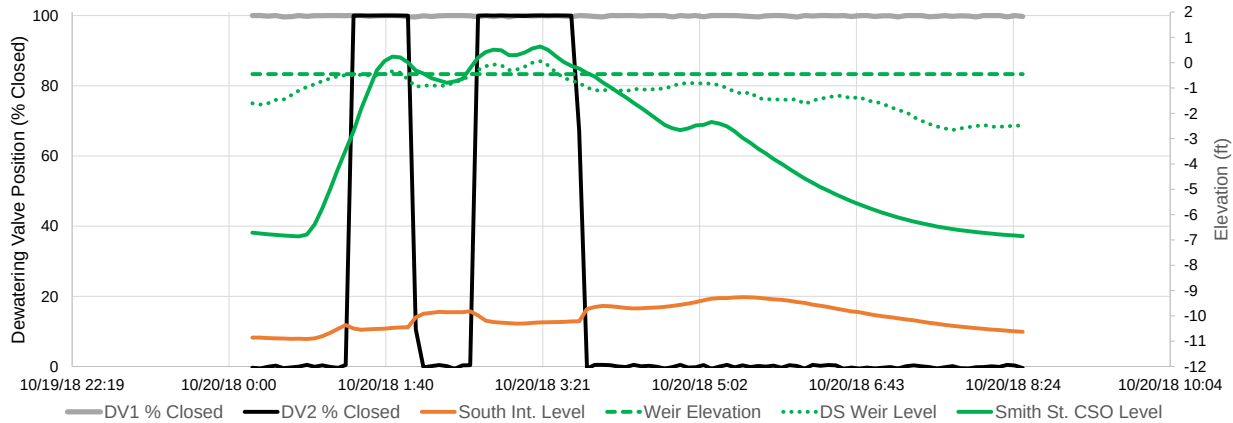
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

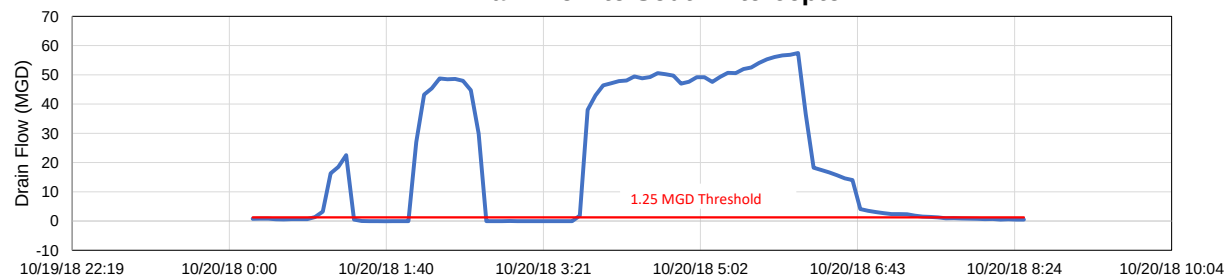
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

Localized storm, not recorded in airport data, likely triggered this event.

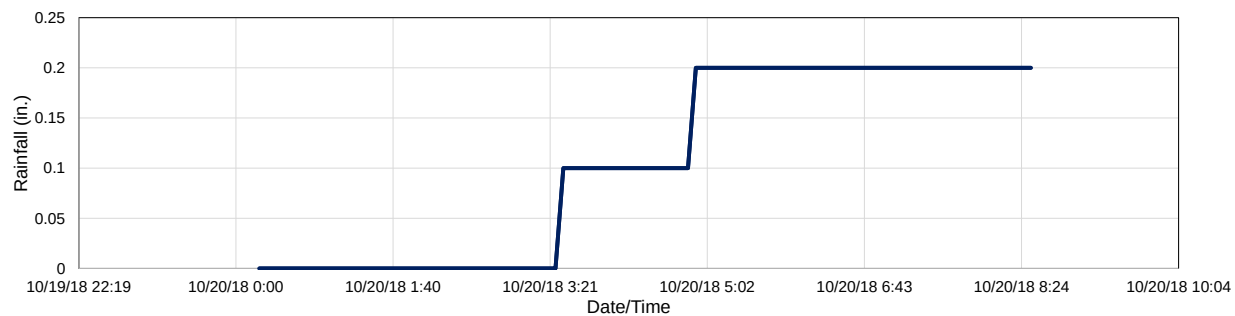
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	11/13/2018
Event Start Date/Time:	10/20/2018 23:05
Event End Date/Time:	10/20/2018 23:35

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.2 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

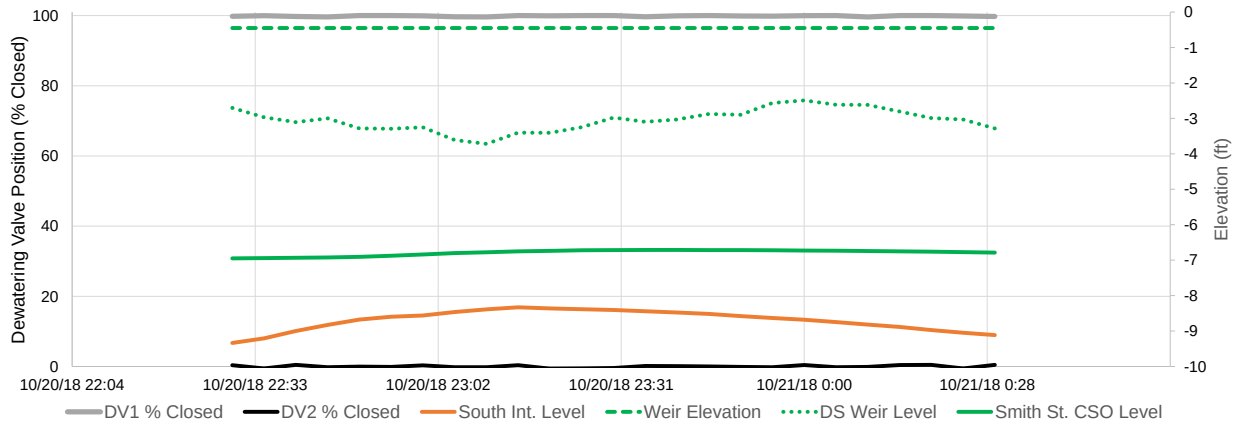
Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-6.71 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	49,526 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

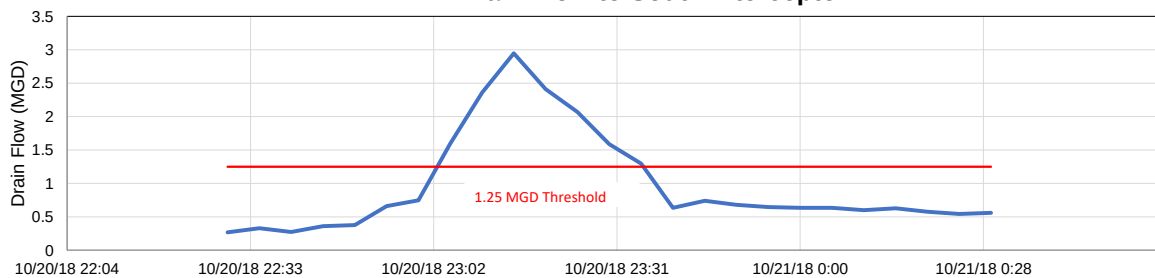
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

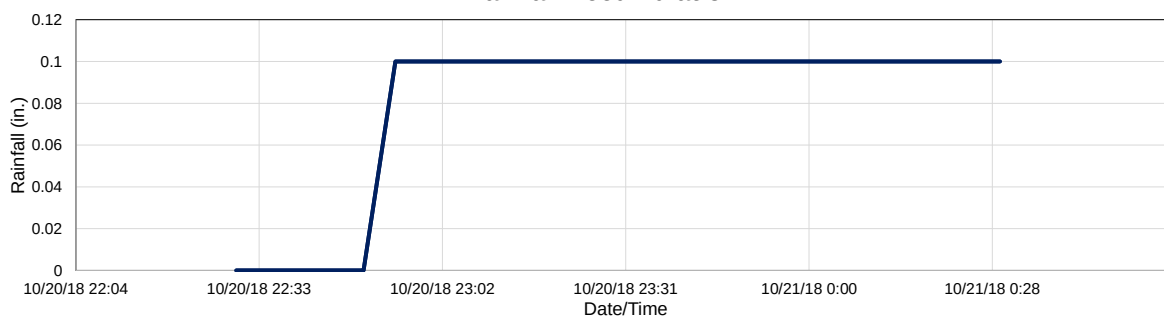
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	11/13/2018
Event Start Date/Time:	10/27/2018 18:25
Event End Date/Time:	10/27/2018 19:45

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.1 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

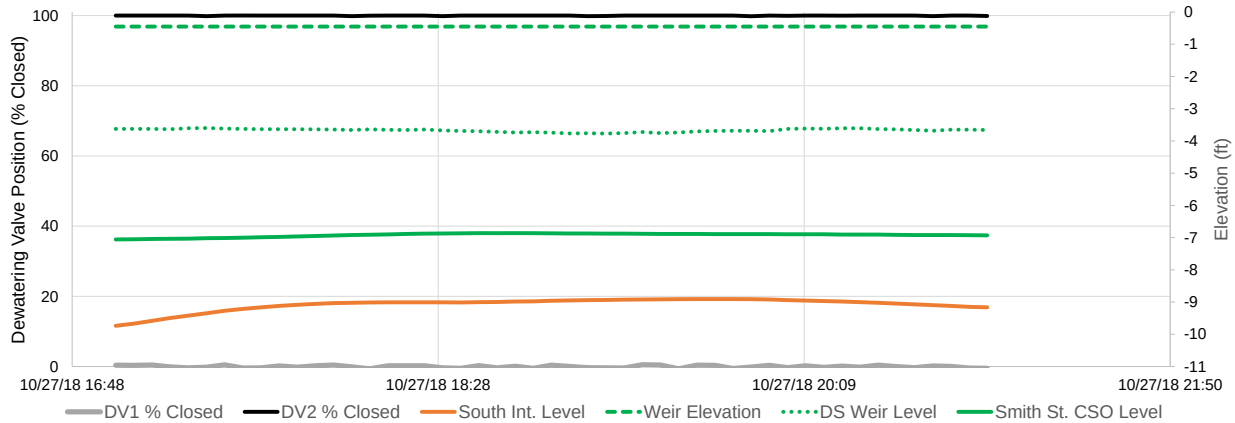
Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-6.86 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	50,242 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

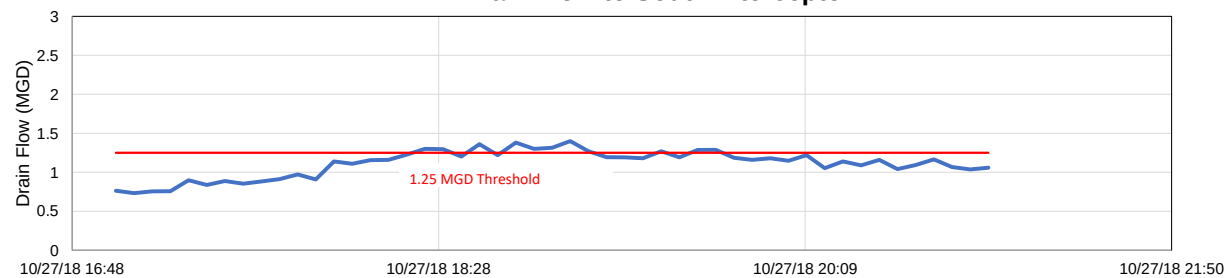
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

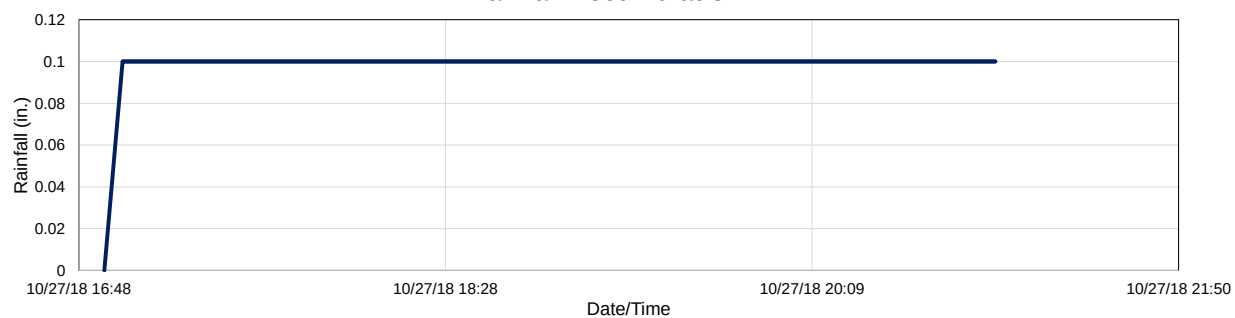
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	11/13/2018
Event Start Date/Time:	10/31/2018 14:30
Event End Date/Time:	10/31/2018 15:05

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.1 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

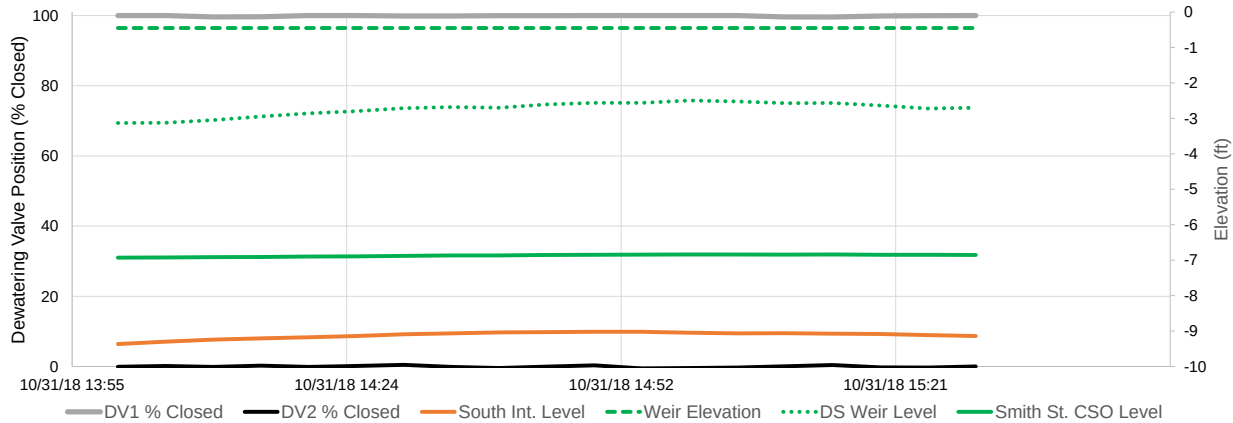
Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-6.84 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	9,119 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

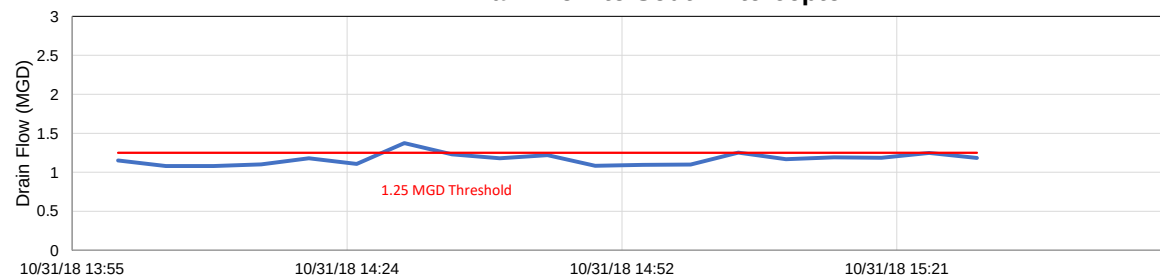
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

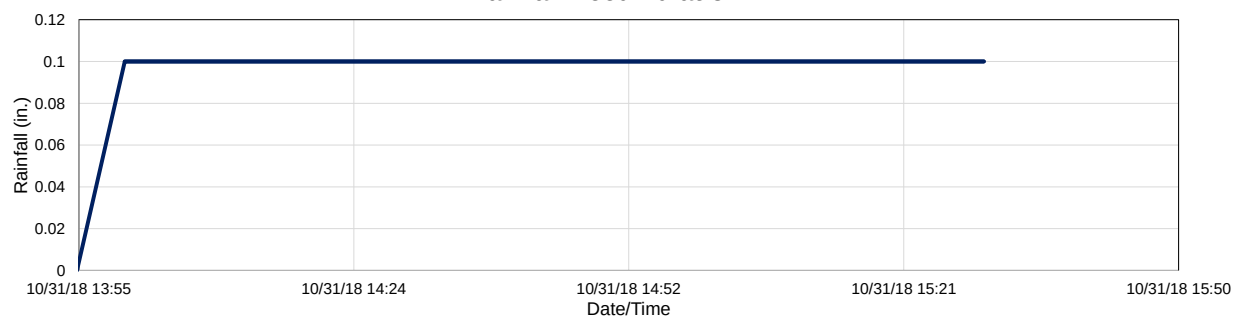
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



ATTACHMENT A

Communication regarding adjusting drain flows beyond 60 MGD



From: [Hintz, Angela](#)
To: [Bhatt, Tanmay](#)
Subject: FW: BSA October KPI Reports
Date: Monday, November 5, 2018 5:21:17 PM
Attachments: [image001.png](#)
[bsaspp_final_results_Oct2018.xlsx](#)

From: Maria Krug <mkrug@emnet.net>
Sent: Monday, November 5, 2018 5:18 PM
To: Hintz, Angela <Angela.Hintz@arcadis.com>
Cc: Tim Ruggaber <truggaber@emnet.net>
Subject: BSA October KPI Reports

Hi Angela,

Please see attached the Bird SPP data for October. The Lang gates are still in manual open, so we will just need to include the cover sheet as in September, and the Smith St. data is available on the EmNet portal.

Mike will be re-scaling the flow meter at Smith St. on Friday to extend beyond 60 MGD which will take care of the default 32,766 MGD value that occurs when the flow goes beyond the limit right now. If there were instances in the October data, we can continue to add the note and adjust to 59 MGD like in September.

Can you have the KPI reports to us by Nov 14th?

Thanks!
Maria

Maria Krug
Project Manager



Real Time Intelligence & Optimization

EmNet LLC

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Suite #22
South Bend, IN 46617

Office: 574.855.1012 ext. 124
Email: mkrug@emnet.net

November 2018 Smith St. RTC KPI Report

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for natural and
built assets

Smith St. RTC Monthly Performance Report

November 2018

Event Date	Volume Captured (gal)	Did a seiche occur during wet weather? (Note: if a seiche occurs during wet weather, volume captured will be slightly overestimated due to the inclusion of the seiche)	Event drain flow threshold (MGD)
11/1/2018	275,761	No	1.25
11/2/2018	2,345,118	No	1.25
11/6/2018	10,786,250	Yes	1.25
11/7/2018	7,199,447	No	1.25
11/9/2018	7,962,850	Yes	1.25
11/16/2018	2,748,031	Yes	1.25
11/21/2018	6,132,776	No	1.25
11/26/2018	49,941	No	1.25
11/26/2018	4,679,258	No	1.25
11/27/2018	582,805	No	1.25
Total Volume Captured (gal)	42,762,237		

Site:	Smith RTC
Analysis Date:	12/12/2018
Event Start Date/Time:	11/1/2018 11:50
Event End Date/Time:	11/1/2018 14:20

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.2 in.
Storm Event Duration:	2 hr.
Storm Type:	Less than one year

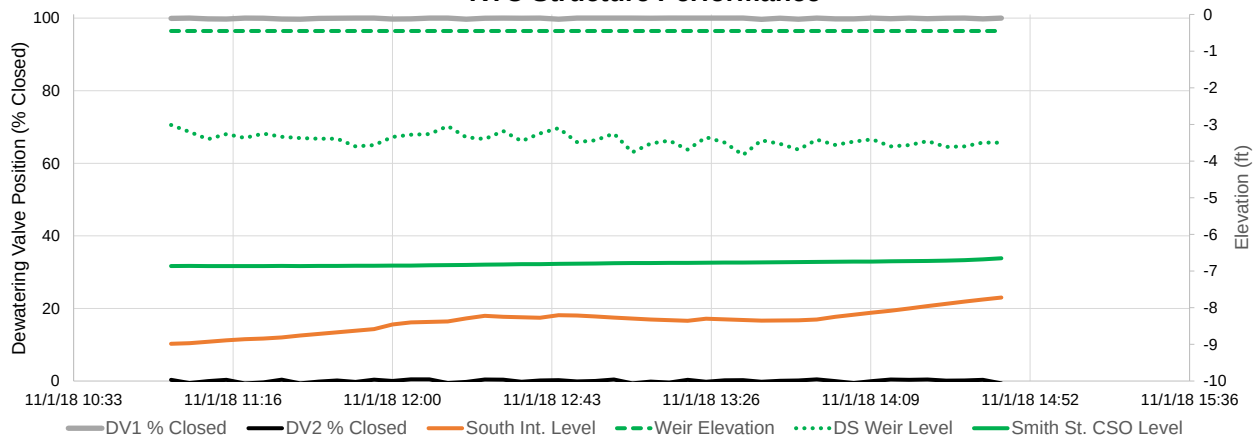
Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-6.65 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	275,761 Gal.
Did seiche occur during wet weather?	No

*Note: If seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

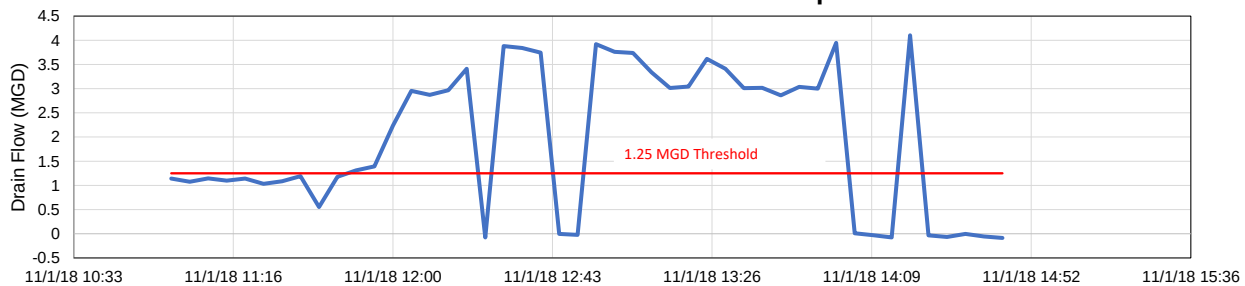
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

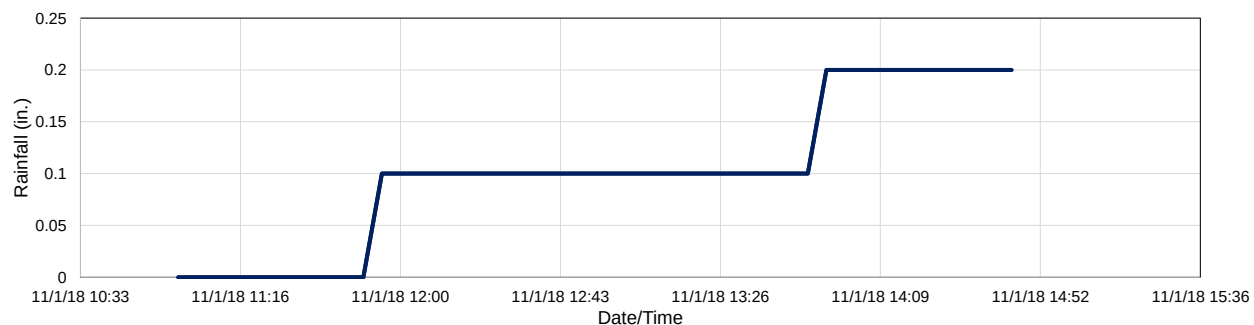
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	12/12/2018
Event Start Date/Time:	11/2/2018 7:05
Event End Date/Time:	11/2/2018 14:10

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Time Lead Dewatering Valve Closed	11/2/2018 6:30
Time Lead Dewatering Valve Opened	11/2/2018 12:55
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-0.44 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	2,345,118 Gal.
Did seiche occur during wet weather?	No

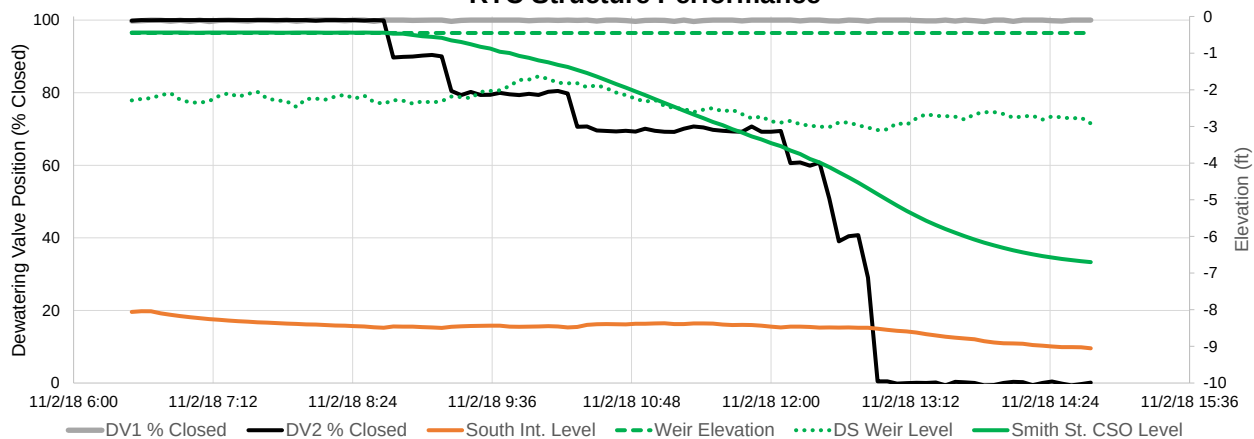
*Note: If seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

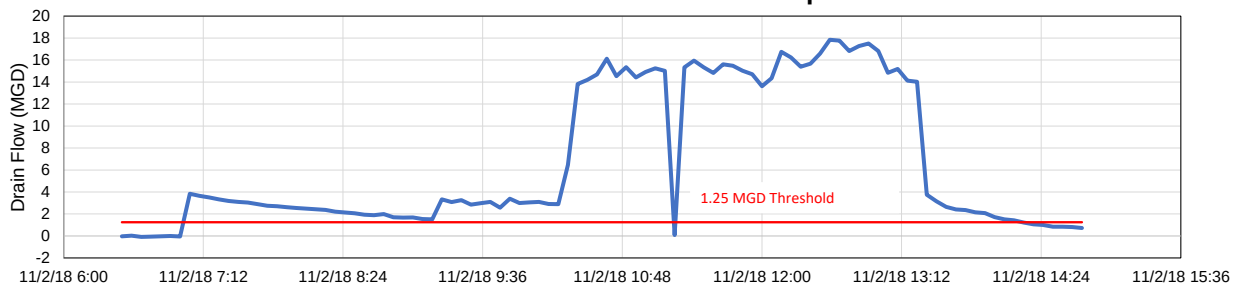
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

No rainfall recorded at the airport. The event was caused by a localized storm.

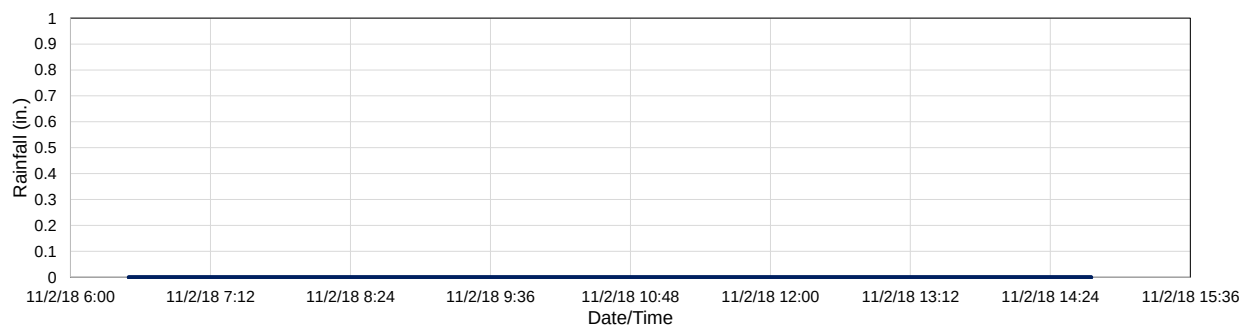
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	12/12/2018
Event Start Date/Time:	11/6/2018 6:30
Event End Date/Time:	11/7/2018 3:55

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.1 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

Time Lead Dewatering Valve Closed	11/6/2018 13:30
Time Lead Dewatering Valve Opened	11/6/2018 23:50
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	2.42 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	10,786,250 Gal.
Did seiche occur during wet weather?	Yes

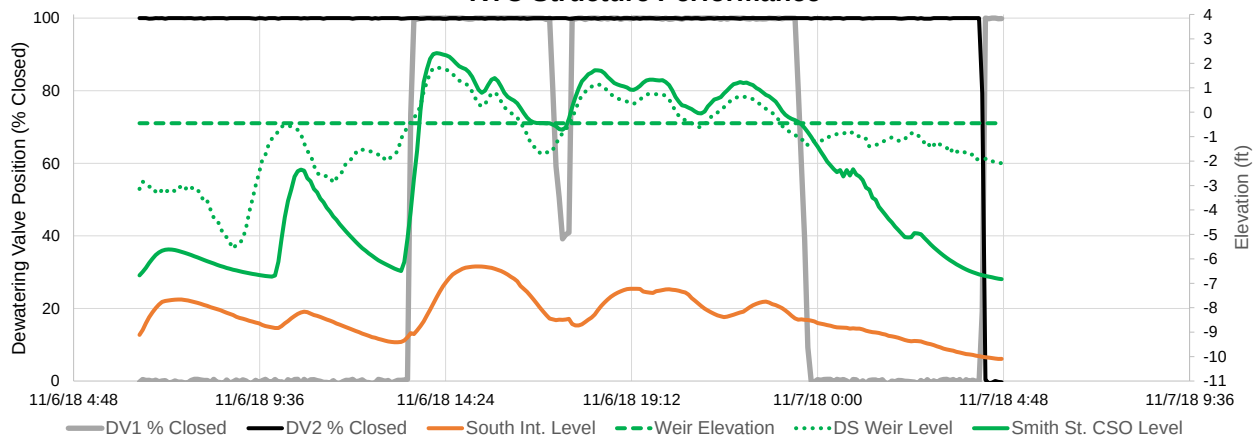
*Note: If seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

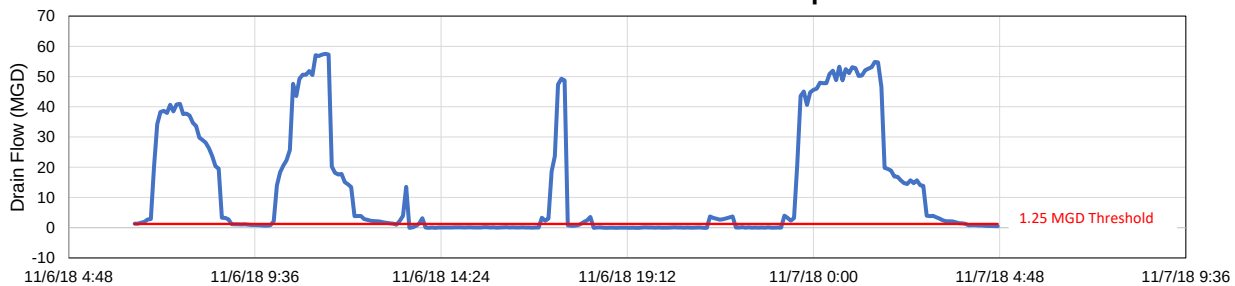
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

Actual rainfall around Smith RTC structure was likely more than the rainfall recorded at the airport, resulting in an extended event.

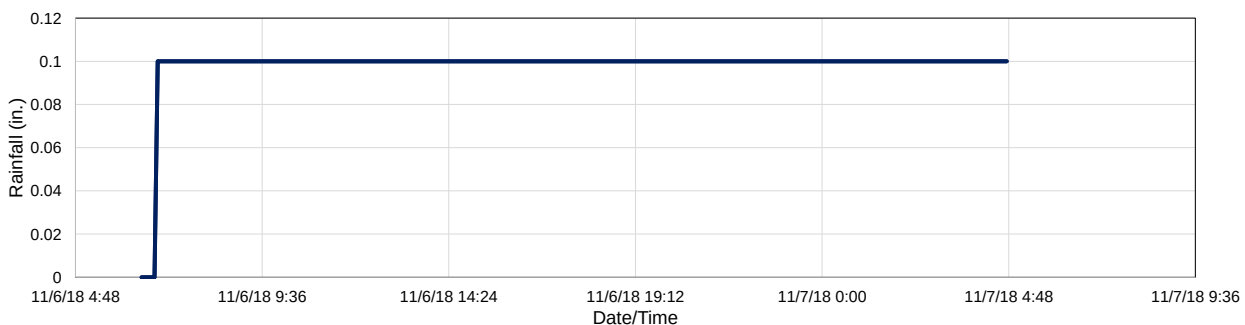
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	12/07/2018
Event Start Date/Time:	11/7/2018 7:40
Event End Date/Time:	11/7/2018 19:05

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Time Lead Dewatering Valve Closed	11/7/2018 13:50
Time Lead Dewatering Valve Opened	11/7/2018 16:05
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	0.73 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	7,199,447 Gal.
Did seiche occur during wet weather?	No

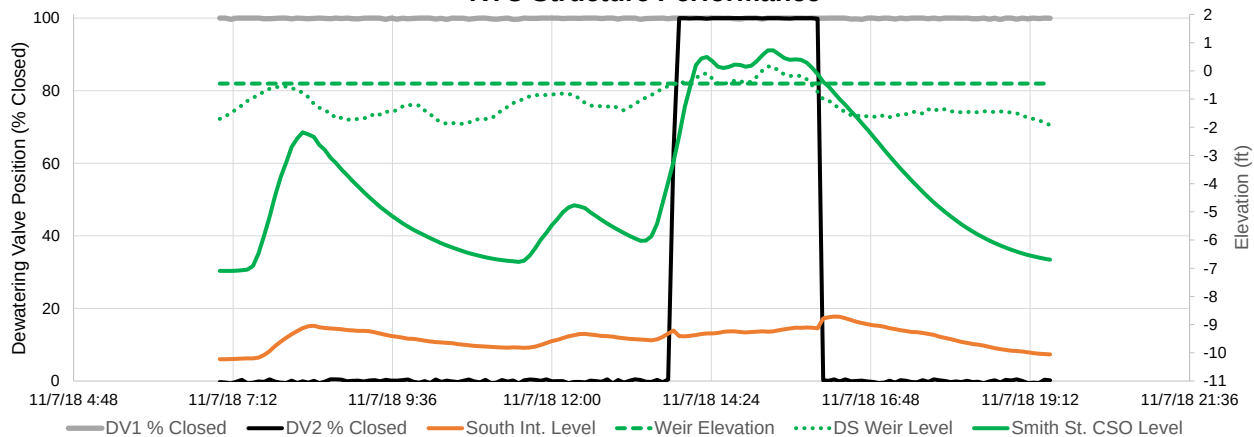
*Note: If seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

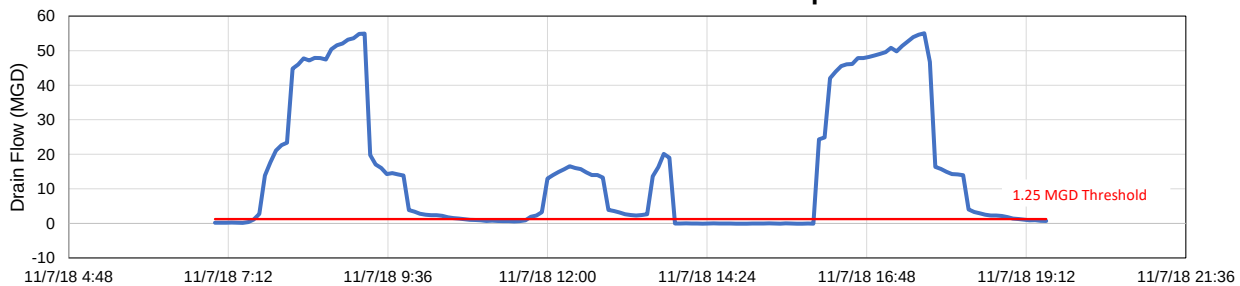
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

No rainfall recorded at the airport. The event was caused by a localized storm.

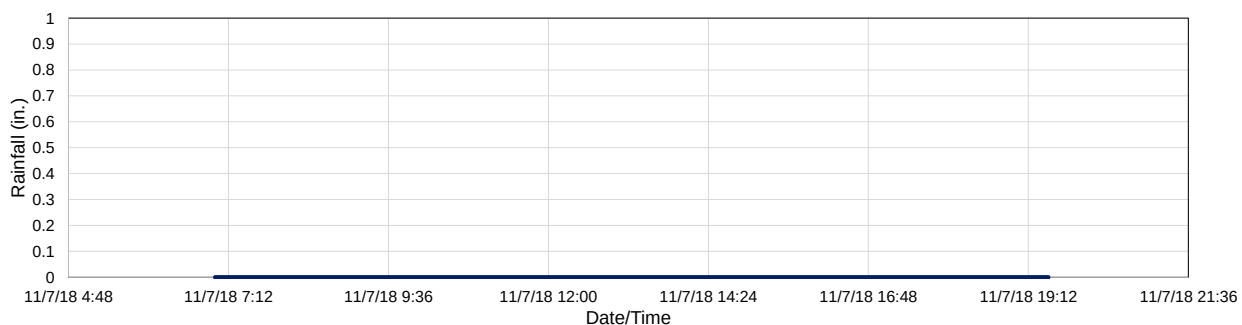
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	12/12/2018
Event Start Date/Time:	11/9/2018 20:55
Event End Date/Time:	11/10/2018 17:00

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.2 in.
Storm Event Duration:	1.5 hr.
Storm Type:	Less than one year

Time Lead Dewatering Valve Closed	11/9/2018 23:20
Time Lead Dewatering Valve Opened	11/10/2018 8:10
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	1.14 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	7,962,850 Gal.
Did seiche occur during wet weather?	Yes

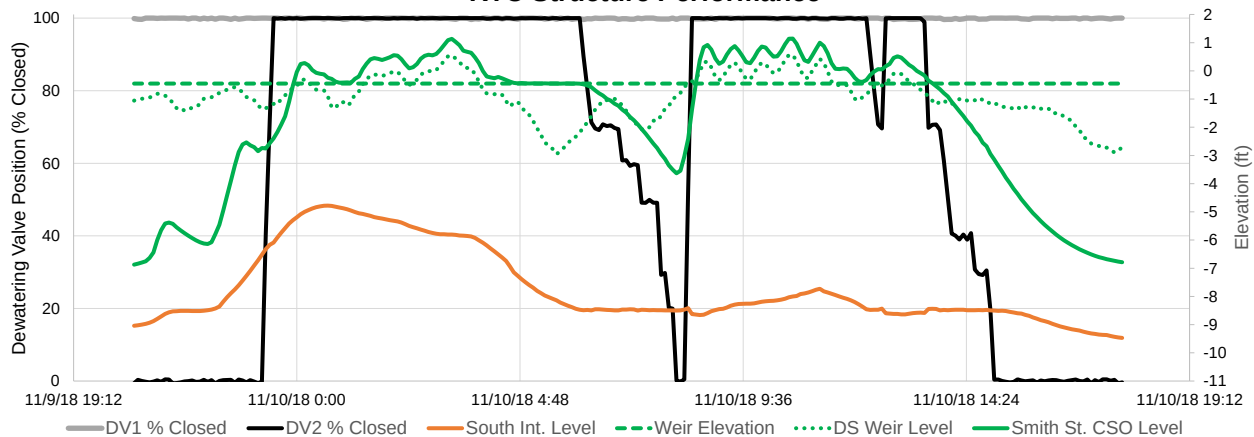
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

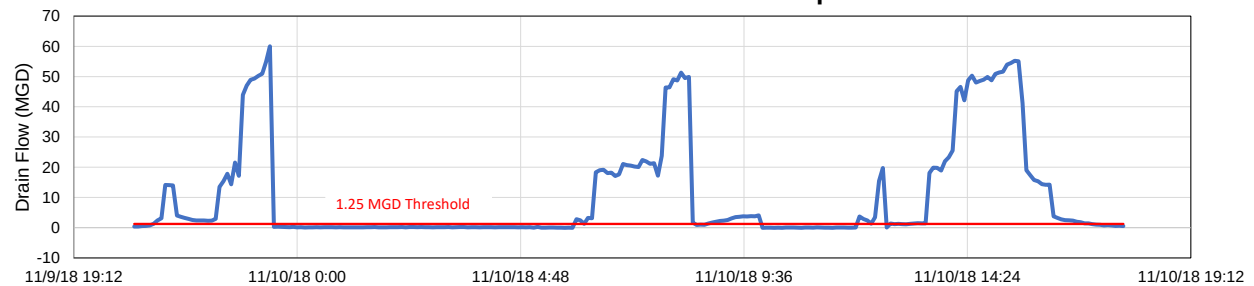
Actual rainfall around Smith RTC structure was likely more than the rainfall recorded at the airport, resulting in an extended event.

*Note: If seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

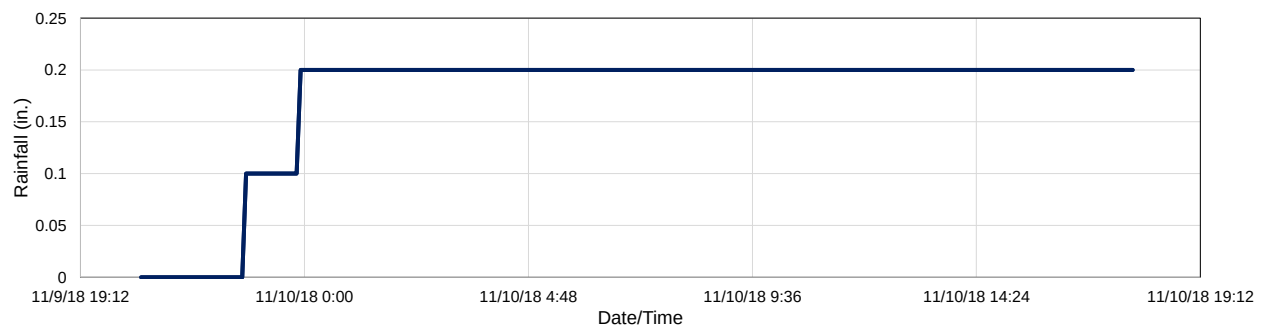
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	12/12/2018
Event Start Date/Time:	11/16/2018 7:25
Event End Date/Time:	11/17/2018 8:00

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.1 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

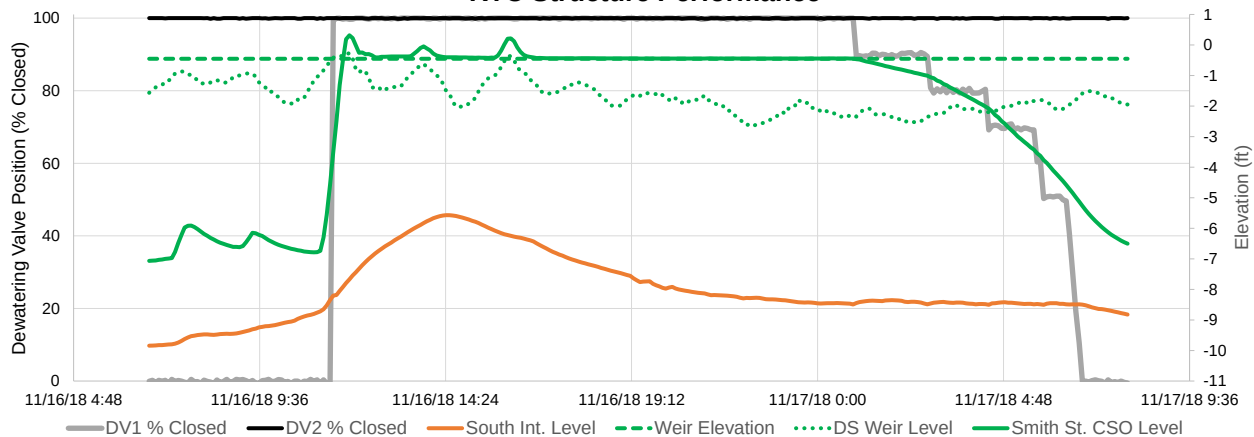
Time Lead Dewatering Valve Closed	11/16/2018 11:30
Time Lead Dewatering Valve Opened	11/17/2018 6:50
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	0.32 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	2,748,031 Gal.
Did seiche occur during wet weather?	Yes

Recommended Operational Changes/Notes:

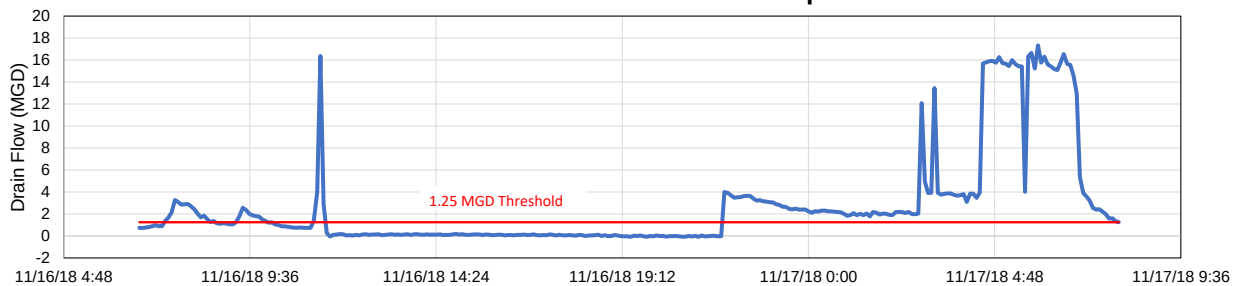
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

*Note: If seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

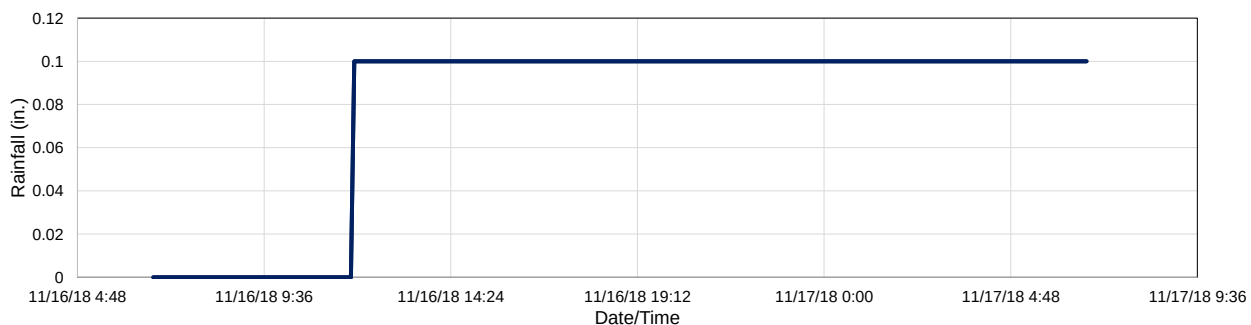
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	12/12/2018
Event Start Date/Time:	11/21/2018 3:40
Event End Date/Time:	11/21/2018 11:35

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Time Lead Dewatering Valve Closed	11/21/2018 4:05
Time Lead Dewatering Valve Opened	11/21/2018 6:55
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	0.94 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	6,132,776 Gal.
Did seiche occur during wet weather?	No

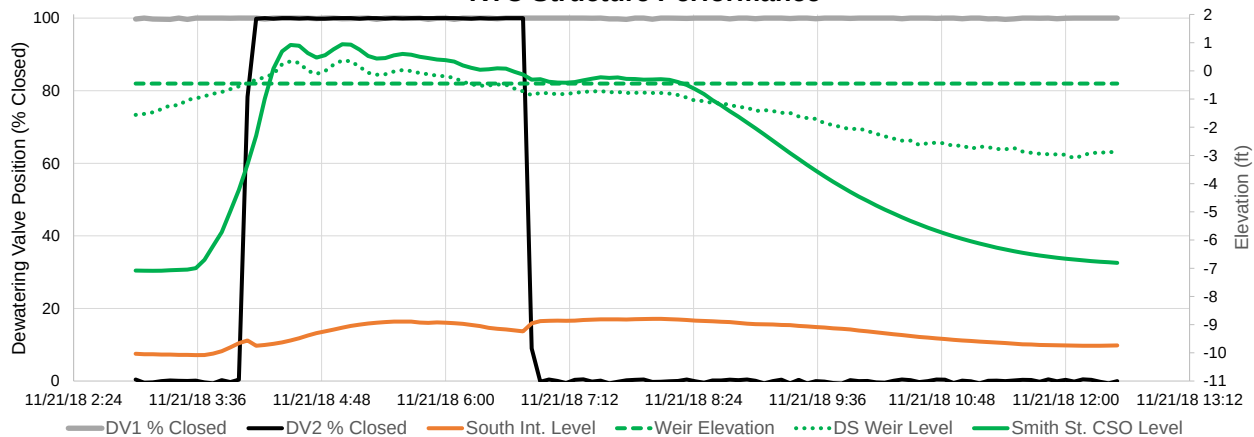
*Note: If seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

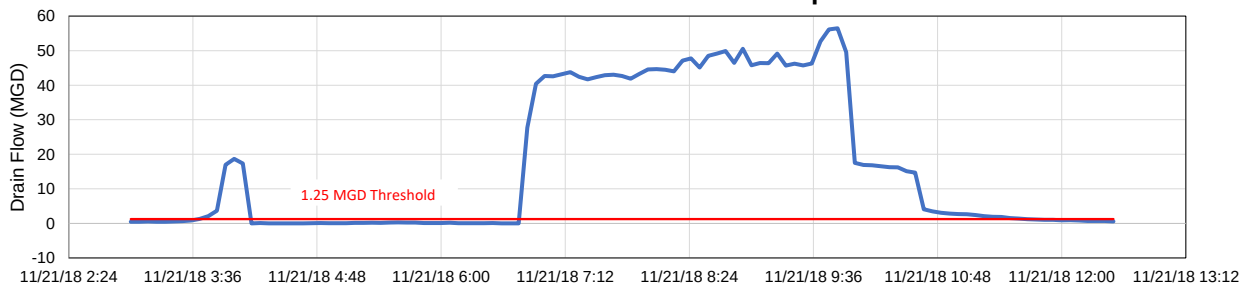
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

No rainfall recorded at the airport. The event was caused by a localized storm.

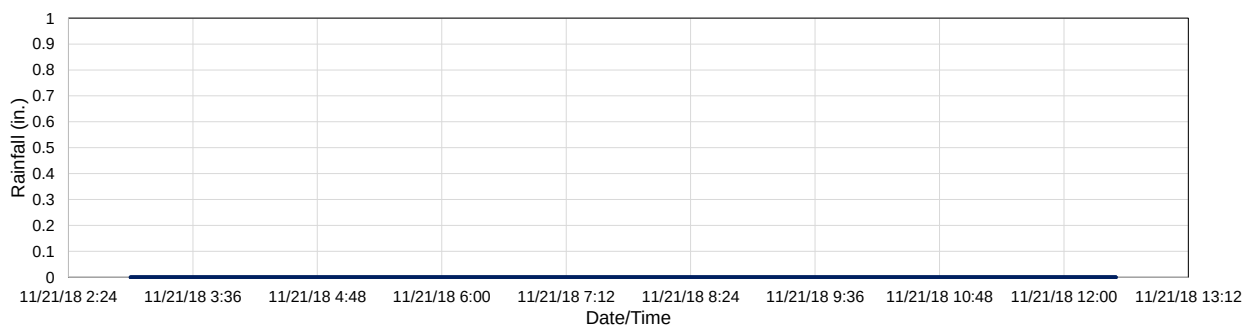
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	12/12/2018
Event Start Date/Time:	11/26/2018 9:35
Event End Date/Time:	11/26/2018 10:30

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.2 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

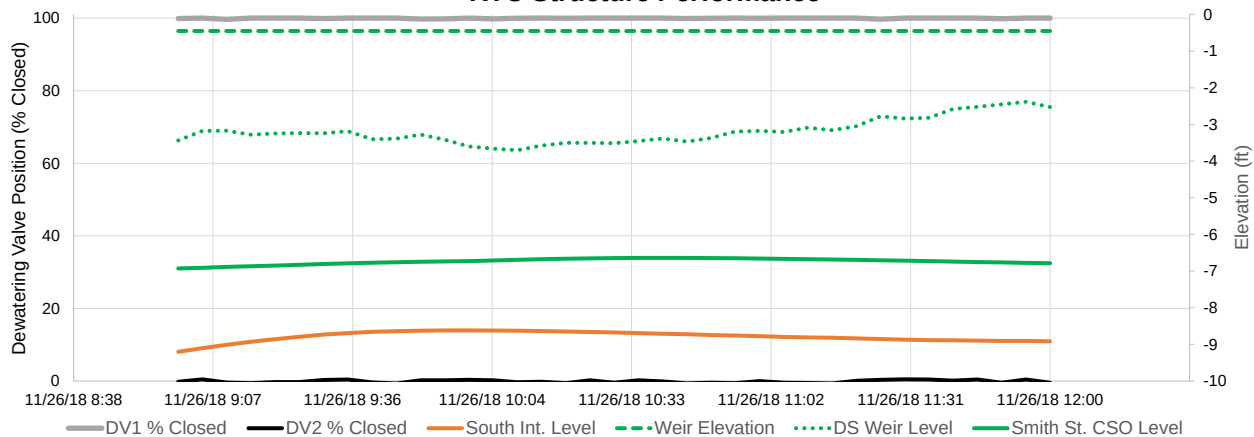
Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-6.64 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	49,941 Gal.
Did seiche occur during wet weather?	No

*Note: If seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

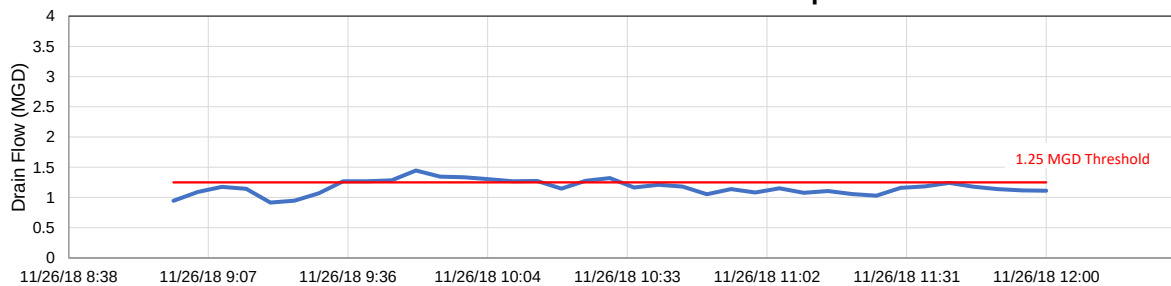
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

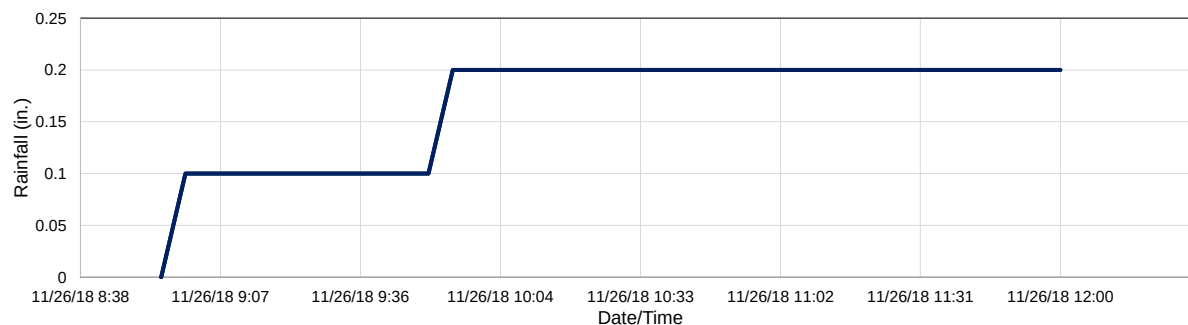
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	12/12/2018
Event Start Date/Time:	11/26/2018 15:40
Event End Date/Time:	11/26/2018 20:10

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Time Lead Dewatering Valve Closed	11/26/2018 16:00
Time Lead Dewatering Valve Opened	11/26/2018 16:35
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-0.13 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	4,679,258 Gal.
Did seiche occur during wet weather?	No

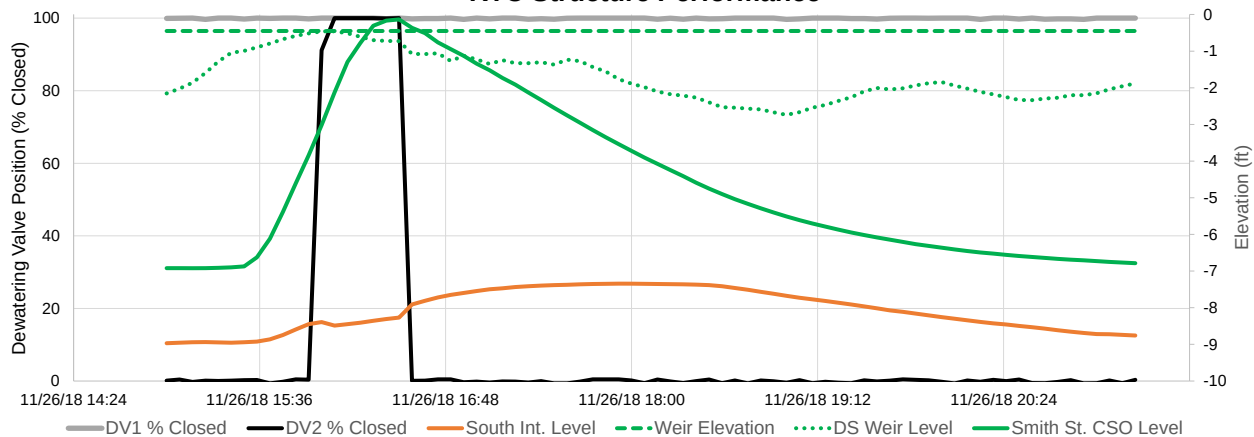
*Note: If seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

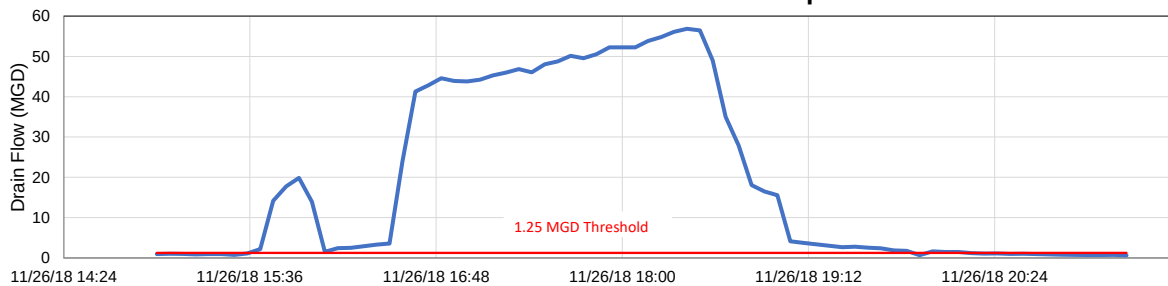
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

No rainfall recorded at the airport. The event was caused by a localized storm.

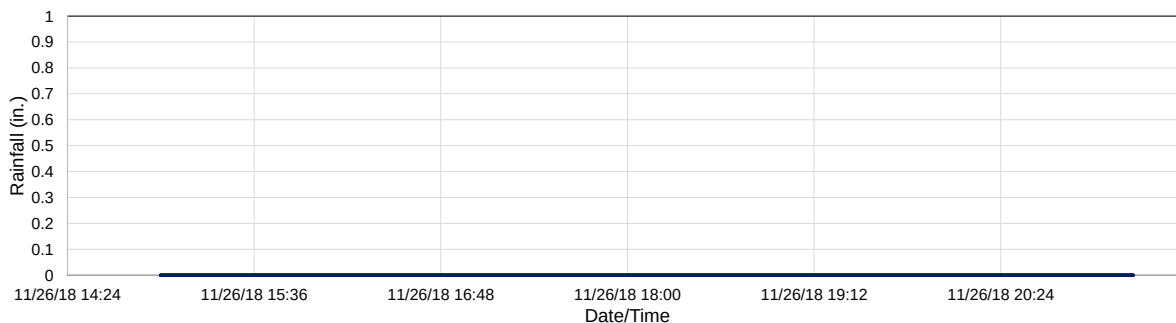
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	12/12/2018
Event Start Date/Time:	11/27/2018 4:00
Event End Date/Time:	11/27/2018 5:55

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-5.01 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	582,805 Gal.
Did seiche occur during wet weather?	No

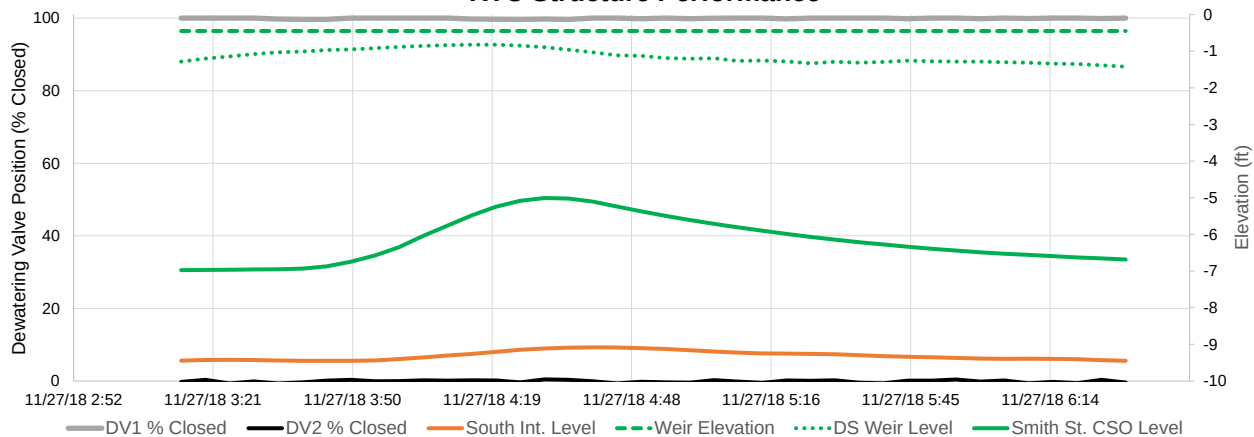
*Note: If seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

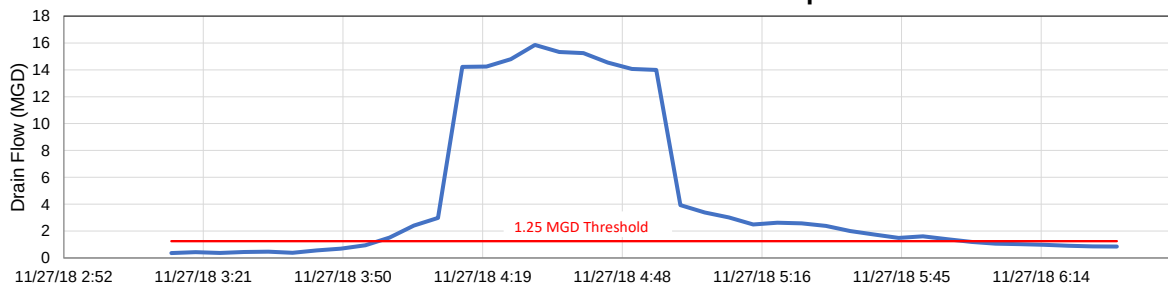
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

No rainfall recorded at the airport. The event was caused by a localized storm.

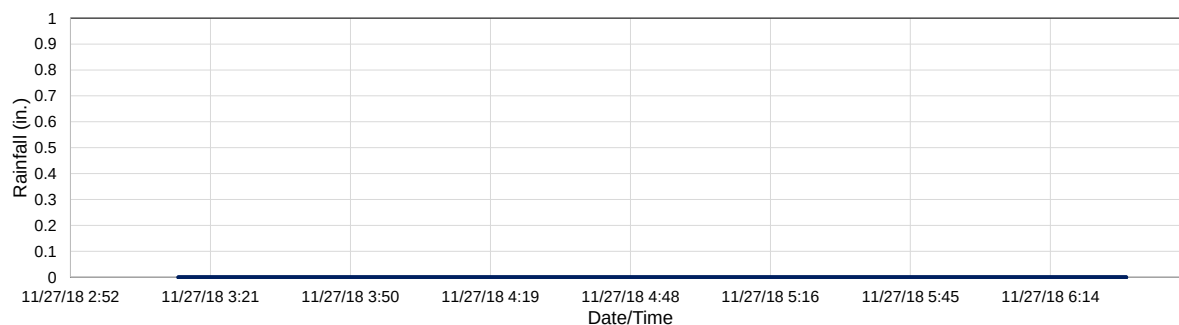
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



December 2018 Smith St. RTC KPI Report

B U F F A L O
SEWER AUTHORITY



ARCADIS

Design & Consultancy
for natural and
built assets

Smith St. RTC Monthly Performance Report

December 2018

Event Date	Volume Captured (gal)	Did a seiche occur during wet weather? (Note: if a seiche occurs during wet weather, volume captured will be slightly overestimated due to the inclusion of the seiche)	
			Event drain flow threshold (MGD)
12/1/2018	88,255	No	1.25
12/2/2018	8,327,930	No	1.25
12/6/2018	5,522,666	No	1.25
12/6/2018	601,085	No	1.25
12/20/2018	2,366,149	No	1.25
12/28/2018	3,799,650	No	1.25
12/31/2018	2,308,972	No	1.25
Total Volume Captured (gal)	23,014,707		

Site:	Smith RTC
Analysis Date:	12/27/2018
Event Start Date/Time:	12/1/2018 21:35
Event End Date/Time:	12/1/2018 22:30

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.1 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

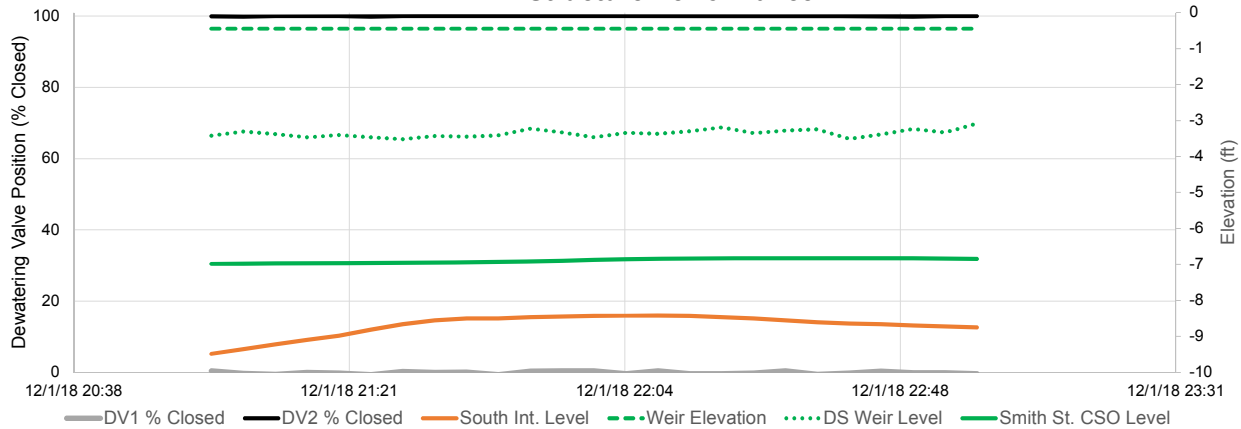
Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-6.82 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	88,255 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

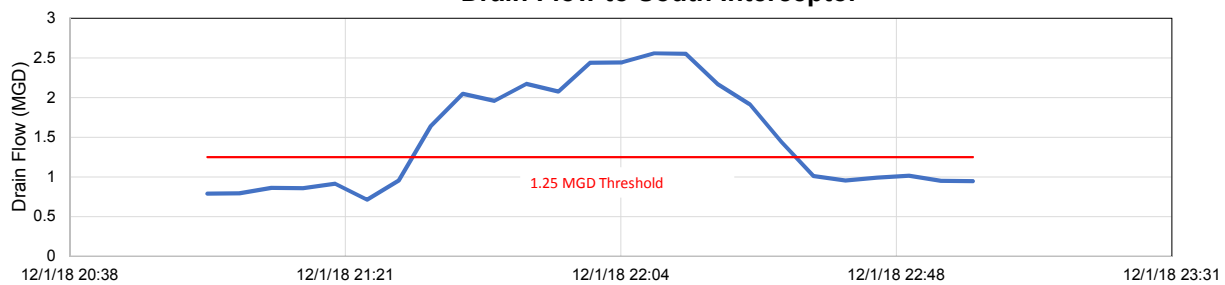
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

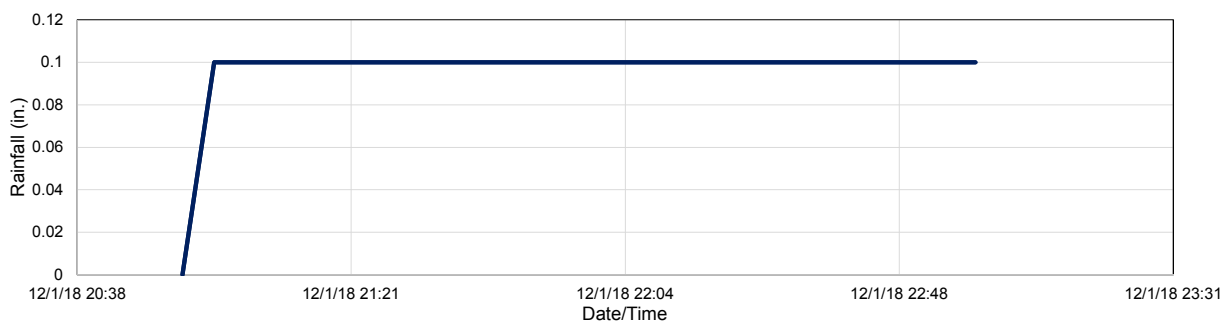
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	12/27/2018
Event Start Date/Time:	12/2/2018 21:50
Event End Date/Time:	12/3/2018 9:25

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.3 in.
Storm Event Duration:	2 hr.
Storm Type:	Less than one year

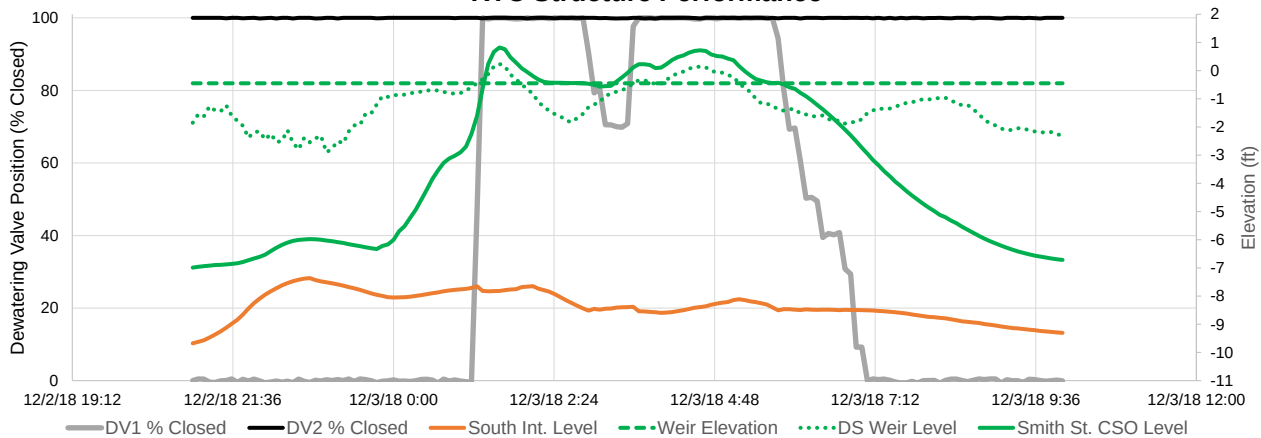
Time Lead Dewatering Valve Closed	12/3/2018 1:15
Time Lead Dewatering Valve Opened	12/3/2018 7:05
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	0.82 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	8,327,930 Gal.
Did seiche occur during wet weather?	No

*Note: If seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

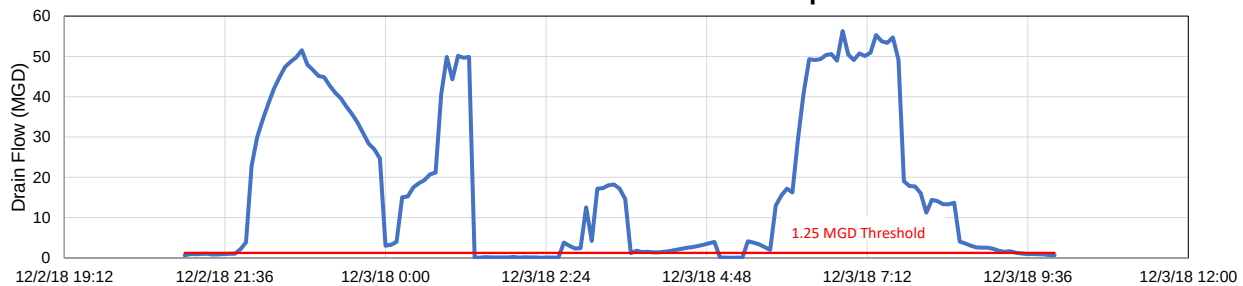
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

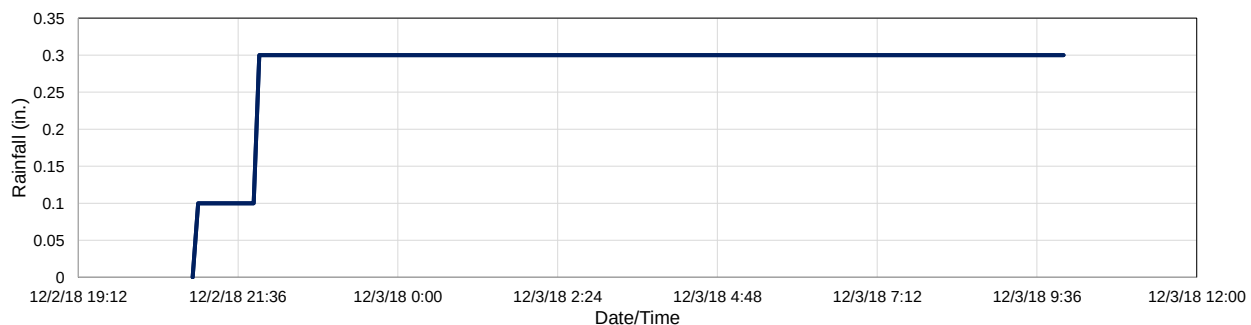
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	12/27/2018
Event Start Date/Time:	12/6/2018 0:15
Event End Date/Time:	12/6/2018 7:40

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.1 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

Time Lead Dewatering Valve Closed	12/6/2018 1:15
Time Lead Dewatering Valve Opened	12/6/2018 1:55
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-0.01 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	5,522,666 Gal.
Did seiche occur during wet weather?	No

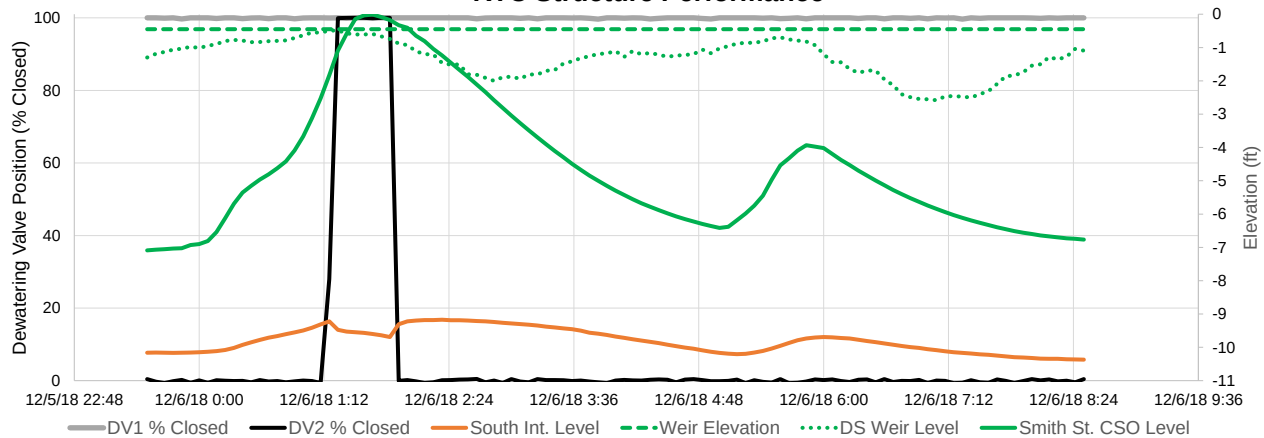
*Note: If seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

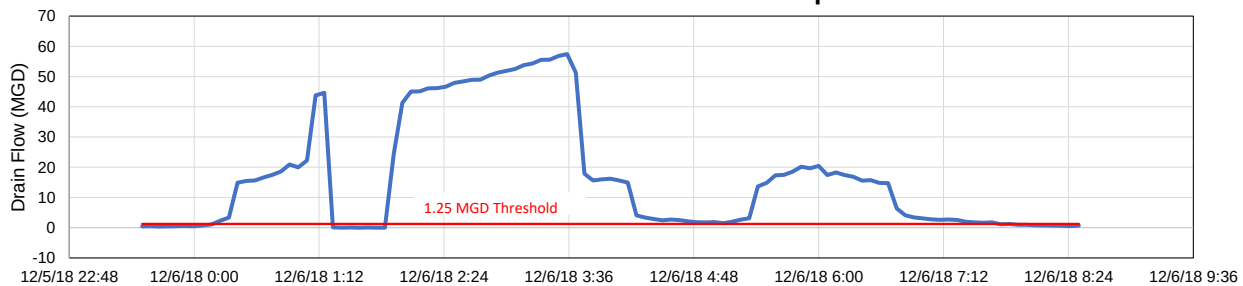
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

This event was caused due to a combination of localized snowmelt and rainfall.

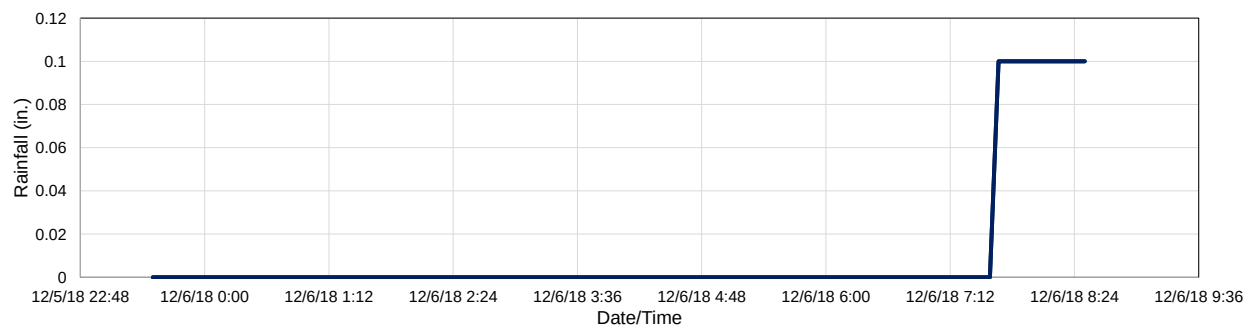
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	12/27/2018
Event Start Date/Time:	12/6/2018 15:50
Event End Date/Time:	12/6/2018 17:45

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.1 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-4.94 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	601,085 Gal.
Did seiche occur during wet weather?	No

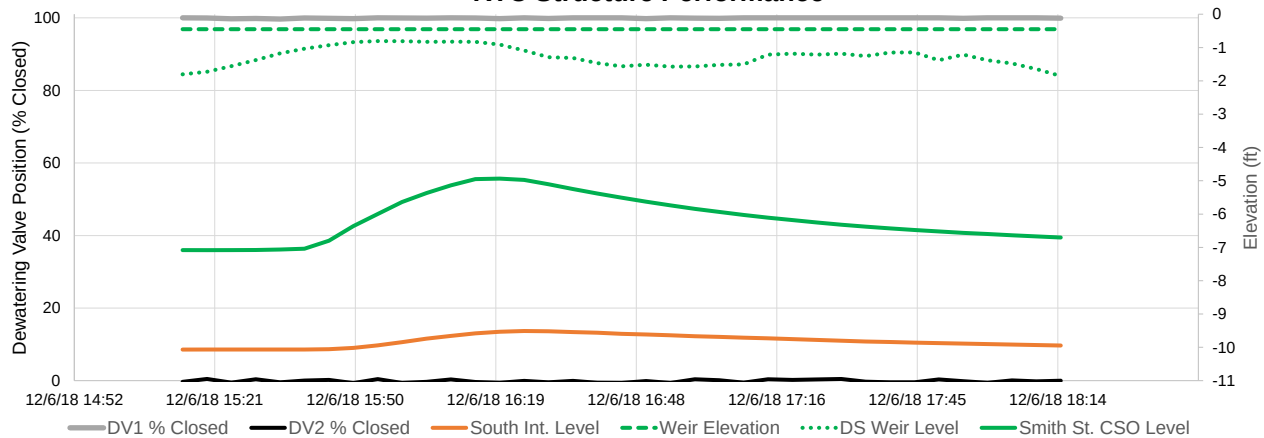
*Note: If seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

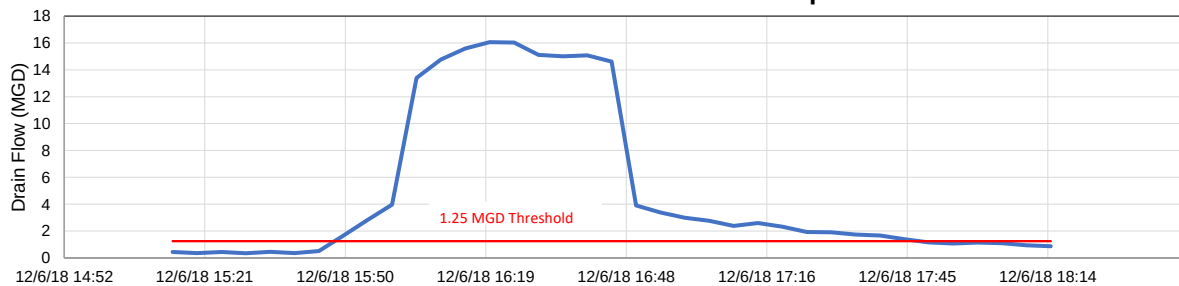
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

This event was caused due to a combination of localized snowmelt and rainfall.

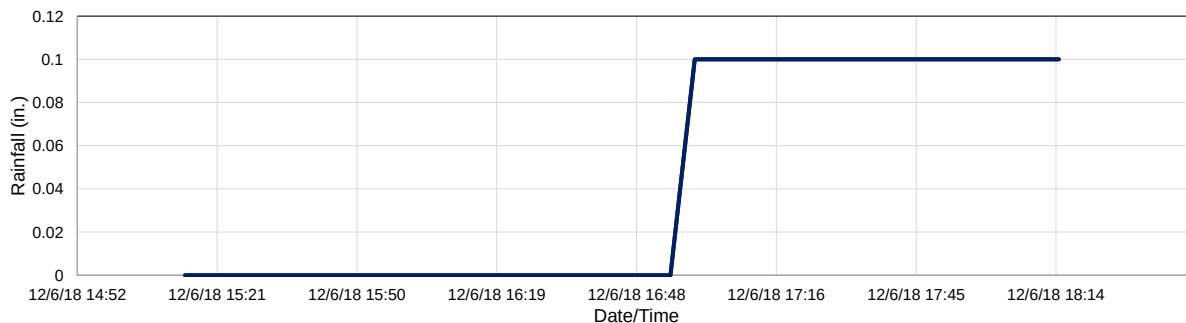
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	12/27/2018
Event Start Date/Time:	12/20/2018 22:40
Event End Date/Time:	12/21/2018 12:30

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.7 in.
Storm Event Duration:	3 hr.
Storm Type:	Less than one year

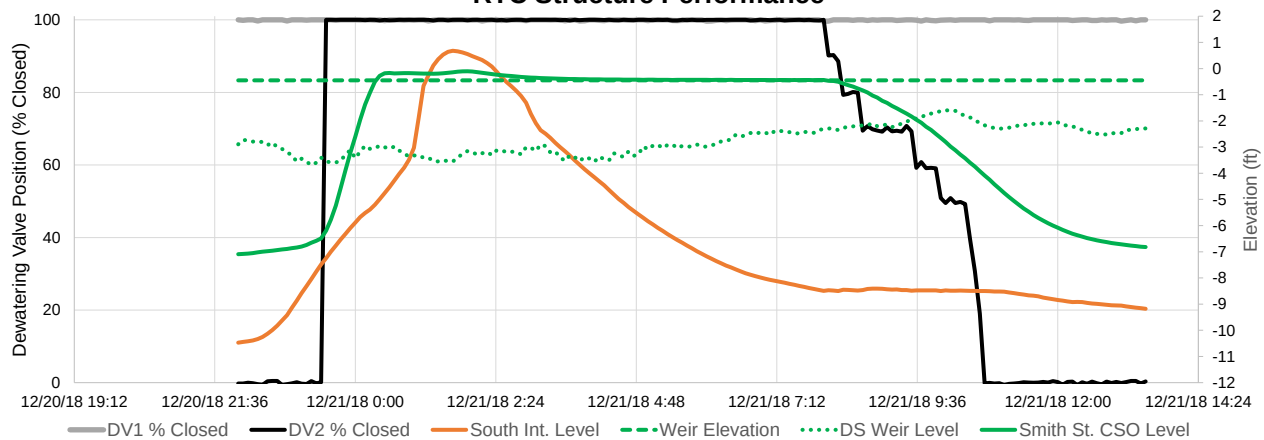
Time Lead Dewatering Valve Closed	12/20/2018 23:30
Time Lead Dewatering Valve Opened	12/21/2018 10:45
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-0.10 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	2,366,149 Gal.
Did seiche occur during wet weather?	No

*Note: If seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

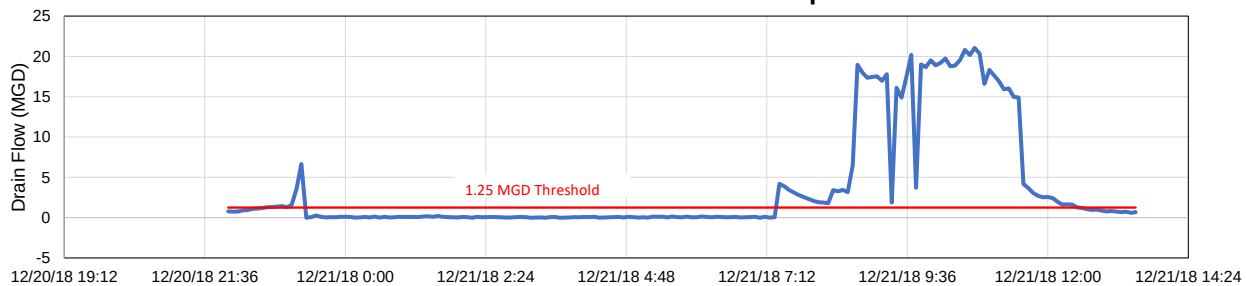
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

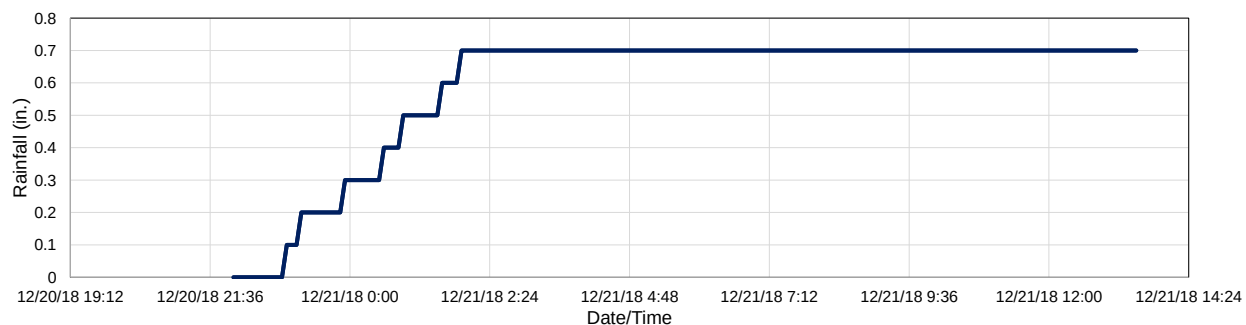
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	1/14/2019
Event Start Date/Time:	12/28/2018 21:25
Event End Date/Time:	12/29/2018 5:05

Analyst Name, Organization:	Angela Hintz, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

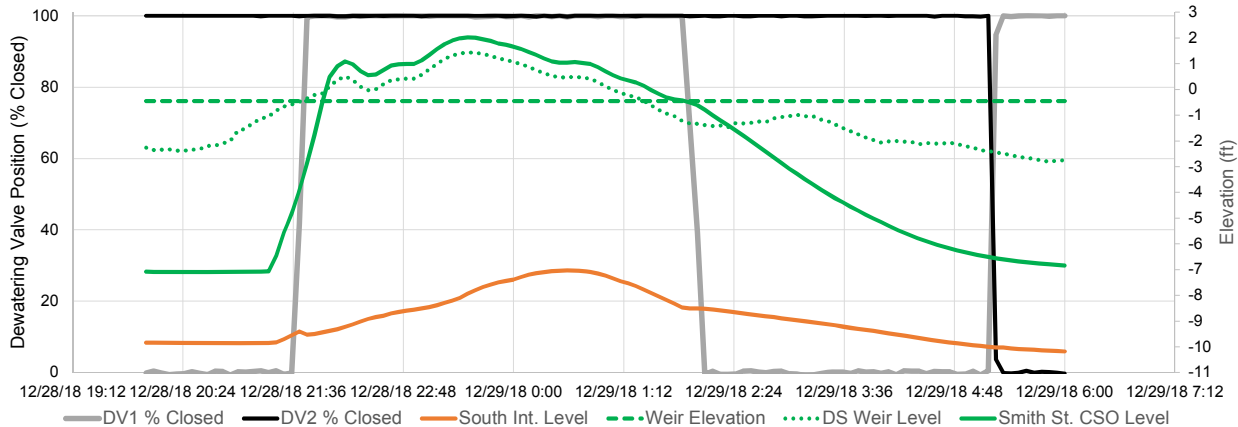
Time Lead Dewatering Valve Closed	12/28/2018 21:40
Time Lead Dewatering Valve Opened	12/29/2018 2:05
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	2.02 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	3,799,650 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

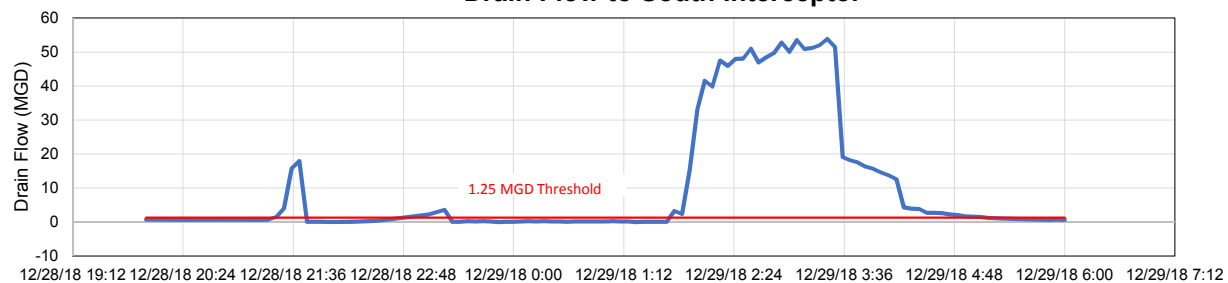
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. No recordable precipitation, although temps were above freezing from midnight to approximately 8:00 am on 12/29/2018, resulting in snowmelt.

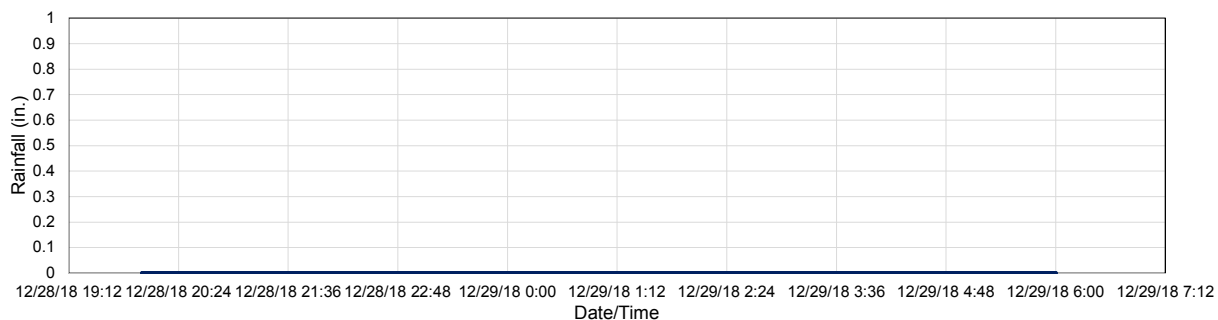
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	1/14/2019
Event Start Date/Time:	12/31/2018 17:30
Event End Date/Time:	1/1/2019 7:30

Analyst Name, Organization:	Angela Hintz, Arcadis
Total Rainfall Accumulation:	0.7 in.
Storm Event Duration:	7.5 hrs
Storm Type:	Less than one year

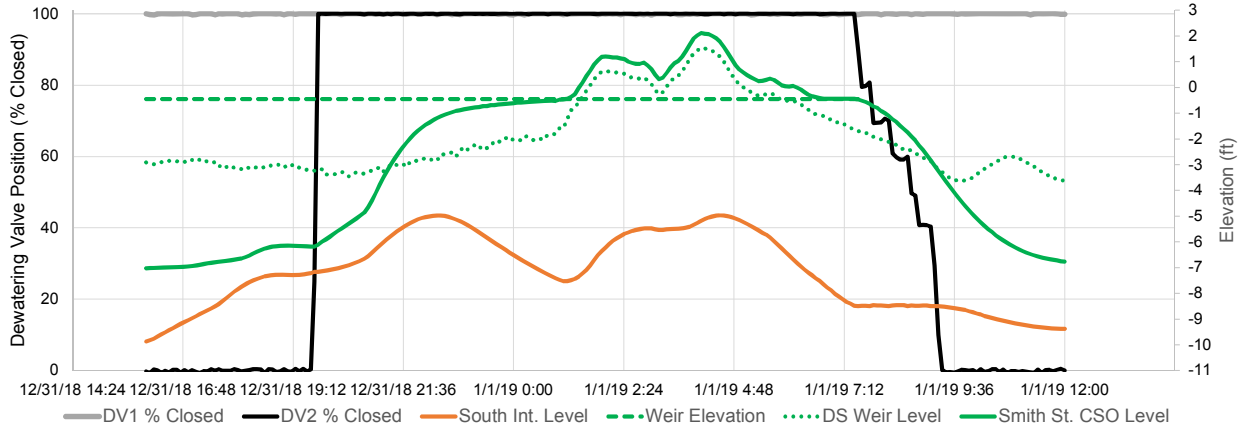
Time Lead Dewatering Valve Closed	12/31/2018 19:40
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	2.12 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	2,308,972 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

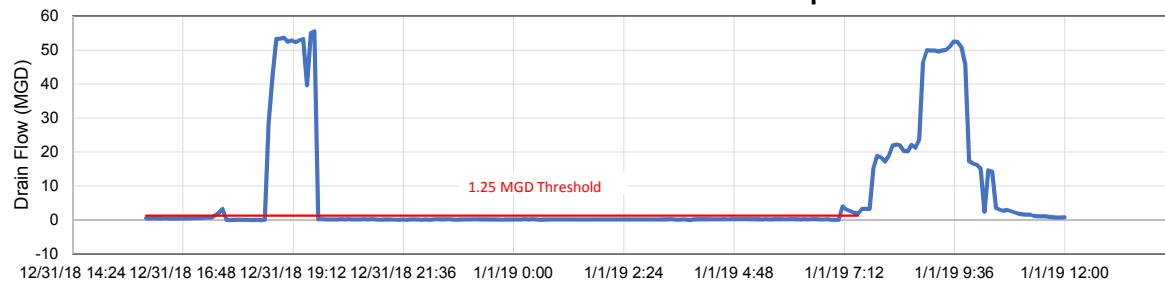
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

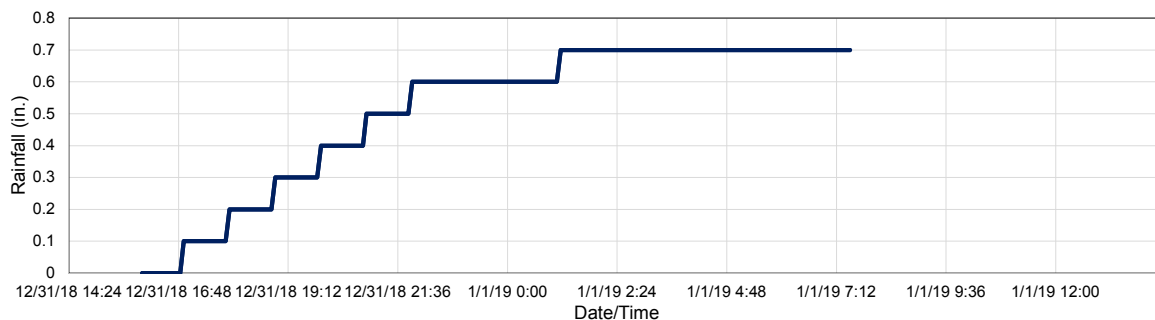
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



January 2019 Smith St. RTC KPI Report

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Smith St. RTC Monthly Performance Report

January 2019

Event Date	Volume Captured (gal)	Did a seiche occur during wet weather? (Note: if a seiche occurs during wet weather, volume captured will be slightly overestimated due to the inclusion of the seiche)	
			Event drain flow threshold (MGD)
1/3/2019	4,135,974	No	1.25
1/8/2019	7,511,537	Yes	1.25
1/16/2019	6,999,059	No	1.25
1/23/2019	87,560	No	1.25
1/25/2019	4,723,882	No	1.25
1/27/2019	6,552,624	No	1.25
1/29/2019	22,342,450	Yes	1.25
Total Volume Captured (gal)	52,353,086		

Site:	Smith RTC
Analysis Date:	02/12/2019
Event Start Date/Time:	1/3/2019 1:45
Event End Date/Time:	1/3/2019 6:30

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Time Lead Dewatering Valve Closed	1/3/2019 1:55
Time Lead Dewatering Valve Opened	1/3/2019 3:10
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	0.97 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	4,135,974 Gal.
Did seiche occur during wet weather?	No

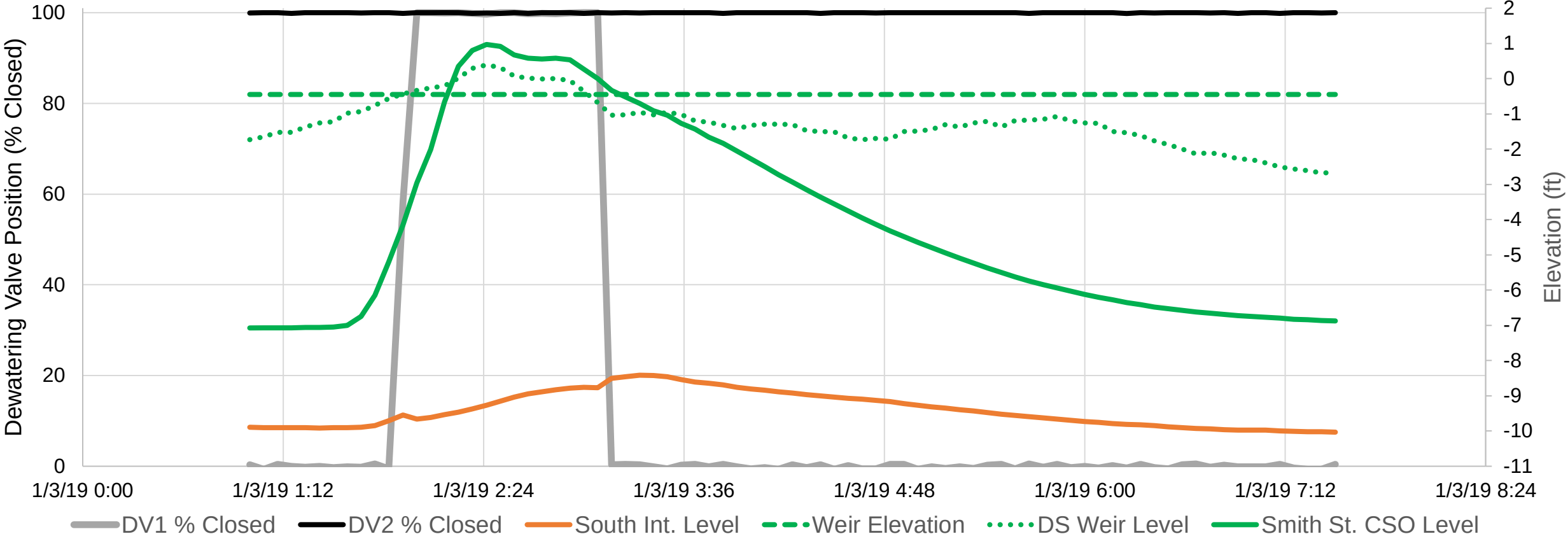
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

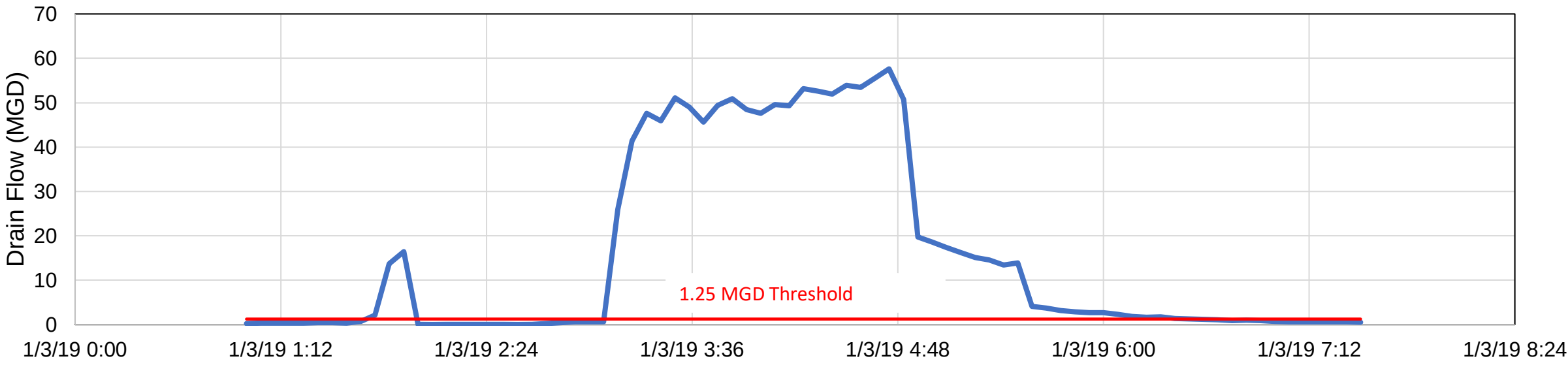
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

No rainfall was recorded during or before the event. High temperatures, high 30s (°F), were recorded which caused snowmelt resulting in the event.

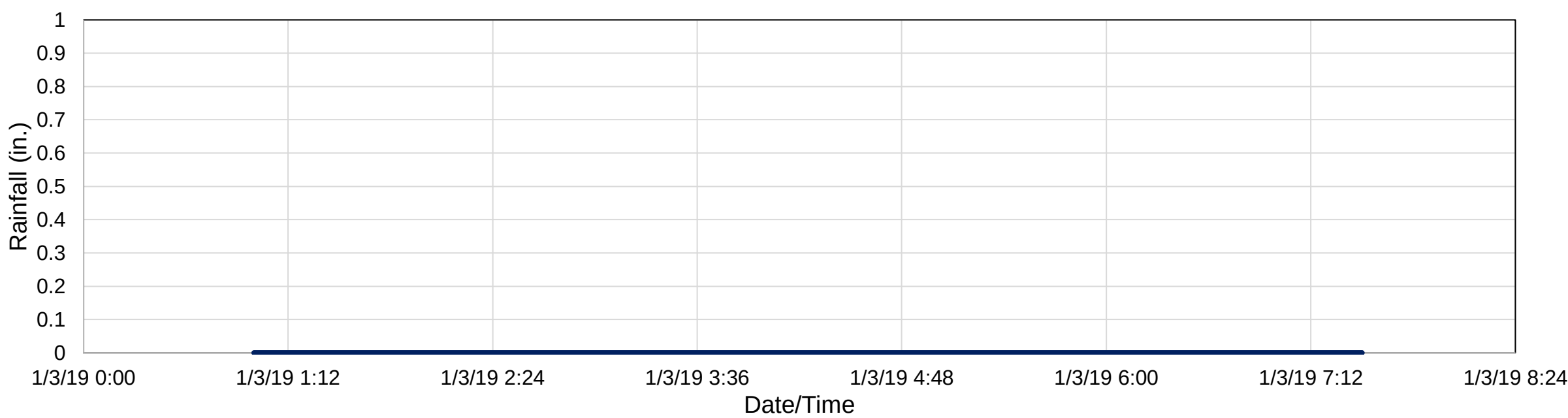
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	02/12/2019
Event Start Date/Time:	1/8/2019 13:05
Event End Date/Time:	1/9/2019 8:40

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.1 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

Time Lead Dewatering Valve Closed	1/8/2019 14:25
Time Lead Dewatering Valve Opened	1/9/2019 6:30
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	1.39 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	7,511,537 Gal.
Did seiche occur during wet weather?	Yes

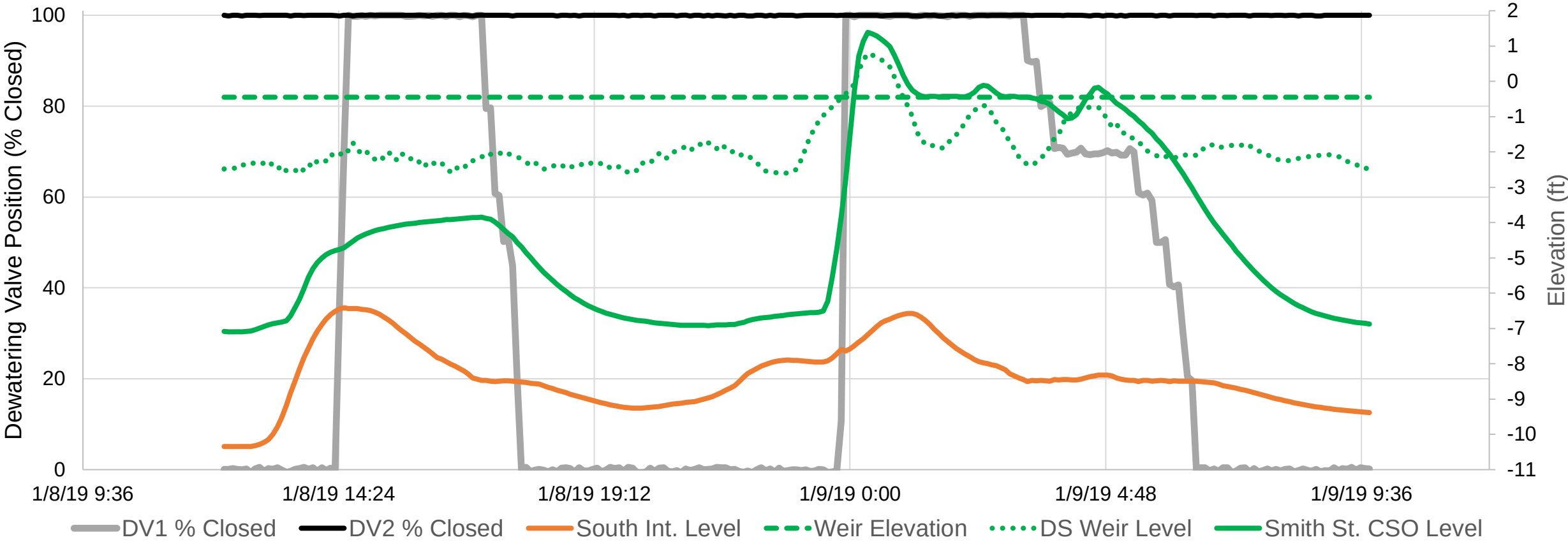
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

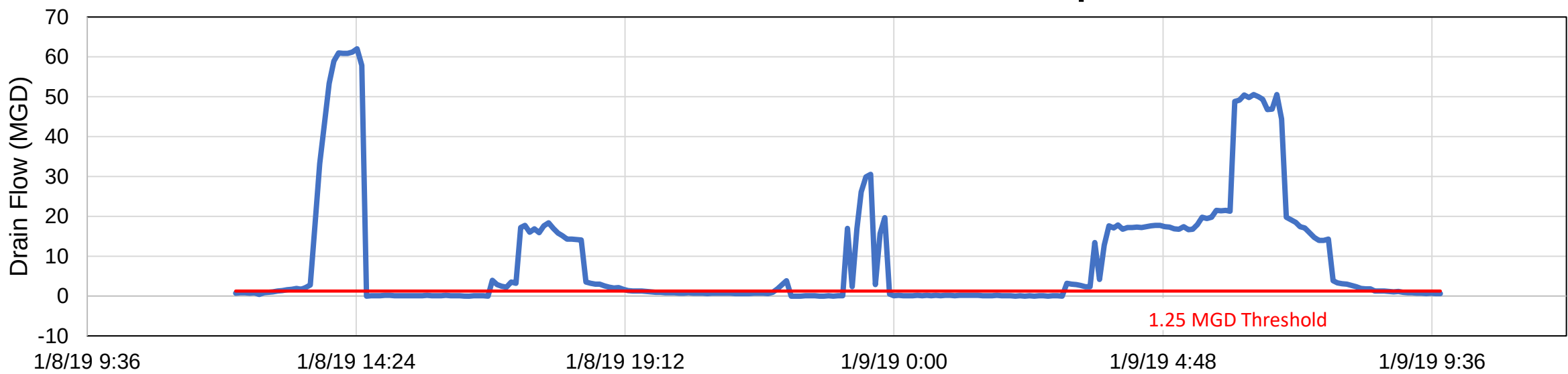
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

Temperature reached up to high 40s (°F), and the event was caused by both rainfall and snowmelt.

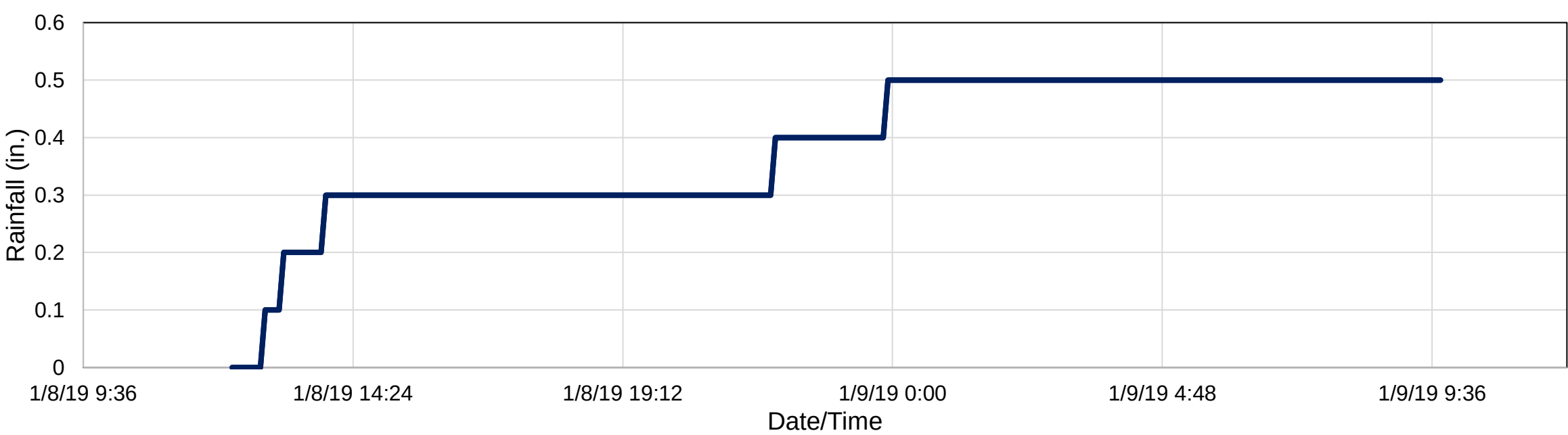
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



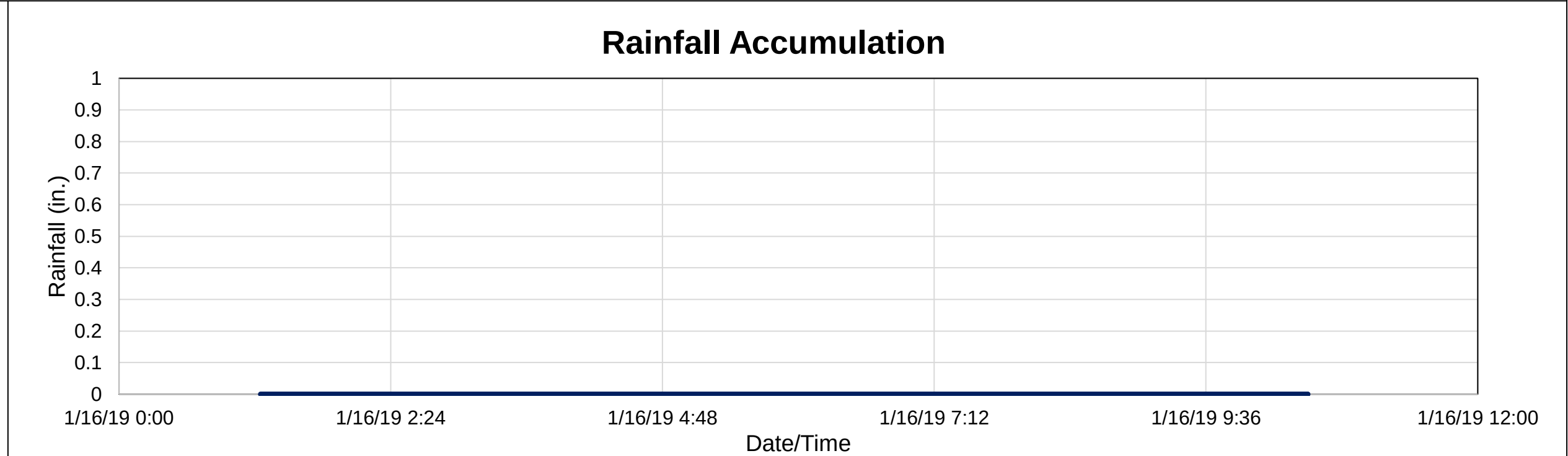
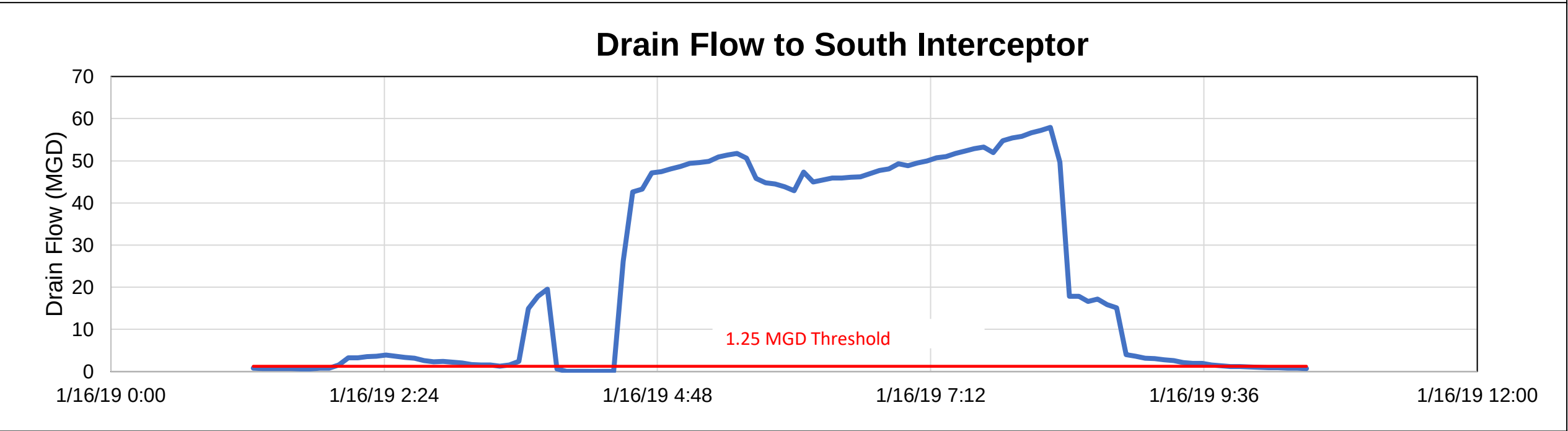
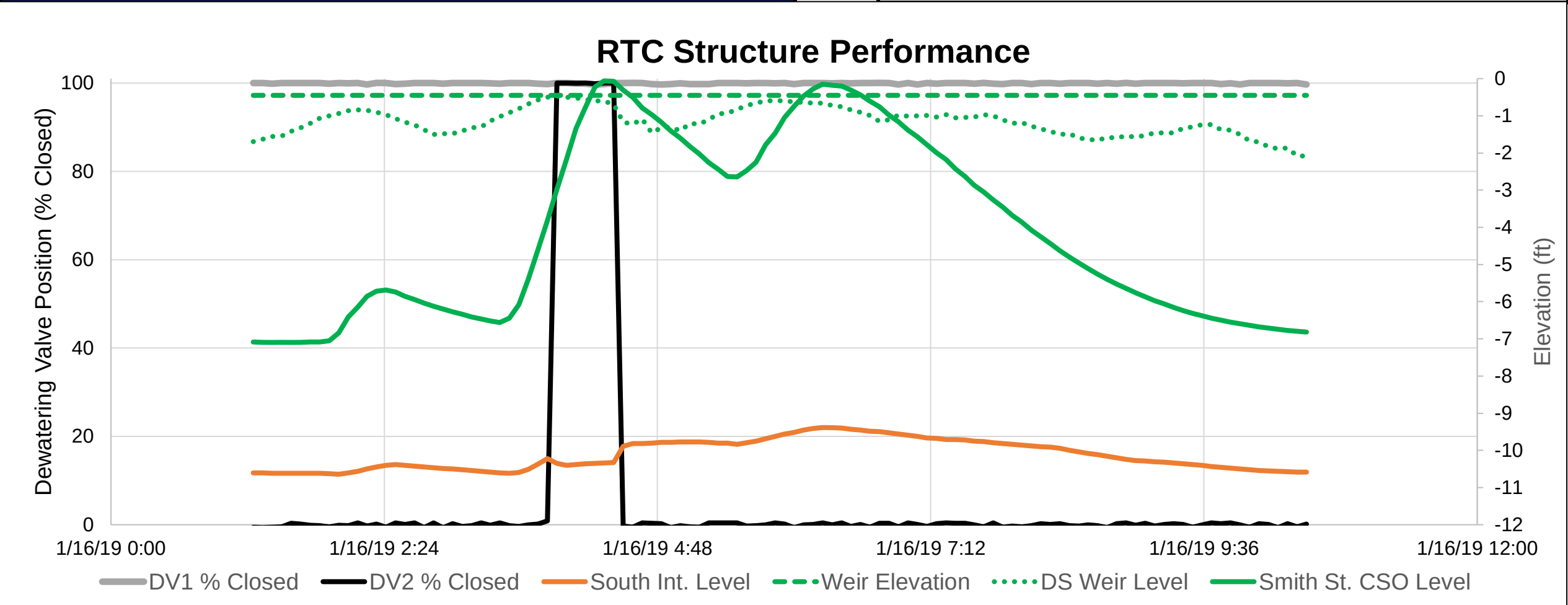
Site:	Smith RTC
Analysis Date:	02/12/2019
Event Start Date/Time:	1/16/2019 2:00
Event End Date/Time:	1/16/2019 9:45

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Time Lead Dewatering Valve Closed	1/16/2019 3:55
Time Lead Dewatering Valve Opened	1/16/2019 4:30
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-0.06 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	6,999,059 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.
No rainfall recorded at the airport. The event was likely caused due to localized rainfall.



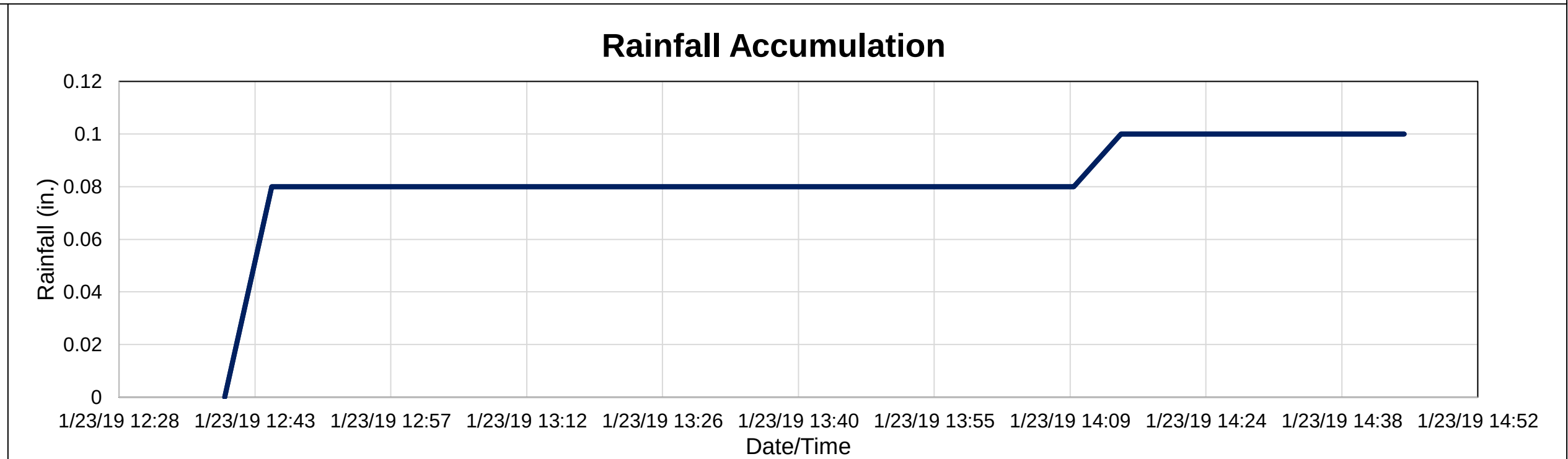
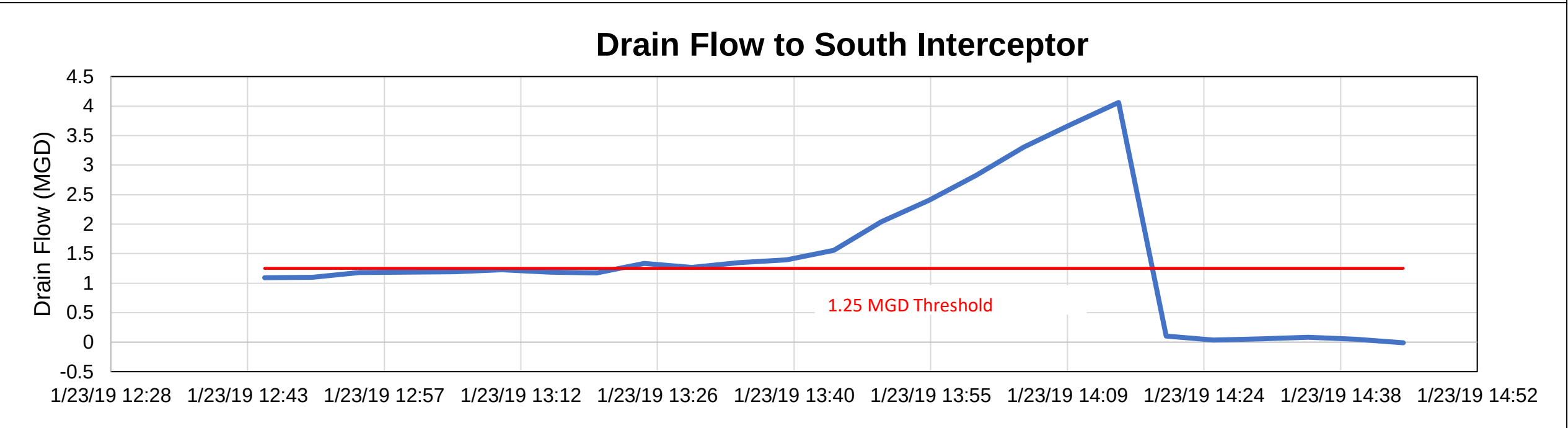
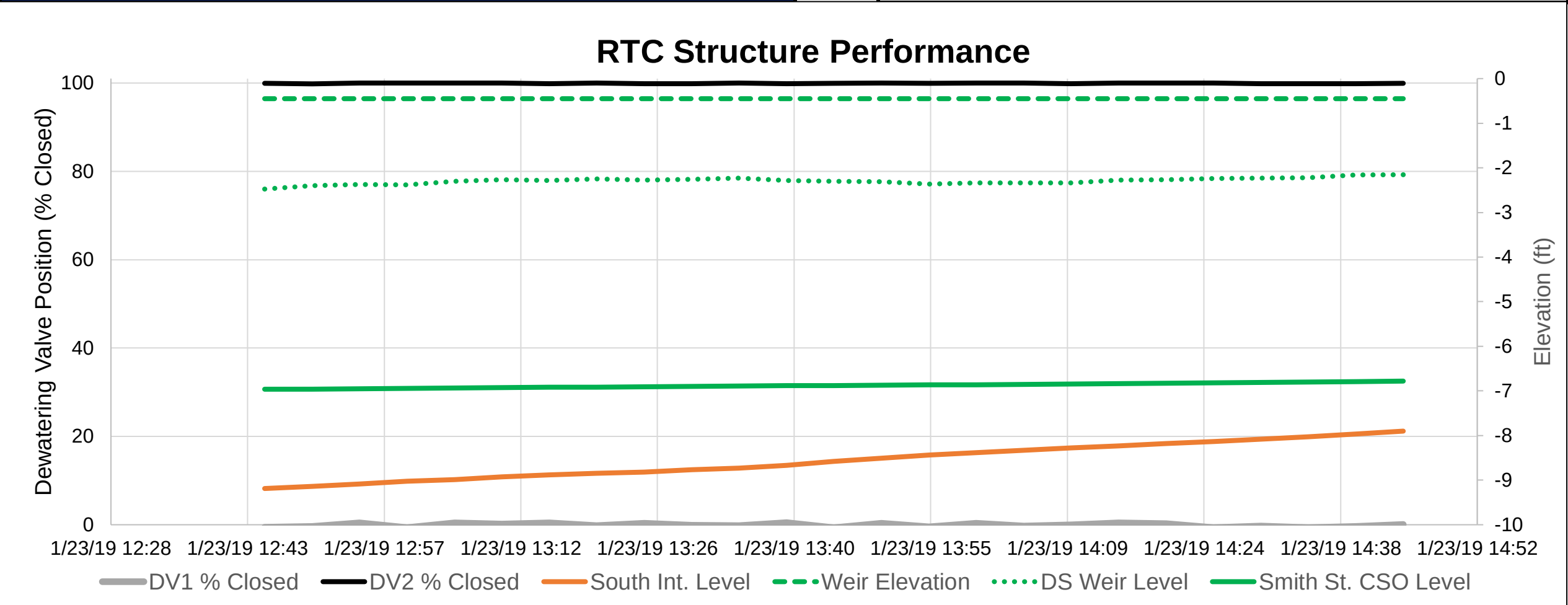
Site:	Smith RTC
Analysis Date:	02/12/2019
Event Start Date/Time:	1/23/2019 13:25
Event End Date/Time:	1/23/2019 14:15

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.1 in.
Storm Event Duration:	2 hr.
Storm Type:	Less than one year

Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-6.78 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	87,560 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:
Rainfall data sourced from South Buffalo rain gauge, as provided by BSA.



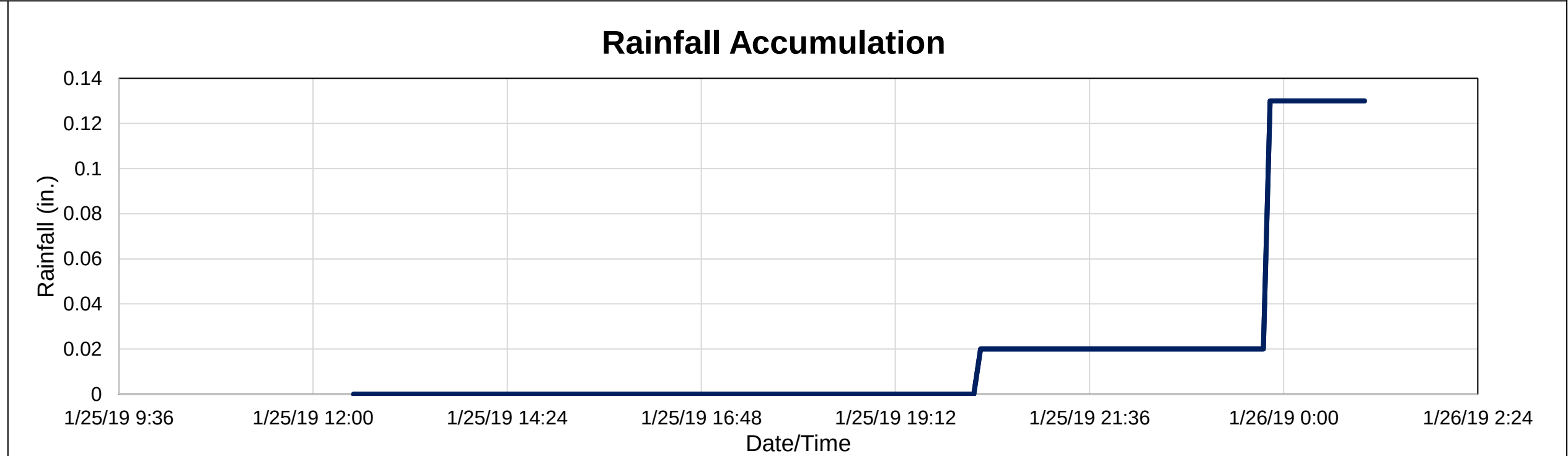
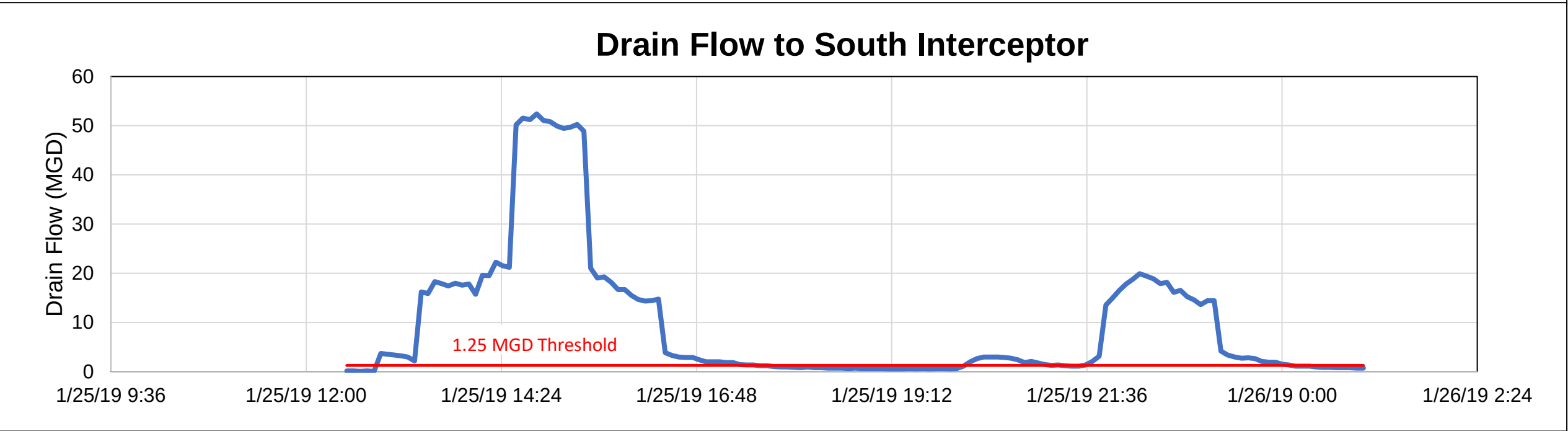
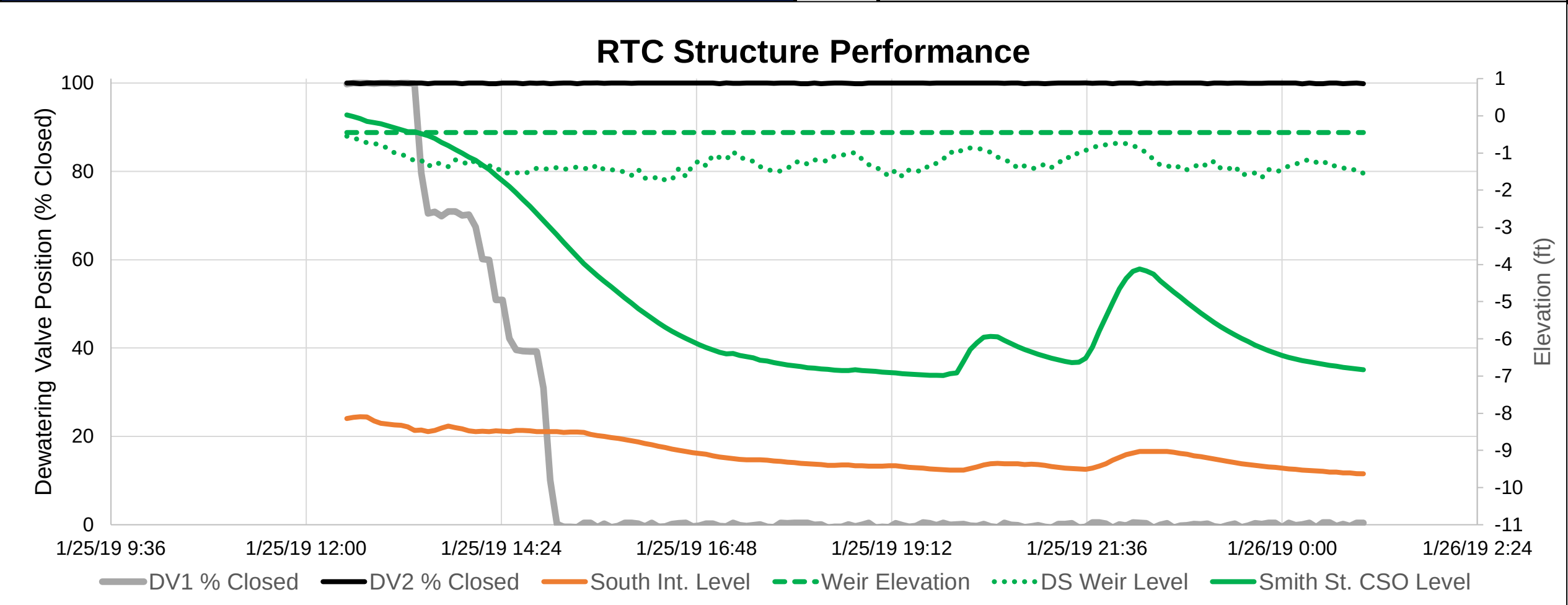
Site:	Smith RTC
Analysis Date:	02/12/2019
Event Start Date/Time:	1/25/2019 12:55
Event End Date/Time:	1/26/2019 0:05

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.13 in.
Storm Event Duration:	3.5 hr.
Storm Type:	Less than one year

Time Lead Dewatering Valve Closed	1/25/2019 12:30
Time Lead Dewatering Valve Opened	1/25/2019 15:05
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	0.02 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	4,723,882 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:
Rainfall data sourced from South Buffalo rain gauge, as provided by BSA. Rainfall on the previous day, and early morning on January 25 also contributed to this event.



Site:	Smith RTC
Analysis Date:	02/12/2019
Event Start Date/Time:	1/27/2019 6:25
Event End Date/Time:	1/27/2019 12:50

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.08 in.*
Storm Event Duration:	1.5 hr.
Storm Type:	Less than one year

Time Lead Dewatering Valve Closed	1/27/2019 6:35
Time Lead Dewatering Valve Opened	1/27/2019 7:55
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	2.75 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	6,552,624 Gal.
Did seiche occur during wet weather?	No

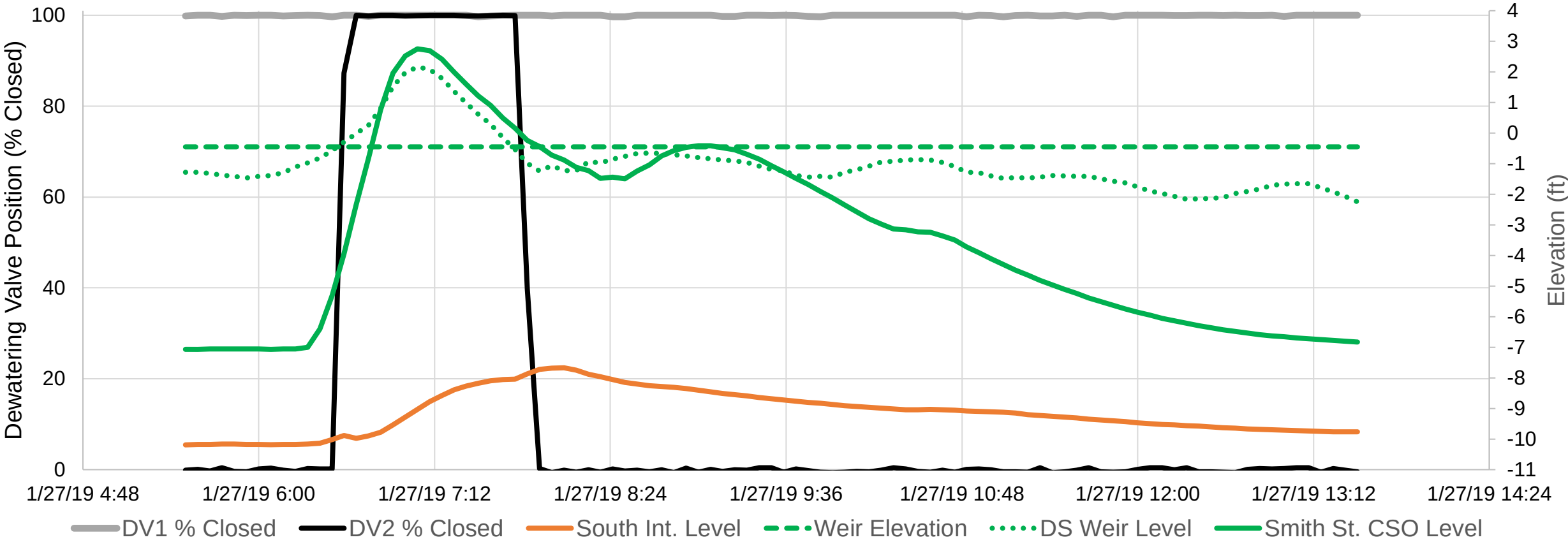
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

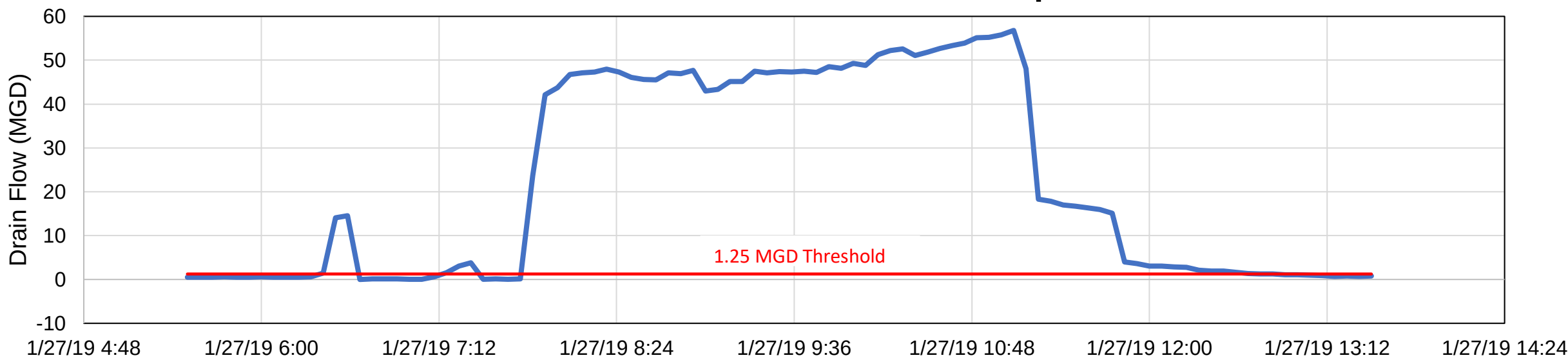
Rainfall data sourced from South Buffalo rain gauge, as provided by BSA.

* Additional 0.04 inches of rainfall, recorded an hour before the event started, also contributed to this event.

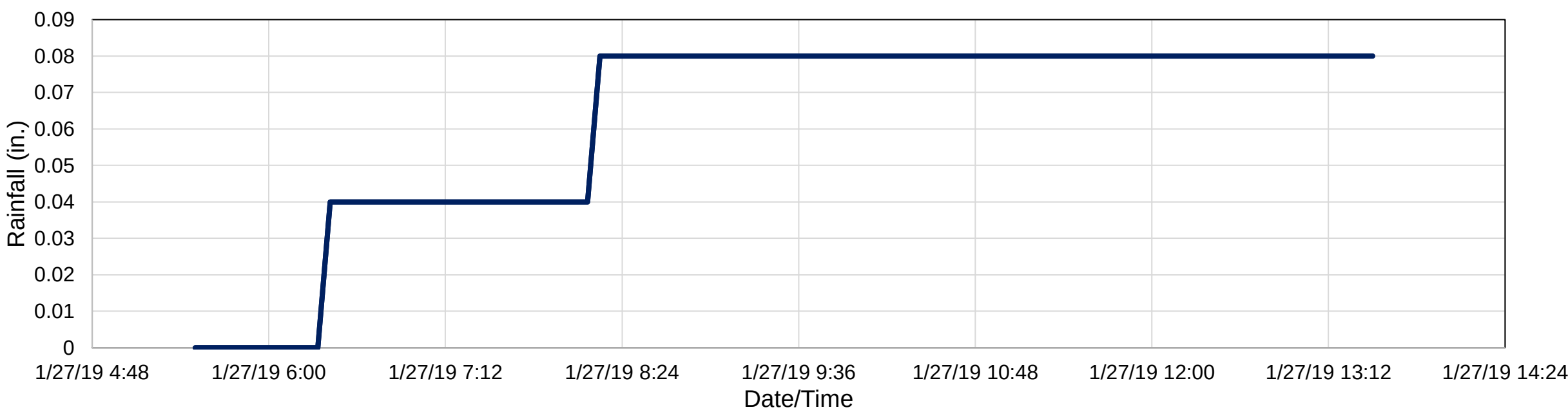
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	02/12/2019
Event Start Date/Time:	1/29/2019 4:30
Event End Date/Time:	1/31/2019 2:25

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.28 in.
Storm Event Duration:	24 hr.
Storm Type:	Less than one year

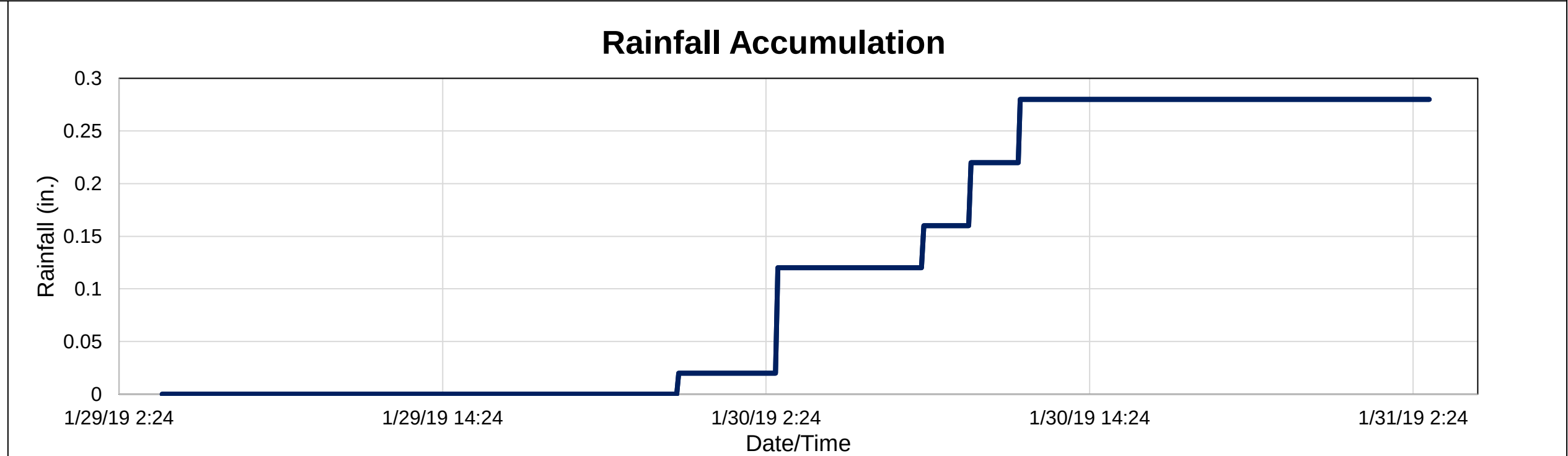
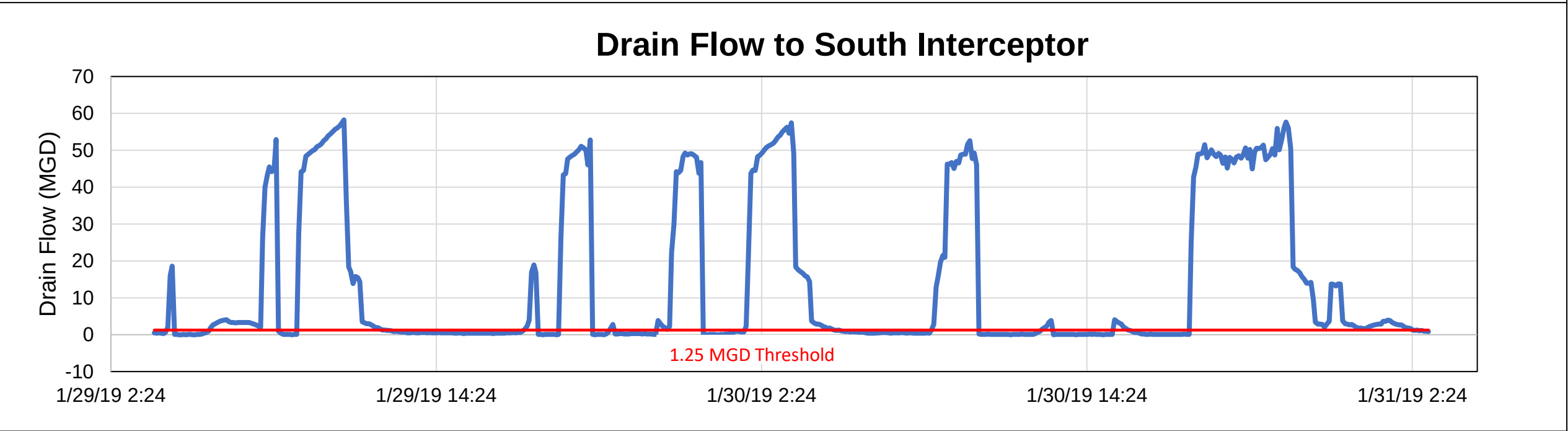
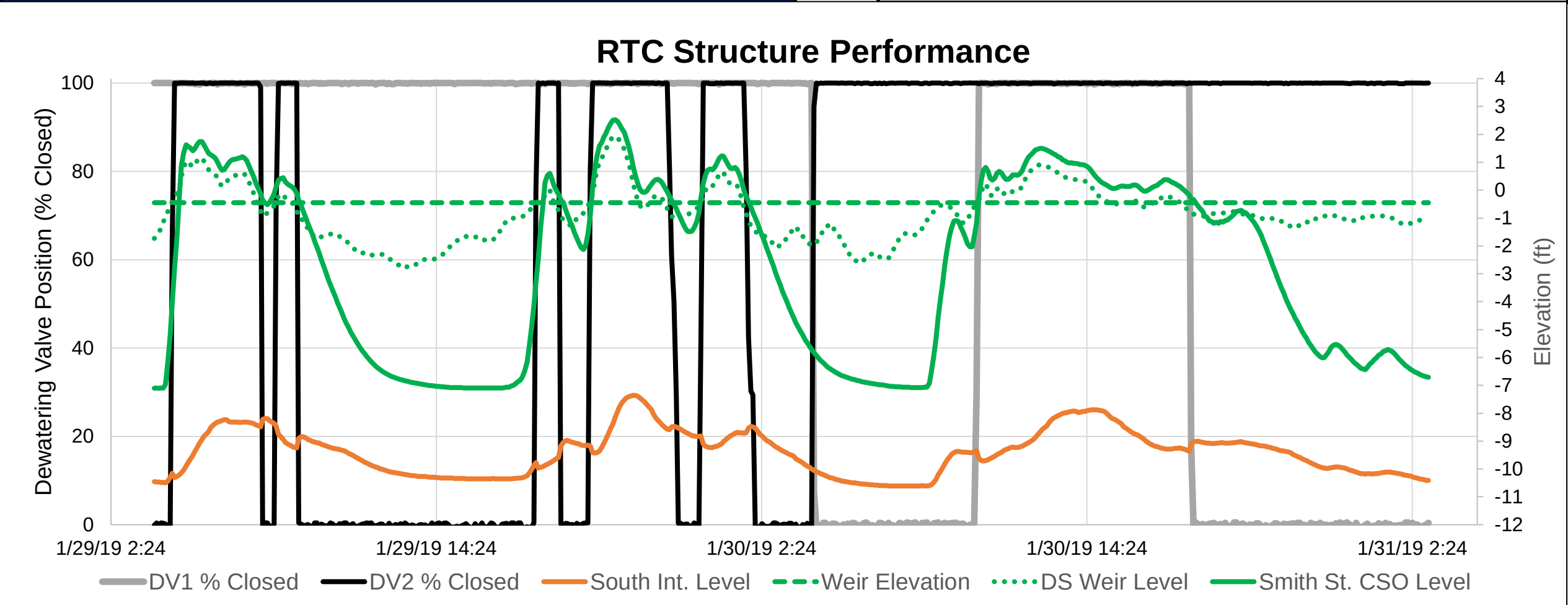
Time Lead Dewatering Valve Closed	1/29/2019 4:40
Time Lead Dewatering Valve Opened	1/30/2019 18:20
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	2.53 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	22,342,450 Gal.
Did seiche occur during wet weather?	Yes

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

Rainfall data sourced from South Buffalo rain gauge, as provided by BSA.

The event was probably triggered by snowmelt as temperature was above freezing point prior to the event.



February 2019 Smith St. RTC KPI Report

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February 2019

Event Date	Volume Captured (gal)	Did a seiche occur during wet weather? (Note: if a seiche occurs during wet weather, volume captured will be slightly overestimated due to the inclusion of the seiche)	Event drain flow threshold (MGD)
2/3/2019	5,074,704	No	1.25
2/4/2019	680,961	No	1.25
2/6/2019	3,097,180	No	1.25
2/7/2019	2,890,994	No	1.25
2/7/2019	735,816	Yes	1.25
2/8/2019	11,713,991	No	1.25
2/12/2019	7,825,343	Yes	1.25
2/15/2019	5,283,680	No	1.25
2/24/2019	6,881,389	Yes	1.25
Total Volume Captured (gal)	44,184,058		

Site:	Smith RTC
Analysis Date:	03/14/2019
Event Start Date/Time:	2/3/2019 13:40
Event End Date/Time:	2/3/2019 20:30

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-6.24 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	5,074,704 Gal.
Did seiche occur during wet weather?	No

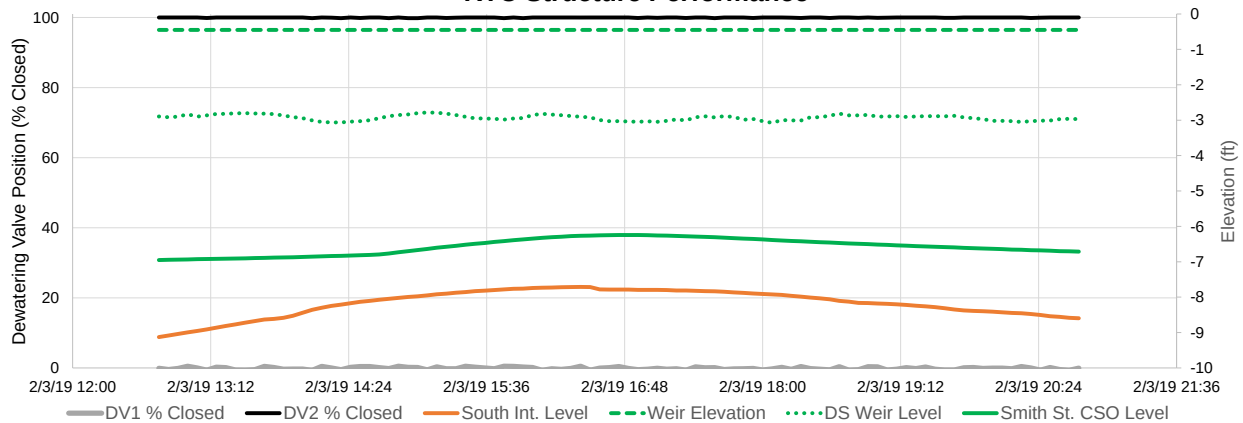
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

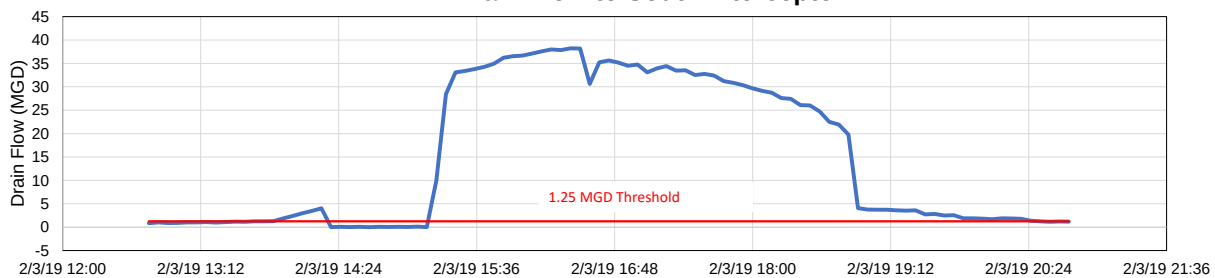
Rainfall data sourced from BSA rain gauge station at South Buffalo.

This event was caused by snowmelt, as temperatures rose up to low 50s (°F), and possibly localized rainfall.

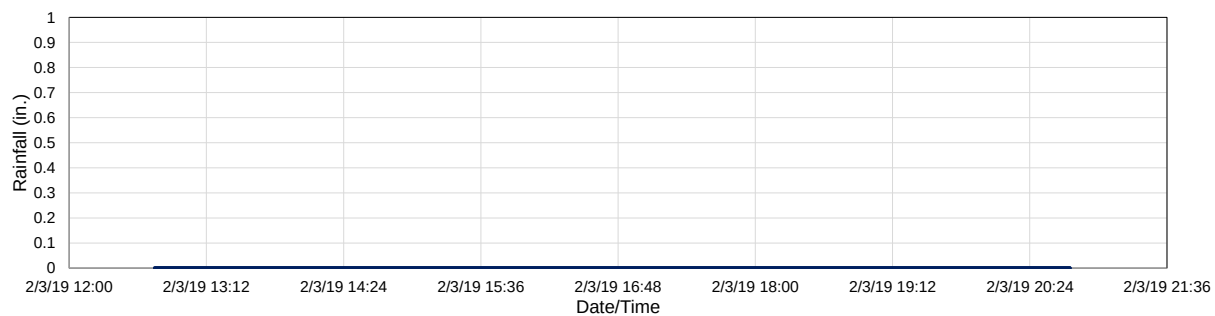
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	03/14/2019
Event Start Date/Time:	2/4/2019 3:45
Event End Date/Time:	2/4/2019 8:20

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-6.59 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	680,961 Gal.
Did seiche occur during wet weather?	No

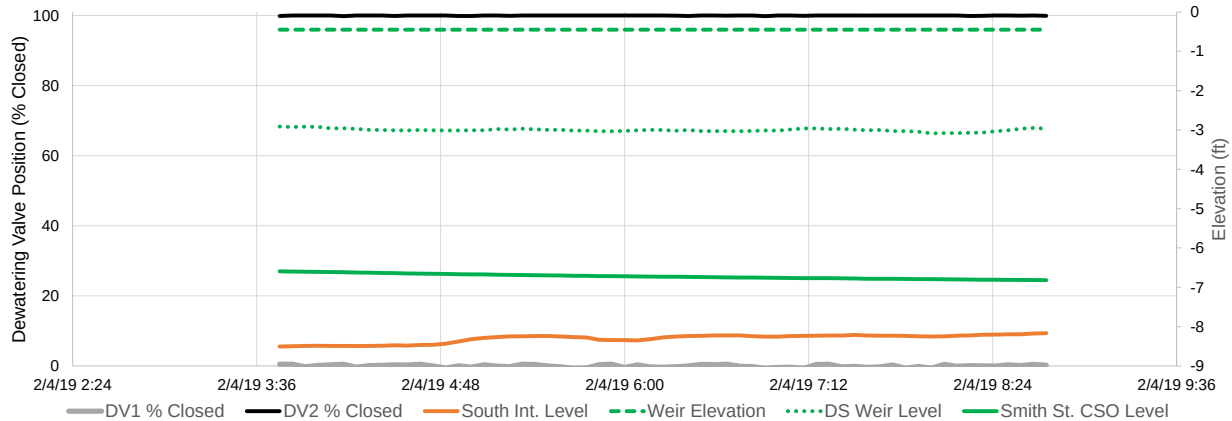
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

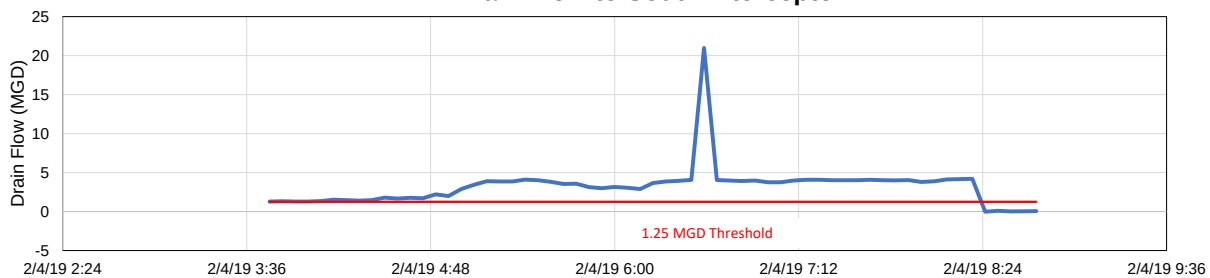
Rainfall data sourced from BSA rain gauge station at South Buffalo.

This event was caused by snowmelt, as temperatures rose up to high 50s (°F), and possibly localized rainfall.

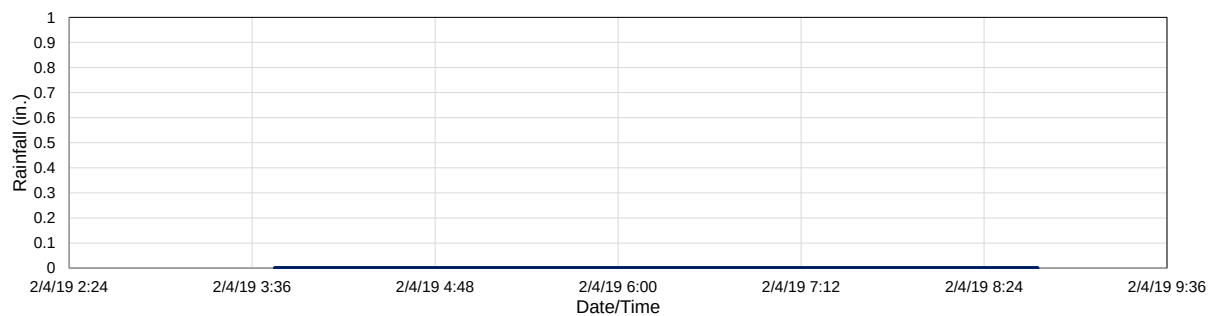
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	03/14/2019
Event Start Date/Time:	2/6/2019 2:30
Event End Date/Time:	2/6/2019 10:05

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.79 in.
Storm Event Duration:	4 hrs.
Storm Type:	Less than one year

Time Lead Dewatering Valve Closed	2/6/2019 2:15
Time Lead Dewatering Valve Opened	2/6/2019 7:35
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-0.44 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	3,097,180 Gal.
Did seiche occur during wet weather?	No

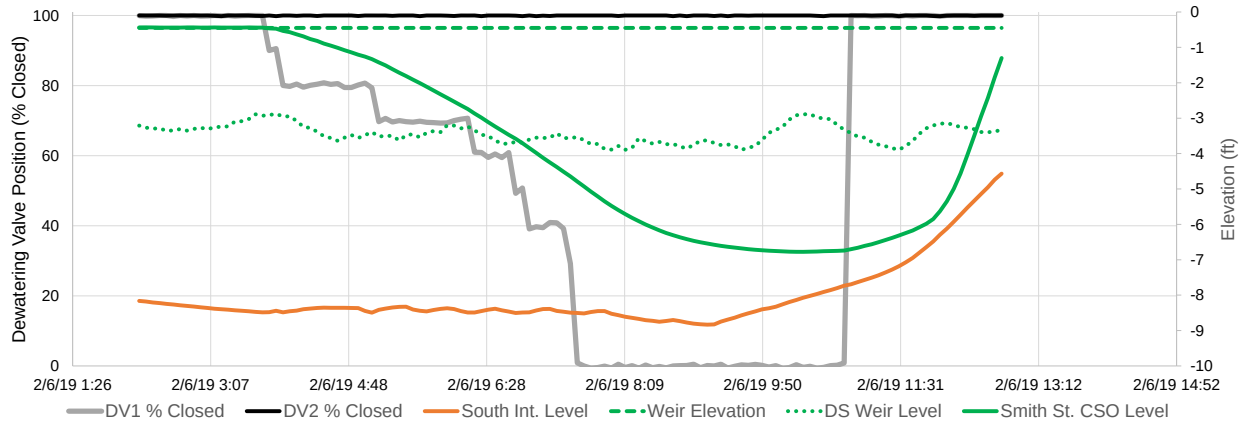
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

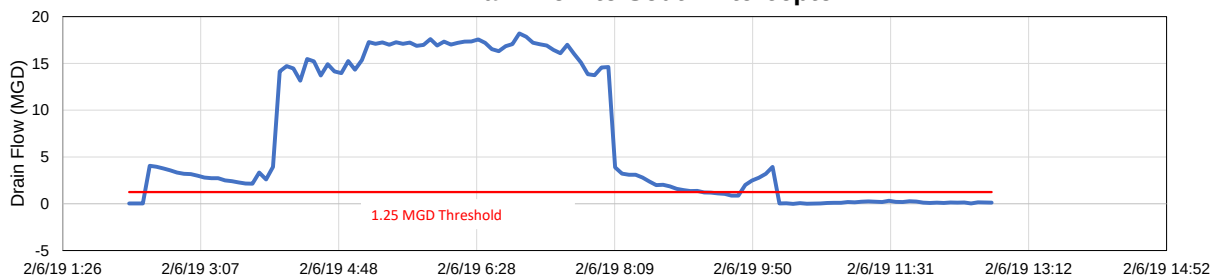
Rainfall data sourced from BSA rain gauge station at South Buffalo.

No rainfall recorded at South Buffalo rain gauge at the start of the event. This event was likely triggered by localized rainfall.

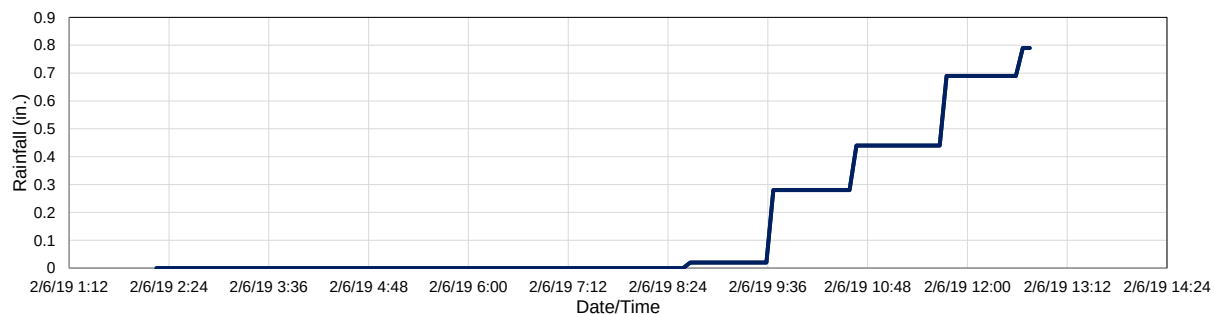
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	03/14/2019
Event Start Date/Time:	2/7/2019 7:40
Event End Date/Time:	2/7/2019 13:40

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Time Lead Dewatering Valve Closed	2/7/2019 7:00
Time Lead Dewatering Valve Opened	2/7/2019 12:10
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-0.43 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	2,890,994 Gal.
Did seiche occur during wet weather?	No

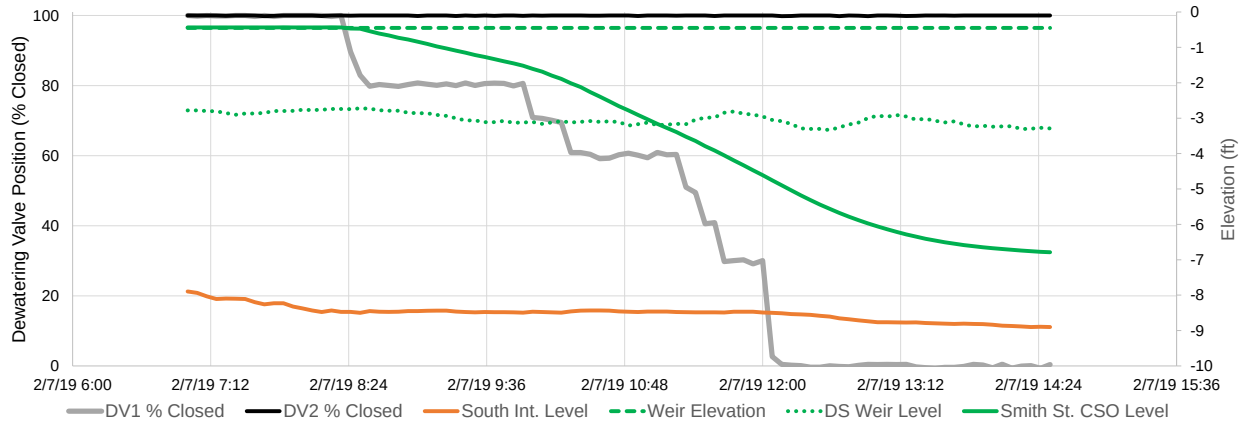
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

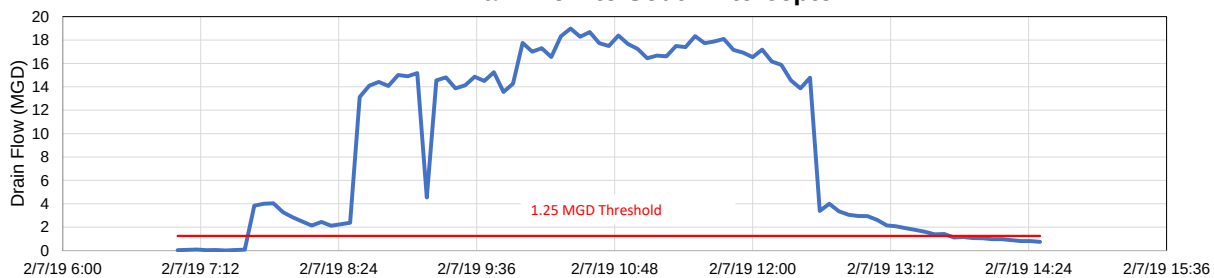
Rainfall data sourced from BSA rain gauge station at South Buffalo.

No rainfall recorded at South Buffalo rain gauge. This event was likely caused due to localized rainfall.

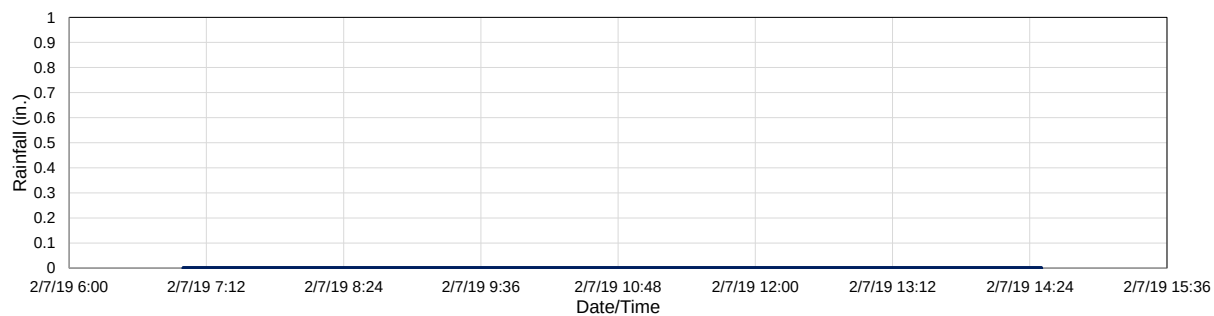
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	03/14/2019
Event Start Date/Time:	2/7/2019 22:45
Event End Date/Time:	2/8/2019 2:15

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.04 in.
Storm Event Duration:	2 hrs.
Storm Type:	Less than one year

Time Lead Dewatering Valve Closed	2/8/2019 2:15
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	1.74 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	735,816 Gal.
Did seiche occur during wet weather?	Yes

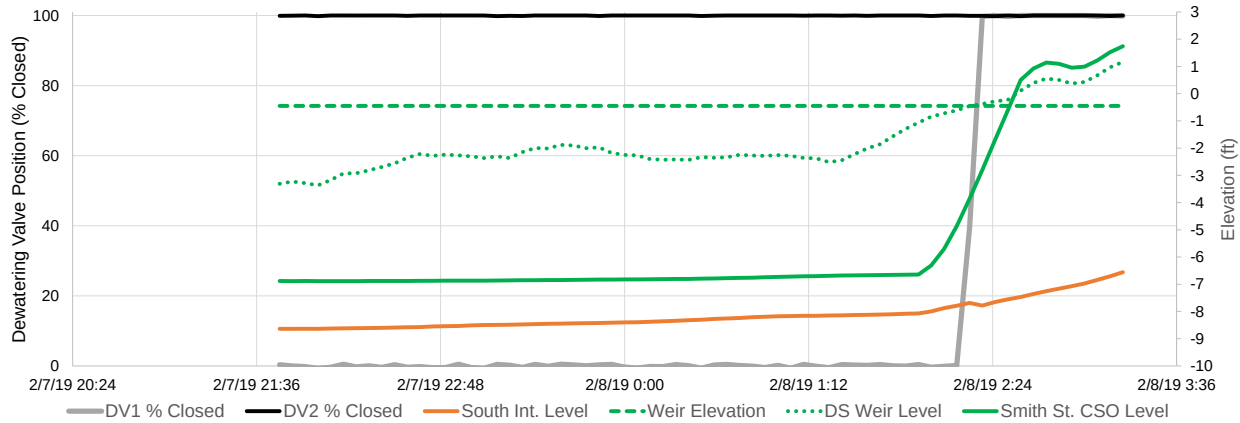
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

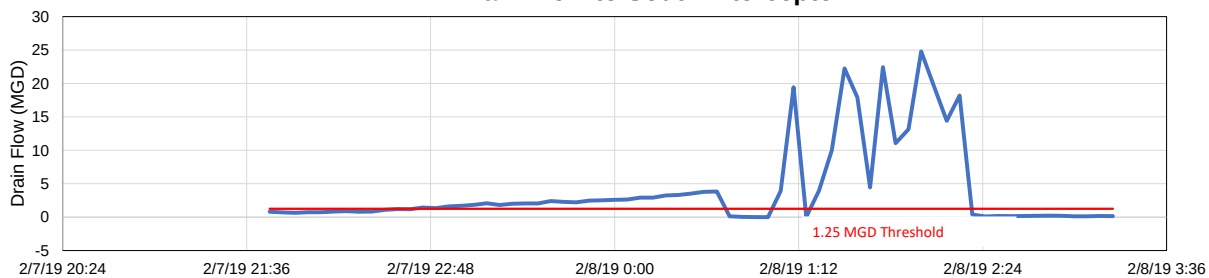
Rainfall data sourced from BSA rain gauge station at South Buffalo.

High temperatures, up to 60 °F, were recorded on the evening of February 7, which caused snowmelt triggering the event. Rainfall also contributed later in sustaining the event.

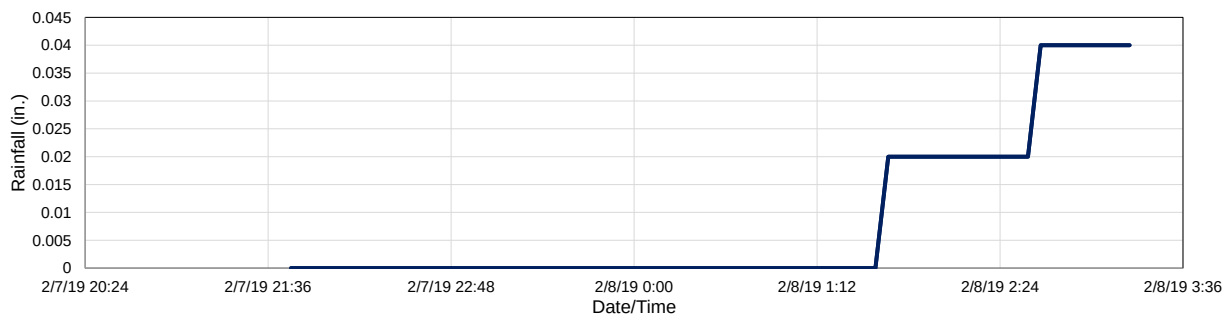
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	03/14/2019
Event Start Date/Time:	2/8/2019 12:55
Event End Date/Time:	2/9/2019 0:20

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Time Lead Dewatering Valve Closed	2/8/2019 12:15
Time Lead Dewatering Valve Opened	2/8/2019 21:25
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	0.25 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	11,713,991 Gal.
Did seiche occur during wet weather?	No

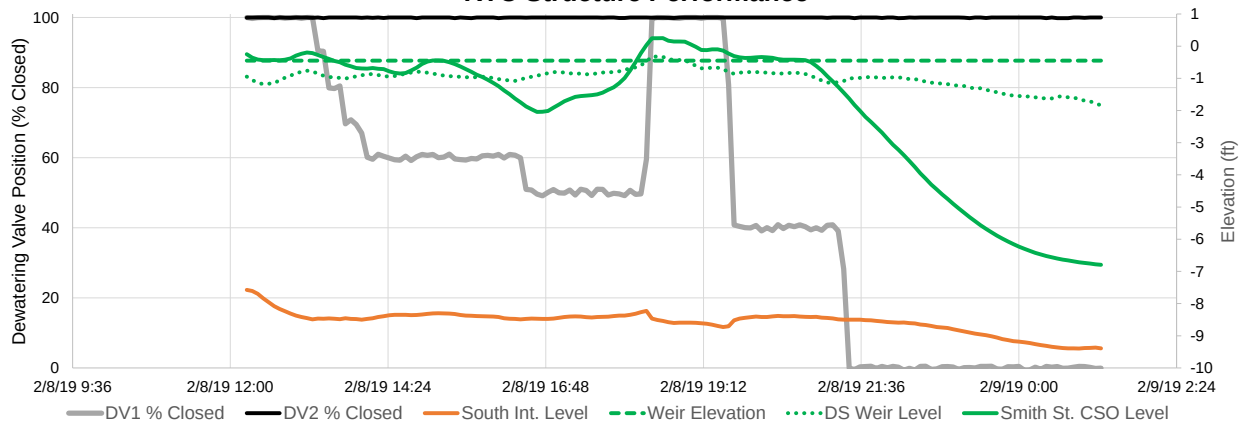
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

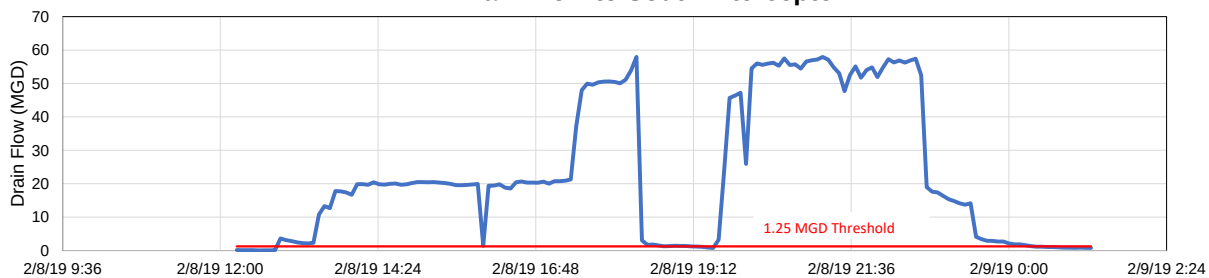
Rainfall data sourced from BSA rain gauge station at South Buffalo.

No rainfall was recorded during or before the event, and temperatures were below freezing point. The event was likely caused by water in the sewer from snowmelt and rainfall from the previous night.

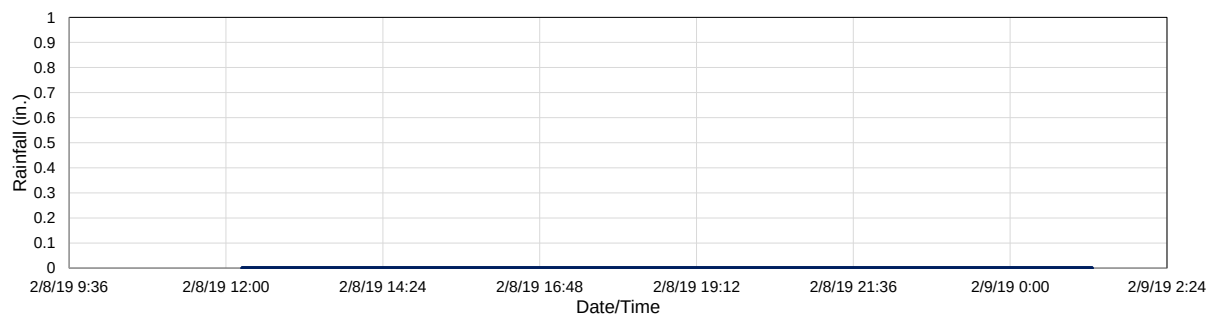
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	03/14/2019
Event Start Date/Time:	2/12/2019 20:30
Event End Date/Time:	2/14/2019 0:55

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.55 in.
Storm Event Duration:	10 hrs.
Storm Type:	Less than one year

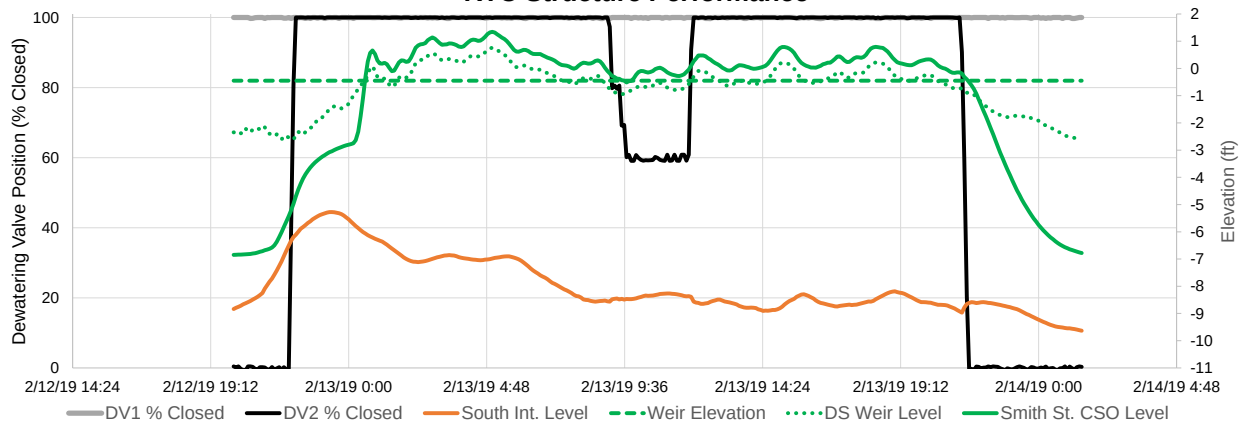
Time Lead Dewatering Valve Closed	2/12/2019 20:35
Time Lead Dewatering Valve Opened	2/13/2019 21:35
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	1.34 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	7,825,343 Gal.
Did seiche occur during wet weather?	Yes

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

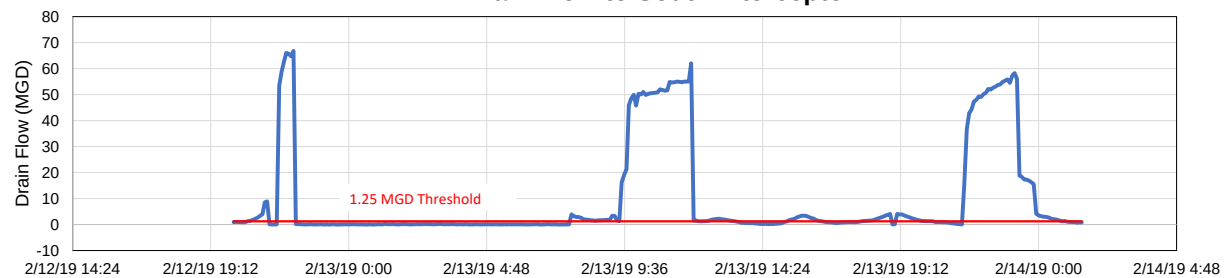
Recommended Operational Changes/Notes:

Rainfall data sourced from BSA rain gauge station at South Buffalo.

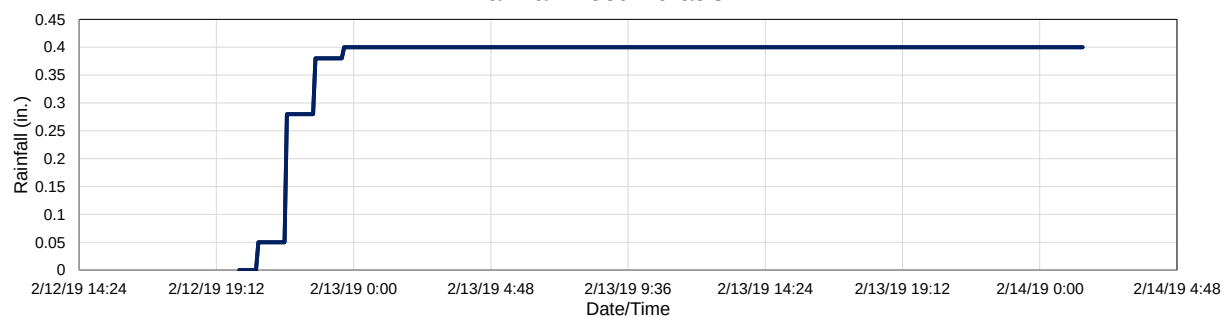
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	03/14/2019
Event Start Date/Time:	2/15/2019 9:00
Event End Date/Time:	2/15/2019 15:50

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.04 in.
Storm Event Duration:	2 hrs.
Storm Type:	Less than one year

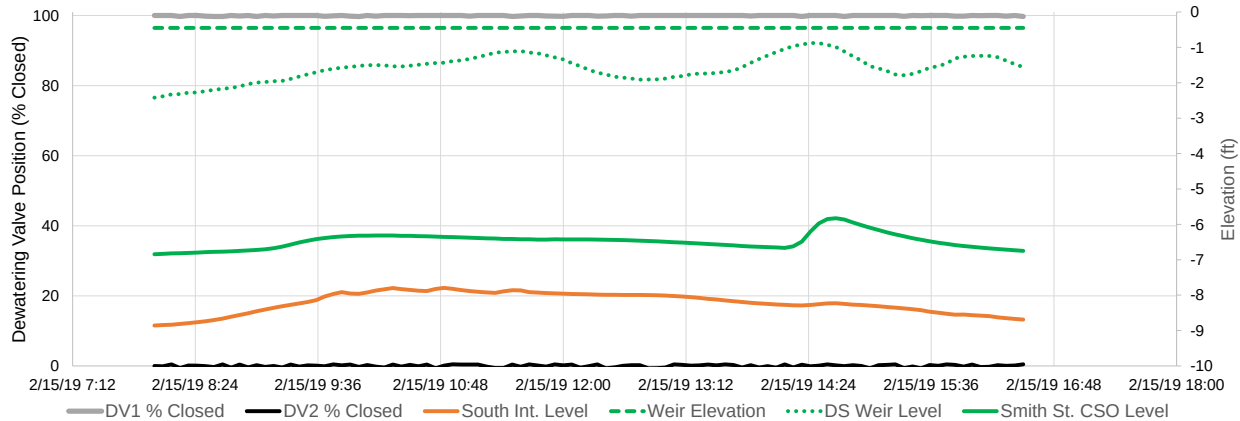
Time Lead Dewatering Valve Closed	2/15/2019 8:15
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-5.83 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	5,283,680 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

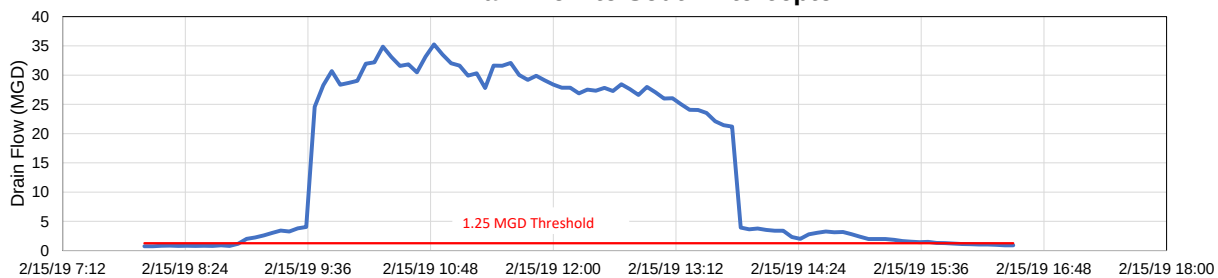
Recommended Operational Changes/Notes:

Rainfall data sourced from BSA rain gauge station at South Buffalo.

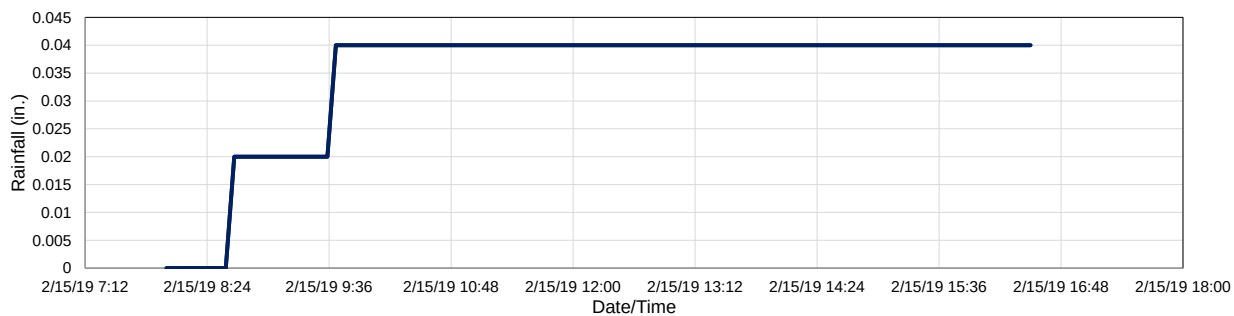
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	03/14/2019
Event Start Date/Time:	2/24/2019 9:05
Event End Date/Time:	2/25/2019 13:45

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.38 in.
Storm Event Duration:	6 hrs.
Storm Type:	Less than one year

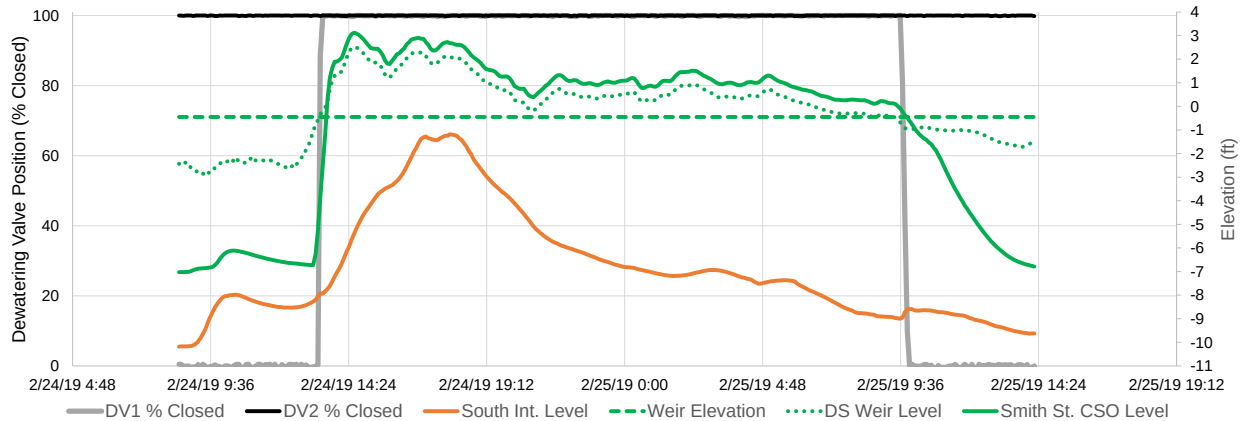
Time Lead Dewatering Valve Closed	2/24/2019 13:25
Time Lead Dewatering Valve Opened	2/25/2019 9:55
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	3.12 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	6,881,389 Gal.
Did seiche occur during wet weather?	Yes

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

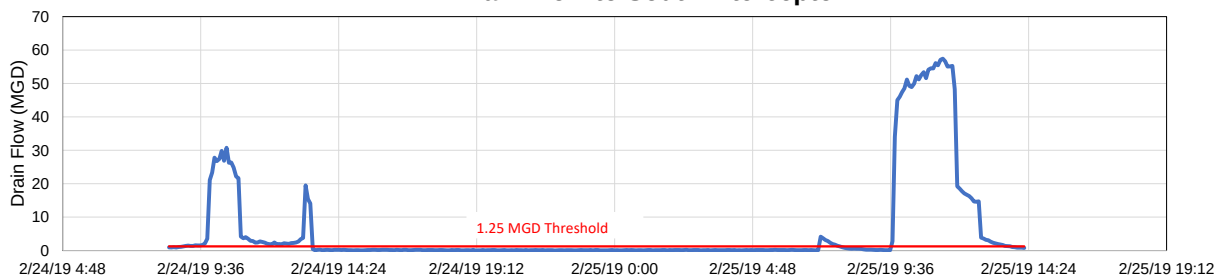
Recommended Operational Changes/Notes:

Rainfall data sourced from BSA rain gauge station at South Buffalo.

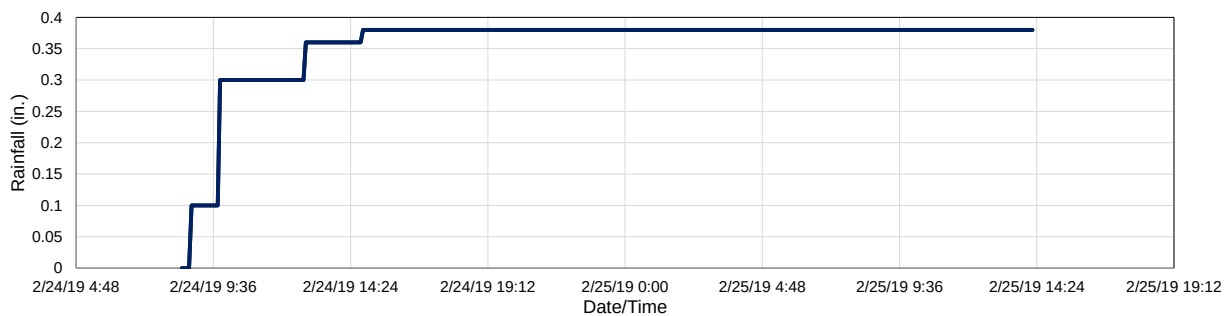
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



March 2019 Smith St. RTC KPI Report

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Smith St. RTC Monthly Performance Report

March 2019

Event Date	Volume Captured (gal)	Did a seiche occur during wet weather? (Note: if a seiche occurs during wet weather, volume captured will be slightly overestimated due to the inclusion of the seiche)	Event drain flow threshold (MGD)
3/10/2019	4,428,880	Yes	1.25
3/30/2019	7,093,207	No	1.25
Total Volume Captured (gal)	11,522,087		

March 10, 2019

1

Site:	Smith RTC
Analysis Date:	04/12/2019
Event Start Date/Time:	3/10/2019 1:00
Event End Date/Time:	3/11/2019 2:00

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.49 in.
Storm Event Duration:	2 hr.
Storm Type:	Less than one year

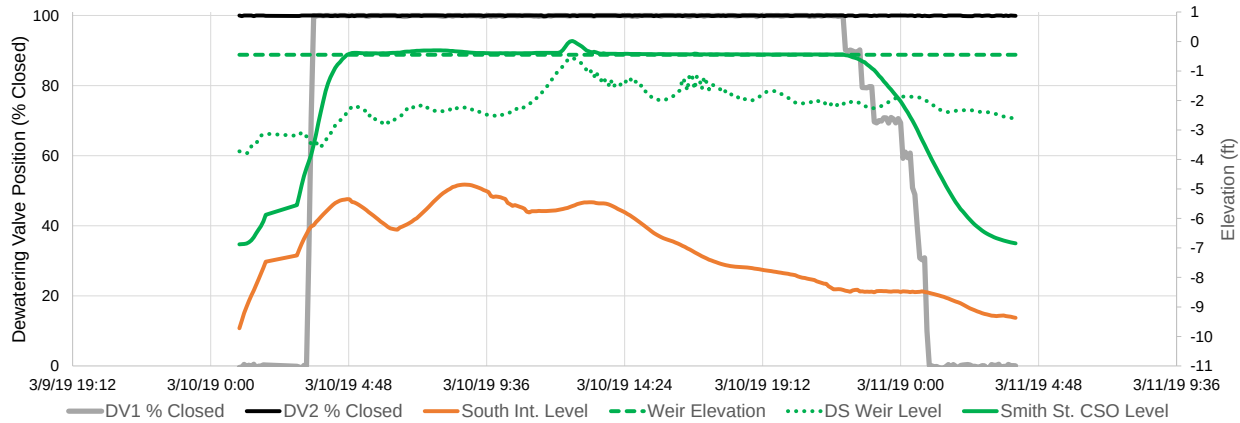
Time Lead Dewatering Valve Closed	3/10/2019 3:25
Time Lead Dewatering Valve Opened	3/10/2019 22:05
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	0.02 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	4,428,880 Gal.
Did seiche occur during wet weather?	Yes

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

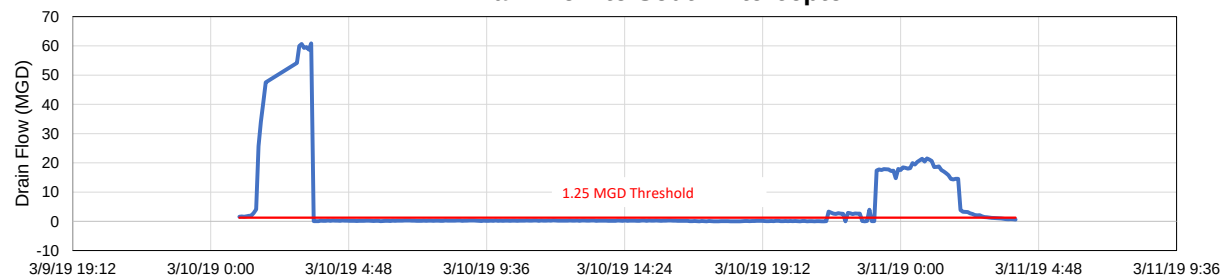
Recommended Operational Changes/Notes:

Rainfall data sourced from BSA rain gauge station at South Buffalo.

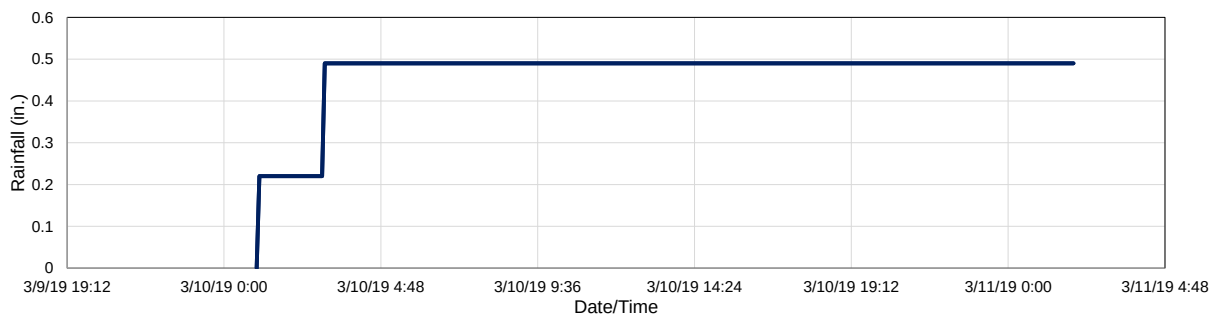
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	04/12/2019
Event Start Date/Time:	3/30/2019 9:25
Event End Date/Time:	3/30/2019 23:20

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	1.9 in.
Storm Event Duration:	26 hr.
Storm Type:	Less than two year

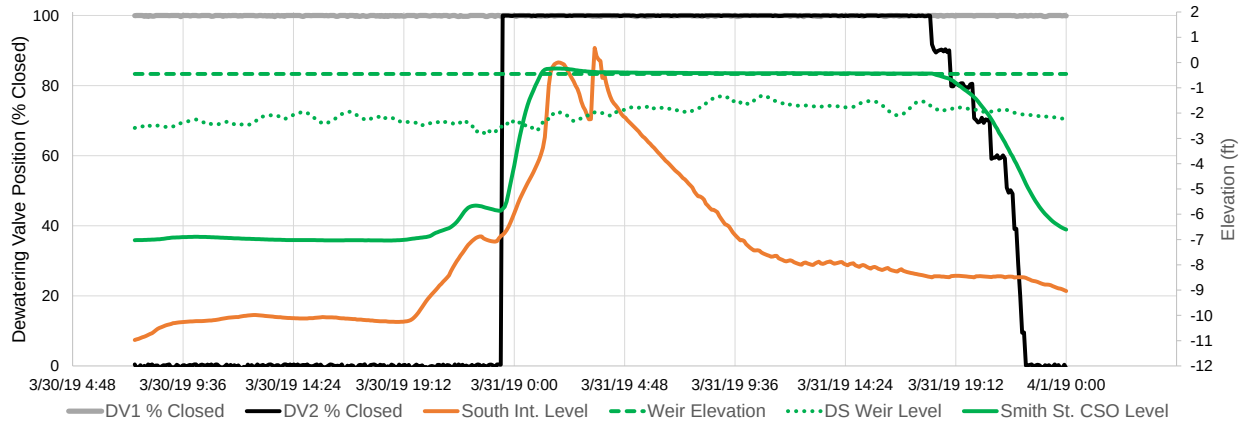
Time Lead Dewatering Valve Closed	3/30/2019 23:30
Time Lead Dewatering Valve Opened	3/31/2019 18:10
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-0.23 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	7,093,207 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

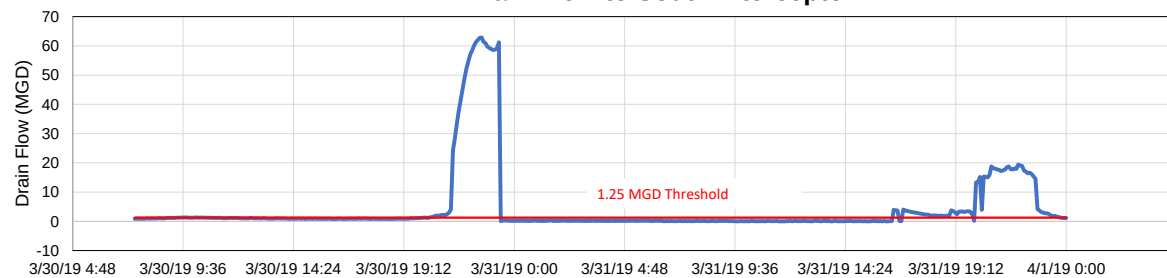
Recommended Operational Changes/Notes:

Rainfall data sourced from BSA rain gauge station at South Buffalo.

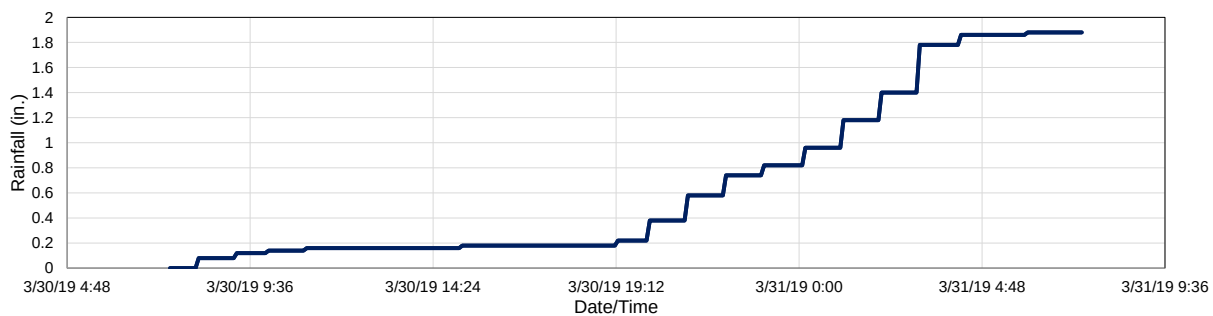
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



April 2019 Smith St. RTC KPI Report

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Smith St. RTC Monthly Performance Report

April 2019

Event Date	Volume Captured (gal)	Did a seiche occur during wet weather? (Note: if a seiche occurs during wet weather, volume captured will be slightly overestimated due to the inclusion of the seiche)	
		Event drain flow threshold (MGD)	
4/12/2019	162,865	No	1.25
4/14/2019	5,699,472	Yes	1.25
4/16/2019	475,776	No	1.25
4/19/2019	6,962,535	No	1.25
4/23/2019	5,804,409	No	1.25
4/26/2019	15,509,929	No	1.25
4/30/2019	1,069,559	No	1.25
Total Volume Captured (gal)	35,684,545		

Site:	Smith RTC
Analysis Date:	05/10/2019
Event Start Date/Time:	4/12/2019 15:00
Event End Date/Time:	4/12/2019 21:25

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Time Lead Dewatering Valve Closed	4/12/2019 17:00
Time Lead Dewatering Valve Opened	4/12/2019 20:20
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-6.36 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	162,865 Gal.
Did seiche occur during wet weather?	No

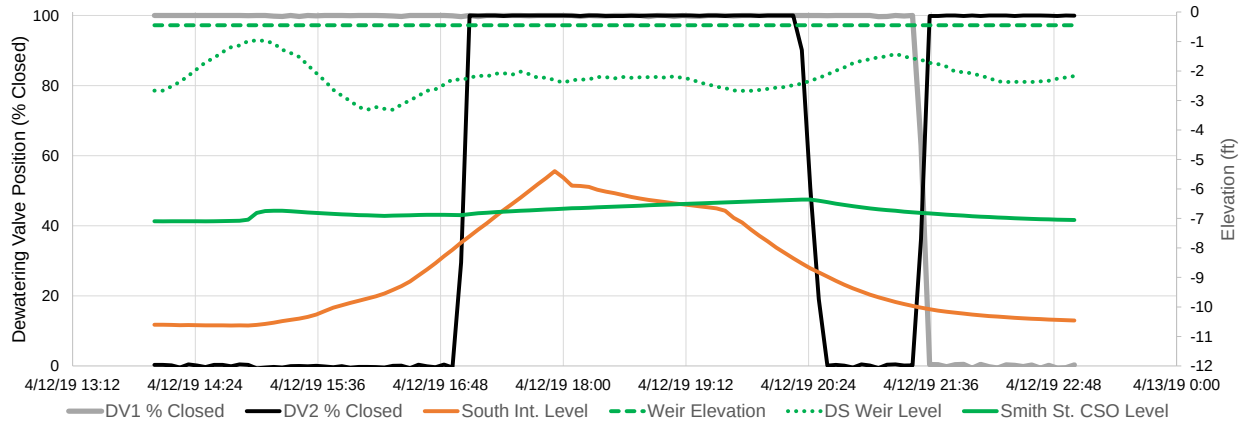
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

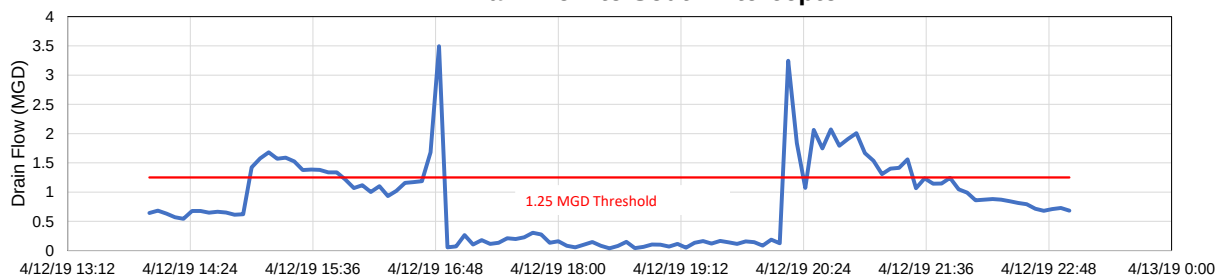
Rainfall data sourced from BSA rain gauge station at South Buffalo.

This event was caused by snowmelt and localized rainfall. Temperature went up to low 60s (°F) causing melting of snow from previous day's snowfall.

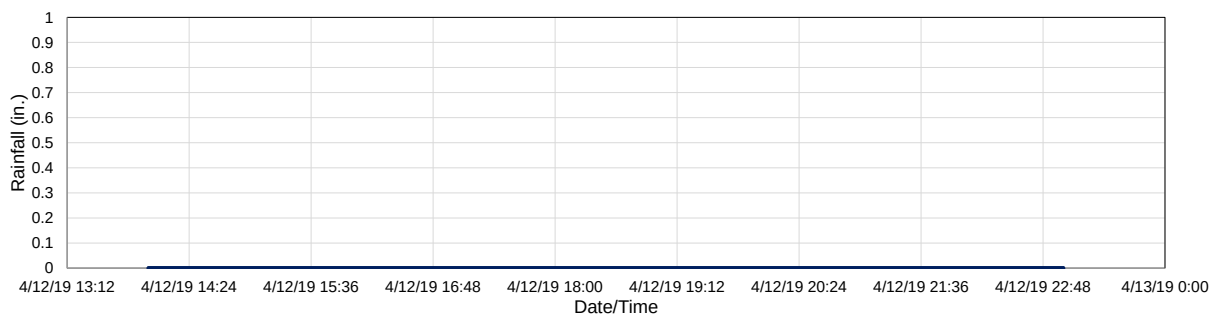
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	05/10/2019
Event Start Date/Time:	4/14/2019 13:45
Event End Date/Time:	4/15/2019 18:15

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	1.3 in.
Storm Event Duration:	24 hrs.
Storm Type:	Less than one year

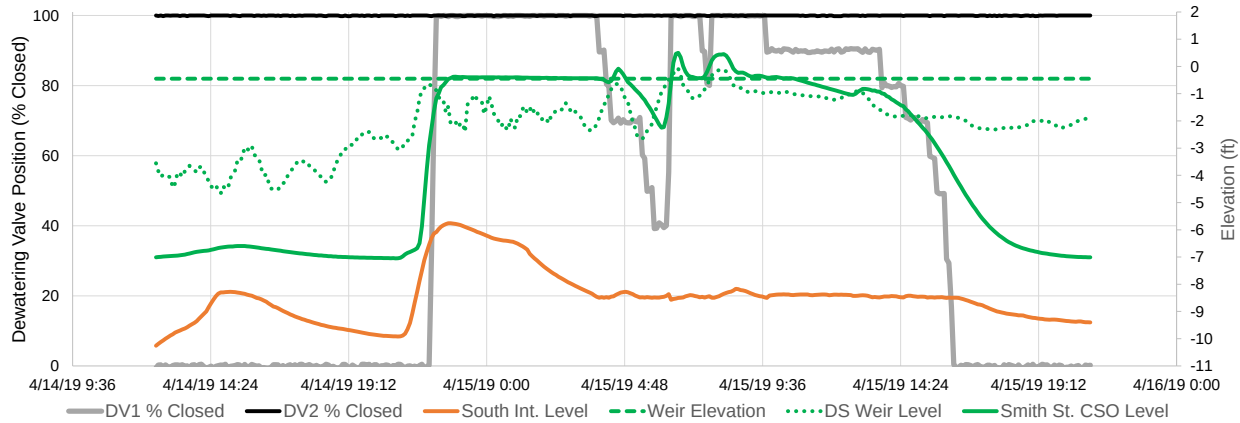
Time Lead Dewatering Valve Closed	4/14/2019 22:05
Time Lead Dewatering Valve Opened	4/15/2019 3:55
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	0.50 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	5,699,472 Gal.
Did seiche occur during wet weather?	Yes

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

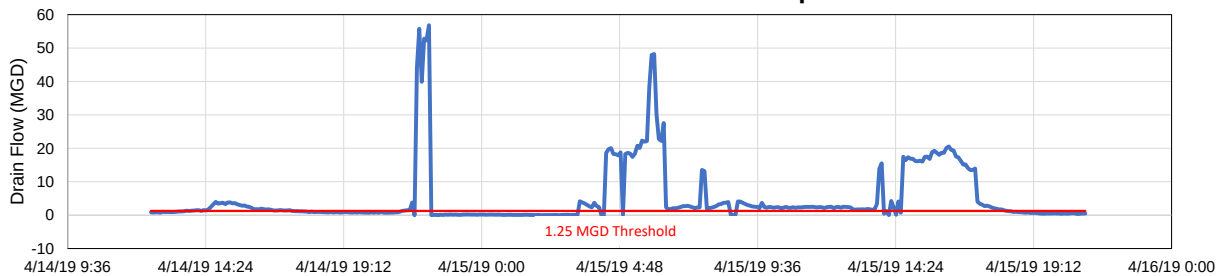
Recommended Operational Changes/Notes:

Rainfall data sourced from BSA rain gauge station at South Buffalo.

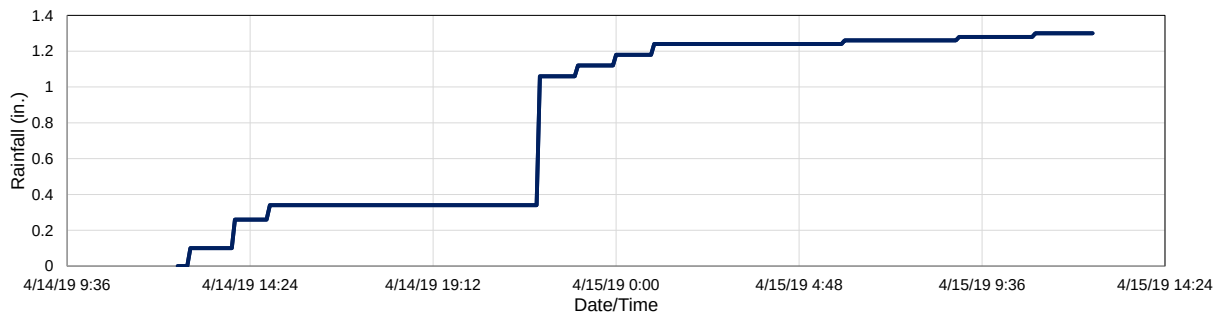
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	05/10/2019
Event Start Date/Time:	4/16/2019 18:20
Event End Date/Time:	4/17/2019 2:45

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.44 in.
Storm Event Duration:	6 hrs.
Storm Type:	Less than one year

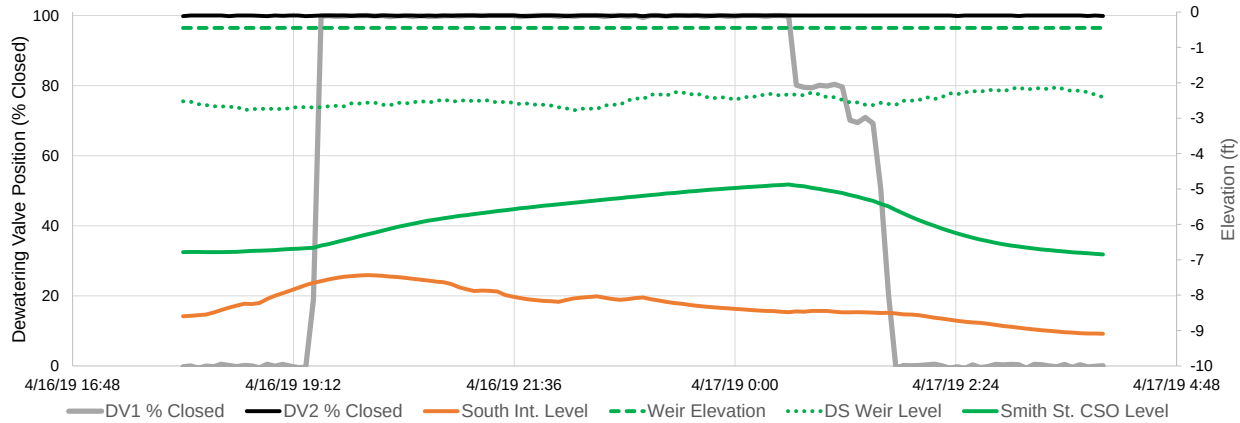
Time Lead Dewatering Valve Closed	4/16/2019 19:25
Time Lead Dewatering Valve Opened	4/17/2019 0:40
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-4.87 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	475,776 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

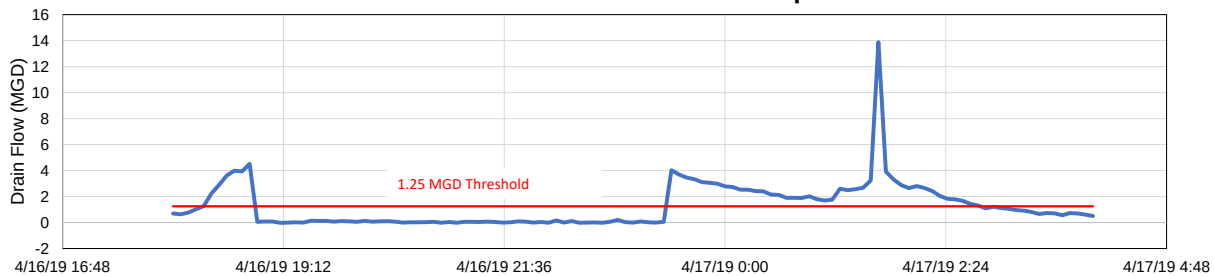
Recommended Operational Changes/Notes:

Rainfall data sourced from BSA rain gauge station at South Buffalo.

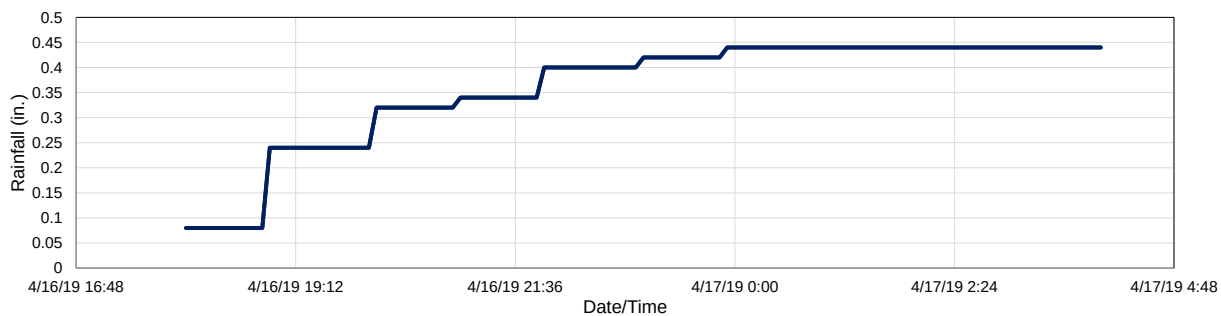
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	05/06/2019
Event Start Date/Time:	4/19/2019 17:30
Event End Date/Time:	4/21/2019 0:00

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	1.02 in.*
Storm Event Duration:	29 hrs.
Storm Type:	Less than one year

Time Lead Dewatering Valve Closed	4/19/2019 17:50
Time Lead Dewatering Valve Opened	4/20/2019 1:10
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-3.89 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	6,962,535 Gal.
Did seiche occur during wet weather?	No

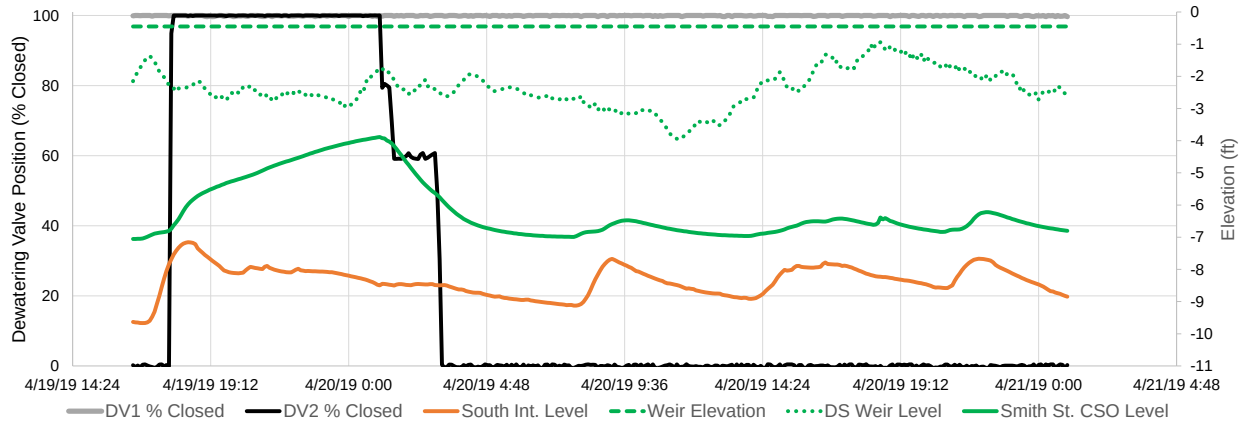
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

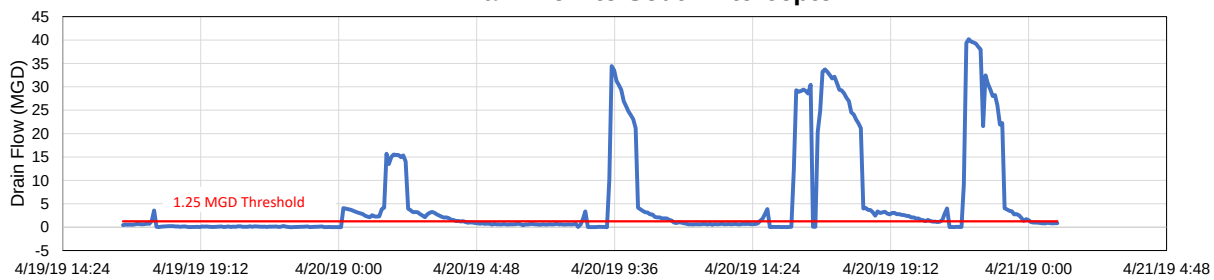
Rainfall data sourced from BSA rain gauge station at South Buffalo.

* Rainfall was intermittent during the event.

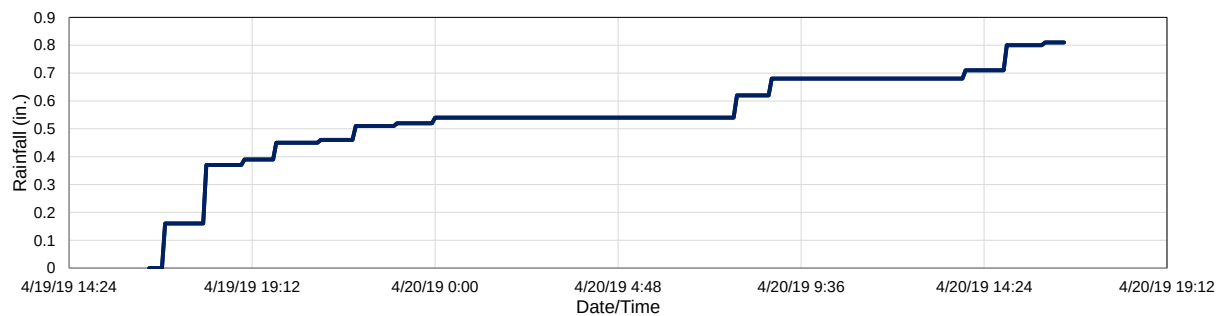
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	05/13/2019
Event Start Date/Time:	4/23/2019 17:55
Event End Date/Time:	4/23/2019 21:45

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

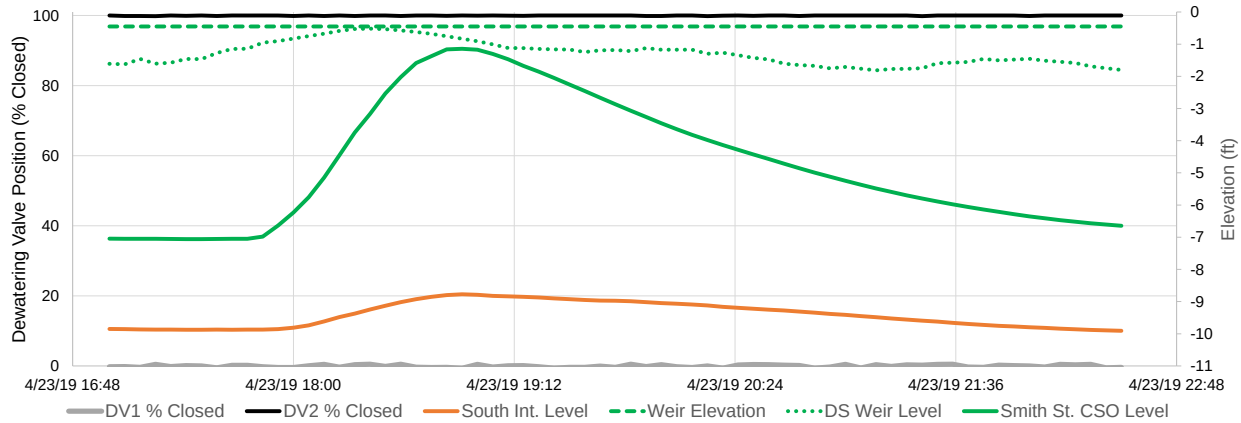
Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-1.14 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	5,804,409 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

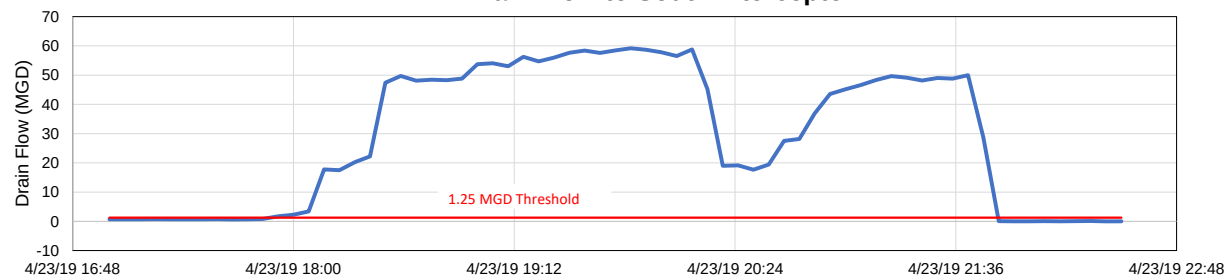
Recommended Operational Changes/Notes:

No rainfall recorded at BSA rain gauge station at South Buffalo or at the airport. This event was likely caused by localized rainfall.

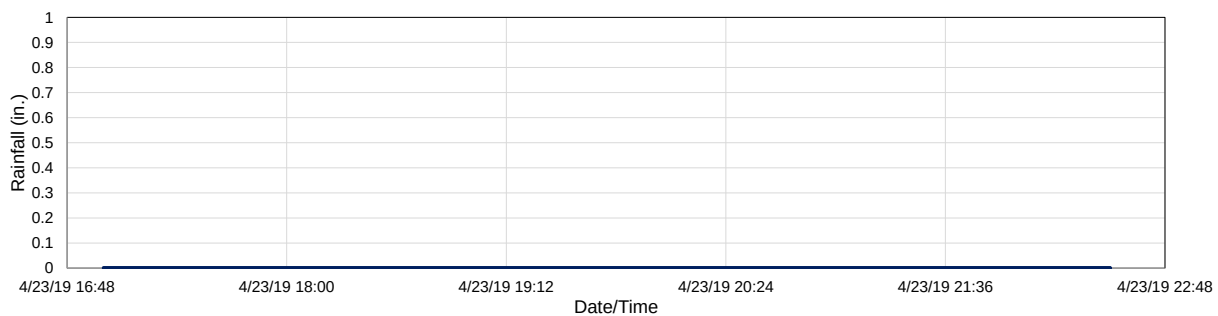
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	05/13/2019
Event Start Date/Time:	4/26/2019 6:35
Event End Date/Time:	4/27/2019 13:00

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.47 in.
Storm Event Duration:	14 hr.
Storm Type:	Less than one year

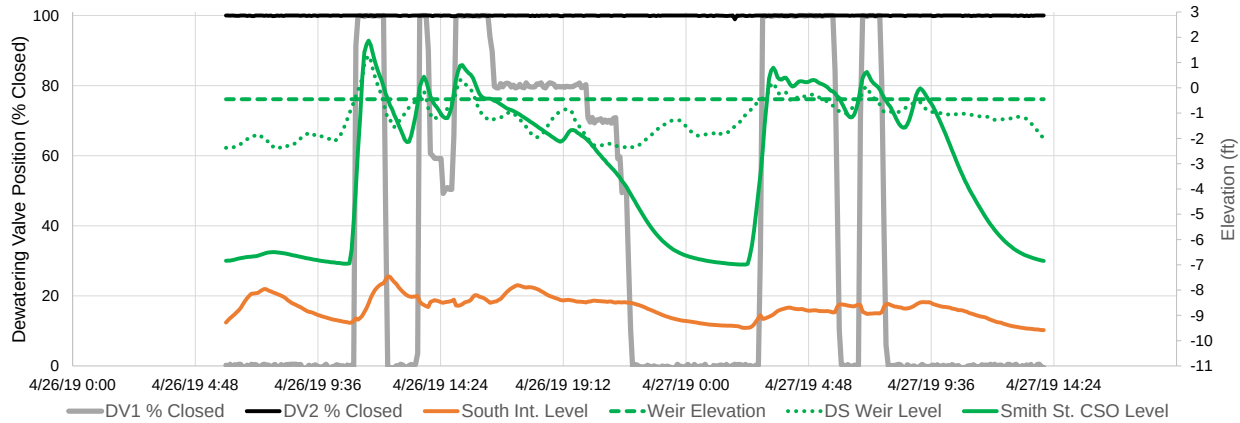
Time Lead Dewatering Valve Closed	4/26/2019 11:05
Time Lead Dewatering Valve Opened	4/27/2019 7:40
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	1.87 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	15,509,929 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

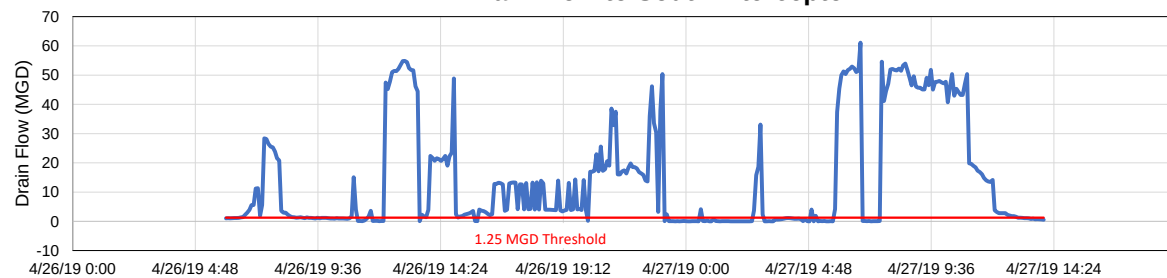
Recommended Operational Changes/Notes:

Rainfall data sourced from BSA rain gauge station at South Buffalo.

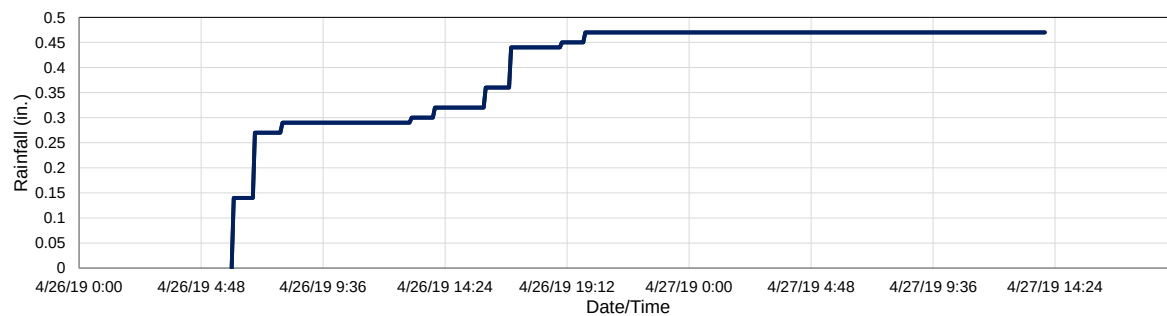
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	05/13/2019
Event Start Date/Time:	4/30/2019 3:10
Event End Date/Time:	4/30/2019 7:25

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.01 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

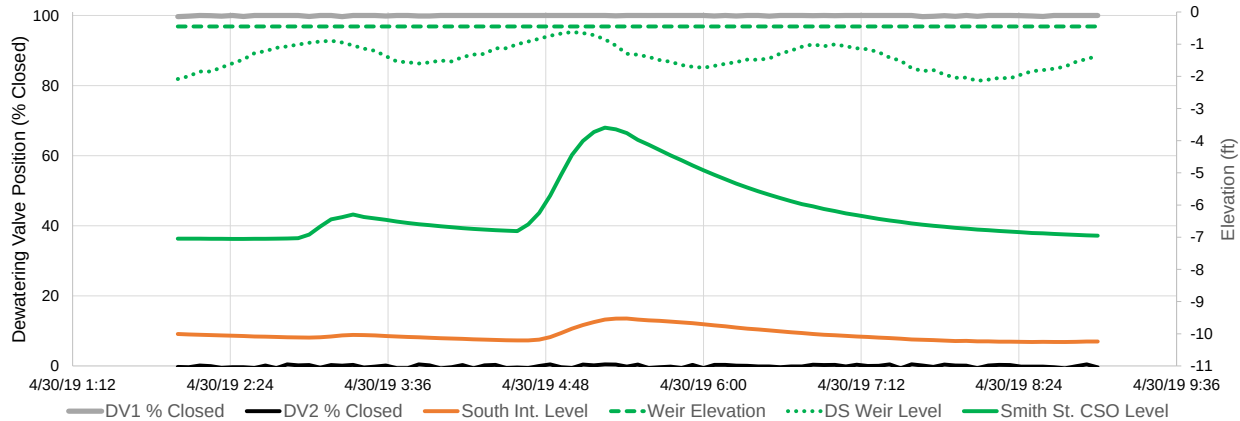
Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-3.59 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	1,069,559 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

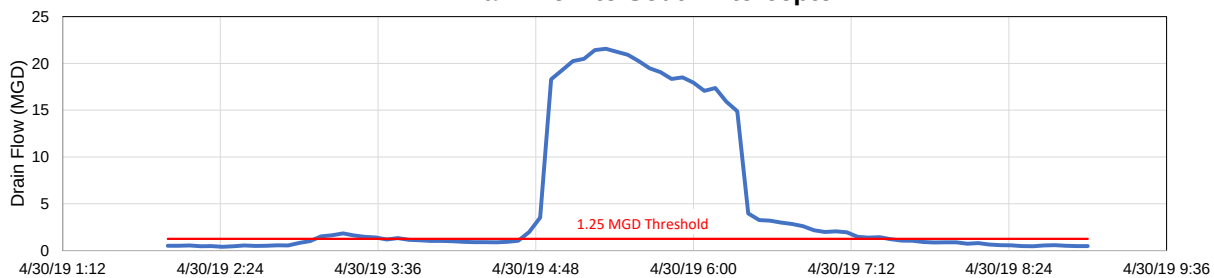
Recommended Operational Changes/Notes:

Rainfall data sourced from BSA rain gauge station at South Buffalo. Rainfall from the previous night (~0.05 inch) likely contributed to this event.

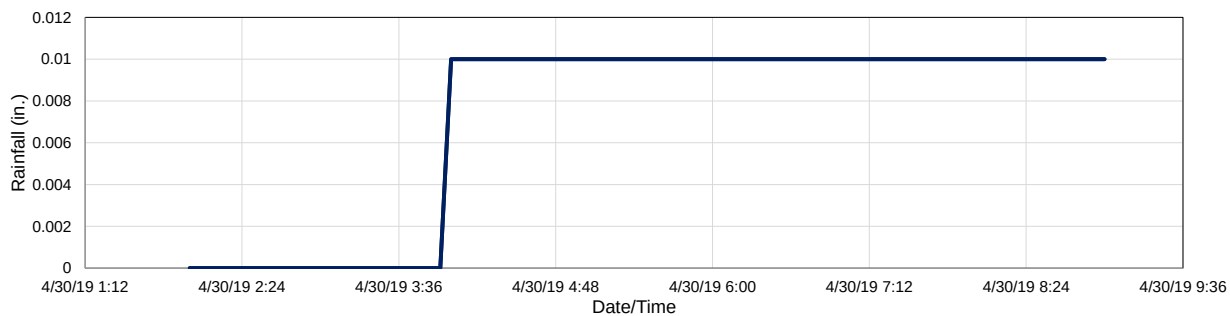
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



May 2019 Smith St. RTC KPI Report

BUFFALO
SEWER AUTHORITY



ARCADIS

Design & Consultancy
for natural and
built assets

Smith St. RTC Monthly Performance Report

May 2019

Event Date	Volume Captured (gal)	Did a seiche occur during wet weather? (Note: if a seiche occurs during wet weather, volume captured will be slightly overestimated due to the inclusion of the seiche)	Event drain flow threshold (MGD)
5/1/2019	2,998,955	No	1.25
5/4/2019	173,277	No	1.25
5/9/2019	9,164,013	Yes	1.25
5/11/2019	51,748	No	1.25
5/13/2019	1,579,075	No	1.25
5/15/2019	3,649,520	No	1.25
5/16/2019	675,391	No	1.25
5/16/2019	283,795	No	1.25
5/17/2019	24,586	No	1.25
5/18/2019	176,485	No	1.25
5/19/2019	25,249,746	No	1.25
5/22/2019	19,847,066	No	1.25
5/25/2019	18,556,143	No	1.25
5/28/2019	29,721,624	Yes	1.25
Total Volume Captured (gal)	112,151,424		

Note: Indicated captured volume is underestimated as complete dataset was not available for May 16 and May 17.

May 1, 2019

1

Site:	Smith RTC
Analysis Date:	06/10/2019
Event Start Date/Time:	5/1/2019 20:15
Event End Date/Time:	5/2/2019 3:20

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.71 in.
Storm Event Duration:	4 hrs.
Storm Type:	Less than one year

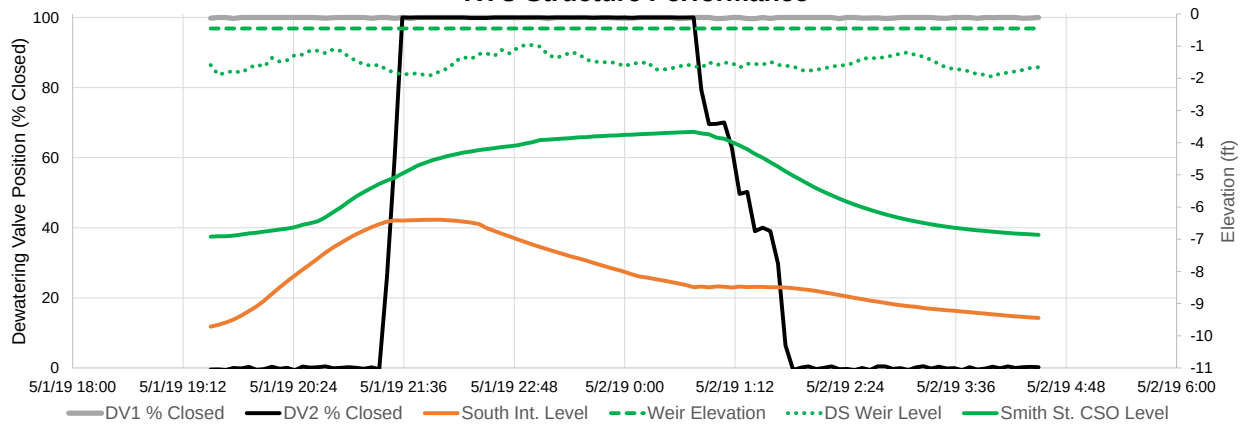
Time Lead Dewatering Valve Closed	5/1/2019 21:25
Time Lead Dewatering Valve Opened	5/2/2019 0:50
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-3.66 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	2,998,955 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

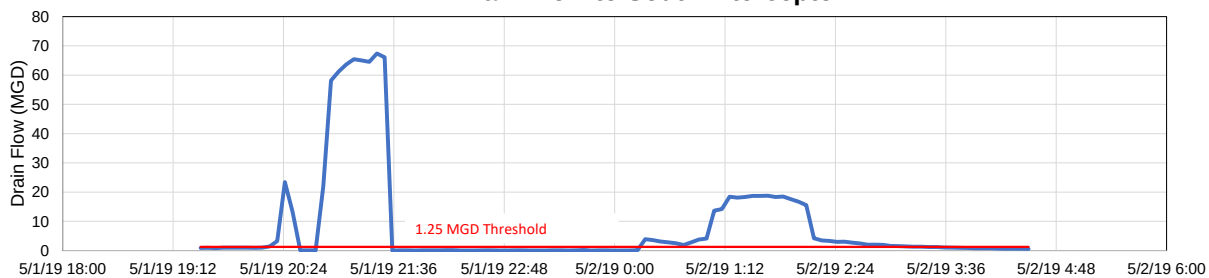
Recommended Operational Changes/Notes:

Rainfall data sourced from BSA rain gauge station at South Buffalo.

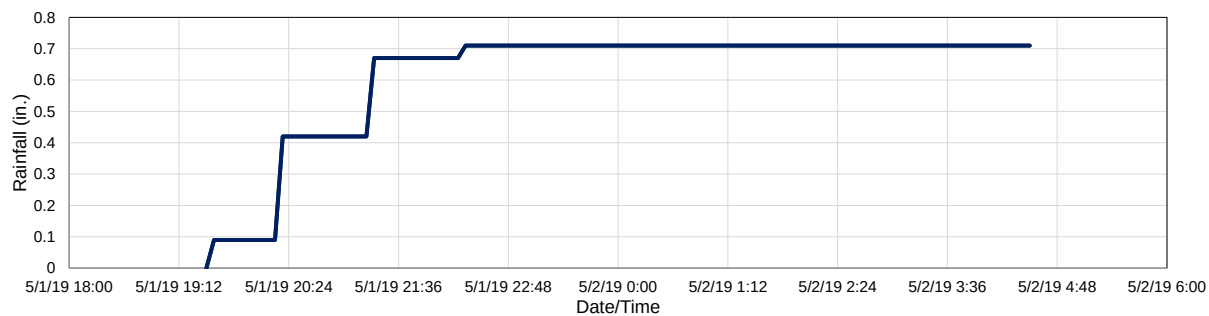
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	06/10/2019
Event Start Date/Time:	5/4/2019 13:55
Event End Date/Time:	5/4/2019 17:45

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-6.20 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	173,277 Gal.
Did seiche occur during wet weather?	No

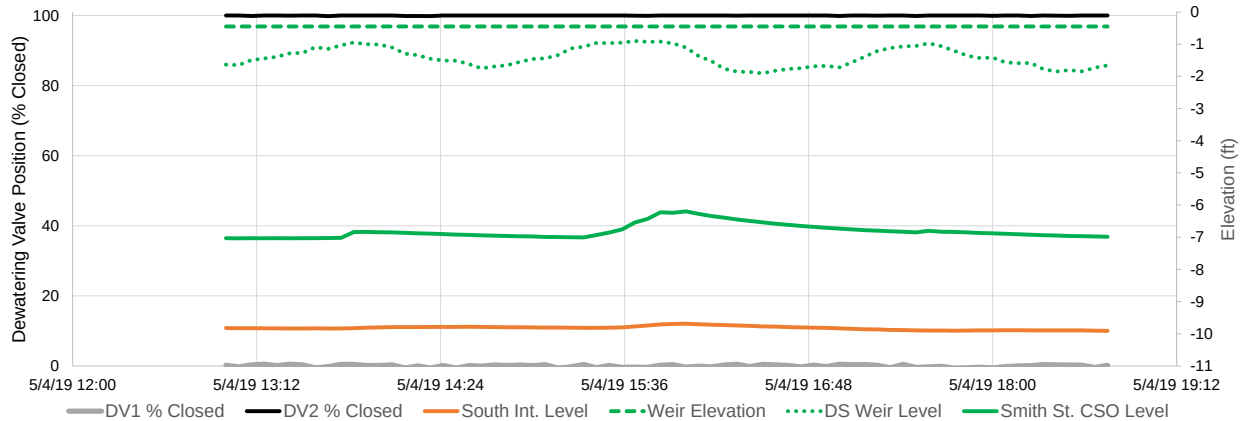
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

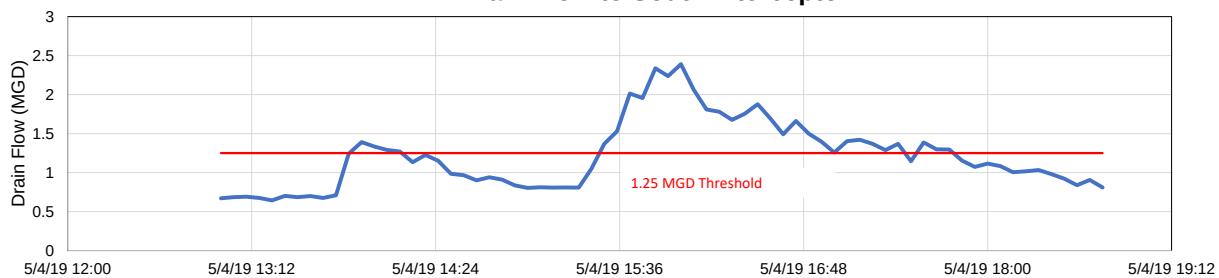
Rainfall data sourced from BSA rain gauge station at South Buffalo.

No rainfall was recorded during or prior to the event. This event was likely caused by localized rainfall.

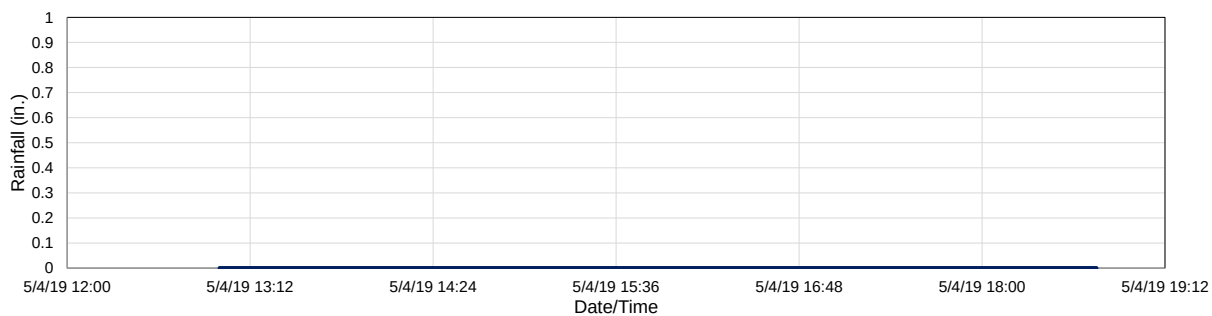
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	06/10/2019
Event Start Date/Time:	5/9/2019 18:20
Event End Date/Time:	5/10/2019 17:30

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.4 in.
Storm Event Duration:	See notes section
Storm Type:	Less than one year

Time Lead Dewatering Valve Closed	5/10/2019 1:25
Time Lead Dewatering Valve Opened	5/10/2019 13:50
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	0.39 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	9,164,013 Gal.
Did seiche occur during wet weather?	Yes

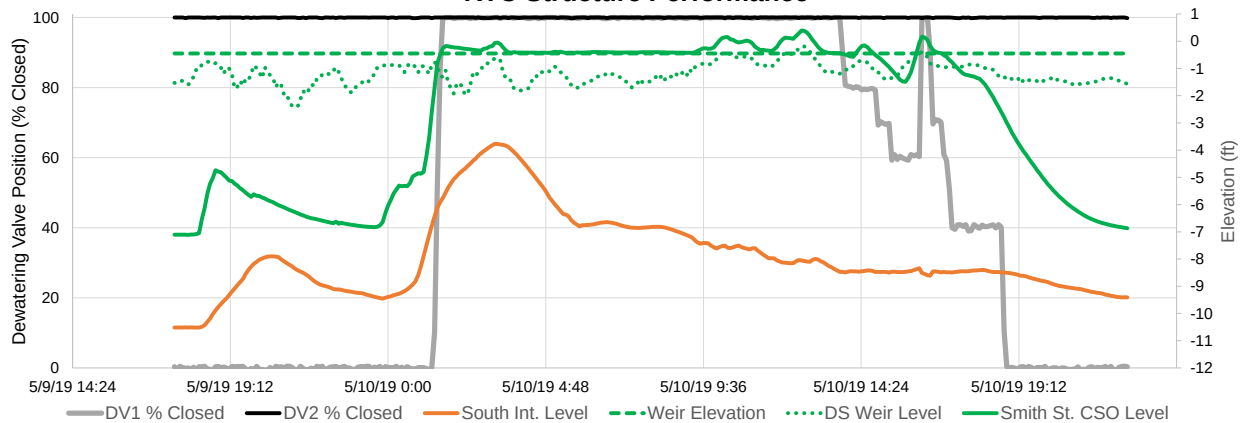
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

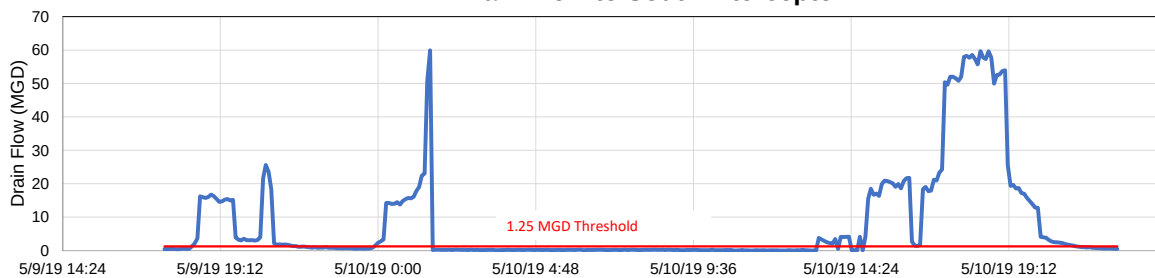
Rainfall data sourced from BSA rain gauge station at South Buffalo.

Two rainfall events contributed to this event, one was recorded at 0.39-inch over three hours while the other recorded at 0.01-inch over an hour.

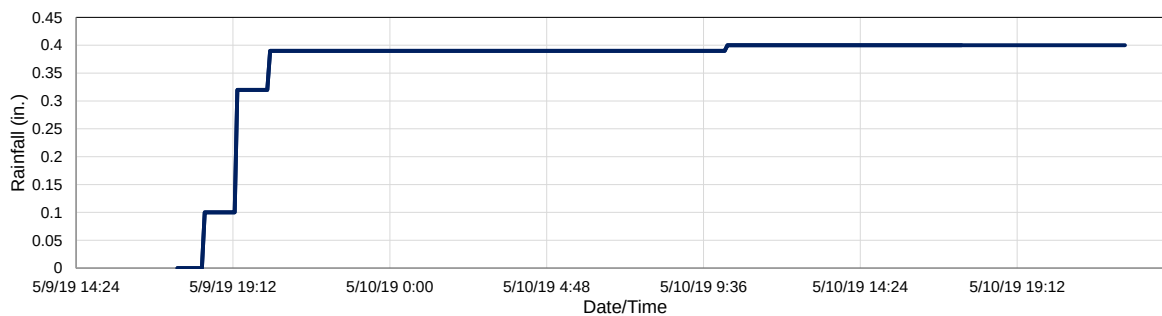
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	06/10/2019
Event Start Date/Time:	5/11/2019 4:45
Event End Date/Time:	5/11/2019 5:25

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-6.24 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	51,748 Gal.
Did seiche occur during wet weather?	No

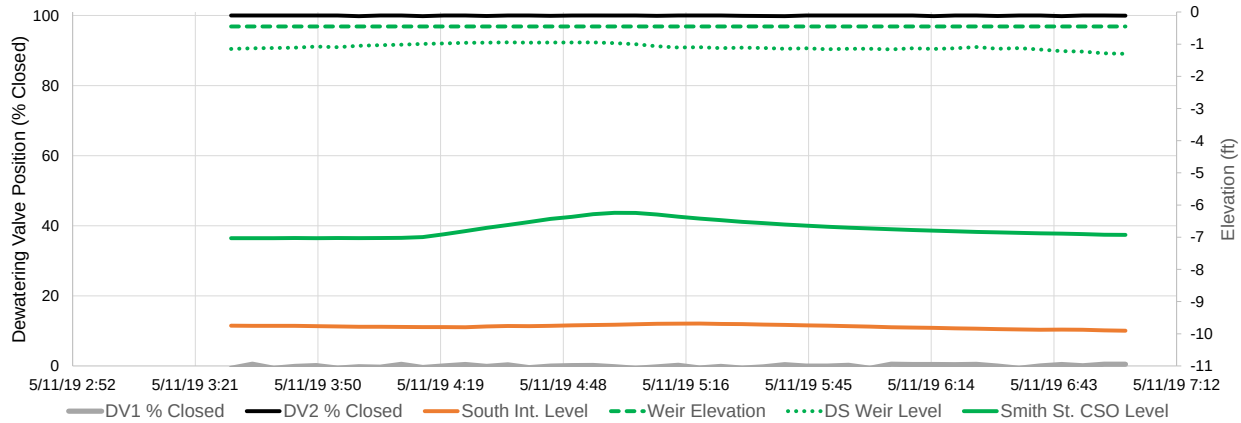
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

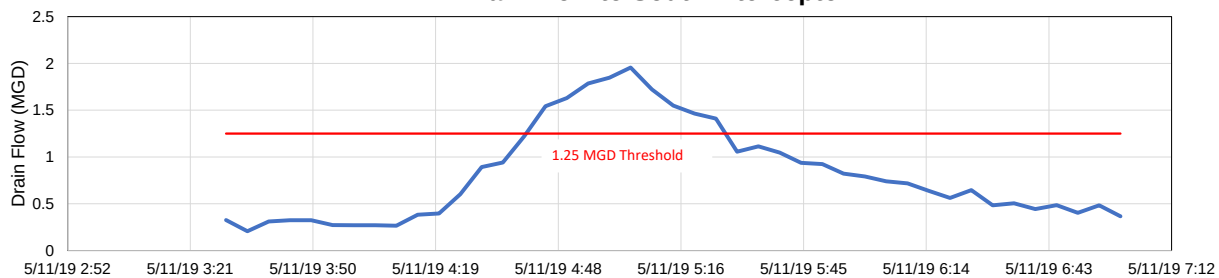
Rainfall data sourced from BSA rain gauge station at South Buffalo.

This event likely caused by localized rainfall.

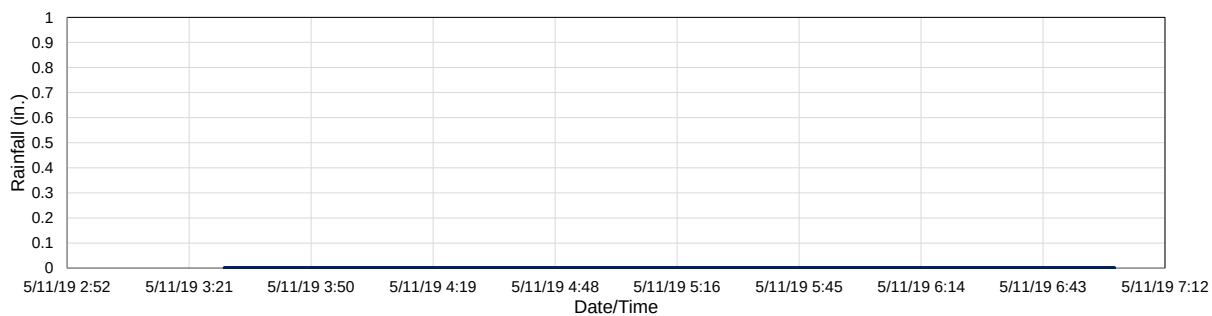
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	06/10/2019
Event Start Date/Time:	5/13/2019 10:35
Event End Date/Time:	5/14/2019 0:40

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.18 in.
Storm Event Duration:	6 hrs.
Storm Type:	Less than one year

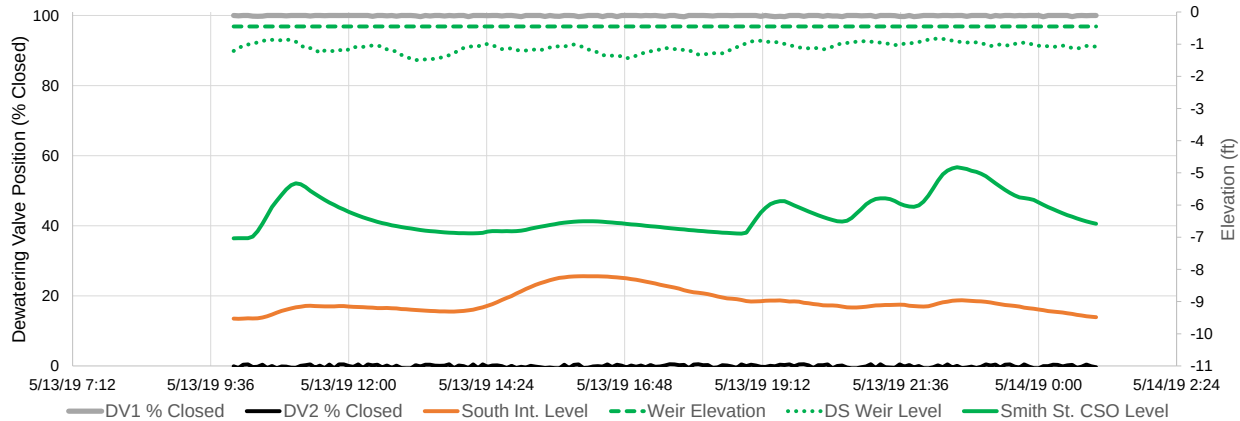
Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-4.83 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	1,579,075 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

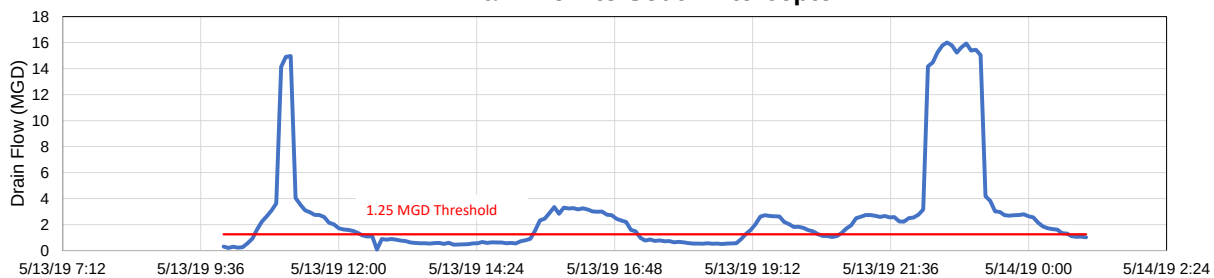
Recommended Operational Changes/Notes:

Rainfall data sourced from BSA rain gauge station at South Buffalo.

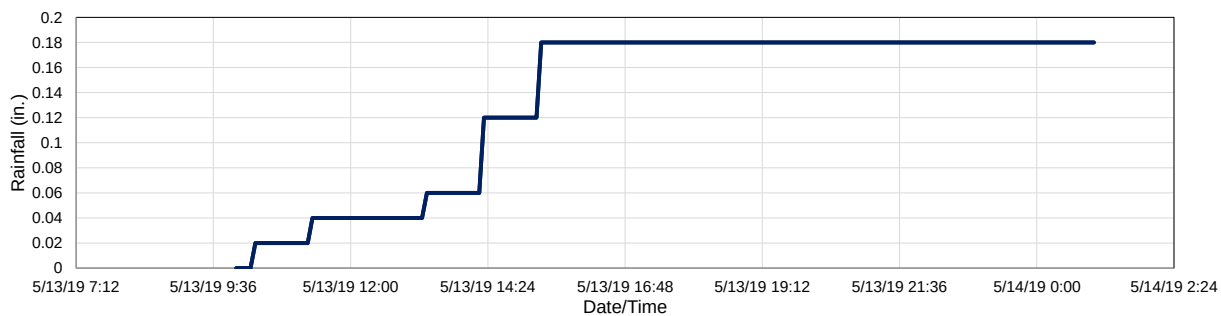
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	06/10/2019
Event Start Date/Time:	5/15/2019 10:15
Event End Date/Time:	5/15/2019 16:50

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-3.90 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	3,649,520 Gal.
Did seiche occur during wet weather?	No

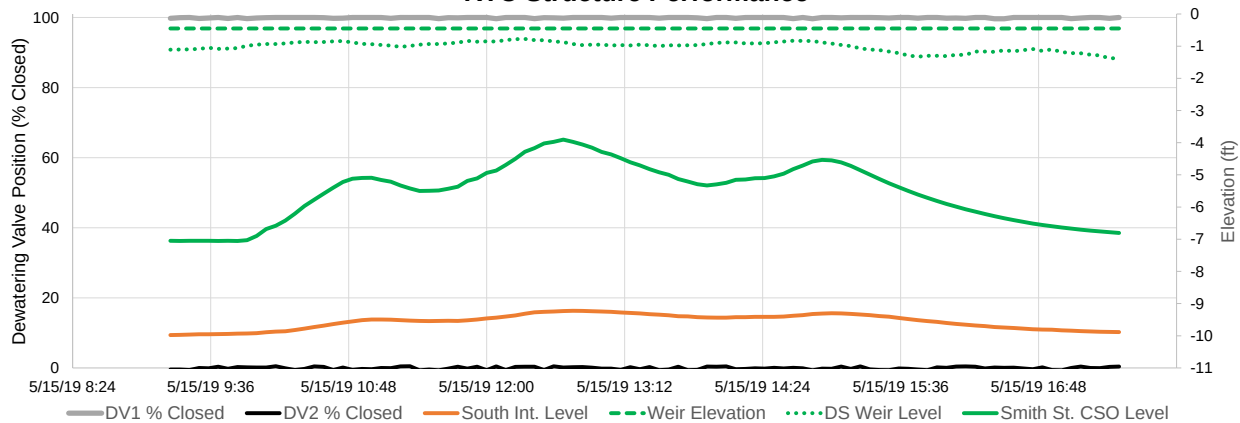
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

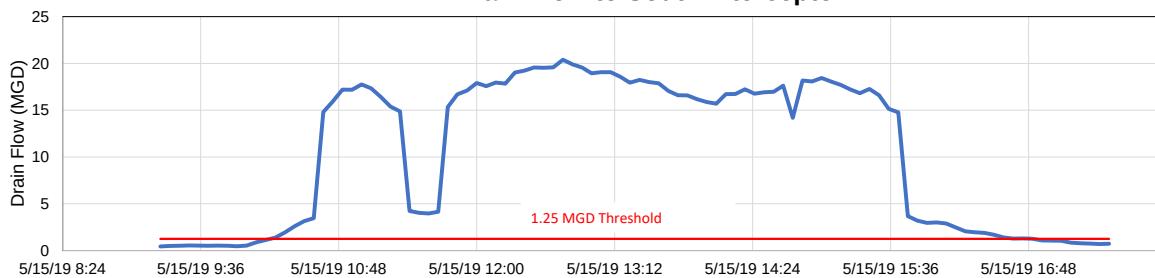
Rainfall data sourced from BSA rain gauge station at South Buffalo.

No rainfall recorded during and prior to the event. This event was likely caused by localized rainfall.

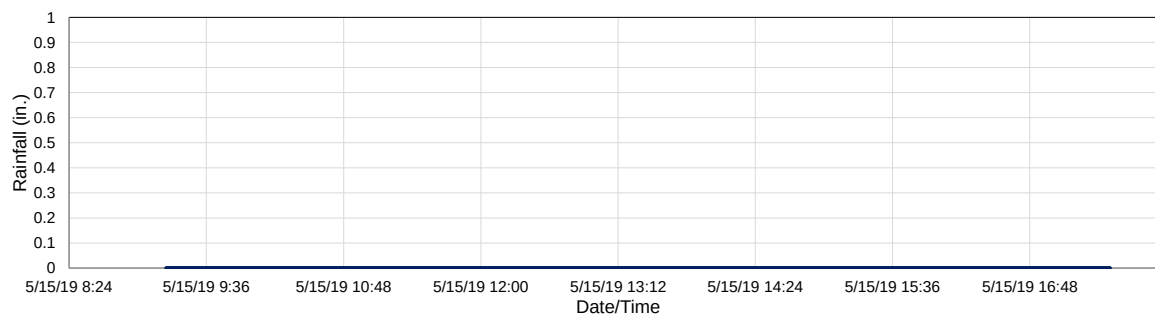
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	06/10/2019
Event Start Date/Time:	5/16/2019 5:55
Event End Date/Time:	5/16/2019 8:05

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-4.48 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	675,391 Gal.
Did seiche occur during wet weather?	No

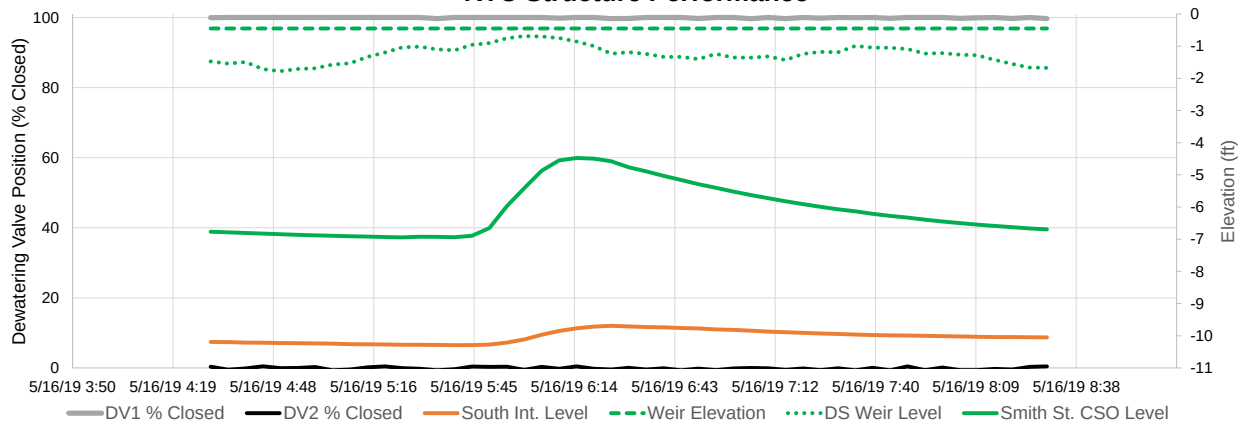
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

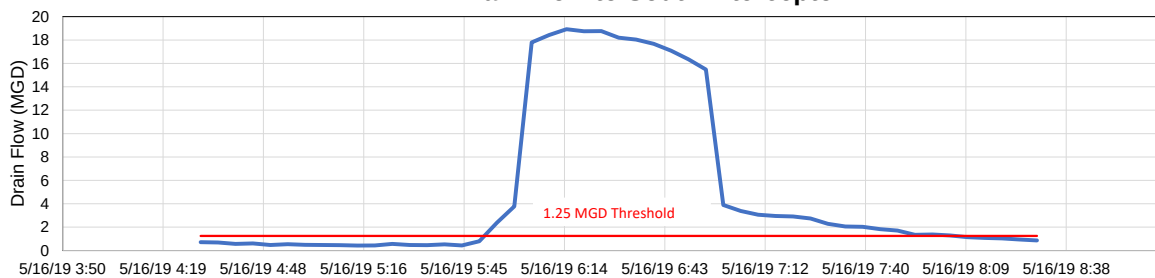
Rainfall data sourced from BSA rain gauge station at South Buffalo.

No rainfall recorded during and prior to the event. This event was likely caused by localized rainfall.

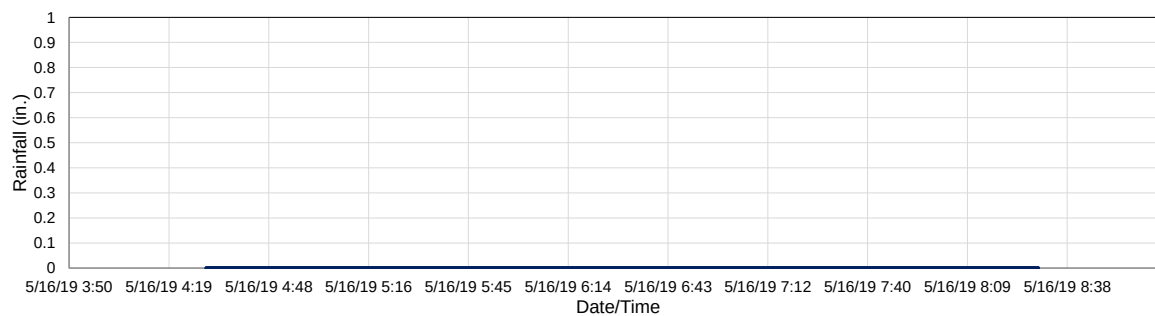
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	06/10/2019
Event Start Date/Time:	5/16/2019 23:25
Event End Date/Time:	5/17/2019 3:40

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-5.37 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	283,795 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

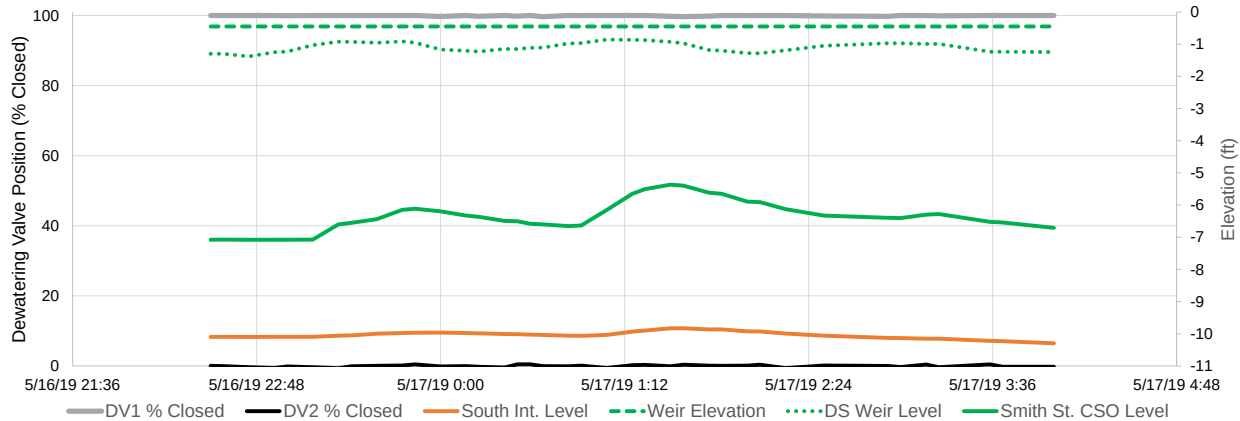
Recommended Operational Changes/Notes:

Rainfall data sourced from BSA rain gauge station at South Buffalo.

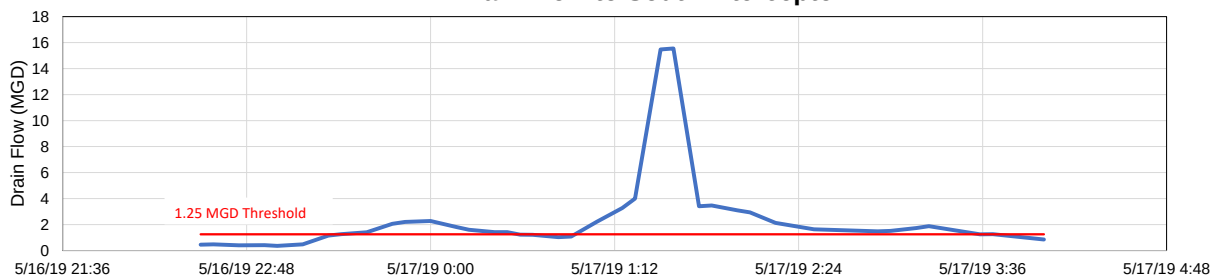
No rainfall was recorded during or prior to the event. This event was likely caused by localized rainfall.

Indicated captured volume is underestimated as complete dataset was not available.

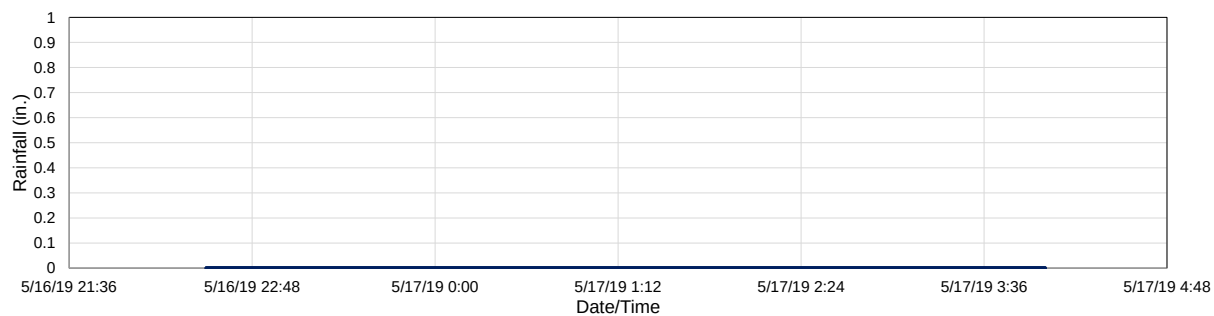
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	06/10/2019
Event Start Date/Time:	5/17/2019 16:20
Event End Date/Time:	5/17/2019 17:00

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-6.36 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	24,586 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

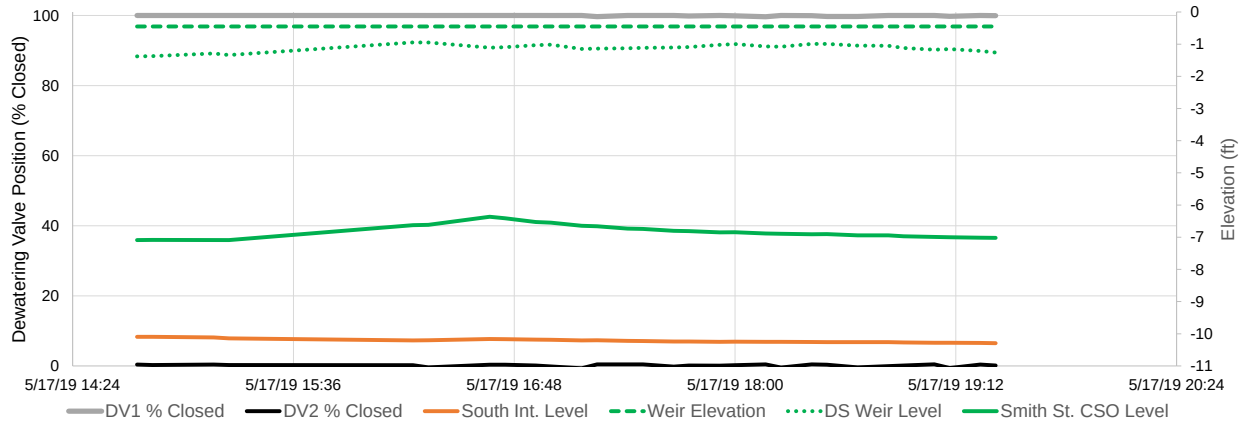
Recommended Operational Changes/Notes:

Rainfall data sourced from BSA rain gauge station at South Buffalo.

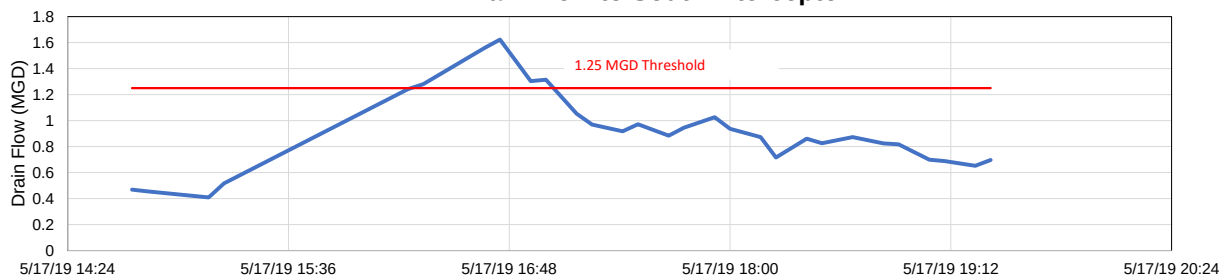
No rainfall was recorded during or prior to the event. This event was likely caused by localized rainfall.

Indicated captured volume is underestimated as complete dataset was not available.

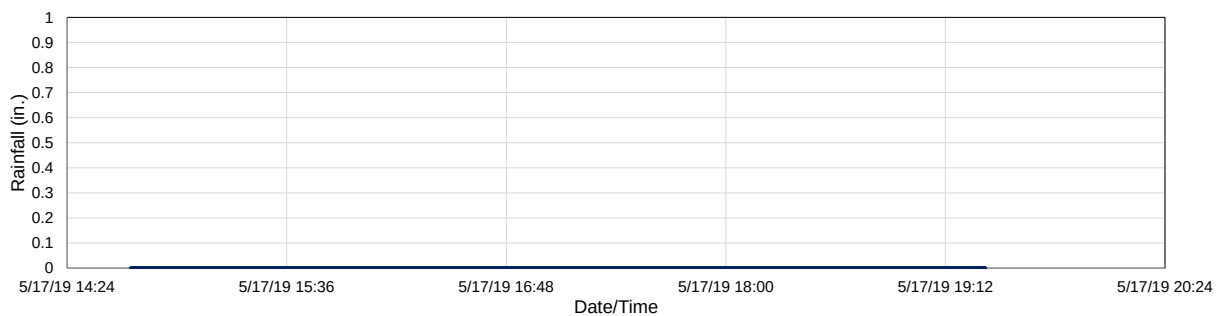
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	06/10/2019
Event Start Date/Time:	5/18/2019 2:20
Event End Date/Time:	5/18/2019 3:50

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Time Lead Dewatering Valve Closed	NA
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-5.50 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	176,485 Gal.
Did seiche occur during wet weather?	No

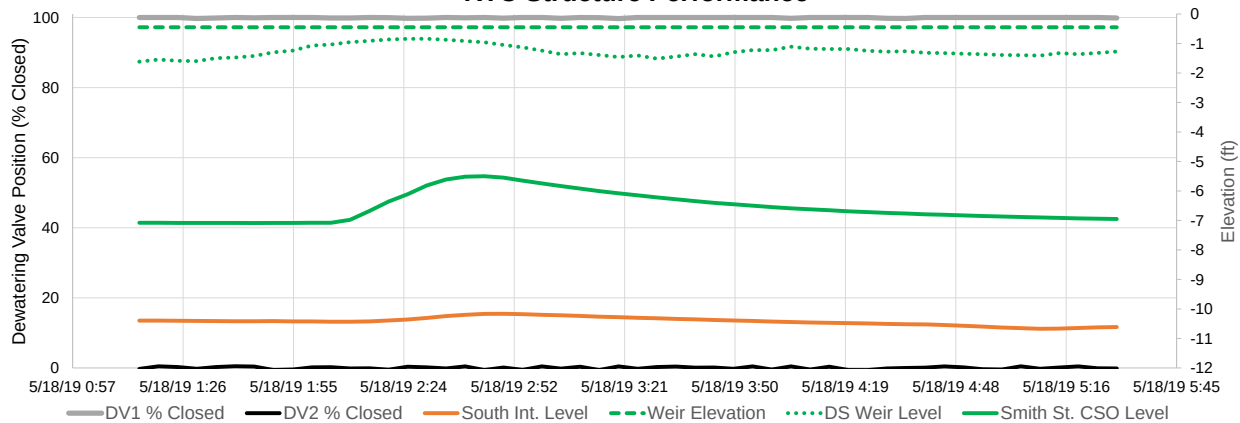
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

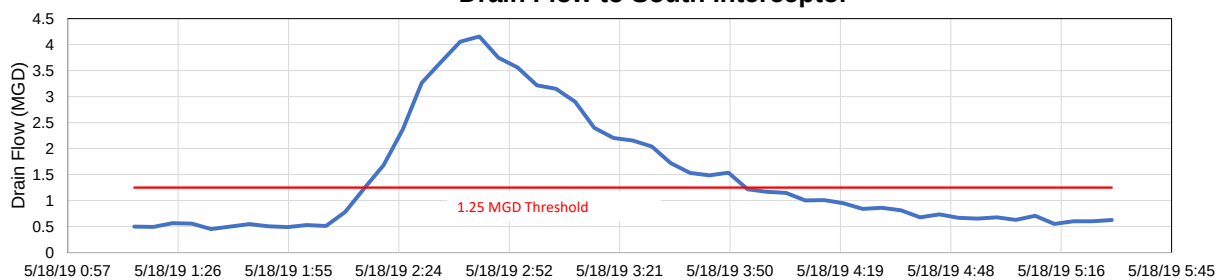
Rainfall data sourced from BSA rain gauge station at South Buffalo.

No rainfall was recorded during or prior to the event. This event was likely caused by localized rainfall.

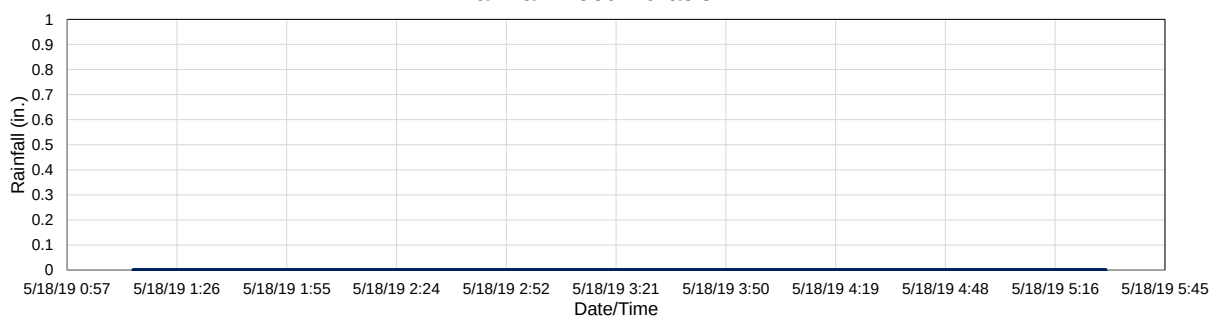
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	06/10/2019
Event Start Date/Time:	5/19/2019 17:55
Event End Date/Time:	5/21/2019 14:05

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.04 in.
Storm Event Duration:	2 hrs.
Storm Type:	Less than one year

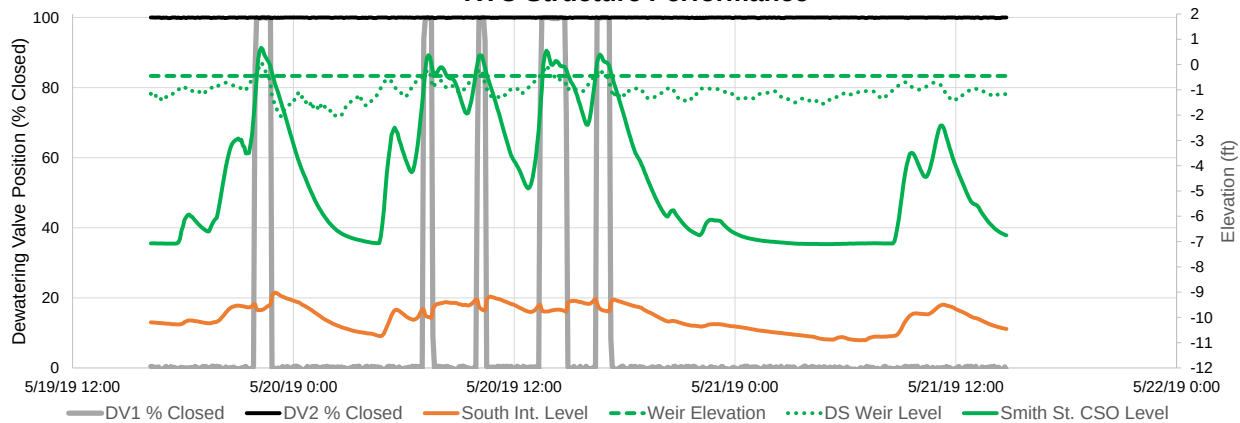
Time Lead Dewatering Valve Closed	5/19/2019 21:55
Time Lead Dewatering Valve Opened	5/19/2019 22:50
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	0.66 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	25,249,746 Gal.
Did seiche occur during wet weather?	No

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

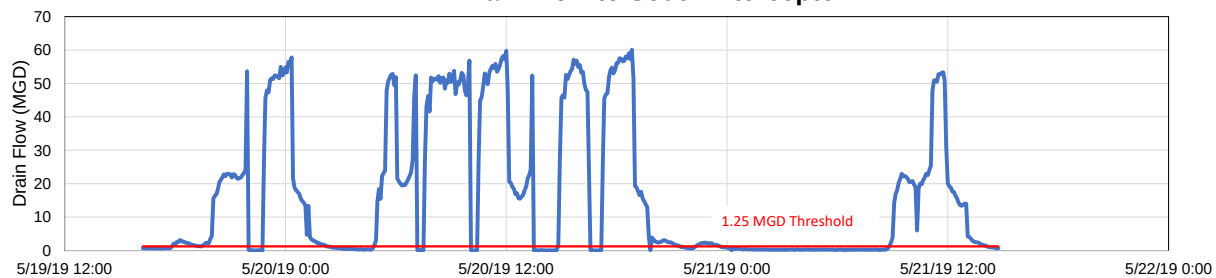
Recommended Operational Changes/Notes:

Rainfall data sourced from BSA rain gauge station at South Buffalo.

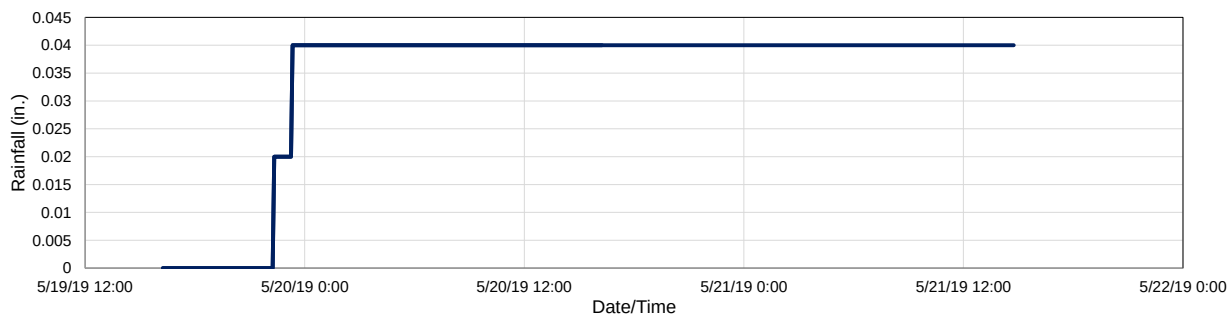
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	06/10/2019
Event Start Date/Time:	5/22/2019 15:55
Event End Date/Time:	5/24/2019 15:35

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.24 in.
Storm Event Duration:	5 hrs.
Storm Type:	Less than one year

Time Lead Dewatering Valve Closed	5/23/2019 15:35
Time Lead Dewatering Valve Opened	5/23/2019 16:05
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	0.21 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	19,847,066 Gal.
Did seiche occur during wet weather?	No

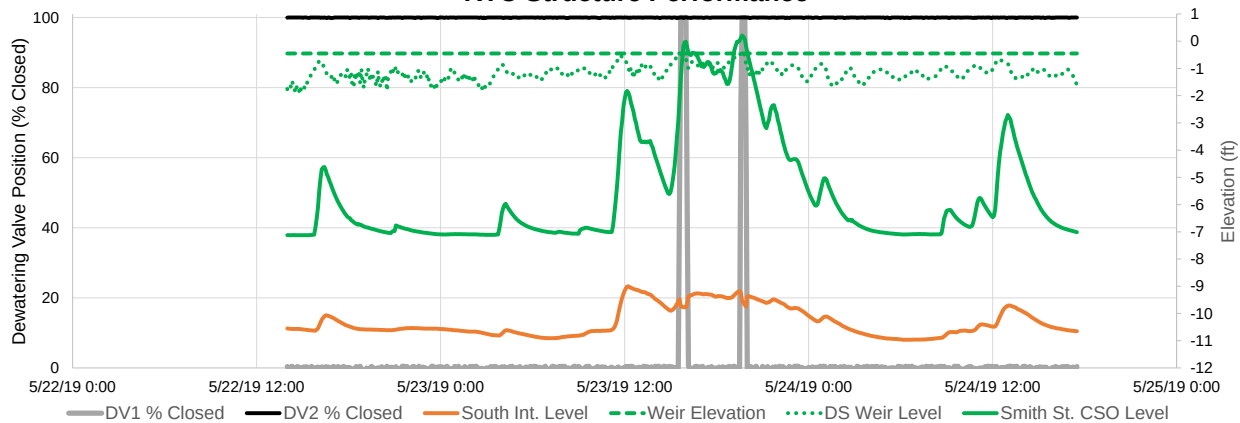
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

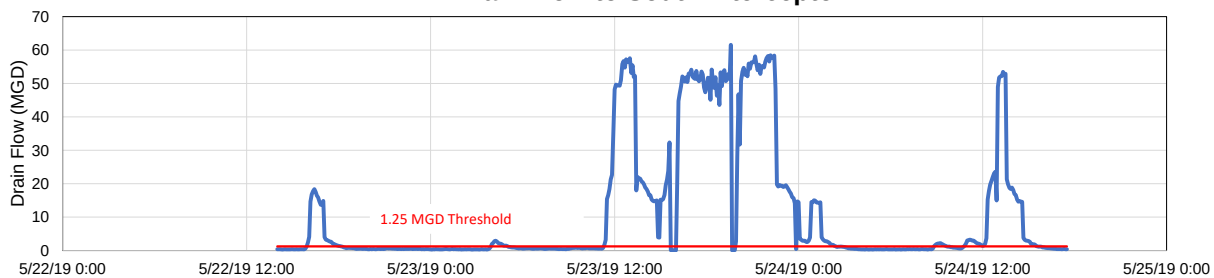
Rainfall data sourced from BSA rain gauge station at South Buffalo.

Localized rainfall contributed to initial part of the event.

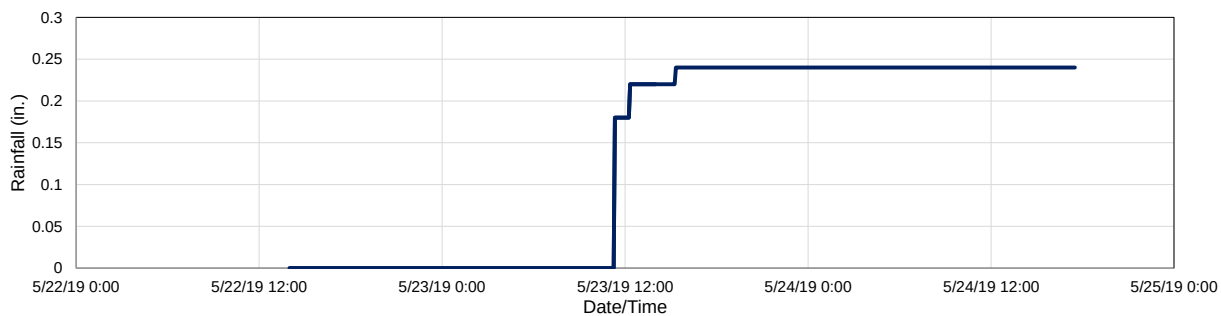
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	06/10/2019
Event Start Date/Time:	5/25/2019 11:50
Event End Date/Time:	5/27/2019 15:55

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.33 in.
Storm Event Duration:	See notes section
Storm Type:	Less than one year

Time Lead Dewatering Valve Closed	5/25/2019 21:55
Time Lead Dewatering Valve Opened	5/25/2019 22:20
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	0.29 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	18,556,143 Gal.
Did seiche occur during wet weather?	No

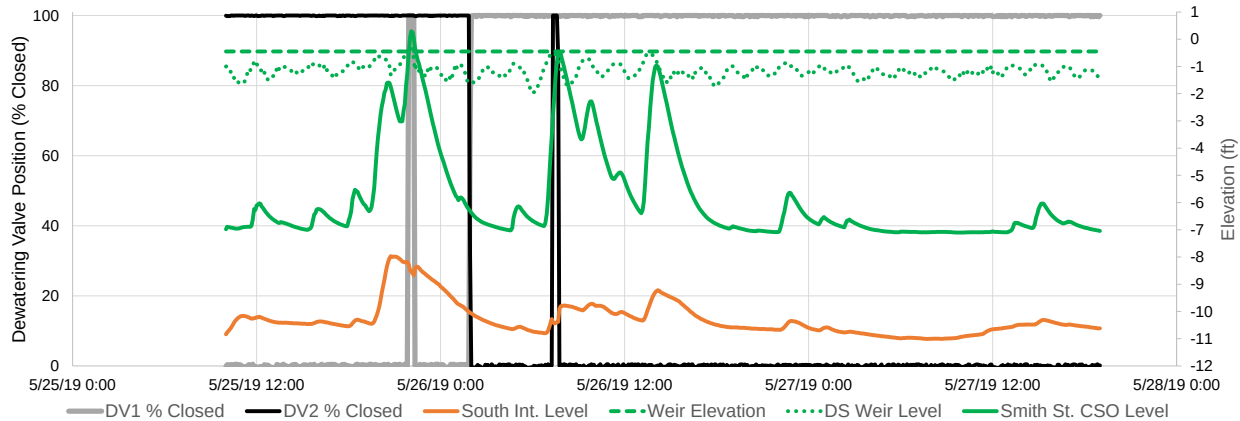
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

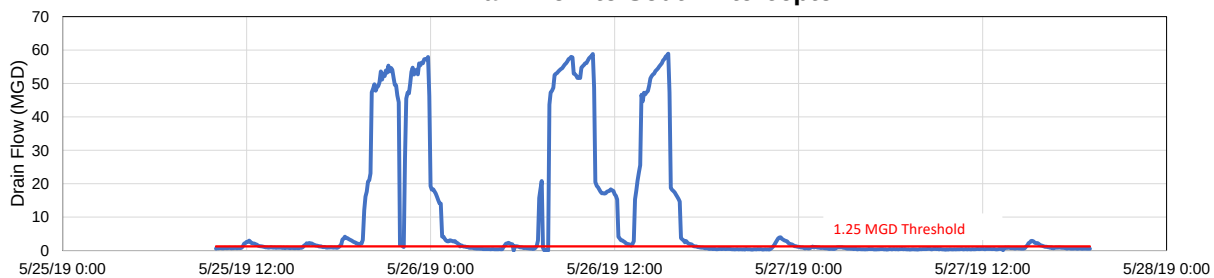
Rainfall data sourced from BSA rain gauge station at South Buffalo.

Two rainfall events contributed to this event, one was recorded at 0.08-inch over an hour while the other recorded at 0.25-inch over 8 hours.

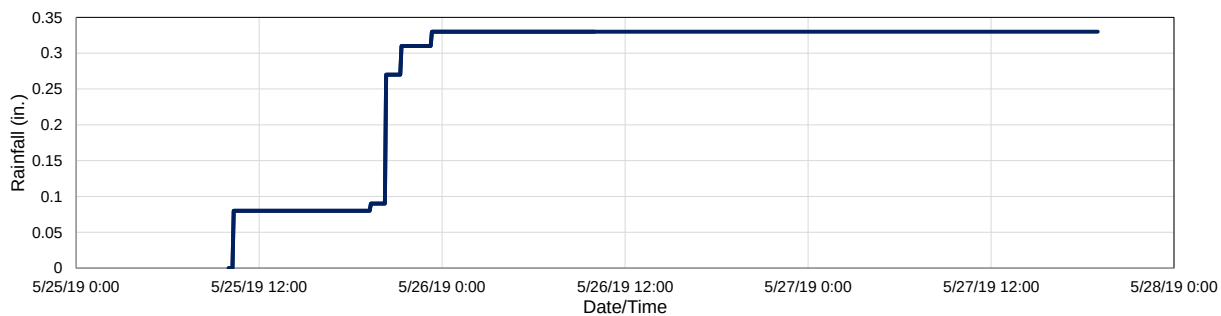
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	06/10/2019
Event Start Date/Time:	5/28/2019 8:05
Event End Date/Time:	5/31/2019 12:20

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.56 in.
Storm Event Duration:	See notes section
Storm Type:	Less than one year

Time Lead Dewatering Valve Closed	5/28/2019 16:00
Time Lead Dewatering Valve Opened	NA
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-0.08 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	29,721,624 Gal.
Did seiche occur during wet weather?	Yes

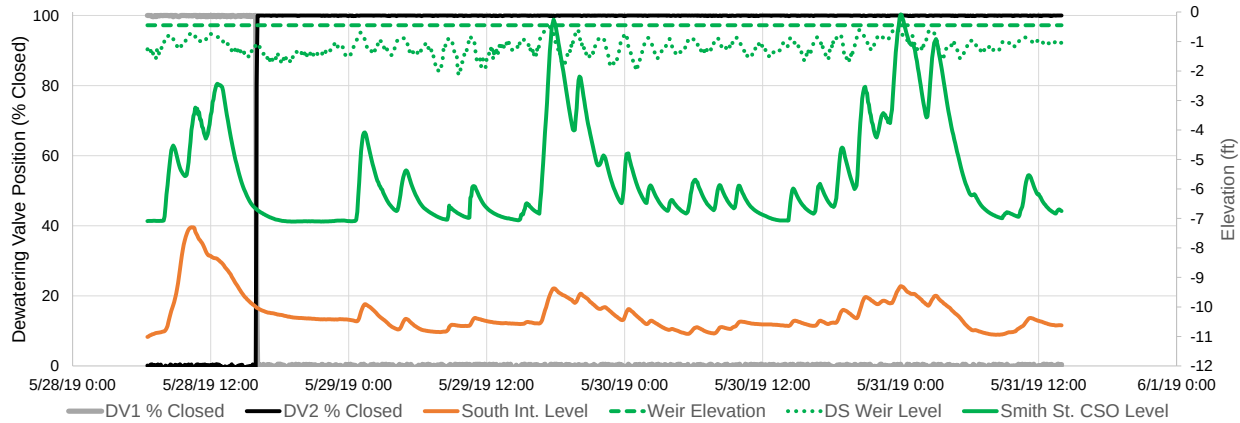
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

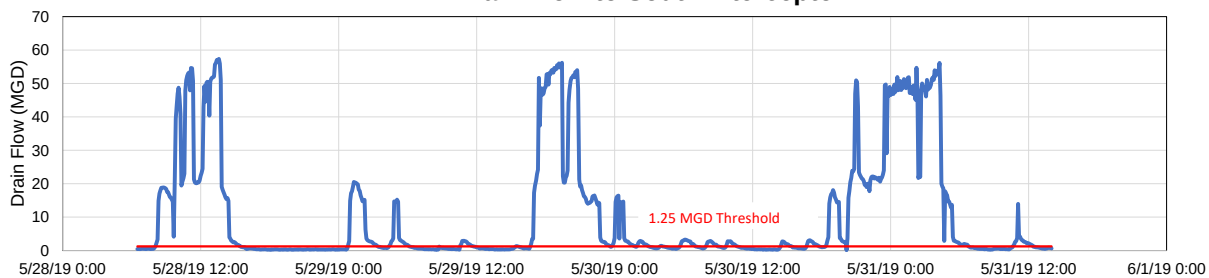
Rainfall data sourced from BSA rain gauge station at South Buffalo.

Two rainfall events contributed to this event, one was recorded at 0.54-inch over five hours while the other recorded at 0.02-inch over an hour.

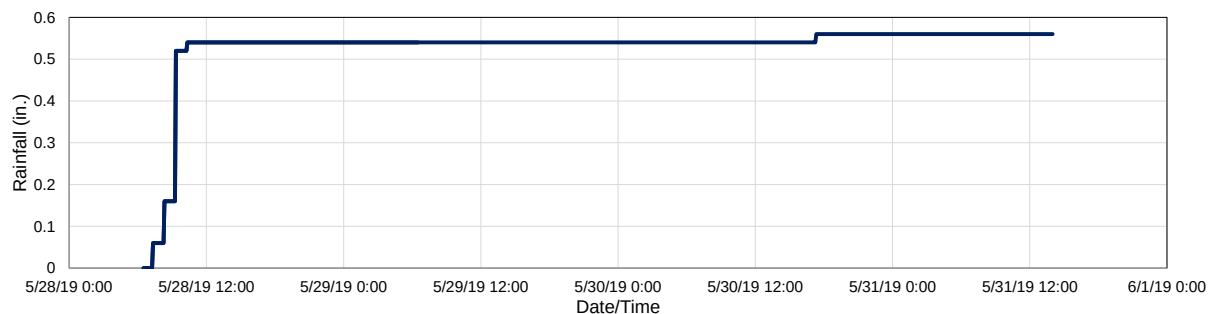
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



June 2019 Smith St. RTC KPI Report

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Smith St. RTC Monthly Performance Report

June 2019

Event Date	Volume Captured (gal)	Did a seiche occur during wet weather? (Note: if a seiche occurs during wet weather, volume captured will be slightly overestimated due to the inclusion of the seiche)	
		Event drain flow threshold (MGD)	
6/1/2019	96,877,856	No	1.25
6/10/2019	20,355,638	Yes	1.25
6/13/2019	36,872,786	Yes	1.25
6/16/2019	34,080,070	No	1.25
6/20/2019	107,962,077	Yes	1.25
6/25/2019	155,624,887	No	1.25
Total Volume Captured (gal)	451,773,314		

Note: The event starting on June 25 extended into July 1

Site:	Smith RTC
Analysis Date:	07/12/2019
Event Start Date/Time:	6/1/2019 22:15
Event End Date/Time:	6/7/2019 11:55

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.66 in.
Storm Event Duration:	See notes section
Storm Type:	Less than one year

Time Lead Dewatering Valve Closed	6/1/2019 21:40
Time Lead Dewatering Valve Opened	6/6/2019 5:55
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	0.63 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	96,877,856 Gal.
Did seiche occur during wet weather?	No

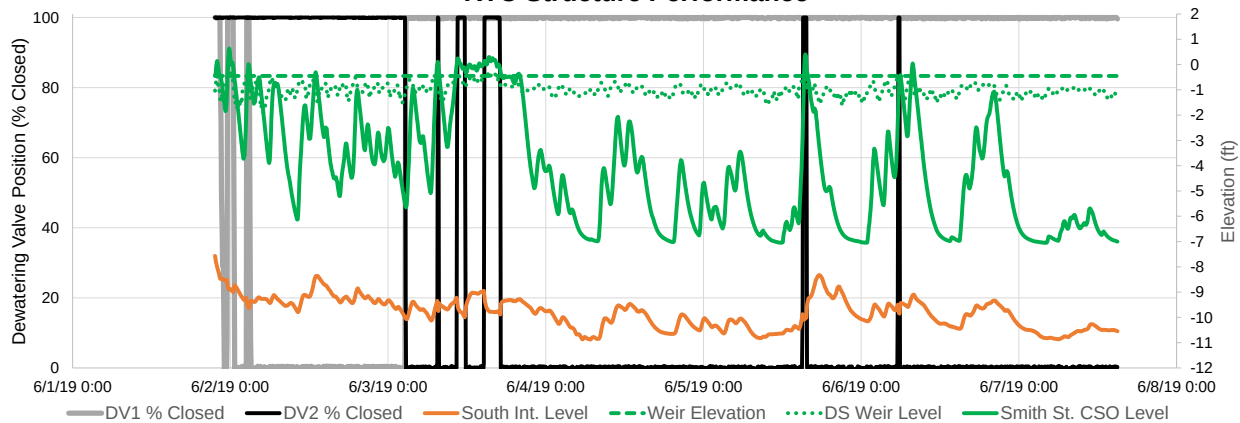
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

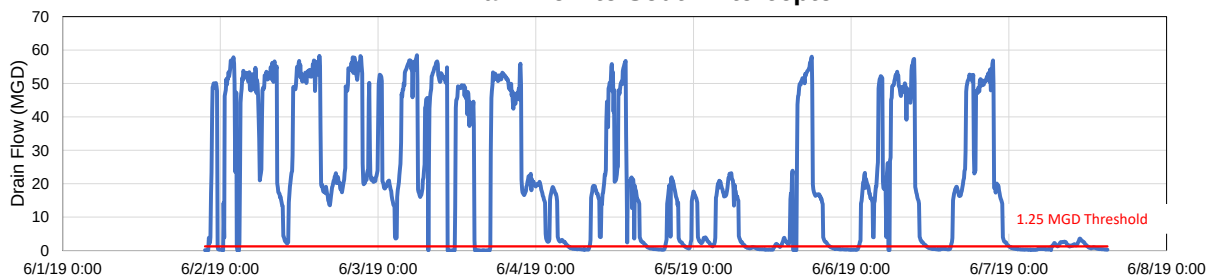
Rainfall data sourced from BSA rain gauge station at South Buffalo.

Rainfall was intermittent during the event.

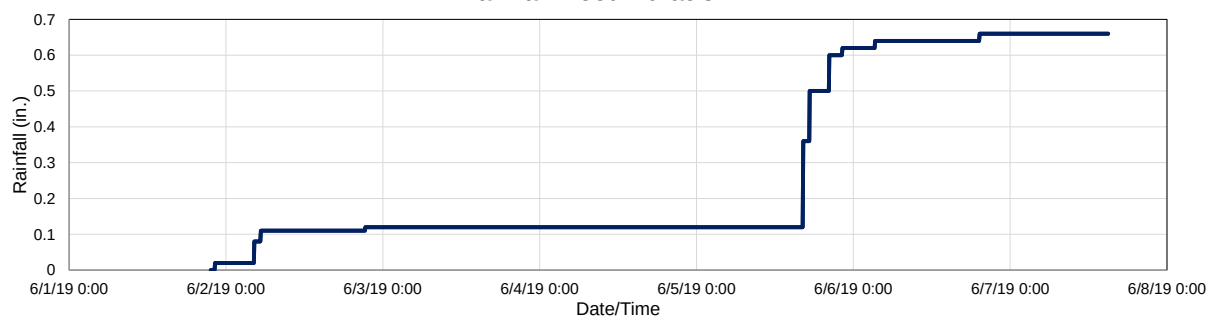
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	07/12/2019
Event Start Date/Time:	6/10/2019 9:50
Event End Date/Time:	6/12/2019 6:15

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	1.43 in.
Storm Event Duration:	12 hrs.
Storm Type:	Less than one year

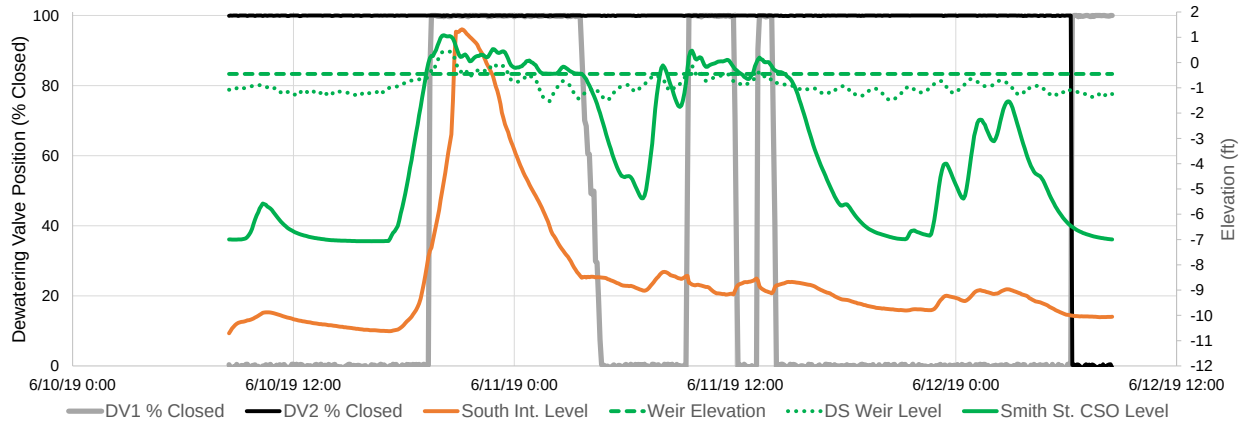
Time Lead Dewatering Valve Closed	6/10/2019 19:25
Time Lead Dewatering Valve Opened	6/12/2019 6:20
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	1.08 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	20,355,638 Gal.
Did seiche occur during wet weather?	Yes

*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

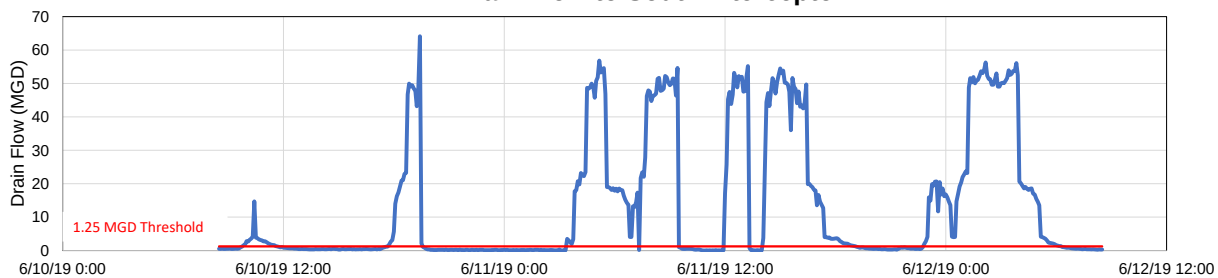
Recommended Operational Changes/Notes:

Rainfall data sourced from BSA rain gauge station at South Buffalo.

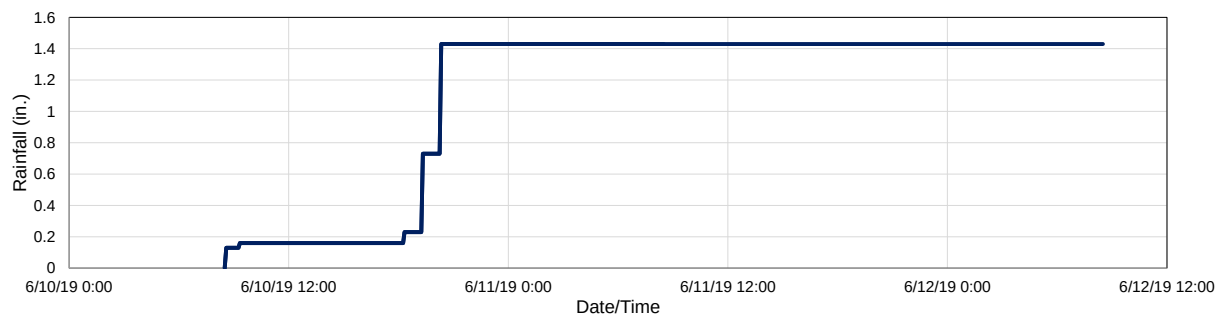
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	07/12/2019
Event Start Date/Time:	6/13/2019 3:15
Event End Date/Time:	6/15/2019 19:05

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.59 in.
Storm Event Duration:	4 hrs.
Storm Type:	Less than one year

Time Lead Dewatering Valve Closed	6/13/2019 4:00
Time Lead Dewatering Valve Opened	6/15/2019 15:30
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	1.40 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	36,872,786 Gal.
Did seiche occur during wet weather?	Yes

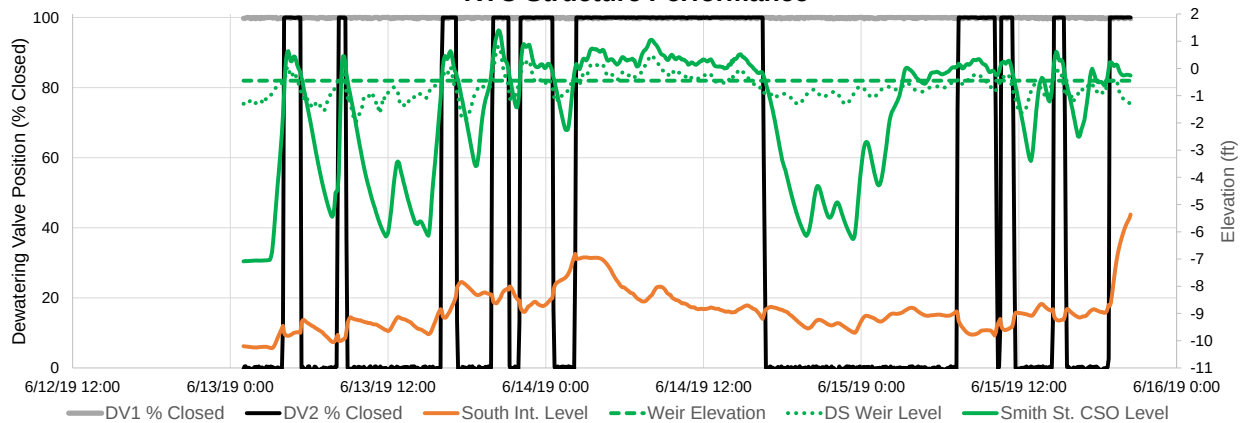
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

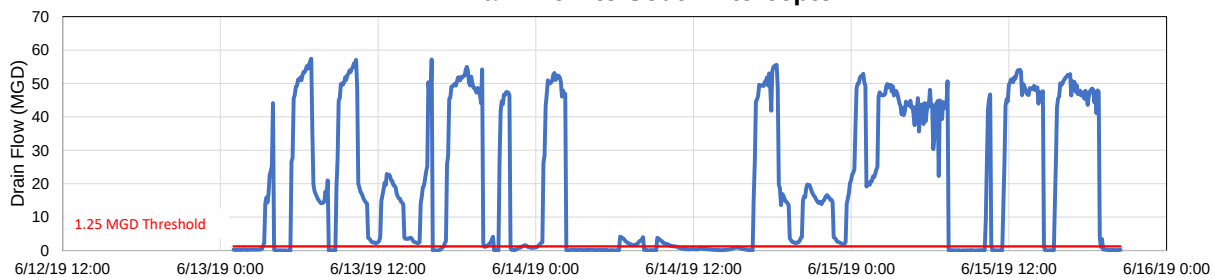
Rainfall data sourced from BSA rain gauge station at South Buffalo.

This event was possibly triggered by a localized storm.

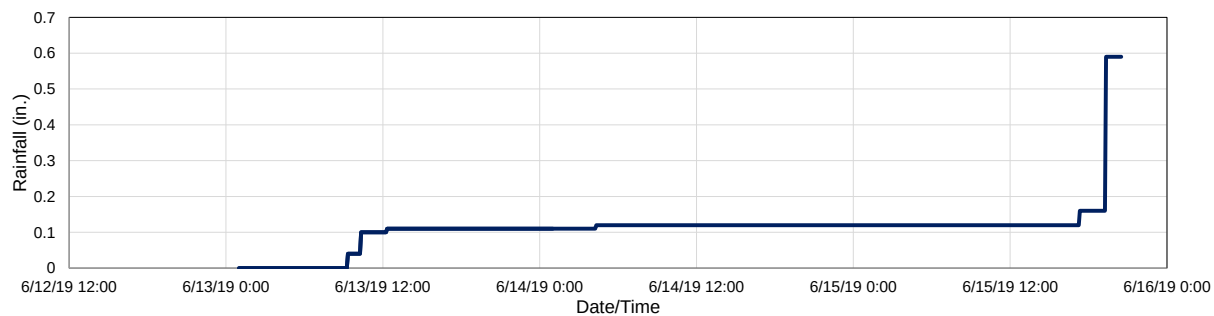
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	07/12/2019
Event Start Date/Time:	6/16/2019 11:30
Event End Date/Time:	6/20/2019 0:10

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Time Lead Dewatering Valve Closed	6/16/2019 9:30
Time Lead Dewatering Valve Opened	6/19/2019 19:00
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	-0.25 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	34,080,070 Gal.
Did seiche occur during wet weather?	No

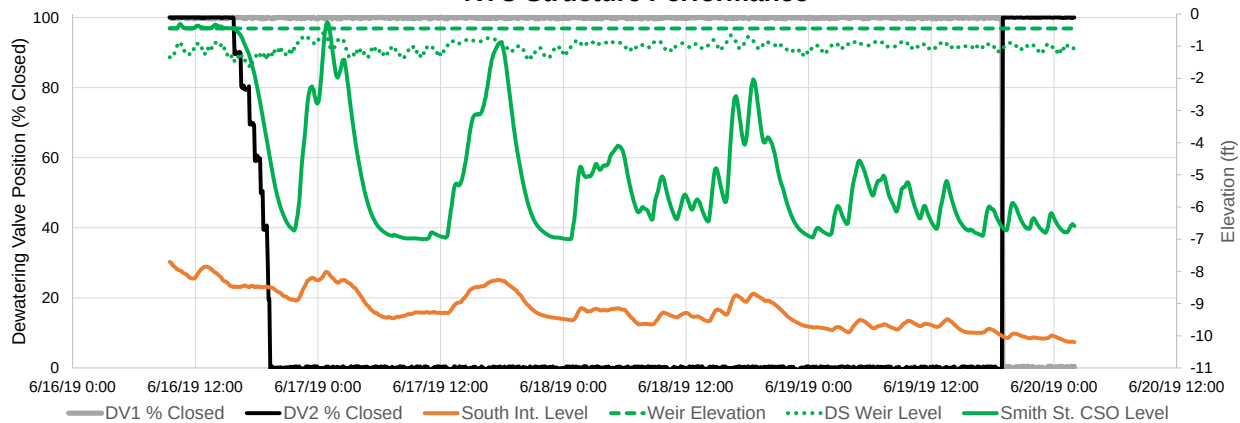
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

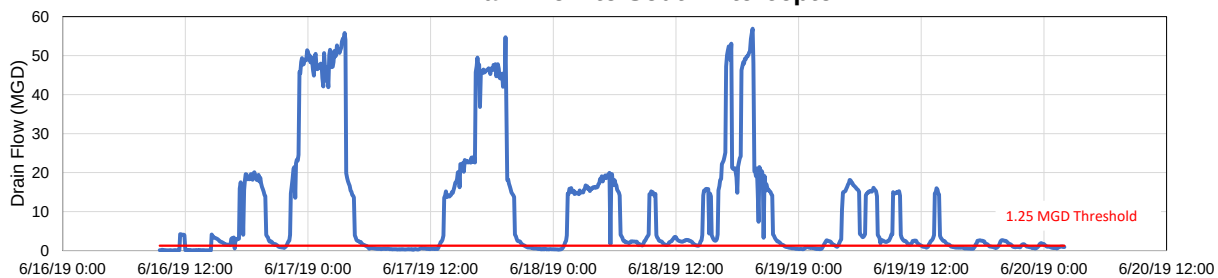
Rainfall data sourced from BSA rain gauge station at South Buffalo.

No Rainfall was recorded at South Buffalo rain gauge during the event. This event was likely caused by localized storm.

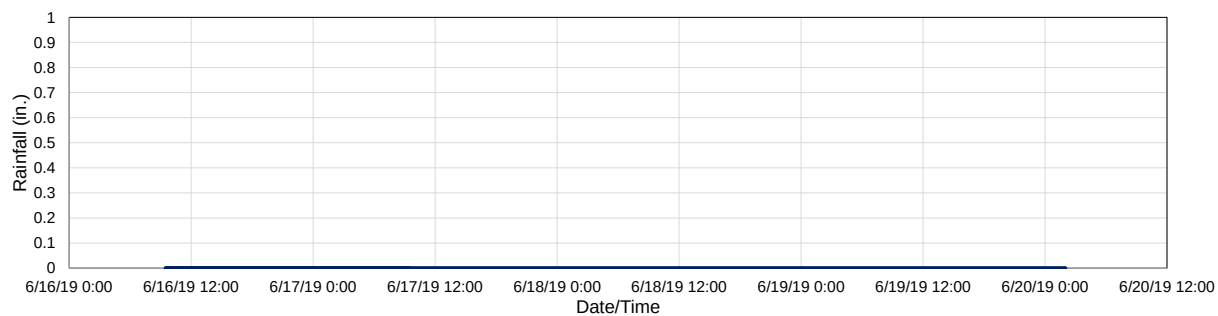
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	07/12/2019
Event Start Date/Time:	6/20/2019 8:15
Event End Date/Time:	6/25/2019 9:25

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	1.04 in.
Storm Event Duration:	See notes section
Storm Type:	Less than one year

Time Lead Dewatering Valve Closed	6/21/2019 1:35
Time Lead Dewatering Valve Opened	6/25/2019 6:15
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	0.77 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	107,962,077 Gal.
Did seiche occur during wet weather?	Yes

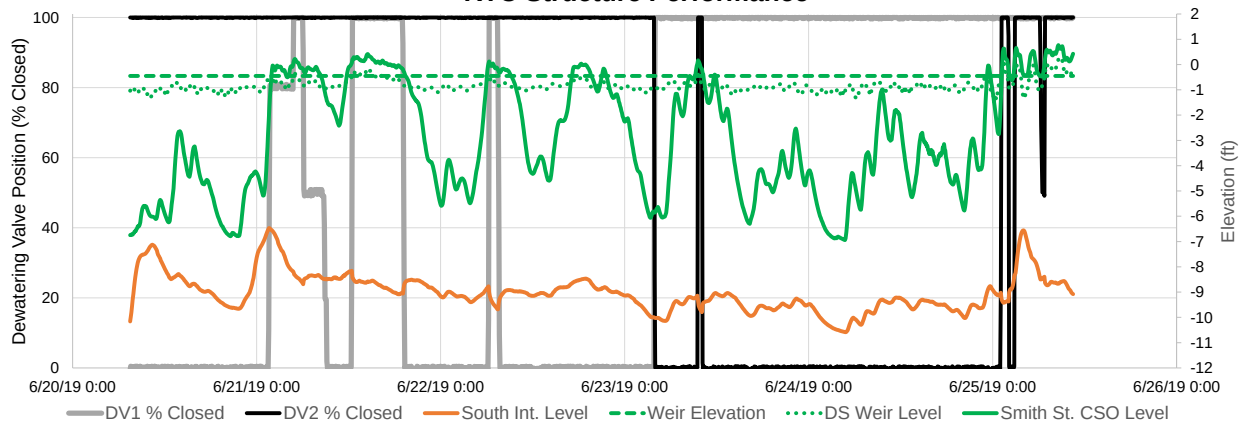
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

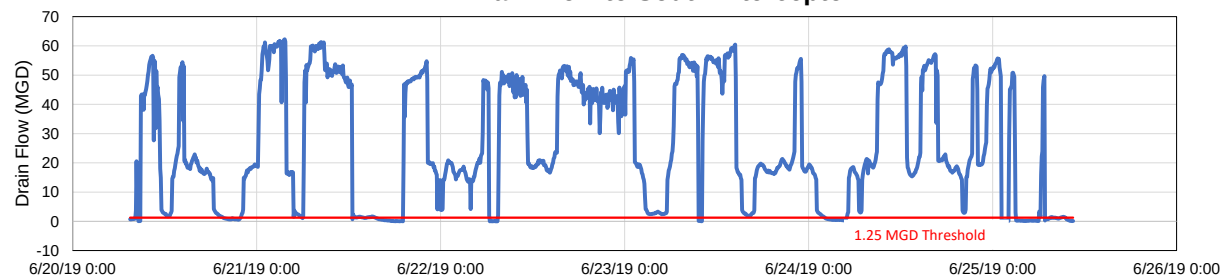
Rainfall data sourced from BSA rain gauge station at South Buffalo.

Rainfall was intermittent during the event.

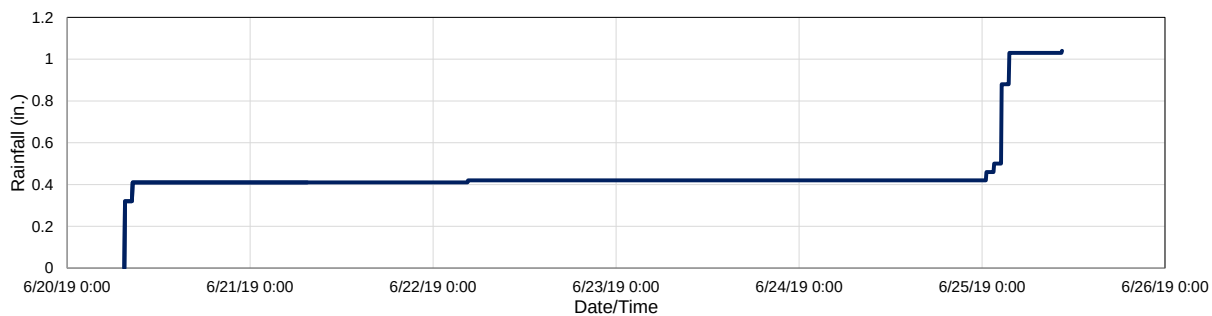
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



Site:	Smith RTC
Analysis Date:	07/12/2019
Event Start Date/Time:	6/25/2019 16:30
Event End Date/Time:	7/1/2019 8:50

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.06 in.
Storm Event Duration:	3 hrs.
Storm Type:	Less than one year

Time Lead Dewatering Valve Closed	6/25/2019 15:30
Time Lead Dewatering Valve Opened	6/30/2019 9:30
Elevation of Weir	-0.45 ft.
Maximum Elevation Reached of Smith St. CSO:	0.62 ft.
Event Drain Flow Threshold	1.25 MGD
Total Volume Captured	155,624,887 Gal.
Did seiche occur during wet weather?	No

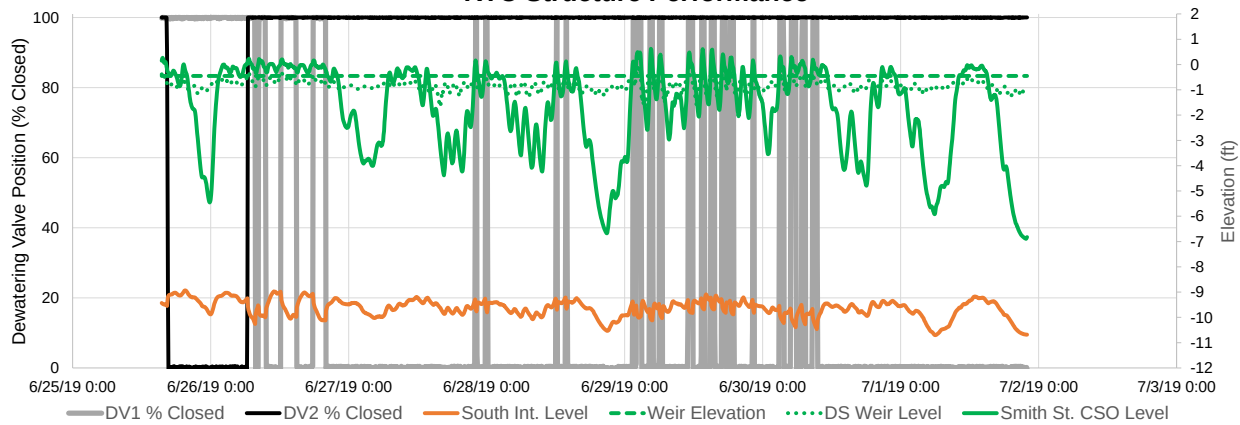
*Note: if seiche occurred during wet weather, volume captured will be slightly overestimated due to inclusion of the seiche.

Recommended Operational Changes/Notes:

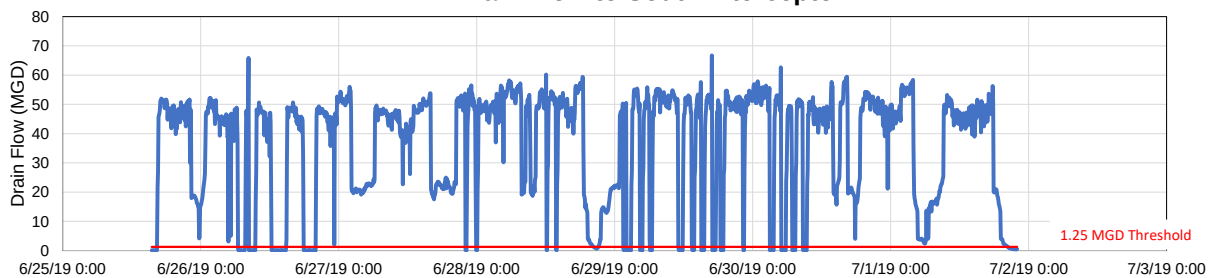
Rainfall data sourced from BSA rain gauge station at South Buffalo.

Localized rainfall likely triggered this event.

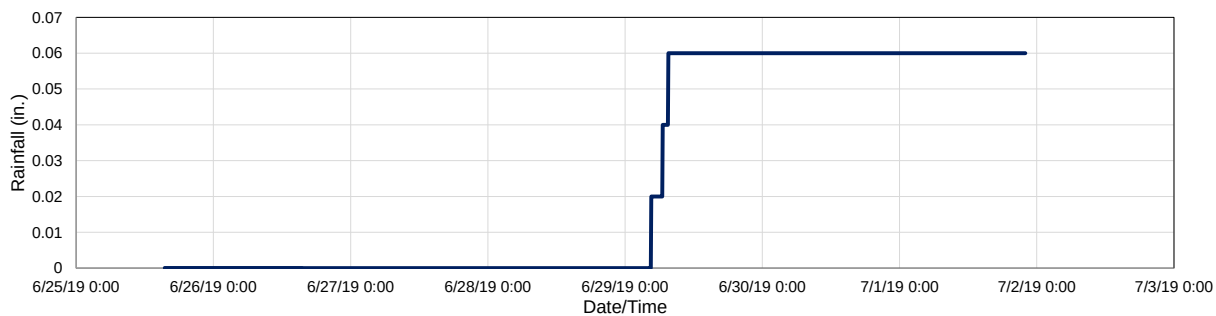
RTC Structure Performance



Drain Flow to South Interceptor



Rainfall Accumulation



July 2018 Lang Ave. RTC KPI Report

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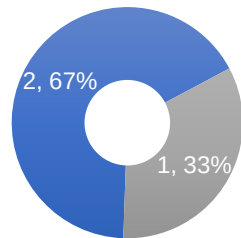
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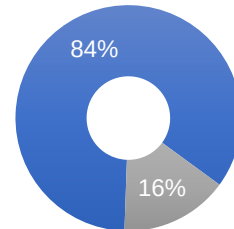
July 2018

Prevented SPP Events



- Number of Prevented SPP Overflow Events
- Number of Occurred SPP Overflow Events

Prevented SPP Volume



- Prevented SPP Overflow Volume (Gal.)
- Occurred SPP Overflow Volume (Gal.)

Number of Prevented SPP Overflow Events	Number of Occurred SPP Overflow Events	Prevented SPP Overflow Volume (Gal.)	Occurred SPP Overflow Volume (Gal.)
2	1	1,666,176	305,876
Event Date	SPP Overflow Volume Prevented	SPP Overflow Volume Occurred	Percent Capture
07/02/2018	242,585	-	100%
07/22/2018	576,032	-	100%
07/25/2018	847,559	305,876	73%

July 2, 2018

1

Site:	Lang RTC
Analysis Date:	09/13/2018
Event Start Date/Time:	7/2/2018 23:05
Event End Date/Time:	7/3/2018 0:40

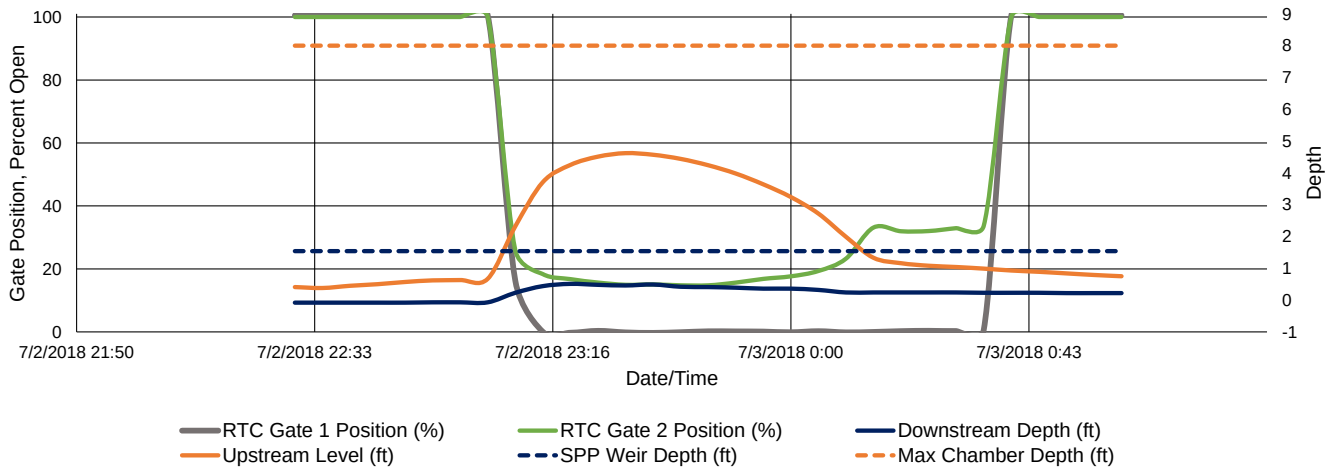
Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.1 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	0.67 ft.
Return to Normal Depth:	0.99 ft.
Time Gate 1 Activated:	7/2/2018 23:05
Time Gate 2 Activated:	7/2/2018 23:05
Time Gate 1 Returned to Normal:	7/3/2018 0:40
Time Gate 2 Returned to Normal:	7/3/2018 0:40
Percent Capture	100%
Depth of Weir	8.00 ft.
Maximum Depth Reached:	4.62 ft.
Volume Stored:	242,585 Gal.
Unused Storage Volume:	616,245 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	242,585 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

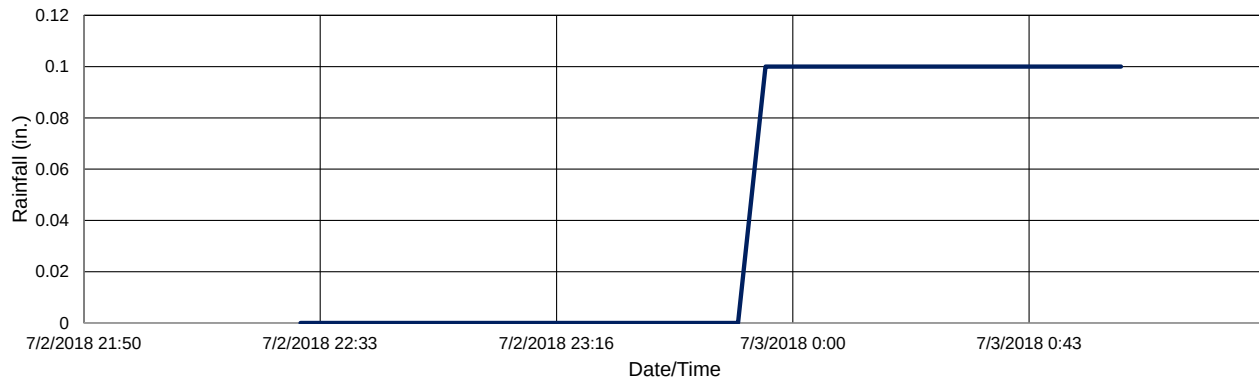
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. Rainfall data is updated on an hourly basis, and therefore the gate performance graph shows activation before rainfall data is recorded.

RTC Gate Performance



Rainfall Accumulation



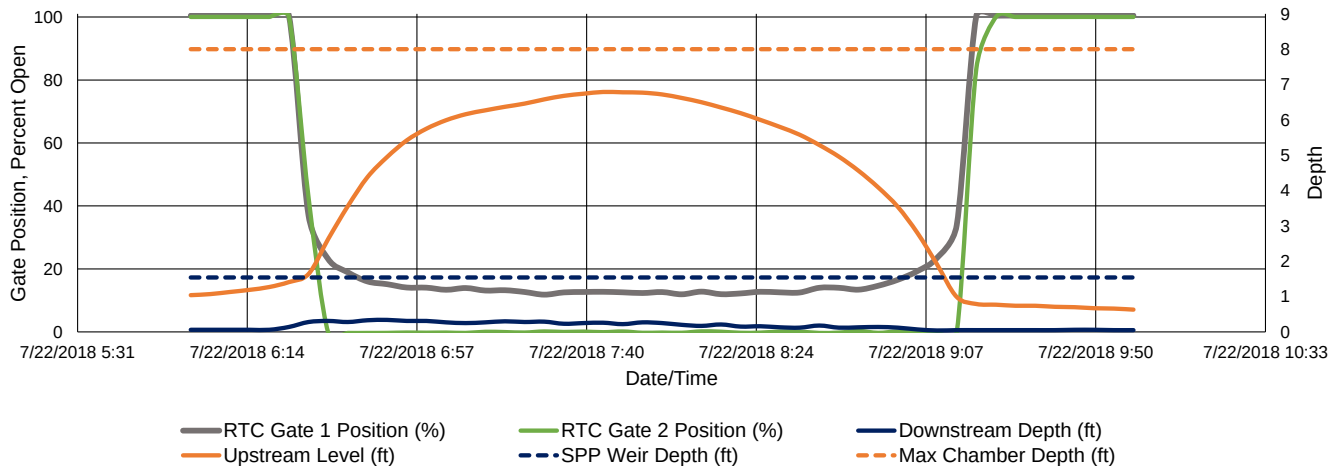
Site:	Lang RTC
Analysis Date:	09/13/2018
Event Start Date/Time:	7/22/2018 6:25
Event End Date/Time:	7/22/2018 9:20

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.7 in.
Storm Event Duration:	2 hr.
Storm Type:	Less than one year

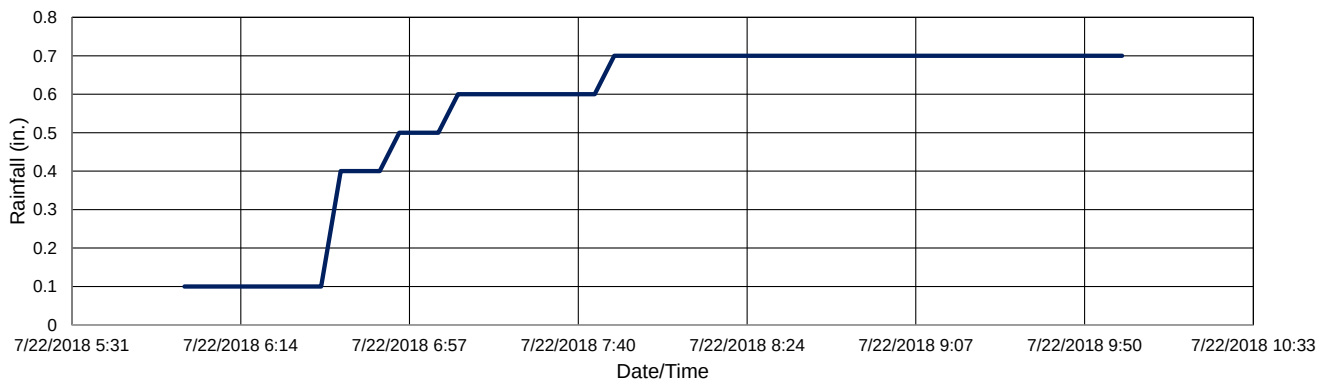
Gate Activation Trigger Depth:	1.41 ft.
Return to Normal Depth:	0.99 ft.
Time Gate 1 Activated:	7/22/2018 6:25
Time Gate 2 Activated:	7/22/2018 6:25
Time Gate 1 Returned to Normal:	7/22/2018 9:20
Time Gate 2 Returned to Normal:	7/22/2018 9:20
Percent Capture	100%
Depth of Weir	8.00 ft.
Maximum Depth Reached:	6.79 ft.
Volume Stored:	576,032 Gal.
Unused Storage Volume:	269,492 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	576,032 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

RTC Gate Performance



Rainfall Accumulation



July 25, 2018

3

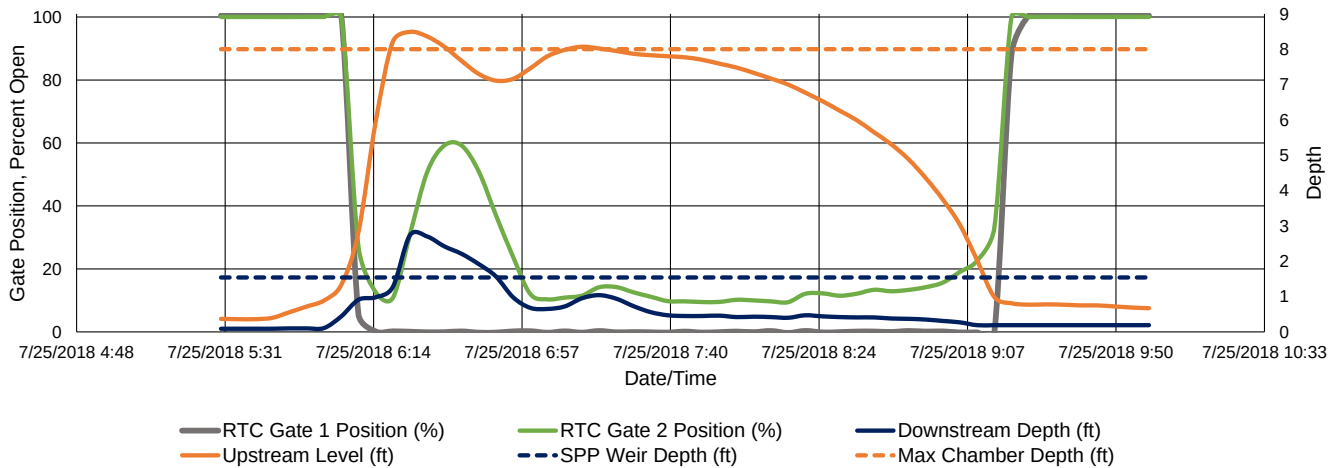
Site:	Lang RTC
Analysis Date:	09/13/2018
Event Start Date/Time:	7/25/2018 6:05
Event End Date/Time:	7/25/2018 9:25

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.7 in.
Storm Event Duration:	2 hr.
Storm Type:	Less than one year

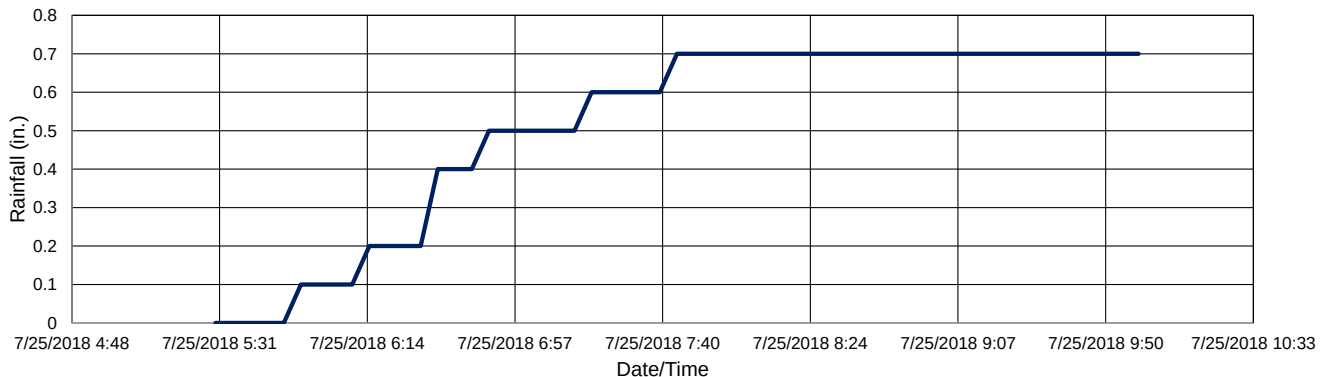
Gate Activation Trigger Depth:	1.33 ft.
Return to Normal Depth:	0.81 ft.
Time Gate 1 Activated:	7/25/2018 6:05
Time Gate 2 Activated:	7/25/2018 6:05
Time Gate 1 Returned to Normal:	7/25/2018 9:25
Time Gate 2 Returned to Normal:	7/25/2018 9:25
Percent Capture	73%
Depth of Weir	8.00 ft.
Maximum Depth Reached:	8.00 ft.
Volume Stored:	847,559 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	305,876 Gal.
Overflow Volume Prevented:	847,559 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

RTC Gate Performance



Rainfall Accumulation



August 2018 Lang Ave. RTC KPI Report

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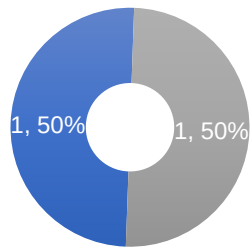


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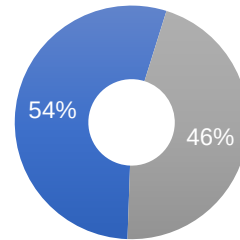
August 2018

Prevented SPP Events



- Number of Prevented SPP Overflow Events
- Number of Occurred SPP Overflow Events

Prevented SPP Volume



- Prevented SPP Overflow Volume (Gal.)
- Occurred SPP Overflow Volume (Gal.)

Number of Prevented SPP Overflow Events	Number of Occurred SPP Overflow Events	Prevented SPP Overflow Volume (Gal.)	Occurred SPP Overflow Volume (Gal.)
1	1	855,930	721,058
Event Date	SPP Overflow Volume Prevented	SPP Overflow Volume Occurred	Percent Capture
08/02/2018	2,425	-	100%
08/08/2018	853,505	721,058	54%

August 2, 2018

1

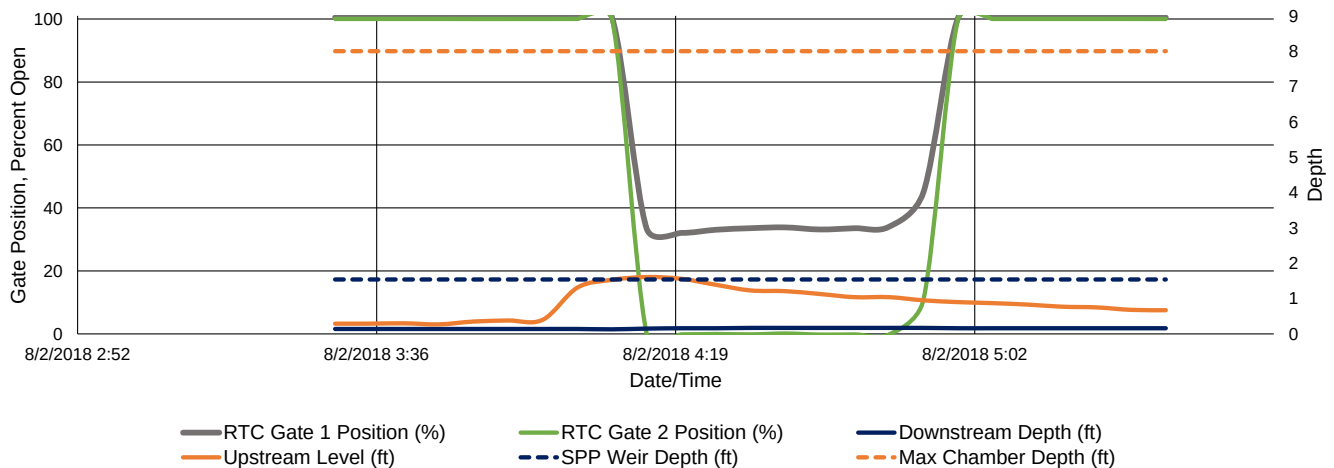
Site:	Lang RTC
Analysis Date:	09/13/2018
Event Start Date/Time:	8/2/2018 4:10
Event End Date/Time:	8/2/2018 5:00

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

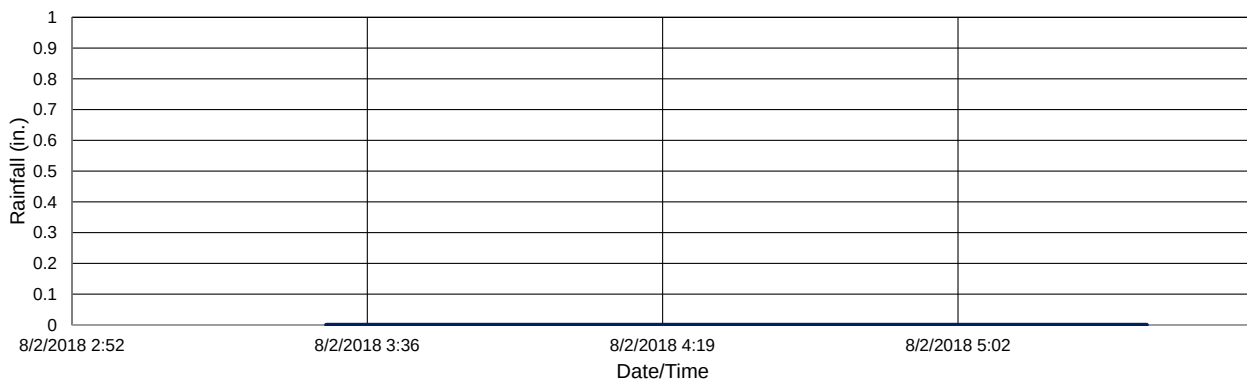
Gate Activation Trigger Depth:	1.53 ft.
Return to Normal Depth:	0.95 ft.
Time Gate 1 Activated:	8/2/2018 4:10
Time Gate 2 Activated:	8/2/2018 4:10
Time Gate 1 Returned to Normal:	8/2/2018 5:00
Time Gate 2 Returned to Normal:	8/2/2018 5:00
Percent Capture	100%
Depth of Weir	8.00 ft.
Maximum Depth Reached:	1.61 ft.
Volume Stored:	2,425 Gal.
Unused Storage Volume:	839,757 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	2,425 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:
Similar to gate activation at Bird Avenue on the same day, this activation was caused by a localized rainfall event.

RTC Gate Performance



Rainfall Accumulation



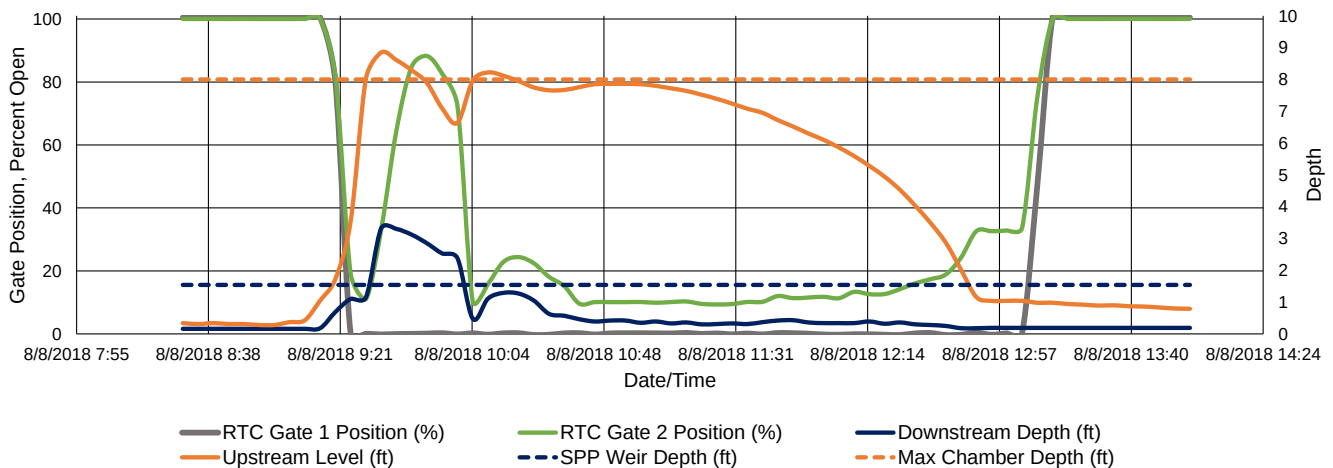
Site:	Lang RTC
Analysis Date:	09/13/2018
Event Start Date/Time:	8/8/2018 9:15
Event End Date/Time:	8/8/2018 13:15

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	1.3 in.
Storm Event Duration:	2.5 hr.
Storm Type:	Less than two year

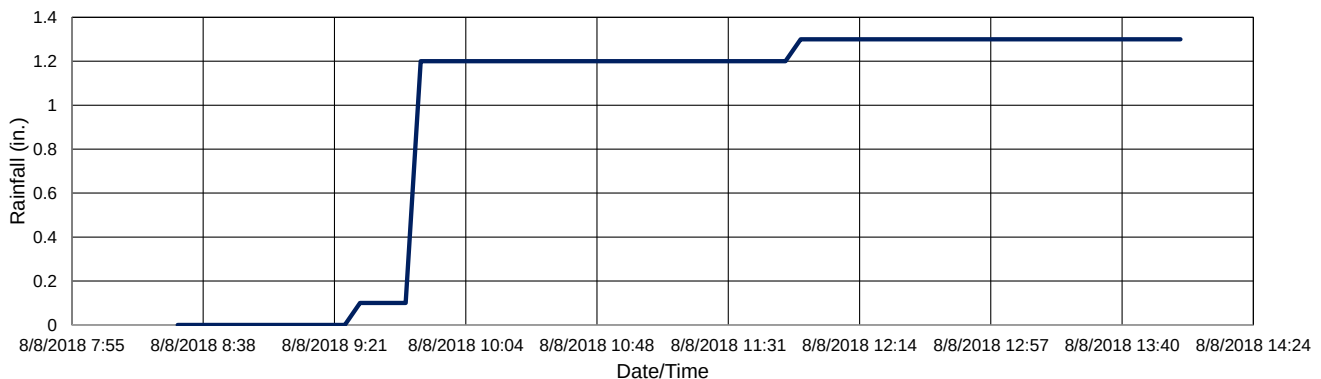
Gate Activation Trigger Depth:	1.05 ft.
Return to Normal Depth:	0.98 ft.
Time Gate 1 Activated:	8/8/2018 9:15
Time Gate 2 Activated:	8/8/2018 9:15
Time Gate 1 Returned to Normal:	8/8/2018 13:15
Time Gate 2 Returned to Normal:	8/8/2018 13:15
Percent Capture	54%
Depth of Weir	8.00 ft.
Maximum Depth Reached:	8.00 ft.
Volume Stored:	853,505 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	721,058 Gal.
Overflow Volume Prevented:	853,505 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

RTC Gate Performance



Rainfall Accumulation



September 2018 Lang Ave. RTC KPI Report

(no activations this month)



October 2018 Lang Ave. RTC KPI Report

(no activations this month)



November 2018 Lang Ave. RTC KPI Report

(no activations this month)



December 2018 Lang Ave. RTC KPI Report

(no activations this month)



January 2019 Lang Ave. RTC KPI Report

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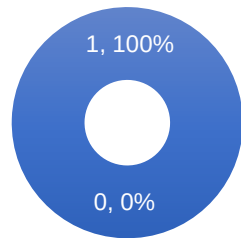


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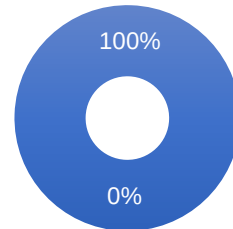
January 2019

Prevented SPP Events



■ Number of Prevented SPP Overflow Events
■ Number of Occurred SPP Overflow Events

Prevented SPP Volume



■ Prevented SPP Overflow Volume (Gal.)
■ Occurred SPP Overflow Volume (Gal.)

Number of Prevented SPP Overflow Events	Number of Occurred SPP Overflow Events	Prevented SPP Overflow Volume (Gal.)	Occurred SPP Overflow Volume (Gal.)
1	0	843,050	-
Event Date	SPP Overflow Volume Prevented	SPP Overflow Volume Occurred	Percent Capture
01/23/2019	843,050	-	100%

*Lang Avenue RTC structure was put back into operation in mid-January, 2019.

Site:	Lang RTC
Analysis Date:	02/12/2019
Event Start Date/Time:	1/23/2019 15:15
Event End Date/Time:	1/24/2019 11:50

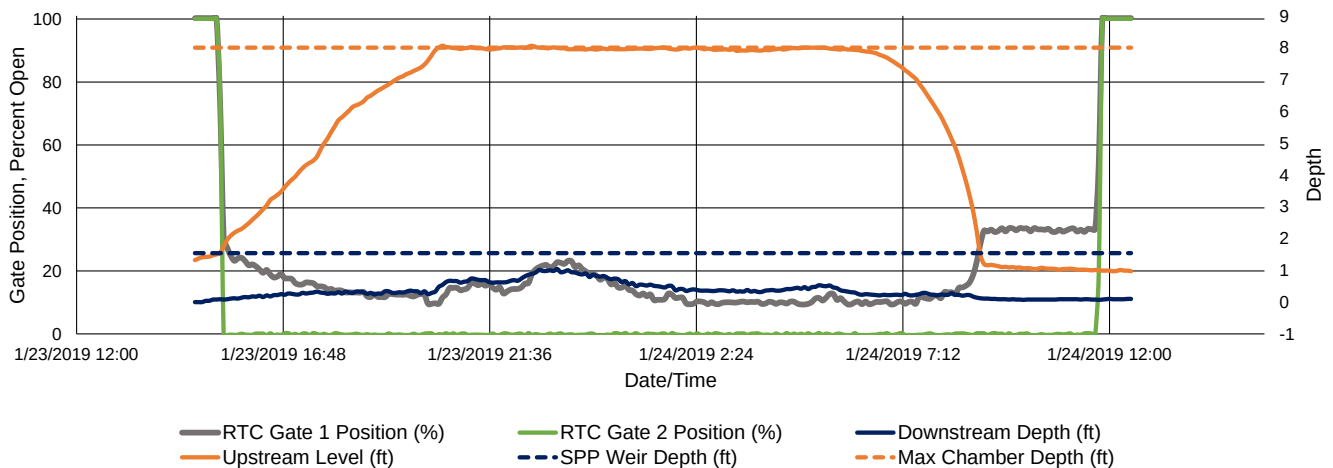
Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	1.2 in.
Storm Event Duration:	16 hr.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.50 ft.
Return to Normal Depth:	1.00 ft.
Time Gate 1 Activated:	1/23/2019 15:15
Time Gate 2 Activated:	1/23/2019 15:15
Time Gate 1 Returned to Normal:	1/24/2019 11:50
Time Gate 2 Returned to Normal:	1/24/2019 11:50
Percent Capture	100%
Depth of Weir	8.00 ft.
Maximum Depth Reached:	8.00 ft.
Volume Stored:	843,050 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	843,050 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

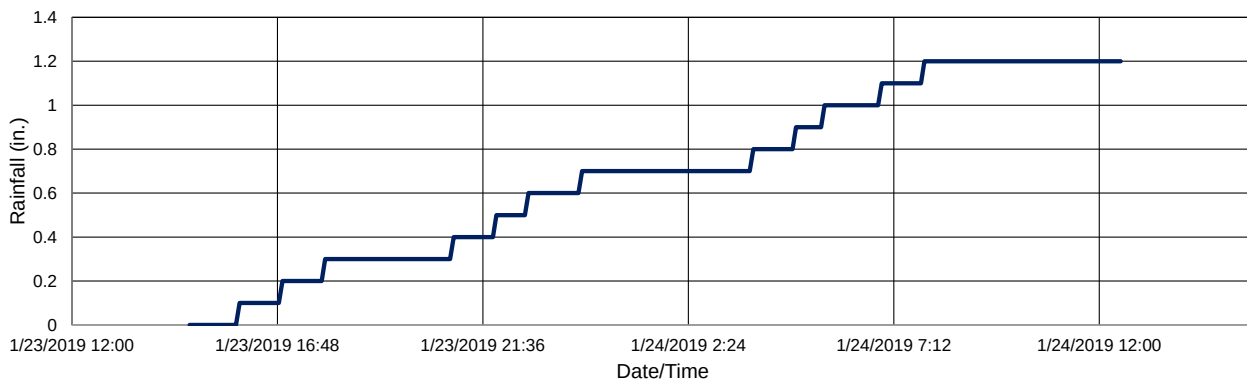
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

RTC Gate Performance



Rainfall Accumulation



February 2019 Lang Ave. RTC KPI Report

BUFFALO
SEWER AUTHORITY



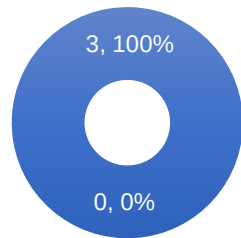
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Lang Ave. RTC Monthly Performance Report

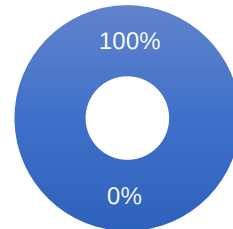
February 2019

Prevented SPP Events



■ Number of Prevented SPP Overflow Events
■ Number of Occurred SPP Overflow Events

Prevented SPP Volume



■ Prevented SPP Overflow Volume (Gal.)
■ Occurred SPP Overflow Volume (Gal.)

Number of Prevented SPP Overflow Events	Number of Occurred SPP Overflow Events	Prevented SPP Overflow Volume (Gal.)	Occurred SPP Overflow Volume (Gal.)
3	0	1,863,782	-
Event Date	SPP Overflow Volume Prevented	SPP Overflow Volume Occurred	Percent Capture
2/4/2018	842,474	-	100%
2/6/2018	844,449	-	100%
2/12/2018	176,859	-	100%

*For overflow volume calculations, downstream depth data was used for events prior to February 8 and SPP depth data for events after that.

Site:	Lang RTC
Analysis Date:	03/14/2019
Event Start Date/Time:	2/4/2019 12:55
Event End Date/Time:	2/5/2019 10:20

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

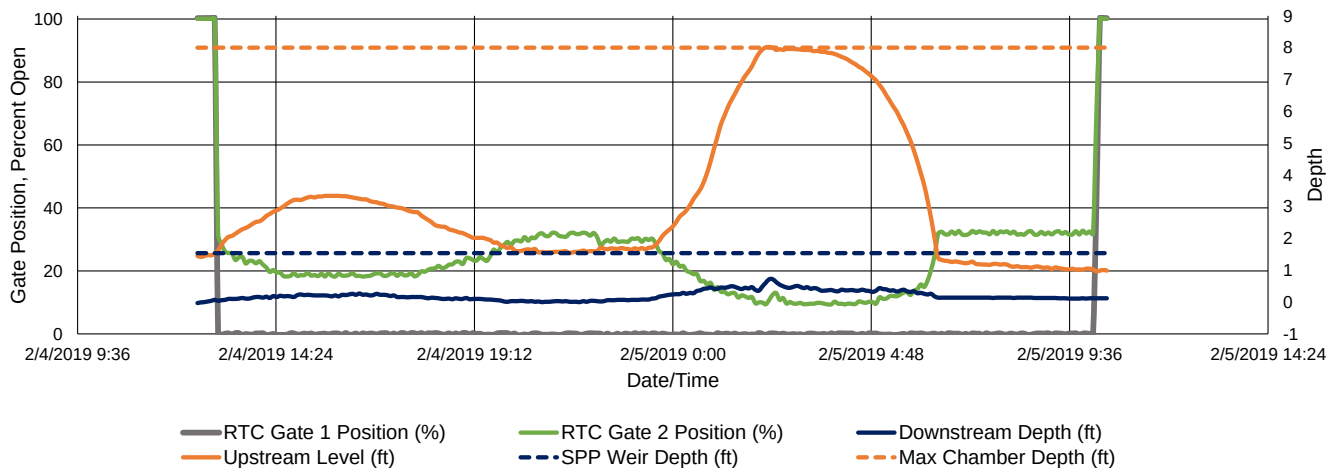
Gate Activation Trigger Depth:	1.52 ft.
Return to Normal Depth:	0.97 ft.
Time Gate 1 Activated:	2/4/2019 12:55
Time Gate 2 Activated:	2/4/2019 12:55
Time Gate 1 Returned to Normal:	2/5/2019 10:20
Time Gate 2 Returned to Normal:	2/5/2019 10:20
Percent Capture	100%
Depth of Weir	8.00 ft.
Maximum Depth Reached:	8.00 ft.
Volume Stored:	842,474 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	842,474 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:

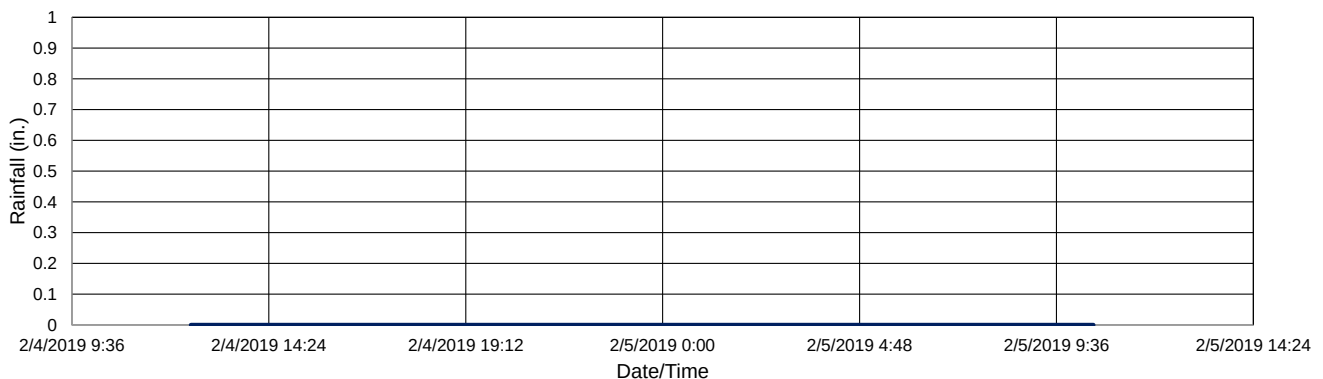
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

Temperatures rose up to high 50s (°F), causing snowmelt that caused the event.

RTC Gate Performance



Rainfall Accumulation



Site:	Lang RTC
Analysis Date:	03/14/2019
Event Start Date/Time:	2/6/2019 11:30
Event End Date/Time:	2/6/2019 23:50

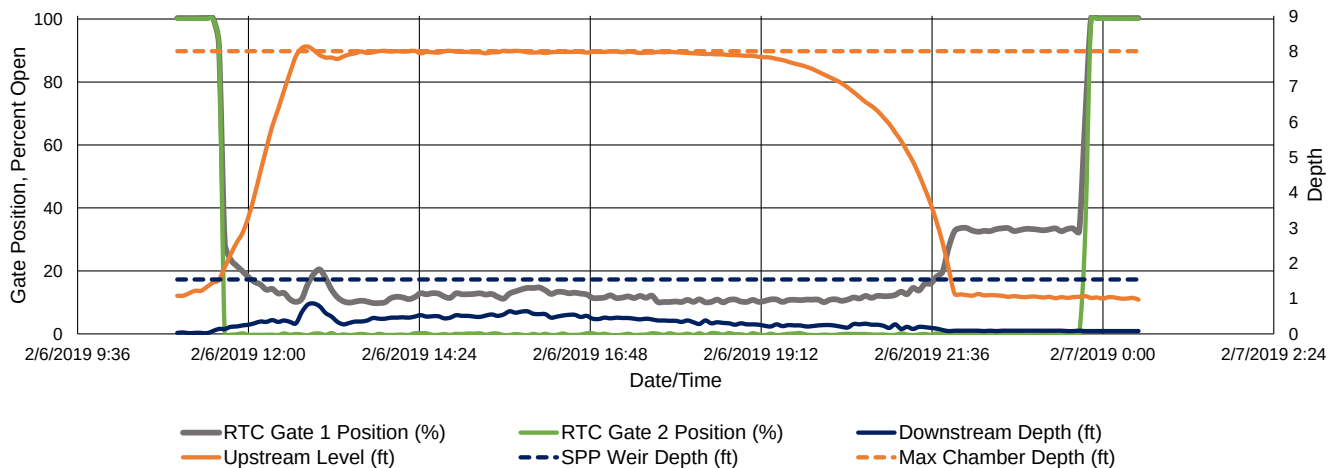
Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.2 in.
Storm Event Duration:	2 hr.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.45 ft.
Return to Normal Depth:	1.07 ft.
Time Gate 1 Activated:	2/6/2019 11:30
Time Gate 2 Activated:	2/6/2019 11:30
Time Gate 1 Returned to Normal:	2/6/2019 23:50
Time Gate 2 Returned to Normal:	2/6/2019 23:50
Percent Capture	100%
Depth of Weir	8.00 ft.
Maximum Depth Reached:	8.00 ft.
Volume Stored:	844,449 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	844,449 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

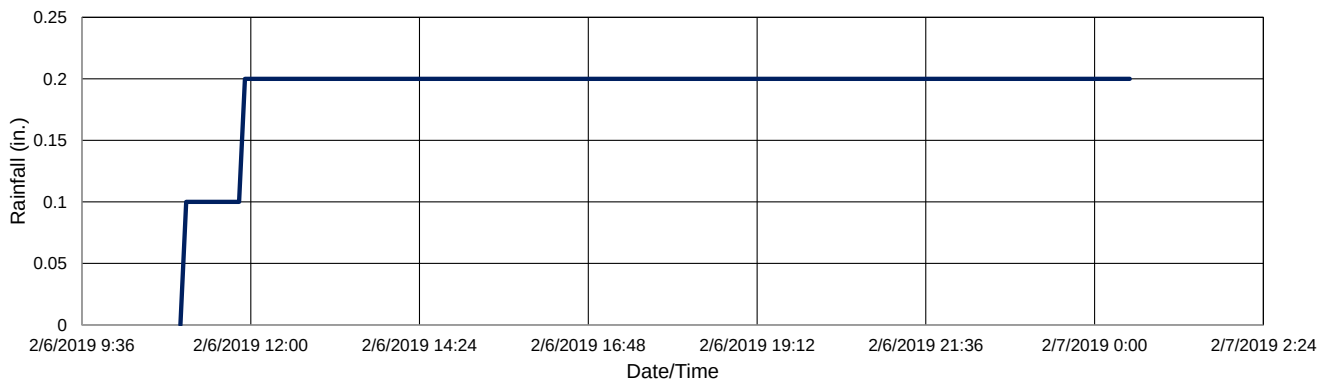
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

RTC Gate Performance



Rainfall Accumulation



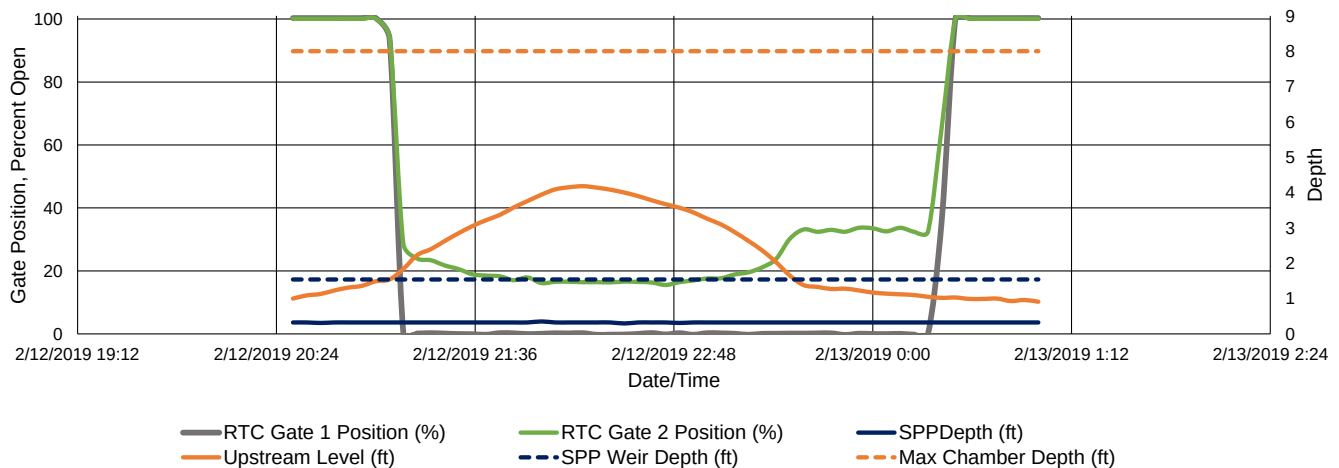
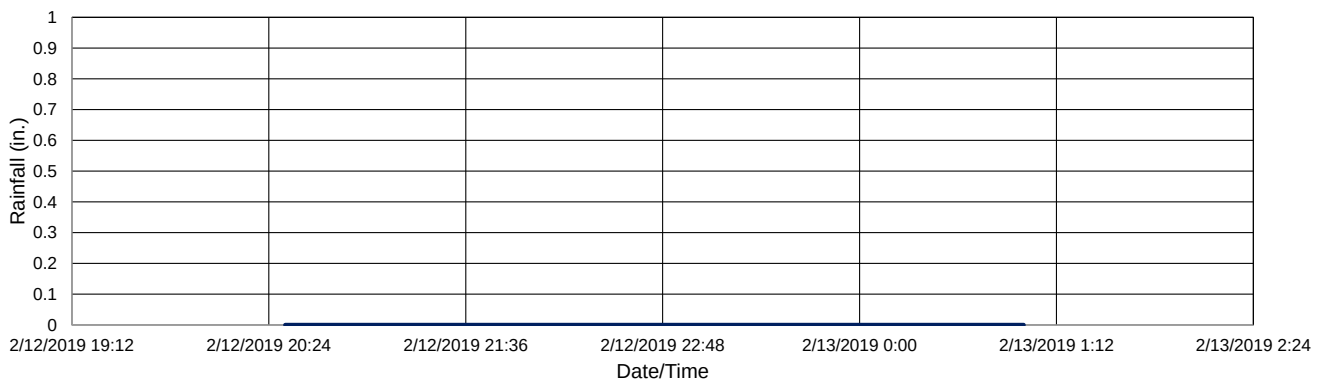
Site:	Lang RTC
Analysis Date:	03/14/2019
Event Start Date/Time:	2/12/2019 21:00
Event End Date/Time:	2/13/2019 0:30

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Gate Activation Trigger Depth:	1.49 ft.
Return to Normal Depth:	1.02 ft.
Time Gate 1 Activated:	2/12/2019 21:00
Time Gate 2 Activated:	2/12/2019 21:00
Time Gate 1 Returned to Normal:	2/13/2019 0:30
Time Gate 2 Returned to Normal:	2/13/2019 0:30
Percent Capture	100%
Depth of Weir	8.00 ft.
Maximum Depth Reached:	4.18 ft.
Volume Stored:	176,859 Gal.
Unused Storage Volume:	666,476 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	176,859 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. No rainfall was recorded during the event, however, 0.2-inch rainfall was recorded prior to the event.

RTC Gate Performance**Rainfall Accumulation**

March 2019 Lang Ave. RTC KPI Report

BUFFALO
SEWER AUTHORITY

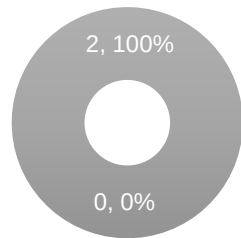


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Lang Ave. RTC Monthly Performance Report

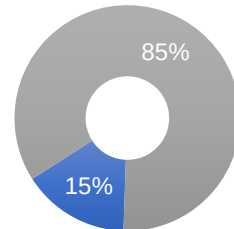
March 2019

Prevented SPP Events



■ Number of Prevented SPP Overflow Events
■ Number of Occurred SPP Overflow Events

Prevented SPP Volume



■ Prevented SPP Overflow Volume (Gal.)
■ Occurred SPP Overflow Volume (Gal.)

Number of Prevented SPP Overflow Events	Number of Occurred SPP Overflow Events	Prevented SPP Overflow Volume (Gal.)	Occurred SPP Overflow Volume (Gal.)
0	2	1,372,673	7,550,394
Event Date	SPP Overflow Volume Prevented	SPP Overflow Volume Occurred	Percent Capture
3/10/2019	578,099	3,067,247	16%
3/30/2019	794,574	4,483,147	15%

March 10, 2019

1

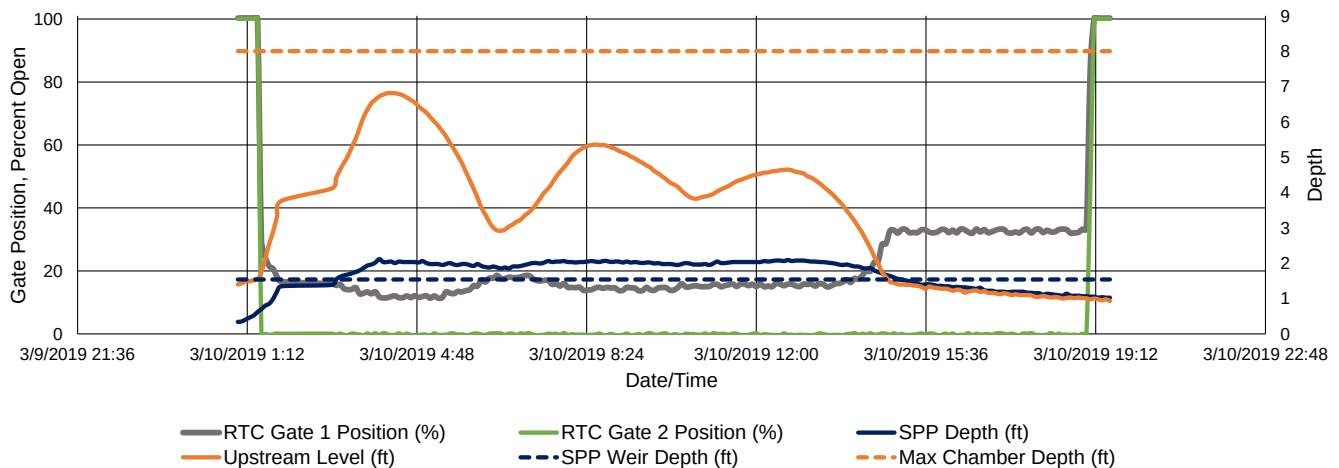
Site:	Lang RTC
Analysis Date:	04/12/2019
Event Start Date/Time:	3/10/2019 1:25
Event End Date/Time:	3/10/2019 19:10

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.2 in.
Storm Event Duration:	2 hr
Storm Type:	Less than one year

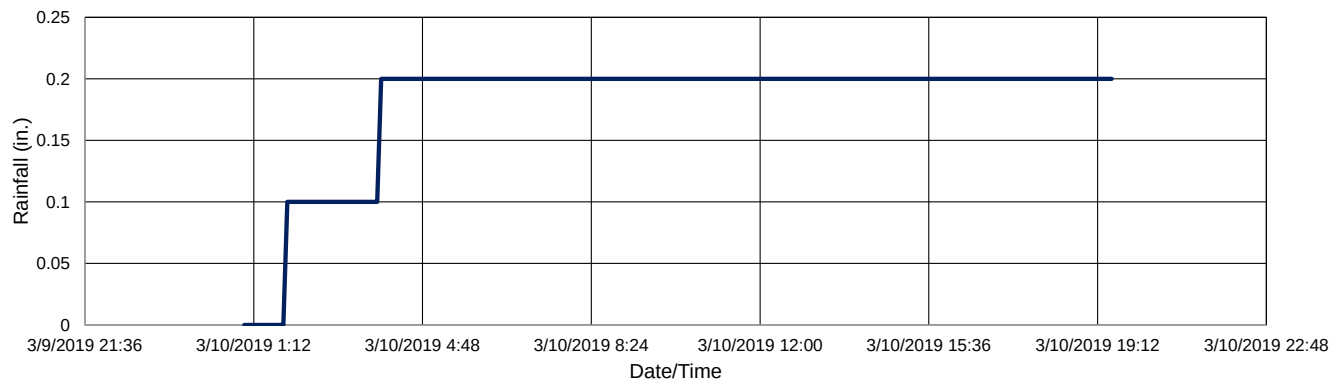
Gate Activation Trigger Depth:	1.55 ft.
Return to Normal Depth:	0.98 ft.
Time Gate 1 Activated:	3/10/2019 1:25
Time Gate 2 Activated:	3/10/2019 1:25
Time Gate 1 Returned to Normal:	3/10/2019 19:10
Time Gate 2 Returned to Normal:	3/10/2019 19:10
Percent Capture	16%
Depth of Weir	8.00 ft.
Maximum Depth Reached:	6.82 ft.
Volume Stored:	578,099 Gal.
Unused Storage Volume:	263,491 Gal.
Overflow Volume:	3,067,247 Gal.
Overflow Volume Prevented:	578,099 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	3,067,247 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

RTC Gate Performance



Rainfall Accumulation



Site:	Lang RTC
Analysis Date:	04/12/2019
Event Start Date/Time:	3/30/2019 21:20
Event End Date/Time:	3/31/2019 14:05

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.1 in.*
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

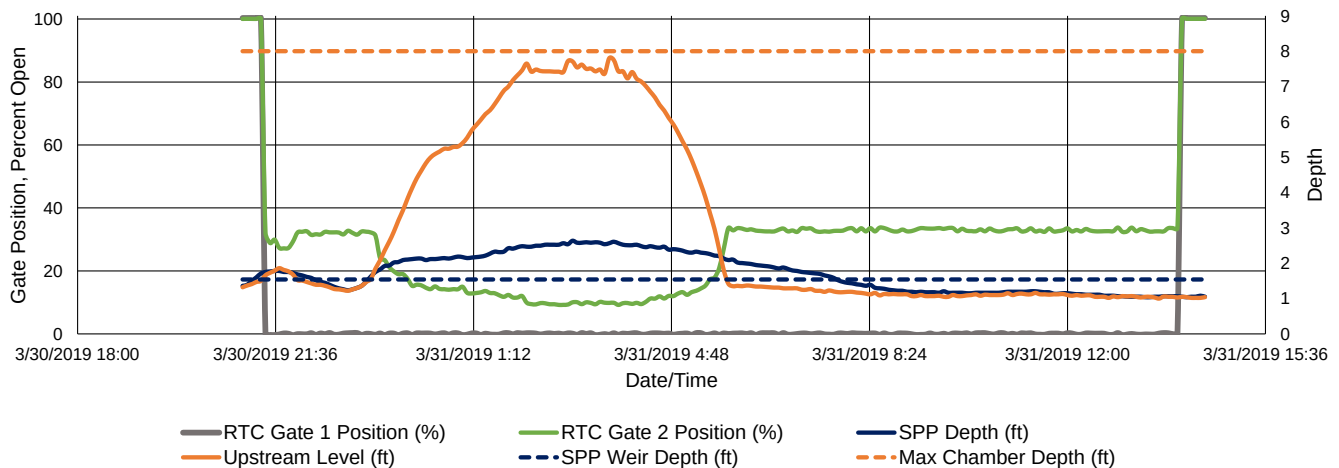
Gate Activation Trigger Depth:	1.50 ft.
Return to Normal Depth:	1.03 ft.
Time Gate 1 Activated:	3/30/2019 21:20
Time Gate 2 Activated:	3/30/2019 21:20
Time Gate 1 Returned to Normal:	3/31/2019 14:05
Time Gate 2 Returned to Normal:	3/31/2019 14:05
Percent Capture	15%
Depth of Weir	8.00 ft.
Maximum Depth Reached:	7.80 ft.
Volume Stored:	794,574 Gal.
Unused Storage Volume:	48,476 Gal.
Overflow Volume:	4,483,147 Gal.
Overflow Volume Prevented:	794,574 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	4,483,147 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:

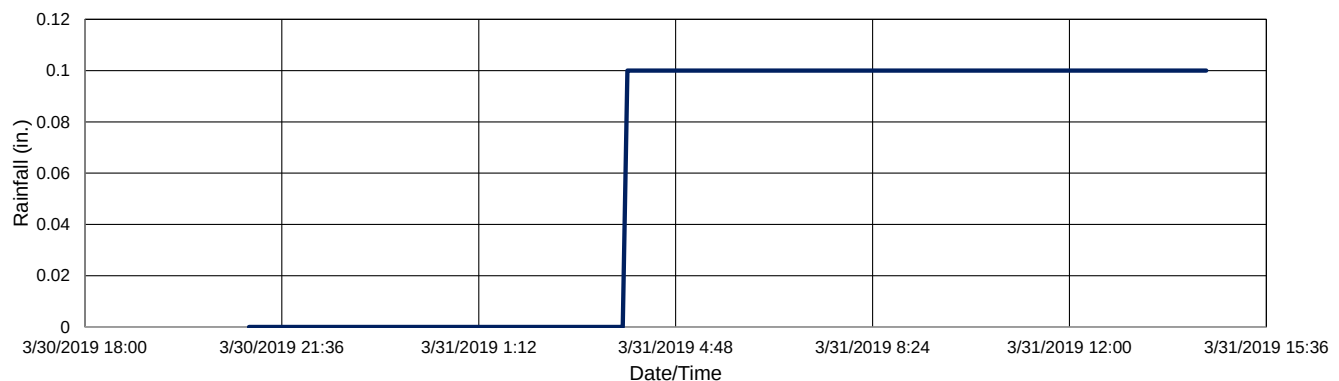
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

* 0.4-inch of rainfall was recorded on the evening of March 30, prior to gate activation.

RTC Gate Performance



Rainfall Accumulation

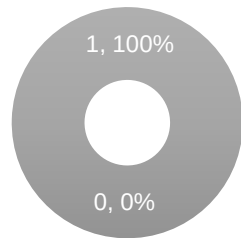


April 2019 Lang Ave. RTC KPI Report

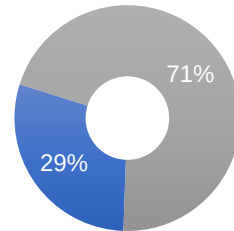
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Prevented SPP Events

■ Number of Prevented SPP Overflow Events
 ■ Number of Occurred SPP Overflow Events

Prevented SPP Volume

■ Prevented SPP Overflow Volume (Gal.)
 ■ Occurred SPP Overflow Volume (Gal.)

Number of Prevented SPP Overflow Events	Number of Occurred SPP Overflow Events	Prevented SPP Overflow Volume (Gal.)	Occurred SPP Overflow Volume (Gal.)
0	1	341,386	824,613
Event Date	SPP Overflow Volume Prevented	SPP Overflow Volume Occurred	Percent Capture
4/14/2019	341,386	824,613	29%

April 14, 2019

1

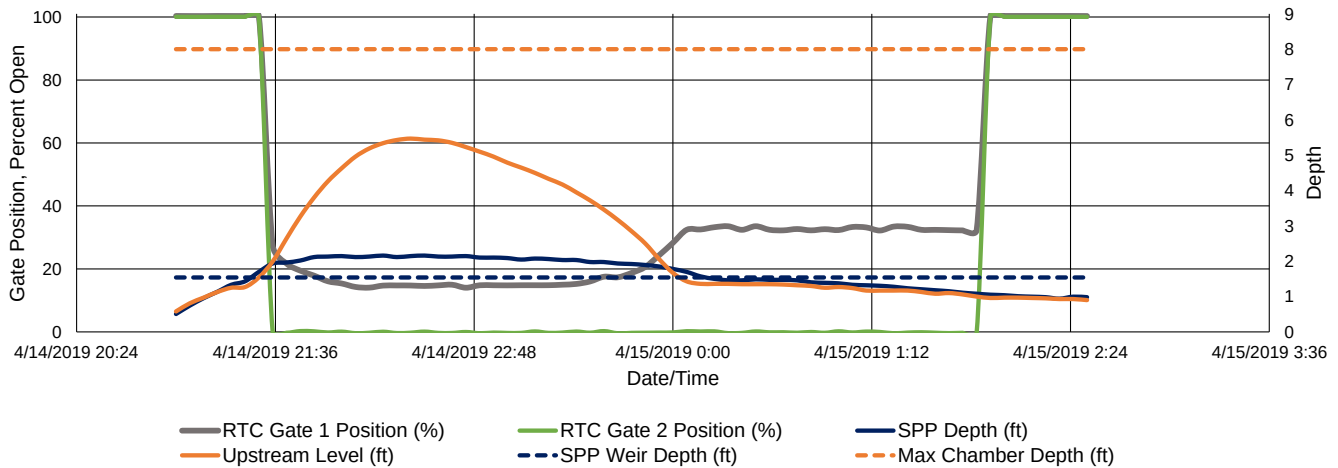
Site:	Lang RTC
Analysis Date:	05/06/2019
Event Start Date/Time:	4/14/2019 21:30
Event End Date/Time:	4/15/2019 1:55

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

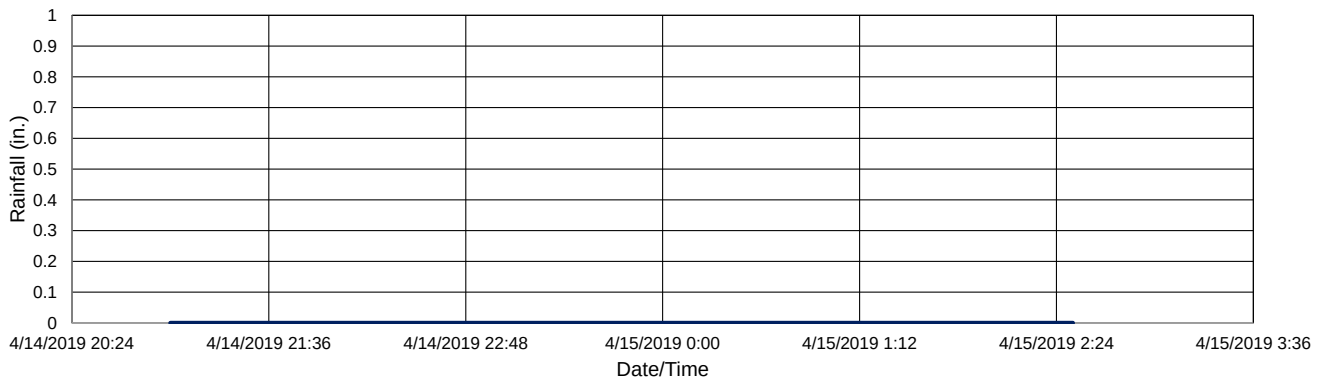
Gate Activation Trigger Depth:	1.54 ft.
Return to Normal Depth:	1.00 ft.
Time Gate 1 Activated:	4/14/2019 21:30
Time Gate 2 Activated:	4/14/2019 21:30
Time Gate 1 Returned to Normal:	4/15/2019 1:55
Time Gate 2 Returned to Normal:	4/15/2019 1:55
Percent Capture	29%
Depth of Weir	8.00 ft.
Maximum Depth Reached:	5.47 ft.
Volume Stored:	341,386 Gal.
Unused Storage Volume:	500,501 Gal.
Overflow Volume:	824,613 Gal.
Overflow Volume Prevented:	341,386 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	824,613
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.
No rainfall recorded during the gate activation event. However, 0.3-inch of rainfall was recorded earlier in the evening.

RTC Gate Performance



Rainfall Accumulation



May 2019 Lang Ave. RTC KPI Report

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SEWER AUTHORITY



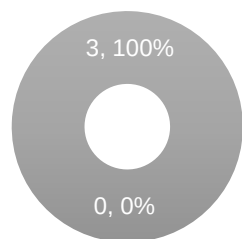
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Lang Ave. RTC Monthly Performance Report

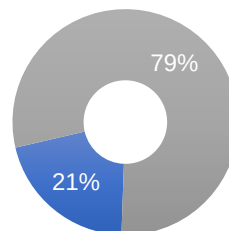
May 2019

Prevented SPP Events



■ Number of Prevented SPP Overflow Events
■ Number of Occurred SPP Overflow Events

Prevented SPP Volume



■ Prevented SPP Overflow Volume (Gal.)
■ Occurred SPP Overflow Volume (Gal.)

Number of Prevented SPP Overflow Events	Number of Occurred SPP Overflow Events	Prevented SPP Overflow Volume (Gal.)	Occurred SPP Overflow Volume (Gal.)
0	3	1,065,261	4,055,440

Event Date	SPP Overflow Volume Prevented	SPP Overflow Volume Occurred	Percent Capture
5/1/2019	208,667	759,275	22%
5/9/2019	13,544	58,921	19%
5/10/2019	843,050	3,237,244	21%

Note: Since the gates were in emergency open starting May 28, events up to May 27 are recorded.

May 1, 2019

1

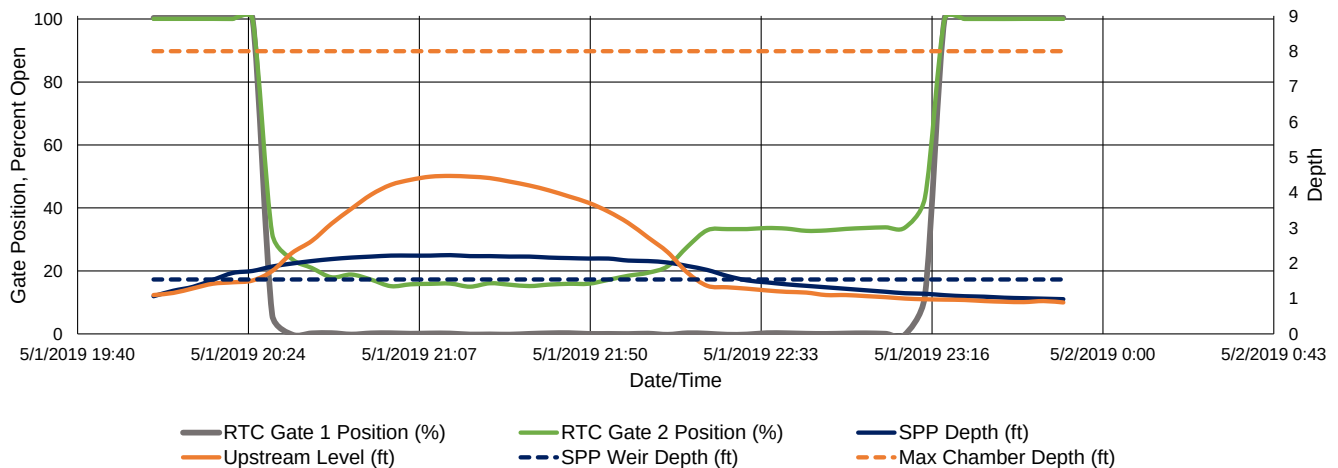
Site:	Lang RTC
Analysis Date:	06/10/2019
Event Start Date/Time:	5/1/2019 20:25
Event End Date/Time:	5/1/2019 23:20

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.1 in.*
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

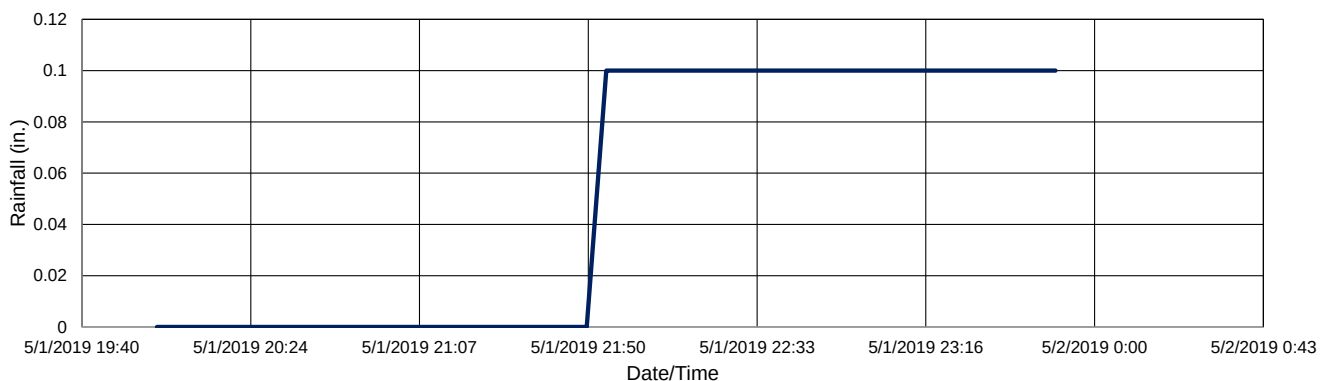
Gate Activation Trigger Depth:	1.51 ft.
Return to Normal Depth:	0.98 ft.
Time Gate 1 Activated:	5/1/2019 20:25
Time Gate 2 Activated:	5/1/2019 20:25
Time Gate 1 Returned to Normal:	5/1/2019 23:20
Time Gate 2 Returned to Normal:	5/1/2019 23:20
Percent Capture	22%
Depth of Weir	8.00 ft.
Maximum Depth Reached:	4.47 ft.
Volume Stored:	208,667 Gal.
Unused Storage Volume:	634,096 Gal.
Overflow Volume:	759,275 Gal.
Overflow Volume Prevented:	208,667 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	759,275 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.
* 0.3-inch of rainfall was recorded in the evening prior to the event, which also contributed to this event.

RTC Gate Performance



Rainfall Accumulation



Site:	Lang RTC
Analysis Date:	06/10/2019
Event Start Date/Time:	5/9/2019 19:35
Event End Date/Time:	5/9/2019 20:40

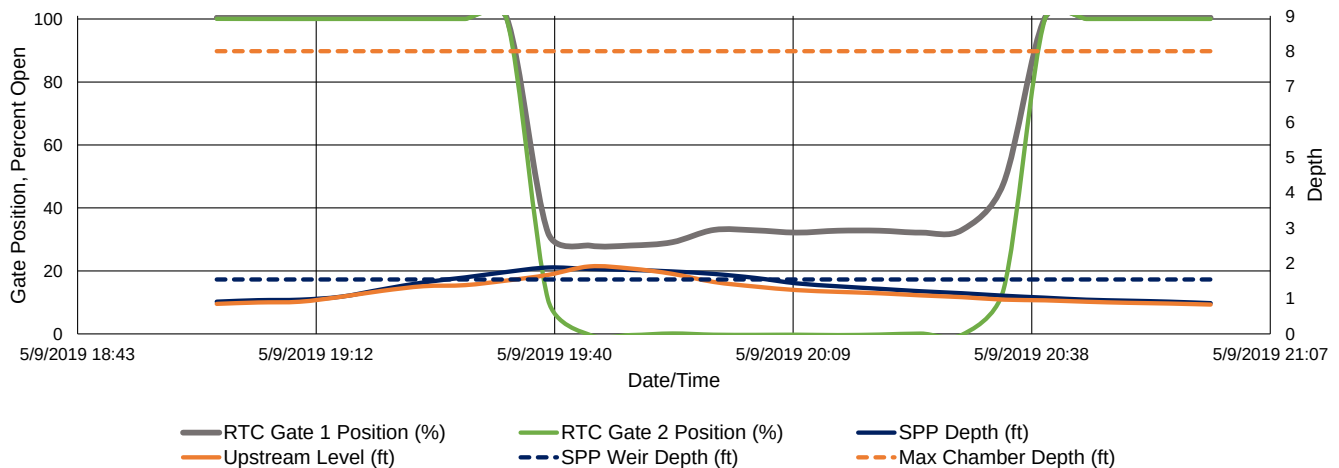
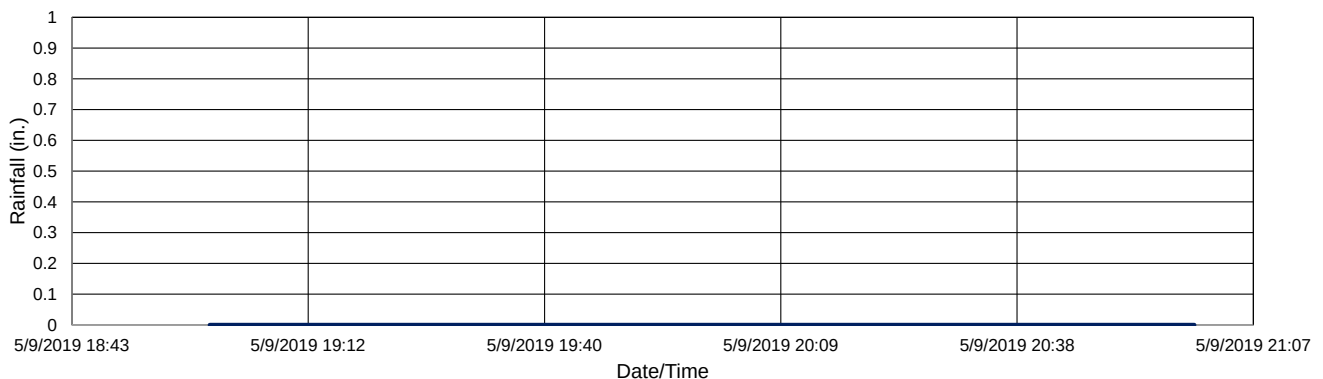
Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Gate Activation Trigger Depth:	1.51 ft.
Return to Normal Depth:	0.97 ft.
Time Gate 1 Activated:	5/9/2019 19:35
Time Gate 2 Activated:	5/9/2019 19:35
Time Gate 1 Returned to Normal:	5/9/2019 20:40
Time Gate 2 Returned to Normal:	5/9/2019 20:40
Percent Capture	19%
Depth of Weir	8.00 ft.
Maximum Depth Reached:	1.91 ft.
Volume Stored:	13,544 Gal.
Unused Storage Volume:	829,219 Gal.
Overflow Volume:	58,921 Gal.
Overflow Volume Prevented:	13,544 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	58,921 Gal.
Could SPP activation have been prevented?	Yes

Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

No rainfall was recorded during the event, however 0.2-inch of rainfall was recorded prior to the event.

RTC Gate Performance**Rainfall Accumulation**

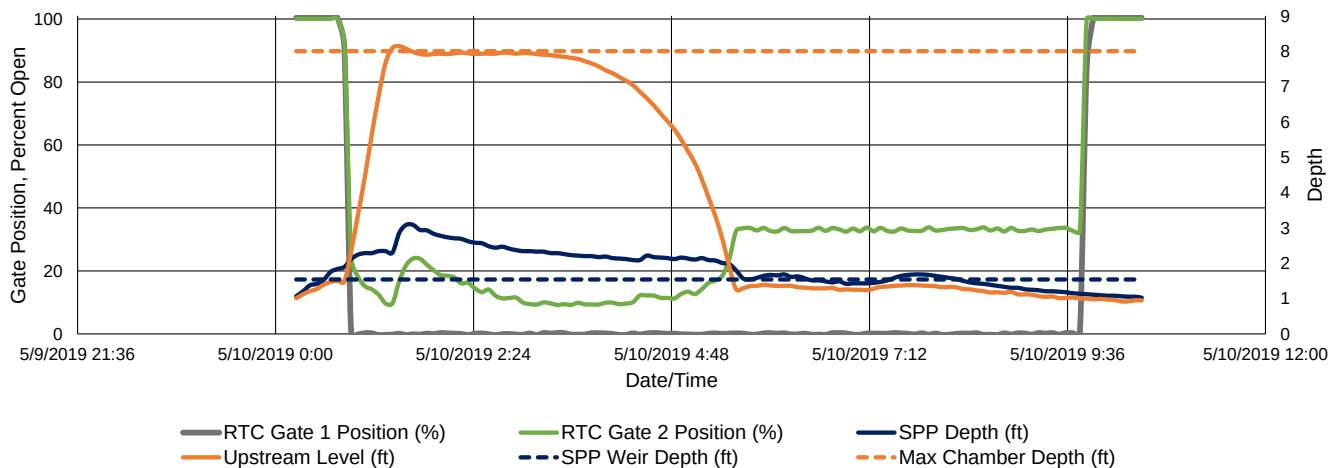
Site:	Lang RTC
Analysis Date:	06/10/2019
Event Start Date/Time:	5/10/2019 0:45
Event End Date/Time:	5/10/2019 9:55

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.2 in.
Storm Event Duration:	2 hrs.
Storm Type:	Less than one year

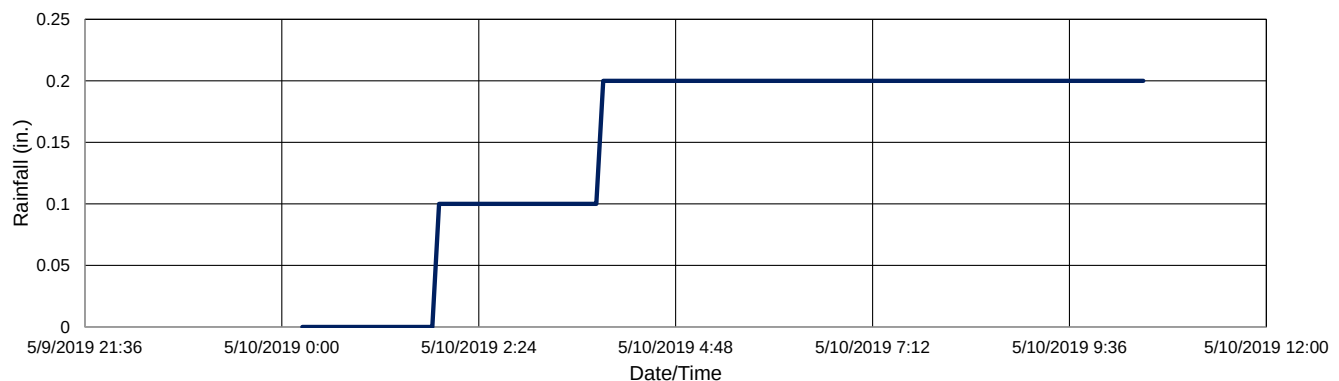
Gate Activation Trigger Depth:	1.50 ft.
Return to Normal Depth:	1.00 ft.
Time Gate 1 Activated:	5/10/2019 0:45
Time Gate 2 Activated:	5/10/2019 0:45
Time Gate 1 Returned to Normal:	5/10/2019 9:55
Time Gate 2 Returned to Normal:	5/10/2019 9:55
Percent Capture	21%
Depth of Weir	8.00 ft.
Maximum Depth Reached:	8.00 ft.
Volume Stored:	843,050 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	3,237,244 Gal.
Overflow Volume Prevented:	843,050 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data.

RTC Gate Performance



Rainfall Accumulation



June 2019 Lang Ave. RTC KPI Report

(Gates were in emergency open
due to maintenance issues with
the upstream level sensor)



July 2018 Bird Ave. RTC KPI Report

BUFFALO
SEWER AUTHORITY



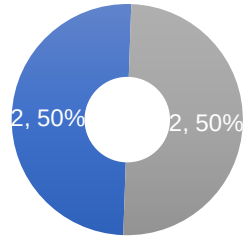
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Bird Ave. RTC Monthly Performance Report

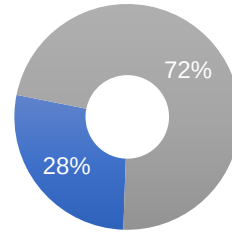
July 2018

Prevented SPP Events



■ Number of Prevented SPP Overflow Events
■ Number of Occurred SPP Overflow Events

Prevented SPP Volume



■ Prevented SPP Overflow Volume (Gal.)
■ Occurred SPP Overflow Volume (Gal.)

Number of Prevented SPP Overflow Events	Number of Occurred SPP Overflow Events	Prevented SPP Overflow Volume (Gal.)	Occurred SPP Overflow Volume (Gal.)
2	2	1,969,495	5,174,709

Event Date	SPP Overflow Volume Prevented	SPP Overflow Volume Occurred	Percent Capture
07/05/2018	26,231	-	100%
07/16/2018	151,747	-	100%
07/22/2018	895,953	4,345,994	17%
07/25/2018	895,564	828,715	52%

July 5, 2018

1

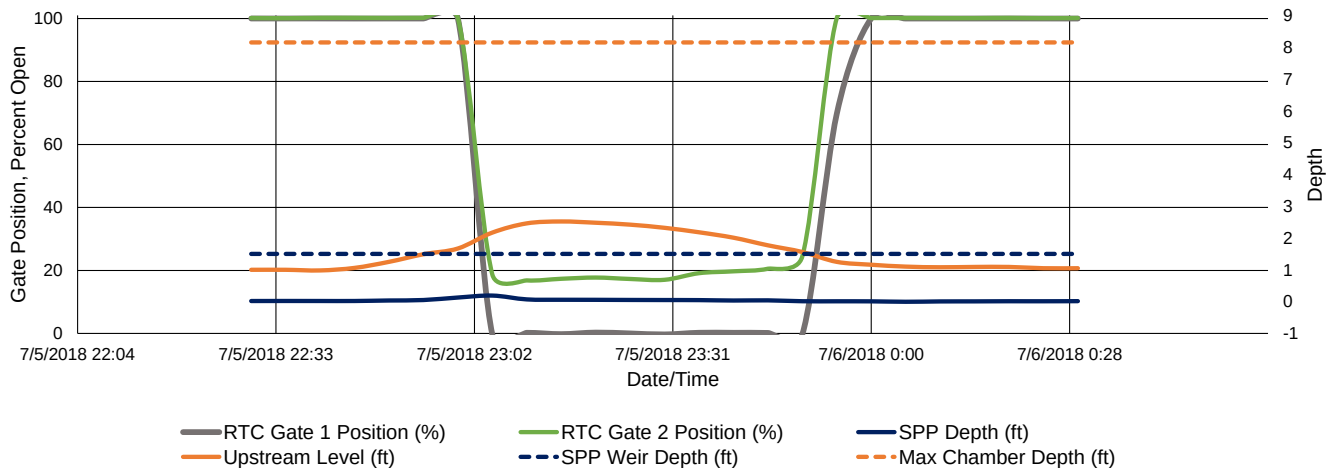
Site:	Bird RTC
Analysis Date:	09/13/2018
Event Start Date/Time:	7/5/2018 23:00
Event End Date/Time:	7/6/2018 0:00

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.15 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than 1-year storm

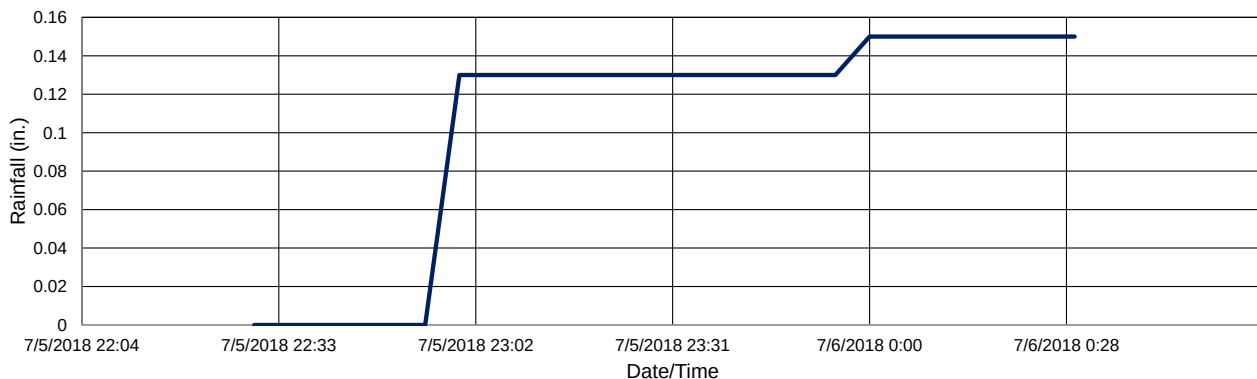
Gate Activation Trigger Depth:	1.67 ft.
Return to Normal Depth:	1.25 ft.
Time Gate 1 Activated:	7/5/2018 23:00
Time Gate 2 Activated:	7/5/2018 23:00
Time Gate 1 Returned to Normal:	7/6/2018 0:00
Time Gate 2 Returned to Normal:	7/6/2018 0:00
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	2.52 ft.
Volume Stored:	26,231 Gal.
Unused Storage Volume:	868,911 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	26,231 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:
Rainfall data sourced from South Buffalo rain gauge, as provided by BSA.

RTC Gate Performance



Rainfall Accumulation



July 16, 2018

2

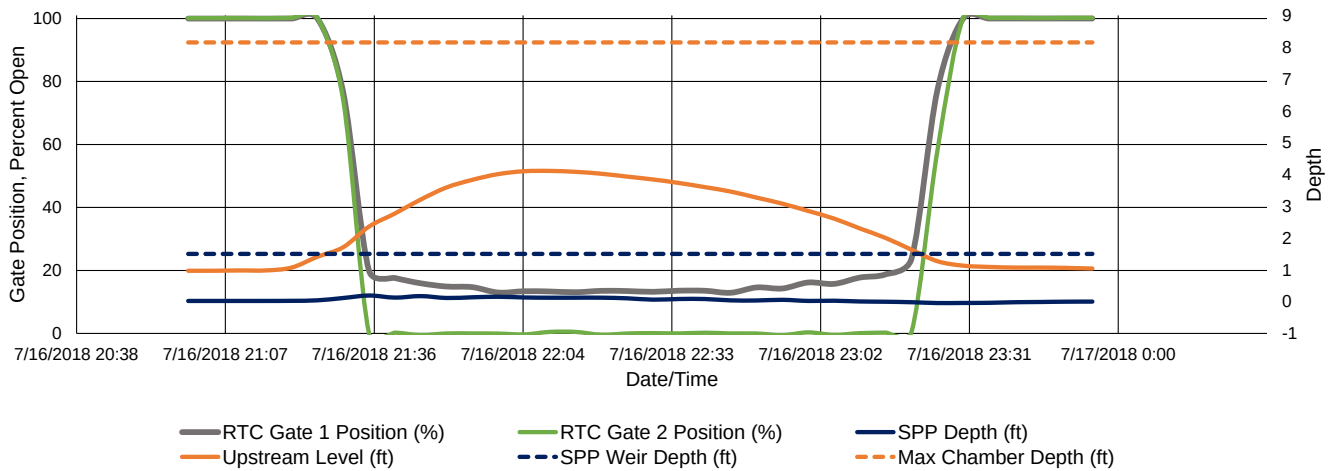
Site:	Bird RTC
Analysis Date:	09/13/2018
Event Start Date/Time:	7/16/2018 21:25
Event End Date/Time:	7/16/2018 23:30

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.15 in.
Storm Event Duration:	1.0* hr.
Storm Type:	Less than 1-year storm

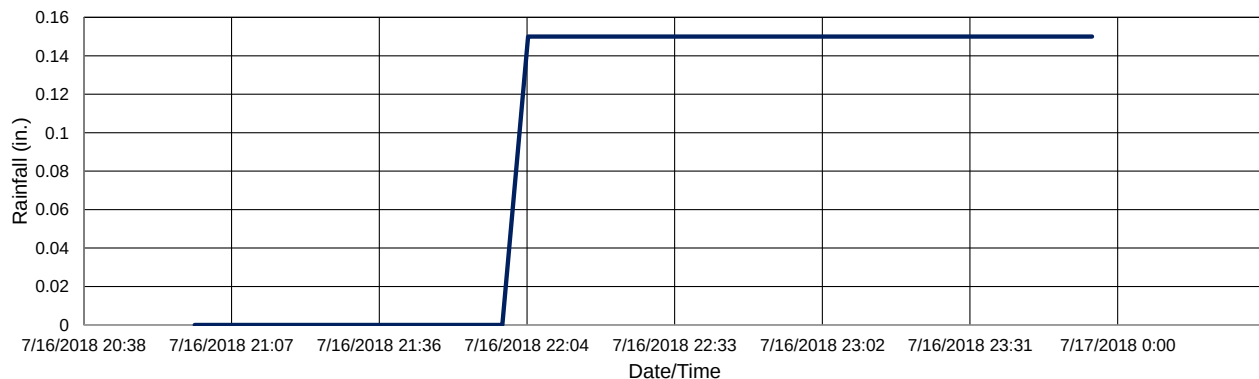
Gate Activation Trigger Depth:	1.41 ft.
Return to Normal Depth:	1.27 ft.
Time Gate 1 Activated:	7/16/2018 21:25
Time Gate 2 Activated:	7/16/2018 21:25
Time Gate 1 Returned to Normal:	7/16/2018 23:30
Time Gate 2 Returned to Normal:	7/16/2018 23:30
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	4.11 ft.
Volume Stored:	151,747 Gal.
Unused Storage Volume:	745,919 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	151,747 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:
Rainfall data sourced from South Buffalo rain gauge, provided by BSA. Rainfall data is updated on an hourly basis in BSA's system, and therefore the gate performance graph shows activation before rainfall data is recorded.

RTC Gate Performance



Rainfall Accumulation



July 22, 2018

3

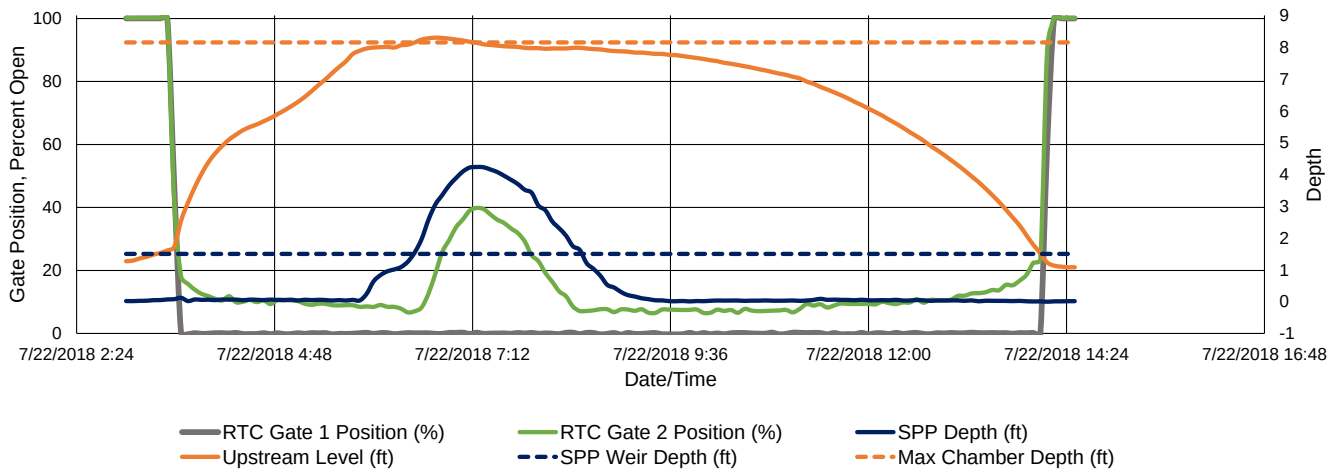
Site:	Bird RTC
Analysis Date:	09/13/2018
Event Start Date/Time:	7/22/2018 3:30
Event End Date/Time:	7/22/2018 14:15

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.76 in.
Storm Event Duration:	5 hr.
Storm Type:	Less than one year

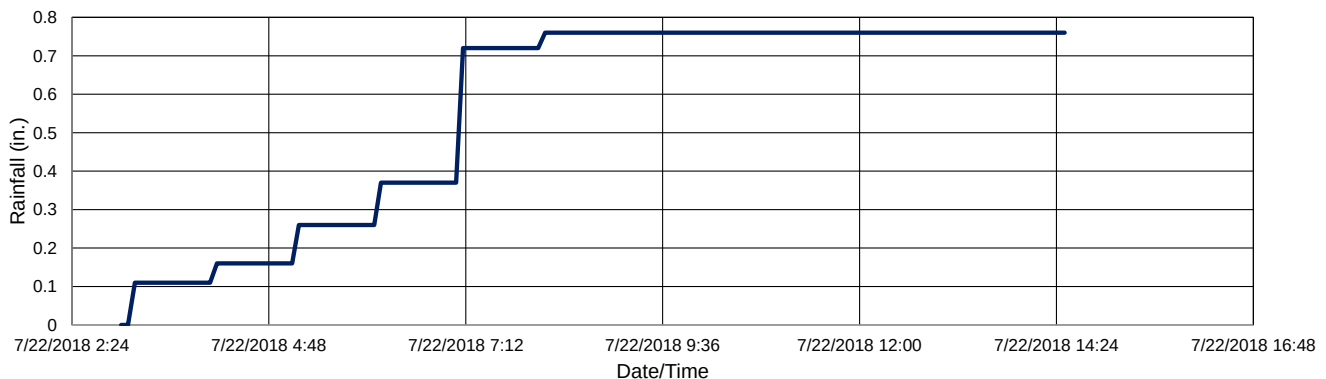
Gate Activation Trigger Depth:	1.61 ft.
Return to Normal Depth:	1.23 ft.
Time Gate 1 Activated:	7/22/2018 3:30
Time Gate 2 Activated:	7/22/2018 3:30
Time Gate 1 Returned to Normal:	7/22/2018 14:15
Time Gate 2 Returned to Normal:	7/22/2018 14:15
Percent Capture	17%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.15 ft.
Volume Stored:	895,953 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	4,345,994 Gal.
Overflow Volume Prevented:	895,953 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:
Rainfall data sourced from South Buffalo rain gauge, as provided by BSA.

RTC Gate Performance



Rainfall Accumulation



July 25, 2018

4

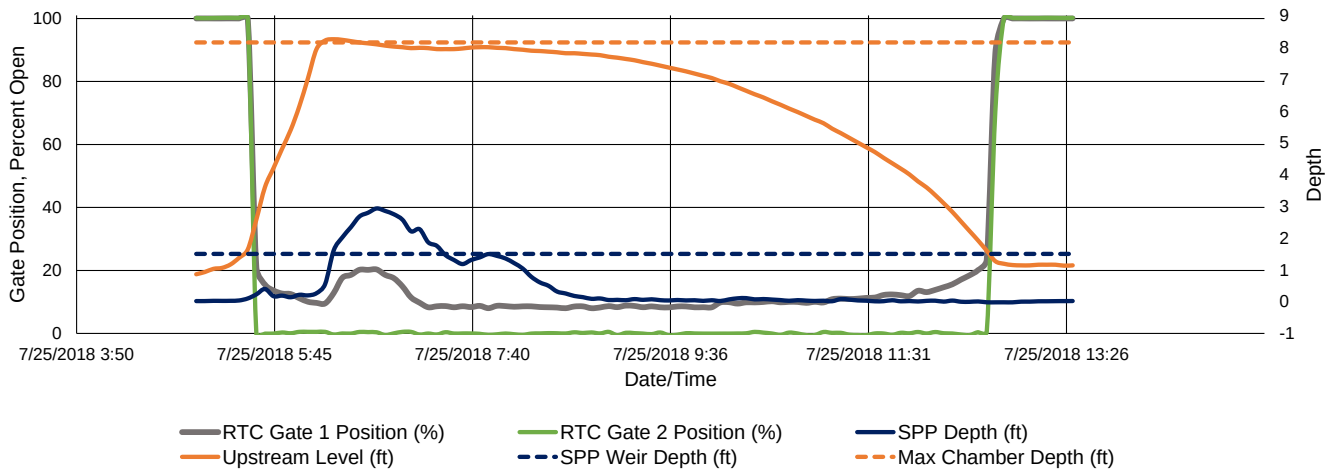
Site:	Bird RTC
Analysis Date:	09/13/2018
Event Start Date/Time:	7/25/2018 5:30
Event End Date/Time:	7/25/2018 12:50

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.07 in.
Storm Event Duration:	3.5 hr.
Storm Type:	Less than one year

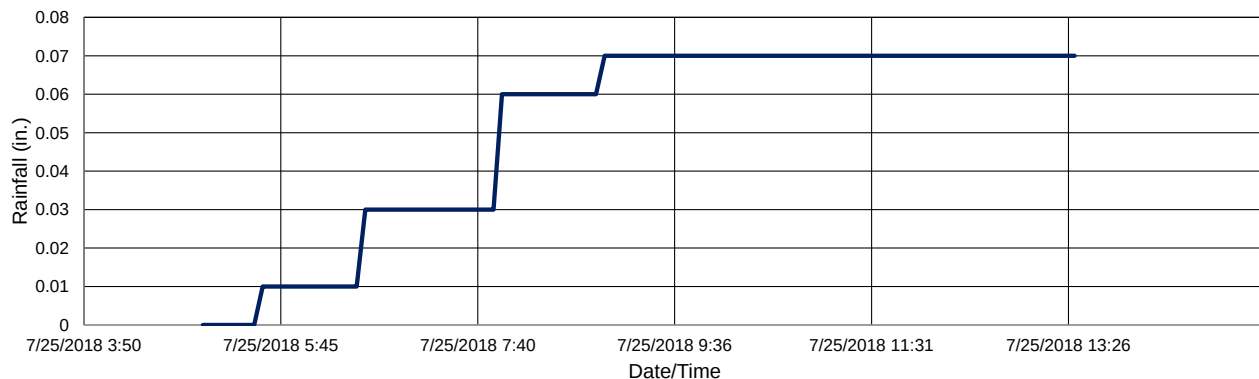
Gate Activation Trigger Depth:	1.64 ft.
Return to Normal Depth:	1.27 ft.
Time Gate 1 Activated:	7/25/2018 5:30
Time Gate 2 Activated:	7/25/2018 5:30
Time Gate 1 Returned to Normal:	7/25/2018 12:50
Time Gate 2 Returned to Normal:	7/25/2018 12:50
Percent Capture	52%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.15 ft.
Volume Stored:	895,564 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	828,715 Gal.
Overflow Volume Prevented:	895,564 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:
Rainfall data sourced from South Buffalo rain gauge, as provided by BSA.

RTC Gate Performance



Rainfall Accumulation



August 2018 Bird Ave. RTC KPI Report

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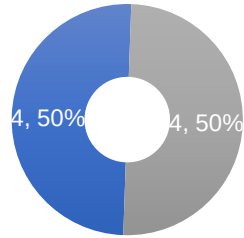


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Bird Ave. RTC Monthly Performance Report

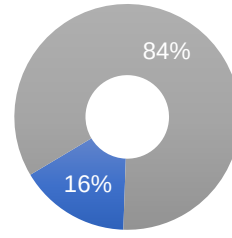
August 2018

Prevented SPP Events



■ Number of Prevented SPP Overflow Events
■ Number of Occurred SPP Overflow Events

Prevented SPP Volume



■ Prevented SPP Overflow Volume (Gal.)
■ Occurred SPP Overflow Volume (Gal.)

Number of Prevented SPP Overflow Events	Number of Occurred SPP Overflow Events	Prevented SPP Overflow Volume (Gal.)	Occurred SPP Overflow Volume (Gal.)
4	4	4,804,947	25,448,345

Event Date	SPP Overflow Volume Prevented	SPP Overflow Volume Occurred	Percent Capture
08/02/2018	864,707	-	100%
08/07/2018	896,074	186,986	83%
08/08/2018	897,938	5,801,490	13%
08/14/2018	52,007	-	100%
08/17/2018	145,053	-	100%
08/18/2018	896,725	19,450,114	4%
08/21/2018	881,284	9,755	99%
08/29/2018	171,159	-	100%

August 2, 2018

1

Site:	Bird RTC
Analysis Date:	09/13/2018
Event Start Date/Time:	8/2/2018 3:45
Event End Date/Time:	8/2/2018 8:00

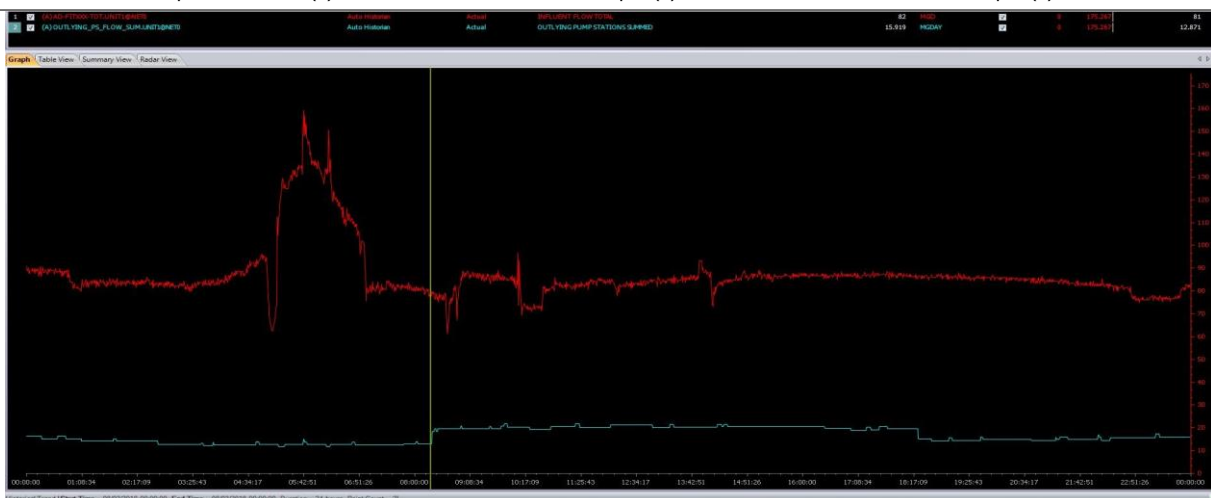
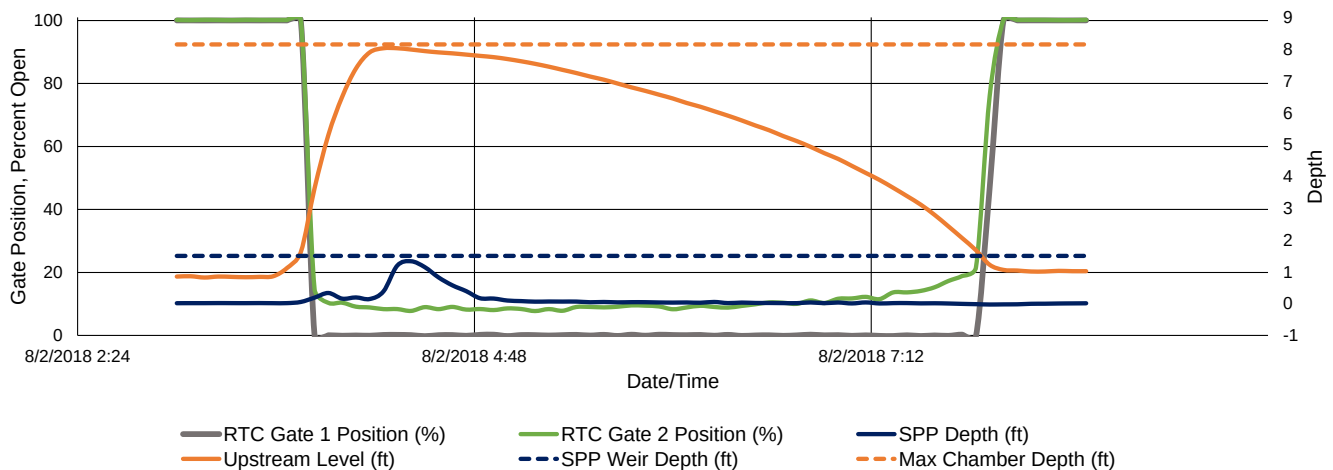
Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Gate Activation Trigger Depth:	1.62 ft.
Return to Normal Depth:	1.22 ft.
Time Gate 1 Activated:	8/2/2018 3:45
Time Gate 2 Activated:	8/2/2018 3:45
Time Gate 1 Returned to Normal:	8/2/2018 8:00
Time Gate 2 Returned to Normal:	8/2/2018 8:00
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.03 ft.
Volume Stored:	864,707 Gal.
Unused Storage Volume:	31,119 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	864,707 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:

No rainfall was recorded for the day at South Buffalo station, Amherst Quarry station, and airport station. The graph below from BSA SCADA system indicates that an increase in influent flow (red line on the graph) to the WWTP overlapped with the time period of gate activation, indicating that a localized rain event caused gate activation.

RTC Gate Performance



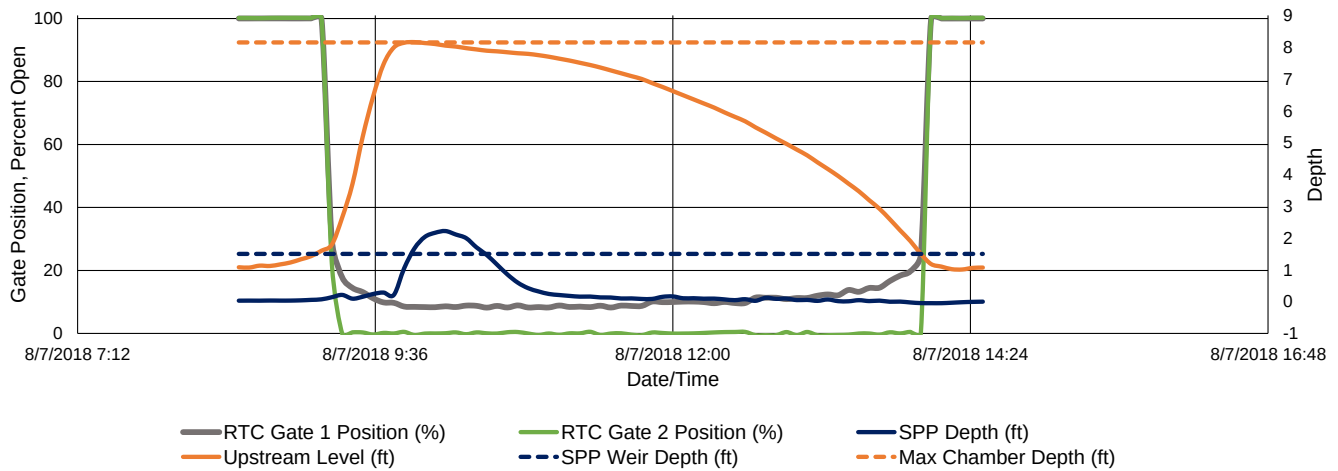
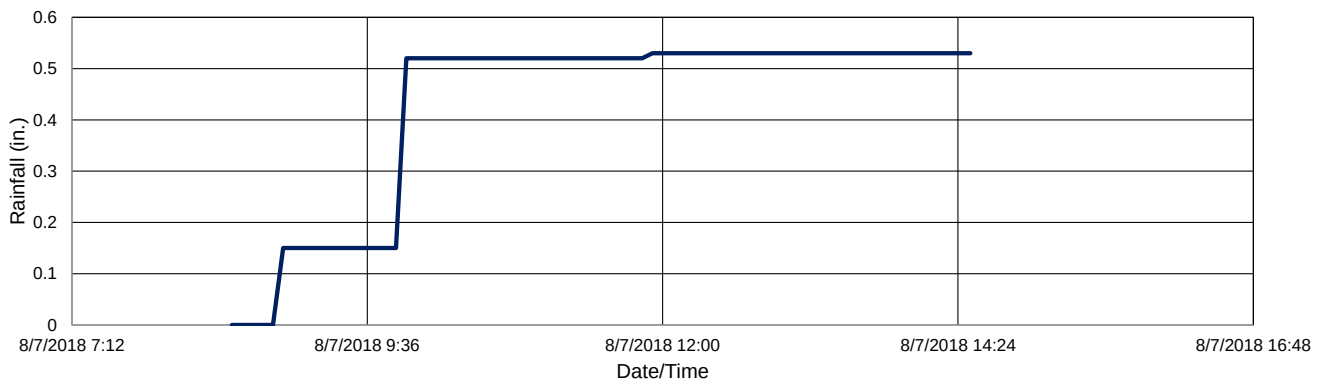
Site:	Bird RTC
Analysis Date:	09/13/2018
Event Start Date/Time:	8/7/2018 9:10
Event End Date/Time:	8/7/2018 14:05

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.53 in.
Storm Event Duration:	3 hr.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.60 ft.
Return to Normal Depth:	1.50 ft.
Time Gate 1 Activated:	8/7/2018 9:10
Time Gate 2 Activated:	8/7/2018 9:10
Time Gate 1 Returned to Normal:	8/7/2018 14:05
Time Gate 2 Returned to Normal:	8/7/2018 14:05
Percent Capture	83%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.15 ft.
Volume Stored:	896,074 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	186,986 Gal.
Overflow Volume Prevented:	896,074 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:

Rainfall data sourced from South Buffalo rain gauge, as provided by BSA.

RTC Gate Performance**Rainfall Accumulation**

August 8, 2018

3

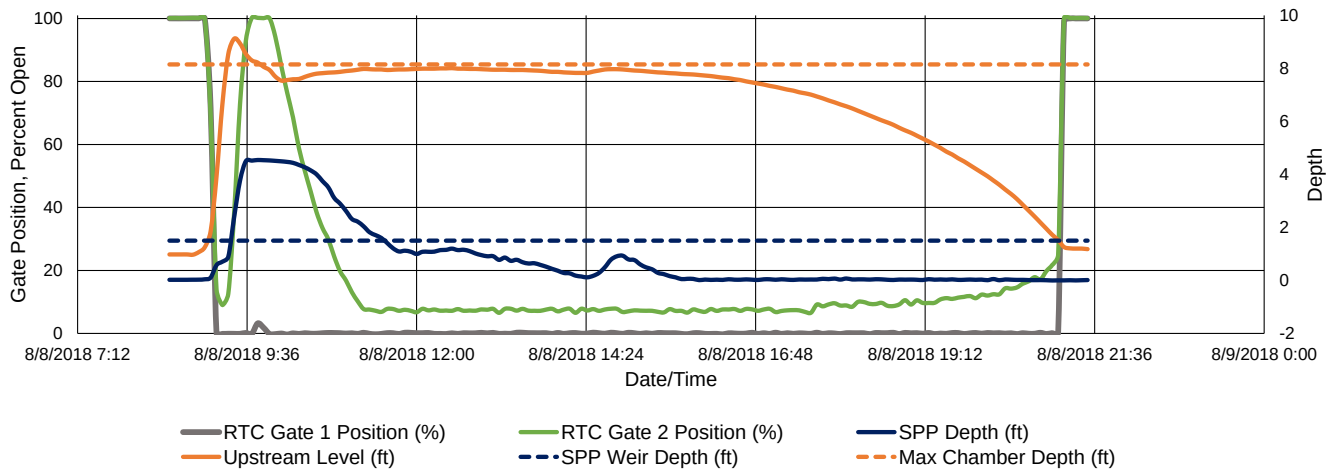
Site:	Bird RTC
Analysis Date:	09/13/2018
Event Start Date/Time:	8/8/2018 9:00
Event End Date/Time:	8/8/2018 21:10

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.72 in.
Storm Event Duration:	4 hr.
Storm Type:	Less than one year

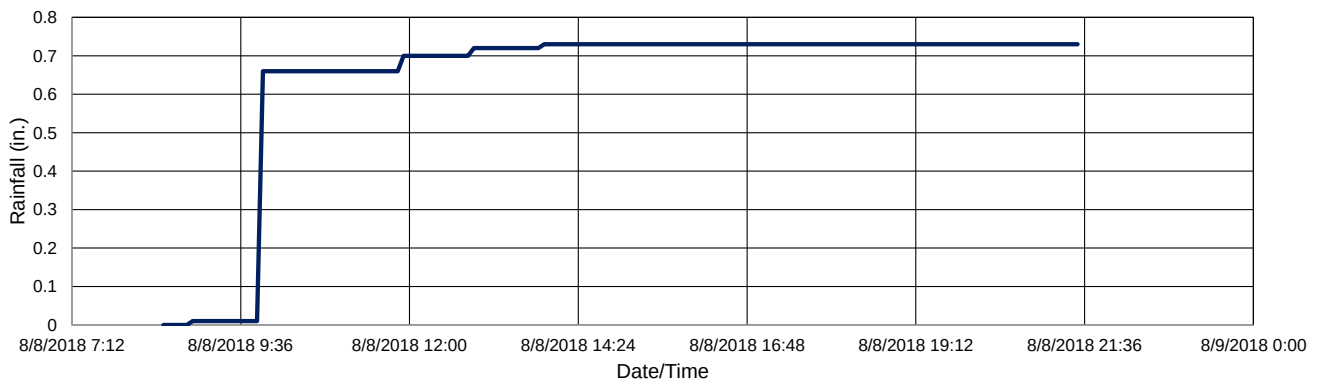
Gate Activation Trigger Depth:	1.25 ft.
Return to Normal Depth:	1.52 ft.
Time Gate 1 Activated:	8/8/2018 9:00
Time Gate 2 Activated:	8/8/2018 9:00
Time Gate 1 Returned to Normal:	8/8/2018 21:10
Time Gate 2 Returned to Normal:	8/8/2018 21:10
Percent Capture	13%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.15 ft.
Volume Stored:	897,938 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	5,801,490 Gal.
Overflow Volume Prevented:	897,938 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:
Rainfall data sourced from South Buffalo rain gauge, as provided by BSA.

RTC Gate Performance



Rainfall Accumulation



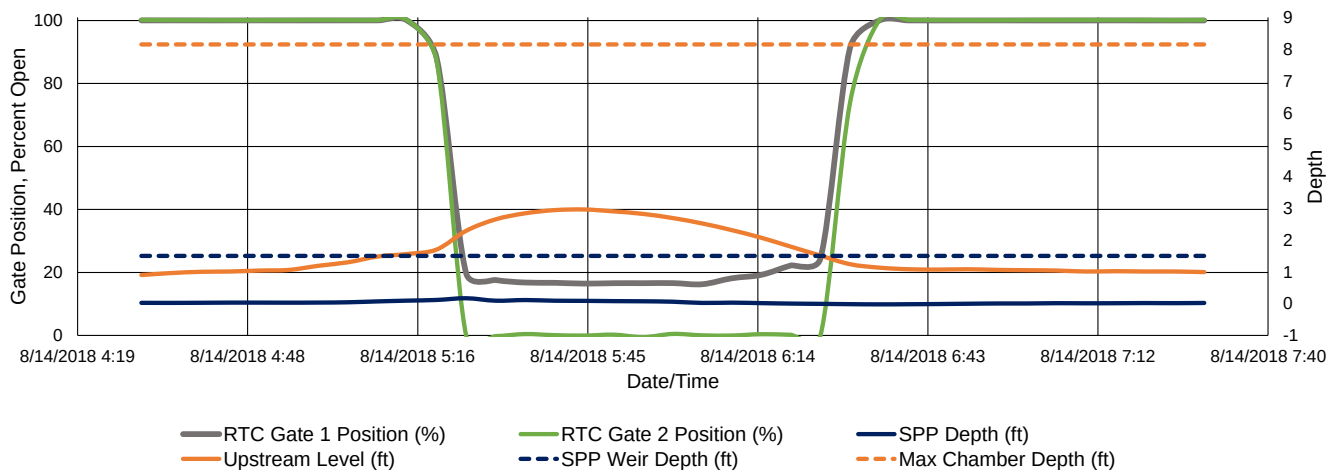
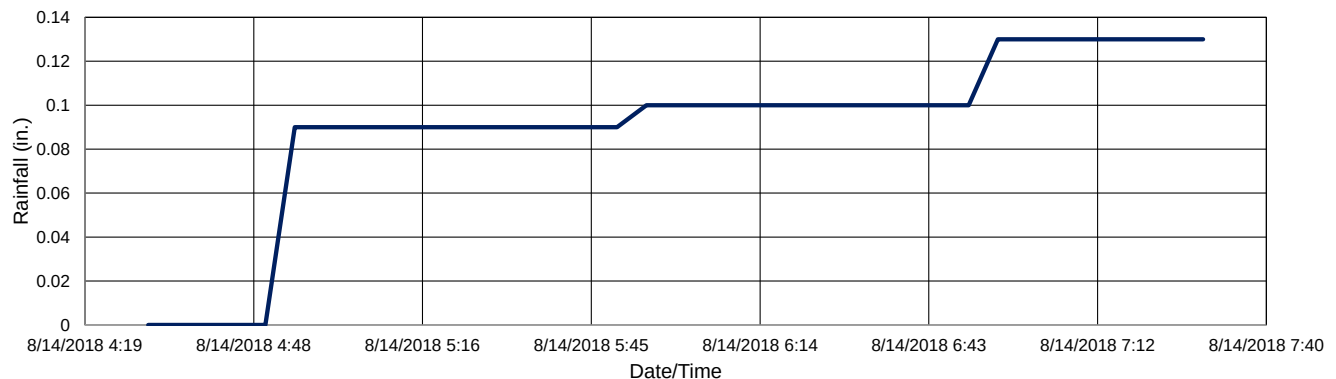
Site:	Bird RTC
Analysis Date:	09/13/2018
Event Start Date/Time:	8/14/2018 5:15
Event End Date/Time:	8/14/2018 6:35

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.13 in.
Storm Event Duration:	2 hr.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.56 ft.
Return to Normal Depth:	1.24 ft.
Time Gate 1 Activated:	8/14/2018 5:15
Time Gate 2 Activated:	8/14/2018 5:15
Time Gate 1 Returned to Normal:	8/14/2018 6:35
Time Gate 2 Returned to Normal:	8/14/2018 6:35
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	2.96 ft.
Volume Stored:	52,007 Gal.
Unused Storage Volume:	844,517 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	52,007 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:

Rainfall data sourced from South Buffalo rain gauge, as provided by BSA.

RTC Gate Performance**Rainfall Accumulation**

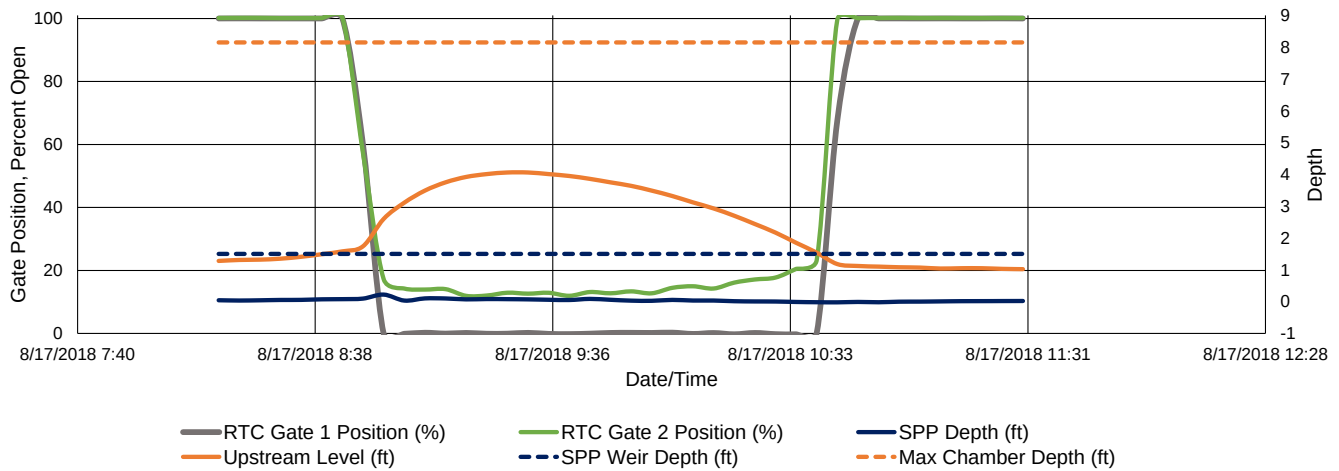
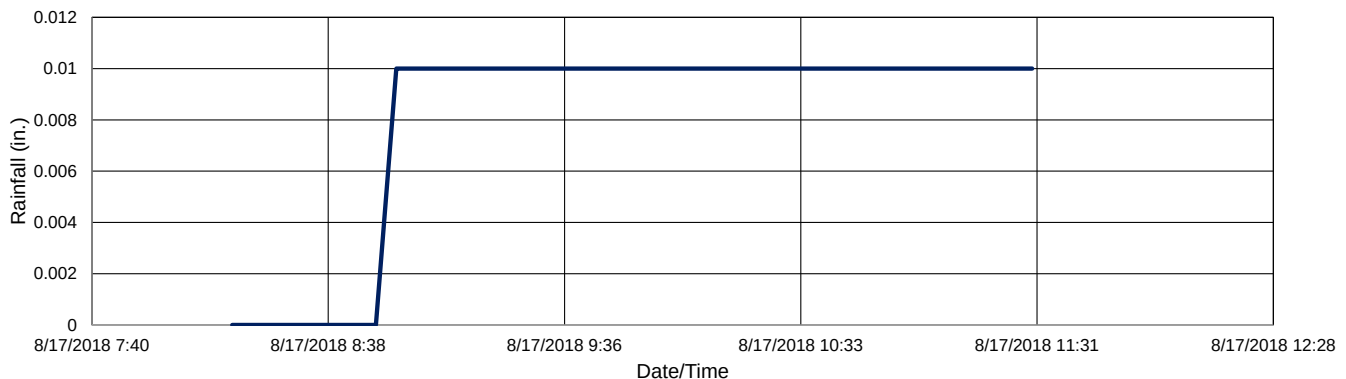
Site:	Bird RTC
Analysis Date:	09/13/2018
Event Start Date/Time:	8/17/2018 8:45
Event End Date/Time:	8/17/2018 10:50

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.01 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.58 ft.
Return to Normal Depth:	1.18 ft.
Time Gate 1 Activated:	8/17/2018 8:45
Time Gate 2 Activated:	8/17/2018 8:45
Time Gate 1 Returned to Normal:	8/17/2018 10:50
Time Gate 2 Returned to Normal:	8/17/2018 10:50
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	4.06 ft.
Volume Stored:	145,053 Gal.
Unused Storage Volume:	751,253 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	145,053 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:

Rainfall data sourced from South Buffalo rain gauge, as provided by BSA.

RTC Gate Performance**Rainfall Accumulation**

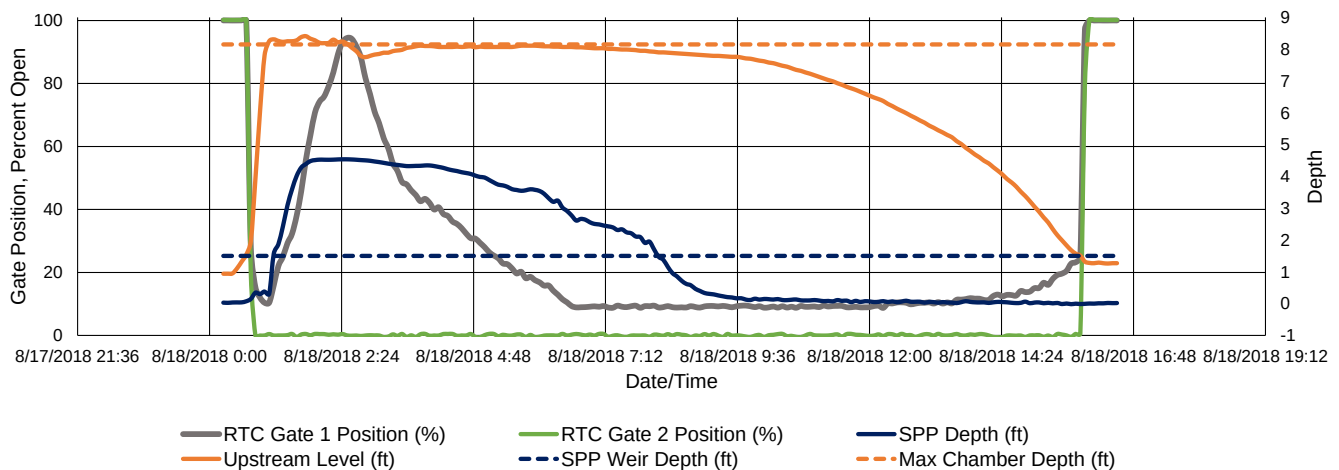
Site:	Bird RTC
Analysis Date:	09/13/2018
Event Start Date/Time:	8/18/2018 0:40
Event End Date/Time:	8/18/2018 16:00

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	1.84 in.
Storm Event Duration:	8 hr.
Storm Type:	Less than five year

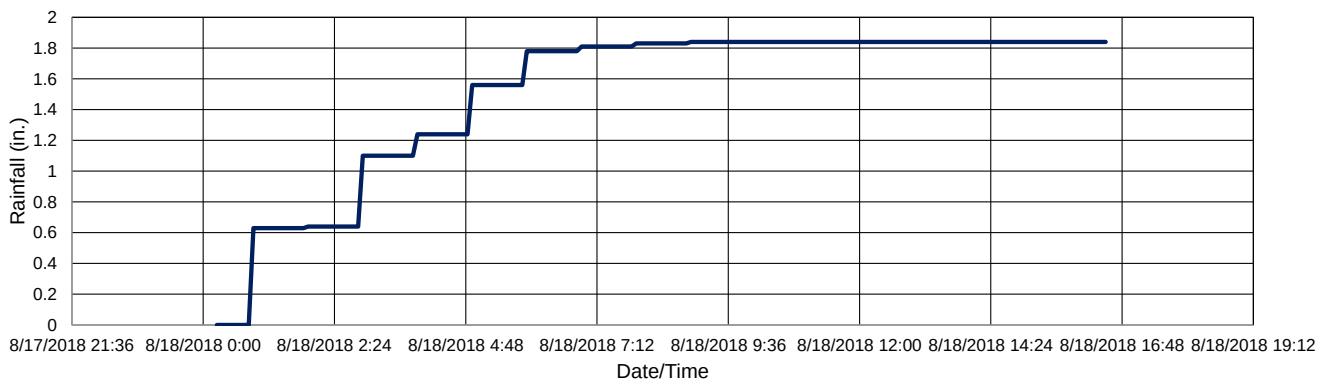
Gate Activation Trigger Depth:	1.54 ft.
Return to Normal Depth:	1.32 ft.
Time Gate 1 Activated:	8/18/2018 0:40
Time Gate 2 Activated:	8/18/2018 0:40
Time Gate 1 Returned to Normal:	8/18/2018 16:00
Time Gate 2 Returned to Normal:	8/18/2018 16:00
Percent Capture	4%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.15 ft.
Volume Stored:	896,725 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	19,450,114 Gal.
Overflow Volume Prevented:	896,725 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:
Rainfall data sourced from South Buffalo rain gauge, as provided by BSA.

RTC Gate Performance



Rainfall Accumulation



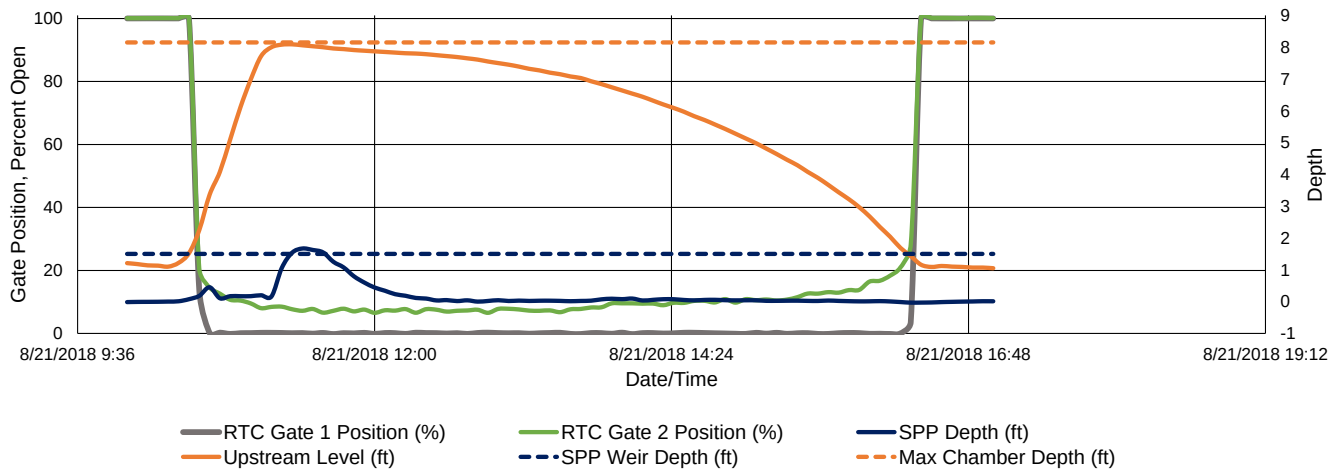
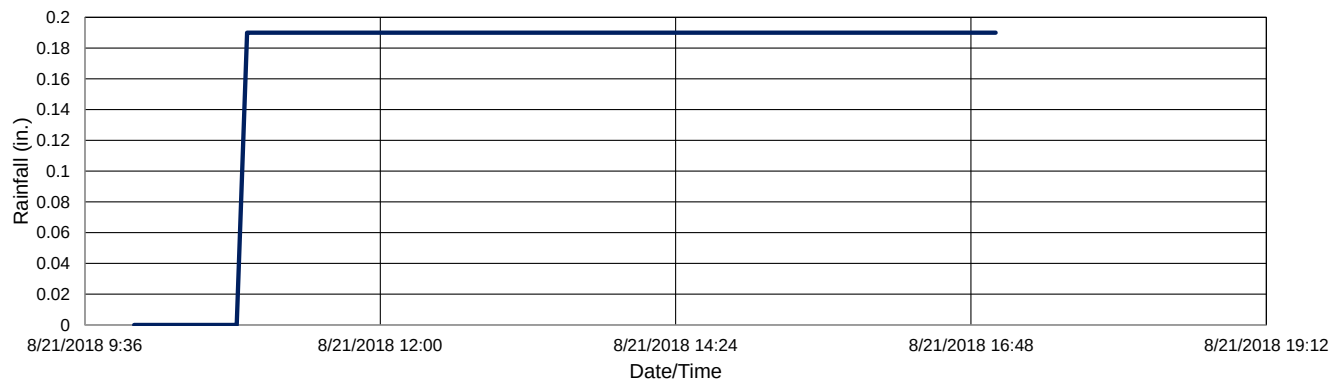
Site:	Bird RTC
Analysis Date:	09/13/2018
Event Start Date/Time:	8/21/2018 10:30
Event End Date/Time:	8/21/2018 16:25

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.19 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.52 ft.
Return to Normal Depth:	1.43 ft.
Time Gate 1 Activated:	8/21/2018 10:30
Time Gate 2 Activated:	8/21/2018 10:30
Time Gate 1 Returned to Normal:	8/21/2018 16:25
Time Gate 2 Returned to Normal:	8/21/2018 16:25
Percent Capture	99%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.09 ft.
Volume Stored:	881,284 Gal.
Unused Storage Volume:	15,628 Gal.
Overflow Volume:	9,755 Gal.
Overflow Volume Prevented:	881,284 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	9,755 Gal.
Could SPP activation have been prevented?	Yes

Recommended Operational Changes/Notes:

Rainfall data sourced from South Buffalo rain gauge, as provided by BSA.

RTC Gate Performance**Rainfall Accumulation**

August 29, 2018

8

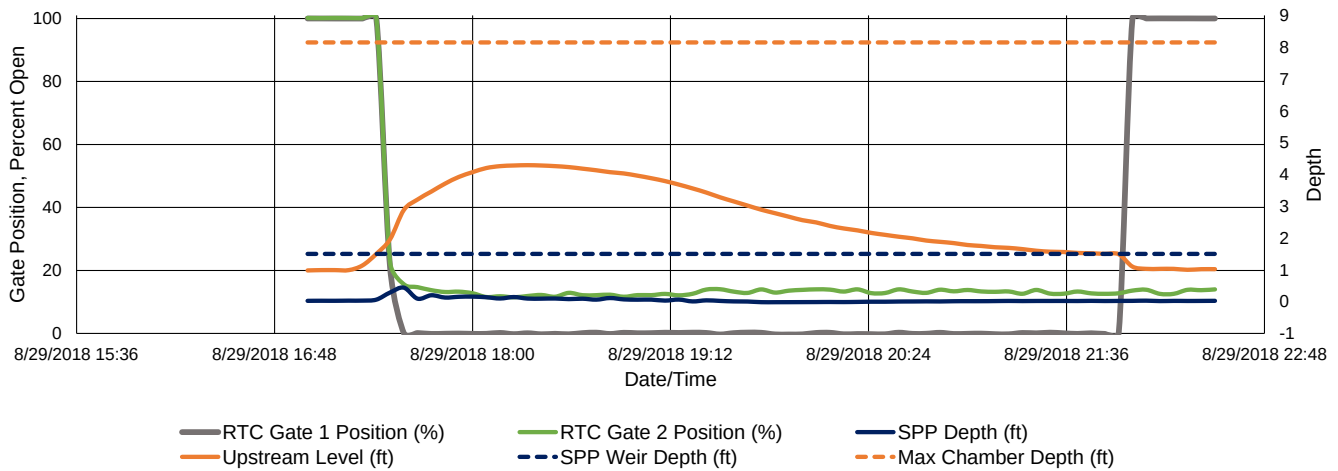
Site:	Bird RTC
Analysis Date:	09/13/2018
Event Start Date/Time:	8/29/2018 17:25
Event End Date/Time:	8/29/2018 22:00

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.05 in.
Storm Event Duration:	4 hr.
Storm Type:	Less than one year

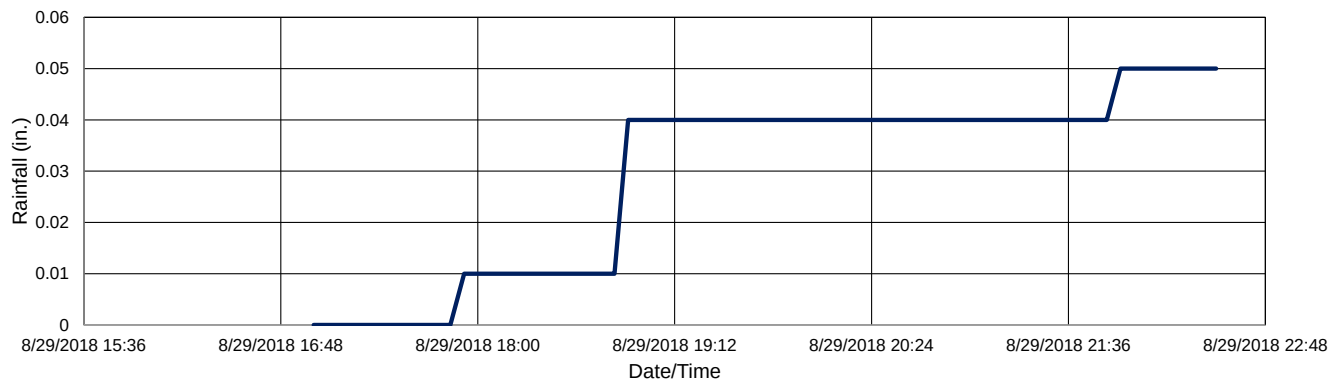
Gate Activation Trigger Depth:	1.50 ft.
Return to Normal Depth:	1.49 ft.
Time Gate 1 Activated:	8/29/2018 17:25
Time Gate 2 Activated:	8/29/2018 17:25
Time Gate 1 Returned to Normal:	8/29/2018 22:00
Time Gate 2 Returned to Normal:	8/29/2018 22:00
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	4.29 ft.
Volume Stored:	171,159 Gal.
Unused Storage Volume:	725,924 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	171,159 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:
Rainfall data sourced from South Buffalo rain gauge, as provided by BSA.

RTC Gate Performance



Rainfall Accumulation



September 2018 Bird Ave. RTC KPI Report

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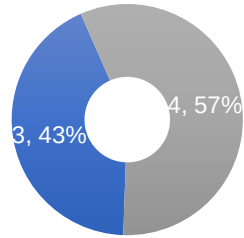
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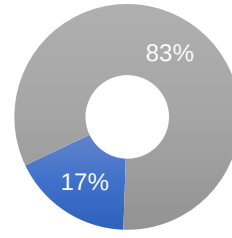
September 2018

Prevented SPP Events



■ Number of Prevented SPP Overflow Events
■ Number of Occurred SPP Overflow Events

Prevented SPP Volume



■ Prevented SPP Overflow Volume (Gal.)
■ Occurred SPP Overflow Volume (Gal.)

Number of Prevented SPP Overflow Events	Number of Occurred SPP Overflow Events	Prevented SPP Overflow Volume (Gal.)	Occurred SPP Overflow Volume (Gal.)
3	4	4,542,472	21,571,903

Event Date	SPP Overflow Volume Prevented	SPP Overflow Volume Occurred	Percent Capture
09/01/2018	323,232	-	100%
09/10/2018	896,192	12,275,564	7%
09/11/2018	882,794	88,827	91%
09/21/2018	616,720	-	100%
09/25/2018	890,602	532,102	63%
09/25/2018	897,614	8,675,410	9%
09/29/2018	35,318	-	100%

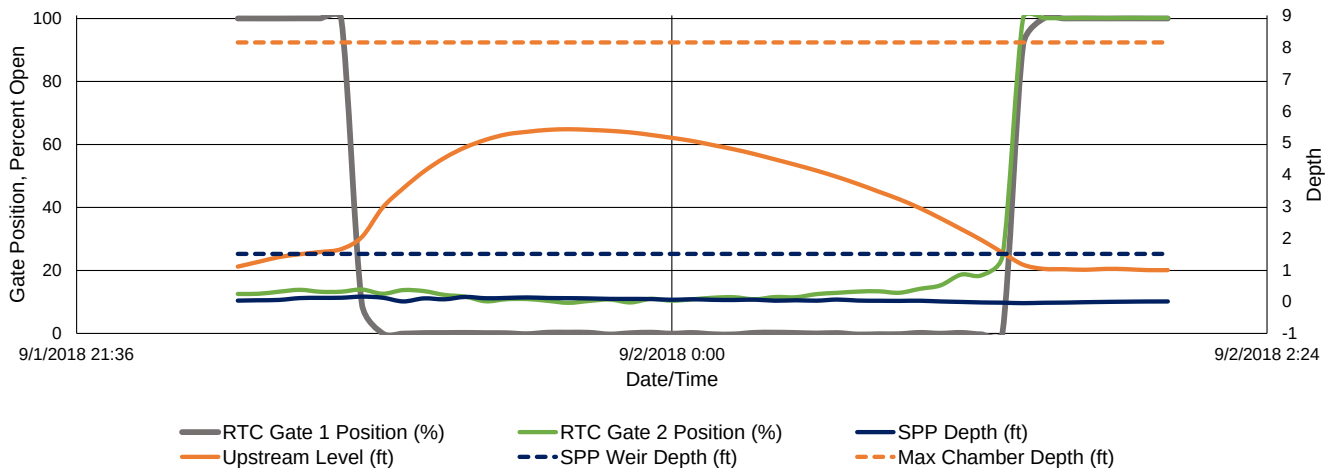
Site:	Bird RTC
Analysis Date:	10/16/2018
Event Start Date/Time:	9/1/2018 22:40
Event End Date/Time:	9/2/2018 1:30

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.09 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

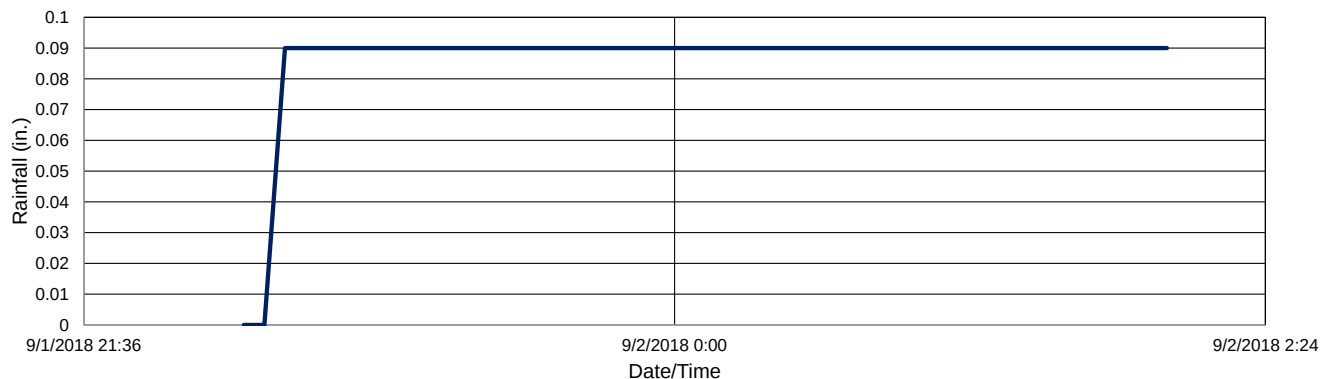
Gate Activation Trigger Depth:	1.65 ft.
Return to Normal Depth:	1.16 ft.
Time Gate 1 Activated:	9/1/2018 22:40
Time Gate 2 Activated:	8/29/2018 17:25
Time Gate 1 Returned to Normal:	9/2/2018 1:30
Time Gate 2 Returned to Normal:	9/2/2018 1:30
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	5.42 ft.
Volume Stored:	323,232 Gal.
Unused Storage Volume:	572,195 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	323,232 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:
Rainfall data sourced from South Buffalo rain gauge, as provided by BSA. Gate 2 remained partially closed after the event of August 29, 2018, and returned to fully open position after this event.

RTC Gate Performance



Rainfall Accumulation



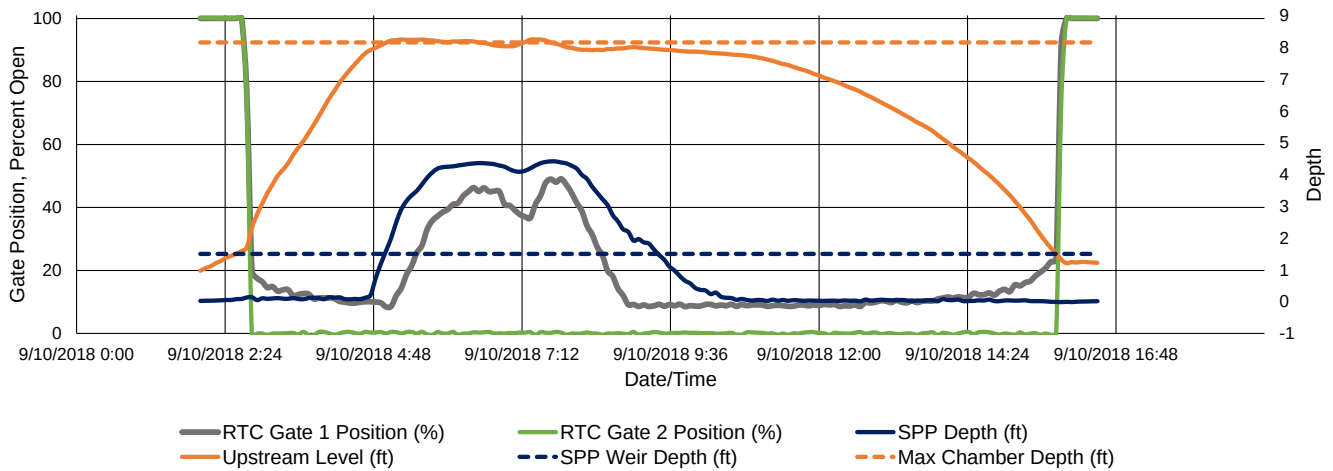
Site:	Bird RTC
Analysis Date:	10/16/2018
Event Start Date/Time:	9/10/2018 2:40
Event End Date/Time:	9/10/2018 16:00

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	1.3 in.
Storm Event Duration:	6 hr.
Storm Type:	One year

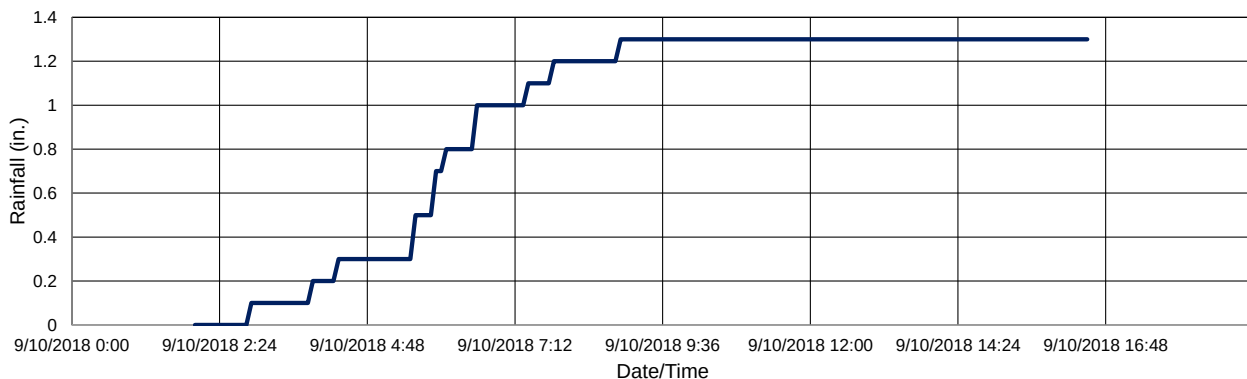
Gate Activation Trigger Depth:	1.59 ft.
Return to Normal Depth:	1.32 ft.
Time Gate 1 Activated:	9/10/2018 2:40
Time Gate 2 Activated:	9/10/2018 2:40
Time Gate 1 Returned to Normal:	9/10/2018 16:00
Time Gate 2 Returned to Normal:	9/10/2018 16:00
Percent Capture	7%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.15 ft.
Volume Stored:	896,192 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	12,275,564 Gal.
Overflow Volume Prevented:	896,192 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry did not record any rainfall for majority of the month.

RTC Gate Performance



Rainfall Accumulation



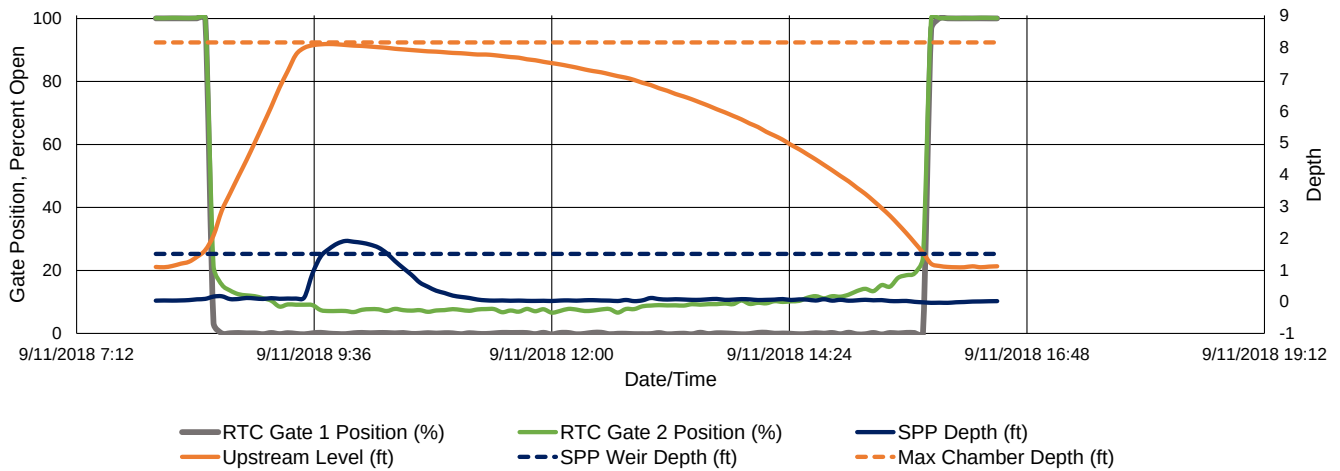
Site:	Bird RTC
Analysis Date:	10/16/2018
Event Start Date/Time:	9/11/2018 8:30
Event End Date/Time:	9/11/2018 15:55

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

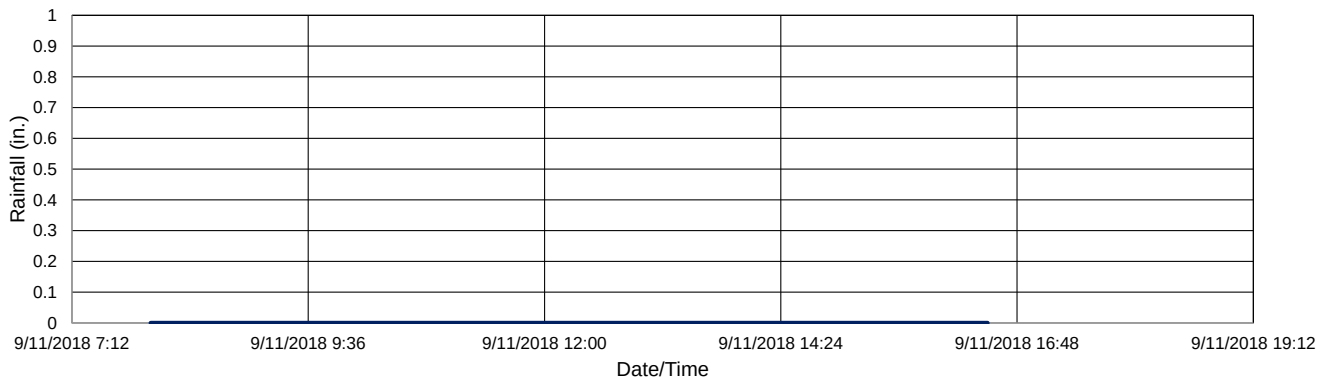
Gate Activation Trigger Depth:	1.62 ft.
Return to Normal Depth:	1.19 ft.
Time Gate 1 Activated:	9/11/2018 8:30
Time Gate 2 Activated:	9/11/2018 8:30
Time Gate 1 Returned to Normal:	9/11/2018 15:55
Time Gate 2 Returned to Normal:	9/11/2018 15:55
Percent Capture	91%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.10 ft.
Volume Stored:	882,794 Gal.
Unused Storage Volume:	13,033 Gal.
Overflow Volume:	88,827 Gal.
Overflow Volume Prevented:	882,794 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	88,827 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:
No rainfall recorded at Buffalo airport. This event was likely caused by a localized rain event that was not captured by BSA rain gauge stations due to possible technical glitch. BSA rain gauge stations at South Buffalo and Amherst Quarry did not record any rainfall for majority of the month.

RTC Gate Performance



Rainfall Accumulation



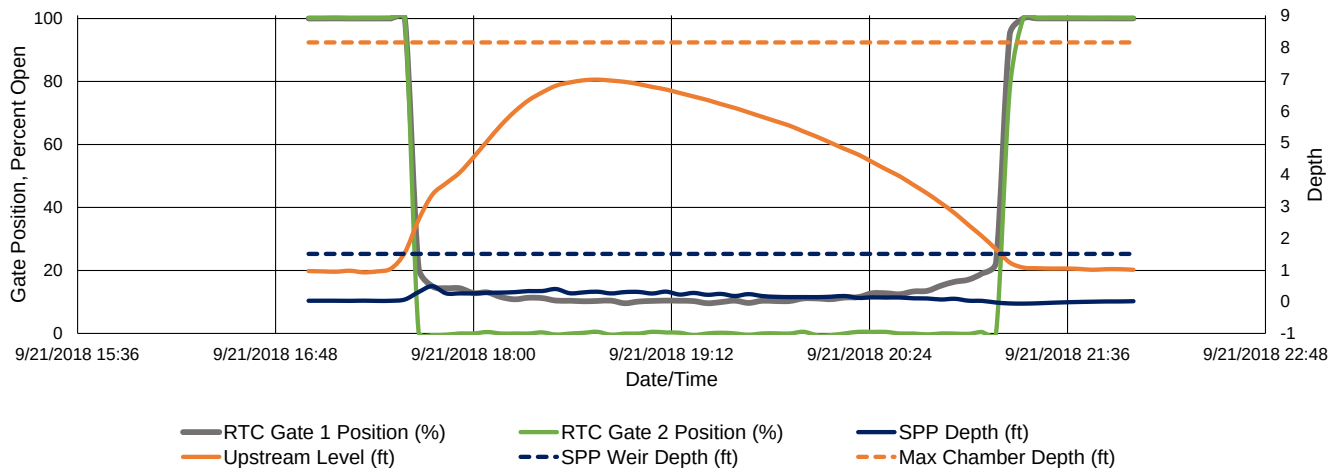
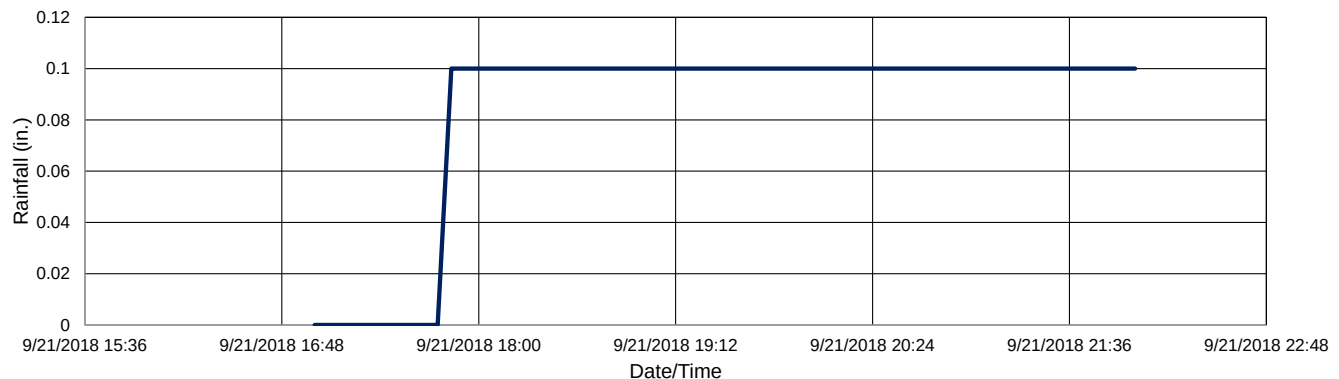
Site:	Bird RTC
Analysis Date:	10/16/2018
Event Start Date/Time:	9/21/2018 17:35
Event End Date/Time:	9/21/2018 21:20

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.1 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.54 ft.
Return to Normal Depth:	1.23 ft.
Time Gate 1 Activated:	9/21/2018 17:35
Time Gate 2 Activated:	9/21/2018 17:35
Time Gate 1 Returned to Normal:	9/21/2018 21:20
Time Gate 2 Returned to Normal:	9/21/2018 21:20
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	6.98 ft.
Volume Stored:	616,720 Gal.
Unused Storage Volume:	280,006 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	616,720 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry did not record any rainfall for majority of the month.

RTC Gate Performance**Rainfall Accumulation**

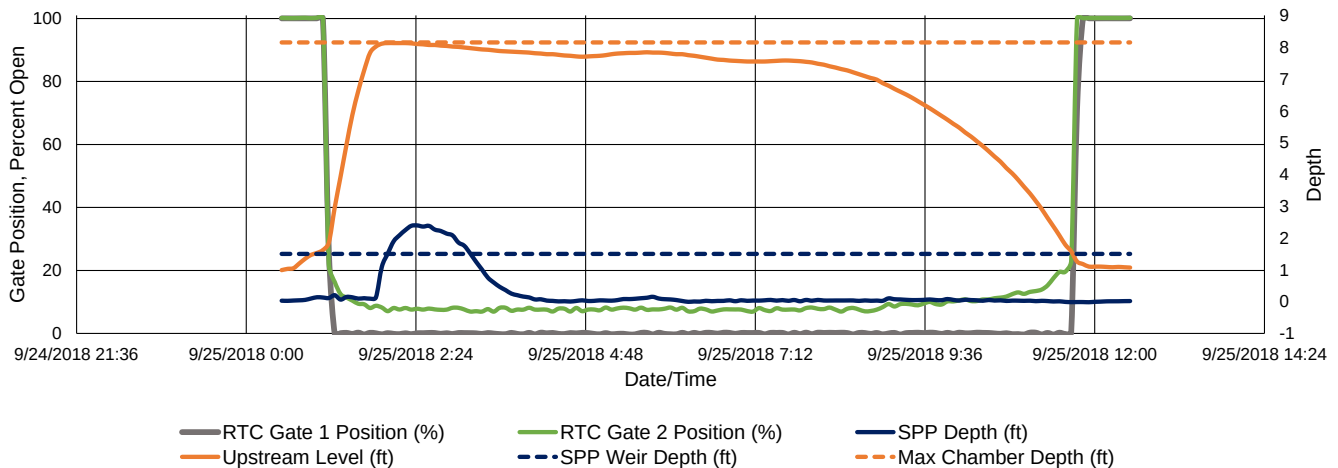
Site:	Bird RTC
Analysis Date:	10/16/2018
Event Start Date/Time:	9/25/2018 1:05
Event End Date/Time:	9/25/2018 11:50

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.5 in.
Storm Event Duration:	4 hr.
Storm Type:	Less than one year

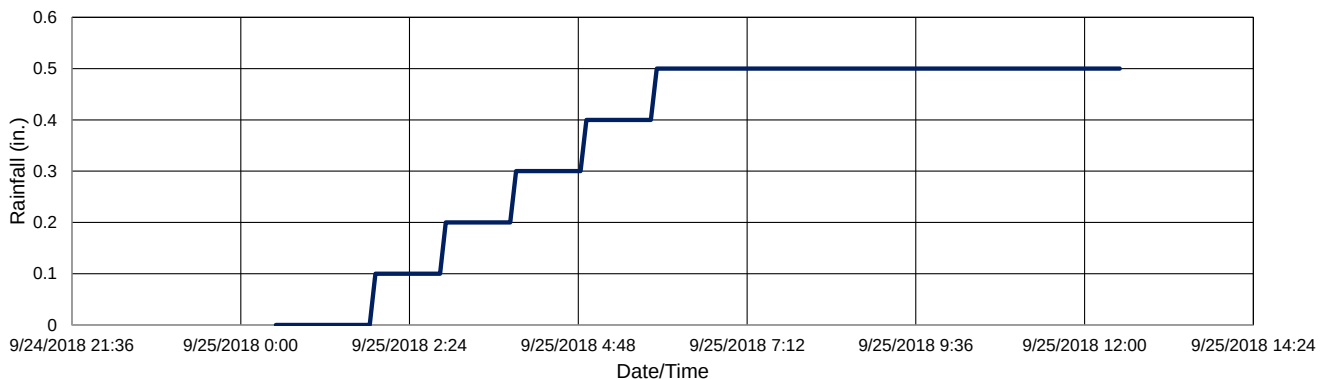
Gate Activation Trigger Depth:	1.62 ft.
Return to Normal Depth:	1.26 ft.
Time Gate 1 Activated:	9/25/2018 1:05
Time Gate 2 Activated:	9/25/2018 1:05
Time Gate 1 Returned to Normal:	9/25/2018 11:50
Time Gate 2 Returned to Normal:	9/25/2018 11:50
Percent Capture	63%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.13 ft.
Volume Stored:	890,602 Gal.
Unused Storage Volume:	5,225 Gal.
Overflow Volume:	532,102 Gal.
Overflow Volume Prevented:	890,602 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	532,102 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry did not record any rainfall for majority of the month.

RTC Gate Performance



Rainfall Accumulation



Site:	Bird RTC
Analysis Date:	10/16/2018
Event Start Date/Time:	9/25/2018 21:50
Event End Date/Time:	9/26/2018 19:40

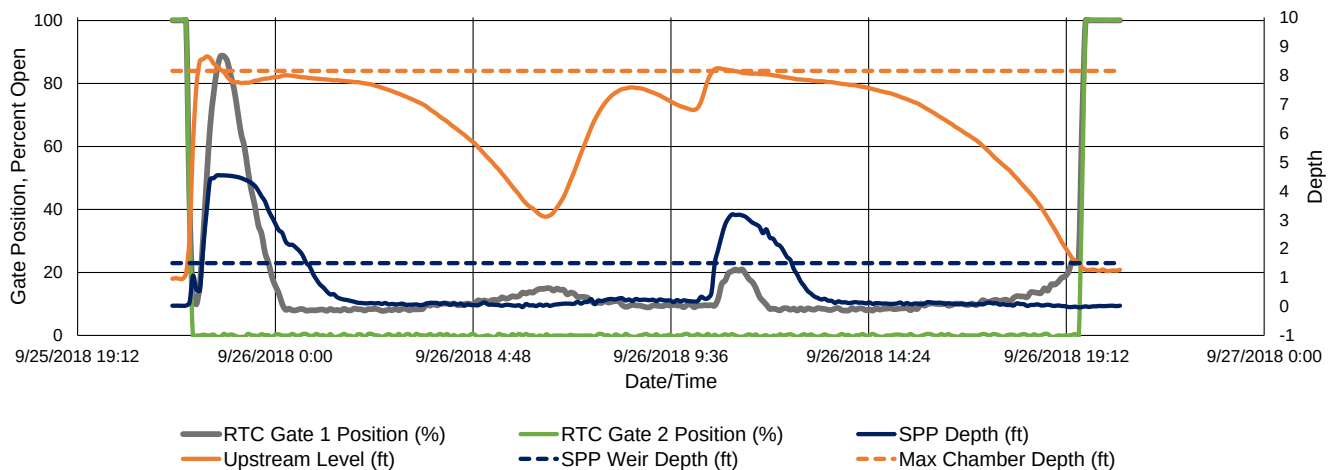
Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	1.2 in.
Storm Event Duration:	12.5 hr.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.15 ft.
Return to Normal Depth:	1.34 ft.
Time Gate 1 Activated:	9/25/2018 21:50
Time Gate 2 Activated:	9/25/2018 21:50
Time Gate 1 Returned to Normal:	9/26/2018 19:40
Time Gate 2 Returned to Normal:	9/26/2018 19:40
Percent Capture	9%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.15 ft.
Volume Stored:	897,614 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	8,675,410 Gal.
Overflow Volume Prevented:	897,614 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

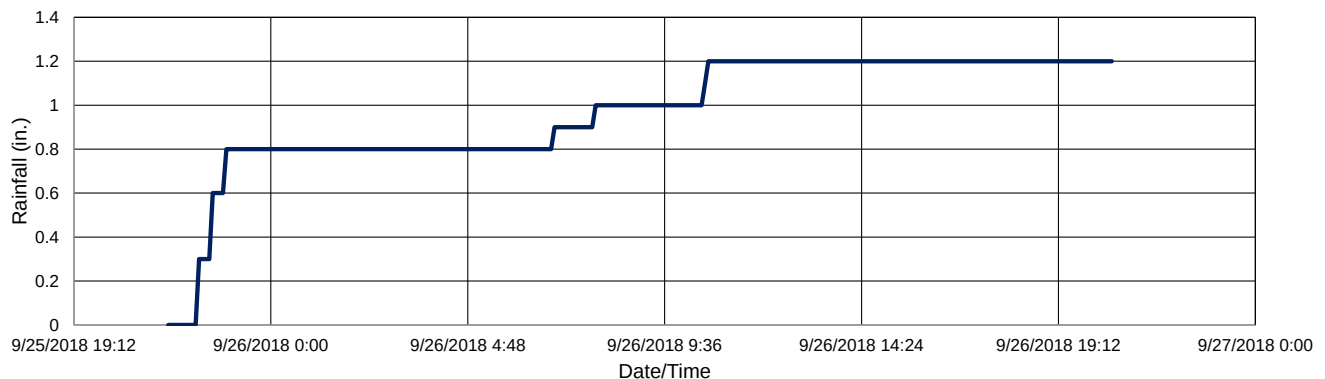
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry did not record any rainfall for majority of the month.

RTC Gate Performance



Rainfall Accumulation



Site:	Bird RTC
Analysis Date:	10/16/2018
Event Start Date/Time:	9/29/2018 1:30
Event End Date/Time:	9/29/2018 3:10

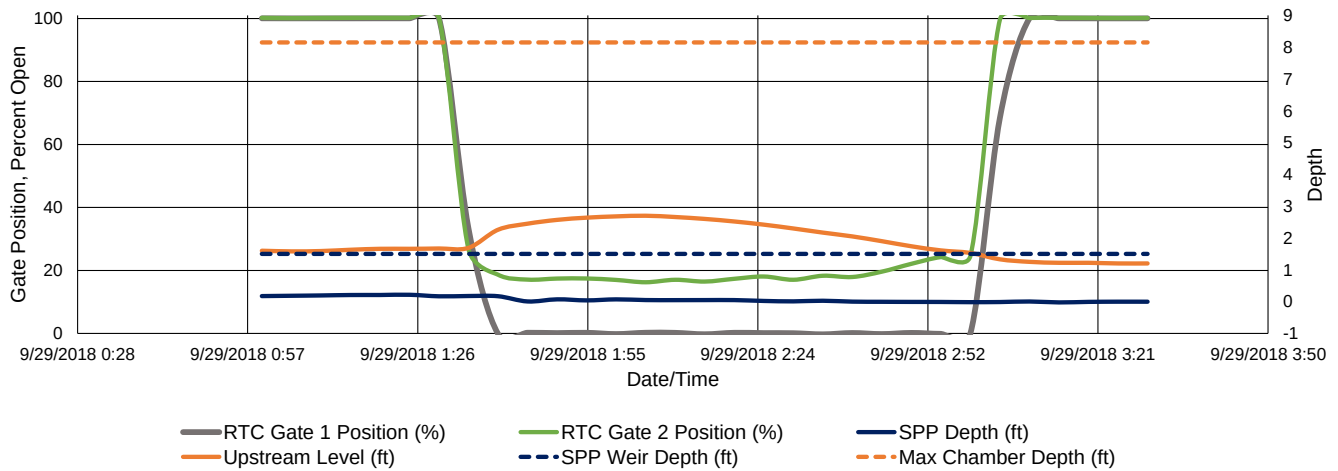
Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.1 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.67 ft.
Return to Normal Depth:	1.33 ft.
Time Gate 1 Activated:	9/29/2018 1:30
Time Gate 2 Activated:	9/29/2018 1:30
Time Gate 1 Returned to Normal:	9/29/2018 3:10
Time Gate 2 Returned to Normal:	9/29/2018 3:10
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	2.70 ft.
Volume Stored:	35,318 Gal.
Unused Storage Volume:	859,823 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	35,318 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

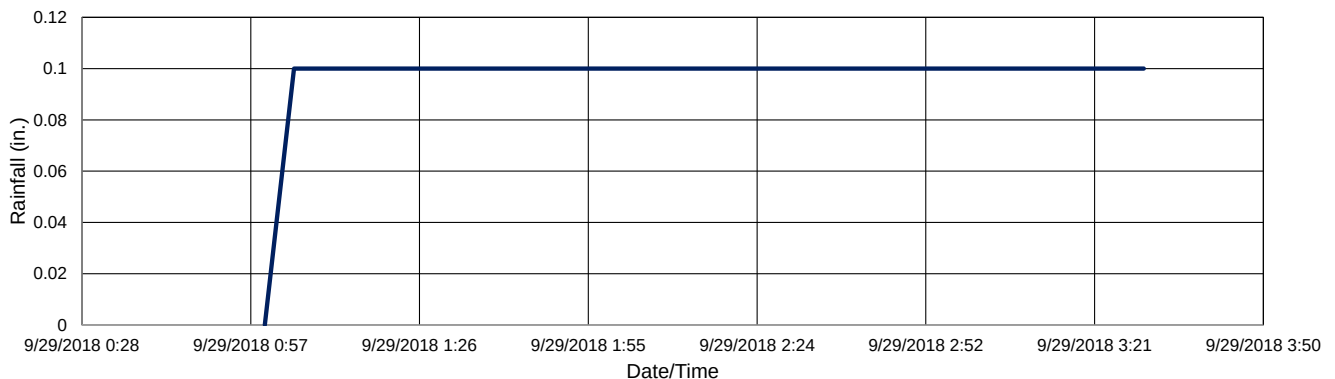
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry did not record any rainfall for majority of the month.

RTC Gate Performance



Rainfall Accumulation



October 2018 Bird Ave. RTC KPI Report

BUFFALO
SEWER AUTHORITY



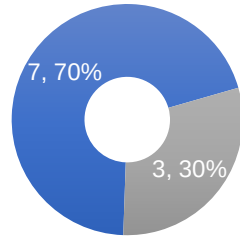
ARCADIS

Design & Consultancy
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built assets

Bird Ave. RTC Monthly Performance Report

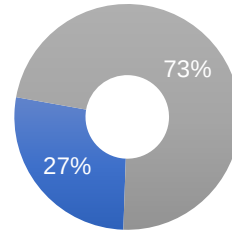
October 2018

Prevented SPP Events



■ Number of Prevented SPP Overflow Events
■ Number of Occurred SPP Overflow Events

Prevented SPP Volume



■ Prevented SPP Overflow Volume (Gal.)
■ Occurred SPP Overflow Volume (Gal.)

Number of Prevented SPP Overflow Events	Number of Occurred SPP Overflow Events	Prevented SPP Overflow Volume (Gal.)	Occurred SPP Overflow Volume (Gal.)
7	3	4,966,115	13,264,418

Event Date	SPP Overflow Volume Prevented	SPP Overflow Volume Occurred	Percent Capture
10/2/2018	895,953	7,037,140	11%
10/4/2018	897,882	794,709	53%
10/6/2018	372,152	5,432,569	6%
10/20/2018	606,337	-	100%
10/20/2018	154,504	-	100%
10/20/2018	472,554	-	100%
10/27/2018	177,026	-	100%
10/27/2018	606,771	-	100%
10/28/2018	89,655	-	100%
10/31/2018	693,281	-	100%

October 2, 2018

1

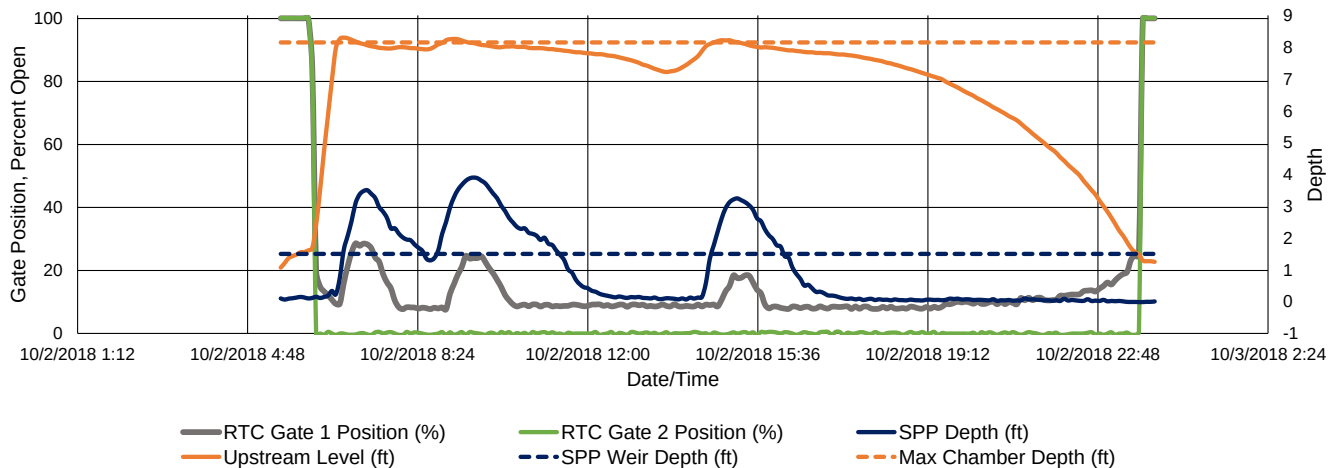
Site:	Bird RTC
Analysis Date:	11/13/2018
Event Start Date/Time:	10/2/2018 6:05
Event End Date/Time:	10/2/2018 23:45

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	1.0 in.
Storm Event Duration:	9 hr.
Storm Type:	Less than one year

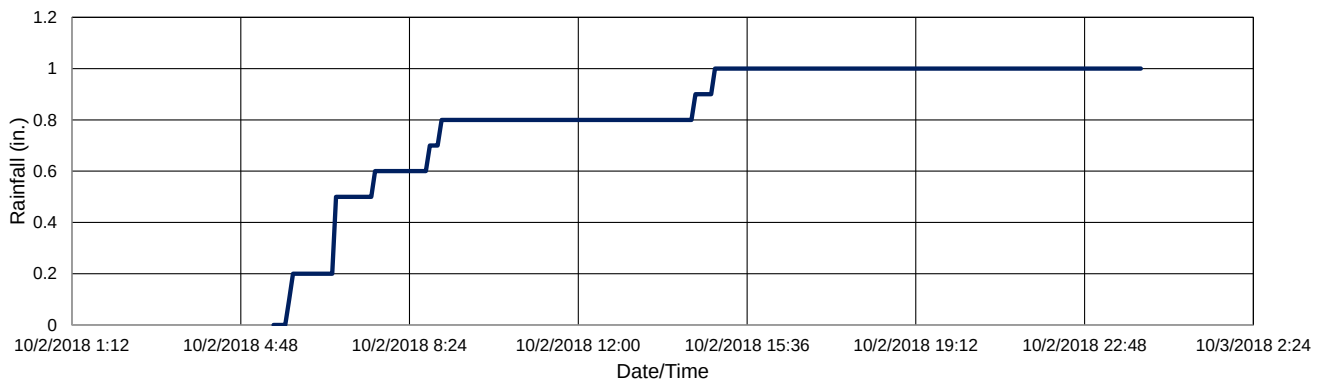
Gate Activation Trigger Depth:	1.61 ft.
Return to Normal Depth:	1.48 ft.
Time Gate 1 Activated:	10/2/2018 6:05
Time Gate 2 Activated:	10/2/2018 6:05
Time Gate 1 Returned to Normal:	10/2/2018 23:45
Time Gate 2 Returned to Normal:	10/2/2018 23:45
Percent Capture	11%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.15 ft.
Volume Stored:	895,953 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	7,037,140 Gal.
Overflow Volume Prevented:	895,953 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

RTC Gate Performance



Rainfall Accumulation



Site:	Bird RTC
Analysis Date:	11/13/2018
Event Start Date/Time:	10/4/2018 7:20
Event End Date/Time:	10/4/2018 10:55

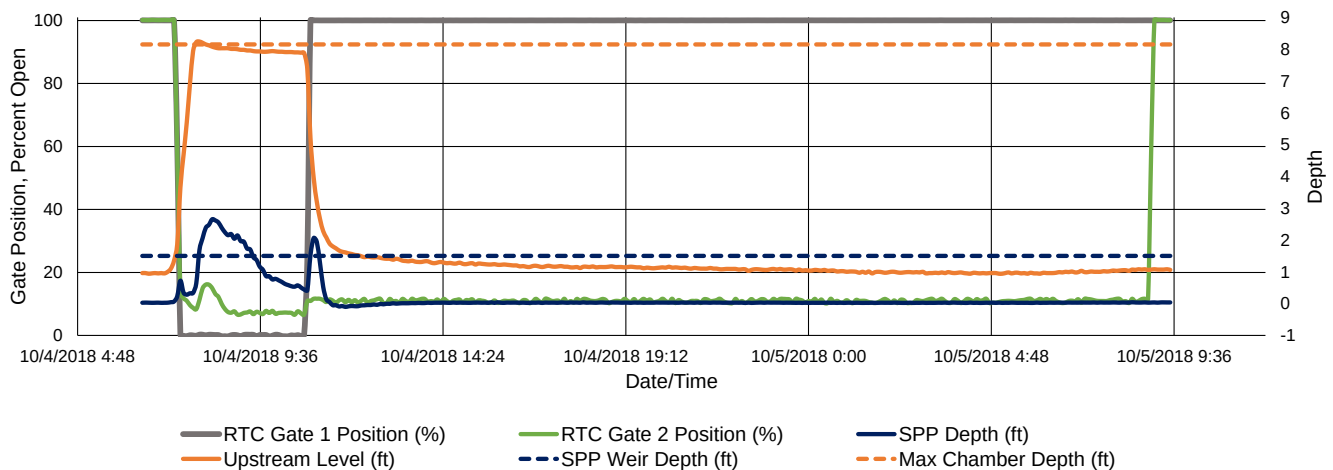
Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.4 in.
Storm Event Duration:	1.5 hr.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.35 ft.
Return to Normal Depth:	7.38 ft.
Time Gate 1 Activated:	10/4/2018 7:20
Time Gate 2 Activated:	10/4/2018 7:20
Time Gate 1 Returned to Normal:	10/4/2018 10:55
Time Gate 2 Returned to Normal:	10/4/2018 10:55
Percent Capture	53%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.15 ft.
Volume Stored:	897,882 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	794,709 Gal.
Overflow Volume Prevented:	897,882 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

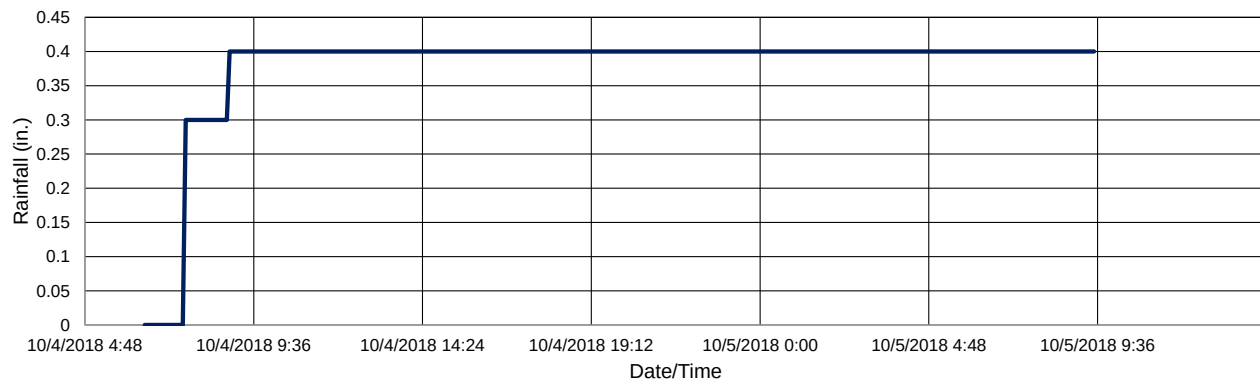
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

RTC Gate Performance



Rainfall Accumulation



Site:	Bird RTC
Analysis Date:	11/13/2018
Event Start Date/Time:	10/6/2018 11:25
Event End Date/Time:	10/6/2018 12:00

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.4 in.
Storm Event Duration:	0.5 hr.
Storm Type:	Less than one year

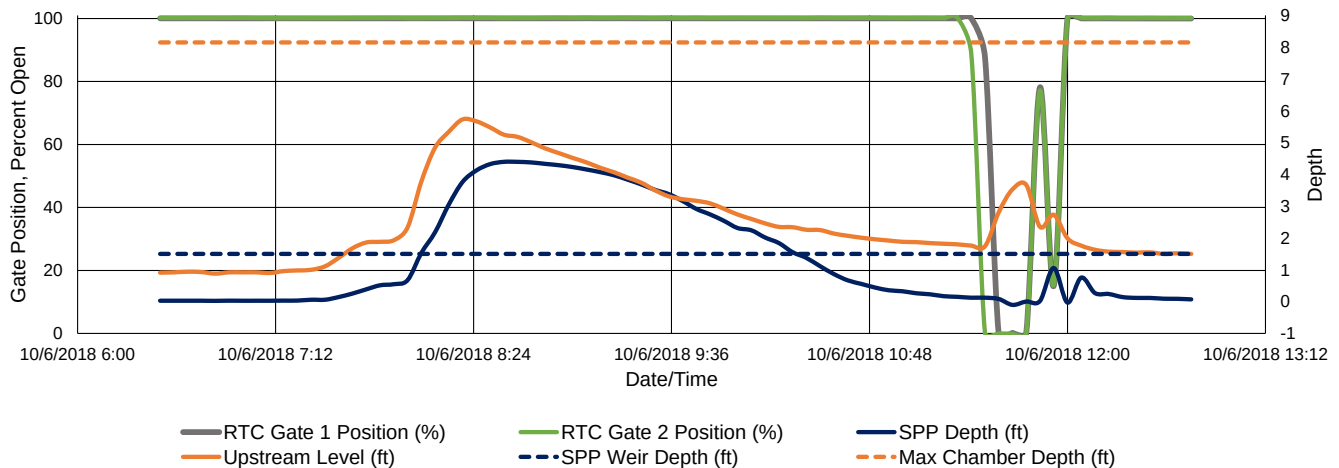
Gate Activation Trigger Depth:	1.76 ft.
Return to Normal Depth:	2.73 ft.
Time Gate 1 Activated:	10/6/2018 11:25
Time Gate 2 Activated:	10/6/2018 11:20
Time Gate 1 Returned to Normal:	10/6/2018 12:00
Time Gate 2 Returned to Normal:	10/6/2018 12:00
Percent Capture	6%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	5.73 ft.
Volume Stored:	372,152 Gal.
Unused Storage Volume:	521,516 Gal.
Overflow Volume:	5,432,569 Gal.
Overflow Volume Prevented:	372,152 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	5,432,569 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:

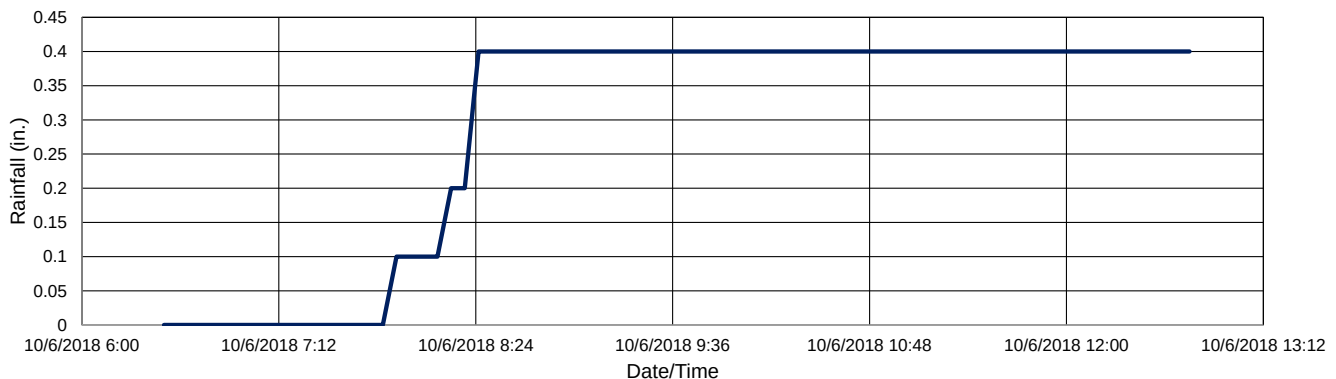
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

Gates should have started closing when the water level started rising around 7:30 a.m. This would have prevented some, if not all, of the overflow. However, gates did close later on and prevented certain overflow volume.

RTC Gate Performance



Rainfall Accumulation



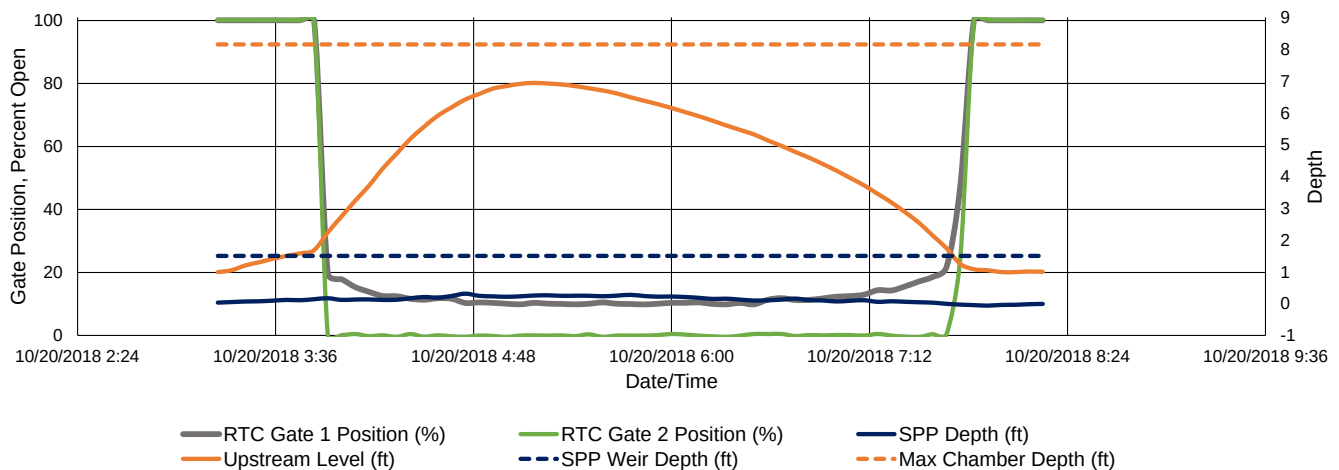
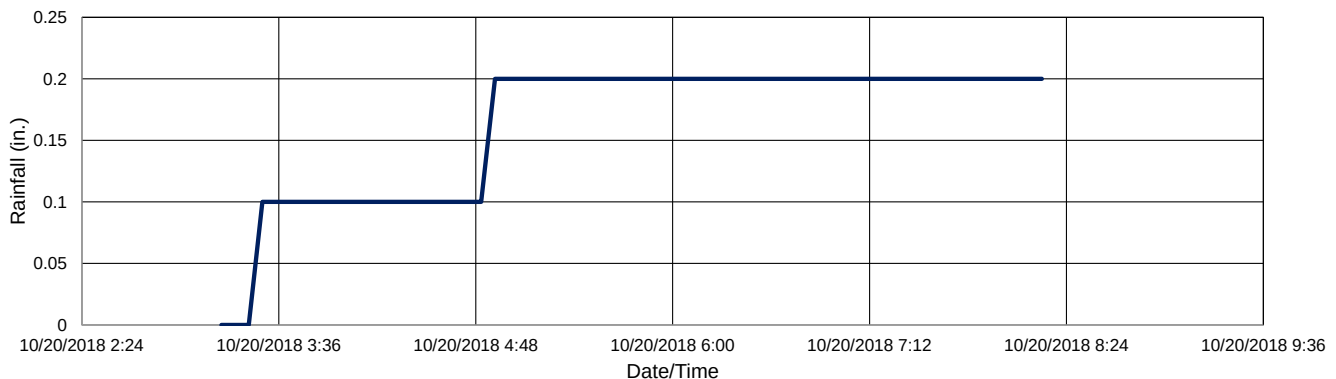
Site:	Bird RTC
Analysis Date:	11/13/2018
Event Start Date/Time:	10/20/2018 3:50
Event End Date/Time:	10/20/2018 7:50

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.2 in.
Storm Event Duration:	1.5 hr.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.68 ft.
Return to Normal Depth:	1.25 ft.
Time Gate 1 Activated:	10/20/2018 3:50
Time Gate 2 Activated:	10/20/2018 3:50
Time Gate 1 Returned to Normal:	10/20/2018 7:50
Time Gate 2 Returned to Normal:	10/20/2018 7:50
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	6.94 ft.
Volume Stored:	606,337 Gal.
Unused Storage Volume:	288,656 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	606,337 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

RTC Gate Performance**Rainfall Accumulation**

Site:	Bird RTC
Analysis Date:	11/13/2018
Event Start Date/Time:	10/20/2018 14:25
Event End Date/Time:	10/20/2018 19:05

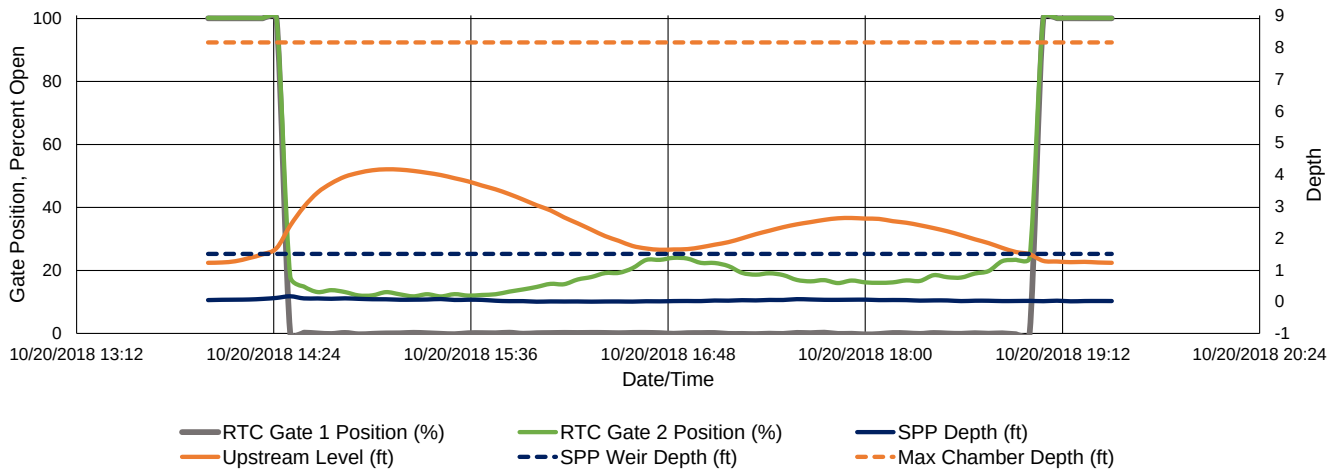
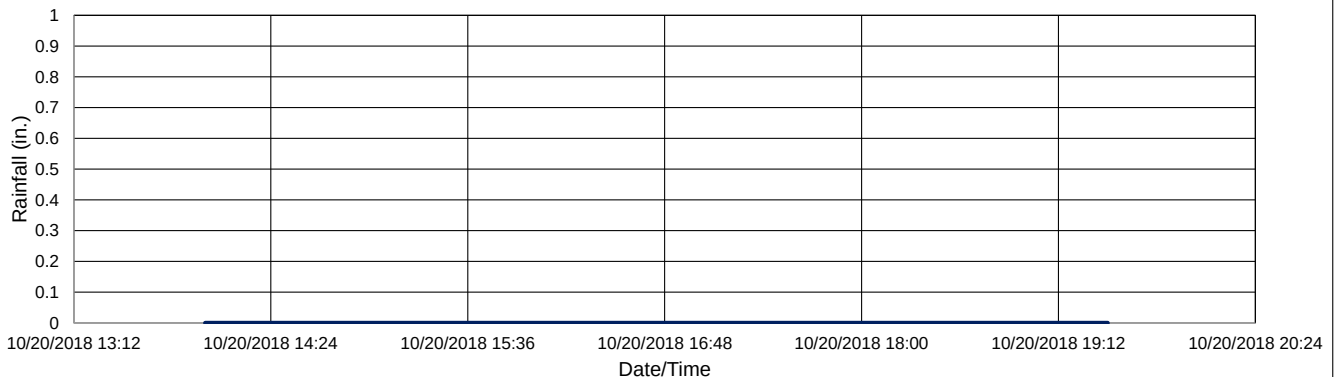
Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Gate Activation Trigger Depth:	1.68 ft.
Return to Normal Depth:	1.49 ft.
Time Gate 1 Activated:	10/20/2018 14:25
Time Gate 2 Activated:	10/20/2018 14:25
Time Gate 1 Returned to Normal:	10/20/2018 19:05
Time Gate 2 Returned to Normal:	10/20/2018 19:05
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	4.16 ft.
Volume Stored:	154,504 Gal.
Unused Storage Volume:	740,488 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	154,504 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

Gate activation event was triggered by 0.1 inch of rainfall that was recorded an hour before the event started.

RTC Gate Performance**Rainfall Accumulation**

Site:	Bird RTC
Analysis Date:	11/13/2018
Event Start Date/Time:	10/20/2018 22:15
Event End Date/Time:	10/21/2018 2:05

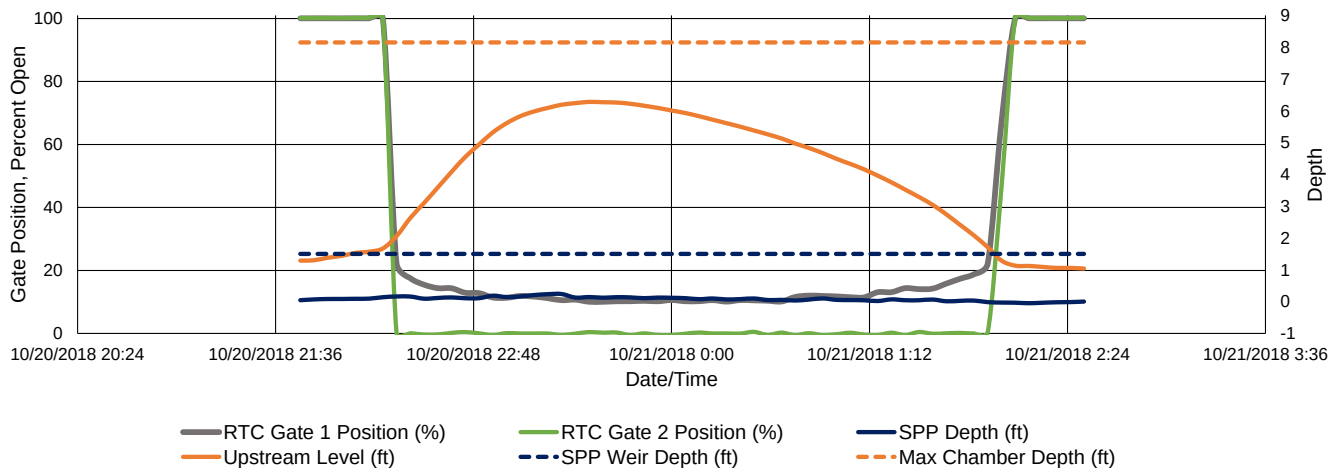
Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.2 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.67 ft.
Return to Normal Depth:	1.29 ft.
Time Gate 1 Activated:	10/20/2018 22:15
Time Gate 2 Activated:	10/20/2018 22:15
Time Gate 1 Returned to Normal:	10/21/2018 2:05
Time Gate 2 Returned to Normal:	10/21/2018 2:05
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	6.28 ft.
Volume Stored:	472,554 Gal.
Unused Storage Volume:	422,588 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	472,554 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

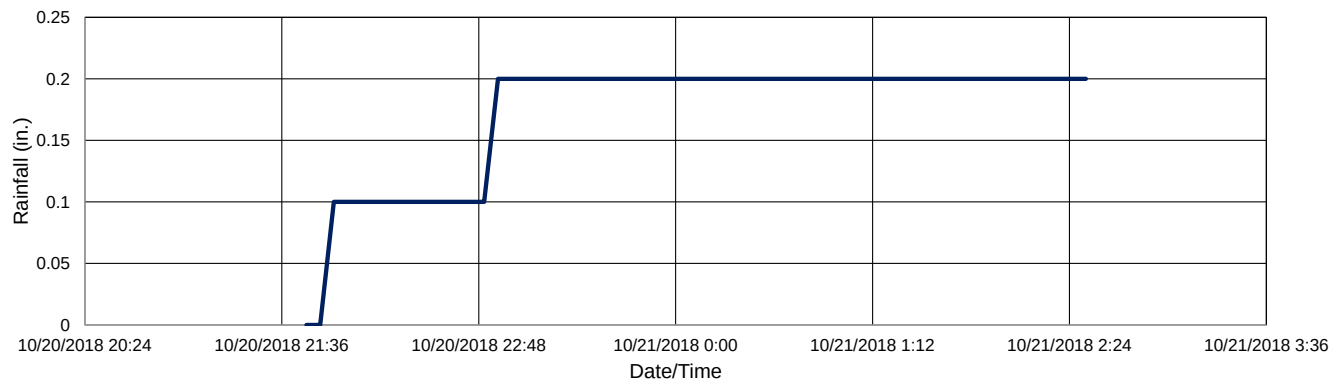
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

RTC Gate Performance



Rainfall Accumulation



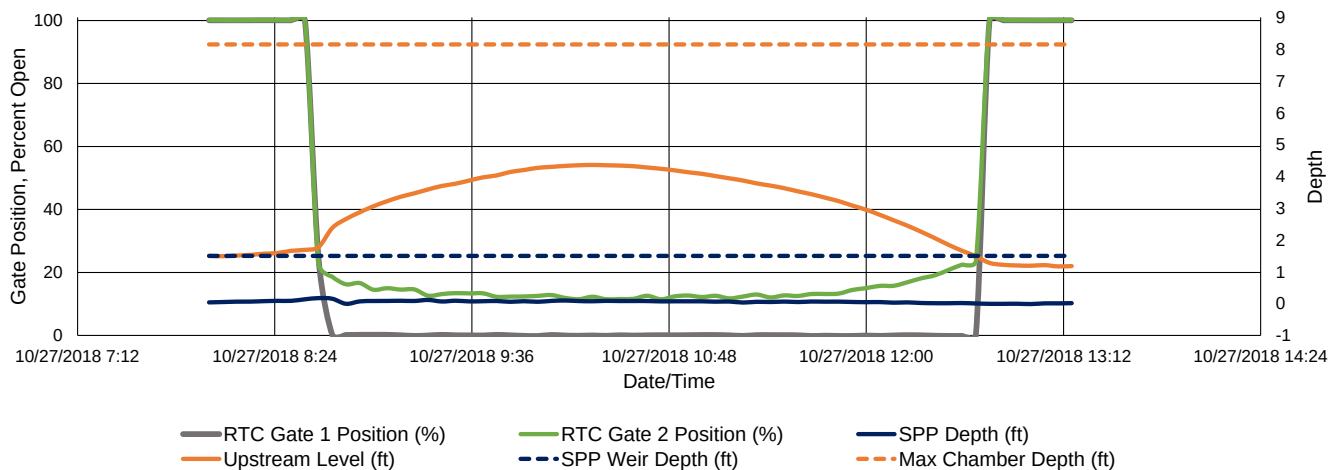
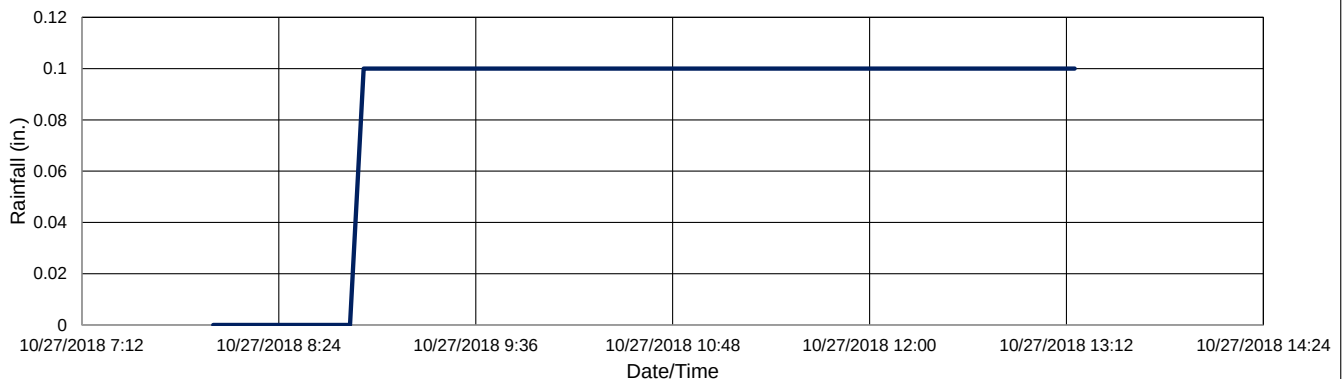
Site:	Bird RTC
Analysis Date:	11/13/2018
Event Start Date/Time:	10/27/2018 8:35
Event End Date/Time:	10/27/2018 12:45

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.1 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.69 ft.
Return to Normal Depth:	1.49 ft.
Time Gate 1 Activated:	10/27/2018 8:35
Time Gate 2 Activated:	10/27/2018 8:35
Time Gate 1 Returned to Normal:	10/27/2018 12:45
Time Gate 2 Returned to Normal:	10/27/2018 12:45
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	4.36 ft.
Volume Stored:	177,026 Gal.
Unused Storage Volume:	717,815 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	177,026 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

RTC Gate Performance**Rainfall Accumulation**

Site:	Bird RTC
Analysis Date:	11/13/2018
Event Start Date/Time:	10/27/2018 16:45
Event End Date/Time:	10/28/2018 0:50

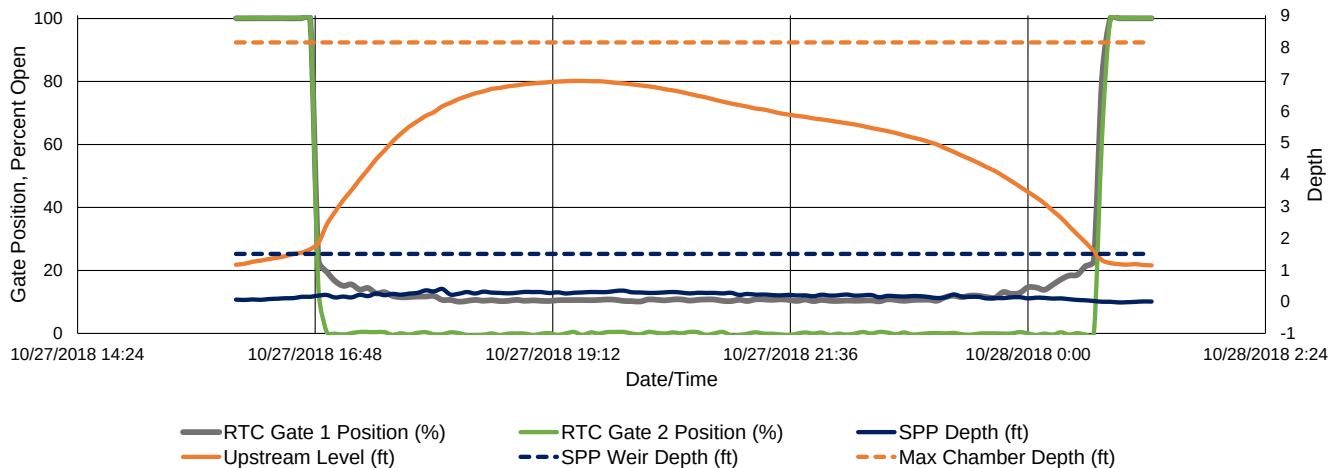
Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.1 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.65 ft.
Return to Normal Depth:	1.30 ft.
Time Gate 1 Activated:	10/27/2018 16:45
Time Gate 2 Activated:	10/27/2018 16:45
Time Gate 1 Returned to Normal:	10/28/2018 0:50
Time Gate 2 Returned to Normal:	10/28/2018 0:50
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	6.94 ft.
Volume Stored:	606,771 Gal.
Unused Storage Volume:	288,656 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	606,771 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

RTC Gate Performance



Rainfall Accumulation



Site:	Bird RTC
Analysis Date:	11/13/2018
Event Start Date/Time:	10/28/2018 19:50
Event End Date/Time:	10/29/2018 1:15

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

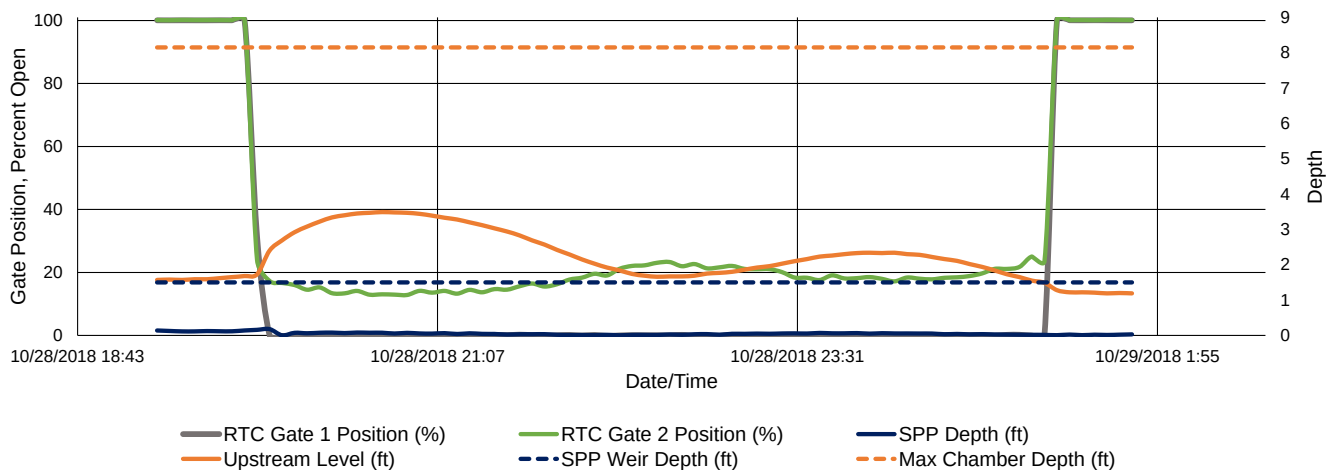
Gate Activation Trigger Depth:	1.68 ft.
Return to Normal Depth:	1.49 ft.
Time Gate 1 Activated:	10/28/2018 19:50
Time Gate 2 Activated:	10/28/2018 19:50
Time Gate 1 Returned to Normal:	10/29/2018 1:15
Time Gate 2 Returned to Normal:	10/29/2018 1:15
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	3.49 ft.
Volume Stored:	89,655 Gal.
Unused Storage Volume:	805,337 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	89,655 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:

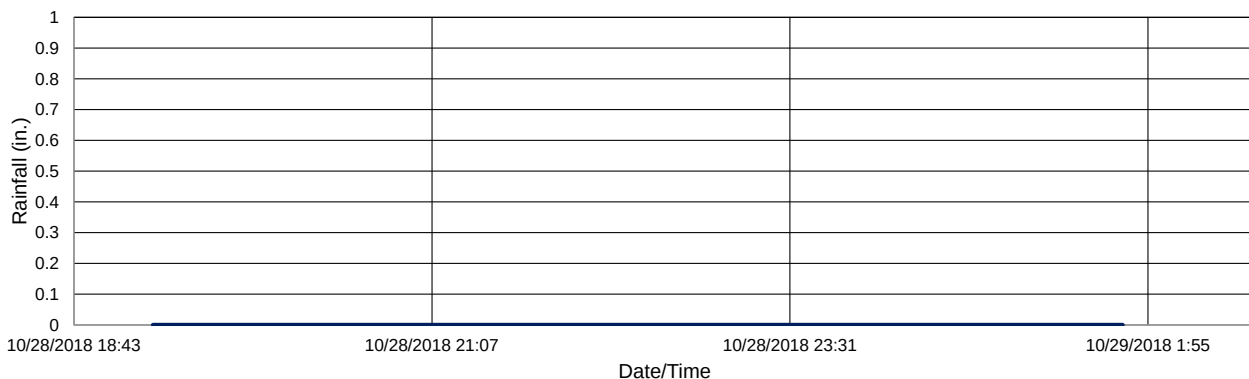
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

No rainfall recorded at the airport. The event was likely caused by a localized storm.

RTC Gate Performance



Rainfall Accumulation



Site:	Bird RTC
Analysis Date:	11/13/2018
Event Start Date/Time:	10/31/2018 12:30
Event End Date/Time:	10/31/2018 20:10

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.1 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

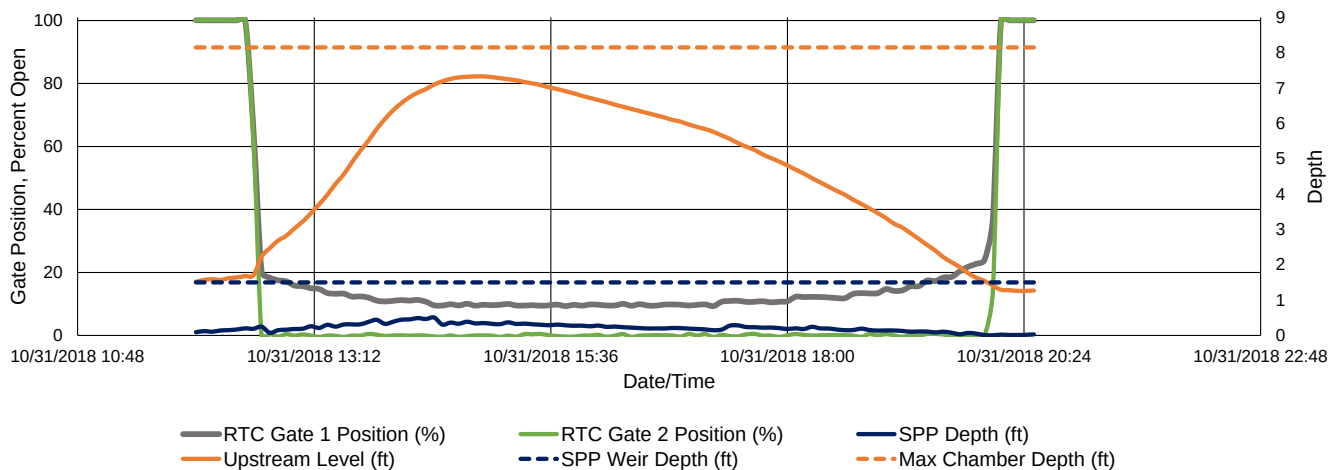
Gate Activation Trigger Depth:	1.68 ft.
Return to Normal Depth:	1.41 ft.
Time Gate 1 Activated:	10/31/2018 12:30
Time Gate 2 Activated:	10/31/2018 12:30
Time Gate 1 Returned to Normal:	10/31/2018 20:10
Time Gate 2 Returned to Normal:	10/31/2018 20:10
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	7.33 ft.
Volume Stored:	693,281 Gal.
Unused Storage Volume:	201,712 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	693,281 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:

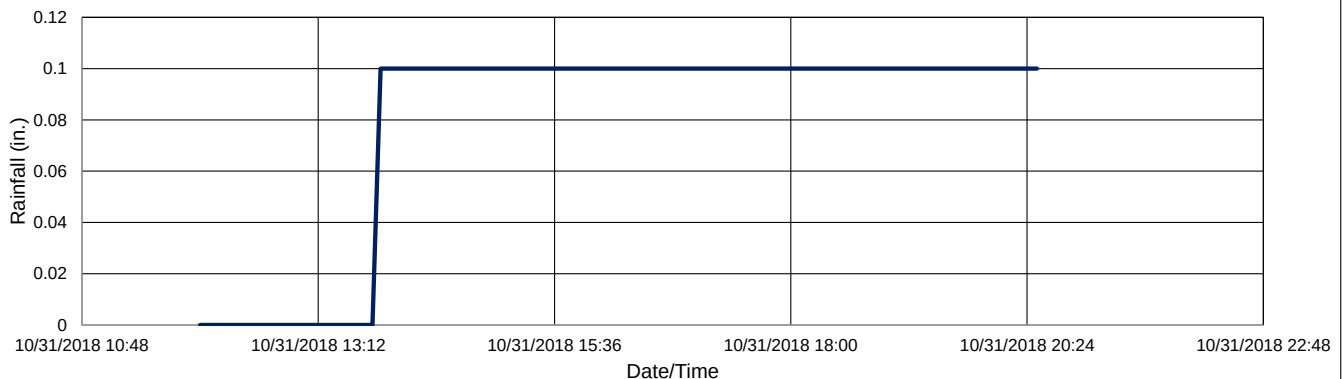
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

In addition to the rainfall indicated in graph below, this event likely received flow contribution from a localized storm event not recorded at the airport.

RTC Gate Performance



Rainfall Accumulation



November 2018 Bird Ave. RTC KPI Report

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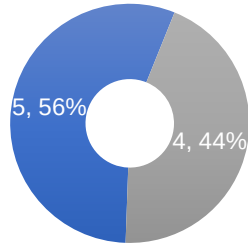


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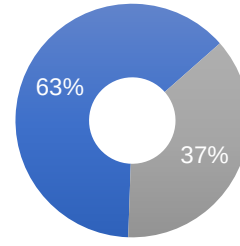
November 2018

Prevented SPP Events



■ Number of Prevented SPP Overflow Events
■ Number of Occurred SPP Overflow Events

Prevented SPP Volume



■ Prevented SPP Overflow Volume (Gal.)
■ Occurred SPP Overflow Volume (Gal.)

Number of Prevented SPP Overflow Events	Number of Occurred SPP Overflow Events	Prevented SPP Overflow Volume (Gal.)	Occurred SPP Overflow Volume (Gal.)
5	4	5,577,218	3,282,694
Event Date	SPP Overflow Volume Prevented	SPP Overflow Volume Occurred	Percent Capture
11/1/2018	871,750	1,881,440	32%
11/2/2018	437,911	-	100%
11/3/2018	335,003	-	100%
11/6/2018	887,733	837,641	51%
11/9/2018	836,401	-	100%
11/15/2018	153,411	-	100%
11/16/2018	853,470	198,509	81%
11/24/2018	328,856	-	100%
11/26/2018	872,683	365,104	71%

Site:	Bird RTC
Analysis Date:	12/12/2018
Event Start Date/Time:	11/1/2018 8:30
Event End Date/Time:	11/1/2018 15:50

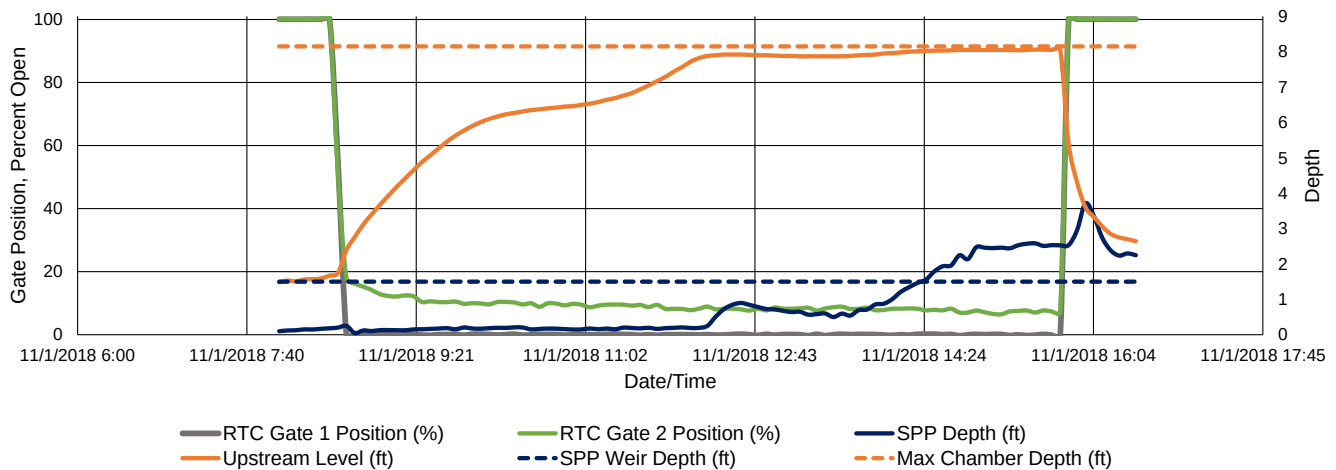
Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.6 in.
Storm Event Duration:	7.5 hr.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.67 ft.
Return to Normal Depth:	8.05 ft.
Time Gate 1 Activated:	11/1/2018 8:30
Time Gate 2 Activated:	11/1/2018 8:30
Time Gate 1 Returned to Normal:	11/1/2018 15:50
Time Gate 2 Returned to Normal:	11/1/2018 15:50
Percent Capture	32%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.06 ft.
Volume Stored:	871,750 Gal.
Unused Storage Volume:	23,391 Gal.
Overflow Volume:	1,881,440 Gal.
Overflow Volume Prevented:	871,750 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	1,881,440 Gal.
Could SPP activation have been prevented?	No

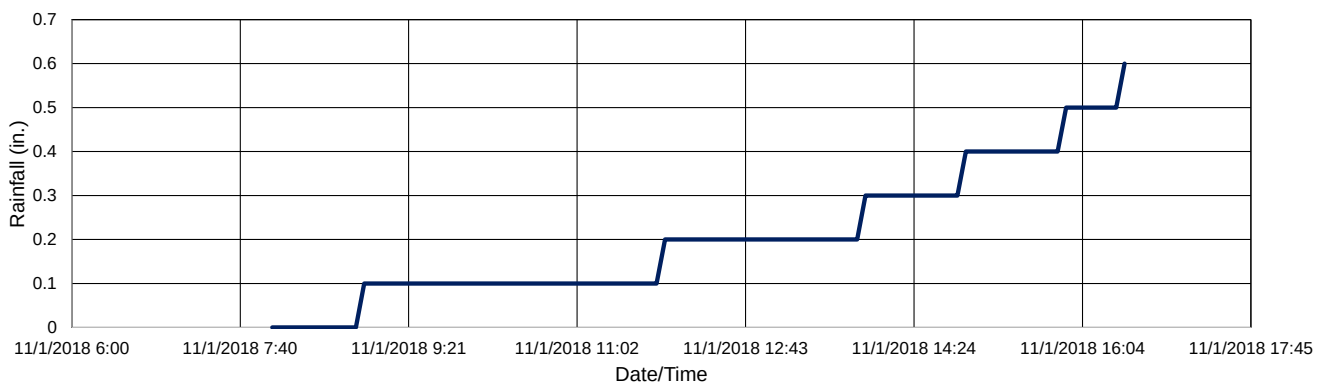
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

RTC Gate Performance



Rainfall Accumulation



Site:	Bird RTC
Analysis Date:	12/12/2018
Event Start Date/Time:	11/2/2018 7:30
Event End Date/Time:	11/2/2018 23:50

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

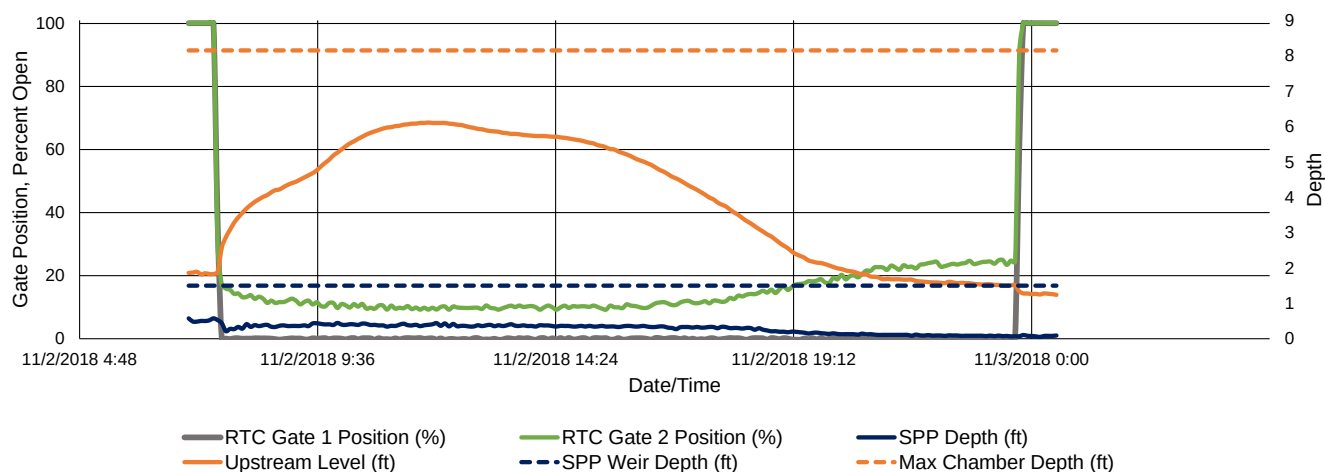
Gate Activation Trigger Depth:	1.83 ft.
Return to Normal Depth:	1.34 ft.
Time Gate 1 Activated:	11/2/2018 7:30
Time Gate 2 Activated:	11/2/2018 7:30
Time Gate 1 Returned to Normal:	11/2/2018 23:50
Time Gate 2 Returned to Normal:	11/2/2018 23:50
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	6.11 ft.
Volume Stored:	437,911 Gal.
Unused Storage Volume:	454,396 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	437,911 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:

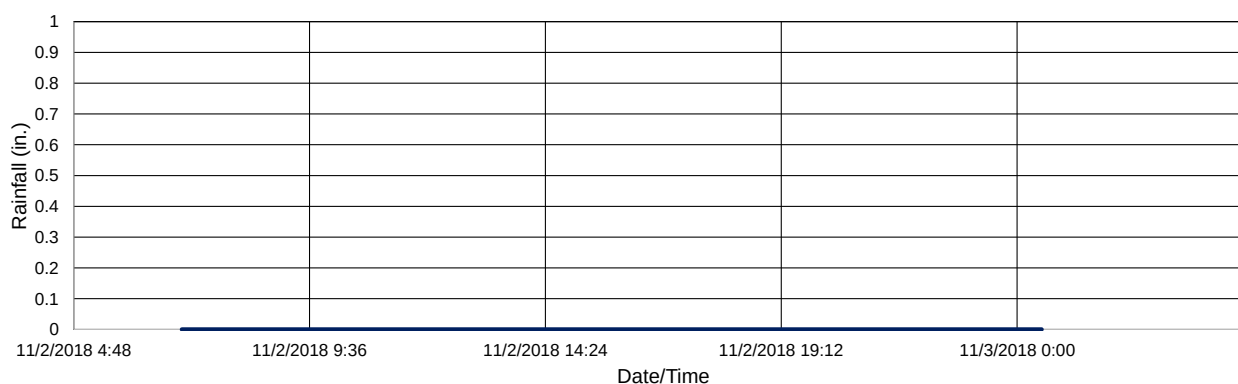
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

No rainfall recorded at the airport. The event was likely caused by a localized storm.

RTC Gate Performance



Rainfall Accumulation



Site:	Bird RTC
Analysis Date:	12/12/2018
Event Start Date/Time:	11/3/2018 8:00
Event End Date/Time:	11/3/2018 12:50

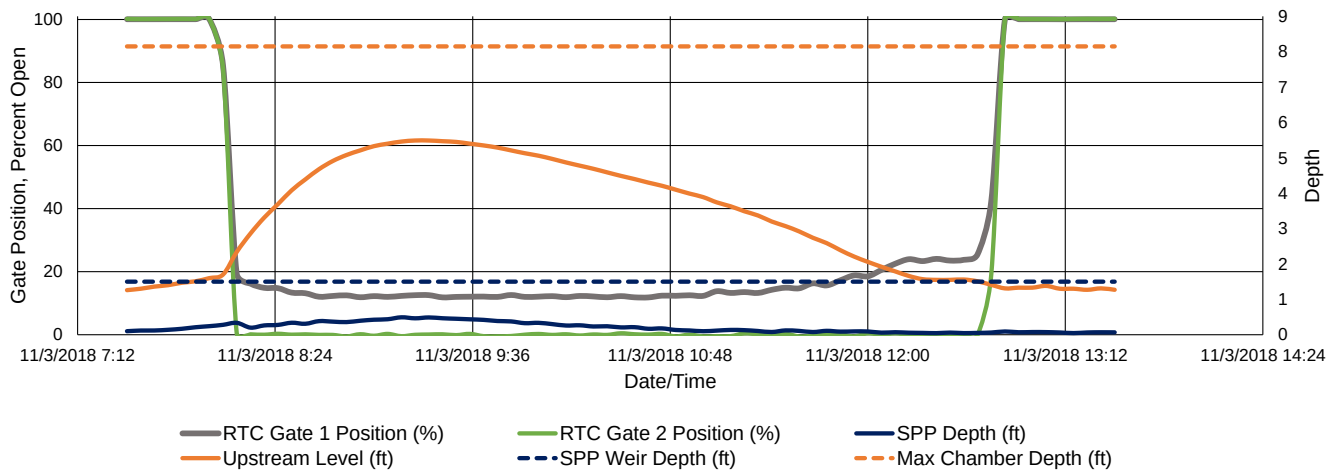
Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.2 in.
Storm Event Duration:	2 hr.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.60 ft.
Return to Normal Depth:	1.41 ft.
Time Gate 1 Activated:	11/3/2018 8:00
Time Gate 2 Activated:	11/3/2018 8:00
Time Gate 1 Returned to Normal:	11/3/2018 12:50
Time Gate 2 Returned to Normal:	11/3/2018 12:50
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	5.49 ft.
Volume Stored:	335,003 Gal.
Unused Storage Volume:	561,072 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	335,003 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

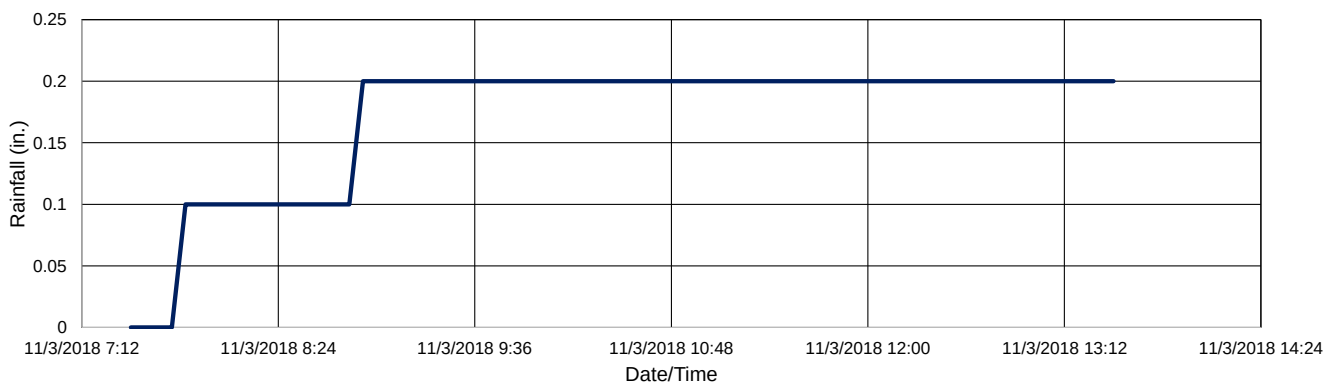
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

RTC Gate Performance



Rainfall Accumulation



Site:	Bird RTC
Analysis Date:	12/12/2018
Event Start Date/Time:	11/6/2018 5:55
Event End Date/Time:	11/6/2018 18:05

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.2 in.
Storm Event Duration:	2 hr.
Storm Type:	Less than one year

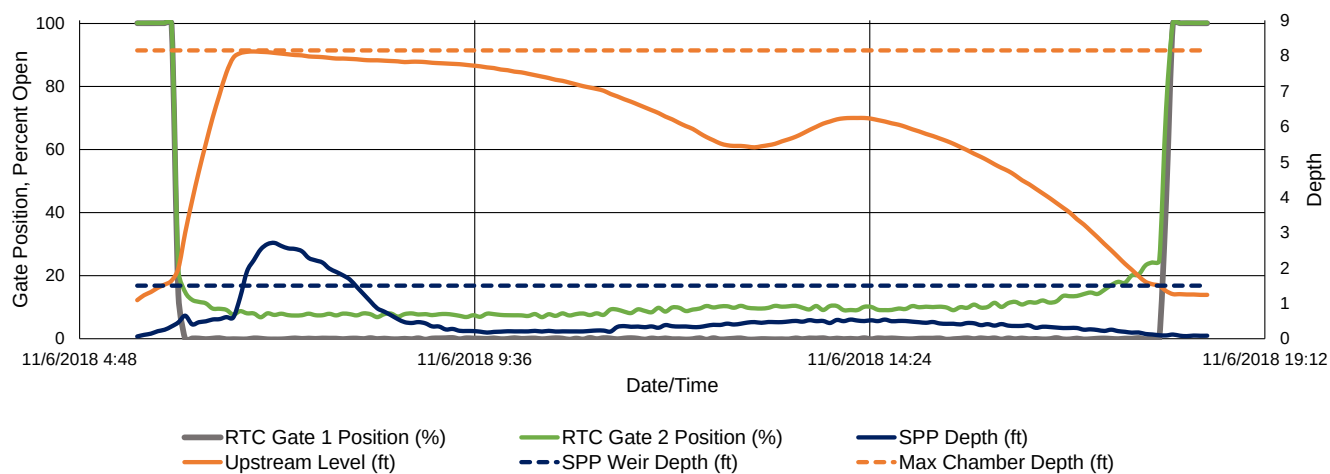
Gate Activation Trigger Depth:	1.64 ft.
Return to Normal Depth:	1.35 ft.
Time Gate 1 Activated:	11/6/2018 5:55
Time Gate 2 Activated:	11/6/2018 5:55
Time Gate 1 Returned to Normal:	11/6/2018 18:05
Time Gate 2 Returned to Normal:	11/6/2018 18:05
Percent Capture	51%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.12 ft.
Volume Stored:	887,733 Gal.
Unused Storage Volume:	7,831 Gal.
Overflow Volume:	837,641 Gal.
Overflow Volume Prevented:	887,733 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	837,641
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:

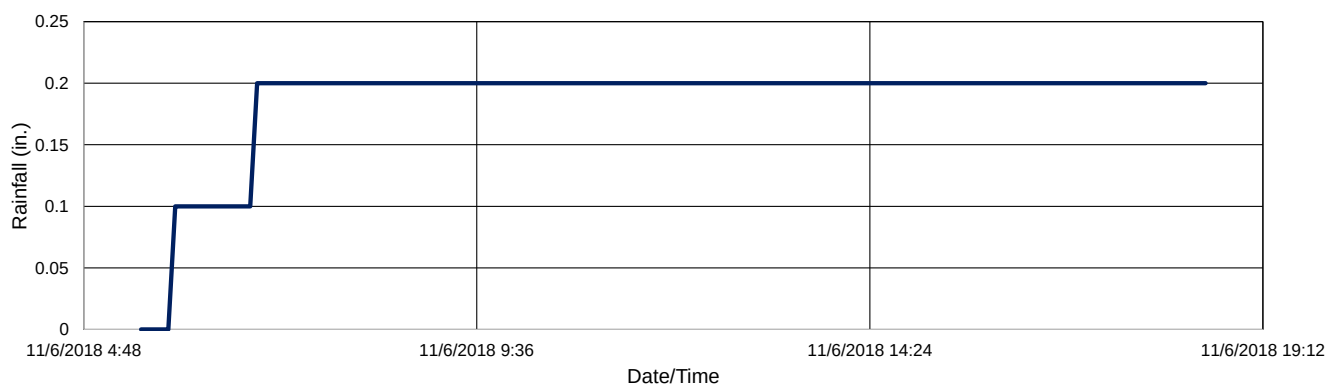
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

Actual rainfall around Bird RTC structure was likely more than the rainfall recorded at the airport, and caused overflow of SPP weir.

RTC Gate Performance



Rainfall Accumulation



Site:	Bird RTC
Analysis Date:	12/12/2018
Event Start Date/Time:	11/9/2018 11:35
Event End Date/Time:	11/10/2018 6:05

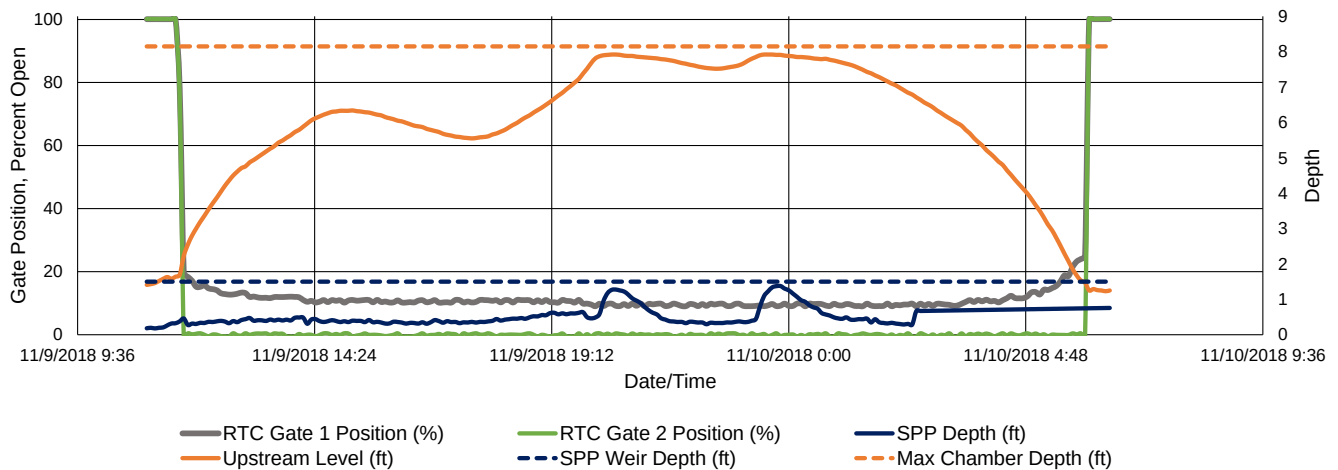
Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.3 in.
Storm Event Duration:	12 hr.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.64 ft.
Return to Normal Depth:	1.47 ft.
Time Gate 1 Activated:	11/9/2018 11:35
Time Gate 2 Activated:	11/9/2018 11:35
Time Gate 1 Returned to Normal:	11/10/2018 6:05
Time Gate 2 Returned to Normal:	11/10/2018 6:05
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	7.92 ft.
Volume Stored:	836,401 Gal.
Unused Storage Volume:	59,164 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	836,401 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

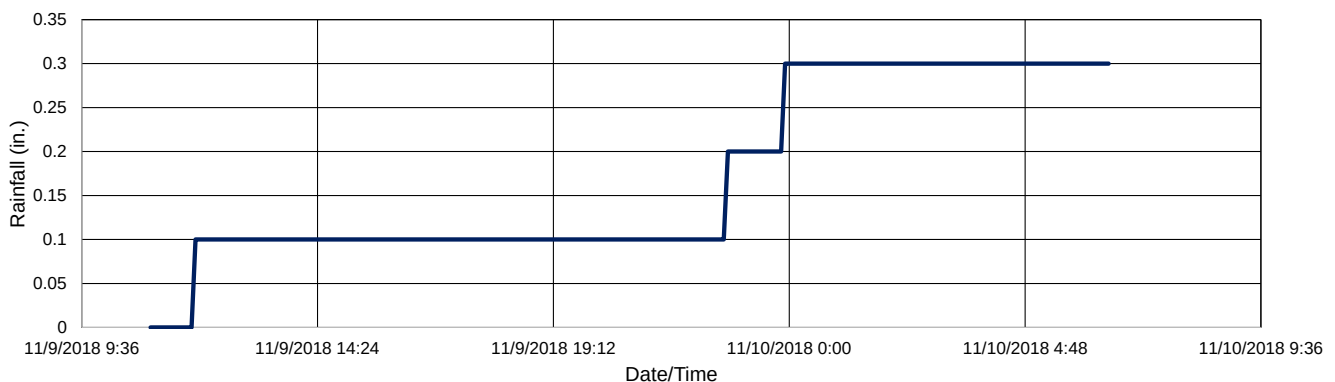
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

RTC Gate Performance



Rainfall Accumulation



Site:	Bird RTC
Analysis Date:	12/12/2018
Event Start Date/Time:	11/15/2018 21:30
Event End Date/Time:	11/16/2018 1:25

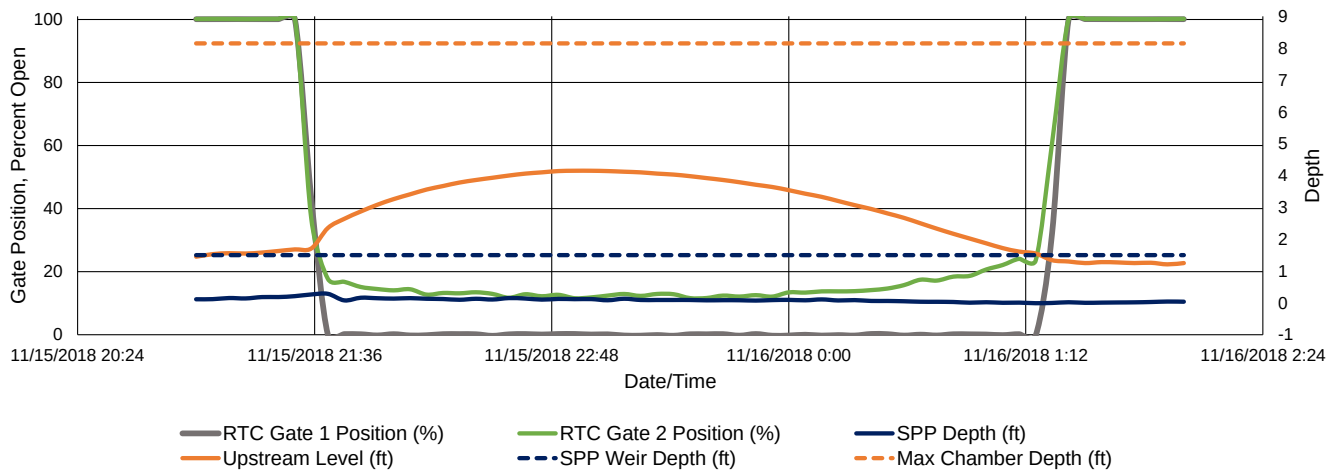
Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.5 in.
Storm Event Duration:	4 hr.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.68 ft.
Return to Normal Depth:	1.34 ft.
Time Gate 1 Activated:	11/15/2018 21:30
Time Gate 2 Activated:	11/15/2018 21:30
Time Gate 1 Returned to Normal:	11/16/2018 1:25
Time Gate 2 Returned to Normal:	11/16/2018 1:25
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	4.15 ft.
Volume Stored:	153,411 Gal.
Unused Storage Volume:	741,582 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	153,411 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

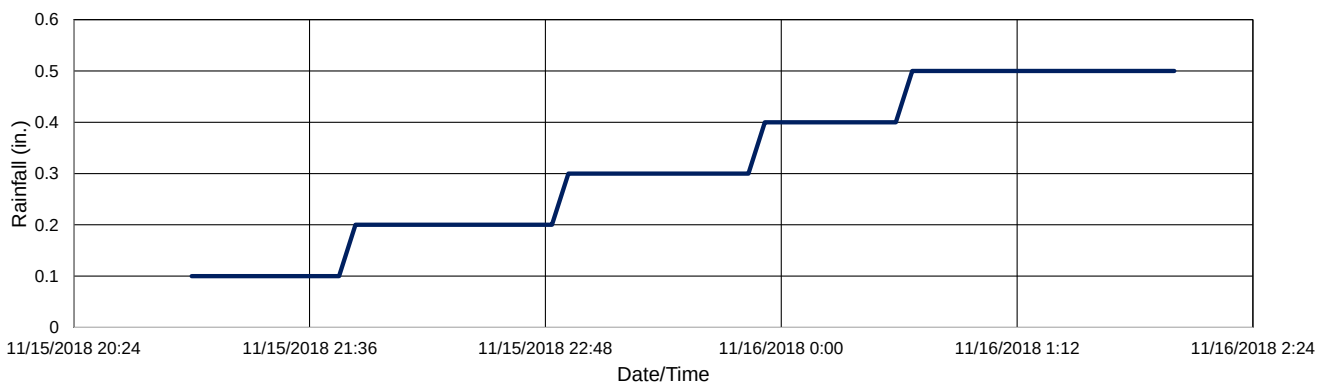
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

RTC Gate Performance



Rainfall Accumulation



Site:	Bird RTC
Analysis Date:	12/12/2018
Event Start Date/Time:	11/16/2018 8:05
Event End Date/Time:	11/17/2018 18:35

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.1 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

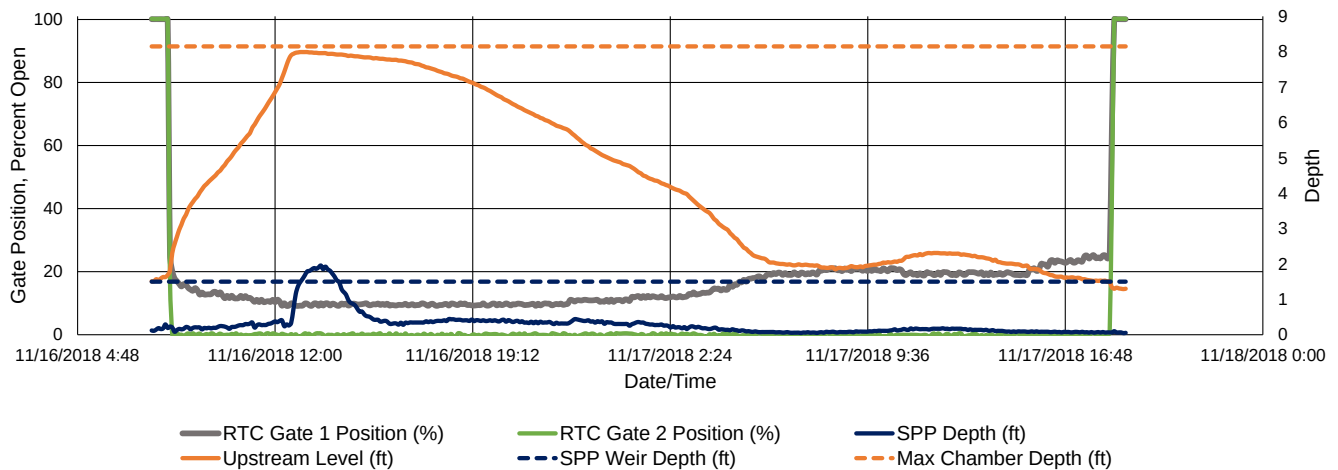
Gate Activation Trigger Depth:	1.69 ft.
Return to Normal Depth:	1.34 ft.
Time Gate 1 Activated:	11/16/2018 8:05
Time Gate 2 Activated:	11/16/2018 8:05
Time Gate 1 Returned to Normal:	11/17/2018 18:35
Time Gate 2 Returned to Normal:	11/17/2018 18:35
Percent Capture	81%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	7.99 ft.
Volume Stored:	853,470 Gal.
Unused Storage Volume:	41,371 Gal.
Overflow Volume:	198,509 Gal.
Overflow Volume Prevented:	853,470 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	198,509
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:

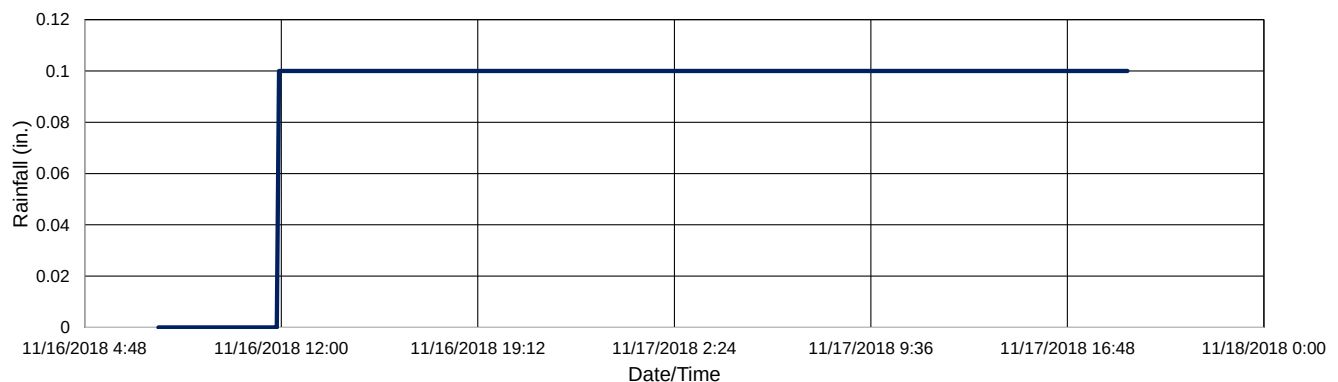
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

Actual rainfall around Bird RTC structure was likely more than the rainfall recorded at the airport, and caused overflow of SPP weir.

RTC Gate Performance



Rainfall Accumulation



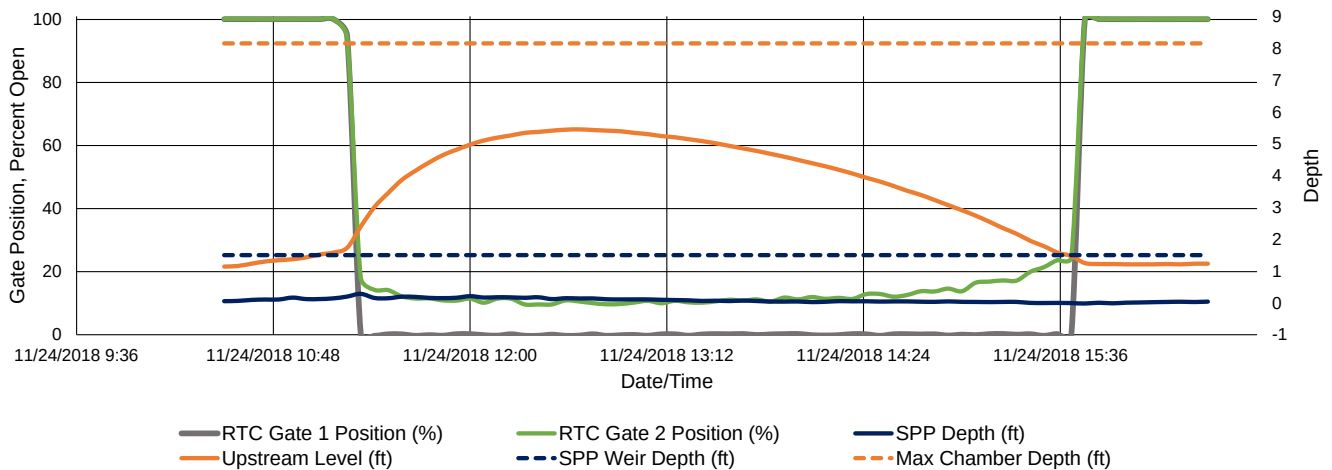
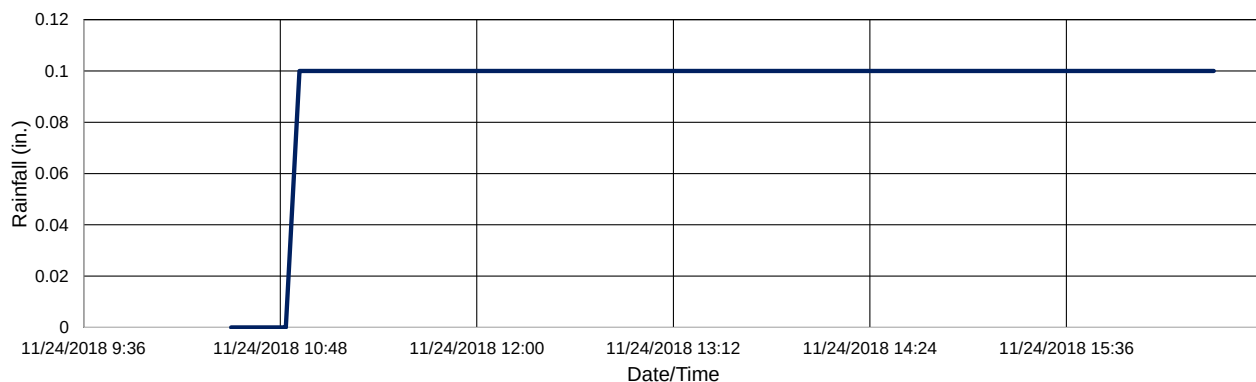
Site:	Bird RTC
Analysis Date:	12/12/2018
Event Start Date/Time:	11/24/2018 11:10
Event End Date/Time:	11/24/2018 15:45

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.1 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.58 ft.
Return to Normal Depth:	1.47 ft.
Time Gate 1 Activated:	11/24/2018 11:10
Time Gate 2 Activated:	11/24/2018 11:10
Time Gate 1 Returned to Normal:	11/24/2018 15:45
Time Gate 2 Returned to Normal:	11/24/2018 15:45
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	5.45 ft.
Volume Stored:	328,856 Gal.
Unused Storage Volume:	567,451 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	328,856 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

RTC Gate Performance**Rainfall Accumulation**

Site:	Bird RTC
Analysis Date:	12/12/2018
Event Start Date/Time:	11/26/2018 7:45
Event End Date/Time:	11/27/2018 17:35

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.3 in.
Storm Event Duration:	2 hr.
Storm Type:	Less than one year

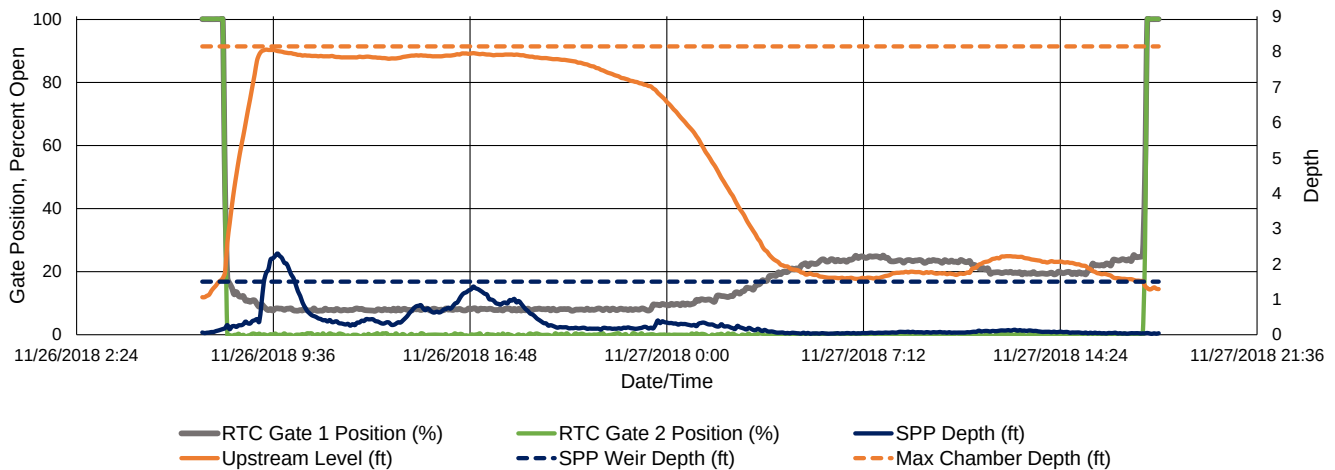
Gate Activation Trigger Depth:	1.60 ft.
Return to Normal Depth:	1.38 ft.
Time Gate 1 Activated:	11/26/2018 7:45
Time Gate 2 Activated:	11/26/2018 7:45
Time Gate 1 Returned to Normal:	11/27/2018 17:35
Time Gate 2 Returned to Normal:	11/27/2018 17:35
Percent Capture	71%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.06 ft.
Volume Stored:	872,683 Gal.
Unused Storage Volume:	23,391 Gal.
Overflow Volume:	365,104 Gal.
Overflow Volume Prevented:	872,683 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	365,104
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:

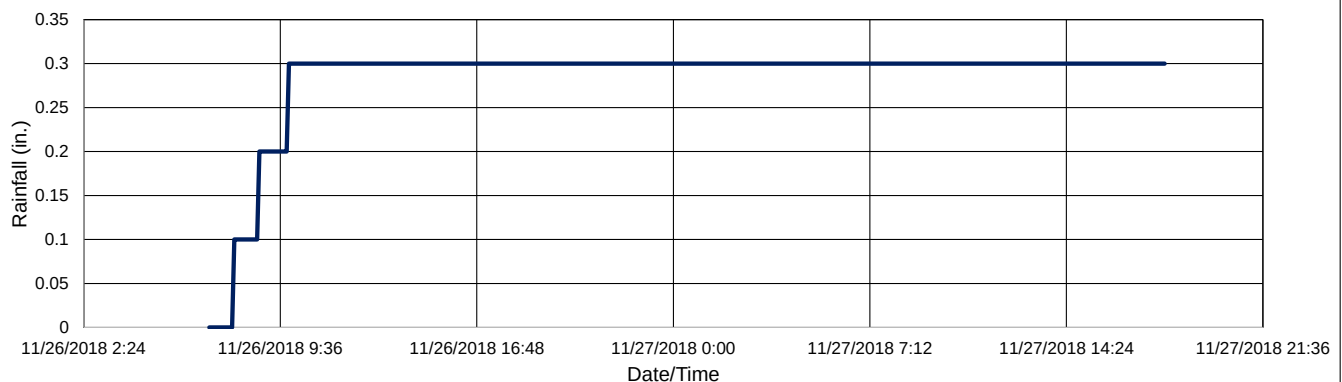
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

Actual rainfall around Bird RTC structure was likely more than the rainfall recorded at the airport, resulting in an extended event.

RTC Gate Performance



Rainfall Accumulation



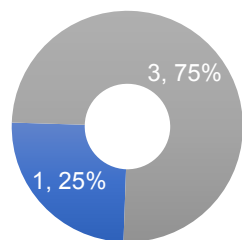
December 2018 Bird Ave. RTC KPI Report

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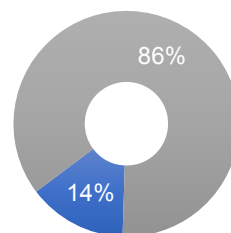


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Prevented SPP Events

■ Number of Prevented SPP Overflow Events
 ■ Number of Occurred SPP Overflow Events

Prevented SPP Volume

■ Prevented SPP Overflow Volume (Gal.)
 ■ Occurred SPP Overflow Volume (Gal.)

Number of Prevented SPP Overflow Events	Number of Occurred SPP Overflow Events	Prevented SPP Overflow Volume (Gal.)	Occurred SPP Overflow Volume (Gal.)
1	3	3,328,895	20,189,963

Event Date	SPP Overflow Volume Prevented	SPP Overflow Volume Occurred	Percent Capture
12/1/2018	866,880	45,578	95%
12/20/2018	895,697	12,384,242	7%
12/28/2018	670,126	-	100%
12/31/2018	896,192	7,760,143	10%

Site:	Bird RTC
Analysis Date:	12/27/2018
Event Start Date/Time:	12/1/2018 20:45
Event End Date/Time:	12/3/2018 15:00

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.5 in.
Storm Event Duration:	24 hr.
Storm Type:	Less than one year

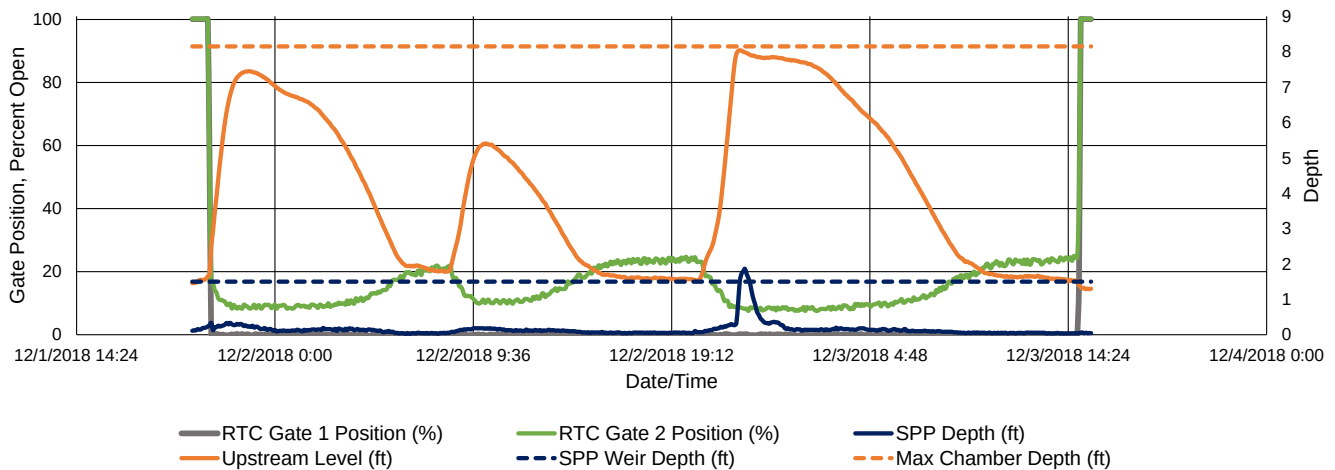
Gate Activation Trigger Depth:	1.65 ft.
Return to Normal Depth:	1.41 ft.
Time Gate 1 Activated:	12/1/2018 20:45
Time Gate 2 Activated:	12/1/2018 20:45
Time Gate 1 Returned to Normal:	12/3/2018 15:00
Time Gate 2 Returned to Normal:	12/3/2018 15:00
Percent Capture	95%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.04 ft.
Volume Stored:	866,880 Gal.
Unused Storage Volume:	28,547 Gal.
Overflow Volume:	45,578 Gal.
Overflow Volume Prevented:	866,880 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	45,578 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:

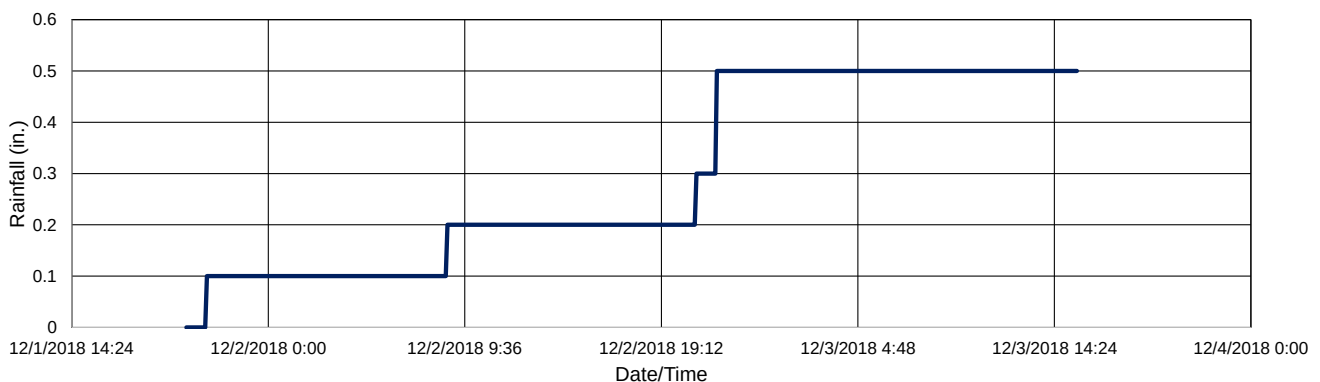
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

This event was caused by a combination of rainfall and snowmelt.

RTC Gate Performance



Rainfall Accumulation



Site:	Bird RTC
Analysis Date:	12/27/2018
Event Start Date/Time:	12/20/2018 22:20
Event End Date/Time:	12/21/2018 23:45

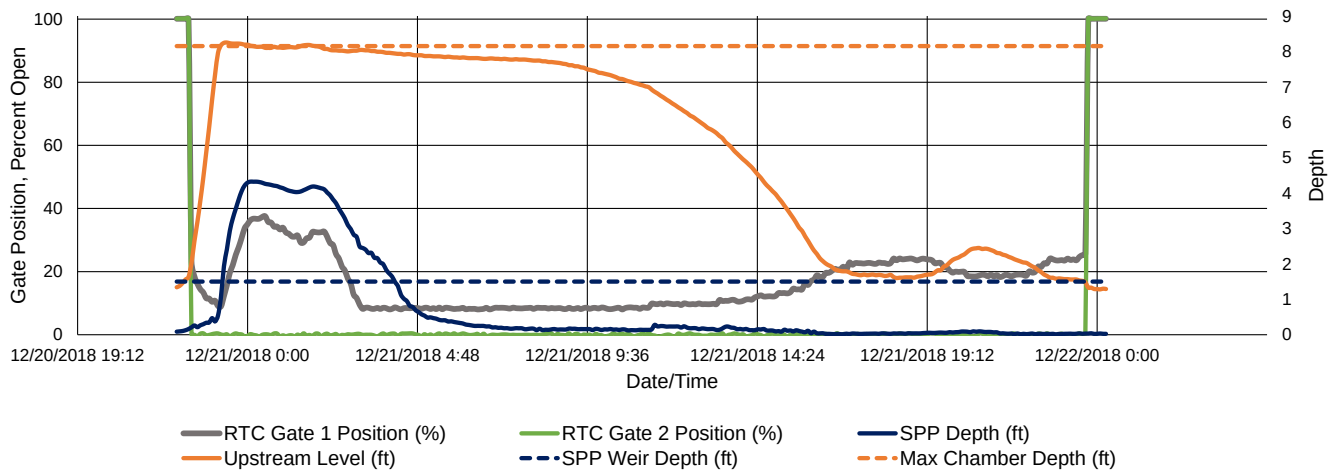
Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.7 in.
Storm Event Duration:	3 hr.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.63 ft.
Return to Normal Depth:	1.48 ft.
Time Gate 1 Activated:	12/20/2018 22:20
Time Gate 2 Activated:	12/20/2018 22:20
Time Gate 1 Returned to Normal:	12/21/2018 23:45
Time Gate 2 Returned to Normal:	12/21/2018 23:45
Percent Capture	7%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.15 ft.
Volume Stored:	895,697 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	12,384,242 Gal.
Overflow Volume Prevented:	895,697 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

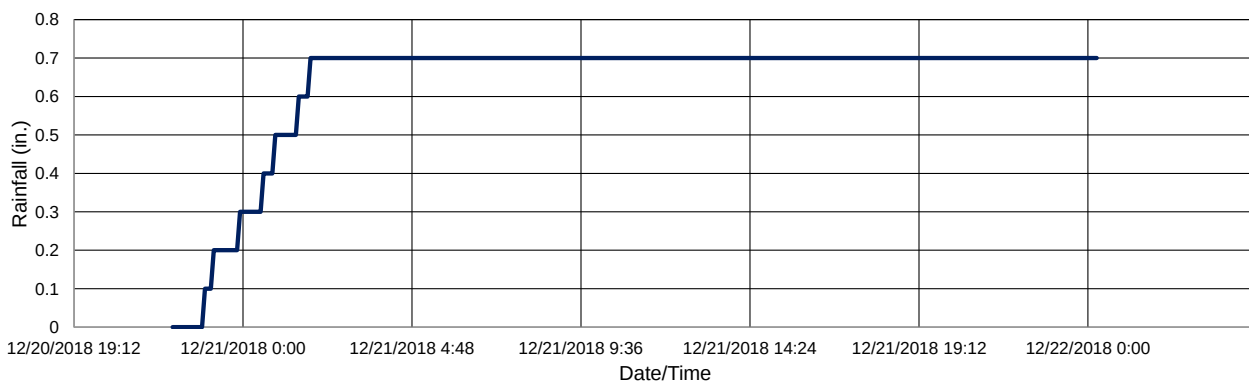
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

RTC Gate Performance



Rainfall Accumulation



Site:	Bird RTC
Analysis Date:	1/11/2019
Event Start Date/Time:	12/27/2018 23:55
Event End Date/Time:	12/28/2018 8:50

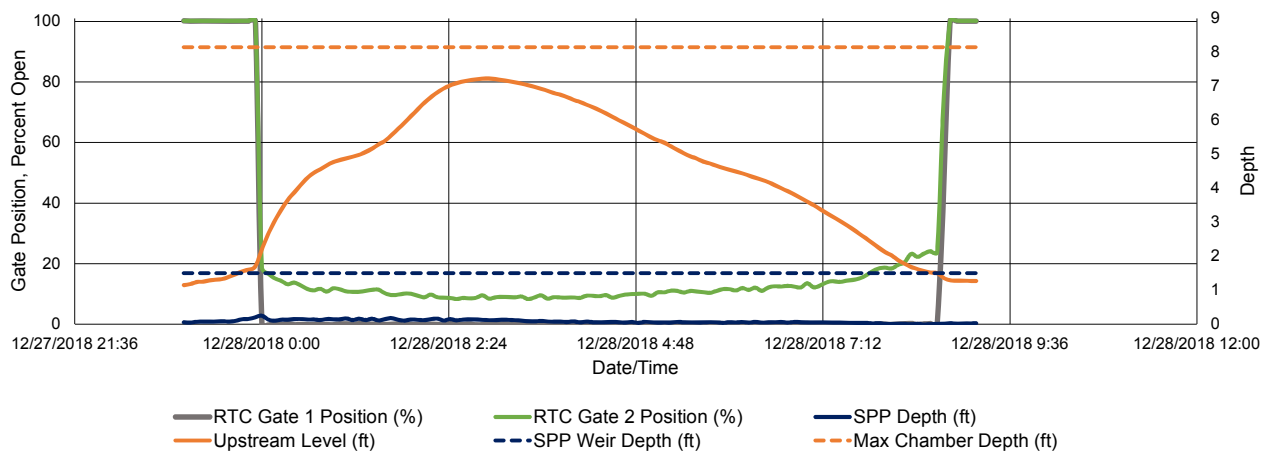
Analyst Name, Organization:	Angela Hintz, Arcadis
Total Rainfall Accumulation:	0.2 in.
Storm Event Duration:	2 hr.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.70 ft.
Return to Normal Depth:	1.36 ft.
Time Gate 1 Activated:	12/27/2018 23:55
Time Gate 2 Activated:	12/27/2018 23:55
Time Gate 1 Returned to Normal:	12/28/2018 8:50
Time Gate 2 Returned to Normal:	12/28/2018 8:50
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	7.23 ft.
Volume Stored:	670,126 Gal.
Unused Storage Volume:	224,558 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	670,126 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA Gal.
Could SPP activation have been prevented?	No

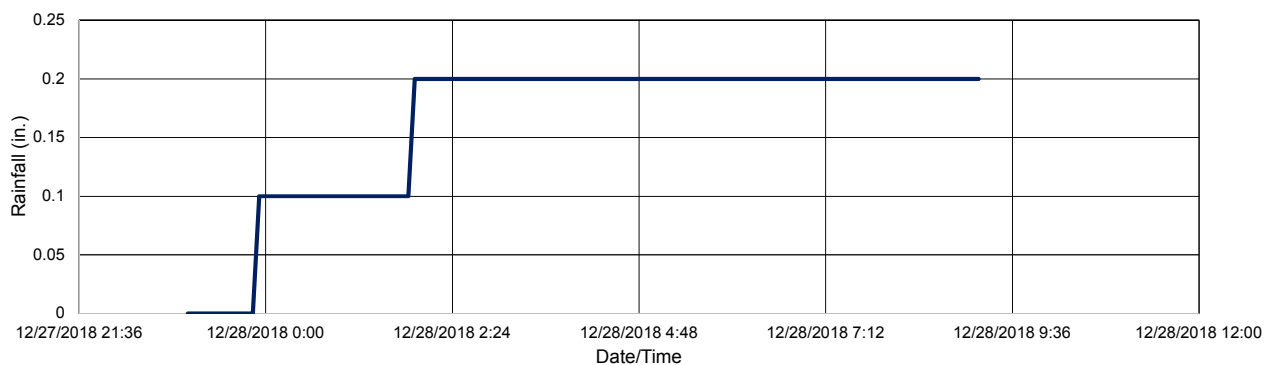
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

RTC Gate Performance



Rainfall Accumulation



Site:	Bird RTC
Analysis Date:	1/11/2019
Event Start Date/Time:	12/31/2018 15:55
Event End Date/Time:	1/1/2019 17:45

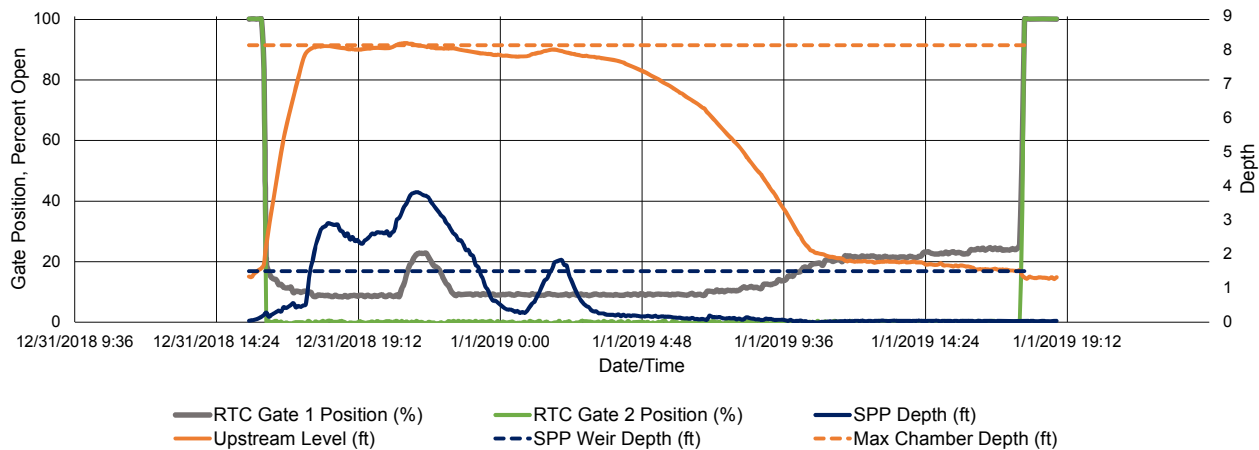
Analyst Name, Organization:	Angela Hintz, Arcadis
Total Rainfall Accumulation:	0.7 in.
Storm Event Duration:	7.5 hr.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.59 ft.
Return to Normal Depth:	1.38 ft.
Time Gate 1 Activated:	12/31/2018 15:55
Time Gate 2 Activated:	12/31/2018 15:55
Time Gate 1 Returned to Normal:	1/1/2019 17:45
Time Gate 2 Returned to Normal:	1/1/2019 17:45
Percent Capture	10%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.15 ft.
Volume Stored:	896,192 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	7,760,143 Gal.
Overflow Volume Prevented:	896,192 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

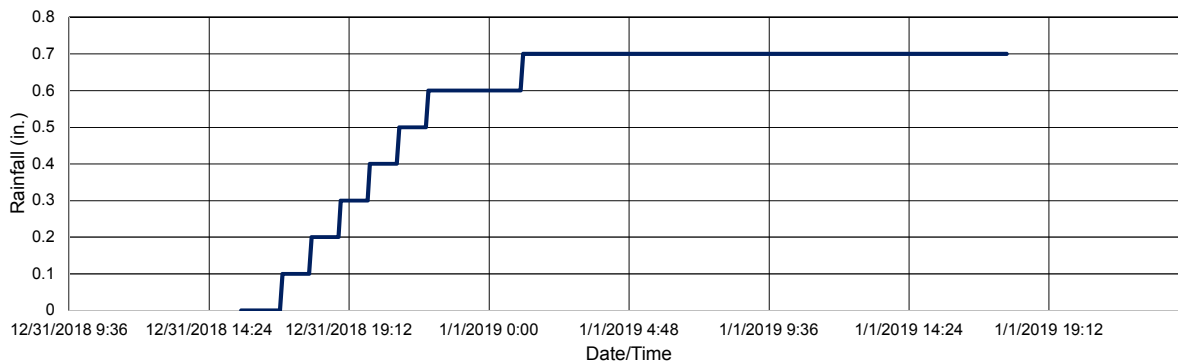
Recommended Operational Changes/Notes:

Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

RTC Gate Performance



Rainfall Accumulation

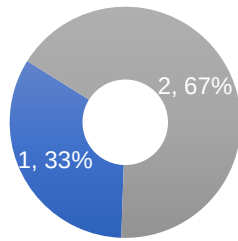


January 2019 Bird Ave. RTC KPI Report

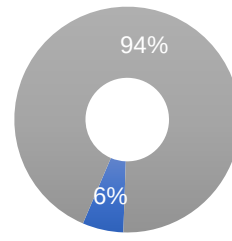
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Prevented SPP Events

■ Number of Prevented SPP Overflow Events
 ■ Number of Occurred SPP Overflow Events

Prevented SPP Volume

■ Prevented SPP Overflow Volume (Gal.)
 ■ Occurred SPP Overflow Volume (Gal.)

Number of Prevented SPP Overflow Events	Number of Occurred SPP Overflow Events	Prevented SPP Overflow Volume (Gal.)	Occurred SPP Overflow Volume (Gal.)
1	2	2,000,764	32,117,602
Event Date	SPP Overflow Volume Prevented	SPP Overflow Volume Occurred	Percent Capture
1/7/2019	207,957	-	100%
1/8/2019	897,380	1,509,256	37%
1/23/2019	895,427	30,608,346	3%

Site:	Bird RTC
Analysis Date:	2/12/2019
Event Start Date/Time:	1/7/2019 21:40
Event End Date/Time:	1/8/2019 1:05

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

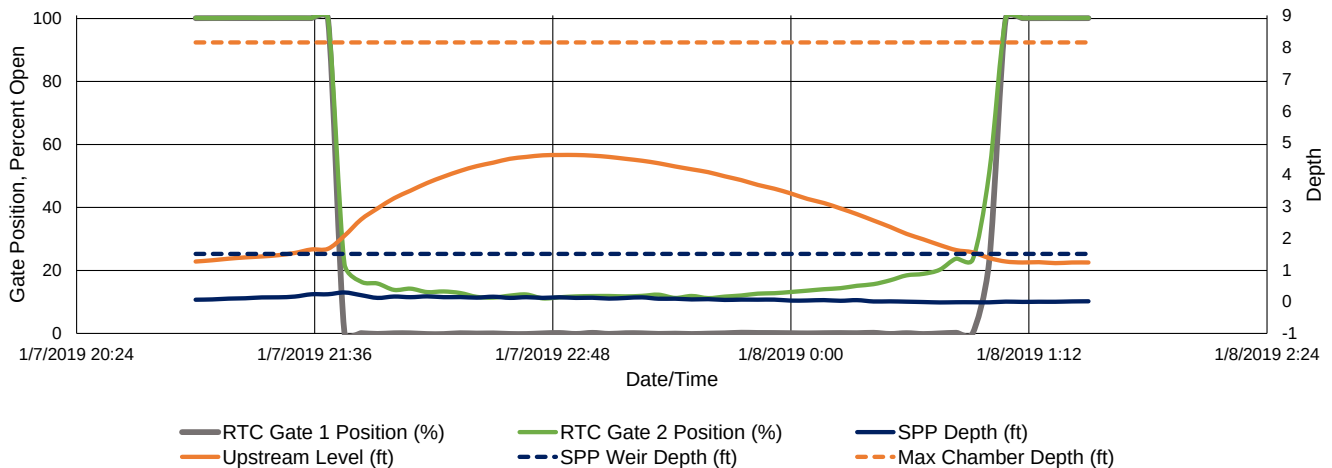
Gate Activation Trigger Depth:	1.66 ft.
Return to Normal Depth:	1.37 ft.
Time Gate 1 Activated:	1/7/2019 21:40
Time Gate 2 Activated:	1/7/2019 21:40
Time Gate 1 Returned to Normal:	1/8/2019 1:05
Time Gate 2 Returned to Normal:	1/8/2019 1:05
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	4.61 ft.
Volume Stored:	207,957 Gal.
Unused Storage Volume:	687,329 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	207,957 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:

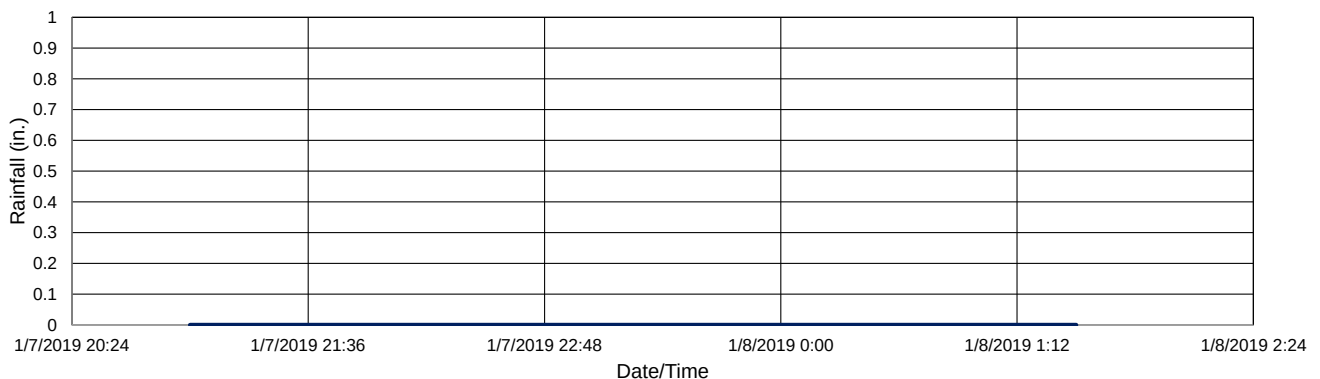
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

No rainfall was recorded at the airport, and the temperature ranged from high 30s (°F) to low 40s (°F) during the event. This event was likely caused by localized rainfall, and snowmelt.

RTC Gate Performance



Rainfall Accumulation



Site:	Bird RTC
Analysis Date:	2/12/2019
Event Start Date/Time:	1/8/2019 12:45
Event End Date/Time:	1/9/2019 11:00

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.5 in.
Storm Event Duration:	11 hr.
Storm Type:	Less than one year

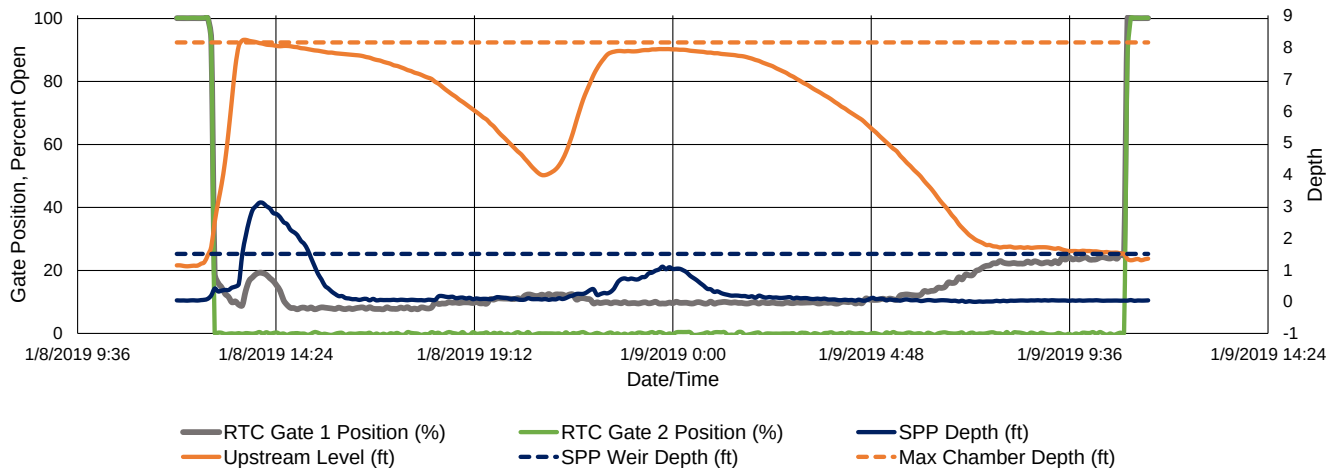
Gate Activation Trigger Depth:	1.46 ft.
Return to Normal Depth:	1.50 ft.
Time Gate 1 Activated:	1/8/2019 12:45
Time Gate 2 Activated:	1/8/2019 12:45
Time Gate 1 Returned to Normal:	1/9/2019 11:00
Time Gate 2 Returned to Normal:	1/9/2019 11:00
Percent Capture	37%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.15 ft.
Volume Stored:	897,380 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	1,509,256 Gal.
Overflow Volume Prevented:	897,380 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:

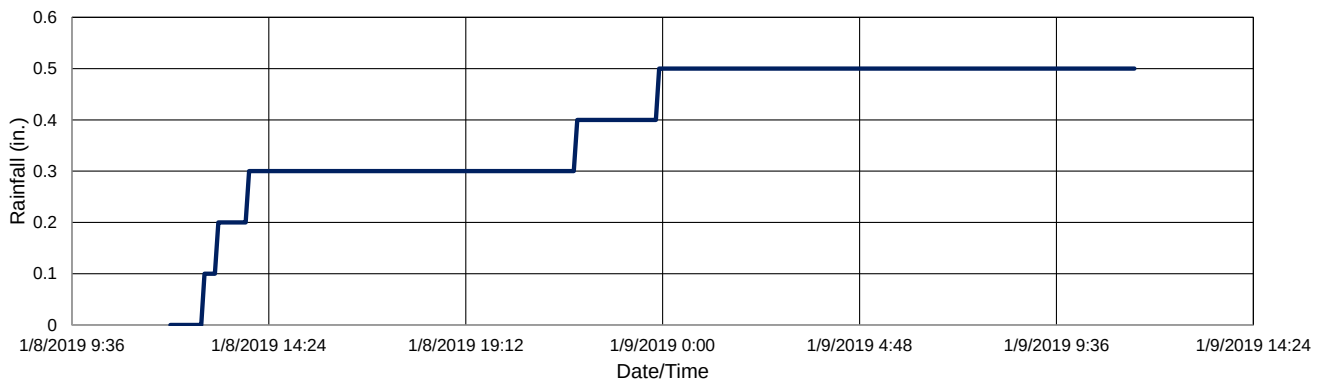
Rainfall data sourced from Weather Underground that records Buffalo airport rain gauge data. BSA rain gauge stations at South Buffalo and Amherst Quarry were out of service.

Temperature reached up to high 40s (°F), and the event was caused by both rainfall and snowmelt.

RTC Gate Performance



Rainfall Accumulation

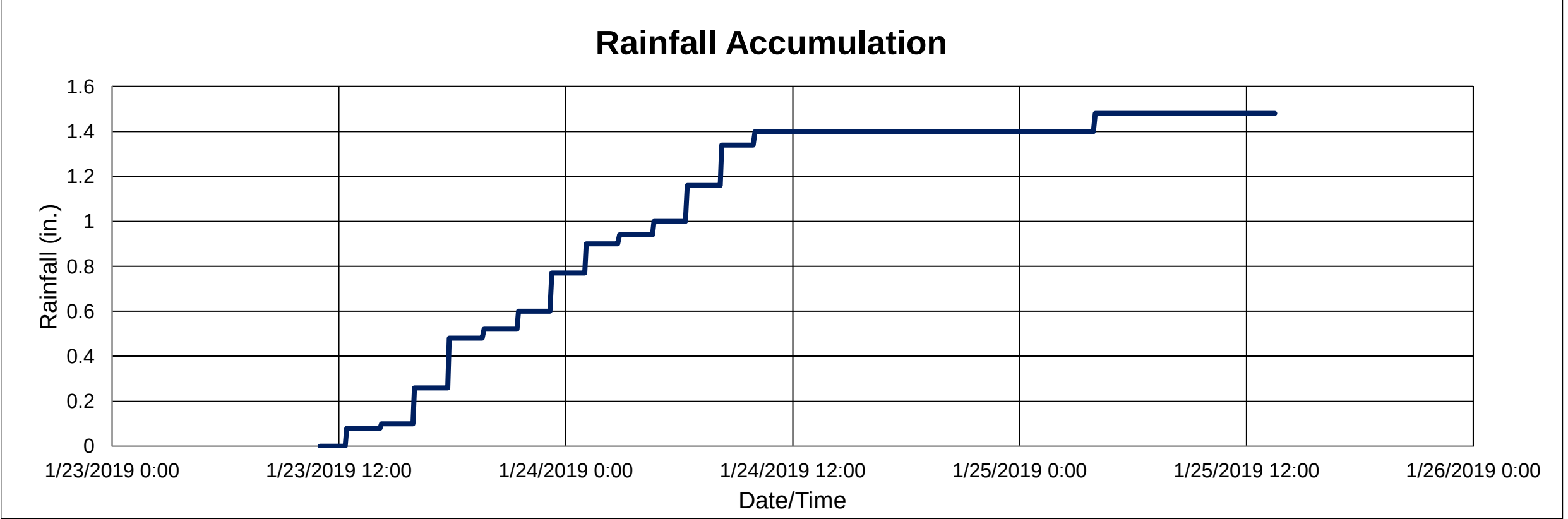
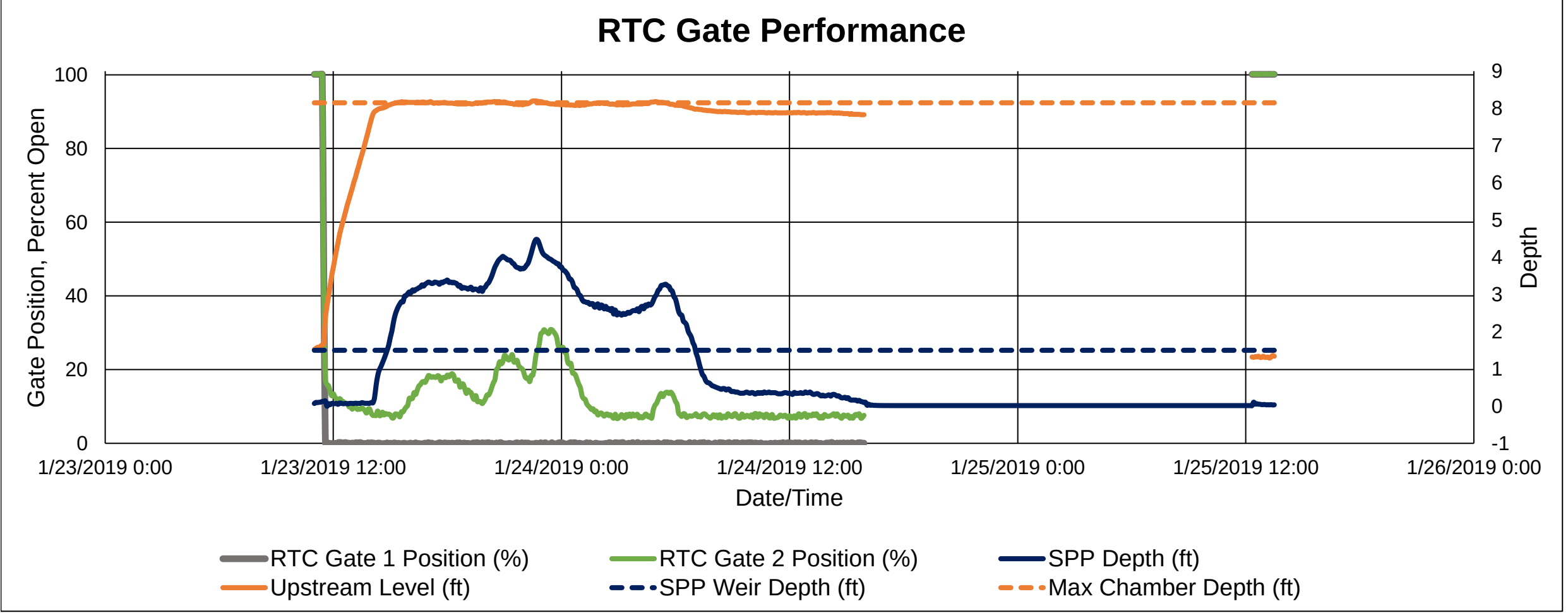


Site:	Bird RTC
Analysis Date:	2/12/2019
Event Start Date/Time:	1/23/2019 11:25
Event End Date/Time:	1/25/2019 12:20

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	1.48 in.
Storm Event Duration:	40 hr.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.65 ft.
Return to Normal Depth:	1.32 ft.
Time Gate 1 Activated:	1/23/2019 11:25
Time Gate 2 Activated:	1/23/2019 11:25
Time Gate 1 Returned to Normal:	1/25/2019 12:20
Time Gate 2 Returned to Normal:	1/25/2019 12:20
Percent Capture	3%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.15 ft.
Volume Stored:	895,427 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	30,608,346 Gal.
Overflow Volume Prevented:	895,427 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:
Rainfall data sourced from South Buffalo rain gauge, as provided by BSA.
RTC Gate Performance graph indicates missing datapoints for all the parameters except SPP depth. This was due to a communication issue with the Emnet Gateway as indicated in Attachment A to this report. However, the calculated overflow volume is correct since it is derived from SPP depth data, for which entire dataset was available.
Temperatures peaked up to 46 °F, and this event was caused by both rainfall and snowmelt.



ATTACHMENT A

Communication regarding gate activation event of January 23



Bhatt, Tanmay

From: Maria Krug Comuniello <mcomuniello@emnet.net>

Sent: Tuesday, February 5, 2019 6:46 PM

To: Hintz, Angela <Angela.Hintz@arcadis.com>

Subject: BSA January KPI reports

Hi Angela,

Please see attached the Bird SPP data for January. A few things to note for the January KPI reports-

- The Lang gates were put back in operation in mid-January, so there will be events to include for the month. The Lang downstream depth from the Emnet data portal can be used in place of the SPP depth, as we had been doing prior to the gates being manually opened.
- There was a communication issue with the Emnet Gateway on 1/24, so there is no data available between 1/24 at 4pm and 1/25 around 1pm. It looks like this was during dry weather at Lang and Smith St, but Bird was in storage mode so there is some data missing from the end of the event.
- The storm event on 1/1 was included on the December KPI report.

Can you have the KPI reports to us by Feb 14th?

Thanks!

Maria

February 2019 Bird Ave. RTC KPI Report

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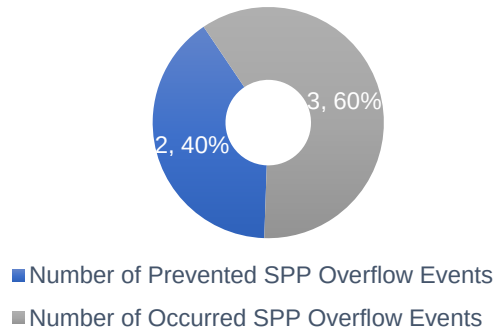
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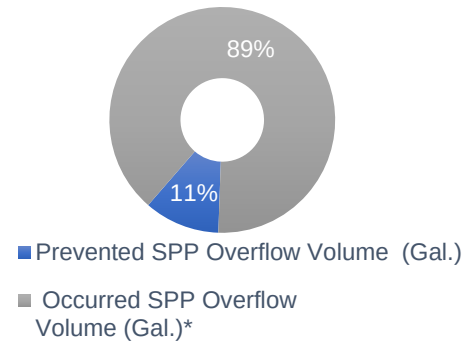
Bird Ave. RTC Monthly Performance Report

February 2019

Prevented SPP Events



Prevented SPP Volume



Number of Prevented SPP Overflow Events	Number of Occurred SPP Overflow Events	Prevented SPP Overflow Volume (Gal.)	Occurred SPP Overflow Volume (Gal.)*
2	3	3,868,384	31,831,873

Event Date	SPP Overflow Volume Prevented	SPP Overflow Volume Occurred	Percent Capture
2/3/2019	894,840	26,030,950	3%
2/12/2019	895,286	4,092,685	18%
2/15/2019	856,751	-	100%
2/21/2019	328,979	-	100%
2/24/2019	892,528	1,708,238	34%

*Calculated overflow volume is overestimated as a result of the Bird underflow project and SPP modifications

Site:	Bird RTC
Analysis Date:	3/14/2019
Event Start Date/Time:	2/3/2019 11:15
Event End Date/Time:	2/9/2019 0:35

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	1.44 in.
Storm Event Duration:	17* hrs.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.69 ft.
Return to Normal Depth:	1.48 ft.
Time Gate 1 Activated:	2/3/2019 11:15
Time Gate 2 Activated:	2/3/2019 11:15
Time Gate 1 Returned to Normal:	2/9/2019 0:35
Time Gate 2 Returned to Normal:	2/9/2019 0:35
Percent Capture	3%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.15 ft.
Volume Stored:	894,840 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	26,030,950 Gal.
Overflow Volume Prevented:	894,840 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

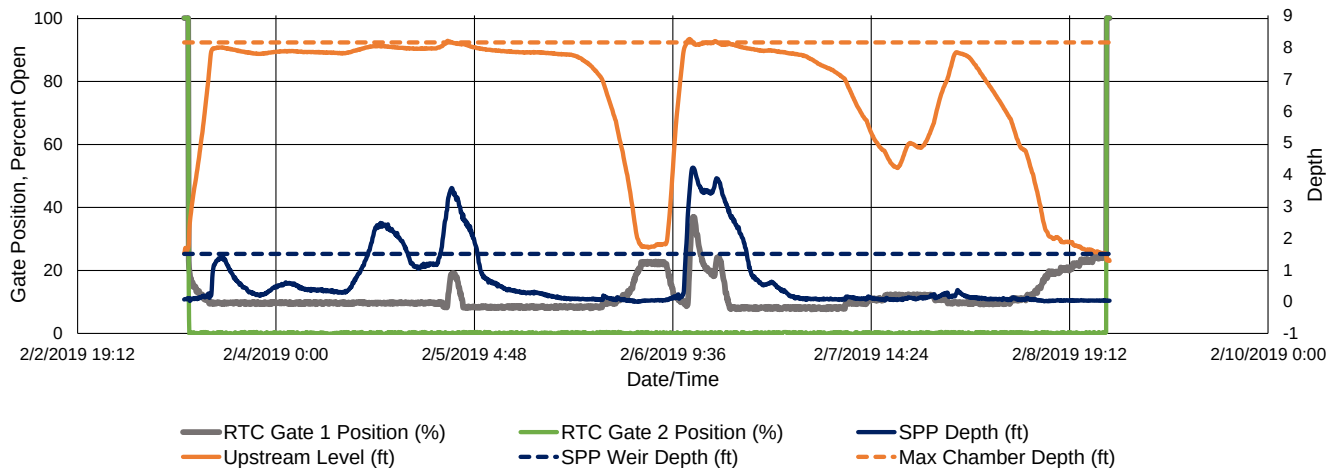
Recommended Operational Changes/Notes:

Rainfall data sourced from BSA rain gauge station at South Buffalo.

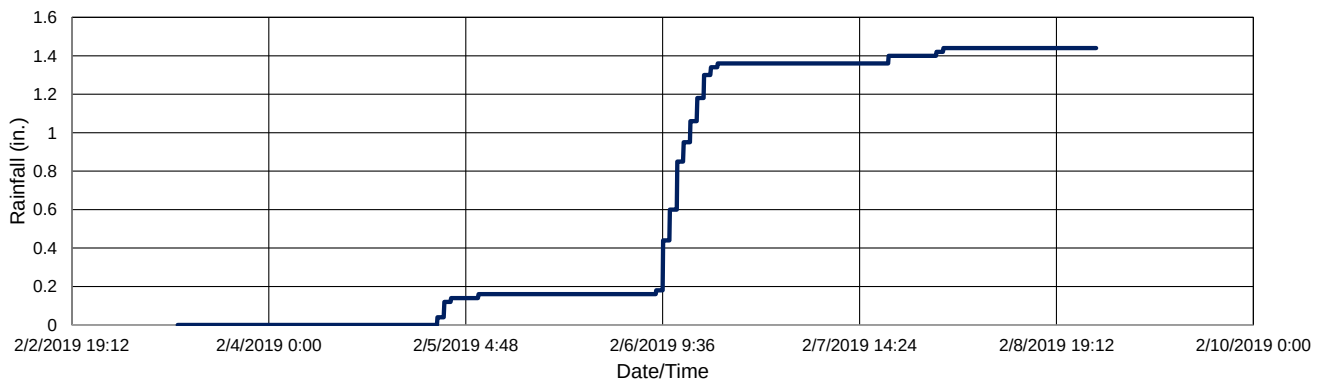
This event was initiated by snowmelt as temperatures rose up to high 50s (°F), and later continued due to rainfall.

*Rainfall was not continuous.

RTC Gate Performance



Rainfall Accumulation



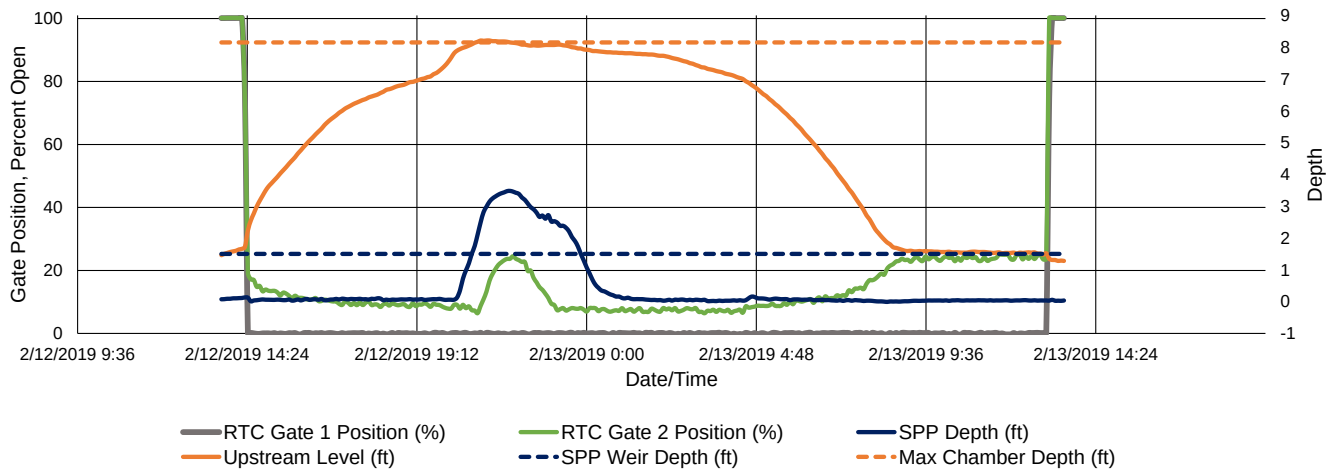
Site:	Bird RTC
Analysis Date:	3/14/2019
Event Start Date/Time:	2/12/2019 14:15
Event End Date/Time:	2/13/2019 13:10

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.55 in.
Storm Event Duration:	10 hrs.
Storm Type:	Less than one year

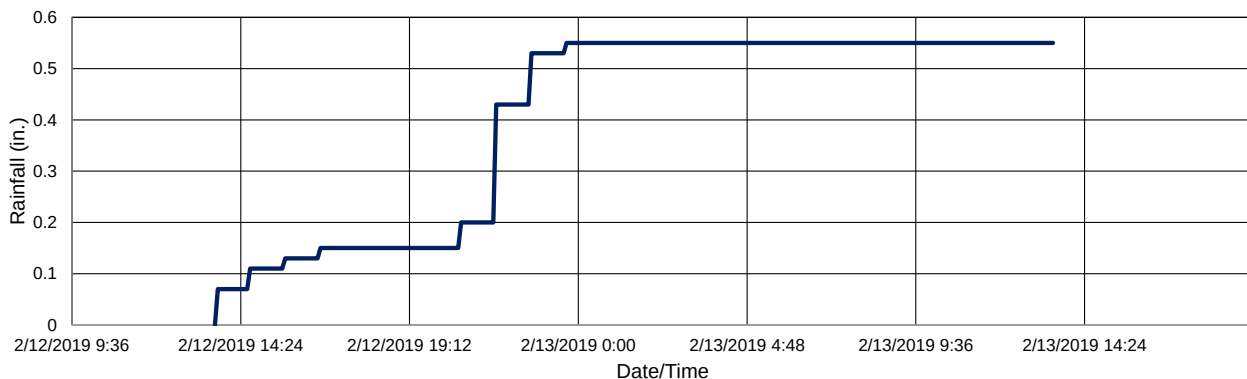
Gate Activation Trigger Depth:	1.66 ft.
Return to Normal Depth:	1.35 ft.
Time Gate 1 Activated:	2/12/2019 14:15
Time Gate 2 Activated:	2/12/2019 14:15
Time Gate 1 Returned to Normal:	2/13/2019 13:10
Time Gate 2 Returned to Normal:	2/13/2019 13:10
Percent Capture	18%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.15 ft.
Volume Stored:	895,286 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	4,092,685 Gal.
Overflow Volume Prevented:	895,286 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:
Rainfall data sourced from BSA rain gauge station at South Buffalo.

RTC Gate Performance



Rainfall Accumulation



Site:	Bird RTC
Analysis Date:	3/14/2019
Event Start Date/Time:	2/15/2019 6:05
Event End Date/Time:	2/15/2019 23:15

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.06 in.
Storm Event Duration:	6 hrs.
Storm Type:	Less than one year

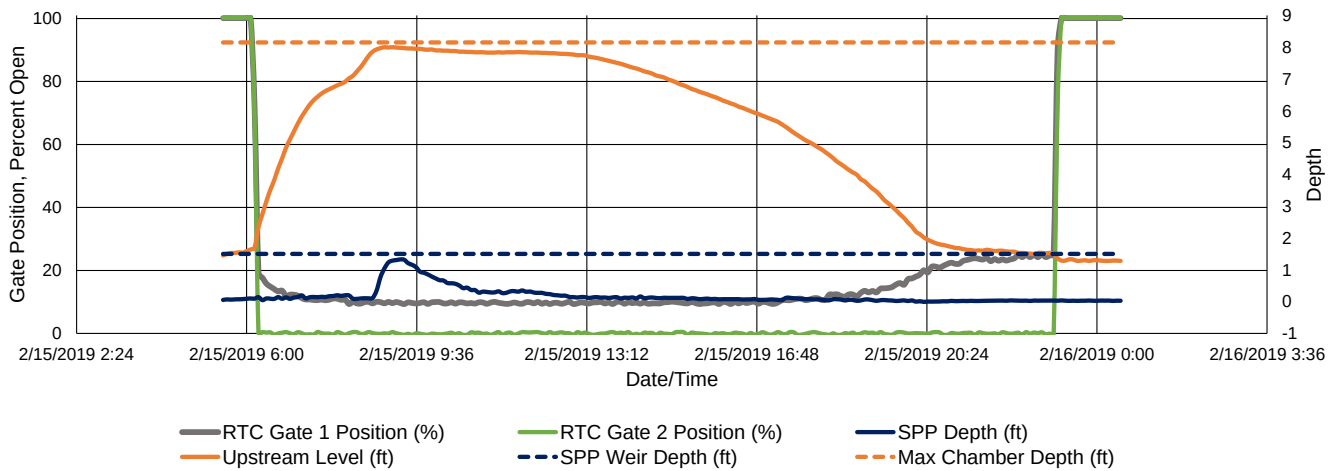
Gate Activation Trigger Depth:	1.64 ft.
Return to Normal Depth:	1.36 ft.
Time Gate 1 Activated:	2/15/2019 6:05
Time Gate 2 Activated:	2/15/2019 6:05
Time Gate 1 Returned to Normal:	2/15/2019 23:15
Time Gate 2 Returned to Normal:	2/15/2019 23:15
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.00 ft.
Volume Stored:	856,751 Gal.
Unused Storage Volume:	38,814 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	856,751 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:

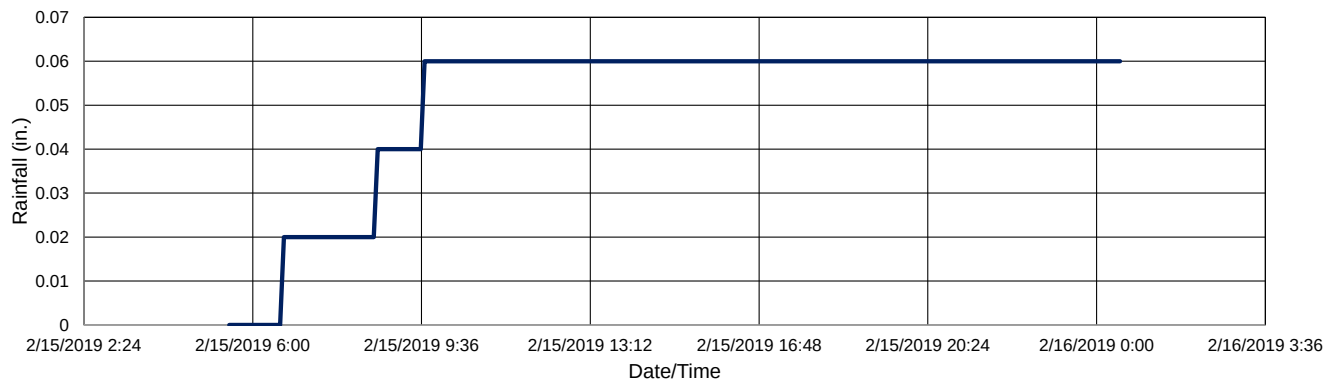
Rainfall data sourced from BSA rain gauge station at South Buffalo.

No rainfall was recorded at the airport, and the temperature ranged from high 30s (°F) to low 40s (°F) during the event. This event was likely caused by localized rainfall, and snowmelt.

RTC Gate Performance



Rainfall Accumulation



Site:	Bird RTC
Analysis Date:	3/14/2019
Event Start Date/Time:	2/21/2019 1:50
Event End Date/Time:	2/21/2019 19:15

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

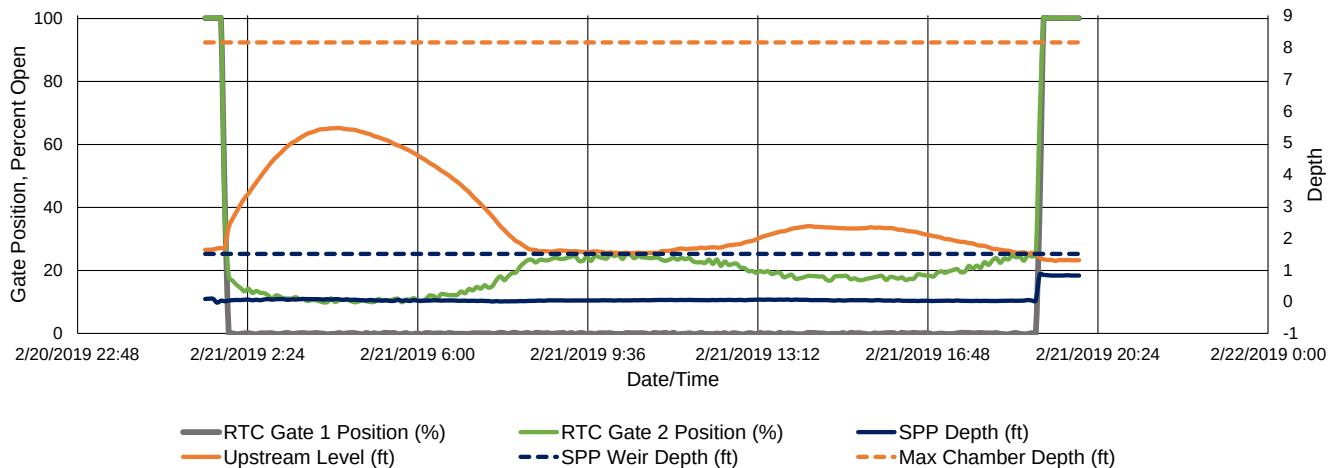
Gate Activation Trigger Depth:	1.69 ft.
Return to Normal Depth:	1.39 ft.
Time Gate 1 Activated:	2/21/2019 1:50
Time Gate 2 Activated:	2/21/2019 1:50
Time Gate 1 Returned to Normal:	2/21/2019 19:15
Time Gate 2 Returned to Normal:	2/21/2019 19:15
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	5.46 ft.
Volume Stored:	328,979 Gal.
Unused Storage Volume:	565,862 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	328,979 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:

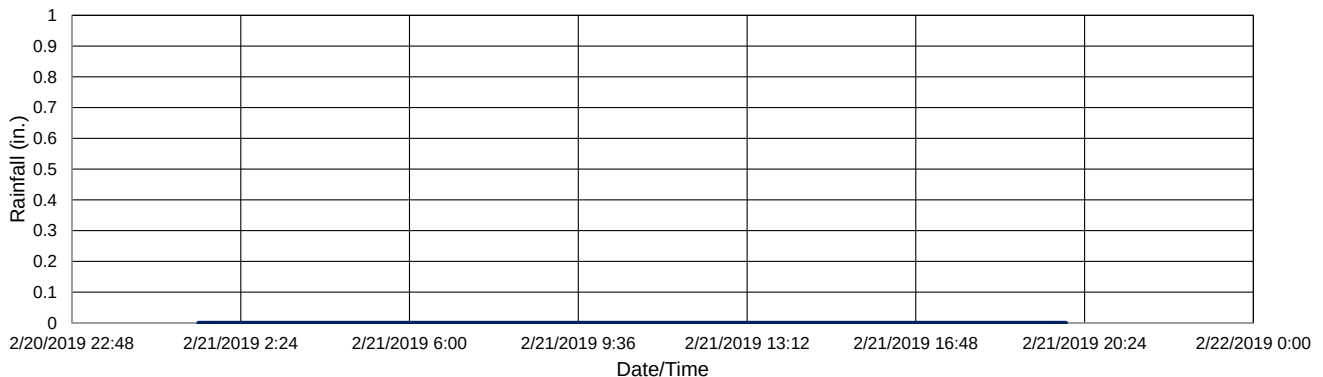
Rainfall data sourced from BSA rain gauge station at South Buffalo.

No rainfall was recorded, and the temperature ranged from mid to high 30s (°F) during the event. This event was likely caused by localized rainfall, and snowmelt.

RTC Gate Performance



Rainfall Accumulation



Site:	Bird RTC
Analysis Date:	3/14/2019
Event Start Date/Time:	2/24/2019 8:40
Event End Date/Time:	2/25/2019 0:50

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.38 in.
Storm Event Duration:	6 hrs.
Storm Type:	Less than one year

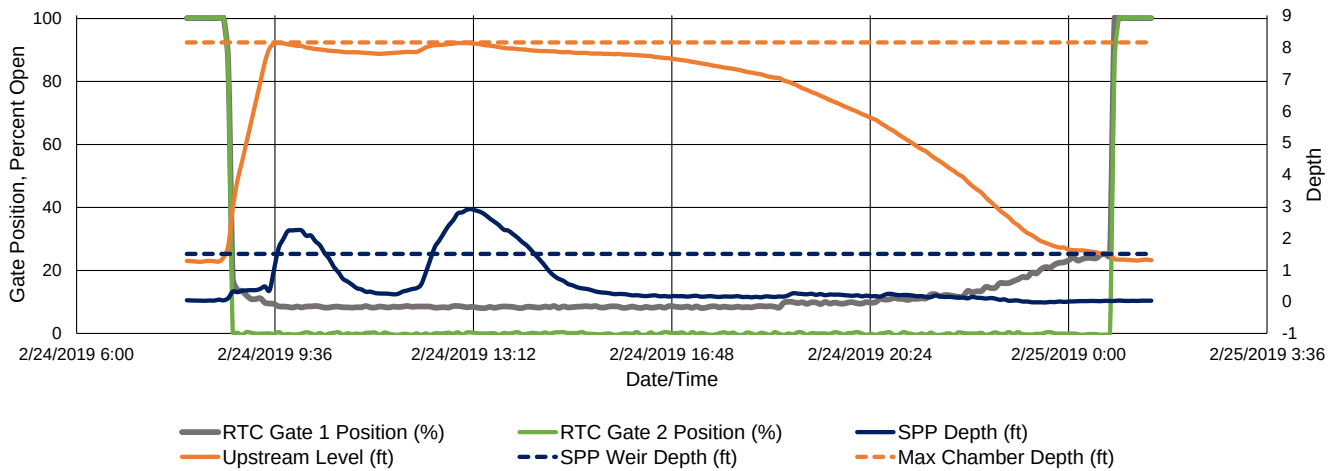
Gate Activation Trigger Depth:	1.39 ft.
Return to Normal Depth:	1.51 ft.
Time Gate 1 Activated:	2/24/2019 8:40
Time Gate 2 Activated:	2/24/2019 8:40
Time Gate 1 Returned to Normal:	2/25/2019 0:50
Time Gate 2 Returned to Normal:	2/25/2019 0:50
Percent Capture	34%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.13 ft.
Volume Stored:	892,528 Gal.
Unused Storage Volume:	5,225 Gal.
Overflow Volume:	1,708,238 Gal.
Overflow Volume Prevented:	892,528 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	1,708,238 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:

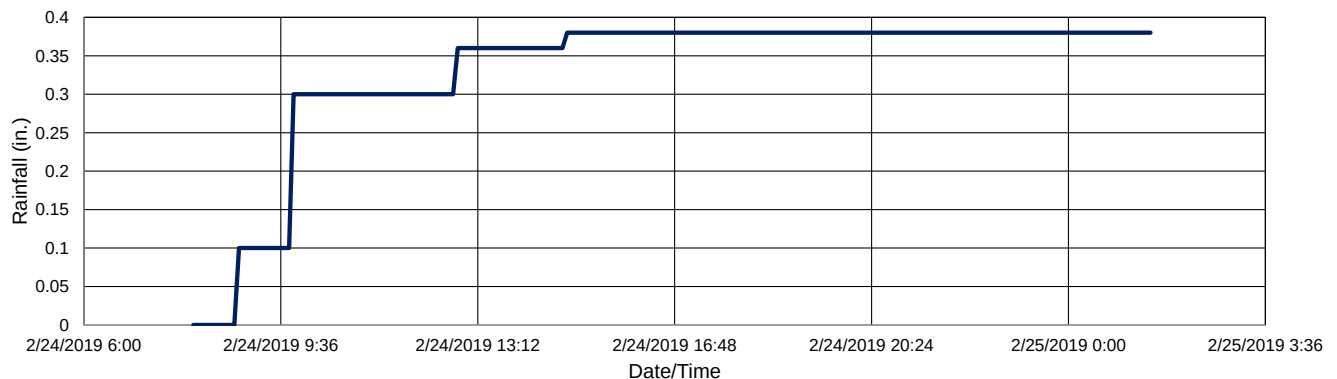
Rainfall data sourced from BSA rain gauge station at South Buffalo.

This event was caused by rainfall, and snowmelt. Temperatures rose up to high 40s (°F) during the event.

RTC Gate Performance



Rainfall Accumulation



March 2019 Bird Ave. RTC KPI Report

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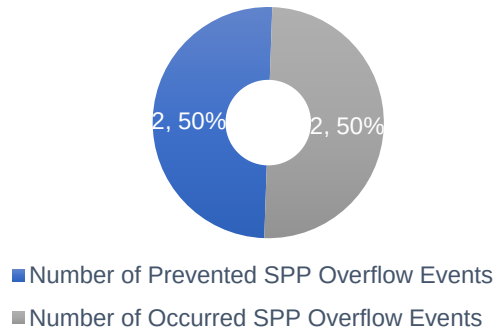
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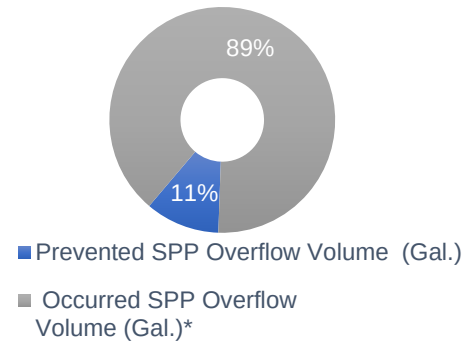
Bird Ave. RTC Monthly Performance Report

March 2019

Prevented SPP Events



Prevented SPP Volume



Number of Prevented SPP Overflow Events	Number of Occurred SPP Overflow Events	Prevented SPP Overflow Volume (Gal.)	Occurred SPP Overflow Volume (Gal.)*
2	2	2,709,019	22,733,091
Event Date	SPP Overflow Volume Prevented	SPP Overflow Volume Occurred	Percent Capture
3/10/2019	895,286	9,220,499	9%
3/14/2019	709,934	-	100%
3/30/2019	208,235	-	100%
3/30/2019	895,564	13,512,592	6%

*Calculated overflow volume is overestimated as a result of the Bird underflow project and SPP modifications

March 10, 2019

1

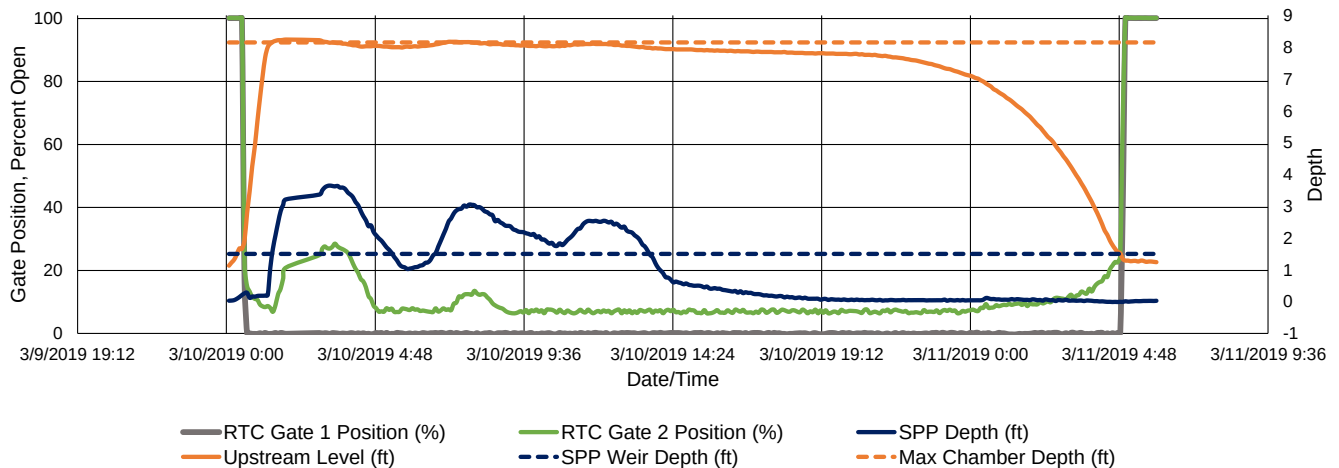
Site:	Bird RTC
Analysis Date:	4/12/2019
Event Start Date/Time:	3/10/2019 0:30
Event End Date/Time:	3/11/2019 5:00

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.8 in.
Storm Event Duration:	13 hrs.
Storm Type:	Less than one year

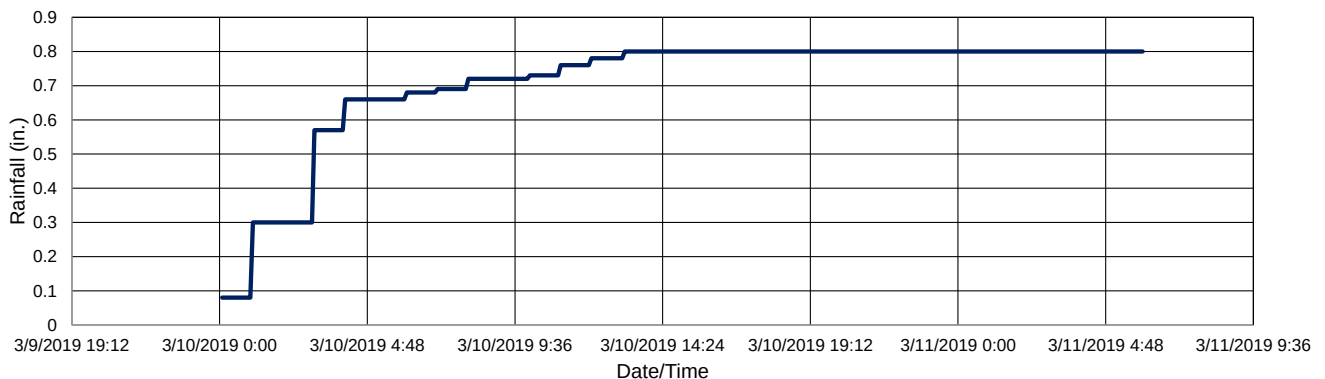
Gate Activation Trigger Depth:	1.66 ft.
Return to Normal Depth:	1.34 ft.
Time Gate 1 Activated:	3/10/2019 0:30
Time Gate 2 Activated:	3/10/2019 0:30
Time Gate 1 Returned to Normal:	3/11/2019 5:00
Time Gate 2 Returned to Normal:	3/11/2019 5:00
Percent Capture	9%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.15 ft.
Volume Stored:	895,286 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	9,220,499 Gal.
Overflow Volume Prevented:	895,286 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:
Rainfall data sourced from BSA rain gauge station at South Buffalo.

RTC Gate Performance



Rainfall Accumulation



March 14, 2019

2

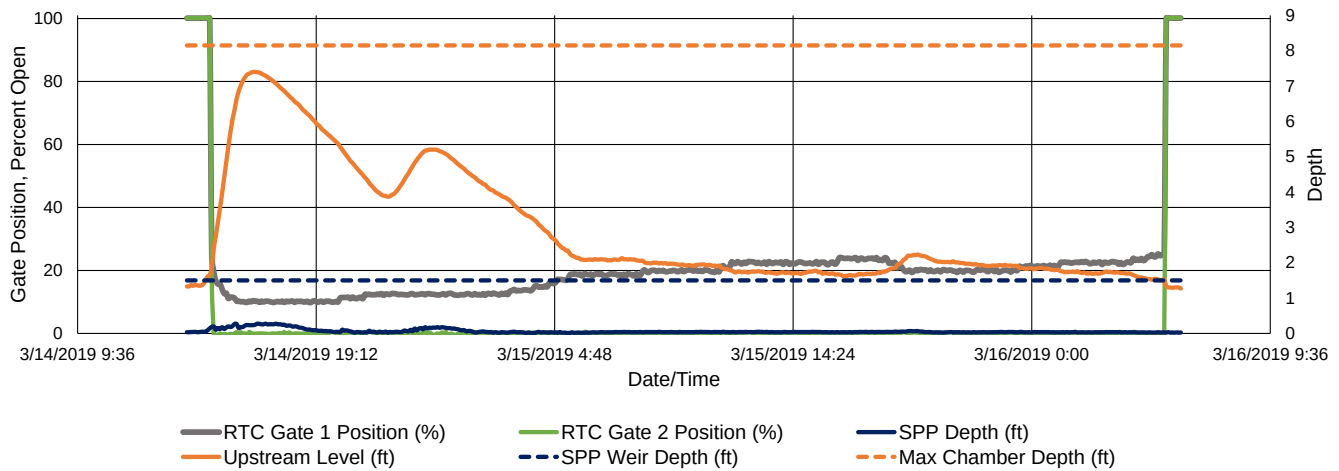
Site:	Bird RTC
Analysis Date:	4/12/2019
Event Start Date/Time:	3/14/2019 14:55
Event End Date/Time:	3/16/2019 5:25

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.16 in.
Storm Event Duration:	7 hrs.
Storm Type:	Less than one year

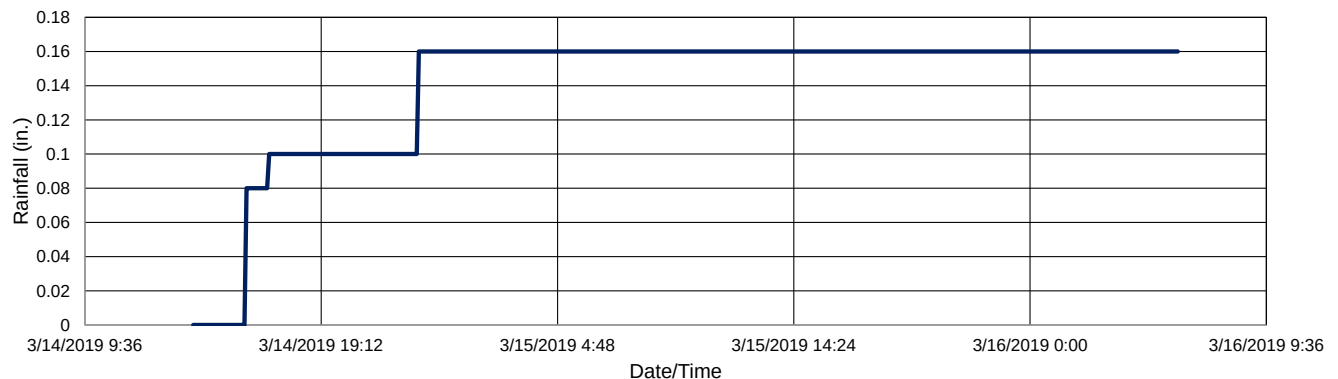
Gate Activation Trigger Depth:	1.65 ft.
Return to Normal Depth:	1.52 ft.
Time Gate 1 Activated:	3/14/2019 14:55
Time Gate 2 Activated:	3/14/2019 14:55
Time Gate 1 Returned to Normal:	3/16/2019 5:25
Time Gate 2 Returned to Normal:	3/16/2019 5:25
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	7.40 ft.
Volume Stored:	709,934 Gal.
Unused Storage Volume:	185,493 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	709,934 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:
Rainfall data sourced from BSA rain gauge station at South Buffalo.

RTC Gate Performance



Rainfall Accumulation



March 30, 2019

3

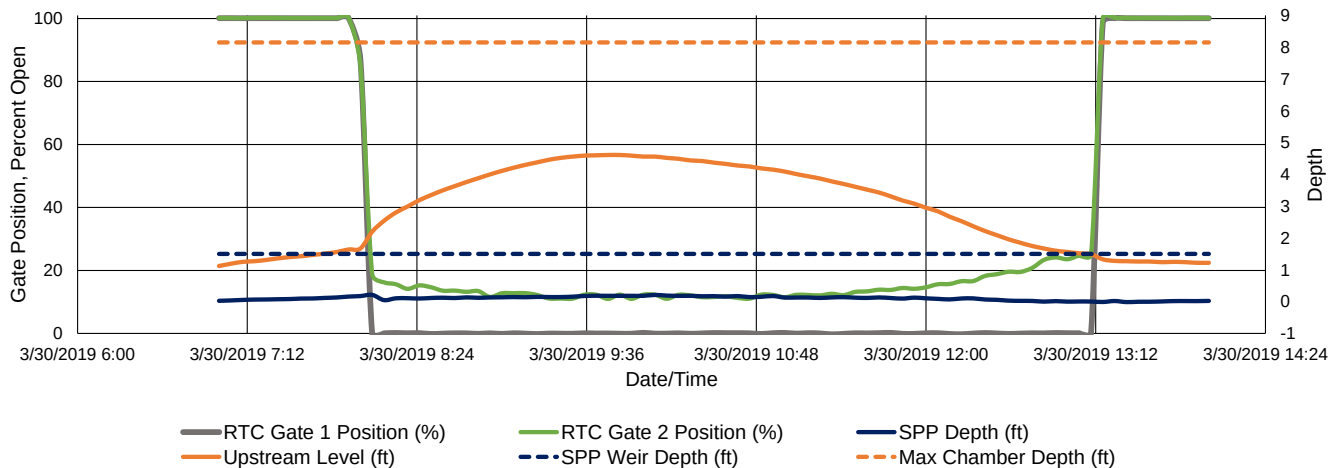
Site:	Bird RTC
Analysis Date:	4/12/2019
Event Start Date/Time:	3/30/2019 7:55
Event End Date/Time:	3/30/2019 13:20

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.2 in.
Storm Event Duration:	4 hrs.
Storm Type:	Less than one year

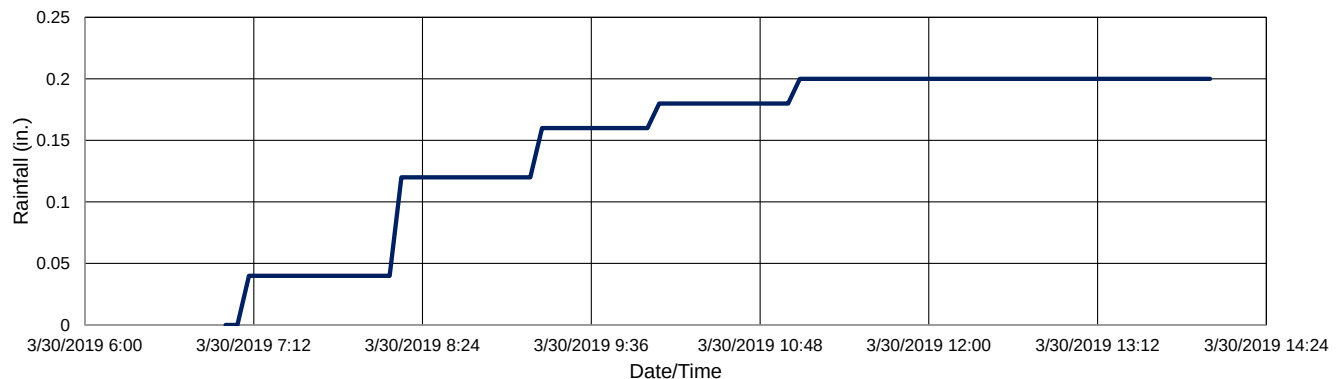
Gate Activation Trigger Depth:	1.64 ft.
Return to Normal Depth:	1.33 ft.
Time Gate 1 Activated:	3/30/2019 7:55
Time Gate 2 Activated:	3/30/2019 7:55
Time Gate 1 Returned to Normal:	3/30/2019 13:20
Time Gate 2 Returned to Normal:	3/30/2019 13:20
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	4.61 ft.
Volume Stored:	208,235 Gal.
Unused Storage Volume:	687,329 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	208,235 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:
Rainfall data sourced from BSA rain gauge station at South Buffalo.

RTC Gate Performance



Rainfall Accumulation



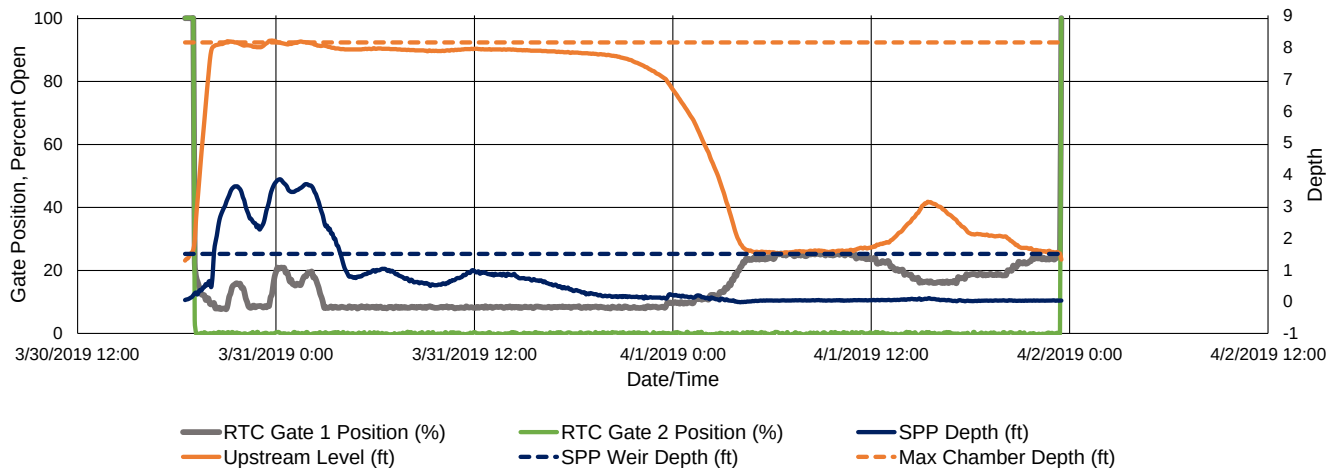
Site:	Bird RTC
Analysis Date:	4/12/2019
Event Start Date/Time:	3/30/2019 19:00
Event End Date/Time:	4/1/2019 23:30

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	1.72 in.
Storm Event Duration:	15 hrs.
Storm Type:	Less than two year

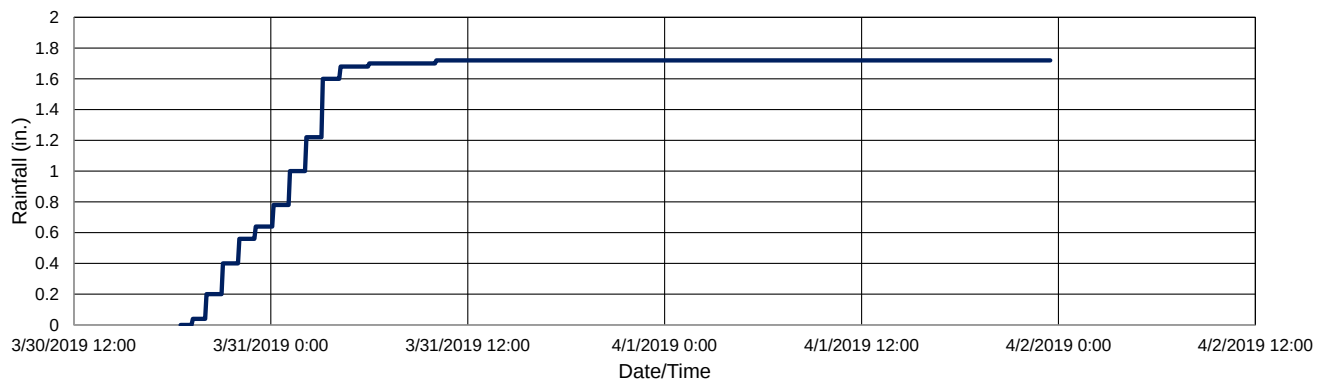
Gate Activation Trigger Depth:	1.64 ft.
Return to Normal Depth:	1.51 ft.
Time Gate 1 Activated:	3/30/2019 19:00
Time Gate 2 Activated:	3/30/2019 19:00
Time Gate 1 Returned to Normal:	4/1/2019 23:30
Time Gate 2 Returned to Normal:	4/1/2019 23:30
Percent Capture	6%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.15 ft.
Volume Stored:	895,564 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	13,512,592 Gal.
Overflow Volume Prevented:	895,564 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:
Rainfall data sourced from BSA rain gauge station at South Buffalo.

RTC Gate Performance



Rainfall Accumulation



April 2019 Bird Ave. RTC KPI Report

BUFFALO
SEWER AUTHORITY



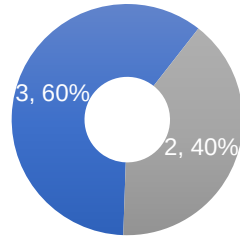
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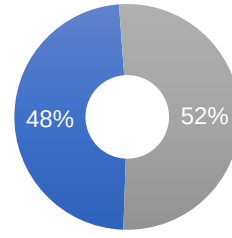
April 2019

Prevented SPP Events



■ Number of Prevented SPP Overflow Events
■ Number of Occurred SPP Overflow Events

Prevented SPP Volume



■ Prevented SPP Overflow Volume (Gal.)
■ Occurred SPP Overflow Volume (Gal.)*

Number of Prevented SPP Overflow Events	Number of Occurred SPP Overflow Events	Prevented SPP Overflow Volume (Gal.)	Occurred SPP Overflow Volume (Gal.)*
3	2	2,789,688	2,990,110

Event Date	SPP Overflow Volume Prevented	SPP Overflow Volume Occurred	Percent Capture
4/12/2019	60,771	-	100%
4/14/2019	895,286	2,767,050	24%
4/16/2019	823,669	-	100%
4/19/2019	114,969	-	100%
4/19/2019	894,993	223,060	80%

*Calculated overflow volume is not accurate as a result of the Bird underflow project and SPP modifications.

*Gates were in manual open after April 20, 2019, and events after April 20, 2019 are not included.

April 12, 2019

1

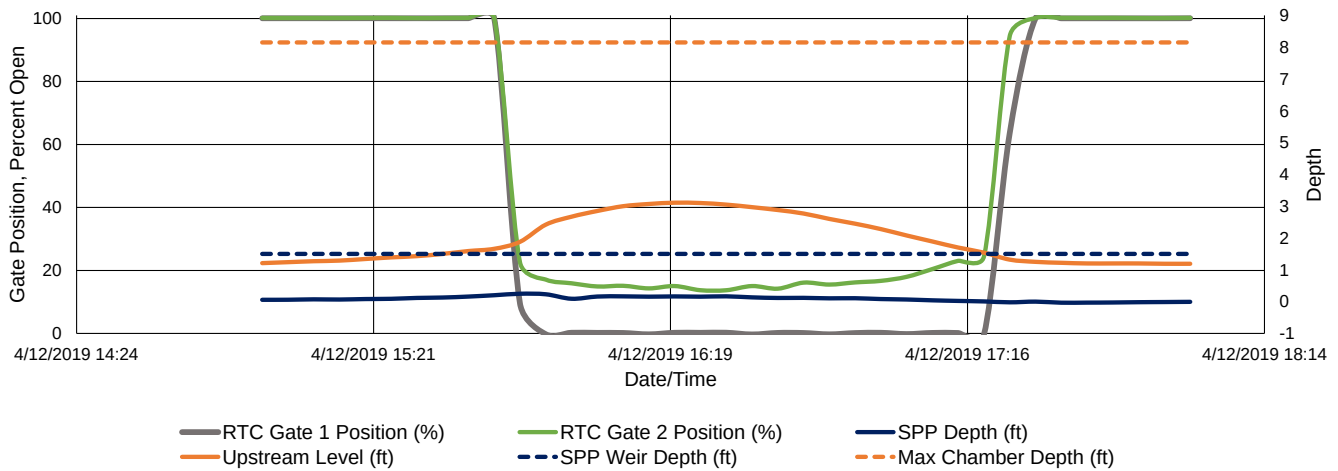
Site:	Bird RTC
Analysis Date:	05/10/2019
Event Start Date/Time:	4/12/2019 15:45
Event End Date/Time:	4/12/2019 17:30

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

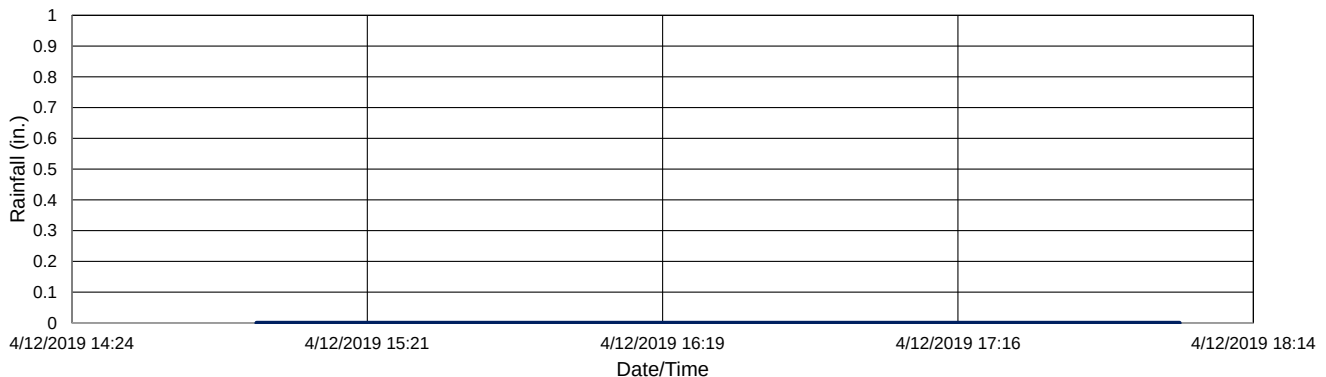
Gate Activation Trigger Depth:	1.66 ft.
Return to Normal Depth:	1.32 ft.
Time Gate 1 Activated:	4/12/2019 15:45
Time Gate 2 Activated:	4/12/2019 15:45
Time Gate 1 Returned to Normal:	4/12/2019 17:30
Time Gate 2 Returned to Normal:	4/12/2019 17:30
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	3.11 ft.
Volume Stored:	60,771 Gal.
Unused Storage Volume:	834,515 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	60,771 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:
Rainfall data sourced from BSA rain gauge station at South Buffalo.
This event was caused by snowmelt and localized rainfall. Temperature went up to low 60s (°F) causing melting of snow from previous day's snowfall.

RTC Gate Performance



Rainfall Accumulation



April 14, 2019

2

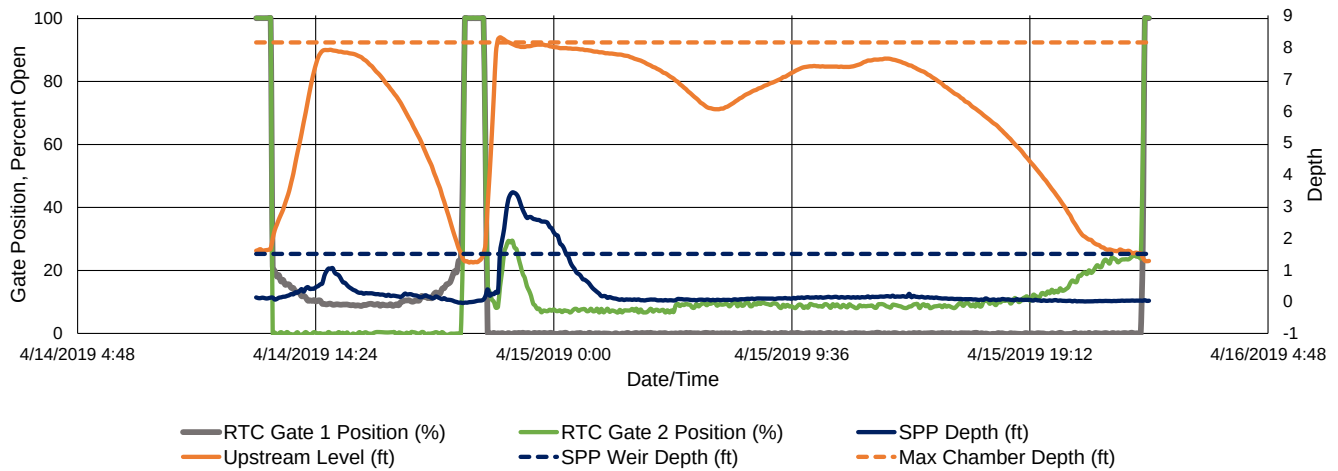
Site:	Bird RTC
Analysis Date:	05/10/2019
Event Start Date/Time:	4/14/2019 12:35
Event End Date/Time:	4/15/2019 23:50

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	1.38 in.
Storm Event Duration:	24 hrs.
Storm Type:	Less than one year

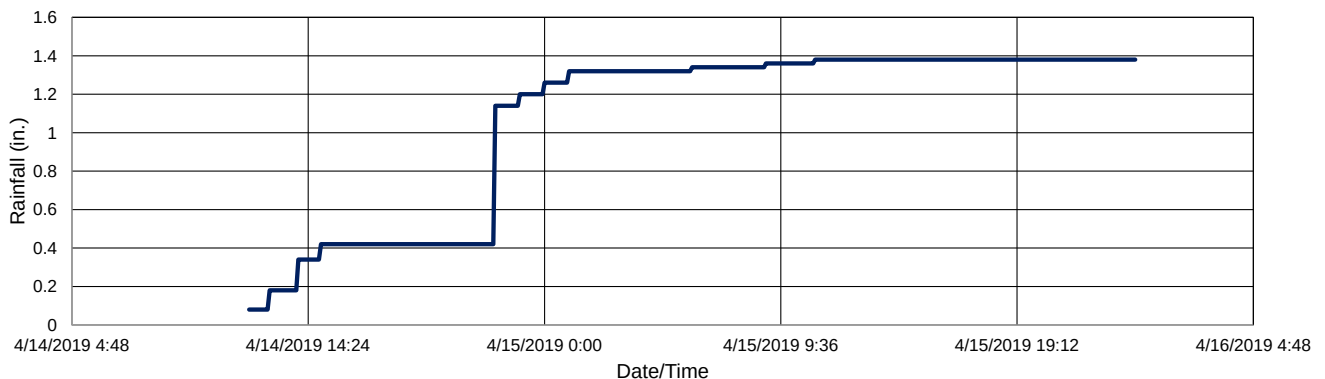
Gate Activation Trigger Depth:	1.66 ft.
Return to Normal Depth:	1.38 ft.
Time Gate 1 Activated:	4/14/2019 12:35
Time Gate 2 Activated:	4/14/2019 12:35
Time Gate 1 Returned to Normal:	4/15/2019 23:50
Time Gate 2 Returned to Normal:	4/15/2019 23:50
Percent Capture	24%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.15 ft.
Volume Stored:	895,286 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	2,767,050 Gal.
Overflow Volume Prevented:	895,286 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:
Rainfall data sourced from BSA rain gauge station at South Buffalo.

RTC Gate Performance



Rainfall Accumulation



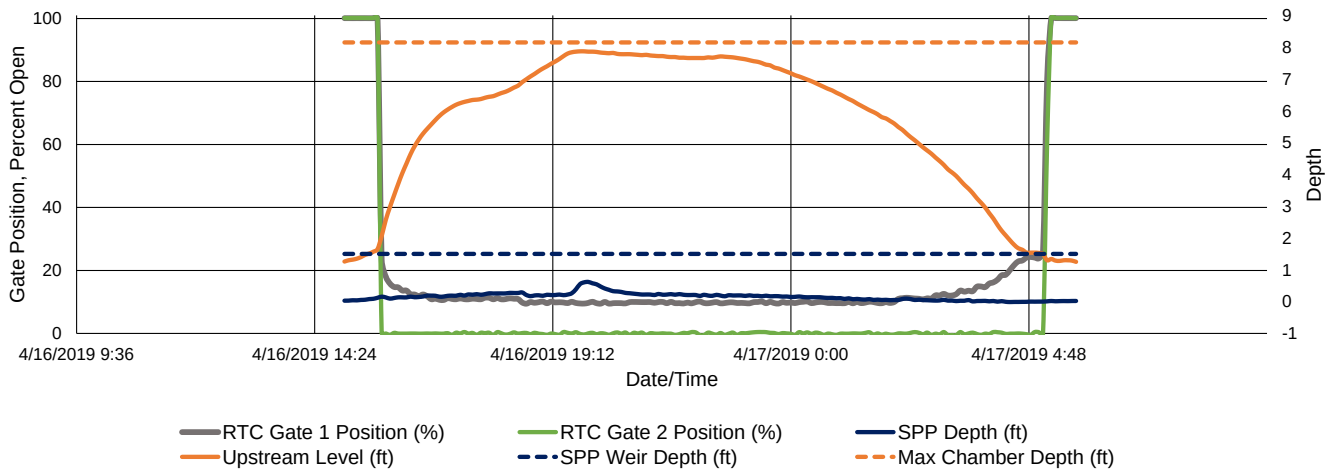
Site:	Bird RTC
Analysis Date:	05/10/2019
Event Start Date/Time:	4/16/2019 15:40
Event End Date/Time:	4/17/2019 5:15

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.64 in.
Storm Event Duration:	9 hrs.
Storm Type:	Less than one year

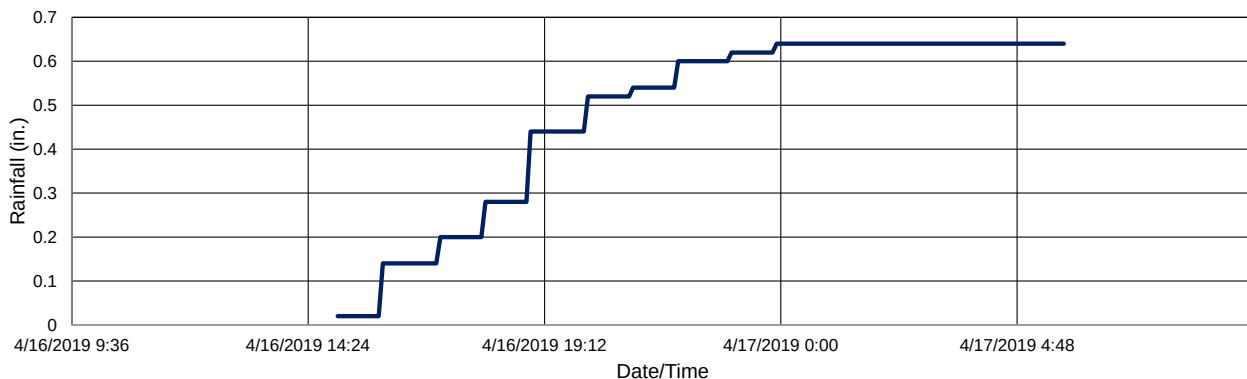
Gate Activation Trigger Depth:	1.65 ft.
Return to Normal Depth:	1.30 ft.
Time Gate 1 Activated:	4/16/2019 15:40
Time Gate 2 Activated:	4/16/2019 15:40
Time Gate 1 Returned to Normal:	4/17/2019 5:15
Time Gate 2 Returned to Normal:	4/17/2019 5:15
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	7.87 ft.
Volume Stored:	823,669 Gal.
Unused Storage Volume:	71,758 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	823,669 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:
Rainfall data sourced from BSA rain gauge station at South Buffalo.

RTC Gate Performance



Rainfall Accumulation



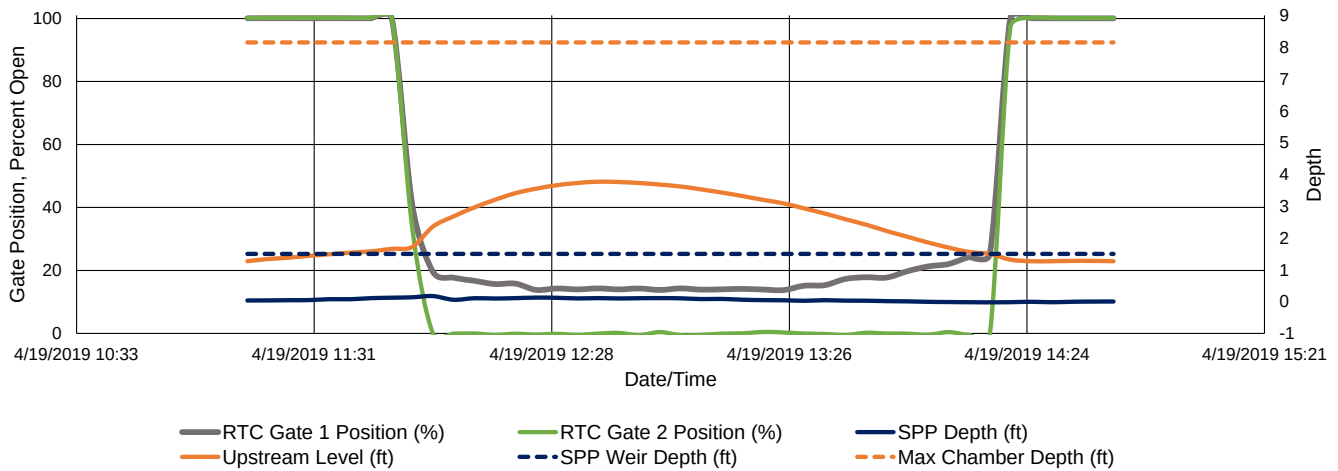
Site:	Bird RTC
Analysis Date:	05/10/2019
Event Start Date/Time:	4/19/2019 11:50
Event End Date/Time:	4/19/2019 14:20

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.16 in.
Storm Event Duration:	3 hrs.
Storm Type:	Less than one year

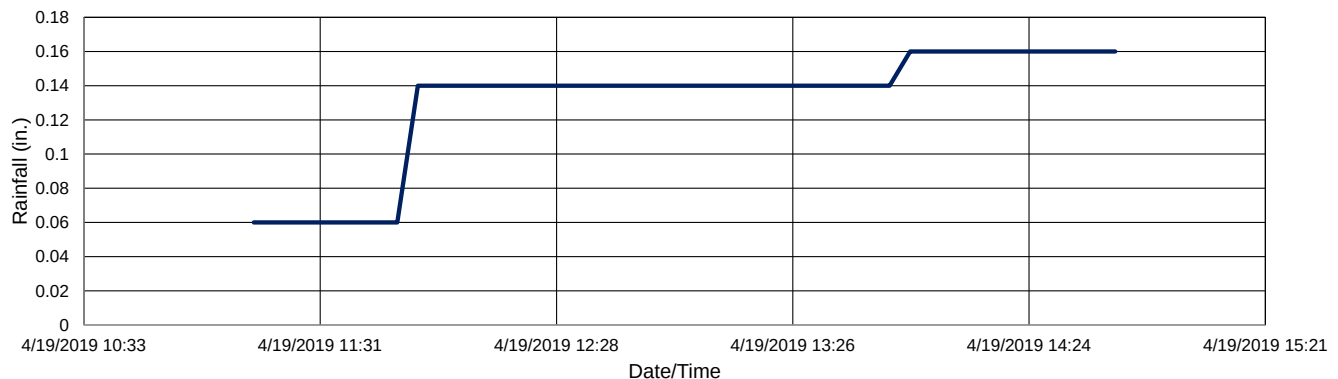
Gate Activation Trigger Depth:	1.66 ft.
Return to Normal Depth:	1.50 ft.
Time Gate 1 Activated:	4/19/2019 11:50
Time Gate 2 Activated:	4/19/2019 11:50
Time Gate 1 Returned to Normal:	4/19/2019 14:20
Time Gate 2 Returned to Normal:	4/19/2019 14:20
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	3.77 ft.
Volume Stored:	114,969 Gal.
Unused Storage Volume:	780,317 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	114,969 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:
Rainfall data sourced from BSA rain gauge station at South Buffalo.

RTC Gate Performance



Rainfall Accumulation



Site:	Bird RTC
Analysis Date:	05/10/2019
Event Start Date/Time:	4/19/2019 17:05
Event End Date/Time:	4/20/2019 13:55

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.71 in.*
Storm Event Duration:	26 hrs.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.68 ft.
Return to Normal Depth:	10.42 ft.
Time Gate 1 Activated:	4/19/2019 17:05
Time Gate 2 Activated:	4/19/2019 17:05
Time Gate 1 Returned to Normal:	4/20/2019 13:55
Time Gate 2 Returned to Normal:	4/20/2019 13:55
Percent Capture	80%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.15 ft.
Volume Stored:	894,993 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	223,060 Gal.
Overflow Volume Prevented:	894,993 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

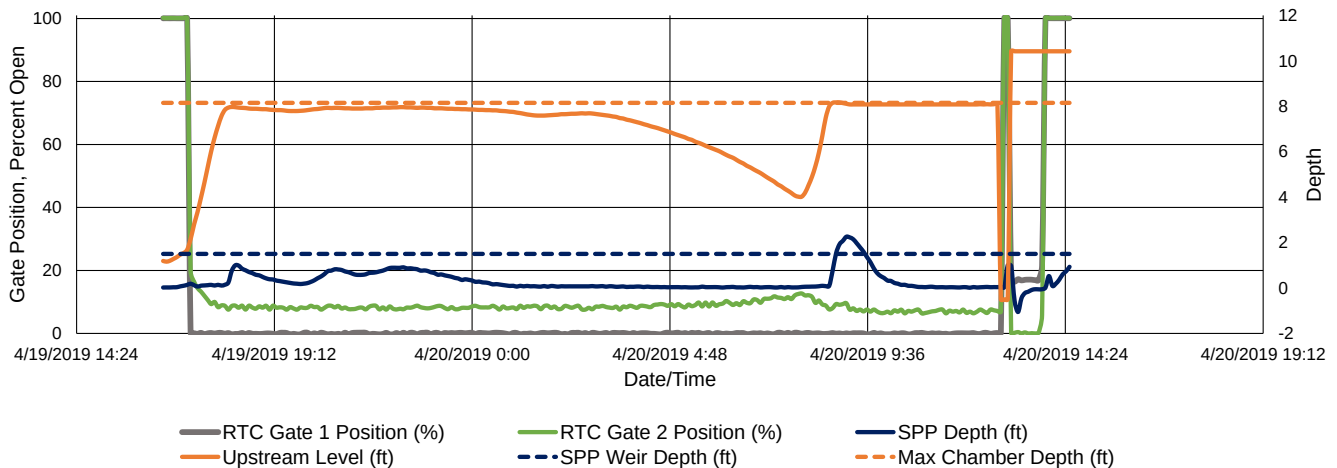
Recommended Operational Changes/Notes:

Rainfall data sourced from BSA rain gauge station at South Buffalo.

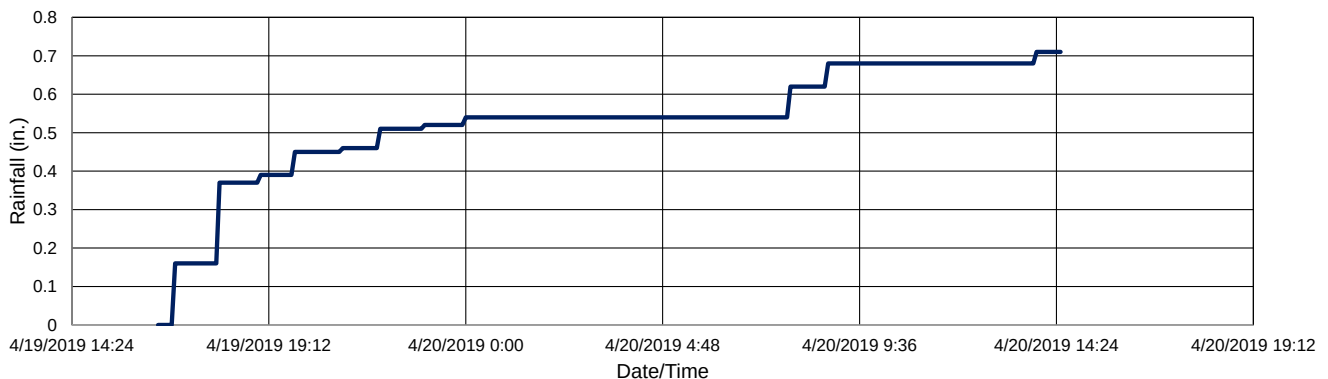
As indicated in Attachment A, upstream level sensor dropped out of communication during the event. The gates were placed in manual open on April 20 at 13:50, and therefore overflow volume that may have occurred after this time is not included. Overflow volume is shown here for the active storage period and is based on calculated SPP depth.

* Rainfall was intermittent during the event.

RTC Gate Performance



Rainfall Accumulation



ATTACHMENT A

Communication regarding gate activation on April 19



From: Maria Krug Comuniello <mcomuniello@emnet.net>

Sent: Monday, May 6, 2019 1:42 PM

To: Hintz, Angela <Angela.Hintz@arcadis.com>

Cc: Kristina Macro <kmacro@emnet.net>

Subject: April BSA KPI reports

Hi Angela,

Please see attached the Bird SPP data for April – as we discussed on Friday’s call, the Bird upstream level sensor dropped out in the middle of the April 20th event. It looks like Bird had already reached its maximum storage depth before that happened, and the neural network results for SPP depth during that period seem to be reasonable (the neural network relies more on the downstream level input). However, this erroneous data should be noted in the KPI report – let us know if you’d like to discuss further after you have a chance to look through the data. Also, since the April data is still using the neural network data for the Bird SPP depth, the KPI report should still include the same note as previous months that the calculated overflow volume will be overestimated as a result of the Bird underflow project and SPP modifications.

The Bird gates have been in manual open since the April 20th event. The measured SPP depth downstream of Lang can be found on the EmNet data portal (labeled as “Lang SPP Depth”) for all of April.

Thanks!

Maria

Maria Krug Comuniello

Project Manager

EmNet, a Xylem brand

121 S. Niles Ave., Suite 22,

South Bend, IN 46617

O: +1.574.855.1012 x124 M: +1.828.467.8015



May 2019 Bird Ave. RTC KPI Report

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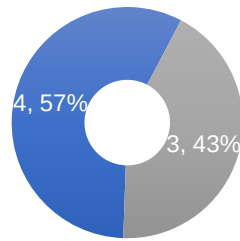
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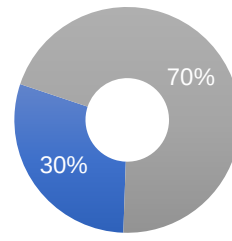
May 2019

Prevented SPP Events



■ Number of Prevented SPP Overflow Events
■ Number of Occurred SPP Overflow Events

Prevented SPP Volume



■ Prevented SPP Overflow Volume (Gal.)
■ Occurred SPP Overflow Volume (Gal.)*

Number of Prevented SPP Overflow Events	Number of Occurred SPP Overflow Events	Prevented SPP Overflow Volume (Gal.)	Occurred SPP Overflow Volume (Gal.)*
4	3	4,393,573	10,458,801

Event Date	SPP Overflow Volume Prevented	SPP Overflow Volume Occurred	Percent Capture
5/9/2019	894,524	9,412,527	9%
5/13/2019	894,840	445,167	67%
5/15/2019	45,590	-	100%
5/23/2019	718,039	-	100%
5/25/2019	148,353	-	100%
5/25/2019	795,315	-	100%
5/28/2019	896,912	601,107	60%

*Calculated overflow volume is not accurate as a result of the Bird underflow project and SPP modifications.

*Gates were in manual open up to May 8, 2019, and therefore events during this period are not recorded.

May 9, 2019

1

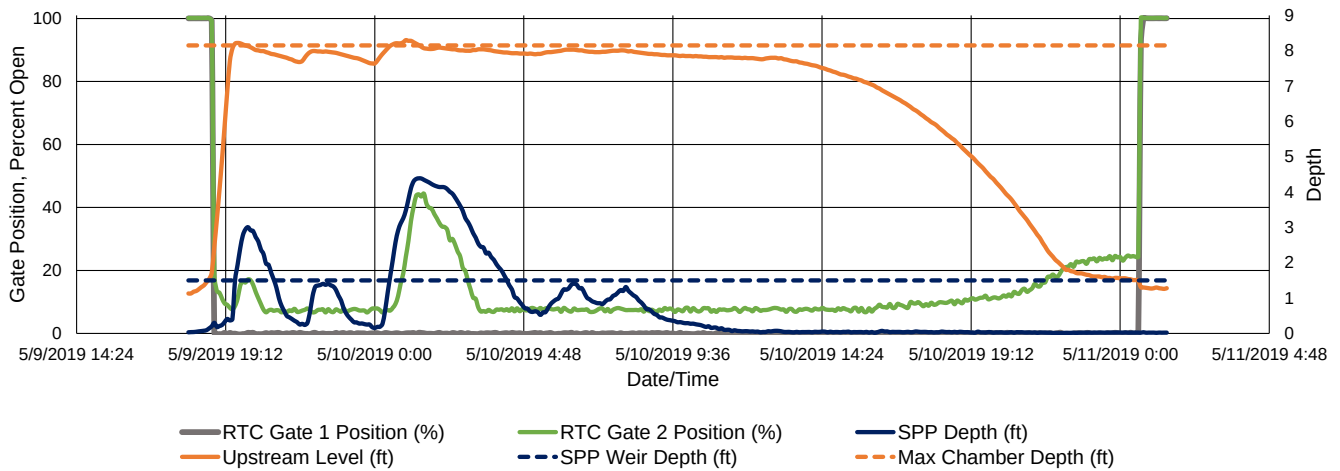
Site:	Bird RTC
Analysis Date:	06/10/2019
Event Start Date/Time:	5/9/2019 18:45
Event End Date/Time:	5/11/2019 0:45

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.4 in.
Storm Event Duration:	See notes section
Storm Type:	Less than one year

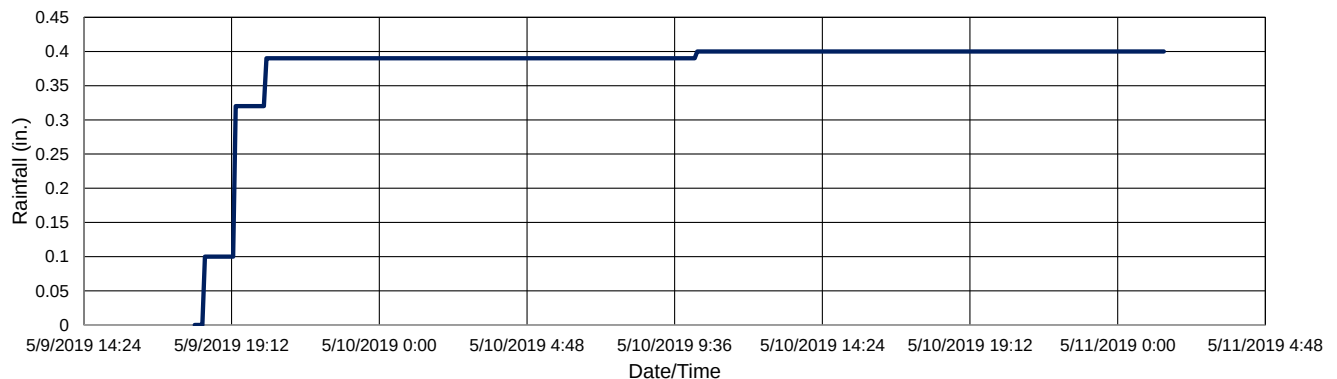
Gate Activation Trigger Depth:	1.71 ft.
Return to Normal Depth:	1.31 ft.
Time Gate 1 Activated:	5/9/2019 18:45
Time Gate 2 Activated:	5/9/2019 18:45
Time Gate 1 Returned to Normal:	5/11/2019 0:45
Time Gate 2 Returned to Normal:	5/11/2019 0:45
Percent Capture	9%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.15 ft.
Volume Stored:	894,524 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	9,412,527 Gal.
Overflow Volume Prevented:	894,524 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:
Rainfall data sourced from BSA rain gauge station at South Buffalo.
Two rainfall events contributed to this event, one was recorded at 0.39-inch over five hours while the other recorded at 0.01-inch over an hour.

RTC Gate Performance



Rainfall Accumulation



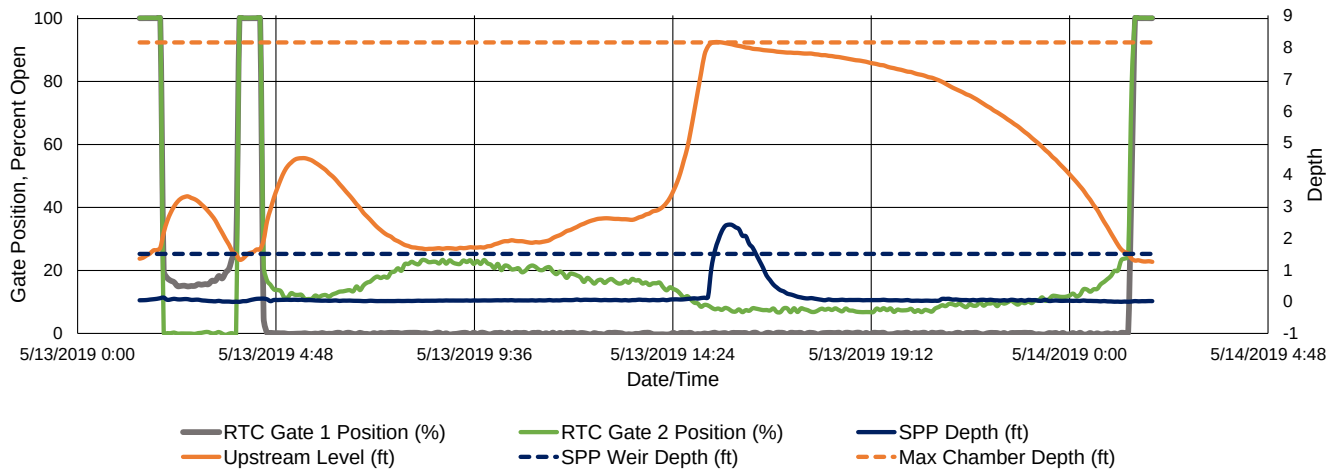
Site:	Bird RTC
Analysis Date:	06/10/2019
Event Start Date/Time:	5/13/2019 2:00
Event End Date/Time:	5/14/2019 1:35

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.42 in.
Storm Event Duration:	14 hrs.
Storm Type:	Less than one year

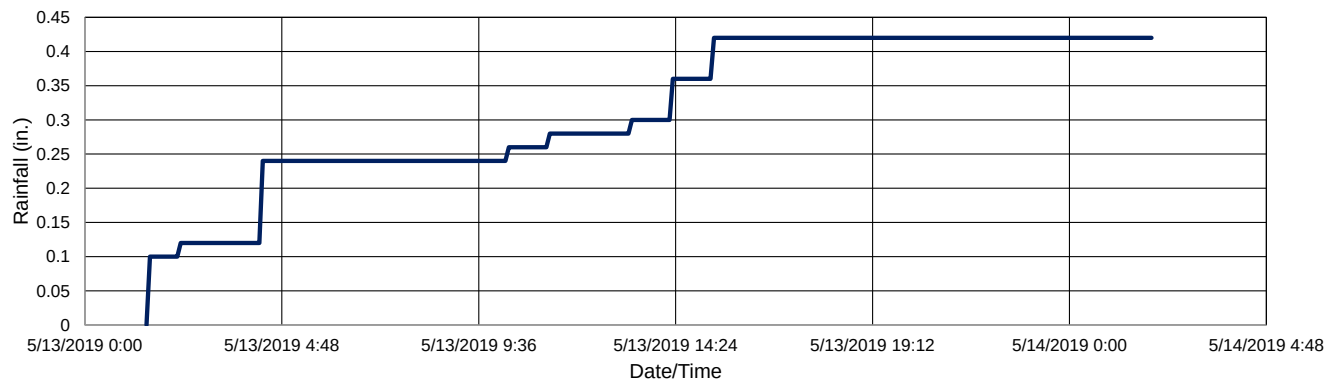
Gate Activation Trigger Depth:	1.69 ft.
Return to Normal Depth:	1.35 ft.
Time Gate 1 Activated:	5/13/2019 2:00
Time Gate 2 Activated:	5/13/2019 2:00
Time Gate 1 Returned to Normal:	5/14/2019 1:35
Time Gate 2 Returned to Normal:	5/14/2019 1:35
Percent Capture	67%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.15 ft.
Volume Stored:	894,840 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	445,167 Gal.
Overflow Volume Prevented:	894,840 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:
Rainfall data sourced from BSA rain gauge station at South Buffalo.

RTC Gate Performance



Rainfall Accumulation



May 15, 2019

3

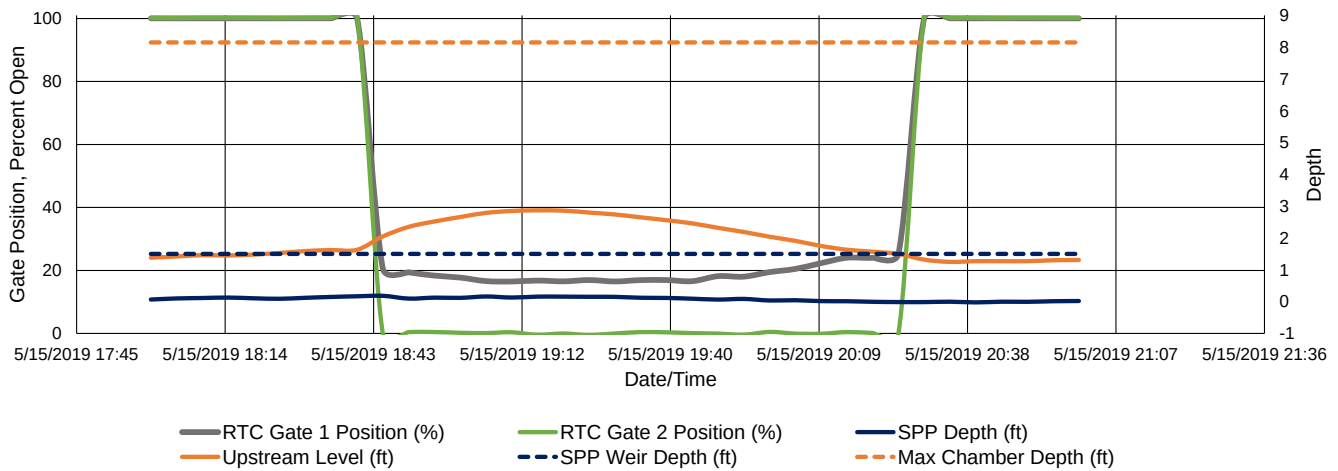
Site:	Bird RTC
Analysis Date:	06/10/2019
Event Start Date/Time:	5/15/2019 18:40
Event End Date/Time:	5/15/2019 20:30

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.05 in
Storm Event Duration:	3 hrs.
Storm Type:	Less than one year

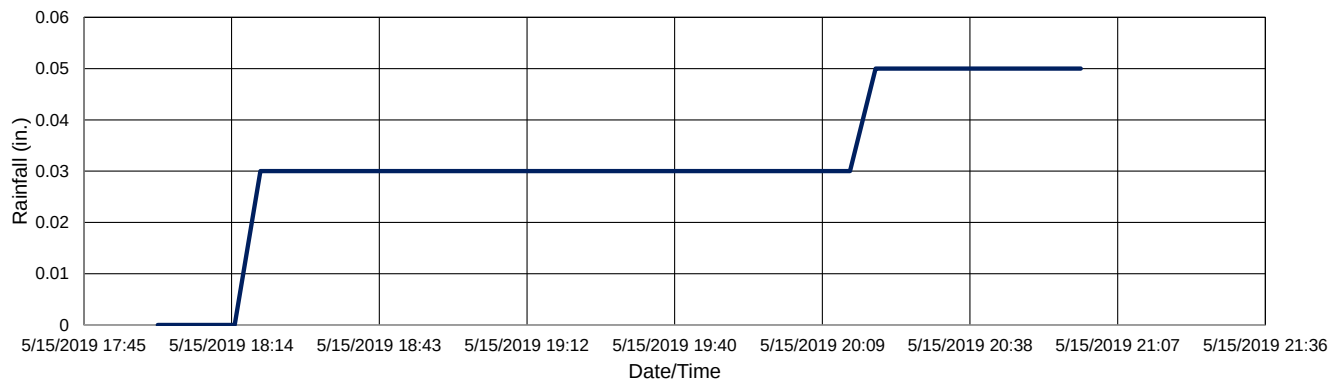
Gate Activation Trigger Depth:	1.63 ft.
Return to Normal Depth:	1.50 ft.
Time Gate 1 Activated:	5/15/2019 18:40
Time Gate 2 Activated:	5/15/2019 18:40
Time Gate 1 Returned to Normal:	5/15/2019 20:30
Time Gate 2 Returned to Normal:	5/15/2019 20:30
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	2.87 ft.
Volume Stored:	45,590 Gal.
Unused Storage Volume:	850,107 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	45,590 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:
Rainfall data sourced from BSA rain gauge station at South Buffalo.

RTC Gate Performance



Rainfall Accumulation



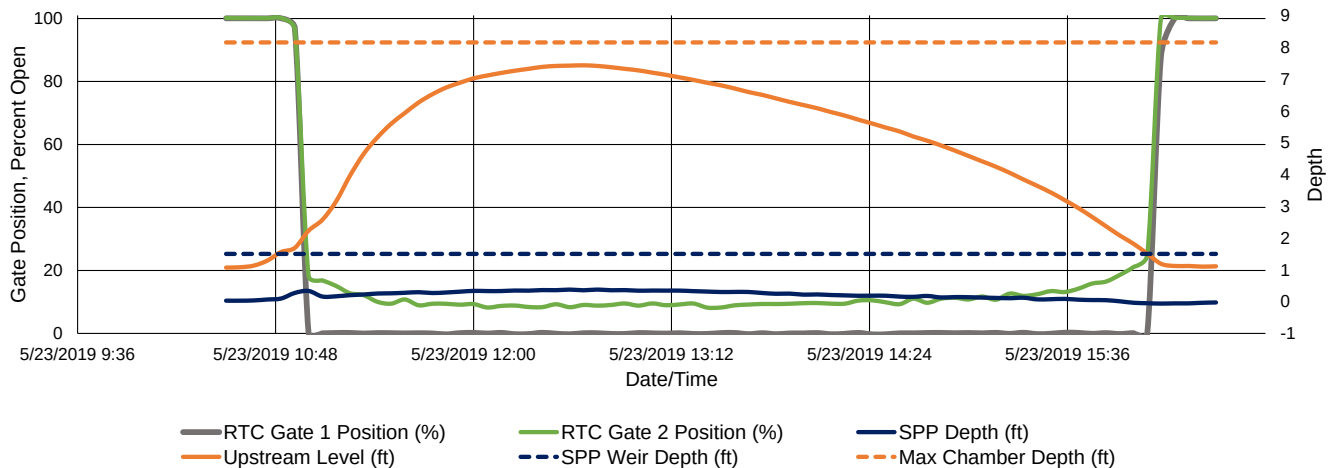
Site:	Bird RTC
Analysis Date:	06/10/2019
Event Start Date/Time:	5/23/2019 10:50
Event End Date/Time:	5/23/2019 16:15

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.24 in.
Storm Event Duration:	4 hrs.
Storm Type:	Less than one year

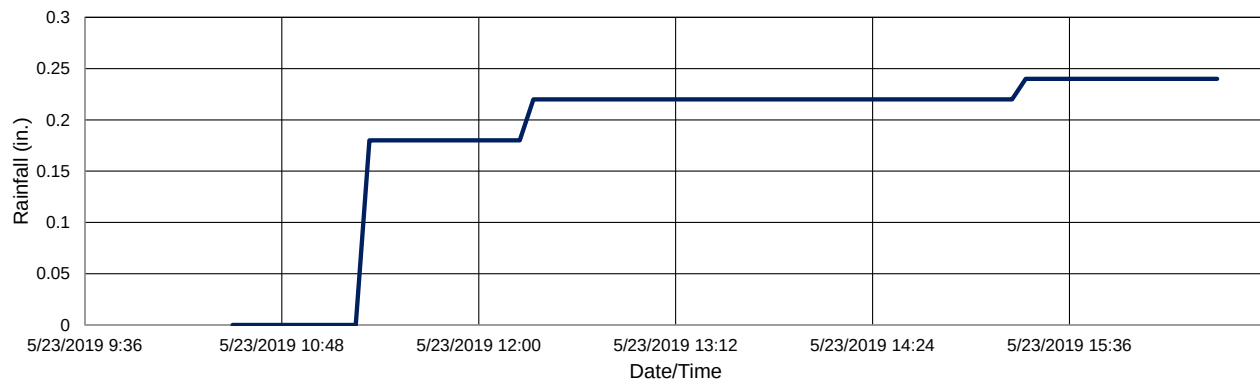
Gate Activation Trigger Depth:	1.56 ft.
Return to Normal Depth:	1.19 ft.
Time Gate 1 Activated:	5/23/2019 10:50
Time Gate 2 Activated:	5/23/2019 10:50
Time Gate 1 Returned to Normal:	5/23/2019 16:15
Time Gate 2 Returned to Normal:	5/23/2019 16:15
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	7.43 ft.
Volume Stored:	718,039 Gal.
Unused Storage Volume:	178,485 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	718,039 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:
Rainfall data sourced from BSA rain gauge station at South Buffalo.

RTC Gate Performance



Rainfall Accumulation



Site:	Bird RTC
Analysis Date:	06/10/2019
Event Start Date/Time:	5/25/2019 9:35
Event End Date/Time:	5/25/2019 12:10

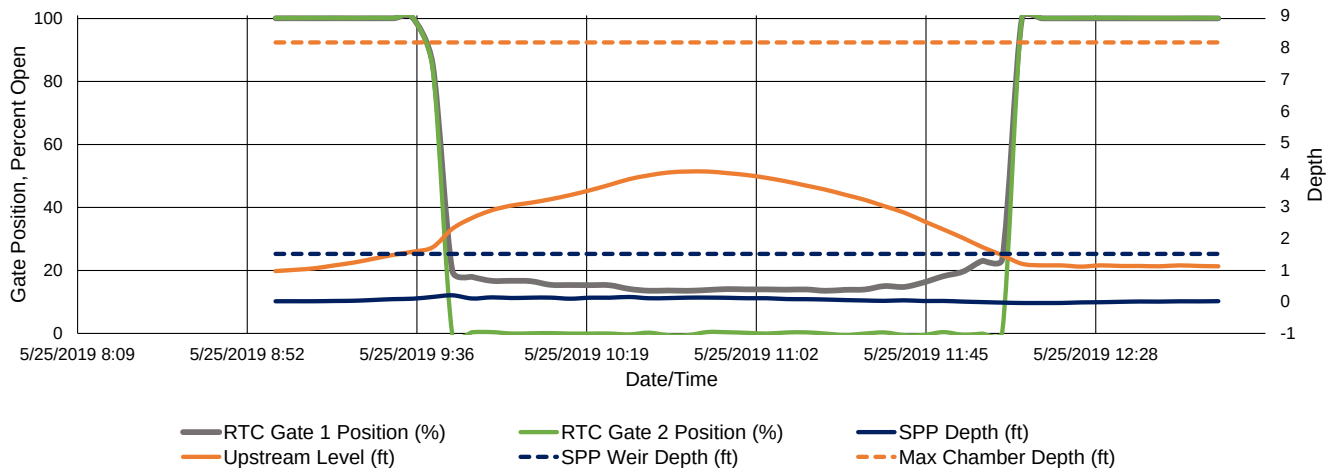
Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.08 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.57 ft.
Return to Normal Depth:	1.46 ft.
Time Gate 1 Activated:	5/25/2019 9:35
Time Gate 2 Activated:	5/25/2019 9:35
Time Gate 1 Returned to Normal:	5/25/2019 12:10
Time Gate 2 Returned to Normal:	5/25/2019 12:10
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	4.09 ft.
Volume Stored:	148,353 Gal.
Unused Storage Volume:	748,064 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	148,353 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

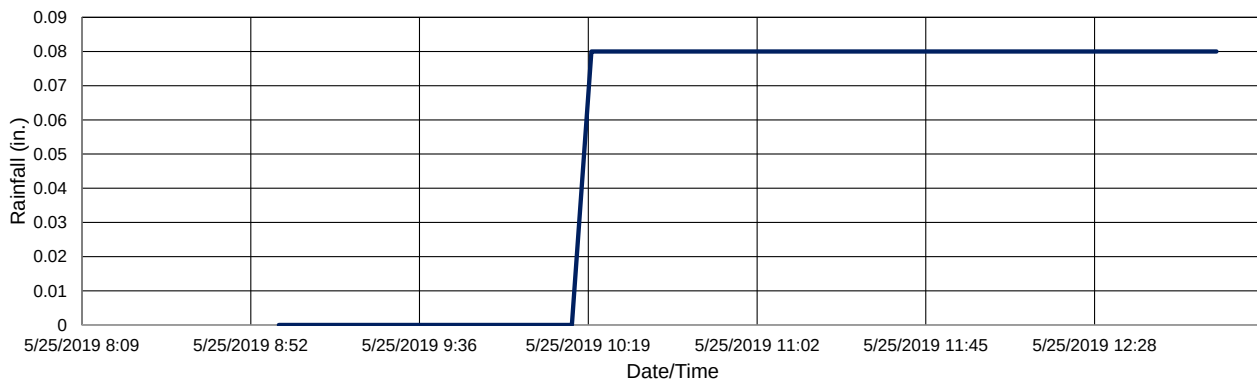
Recommended Operational Changes/Notes:

Rainfall data sourced from BSA rain gauge station at South Buffalo. From graphs it seems that the event started before rainfall, but rainfall is recorded at hourly intervals and therefore gate activation was actually consistent with rainfall.

RTC Gate Performance



Rainfall Accumulation



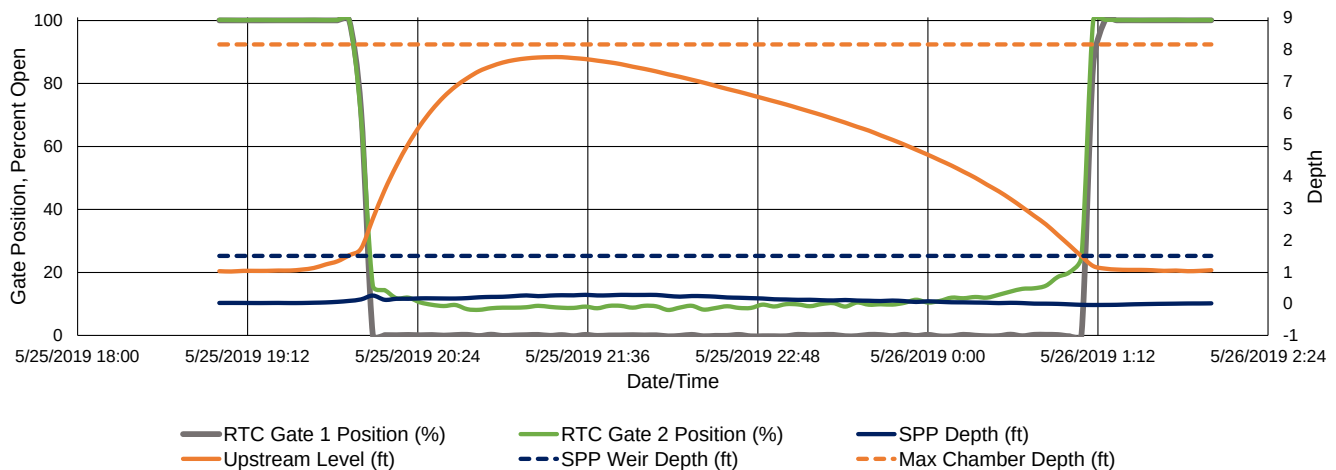
Site:	Bird RTC
Analysis Date:	06/10/2019
Event Start Date/Time:	5/25/2019 19:55
Event End Date/Time:	5/26/2019 1:15

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.25 in.
Storm Event Duration:	4 hrs.
Storm Type:	Less than one year

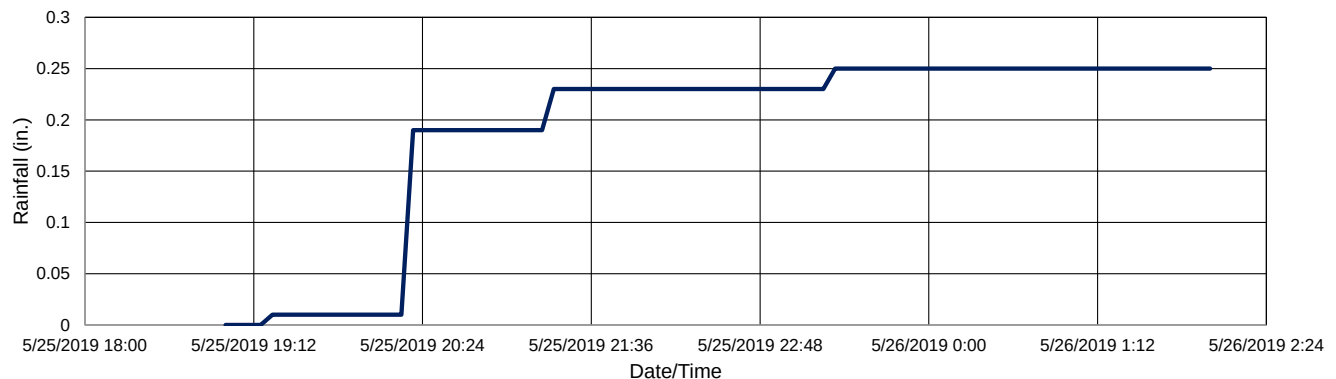
Gate Activation Trigger Depth:	1.52 ft.
Return to Normal Depth:	1.18 ft.
Time Gate 1 Activated:	5/25/2019 19:55
Time Gate 2 Activated:	5/25/2019 19:55
Time Gate 1 Returned to Normal:	5/26/2019 1:15
Time Gate 2 Returned to Normal:	5/26/2019 1:15
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	7.75 ft.
Volume Stored:	795,315 Gal.
Unused Storage Volume:	101,597 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	795,315 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:
Rainfall data sourced from BSA rain gauge station at South Buffalo.

RTC Gate Performance



Rainfall Accumulation



May 28, 2019

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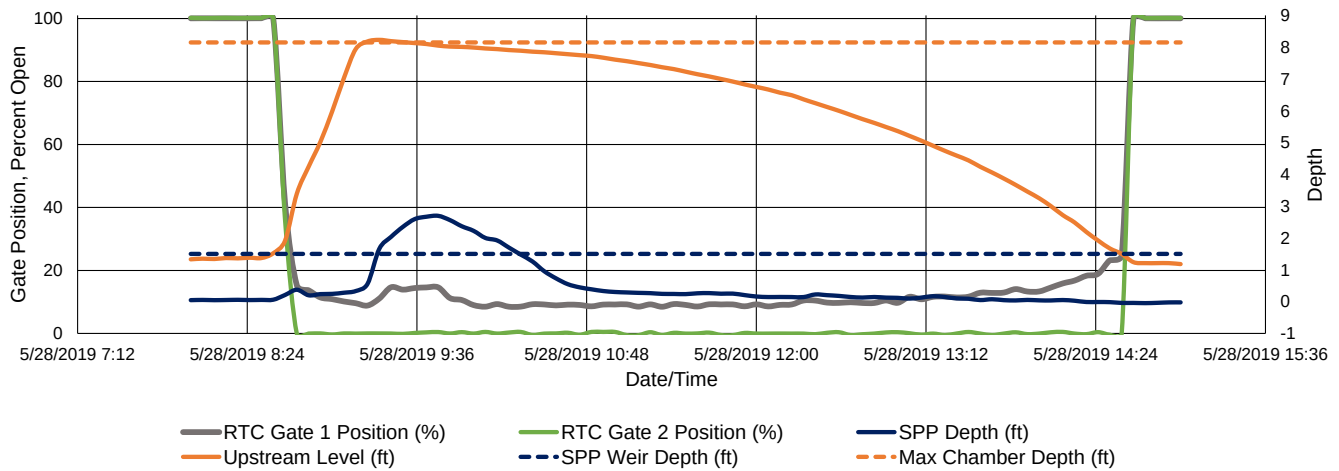
Site:	Bird RTC
Analysis Date:	06/10/2019
Event Start Date/Time:	5/28/2019 8:35
Event End Date/Time:	5/28/2019 14:40

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.48 in.
Storm Event Duration:	3 hrs.
Storm Type:	Less than one year

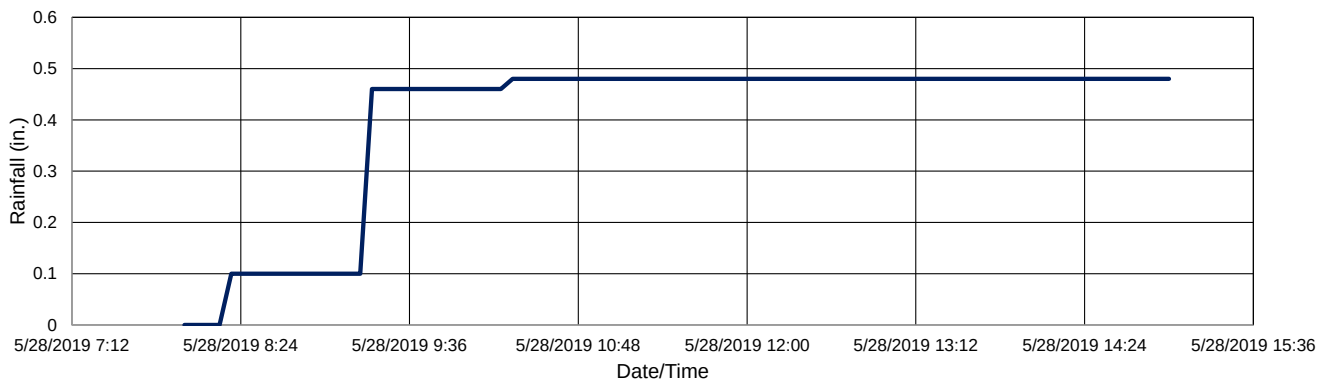
Gate Activation Trigger Depth:	1.52 ft.
Return to Normal Depth:	1.50 ft.
Time Gate 1 Activated:	5/28/2019 8:35
Time Gate 2 Activated:	5/28/2019 8:35
Time Gate 1 Returned to Normal:	5/28/2019 14:40
Time Gate 2 Returned to Normal:	5/28/2019 14:40
Percent Capture	60%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.15 ft.
Volume Stored:	896,912 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	601,107 Gal.
Overflow Volume Prevented:	896,912 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:
Rainfall data sourced from BSA rain gauge station at South Buffalo.

RTC Gate Performance



Rainfall Accumulation



June 2019 Bird Ave. RTC KPI Report

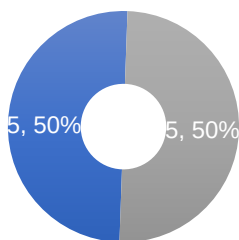
BUFFALO
SEWER AUTHORITY



ARCADIS

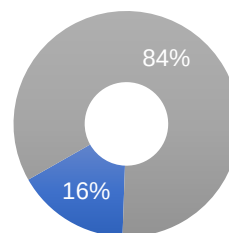
Design & Consultancy
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built assets

Prevented SPP Events



■ Number of Prevented SPP Overflow Events
 ■ Number of Occurred SPP Overflow Events

Prevented SPP Volume



■ Prevented SPP Overflow Volume (Gal.)
 ■ Occurred SPP Overflow Volume (Gal.)*

Number of Prevented SPP Overflow Events	Number of Occurred SPP Overflow Events	Prevented SPP Overflow Volume (Gal.)	Occurred SPP Overflow Volume (Gal.)*
5	5	4,512,340	23,298,497

Event Date	SPP Overflow Volume Prevented	SPP Overflow Volume Occurred	Percent Capture
6/13/2019	88,856	-	100%
6/13/2019	896,725	1,146,855	44%
6/15/2019	895,953	15,508,395	5%
6/20/2019	857,710	6,014	99%
6/20/2019	875,716	818,654	52%
6/24/2019	897,380	5,818,579	13%

*Calculated overflow volume is not accurate as a result of the Bird underflow project and SPP modifications.

*Data were not available prior to June 12, 2019, and therefore events between June 1 and June 11 are not recorded.

On May 31st, there was an outage with the EmNet servers that enable sensor data collection. The EmNet servers were brought back online on June 1st, but communication had to be reset between EmNet and each RTC site.

The Lang, Hazelwood, and Smith St. RTC sites were reset on June 1st, but the Bird RTC site could not be reset until the connection was re-established on June 11th

Site:	Bird RTC
Analysis Date:	07/12/2019
Event Start Date/Time:	6/13/2019 17:25
Event End Date/Time:	6/13/2019 19:35

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

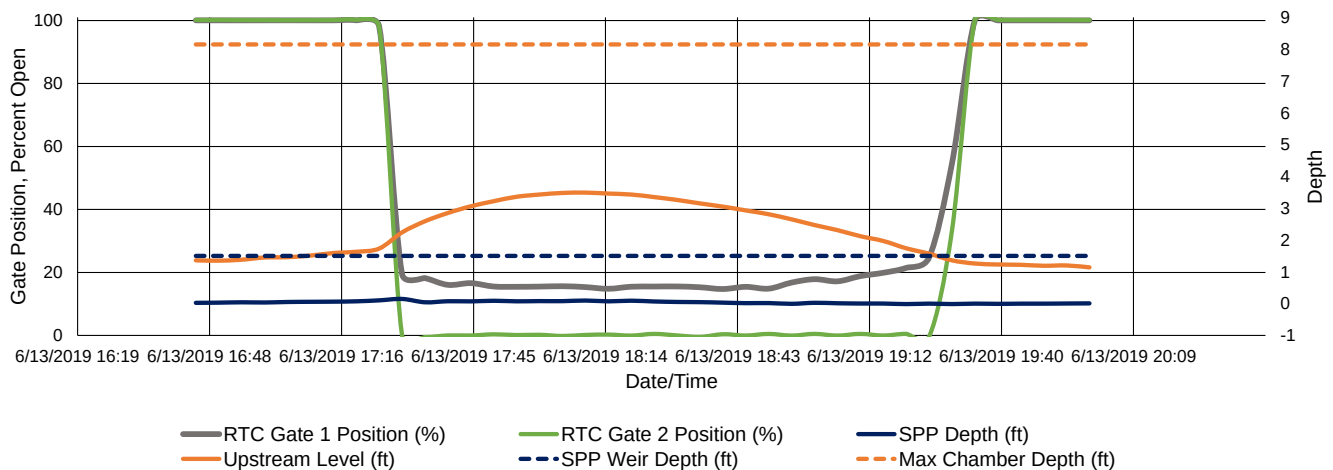
Gate Activation Trigger Depth:	1.73 ft.
Return to Normal Depth:	1.36 ft.
Time Gate 1 Activated:	6/13/2019 17:25
Time Gate 2 Activated:	6/13/2019 17:25
Time Gate 1 Returned to Normal:	6/13/2019 19:35
Time Gate 2 Returned to Normal:	6/13/2019 19:35
Percent Capture	100%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	3.49 ft.
Volume Stored:	88,856 Gal.
Unused Storage Volume:	805,337 Gal.
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	88,856 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:

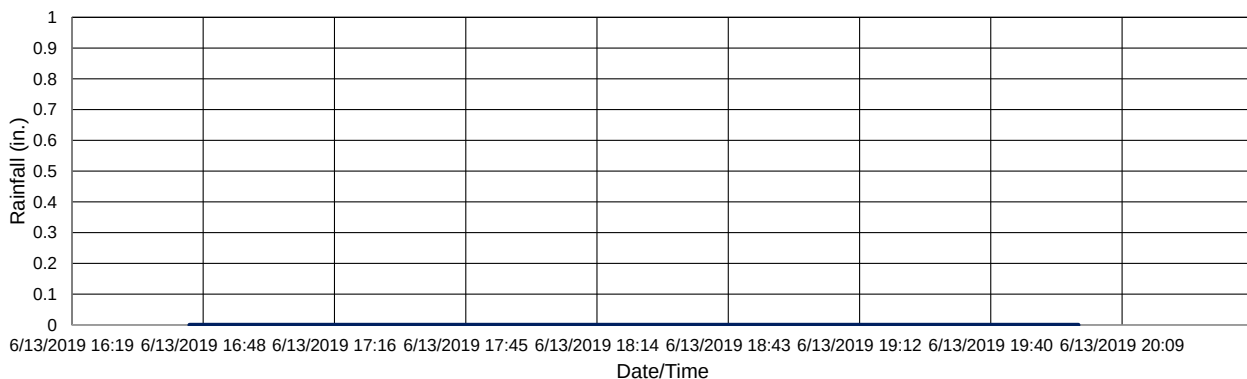
Rainfall data sourced from BSA rain gauge station at South Buffalo.

No rainfall was recorded during the event. However, 0.1-inch of rainfall was recorded earlier in the day which contributed to this event.

RTC Gate Performance



Rainfall Accumulation



Site:	Bird RTC
Analysis Date:	07/12/2019
Event Start Date/Time:	6/13/2019 23:35
Event End Date/Time:	6/14/2019 9:20

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.01 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

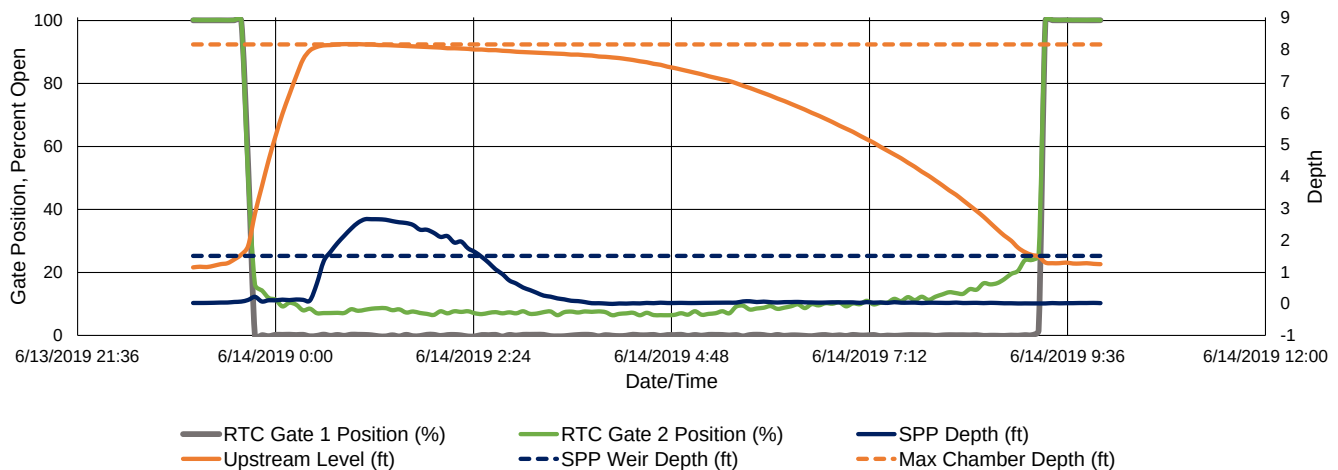
Gate Activation Trigger Depth:	1.54 ft.
Return to Normal Depth:	1.48 ft.
Time Gate 1 Activated:	6/13/2019 23:35
Time Gate 2 Activated:	6/13/2019 23:35
Time Gate 1 Returned to Normal:	6/14/2019 9:20
Time Gate 2 Returned to Normal:	6/14/2019 9:20
Percent Capture	44%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.15 ft.
Volume Stored:	896,725 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	1,146,855 Gal.
Overflow Volume Prevented:	896,725 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0
Could SPP activation have been prevented?	NA

Recommended Operational Changes/Notes:

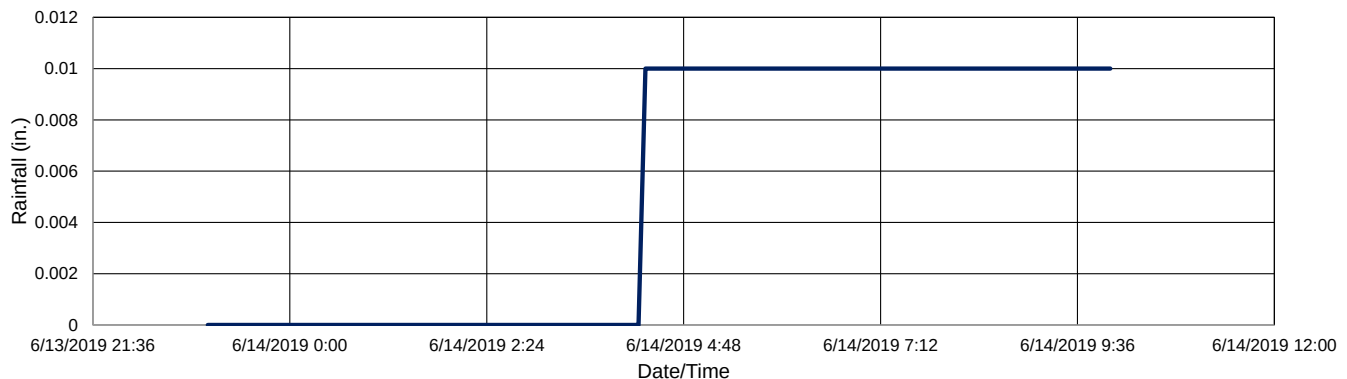
Rainfall data sourced from BSA rain gauge station at South Buffalo.

This event was likely caused due to a localized storm.

RTC Gate Performance



Rainfall Accumulation



June 15, 2019

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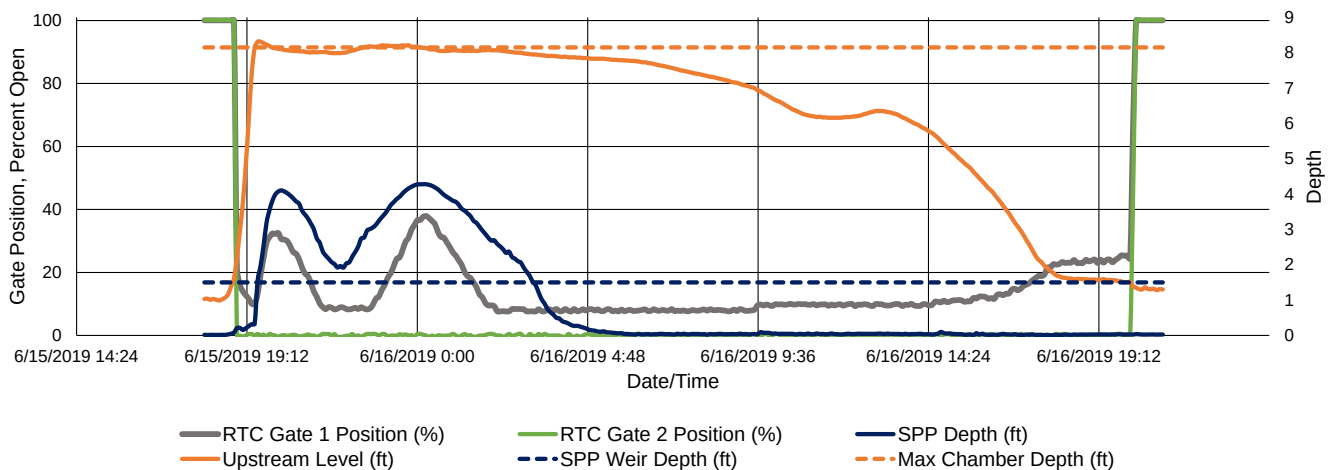
Site:	Bird RTC
Analysis Date:	07/12/2019
Event Start Date/Time:	6/15/2019 18:50
Event End Date/Time:	6/16/2019 20:15

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.43 in.
Storm Event Duration:	1 hr.
Storm Type:	Less than one year

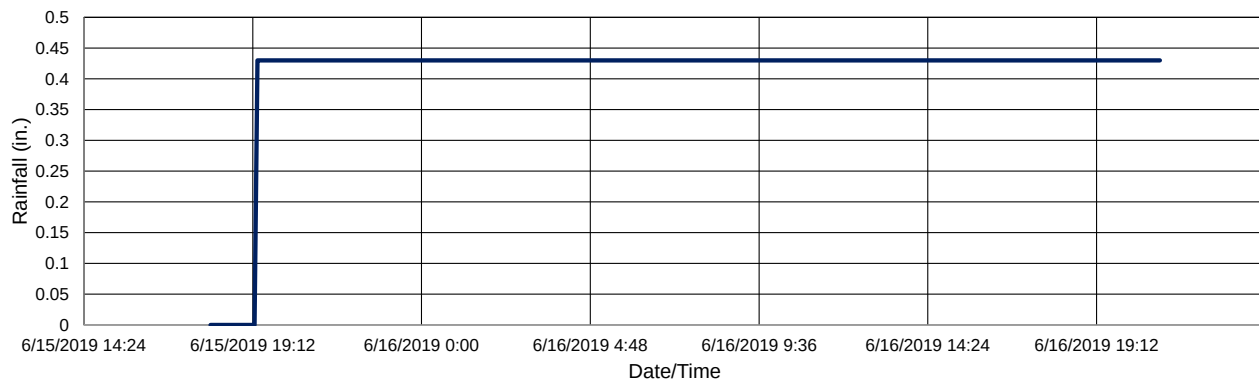
Gate Activation Trigger Depth:	1.61 ft.
Return to Normal Depth:	1.39 ft.
Time Gate 1 Activated:	6/15/2019 18:50
Time Gate 2 Activated:	6/15/2019 18:50
Time Gate 1 Returned to Normal:	6/16/2019 20:15
Time Gate 2 Returned to Normal:	6/16/2019 20:15
Percent Capture	5%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.15 ft.
Volume Stored:	895,953 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	15,508,395 Gal.
Overflow Volume Prevented:	895,953 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:
Rainfall data sourced from BSA rain gauge station at South Buffalo.

RTC Gate Performance



Rainfall Accumulation



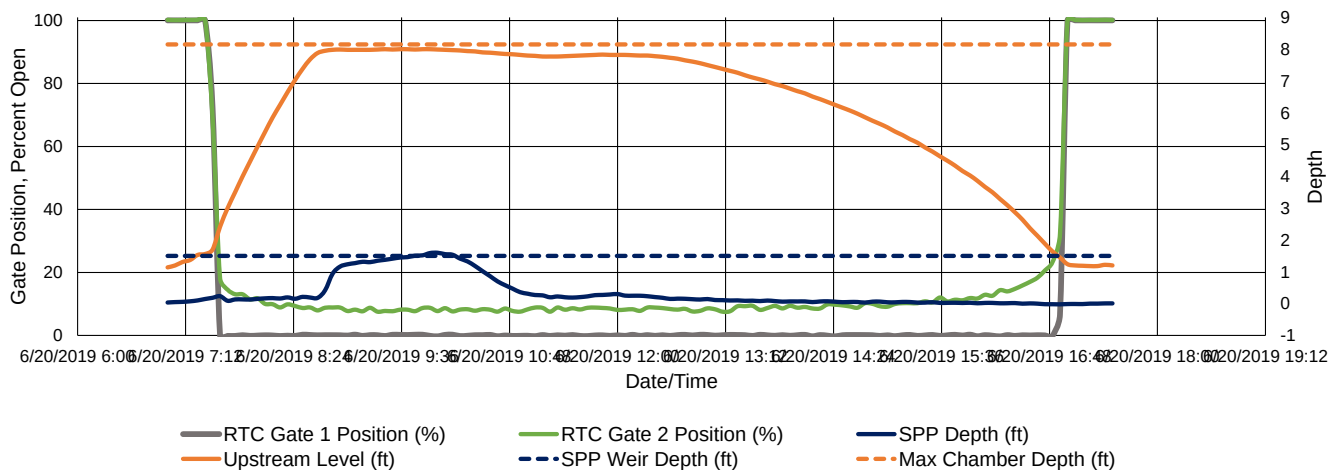
Site:	Bird RTC
Analysis Date:	07/12/2019
Event Start Date/Time:	6/20/2019 7:25
Event End Date/Time:	6/20/2019 17:00

Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.41 in.
Storm Event Duration:	2 hrs.
Storm Type:	Less than one year

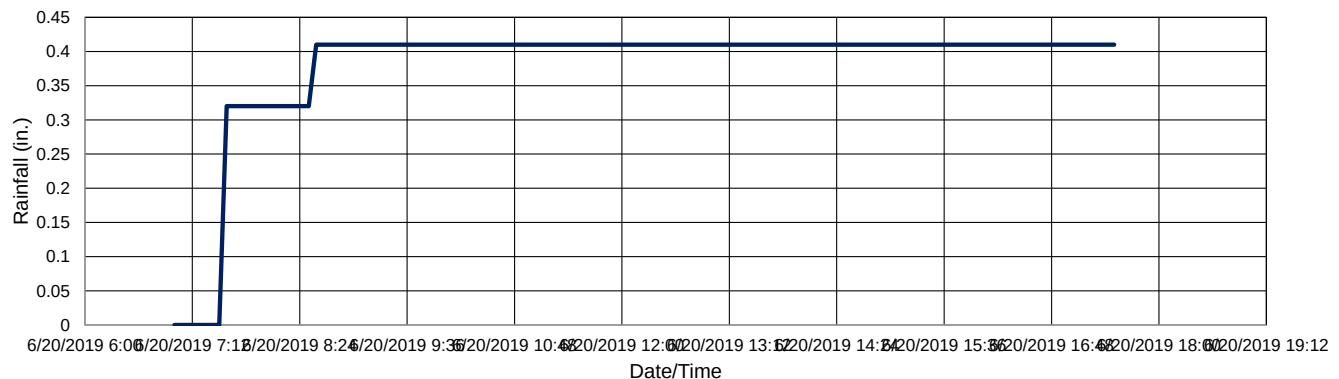
Gate Activation Trigger Depth:	1.56 ft.
Return to Normal Depth:	1.45 ft.
Time Gate 1 Activated:	6/20/2019 7:25
Time Gate 2 Activated:	6/20/2019 7:25
Time Gate 1 Returned to Normal:	6/20/2019 17:00
Time Gate 2 Returned to Normal:	6/20/2019 17:00
Percent Capture	99%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.00 ft.
Volume Stored:	857,710 Gal.
Unused Storage Volume:	38,814 Gal.
Overflow Volume:	6,014 Gal.
Overflow Volume Prevented:	857,710 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	6,014 Gal.
Could SPP activation have been prevented?	Yes

Recommended Operational Changes/Notes:
Rainfall data sourced from BSA rain gauge station at South Buffalo.

RTC Gate Performance



Rainfall Accumulation



Site:	Bird RTC
Analysis Date:	07/12/2019
Event Start Date/Time:	6/20/2019 22:50
Event End Date/Time:	6/21/2019 7:05

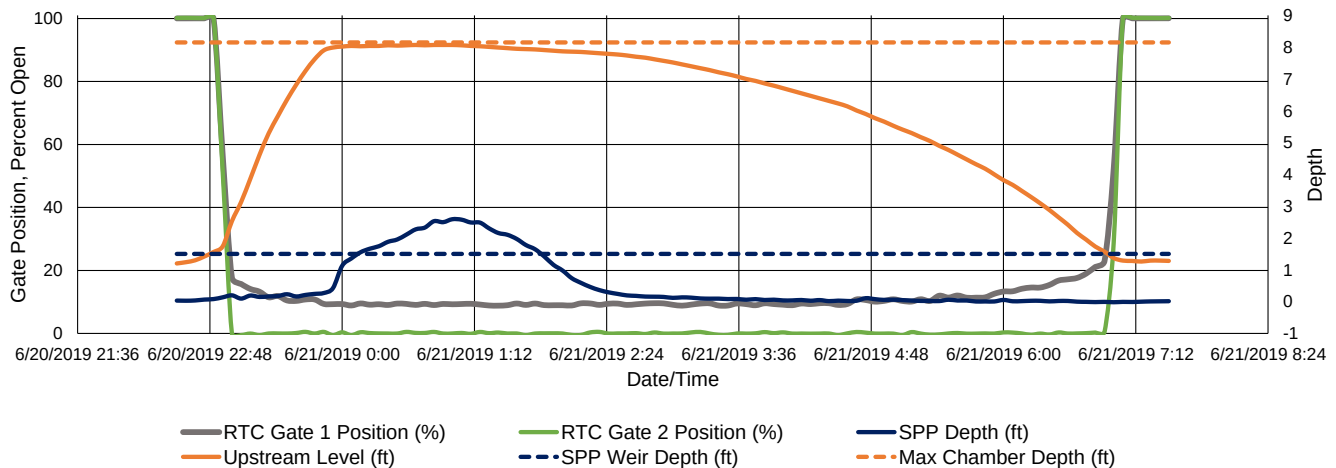
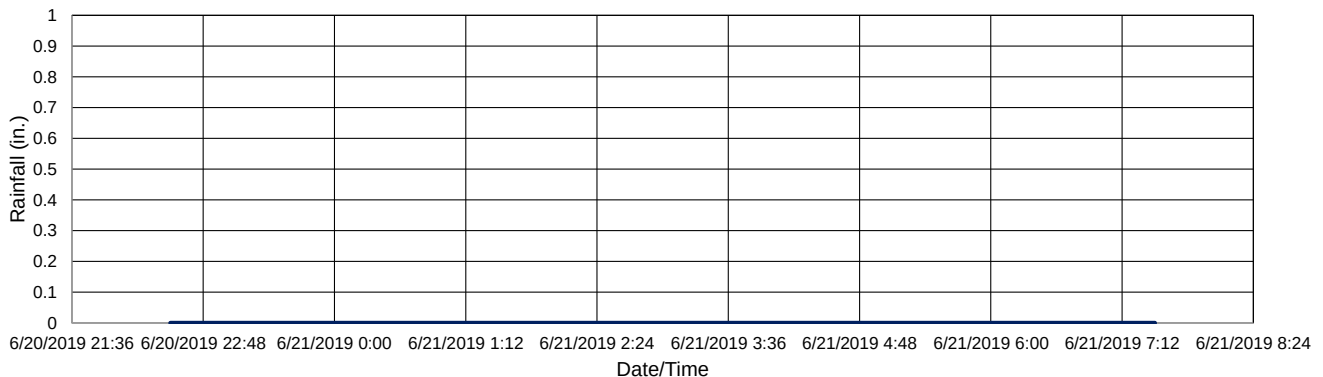
Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	NA
Storm Event Duration:	NA
Storm Type:	NA

Gate Activation Trigger Depth:	1.56 ft.
Return to Normal Depth:	1.37 ft.
Time Gate 1 Activated:	6/20/2019 22:50
Time Gate 2 Activated:	6/20/2019 22:50
Time Gate 1 Returned to Normal:	6/21/2019 7:05
Time Gate 2 Returned to Normal:	6/21/2019 7:05
Percent Capture	52%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.07 ft.
Volume Stored:	875,716 Gal.
Unused Storage Volume:	20,807 Gal.
Overflow Volume:	818,654 Gal.
Overflow Volume Prevented:	875,716 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	818,654 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:

Rainfall data sourced from BSA rain gauge station at South Buffalo.

No rainfall recorded at South Buffalo rain gauge during this storm event. This event was likely caused by a localized storm.

RTC Gate Performance**Rainfall Accumulation**

Site:	Bird RTC
Analysis Date:	07/12/2019
Event Start Date/Time:	6/24/2019 22:40
Event End Date/Time:	6/25/2019 12:20

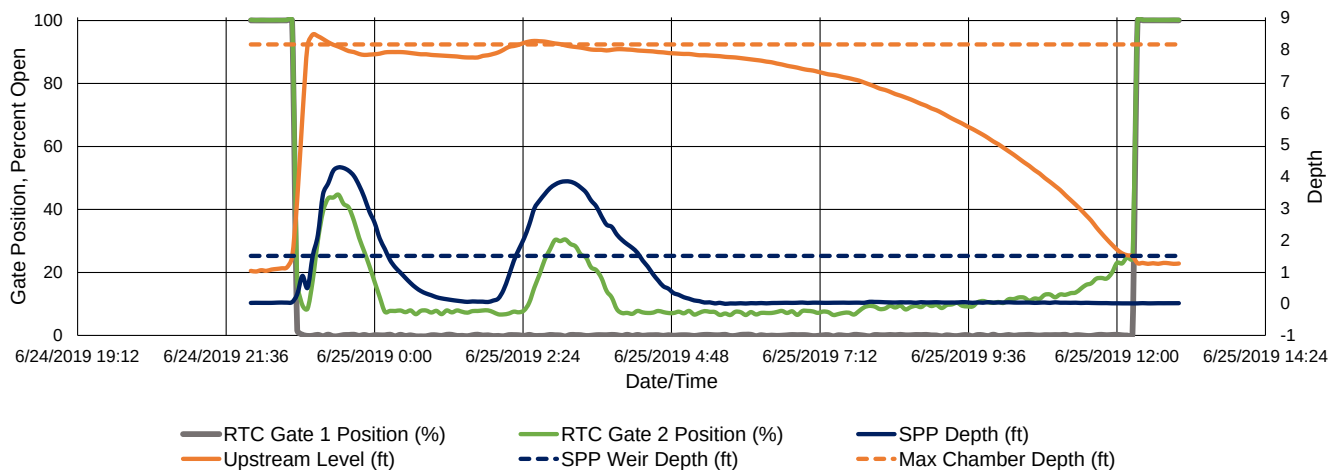
Analyst Name, Organization:	Tanmay Bhatt, Arcadis
Total Rainfall Accumulation:	0.4 in.
Storm Event Duration:	See notes section
Storm Type:	Less than one year

Gate Activation Trigger Depth:	1.46 ft.
Return to Normal Depth:	1.49 ft.
Time Gate 1 Activated:	6/24/2019 22:40
Time Gate 2 Activated:	6/24/2019 22:40
Time Gate 1 Returned to Normal:	6/25/2019 12:20
Time Gate 2 Returned to Normal:	6/25/2019 12:20
Percent Capture	13%
Depth of Weir	8.15 ft.
Maximum Depth Reached:	8.15 ft.
Volume Stored:	897,380 Gal.
Unused Storage Volume:	0 Gal.
Overflow Volume:	5,818,579 Gal.
Overflow Volume Prevented:	897,380 Gal.
SPP Activation Prevented:	No
If No, what is the overflow volume when storage was available?	0 Gal.
Could SPP activation have been prevented?	No

Recommended Operational Changes/Notes:

Rainfall data sourced from BSA rain gauge station at South Buffalo.

No rainfall recorded at South Buffalo rain gauge during this storm event. This event was likely caused by a localized storm.

RTC Gate Performance**Rainfall Accumulation**